RIGOL

Distribution in the UK & Ireland

Lambda

Lambda Photometrics Limited
Lambda House Batford Mill
Harpenden Herts AL5 5BZ
United Kingdom
E: info@lambdaphoto.co.uk
W: www.lambdaphoto.co.uk
T: +44 (0)1582 764334
F: +44 (0)1582 712084

DNA5000 Series

Vector Network Analyzer

Data Sheet

DSR01102-1110
Dec. 2025

Product Features

Product Features

- Frequency range: 5 kHz to 26.5 GHz
- Number of Ports: 2
- Frequency resolution 1 Hz
- Max. output power 10 dBm
- High dynamic range 127 dB (typ.)
- Trace noise: 0.005 dB
- IF BW: 1 Hz to 10 MHz
- Compatible with the mechanical calibration kit and the Ecal electronic calibration kit, supporting various calibration types (SOLT, Response Short, Response Open, OSL, Enhanced Response 1 to 2, Response Through)
- Integrates S-parameters, impedance, VSWR, TDA, fixture embedding/de-embedding, antenna test, and etc.
- Portable and light-weighted design, with the compact size of (358.1 mm x 214.8 mm x 121.4 mm) and light weight of 5.3 kg
- 10.1'' 1280x800 HD touch screen
- Supports LAN, USB Device, USB Host, and HDMI interfaces
- Supports standard SCPI instruction sets
- Supports Web Control for remote operation
- Supports both physical key operation and touch screen operation; allowing you to use externally connected keyboard and mouse to input values

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DNA5000 series vector network analyzer provides various calibration methods such as frequency response, single-port, response isolation, enhanced response, full dual-port, and electronic calibration. It supports various display formats such as Log Mag, Lin Mag, SWR, Phase, Group Delay, Smith Chart, and Polar Chart. Through the connectivity with the instrument under test via the standard interfaces such as USB, LAN, and HDMI, this series can accurately measure the amp/freq characteristics, phase/freq characteristics, and group delay characteristics of the microwave network.

While maintaining the high-performance characteristics in terms of its specifications, appearance, display effects, and software interface, the DNA5000 series features compact size, light weight, and low noise, offering you better user experience. This series product can be widely used in the electronics, communication, and microwave fields. It is the commonly used test instrument in the R&D and batch production for the industry and universities.

Specifications

Specifications are valid under the following conditions: the instrument is within the calibration period; stored for at least two hours at 0℃ to 40℃ temperature; 60-minute warm-up. Unless otherwise noted, the specifications in the manual include the measurement uncertainty.

- **Typical (typ.)**: typical performance, which 80 percent of the measurement results will meet at room temperature (approximately 25℃). The data are not warranted and do not include the measurement uncertainty.
- **Nominal (nom.):** the expected mean or average performance or a designed attribute (such as the 50Ω connector). The data are not warranted and are measured at room temperature (approximately 25℃).
- **Measured (meas.):** an attribute measured during the design phase which can be compared to the expected performance, e.g. the amplitude drift varies with time. The data are not warranted and are measured at room temperature (approximately 25℃).
- **Specification:** guaranteed performance. The Specification includes the limit conditions, which are applicable to all the specifications and characteristics at room temperature (approximately 25℃), unless otherwise noted.

NOTE:

All charts in this manual are the measurement results of multiple instruments at room temperature unless otherwise noted.

Product Model

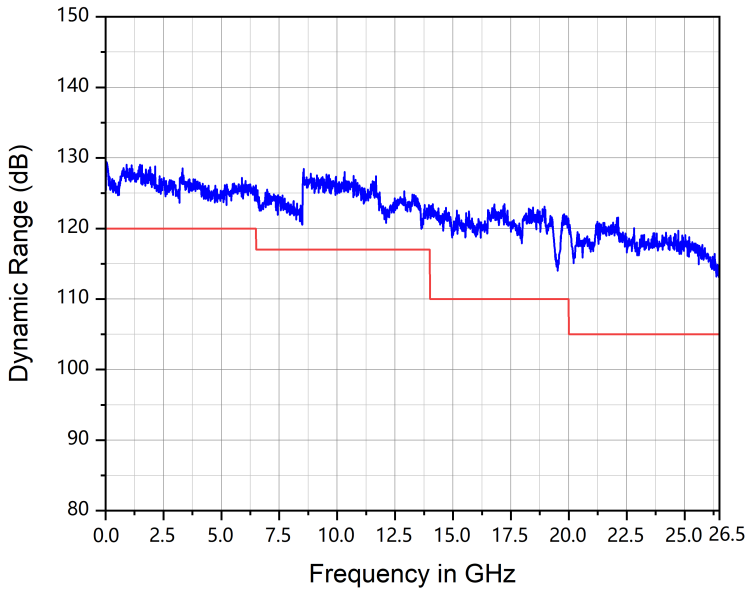
Model	Frequency	Number of Ports
DNA5042	5 kHz to 4.5 GHz	2
DNA5082	5 kHz to 8.5 GHz	2
DNA5142	5 kHz to 14 GHz	2
DNA5202	5 kHz to 20 GHz	2
DNA5262	5 kHz to 26.5 GHz	2

