

25.01.06

RA-N2601-11

APPROVAL SHEET

MODEL : SPIDER X SLIM
Bluetooth
Antenna layout

Review	Consent	Approval

Messrs. SENA Technology Co.,Ltd



RadiNa Co. ,Ltd

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1. Revision History

NO.	Before	After	Reason	Date
1				
2				
3				
4				
5				
6				
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12				
13				

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2.Product Information

2.1 General Features

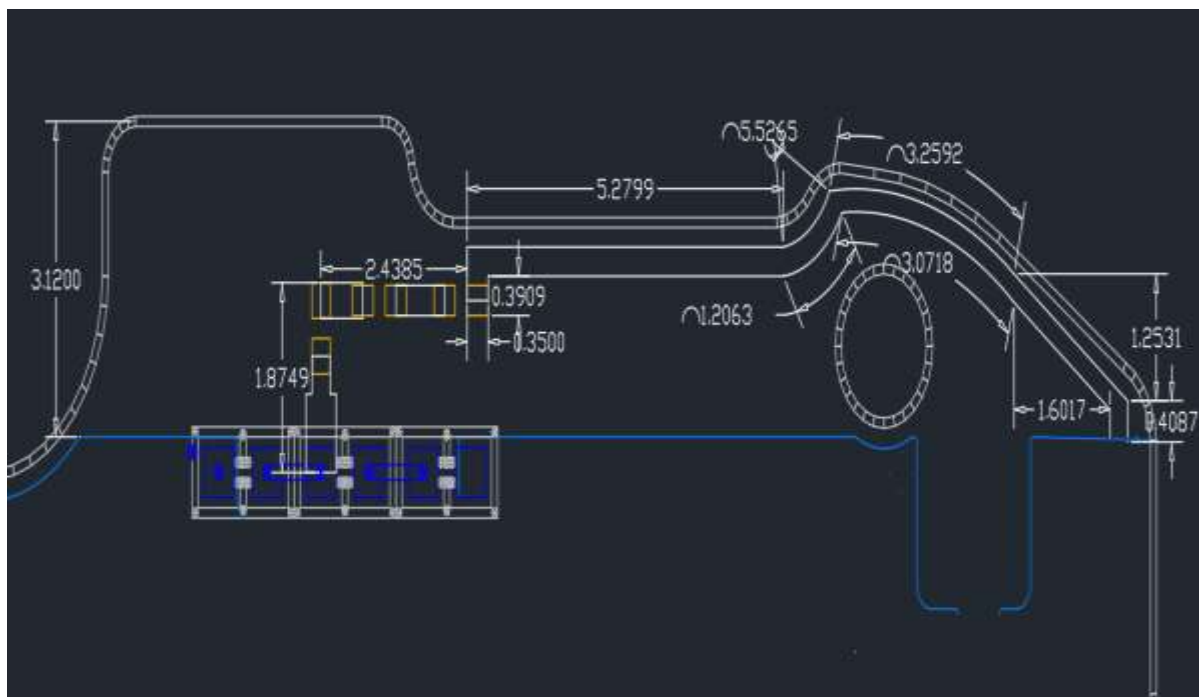
PART NUMBER	GradiANT
ANTENNA TYPE	PCB pattern Antenna
APPLICATIONS	Bluetooth

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	

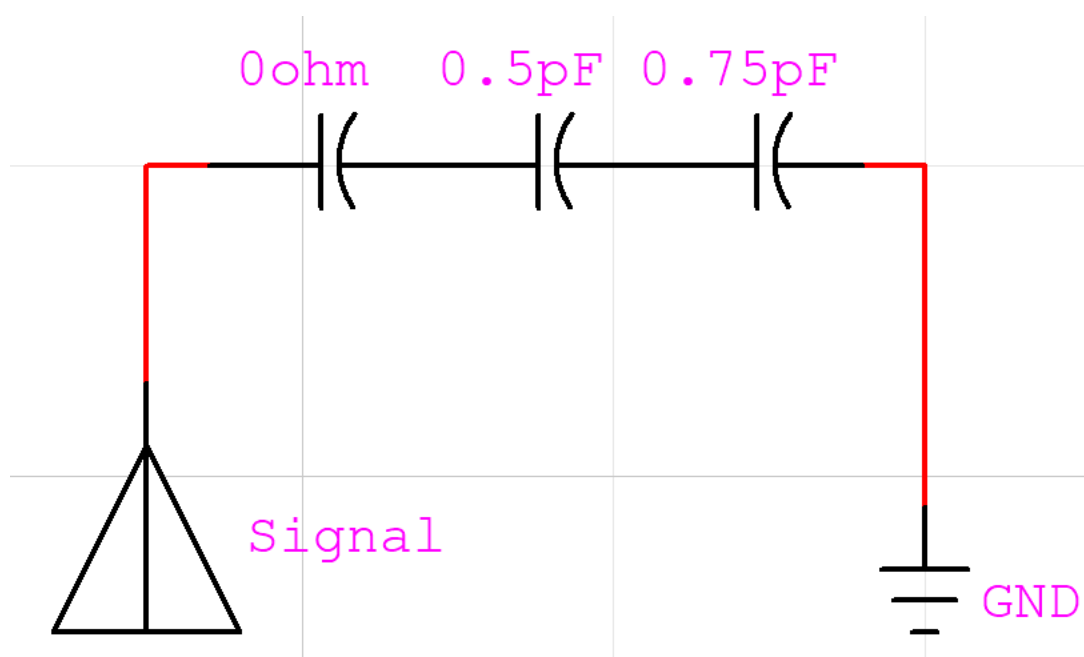
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3. Pattern Specifications



