

SPECIFICATION

Chip Antenna

Manufacturer: Sena Technologies Co., Ltd.

Part Number: SENA_003



WRITTEN	CHECKED	APPROVED
Seunghyun Kim	Seunghyun Kim	Seunghyun Kim
		

March 14, 2025

Sena Technologies Co., Ltd.

19, Heolleung-ro 569-gil, Gangnam-gu,
Seoul, 06376, South Korea

Tel: +82-2-576-7362

Fax: +82-2-573-7710

Website: <http://www.sena.com>

<u>1. SPECIFICATIONS</u>	<u>3</u>
1.1. Electrical Specifications	
1.2. Mechanical Specifications	
1.3. Appearance and Dimensions	
<u>2. MEASUREMENT</u>	<u>4</u>
2.1. Electrical Characteristics	
2.2. Passive Measurement	
2.3. Measurement Process	
<u>3. RELIABILITY TEST</u>	<u>9</u>
<u>4. SOLDERING RECOMMENDATIOS</u>	<u>9</u>
4.1. Reflow Soldering Profile	

1. SPECIFICATIONS

1.1. Electrical Specifications

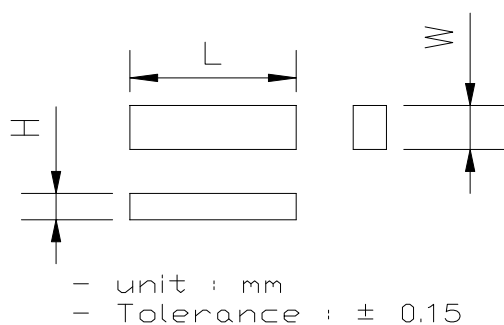
ITEM	SPEC.	Unit
Frequency	2400-2485	MHz
Bandwidth @ VSWR 2.5:1	100	MHz
Gain Max.	0.27	dBi
Polarization	Linear	
Azimuth Beam Pattern	Omni-directional	
Impedance	50	Ω

※ These values are measured on the matched reference test board.

1.2. Mechanical Specifications

Electrode	Silver	
Dimensions (L x W x H)	9.0 x 3.0 x 1.2	mm
Operating Temperature	-40 ~ +85	°C

