

***NE3-22033***

***UBC1340***

***Antenna 2/5Gx3,5Gx1,WiFi6Ex4***

*Version: NE3-22033*

*Version: V 2.03*

*Tested Date: 2022/09/05*

*Tested By: Neal Reviewed*

*By: Stone*

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# Revision History

Released Date	Version	Record
2022/05/20	V1.01	Antenna Testing Report With Housing
2022/05/27	V1.02	Improvement of antenna Isolation efficiency
2022/06/01	V1.03	Improvement of antenna Isolation efficiency
2022/07/01	V2.01	Isolation optimization
2022/08/02	V2.02	Winding position and Isolation optimization
2022/09/05	V2.03	Antenna Testing Report With Housing

# Specification

## Requirements of Antenna Design

RF Function	Number of ANT	Frequency Band	Remark
2G / 5G	3	2400 ~ 2500 MHz & 5050~5825 MHz	
5G	1	5050 ~ 5825 MHz	
6G	4	5925 ~ 7125 MHz	

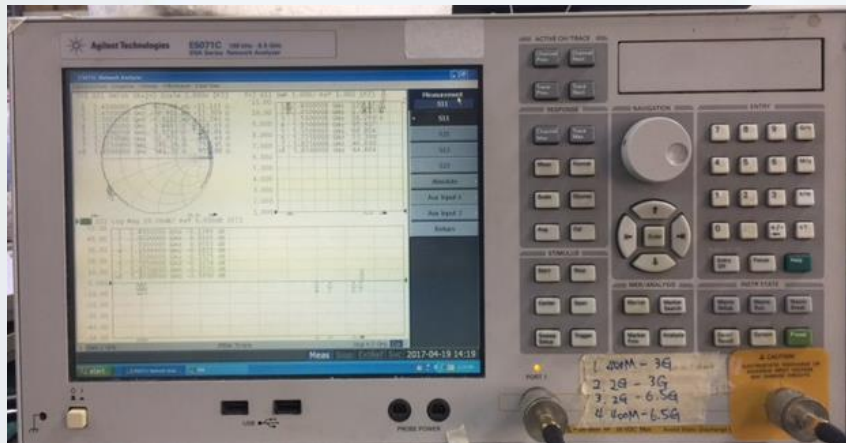
## Requirements of Measurement

Test Item	Specification	Remark
Return Loss	> 10dB	
Isolation	> 25dB	
Peak gain	DB:2.4GHz<3.5dBi /5GHz: <4 dBi ; 5 GHz: <3.5 dBi; 6 GHz: <3.5 dBi	
Efficiency	N/A	
Radiation pattern	Scale: +10 ~ 40dBi, Angle step size: 2 degree	

# Antenna Placement & Solution

Cable Loss				
ANT#	2G(dB)	5G(dB)	6G(dB)	Cable length(mm)
2/5G1	0.89	1.41	1.55	287
6G2	0.49	0.77	0.85	158
5G3	0.64	1.00	1.11	205
6G4	0.14	0.22	0.24	44
6G5	0.14	0.22	0.24	45
2/5G6	0.14	0.22	0.24	45
6G7	0.45	0.71	0.78	145
2/5G8	0.25	0.39	0.45	80

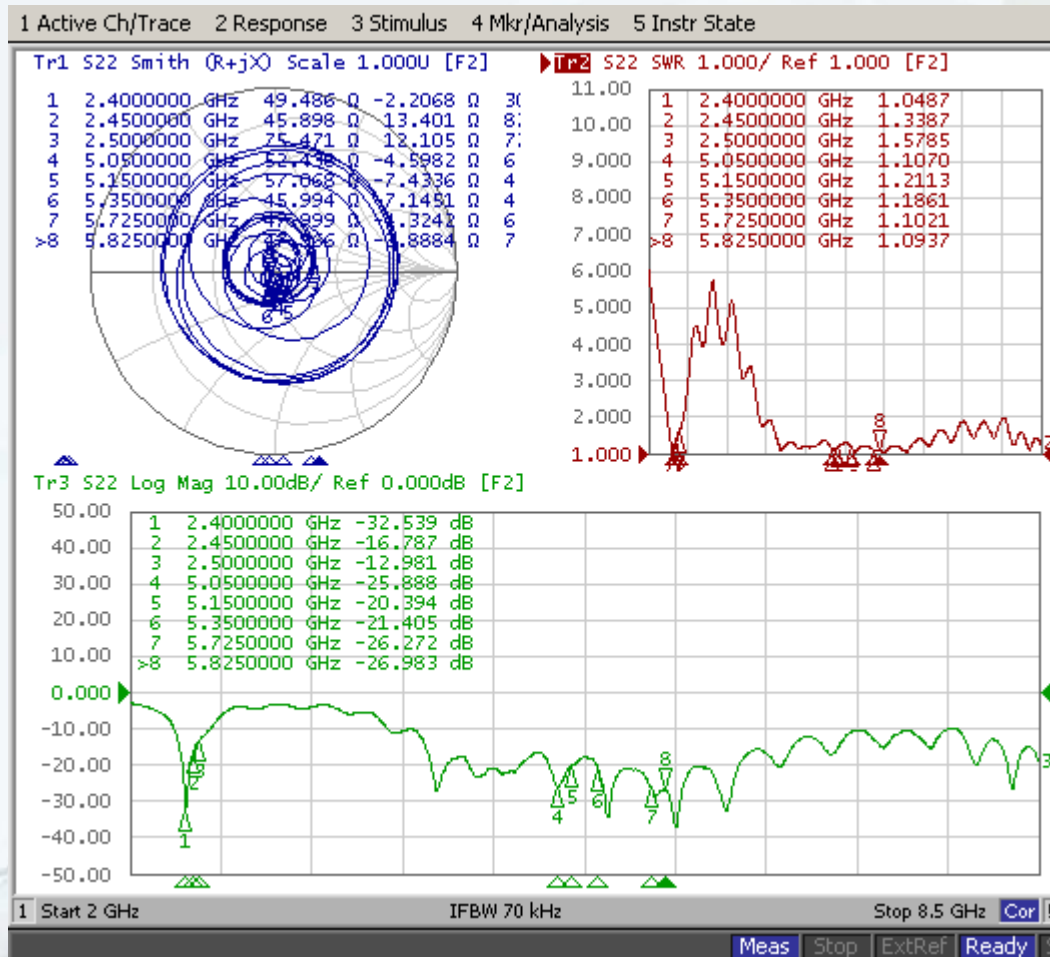
# Test Setup for S-parameter Measurement



Equipment	Brand	Model	S/N
Network Analyzer	Keysight	E5071C	MY46107744

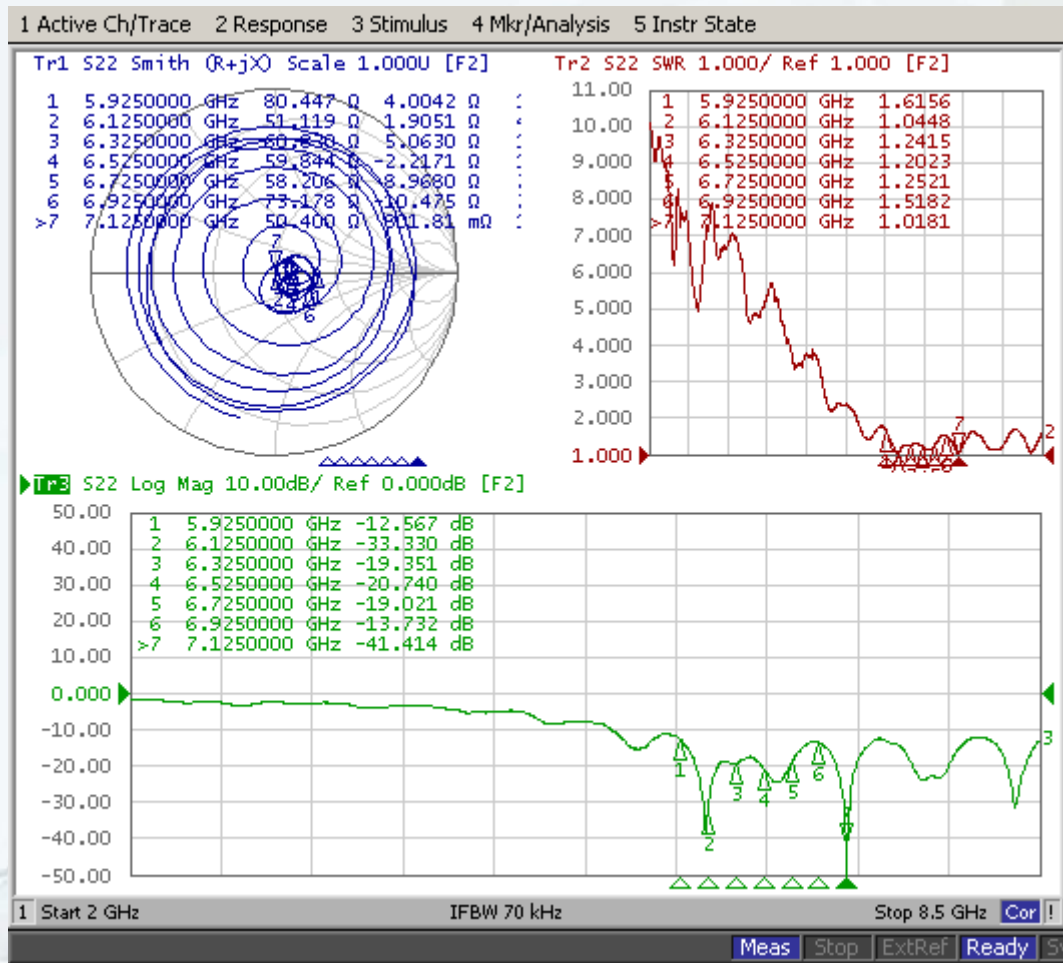
# Return Loss Results

2/5G1 (2400MHz – 2500MHz) (Criterion:>10dB)



