Wi-Fi 6E Multipath Emulator

Simulates 'true' multipath effects in a wireless environment

10444 Series
Model 10444-4
RoHS

Features

- Produced "true" multipath effects
- Best in class insertion loss (13 dB) & roll off between taps (6.5 dB)
- Simulates TGn-A/B Channel Models
- 4 independent channels with 2 clusters per channel
- Integrated programmable phase shifter / delay line

Applications

- Ideal for MIMO Conductive Testing
- Wi-Fi 6E / WiMAX /4G LTE/5G multipath fading simulators
- Engineering/Production test lab environments

Description

The multipath emulator is designed to create the conditions described by the TGn-B channel model, as detailed in IEEE 802.11-03/940r1. Two clusters are produced, spaced from one another by 20 ns of delay, each cluster produces a series of taps, which decay exponentially. The system includes 4 individual channels with a bypass switch in each one, allowing the user to bypass the multipath simulator, creating the conditions described in the TGn-A channel model. Additionally, the system includes a programmable phase shifter, allowing the user to precisely tune the frequency response.

Control Configuration

The USB-LAN attenuator provides four channels of attenuation controllable via either USB 2.0 or 10/100Base-T Ethernet interfaces. The attenuation channels can be operated independently or in a synchronized fashion where all attenuators change simultaneously.

10/100BaseT Ethernet: The Ethernet port supports 10/100BaseT operation, with auto-negotiation of the interface speed and duplex mode. Supported network protocols include: IP, UDP, TCP, ICMP (ARP and PING), DHCP, AUTOIP, TELNET, and HTTP. The TCP and UDP servers allow connections to be established for general programming purposes. A TELNET server is provided for a command-line interface that implements many of the functions of the serial console CLI, and an HTTP server that allows control via a browser or JQUERY.

USB Control: In USB mode the attenuator is controlled and powered via a standard USB 2.0 connection to a USB host. The system operates as a USB CDC device. Programming is done via simple ASCII text-based message strings to control the device.

Key Specifications

No. of Channels	4
Number of Clusters	2
ConfigRMS Time delay	15ns (nominal)
Time Delay Between Clusters:	20 ns +/- 1ns
Time Delay Between Taps:	10 ns +/- 1ns
Roll-Off Between Taps	7 dB (typical) 10 dB (max)
Switching Speed	100 nsec. (10% RF to 90% RF)
Command Processing Time	3-5 msec (typical)
Control Logic	Ethernet (10/100), RS-232, USB 2.0
Operating Voltage	Though USB +5V
RF Connectors	SMA Female input/output
Size	19" W x 3.5" H x 12" D (std 19" rack mount)
Weight	TBD g (TBD oz.) Typical
RF Connectors	SMA Female located on front panel
Impedance	50 ohms nominal

Wi-Fi 6E Multipath Emulator

Simulates 'true' multipath effects in a wireless environment

10444 Series
Model 10444-4
RoHS

RF Specifications

Parameter	Frequency Range	Condition	Minimum	Typical	Maximum	Units
Operating Frequency	-	-	4.7	-	7.25	GHz
Nominal Impedance	4.7 - 7.25 GHz	-	-	50		Ohm
Config RMS Time delay	4.7 - 7.25 GHz	0.5 dB Steps	-	15	4.5	Ns
Insertion Loss	4.7 - 7.25 GHz	ByPass	-	4.0		dB
	7.25 GHz	At Peak of Band	-	13		
	4.7 - 7.25 GHz	Cluster 1, Tap 1	-	17		
VSWR (All Ports)	4.7 - 7.25 GHz		-	2:1		-
Phase Shift	@7.25 GHz	Maximum			405	deg
	@7.25 GHz	Increment		45		deg
RF Input Power, CW	4.7 - 7.25 GHz	Steady State	-	-	+20	dBm
Operating Temperature	4.7 - 7.25 GHz	-	0	-	50	°C
Storage Temperature	-	-	-20	-	80	°C

