DATASHEET APUASYN20(-X) Specification v1.23

Ultra-Agile Signal Source from 8 kHz to 20 GHz

(single and multi-channel version)

Document size:

1 title page
11 content pages

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 (unless otherwise stated).

Min/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.

Typical: Expected mean values, not warranted performance.

INTRODUCTION

The APUASYN20 is a very compact, very agile signal source up to 20 GHz. It combines fast switching speeds with good phase noise and signal quality.

The single-channel unit is available as mountable module or in a compact enclosure with display and front panel control.

The multi-channel version APUASYN20-X is available in 1, 2, 3 or 4 channel configurations in a standard 1U 19'' rack-mountable enclosure. For high phase coherence, RF channels are locked to a single reference source.

The APUASYN20 hat USB, LAN and a parallel port interface and can be controlled using the SCPI 1999 command set.

SPECIFICATIONS

PARAMETER	MIN	TYPICAL	MAX	NOTE
Frequency range	100 kHz 8 kHz		20 GHz	Option 9K
Resolution		0.01 Hz		
Phase resolution		0.1 deg		
Switching speed		200 µs 1µs	500µs 5µs	Option FS
SSB Phase noise at 1 GHz				See also plots
at 1 kHz from carrier		-120dBc/Hz		
at 20 kHz from carrier		-130 dBc/Hz		
Spectral purity Output harmonics Sub-harmonics		-20 dBc -80 dBc -60 dBc	-10dBc -70 dBc -50 dBc	P_{out} = +10 dBm < 10 GHz > 10 GHz
Non-harmonic spurious (>10 kHz offset)		-65dBc	-55dBc	
Power level				
Range	0 dBm		+18 dBm	Settable to -10 to +23 dBm
Resolution		0.5 dB		
Level uncertainty		±1.5 dB		
Output impedance VSWR		50 Ω 1.7	2.0	
Reference frequency input	1 MHz		200 MHz	Integer MHz
Reference input level	-5 dBm	0 dBm	+13 dBm	
Lock Range			+/- 1.0 ppm	
Reference input impedance		50 Ω		
Internal reference frequency output		100 MHz		
Initial accuracy of internal reference		±40 ppb		calibrated at 23 ± 3 °C at time of calibration
Temperature stability (0 to 50 degC)			±100 ppb	
Aging 1st year		0.5 ppm		
Aging per day (after 30days operations)			5 ppb	
Warm-Up time		5 min		
Output of internal reference		+0dBm 50 Ω		
Reverse power protection				
DC voltage		7 V		
RF power			23 dBm	

Dimensions	standard
Including connectors	W x L x H = 270 x 105 x 60 mm, < 1.0 kg
Dimensions benchtop enclosure	**option TOUCH**
Including connectors	W x L x H = 172 x 273 x 106 mm
Dimensions 1HE	**APUASYN20-X**
Including connectors	W x L x H = 43 mm H x 426 mm W x 480 mm

Sweeping Capability

| PARAMETER	MIN	TYPICAL	MAX	NOTE
Frequency / List sweep Sweep type: linear, logarithmic, random				
Step time	500 µs 5 µs		200 s	Option FS
Timing resolution		5 ns		
Timing accuracy per point		20 ns		
Generalized list sweep allows individual setting of frequency, step-time, and off-time for each point				

Modulation Capabilities

PARAMETER	MIN	TYPICAL	MAX	NOTE
Pulse modulation On/off ratio		60 dB		
Repetition frequency	DC		10MHz	
Pulse width	30 ns		20 s	
Pulse rise/fall time		9 ns		
Pulse trainslength (pulses)	2		4192	
Video crosstalk		-40 dB		
Modulation source		Internal/ External		
External input amplitude		1 V TTL		AC DC
Delay (to RF)		20 ns	40 ns	

Trigger (TRIG IN/OUT)

| 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 uncertainty		5 µs		
External Trigger delay	50 µs		40 s	
External Delay Resolution		15 ns		
Trigger Modulo	1		255	Execute only on Nth trigger event
Trigger Polarity		Rising, falling		

