



WHA YU INDUSTRIAL CO., LTD.(HEAD OFFICE)

DONGGUAN AEON TECH CO.,LTD.(CHINA)

SPECIFICATION FOR APPROVAL

CUSTOMER: 台達電

PART NAME: RF Antenna Assembly

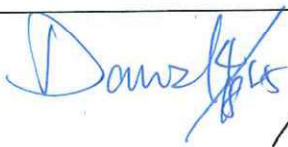
RoHS Compliant

PART NO.:

REVISION:

W. Y. P/NO.: C393-510381-A(SRF2025494)

REV.: X2

	MANUFACTURER SIGNATURE	CUSTOMER SIGNATURE
APPROVED BY :	 	
DATE :		

WHA YU GROUP

WHA YU INDUSTRIAL CO., LTD.(HEAD OFFICE)

譚裕實業股份有限公司

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Specification



Requirements of Antenna Design

RF Function	Number of ANT	Frequency Band	Remark
TB	2	2400 - 2500 MHz / 5150 - 5850 MHz / 5925 – 7125 MHz	
DB	2	2400 - 2500 MHz / 5150 - 5850 MHz	
6G	2	5925 - 7125 MHz	
BT	1	2400 - 2500 MHz	

Requirements of Measurement

Test Item	Specification	Remark
Return Loss	> 10dB	
Isolation	>25 dB	
Peak gain	2.4 GHz: <5 dBi 5 GHz: < 6 dBi	
Efficiency	>60%	
Radiation pattern	Scale: +10 ~ -40dBi, Angle step size: 5 degree	

Antenna Dimension and Placement



Antenna	ANT Type	Size (L * W * H* T)	Cable Length (mm)	Cable Type
TB0	PIFA	31mm*11.5mm*6.8mm	167 mm	1.13 Low Loss (灰)
TB1	PIFA	31mm*11.5mm*6.8mm	263 mm	1.13 Low Loss (綠)
DB0	PIFA	31mm*11.5mm*6.8mm	102 mm	1.13 Low Loss (藍)
DB1	PIFA	31mm*11.5mm*6.8mm	254 mm	1.13 Low Loss (紅)

Antenna Dimension and Placement

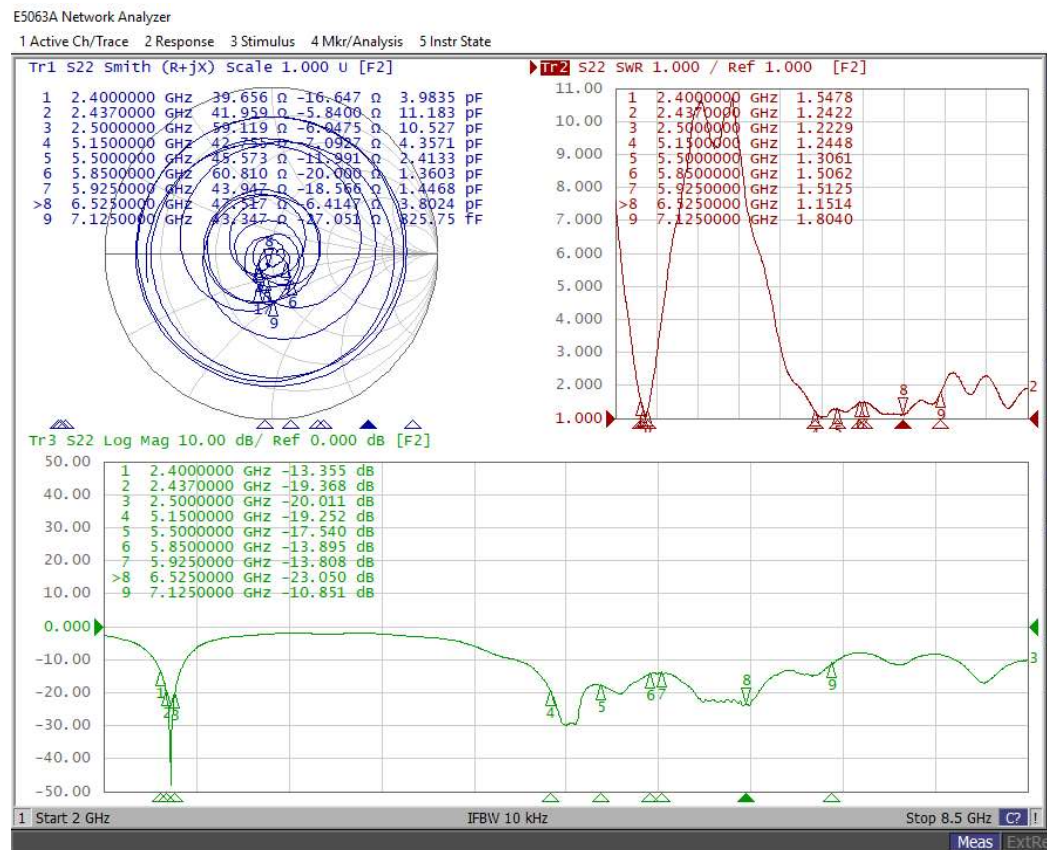


Antenna	ANT Type	Size (L * W * H* T)	Cable Length (mm)	Cable Type
6G0	Dipole	28mm*8.55mm*0.6mm(H=12)	225 mm	1.13 Low Loss (黒)
6G1	Dipole	28mm*8.55mm*0.6mm(H=12)	140 mm	1.13 Low Loss (黄)
BT	Dipole	60mm*60mm*0.8mm(H=12.7)	170 mm	1.13 Low Loss (白)

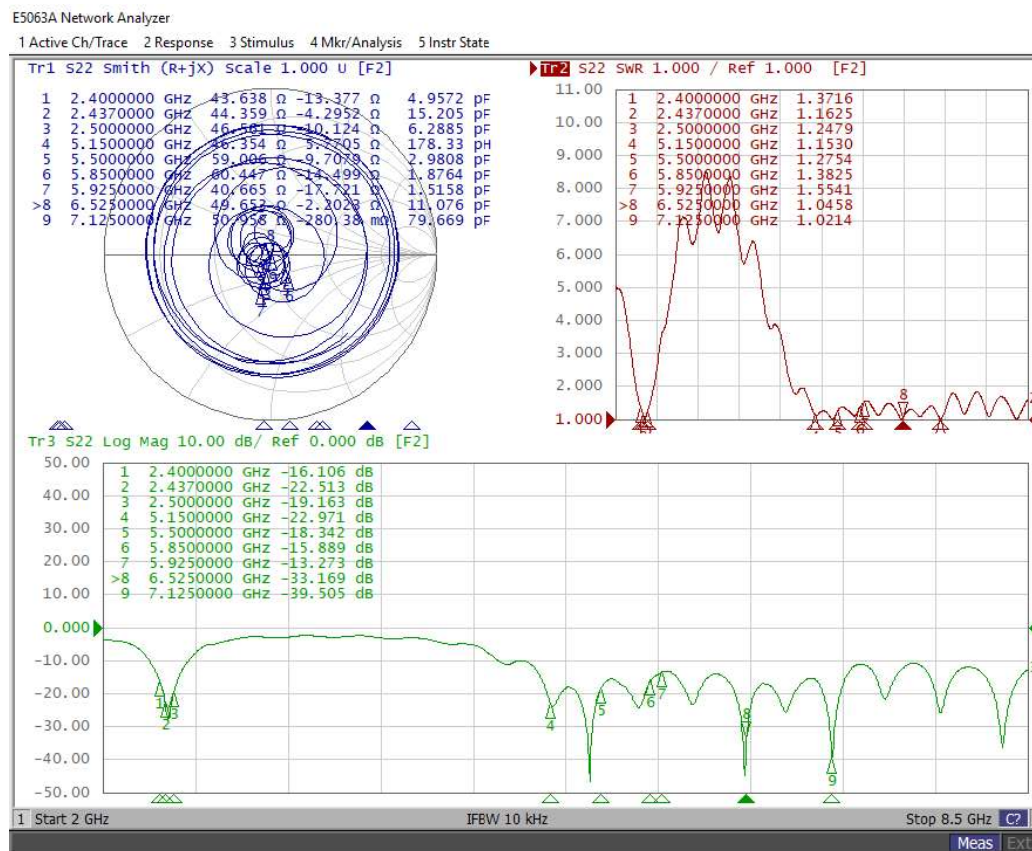
Test Setup for S-parameter Measurement



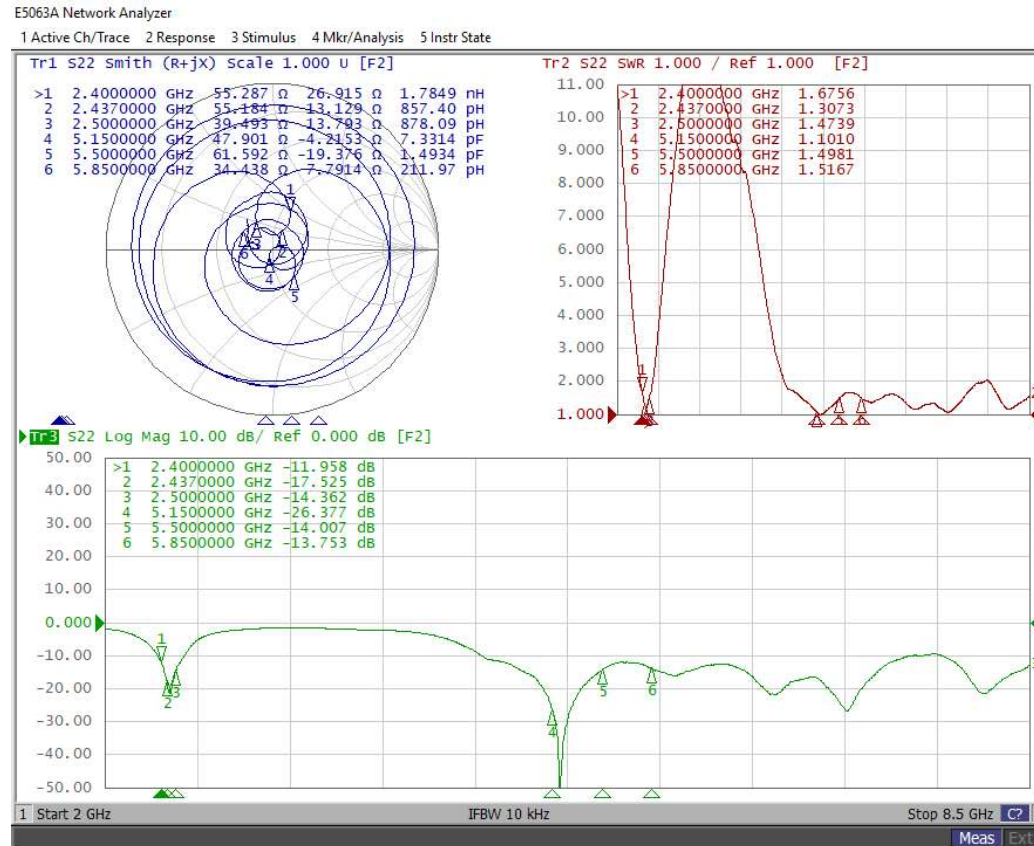
Equipment	Brand	Model	S/N
Network Analyzer	Keysight	E5063A	MY54706080



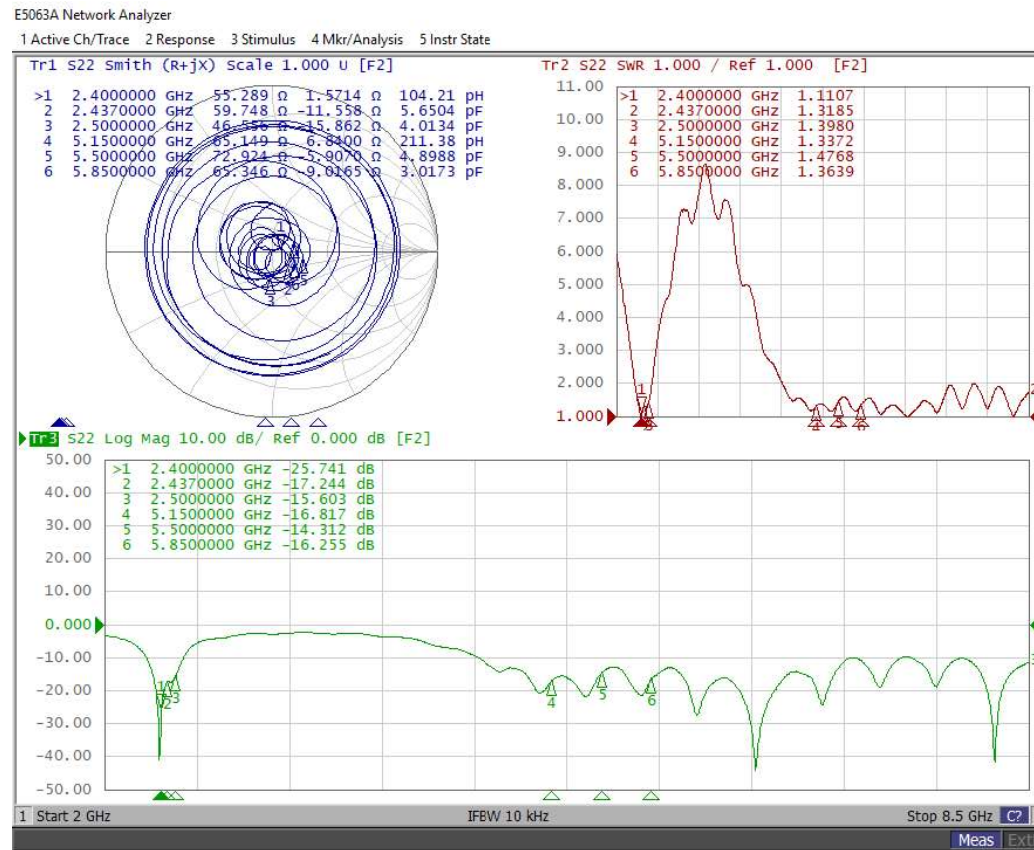
Antenna	Frequency
TB 0	2400 – 2500 MHz
	5150 – 5850 MHz
	5925 – 7125 MHz



