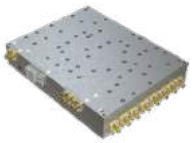
SERIES / PRODUCTS	Model	FREQUENCY RANGE	OUTPUT POWER	SSB PHASE NOISE	Page
	1466 Signal Generator	6KHz to 13/20/33/45/53/67/90/110GHz	-150dBm to +25dBm	-145 dBc/Hz@10kHz offset (typ., 1 GHz carrier)	01
	1466V Vector Signal Generator	6KHz to 13/20/33/45/53/67GHz	-150dBm to +25dBm	-145 dBc/Hz@10kHz offset (typ., 1 GHz carrier)	12
	1465 Signal Generator	100KHz to 3/6/10/20/40/50/67GHz	-110dBm to +20dBm	-142 dBc/Hz@10kHz offset (typ., 1 GHz carrier)	29
	1465V Vector Signal Generator	100KHz to 10/20/40/50/67GHz	-110dBm to +20dBm	-142 dBc/Hz@10kHz offset (typ., 1 GHz carrier)	37
	1433 Handheld Signal Generator	1MHz to 20/26.5/40/50GHz	-120dBm to +10dBm	-108 dBc/Hz@10kHz offset (typ., 1 GHz carrier)	46
	1435 Signal Generator	9KHz to 3/6/12/20/40GHz	-110dBm to +20dBm	-115 dBc/Hz@10kHz offset (typ., 1 GHz carrier)	51
	1435V Vector Signal Generator	9KHz to 3/6GHz	-110dBm to +22dBm	-115 dBc/Hz@10kHz offset (typ., 1 GHz carrier)	59
	SG2000 RF Signal Generator	100KHz to 15GHz 9KHz to 20GHz	-120dBm to +10dBm	-115 dBc/Hz@10kHz offset (typ., 1 GHz carrier)	66
	SG2060 Multi Standard Signal Generator	9KHz to 6GHz	-120dBm to +10dBm	-98 dBc/Hz@10kHz offset (typ., 1 GHz carrier)	68
	SG1030 RF Signal Generator	9KHz to 3GHz	-120dBm to +10dBm	-105 dBc/Hz@100kHz offset (typ., 1 GHz carrier)	71
	MSG150A/200A Signal Generator Module	100KHz to 15GHz 9KHz to 20GHz	-120dBm to +10dBm	-115 dBc/Hz@10kHz offset (typ., 1 GHz carrier)	74
	MSG700 Signal Generator Module	9KHz to 3GHz 9KHz to 6GHz	-120dBm to +10dBm	-98 dBc/Hz@10kHz offset (typ., 1 GHz carrier)	76

Quality&**Precise**

MAXWELLON
1466

6kHz~13GHz/20GHz/33GHz/45GHz/53GHz/67GHz/90GHz/110GHz

Signal Generator

2023

MAXWELLON

The Maxwellom 1466 series signal generator is a universal testing instrument for microwave and millimeter wave tip testing. It has a wide frequency range, high signal spectrum purity, high accuracy, and a large dynamic range of power output. Coupled with a single machine dual RF channel design, it can meet various testing requirements of users. The rich built-in functions such as analog sweep, analog modulation, and pulse modulation make testing more convenient. Newly upgraded human-computer interaction, featuring a series of new features such as large screen touch graphics guided interaction, mobile browser access control, multi manufacturer power meter connection recognition, multi client deployment, SCPI command recording, and control interface customization, creating a sense of user testing happiness.

The Maxwellom 1466 series signal generator is an ideal choice for high standard testing from component level to system level in cutting-edge technology fields such as communication and aerospace.

Key Feature

Excellent RF Performance

Frequency coverage of 6kHz~13GHz/20GHz/33GHz/45GHz/53GHz/67GHz/90GHz/110GHz;
Excellent spectral purity, SSB-132 dBc/Hz (typical value, 10 GHz carrier 10kHz frequency offset), spurious<-80 dBc (10 GHz carrier);
Excellent broadband bottom noise, SSB-161 dBc/Hz (typical value, 20GHz carrier 30MHz frequency offset);
Large output power dynamic range, with a maximum dynamic range of -150dBm~+25dBm (settable);
Support AM, FM, ΦM and pulse modulation, with a minimum pulse width of 20ns for pulse modulation;
Support step sweep, list sweep, power sweep, and analog sweep;
Support single machine dual channel, each channel can be set independently.

Newly Upgraded Human-computer Interaction

Large screen touch graphic guided interaction, supporting user-defined menus;
Cross platform client and browser access control;
Real time recording of SCPI instructions and automatic generation of program controlled example engineering.

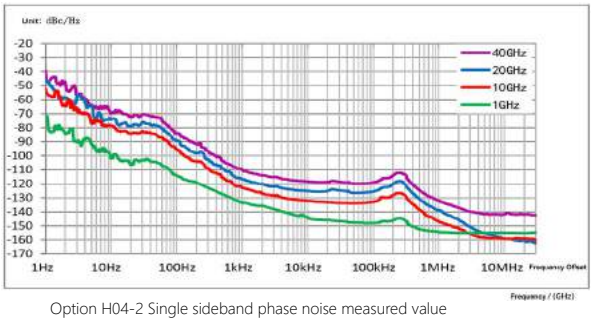
Excellent Performance

110ghz Coaxial Frequency Coverage

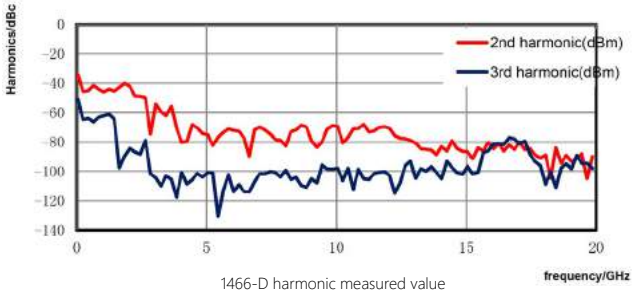
The Maxwellon 1466 series signal generator does not require an external frequency converter, and the coaxial output frequency covers 6kHz~110GHz, ensuring high-precision large dynamic range amplitude control. It has power accuracy and stability that cannot be achieved by external spread spectrum schemes. At the same time, it supports external Maxwellon 8240X series frequency converters, which can further expand the frequency to 750GHz. It is a powerful tool for efficiently conducting millimeter wave 5G communication RF consistency testing.

Excellent Spectral Purity

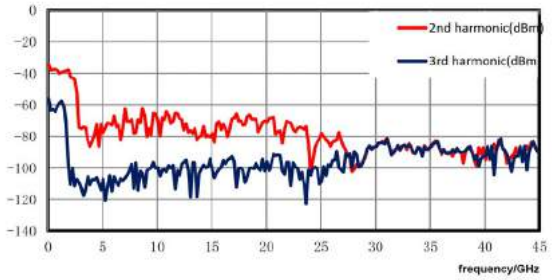
The Maxwellon 1466 series signal generator supports high-purity spectrum signal output:
SSB -145 dBc/Hz (typical value, 1 GHz carrier 10kHz frequency offset);
SSB -132 dBc/Hz (typical value, 10 GHz carrier 10kHz frequency offset);
SSB -161 dBc/Hz (typical value, 20 GHz carrier 30kHz frequency offset);
Spurious<-80 dBc (10 GHz carrier); Harmonic<-55dBc.



Option H04-2 Single sideband phase noise measured value



1466-D harmonic measured value

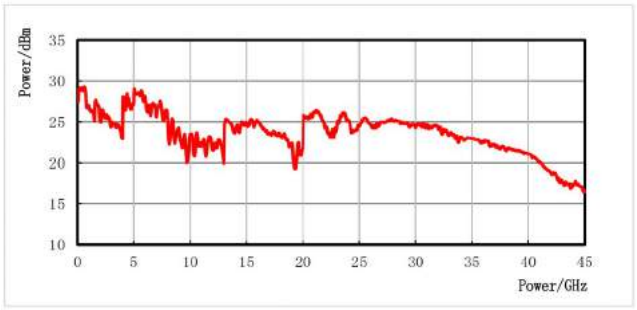


1466-G harmonic measured value

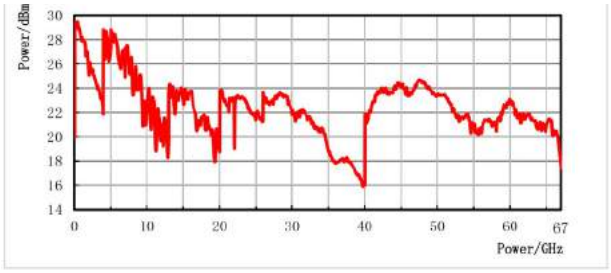
Large Dynamic Range, High Accuracy Power Output

The typical maximum output power values of the Maxwellon 1466 series signal generator are:
+27dBm at 5GHz,
+24dBm at 20GHz,
+25dBm at 30GHz,
+22dBm at 60GHz,
+3dBm at 110GHz,
The minimum output power is -150dBm (adjustable), and the dynamic range exceeds 170dB.
It has excellent power accuracy indicators, with a typical value of<0.5dB(below 20GHz).

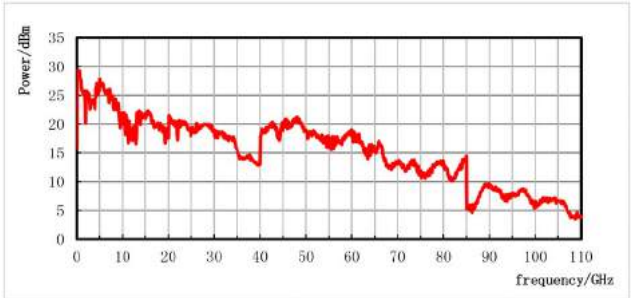
1466-D maximum output power measured value (option H05-20)



1466-G maximum output power measured value (option H05-45)



1466-L maximum output power measured value (option H05-67)



1466-P maximum output power measured value (option H05-110)

Abundant Built-in Features

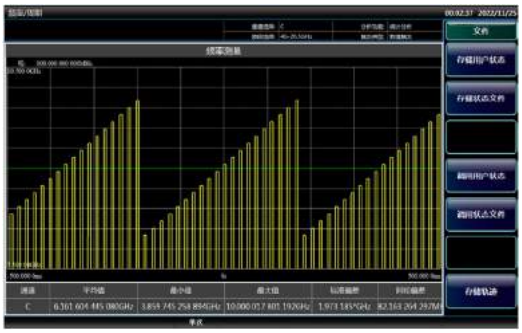
Complete Analog Modulation

Supports amplitude modulation, frequency modulation, phase modulation, and pulse modulation. Equipped with complex pulse modulation functions such as dual pulse, pulse train, repeat frequency stagger, repeat frequency jitter, repeat frequency slip, etc.

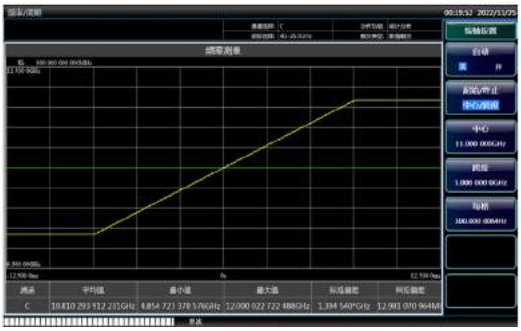
Analog modulation configuration interface

Multi Style Sweep Function

Supports step sweep, list sweep, analog sweep (slope sweep), and power sweep functions.



Step sweep measurement results



Simulated sweep (slope sweep) actual measurement results

Newly Upgraded Human-computer Interaction

Touchable Graphic Guided Interaction

Adopting an 11.6-inch high-resolution touch screen, it clearly displays the main parameters and instrument status information, combined with a signal flow diagram guidance interface, making the display more intuitive and interactive.

Signal Flow Diagram Guidance Interface

Flexible Editing of User Control Interface

Support user-defined menus, customize personalized user control interfaces according to testing habits, achieve multi-functional operations within a window, and avoid the troubles of deep menus and repeated searches.

User Defined Menu

Support Cross Platform Client Manipulation

Cross platform client and browser access control. Supports multiple clients to connect simultaneously, and the instrument's working status is synchronized and refreshed. Support web browser access control for mobile devices.

Browser Access

Synchronous Recording of SCPI Instructions, One Click Script Generation

Not only can recorded SCPI instructions be exported with one click, but also VS (C++, C #), Qt, Matlab, LabView program control example projects can be automatically generated, making program control simpler.

SCPI instruction recording

Specification

Frequency Properties			
Frequency Range	1466-C: 6kHz~13GHz 1466-D: 6kHz~20GHz 1466-E: 6kHz~33GHz 1466-G: 6kHz~45GHz 1466-H: 6kHz~53GHz 1466-L: 6kHz~67GHz 1466-N: 6kHz~90GHz 1466-P: 6kHz~110GHz	Frequency	N (Internal YO harmonic number)
		6kHz≤f≤10MHz	/
		10MHz<f≤50MHz	/
		50MHz<f≤62.5MHz	1/256
		62.5MHz<f≤125MHz	1/128
		125MHz<f≤250MHz	1/64
		250MHz<f≤500MHz	1/32
		500MHz<f≤1GHz	1/16
		1GHz<f≤2GHz	1/8
		2GHz<f≤4GHz	1/4
		4GHz<f≤8GHz	1/2
		8GHz<f≤20GHz	1
		20GHz<f≤40GHz	2
		40GHz<f≤67GHz	4
		100GHz<f≤110GHz	6
Frequency Resolution	0.001Hz		
Frequency Switching Time	<15ms		
Timebase Aging Rate (typical value)	$\pm 5\times10^{-10}$ /day (after 30-day continuous power-on)		

Reference Output	Frequency	10MHz	
	Power	>+4dBm to 50 Ω load	
Reference Input	Frequency	1 ~ 100MHz , steps of 1Hz	
	Power	-5dBm ~ +10dBm, 50Ω Impedance	
Sweep Properties			
Sweep Mode	Step Sweep, List Sweep, Analog Sweep (Slope Sweep, Option S15)		
	Power Sweep (Option S16)		
Analog Sweep (Slope Sweep, Option S15)	Max. Sweep Speed	f>4GHz	400MHz/ms
	Sweep Accuracy	±0.05% sweep width (sweep time 100ms, within the specified maximum sweep width of 100ms)	

Power Properties

	Model	Standard	Programmed Stepper Attenuator Option H01-90/120/130
Min. Power	1466-C/D/E/G	-10dBm (-20dBm configurable)	Option H01-130: 6kHz≤f≤100kHz: -90.0dBm (-150dBm configurable) f>100kHz: -120.0dBm (-150dBm configurable)
	1466-H/L	-10dBm (-20dBm configurable)	Option H01-90: -90.0dBm (-110dBm configurable) Option H01-120: -90.0dBm (-140dBm configurable)
	1466-N/P	-10dBm (-20dBm configurable)	Option H01-50: -50.0dBm (-70dBm configurable)

Max. Power (Continuous wave, 25 ± 10 ° C)

1466-C				
Frequency Range	Standard	Programmed stepper attenuator option H01-130 H01-B130	High-power output option H05-13 H05-B13	Programmed stepper attenuator option+ High-power output option H01-130+ H05-13, H01-B130+H05-B13
6kHz≤f≤50MHz	≥+15.0	≥+15.0	≥+15.0	≥+15.0
50MHz<f≤13GHz	≥+15.0	≥+15.0	≥+20.0	≥+20.0

1466-D				
Frequency Range	Standard	Programmed stepper attenuator option H01-130 H01-B130	High-power output option H05-20 H05-B20	Programmed stepper attenuator option+ High-power output option H01-130+H05-20, H01-B130+H05-B20
6kHz≤f≤50MHz	≥+15.0	≥+15.0	≥+15.0	≥+15.0
50MHz<f≤20GHz	≥+15.0	≥+15.0	≥+20.0	≥+20.0

1466-E				
Frequency Range	Standard	Programmed stepper attenuator option H01-130 H01-B130	High-power output option H05-33 H05-B33	Programmed stepper attenuator option+ High-power output option H01-130+H05-33, H01-B130+H05-B33
6kHz≤f≤50MHz	≥+8.0	≥+8.0	≥+8.0	≥+8.0
50MHz<f≤6GHz	≥+12.0	≥+12.0	≥+20.0	≥+20.0
6GHz<f≤18GHz	≥+12.0	≥+12.0	≥+18.0	≥+18.0
18GHz<f≤30GHz	≥+12.0	≥+12.0	≥+17.0	≥+17.0
30GHz<f≤33GHz	≥+12.0	≥+12.0	≥+18.0	≥+18.0

Max. Power
(Continuous wave, 25 ± 10 ° C)

1466-G

Frequency Range	Standard	Programmed stepper attenuator option H01-130 H01-B130	High-power output option H05-45 H05-B45	Programmed stepper attenuator option+ High-power output option H01-130+H05-45, H01-B130+H05-B45
6kHz≤f≤50MHz	≥+8.0	≥+8.0	≥+8.0	≥+8.0
50MHz<f≤6GHz	≥+12.0	≥+12.0	≥+20.0	≥+20.0
6GHz<f≤18GHz	≥+12.0	≥+12.0	≥+18.0	≥+18.0
18GHz<f≤30GHz	≥+12.0	≥+12.0	≥+17.0	≥+17.0
30GHz<f≤40GHz	≥+12.0	≥+12.0	≥+18.0	≥+18.0
40GHz<f≤45GHz	≥+12.0	≥+12.0	≥+14.0	≥+14.0

1466-H

Frequency Range	Standard	Programmed stepper attenuator option H01-90/120 H01-B90/B120	High-power output option H05-53 H05-B53	Programmed stepper attenuator option+ High-power output option H01-90/120+H05-53 H01-B90/120+H05-B53
6kHz≤f≤50MHz	≥+8.0	≥+8.0	≥+8.0	≥+8.0
50MHz<f≤20GHz	≥+8.0	≥+8.0	≥+17.0	≥+16.0
20GHz<f≤40GHz	≥+8.0	≥+8.0	≥+15.0	≥+13.0
40GHz<f≤53GHz	≥+8.0	≥+8.0	≥+20.0	≥+18.0

1466-L

Frequency Range	Standard	Programmed stepper attenuator option H01-90/120 H01-B90/B120	High-power output option H05-67 H05-B67	Programmed stepper attenuator option+ High-power output option H01-90/120+H05-53 H01-B90/120+H05-B53
6kHz≤f≤50MHz	≥+8.0	≥+8.0	≥+8.0	≥+8.0
50MHz<f≤20GHz	≥+8.0	≥+8.0	≥+17.0	≥+16.0
20GHz<f≤40GHz	≥+8.0	≥+8.0	≥+15.0	≥+13.0
40GHz<f≤53GHz	≥+8.0	≥+8.0	≥+20.0	≥+18.0
53GHz<f≤65GHz	≥+8.0	≥+8.0	≥+18.0	≥+16.0
65GHz<f≤67GHz	≥+8.0	≥+8.0	≥+15.0	≥+12.0

1466-N

Frequency Range	Standard	Programmed stepper attenuator option H01-50 H01-B50	High-power output option H05-110 H05-B110	Programmed stepper attenuator option+ High-power output option H01-50+H05-110, H01-B50+H05-B110
6kHz≤f≤50MHz	≥+5.0	≥+5.0	≥+8.0	≥+8.0
50MHz<f≤20GHz	≥+5.0	≥+5.0	≥+13.0	≥+13.0
20GHz<f≤40GHz	≥+5.0	≥+5.0	≥+12.0	≥+10.0
40GHz<f≤67GHz	≥+3.0	≥+3.0	≥+10.0	≥+8.0
67GHz<f≤85GHz	≥0.0	≥0.0	≥+7.0	≥+5.0
85GHz<f≤90GHz	≥-5.0	≥-5.0	≥+3.0	≥0.0

1466-P

Frequency Range	Standard	Programmed stepper attenuator option H01-50 H01-B50	High-power output option H05-90 H05-B90	Programmed stepper attenuator option+ High-power output option H01-50+H05-90, H01-B50+H05-B90
6kHz≤f≤50MHz	≥+5.0	≥+5.0	≥+8.0	≥+8.0
50MHz<f≤20GHz	≥+5.0	≥+5.0	≥+13.0	≥+13.0

Max. Power (Continuous wave, 25 ± 10 ° C)	20GHz≤f≤40GHz	≥+5.0	≥+5.0	≥+12.0	≥+10.0
	40GHz<f≤67GHz	≥+3.0	≥+3.0	≥+10.0	≥+8.0
	67GHz<f≤85GHz	≥0.0	≥0.0	≥+7.0	≥+5.0
	85GHz<f≤110GHz	≥-5.0	≥-5.0	≥+3.0	≥0.0

Power Accuracy (25 ± 10 ° C)

Standard

Frequency \ Power(dBm)	-10dBm<P≤+10dBm	+10dBm<P≤+25dBm	+25dBm<P
6kHz≤f≤50MHz	±1.0dB	±1.0dB	—
50MHz<f≤3GHz	±0.5dB	±0.5dB	±1.0dB
3GHz<f≤20GHz	±0.9dB	±0.9dB	±1.2dB
20GHz<f≤40GHz	±1.0dB	±1.0dB	—
40GHz<f≤50GHz	±1.3dB	±1.3dB	—
50GHz<f≤67GHz	±1.8dB	±1.8dB	—
67GHz<f≤85GHz	±2.0dB	±2.0dB	—
85GHz<f≤110GHz	±2.2dB	—	—

Programmable Stepper Attenuator Option H01-130/120/90/50/B130

Frequency \ Power(dBm)	-120dBm<P ≤-90dBm	-90dBm<P ≤-50dBm	-50dBm<P ≤+10dBm	+10dBm<P ≤+25dBm	+25dBm<P
6kHz≤f≤50MHz	—	±1.5dB	±1.0dB	±1.0dB	—
50MHz<f≤3GHz	±1.2dB	±0.7dB	±0.5dB	±0.5dB	±1.0dB
3GHz<f≤20GHz	±1.8dB	±0.9dB	±0.9dB	±0.9dB	±1.2dB
20GHz<f≤40GHz	—	±1.2dB	±1.0dB	±1.0dB	—
40GHz<f≤50GHz	—	±1.5dB	±1.3dB	±1.3dB	—
50GHz<f≤67GHz	—	±2.0dB	±1.8dB	±1.8dB	—
67GHz<f≤85GHz	—	—	±2.0dB	±2.0dB	—
85GHz<f≤110GHz	—	—	±2.2dB	—	—

Power Resolution	0.01dB	
Power Temperature Stability	0.02dB/ C (typical value)	
Output Impedance	50 Ω (rated value)	
VSWR (Internal stable amplitude) (typical value)	100kHz≤f≤20GHz	<1.6
	20GHz<f≤40GHz	<1.8
	40GHz<f≤67GHz	<2.0
	67GHz<f≤85GHz	<2.5
	85GHz<f≤110GHz	<3.0
Max. Reverse Power	0.5W (0V DC) (rated value)	

Spectral Purity

Harmonic (whichever is smaller between+10dBm and maximum output power)	Frequency	Standard	
	100kHz≤f≤3GHz	<-30dBc	
	3GHz<f≤67GHz	<-55dBc	
	67GHz<f≤110GHz	<-40dBc	
Subharmonic (whichever is smaller between+10dBm and maximum output power)	6kHz≤f≤20GHz	<-80dBc	
	20GHz<f≤40GHz	<-60dBc	
	40GHz<f≤110GHz	<-50dBc	
Non harmonic (at 0dBm, 3kHz frequency offset further away)	Frequency	Option H04-1	Option H04-2
	6kHz≤f≤250MHz	<-58dBc	<-68dBc
	250MHz<f≤4GHz	<-70dBc	<-80dBc
	4GHz<f≤10GHz	<-70dBc	<-80dBc

Non harmonic (at 0dBm, 3kHz frequency offset further away)	Frequency	Option H04-1	Option H04-2
	6kHz≤f≤250MHz	<-58dBc	<-68dBc
	250MHz<f≤4GHz	<-70dBc	<-80dBc
	4GHz<f≤10GHz	<-70dBc	<-80dBc
	10GHz<f≤20GHz	<-64dBc	<-74dBc
	20GHz<f≤40GHz	<-58dBc	<-68dBc
	40GHz<f≤67GHz	<-52dBc	<-62dBc
	67GHz<f≤110GHz	<-48dBc	<-58dBc

SSB Phase Noise (dBc/Hz, whichever is smaller between+10dBm or the maximum output power)

Low Phase Noise Option H04-1

Frequency Offset / Frequency	10Hz	100Hz	1kHz	10kHz	100kHz	1MHz	10MHz
100MHz	—	<-118	<-141	<-148	<-150	—	—
250MHz<f≤500MHz	—	<-111	<-130	<-145	<-143	—	—
0.5 GHz<f≤1GHz	—	<-105	<-124	<-140	<-138	—	—
1 GHz<f≤2GHz	—	<-100	<-118	<-134	<-132	—	—
2 GHz<f≤4GHz	—	<-93	<-113	<-128	<-126	—	—
4GHz<f≤10GHz	—	<-85	<-105	<-120	<-118	—	—
10GHz<f≤20GHz	—	<-79	<-99	<-114	<-112	—	—
20GHz<f≤40GHz	—	<-73	<-93	<-108	<-106	—	—
40GHz<f≤67GHz	—	<-67	<-87	<-103	<-101	—	—
67GHz<f≤110GHz	—	<-61	<-81	<-97	<-95	—	—

Low Phase Noise Option H04-1

Frequency Offset / Frequency	10Hz	100Hz	1kHz	10kHz	100kHz	1MHz	10MHz
100MHz	<-102	<-118	<-141	<-148	<-150	<-152	<-152
250MHz<f≤500MHz	<-92	<-112	<-135	<-146	<-148	<-150	<-150
0.5 GHz<f≤1GHz	<-90	<-110	<-134	<-144	<-147	<-150	<-150
1 GHz<f≤2GHz	<-88	<-104	<-127	<-138	<-142	<-148	<-148
2 GHz<f≤4GHz	<-82	<-99	<-122	<-135	<-136	<-146	<-148
4GHz<f≤10GHz	<-77	<-91	<-115	<-128	<-128	<-140	<-154
10GHz<f≤20GHz	<-71	<-85	<-109	<-122	<-122	<-134	<-152
20GHz<f≤40GHz	<-63	<-79	<-99	<-116	<-116	<-128	<-142
40GHz<f≤67GHz	<-57	<-73	<-94	<-110	<-110	<-122	<-136
67GHz<f≤110GHz	<-51	<-67	<-88	<-104	<-104	<-116	<-130

Modulation Properties

Frequency Modulation (50MHz<f ≤ 50GHz, option S11)	Maximum Frequency Deviation: N × 20MHz (N is the fundamental harmonic order)	
	Accuracy (1kHz rate, N × 20kHz ≤ frequency deviation<N × 800kHz):<± (2.5% × Set frequency offset+20Hz)	
	Modulation Rate (3dB bandwidth, N × 500kHz frequency offset): DC-10MHz	
	Distortion (1kHz rate, N × 20kHz ≤ frequency deviation<N × 800kHz):<1%	
Phase Modulation (50MHz<f ≤ 50GHz, option S11)	Max. Phase Deviation:	Normal mode: N × 20.0rad (N is the number of YO harmonics)
		Broadband mode: N × 2rad
		Low noise mode: N × 0.2rad
	Accuracy (1kHz rate, N × 0.2rad ≤ phase deviation < N × 8rad, normal mode):<± (3% × Set phase deviation+0.01 rad)	
	Modulation rate (3dB bandwidth):Broadband mode DC~10MHz (typical value)	
	Distortion (1kHz rate, N × 0.8rad ≤ phase deviation < N × 8rad phase deviation, Total harmonic distortion):<0.8%	

