

Evolution path of 3Tx UEs

MediaTek Inc., China Telecom, China Unicom, OPPO, Softbank, T-Mobile USA, Verizon

Introduction

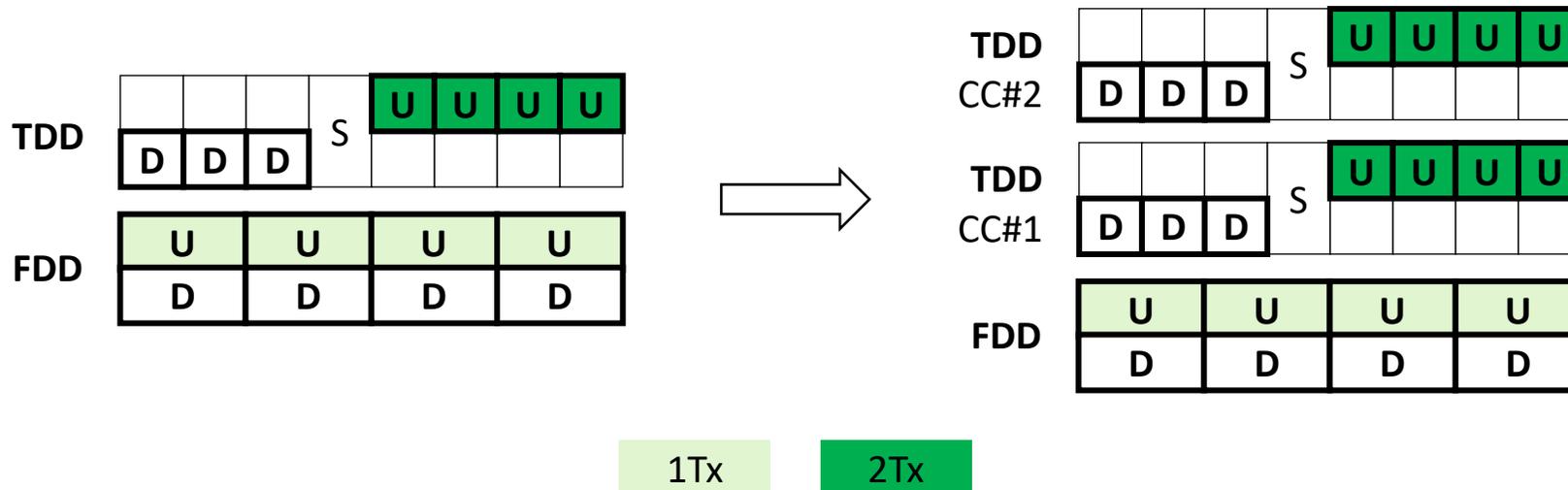
- **Rel-18:** first step towards 3Tx via:
 - WI [4Rx low NR band handheld 3Tx NR CA ENDC](#) (non-spectrum)
 - WI [R18 3Tx NR CA ENDC](#) (spectrum)
 - **Benefit:** 3Tx on top of PC2 and PC1.5 ⇒ configuration flexibility for UL-MIMO with UL CA ⇒ **UL Tput improvement**
 - NOTE: Limitations introduced to ensure solid foundations with limited workload e.g. 1 CC per band and 1 Tx only for FDD band
- **Rel-19:** Further evolution to utilize 3Tx architecture for even better performance
 - [NR ENDC RF Ph4](#) (RAN#103): incl. discussing the general requirements for 3Tx UE (HPUE with CA)
 - No further limitations on the detailed configurations and power classes (e.g., FDD 2T or intra-band CA)
 - ⇒ **The detailed scenario should be reflected in the corresponding spectrum WI.**
- **MediaTek views** on the next step for 3Tx evolution for the spectrum WI in the following slides

Discussion

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- One very straightforward enhancement is **to consider more than 1 CC in a band.**
 - For MNOs with **>100MHz spectrum** holding in a band, it is very beneficial to **fully utilize this spectrum for UL Tput enh.**
 - It is reasonable to **focus on TDD band**, since typically >100MHz BW is only in TDD
 - **Contiguous intra-band CA** can be considered as a starting point.

