

24.11.26

RA-N2411-72

APPROVAL SHEET

**MODEL :NTT-Easy
ANTENNA
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				
13				

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2. Product Information

2.1 General Features

PART NUMBER	GRSN24831MS72
ANTENNA TYPE	PCB pattern Antenna
APPLICATIONS	—
Dimensions (L x W x H)	9.0 x 3.0 x 1.2 mm
Operating Temperature	-40~ +85 ° C

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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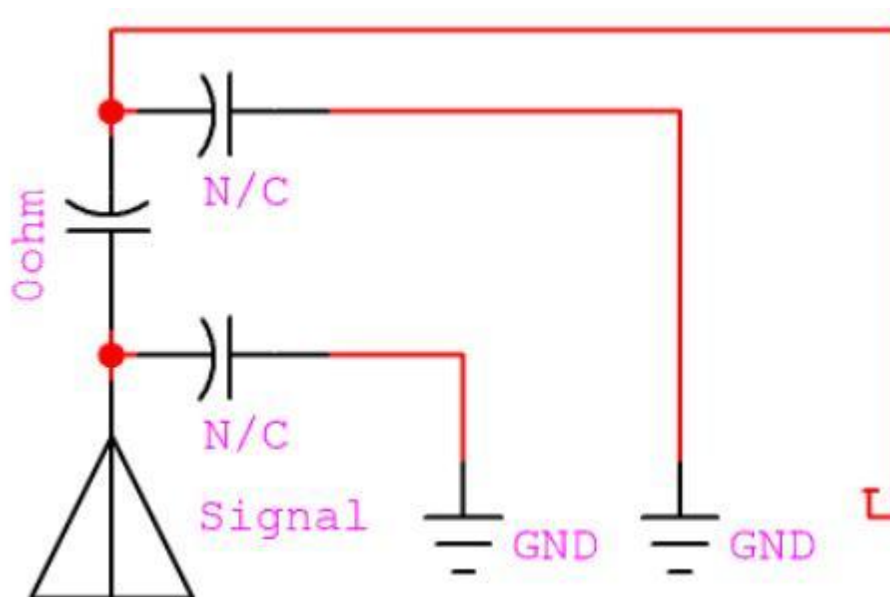
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3. Pattern Specifications



4. Matching Network

Capacitor value can be changed depending on different situation



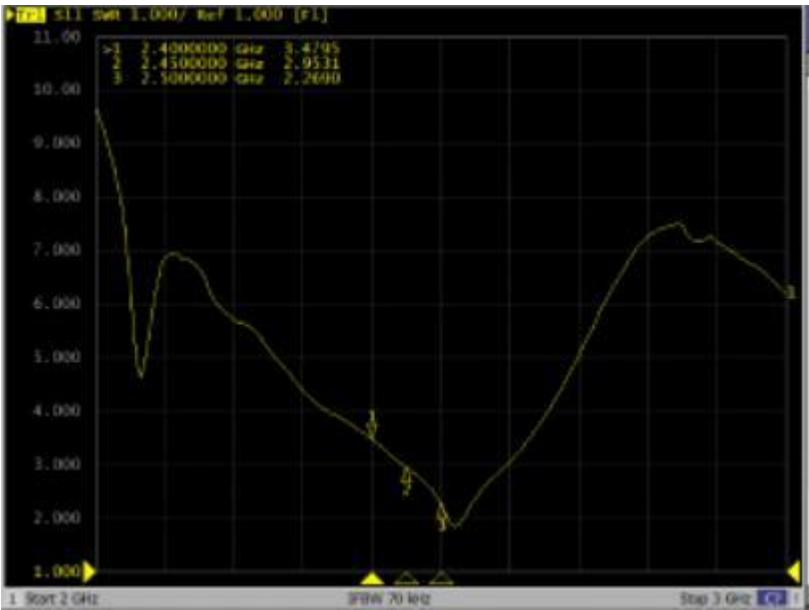
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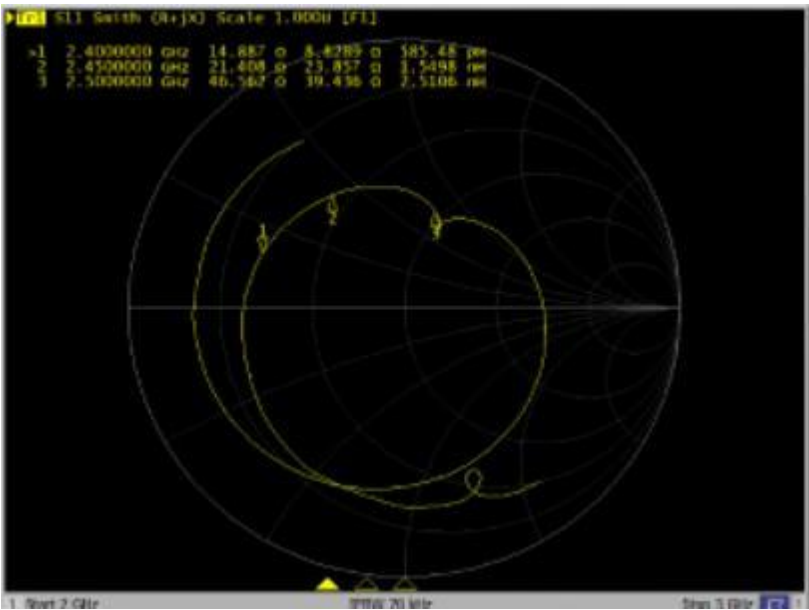
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5. Electrical Characterristics

