Ana Pico
of Switzerland

Accurate – Reliable – Affordable

AnaPico

Company and Products

www.anapico.com

AnaPico Switzerland

100% Swiss Company
Supplying RF and MW T&M Instruments

Founded in 2004 in Zurich, Switzerland

ISO 9001:2015 certified

Own R&D, partly outsourced manufacturing

Represented in more than 40 countries

Profitable for > 15 consecutive years

Skills

At AnaPico, we create Swiss made T&M instruments with unique features.

Hardware Skills

- RF/MW analog and digital electronic system design up to 65 GHz
- FPGA board design / programming of timing critical real-time control and signal processing applications
- Mechanical design & assembly, EMI/EMC

Software Skills

- Embedded Linux (modified real-time kernels), and firmware design (C/C++)
- Application user interfaces (Java, Csharp, VB, Python)
- Instrument driver (C/C++, Assembler)
- Testing software (VB.NET, Python, Matlab, Labview)

Services

In partnership with our contracted distributors in over 40 countries, AnaPico operates a growing service network in the world, offering services, that meet customer's expectation.

Calibration

All our T&M Instruments get fully traceable calibration and are delivered together with calibration certificates.

Product Updates

Firmware and GUI Software for our T&M instruments are continuously maintained and updated.

Technical and Logistic Support

Our local contracted distributors always have trained and knowledgeable colleagues helping our customers with requirement clarifications, instrument trial uses, application support, delivery and related logistics.

Maintenance and Repair

All new products of AnaPico have a standard 2 years warranty period. The warranty period is extendable. Our calibration & repair service is also available for additional 5 years after the product phase-out.

Products

Signal Generators

- Single- and multi-channel SGs up to >50 GHz
- Fast switching, very low phase noise, compact size, battery operation
- Switching time down to 5 us (analog SGs) and <100 ns (VSGs)
- Multi-channel SGs: phase-coherent and phase memory
- Portable, benchtop, rack-mount

Frequency Synthesizers

- Single- and multi-channel, up to 43 GHz
- Fast switching, high resolution, very low phase noise
- Flange- and rack-mount, benchtop

Signal Source Analyzers

- 7 / 26 / 40 GHz models
- Absolute and additive phase noise and amplitude noise measurement
- Transient analysis, short- and long-time frequency stability analysis
- One-step VCO characterization, baseband FFT, spectral analysis
- Internal and external references

AnaPico Products

SINGLE-CHANNEL RF / MW SIGNAL GENERATORS	MULTI-CHANNEL RF / MW SIGNAL GENERATORS	FREQUENCY SYNTHESIZERS SINGLE- / MULTI-CHANNELS	SIGNAL SOURCE ANALYZERS / PHASE NOISE TESTERS
			
APSINX010/APSINXX: single-channel RF/MW SGs up to 2, 4, 6, 12, 20, 26 GHz, analog modulations **APULNXX**: high-performance MW SGs up to 12, 20, 26, 40 GHz, analog modulations **APLCXX**: high-purity MW SGs up to 12, 20, 40, 54 GHz, analog modulations **APVSGXX**: ultra-agile, vector RF and MW SG up to 4, 6, 12, 20, 40 GHz, digital modulations	**APMS-X**: up to 4 fully independently adjustable, phase-coherent and phase memory, up to 6, 12, 20, 33, 40 GHz **APLC-X**: up to 4 fully independently adjustable, phase-coherent, up to 12, 20, 40, 54 GHz **APVSG-X**: up to 4 fully independently adjustable, phase-coherent, 4, 6, 12, 20, 40 GHz	**APSYN420(-X) / APSYN140(-X)**: single- and multi-channel frequency synthesizers up to 20, 40 GHz **APUASYN20(-X)**: up to 20 GHz, 1/2/3/4 channels, phase-coherent **APMSYN22 / APMSYN40**: up to 22 / 40 GHz, multi-channel configurable **APMQS20**: NI QuickSyn FSW-0020 replacement and upgrade	**APPH**: versatile, broadband instruments up to 7, 26, 40 GHz with multiple measurement modes and high measurement sensitivity

Single-Channel RF & MW Signal Generators

Universities & Research
PSI Switzerland, CERN, MIT, Zhejiang Uni., Nanjing Uni.

Communications
Cisco Systems, Thorlabs, Facebook, Ericsson, Nokia

Satellite Communication
ImageSat, ViaSat

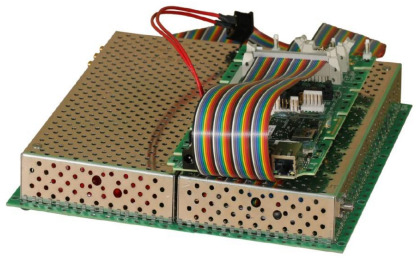
Defense
Rockwell Collins, Thales, Northrop Grumman, Raytheon, Pulsar, Aselsan, MBDA, IAI ELTA, Elbit, L3-Comm, Leonardo, US Navy, Boeing, Lockheed Martin, CETC China

Microwave
MI - NSI, SPEAG, Mitsubishi, MIT, IBM, CNES, Anritsu, CETC China

APSIN Series:

Single-Channel RF/MW SGs – Basic Models

The APSIN RF/MW SG family consists of a series of very compact, portable analog signal generators covering frequency up to 2 / 4 / 6 / 12 / 20 and 26 GHz. Fast switching, low noise.



Models	Description	Output Power
APSIN2010HC	9 kHz to 2 GHz	-120 to +18 dBm
APSIN4010HC	9 kHz to 4 GHz	-120 to +18 dBm
APSIN6010HC	9 kHz to 6 GHz	-120 to +18 dBm
APSIN6G	9 kHz to 6 GHz	-120 to +25 dBm
APSIN12G	9 kHz to 12 GHz	-120 to +25 dBm
APSIN20G	9 kHz to 20 GHz	-120 to +25 dBm
APSIN26G	9 kHz to 26 GHz	-120 to +25 dBm

Features

- Modulation: AM, FM, PM, PULSE
- Battery operation (optional)
- Benchtop and portable, rack-mount

APULN Series:

Single-Channel RF/MW SGs – High-Performance Models

The APULN family consists of a series of very compact, portable analog signal generators covering up to 12.75, 20, 26 and 40 GHz. Very low phase noise, excellent signal purity, fast switching, high output power, enhanced harmonic rejection.

Models	Description	Output Power
APULN12	8 kHz to 12.75 GHz	-120 to +24 dBm
APULN20	8 kHz to 20 GHz	-120 to +24 dBm
APULN26	8 kHz to 26 GHz	-120 to +24 dBm
APULN40	8 kHz to 40 GHz	-120 to +24 dBm

Features

- Excellent signal purity: ultra-low phase noise and low spurious
- Combination of highest output power and fast switching
- Analog modulation FM, PM, AM, PULSE, PULSED CHIRPS
- Powerful touch-display control
- Portable, power bank operational

APSIN / APULN Series – Options

Option EB6: External power bank adapter cable with voltage converter for 12 to 25V

Option	Description	Supported Models
Option HP	High output power	APSINXXG
Option PE3/PE/PE2	Mechanical step attenuator	APSIN, APULN
Option PE4	Electrical / mechanical step attenuators	APULN
Option LN/LN+	Enhanced close in phase noise	APULN
Option FS	Fast switching	APULN, APSINXXG
Option NM	Remove modulation functions	APSIN20G, APSIN26G
Option MOD	AM, FM, PM, PULSE	APULN
Option FILT	Enhanced harmonic rejection	APULN
Option AVIO	Avionics modulations	APSIN
Option VREF	Variable external reference	APULN
Option REAR	Move output to rear panel	All
Option 1URM	1U 19“ Rackmount unit	All
Option B3	Internal battery module	APSIN
Option EB	Adapter cable to ext. power bank	APULN
Option EB6	Adapter cable w/ DC convert. to power bank	APSIN
Option 9K	Frequency extension to 9 kHz	APSIN12G, APSIN20G
Option 8K	Frequency extension to 8 kHz	APULN
Option GPIB	Adding GPIB interface	All

APLC Series:

Single-Channel MW SGs – High-Purity Models

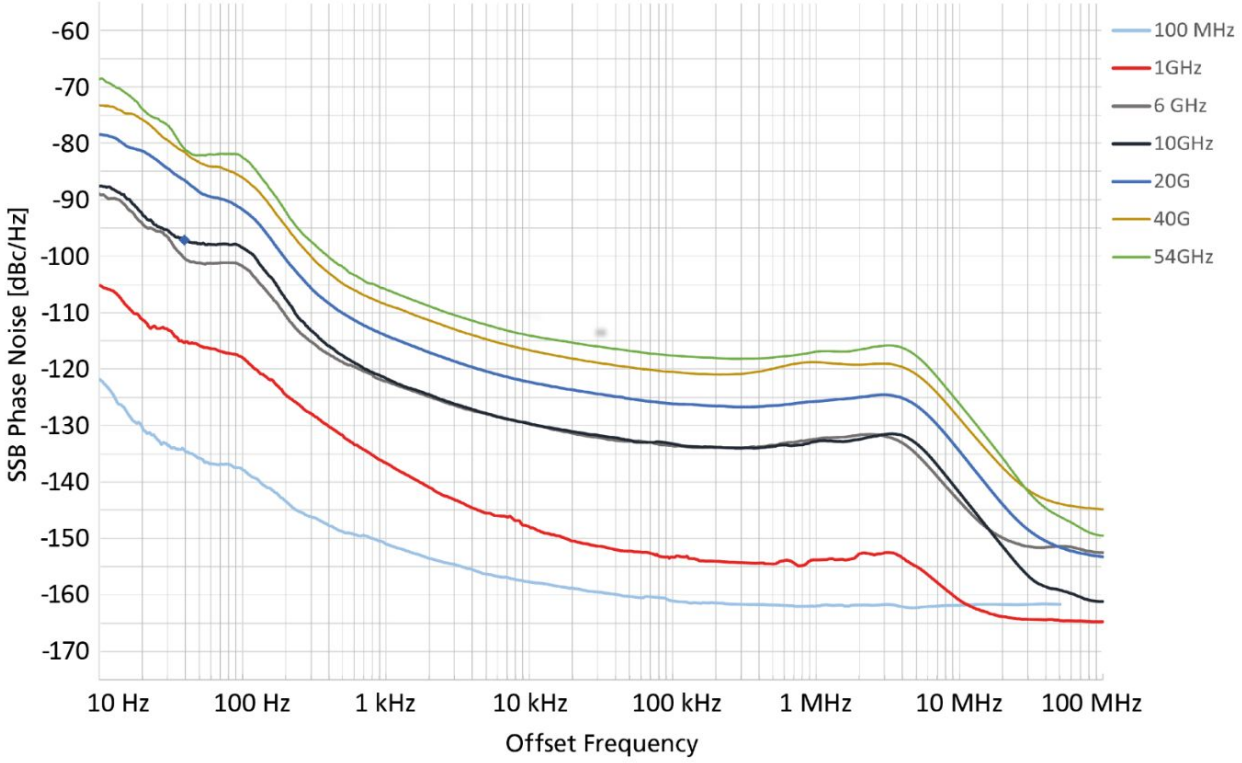
The APLC family consists of a series of very compact, portable analog signal generators covering up to 12.75, 20, 40, and 54 GHz. Extremely low phase noise, excellent signal purity.

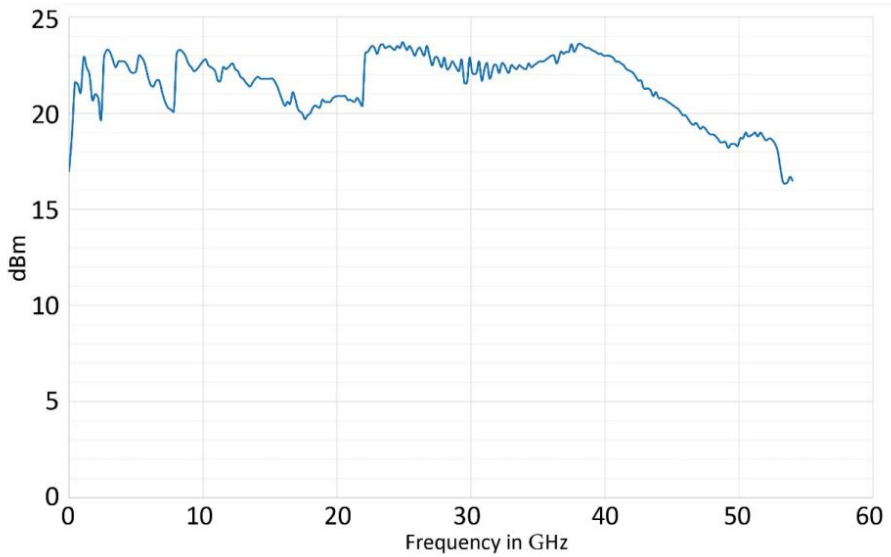
Models	Description	Output Power
APLC12	9 kHz to 12.75 GHz	-120 to +20 dBm
APLC20	9 kHz to 20 GHz	-120 to +20 dBm
APLC40	9 kHz to 40 GHz	-120 to +20 dBm
APLC50	9 kHz to 54 GHz	-120 to +20 dBm

Features

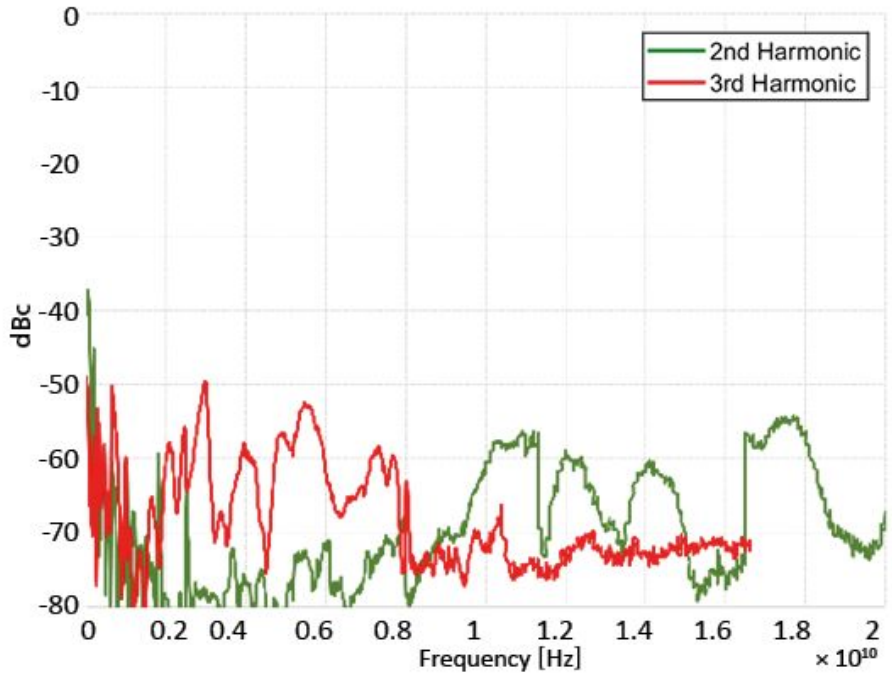
- Phase noise: -130 dBc/Hz, @ 20 kHz from 10 GHz
  Harmonics: -50 dBc; Spurious: -85 dBc (X band)
- Fast Switching 5 us with option FS
- Refs: 10/100 MHz; CLK: 6 GHz
- Int./Ext. Pulse Mod; Int. AM/FM/PM

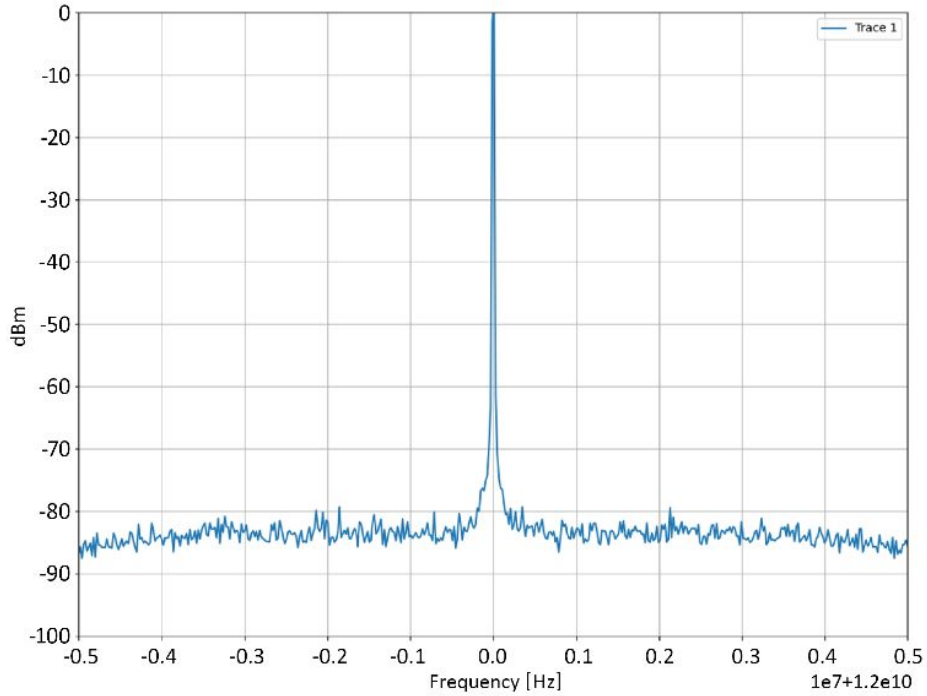
APLC: Phase Noise and Max Power



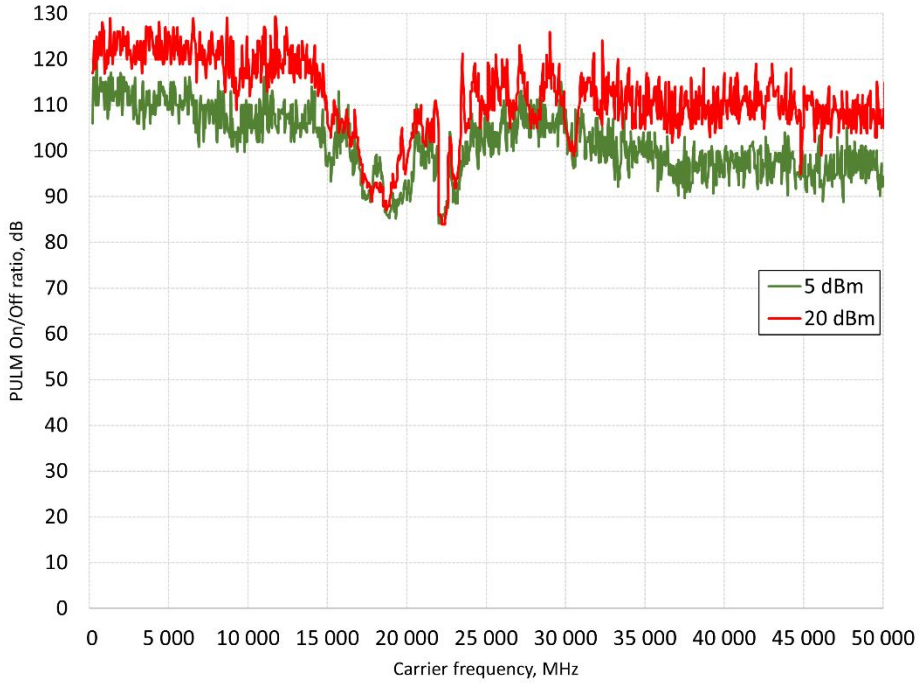


APLC: Harmonics and Non-Harmonics

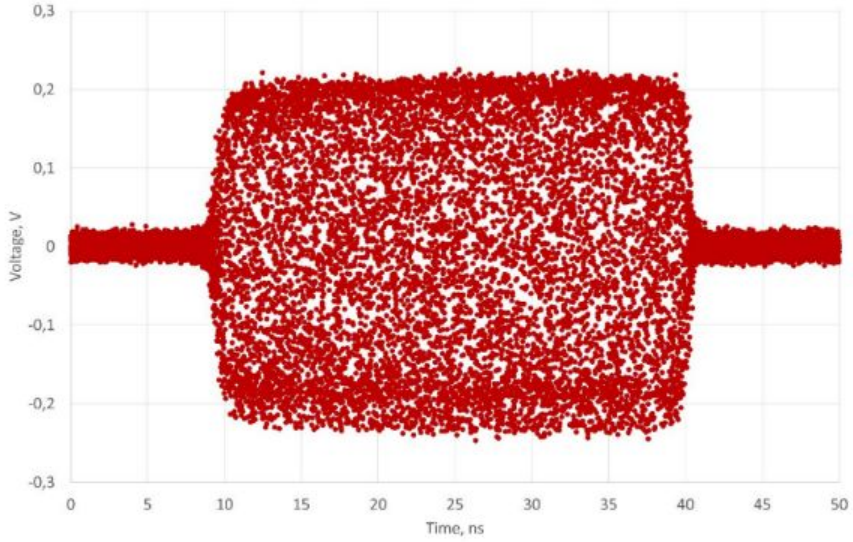




APLC: Pulse Modulation



20 ns Pulse Width



50 GHz, 30 ns Pulse
Rise/Fall time: 2-3 ns

APHSP Series:

Single-Channel SGs – HIGH-END Models (Release Q2’24)

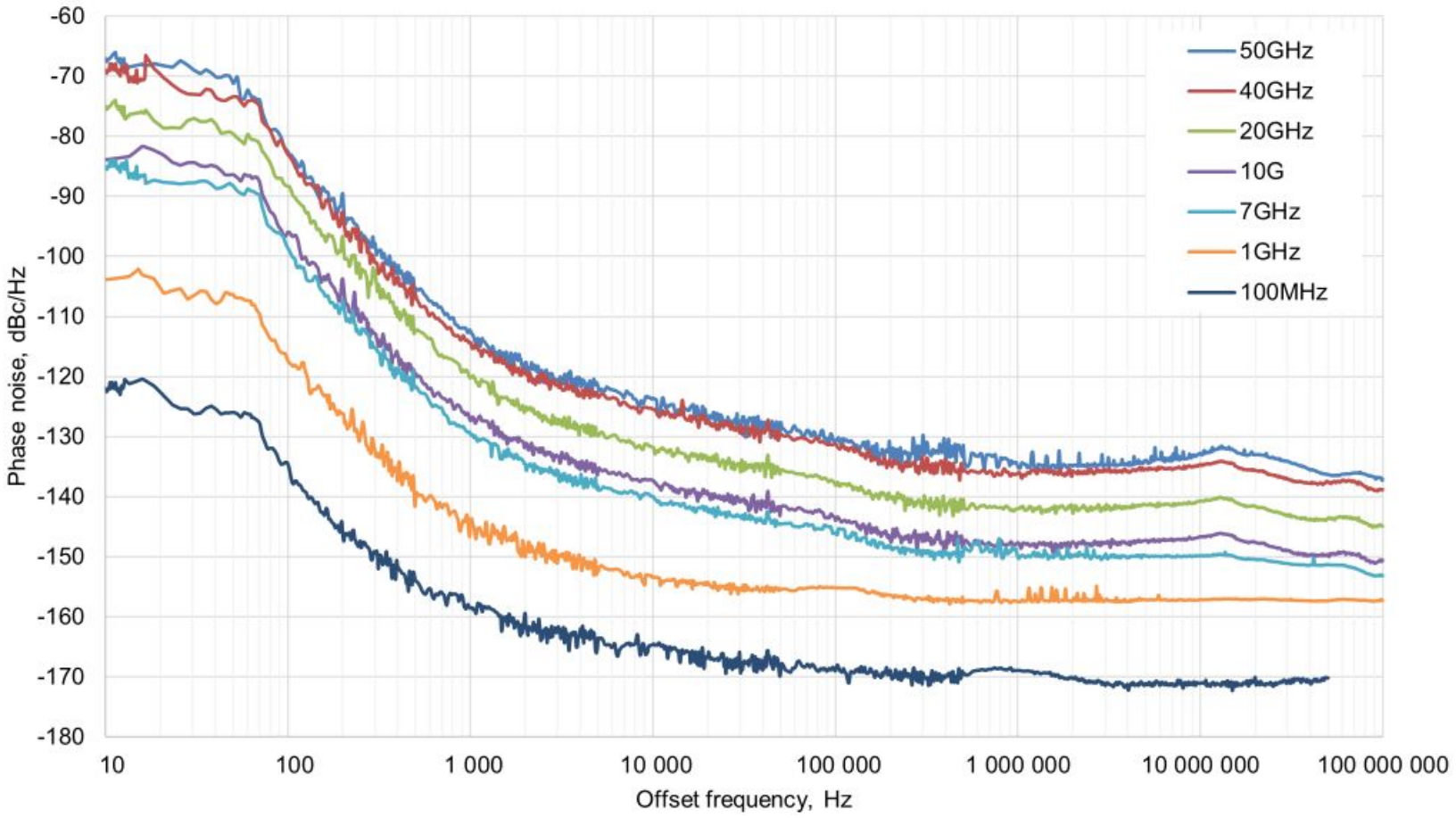
The APHSP family: Covering up to 12.75, 20, 40, and 51 GHz.
Extremely low phase noise, excellent signal purity.

Models	Description	Output Power
APHSP12	1 kHz to 12.75 GHz	-120 to +20 dBm
APHSP20	1 kHz to 20 GHz	-120 to +20 dBm
APHSP40	1 kHZ to 40 GHz	-120 to +20 dBm
APHSP50	1 kHz to 51 GHz	-120 to +20 dBm

Features

- Phase Noise -140 dBc/Hz, @ 20 kHz from 10 GHz
  Harmonics: -50 dBc; Spurious: -80 dBc
- Fast Switching 5 us with option FS
- Refs: 10/100 MHz; CLK: 6 GHz
- Int./Ext. Pulse Mod; Int. AM/FM/PM

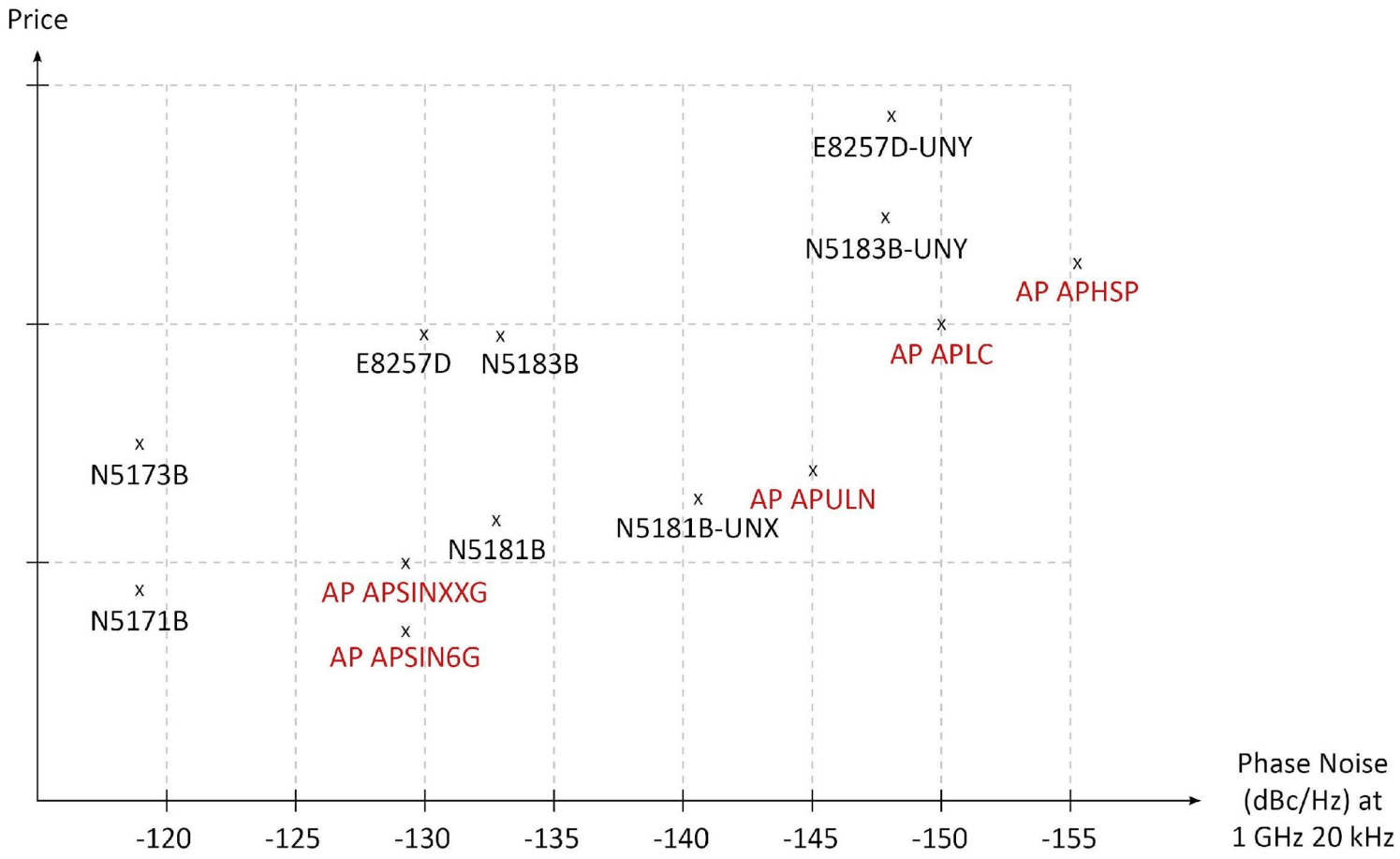
APHSP: Phase Noise



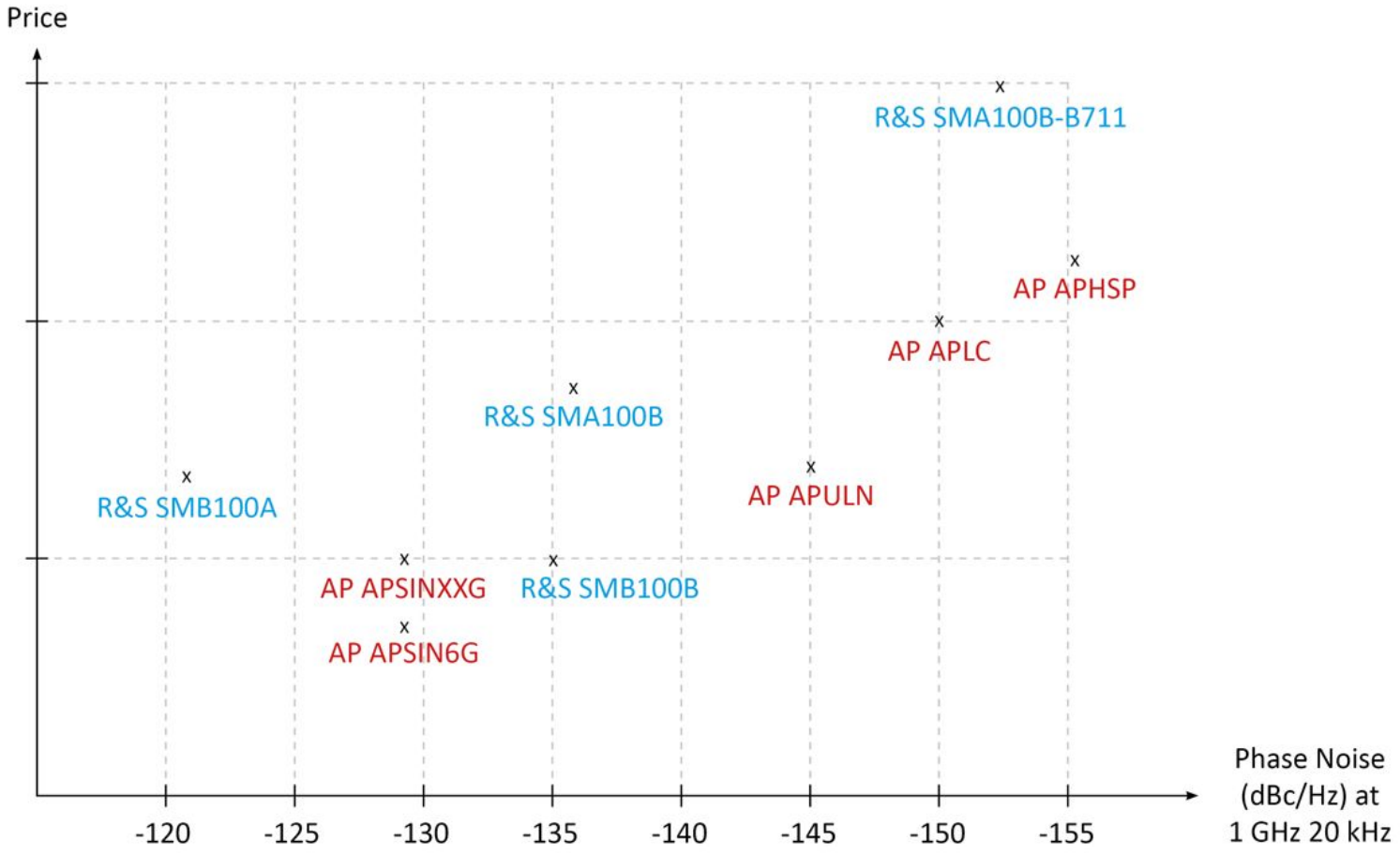
Analog SGs: Competitive Comparison

	APSIN20G	APULN20	APLC20	APHSP20	Keysight MXG N5183B	Keysight PSG E8257D	Rohde&Schwarz SMA100B
Freq. Range Resolution	9 / 100 kHz - 20 GHz 0.001 Hz	100 kHz - 20 GHz 0.001 Hz	8 kHz – 20 GHz 0.001 Hz	1 kHz – 20 GHz 0.001	9 kHz -20 GHz 0.001 Hz	250 kHz -20 GHz 0.01 Hz	8 kHz – 20 GHz 0.001 Hz
Switching Speed Option FS	30 us	25 us	20 us	5 us	5 ms	6 ms	1.5 ms
Power range Option PE4/PE/PE2 Option HP Resolution	-20 to +15 dBm -90 to +15 dBm up to +25 dBm 0.01 dB	-25 to +25 dBm -55/-90/-120 to +24 dBm 0.01 dB	-20 to +20 dBm -120 to +20 dBm - 0.01 dB	-20 to +20 dBm -120 to +20 dBm 0.01 dB	-20 to +15 dBm -135 to +15 dBm up to +30 dBm 0.01 dB	-135 to +15 dBm -135 to +15 dBm up to 21 dBm 0.01 dB	-127 to +30 dBm w/ various options 0.01 dB 0.01 dB
SSB Phase Noise (dBc/Hz):							
Options @10GHz, offset 20 kHz @10GHz, offset 1 kHz @10GHz, offset 1 Hz	 -109 -21	Std / LN -123 / -125 -34 / -50	Std / LN -130 / -130 -122 / -122 -33 / -60	Std / LN -140 / -140 -127 / -127 -33 / -60	Std / UNY -111 / -125 -50 / -45	Std / UNX / UNY / HY2 -116 / -110 / -120 / -120 - / -37 / -43 / -43	Std / B709 / B710 / B711 -120 / -119 / -119 / -132 ../../../ -120 -28 / -39 / -56 / -56
Modulations	AM / FM / PM / Pulse	AM / FM / PM / Pulse / Chirp	- / -/ - / Pulse / Chirp	- / -/ - / Pulse / Chirp	AM / FM / PM / Pulse	AM / FM / PM / Pulse	AM / FM / PM / Pulse
Battery operation	Int./ext. battery	Ext. battery	Ext. Battery	Ext. Battery	impossible	impossible	impossible
Weight Power consump.	2.5 kg 20 W	2.5 kg 25 W	3 kg 30 W	3 kg 33 W	15 kg 280 W	22 kg 450 W	19 kg 300 W

Analog SGs: Competitive Comparison – Keysight vs. AnaPico



Analog SGs: Competitive Comparison – R&S vs. AnaPico



Popular MW SGs and AnaPico Alternatives

Keyword	Avg. monthly searches on Google	Company	AnaPico Alternatives
SMA100B	170	R&S	Could be replaced by APLC or APHSP, exception High power applications
✔ SMB100A	170	R&S	Could be fully replaced by APSIN, APULN or APLC
✔ E8257D	110	Keysight	Could be fully replaced by AnaPico APLC, APHSP
✔ SMB100B	90	R&S	Could be fully replaced by APSIN6G
✔ N5173B	50	Keysight	Could be fully replaced by APSIN or APULN SG
✔ N5183B	40	Keysight	Could be replaced by APLC or APULN

APVSG Series:

Single-Channel RF/MW VSGs – Ultra-Agile

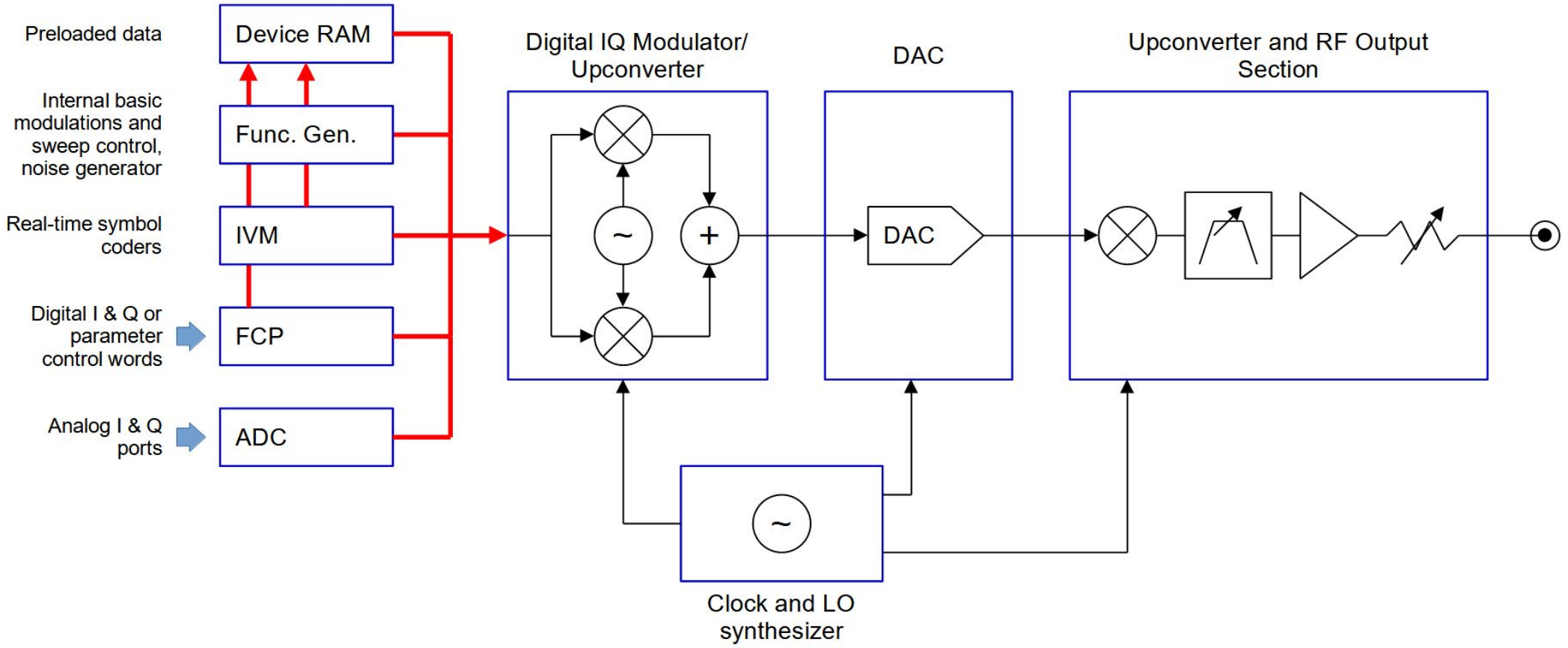
Wideband I/Q modulation, ultra-agile switching / sweeping / chirping.
Internal AWG. I/Q data playback, fast control port, …

