

25.01.10

RA-N2501-12

APPROVAL SHEET

**MODEL :NTT-Easy
SUB ANTENNA
Antenna layout**

Review	Consent	Approval

Messrs. SENA Technology 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>

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1. Revision History

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

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2. Product Information

2.1 General Features

PART NUMBER	GRSN24831MS72
ANTENNA TYPE	PCB pattern Antenna
APPLICATIONS	MESH

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	

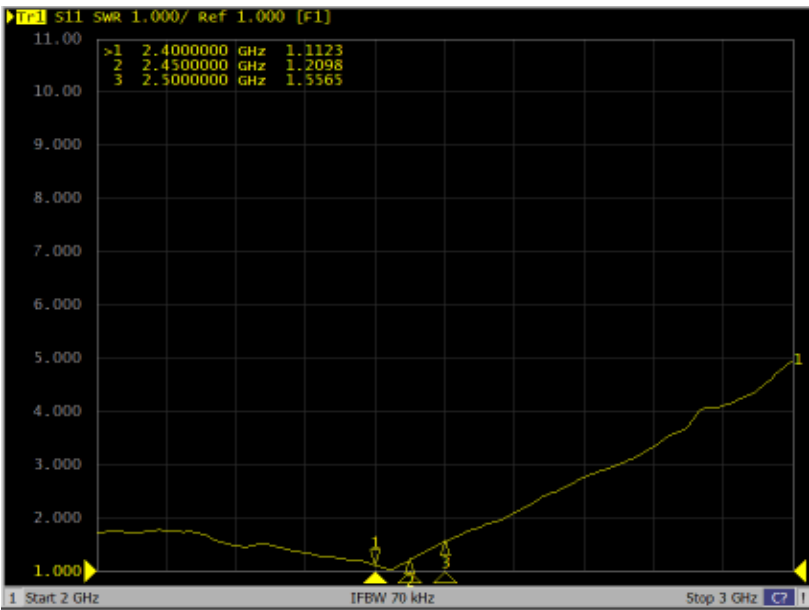
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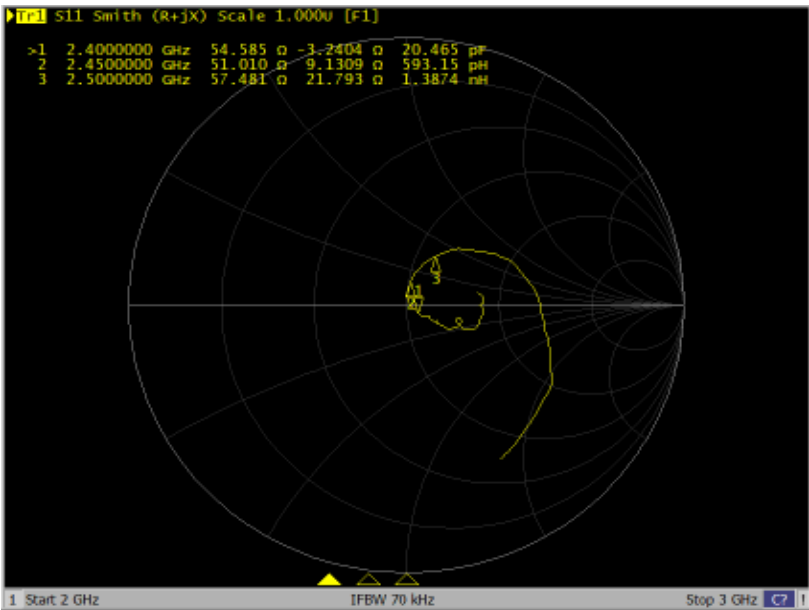
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5. Electrical Characterristics