1.3. Appearance and Dimensions



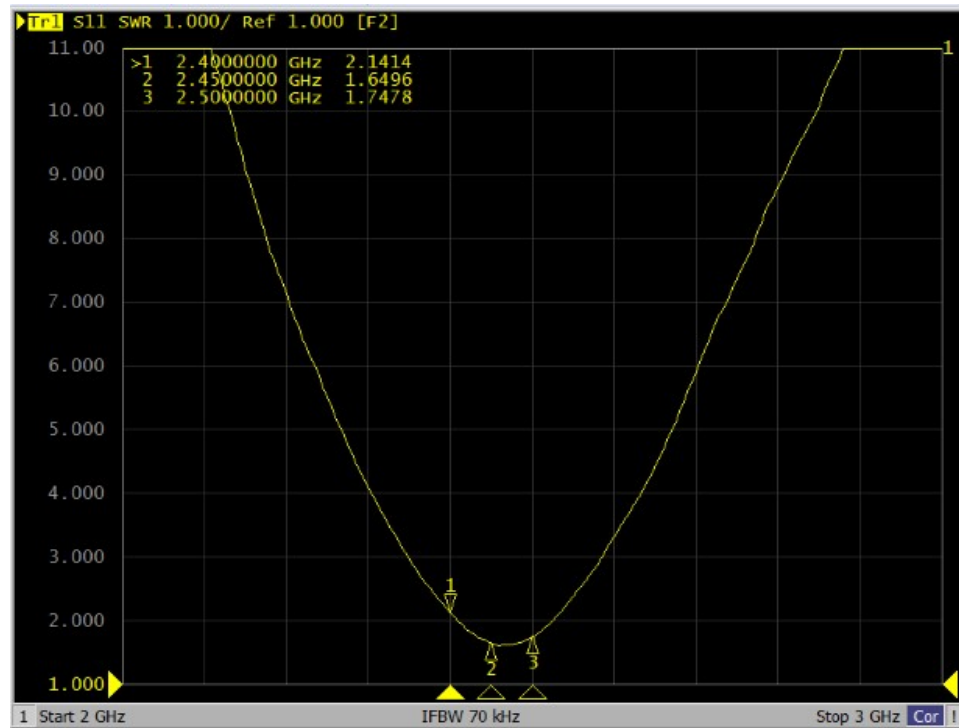
L	9.0
W	3.0
H	1.2

- Laminate: FR-4, 1.20mm
- Plating Thickness: 1.5oz (54um)
- Board Thickness: 1.30mm (typ.)

