2023.10.19

RA-N3210-51

APPROVAL SHEET

MODEL : X-COM3 PRO

Main ANT

Antenna layout

Review	Consent	Approval

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1. Revision History

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2. Product Information

2.1 General Features

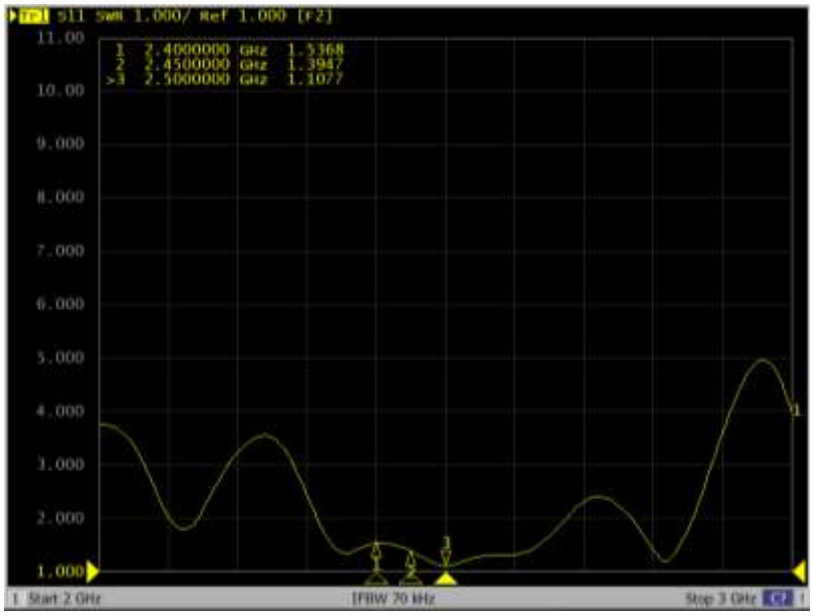
PART NUMBER	GRSN23108MS41
ANTENNA TYPE	Dipole Antenna
APPLICATIONS	Mesh

