



HuiZhou Speed Wireless Technology CO., LTD.
Taiwan Speed Wireless Technology CO.,LTD.

Antenna Specification Datasheet

Customer Name : Wistron

Date : 2023.11.17.

OEM P/N	XXXXXXXXXX
SPEED P/N	F-0Q-FS-6156-001-00
Version	A

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天線廠牌: SPEED

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Project Name : FGR-70G	Author : Yahsen	File Name : 4G+5G Antenna
Date : 2023.11.17	Check : Eison	
Rev : A		
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Revision History

Date	Revision	Description of changes
2023-11-17	A	First release

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1. Test Criteria

Test Criteria

Radiation gain measurement shall be made with the antennas installed in the intended notebook system. This specification evaluates performance of antenna at a system level with the antennas operating in a manner similar to customer use.

1.1 Test setup, Processes and Criteria

The gain measurement shall follow by following conditions:

- It is required that all the antenna gain to be measured spherically and computed by spatial average be computed of the resultant gain.
- During gain measurement, all other antennas not under test should be terminated by 50 Ohm load in end of cable.
- Space points of 3D gain measurement are increase by specific steps from Theta 0~180 degrees, and Phi, 0~360 degrees, as figure below. The increment steps are different steps are different by antenna functions, besides WiMAX defined in sections of WiMax antenna gain specifications, gain measurement to other function of antennas s should following steps table below.

Theta Start	15 degree	Phi Start	0 degree
Theta Stop	165 degree	Phi Stop	360 degree
Theta Increment	15 degree	Phi Increment	15 degree

1.2. Test Environment

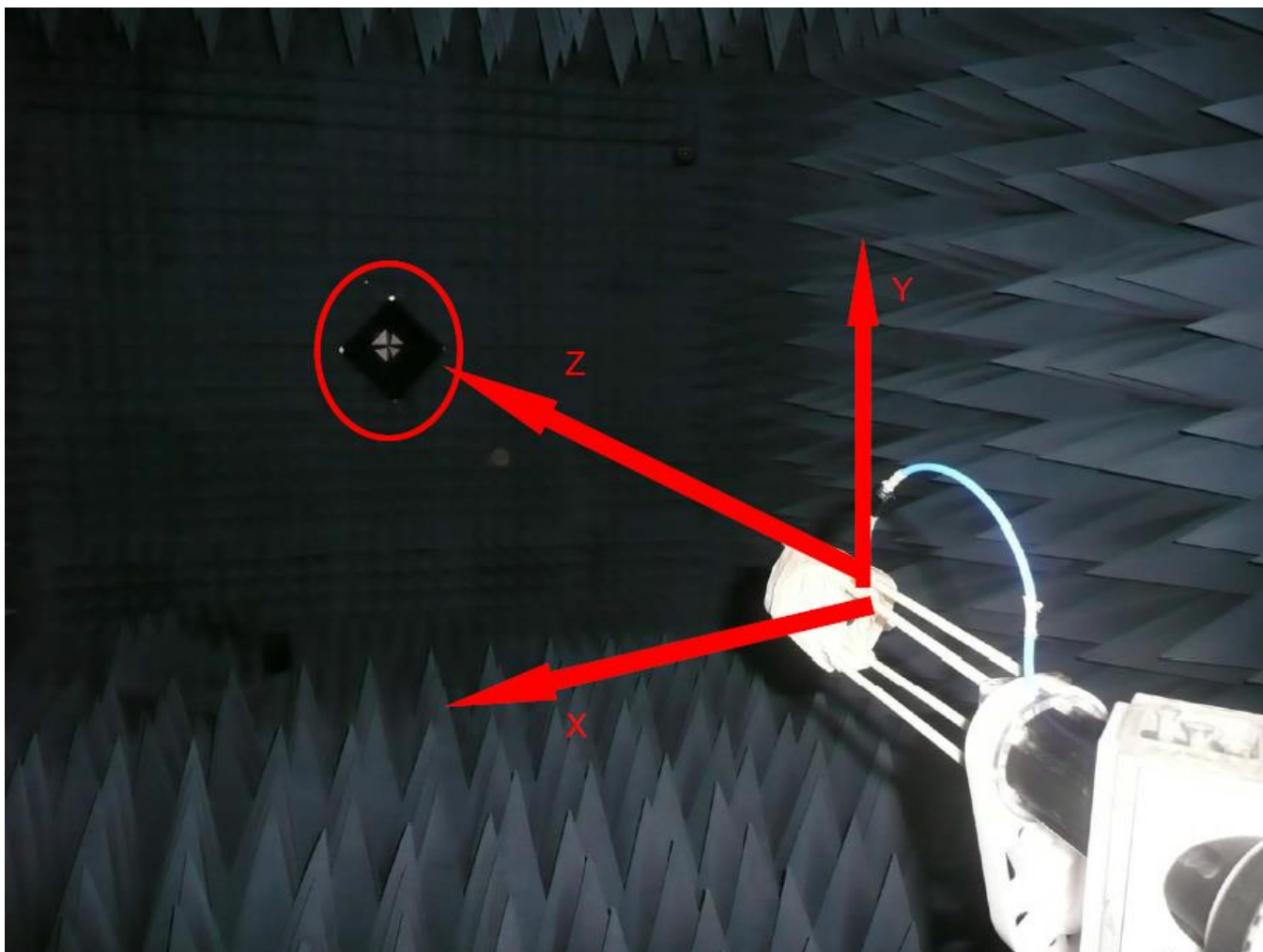
The testing of antenna gain should be made at a CTIA qualified lab with an RF anechoic chamber with at least 3-meter separation from the receive antenna to the antenna under test. The antenna gain report from unqualified lab can't be referenced a passing. Besides, all test equipment including horn antennas, adapters, cables, network analyzers, and receivers shall be calibrated per manufacturer's minimum calibration requirements.

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1.2.1 LTE Antenna Test Environment

The RF anechoic chamber must be lined with absorptive material rated at a minimum frequency range from 600 MHz to 7.125 GHz.

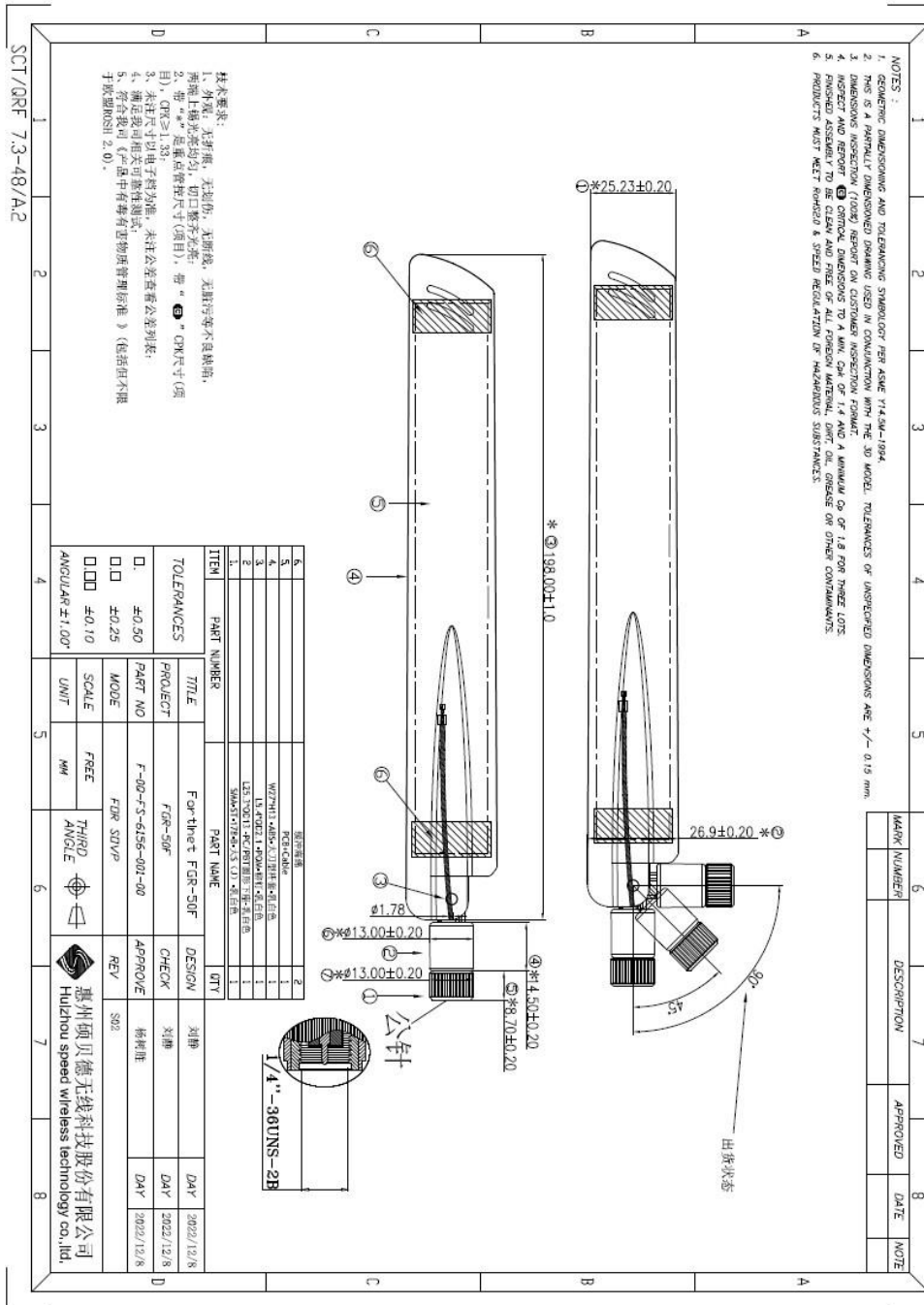
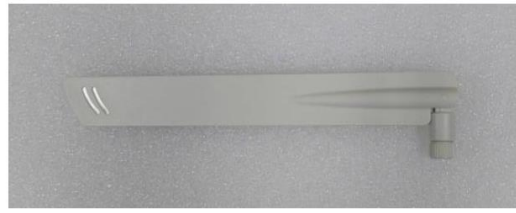
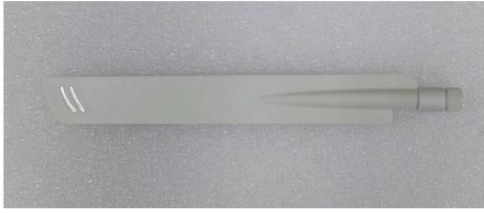
1.2.2 Test Conditions



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1.3 Antenna Drawing

Antenna type/ connector type : Dipole/SMA



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2 Antenna Gain Specification

In order to ensure compliance with customers and worldwide carrier specification, it's required that antenna gain should be measured to meet customers antenna specification. It should be measured spherically and spatial average be computed of the resultant gain, and cover all the necessary required frequencies listed in the latest antenna format.

2.1 LTE Antenna Requirements

This specification evaluates performance of antenna at a system level with the antennas operating in a manner similar to customer use. It is required that all the antenna gain should be measured spherically and a spatial average be computed of the resultant gain.

2.2 LTE Antenna Frequency Bands

The following table documents the frequency requirements of LTE antenna assemblies for customers products.