Dynamic Range

Measurement condition: 10 Hz IF BW; ambient temperature: 23°C (±3°C), deviation from the calibration temperature less than 1°C

System Dynamic Range [1]		
Frequency Range	Specification	Typical
100 kHz to 10 MHz	105 dB	115 dB
10 MHz to 6.5 GHz	120 dB	127 dB
6.5 GHz to 8.5 GHz	117 dB	122 dB
8.5 GHz to 14 GHz	117 dB	122 dB
14 GHz to 20 GHz	110 dB	115 dB
20 GHz to 26.5 GHz	105 dB	110 dB

[1] System Dynamic Range = Actual Maximum Power - Receiver Noise Floor at 10 Hz IF BW



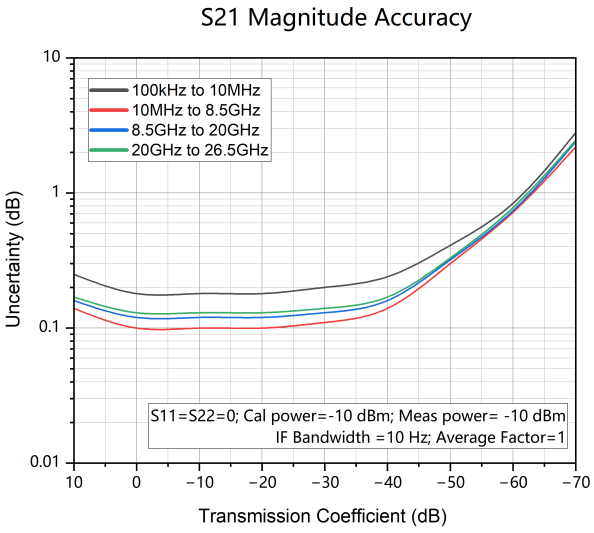
System Performance after Error Correction (Calibration)

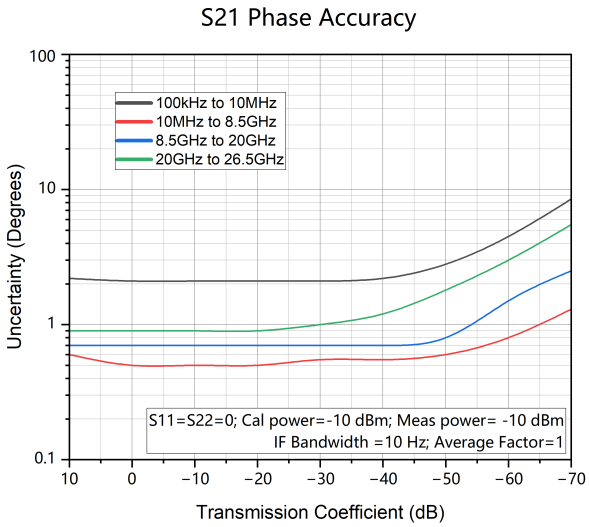
Calibration Error with Mechanical Calibration Kit 85052D[1]					
Frequency Range	Directivity	Load Match	Source Match	Transmission Tracking	Reflection Tracking
5 kHz to 100 kHz	20 dB	20 dB	20 dB	±0.30 dB	±0.30 dB
100 kHz to 10 MHz	42 dB	42 dB	40 dB	±0.01 dB	±0.01 dB
10 MHz to 6.5 GHz	42 dB	38 dB	40 dB	±0.01 dB	±0.01 dB
6.5 GHz to 8.5 GHz	42 dB	38 dB	40 dB	±0.05 dB	±0.03 dB

Calibration Error with Mechanical Calibration Kit 85052D[1]					
8.5 GHz to 14 GHz	42 dB	35 dB	36 dB	±0.05 dB	±0.06 dB
14 GHz to 20 GHz	40 dB	35 dB	35 dB	±0.07 dB	±0.07 dB
20 GHz to 26.5 GHz	40 dB	35 dB	35 dB	±0.07 dB	±0.10 dB

