1. Original Antenna

SENA-DP01-19.7

2 ~ 6 page

SPECIFICATION

External Antenna

Model No. : SENA-DP01-19.7

WRITTEN	CHECKED	APPROVED

April. 20, 2015

Notes
The contents of this data sheet are subject to change without notice. Please confirm the specifications and delivery conditions when placing your order.

1. SPECIFICATIONS

1.1. Electrical Specifications

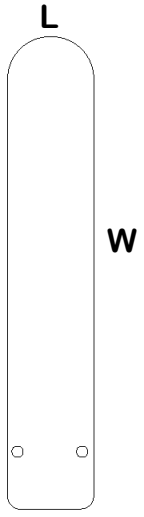
ITEM	SPEC.	Unit
Frequency	2400-2485	MHz
Bandwidth @ VSWR 2.5:1	100	MHz
Max Gain	1.2	dBi
Polarization	Linear	
Azimuth Beam Pattern	Omni-directional	
Impedance	50	Ω

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

1.2. Mechanical Specifications

Electrode	Copper	
Dimensions (W x L x H)	19.7x105x0.4	mm
Operating Temperature	-35 ~ +85	℃

1.3. Appearance and Dimensions

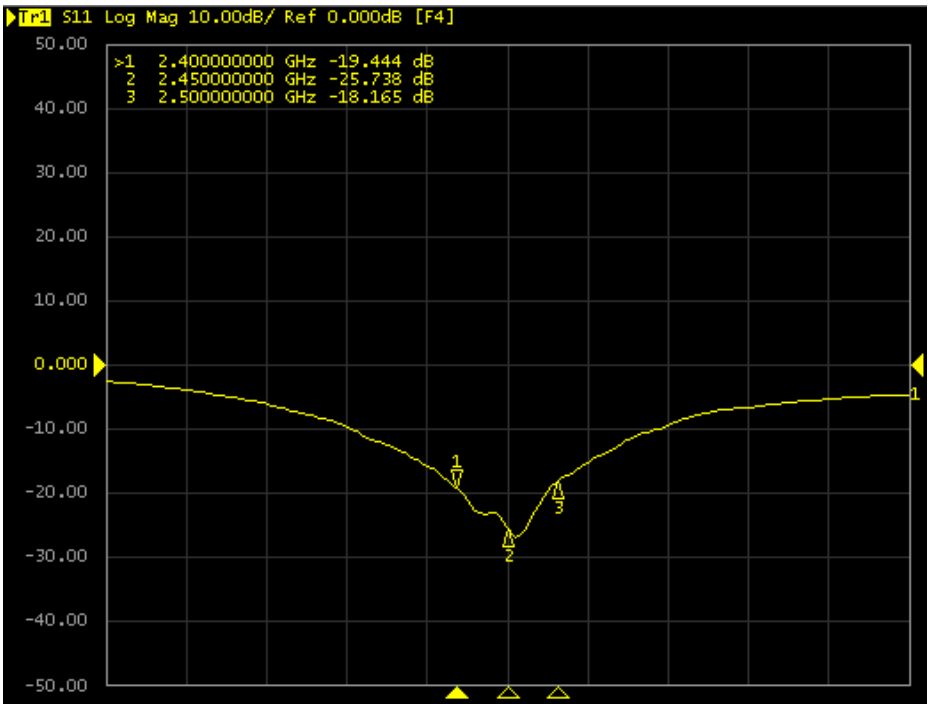


W(가로)	19.7
L(세로)	105
H(높이)	0.4

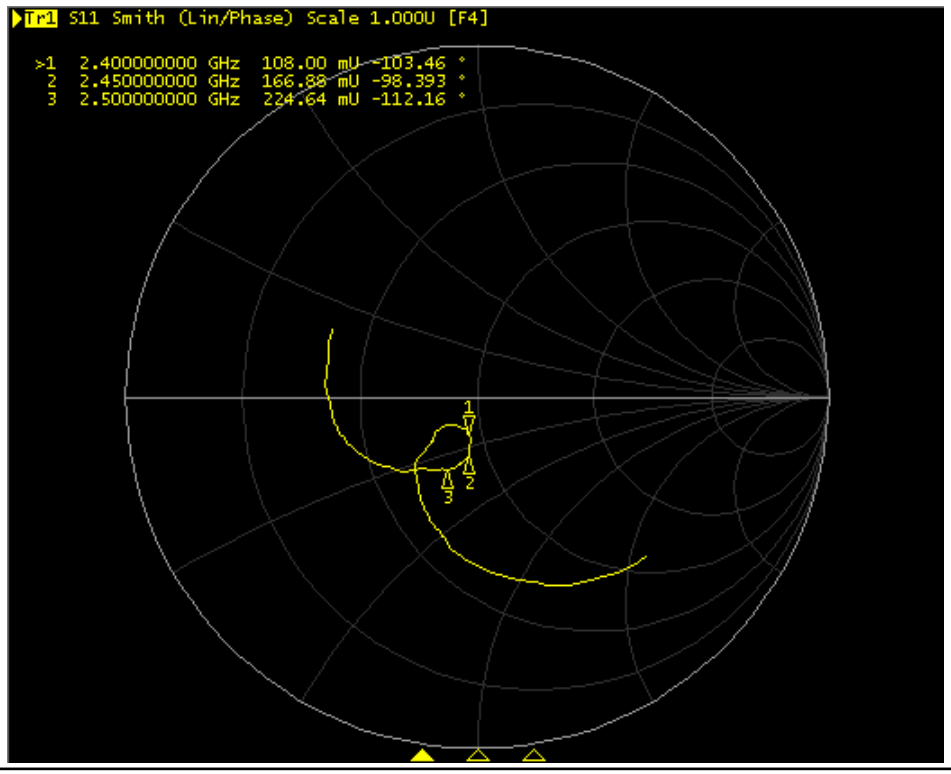
2. MEASUREMENT

2.1. Electrical Characteristic

A. S_{11} (Return Loss)

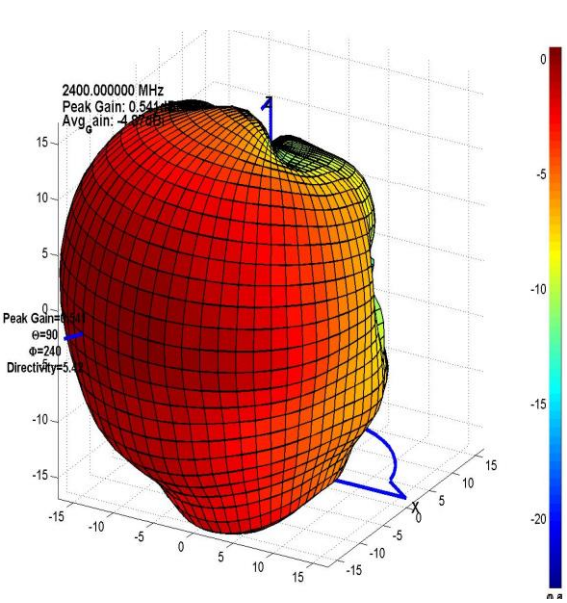


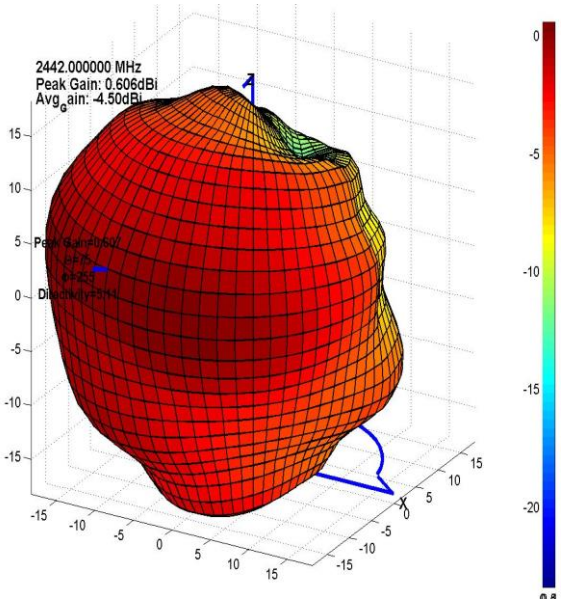
B. (Smith Chart)

