WSDU-2X4R

High Dynamic 2 Section 4 Way Multicoupler 100 kHz … 4000 MHz / 20 MHz … 3600 MHz

Features

- 2 independent RF sections
- wideband
- high dynamic
- lossless signal distribution
- variants with AC or DC supply
- VLF/HF suppression filter in variant 20 MHz…3.6 GHz

Applications

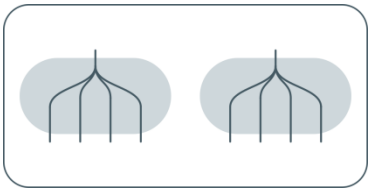
- antenna signal distributions
- broadcast signal distribution
- AM, FM, DAB, DVB-T, GNSS, SDARS
- radio monitoring
- direction finding
- low jitter femto clock distribution

At a Glance

Multicouplers are needed to distribute a common signal source to many outputs without loss in level and low distortion. In receiving applications, a huge amount of radio signals covered in the large frequency range effort high demands to the linearity and the noise of the multicoupler. The WSDU-2X4R is the right solution for modern radio signal distribution systems that must cover the frequency range up to 4 GHz.

Simplified Block Diagram

The WSDU-2X4R has two identical distribution sections. Each section distributes the signals from one input to 4 equal outputs without loss in level.



The WSDU-2X4R is available in variants with AC or DC power supply.

Lossless 1 to 4 Signal Distribution

The signals at the inputs are amplified by using broadband low-noise amplifiers with a wide dynamic range -weak signals are linearly amplified even if they occur next to signals with very strong levels-. As a result, the distributed input signals are made available at the four outputs in each section without any loss in level.

The hardware structure of the distribution offers optimal phase and amplitude balance performance. All inputs and outputs have N female connectors.

V/UHF Receiving Systems

For the use in VHF and UHF receiving systems a variant with a 20 MHz high pass filters in both input paths is available. The high pass filters suppress unwanted signals like local radio stations in the LF and HF range.

High Port-to-Port Isolation

WSDU-2X4R features a high port-to-port isolation. The connected receivers are prevented from affecting each other, e.g. via local oscillators or synthesizers.

Filters for Short Wave

For operation in short wave applications, different bandpass filters for external mounting are available. With help of this filters out band signals are effectively suppressed to avoid unwanted distortions in the short wave range. The filters can be easily mounted on the RF input sockets of the WSDU-2X4R.

RF Specification

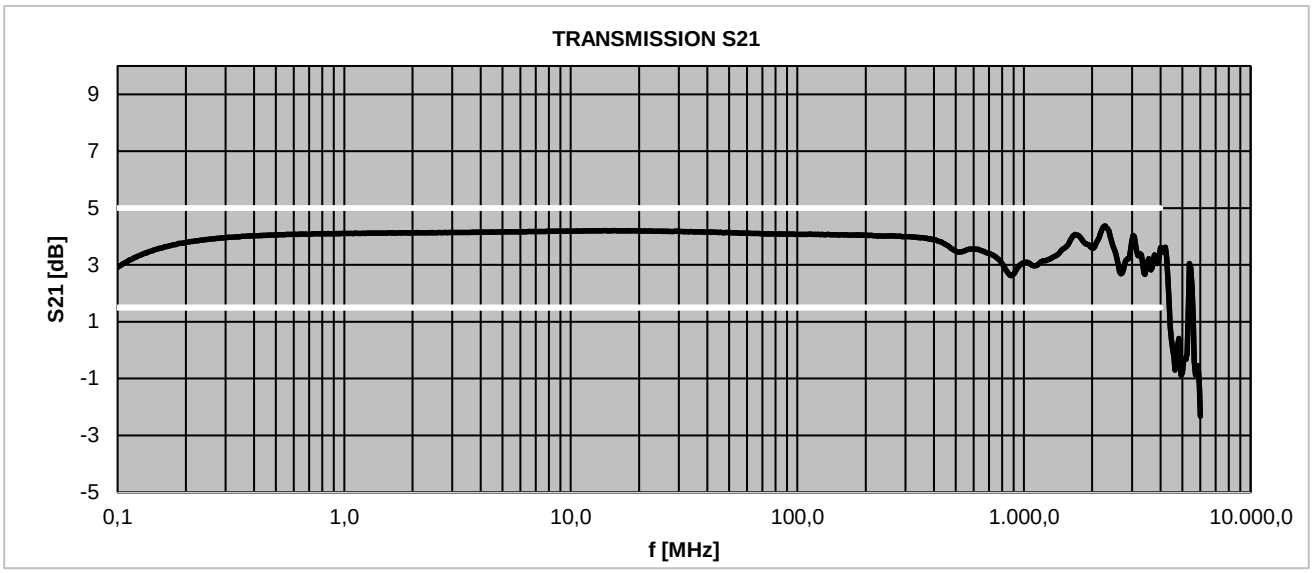
Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
impedance	Z_{in} / Z_{out}		50		Ohm	
number of sections	n_{SEC}		2			
low frequency	f_{min}		100	150	kHz	without high pass filter
high frequency	f_{max}	4000	5000		MHz	
low frequency	f_{min}			20	MHz	with high pass filter
high frequency	f_{max}	3600	4000		MHz	
high pass suppression	S_{21}		-20		dBr	@ 5 MHz
	S_{21}		-60		dBr	@ 1 MHz
gain	S_{21}		-2.5		dB	@ 10kHz
	S_{21}	1.5	4.0	5.5	dB	
input return loss	S_{11}		-17	-10	dB	f ≤ 2000 MHz
	S_{11}		-11	-7	dB	f > 2000 MHz
output return loss	S_{22}		-20	-13	dB	f ≤ 1000 MHz
	S_{22}		-13	-7	dB	f > 2000 MHz
reverse isolation	S_{12}		-65	-55	dB	
output isolation	S_{23}		-33	-27	dB	distance = 1
	S_{23}		-48	-40	dB	distance > 1
channel separation	S_{23}		-95	-75	dB	
amplitude balance	dS_{23}		±0.1		dB	
phase balance	φ_{23}		±1		deg	
1 dB compression	P_{1dB}	+8	+11		dBm	f ≤ 2000 MHz
	P_{1dB}	+5	+8		dBm	2000 MHz < f ≤ 3000 MHz
	P_{1dB}	+3	+6		dBm	f > 3000 MHz
3rd order intercept	OIP3	21	24		dBm	f = 1000 MHz, note 1
	OIP3	18	21		dBm	f = 2000 MHz, note 1
	OIP3	15	18		dBm	f = 3000 MHz, note 1
2nd order intercept	OIP2	40	54		dBm	f = 1000 MHz, note 1
	OIP2	27	38		dBm	f = 2000 MHz, note 1
	OIP2	27	38		dBm	f = 3000 MHz, note 1
noise figure	NF		7.5	9.0	dB	f ≤ 2000 MHz
	NF		8.0	9.5	dB	f > 2000 MHz
spurious	P_{SPUR}		-110		dBm	150 kHz ± 30kHz
	P_{SPUR}		-120		dBm	100/200 kHz ± 20kHz
added jitter	t_J		< 2.3		fs	@500 MHz, 1 Hz … 1 MHz
maximum input power	$P_{RF\ max}$			+15	dBm	CW, no damage
maximum DC voltage	U_{DC}			20	V	all RF ports
ESD discharge resistor	R_{ESD}		4.7		kΩ	all RF ports
RF connectors	X_{RF}		N female			N female

