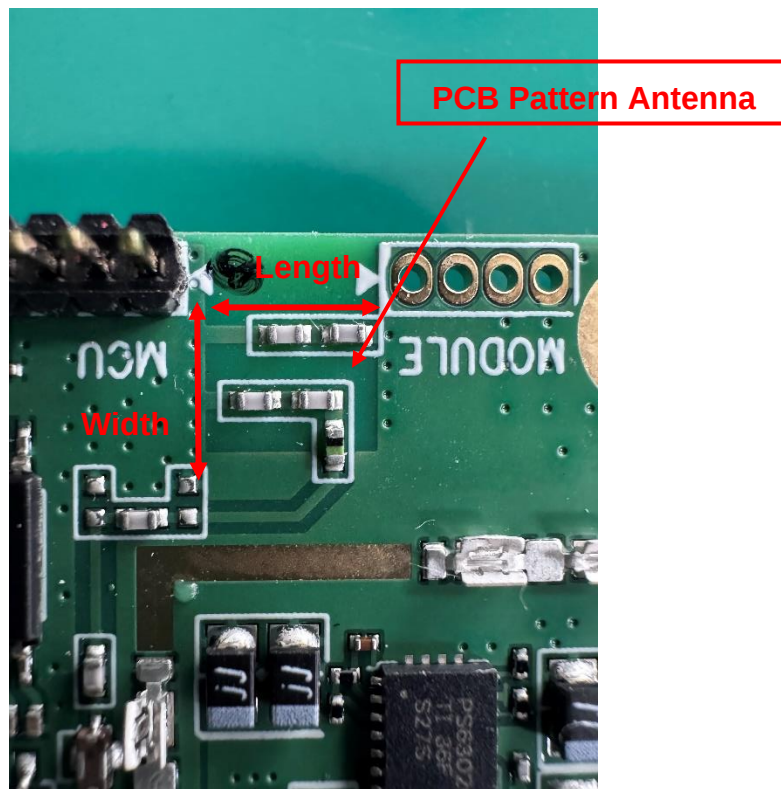


Antenna Information

Item	Contents
Antenna Type	PCB Pattern Antenna
Antenna peak gain	-0.06 dBi
Manufacturer / Model name	Victory Giant Technology / -
Address of manufacturer	Xingcheng Science and Technology Park, Danshui Street, Huiyang District, Huizhou City, Guangdong Province
Test Laboratory	RADINA. Co., LTD
Antenna Length	0.5 cm
Antenna Width	0.6 cm



Model name: ST4230

APPROVAL SHEET

MODEL : ST4230
Antenna layout

Review	Consent	Approval



RadiNa Co. ,Ltd

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6. Measurement Process

1. Revision History

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NO.	Before		After	Reason	Date
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6					
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8					
9					
10					
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12					
13					

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2. Product Information

2.1 General Features

PART NUMBER	GradiAnt Antenna
ANTENNA TYPE	PCB Pattern Antenna
APPLICATIONS	Bluetooth