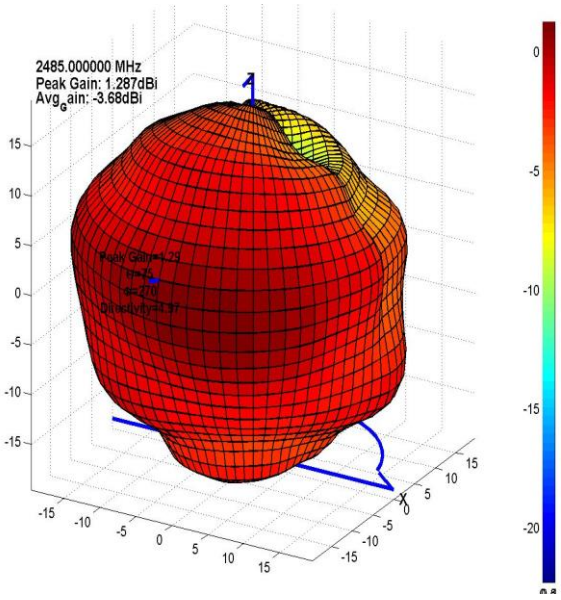


3. Radiation Data

Frequency	Efficiency	Average Gain			Max Gain			Max Position	Directivity
		Ver	Hor	Total	Ver	Hor	Total		
2400.000000 MHz	32.5 %	-6.2 dBi	-5.8 dBi	-4.9 dBi	-1.0 dBi	0.5 dBi	0.5 dBi	Theta90/Pie240	4.42 dB
2442.000000 MHz	35.4 %	-6.3 dBi	-5.3 dBi	-4.5 dBi	-1.6 dBi	0.6 dBi	0.6 dBi	Theta75/Pie255	4.11 dB
2485.000000 MHz	42.8 %	-6.8 dBi	-4.4 dBi	-3.7 dBi	-1.6 dBi	1.2 dBi	1.3 dBi	Theta75/Pie270	3.97 dB







4. RELIABILITY TEST

No	Item	Test condition	Test Requirements
1	Thermal Shock (Temperature Cycle)	1. 1 cycle / step 1 : -40 ± 3℃, 30 min step 2 : +85 ± 3℃, 30 min 2. Number of cycle : 10 3. Measure after left for 48 hrs min. at room temperature	1. No visual damage 2. VSWR satisfy
2	High Temperature Resistance	1. Temperature : +85 ± 5℃ 2. Time : 96 hrs 3. Measure $VSWR_C$ after left for 24 hrs min. at room temperature	1. No visual damage 2. VSWR satisfy
3	Low Temperature Resistance	1. Temperature : -40 ± 5℃ 2. Time : 96 hrs 3. Measure $VSWR_C$ after left for 48 hrs min. at room temperature	1. No visual damage 2. VSWR satisfy
4	Humidity (Steady Condition)	1. Humidity : 85 % RH 1. Temperature : +85 ± 3℃ 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	ESD	1. ESD Level : 8KV 2. Mode : Contact discharge 3. Number of cycle : 100 ※ Used Ref test PCB.	1. No visual damage 2. VSWR satisfy

2. Add Antenna

30K-Antenna

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2017.07.25

RA-N0726-4

APPROVAL SHEET

MODEL : 30K
Antenna layout

Review	Consent	Approval

Messrs. SENA Technology Co.,Ltd

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   2.1 General Features

   2.2 Electrical Specifications

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   3.2 Smith Chart

   3.3 3D-PLOT

   3.4 2D-GAIN

4. Passive Measurement

5. Measurement Process

1. Revision History

NO.	Before	After	Reason	Date
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				

