

NE3-22040
UBN2315
Antenna 2/5Gx2,5Gx2,WiFi6Ex4

Version: NE3-22040

Tested Date: 2022/11/16

Tested By: Wei

Reviewed By: Tim Cheng

Contents

- Revised History
- Conclusion & Comments
- Specification
- Antenna Placement & Solution
- Test Setup for S-parameter Measurement
- Return Loss Results
- Isolation Results
- Test Setup for Radiation Pattern Measurement
- 2D Radiation Pattern Results
- Results Summary (return loss, isolation, peak gain, efficiency)

Revision History

Released Date	Version	Record
2022/07/01	V2.01	Antenna Testing Report
2022/07/01	V2.02	Main board add 3 mm
2022/07/15	V2.03	Antenna fine tune (main board add 3 mm)
2022/07/25	V2.04	DB1 and 5G2 change position(main board add 3 mm)
2022/10/13	V2.05	5G2 & DB4 fine tune (S1)
2022/11/16	V2.06	6G5~6G8 change connector (MHF-4L Plug →MHF Plug)

Specification

Requirements of Antenna Design

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

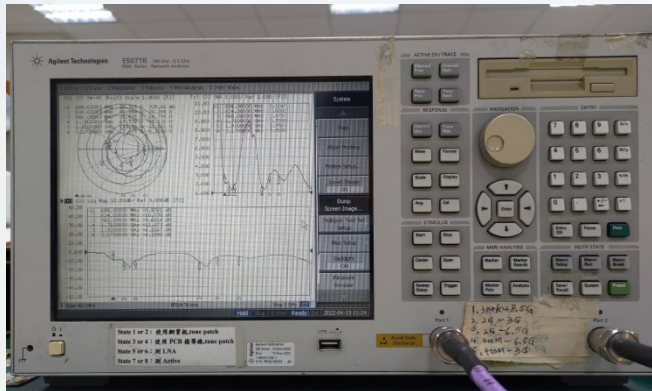
Requirements of Measurement

Test Item	Specification	Remark
Return Loss	> 10dB	
Isolation	> 25dB	
Peak gain	2.4 GHz: <3.5 dBi(dual band) ; 5 GHz: <4 dBi(dual band); 5 GHz: <3.5 dBi(single band); 6 GHz: <3.5 dBi(single band)	
Efficiency	>70%	
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)
DB1	0.67	1.05	1.16	215
5G2	0.66	1.05	1.16	214
5G3	0.57	0.91	1.00	185
DB4	0.35	0.55	0.61	113
6G5	0.38	0.60	0.66	122
6G6	0.23	0.36	0.39	73
6G7	0.24	0.38	0.42	78
6G8	0.58	0.92	1.01	187

