becker nachrichtentechnik

AIE-W8LR

8 Port Air Interface Emulator, 500 … 9000 MHz, 50 Ω

Features

- 127 dB attenuation range
- High power capability
- LAN and USB Remote Interface
- Trigger interface
- Compact 19”, 2 U device

Applications

- Air interface emulation
- Full fan-out matrix
- Multipoint radio fading simulation
- Mesh network testing
- Wi-Fi (802.11 a/h, ac, b, g, n, p)
- LTE 5G, 6G
- V2X, V2V

At a Glance

The AIE-W8LR radio field emulator enables the realistic simulation of RF levels for wireless communication between mobile devices and wireless networks such as Wi-Fi or LTE. The device features 8 RF ports that can be used for base stations or DUTs (Devices Under Test), such as mobile phones. Each of the 8 ports can be configured with an individual combination of signals from the other 7 ports. The signal levels can be varied within a wide dynamic range using internal precision attenuators.

Due to the device’s high-frequency bandwidth, it can be flexibly used for almost all common wireless transmission standards, including GSM900, GSM1800, UMTS, LTE 4G, LTE 5G FR1, LTE6G, IEEE 802.11a/b/g/n/ac/ax (Wi-Fi 6E), and 802.11be (Wi-Fi 7).

Matrix function

The AIE-W8LR 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-W8LR 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-W8LR 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}		8			bi-directional
return loss*2	S_{11}, S_{22}		-15	-7	dB	
insertion loss*1	S_{21}	-36	-30		dB	f = 1 GHz
	S_{21}	-39	-32		dB	f = 2 GHz
	S_{21}	-48	-41		dB	f = 5 GHz
	S_{21}	-54	-47		dB	f = 7 GHz
	S_{21}	-57	-52		dB	f = 8 GHz
attenuation dynamic*3	dATT		-30		dB	
attenuation range	ΔS_{21}	0.00		127.0	dB	
attenuation resolution	dS_{21}		0.25		dB	
attenuation accuracy	ATT_{ERR}		± 0.50		dB	@ 3 GHz, ATT = 63.5 dB
	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
trigger input	X_{TRIG}	BNC female				internal 1 kΩ pull up, active high
trigger level	u_{TRIG}	TTL (0 / 5 V)				
trigger offset	t_O		0.5		µs	50% trigger → 50% RF
attenuator settling time	t_{RISE}		0.3		µs	10% → 90% RF

