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RA-N2103-31

Radina Intelligent Manufacturing (Suzhou) Co., Ltd.

No.2 Zhongshi Road, Caohu Street, Xiangcheng Economic and Technological Development Zone,
Suzhou, China

APPROVAL SHEET

MODEL : BCM-SQ400-AS
Antenna layout

Review	Consent	Approval

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1. Revision History

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NO.	Before	After	Reason	Date
1				
2				
3				
4				
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13				

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2. Product Information

2.1 General Features

PART NUMBER	GradiANT
ANTENNA TYPE	PCB Pattern Antenna
APPLICATIONS	Bluetooth

manufacturer

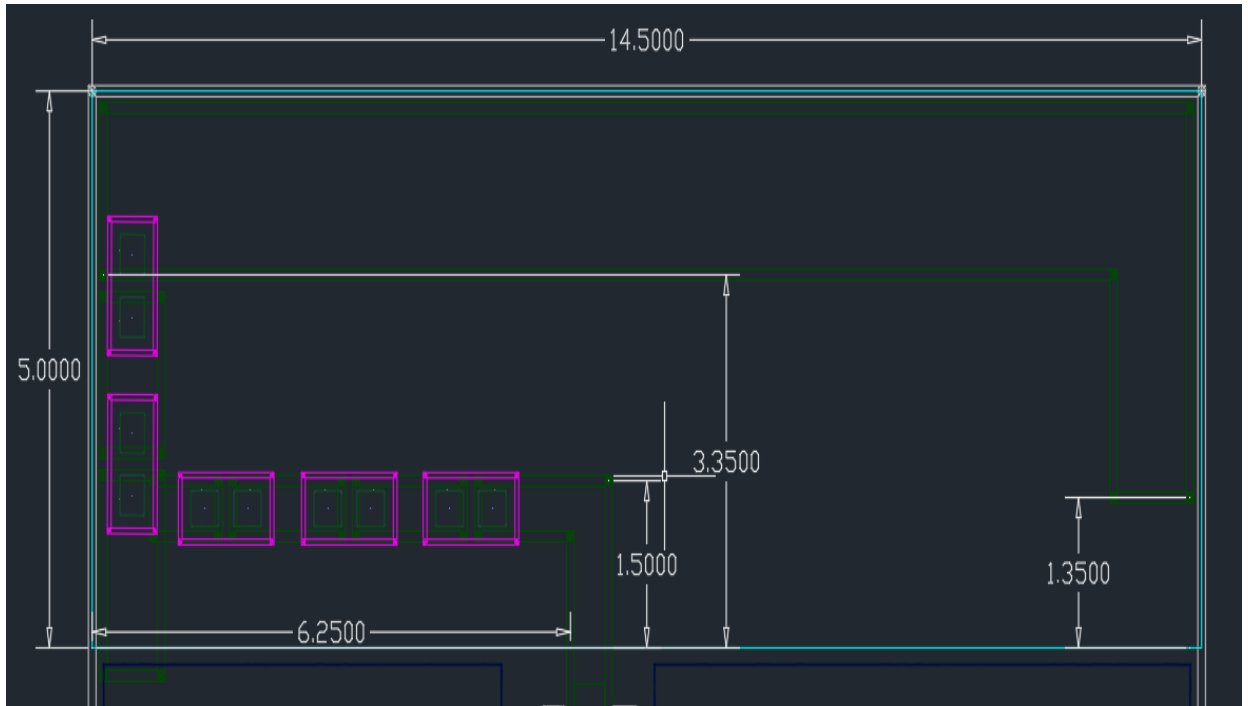
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2.2 Electrical Specifications

Frequency Range1 (TX)		2400MHz~2485MHz	
Frequency Range1 (RX)		2400MHz~2485MHz	
IMPEDANCE		50 Ω	
V.S.W.R	TX	2400MHz	2485MHz
		3 ↓	3 ↓
	RX	2400MHz	2485MHz
		3 ↓	3 ↓
RADIATION PATTERN		Omni-directional	
POLARIZATION		Linear	