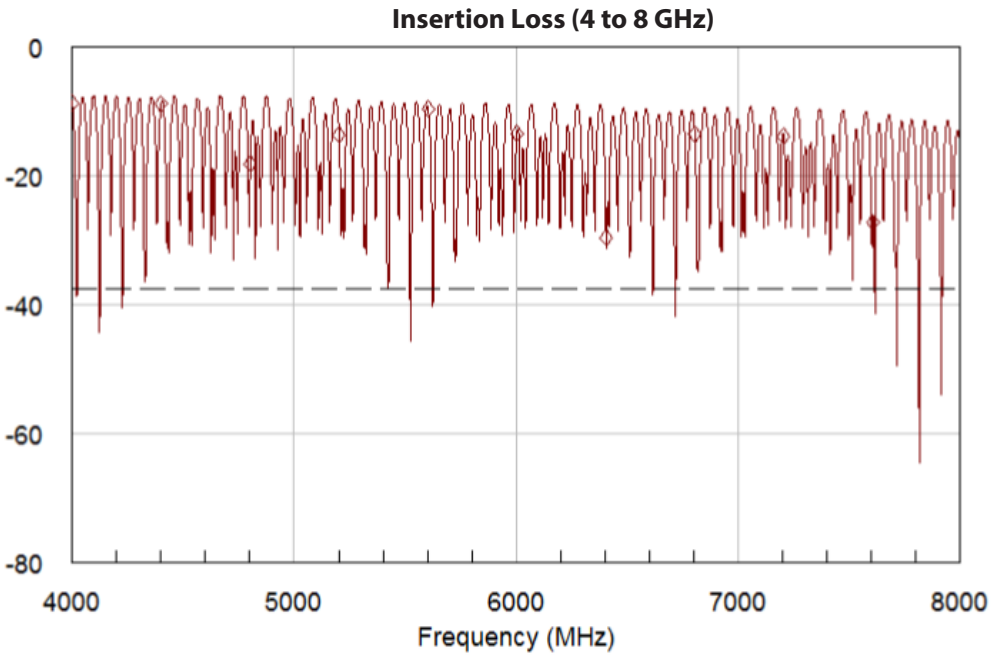
1. *X% is the percentage of the nominal attenuation setting. For example the accuracy of 30 dB @ 8 GHz is ± (1.0+0.025x30) dB. This equates to ±1.75 dB which means when setting the attenuator at 30 dB, the actual measured normalized value would be between 28.25 dB and 31.75 dB.*
2. *The values in the table apply at room temperature unless otherwise specified.*