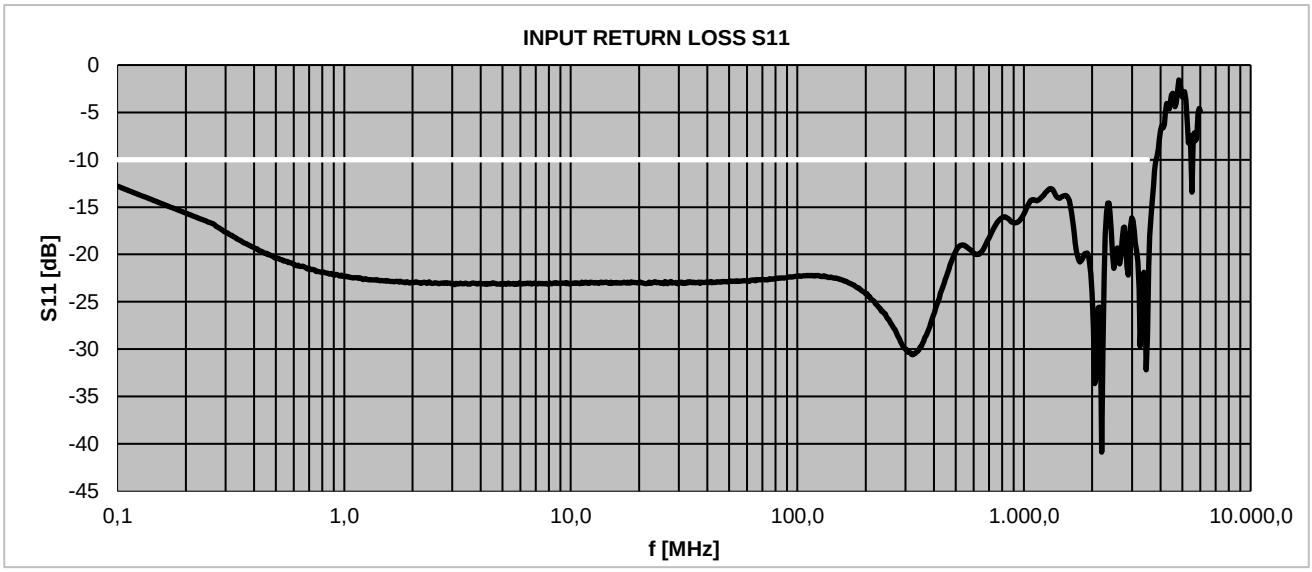
Note 1: frequency space 100 MHz

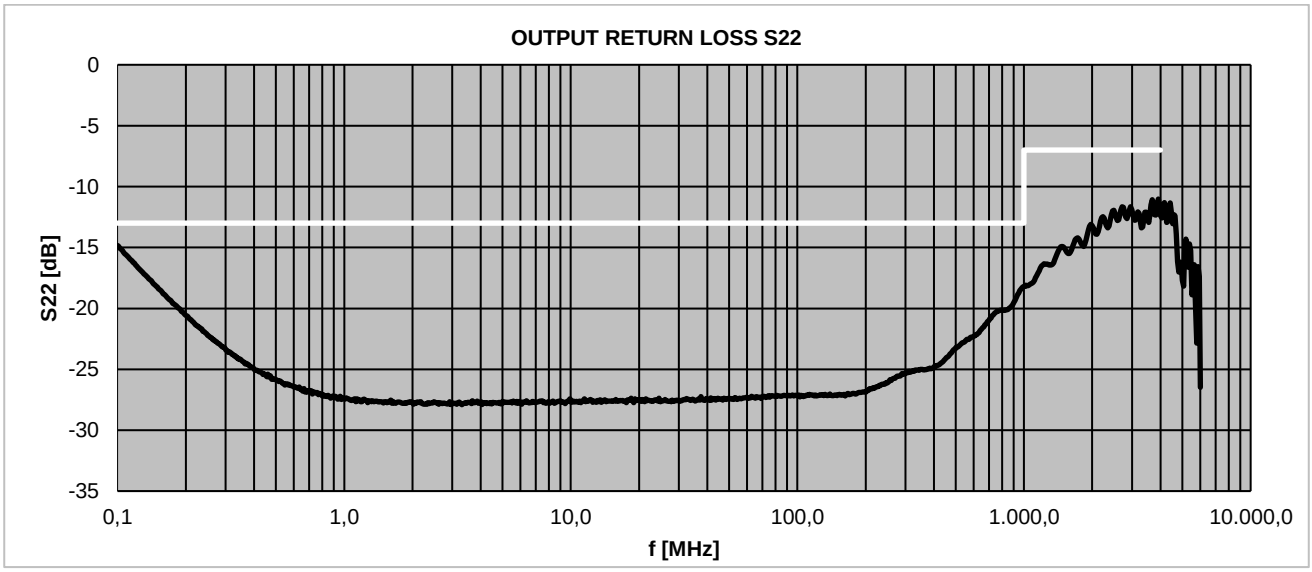
Common Specification

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
AC supply variant						
voltage supply range	U_{AC}	90	230	260	V	50 / 60 Hz AC
power consumption	P		26	50	W	
power socket	X_{AC}	IEC-60320 C14				country specific mains cable
DC supply variant						
voltage supply range	U_{DC}	22	24	30	V	
power consumption	P		20		W	
power socket	X_{AC}	XLR male				
Dimensions and weight						