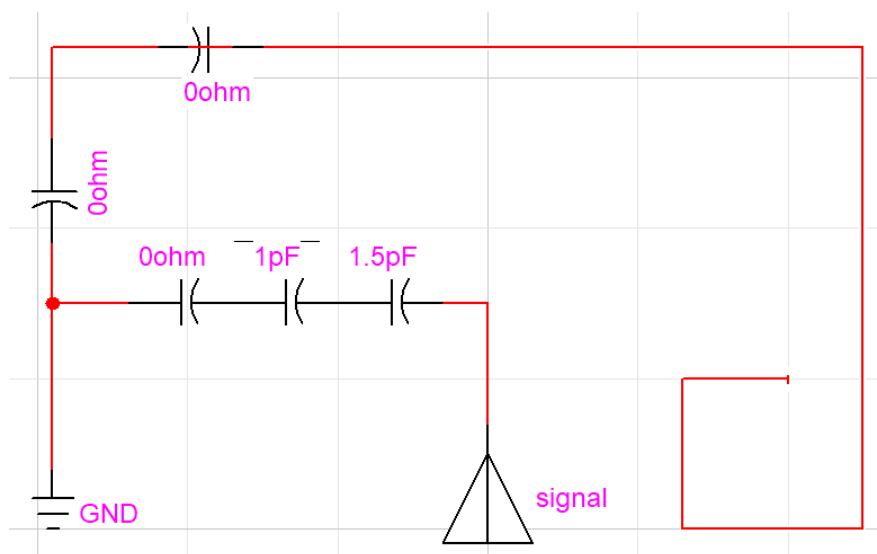
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3. Pattern Specifications



4. Matching Network

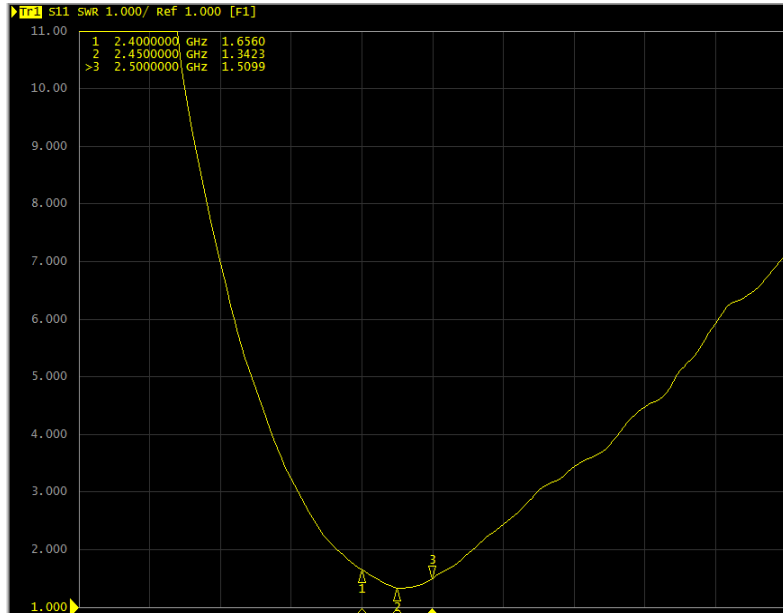
Capacitor value can be changed depending on different situation



