

2025.04.18

RA-N2503-64

APPROVAL SHEET

MODEL : OUTLANDER
Antenna layout

Review	Consent	Approval

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1. Revision History

NO.	Before	After	Reason	Date
1				
2				
3				
4				
5				
6				
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12				
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2.Product Information

2.1 General Features

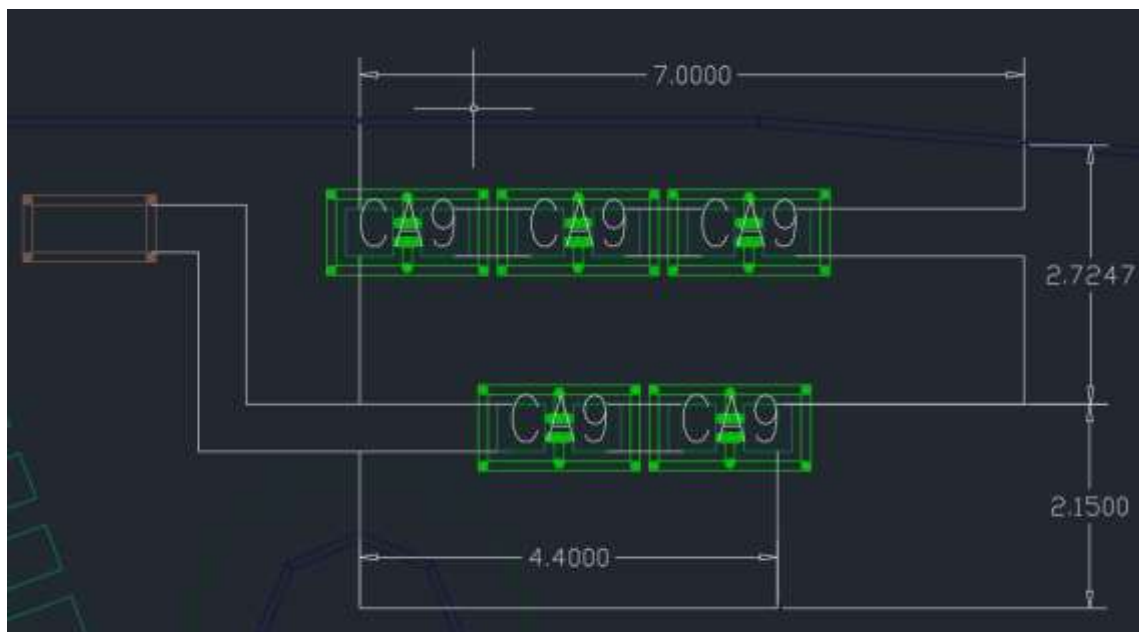
PART NUMBER	GRSN25043WF64
ANTENNA TYPE	PCB Pattern Antenna
APPLICATIONS	Bluetooth

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	

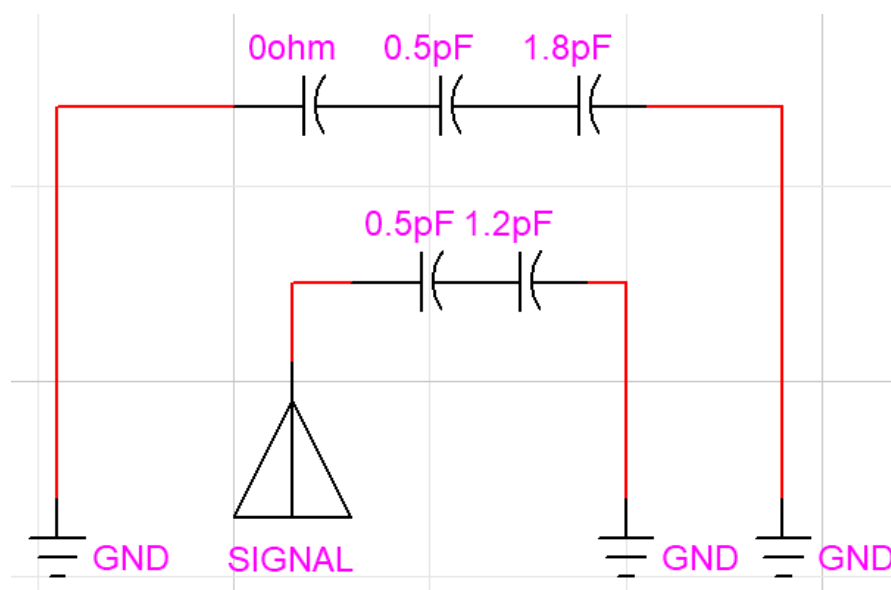
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3. Pattern Specifications



