becker nachrichtentechnik

FDMX-PT

De-Multiplexer for Broadcast and Navigation Signals with Programmable DC Loads Dual (AM/FM), DAB3/DAB-L, DVB-T, GNSS, SAT (SDARS)

Features

- de-multiplexer for broadcast bands
- programmable DC loads in each channel
- optical indication of phantom voltage
- direct fakra connection to (DUT)
- USB remote interface

Applications

- AM, FM, DAB, DVB-T, SDARS
- GNSS: GPS, GLONASS, GALILEO
- automotive infotainment test
- R&D
- production

At a Glance

FDMX-PT from Becker Nachrichtentechnik is a compact de-multiplexer unit as table top unit in 50 Ohm technology. The FDMX-PT splits the broadcast bands into the individual sections and makes them available at 6 RF ports. The ports have coded Fakra connectors, that have become standard in automobile infotainment, for the direct connection to device under test (DUT). All outputs have integrated programmable DC loads for the emulation of active antennas. Thus the DUT has the full RF and DC environment for ready to use operation in laboratories with intensive DC test capability.
The presences of phantom voltages coming from the DUT are indicated by LEDs on the front side of the FDMX-PT.
With help of the FDMX-PT cost efficient solutions for multi signal distribution in R&D and factory buildings can be realized using only one common coaxial cable for transmission of all broadcast and GNSS signals to the test setups.

Special Features

The FDMX-PT unit enables plug and play solution for the RF connection of car infotainment components. FDMX-PT has dual ports for “analogue” AM/FM radio signals, one port for digital radio DAB3/DAB-L signals, one port for digital television DVB-T signals, one port for satellite navigation signals GNSS (GPS, GALILEO, GLONASS) and one port for satellite radio signals SAT (SDARS, XM-radio). All RF ports feature programmable DC loads for the phantom supplies in the DUTs. The DC loads in each channel is configurable in the range 1…300 mA in 1 mA steps. For the evaluation of phantom voltages the FDMX-PT has a 6 channel voltmeter.
The settings of the programmable loads and the read out of the voltmeter measurements are done via USB interface with simple ASCII protocols.
A Fakra cable set with cable length 1 m for all RF connectors, an AC adapter and a USB cable are part of the product package.

Rugged Design

The FDMX-PT unit is built in a milled aluminium case to give best shielding for avoiding EMI influences caused by radio signals coming from the environment. The built in DC loads and the internal voltmeter function do not need cabling to external devices. External cables have often proven to be problematic due to radio interference from i.e. local radio stations. The RF connector for the multi signal input is N female.

RF Specification

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
impedance	Z		50		Ohm	
RF COM port						
low frequency	f_{min}		50	150	kHz	
high frequency	f_{max}	2345	2700		MHz	
return loss	S_{11}		-12	-7	dB	
RF input power	P_{in}			+10	dBm	
maximum DC Voltage	U_{DC}			20	V	
ESD discharge resistor	R_{ESD}		4.7		kΩ	
connector	X_{COM}		N female			
AM (Dual AM/FM)						
low frequency	f_{min}		50	150	kHz	
high frequency	f_{max}	30			MHz	
return loss	S_{22}		-15	-10	dB	
insertion loss	S_{21}	-4.5	-3.5	-3.0	dB	
FM (Dual AM/FM)						
low frequency	f_{min}			77	MHz	
high frequency	f_{max}	108			MHz	
return loss	S_{22}		-20	-12	dB	
insertion loss	S_{21}	-5.5	-4.0	-3.0	dB	
attenuations	a_{DAB}		-35	-25	dB	DAB3 (174 … 228 MHz)
	a_{DVB-T}		-75	-50	dB	DVB-T (474 … 786 MHz)
	a_{GNSS}		-90	-65	dB	GNSS (1555 … 1625 MHz)
	a_{SAT}		-80	-55	dB	SAT (2320 … 2345 MHz)
RF input power	P_{RF}			+10	dBm	
DC voltage range	I_{DC}	0		15	V	
voltmeter accuracy	dU_{DC}		±60	±200	mV	
current setting range	I_{DC}	1		300	mA	Note 1
current accuracy	dI_{DC}		±1+1	±3+3	%+mA	U_{DC} > 1.8 V
connector	X_{AMFM}		Dual Fakra B plug (white, male)			
DAB3 / DAB-L						
low frequency	f_{min}			170	MHz	DAB3
high frequency	f_{max}	240			MHz	
return loss	S_{33}		-15	-9	dB	
insertion loss	S_{31}	-3.0	-2.0	-0.5	dB	
		-2.5	-1.5	-0.5	dB	f ≥ 174 MHz
low frequency	f_{min}			1452	MHz	DAB-L
high frequency	f_{max}	1480			MHz	
return loss	S_{33}		-15	-9	dB	
insertion loss	S_{31}	-6.0	-4.0	-3.0	dB	
attenuation	a_{AMFM}		-45	-35	dB	AM/FM (0.15 … 108 MHz)
	a_{DVB-T}		-35	-25		DVB-T (474 … 786 MHz)
	a_{GNSS}		-40	-25		GNSS (1555 … 1625 MHz)
	a_{SAT}		-35	-25		SAT (2320 … 2345 MHz)
RF input power	P_{RF}			+10	dBm	
DC voltage range	I_{DC}	0		15	V	
voltmeter accuracy	dU_{DC}		±60	±200	mV	
current setting range	I_{DC}	1		300	mA	Note 1
current accuracy	dI_{DC}		±1+1	±3+3	%+mA	U_{DC} > 1.8 V
connector	X_{DAB}		Fakra A plug (black, male)			