Amplitude Modulation (10MHz<f ≤ 50GHz, option S11)	Maximum depth: > 90%	
	Modulation rate (3 dB bandwidth, 30% modulation depth): DC~100kHz	
	Accuracy (1kHz modulation rate, 30% modulation depth): ± (5% × Set Depth+1%)	
	Distortion (1kHz modulation rate, linear mode, Total harmonic distortion, 30% modulation depth):<1.5%	
Pulse Modulation (option S13, S12)	Pulse Modulation Option S12	
	Switch Ratio	>80dB (50MHz<f≤67GHz)
		>60dB (67GHz<f≤110GHz)
	Rise and Fall Time	<20ns (50MHz<f≤67GHz)
		<30ns (67GHz<f≤110GHz)
	Repetitive Frequency	0Hz~25MHz
	Min. Pulse Width	0.1μs
	Narrow Pulse Modulation Option S13	
	Switch Ratio	>80dB (50MHz<f≤67GHz)
	Rise and Fall Time	<10ns (50MHz<f≤67GHz)
	Repetitive Frequency	0Hz~25MHz (50MHz<f≤67GHz)
	Min. Pulse Width	20ns (50MHz<f≤67GHz)
Low Frequency Output/Function Generator (option S14)	Support Frequency/Phase Modulation, Amplitude Modulation Source Output	
	Waveform: Sine Wave, Square Wave, Triangular Wave, Sawtooth Wave, Noise, Double Sine Wave, Sweep Sine Wave	
	Frequency Range	Sine Wave, Double Sine, Swept Sine:DC~10MHz
		Square Wave, Triangular Wave, Sawtooth Wave:0.1Hz~1MHz
	Frequency Resolution: 0.1Hz	
	Low Frequency Output: amplitude 0-5Vpp (rated value), up to 50 Ω load	
General Properties		
RF Output Port	1466-C/D: 3.5mm (male),50Ω impedance	
	1466-E/G: 2.4mm(male),50Ω impedance	
	1466-H/L: 1.85mm(male),50Ω impedance	
	1466-N/P: 1.0mm(male),50Ω impedance	
Maximum External Dimensions (Width × High × Deep)	475mm × 193mm × 610mm (including handle and protective bottom corner)	
Weight	426mm × 177mm × 500mm (excluding handles and protective corners)	
	< 35 kg (different models and options, different weights)	
Power	100-120VAC, 50-60Hz; or 200~240VAC, 50~60Hz (adaptive)	
Powe Consumption	<600W	
Temperature Range	Working Temperature: 0 ℃ ~+50 ℃ ; Storage Temperature: -40 ℃ ~+70 ℃	

Ordering Information

Model

Model	Name	Description
1466-C	Signal Generator	6kHz~13GHz
1466-D	Signal Generator	6kHz~20GHz
1466-E	Signal Generator	6kHz~33GHz
1466-G	Signal Generator	6kHz~45GHz
1466-H	Signal Generator	6kHz~53GHz
1466-L	Signal Generator	6kHz~67GHz
1466-N	Signal Generator	6kHz~90GHz
1466-P	Signal Generator	6kHz~110GHz

Standard

No.	Name	Description
1	Power Cord	Standard three core power cord
2	Qualification Certificate	/

Options

Option Model	Name	Description
Programmed Stepper Attenuator Option		
1466-H01-130	130dB programmable stepper attenuator	Used to expand the dynamic range of output power, suitable for 1466C/D/E/G.
1466-H01-90	90dB programmable stepper attenuator	Used to expand the dynamic range of output power, suitable for 1466H/L.
1466-H01-120	120dB programmable stepper attenuator	Used to expand the dynamic range of output power, suitable for 1466H/L.
1466-H01-50	50dB programmable stepper attenuator	Used to expand the dynamic range of output power, suitable for 1466N/P.
1466-H01-B130	Channel B 130dB programmable stepper attenuator	Used to expand the dynamic range of channel B output power. Suitable for 1466C/D, mandatory option 1466-H11-B13/B20.
Low Phase Noise Option		
1466-H04-1	Low phase noise	Optimize phase noise, 10GHz@10kHz : -120dBc/Hz. Either 1466-H04-1 or 1466-H04-2 must be selected.
1466-H04-2	Ultra low phase noise	Optimize phase noise, 10GHz@10kHz : -128dBc/Hz. Either 1466-H04-1 or 1466-H04-2 must be selected.
1466-H04-B1	Channel B low phase noise	Optimize channel B phase noise, 10GHz@10kHz : -120dBc/Hz, 1466-H11-B13/B20 is required. Either 1466-H04-B1 or 1466-H04-B2 must be selected.
1466-H04-B2	Channel B ultra low phase noise	Optimize channel B phase noise, 10GHz@10kHz : -128dBc/Hz, must choose 1466-H11-B13/B20, 1466-H04-2. Either 1466-H04-B1 or 1466-H04-B2 must be selected.
High Power Options		
1466-H05-13	13GHz high-power output	Increase maximum output power. Suitable for 1466C.
1466-H05-20	20GHz high-power output	Increase maximum output power. Suitable for 1466D.
1466-H05-33	33GHz high-power output	Increase maximum output power. Suitable for 1466E.
1466-H05-45	45GHz high-power output	Increase maximum output power. Suitable for 1466G.
1466-H05-53	53GHz high-power output	Increase maximum output power. Suitable for 1466H.
1466-H05-67	67GHz high-power output	Increase maximum output power. Suitable for 1466L.
1466-H05-90	90GHz high-power output	Increase maximum output power. Suitable for 1466N.
1466-H05-110	110GHz high-power output	Increase maximum output power. Suitable for 1466P.
1466-H05-B13	13GHz channel B high-power output	Increase the maximum output power of channel B. Suitable for 1466C, option 1466-H11-B13 is required.
1466-H05-B20	20GHz channel B high-power output	Increase the maximum output power of channel B. Suitable for 1466D, option 1466-H11-B20 is required.

Option Model	Name	Description
Dual Channel Option		
1466-H11-B13	13GHz channel B	Add channel B to output 6kHz~13GHz analog signal. Suitable for 1466C/D.
1466-H11-B20	20GHz channel B	Add channel B to output 6kHz~20GHz analog signal. Suitable for 1466D.
Analog Modulation Option		
1466-S11	Analog modulation function	Add analog modulation function, including AM, FM, Φ M.
1466-S12	Pulse modulation function	Add pulse modulation function, with a minimum pulse width of 100ns.
1466-S13	Narrow pulse modulation function	Add pulse modulation function, with a minimum pulse width of 20ns.
1466-S14	Low frequency output/function generation function	Add low-frequency output and Function generator functions.
Sweep Option		
1466-S15	Analog sweep function	Add analog frequency sweep function (slope sweep).
1466-S16	Power sweep function	Add power sweep function.
Matching Options		
1466-H94	Cabinet installation kit	A dedicated kit installed in the cabinet.
1466-H99	Aluminum alloy transport box	High strength and lightweight aluminum alloy transport box with lifting handle and universal roller, convenient for transportation.
1466-H100	User manual (paper version)	Provide a detailed user manual in hard copy.

Quality&**Precise**

MAXWELLON 1466V

6kHz~13GHz/20GHz/33GHz/45GHz/53GHz/67GHz

Vector Signal Generator

2023

Maxwellon

The Maxwellon 1466V series signal generator is a high-end universal testing instrument for microwave and millimeter waves. It has the advantages of wide frequency range coverage, large RF modulation bandwidth, and high signal spectral purity. With a single machine dual RF channel and multi machine cascade design, it can meet your various testing requirements. The rich built-in functions of analog modulation, digital modulation, fading simulation, AWGN, etc. make daily testing more convenient. Collaborate with simulation software to achieve multi scene signal simulation, making it easy to test complex scenarios such as wireless communication and mobile communication.

Newly upgraded human-computer interaction with a series of new features such as large screen touch graphics guided interaction, mobile browser access control, multi manufacturer power meter connection recognition, multi client deployment, SCPI command recording, control interface customization, and baseband waveform preview, creating a sense of happiness for users in testing.

The Maxwellon 1466V series signal generator is an ideal choice for high standard testing from component level to system level in cutting-edge technology fields such as communication and aerospace.

Key Feature

Excellent RF Performance

Frequency coverage of 6kHz~13GHz/20GHz/33GHz/45GHz/53GHz/67GHz;
Excellent spectral purity, SSB-132 dBc/Hz (typical value, 10 GHz carrier 10kHz frequency offset), spurious<-80 dBc (10 GHz carrier);
Excellent broadband bottom noise, SSB-161 dBc/Hz (typical value, 20GHz carrier 30MHz frequency offset);
Large output power dynamic range, with a maximum dynamic range of -150dBm~+25dBm (settable);
Maximum 2GHz RF modulation bandwidth, 500MHz/1GHz/2GHz bandwidth can be flexibly selected;
Excellent vector modulation accuracy, EVM<0.8% (5GNR, FR2 28GHz);

Abundant built-in Features

Rich modulation functions, covering analog modulation, pulse modulation, and over 30 digital modulation styles;
Support user-defined variable sampling rate playback function for arbitrary wave data;
Support continuous wave multi tone and complex multi carrier modulation functions;
More than 600 mobile communication TestModels/FRCs covering protocols such as 5G NR and LTE;
Internal integrated WLAN standard wireless connection signal simulation function;
Multi type noise addition and real-time fading simulation function;

Multi Scene Signal Simulation

Support flexible editing and simulation of multiple communication protocol signals;
Single machine dual channel+multi machine cascade, multi-channel independent or phase coherent output can be flexibly configured;

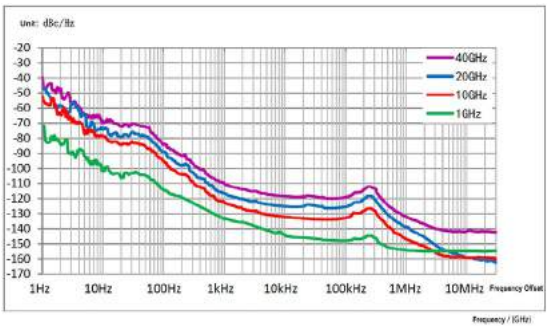
Newly Upgraded Human-computer Interaction

Large screen touch graphic guided interaction, supporting user-defined menus;
Cross platform client and browser access control;
Real time recording of SCPI instructions and automatic generation of program controlled example engineering.

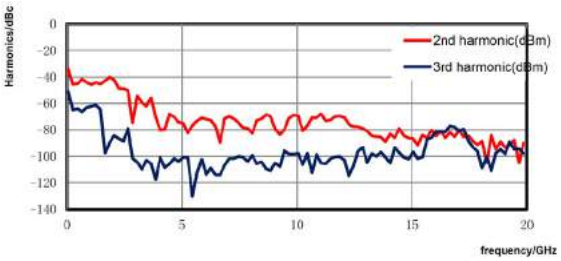
Excellent Performance

Excellent Spectral Purity

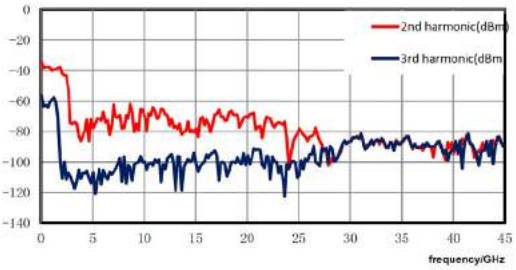
The Maxwellon 1466V series signal generator supports high-purity spectrum signal output:
SSB -145 dBc/Hz (typical value, 1 GHz carrier 10kHz frequency offset);
SSB -132 dBc/Hz (typical value, 10 GHz carrier 10kHz frequency offset);
SSB -161 dBc/Hz (typical value, 20 GHz carrier 30kHz frequency offset);
Spurious<-80 dBc (10 GHz carrier); Harmonic<-55dBc.



Option H04-2 Single sideband phase noise measured value



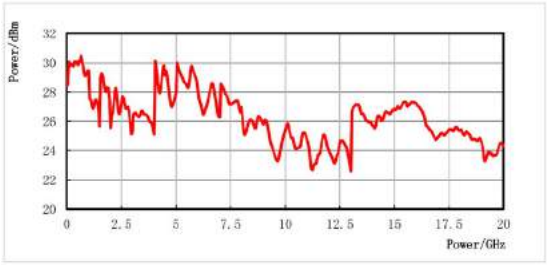
1466V-D harmonic measured value



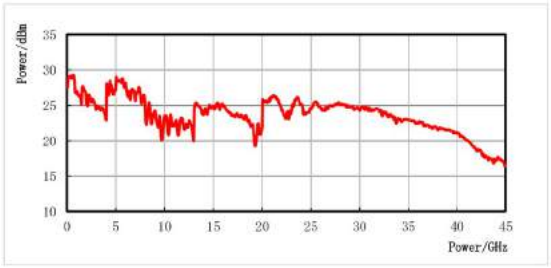
1466V-G harmonic measured value

Large Dynamic Range, High Accuracy Power Output

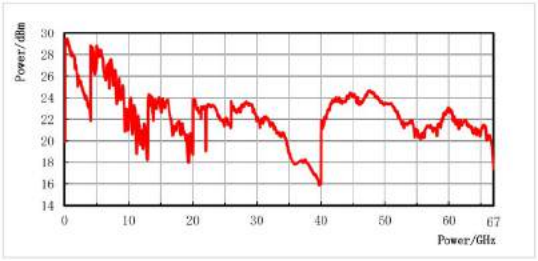
The typical maximum output power values of the Maxwellon 1466V series signal generator are:
+27dBm at 5GHz,
+24dBm at 20GHz,
+25dBm at 30GHz,
+22dBm at 60GHz.
The minimum output power is -150dBm (adjustable), and the dynamic range exceeds 170dB.
It has excellent power accuracy indicators, with a typical value of<0.5dB(below 20GHz).



1466V-D maximum output power measured value (option H05-20)



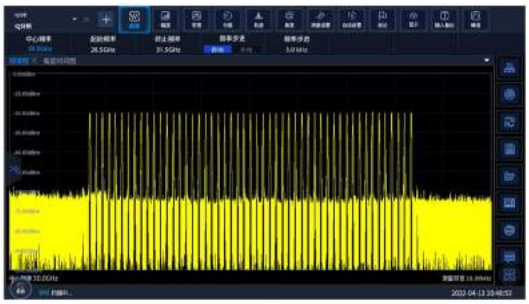
1466V-G maximum output power measured value (option H05-45)



1466V-L maximum output power measured value (option H05-67)

2GHz RF Modulation Bandwidth

The Maxwellon 1466V series signal generator can provide a maximum 2GHz RF modulation bandwidth, and supports flexible selection of 500MHz, 1GHz, and 2GHz bandwidths according to different application scenarios. When using external broadband baseband signal input, the RF modulation bandwidth can reach up to 5GHz. Whether it's 5G communication now or 6G communication in the future, outstandingmodulation bandwidth performance can easily face testing challenges.(below 20GHz).



30GHz carrier 2GHz modulation bandwidth multi tone signal spectrum

Excellent Vector Modulation Accuracy

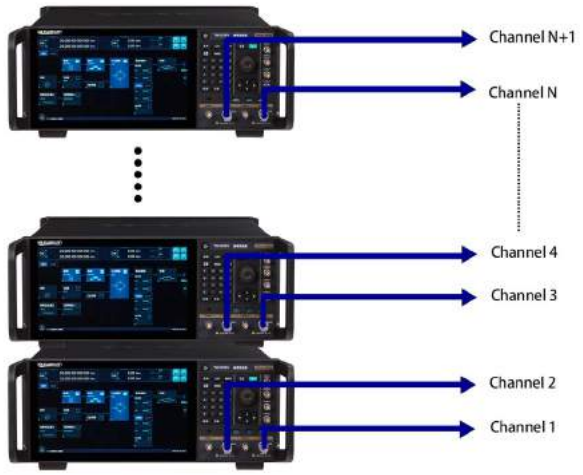
The Maxwellon 1466V series signal generator has excellent vector modulation accuracy
QPSK modulation EVM measured value of 0.4% (2GHz carrier).
Excellent adjacent power ratio
5GNR ACPR< -55dBc@2GHz Carrier (typical value)
-45dBc@42.5GHz Carrier (typical value)
Capable of conducting performance evaluation in communication equipment research and development, as well as testing communication equipment performance in production lines.

QPSK modulation EVM measurement results

2GHz carrier 5G NR ACPR measurement results

Cascade Multiple Machines to Achieve Multi-source Coherent Excitation

Supports multi machine cascading, providing solutions for MIMO, beamforming, and signal diversity testing.



Multiple cascaded

Abundant Built-in Features

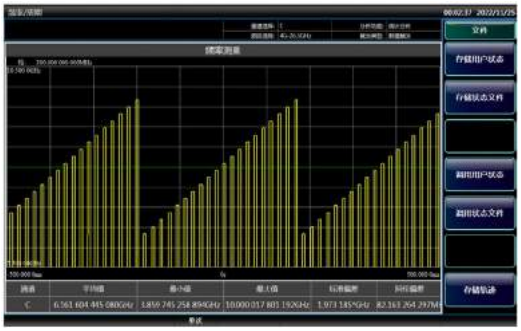
Complete Analog Modulation

Supports amplitude modulation, frequency modulation, phase modulation, and pulse modulation. Equipped with complex pulse modulation functions such as dual pulse, pulse train, repeat frequency stagger, repeat frequency jitter, repeat frequency slip, etc.

Analog modulation configuration interface

Multi Style Sweep Function

Supports step sweep, list sweep, analog sweep (slope sweep), and power sweep functions.

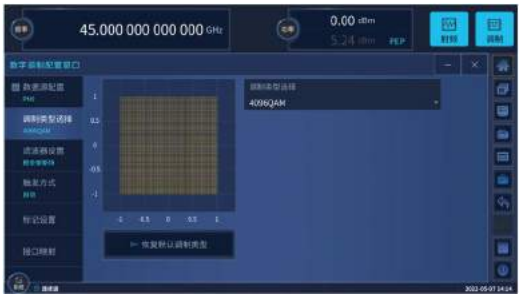


Step sweep measurement results

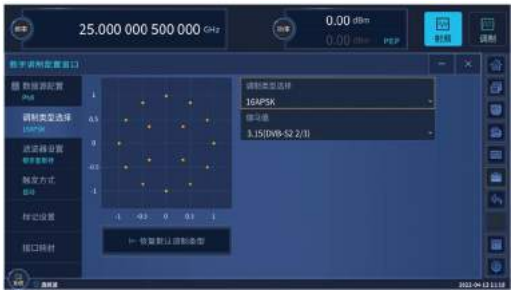
Simulated sweep (slope sweep) actual measurement results

Comprehensive Standard Digital Modulation Styles

The generation of over 30 digital standard modulation signals (PSK, FSK, QAM, APSK) encompasses all important frequency bands and modulation styles in digital communication.



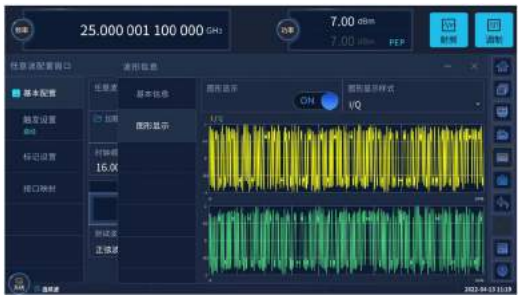
4096QAM modulation configuration interface



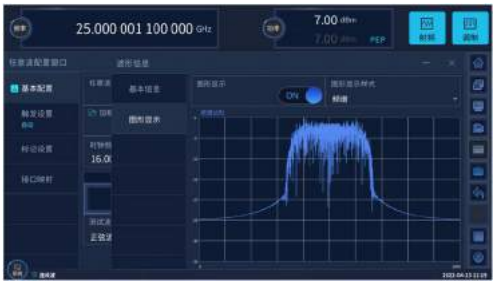
16APSK modulation configuration interface

Any Wave Playback

Support user-defined variable sampling rate playback function for arbitrary wave data. With the convenient baseband preview function, it is convenient for you to verify the correctness of data in the time and frequency domains in the first time.



Arbitrary wave IQ data display interface



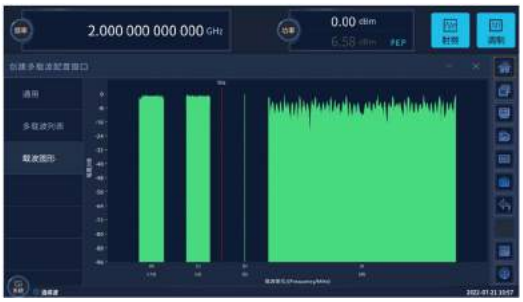
Arbitrary wave IQ data spectrum display interface

Multicarrier

Support continuous wave multi tone and complex multi carrier modulation functions, making the construction of complex signal scenes easy.

Multi tone modulation configuration interface

Complex multi carrier modulation configuration interface



Complex Multicarrier Modulation Graphical Attribute Interface

Multiple carriers with different modulation types

Multi Type Noise Addition

Supports noise enhancement functions such as pure noise, additive Gaussian noise, and continuous wave interference.

Configuration interface for additive Gaussian white noise

Intrapulse Modulation

Support multiple types of intra pulse modulation, including linear frequency modulation, barker code, phase modulation code, etc.

Intrapulse modulation configuration interface

Real Time Fading Simulation

There are 20 maximum fading paths, supporting pure Doppler, Rayleigh, Rice, Rayleigh+lognormal and other fading types. It supports preset fading scenario modes and can simulate the fading channel model defined by 3GPP.

Real time fading simulation configuration interface

Multi Scene Signal Simulation

The Maxwellon 1466V series signal generator combines simulation software to support multiple types of signal simulation and RF output, such as communication.

Mobile Communication Signal Simulation

For the development and production of mobile communication base stations or terminals, as well as the necessary RF consistency testing for network verification and approval of mobile communication equipment, the Maxwellon 1466V series signal generator supports standard protocol signal one click simulation by embedding over 600 TestModels/FRCs including 5G NR.

5G NR TM Use Case Interface

Downlink scheduling settings

FR1-TM1_1_FDD_100MHz_30kHz

FR1-TM3_1_FDD_100MHz_60kHz

FRC-FR1-100MHz_A1-8

UL_FR1_FDD_100MHz

WLAN Signal Simulation

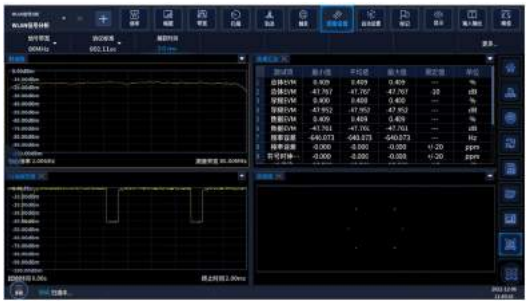
Testing for the development and production of wireless communication terminals, with 802.11a/b/g/n/ac/ax wireless connection PPDU, MPDU, A-MPDU and other signal simulation, supporting physical frame block signal simulation composed of multiple PPDUs with different modulation and coding methods.

WLAN physical frame block configuration interface

PPDU configuration interface

IEEE 802.11ax Single User PPDU Signal Demodulation EVM, 80MHz Transmission Bandwidth, 256QAM

IEEE 802.11ax Single User PPDU Signal Demodulation EVM, 80MHz Transmission Bandwidth, 1024QAM



IEEE 802.11ac Single User PPDU Signal Demodulation EVM, 80MHz Transmission Bandwidth, QPSK+BPSK

IEEE 802.11ac Single User PPDU Signal Demodulation EVM, 1600MHz Transmission Bandwidth, QPSK+BPSK

Newly Upgraded Human-computer Interaction

Touchable Graphic Guided Interaction

Adopting an 11.6-inch high-resolution touch screen, it clearly displays the main parameters and instrument status information, combined with a signal flow diagram guidance interface, making the display more intuitive and interactive.

Signal Flow Diagram Guidance Interface

Flexible Editing of User Control Interface

Support user-defined menus, customize personalized user control interfaces according to testing habits, achieve multi-functional operations within a window, and avoid the troubles of deep menus and repeated searches.

User Defined Menu

Support Cross Platform Client Manipulation

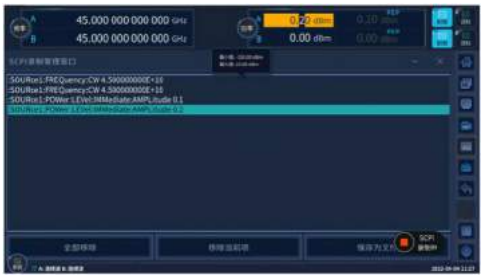
Cross platform client and browser access control. Supports multiple clients to connect simultaneously, and the instrument's working status is synchronized and refreshed. Support web browser access control for mobile devices.

Browser Access

Synchronous Recording of SCPI Instructions, One Click Script Generation

Not only can recorded SCPI instructions be exported with one click, but also VS (C++, C #), Qt, Matlab, LabView program control example projects can be automatically generated, making program control simpler.

