

6 Specification

This chapter lists the specifications and general specifications of the analyzer. All the specifications are guaranteed when the following conditions are met unless otherwise noted.

- The instrument must have been warmed-up for 30 minutes.
- The instrument is in the calibration period and a self calibration has been performed.

6.1 Specification

6.1.1 Frequency

Frequency		
Frequency Range	DSA1030A	9 kHz to 3 GHz
Frequency Resolution		1 Hz

Internal Frequency Reference		
Reference Frequency		10 MHz
Aging Rate		<3 ppm/year
Temperature Drift	20 °C to 30 °C	<3 ppm

Frequency Readout Accuracy		
Marker Resolution		span / (sweep points-1)
Marker Uncertainty		±(frequency indication × frequency reference uncertainty + 1% × span + 10% × resolution bandwidth + marker resolution)

Marker Frequency Counter		
Resolution		1 Hz, 10 Hz, 100 Hz, 1 kHz
Uncertainty		±(frequency indication × frequency reference uncertainty + counter resolution)

Note: Frequency Reference Uncertainty = (aging rate × period since adjustment + temperature drift).

Frequency Span		
Range	DSA1030A	0 Hz, 100 Hz to 3 GHz
Uncertainty		±span / (sweep points-1)

SSB Phase Noise		
Carrier Offset	10 kHz	<-88 dBc/Hz typ.
	100 kHz	<-100 dBc/Hz typ.
	1 MHz	<-110 dBc/Hz typ.

Note: Typical $f_c = 500\text{MHz}$, $\text{RBW} \leq 1\text{kHz}$, sample detector, and trace average ≥ 50 .

Bandwidths		
Resolution Bandwidth (-3dB)		10 Hz to 1 MHz, in 1-3-10 sequence
RBW Uncertainty		<5%, nominal
Resolution Filter Shape Factor (60dB: 3dB)		<5, nominal
Video Bandwidth (-3dB)		1 Hz to 3 MHz, in 1-3-10 sequence

6.1.2 Amplitude

Measurement Range		
Range		DANL to +30 dBm

Maximum rated input level		
DC Voltage		50 V
CW RF Power	RF attenuation $\geq 20\text{dB}$	30 dBm (1W)
Max. Damage Level		40 dBm (10W)

Note: When input level $> 33\text{ dBm}$, the protection switch will be on.

1dB Gain Compression		
Total Power at Input Mixer	$f_c \geq 50\text{MHz}$, preamplifier off	$> 0\text{ dBm}$

Note: Mixer power level (dBm) = input power (dBm) – input attenuation (dB).

Displayed Average Noise Level (DANL)		
0 dB RF Attenuation, $\text{RBW} = \text{VBW} = 10\text{ Hz}$, Sample Detector, Trace Average ≥ 50		
DANL (Preamplifier Off)	100 kHz to 10 MHz	$< -85\text{ dBm} - 3 \times (f/1\text{ MHz})$ dB, typ. -125 dBm

DANL (Preamplifier On)	10 MHz to 2.5 GHz	$< -127 \text{ dBm} + 3 \times (f/1\text{GHz})$ dB, typ. -130 dBm
	2.5 GHz to 3 GHz	$< -115 \text{ dBm}$
	100 kHz to 1 MHz	$< -103 \text{ dBm}$
	1 MHz to 10 MHz	$< -103 \text{ dBm} - 3 \times (f/1 \text{ MHz})$ dB, typ. -143 dBm
	10 MHz to 2.5 GHz	$< -145 \text{ dBm} + 3 \times (f/1 \text{ GHz})$ dB, typ. -148 dBm
	2.5 GHz to 3 GHz	$< -133 \text{ dBm}$

Level Display

Logarithmic Level Axis		1 dB to 200 dB
Linear Level Axis		0 to Reference Level
Number of Display Points	Normal	601
	Full Screen	751
Number of Traces		3 + Math Trace
Trace Detectors		Normal, Positive-peak, Negative-peak, Sample, RMS, Voltage Average
Trace Functions		Clear Write, Max Hold, Min Hold, Average, View, Blank
Units of Level Axis		dBm, dBmV, dBμV, nV, μV, mV, V, nW, μW, mW, W

Frequency Response

10 dB RF attenuation, relative to 50 MHz, 20 °C to 30 °C		
Frequency Response (Preamplifier Off)	100 kHz to 3 GHz	$< 0.7 \text{ dB}$
Frequency Response (Preamplifier On)	1 MHz to 3 GHz	$< 1.0 \text{ dB}$

