

## 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

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## RF Specifications

Parameter	Frequency Range	Condition	Minimum	Typical	Maximum	Units
Operating Temperature	-	-	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  $\pm (1.0+0.025 \times 30)$  dB. This equates to  $\pm 1.75$  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.

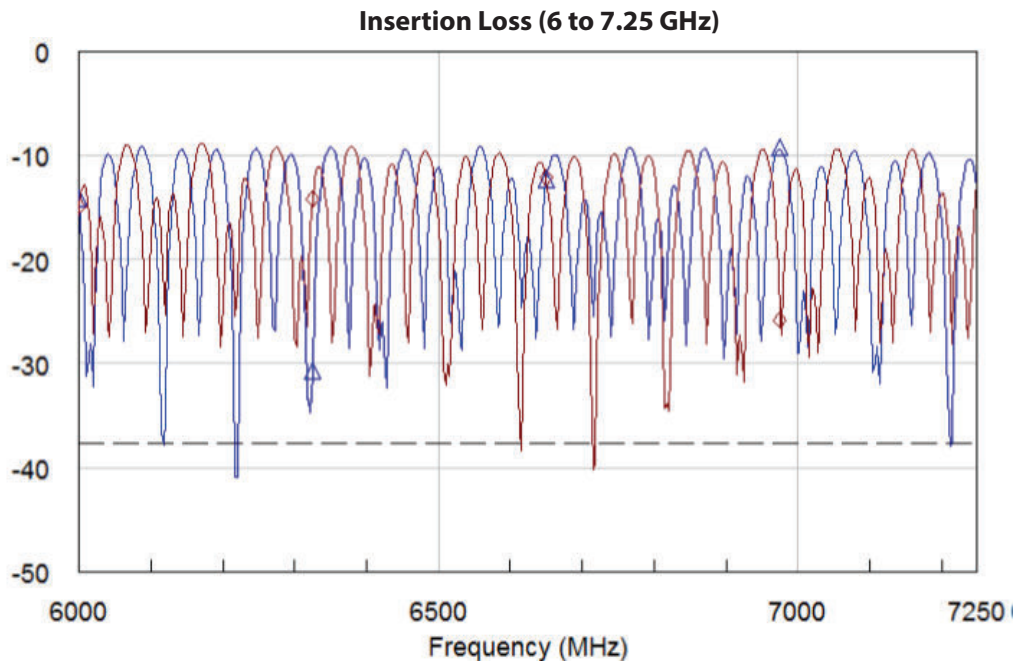
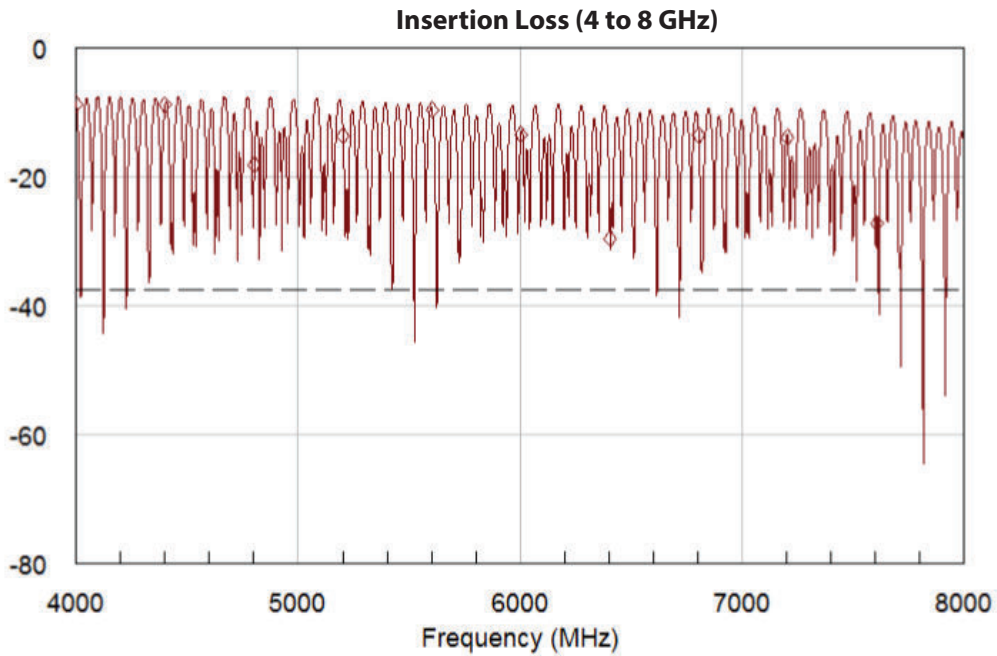
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## Typical RF Performance

