**3GPP TSG-RAN WG4 Meeting #100e R4-2115062**

**Online, 16th – 27th Aug, 2021**

**Agenda item: 10.5.1**

**Source: China Unicom**

**Title****: TP for TR 38.861: Conclusion of SI for FDD HPUE**

**Document for: Approval**

# Introduction

This contribution provides a Text Proposal for the SAR Scheme and conclusion part of the SI on high power UE (power class 2) for one NR FDD band.

# Text Proposal

**<Start of TP>**

# 5 SAR Scheme

To accommodate the SAR limits of the NR PC2 FDD High Power UE, both UE-based and network-based solutions are considered in the study phase. For UE-based solution, the UE implementation based mechanism is used to ensure SAR compliance. In addition to UE-based solution, an optional method of reporting duty-cycle capability was also intensively discussed, but there is no conclusion reached.

# 9 SI Conclusion

In this study item, different aspects of enabling PC2 in NR FDD band n1 and n3 are thoroughly studied. The contents of the study include the applicable schemes to comply with SAR limits with 26dBm UE Tx power, the interference issues raised by FDD PC2, UE implementation and RF architectures, as well as system performance evaluation to support NR FDD HPUE.

Several SAR compliance solutions are studied and discussed in RAN4, including UE-implementation based methods, reusing of existing duty-cycle reporting method, and half-duplex operation method. After careful studies and thorough discussions, the UE-implementation based methods are considered feasible to make sure SAR regulation is not violated. In addition, optional feature of applying duty cycle is also considered, as a standardized solution, to solve SAR compliance issue.

Regarding the interference issues, it was identified by the group that both MSD and UL configuration are possible alternatives to handle REFSENS degradation in FDD PC2, and the MSD method will be adopted for the cases of n1 and n3 PC2. MSD values can first be calculated based on available RF components and existing assumptions. If there are new components available in the future with better performance, new assumptions can also be considered for MSD calculations.

In order to support 26dBm UE Tx power, two RF architectures (i.e. 2Tx×23dBm and 1Tx×26dBm) are considered and agreed during the study. It is found out that FDD HPUE with 2Tx architecture is feasible and can reuse existing RF components targeted for PC3, while 1Tx may need to use newly designed components. So further analyses of 1Tx architecture could be carried out when the new components become available.

To fully evaluate the impacts of FDD HPUE to the system performance, Dynamic system level simulations and Monte Carlo simulations are carried out. In dynamic system level simulation, performance gain for both cell average and cell edge cases are verified under various power control parameters. On the other hand, performance gain can be observed for the 5%-tile throughput and average cell throughput under Monte Carlo simulation. The potential DL degradation due to Tx/Rx de-sense does not lead to substantial performance degradation in typical interference limited scenarios.

In conclusion, it is shown in this SI that high power UE (power class 2) for NR FDD band brings positive system performance gain to the network, and it is feasible to reuse existing RF components to support 26dBm UE Tx power, while new components with performance improvement are also expected to be available in the future. UE implementation based solution (P-MPR) is used for SAR compliance. There is no consensus on the optional report of duty cycle capability, but duty cycle used as an UE implementation method is not precluded. Specific MSD values and other specification impact(s) will be determined in the Work Item phase.

**<End of TP>**