

Model 855 Specification

A compact, 10 MHz to 6.2, 12.5, or 20 GHz ultra low phase noise, phase coherent signal generator with up to 8 independent outputs



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NSCA Technologies & Tra-Cal Lab 7901 Beechcraft Ave., Ste. M & N, Gaithersburg, MD 20879
www.nscainc.com | info@nscainc.com | 1-888-280-6722 (toll-free #)

Introduction

The 855 is a phase-coherent, multi-output, fast-switching generator with low phase noise and a frequency range from 10 MHz to 6.2, 12.5, or 20.0 GHz. It's ideally suited for a wide range of applications where good signal quality, accurate and wide output power range are required. Excellent phase noise is combined with spurious and harmonic rejection. A high-stability OCXO reference provides excellent frequency accuracy and stability. The generator accepts external 10, 100 and 1000 MHz references.

The 855 comes in a standard 19 inch 1U (up to 4 channels) or 3U (4 or 8 channels) enclosure and offers various control interfaces like USB, LAN or GPIB. Each interface allows easy and fast communication using a SCPI 1999 command set. Remote control of the instrument can be quickly attained from any host system. A customer-supplied application programming interface (API) or programming examples for Matlab, Labview, C++ and other commercially available tools make implementation very straightforward.



Model 855 1U Rackmount

CW Specifications

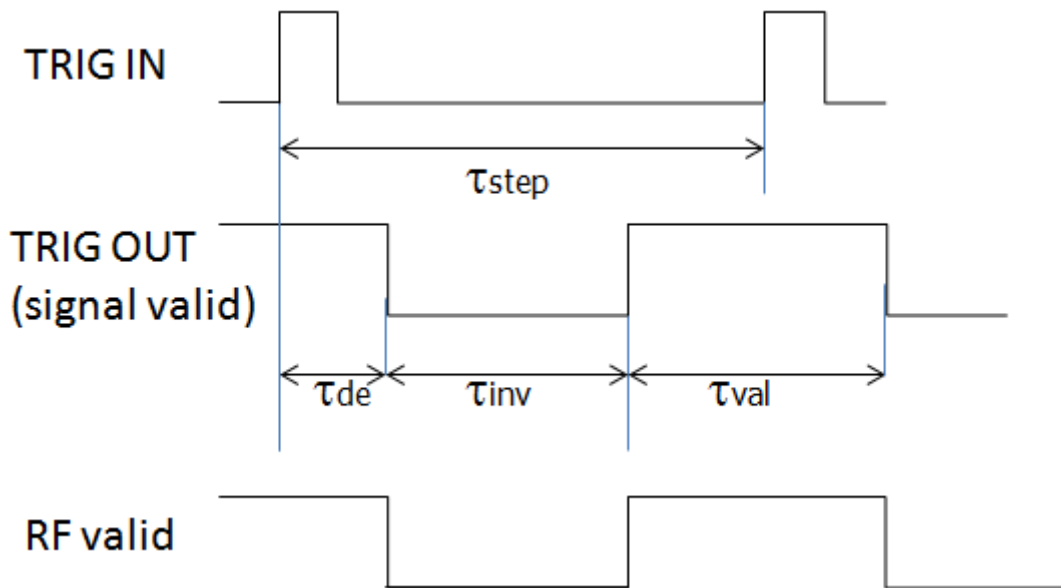
The specifications in the following pages describe the warranted performance of the signal generator for $25 \pm 8^\circ\text{C}$ after a 30 minute warm-up period. Typical specifications describe expected, but not warranted performance. Min and Max specifications are warranted.