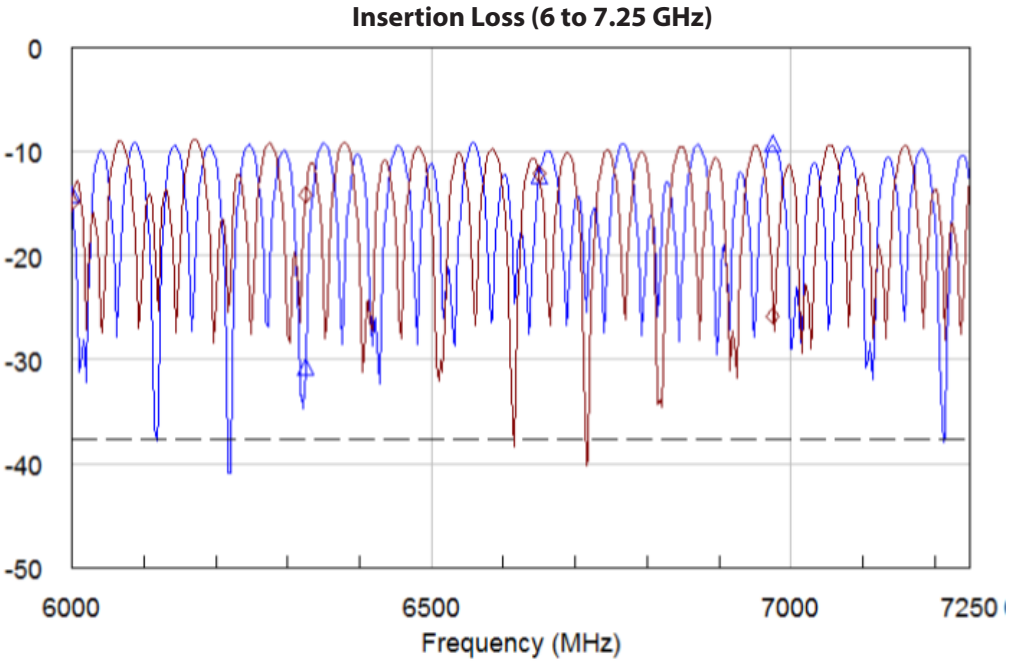
Wi-Fi 6E Multipath Emulator

Simulates 'true' multipath effects in a wireless environment

10444 Series
Model 10444-4
RoHS

Typical RF Performance



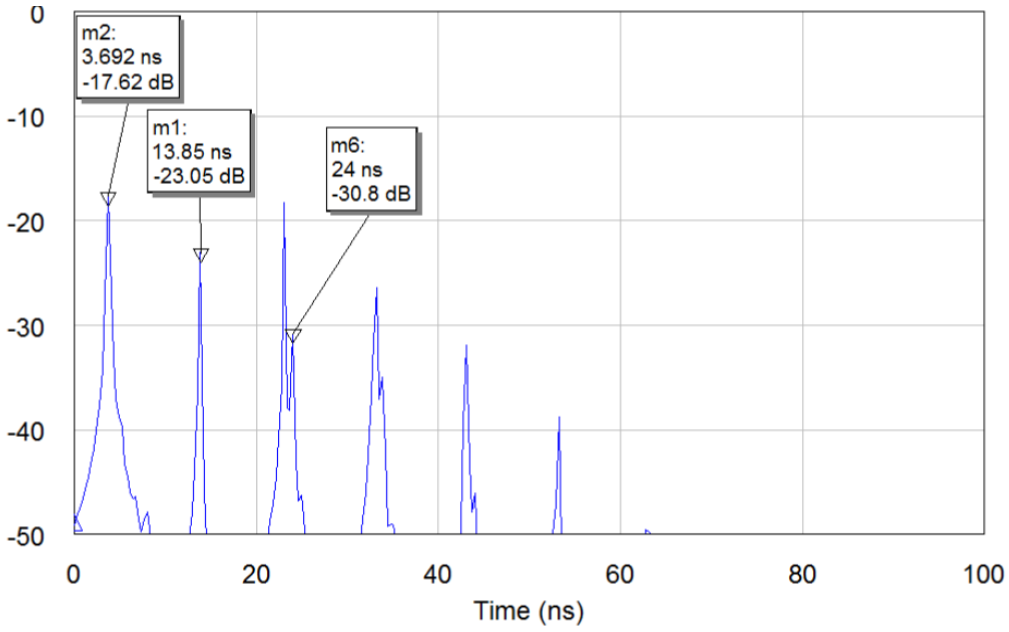


Wi-Fi 6E Multipath Emulator

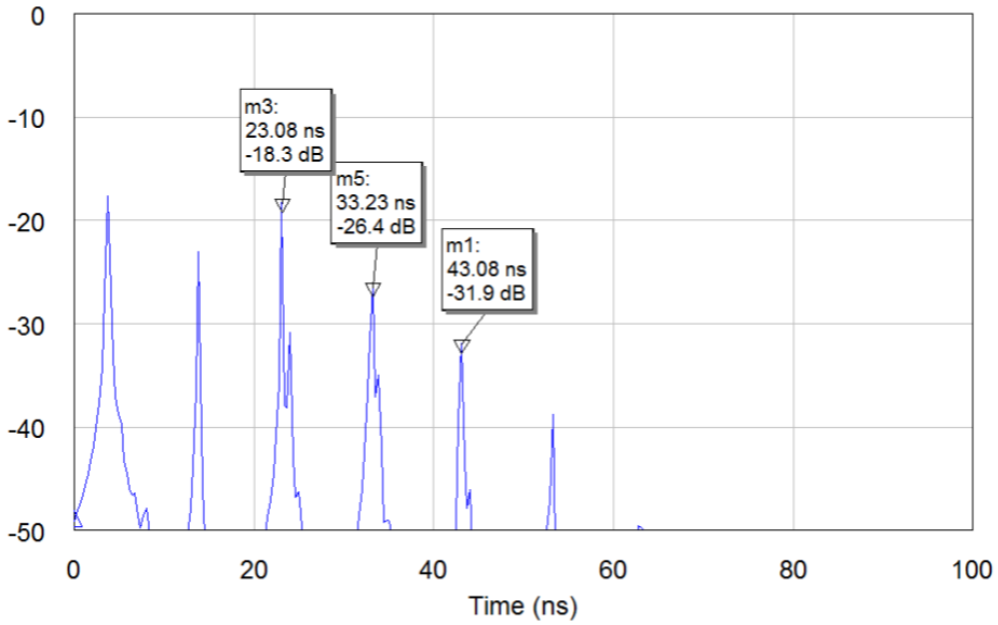
Simulates 'true' multipath effects in a wireless environment