4. Matching Network

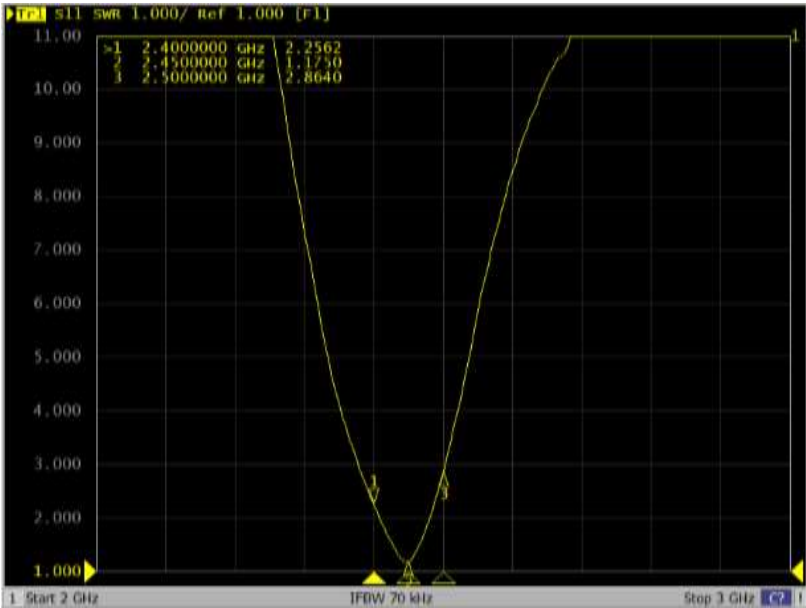
Capacitor value can be changed depending on different situation



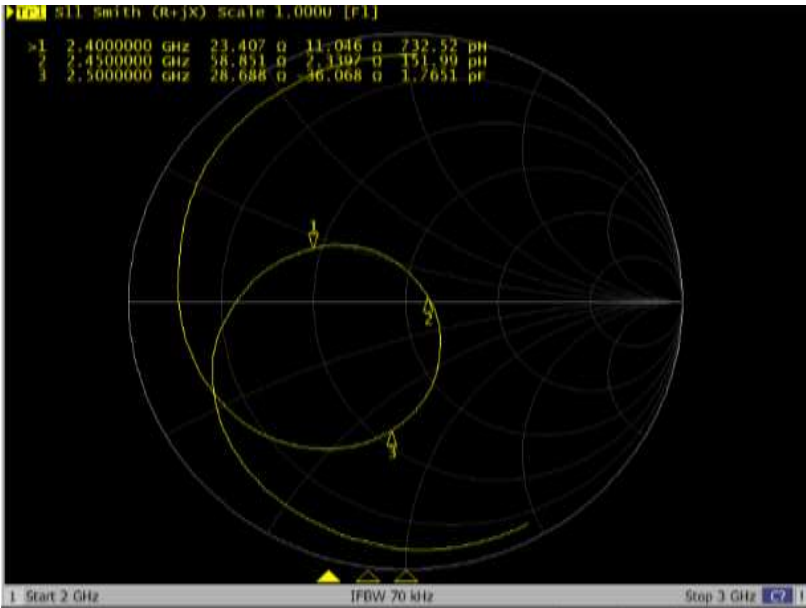
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5. Electrical Characterristics