Parameter	Min.	Typ.	Max.	Note
Frequency range	1 MHz		6.0 GHz	855-6
	1 MHz		12.5 GHz	855-12
	1 MHz		20.0 GHz	855-20
Resolution		0.1 Hz		
Switching speed			0.02 ms	
Frequency / Amplitude settling time		0.01 ms	0.015 ms	
SSB Phase noise at 500 MHz				
At 10 Hz from carrier		-105 dBc/Hz		scales with frequency at 20 dB/dec
20 kHz		-141 dBc/Hz		
100 kHz		-147 dBc/Hz		
Power level				
Range	-20 dBm -20 dBm -20 dBm		+16 dBm +15 dBm +18 dBm	<6.2 GHz <12.5 GHz, 855-12G 0.1 to 20 GHz, 855-20G
Range with option PE4	-80 dBm -80 dBm -75 dBm		+13 dBm +13 dBm +13 dBm	<6.2 GHz <12.5 GHz, 855-12G 0.1 to 20 GHz, 855-20G
Resolution		0.01 dB		
Thermal drift		0.015 dB / degC		
Level uncertainty		0.25 dB	± 1.0 dB ± 1.6 dB	-20 dBm to Pmax Option PE4, -60 to -20 dBm
Output impedance		50 Ohms		
VSWR		1.8		
Reverse Power Protection				
DC Voltage		15 V		
RF power			+26 dBm	
Spectral purity				
Output harmonics		-30 dBc	-25 dBc	at +10 dBm output power <100 MHz
		-40 dBc	-30 dBc	100 MHz to 6.5 GHz
		-50 dBc	-35 dBc	>6 GHz
Non-harmonic spurious		-75 dBc		offsets > 1 kHz

Parameter	Min.	Typ.	Max.	Note
Channel to channel				
Isolation		> 90 dB		< 3 GHz
Phase stability				over 6 hours, at 1 GHz
same instrument		30 mrad		
different instr.		40 mrad		100MHz phase locked
Phase coherent switching		optional		Option PHC
Temperature stability (10 to 45 degC)			0.02 ppm	
Aging (1st year)			0.05 ppm	
Reference IN		10 MHz. 100 MHz or 1000 MHz		
Reference OUT		10 MHz or 100 MHz		
Power consumption		10 W + 10 W per channel 10 W + 12 W per channel		6 and 12 GHz versions 20 GHz version

Sweeping Capability

Parameter	Min.	Typ.	Max.	Note
Digital power / frequency / list sweeps				
Sweep type: linear, logarithmic, random				
All channels can be programmed and run independently or fully synchronized.				
Step time (τ_{step})	20 μ s		200 s	For 1 channel, if N channels are swept synchronously, minimum step time is N times 20 μ s
Dwell time (τ_{val})	10 μ s		100 s	
Off-time (incl. transient time) (t_{off})	0		100 s	
Transient time (τ_{inv})			15 μ s	
Timing delay (τ_{de})		50 ns		
Time resolution		5 ns		
Timing accuracy per point		5 ns		



Modulation Capabilities

Parameter	Min.	Typ.	Max.	Note
Pulse Modulation				
On/off ratio		80 dB 60 dB		at +10 dBm , <7 GHz at +10 dBm , >7 GHz
Repetition frequency	0.1 Hz		20 MHz	Internal individually for each channel or external for user selected channels
Duty cycle	1 % to 99 % in 1% steps			within specified minimum pulse width
Minimum Pulse width	50 ns			
Pulse rise/fall time		10 ns		
External input amplitude	TTL			

Trigger Output (TRIG OUT)

Output is TRIG OUT at rear panel has multiple operating modes.

Parameter	Min.	Typ.	Max.	Note
MULTIFUNCTION GENERATOR sine, triangle, square wave				
Frequency range	1 Hz 1 Hz		3 MHz 1 MHz 50 kHz	sine triangle square
Frequency resolution		0.1 Hz		
Output voltage amplitude peak-peak	10 mV	5V	2 V	Sine, triangle Square (CMOS output)
Harmonic Distortion		1 %		< 100 kHz, 1 Vpp
Output impedance		50 Ohms CMOS		Sine, triangle square wave
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			
Trigger waveform pulse width	100 ns			