Note 1: Total power dissipation of all channels might maximum 5 W. DC loads shut down when +60°C housing temperature exceeded.

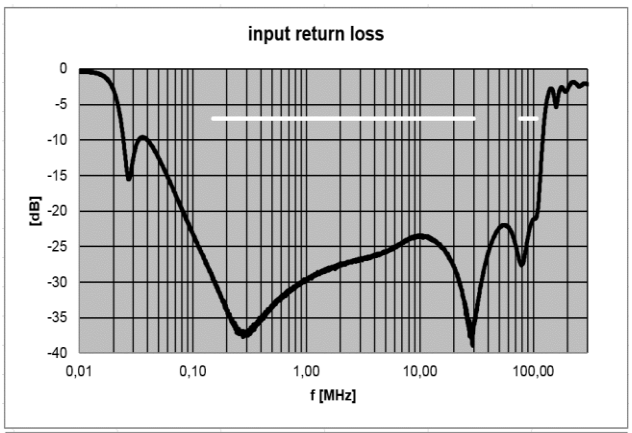
DVB-T						
low frequency	f_{min}			470	MHz	
high frequency	f_{max}	790			MHz	
return loss	S_{44}		-12	-7	dB	
insertion loss	S_{41}	-2.5	-1.5	-0.5	dB	
attenuation	a_{AMFM}		-100	-60	dB	AM/FM (0.15…108 MHz)
	a_{DAB3}		-45	-35	dB	DAB3 (174…228 MHz)
	a_{DABL}		-45	-35	dB	DAB-L (1452…1492 MHz)
	a_{GNSS}		-50	-40	dB	GNSS (1555…1625 MHz)
	a_{SAT}		-55	-40	dB	SAT (2320…2345 MH)
RF input power	P_{RF}			+10	dBm	
DC voltage range	I_{DC}	0		15	V	
voltmeter accuracy	dU_{DC}		±60	±200	mV	
current setting range	I_{DC}	1		300	mA	Note 1
current accuracy	dI_{DC}		±1+1	±3+3	%+mA	U_{DC} > 1.8 V
connector	X_{DVB-T}	Fakra E plug (green, male)				
GNSS						
low frequency	f_{min}			1555	MHz	
high frequency	f_{max}	1625			MHz	
return loss	S_{55}		-12	-7	dB	
insertion loss	S_{51}	-7	-4	-3	dB	
attenuation	a_{AMFM}		-90	-75	dB	AM/FM (0.15 … 108 MHz)
	a_{DAB3}		-90	-75	dB	DAB3 (174 … 228 MHz)
	a_{DABL}		-35	-25	dB	DAB-L (1452 … 1480 MHz)
	a_{DVB-T}		-80	-55	dB	DVB-T (474 … 786 MHz)
	a_{SAT}		-35	-25	dB	SAT (2320 … 2345 MH)
RF input power	P_{RF}			+10	dBm	
DC voltage range	I_{DC}	0		15	V	
voltmeter accuracy	dU_{DC}		±60	±200	mV	
current setting range	I_{DC}	1		300	mA	Note 1
current accuracy	dI_{DC}		±1+1	±3+3	%+mA	U_{DC} > 1.8 V
connector	X_{GNSS}	Fakra C plug (blue, male)				
SAT (SDARS)						
low frequency	f_{min}			2320	MHz	
high frequency	f_{max}	2345			MHz	
return loss	S_{66}		-15	-8	dB	
insertion loss	S_{61}	-3.0	-2.0	-0.5	dB	
attenuation	a_{800M}		-90	-75	dB	≤ 786 MHz
	a_{DABL}		-25	-18	dB	DAB-L (1452 … 1480 MHz)
	a_{GNSS}		-20	-15	dB	GNSS (1555 … 1625 MHz)
RF input power	P_{RF}			+10	dBm	
DC voltage range	I_{DC}	0		15	V	
voltmeter accuracy	dU_{DC}		±60	±200	mV	
current setting range	I_{DC}	1		300	mA	Note 1
current accuracy	dI_{DC}		±1+1	±3+3	%+mA	U_{DC} > 1.8 V
connector		Fakra F plug (brown, male)				

