

DSA815 Specifications

This chapter lists the specifications and general specifications of the analyzer. All the specifications apply to the following conditions unless otherwise noted.

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

Typical value and nominal value are defined as follows.

- Typical value: defined as the specifications of the product under specified conditions.
- Nominal value: defined as the approximate quantity in the application of the product.

Technical Specifications

Frequency

Frequency		
Frequency Range	DSA815	9 kHz to 1.5 GHz
Frequency Resolution		1 Hz

Internal Frequency Reference		
Reference Frequency		10 MHz
Aging Rate		<2 ppm/year
Temperature Drift	20 °C to 30 °C	<2 ppm

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

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

Note: Frequency Reference Uncertainty= (aging rate \times period since the last calibration + temperature drift).

Frequency Span		
Range	DSA815	0 Hz, 100 Hz to 1.5 GHz
Uncertainty		\pm span / (sweep points-1)

SSB Phase Noise		
Carrier Offset	10 kHz	<-80 dBc/Hz

Bandwidth		
Resolution Bandwidth (-3 dB)		100 Hz to 1 MHz, in 1-3-10 sequence
Resolution Bandwidth (-6dB)	Option	200 Hz, 9 kHz, 120 kHz
RBW Uncertainty		< 5%, nominal
Resolution Filter Shape Factor (60 dB: 3 dB)		<5, nominal
Video Bandwidth (-3 dB)		1 Hz to 3 MHz, in 1-3-10 sequence

Amplitude

Measurement Range		
Range		DANL to +20 dBm

Maximum rated input level		
DC Voltage		50 V
CW RF Power	RF attenuation =30 dB	+20 dBm (100 mW)
Max. Damage Level		+30 dBm (1W)

Note: When input level >+25 dBm (preamplifier off) or +5 dBm (preamplifier on), the protection switch will be on.

Displayed Average Noise Level (DANL)		
0 dB RF Attenuation, RBW=VBW=100 Hz, Sample Detector, Trace Average \geq 50		
DANL (Preamp Off)	100 kHz to 1 MHz	<-90 dBm, typical -110 dBm
	1 MHz to 1.5 GHz	<-110 dBm+6 x (f/1GHz) dB, typical -115 dBm

DANL (Preamplifier On)	100 kHz to 1 MHz	<- 110 dBm, typical -130 dBm
	1 MHz to 1.5 GHz	<-130 dBm+6 x (f/1 MHz) dB, typical -135 dBm

Level Display Range		
Log Scale		1 dB to 200 dB
Linear Scale		0 to Reference Level
Number of Points		601
Number of Traces		3+ Math Trace
Trace Detector		Normal, Positive-peak, Negative-peak, Sample, RMS, Voltage Average, Quasi-Peak
Trace Function		Clear Write, Max Hold, Min Hold, Average, Freeze, Blank
Scale Unit		dBm, dBmV, dB μ V, nV, μ V, mV, V, nW, μ W, mW, W

Frequency Response		
10 dB RF Attenuation, Relative to 50 MHz, 20 °C to 30 °C		
Frequency Response (Preamplifier Off)	100 kHz to 1.5 GHz	<0.7 dB
Frequency Response (Preamplifier On)	1 MHz to 1.5 GHz	<1.0 dB

Input Attenuation Switching Uncertainty		
Setting Range		0 to 30 dB, in 1 dB step
Switching Uncertainty	fc=50 MHz, relative to 10 dB, 20 °C to 30 °C	< 0.5 dB

Absolute Amplitude Uncertainty		
Uncertainty	fc=50 MHz, peak detector, preamplifier off, 10 dB RF attenuation, input	\pm 0.4 dB

	signal=-10 dBm, 20 °C to 30 °C	
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RBW Switching Uncertainty

Uncertainty	100 Hz to 1 MHz, relative to 1 kHz RBW	<0.1 dB
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Reference Level

Range		-100 dBm to +20 dBm , in 1 dB step
Resolution	Log Scale	0.01 dB
	Linear Scale	4 digits

Full Amplitude Measurement Uncertainty

Full Amplitude 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<1.5 GHz, 20 °C to 30 °C	<1.5 dB, nominal
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RF Input VSWR

10 dB RF Attenuation		
VSWR	1 MHz to 1.5 GHz	<1.5

Intermodulation

Second Harmonic Intercept (SHI)		+40 dBm
Third-order Intercept (TOI)	fc >30 MHz	+10 dBm

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

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

Spurious Responses		
Image Frequency		<-60 dBc
Intermediate Frequency		<-60 dBc
Spurious Response, Inherent		<-88 dBm, typical
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, typical

Sweep

Sweep		
Sweep Time Range	100 Hz \leq Span \leq 1.5 GHz	10 ms to 1500 s
	Zero Span	20 μ s to 1500 s
Sweep Time Uncertainty	100 Hz \leq Span \leq 1.5 GHz	5%, nominal
	Zero Span	0.5%, nominal
Sweep Mode		Continuous, Single

Trigger

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

Tracking Generator (DSA815 Option)

TG Output		
Frequency Range		9 kHz to 1.5 GHz
Output Level		-20 dBm to 0 dBm, in 1 dB step
Output Flatness	1 MHz to 1.5 GHz, referenced to 50 MHz	±3 dB

Input/Output

RF Input		
Impedance		50 Ω
Connector		N-type, female

TG Out		
Impedance		50 Ω
Connector		N-type, female

10 MHz REF In/10 MHz REF Out/External Trigger In		
Connector		BNC female
10 MHz REF In Amplitude		0 dBm to +10 dBm
10 MHz REF Out Amplitude		+3 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

General Specifications

Display		
Type		TFT LCD
Resolution		800 x 480
Size		8"
Color		64 k

Printer Supported		
Protocol		PictBridge

Remote Control		
USB		USB TMC
LAN		10/100 Base-T, RJ-45, LXI-C Class
IEC/IEEE BUS (GPIB)	with USB-GPIB interface converter option	IEEE 488.2

Mass Memory		
Mass Memory		Internal Memory USB Storage Device (not supplied)

Power Supply		
Input Voltage Range, AC		100 V to 240 V, nominal
AC Supply Frequency		45 Hz to 440 Hz
Power Consumption		Typical 35 W, Max 50 W with all options.

Temperature		
Operating Temperature Range		5 °C to 40 °C
Storage Temperature Range		-20 °C to 70 °C

Dimensions		
	(W x H x D)	361.6 mm x 178.8 mm x 128mm(14.2 inches x 7.0 inches x 5.0 inches)

Weight		
	With Tracking Generator	4.25 kg (9.4 lbs)