# Return Loss Results

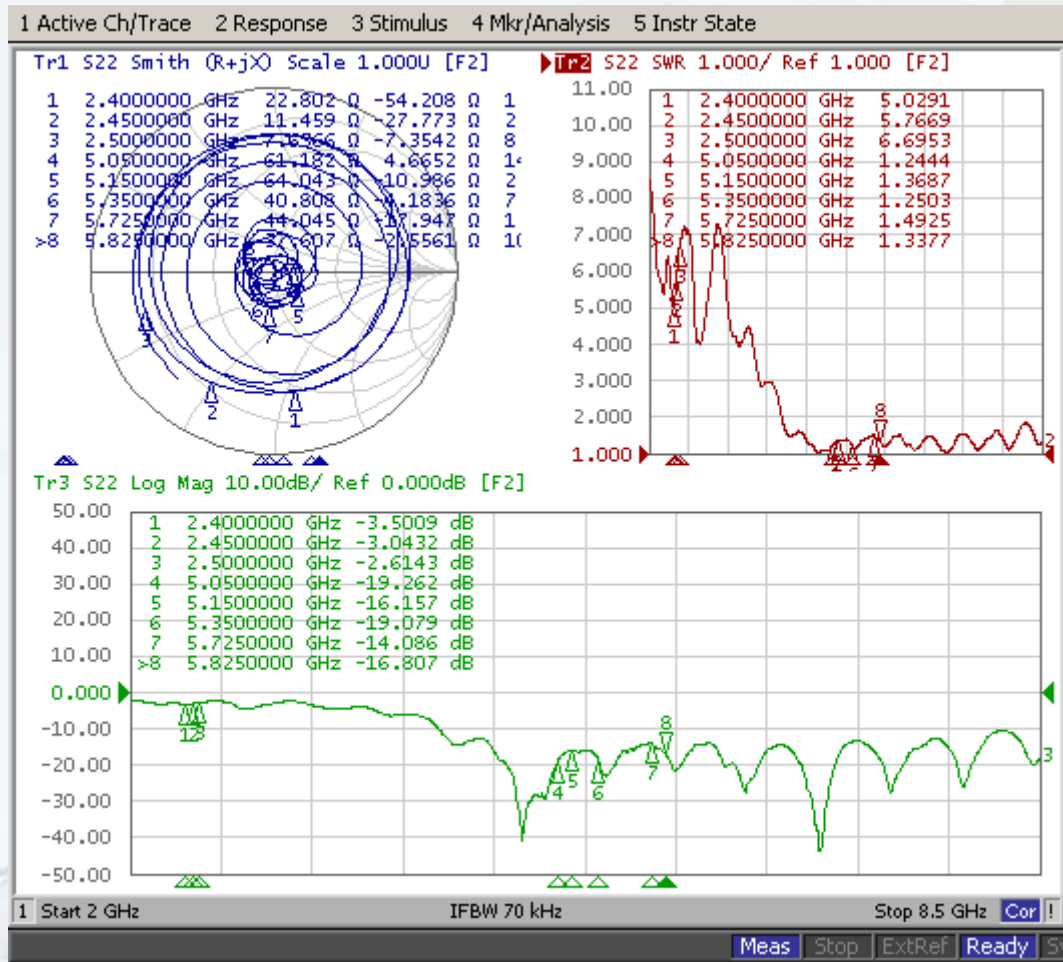
6G2 (5925MHz – 7125MHz) (Criterion:>10dB)





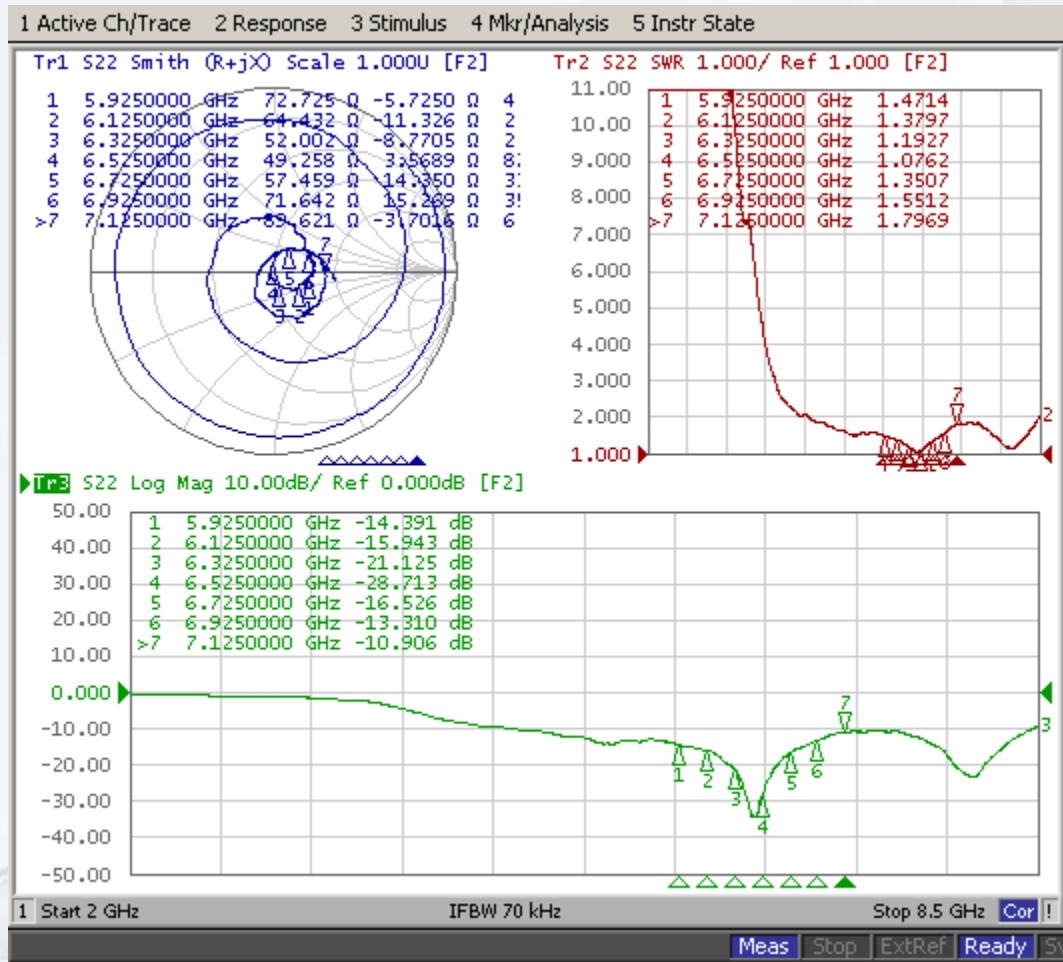
# Return Loss Results

5G3 (5050MHz – 5825MHz) (Criterion:>10dB)



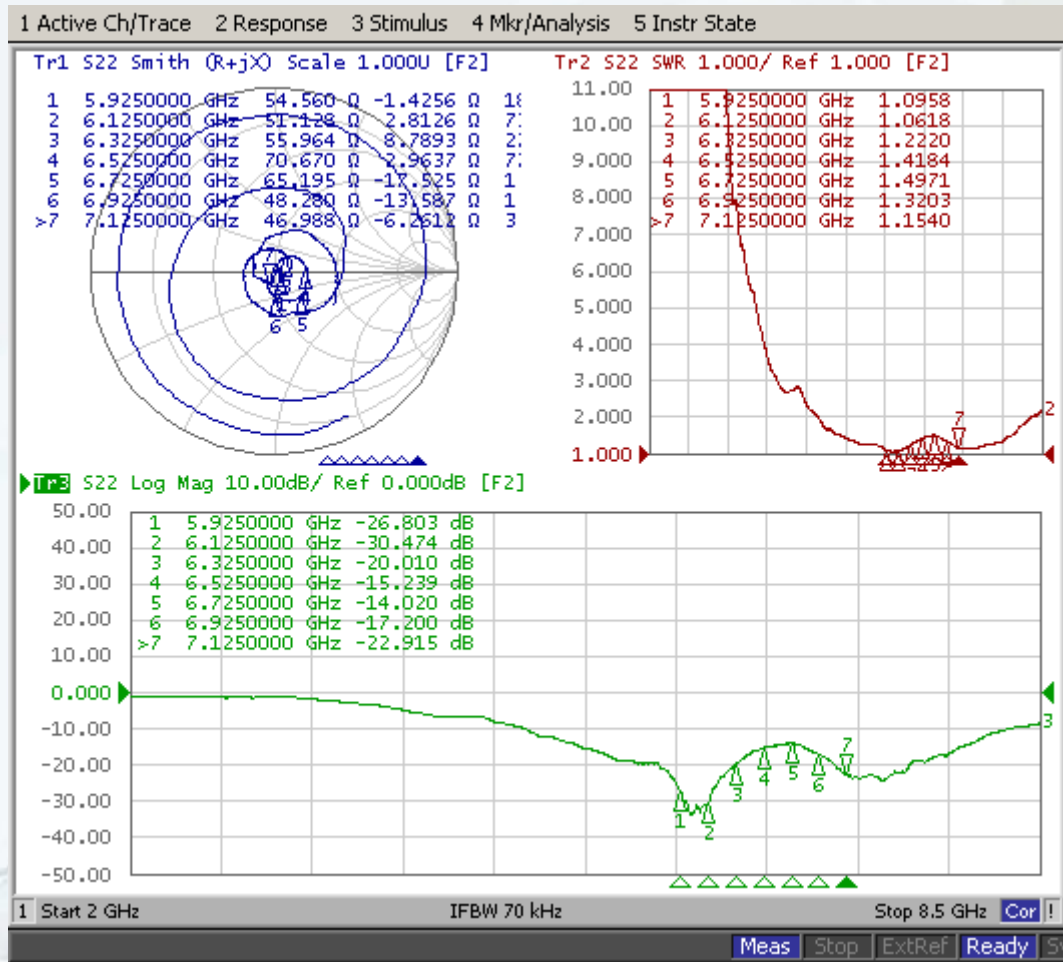
# Return Loss Results

6G4 (5925MHz – 7125MHz) (Criterion:>10dB)



