

OQVS-300 High Precision Voltage Source



OQVS-300 series DC voltage source is a precision voltage source with low noise and high stability, which can provide reliable equipment support for precision measurement scenarios such as superconducting quantum computing, silicon-based quantum computing and so on, and can be widely used in IC R&D, industrial production, laboratory basic research and other fields.

Key Features:

- ✧ 16 channel output, support channel number customization
- ✧ Low frequency (0.1-10Hz) voltage noise as low as $3.9\mu\text{V}$
- ✧ 24 h Stability $\leq 35\mu\text{V}$ within a range of $\pm 10\text{V}$ (room temperature)
- ✧ 20-bit vertical resolution
- ✧ Support programming control
- ✧ Support real-time temperature monitoring

Detailed Parameters

Model	OQVS-300-16
Performance Parameters	
Channels	16
Output voltage range	$\pm 10\text{ V}$
Voltage step	$19\mu\text{V}$
Vertical resolution	20bit
Low frequency (0.1-10Hz) voltage noise	$\leq 3.9\mu\text{V}$
24 h Stability	$\leq 35\mu\text{V}$ ($\pm 10\text{V}$, Test at room temperature)
Other	
Ambient temperature	$0^{\circ}\text{C}-45^{\circ}\text{C}$
Ambient humidity	5%-80% relative humidity, no condensation
Storage temperature	$-25^{\circ}\text{C}-60^{\circ}\text{C}$
Preheating time	30 min
Cooling requirement	The back of the running instrument must be able to guarantee at least 80 mm isolation space
Size (L * W * H)	482.6mm×44mm×390.7mm (Standard 1U Rack)

Test Data

Note : The following is test data for OQVS-300-16.

1 Voltage Linearity

During the test, several channels are randomly selected and the output voltage is read and averaged using a digital multimeter.