dimensions	W x H x D	approx. 482 x 44 x 145			mm	19” 1 U, without connectors and handles
weight	m		2.9		kg	
Environment Conditions						
operating temp. range	T_o	+5		+45	°C	
storage temp. range	T_s	-40		+70	°C	
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	WSDU-2X4R	P/N: 1107.6202.3				20 MHz … 3600 MHz, AC supply
	WSDU-2X4R	P/N: 1107.6202.4				20 MHz … 3600 MHz, DC supply
	WSDU-2X4R	P/N: 1107.6202.1				100 kHz … 4000 MHz, AC supply
	WSDU-2X4R	P/N: 1107.6202.2				100 kHz … 4000 MHz, DC supply

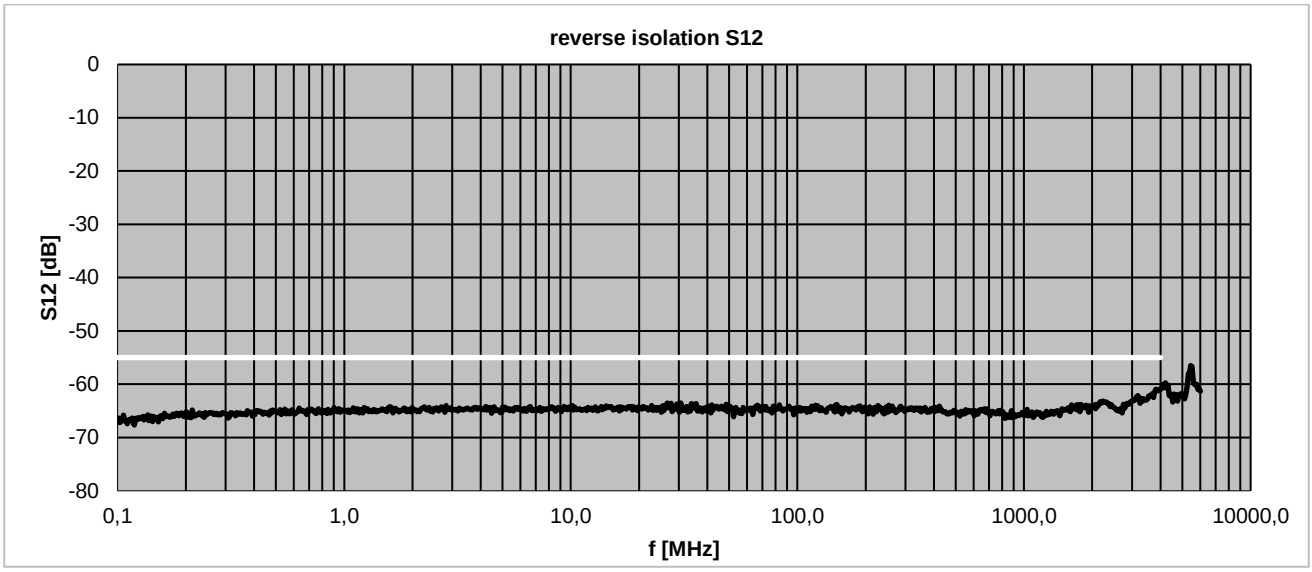
S-Parameters (typical responses)

