**3GPP TSG RAN Meeting #88e *DRAFT* RP-201260**

**June 29th – July 3rd, 2020**

**Electronic Meeting**

**Agenda item:** 9.12

**Source:** Qualcomm Incorporated

**Title:** ***DRAFT*** Summary of email discussion on Rel-17 lower NR UE capabilities

**Document for:** Discussion/Decision

# Introduction

After the discussion of [1] at RAN #88, it was agreed to start a RAN email reflector discussion on the scope of the proposal. The scope of the proposal is given as follows.

* Enable both the following in the Rel-17 NR specifications
  1. For FR1, allow UEs to support a bandwidth of 50 MHz for bands that mandate 100 MHz in Rel-16
  2. For FR1, allow UEs to support 2 Rx in bands that mandate 4 Rx in Rel-16
* Add mechanism to enable the following:

1. Access restriction mechanism, which allows the network to indicate whether it can accept lower capability UEs or not
   * + Lack of signaling means the UEs are not allowed to connect
2. Endorse the use of the maximum data rate determined according to 4.1.2 in 38.306 to label the different tiers of UEs to make the subscribers aware of the capabilities of UEs.

In the following, we ask for comments on the proposed scope.

Note that the only the scope is subject of this email discussion.

# Discussion

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| **Company** | **Comments on proposal scope** |
| ZTE | In general, we are fine with introducing the support of such lower capability UEs.  The major proposed scope is aligned with the scope of Rel-17 RedCap SI, i.e. bandwidth reduction, reduced number of Rx antennas and access restriction mechanism. So it's more appropriate to support this in Rel-17 RedCap item instead of covering this in another Rel-17 WI or TEI. |
| Samsung | We are fine with the proposed scope.  It can be considered in Rel-17 TEI or together with RedCap WI. |
| Intel | In our view, RedCap SI/WI mainly targets on other use cases such as industrial wireless sensor, video surveillance, wearable, etc. We would anticipate further discussion on device type or UE category under RedCap WI, once transitioned. On the other hand, my understanding has been that your target scenario is on reduced complexity for smartphone use case. if smartphone is not targeted, the existing scope in RedCap is sufficient in our view. Therefore, we would not prefer to tangle those aspects under RedCap.  Given the limited impact on mainly RAN4 and possibly relevant signaling in RAN2, we think TEI seems a better place to proceed. If there is a concern on TEI, we would rather prefer to have a separate work item. |
| T-Mobile USA | We have concerns about the wording in the proposal above. The wording “enable” makes it sound like the e-mail discussion will be deciding if the changes will be incorporated in Rel-17. We believe that it would OK to decide via e-mail if these changes could be studied, not if they will be enabled in the Rel-17 specifications. We would prefer the following wording.   * Study the benefits and potential impacts of potentially enabling both the following in the Rel-17 NR specifications and the potentially applicability for various categories of UEs (smartphones, watches and wearables, etc.)   1. For FR1, allow UEs to support a bandwidth of 50 MHz for bands that mandate 100 MHz in Rel-16   2. For FR1, allow UEs to support 2 Rx in bands that mandate 4 Rx in Rel-16 * Study mechanisms that could potentially enable the following:  1. Access restriction mechanism, which allows the network to indicate whether it can accept lower capability UEs or not    * + Lack of signaling means the UEs are not allowed to connect 2. Endorse the use of the maximum data rate determined according to 4.1.2 in 38.306 to label the different tiers of UEs to make the subscribers aware of the capabilities of UEs. |
| DOCOMO | We don’t agree with the proposal. First, as the lower capability UE is targeting low-end smartphone, it is different from RedCap use cases and should not be included in RedCap SI/WI. Second, we have to consider the coexistence between the UE without lower capability (e.g. current 5G smartphone) and low-end smartphone. The reduced BW degrades the system capacity and makes the scheduler complicated. The reduced number of Rx degrades the coverage and affects cell planning. Third, if the lower capability UE is supported in Rel.17 in addition to RedCap UE, at least 2 new UE types will be introduced, which has risk of fragmentation. |
| SoftBank | We share the same view as T-Mobile USA, and support their wording change. Both 1st bullet and 2nd bullet require our very careful assessment. |
| CHTTL | We share the same view as DOCOMO. The reduced number of Rx will degrade the coverage and impacts the already planned deployments. In addition, currently there is no bandwidth combination set for inter-band EN-DC, mandatory support in the single band is also extended to EN-DC configurations including that band, reduced BW will impact the relevant EN-DC combinations. |
| OPPO | We are supportive for the proposal into the Rel-17. It can be considered both with another WID or in the RedCap SID/WID.  For Rel-17 SID, we may not have enough time to set a dedicated one. Thus, TEI would be an reasonable choices. The introducing of lower capability UE is try to created good levels of economic scale for NR. The current NR is somehow too high end.  For network side performance, it could be clearly stated that phone may have some performance loss to the consumer. For sure the coverage will be reduced, but it will not be unusable. In some band, only 2RX is required even in Rel-15. Study is not needed for the low capability UE.  In that sense Rel-17 TEI should be fine.  If we have to do an assessment, which may not mean we have to compensate the loss, it can be put in RedCap items. |
| vivo | We support the proposed scope and believe it is feasible to be included in RedCap as a separate use case, i.e. lower capability smartphone |
| LG | In general, we are fine with including this discussion in Rel-17 REDCAP SI. This is because REDCAP discussion already includes all the major topics such as reduced bandwidth, reduced number of antennas, access barring mechanisms, potential coverage shortage problem, etc. Creating another WI/SI for this discussion seems to lead to overlapping work. On the other hand, it doesn’t seem to be appropriate to agree supporting a special type of UE at this stage in REDCAP SI discussion. Therefore, we think Qualcomm’s proposal can be treated as one of the proposals among many other proposals in REDCAP SI. |
| MotorolaMobility | We support this proposal. We believe the proper way to address this is through a separate WI since this proposal targets smartphones, distinct from UE types addressed by RedCap. |
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# Conclusions

To be updated after completing the email discussion

# References

1. RP-200867, “WF on lower NR UE capabilities”, Qualcomm