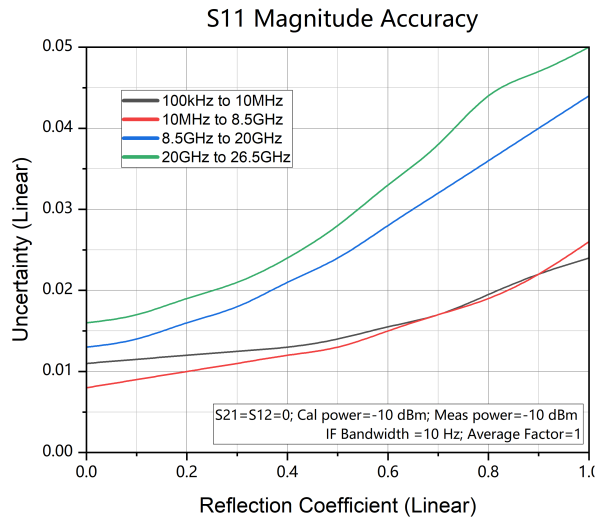
[1] Measurement condition: 10 Hz IF BW; data not averaged; ambient temperature: 23°C (±3°C), deviation from the calibration temperature less than 1°C.

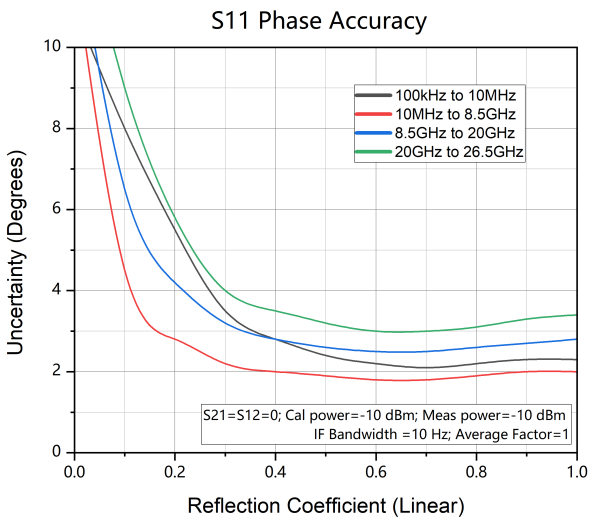
Transmission Uncertainty (Amplitude and Phase)





Reflection Uncertainty (Amplitude and Phase)





System Performance Without Error Correction/Calibration

Uncorrected Error (Specification)					
Frequency Range	Directivity	Load Match	Source Match	Transmission Tracking	Reflection Tracking
100 kHz to 10 MHz	25 dB	15 dB	25 dB	±1.5 dB	±1.5 dB
10 MHz to 6.5 GHz	25 dB	15 dB	25 dB	±1.5 dB	±1.5 dB

Uncorrected Error (Specification)					
6.5 GHz to 8.5 GHz	25 dB	15 dB	25 dB	±1.5 dB	±1.5 dB
8.5 GHz to 14 GHz	23 dB	13 dB	23 dB	±1.5 dB	±1.5 dB
14 GHz to 20 GHz	20 dB	10 dB	20 dB	±1.5 dB	±1.5 dB
20 GHz to 26.5 GHz	20 dB	8 dB	20 dB	±1.5 dB	±1.5 dB

Uncorrected Error (Specification)					
Frequency Range	Directivity	Load Match	Source Match	Transmission Tracking	Reflection Tracking
100 kHz to 10 MHz	35 dB	25 dB	35 dB	±0.5 dB	±0.5 dB
10 MHz to 6.5 GHz	35 dB	25 dB	30 dB	±0.5 dB	±0.5 dB
6.5 GHz to 8.5 GHz	35 dB	25 dB	30 dB	±0.5 dB	±0.5 dB
8.5 GHz to 14 GHz	35 dB	20 dB	25 dB	±0.5 dB	±0.5 dB
14 GHz to 20 GHz	30 dB	20 dB	25 dB	±0.5 dB	±0.5 dB
20 GHz to 26.5 GHz	30 dB	20 dB	25 dB	±0.5 dB	±0.5 dB

Test Port Output

Frequency Characteristics	
Aging Rate	<1 ppm/year
Temperature Stability	<0.5 ppm 0℃ to 40℃, with the reference 25℃
Initial Calibration Accuracy	1 ppm
Frequency Resolution	1 Hz
Sweep Points	1 to 100,001
IF BW Range	1 Hz to 10 MHz

Max. Output Power	
5 kHz to 100 kHz	0 dBm
100 kHz to 10 MHz	5 dBm
10 MHz to 6.5 GHz	10 dBm

Max. Output Power	
6.5 GHz to 8.5 GHz	8 dBm
8.5 GHz to 14 GHz	8 dBm
14 GHz to 20 GHz	6 dBm
20 GHz to 26.5 GHz	0 dBm

Power Sweep Range	
5 kHz to 100 kHz	-40 dBm to 0 dBm
100 kHz to 10 MHz	-40 dBm to 5 dBm
10 MHz to 6.5 GHz	-40 dBm to 10 dBm
6.5 GHz to 8.5 GHz	-40 dBm to 8 dBm
8.5 GHz to 14 GHz	-40 dBm to 8 dBm
14 GHz to 20 GHz	-40 dBm to 6 dBm
20 GHz to 26.5 GHz	-40 dBm to 0 dBm