4. Matching Network

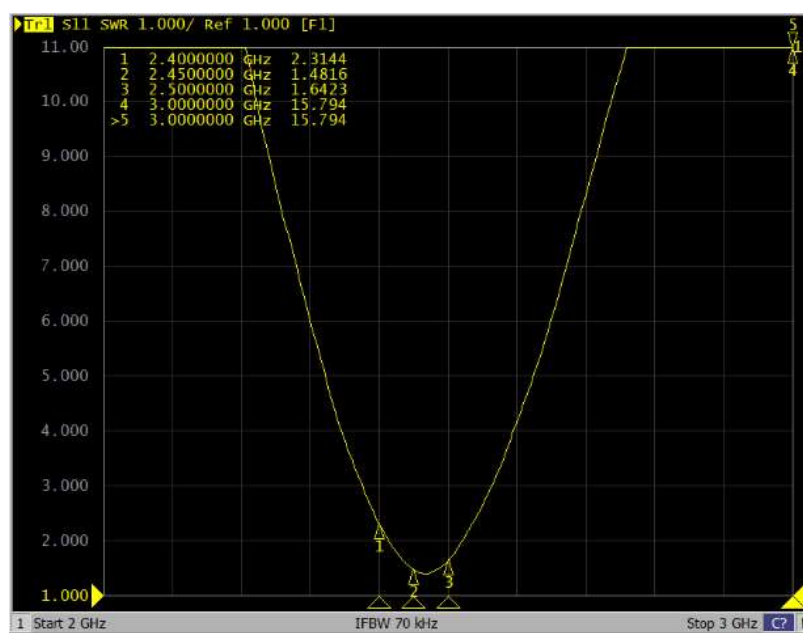
Capacitor value can be changed depending on different situation



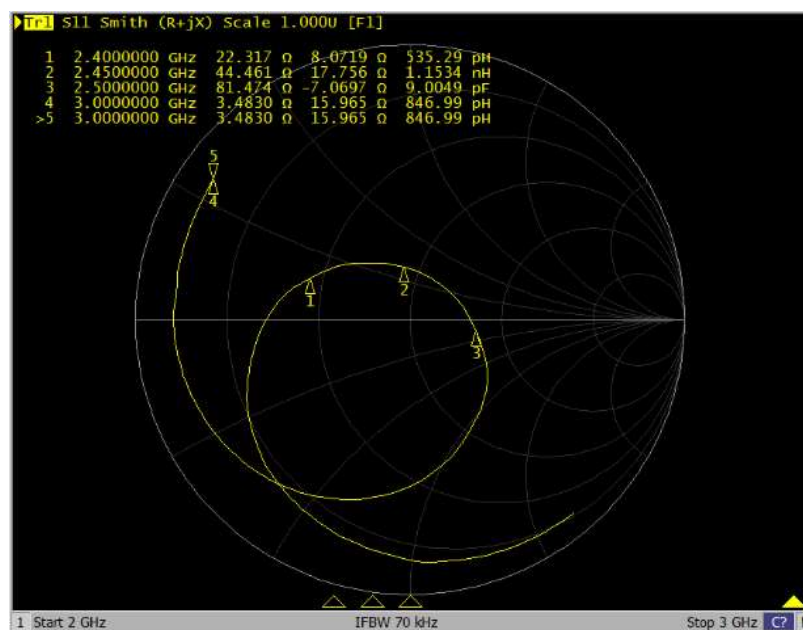
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5. Electrical Characterristics