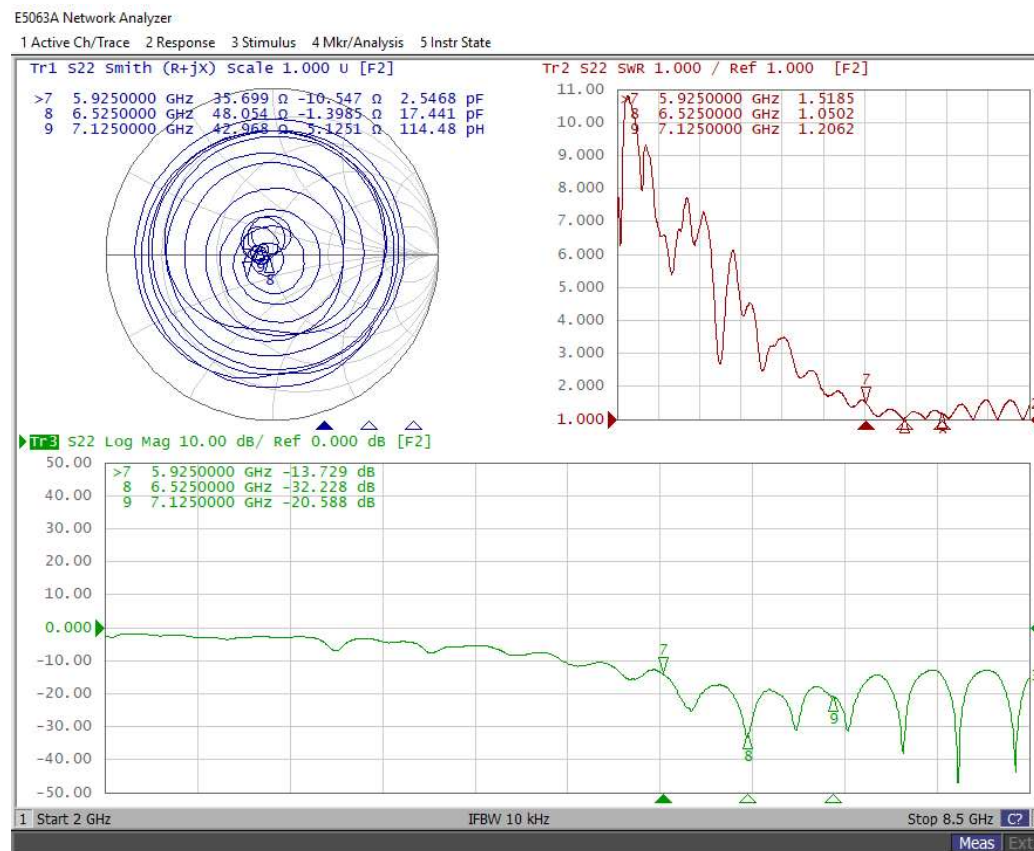
Antenna	Frequency
TB 1	2400 – 2500 MHz
	5150 – 5850 MHz
	5925 – 7125 MHz



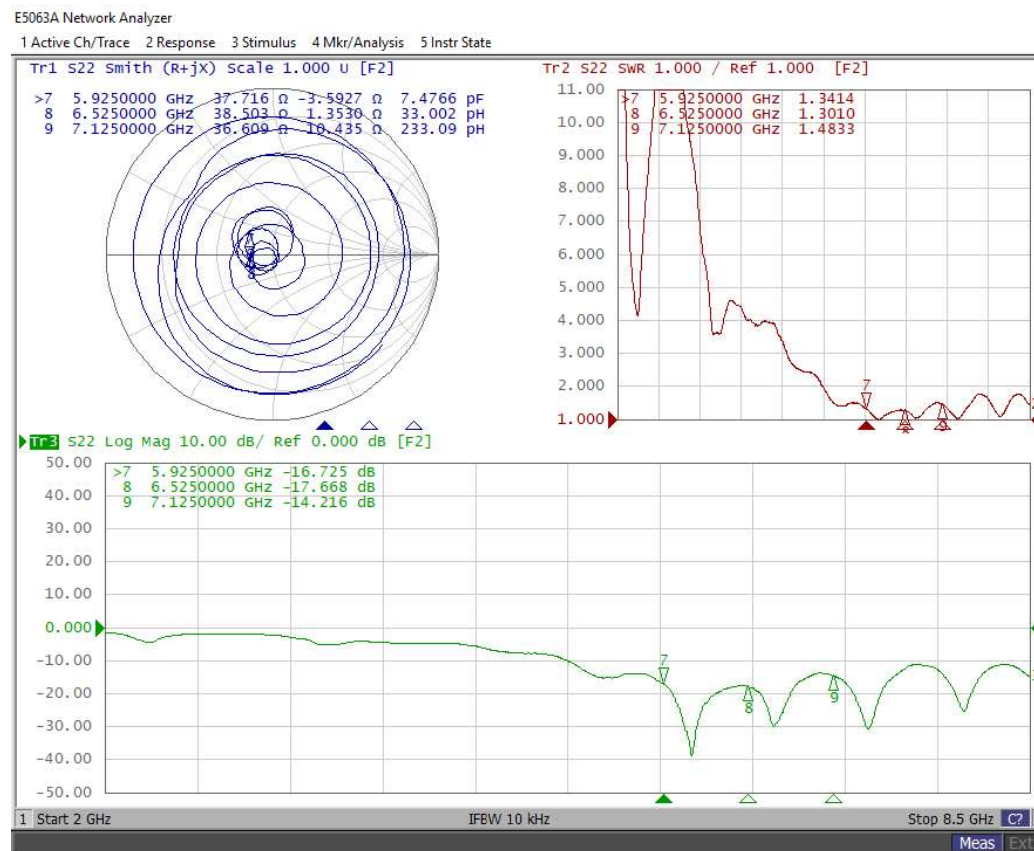
Antenna	Frequency
DB 0	2400 – 2500 MHz 5150 – 5850 MHz



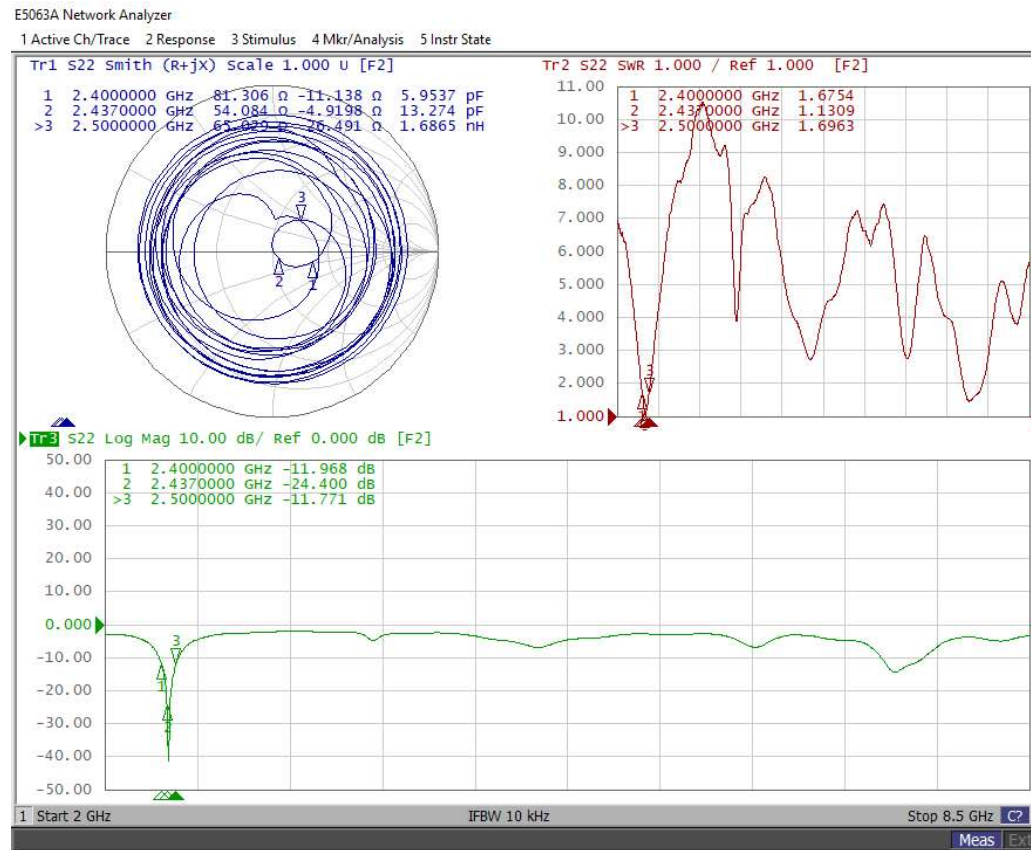
Antenna	Frequency
DB 1	2400 – 2500 MHz 5150 – 5850 MHz