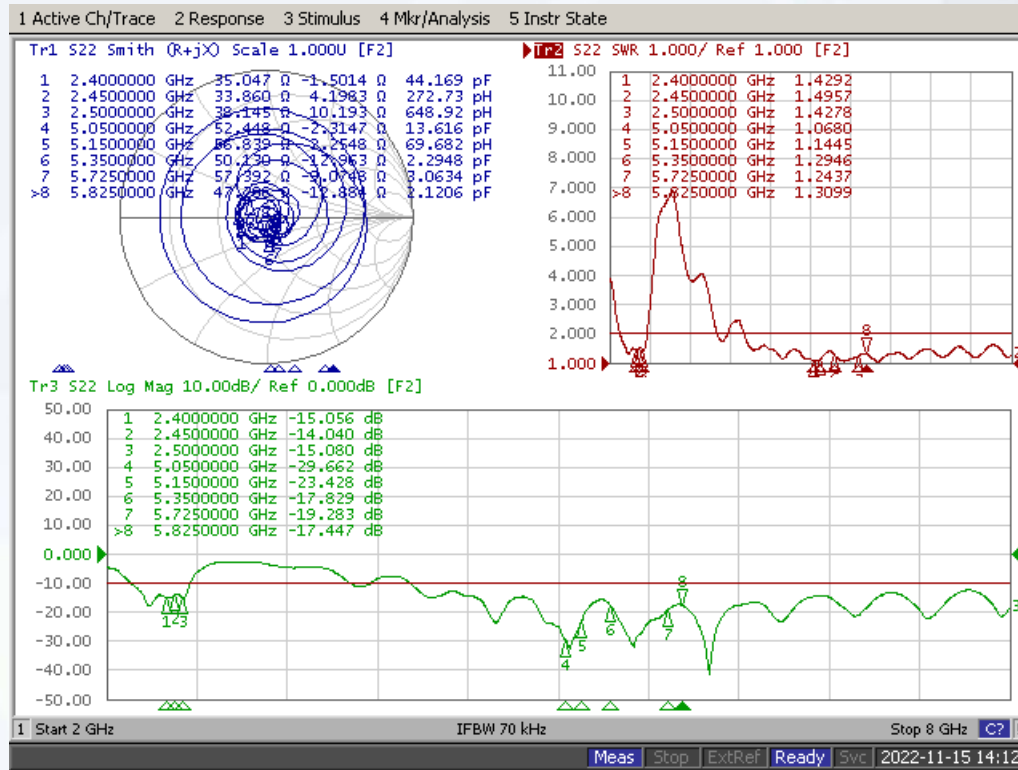
Test Setup for S-parameter Measurement



Equipment	Brand	Model	S/N
Network Analyzer	Keysight	E5071B	MY42403554

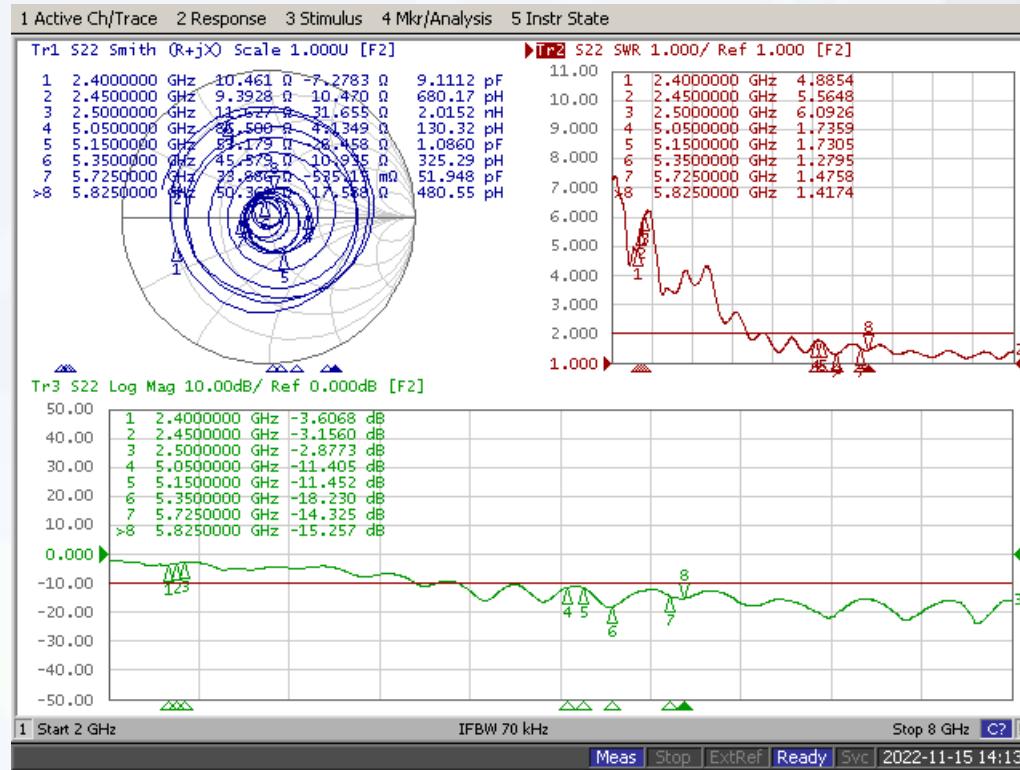
Return Loss Results

DB1 (2400MHz – 2500MHz; 5050MHz – 5825MHz)



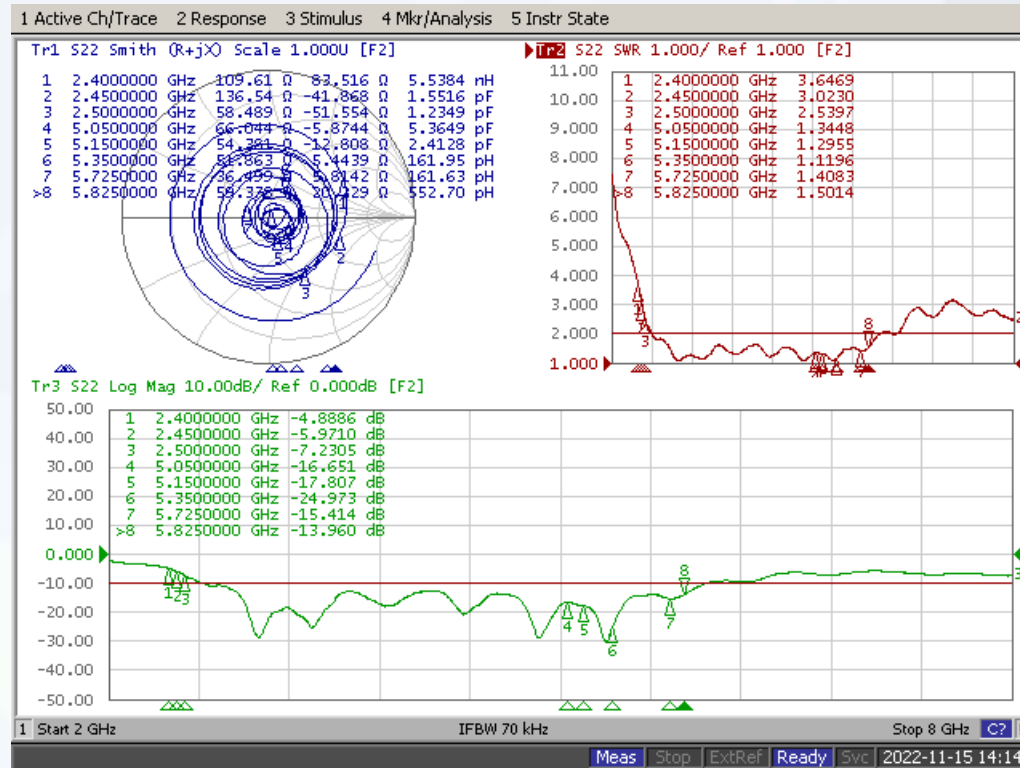
Return Loss Results

5G2 (5050MHz – 5825MHz)



