

RP-223458

3GPP TSG RAN Meeting #98-e

Electronic Meeting, December 12-16, 2022

Source: ZTE

Title: Moderator's summary for discussion [98e-18-R18-NCR]

Agenda Item: 9.3.1.6

Document for: Discussion and Decision

1 Introduction

In RAN#97-e, the WI on NR network-controlled repeaters has been approved in [1]. However, given that different views were provided by companies during the discussion in RAN#97-e, the following two notes are pending to be checked in this meeting.

- 4.1 Objective of SI or Core part WI or Testing part WI
Note: Power control aspect will be checked in RAN#98e.
- 4.2 Objective of Performance part WI
Note-2: The demodulation requirement can be checked in RAN#98e.

In this meeting, contributions from individual companies have been submitted to address these pending aspects of this topic in [2][3][4][5][6][7][8][9][10][11].

2 Initial round discussion on the pending scope of Rel-18 NCR WI

2.1 Power control as side control information in Rel-18

According to the inputs in this meeting [3][4][5][6][7][8][9][10][11], it seems that majority prefer to preclude power control information as side control information in Rel-18 at least due to the limited TUs for this WI. Regarding the technical aspects including benefits and how to enable this feature, given the controversial views in [5][6][7][9][11], it can be checked in future release and no further changes on the existing TR 38.867 is needed.

Then, as the moderator, it is proposed that power control as side control information is not supported in Rel-18 NCR WI with the following change in [2].

Specify the signalling and behavior of the following side control information for controlling the NCR-Fwd [RAN1, RAN2]

- *Beamforming*
- *UL-DL TDD operation*
- *ON-OFF information*

Note: Power control aspect will be checked in RAN#98e.

To collect views on this aspect, companies are encouraged to provide views on Question 2-1.

Feedback Form 1: Q2-1: Any views on the proposed update on power control for Rel-18 NCR WID above?

1 – Samsung Electronics Co. We support to remove "note" for power control aspect in SID.
2 – Ericsson LM We support the proposed update
3 – NEC Corporation We prefer to include power control as one kind of side control information, due to the good progresses made on other aspects.
4 – OPPO We support the WID update proposed by moderator.
5 – CATT We support the proposal by the moderator.
6 – Apple France We tend to share similar view as NEC, as also discussed in our contribution. However, if majority view is not to consider this aspect in Rel-18, we can accept it
7 – Huawei Tech.(UK) Co.. Ltd It would be good to include NCR power control in the WI. It is used at least for supporting adaptive backhaul beam, which has been agreed in RAN1. Without network control of the NCR-Fwd amplifying gain, a fixed amplifying gain is expected to be adopted, and the NCR cannot work with adaptive backhaul beam.

For example, gNB transmits signals for NCR forwarding in two beams, in two consecutive time slots, and the larger RSRP is in the second beam/slot. If the target amplifying gain is set according to the first slot (lower) RSRP, the larger power received by NCR from gNB may saturate the NCR-Fwd for downlink in the second (higher RSRP) slot. The distorted signal not only makes the forwarding useless, but also introduces interference for the network. On the other hand, if the target amplifying gain is set according to the lower RSRP of the second slot, the lower power received by NCR from gNB beam in the first slot may lead to a coverage hole.

The WI claims already a good 85% completion in RAN1 (so could already write its specs), and has 1 TU allocated remaining. This is enough time for the remaining issues including power control.

8 – Pivotal Commware

We support moderator proposal to remove the note referring to Power Control.

9 – AT&T GNS Belgium SPRL

We do not support the proposal. Given good progress on the WI, there is adequate time to address some limited power control aspects as part of side control information. We see benefits in specifying semi-static (e.g., via MAC/RRC) power control to support more efficient interference management and improved energy efficiency at the NCR. Moreover, we do not see the need for dynamic power control.

Our proposal is to replace the NOTE with a bullet under side control information to include “semi-static power control” allowing companies to further investigate the potential benefits, necessity, and details.

10 – Qualcomm Incorporated

We do not support removing power control. While it could be difficult to add a dynamic version of power control in the available Rel-18 time, adding semi-static power control is quite feasible and beneficial.

It could be further discussed if the allowed update rate of the semi-static power control needs to be limited in order to ease repeater implementation. But relying on proprietary messages to control Fwd link power setting would seem inappropriate given the high likelihood of inter-vendor gNB-NCR deployment scenarios.

11 – Nokia Italy

We would be generally OK with further study on semi-static power control, but do not believe there is enough time to study dynamic power control.

12 – NTT DOCOMO INC.

We support the proposal.

13 – ETRI

RAN1 agreed to support simultaneous UL transmission of C-link and backhaul link by NCR capability.

Since C-link and backhaul link may share the same PA per NCR implementation, we still believe that a simple power control rule (e.g. semi-static configuration, or prioritization, etc.) to handle the simultaneous UL transmission cases would be required, at least.

We think that forcing to have TDMed C-link and backhaul link for all types of NCRs is not a good solution, especially when the NCR has multiple UEs to serve.

We may be OK to remove the note from the WID, which means that there would be no specific time slot for NCR power control for non-overlapped C-link and backhaul link cases.

However, we hope this would not be a logic to block any future RAN1 discussion to enable simultaneous UL transmission of C-link and backhaul link, which has clear benefits over the TDMed mode.

14 – Spreadtrum Communications

We are fine with the proposal.

15 – KDDI Corporation

Considering the remaining TU, we basically agree with the moderator’s proposal. If there are many companies that want to include power control, we are open to discuss only semi-static power control as a compromise.

16 – ZTE Corporation

We are fine to remove the power control since no consensus on the target channel/mechanism for power control has been achieved. although the progress seems good in RAN1, there are still remaining details that need to be handled including detailed DCI design, and RRC/MAC CE parameter list. It’s risky to extend the scope now.

17 – Rakuten Mobile

We support the proposal.

18 – China Mobile Com. Corporation

Though we are supportive of the power control feature, considering the limited TU and the majority view, it is acceptable to finish the WI on time with the note removed.

19 – China Telecommunication Corp.

We support the proposal

20 – Intel China Ltd.

We support the proposal.

21 – Verizon UK Ltd

We support the proposal

22 – Motorola Mobility France S.A.S

We do not agree with the proposal, and support including power control in the objectives. With respect to technical arguments for or against power control, some evaluation results in TR 38.867 show benefit of power control, while the TR makes no technical argument against it. The TR recommendation does not preclude power control. A majority of companies showed interest in the topic in RAN#97-e, but the main

concern was time. Therefore it was concluded in RAN#97-e to “check again the situation in RAN#98e depending on the progress of the higher priority side control information.” [RP-222670]

Given 85% progress in RAN1 in two meetings (one of which an e-meeting), there is ample time to finish the current side control information in the remaining time and attend to power control at least as second priority.