SCPI instruction recording



SCPI instruction recording

Specification

Frequency Properties			
Frequency Range	1466V-C: 6kHz~13GHz 1466V-D: 6kHz~20GHz 1466V-E: 6kHz~33GHz 1466V-G: 6kHz~45GHz 1466V-H: 6kHz~53GHz 1466V-L: 6kHz~67GHz	Frequency	N (Internal YO harmonic number)
		6kHz≤f≤10MHz	/
		10MHz<f≤50MHz	/
		50MHz<f≤62.5MHz	1/256
		62.5MHz<f≤125MHz	1/128
		125MHz<f≤250MHz	1/64
		250MHz<f≤500MHz	1/32
		500MHz<f≤1GHz	1/16
		1GHz<f≤2GHz	1/8
		2GHz<f≤4GHz	1/4
		4GHz<f≤8GHz	1/2
		8GHz<f≤20GHz	1
		20GHz<f≤40GHz	2
		40GHz<f≤67GHz	4
Frequency Resolution	0.001Hz		
Frequency Switching Time	<15ms		
Timebase Aging Rate (typical value)	$\pm 5\times10^{-10}$ /day (after 30-day continuous power-on)		
Reference Output	Frequency	10MHz	
	Power	>+4dBm to 50 Ω load	
Reference Input	Frequency	1 ~ 100MHz , steps of 1Hz	
	Power	-5dBm ~ +10dBm, 50Ω Impedance	
Sweep Properties			
Sweep Mode	Step Sweep, List Sweep, Analog Sweep (Slope Sweep, Option S15)		
	Power Sweep (Option S16)		
Analog Sweep (Slope Sweep, Option S15)	Max. Sweep Speed	f>4GHz	400MHz/ms
	Sweep Accuracy	±0.05% sweep width (sweep time 100ms, within the specified maximum sweep width of 100ms)	
Power Properties			
Min. Power	Model	Standard	Programmed Stepper Attenuator Option H01-90/120/130
	1466V-C/D/E/G	-10dBm (-20dBm configurable)	Option H01-130: -120.0dBm (-150dBm configurable)
	1466V-H/L	-10dBm (-20dBm configurable)	Option H01-90: -90.0dBm (-110dBm configurable) Option H01-120: -90.0dBm (-140dBm configurable)

Max. Power (Continuous wave, 25 ± 10 ° C)	1466V-C				
	Frequency Range	Standard	Programmed stepper attenuator option H01-130 H01-B130	High-power output option H05-13 H05-B13	Programmed stepper attenuator option+ High-power output option H01-130+H05-13, H01-B130+H05-B13
	6kHz≤f≤50MHz	≥+15.0	≥+15.0	≥+15.0	≥+15.0
	50MHz<f≤13GHz	≥+15.0	≥+15.0	≥+20.0	≥+20.0
	1466V-D				
	Frequency Range	Standard	Programmed stepper attenuator option H01-130 H01-B130	High-power output option H05-20 H05-B20	Programmed stepper attenuator option+ High-power output option H01-130+H05-20, H01-B130+H05-B20
	6kHz≤f≤50MHz	≥+15.0	≥+15.0	≥+15.0	≥+15.0
	50MHz<f≤20GHz	≥+15.0	≥+15.0	≥+20.0	≥+20.0
	1466V-E				
	Frequency Range	Standard	Programmed stepper attenuator option H01-130 H01-B130	High-power output option H05-33 H05-B33	Programmed stepper attenuator option+ High-power output option H01-130+H05-33, H01-B130+H05-B33
	6kHz≤f≤50MHz	≥+8.0	≥+8.0	≥+8.0	≥+8.0
	50MHz<f≤6GHz	≥+12.0	≥+12.0	≥+20.0	≥+20.0
	6GHz<f≤18GHz	≥+12.0	≥+12.0	≥+18.0	≥+18.0
	18GHz<f≤30GHz	≥+12.0	≥+12.0	≥+17.0	≥+17.0
	30GHz<f≤33GHz	≥+12.0	≥+12.0	≥+18.0	≥+18.0
	1466V-G				
	Frequency Range	Standard	Programmed stepper attenuator option H01-130 H01-B130	High-power output option H05-45 H05-B45	Programmed stepper attenuator option+ High-power output option H01-130+H05-45, H01-B130+H05-B45
	6kHz≤f≤50MHz	≥+8.0	≥+8.0	≥+8.0	≥+8.0
	50MHz<f≤6GHz	≥+12.0	≥+12.0	≥+20.0	≥+20.0
	6GHz<f≤18GHz	≥+12.0	≥+12.0	≥+18.0	≥+18.0
	18GHz<f≤30GHz	≥+12.0	≥+12.0	≥+17.0	≥+17.0
	30GHz<f≤40GHz	≥+12.0	≥+12.0	≥+18.0	≥+18.0
	40GHz<f≤45GHz	≥+12.0	≥+12.0	≥+14.0	≥+14.0
	1466V-H				
	Frequency Range	Standard	Programmed stepper attenuator option H01-90/120 H01-B90/B120	High-power output option H05-53 H05-B53	Programmed stepper attenuator option+ High-power output option H01-90/120+H05-53 H01-B90/120+H05-B53
	6kHz≤f≤50MHz	≥+8.0	≥+8.0	≥+8.0	≥+8.0
	50MHz<f≤35GHz	≥+8.0	≥+8.0	≥+17.0	≥+16.0
	35GHz<f≤40GHz	≥+8.0	≥+8.0	≥+15.0	≥+13.0

Max. Power (Continuous wave, 25 ± 10 ° C)	40GHz<f≤53GHz	≥+8.0	≥+8.0	≥+20.0	≥+18.0
	1466V-L				
	Frequency Range	Standard	Programmed stepper attenuator option H01-90/120 H01-B90/B120	High-power output option H05-67 H05-B67	Programmed stepper attenuator option+ High-power output option H01-90/120+H05-53 H01-B90/120+H05-B53
	6kHz≤f≤50MHz	≥+8.0	≥+8.0	≥+8.0	≥+8.0
	50MHz<f≤35GHz	≥+8.0	≥+8.0	≥+17.0	≥+16.0
	35GHz<f≤40GHz	≥+8.0	≥+8.0	≥+15.0	≥+13.0
	40GHz<f≤53GHz	≥+8.0	≥+8.0	≥+20.0	≥+18.0
	53GHz<f≤65GHz	≥+8.0	≥+8.0	≥+18.0	≥+16.0
	65GHz<f≤67GHz	≥+8.0	≥+8.0	≥+15.0	≥+12.0

Power Accuracy (25 ± 10 ° C)	Standard			
	Power(dBm) / Frequency	-10dBm ＜ P≤+10dBm	+10dBm ＜ P≤+25dBm	+25dBm ＜ P
	6kHz≤f≤50MHz	±1.0dB	±1.0dB	/
	50MHz<f≤3GHz	±0.5dB	±0.5dB	±1.0dB
	3GHz<f≤20GHz	±0.9dB	±0.9dB	±1.2dB
	20GHz<f≤40GHz	±1.0dB	±1.0dB	/
	40GHz<f≤50GHz	±1.3dB	±1.3dB	/
	50GHz<f≤67GHz	±1.8dB	±1.8dB	/

H01-130/120/90/50/B130 Programmable Stepper Attenuator Option

Power(dBm) / Frequency	-120dBm<P≤ -90dBm	-90dBm<P≤ -50dBm	-50dBm<P≤ +10dBm	+10dBm<P≤ +25dBm	+25dBm<P
6kHz≤f≤50MHz	/	±1.5dB	±1.0dB	±1.0dB	/
50MHz<f≤3GHz	±1.2dB	±0.7dB	±0.5dB	±0.5dB	±1.0dB
3GHz<f≤20GHz	±1.8dB	±0.9dB	±0.9dB	±0.9dB	±1.2dB
20GHz<f≤40GHz	/	±1.2dB	±1.0dB	±1.0dB	/
40GHz<f≤50GHz	/	±1.5dB	±1.3dB	±1.3dB	/
50GHz<f≤67GHz	/	±2.0dB	±1.8dB	±1.8dB	/

Power Resolution	0.01dB	
Power Temperature Stability	0.02dB/ C (typical value)	
Output Impedance	50 Ω (rated value)	
VSWR (Internal stable amplitude) (typical value)	100kHz≤f≤20GHz	<1.6
	20GHz<f≤40GHz	<1.8
	40GHz<f≤67GHz	<2.0
Max. Reverse Power	0.5W (0V DC) (rated value)	

Spectral Purity

Harmonic (whichever is smaller between+10dBm and maximum output power)	Frequency	Standard
	6kHz≤f≤3GHz	<-30dBc
	3GHz<f≤67GHz	<-55dBc
Subharmonic (whichever is smaller between+10dBm and maximum output power)	100kHz≤f≤20GHz	<-80dBc
	20GHz<f≤40GHz	<-60dBc
	40GHz<f≤67GHz	<-50dBc

Non harmonic (at 0dBm, 3kHz frequency offset further away)	Frequency	Option H04-1	Option H04-1
	6kHz≤f≤250MHz	<-58dBc	<-68dBc
	250MHz<f≤4GHz	<-70dBc	<-80dBc
	4GHz<f≤10GHz	<-70dBc	<-80dBc
	10GHz<f≤20GHz	<-64dBc	<-74dBc

Non harmonic (at 0dBm, 3kHz frequency offset further away)	Frequency		Option H04-1			Option H04-1	
	20GHz<f≤40GHz		<-58dBc			<-68dBc	
	40GHz<f≤67GHz		<-45dBc			<-45dBc	
SSB Phase Noise (dBc/Hz, whichever is smaller between+10dBm or the maximum output power)	Low Phase Noise Option H04-1						
	Frequency Offset / Frequency	10Hz	100Hz	1kHz	10kHz	100kHz	1MHz	10MHz
	100MHz	/	<-118	<-141	<-148	<-150	/	/
	250MHz<f≤500MHz	/	<-111	<-130	<-145	<-143	/	/
	0.5 GHz<f≤1GHz	/	<-105	<-124	<-140	<-138	/	/
	1 GHz<f≤2GHz	/	<-100	<-118	<-134	<-132	/	/
	2 GHz<f≤4GHz	/	<-93	<-113	<-128	<-126	/	/
	4GHz<f≤10GHz	/	<-85	<-105	<-120	<-118	/	/
	10GHz<f≤20GHz	/	<-79	<-99	<-114	<-112	/	/
	20GHz<f≤40GHz	/	<-73	<-93	<-108	<-106	/	/
	40GHz<f≤67GHz	/	<-67	<-87	<-103	<-101	/	/
	67GHz<f≤110GHz	/	<-61	<-81	<-97	<-95	/	/
	Ultra Low Phase Noise Option H04-2						
	Frequency Offset / Frequency	10Hz	100Hz	1kHz	10kHz	100kHz	1MHz	10MHz
	100MHz	<-102	<-118	<-141	<-148	<-150	<-152	<-152
	250MHz<f≤500MHz	<-92	<-112	<-135	<-146	<-148	<-150	<-150
	0.5 GHz<f≤1GHz	<-90	<-110	<-134	<-144	<-147	<-150	<-150
	1 GHz<f≤2GHz	<-88	<-104	<-127	<-138	<-142	<-148	<-148
	2 GHz<f≤4GHz	<-82	<-99	<-122	<-135	<-136	<-146	<-148
	4GHz<f≤10GHz	<-77	<-91	<-115	<-128	<-128	<-140	<-154
	10GHz<f≤20GHz	<-71	<-85	<-109	<-122	<-122	<-134	<-152
	20GHz<f≤40GHz	<-63	<-79	<-99	<-116	<-116	<-128	<-142
	40GHz<f≤67GHz	<-57	<-73	<-94	<-110	<-110	<-122	<-136

Modulation Properties

Frequency Modulation (50MHz<f ≤ 50GHz, option S11)	Maximum Frequency Deviation: N × 20MHz (N is the fundamental harmonic order)	
	Accuracy (1kHz rate, N × 20kHz ≤ frequency deviation<N × 800kHz):<± (2.5% × Set frequency offset+20Hz)	
	Modulation Rate (3dB bandwidth, N × 500kHz frequency offset): DC-10MHz	
	Distortion (1kHz rate, N × 20kHz ≤ frequency deviation<N × 800kHz):<1%	
Phase Modulation (50MHz<f ≤ 50GHz, option S11)	Max. Phase Deviation:	Normal mode: N × 20.0rad (N is the number of YO harmonics)
		Broadband mode: N × 2rad
		Low noise mode: N × 0.2rad
	Accuracy (1kHz rate, N × 0.2rad ≤ phase deviation < N × 8rad, normal mode):<± (3% × Set phase deviation+0.01 rad)	
	Modulation rate (3dB bandwidth):Broadband mode DC~10MHz (typical value)	
	Distortion (1kHz rate, N × 0.8rad ≤ phase deviation < N × 8rad phase deviation, Total harmonic distortion):<0.8%	
Amplitude Modulation (10MHz<f ≤ 50GHz, option S11)	Maximum depth: > 90%	
	Modulation rate (3 dB bandwidth, 30% modulation depth): DC~100kHz	
	Accuracy (1kHz modulation rate, 30% modulation depth): ± (5% × Set Depth+1%)	
	Distortion (1kHz modulation rate, linear mode, Total harmonic distortion, 30% modulation depth):<1.0%	
Pulse Modulation (f>50MHz, option S13, S12)	Pulse Modulation Option S12	
	Switch Ratio	>80dB
	Rise and Fall Time	<20ns
	Repetitive Frequency	0Hz~25MHz
	Min. Pulse Width	0.1μs

Pulse Modulation (f>50MHz, option S13, S12)	Pulse Modulation Option S13		
	Switch Ratio	>80dB	
	Rise and Fall Time	<10ns	
	Repetitive Frequency	0Hz~25MHz	
	Min. Pulse Width	20ns	
Low Frequency Output/ Function Generator (option S14)	Support Frequency/Phase Modulation, Amplitude Modulation Source Output		
	Waveform: Sine Wave, Square Wave, Triangular Wave, Sawtooth Wave, Noise, Double Sine Wave, Sweep Sine Wave		
	Frequency Range	Sine Wave, Double Sine, Swept Sine:DC~10MHz	
		Square Wave, Triangular Wave, Sawtooth Wave:0.1Hz~1MHz	
	Frequency Resolution: 0.1Hz		
	Low Frequency Output: amplitude 0-5Vpp (rated value), up to 50 Ω load		
Vector Modulation Accuracy (EVM, RMS%, Calibrated, 0dBm, 25℃ ± 10 ℃)	Universal Modulation Format (Symbol Rate 4Msps, Root Nyquist Filter, α= 0.3, QPSK format, f>100MHz)	100MHz f≤4GHz: <0.8%	
		4GHz f≤20GHz: <1.0%	
		20GHz f≤40GHz: <1.2%	
		40GHz f≤67GHz: <1.4%	
	CDMA (Symbol Rate 3.84Msps, Root Nyquist Filter, α= 0.22, QPSK format)	<0.7% (2GHz)	
	5GNR (Test Model 3.1a,100MHz,256QAM,30kHz SCS,Option S01)	<0.85% (100MHz,3.5GHz)	
		<1.0% (100MHz,10GHz)	
		<1.2% (100MHz,28GHz)	
		<1.8% (100MHz,42.5GHz)	
Adjacent Channel Power Ratio (ACPR, Calibrated at 25° C ± 10° C)	CDMA (Symbol Rate 3.84Msps, Root Nyquist Filter, α= 0.22, QPSK format, 0dBm)	>64dBc (2GHz)	
	5GNR (Test Model 3.1a,100MHz,256QAM,30kHz SCS,Option S01)	1466V-C/D/E/F	>52dBc (100MHz,3.5GHz, 0dBm)
			>51dBc (100MHz,10GHz,0dBm)
			>48dBc (100MHz,28GHz,0dBm)
			>42dB (100MHz,42.5GH,0dBm)
		1466V-H/L	>52dBc (100MHz,3.5GHz, 0dBm)
			>51dBc (100MHz,10GHz, 0dBm)
			>46dB (100MHz,28GHz, +5dBm)
			>41dB (100MHz,42.5GHz, +5dBm)
Internal Modulation Bandwidth (Carrier 900MHz,2.6GHz,3.5GHz,10 GHz,28GHz,42.5GHz,option S01/02)	Option H31-500/H31-B500	500MHz (multi tone, 51 tones, frequency interval of 10MHz, frequency response<3.0dB)	
	Option H31-1000/H31-B1000	1GHz (Multi tone, with 51 tones, carrier frequency ≥ 2.6GHz, frequency interval of 20MHz, frequency response<4.0dB)	
	Option H31-2000/H31-B2000	2GHz (Multi tone, with 51 tones, carrier frequency ≥ 3.5GHz, frequency interval of 40MHz, frequency response<5.0dB)	
External Modulation Bandwidth (Carrier 10GHz,28GHz,42.5GHz)	Standard	2GHz (Stable amplitude open loop, I-channel input 500mVpp sine wave, frequency response ± 5.0dB)	
	Option H33/H33-B	5GHz (f > 20GHz, stable amplitude open-loop, I-channel input 500mVrms sine wave, frequency response ± 8.0dB)	
Internal Baseband Signal Generator	Number of Channels	2 (I and Q)	
	Max. Symbol Rate	Standard	150Msps
		Option H31-1000	300Msps
		Option H31-2000	600Msps
	Baseband Waveform Memory	Standard	1G Sample Point
		Option H32	4G Sample Point
	Real Time Baseband Mode		
	Modulation Format	PSK: BPSK,QPSK,AQPSK,OQPSK,π/4DQPSK,8PSK	
		QAM: 16,32,64,128,256,512,1024,2048,4096	
		FSK: 2,4,8,16,32,64	

Internal Baseband Signal Generator	Modulation Format	ASK,MSK,APSK,Arbitrary Wave Modulation
	Max. Frequency Interval in Multi Tone Mode (H31-2000)	2GHz
	EVM	<0.5% (typical value) (RMS%, symbol rate 4Msps, root Nyquist filter, α= 0.3, QPSK format)
	Arbitrary Wave Mode	
	Data Format	Waveform Segment, Sequence
	Maximum Clock Frequency (H31-2000)	2.5GHz
	Trigger Mode	Continuous, Single, Gated
	Trigger Source	Key Triggered, External
	Trigger Types	Automatic, Triggered, Real-Time, Single Ignored Repeated Trigger, Single Buffered Repeated Trigger, Single Real-Time Repeated Trigger, High Effective Gate Control, Low Effective Gate Control.
General Properties		
RF Output Port	1466V-C/D: 3.5mm (male),50Ω impedance	
	1466V-E/G: 2.4mm(male),50Ω impedance	
	1466V-H/L: 1.85mm(male),50Ω impedance	
Maximum External Dimensions (Width × High × Deep)	475mm × 193mm × 610mm (including handle and protective bottom corner)	
	426mm × 177mm × 500mm (excluding handles and protective corners)	
Weight	< 35 kg (different models and options, different weights)	
Power	100-120VAC, 50-60Hz; or 200~240VAC, 50~60Hz (adaptive)	
Powe Consumption	<700W	
Temperature Range	Working Temperature: 0 ℃ ~+50 ℃ ; Storage Temperature: -40 ℃ ~+70 ℃	

Ordering Information

Model

Model	Name	Description
1466V-C	Vector Signal Generator	6kHz~13GHz
1466V-D	Vector Signal Generator	6kHz~20GHz
1466V-E	Vector Signal Generator	6kHz~33GHz
1466V-G	Vector Signal Generator	6kHz~45GHz
1466V-H	Vector Signal Generator	6kHz~53GHz
1466V-L	Vector Signal Generator	6kHz~67GHz

Standard

No.	Name	Description
1	Power Cord	Standard three core power cord
2	Qualification Certificate	/

Options

Option Model	Name	Description
Programmed Stepper Attenuator Option		
1466V-H01-130	130dB programmable stepper attenuator	Used to expand the dynamic range of output power, suitable for 1466V-C/D/E/G.
1466V-H01-120	120dB programmable stepper attenuator	Used to expand the dynamic range of output power, suitable for 1466V-H/L.
1466V-H01-90	90dB programmable stepper attenuator	Used to expand the dynamic range of output power, suitable for 1466V-H/L.
1466V-H01-B130	Channel B 130dB programmable stepper attenuator	Used to expand the dynamic range of channel B output power. Suitable for 1466V-C/D, mandatory 1466V-H11-B13/B20/BV13/BV20 options.
Low Phase Noise Option		
1466V-H04-1	Low phase noise	Optimize phase noise, 10GHz@10kHz : -120dBc/Hz. Either 1466V-H04-1 or 1466V-H04-2 must be selected.
1466V-H04-2	Ultra low phase noise	Optimize phase noise, 10GHz@10kHz : -128dBc/Hz. Either 1466V-H04-1 or 1466V-H04-2 must be selected.
1466V-H04-B1	Channel B low phase noise	Optimize channel B phase noise, 10GHz@10kHz : -120dBc/Hz, must choose 1466V-H11-B13/B20/BV13/BV20. Either 1466V-H04-B1 or 1466V-H04-B2 must be selected.
1466V-H04-B2	Channel B ultra low phase noise	Optimize channel B phase noise, 10GHz@10kHz : -128dBc/Hz, 1466V-H11-B13/B20/BV13/BV20, 1466V-H04-2 are required. Either 1466V-H04-B1 or 1466V-H04-B2 must be selected.
High Power Options		
1466V-H05-13	13GHz high-power output	Increase maximum output power. Suitable for 1466V-C.
1466V-H05-20	20GHz high-power output	Increase maximum output power. Suitable for 1466V-D.
1466V-H05-33	33GHz high-power output	Increase maximum output power. Suitable for 1466V-E.
1466V-H05-45	45GHz high-power output	Increase maximum output power. Suitable for 1466V-G.
1466V-H05-53	53GHz high-power output	Increase maximum output power. Suitable for 1466V-H.
1466V-H05-67	67GHz high-power output	Increase maximum output power. Suitable for 1466V-L.
1466V-H05-B13	13GHz channel B high-power output	Increase the maximum output power of channel B. Suitable for 1466V-C, option 1466V-H11-B13/BV13 is required.
1466V-H05-B20	20GHz channel B high-power output	Increase the maximum output power of channel B. Suitable for 1466V-D, option 1466V-H11-B20/BV20 is required.
Dual Channel Option		
1466V-H11-BV13	13GHz Vector Channel B	Add channel B to output a 100kHz~13GHz vector signal. Suitable for 1466V-D.
1466V-H11-BV20	20GHz Vector Channel B	Add channel B to output a 100kHz~20GHz vector signal. Suitable for 1466V-D.
Internal Modulation Bandwidth Option		
1466V-H31-500	500MHz modulation bandwidth	The internal modulation bandwidth is 500MHz. Either 1466V-H31-500, 1466V-H31-1000, or 1466V-H31-2000 is mandatory.
1466V-H31-1000	1GHz modulation bandwidth	The internal modulation bandwidth is 1GHz. Either 1466V-H31-500, 1466V-H31-1000, or 1466V-H31-2000 is mandatory.
1466V-H31-2000	2GHz modulation bandwidth	The internal modulation bandwidth is 2GHz. Either 1466V-H31-500, 1466V-H31-1000, or 1466V-H31-2000 is mandatory.
1466V-H31-B500	Channel B 500MHz modulation bandwidth	The internal modulation bandwidth of channel B is 500MHz. Either 1466V-H31-B500, 1466V-H31-B1000, or 1466V-H31-B2000 must be selected, and options 1466V-H11-BV13 or 1466V-H11-BV20 must be selected.
1466V-H31-B1000	Channel B 1GHz modulation bandwidth	The internal modulation bandwidth of channel B is 1GHz. Either 1466V-H31-B500, 1466V-H31-B1000, or 1466V-H31-B2000 must be selected, and options 1466V-H11-BV13 or 1466V-H11-BV20 must be selected.
1466V-H31-B2000	Channel B 2GHz modulation bandwidth	The internal modulation bandwidth of channel B is 2GHz. Either 1466V-H31-B500, 1466V-H31-B1000, or 1466V-H31-B2000 must be selected, and options 1466V-H11-BV13 or 1466V-H11-BV20 must be selected.
High Capacity Memory Options		
1466V-H32	Built-in baseband large capacity memory	The built-in baseband memory expands to 16GB.
1466V-H32-B	Channel B built-in baseband large capacity memory	The built-in baseband memory of channel B can be expanded to 16GB, and options 1466V-H11-BV13 or 1466V-H11-BV20 are required.

Option Model	Name	Description
Broadband External IQ Input Option		
1466V-H33	Broadband external IQ input	Broadband external IQ input.
1466V-H33-B	Channel B broadband external IQ input	Channel B broadband external IQ input requires the option of 1466V-H11-BV13 or 1466V-H11-BV20.
Matching Options		
1466V-H94	Cabinet installation kit	A dedicated kit installed in the cabinet.
1466V-H99	Aluminum alloy transport box	High strength and lightweight aluminum alloy transport box with lifting handle and universal roller, convenient for transportation.
1466V-H100	User manual (paper version)	Provide a detailed user manual in hard copy.
1466V-S01	Arbitrary wave modulation function	Supports downloading and playing of arbitrary wave data, generating baseband signals or achieving signal playback. Suitable for all models of the 1466V series.
1466V-S02	Multi tone modulation function	Implement multi tone modulation function.
1466V-S03	Intrapulse modulation function	Intrapulse linear frequency modulation, Barker code, and other functions. Suitable for all models of the 1466V series. Suitable for the - V series.
1466V-S04	Additive white Gaussian noise generation function	It supports pure noise generation, Additive white Gaussian noise (AWGN) and continuous wave interference functions.
1466V-S06	Waveform segment file generation function	Realize the generation of waveform segment files from digital modulation signals.
1466V-S07	Sequence file generation function	Implement generating sequence files from multiple waveform segment files. Any wave option S01 needs to be selected.
1466V-S08	Multi carrier signal generation function	Implement multi carrier signal output. Any wave option S01 needs to be selected.
1466V-S09	Frequency hopping signal generation function	Implement the function of generating frequency hopping signals.
Analog Modulation Options		
1466V-S11	Analog modulation function	Add analog modulation function, including AM, FM, Φ M.
1466V-S12	Pulse modulation function	Add pulse modulation function, with a minimum pulse width of 100ns.
1466V-S13	Narrow pulse modulation function	Add pulse modulation function, with a minimum pulse width of 20ns.
1466V-S14	Low frequency output/function generation function	Add low-frequency output and Function generator functions.
Sweep Function Options		
1466V-S15	Simulated sweep (slope sweep)	Add analog frequency sweep function (slope sweep).
1466V-S16	Power sweep	Add power sweep function.
Built-In Signal Simulation Option		
1466V-S21	Wireless connection signal simulation function	802.11a/b/g/n/ac/ax (Wi Fi 1~Wi Fi 6) wireless connection PPDU, MPDU, A-MPDU and other signal simulation, with multiple module parameter setting functions such as preamble, data domain, MAC frame, PE, spatial mapping, etc., supporting physical frame block signal simulation composed of multiple PPDUs with different modulation and coding methods. Suitable for all models of the 1466-V series.
1466V-S31	Communication signal simulation GSM/ EDGE	Supports conventional, synchronous, frequency correction, access, and air burst types for full/half speed at normal symbol rates, as well as various burst types at high symbol rates; Supports MSK/FSK, AQPSK, 8PSK, 16QAM, 32QAM modulation with normal symbol rates, as well as QPSK, 16QAM, 32QAM modulation with high symbol rates; Supports three different types of frame structure configurations: single frame, double frame, and no frame; Support independent configuration of power for each time slot; Support channel encoding for each time slot; Support high symbol rate wide pulse and narrow pulse filtering; Supports up to 64 multi carrier configurations.
1466V-S33	Communication signal simulation LTE/LTE-Advanced	Uplink: Supports FDD/TDD duplex mode, PRACH, PUCCH, PUSCH and other uplink channels with different bandwidths and modulation encoding methods, as well as DMRS uplink signal simulation. It has the function of simulating 44 types of FRC signals from A1 to A8. Downlink: Supports FDD/TDD duplex mode, PBCH, PCFICH, PHICH, PDCCH, PDSCH and other downlink channels with different bandwidth and modulation encoding methods, as well as CRS, PSS, SSS and other downlink signal simulation in Auto DCI/Manual scheduling PDSCH mode. It has aggregation function for up to 5 carriers, multi antenna setting function for up to 4 antennas, and 8 TestModel signal simulation functions from E-TM1 to E-TM3.

Option Model	Name	Description
Built-In Signal Simulation Option		
1466V-S34	Communication signal simulation 5G NR	Support signal generation for 5G NR protocol R16 version, including various bandwidth and subcarrier spacing settings; Can generate over 600 TestModels and FRCs, support standard protocol signal one click simulation, and quickly establish test scenarios; Support detailed configuration of time-frequency resources for multiple channels including uplink PUSCH, PUCCH, PRACH, downlink PDSCH, and CORESET, PDSCH/PUSCH channel encoding, and multi antenna and multi-layer transmission simulation; Support multiple signal configurations such as CSI-RS, SRS, SS/PBCH, PRS, LTE-CRS, etc; Supports multiple upstream and downstream DCI formats in CORESET, and DCI automatically calls PDSCH configuration; Support Carrier aggregation and cross carrier scheduling; Supports multiple filters and user-defined filter configurations.
1466V-S35	Communication signal simulation NB-Iot	Uplink: Supports Standalone and In_ Band, Guard_ Band and other deployment modes, with uplink channel functions such as NPUSCH and NPRACH with different bandwidths and modulation encoding methods. NPUSCH formats include F1 and F2, and signal styles include Single tone (15kHz/3.75kHz) and SC-FDMA (15kHz). Downline: Supports Standalone and In_ Band, Guard_ Band and other deployment modes, with downstream channels such as NPBCH, NPDCCH, and NPDSCH with different bandwidths and modulation encoding methods, as well as downstream signal simulation functions such as NPSS, NSSS, and NRS. The DCI format includes N0, N1, and N2, and the NPDCCH search space includes UE specific, type1 common, and type2 common.
1466V-S61	Digital broadcasting signal analog DVB-H/T/T2/S2/S2X	Supports DVB-H, DVB-T, DVB-T2, and DVB-S2X protocols; Support channel encoding of data according to protocol standards, including scrambling, interleaving, outer code (BCH), and inner code (LDPC) with bit rates ranging from 1/4 to 31/45; Configurable baseband (BB) head, VL-SNR head, TS head, GSE head; Support DVB-S2 modulation schemes: QPSK, 8APSK, 8PSK, 16APSK, 32APSK, 64APSK, 128APSK, 256APSK; Support QPSK and π/2BPSK in VL-SNR mode; Support the insertion and configuration of pilots; Supports superframe configuration, skip beam configuration, and configurable dwell time.

Quality&**Precise**

MAXWELLON 1465

100kHz~10GHz/20GHz/40GHz/50GHz/67GHz/70GHz

Signal Generator

2023

Maxwellon

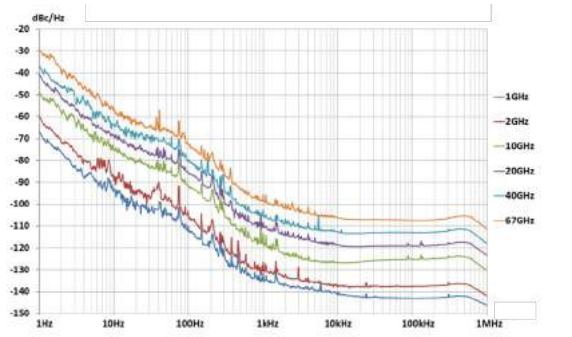
1465 series signal generators, with the frequency range of 100kHz ~ 67GHz, are provided with high purity spectrum and high output power. The single side band phase noise at 10GHz carrier and 10kHz frequency offset is -126dBc/Hz. The maximum output power reaches up to 1W at 20GHz carrier, and the dynamic output power range gets 150dB. All these specifications can meet the high-end requirements of electromagnetic signal tests. In addition, 1465 signal generators own the functions of high-precision analog sweep and high-performance analog and pulse modulation, with maximum bandwidth of internally modulated signal generator up to 10MHz, various signal waveforms, the minimum pulse width of 20ns and flexible pulse trains, which can meet the test requirements of analog and pulse modulations. A 10.1-in. display screen of 1280×800 resolution as well as a number of independent operation styles, such as buttons, mouse and touch screens are equipped so as to improve user experience and test efficiency.

