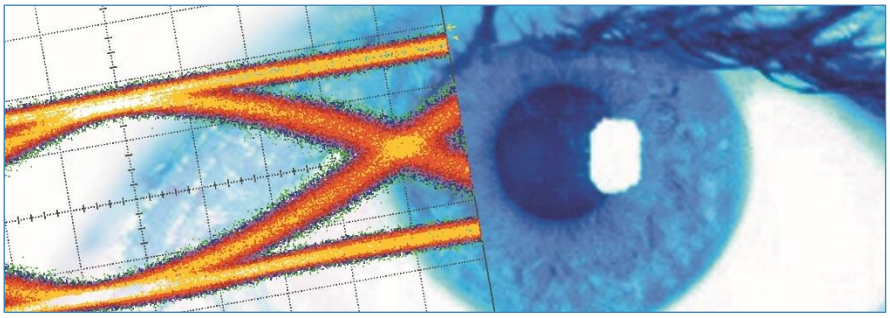


Data Sheet

SHF 78124 A

32 / 64 GHz Synthesized Clock Generator

Description

The SHF 78124 A is a compact synthesized continuous wave (CW) signal generator featuring a wide-frequency range (tunable continuously without any gap), adjustable output power, low jitter, low harmonic and low non-harmonic signal components.

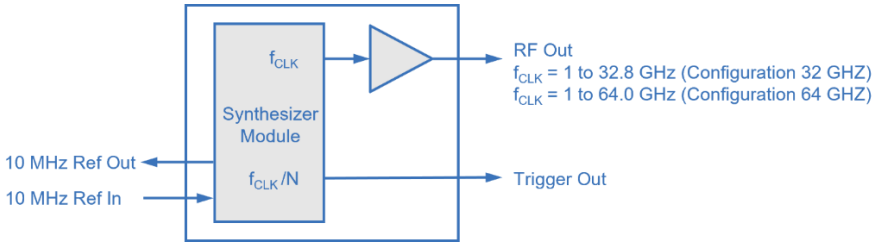
In 'configuration 32' it features a frequency range from 1 to 32.8 GHz with a 1 kHz resolution and an output power range from -6 to 6 dBm (in standard configuration) or -8 to +8 dBm (with the high output power option (opt. HOP). The output power can be adjusted in 0.1 dB steps.

In 'configuration 64' it features a frequency range from 1 to 64 GHz with a 1 kHz resolution and an output power range from -10 to +6 dBm. The output power can be adjusted in 0.1 dB steps.

An additional trigger output provides a trigger signal whose frequency can be 1/n of the output frequency (with n= 4, 8, 16, 32, 64 or 128).

The SHF 78124 A is perfectly suited as a clock source for our BERT and AWG Systems. To derive further clock signals at various frequencies fitting clock distributions and clock doublers are available.

Block Diagram



Features

- Clock frequency ranges from f_{CLK} = 1 to 32.8/64.0 GHz with 1 kHz resolution
- Output power adjustable from -10 to +8 dBm with 0.1 dB resolution depending on selected configuration and option.
- 10 MHz reference input and output for phase locking to other instruments
- Controlled by intuitive graphical user interface SHF Control Center (SCC)
- Remote programming interface (Ethernet) for automated measurements

Configurations

The SHF 78124 A can be equipped in two different configurations:

32: Output frequency range from 1 to 32.8 GHz

64: Output frequency range from 1 to 64.0 GHz

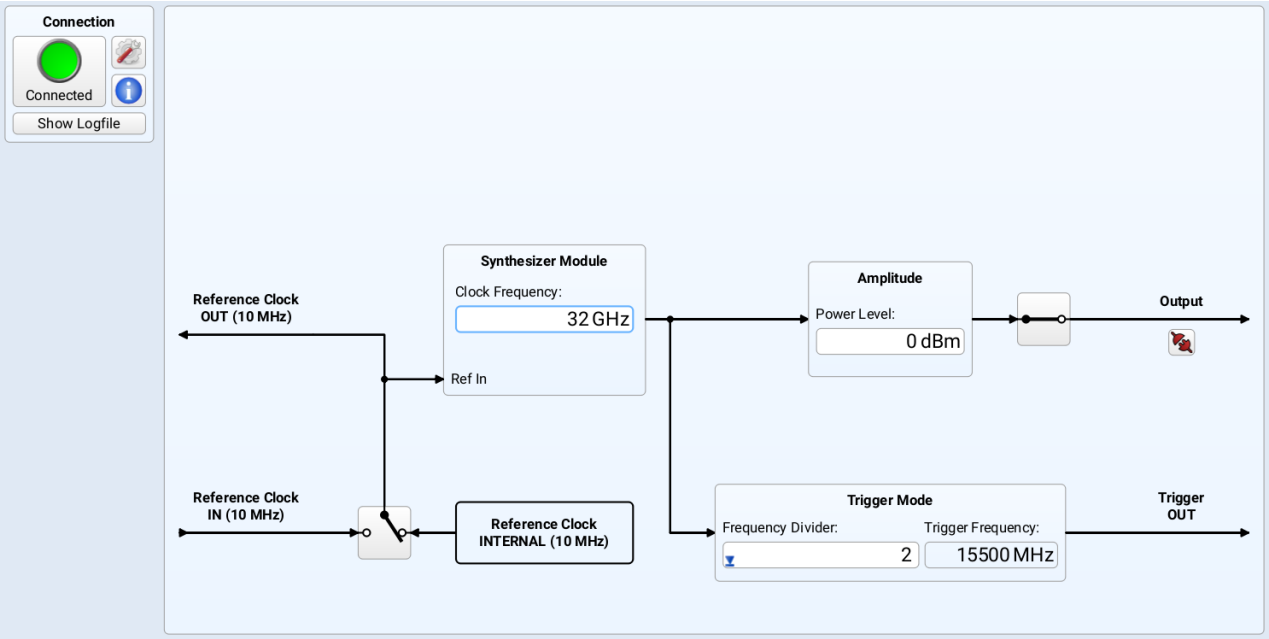
Options

HOP: The High Output Power option extends the output amplitude range from -8 to +8 dBm. It is available for the 32 GHz configuration only.

Operation of the Synthesized Signal Generator

The SHF 78124 A is controlled over a standard Ethernet connection by an external computer (not part of the delivery). Every system comes along with the intuitive, easy to use SHF Control Center software (SCC). It provides the interface for changing the device parameters, see screenshot below.

Additionally, the instrument may be programmed remotely over the Ethernet connection for automated tests and measurements. Please refer to the SHF BERT Programming Manual.



SHF Control Center GUI

Specifications

Clock Output (RF Out) Configuration 32 GHz [1]

Parameter	Unit	Symbol	Min	Typ	Max	Comment
Operating Frequency	GHz	f_{CLK}	1		32.8	
Frequency Resolution	kHz		1			
Frequency Accuracy	ppb		–1000		+1000	with internal reference
Frequency Stability	ppb		–50		+50	Ambient temperature 21°C
Frequency Stability Aging	ppb		–500		+500	per year
Minimum Output Power	dBm	$P_{out,min}$			-6 -8	With Option HOP
Maximum Output Power	dBm	$P_{out,max}$	6 8			With Option HOP
Output Power Resolution	dB		0.1			
Output Power Accuracy	dB		–1		1	Ambient temperature 21°C
Harmonics/Spurious Signals	dBc				–20	
Phase Noise	dBc/Hz			–80 –96 –94 –119		f_{CLK} = 10 GHz 1 kHz offset 10 kHz offset 100 kHz offset 1 MHz offset
Output Impedance	Ω			50		
Connector						2.92 mm (K) female

[1] The specifications in this datasheet are only valid if the internal reference is activated. If the external reference setting is activated the signal at Ref In is fed through to Ref Out. In this case the parameters frequency, stability and amplitude depend on the Ref In signal.