Power Level Accuracy		
Frequency Range	Specification	Typical
100 kHz to 100 MHz	±1.0 dB	±0.6 dB
100 MHz to 8.5 GHz	±1.0 dB	±0.6 dB
8.5 GHz to 26.5 GHz	±1.5 dB	±0.6 dB

Power Linearity[1]	
100 kHz to 100 MHz	±0.6 dB
100 MHz to 8.5 GHz	±0.6 dB
8.5 GHz to 26.5 GHz	±0.6 dB

[1] Given the power linearity in relative to 0 dBm, sweep mode: -20 dBm≤ Power ≤ 0 dBm.

Power Characteristics	
Power Resolution	0.01 dB

Power Characteristics	
Maximum Available Power	10 dBm
Minimum Available Power	-40 dBm

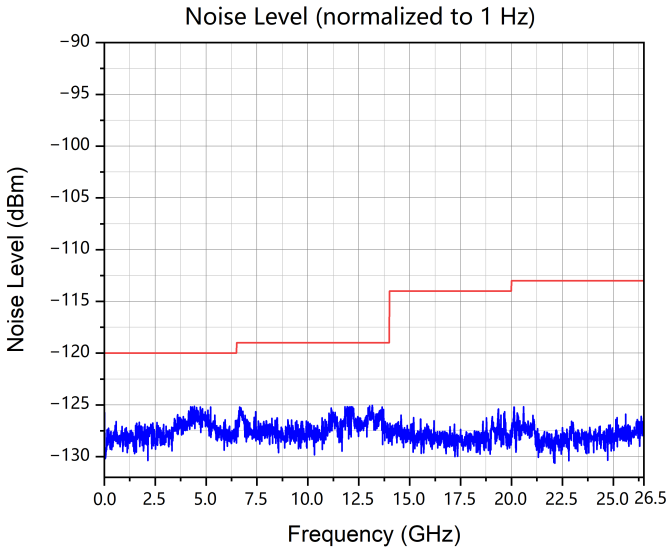
Harmonics & Spurious[1]	
Second Harmonics	
100 kHz to 26.5 GHz	-25 dBc
Third Harmonics	
100 kHz to 100 MHz	-30 dBc
100 MHz to 8.5 GHz	-40 dBc
8.5 GHz to 26.5 GHz	-30 dBc
Spurious (non-harmonics)	
100 kHz to 20 GHz	-30 dBc
20 GHz to 26.5 GHz	-25 dBc

[1] frequency listed is the harmonic frequency, measured at 0 dBm.

Test Port Input

Test Port Noise Floor[1]		
Frequency Range	Specification	Typical
100 kHz to 10 MHz	-105 dBm	-120 dBm
10 MHz to 6.5 GHz	-120 dBm	-125 dBm
6.5 GHz to 8.5 GHz	-119 dBm	-124 dBm
8.5 GHz to 14 GHz	-119 dBm	-124 dBm
14 GHz to 20 GHz	-114 dBm	-119 dBm
20 GHz to 26.5 GHz	-113 dBm	-118 dBm

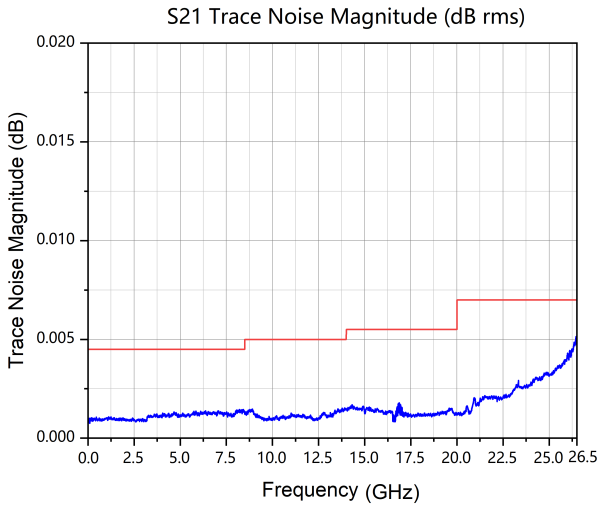
[1] Noise Power is defined as the RMS value of the test transmission coefficient at 10 kHz IF BW, and normalized to 1 Hz.