2.2 Electrical Specifications

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

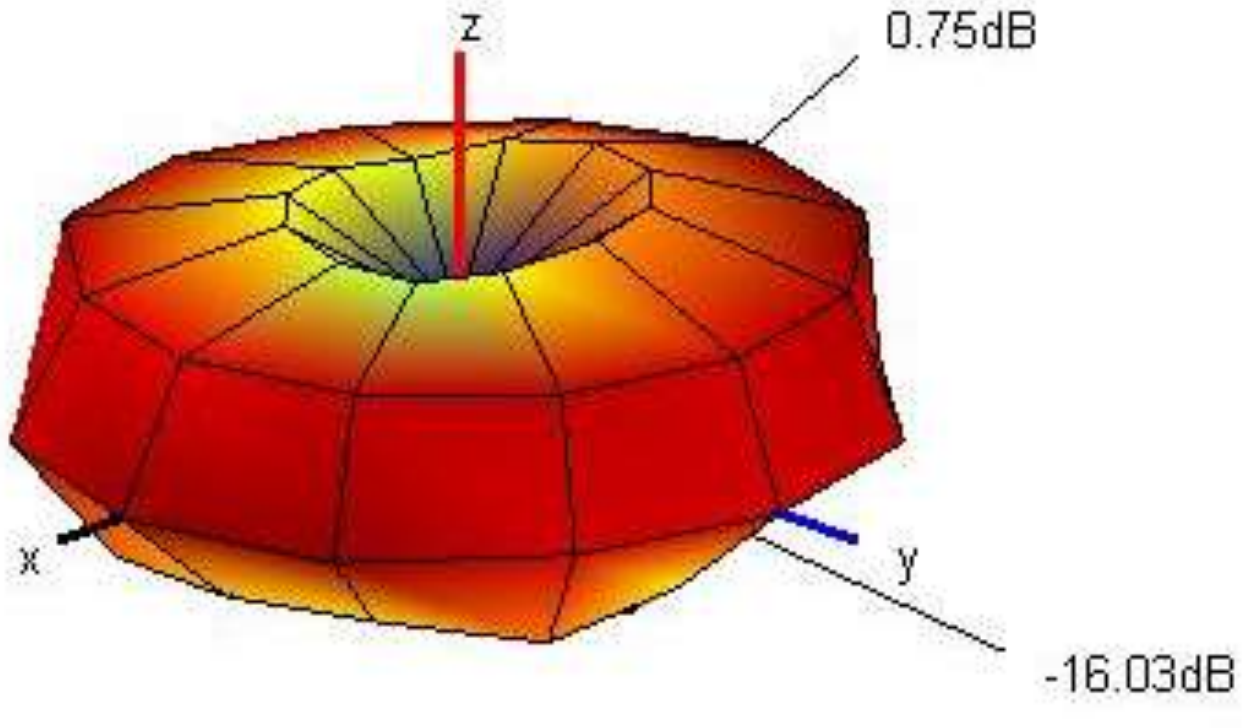
3. Electrical Characterristics

3.1 VSWR

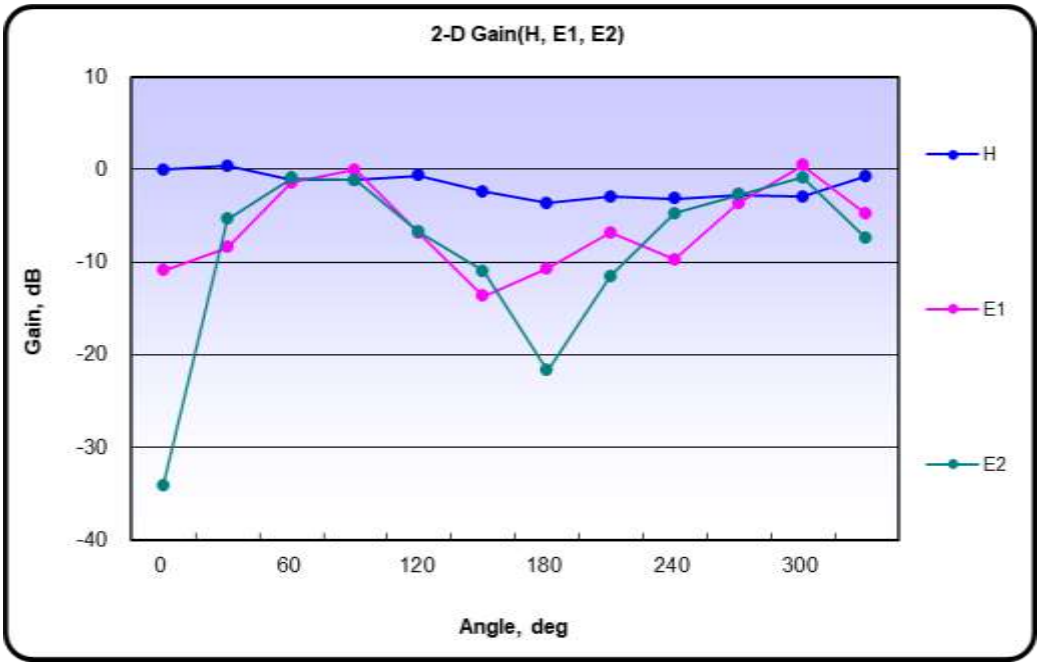


3.2 SMITH CHART

3.3 3D-PLOT



3.4 2D-GAIN



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]	**-3.71**	**-3.60**	**-3.43**	**-3.48**	**-3.56**	**-3.58**	**-3.19**	**-3.08**	**-3.00**	**-2.91**
Efficiency [%]	**42.6**	**43.7**	**45.4**	**44.9**	**44.1**	**43.9**	**47.9**	**49.2**	**50.1**	**51.2**
TRG_{θ} [dB]	-4.37	-4.21	-4.03	-4.01	-4.06	-4.04	-3.61	-3.45	-3.36	-3.24
$Gain_{\theta\ Peak}$ [dB]	-0.71	-0.52	-0.42	-0.09	-0.03	-0.39	-0.05	0.14	0.57	0.70
$Gain_{\theta\ Min}$ [dB]	-27.94	-21.39	-33.83	-27.87	-23.47	-23.15	-19.20	-15.38	-18.96	-17.89
TRG_{φ} [dB]	-12.21	-12.40	-12.35	-12.92	-13.17	-13.54	-13.61	-13.90	-14.04	-14.28
$Gain_{\varphi\ Peak}$ [dB]	-5.76	-5.41	-5.45	-6.93	-6.97	-6.35	-7.26	-6.81	-7.65	-8.53
$Gain_{\varphi\ Min}$ [dB]	-29.06	-29.37	-33.71	-37.71	-32.29	-27.45	-23.37	-33.68	-37.82	-32.22
UHRG [dB]	-5.48	-5.44	-5.22	-5.27	-5.32	-5.39	-5.02	-4.91	-4.85	-4.77
UHRG/TRG [%]	66.5	65.4	66.2	66.3	66.6	65.8	65.6	65.5	65.4	65.1
H-Plane	-4.02	-3.58	-3.43	-3.15	-2.99	-2.90	-2.25	-1.98	-1.82	-1.58
E1-Plane, AVG [dB]	-4.90	-4.82	-4.76	-5.10	-4.94	-5.08	-4.79	-4.55	-4.36	-4.31
E2-Plane, AVG [dB]	-5.53	-5.53	-5.42	-5.14	-5.57	-5.45	-5.01	-5.08	-4.76	-4.68
Peak Gain [dB]	-0.55	-0.44	-0.10	-0.03	0.04	-0.33	0.13	0.34	0.64	0.75
Directivity [dB]	3.16	3.16	3.33	3.45	3.59	3.25	3.33	3.42	3.64	3.66
Minimum Gain [dB]	-19.33	-18.10	-22.75	-18.71	-17.72	-20.80	-16.49	-14.05	-18.90	-16.03

