# QATT-7G

## 4 Channel Step Attenuator 100 kHz … 7000 MHz  0 … 95.25 dB in 0.25 dB steps

### Features

- 4 independent RF channels
- attenuation range 0 … 95.25 dB
  in 0.25 dB steps
- MMI for local control
- LAN and USB remote interface
- intuitive graphic user interface (GUI)
- trigger port for synchronous
  operation
- compact 19", 1 U design

### Applications

- air interface emulations
- product testing and validation
- cellular and wireless
- 5G (FR1)
- broadcast and GNSS

### Scope

QATT-7G is a 4 channel step attenuator suitable in the frequency range from 100 kHz up to 7000 MHz. Due its high bandwidth QATT-7G is also suitable in applications in combination with the 5G (FR1) standard. It is designed in 50 Ohm technology. Each channel has an attenuation range of 95.25 dB adjustable in 0.25 dB steps. The attenuators are based on wear-free semiconductor switches for a reproducible operation.

QATT-7G is designed in 19" technology for an easy installation into 19" system racks. It is also suitable as table top unit for laboratory use.

### Versatile Control Modes

QATT-7G has a MMI (Man Machine Interface) for local operation.

For remote control use the device offers LAN and USB interfaces. The control occurs via ASCII strings.

Additional QATT-7G has a graphic user interface (GUI) for an intuitive control via LAN interface. The GUI enables a location-independent operation regardless of the user's operating system also with multiple devices in a single network.
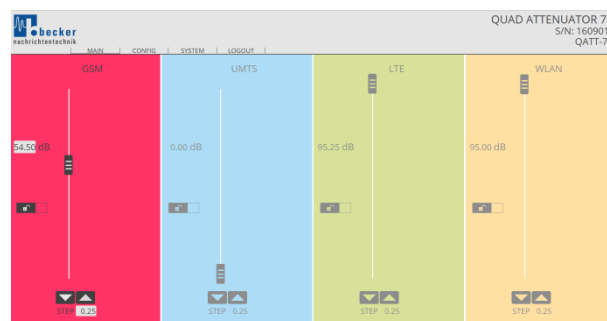
Appearance of QATT-7G web interface

### Synchronous Operation

Like many other products of Becker Nachrichtentechnik, QATT-7G offers 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.

**RF Specification**

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Condition |
|---|---|---|---|---|---|---|
| impedance | $Z_{in}$ / $Z_{out}$ | | 50 | | Ohm | |
| number of channels | $n_{CH}$ | | 4 | | | |
| low frequency | $f_{min}$ | | | 100 | kHz | |
| high frequency | $f_{max}$ | 7000 | 8000 | | MHz | |
| return loss | $S_{11}$, $S_{22}$ | | -9 | -7 | dB | f < 1 MHz |
| | $S_{11}$, $S_{22}$ | | -12 | -10 | dB | 1 MHz ≤ f < 600 MHz |
| | $S_{11}$, $S_{22}$ | | -16 | -12 | dB | 600 MHz ≤ f ≤ 2000 MHz |
| | $S_{11}$, $S_{22}$ | | -10 | -8 | dB | 2000 MHz < f ≤ 4500 MHz |
| | $S_{11}$, $S_{22}$ | | -13 | -11 | dB | 4500 MHz < f ≤ 6000 MHz |
| | $S_{11}$, $S_{22}$ | | -12 | -8 | dB | f > 6000 MHz |
| insertion loss | $S_{21}$ | | -3.5 | -5.0 | dB | f ≤ 100 MHz |
| | $S_{21}$ | | -4.0 | -6.0 | dB | 100 MHz < f ≤ 600 MHz |
| | $S_{21}$ | | -6.0 | -7.0 | dB | 600 MHz < f ≤ 2000 MHz |
| | $S_{21}$ | | -7.0 | -9.5 | dB | 2000 MHz < f ≤ 4500 MHz |
| | $S_{21}$ | | -9.0 | -12.0 | dB | 4500 MHz < f ≤ 6000 MHz |
| | $S_{21}$ | | -10.5 | -13.5 | dB | f > 6000 MHz |
| channel isolation | $a_{ISO}$ | | -130 | -100 | dB | |
| attenuation range | a | 0 | | 95.25 | dB | in 0.25 dB steps |
| attenuation accuracy | Δa | | ±0.5 | | dB | f ≤ 2200 MHz @ ATT63.75 dB |
| | Δa | | ±2.0 | | dB | f > 2200 MHz @ ATT63.75 dB |
| attenuator settling time | $t_{SET}$ | | 0.3 | | µs | rise/fall time between ATT steps |
| RF commands processing rate | PR | | 500 | | cmd/s | setting a single channel in MASTER or OUT mode without additional system load (e.g. web interface) |
| DC voltage | $U_{DC}$ | | | 20 | V | all RF ports |
| ESD discharge resistor | $R_{ESD}$ | | 4.7 | | kΩ | all RF ports |
| input power | $P_{RF}$ | | | +28 | dBm | f ≥ 50 MHz |
| RF connectors | $X_{RF}$ | | N female | | | |

