



DATASHEET APLCXX Specification 1.10

Single & Multi-Channel High Performance Sources

9 kHz to 12.75, 20, 40 and 54 GHz



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DEFINITIONS

The specifications in the following pages describe the warranted performance of the instrument for 23 ± 5 °C after a 30-minute warm-up period

Typical: Expected mean values, not warranted performance

Min and max: Parameter range that is guaranteed by product design, and/or production tested. Warranted performance specifications include guard-bands to account for the expected statistical performance distribution, measurement uncertainties, and changes in performance due to environmental conditions.

INTRODUCTION

The APLCxx is a series of phase-coherent, single or multi-channel, ultra-fast switching and ultra-low phase noise signal generators with a frequency range up to 12, 20, 40, and 54 GHz. It is ideally suited for a wide range of applications, where good signal quality, accurate and wide output power ranges, and very stable phase coherence among all channels are required. Excellent phase noise is combined with good spurious, harmonic rejection and optionally leading-edge switching speed of 25 μ s.

A high-stability OCXO reference provides excellent frequency accuracy and stability. The generator accepts a wide range of external references including the commonly used 10 and 100 MHz for higher phase synchronization, and a flexible reference choice in the range of 1-250 MHz for those applications with customer- or system-specific reference frequencies. Moreover, the APLCxx features a pair of AnaPico-specific high-frequency CLK ports (6 GHz, one input and one output) that enables excellent phase synchronization among the outputs of multiple APLCxx instruments.

The APLCxx(-X) comes in a desktop enclosure (single channel) or in a 19 inch 2U (1 up to 4 channels) rack-mountable module form. It can be intuitively controlled by a PC based GUI software. Moreover, the instrument offers various communication interfaces like USB, LAN or GPIB. Each interface allows for easy and fast communication using SCPI 1999 command set. Remote control of the instrument can be quickly achieved from any host system. A customer-supplied application programming interface (API) or programming examples for Matlab, Labview, C++ and other commercially available tools make the control implementation very straightforward.

FACTS & FIGURES & SPECIFICATIONS

Signal Specifications

PARAMETER	MIN	TYPICAL	MAX	NOTE
Channels	1		4	
Frequency Ranges				
APLC12	10 MHz		12.75 GHz	
APLC20	10 MHz		20 GHz	
APLC40	10 MHz		40 GHz	
APLC50	10 MHz 9 kHz		54 GHz	Option 9K
Resolution		<0.001 Hz		
Phase Adjustment Range	0 deg		360 deg	individually adjustable per channel
Phase Resolution		0.1 deg		
Deterministic Relative Phase between channels (Phase Memory)				Option PHS
Switching Speed		1.5 ms		after SCPI command received
CW Mode		500 μs		
Sweep / List Mode		15 μs	25 μs	Option FS, above 10 MHz
Thermal Drift		0.015 dB/°C		

Frequency Reference

PARAMETER	MIN	TYPICAL	MAX	NOTE
Internal Reference Frequency		100 MHz 10 MHz		Option LN/LN+
Temperature stability 0 to 50 degC			±100 ppb ±20 ppb	Option LN/LN+
Aging 1st year			1000 ppb 30 ppb 20 ppb	Option LN Option LN+
Aging per day			5 ppb 0.5 ppb < 0.5 ppb	after 30 days operations Option LN Option LN+
Warm-up time		5 min		
Output of internal reference		10 MHz 100 MHz		REF OUT port, selectable
Output of High Frequency Clock		6 GHz		CLK OUT port high phase synchronous mode
Output power	-3 dBm 6 dBm		+ 3 dBm +12 dBm	10 MHz, 6 GHz 100 MHz
Output impedance		50 Ohms		
Bypass Internal Reference Input		100 MHz		Option LN/LN+ is disabled
Phase Lock to External Reference	1 MHz	10 MHz integer MHz	250 MHz	REF IN port Option VREF Option LN/LN+ is disabled
High Frequency Clock Input (Bypass Internal Reference)		6 GHz		CLK IN port high phase synchronous mode
Reference input level				
10 MHz or 1-250 MHz or 6 GHz	-5 dBm	0 dBm	+10 dBm	
100 MHz	+5 dBm		+13 dBm	
Lock Range				
10 MHz or 1-250 MHz			±1.5 ppm	
Bypass 100 MHz			100 ppm	
Reference Input Impedance		50 Ohms		



Absolute Phase Noise

Absolute SSB Phase noise dBc/Hz.

Specified values in plain text, typical values in brackets. CW, level = 20 dBm or maximum available output power, whichever is lower

OFFSET	10 Hz	100 Hz	1 kHz	10 kHz	100 kHz	1 MHz	10 MHz
FREQUENCY							
100 MHz	-100 (-105)	-130 (-135)	-143 (-145)	-150 (-155)	-156 (-160)	-156 (-160)	-156 (-160)
1 GHz	-80 (-85)	-110 (-115)	-132 (-134)	-143 (-145)	-147 (-149)	-148 (-150)	-153 (-155)
3 GHz	-70 (-75)	-100 (-105)	-123 (-125)	-133 (-135)	-136 (-138)	-136 (-138)	-145 (-147)
6 GHz	-64 (-69)	-94 (-99)	-117 (-119)	-126 (-128)	-130 (-132)	-130 (-132)	-139 (-142)
10 GHz	-60 (-65)	-90 (-95)	-114 (-116)	-124 (-127)	-128 (-130)	-128 (-130)	-135 (-138)
40 GHz	-48 (-53)	-78 (-83)	-103 (-110)	-113 (-115)	-116 (-118)	-116 (-118)	-122 (-125)
54 GHz	-46 (-51)	-76 (-81)	-98 (-101)	-108 (-111)	-111 (-114)	-111 (-114)	-116 (-119)

Absolute SSB Phase noise with LN/LN+ option dBc/Hz

Specified values in plain text, typical values in brackets. CW, level = 20 dBm or maximum available output power, whichever is lower

OFFSET	10 Hz	100 Hz	1 kHz	10 kHz	100 kHz	1 MHz	10 MHz
FREQUENCY							
100 MHz	-116 (-120)	-130 (-132)	-143 (-145)	-150 (-155)	-156 (-160)	-156 (-160)	-156 (-160)
1 GHz	-96 (-100)	-110 (-112)	-132 (-134)	-143 (-145)	-147 (-149)	-148 (-150)	-153 (-155)
3 GHz	-86 (-90)	-100 (-103)	-123 (-125)	-132 (-134)	-136 (-138)	-135 (-137)	-145 (-147)
6 GHz	-80 (-84)	-94 (-98)	-117 (-119)	-126 (-128)	-130 (-132)	-130 (-132)	-139 (-142)
10 GHz	-76 (-80)	-90 (-94)	-114 (-116)	-124 (-126)	-128 (-130)	-128 (-130)	-135 (-138)
40 GHz	-64 (-68)	-78 (-82)	-102 (-104)	-112 (-115)	-116 (-118)	-116 (-118)	-123 (-126)
54 GHz	-63 (-62)	-76 (-80)	-98 (-101)	-108 (-111)	-111 (-114)	-111 (-114)	-116 (-119)



Spectral Purity

PARAMETER	MIN	TYPICAL	MAX	NOTE
Harmonics				at +10 dBm output power
9 kHz to 175 MHz		-30 dBc		
175 MHz to 2.5 GHz		-55 dBc	-45 dBc	
2.5 GHz to 22 GHz		-60 dBc	-50 dBc	
22 GHz to 30 GHz		-25 dBc	-20 dBc	
30 GHz to 54 GHz		-55 dBc		
Sub-Harmonics				at +10 dBm output power
< 2.5 GHz		-80 dBc		
2.5 GHz to 11.3 GHz		-70 dBc	-60 dBc	
11.3 GHz to 54 GHz		-70 dBc	-55 dBc	
Non-Harmonic Spurious				10 kHz to 0.5 GHz offset from carrier
< 2.5 GHz		-95 dBc	-85 dBc	
1.2 to 2.5 GHz		-90 dBc	-86 dBc	
2.5 to 5.6 GHz		-85 dBc	-80 dBc	
5.6 to 11.3 GHz		-80 dBc	-74 dBc	
11.3 to 22 GHz		-75 dBc	-68 dBc	
22 to 44 GHz		-70 dBc	-65 dBc	
44 to 54 GHz		-67 dBc	-62 dBc	



