

Sample Approved Sheet

Hetuo (R1310A) Acknowledgment

Customer Name Dongguan Ruihe Electronic Technology Co., Ltd

Client Type R1310A

Brand HT-R1310A-L-V1

Hetuo Judgment Audit Team

Formulate	Check	Ratify	Acknowledge the book completion time
Liyaona	Huxuewen	Daitingting	2024.01.08

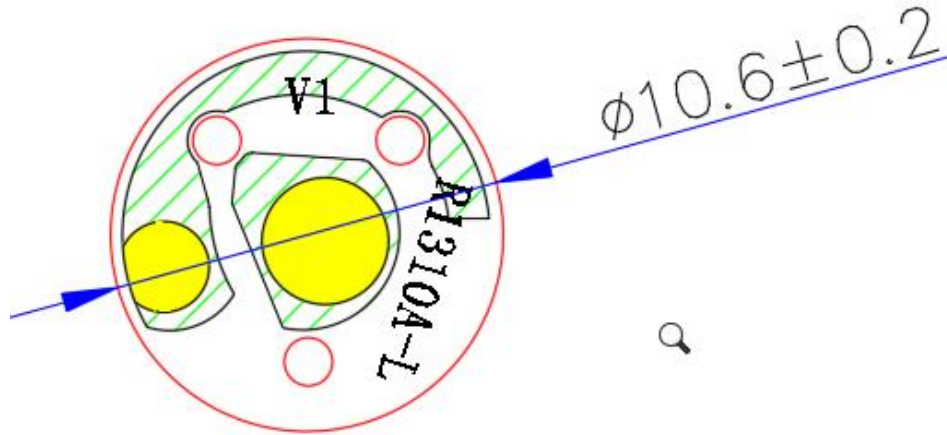
(Client) Judgment Audit Team

Acknowledgement Number _____ Proving time

acknowledge	check	ratify	Acknowledge the book completion time
Project Review ☐ Three acknowledgements ☐ Specifications/drawings ☐ examining report ☐ Specimen PCS ☐ Safety standard ☐ HSF			
Appraisal report ☐ Accept ☐ Conditional acceptance ☐ Refuse			

1. Antenna picture

The report mainly provides the test status of the electrical properties parameters of **R1310A**. The **R1310A** antenna is a **2.4-2.5GHz** Band . The antenna Picture and assembly are shown below.
Antenna picture & assembly picture



2. Antenna Test Equipment Introduction

Test of antenna input characteristics using Agilent E5071C and Agilent 5062A vector network analyzer; The radiation pattern of the antenna are tested using the Satimo starlab 3D near field Anechoic Chamber , and the instrument is used to agilent8960 E5515 and Agilent E4438C. The test coordinates of the darkroom are as follows:

