

AIE-W5LR

5 Port Air Interface Emulator 500 ... 9000 MHz, 50 Ω

Features

- wideband
- 2 watt power capability
- 127 dB attenuation range
- LAN and USB Remote Interface
- Trigger interface
- compact 19", 1 U device

Applications

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



At a Glance

The air interface emulator AIE-W5LR enables the realistic emulation of HF levels for radio field communication such as in wireless networks. The device offers 5 bidirectional inputs and outputs for connecting different network access points. Each of the 5 ports can be fed separately with a composite RF signal. A freely programmable mixture of the other 4 signals can then be set individually for each port. The levels can be varied over a wide dynamic range using internal precision attenuators. The AIE-W5LR makes it possible to emulate a realistic air interface in which connected access points simultaneously receive field signals of different strengths from other access points in the network. The reproducibility of different realistic scenarios in a laboratory environment saves time and money in product development and verification.

Matrix function

The AIE-W5LR can also be used as a non-blocking matrix switch. Each input and output can be connected to the other ports in any way. Attenuators between the signal paths also allow the emulation of fading effects. Due to the fast response time of the attenuators, the device is ideal for efficient and fast solutions in automatic test systems.

Wideband

The operating frequency range is 500MHz to 9000MHz. Therefore, the AIE-W5LR is usable for all Wi-Fi standards including 802.11p for V2X and V2V communication.

High Dynamic

The adjustment range of the digitally controlled attenuator is 127.0 dB and can be freely adjusted in 0.25 dB steps. This enables use in test applications with the highest demands on dynamics and accuracy. The high attenuation range allows RF signal levels to be reduced below the sensitivity limit of connected devices. All RF connections of the device allow power levels of up to 2 watts.

Synchronous Operation

The AIE-W5LR can be conveniently and efficiently remotely controlled via LAN and USB interfaces and an additional TRIGGER-IO port. With each execution of switching commands, the trigger interface delivers a precise voltage pulse that can be used for the synchronous execution of switching commands from other devices in the compound. In addition, external pulses can be applied to this port in order to synchronously trigger the execution of pending switching commands. The emulator's attenuator configuration can be preloaded with SCPI-oriented ASCII strings in a queue over the LAN interface. After a positive TTL pulse edge at the trigger input, the preloaded damper configuration is then executed by the hardware without delay.

Principle diagram



RF Specifications

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
impedance	Z_{IN}/Z_{OUT}		50		Ω	
low frequency	f_{min}		400	500	MHz	
high frequency	f_{max}	8000	9000		MHz	
number of RF ports	n_{RF}		5			bi-directional
return loss* ²	S_{11}, S_{22}		-14	-10	dB	$f \leq 4$ GHz
	S_{11}, S_{22}		-14	-7	dB	$f > 4$ GHz
insertion loss* ¹	S_{21}	-24	-21		dB	$f = 1$ GHz
	S_{21}	-26	-23		dB	$f = 2$ GHz
	S_{21}	-33	-30		dB	$f = 5$ GHz
	S_{21}	-40	-37		dB	$f = 7$ GHz
	S_{21}	-42	-39		dB	$f = 8$ GHz
attenuation dynamic* ³	dATT		-30		dB	
attenuation range	ΔS_{21}	0.00		127.0	dB	
attenuation resolution	d S_{21}		0.25		dB	
attenuation accuracy	ATT _{ERR}		± 0.50		dB	@ 3 GHz, ATT = 63.5 dB
	t _{ASET}		1		μ s	
atten. response time	t _{ARSP}		1		ms	
DC voltage	U _{DC}			20	V	
ESD discharge resistor	R _{ESD}		4.7		k Ω	all inputs and outputs
input power	P _{RF}			+33	dBm	CW
RF connector	X _{RF}	N female				rear side
trigger input	X _{TRIG}	BNC female				internal 1 k Ω pull up, active high
trigger level	U _{TRIG}	TTL (0 / 5 V)				
trigger offset	t _o		0.5		μ s	50% trigger → 50% RF
attenuator settling time	t _{RISE}		0.3		μ s	10% → 90% RF