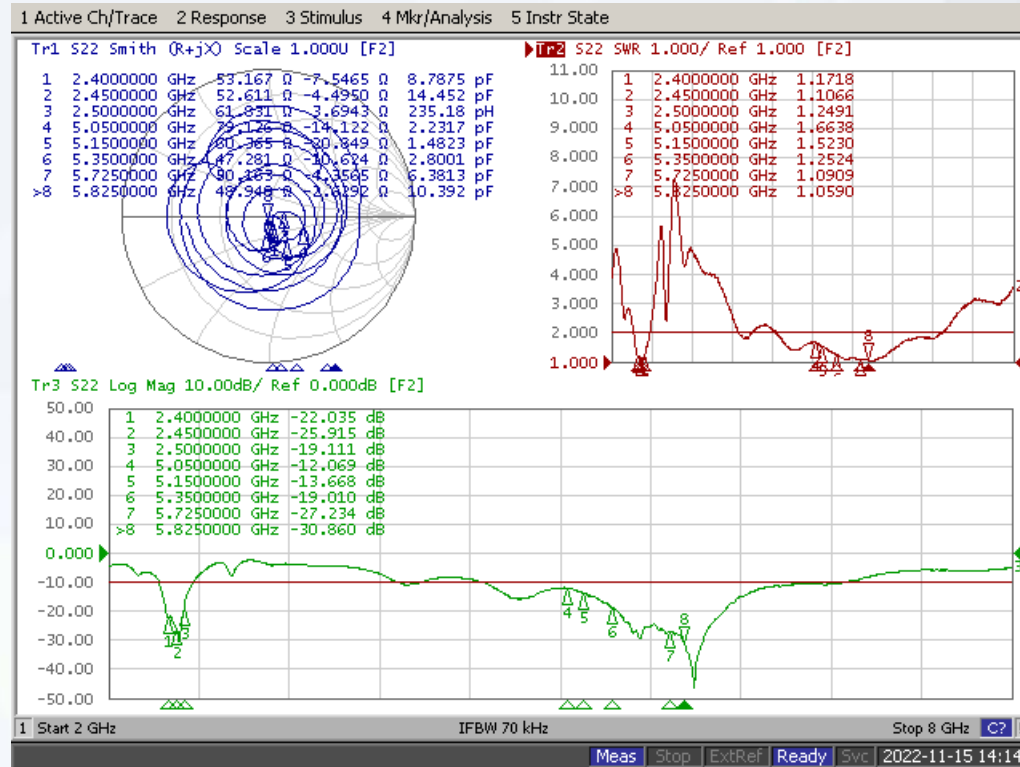
Return Loss Results

5G3 (5050MHz – 5825MHz)



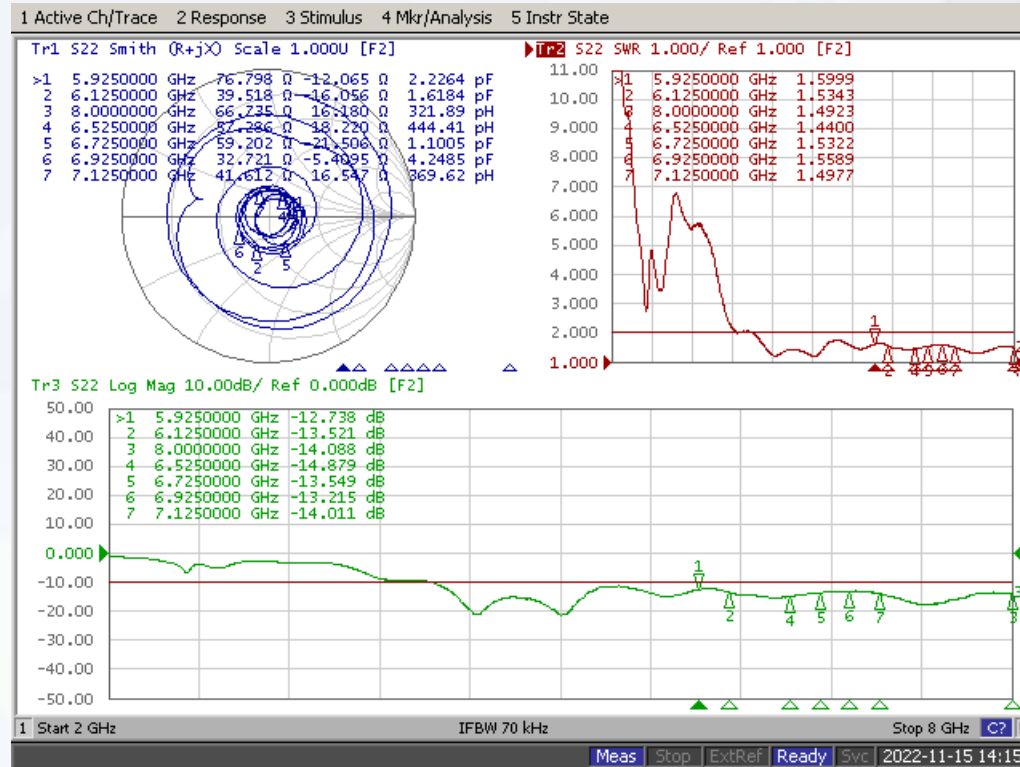
Return Loss Results

DB4 (2400MHz – 2500MHz; 5050MHz – 5825MHz)