Description	Frequency
LTE (sub 6G)	0.617-0.960GHz
	1.452-2.690GHz
	3.3-4.2 GHz
	5-5.925 GHz
WIFI 6E	5.925-7.125 GHz

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3 S-Parameter Measurement Result

3.1. Reflection coefficient :

(1) Instrument : Network Analyzer.

(2) Setup :

(3) Calibrate the Network Analyzer by one port calibration using O.S.L. calibration kits.

(4) Connect the antenna under test to the Network Analyzer.

(5) Measure the S11(reflection coefficient) shown in Fig. 1.

(6) Generally, the S11 is less than -10dB to ensure the 90% power into antenna and only less than 10% power back to system.

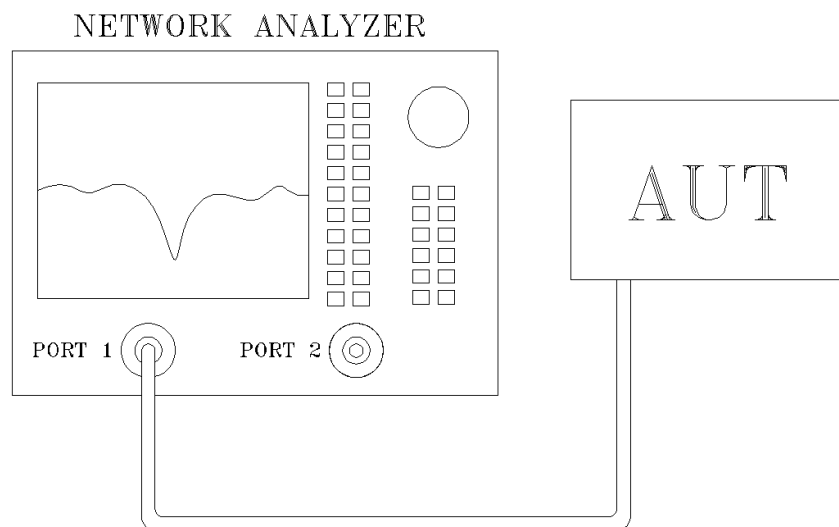
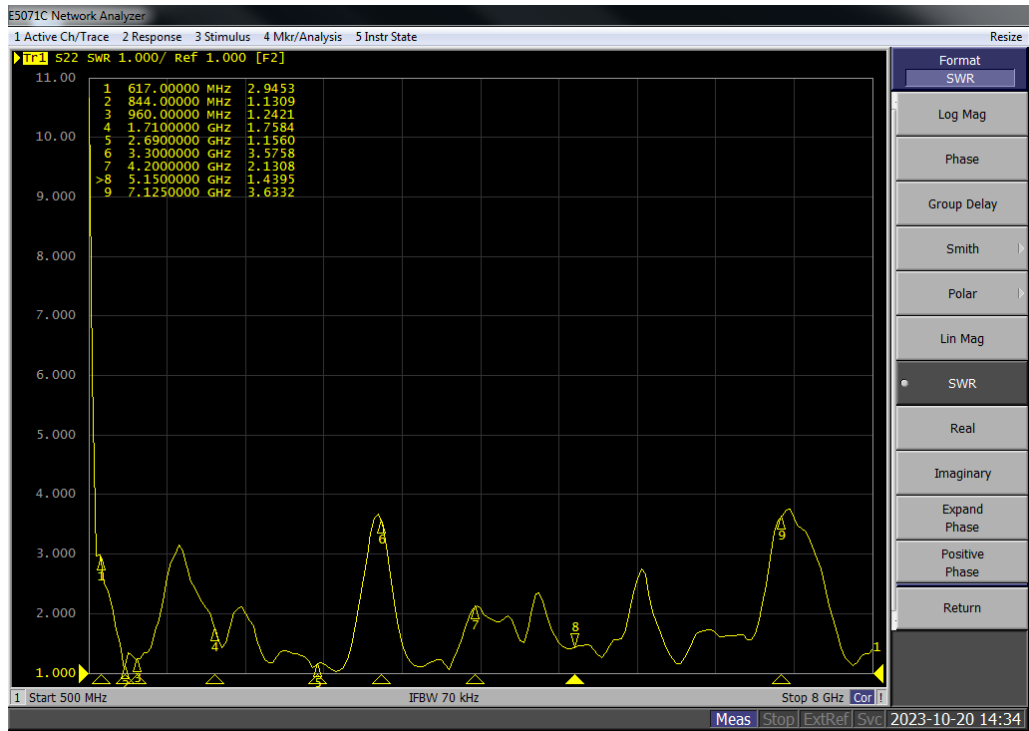
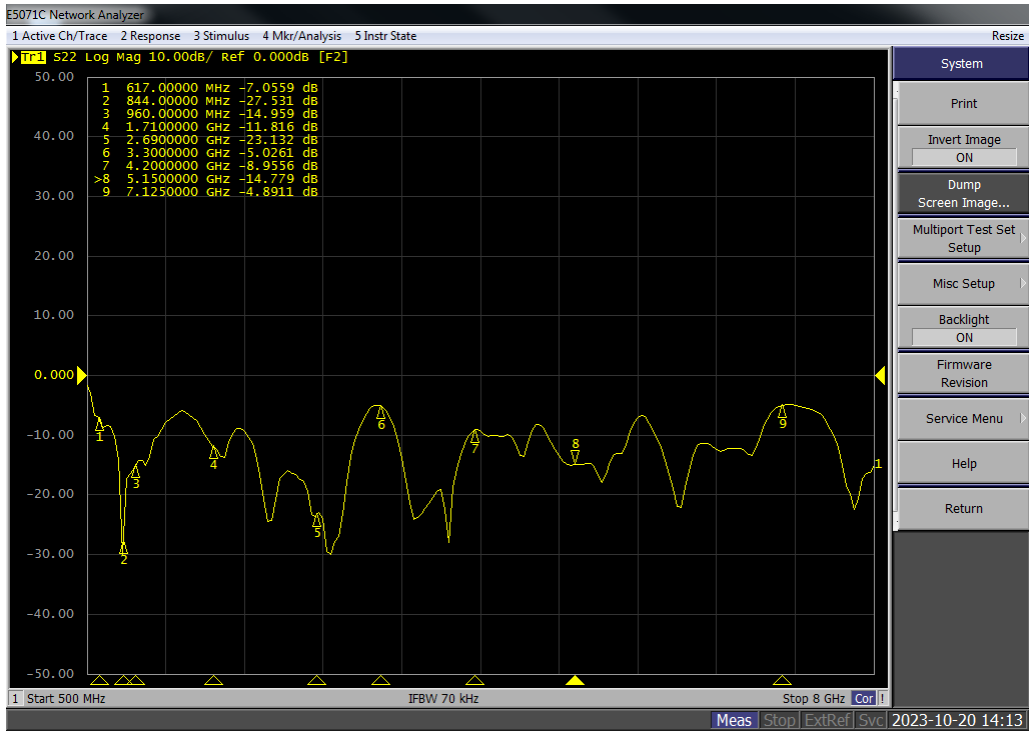


Fig.1 Antenna measured in Network Analyzer

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Return Loss & VSWR



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4. Antenna Performance Test

4.1 Antenna+Cable Measurement Gain Value

Frequency (GHz)	Peak Gain (dBi)	AVG Gain (dBi)	3D Radiation Efficiency(%)
0.617	-0.04	-3.65	43.15
0.6345	-0.3	-3.98	39.99
0.652	-0.27	-3.78	41.88
0.663	-0.55	-3.89	40.83
0.6805	-0.83	-3.74	42.27
0.698	-0.83	-3.33	46.45
0.699	-0.98	-3.4	45.71
0.703	-0.7	-3.28	46.99
0.704	-0.76	-3.28	46.99
0.7075	-0.88	-3.46	45.08
0.71	-0.86	-3.53	44.36
0.716	-0.76	-3.58	43.85
0.717	-0.73	-3.48	44.87
0.7225	-0.3	-3.15	48.42
0.728	-0.52	-3.32	46.56
0.729	-0.52	-3.46	45.08
0.734	-0.83	-3.74	42.27
0.7375	-0.45	-3.35	46.24
0.74	-0.33	-3.2	47.86
0.746	-0.28	-3.2	47.86
0.748	-0.58	-3.5	44.67
0.751	-0.62	-3.49	44.77
0.756	-0.53	-3.53	44.36
0.758	-0.62	-3.55	44.16

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Frequency (GHz)	Peak Gain (dBi)	AVG Gain (dBi)	3D Radiation Efficiency(%)
0.763	-0.26	-3.2	47.86
0.768	-0.72	-3.63	43.35
0.777	-0.47	-3.31	46.67
0.7805	-0.43	-3.35	46.24
0.782	-0.33	-3.35	46.24
0.787	-0.49	-3.59	43.75
0.788	-0.53	-3.51	44.57
0.791	-0.39	-3.43	45.39
0.798	0.3	-2.81	52.36
0.803	1.87	-2.61	54.83
0.814	1.72	-2.74	53.21
0.815	1.59	-2.81	52.36
0.821	1.49	-2.46	56.75
0.824	-0.53	-3.5	44.67
0.83	-0.39	-3.34	46.34
0.832	0.35	-2.77	52.84
0.8365	1.82	-2.6	54.95
0.8375	1.72	-2.77	52.84
0.845	1.65	-2.84	52.00
0.849	1.56	-2.4	57.54
0.859	-0.47	-3.47	44.98
0.86	-0.37	-3.37	46.03
0.862	0.38	-2.84	52.00
0.869	1.79	-2.64	54.45

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Frequency (GHz)	Peak Gain (dBi)	AVG Gain (dBi)	3D Radiation Efficiency(%)
0.875	1.3	-2.51	56.10
0.88	1.22	-2.53	55.85
0.89	1.19	-2.67	54.08
0.894	1.01	-2.87	51.64
0.8975	1.19	-2.87	51.64
0.915	2	-2.72	53.46
0.925	2.3	-2.73	53.33
0.9425	1.92	-3.37	46.03
0.96	2.08	-3.14	48.53
1.452	1.07	-3.14	48.53
1.474	1.13	-2.96	50.58
1.496	1.18	-2.9	51.29
1.71	2.4	-2.36	58.08
1.7325	2.96	-1.96	63.68
1.745	2.96	-2.17	60.67
1.7499	2.9	-2.15	60.95
1.755	2.41	-2.45	56.89
1.78	1.9	-2.83	52.12
1.785	1.93	-2.7	53.70
1.805	1.97	-2.62	54.70
1.8425	1.56	-2.36	58.08
1.85	1.03	-2.79	52.60
1.88	1.21	-2.41	57.41
1.8825	1.3	-2.32	58.61