2. Product Information

2.1 General Features

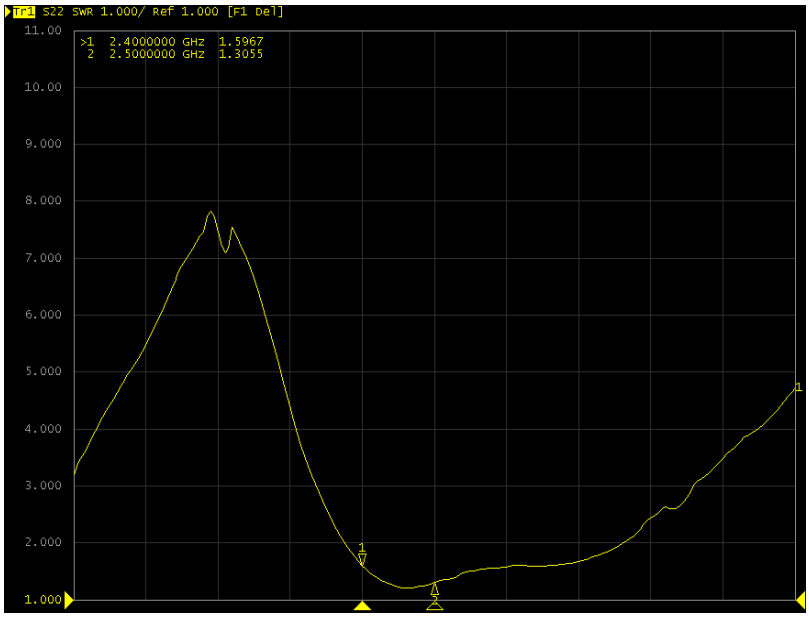
PART NUMBER	GradiANT
ANTENNA TYPE	PCB Pattern Antenna
APPLICATIONS	Bluetooth

2.2 Electrical Specifications

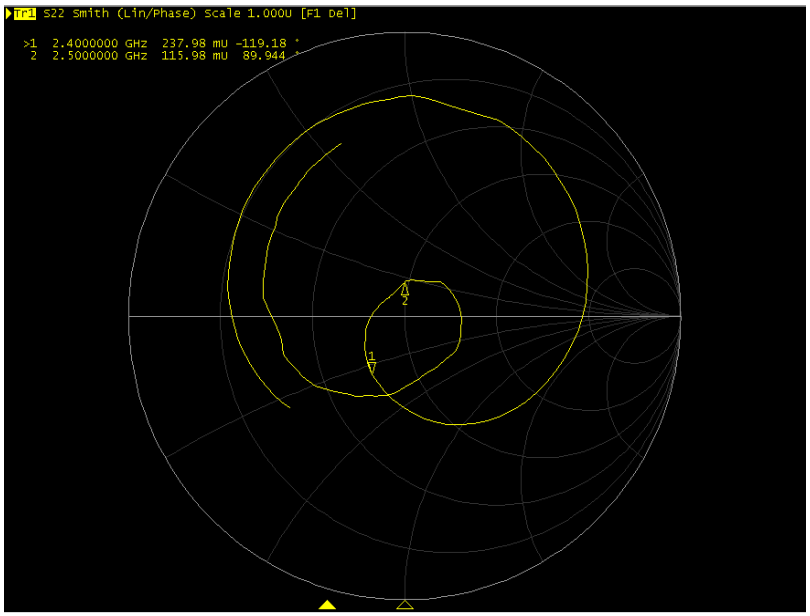
Frequency Range1 (TX)		2400MHz~2485MHz	
Frequency Range1 (RX)		2400MHz~2485MHz	
IMPEDANCE		50 Ω	
V.S.W.R	TX	2400MHz	2485MHz
		3↓	3↓
	RX	2400MHz	2485MHz
		3↓	3↓
RADIATION PATTERN		Omni-directional	
POLARIZATION		Linear	