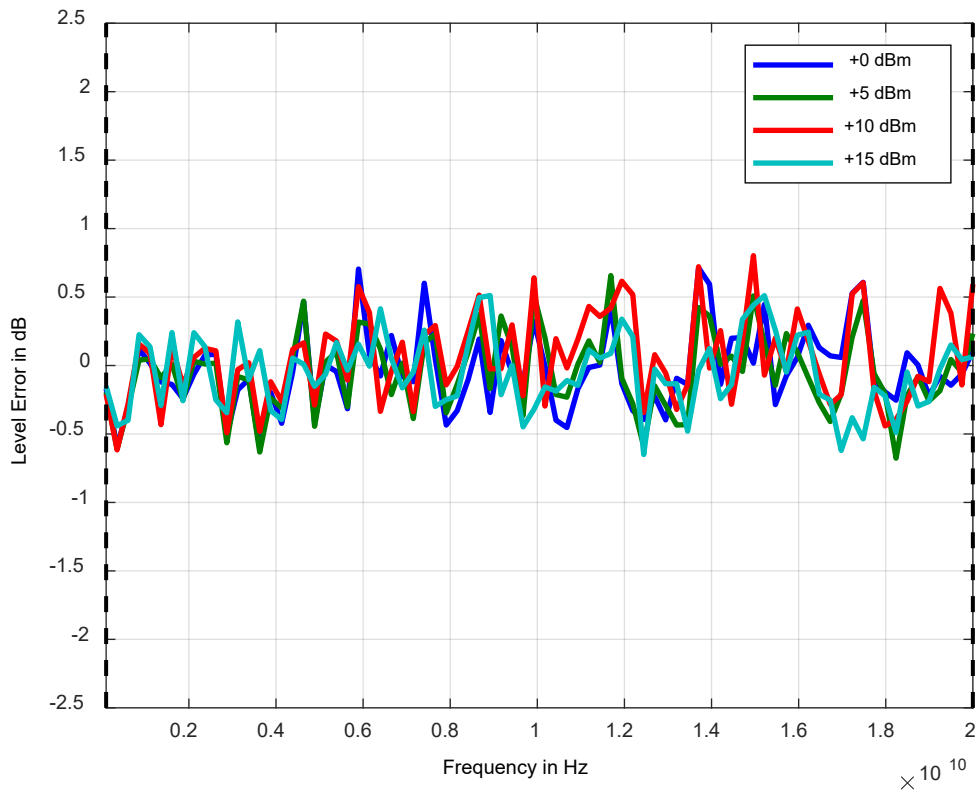## Typical Maximum Output Power
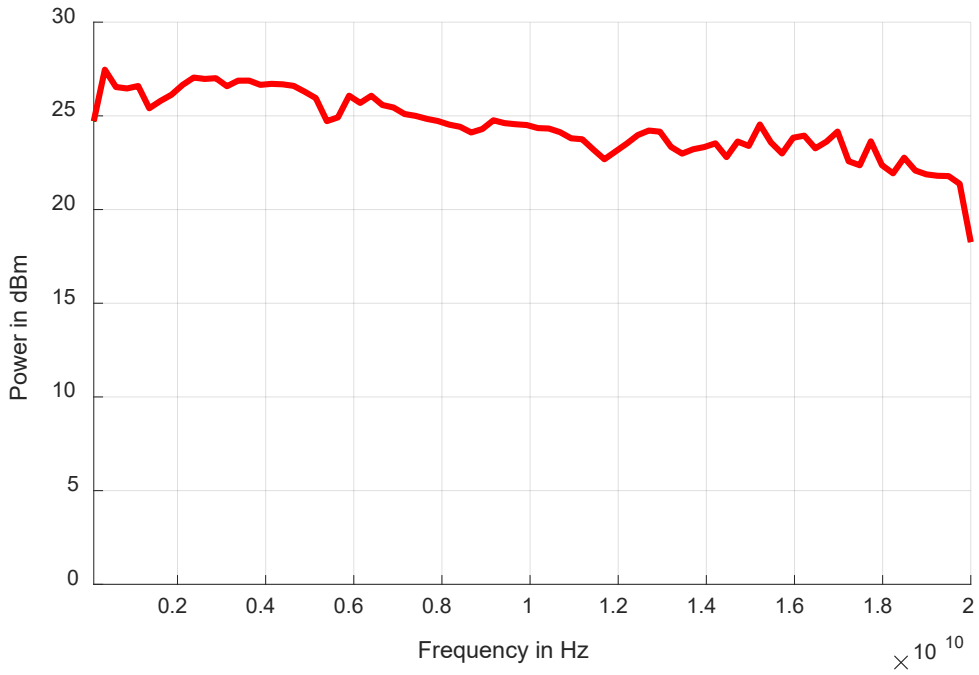
