

2024.01.11

RA-N2301-11

APPROVAL SHEET

MODEL : KANE3
Antenna layout

Review	Consent	Approval

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	PRODUCT APPROVAL SHEET		GRTW23012BE31			
	MODEL NAME	KANE3	REV.	1.0	Page	2 / 10


Table of contents

1. Revision History
2. Product Information
 - 2.1 General Features
 - 2.2 Electrical Specifications
3. Pattern Specifications
4. Matching Network
5. Electrical Characteristics
 - 5.1 VSWR
 - 5.2 Smith Chart
 - 5.3 3D-PLOT
 - 5.4 2D-GAIN
6. Passive Measurement
7. Measurement Process

	PRODUCT APPROVAL SHEET		GRTW23012BE31			
	MODEL NAME	KANE3	REV.	1.0	Page	3 / 10

1. Revision History

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

	PRODUCT APPROVAL SHEET		GRTW23012BE31			
	MODEL NAME	KANE3	REV.	1.0	Page	4 / 10


2. Product Information

2.1 General Features

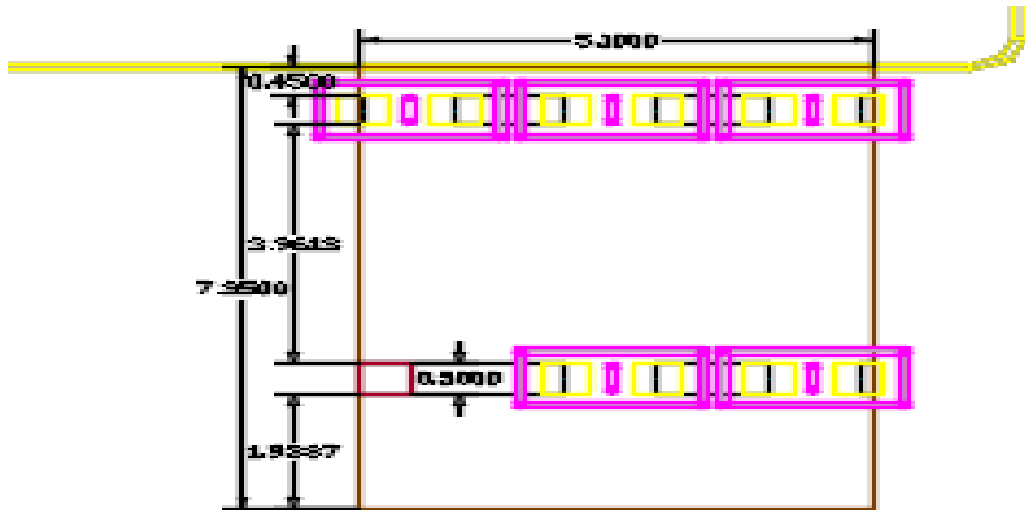
PART NUMBER	GradiANT
ANTENNA TYPE	PCB Pattern Antenna
APPLICATIONS	bluetooth