*1: ch. attenuator setting: 0.00 dB

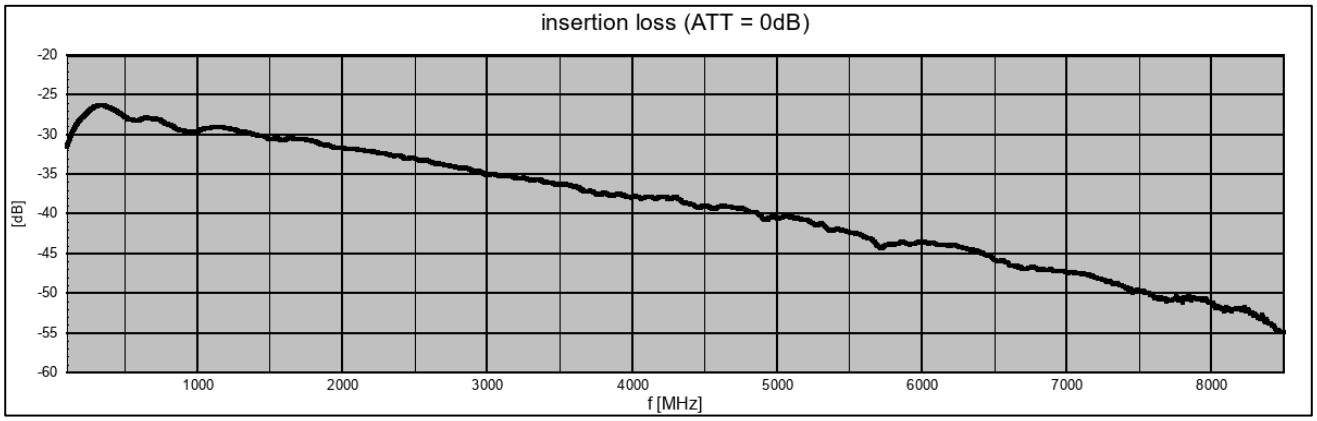
*2: ch. attenuator setting: 127.00 dB

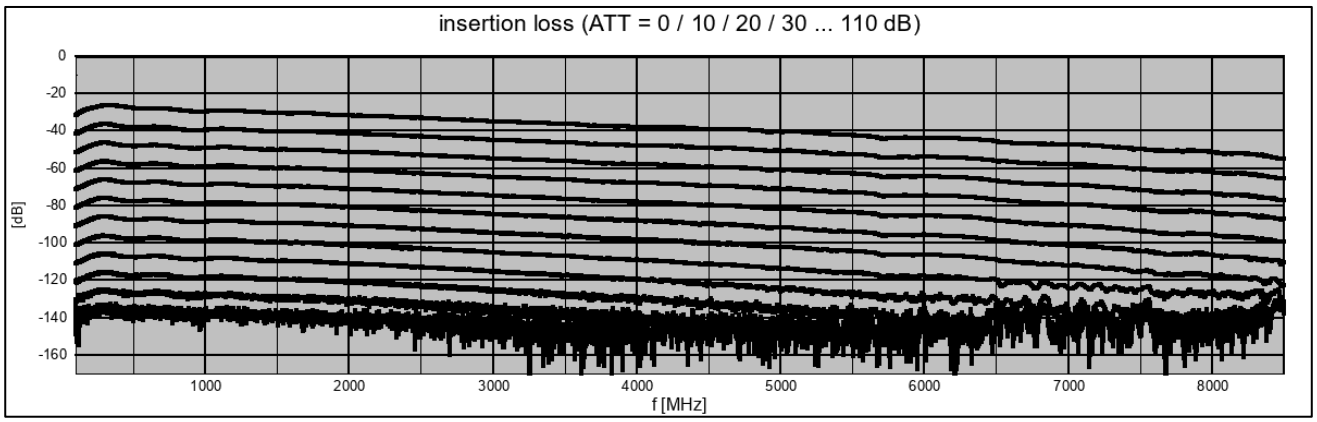
*3 ch.. attenuator setting 127.00, all other ch. attenuator setting 0.00 dB, referred to insertion loss

