

## RSDU-2X4AR

2 Channel Radio Signal Conditioning and Distribution Unit 100 kHz...2500 MHz, 50  $\Omega$

### Features

- wideband
- 2 identical sections with 4 level adjustable outputs (cascadable)
- frequency selective inputs
- wideband generator inputs
- through, amplifier and attenuator paths
- programmable DC current sinks
- DC voltage and current measurement function
- LAN remote control interface
- graphical user interface
- compact 19", 1 U design



### Applications

- End-of-line test
- RF Test  
AM, FM, DAB, DVB-T, GNSS,  
SDARS /
- phantom supply test
- signal conditioning

### Scope

RSDU-2X4AR is a compact device containing two complete identical RF conditioning sections (A and B). Via the LOC\_IN/LOC\_OUT wideband input/output the two sections of the RSDU-2X4AR can be combined to have 8 outputs with the same signal content. More than 8 outputs can be realized by cascading further RSDU-2X4AR devices without the cost of additional signal generators or power splitters.

### A/B section description

Each section has 3 RF inputs with a distribution to 4 outputs.

### Input combining and selection

2 of the 3 inputs are frequency selective and are combined with a duplexer network to a common signal. The 3<sup>rd</sup> input is wideband and allows to feed in generator signals or is used as input for cascading sections. All RF input ports are DC blocked and equipped with ESD discharging resistors.

### Common path gain/attenuation

For signal conditioning the common signal path can be amplified, attenuated or passed through. An additional programmable attenuator allows level setting for the common signal in steps of 0.25 dB. Over all stages an overall level setting dynamic of approx. 85 dB is possible.

### High dynamic amplification

The amplifier path contains a high dynamic amplifier which combines a low noise figure with high headroom in level. The high-level capability allows linear transmission of signals especially for signals with digital modulation.

### Output paths

All RF output paths support the multi octave frequency range 100 kHz...2500 MHz. The outputs OUT1...OUT4 are individually adjustable in level over a 31.75 dB range in 0.25 dB steps in each channel.

### Programmable DC current sinks

RSDU-2X4AR offers programmable internal current sinks. The architecture eliminates cabling to external DC loads and related electromagnetic interference (EMI) problems which are often caused by the external cables.

Each of the outputs is equipped with an independent programmable current sink for phantom supply test. The current sinks are adjustable in the range 0...400 mA via remote interface.

### Voltage and current measurement

Internal volt and ampere-meters allow precise read back of the phantom voltage and the current flow into the sink for each output channel.

### Remote control

All settings of both sections of the RSDU-2X4AR can be remote-controlled via a common LAN remote interface with ASCII strings. Additionally all path settings and the device identification can be queried via the remote interface.

### Fine resolution in attenuation

The attenuators in the common path and the individual outputs allow total attenuations up to 63.5 dB in 0.25 dB steps for each channel.

### High output-to-output isolation

The output splitter is designed as wideband, active multicoupler which is lossless in level. A second benefit is high decoupling of the output channels. A failing DUT does not have any influence to the other DUTs during the test.

### Optical signalling

LEDs on the front side indicate the power status and the selected signal paths of both sections.

### GUI (Graphic User Interface)

A GUI is provided for local laptop control of the device, e.g. to set signal paths and attenuator levels.