**TRIGGER IO Specification**

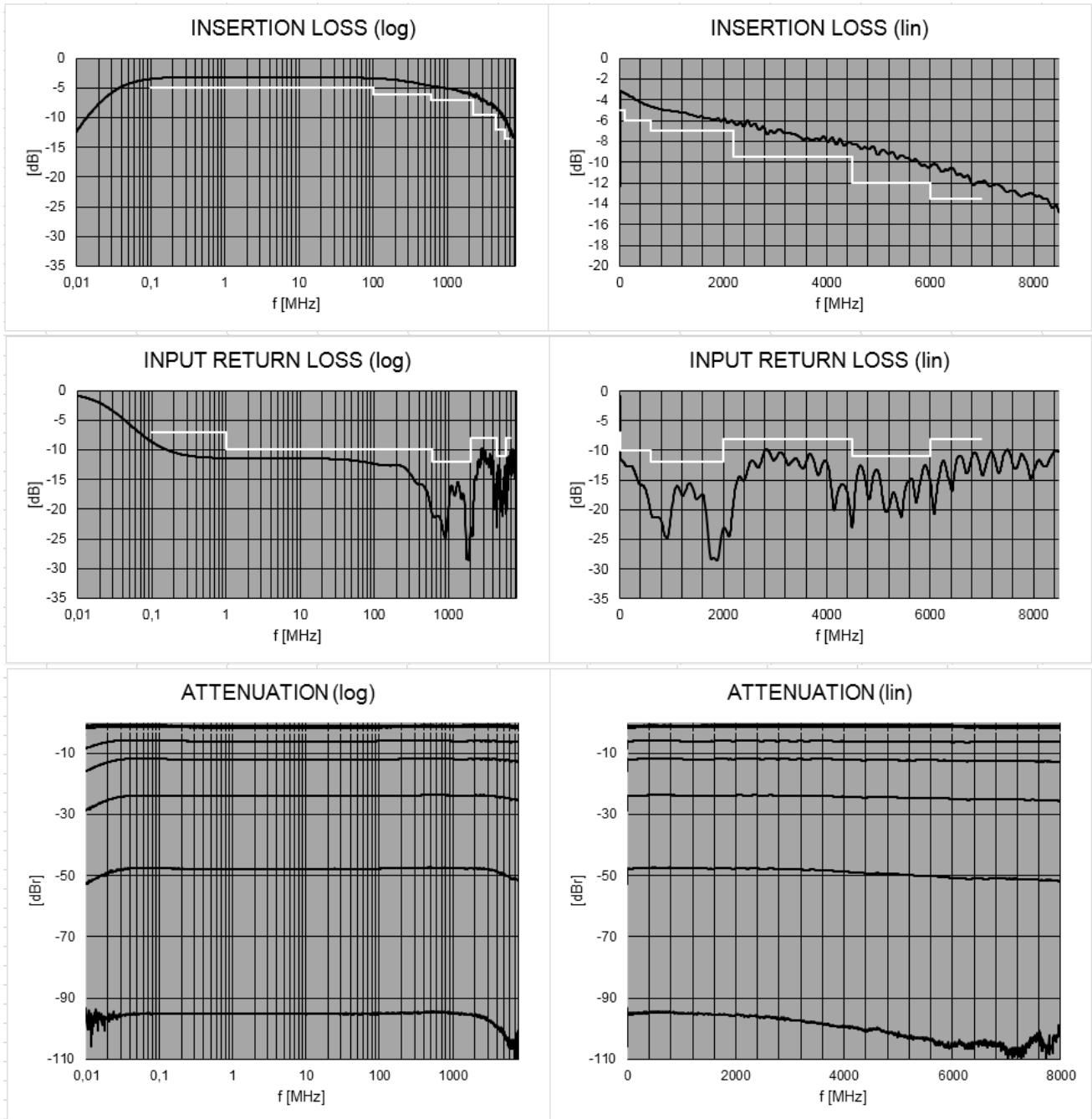| Parameter | Symbol | Min. | Typ. | Max. | Unit | Condition |
|---|---|---|---|---|---|---|
| connector type | | | BNC female | | | |
| function type | | | open collector, wired AND | | positive edge = trigger | |
| | | | low state = BUSY | | "SLAVE" mode | |
| logic high level | $U_H$ | 2.0 | 5.0 | 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
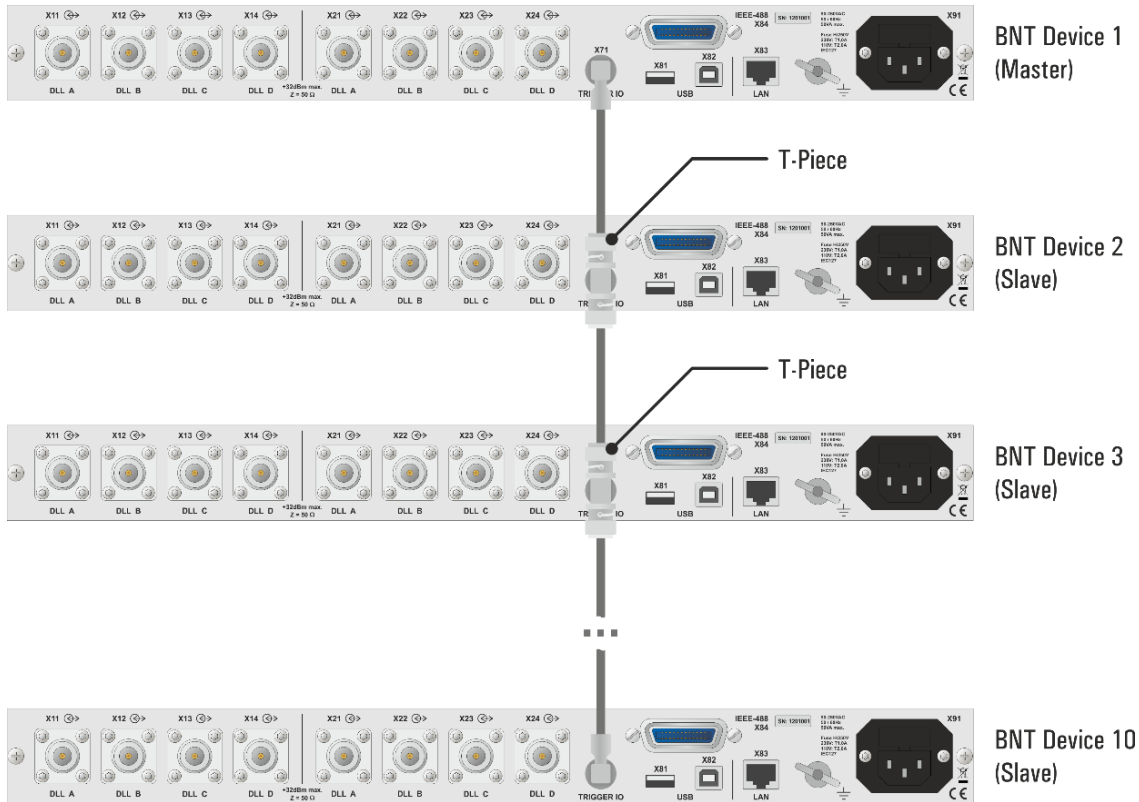
Note 2: capacitive load ≤ 2 nF