5.1 VSWR



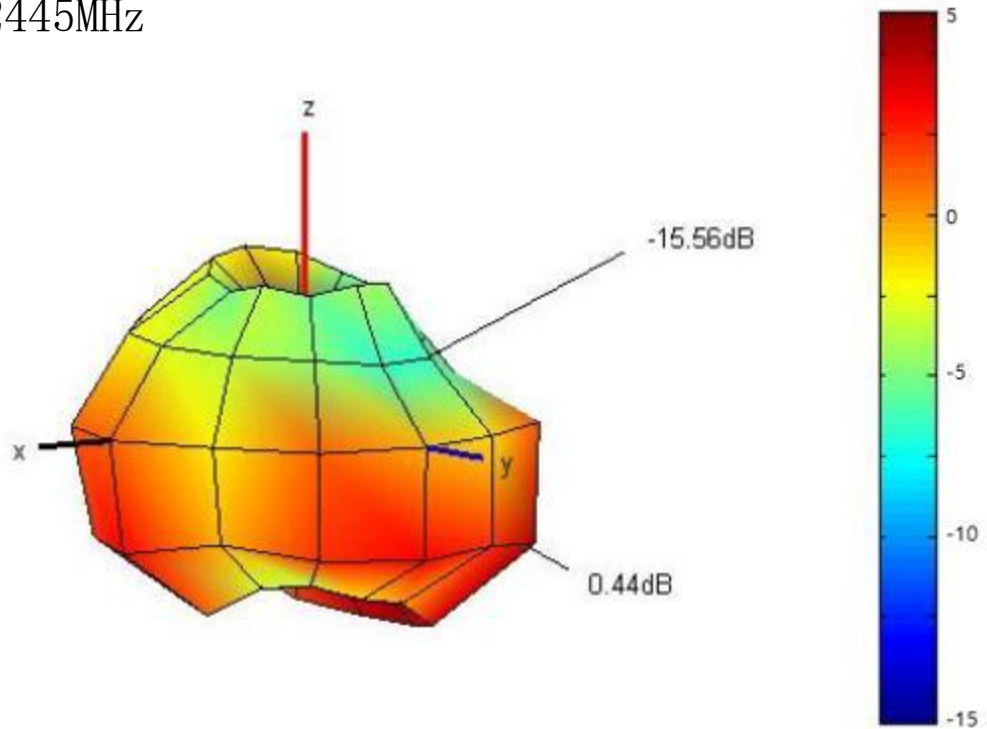
5.2 SMITH CHART



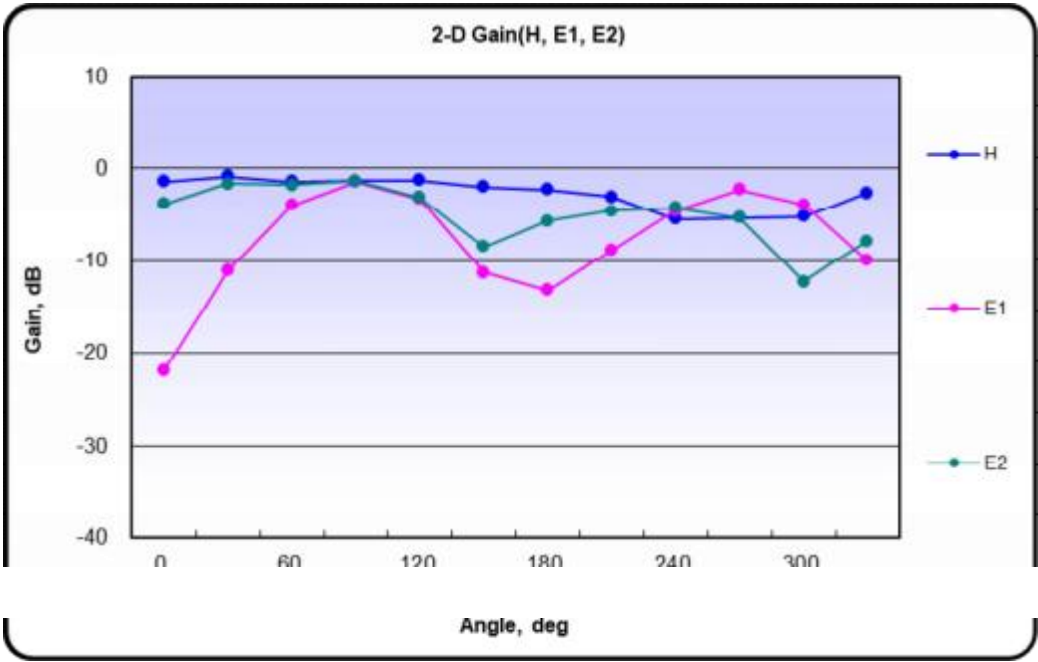
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5.3
3D-PLOTs