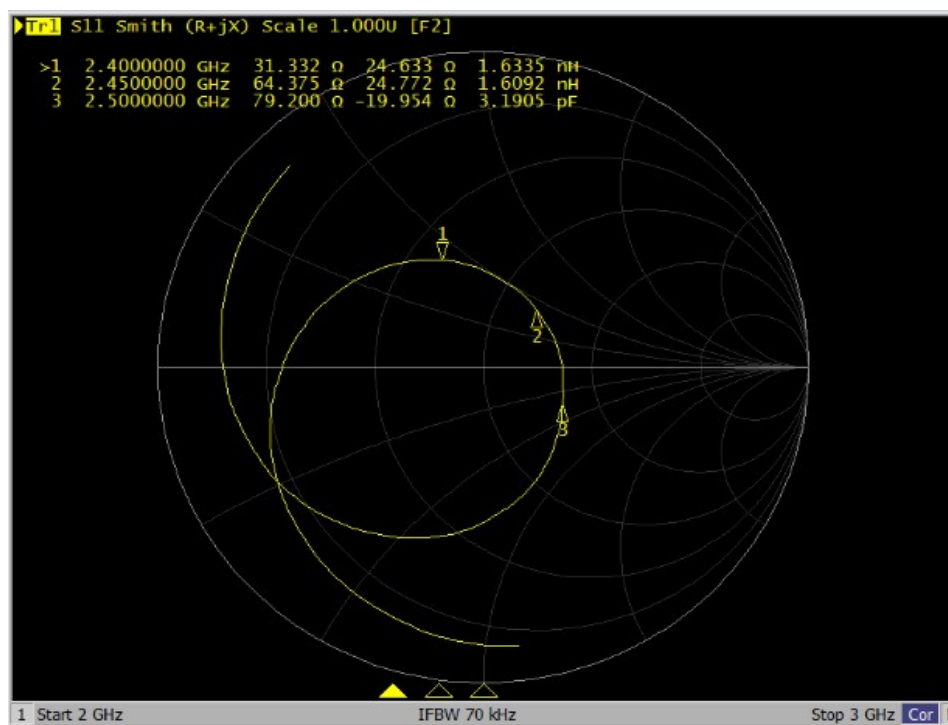
2. MEASUREMENT

2.1. Electrical Characteristic

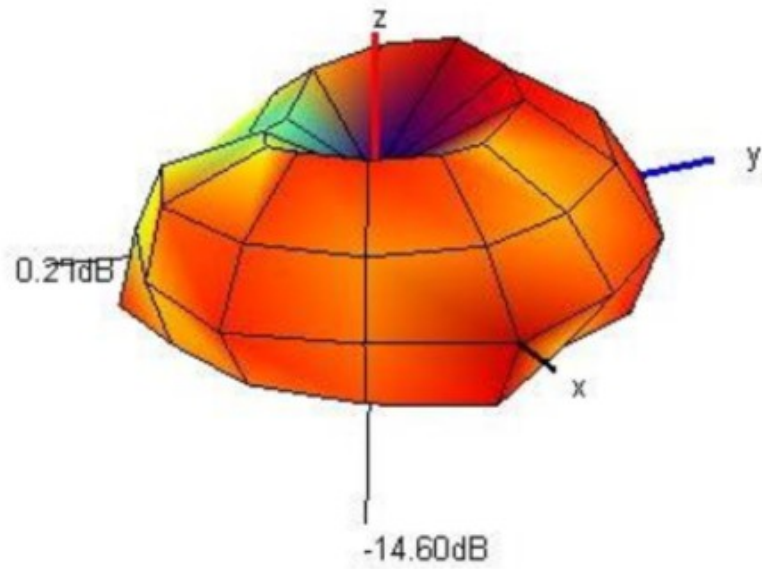
2.1.1. VSWR



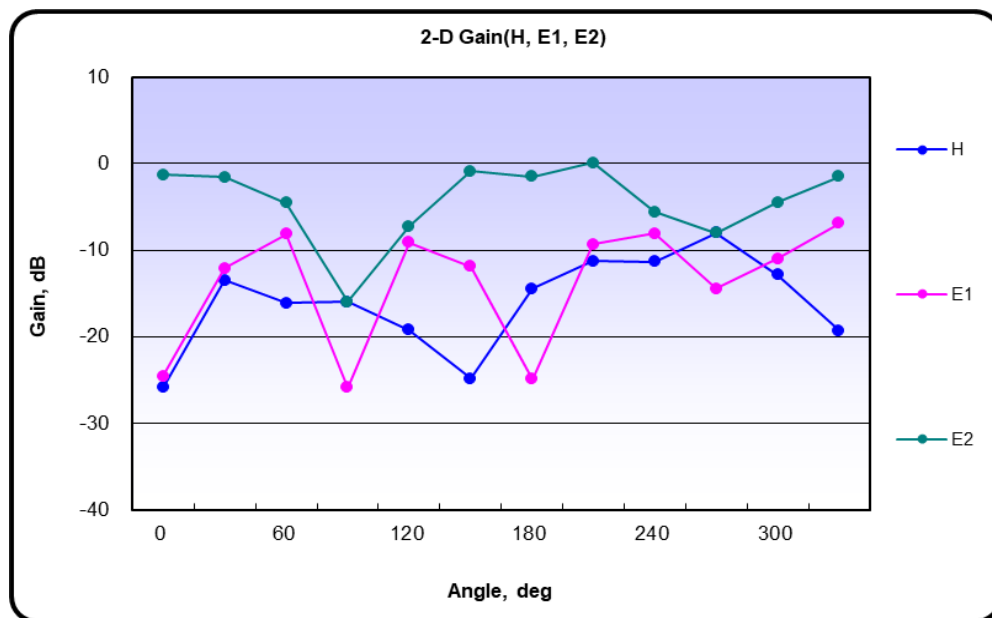
2.1.2. Smith chart



2.1.3. 3D-PLOTS



2.1.4. 2D-GAIN



2.2. 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]	-2.41	-2.33	-2.34	-2.39	-2.35	-2.38	-2.31	-2.11	-1.90	-1.93
Efficiency [%]	57.5	58.5	58.4	57.7	58.2	57.9	58.8	61.5	64.5	64.1
UHRG [dB]	-5.82	-5.75	-5.72	-5.78	-5.75	-5.71	-5.64	-5.43	-5.22	-5.29
UHRG/TRG [%]	45.5	45.5	45.9	45.8	45.7	46.4	46.4	46.6	46.6	46.1
H-Plane	-13.34	-13.06	-13.56	-13.46	-13.12	-13.94	-14.20	-14.21	-14.01	-13.66
E1-Plane, AVG [dB]	-11.44	-11.10	-11.29	-11.48	-11.24	-10.68	-10.87	-11.40	-10.77	-10.78
E2-Plane, AVG [dB]	-3.35	-3.30	-3.15	-3.21	-3.26	-3.47	-3.16	-2.91	-2.96	-2.98
Peak Gain [dB]	-0.42	-0.10	-0.15	-0.54	-0.42	-0.18	-0.36	-0.03	0.18	0.27
Directivity [dB]	1.99	2.23	2.19	1.85	1.93	2.20	1.95	2.09	2.09	2.20
Minimum Gain [dB]	-13.52	-13.07	-13.56	-12.95	-13.37	-14.03	-13.91	-14.99	-12.05	-15.75