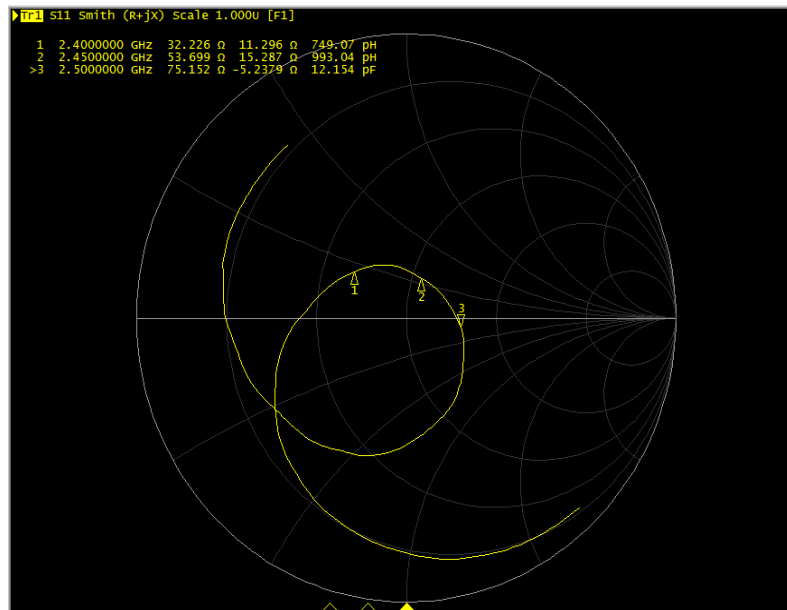
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5. Electrical Characteristics

