becker nachrichtentechnik

WSDU-2X4SER

Extremely Wideband 2-Section 4-Way Signal Distribution Unit,
200 kHz … 30 MHz / 20 … 8000 MHz

Features

- 2 independent RF sections
- Section A: 200 kHz … 30 MHz
  - High dynamic short-wave section
  - Input bandpass filter
  - Lighting protection
- Section B: 20 MHz … 8000 MHz
  - Extremely wideband section
- Variants with AC or DC supply
- Optional remote interface with BITE

Applications

- Antenna signal distributions
- Radio monitoring
- Direction finding
- R&D

Scope

WSDU-2X4SER is an extremely wideband multicoupler devices that distributes signals from one common input to 4 outputs each in two independent sections. Section A is optimized for shortwave signals with the highest demands on dynamics and linearity. Section B is optimized for extremely high bandwidth. The device is available in variants with AC or DC power supply.

Lossless 1 to 4 Signal Distributions

The RF input the signal is amplified by using innovative 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 signal is made available at the four outputs of each section without any loss in level.

The hardware structures of the distributions offer best phase and amplitude balance performance. All RF inputs and outputs have N female connectors.

Variants for AC and DC Supply

WSDU-2X4SER is available in two variants for supply the unit with AC or DC power. Both variants cover a wide voltage supply range.

Device Monitoring

WSDU-2X4SER device is equipped with a built-in device monitoring capability which offers optical signalization of the device health as standard.

For remote monitoring a variant with LAN and USB remote interfaces is available. Via the remote interfaces information about operating points of the internal wideband amplifier stages, the module temperature and the device identification can be queried in form of ASCII strings.

The variant with remote monitoring supports SNMP (simple network management protocol) which enables monitoring without any effort, even in complex environments. The WSDU-2X4SER is able to identify failures and to inform the supervising system automatically.

Input Limiter

The optional input limiter provides reliable protection for the wideband RF input (section B) of the WSDU-2X4SER against excessive signal levels and transient overload conditions. This prevents the broadband amplifier stages from being damaged. Especially in environments with highly variable or unexpectedly high input levels, the input limiter significantly enhances the operational reliability and long-term stability of the system.

RF Specification

Section A: 200 kHz … 30 MHz

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
impedance	Z_{IN}/Z_{OUT}		50		ohms	
low frequency	f_{MIN}		200	300	kHz	
high frequency	f_{MAX}	30	35		MHz	
gain	S_{21}	+2	+3	+4	dB	
input return loss	S_{11}		-25	-14	dB	VSWR < 1.5
output return loss	S_{22}		-20	-14	dB	VSWR < 1.5
reverse isolation	S_{12}		-30	-27	dB	
o-o isolation	S_{23}		-34	-27	dB	adjacent channel
o-o amplitude balance	dS_{23}		±0.02		dB	
phase balance	φ_{23}		±0.3		deg	
attenuations	S_{21_50k}		-25	-17	dBr	@ 50 kHz, rel. S_{21} @ 10 MHz
	S_{21_60M}		-22	-17	dBr	@ 60 MHz, rel. S_{21} @ 10 MHz
	S_{21_80M}		-40	-30	dBr	@ 80 MHz, rel. S_{21} @ 10 MHz
2nd order intercept	OIP2[2]	+65	+85		dBm	
3rd order intercept	OIP3[1]	+22	+25		dBm	f < 500 kHz
	OIP3[1]	+26	+29		dBm	500 kHz ≤ f < 1 MHz
	OIP3[1]	+32	+39		dBm	f ≥ 1 MHz
1 dB compression	P_{1dB}	+15	+18		dBm	f < 1 MHz
	P_{1dB}	+17	+20		dBm	f ≥ 1 MHz
noise figure	NF		7	9	dB	
maximum input power	P_{in}			+25	dBm	CW, no damage
maximum DC voltage	U_{DC}			24	V	all RF ports
ESD discharge resistor	R_{ESDI}		100		kΩ	RF input
ESD discharge resistor	R_{ESDO}		10		kΩ	RF outputs

Note 1: test frequency pairs for OIP2: 1.0 / 1.3 MHz, 2.5 / 3.5 MHz, 12 / 15 MHz, 22 / 27 MHz. output level 2 x 0 dBm.

Note 2: test frequency pairs for OIP3: 290 / 310 kHz, 490 / 510 kHz, 0.9 / 1.1 MHz, 2.8 / 2.9 MHz, 29.8 / 29.9 MHz. output level 2 x 0 dBm.

Section B: 20 MHz … 8000 MHz

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
impedance	Z_{in} / Z_{out}		50		Ohm	
low frequency	f_{min}		15	20	MHz	
high frequency	f_{max}	8000	8500		MHz	
gain	S_{21}	3	4	5.5	dB	f ≤ 1 GHz
	S_{21}	1.0	3.5	5.5	dB	1 GHz < f ≤ 7 GHz
	S_{21}	0	3.5	5.5	dB	f > 7 GHz
gain flatness	ΔS_{21}		±2		dB	
input return loss	S_{11}		-15	-9	dB	
output return loss	S_{22}		-17	-13	dB	f ≤ 2 GHz
	S_{22}		-13	-10	dB	f > 2 GHz
reverse isolation	S_{12}		-70	-55	dB	
output isolation	S_{23}		-30	-20	dB	distance = 1
	S_{23}		-50		dB	distance > 1
amplitude balance	dS_{23}		±0.4		dB	
phase balance	φ_{23}		±2		deg	
1 dB compression	P_{1dB}	+2.5	+6.0		dBm	f ≤ 3 GHz
3rd order intercept	OIP3[1]	+17	+21		dBm	f ≤ 1 GHz
	OIP3[1]	+13	+17		dBm	1 GHz < f ≤ 4 GHz
	OIP3[1]	+10	+15		dBm	f > 4 GHz
2nd order intercept	OIP2[2]	+25	+40		dBm	40/60 MHz, 1000/1100 MHz
	OIP2[2]	+16	+30		dBm	3000/3100 MHz, 3900/4000 MHz
noise figure	NF		8	11	dB	f < 100 MHz
	NF		8	9.5	dB	100 MHz ≤ f ≤ 7 GHz
	NF		8.5	10.5	dB	f > 7 GHz
input power	P_{in}			+10	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
Variant with input limiter						
input return loss	S_{11}		-9	-6	dB	f > 7 GHz
gain	S_{21}	-1.5	2.0	5.5	dB	f > 7 GHz
noise figure	NF		10	12	dB	f > 6 GHz
input power	P_{in}			+30	dBm	CW, no damage

Note 1: P_{in} = 2 x -10 dBm, specified and tested for Δf = 50 MHz

Note 2: P_{in} = 2 x -10 dBm, specified and tested for mentioned frequency pairs

OIP2 & OIP3 values are the average value of the upper and lower intermodulation distortion.