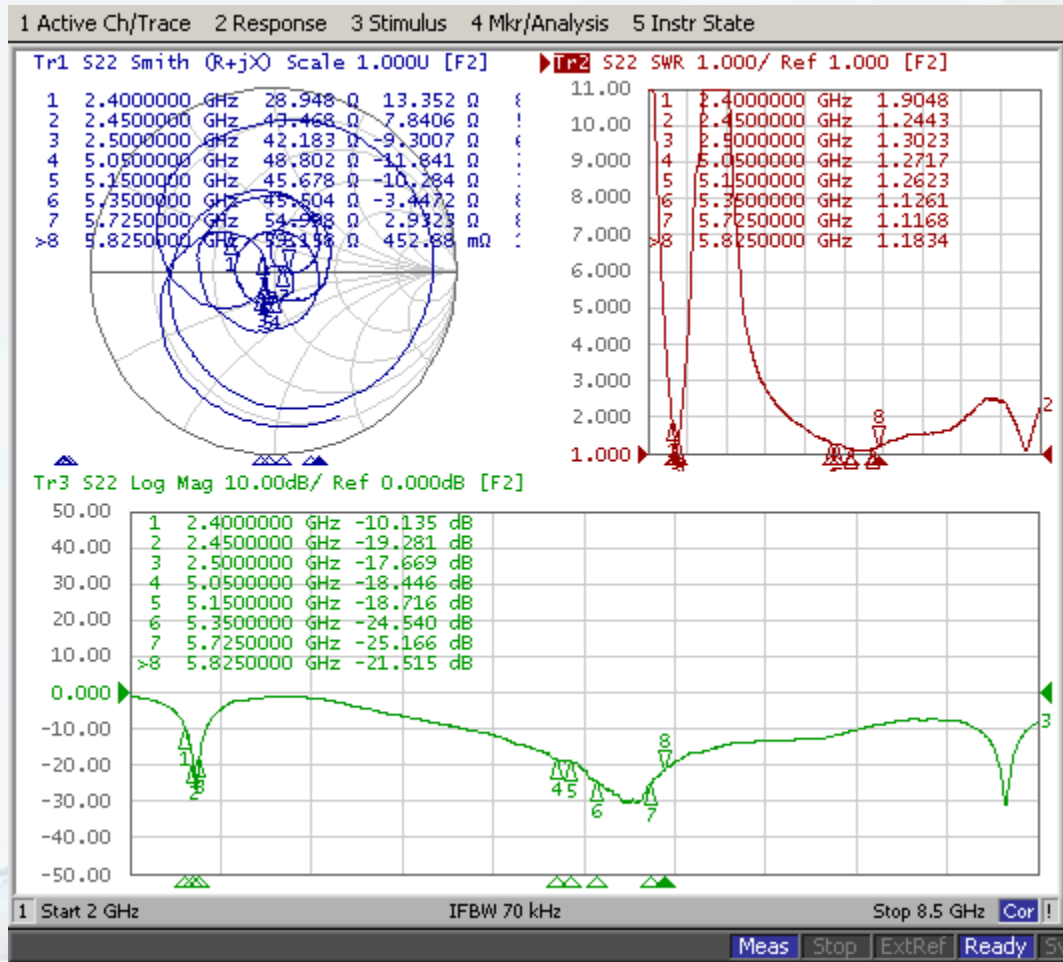
# Return Loss Results

6G5 (5925MHz – 7125MHz) (Criterion:>10dB)



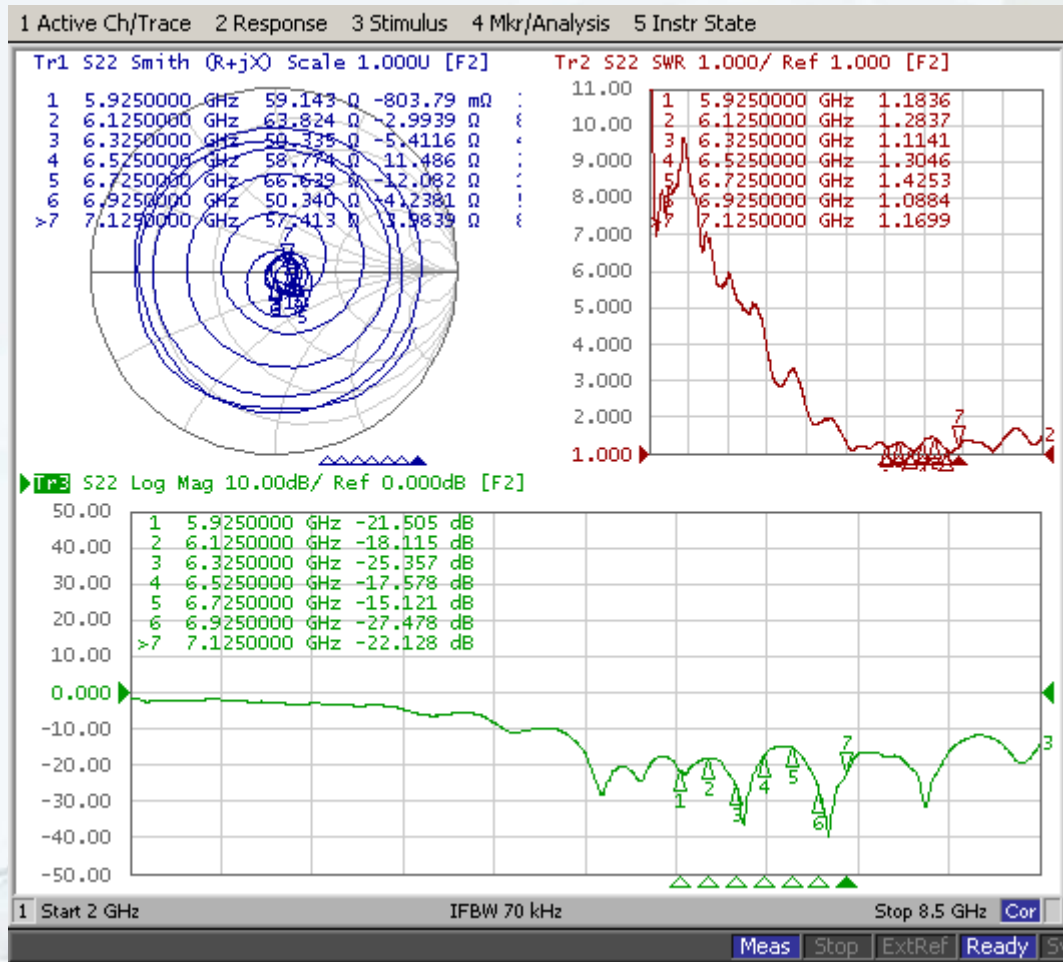
# Return Loss Results

2/5G6 (2400MHz – 2500MHz) (Criterion:>10dB)



