

AnaPico

 of Switzerland

**Smart Measurement
Solutions**



RF & Microwave Instruments

Synthesizers

Signal Generators

Signal Source Analyzers

Phase Noise Testers

2016/2017

UK & Ireland Distributor

Instruments 4 Engineers Ltd

+44 (0) 161 871 7450

sales@instruments4engineers.com
www.instruments4engineers.com



Introduction

Anapico is an ISO9001:2008 certified technology leader developing and selling advanced test & measurement instruments for a broad range of RF & microwave applications.

Established in 2005 in Zürich, Switzerland, Anapico is investing substantial resources in R&D and is involved in national and international research projects to continuously improve and deliver best-in-class performance, differentiate in important functionality, and deliver cost-effective solutions with premium customer support.

All our instruments are manufactured and 100% tested in Switzerland. High quality standards ensure competitive performance paired with high product quality and reliability.

The Product Ranges Comprise

- » Single & Multi Channel RF Signal Generators
- » Standard and Customized Synthesizer Modules
- » Signal Source Analyzers
- » Phase Noise Testers for Automated Testing

Unique features of our products are

- » Compact and low weight chassis
- » Low power dissipation
- » Battery operation
- » Custom specific solutions
- » Unpaired combination of low noise and fast switching (measurement) speeds



RF & Microwave Signal Generators

Anapico signal generators offer wide frequency ranges up to 40 GHz, show outstanding switching speeds and feature special modulations like fast chirps and pulse trains.

The portfolio ranges from ultra-compact and unexcelled fast and low phase noise signal sources for portable or benchtop applications, to premium class signal generators with multi-channel outputs for most demanding applications in production and automated solutions.

Anapico's signal generators deliver benchmark performance in its class to address your signal source requirements in the field or on the bench. Models start from 9 kHz and combine high output power, exceptional phase noise, and fast switching.

All models are supported with certified Labview™ drivers, and a full programming library for SCPI remote control via USB, Ethernet, or GPIB. Integration into your own system is made very simple.

Single and Multi Channel Systems

Anapico offers both single and multi-channel systems up to 8 channels. The multi-channel systems feature excellent channel-to-channel phase stability and benefit from high integration level to provide highest performance at attractive per-channel costs.

Low Phase Noise

Low jitter and low SSB phase noise performance are standard with Anapico's signal generators. For highest requirements as ADC clocks or in receiver selectivity measurements, ultra-low phase noise options are available.

Fast Frequency and Level Settling Times down to 30 µs

These are critical parameters to ensure maximum throughput in production applications. With frequency and level settling times of below 400 micro-seconds in conventional frequency selection mode, or 150 micro-seconds in list or sweep mode, the instruments are ideally suited for frequency hopping and semiconductor production test applications.

With a fast-switching option some of Anapico's signal sources can switch in less than 30 micro-seconds from any frequency and power pair to another.

High Output Power up to +27 dBm

Models with RF calibrated output up to +27 dBm can be set to a resolution of 0.01 dB. The dynamic range of selected models can be extended with optional step attenuators down to -130 dBm.

Additional Features

- >> a wide dynamic range level control guarantees a stable phase versus output power.
- >> no positive RF level transients generated as a result of changing between any frequency or level
- >> excellent linearity and monotonicity even over fine RF level steps
- >> repeatability ensures the same RF level is produced every time

Flexible Modulation Capabilities

With up to three independent internal modulation sources and multiple external modulation inputs, a wide selection of modulation modes is catered for.

An internal pulse modulator with internal pulse generator allows the generation of fast rise time RF signals with on/off ratios that meet the most demanding tests on radar RF and IF stages and EMC/ECCM test applications.

Sweep / Trigger / Chirp

The comprehensive sweep mode provides a digital sweep of carrier frequency and RF level in discrete steps. It is possible to set the start, stop, number of steps (or step size) and step time, up to a maximum of 65536 steps. A sweep can be externally triggered via a rear panel BNC connector for Start, Start/Stop and Step.

Selectable Enclosure

Anapico signal generators are available in different form factors:

>> a compact, light weight and truly portable (internal battery powered) unit, particularly attractive for wireless/wired service installation, field testing or remote on-site maintenance applications.

>> a standardized 1U slim rack-mount unit, for ATE, space limited applications with performance capable for high throughput testing.

>> or a convenient desktop instrument with newest touch-display control, for easy and quick access in your labs.