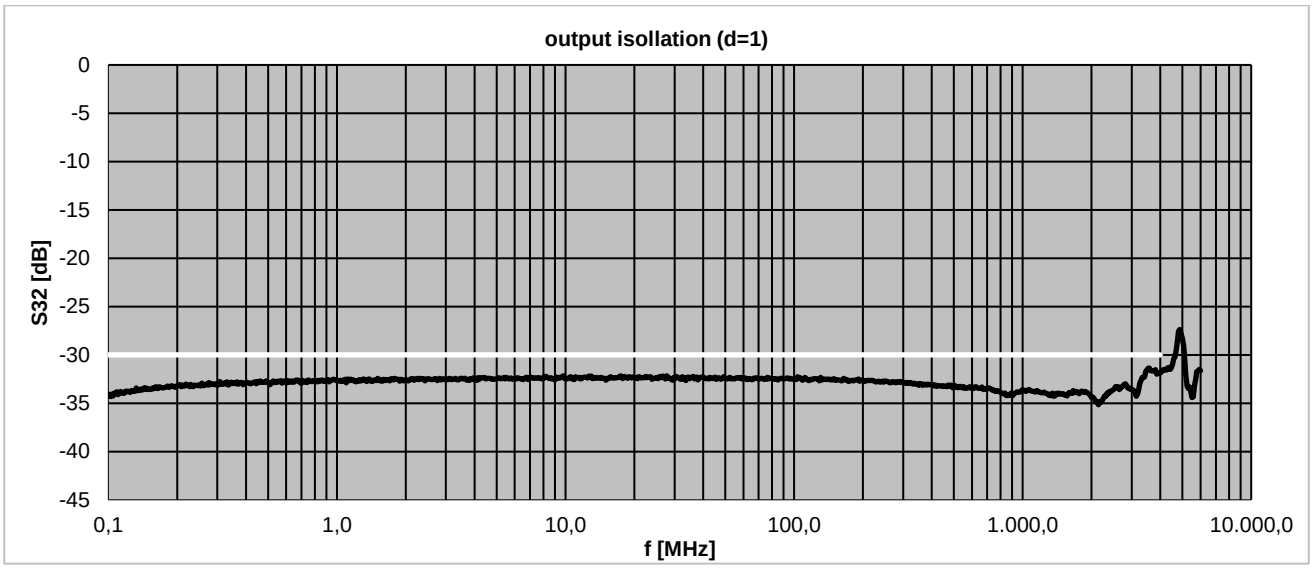


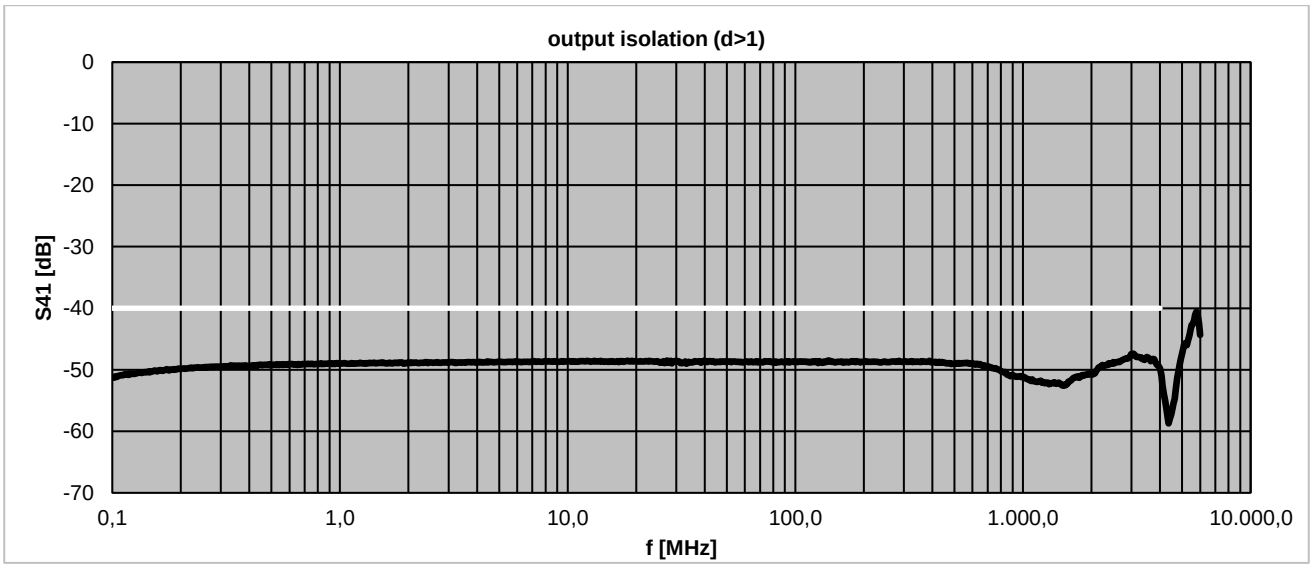


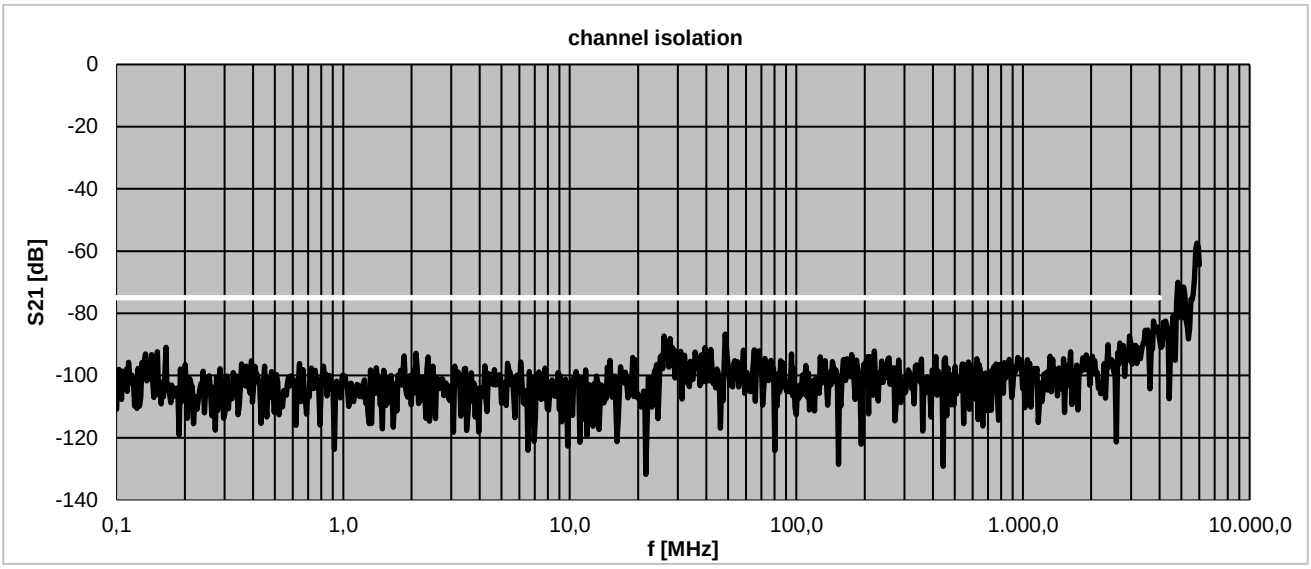


Isolations (typical responses)