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	

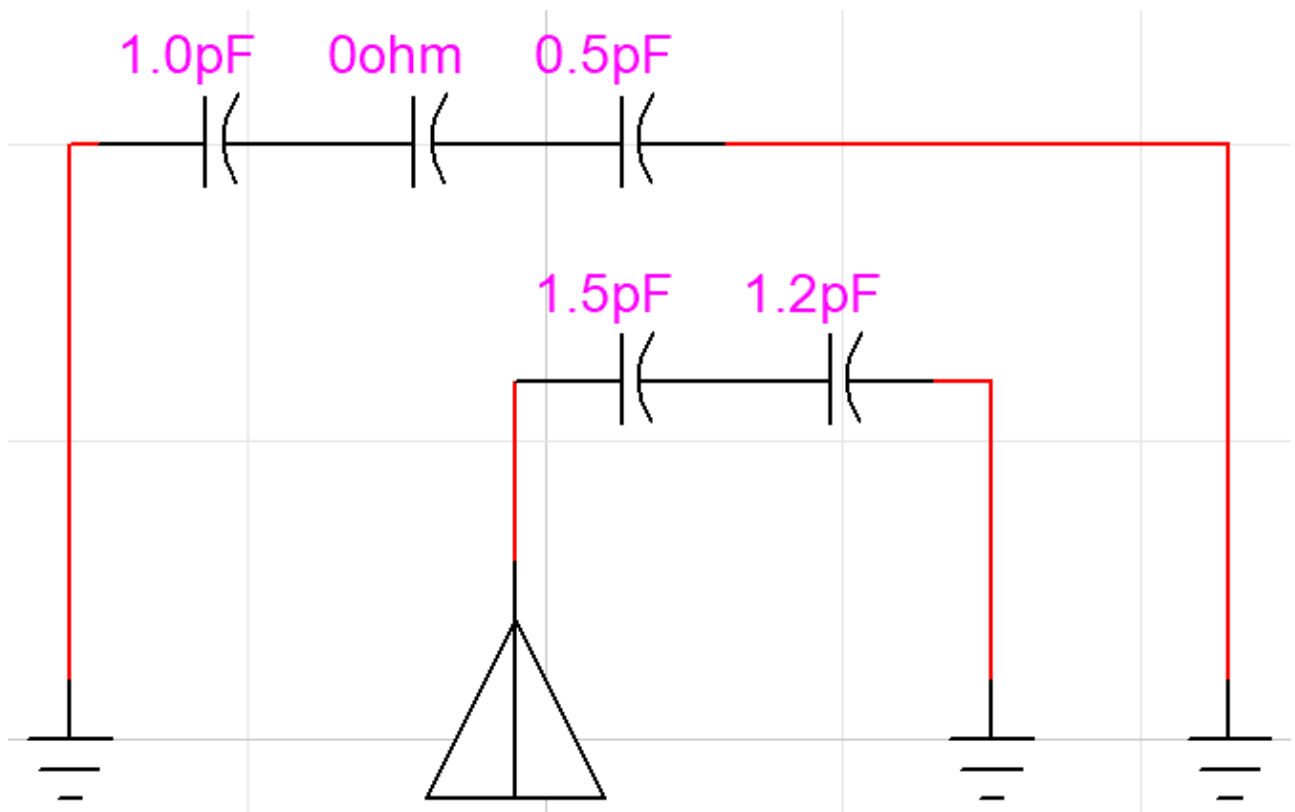
	PRODUCT APPROVAL SHEET		GRTW23012BE31			
	MODEL NAME	KANE3	REV.	1.0	Page	5 / 10


3. Pattern Specifications



4. Matching Network

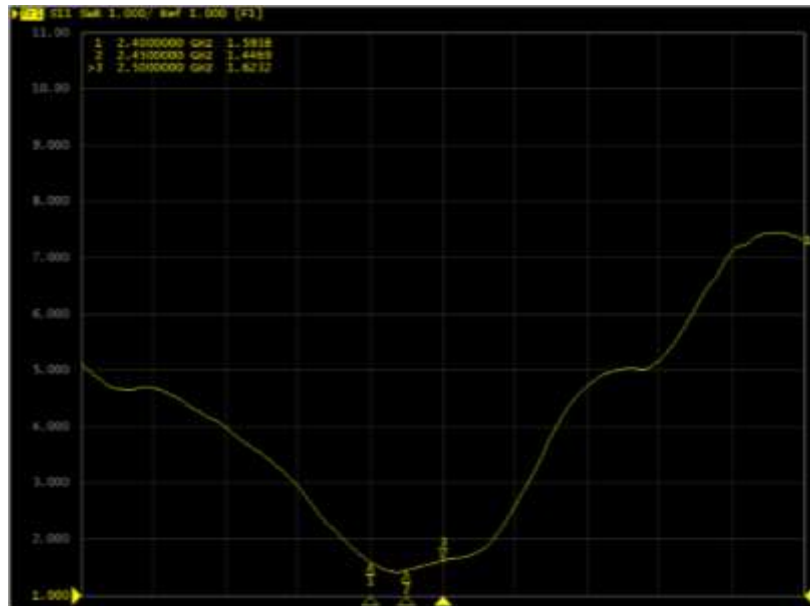
Capacitor value can be changed depending on different situation