Clock Output (RF Out) Configuration 64 GHz [2]

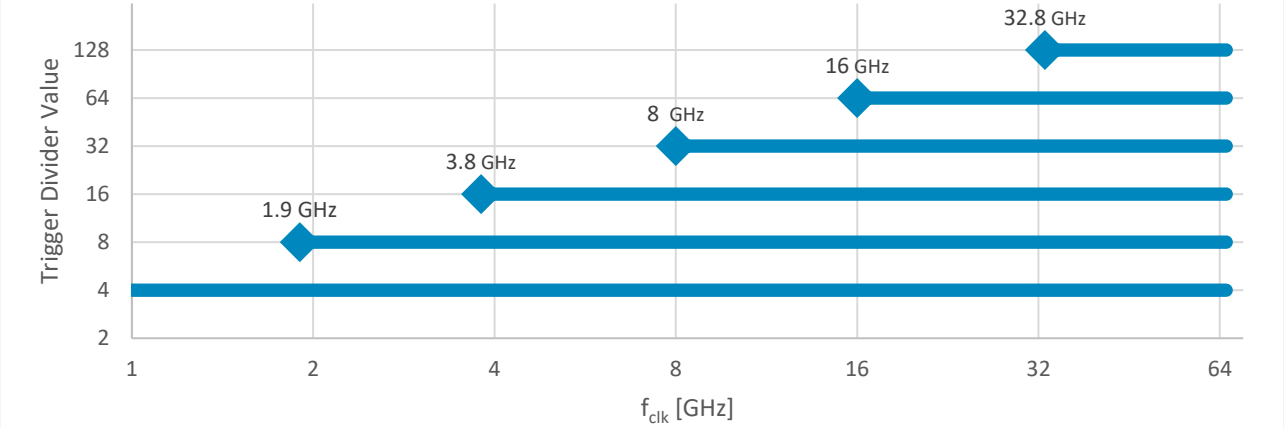
Parameter	Unit	Symbol	Min	Typ	Max	Comment
Operating Frequency	GHz	f_{CLK}	1		64	
Frequency Resolution	kHz		1			
Frequency Accuracy	ppb		–1000		+1000	with internal reference
Frequency Stability	ppb		–50		+50	Ambient temperature 21°C
Frequency Stability Aging	ppb		–500		+500	per year
Minimum Output Power	dBm	$P_{out,min}$			–10	
Maximum Output Power	dBm	$P_{out,max}$	6			
Output Power Resolution	dB		0.1			
Output Power Accuracy	dB		–1		1	Ambient temperature 21°C
Harmonics/Spurious Signals	dBc				–20	
Phase Noise	dBc/Hz			–80 –96 –94 –119		f_{CLK} = 10 GHz 1 kHz offset 10 kHz offset 100 kHz offset 1 MHz offset
Output Impedance	Ω			50		
Connector						1.85 mm (V) female

[2] The specifications in this datasheet are only valid if the internal reference is activated. If the external reference setting is activated the signal at Ref In is fed through to Ref Out. In this case the parameters frequency, stability and amplitude depend on the Ref In signal.

Trigger Output

Parameter	Unit	Symbol	Min	Typ	Max	Comment
Frequency						f_{CLK} / n n = 4, 8, 16, 32, 64 and 128 depending on f_{CLK} as shown in Available Trigger Output Divider Values
Output Amplitude	mVpp		400		800	
Output Impedance	Ω			50		
Connector						2.92 mm (K) female

Available Trigger Output Divider Values



Ref In

Parameter	Unit	Symbol	Min	Typ	Max	Comment
Reference Frequency	MHz	f_{ref}		10		
Amplitude	Vpp		0.2		3.3	
Input Impedance	Ω			50		
Connector						SMA female

Ref Out (using internal reference setting) [3]