Battery Operation

In the portable version, internal rechargeable batteries allow for power-supply independent operation, making the APSINs truly portable and versatile instruments.

Remote Operation

All models feature USB, GPIB and LAN VXI-11 interfaces with standardized SCPI command language and application programming library. Certified Labview™ drivers are also available. Programming examples for many wide-spread testing software are provided. A remote desktop GUI is also supported allowing off-site remote control.

Non-Volatile Memory

Hundreds of full instrument settings may be stored in the non-volatile instrument memory. Each stored setting may be individually named.

Low Cost of Ownership

All instruments come with a standard 2-year warranty and recommended 2-year calibration periodicity. Options to extend the warranty to three or five years are available.

MODELS SINGLE-OUTPUT RF SERIES



APSIN2010HC (2 GHz), APSIN4010HC (4 GHz), APSIN6010HC (6 GHz)

The APSINX010 model series comprises Anapico's RF signal generators up to 2, 4 or 6 GHz. The quiet, very stable sources provide low phase noise, fast switching speeds, high output power, and complementary analog modulation and sweeping capabilities. Besides all standard analog modulations, programmable pulse trains, (pulsed) chirps, and an optional full set of avionics modulations (VOR/ILS/MODE-S) are available. An optional module makes these light-weight (only 2.5 kgs) instruments fully battery powered.



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RF & Microwave Signal Generators

MODELS MICROWAVE SERIES



APSIN12G (12 GHz), APSIN20G (20.5 GHz), APSIN26G (26.5 GHz)

With a comprehensive range of features and options, the APSINXXG meets the needs for a general-purpose microwave signal generator while offering the high performance required by demanding, critical receiver measurements or rapid manufacturing. State-of-the-art performance with low phase noise, fast switching speed, and wide dynamic range without any compromise in signal purity makes it an ideal choice for applications in both R&D and manufacturing. Complementary standard high time base stability, wideband frequency modulation (FM), high-speed pulse and fast frequency chirping makes the APSINXXG a fully configured versatile microwave source.

Options

All listed options can be combined.

Option FS

The option reduces switching speed from the APSINXXG to below 40 micro-seconds.

Option LN

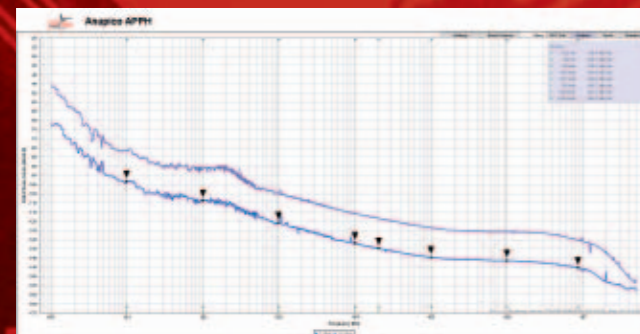
This option further enhances the low phase noise of the APSINXXG to very low values.

Option HP

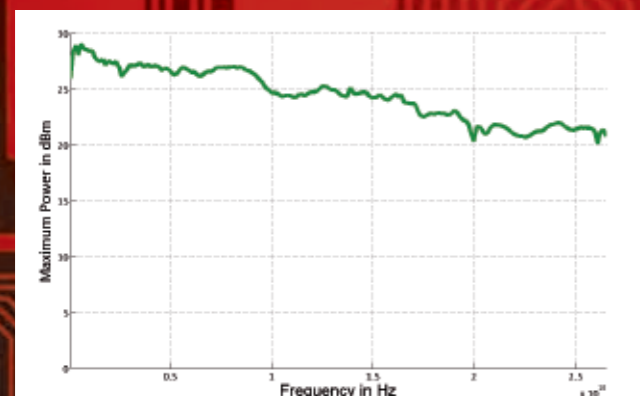
An extended high power version of the APSINXXG provides up to +27 dBm output power.

Option PE3

Extended power range using step attenuator module.