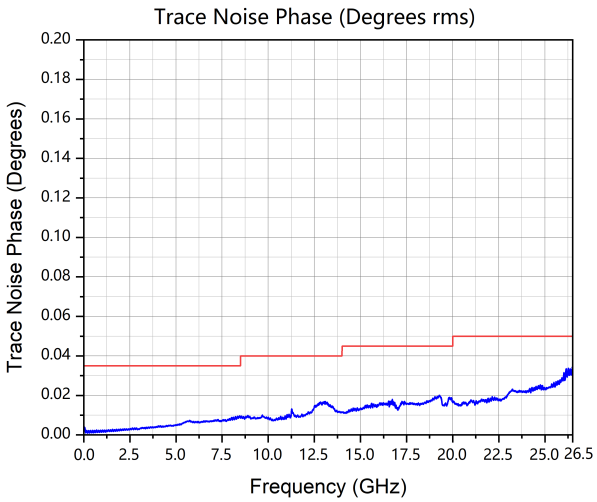


Trace Noise[1]

Frequency Range	Magnitude		Phase	
	Specification	Typical	Specification	Typical
100 kHz to 10 MHz	0.006 dB_{rms}	0.003 dB_{rms}	0.045 $degree_{rms}$	0.025 $degree_{rms}$
10 MHz to 8.5 GHz	0.0045 dB_{rms}	0.0015 dB_{rms}	0.035 $degree_{rms}$	0.013 $degree_{rms}$
8.5 GHz to 14 GHz	0.005 dB_{rms}	0.002 dB_{rms}	0.04 $degree_{rms}$	0.022 $degree_{rms}$
14 GHz to 20 GHz	0.0055 dB_{rms}	0.0025 dB_{rms}	0.045 $degree_{rms}$	0.025 $degree_{rms}$
20 GHz to 26.5 GHz	0.007 dB_{rms}	0.005 dB_{rms}	0.05 $degree_{rms}$	0.040 $degree_{rms}$

[1] Tested under default power at power-on. Transmission and Reflection Trace Noise: for signal <10 MHz, IF BW is 1 kHz; for signal ≥10 MHz, IF BW is 10 kHz.



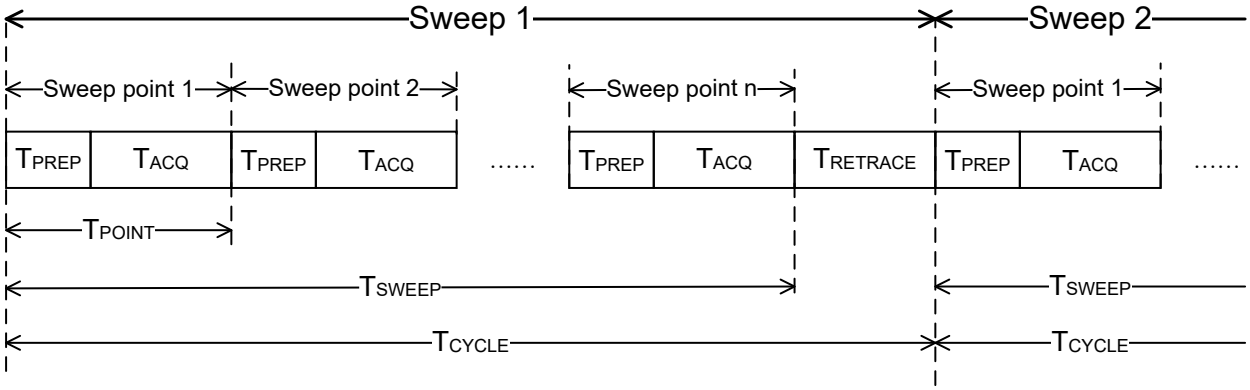


Temperature Stability (Typical)		
Frequency Range	Magnitude	Phase
100 kHz to 10 MHz	0.05 dB/°C	1.00 degree/°C
10 MHz to 6.5 GHz	0.03 dB/°C	0.25 degree/°C
6.5 GHz to 8.5 GHz	0.04 dB/°C	0.30 degree/°C
8.5 GHz to 14 GHz	0.04 dB/°C	0.45 degree/°C
14 GHz to 20 GHz	0.05 dB/°C	0.60 degree/°C
20 GHz to 26.5 GHz	0.07 dB/°C	0.80 degree/°C

Damage Input Level	
Damage Input Level	+27 dBm or ±35 VDC

Meas Time

Sweep time (sweep type CW, 1 GHz center frequency, 200 MHz span, 201 sweep points, measurement parameter S11)		
	Band Span	Time
T_{SWEEP}	1 MHz	7.71 ms
	500 kHz	8.05 ms
T_{CYCLE}	1 MHz	8.23 ms
	500 kHz	8.59 ms
T_{PREP}	/	35 µs
T_{ACQ}	1 MHz	3.5 µs
	500 kHz	5.3 µs
T_{POINT}	1 MHz	38.5 µs
	500 kHz	40.3 µs



Measurement sequence

- **T_{SWEEP}**: Time required for one sweep
- **T_{CYCLE}**: Sweep cycle time ($T_{CYCLE} = T_{SWEEP} + T_{RETRACE}$)
- **T_{PREP}**: Preparation time required to set up the internal hardware components
- **T_{ACQ}**: Data acquisition time (T_{ACQ} = Filter settling time + Detector time)
- **T_{POINT}**: Total time for one sweep point
- **$T_{RETRACE}$**: Time between two sweeps