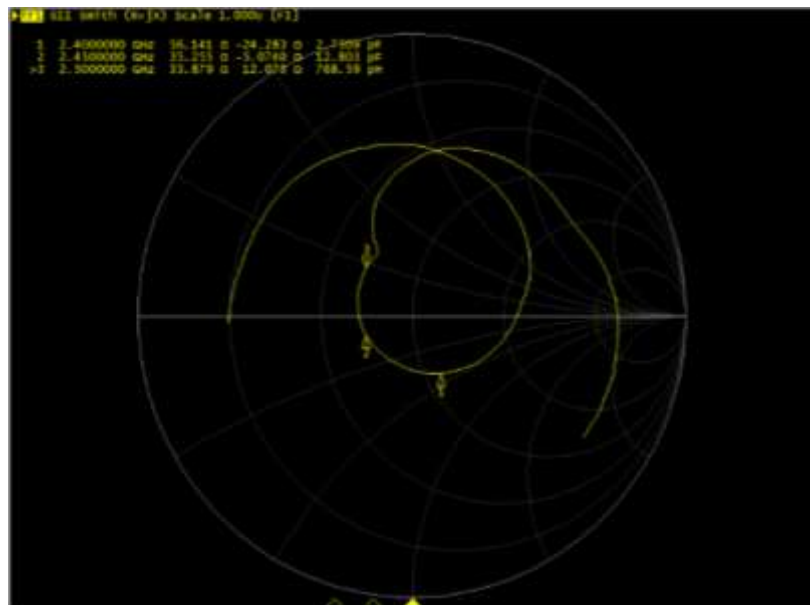
	PRODUCT APPROVAL SHEET		GRTW23012BE31			
	MODEL NAME	KANE3	REV.	1.0	Page	6 / 10