RMS Jitter

CARRIER FREQUENCY	MIN	TYPICAL	MAX	NOTE
155 MHz		20 fs	25 fs	BW 100 Hz to 1.5 MHz
622 MHz		18 fs	25 fs	BW 1 kHz to 5 MHz
1 GHz		21fs	27 fs	BW 10 Hz to 10 MHz
2.488 GHz		25 fs	30 fs	BW 5 kHz to 20 MHz
9.952 GHz		20 fs	30 fs	BW 10 kHz to 80 MHz

Figure 1: Phase Noise at different frequencies, power +20 dBm, Option LN

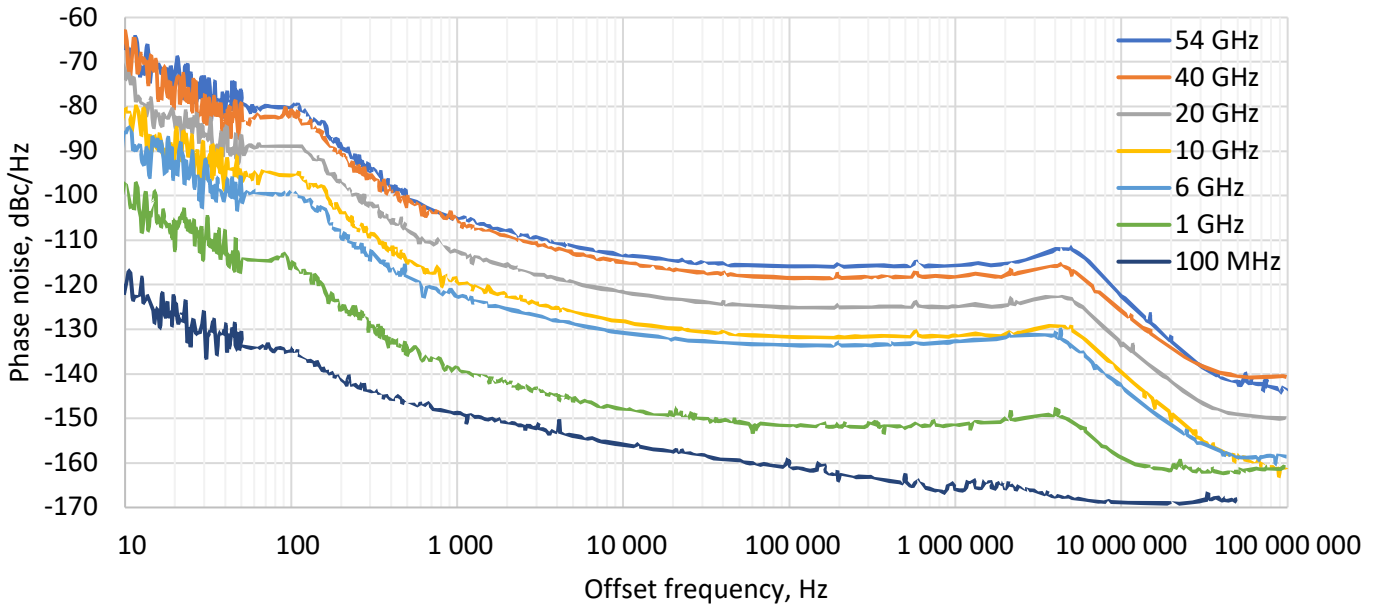


Figure 2: Amplitude Noise at power +10 dBm

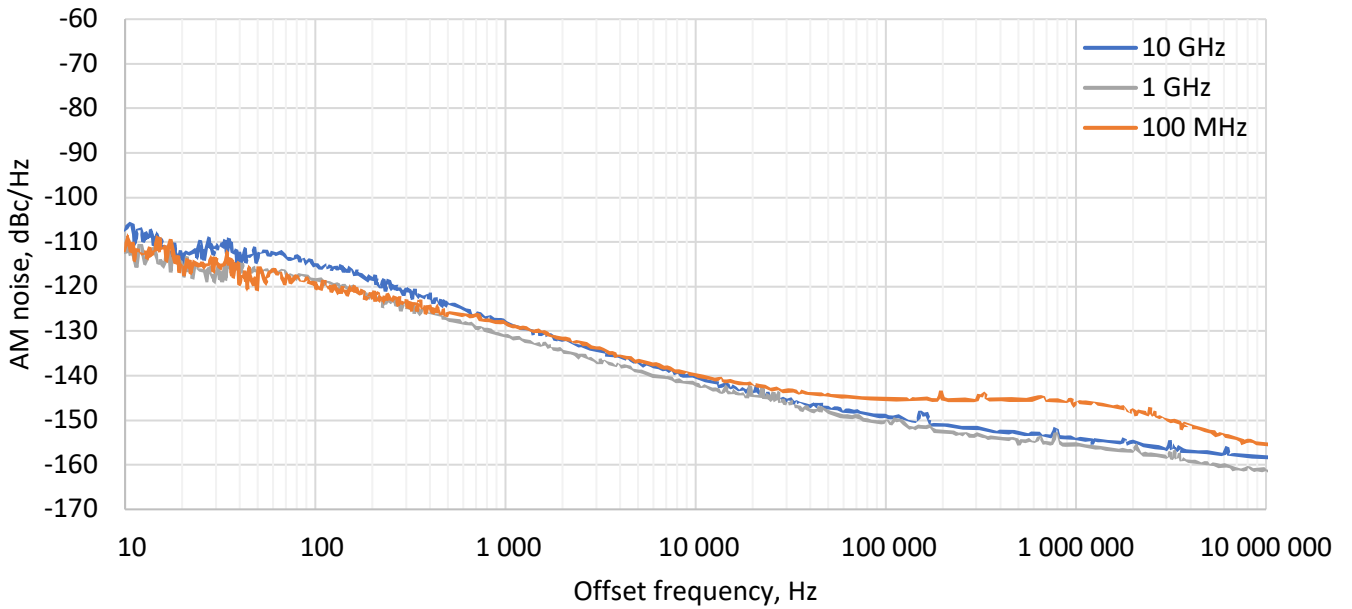
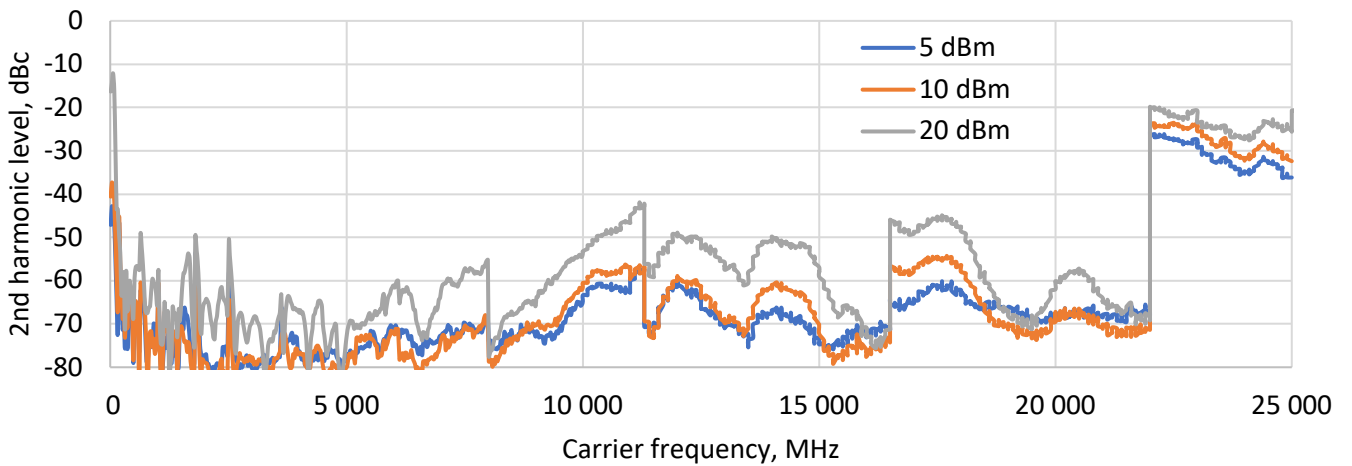


