becker

nachrichtentechnik

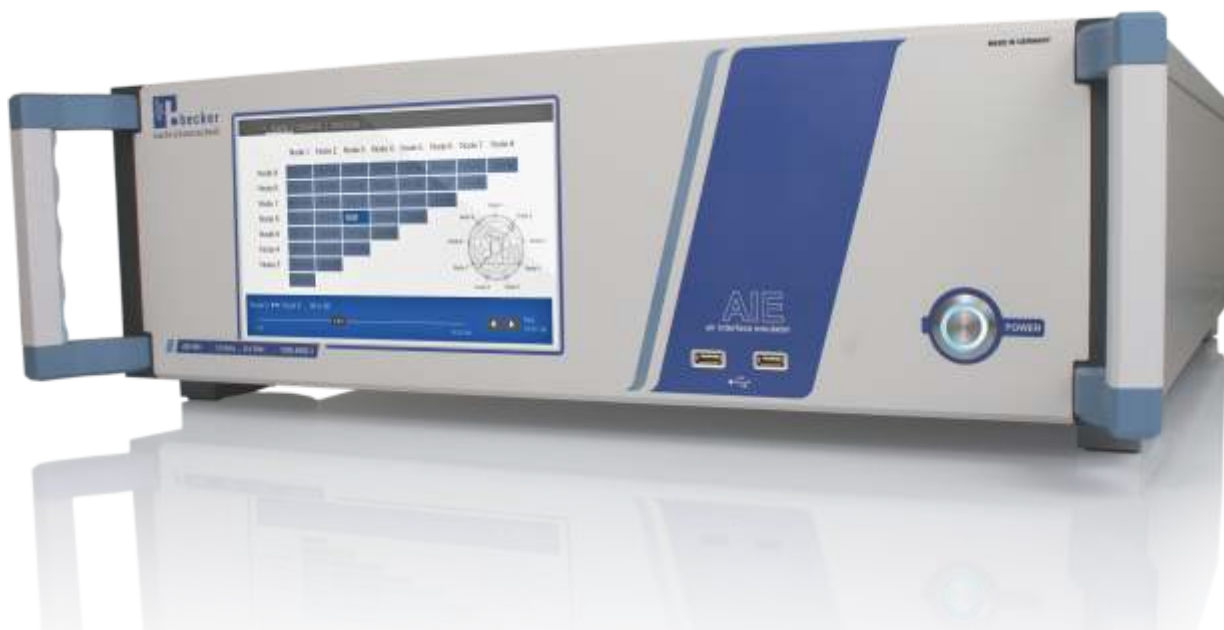## AIE - Series

Air Interface Emulators

Test **Solutions** for
Mobile and **Wireless**
Communication

AIE
Air Interface Emulator

At a glance

Reduction of costs in the design and verification phase of wireless networks and mobile components.
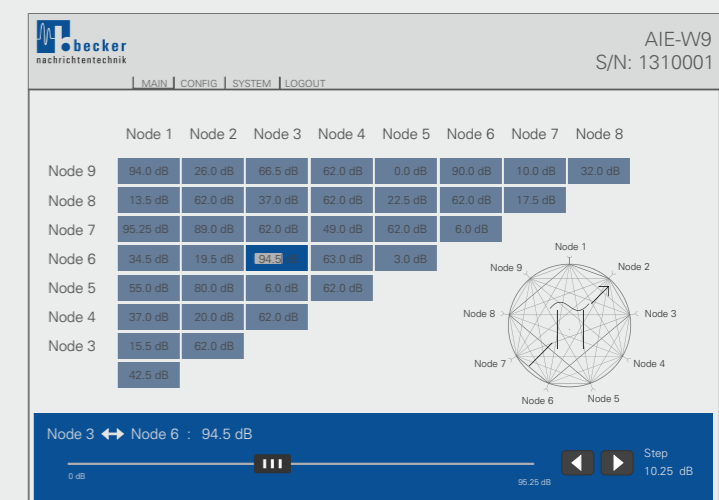
Devices for mobile communication, such as mobile phones and wireless networks, have become articles of daily use. These devices grow constantly in their complexity, similarly to the corresponding radio transmission standards. The extension of existing transmission standards, such as GSM and UMTS in the field of mobile communications are complemented by new standards, such as LTE. Broadcast standards are supplemented or replaced by digital transmission methods. This trend requires extensive testing of new developed devices regarding their compatibility with various wireless standards in the design and verification phase.