Data Transmission Time (IFBW = 1 MHz)

Frequency Range		RBW	201 points	401 points	1601 points
10 MHz to 4.5 GHz	Not Calibrated	1 MHz	9.8 ms	17.58 ms	64.7 ms
		500 kHz	10.1 ms	18.3 ms	67.3 ms
		100 kHz	12.5 ms	23.2 ms	86.9 ms
		1 kHz	248 ms	498 ms	1985 ms
10 MHz to 4.5 GHz	Dual-port Calibration	1 MHz	19.15 ms	34.9 ms	128.6 ms
		500 kHz	19.85 ms	36.2 ms	134.2 ms
		100 kHz	24.8 ms	46.1 ms	174 ms
		1 kHz	501 ms	996 ms	3965 ms
10 MHz to 8.5 GHz	Not Calibrated	1 MHz	10.76 ms	18.5 ms	65.1 ms
		500 kHz	11.08 ms	19.2 ms	67.8 ms
		100 kHz	13.58 ms	24.2 ms	87.6 ms
		1 kHz	251 ms	500 ms	1980 ms

Data Transmission Time (IFBW = 1 MHz)					
10 MHz to 8.5 GHz	Dual-port Calibration	1 MHz	22 ms	37.45 ms	130.6 ms
		500 kHz	22.65 ms	38.9 ms	136.2 ms
		100 kHz	27.6 ms	48.7 ms	175.5 ms
		1 kHz	502 ms	998 ms	3960 ms
10 MHz to 26.5 GHz	Not Calibrated	1 MHz	15.2 ms	24.4 ms	70.8 ms
		500 kHz	15.58 ms	25.15 ms	73.8 ms
		100 kHz	18.05 ms	30.1 ms	93.4 ms
		1 kHz	257 ms	506 ms	2,000 ms
10 MHz to 26.5 GHz	Dual-port Calibration	1 MHz	31 ms	49.4 ms	142.5 ms
		500 kHz	31.65 ms	50.7 ms	147.5 ms
		100 kHz	36.55 ms	60.7 ms	187 ms
		1 kHz	511 ms	1008 ms	3990 ms

Input/Output

RF Test Port Input

RF Test Port Input (on the front panel)	
Frequency Range	5 kHz to 26.5 GHz
Number of Ports	2
Input Impedance	50 Ω (nom.)
Connector Type	3.5mm Threaded Male Connector (applicable to DNA5202, DNA5262) N-type female (applicable to DNA5042, DNA5082, DNA5142)

10 MHz Reference Clock Connector

10 MHz Reference Output (on the rear panel)	
Frequency	10 MHz (fixed)
Output Level	+3 dBm to +10 dBm, +7 dBm (typ.)
Output Impedance	50 Ω (nom.)
Connector Type	BNC (F)
10 MHz Reference Clock Input (on the rear panel)	
Frequency	10 MHz ± 10 ppm
Input Level	0 dBm to +10 dBm
Input Impedance	50 Ω (nom.)
Connector Type	BNC (F)

Ext Trigger I/O

Trig Input (on the rear panel)	
Input Impedance	≥1 kΩ (nom.)
Input Level	3.3 V TTL Level
Connector Type	BNC (F)

Trig Output (on the rear panel)	
Impedance	50 Ω (nom.)
Output Level	3.3 V TTL Level
Connector Type	BNC (F)

Communication Interface

Communication Interface	
USB DEVICE	USB 3.0, 1 on the rear panel
USB HOST	USB 3.0, 1 on the rear panel
HDMI	1 on the rear panel, HDMI 1.4, A plug
LAN	1 on the rear panel, 10/100/1000 Base-T

General Specifications

Display

Display	
LCD	10.1-inch capacitive multi-touch screen, gesture enabled operation
Display Resolution	1280*800

Power

Power Supply	
Power Supply	100 Vrms to 240 Vrms, 50 Hz/60 Hz
Power Consumption	80 W (DNA5042, DNA5082) 100 W (DNA5142, DNA5202, DNA5262)
Fuse	5 A, T degree, 250 V

Processor System

Operating System		
Operating System		Linux
Mass Memory	Internal Storage	256GB
	External Storage	USB storage device (not supplied)

Working Environment

Environment		
Temperature Range	Operating	0℃~40℃
	Storage	-20℃~70℃

Environment		
Humidity Range	Operating	0℃ to 30℃: ≤95%RH 30℃ to 40℃: ≤75%RH
	Non-Operating	Below +40°C: 5% to 90%, without condensation +40°C to +60°C: 5% to 80%, without condensation +60°C to +70°C: 5% to 40%, without condensation
Altitude	Operating Height	Below 2000 m (6561.68 feet)