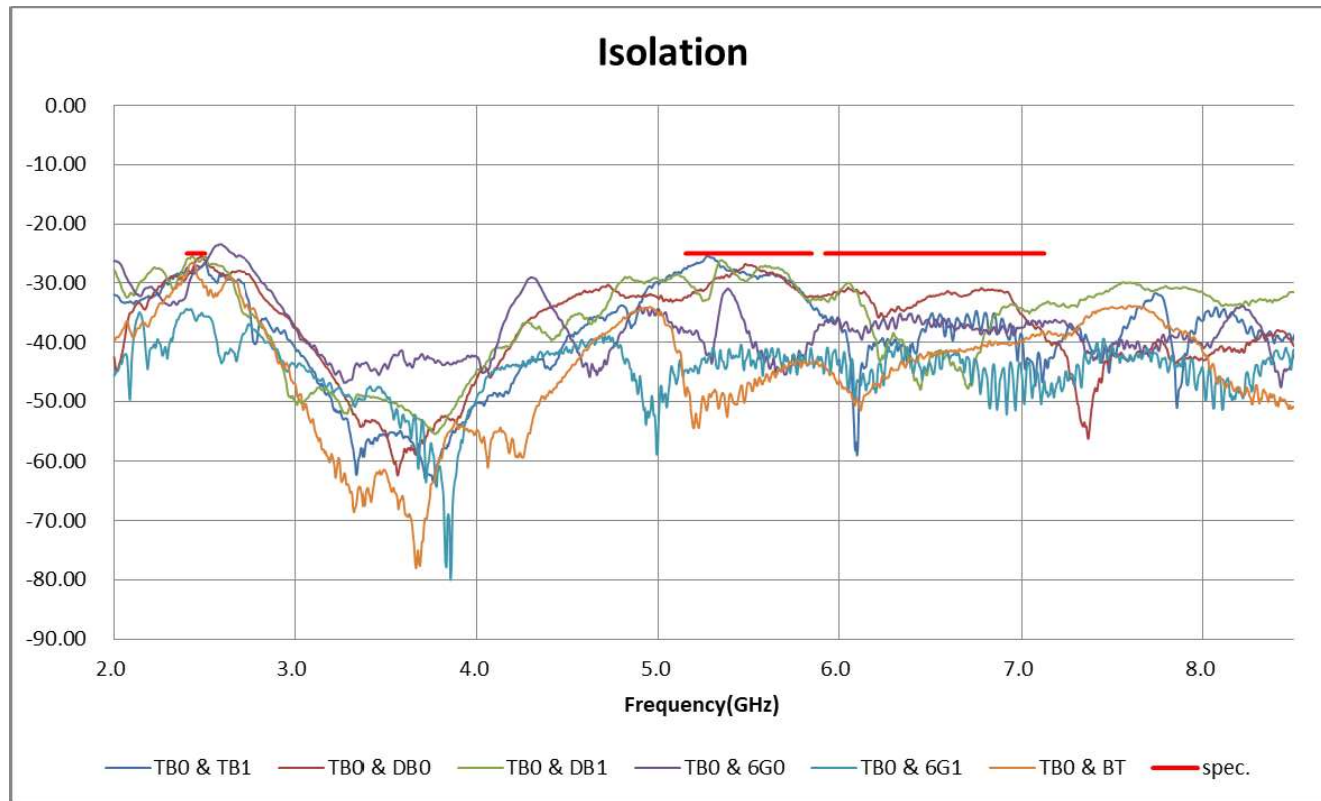
Antenna	Frequency
6G 0	5925 – 7125 MHz

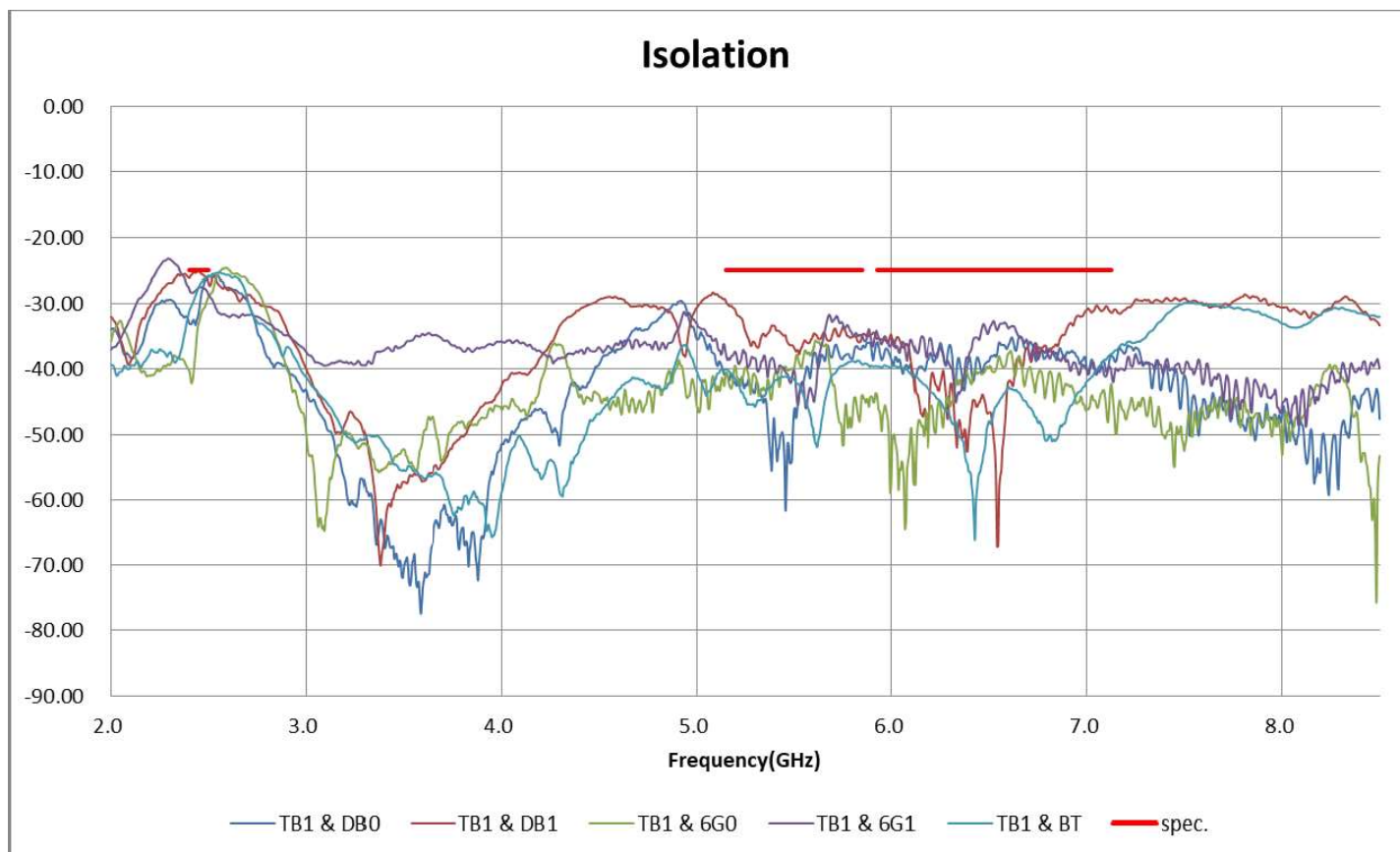


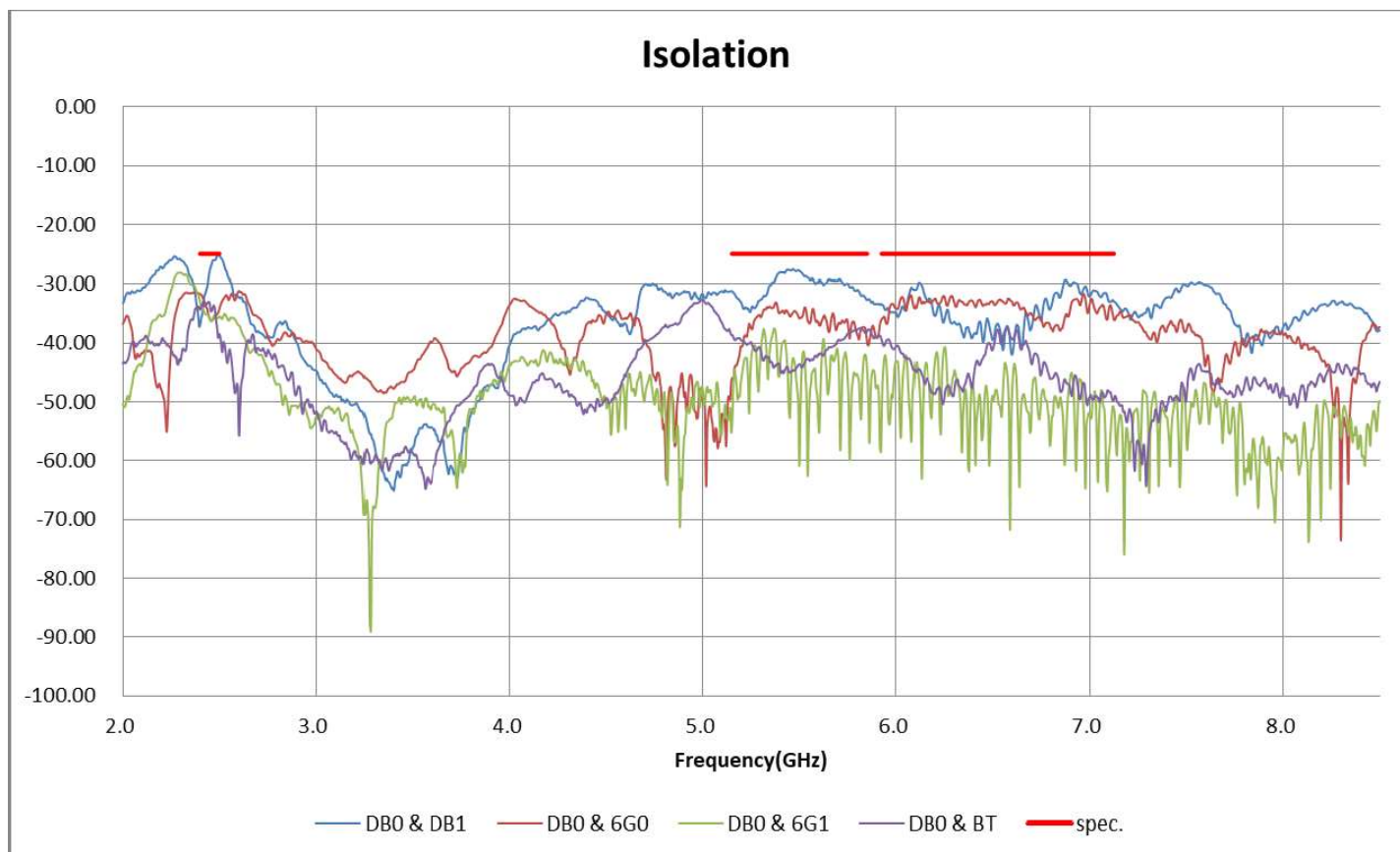
Antenna	Frequency
6G 1	5925 – 7125 MHz

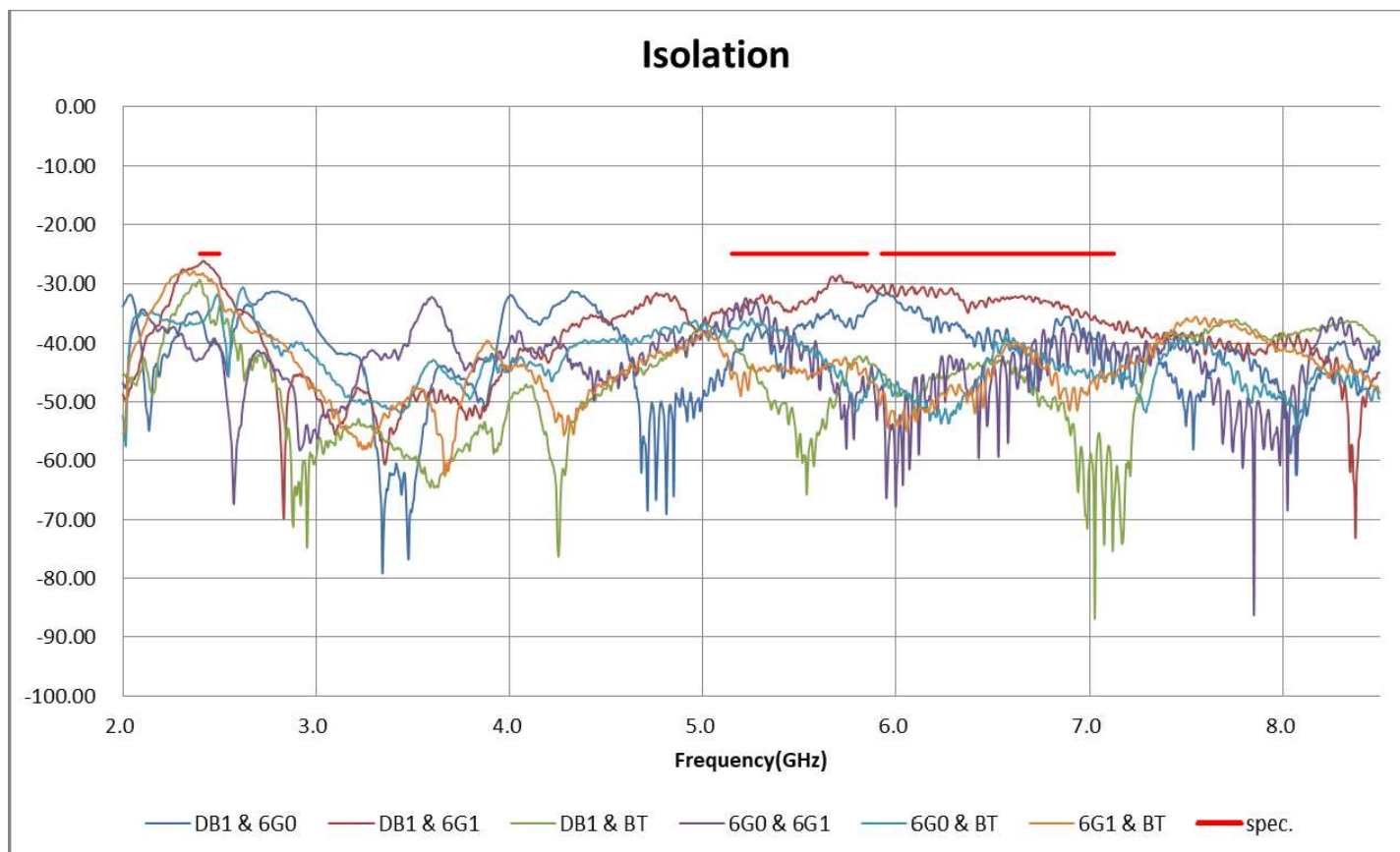


Antenna	Frequency
BT	2400 – 2500 MHz









Test Setup for Radiation Pattern Measurement



Chamber Information

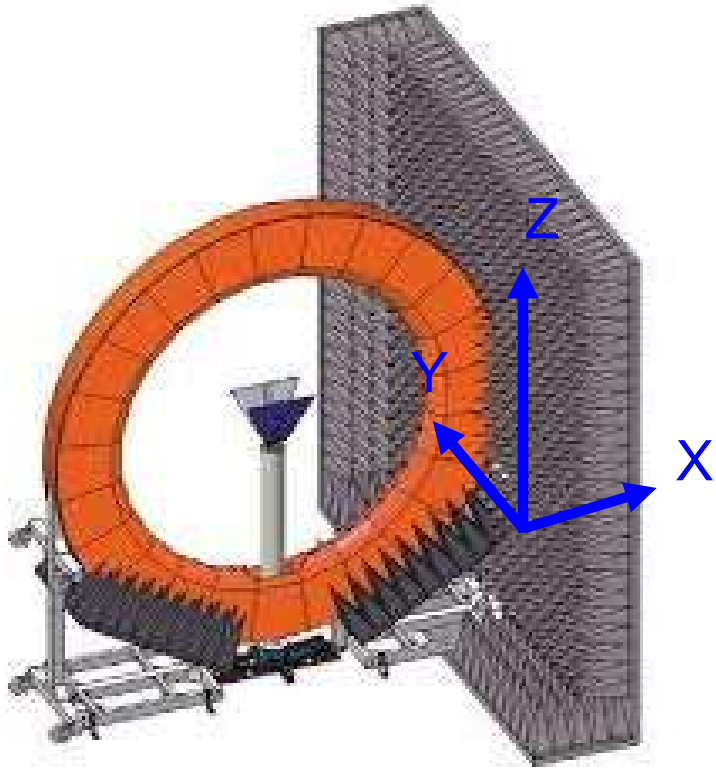
- SATIMO SG-24L Multi-Probe Antenna Measurement System