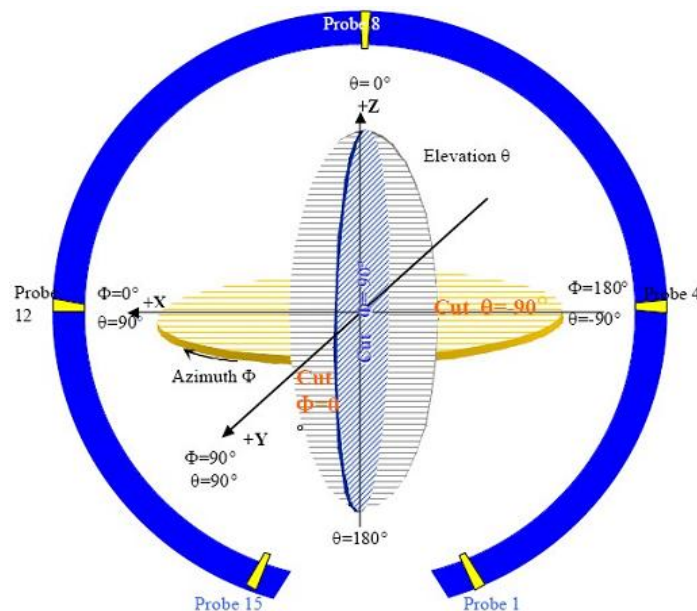


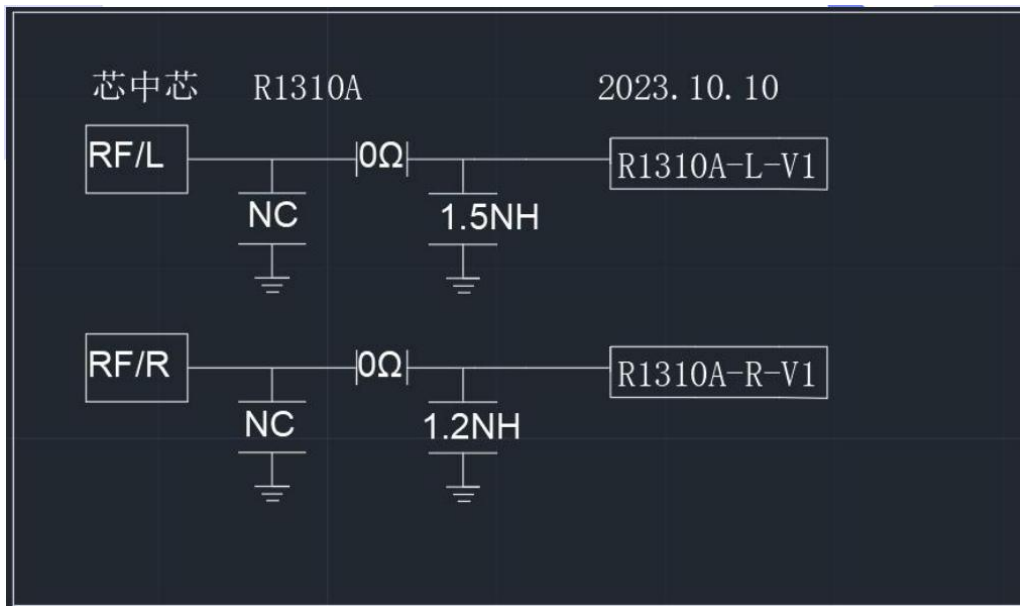
图 4 3D 微波暗室测试坐标系 (back view)