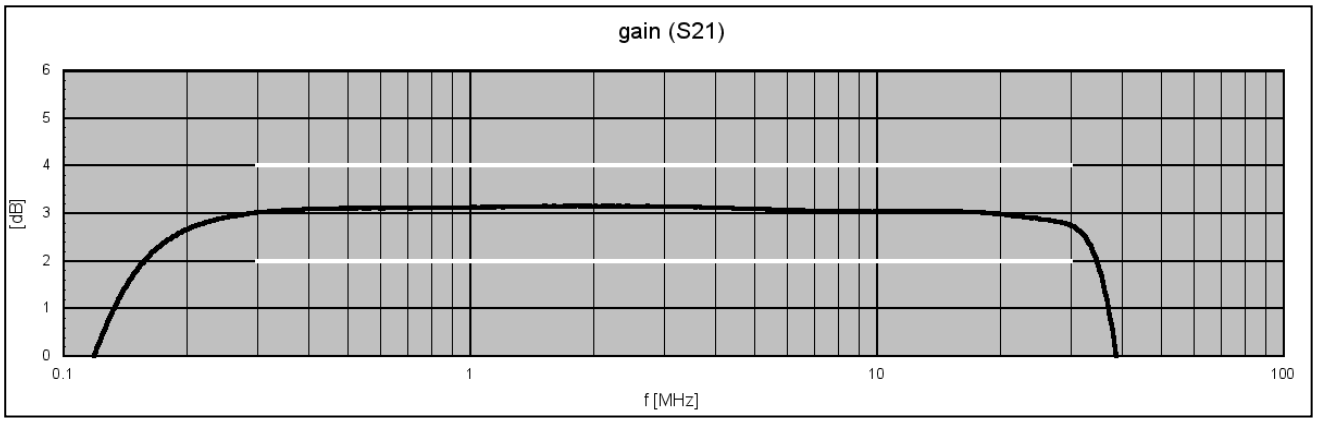
Common Specification

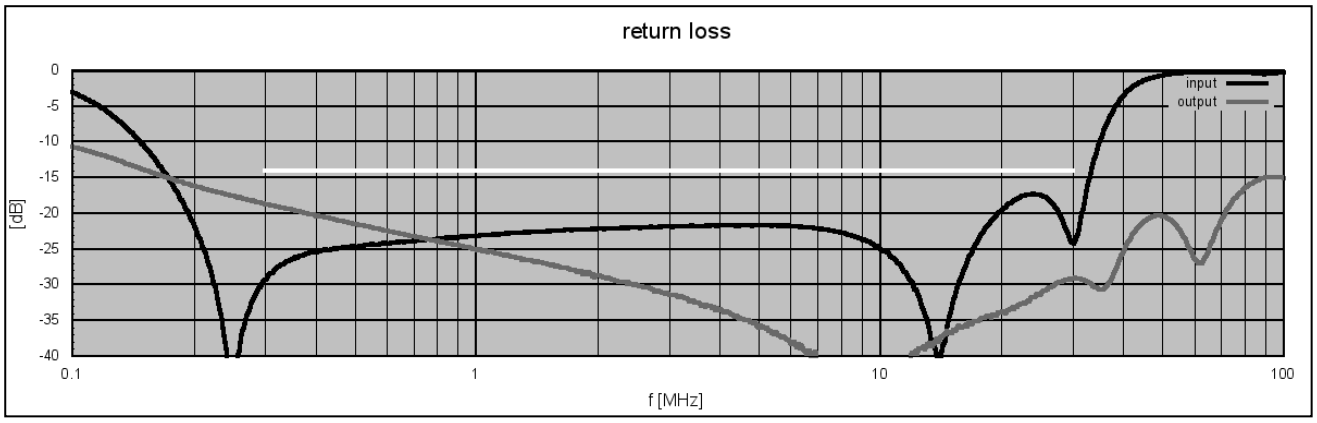
Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
RF connectors			N female			
AC supply variant						
voltage supply range	U_{AC}	90	230	260	V	50 / 60 Hz AC
power consumption	P		13	20	W	
power socket	X_{AC}		IEC-60320 C14			country specific mains cable
DC supply variant						
voltage supply range	U_{DC}	18	24	28	V	
current consumption	I_{DC}		500		mA	@ 24 V
power socket	X_{DC}		3 pole XLR male			
Dimensions and weight						
dimensions	W x H x D		approx. 482 x 44 x 265		mm	19” 1 U, without connectors and handles
weight	m		4.5		kg	
Environment conditions						
operating temp. range	T_o	+5		+45	°C	
storage temp. range	T_s	-40		+70	°C	
Remote interfaces (variant with remote device monitoring)						
remote ports	LAN	10/100BaseT		TCP/IP		RJ45 on rear side
	LAN		SNMPv2 trap function			
	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	WSDU-2X4SER		P/N: 2306.6102.1			variant with AC supply
	WSDU-2X4SER		P/N: 2306.6102.2			AC supply with device monitoring
	WSDU-2X4SER		P/N: 2306.6102.3			variant with DC supply
	WSDU-2X4SER		P/N: 2306.6102.4			DC supply with device monitoring
	WSDU-2X4SER		P/N: 2306.6102.5			AC supply with section B input limiter
	WSDU-2X4SER		P/N: 2306.6102.6			AC supply with remote monitoring and section B input limiter
	WSDU-2X4SER		P/N: 2306.6102.7			DC supply with section B input limiter
	WSDU-2X4SER		P/N: 2306.6102.8			DC supply with remote monitoring and section B input limiter

