

2021.11.22

RA-N2103-31

APPROVAL SHEET

MODEL : BCM-SQ400-AS
Antenna layout

Review	Consent	Approval

	PRODUCT APPROVAL SHEET		GRBB21N22BT91			
	MODEL NAME	BCM-SQ400-AS	REV.	1.0	Page	2 / 10

Table of contents

- 1. Revision History
- 2. Product Information
 - 2.1 General Features
 - 2.2 Electrical Specifications
- 3. Pattern Specifications
- 4. Matching Network
- 5. Electrical Characteristics
 - 5.1 VSWR
 - 5.2 Smith Chart
 - 5.3 3D-PLOT
 - 5.4 2D-GAIN
- 6. Passive Measurement
- 7. Measurement Process

- 1. Revision History

	PRODUCT APPROVAL SHEET		GRBB21N22BT91			
	MODEL NAME	BCM-SQ400-AS	REV.	1.0	Page	3 / 10

NO.	Before	After	Reason	Date
1				
2				
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	PRODUCT APPROVAL SHEET		GRBB21N22BT91			
	MODEL NAME	BCM-SQ400-AS	REV.	1.0	Page	4 / 10

2.Product Information

2.1 General Features

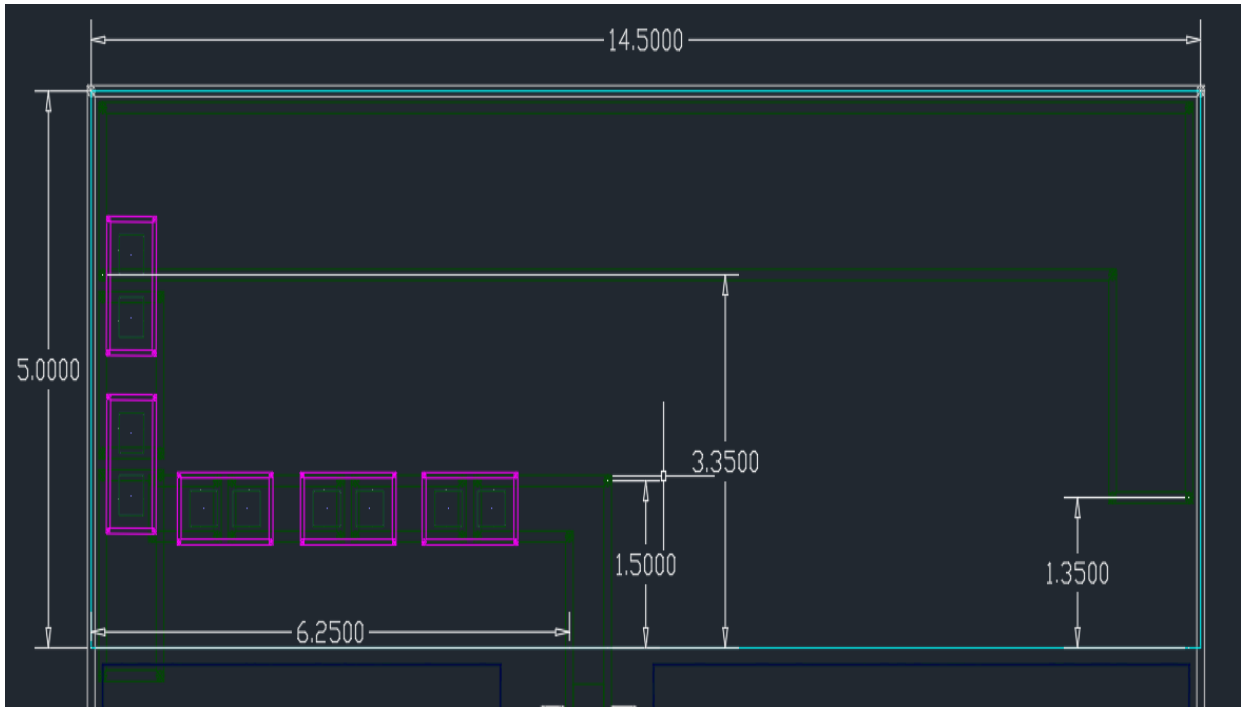
PART NUMBER	GradiANT
ANTENNA TYPE	PCB Pattern Antenna
APPLICATIONS	Bluetooth