2.2 Electrical Specifications

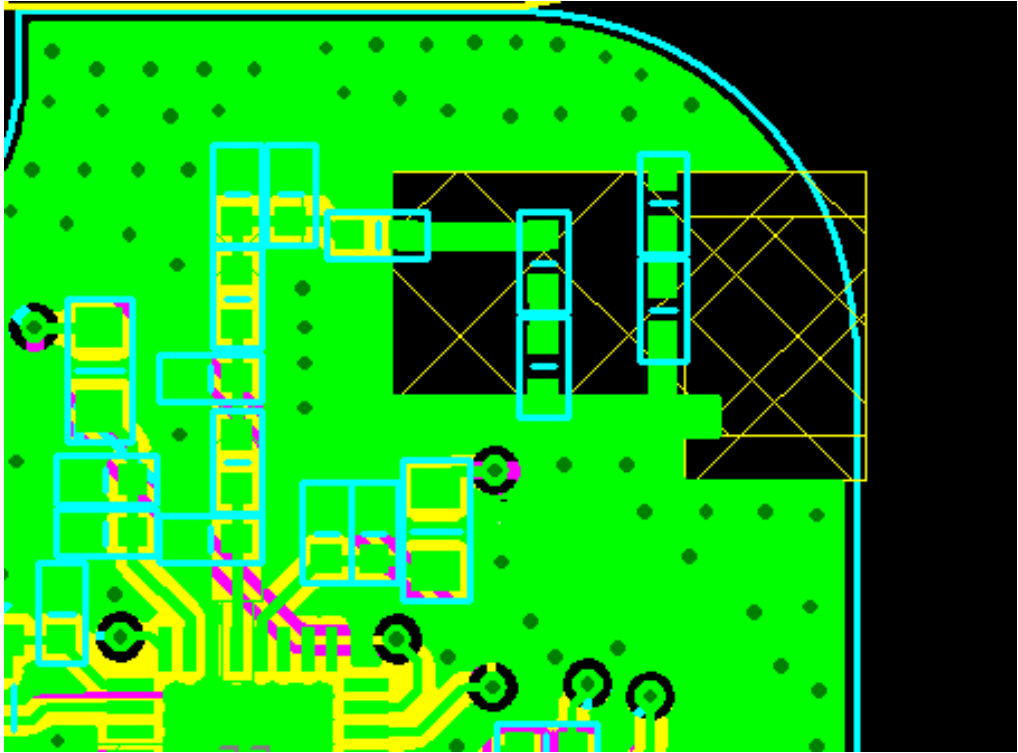
Frequency Range1 (TX)		2400MHz~2498MHz	
Frequency Range1 (RX)		2400MHz~2498MHz	
IMPEDANCE		50 Ω	
V.S.W.R	TX	2400MHz	2498MHz
		5 ↓	5 ↓
	RX	2400MHz	2498MHz
		5 ↓	5 ↓
RADIATION PATTERN		Omni-directional	
POLARIZATION		Linear	

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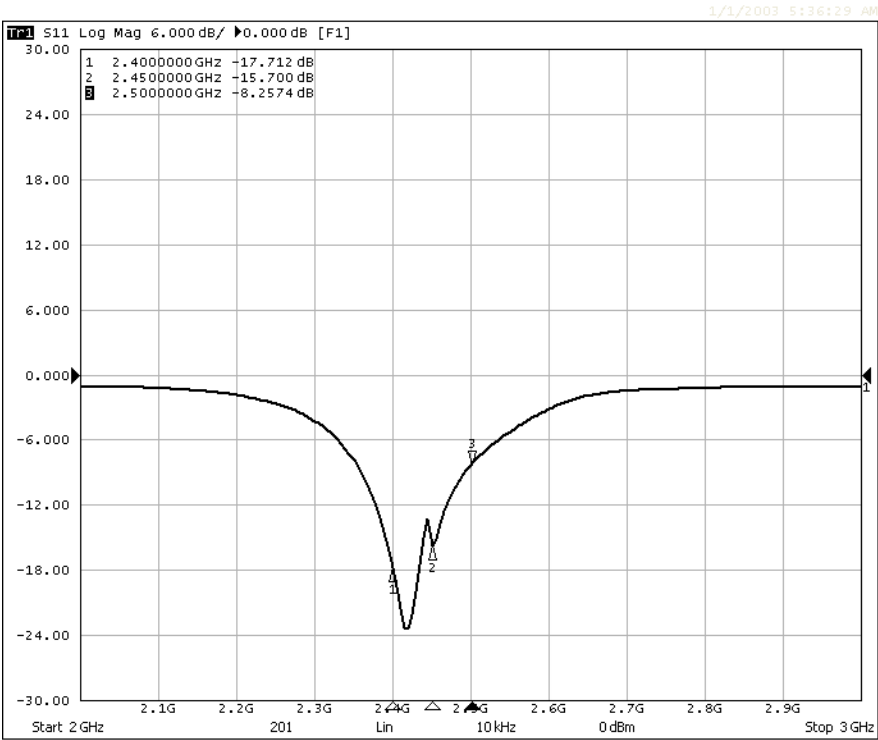
3. Pattern Specifications



