AIE-W5ER

5 Port Air Interface Emulator 400 … 6000 MHz, 50 Ω

Features

- wideband
- 2 watt power capability
- 95.25 dB attenuation range
- LAN and USB Remote Interface
- Trigger interface
- 19”, 3 U device

Applications

- Air Interface Emulation
- WiFi communication testing
- 802.11 a/h, ac, b, g, n, p
- V2X and V2V
- Fading simulation

At a Glance

The AIE-W5ER air interface emulator enables real emulation of RF levels for radio communication for wireless networks. It has 5 RF Ports for the connection of access points. All signal paths are bidirectional. Each of the 5 ports can be fed with a composite RF signal that is individually composed of a programmable mix of the 4 signals coming from the remaining ports. The variation of levels can be done in a wide dynamic range with internal precision attenuators.
The AIE-W5ER allows to recreate a realistic air interface, whereby the connected access points receives multiple signals from the remaining access points simultaneously with varying propagation loss. The reproducible emulation of air interface scenarios in laboratory environment saves time and cost in product development and verification.

Matrix function

The AIE-W5ER can also be used as non-blocking matrix. Every port has free access to the remaining ports. Attenuators between the signal paths allow also the emulation of fading effects. With a fast attenuator response time, the device is an efficient and fast solution for automatic testing systems.

Wideband

The operating frequency range covers 400 MHz to 6000 MHz. Therefore the AIE-W5ER is useable for all Wi-Fi standards including 802.11p for V2X and V2V communication.

High Dynamic

The setting range of the digitally controlled attenuators covers 95.25 dB and is adjustable in 0.25 dB steps. This allows test scenarios with highest requirements for dynamics and accuracy. All RF ports of the air emulation system allow signals levels of up to 2 Watts.

Synchronous Operation

For remote control the AIE-W5ER offers LAN and USB interfaces. AIE-W5ER offers additional a TRIGGER IO port. This Interface provides a precise trigger pulse which complies with the physical execution of the applied switching command. On the other hand, external pulses can be applied to this port in order to trigger the execution of queued switching commands synchronously.
The attenuator configuration of the emulator can be preloaded with SCPI oriented ASCII strings via LAN interface without execution. After a positive TTL pulse slope at the trigger input, the preloaded attenuator configuration will be executed only by hardware in micro seconds.

Principle diagram

RF Specifications

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
impedance	Z_{in} / Z_{out}		50		Ohm	
low frequency	f_{min}		300	400	MHz	
high frequency	f_{max}	6000			MHz	
number of RF ports	n_{RF}		5			bi-directional
return loss	S_{11}, S_{22}		-12		dB	
insertion loss[1]	S_{21}		-17		dB	f ≤ 1 GHz
	S_{21}		-19		dB	1 GHz ≤ f ≤ 3 GHz
	S_{21}		-22		dB	3 GHz < f ≤ 5 GHz
	S_{21}		-24		dB	5 GHz < f ≤ 6 GHz
isolation	S_{21}		-40		dB	between ports, ATT = 0 dB
attenuation range	ΔS_{21}	0.00		95.25	dB	
attenuation resolution	dS_{21}		0.25		dB	
attenuation accuracy	ATT_{ERR}		± 0.50		dB	@ 3 GHz, ATT = 63.25 dB
attenuator settling time	t_{ASET}		1		µs	
atten. response time	t_{ARSP}		1		ms	
DC voltage	U_{DC}			20	V	
ESD discharge resistor	R_{ESD}		4.7		kΩ	all inputs and outputs
input power	P_{RF}			+33	dBm	CW
RF connector	X_{RF}		N female			rear side