**Common Specification**

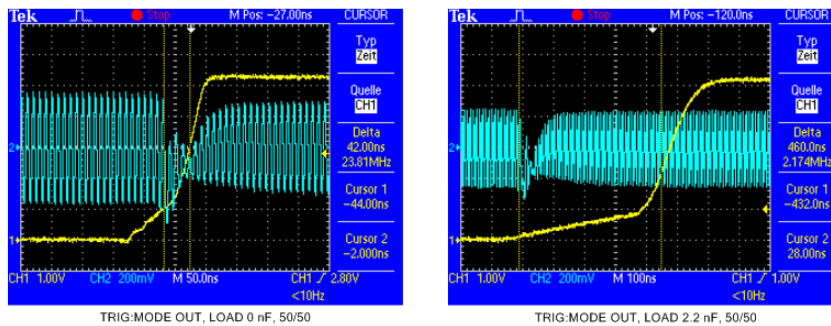| Parameter | Symbol | Min. | Typ. | Max. | Unit | Condition |
|---|---|---|---|---|---|---|
| voltage supply range | $U_{AC}$ | 90 | 230 | 260 | V | 50 / 60 Hz AC |
| power consumption | $P_{AC}$ | | 4 | | W | |
| power socket | $X_{AC}$ | IEC-60320 C14 | | | | country specific mains cable |
| **Dimensions and weight** | | | | | | |
| dimensions | W x H x D | approx. 482 x 44 x 210 | | | mm | 19" 1 U, without connectors and handles |
| weight | m | | 2.8 | | 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** | QATT-7G | P/N: 1302.4702.1 | | | | |