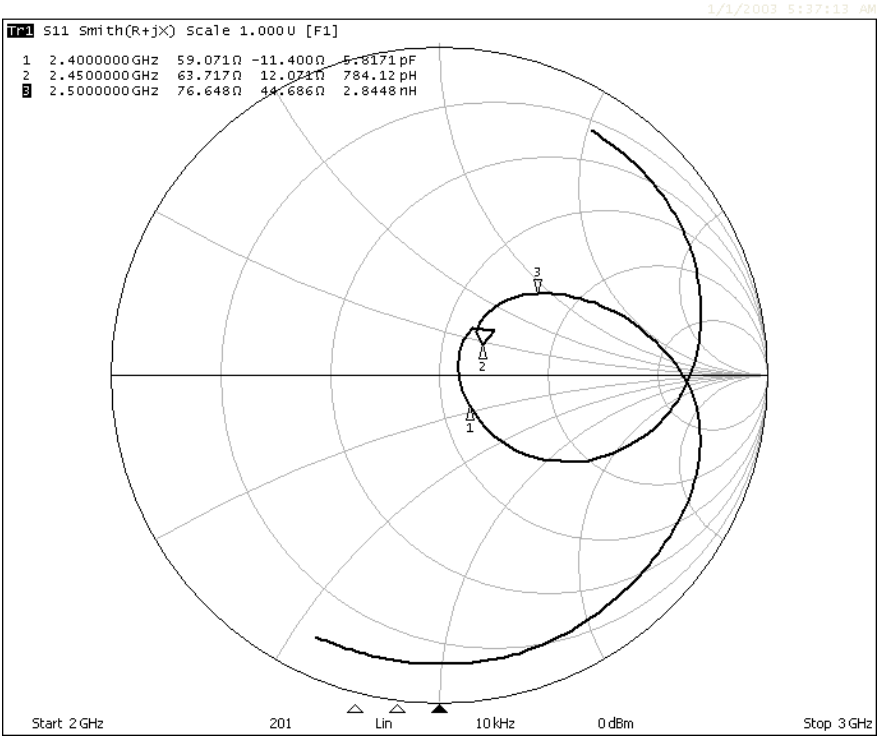
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4.Electrical Characterristics