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Frequency (GHz)	Peak Gain (dBi)	AVG Gain (dBi)	3D Radiation Efficiency(%)
1.9	1.12	-2.26	59.43
1.91	1.52	-1.87	65.01
1.915	1.68	-1.81	65.92
1.92	1.43	-2.25	59.57
1.93	1.56	-2.33	58.48
1.95	1.56	-2.59	55.08
1.96	1.62	-2.5	56.23
1.9625	1.69	-2.41	57.41
1.98	1.41	-2.59	55.08
1.99	1.34	-2.56	55.46
1.995	1.18	-2.69	53.83
2.01	0.44	-3.16	48.31
2.018	0.37	-3.19	47.97
2.025	0.05	-3.57	43.95
2.11	0.6	-2.4	57.54
2.1325	0.85	-2.1	61.66
2.14	0.77	-2.18	60.53
2.155	0.68	-2.39	57.68
2.17	0.71	-2.39	57.68
2.2	0.22	-2.96	50.58
2.3	1.12	-2.16	60.81
2.305	0.29	-2.12	61.38
2.31	0.3	-2.02	62.81
2.315	0.41	-1.96	63.68

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Frequency (GHz)	Peak Gain (dBi)	AVG Gain (dBi)	3D Radiation Efficiency(%)
2.35	0.25	-2.03	62.66
2.355	0.92	-2.11	61.52
2.36	0.81	-2.11	61.52
2.4	0.31	-2.5	56.23
2.496	0.22	-2.57	55.34
2.5	-0.29	-3.12	48.75
2.535	0.82	-2.27	59.29
2.57	0.85	-2.13	61.24
2.593	0.94	-1.96	63.68
2.595	0.7	-2.26	59.43
2.62	0.75	-2.27	59.29
2.655	0.42	-2.72	53.46
2.69	2.62	-3.32	46.56
3.3	-0.2	-3.25	47.32
3.4	0.1	-3.53	44.36
3.5	0.26	-2.03	62.66
3.55	0.02	-3.66	43.05
3.6	-0.05	-3.31	46.67
3.625	-0.1	-3.54	44.26
3.7	0.03	-2.84	52.00
3.75	-0.16	-3.32	46.56
3.8	0.06	-3.33	46.45
4.2	0.19	-3.3	46.77
4.4	1.51	-3.49	44.77
4.7	1.69	-2.02	62.81
5	2.53	-2.46	56.75
5.15	2.54	-2.91	51.17
5.25	1.88	-3.01	50.00
5.35	1.8	-2.37	57.94
5.47	2.36	-3.35	46.24

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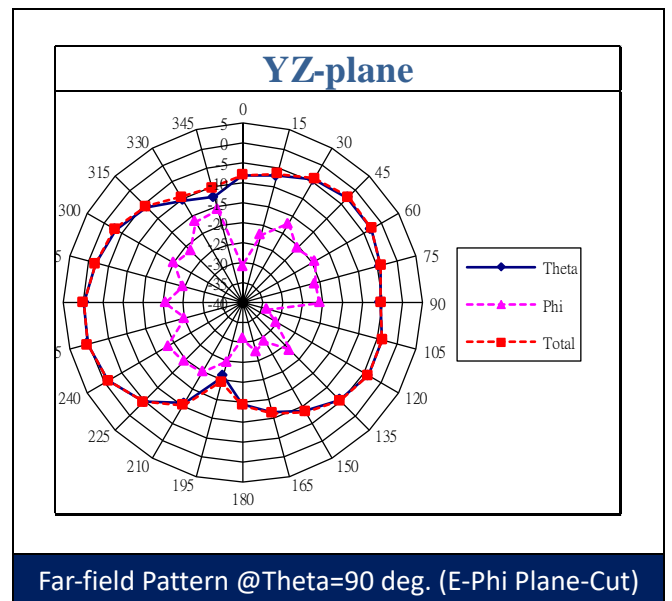
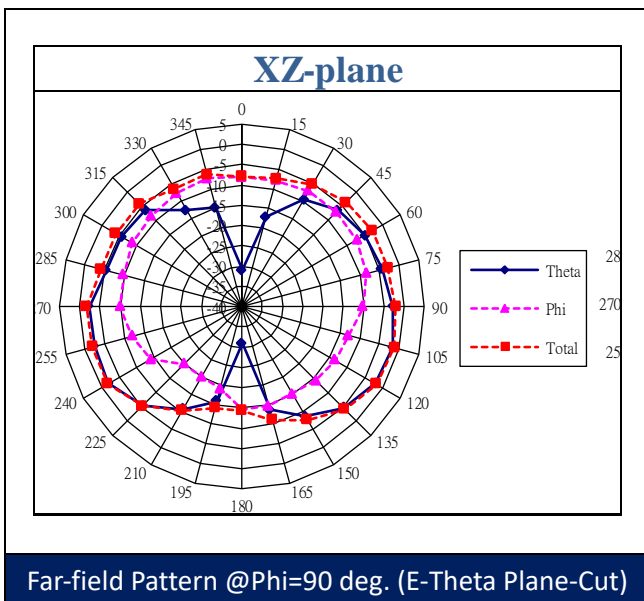
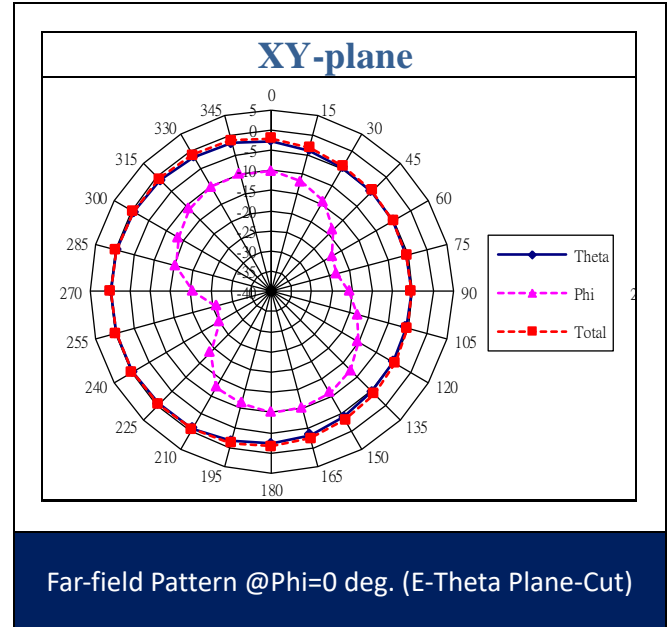
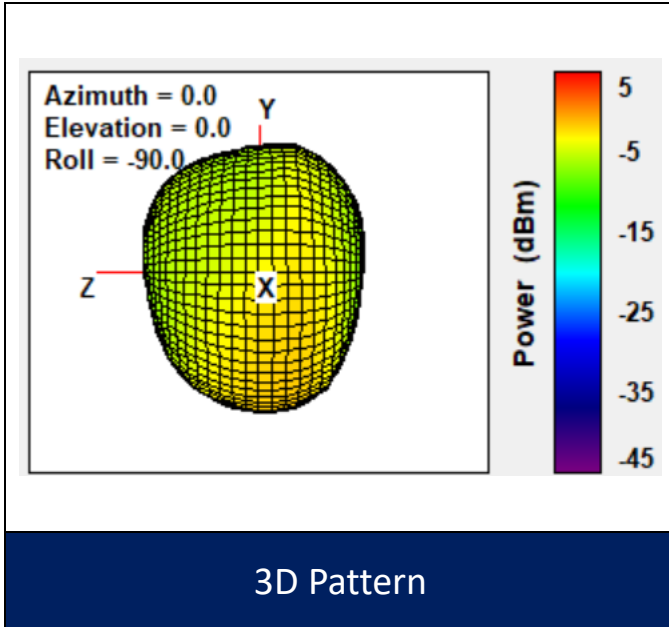
Frequency (GHz)	Peak Gain (dBi)	AVG Gain (dBi)	3D Radiation Efficiency(%)
5.5375	2.45	-2.55	55.59
5.6	2.12	-3.19	47.97
5.725	1.85	-2.56	55.46
5.785	2.5	-3.2	47.86
5.85	1.93	-2.79	52.60
5.925	1.59	-2.75	53.09
6	1.89	-3.45	45.19
6.125	1.72	-3.44	45.29
6.225	1.18	-3.34	46.34
6.325	0.29	-3.18	48.08
6.425	0.91	-2.97	50.47
6.525	1.5	-2.64	54.45
6.625	1.08	-3.41	45.60
6.725	2.37	-3.03	49.77
6.875	2.4	-2.87	51.64
6.925	2.32	-3.68	42.85
7	2.09	-3.9	40.74
7.125	1.89	-3.61	43.55

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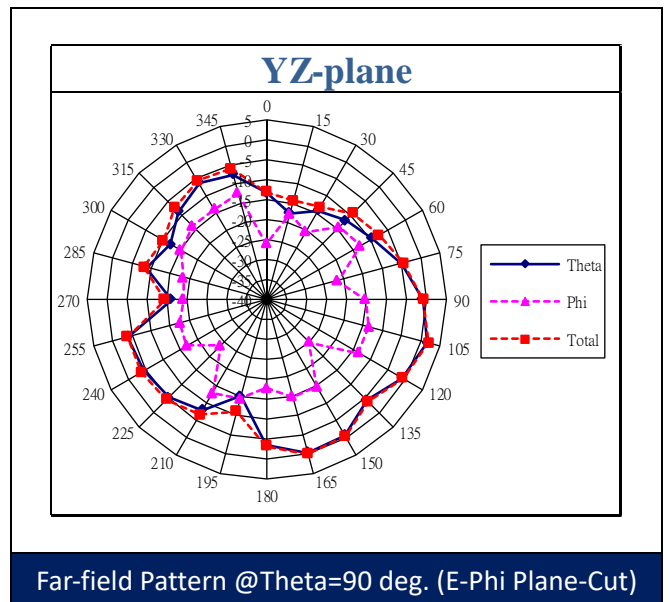
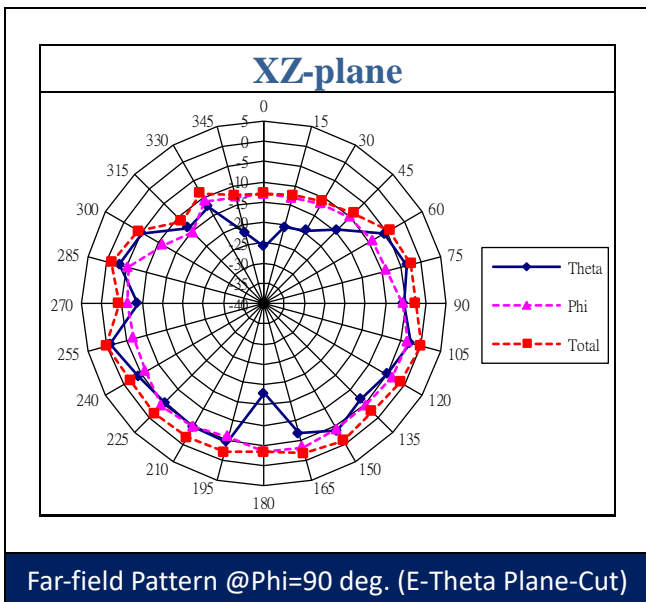
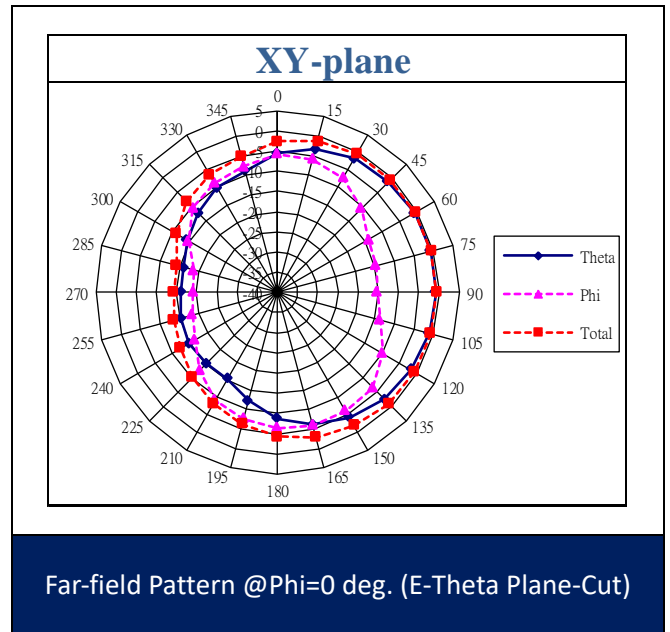
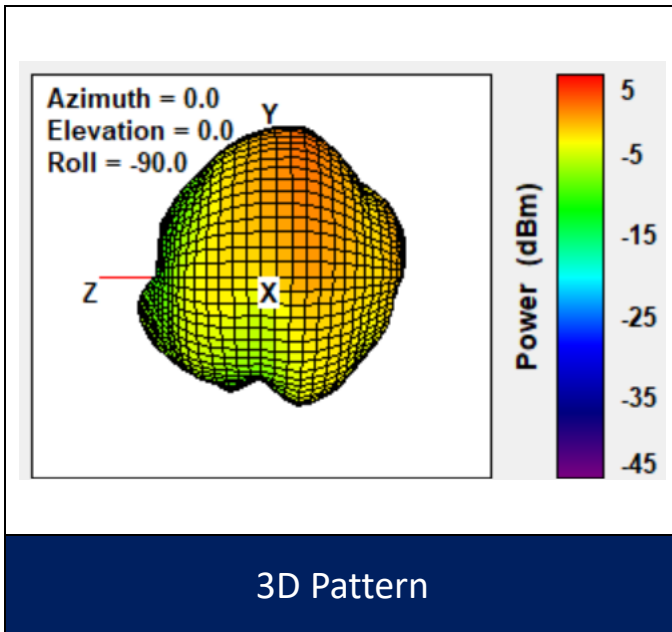
Radiation characteristics of antennae Loaded in Host Platform