Input Attenuation Switching Uncertainty

Setting Range		0 to 50 dB, in 1 dB step
Switching Uncertainty	fc=50 MHz, relative to 10 dB, 20 °C to 30 °C	$< (0.3 + 0.01 \times \text{attenuator setting}) \text{ dB}$

Absolute Amplitude Uncertainty		
Uncertainty	fc=50 MHz, peak detector, preamplifier off, 10 dB RF attenuation, input signal=-10 dBm, 20 °C to 30 °C	±0.4 dB

RBW Switching Uncertainty		
Uncertainty	10 Hz to 1 MHz, relative to 1 kHz RBW	<0.1 dB

Reference Level		
Range		-100 dBm to +30 dBm, in 1 dB step
Resolution	Log Scale	0.01 dB
	Linear Scale	4 digits

Level Measurement Uncertainty		
Level Measurement Uncertainty	95% confidence level, S/N>20 dB, RBW=VBW=1 kHz, preamplifier off, 10 dB RF attenuation, -50 dBm<reference level<0, 10 MHz<fc<3 GHz, 20 °C to 30 °C	<1.0 dB, nominal

RF Input VSWR		
10 dB RF Attenuation		
VSWR	100 kHz to 10 MHz	<1.8
	10 MHz to 2.5 GHz	<1.5
	2.5 GHz to 3 GHz	<1.8

Intermodulation		
Second Harmonic Intercept (SHI)		+35 dBm

Third-order Intermodulation (TOI)	$f_c > 30 \text{ MHz}$	+7 dBm
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Spurious Responses		
Image Frequency		<-60 dBc
Intermediate Frequency		<-60 dBc
Spurious Response, Inherent		<-88 dBm, typ.
Spurious Response, Others	Referenced to local oscillators, referenced to A/D conversion, referenced to subharmonic of first LO, referenced to harmonic of first LO	<-60 dBc
Input Related Spurious	Mixer level: -30 dBm	<-60 dBc, typ.

6.1.3 Sweep

Sweep		
Sweep Time Range	$100 \text{ Hz} \leq \text{Span} \leq 3 \text{ GHz}$	10 ms to 3000 s
	Span=0 Hz	20 μs to 3000 s
Sweep Time Uncertainty	$100 \text{ Hz} \leq \text{Span} \leq 3 \text{ GHz}$	5%, nominal
	Span=0 Hz	0.5%, nominal
Sweep Mode		Continuous, single

6.1.4 Trigger

Trigger		
Trigger Source		Free run, Video, External
External Trigger Level		5 V TTL level

6.1.5 Tracking Generator (DSA1030A Option)

TG Output		
Frequency Range		9 kHz to 3 GHz
Output Level		-20 dBm to 0 dBm, in 1 dB steps
Output Flatness	10 MHz to 3 GHz, referenced to 50 MHz	±3 dB

6.1.6 Input/Output

RF Input		
Impedance		50 Ω
Connector		N female

TG out		
Impedance		50 Ω
Connector		N female

Probe Power		
Voltage/Current		+15 V, <10% at 150 mA -12.6 V _L <10% at 150 mA

10 MHz REF In / 10 MHz REF Out / External Trigger In		
Connector		BNC female
10 MHz REF Amplitude		0 dBm to 10 dBm
Trigger Voltage		5 V TTL level

USB		
	USB Host	
Connector		B plug
Protocol		Version 2.0
	USB Device	
Connector		A plug
Protocol		Version 2.0

VGA		
Connector		VGA compatible, 15-pin mini D-SUB
Resolution		800 * 600 @ 60Hz

6.2 General Specification

Display		
Type		TFT LCD
Resolution		800 * 480
Size		8.5"
Colors		65536

Printer Supported		
Protocol		PictBridge

Remote Control		
USB		USB TMC
LAN Interface		10/100 Base-T, RJ-45
IEC/IEEE Bus (GPIB)	with opt. USB-GPIB	IEEE 488.2

Mass Memory		
Mass Memory		Flash Disk (internal), USB Disk (not supplied)
Data Storage Space	Flash Disk (internal)	1G Bytes

Power Supply		
Input Voltage Range, AC		100 V to 240 V, nominal
AC Supply Frequency		45 Hz to 440 Hz
Input Voltage Range, DC		10 V to 18 V, nominal
Power Consumption		Typ. 35 W, Max 60 W with all options.
Operation Time at DC Power Supply		About 3 hours

Temperature		
Operating temperature range		5 °C to 40 °C
Storage temperature range		-20 °C to 70 °C

Dimensions		
	(W x H x D)	399 mm x 223 mm x 159 mm (15.7 inches x 8.78 inches x 6.26 inches)

Weight		
	Without battery pack	6.2 kg (13.7 lbs)
	With battery pack	7.4 kg (16.3 lbs)