

# LTE\_DL\_TDD\_TX\_TestBench

## Where To Find This Example

Select **Help > Open Examples...** from the menus and type either the example name listed above or one of the keywords below.

Or in Version 14 or higher you can open the project directly from this page using this button. Make sure to select the **Enable Guided Help** before clicking this button.

[Open Install Example](#)

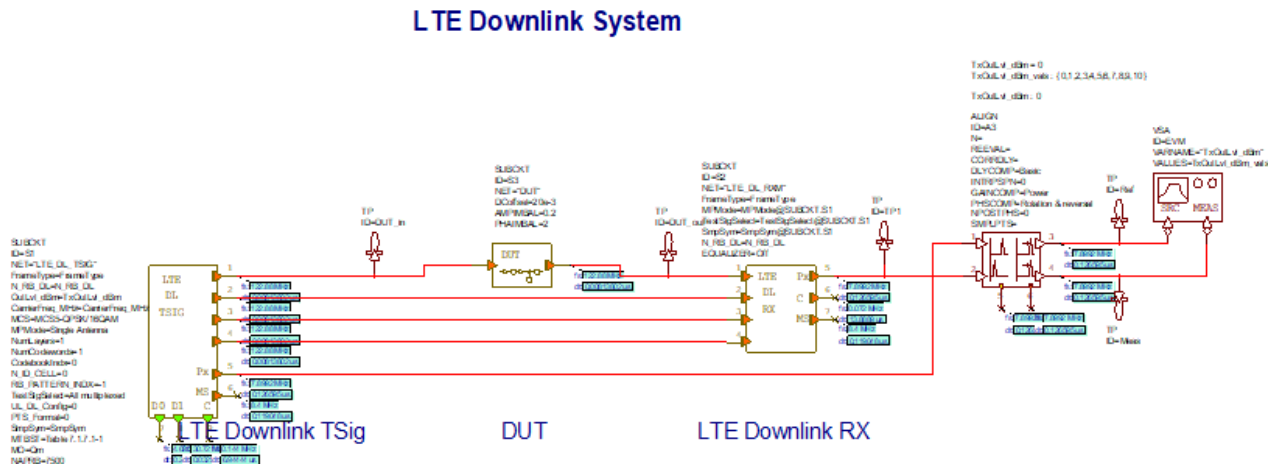
## Design Notes

### LTE FDD Downlink Base Station TX Test Bench

This example demonstrates:

LTE FDD Downlink TX, compliant with 3GPP specifications.

Specification document: TS 36.104, TS 36.211, TS 36.212



Configurable options include:

**NFramesSweep:** number of 10ms frames used in each sweep

**FrameType:** frame type and cycling prefix:

- 0: Frame structure type 1 / Normal CP: FDD
- 1: Frame structure type 2 / Normal CP: TDD
- 2: Frame structure type 1 / Extended CP: FDD
- 3: Frame structure type 2 / Extended CP: TDD

