AMP51505925-TRX

Wi-Fi TX/RX Booster Amplifier for Radiating Cables 5150 … 5925 MHz

Features

- rugged and compact design
- phantom supply / forwarding
- signal direction detection
- low noise RX amplifier
- up to 1 W PEP TX power
- reverse polarity protection
- optical indications

Applications

- radio coverage in rail and street tunnels and buildings
- high-bay warehouses
- office buildings
- Wi-Fi 802.11 a/g/n/ac/ax

At a Glance

AMP51505925-TRX is a compact, high dynamic RX and TX amplifier module for radio coverage range extension in tunnels and buildings. The module is designed for the frequency range 5150…5925 MHz and therefore suitable in Wi-Fi 802.11a/n/ac/ax applications.
AMP51505925-TRX contains a high linearity TX power amplifier and a low noise RX amplifier path. As default the internal TX / RX switch is set to RX (LNA path). An integrated high speed level detector at the input recognizes transmitter power coming from the access point to set TX/RX switch to the TX (power amplifier path).
The Wi-Fi booster has a typical gain of 20 dB in RX and TX direction for the compensation of longitudinal loss of radiating cable segments. In practice the minimum power at any point in the radiating cable must be around 0 dBm for higher modulation schemes. Using the radiating cable RMC12-CH from Eupen, segments of approx. 80 m length can be driven with one booster amplifier.
Two RF cables with 180° orientated N connectors with a length of 25 cm for mounting the booster amplifier on the wall are part of delivery.

Photo shows mounted booster amplifier module on a wall between two radiating cable segments.

Phantom Supply

The supply of the module with DC power occurs via phantom supply via the RF ports.
Internal BIAS-Ts route the DC power between RF input and output. This enables cascading further booster amplifier modules without the effort of additional power supplies.

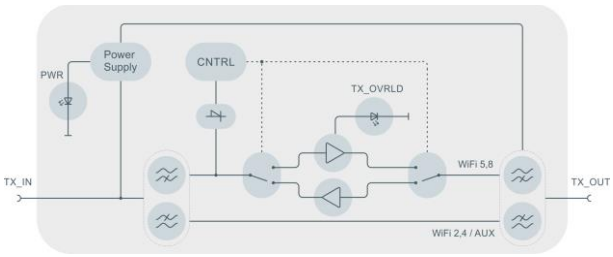
Optical Indications

For maintenance friendly operation, the module offers two LEDs. One for DC power indication and one for indication of TX overload state. TX overload is active when the TX Amplifier is in compression caused by too much input power.

Rugged Design

The booster amplifier is housed is a milled aluminum case. This saves the circuits against mechanical damage and gives best shielding for avoiding EMI influences caused by radio signals coming from the environment.

Block Diagram



Kit for 5 GHz Wi-Fi Coverage Extension

For a first, simple Wi-Fi extension for a coverage with two radiating cable segments, a kit with one booster amplifier, a DC feeding unit DFU and a termination unit is available. The booster amplifier can be phantom supplied via DC feeding unit with 24 V DC.

The Wi-Fi coverage area is extendable by adding further AMP51505925-TRX booster amplifier modules.
Up to 4 booster amplifier modules for covering of up to 500 m rating cable length can be supplied with the DC feeding unit.