Figure 3: 2nd harmonic





Level Performance

PARAMETER	MIN	TYPICAL	MAX	NOTE
Output Power Level				
9 kHz to 1 MHz	-20 dBm		+7 dBm	
1 MHz to 10 MHz	-20 dBm		+12 dBm	
10 MHz to 2.5 GHz	-20 dBm		+17 dBm	
2.5 GHz to 22 GHz	-20 dBm		+19 dBm	
22 GHz to 42 GHz	-20 dBm		+20 dBm	
42 GHz to 50 GHz	-20 dBm		+15 dBm	
50 GHz to 54 GHz	-20 dBm		+10 dBm	
Output Power Level				Option PE2-12/20/40
9 kHz to 1 MHz	-120 dBm		+7 dBm	
1 MHz to 10 MHz	-120 dBm		+12 dBm	
10 MHz to 2.5 GHz	-120 dBm		+16 dBm	
2.5 GHz to 40 GHz	-120 dBm		+16 dBm	
Output Power Level				Option PE2-50
9 kHz to 1 MHz	-110 dBm		+7 dBm	
1 MHz to 10 MHz	-110 dBm		+12 dBm	
10 MHz to 2.5 GHz	-110 dBm		+16 dBm	
2.5 GHz to 42 GHz	-110 dBm		+16 dBm	
42 GHz to 50 GHz	-110 dBm		+11 dBm	
50 GHz to 54 GHz	-110 dBm		+6 dBm	
Power Resolution		0.01 dB		
Reverse Power Protection				
DC Voltage			0 V	
RF Power			26 dBm	
Output impedance		50 Ohms		
VSWR		1.3	1.5	< 15 GHz
		1.6	1.8	15 to 35 GHz
		1.9	2.2	> 35 GHz



Power Level Uncertainty

Specified values in plain text, typical values in brackets

Frequency Range	-120 or -110 to -50 dBm Option PE2	-50 to -15 dBm Option PE2	-15 to +15 dBm	+ 15 dBm to Max Power
9 kHz to 22 GHz	2.0 dB	1.2 dB	0.8 dB (0.3 dB)	1.2 dB
22 to 40 GHz	2.3 dB	1.8 dB	0.2 dB (0.4 dB)	2.3 dB
40 to 54 GHz	2.5 dB	2.0 dB	1.3 dB (0.5 dB)	2.5 dB

Relative Power Error (0.1 dB step)

Specified values in plain text, typical values in brackets

Frequency Range	-120 or -110 to -50 dBm Option PE2	-50 to -15 dBm Option PE2	-15 to +15 dBm	+ 15 dBm to Max Power
9 kHz to 20 GHz	0.5(< 0.1 dB)	0.5 dB (< 0.1 dB)	0.5 dB (< 0.1 dB)	(< 0.1 dB)
20 GHz to 40 GHz	(< 0.1 dB)	(< 0.1 dB)	(< 0.1 dB)	(< 0.1 dB)
40 GHz to 54 GHz	(< 0.1 dB)	(< 0.1 dB)	(< 0.1 dB)	(< 0.1 dB)

Figure 4: Maxpower 10 MHz to 54 GHz (standard, over 20 devices)

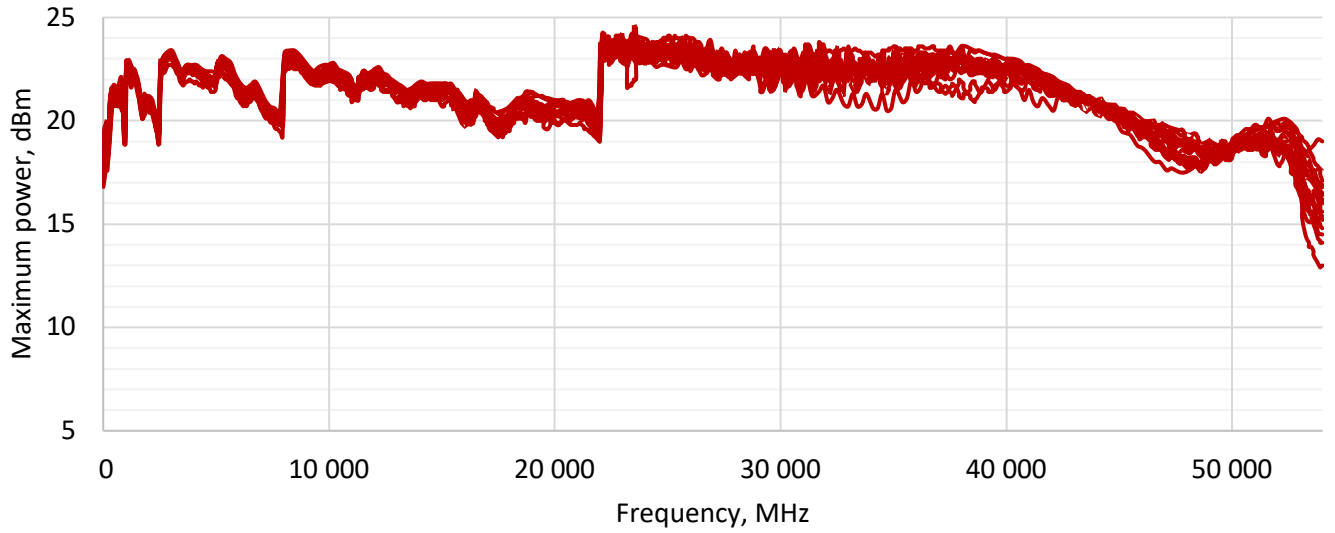


Figure 5: Maxpower 10 MHz to 54 GHz (option PE2)