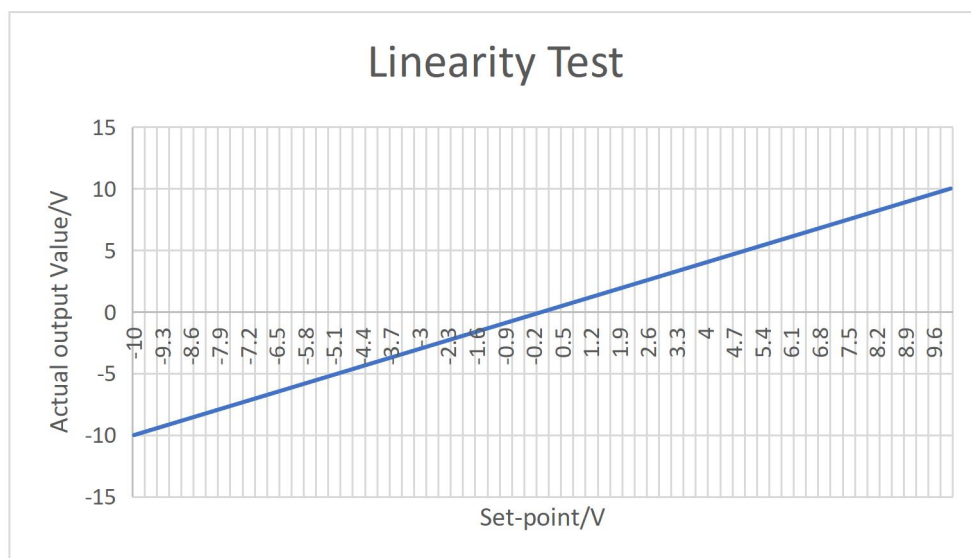


Figure 1 Linearity of channel 1

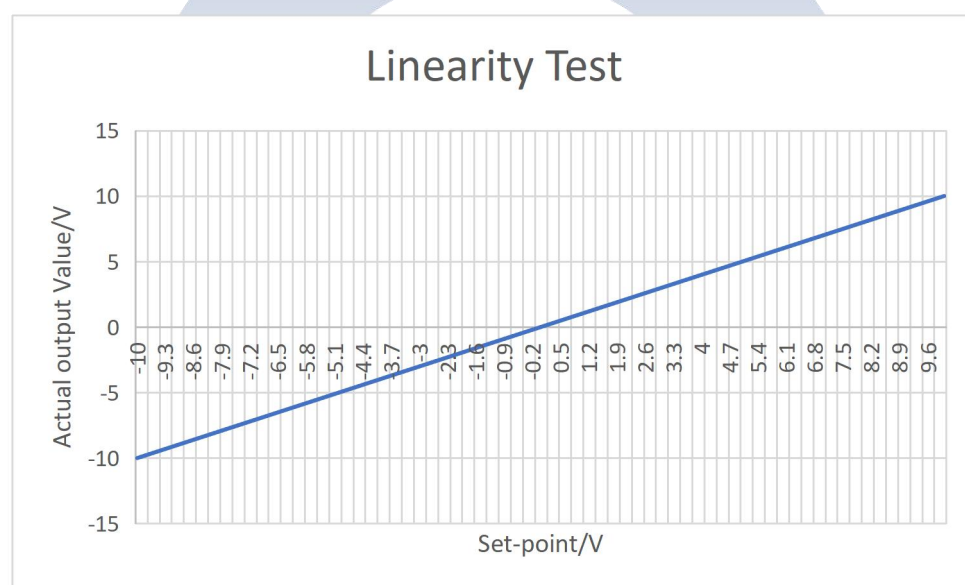


Figure 2 Linearity of channel 3

2 Low frequency (0.1-10Hz) voltage noise

Set the output of the voltage source to -5V, -2.5V, 2.5V, 5V, and measure 0.1-10Hz voltage noise :

Voltage values/V	-5	-2.5	0	2.5	5
Low frequency (0.1-10Hz) voltage noise value /Vpp	1.6	0.95	0.82	0.93	1.5



Figure 3 Voltage noise image (100,000x magnification)

3 24h stability

The voltage output value of the channel was randomly set, and the voltage value of a single channel was continuously measured, which was read every 10 s for 24 hours.

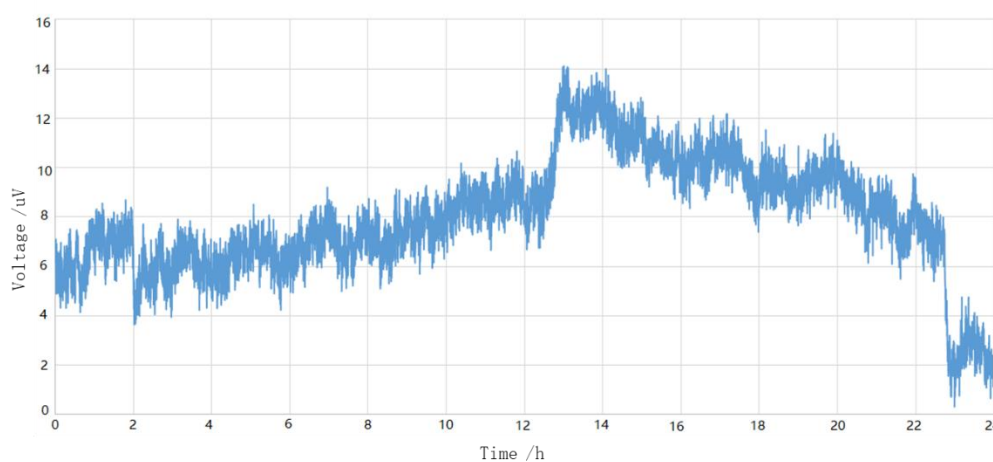


Figure 4 24 h voltage fluctuation map

When the voltage is set to -9.9V and the natural temperature varies slowly from 29 °C to 32 °C, the voltage jitter is 15uV in 24 hours.

4 Ripple

Set output 0V, oscilloscope time scale 20ms/div.

