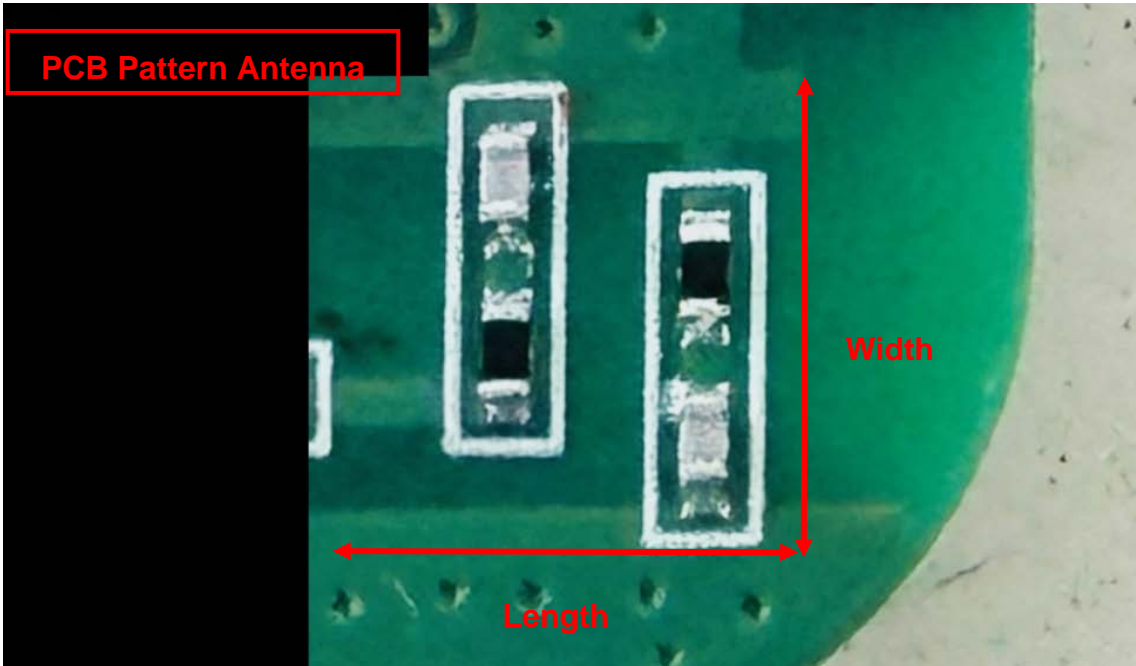


# Antenna Information

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: ST4930

# APPROVAL SHEET

MODEL : ST4930  
**Antenna layout**


Review	Consent	Approval



**RadiNa Co. ,Ltd**

TEL:+82-2-463-0373 FAX:+82-2-463-0374

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2.1 General Features

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## 1. Revision History

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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