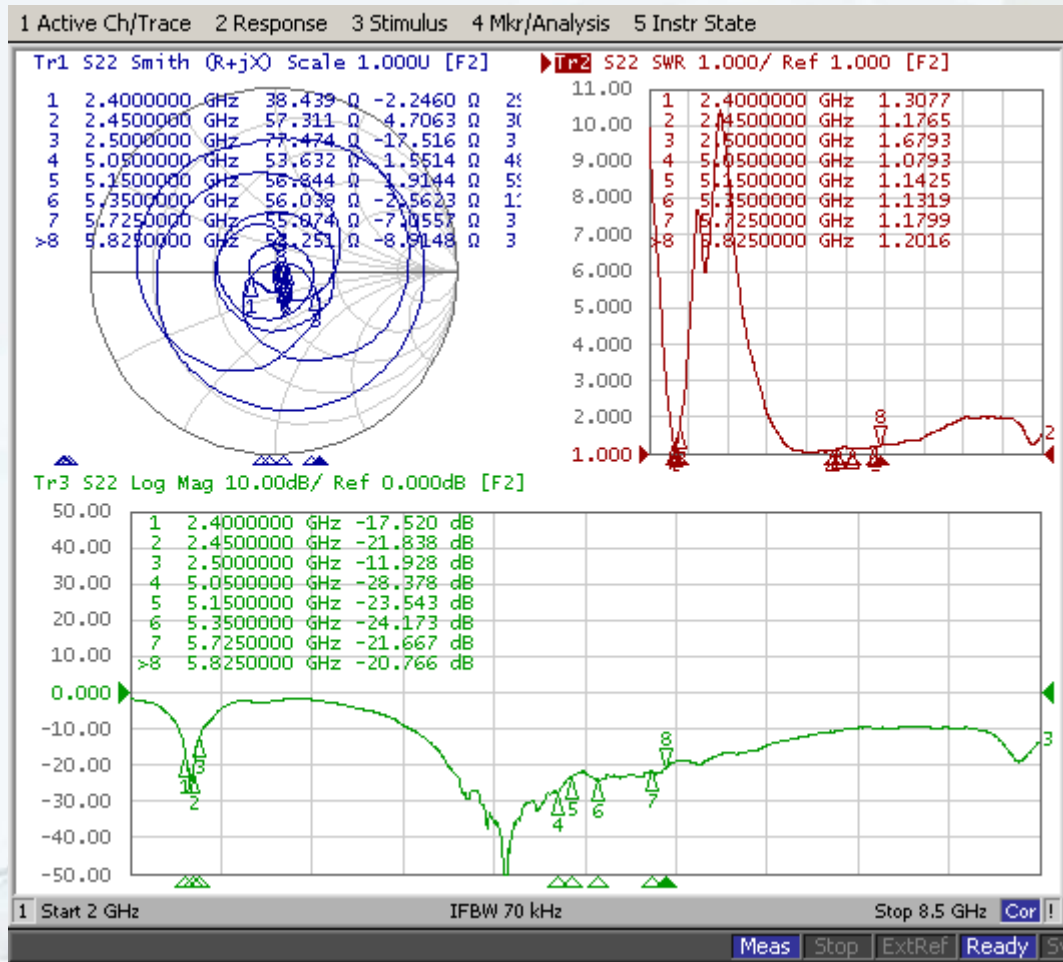
# Return Loss Results

6G7 (5925MHz – 7125MHz) (Criterion:>10dB)



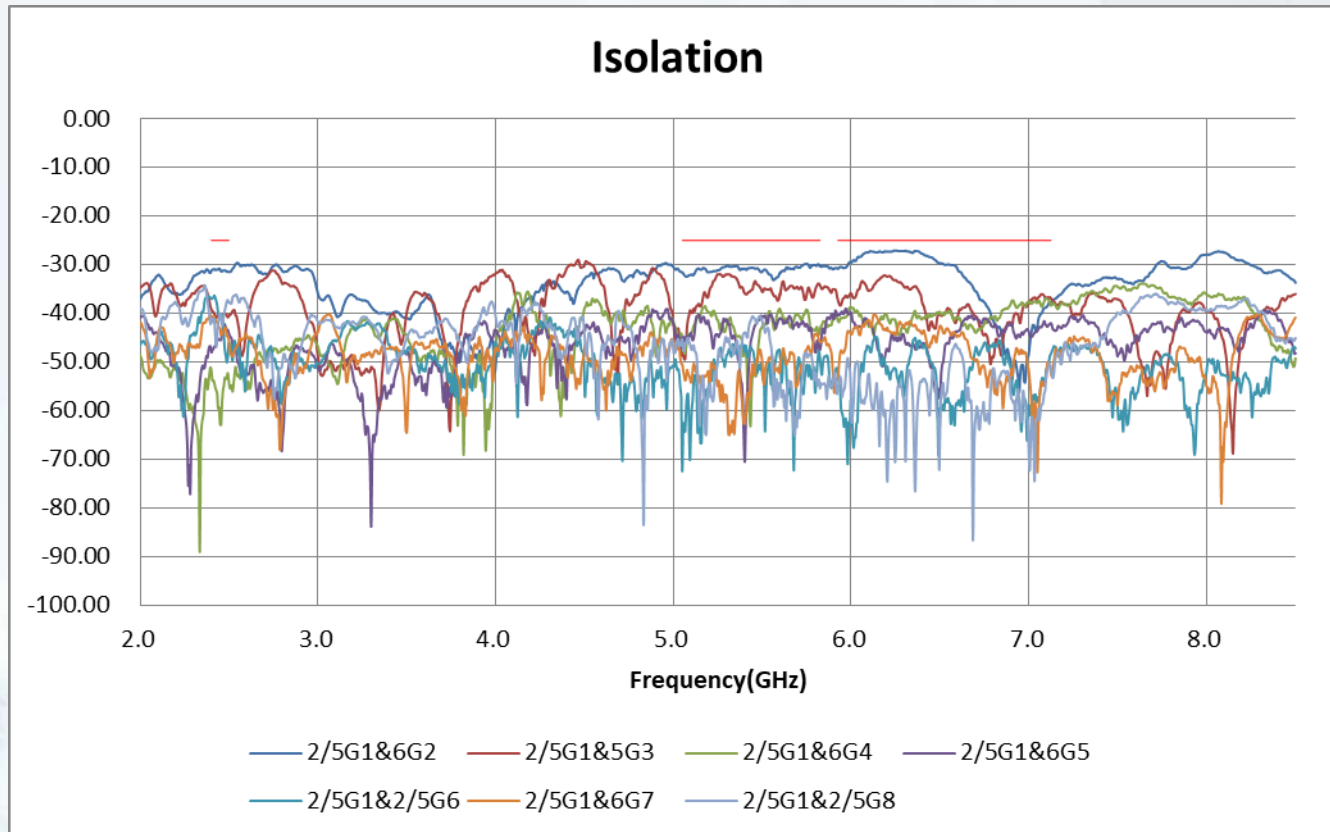
# Return Loss Results

2/5G8 (2400MHz – 2500MHz) (Criterion:>10dB)



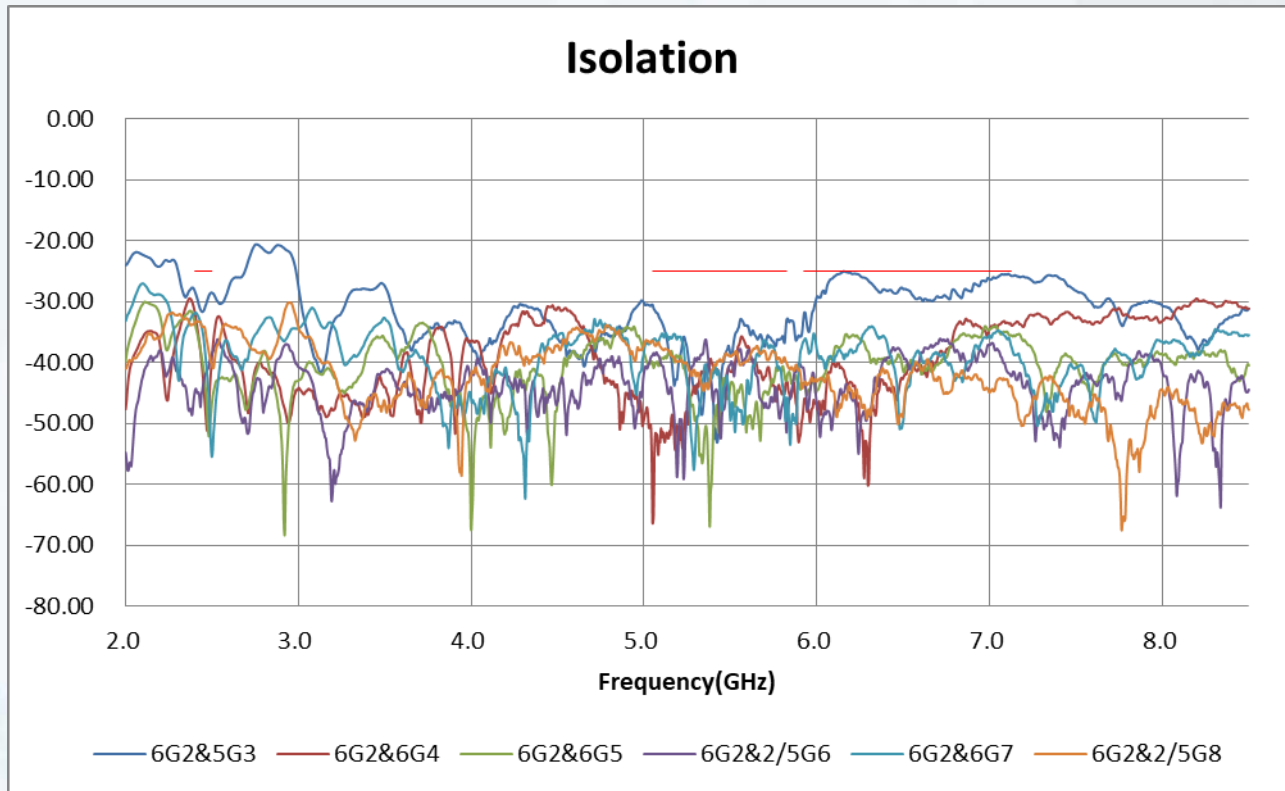
# Isolation Results

2/5G1-6G2~2/5G1-2/5G8 (Criterion:>25 dB)