5.1 VSWR

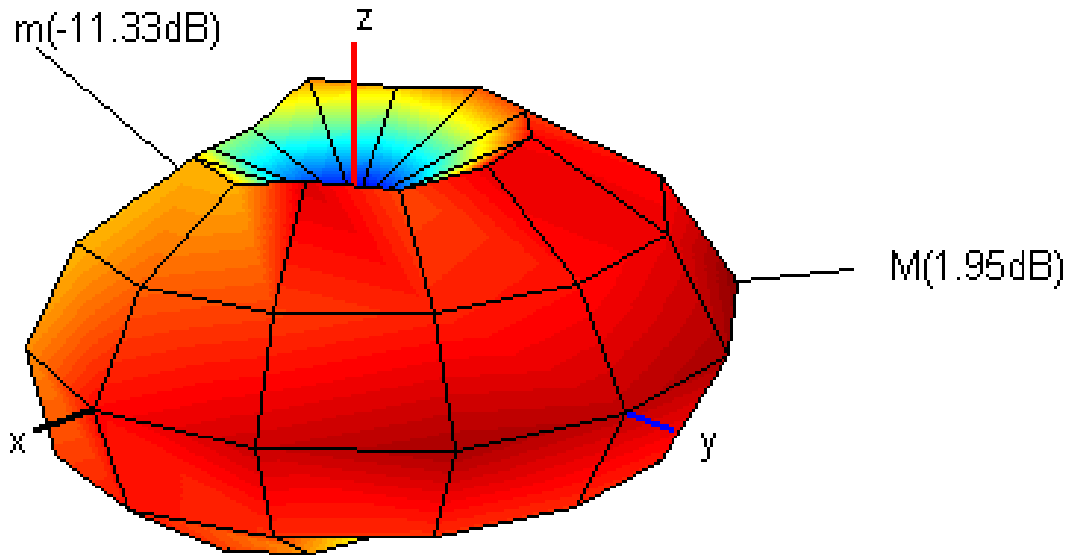


5.2 SMITH CHART

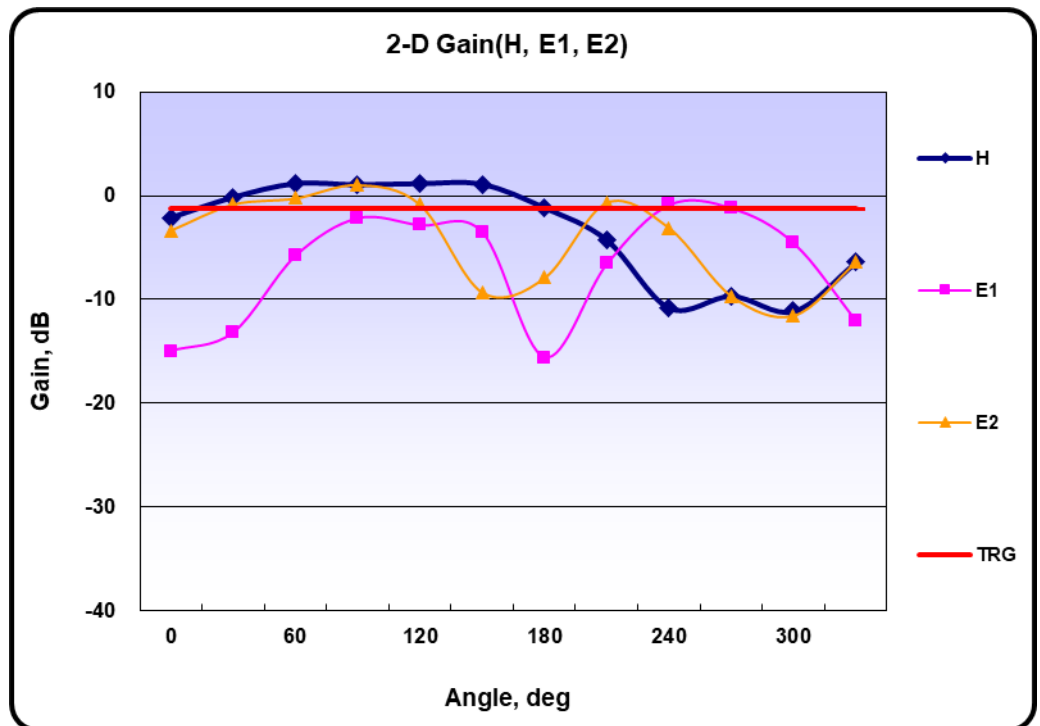


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5.3 3D-PLOTS



5.4 2D-GAIN



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6. 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)	-2.20	-2.10	-1.90	-1.61	-1.79	-1.62	-1.43	-1.34	-1.39	-1.29
Efficiency(%)	60.25	61.72	64.51	69.04	66.23	68.91	72.00	73.39	72.60	74.36
TRG(dB)	-2.20	-2.10	-1.90	-1.61	-1.79	-1.62	-1.43	-1.34	-1.39	-1.29
TRG _{Theta} (dB)	-3.77	-3.62	-3.48	-3.16	-3.30	-3.20	-2.99	-2.83	-2.92	-2.88
TRG _{Phi} (dB)	-7.37	-7.39	-7.07	-6.83	-7.11	-6.77	-6.62	-6.73	-6.66	-6.41
UHRG(dB)	-5.39	-5.34	-5.09	-4.79	-5.08	-4.84	-4.64	-4.65	-4.70	-4.50
UHRG/TRG(%)	47.96	47.37	47.98	48.03	46.83	47.59	47.70	46.68	46.64	47.68
H-Plane	-2.17	-1.92	-1.91	-1.67	-1.72	-1.69	-1.50	-1.39	-1.51	-1.56
E1-Plane, AVG(dB)	-5.42	-5.20	-5.15	-4.78	-4.94	-4.88	-4.74	-4.47	-4.51	-4.58
E2-Plane, AVG(dB)	-3.76	-3.44	-3.31	-3.02	-3.05	-2.90	-2.98	-2.73	-2.82	-2.75
Peak Gain(dB)	1.20	1.31	1.21	1.82	1.68	1.42	1.91	1.75	1.70	1.95
Directivity(dB)	3.40	3.40	3.12	3.43	3.47	3.04	3.34	3.09	3.09	3.23
Minimum Gain(dB)	-12.78	-11.30	-12.41	-10.95	-12.14	-12.05	-11.77	-10.91	-11.15	-11.34