617MHz



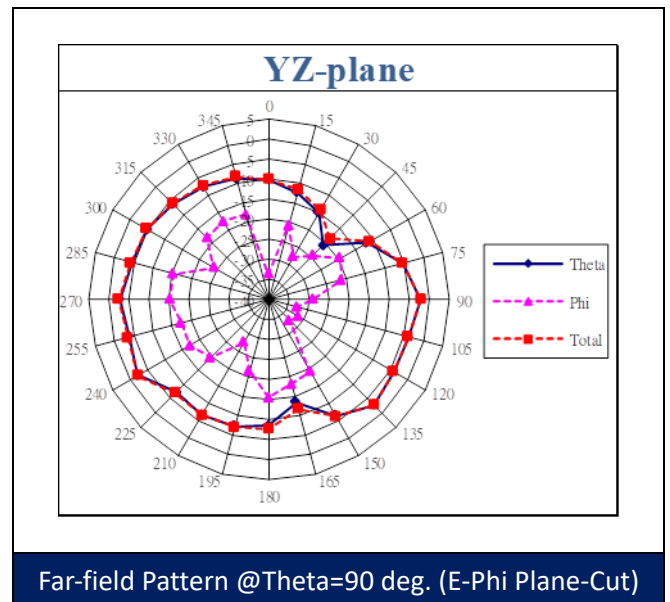
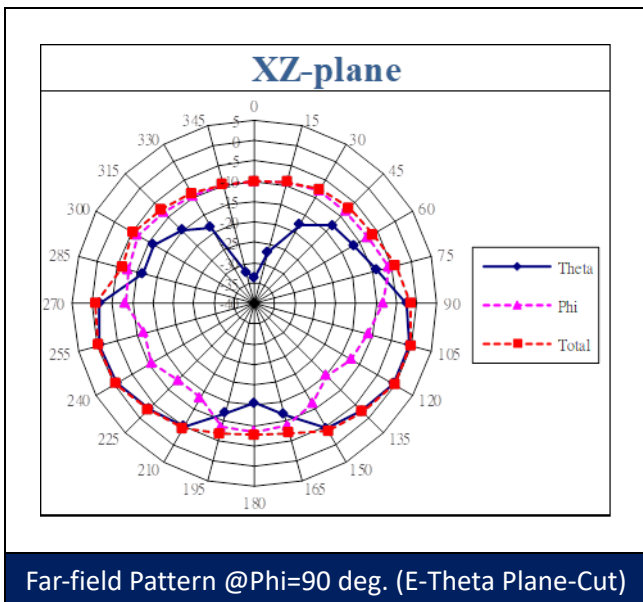
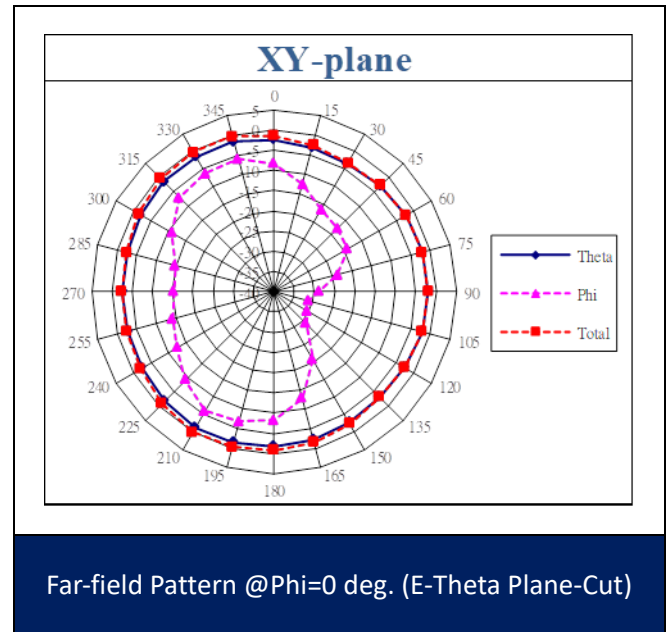
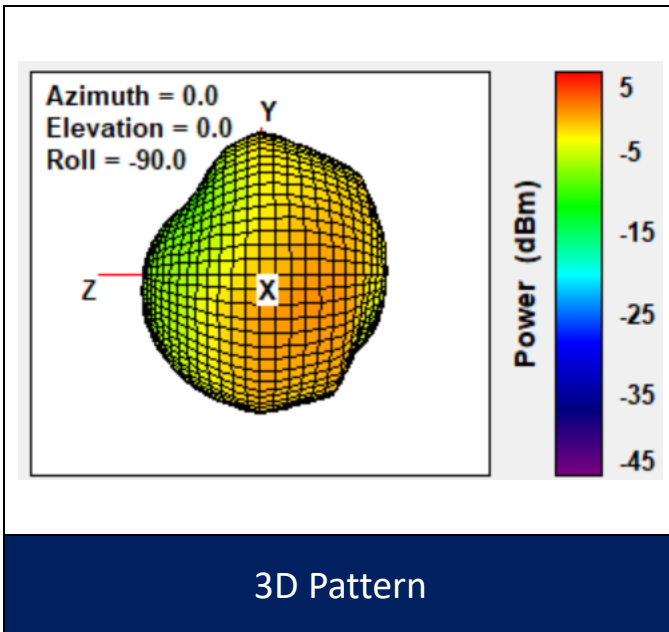
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960MHz



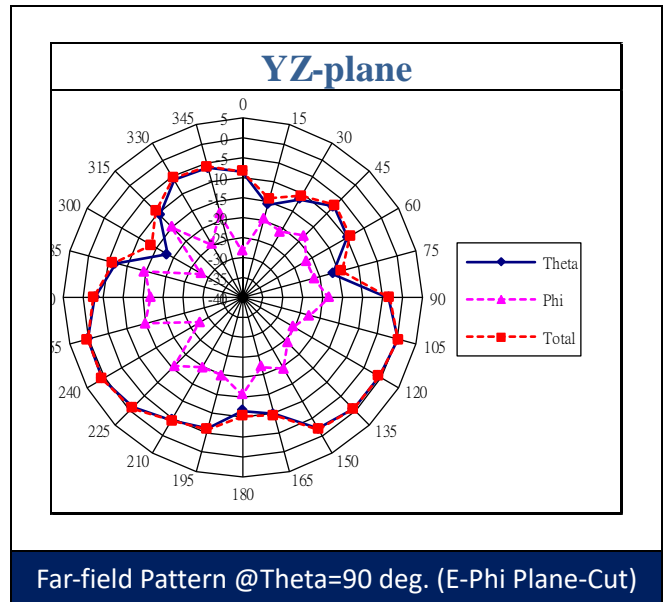
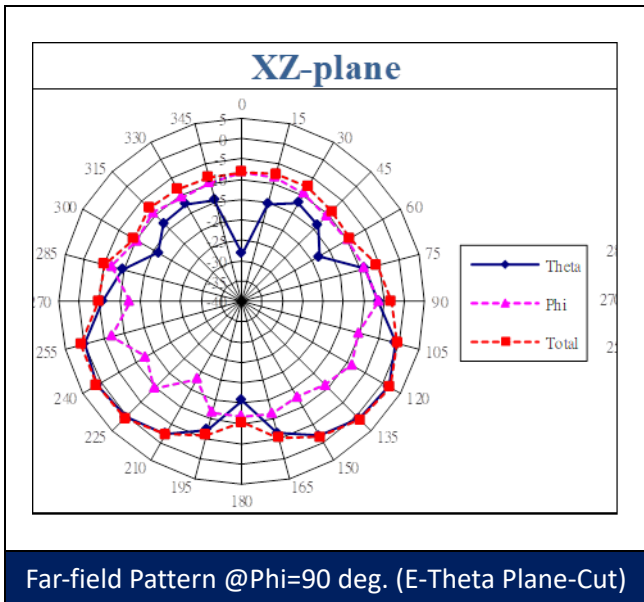
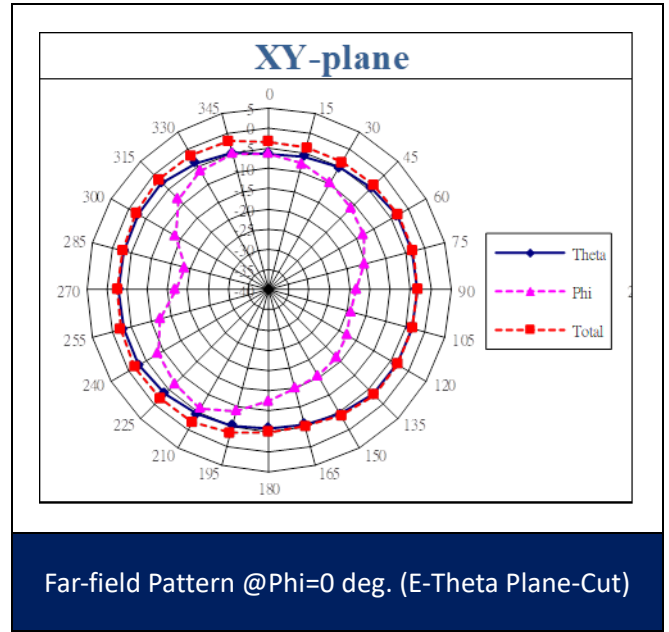
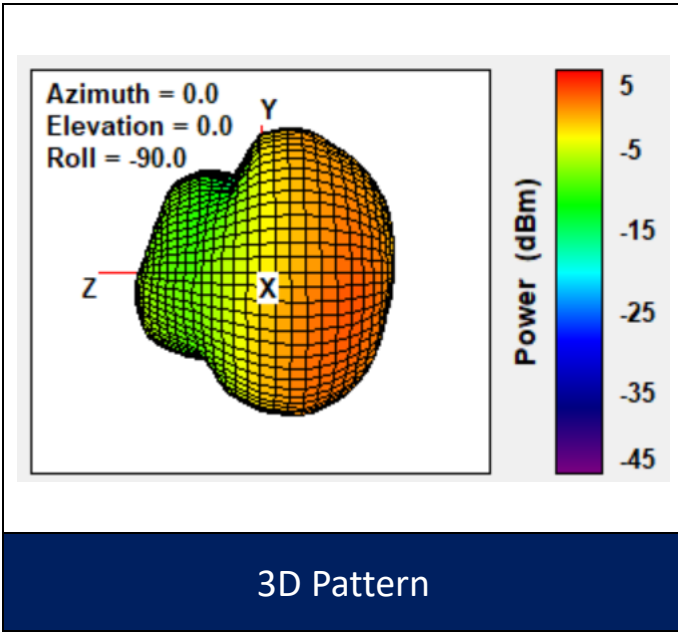
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1575MHz