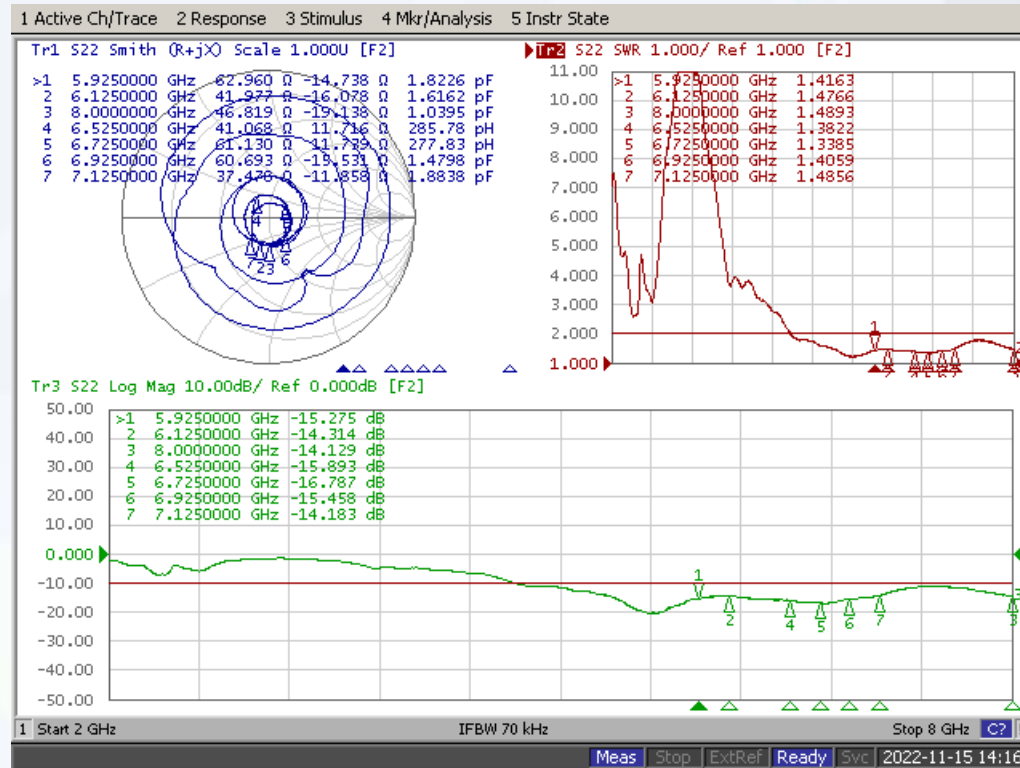
Return Loss Results

6G5 (5925MHz – 7125MHz)



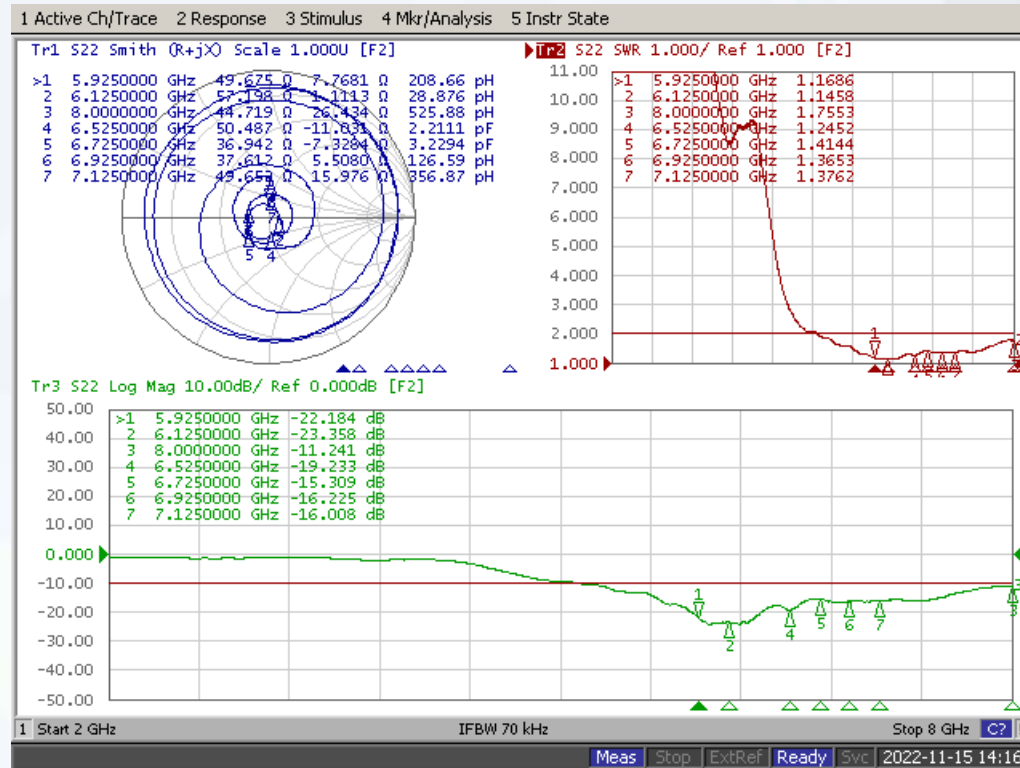
Return Loss Results

6G6 (5925MHz – 7125MHz)