Parameter	Unit	Symbol	Min	Typ	Max	Comment
Reference Frequency	MHz			10		
Amplitude	Vpp				0.8	
Output Impedance	Ω			50		
Frequency Accuracy	ppb		–1000		+1000	
Frequency Stability	ppb		–50		+50	Ambient temperature 21°C
Frequency Stability Aging	ppb		–500		+500	per year
Connector						SMA female

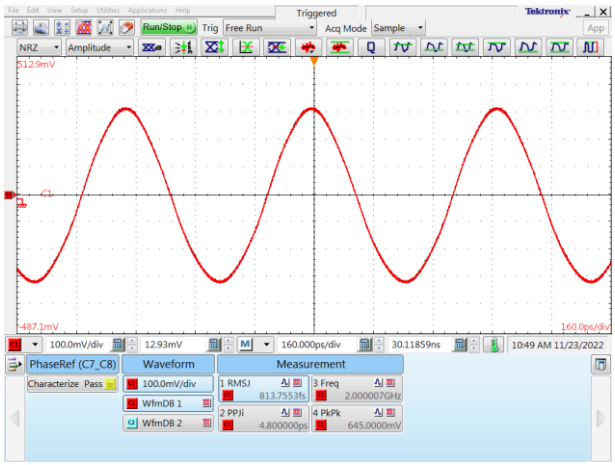
General

Parameter	Unit	Symbol	Min	Typ	Max	Conditions
Supply Voltage	V		+22	+24	+26	4 pin DIN Power Jack
Supply Current	mA			850 1060		Configuration 32 G Configuration 64 G
Power Consumption	W				25 30	Configuration 32 G Configuration 64 G +24 V switching power supply is included
Weight	kg			2.6 2.2		without power supply Configuration 64 Configuration 32
Operating Temperature	°C		10		35	Ambient temperature

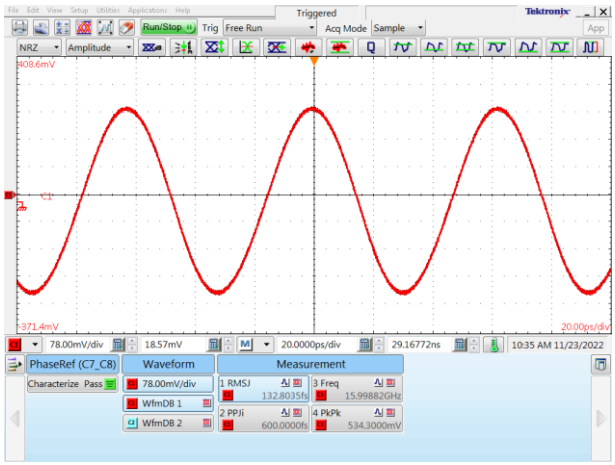
[3] The specifications in this datasheet are only valid if the internal reference is activated. If the external reference setting is activated the signal at Ref In is fed through to Ref Out. In this case the parameters frequency, stability and amplitude depend on the Ref In signal.