5.1 VSWR

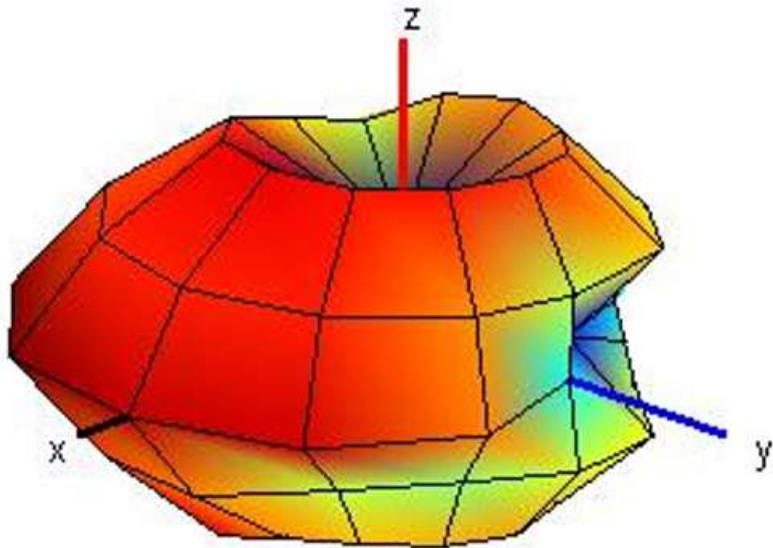


5.2 SMITH CHART

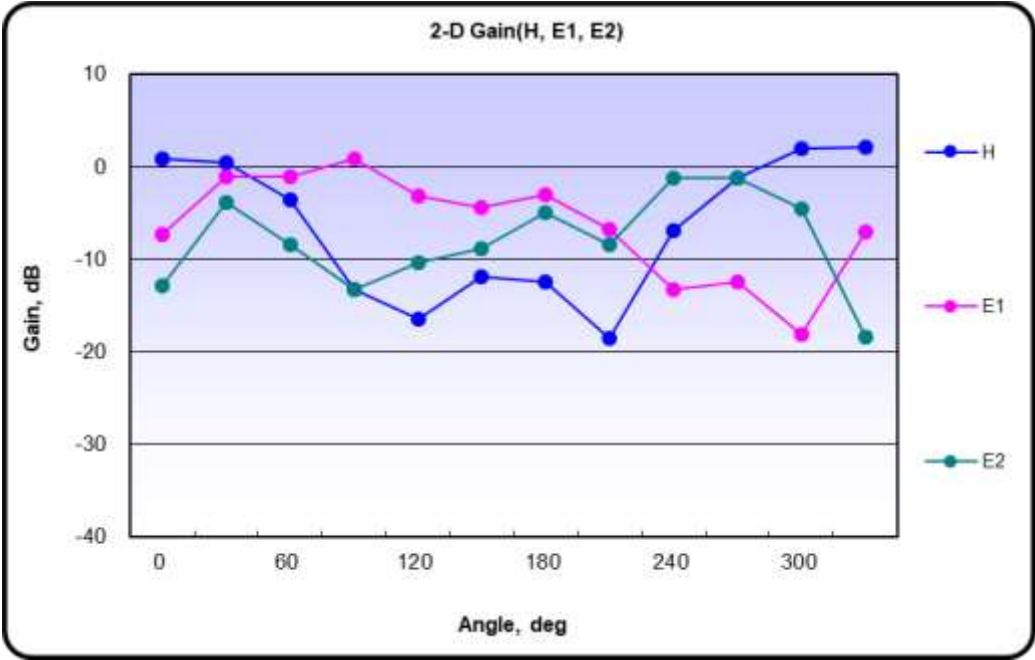


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5.3 3D-PLOTs



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]	-4.03	-3.76	-3.52	-3.40	-3.26	-3.22	-2.98	-2.73	-2.78	-2.63
Efficiency [%]	39.6	42.1	44.5	45.7	47.2	47.7	50.4	53.3	52.8	54.6
TRG _θ [dB]	-5.70	-5.45	-5.10	-5.03	-4.87	-4.79	-4.55	-4.31	-4.39	-4.22
Gain _{θ Peak} [dB]	-1.01	-0.96	-0.40	-0.53	-0.19	-0.26	-0.13	0.42	-0.08	0.18
Gain _{θ Min} [dB]	-24.45	-34.64	-32.86	-24.31	-22.36	-22.99	-25.76	-20.01	-21.50	-19.45
TRG _φ [dB]	-8.98	-8.66	-8.67	-8.45	-8.35	-8.40	-8.14	-7.88	-7.87	-7.76
Gain _{φ Peak} [dB]	-3.01	-2.92	-3.07	-2.37	-2.29	-2.45	-1.86	-2.28	-1.32	-1.46
Gain _{φ Min} [dB]	-26.13	-34.04	-31.86	-34.83	-26.64	-31.18	-40.64	-29.99	-31.67	-27.03
UHRG [dB]	-6.97	-6.71	-6.46	-6.38	-6.28	-6.21	-5.94	-5.72	-5.74	-5.54
UHRG/TRG [%]	50.8	50.6	50.8	50.3	49.9	50.2	50.5	50.3	50.6	51.2
H-Plane	-3.50	-3.31	-2.92	-2.86	-2.64	-2.66	-2.52	-2.23	-2.43	-2.23
E1-Plane, AVG [dB]	-5.70	-5.40	-5.00	-5.04	-4.83	-4.63	-4.35	-4.19	-4.00	-3.91
E2-Plane, AVG [dB]	-6.68	-6.33	-5.93	-6.11	-6.05	-6.18	-6.12	-5.74	-5.81	-5.69
Peak Gain [dB]	-0.80	-0.56	-0.22	-0.19	0.19	-0.02	0.15	0.62	0.15	0.43
Directivity [dB]	3.23	3.20	3.30	3.21	3.44	3.20	3.12	3.35	2.92	3.06
Minimum Gain [dB]	-21.81	-19.63	-19.13	-19.78	-17.29	-18.72	-19.90	-19.59	-19.21	-15.30