	11	12	13	14	15	16	17	18	19	20
Frequency(MHz)	2450	2455	2460	2465	2470	2475	2480	2485	2490	2497
Efficiency(dB)	-1.38	-1.41	-1.37	-1.52	-1.66	-1.57	-1.85	-2.25	-2.18	-2.20
Efficiency(%)	72.83	72.28	72.91	70.54	68.21	69.70	65.30	59.56	60.49	60.21
TRG(dB)	-1.38	-1.41	-1.37	-1.52	-1.66	-1.57	-1.85	-2.25	-2.18	-2.20
TRG _{Theta} (dB)	-2.91	-2.92	-2.96	-3.11	-3.21	-3.15	-3.45	-3.86	-3.78	-3.90
TRG _{Phi} (dB)	-6.63	-6.74	-6.50	-6.65	-6.89	-6.73	-6.96	-7.35	-7.29	-7.10
UHRG(dB)	-4.64	-4.72	-4.63	-4.77	-4.96	-4.83	-5.12	-5.53	-5.51	-5.50
UHRG/TRG(%)	47.14	46.63	47.25	47.23	46.83	47.17	47.06	47.01	46.50	46.86
H-Plane	-1.45	-1.61	-1.70	-1.82	-2.00	-1.81	-2.36	-2.74	-2.78	-2.98
E1-Plane, AVG(dB)	-4.56	-4.57	-4.74	-4.88	-4.97	-4.77	-5.09	-5.76	-5.41	-5.50
E2-Plane, AVG(dB)	-2.86	-2.79	-2.82	-3.00	-3.15	-3.03	-3.32	-3.67	-3.60	-3.73
Peak Gain(dB)	1.74	1.56	1.82	1.48	1.36	1.53	0.91	0.79	0.72	0.32
Directivity(dB)	3.12	2.96	3.19	2.99	3.02	3.09	2.76	3.04	2.90	2.52
Minimum Gain(dB)	-11.30	-11.01	-10.88	-11.66	-12.22	-11.70	-12.86	-13.31	-14.58	-12.50

Average Efficiency	-1.69dBi,	67.75%
Peak Gain	1.95dBi,	

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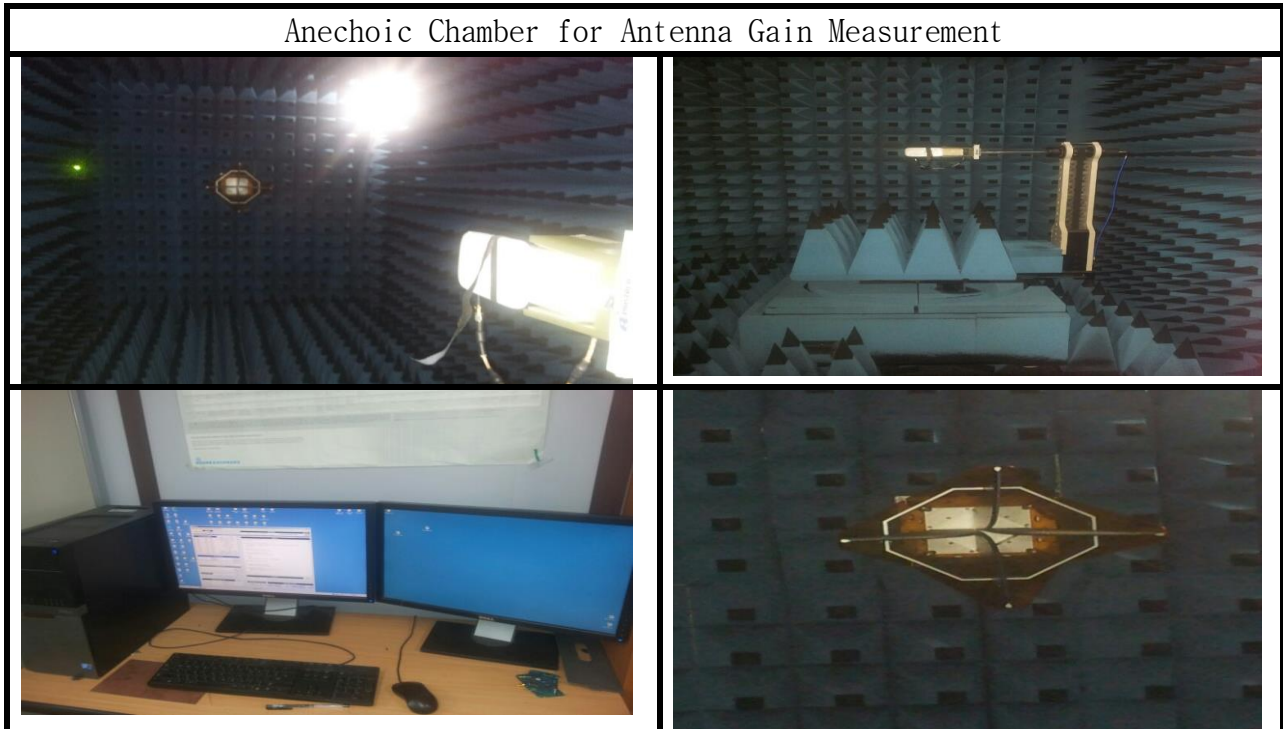
7. Measurement Process