# Isolation Results

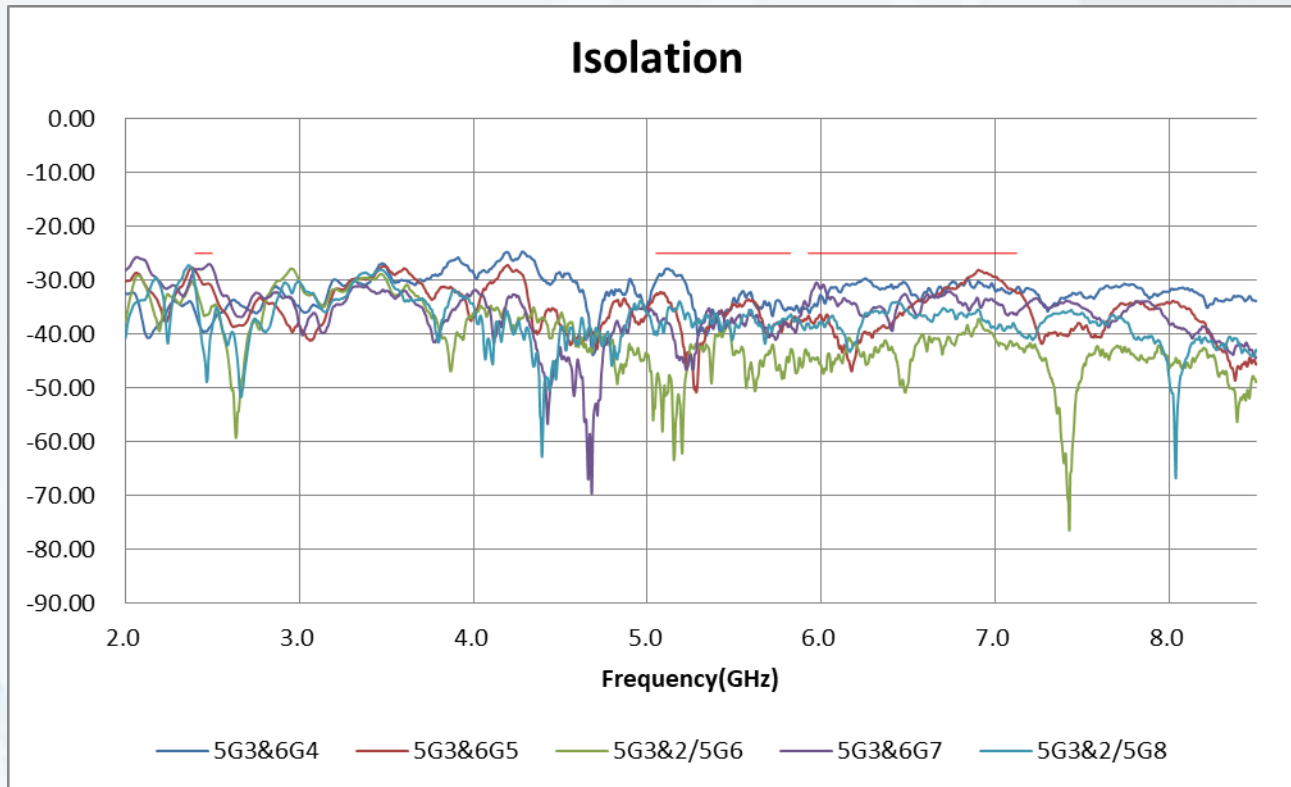
6G2-5G3~6G2-2/5G8(Criterion:>25 dB)





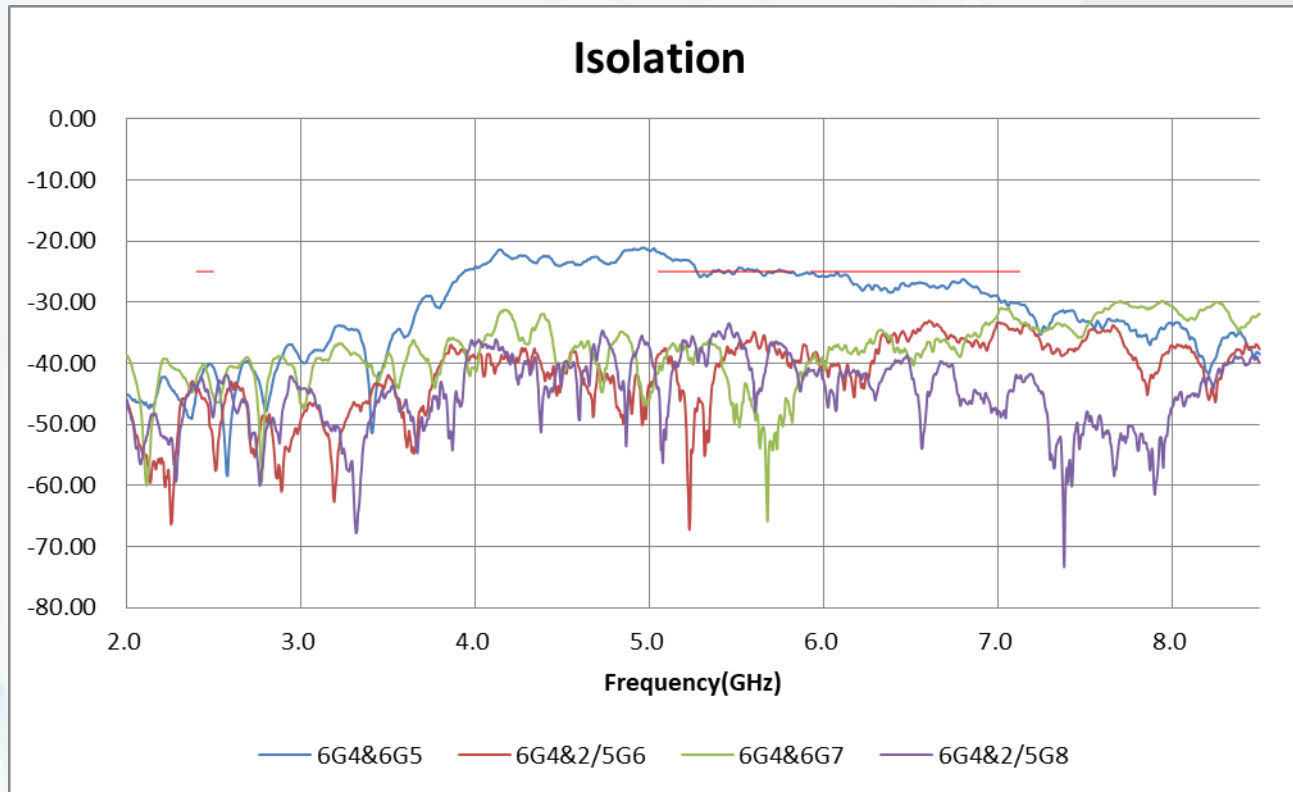
# Isolation Results

5G3-6G4~5G3-2/5G8 (Criterion:>25 dB)



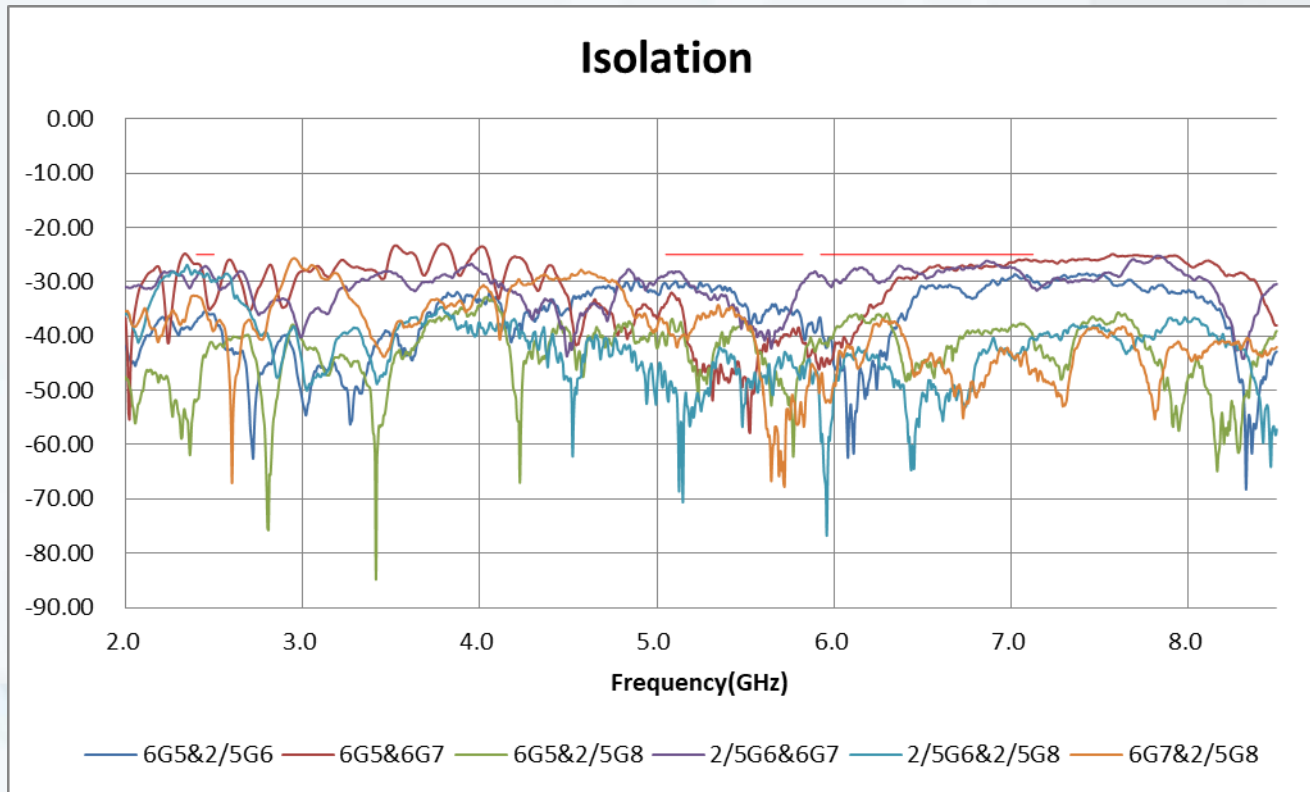
# Isolation Results

6G4-6G5~6G4-2/5G8 (Criterion:>25 dB)