**ModType:** modulation type used in data channels (QPSK, 16QAM, 64QAM)

**N\_RB\_DL:** number of resource blocks used for transmission

**nAntennaPorts:** number of antenna ports (1, 2 or 4)

**Carrier Frequency (MHz)**

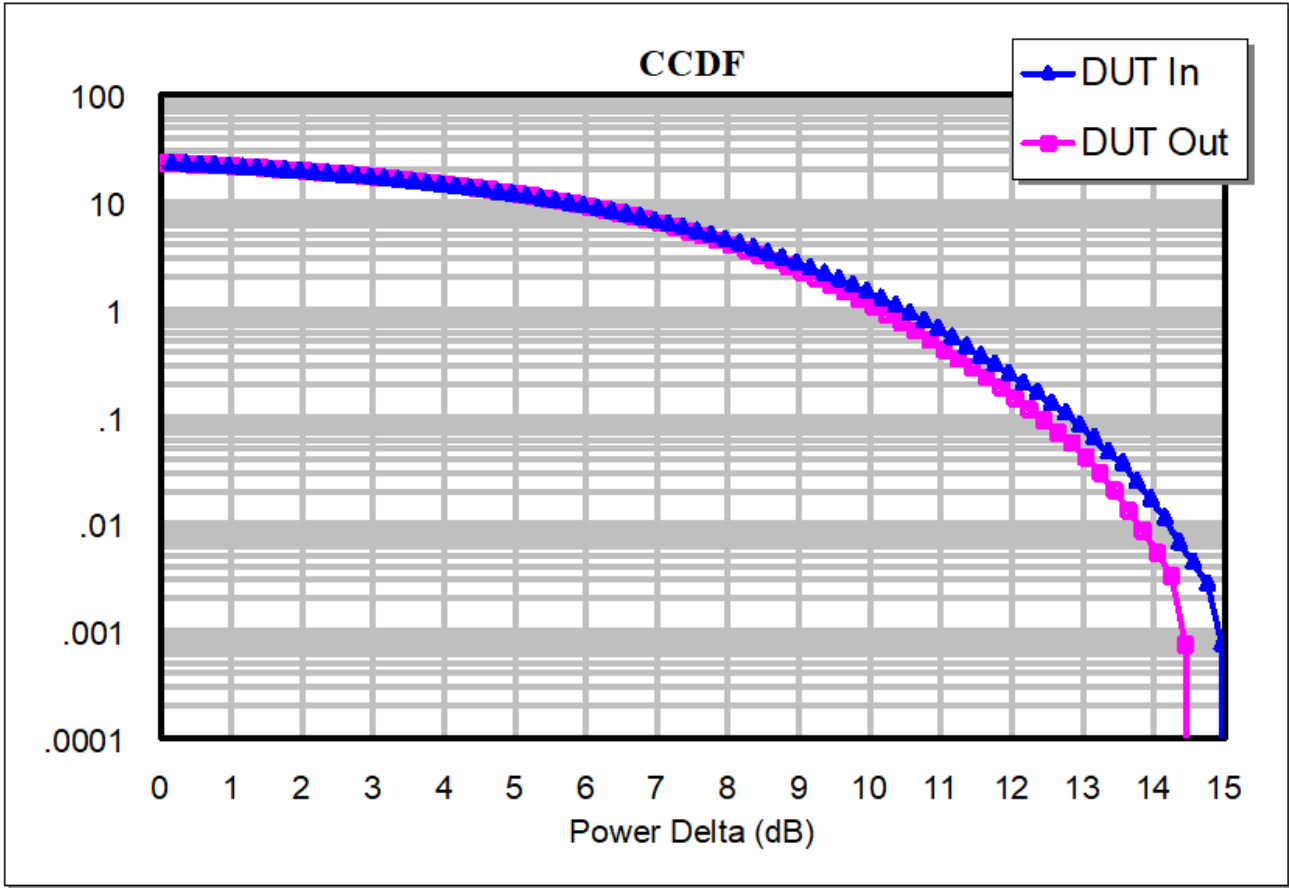
**TxOutLvlStart, TxOutLvlSpan, TxOutLvlStep (dBm):** Define swept power of transmitted signal

