3GPP TSG-RAN WG4 Meeting #104-e R4-22xxxxx

Electronic Meeting, Aug 15 – Aug 26, 2022

**Title:** draft Reply LS on *ModifiedMPR-Behaviour* clarification for different power classes

**Response to:** R5-223635

**Release:** Rel-16

**Work Item:** NR\_RF\_FR2\_req\_enh-UEConTest

**Source:** RAN4

**To:** RAN5

**Cc:**

**Contact Person:**

**Name:** Liu Ye

**E-mail Address:** leo.liuye@huawei.com

**Send any reply LS to: 3GPP Liaisons Coordinator,** **mailto:3GPPLiaison@etsi.org**

**Attachments**: N/A

**1. Overall Description:**

RAN4 would like to thank RAN5 for clarification questions on *ModifiedMPR-Behaviour* for different power classes.

With regard to the questions raised by RAN5, the answers from RAN4 are as follows:

**Question a)** *For Rel-15 PC3 UE, is the MPR as defined in 38.101-2 v16.2.0 applicable if the UE supports modifiedMPR-Behaviour bit 0 UE capability?*

**Answer:** Yes, for Rel-15 PC3 UE, MPR defined in 38.101-2 v16.2.0 is also applicable if the UE reports modifiedMPR-Behaviour bit 0 UE capability, but this modified MPR is optional for a Rel-15 UE.

**Question b)** *For Rel-15 PC2 and PC4 UEs, is modifiedMPR-Behaviour bit 0 capability applicable?*

[**Answer alt1:** Yes, Since MPR for PC2 and PC4 refers to the PC3 MPR requirement, the *modifiedMPR-Behaviour* bit 0 capability is also applicable for Rel-15 PC2 and PC4 UEs.]

**Answer alt2:** No, *modifiedMPR-Behaviour* bit 0 capability is not applicable for Rel-15 PC2 and PC4 UEs.

*Alt 1: QC, HW*

*Alt 2: OPPO, E//, Xiaomi*

Discussions:

Huawei: suggest Alt2.

Qualcomm: not OK with Alt2. MPR study is based on max TRP limit for each power class. 35 max TRP and 23 max TRP. MPR only depends on the max TRP limit. It is not accident way. What applies to PC3 applies to all power classes.

Ericsson: in our view we should follow the definition. If the definition is unclear we need change. Regardless MRP is based on TPR, if PC3 is well defined, it applies to PC3. It cannot be used for general purpose to indicating other relation in the specification. It is hard to do at this late stage.

OPPO: Agree with Ericsson. The question is about the signaling. It is quite clear to find in RAN4. There is no ambiguity. MPR requirement may apply to other classes. For LS, we can focus on RAN5 question about signaling.

Qualcomm: I missed the one details. We can go with Alt2.

Agreement: Agree Alt2.

**Question c)** *For Rel-16 PC3 UE, is the MPR as defined in 38.101-2 v16.2.0 mandatory or optional? In case it is mandatory then is the Rel-16 UE expected to signal modifiedMPR-Behaviour bit 0=true?*

**Answer alt1:** For Rel-16 PC3 UE, the MPR as defined in 38.101-2 v16.2.0 is optional according to the current specification.

[**Answer alt2:** For Rel-16 PC3 UE, the MPR as defined in 38.101-2 v16.2.0 is mandatory and the bit shall be set to “1”.]

*Alt 1: OPPO, QC, HW, Xiaomi, Apple*

*Alt 2: E//*

Discussions:

Ericsson: It breaks the entire concept of modified MPR. Rel-16 UE shall meet this requirement. It was Skyworks CR, which was done for open release. RAN5 is very confused about the requirement. The CR is not intended to Rel-17. The question is whether to allow Rel-15 UE to report the capability in the specific version of spec. Maximum output power is not optional feature.

Huawei: in the current spec, in annex, it is said that “maybe bit 1”. It is not only for FR2 but for FR1. One modified MPR is introduced, we use may rather than shall. From test perspective UE may not distinguish the sub versions of spec. We disagree that mandatory should be correct manner.

OPPO: agree with Huawei. In Rel-16 we have two sets of MPR value. If we mandate UE to fufil the tightened MPR, we cannot guarantee UE to meet the requirement in 16.2.0.

Qualcomm: There is only one MPR, the later release superseed the earlier release. MPR scheme applies to earlier releases. We have CR in maintenance agenda which does not meet the requirement either.

Apple: in our understanding, the MPR bit is introduced in the middle of release. We should keep optional. Network can handle UE signalling 0. For Rel-17, we can make it mandatory. Spec should identify which MPR should be applied based on bit is set to 0 or 1.

Ericsson: Alt1 breaks the way that spec is supposed to work. Something specified in the open release, for which UE has to meet. November 2019 CR is not intended to be optional. It would be RAN5 confuse. UE should set the MPR bit to 1.

Huawei: as mentioned by Ericsson, the spec uses “may” rather than “shall”. It will cause NBC issue. In market there may be Rel-15 UE.

OPPO: share the similar view as Huawei. When the modified MPR was introduced, it is used to indicate the optional MPR. It has been specified in the spec that it may be indicated as 1.

Ericsson: In our view point, the table is not correct. Rel-16 must meet it. Rel-15 does not need to meet the change in later release. It is “may” for Rel-15 and it is “shall” for Rel-16. Table should be correct. Not bullet.