- Angle between probes: 15°

- Frequency range: 400 MHz – 8.5 GHz

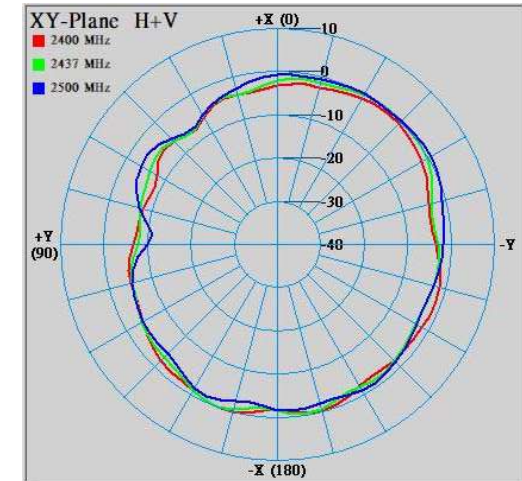
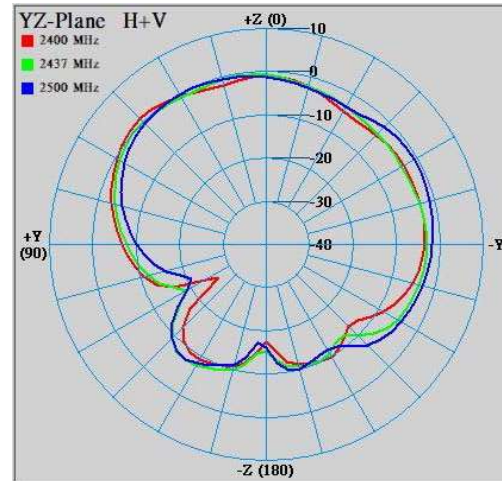
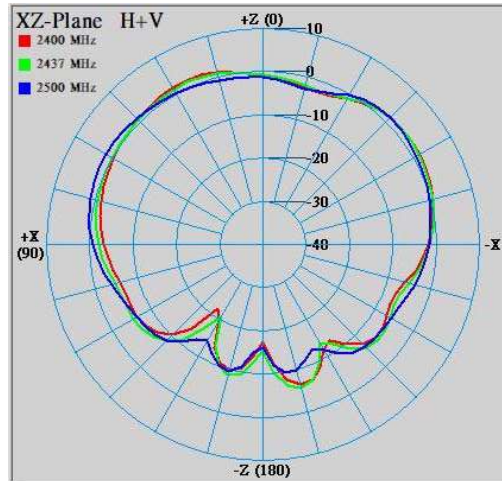
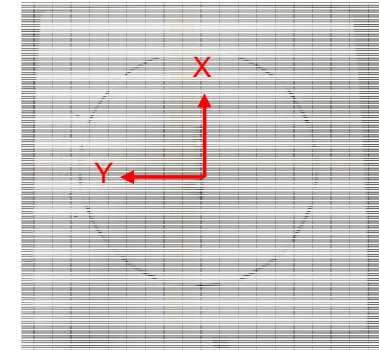
- Chamber Room Size: 5m L x 5m W x 5m H

- Software: Wave Studio



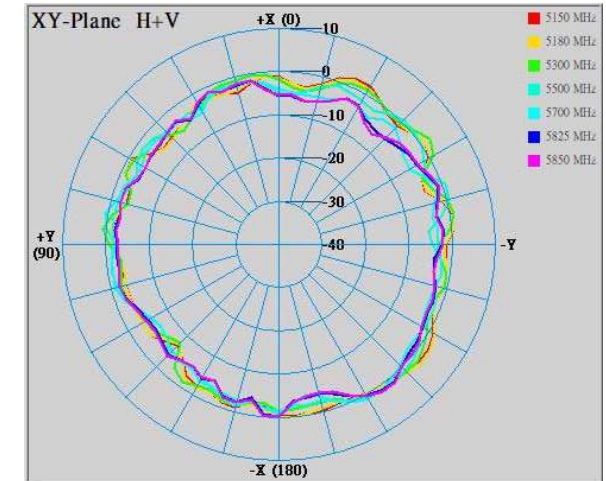
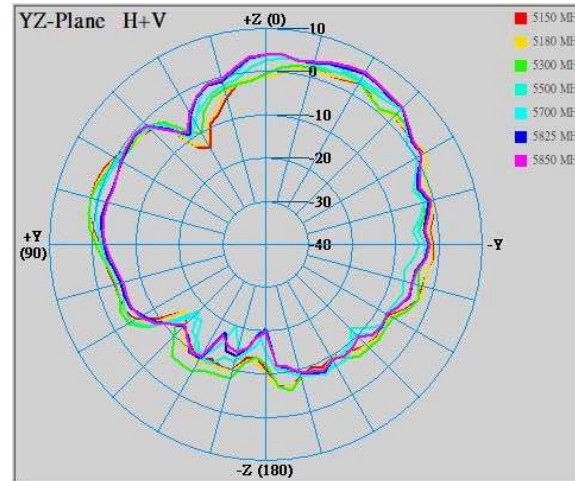
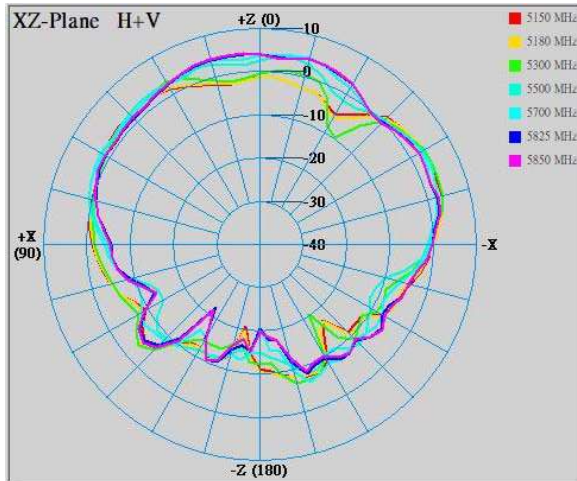
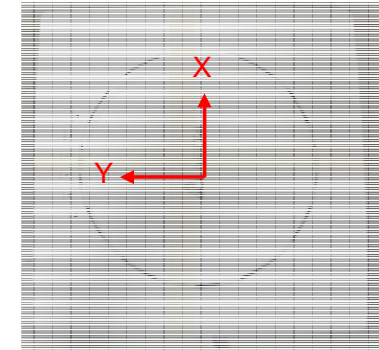
2D Radiation Pattern Results

TB0-2G



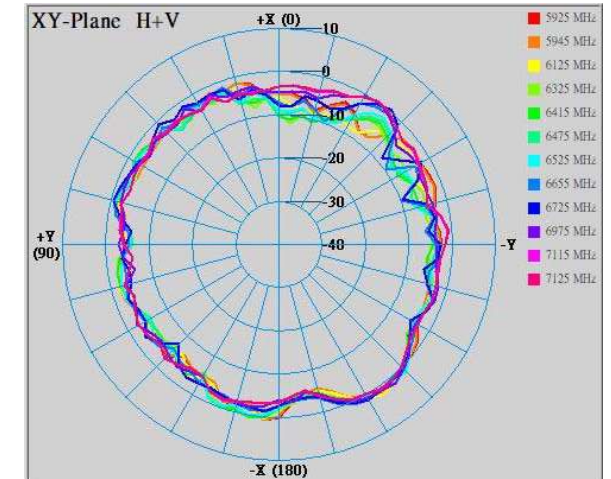
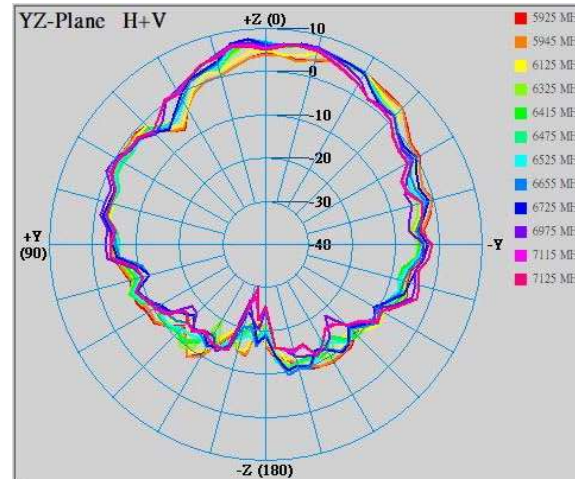
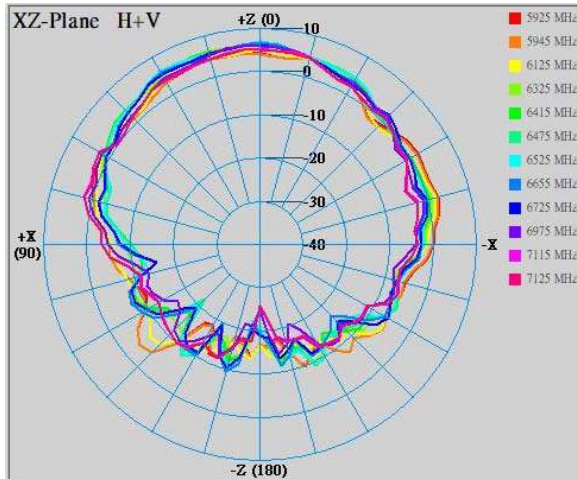
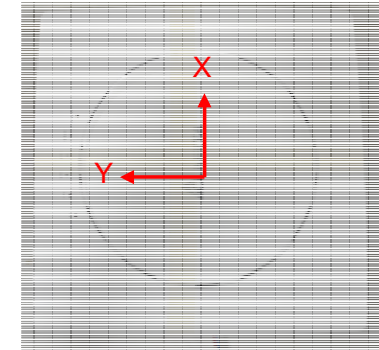
2D Radiation Pattern Results

TB0-5G



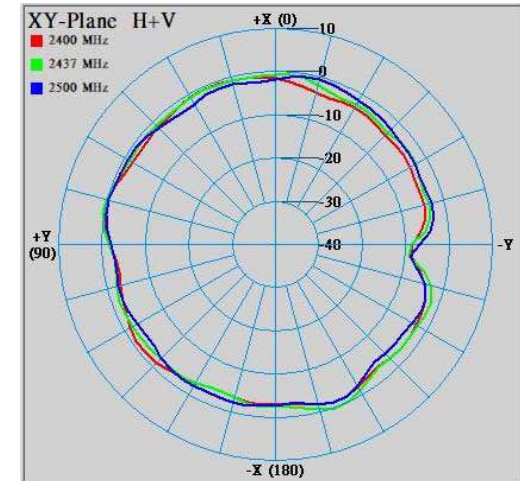
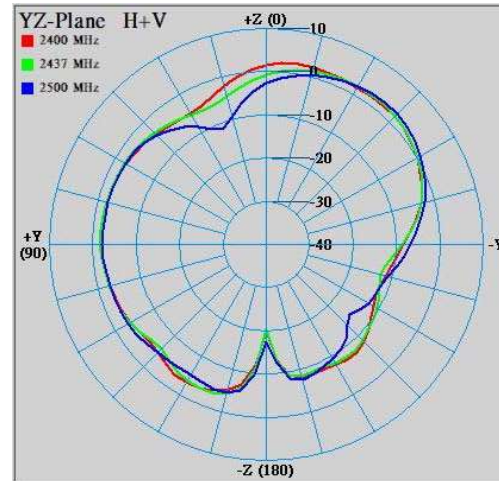
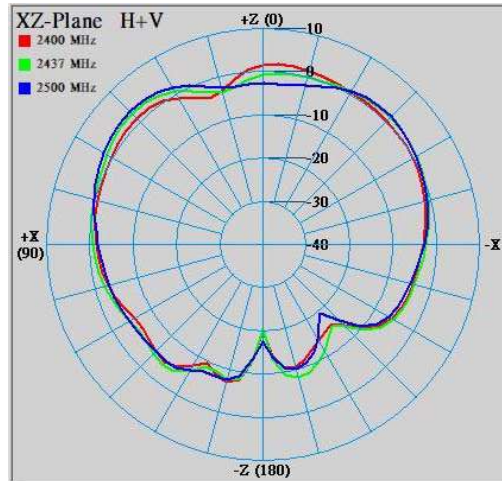
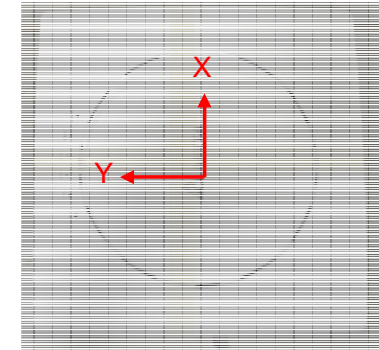
2D Radiation Pattern Results