23 – vivo Mobile Communication Co.

We support power control considering the good progress so far. Higher layer signaling for power control is acceptable for us, which requires limited spec. effort.

24 – Telstra Limited

We do not support the moderators proposal. We agree with sentiments from AT&T, Qualcom, Huawei, etc that there appears to be adequate TU to complete some limited power control aspects, eg semi-static.

25 – Fujitsu Limited

In our understanding, the side control information of power control is beneficial, e.g., to save power and reduce interference. However, considering the progress of the WI, we are OK with the proposal.

Besides, we’d like to echo the comment from ETRI. Although the side control information of power control may not be supported in this release, the power allocation between the C link and BH link should be discussed. For example, in the case that C link and BH link share the same PA and can simultaneously transmit, the priority rule should be discussed, i.e., when the maximum power of the links from the NCR to the gNB is reached, the NCR should prioritize the C link transmission or the BH link forwarding.

26 – LG Electronics France

We are ok with the moderator’s proposal

27 – Panasonic Holdings Corporation

As forward link beam management was agreed based on OAM, we are also ok to handle power control of forward link as OAM. For backhaul link, the relation with NCR-MT Tx and backhaul link need some more discussion including power control but it may not be required to be explicit mention in the WID. Therefore, we are ok to remove just generic description of power control.

28 – Deutsche Telekom AG

We agree with Telstra and AT&T NOT adding this !

We also refer to our operator contribution in 915 which clearly indicates that we are already overloaded and quality suffers.

29 – Sony Group Corporation

Given that only one meeting is left in this WI, we support the proposal, i.e., removing the note about the power control aspect from Rel-18 NCR.

30 – Philips International B.V.

Given the apparent divergence of views on power control, we tend to support the moderator’s proposed update. This is on the understanding that consideration of power control in a future release is not precluded. However, we are not against a limited study on, e.g., semi-static power control, as suggested by some companies.

2.2 Demodulation requirement for C-link of NCR-MT

As proposed in [8], according to the overall progress from RAN1 and RAN2, it seems reasonable to define the demod requirement impacts from RAN4 perspective to check the performance of C-link for NCR-MT in order to ensure the performance for controlling.

Then, as the moderator, the following changes are proposed in [2].

4.2 Objective of Performance part WI

NOTE: Leave empty if the WI proposal does not contain a RAN performance part.

Study and define the RF conformance testing requirements and EMC requirements of NCR if necessary [RAN4]

Study and define the RRM performance requirements of NCR-MT if necessary [RAN4]

Define the demodulation performance requirements for C-link of NCR-MT if necessary [RAN4]

Note-1: The existing requirements defined in RAN4 can be reused if applicable.

~~***Note-2: The demodulation requirement can be checked in RAN#98e.***~~

To collect the views on this aspect, companies are encouraged to provide views on Question 2-2.

Feedback Form 2: Q2-2: Any views on the proposed update on the demodulation requirement for Rel 18 NCR WID above?

1 – Samsung Electronics Co.

We are ok to modify

2 – NEC Corporation

We agree with this updates.

3 – OPPO

We are fine with the proposed update.

<p>4 – CATT</p> <p>We are ok with the proposal.</p>
<p>5 – Qualcomm Incorporated</p> <p>We would be ok with the update with the understanding that mostly existing requirements are going to be reused, i.e. Note-1 applies to demod as well.</p>
<p>6 – Nokia Italy</p> <p>We support the proposed update from the moderator.</p>
<p>7 – Spreadtrum Communications</p> <p>We are ok with the updated proposal</p>
<p>8 – ZTE Corporation</p> <p>We are fine with the proposal. Regarding the details, it can be handled at the WG level including the reuse of existing requirements.</p>
<p>9 – Intel China Ltd.</p> <p>We are fine with the proposal.</p> <p>We support defining a limited set of demodulation requirements for NCR-MT including PDSCH, PDCCH and the exact set of requirements can be discussed in RAN4. The word ‘if necessary’ is unclear and prefer to remove it</p>
<p>10 – KT Corp.</p> <p>Support proposed update</p>
<p>11 – Huawei Tech.(UK) Co.. Ltd</p> <p>The demodulation performance requirements work for NCR-MT is not needed and we propose to remove it from the notes. Firstly, NCR-MT is not an independent device rather than a control unit for NCR-Fwd. Performance of NCR-Fwd is more critical for the system performance than NCR-MT. RAN4 work should focus on ensuring and verify the performance of NCR-Fwd. C-link performance is like OAM link and can be left to network planning for deployment. Secondly RAN4 workload is high and the TU resource is quite limited.</p> <p><i>4.2 Objective of Performance part WI</i></p> <p><i>NOTE: Leave empty if the WI proposal does not contain a RAN performance part.</i></p> <p><i>Study and define the RF conformance testing requirements and EMC requirements of NCR if necessary [RAN4]</i></p> <p><i>Study and define the RRM performance requirements of NCR-MT if necessary [RAN4]</i></p> <p><i>Define the demodulation performance requirements for C-link of NCR-MT if necessary [RAN4]</i></p> <p><i>Note-1: The existing requirements defined in RAN4 can be reused if applicable.</i></p> <p><i>Note-2: The demodulation requirement can be checked in RAN#98e.</i></p>

<p>12 – Panasonic Holdings Corporation</p> <p>We support the update.</p>
<p>13 – Panasonic Holdings Corporation</p> <p>We support to close the SID and start WI but XR Awareness can be studied in WI. RAN4 involvement depends on RRM aspect is included or not.</p>
<p>14 – Panasonic Holdings Corporation</p> <p>Sorry above our reply on SID on XR was my mistake.</p>
<p>15 – Ericsson France S.A.S</p> <p>We tend to share the view of Huawei that, since the repeater is a network node deployed by the operator demodulation requirements are not essential and RAN4 workload is high. As a compromise proposal, one way forward could be to clarify that any demodulation requirements for the NCR shall be a subset of UE demodulation requirements. Then there is no need to discuss simulation assumptions, simulations etc. and the work would be copying during spec drafting. Of course even this adds workload to the demod delegates.</p>
<p>16 – Sony Group Corporation</p> <p>We support the proposal update.</p>

2.3 Any other changes in RP-222873?

In addition, other updates including unique number, corresponding changes on the impacted TS based on the WG progress, are also provided in [2].

To collect the views on these changes, companies are encouraged to provide views on Question 2-3.

Feedback Form 3: Q2-3: Any views on the other proposed changes in the revised WID RP-222873?