Key Feature

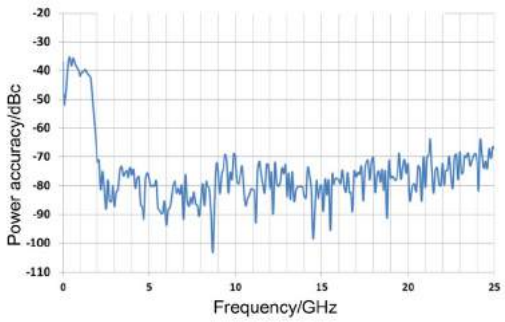
- High Purity Spectrum
- Broadband And High-Power Output
- High Stability Frequency And Power Output
- Convenient Touch Screen Control
- Complete Frequency Band Serialization
- High-Precision Analog Sweep
- Super-High Power Dynamic Range
- Excellent Analog Modulation
- High-Performance Pulse Modulation
- Multiple Control And Function Extension Interfaces

High Purity Spectrum

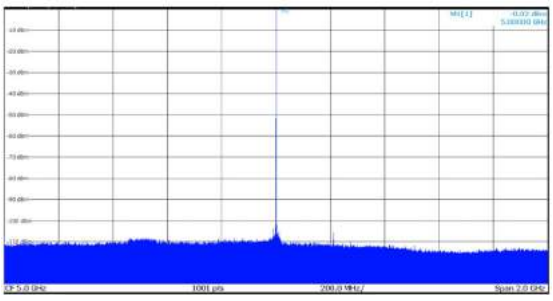
1465 series signal generators are able to output extremely pure signal spectrum, typical single side band phase noise at 10GHz carrier and 10kHz frequency offset of -126dBc/Hz, and at 1GHz carrier and 10kHz frequency offset of -142dBc/Hz. This performance can be used in Doppler radar, high-performance receiver blocking and adjacent channel selectivity tests, and are ideal alternatives to local oscillator and low-jitter clock.



Option H04 single side band phase noise



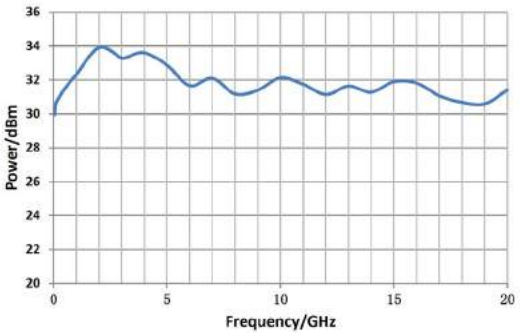
Harmonic



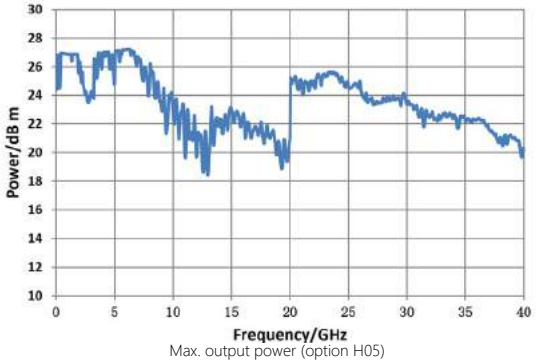
2GHz sweep width non-harmonics

Broadband And High-Power Output

For H05 high-power options, typical values for the maximum output power are +22dBm for 20GHz,+20dBm for 40GHz, and +10dBm for 67GHz. For H06 enhanced high-power option, the output power is +30dBm (1W). When high-power input signals are required in your test, the required test signals can be obtained, with no external amplifier, and higher power accuracy and stability will be achieved.



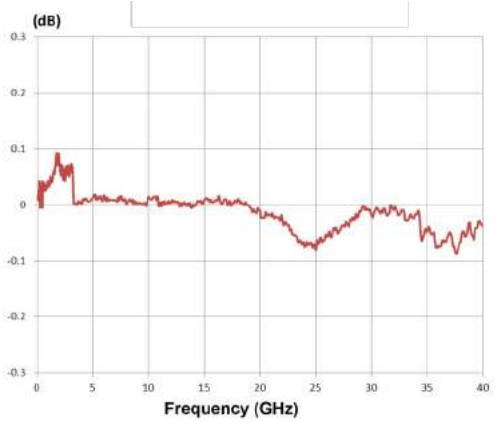
Max. output power (option H06)



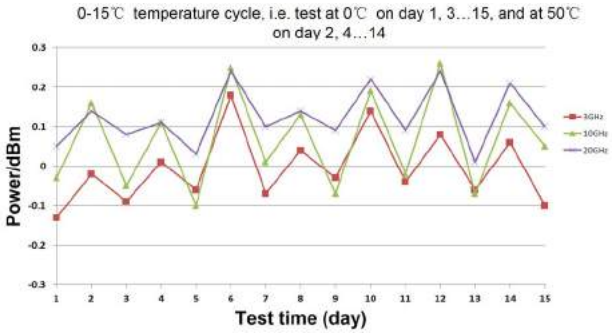
Max. output power (option H05)

High Stability Frequency And Power Output

The stability is high for both the frequency and power of an output signal. Time-base aging rate is $\pm 5\times10^{-8}$/year, and for 10MHz high stability time-base, variation per year is not more than 0.5Hz. Both output power accuracy and stability are quite remarkable, i.e. after 15-day continuous power-on in the environment for a temperature cycle of 0°C-50°C, the power variation is less than 0.2dB at the same temperature, and rate of temperature change for the power is less than 0.01dB/°C.



0dBm Power accuracy



15-day temperature cycle power stability test

Convenient Touch Screen Control

A 10.1-inch LED display screen of 1280×800 resolution shows the instrument status information clearly. Conspicuous color matching, proper function division and various function panel buttons provide a fresh sight of vision, easy operation and higher test efficiency for you. Besides with the panel buttons, the instrument can be controlled independently by operating with enter knob, sliding or clicking on the touch screen, and using external keyboard or mouse.

Complete Frequency Band Serialization

For 1465A/B/C/D/F/H/L signal generators, the frequency ranges are 100kHz-3GHz/6GHz/10GHz/20GHz/40GHz/50GHz/67GHz. In this 7 serialized models, the minimum selectable output frequency is 9kHz for 1465A/B, and for 1465L, the maximum selectable output frequency is 70GHz. Each model has various options available for function and performance extension. There is always one model suitable for you, no matter for metrology solutions or basic signal generators, only radio-frequency range test signals or millimeter-wave for signal frequency.

High-Precision Analog Sweep

Full-band high-precision analog sweep function allows rapid sweep in your broadband test. In addition, step sweep and list sweep are provided for your other test requirements..

Super-High Power Dynamic Range

A 150dB power dynamic range of -130dBm - +20dBm is provided as the best choice for testing a high-sensitivity receiver.

Excellent Analog Modulation

With the functions of AM, FM and ΦM, it supports internally and externally modulated resource input. For both the FM and ΦM, the modulation bandwidth is from DC to 10MHz, while linear and exponential modes are provided for AM, with the linear AM depth of more than 90%. An internally modulated signal generator, with the frequency range from DC to 10MHz, 0.1Hz resolution and 7 modulated waveforms, can output low-frequency signals directly.

High-Performance Pulse Modulation

The depth of modulation is more than 80dB, with the rise and fall time of less than 10ns and the minimum pulse width of 20ns. Clock gate and various external trigger modes are supported. A standard internal pulse generator, with 6 pulse modes, pulse width from 20ns to 42s, and 10ns step, has the function of pulse train required in radar test.

Multiple Control And Function Extension Interfaces

There are USB, LAN, GPIB, monitor interface and other auxiliary interfaces, in which USB is used to transmit data, and connect with keyboard/mouse etc., while LAN and GPIB are used for program control, and monitor interface for external display.

Typical Applications

Comprehensive Performance Evaluation For Electronic System

1465 series signal generators, with the frequency range from 100kHz to 67GHz, generate signals with high purity spectrum, high power output and remarkable stability, which can be used for comprehensive performance evaluation for such electronic systems as radar system, electronic warfare system, communication equipment system, and for solving such index test problems as band width, sensitivity, dynamic range and intermodulation distortion.

High-Performance Receiver Test

1465 series signal generators, with extremely low single side band phase noise and excellent non-harmonic suppression, can output perfect pure signals, used in phase noise, block and adjacent channel selectivity test for a high-performance receiver in the radar, electronic warfare system or communication equipment.

High-Power Device Test

1465 series signal generators, with the maximum output power of 1W, can test a high-power device, with no external amplifier, and overcome the loss of test system, with higher signal power accuracy and stability.

Durability Test Of Electric Equipment

All 1465 series signal generators, with the operating temperature range of 0-50ºC, have high frequency and power stability, and can be used in the durability test of electric equipment where the instrument needs to be powered on for days.

Excitation Signal And Local Oscillator Substitution

1465 series signal generators, with extremely pure signal quality and high output power, can be used for signal excitation for amplifiers, and as an ideal alternative for local oscillator in the tested equipment, such as transmitter and receiver etc..

Specification[1]

Frequency Properties			
Frequency Range	1465A: 100kHz-3GHz (Min. frequency 9kHz) 1465B: 100kHz~6GHz (Min. frequency 9kHz) 1465C: 100kHz~10GHz 1465D: 100kHz~20GHz 1465D+H06: 10MHz~20GHz 1465F: 100kHz~40GHz 1465H: 100kHz~50GHz 1465L: 100kHz~67GHz (Max. frequency of 70GHz)	Frequency	N (Internal YO harmonic number)
		100kHz≤f≤250MHz	1/8
		250MHz<f≤500MHz	1/16
		500MHz<f≤1GHz	1/8
		1GHz<f≤2GHz	1/4
		2GHz<f≤3.2GHz	1/2
		3.2GHz<f≤10GHz	1
		10GHz<f≤20GHz	2
		20GHz<f≤40GHz	4
		40GHz<f≤67GHz	8
Frequency Resolution	0.001Hz		
Frequency Switching Time	<20ms(typical value[2])		
Timebase Aging Rate (typical value[3])	$\pm 5\times10^{-10}$ /day (after 30-day continuous power-on)		
Reference Output	Frequency	10MHz	
	Power	>+4dBm to 50 Ω load	
Reference Input	Frequency	1-50MHz, 1Hz step	
	Power	-5dBm ~ +10dBm, 50Ω impedance	

Sweep Properties			
Sweep Mode	Step Sweep, List Sweep, Analog Sweep, Power Sweep		
High-Precision Analog Sweep (option H03)	Max. Sweep Speed	100kHz≤f≤500MHz	25MHz/ms
		500MHz<f≤1GHz	50MHz/ms
		1GHz<f≤2GHz	100MHz/ms
		2GHz<f≤3.2GHz	200MHz/ms
		3.2GHz<f	400MHz/ms
	Sweep Accuracy	±0.05% Sweep width (for 100ms, within the maximum width of 100ms as specified)	

Power Properties					
Min. Power	Model	Standard	Option H01A/B		
	1465A/B/C/D/F	-20dBm	-110dBm (-135dBm configurable)		
	1465D+ option H06	-10dBm	-90dBm (-125dBm configurable)		
	1465H/L	-20dBm	-90dBm (-110dBm configurable)		
Max. power (25±10°C)	Frequency range	Standard	H01A/B programmable step attenuator option	H05 high-power output option	Options H01A/B+H05
	1465A/B/C/D				
	100kHz≤f≤20GHz	15dBm	15dBm	20[3]dBm	20[3]dBm
	1465D+ option H06				
	10MHz≤f≤20GHz	28dBm	27dBm	---	---
	1465F				
	100kHz≤f≤9GHz	12dBm	12dBm	20dBm	20dBm
	9GHz<f≤40GHz	12dBm	12dBm	17dBm	17dBm

Max. power (25±10°C)	Frequency range	Standard	H01A/B programmable step attenuator option	H05 high-power output option	Options H01A/B+H05
	1465H/L				
	100kHz≤f≤15GHz	5dBm	5dBm	17dBm	17dBm
	15GHz<f≤30GHz	5dBm	5dBm	13dBm	13dBm
	30GHz<f≤67GHz	5dBm	4dBm	8dBm	8dBm
Power Accuracy (25±10°C)	Standard				
	power (dBm) / Frequency	>20	10~20	-10~10	-20~-10
	100kHz≤f≤2GHz	---	±0.8dB	±0.6dB	±1.5dB
	2GHz<f≤20GHz	---	±0.8dB	±0.8dB	±1.5dB
	20GHz<f≤40GHz	---	±1.0dB	±0.9dB	±1.8dB
	40GHz<f≤50GHz	---	---	±1.3dB	±1.8dB
	50GHz<f≤67GHz	---	---	±1.5dB	±2.0dB
	H01A/B Programmable Step Attenuator Option				
	power (dBm) / Frequency	>20	10~20	-10~10	-70~-10	-90~-70
	100kHz≤f≤2GHz	---	±0.8dB	±0.6dB	±0.7dB	±1.5dB
	2GHz<f≤20GHz	---	±0.8dB	±0.8dB	±0.9dB	±1.8dB
	20GHz<f≤40GHz	---	±1.0dB	±0.9dB	±1.0dB	±2.0dB
	40GHz<f≤50GHz	---	---	±1.3dB	±1.5dB	±2.5dB
	50GHz<f≤67GHz	---	---	±1.5dB	±1.8dB	±3.0dB
	1465D+ H06 Enhanced High-Power Output Option				
	10MHz≤f≤500MHz	---	±1.3dB	±0.9dB	±1.0dB	±1.8dB
	500MHz<f≤20GHz	±1.2dB	±0.8dB	±0.8dB	±1.1dB	±2.0dB
Power Resolution	0.01dB				
Power Temperature Stability	0.02dB/℃ (typical value)				
Output Impedance	50Ω (Rating[4])				
VSWR (Internal fixed amplitude) (typical value)	100kHz≤f≤20GHz	<1.6			
	20GHz<f≤40GHz	<1.8			
	40GHz<f≤67GHz	<2.0			
Max. Reverse Power	0.5W (0V DC) (rating)				

Spectrum Purity[5]

Harmonic (at +10dBm or Max. specified output power, whichever is lower)	Frequency	Standard	H06 enhanced high-power option
	100kHz≤f≤10MHz	<-25dBc	---
	10MHz<f≤2GHz	<-30dBc	<-25dBc
	2GHz<f≤6GHz (1465B)	<-30dBc	---
	2GHz<f≤9GHz	<-55dBc	<-35dBc
	9GHz<f≤14GHz	<-55dBc	<-27dBc
	14GHz<f≤20GHz	<-55dBc	<-30dBc
	20GHz<f≤67GHz	<-50dBc (typical value)	---
Sub-harmonic (at+10dBm or Max. specified output power, whichever is lower)	100kHz≤f≤10GHz	---	
	10GHz<f≤20GHz	<-60dBc	
	20GHz<f≤67GHz	<-50dBc	
Non-harmonic (At 0dBm, beyond 3kHz offset)	Frequency	Standard package	Option H04
	100kHz≤f≤250MHz	<-58dBc	<-58dBc
	250MHz<f≤3.2GHz	<-74dBc	<-80dBc
	3.2GHz<f≤10GHz	<-62dBc	<-70dBc
	10GHz<f≤20GHz	<-56dBc	<-64dBc

Non-harmonic (At 0dBm, beyond 3kHz offset)	Frequency	Standard package		Option H04			
	20GHz<f≤40GHz	<-50dBc		<-58dBc			
	40GHz<f≤67GHz	<-44dBc		<-52dBc			
SSB Phase Noise (dBc/Hz, +10dBm or Max. output power, whichever is smaller)	Frequency	1Hz	10Hz	100Hz	1kHz	10kHz	100kHz
	100kHz≤f≤250MHz	---	---	-104	-121	-128	-130
	250MHz<f≤500MHz	---	---	-108	-126	-132	-136
	0.5 GHz<f≤1GHz	---	---	-101	-121	-130	-130
	1 GHz<f≤2GHz	---	---	-96	-115	-124	-124
	2 GHz<f≤3.2GHz	---	---	-92	-111	-120	-120
	3.2 GHz<f≤10GHz	---	---	-81	-101	-110	-110
	10 GHz<f≤20GHz	---	---	-75	-95	-104	-104
	20 GHz<f≤40GHz	---	---	-69	-89	-98	-98
	40 GHz<f≤67GHz	---	---	-64	-84	-92	-92
	H04 Ultra Low Phase Noise Option						
	100kHz≤f≤250MHz	-64	-92	-105	-123	-138	-142
	250MHz<f≤500MHz	-67	-93	-111	-126	-138	-142
	0.5 GHz<f≤1GHz	-62	-91	-105	-123	-138	-138
	1 GHz<f≤2GHz	-57	-86	-100	-117	-133	-133
	2 GHz<f≤3.2GHz	-52	-81	-96	-113	-128	-128
	3.2 GHz<f≤10GHz	-43	-72	-85	-105	-120	-120
	10 GHz<f≤20GHz	-37	-66	-79	-98	-114	-114
	20 GHz<f≤40GHz	-31	-60	-73	-91	-108	-108
	40 GHz<f≤67GHz	-26	-54	-68	-85	-102	-102

Modulation Properties

Frequency Modulation (option H02A)	Maximum Deviation	N×16MHz (N: YO harmonic number)	
	Accuracy (at 1kHz, N×20kHz≤deviations<N×800kHz)	<± (3.5%× set frequency offset +20Hz)	
	Modulation rate (3dB band width, 500kHz frequency offset)	DC-10MHz	
	Distortion (at 1kHz, N×20kHz≤ distortion <N×800kHz)	<1%	
Phase Modulation (option H02A)	Maximum Deviation	Normal mode	N×16rad (N: YO harmonic number)
		Broadband mode	N×1.6rad (N: YO harmonic number)
	Accuracy (at 1kHz, N×0.2rad≤deviations<N×8rad, normal mode)	<± (5% of deviation +0.01 rad)	
	Modulation Rate (3dB bandwidth)	Narrowband mode	DC - 1MHz (typical value)
		Broadband mode	DC - 10MHz (typical value)
	Distortion (at 1kHz, N×0.8rad≤deviations<N×8rad, THD)	<1%	
Amplitude Modulation (option H02A)	Max. Depth	>90%	
	Modulation Rate (3 dB bandwidth, 30% modulation depth)	DC-100kHz	
	Accuracy (1kHz modulation rate,30% modulation depth)	± (6% of setting +1%)	
	Distortion (1kHz modulation rate, linear mode, THD, 30% modulation depth)	<1.5%	
Pulse Modulation (option H02B)	Switch Ratio	>80dB	
	Rise And Fall Time	<20ns	
	Min. Pulse Width For Internal Fixed Amplitude	1μs	
	Min. Pulse Width For Non Fixed Amplitude	0.1μs	
Narrow Pulse modulation (option H02C)	Switch Ratio	>80dB	
	Rise And Fall Time	<15ns (50MHz~3.2GHz)	
		<10ns (>3.2GHz)	
	Min. pulse width ALC On	1μs	
	Min. pulse width ALC Off	30ns (50MHz~3.2GHz)	
		20ns (>3.2GHz)	

Internally Modulated Signal Generator (option H02A/B/C)	Internally modulated signal generator (option H02A/B/C) There are 3 independent signals respectively for frequency/phase modulation, amplitude modulation and low frequency output signals. Waveform: Sine, square, triangle, sawtooth, noise, double sine, sweep sine. Frequency range: DC -10MHz for sinusoidal wave, double sine, sweep sine wave; 0.1Hz-100kHz for square wave, triangular wave and sawtooth wave. Frequency resolution: 0.1Hz Low frequency output: Amplitude: 0-5Vpeak (rating), to 50Ω load. Pulse modulation signal: Pulse width: 20ns ~ (42s-10ns), pulse period: 100ns~42s, resolution: 10ns
General Properties	
RF Output Port	1465A/B/C: N (female), impedance: 50Ω 1465D: 3.5mm (male), N (female) (option H91), impedance: 50Ω 1465F: 2.4mm (male), impedance: 50Ω 1465H/L: 1.85 mm (male), impedance: 50Ω
Dimensions	W×H×D=426mm×177mm×460mm (excluding. handle, foot mat and footing) W×H×D=510mm×190mm×534mm (including handle (option H93), foot mat and footing)
Weight	<28kg (as per model and option configuration)
Power Supply	100-120VAC, 50-60Hz; or 200-240VAC, 50-60Hz (self-adaptive)
Power Consumption	<350W
Temperature Range	Operating temperature: 0 - +50℃; storage temperature: -40 - +70℃

Notes:

1.1465 series signal generators, after stored for 2h at the ambient temperature and preheated for 30min, meet all performance indexes, within the given operating range.

2.Typical value is a supplementary item given with a set value, only for reference by users.

3. +16dBm for 1465B

4.Rating is a predicated performance, which is useful in product description, but not covered by product warranty.

5.Spectrum purity index is in dot frequency non modulation mode.

The test power is set to +15dBm for SSB phase noise of 100kHz≤f≤250MHz. For option H06, the frequency range is 100MHz≤f≤250MHz, and the frequency range less than 100MHz is not guaranteed.

Ordering Information

Model

Model	Name	Description
1465-A	Signal Generator	100kHz~3GHz
1465-B	Signal Generator	100kHz~6GHz
1465-C	Signal Generator	100kHz~10GHz
1465-D	Signal Generator	100kHz~20GHz
1465-F	Signal Generator	100kHz~40GHz
1465-H	Signal Generator	100kHz~50GHz
1465-L	Signal Generator	100kHz~67GHz

Standard

No.	Name	Description
1	Power Cord	Standard three core power cord
2	Qualification Certificate	/

Options

Option Model	Name	Description	Match
1465-H01A	115dB programmable step attenuato	To expand output power dynamic range	Only A/B/C/D/F options
1465-H01B	90dB programmable step attenuator	To expand output power dynamic range	Only H and L options
1465-H02A	Analog modulation	Additional analog modulation, including AM, FM, ΦM, and low-frequency output	All models
1465-H02B	Pulse modulation	Additional pulse modulation, with the minimum pulse width of 100ns	All models
1465-H02C	Narrow pulse modulation	Additional pulse modulation, with the minimum pulse width of 20ns	All models, including H02B
1465-H03	Analog sweep	Additional analog sweep (slope sweep)	All models
1465-H04	Ultra low phase noise	To reduce phase noise, 10GHz@10kHz: -120dBc/Hz	All models
1465-H05	High-power output	To increase the maximum output power	All models
1465-H06	Enhanced high-power output	To increase the maximum output power of 10MHz-20GHz substantially	Only 1465D option
1465-H80	87230 USB power probe	For power measurement and calibration (9kHz-6GHz)	All models
1465-H81	87231 USB power probe	For power measurement and calibration (10MHz-18GHz)	All models
1465-H82	87232 USB power probe	For power measurement and calibration (50MHz-26.5GHz)	All models
1465-H83	87233 USB power probe	For power measurement and calibration (50MHz-40GHz)	All models
1465-H90	Electromagnetic compatibility	As specified in GJB-151A (touch screen disabled)	All models
1465-H91	N RF output port	To change RF output port to N (female)	Only 1465D option
1465-H92	Rear panel RF output	To move RF output port to rear panel	All models
1465-H94	Rack installation kit	Kit for installing instrument on the cabinet	All models
1465-H95	Commercial calibration certificate	Instrument is entrusted to metrology service	All models
1465-H97	Colorfully-printed user manual	User manual and programming manual are color prints	All models
1465-H98	English options	Panel, software interface, user manual and programming manual are English version	All models
1465-H99	Aluminum alloy transport case	Portable high-intensity aluminum alloy transport case, with handles and universal wheels for easy handling.	All models
1465-S10	Complex pulse sequence	Extend the pulse generation style. Support the generation of complex pulse sequences such as double pulse, multi-pulse, PRF staggering, PRF jitter, and PRF slip.	Optional for all models, must choose H02B or H02C option

Quality&**Precise**

MAXWELLON 1465V

100kHz~10GHz/20GHz/40GHz/50GHz/67GHz

Vector Signal Generator

2023

Maxwellon

1465-V series signal generators has excellent vector modulation performance within the frequency range of 100 kHz to 67GHz. It has 1GHz internal modulation bandwidth and 2GHz external modulation real-time bandwidth, which can meet various modulation needs of wideband signals. The generator has excellent spectrum purity and output power specifications. The phase noise of 10GHz carrier@10kHz frequency offset can be reached to -126dBc/Hz, to meet high-level test needs which have strict requirements of testing signals. The generator also has excellent vector modulation accuracy and at the full frequency range the EVM is less than 1.4% (4Msps), which makes the generator be used in metrology purpose. The baseband signal generator can be set easily with flexible performance and many modulation formats. More than 20 kinds of common modulation formats are supported, such as PSK, QAM, and FSK, ASK and so on. The arbitrary wave modulation support 5 kinds of download file format, users can edit and download the waveform according to their own requirement.

Key Feature

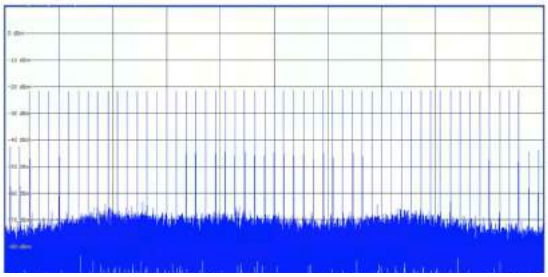
- Broadband Vector Signal Generation
- Large Vector Modulation Bandwidth
- High Compatible Arbitrary Wave Data Format Download
- High Purity Spectrum
- Broadband And High-Power Output
- Metrology Grade Vector Modulation Accuracy
- Complete Universal Digital Modulation Format
- Convenient Touch Screen Control
- Multiple Control And Function Extension Interfaces

Broadband Vector Signal Generation

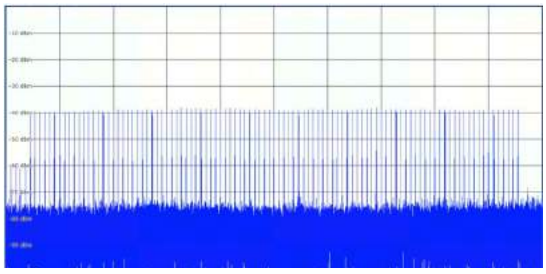
1465-V series signal generators can provide various signal testing solutions covering 10GHz/20GHz/40GHz/50GHz/67GHz to meet user's specific needs in different fields. Especially,1465-V-L signal generator with 100kHz~67GHz frequency range can meet test needs of most users .

Large Vector Modulation Bandwidth

1465-V series signal generators can provide 1GHz internal modulation bandwidth and 2GHz external modulation bandwidth (above 3.2GHz carrier) vector signal generation function .