Becker Nachrichtentechnik GmbH offers solutions for both radio field simulations for wireless networks and broadcast applications. With the assistance of the components of the AIE (Air Interface Emulatior) series, these tests can be performed economically and are reproducible in a laboratory environment.
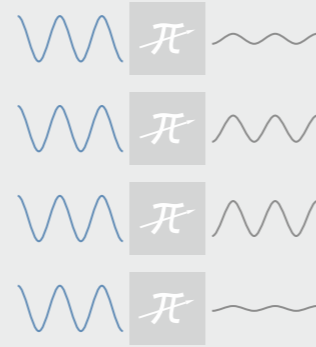
Quality made in Germany

Our company with many years of experience is a manufacturer of innovative high quality products in the range of RF communications equipment and further a service provider for solutions tailored to customer requirements.

The team of Becker Nachrichtentechnik GmbH (BNT) is specialized in development and prepartion of components, devices and systems in communication technologies in the frequency range up to 8.5 GHz.

Controllable via web interface

For remote control, the devices are equipped with standard interfaces LAN and USB.

A special feature of the devices with LAN interface is their web capability. Via the web interface, manual operations and device status queries can be carried out. The web interface function is independent of location and of the operating system.

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AIE-W9
S/N: 1310001

| MAIN | CONFIG | SYSTEM | LOGOUT |

	Node 1	Node 2	Node 3	Node 4	Node 5	Node 6	Node 7	Node 8
Node 9	94.0 dB	26.0 dB	66.5 dB	62.0 dB	0.0 dB	90.0 dB	10.0 dB	32.0 dB
Node 8	13.5 dB	62.0 dB	37.0 dB	62.0 dB	22.5 dB	63.0 dB	17.5 dB	
Node 7	95.25 dB	89.0 dB	62.0 dB	49.0 dB	62.0 dB	6.0 dB		
Node 6	94.5 dB	19.5 dB	94.5 dB	63.0 dB	3.0 dB			
Node 5	55.0 dB	60.0 dB	6.0 dB	62.0 dB				
Node 4	37.0 dB	20.0 dB	62.0 dB					
Node 3	15.5 dB	62.0 dB						
	42.5 dB							

Node 3 ⟷ Node 6 : 94.5 dB

0 dB   96.25 dB

Step
10.25 dB

LAN

QATT - Quad Attenuator

- wideband: 100 kHz … 4000 MHz (100 kHz … 7000 MHz)
- attenuator setting range 0 … 100 dB (0 … 95.25 dB)
  in 0.5 dB steps (0.25 dB)
- input power up to 0.5 Watts
- USB, LAN and optional GPIB interface
- web interface

QATT offers the possibility to perform field strength scenarios in the frequency range of 100 kHz … 4000 MHz. Due to its the high bandwidth, QATT is suitable for all major wireless standards.

High setting range
Each of the 4 channels has an attenuation range of 100 dB, adjustable in 0.5 dB steps. In the circuit design, modern wear-free semiconductor switches are used which guarantee high availability of QATT.

High operating comfort
QATT can be controlled locally via the control panel on the front. As a remote control interface, the QATT offers USB remote and LAN interfaces. The BNT GmbH LAN interface provides web capability and is installed by default.

Up to 7 GHz
The "7G" Variant of QATT enables reproducible attenuation settings in a frequency range from 100 kHz to 7000 MHz with a dynamic range of 95.25 dB, adjustable in 0.25 dB steps. The QATT 7G is therefore the right solution for applications in the field of GSM, UMTS, LTE, WLAN 802.11 a/h, b, g, n, Bluetooth, ZigBee and radar applications.