5.1 VSWR



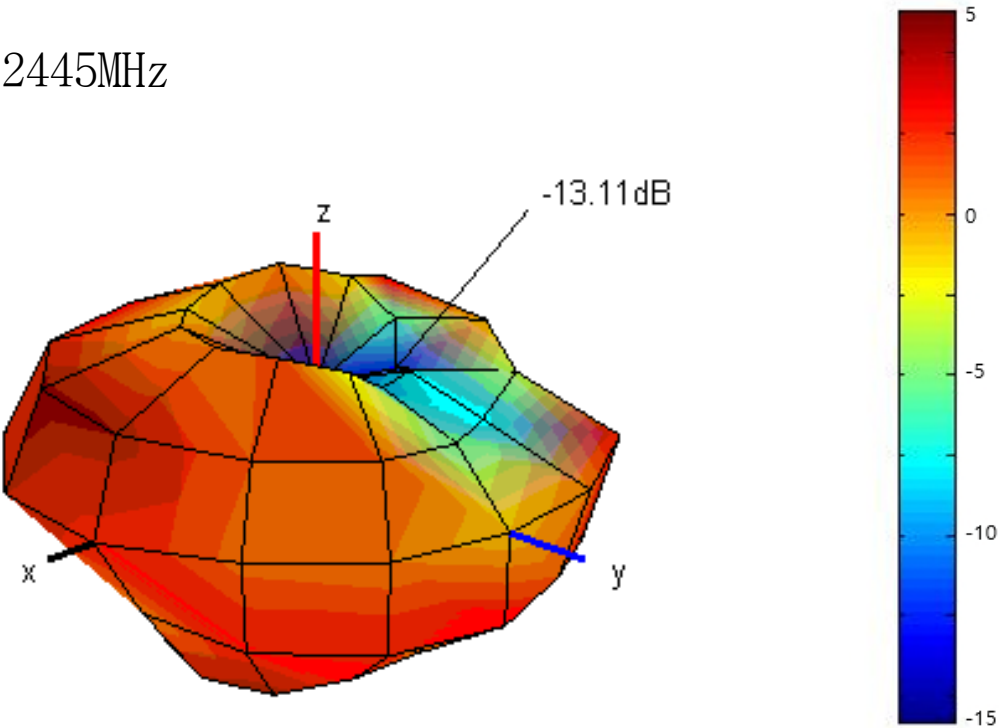
5.2 SMITH CHART



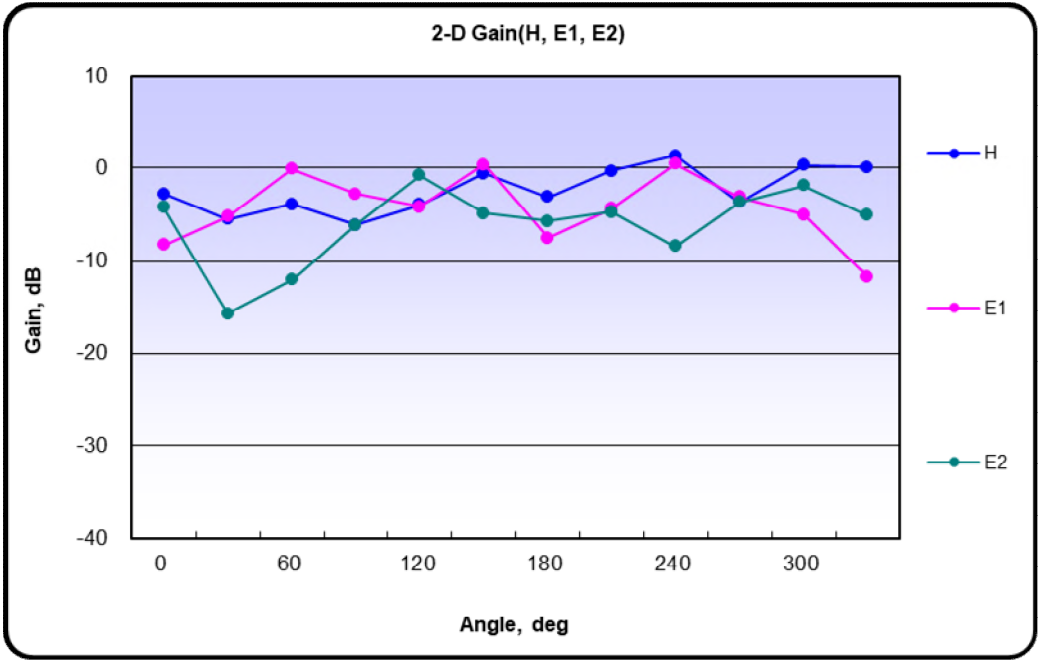
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5.3 3D-PLOTs