Multi-tone signal using 9GHz carrier and 1GHz modulation bandwidth



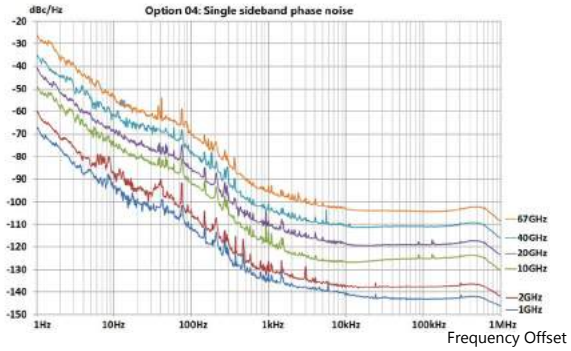
Multi-tone signal using 60GHz carrier and 1GHz modulation bandwidth

High Compatible Arbitrary Wave Data Format Download

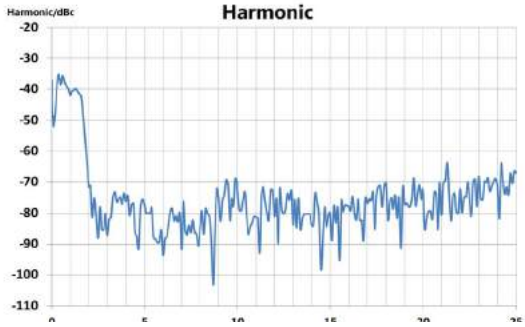
1465-V series signal generators support direct download and display of arbitrary waveforms. The file formats include Mat-File 5, ASCII, Binary, cap and csv. The generator has a 2GSa storage depth.

High Purity Spectrum

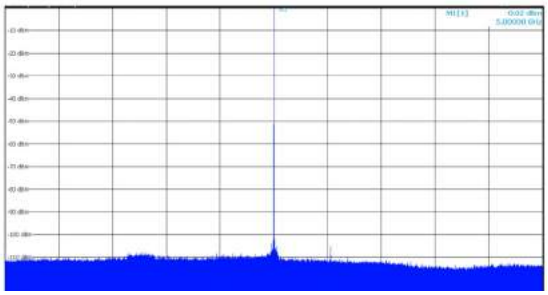
1465-V series signal generators are able to output extremely pure signal spectrum. The single side band phase noise of 10GHz carrier and 10kHz frequency offset has a typical value of -126dBc/Hz and 1GHz carrier and 10kHz frequency offset typically reaches -142dBc/Hz. It can be used for Doppler radar as well as high-performance receiver block and adjacent channel selectivity test. It also can be an ideal alternative device for local oscillator and low jitter timer.



Option H04 single side band phase noise



Harmonic

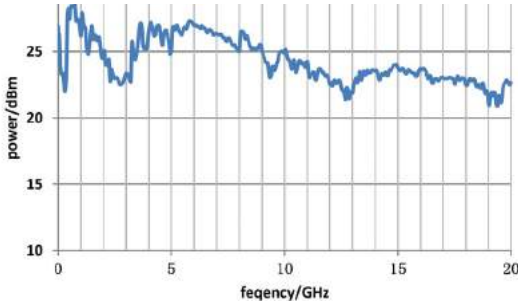


2GHz sweep width non-harmonics

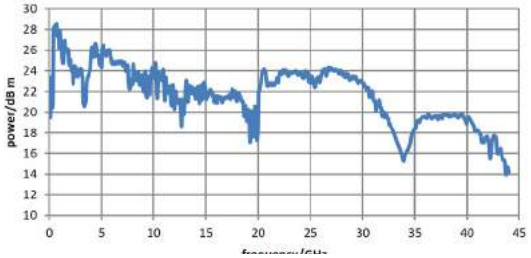
-8

Broadband And High-Power Output

For high-power option H05, typical values for the maximum output power are +22dBm at 20GHz and +16dBm at 40GHz.There's no need for an external amplifier when you need high power stimulus signal during test. And what's more, the power accuracy and stability are better.



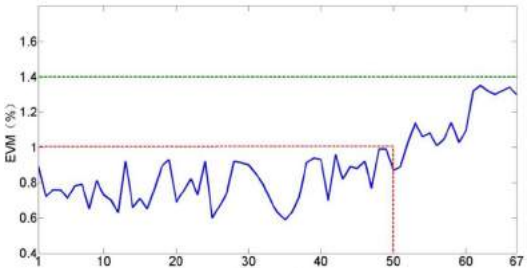
1465D-V maximum power output (option H05)



1465F-Vmaximum power output (option H05)

Metrology Grade Vector Modulation Accuracy

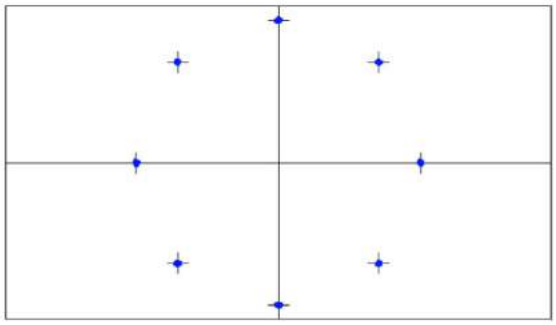
1465-V series signal generators has excellent vector modulation accuracy. The EVM is less than 1.4% (typical value<1.0%) at the frequency range 100kHz-40GHz, and EVM<2.5% (typical value<1.5%) at the frequency range 40GHz-67GHz .



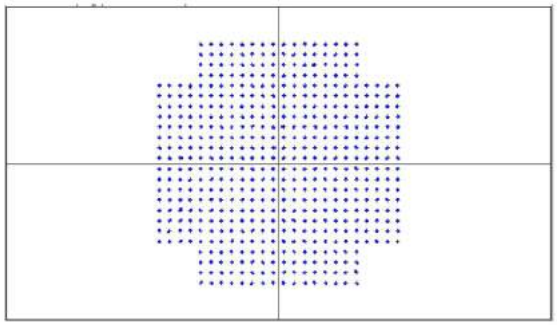
Symbol rate：4Msps, root-Nyquist filter, α=0.3, EVM test under QPSK

Complete Universal Digital Modulation Format

1465-V series signal generators can provide real-time generation of universal digital modulation signals, including more than 20 kinds of modulations, such as PSK,QAM,FSK,MSK etc.



8PSK



512QAM

Convenient Touch Screen Control

A 10.1-inch LED display screen of 1280×800 resolution shows the instrument states information clearly. Conspicuous color matching, proper function division and various function panel buttons provide a fresh sight of vision, easy operation and higher test efficiency for you. Besides with the panel buttons, the instrument can be controlled independently by operating with enter knob, sliding or clicking on the touch screen, and using external keyboard or mouse.

Multiple Control and Function Extension Interfaces

Support various auxiliary interfaces such as USB, LAN, GPIB, Monitor. The USB interface can be used for data transmission and external keyboard/mouse. LAN and GPIB can be used for programmable control. The monitor connector can be used for external display when using a CRT or LCD.

Typical Applications

High-reliability Communication system Test

Support various auxiliary interfaces such as USB, LAN, GPIB, Monitor. The USB interface can be used for data transmission and external keyboard/mouse. LAN and GPIB can be used for programmable control. The monitor connector can be used for external display when using a CRT or LCD.

To Simulate Various Application Scenes for Radar and EM Environment

1465-V series signal generator has wide frequency range and high resolution(16bit)as well as powerful signal simulation function. It can generate complex sequences of various modulation formats by editing waveform segment under different scenes. Together with abundant functional synchronous trigger interface, it can simulate complex interference signal under actual environment and accomplish anti-interference test of radar equipment.

Provide Accurate Arbitrary Wave Modulation Signal

1465-V series signal generator has 2G sampling point waveform storage capacity. This feature can allow designer to generate a long-time test data, which may be more close to the reality. User can create one of the kinds of arbitrary wave data using the third party tools or software.

High-performance Receiver Test

1465-V series signal generator has a 140dB output dynamic range and extremely high frequency stability as well as 0.001Hz frequency resolution. It can output high-accuracy standard test signal which can solve parameter test problem such as sensitivity, dynamic range and channel selectivity to accomplish test of high-performance receiver used in radar, electronic warfare and communication equipment.

Local Oscillator Substitution

1465-V series signal generator has extremely high signal quality, thus can be used as an ideal device to substitute LO when testing transmitter and receiver and other systems. It will guarantee your test accuracy and creditability by avoiding negative influences that low-quality LO brings in.

Specification[1]

Frequency Properties					
Frequency Range	1465C-V:100kHz~10GHz 1465D-V:100kHz~20GHz 1465F-V:100kHz~40GHz (Max. frequency of 44GHz) 1465H-V:100kHz~50GHz 1465L-V:100kHz~67GHz	Frequency	N (Internal YO harmonic number)		
		100kHz≤f≤250MHz	1/8		
		250MHz<f≤500MHz	1/16		
		500MHz<f≤1GHz	1/8		
		1GHz<f≤2GHz	1/4		
		2GHz<f≤3.2GHz	1/2		
		3.2GHz<f≤10GHz	1		
		10GHz<f≤20GHz	2		
		20GHz<f≤28.5GHz	3		
		28.5GHz<f≤50GHz	5		
		50GHz<f≤67GHz	10		
Frequency Resolution	0.001Hz				
Frequency Switching Time	<20ms(typical value)				
Timebase Aging Rate (typical value[2])	$\pm 5\times10^{-10}$ /day (after 30-day continuous power-on)				
Reference Output	Frequency	10MHz			
	Power	>+4dBm to 50 Ω load			
Reference Input	Frequency	1-50MHz, 1Hz step			
	Power	-5dBm ~ +10dBm, 50Ω impedance			
Sweep Properties					
Sweep Mode	Step Sweep, List Sweep, Analog Sweep, Power Sweep				
High-Precision Analog Sweep (option H03)	Max. Sweep Speed	100kHz≤f≤500MHz	25MHz/ms		
		500MHz<f≤1GHz	50MHz/ms		
		1GHz<f≤2GHz	100MHz/ms		
		2GHz<f≤3.2GHz	200MHz/ms		
		3.2GHz<f	400MHz/ms		
	Sweep Accuracy	±0.05% Sweep width (for 100ms, within the maximum width of 100ms as specified)			
Power Properties					
Min. Power	Model	Standard	Option H01A/B		
	1465C/D/F-V	-20dBm	-110dBm (-135dBm configurable)		
	1465H/L-V	-20dBm	-90dBm (-110dBm configurable)		
Max. power (25±10°C)	Frequency range	Standard	H01A/B programmable step attenuator option	H05 high-power output option	Options H01A/B+H05
	1465C/D-V				
	100kHz≤f≤20GHz	15dBm	15dBm	20[3]dBm	20[3]dBm
	1465F-V				
	100kHz≤f≤9GHz	10dBm	10dBm	18dBm	18dBm
	9GHz<f≤30GHz	10dBm	10dBm	15dBm	15dBm
	30GHz<f≤40GHz	10dBm	10dBm	12dBm	12dBm
	1465H/L-V				
	100kHz≤f≤15GHz	5dBm	5dBm	15dBm	15dBm

Max. power (25±10°C)	Frequency range	Standard	H01A/B programmable step attenuator option	H05 high-power output option	Options H01A/B+H05
	15GHz<f≤30GHz	5dBm	5dBm	12dBm	12dBm
	30GHz<f≤60GHz	5dBm	4dBm	8dBm	6dBm
	60GHz<f≤67GHz	4dBm	3dBm	6dBm	4dBm

Power Accuracy (25±10°C)	Standard			
	power (dBm) / Frequency	10~20	-10~10	20~-10
	100kHz≤f≤2GHz	±0.8dB	±0.6dB	±1.5dB
	2GHz<f≤20GHz	±0.8dB	±0.8dB	±1.5dB
	20GHz<f≤40GHz	±1.0dB	±0.9dB	±1.8dB
	40GHz<f≤50GHz	---	±1.3dB	±1.8dB
	50GHz<f≤67GHz	---	±1.5dB	±2.0dB

	H01A/B Programmable Step Attenuator Option				
	power (dBm) / Frequency	10~20	-10~10	-70~-10	-90~-70
	100kHz≤f≤2GHz	±0.8dB	±0.6dB	±0.7dB	±1.5dB
	2GHz<f≤20GHz	±0.8dB	±0.8dB	±0.9dB	±1.8dB
	20GHz<f≤40GHz	±1.0dB	±0.9dB	±1.0dB	±2.0dB
	40GHz<f≤50GHz	---	±1.3dB	±1.5dB	±2.5dB
	50GHz<f≤67GHz	---	±1.5dB	±1.8dB	±3.0dB

Power Resolution	0.01dB	
Power Temperature Stability	0.02dB/°C (typical value)	
Output Impedance	50Ω (Rating[4])	
VSWR (Internal fixed amplitude) (typical value)	100kHz≤f≤20GHz	<1.6
	20GHz<f≤40GHz	<1.8
	40GHz<f≤67GHz	<2.0
Max. Reverse Power	0.5W (0V DC) (rating)	

Spectrum Purity[5]

Harmonic (at +10dBm or Max. specified output power, whichever is lower)	Frequency	Standard
	100kHz≤f≤10MHz	<-25dBc
	10MHz<f≤2GHz	<-30dBc
	2GHz<f≤6GHz (1465B-V)	<-30dBc
	2GHz<f≤20GHz	<-55dBc
	20GHz<f≤67GHz	<-45dBc
Sub-harmonic (at+10dBm or Max. specified output power, whichever is lower)	100kHz≤f≤10GHz	---
	10GHz<f≤20GHz	<-60dBc
	20GHz<f≤67GHz	<-45dBc

Non-harmonic (At 0dBm, beyond 3kHz offset)	Frequency	Standard	Option H04
	100kHz≤f≤250MHz	<-58dBc	<-58dBc
	250MHz<f≤3.2GHz	<-74dBc	<-80dBc
	3.2GHz<f≤10GHz	<-62dBc	<-70dBc
	10GHz<f≤20GHz	<-56dBc	<-64dBc
	20GHz<f≤28.5GHz	<-52dBc	<-52dBc
	28.5GHz<f≤40GHz	<-45dBc	<-45dBc
	40GHz<f≤67GHz	<-42dBc	<-42dBc

SSB phase noise (dBc/Hz, +10dBm or Max. output power, whichever is smaller)	Standard						
	Frequency	1Hz	10Hz	100Hz	1kHz	10kHz	100kHz
	100kHz≤f≤250MHz	---	---	-104	-121	-128	-130
	250MHz<f≤500MHz	---	---	-108	-126	-132	-136
	0.5GHz<f≤1GHz	---	---	-101	-121	-130	-130
	1GHz<f≤2GHz	---	---	-96	-115	-124	-124
	2GHz<f≤3.2GHz	---	---	-92	-111	-120	-120
	3.2GHz<f≤10GHz	---	---	-81	-101	-110	-110
	10GHz<f≤20GHz	---	---	-75	-95	-104	-104
	20GHz<f≤28.5GHz	---	---	-69	-89	-98	-98
	28.5GHz<f≤50GHz	---	---	-64	-84	-92	-92
	50GHz<f≤67GHz	---	---	-57	-77	-86	-86
	H04 Ultra Low Phase Noise Option						
	100kHz≤f≤250MHz6	-64	-92	-105	-123	-138	-141
	250MHz<f≤500MHz	-67	-93	-111	-126	-138	-142
	0.5GHz<f≤1GHz	-62	-91	-105	-123	-138	-138
	1GHz<f≤2GHz	-57	-86	-100	-117	-133	-133
	2GHz<f≤3.2GHz	-52	-81	-96	-113	-128	-128
	3.2GHz<f≤10GHz	-43	-72	-85	-105	-120	-120
	10GHz<f≤20GHz	-37	-66	-79	-98	-114	-114
	20GHz<f≤28.5GHz	-31	-60	-73	-91	-108	-108
	28.5GHz<f≤50GHz	-26	-54	-68	-85	-102	-102
	50GHz<f≤67GHz	-20	-48	-62	-79	-96	-96

Modulation Properties

Frequency Modulation ((option H02A))	Maximum Frequency Deviation: N × 16MHz (N: YO harmonic number))	
	Accuracy (1kHz rate, N × 20kHz ≤ frequency deviation<N × 800kHz):<± (3.5% × Set frequency offset+20Hz)	
	Modulation Rate (3dB bandwidth, N × 500kHz frequency offset): DC-10MHz	
	Distortion (1kHz rate, N × 20kHz ≤ frequency deviation<N × 800kHz):<1%	
Phase Modulation (option H02A)	Max. Phase Deviation:	Normal mode: N × 16rad (N: YO harmonic number)
		Broadband mode: N × 1.6rad
	Accuracy (1kHz rate, N × 0.2rad ≤ phase deviation < N × 8rad, normal mode):<± (5% × Set phase deviation+0.01 rad)	
	Modulation rate (3dB bandwidth):Broadband mode DC~10MHz (typical value)	
	Distortion (1kHz rate, N × 0.8rad ≤ phase deviation < N × 8rad phase deviation, Total harmonic distortion):<1%	
Amplitude Modulation (option H02A)	Maximum depth: > 90%	
	Modulation rate (3 dB bandwidth, 30% modulation depth): DC~100kHz	
	Accuracy (1kHz modulation rate, 30% modulation depth): ± (6% × Set Depth+1%)	
	Distortion (1kHz modulation rate, linear mode, Total harmonic distortion, 30% modulation depth):<1.5%	
Pulse Modulation (option H02B)	Switch Ratio	>80dB
	Rise and Fall Time	<20ns
	Min. Pulse Width With Alc On	1μs
	Min. Pulse Width With Alc Off	0.1μs
Narrow Pulse Modulation (option H02C)	Switch Ratio	>80dB
	Rise and Fall Time	<15ns(500MHz-3.2GHz)
		<10ns(>3.2GHz)
	Min. Pulse Width With Alc On	1μs
	Min. Pulse Width With Alc Off	30ns(500MHz-3.2GHz)
		20ns(>3.2GHz)

Internally Modulated Signal Generator (option H02A/B/C)	There are 3 independent signals respectively for frequency/phase modulation, amplitude modulation and low frequency output signals. **Waveform**: sine, square, triangle, Sawtooth, noise, double sine, sweep sine. **Frequency range:** DC~10MHz for sine, double sine, sweep sine; 0.1Hz~100kHz for square, triangle, Sawtooth. **Frequency resolution:** 0.1Hz. **Low frequency output:** Amplitude: 0~5Vpeak(rating), to 50Ω load. **Pulse modulation signal**: pulse width: 20ns~(42s-10ns);pulse period: 100ns~42s;resolution: 10ns.		
Vector Modulation Accuracy (after calibration, 25℃ ±10℃) (4M sps, root Nyquist,α=0.3, QPSK, 0dBm)	1465C/D/F-V	50MHz~40GHz(or max. frequency)	EVM(RMS%)<1.4%
	1465H/L-V	50MHz~40GHz	EVM(RMS%)<1.4%
		40GHz~67GHz(or max. frequency)	EVM(RMS%)<2.5%
Internal Modulation Bandwidth	(Carrier 900MHz, 1.8GHz, 2.4GHz, 6GHz, 18GHz, 35GHz, 50GHz) **Standard package:** 120MHz(Multitone, Tone quantity: 51, Frequency space: 2.4MHz,±3dB bandwidth) **H31 large modulation bandwidth option:** 200MHz (Multitone, Tone quantity: 51, Frequen cy space: 4MHz, ±3dB bandwidth) **H36 500MHz large modulation bandwidth option:** 500MHz (Multi tone, Tone quantity: 51 2 , ±3dB bandwidth) **H37 1GHz large modulation bandwidth option:** 1G Hz (Multi tone, Tone quantity: 51 2 , ±3dB bandwidth)		
External Modulation Bandwidth	(Carrier 900MHz,1.8GHz,2.4GHz,6GHz,18GHz,35GHz,50GHz) 200MHz(ALC OFF, input 100mVrms sine to channel I, ±4dB bandwidth)		
External Wide Modulation Bandwidth (option H33)	(6GHz,18GHz,35GHz,50GHz) 2GHz(ALC OFF, input 100mVrms sine to channel I, ±4dB bandwidth)		
Internal Baseband Signal Generator	**Channel quantities**:2(I and Q) **Max. symbol rate:** **standard package:** 60Msps(Max. 4bit/symbol) option H31: 125Msps(Max. 4bit/symbol) option H36: 156.25Msps option H37: 312.5Msps **Baseband waveform internal memory:** standard package: 1GSa option H32: 2GSa **Modulation format:** PSK: BPSK, QPSK, OQPSK, π/4 DQPSK, D8PSK, 16PSK; QAM: 4, 16, 32, 64, 128, 256, 512, 1024; FSK: 2, 4, 8, 16; ASK; MSK; Arbitrary wave modulation. **Dual-tone mode max. frequency offset:** 200MHz **EVM:** <1.0%(typical value)(RMS%, Symbol rate 4Msps, Root Nyquist, α=0.3,QPSK)		

General Properties

RF Output Port	1465C-V: N (female), impedance 50Ω. 1465D-V: 3.5mm (male), N (female) (option H91), impedance 50Ω. 1465F-V: 2.4mm (male), impedance 50Ω.
Dimensions	W×H× D: 517mm×192mm×550mm
Weight	<28kg (as per model and option configuration)
Power Supply	100-120VAC, 50-60Hz; or 200-240VAC, 50-60Hz (self-adaptive)
Power Consumption	<400W
Temperature Range	Operating temperature: 0 - +50ºC; storage temperature: -40 - +70ºC

Notes:

1.When 1465-V series signal generator is under environment temperature for 2 hours, attenuator is automatically coupling(or ALC power>-5dBm)after 30 minutes warm-up time. The generator meets every parameter performance within given working temperature.

2.Typical value is a supplementary characteristic just for user's reference. These specifications are not guaranteed.

3.Rating value is an expected performance, or used to describe the product performance which is useful but not included in product performance warranty.

4.Spectral purity parameter is tested in a certain frequency without any modulation.

5.The single sideband phase noise of 100kHz≤f≤250MHz is tested a output power of +15dBm.

Ordering Information

Model

Model	Name	Description
1465C-V	Vector Signal Generator	100kHz~10GHz
1465D-V	Vector Signal Generator	100kHz~20GHz
1465F-V	Vector Signal Generator	100kHz~40GHz
1465H-V	Vector Signal Generator	100kHz~50GHz
1465L-V	Vector Signal Generator	100kHz~67GHz

Standard

No.	Name	Description
1	Power Cord	Standard three core power cord
2	Qualification Certificate	/

Options

Option Model	Name	Description	Match
1465V-H01A	115dB programmable step attenuator	To expand output power dynamic range	Optional for C/D/F-V
1465V-H01B	90dB programmable step attenuator	To expand output power dynamic range	Optional for H/L-V
1465V-H02A	Analog modulation	Add analog modulation function	Optional for all models
1465V-H02B	Pulse modulation	Add pulse modulation function,100ns min. pulse width	Optional for all models
1465V-H02C	Narrow Pulse modulation	Add pulse modulation function,20ns min. pulse width	Optional for all models,including H02B
1465V-H03	Analog sweep frequency	Add analog sweep frequency function(slope sweep)	Optional for all models
1465V-H04	Ultra-low phase noise	Optimize phase noise,10GHz@10kHz:-120dBc/Hz	Optional for all models
1465V-H05	Large power output	Improve max. output power	Optional for all models
1465V-H31	Large modulation bandwidth	Expand internal modulation bandwidth to 200MHz	Optional for all models
1465V-H32	Internal baseband large capacity memory	Expand internal baseband memory to 8GB	Optional for all models
1465V-H33	Wideband external IQ input	Add wideband external IQ input function	Optional for C/D/F-V
1465V-H35	High-speed external baseband data input (optical port)	Support external arbitrary wave baseband data real-time import through optical fiber interface, a total of 4 optical fiber interfaces	Optional for C/D/F/H/L-V
1465V-H36	500MHz Large modulation bandwidth	The internal modulation bandwidth is expanded to 500MHz	Optional for all models
1465V-H37	1GHz Large modulation bandwidth	The internal modulation bandwidth is expanded to 1GHz	Optional for all models
1465V-H80	87230 USB power sensor	For power measurement and calibration(50MHz-6GHz)	Optional for all models
1465V-H81	87231 USB power sensor	For power measurement and calibration(50MHz-18GHz)	Optional for all models
1465V-H82	87232 USB power sensor	For power measurement and calibration(50MHz-26.5GHz)	Optional for all models
1465V-H83	87233 USB power sensor	For power measurement and calibration(50MHz-40GHz)	Optional for all models
1465V-H90	GJB EMC	Meet GJB-151A EMC regulation(without touch screen function)	Optional for all models
1465V-H91	N type RF output interface	Change RF output port to N type (female),only optional for 1465VD-V	Optional for D-V
1465V-H92	Rear panel RF output	Move RF output port to rear panel	Optional for all models
1465V-H94	Rack mount kit	Mount kit for rack	Optional for all models
1465V-H95	Commercial calibration certificate	Entrust metering institute to meter the instrument	Optional for all models
1465V-H97	Color printing user manual	User manual and programming manual are color printed	Optional for all models

Option Model	Name	Description	Match
1465V-H98	English options	Panel, software interface, user manual and programming manual are English version	Optional for all models
1465V-H99	Aluminum alloy transport case	High-intensity portable aluminum alloy transport case, with carrying handle and omni-directional wheel, convenient for transportation	Optional for all models
1465V-S01	Arbitrary wave	Support arbitrary wave data download and playback,baseband signal generation or signal playback	Optional for all models
1465V-S02	Linear frequency modulation (LFM)	Support intra-pulse linear frequency modulation function	Optional for all models
1465V-S03	Gaussian white noise	Support pure noise generation, additive noise and continuous wave interference function	Optional for all models
1465V-S04	Dynamic fading	Support general fading simulation and aviation channel dynamic fading simulation	Optional for all models, mustchoose1465V-S01 option
1465V-S05	Radar signal simulation	Simulate various system radar radiation signals, echo signals, clutter signals and various deceptive and suppressed interference, with hierarchical multi-radar simulation scene management function	Optional for all models, must choose 1465V-S01 option, the software canbe installed on the computer
1465V-S10	Complex pulse sequence	Extend the pulse generation style. Support the generation of complex pulse sequences such as double pulse, multi-pulse, PRF staggering, PRF jitter, and PRF slip.	Optional for all models, must choose H02B or H02C option

Quality&**Precise**

MAXWELLON 1433

1MHz~20GHz/26.5GHz/40GHz/50GHz

Handheld Signal Generator

2023

Maxwellon

Maxwellon 1433 Series Handheld Signal Generator is designed for field testing. It has the functions of CW signal output, FM/AM/ Pulse modulation, large dynamic range amplitude adjustment, step/list sweep, Unstable amplitude and unlock alarm function etc.

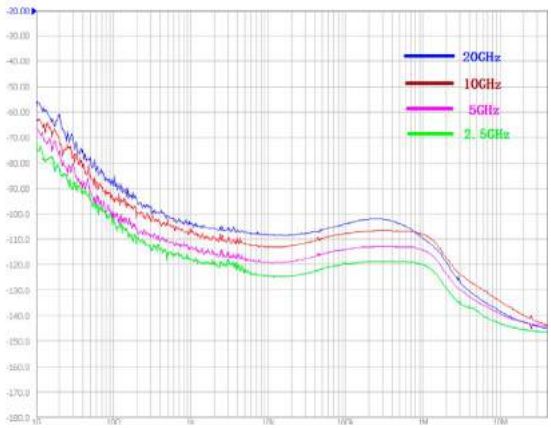
1433 Series Handheld Signal Generator has 8.4-inch large capacitive touch screen, with small size, flexible power supply and good working environment adaptability. It can be applied to the field installation, debugging and daily maintenance of fault diagnosis of electronic integrated system, receiver performance test, radar, communication, navigation and other equipment test.

