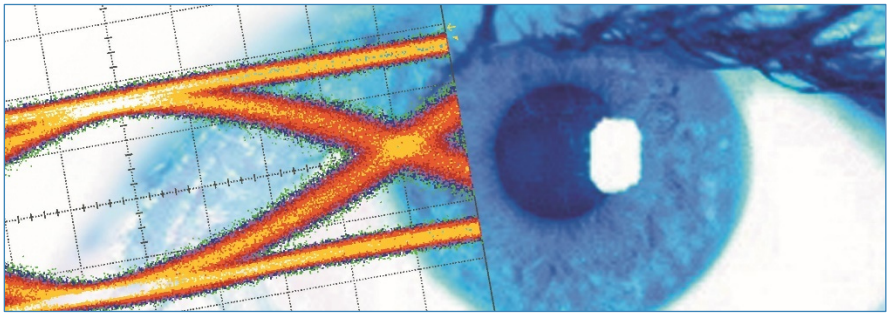
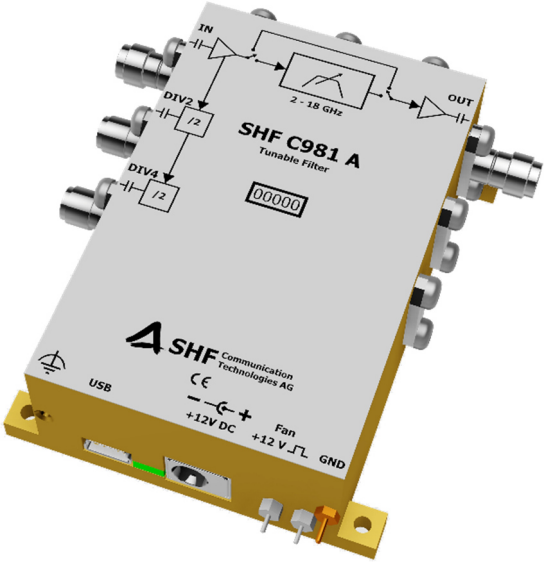


Data Sheet

SHF C981 A



Tunable Filter

Description

The SHF C981 A is a RoHS compliant tunable filter with frequency detection. It detects the dominant frequency and automatically sets a narrow bandpass filter to clean the incoming signal.

If the incoming signal frequency is out of range of the filter bank, a built-in bypass path is selected, therefore the SHF C981 A is useable up to 65 GHz.

This makes the SHF C981 A an ideal “clock cleaner” e.g., for triggering sampling oscilloscopes.

Features

- Automatic filter bank between 2 GHz – 18 GHz
- Frequency detection between 4 GHz – 60 GHz[1]
- Bypass function from 0.1 GHz up to 65 GHz
- Filter bandwidth of typ. 1/6 of center frequency with a band stop suppression up to. 50 dB
- Useable divided by 2 and divided by 4 outputs for further clock distribution

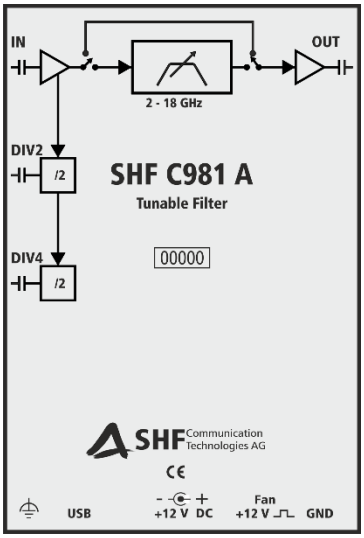
Accessories

In addition to the module itself, the following parts are complementary and parts of each delivery.

- +12 V Power Supply Desktop Adapter
- Heat-Sink (mounted to the device)
- Functional Earth Cable
- Mini-USB cable