2445MHz



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]	-1.56	-1.61	-1.70	-1.71	-1.96	-1.98	-1.73	-1.79	-1.86	-1.77
Efficiency [%]	69.8	69.0	67.6	67.5	63.6	63.4	67.2	66.3	65.2	66.6
TRG _θ [dB]	-2.68	-2.67	-2.82	-2.80	-3.08	-3.08	-2.82	-2.88	-2.95	-2.87
Gain _{θ Peak} [dB]	1.57	1.75	1.61	1.60	1.43	1.37	1.71	1.53	1.51	1.33
Gain _{θ Min} [dB]	-26.25	-21.15	-22.57	-18.56	-24.64	-22.76	-18.76	-18.05	-18.10	-18.62
TRG _φ [dB]	-7.99	-8.24	-8.12	-8.23	-8.41	-8.48	-8.26	-8.31	-8.39	-8.26
Gain _{φ Peak} [dB]	-3.58	-2.82	-3.32	-3.57	-3.42	-3.18	-3.43	-3.27	-3.34	-3.12
Gain _{φ Min} [dB]	-19.44	-22.24	-20.17	-20.45	-23.19	-21.36	-19.58	-23.40	-21.56	-24.25
UHRG [dB]	-4.78	-4.83	-4.95	-4.98	-5.25	-5.23	-5.08	-5.11	-5.20	-5.12
UHRG/TRG [%]	47.6	47.7	47.3	47.1	46.9	47.3	46.2	46.5	46.3	46.2
H-Plane	-1.32	-1.34	-1.40	-1.50	-1.76	-1.70	-1.59	-1.72	-1.75	-1.77
E1-Plane, AVG [dB]	-3.03	-3.13	-3.26	-3.24	-3.49	-3.48	-3.21	-3.16	-3.20	-3.08
E2-Plane, AVG [dB]	-4.55	-4.42	-4.50	-4.37	-4.93	-4.96	-4.89	-4.80	-4.74	-4.79
Peak Gain [dB]	0.34	0.39	0.43	0.38	0.15	0.05	0.39	0.20	0.22	-0.03
Directivity [dB]	1.90	2.00	2.12	2.08	2.11	2.03	2.12	1.99	2.08	1.74
Minimum Gain [dB]	-13.22	-11.94	-11.27	-11.62	-12.86	-12.93	-13.00	-11.54	-12.89	-13.11

	11	12	13	14	15	16	17	18	19	20
Frequency [MHz]	2450	2455	2460	2465	2470	2475	2480	2485	2490	2497
Efficiency [dB]	-1.93	-1.89	-2.08	-2.07	-1.87	-1.81	-1.81	-2.25	-2.41	-2.49
Efficiency [%]	64.2	64.7	62.0	62.1	65.0	65.9	65.9	59.5	57.4	56.4
TRG _θ [dB]	-3.03	-2.98	-3.18	-3.16	-2.94	-2.87	-2.89	-3.30	-3.45	-3.50
Gain _{θ Peak} [dB]	1.13	1.39	1.27	0.73	1.48	0.98	1.81	0.69	0.32	0.65
Gain _{θ Min} [dB]	-17.55	-19.49	-17.54	-18.89	-19.69	-16.97	-17.97	-15.96	-15.37	-17.31
TRG _φ [dB]	-8.41	-8.45	-8.59	-8.59	-8.48	-8.45	-8.40	-8.95	-9.13	-9.30
Gain _{φ Peak} [dB]	-3.39	-3.40	-3.48	-3.22	-3.93	-3.57	-3.09	-3.76	-3.64	-3.57
Gain _{φ Min} [dB]	-22.58	-27.10	-25.91	-39.16	-43.21	-31.18	-31.50	-35.36	-29.83	-30.85
UHRG [dB]	-5.27	-5.30	-5.47	-5.44	-5.29	-5.28	-5.25	-5.76	-5.98	-6.06
UHRG/TRG [%]	46.3	45.6	45.8	46.0	45.5	45.0	45.3	44.6	44.0	43.9
H-Plane	-1.98	-1.93	-2.08	-2.12	-1.91	-1.82	-1.86	-2.23	-2.40	-2.39
E1-Plane, AVG [dB]	-3.24	-3.08	-3.56	-3.41	-3.14	-3.08	-2.98	-3.42	-3.73	-3.83
E2-Plane, AVG [dB]	-4.93	-4.80	-5.01	-5.04	-4.81	-4.64	-4.80	-5.12	-5.07	-5.32
Peak Gain [dB]	-0.16	0.06	-0.06	-0.50	0.22	-0.14	0.58	-0.45	-0.69	-0.49
Directivity [dB]	1.76	1.96	2.01	1.57	2.09	1.57	2.39	1.80	1.72	2.00
Minimum Gain [dB]	-12.36	-13.80	-12.72	-11.58	-11.53	-10.77	-11.46	-11.90	-11.19	-11.21