Phase Noise with Option LN

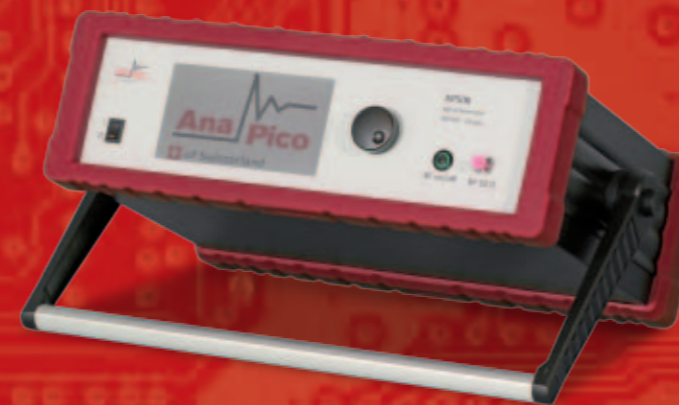


Maximum Output Power with Option HP



Option 1URM

Assembly into a 19 inch 1U rack-mountable chassis.



Option TP

A large colored touch-screen LCD enables all relevant set-up information to be displayed on one screen with reconfigurable soft menu buttons. It is quick to learn, easy to use, clear, with large characters and a wide viewing angle.

Option GPIB

IEEE-488.2, 1987 programming interface.

MODELS MULTIPLE-OUTPUT SERIES



APMS3003 (3 GHz)

The APMS3003 is a phase coherent triple-output RF signal generator with a frequency range from 9 kHz to 3.0 GHz and is ideally suited for a wide range of application, where good signal quality as well as accurate and wide output power range is required. Good phase noise is combined with spurious and harmonic rejection.

APMS06G-N (6 GHz), APMS12G-N (12.5 GHz), APMS20G-N (20 GHz)

The series of APMSXXG-N are phase coherent multi-output fast switching and low phase noise signal generators from 1 MHz up to 6, 12 or 20 GHz with 1 up to 8 phase synchronous channels. Excellent phase noise is combined with spurious and harmonic rejection.

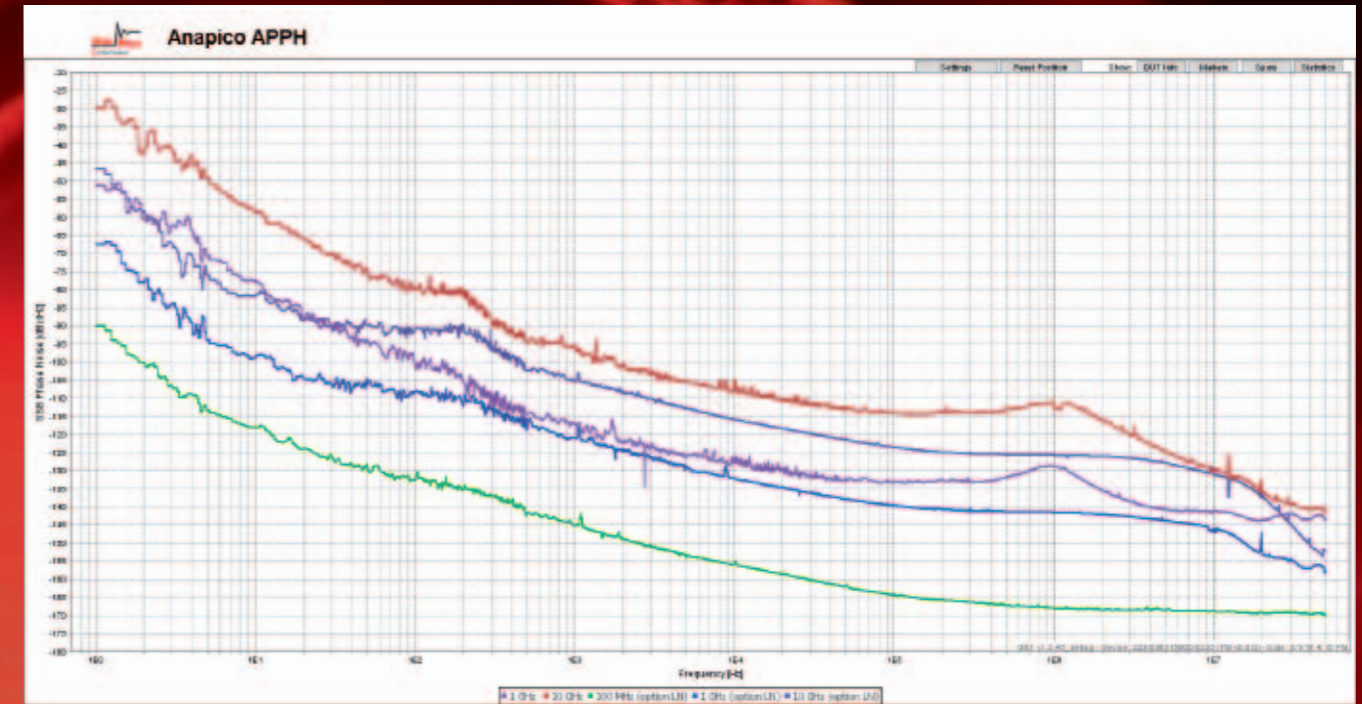
The APMSXXG comes in standard 19 inch 1U (up to 4 channels) or 3U (4 to 8 channels) enclosure and offers various control interfaces like USB, LAN, or GPIB.