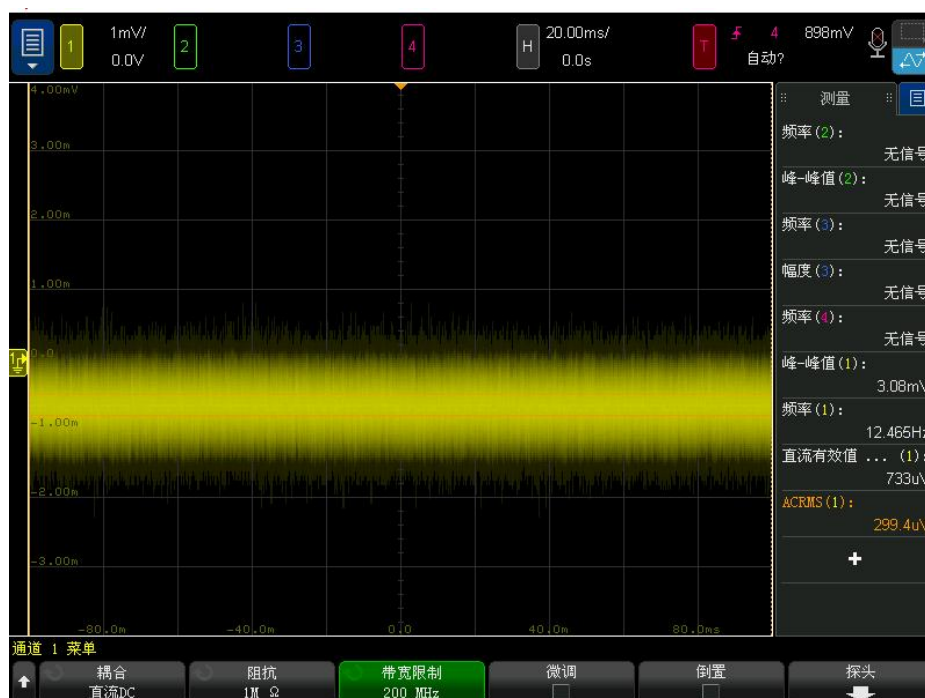


Figure 5 The 200MHz bandwidth limit for 1MΩ impedance

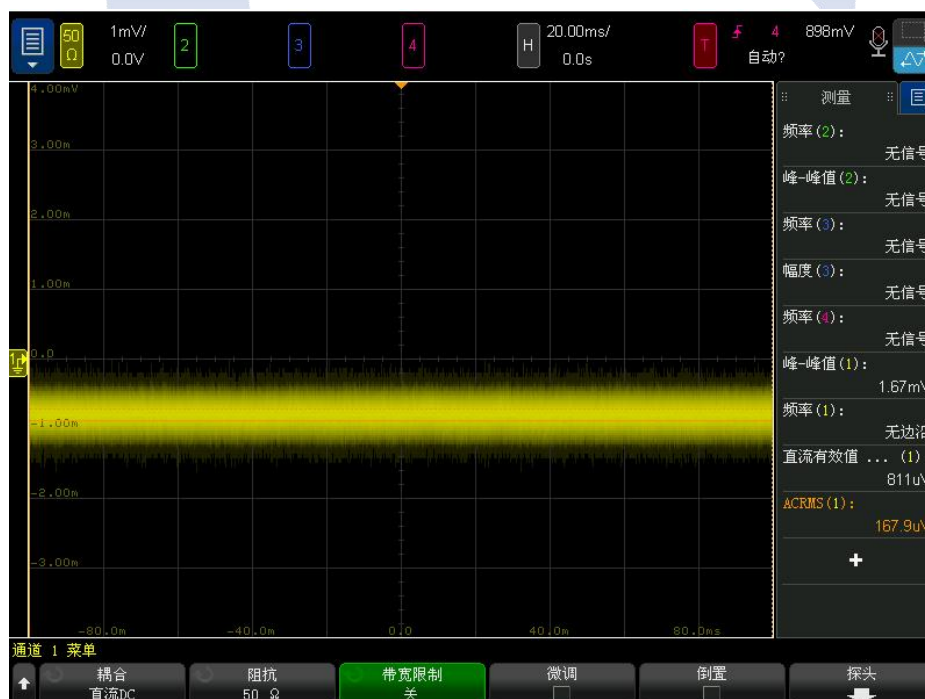


Figure 6 The 50Ω impedance without bandwidth limit

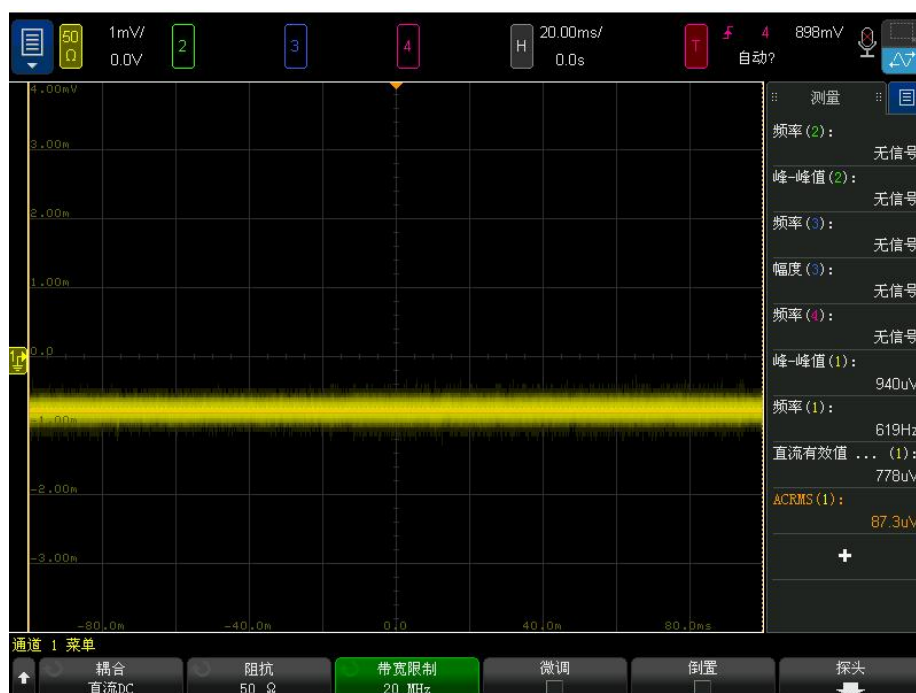


Figure 7 The 50Ω impedance 20MHz bandwidth limit

5 Noise spectrum

The output of the voltage source channel was set as 0V, and the output was connected to the spectrum analyzer, which was set as DC coupling. Measure