Regulations

Electromagnetic Compatibility and Safety		
Electromagnetic Compatibility (EMC)	Anti-interference conforms to specifications in EMC Directive 2014/30/EU;	
	EMC RF and emission limits conforms to CISPR11/EN 55011, Group 1, Class A	
	IEC61000-4-2:2008/EN61000-4-2	±4.0 kV (contact discharge), ±8.0 kV (air discharge)
	IEC61000-4-3:2002/EN61000-4-3	3 V/m (80 MHz to 1 GHz); 3 V/m (1.4 GHz to 2 GHz); 1 V/m (2.0 GHz to 2.7 GHz)
	IEC61000-4-4:2004/EN61000-4-4	1 kV power line
	IEC61000-4-5:2001/EN61000-4-5	0.5 kV (phase-to-neutral voltage); 1 kV (phase-to-earth voltage); 1 kV (neutral-to-earth voltage)
	IEC61000-4-6:2003/EN61000-4-6	3 V, 0.15 MHz-80 MHz
	IEC61000-4-11:2004/EN 61000-4-11	Voltage dip: 0% UT during half cycle 0% UT during 1 cycle 70% UT during 25 cycles Short interruption: 0% UT during 250 cycles
Safety	EN 61010-1, IEC 61010-1, UL 61010-1, CAN/CSA-C22.2 No. 61010-1	

Electromagnetic Compatibility and Safety	
Environment	Samples of this product have been type tested in accordance with RIGOL's reliability test regulations and verified to be robust against the environmental stresses of storage, transportation, and end-use; those stresses include, but are not limited to, temperature, humidity, shock, and vibration.The test methods are compliant with standards specified in GB/T65872 Class 2 and MIL-PRF-28800F Class 3.

Mechanical Dimensions

Mechanical Dimensions		
Dimensions (W x H x D)		358.1 mm x 214.8 mm x 121.4 mm 14.1-inch x 8.45-inch x 4.8-inch
Rack Mount Kit		5U
Weight	Mechanical Calibration Kit Excluded	Package Excluded: < 5 kg (11.02 lb) Package Included: < 7 kg (15.43 lb)

Warranty and Calibration Interval

Warranty and Calibration	
Recommended Calibration Interval	18 months
Warranty	Three years for the mainframe, excluding accessories.

Order Information and Warranty Period

Order Information

	Description	Order No.
Model	Vector Network Analyzer, 5 kHz to 4.5 GHz, 2 ports	DNA5042
	Vector Network Analyzer, 5 kHz to 8.5 GHz, 2 ports	DNA5082
	Vector Network Analyzer, 5 kHz to 14 GHz, 2 ports	DNA5142
	Vector Network Analyzer, 5 kHz to 20 GHz, 2 ports	DNA5202
	Vector Network Analyzer, 5 kHz to 26.5 GHz, 2 ports	DNA5262
Standard Accessory	Power Cord	-
Measurement Application Option	TDA (Time-Domain Analysis)	DNA-TDA10
	DTF (Distance to Fault)	DNA-DTF10
Optional Accessories	Electronic Calibration Kit, 100 kHz to 9 GHz, 2 ports, Type-N (F), 50 Ω	ECAL109-NF2
	Electronic Calibration Kit, 100 kHz to 14 GHz, 2 ports, Type-N (F), 50 Ω	ECAL114-NF2
	Electronic Calibration Kit, 100 kHz to 26.5 GHz, 3.5 mm (F), 2 ports	ECAL126-35F2
	4-in-1 OSLT Mechanical Calibration Kit, DC to 26.5 GHz, 3.5 mm (F)	MCAL226-35F5

Optional Accessories	Mechanical Calibration Kit, DC to 4.5 GHz, Type-N (M), 50 Ω	MCAL104-NM1
	Mechanical Calibration Kit, DC to 4.5 GHz, Type-N (F), 50 Ω	MCAL104-NF1
	Mechanical Calibration Kit, DC to 9 GHz, Type-N (M), 50 Ω	MCAL109-NM1
	Mechanical Calibration Kit, DC to 9 GHz, Type-N (F), 50 Ω	MCAL109-NF1
	Mechanical Calibration Kit, DC to 9 GHz, Type-N (M & F), 50 Ω	MCAL109-NK1
	Mechanical Calibration Kit, DC to 4.5 GHz, 3.5 mm (M)	MCAL104-SM1
	Mechanical Calibration Kit, DC to 4.5 GHz, 3.5 mm (F)	MCAL104-SF1
	Mechanical Calibration Kit, DC to 9 GHz, 3.5 mm (M)	MCAL109-SM1
	Mechanical Calibration Kit, DC to 9 GHz, 3.5 mm (F)	MCAL109-SF1
	Mechanical Calibration Kit, DC to 9 GHz, 3.5 mm (M & F)	MCAL109-SK1
	Mechanical Calibration Kit, DC to 26.5 GHz, 3.5 mm (M & F)	MCAL126-35K1