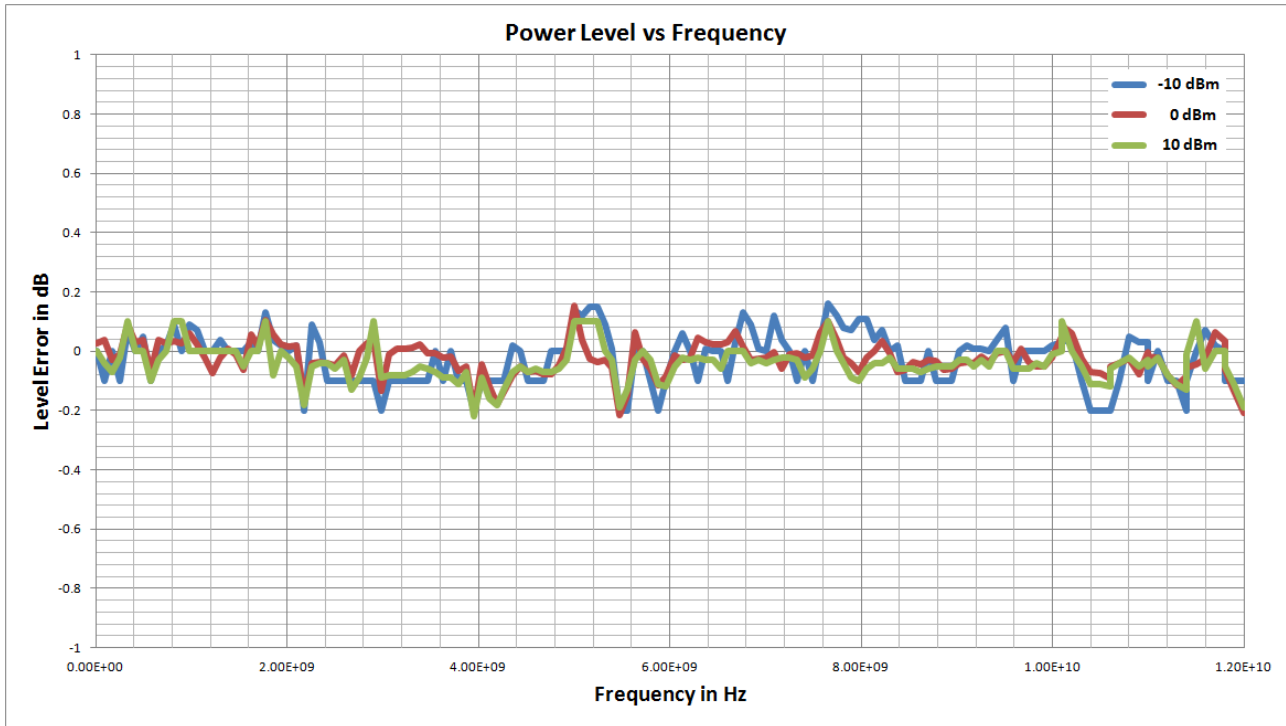
Trigger (TRIG IN)