Key Feature

- Wide frequency range: 1MHz to 20/26.5/40/50GHz
- Higher frequency resolution: 0.1Hz
- Phase noise performance: -110dBc/Hz@10kHz frequency offset @10GHz carrier (typical)
- Various auxiliary test interfaces: reference input/output, pulse input, monitoring output, synchronization output etc.
- Support LAN and USB interface program control
- 8.4-inch LCD touch screen, multi-window display

Excellent Phase Noise Performance

SSB phase noise is better than -110dBc/Hz@10kHz frequency offset @10GHz carrier



Convenient And Fast User Operation Experience

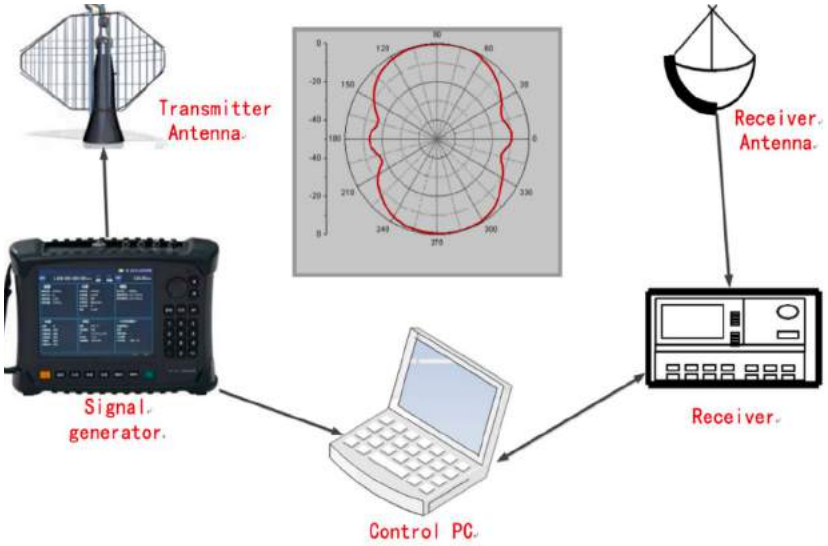
8.4-inch high-brightness LCD touch-screen, 800×600 resolution, multi-window display

Typical Applications

Electronic System Anti-Jamming Performance Test

Radar Reception Performance Test And Troubleshooting

Field Test of Antenna Pattern



Specification

Frequency Properties			
Frequency Range	1433D: 1MHz to 20GHz, 1433E: 1MHz to 26.5GHz, 1433F: 1MHz to 40GHz, 1433H: 1MHz to 50GHz	Frequency	N (Internal YO harmonic number)
		1MHz≤f≤2.35GHz	1/2
		2.35GHz≤f≤2.5GHz	1/8
		2.5GHz≤f≤5GHz	1/4
		5GHz≤f≤10GHz	1/2
		10GHz≤f≤20GHz	1
		20GHz≤f≤40GHz	2
		40GHz≤f≤50GHz	4
Frequency Resolution	0.1Hz		
Initial Calibration Accuracy	$\pm 0.5\times10^{-6}$		
Internal Timebase	Aging rate	$\pm 0.5\times10^{-6}$/year	
	Temperature effects	$\pm 0.3\times10^{-6}$(-10℃ - 50℃, versus 25℃ ±5℃)	
Reference Output	Frequency	10MHz	
	Power	>0dBm to 50 Ω load	
Reference Input	Frequency	10-100MHz, 1MHz step	
	Power	-5dBm to +10dBm, impedance: 50Ω	

Sweep Properties		
Sweep Mode	Step Sweep, List Sweep	
Sweep points	2 to 1601	
Dwell time	10ms~100s	
Trigger mode	Auto/Manual	
Power Properties		
Stable Output Power Range (25℃ ±10℃ , CW mode)	1MHz≤f<2.5GHz	-120dBm to +5dBm
	2.5GHz≤f≤10GHz	-120dBm to +10dBm
	10GHz<f≤20GHz	-120dBm to +5dBm
	20GHz<f≤40GHz	-120dBm to +5dBm
	40GHz<f≤50GHz	-120dBm to 0dBm
Power Accuracy (25℃ ±10℃)	-10dBm<P≤Max. output power	±1.0dB
	-60dBm<P≤-10dBm	±1.5dB
	-90dBm<P≤-60dBm	±1.8dB
Output Impedance	50Ω (Rating)	
SWR	1MHz≤f≤20GHz	<1.8:1
	20GHz<f≤40GHz	<2.0:1
	40GHz<f≤50GHz	<2.5:1
Maximum Reverse Power	+27dBm (0V DC)(Rating)	
Spectral Purity (specification is point frequency without modulated mode)		
Harmonics (Measured at +5dBm or maximum specified power, whichever is lower)	1MHz≤f≤1.5GHz	≤-40dBc
	1.5GHz<f≤2.5GHz	≤-30dBc
	2.5GHz<f≤19GHz	≤-40dBc
	19GHz<f≤25GHz	≤-30dBc
	25GHz<f≤50GHz	≤-35dBc (typical)
Non-harmonics (0dBm, >10kHz offset)	1MHz≤f<2.5GHz	≤-54dBc
	2.5GHz≤f<5GHz	≤-60dBc
	5GHz≤f≤10GHz	≤-56dBc
	10GHz<f≤20GHz	≤-50dBc
	20GHz<f≤38GHz	≤-44dBc
	38GHz<f≤50GHz	≤-40dBc
SSB Phase Noise (at maximum stable output power)	1MHz≤f≤2.35GHz	≤-82dBc/Hz@100Hz
		≤-98dBc/Hz@1kHz
		≤-108dBc/Hz@10kHz
		≤-106dBc/Hz@100kHz
	2.35GHz≤f≤2.5GHz	≤-94dBc/Hz@100Hz
		≤-110dBc/Hz@1kHz
		≤-120dBc/Hz@10kHz
		≤-118dBc/Hz@100kHz
	2.5GHz≤f≤5GHz	≤-88dBc/Hz@100Hz
		≤-104dBc/Hz@1kHz
		≤-114dBc/Hz@10kHz
		≤-112dBc/Hz@100kHz
	5GHz≤f≤10GHz	≤-82dBc/Hz@100Hz
		≤-98dBc/Hz@1kHz
		≤-108dBc/Hz@10kHz
		≤-106dBc/Hz@100kHz

SSB Phase Noise (at maximum stable output power)	10GHz<f≤20GHz	≤-76dBc/Hz@100Hz
		≤-92dBc/Hz@1kHz
		≤-102dBc/Hz@10kHz
		≤-100dBc/Hz@100kHz
	20GHz<f≤40GHz	≤-70dBc/Hz@100Hz
		≤-86dBc/Hz@1kHz
		≤-96dBc/Hz@10kHz
		≤-94dBc/Hz@100kHz
	40GHz<f≤50GHz	≤-68dBc/Hz@100Hz
		≤-84dBc/Hz@1kHz
		≤-94dBc/Hz@10kHz
		≤-92dBc/Hz@100kHz
Modulation Characteristics		
Pulse Modulation (Frequency >10MHz)	On/off ratio	≥80dB
	Rise/fall times	≤30ns
	Minimum pulse width ALC ON	1us (Deviation±50ns)
	Minimum pulse width ALC OFF	100ns (Deviation±20ns)
Amplitude Modulation (Frequency >10MHz)	Modulation type	Linear modulation, exponent modulation
	Modulation rate (3dB bandwidth)	DC - 20kHz
	Maximum depth	Linear closed loop: ≥90%
		Exponent closed loop: ≥20dB
	Linear AM accuracy	± (5%× setting depth+1%) (at 1kHz modulation rate)
	Exponent AM accuracy	± (5%× setting depth+1dB) (at 1kHz modulation rate)
Frequency Modulation (Frequency >10MHz)	Modulation rate (3dB bandwidth)	DC - 20kHz
	Maximum peak deviation	N×800kHz (N: YO harmonic number) , accuracy: ±10% (at 1kHz)
	Distortion	±3% (at 1kHz, 100kHz offset, 300Hz - 3kHz demodulation bandwidth)
General Characteristics		
RF Output Port	1433D	N (female) , impedance: 50Ω
	1433E	2.4mm (male) , impedance: 50Ω
	1433F	2.4mm (male) , impedance: 50Ω
	1433H	2.4mm (male) , impedance: 50Ω
Dimensions (W×H×D)	314mm×218mm×91mm (excluding handle, foot mat and footing)	
Weight	≤ 5.5kg (including battery)	
Power Supply	Power adapter	Input: 100 - 240V, 50/60Hz AC; Output: 15VDC, 4A
	Lithium electronic battery	10.8V, 9900mAh
Power Consumption	≤45W (Battery charging is not included)	
Temperature Range	Operating temperature	-10℃ to +50℃ (battery charging temperature: 0℃ to +45℃)
	Storage temperature	-40℃ to +70℃ (battery storage temperature: -20℃ to +60℃)
Other Interface	Pulse input	BNC (male)
	Synchronization output	BNC (male)
	Monitoring output	BNC (male)
	Reference input/output	BNC (male)

Notes:

Ratings refer to expected performance, or describe product performance that is useful in the product but not covered by the product warranty.

Ordering Information

Model

Model	Name	Description
1433D	Handheld Signal Generator	1MHz to 20 GHz
1433E	Handheld Signal Generator	1MHz to 26.5 GHz
1433F	Handheld Signal Generator	1MHz to 40 GHz
1433H	Handheld Signal Generator	1MHz to 50 GHz

Standard

No.	Name	Description
1	Power Cord	Standard three core power cord
2	Product certificate	

Options

Option Model	Name	Description
1433-S01	USB Power Meter Option (software)	USB Power Measurement Function (Requires USB Power sensor:H06~H13)
1433-H02	Power Adapter	Power Adapter
1433-H03	Rechargeable Battery	Standby Battery
1433-H04	Purple Cat5e Cable	Point to Point, 2 Meters
1433-H05	Micro SD Card	Class4, Capacity: 8G
1433-H06	87230 USB CW Power Sensor	9kHz ~ 6GHz, for CW power measurement (S01 is optional)
1433-H07	87231 USB CW Power Sensor	10MHz ~ 18GHz , for CW power Measurement (S01 is optional)
1433-H08	87232 USB CW Power Sensor	50MHz ~ 26.5GHz , for CW power Measurement (S01 is optional)
1433-H09	87233 USB CW Power Sensor	50MHz ~ 40GHz , for CW power Measurement (S01 is optional)
1433-H10	87234D USB Peak Power Sensor	50MHz ~ 18GHz , for Peak power Measurement (S01 is optional)
1433-H11	87234E USB Peak Power Sensor	50MHz ~ 26.5GHz , for Peak power Measurement (S01 is optional)
1433-H12	87234F USB Peak Power Sensor	50MHz ~ 40GHz , for Peak power Measurement (S01 is optional)
1433-H13	87234L USB Peak Power Sensor	50MHz ~ 67GHz , for Peak power Measurement (S01 is optional)
1433-H16	Safety Instrument Carrying Case	High strength light weight packing case with handle for transportation

Quality&**Precise**

MAXWELLON 1435

9kHz~3GHz/6GHz/12GHz/20GHz/40GHz

Signal Generator

2023

Maxwellon

Based on innovative technologies, the 1435 series signal generator achieves balance in terms of performance, economy and volumetric weight. It also has excellent spectral purity, with a single side band (SSB) phase noise of -136dBc/Hz (when the carrier is 1GHz and the frequency offset is 10kHz) or -116dBc/Hz (when the carrier is 10GHz and the frequency offset is 10kHz).

It provides a high power output and a large dynamic range, with the maximum output power up to 20dBm@20GHz and an output power dynamic range greater than 150dB. It responds fast and switches to another frequency in only 1ms, which shortens the test time and improves test efficiency, meeting the needs of massive data testing; in addition, it also has excellent analog modulation and pulse modulation functions. By adopting advanced frequency synthesis and RF channel signal processing technologies, it can achieve high performance while reducing the cost. Besides, The 1435 series signalgenerator can meet both the test requirements for high performance in the R&D phase and the test requirements for high efficiency in the production phase.

Key Feature

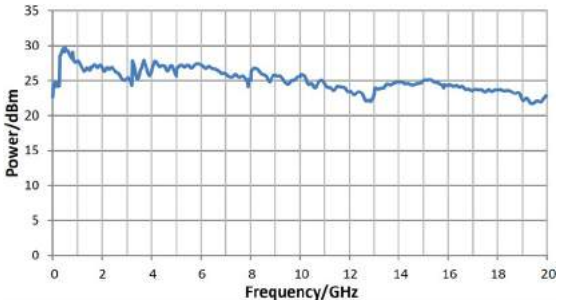
- Wide frequency coverage
- High output power
- Excellent SSB phase noise
- Extremely short frequency switching time
- High performance pulse modulation
- Built-in multi-function function generator
- Small size and light weight
- High-sensitivity LED touch screen

Wide Frequency Coverage

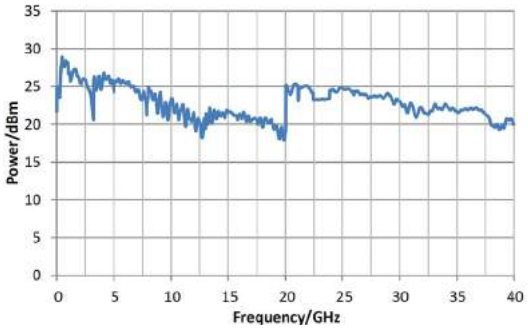
The 1435A/B/C/D/F series signal generator provides a frequency range of 9kHz~3GHz/6GHz/12GHz/20GHz/40GHz. Its lowest frequency can be as low as 9kHz and its highest frequency can be as high as 40GHz, which can meet the needs of wide frequency band testing.

High Output Power

When the H08 high-power output option is selected, the measured value of the full-band output power of the 1435A/B/C/D series signal generator can be above 20dBm and the full-band output power of the 1435F series signal generator can be above 17dBm. In the test where high-power excitation signals are required, the 1435 series signal generator can be used to obtain the required test signal without an external amplifier.



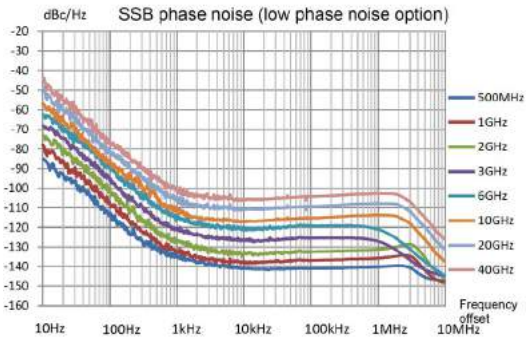
1435D maximum output power (option H08)



1435F maximum output power (option H08)

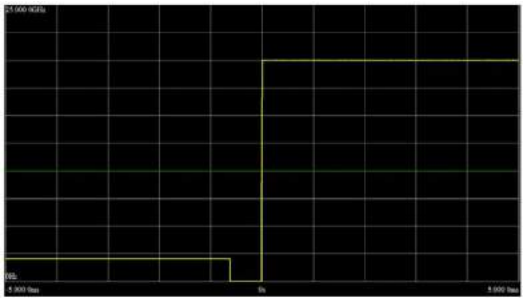
Excellent SSB Phase Noise

The 1435 series signal generator provides two steps of SSB phase noise for users. The standard SSB phase noise is measured at -101dBc/Hz (10GHz@10kHz), and the SSB phase noise can be as low as -116dBc/Hz (10GHz@10kHz) when the low phase noise option is selected. Users can select the phase noise as required to achieve the optimal cost performance.



Extremely Short Frequency Switching Time

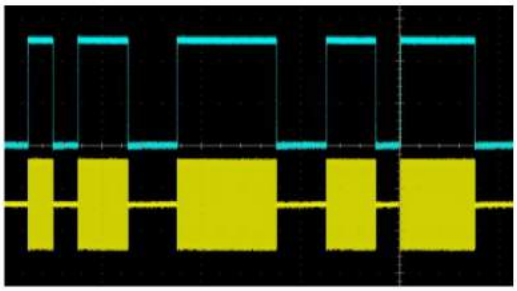
The 1435 series signal generator can realize fast frequency switching in the full frequency band, and the measured frequency switching time is 0.67ms, which can meet the test requirements for high speed.



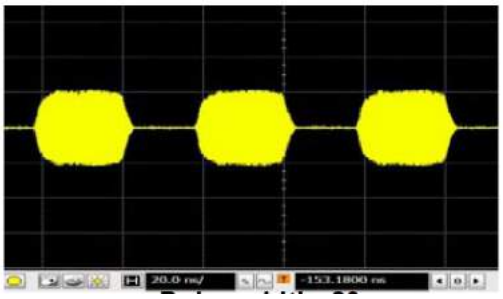
2GHz to 20GHz frequency switching time

High Performance Pulse Modulation

The pulse switch ratio is greater than 80dB, and the rise and fall time is shorter than 10ns. When the narrow pulse option H04 with a minimum pulse width of 20ns, a pulse width range of 20ns~42s-10ns and a step of 10ns is selected, it supports various triggering modes such as gating and external triggering.It's also equipped with the pulse string required in radar test.



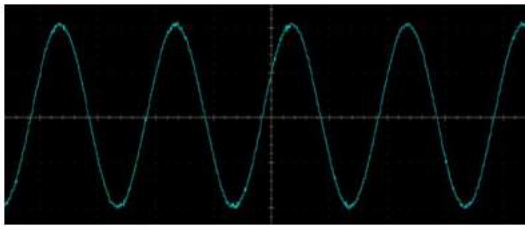
Pulse string



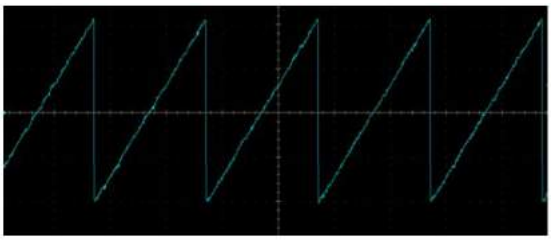
Pulse width: 20ns

Multi-Function Function Generator

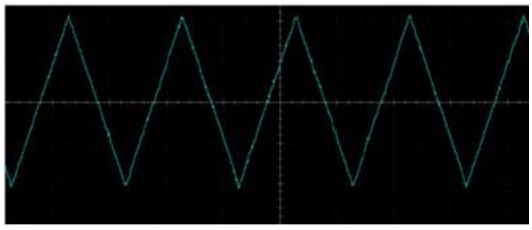
The multi-function function generator consists of seven waveform generators for generating AM/FM/ΦM modulated signals and low-frequency output signals. Two waveform generators can generate a dual-tone modulated signal by internal addition and are used for AM/FM/ΦM. The seven waveform generators include two standard function generators, one double-function generator, one scan function generator, two noise generators, and one DC generator. The DC generator generates DC levels, which can only be used for low frequency output. For the waveform generator, its sine wave frequency range is 0.1Hz~10MHz, and its frequency range of triangle wave, square wave, sawtooth wave and pulse is 0.1Hz~1MHz, and the frequency resolution is 0.1Hz.



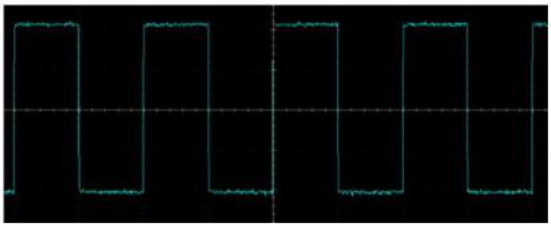
Sine wave



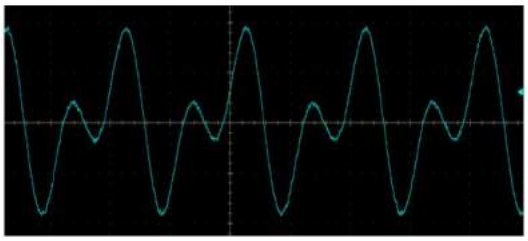
Sawtooth wave



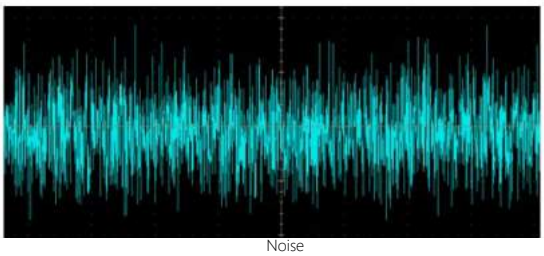
Triangle wave



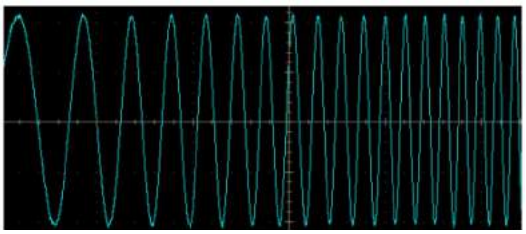
Square wave



Double sine wave



Noise



Frequency sweep sine

Small Size And Light Weight

By adopting the portable 3U-high chassis design, the 1435ABCDF series signal generator has its weight and volume greatly reduced (compared to bench instruments). The heaviest model of this series is 10.9kg, and the lightest model is 7.4kg.

High-Sensitivity Led Touch Screen

The 7-inch wide LED display which supports a resolution of 800 × 480 pixels clearly shows the instrument status information. The combination of the capacitive screen and the tailored window interface enables the 1435ABCDF series signal generator to respond sensitively and accurately to users' touch operations. In addition to the touch screen, the user can also operate the instrument by the panel buttons, the rotary knobs (with the Enter function), and the external keyboard and mouse conveniently and quickly.

Typical Applications

General Test

The 1435 series signal generator provides complete functions and a frequency range of 9kHz~40GHz. It provides AM, FM, ΦM, and PM analog modulation functions and supports step scan and list scan. Also, it has excellent performance. By adopting a design which realizes the balance between performance, economy and volumetric weight, it supports free configuration of various options, which makes it widely available. In respect of cost, it can be used for teaching; in respect of performance, it can be used in laboratory tests.

Defense Test

The 1435 series signal generator supports high-performance pulse modulation, with a pulse-to-modulation switch ratio greater than 80dB, the rise and fall time less than 10ns, and the minimum pulse width of 20ns. It supports various pulse patterns such as pri stagger, prf jittering and pulse string, which is suitable for radar system testing. It has excellent phase noise performance and is available for receiver testing. It has a small size and can be carried along for field testing.

Production Line Test

The 1435 series signal generator takes only 1ms to switch to another frequency. It provides a high test speed, shortens the test time, and improves the test efficiency, thus meeting the requirements of massive data test. It provides a high power output and needs no external power amplifier, thus saving the space and cost. It supports multiple control interfaces such as USB, LAN and GPIB, which facilitates the formation of an automated test system and is suitable for production line test.

Specification[1]

Frequency Properties			
Frequency Range	1435A:9kHz~3GHz 1435B:9kHz~6GHz 1435C:9kHz~12GHz 1435D:9kHz~20GHz 1435F:9kHz~40GHz	Frequency	N (Internal YO harmonic number)
		9kHz≤f<250MHz	1/8
		250MHz<f≤375MHz	1/16
		375MHz<f≤750MHz	1/8
		750MHz<f≤1.5GHz	1/4
		1.5GHz<f≤3GHz	1/2
		3GHz<f≤6GHz	1
		6GHz<f≤12GHz	2
		12GHz<f≤24GHz	4
		24GHz<f≤40GHz	8
Frequency Resolution	0.001Hz		
Frequency Switching Time	<1ms(typical value[2])		
Timebase Aging Rate (typical value)	Standard: $\pm5\times10^{-7}$/year (after continuous switch-on for 30 days)		
	High Stability Time Base option H10: $\pm5\times10^{-10}$/day (after 30-day continuous power-on)		
Reference Output	Frequency	10MHz	
	Power	>+4dBm to 50 Ω load	
Reference Input	Frequency	1-50MHz, 1Hz step	
	Power	0dBm~+7dBm, 50Ω impedance	
Sweep Properties			
Sweep Mode	Step Sweep, List Sweep		
Scan Dwell Time	100μs~100s		
Power Features			
Min. Power	Standard:-15dBm (can be set -20dBm)		
	Option H01:-110dBm (can be set -135dBm)		

Max. Power (25±10°C)	Frequency Range	Standard	High Power Output Option H08
	1435A/B		
	9kHz≤f≤3GHz	18dBm	22dBm
	3GHz<f≤5GHz	16dBm	20dBm
	5GHz<f≤6GHz	15dBm	18dBm
	1435C/D		
	9kHz≤f≤3GHz	16dBm	21dBm
	3GHz<f≤20GHz	15dBm	20dBm
	1435F		
	9kHz≤f≤3GHz	14dBm	20dBm
	3GHz<f≤17GHz	13dBm	17dBm
	17GHz<f≤40GHz	11dBm	15dBm

Power Accuracy (25±10°C)	Standard			
	Power (dBm) / Frequency	10~Max. Power	-10 ~ 10	-15 ~ 10
	9kHz≤f≤2GHz	±0.8dB	±0.6dB	±1.5dB
	2GHz<f≤20GHz	±0.9dB	±0.7dB	±1.5dB
	20GHz<f≤40GHz	±0.9dB	±0.8dB	±1.8dB

Power Accuracy (25±10°C)	H01A/B Programmable Step Attenuator Option				
	Power (dBm) / Frequency	10~Max. Power	-10 ~ 10	-70 ~ 10	-90 ~ 70
	9kHz<f≤2GHz	±0.8dB	±0.6dB	±0.7dB	±1.4dB
	2GHz<f≤20GHz	±0.9dB	±0.7dB	±0.7dB	±1.6dB
	20GHz<f≤40GHz	±0.9dB	±0.8dB	±1.1dB	±2.0dB

Power Resolution	0.01dB	
Output Impedance	50Ω (rated value[3])	
Source Standing Wave Ratio,VSWR (Internal Fixed Amplitude) (Typical Value)	9kHz≤f≤3GHz	<1.7
	3GHz<f≤13GHz	<1.6
	13GHz<f≤20GHz	<1.8
	20GHz<f≤40GHz	<1.6
Max. Reverse Power	0.5W (0V DC) (rated value)	

Spectral Purity[4]

Harmonic Wave (at +10dBm)	9kHz≤f≤10MHz	<-23dBc
	10MHz<f≤2GHz	<-30dBc
	2GHz<f≤6GHz (1435B)	<-30dBc
	2GHz<f≤20GHz	<-55dBc
	20GHz<f≤40GHz	<-50dBc (typical value)
Subharmonic Wave (at +10dBm)	9kHz≤f≤6GHz	None
	6GHz<f≤12GHz	<-60dBc
	12GHz<f≤24GHz	<-55dBc
	24GHz<f≤40GHz	<-50dBc

Non-Harmonic Wave (at 0dBm, 10kHz Frequency Offset)	Frequency	Standard	Low Phase Noise Option
	9kHz≤f≤250MHz	<-54dBc	<-60dBc
	250MHz<f≤3GHz	<-62dBc	<-77dBc
	3GHz<f≤6GHz	<-56dBc	<-71dBc
	6GHz<f≤12GHz	<-50dBc	<-65dBc
	12GHz<f≤24GHz	<-44dBc	<-59dBc
	24GHz<f≤40GHz	<-38dBc	<-53dBc

SSB Phase Noise (dBc/Hz at +10dBm)	Standard				
	Frequency	100Hz	10kHz		
	100MHz	-83	-115		
	250 MHz	-93	-127		
	500MHz	-89	-121		
	1 GHz	-83	-115		
	2 GHz	-77	-109		
	3GHz	-74	-105		
	4 GHz	-71	-103		
	6 GHz	-68	-99		
	10 GHz	-63	-95		
	20 GHz	-57	-89		
	40 GHz	-51	-83		
	Low Phase Noise Option				
	Frequency	100Hz	1kHz	10kHz	100kHz
	100MHz	-83	-112	-131	-131
	250 MHz	-93	-123	-139	-139
	500MHz	-89	-119	-135	-135
	1 GHz	-83	-113	-132	-132
	2 GHz	-77	-107	-126	-126
	3GHz	-74	-104	-121	-121
	4 GHz	-71	-101	-120	-120
	6 GHz	-68	-98	-115	-115
	10 GHz	-63	-93	-113	-113
	20 GHz	-57	-87	-107	-107
	40 GHz	-51	-81	-101	-101
Modulation Features					
Frequency Modulation[5] (Option H02)	Maximum frequency offset: N × 16MHz (N is the number of fundamental harmonic wave) Accuracy (1kHz modulation rate, frequency offset: N × 500kHz): ± (2% × set frequency offset + 20Hz) Modulation rate (3dB bandwidth, frequency offset: N × 500kHz): DC-7MHz Distortion (1kHz rate, frequency offset: N × 500kHz): <0.4%				
Phase Modulation[5] (Option H02)	Maximum phase offset: N × 16rad (N is the number of fundamental harmonic wave) Accuracy (1kHz modulation rate, frequency offset: N × 500kHz): ± (2% × set phase offset + 0.01rad) Modulation rate (3dB bandwidth, phase offset: N × 8rad): DC-1MHz Distortion (1kHz modulation rate, phase offset: N × 8rad): <0.4%				
Amplitude Modulation[5] (Option H02)	Maximum depth: >90% Amplitude modulation accuracy: (1kHz modulation rate, 30% modulation depth): ±(4% × set depth +1%) Amplitude modulation bandwidth(bandwidth: 3dB; modulation depth: 30%; frequency test points: 1GHz, 5GHz, 20GHz, 40GHz): DC~100kHz Distortion (1kHz modulation rate, linear mode, total harmonic distortion, 30% modulation depth): <2%				
Pulse Modulation[6] (Option H03)	Switching ratio	>80dB			
	Rise and fall time	<10ns			
	Minimum pulse of internal fixed amplitude	1μs			
	Minimum pulse of non-fixed amplitude	100ns			
Narrow Pulse Modulation[6] (Option H04)	Switching ratio	>80dB			
	Rise and fall time	<10ns			
	Minimum pulse of internal fixed amplitude	1μs			
	Minimum pulse of non-fixed amplitude	20ns			

Internally Modulated Signal Generator (Option H02)	It provides three independent signals for frequency/phase modulation, amplitude modulation and low frequency output signals **Waveform:** sine wave, square wave, triangle wave, sawtooth wave **Frequency range:** sine wave 0.1Hz~10MHz Square wave, triangle wave, sawtooth wave 0.1Hz~1MHz **Frequency resolution:** 0.1Hz **Low frequency output:** amplitude 0~5V peak (rated value), to 50Ω load
Internal Pulse Generator (Option H03)	Pulse width: 20ns~(42s-10ns) (rated value) Pulse period: 40ns~42s (rated value) Resolution: 10ns
Multi-Function Function Generator	The Multi-function generator consists of 7 waveform generators. The generator can be set separately or five generators can be set simultaneously by using the AM, FM/ΦM and the composite modulation features in the low-frequency output. **Waveform:** Function generator 1: sine wave, triangle wave, square wave, sawtooth wave, pulse Function generator 2: sine wave, triangle wave, square wave, sawtooth wave, pulse Dual function generator: sine wave, triangle wave, square wave, sawtooth wave,pulse, phase offset and amplitude ratio of audio 2 relative to audio 1; Scan function generator: sine wave, triangle wave, square wave, sawtooth wave; Noise generator 1: uniform, Gaussian; Noise generator 2: uniform, Gaussian; DC: LF output only; **Frequency Parameters:** Sine wave: 0.1Hz to 10MHz; Triangle wave, square wave, sawtooth wave, pulse: 0.1Hz to 1MHz; Resolution: 0.1Hz;
General Features	
RF Output Port	1435A/B/C: N type (negative), impedance 50Ω 1435D: 3.5mm (positive), N type (negative) (option H91), impedance 50Ω 1435F: 2.4mm (positive), impedance 50Ω
Maximum Dimensions (width × height × depth)	330mm × 147mm × 397mm (excluding the handle) 420mm × 147mm × 445mm (including the handle)
Weight	<12kg (the weight varies with the model and option configuration)
Power Supply	100~120VAC, 50~60Hz; or 200~240VAC, 50~60Hz (self-adaptive)
Power Consumption	Less than 300W
Temperature Range	Operating temperature: 0°C~+50°C; storage temperature: -40°C~+70°C

Notes:

1. The 1435 series signal generator can be stored at ambient temperature for 2 hours. After preheating for 30 minutes, the attenuator is automatically coupled (or ALC power is greater than -5dBm) to meet the performance of each indicator within a given working range.