## RF Specification

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
impedance	$Z_{in} / Z_{out}$		50		Ohm	
sections	$n_{CH}$		2			A and B
low frequency	$f_{min}$		100	150	kHz	
high frequency	$f_{max}$	2500			MHz	
RF connectors	$X_{RF}$	SMA female				
<b>inputs (in each section)</b>						
DC voltage	$U_{DC}$			20	V	
ESD discharge resistor	$R_{ESD}$		4.7		k $\Omega$	
maximum input power	$P_{in,max}$			0	dBm	CW, no damage
<b>LOW IN:</b>						
low frequency	$f_{LOW}$		0.10	0.15	MHz	
high frequency	$f_{HIGH}$	800			MHz	
return loss	$S_{11}$		-11	-9	dB	$f < 500$ kHz, THROUG/ATT
	$S_{11}$		-15	-12	dB	$f \geq 500$ kHz, THROUG/ATT
	$S_{11}$		-7,5	-5	dB	$f < 80$ MHz, AMP
	$S_{11}$		-15	-9	dB	$f \geq 80$ MHz, AMP
<b>HIGH IN:</b>						
low frequency	$f_{LOW}$			1400	MHz	
high frequency	$f_{HIGH}$	2500			MHz	
return loss	$S_{11}$		-15		dB	
<b>LOC IN:</b>						
low frequency	$f_{LOW}$		0.10	0.15	MHz	
high frequency	$f_{HIGH}$	2500			MHz	
return loss	$S_{11}$		-10	-5	dB	$f < 500$ kHz
			-18	-12	dB	$0.5 \text{ MHz} \leq f \leq 800 \text{ MHz}$
			-18		dB	$800 \text{ MHz} < f < 1400 \text{ MHz}$
			-15		dB	$f \geq 1400 \text{ MHz}$



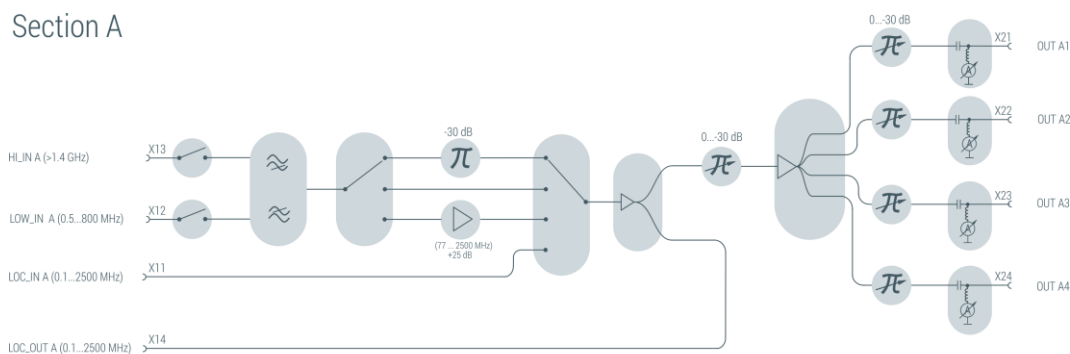
Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
common ATT range	$a_{OUT}$	0		31.75	dB	$ATT_{COM}$
common ATT step size	$\Delta a$		0.25		dB	$ATT_{COM}$
<b>outputs</b> (in each section)						
<i>LOC OUT:</i>						
low frequency	$f_{LOW}$		0.10	0.15	MHz	
high frequency	$f_{HIGH}$	2500			MHz	
return loss	$S_{11}$		-18	-12	dB	
insertion loss	$S_{21}$	-1.5	0	+1.5	dB	referred to LOC_IN
<i>OUT1....OUT8:</i>						
						( $ATT_{COM} = ATT_{OUT} = 0dB$ )
low frequency	$f_{LOW}$		0.10	0.15	MHz	
high frequency	$f_{HIGH}$	2500			MHz	
return loss	$S_{22}$		-18	-12	dB	
output ATT range	$a_{OUT}$	0		31.75	dB	$ATT_{OUT}$
output ATT step size	$\Delta a$		0.25		dB	$ATT_{OUT}$
1 dB compression	$P_{1dB}$	+5	+7		dBm	
3 <sup>rd</sup> order intercept	OIP3	+20	+24		dBm	$f \leq 800$ MHz
	OIP3	+17	+21		dBm	$f \geq 1400$ MHz
isolation	$S_{23}$		-24	-22	dB	neighbored outputs (d=1)
			-58	-50	dB	d $\geq 2$
phantom voltage range	$U_{PH}$	0		15	V	18 V absolute maximum
voltage measurement accuracy	$dU_{MEAS}$		$\pm 0.01$	$\pm 0.03$	V	$U_{PH} < 3$ V
	$dU_{MEAS}$		$\pm 0.5$	$\pm 1.0$	%	$U_{PH} \geq 3$ V
volt. meas. resolution	$\Delta U_{MEAS}$		4.4		mV	
current sink range	$I_{SINK}$	0		400	mA	
current meas. accuracy	$dI_{MEAS}$		$\pm 0.2$	$\pm 0.5$	mA	$I \leq 200$ mA
			$\pm 0.4$	$\pm 0.8$	mA	$I > 200$ mA
current meas. resolution	$\Delta I_{MEAS}$		0.11		mA	
current sink accuracy	$dI_{SINK}$		$\pm 0.3$	$\pm 0.7$	mA	$I \leq 200$ mA, $U_{PH} \geq 1.5$ V
			$\pm 0.5$	$\pm 1.0$	mA	$I > 200$ mA, $U_{PH} \geq 1.5$ V
current step size	$\Delta I_{SINK}$		0.11		mA	
total DC dissipation	$P_{DC}$			24	W	
<b>THROUGH paths</b> ( $ATT_{COM} = ATT_{OUT} = 0dB$ )						
gain	$S_{21}$	2,0	3,5	5,0	dB	$f < 200$ MHz
		0,0	2,0	3,5	dB	$f \geq 200$ MHz
noise figure	NF		13	17	dB	
<b>AMP paths</b> ( $ATT_{COM} = ATT_{OUT} = 0dB$ )						
gain	$S_{21}$	26.5	28.0	29.5	dB	$f < 200$ MHz
		23.5	26.0	29.0	dB	$f \geq 200$ MHz
noise figure	NF		20		dB	@ 1 MHz
			6.0	8.0	dB	$f \geq 70$ MHz
<b>ATT paths</b> ( $ATT_{COM} = ATT_{OUT} = 0dB$ )						
gain	$S_{21}$	-27.5	-26.0	-24.5	dB	$f < 200$ MHz
		-29.0	-27.5	-25.5	dB	$f \geq 200$ MHz
noise figure	NF		45		dB	