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	

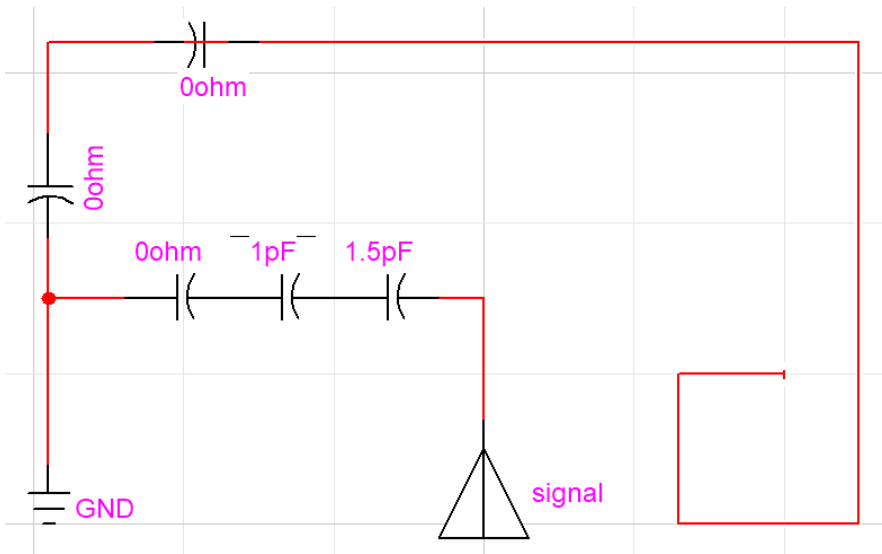
	PRODUCT APPROVAL SHEET		GRBB21N22BT91			
	MODEL NAME	BCM-SQ400-AS	REV.	1.0	Page	5 / 10

3. Pattern Specifications



4. Matching Network

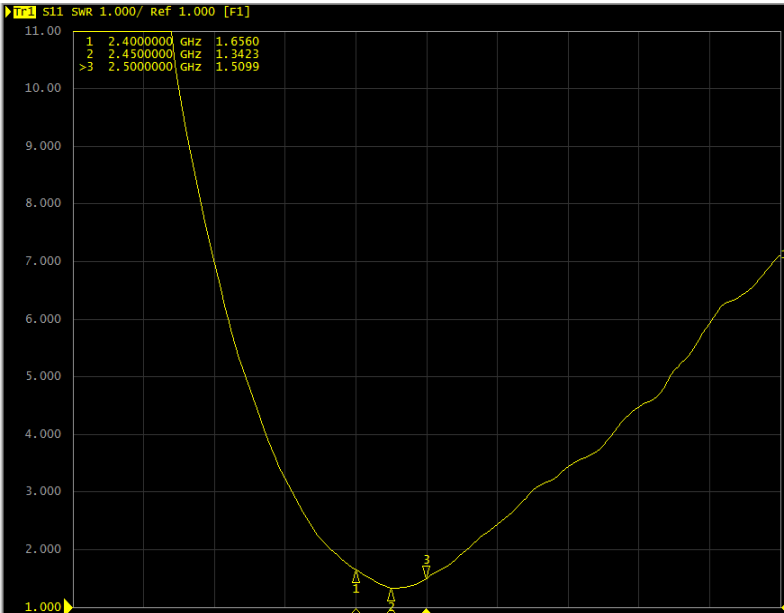
Capacitor value can be changed depending on different situation