Models	Description	Output Power
APVSG04	10 MHz to 4 GHz	-120 to +17 dBm
APVSG06	10 MHz to 6 GHz	-120 to +15 dBm
APVSG12	10 MHz to 12 GHz	-120 to +15 dBm
APVSG20	10 MHz to 20 GHz	-120 to +19 dBm
APVSG40	10 MHz to 40 GHz	-120 to +14 dBm

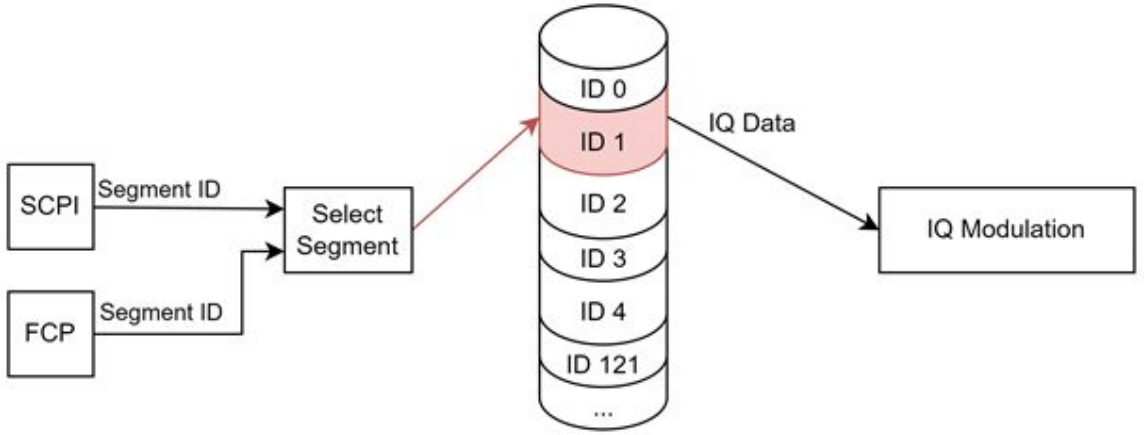
Features

- Ultra-fast switching: <100 ns within mod BW; 2 us wide-band.
- Low phase noise: -145 dBc/Hz at 1 GHz, 20 kHz offset
  -115 dBc/Hz at 40 GHz, 20 kHz offset
- 400 MHz digital and 100 MHz analog modulation bandwidth
- Internal baseband SG: 500 MHz sampling, 512 MSa memory

APVSG – Function Diagram



APVSG – Digital Modulation



- **Sampling rate:** adjustable up to 500 MHz

  Modulation bandwidth: 400 MHz
- **Internal I/Q data storage size:** 512 MSa (16 bits I and 16 bits Q) up to 4 marker bits
- Customer compiled I/Q data uploadable via GUI SW and SCPI command
- **Playback from internal I/Q storage:** sequential or segment address controlled; internally programmable or addressing through FCP
- Fast settling and low latency

APWSS Series:

Single-Channel Wide-Band Vector Signal Sources (Release 2025)

Models	Description	Output Power
APWSSXX	10 MHz to XX GHz	-120 to +18 dBm
APWSS20	10 MHz to 20 GHz	-120 to +18 dBm
APWSS40	10 MHz to 40 GHz	-120 to +18 dBm
APWSS50	10 MHz to 54 GHz	-120 to +18 dBm

Features

- > 2 GHz IQ bandwidth
- 1…2 us switching speed
- 100 Gb/s IQ streaming
- Ultra-fast PWD time-synchronous playback

Multi-Channel RF & MW Signal Generators

Radar
Thales Air System, UMass Lowell, Google, …

Quantum Computing
IBM Research, Google, Uni. of Innsbruck, Oxford Uni., Uni. of Science and Technology of China, Tsinghua uni. China, Beijing Uni. China, Zhejiang Uni. China, Tokyo University of Sciences, NIST, NTT, NEC, RIKEN Japan, ETRI Korea, Uni. Of Technology Sydney, …

Automated Testing
R.A. Wood, Qualcomm, Teradyne, Huawei, …

Aerospace & Defence
Thales Alenia Space, Rack-System (Beijing), Aethercomm, AirBus France, …

APMS-X Series:

Multi-Channel RF & MW Analog SGs

The APMS multi-channel SG family consists of various models supporting up to 6 / 12 / 20 / 33 / 40 GHz. The multiple outputs are phase-coherent, fast switching, and exhibit very low phase noise. All the channels are independently adjustable. Optionally, they also have features of phase-coherent switching and phase memory.

Models	Description	Output Power
APMS06G-2/3/4-ULN	300 kHz to 6 GHz	-80 to +25 dBm
APMS12G-2/3/4-ULN	300 kHz to 12 GHz	-80 to +23 dBm
APMS20G-2/3/4-ULN	300 kHz to 20 GHz	-80 to +20 dBm
APMS33G-2/3/4-ULN	300 kHz to 33 GHz	-50 to +19 dBm
APMS40G -2/3/4-ULN	300 kHz to 40 GHz	-50 to +18 dBm

Features

- Very Low phase noise at 1 GHz and 20 kHz offset: -145 dBc/Hz
- Fast switching: 500 us and 25 us with option FS
- Phase-coherent, phase-coherent switching, phase memory
- independently adjustable channel phase
- Analog modulations

APLC-X Series:

Multi-Channel High-Purity SGs

The APLC multi-channel SG family consist of various models supporting up to 54 GHz. The multiple outputs are phase-coherent and exhibit excellent phase noise and spurious performance. All the channels are independently adjustable. Optionally, they also have features of phase-coherent switching and phase memory.

Models	Description	Output Power
APLC12-1/2/3/4	9 kHz to 12.75 GHz	-120 to +20 dBm
APLC20-1/2/3/4	9 kHz to 20 GHz	-120 to +20 dBm
APLC40-1/2/3/4	9 kHz to 40 GHz	-120 to +20 dBm
APLC50-1/2/3/4	9 kHz to 54 GHz	-120 to +20 dBm

Features

- Very Low phase noise at 10 GHz and 20 kHz offset: -130 dBc/Hz
- Low spurious: -85 dBc; harmonics: -50 dBc
- Fast switching: 5 us with option FS
- Phase-coherent, phase-coherent switching, phase memory
- independently adjustable channel phase
- Pulse and analog (AM/FM/PM) modulations

APHSP-X Series:

HIGH END Multi-Channel SGs (Release Q2’24)

Models	Description	Output Power
APHSP12-1/2/3/4	1 kHz to 12.75 GHz	-120 to +20 dBm
APHSP20-1/2/3/4	1 kHz to 20 GHz	-120 to +20 dBm
APHSP40-1/2/3/4	1 kHz to 40 GHz	-120 to +20 dBm
APHSP50-1/2/3/4	1 kHz to 51 GHz	-120 to +20 dBm

Features

- Superior phase noise: at 10 GHz and 20 kHz offset: -140 dBc/Hz
- Ultra-fast switching: 500 us and 5 us with option FS
- Outstanding spurious and harmonic rejection
- Phase-coherent, phase-coherent switching, phase memory
- Independently adjustable channel phase
- Int./Ext. Pulse Mod; Int. AM/FM/PM

APVSG-X Series:

Multi-Channel RF/MW VSGs

Wideband I/Q modulation, ultra-agile switching / sweeping / chirping.
Internal AWG. I/Q data playback and streaming, fast control port, …

Models	Description	Output Power
APVSG04	10 MHz to 4 GHz	-120 to +17 dBm
APVSG06	10 MHz to 6 GHz	-120 to +15 dBm
APVSG12	10 MHz to12 GHz	-120 to +15 dBm
APVSG20	10 MHz to 20 GHz	-120 to +19 dBm
APVSG40	10 MHz to 40 GHz	-120 to +14 dBm

Features

- Ultra-fast switching: <1 us within mod BW; 2 us wide-band.
- Low phase noise: -145 dBc/Hz at 1 GHz, 20 kHz offset
  -115 dBc/Hz at 40 GHz, 20 kHz offset
- 400 MHz digital and 100 MHz analog modulation bandwidth
- Internal baseband SG: 500 MHz sampling, 512 MSa memory

APWSS-X Series:

Multi-Channel Wide-Band Vector Signal Sources (Release 2025)

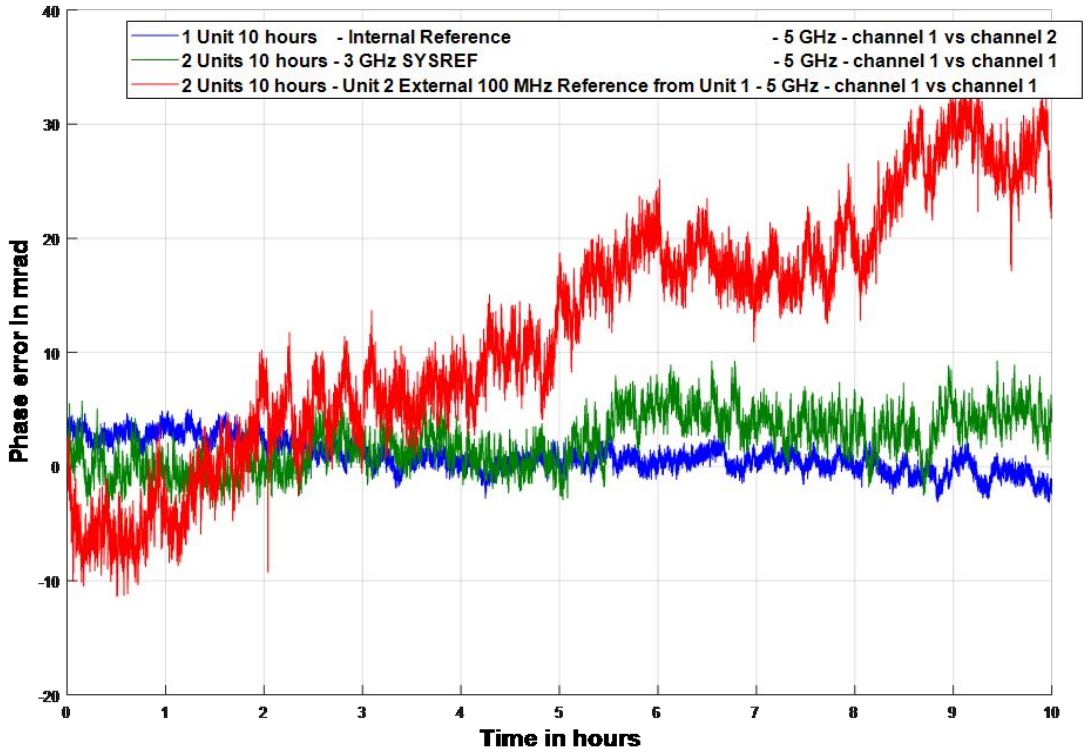
Models	Description	Output Power
APWSSXX-X	10 MHz to ?? GHz	-120 to +18 dBm
APWSS20-X	10 MHz to 20 GHz	-120 to +18 dBm
APWSS40-X	10 MHz to 40 GHz	-120 to +18 dBm
APWSS50-X	10 MHz to 54 GHz	-120 to +18 dBm

Features

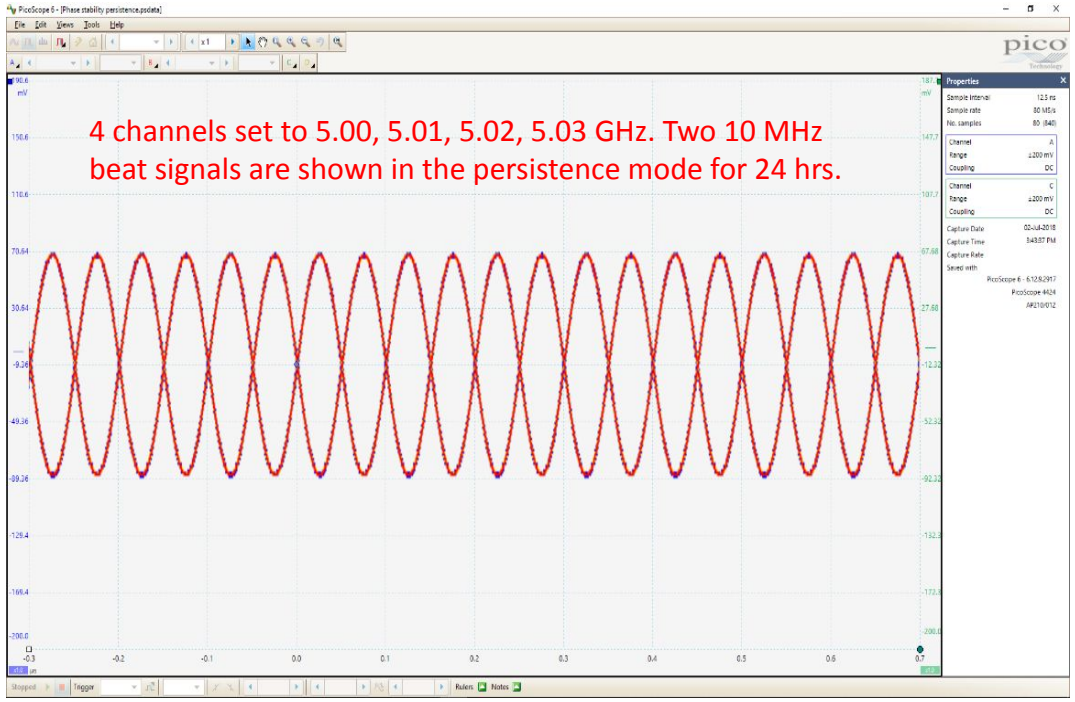
- > 2 GHz IQ bandwidth
- 1…2 us switching
- 100Gb/s IQ streaming
- Up to 4 channels per 2 HU module
- Phase-coherent switching, independently adjustable phase
- Ultra-fast PWD time-synchronous playback and streaming

Phase Coherence (1)

Phase Coherence at 5 GHz



Phase coherence between 2 different frequencies



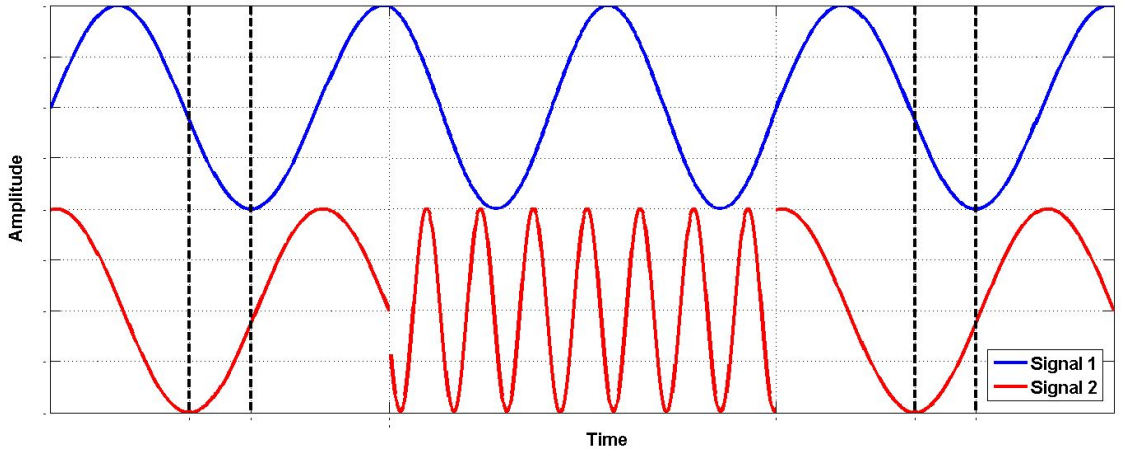
Phase Coherence (2)

How to reach the excellent phase coherence:

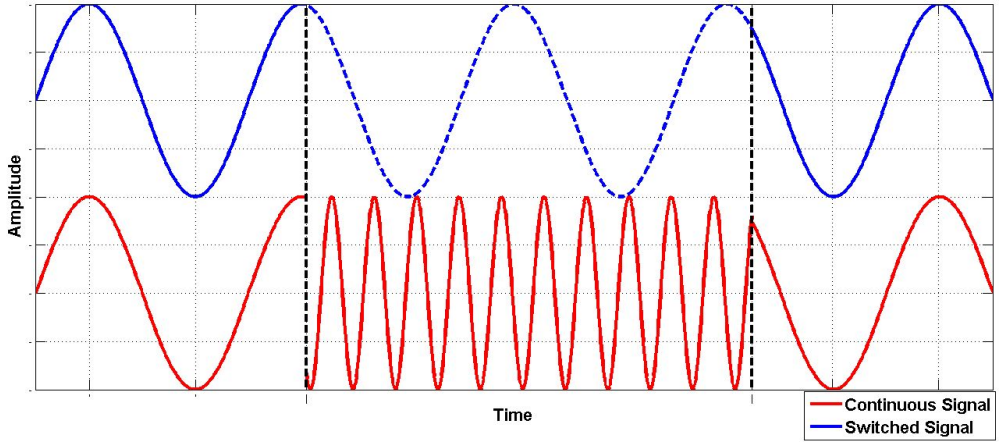
- Each APMS-X/APVSG-X module has a common highly stable OCXO frequency reference. Frequencies of all channels are digitally synthesized / derived from the common reference frequency with high resolution.
- Same frequency synthesis circuitries of the parallel channels ensures the maximum phase coherence.
- All the channels in the APMS and APVSG module are in a similar ambient environment that ensures min. drift difference.
- Each module features a pair of high-frequency clock ports (3 GHz for APMS or 6 GHz for APVSG) allowing for excellent phase synchronization between the multiple APMS/APVSG modules.
- Flexible synchronization to different external references: 10 MHz, 100 MHz, 1 GHz, and even a reference range of 5 to 250 MHz.

Phase-Coherent Switching

Phase Coherent Switching:
The relative phase between channels 1 and 2 (signal 1 and 2) remains the same after channel 2 temporarily switched to a different frequency.



Phase Memory:
The signal returns to the same absolute phase when returning to the previous frequency and amplitude setting.