## Common Specification

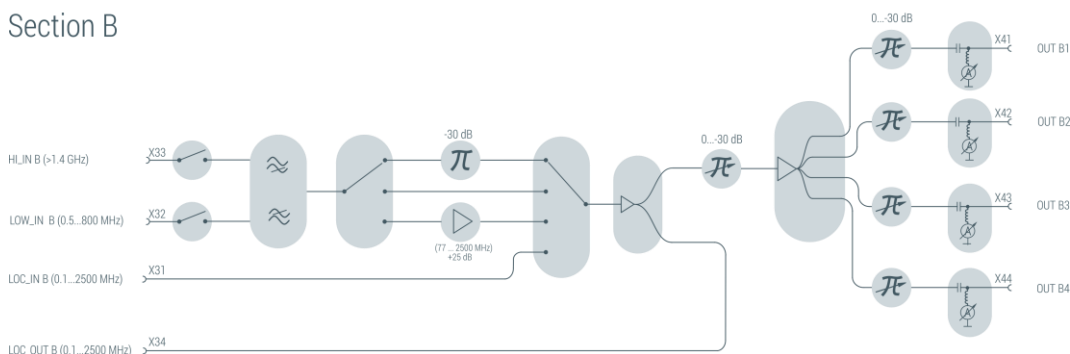
Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
voltage supply range	$U_{AC}$	90	230	260	V	50 / 60 Hz AC
power consumption	$P_{AC}$		12	50	W	
power socket	$X_{AC}$	IEC-60320 C14				country specific mains cable
<b>Dimensions and weight</b>						
dimensions	W x H x D	approx. 482 x 44 x 210			mm	19" 1 U, without connectors and handles
weight	m		3.7		kg	
<b>Environment conditions</b>						
operating temp. range	$T_o$	+5		+45	°C	
storage temp. range	$T_s$	-40		+70	°C	
<b>Remote interfaces</b>						
remote ports	LAN	10/100BaseT	TCP/IP			RJ45
	USB	2.0 (high speed)				USB type B
<b>Product conformity</b>						
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
<b>Ordering information</b>	RSDU-2X4AR	P/N: 1810.6012.1				