5. Electrical Characteristics

5.1 VSWR

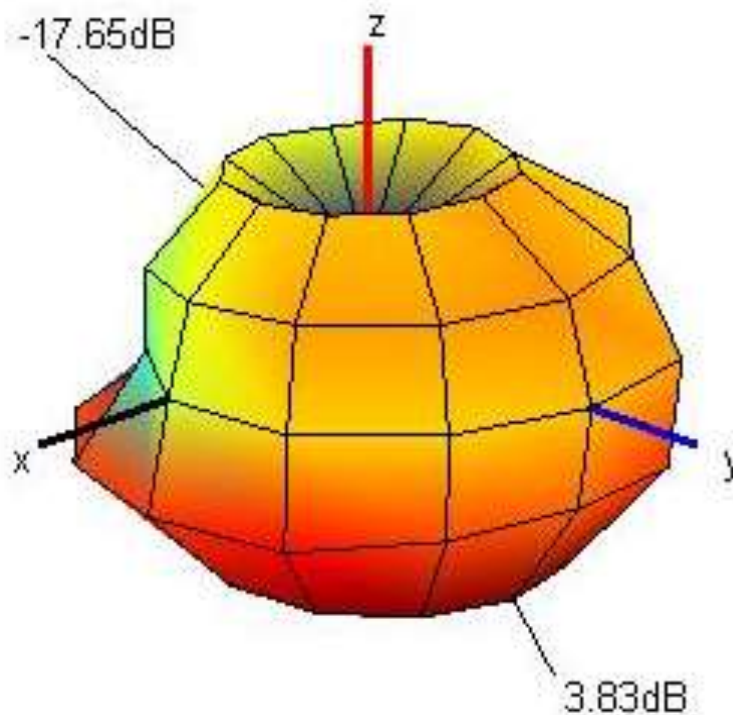


5.2 SMITH CHART

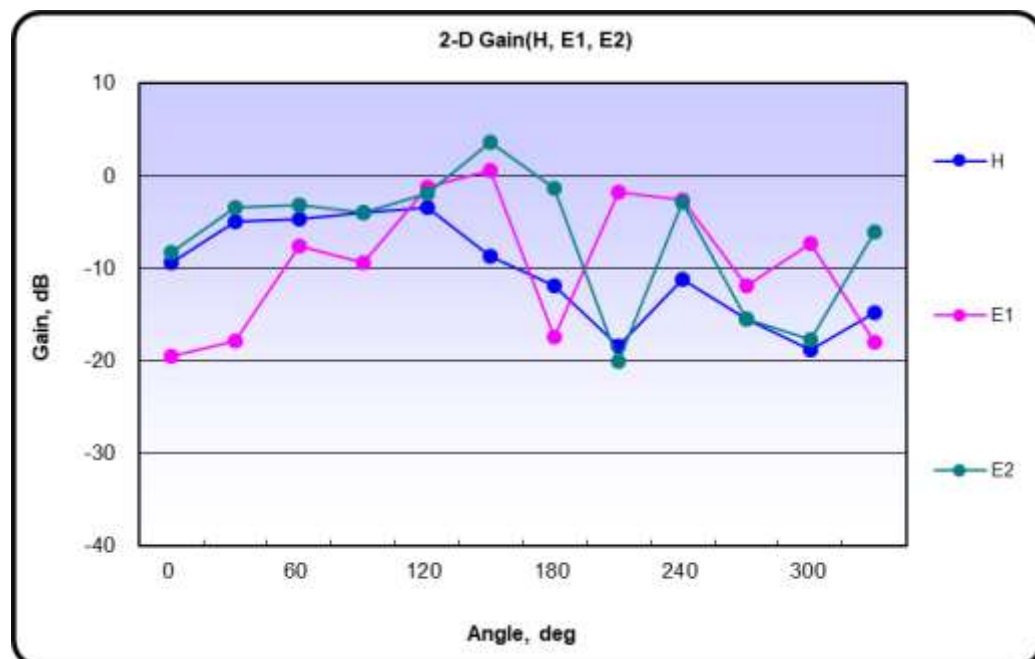



	PRODUCT APPROVAL SHEET		GRTW23012BE31			
	MODEL NAME	KANE3	REV.	1.0	Page	7 / 10

5.3 3D-PLOTs



5.4 2D-GAIN




	PRODUCT APPROVAL SHEET			GRTW23012BE31			
	MODEL NAME	KANE3		REV.	1.0	Page	8 / 10

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]	-2.73	-2.83	-3.01	-3.17	-3.30	-3.11	-2.93	-3.00	-3.14	-3.08
Efficiency [%]	53.3	52.1	50.0	48.2	46.8	48.9	51.0	50.1	48.5	49.2
TRG_θ [dB]	-3.64	-3.70	-3.90	-4.08	-4.18	-4.04	-3.79	-3.88	-4.07	-3.96
Gain_{θ Peak} [dB]	3.57	3.35	3.24	3.54	3.41	3.54	3.77	3.84	3.58	3.71
Gain_{θ Min} [dB]	-22.90	-24.90	-24.24	-25.38	-22.17	-22.27	-19.80	-19.56	-22.56	-20.27
TRG_φ [dB]	-9.97	-10.25	-10.34	-10.39	-10.65	-10.28	-10.36	-10.35	-10.29	-10.43
Gain_{φ Peak} [dB]	-1.16	-1.88	-1.52	-1.84	-2.13	-1.55	-1.64	-1.49	-1.17	-1.92
Gain_{φ Min} [dB]	-30.57	-37.27	-54.02	-38.07	-51.98	-33.64	-32.00	-47.56	-33.47	-51.42
UHRG [dB]	-8.26	-8.34	-8.59	-8.82	-8.98	-8.79	-8.80	-8.82	-8.94	-8.99
UHRG/TRG [%]	28.0	28.2	27.7	27.2	27.0	27.0	25.9	26.2	26.3	25.6
H-Plane	-7.73	-7.86	-7.85	-8.27	-8.25	-8.10	-7.72	-7.70	-7.87	-7.78
E1-Plane, AVG [dB]	-5.06	-5.11	-5.32	-5.63	-5.57	-5.35	-5.18	-5.20	-5.43	-5.08
E2-Plane, AVG [dB]	-2.70	-2.78	-2.96	-3.06	-3.18	-2.97	-2.80	-2.71	-3.22	-2.97
Peak Gain [dB]	3.85	3.59	3.53	3.65	3.55	3.69	3.90	3.95	3.82	3.83
Directivity [dB]	6.58	6.42	6.54	6.82	6.85	6.80	6.83	6.95	6.96	6.91
Minimum Gain [dB]	-20.22	-19.35	-19.02	-18.19	-22.01	-20.47	-18.21	-18.14	-20.20	-17.65


