

Product Description

octoFade-3GPP Channel Emulation RTL

octoFade-3GPP RTL emulates multipath/Doppler fading and AWGN per 3GPP certification specifications. It supports [GSM, UMTS and LTE channel models](#).

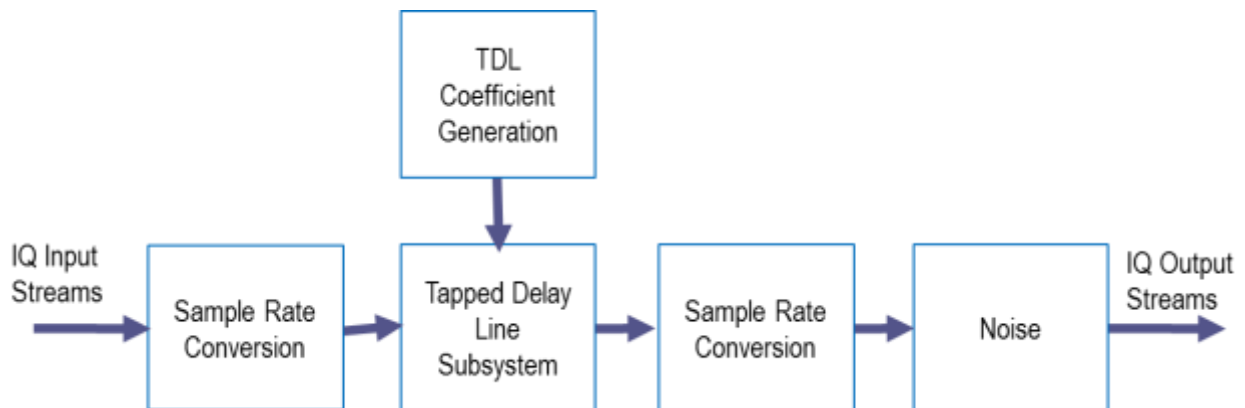
octoFade-3GPP RTL is easily customizable, expandable and extremely resource-efficient. The Stratix IV based VHDL implementation of 2G/3G/LTE 3GPP models uses only 23% of ALUTs, 37% of memory and 29% of DSP blocks in the EP4SGX530KH40C2 device. RTL is also available fully integrated into [octoFade-module](#). The octoFade-3GPP RTL can be easily integrated with off-the-shelf RF test equipment for testing through the device antenna terminals.

Features

- Operates in real-time on digital IQ samples
- Supports
 - 3GPP models for UMTS, GSM and LTE
 - Variety of SISO/MIMO channel configurations
 - SNR/AWGN

Applications

- R&D and QA testing of 2G/3G/LTE radios
- Integration with RF signal generators, analyzers and other test equipment



octoFade-3GPP RTL functional block diagram

octoScope can customize the octoFade-3GPP RTL to fit a desired hardware platform and customer requirements. 802.11n/ac channel models, currently available as C software, will be available as RTL in Q4 of 2012.

octoFade-3GPP Specifications

Parameter	Specification
Digital IQ inputs (N)	Up to 8 (16-bit)
Digital IQ outputs (M)	Up to 4 (16-bit)
MIMO configurations	4x4 or dual 4x2 or smaller configurations
Input/Output sample rate	61.44 MHz
Maximum number of TDL paths	Up to 16 paths
Maximum number of taps per TDL (T)	Up to 18
Maximum number of taps	144 taps total (N x M x T)
Tap specifications	0 to -40dB; 0.1dB resolution 10ns delay resolution 30us max delay range
3GPP channel models	LTE: EPA 5Hz; EVA 5Hz;EVA 70Hz; ETU 70Hz; ETU 300Hz; MBSFN GSM: RAX; HTx; TUX; EQx; Tlx UMTS: PA3; PB3; VA30; VA120; MBSFN Moving propagation, birth-death, high-speed train
Custom channel models	Arbitrary fading profiles can be implemented in software and loaded into the FPGA via register interface.
Static models	Identity, Butler
Distortion	Better than -50dBc for Identity case
AWGN	SNR: -10 to +25dB; 0.1dB resolution Bandwidth: Up to 20MHz, per 3GPP standard requirements
Fading	Types: Rician/Rayleigh Spectrum: Classical Doppler Shift: 0.1 – 1000Hz; 1Hz resolution
Control Interface	32-bit register memory map
FPGA resources (dual channel 4x2 MIMO topology example with 18 taps per MIMO path)	Logic: ~84k ALUTs (used as multipliers)* Memory: 6-7 Mb Multipliers: 300

octoScope can modify any of these specifications and adapt the RTL to the desired FPGA platform. The octoFade solution can be easily integrated with off-the-shelf RF test equipment, such as VSA/VSG, for testing through the device antenna ports. octoScope welcomes customer inquiries about adding 802.11n/ac models to the RTL. Please contact sales@octoscope.com.

octoFade-3GPP Specifications

Parameter	Specification
Digital IQ inputs (N)	Up to 8 (16-bit)
Digital IQ outputs (M)	Up to 4 (16-bit)
MIMO configurations	4x4 or dual 4x2 or smaller configurations
Input/Output sample rate	61.44 MHz
Maximum number of TDL paths	Up to 16 paths
Maximum number of taps per TDL (T)	Up to 18
Maximum number of taps	144 taps total (N x M x T)
Tap specifications	0 to -40dB; 0.1dB resolution 10ns delay resolution 30us max delay range
3GPP channel models	LTE: EPA 5Hz; EVA 5Hz;EVA 70Hz; ETU 70Hz; ETU 300Hz; MBSFN GSM: RAX; HTx; TUx; EQx; Tlx UMTS: PA3; PB3; VA30; VA120; MBSFN Moving propagation, birth-death, high-speed train
Custom channel models	Arbitrary fading profiles can be implemented in software and loaded into the FPGA via register interface.
Static models	Identity, Butler
Distortion	Better than -50dBc for Identity case
AWGN	SNR: -10 to +25dB; 0.1dB resolution Bandwidth: Up to 20MHz, per 3GPP standard requirements
Fading	Types: Rician/Rayleigh Spectrum: Classical Doppler Shift: 0.1 – 1000Hz; 1Hz resolution
Control Interface	32-bit register memory map
FPGA resources (dual channel 4x2 MIMO topology example with 18 taps per MIMO path)	Logic: ~84k ALUTs (used as multipliers)* Memory: 6-7 Mb Multipliers: 300

octoScope can modify any of these specifications and adapt octoFade-RTL to the desired FPGA platform, for example [Altera Stratix IV GX FPGA Development Kit, 530 Edition \(DK-DEV-4SGX230N\)](#) or [National Instruments LabVIEW FPGA module](#). The octoFade solution can be easily integrated with off-the-shelf RF test equipment, such as VSA/VSG, for testing through the device antenna ports or over-the-air. 802.11n/ac models will be available in RTL in Q4 of 2012. Please contact sales@octoscope.com with any inquiries.