Competitive Comparison VSGs for Quantum Computing

	AnaPico APVSG	R&S SMCV100B	ZI SHFSG 8.5 GHz	R&S SGS100A
Single- / Multi-Channels	yes / yes	yes / no	4 or 8 channels	yes / yes (ext ref sync)
Frequency range	10 MHz to 4 / 6 / 12 / 20 / 40 GHz	3 / 6 / 7.125 GHz	DC to 8.5 GHz	80 MHz to 6 / 12.75 GHz
Switching Time	< 100 ns within 400 MHz < 2 us over entire range	< 5 ms	?	500 us
Ext. Ref. In	10 / 100 MHz, 3 GHz	10 MHz	10, 100 MHz	10, 13, 100, 1000 MHz
Ref. Out	10 / 100 MHz, 3 GHz	10 MHz	10, 100 MHz	10, 1000 MHz
Output power range	-120 to + 20 dBm	-120 to +15 / 20 dBm HP option)	-30 to +10 dBm	-120 to +15 dBm with option B26
Phase Noise @ 20 kHz offset		Standard / with Option K709		
1 GHz	-145 dBc/Hz	-112 dBc/Hz / -135 dBc/Hz	Phase noise (@ 6 GHz) -90 dBc/Hz @ 1 kHz offset -98 dBc/Hz @ 10 kHz offset -100 dBc/Hz @ 100 kHz offset	-133 dBc/Hz
7.125 GHz	-115 dBc/Hz	-112 dBc/Hz / -112dBc/Hz		
40 GHz	-115 dBc/Hz			
Phase Coherence	Yes	?	?	Yes, Option K90
I/Q Modulation				
Mode	internal BB I/Q	Internal BB I/Q		No int. BB IQ generator
Modulation Bandwidth	400 MHz	240 MHz		
Digital I/Q input	yes	yes	No	No
I/Q Sampling rate	125 / 250 MHz max	75 / 140 / 200 / 300 MHz		
Analog I/Q input	yes, 50 MHz	no	Yes, 1 GHz BW	Yes, 1 GHz BW
Waveform Length	512 Msample max, 32 bits	512 Msample max, 16 bits	98 kSa per channel	No
Custom digital modulation	Option IVM	ASK, FSK, PSK, QAM (option K199)	No	No
Basic AM/FM/PM	yes, internal (option MOD)	yes, internal (option K197)	No	No
Pulse Mod	yes, internal (option MOD)	yes, internal (option K198)	No	Yes, K22
AWGN	yes, internal	yes, K62	No	No




MW Frequency Synthesizers

Radar
GTMR

Automated Testing
NI-MSI

Microwave
Facebook, SpaceX, Ratheon, Lockheed Martin, Boeing, Northrop, NRAO

5G Wireless Communication
Ericsson, Huawei

Frequency Synthesizers

Wide-band up to 20 / 22 / 40 GHz. Single and multi-channels. Accurate frequency and low phase noise. Fast switching and frequency sweeping. Phase coherent. Flange- or rack-mount, benchtop.

Model	Description	Output Power
APSYN420(-1/2)	10 MHz to 20 GHz	+23 dBm
APSYN140(-1/2/3/4)	8 kHz to 43 GHz	-10 to +25 dBm
APUASYN20(-1/2/3/4)	100 kHz to 20 GHz	0 to +18 dBm
APMSYN22 APMSYN40	100 kHz to 22 GHz 1 MHz to 40 GHz	-40 to +25 dBm -30 to +25 dBm
APMQS20	8 kHz to 20 GHz	-25 to +16 dBm

Features

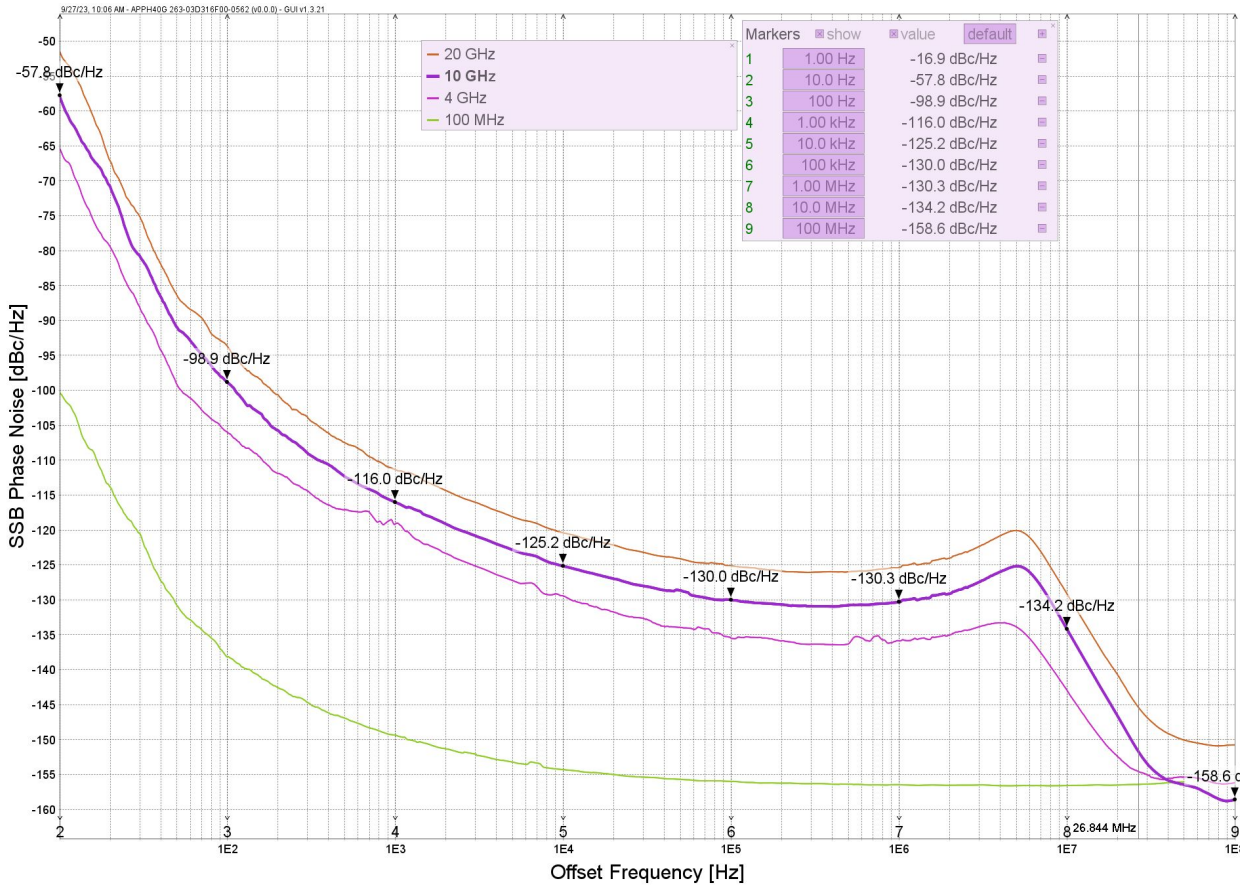
- Low phase noise and fast switching
- High harmonics suppression. APSYN140: -50 dBc with option FILT.
- LAN, USB, SPI, control interfaces
- Single- or multi-channel models
- FM, PM, Pulse Modulations

Instrument-Grade Synthesizer APMQS20

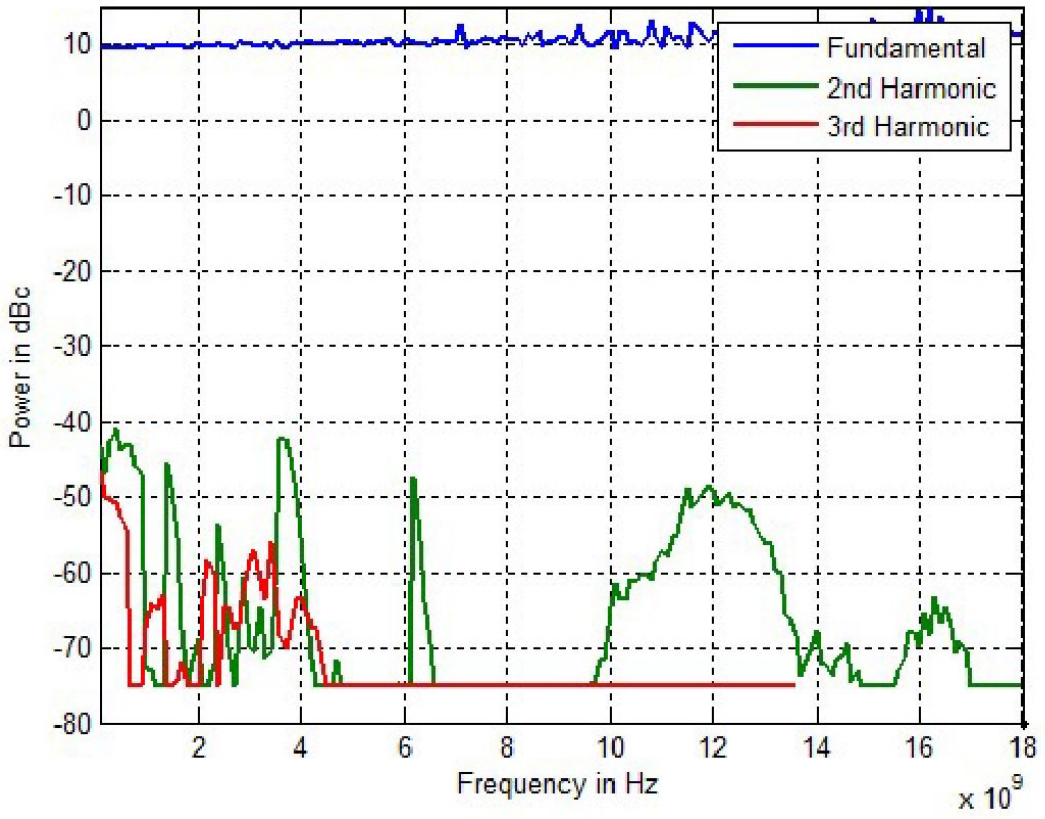
Models	Description	Output Power
APMQS20	100 kHz to 22 GHz	-20 to +18 dBm

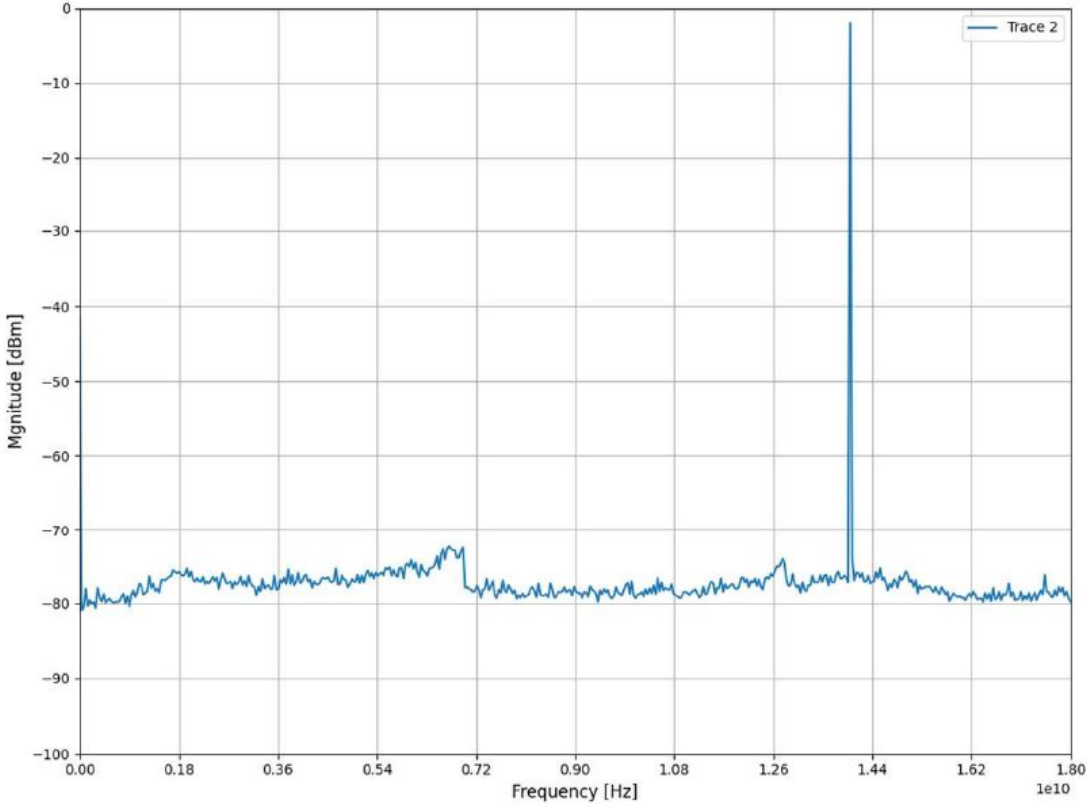
Features

- Harmonics -50 dBc;
  Spurious -80 dBc;
  Phase noise -127 dBc/Hz @ 20 kHz from 10 GHz.
- Pulse modulation
- “NI QuickSyn” replacement



APMQS20: Harmonics and Non-Harmonics





APMQS20: Drop-In Replacement and Upgrade of NI QuickSyn FSW-0020

- High-purity local oscillators
- Drop-in replacement of FSW-0020 and FSW-0010
- Reference frequency module for T&M instruments
- Precise system clock
- Radar / EW
- Quantum computing

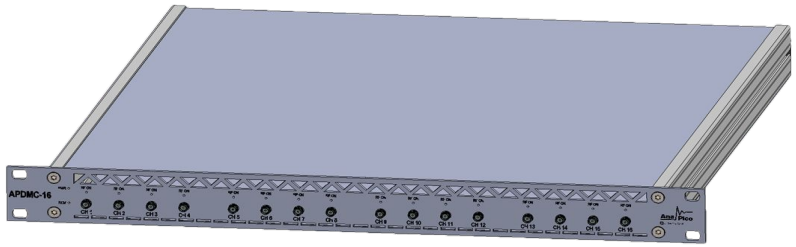
Parameter	NI FSW-0020	AnaPico APMQS20
Frequency range	0.2 to 20 GHz	8 kHz to 20 GHz
Switching speed	100 µs (list sweep) 200 µs (over SPI)	20 µs (list sweep) 200 µs (over SPI)
Power range	-10 to +13 dBm @ > 0.5 GHz	-25 to +16 dBm @ > 1 GHz
Level accuracy	±2.0 dB	±0.3 dB
Phase noise @ 100 Hz / 10 kHz / 1 MHz from 10 GHz:	-83 / -122 / -126 dBc/Hz	-95 / -126 / -130 dBc/Hz
Harmonics / Non-harmonics	-35 / -70 dBc @ > 0.5 GHz	-50 / -70 dBc @ > 0.1 GHz
Modulations	Pulse, AM/FM	Pulse, AM/FM
Reference in/out	10 MHz	10 MHz, 100 MHz, 1 GHz
Communication ports	SPI, USB	SPI, USB, Ethernet
Power supply and consumption	12 VDC / 20 W	12 – 30 VDC / 24 W

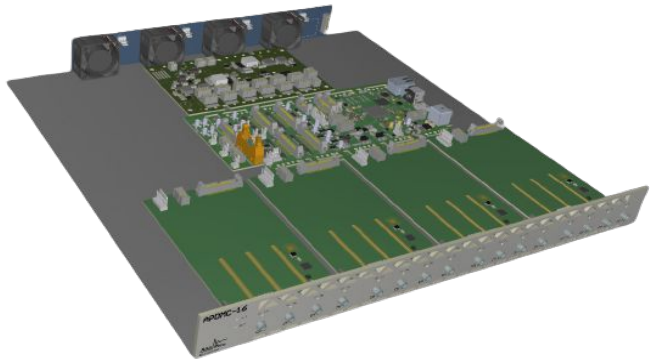
APMQS20 vs. FSW-0020 vs. 5510A/5511A

Parameter	NI FSW-0020	SignalCore 5510A/5511A	AnaPico APMQS20
Frequency range	0.2 to 20 GHz	100 MHz to 20 GHz	8 kHz to 20 GHz
Switching speed	100 µs (list sweep) 200 µs (over SPI)	350 µs (list sweep)	20 µs (list sweep) 200 µs (over SPI)
Power range	-10 to +13 dBm @ > 0.5 GHz	-20 to +15 dBm @ < 18 GHz -20 to +10 dBm @ > 18 GHz	-25 to +16 dBm @ > 1 GHz
Level accuracy	±2.0 dB	±2.0 dB	±0.3 dB
SSB Phase noise **@ 100 Hz, 10 kHz, 1 MHz from 10 GHz:**	-83 / -122 / -126 dBc/Hz	-80 / -117 / -116 dBc/Hz	-95 / -126 / -130 dBc/Hz
Harmonics / Non-harmonics	-35 / -70 dBc @ > 0.5 GHz	-20 / -70 dBc @ > 0.4 GHz	-50 / -70 dBc @ > 0.1 GHz
Modulations	Pulse, AM/FM	None	Pulse, AM/FM
Reference in/out	10 MHz	10 MHz, 100 MHz	10 MHz, 100 MHz, 1 GHz
Communication ports	SPI, USB	PXI, USB	SPI, USB, Ethernet
Power supply and consumption	12 VDC / 20 W	10 – 15 VDC / 21 W 5, 12 VDC / 21 W	12 – 30 VDC / 24 W

APDMC-X Series:
High Density Multi-Channel SGs (Release Mid. 2024)

The APDMC20-X is a very high channel density synthesizer with up to 16 independent channels, specialized for high density phase-coherent multi-RFLO and system clock applications.





Models	Description	Output Power
APDMC3-8/16 APDMC20-8/16/32 APDMCXX-X	1 MHz to 3 GHz 10 MHz to 20 GHz customizabe	-10 to 18 dBm

Features:

- High channel density up to 16 channels in a 19” 1HU chassis
- Low price per channel
- Phase-coherent, phase-coherent switching, phase memory
- Customizable in frequency and power dynamic range

Frequency Synthesizers

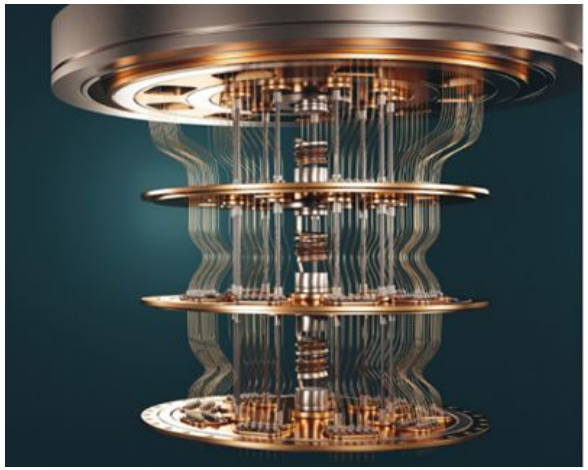
- **Compact size for instrument-embedding and system integration.**
- **Multi-channel configurability with 1 GHz common reference use for Phase Coherence.**
- **APMSYN22 PhN behavior like APSIN, APUASYN;**
  APMSYN40 PhN behavior like APULN, APMS, APSYN140;
  APMQS20 PhN behavior like APLC.

- **Very cost-efficient signal sources 20 / 40 GHz, in desktop / portable form,**
  if no AM and wide power range adjustment needed.

- **Lower cost alternatives to APMS: APUASYN20-X / APSYN140-X for Quantum Computing:**
  RFLOs to IQ mixers, and for pumping the parametric amplifiers.

