GTW - Issues for [104-bis-e][141] NR\_cov\_enh2\_part1

# Topic #1: Clarification on the objective

### Sub-topic #1-1: The neccesity of this objective

**Issue 1-1-1: Whether to remove this objective**

* ***Objective in RP-221858 (WI for Rel-18 further NR coverage enhancements):***
  + *Enhancements to realize increasing UE power high limit for CA and DC based on Rel-17 RAN4 work on “Increasing UE power high limit for CA and DC”, in compliance with relevant regulations.*
* **Summary of round 1 discussion**
  + Option 1: Yes, due to the following analysis on the tentative objectives: (Samsung, Apple, Huawei, Meta, Vivo, and Ericsson)
* PC 2, 23dBm + 23dBm: FDD+FDD, without UL-MIMO. It is now precluded in Rel-17 FDD HPUE basket WIs, and currently the WID basket for NR inter-band CA/DC with high power on FDD bands approved in RAN#97-e has not included the FDD HPUE in the uplink.
* PC 1.5, 26dBm + 26dBm: FDD+FDD, without UL-MIMO. It is even more challenge than PC2 FDD HPUE, this is too early to be discussed.
* Intra-band non-contiguous CA. Since there is quite limited band combinations (CA\_n41(2A), CA\_n77(2A) and CA\_n78(2A)) for intra-band non-contiguous, and PC 1.5 has already been supported for band n41, n77 and n78, it seems that increasing CA power limit is not needed for this case.
  + Option 2: No, but clarification is needed (Nokia, OPPO, Xiaomi, Skyworks)
* **Moderator’s recommendation**
  + Check if this objective can be removed based on companies’ view.

### Sub-topic #1-2: Inter-band CA/DC scenario for Rel-18 RAN4 study

**Issue 1-2-2: Any other candidate(s) can be considered**

* **Case 1: PC3 inter-band BC with PC3 for band 1 and PC5 for band 2**
* **Summary from round 1 discussion**
  + Option 1: No need to consider. (Samsung, Apple, Meta, Huawei, Vivo)
* It seems that this is for low-end UE (PC5), but low-end UE is not needed to support UL CA.
* In LTE, the PC combinations are discussed, but UE vendor did not have the specific PC combinations in real market.
* There is no such kind of band combination in the current spec.
* The UE would also have to include PC3 for the band combination (if not included then PC3 is implicit since the default power class).
  + Option 2: Can be considered. (Skyworks, Nokia, OPPO, ZTE)
* Only for PC3 NR band + PC5 NRU band only (n46, n96, n102) (Clarification from Skyworks)
* **Moderator’s recommendation**
  + Further discussion.
* **Case 2: PC1.5 band combination with PC1.5 band 1 and any PC band 2**
* **Note: this calls for 3 transmitters and only for 1CC for both bands**
* **Summary from round 1 discussion**
  + Option 1: No need to consider.
  + Option 2: Could be considered.
* **Moderator’s recommendation**
  + Further discussion.
* **Case 3: PC2 FDD band without TxD + PC3 TDD/FDD band**
* **Note: this calls for 3 transmitters and only for 1CC for both bands**
* **Summary from round 1 discussion**
  + Option 1: No need to consider.
  + Option 2: Could be considered.
* **Moderator’s recommendation**
  + Further discussion.

### Sub-topic #1-3: Intra-band CA/DC scenario for Rel-18 RAN4 study

**Issue 1-3-1: Whether intra-band UL CA scenario needs to be considered**

* **Summary of round 1 discussion**
  + Option 1: No need to be considered. (Samsung, Apple, Huawei, Vivo, Skyworks and [Meta])
* Since for intra-band scenario the co-located deployment is assumed, the gain from different MOP for each CC might be questionable due to equalizing PSD which should be expected for that assumption.
* PC1.5 could be a more natural choice.
* Different MOP for each CC can lead to MPR/A-MPR change, which is out of the scope.
  + Option 2: Can be considered. (Nokia, OPPO, Xiaomi and [ZTE])
* However, the existing R17 approaches (sum power of each band) could not be reuse.
* **Moderator’s recommendation**
  + Further discussion.

### Sub-topic #1-4: Other candidate(s) for Rel-18 RAN4 study scope

**Issue 1-4-1: Whether ‘PC 2 single band UL-MIMO with PC3 PA + PC2 PA’ needs to be considered**

* **Summary of round 1 discussion**
  + Option 1: No need to be considered. (Samsung, Apple, Huawei, Vivo, Skyworks, [Ericsson] and [Meta])
* Current assumption on the equal splitting of transmission power between two chains will be violated.
* PC3 PA would be the linearity bottleneck where the MPR due to RIMD could render diminishing return in total output power gain.
* MPR/A-MPR requires review, which is out of the scope.
* PC1.5 for single band or full-power UL-MIMO mode 2 can serve the purpose of increasing transmission power.
* UL-MIMO should not be included in this coverage enhancement WI.
  + Option 2: Can be considered. (Nokia, OPPO, Xiaomi)
* **Moderator’s recommendation**
  + Further discussion.