3. Electrical Specification

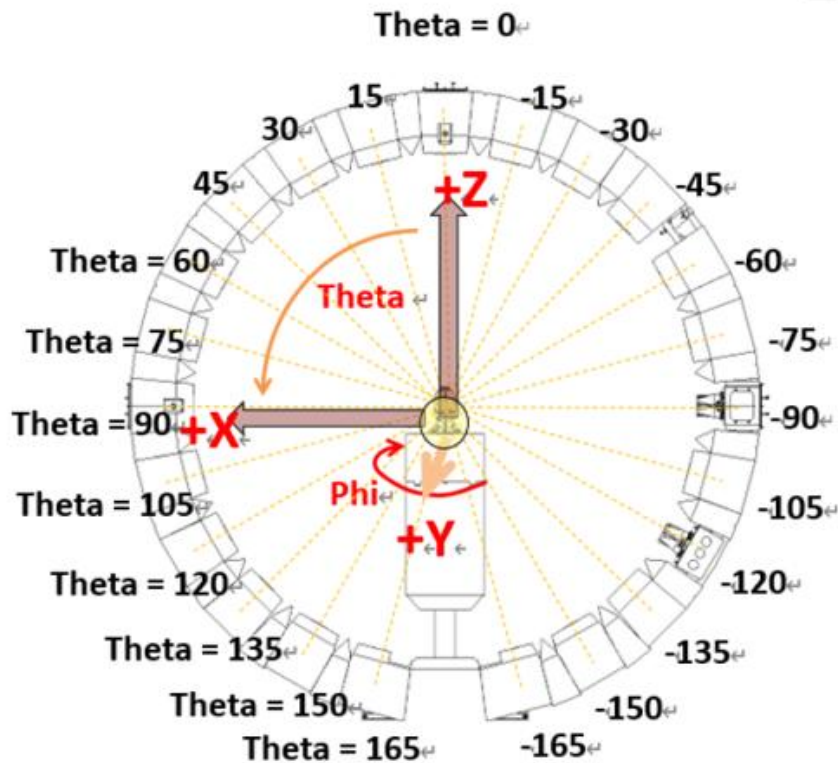
3-2 Passive S11 parameter

Measuring Method is a 50 Ω coaxial cable is connected to the antenna. Then this cable is connected to a network analyzer to measure the S11 parameter, Keeping this fixture away from metal at least 20cm.

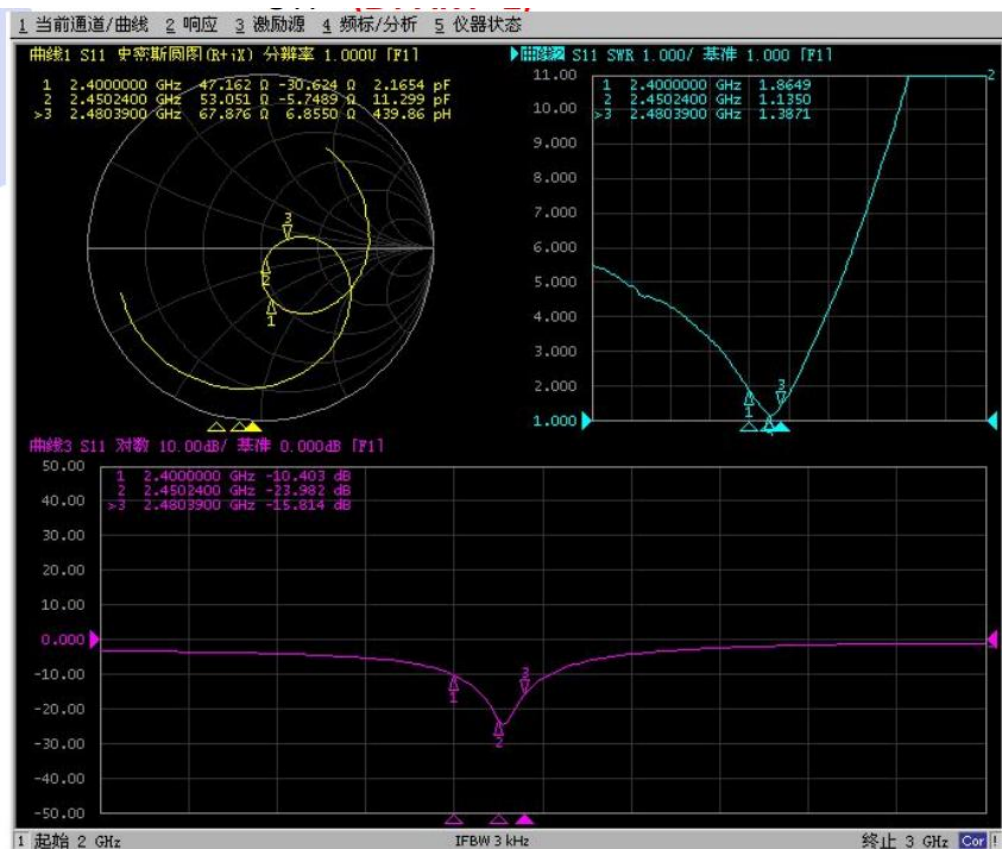
VSWR—L



Sample status & coordinates



S11—L(BT ANT)