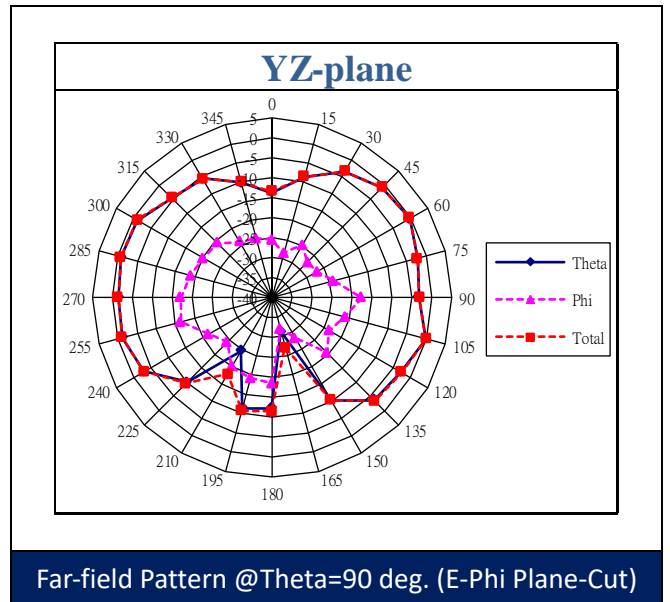
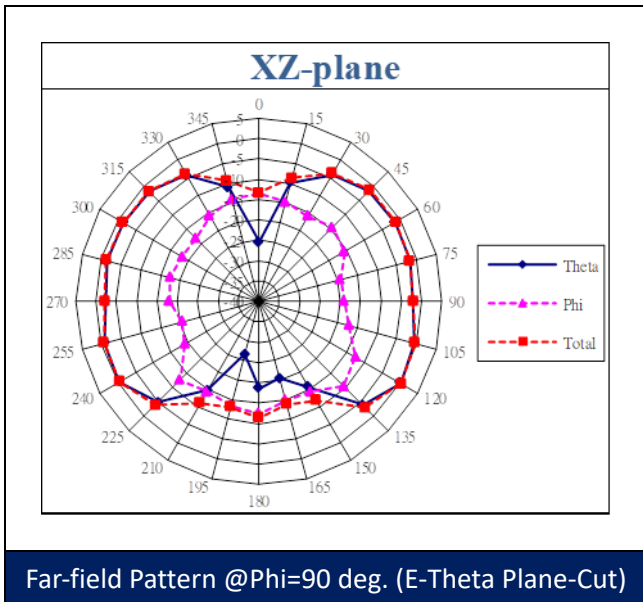
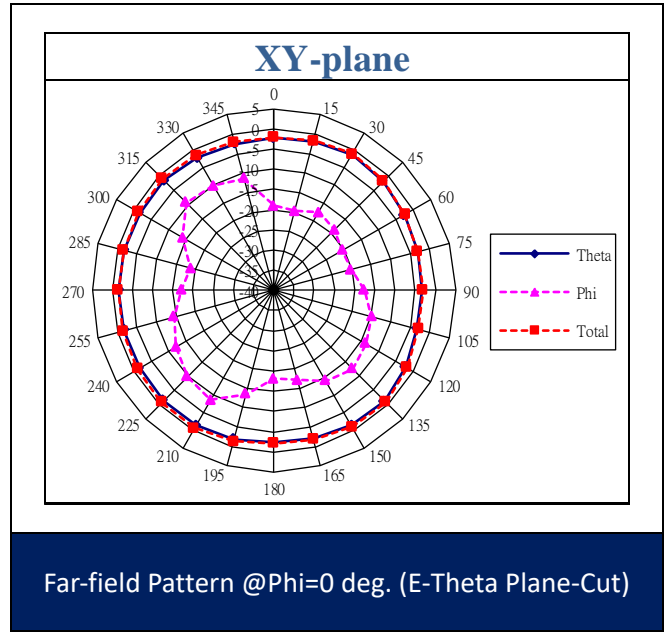
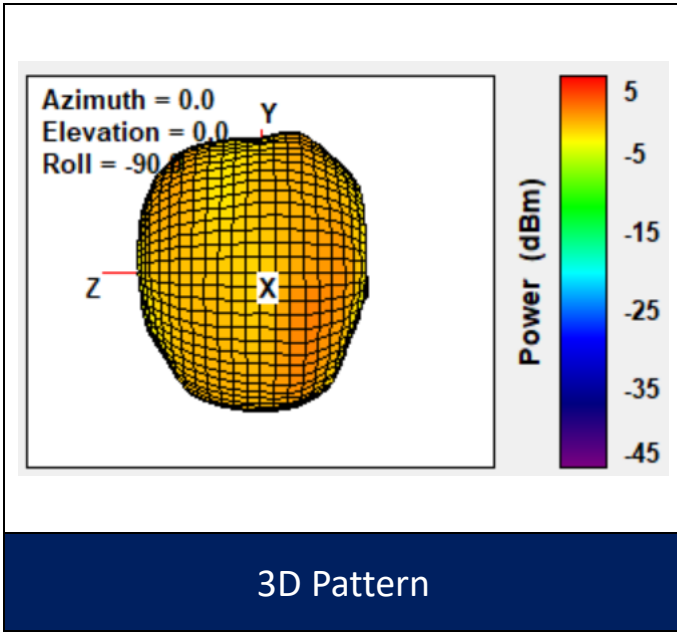
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1710MHz



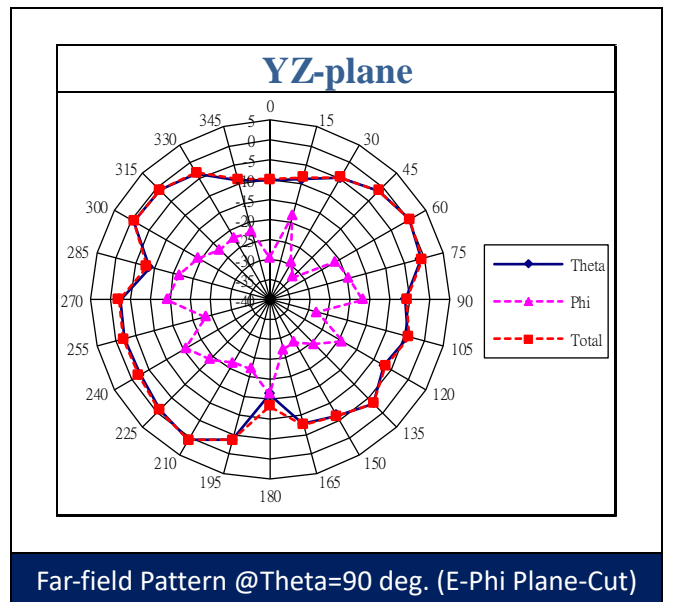
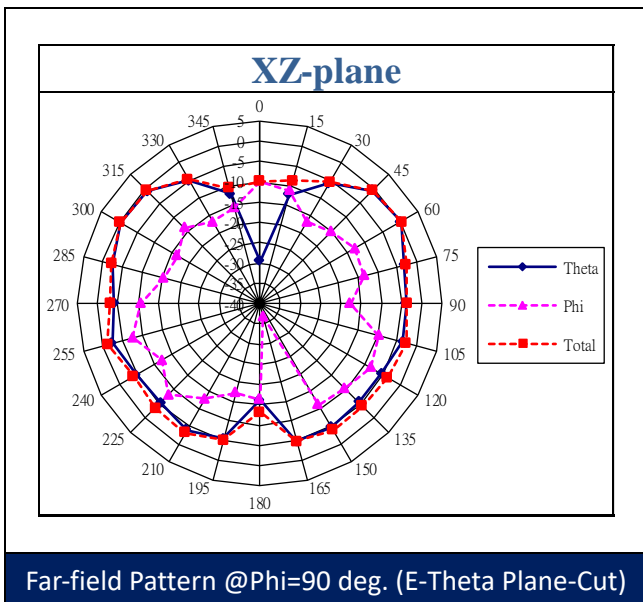
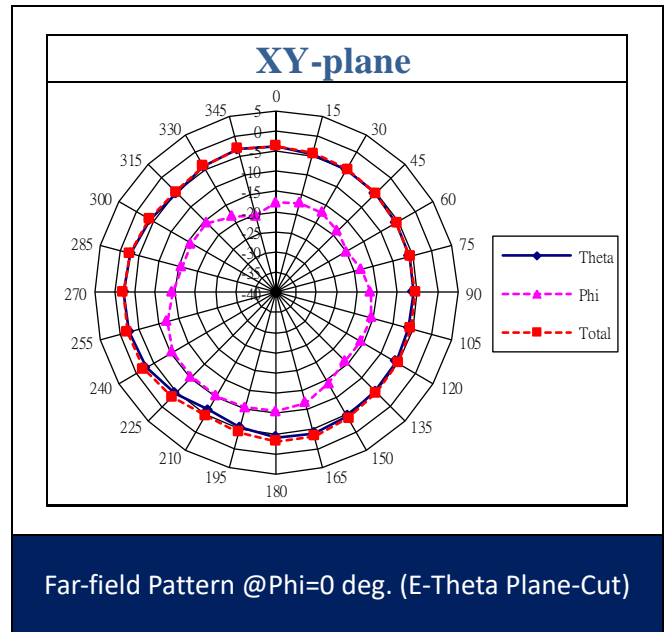
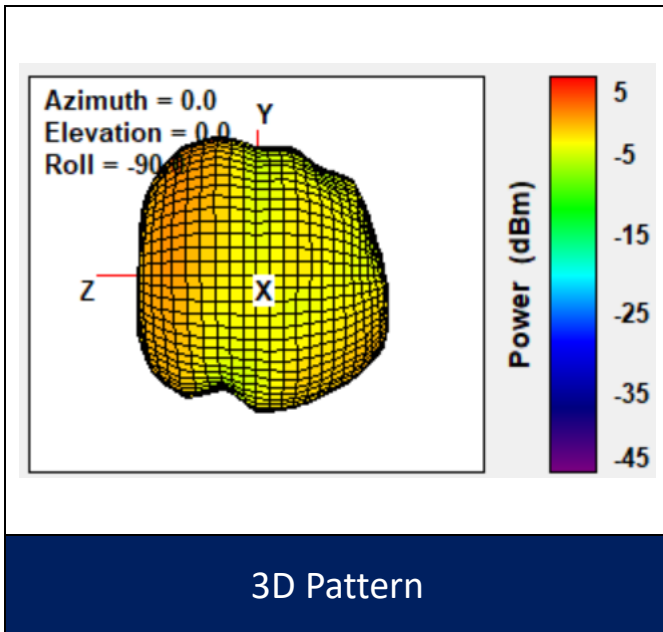
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2170MHz