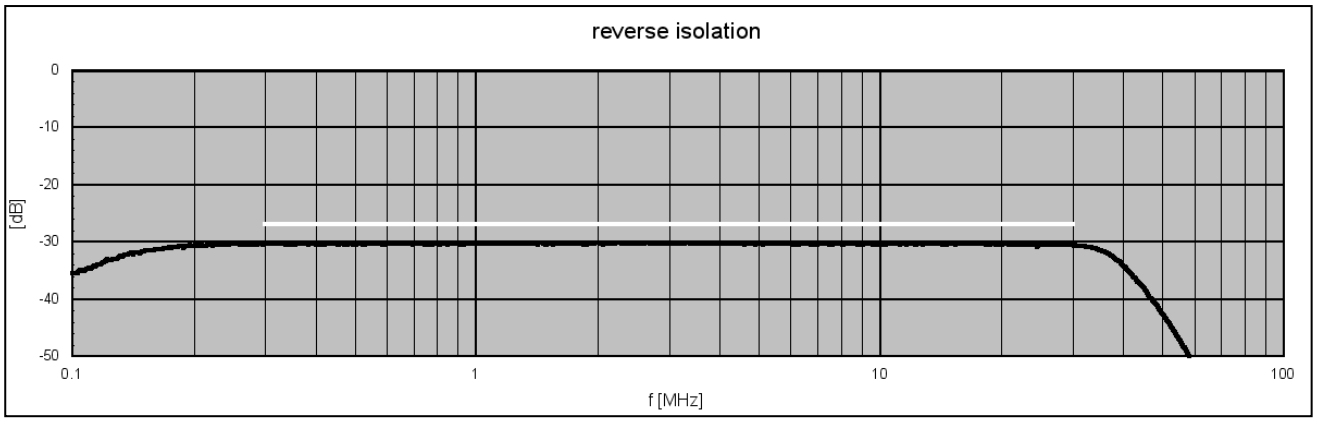
S-Parameters

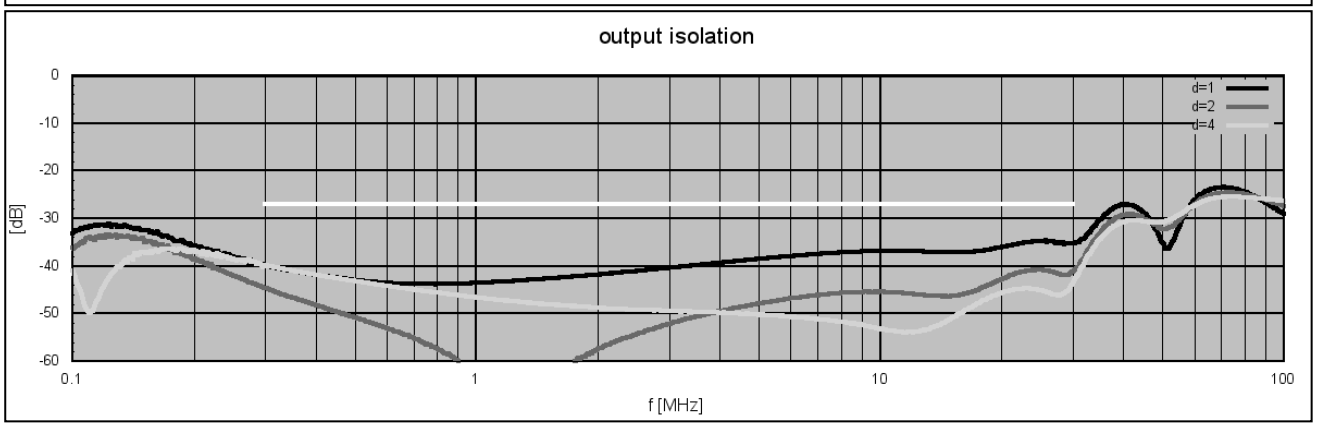
typical responses

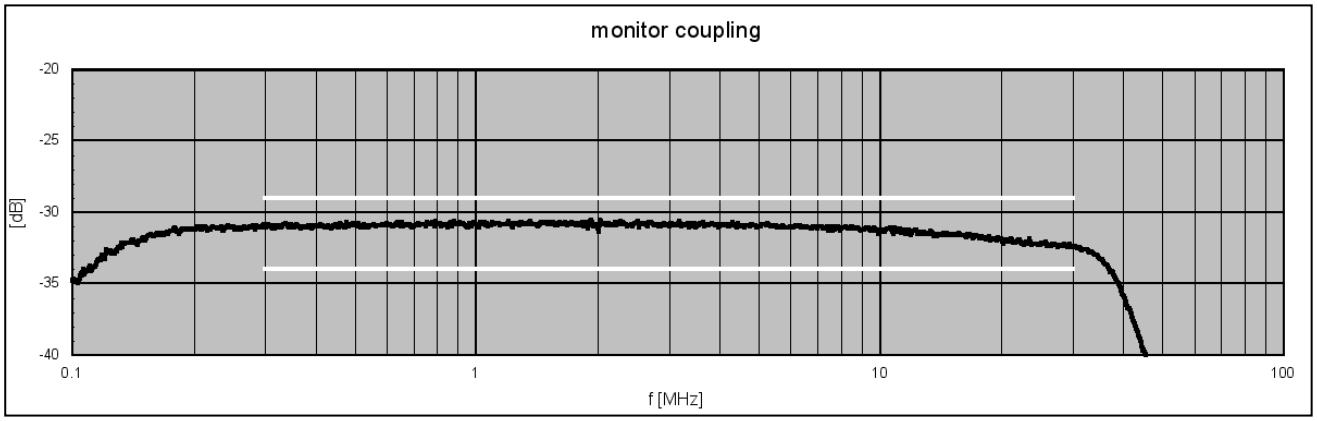
Section A: 200 kHz … 30 MHz

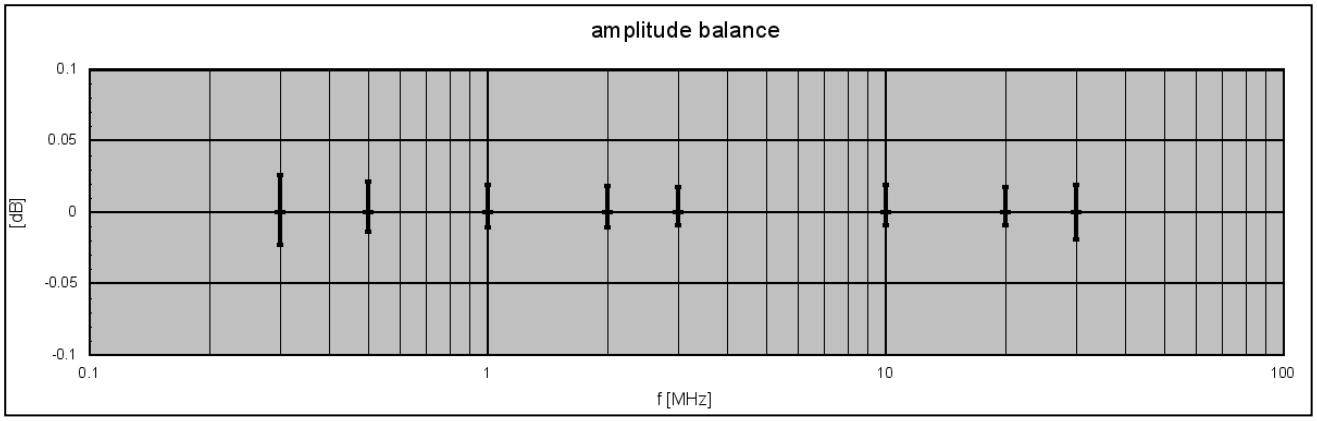