7.1 SWR / Return loss

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

7.2 Gain

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

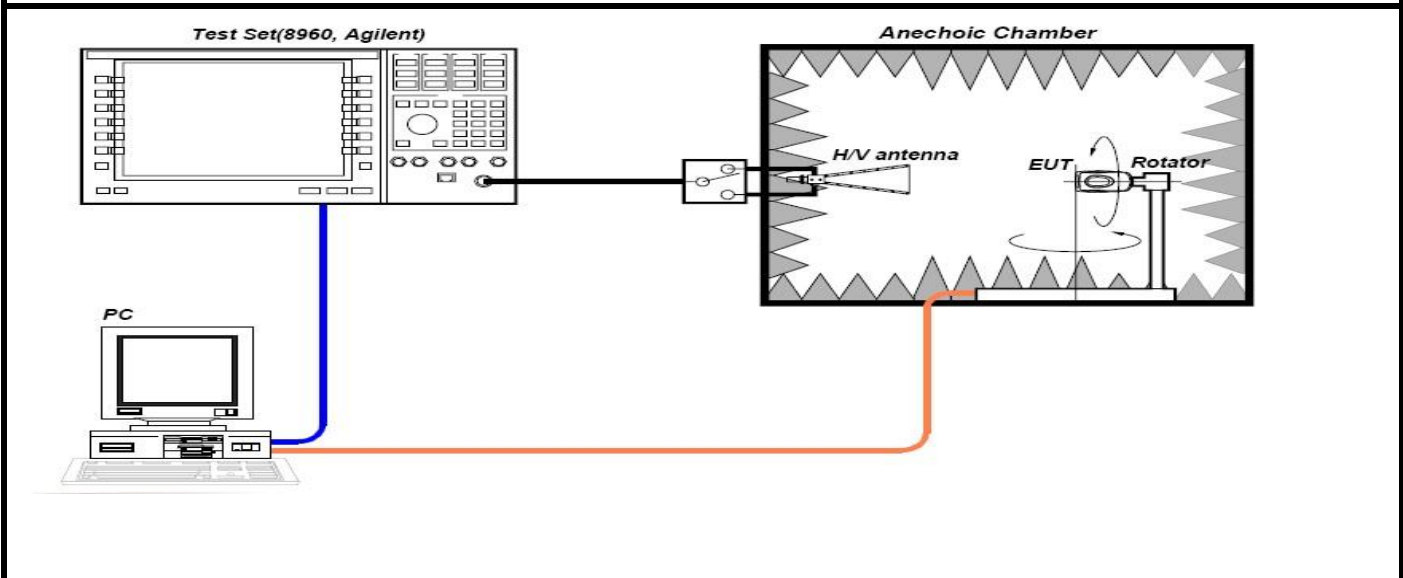


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7.3 Gain test block diagram

Active test System

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



Passive test System

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