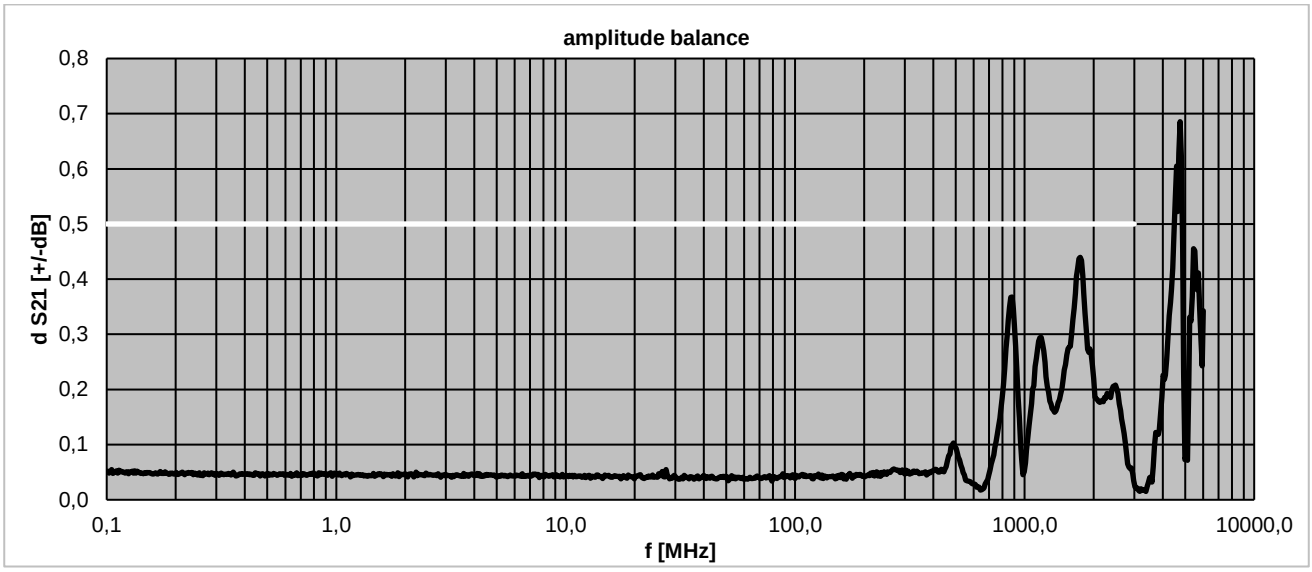


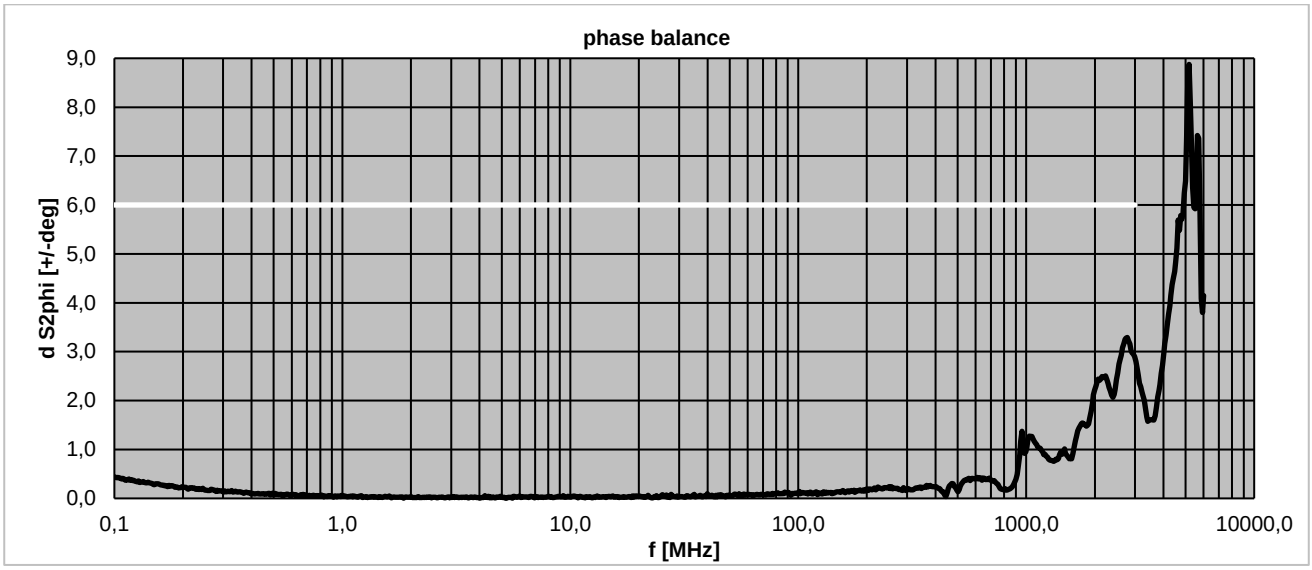




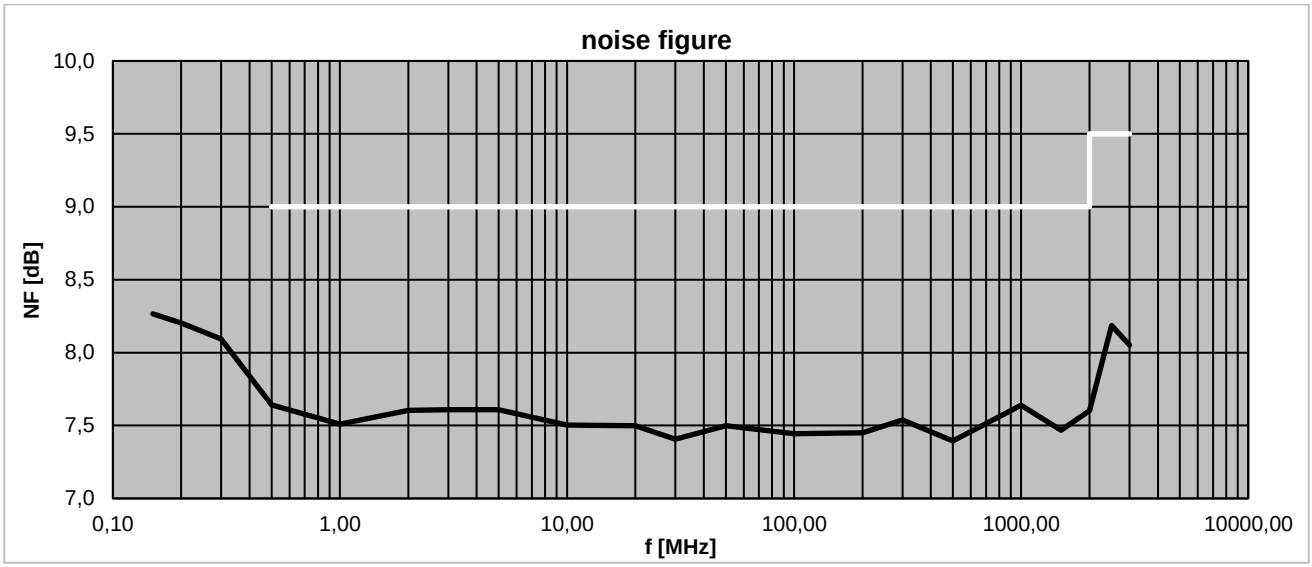

channel isolation
0
-20
-40