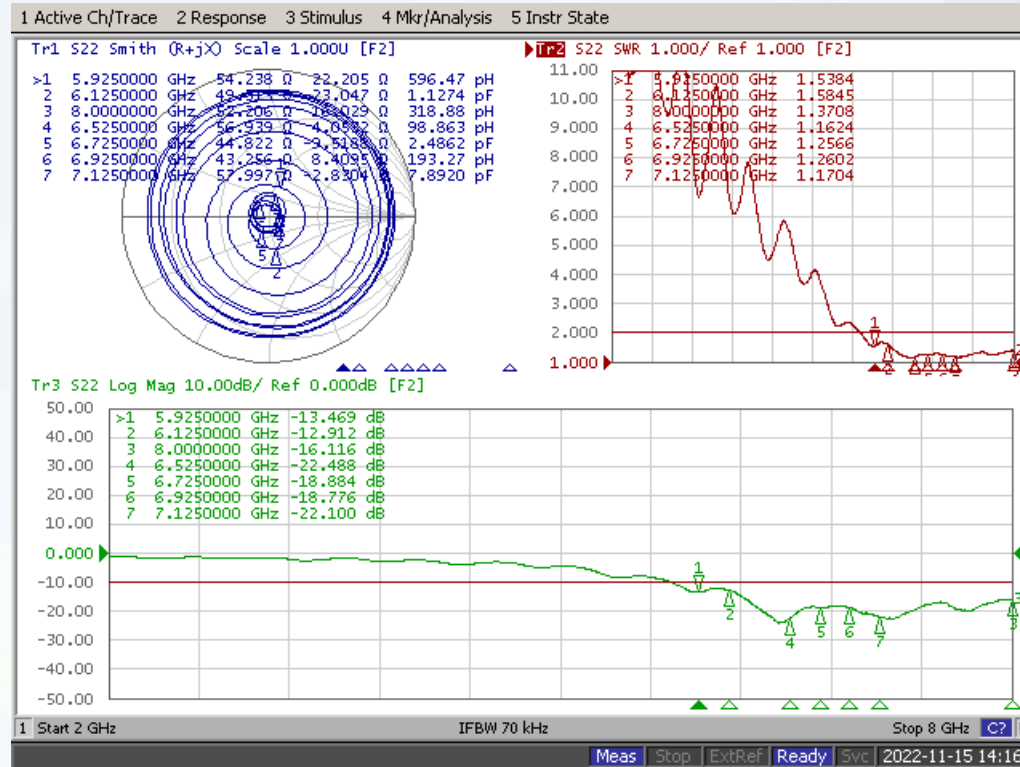
Return Loss Results

6G7 (5925MHz – 7125MHz)