**S-Parameters** (typical responses)

### INSERTION LOSS (log)

### INSERTION LOSS (lin)

### INPUT RETURN LOSS (log)

### INPUT RETURN LOSS (lin)

### ATTENUATION (log)

### ATTENUATION (lin)

## Trigger I/O Connection



BNT Device 1 (Master)

T-Piece

BNT Device 2 (Slave)

T-Piece

BNT Device 3 (Slave)

BNT Device 10 (Slave)

## Trigger IO responses (typical)



TRIG:MODE OUT, LOAD 0 nF, 50/50



TRIG:MODE OUT, LOAD 2.2 nF, 50/50

External Trigger (yellow) vs. RF Signal (blue), Trigger Mode "OUT", with and without capacitive load



TRIG:MODE MASTER, NO LOAD, 50/50



TRIG:MODE MASTER, LOAD 2.2 nF, 50/50
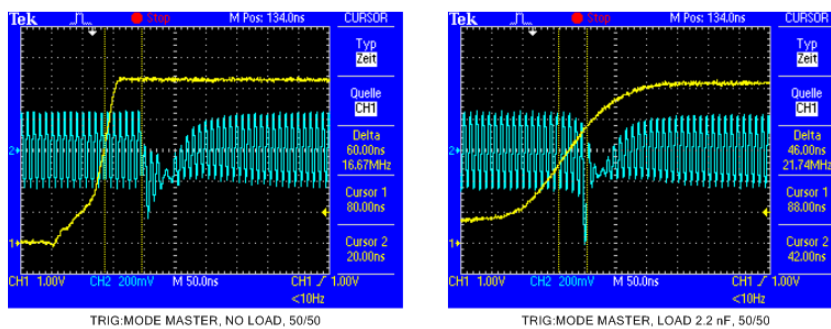
External Trigger (yellow) vs. RF Signal (blue), Trigger Mode "MASTER", with and without capacitive load

## Appearances

### Front View



### Rear View



### Dimensions



465 mm

32 mm

44 mm

267 mm

210 mm

483 mm

all dimensions in mm
± 2 mm
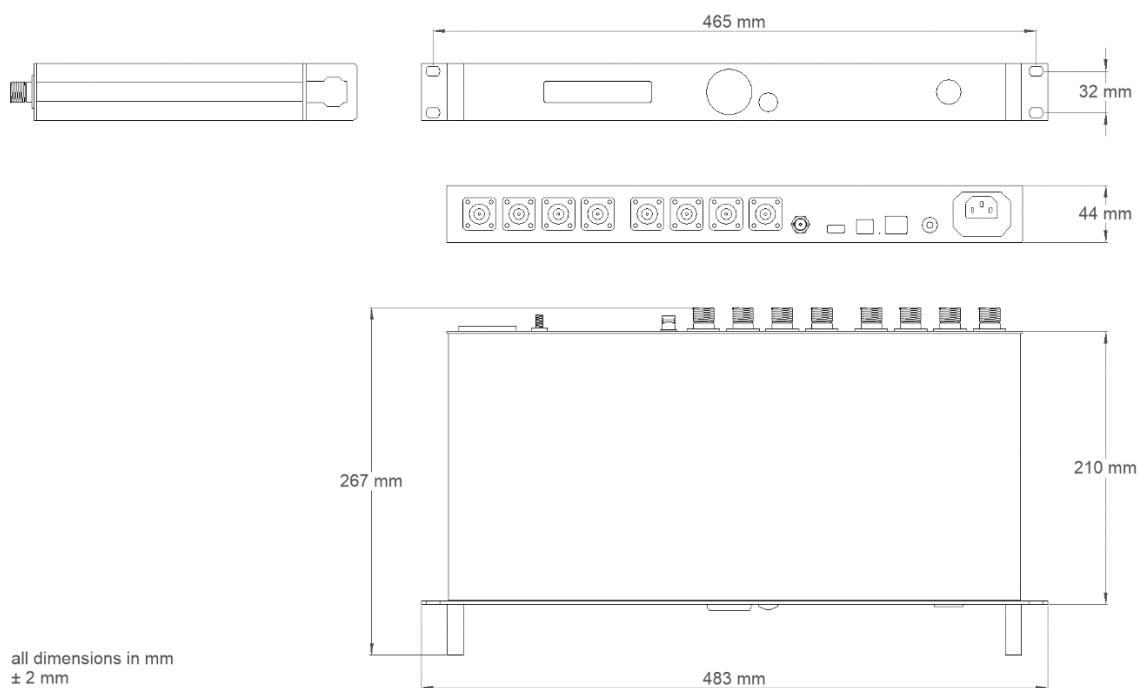
### Related Products

| 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 dB, 0.5 dB steps | 1302.4702.1 |
| 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 |