-60
-80
-100
-120
-140
S21 [dB]
0,1
1,0
10,0
100,0
1.000,0
10.000,0
f [MHz]

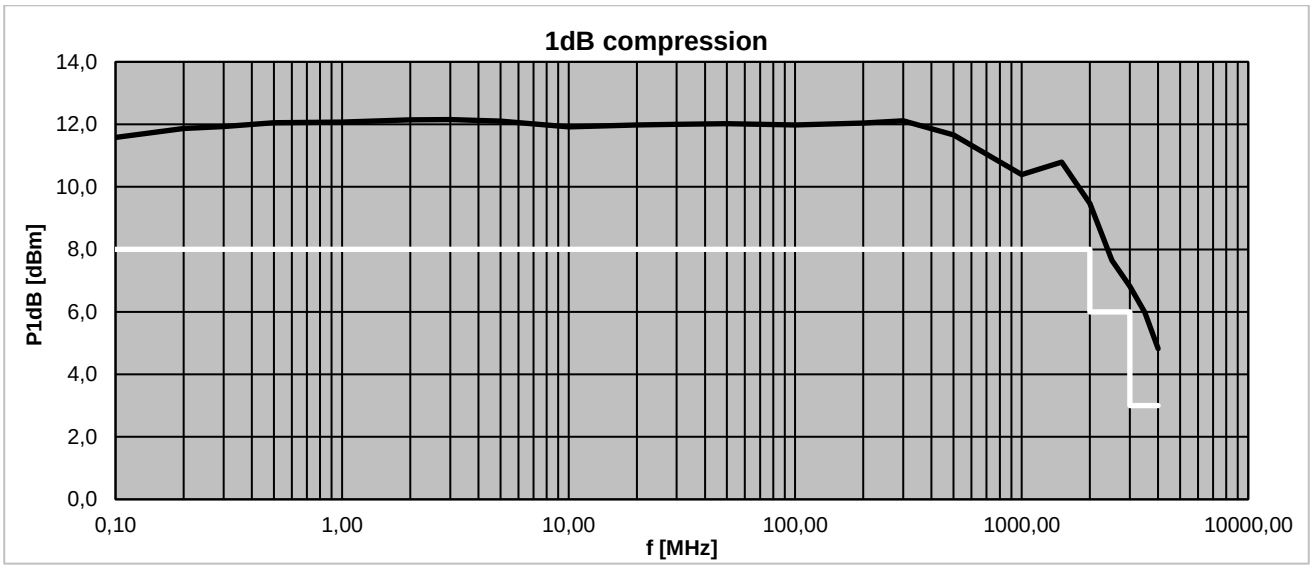
Output Balances (typical responses)