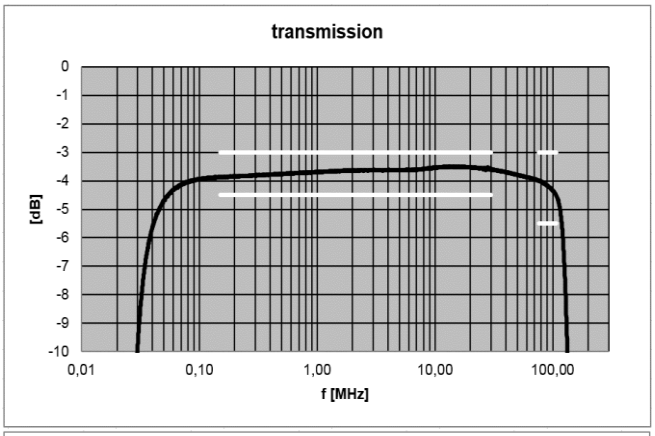
Note 1: Total power dissipation of all channels might maximum 5 W. DC loads shut down when +60°C housing temperature exceeded.

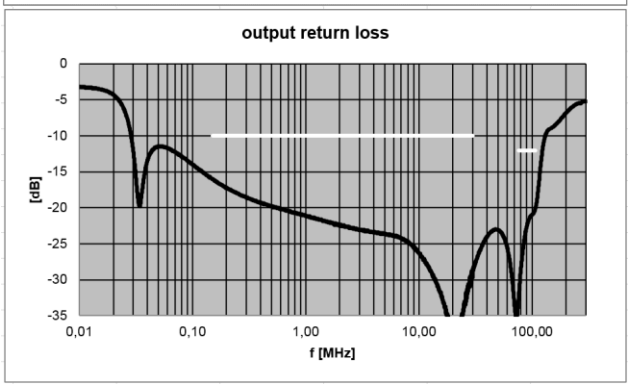
Common Specification

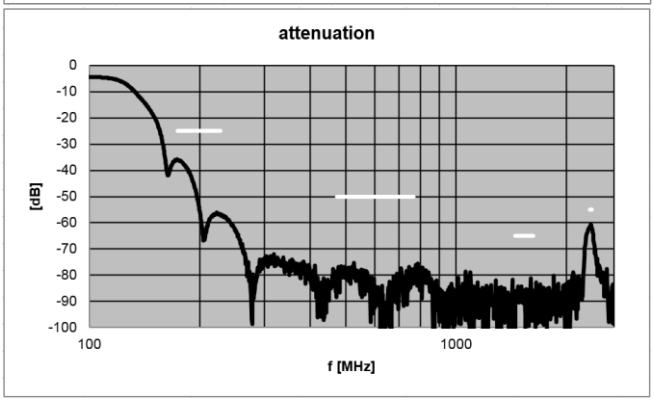
Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
dimensions	W x H x D		approx. 154 x 37 x 93		mm	without connectors
weight	m		0.7		kg	
remote interface			USB 1.1 & 2.0 compatible, virtual Com Port (VCP)			SCPI oriented ASCII commands
remote connector	X_{RM}		USB type B			
operating temp. range	T_o	+5		+40	°C	housing surface
storage temp. range	T_s	-40		+70	°C	
ordering information	FDMX-PT		P/N: 1310.6003.2			Fakra cable set, AC adaptor and an USB cable is part of product package