3. Electrical Characterristics

3.1 VSWR

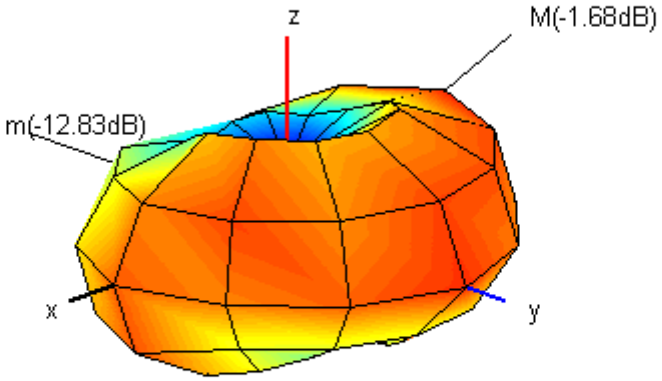


3.2 SMITH CHART

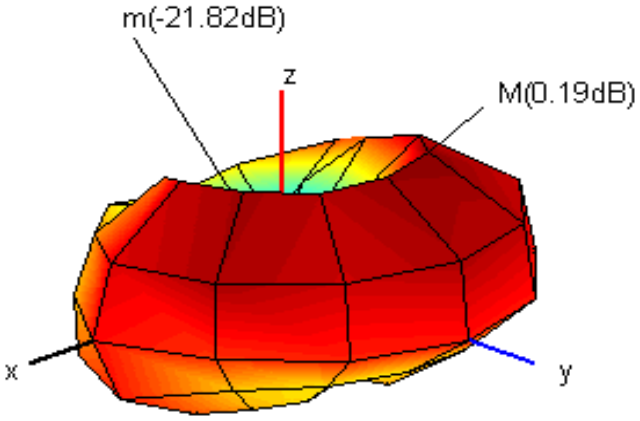


3.3 3D-PLOTs

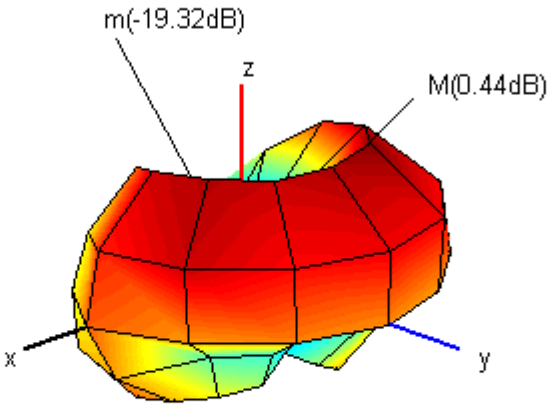
2400MHZ



2445MHZ

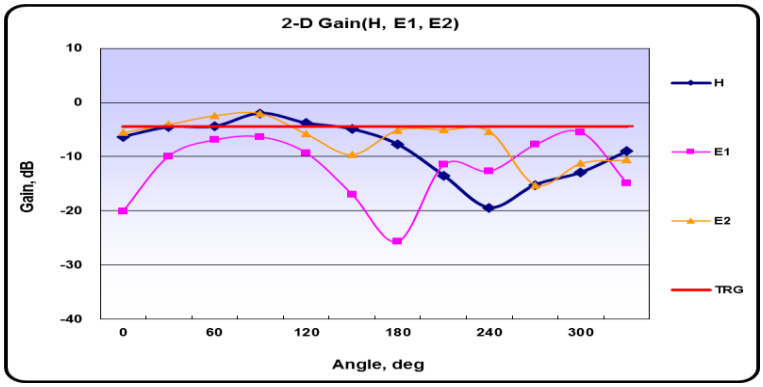


2485MHZ



3.4 2D-GAIN

2400MHZ



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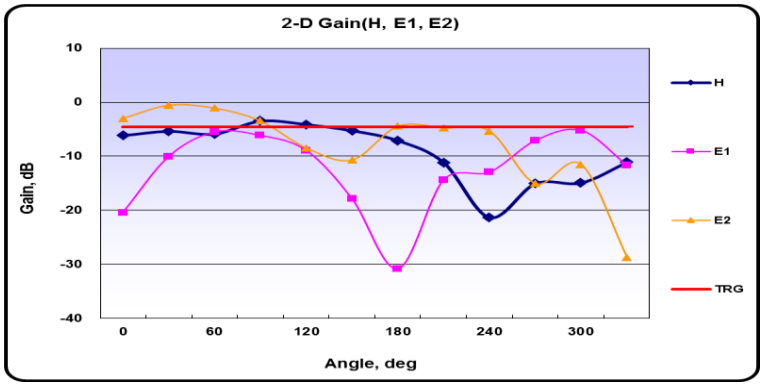

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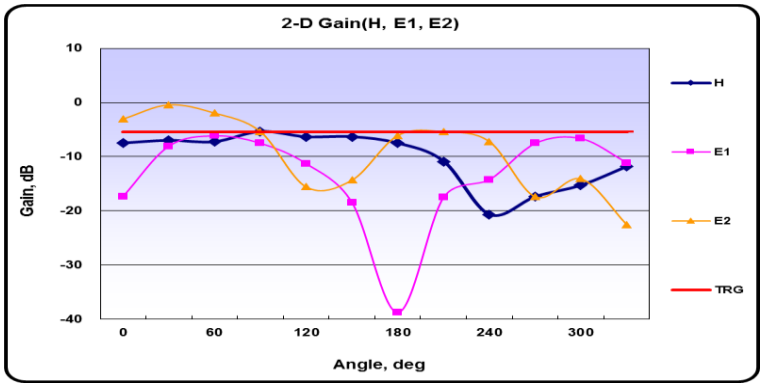


4. Passive Measurement

	1	2	3	4	5	6	7	8	9	10
Frequency(MHz)	**2400**	**2405**	**2410**	**2415**	**2420**	**2425**	**2430**	**2435**	**2440**	**2445**
Efficiency(dB)	**-4.43**	**-4.50**	**-4.38**	**-4.16**	**-3.97**	**-3.89**	**-3.76**	**-4.59**	**-4.52**	**-4.53**
Efficiency(%)	**36.09**	**35.46**	**36.49**	**38.39**	**40.04**	**40.81**	**42.10**	**34.74**	**35.35**	**35.25**