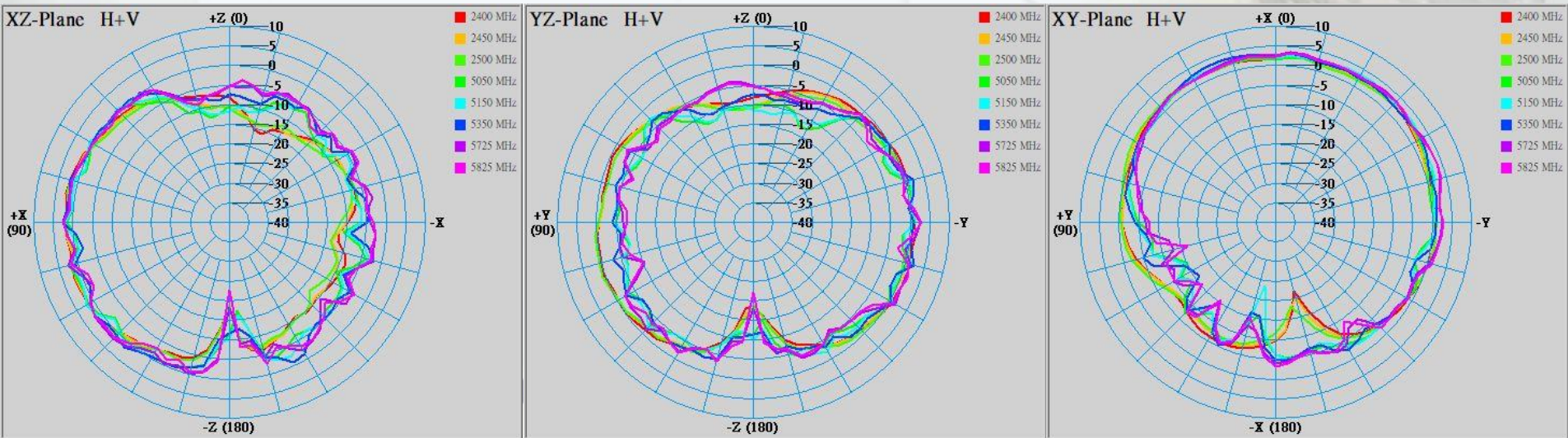
# Isolation Results

6G5-2/5G6~6G7-2/5G8 (Criterion:>25dB)



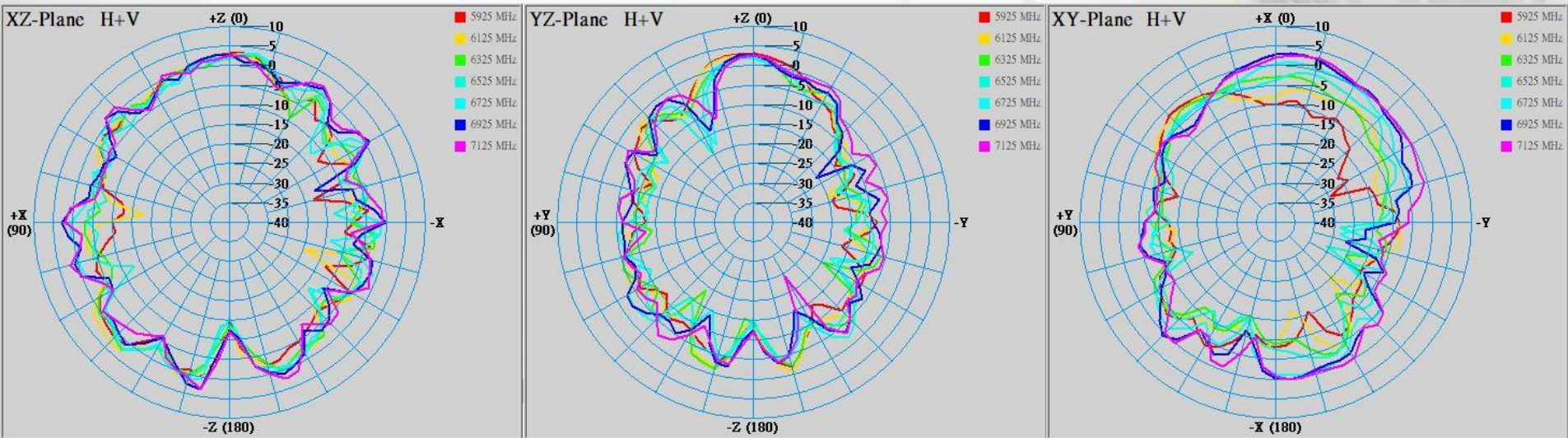
# 2D Radiation Pattern Results

2/5G1



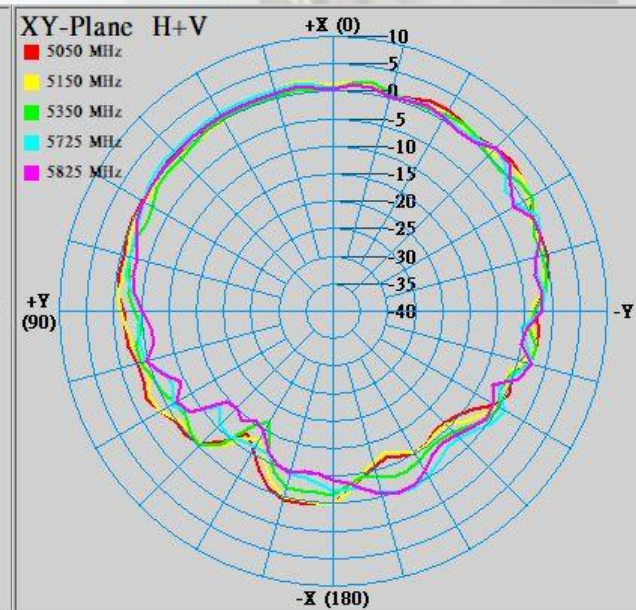
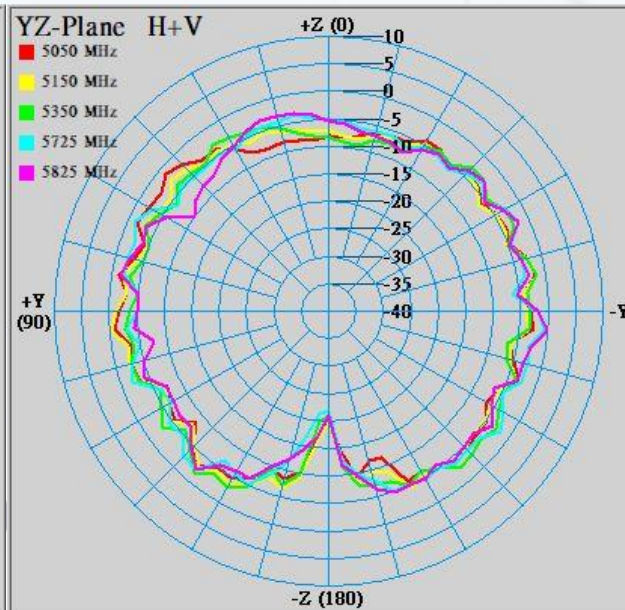
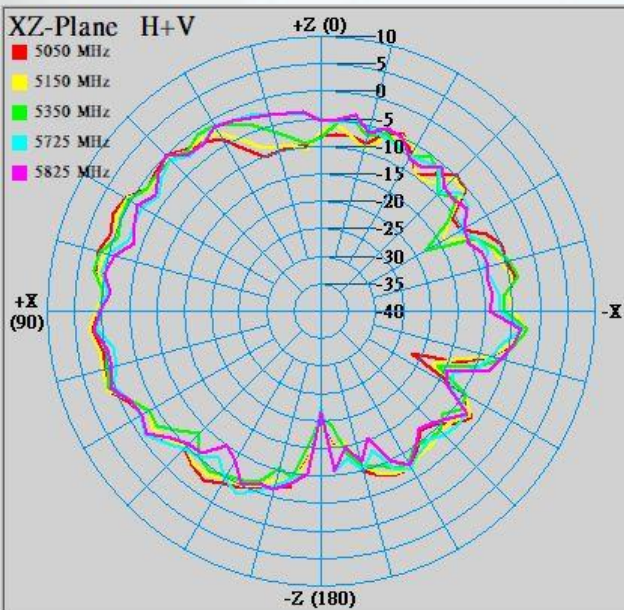
# 2D Radiation Pattern Results

