Technical Report on V2X

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I. Frame Structure of LTE system

LTE transmissions are segmented into frames, which are 10ms in duration. There are 10 subframes in one frame, and 2 slots in one subframe. This means that we have 20 slots within one frame. One slot is made up of 6 or 7 symbols. The number of symbols depends on the length of the cycle prefix.

A. Frequency Division Duplex Frame Structure

LTE frame structure is divided into two system. The first is frequency division duplex (FDD) LTE. In FDD, both downlink and uplink transmission happens at the same time at different frequency domain. So each frame consists entirely of uplink subframe or downlink subframe. FDD enables continuous transmission through uplink and downlink. Interference between the frequency bands F1 and F2 may occur, so guard band is required.

B. Time Division Duplex Frame Structure

Second is time division duplex (TDD) LTE. In TDD, the transmission is divided into time domain, so each frame can be consisted by either downlink, uplink or special subframe. The sequence of these subframes has been defined by 3GPP with the name TDD Frame Configurations. There comes a special subframe which comes when there is transition from downlink subframe to uplink subframe. The special subframe is consist of three parts: downlink pilot, guard period, and uplink pilot.