TRG(dB)	**-4.43**	**-4.50**	**-4.38**	**-4.16**	**-3.97**	**-3.89**	**-3.76**	**-4.59**	**-4.52**	**-4.53**
TRG_{Theta}(dB)	-7.19	-7.17	-6.99	-6.73	-6.49	-6.40	-6.16	-6.98	-6.91	-6.92
TRG_{Phi}(dB)	-7.70	-7.89	-7.83	-7.66	-7.54	-7.47	-7.48	-8.33	-8.25	-8.25
UHRG(dB)	-7.54	-7.56	-7.34	-7.06	-6.79	-6.60	-6.36	-7.08	-6.93	-6.87
UHRG/TRG(%)	48.86	49.48	50.62	51.28	52.34	53.57	54.91	56.37	57.33	58.30
H-Plane	-6.40	-6.50	-6.34	-6.18	-6.02	-5.99	-5.93	-6.91	-6.97	-7.06
E1-Plane, AVG(dB)	-9.66	-9.64	-9.46	-9.18	-8.99	-8.92	-8.53	-9.38	-9.22	-9.23
E2-Plane, AVG(dB)	-5.52	-5.42	-5.18	-4.93	-4.54	-4.50	-4.20	-5.01	-4.84	-4.84
Peak Gain(dB)	-1.68	-1.81	-1.78	-1.42	-0.89	-0.79	-0.33	-0.64	-0.33	-0.19
Directivity(dB)	2.74	2.69	2.60	2.73	3.09	3.10	3.43	3.95	4.19	4.34
Minimum Gain(dB)	-12.83	-12.96	-13.69	-14.26	-15.40	-16.17	-16.48	-18.51	-19.78	-21.83