6G2



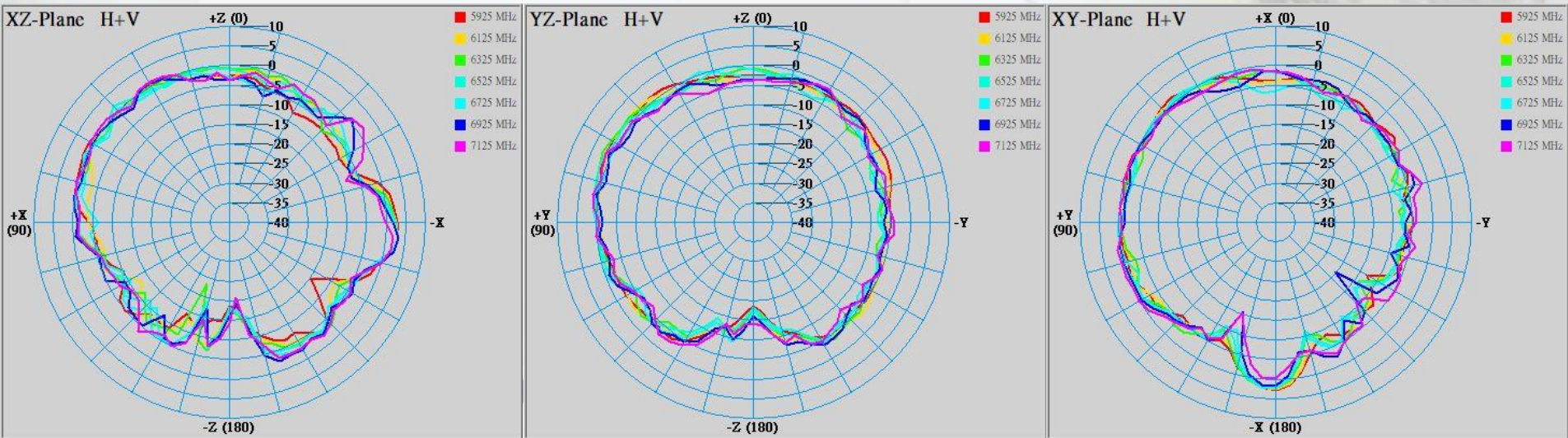
# 2D Radiation Pattern Results

5G3



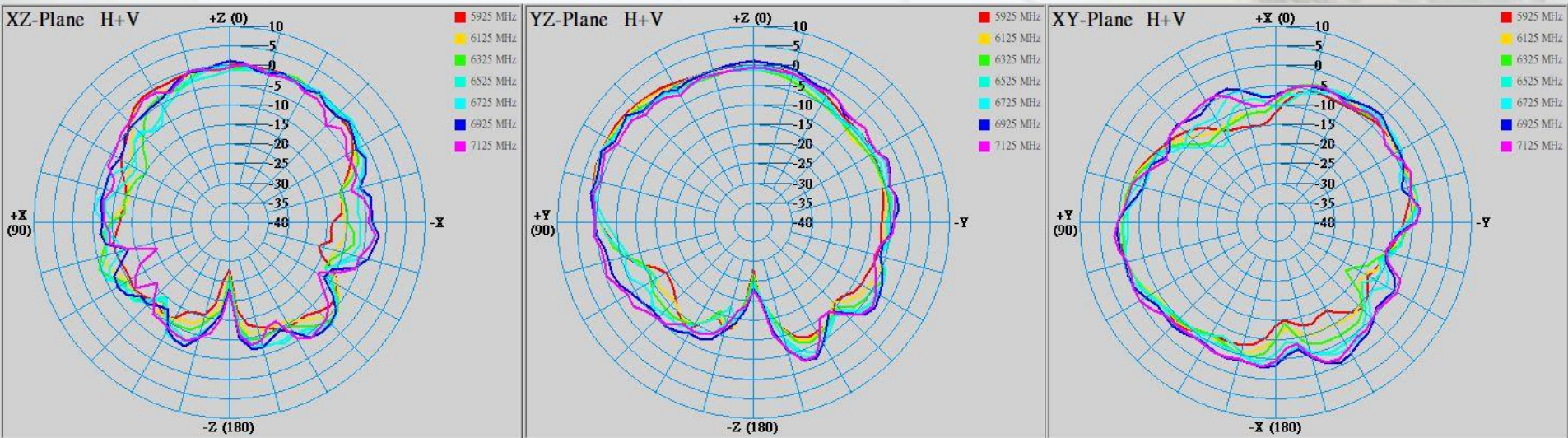
# 2D Radiation Pattern Results

6G4



# 2D Radiation Pattern Results

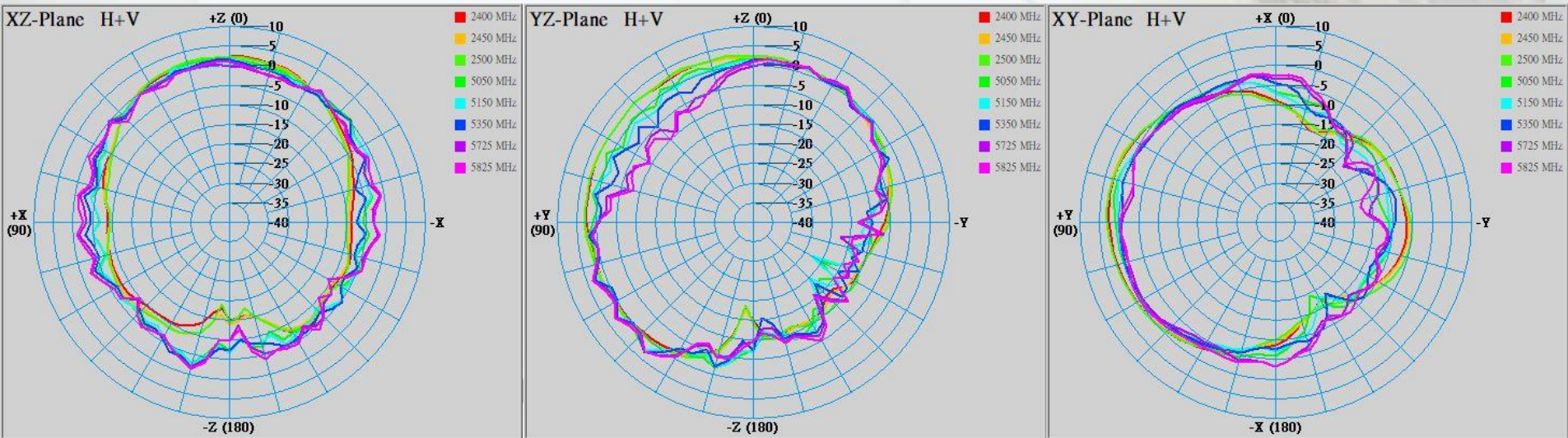
6G5





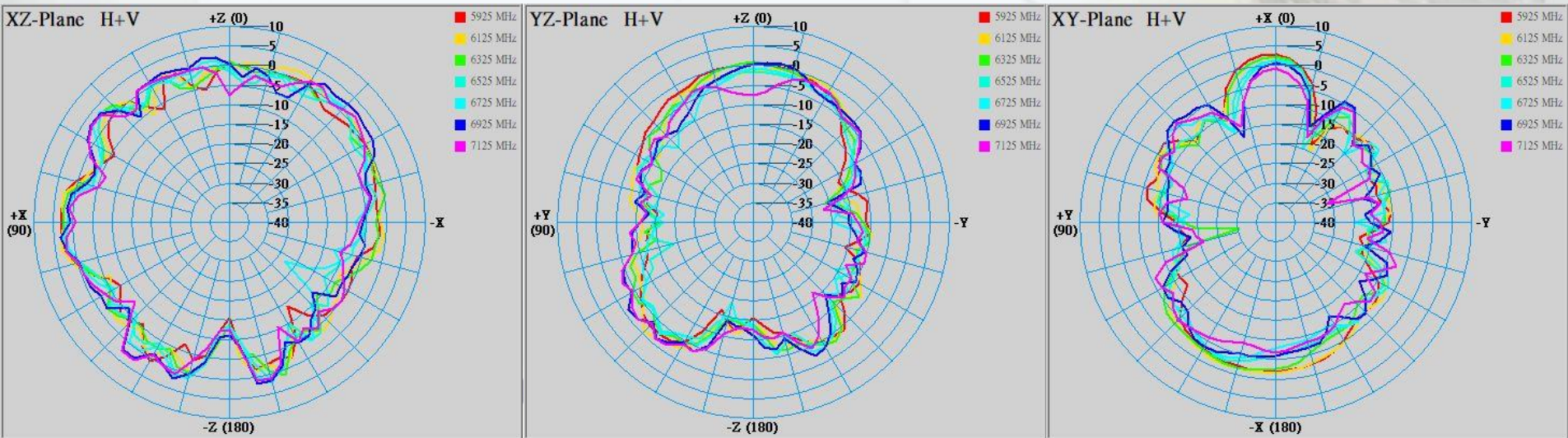
# 2D Radiation Pattern Results

2/5G6



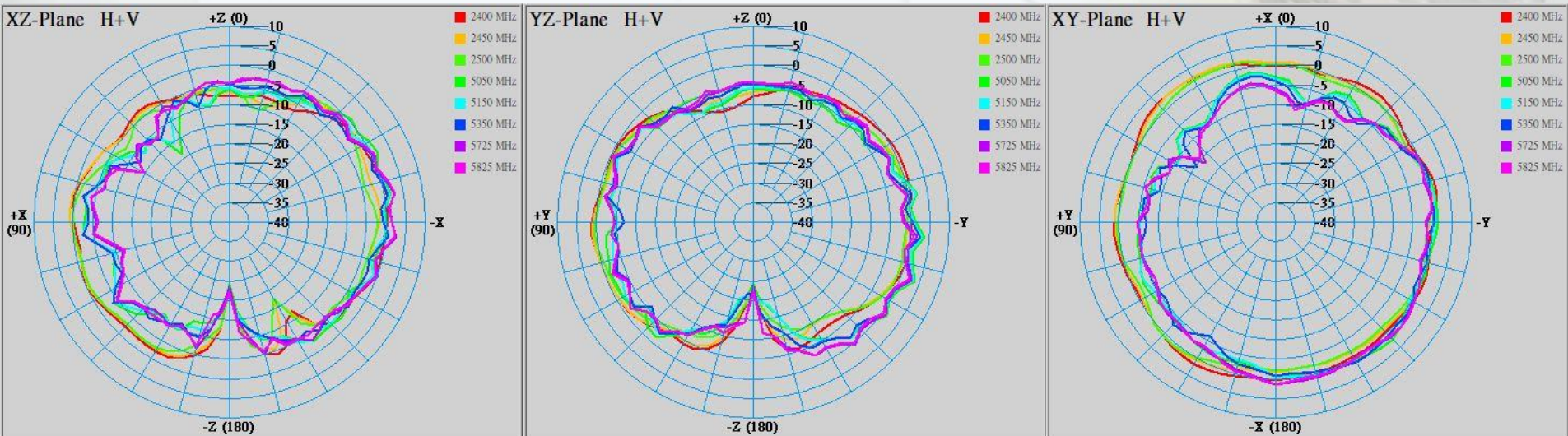
# 2D Radiation Pattern Results

6G7



# 2D Radiation Pattern Results

2/5G8



# Results Summary

Return Loss (Criterion: >10dB)

Frequency (MHz)	2/5G1	5G3	2/5G6	2/5G8
2400 MHz	32.5	-	10.1	17.5
2450 MHz	16.7	-	19.2	21.8
2500 MHz	12.9	-	17.6	11.9
5050 MHz	25.8	19.2	18.4	28.3
5150 MHz	20.3	16.1	18.7	23.5
5350 MHz	21.4	19.0	24.5	24.1
5725 MHz	26.2	14.0	25.1	21.6
5825 MHz	26.9	16.8	21.5	20.7

# Results Summary

Return Loss (Criterion: >10dB)

Frequency (MHz)	6G2	6G4	6G5	6G7
5925 MHz	12.5	14.3	26.8	21.5
6125 MHz	33.3	15.9	30.4	18.1
6325 MHz	19.3	21.1	20.0	25.3
6525 MHz	20.7	28.7	15.2	17.5
6725 MHz	19.0	16.5	14.0	15.1
6925 MHz	13.7	13.3	17.2	27.4
7125 MHz	41.4	10.9	22.9	22.1

# Results Summary

## Isolation (Criterion: >25dB)

	2/5G1-6G2	2/5G1-5G3	2/5G1-6G4	2/5G1-6G5	2/5G1-2/5G6	2/5G1-6G7	2/5G1-2/5G8
2400 MHz	31	39	52	48	37	41	41
2450 MHz	31	40	63	45	40	43	40
2500 MHz	31	40	55	45	46	48	38
5050 MHz	32	48	45	47	72	50	45
5350 MHz	30	33	45	46	48	59	46
5725 MHz	30	35	41	42	56	51	53
5825 MHz	30	34	44	48	49	46	55
5925 MHz	31	37	42	40	51	53	55
6125 MHz	27	34	44	44	45	40	60
6325 MHz	27	35	43	47	49	42	52
6725 MHz	37	43	43	42	48	52	61
7125 MHz	38	37	38	42	48	52	51

# Results Summary

## Isolation (Criterion: >25dB)

	6G2-5G3	6G2-6G4	6G2-6G5	6G2-2/5G6	6G2-6G7	6G2-2/5G8
2400 MHz	29	33	34	44	32	33
2450 MHz	32	43	41	43	36	34
2500 MHz	29	38	46	38	55	41
5050 MHz	31	66	40	39	36	36
5350 MHz	43	42	51	36	40	44
5725 MHz	36	42	44	47	38	39
5825 MHz	33	43	43	51	48	40
5925 MHz	32	46	44	42	36	44
6125 MHz	25	40	38	46	38	48
6325 MHz	27	48	39	44	34	45
6725 MHz	29	38	40	36	39	44
7125 MHz	26	34	36	42	37	44

# Results Summary

## Isolation (Criterion: >25dB)

	5G3-6G4	5G3-6G5	5G3-2/5G6	5G3-6G7	5G3-2/5G8
2400 MHz	36	28	31	28	31
2450 MHz	40	31	37	28	43
2500 MHz	38	32	35	28	38
5050 MHz	30	33	50	36	40
5350 MHz	39	39	43	35	37
5725 MHz	36	38	43	40	38
5825 MHz	35	37	43	39	37
5925 MHz	36	37	43	35	38
6125 MHz	31	43	44	33	40
6325 MHz	31	39	43	35	36
6725 MHz	32	31	41	32	36
7125 MHz	31	32	42	36	39



# Results Summary

## Isolation (Criterion: >25dB)

	6G4-6G5	6G4-2/5G6	6G4-6G7	6G4-2/5G8