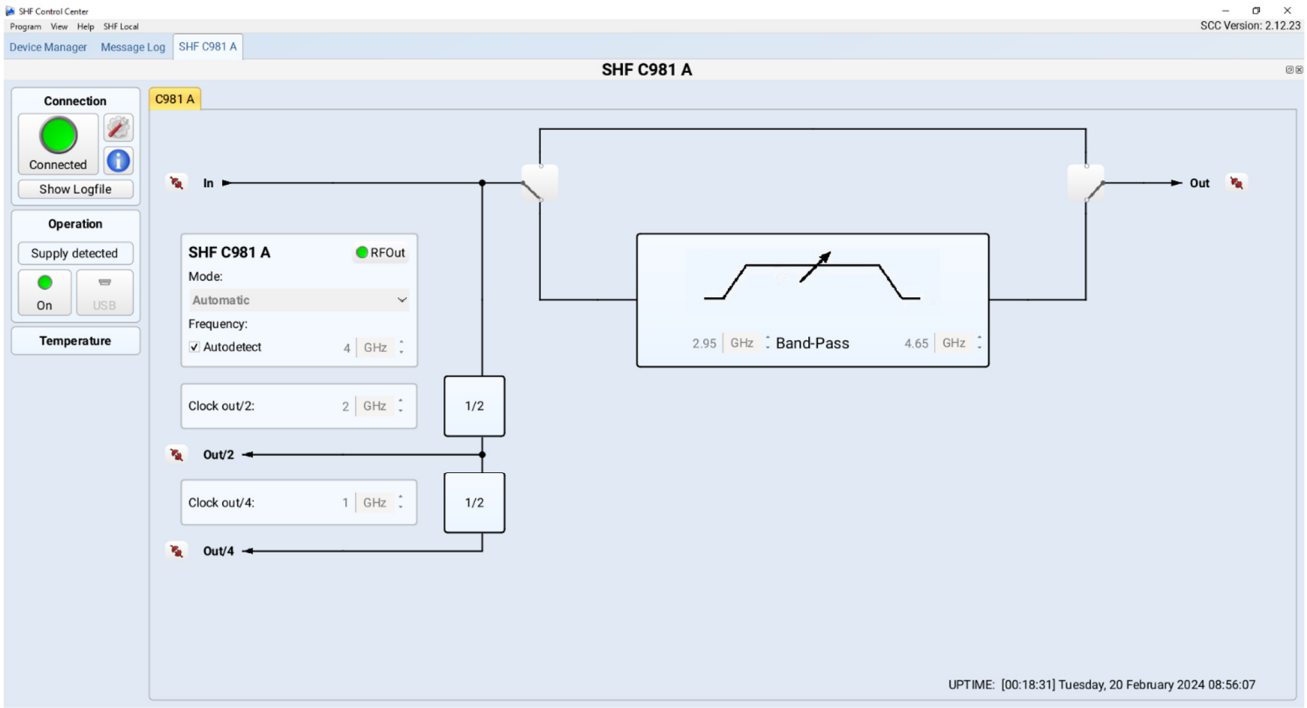
[1] For frequencies below 4 GHz and above 60 GHz, a manual input within the SHF Control Center GUI is required

Block Diagram



Ease of Use

- Only a single 12 V supply (complementary part of the delivery) is needed for operation.
- Upon delivery, the SHF C981 A is ready to use, without any further configuration.
- The SHF C981 A can be controlled by intuitive graphical user interface (SHF Control Center) via USB.



SCC GUI

Specifications

Absolute Maximum Ratings

Parameter	Unit	Symbol	Min	Typ	Max	Comment
Input Power	dBm	P_{in}			10	
External DC Voltage on RF Ports	V	V_{dc}	-6		6	

Electrical Characteristics (At 35°C case temperature, unless otherwise specified)

Parameter	Unit	Symbol	Min	Typ	Max	Comment
Input Power	dBm	P_{in}	-9		0	
Useable Frequency Range	GHz	f	0.1		65	
Filter Range	GHz	f	2		18	
Frequency Detection	GHz	f	4		60	
Clock /2	GHz	f	2		30	See[2]
Clock /4	GHz	f	1		15	See[2]
Amplitude Clock /2	mV_{pp}	A_{c2}	400		1000	See[3]
Amplitude Clock /4	mV_{pp}	A_{c4}	600		1000	See[3]
Filter Bandwidth	MHz	f_{bw}		Fc/6		Fc = Center frequency
Band Stop Rejection	dBc			30		
Signal Gain	dB	G	-1		4	Up to 50 GHz. For further information see Page 7
Settling Time	ms	T		20		
Maximum Gain during Frequency Switching	dB	G_{max}			10	
Psat	dBm	P_{sat}			18	
RMS Jitter	fs	J_{rms}				See[4]
Duty Cycle	%	DuCy				See[4]

[2] Above 60 GHz and below 4 GHz the divider stages may produce signals with random frequency

[3] Does not depend on Input Power, decreases with increasing frequency

[4] No Signal degradation in Jitter or duty Cycle were observed for sin or square wave signals

Power requirements

Parameter	Unit	Symbol	Min	Typ	Max	Conditions
Supply Voltage	V	V_{in}	11.75	12	12.25	2 mm x 5.9 mm Power Jack
Supply Current	mA	I_{in}		1000		
Power Dissipation	W	P_{diss}		12		