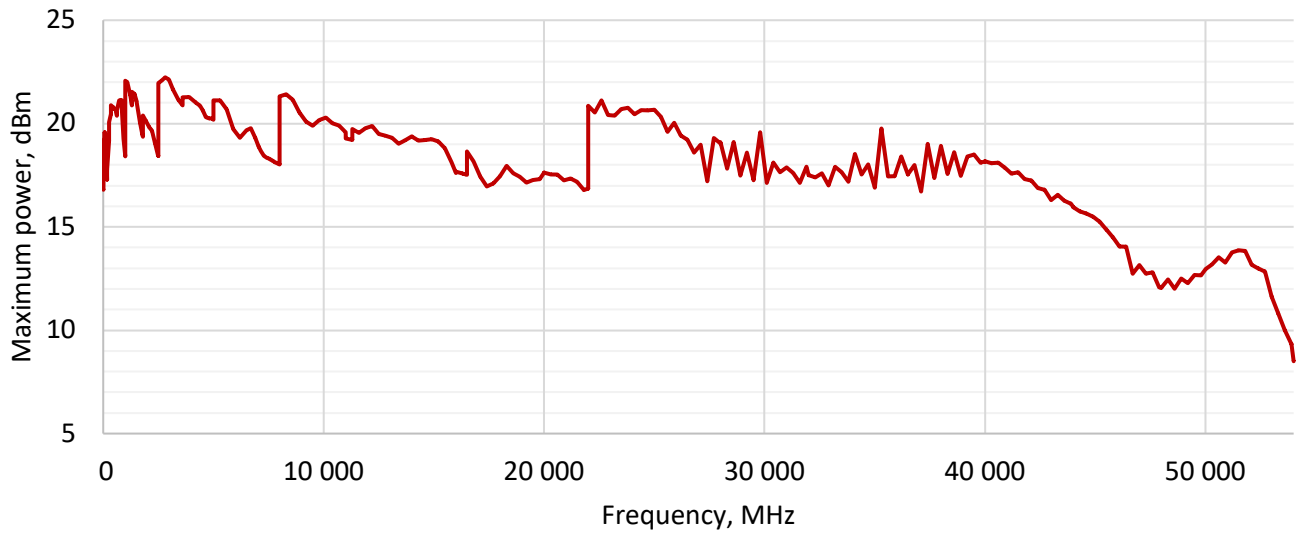


Figure 6: Power Accuracy from -15 to +15 dBm

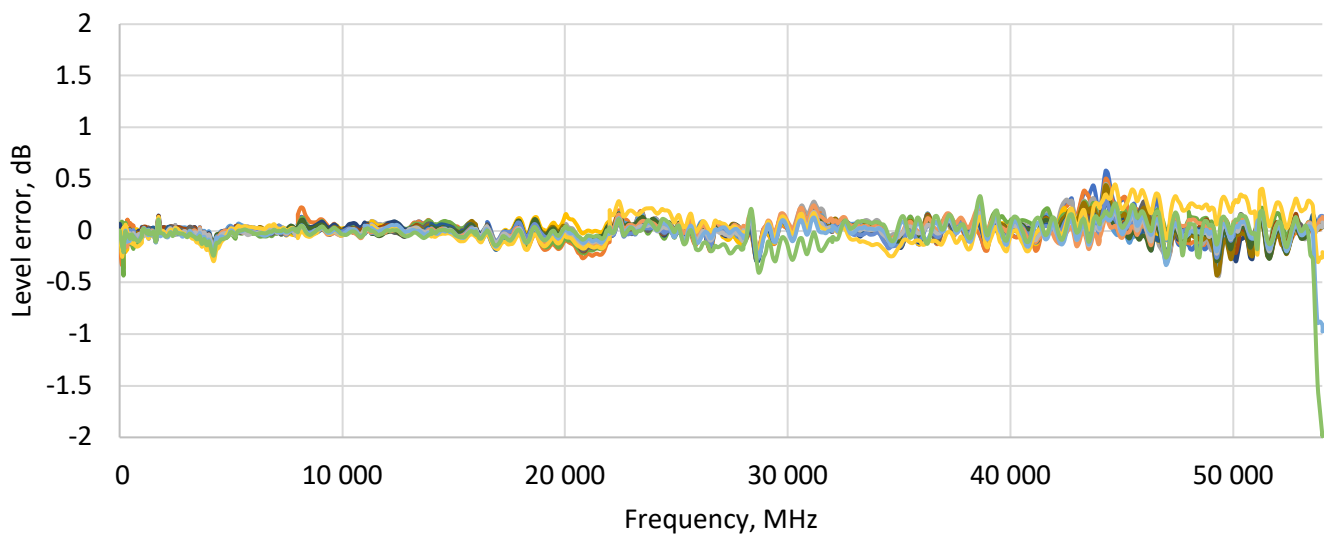


Figure 7: Power Linearity at different frequencies

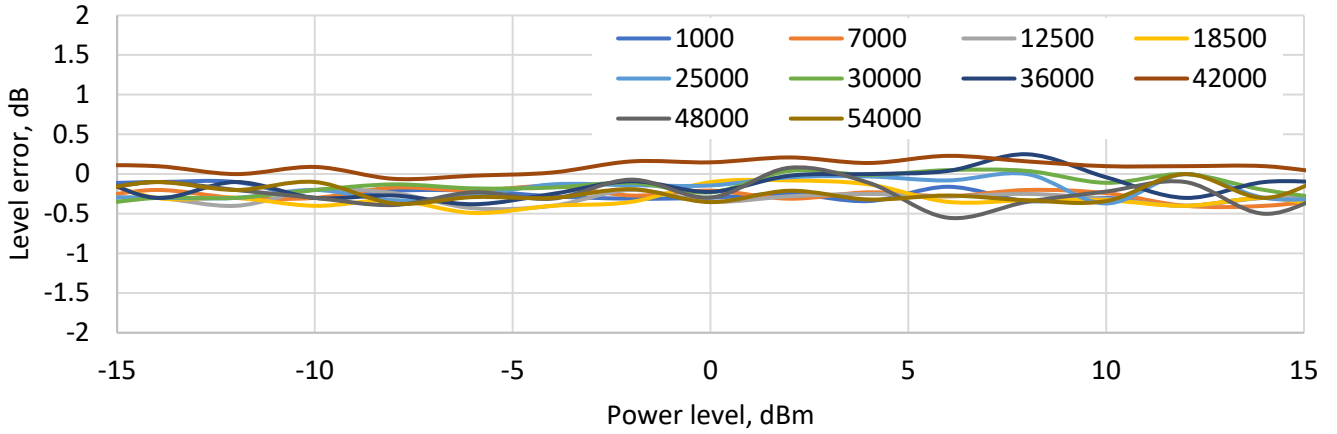


Figure 8: Absolute Power error at 20 GHz - Option PE2-20

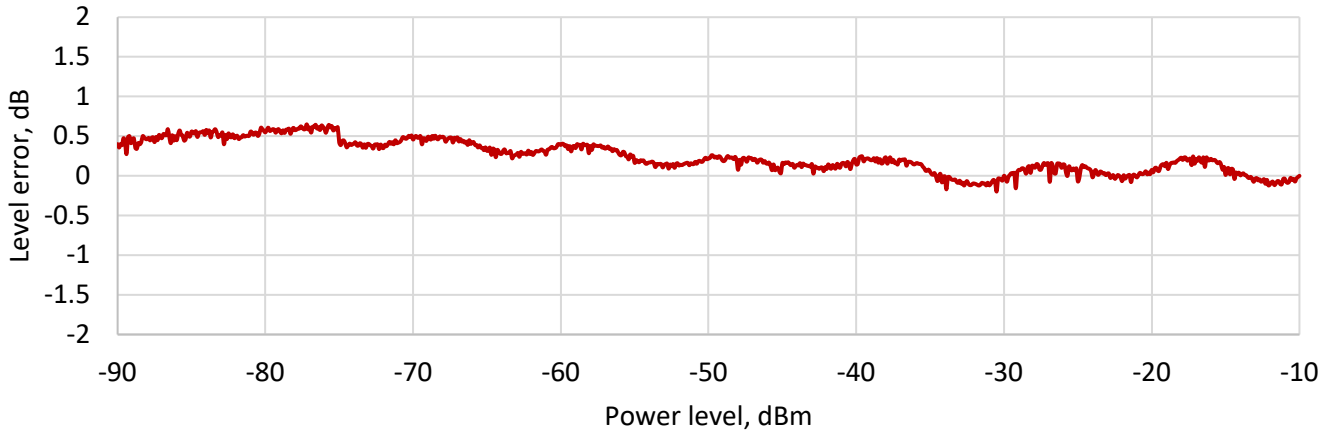
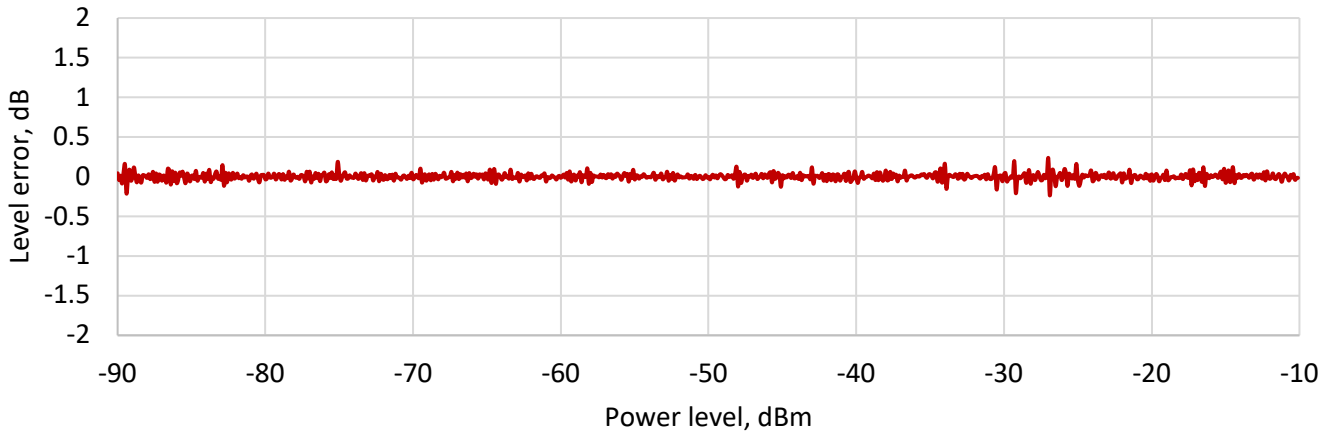


