

2023.12.08

RA-N2312-05

APPROVAL SHEET

**MODEL : PhanTom
BT Antenna layout**

Review	Consent	Approval

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1. Revision History

NO.	Before	After	Reason	Date
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				

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2. Product Information

2.1 General Features

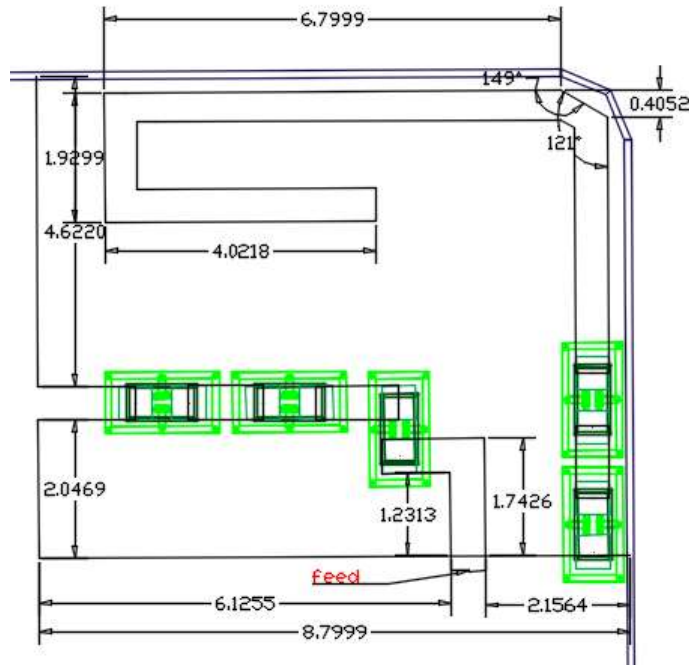
PART NUMBER	GradiANT
ANTENNA TYPE	PCB Pattern Antenna
APPLICATIONS	Bluetooth

2.2 Electrical Specifications

Frequency Range1 (TX)		2400MHz~2485MHz	
Frequency Range1 (RX)		2400MHz~2485MHz	
IMPEDANCE		50 Ω	
V.S.W.R	TX	2400MHz	2485MHz
		5 ↓	5 ↓
	RX	2400MHz	2485MHz
		5 ↓	5 ↓
RADIATION PATTERN		Omni-directional	
POLARIZATION		Linear	

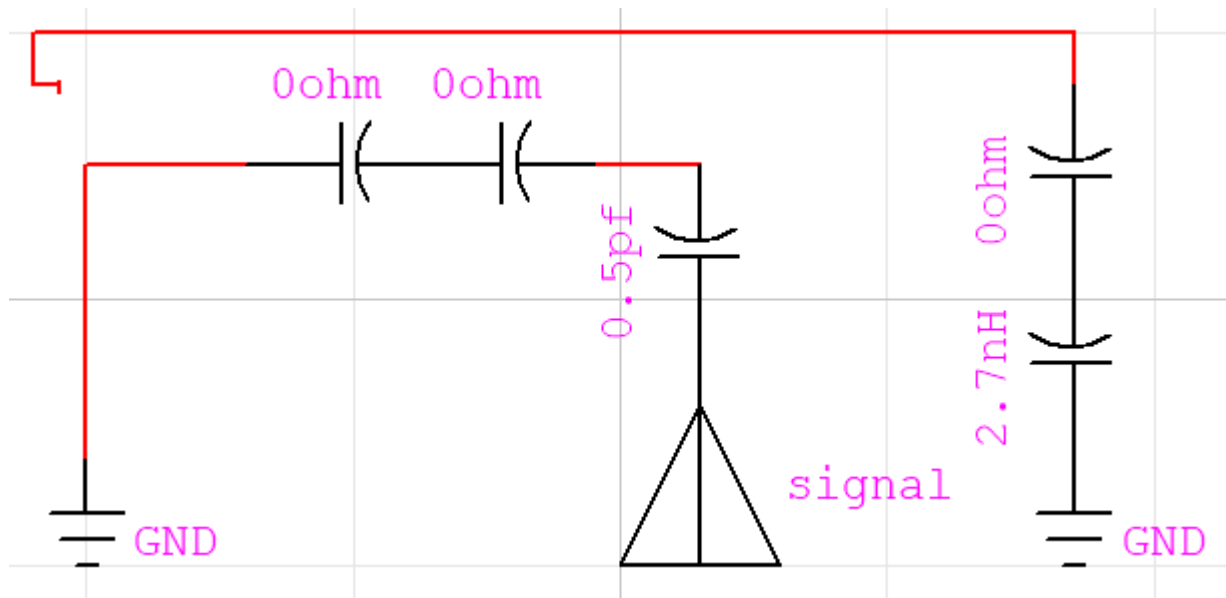
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3. Pattern Specifications