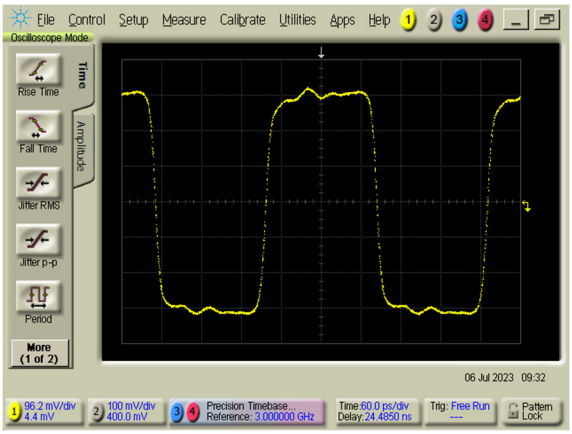
Mechanical Characteristics

Parameter	Unit	Symbol	Min	Typ	Max	Conditions
Input Connector						1.85 mm (V) female[5]
Output Connector						1.85 mm (V) female[3]
Input/2 Connector						2.92 mm (K) female[3]
Input/4 Connector						2.92 mm (K) female[3]
Dimensions	mm					see pages 10 & 11
Weight	g			180 480		W/o Heatsink With Heatsink and Fan

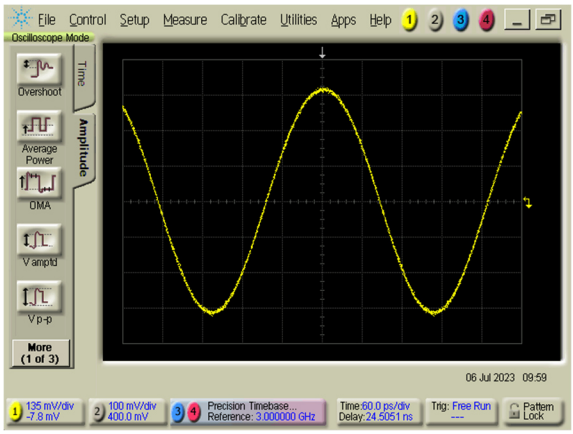
[5] Other gender configurations are available on request.
Other connector types, e.g. 2.92 mm (K) or Mini-SMP (GPPO®) connectors, are also available but may impact the bandwidth and reflection characteristic.

Output Filtered Waveform

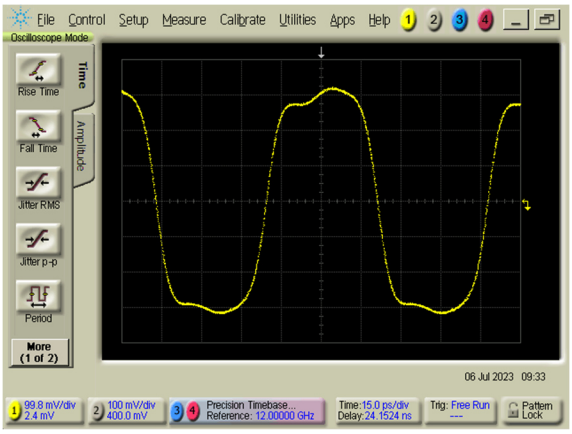
The measurements below had been performed using a signal generator (Anritsu MG3697C), SHF C991 A (clock distribution) and a DCA (Agilent 86100D) with a Precision Time Base (Agilent 86107A). The output of the SHF C981 A had been connected directly to the DCA input.