	11	12	13	14	15	16	17	18	19	20
Frequency [MHz]	2450	2455	2460	2465	2470	2475	2480	2485	2490	2497
Efficiency [dB]	-2.08	-2.27	-2.26	-2.16	-2.00	-2.19	-2.38	-2.94	-3.21	-3.21
Efficiency [%]	62.0	59.3	59.4	60.8	63.1	60.4	57.8	50.9	47.8	47.7
UHRG [dB]	-5.38	-5.58	-5.61	-5.47	-5.33	-5.56	-5.80	-6.32	-6.61	-6.60
UHRG/TRG [%]	46.7	46.6	46.2	46.6	46.4	46.0	45.5	45.9	45.7	45.8
H-Plane	-14.43	-15.07	-14.93	-14.88	-14.67	-14.54	-15.10	-15.58	-15.93	-15.12
E1-Plane, AVG [dB]	-11.08	-10.93	-10.99	-10.91	-11.04	-10.56	-11.69	-11.83	-12.04	-11.73
E2-Plane, AVG [dB]	-3.04	-3.17	-3.33	-3.29	-2.94	-3.21	-3.48	-3.98	-4.35	-4.12
Peak Gain [dB]	-0.14	-0.18	0.06	-0.28	0.18	-0.36	-0.24	-1.19	-1.13	-1.49
Directivity [dB]	1.94	2.09	2.32	1.88	2.18	1.83	2.14	1.75	2.08	1.72
Minimum Gain [dB]	-12.93	-14.09	-14.48	-14.72	-16.00	-14.29	-16.20	-15.85	-15.66	-14.38