4. Matching Network

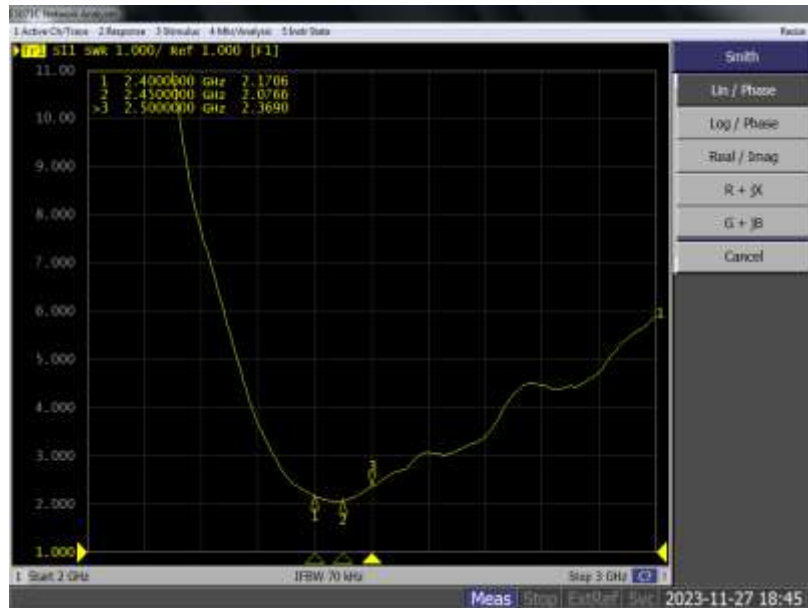
Capacitor value can be changed depending on different situation



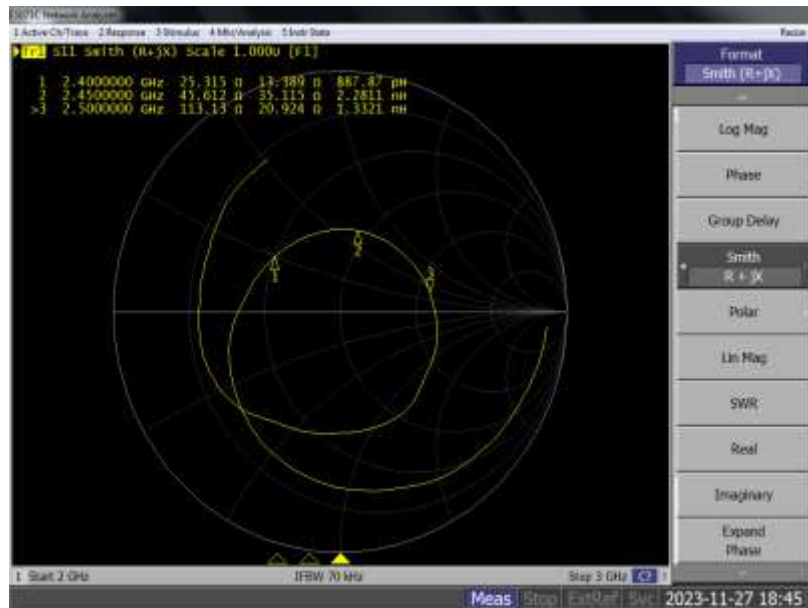
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5. Electrical Characteristics