	11	12	13	14	15	16	17	18	19	20
Frequency [MHz]	2450	2455	2460	2465	2470	2475	2480	2485	2490	2497
Efficiency [dB]	-3.33	-3.30	-3.65	-3.80	-3.79	-3.95	-3.89	-4.25	-4.06	-4.18
Efficiency [%]	46.4	46.8	43.1	41.7	41.7	40.2	40.8	37.5	39.2	38.2
TRG_θ [dB]	-4.24	-4.18	-4.55	-4.71	-4.69	-4.83	-4.80	-5.22	-4.98	-5.09
Gain_{θ Peak} [dB]	3.49	3.61	3.16	3.17	3.28	3.05	2.67	2.61	2.86	2.99
Gain_{θ Min} [dB]	-25.38	-21.12	-26.25	-26.55	-27.46	-35.46	-32.78	-37.22	-32.64	-38.29
TRG_φ [dB]	-10.60	-10.63	-10.93	-11.00	-11.10	-11.34	-11.15	-11.27	-11.25	-11.42
Gain_{φ Peak} [dB]	-1.88	-1.65	-2.13	-2.17	-2.10	-2.51	-2.37	-2.37	-2.35	-2.83
Gain_{φ Min} [dB]	-30.26	-33.80	-34.09	-35.27	-40.37	-37.46	-38.39	-30.40	-30.41	-32.81
UHRG [dB]	-9.27	-9.47	-9.72	-9.91	-9.86	-10.24	-9.88	-10.26	-10.11	-10.22
UHRG/TRG [%]	25.5	24.1	24.8	24.5	24.8	23.5	25.2	25.1	24.8	24.9
H-Plane	-7.91	-8.25	-8.02	-8.22	-8.18	-8.27	-7.84	-8.07	-7.69	-7.93
E1-Plane, AVG [dB]	-5.31	-5.22	-5.55	-5.97	-5.62	-6.05	-5.69	-6.19	-6.11	-5.90
E2-Plane, AVG [dB]	-3.15	-3.15	-3.60	-3.73	-3.73	-3.92	-3.94	-4.28	-3.89	-4.06
Peak Gain [dB]	3.58	3.72	3.28	3.24	3.35	3.20	3.34	2.72	2.90	3.04
Directivity [dB]	6.92	7.02	6.94	7.04	7.15	7.15	7.23	6.97	6.96	7.22
Minimum Gain [dB]	-20.42	-18.71	-19.06	-21.99	-21.78	-33.34	-23.10	-27.86	-25.42	-27.33