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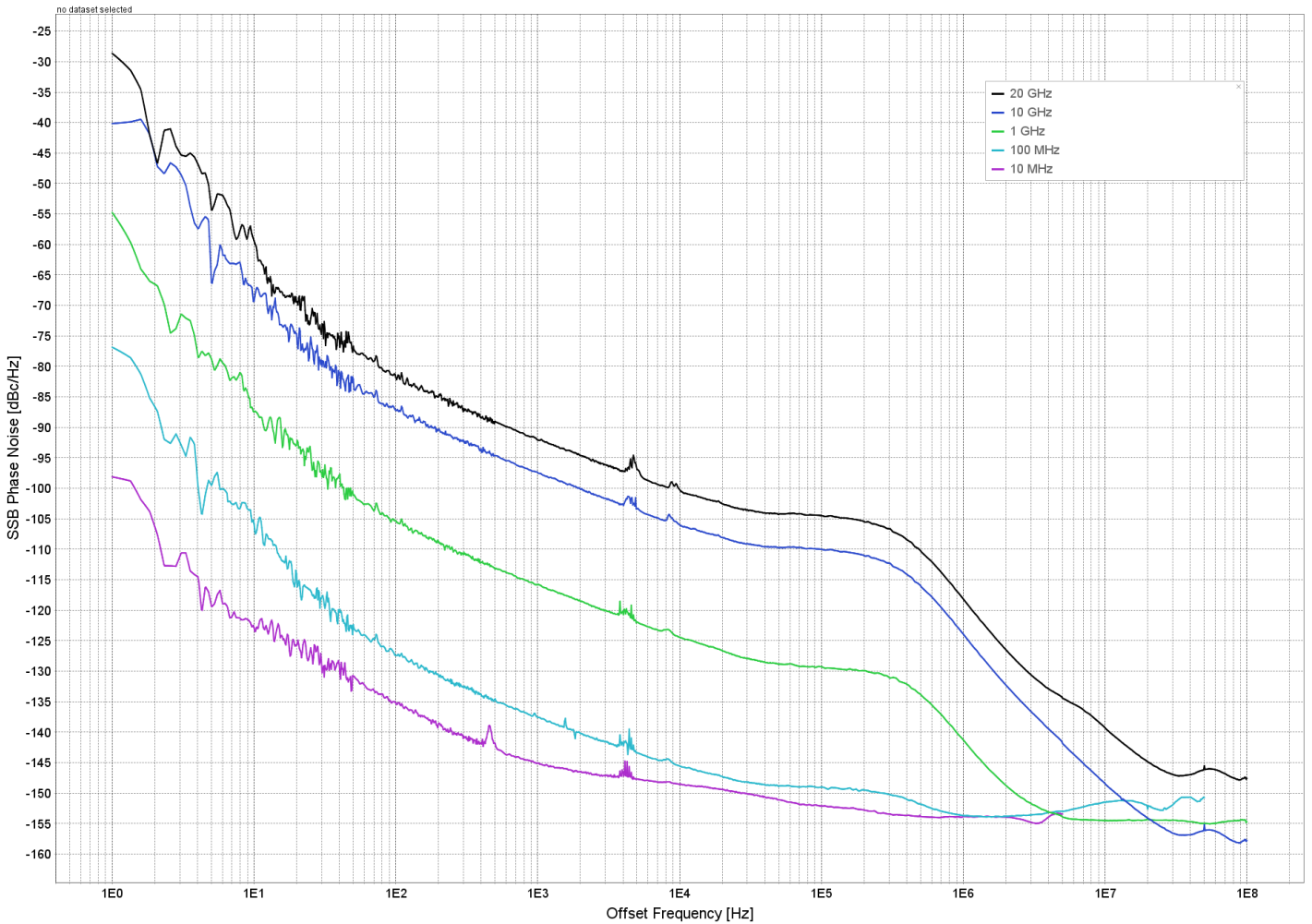
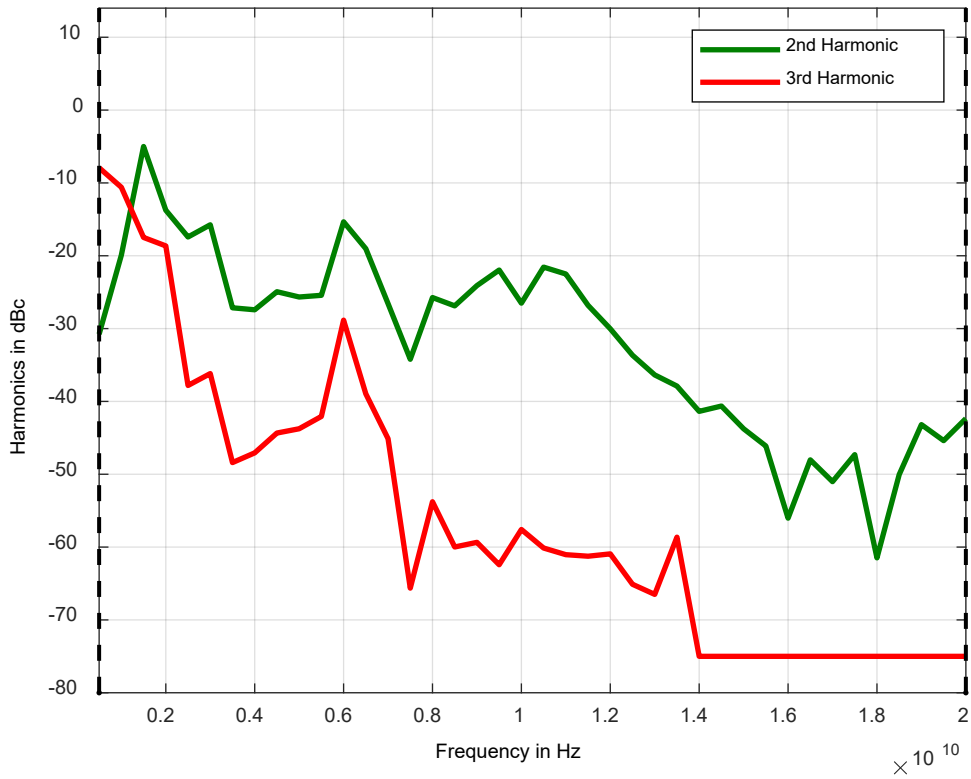