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]	-5.66	-5.76	-5.67	-5.59	-5.41	-5.44	-5.53	-5.53	-5.57	-5.31
Efficiency [%]	27.2	26.6	27.1	27.6	28.7	28.6	28.0	28.0	27.7	29.4
TRG _θ [dB]	-6.93	-6.99	-6.94	-6.86	-6.70	-6.78	-6.85	-6.84	-6.92	-6.74
Gain _{θ Peak} [dB]	0.24	0.62	0.61	0.63	0.69	0.61	0.34	0.55	0.48	0.36
Gain _{θ Min} [dB]	-32.36	-29.23	-32.41	-27.49	-28.60	-31.20	-32.62	-28.69	-29.75	-29.60
TRG _φ [dB]	-11.63	-11.81	-11.65	-11.54	-11.33	-11.19	-11.35	-11.37	-11.31	-10.83
Gain _{φ Peak} [dB]	-7.11	-7.54	-7.08	-7.20	-6.80	-6.96	-6.48	-7.12	-7.17	-6.45
Gain _{φ Min} [dB]	-24.27	-45.63	-24.44	-26.91	-28.66	-26.52	-29.43	-44.75	-23.85	-40.78
UHRG [dB]	-11.22	-11.39	-11.27	-11.24	-10.97	-10.87	-10.99	-11.01	-11.10	-10.54
UHRG/TRG [%]	27.8	27.3	27.5	27.2	27.8	28.7	28.5	28.3	28.0	30.0
H-Plane	-7.54	-7.57	-7.65	-7.43	-7.45	-7.31	-7.47	-7.61	-7.64	-7.45
E1-Plane, AVG [dB]	-4.89	-4.82	-4.92	-4.85	-4.74	-4.87	-4.86	-4.97	-4.88	-4.85
E2-Plane, AVG [dB]	-9.99	-9.55	-9.36	-9.49	-9.21	-9.17	-9.28	-9.32	-9.12	-8.74
Peak Gain [dB]	0.26	0.32	0.33	0.24	0.30	0.24	0.35	0.38	0.41	0.44
Directivity [dB]	5.91	6.08	6.00	5.83	5.72	5.68	5.88	5.90	5.98	5.75
Minimum Gain [dB]	-14.26	-18.20	-16.65	-17.33	-17.38	-16.55	-16.33	-15.59	-14.77	-15.56

	11	12	13	14	15	16	17	18	19	20
Frequency [MHz]	2450	2455	2460	2465	2470	2475	2480	2485	2490	2497
Efficiency [dB]	-5.21	-4.97	-5.21	-5.36	-5.19	-5.04	-4.80	-5.17	-5.47	-5.46
Efficiency [%]	30.2	31.8	30.1	29.1	30.2	31.3	33.1	30.4	28.4	28.4
TRG _θ [dB]	-6.66	-6.38	-6.67	-6.90	-6.71	-6.59	-6.39	-6.72	-7.11	-7.11
Gain _{θ Peak} [dB]	0.80	1.26	0.59	0.24	0.34	0.69	0.82	-0.02	-0.24	-0.50
Gain _{θ Min} [dB]	-24.17	-25.53	-27.93	-32.81	-28.20	-28.74	-22.41	-23.96	-32.67	-27.44
TRG _φ [dB]	-10.68	-10.55	-10.66	-10.62	-10.51	-10.29	-9.93	-10.40	-10.48	-10.46
Gain _{φ Peak} [dB]	-5.53	-5.75	-6.52	-5.52	-6.16	-5.87	-4.84	-5.36	-5.36	-5.15
Gain _{φ Min} [dB]	-36.60	-27.50	-26.64	-27.41	-29.41	-30.57	-23.09	-21.56	-37.01	-29.11
UHRG [dB]	-10.49	-10.35	-10.50	-10.54	-10.47	-10.20	-9.97	-10.33	-10.47	-10.39
UHRG/TRG [%]	29.6	29.0	29.6	30.3	29.6	30.5	30.4	30.5	31.6	32.2
H-Plane	-7.41	-7.29	-7.36	-7.83	-7.65	-7.45	-7.30	-7.51	-7.95	-7.83
E1-Plane, AVG [dB]	-4.67	-4.36	-4.69	-5.13	-4.98	-4.77	-4.49	-4.91	-5.21	-5.32
E2-Plane, AVG [dB]	-8.90	-8.38	-8.77	-8.84	-8.79	-8.74	-8.28	-8.60	-8.78	-8.58
Peak Gain [dB]	0.47	0.37	0.35	0.36	0.26	0.30	0.38	0.17	-0.11	-0.27
Directivity [dB]	5.68	5.35	5.56	5.72	5.45	5.34	5.18	5.35	5.36	5.19
Minimum Gain [dB]	-13.34	-15.97	-14.76	-13.38	-14.60	-12.78	-15.18	-13.58	-15.21	-15.32