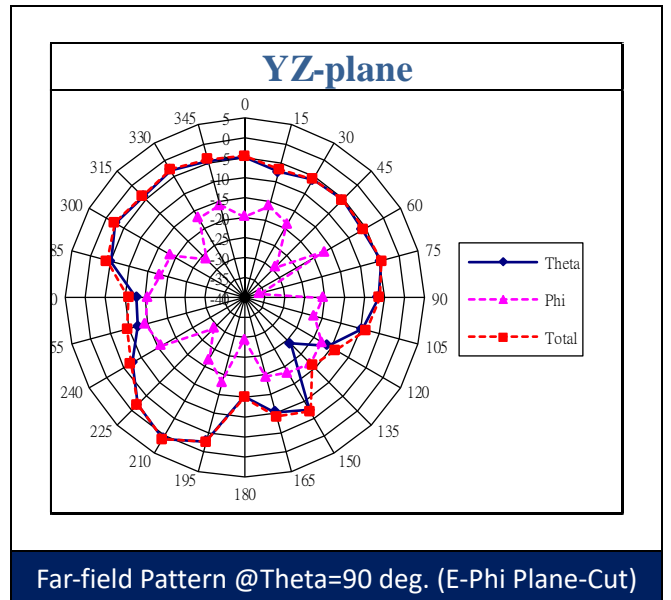
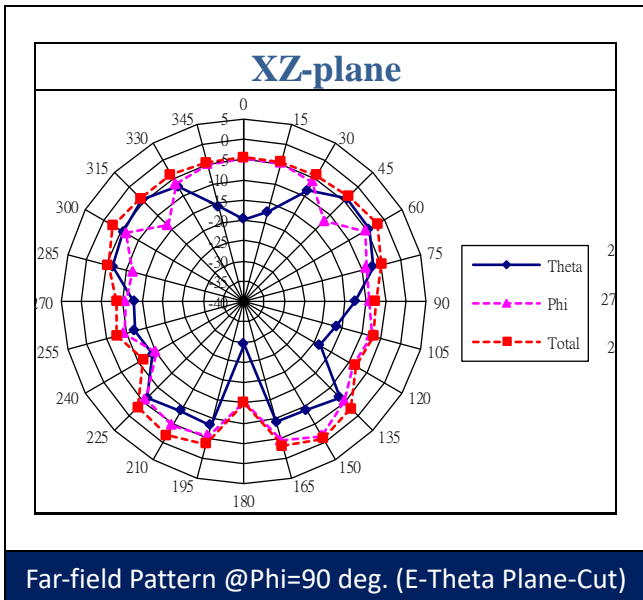
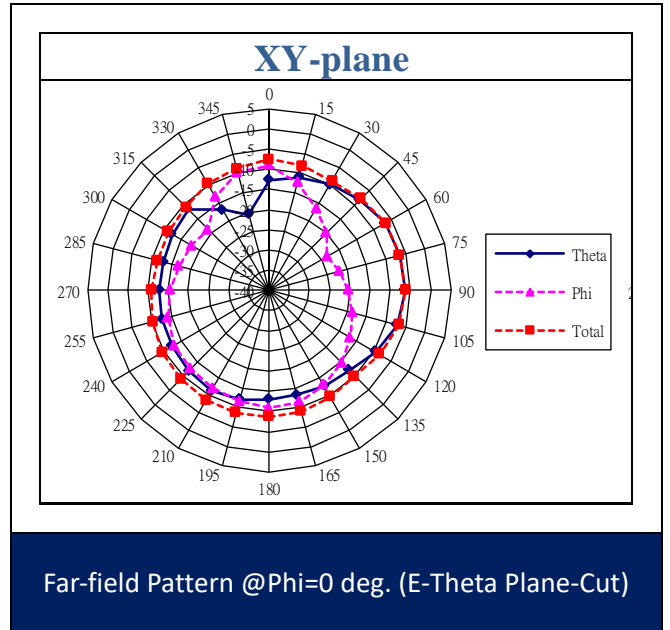
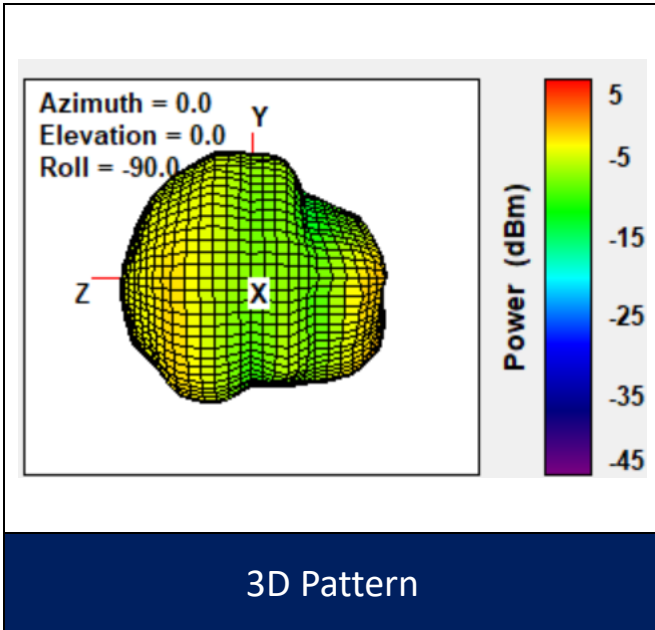
Project Name : FGR-70G	Author : Yahsen	File Name : 4G+5G Antenna
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2690MHz



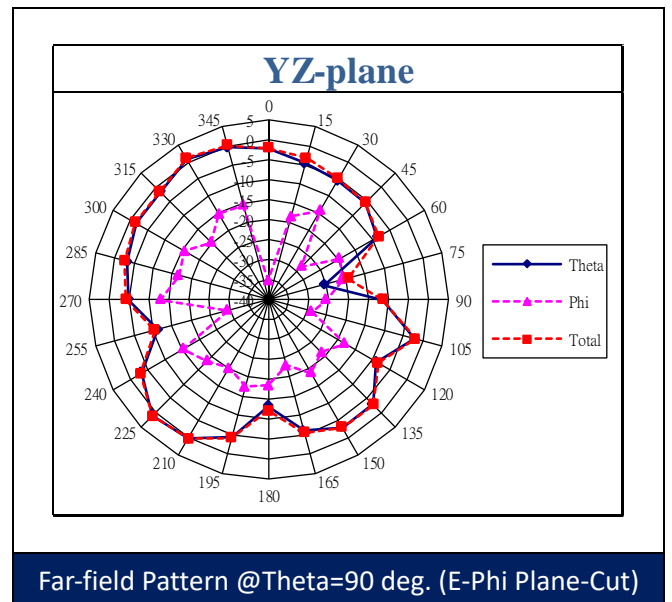
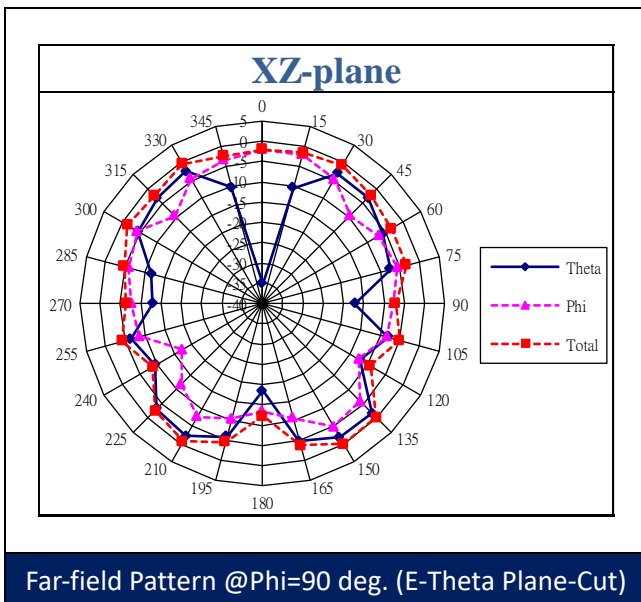
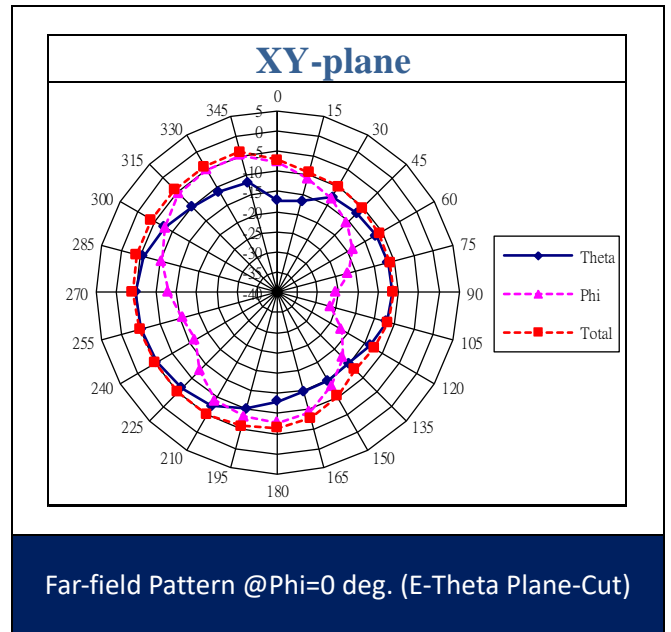
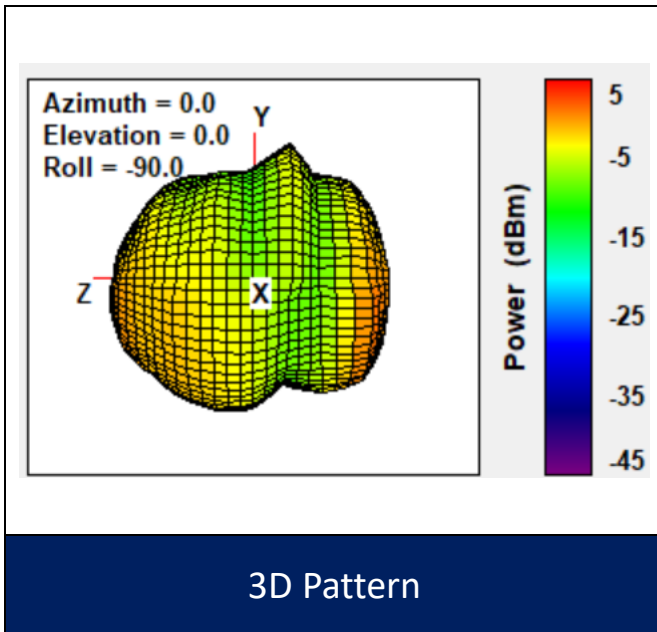
Project Name : FGR-70G	Author : Yahsen	File Name : 4G+5G Antenna
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3300MHz