Input is TRIG IN at rear panel

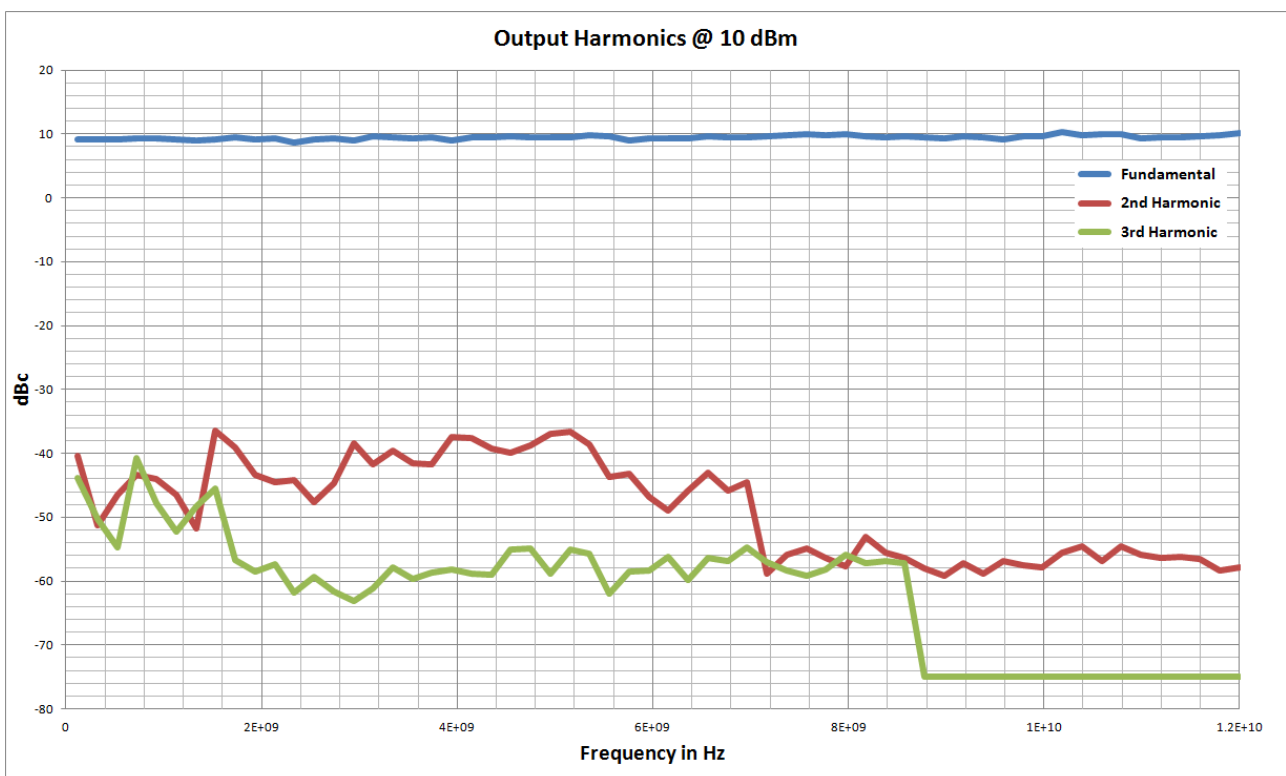
Parameter	Min.	Typ.	Max.	Note
Trigger Types	Continuous, single, gated, gated direction			
Trigger Source	external, bus (GPIB, LAN, USB)			
Trigger Modes	continuous free run, trigger and run, reset and run			
Trigger latency		5 ns		
Trigger uncertainty		10 ns		
External trigger delay	50 ns		10 s	programmable
External delay Resolution		10 ns		
Trigger Modulo	1		255	Execute only on Nth trigger event
Trigger Polarity	Rising, falling			