Typical Output Waveforms

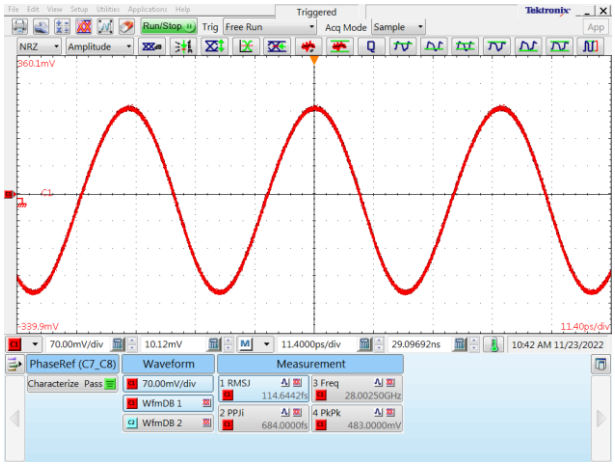
Configuration 32



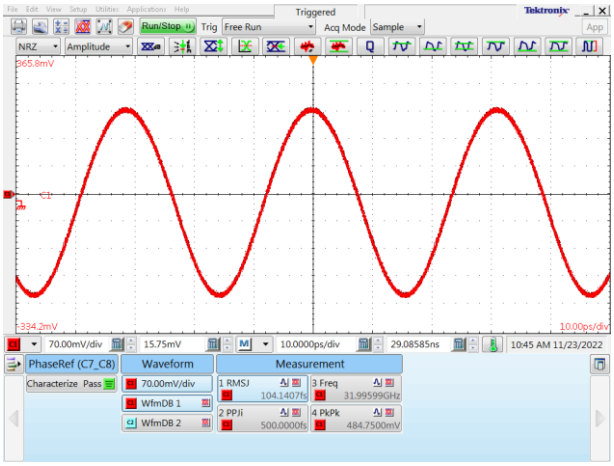
2 GHz clock output at 0 dBm



16 GHz clock output at 0 dBm

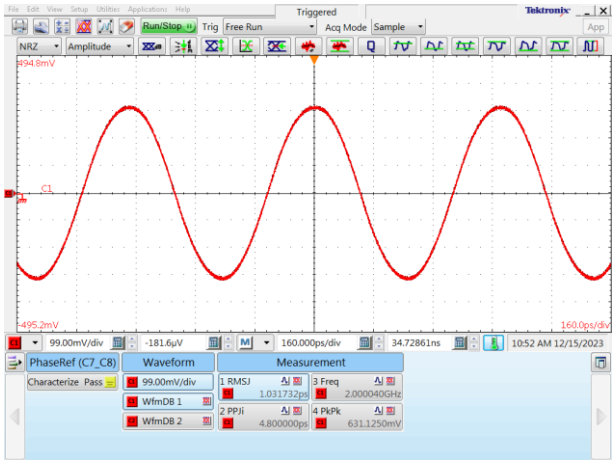


28 GHz clock output at 0 dBm

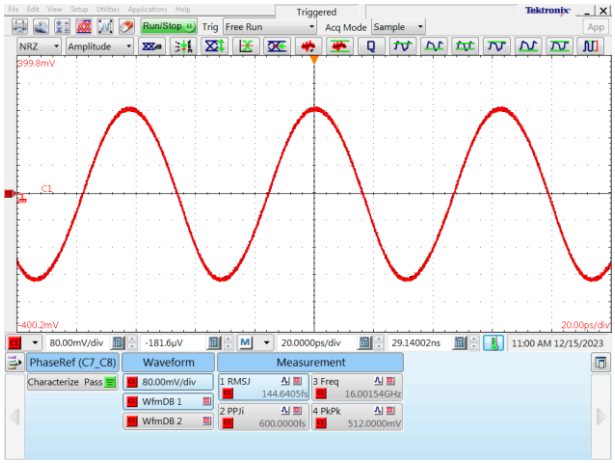


32 GHz clock output at 0 dBm

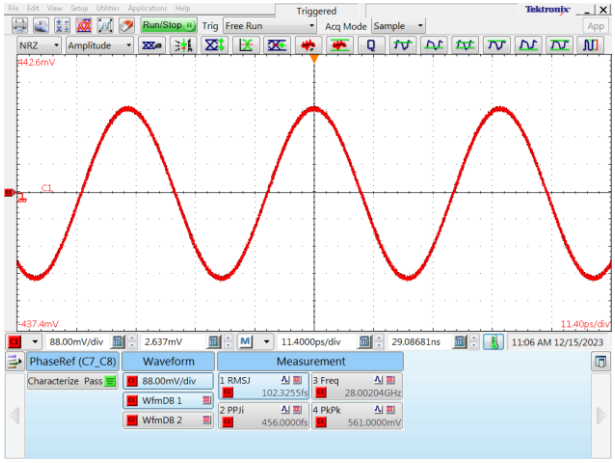
Configuration 64



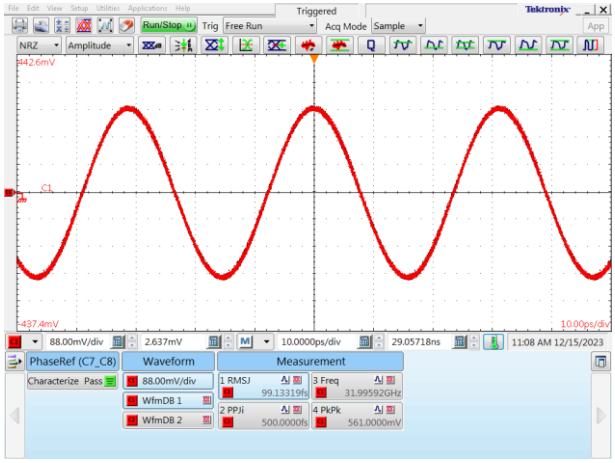