5.1 VSWR



5.2 SMITH CHART





PRODUCT APPROVAL SHEET

MODEL NAME

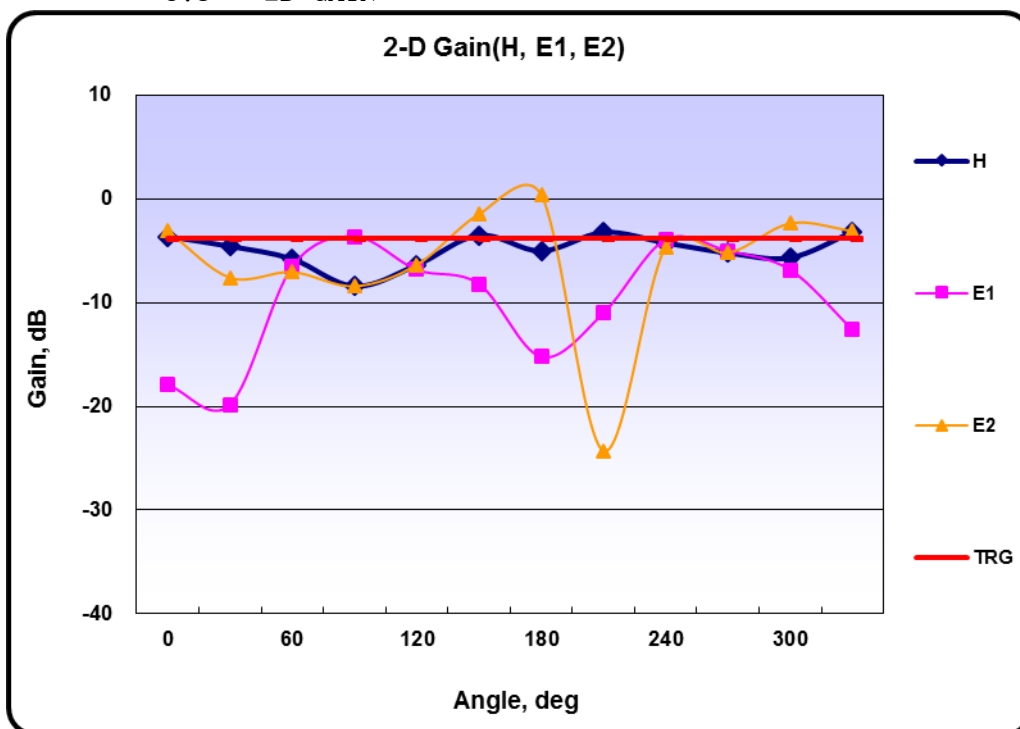
ST4230

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5.3 2D-GAIN



5. Passive Measurement

	1	2	3	4	5	6	7	8	9	10
Frequency(MHz)	2400	2405	2410	2415	2420	2425	2430	2435	2440	2445
Efficiency(dB)	-4.25	-4.17	-4.05	-3.89	-3.95	-3.96	-3.84	-3.82	-3.95	-4.52
Efficiency(%)	37.58	38.28	39.31	40.82	40.23	40.21	41.34	41.45	40.29	35.31
TRG(dB)	-4.25	-4.17	-4.05	-3.89	-3.95	-3.96	-3.84	-3.82	-3.95	-4.52
TRG _{Theta} (dB)	-6.31	-6.27	-6.04	-5.88	-5.98	-6.00	-5.72	-5.61	-5.57	-6.44
TRG _{Phi} (dB)	-8.48	-8.34	-8.41	-8.24	-8.24	-8.22	-8.37	-8.54	-9.01	-9.00
UHRG(dB)	-7.40	-7.29	-7.19	-6.95	-7.03	-7.02	-6.92	-6.99	-7.11	-7.23
UHRG/TRG(%)	48.43	48.76	48.53	49.40	49.26	49.45	49.11	48.21	48.22	53.64
H-Plane	-5.06	-4.98	-4.88	-4.68	-4.80	-4.97	-4.68	-4.58	-4.44	-5.39
E1-Plane, AVG(dB)	-7.33	-7.54	-7.22	-7.28	-7.56	-7.66	-7.51	-7.56	-7.48	-8.69
E2-Plane, AVG(dB)	-5.04	-4.92	-4.57	-4.32	-4.29	-4.31	-4.03	-3.62	-3.90	-4.17
Peak Gain(dB)	-0.66	-0.68	-0.42	-0.64	-0.52	-0.34	-0.23	-0.37	-0.64	-0.96
Directivity(dB)	3.59	3.49	3.64	3.25	3.44	3.61	3.60	3.45	3.30	3.56
Minimum Gain(dB)	-10.52	-9.68	-8.77	-9.15	-8.96	-8.20	-8.35	-8.09	-8.46	-9.39

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	11	12	13	14	15	16	17	18	19	20
Frequency(MHz)	2450	2455	2460	2465	2470	2475	2480	2485	2490	2497
Efficiency(dB)	-4.46	-4.15	-4.09	-4.22	-4.33	-4.26	-4.40	-4.72	-4.70	-4.92
Efficiency(%)	35.80	38.46	38.98	37.84	36.86	37.48	36.27	33.73	33.85	32.20
TRG(dB)	-4.46	-4.15	-4.09	-4.22	-4.33	-4.26	-4.40	-4.72	-4.70	-4.92
TRG _{Theta} (dB)	-7.08	-6.53	-6.52	-6.58	-6.61	-6.57	-6.72	-7.04	-7.09	-7.30
TRG _{Phi} (dB)	-7.90	-7.89	-7.78	-8.00	-8.23	-8.11	-8.24	-8.55	-8.44	-8.66
UHRG(dB)	-7.05	-6.87	-6.93	-7.09	-7.28	-7.16	-7.40	-7.76	-7.76	-8.06
UHRG/TRG(%)	55.09	53.49	52.04	51.67	50.76	51.25	50.14	49.68	49.48	48.55
H-Plane	-7.12	-6.59	-6.55	-6.53	-6.56	-6.76	-6.94	-7.35	-7.74	-8.38
E1-Plane, AVG(dB)	-9.59	-8.83	-8.70	-9.08	-8.98	-9.21	-9.14	-9.52	-9.84	-10.01
E2-Plane, AVG(dB)	-3.92	-3.58	-3.49	-3.63	-3.61	-3.33	-3.63	-3.67	-3.57	-3.78
Peak Gain(dB)	-0.38	-0.06	-0.08	-0.31	-0.36	-0.48	-0.24	-0.44	-0.62	-0.26
Directivity(dB)	4.09	4.09	4.01	3.91	3.97	3.78	4.16	4.28	4.09	4.66
Minimum Gain(dB)	-11.80	-12.46	-12.42	-12.35	-12.01	-12.49	-13.19	-13.51	-14.77	-14.08