Typical Performance

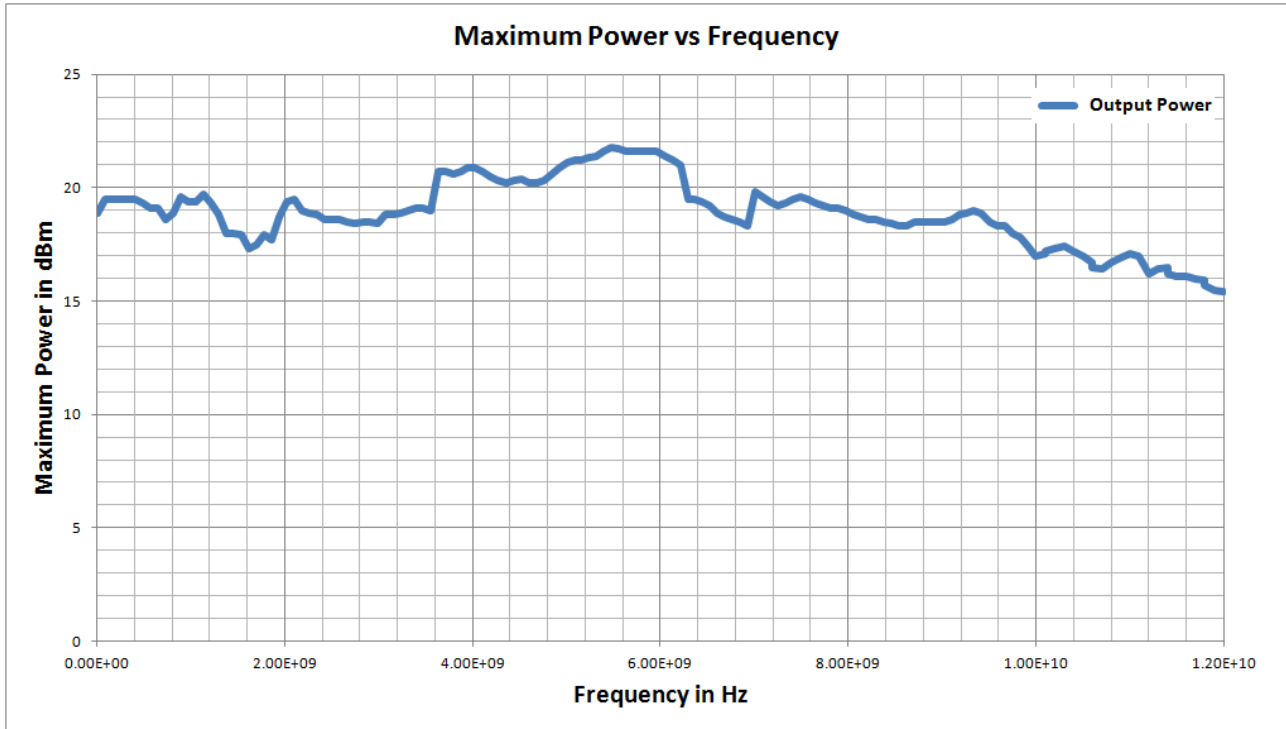
Output Power Accuracy



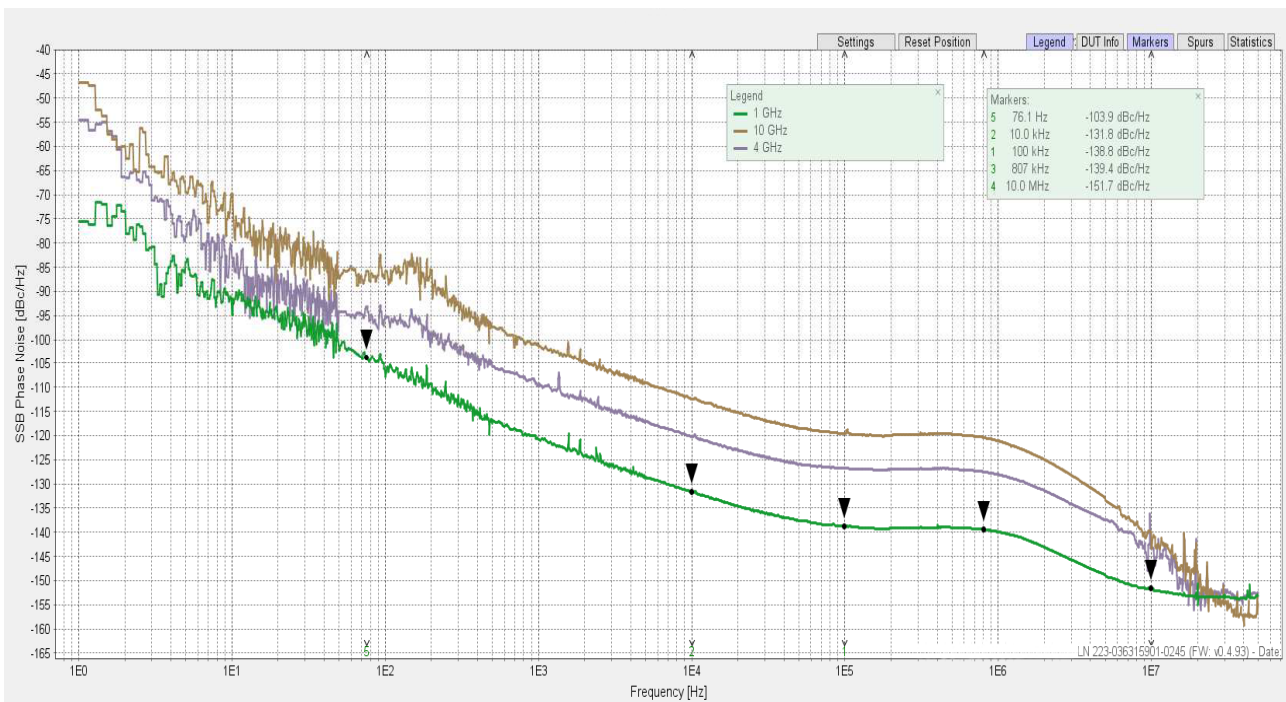
Harmonic distortion



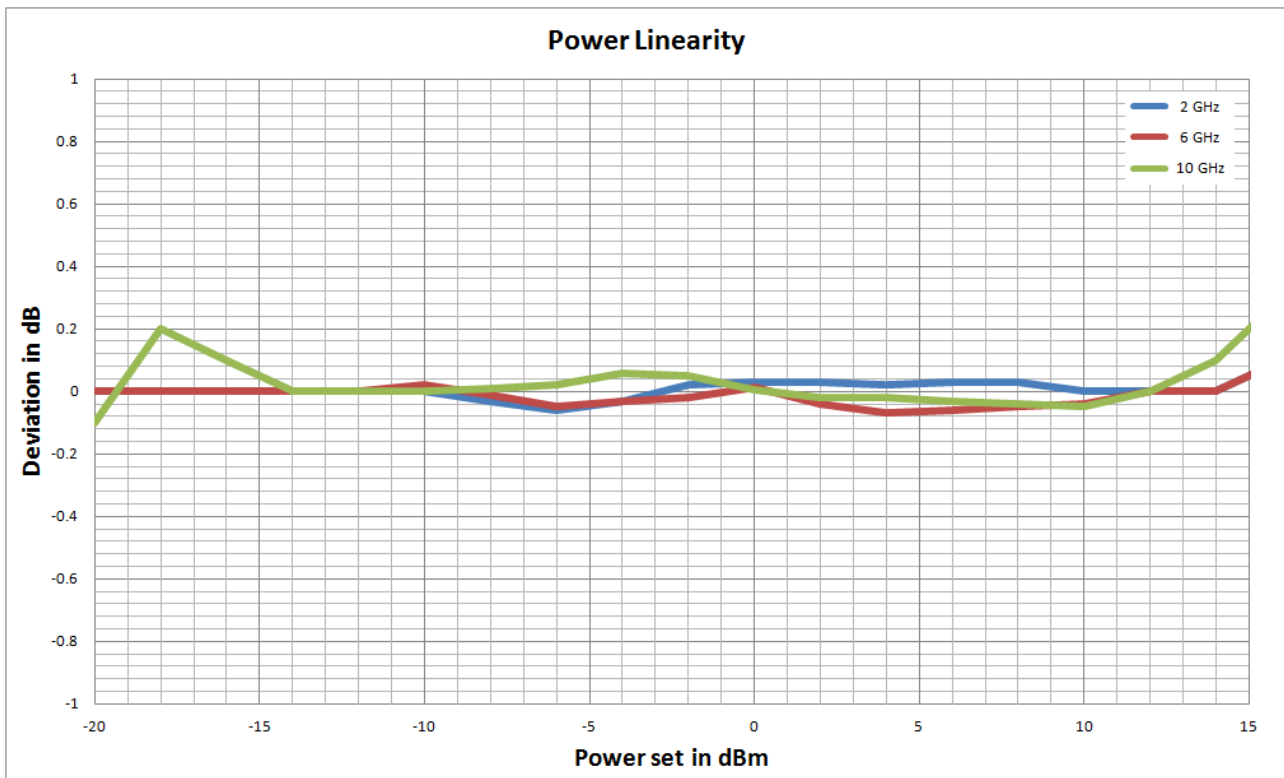
Maximum Output Power



SSB Phase Noise at 1 , 4, and 10 GHz



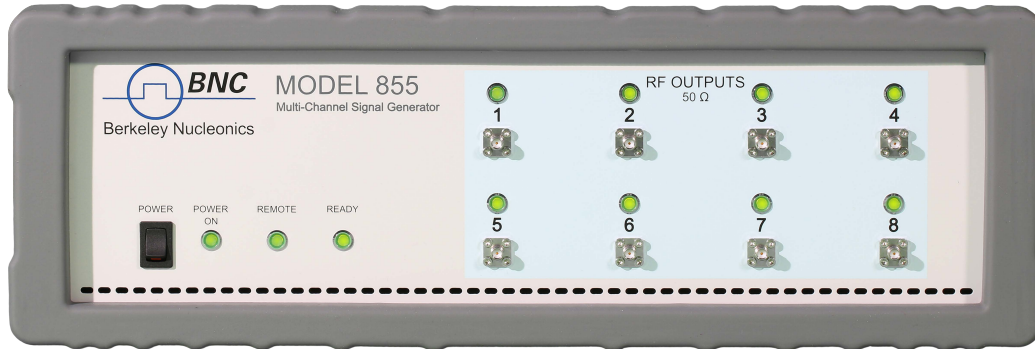
Output Power Linearity



Connectors

Front panel:

8 channel (3U)

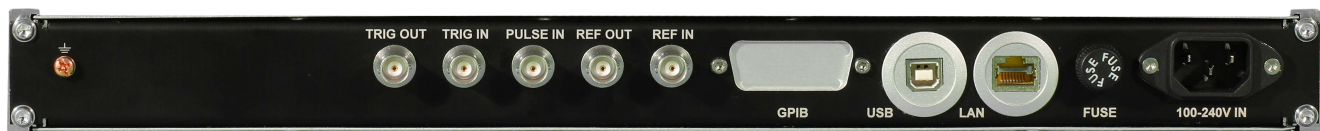
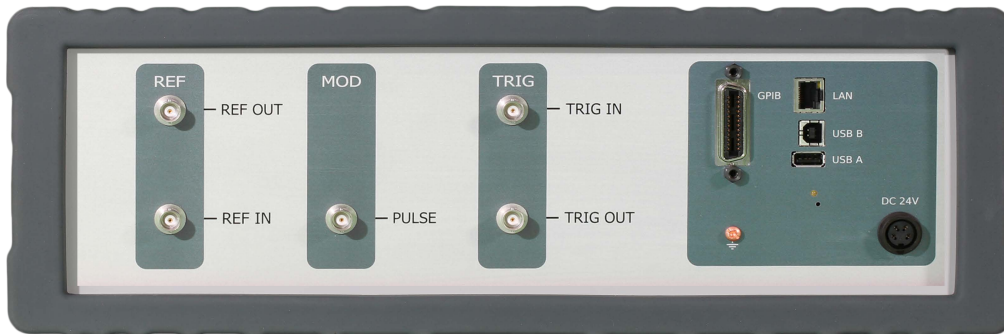


4 channel (1U)



1. RF outputs 1 to N: SMA female
2. DC power switch

Rear panel:



1. Trigger input: BNC female
2. Trigger output: BNC female