Average Efficiency	-3.40dBi	45.70%
Peak Gain	3.95dBi	

	PRODUCT APPROVAL SHEET		GRTW23012BE31			
	MODEL NAME	KANE3	REV.	1.0	Page	9 / 10

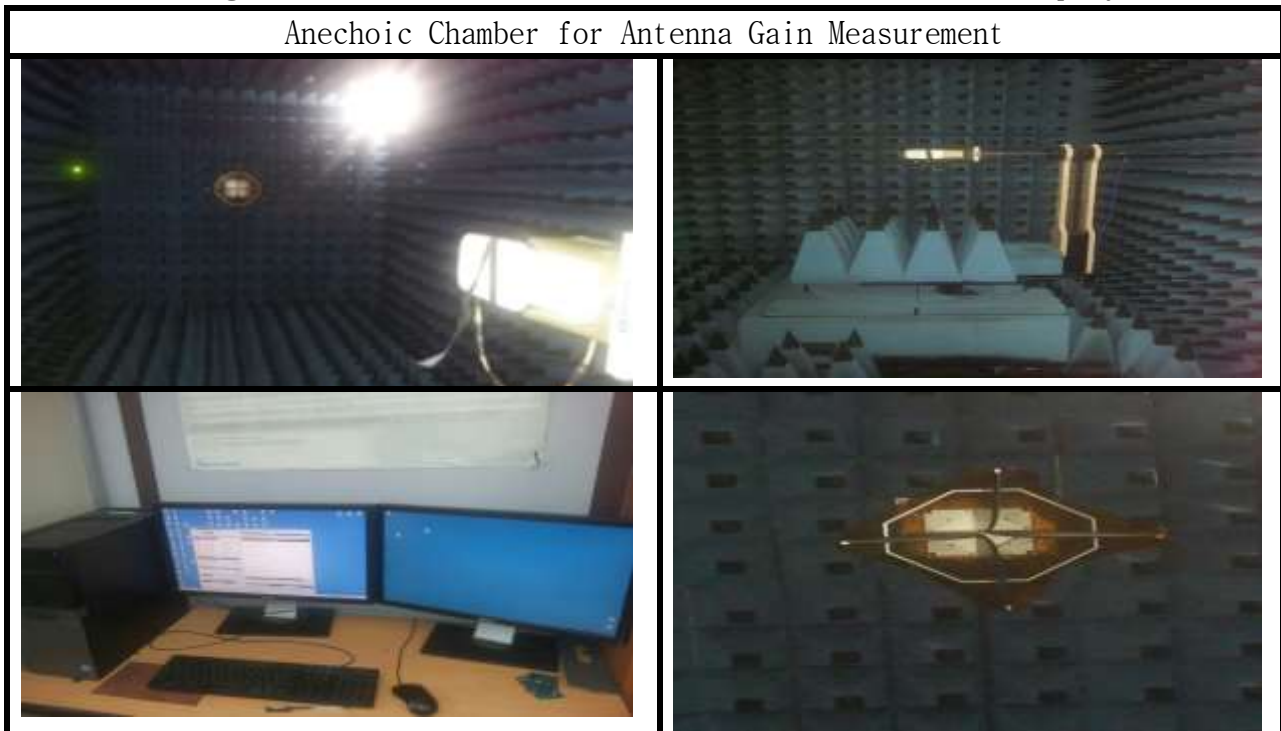
7. Measurement Process

7.1 SWR / Return loss

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

7.2 Gain

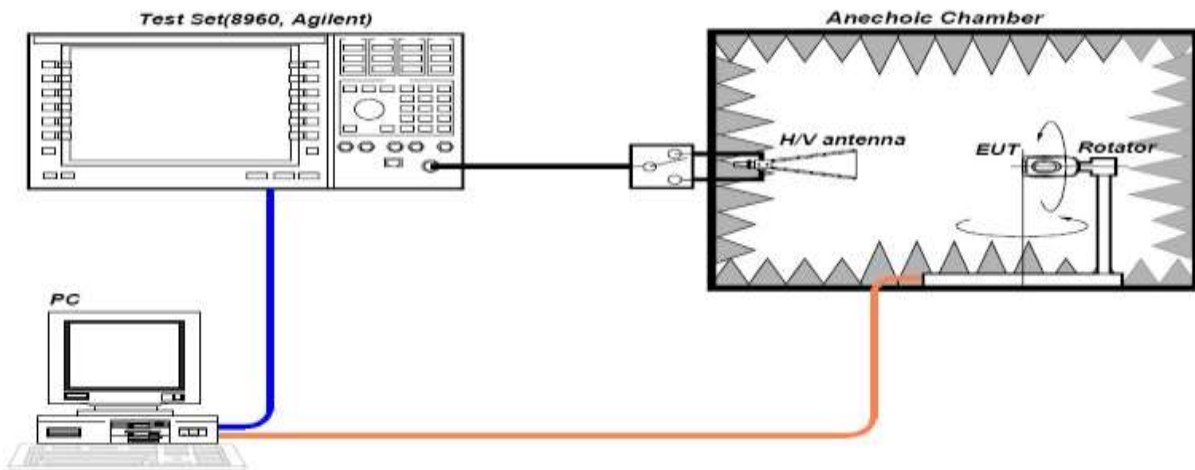
Antenna gain is measured in the anechoic chamber of this company.



7.3 Gain test block diagram

Active test System

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



Passiver test System

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