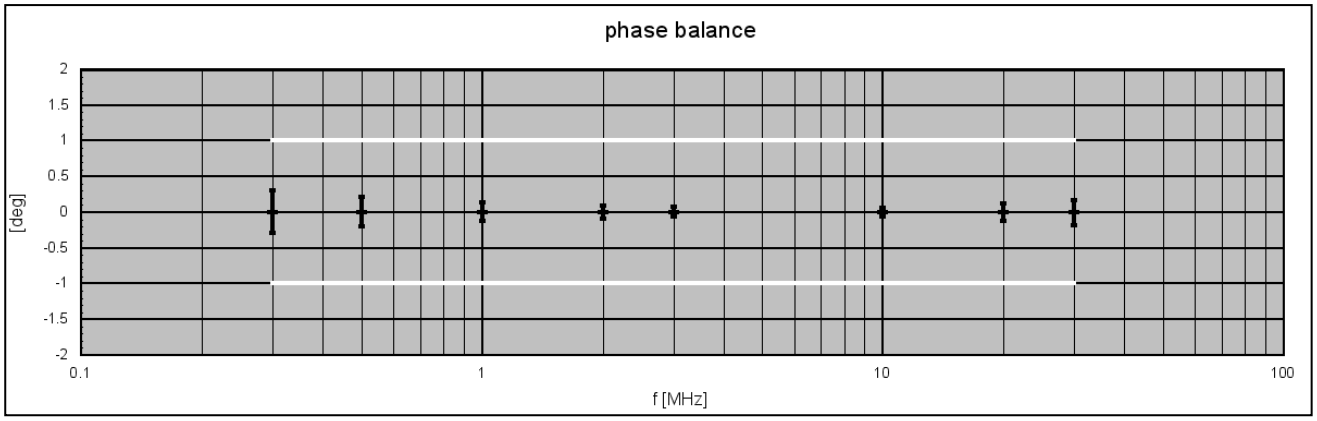


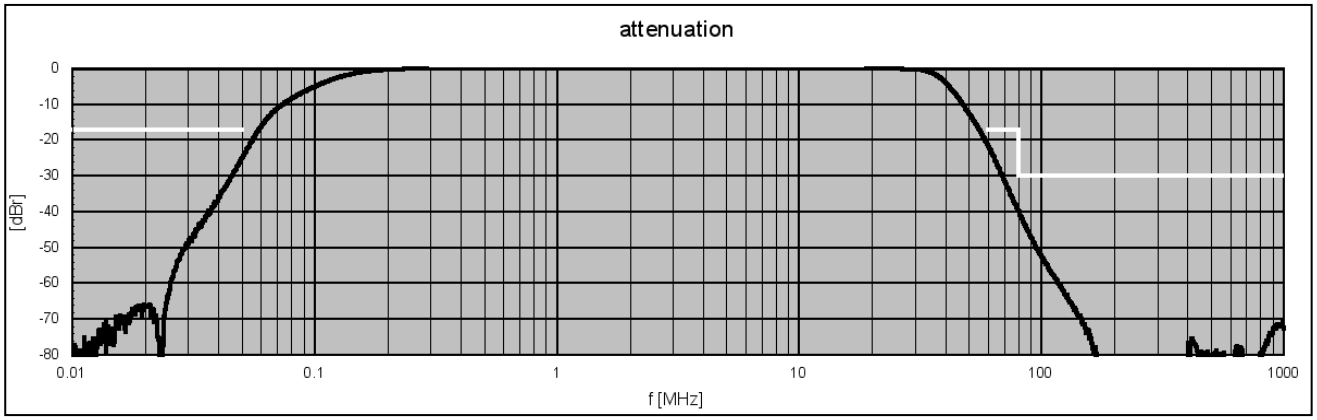




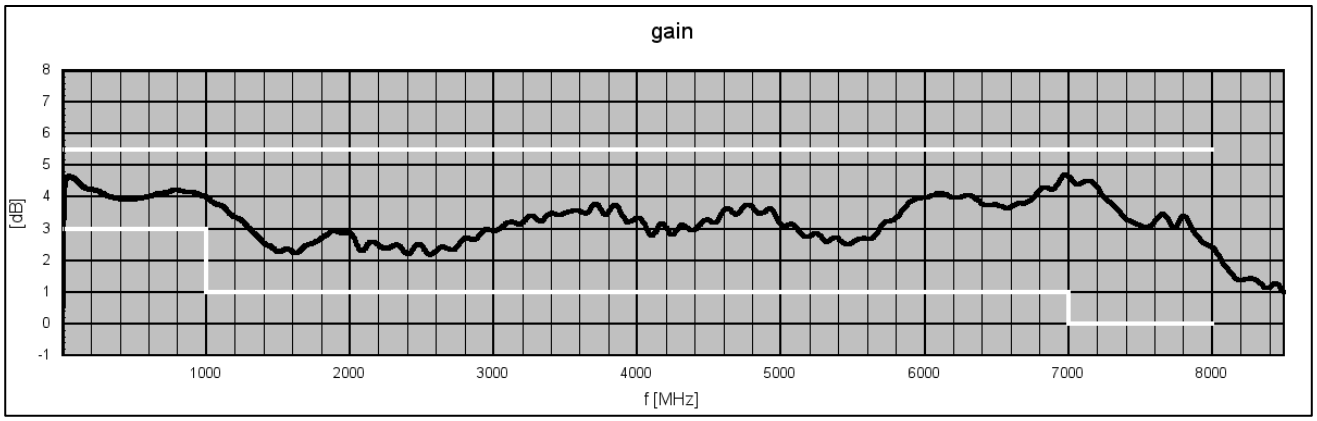

monitor coupling
-20
-25
-30
-35
-40
[dB]
0.1
1
10
100
f [MHz]

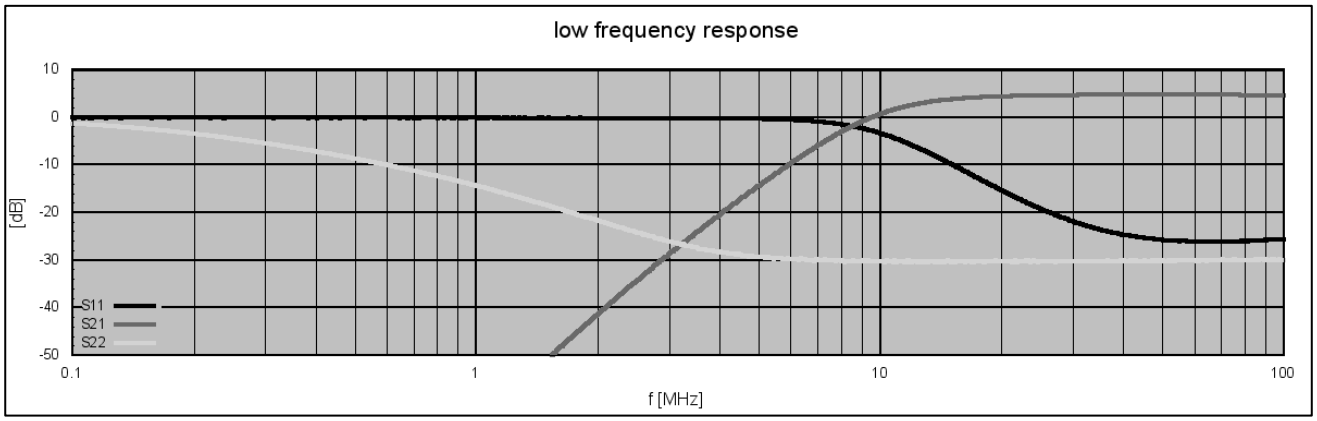