TB0-6G



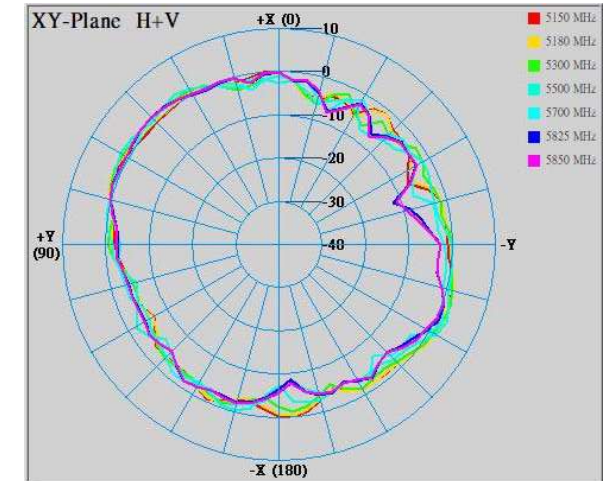
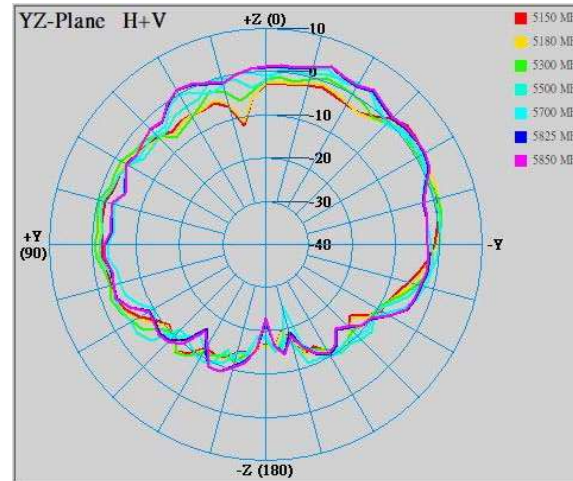
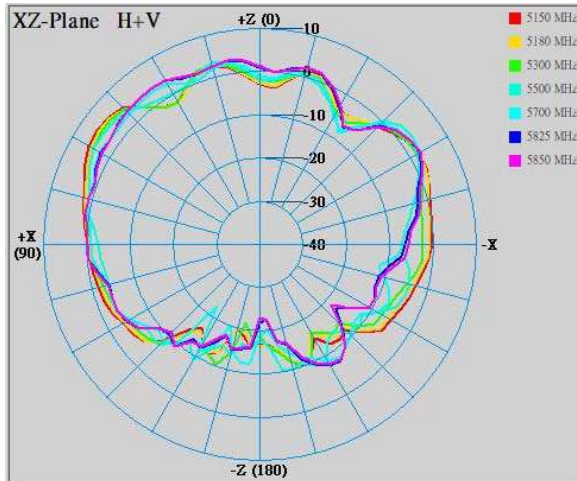
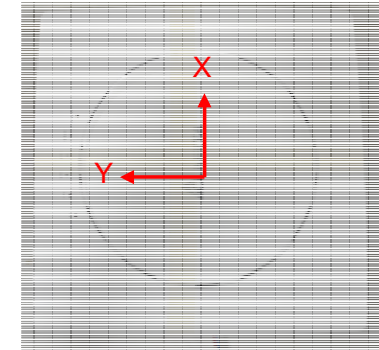
2D Radiation Pattern Results

TB1-2G



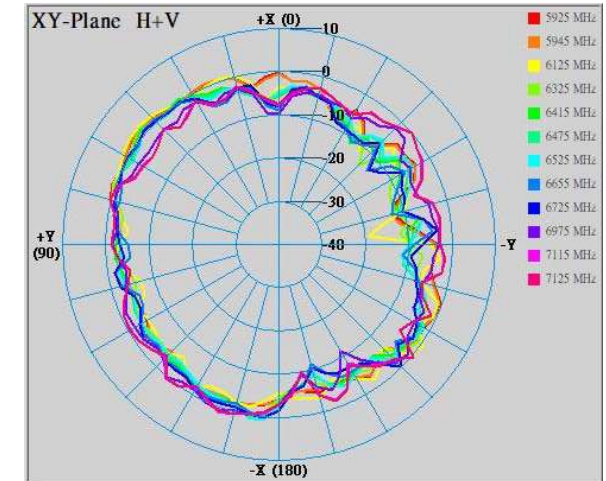
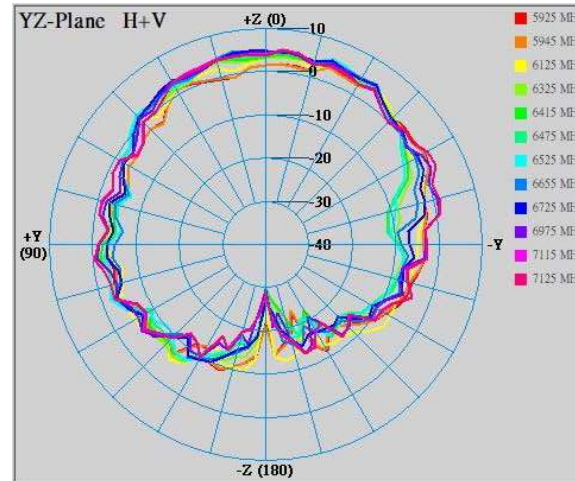
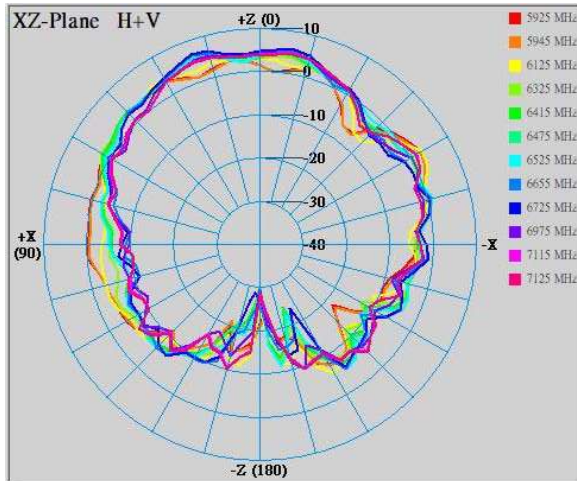
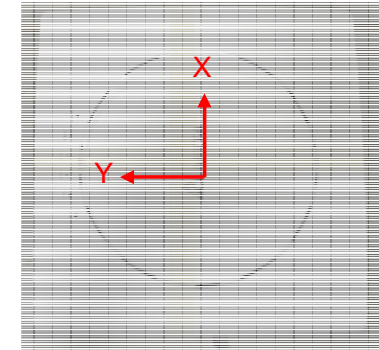
2D Radiation Pattern Results

TB1-5G



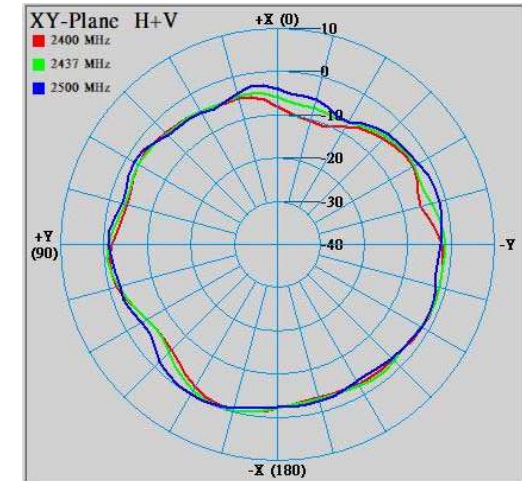
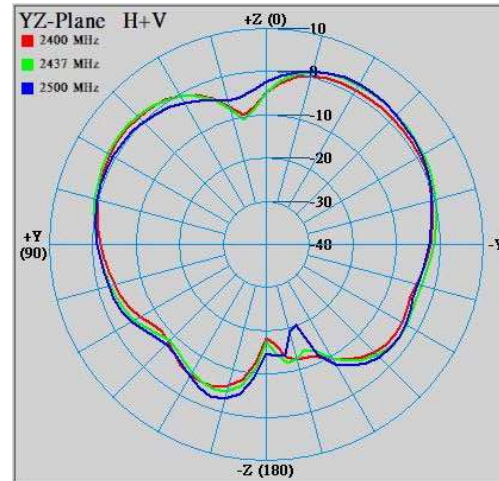
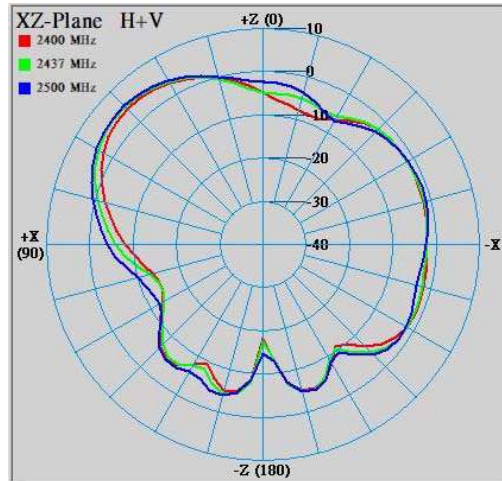
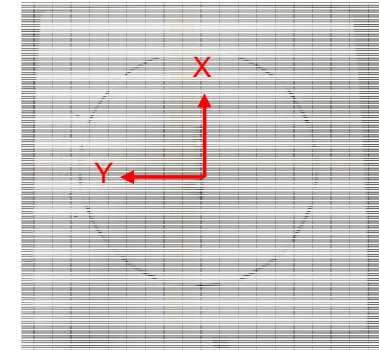
2D Radiation Pattern Results

TB1-6G



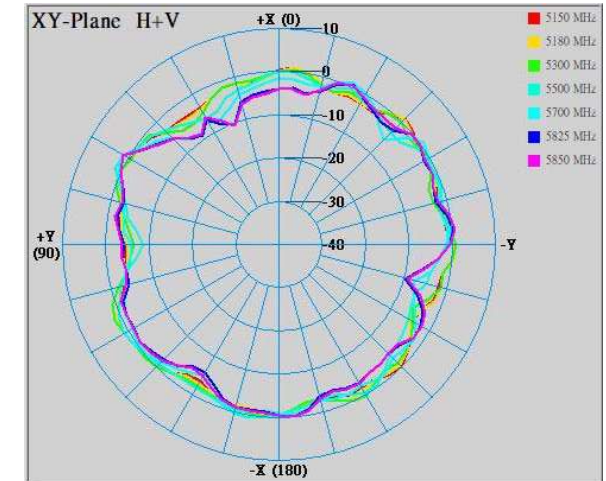
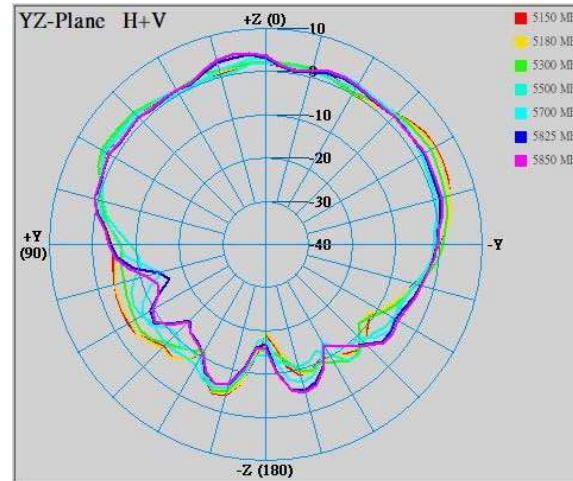
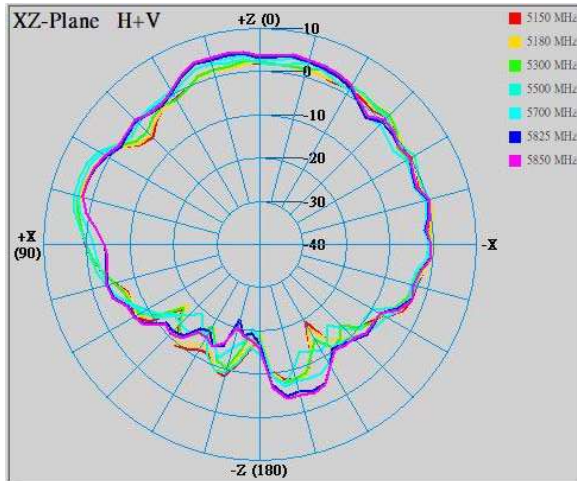
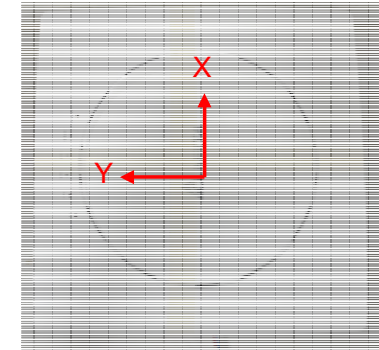
2D Radiation Pattern Results

