

# AIE-4X4ER

4 Channel Air Interface Emulator 400 ... 6000 MHz, 50  $\Omega$

## Features

- wideband
- 95.25 dB attenuation range
- LAN and USB Remote Interface
- Trigger interface
- 19", 3 U device

## Applications

- Air Interface Emulation
- MIMO emulation
- GSM, UMTS, LTE, 5G
- Handover testing
- Fading simulation

## At a Glance

The AIE-4X4ER air interface emulator enables real emulation of RF levels for radio communication between mobile devices and a wireless networks. It has 4 RF Ports for base stations and 4 ports for DUTs like cellular phones. All signal paths are bidirectional. Every of the 4 DUT ports can be fed with a composite RF signal that is individually composed of a programmable mix of the 4 signals coming from the base station ports. The variation of levels can be done in a wide dynamic range with internal precision attenuators.

The AIE-4X4ER allows to recreate a realistic air interface, whereby the DUTs receives a multiple cellular stations simultaneously with varying propagation loss. In particular it allows the simulation of handovers between cellular base stations and cellular phones.

The reproducible emulation of air interface scenarios in laboratory environment saves time and cost in product development and verification.

## Matrix function

The AIE-4X4ER can also be used as non-blocking matrix. Every output has free access to each input. 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-4X4ER is useable for all cellular standards including 5 G.

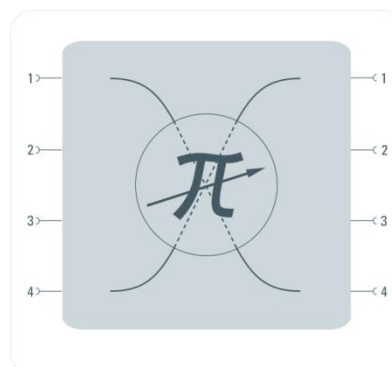
## High Dynamic

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.

## Remote control with Trigger

For remote control the AIE-4X4ER offers a LAN interface and a trigger input. The switching configuration of the matrix device 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 switch 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 inputs	$n_{IN}$		4			bi-directional
number of RF outputs	$n_{OUT}$		4			bi-directional
DC voltage	$U_{DC}$			20	V	
return loss	$S_{11}, S_{22}$		-12		dB	
maximum input power	$P_{RF}$			+33	dBm	
DC voltage	$U_{DC}$			15	V	
ESD discharge resistor	$R_{ESD}$		1.2		k $\Omega$	all inputs and outputs
insertion loss*	$S_{21}$		-17		dB	$f \leq 1$ GHz
	$S_{21}$		-19		dB	$1 \text{ GHz} \leq f \leq 3 \text{ GHz}$
	$S_{21}$		-22		dB	$3 \text{ GHz} < f \leq 5 \text{ GHz}$
	$S_{21}$		-24		dB	$5 \text{ GHz} < f \leq 6 \text{ GHz}$
isolation	$S_{21}$		40		dB	between channels ATT = 0 dB
attenuation range	$\Delta S_{21}$	0.00		95.25	dB	
attenuation resolution	$dS_{21}$		0.25		dB	
attenuation accuracy	$ATT_{ERR}$		$\pm 0.50$		dB	@ 3 GHz, ATT = 63.25 dB
attenuator settling time	$t_{ASET}$		1		$\mu$ s	
atten. response time	$t_{ARSP}$		1		ms	
RF connector	$X_{RF}$		N female			rear side
trigger input	$X_{TR}$		BNC female			rear side
trigger level	$U_{TR}$		TTL (0 V / 5 V)			positive slope, 1 k $\Omega$ pull up

\* Insertion loss at attenuator setting 0.00 dB.

## Common Specifications

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
power supply	$u_{AC}$	90	230	260	V	50 / 60 Hz
power consumption	P		6		W	
power socket	$X_{AC}$	IEC-60320 C14				country specific power cable
dimensions	W x H x D	approx. 515 x 150 x 450			mm	19", 3 U
weight			12		kg	
remote interface		10/100BaseT				RJ45 connector
		2.0 (high speed)				USB type B connector
operating temp. range	$T_o$	+ 20		+ 30	$^{\circ}$ C	within specification
storage temp. range	$T_s$	- 40		+ 70	$^{\circ}$ C	
EMC		including IEC/EN61326-1				in line with EMC directive 2014/30/EU
safety		in line with IEC/EN 61010-1				
ordering information		AIE-4X4ER		P/N: 1201.4902.1		