S-Parameters (typical responses)
AM/FM signal path

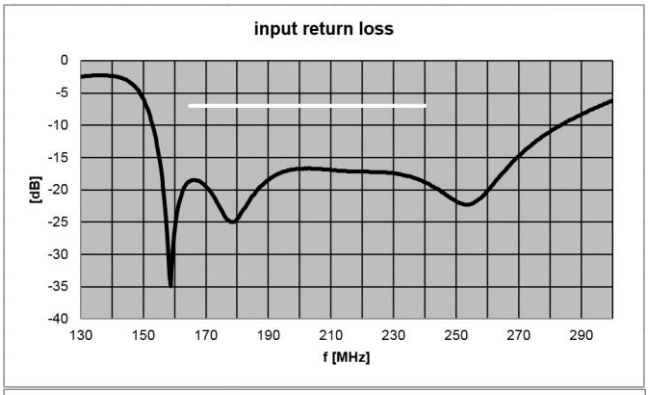


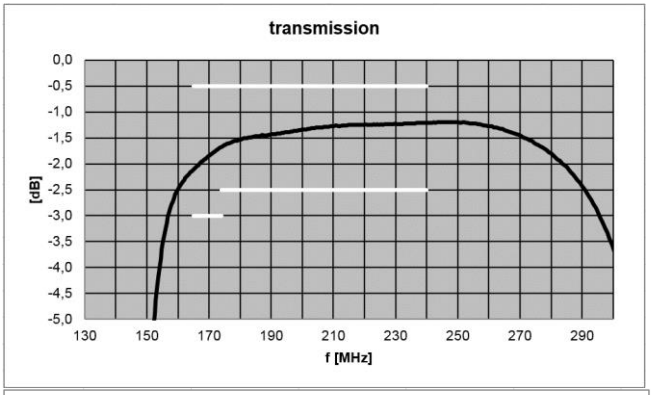


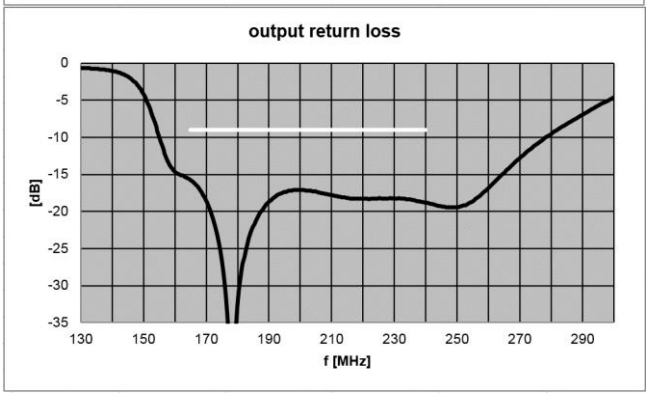


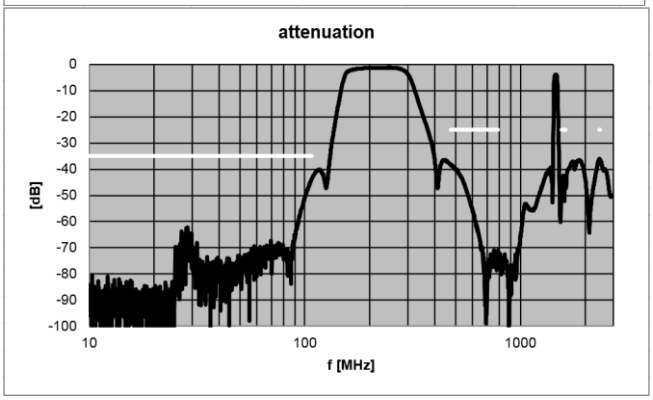


DAB3 signal path

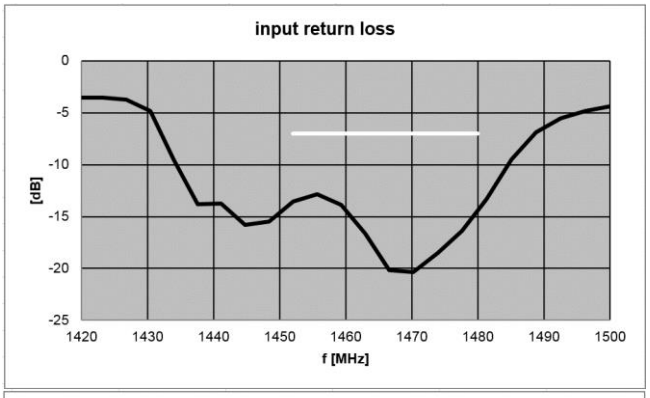


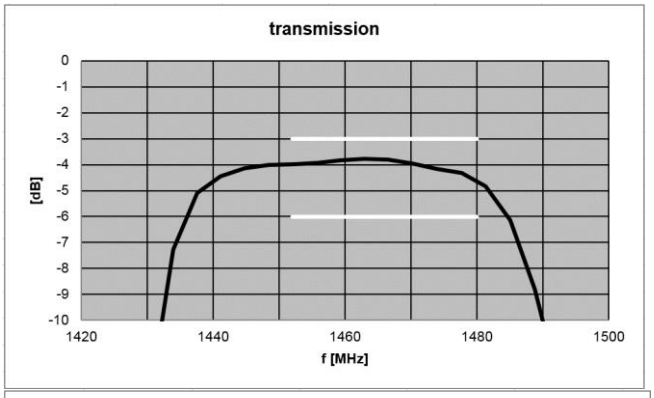


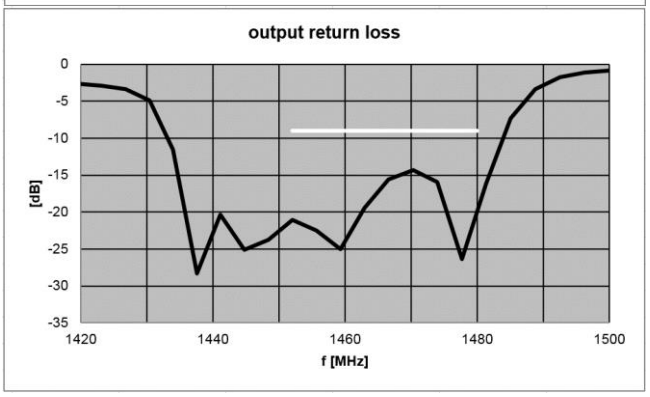