DB0-2G



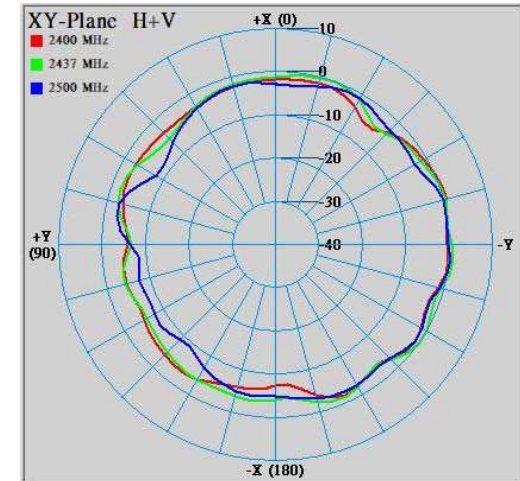
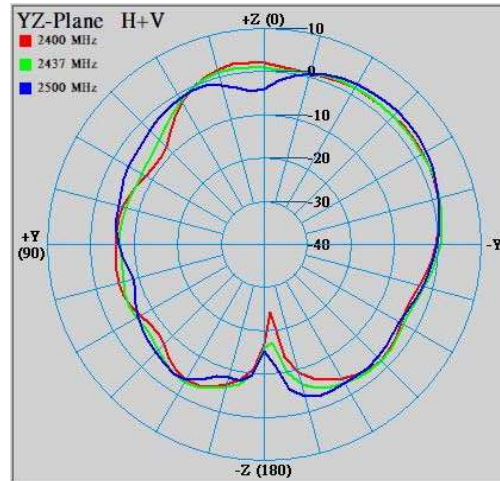
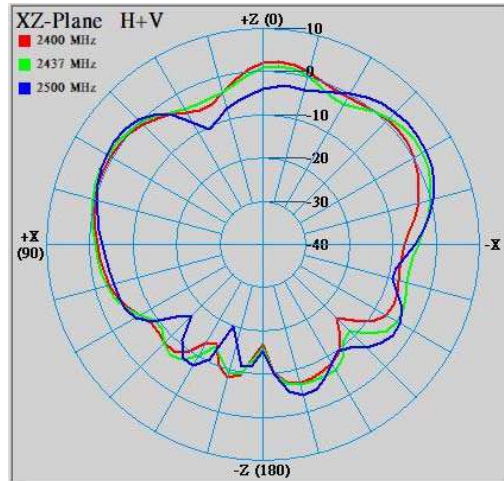
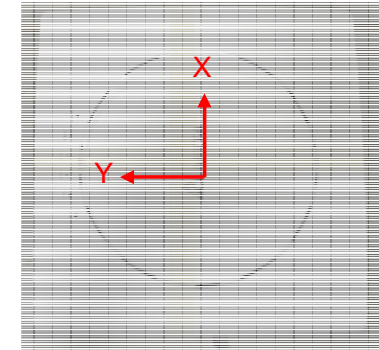
2D Radiation Pattern Results

DB0-5G



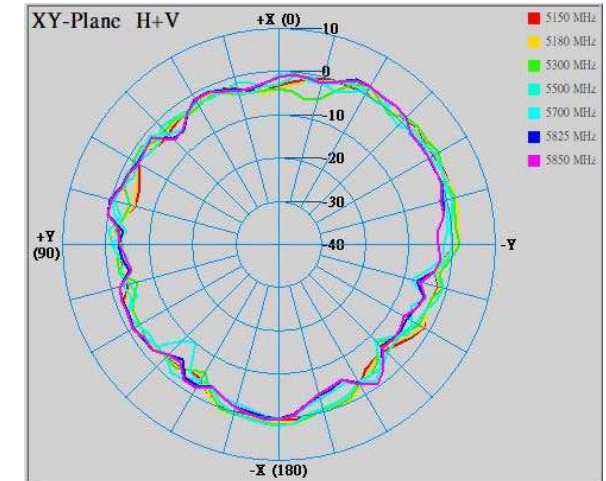
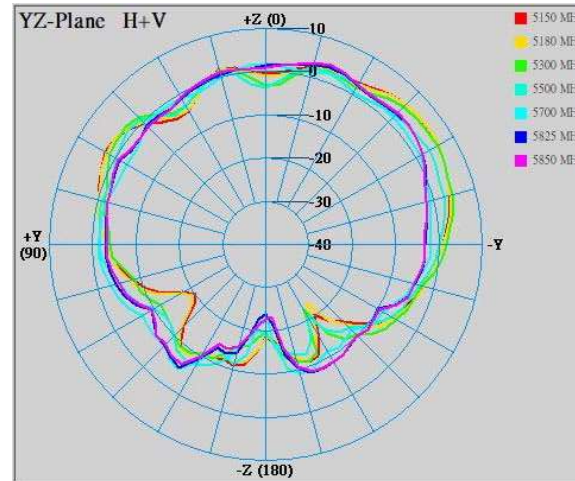
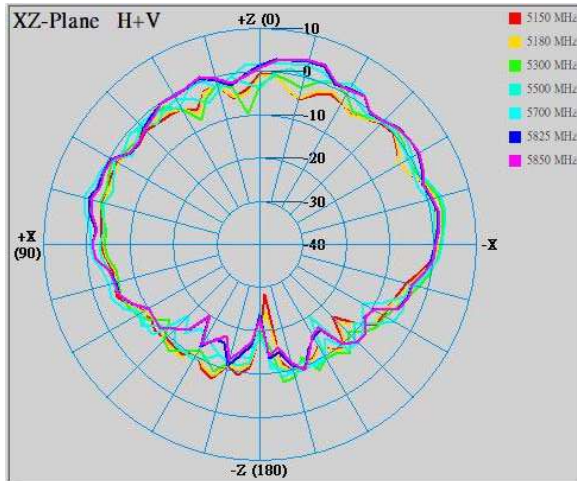
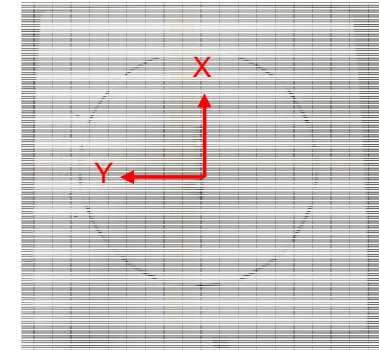
2D Radiation Pattern Results

DB1-2G



2D Radiation Pattern Results

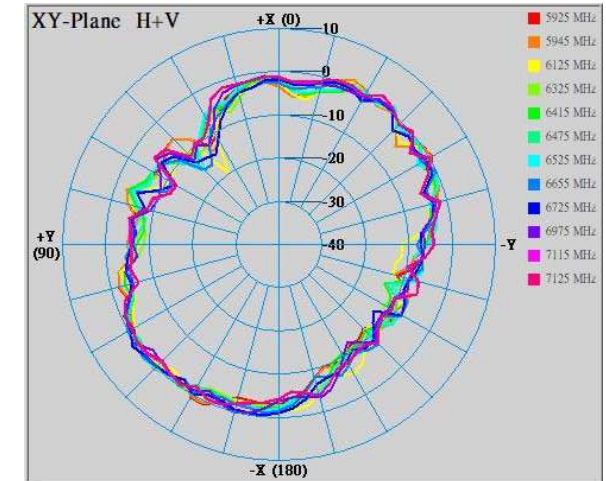
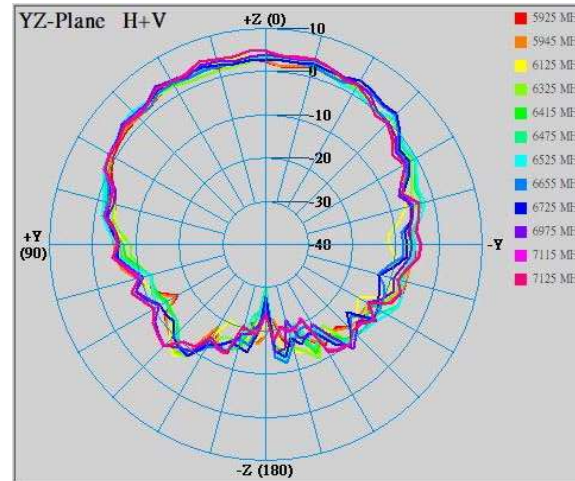
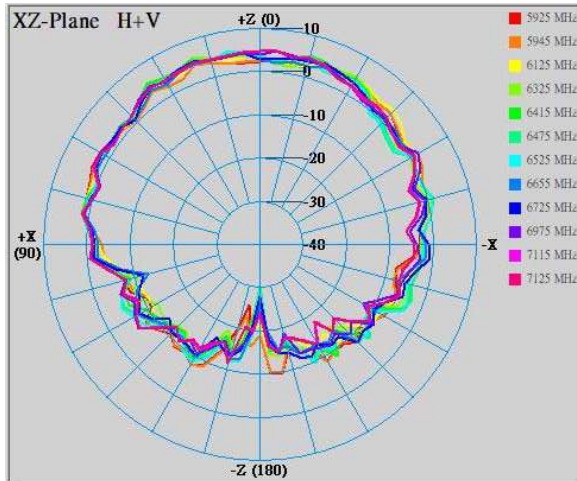
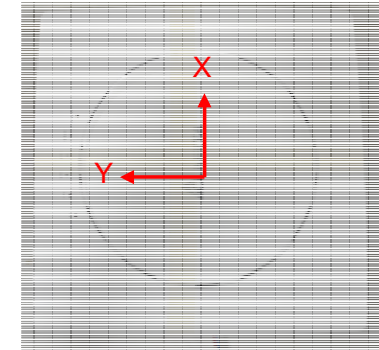
DB1-5G



2D Radiation Pattern Results



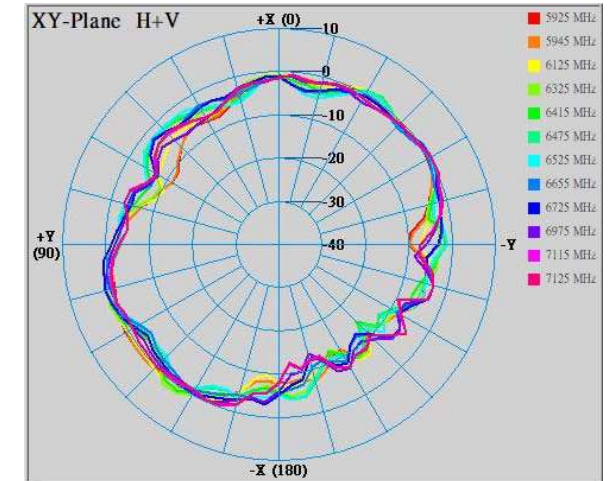
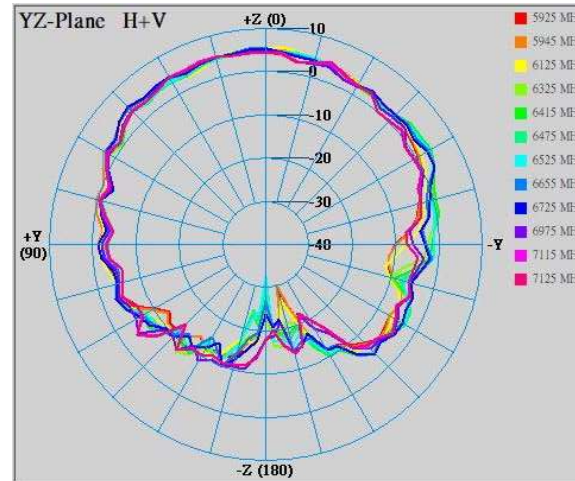
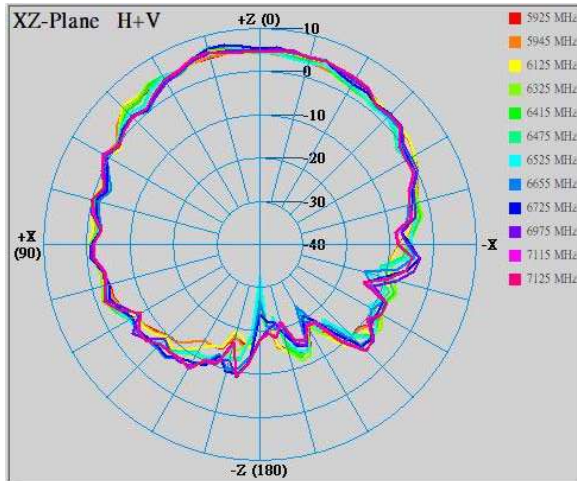
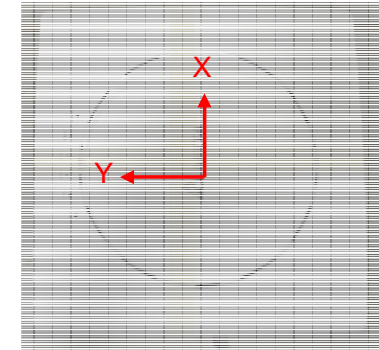
6G0