Qualcomm: how can we read from standard what MPR should be applied if bit is 0.

T-Mobile USA: for FR1, we have similar situation. In the table, we can indicate that table is applied to which version of release.

Huawei: we have CR from Nokia to change Rel-17.

Ericsson: we proposal the method to be considered until tomorrow. This is the matter of principle.

Huawei: delaying the discussion until tomorrow is not useful.

Qualcomm: to Ericsson, the problem is that the intend is not correctly captured in the spec.

**Question d)** *For Rel-16 PC3 UE, which version of specification is taken as default MPR requirement, 38.101-2 v16.2.0 or latest version (v16.11.0 released in Apr 2022)? What are the Rel-16 MPR requirements if the UE signals respectively modifiedMPR-Behaviour bit 0=false and modifiedMPR-Behaviour bit 0=true?*

[**Answer alt1:** For Rel-16 PC3 UE, the latest Rel-16 version of specification can be taken for the MPR requirement. A Rel-16 PC3 UE is still allowed to signal *modifiedMPR-Behaviour* bit 0=false and use the previous MPR requirement before v16.2.0 specification, otherwise, if modifiedMPR-Behaviour bit 0=true is indicated, the modified MPR is applied for a Rel-16 PC3 UE.]

**Answer alt2:** For Rel-16 PC3 UE, 38.101-2 v16.1.0 and earlier versions are taken as default MPR requirement. The PC3 UE need meet the MPR as defined in 38.101-2 v16.2.0 if the PC3 UE signals respectively *modifiedMPR-Behaviou*r bit 0=ture, if not, the PC3 UE just need meet the default MPR requirement.

*Alt 1: OPPO, HW*

*Alt 2: QC, Xiaomi, HW, Apple*

*Neither: E//*

**Discussions:**

OPPO: Alt 2 includes two aspects: when bit = 1, we have concern. It is fixed to V16.2.0. In RAN5 when they define the test cases, they refer to latest version. If MPR is refer to early release and other requirements are the latest ones, that would lead to the problem. MPR and other requirements should follow the same version.

Ericsson: this is one other reason. We did not follow the principle.

Huawei: we can decouple this from the previous one. For the comment, T-Mobile has CR in this meeting which is aligned with alt1. We use the latest version for MPR requirement. It is also OK for us. We can accept to use the latest version if bit is 1.

T-Mobile USA: we appreciate Huawei comment. We feel confused on Ericsson comment. We have early releases. Vendor should draw line. It is better to point to requirement in the current spec release.

OPPO: agree with Huawei. Besides the values change, there are other changes. If we fixed the MPR to v16.1.0. It will make spec update for MPR meaningless.

Ericsson: it is how standard works. When Rel-16 is open, everything specified in Rel-16 applies. If something specified in the release, there is one year before conformance testing. Always latest version applies.

OPPO: the open release is specified in RAN2 or RAN4?

ZTE: it is not possible to change the core requirement. I did not agree with concern of OPPO. I agree with Ericsson if we are talking that UE should comply the release we did not differentiate it depending on version. MRP default.

T-Mobile USA: Ericsson is correct. In spec, we do not refer to old version. It just refers to Rel-17/16 UEs.

OPPO: to ZTE, Rel-16 is frozen. But the discussion now is about Rel-16 early version, which is not frozen.

**Question e)** *For Rel-16 PC2, PC4 and PC5 UEs is modifiedMPR-Behaviour bit 0 capability applicable*?

[**Answer alt1:** Yes, *modifiedMPR-Behaviour* bit 0 capability is also applicable for Rel-16 PC2, PC4 and PC5 UEs, the behaviour is similar to that of PC3 UE.]

**Answer alt2:** No, *modifiedMPR-*Behaviour bit 0 capability is not applicable for Rel-16 PC2, PC4 and PC5 UEs.

*Alt 1: QC, HW.*

*Alt 2: OPPO, E//, Xiaomi*

Agreement: Agree Alt2.

**Question f)** *For Rel-17 PC3 UE, what are the MPR requirements if the UE signals respectively modifiedMPR-Behaviour bit 0=false and modifiedMPR-Behaviour bit 0=true?*

[**Answer alt1:** For a Rel-17 PC3 UE, applicable MPR requirement depends on the indicated capability, i.e. original MPR (before v16.2.0) for UE signals *modifiedMPR-Behaviour* bit 0=false while the modified MPR (requirement in latest Rel-17 specification) for UE signals *modifiedMPR-Behaviour* bit 0=true.]

**Answer alt2:** For a Rel-17 PC3 UE, it should comply with the improved MPR defined in the latest Rel-17 version of 38.101-2 and may not set this bit 0 to false.

*Alt 1: HW, Xiaomi*

*Alt 2: OPPO, QC, E//, HW, Apple*

Discussions:

Agreement:

For a Rel-17 PC3 UE, it shall comply with the improved MPR defined in the latest Rel-17 version of 38.101-2 and may not set this bit 0 to false.

**2. Actions:**

**To RAN1:**

**ACTION:** RAN4 respectfully asks RAN5 to take the above feedback into account for the future work.

**3. Date of Next TSG WG RAN4 Meetings:**

TSG-RAN4 Meeting#104-bis-e 10th – 19th October 2022 Online

TSG-RAN4 Meeting#105 14th – 18th November 2022 Canada