*1: ch. attenuator setting: 0.00 dB

*2: ch. attenuator setting: 127.00 dB

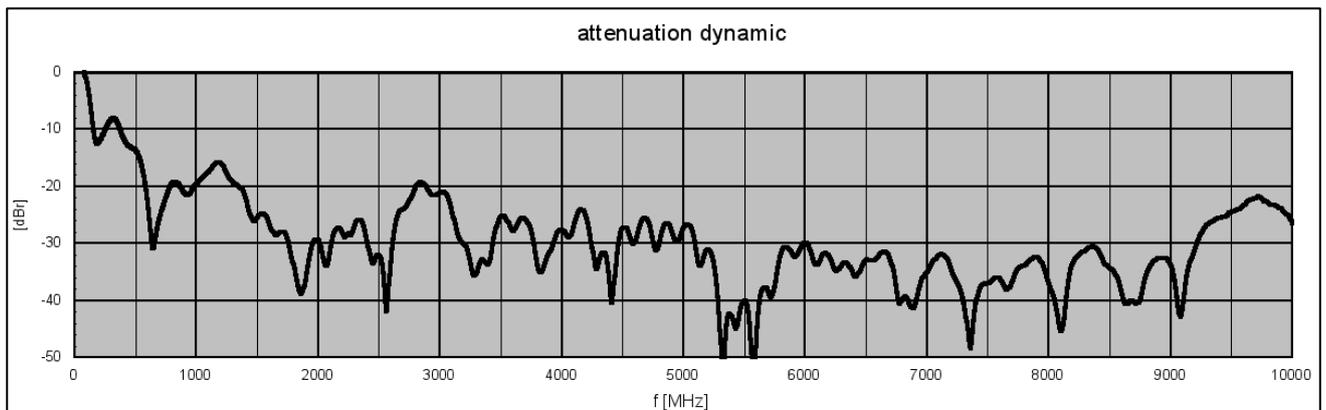
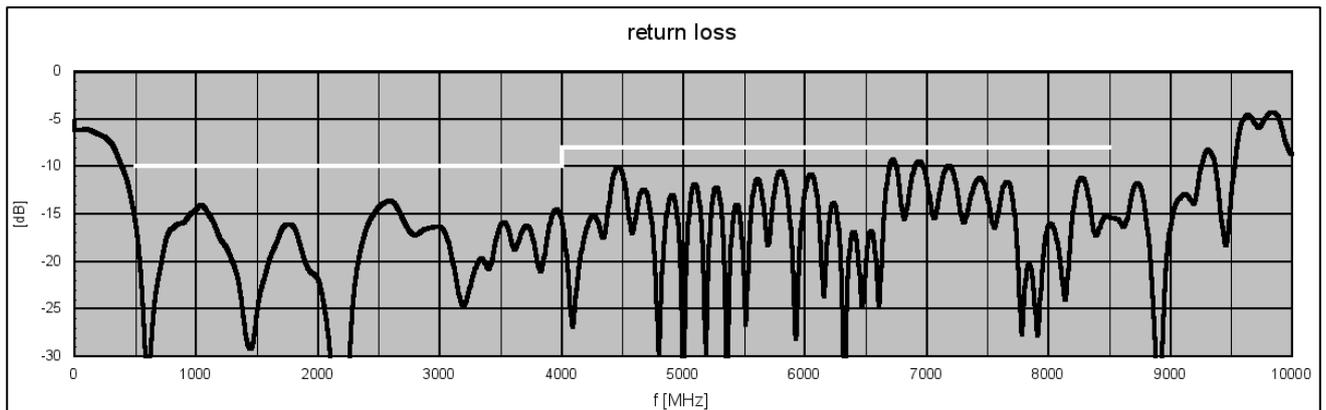
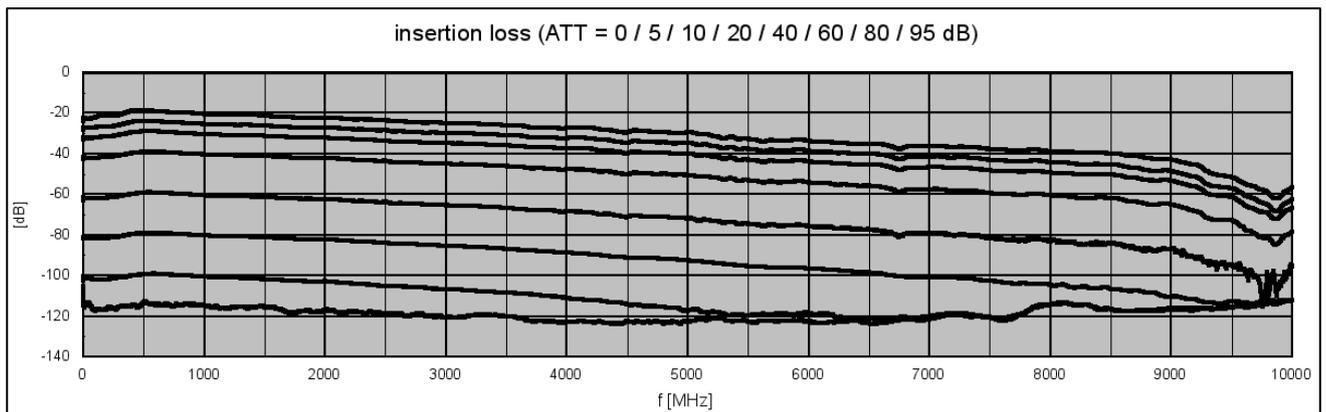
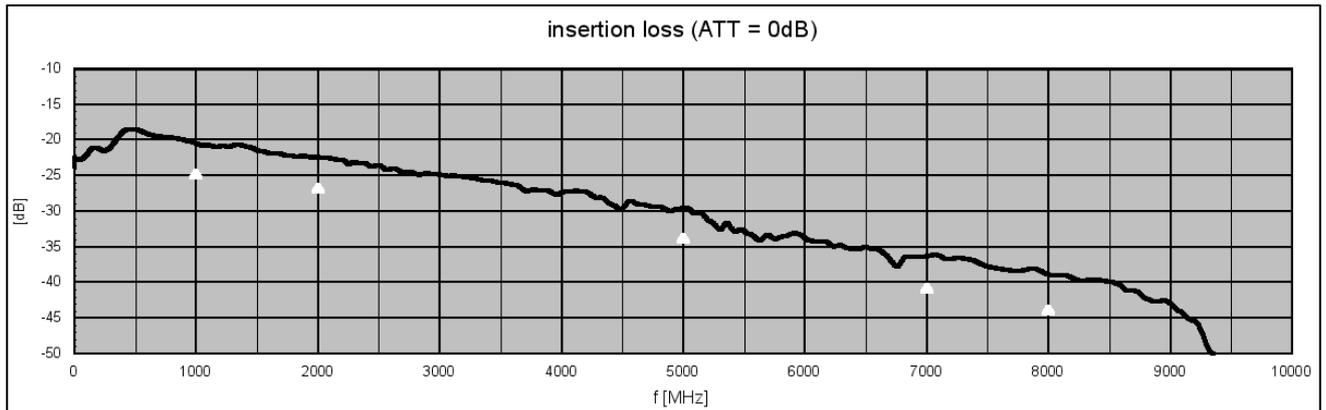
*3 ch.. attenuator setting 127.00, all other ch. attenuator setting 0.00 dB, referred to insertion loss

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}		3		W	
power socket	X _{AC}	IEC-60320 C14				country specific mains cable
Dimensions and weight						
dimensions	W x H x D	approx. 482 x 44 x 460			mm	19" 1 U, without connectors and handles
weight	m		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-W5LR		2109.4002.1			



S-Parameters (typical responses)



Appearances

Front View



Rear View



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