RF Specification

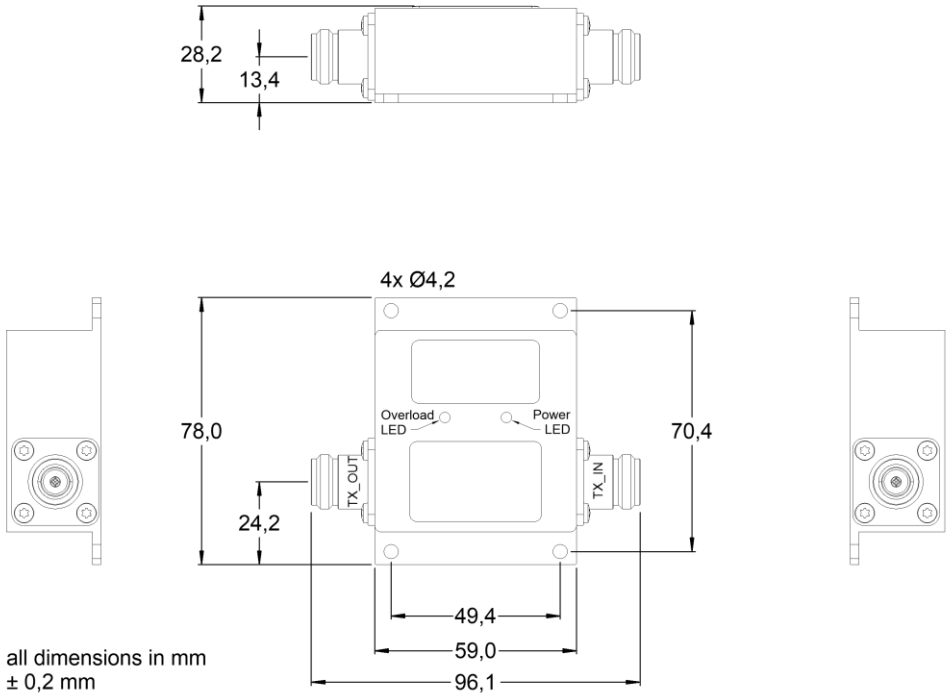
Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
impedance	Z_{in} / Z_{out}		50		Ohm	
WiFi frequency ranges	$f_{2.4}$	2400		2480	MHz	bypassed
	$f_{5.8}$	5150		5925	MHz	
WiFi 5.8 RX mode						
gain	S_{12}		20		dB	
noise figure	NF		3.5		dB	
input power	P_{RX}			-30	dBm	limited by TX detection
OIP3	OPIP3*1		+22		dBm	
TX/RX switching delay	$t_{TX/RX}$		250		ns	90% TX_{IN} to 90% RXOUT
TX/RX slew rate	$t_{10/90\%}$		100		ns	
WiFi 5.8 TX mode						
linear gain	S_{21}		20		dB	
1 dB compression	P_{1dB}		+28		dBm	
OIP3	OPIP3*2		+35		dBm	
TX detection threshold	P_{THRES}		-15		dBm	P_{IN}, average
RX/TX switching delay	$t_{TX/RX}$		400		ns	10% TX_{IN} to 90% TX_{OUT}
RX/TX slew rate	$t_{10/90\%}$		100		ns	
WiFi 2.4						
insertion loss	S_{21}		-4	-6	dB	@ 2.5 GHz, bi-directional
RF connectors	X_{RF}		N female			

*1: measured with output level of 2 x +7 dBm,
*2: measured with output level of 2 x +20 dBm,
OIP3 test frequencies: 5250 / 5350 MHz, 5450 / 5550 MHz, 5725 / 5825 MHz

Common Specification (WiFi Booster AMP51505925-TRX)

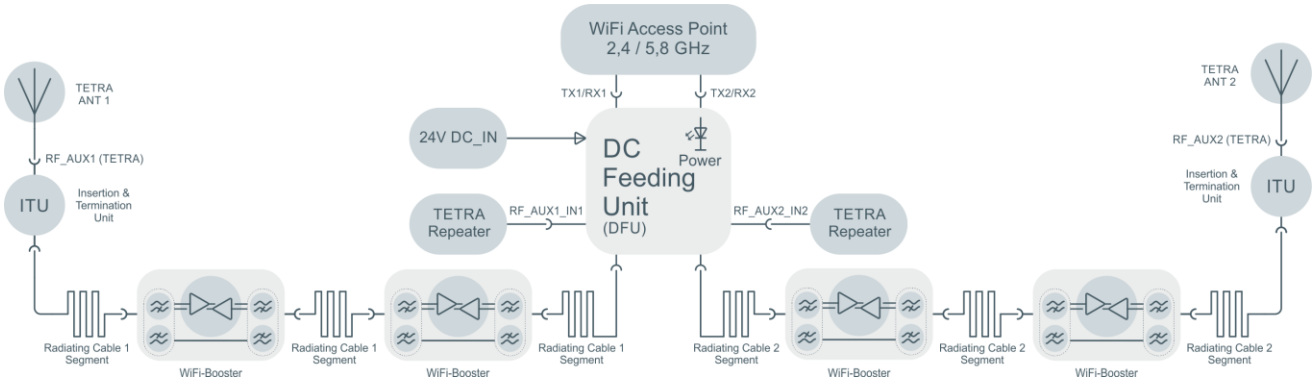
Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
supply voltage	U_{PHTM}	12		28	V	phantom supply
supply current	I_{PHTM}		90		mA	@ 24 V, RX (idle)
supply current	I_{PHTM}			200	mA	@ 24 V, 100% TX
power consumption	P_{DC}		1.7		W	RX (idle)
			4.8		W	100% TX
DC Bypass current	I_{BYP}			1.35	A	cascading AMP51505925-TRX
dimensions	W x H x D		approx. 59 x 28 x 78		mm	without connectors
weight	m		400		g	including 2 pcs RF cables
operating temp. range	T_o	0		+50	°C	
storage temp. range	T_s	-40		+70	°C	
ordering information	AMP51505925-TRX			1802.5041.1		including 2 pcs RF cables, length 25 cm

Dimensions (Booster Module)



Application Example

The following diagram shows the setup with one dual band, 2 MIMO WiFi access point. In total the single access point (AP) multiplies the cell area more than 5 times. Additional the radiating cables are used to the transmission of TETRA signals.



Related Products

Product	Description	P/N
AMP5150-5925-TRX-K	Kit for 5 GHz Wi-Fi Coverage Extension using Radiating Cables	1802.5011.1
DFU	DC Feeding Unit	1802.5031.1
TU	Termination Unit	1802.5021.1