Figure 9: Power Linearity in 0.1 dB steps at 20 GHz - Option PE2-20





Modulation Capabilities

PARAMETER	MIN	TYPICAL	MAX	NOTE
Pulse Modulation				Option PULSE
Modulation Source		Int/Ext		
External input amplitude		TTL		
Pulse rise/fall time		3 ns	5 ns	
On/off ratio (power >= +10 dBm)	80 dB	100 dB		
Pulse overshoot			10%	
Pulse delay		20 ns		
Pulse polarity		Normal, inverse		selectable
Internal pulse generator				Option PULSE
Repetition frequency (PRF)	0.1 Hz		50 MHz	= 1/T
Duty cycle	1 % to 99 % in 1% steps			within specified minimum pulse width
Pulse Pattern Modulation & Staggered PRF				using internal pattern generator
Pulse width	10 ns		20 s	
Programmable pattern length	2		65536	
Duty cycle	0.05%		99.95%	
Pulse width resolution		5 ns		
Pulse period (T) accuracy		0.00005xT+ 3 ns		
Pulse width accuracy		0.00005xT+ 5 ns		
Pulse jitter		2 ns	5 ns	
Polarity		selectable		
Amplitude Modulation				Option MOD
Modulation Source		Internal		
Modulation Depth	0%		100%	
Depth accuracy		0.05·DEPT+2%		1 kHz rate, 30% depth
Depth resolution		1%		
Distortion (THD)			3%	1 kHz rate, 30% depth
Modulation rate	0.1 Hz		30 kHz	
Modulation waveforms	Sine			
Frequency Modulation				Option MOD
Modulation source		Internal		
Maximum Frequency deviation (peak)		N·20 MHz		Or 10% of carrier whichever is lower. For N values see below
Deviation accuracy		0.01·DEV+2Hz		
Distortion (THD)			3%	1 kHz rate, 10 kHz deviation
Modulation rate	0.1 Hz		30 kHz	
Modulation waveforms	Sine			
Phase Modulation				Option MOD
Modulation Source		Internal		
Phase deviation (peak)	0		1000·N rad	For N values see below
Deviation accuracy		0.01·DEV+10 ⁻³		
Modulation rate	0.1 Hz		30 kHz	
Modulation waveforms	Sine			
Distortion (THD)			3%	

Note:

- N=1 for frequencies 9 kHz - 175MHz
- N=1/64 for frequencies 175 – 177 MHz
- N=1/32 for frequencies 177 – 353 MHz
- N=1/16 for frequencies 353 – 706 MHz
- N=1/8 for frequencies 0.706 – 1.4125 GHz
- N=1/4 for frequencies 1.4125 – 2.825 GHz
- N=1/2 for frequencies 2.825 – 5.65 GHz
- N=1 for frequencies 5.65 – 11.3 GHz
- N=2 for frequencies 11.3 – 22 GHz
- N=4 for frequencies 22 – 44 GHz
- N=6 for frequencies 44 – 54 GHz

Figure 10: Pulse On / Off ratio

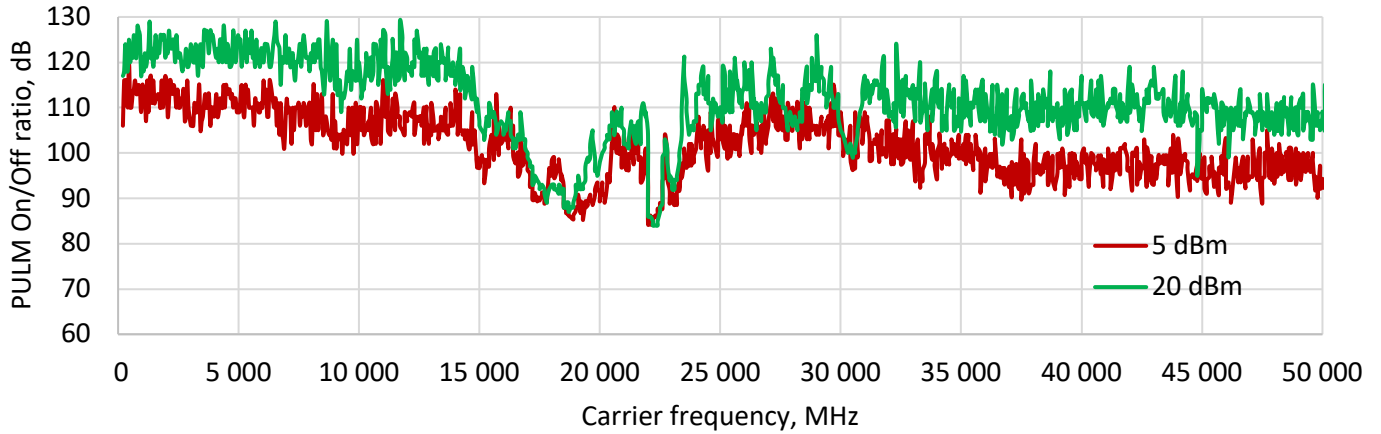


Figure 11: 10 GHz pulse modulation 30 ns

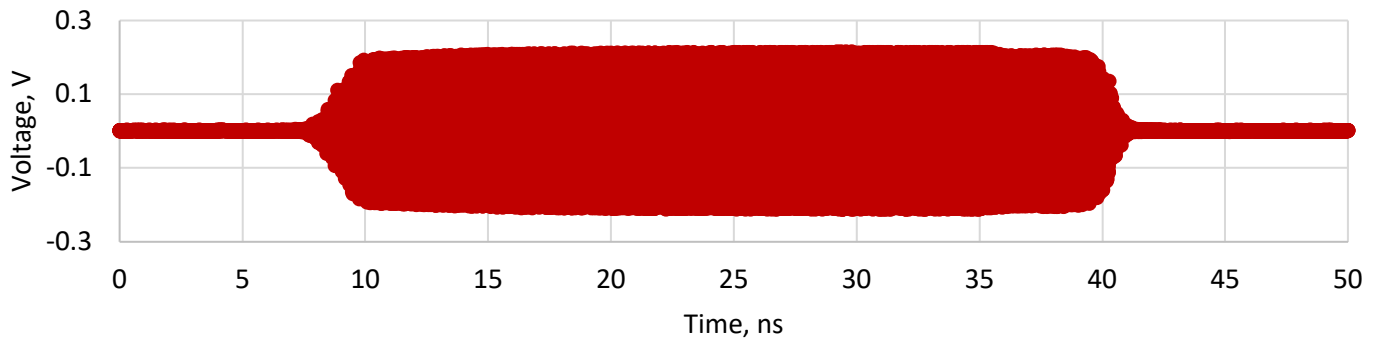
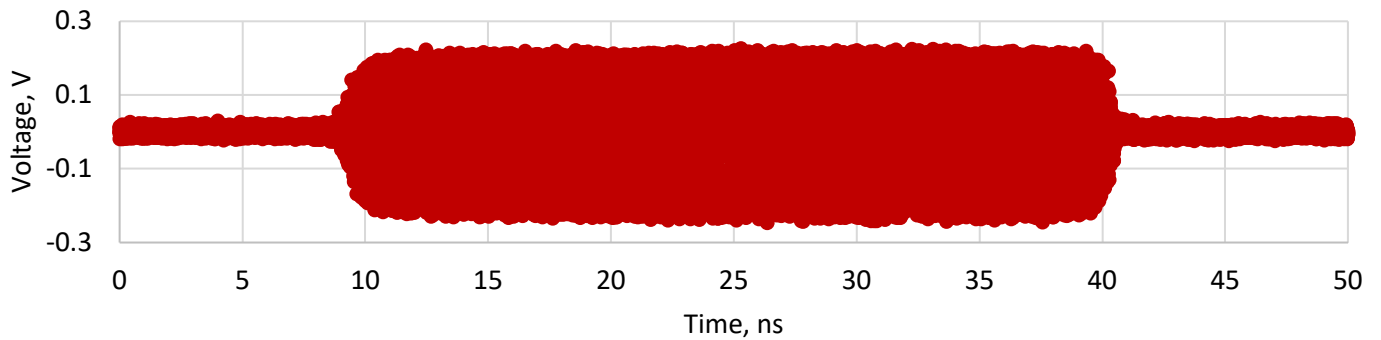