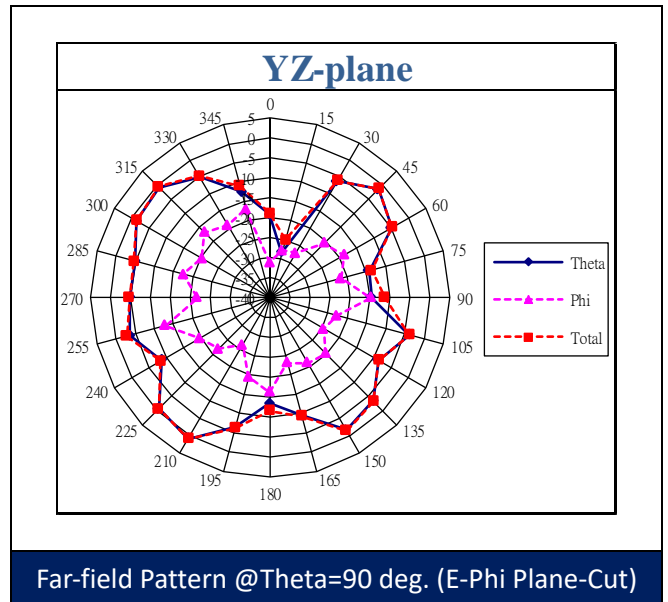
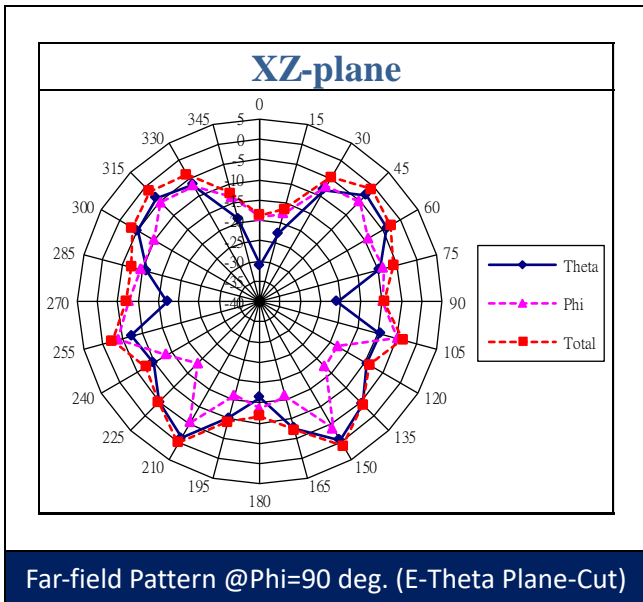
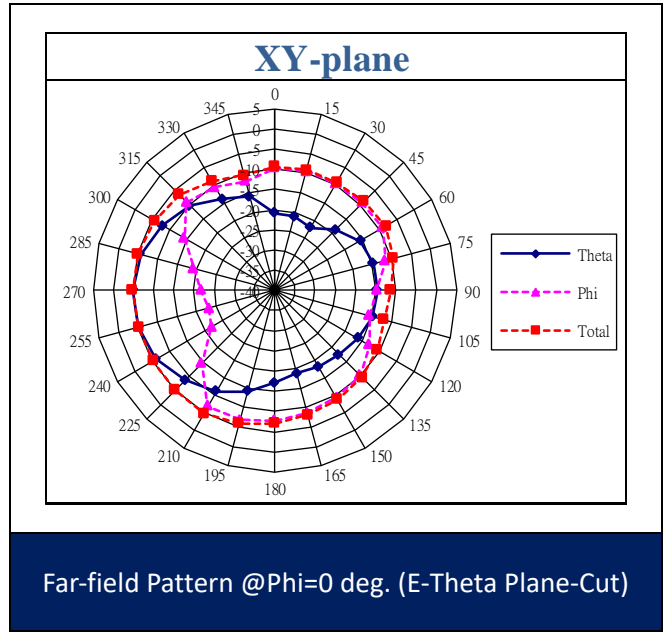
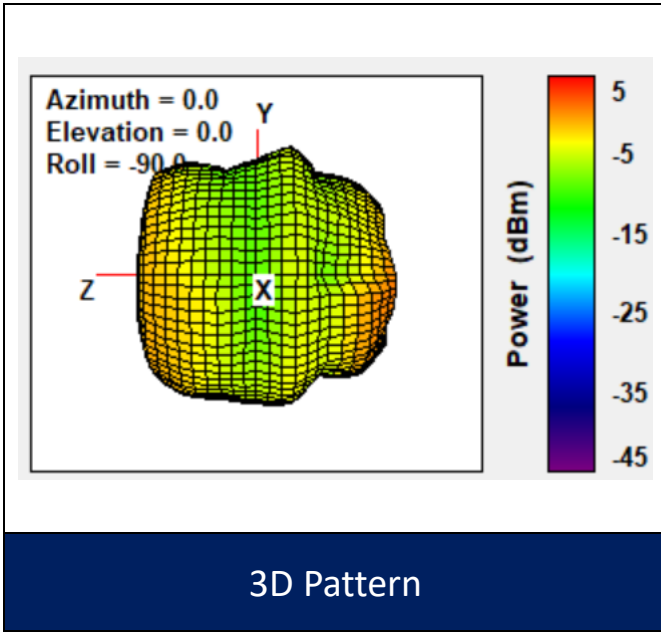
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4200MHz



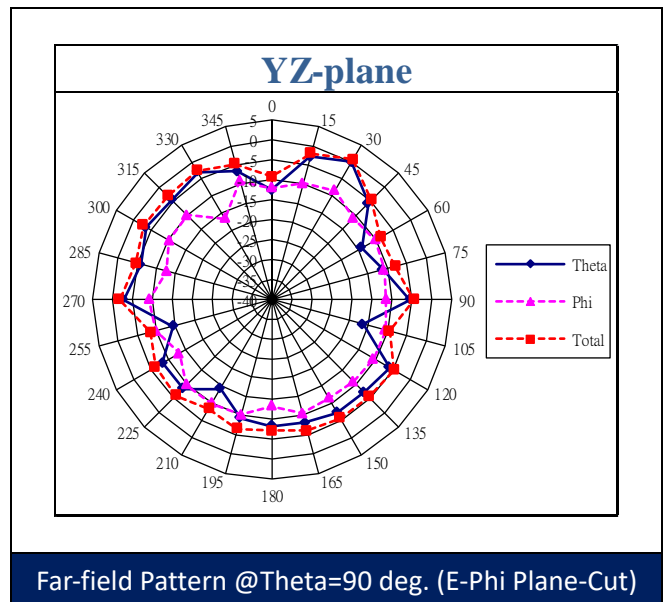
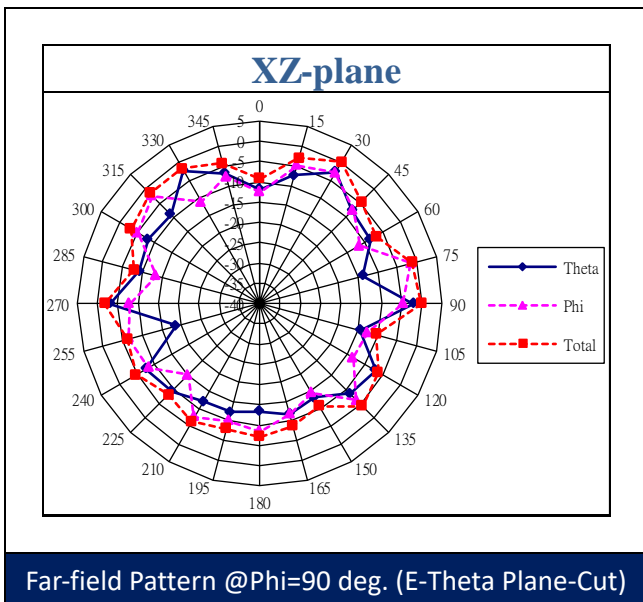
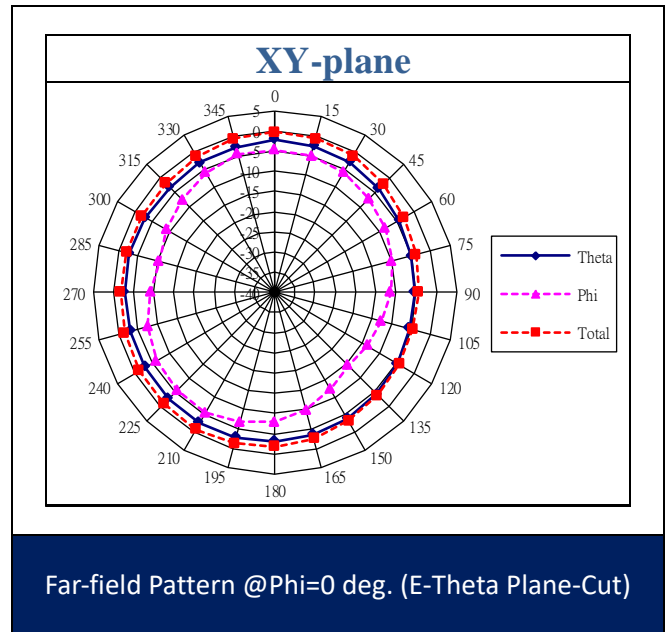
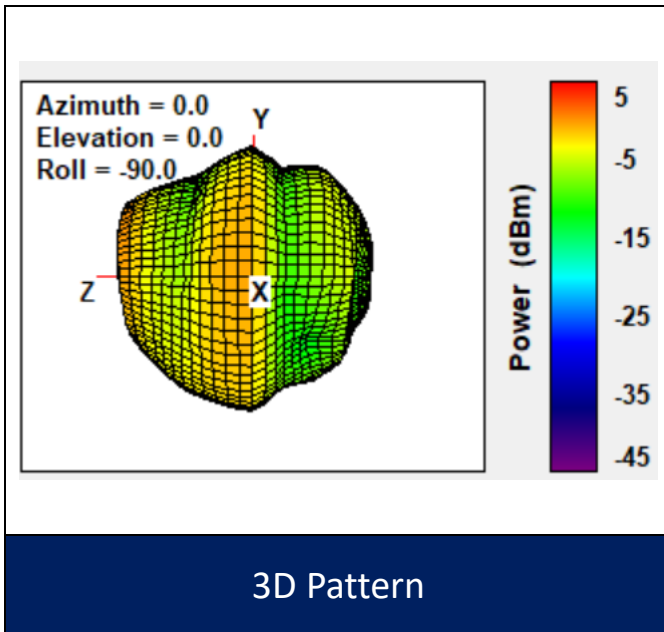
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5000MHz