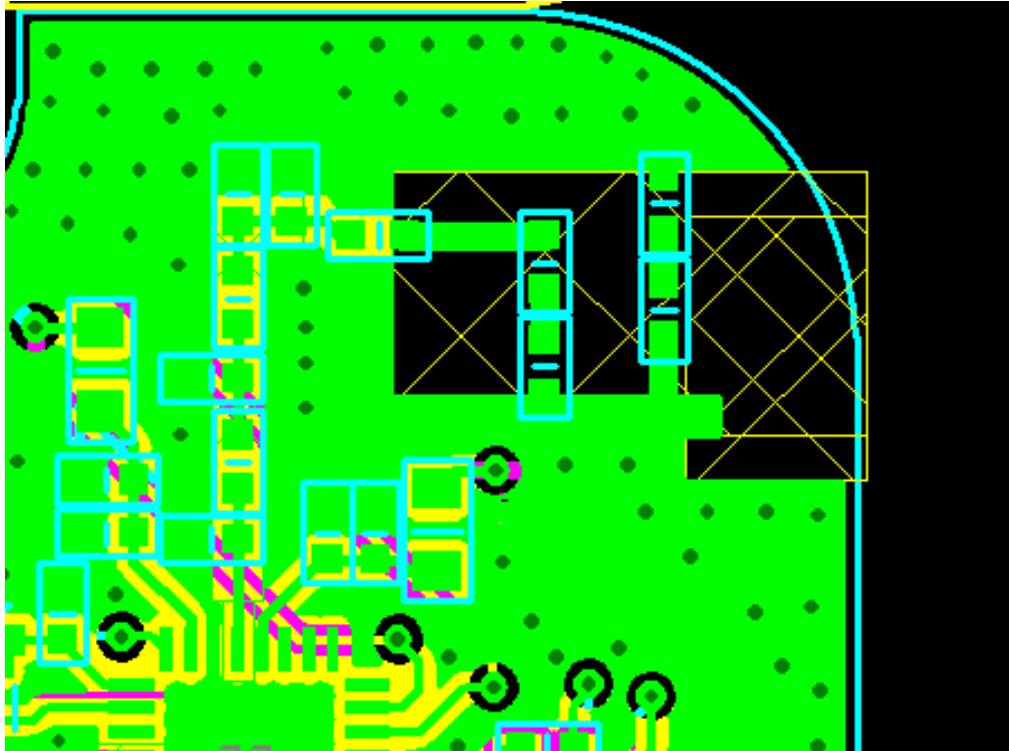
Frequency Range1 (TX)		2400MHz~2498MHz	
Frequency Range1 (RX)		2400MHz~2498MHz	
IMPEDANCE		50 Ω	
V.S.W.R	TX	2400MHz	2498MHz
		5 ↓	5 ↓
	RX	2400MHz	2498MHz
		5 ↓	5 ↓
RADIATION PATTERN		Omni-directional	
POLARIZATION		Linear	

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### 3. Pattern Specifications





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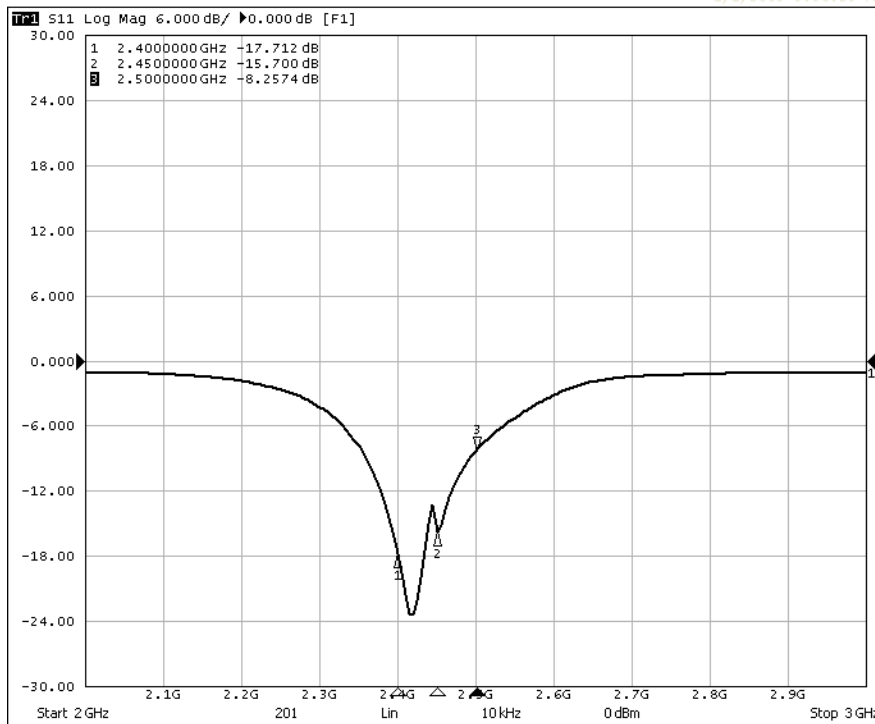
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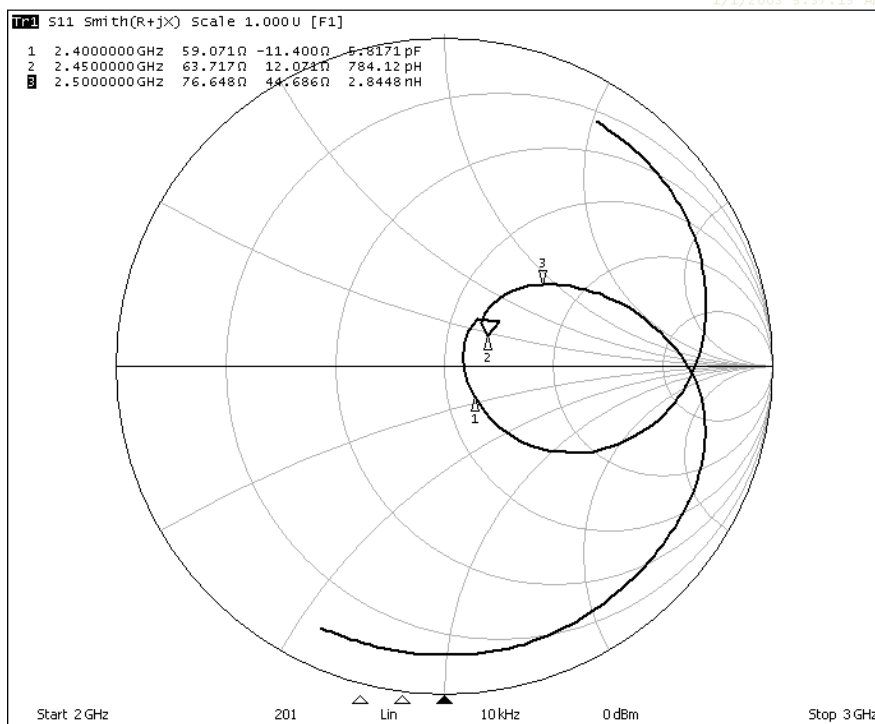
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## 4. Electrical Characteristics