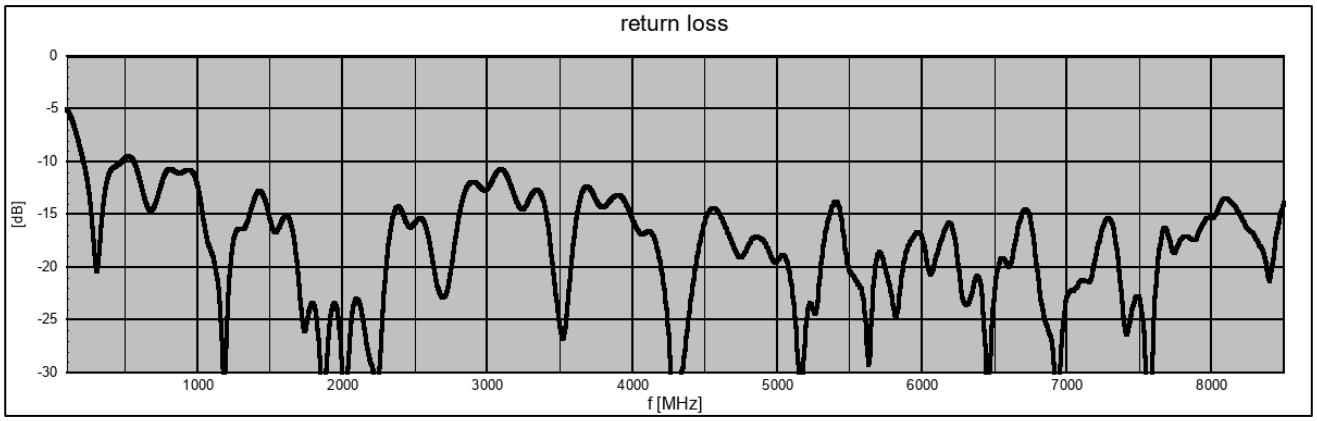
Common Specification

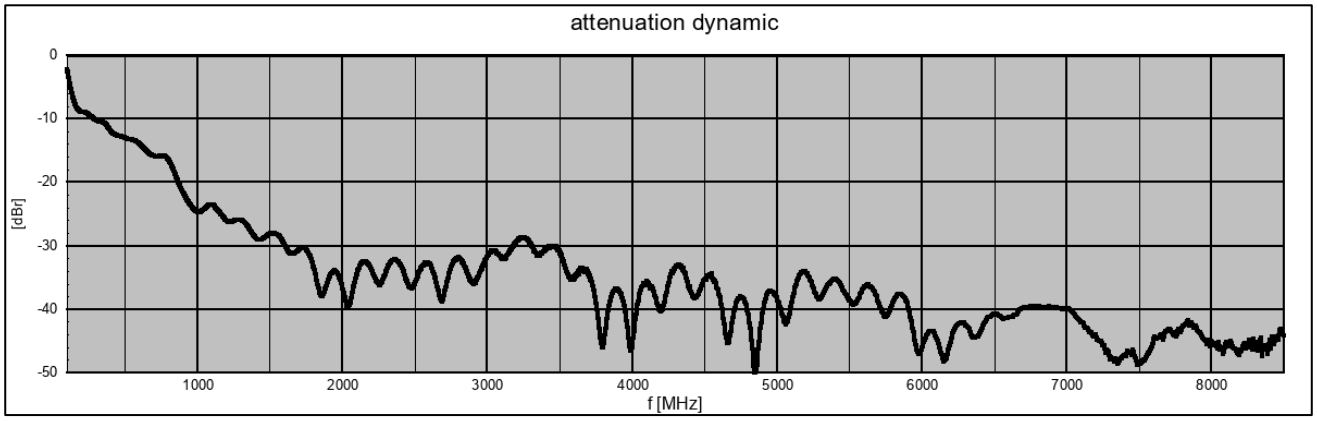
Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
voltage supply range	U_{AC}	90	230	260	V	50 / 60 Hz AC
power consumption	P_{AC}		3		W	
power socket	X_{AC}	IEC-60320 C14				country specific mains cable
Dimensions and weight						
dimensions	W x H x D	approx. 482 x 89 x 460			mm	19” 2 U, without connectors and handles
weight	m		9		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-W8LR		2109.4102.1			

S-Paramters (typical responses)







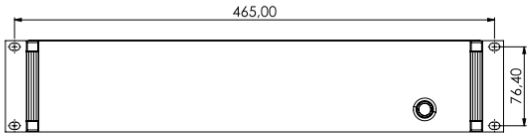


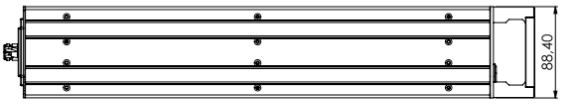
Appearances

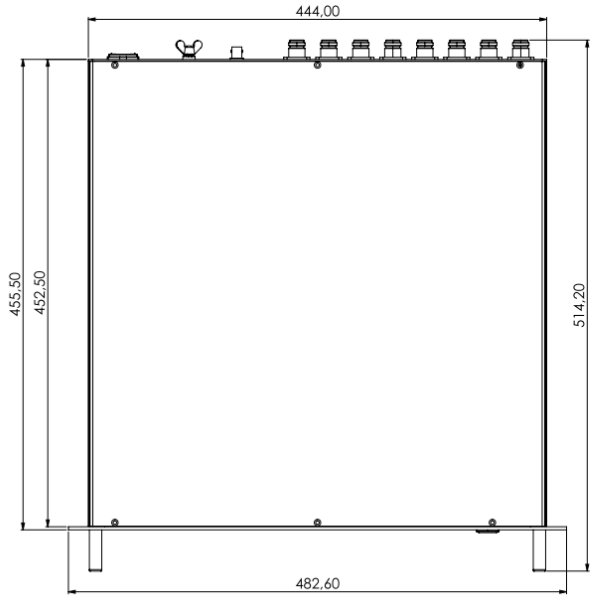
Front View

Rear View

Dimensions







all dimensions in mm
±2mm

Related Products

Product	Description	P/N
AIE-W5LR	5 Port Air Interface Emulator 500… 9000 MHz	2109.4002.1
AIE-4X4LR	4X4 Channel Air Interface Emulator, 500…9000 MHz	2109.4502.2
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