Average Efficiency	-1.91dBi	64.46%
Peak Gain	0.58dBi	

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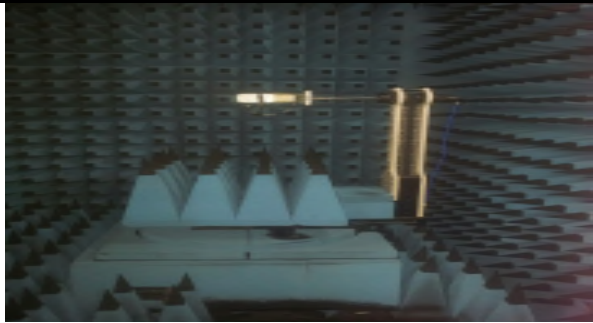
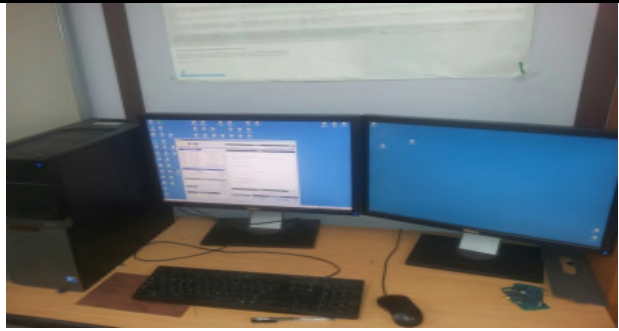
7.Measurement Process

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.

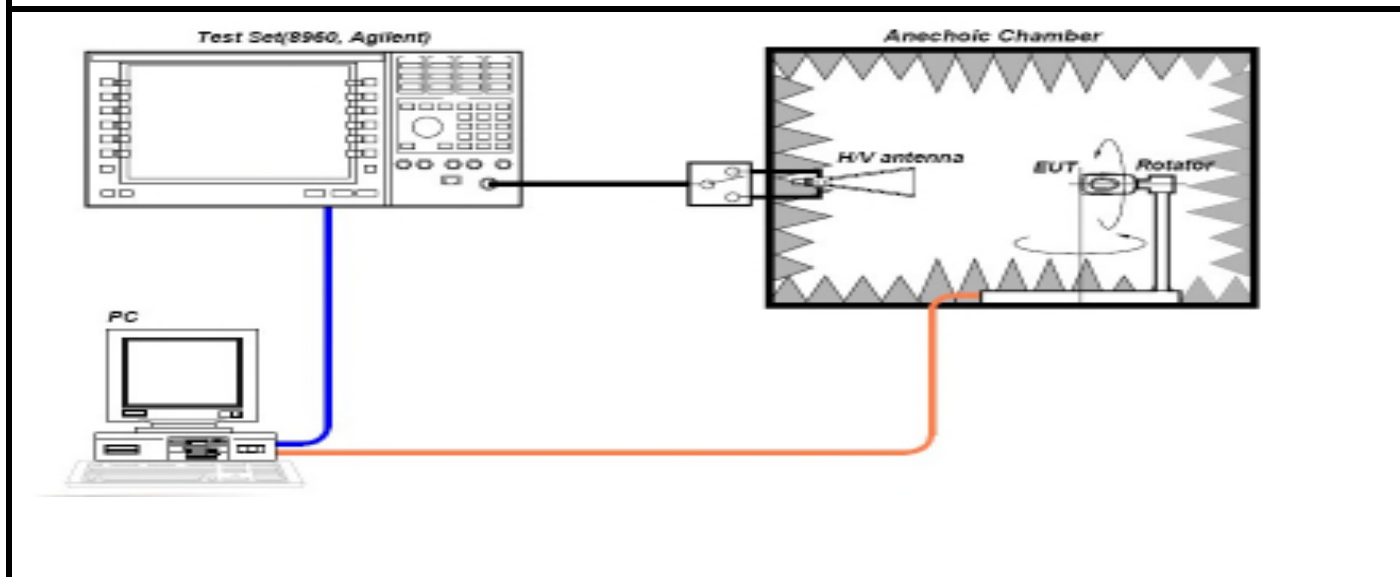
Anechoic Chamber for Antenna Gain Measurement	
	
	

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7.3 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