amplitude balance
0.1
0.05
0
-0.05
-0.1
[dB]
0.1
1
10
100
f [MHz]

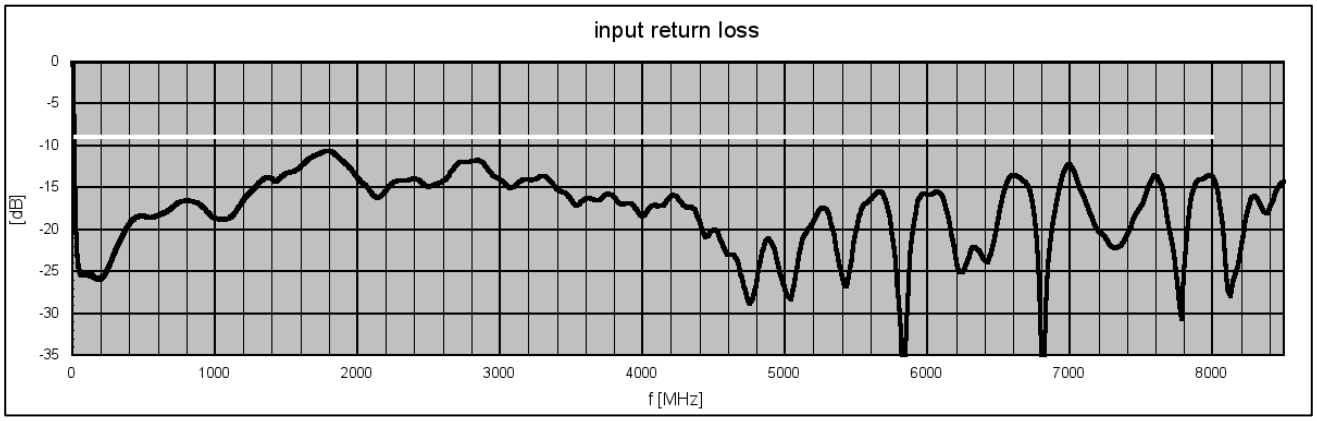

phase balance
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
[deg]
0.1
1
10
100
f [MHz]

