DATA SHEET

VSG Vector Signal Generator

VSG1008D

- ✓ Frequency range:400MHz ~ 8GHz.
- ✓ Bandwidth:960MHz.
- ✓ Output level range (CW mode): -120~+20dBm.
- ✓ Importing waveform file formats: *.bin, *.wfm, *.txt, *.mat,
- ✓ EVM （Vector mode） 802.11ax ≤-50dBm （typical）

中科四点零
RF-Cube

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Definitions and conditions

Technical Specifications refer to the performance of a calibrated instrument that can be guaranteed under specified operating conditions, which includes measurement uncertainty.

Typical values describe additional product performance information that is not covered by the product Warranty. It is performance beyond specifications that 80 percent of the units exhibit with a 90 percent confidence level. This data does not include measurement uncertainty and is valid only at room temperature (approximately 25 ° C) after alignment within the stated alignment time and temperature limits.

Nominal values indicate expected performance or describe product performance that is useful in the application of the product but are not covered by the product warranty, which are Measured at room temperature (approximately 25 ° C) .Unless otherwise noted, the data in this document is nominal.

Measured values represent the performance characteristics measured during the design phase for comparison with expected performance, which not covered by the product warranty and are Measured at room temperature (approximately 25 ° C) .

Frequency technical specifications

Capture Depth	
Standard	512Msa of IQ data
Frequency range	
Frequency range	400MHz to 8GHz
Resolution	0.1Hz
Signal generation bandwidth (maximum can be set)	
400MHz to 550MHz	80MHz
550MHz to 1.31GHz	160MHz
1.31GHz to 2GHz	480MHz
2GHz to 8GHz	960MHz
Reference output	
Frequency	10MHz
Amplitude	⩾-0.05dBm，50Ω nominal
Frequency accuracy	±200ppb
Frequency Aging Rate (Per day)	±1ppb
Temperature stability (-40~85°C, 25°C typical)	±20ppb
External reference input	
Input frequency	10MHz
frequency stability	Depends on the stability of the external reference input signal
Input amplitude	+2~+12dBm，50Ω nominal
Waveform	Sine wave
Scanning mode (frequency and amplitude)	
Working mode	Step scan List scan
Scanned range	Within the frequency and amplitude range of the instrument
Trigger	Free、External
Trigger resolution	TBD
Trigger delay range	TBD

Amplitude technical specifications

Output index	
Output level range	+20 to -120dBm （typical）
Resolution	< 0.1dB
connector	N-K connector, 50Ωnominal
Port VSWR	
Frequency Range	**Output Power (0dBm)**
400MHz ~ 600MHz	< 2.1:1， typical < 2:1
600MHz ~ 6.5GHz	< 1.75:1， typical < 1.6:1
6.5GHz ~ 8GHz	< 1.8:1， typical < 1.65:1

Absolute level accuracy (CW mode)						
typical indicated by italics, 25 ℃						
Frequency range	**20dBm to 10dBm**	**10dBm to 0dBm**	**0dBm to -60dBm**	**-60dBm to -90dBm**	**-90dBm to -100dBm**	**-100dBm to -120dBm**
400MHz to 550MHZ	<±0.8dB, *<±0.55 dB*	<±0.75dB, *<±0.55 dB*	<±0.75dB, *<±0.55 dB*	<±0.85dB, *<±0.60 dB*	<±0.95dB, *<±0.65 dB*	<±1.25dB, *<±0.65 dB*
550MHz to 4.3GHz	<±0.95dB, *<±0.45 dB*	<±0.85dB, *<±0.50 dB*	<±0.75dB, *<±0.45 dB*	<±0.85dB, *<±0.60 dB*	<±0.95dB, *<±0.65 dB*	<±1.25dB, *<±0.65 dB*
4.3GHz to 6GHz	<±1.1dB, *<±0.55 dB*	<±1.00dB, *<±0.55 dB*	<±0.80dB, *<±0.55 dB*	<±0.85dB, *<±0.60 dB*	<±0.95dB, *<±0.65 dB*	<±1.3dB, *<±0.65 dB*
6GHz to 8GHz	<±1.2dB, *<±0.55 dB*	<±1.05dB, *<±0.55 dB*	<±0.80dB *<±0.55 dB*	<±1.15dB *<±0.60 dB*	<±1.15dB *<±0.65 dB*	<±1.3dB, *<±0.65 dB*

In order to achieve the best test accuracy, internal calibration needs to be performed by clicking "SYSTEM", selecting "Calibration" (Cal), and waiting for approximately 7 minutes.