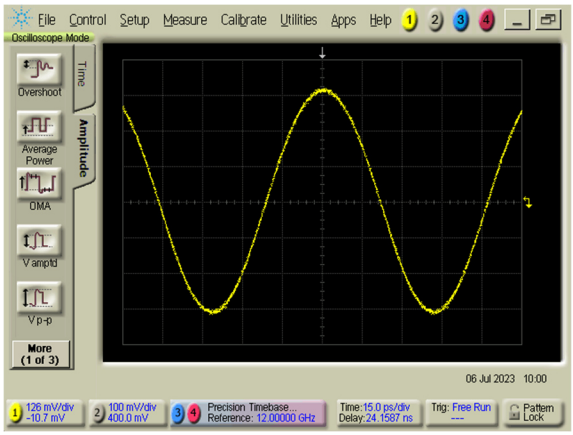
Input Signal @ 3 GHz



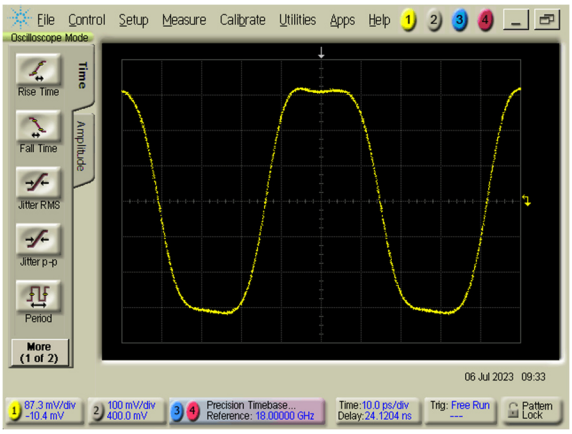
Output Signal @ 3 GHz



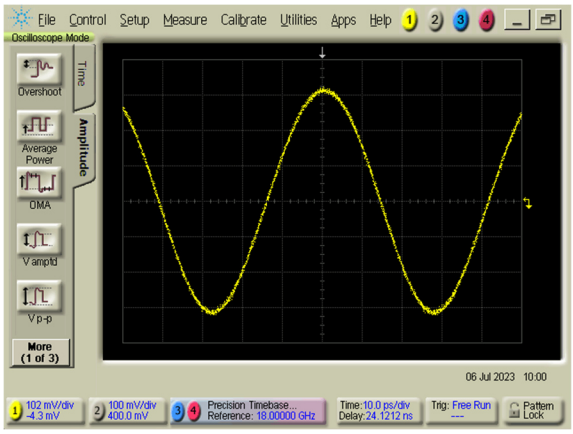
Input Signal @ 12 GHz



Output Signal @ 12 GHz



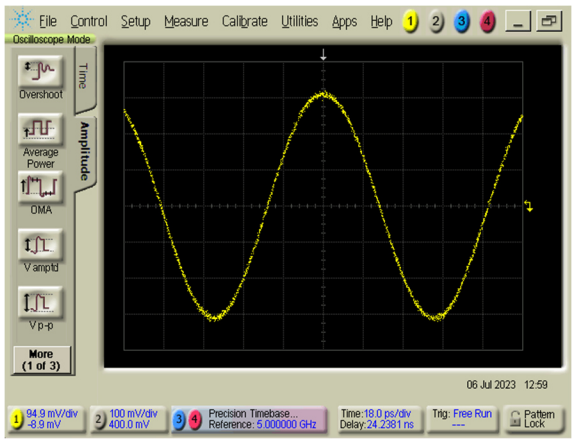
Input Signal @ 18 GHz



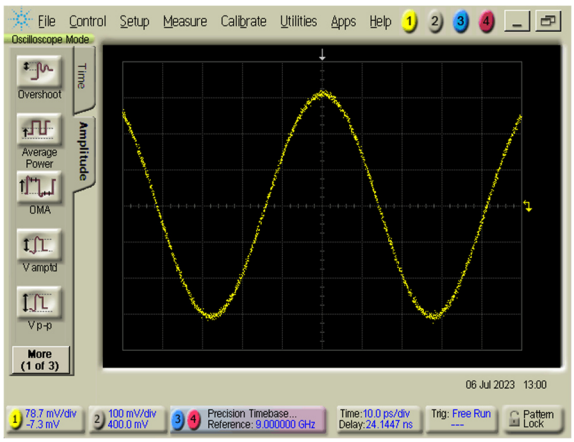
Output Signal @ 18 GHz

Typical Bypass Waveform

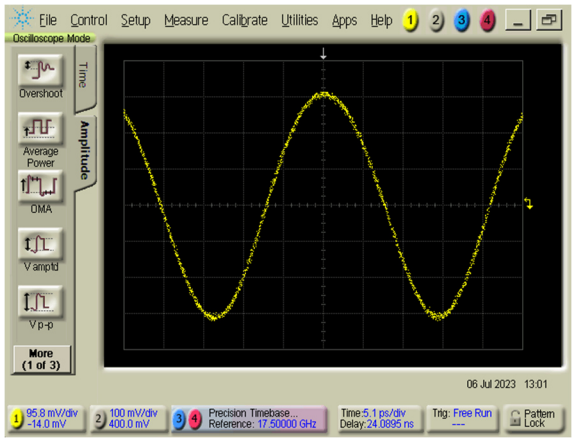
The measurements below had been performed using a signal generator (Anritsu MG3697C), SHF C991 A (clock distribution) and a DCA (Agilent 86100D) with a Precision Time Base (Agilent 86107A). The output of the SHF C981 A had been connected directly to the DCA input. The Phase reference was clocked by the /2 Output of SHF C981 A.