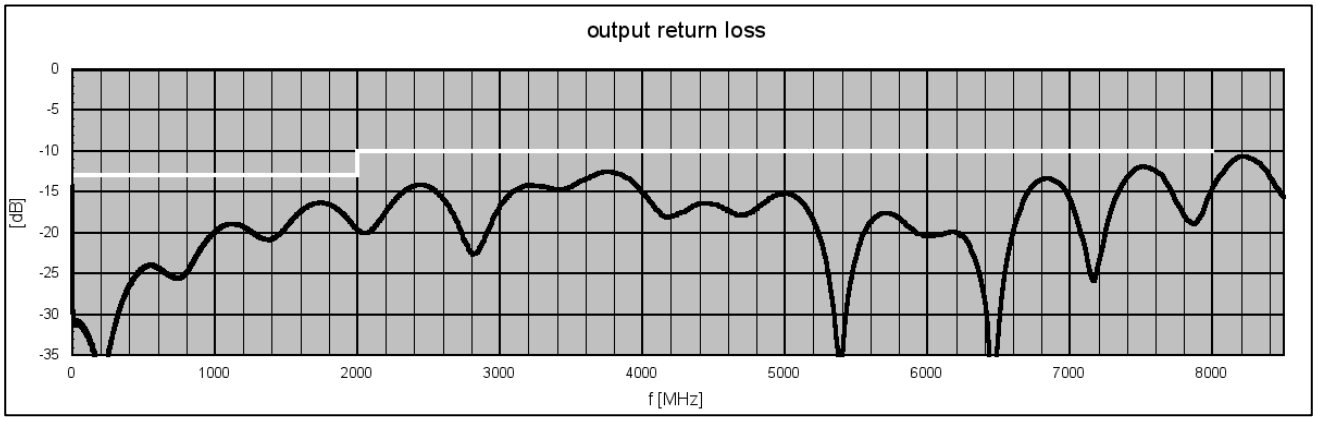

attenuation
0
-10
-20
-30
-40
-50
-60
-70
-80
[dBr]
0.01
0.1
1
10
100
1000
f [MHz]