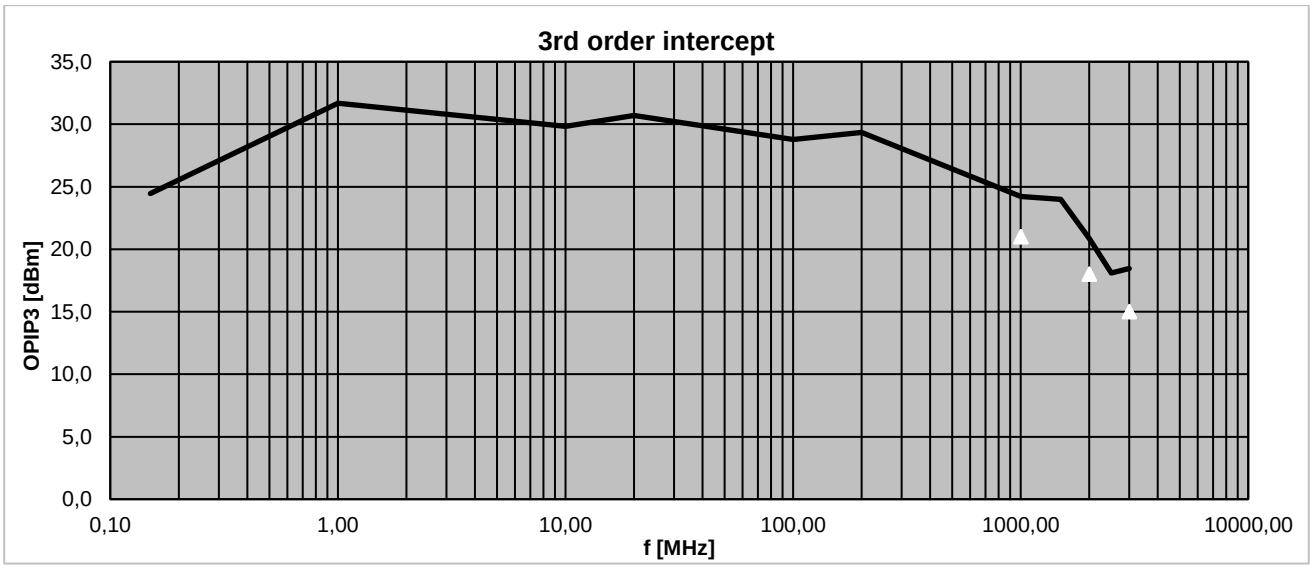


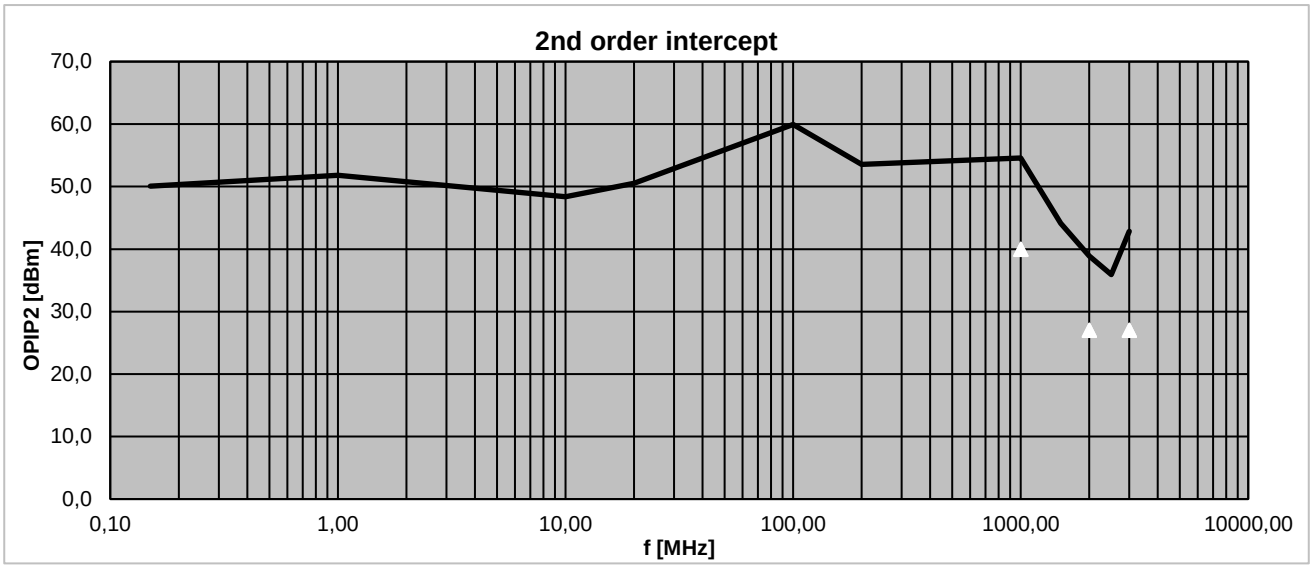


Dynamic Range (typical responses)

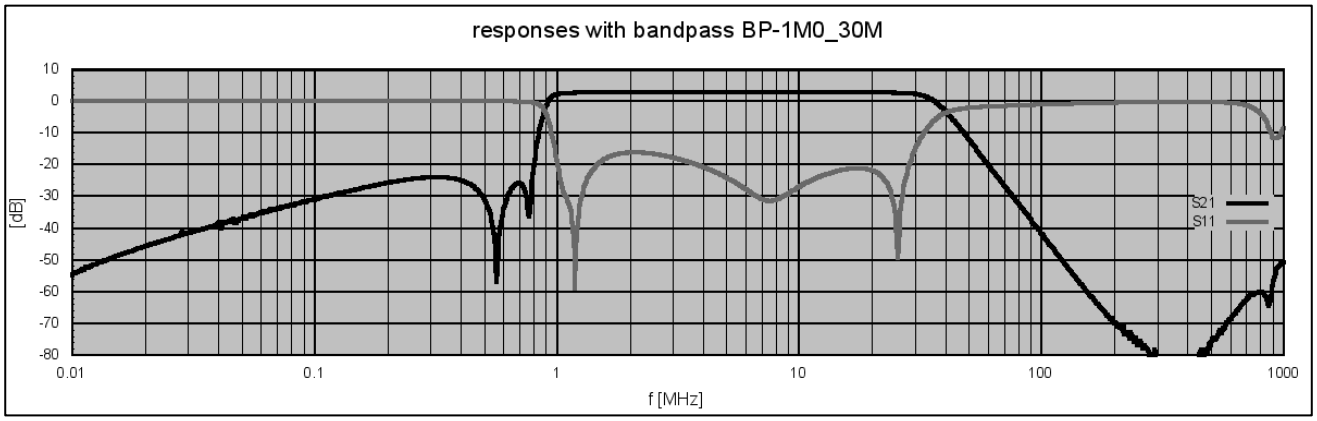








S-Parameters with band pass filter for short wave application



Transmission and input return loss with 1 … 30 MHz band pass filter BP-1M0_30M installed in RF input.