Figure 12: 50 GHz pulse modulation 30 ns



Phase Coherence

PARAMETER	MIN	TYPICAL	MAX	NOTE
Relative Phase Stability				See plot
Between channels			2 deg p-p	Measured 0.36 deg RMS over 10 hours
Between synchronized Modules			2 deg p-p	Measured 0.36 deg RMS over 10 hours
Phase-Coherent Switching				
Phase mismatch at outputs				
Channel to Channel Isolation	100 dB	> 110 dB		9 kHz to 50 GHz, 10 dBm, outputs are terminated with 50 Ohm

Figure 13: Channel-to-channel Isolation (tba)

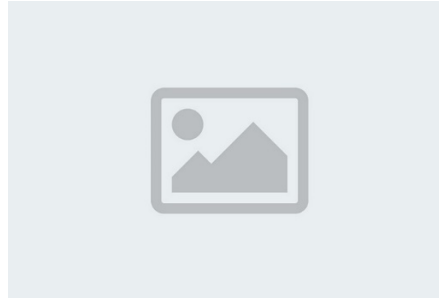
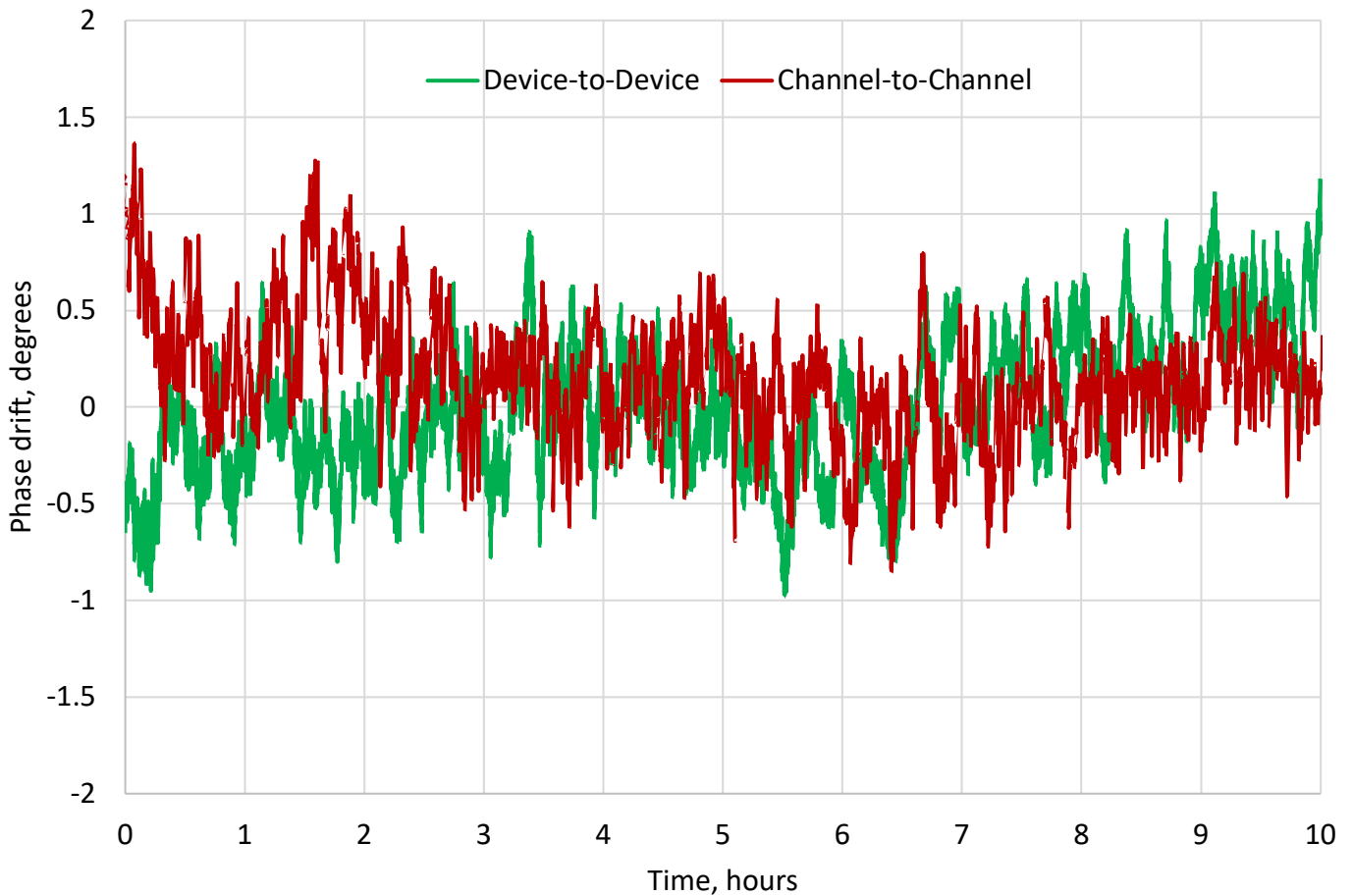
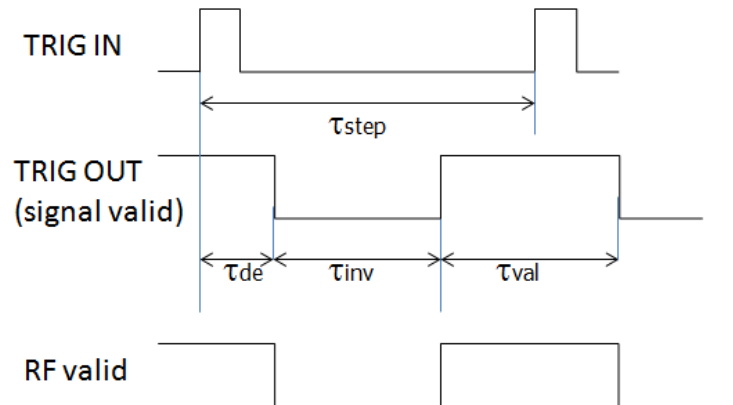


Figure 14: Relative Channel to channel Phase Stability
Measured at 54 GHz, 0 dBm output in temperature-controlled environment over 10 hours



Sweeping Capability

PARAMETER	MIN	TYPICAL	MAX	NOTE
Sweep Parameters	Frequency, power, phase, list			
Sweep type	Linear, logarithmic			
Step time ($t_{\text{step}} = t_{\text{dwell}} + t_{\text{off}}$)	500 μs		19998 s	Option FS
	15 μs			
Dwell time (t_{dwell})	0 μs		9999 s	
Off time (t_{off})	0 μs		9999 s	
Time resolution		5 ns		
Timing delay (τ_{de})		50 ns		
Transient time (τ_{inv})		15 μs	25 μs	
Timing accuracy per point		5 ns		
Number of points	2		10000	Per channel





Trigger (TRIG IN)

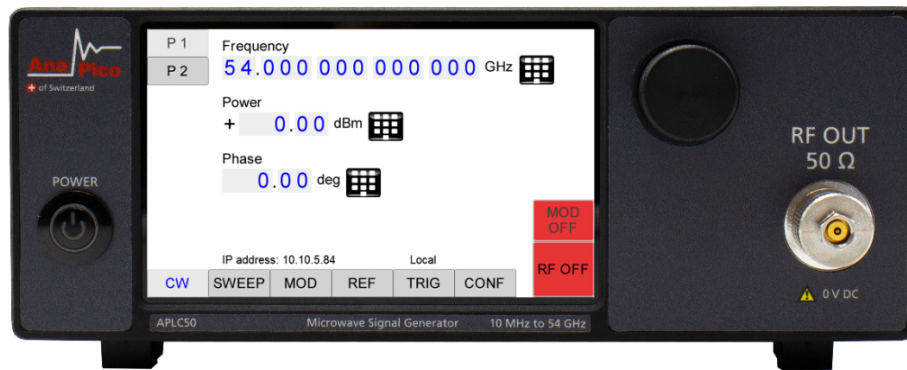
PARAMETER	MIN	TYPICAL	MAX	NOTE
Trigger Types		Continuous Single (point) Gated Gated direction		
Trigger Source		External Bus (LAN, USB)		
Trigger Modes		Continuous free run Trigger and run Reset and run		
Trigger latency		5 ns		
Trigger uncertainty		10 ns		
External trigger delay	50 ns		40 s	settable
External delay resolution		5 ns		
Trigger Modulo	1		255	execute only on Nth trigger event
Trigger Polarity		Rising Falling		
External trigger input threshold	0.85 V	0.9 V	0.95 V	TTL compatible
External trigger input voltage range	-0.5 V		+5.5 V	TTL compatible
External trigger input hysteresis		60 mV		