3-3 Antenna Matching Network

Gain & Efficiency—BT-ANT-L



深圳市合拓科技有限公司

Frequency ID	1	2	3	4	5	6	7	8	9	10	11
Frequency (MHz)	2400.0	2410.0	2420.0	2430.0	2440.0	2450.0	2460.0	2470.0	2480.0	2490.0	2500.0
Efficiency (dBi)	-7.07	-6.92	-6.95	-6.78	-6.93	-7.02	-7.06	-7.00	-7.07	-7.21	-7.31
Gain (dBi)	-2.63	-2.51	-2.52	-2.26	-2.47	-2.48	-2.65	-2.29	-2.32	-2.36	-3.14
Efficiency (%)	19.61	20.32	20.19	20.97	20.29	19.87	19.69	19.93	19.64	19.03	18.59
Directivity (dB)	4.45	4.41	4.43	4.53	4.46	4.54	4.41	4.72	4.74	4.85	4.16
Peak Gain Position (Theta)	105.00	105.00	90.00	90.00	105.00	90.00	75.00	90.00	90.00	90.00	90.00
Peak Gain Position (Phi)	90.00	90.00	105.00	120.00	105.00	120.00	105.00	120.00	120.00	120.00	120.00
Efficiency ThetaPol (%)	10.42	10.95	10.88	11.29	10.98	10.88	10.86	11.39	11.64	11.22	11.11
Efficiency PhiPol (%)	9.20	9.37	9.31	9.68	9.32	8.99	8.84	8.54	8.00	7.81	7.49
Upper Hem. Efficiency (%)	11.10	11.33	11.37	11.90	11.65	11.40	11.57	11.69	11.60	11.19	10.78
Lower Hem. Efficiency (%)	8.51	8.99	8.82	9.08	8.65	8.47	8.13	8.25	8.04	7.84	7.81

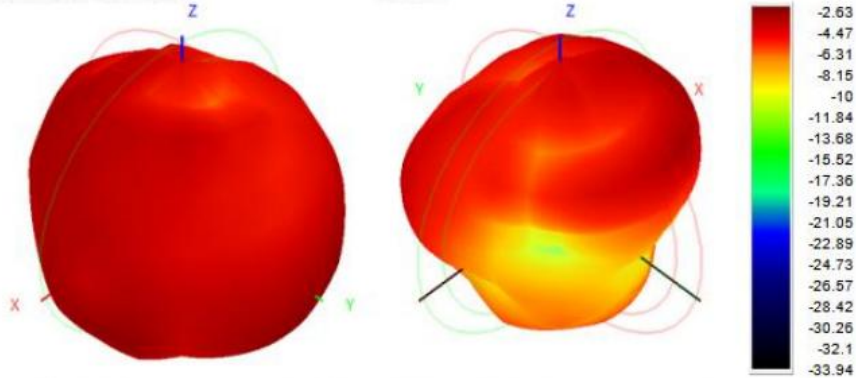
Gain (dBi)	-2.63	-2.51	-2.52	-2.26	-2.47	-2.48	-2.65	-2.29	-2.32	-2.36	-3.14
Efficiency (%)	19.61	20.32	20.19	20.97	20.29	19.87	19.69	19.93	19.64	19.03	18.59

2D/3D—BT-L

2D&3D—BT-ANT

2400.0MHz H+V, Eff: 19.6%

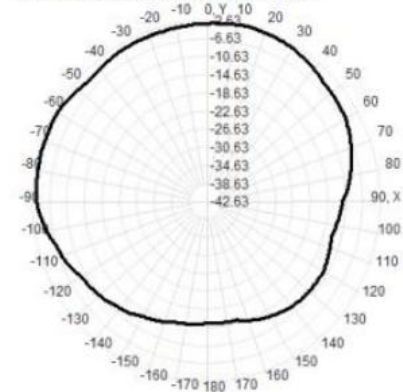
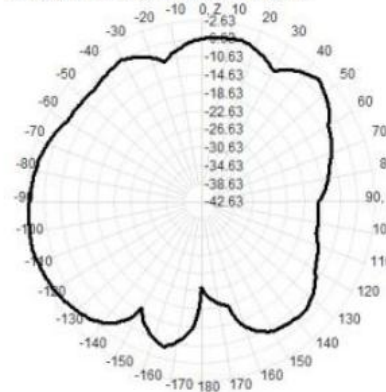
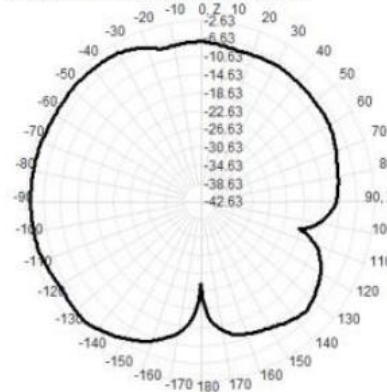
Back View