2. The typical value is a supplementary feature given based on the stereotype value, which is only for user reference, and will not be assessed.

3. The rated value refers to the expected performance, or describes the product performance that is useful in the product but is not included in the product warranty.

4. The spectral purity indicates that the point frequency has no modulation mode.

5. The technical specifications of frequency modulation, phase modulation and amplitude modulation are applicable to frequencies above 10MHz.

6. The technical specifications of pulse modulation and narrow pulse modulation are applicable to frequencies above 50MHz.

Ordering Information

Model

Model	Name	Description
1435A	Vector Signal Generator	9kHz~3GHz
1435B	Vector Signal Generator	9kHz~6GHz
1435C	Vector Signal Generator	9kHz~12GHz
1435D	Vector Signal Generator	9kHz~20GHz
1435F	Vector Signal Generator	9kHz~40GHz

Standard

No.	Name	Description
1	Power Cord	Standard three core power cord
2	Product certificate	

Options

Option Model	Name	Description
1435-H01	115dB Programmable Step Attenuator	Expand the output power dynamic range.
1435-H02	Analog Modulation	Increase analog modulation functions, including AM, FM, ΦM, and low frequency output.
1435-H03	Pulse Modulation	Increase the pulse modulation function with a minimum pulse width of 100ns.
1435-H04	Narrow Pulse Modulation	Increase the pulse modulation function with a minimum pulse width of 20ns.
1435-H05	Multi-function Function Generator	Add a richer analog modulation signal format. (Note: The H05 option is available after the H02 analog modulation option is selected).
1435-H06	Low Phase Noise	Optimize SSB phase noise, 10GHz@10kHz:-113dBc/Hz.
1435-H08	High Power Output	Increase the maximum output power.
1435-H10	High Stability Time Base Option	Internal time base aging rate.
1435-H50	Calibration Certificate	Instrument calibration.
1435-H91	N type Connector for RF Output	N type connector for RF output, applicable to 1435D.
1435-H92	RF Output Moving to the Rear Panel	RF output on rear panel.
1435-H93	Portable Handle	3U handle.
1435-H94	Rack Mount Kit	Mounting kit for the upper cabinet.
1435-H95	Aluminum alloy Transport Case	High-strength lightweight aluminum alloy transport case with handle and universal roller for easy transportation.
1435-H98	English Kit	English panel, English manual, English operation interface and English operating system.
1435-S01	Arbitrary Wave	Support arbitrary wave data download and broadcast, generate baseband signal or realize signal replay, only for 1435-V
1435-S02	Linear Frequency Modulation	Support linear frequency modulation function, only for 1435-V
1435-S03	White Gaussian Noise	Support pure noise generation, additive noise, continuous wave interference function, only for 1435-V

Quality&**Precise**

MAXWELLON 1435V

9kHz~3GHz/6GHz

Vector Signal Generator

2023

Maxwellon

Based on innovative technologies, the 1435-V series signal generator achieves balance in terms of performance, economy and volumetric weight. It supports arbitrary modulation of wave data downloaded in 5 formats, and enables users to edit, download, and configure the waveforms as required to complete various signal simulations and meet the testing requirements of various complex signals. Its baseband signal generator is easy to set up and has excellent performance. It supports real-time occurrence of general digital modulation signals in more than 20 formats such as PSK, QAM, FSK and MSK. It also has excellent spectral purity, with a single side band (SSB) phase noise of -136dBc/Hz (when the carrier is 1GHz and the frequency offset is 10kHz) or -120dBc/Hz (when the carrier is 6GHz and the frequency offset is 10kHz).

It provides a high power output and a large dynamic range, with the maximum output power up to 22dBm@3GHz and an output power dynamic range greater than 150dB. Besides, it is equipped with a 7-inch high-sensitivity LED touch screen, and supports operation by touch screen, panel buttons, rotary knobs, external mouse and keyboard, etc.

Key Feature

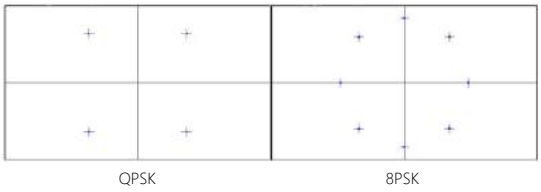
- Wide frequency coverage
- High output power
- Excellent SSB phase noise
- Extremely short frequency switching time
- High performance pulse modulation
- Built-in multi-function function generator
- Small size and light weight
- High-sensitivity LED touch screen

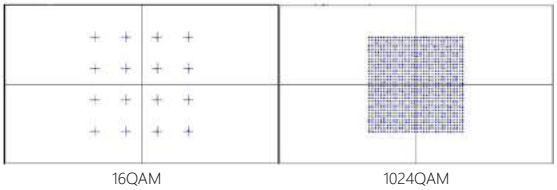
High Compatibility, Downloading Of Wave Data In Arbitrary Format

The 1435-V series signal generator supports direct downloading and playing of arbitrary wave data in five formats: Mat-File 5, ASCII, Binary, cap and csv, and provides a storage depth of 2G sampling points.

Complete Universal Digital Modulation Modes

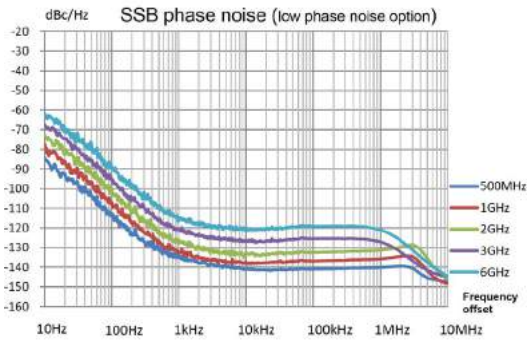
The 1435-V series signal generator supports real-time occurrence of universal digital modulation signals in more than 20 formats, including PSK, QAM, FSK and MSK.





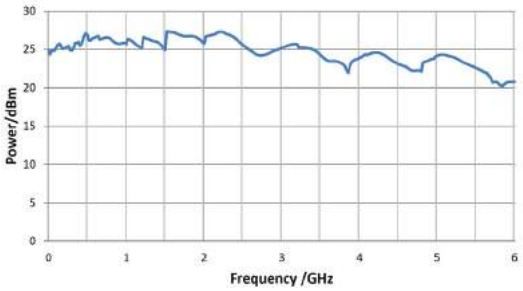
Excellent SSB Phase Noise

The 1435-V series signal generator provides two st ep s of SSB phase noise for users. The standard SSB phase noise is measured at -104dBc/Hz (6GHz@10kHz) and the SSB phase noise can be as low as -120dBc/Hz (6GHz@10kHz) when the low phase noise option is selected . Users can select the phase noise as required to achieve the optimal cost performance.
It covers a frequency range of 9kHz to 6GHz.



High Output Power

When the H08 high-power output option is selected, the measured value of the full-band output power of the 1435-V series signal generator can be above 20dBm. In the test where high-power excitation signals are required, the 1435-V series signal generator can be used to obtain the required test signal without an external amplifier.



Maximum output power of 1435B-V (option H08)

Small Size And Light Weight

By adopting the portable 3U-high chassis design, the 1435-V series signal generator has its weight and volume greatly reduced (compared to bench instruments). The heaviest model of this series is 9.4kg, and the lightest model is 7.8kg.

High-Sensitivity Led Touch Screen

The 7-inch wide LED display which supports a resolution of 800 × 480 pixels clearly shows the instrument status information. The combination of the capacitive screen and the tailored window interface enables the 1435-V series signal generator to respond sensitively and accurately to users' touch operations. In addition to the touch screen, the user can also operate the instrument by the panel buttons, the rotary knobs (with the Enter function), and the external keyboard and mouse conveniently and quickly.

Typical Applications

General Test

The 1435-V series signal generator has complete functions, and supports both digital modulation and AM, FM, ΦM and PM analog modulation functions, which can be widely used in the field of RF testing.

Test Of Communication Systems

The 1435-V series signal generator provides excellent digital modulation performance, complete digital modulation modes, and supports real-time occurrence of universal digital modulation signals and user-defined modulation signals in more than 20 formats such as PSK, QAM, FSK, MSK, etc., which is suitable for various indicator tests, for example, the bit error rate of a communication system.

Test Of Navigation Systems

The 1435-V series signal generator is highly compatible and supports arbitrary wave data in various formats, which enables it to conveniently play user-defined navigation data files. In addition, it has a power dynamic range up to 150dB. Thus, it is suitable for such indicator tests as the sensitivity and signal-to-noise ratio of a navigation receiving devices.

Specification[1]

Frequency Properties			
Frequency Range	1435A-V:9kHz~3GHz 1435B-V:9kHz~6GHz	Frequency	N (Internal YO harmonic number)
		9kHz≤f≤250MHz	1/8
		250MHz≤f≤375MHz	1/16
		375MHz<f≤750MHz	1/8
		750MHz<f≤1.5GHz	1/4
		1.5GHz<f≤3GHz	1/2
		3GHz<f≤6GHz	1
Frequency Resolution	0.001Hz		
Frequency Switching Time	<1ms(typical value[2])		
Timebase Aging Rate (typical value)	Standard: $\pm 5\times10^{-7}$/year (after continuous switch-on for 30 days)		
	High Stability Time Base option H10: $\pm 5\times10^{-10}$ /day (after 30-day continuous power-on)		
Reference Output	Frequency	10MHz	
	Power	>+4dBm to 50 Ω load	
Reference Input	Frequency	1-50MHz, 1Hz step	
	Power	0dBm~+7dBm, 50Ω impedance	
Sweep Properties			
Sweep Mode	Step Sweep, List Sweep		
Scan Dwell Time	100μs~100s		
Power Features			
Min. Power	Standard:-15dBm (can be set -20dBm)		
	Option H01:-110dBm (can be set -135dBm)		
Max. Power (25±10°C)	Frequency Range	Standard	High Power Output Option H08
	9kHz≤f≤3GHz	18dBm	22dBm
	3GHz<f≤5GHz	16dBm	20dBm
	5GHz<f≤6GHz	15dBm	18dBm

Power Accuracy (25±10°C)	Standard				
	Power (dBm) / Frequency	10~Max. Power	-10 ~ 10		-15 ~ 10
	9kHz≤f≤2GHz	±0.8dB	±0.6dB		±1.5dB
	2GHz<f≤6GHz	±0.9dB	±0.7dB		±1.5dB
	H01 programmable step attenuator option				
	Power (dBm) / Frequency	10~Max. Power	-10~10	-70~-10	-90~-70
	9kHz≤f≤2GHz	±0.8dB	±0.6dB	±0.7dB	±1.4dB
	2GHz<f≤6GHz	±0.9dB	±0.7dB	±0.7dB	±1.6dB
Power Resolution	0.01dB				
Output Impedance	50Ω (rated value[3])				
Source Standing Wave Ratio, VSWR (Internal Fixed Amplitude) (Typical Value)	9kHz≤f≤3GHz	<1.7			
	3GHz<f≤6GHz	<1.6			
Max. Reverse Power	0.5W (0V DC) (rated value[3])				

Spectral Purity[4]

Harmonic Wave (at +10dBm)	Frequency	Standard			
	9kHz≤f≤10MHz	<-23dBc			
	10MHz<f≤2GHz	<-30dBc			
	2GHz<f≤3GHz (1435A-V)	<-55dBc			
	2GHz<f≤6GHz (1435B-V)	<-30dBc			
Subharmonic Wave (at +10dBm)	9kHz≤f≤6GHz	None			
Non-harmonic Wave (at 0dBm, 10kHz Frequency Offset)	Frequency	Standard	Low phase noise option		
	9kHz≤f≤250MHz	<-54dBc	<-60dBc		
	250MHz<f≤3GHz	<-62dBc	<-77dBc		
	3GHz<f≤6GHz	<-56dBc	<-71dBc		
SSB Phase Noise (dBc/Hz at +10dBm)	Standard				
	Frequency	100Hz	10kHz		
	100MHz	-83	-115		
	250 MHz	-93	-127		
	500MHz	-89	-121		
	1 GHz	-83	-115		
	2 GHz	-77	-109		
	3GHz	-74	-105		
	4 GHz	-71	-103		
	6 GHz	-68	-99		
	Low phase noise option H06				
	Frequency	100Hz	1kHz	10kHz	100kHz
	100MHz	-83	-112	-131	-131
	250MHz	-93	-123	-139	-139
	500MHz	-89	-119	-135	-135
	1GHz	-83	-113	-132	-132
	2GHz	-77	-107	-126	-126
	3GHz	-74	-104	-121	-121
	4GHz	-71	-101	-120	-120
	6GHz	-68	-98	-115	-115

Modulation Features			
Frequency Modulation[5] (Option H02)	Maximum frequency offset: N × 16MHz (N is the number of fundamental harmonic wave) Accuracy (1kHz modulation rate, frequency offset: N × 500kHz): ± (2% × set frequency offset + 20Hz) Modulation rate (3dB bandwidth, frequency offset: N × 500kHz): DC-7MHz Distortion (1kHz rate, frequency offset: N × 500kHz): <0.4%		
Phase Modulation[5] (Option H02)	Maximum phase offset: N × 16rad (N is the number of fundamental harmonic wave) Accuracy (1kHz modulation rate, frequency offset: N × 500kHz): ± (2% × set phase offset + 0.01rad) Modulation rate (3dB bandwidth, phase offset: N × 8rad): DC-1MHz Distortion (1kHz modulation rate, phase offset: N × 8rad): <0.4%		
Amplitude Modulation[5] (Option H02)	Maximum depth: >90% Amplitude modulation accuracy(1 kHz modulation rate, 30% modulation depth): ± (4% × set depth +1%) Amplitude modulation distortion(1kHz modulation rate, linear mode, total harmonic distortion, 30% modulation depth): <2%; Amplitude modulation bandwidth (3dB bandwidth, 30% modulation depth, frequency test point: 1GHz, 5GHz): DC~100kHz.		
Pulse Modulation[6] (Option H03)	Switching ratio		>80dB
	Rise and fall time		<10ns
	Minimum pulse of internal fixed amplitude		1μs
	Minimum pulse of non-fixed amplitude		100ns
Narrow Pulse Modulation[6] (Option H04)	Switching ratio		>80dB
	Rise and fall time		<10ns
	Minimum pulse of internal fixed amplitude		1μs
	Minimum pulse of non-fixed amplitude		20ns
Internal Analog Modulation Signal Generator (Option H02)	It provides three independent signals for frequency/phase modulation, amplitude modulation and low frequency output signals Waveform: sine wave, square wave, triangle wave, sawtooth wave Frequency range: sine wave 0.1Hz~10MHz Square wave, triangle wave, sawtooth wave 0.1Hz~1MHz Frequency resolution: 0.1Hz Low frequency output: amplitude 0~5V peak (rated value), to 50Ω load		
Internal Pulse Generator (Option H03)	Pulse width: 20ns~(42s-10ns) (rated value) Pulse period: 40ns~42s Resolution: 10ns		
Multi-function Function Generator (Option H05)	The Multi-function generator consists of 7 waveform generators. The generator can be set separately or five generators can be set simultaneously by using the AM, FM/ΦM and the composite modulation characteristics in the low-frequency output. Waveform: Function generator 1: sine wave, triangle wave, square wave, sawtooth wave, pulse Function generator 2: sine wave, triangle wave, square wave, sawtooth wave, pulse Dual function generator: sine wave, triangle wave, square wave, sawtooth wave, pulse, phase offset and amplitude ratio of audio 2 relative to audio 1; Scan function generator: sine wave, triangle wave, square wave, sawtooth wave; Noise generator 1: uniform, Gaussian; Noise generator 2: uniform, Gaussian; DC: LF output only; Frequency parameters: Sine wave: 0.1Hz to 10MHz; Triangle wave, square wave, sawtooth wave, pulse: 0.1Hz to 1MHz; Resolution: 0.1Hz;		
Vector Modulation Accuracy (25°C ± 10°C After Calibration) (Symbol Rate: 4Msps, Root Nyquist Filter, A=0.3, QPSK Format, 0dBm)	50MHz~3GHz		EVM (RMS%) <1.4%
	3GHz~6GHz	Standard	EVM (RMS%) <1.8%
		Low phase noise option	EVM (RMS%) <1.4%
Internal Modulation Bandwidth	(Carrier 900MHz, 1.8GHz, 2.4GHz, 6GHz) Standard: 120MHz (multi-tone, number of tones: 51, frequency interval: 2.4MHz, ±3dB bandwidth); H09 large modulation bandwidth option: 200MHz (multi-tone, number of tones: 51, frequency interval: 4MHz, ±3dB bandwidth).		

External Modulation Bandwidth	(Carrier 900MHz, 1.8GHz, 2.4GHz, 6GHz) 200MHz (open loop of fixed amplitude, input 100mVrms sine wave through I channel,±4dB bandwidth)
Internal Baseband Signal Generator	**Number of channels**: 2 (I and Q) **Maximum symbol rate:** Standard: 75Msps Option 09: 125Msps **Baseband waveform memory:** Standard: 1G sampling point Option H32: 2G sampling point **Real-time baseband mode:** Modulation format: PSK: BPSK, QPSK, OQPSK, π/4DQPSK, D8PSK, 16PSK QAM: 4, 16, 32, 64, 128, 256, 512, 1024 FSK: 2, 4, 8, 6 ASK, MSK, arbitrary wave modulation EVM: <1.0% (typical value) (RMS%, symbol rate: 4Msps, root Nyquist filter, α=0.3, QPSK format) Maximum frequency interval in dual tone mode: 200MHz **Arbitrary wave mode:** Data format: Mat-File 5, ASCII, Binary, cap, csv. Trigger: Trigger type: continuous, single, gating, advanced waveform segments; Trigger source: trigger key, external, remote (GPIB, LAN); Trigger mode: auto play, trigger play, trigger reset, single auto, single trigger buffer, single reset, gated (high, low), waveform segment-single, waveform segment-continuous;
AWGN (option S03)	Types: Pure noise, Continuous wave jamming, Additive noise Noise bandwidth: 120/200MHz Setting range: 0 to 40dB
General Features	
RF Output Port	N type (negative), impedance 50Ω
Maximum Dimensions (width × height × depth)	330mm × 147mm × 397mm (excluding the handle)
	420mm × 147mm × 445mm (including the handle)
Weight	<12kg (the weight varies with the model and option configuration)
Power Supply	100~120VAC, 50~60Hz; or 200~240VAC, 50~60Hz (self-adaptive)
Power Consumption	Less than 300W
Temperature Range	Operating temperature: 0°C~+50°C; storage temperature: -40°C~+70°C

Notes:

1. The 1435-V series signal generator can be stored at ambient temperature for 2 hours. After preheating for 30 minutes, the attenuator is automatically coupled (or ALC power is greater than -5dBm) to meet the performance of each indicator within a given working range.

2.The typical value is a supplementary feature given based on the stereotype value, which is only for user reference, and will not be assessed.

3.The rated value refers to the expected performance, or describes the product performance that is useful in the product but is not included in the product warranty.

4.The spectral purity indicates that the point frequency has no modulation mode.

5.The technical specifications of frequency modulation, phase modulation and amplitude modulation are applicable to frequencies above 10MHz.

6.The technical specifications of pulse modulation and narrow pulse modulation are applicable to frequencies above 50MHz.

Ordering Information

Model

Model	Name	Description
1435A-V	Vector Signal Generator	9kHz~3GHz
1435B-V	Vector Signal Generator	9kHz~6GHz

Standard

No.	Name	Description
1	Power Cord	Standard three core power cord
2	Product certificate	

Options

Option Model	Name	Description
1435V-H01-A	115dB programmable step attenuator	Expand the output power dynamic range.
1435V-H02	Analog modulation	Increase analog modulation functions, including AM, FM, ΦM and low frequency output.
1435V-H03	Pulse modulation	Increase the pulse modulation function with a minimum pulse width of 100ns.
1435V-H04	Narrow pulse modulation	Increase the pulse modulation function with a minimum pulse width of 20ns.
1435V-H05	Multi-function function generator	Add a richer analog modulation signal format. (Note: The H05 option is available after the H02 analog modulation option is selected.)
1435V-H06	Low phase noise	Optimize SSB phase noise, 6GHz@10kHz: -115dBc/Hz.
1435V-H08	High power output	Increase the maximum output power.
1435V-H09	Large modulation bandwidth	The internal modulation bandwidth is extended to 200MHz, suitable for the -V series.
1435V-H10	High stability time base option	Internal time base aging rate.
1435V-H32	Large-capacity memory of built-in baseband	Built in baseband memory is expanded to 8GB, suitable for the -V series.
1435V-H50	Calibration certificate	Instrument calibration.
1435V-H92	RF output moved to the rear panel	RF output on rear panel.
1435V-H93	Portable handle	3U handle.
1435V-H94	Rack mount kit	Mounting kit for the upper cabinet.
1435V-H95	Aluminum alloy transport case	High-strength lightweight aluminum alloy transport case with handle and universal roller for easy transportation.
1435V-H98	English kit	English panel, English manual, English operation interface and English operating system.
1435V-S01	Arbitrary	Support arbitrary wave data download and playback, generation of baseband signal or signal playback
1435V-S02	Linear	Supported intra-pulse linear frequency modulation function
1435V-S03	Gaussian White Noise	Supported pure noise generation, additive noise generation and continuous wave jamming generation

Quality&**Precise**

MAXWELLON SG2000

100kHz~15.0GHz/ 9kHz~20GHz

RF Signal Generator

2023

Maxwellon

The SG2000 series microwave signal generator is positioned as a multifunctional and cost-effective signal generator. Its frequency range covers up to 20GHz and has various commonly used analog modulation functions (AM/FM/ΦM) Pulse modulation function, low-frequency output function, and frequency sweep function. The rich logical hardware interfaces and wide screen LCD display, standard 2U height chassis, complete standard SCPI command set, and universal multi communication mode bring great convenience for remote control and secondary integration development.

Key Feature

- Frequency range up to 20GHz
- High signal purity, SSB phase noise<-115dBc/ Hz@10 KHz
- 130dB wide dynamic power regulation output
- Various analog modulation AM/FM/ΦM
- Pulse modulation, up to 70dB on off ratio;External input pulse sequence
- Internal modulation source: sine wave, square wave, triangular wave, Sawtooth wave wave
- Standard 2U height for easy rack integration; Provide rack installation kit
- USB/LAN remote control interface, providing standard SCPI command set

Specification

Frequency Properties		
Frequency Range	SG2150A: 100kHz~15GHz	
	SG2200A: 9kHz~20GHz	
Frequency Resolution	0.01Hz	
Internal Reference Frequency	10 MHz	
Temperature Stability	±1.0ppm	
Internal Reference Output	10 MHz, +8 dBm (typ.)	
Spectral Purity		
Harmonic	< -30 dBc (typ.)	
Non-Harmonic	< -60 dBc (typ.)	
SSB Phase Noise	Carrier Frequency Offset @f=1GHz	-115 dBc / Hz @ 10kHz offset
Sweep Properties		
Sweep Mode	Step Sweep, List Sweep	
Sweep points	Step Sweep	2 ~ 65535
	List Sweep	2 ~16383
Dwell time	10ms~50s	
Trigger mode	Free/External	
Power Properties		
Output Power Range	Max. output power	+ 10 dBm
	Min. output power	- 120 dBm
Power Accuracy	±1.0 dB(ALC open)	
Modulation Characteristics		
Internal Modulation Signal Generator (LF)	Waveform	Sine, Square, Triangle,
	Sine	1 Hz~500 kHz
	Triangle	1 Hz~100 kHz
	Square	1 Hz~20 kHz
Output level	$0.2V_{p-p}$ ~ $2V_{p-p}$	

Analog Modulation (AM/FM/ΦM),Supporting internal and external modulation sources		
Amplitude Modulation	Modulation Depth	0 %~90 %
	Modulation Frequency Range	10 Hz~20 kHz
Phase Modulation	Max. phase Offset	N[1] × 6 rad
	Modulation Frequency Range	10 Hz~200 kHz
Frequency Modulation	Frequency Offset	N[1] × 64 MHz
	Modulation Frequency Range	10 Hz~200 kHz
Pulse Modulation	Break-make Ratio	≥70 dB
	Pulse Cycle Range	400 ns~160 s
	Pulse width	200 ns~85 s
Interface		
RF Output Interface	N type 50ohm	
LF Output	BNC 50ohm	
Functional Interface	Interface Name	External Pulse Modulation Input, Internal Pulse Output, External Trigger Input, Internal Trigger Output, External Modulation Input, 10M Reference Input/Output, AM Modulation Input, FM Modulation Input, Sweep Output
	Interface Type	BNC
LAN	10/100 Base T (Rear Panel)	
General Properties		
Dimension (W x D x H)	430mm×380mm×100mm	
Weight	Approx. 5Kg	
Operating Temp.	-10℃ ~ +45℃	
Storage Temp.	-20℃ ~ +70℃	
Power Supply	110 ~ 240V 50/60Hz	

Notes:

1. N represents a factor that helps define and determine indicators, with a maximum of 1 and a minimum of 1/128.

Ordering Information

Model

Model	Name	Description
SG2000A	RF Signal Generator	100kHz~15GHz
SG2000B	RF Signal Generator	9kHz~20GHz

Standard

No.	Name	Description
1	Power Cord	Standard three core power cord
2	Product certificate	

Options

Option Model	Name
SG2000-PMC	Power meter control kit
SG2000-RMK	Rack Mount Kit

Quality&**Precise**

MAXWELLON SG2060

9kHz~6GHz

Multi Standard Signal Generator

2023

Maxwellon

Maxwellon SG2060 series RF signal generator provides a wide range of product choices for different functional requirements and application scenarios, suitable for teaching, research, product development, production, and maintenance. Each type of product has outstanding features in its function to characterize the focus of its testing field. SG2060 series features a variety of key analog modulation functions, standard digital modulation functions, and customizable dedicated modulation methods. Rich logic hardware interface and widescreen LCD display make it easy to control various operations.