5.1 VSWR

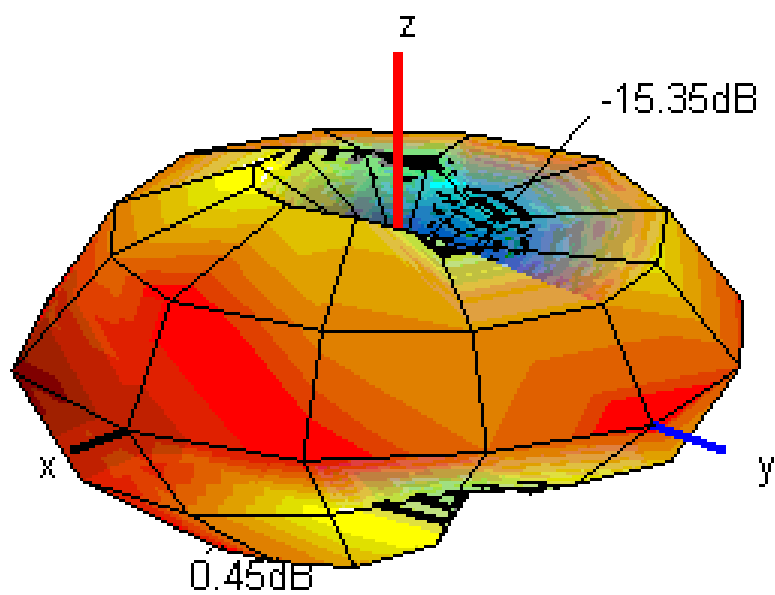


5.2 SMITH CHART

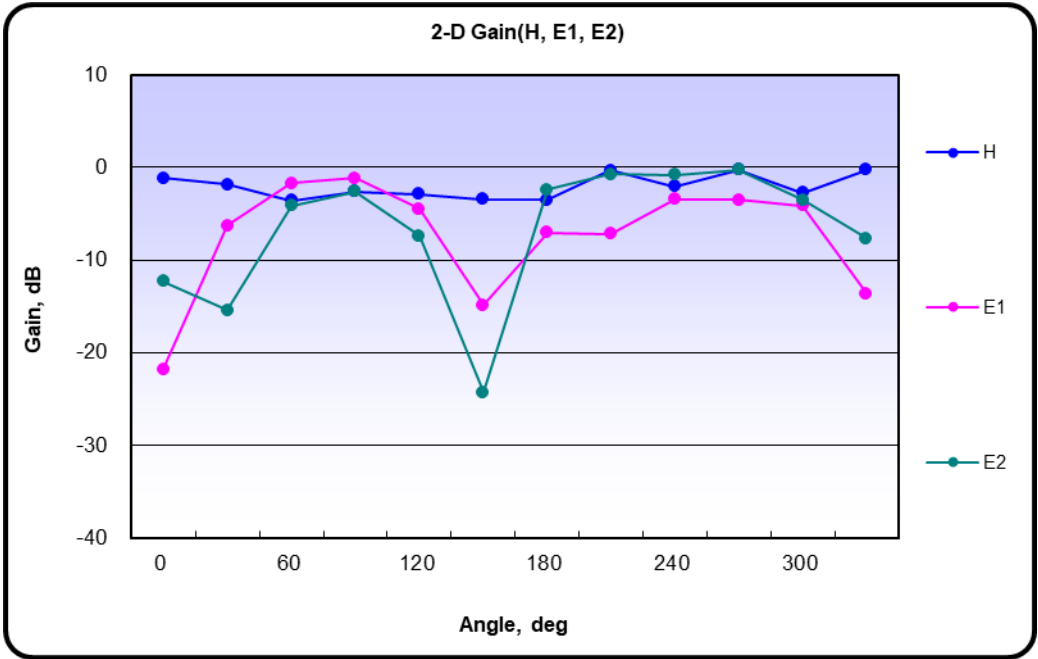


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5.3 3D-PLoTs



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]	-3.82	-3.79	-3.73	-3.63	-3.54	-3.51	-3.44	-3.32	-3.38	-3.07
Efficiency [%]	41.5	41.8	42.4	43.3	44.3	44.6	45.3	46.5	46.0	49.4
TRG _θ [dB]	-4.45	-4.43	-4.39	-4.28	-4.27	-4.26	-4.14	-4.07	-4.18	-3.84
Gain _{θ Peak} [dB]	0.02	0.15	-0.37	0.09	-0.11	0.07	0.46	-0.08	0.44	0.17
Gain _{θ Min} [dB]	-19.85	-23.20	-24.96	-17.97	-19.46	-21.05	-20.47	-21.37	-32.00	-24.28
TRG _φ [dB]	-12.55	-12.43	-12.20	-12.19	-11.66	-11.50	-11.73	-11.33	-11.10	-10.94
Gain _{φ Peak} [dB]	-5.20	-4.29	-4.57	-3.95	-3.57	-3.21	-3.38	-3.22	-2.99	-3.04
Gain _{φ Min} [dB]	-29.56	-36.78	-37.07	-38.55	-33.27	-35.70	-29.82	-28.47	-36.44	-34.15
UHRG [dB]	-7.49	-7.48	-7.47	-7.43	-7.39	-7.36	-7.19	-7.10	-7.19	-6.87
UHRG/TRG [%]	43.0	42.8	42.2	41.7	41.2	41.2	42.2	41.9	41.5	41.7
H-Plane	-2.40	-2.41	-2.38	-2.25	-2.25	-2.23	-2.18	-1.97	-2.25	-1.88
E1-Plane, AVG [dB]	-5.52	-5.62	-5.45	-5.50	-5.45	-5.30	-5.28	-5.02	-5.39	-5.02
E2-Plane, AVG [dB]	-4.72	-4.60	-4.58	-4.26	-4.29	-4.33	-4.26	-4.10	-4.05	-3.79
Peak Gain [dB]	0.14	0.29	0.08	0.18	0.04	0.20	0.54	0.17	0.59	0.45
Directivity [dB]	3.96	4.08	3.81	3.81	3.58	3.71	3.99	3.49	3.97	3.52
Minimum Gain [dB]	-17.89	-18.01	-21.05	-17.04	-15.35	-16.59	-18.13	-16.09	-19.68	-15.35