## Block diagram

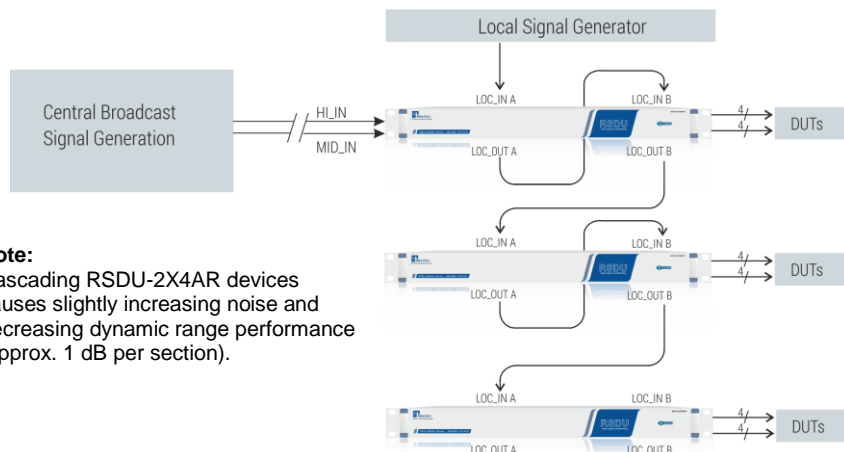
### Section A



### Section B

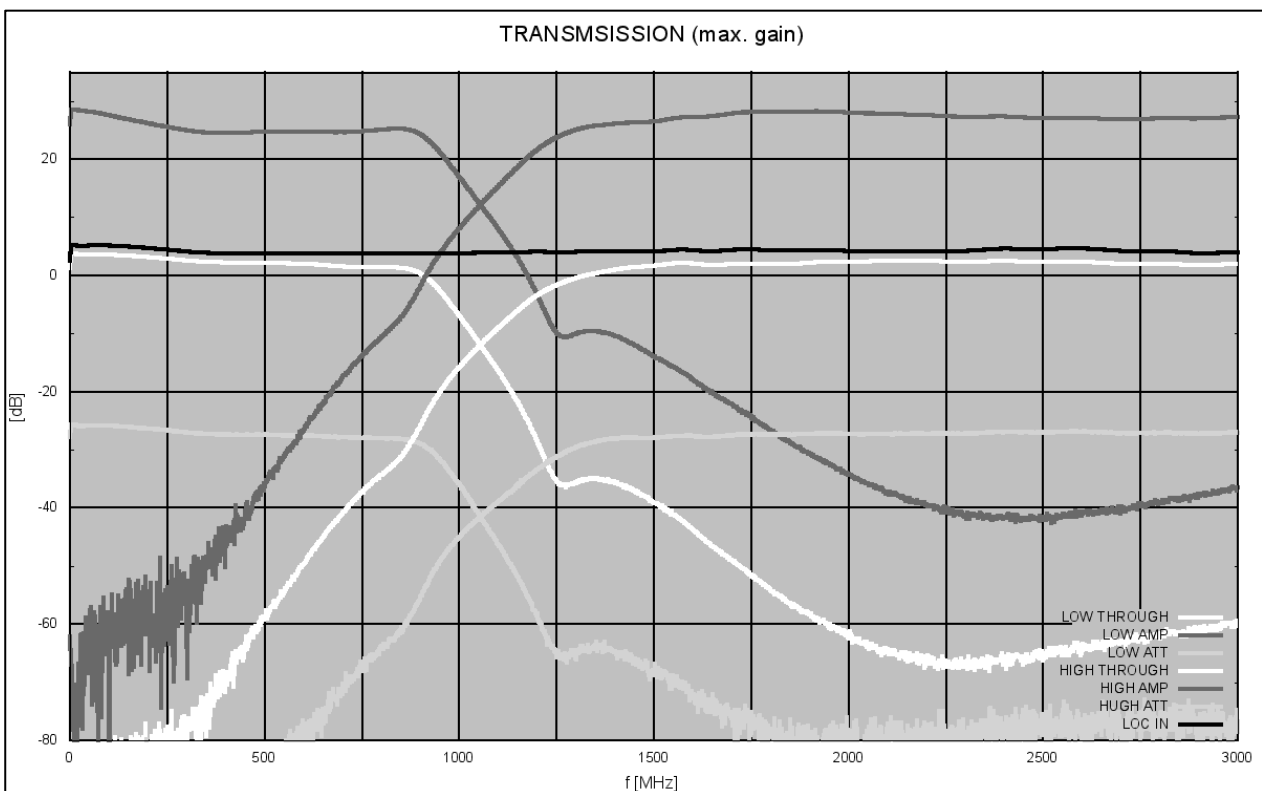


### Application example

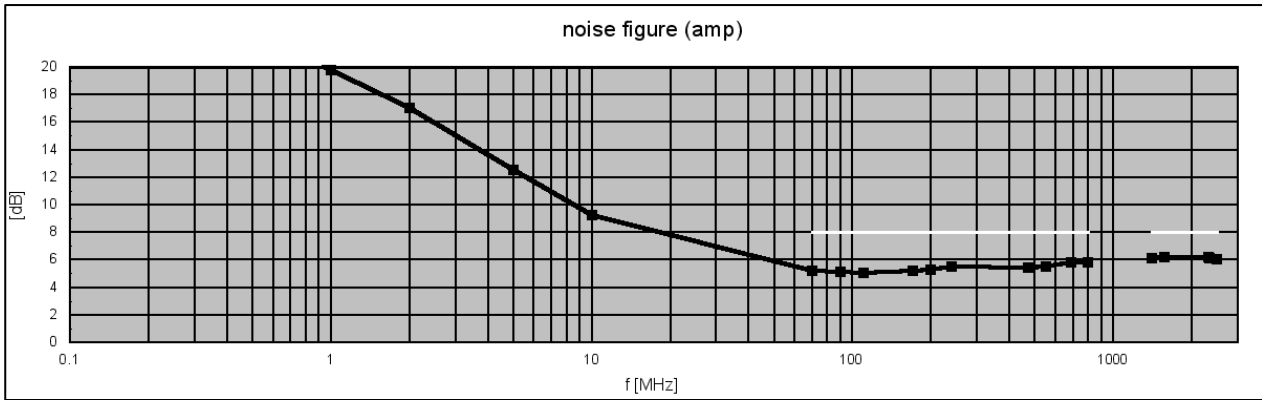