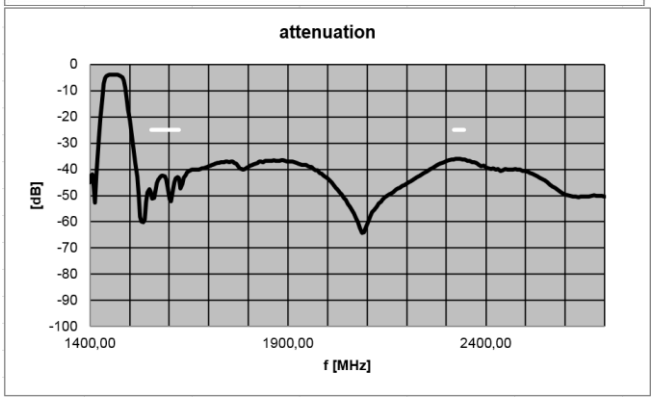


DAB-L signal path

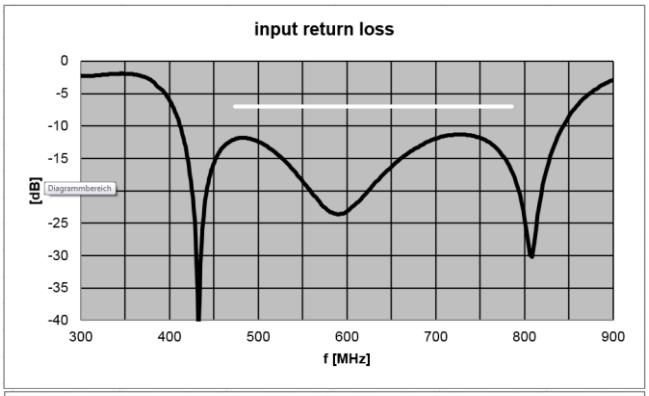


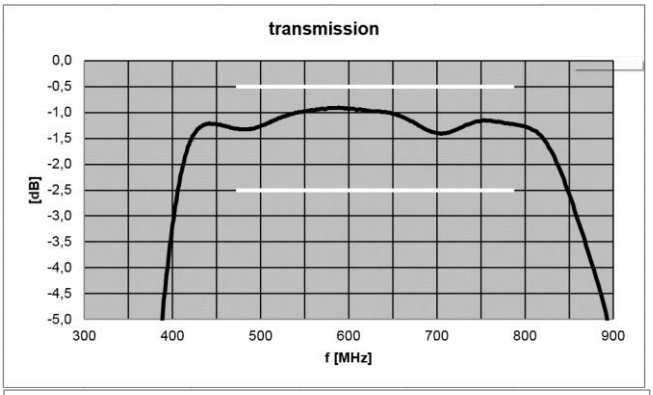


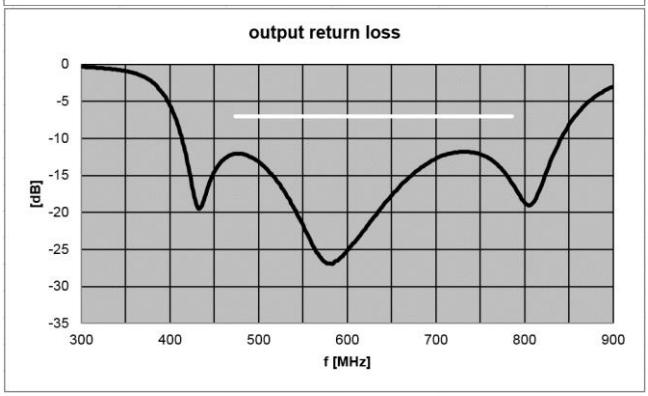


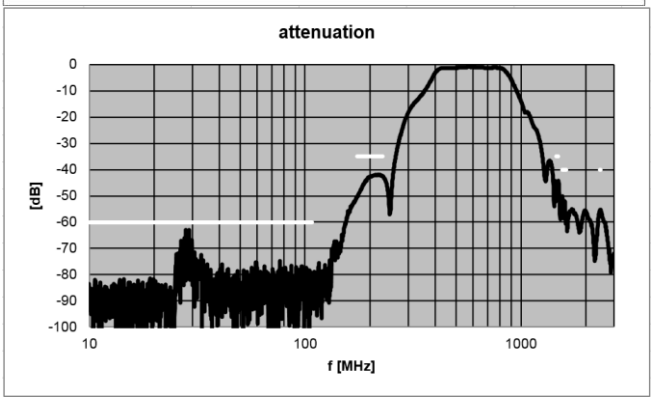


DVB-T signal path

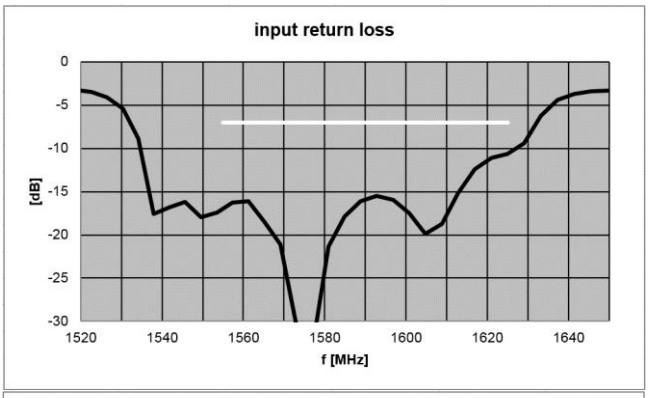


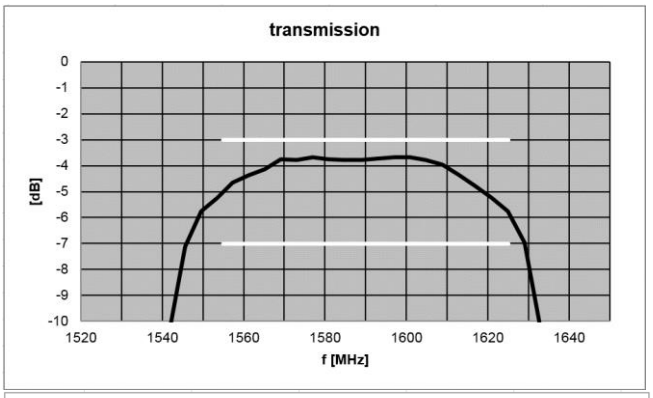


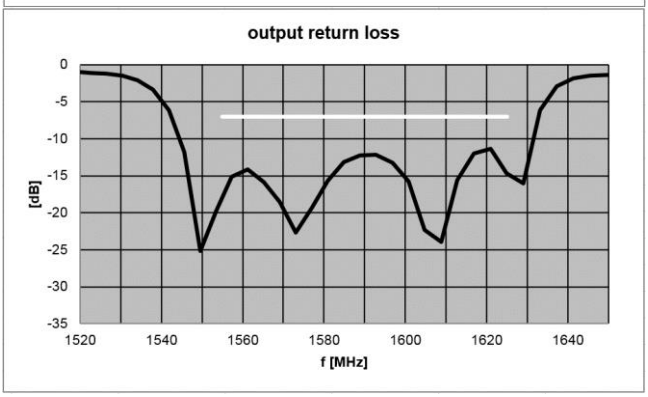