	11	12	13	14	15	16	17	18	19	20
Frequency [MHz]	2450	2455	2460	2465	2470	2475	2480	2485	2490	2497
Efficiency [dB]	-3.05	-2.96	-3.12	-3.10	-2.91	-2.90	-2.98	-3.54	-3.65	-3.69
Efficiency [%]	49.6	50.6	48.8	49.0	51.2	51.3	50.3	44.2	43.2	42.8
TRG _θ [dB]	-3.84	-3.73	-3.91	-3.91	-3.71	-3.70	-3.79	-4.38	-4.47	-4.54
Gain _{θ Peak} [dB]	0.30	0.81	0.44	0.13	0.66	0.95	0.64	0.15	0.16	0.15
Gain _{θ Min} [dB]	-21.61	-20.11	-18.93	-24.27	-21.42	-22.74	-22.29	-24.39	-24.91	-22.81
TRG _φ [dB]	-10.83	-10.83	-10.93	-10.79	-10.63	-10.65	-10.67	-11.10	-11.27	-11.21
Gain _{φ Peak} [dB]	-2.77	-3.15	-3.30	-3.02	-2.73	-2.85	-2.71	-3.09	-3.88	-3.65
Gain _{φ Min} [dB]	-29.15	-31.15	-35.68	-31.73	-41.07	-26.07	-26.61	-28.79	-31.19	-35.31
UHRG [dB]	-6.81	-6.76	-6.91	-7.03	-6.81	-6.88	-7.00	-7.68	-7.80	-7.81
UHRG/TRG [%]	42.0	41.7	41.8	40.5	40.7	40.0	39.6	38.5	38.4	38.8
H-Plane	-1.82	-1.65	-1.77	-1.87	-1.68	-1.69	-1.86	-2.53	-2.56	-2.73
E1-Plane, AVG [dB]	-5.07	-4.89	-5.07	-5.13	-4.79	-4.90	-4.93	-5.54	-5.41	-5.60
E2-Plane, AVG [dB]	-3.86	-3.59	-3.84	-3.77	-3.60	-3.56	-3.57	-4.13	-4.41	-4.29
Peak Gain [dB]	0.57	0.95	0.57	0.74	0.78	1.05	0.81	0.54	0.30	0.56
Directivity [dB]	3.62	3.91	3.69	3.84	3.69	3.95	3.80	4.09	3.94	4.25
Minimum Gain [dB]	-16.79	-14.88	-15.06	-15.25	-14.28	-16.22	-13.54	-15.50	-15.58	-17.44

Average Efficiency	-3.35dBi	46.29%
Peak Gain	1.05dBi	