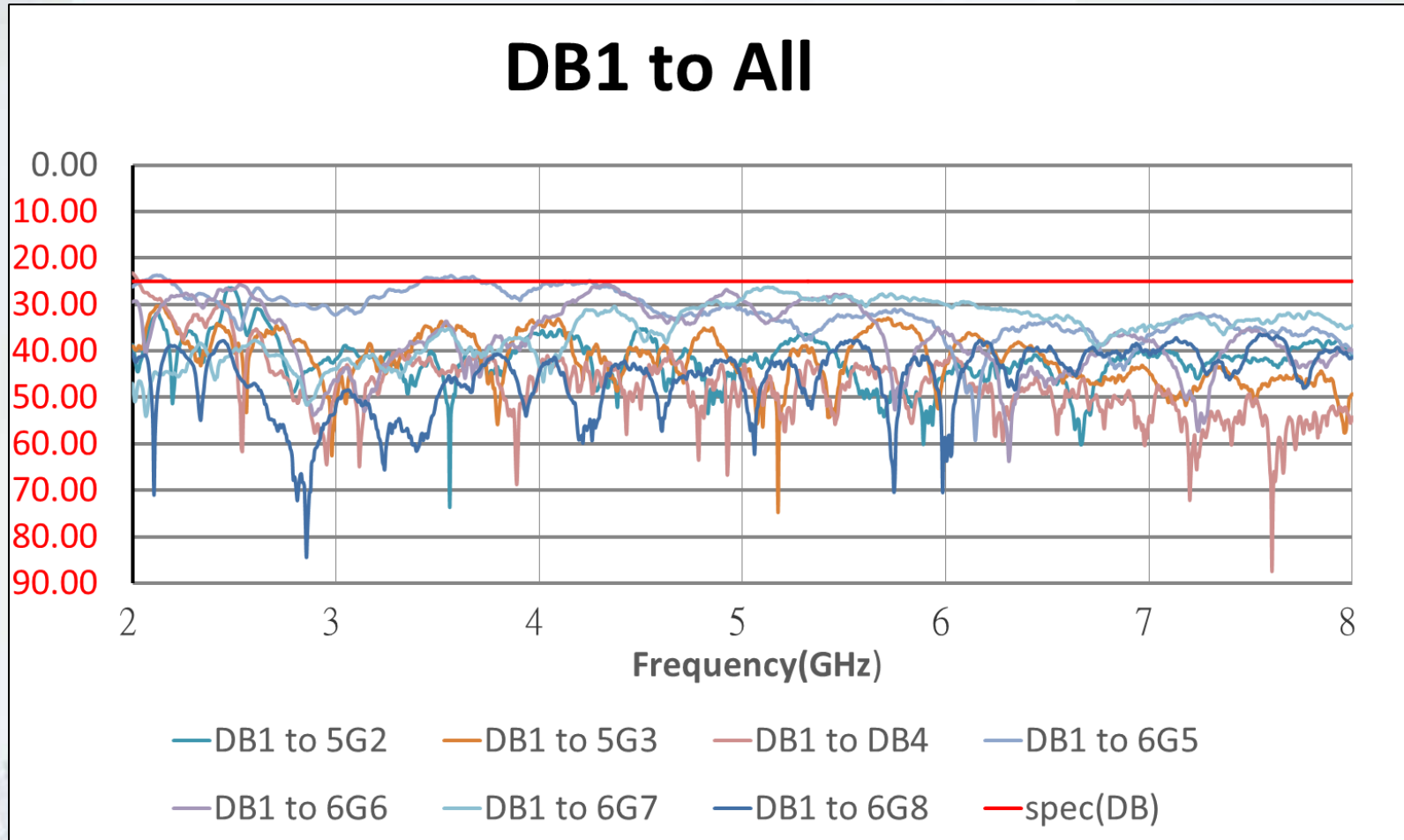
Return Loss Results

6G8 (5925MHz – 7125MHz)