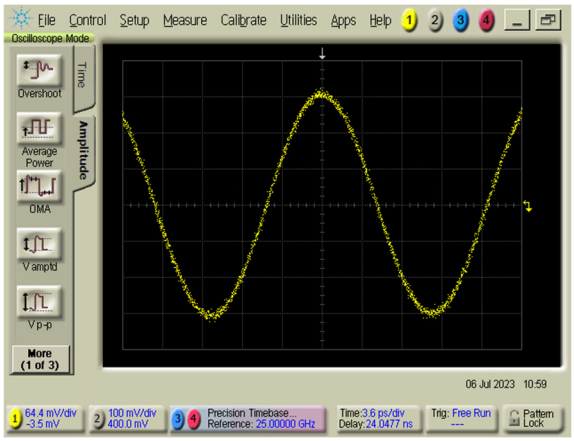
Bypass Signal @ 10 GHz



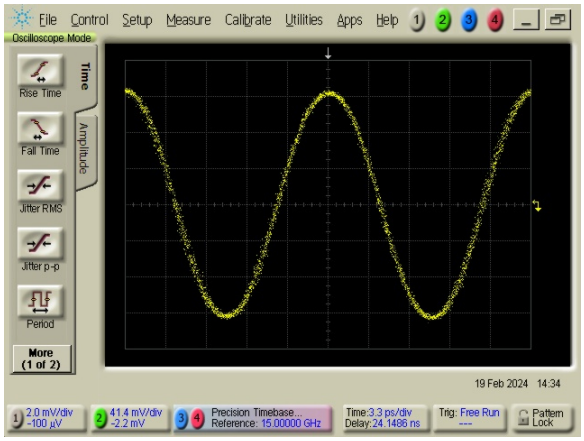
Bypass Signal @ 18 GHz



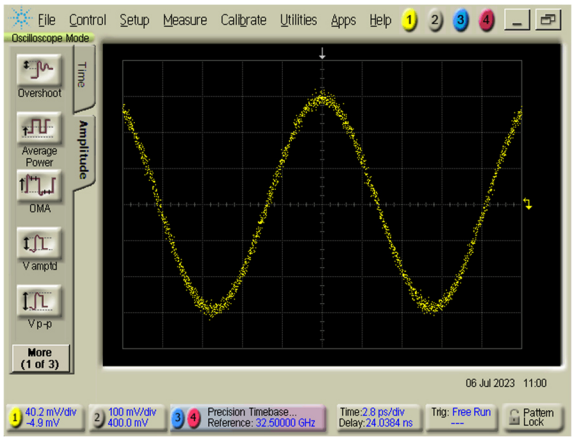
Bypass Signal @ 35 GHz



Bypass Signal @ 40 GHz



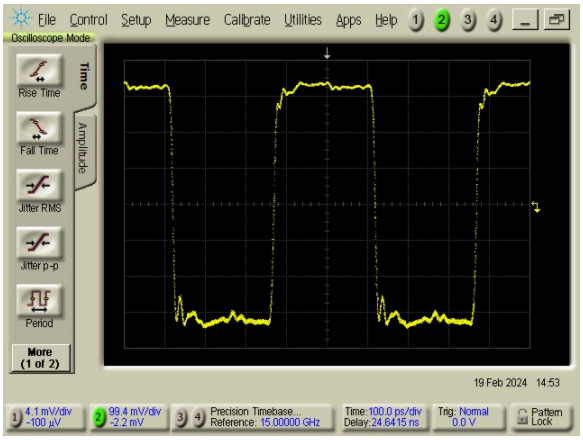
Bypass Signal @ 60 GHz



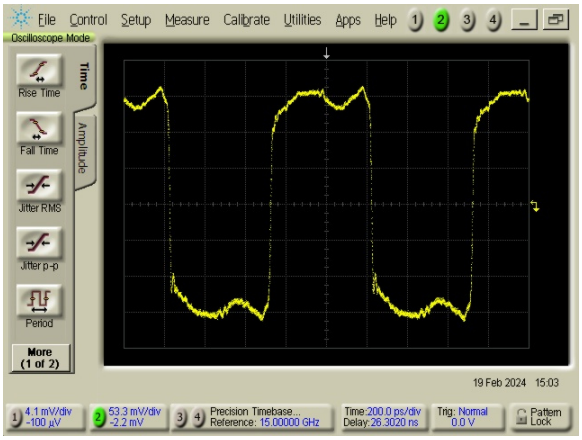
Bypass Signal @ 65 GHz

Typical Clock Divider Waveform

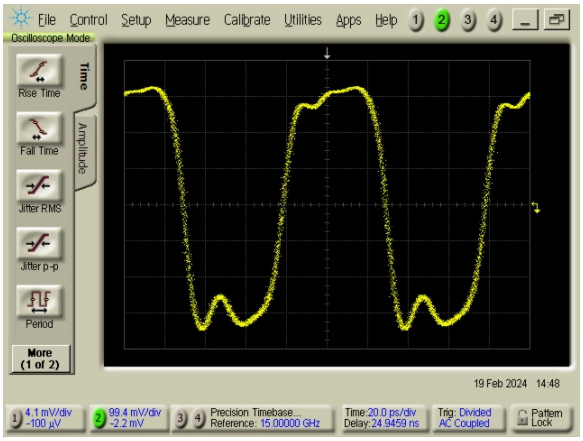
The measurements below had been performed using a signal generator (Anritsu MG3697C) and a DCA (Agilent 86100D) with a Precision Time Base (Agilent 86107A). The output of the SHF C981 A had been connected directly to the DCA input. The Phase reference was clocked by the /4 Output of SHF C981 A.