Key Feature

- Frequency range from 9 kHz to 6 GHz
- Typical output power from -120dBm to +10dBm
- Multiple digital modulation formats (ASK/PSK/FSK), built-in IQ modulator (B type)
- AM/FM/ΦM analog modulation functions, modulation rate up to 1MHz
- Support pulse modulation, minimum pulse width 200ns
- Support linear frequency modulation which can simulate radar signals
- Customizable dedicated communication modulation (SSB/DSB/CW)
- As frequency upper conversion, support external input IF signals
- Standard IF input output, USB/LAN remote control interface, SCPI supported

Specification

Frequency Properties		
Frequency Range	9kHz ~ 6GHz	
Frequency Resolution	0.23 Hz	
Internal Reference Frequency	10 MHz	
Temperature Stability	±1ppm (option: ±100ppb)	
Internal Reference Output	10 MHz, +2 dBm (typ.)	
Spectral Purity		
Harmonic	< -35 dBc (typ.)	
Non-Harmonic	< -60 dBc (typ.)	
SSB Phase Noise	Carrier Frequency Offset @f=1GHz	-98 dBc / Hz @ 10kHz offset
Sweep Properties		
Sweep Mode	Step Sweep, List Sweep	
Sweep points	Step Sweep	2 ~ 65535
	List Sweep	2 ~16383
Dwell time	5ms~50s	
Trigger mode	Free/External	
Power Properties		
Output Power Range	9 kHz~50 kHz	- 120 dBm~0 dBm
	50 kHz~6 GHz	- 120 dBm~+ 10 dBm
Power Accuracy	±1.5 dB(typ.)	
Modulation Characteristics		
Internal Modulation Signal Generator (LF)	Waveform	Sine, Square, Triangle, Sawtooth
	Sine	1 Hz~500 kHz
	Square/Triangle	1 Hz~100 kHz
	Sawtooth	1 Hz~20 kHz

Analog Modulation (AM/FM/ΦM),Supporting internal and external modulation sources			
		SG2060A	SG2060B
Amplitude Modulation	Modulation Depth	0 %~100 %	1 %~100 %
	Modulation Rate	20 Hz~1 MHz	1 Hz~1 MHz
Phase Modulation	Modulation Phase	0°~360°	0°~360°
	Modulation Rate	20 Hz ~1 MHz	1 Hz ~1 MHz
Frequency Modulation	Frequency Offset	5 MHz	5 MHz
	Modulation Rate	20 Hz~1 MHz	1 Hz ~1 MHz
Digital Modulation, supporting internal and external modulation sources			
IQ Modulator		/	Support
Internal Source		ASK/2FSK/4FSK/8FSK/2PSK/4PSK/8PSK	Supports universal digital modulation (option)
External Sources		/	Arb Mode (IQ data), Data Rate: 1 ksps~20 Msps
Pulse Modulation	Break-make Ratio	≥70 dB	
	Pulse Cycle Range	300 ns~160 s	
	Pulse width	200 ns~85 s	
Linear Frequency Modulation	Sweep Maximum Range	20MHz	
	Sweep Time	1 μs~1 s	
Frequency Upper Conversion	Input IF frequency range	200 MHz ± 10 MHz	
	Input IF power range	-50dBm ~ 0dBm	
	Output frequency range	61MHz ~ 6GHz	
	Output power range	-120dBm ~ +10dBm	
Interface			
RF Output Interface	N type 50ohm		
LF Output	BNC 50ohm		
Functional Interface	Interface Name	External Intermediate Frequency Input, External Pulse Modulation Input, External Trigger Input, External Modulation Input, 10 M Reference Input/Output, Internal Trigger Output, Internal Pulse Output, Scanning Synchronization Output	
	Interface Type	BNC	
LAN	10/100 Base T (Rear Panel)		
USB	USB 2.0		
General Properties			
Dimension (W x D x H)	430mm×380mm×100mm		
Weight	Approx. 5Kg		
Operating Temp.	-10℃ ~ +45℃		
Storage Temp.	-20℃ ~ +70℃		
Power Supply	110 ~ 240V 50/60Hz		

Ordering Information

Model

Model	Name	Description
SG2060A	Multi-standard Signal Generator	9 kHz to 6 GHz
SG2060B	Multi-standard Signal Generator	9 kHz to 6 GHz, built-in IQ modulator

Standard

No.	Name	Description
1	Power Cord	Standard three core power cord
2	Product certificate	

Options

Option Model	Name
BBG	Internal baseband data generation
RFUC	RF upconversion device
AMK	Amplitude modulation option (SSB/DSB/CW)
OCXO[1]	High stability time base option
PMC	Power meter control kit
RMK	Rack Mount Kit
LFM	Linear frequency modulation function

Notes:

1. This option can only be assembled and calibrated at the manufacturer's location

Quality&**Precise**

MAXWELLON SG1030

9kHz~3GHz

RF Signal Generator

2023

Maxwellon

SG1030 RF signal generator provides engineers with a "Smaller, lighter and easier" solution for 3GHz signal-generation applications. While it is an entry level instrument, the SG1030 provides most commonly used functions an engineer needs such as CW signal generation, AM/FM/PM/Pulse modulation, digital modulation (ASK, FSK, PSK), Up-converting, LF output etc. SG1030 also provides flexible interfaces and support SCPI for easy remote control. SG1030 is perfect suitable for education, RF component manufacture and maintenance.

Key Feature

- Frequency range from 9 kHz to 3 GHz
- Typical output power from -120dBm to +10dBm
- Standard low frequency output function, sine, square, triangle and saw tooth wave forms are supported
- Standard analog modulation functions, AM, FM, PM and Pulse modulation, minimum pulse width is 100ns
- Standard digital modulation functions, ASK, 2/4/8FSK, 2/4/8PSK supported
- Support linear frequency modulation, can simulate radar signals
- Standard IF input output, USB/LAN remote control interface, SCPI supported

Specification

Frequency Properties		
Frequency Range	9kHz ~ 3GHz	
Frequency Resolution	0.23 Hz	
Internal Reference Frequency	10 MHz	
Temperature Stability	±1ppm (option: ±100ppb)	
Internal Reference Output	10 MHz, +2 dBm (typ.)	
Spectral Purity		
Harmonic	< -30 dBc (typ.)	
Non-Harmonic	< -50 dBc (typ.)	
SSB Phase Noise	Carrier Frequency Offset @f=300MHz	≤-105 dBc / Hz @ 10kHz offset
		≤-115 dBc / Hz @ 100kHz offset
	Carrier Frequency Offset @f=1GHz	≤-93 dBc / Hz @ 10kHz offset
		≤-105 dBc / Hz @ 100kHz offset
Sweep Properties		
Sweep Mode	Step Sweep, List Sweep	
Sweep points	Step Sweep	2 ~ 65535
	List Sweep	2 ~16383
Dwell time	5ms~50s	
Trigger mode	Free/External	
Power Properties		
Output Power Range	9 kHz~50 kHz	- 120 dBm~0 dBm
	50 kHz~3 GHz	- 120 dBm~+ 10 dBm
Power Accuracy	±1.5 dB(typ.)	
Modulation Characteristics		
Internal Modulation Signal Generator (LF)	Waveform	Sine, Square, Triangle, Sawtooth
	Sine	1 Hz~500 kHz
	Square/Triangle	1 Hz~100 kHz
	Sawtooth	1 Hz~20 kHz

Analog Modulation (AM/FM/ΦM),Supporting internal and external modulation sources			
		SG1030A	SG1030B
Amplitude Modulation	Modulation Depth	0 %~100 %	1 %~100 %
	Modulation Rate	20 Hz~1 MHz	1 Hz~1 MHz
Phase Modulation	Modulation Phase	0°~360°	0°~360°
	Modulation Rate	20 Hz ~1 MHz	1 Hz ~1 MHz
Frequency Modulation	Frequency Offset	5 MHz	5 MHz
	Modulation Rate	20 Hz~1 MHz	1 Hz ~1 MHz
Digital Modulation, supporting internal and external modulation sources			
IQ Modulator		/	Support
Internal Source		ASK/2FSK/4FSK/8FSK/2PSK/4PSK/8PSK	Supports universal digital modulation (option)
External Sources		/	Arb Mode (IQ data), Data Rate: 1 ksps~20 Msps (Option: 1 ksps~50 Msps)
Pulse Modulation	Break-make Ratio	≥60 dB	
	Pulse Cycle Range	200 ns~160 s	
	Pulse width	100 ns~85 s	
Linear Frequency Modulation	Sweep Maximum Range	20MHz(Option:50MHz)	
	Sweep Time	1 μs~1 s	
Frequency Upper Conversion	Input IF frequency range	190 MHz ± 30 MHz	
	Input IF power range	-50dBm ~ 0dBm	
	Output frequency range	201MHz ~ 3GHz	
	Output power range	-120dBm ~ +10dBm	
Interface			
RF Output Interface	N type 50ohm (Front Panel)		
LF Output	BNC 50ohm (Front Panel)		
IF Input	BNC 50ohm (Front Panel)		
USB	USB B 2.0 B type (Front Panel)		
External Ref In/Out	BNC 50ohm (Rear Panel)		
External Pulse Input	BNC 50ohm (Rear Panel)		
External Trigger Input	BNC 50ohm (Rear Panel)		
LAN	10/100 Base T (Rear Panel)		
USB	USB A type (Rear Panel)		
RS232	9-PIN D-SUB Male (Rear Panel)		
General Properties			
Dimension (W x D x H)	340mm×230mm×110mm		
Weight	Approx. 5Kg		
Operating Temp.	-10℃ ~ +45℃		
Storage Temp.	-20℃ ~ +70℃		
Power Supply	110 ~ 240V 50/60Hz		

Ordering Information

Model

Model	Name	Description
SG1030A	Signal Generator	9 kHz~3.0 GHz
SG1030B	Signal Generator	9 kHz~3.0 GHz, built-in IQ modulator

Standard

No.	Name	Description
1	Power Cord	Standard three core power cord
2	Product certificate	

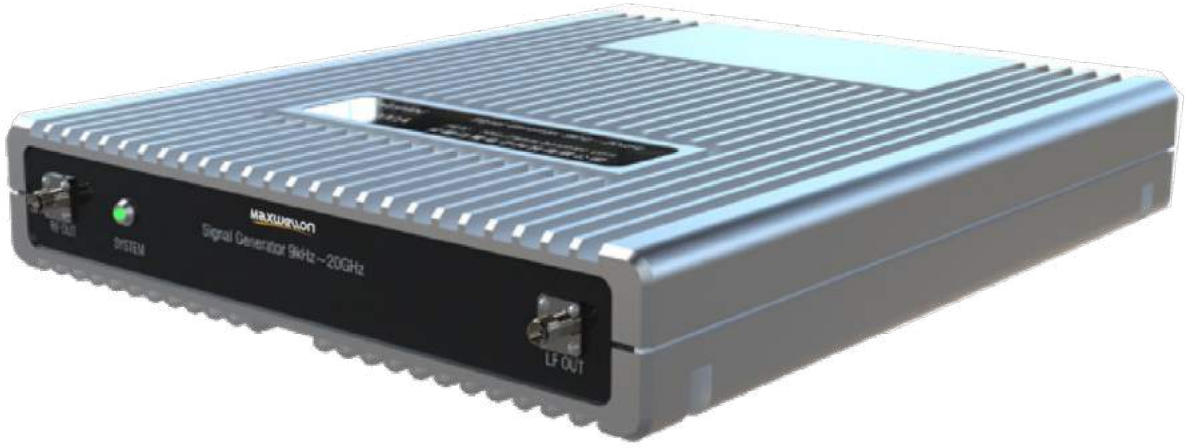
Options

Option Model	Name
BBG	Internal baseband data generation
RFUC	RF upconversion device
LFM	Linear frequency modulation function
BBW	Real time bandwidth options
AMK	Amplitude modulation option (SSB/DSB/CW)
OCXO[1]	High stability time base option
PMC	Power meter control kit

Notes:

1. This option can only be assembled and calibrated at the manufacturer's location

Quality&**Precise**



MAXWELLON MSG150A/MSG200A

100kHz~15GHz/ 9kHz~20GHz

RF Signal Generator

2023

Maxwellon

MSG150A/MSG200A microwave signal source module has ultra wide band, excellent performance and easy integration characteristics. The module has a variety of practical functions such as continuous wave signal, analog modulation, pulse modulation, amplitude/frequency sweep, low-frequency function waveform output, and has a very high cost performance ratio. The module height is standard 1U, suitable for system integration and desktop testing and measurement equipment use. The complete standard SCPI command set and universal LAN interface bring great convenience for remote control and secondary development.

Key Feature

- Frequency range up to 20GHz
- High signal purity, SSB phase noise<-115dBc/ Hz@10 KHz
- Output power -120dBm to+10dBm
- Various analog modulation AM/FM/ΦM
- Pulse modulation, up to 70dB on off ratio;External input pulse sequence
- Internal modulation source: sine, square, triangular
- Low power consumption, light weight, and compact size
- USB/LAN remote control interface, providing standard SCPI command set

Specification

Frequency Properties		
Frequency Range	MSG150A: 100kHz~15GHz	
	MSG200A: 9kHz~20GHz	
Frequency Resolution	0.01Hz	
Internal Reference Frequency	10 MHz	
Temperature Stability	±1.0ppm	
Internal Reference Output	10 MHz, +8 dBm (typ.)	
External Reference Output	0 dBm~+10 dBm	
Spectral Purity		
Harmonic	< -30 dBc (typ.)	
Non-Harmonic	< -60 dBc (typ.)	
SSB Phase Noise	Carrier Frequency Offset @f=1GHz	-115 dBc / Hz @ 10kHz offset
Sweep Properties		
Sweep Mode	Step Sweep, List Sweep	
Sweep points	Step Sweep	2 ~ 65535
	List Sweep	2 ~16383
Dwell time	10ms~50s	
Trigger mode	Free/External	
Power Properties		
Output Power Range	Max. output power	+ 10 dBm
	Min. output power	- 120 dBm
Power Accuracy	±1.0 dB(ALC open)	
Modulation Characteristics		
Internal Modulation Signal Generator (LF)	Waveform	Sine, Square, Triangle,
	Sine	1 Hz~500 kHz
	Triangle	1 Hz~100 kHz
	Square	1 Hz~20 kHz
Output level	$0.2V_{p-p}$ ~ $2V_{p-p}$	

Analog Modulation (AM/FM/ΦM),Supporting internal and external modulation sources		
Amplitude Modulation	Modulation Depth	0 %~90 %
	Modulation Frequency Range	10 Hz~20 kHz
Phase Modulation	Max. phase Offset	N × 6 rad
	Modulation Frequency Range	10 Hz~200 kHz
Frequency Modulation	Frequency Offset	N × 64 MHz
	Modulation Frequency Range	10 Hz~200 kHz
Pulse Modulation	Break-make Ratio	≥70 dB
	Pulse Cycle Range	400 ns~160 s
	Pulse width	200 ns~85 s
Interface		
RF Output Interface	SMA , 50Ω	
LF Output	SMA , 50Ω	
Functional Interface	Interface Name	External Pulse Modulation Input, Internal Pulse Output, External Trigger Input, Internal Trigger Output, External Modulation Input, 10M Reference Input/Output, AM Modulation Input, FM Modulation Input, Sweep Output
	Interface Type	SMA
LAN	10/100 Base T	
General Properties		
Dimension (W x D x H)	245 mm × 190 mm × 44 mm	
Weight	Approx. 1 .5 kg	
Operating Temp.	-10℃ ~ +45℃	
Storage Temp.	-20℃ ~ +70℃	
Power Supply	DC: +12V ± 5%/2 A	

Notes:

1. N represents a factor that helps define and determine indicators, with a maximum of 1 and a minimum of 1/128.

Ordering Information

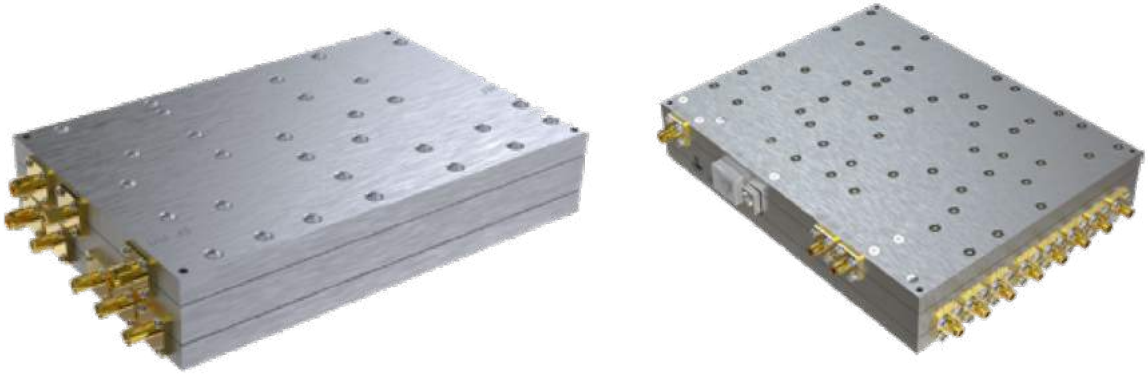
Model

Model	Name	Description
MSG150A	Signal Generator Module	100kHz~15GHz
MSG200A	Signal Generator Module	9kHz~20GHz

Standard

No.	Name	Description
1	Power Cord	DC: +12V ± 5%/2 A
2	Product certificate	

Quality&**Precise**



MAXWELLON MSG700

9kHz~3.0GHz/ 6.0GHz

Signal Generator Module

2023

Maxwellon

The MSG700 series signal generator module has rich functions and a flexible integrated volume. The module has multiple functions such as continuous wave signal, analog modulation, pulse modulation, digital modulation, amplitude/frequency sweep, linear frequency modulation, and upconversion, suitable for teaching and research, product development, and system integration.

The A-series modules focus on analog signal modulation, with a maximum analog modulation rate of up to 1MHz.The B-type module focuses on digital modulation and is equipped with an IQ modulator, which can flexibly support input I/Q modulation of baseband data such as various communication data links, standard public network communication, and cable digital television broadcasting. The maximum baseband modulation bandwidth is up to 20MHz, making it convenient for users to build experimental platforms.

The complete standard SCPI command set and universal USB and LAN interfaces bring great convenience for remote control and secondary development.

Key Feature

- Frequency Range: 9kHz~3.0GHz/6.0GHz
- Typical output power from -120dBm to +10dBm
- Support multiple digital modulation, built-in IQ modulator (B-type)
- AM/FM/ΦM analog modulation functions, maximum modulation rate up to 1MHz (A-type)
- Support pulse modulation, minimum pulse width 100ns
- Support linear frequency modulation, can simulate radar signals
- As frequency upper conversion, support external input IF signals
- Internal modulation source: sine wave, square wave, triangle wave, sawtooth wave
- USB/ LAN remote control interface, SCPI supported
- Low power consumption, light weight and compact size, suitable for system integration and installation

Specification

Frequency Properties		
Frequency Range	MSG730A/B: 9kHz~3.0GHz	
	MSG760A/B: 9kHz~6.0GHz	
Frequency Resolution	0.23Hz	
Internal Reference Frequency	10 MHz	
Temperature Stability	±1.0ppm	
Internal Reference Output	10 MHz, +2 dBm (typ.)	
Spectral Purity		
Harmonic	MSG730: < -30 dBc (typ.)	
	MSG760: < -35 dBc (typ.)	
Non-Harmonic	MSG730: < -50 dBc (typ.)	
	MSG760: < -60 dBc (typ.)	
SSB Phase Noise	Carrier Frequency Offset @f=1GHz	MSG730: -93 dBc/Hz@10kHz offset
		MSG760: -98 dBc/Hz@10kHz offset
Sweep Properties		
Sweep Mode	Step Sweep, List Sweep	
Sweep points	Step Sweep	2 ~ 65535
	List Sweep	2 ~16383
Dwell time	5ms~50s	
Trigger mode	Free/External	

Power Properties

Output Power Range	9kHz~50kHz	-120dBm~0dBm
	50kHz~6.0GHz	-120dBm~+10dBm
Power Accuracy	±1.5 dB(typ.)	

Modulation Characteristics

Analog Modulation (AM/FM/ΦM),Supporting internal and external modulation sources

		MSG730A/MSG760A	MSG730B/MSG760B
Amplitude Modulation	Modulation Depth	0 %~100 %	1 %~100 %
	Modulation Rate	20Hz~1MHz	1Hz~1MHz
Phase Modulation	Modulation Phase	0°~360°	0°~360°
	Modulation Rate	20Hz~1MHz	1Hz~1MHz
Frequency Modulation	Frequency Offset	5MHz	5MHz
	Modulation Rate	20Hz~1MHz	1Hz~1MHz

Digital Modulation, supporting internal and external modulation sources

IQ Modulator		/	Support
Internal Source		ASK/2FSK/4FSK/8FSK/2PSK/4PSK/8PSK	Supports universal digital modulation (option)
External Sources		/	Arb Mode (IQ data),
Pulse Modulation	Break-make Ratio	≥60 dB	
	Pulse Cycle Range	MSG730A/B: 200ns~160s	
		MSG760A/B: 300ns~160s	
	Pulse width	MSG730A/B: 100ns~85s	
		MSG760A/B: 200ns~85s	
Linear Frequency Modulation	Sweep Maximum Range	20MHz(MSG700 option: 50MHz)	
	Sweep Time	1 μs~1 s	
Frequency Upper Conversion	Input IF frequency range	MSG730A/B: 190MHz±30MHz	
		MSG760A/B: 200MHz±10MHz	
	Input IF power range	-50dBm ~ 0dBm	
	Output frequency range	MSG730A/B: 201MHz~3.0GHz	
		MSG760A/B: 61MHz~6.0GHz	

Interface

RF Output Interface	SMA, 50Ω	
LF Output	SMA, 50Ω	
Functional Interface	Interface Name	External Intermediate Frequency Input, External Pulse Modulation Input, External Trigger Input, External Modulation Input, 10m Reference Input/Output
	Interface Type	SMA
LAN	10/100 Base T	
USB	USB 2.0	

General Properties

Dimension (W x D x H)	MSG730A/B:145mm×95mm×28mm
	MSG760A/B:165mm×122mm×28mm500g
Weight	MSG730A/B:500g
	MSG760A/B:700g
Operating Temp.	-10℃ ~ +45℃
Storage Temp.	-40℃ ~ +70℃
Power Supply	DC:+12V±5%/1.5A

Ordering Information

Model

Model	Name	Description
MSG730A	Signal Generator Module	9kHz~3.0GHz
MSG730B	Signal Generator Module	9kHz~3.0GHz, built-in IQ modulator
MSG760A	Signal Generator Module	9kHz~6.0GHz
MSG760B	Signal Generator Module	9kHz~6.0GHz, built-in IQ modulator

Standard

No.	Name	Description
1	Power Cord	DC:+12V±5%/1.5A
2	Product certificate	

Options

Option Model	Name
BBG	Internal baseband data generation
BBW	Real time bandwidth options
RFUC	RF upconversion device
LFM	Linear frequency modulation function
AMK	Amplitude modulation option (SSB/DSB/CW)

Quality&**Precise**

MAXWELLON 82401/06

50GHz~500GHz

Millimeter-Wave Source Modules

2023

Maxwellon

Maxwellon TW82401/TW82406 series millimeter-wave source modules excel in terms of output power and application convenience. This series source module can work together with a microwave signal generator to build up a millimeter-wave signal generation system. The module is fed and controlled by the RF signal and software through corresponding special cables, respectively. The output frequency and power are controlled by the synthesized signalsource. A special power adapter provides the DC drive for the modules.

Key Feature

- Wide frequency range: 50GHz-500GHz
- Power Supply: 15V adapter
- Input frequency: < 24GHz
- Compact and portable, low consumption, low heating volume, standard waveguide output
- Direct display: when the signal source is working, it can directly show the state of the source module's output port
- Built-in high-gain microwave amplifier which lowers the requirement on signal generator

Typical Applications

TW82401/TW82406 series source modules can realize the frequency extension of microwave signal source to cover 50GHz ~ 500GHz frequency band, which can satisfy the measurement requirements of high-frequency signal in the fields of millimeter-wave radar, communications, and RCS (Radar Cross-Section).

Specification

Model	82406	82401N	82406A	82401QA	82406B	82406C	82401SA	82406D	82401TA	82406E
Output Frequency (GHz)	50 to 75	60 to 90	75 to 110	90 to 140	110 to 170	170 to 220	170 to 260	220 to 325	260 to 400	325 to 500
Output power (dBm)	≥+13	≥+11	≥+10	≥+5	≥+2	≥-2	≥-6	≥-8	≥-12	≥-18
	16 (typ.)	13 (typ.)	15 (typ.)	10 (typ.)	9 (typ.)	2(typ.)	0 (typ.)	-3 (typ.)	-6 (typ.)	-10 (typ.)
Multiplication counts	4	6	6	6	12	12	12	18	18	36
Amplitude-stabilized options	Yes	Yes	Yes	Yes	Yes	NA	NA	NA	NA	NA
Input frequency range(GHz)	12.5 - 18.75	10.0 - 15.0	12.50 - 18.33	15.0 - 23.3	9.17 - 14.17	14.17 - 18.33	14.17 - 21.67	12.2 - 18.06	14.44 - 22.22	9.02 - 13.89
Dimension (mm)	120×85×240 (without protrusions (W×H×D)									
Power type	15V adapter									
Power consumption	<25W									
RF input connector	3.5mm (f)									
Output connector	WR15	WR12	WR10	WR8.0	WR6.5	WR5.1	WR4.3	WR3.4	WR2.8	WR2.2

Ordering Information

Model

Model	Name	Description
82406	Source Module	Frequency Range: 50 to 75GHz
82401N	Source Module	Frequency Range: 60 to 90 GHz
82406A	Source Module	Frequency Range: 75 to 110 GHz
82401QA	Source Module	Frequency Range: 90 to 140 GHz
82406B	Source Module	Frequency Range: 110 to 170 GHz
82406C	Source Module	Frequency Range: 170 to 220 GHz
82401SA	Source Module	Frequency Range: 170 to 260 GHz
82406D	Source Module	Frequency Range: 220 to 325 GHz
82401TA	Source Module	Frequency Range: 260 to 400 GHz
82406E	Source Module	Frequency Range: 325 to 500 GHz

Standard

No.	Name	Description
1	Power Cord	3-phase power cord
2	Control Cable	Information interchange between the device and source module
3	Power Adapter	15V-16V DC output, 1 pc

Options

Option Model	Name	Function	Description
82406-01	Amplitude-stabilized	Realize stable output power in 50GHz~75GHz frequency band Output poweradjustable range:0dBm~10dBm	With BNC cable, suitable forTW4104 series signal generator
82406A- 001	Amplitude-stabilized	Realize stable output power in 75GHz~110GHz frequency band Output poweradjustable range: 0dBm~10dBm	With BNC cable, suitable forTW4104 series signal generator
82406B- 001	Amplitude-stabilized	Realize stable output power in 110GHz~170GHz frequency band Output power adjustable range: -5dBm~5dBm	With BNC cable, suitable forTW4104 series signal generator

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