Multi-Purpose Output (FUNC OUT)

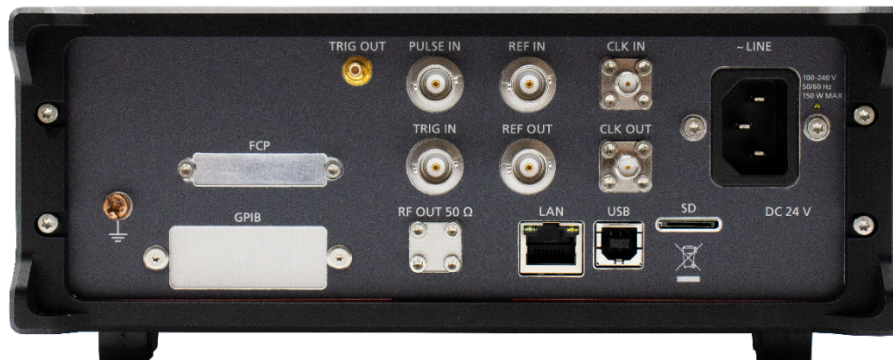
PARAMETER	MIN	TYPICAL	MAX	NOTE
VIDEO OUTPUT (of internal pulse modulator)				
Output		CMOS		
Period	30 ns		50 s	
Pulse width	15 ns		50 s	
RF delay		10 ns		
TRIGGER OUT Synchronization mode for multiple sources				
Modes		Trigger on sweep start Trigger on each point Signal Valid		

Single-Channel Front Panel (Desktop enclosure)



- Power switch
- Rotary knob
- RF Outputs:
 - APHSP12/20: 3.5mm male hand-tight (female flange-mount optional)
 - APHSP40: 2.92 mm male hand-tight (female flange-mount optional)
 - APHSP50: 1.85/2.4 mm male hand-tight (female flange-mount optional)

Single-Channel Rear Panel (Desktop enclosure)



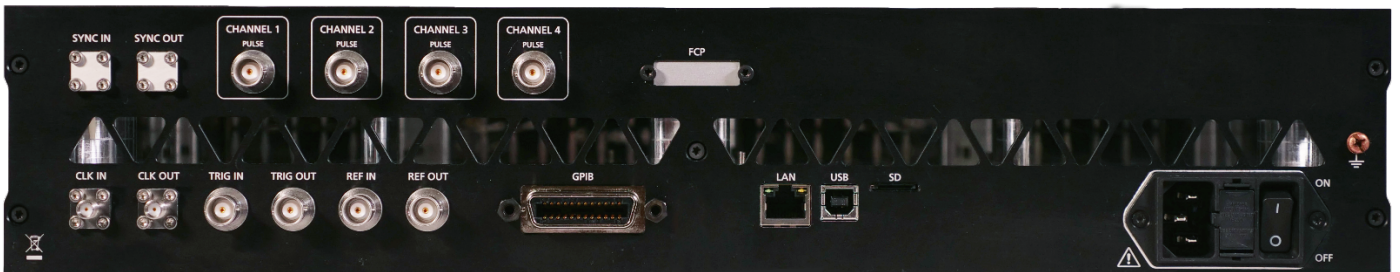
- Trigger output (TRIG OUT): BNC female
- PULSE IN: Pulse modulation input: BNC female
- Reference input (REF IN): BNC female
- High Stability Reference input (CLK IN, 6 GHz): SMA female
- Trigger input (TRIG IN): BNC female
- Reference output (REF OUT): BNC female
- High Stability Reference output (CLK OUT, 6 GHz): SMA female
- GPIB: IEEE-488.2, 1987 with listen and talk (optional)
- LAN connection: RJ-45
- USB 2.0 device
- Card slot (SD)
- 100-240V AC power plug
- Ground reference screw (earth) M4

Multi-Channel Front Panel (19" 2 HU)



- RF outputs:
 - APLC12/20: SMA female
 - APLC40: K female
 - APLC50: 1.85/2.4 mm female
- External pulse modulation inputs: BNC female

Multi-Channel Rear Panel (19" 2 HU)

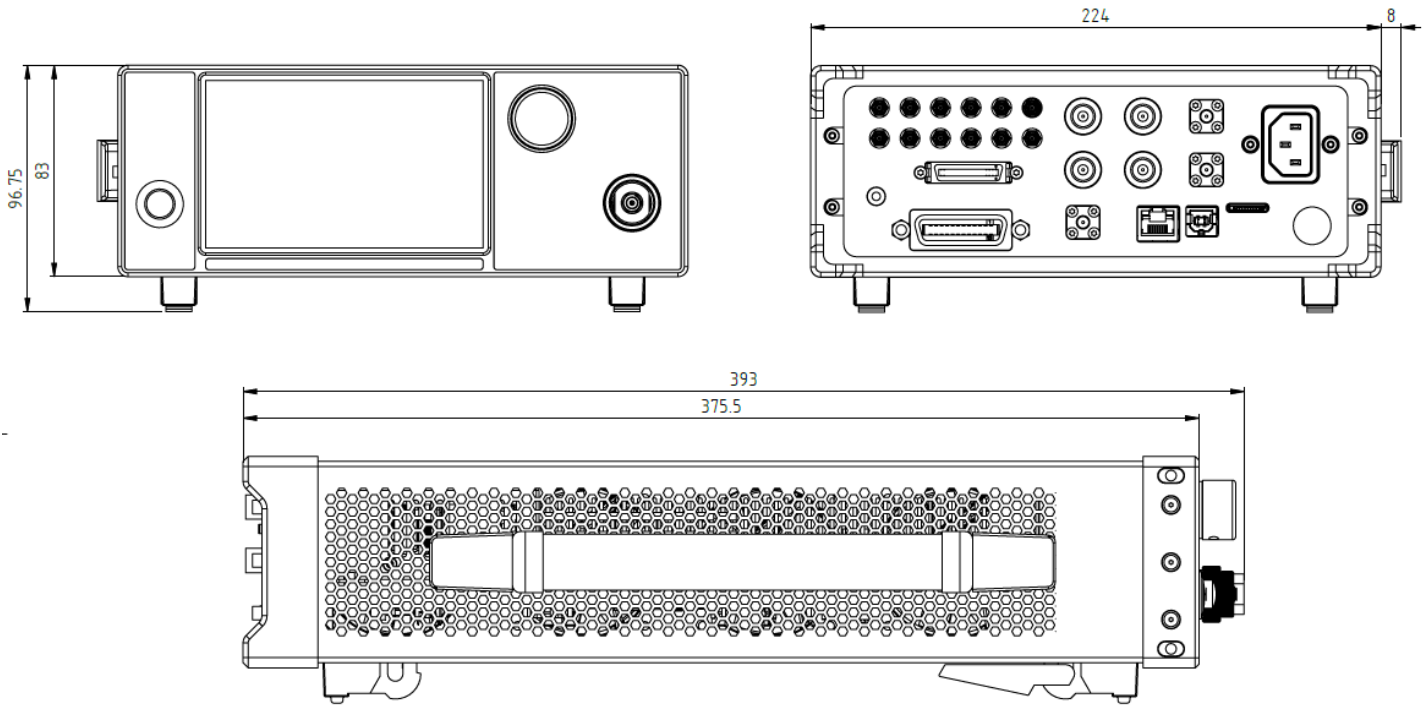


- Channel 1, 2, 3, 4 PULM input: BNC female
- Fast control port (FCP): 36-pin mini-D female 3M MDR 102 series
- High Stability Reference input (CLK IN, 6 GHz): SMA female
- High Stability Reference output (CLK OUT, 6 GHz): SMA female
- Trigger input (TRIG IN): BNC female
- Trigger output (TRIG OUT): BNC female
- Reference input (REF IN): BNC female
- Reference output (REF OUT): BNC female
- GPIB: IEEE-488.2, 1987 with listen and talk (optional)
- LAN connection: RJ-45
- USB 2.0 device
- Card slot (SD)
- FUSE (3.15 A)
- 100-240V AC power plug
- Power switch
- Ground reference screw (earth) M4

