

SFD DOCSIS[®] Signal Generator

The Calian SFD produces OFDM and SC-QAM signals for DOCSIS 4.0, legacy DOCSIS, and digital cable TV in line with J.83 A/B/C and analog cable TV standards. Its downstream frequency range covers from 47 MHz to 1794 MHz. The upstream frequency range covers from 5 MHz to 204 MHz. Downstream and upstream DOCSIS OFDM and SC-QAM carriers are modulated using Ethernet data traffic or an internally generated internal PN23 data sequence.

The Calian SFD downstream DOCSIS 4.0 OFDM modulated carriers are specification compliant with carrier bandwidths up to 192 MHz and support all constellation rates. Alternatively, either a single DOCSIS SC-QAM channel at any downstream frequency or 96 simultaneous SC-QAM channels above 1002 MHz are available and all compliant with ITU J.83 modulation standards. The Calian SFD can also produce an analog TV signal or other preconfigured common cable waveforms.

The Calian SFD upstream DOCSIS OFDMA signal can be generated in real-time at the desired burst transmission rate. DOCSIS ATDMA or S-CDMA signals can also be produced using real-time data.

The digital signal generation capabilities of the Calian SFD make it ideal for testing tuners, cable modems and upstream CMTS receivers in R&D and production environments. The available RF cable impairment simulate real world transmission environments for a variety of testing scenarios, plus it can add phase noise, AWGN noise, RF tilt, AM hum, and a defined bit error rate in the transmit signal.

The desktop size of a half rack unit width and two-unit height make it convenient for use by developers at their desk or manufacturing facilities with limited available space.

The complex signal generation process can be conveniently configured from a PC or a web interface. Remote control SCPI commands enable the generator to be used in automatic test systems.



Key facts

- Frequency range in downstream: 47 MHz to 1218 MHz (extendable to 1794 MHz)
- Frequency range in upstream: 5 MHz to 204 MHz
- DOCSIS OFDM, SC-QAM, digital and analog TV
- Simultaneous generation of 96 SC-QAM channels above 1GHz with SFD-K202 option for DOCSIS 4.0
- ARB generator bandwidth up to 200 MHz
- Signal interference and distortion simulation

Benefits and key features

Downstream signal generation

- Realtime modulation of DOCSIS OFDM and SC-QAM (J.83 A/B/C)

Upstream cable modem data traffic simulation

- Realtime modulation of DOCSIS OFDMA, A-TDMA, and S-CDMA
- Trigger function for burst timing control

Powerful ARB generator

- Playout ARB files up to 200 MHz bandwidth

Specifications in brief

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RF parameters		
Downstream frequency range		47 MHz to 1212 MHz
	With SFD-K3018 option	47 MHz to 1794 MHz
Upstream frequency range		5 MHz to 204 MHz
Level	192 MHz DOCSIS 3.1	59 dBmV
	J.83/A/B/C (DOCSIS 3.0)	62 dBmV
MER	192 MHz DOCSIS 3.1	57 dB (typ.)
	J.83/A/B/C	48 dB (typ.)
Downstream modulation (SFD-K201 option)		
Enhanced functions		Insertion of timestamps in the downstream PLC, display of transmission data rate, Calian FSW compatibility
Upstream modulation (SFD-K300 option)		
DOCSIS 3.1	Modulation mode	OFDMA
	Bandwidth	6.4 MHz to 96 MHz
DOCSIS 3.0	Modulation mode	A-TDMA, S-CDMA
	Bandwidth	800 kHz, 1.6 MHz, 3.2 MHz, 6.4 MHz
ARB waveform generator		
Bandwidth		200 MHz
Memory		256 Mbyte
Sample rate		240 Msample/s
Waveform		DOCSIS 3.1, DOCSIS 3.0, J.83, PAL, NTSC, A-TDMA, S-CDMA, FM spectrum, additional PAL and SECAM signals
Signal interference (SFD-K1050 option)		
Bit error rate		10^{-2} to 10^{-6}
Noise		AWGN, phase noise
AC hum	Amplitude modulation	47 Hz to 200 Hz, 0 % to 6 %
Tilt	DOCSIS 3.1	± 15 dB/GHz
Transmission parameters for SFD-K202 (above 1002 MHz)		
DVB-C	Constellation	64QAM, 256QAM
	Rolloff	0.15
	Symbol rate	6.952 Msps
	Number of carriers	80
J83/B	Constellation	64QAM
	Rolloff	0.18
	Symbol rate	5.056946 Msps
	Number of carriers	96
J83/C	Constellation	256QAM
	Rolloff	0.12
	Symbol rate	5.360537 Msps
	Number of carriers	96