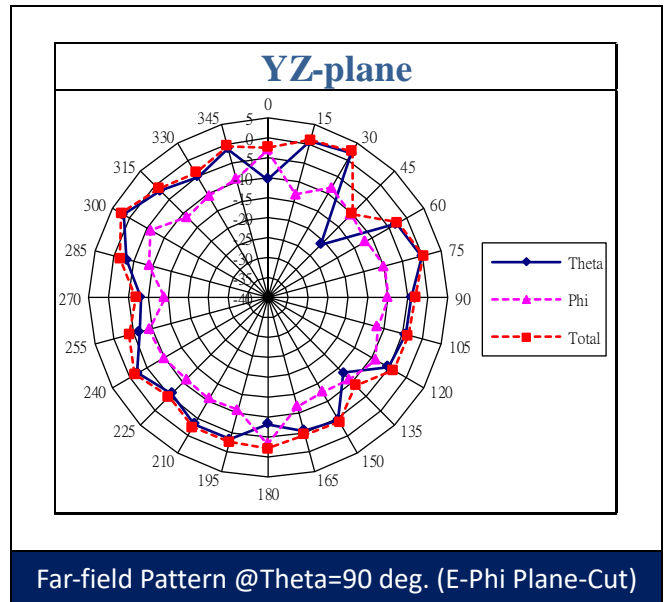
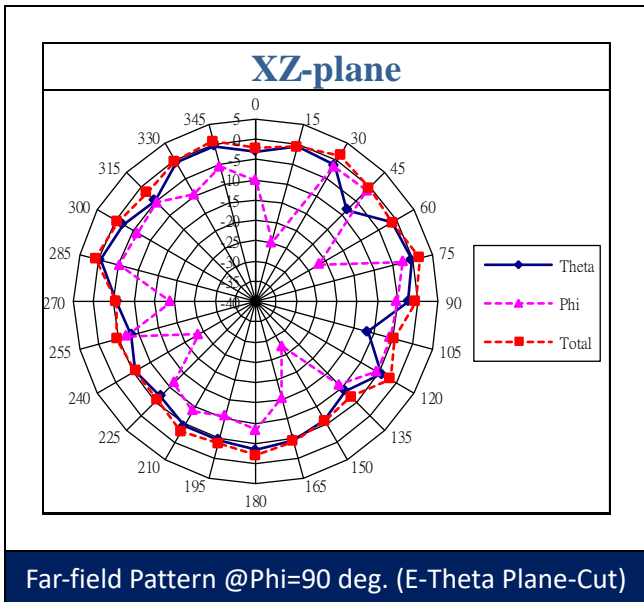
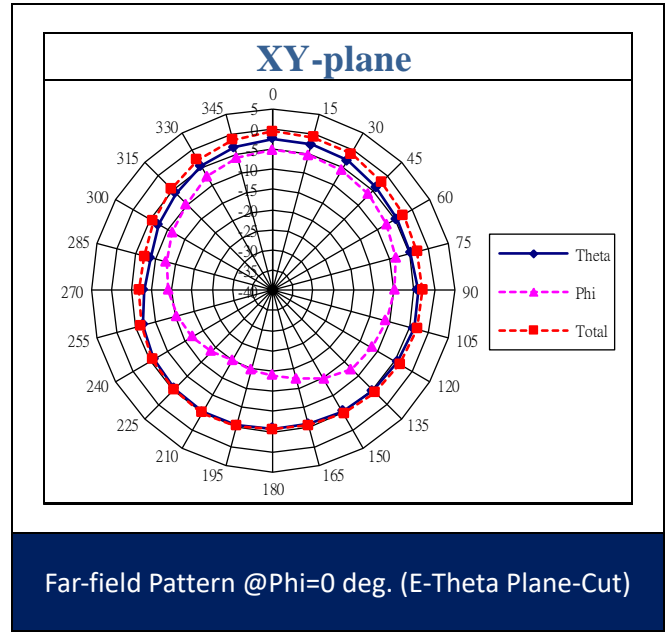
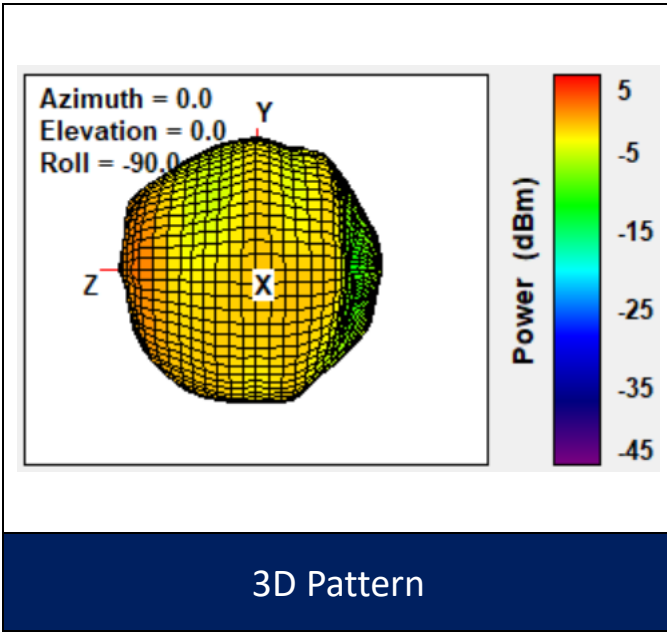
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5925MHz



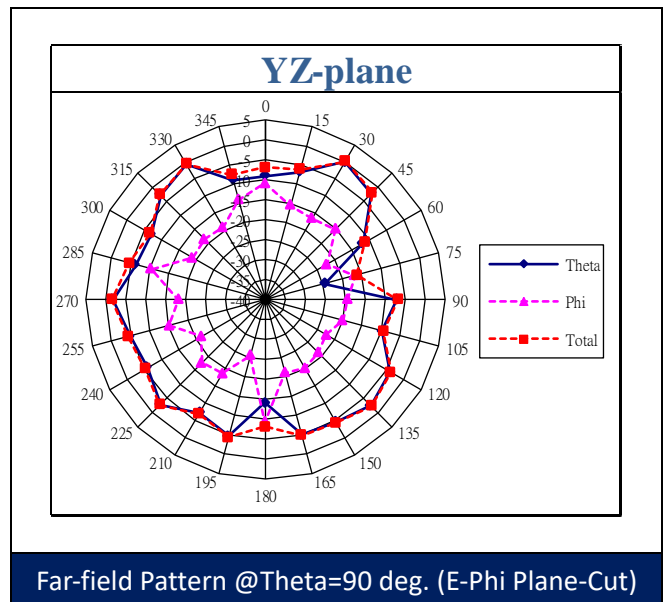
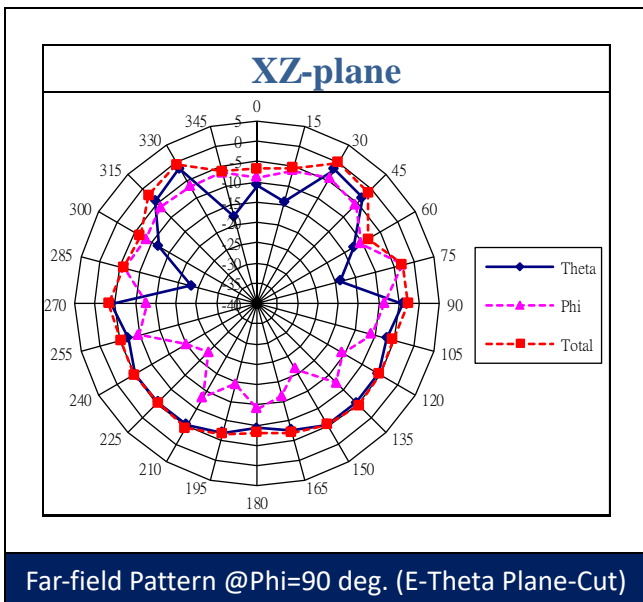
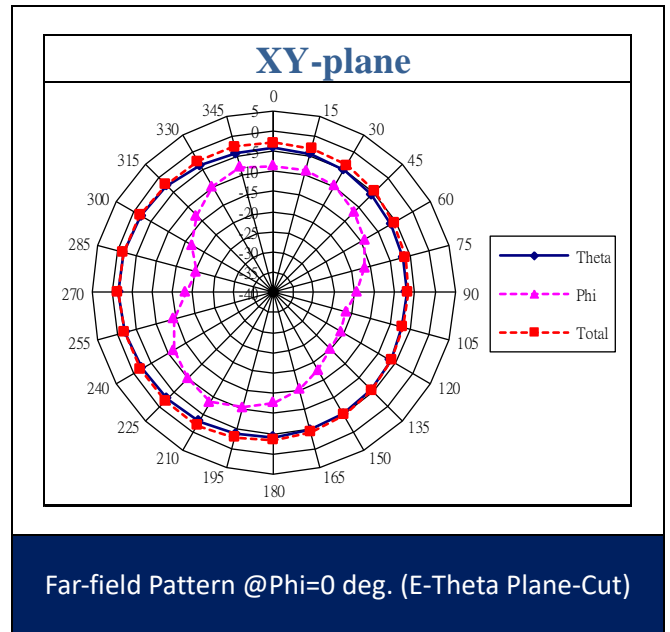
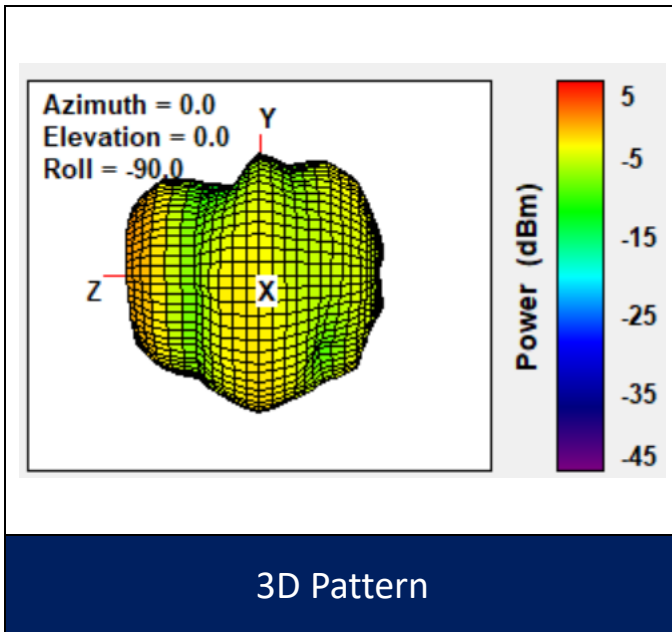
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6525MHz



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7125MHz



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