10444 Series
Model 10444-4
RoHS

Cluster 1, BPI Time domain



Cluster 2, BPI time domain

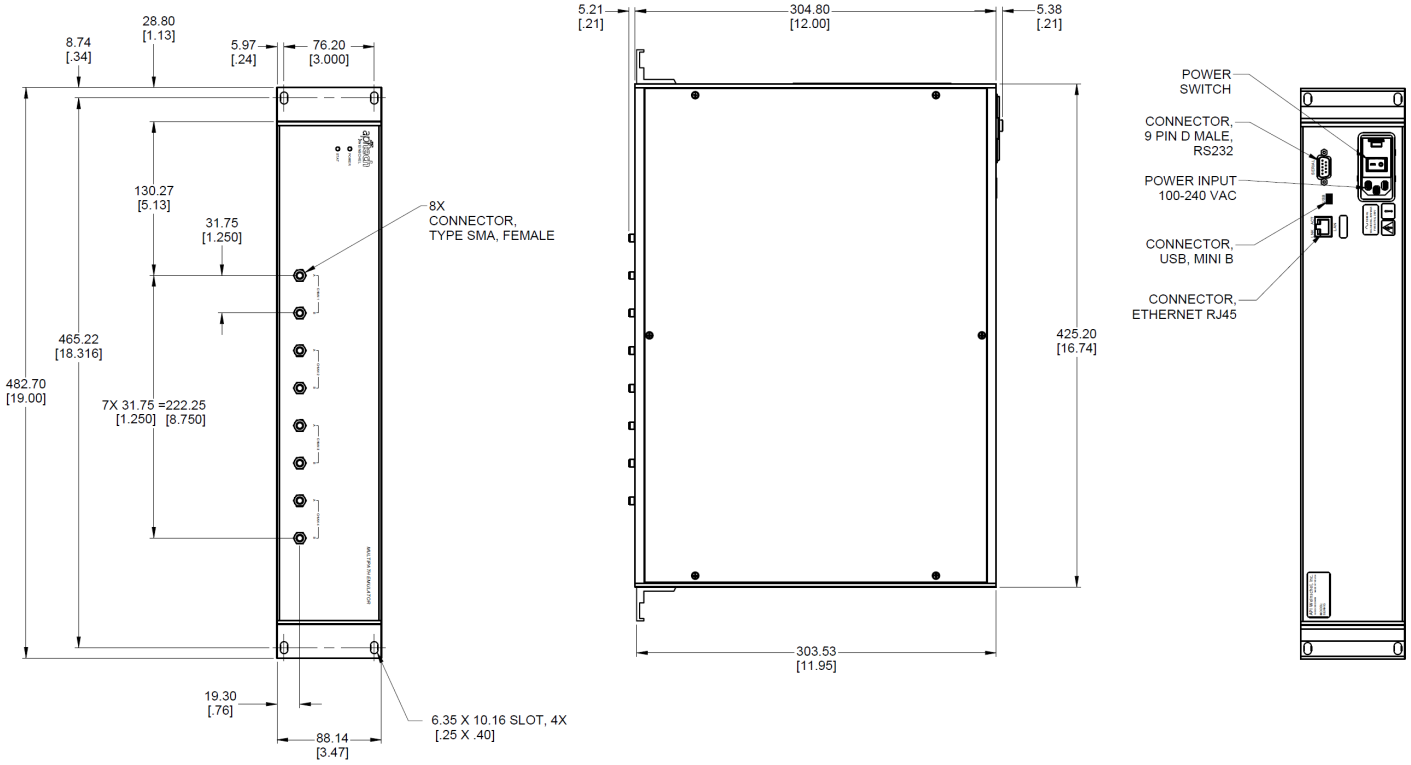


Wi-Fi 6E Multipath Emulator

Simulates 'true' multipath effects in a wireless environment

10444 Series
Model 10444-4
RoHS

Mechanical Dimensions



Notes:

1. ALL DIMENSIONS ARE GIVEN IN MM (INCHES)

2. ALL MATERIALS AND PROCESSES ARE TO BE IN COMPLIANCE WITH THE EUROPEAN DIRECTIVE RESTRICTION OF HAZARDOUS SUBSTANCES (RoHS) (REF: WEINSCHEL 020-638)

3. CONTROL CONNECTORS:

a. ETHERNET, RJ45

b. USB - MICRO-B

c. POWER, PHOENIX CONTACT, 2.5MM, MATES WITH PHOENIX CONTACT P/N PTSM 0.5/2-P-2, 5-1778832

AUX Port (3c)		
PIN#	**SIGNAL**	**DESCRIPTION**
1	SYNC	Out, 5V CMOS
2	GND	Signal Ground