2400 MHz	45	45	42	44
2450 MHz	41	46	40	44
2500 MHz	41	56	46	48
5050 MHz	22	39	42	44
5350 MHz	25	48	36	36
5725 MHz	25	38	51	36
5825 MHz	25	40	48	40
5925 MHz	25	40	40	41
6125 MHz	26	42	37	41
6325 MHz	28	36	35	43
6725 MHz	27	36	37	41
7125 MHz	30	35	33	42

# Results Summary

## Isolation (Criterion: >25dB)

	6G5-2/5G6	6G5-6G7	6G5-2/5G8	2/5G6-6G7	2/5G6-2/5G8	6G7-2/5G8
2400 MHz	37	27	52	29	28	33
2450 MHz	36	31	44	27	29	35
2500 MHz	36	34	42	29	30	39
5050 MHz	30	34	42	29	48	38
5350 MHz	31	45	40	33	42	35
5725 MHz	35	40	51	38	43	68
5825 MHz	39	41	45	30	46	54
5925 MHz	37	45	40	29	55	49
6125 MHz	54	39	36	28	43	45
6325 MHz	39	31	39	29	47	38
6725 MHz	32	27	40	28	52	53
7125MHz	30	26	40	31	40	46

# Results Summary

## Peak gain & Efficiency – 2/5G1(ANT1)

Frequency (MHz)	Peak Gain (dBi)	Efficiency (%)
2400 MHz	3.3	70
2450 MHz	2.9	71
2500 MHz	3.2	73
5050 MHz	3.5	70
5150 MHz	3.8	72
5350 MHz	3.7	71
5725 MHz	3.9	71
5825 MHz	3.9	72

# Results Summary

## Peak gain & Efficiency – 6G2(ANT2)

Frequency (MHz)	Peak Gain (dBi)	Efficiency (%)
5925 MHz	3.3	72
6125 MHz	3.4	76
6325 MHz	3.2	74
6525 MHz	3.4	75
6725 MHz	3.3	72
6925 MHz	3.4	71
7125 MHz	3.3	73

# Results Summary

## Peak gain & Efficiency – 5G3(ANT3)

Frequency (MHz)	Peak Gain (dBi)	Efficiency (%)
5050 MHz	3.3	76
5150 MHz	3.4	77
5350 MHz	3.5	76
5725 MHz	3.2	74
5825 MHz	3.4	76

# Results Summary

## Peak gain & Efficiency – 6G4(ANT4)

Frequency (MHz)	Peak Gain (dBi)	Efficiency (%)
5925 MHz	3.3	81
6125 MHz	3.3	82
6325 MHz	3.3	83
6525 MHz	3.3	81
6725 MHz	3.2	81
6925 MHz	3.4	82
7125 MHz	3.4	81

# Results Summary

## Peak gain & Efficiency – 6G5(ANT5)

Frequency (MHz)	Peak Gain (dBi)	Efficiency (%)
5925 MHz	3.3	80
6125 MHz	3.4	81
6325 MHz	3.3	83
6525 MHz	3.4	81
6725 MHz	3.2	82
6925 MHz	3.3	81
7125 MHz	3.4	81

# Results Summary

## Peak gain & Efficiency – 2/5G6(ANT6)

Frequency (MHz)	Peak Gain (dBi)	Efficiency (%)
2400 MHz	3.3	78
2450 MHz	3.4	77
2500 MHz	3.4	76
5050 MHz	3.8	78
5150 MHz	3.6	77
5350 MHz	3.9	79
5725 MHz	3.9	78
5825 MHz	3.7	77



# Results Summary

## Peak gain & Efficiency – 6G7(ANT7)

Frequency (MHz)	Peak Gain (dBi)	Efficiency (%)
5925 MHz	3.3	76
6125 MHz	3.4	77
6325 MHz	3.4	78
6525 MHz	3.3	77
6725 MHz	3.4	76
6925 MHz	3.4	79
7125 MHz	3.3	78

# Results Summary

## Peak gain & Efficiency – 2/5G8(ANT8)

Frequency (MHz)	Peak Gain (dBi)	Efficiency (%)
2400 MHz	3.2	80
2450 MHz	2.7	82
2500 MHz	2.2	81
5050 MHz	3.8	83
5150 MHz	3.8	81
5350 MHz	3.4	82
5725 MHz	3.9	81
5825 MHz	3.9	82