Single- and Multi-Channel APVSG -- Applications

- Generation of standard wireless communication signals (5G, 6G, BT, WiFi, GNSS, etc.) with 3rd party software
- Radar, EW
  - PDW playback and streaming
  - Fast freq hopping (communication and jamming)
- Quantum Computing: Generation of QuBit manipulation signals
- Avionics modulation signals
- EMC testing: multi-carrier with user-definable carrier modulation
- Power bank supported field applications



RF & MW Signal Sources Relevant for Radar & EW

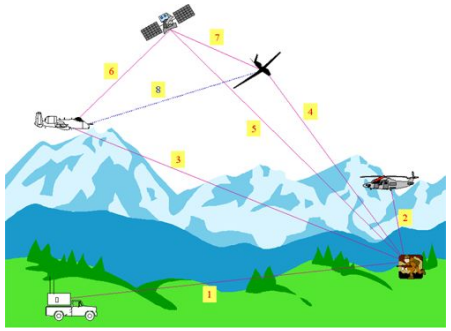
Enabling Features:

- Compact size and low power consumption
- Single- and multi-channel configurability
- Fast Power and Frequency Switching
- Low Phase Noise and High Signal Purity
- Multi-Channel Sources:
  - Phase Coherence
  - Phase-Coherent Switching
  - Channel-Individual Phase Adjustment
  - APVSG-X:
    * PDW (Pulse Descriptor Word) Playback and Streaming
    * Waveform and Time Base Synchronization
    * Phase Calibratable Mode

RADAR & EW Application Scenarios

Vehicle- Submarine- and Air-Borne Radar Systems

Communication and Jamming



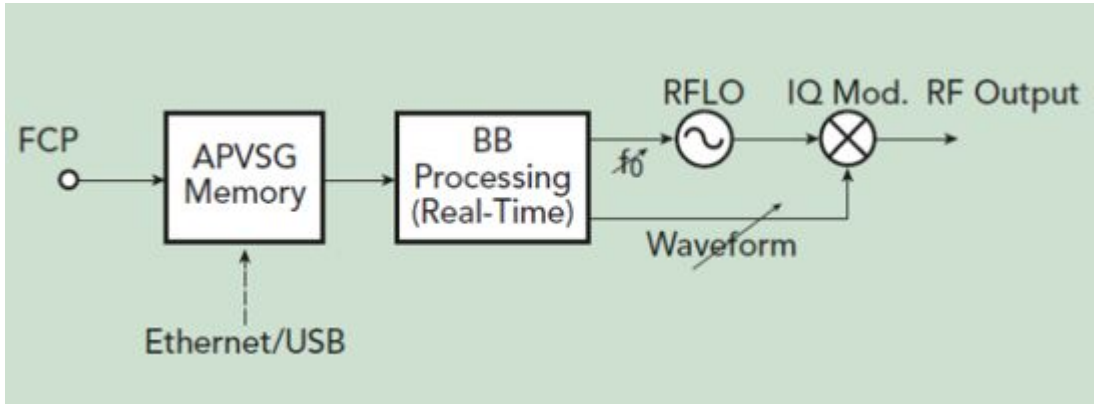
Radar Path Calibration w/ Powerbank Operated SGs

APVSG-X for Radar and EW: Main Operation Modes

- Compilation of I/Q files / segments; upload to APVSG internal RAM; (segment ID selective) playback
- I/Q file streaming through FCP (Fast Control Port): **Option FCP**
- Compilation of PDW lists; Upload to APVSG; real-time interpretation to I/Q data; playback: **Option PDW**
- PDW list streaming through FCP (Fast Control Port): **Option FCP**

- Ultra-fast switching: **Option UFS**
- Phase-coherent switching: **Option PHS**
- Time base synchronization: **Option SYNC**
- Phase-calibratable mode: **Option PCM**

Pulse Descriptor Word: Playback and Streaming



Mode 1: PDW List Upload & Playback

A list of PDWs (precompiled file describing pulse sequence parameters) is uploaded into the APVSG internal memory. During the playback, each PDW is translated to the corresponding modulation parameters in real-time for signal generation.

Mode 2: PDW Streaming

PDWs are fed into the APVSG internal memory in real-time through the FCP (Fast Control Port) for immediate playback as described in mode 1.

(AN6008: Pulse Descriptor Word for APVSG)

PDW (Pulse Descriptor Word) Structure

Address Range	Parameter Name	Parameter Group
1	PDW Configuration	PDW Setting
2 – 3	Reserved	
4	PDW Modulation	
5 – 6	Reserved	
7	PDW Marker	
8 – 15	Reserved	
16 – 23	Start Time	PDW Timing
24 – 31	Pulse Width	
32 – 33	Waveform Segment	Waveform Modulation
34 – 47	Reserved	
48	RF Output	Carrier Output
49 – 54	Frequency	
55 – 56	Power	
57 – 58	Fixed Phase	
60 – 69	Reserved	Offset
70 – 89	Reserved	FM/PM
90 – 97	Reserved	AM
98 – 105	Reserved	Chirp
106	Sweep On Pulse	Phase Sweep
107 – 108	Phase Step	
109 – 116	Sweep Dwell Time	
117 – 124	Sweep Step Time	
125 – 255	Reserved	Reserved

PCM: Phase Calibratable Mode

- With option PHS, the APVSG guarantees deterministic and reproducible phase relationshs between individual channels and devices.
- Deterministic and reproducible, however, means that those phase relationships may still vary with power and frequency settings. Varying RF path configurations (gain and attenuation settings must be adjusted) cause jumps in the phase relationship over power and frequency setting. Thus, phase calibration is only feasible for selected combinations of power and frequency. Covering a broader range of power and frequency would require a very high number of phase calibration points, causing prohibitively long calibration measurement times.
- PCM addresses that shortcoming by using less, and therefore larger, ranges over power and frequency using a common RF path configuration and thus generating stable phase relationships.
- Power setting accuracy and resolution is maintained by scaling IQ modulation data instead of adjusting RF path gain or attenuation.

(AN6011: Phase Calibratable Mode for APVSG)

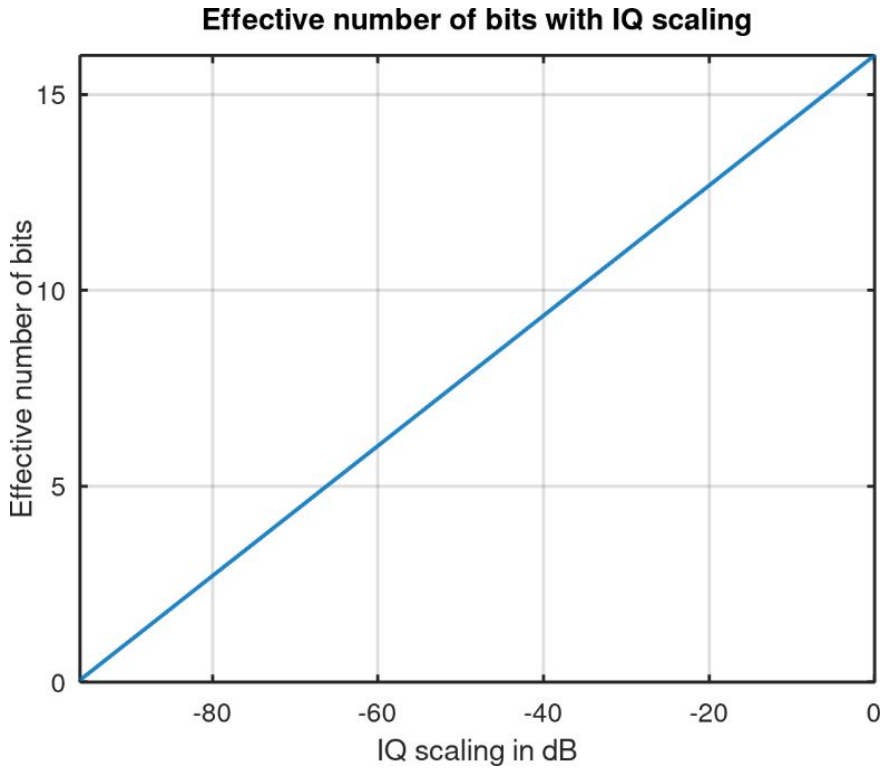
PCM: Effect of PCM

Advantages of PCM

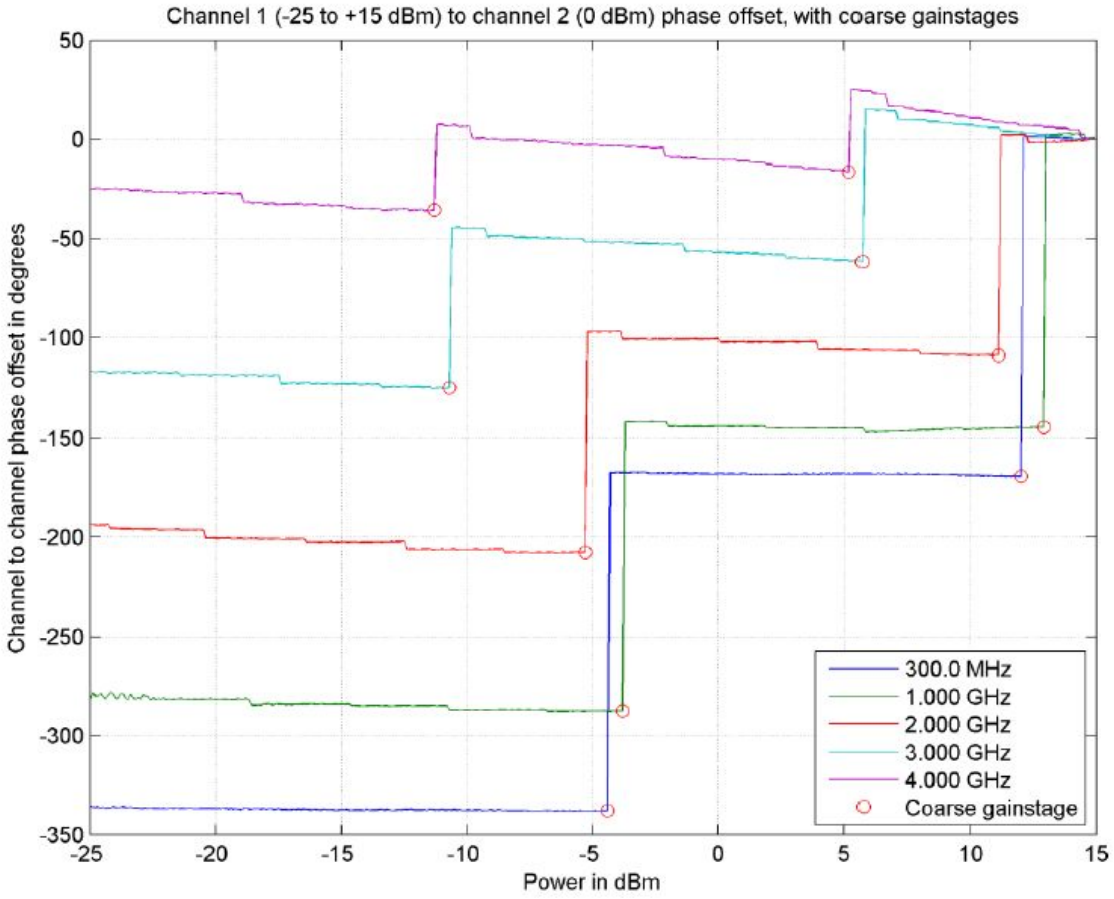
- Static phase relationships over power level.
- Linear phase relationships over frequency.
- Phase calibration over a larger or even the full power and frequency range is possible with only a few calibration points.
- PCM has no impact on switching speed. PCM is fully supported in ultra-fast switching (UFS) mode, e.g., with pulse descriptor word (PDW) playback.

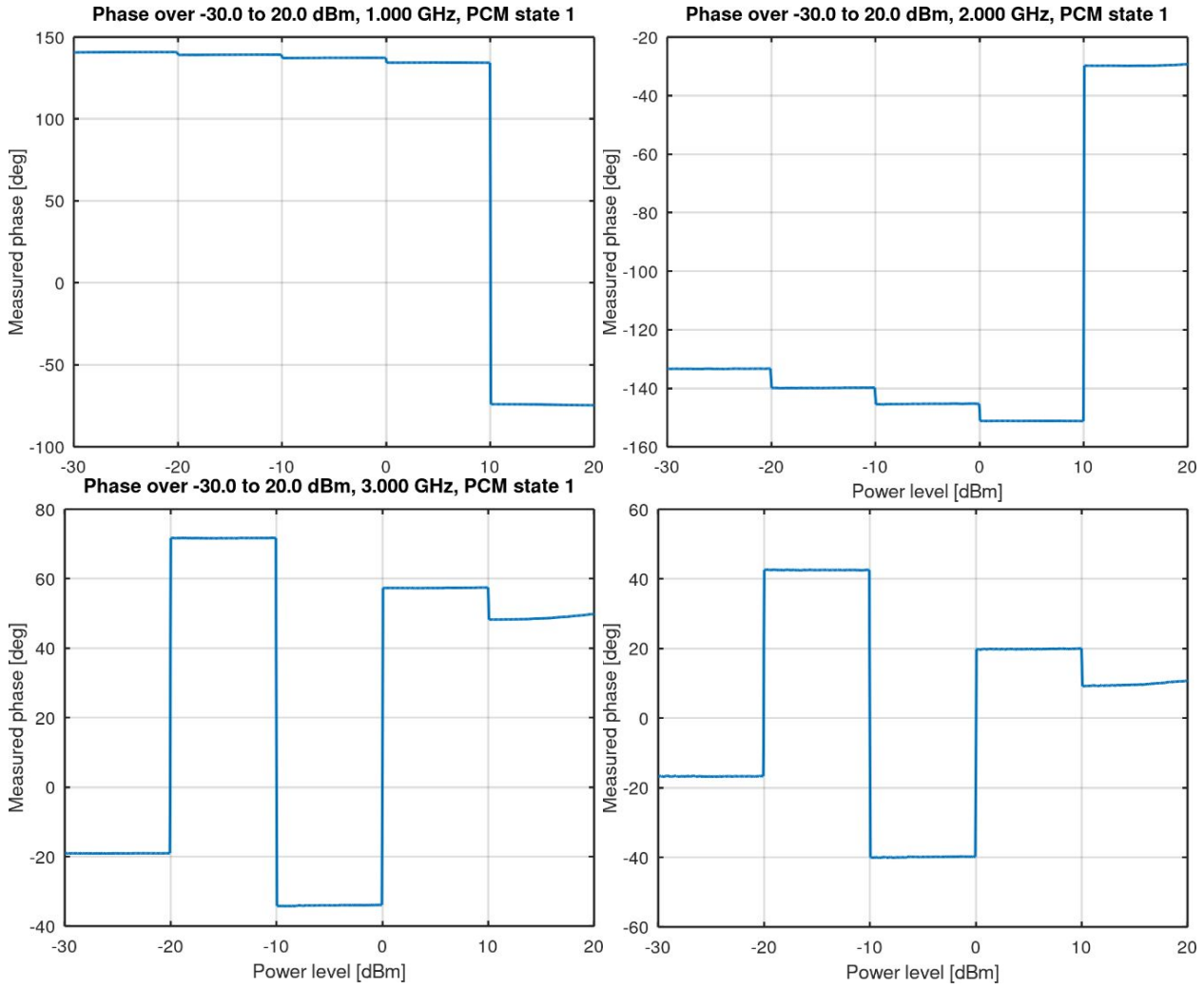
Impact of IQ Scaling

- Effective # of bits decreases with bigger IQ scaling range.

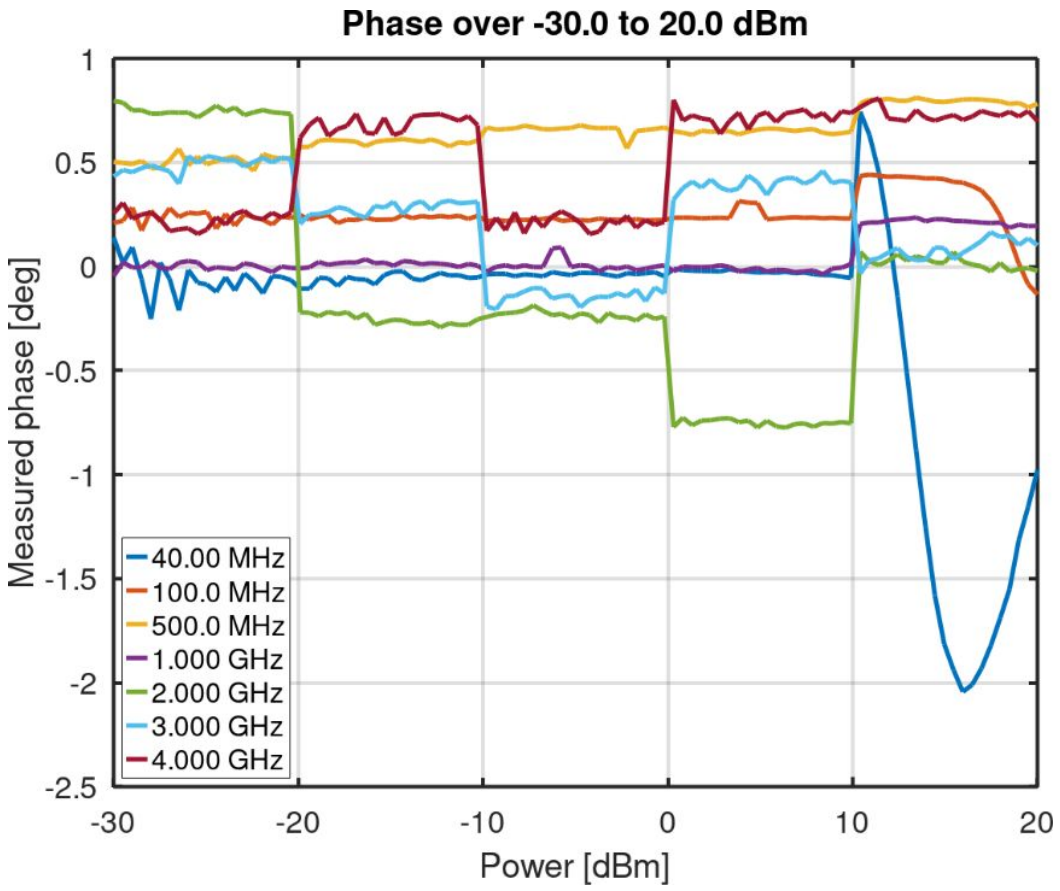


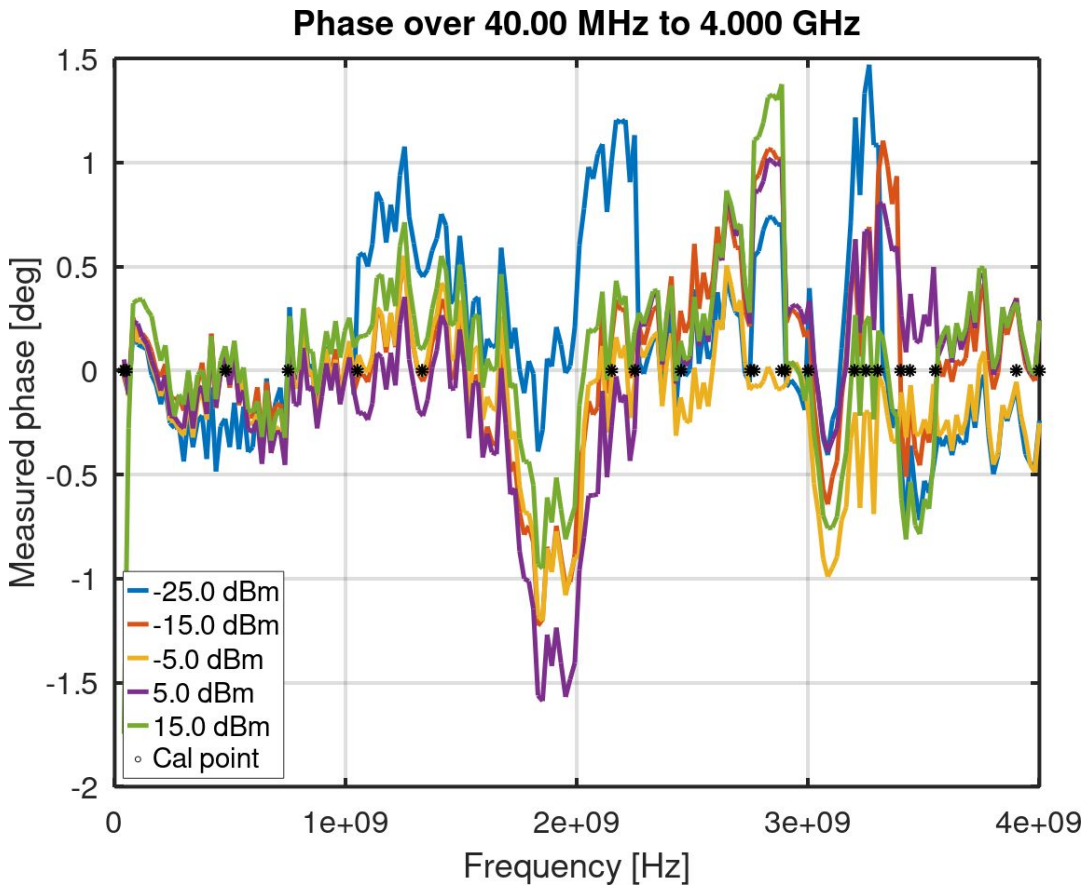
Phase vs. Power and Frequency Before and After Calibratable Mode