### 5.1 VSWR



### 5.2 SMITH CHART



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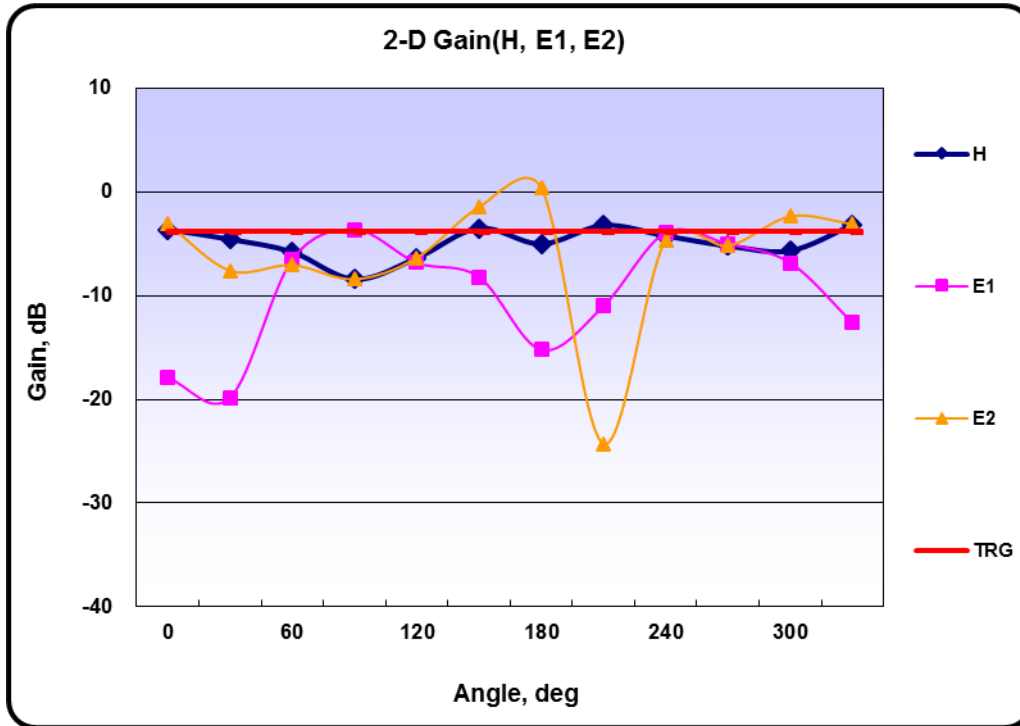
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5.3 2D-GAIN