noise spectrum in the 3 Hz -503Hz, 503Hz-10KHz, 10 KHz-100KHz, 100KHz-1.5MHz, 1MHz-100MHz, 100MHz-3GHz band

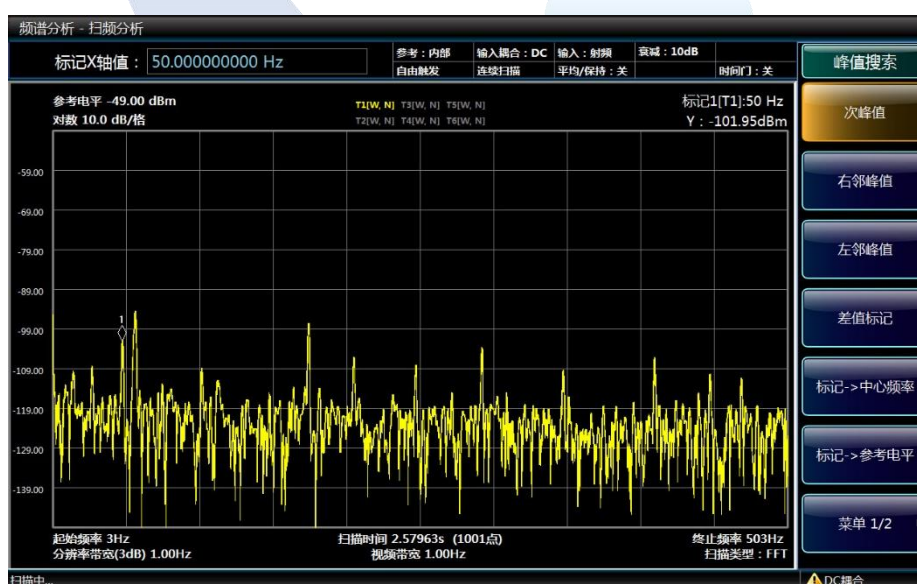


Figure 8 Noise in the 3Hz-503Hz band: The 50Hz power frequency noise is below -100dBm (65Hz and its doubling frequency in the figure are influenced by the fan of the spectrometer), but the power frequency noise is also affected by the environment. Different test periods and different