Spectrum purity technical specifications

Absolute SSB phase noise under standard configuration (dBc/Hz, CW mode. 1GHz frequency 0dBm output power typical)	
10kHz	-136 typical -137
1MHz	-143 typical -144
10MHz	-145 typical -146

Harmonics(CW mode，0 dBm output power)	
Frequency range	Output power(0dBm)
400MHz to 3GHz	≤-46dBc, typical≤-51dBc
3 to 4.3GHz	≤-43dBc, typical≤-45dBc
4.3GHz to 5.8GHz	≤-43dBc, typical≤-45dBc
5.8GHz to 8GHz	≤-45dBc, typical≤-50dBc
Non-harmonic spurious (CW mode，0 dBm output power)	
Frequency range	>10kHz frequency offset
400MHz to 4.3GHz	≤-65dBc, typical≤-70dBc
4.3GHz to 5.8GHz	≤-60dBc, typical≤-65dBc
5.8GHz to 8GHz	≤-60dBc, typical≤-65dBc
Broadband noise floor (dBm/Hz, CW mode，0 dBm output power，center frequency offset is 13.3MHz)	
400MHz to 4.3GHz	-139, typical -143
4.3GHz to 8GHz	-140, typical -144
OIP3 (dBm, output power level= 0dBm)	
400MHz to 8GHz	+24dBm, typical +27
IMD3 (dBc, output power level= 0dBm)	
400MHz to 4.3GHz	-63, typical -67
4.3GHz to 8GHz	-56, typical -58
LO Feedthrough (dBc, output power level= 0dBm)	
400MHz to 4.3GHz	≤-50
4.3GHz to 8GHz	≤-50
Image (dBc, output power level= 0dBm)	
2GHz to 8GHz, 80MHz BW	≤-50
2GHz to 8GHz, 160MHz BW	≤-50
2GHz to 8GHz, 480MHz BW	≤-50
2GHz to 8GHz, 960MHz BW	≤-50
Flatness (dB, output power level= 0dBm)	
Bandwidth=80 MHz	
400MHz to 550MHz	≤±1.0, typical ≤±0.35

Bandwidth=160MHz	
550MHz to 1310MHz	≤±1.3, typical ≤±0.4

Bandwidth=480MHz	
1310MHz to 2000MHz	⩽±1.3, typical ⩽±0.8

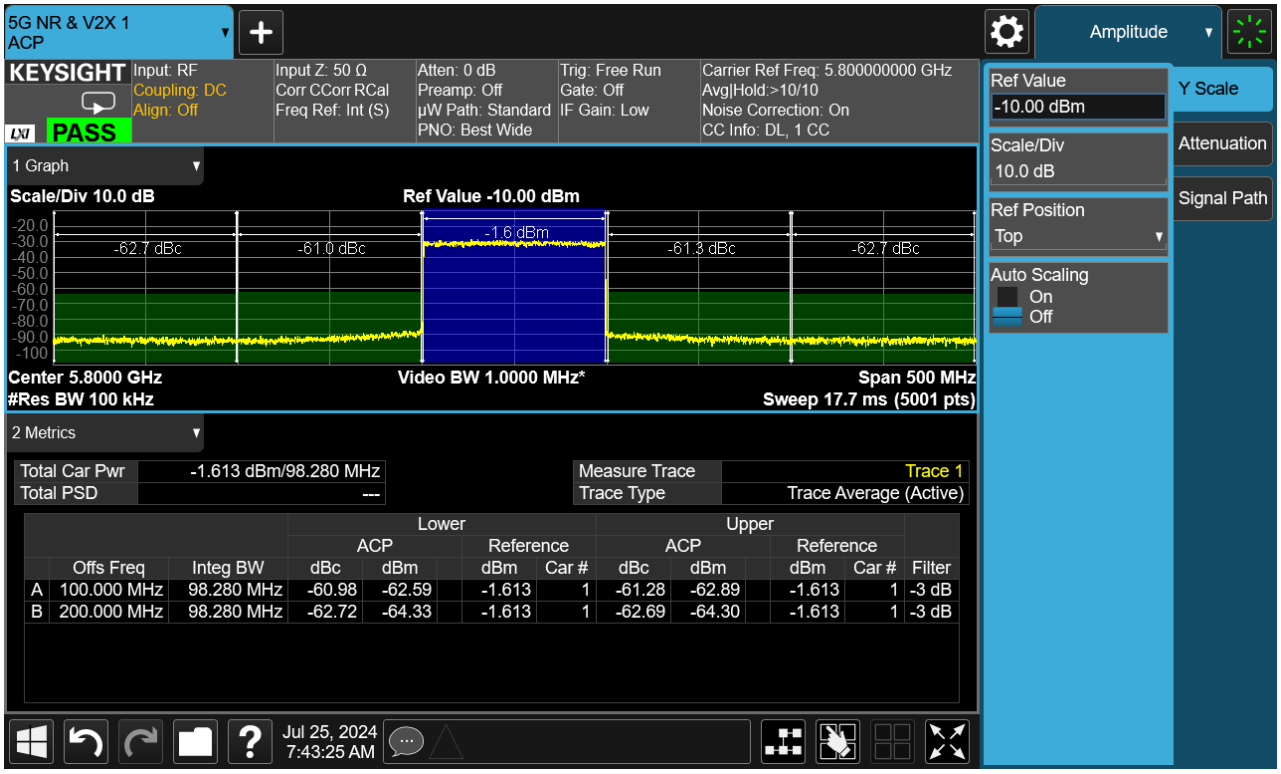
Bandwidth=960MHz	
2000MHz to 3400MHz	⩽±1.8, typical ⩽±0.7
3400MHz to 4300MHz	⩽±1.6, typical ⩽±0.7
4300MHz to 5600MHz	⩽±1.4, typical ⩽±0.7
5600MHz to 8000MHz	⩽±1.3, typical ⩽±0.7