**UL\_DL\_Config:** Uplink/Downlink Configuration for TDD (0, 1, 2, 3, 4, 5 or 6)

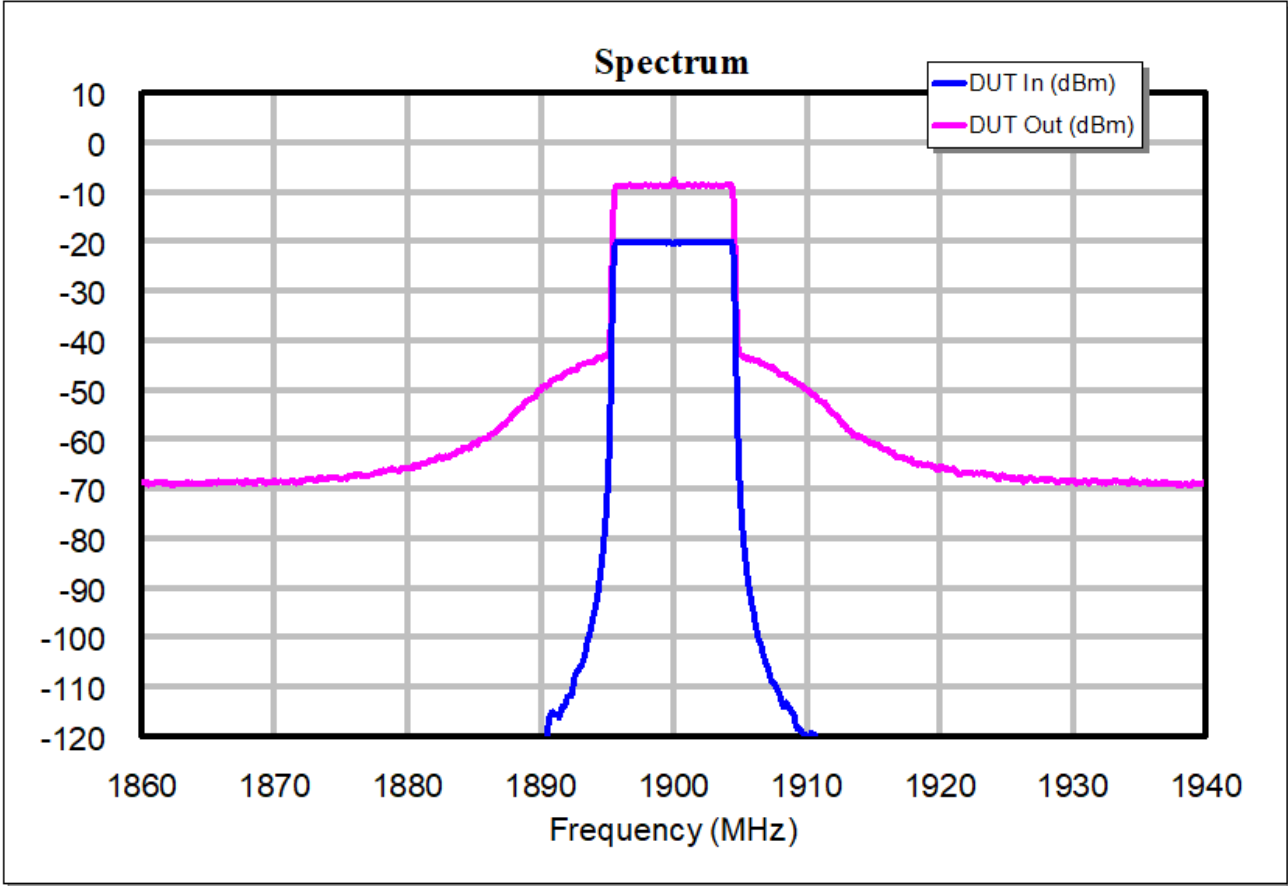
**PTS\_Format:** Pilot Time Slot Format for TDD (0, 1, 2, 3, 4, 5, 6, 7 or 8)

The test bench can be used to monitor:

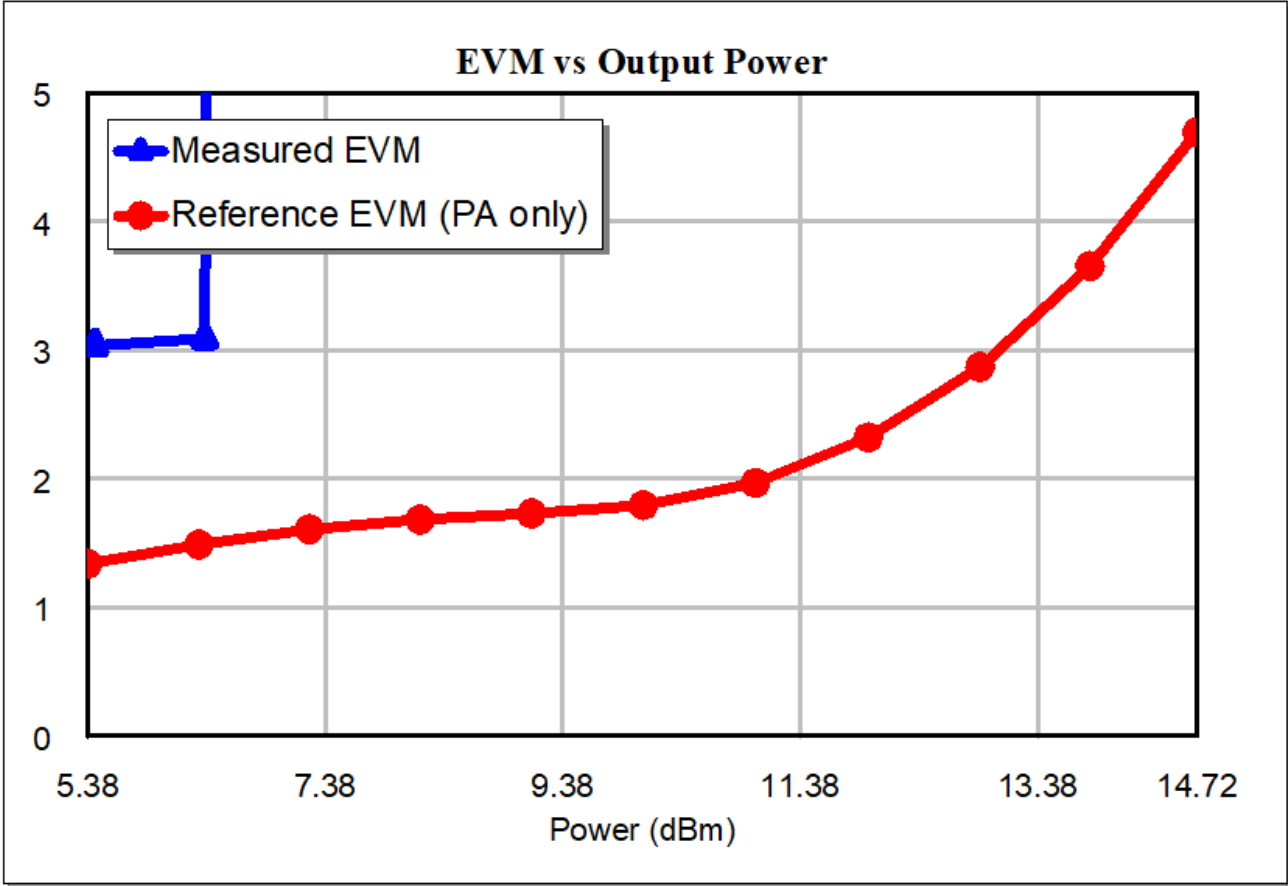
The CCDF at the input and output of DUT



The TX signal spectrum at the input and output of DUT



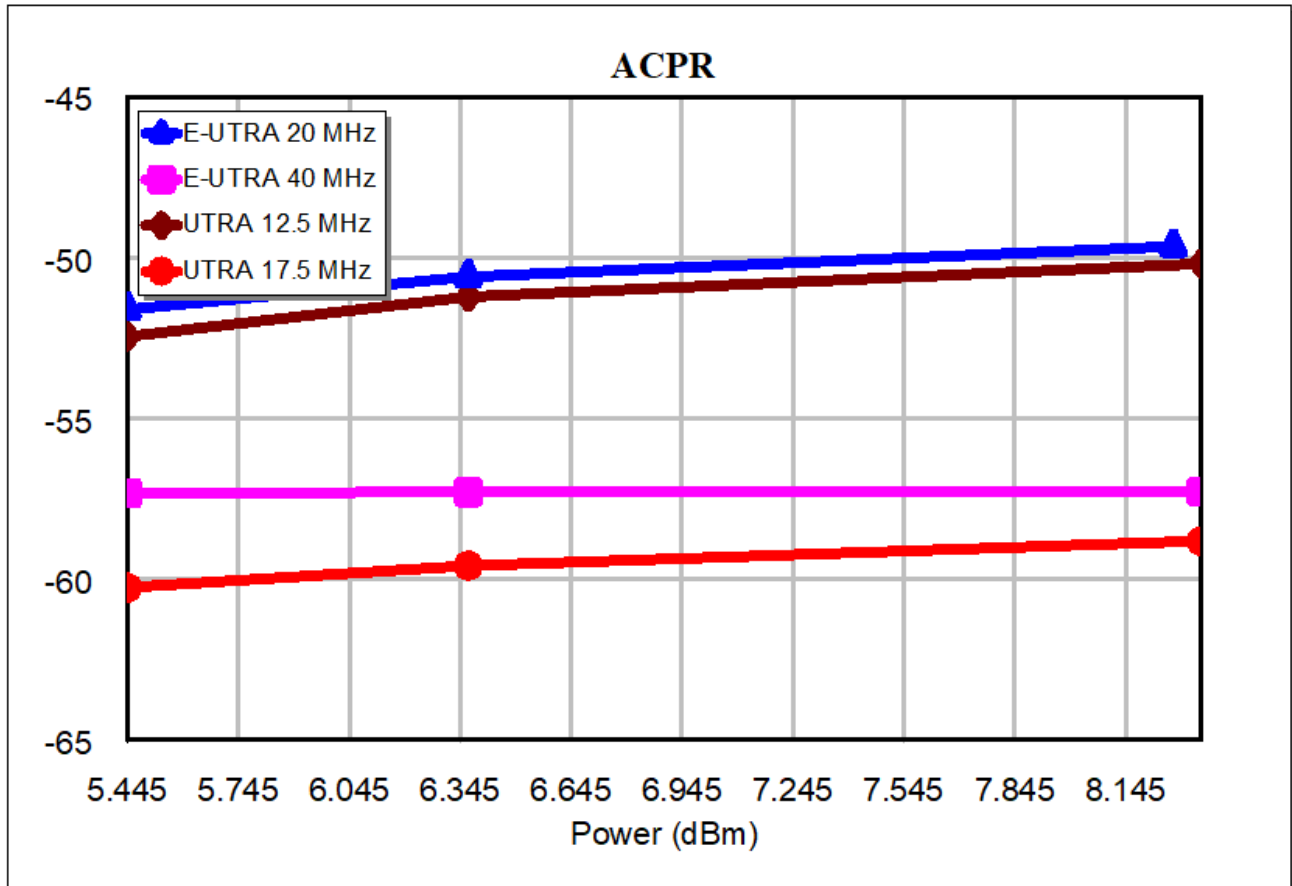
EVM %rms vs. output power



The impact of phase noise on EVM

The impact of phase/amplitude and DC offset on EVM

ACPR



N\_RB\_DL defines the channel bandwidth as defined in the specifications (See Global Definitions for relationship between N\_RB\_DL and channel BW).

Note that the amplifier model is based on a text data file. It can be replaced with an MWO circuit or a VSS behavioral amplifier model that accounts for frequency dependency. This test bench is used to illustrate several capabilities of VSS.

This example can be used to test a PA's error vector magnitude (EVM) performance vs. output power.

A reference IQ plot versus the measured IQ plot is shown. EVM measurements are calculated for each power level and plotted in the "EVM vs. Output Power" graph.

Please read the online help for information on any of the blocks that are used in the system diagrams. In addition, please read the online help for ACPR and EVM measurements.