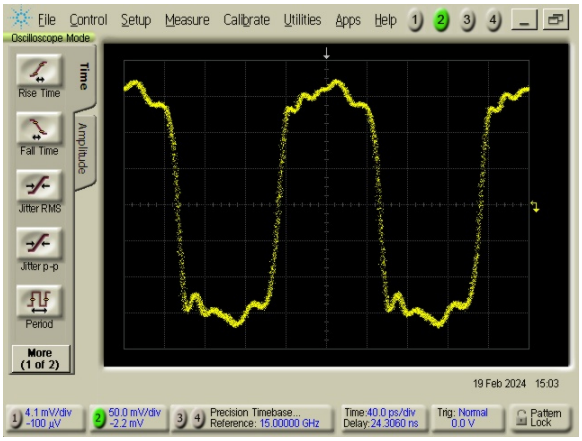
Clock /2 @ 4 GHz Input



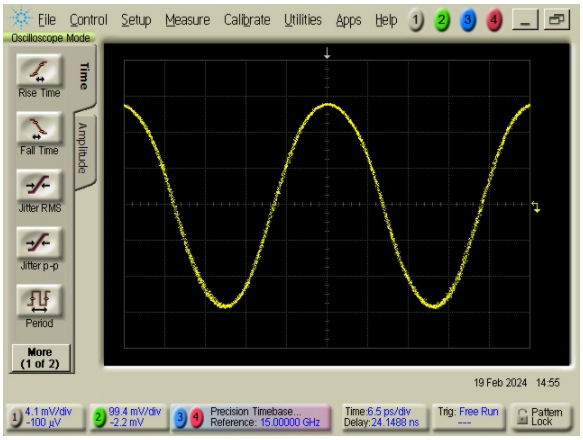
Clock /4 @ 4 GHz Input



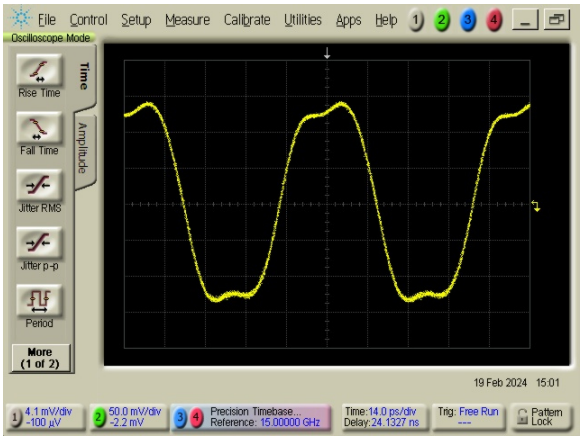
Clock /2 @ 20 GHz Input



Clock /4 @ 20 GHz Input



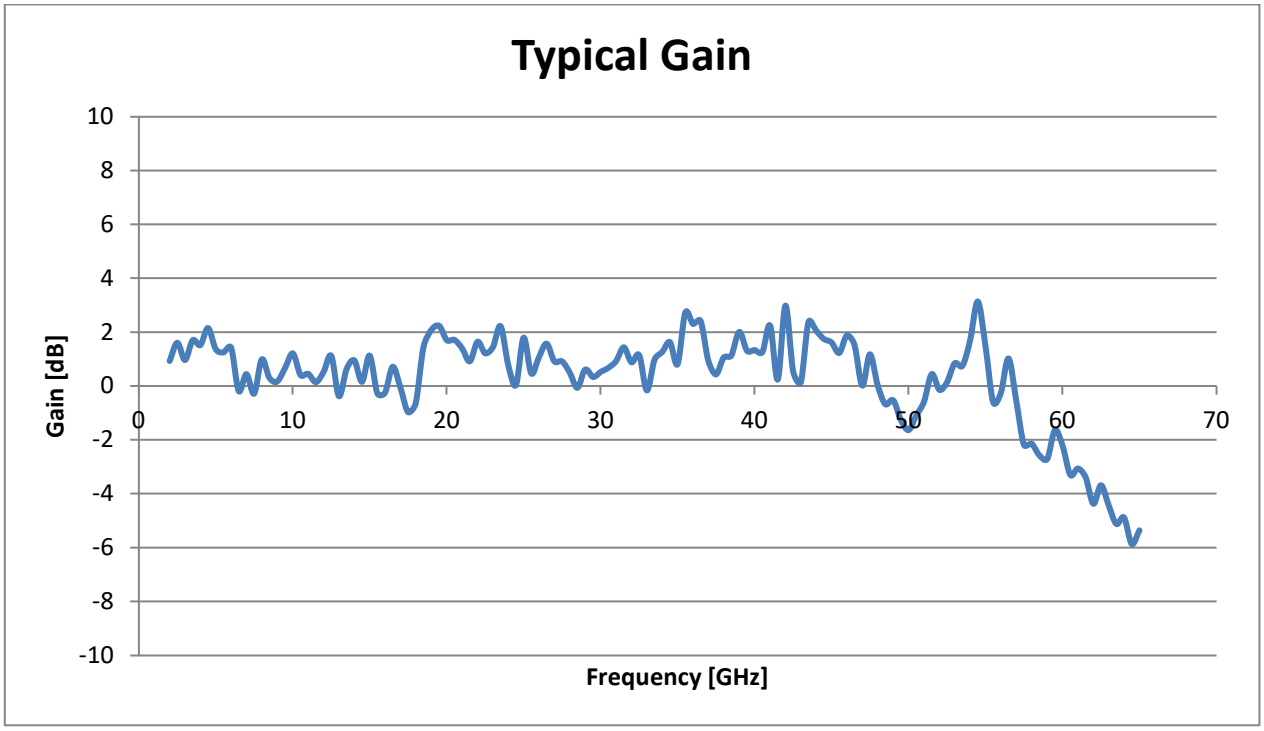