5.1 VSWR

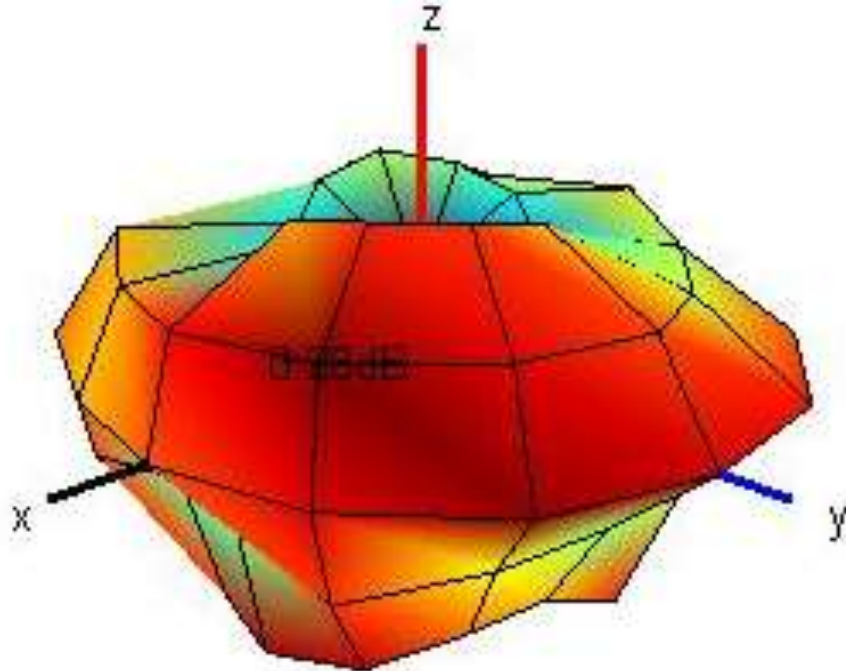


5.2 SMITH CHART

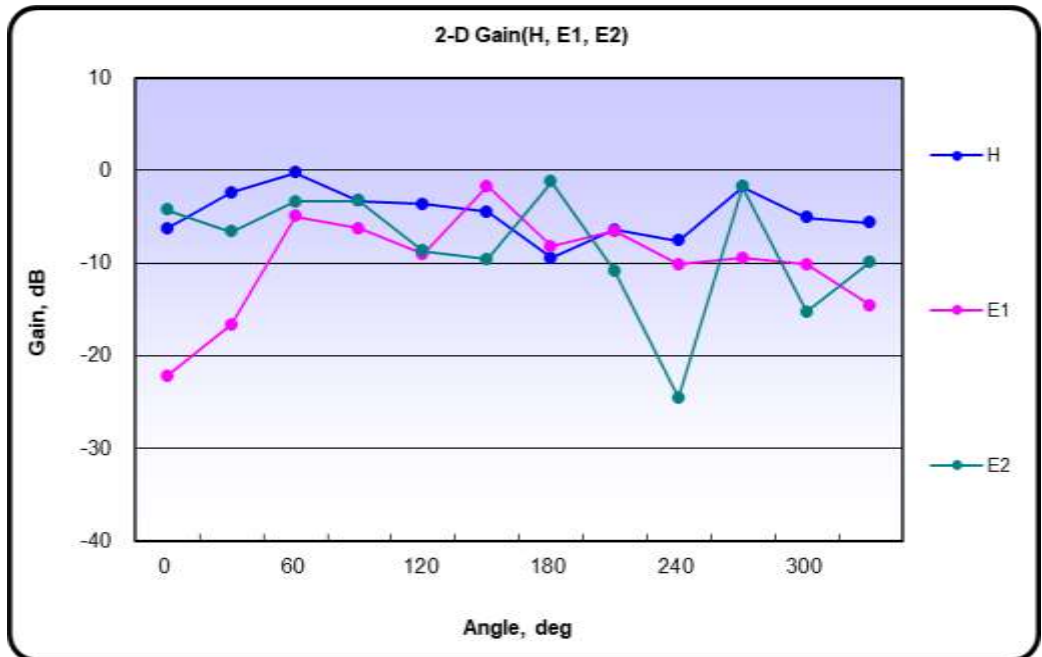





5.3 3D-PLOTS



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]	-4.91	-4.89	-4.68	-4.60	-4.47	-4.62	-4.48	-4.49	-4.36	-4.36
Efficiency [%]	32.3	32.5	34.0	34.7	35.8	34.5	35.6	35.6	36.7	36.6
TRG_θ [dB]	-6.85	-6.79	-6.53	-6.43	-6.32	-6.47	-6.30	-6.31	-6.26	-6.35
Gain_{θ Peak} [dB]	-0.47	-0.25	0.01	0.31	0.51	-0.08	0.30	0.12	-0.37	-0.23
Gain_{θ Min} [dB]	-25.29	-37.60	-36.44	-29.28	-29.53	-34.83	-31.24	-26.42	-30.85	-27.02
TRG_φ [dB]	-9.36	-9.38	-9.28	-9.22	-9.05	-9.22	-9.14	-9.15	-8.86	-8.70
Gain_{φ Peak} [dB]	-4.19	-3.69	-3.75	-3.64	-3.36	-3.77	-3.20	-3.18	-2.40	-2.50
Gain_{φ Min} [dB]	-25.97	-32.95	-33.70	-33.75	-32.07	-31.53	-53.48	-27.39	-32.80	-29.09
UHRG [dB]	-8.26	-8.14	-7.93	-7.87	-7.67	-7.74	-7.61	-7.57	-7.49	-7.45
UHRG/TRG [%]	46.3	47.3	47.4	47.1	47.8	48.8	48.7	49.2	48.6	49.1
H-Plane	-3.36	-3.23	-2.96	-3.03	-2.94	-3.33	-3.36	-3.56	-3.80	-4.00
E1-Plane, AVG [dB]	-8.24	-8.58	-8.18	-7.78	-7.95	-8.16	-7.85	-8.14	-7.71	-7.58
E2-Plane, AVG [dB]	-6.54	-6.54	-6.25	-5.99	-5.63	-5.59	-5.33	-5.28	-5.28	-5.48
Peak Gain [dB]	-0.03	0.15	0.42	0.63	0.86	0.22	0.58	0.40	0.39	0.28
Directivity [dB]	4.88	5.04	5.11	5.22	5.33	4.84	5.06	4.89	4.74	4.64
Minimum Gain [dB]	-17.95	-23.72	-25.81	-22.34	-18.25	-17.94	-16.04	-15.37	-15.41	-14.44