RF & Microwave Signal Generators

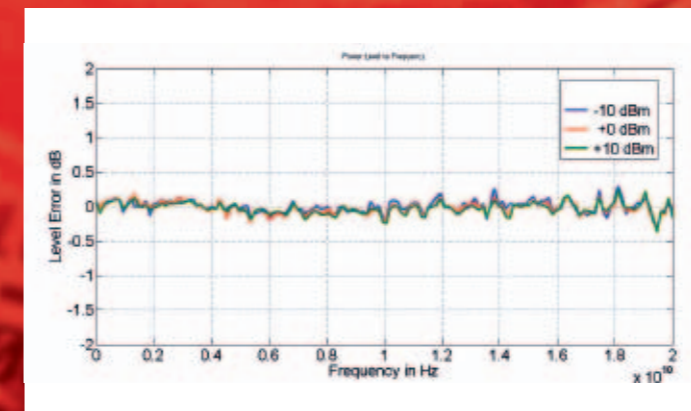
Model Comparison

	APSINX010	APSINXXG	APMSXXG-N	APSYN420
Number of Outputs	1	1	2,4,6 or 8	1 or 2
Frequency Range	9 kHz - 6.1 GHz	100 kHz - 26.5 GHz	1 MHz - 6/12 or 20 GHz	10 MHz - 20 GHz
Frequency Resolution	0.001 Hz	0.001 Hz	0.001 Hz	0.001 Hz
Switching Speed	0.5 ms	0.4 ms	0.1 ms	0.13 ms
Option FS		0.03 ms		
Power Range	-30 to +15 dBm	-20 to +15 dBm	-20 to +18 dBm	+ 20 dBm
Options PE3	-130 to +13 dBm	-100 to +13 dBm		
Power Resolution	0.01 dB	0.01 dB	0.01 dB	
Phase Noise at 1 GHz				
10 Hz	-80 dBc/Hz	-80 dBc/Hz	-105 dBc/Hz	-80 dBc/Hz
20 kHz	-130 dBc/Hz	-128 dBc/Hz	-138 dBc/Hz	-128 dBc/Hz
Option LN				
1 Hz		-70 dBc/Hz		
10 Hz		-100 dBc/Hz		
100 kHz		-140 dBc/Hz		
Timing Reference	OEXO, 0.1 ppm	OEXO, 0.1 ppm	OEXO, 0.01 ppm	OEXO, 0.01 ppm
Option LN		OEXO, 0.1 ppm		
Available Chassis	portable / 1U	portable / 1U / 3U	1U / 3U	mini
Extras	Internal Battery	Internal Battery	-	-
Weight	2.5 kg	2.5 kg	8 kg	< 1 kg
Power Consumption	< 15 W	< 18 W	12 W per channel	< 12 W