Clock /2 @ 60 GHz Input



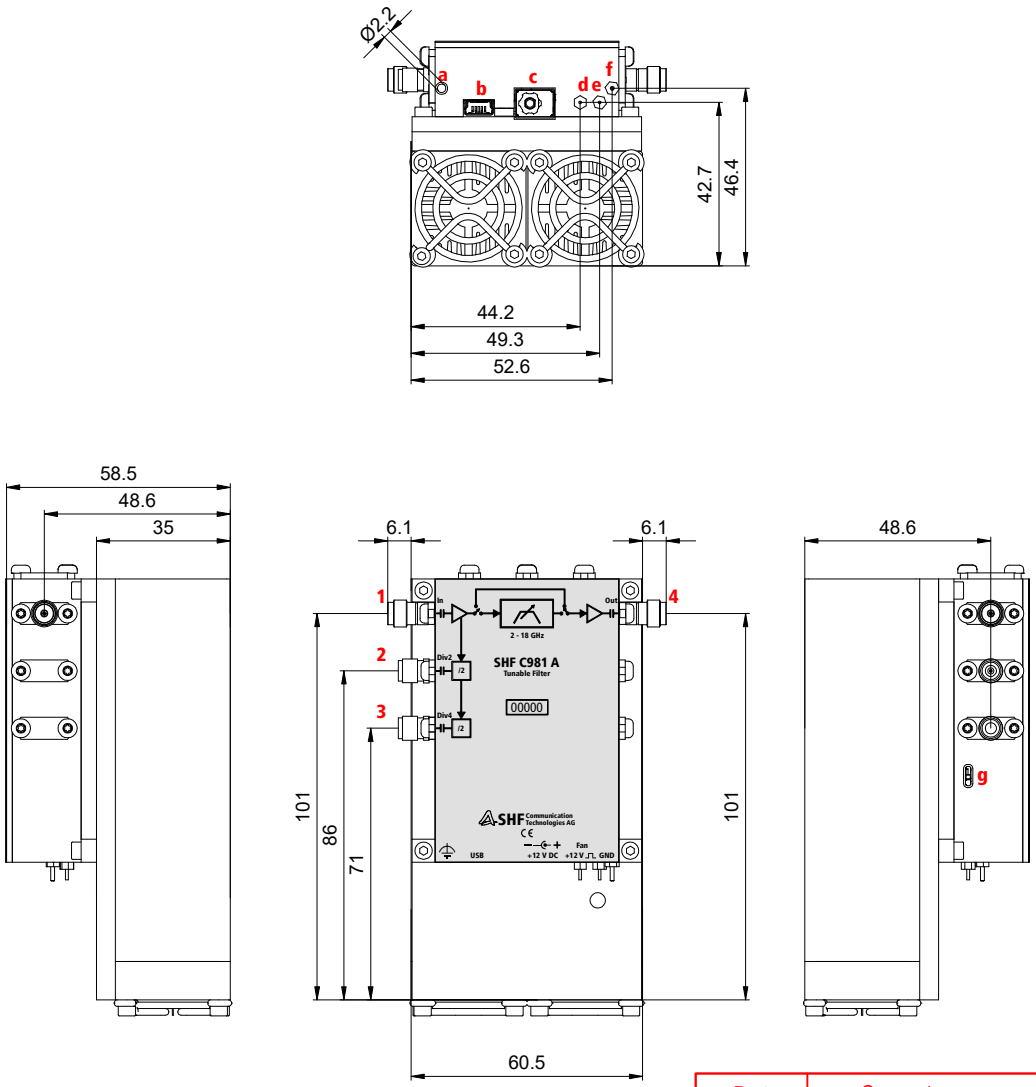
Clock /4 @ 60 GHz Input

Typical Gain

The following diagram shows the typical input to output gain in normal operation. Between 2 GHz and 18 GHz the output is filtered.