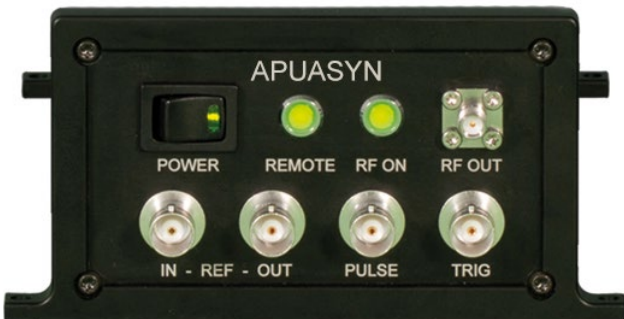## ⬡ Power linearity
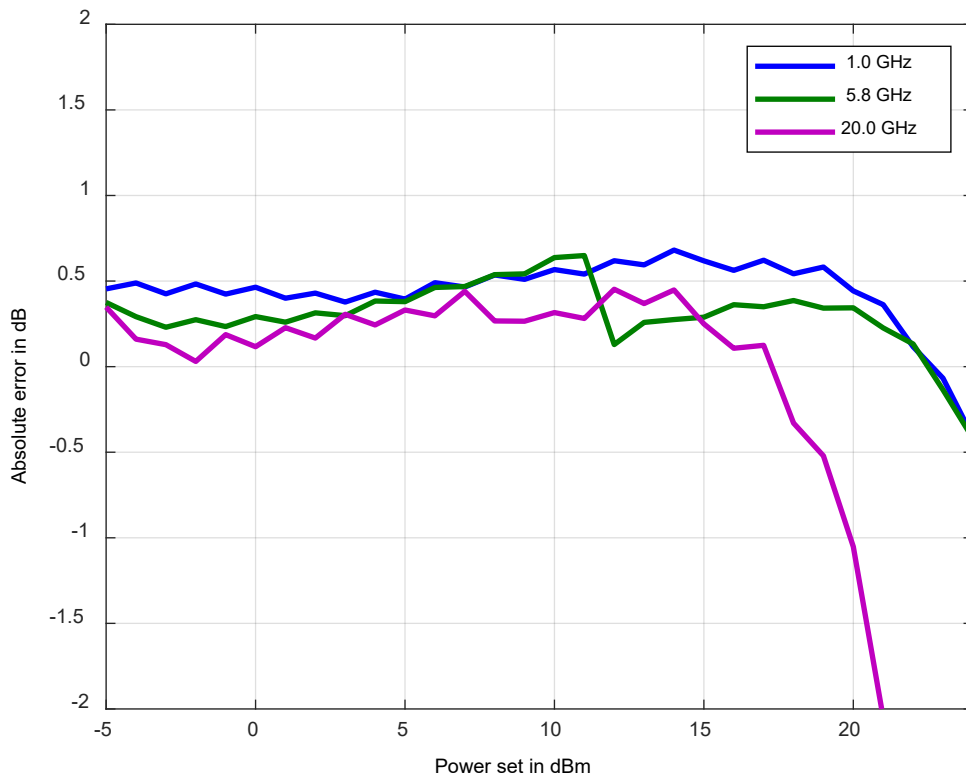
⬡ Power level accuracy