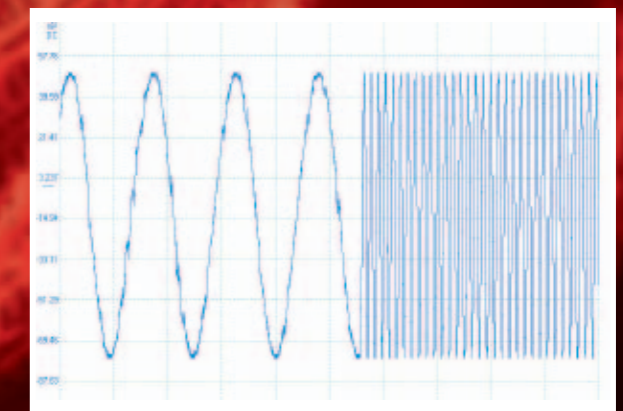
Typical Performance Plots



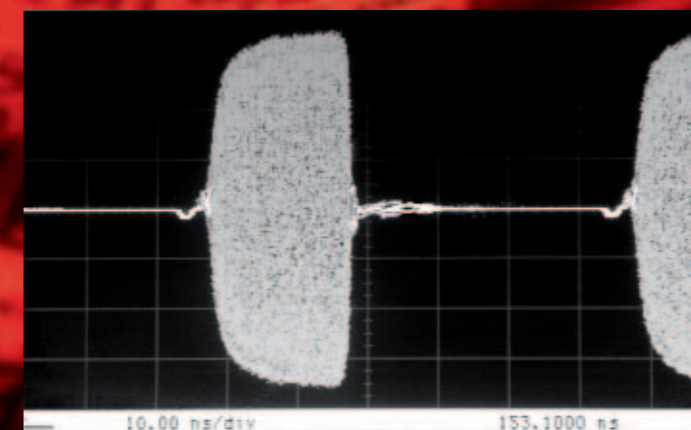
Phase Noise Performance APSIN20G



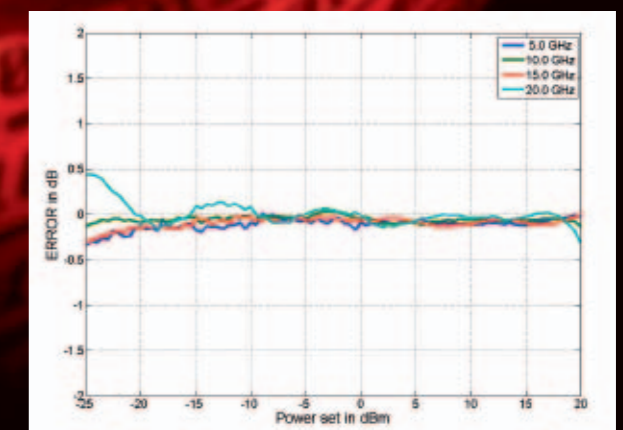
Power Level Accuracy



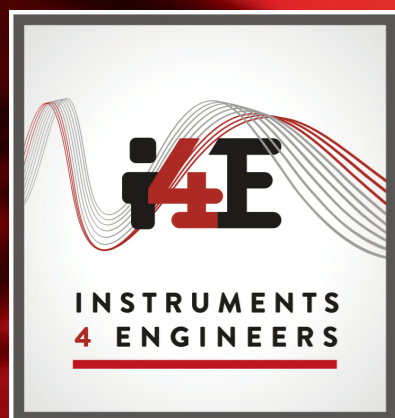
Phase Continuous Switching



20 ns Pulse Modulation



Power Automated Level Control Linearity



Synthesizer Modules

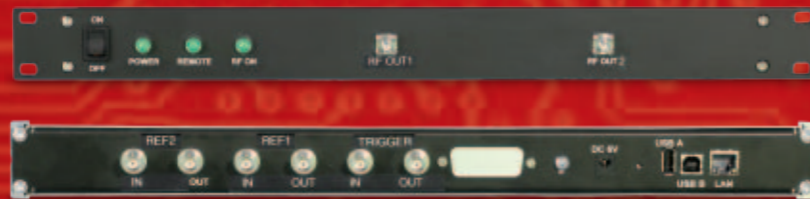
Anapico offers a variety of customized synthesizer modules and subsystems for system integration or OEM for fast turn-around times and fastest time-to-market.



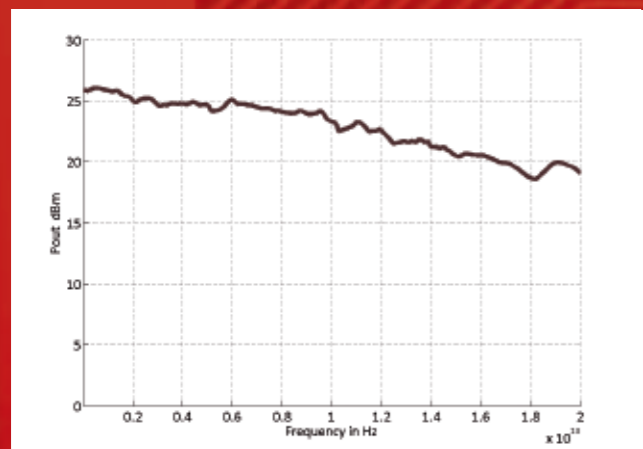
APSYN Wideband Microwave Synthesizers

The APSYN wideband synthesizer module series comprises different models up to 30 GHz.

