

53100A Phase Noise Analyzer

For Precision Oscillator Characterization



Summary

The 53100A Phase Noise Analyzer measures the amplitude, phase and frequency stability of high-performance RF sources. Carrier frequencies from 1 MHz to 200 MHz are supported. The 53100A tells you everything you need to know about the stability characteristics of your devices, at timescales ranging from femtoseconds to days. From use on a bench-top or embedded into rack-mount ATE systems, the small formfactor and industry-leading measurement speed makes this test set versatile for multiple applications.

Expanding upon the heritage of the 3120A and 51XXA series of instruments, the 53100A makes fast yet accurate single side band (SSB) phase noise and Allan deviation (ADEV) measurements at a fraction of the cost of alternate solutions. Thanks to an improved design and advancements in manufacturing, the 53100A offers improvements in reliability and performance over its predecessor technologies.

Features

- Independent input and reference frequencies from 1 to 200 MHz (capable of higher frequencies with external down-converters)
- No phase-locking or measurement calibration required
- Single or dual reference oscillator inputs allow cross-correlation measurements
- TSC 51XXA command and data stream emulation reduces the burden of re-writing existing test scripts
- Intuitive graphical interface enables a user to quickly start making measurements

Measurements

- Real-time 'strip charts' of phase and frequency differences at subpicosecond precision
- Absolute frequency counts at 13+ digits per second, 17 digits maximum
- Allan deviation (ADEV) typically 5E-15 at t=1s
- Modified Allan deviation (MDEV), Hadamard deviation (HDEV), time deviation (TDEV) and Maximum Time Interval Error (MTIE)
- Phase noise and AM noise at offsets from 0.001 Hz to 1 MHz and levels typically below -175 dBc/Hz (10 MHz floor)
- RMS-integrated time jitter, residual FM, and SSB carrier/noise ratio

Using high performance host-based DSP techniques on a Windows® PC, all of these measurements can be made simultaneously. Results appear as you watch – and you can save, view, compare, or print them at any time with a variety of export options including TSC 51XXA compatibility. Accuracy and stability are inherited from a user-supplied external reference which can run at any frequency within the supported range, with no calibration required by the instrument itself.

Specifications @ 25 °C (ambient), unless noted otherwise

Performance

Frequency Range	1 to 200 MHz
Allan Deviation (t=1s)	7E-15 (5E-15 typical)
Allan Deviation (t=1000s)	2E-16 (1E-16 typical)

Phase Noise Specifications

Offset Frequency Range	0.001 Hz to 1 MHz
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System Noise Floor

Offset	5 MHz Carrier	100 MHz carrier
1 Hz	-135	-120
10 Hz	-145	-130
100 Hz	-155	-145
1 kHz	-165	-160
10 kHz	-170	-170
>100 kHz	-170	-170
Spurious (5 to 100 MHz)	-100	-100

Electrical Specifications

Input Signal Level	-5 to +15 dBm
Input Impedance	50Ω

Mechanical & Environmental Specifications

Size	13.5 x 8.5 x 3.6 inches (344 x 215 x 91 mm)
Power	<20W (90 to 264 VAC)
Operating Temperature	+15°C to 35°C
Storage Temperature	-20°C to +50°C
Unit Weight	3.2 kg (7 lbs)
MTBF	90,000 hrs at 25°C (GB)
Compliance	RoHS, CE, FCC

Product Includes

- USB 2.0 cable, A(m) / B(m)
- Power supply (50/60 Hz, 100 to 240V)
- (Qty= 2) N(m) / BNC(f) coax adapters
- (Qty=5) SMA(m) / SMA(f) coax jumpers, 1 inch (25.4 mm)

Front Panel

N(f) RF connector	(Qty=2) DUT and Reference
SMA(f) RF connector	(Qty=4) Multichannel expansion
LED	Instrument status indication

Rear Panel

USB-B connector	PC connectivity
SMA(f) RF connectors	(Qty=3) Reserved for future use
DC input jack (2.1mm)	For use with 15V external power supply

Ordering Information

Part Number	Description
090-53100-000	53100A Phase Noise Analyzer

Software



53100A phase noise test software is shipped along with the product. It allows a user to set up various measurement configurations/speeds, toggle display settings, import/export data, run scripts, set up mask lines and more.