<p>1 – AT&T GNS Belgium SPRL</p> <p>We support the other proposed changes. In addition to these updates proposed in RP-222873, we suggest the following:</p> <ul style="list-style-type: none">- Change “New WID” to “Revised WID” in the title.- Remove brackets around Rel-18 for the Potential Target Release- Section 2.2: Remove RAN2, RAN3 as only the lead WG is to be listed, i.e., RAN1.- Section 5: Remove curly bracket guidance text in the table headers.
<p>2 – Nokia Italy</p> <p>The following RAN4 specifications should be added to clause 5 of the WID.</p>

- 38.106 TS ‘NR repeater radio transmission and reception’
- 38.114 TS ‘NR; Repeaters ElectroMagnetic Compatibility (EMC)’.

2.4 Moderator’s observations

2.4.1 Observation for power control as side control information in Rel-18

As observed from the feedback received, it seems that majority is fine to preclude the power control in Rel-18.

1. Regarding the comments on power allocation for C-link and backhaul proposed by [Fujitsu, ETRI]:
From moderator’s view, multiplexing of the UL of C-link and backhaul link in either TDM or simultaneous transmission (NCR capability) is supported. Then, in this case, if the proper power allocation cannot be handled by implementation, TDM based transmission is still available.
2. Regarding the comments to support the power control including limiting the scope to semi-static approach proposed by [AT&T, QC, Nokia, Motorola, vivo, Telstra]:
From moderator’s perspective, the controversial part of power control is more about whether there is sufficient benefit for semi-static approach and which links/channels are applicable (e.g., DL of access link or UL of backhaul link). Since there is no change on the position from companies, it’s not realistic to solve the controversial part in one quarter and support this feature in Rel-18. Moreover, it should be noticed that even for the semi-static approach, no consensus can be achieved as discussed in the SI phase.

There is concern on adding scope based on the limited TU. Based on the observation, the moderator’s proposal is still kept and provided in Section 3.1

2.4.2 Observation for Demodulation requirement for C-link of NCR-MT

As observed from the feedback received, it seems that the clear majority prefer to define the demodulation requirement for C-link. Regarding the detailed comments:

1. Remove “if necessary” as proposed by [Intel]: The change is incorporated in the updated proposal in Section 3.2.
2. Clarify that “Any demodulation requirements for the NCR should be a subset of UE demodulation requirements” by [Ericsson]:
From moderator’s perspective, with the understanding that “Note-1: The existing requirements defined in RAN4 can be reused if applicable.” is also applied for demodulation part, which is also highlighted by [Qualcomm]. This implies that the baseline is to reuse the existing requirements unless it is not applicable. RAN4 can further discuss the details about the applicability.
3. Regarding [Huawei]’s proposal on not defining the demodulation requirement, from moderator’s perspective, compared to the legacy repeater, successful delivering of side control information via C-link is critical to harvest the benefits. Then, it’s reasonable to introduce it. For the workload part, based on the Note-1, proper management of work in WG group can be expected. The allocated RAN4 TU should be sufficient under the constraint of Note-1.

Based on the observation, the moderator's proposal is updated in Section 3.2.

2.4.3 Observation for other changes

As observed from the feedback received, the proposed changes from [AT&T, Nokia] are reasonable and all of them are incorporated in the updated version.

3 Intermediate round discussion on the pending scope of Rel-18 NCR WI

3.1 Power control as side control information in Rel-18

According to the observation in the initial round, there is no consensus to support power control as side control information within the limited TU in Rel-18. If there is strong interest, it can be possibly considered in the future release. Therefore, the original version of the proposal on the revised objective is kept as below (i.e. remove the note about power control aspect from the WID).

Specify the signalling and behavior of the following side control information for controlling the NCR-Fwd [RAN1, RAN2]

- Beamforming
- UL-DL TDD operation
- ON-OFF information

Note: Power control aspect will be checked in RAN#98e.

Please refrain from repeating the same comments and only raise any strong concern in this round.

Feedback Form 4: Question 3-1: Any strong concern on NOT supporting power control as side control information in Rel-18?

1 – AT&T GNS Belgium SPRL

We have a strong concern that half of the comments in the initial round supported having some form of power control as part of side control information given the potential benefits of interference management, energy efficiency, etc. With this in mind, and in the spirit of compromise, we propose a very limited scope to capture this in the WID objectives as follows:

Specify the signalling and behavior of the following side control information for controlling the NCR-Fwd [RAN1, RAN2]

- Beamforming
- UL-DL TDD operation
- ON-OFF information

- Define semi-static power control parameters (e.g., via MAC CE/RRC)

Note: Power control aspect will be checked in RAN#98e.

2 – FirstNet

We support AT&T's recommendation.

3 – vivo Mobile Communication Co.

We support AT&T's recommendation.

4 – Qualcomm Incorporated

We have strong concern on not supporting power control. We understand that companies in the past had concerns regarding dynamic power control, but that is no longer being proposed for Rel-18.

We assume that almost all companies would agree that some provisioning of repeater power setting would be supported in the network. But perhaps some companies may prefer to use proprietary messages for this. We believe that allowing the gNB to convey power setting to the repeater is the best approach, and that the communication between gNB and repeater will be most likely be inter-vendor. This necessitates defining standards based messaging for repeater power control.

We support the AT&T proposal.

5 – Telstra Limited

Agree with Qualcomms comments and support AT&T's recommendation

6 – Apple France

As we commented in the initial round, semi-static power control can be supported

7 – Motorola Mobility France S.A.S

The strong concern on NOT supporting power control is that gain/power setting at the repeater should be handled either by a static pre-configuration, which is insufficient and constraining in practice, or by a proprietary signaling, which is not justified because it limits inter-vendor operation as Qualcomm pointed out.

We support AT&T's proposal.

8 – ZTE Corporation.

(As the moderator)

Taking the inputs received so far into account, there is still some strong support to add the scope of supporting semi-static power control as one of the side control information. I would like to check whether there is any strong concern on the proposal suggested by AT&T. i.e.

Specify the signalling and behavior of the following side control information for controlling the NCR-Fwd [RAN1, RAN2]

- Beamforming

- *UL-DL TDD operation*
- *ON-OFF information*
- ***Define semi-static power control parameters (e.g., via MAC CE/RRC)***

Note: Power control aspect will be checked in RAN#98e.

9 – Huawei Tech.(UK) Co.. Ltd

We also support AT&T's revised proposal. As commented in the initial round, we think NCR power control is required given that adaptive beams for backhaul link was agreed in RAN1.

10 – Panasonic Holdings Corporation

We are ok to AT&T proposal but it need to clarify whether DL of access link or UL of backhaul link.

11 – ZTE Corporation

We are negative to support this feature given the tight TU allocation. Meanwhile, from a technical perspective, it's also hard to conclude the discussion for all interested channels in one meeting. A more solid discussion can be conducted in the future release.

12 – Ericsson LM

We have strong concerns for introducing power control at this point and we have presented them in our contribution. So far none of those concerns have been addressed by power control proponents.

First of all, there is no **single** power control proposal, but several. What variant of power control is introduced according to the proposal, UL, DL or both? Second, is it specified per access link beam or not? Third, what measurements will power control be based on considering DL power control is not specified in legacy operation? RAN 1 does not have time to first agree on those questions and then specify the functionality.