positions may vary, for example, -91dBm may be measured sometimes

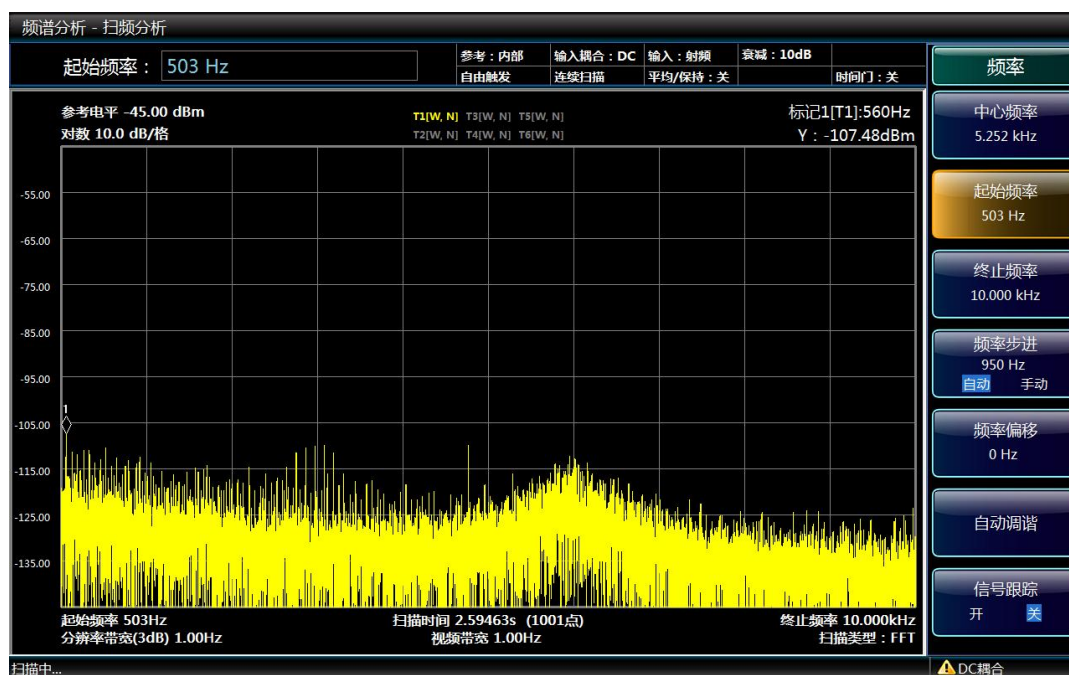


Figure 9 The 503Hz-10KHz frequency band below -100dBm