3. External reference input: BNC female
4. Internal reference output: BNC female
5. Pulse modulation: BNC female
6. LAN connection: RJ-45
7. USB 2.0 host and device
8. GPIB: IEEE-488.2, 1987 with listen and talk (optional)
9. DC Power plug (24V, 6A)

Options

- **PE4**: electrical step attenuator
- **GPIB**: IEEE-488.2,1987 programming interface
- **PHC**: phase coherent switching

General Characteristics

Remote programming interfaces

Ethernet 100BaseT LAN interface,
USB 2.0 , USBTMC
GPIB (IEEE-488.2, 1987) with listen and talk (optional)

Control language SCPI Version 1999.0

Power requirements 100 or 240 VAC, 50 or 60 Hz

Operating temperature range 0 to 45 °C

Storage temperature range -40 to 70 °C

Operating and storage altitude up to 15,000 feet

Dimensions:

19" 1HE enclosure : 43 mm H x 426 mm W x 460 mm L [1.7 in H x 16.8 in W x 18.1 in L]

19" 3HE enclosure incl. rubber: 154 mm H x 467.5 mm W x 342 mm L [6.1 in H x 18.4 in W x 13.5 in L]



notice

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

Recommended calibration cycle 24 months

ISO compliant Instrument is manufactured in an ISO-9001 registered facility under high quality standards.

Document History