As an example, the APSYN420 is a fast-switching, low phase-noise synthesizer operating from 10 MHz up to 20 GHz. The module with a milli-Hz frequency resolution uses a high-stability OCXO internal reference and can be cascaded to provide multiple highly-phase synchronous outputs. The internal reference can be phase-locked to an external reference (1 to 250 MHz). The module has USB and LAN interfaces and can be controlled using SCPI 1999 command set. Operated with an external 6V DC supply, it consumes less than ten watts.



Output Power Level



APSYN420 Key Specifications:

- >> 10 MHz to 20 GHz in 0.001 Hz resolution
- >> >22 dBm output power up to 10 GHz
- >> Chirps, Pulse, Sweeping Capability
- >> Very compact size:
 - only 60 mm H x 106 mm W x 220 mm L
- >> Weight: 1 kgs total

Signal Source Analyzers

The APPH Signal Source Analyzers combine

- >> Phase noise measurements
 - o Residual and absolute
 - o CW or PULSED signals
- >> Amplitude noise measurements
- >> Frequency & phase transient tests (Transient Analyzer)
- >> VCO Characterization and Testing with low-noise internal DC sources
- >> FFT analyzer

Phase Noise Testing from 5 MHz up to 26.5 GHz

Enabling both residual and absolute noise measurements from 5 MHz and up to 26 GHz, the APPH units are flexibly configurable instruments that use either internal or external references with a two-channel cross-correlation engine for maximum dynamic range, thereby simplifying user interface and control to just a single click measurement. Operation requires minimal training and installation and operation can be done within minutes. A Java based graphical user interface (GUI) allows easy access to all the measurement capabilities.

A very wide analysis range from 0.01 Hz up to 100 MHz is available.

With the internal low-phase noise references the APPH is able to cope with the large variety of devices under test. Applications include RF and microwave oscillators, dielectric resonator (DRO), crystal or SAW oscillators, system references clocks, timing modules, phase-locked loops (PLLs), transmitters, or high-speed data convertor clocks.

Use of External References

In the rare case where a phase noise sensitivity is required that cannot be met by the internal sources, external sources may be switched in very easily.

The APPH takes just a minute to display the phase noise trace of ultra high end oscillators – a measurement that often took several hours in the past.

Residual (two port) Phase Noise Measurements

Using a dedicated measurement mode of the APPH, residual (two-port) phase noise of amplifiers and other active and passive devices can be tested.

Pulsed RF Phase Noise

The Anapico APPH can measure phase noise at the push of a button, even on pulsed RF sources. The instrument identifies and records pulsed signals and derives all required pulse parameters (e.g. pulse repetition rate, pulse width). It then demodulates the signal and shows phase noise. Stable measurements take almost no time. All results are available at the push of a button, enabling users to focus on optimizing their circuit design.

VCO Testing

The APPH uses extremely low-noise internal DC sources to supply and control voltage-controlled oscillators (VCO) and other voltage controlled devices. This makes it very easy to quickly characterize free-running oscillators and determine multiple parameters like frequency tuning slope, output power, current consumption, phase noise or supply pushing.

Automated Testing

Powerful processing hardware makes this instrument also ideal for high throughput automated production testing (ATE). Shortest test times can be combined with high repeatability and accuracy.

A comprehensive set of SCPI commands along with an API library allows seamless integration into an existing test environment.

Signal Source Analyzers

MODELS SIGNAL SOURCE ANALYZERS



APPH6040 Signal Source Analyzer

The APPH6040 makes reliable phase-noise (amplitude) measurements from 5 MHz up to 7 GHz over an offset range from 0.01 Hz up to 50/100 MHz. Residual or absolute phase noise measurement can be taken from CW or even pulsed RF signals. Additional analysis capabilities include transient measurement, quasi-real time spectrum monitoring, or fast oscillator characterization. The instrument uses a built-in frequency counter and power detector and supports demanding measurement modes like two-port additive phase noise or femto-second clock jitter characterization.



APPH20G Signal Source Analyzer

The APPH20G is the frequency extended version for noise measurement capabilities up to 26 GHz (starting from 5 MHz). This single box solution allows quick and accurate characterization of microwave signal sources without the need for external down-convertors. Broad measurement capabilities make this instrument an indispensable tool for both, R&D and ATE testing.