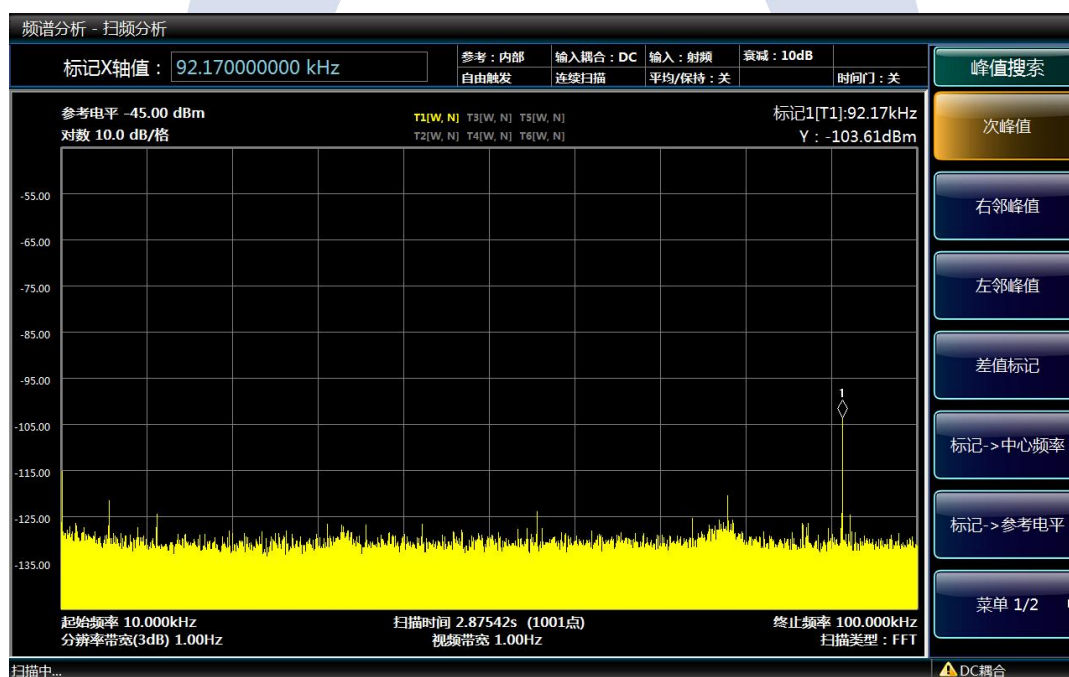


Figure 10 The 10KHz-100KHz band is below -100dBm

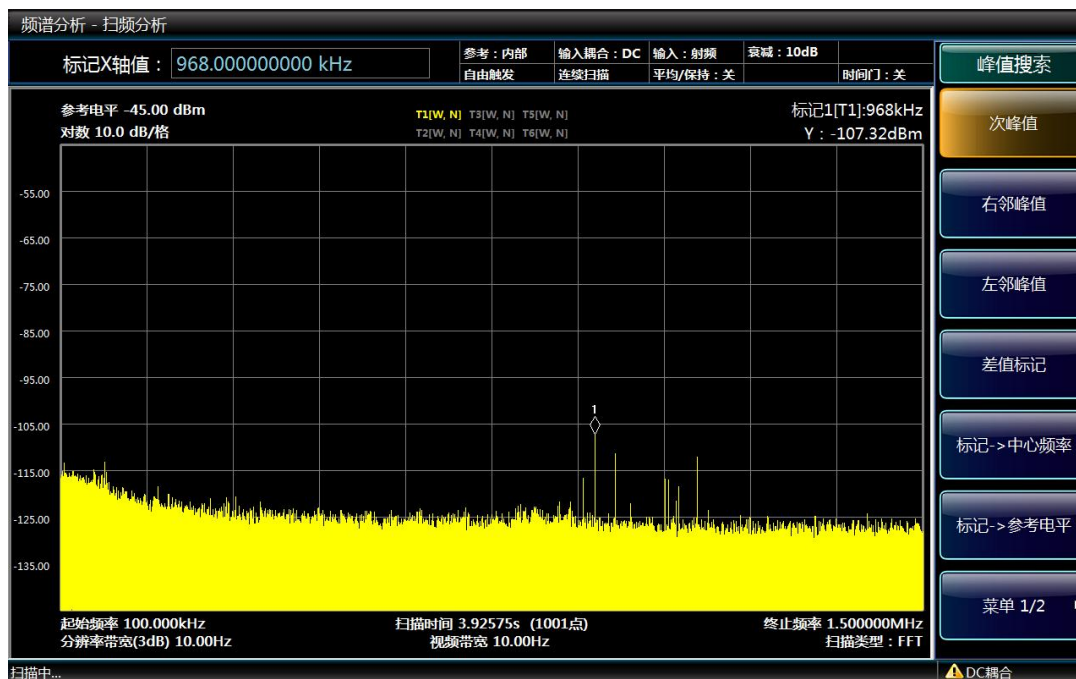


Figure 11 The 100KHz-1.5MHz band is below -100dBm