MECHANICAL SPECIFICATIONS

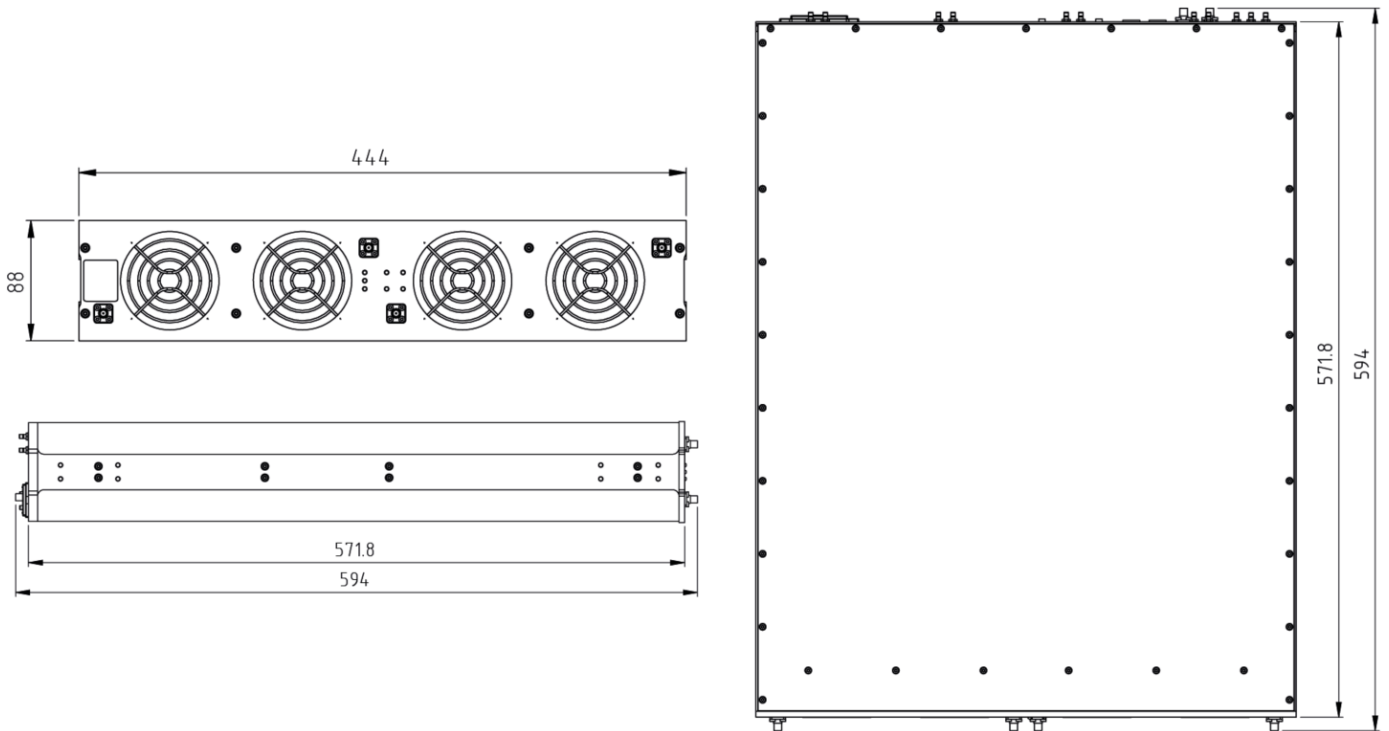
Desktop enclosure: Dimensions & Weight

Including connectors | W x L x H = 232 x 393 x 96.75 mm [9.1 x 15.5 x 3.8 in], ≤10 kg [22 lbs]



19" 2HU: Dimensions & Weight

Including connectors | W x L x H = 444 x 594 x 88 mm [17.5 x 23.4 x 3.5 in], 18 kg [39.7 lbs]



ORDERING INFORMATION

Host Model No.	Product	Description
APLC	APLC12	High Performance SG up to 12.75 GHz
APLC	APLC20	High Performance SG up to 20 GHz
APLC	APLC40	High Performance SG up to 40 GHz
APLC	APLC50	High Performance SG up to 54 GHz
APLC-XX	APLC12-1	1 channel signal generator, up to 12.75 GHz, 19" 2HU rack-mount module
APLC-XX	APLC12-2	2 channel signal generator, up to 12.75 GHz, 19" 2HU rack-mount module
APLC-XX	APLC12-3	3 channel signal generator, up to 12.75 GHz, 19" 2HU rack-mount module
APLC-XX	APLC12-4	4 channel signal generator, up to 12.75 GHz, 19" 2HU rack-mount module
APLC-XX	APLC20-1	1 channel signal generator, up to 20 GHz, 19" 2HU rack-mount module
APLC-XX	APLC20-2	2 channel signal generator, up to 20 GHz, 19" 2HU rack-mount module
APLC-XX	APLC20-3	3 channel signal generator, up to 20 GHz, 19" 2HU rack-mount module
APLC-XX	APLC20-4	4 channel signal generator, up to 20 GHz, 19" 2HU rack-mount module
APLC-XX	APLC40-1	1 channel signal generator, up to 40 GHz, 19" 2HU rack-mount module
APLC-XX	APLC40-2	2 channel signal generator, up to 40 GHz, 19" 2HU rack-mount module
APLC-XX	APLC40-3	3 channel signal generator, up to 40 GHz, 19" 2HU rack-mount module
APLC-XX	APLC40-4	4 channel signal generator, up to 40 GHz, 19" 2HU rack-mount module
APLC-XX	APLC50-1	1 channel signal generator, up to 54 GHz, 19" 2HU rack-mount module
APLC-XX	APLC50-2	2 channel signal generator, up to 54 GHz, 19" 2HU rack-mount module
APLC-XX	APLC50-3	3 channel signal generator, up to 54 GHz, 19" 2HU rack-mount module
APLC-XX	APLC50-4	4 channel signal generator, up to 54 GHz, 19" 2HU rack-mount module
APLC-XX	Option FS	Ultra-fast switching speed
APLC-XX	Option 9K	Frequency range extension to 9 kHz

APLC-XX	Option LN	Enhanced close in phase noise and frequency stability
APLC-XX	Option LN+	Option LN with improved long term frequency stability
APLC-XX	Option MOD	Analog modulations added
APLC-12/20/40	Option PE2-12/20/40	Mechanical step attenuator down to -120dBm
APLC-XX	Option PE2-50	Mechanical step attenuator down to -110dBm
APLC-XX	Option PHS	Phase coherent switching
APLC-XX	Option ReCal	Recalibration with test data (recommended: 2 years interval)
APLC-XX	Option VREF	Flexible external reference frequency support in range 1 to 250 MHz
APLC-XX	Option WE	One-year warranty extension (standard: 2 years)
APLC-XX	Option DATA	Commercial Calibration Certificate with test data (per channel)
APLC-XX	Option FLASH	MicroSD card slot for removable SD memory
APLC-XX	Option GPIB	GPIB interface
APLC-XX	Option PULSE	Pulse modulation (per channel)

GENERAL CHARACTERISTICS

Remote programming interfaces:

- 1 Gbit Ethernet interface
- USB 2.0 device
- GPIB (IEEE-488.2,1987) with listen and talk (Option GPIB)
- Control Language SCPI Version 1999.0

Power requirements: 100 - 240 VAC, 50 or 60 Hz, 200W maximum (80W + 30W per channel), <100W (desktop)

Environmental: Levels similar to MIL-PRF-28800F Class 3/4

Operating ambient temperature range: 0 to +45 °C

Storage ambient temperature range: -40 to +70 °C

Relative humidity range: 20 to 85 %RH (desktop models), 20 to 90 %RH (rack mount models)

Operating and storage altitude up to 15,000 feet/4600 m



Safety / EMC comply with applicable Safety and EMC regulations and directives.

Weight:

Multi-Channel: 19" 2HU HI enclosure 18 kg [39.7 lbs]

Single-Channel: Desktop enclosure ≤10 kg [22 lbs]

Dimensions:

Multi-Channel: 19" 2HU HI enclosure W x L x H = 444 x 594 x 88 mm [17.5 x 23.4 x 3.5 in]

Single-Channel: Desktop enclosure W x L x H = 232 x 393 x 96.75 mm [9.1 x 15.5 x 3.8 in]