Proposal 1: Consider intra-band contiguous UL CA in TDD band for PC2 and PC1.5 3Tx UE in Rel-19 3Tx spectrum WI

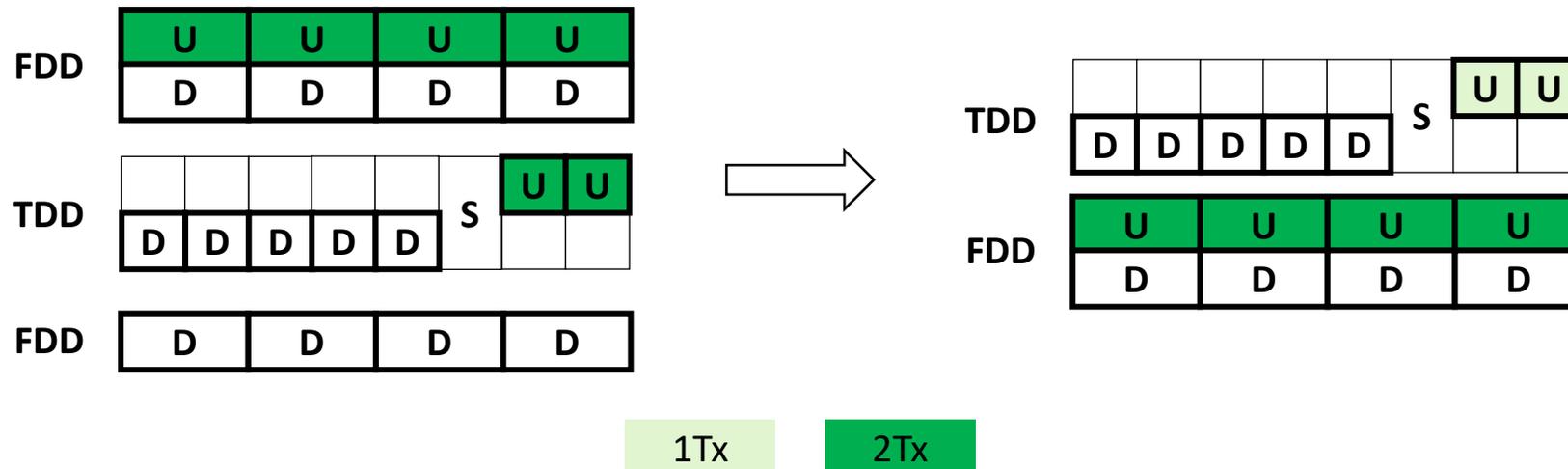


Discussion

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- Single carrier FDD HPUE as an important technique to improve UL performance of cell edge users
 - In Rel-17 non-spectrum WI [NR PC2 UE FDD](#) and Rel-18 spectrum WI [HPUE NR FR1 FDD R18](#)
- UL CA with 2Tx in FDD for FDD-TDD UL CA: can further increase UL Tput and UXP with FDD UL-MIMO

Proposal 2: Consider FDD 2Tx + TDD 1Tx for PC2 and PC1.5 3Tx UE in Rel-19 3Tx spectrum WI