**Note:**  
Cascading RSDU-2X4AR devices causes slightly increasing noise and decreasing dynamic range performance (approx. 1 dB per section).

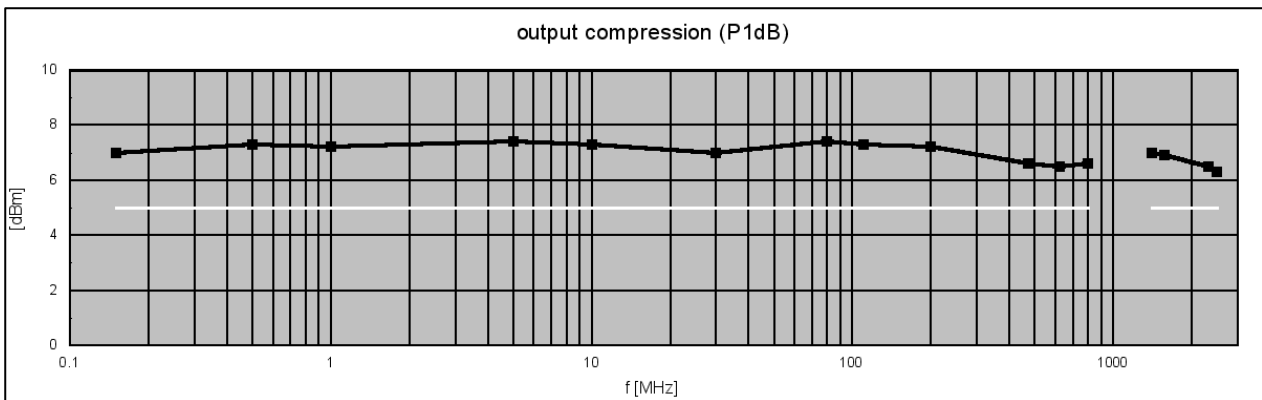
### S-Parameters (typical responses)