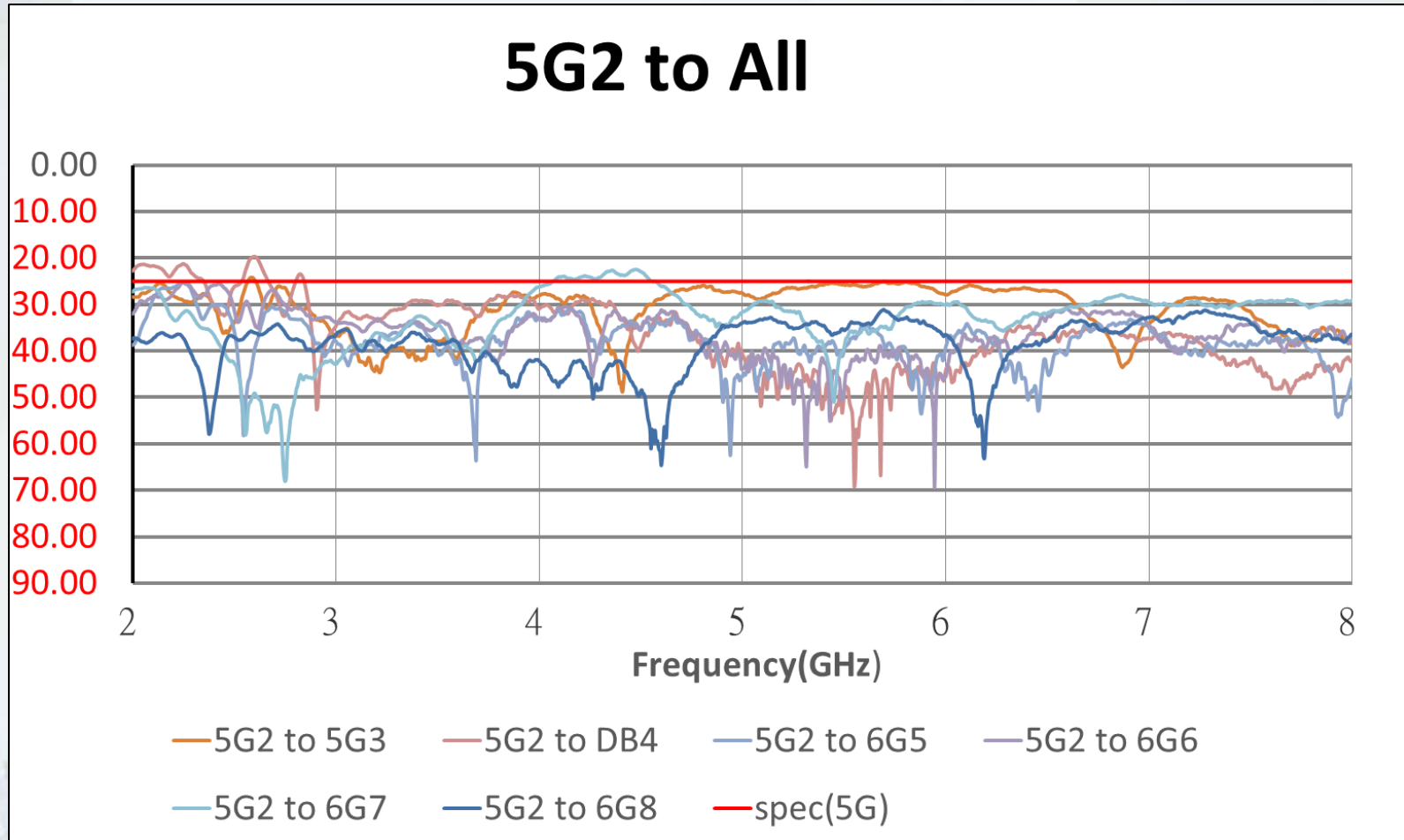
Isolation Results

DB1



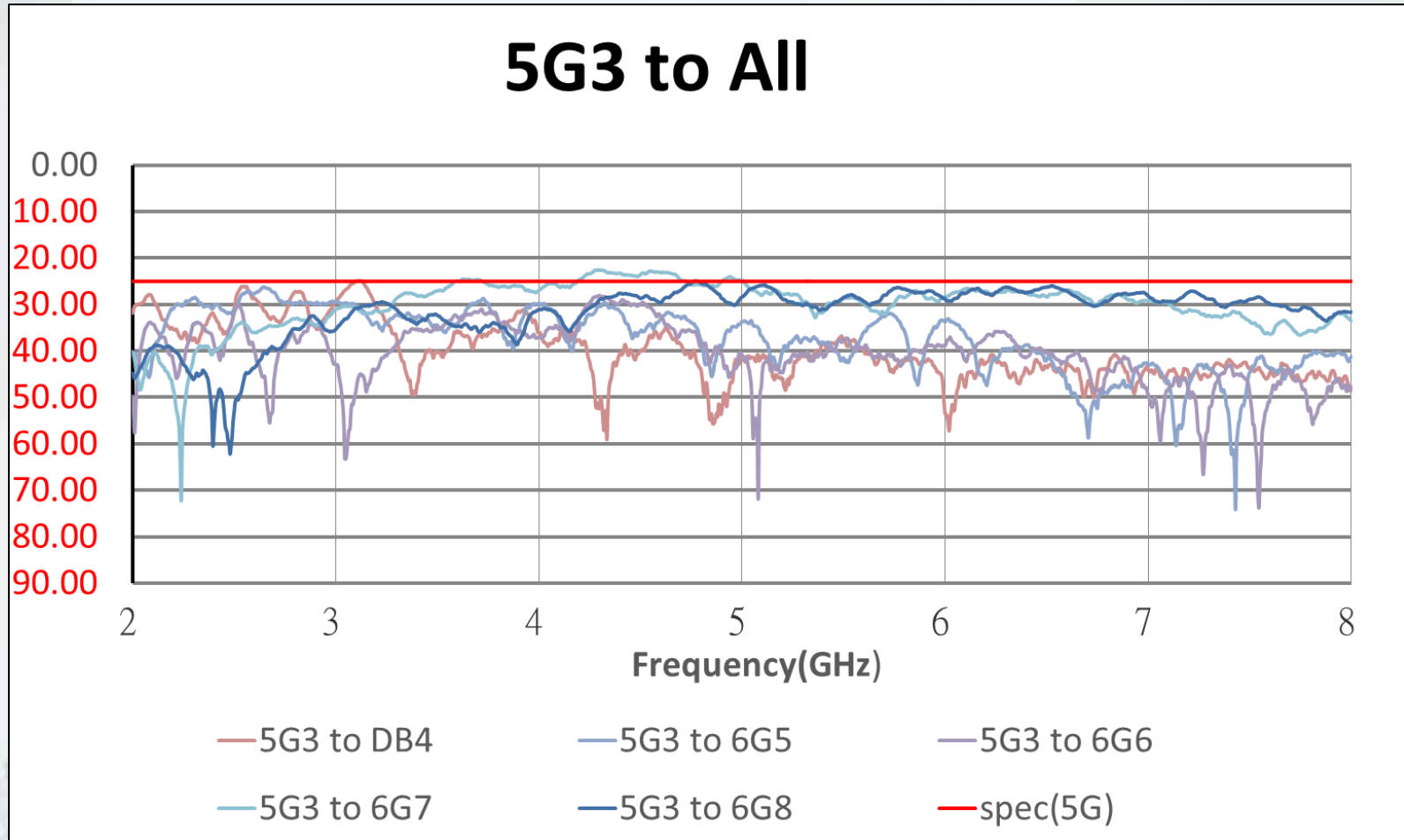
Isolation Results

5G2