Model	Freq.	Impedance	Channels	S11 / S22	P_{IN} max.	Insertion loss	Attenuation range	Supply voltage	Power cons.	Dimensions
QATT	100 kHz … 4000 MHz	50 Ω	4	-17 dB	+27 dBm	6 dB f ≤ 1 GHz	0 - 100 dB 0.5 dB steps	90 - 260 V AC 50/60 Hz	9 W	19" 1HU
QATT7G	100 kHz … 7000 MHz	50 Ω	4	-12 dB	+24 dBm	8 dB f ≤ 5 GHz	0 - 95.25 dB 0.25 dB steps	90 - 260 V AC 50/60 Hz	9 W	19" 1HU

Typ. values

AIE-4X4

Test Solution for Mobile Communication

- bandwidth 500 MHz…3000 MHz
- optimized for GSM, UMTS, WLAN and LTE
- attenuator setting range 0 … 100 dB in 0.5 dB steps
- robust: up to 2 Watts input power
- USB and LAN control interface with web capability
- available with GPIB interface and touchscreen
- compact design (3HU)

Test of handover procedures
The Air Interface Emulator AIE4X4 supports real radio field simulations in the range of mobile communication as well as wireless networks. This allows for the reproduction of handover scenarios in a defined test environment, such as laboratories.

High dynamics and high setting accuracy
The adjustment range of the digital attenuator comprises 100 dB and can be adjusted in 0.5 dB steps. With this, a maximum of dynamics and precision is met. All RF ports are designed for power levels up to 2 Watts. These interfaces are thus robust against the RF output power in respect of mobile phones.

Controllable via web interface
The Air Interface Emulator AIE4X4 can be remotely controlled via ASCII strings over a USB and LAN interface or via web interface. The device can thus be easily integrated into existing automation tools or third-party software. AIE4X4 is also availible with integrated touchscreen MMI.

Model	Freq.	Impedance	RF ports	P_{IN} max.	Insertion loss	Attenuation range	Supply voltage	Power cons.	Dimensions
AIE4X4	500 MHz… 3000 MHz	50 Ω	4	+33 dBm	23 dB	0… -100 dB 0.5 dB steps	90 - 260 V AC 50/60 Hz	9 W	19" 3HU 380x450x135 mm

The AIE-4X4 solutions are based on a modular concept. Different test solutions can be realized on request.
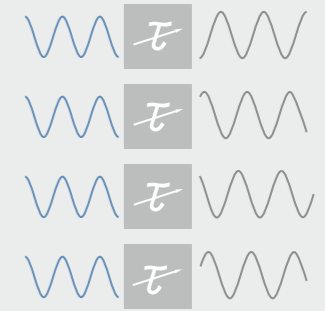
Typ. values

QDLL - Quad Delay Line

QDLL is a four channel programmable step delay line suitable for the frequency range from 250 MHz up to 4000 MHz. Each channel has a delay range from 0 ps …1700 ps and is adjustable in 5 ps steps. Due to its high bandwidth, QDLL is especially suited for mobile communication, wireless networks, radar and for applications in research and science.

High user comfort

Just like the programmable attenuators of the QATT series, QDLL offers a high level of usability. It is equipped with the remote control interfaces USB, LAN and an optional IEEE-488 interface for control via ASCII strings. Additionally, QDLL can be operated manually via interface on the front panel and via web interface.

- suitable for all mobile communication standards like GSM, UMTS and LTE
- channels cascadable for greater delay ranges
- up to 2W input power
- USB and web capable LAN interface

Model	Freq.	Impedance	Channels	S11 / S22	Insertion loss	P_{IN} max.	Delay range	Step size	Supply voltage	Power cons.	Dimensions
QDLL	250 MHz … 4000 MHz	50 Ω	4	-20 dB	6.5 dB	+33 dBm	0 ps - 1700 ps 0 ps - 6800 ps*	5 ps	90 - 260 V AC 50/60 Hz	9 W	19" 1HU