Section B: 20 MHz … 8000 MHz





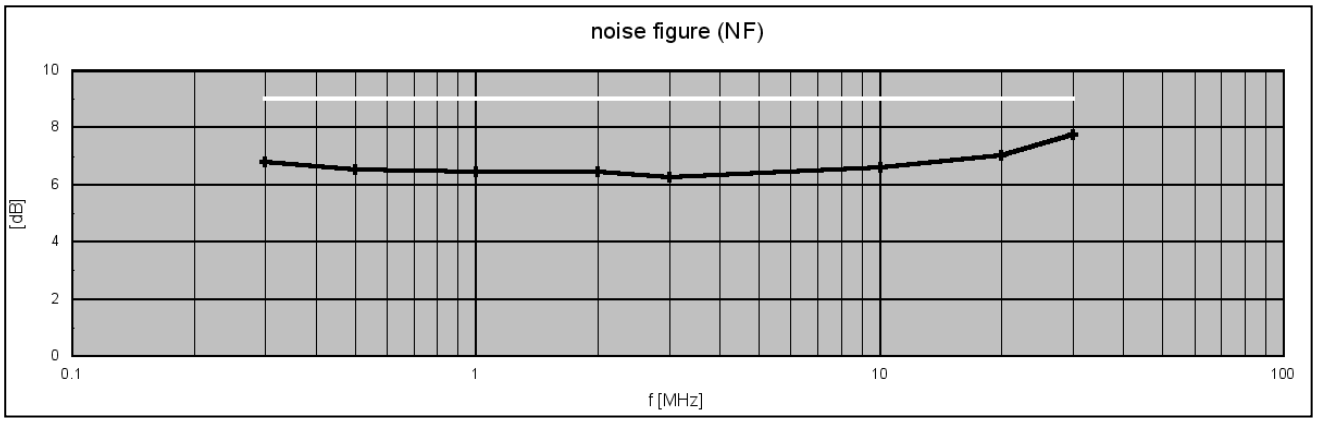


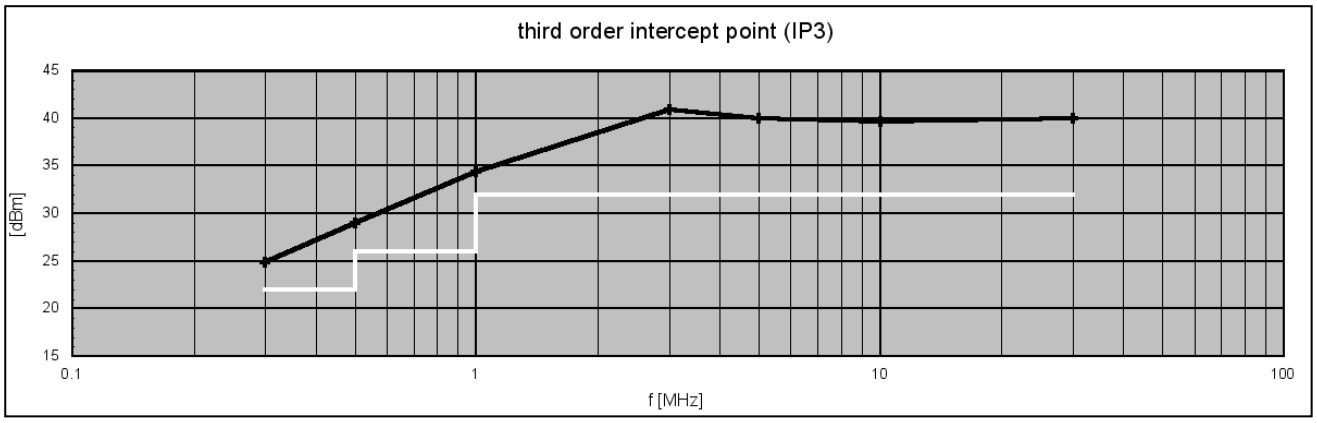


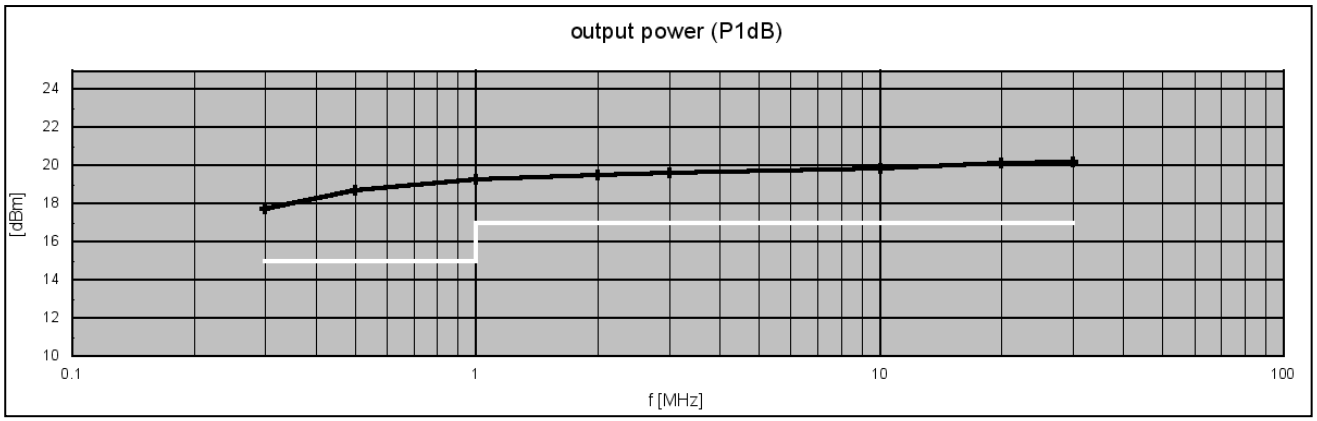
Dynamic Range

typical responses

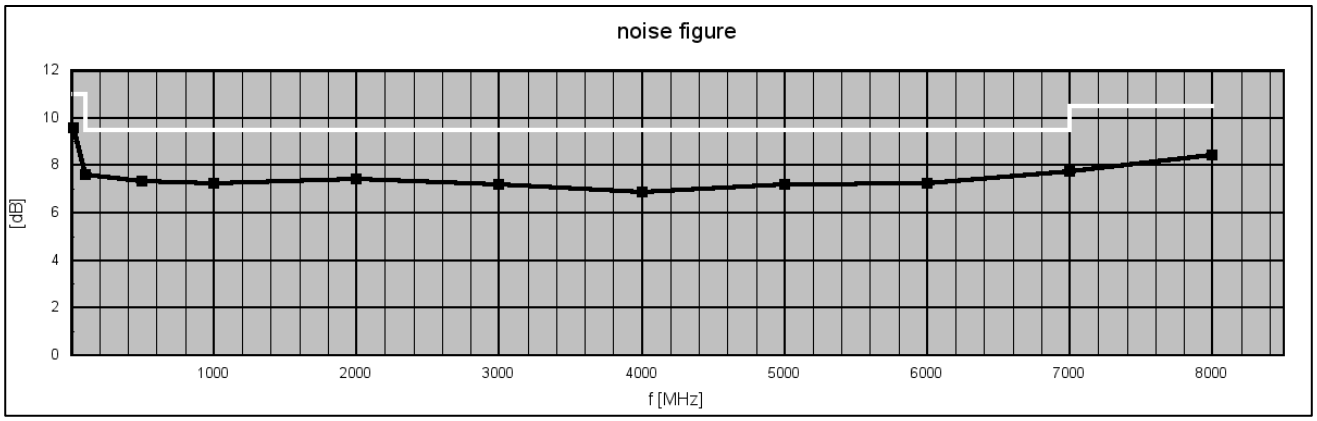
Section A: 200 kHz … 30 MHz

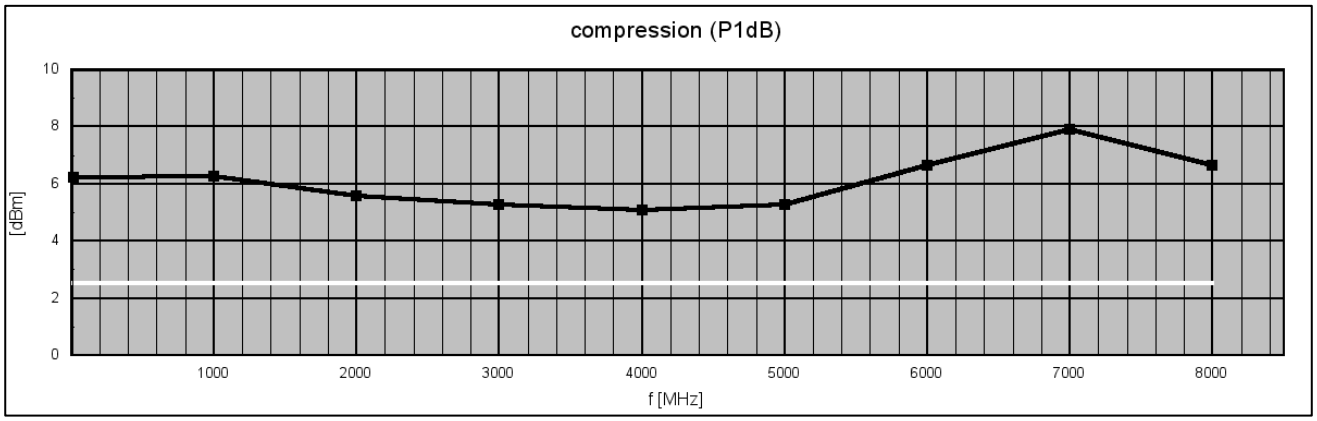


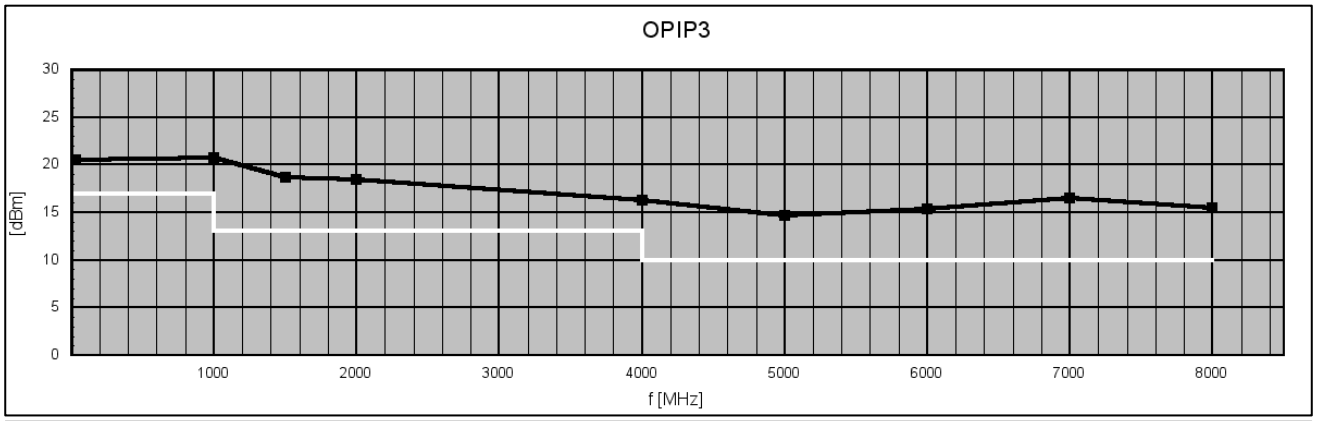


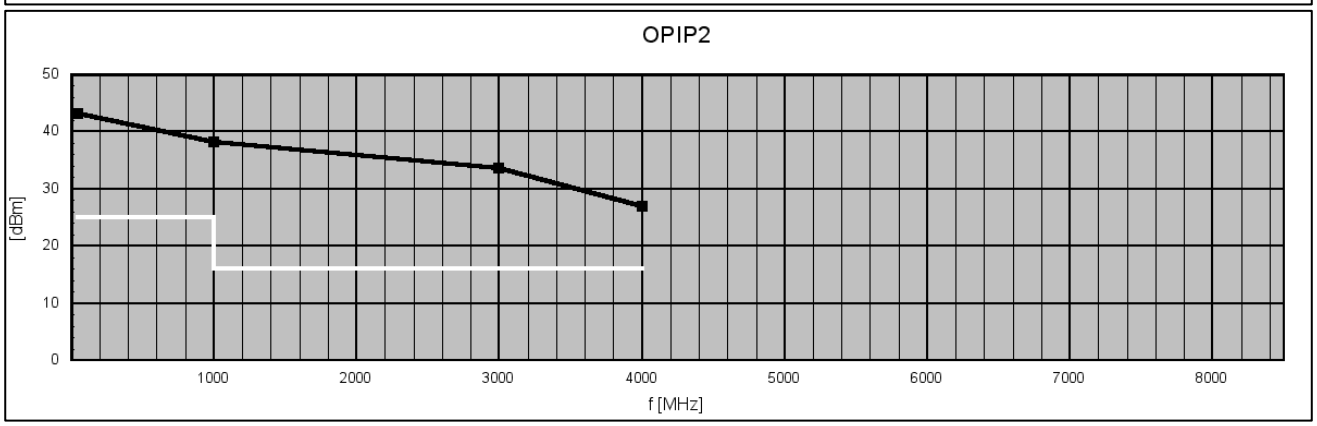


Section B: 20 MHz … 8000 MHz









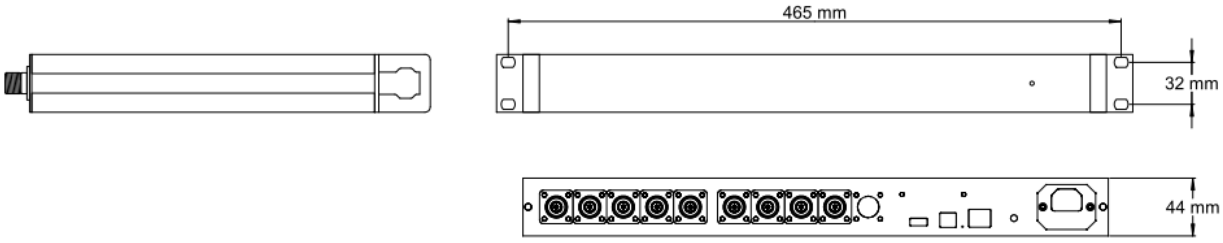
Appearances