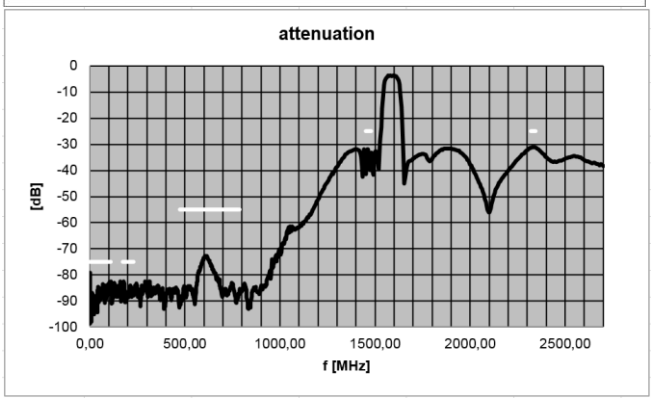


GNSS signal path

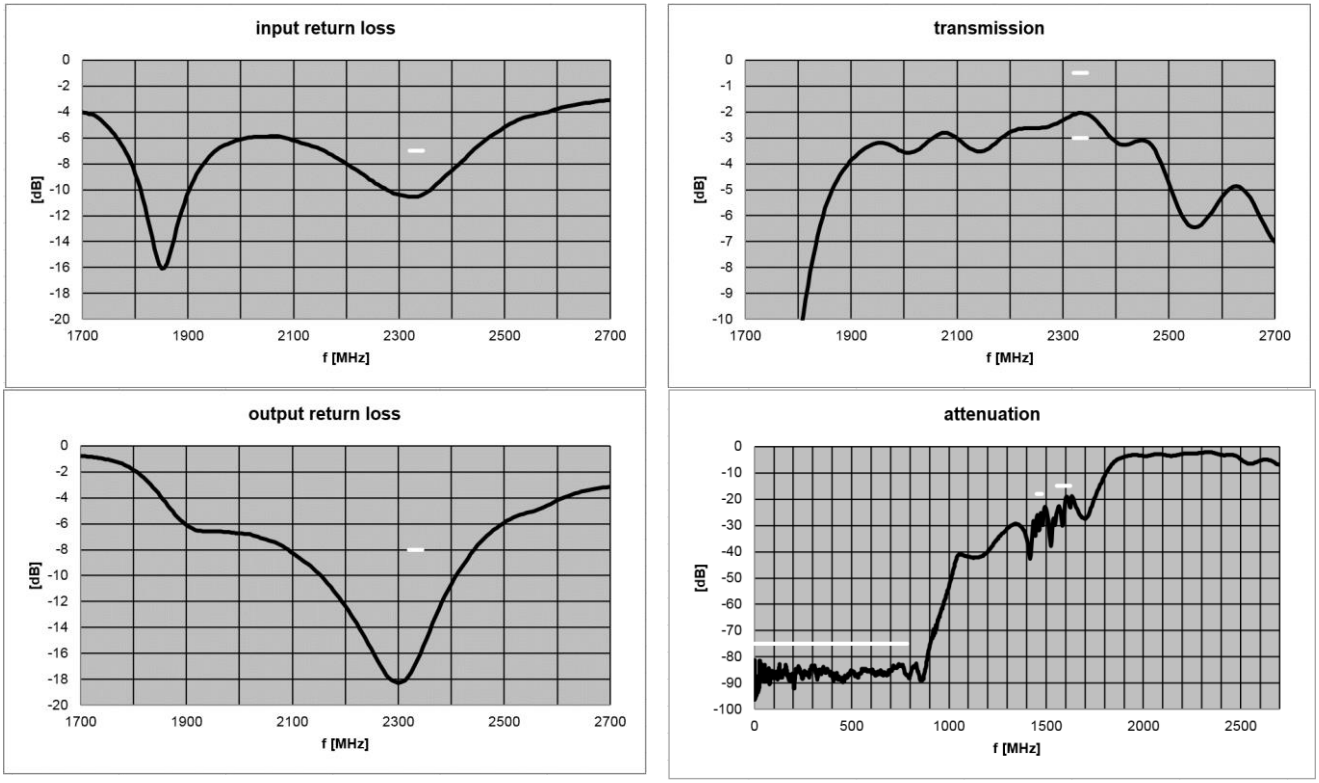








SAT (SDARS) signal path

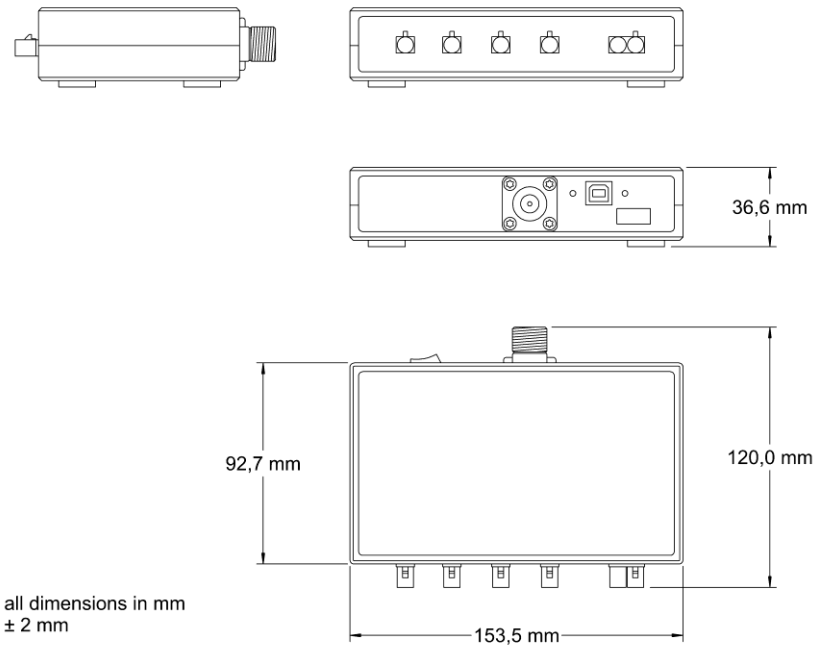


Appearances

Front side

Rear Side

Dimensions



Related Products

Product	Description	P/N
FDMX	De-Multiplexer for Broadcast and Navigation Signals with Resistive DC Loads. Dual (AM/FM), DAB3/DAB-L, DVB-T, GNSS, SAT (SDARS)	1310.6003.1
FDMX-PT	De-Multiplexer for Broadcast and Navigation Signals with Programmable DC Loads 0 … 300 mA. Dual (AM/FM), DAB3/DAB-L, DVB-T, GNSS, SAT (SDARS)	1310.6003.2
FDMX2	De-Multiplexer for Broadcast and Navigation Signals with Resistive DC Loads. Dual (AM/FM/DAB3), DVB-T, GNSS, SAT (SDARS)	1809.6003.1
FDMX2-PT	De-Multiplexer for Broadcast and Navigation Signals with Programmable DC Loads 0 … 300 mA. Dual (AM/FM/DAB3), DVB-T, GNSS, SAT (SDARS)	1809.6003.2
FDML	Dual Port Adapter for AM/FM and DAB3 Broadcast Signals with Resistive DC Loads	1310.6103.2
FDMX-CS	Fakra Cable Set, length 1 m. Includes 4 RF cables with 1 dual RF cable	1310.0107.1
FDMX-AA	AC/DC Wall Wart Power Adpater for USB	1310.0108.1