*cascaded   Typ. values

AIE-W9

Test **Solution** for **Wireless** Networks

- omnidirectional
- bandwidth 1800 MHz … 6400 MHz
- suitable for WLAN standards 802.11 a/h, b, g, n, Bluetooth and ZigBee.
- attenuator setting range 0 ... 95.25 dB in 0.25 dB steps
- remote control via USB, LAN or web interface
- available with GPIB interface and touchscreen
- compact design (3HU)
- attenuator response time of less than 1 ms
- max. 2W input power

Innovative test system for up to 9 wireless nodes

The new AIE-W9 enables the user to perform real field emulations of RF levels for individual paths between up to 9 Nodes. The structure allows the direct connection to every other signal node. Therefore 36 attenuator paths can be adjusted. With the AIE-W9, it is possible to generate reproducible fading and coexistence scenarios in a laboratory or in a test environment without the influence of the live net.
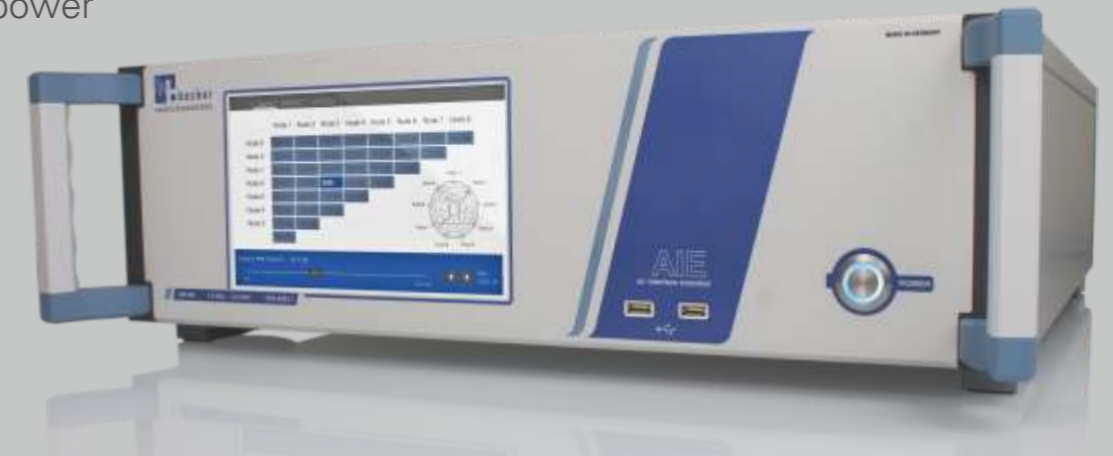
Precision in combination with low losses

The use of modern semiconductors in the AIE-W9 combines high precision damping with low loss in the individual signal paths. The attenuation of all signal paths can be adjusted in 0.25 dB steps over a range of 95.25 dB. With an attenuator response time of less than 1 ms, the device is the efficient and fast solution for automatic testing systems.

High level of usability

The Air Interface Emulator AIE-W9 can be remotely controlled via ASCII strings over USB and LAN interface. The device is ready for integration in your local network and can additionally be operated via built-in web interface. The AIE-W9 is also available with an optional touchscreen on the front panel and GPIB interface. These features allow easy integration into existing automation tools or third-party software.

Model	Freq.	Impedance	RF ports	P_{IN} max.	Insertion loss	Attenuation range	Supply voltage	Power cons.	Dimensions
AIE-W9	1800 MHz… 6400 MHz	50 Ω	9	+33 dBm	26 dB @ 2.4 GHz 31 dB @ 5.8 GHz	0… 95.25 dB 0.25 dB steps	90 - 260 V AC 50/60 Hz	12 W	19" 3HU 450x515x150 mm

The AIE-W solutions are based on a modular concept. Different test solutions can be realized on request.   Typ. values

Becker Nachrichtentechnik GmbH

Kapellenweg 3
53567 Asbach, Germany
Tel.: +49 2683 / 94 352 - 81
E-mail: info@becker-hftechnik.de
Internet: www.becker-hftechnik.de

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