Average Gain	-2.34dBi
Peak Gain	0.27dBi

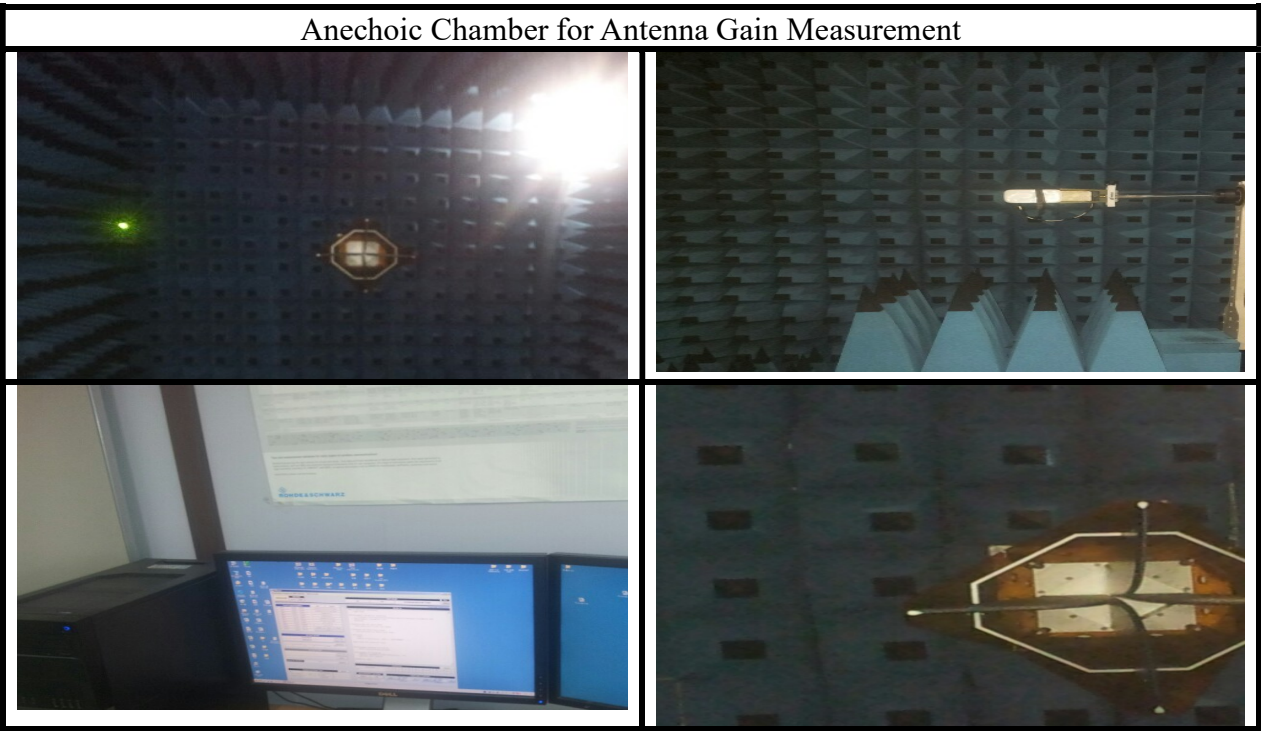
2.3. Measurement Process

2.3.1. SWR / Return loss

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

2.3.2. Gain

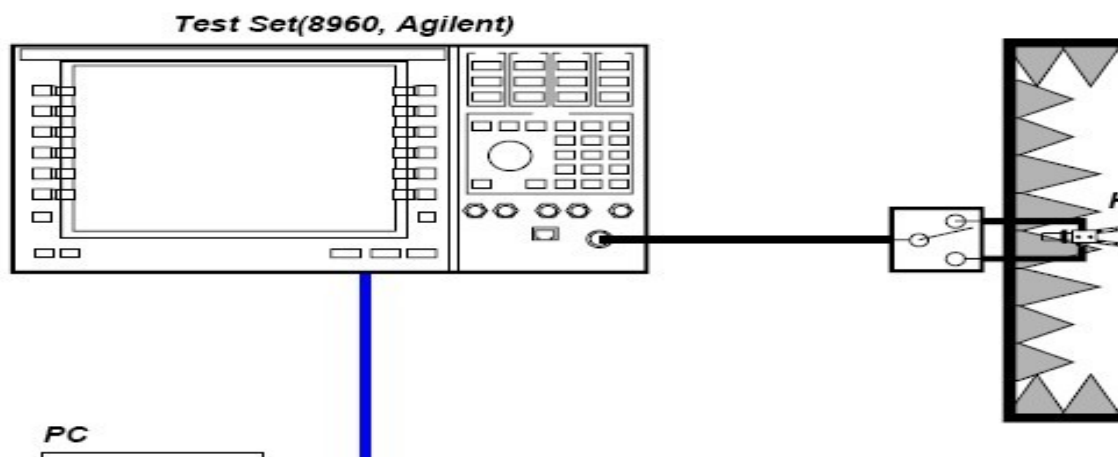
Antenna gain is measured in the anechoic chamber of this company.