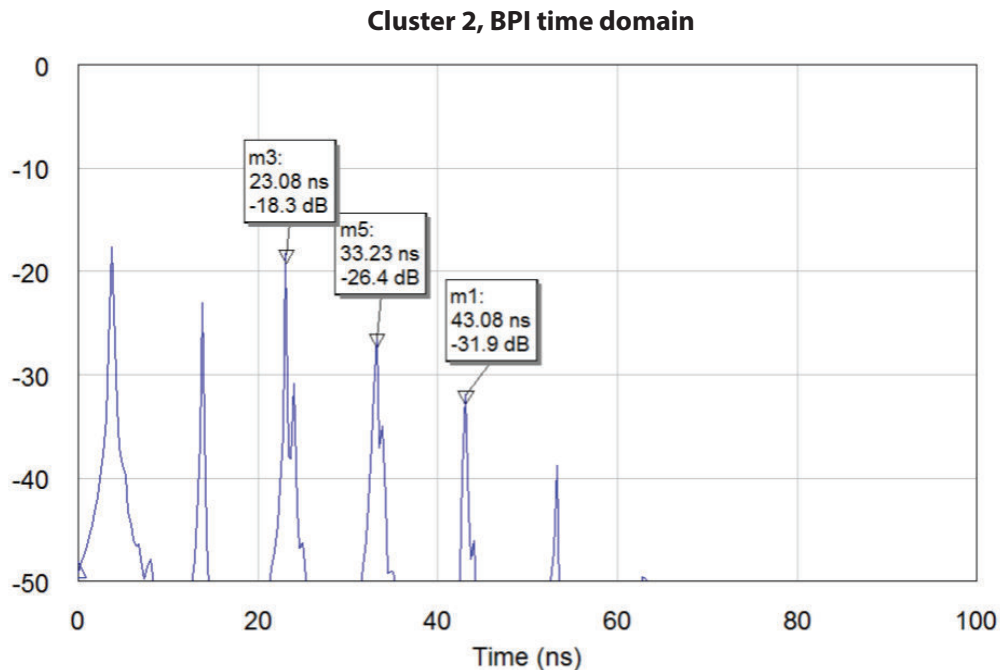
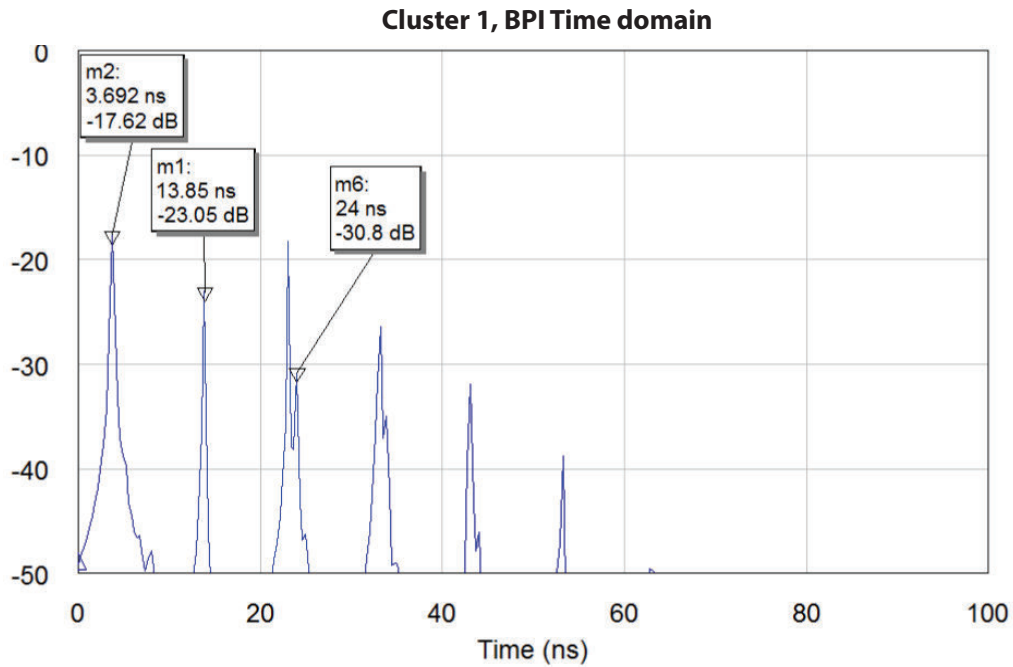