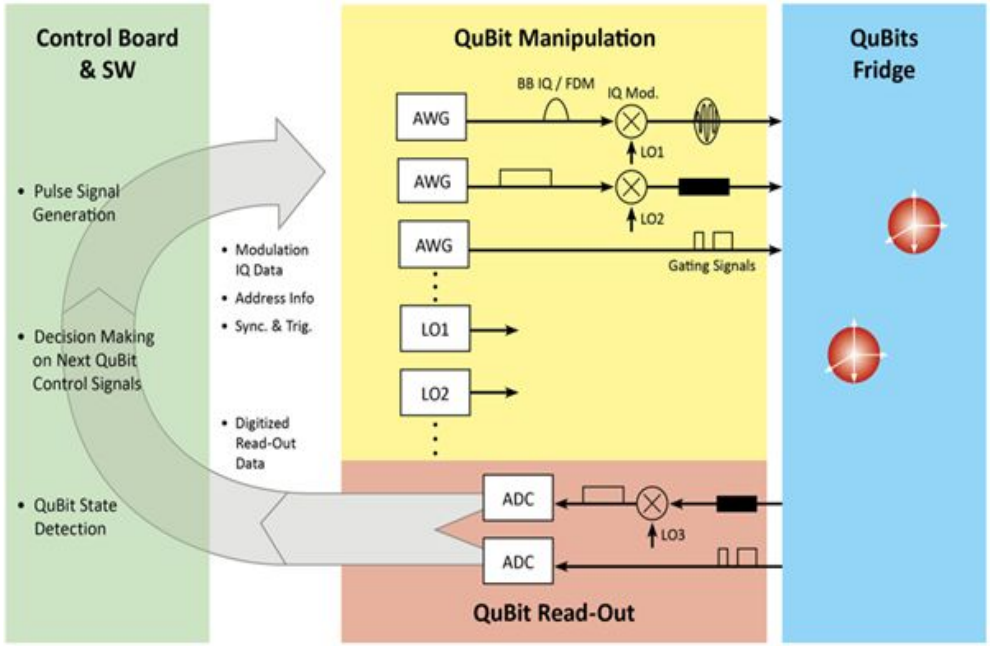


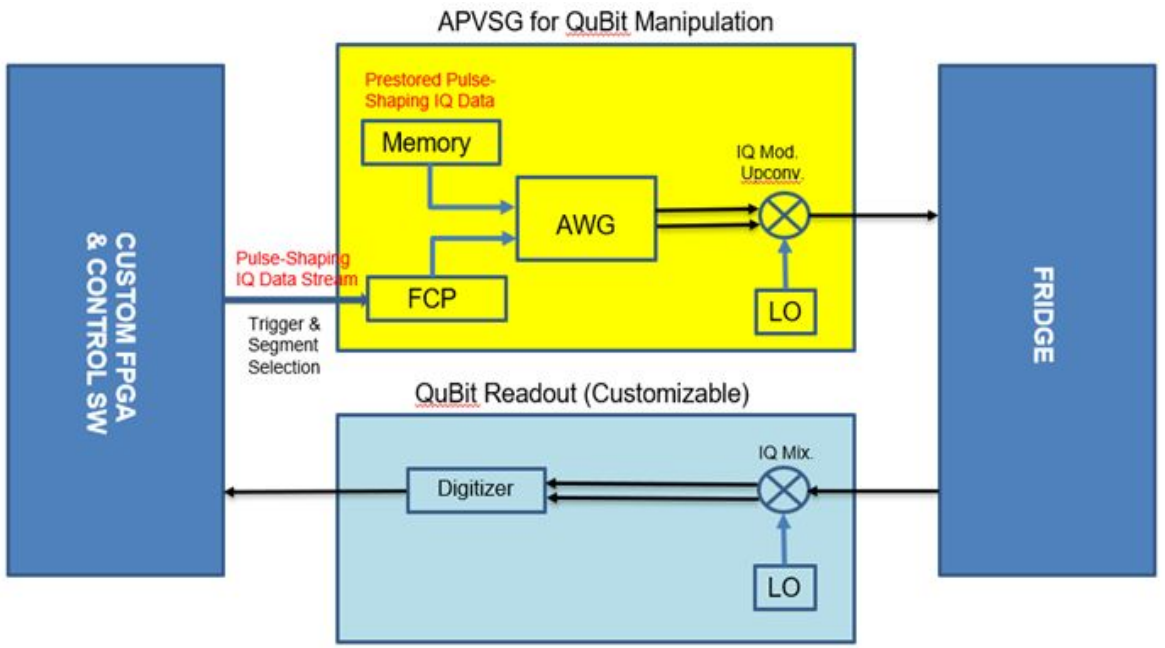
Phase vs. Power and Frequency
After RF Phase Calibration





APMS / APUASYN and APVSG for Quantum Computing





- APMS (APUASYN): RFLOs, Pumping Sources for parametric amplifiers
- APVSG: for multi-QuBit manipulation signal generation
- Phase-coherence, low phase noise, low latency, compact design, low power consumption …

Signal Source Analyzers

Crystals

KVG, NELFC, Magic XTAL, Morion, Greenray, Rakon France & UK, MtronPTI, Quarzcom, SiTime, Semtech, RFX, Taitien Electronics, Haichuang, Haijiang, Panda Nanjing

Time and Frequency Standard Research

METAS, PSI, CNES, European XFEL, NRAO, DESY, Pohang Accelerator, Observatoire Paris, SINAP China, TRESCAL, NIM China

RF and Microwave modules

Rockwell Collins, British Aerospace (BAE), Teledyne, Mitsubishi, Raytheon, Quovo, Custom MMIC, NEC, Peregrine, Cobham, Knowles, Broadcom, JRC, Aoptix, Elbit, ELDES, JPL, FEI, EYAL Microwave, ST Electronics, CETC China, TMY Taiwan, TNO Netherlands, NASA

Communications

NOKIA, Eriksson, Aeroflex Malaysia, Vitesse Semicon, Tektronix, Spreadtrum China

Signal Source Analyzers

Model	Description
APPH6040	1 MHz to 7 GHz
APPH20G	1 MHz to 26 GHz
APPH40G	1 MHz to 40 GHz
APNA50G	1 MHz to 50 GHz (Mid 2024)
APNA65G	1 MHz to 65 GHz (Mid 2024)

Key features

- Easy operation: PC based GUI software, remote control through LAN, USB, GPIB
- Single broadband input from 1 MHz to 7 … 65 GHz
- Low noise floor (< -190 dBc/Hz)
- Offset range: 0.01 Hz to 100 MHz
- Flexible internal and external references
- Built-in 3 independent tuning voltages (-5 to +22 V)
- Built-in 2 independent DC supply voltages (0 to 15 V, 600 mA each)
- External 10 MHz reference input
- External trigger input
- Light weight: 11 kg and compact size

Signal Source Analyzers – Key Functions

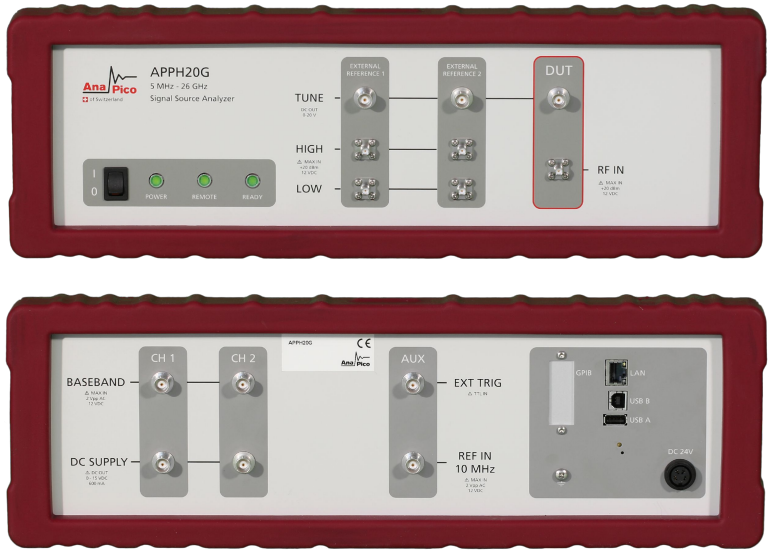
Description

Key functions:
▪ **Phase Noise Measurement**
  ▪ Absolute, residual / additive
  ▪ CW, pulse, burst (time-gated) measurement modes
  ▪ High-drift or slowly modulated
  ▪ With internal or external references
▪ **Amplitude Noise Measurement**
  ▪ Absolute
  ▪ CW and Pulse measurement modes
  ▪ High-drift or slowly modulated
  ▪ Always with internal references
▪ **Transient Measurement** (Frequency, Phase, Amplitude vs Time)
▪ **Short- and Long-Term Frequency Stability / Allan Deviation Measurement**: 1 s ... 10 days
▪ **Complete One-Step VCO Characterization** (Tuning, Tuning Sensitivity, Pushing, Power, Harmonics, Current, Phase Noise)
▪ **Baseband FFT Analyzer** (base-band 1 Hz to 100 MHz)
▪ **Spectral Analysis** (5 MHz to 65 GHz)

Signal Source Analyzers – Options

Option	Description	Supported Models
Option LN	Enhance phase noise test sensitivity (HW)	All
Option PULSE	Add pulsed measurement capability (SW)	All
Option NPS	Very Narrow Pulse measurement mode (SW)	All
Option BURST	Burst mode phase noise measurement (SW)	All
Option AM	Add amplitude noise measurement capability (SW)	All
Option APN	Additive phase noise measurement (SW)	All
Option TRAN	Transient measurement (SW)	All
Option TSTAB	Time stability analysis (SW)	All
Option LO	Access to two internal references (HW)	All
Option VCO	One-step VCO characterization (SW)	All
Option SPEC	Spectrum Monitoring (SW)	All

Signal Source Analyzers – Front and Rear Panels



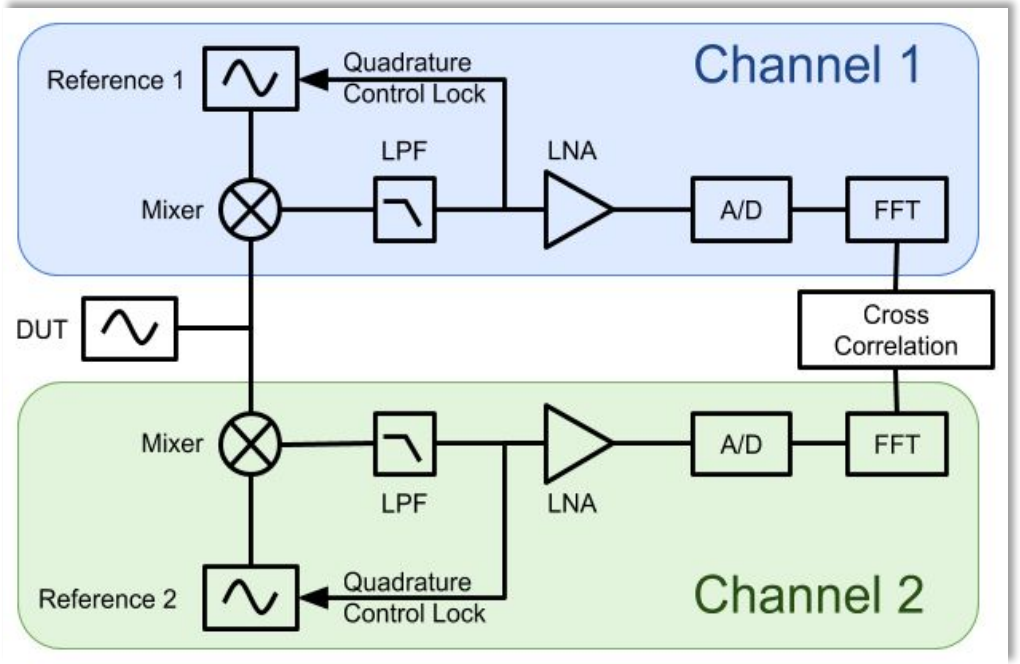
Front

DUT in (-15 to +23 dBm)
DUT tuning voltage out (-5 to +22 V)
Ext. ref. in (up to +23 dBm)
Ext. ref. tuning voltage out (-5 to 22 V)

Rear

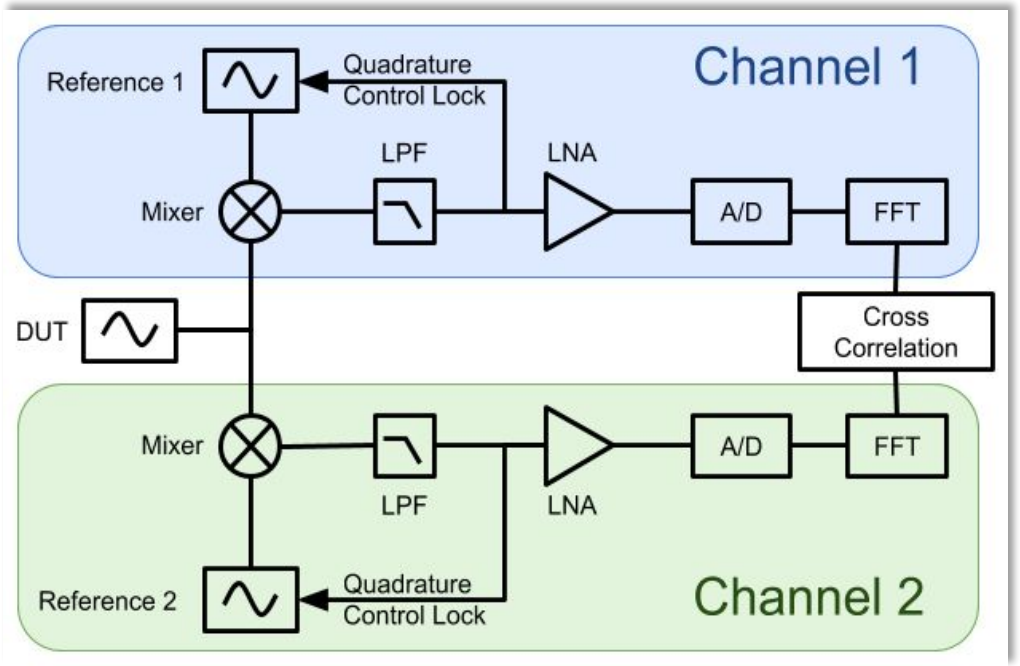
Baseband in 1, 2
Precision power supply voltage out 1, 2, 15 VDC, 600 mA
Ext. trigger in
10 MHz ref. in
LAN, USB, GPIB
DC Power in

Fundamental Concept (Phase Noise Testing)



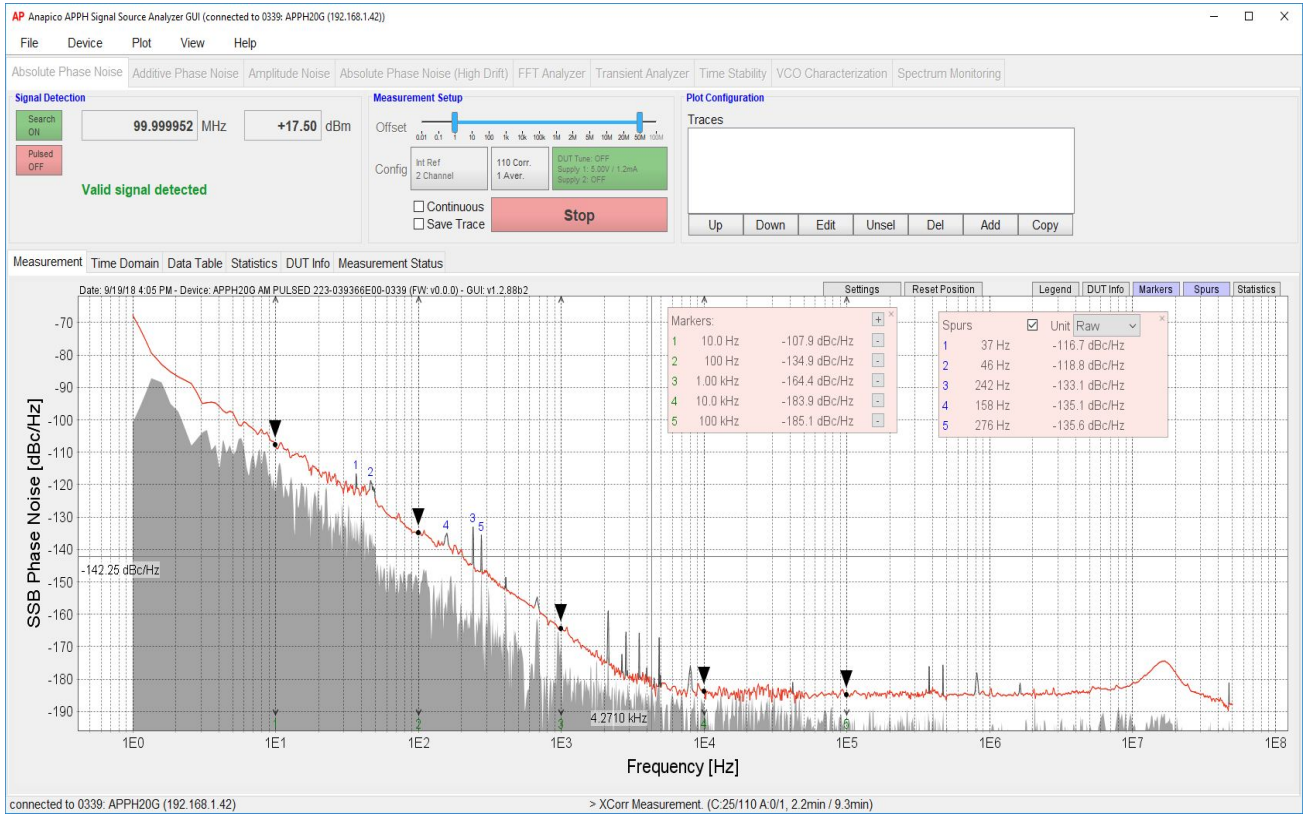
- The DUT signal is divided into two parallel branches.
- Except for high-drifting DUT, we choose to use PLL based «Zero-IF» front-end technology: before LNAs, we have baseband signals incuding all the noise elements.
- «Direct IF Sampling» for high-drifting DUTs.
- References can be internal or external. And in LN mode, an additonal pair of high-quality references are built-in to further reduce the phase noise floor in the close-in freqeuncy area.
- Multiple cross-correlations overcome instrument-internal thermal noise and reference (uncorrelated) noise.

Optimized Algorithm Shortens the Measurement Time



- The PhN measurement time consists of the following:
  - APPH-internal Hardware Setup Time: PLL locking, phase detector calibration, etc.;
  - Data Acquisition Time: Sufficient data need to be collected for meaningful statistical data processing. The higher resolution and lower offset frequency lead to longer data acquisition time;
  - Data Processing Time: FFT and Cross-Correlation, etc.
- APPH applies following techniques to reduce the PhN measurement time:
  - Smart and adaptive choice of circuit parameters such as PLL loop bandwidth to reduce the hardware setup time;
  - Smart choice of resolution (data samples per frequency decade) to shorten the data acquisition time;
  - Highly efficient parallel processing of the data acquisition and processing.