2.3.3. Gain test block diagram

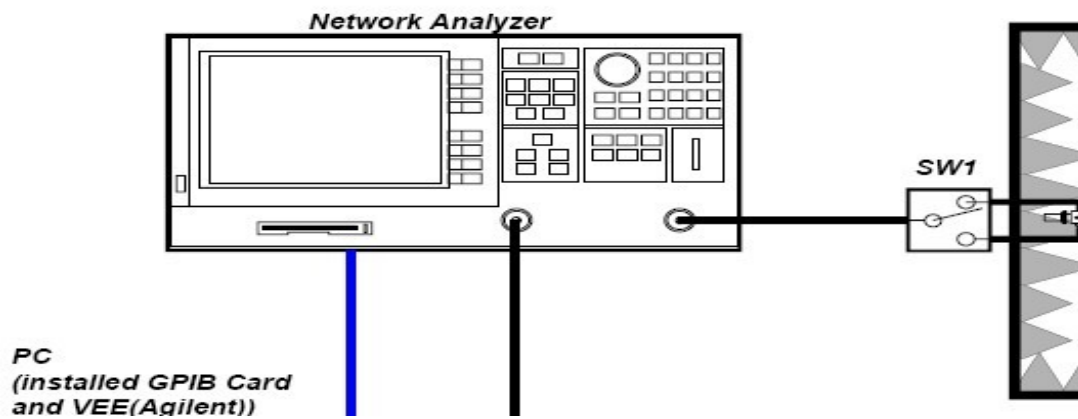
Active test Sysetm

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



Passiver test Sysetm

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



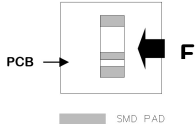
**** Measured by Radina ****

RadiNa Co., Ltd.

TEL:+82-2-463-0373

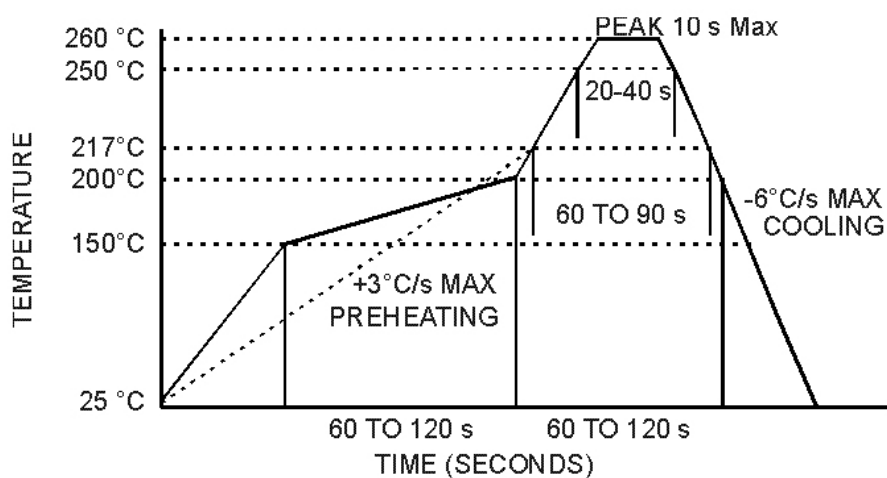
FAX:+82-2-463-0374

3. RELIABILITY TEST

No	Item	Test condition	Test Requirements
1	Adhesion strength	. Applied force on SMD chip till detached point from PCB 	1. No mechanical damage by forces applied on the right 2. Strength (F) > 5 kgf
2	Thermal Shock (Temperature Cycle)	1. 1 cycle / step 1: $-40 \pm 3^\circ\text{C}$, 30 min step 2: $+85 \pm 3^\circ\text{C}$, 30 min 2. Number of cycles: 10 3. Measure after left for 48 hrs min. at room temperature	1. No visual damage 2. VSWR satisfy
3	High Temperature Resistance	1. Temperature: $+85 \pm 5^\circ\text{C}$ 2. Time: 96 hrs 3. Measure VSWR_C after left for 24 hrs min. at room temperature	1. No visual damage 2. VSWR satisfy
4	Low Temperature Resistance	1. Temperature: $-40 \pm 5^\circ\text{C}$ 2. Time: 96 hrs 3. Measure VSWR_C after left for 48 hrs min. at room temperature	1. No visual damage 2. VSWR satisfy
5	Humidity (Steady Condition)	1. Humidity: 85 % RH 1. Temperature: $+85 \pm 3^\circ\text{C}$ 2. Time: 96 hrs 3. Measure VSWR_C after left for 48 hrs min. at room temperature	1. No visual damage 2. VSWR satisfy
6	ESD	1. ESD Level: 8KV 2. Mode: Contact discharge 3. Number of cycles: 100 ※ Used Ref test PCB.	1. No visual damage 2. VSWR satisfy

4. SOLDERING RECOMMENDATIONS

4.1. Reflow Soldering Profile



Note: All the through hole devices can withstand 260°C soldering by terminals only (ie wave solder or hand soldering process)