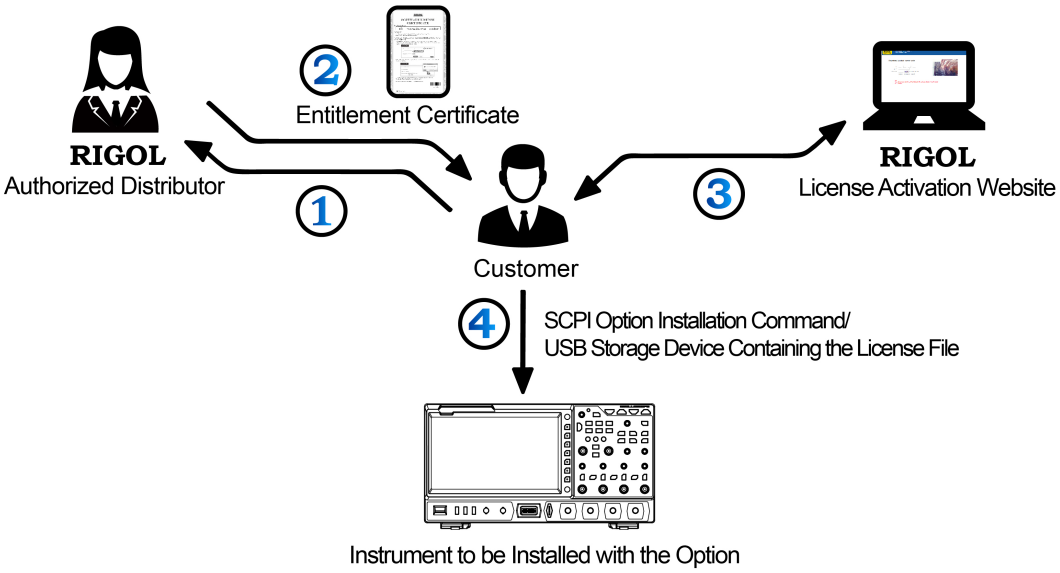
NOTE:

For all the mainframes, accessories, and options, please contact the local office of RIGOL.

Warranty Period

Three years for the mainframe, excluding the accessories.

Option Ordering and Installation Process



1. According to the usage requirements, please purchase the specified function options from **RIGOL Sales Personnel**, and provide the serial number of the instrument that needs to install the option.
2. After receiving the option order, the **RIGOL** factory will mail the paper software product entitlement certificate to the address provided in the order.
3. Log in to **RIGOL** official website for registration. Use the software key and instruments serial number provided in the entitlement certificate to obtain the option license code and the option license file.
4. Install the option by running the SCPI command concerning the option installation. You can also save the option license file to the root directory of the USB storage device. Then insert it to the instrument. After being recognized, follow the instructions to install the option.

NOTE:

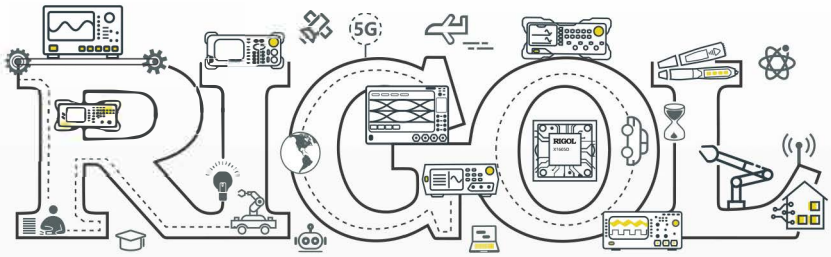
If any problems occur during the option installation process, please contact **RIGOL** technical team.

Boost Smart World and Technology Innovation

Industrial Intelligent Manufacturing

Semiconductors

Education& Research



Communication

System Integration

New Energy

- Cellular-5G/WIFI
- UWB/RFID/ ZIGBEE
- Digital Bus/Ethernet
- Optical Communication

- Digital/Analog/RF Chip
- Memory and MCU Chip
- Third-Generation Semiconductor
- Solar Photovoltaic Cells

- New Energy Automobile
- PV/Inverter
- Power Test
- Automotive Electronics

Provide Testing and Measuring Products and Solutions for Industry Customers

Distribution in the UK & Ireland

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Characterisation, Measurement & Analysis

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Lambda House Batford Mill
Harpenden Herts AL5 5BZ
United Kingdom
E: info@lambdaphoto.co.uk
W: www.lambdaphoto.co.uk
T: +44 (0)1582 764334
F: +44 (0)1582 712084