	12	13	14	15	16	17	18	19	20	12
Frequency [MHz]	**2450**	**2455**	**2460**	**2465**	**2470**	**2475**	**2480**	**2485**	**2490**	**2497**
Efficiency [dB]	**-2.92**	**-2.93**	**-3.02**	**-2.92**	**-2.71**	**-2.67**	**-2.72**	**-3.27**	**-3.29**	**-3.13**
Efficiency [%]	**51.0**	**50.9**	**49.9**	**51.1**	**53.6**	**54.1**	**53.4**	**47.1**	**46.8**	**48.7**
TRG_{θ} [dB]	-3.22	-3.21	-3.28	-3.18	-2.94	-2.89	-2.93	-3.46	-3.48	-3.28
$Gain_{\theta\ Peak}$ [dB]	0.43	0.75	0.35	0.42	0.82	0.83	0.94	0.01	0.37	-0.04
$Gain_{\theta\ Min}$ [dB]	-20.72	-18.56	-19.04	-19.07	-19.77	-19.34	-18.56	-28.68	-22.50	-21.36
TRG_{φ} [dB]	-14.66	-14.97	-15.47	-15.20	-15.65	-15.70	-16.13	-16.98	-17.16	-17.71
$Gain_{\varphi\ Peak}$ [dB]	-9.00	-9.32	-8.83	-9.62	-9.48	-9.93	-11.39	-12.55	-10.55	-11.46
$Gain_{\varphi\ Min}$ [dB]	-35.65	-52.84	-35.43	-37.16	-31.94	-30.91	-36.20	-35.08	-34.87	-39.94
UHRG [dB]	-4.81	-4.87	-4.95	-4.88	-4.73	-4.69	-4.75	-5.35	-5.41	-5.27
UHRG/TRG [%]	64.7	64.1	64.2	63.7	62.8	62.7	62.8	62.0	61.5	61.1
H-Plane	-1.47	-1.42	-1.44	-1.26	-0.93	-0.86	-0.94	-1.41	-1.42	-1.30
E1-Plane, AVG [dB]	-4.41	-4.37	-4.40	-4.56	-4.22	-4.15	-4.36	-4.65	-4.89	-4.56
E2-Plane, AVG [dB]	-4.94	-4.68	-4.91	-4.60	-4.36	-4.34	-4.50	-4.82	-5.04	-4.68
Peak Gain [dB]	0.57	0.80	0.42	0.47	0.83	0.88	0.94	0.04	0.37	-0.03
Directivity [dB]	3.49	3.73	3.44	3.39	3.54	3.54	3.67	3.31	3.67	3.10
Minimum Gain [dB]	-18.72	-16.94	-18.37	-18.38	-18.75	-18.35	-18.34	-24.40	-19.75	-20.45

Average Efficiency	**-3.14dBi**	**48.47%**
Average Efficiency	**0.94dBi**	

5. Measurement Process

5.1 SWR / Return loss

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

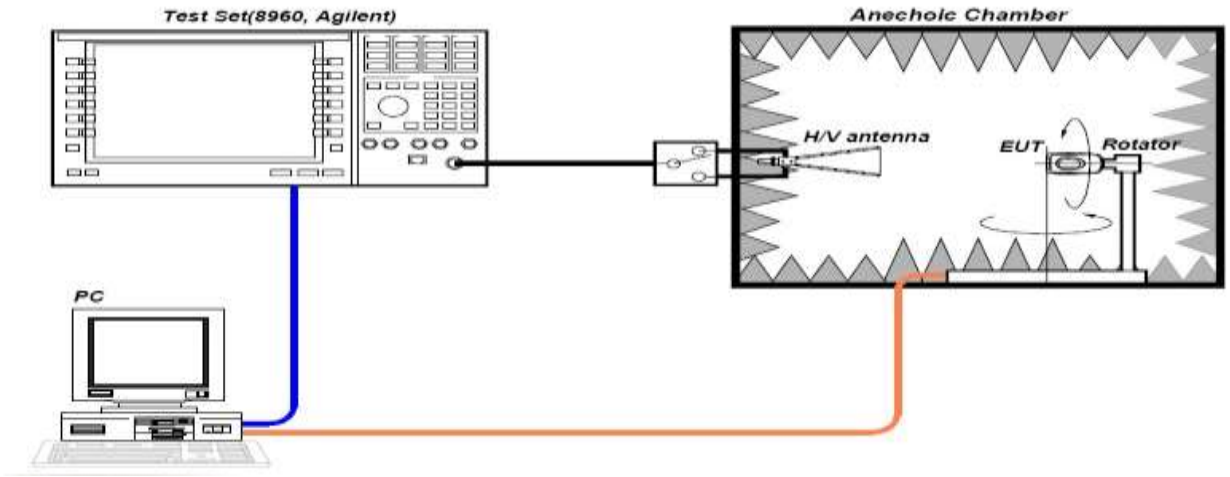
5.2 Gain

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