Note 1: attenuator settings: 0.00 dB

TRIGGER IO Specification

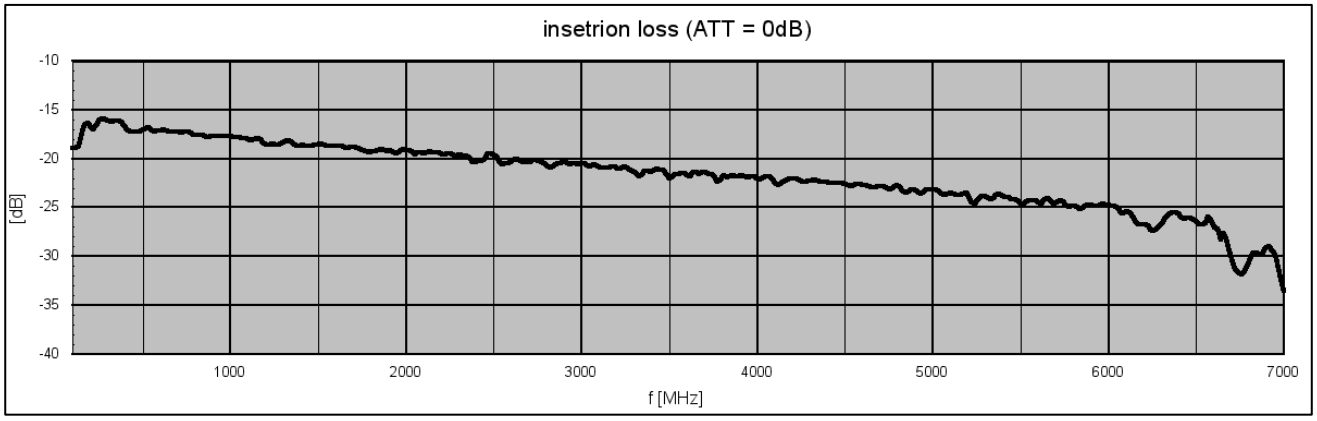
Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
connector type			BNC female			
function type			open collector, wired AND			positive edge = trigger
			low state = BUSY			"SLAVE" mode
logic high level	U_H	2.0	5.0	5.5	V	
logic low level	U_L	-0.5	0.0	1.2	V	
pulse width	T_W		50		µs	
rise time	T_R		0.1[1]	0.5[2]	µs	
sinking current	I_S			60	mA	
passive pull up	R_{PU}		1		kΩ	
active pull up	I_{PU}		10		mA	"MASTER" & "OUT" mode
drivable capacitance	C_D			2	nF	
load capacitance	C_L		110		pF	mode "SLAVE"
trigger offset*	t_O	-500[2]	+0[1]		ns	50% trigger signal to 50% RF-switching (trigger mode "OUT")
trigger offset*	t_O	+10	+60	+200	ns	50% trigger signal to 50% RF-switching (trigger mode "MASTER" or "SLAVE")

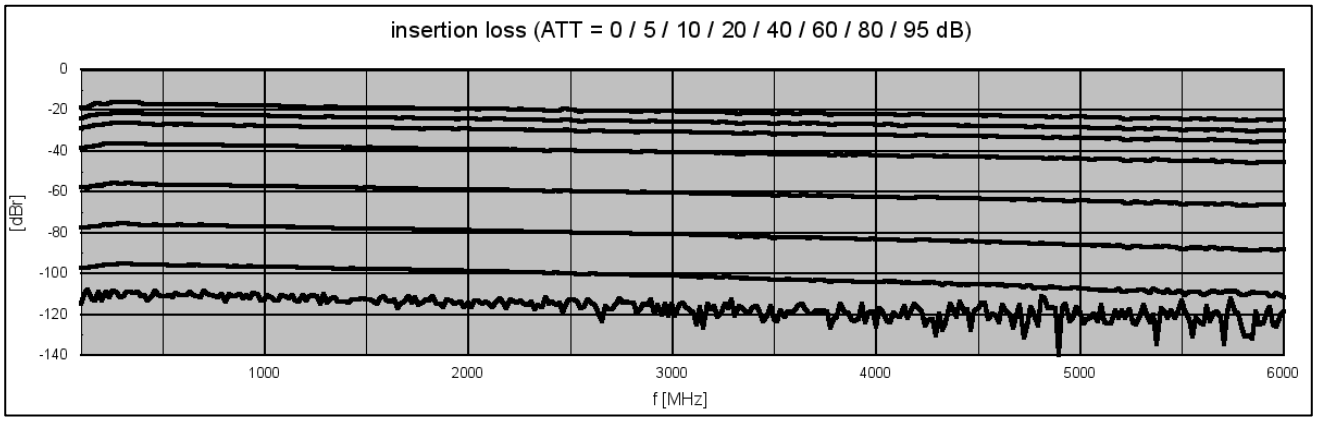
Note 1: capacitive load < 100 pF
Note 2: capacitive load ≤ 2 nF