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 <sub>Theta</sub> (dB)	-6.31	-6.27	-6.04	-5.88	-5.98	-6.00	-5.72	-5.61	-5.57	-6.44
TRG <sub>Phi</sub> (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
<b>Frequency(MHz)</b>	<b>2450</b>	<b>2455</b>	<b>2460</b>	<b>2465</b>	<b>2470</b>	<b>2475</b>	<b>2480</b>	<b>2485</b>	<b>2490</b>	<b>2497</b>
<b>Efficiency(dB)</b>	<b>-4.46</b>	<b>-4.15</b>	<b>-4.09</b>	<b>-4.22</b>	<b>-4.33</b>	<b>-4.26</b>	<b>-4.40</b>	<b>-4.72</b>	<b>-4.70</b>	<b>-4.92</b>
<b>Efficiency(%)</b>	<b>35.80</b>	<b>38.46</b>	<b>38.98</b>	<b>37.84</b>	<b>36.86</b>	<b>37.48</b>	<b>36.27</b>	<b>33.73</b>	<b>33.85</b>	<b>32.20</b>
<b>TRG(dB)</b>	<b>-4.46</b>	<b>-4.15</b>	<b>-4.09</b>	<b>-4.22</b>	<b>-4.33</b>	<b>-4.26</b>	<b>-4.40</b>	<b>-4.72</b>	<b>-4.70</b>	<b>-4.92</b>
<b>TRG<sub>Theta</sub>(dB)</b>	-7.08	-6.53	-6.52	-6.58	-6.61	-6.57	-6.72	-7.04	-7.09	-7.30
<b>TRG<sub>Phi</sub>(dB)</b>	-7.90	-7.89	-7.78	-8.00	-8.23	-8.11	-8.24	-8.55	-8.44	-8.66
<b>UHRG(dB)</b>	-7.05	-6.87	-6.93	-7.09	-7.28	-7.16	-7.40	-7.76	-7.76	-8.06
<b>UHRG/TRG(%)</b>	55.09	53.49	52.04	51.67	50.76	51.25	50.14	49.68	49.48	48.55
<b>H-Plane</b>	-7.12	-6.59	-6.55	-6.53	-6.56	-6.76	-6.94	-7.35	-7.74	-8.38
<b>E1-Plane, AVG(dB)</b>	-9.59	-8.83	-8.70	-9.08	-8.98	-9.21	-9.14	-9.52	-9.84	-10.01
<b>E2-Plane, AVG(dB)</b>	-3.92	-3.58	-3.49	-3.63	-3.61	-3.33	-3.63	-3.67	-3.57	-3.78
<b>Peak Gain(dB)</b>	-0.38	-0.06	-0.08	-0.31	-0.36	-0.48	-0.24	-0.44	-0.62	-0.26
<b>Directivity(dB)</b>	4.09	4.09	4.01	3.91	3.97	3.78	4.16	4.28	4.09	4.66
<b>Minimum Gain(dB)</b>	-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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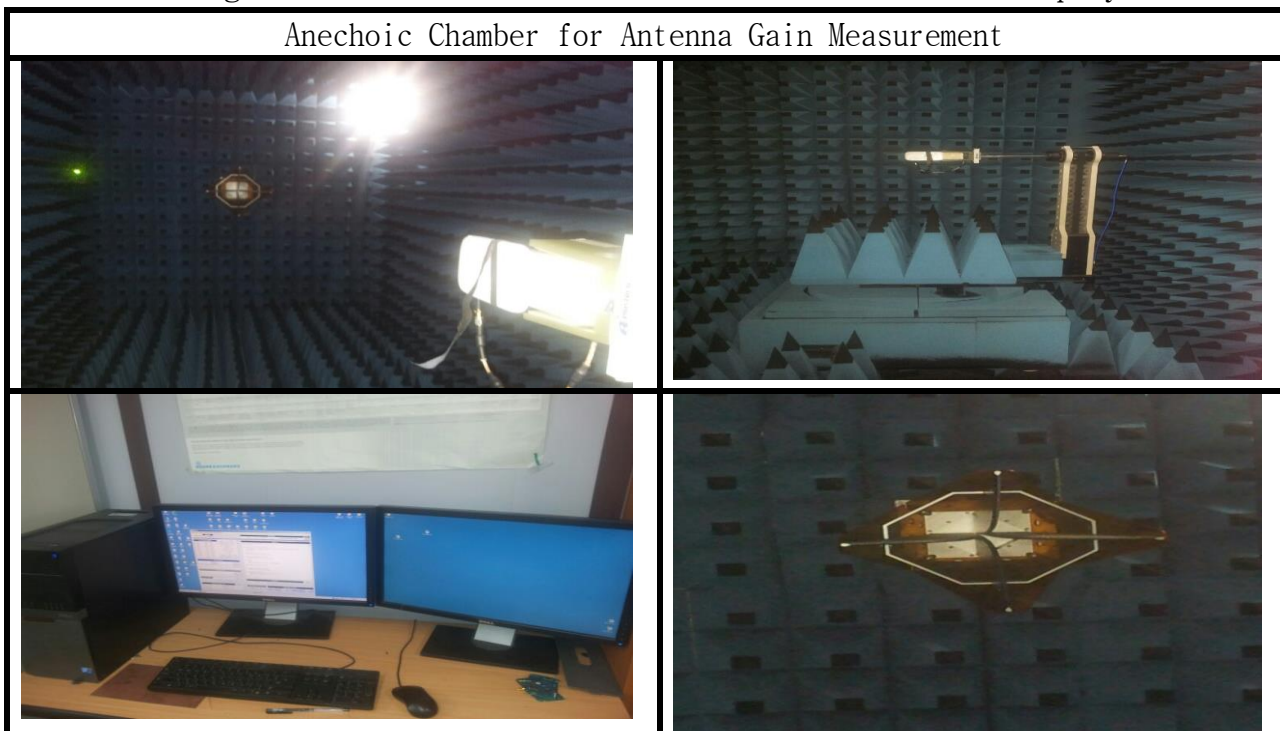
## 6. Measurement Process