Regarding Huawei's comment that DL power control is necessary because of the adaptive backhaul link. We agreed to the adaptive backhaul link as an optional functionality for the sake of compromise although we pointed out these exact problems. One should not right a wrong with another wrong.

Regarding Qualcomm's comment about proprietary vs standardized signaling, considering the made agreement that beam arrangement is provided via OAM, any inter-vendor solution for other properties will be of limited use.

The WID is clear that the NCR is transparent from the UE perspective. By introducing power control, that may no longer be the case. For example, DL PC will have impact on beam reporting, measurements etc. in a way that may violate the UE transparency requirement. UL power control may jeopardize UE power control. Additionally, reciprocity assumptions will be affected if single sided (UL or DL) power control is implemented.

Related to proposing semi-static power control, we don't see how that will work with UE-specific dynamic scheduling, since reasonably different UEs will require different power control settings. And as pointed out earlier, without this dynamic part, beam reciprocity will be lost.

13 – Samsung Electronics Co.

We are not accepting the updated proposal from moderators. As mentioned this meeting and also previous meeting, even in SI period and also last two meetings in WI, we could not reach the conclusion for supporting power control. Also, we found majority views on not supporting power control in the first round. Along with the technical aspect mentioned by Ericsson and ZTE, we already observed that there are many aspects should be touch with semi-static power control such as forward-link, c-link, and backhaul-link and different companies have different understanding which link is involved in semi-static power control. As Pivotal contribution mentioned, OAM based power control and also implementation based adjustment can solve power setting and interference control in the network.

14 – CATT

This issue have been discussed many times in the WG level and the conclusion there is no consensus to support power control.. If we reopen the discussion now, most likely the result will be the same.

3.2 Demodulation requirement for C-link of NCR-MT

According to the initial round discussion, the proposal is updated as below:

4.2 Objective of Performance part WI

NOTE: Leave empty if the WI proposal does not contain a RAN performance part.

Study and define the RF conformance testing requirements and EMC requirements of NCR if necessary [RAN4]

Study and define the RRM performance requirements of NCR-MT if necessary [RAN4]

Define the demodulation performance requirements for C-link of NCR-MT if necessary-[RAN4]

Note-1: The existing requirements defined in RAN4 can be reused if applicable.

Note-2: The demodulation requirement can be checked in RAN#98e.

With the understanding that Note-1 also applies to the demodulation requirements, could we agree on the above updates? If there is still strong concern, please provide more details e.g. why the workload is still too much even with Note-1 under the current TU allocation.

Feedback Form 5: Any strong concern on the proposed update on demodulation requirements?

1 – Ericsson France S.A.S

We are concerned that RAN4 is provided with sufficient guidance to ensure that the overall demod workload remains manageable. Our understanding is that there is not any need to create new requirements / simulations etc., but rather to select a subset of the UE demodulation requirements for IAB-MT. This goes a bit further than "can be reused" (which implies that RAN4 could equally choose to add new requirements)

to clarifying that for demod, the existing UE requirements are expected to be re-used (i.e. a subset, no new simulations etc). To clarify this, we propose to replace note 2 with the following:

Note 2: The demodulation requirements for NCR-MT are expected to be a subset of the UE demodulation requirements in 38.101-4.

2 – ZTE Corporation.

(As the moderator)

As the moderator, whether to add the Note 2 suggested by Ericsson does not make much difference. Please raise any concern on the proposal suggested by Ericsson. i.e.

4.2 Objective of Performance part WI

NOTE: Leave empty if the WI proposal does not contain a RAN performance part.

Study and define the RF conformance testing requirements and EMC requirements of NCR if necessary [RAN4]

Study and define the RRM performance requirements of NCR-MT if necessary [RAN4]

Define the demodulation performance requirements for C-link of NCR-MT [RAN4]

Note-1: The existing requirements defined in RAN4 can be reused if applicable.

~~Note-2: The demodulation requirement can be checked in RAN#98e.~~

Note-2: The demodulation requirements for NCR-MT are expected to be a subset of the UE demodulation requirements in 38.101-4.

3 – Huawei Tech.(UK) Co.. Ltd

We are still not convinced by companies why the performance requirement for NCR-MT is so critical. But we tend to agree with Ericsson. On top of Ericsson proposal, we can compromise to define a limited number of PDSCH requirements for NCR-MT. Because during PDSCH demodulation, the PDCCH should be monitored and decoded first, all the necessary channel performance can be verified.

4.2 Objective of Performance part WI

NOTE: Leave empty if the WI proposal does not contain a RAN performance part.

Study and define the RF conformance testing requirements and EMC requirements of NCR if necessary [RAN4]

Study and define the RRM performance requirements of NCR-MT if necessary [RAN4]

Define the limited number of PDSCH demodulation performance requirements for C-link of NCR-MT if necessary [RAN4]

Note-1: The existing requirements defined in RAN4 can be reused if applicable.

~~Note-2: The demodulation requirement can be checked in RAN#98e.~~

4 – ZTE Corporation

We can live with Ericsson's proposal. Regarding the updates from Huawei, it's not clear about the intention of the "limited number of PDSCH". Moreover, based on the RAN1's agreement, the PDSCH will also be used to carry the side control information, and it's not reasonable to restrict it.

3.3 Other updates on the WID

Please provide any views on the updated proposal based on the initial round discussion. The updated version is uploaded in [https://www.3gpp.org/ftp/tsg_ran/TSG_RAN/TSGR_98e/Inbox/Drafts/\[98e-18-R18-NCR\]](https://www.3gpp.org/ftp/tsg_ran/TSG_RAN/TSGR_98e/Inbox/Drafts/[98e-18-R18-NCR])

Feedback Form 6: Any other views on the updated WID?

1 – Qualcomm Incorporated

Unsure if this Form was supposed to be locked.

Nevertheless, one comment for the final round:

We are not ok with taking the minority view on power control as conclusion. Either a new form should be initiated or the discussion needs to be taken up in the next GTW session. We don't agree with the proposed conclusion.

2 – ZTE Corporation.

(As the moderator)

First, this form was supposed to be locked but left unlocked after the intermediate round. Sorry about the confusion.

As the moderator, I would like to clarify that the proposed conclusion on power control got majority's support/acceptance as shown below.

Support/acceptable (19): Samsung, Ericsson, OPPO, CATT, Apple, Pivotal, NTT DOCOMO, Spreadtrum, KDDI, ZTE, Rakuten, CMCC, China Telecom, Intel, Verizon, LGE, Panasonic, Sony, Philips

Please note that some of the companies are supportive on this technical direction but understand that the remaining time (one RAN1 meeting left with 1TU) is not sufficient to complete the work along with other remaining RAN1 NCR work. Therefore, from the moderator's perspective, the proposed conclusion is based on the majority's view.