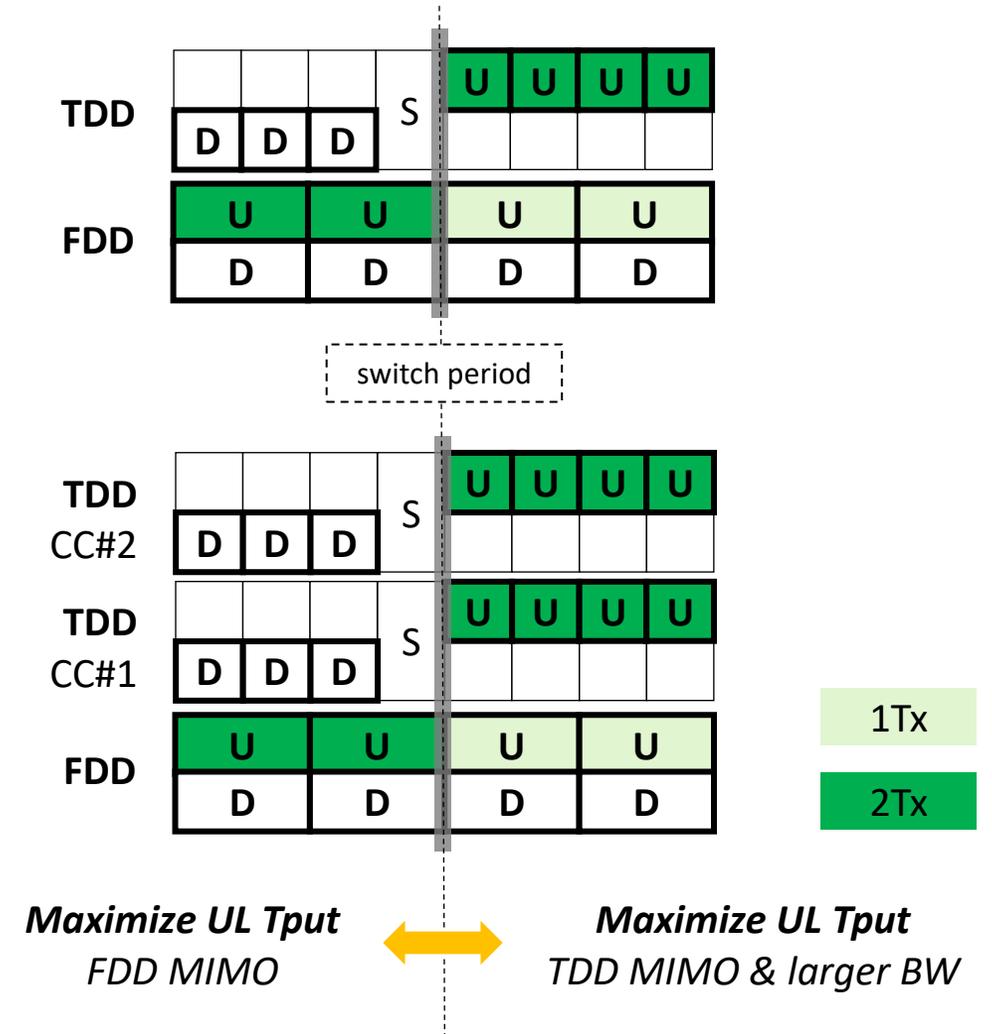
Discussion

[3/3]

- Once 3GPP specs are ready for both
 - FDD 1Tx + TDD 2Tx **and**
 - FDD 2Tx + TDD 1Tx

Tx switching between above 2 scenarios can be considered e.g. 2Tx by default in TDD to enjoy the larger BW, and switching to 2Tx in FDD at cell edge or during the TDD DL slots.

Proposal 3: Consider Tx switching between FDD 1Tx + TDD 2Tx and FDD 2Tx + TDD 1Tx in Dec'24



Summary

- **Proposal 1:** Consider intra-band contiguous UL CA in TDD band for PC2 and PC1.5 3Tx UE in Rel-19 3Tx spectrum WI
- **Proposal 2:** Consider FDD 2Tx + TDD 1Tx for PC2 and PC1.5 3Tx UE in Rel-19 3Tx spectrum WI
- **Proposal 3:** Consider Tx switching between FDD 1Tx + TDD 2Tx and FDD 2Tx + TDD 1Tx in Dec'24

Thank you!