2 GHz clock output at 0 dBm



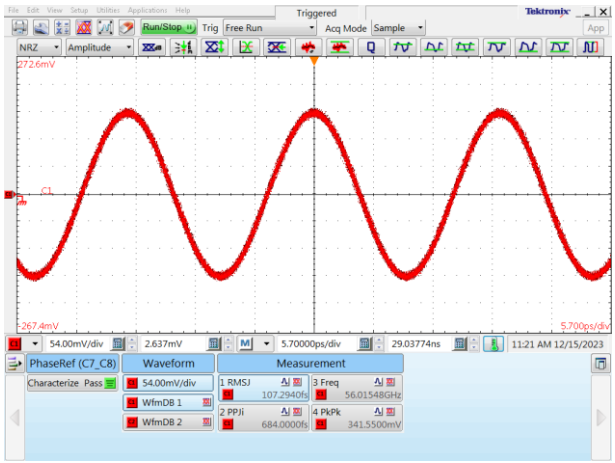
16 GHz clock output at 0 dBm



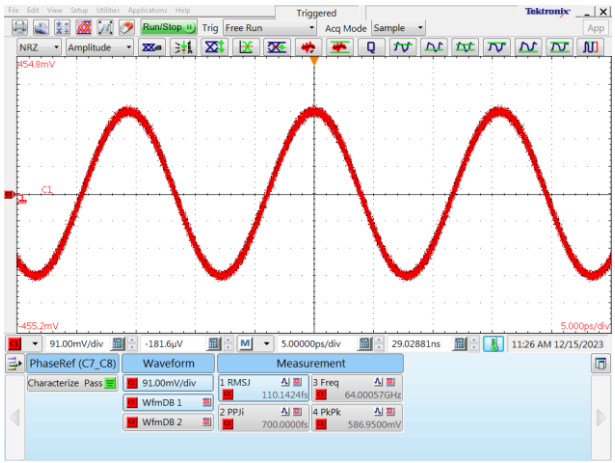
28 GHz clock output at 0 dBm



32 GHz clock output at 0 dBm



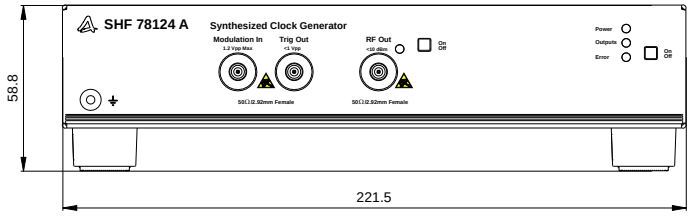
56 GHz clock output at 0 dBm

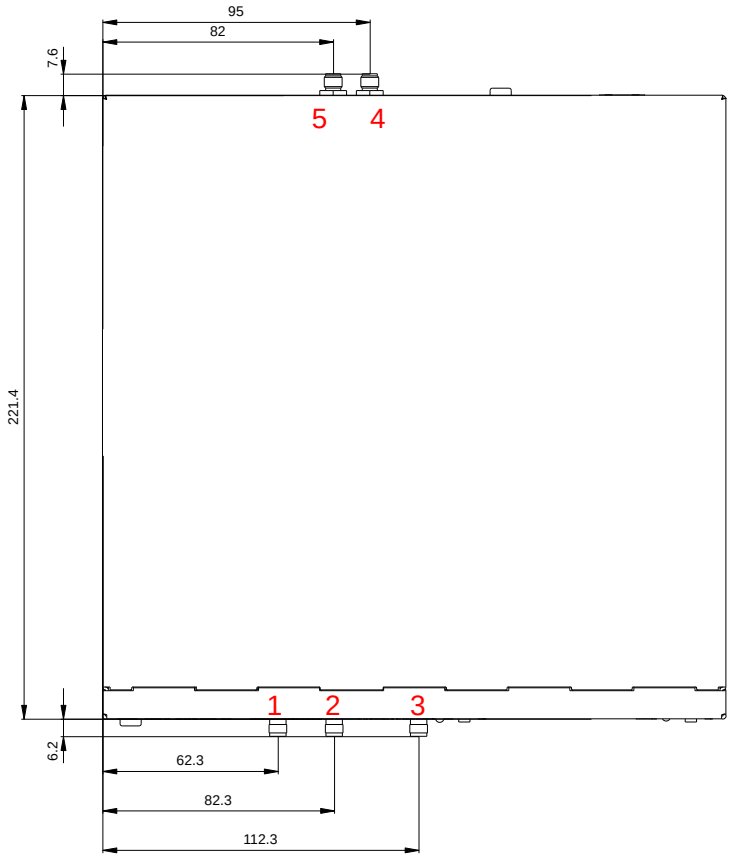


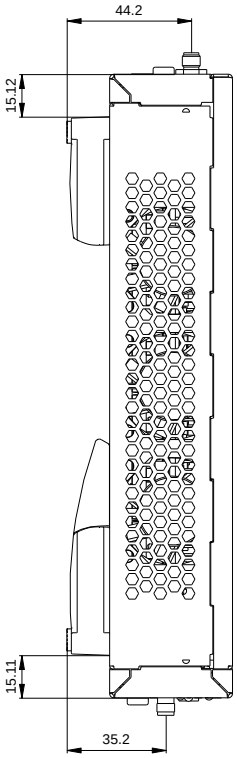
64 GHz clock output at 0 dBm

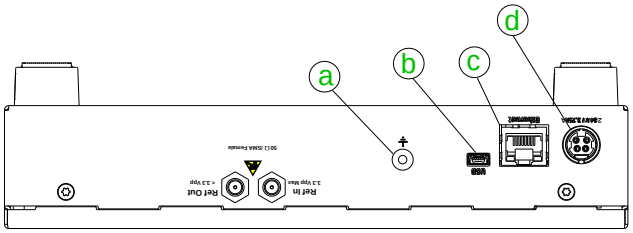
Mechanical Drawings