4 Extended Round

In the final round, one company expressed the view on disagreeing the proposed conclusion. This extended round of discussion is requested.

Proponents (of adding power control to the scope), please try to address the concerns raised in Sections 2.1 and 3.1. For the companies on the other side, if there are any further concern on supporting power control in Rel-18, please raise your concern in the feedback form below. Please also suggest if there is any compromise you can make.

Feedback Form 7: Further discussion on including power control in the Rel-18 NCR WI scope

1 – FirstNet

We support a limited scope for a semi-static power control objective.

2 – Intel China Ltd.

We still prefer no power control for Rel-18 NCR as suggested by the Moderator.

As commented by several companies in intermediate round, there are actually more than one power control proposals, e.g., DL and/or UL power control, control of power amplifying gain and/or Tx power, which has different impact of legacy operation and requires different effort. In our view, it is difficult to converge and complete the design with tight time budget.

3 – Qualcomm Incorporated

Qualcomm supports power control to be kept in the scope.

In response to the Moderator's suggestion to address concerns raised regarding including power control, would like to add notes as follows.

- Some commenters expressed concerns regarding the lack of time in RAN1. A possible option to address these concerns is to limit the power control feature to a single quarter in RAN1.
- Some comments were about the possibility of dynamic power control. It should be clarified that Rel-18 NCR power control is limited to semi-static only.
- Ericsson commented that it is not known if power control is DL or UL. It can be clarified that it is for both. In case companies prefer to limit to UL only, it could be possible to discuss but the default is that it is both for DL and UL.
- Ericsson further commented that since beam arrangement is provided via OAM, power control could/should be handled the same way. Our response is that there is clearly a difference in that while setting beam arrangement only once at deployment can be seen sufficient, power setting is more variable depending on operating conditions changing throughout the day.
- Ericsson further commented that applying power control would make NCR non-transparent to the UE. That is not the case. Turning a corner or stepping out from behind a building is not making anything non-transparent to the UE, and NCR power control is no different.
- Ericsson further commented that a single sided power control may impact reciprocity. We tend to disagree with that view. For those UEs to whom the link is a mix of direct and Fwd link paths, the existence of repeaters already impact reciprocity, and power control is not making that any different. For those UEs who see a dominant Fwd link, there is no impact.
- Ericsson questioned whether the power control is per access link beam or not. Our understanding is that it is, at least in FR2.
- Lastly, Ericsson commented that power control should be dynamic to achieve different settings for different scheduled UEs. Our response is that the UE-to-UE variation can be primarily addressed by power control at the end points, i.e. at the UE (for UL) and at the gNB (for the DL). That doesn't

mean that semi-static power control cannot or would not change. It changes based on variations in active UE population, time of day, etc. Of course, dynamic power control could do better, but that doesn't mean semi-static power control has no significant benefits.

4 – Motorola Mobility France S.A.S

1. A major obstacle to reach a proper conclusion on this topic is too much emphasis on lack of consensus in the past. **Lack of consensus is not an argument.** It's a self-reference, or recursive reference at best. It is more constructive to focus on technical arguments. TR 38.867 cites results that show performance gain with power control. There is no downside mentioned in the TR. The TR conclusion does not preclude power control. There was overwhelming support for including some form of power control in WI objectives in RAN#97, but consensus was not reached due to some objections. Concerns over time led to the note under discussion. It's being argued that time is not an issue either.

2. The assessment in [RP-222930] states: *“There has been no progress on power control during the last two RAN1 meetings”* to argue that power control should be excluded. It is not clarified in the tdoc why it is expected to make progress on an objective not included in the WI yet.

3. Re: Ericsson's comment in the previous round: *“We have strong concerns for introducing power control at this point and we have presented them in our contribution. So far none of those concerns have been addressed by power control proponents.”*

As a matter of fact, the concerns in [RP-223275] didn't make it to the NWM discussion. That's probably why there wasn't a direct response this time around, although these issues have been addressed in the previous discussions. Here are our views on the concerns:

3a. *“There was neither consensus on the purpose with power control in the SI, nor on the necessary signalling for repeater power control. Without consensus on that, further discussions are likely futile.”*

Our view: There were a few different views on power control, but nothing different from any other discussion in RAN1. Limiting the objective further by mentioning “semi-static” will address this concern.

3b. *“Repeater power control would imply functionality beyond that of a gNB. That is not the purpose with the ongoing WI and contradicts cost considerations.”*

Our view: Repeater power/gain setting is under full control of gNB. It is a basic functionality to enable NCR operation and should not introduce any additional costs than another viable realization such as OAM/proprietary signaling would. It is not clear to us how a standard-based signaling increases costs compared to OAM/proprietary signaling.

3c. *“Repeater-Fwd gain control to compensate for channel variations is a matter of higher layer signalling, e.g., OAM, performed on longer time scales to not interfere with UE power control.”*

Our view: Explicit mention of “semi-static” will fully address this concern.

3d. *“RAN1 has chosen the route of tight OAM integration for beam management which is also suitable to set/control repeater power preventing interference and repeater failure from self-oscillation.”*

Our view: This is a slippery slope. One may argue that all of NCR could be OAM/proprietary – no spec needed! The goal of the WI is to have a standard-based solution. And semi-static power control in large time scales does not lead to self-oscillation.

3e. *“Repeater power control would mean that the WI requirement of repeaters being transparent to UEs is lost.”*

Our view: We do not agree. Semi-static power/gain setting is transparent to the UE, no matter if it is realized by standard-based signaling or OAM/proprietary signaling.

3f. *“A gNB has already full control over DL and UL transmission power.”*

Our view: If it is realized that controlling gNB power is sufficient and viable in a particular deployment with no online gain/power setting of NCR whatsoever, the signaling may remain unused. We don't think the signaling needs to be mandatory.

3g. *“RAN1 greatly underestimates the implementation complexity of power control in the gNB, reducing the business case for network-controlled repeaters.”*

Our view: We believe the opposite – **addressing basic issues such as gain/power setting for a repeater is crucial for the feature's success.** Two points about the example complexities mentioned in [RP-223275]: 1) These issues assume a correlation between NCR side control signaling and UE spec, which doesn't have to be the case. We don't think these issues require additional specification. 2) If these issues exist anyway, it should be clarified how they will be addressed in the case of OAM/proprietary signaling instead of standard-based signaling.

In summary:

- Time is not an issue with 85% progress in RAN1 so far.
- Signaling for gain/power setting is needed, and it should not be left to OAM/proprietary signaling.
- Standard-based semi-static signaling does not lead to UE-related complexities, additional cost, etc. more than some OAM/proprietary signaling does.

5 – Apple France

We also support the inclusion of semi-static power control. Semi-static power control will limit the scope and in our view it should be reasonable to conclude in single quarter. We also agree with Qualcomm's views.