### 6.1 SWR / Return loss

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

### 6.2 Gain

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



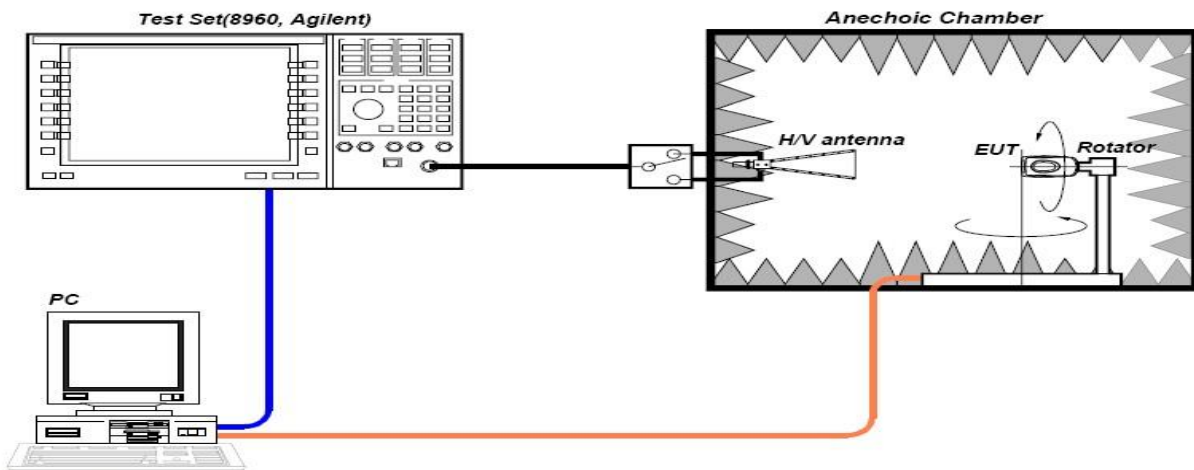
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6.3 Gain test block diagram

Active test System

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



Passive test System

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