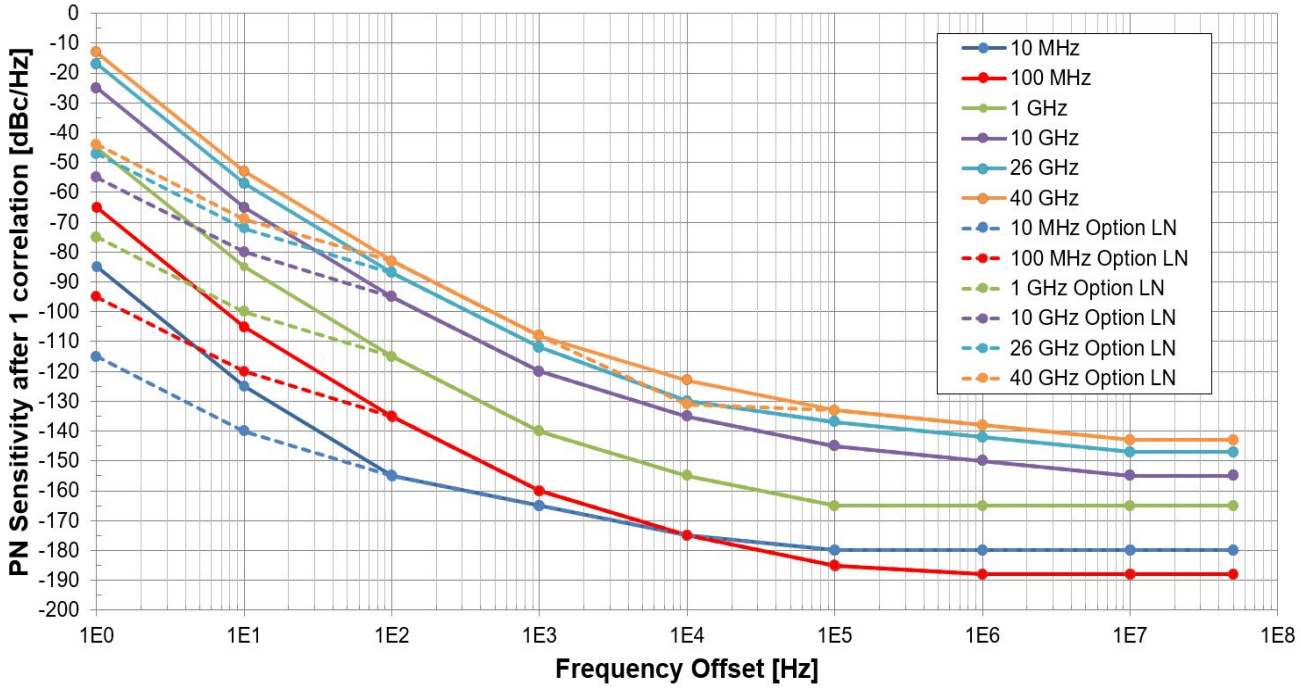
Absolute Phase Noise Measurement – Standard and LN mode



Description

- All on one GUI page
- Automatic DUT frequency search
- Frequency counter and power meter
- Adjustment of offset range, resolution, # of CC and AVG, etc.
- In the “Statistics” tab: jitter, Allen Deviation, etc.
- Spurious on / off

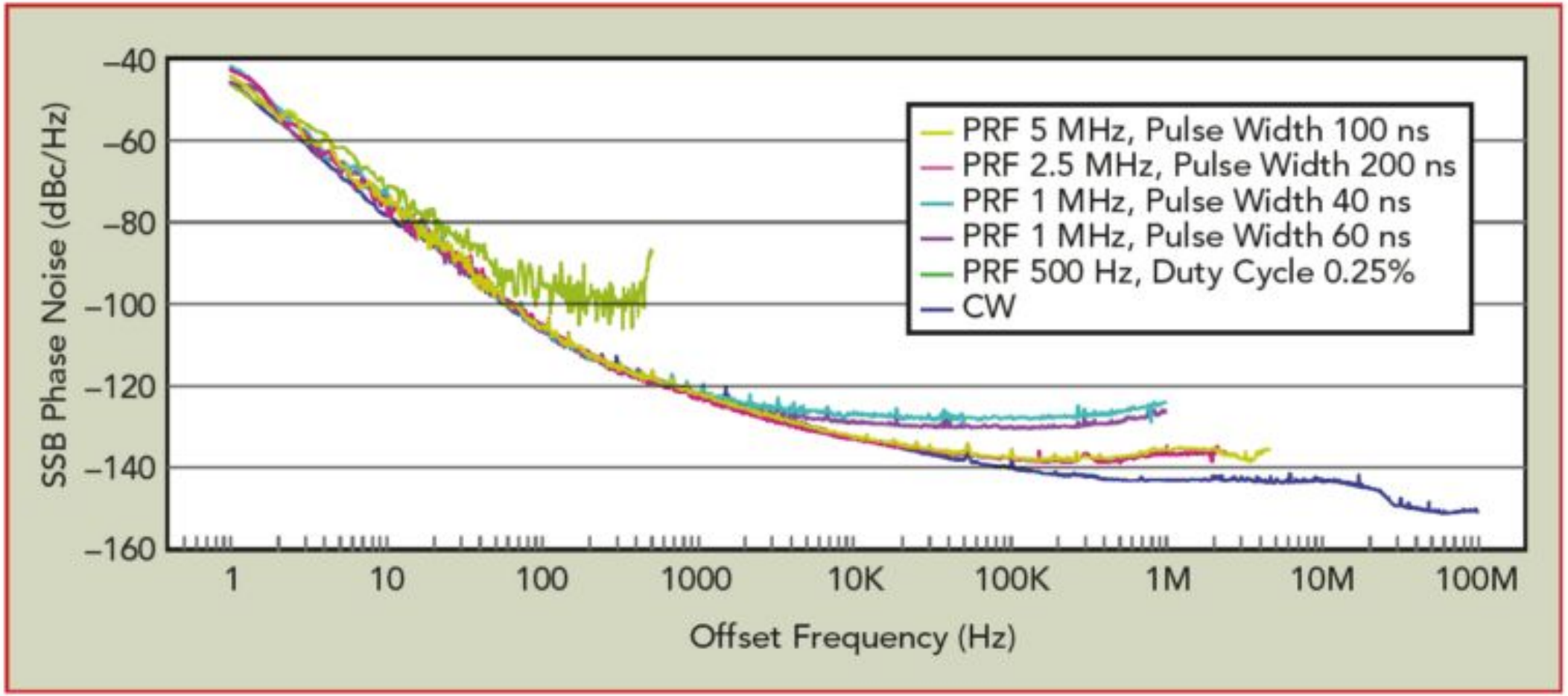
Absolute Phase Noise Measurement – Sensitivity Levels



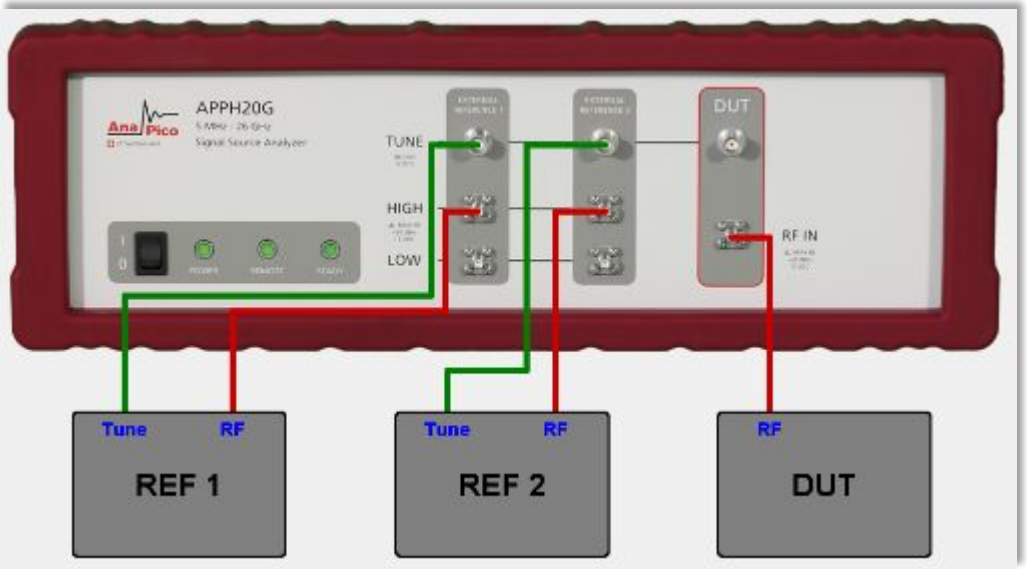
Description

- Measurements (left) done with 1 cross-correlation
- When using internal references, LN mode improves phase noise test sensitivity especially in the offset range < 1 kHz.
- Regardless with internal / external references, multiple cross-correlation further improves the measurement sensitivity:
  - 10 correlations: ~ 5 dB better
  - 100 correlations: ~ 10 dB better
  - Limit: system noise floor

Phase noise of Pulse modulated signal



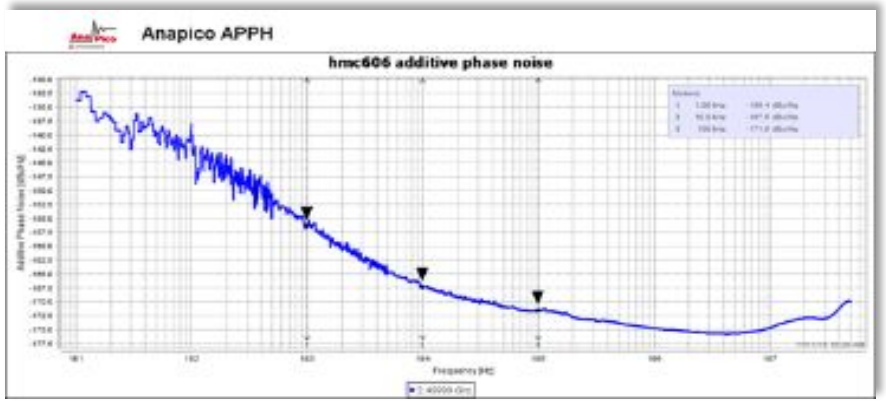
Absolute Phase Noise Measurement – With External References



Description

- The internal references, since they need to be adjustable in a wide frequency range, regardless whether it is in standard or LN mode, have significant influence on phase noise measurement sensitivity. Measuring DUTs with extremely low phase noise would then require a lot of cross-correlation and thus time-consuming.
- Using external references can reduce the number of cross-correlations, and therefore, shorten the measurement time. Choice of external references:
  - frequency-tunable (voltage control input)
  - frequency tuning ranges need to overlap with DUT frequency
  - phase noise of refs can be 10…15 dB worse than DUT's.
- Both single and dual ref channels possible.

Residual Phase Noise Measurement

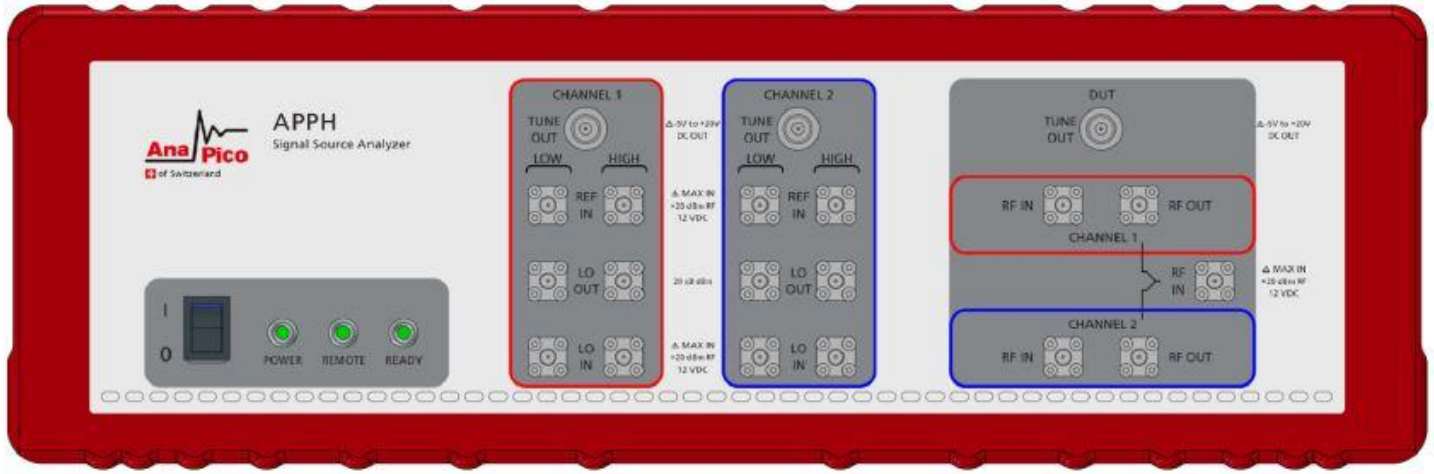


Description

- Measuring additive / residual phase noise of non-oscillating DUTs (LNA, mixer, multiplier / divisor, etc.) with extremely low instrument noise floor
- Using external signal source or internal reference source (option LO)
- Choice of accessories:
  - Oscillation source: Phase noise non-critical, but similar or better amplitude noise than the expected additive phase noise of the DUT.
  - Splitter: Good isolation, ideally non-resistive – low insertion loss
  - Phase shifter: min. 180° phase shift at target frequency
- Power balancing
  - REF IN ports need at least 13 dBm, RF (DUT) port at least 3 dBm
  - Dual-channel: REF IN power levels should be similar

Access to the Built-In References with Option LO

Connectors (Front – Option LO)



Additional RF Inputs

LO1 IN HIGH/LOW, LO2 IN HIGH/LOW: SMA female
RF1 IN, RF2 IN: SMA female

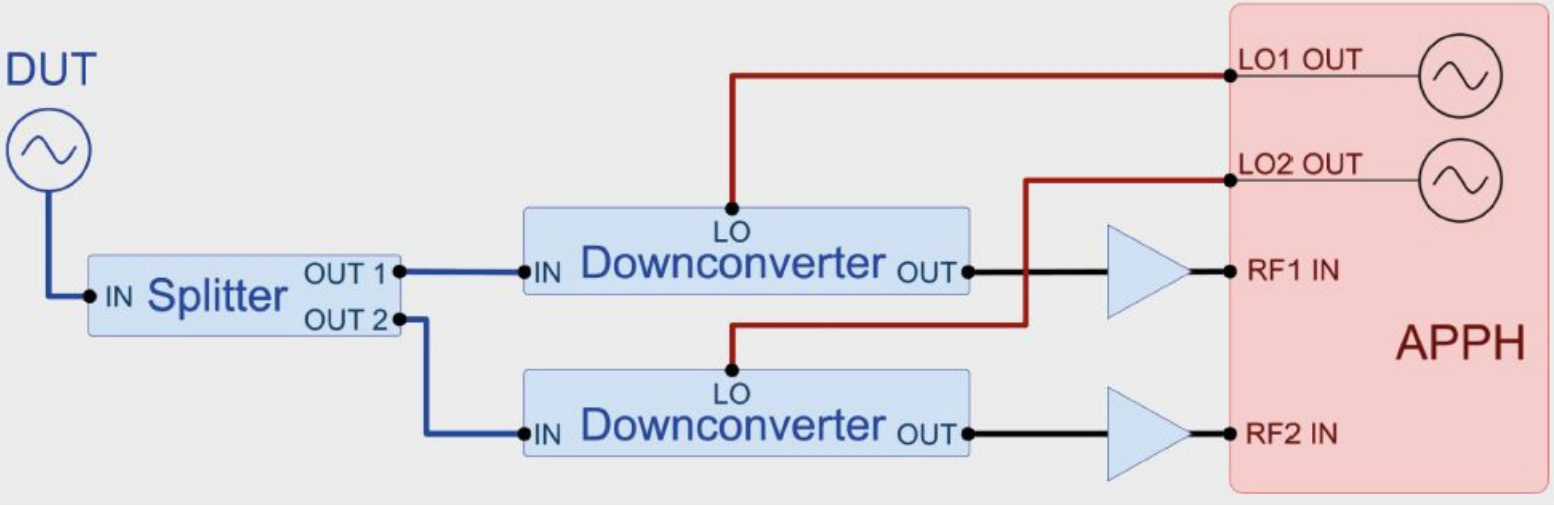
Additional RF Outputs

LO1 OUT HIGH/LOW, LO2 OUT HIGH/LOW: SMA female
RF1 OUT, RF2 OUT: SMA female

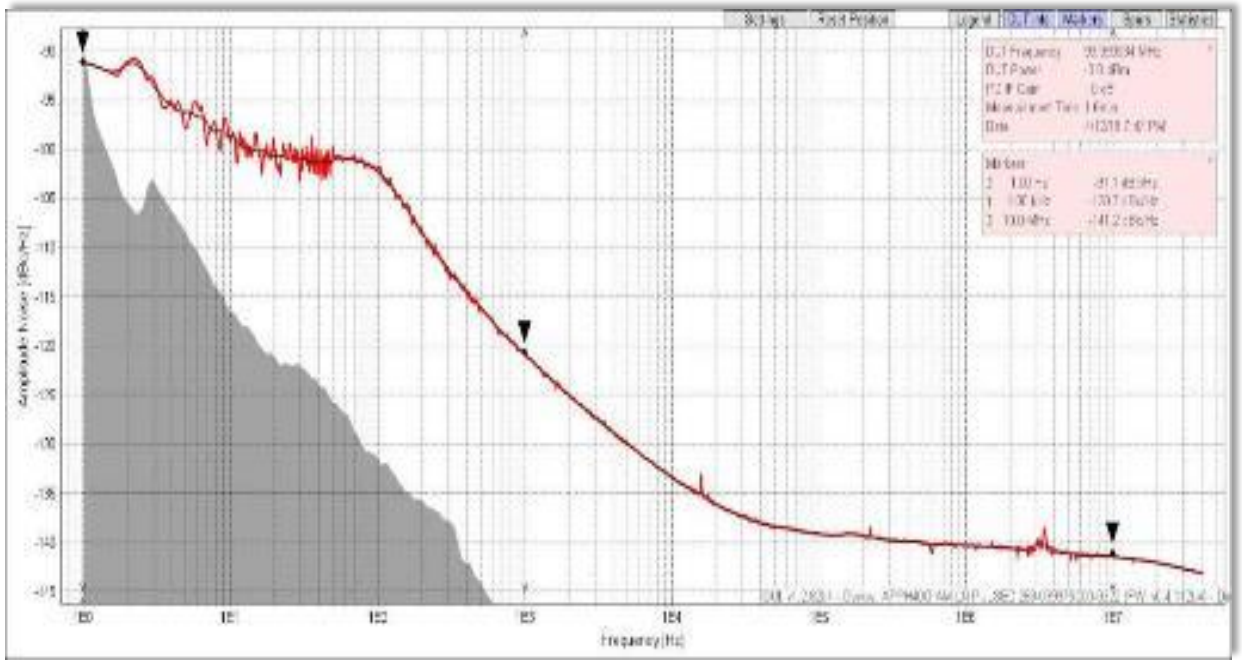
mmW Phase Noise Measurement Using Cross-Correlated Down-Conversion