APPH40G Signal Source Analyzer

The APPH40G works up to 40 GHz with analysis range up to 100 MHz.



Model Comparison

Model	APPH6040	APPH20G	APPH40G (Q4/16)
Frequency Range	5 MHz to 7 GHz	5 MHz to 26 GHz	5 MHz to 40+ GHz
Offset Range	0.01 Hz to 50 MHz	0.01 Hz to 50/100 MHz	0.01 Hz to 100 MHz
PhN Sensitivity at 1 GHz, 1 Average (Option LN)			
@ 1 Hz	-52 (-80)	-52 (-80)	-52 (-80)
@ 10 Hz	-85 (-100)	-85 (-100)	-85 (-100)
@ 1 kHz	-135	-135	-135
@ 10 kHz	-145	-145	-145
@ 100 kHz	-155	-155	-155
@ 1 MHz	-170	-170	-170
Measurement Speed (ATE, 1 kHz, 1 Correlation)	150 ms	150 ms	150 ms
Input Power Range	-15 to +20 dBm	-15 to +20 dBm	-15 to +20 dBm
Measurement Uncertainty			
< 100 Hz	<3 dB	<3 dB	<3 dB
> 100 Hz	< 2 dB	< 2 dB	< 2 dB
Internal / External References	Y / Y	Y / Y	Y / Y
MEASUREMENT MODES			
Absolute Phase Noise	Y	Y	Y
Residual Phase & Amplitude Noise	N	Y	Y
Pulsed Absolute / Residual Phase Noise Measurement	Y	Y	Y
VCO Test Bench	Y	Y	Y
Transient Measurement	Y	Y	Y
INTERFACES			
GPIB	Y (optional)	Y (optional)	Y (optional)
USB/TMC	Y	Y	Y
LAN	Y	Y	Y
VISA/SCPI	Y	Y	Y
Power Consumption	25 W	30 W	30 W
Weight	10 kg (21 lbs)	10 kg (21 lbs)	10 kg (21 lbs)
Warranty	2 years	2 years	2 years

Signal Source Analyzers

Options

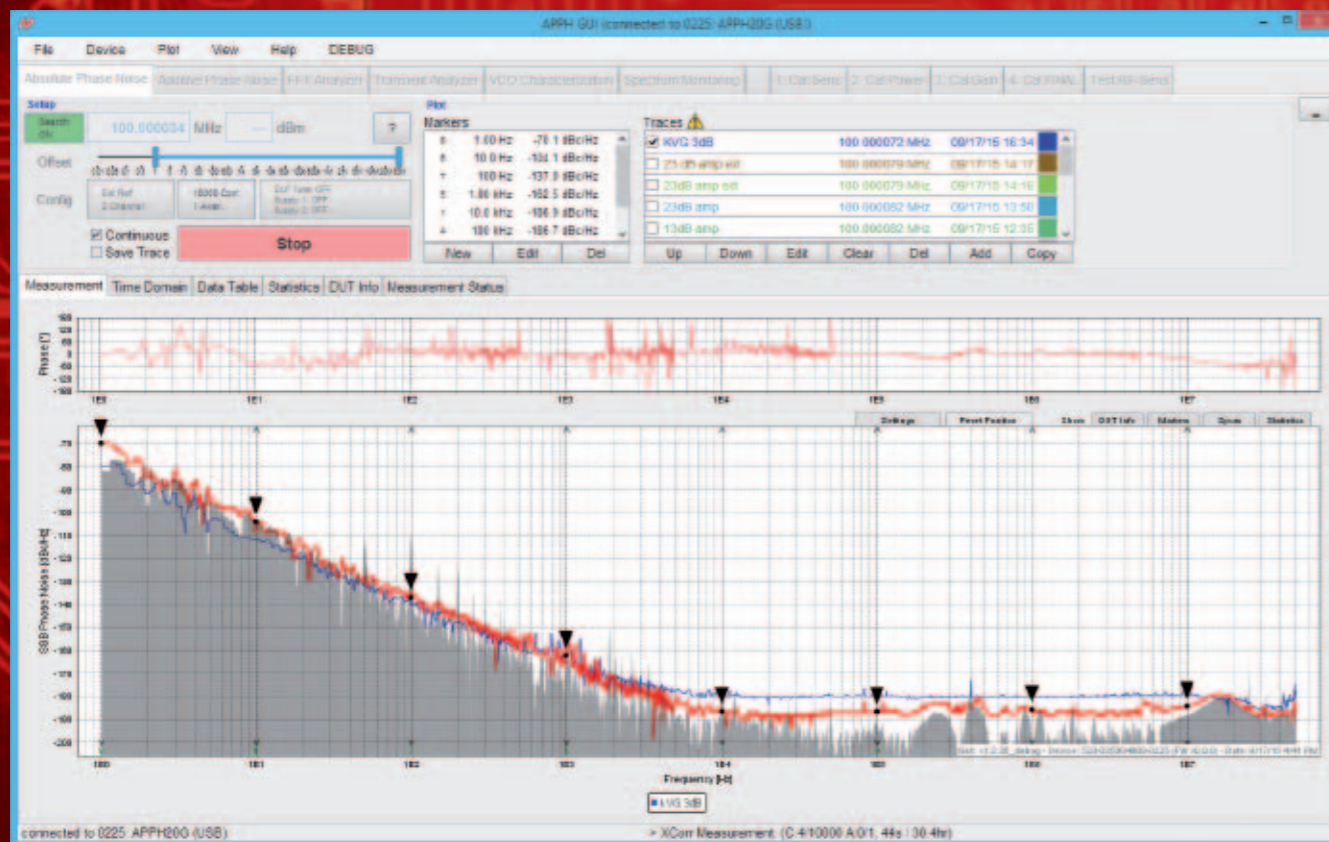
Option LN - ultra low phase noise internal references for further enhanced phase noise sensitivity at offsets below 100 Hz.

