

# FDD/TDD Comparison

## Key Messages

### ***FDD deployments provide greater coverage than TDD***

Mobile devices in a Frequency Division Duplexing (FDD) system transmit on a continuous basis, which enables devices to achieve cell edge rates farther from the base station. Mobile devices in a Time Division Duplexing (TDD) system transmit periodically (e.g., 1/2 or 1/3 of the time compared to FDD); hence, required rates cannot be achieved at similar distances when compared to FDD. The FDD advantage is consistent regardless of the radio technology being used.

### ***FDD needs fewer base stations than TDD***

Since FDD devices achieve desired cell edge rates at farther distances, the number of base stations required to achieve a given area of coverage is reduced.

In a coverage-limited system comparison using the same frequency band, the TDD system required 31% more base stations than FDD when using a 1:1 TDD system and 65% more base stations when using a 2:1 TDD system. Higher frequency bands required even more base stations.

### ***FDD incurs lower costs***

Capital expenditure (CAPEX) and operating expenditure (OPEX) costs are associated with each base station. These costs are independent of the type of duplexing technique used (FDD or TDD). Since FDD requires fewer base stations for the same coverage, it incurs lower deployment and operating costs.

### ***TDD is applicable to unpaired spectrum***

While FDD has clear advantages in coverage and costs, TDD is suitable to be deployed when paired spectrum is not available. FDD systems also benefit from better economies of scale since the implementation of TDD systems is limited.

### ***FDD/TDD: Basic difference***

FDD is implemented on a paired spectrum where downlink and uplink transmissions are sent on separate frequencies. This provides simultaneous exchange of information and reduces interference between the uplink and downlink.

TDD is implemented on an unpaired spectrum, implying the usage of only one frequency for both downlink and uplink transmissions. It is suitable for asymmetric transmission demands and in cases where paired frequency is not available.