	11	12	13	14	15	16	17	18	19	20
Frequency(MHz)	**2450**	**2455**	**2460**	**2465**	**2470**	**2475**	**2480**	**2485**	**2490**	**2497**
Efficiency(dB)	**-4.65**	**-4.60**	**-5.07**	**-5.21**	**-5.35**	**-5.35**	**-5.47**	**-5.42**	**-5.47**	**-5.59**
Efficiency(%)	**34.25**	**34.71**	**31.11**	**30.16**	**29.18**	**29.20**	**28.39**	**28.68**	**28.40**	**27.62**
TRG(dB)	**-4.65**	**-4.60**	**-5.07**	**-5.21**	**-5.35**	**-5.35**	**-5.47**	**-5.42**	**-5.47**	**-5.59**
TRG_{Theta}(dB)	-7.05	-6.96	-7.47	-7.61	-7.72	-7.74	-7.90	-7.87	-7.94	-8.09
TRG_{Phi}(dB)	-8.38	-8.37	-8.80	-8.92	-9.11	-9.07	-9.14	-9.08	-9.09	-9.18
UHRG(dB)	-6.91	-6.77	-7.20	-7.24	-7.32	-7.26	-7.33	-7.24	-7.22	-7.27
UHRG/TRG(%)	59.51	60.67	61.24	62.61	63.46	64.38	65.19	65.89	66.79	67.85
H-Plane	-7.41	-7.29	-7.89	-8.08	-8.29	-8.25	-8.52	-8.48	-8.65	-8.72
E1-Plane, AVG(dB)	-9.35	-9.29	-9.74	-9.86	-10.00	-9.85	-10.00	-9.97	-10.01	-10.11
E2-Plane, AVG(dB)	-4.93	-4.78	-5.26	-5.43	-5.48	-5.56	-5.70	-5.76	-5.80	-6.02
Peak Gain(dB)	0.13	0.41	0.10	0.24	0.32	0.34	0.30	0.44	0.46	0.34
Directivity(dB)	4.79	5.01	5.17	5.45	5.67	5.69	5.77	5.87	5.93	5.93
Minimum Gain(dB)	-22.75	-20.93	-21.43	-21.33	-20.36	-19.45	-20.44	-19.33	-18.27	-17.34