6 – Samsung Electronics Co.

We still do not want power control. We do not want to repeat comments in previous round. Along with comment from proponents, we are not sure whether the scope of "semi-static" is really reduced work load. If we open semi-static power control in NCR, we need to discussion which link we need to consider backhaul or access link? which direction need to consider between UL and DL? Which protocol is feasible between RRC or MAC CE? What is range of gain? level of adjustment? Absolute? Accumulation? How can design details signaling.. so on and on....We do not think we can conclude everything in one meeting. Practically impossible. Regardless of TU issue, we do not think such control is necessary for the fixed node. Once we deployed NCR in the field, the amplifying gain can not simple adjustable, this related to the isolation performance between donor antenna and access antenna and HW capability of gain control, and automatic power adjustment mechanism implemented which require OAM control and not possible to know at gNB. Repeater has been deployed for many years and mainly used for keeping coverage and should try to maxmize amplifying gain in the specific site rather than interference management. We think we can meet that purpose using the current Rel-18 scope in NCR. Moreovev, even if we finished 85% of completion, we still have a lot of discussion topic in the next meeting including DCI design details for aperiodic beam

indication for access link, association between time resource and beam information, signaling design of semi-persistent and persistent beam indication for access link, prioritization rule for beam indication, and more.

7 – Telstra Limited

We support the inclusion of semi-static power control.

8 – Panasonic Holdings Corporation

Question to Qualcomm: Qualcomm describes "Our response is that there is clearly a difference in that while setting beam arrangement only once at deployment can be seen sufficient, power setting is more variable depending on operating conditions changing throughout the day". Our understanding is to change OAM setting depending on operating conditions changing throughout the day is possible. According to Qualcomm understanding, OAM is limited only to "only once at deployment"?

Question to Ericsson: Beam arrangement is OAM is for NCR-UE link handling. Beam management of gNB-NCR link (at least when NCR-MT) is rather similar to UE handling. Can I understand Ericsson's concern is mainly for gNB-UE link?

Question to moderator and all: For NCR-MT, what functionalities needs to be concluded i.e. how much reuse from UE functionality of UE. Fully isolated functionalities between NCR-MT and NCR-Fwd gNB-NCR link increases the complexity of NCR. Therefore, we see the need of the discussion on this. Related to this, how gNB-NCR link power control and NCR-MT power control involves need some discussion and conclusion as some of RF and PA could be shared between NCR-MT and NCR-Fwd. Removing "power control aspect" in this meeting does not prevent such discussion on the interaction between NCR-MT and NCR-Fwd backhaul. Could you confirm this understanding?

9 – CATT

We still have concern to add power control at this stage of the WI. This is not recommended by the TR because there is no consensus of the benefit of introducing such feature. BTW, there is only one RAN1 meeting left for this WI and only 1 TU allocation in the meeting. This issue is quite contentious and has been discussed many WG meeting without conclusion in the SI phase. From the SI discussion, there are different proposals and different understanding of how to introduce. Giving these experience, how can it be possible that the specification can be finished when added at this last moment with only 1TU left in the WI? Note there are still many other issues left to resolve in that last TU.

10 – Qualcomm Incorporated

Since Panasonic had a follow up question, would like to give a short answer here.

Yes, OAM can also give updates multiple times a day. Nevertheless, overall, the thinking is that power control is changed significantly more frequently than beam arrangement. But in the end, this is probably not even the most important point. If a repeater is within the coverage of a base station then the power control should be carrier out on an interface between that base station and the repeater (as opposed to being managed by some faraway OAM server) and it should be based on a standardized interface. This is not true for the beam arrangement because that is more of the function of deployment design, not something that the serving base station would necessary control.

11 – Motorola Mobility France S.A.S

Re: latest comment from Samsung:

“We do not want to repeat comments in previous round.”

A: Most of this latest comment is new. We share our views below.

“Along with comment from proponents, we are not sure whether the scope of ”semi-static” is really reduced work load. If we open semi-static power control in NCR, we need to discussion which link we need to consider backhaul or access link? which direction need to consider between UL and DL? Which protocol is feasible between RRC or MAC CE? What is range of gain? level of adjustment? Absolute? Accumulation? How can design details signaling.. so on and on....”

A: These questions seem appropriate for WG level discussions. If answering any of these is deemed needed for determining WID objectives, raising them in a contribution or in earlier rounds would be more constructive. We are not sure if there will be enough time to converge on newly raised questions in the last hours. But they can be addressed at the WG level.

“we do not think such control is necessary for the fixed node. Once we deployed NCR in the field, the amplifying gain can not simple adjustable, this related to the isolation performance between donor antenna and access antenna and HW capability of gain control, and automatic power adjustment mechanism implemented which require OAM control and not possible to know at gNB.”

A: This argument contradicts the use of OAM signaling for gain adjustment, which is being proposed as a replacement for standard-based signaling. As we mentioned in our previous comment, if it is realized that no online gain/power setting of NCR is needed in a particular deployment, the signaling may remain unused. We don't think the signaling needs to be mandatory. But if signaling is needed, and we believe it is, it's not justified to leave the signaling to OAM.

12 – AT&T GNS Belgium SPRL

We share the view of Qualcomm, Motorola, and others that a limited scope Power Control objective should be included in the revised WID.

We have strong concerns that without defining any semi-static PC in side control, we are assuming that we'll rely on some proprietary OAM solution to address Power Control. In order to achieve Power Control via OAM, L1/L2 measurements from the NCR will be likely required. However, these measurements are similar, if not the same as those required for other functionalities already agreed to be handled over the air interface like beam management, RLM, and initial access. Hence, not only is this more complex for the network to handle via OAM but excluding semi-static power control does not reduce NCR complexity either as had been one of the arguments. Similarly, semi-static power control has limited specification impacts in our view and given the WI is 85% complete already, adequate time should not be a concern to continue this limited-scope objective.

We agree with the moderator summary that there has not been consensus to add an objective to define power control as side control information in the Rel-18 NCR WID due to concerns such as unmanageable workload, or unsubstantiated technical concerns. However, during the SI phase no technical concerns were documented in TR 38.867 for including power control as part of side control information, only benefits

e.g., interference mitigation, avoiding coverage loss, and improved energy efficiency. Our proposal would be to again add the following sub-bullet:

Specify the signalling and behavior of the following side control information for controlling the NCR-Fwd [RAN1, RAN2]

- Beamforming
- UL-DL TDD operation
- ON-OFF information
- Define semi-static power control parameters (e.g., via MAC CE/RRC)

To address some company concerns, we could also add one or more of the following notes regarding scope/progress:

NOTE1: Power control SHALL NOT impact NCR transparency to the UE.

NOTE2: Semi-static power control for access link and backhaul link SHALL target a common solution.

NOTE3: Power control aspect will be checked at RAN#99.

