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Practical network test for RedCap

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Overview for RedCap UE power class

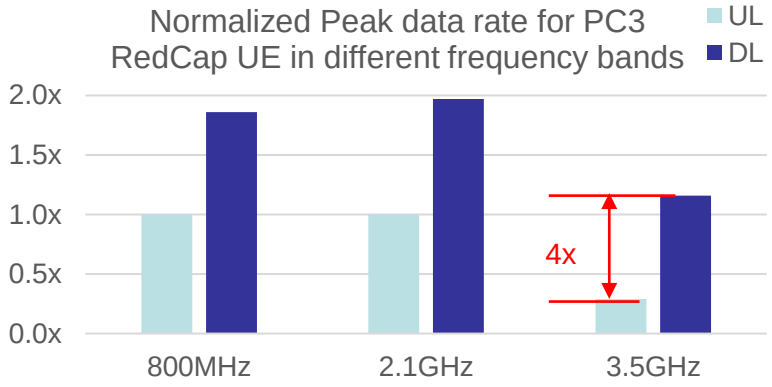
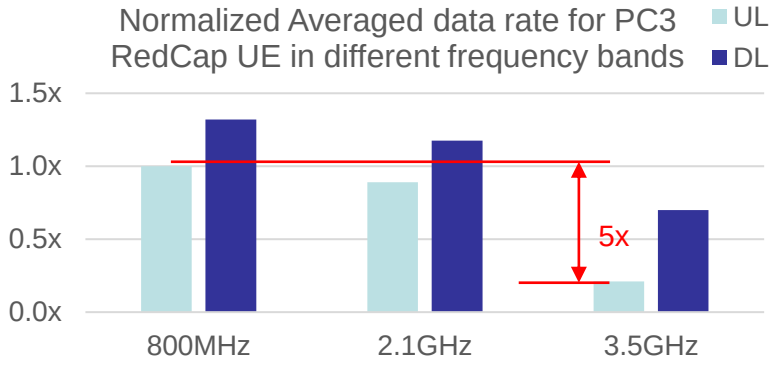
- NR RedCap (reduced capability) UE was introduced from Rel-17, with UE complexity reduction techniques and sometimes with UE power saving techniques suitable for IoT use cases such as industrial wireless sensors, video surveillance, and wearables.

- In Rel-17, only the RAN4 RF requirements for power class 3 (PC3) in FR1 are applicable for RedCap UE. Typically, the RedCap UE and non-RedCap normal UE are operated in the same network and on the same carrier. For non-RedCap normal UE, the RF requirements for power class 2 (PC2) with 3dB higher conducted output power have been specified for a few TDD and FDD bands. In addition, the antenna performance for RedCap UE may not enable good radiated power due to the size and cost constraints.

- Practical network tests for RedCap have been made, in which the latest test data show UL throughput for PC3 RedCap UE may be the shortage after deployment, especially for 3.5GHz. To increase the maximum transmit power is one of efficient way to improve the user UL experience data rate.

Practical network test for PC3 RedCap UE

- The practical network test data are shown in right figures. We have data from several BS and UE vendors in different cities of China which are of more recent vintage. As they share the same trends of the curves, we only present one set of them by anonymizing and normalizing the data for the purposes of comparing the performance among different frequency bands.
- The baseline is data rate for UL 800MHz, which we define as value of 1.0x. The other data rate values are scaled based on the value of UL 800MHz.

- **Observation 1:** There is obvious rate gap between UL and DL for all the tested frequency bands, especially for 3.5GHz, the gap is more than the 4 times by dividing DL to UL.
- **Observation 2:** The UL data rate decreases dramatically with frequency increasing, especially for 3.5GHz the data rate is less than 1/5 comparing to 800MHz

- **Proposal:** Increase the maximum transmit power from PC3 23dBm to PC2 26dBm for RedCap/eRedCap UE.