	11	12	13	14	15	16	17	18	19	20
Frequency [MHz]	2450	2455	2460	2465	2470	2475	2480	2485	2490	2497
Efficiency [dB]	-2.82	-2.80	-2.94	-2.85	-3.08	-3.36	-3.59	-4.37	-4.12	-4.32
Efficiency [%]	52.3	52.5	50.8	51.8	49.2	46.2	43.8	36.6	38.7	36.9
TRG _θ [dB]	-4.40	-4.34	-4.54	-4.40	-4.63	-4.88	-5.11	-5.90	-5.67	-5.82
Gain _{θ Peak} [dB]	-0.04	0.38	-0.33	0.07	-0.55	-0.78	-1.08	-1.64	-1.47	-1.37
Gain _{θ Min} [dB]	-19.45	-23.84	-22.36	-26.41	-29.71	-22.69	-49.04	-26.91	-28.72	-34.14
TRG _φ [dB]	-7.96	-8.04	-8.04	-8.10	-8.32	-8.65	-8.87	-9.64	-9.36	-9.69
Gain _{φ Peak} [dB]	-1.50	-1.33	-2.07	-1.86	-1.83	-1.80	-2.50	-3.65	-2.56	-3.25
Gain _{φ Min} [dB]	-23.71	-25.45	-26.80	-28.03	-33.61	-27.59	-29.39	-24.65	-33.43	-28.02
UHRG [dB]	-5.78	-5.75	-5.87	-5.82	-6.07	-6.35	-6.51	-7.33	-7.10	-7.31
UHRG/TRG [%]	50.5	50.7	51.0	50.5	50.3	50.2	51.0	50.6	50.4	50.3
H-Plane	-2.46	-2.27	-2.62	-2.49	-2.82	-2.87	-3.18	-4.04	-3.81	-3.99
E1-Plane, AVG [dB]	-4.09	-3.89	-4.16	-3.86	-4.04	-4.38	-4.24	-5.17	-4.96	-4.98
E2-Plane, AVG [dB]	-5.96	-5.89	-6.23	-6.09	-6.30	-6.57	-6.97	-7.64	-7.36	-7.75
Peak Gain [dB]	0.21	0.58	0.09	0.34	-0.30	-0.49	-0.77	-1.38	-1.22	-1.07
Directivity [dB]	3.03	3.37	3.03	3.20	2.78	2.87	2.82	2.99	2.90	3.25
Minimum Gain [dB]	-17.52	-18.11	-18.21	-23.00	-28.23	-20.09	-18.53	-18.84	-27.46	-22.45

Average Efficiency	-3.29dBi	46.84%
Peak Gain	0.62dBi	