13 – Samsung Electronics Co.

To Motorola, our comment is not to discuss WG level discussion here, we want to emphasize simply "semi-static" does not mean it is simple and work is acceptable in 1 TU.

14 – ZTE Corporation

We are negative to introduce the power control including semi-static only based on the experience in SI. From technical perspective, the solution is still diverse and there is limited chance to conclude in one meeting. Moreover, we still need to finish the discussion on other remaining aspects including signalling design for aperiodic/semi-persistent signaling design. Also discussion on the RRC/MAC CE parameters are urgent since it has significant impacts on RAN2's progress. With introduction of PC, it may lead the situation to further extend the timeline in next plenary.

15 – Panasonic Holdings Corporation

Thanks Qualcomm for your reply. I see you are more saying the link between base station and repeater. I agree this link is more similar to UE of interference situation. I thought people saying semi-static is mainly for repeater-UE link (my position in the last RAN plenary was as such). If the link between base station and repeater, as I wrote above, the relation with NCR-MT needs to be resolved and I think such discussion should include power control aspect as some of the components should be shared between NCR-MT and NCR-Fwd (of backhaul link). Therefore, my current understanding is backhaul power control of the interaction with NCR-MT can be discussed even without mentioning power control (but I want to have the confirmation).

16 – China Telecommunication Corp.

We are **negative to introduce power control** for Rel-18 NCR. Even if only semi-static power control is considered, there will still be a lot of related issues to be settled considering different links, channels, etc. as also explained by some companies. Moreover, there're also some remaining issues not settled, which are more important. Thus, we think the effort is better to be put on the remaining aspects instead of introducing a new sub-objective.

17 – ZTE Corporation

As rapporteur

@Panasonic Regarding the RF functionalities between NCR-MT and NCR-Fwd, e.g., isolated or shared, in my view, it's part of the ongoing discussion on the RF architecture in RAN4. If there are issues identified by other WGs, they can be triggered in RAN1 via LS as a typical operation even in the maintenance phase. For the relationship between C-link and backhaul, from RAN1's perspective, we have concluded that the simultaneous transmission between the UL of the C-link and the backhaul link is NCR capability. If there are any remaining points to enable this operation, we can still try to fix it as contribution-driven.

18 – Panasonic Holdings Corporation

Thanks Moderator for the clarification of your understanding. As simultaneous transmission between the UL of the C-link and the backhaul link is NCR capability, my understanding is the case NCR does not have such capability need to be discussed and it may have some kind of power control (or something). Then we are more OK not to have power control bullet point.

19 – Huawei Tech.(UK) Co.. Ltd

We support adding semi-static power control to the scope.

Regarding Ericsson's concerns of "there is no single power control proposal, but several":

- *First*: there is no difference in UL and DL amplifying gain for semi-static power control.
- *Second*: how to configure the amplifying gain for each access link beam is up to implementation of gNB.
- *Third*: gNB can determine the amplifying gain based on C-link CSI measurement. And the measurements can be reported by NCR-MT to gNB based on the RAN1 agreements "to support CSI measurement/reporting mechanisms for NCR-MT in C-link" and "same large-scale properties of the channel, i.e., channel properties in Type-A and Type-D (if applicable), are expected to be experienced by C-link and backhaul link".

Regarding Ericsson's comment of "We agreed to the adaptive backhaul link as an optional functionality for the sake of compromise although we pointed out these exact problems. One should not right a wrong with another wrong": It should be clear that power control is NOT coupled with adaptive backhaul link beam. Even when an NCR-MT does not support dedicated beam indication for backhaul link, different beams can still be applied between gNB and NCR-MT. Note that same beam (beam 1) will be assumed when there is simultaneous Tx/Rx between C-link and backhaul link and a default beam (beam 2) will be assumed when there is no simultaneous Tx/Rx between C-link and backhaul link. Beam 1 and beam 2 are not necessarily the same. In this case, power control is still beneficial.

Regarding Samsung's comment of "OAM based power control and also implementation based adjustment can solve power setting and interference control in the network": We don't believe that NCR can handle / aware the interference for the network, neither we believe that NCR can adjust its power settings between two consecutive slots with different beams. In our view, more serious interference problems are caused for both downlink and uplink if the amplifying gain is set/adjusted by NCR implementation (see the example in the initial round).

20 – Orange

We support the specification of semi-static power control in Rel-18 and agree with Qualcomm’s clarifications on the matter.

As an operator, we see this as a very useful feature to adapt more reactively to changing radio conditions in the network, which will help operating network controlled repeaters more efficiently.

21 – vivo Mobile Communication Co.

Ericsson further commented that since beam arrangement is provided via OAM, power control could/should be handled the same way. Our understanding is that there is clearly a difference in that while setting beam arrangement only once at deployment can be seen sufficient, power setting is more variable depending on operating conditions changing throughout the day.

We see the need of limited scope with semi-static power control.

22 – Panasonic Holdings Corporation

For NCR-UE link, based on the discussion here, OAM can change the maximum value multiple times a day. Therefore, inter-vendor aspect is taken into account or not is the discussion. As beam configuration is OAM and not having inter-vendor operability, we don’t see the specific difference and don’t see need to mention of semi-static power control.

For gNB-NCR link, based on the discussion here, essential correction related to power control can be still discussed even after the removal of power control bullet. Mentioning semi-static may be actually problematic if NCR-MT UL is similar to UE to support dynamic power control. We should not have the function for ”beneficial” or ”optimized” considering TU availability. The removal of power control bullet gives the impression to prevent the essential correction. Therefore, our proposal is following.

- remove the bullet point related to power control and ”the removal of the power control bullet does not prevent the essential correction of power control of gNB-NCR link” are minuted.

23 – Ericsson LM

In our understanding, there are two competing alternatives in this discussion:

1. **OAM-based power control**, in which PC would be configured at deployment and kept that way for the foreseeable future (at least hours). Typically, this is how a gNB is configured and considering the repeater is an extension of the gNB, it will result in predictable repeater deployments. We are supporting this solution, which is always possible and has no specification impact.

2. **Semi-statically configured power control**. This would have different purposes (depending on if it is UL or DL PC):

- a. DL power control for managing the possible variations in the BH link for the possible different BH links that may be configured from the adaptive BH link and C-link, and
- b. (i) UL power control to “redistribute the Tx power” from the repeater to the UE and thereby improving the overall SNR. Alternatively (ii), UL power control has been proposed to be needed in order to co-schedule the MT and a UE forwarded with a different power by the repeater.

Regarding 2a, we think that if the gNB chose to configure either the control link or the backhaul with sufficiently different TCI states such that PC is required to mitigate the link difference, then, in our view, the gNB makes a poor job in selecting TCI states for the C-link and BH link, respectively. There is nothing preventing the gNB from selecting a C-link that is aligned with the BH link from a pathloss perspective. Hence, power control is not needed.