Configuration 32







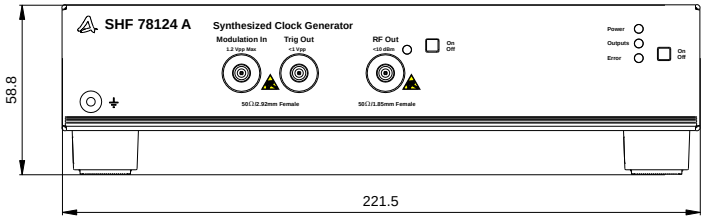


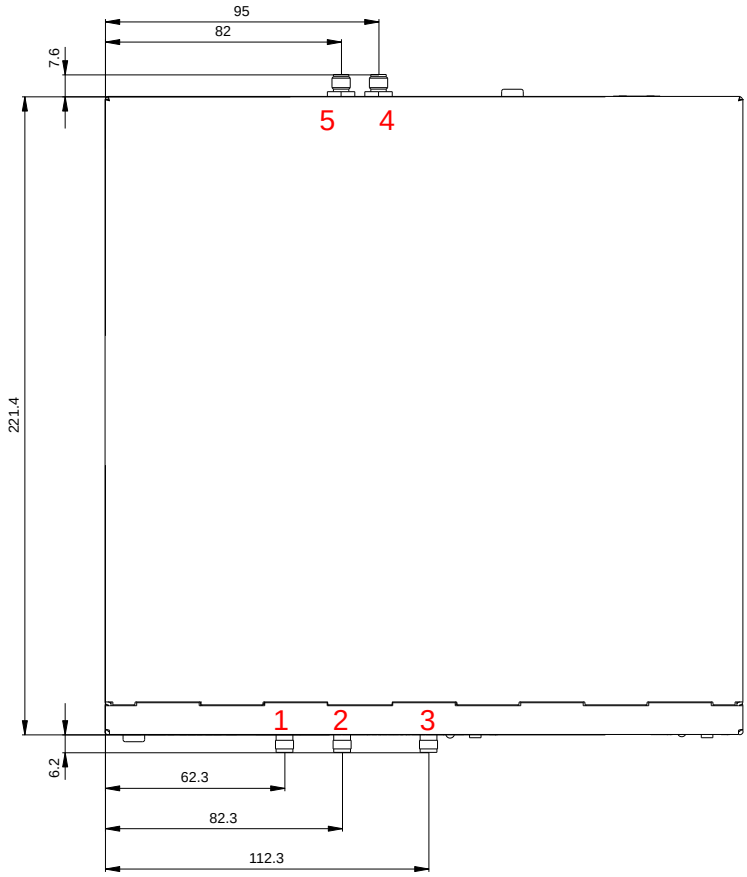
all dimensions in mm

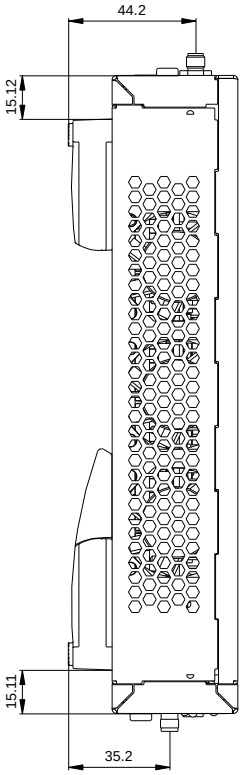
Pos.	Designation
a	GND
b	USB
c	Ethernet
d	Power Supply

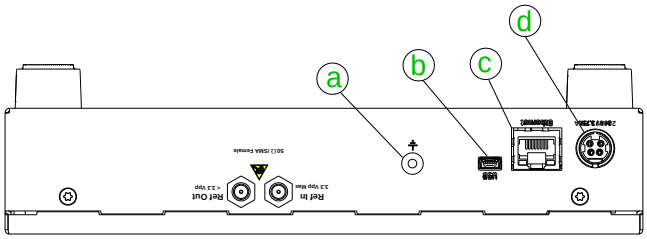
Pos.	Designation	Connector
1	Modulation In	2.92 mm (K) Female
2	Trigger Out	2.92 mm (K) Female
3	RF Out	2.92 mm (K) Female
4	Reference In	SMA Female
5	Reference Out	SMA Female

Configuration 64









all dimensions in mm

Pos.	Designation
a	GND
b	USB
c	Ethernet
d	Power Supply

Pos.	Designation	Connector
1	Modulation In	2.92 mm (K) Female
2	Trigger Out	2.92 mm (K) Female
3	RF Out	1.85 mm (V) Female
4	Reference In	SMA Female
5	Reference Out	SMA Female

SHF Communication Technologies AG

Wilhelm-von-Siemens-Str. 23 D | 12277 Berlin | Germany

+49 30 772 051 0

sales@shf-communication.com

www.shf-communication.com