2D Radiation Pattern Results



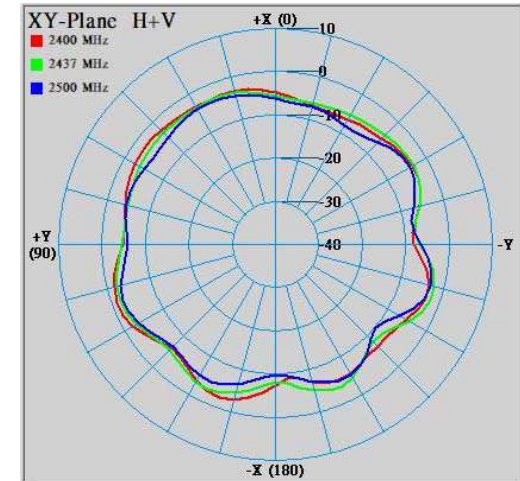
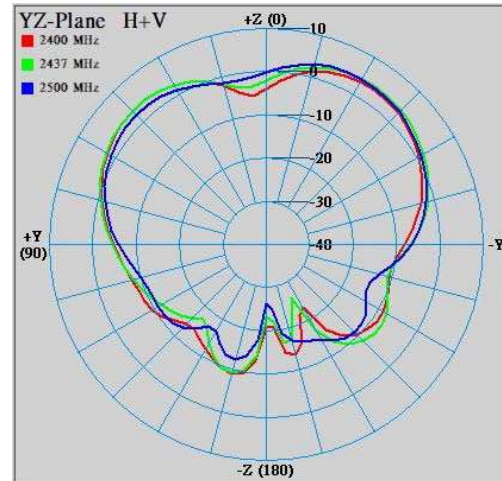
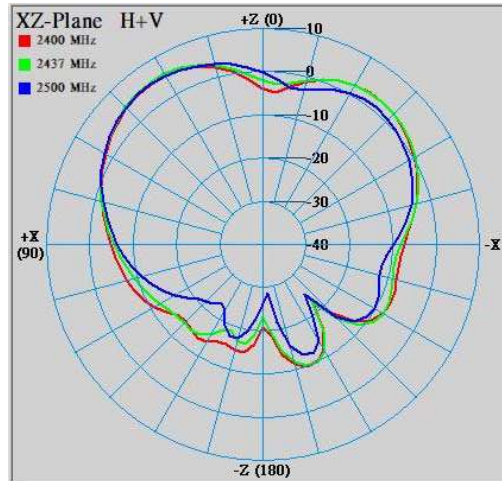
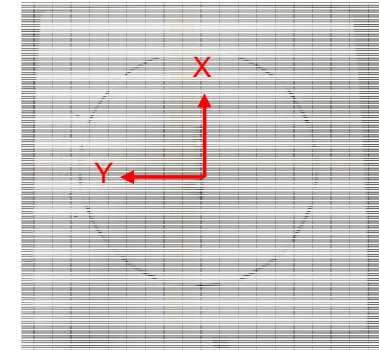
6G1



2D Radiation Pattern Results

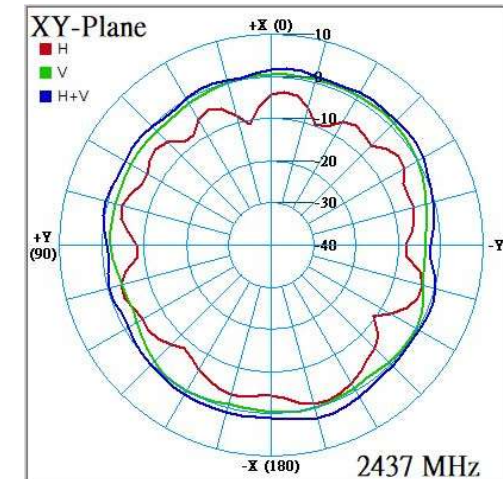
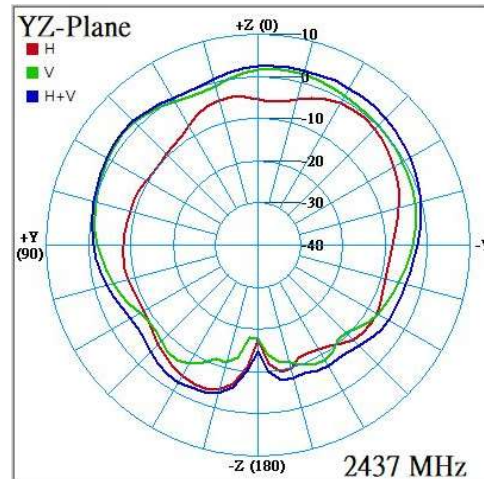
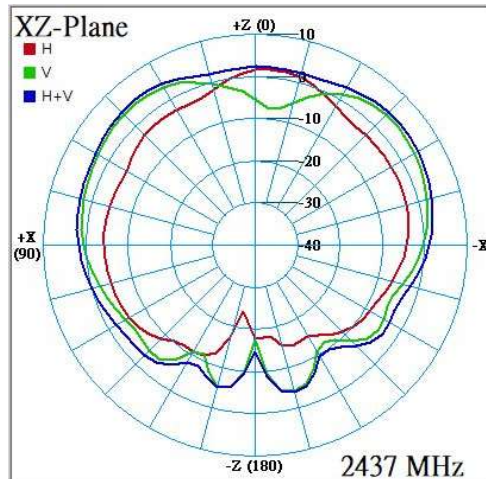
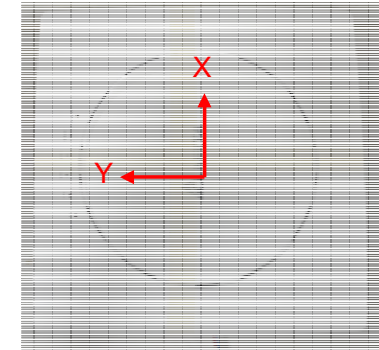


BT



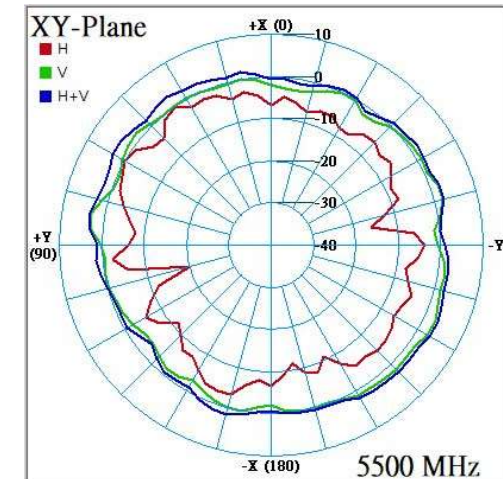
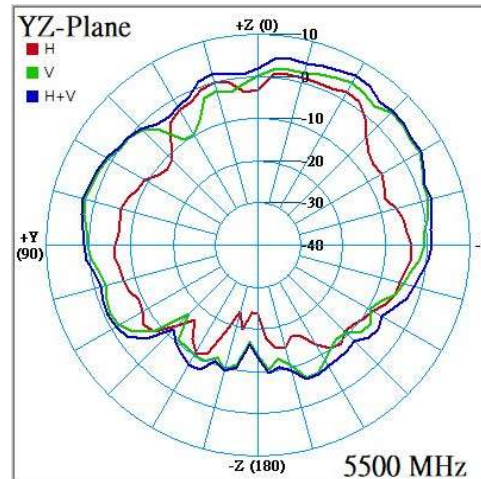
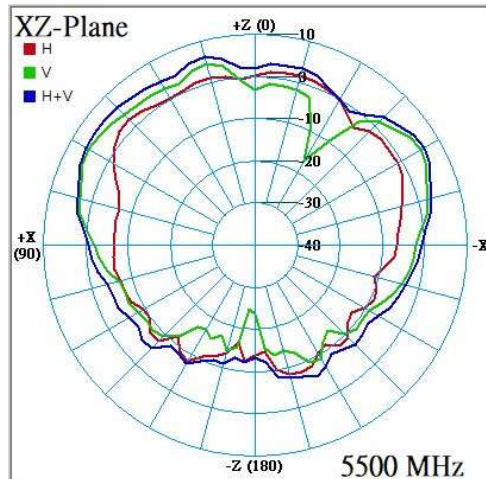
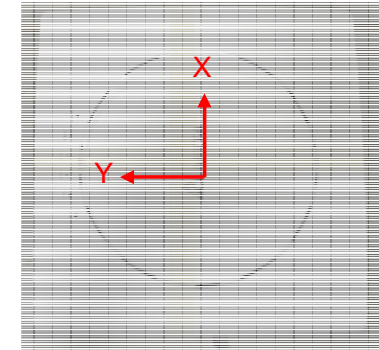
2D Radiation Pattern Results

TB-2437 MHz (Composite gain)

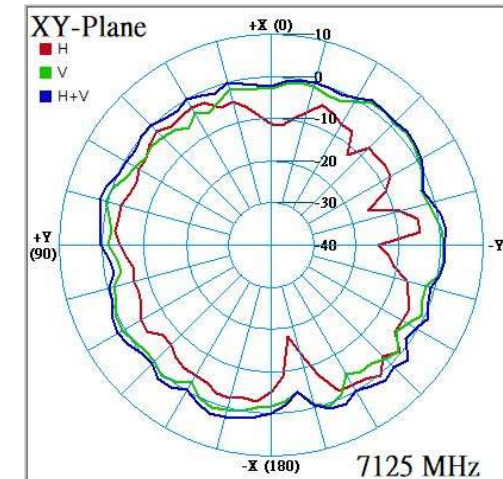
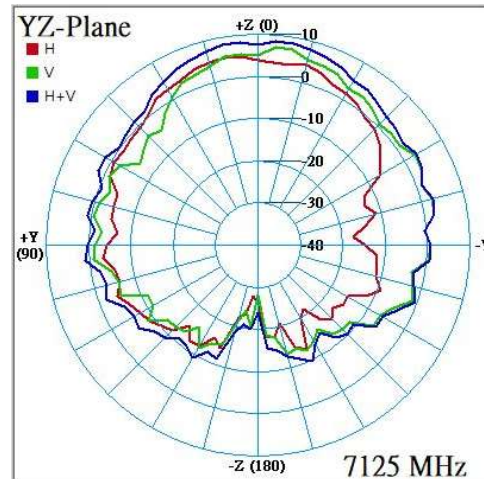
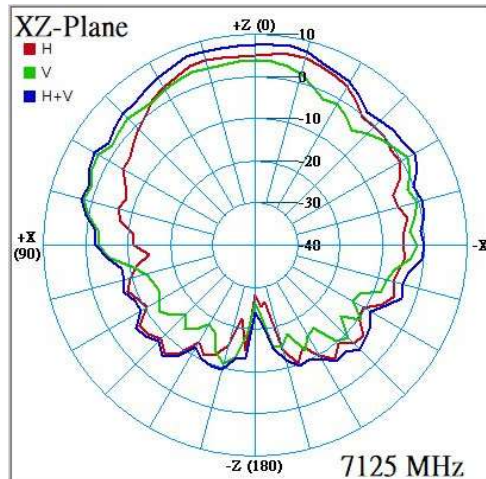
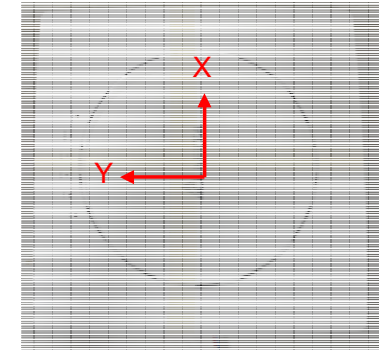


2D Radiation Pattern Results

TB-5500 MHz (Composite gain)

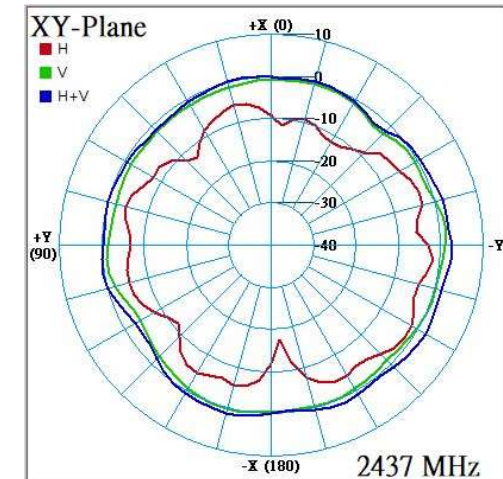
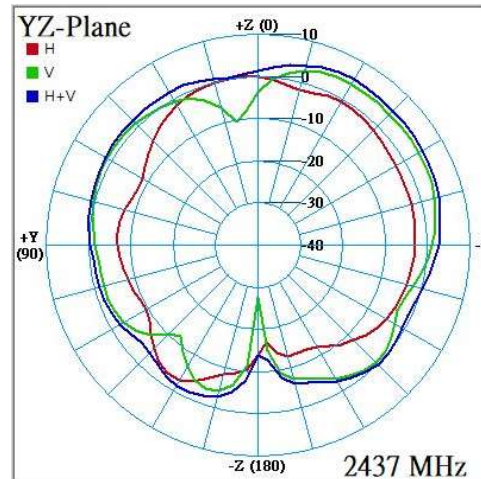
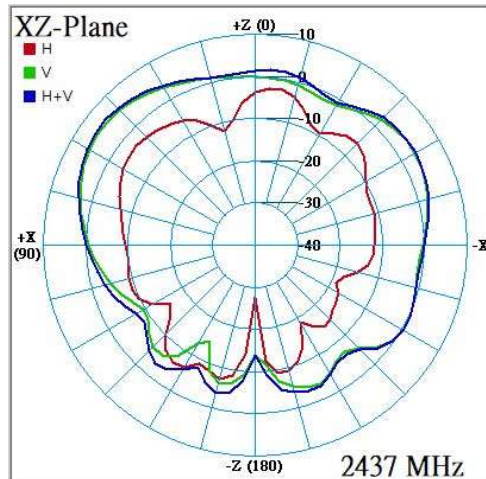
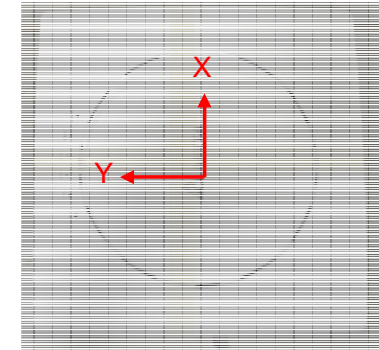