Common Specification

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
voltage supply range	U_{AC}	90	230	260	V	50 / 60 Hz AC
power consumption	P_{AC}		6		W	
power socket	X_{AC}		IEC-60320 C14			country specific mains cable
Dimensions and weight						
dimensions	W x H x D		approx. 482 x 133 x 390		mm	19” 3 U, without connectors and handles
weight	m		9.6		kg	
Environment conditions						
operating temp. range	T_o	+5		+45	°C	
storage temp. range	T_s	-40		+70	°C	
Remote interfaces						
remote ports	LAN		10/100BaseT	TCP/IP		RJ45
	USB		2.0 (high speed)			USB type B
Product conformity						
Electromagnetic compatibility	EU: in line with EMC directive (2014/30/EC)					applied harmonized standards: EN 61326-1 (for use in industrial environment), EN 61326-2-1, EN 55011 (class B), EN 61000-3-2, EN 61000-3-3
Electrical safety	EU: in line with low voltage directive (2014/35/EC)					applied harmonized standard: EN 61010-1
Ordering information	AIE-W5ER		P/N: 1309.4052.1			

S-Parameters (typical responses)



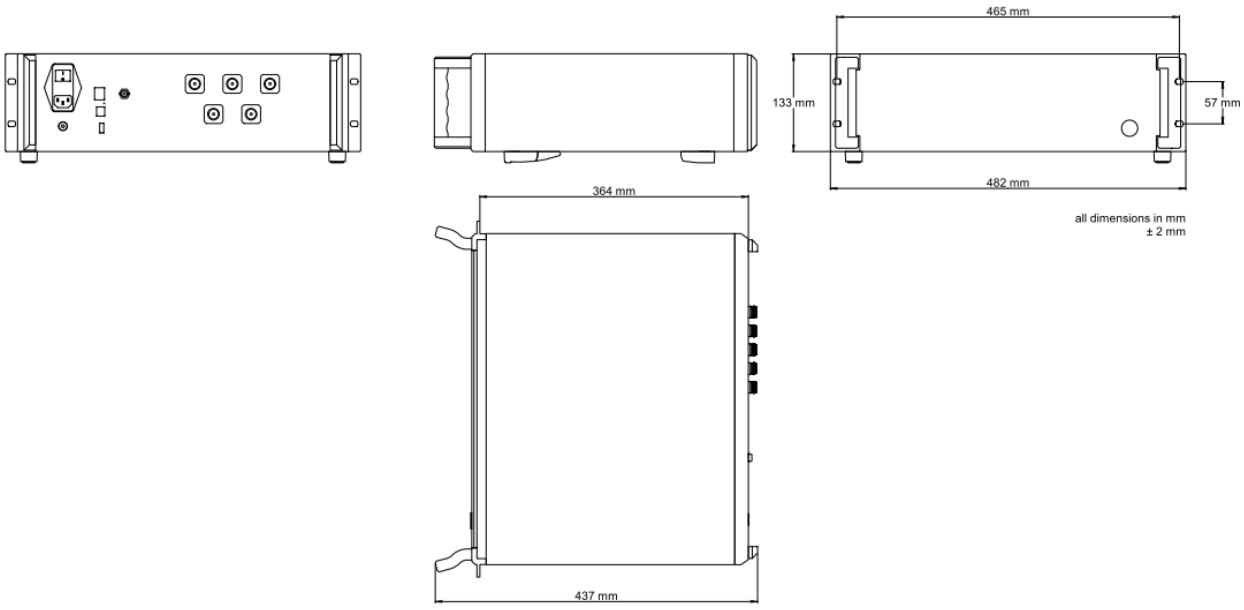


Appearances

Front view

Rear view

Dimensions



Related Products

Product	Description	P/N
QATT-7G	4 Channel Step Attenuator 100 kHz … 7000 MHz, 0 …95.25 dB, 0.25 dB steps	1302.4702.1
QATT	4 Channel Step Attenuator 100 kHz … 4000 MHz, 0 … 100.0 dB, 0.5 dB steps	1302.4002.1
QDLL	4 Channel Programmable Delay Line 250 MHz … 4000 MHz, 0 …1700 ps	1303.4002.1
AIE-4X4ER	4X4 Channel Air Interface Emulator 400 … 6000 MHz	1201.4902.1
AIE-W9R	9 Port Air Interface Emulator 1800 … 6400 MHz	1309.4029.1
AIE-W5ER	5 Port Air Interface Emulator 400 … 6000 MHz	1309.4052.1