Average Efficiency	-4.22dB	37.82%
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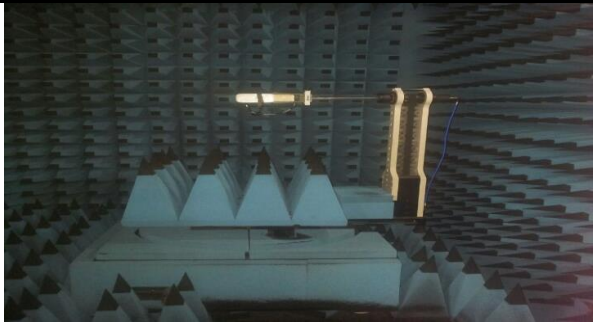
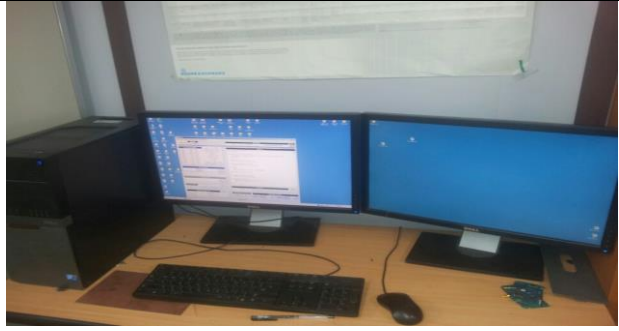
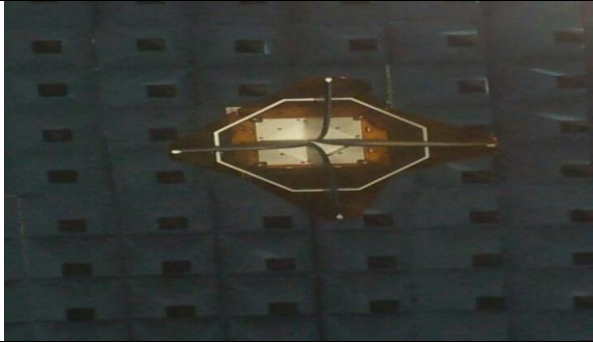
6.Measurement Process

6.1 SWR / Return loss

	Set Condition
Network Analyzer	Agilent 8753ES
Cable	Semi-ridid (40mm, 60mm)
Test condition	

6.2 Gain

Antenna gain is measured in the anechoic chamber of this company.

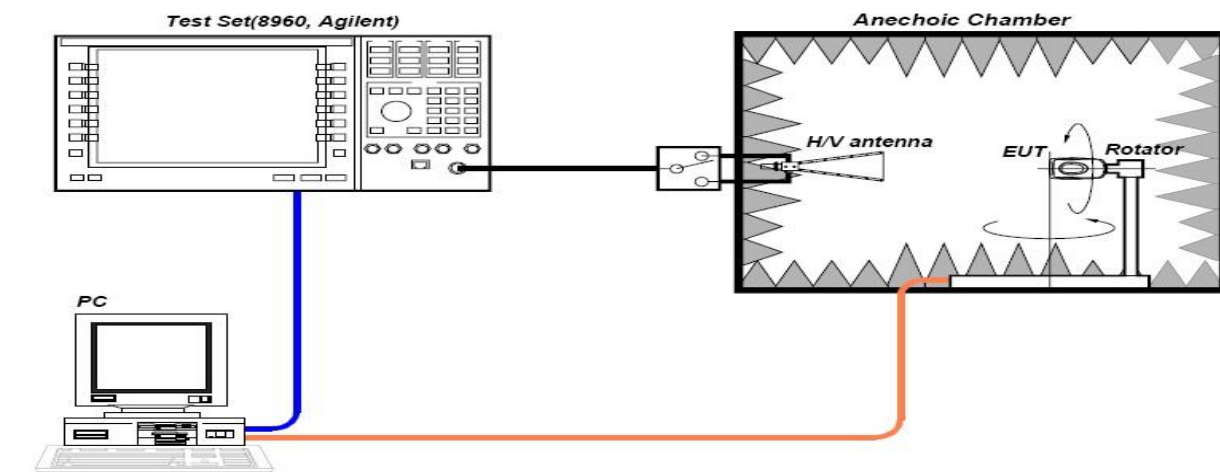
Anechoic Chamber for Antenna Gain Measurement	
	
	

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6.3 Gain test block diagram

Active test Sysetm

- TRP, NHPRP, UHRP
- TIS, NHPIS, UHIS
- Relative Sensitivity



Passiver test Sysetm

- Efficiency
- Peak Gain, Avg, Gain
- Min, Max PWR