Regarding 2b (i), although the idea has some merit from an interference perspective, it will only make a difference where the link budget does not require full UE Tx power, i.e., to UEs that are close to the repeater as explained by Pivotal (RP-223009). That is, it is only beneficial during good channel conditions. Hence, any gain will be limited to scenarios where the SNR increase due to the redistributed Tx power will not be significantly affected.

Regarding 2b (ii), we acknowledge the problem but don't think this problem is limited to repeaters. Dealing with different UE signal powers is needed already today and therefore nothing that needs special attention in the repeater work.

Both 2b options (i) and (ii) would furthermore preferably be implemented with dynamic power control since they are very much linked to individual UEs' behaviors. They would imply the repeater deviates from its in some sense preferred settings for the given coverage area, meaning that the repeater will need to sacrifice some coverage in order to improve it elsewhere due to "changing operating conditions" on a semi-static time frame. That is typically not a desirable property in a network node.

Since options 2a and 2b have different use, UL and DL PC would need to be applied differently. Hence, in our view, they would indeed result in UE transparency and reciprocity being lost and should not be compared with situations where the UL and DL experience similar pathloss changes.

Power control was discussed for the original purpose of interference control. The repeater is considered an extension of the gNB. It is also assumed that the repeater has beam forming capability. We do not see a reason, neither has there been a study, nor a discussion, why the existence of a repeater would increase interference different from a gNB, since the repeater is under gNB control. Only if the NCR itself oscillates would interference not be under direct gNB control. It is unclear how this could be maintained by any other control but the repeater's internal one. Alternatively, we would also need to discuss how interference is measured/detected, additional signaling would result which is not accounted for in the remaining time in the last WI meeting.

Based on the above, we think the benefits with power control are overestimated in the form it is presently proposed.

24 – China Unicom

We do not support the dynamic power control solution, which may bring more complexity for the network side as the interference is not stable and it will be out of control. At the initial phase of NCR WI, if power control is not supported or configured from OAM, the interference issue will be much easier for management. Considering the workload of R18 NCR WI, the power control mechanism could be shifted to R19 for further study and discussion.

25 – Telstra Limited

We share the view of Qualcomm, AT&T, etc seeking a semi-static/limited scope power control capability be included in the revised Rel-18 NCR WID

5 Summary and Conclusion

5.1 Power control as side control information in Rel-18

After two rounds of discussion, it seems that it is still impossible to achieve any consensus to support power control as side control information in Rel-18 due to the concerns (from several companies) on TU and controversial views for technical aspects.

From moderator’s view, it is proposed to conclude as follows:

There is no consensus to add the scope of power control as side control information in the Rel-18 NCR WID.

The outcome of the conclusion should be reflected in the following **Proposal 1** on WID update in Table 1:

Table 1: Proposal 1 on WID updates

Specify the signalling and behavior of the following side control information for controlling the NCR-Fwd [RAN1, RAN2]

- Beamforming
- UL-DL TDD operation
- ON-OFF information

Note: Power control aspect will be checked in RAN#98e.

5.2 Demodulation requirement for C-link of NCR-MT

After two rounds of discussion, a clear majority is fine to define demodulation requirements for C-link of NCR-MT. It seems that the proposed updates from the moderator based on Ericsson’s comment in the intermediate round is a good compromise. Regarding the concerns and proposal from Huawei, it is unclear about exactly what it means by ”limited number” of requirements. It is also related to the size of subset of requirements in the newly added Note-2. This kind of details should be discussed and handled in WG-level based on the note. The following WID updates in Table 2 then entered to the final round for further discussion in emails.

Table 2:

4.2 Objective of Performance part WI

NOTE: Leave empty if the WI proposal does not contain a RAN performance part.

Study and define the RF conformance testing requirements and EMC requirements of NCR if necessary [RAN4]

Study and define the RRM performance requirements of NCR-MT if necessary [RAN4]

Define the demodulation performance requirements for C-link of NCR-MT [RAN4]

Note-1: The existing requirements defined in RAN4 can be reused if applicable.

~~Note-2: The demodulation requirement can be checked in RAN#98e.~~

Note-2: The demodulation requirements for NCR-MT are expected to be a subset of the UE demodulation requirements in 38.101-4.

In the final round of discussion, there is a proposal (sent by email) to make some updates on Note-2 as follows in Table 3. From moderator's perspective, the proposed conclusion is to adopt the following **Proposal 2** on WID updates in Table 3.

Table 3: Proposal 2 on WID updates

4.2 Objective of Performance part WI

NOTE: Leave empty if the WI proposal does not contain a RAN performance

Study and define the RF conformance testing requirements and EMC requirements of NCR if necessary [RAN4]

Study and define the RRM performance requirements of NCR-MT if necessary [RAN4]

Define the demodulation performance requirements for C-link of NCR-MT [RAN4]

Note-1: The existing requirements defined in RAN4 can be reused if applicable.

~~Note-2: The demodulation requirement can be checked in RAN#98e.~~

Note-2: The demodulation requirements for NCR-MT are expected to be based on a subset of the UE demodulation requirements in 38.101-4 with some adaptations for e.g. conformance testing procedure and FRCs that are similar to IAB-MT.

Based on multiple rounds of discussion, it is proposed to adopt the updates captured in the draft revised WID file *RP-22xxxx Revised WID on NR network controlled repeaters_v2.doc* in following folder:

[https://www.3gpp.org/ftp/tsg_ran/TSG_RAN/TSGR_98e/Inbox/Drafts/\[98e-18-R18-NCR\]](https://www.3gpp.org/ftp/tsg_ran/TSG_RAN/TSGR_98e/Inbox/Drafts/[98e-18-R18-NCR])

Please note that the revised WID has captured the proposed updates in Table 1 and Table 3 and some miscellaneous updates including the impacted TS, etc.

6 References

1. RP-222673, New WID proposal for NR network controlled repeaters, ZTE
2. RP-222873, Revised WID on NR network-controlled repeaters, ZTE, Sanechips

3. RP-222930, Checkpoint assessment: NCR WI, Samsung
4. RP-222976, Discussion on Rel-18 WI scope for NCR, Intel Corporation
5. RP-223009, Views on Power Control for NCR, Pivotal Commware, Kumu Networks
6. RP-223048, Discussion on the power control of NR network-controlled repeaters, CMCC
7. RP-223203, On power control for Rel-18 NR network-controlled repeaters, Apple
8. RP-223257, Discussion on the scope of NCR, ZTE, Sanechips
9. RP-223275, On power control for network-controlled repeaters, Ericsson
10. RP-223359, On power control aspects for NR network-controlled repeaters, Lenovo
11. RP-223374, NCR power control, Qualcomm Tech. Netherlands B.V
12. RP-222874, Status report of WI: NR network-controlled repeaters, ZTE