AnaPico APPH Phase Noise Tester

Eravant mmW Module



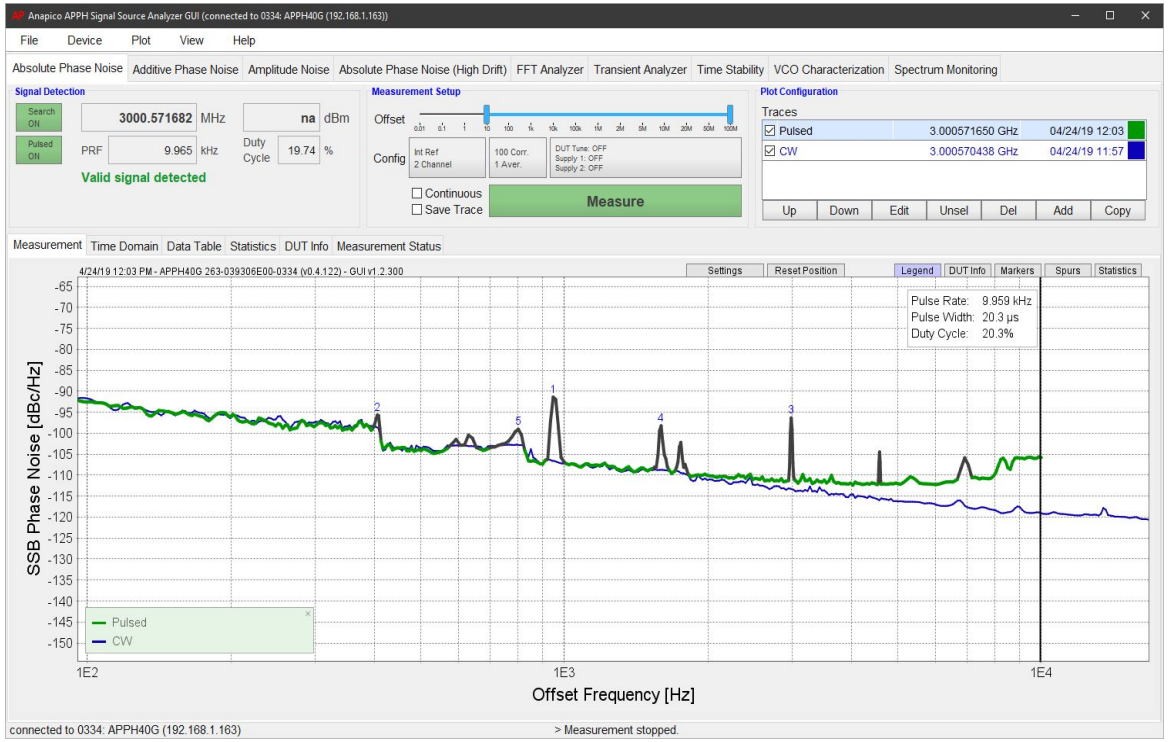
Amplitude Noise



Description

- Frequency range: up to 7 / 18 GHz
- Input power range:
  - 1 MHz to 10 GHz: -20…+20 dBm
  - 10 GHz to 18 GHz: -10…+20 dBm
- Offset Analysis Range: 0.1 Hz to 40 MHz
- No PLL, direct sampling
- Cross-Correlation further reduces measurement noise floor

Phase and Amplitude Noise Measurement in Pulse & Burst Mode



Description

PULSED Absolute and additive phase noise

- Detects pulses / pulse trains with a fast power detector
- Can lock to periodic pulsed signals and (aperiodic) pulse trains
- Automatic detection of duty cycle and pulse repetition frequency (PRF)

PULSED Amplitude noise

- Pulsed characteristic can be analyzed directly with I/Q demodulation
- Measured digitally

BURST mode

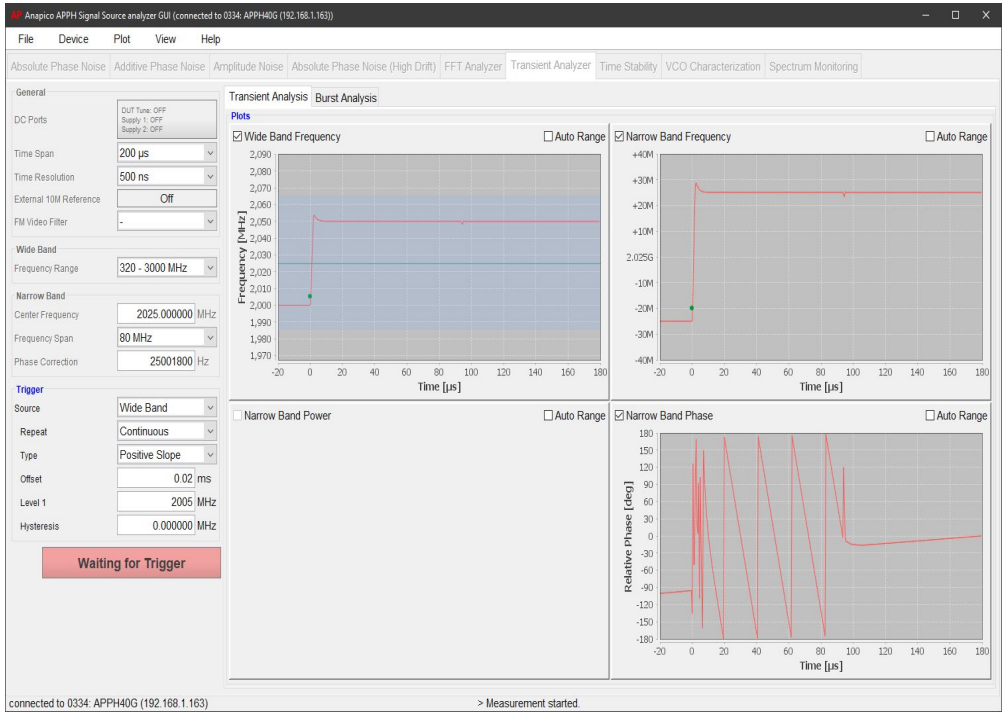
- Phase noise of individual pulses can be observed
- User selectable single pulse or pulse bursts (packet of pulses)

Performing Correct Phase and Amplitude Noise Measurements

Description

1. **Reduce environmental influences**
   - High Use high quality, possibly short coaxial cables for RF and control/tuning signals and shielded wires for DC power supply
   - Use precision DC power supplies or batteries to reduce influence from AC power grid (50 or 60 Hz) and from switching power supplies
   - Minimize mechanical disturbances (vibrations, movement of setup during measurement, loud sounds)
   - Reduce or shield from noise and interference sources (mobile phones, other DUTs, unrelated wiring/cords, computers)
   - Shielding can help to reduce crosstalk, temperature variation, mechanical vibration
2. **Use APPH original AC power adapter**
3. **Setup in general**
   - Fixed setup so it can’t move around
   - Sufficiently warming up of APPH, DUTs and other components
4. **External references**
   - Ideally use separate power supplies for each channel
   - Physically separate references (to reduce channel-to-channel crosstalk)

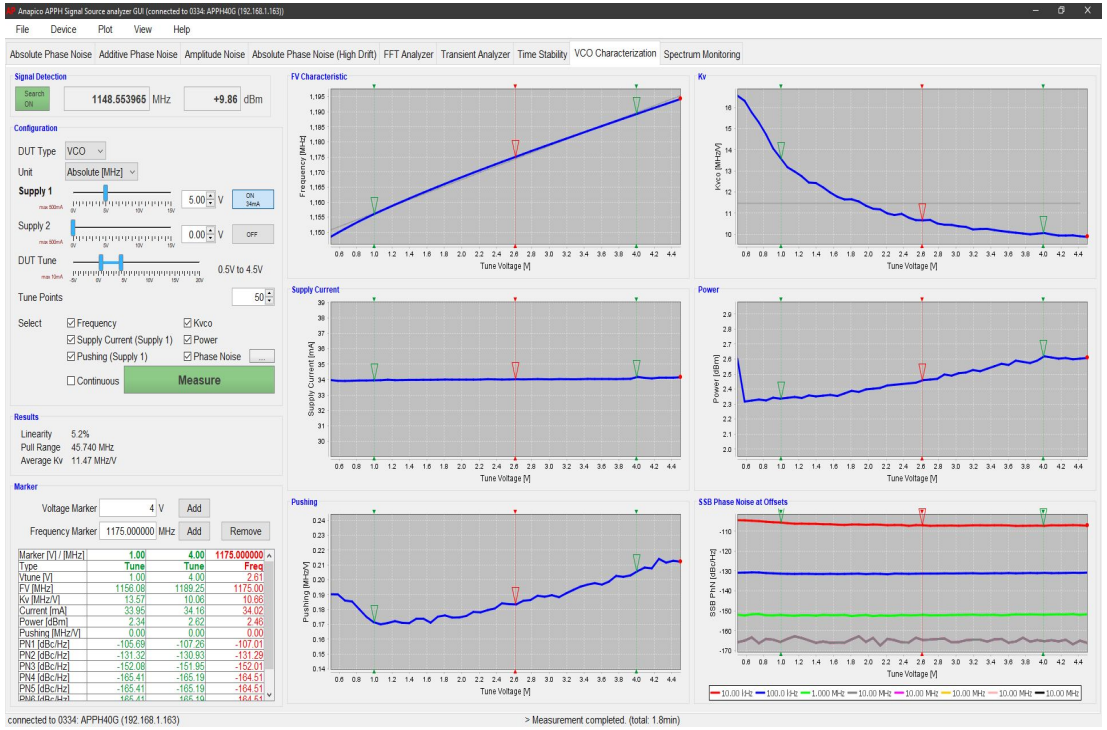
Transient Analysis



Description

- Look at short term behavior in time domain
- Wideband and narrowband mode (200 kHz up to 30 GHz span)
- Excellent time resolution (down to 8 ns)
- Frequency, Phase, Amplitude vs time
- Burst (time gating) mode phase noise
- Trigger mode can be set to internal (self-detecting), external (TRIG IN) or free running
- 4 display fields (max 3 pictures displayable)
  - Wide band freq vs time
  - Narrow band freq vs time
  - Amplitude/Power vs time
  - Phase vs. time or phase noise

VCO Characterization



Marker [V] / [MHz]	1.00	4.00	1175.000000
Type	Tune	Tune	Freq
Vtune [V]	1.00	4.00	2.61
FV [MHz]	1156.08	1189.25	1175.00
Kv [MHz/V]	13.57	10.06	10.66
Current [mA]	33.95	34.16	34.02
Power [dBm]	2.34	2.62	2.46
Pushing [MHz/V]	0.00	0.00	0.00
PN1 [dBc/Hz]	-105.69	-107.26	-107.01
PN2 [dBc/Hz]	-131.32	-130.93	-131.29
PN3 [dBc/Hz]	-152.08	-151.95	-152.01
PN4 [dBc/Hz]	-165.41	-165.19	-164.51
PN5 [dBc/Hz]	-165.41	-165.19	-164.51

Description

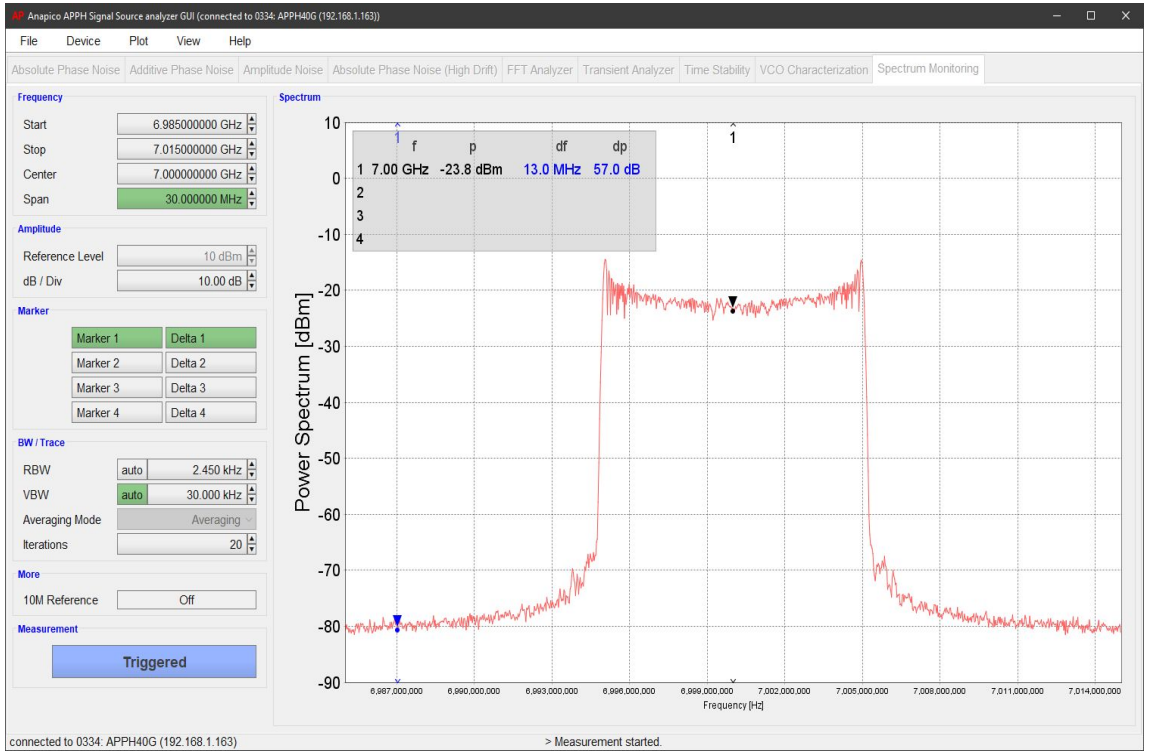
- One-step, full characterization of both VCO- (wide frequency tuning range) and VCXO-style (narrow frequency tuning range) DUTs
- 6 display fields:
  - Freq vs. tuning voltage
  - Kvco vs tuning voltage
  - Supply current vs tuning voltage
  - Power and harmonics vs tuning voltage
  - Pushing vs tuning voltage
  - Phase noise vs. tuning voltage
- Can control various supply and tuning voltages in sweep mode (outputs available at front and rear)

Long-Time Frequency Stability Analysis

Description

- Testing time from 1 s to 10 days
- Frequency drift over time
- Allan Deviation (ADEV) over time

Spectral Analysis



Description

- 5 MHz to 65 GHz
- Uncertainty: +/- 3 dB absolute; +/- 1 dB relative
- Noise floor: about -90 dBm/Hz

Traceable Calibration Procedure


Certificate of Calibration No XXX-00000

Specimen

Description

- Traceable Phase & Amplitude Noise Standard to ±0.5 dB, delivered with calibration certificate of accredited metrological testing lab.
- APPH built-in calibration procedures
- Used at meteorological lab, or by APPH end customer to quickly calibrate the phase and amplitude measurement correctness

Model	Description
APNS	Traceable Phase Noise Standard

Competitive Comparison

Parameters	AnaPico APPH			R&S FSWP		R&S FSPN	Keysight E5052B/E5053A	Keysight E5055A	
Frequency Range	1 MHz to 7/26/40/50/65 GHz			1 MHz to 8/26/50 GHz		1 MHz to 7/26.5 GHz	10 MHz to 7/26 GHz	1 MHz to 8 GHz	
Offset Range	0.01 Hz to 100 MHz			0.01 Hz to 1000 MHz		1 uHz to 1 GHz	1 Hz to 100 MHz	1 mHz to 1 GHz	
PhN Sensitivity dBc/Hz	**Std**	**LN**	**EXT**	**B60**	**B61**			**100**	**200**
@100 MHz, 10 Hz offset	-105	-120	-130	-108	-117	-120	-111	-121	-130
@100 MHz, 10 kHz offset	-175	-175	-178	-170	-170	-172	-164	-169	-169
@1 GHz, 10 Hz offset	-85	-100	-110	-88	-97	-100	-91	-101	-111
@1 GHz, 10 kHz offset	-155	-155	-170	-166	-166	-162	-146	-169	-169
Measurement Modes									
PhN / AM noise / pulsed / pulse trains	Y / Y / Y / Y			Y / Y / Y / Y		Y / Y / N / N	Y / Y / N / N	Y / Y / Y / Y	
Supporting ext. ref. for PhN testing	Y			N		N	N	N	
Residual phase noise CW / pulsed	Y / Y			Y / Y		N	N / N	N / N	
Burst Mode phase & amplitude noise	Y / Y			N / N		N	N / N	N / N	
VCO Testing	Y			Y		Y	Y	Y	
Transient Analyzer	Y			Y		Y	Y	Y	
Time Stability (ADEV)	Y			Y		Y	N	N	
Spectrum Analysis	Y			Y		N	Y	Y	
Integrated Supplies / Tuning Voltage	Y / Y			Y / Y		Y / Y	Y / Y	Y / Y	
Instrument Weight	10 kg			24 kg		> 20 kg	25 kg	24 kg	
Power Consumption	70 W			300 W		> 200 W	500 W	500 W	

Applications

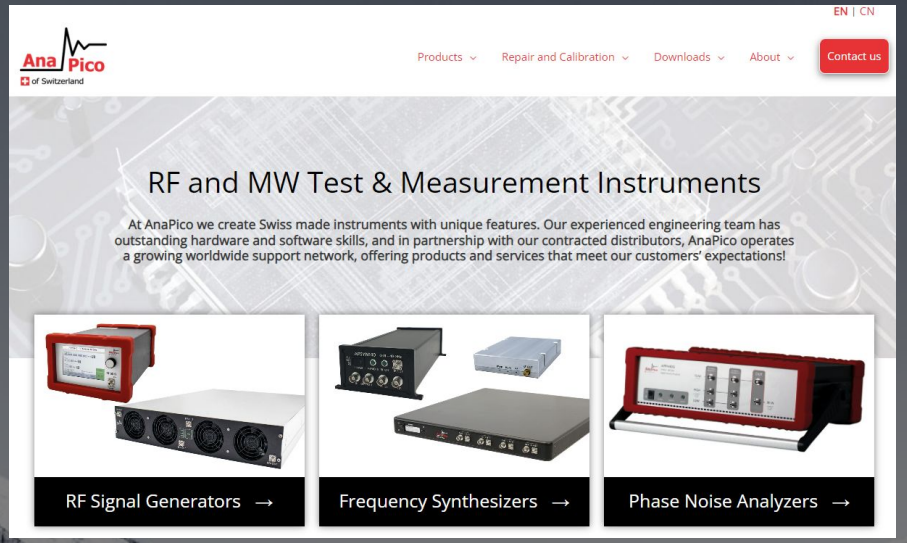
Function	Application	Target Customer
Absolute Phase Noise / ATE	Automated (production) testing	Electronics manufacturers, semiconductor factories, design houses
Absolute Phase Noise	CW: Synthesizer, VCO, PLL, YIG, DRO, OCXO PULSED: Radar	R&D
Residual / Additive Phase Noise	Amplifier, transmitter, pre-scaler, phase coherence , synthesizer, phase stability	Active RF component manufacturer, semiconductor R&D, synthesizer R&D, accelerator time synchronization
Transient Analysis	Synthesizer switching, crystal startup behavior, modulation analysis, BURST mode phase noise analysis	Crystal manufacturer, synthesizer manufacturer
Time Stability	Device and module stability analysis	
VCO Testing	Characterization of VCO and other tuneable oscillating devices	VCO manufacturer
Spectrum Monitoring	Frequency drift, harmonics, modulations	

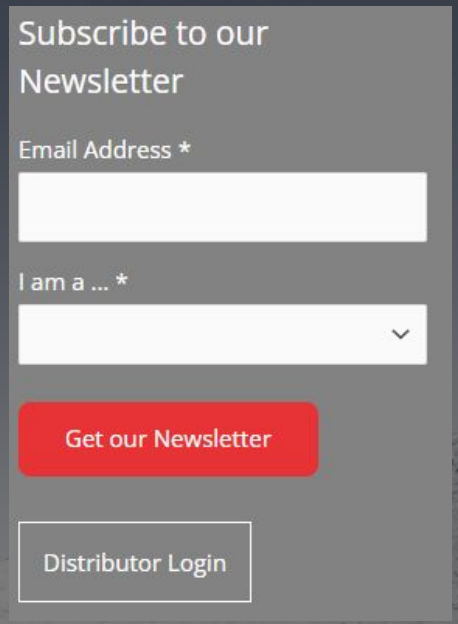
Visit

www.anapico.com

for more info!

Datasheets, user's and programmer's manuals, application notes, tutorial videos, latest firmware and GUI software, …





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Ana Pico

of Switzerland

Accurate
Reliable
Affordable