Harmonic performance at + 10 dBm

Connectors (Front)

Connectors (Rear)

APUASYN20-X Front view

APUASYN20-X Rear view

Fast Control Port

- 8-bit or 16-bit parallel port for fast, time critical settings like frequency
- sequential submission of 48-bit frequency word or access to pre-defined frequency table
- optional amplitude control and support for multi-channel systems (only with 16-bit bus)
- signal generator confirms the received data with ACK (only in 8-bit mode) and informs the controller by the BUSY signal while processing the information.

Connector: 26 pin 3M Mini-D Ribbon Receptacle
8-bit Mode: Address A<3..0>, Data D<3..0>, STROBE, ACK, BUSY
16-bit Mode: Address A<7..0>, Data D<7..0>, STROBE, BUSY
Input signal: 0V to 5 V
Input impedance: 4,7 kΩ
Maximum toggle rate: 10 MHz, frequency switching starts after transfer of last byte

ORDERING INFORMATION

HOST MODEL	PRODUCT	DESCRIPTION
APUASYN20	APUASYN20	20 GHz wideband synthesizer
APUASYN20-X	APUASYN20-X	Multi-output 20 GHz Synthesizer, 19" 1U rack-mount module
APUASYN20	Option TOUCH	Enclosure with touch display control
APUASYN20	Option 9K	Frequency range extension to 9 kHz
APUASYN20	Option FS	Fast switching option (with FCP port)
APUASYN20	Option GPIB	GPIB interface (only with option TOUCH or as 1U rack-mount)

GENERAL CHARACTERISTICS APUASYN20

Remote programming interfaces
> Ethernet interface
> USB2.0 device interface
> Control language: SCPI Version 1999.0
> Fast Control Port FCP

Power requirements: 24VDC; 20 W maximum

Mains adapter supplied: 100-240 VAC in/ 24V 2 A DC out

Storage temperature range: –50 to 85 °C

Operating temperature range: –20 to 75 °C

Operating and storage altitude: up to 15,000 feet

$C\,E$ notice
Safety/EMC complies with applicable Safety and EMC regulations and directives.

Weight: ≤ 0.5 kg (1 lbs) net

Recommended calibration cycle: 24 months

Document History

Version	Date	Author	Notes
V10	2019-05-20	jk	first release
V11	2019-09-20	jk	added options
V12	2020-02-27	jk	Single and multi-channel version
V121	2020-03-25	jk	Plots added
V122	2020-05-08	jk	FCP specification added
V123	2020-06-01	db	FCP details added

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