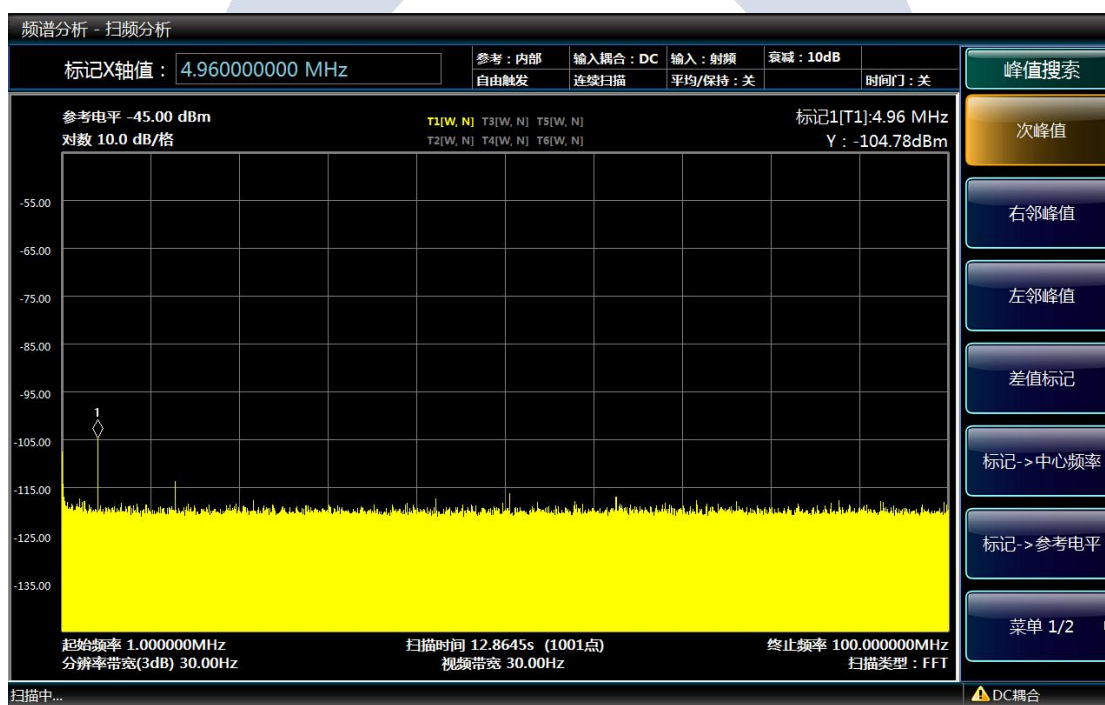


Figure 12 The 1MHz-100MHz band is below -100dBm

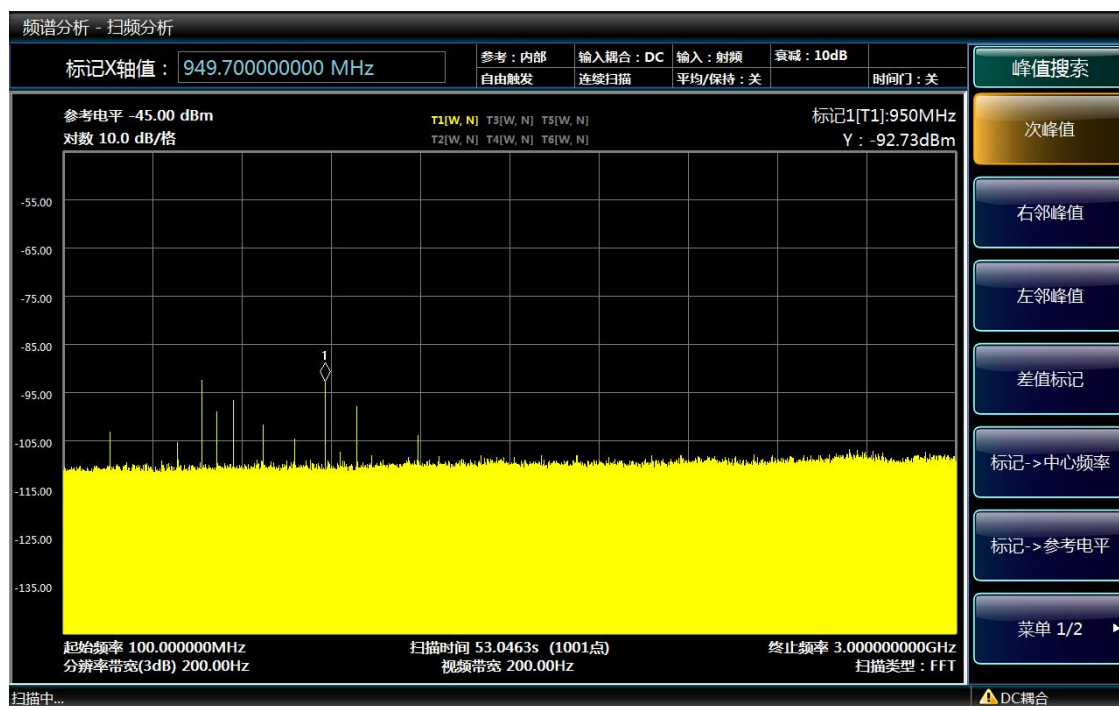


Figure 13 The 100MHz-3GHz band is below -90dBm