## Appearances



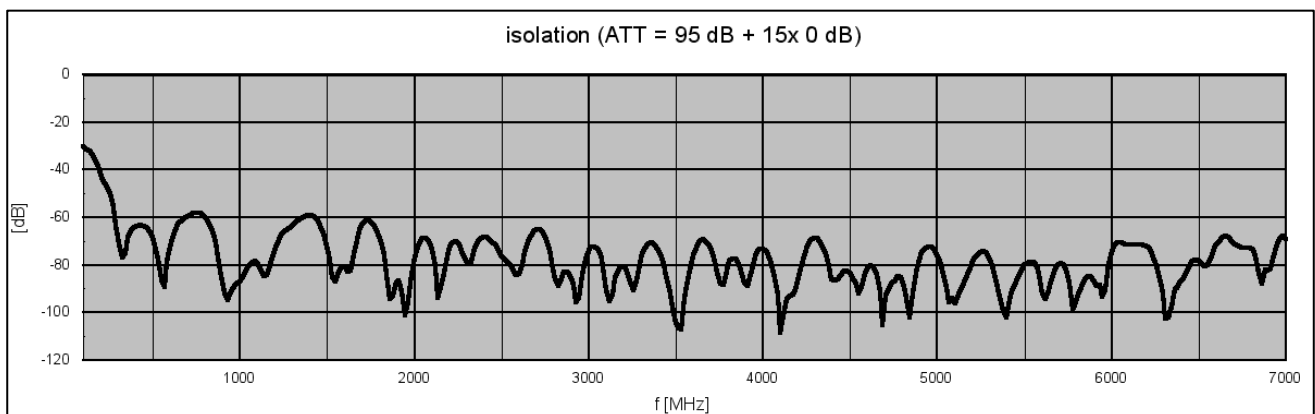
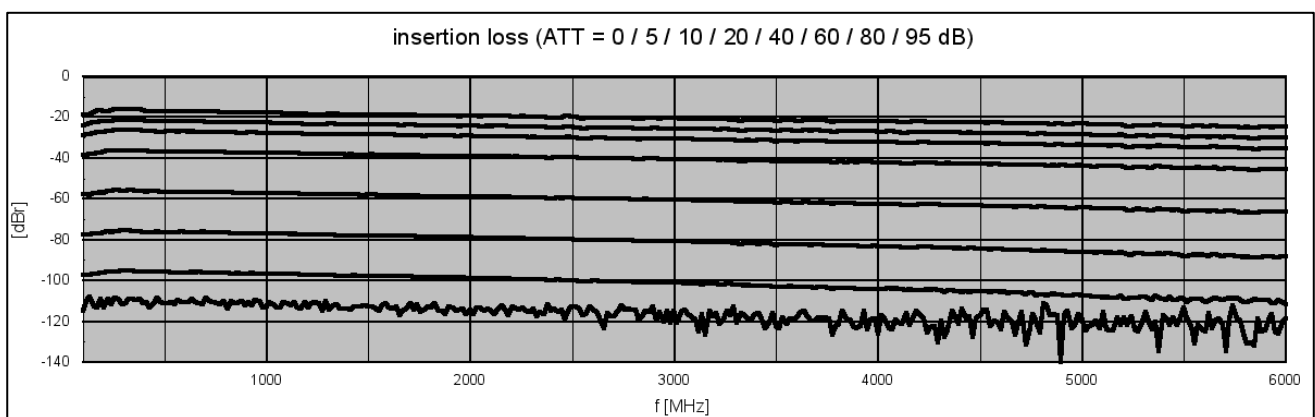
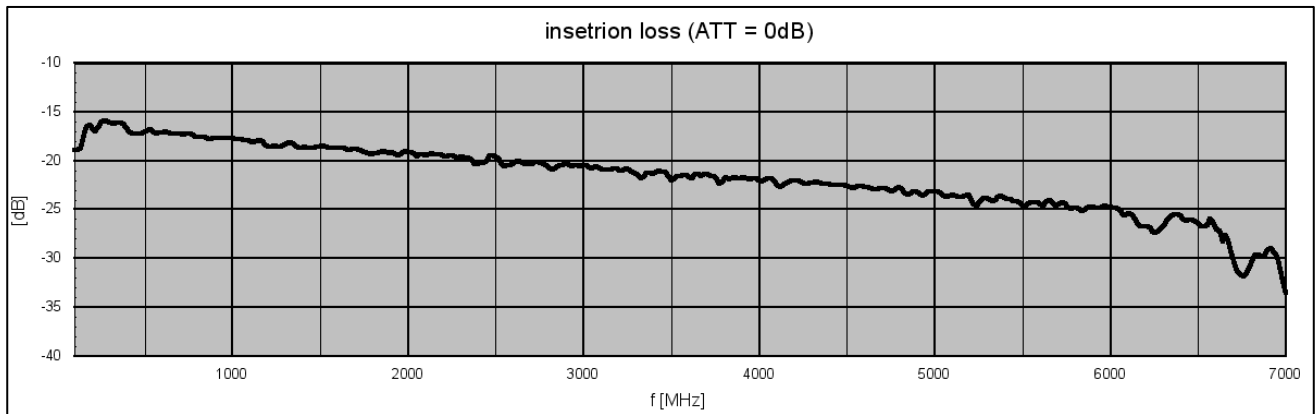
Front view



Rear view



## Typical frequency responses



## Related Products

Product	Description	P/N
AIE-4X4R	4 Channel Air Interface Emulator 500 ... 3000 MHz	1201.4002.1
AIE-W9	9 Port Air Interface Emulator 1800 ... 6400 MHz	1309.4092.1