2D Radiation Pattern Results



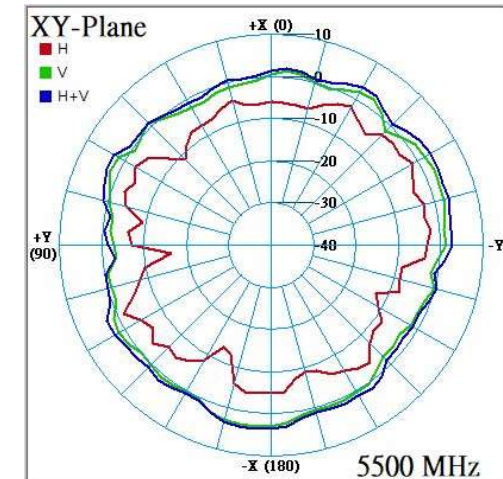
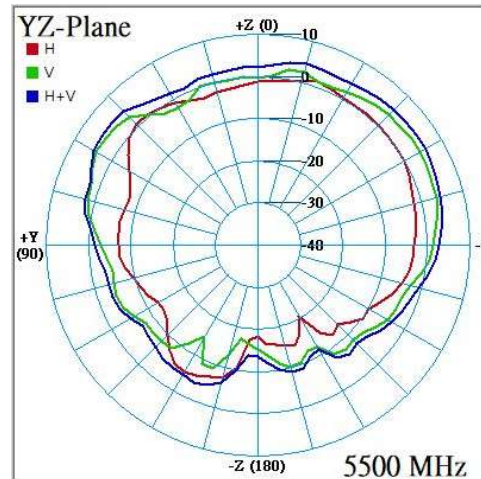
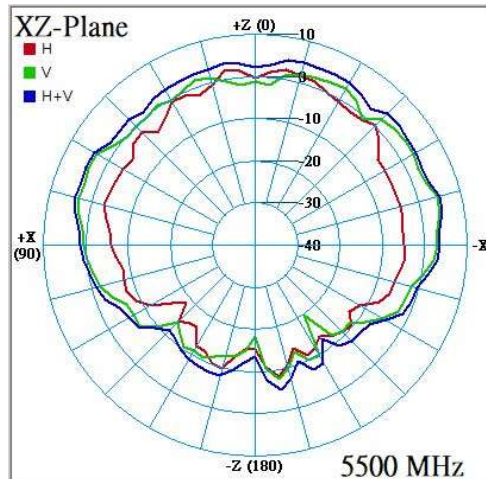
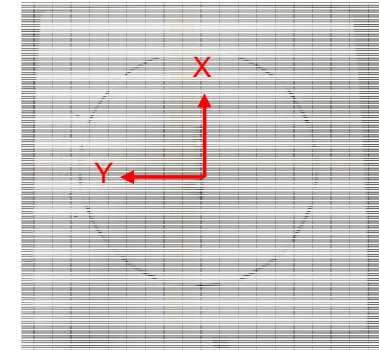
2D Radiation Pattern Results

DB-2437 MHz (Composite gain)



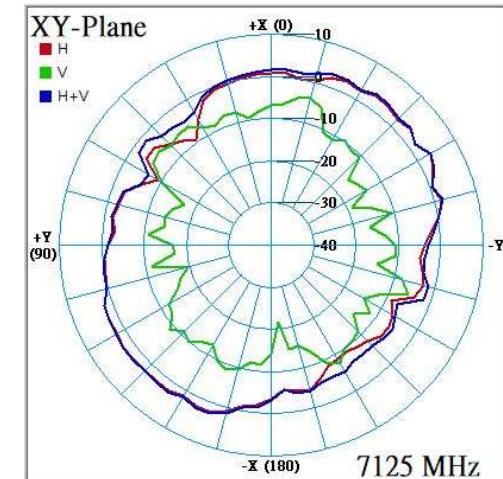
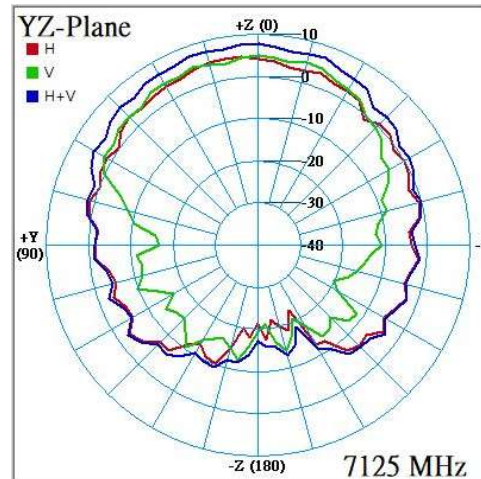
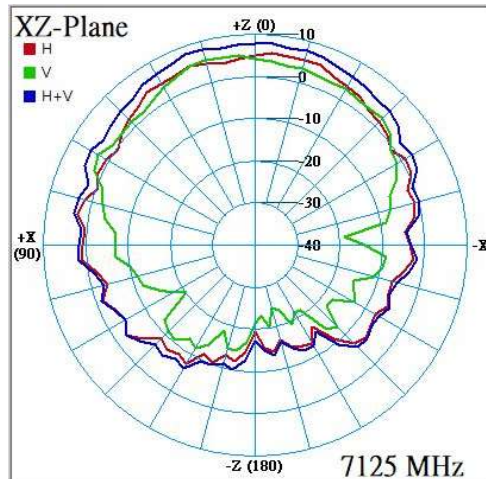
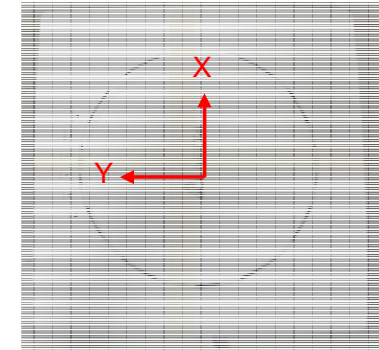
2D Radiation Pattern Results

DB-5500 MHz (Composite gain)



2D Radiation Pattern Results

6G-7125 MHz (Composite gain)



Results Summary - Return Loss



Frequency (MHz)	TB0 (dB)	TB1 (dB)	DB0 (dB)	DB1 (dB)	6G0 (dB)	6G1 (dB)	BT (dB)
2400	13.3	16.1	11.9	25.7	-	-	11.9
2437	19.3	22.5	17.5	17.2	-	-	24.4
2500	20.0	19.1	14.3	15.6	-	-	11.7
5150	19.2	22.9	26.3	16.8	-	-	-
5500	17.5	18.3	14.0	14.3	-	-	-
5850	13.8	15.8	13.7	16.2	-	-	-
5925	13.8	13.2	-	-	13.7	16.7	-
6525	23.0	33.1	-	-	32.2	17.6	-
7125	10.8	39.5	-	-	20.5	14.2	-

Results Summary - Isolation



Frequency(MHz)	TB 0 To TB 1 (dB)	TB 0 To DB 0 (dB)	TB 0 To DB 1 (dB)	TB 0 To 6G 0 (dB)	TB 0 To 6G 1 (dB)	TB 0 To BT (dB)
2400	28	29	26	32	34	29
2437	28	28	26	28	35	26
2500	27	26	26	27	36	31
5150	27	32	29	38	45	49
5500	29	27	29	38	41	47
5850	34	32	33	40	41	44
5925	36	32	33	37	45	44
6525	37	32	42	36	44	42
7125	45	39	33	37	46	39

Results Summary - Isolation



Frequency(MHz)	TB 1 To DB 0 (dB)	TB 1 To DB 1 (dB)	TB 1 To 6G 0 (dB)	TB 1 To 6G 1 (dB)	TB 1 To BT (dB)
2400	32	26	40	27	32
2437	33	25	37	28	29
2500	26	27	29	29	26
5150	41	29	41	37	40
5500	46	37	40	40	42
5850	37	35	44	35	39
5925	36	35	44	34	40
6525	38	51	40	33	46
7125	38	31	42	40	38

Results Summary - Isolation



Frequency(MHz)	DB 0 To DB 1 (dB)	DB 0 To 6G 0 (dB)	DB 0 To 6G 1 (dB)	DB 0 To BT (dB)
2400	37	32	32	34
2437	31	34	35	33
2500	25	34	35	38
5150	31	46	55	39
5500	28	36	61	44
5850	33	39	43	38
5925	33	36	58	39
6525	37	33	49	38
7125	33	36	51	50

Results Summary - Isolation



Frequency(MHz)	DB 1 To 6G 0 (dB)	DB 1 To 6G 1 (dB)	DB 1 To BT (dB)	6G 0 To 6G 1 (dB)	6G 0 To BT (dB)	6G 1 To BT (dB)
2400	35	27	29	43	37	28
2437	39	27	32	41	35	29
2500	41	29	34	40	32	32
5150	45	34	40	36	37	46
5500	37	33	56	41	41	45
5850	34	31	42	49	48	45
5925	32	31	45	48	45	50
6525	38	33	43	52	41	42
7125	46	37	69	40	46	46

Results Summary

3D Peak gain & Efficiency (TB0)



Frequency (MHz)	Peak Gain (dBi)	Efficiency (%)
2400	4.0	63.0
2437	3.8	63.2
2500	4.3	65.2
5150	4.7	73.8
5180	4.7	74.1
5300	4.8	75.2
5500	5.2	75.5
5700	6.0	71.4
5825	5.9	70.3
5850	6.4	72.1
5925	6.5	71.6
5945	6.4	69.3
6125	6.6	71.1
6325	7.6	73.6
6415	7.8	74.1
6475	7.8	72.8
6525	7.8	74.5
6655	7.9	71.3
6725	7.8	71.8
6975	7.4	69.8
7115	7.1	65.9
7125	6.9	64.3

Results Summary

3D Peak gain & Efficiency (TB1)



Frequency (MHz)	Peak Gain (dBi)	Efficiency (%)
2400	3.1	63.8
2437	3.4	68.7
2500	4.7	69.3
5150	6.0	68.7
5180	5.8	68.4
5300	5.3	68.2
5500	5.1	70.5
5700	5.0	64.6
5825	4.5	66.2
5850	4.6	66.8
5925	4.7	63.5
5945	4.7	61.1
6125	5.1	65.3
6325	5.3	64.0
6415	5.8	66.5
6475	6.1	65.8
6525	6.4	67.5
6655	6.6	65.6
6725	6.8	68.5
6975	5.7	63.0
7115	6.0	65.9
7125	6.0	65.3

Results Summary



3D Peak gain & Efficiency (DB0)

Frequency (MHz)	Peak Gain (dBi)	Efficiency (%)
2400	4.6	62.2
2437	5.2	68.1
2500	5.5	70.0
5150	5.6	82.2
5180	5.5	82.0
5300	4.9	81.7
5500	5.3	79.4
5700	5.2	73.5
5825	5.5	72.4
5850	5.9	77.8

Results Summary



3D Peak gain & Efficiency (DB1)

Frequency (MHz)	Peak Gain (dBi)	Efficiency (%)
2400	4.3	65.3
2437	3.8	67.6
2500	4.6	63.1
5150	6.1	71.8
5180	6.2	71.6
5300	5.8	71.4
5500	5.4	71.8
5700	5.6	66.1
5825	5.7	70.3
5850	5.8	71.1

Results Summary

3D Peak gain & Efficiency (6G0)



Frequency (MHz)	Peak Gain (dBi)	Efficiency (%)
5925	4.9	68.1
5945	5.1	68.7
6125	5.8	72.3
6325	6.0	71.3
6415	5.8	73.8
6475	5.8	72.3
6525	5.7	73.8
6655	6.2	69.7
6725	6.6	72.9
6975	5.6	70.6
7115	5.5	71.9
7125	5.5	71.4

Results Summary

3D Peak gain & Efficiency (6G1)



Frequency (MHz)	Peak Gain (dBi)	Efficiency (%)
5925	5.7	79.1
5945	5.7	80.0
6125	6.3	80.2
6325	6.4	80.0
6415	7.1	80.7
6475	7.2	78.5
6525	7.1	79.8
6655	6.9	79.3
6725	7.1	82.0
6975	6.1	76.6
7115	6.1	76.9
7125	6.1	76.4

Results Summary

3D Peak gain & Efficiency (BT)



Frequency (MHz)	Peak Gain (dBi)	Efficiency (%)
2400	5.3	66.4
2437	5.8	72.1
2500	5.7	63.0

Results Summary



Composite gain (TB)

Frequency (MHz)	Peak Gain (dBi)
2437	6.16
5180	7.73
5300	6.90
5500	7.29
5700	7.72
5825	8.50
5945	8.71
6415	9.01
6475	9.17
6655	9.14
6975	9.03
7115	8.94

Results Summary



Composite gain (DB)

Frequency (MHz)	Peak Gain (dBi)
2437	6.33
5180	8.13
5300	7.75
5500	6.94
5700	7.32
5825	7.35

Results Summary



Composite gain (6G)

Frequency (MHz)	Peak Gain (dBi)
5945	7.43
6415	8.12
6475	8.17
6655	7.98
6975	7.84
7115	7.28



Thank You

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