Analog modulation technical index

Frequency modulation (FM)	
FM Deviation	0-1MHz
FM Rate	0-5MHz
FM Trigger Source	Internal、External
FM Waveform	Sine、Dual Sine、Triangle、Ramp Up、Ramp Down、Square
Carrier frequency error（CFE）	<0.2%（1kHz FM rate，50kHz FM deviation）
Total harmonics distortion（THD）	<0.2%（1kHz FM rate，50kHz FM deviation）
Amplitude modulation (AM)	
AM Depth	0-100% (step 0.1%)
AM Rate	0-10MHz
AM Trigger Source	Internal、External
AM Waveform	Sine、Dual Sine、Triangle、Ramp Up、Ramp Down、Square
Total harmonics distortion（THD）	<0.2%（1kHz AM Rate，40% AM Depth）
Pulse modulation (PM)	
Pulse period	200ns-1s
Pulse width	0-99%（period<5ms），0-40%（period≥5ms）
PM Trigger Source	Internal、External
Phase modulation ΦM	
TBD	Require Follow-up supplementary testing

Digital modulation technical specifications

Importing waveform file formats	*.bin, *.wfm, *.txt, *.mat
EVM（Vector）	
802.11ax (CF 5.8G, 80M, 256QAM, MCS9)	≤-50dBm（typical）
Long Term Evolution (LTE, FDD, 20M, 64QAM)	≤0.33%（typical）
ACPR	
5G NR (CF 5G, 100M, 30k SCS, 256QAM)	≤-60dBc（typical）



5.8G ACPR test results

LTE, 20M 64QAM test results

General technical specifications

Remote programming	
Interface	LAN
Control language	SCPI
Power supply and power consumption	
90-264V AC/220W	
Voltage range	90-264V AC
Operating power consumption	≤220W
Standby power consumption	2.5W
Operating temperature range	
0 to 45℃	
Storage temperature range	
-20 to 70℃	
Humidity	
Relative humidity type test: 95%, +40℃ (No condensation)	
Weight	
≤15kg	
Size	
Height: 142mm±5mm Width: 454mm±5mm Length: 408mm±5mm （Without platform accessories）	
Recommended calibration cycle	
24 months	
ISO standard	
The instrument is manufactured in an ISO-9001 certified factory and complies with RF-CUBE internal quality standards.	
Hard disk	
128GB M.2	
Internal storage	
8GB	

Input and output

Back panel connectors	
Ref in	BNC-K connector； 10MHz Reference in; Used for frequency locking internal time base; Nominal input level:0dBm to 10dBm， 50 Ω nominal， sinewave.
Ref out	BNC-K connector； 10MHz Reference out, Used for other instrument time base; Nominal output level+4dBm; 50 Ω nominal; Maximum non-destructive input level +16dBm.
TRIG1	BNC-K connector
TRIG2	BNC-K connector

Power port	The main power switch of the chassis，Controls the shutdown of input AC power。
LAN interface	Used as remote control interfaces
Earthing rod	Used as chassis grounding port
Front panel connectors	
RF Output	N-K connector；Output RF signals; For details about the reverse power protection, see **Output.**
USB2.0X2	USB interface 2.0