Average Efficiency	-5.36dBi	29.10%
Peak Gain	0.47dBi	

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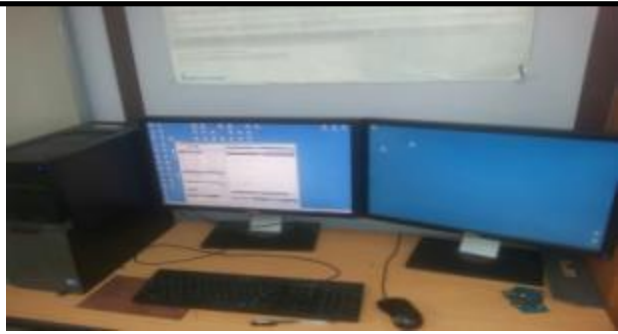
7. Measurement Process

7.1 SWR / Return loss

	Set Condition
Network Analyzer	Agilent 8753ES
Cable	Semi-rigid (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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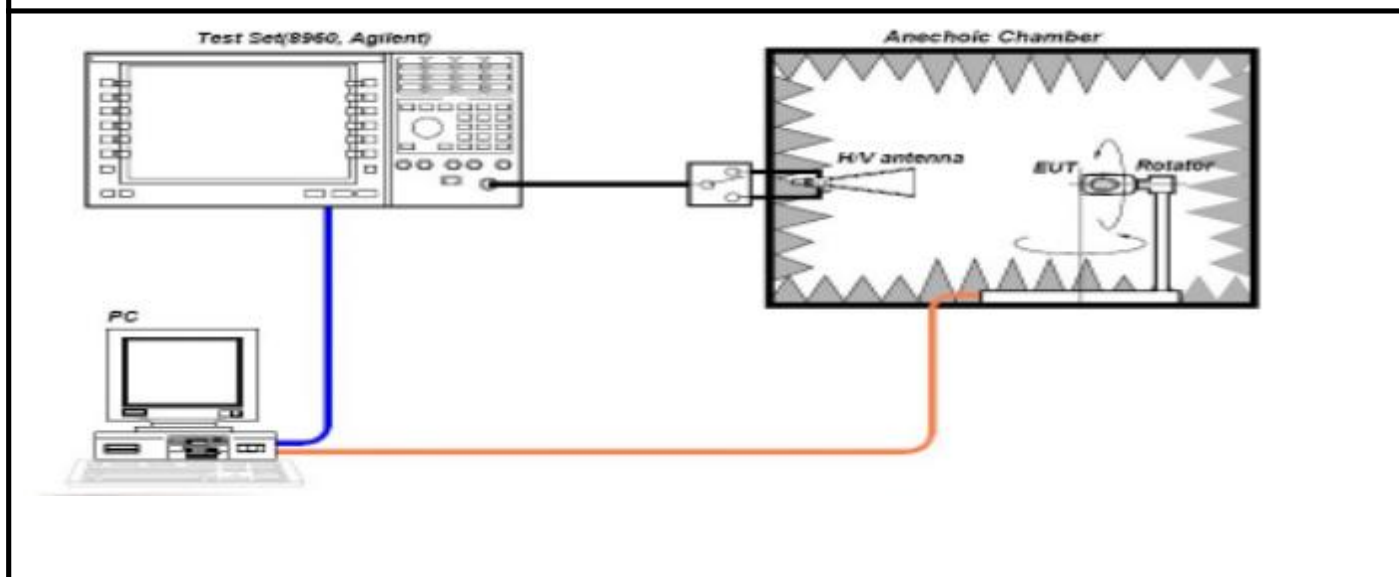
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7.3 Gain test block diagram

Active test Sysetm

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



Passiver test Sysetm

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