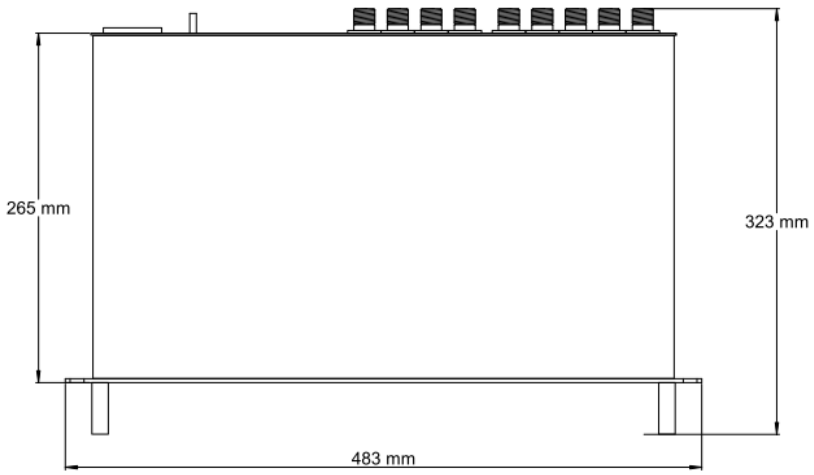
Front View

Rear view

Variant with AC Supply and Remote Monitoring (P/N: 2306.6102.2)

Dimensions





all dimensions in mm
± 2 mm

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 Variant with RF input limiter (Section B) 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 Variant with RF input limiter 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 Variant with RF input limiter 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