Average Efficiency	**-4.71dBi,**	**33.82%**
Peak Gain	**0.46dBi**	

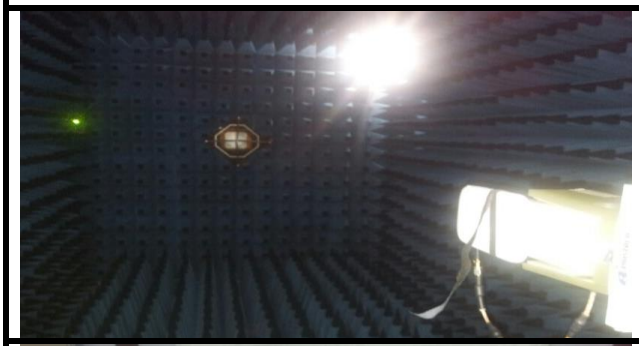
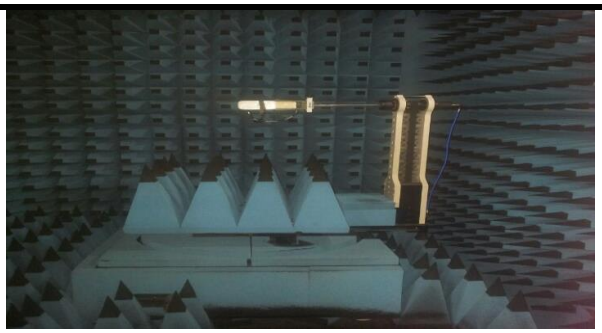
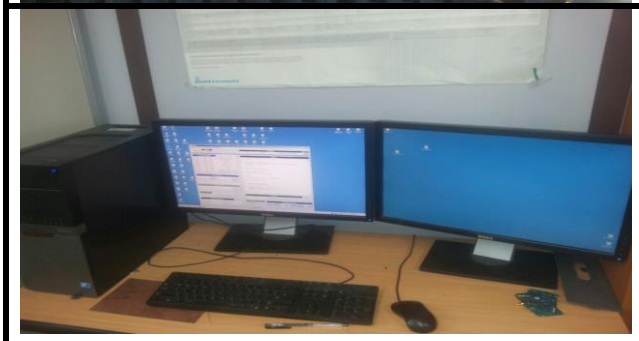
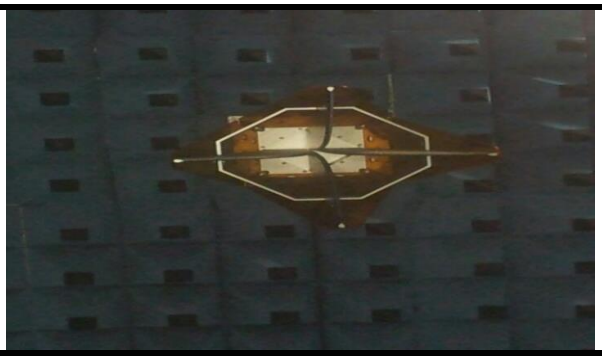
5. Measurement Process

5.1 SWR / Return loss

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

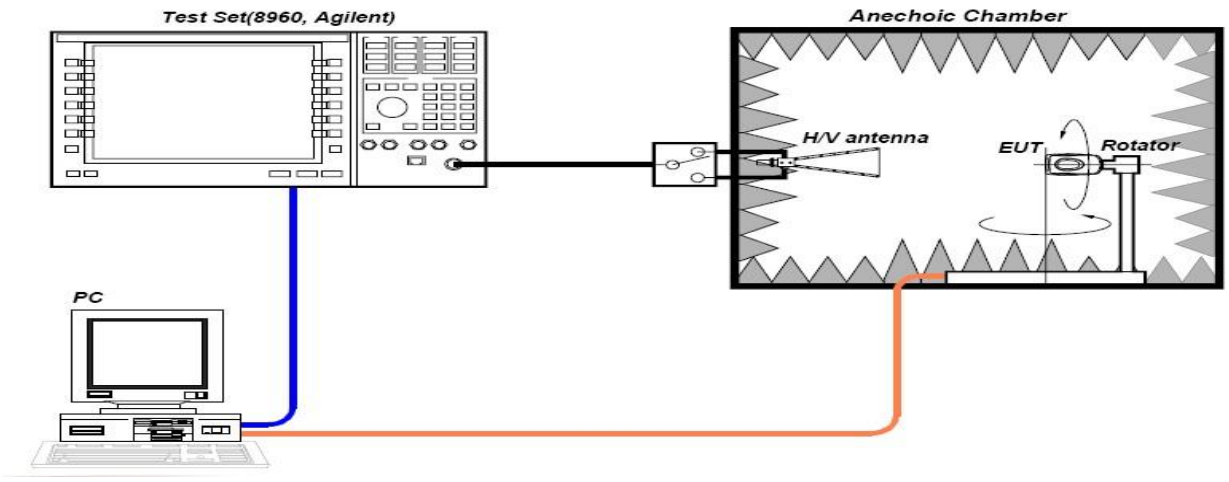
5.2 Gain

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

Anechoic Chamber for Antenna Gain Measurement	
	
	

5.3 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