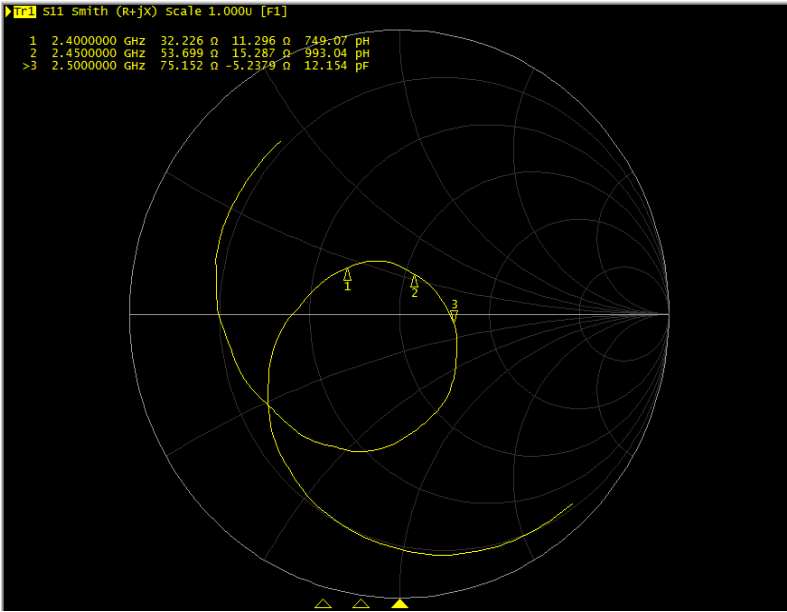
	PRODUCT APPROVAL SHEET		GRBB21N22BT91			
	MODEL NAME	BCM-SQ400-AS	REV.	1.0	Page	6 / 10