Appearance of external mountable filter

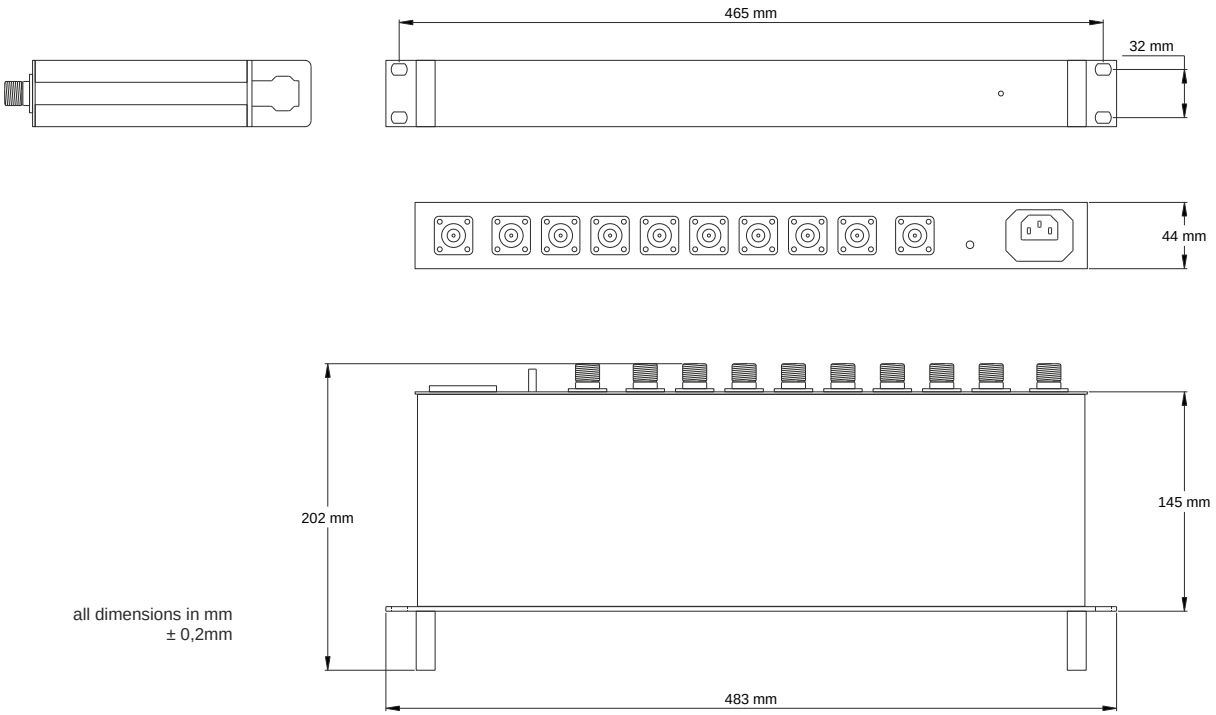
Filters for short wave with different bandwidths are available. See table related products.

Appearances

Front View

Rear View (variant with AC power supply)

Dimensions



all dimensions in mm
± 0,2mm

Related Products (External filters for short wave applications)

Product	P/N	Description
BP-0M5_30M	1502.6301.1	Band Pass Filter Module 0.5 … 30 MHz 90 V surge arrestor and 100 kΩ ESD resistor to GND at input, level limiter, stop band rejections: 30 dB typ. f < 400 kHz, 45 dB typ. 80 MHz ≤ f ≤ 200 MHz, N RF connectors (male / female)
BP-1M0_30M	1502.6311.1	Band Pass Filter Module 1.0 … 30 MHz 90 V surge arrestor and 100 kΩ ESD resistor to GND at input, level limiter, stop band rejections: 30 dB typ. f < 800 kHz, 45 dB typ. 80 MHz ≤ f ≤ 200 MHz, N RF connectors (male / female)
BP-1M7_30M	1502.6321.1	Band Pass Filter Module 1.7 … 30 MHz 90 V surge arrestor and 100 kΩ ESD resistor to GND at input, level limiter, stop band rejections: 30 dB typ. f < 1.3 MHz, 45 dB typ. 80 MHz ≤ f ≤ 200 MHz, N RF connectors (male / female)
LP-30M	1107.6301.1	30 MHz Low Pass Filter Module Passband DC…30 MHz 90 V surge arrestor and 100 kΩ ESD resistor to GND at input, level limiter, stop band rejection: 45 dB typ. @ 80 MHz ≤ f ≤ 200 MHz, N RF connectors (male / female)

Related Products

Product	P/N	Description
WSDU-1X8LR	1107.6152	High Dynamic 8 Way Multicoupler for Broadcast Signals 100 kHz … 4000 MHz AC or DC power supply
WSDU-2X4LR	1107.6252	High Dynamic 2 Section 4 Way Multicoupler for Broadcast Signals 100 kHz … 4000 MHz AC or DC power supply
WSDU-1X8R	1107.6102	High Dynamic 8 Way Multicoupler 100 kHz … 4000 MHz AC or DC power supply
WSDU-2X4R	1107.6202	High Dynamic 2 Section 4 Way Multicoupler 100 kHz … 4000 MHz AC or DC power supply
WSDU-1X8AR	1807.6302	8 Way High Dynamic Signal Conditioning Multicoupler 100 kHz…4000 MHz AC or DC power supply
WSDU-1X8SR	1502.6102	High Dynamic 1X8 Shortwave Signal Distribution Unit 200 kHz … 30 MHz AC or DC power supply Variant with LAN remote interface with SNMPv2 trap function available
WSDU-2X4SER	2306.6102	2-Section 4-Way Signal Distribution Unit Section A: 200 kHz … 30 MHz Section B: 20… 8000 MHz AC or DC power supply Variant with LAN remote interface with SNMPv2 trap function available
WSDU-1X8ER	1501.6302	Extremely Wideband 1 to 8 Signal Distribution Unit 20 … 8000 MHz AC or DC power supply Variant with LAN remote interface with SNMPv2 trap function available
WSDU-2X4ER	1501.6202	Extremely Wideband 2 Section 1X4 Signal Distribution Unit 20 MHz… 8000 MHz AC or DC power supply Variant with LAN remote interface with SNMPv2 trap function available
WSDU-1X8UR	2109.6002	Ultra-Wideband 8-Way Signal Distribution Unit 100 kHz … 18 GHz AC or DC power supply LAN remote interface with SNMPv2 trap function