2400.0MHz Total(E1-XZ), Max= -3.74dBi

2400.0MHz Total(E2-YZ), Max= -2.63dBi

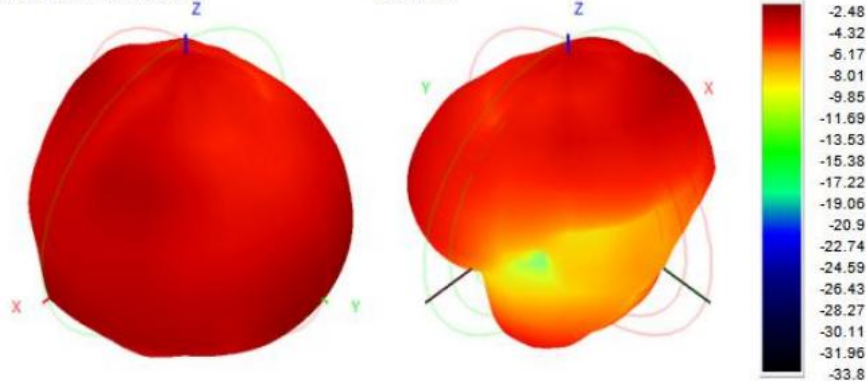
Total(H-XY), Max= -2.85dBi, CirD=12.94



2D&3D—BT-ANT

2450.0MHz H+V, Eff: 19.9%

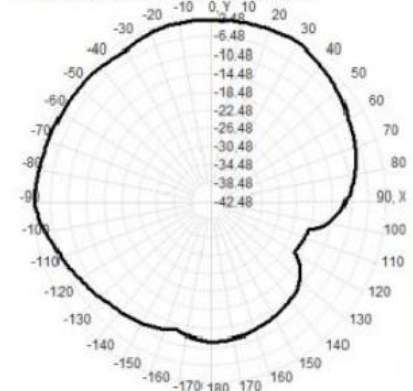
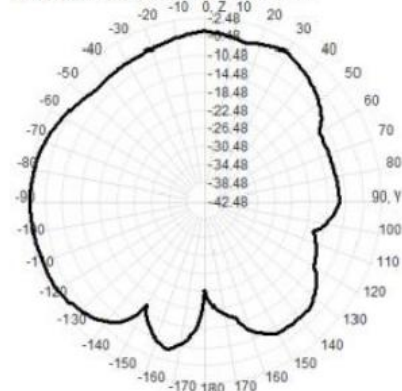
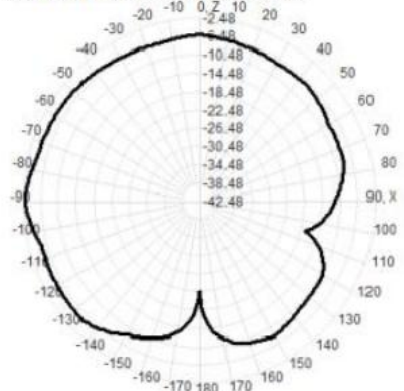
Back View