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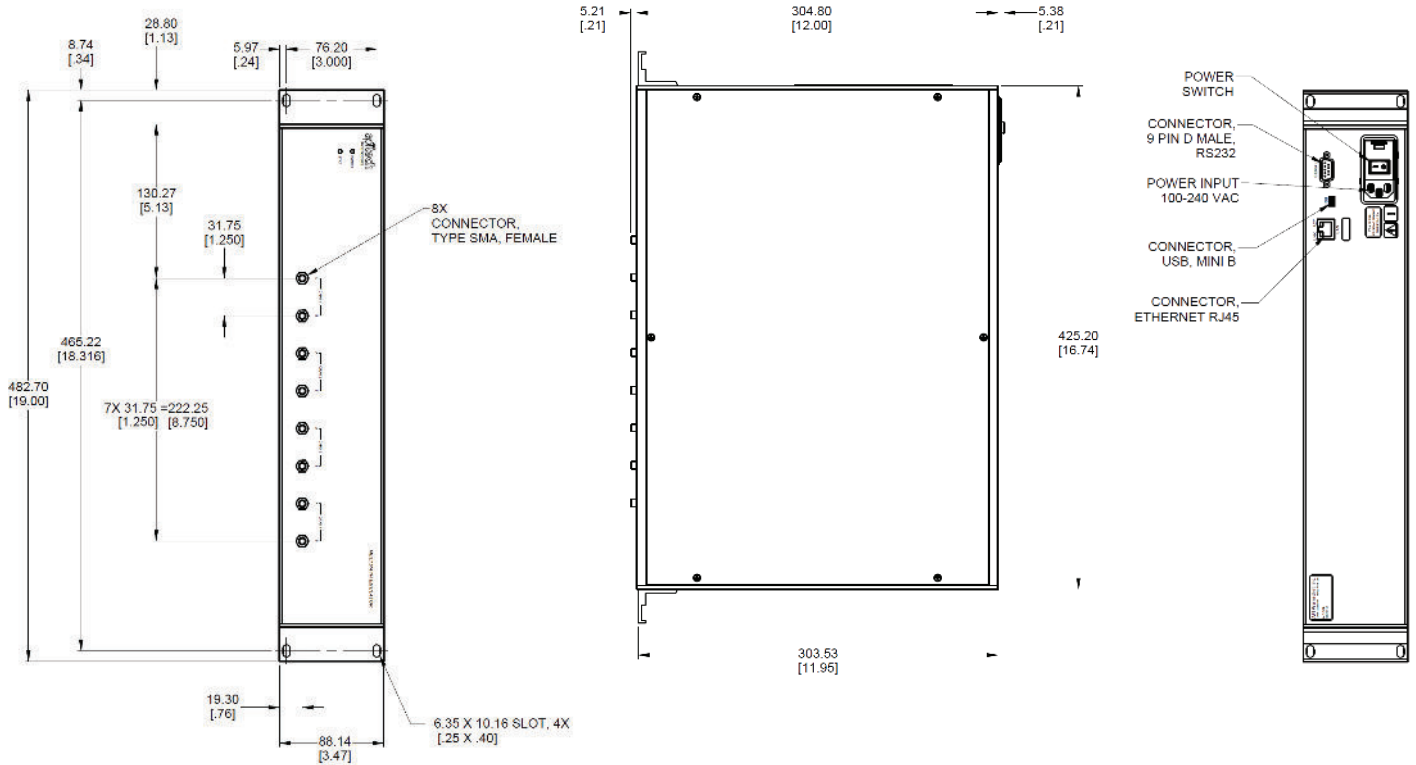
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## Mechanical Dimensions



**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: WEINSCHL 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