Mechanical Drawing with Heat Sink



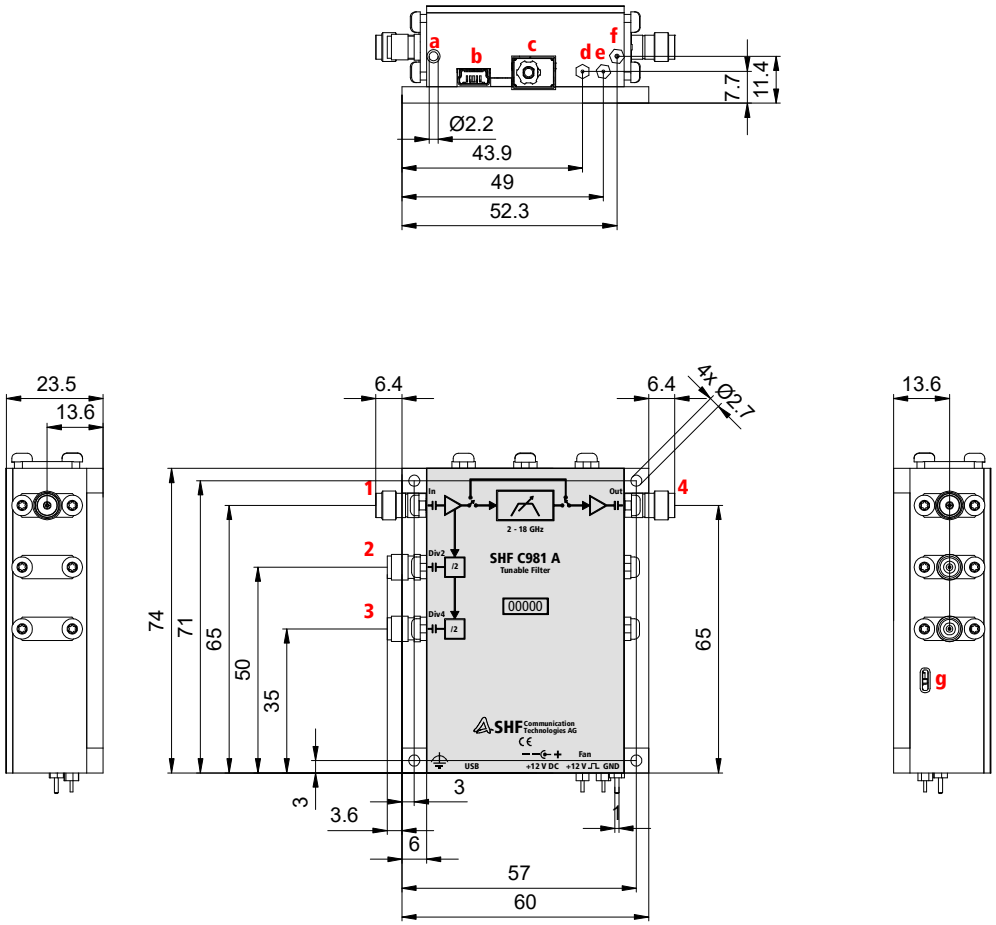
Pos	Port	Connector
1	In	1.85mm (V) female
2	Div2	2.92mm (K) female
3	Div4	2.92mm (K) female
4	Out	1.85mm (V) female

Port	Connector	Designation
a	2 mm Banana Jack	Functional Earth
b	Mini-USB	Control Interface
c	Power Jack 2.0 x 5.9 mm	Power
d	Mini Bushing EMI Filter	Fan+12 V
e	Mini Bushing EMI Filter	Fan Tacho
f	1 mm Soldering Pin	GND
g	Sliding Switch	Service

all dimensions in mm

For permanent mounting remove the heat sink from the module. In that case, please ensure that adequate cooling of the module is guaranteed. It is recommended to use thermal paste or a thermal gap pad for mounting.

Mechanical Drawing without Heat Sink



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f	1 mm Soldering Pin	GND
g	Sliding Switch	Service

all dimensions in mm

Please ensure that adequate cooling of the module is guaranteed.

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