5. Electrical Characterristics

5.1 VSWR

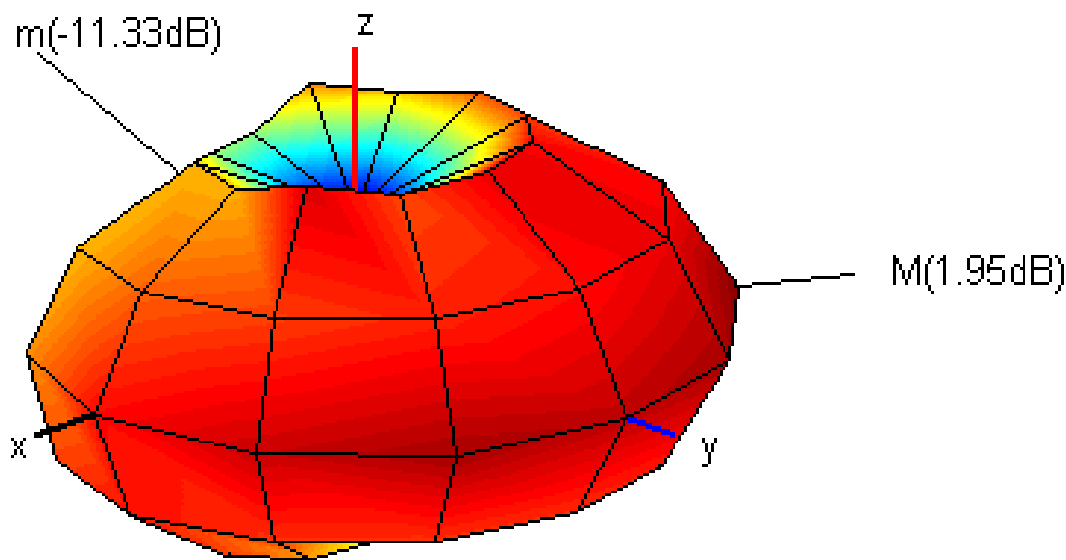


5.2 SMITH CHART

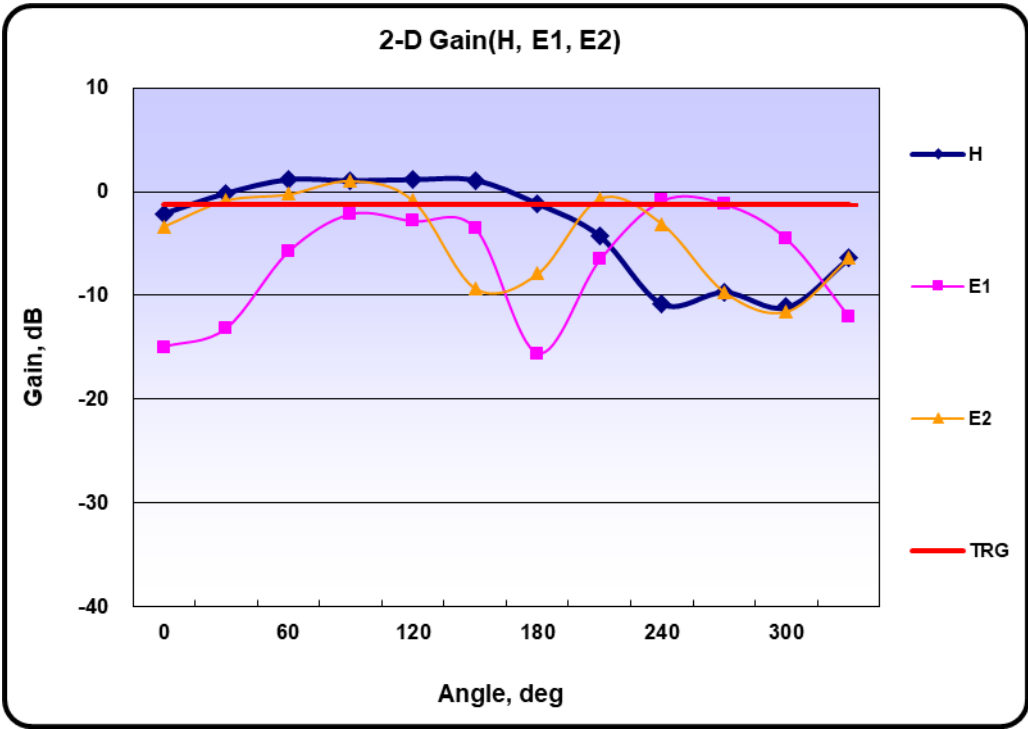


	PRODUCT APPROVAL SHEET		GRBB21N22BT91			
	MODEL NAME	BCM-SQ400-AS	REV.	1.0	Page	7 / 10

5.3 3D-PLoTs



5.4 2D-GAIN



	PRODUCT APPROVAL SHEET		GRBB21N22BT91			
	MODEL NAME	BCM-SQ400-AS	REV.	1.0	Page	8 / 10

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,	

	PRODUCT APPROVAL SHEET		GRBB21N22BT91			
	MODEL NAME	BCM-SQ400-AS	REV.	1.0	Page	9 / 10

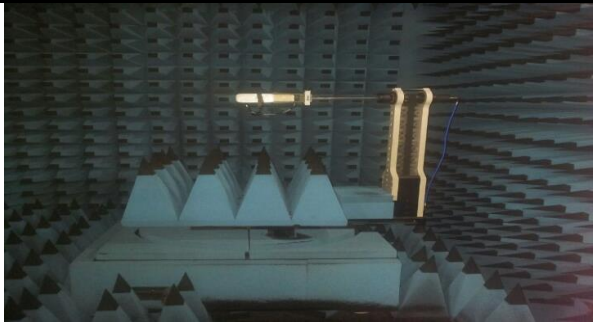
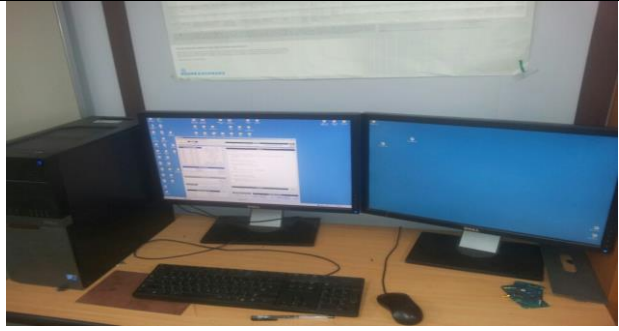
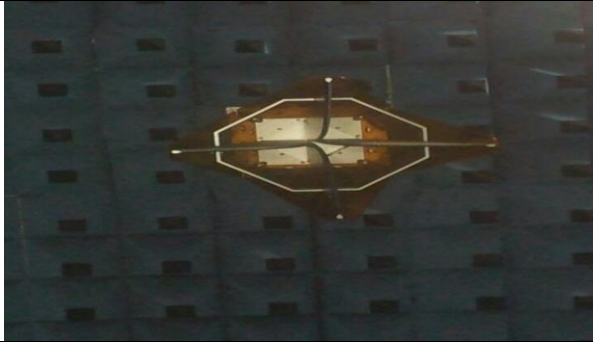
7.Measurement Process

7.1 SWR / Return loss

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

7.2 Gain

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

Anechoic Chamber for Antenna Gain Measurement	
	
	

	PRODUCT APPROVAL SHEET		GRBB21N22BT91			
	MODEL NAME	BCM-SQ400-AS	REV.	1.0	Page	10 / 10

7.3 Gain test block diagram