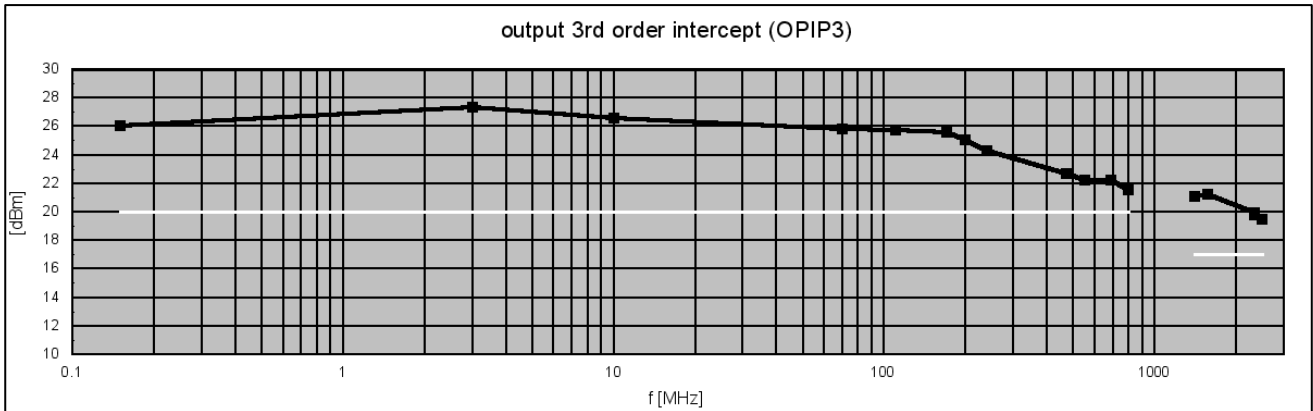
**Noise figure AMP path (typical values)**