Option PULSE - pulsed phase noise measurements.

Option GPIB - interface added.

Option WE3/5 - extended warranty coverage to 3 or 5 years with or without calibration coverage.

Graphical User Interface



The APPHs can be remotely controlled from almost any control software via standard Ethernet, USB, or GPIB interface using SCPI command language.

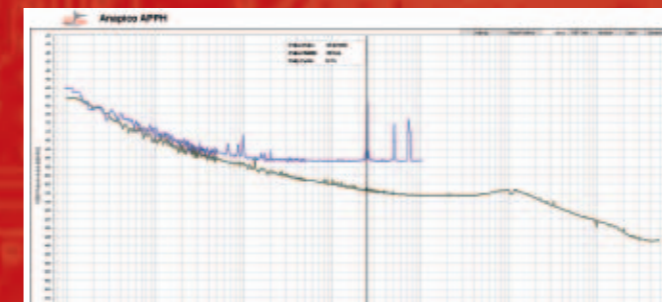
For convenient laboratory use, the APPH hardware can use a virtual front panel as the visual interface. Each unit comes with an open license to operate the Java™ based application GUI on any standard PC.

The GUI primary panel is the control center of the phase noise analyzer. The layout is organized in a logical fashion. Being fully automated, the analyzer will be ready for the user to push the START button as soon as a DUT is attached. Access to the various measurement modes via tabs, and sub-menus allow the user to quickly customize the hardware settings to best fit the job.

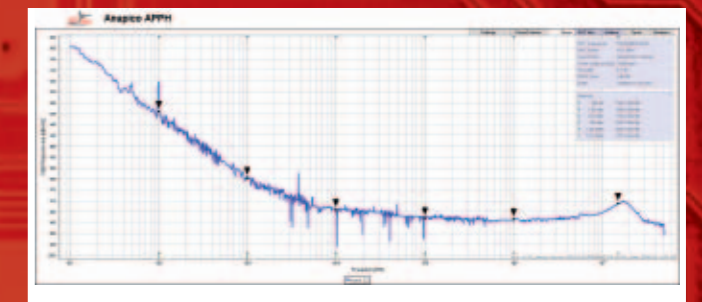
Applications

Characterization of noise and spurious signals is one of the primary tasks in developing transmit and receive modules. This is necessary not only in the development and production of state-of-the-art communications and broadcast systems, but also in special high-tech applications such as radar or satellite receivers.

Apart from phase noise, other parameters that need to be measured when characterizing oscillators include tuning slope, transient response, power, and spurious emissions. Amplifier noise is of significant interest as well. All of these measurements can be carried out with the APPH at a wide range of frequencies up to microwave range in a single box.



Pulsed RF Measurement (10 GHz, 25 kHz Rate, 300 ns Pulse (0.7% Duty Cycle))



Low Phase Noise OCXO Measurement



VCO Characterization (free-running VCO 2-2.7 GHz)