	11	12	13	14	15	16	17	18	19	20
Frequency [MHz]	2450	2455	2460	2465	2470	2475	2480	2485	2490	2497
Efficiency [dB]	-4.42	-4.68	-4.91	-4.79	-4.44	-4.27	-4.31	-4.82	-5.06	-5.33
Efficiency [%]	36.1	34.0	32.3	33.2	36.0	37.4	37.1	33.0	31.2	29.3
TRG_θ [dB]	-6.41	-6.69	-7.06	-6.91	-6.56	-6.32	-6.46	-6.95	-7.23	-7.51
Gain_{θ Peak} [dB]	-0.06	-0.61	-0.67	-1.32	-0.93	-0.39	-0.61	-1.03	-1.45	-1.26
Gain_{θ Min} [dB]	-28.72	-32.12	-24.93	-33.40	-28.55	-31.31	-31.52	-28.51	-35.68	-27.57
TRG_φ [dB]	-8.76	-9.00	-9.00	-8.93	-8.56	-8.52	-8.39	-8.92	-9.11	-9.37
Gain_{φ Peak} [dB]	-2.95	-2.93	-2.69	-2.62	-2.28	-2.09	-1.95	-2.20	-2.64	-2.79
Gain_{φ Min} [dB]	-33.08	-23.70	-25.25	-23.03	-21.92	-24.39	-19.86	-22.40	-26.78	-26.81
UHRG [dB]	-7.49	-7.63	-7.86	-7.76	-7.39	-7.24	-7.29	-7.72	-7.99	-8.31
UHRG/TRG [%]	49.3	50.7	50.7	50.5	50.6	50.6	50.3	51.2	50.9	50.3
H-Plane	-4.20	-4.50	-5.28	-5.16	-4.83	-4.50	-4.83	-5.38	-5.66	-6.05
E1-Plane, AVG [dB]	-7.48	-7.84	-7.96	-7.30	-7.26	-6.88	-6.85	-7.31	-7.67	-7.77
E2-Plane, AVG [dB]	-5.40	-5.81	-6.18	-6.36	-5.91	-5.79	-5.76	-5.93	-6.38	-6.59
Peak Gain [dB]	0.11	-0.37	0.08	-0.27	-0.24	-0.20	0.07	-0.46	-1.02	-0.92
Directivity [dB]	4.53	4.31	4.99	4.52	4.20	4.07	4.37	4.36	4.04	4.41
Minimum Gain [dB]	-14.68	-16.29	-16.98	-16.78	-15.61	-14.28	-14.65	-14.52	-16.39	-15.79

Average Efficiency	-4.64dBi	34.39%
Peak Gain	0.86dBi	