**1 dB compression (typical values)**

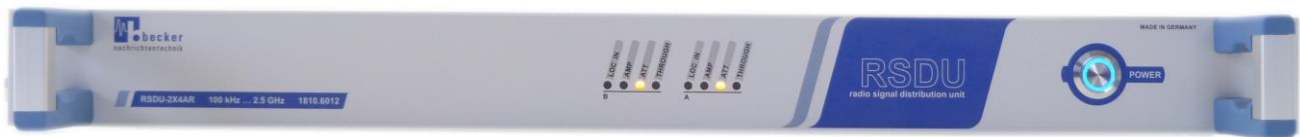


**3<sup>rd</sup> order intercept (typical values)**

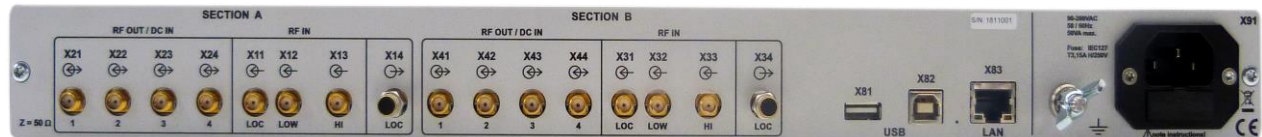


## Appearances

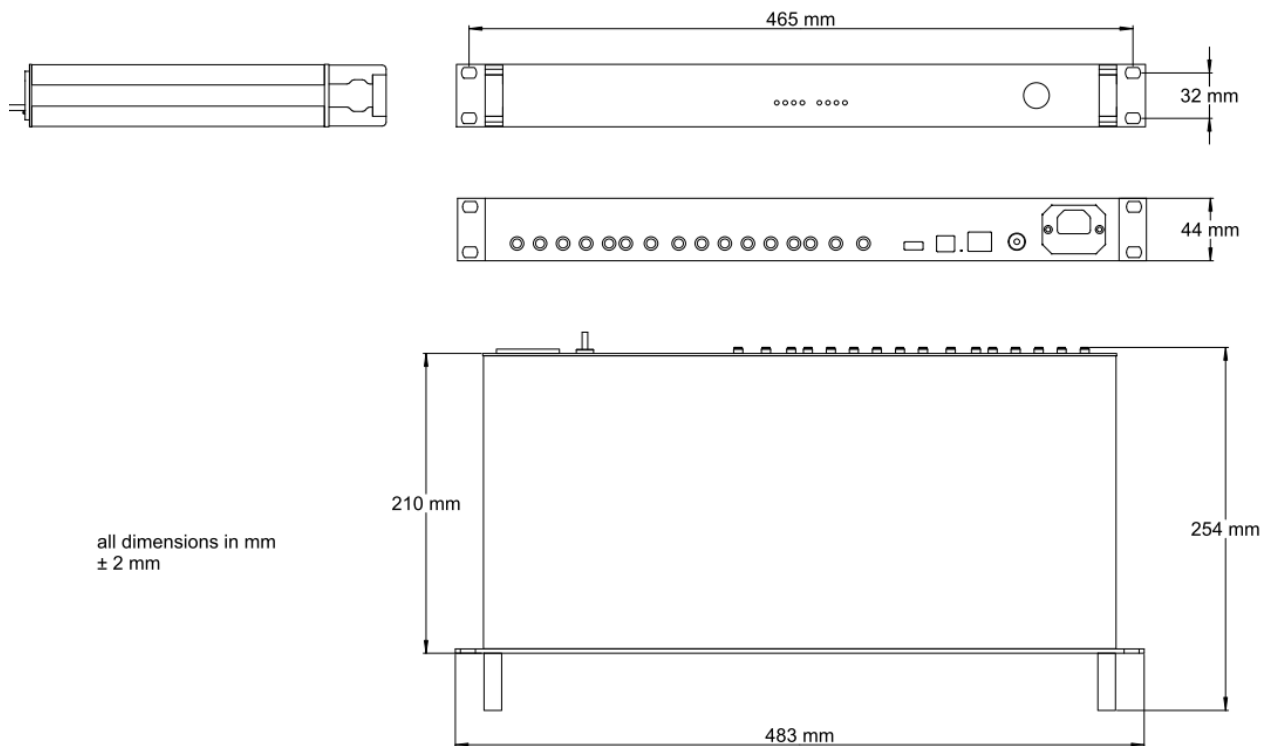
### Front View



### Rear View



### Dimensions



### Related Products

Product	Description	P/N
WSDU-1X8	High Dynamic 1X8 Multicoupler Module 100 kHz ... 4000 MHz	1202.6100.1
WSDU-1X8A	8 Way, High Dynamic, Signal Conditioning Multicoupler Module 100 kHz...4000 MHz	1807.6300.1
WSDU-1X8AR	8 Way, High Dynamic, Signal Conditioning Multicoupler Device 100 kHz...4000 MHz	1807.6302.1
WSDU-1X8R	High Dynamic 1X8 Multicoupler 100 kHz ... 4000 MHz	1107.6102.1
WSDU-2X4R	High Dynamic 2 Section 4 Way Multicoupler 100 kHz ... 4000 MHz	1107.6202.1