2450.0MHz Total(E1-XZ), Max= -2.94dBi

2450.0MHz Total(E2-YZ), Max= -2.95dBi

Total(H-XY), Max= -2.48dBi, CirD=17.76

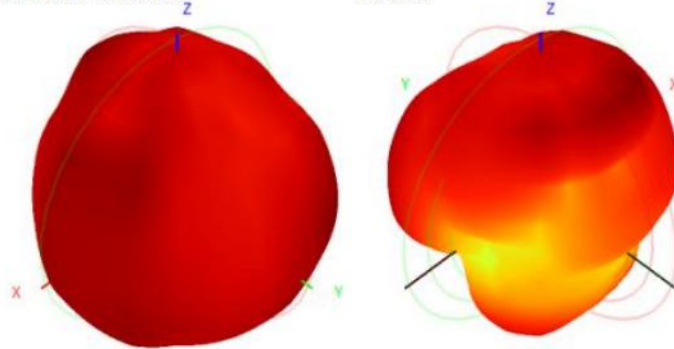


2D&3D

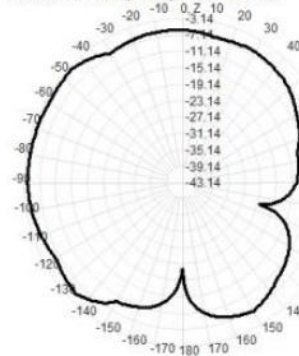
BT- ANT

2500.0MHz H+V, Eff: 18.6%

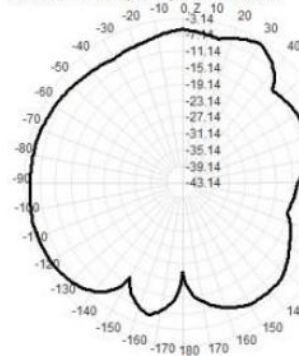
Back View



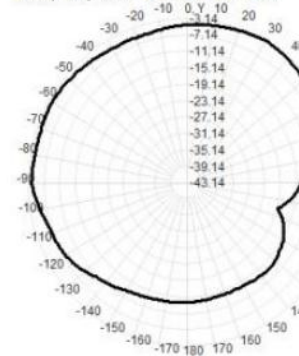
2500.0MHz Total(E1-XZ), Max= -3.97dBi



2500.0MHz Total(E2-YZ), Max= -4.00dBi



Total(H+V), Max= -3.14dBi, CirD=16.31



OTA DATA(L)--FS

Bluetooth Band Antenna Performance Table

Model	Freq. (MHz)	TRP (dBm)	TIS (dBm)	Gain (dBi)	Directivity (dBi)	Efficiency (%)	Efficiency (dB)	Max (dBm)	Theta of Max	Phi of Max	Min (dBm)	Theta of Min	Phi of Min	AVG (dBm)	Max/Min (dB)
		0.98						5.57	0	0	-8.11	0	0	1.30	13.68
		1.33						5.45	0	1	-10.38	0	1	1.39	15.83
		2.29						6.09	0	2	-8.96	0	2	2.25	15.05
			-33.99					-78.90	0	0	-93.58	0	0	-86.33	13.68
			-37.87					-76.16	0	1	-91.99	0	1	-83.58	15.83
			-37.88					-76.63	0	2	-91.68	0	2	-84.15	15.05

OTA DATA(L)--BH

Bluetooth Band Antenna Performance Table

Model	Freq. (MHz)	TRP (dBm)	TIS (dBm)	Gain (dBi)	Directivity (dBi)	Efficiency (%)	Efficiency (dB)	Max (dBm)	Theta of Max	Phi of Max	Min (dBm)	Theta of Min	Phi of Min	AVG (dBm)	Max/Min (dB)
		0.65						9.30	0	0	-10.32	0	0	1.17	19.61
		0.40						9.28	0	1	-13.72	0	1	1.01	22.99
		0.82						9.32	0	2	-11.57	0	2	1.40	20.89
			-89.05					-78.08	0	0	-97.70	0	0	-85.88	19.61
			-88.32					-74.20	0	1	-97.20	0	1	-84.76	22.99
			-86.55					-74.16	0	2	-95.05	0	2	-83.35	20.89

The drawing shows a circular component with a diameter dimension of $\phi 10.6 \pm 0.2$. Inside the circle, there are two yellow circular pads labeled 'V1' and 'R1310A-L'. A blue arrow points from the text 'through-hole-X3' to the component. Another blue arrow points from the text 'Total thickness 0.15±0.05' to the component. The component is shown in a cross-section view, indicating its thickness.