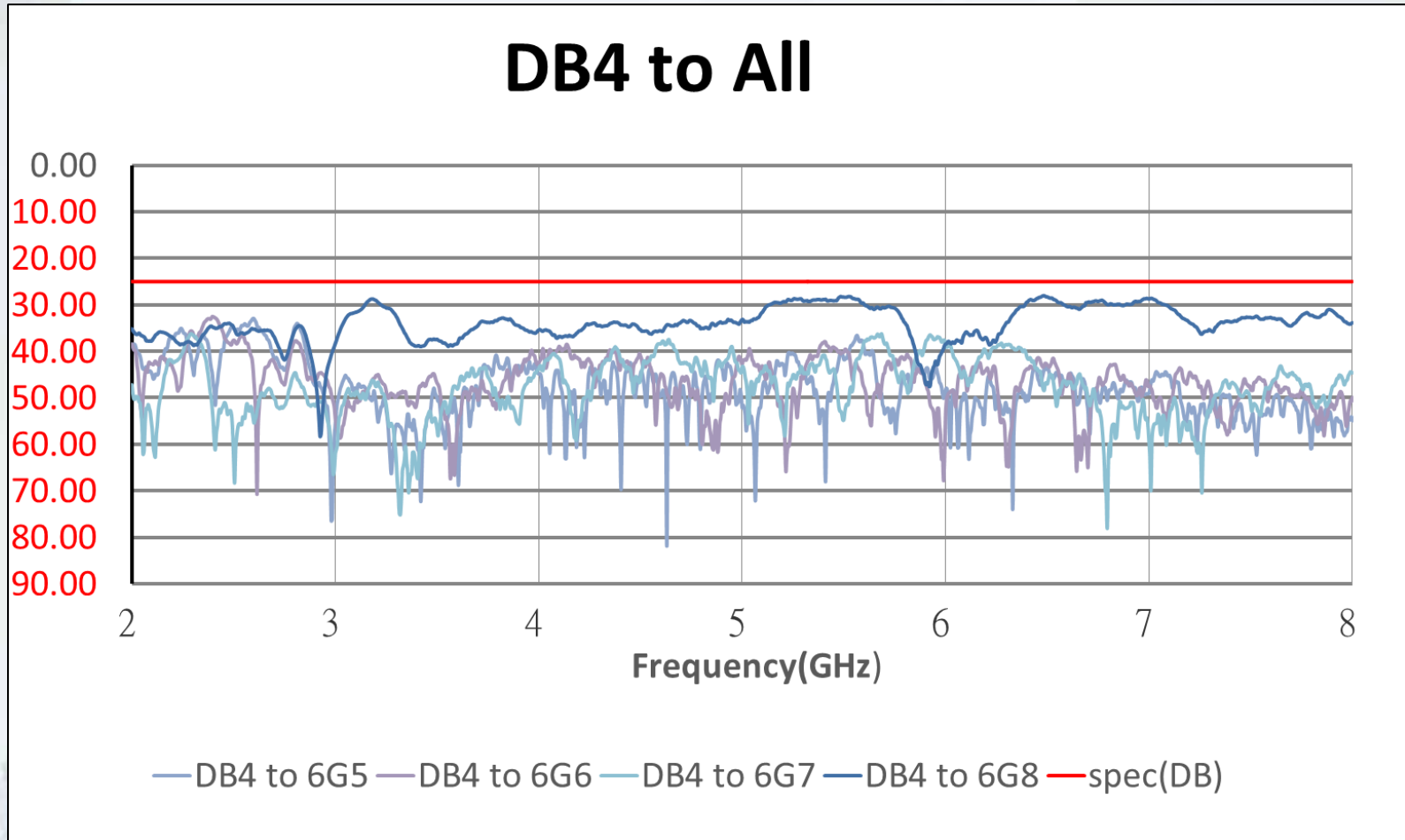
Isolation Results

5G3



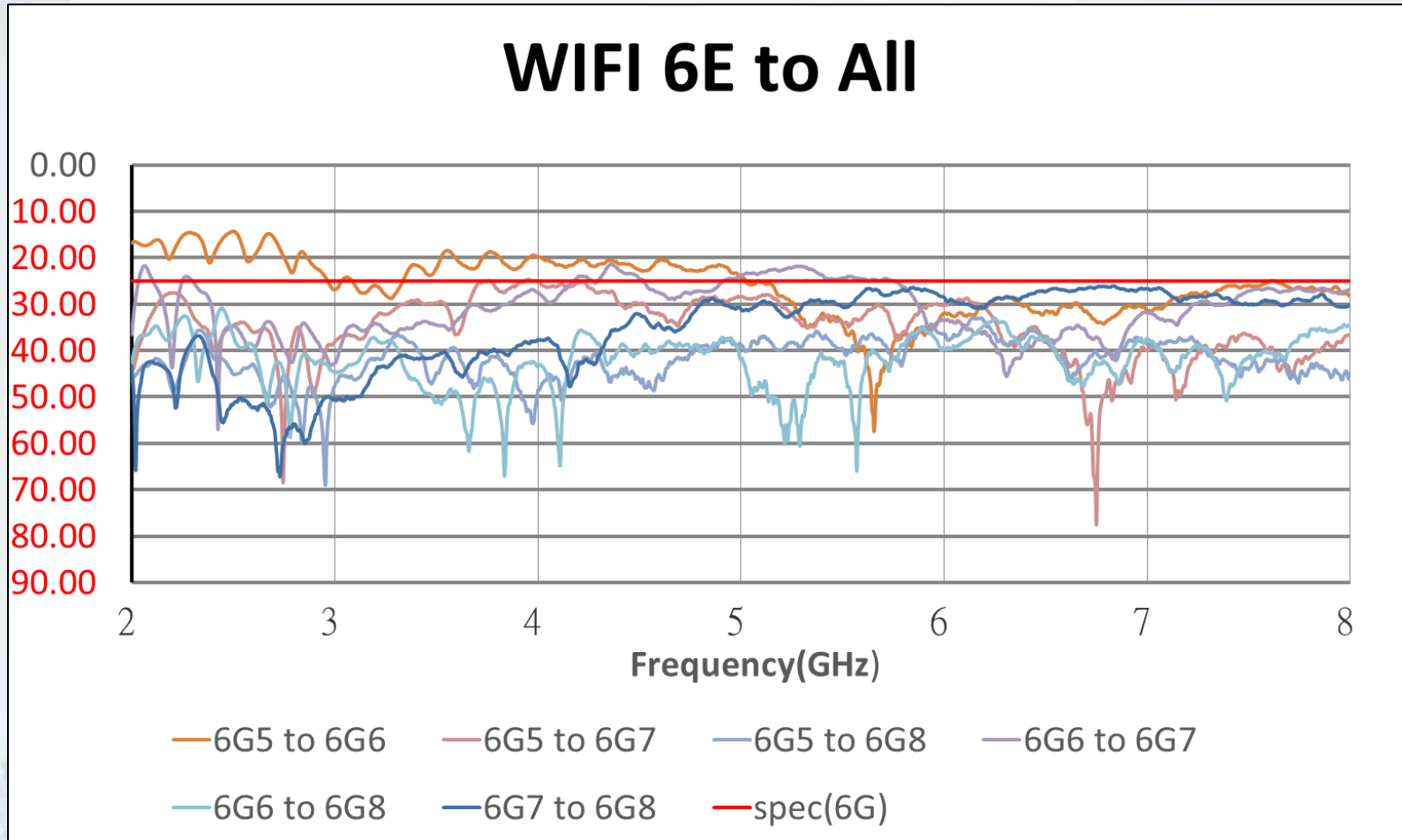
Isolation Results

DB4

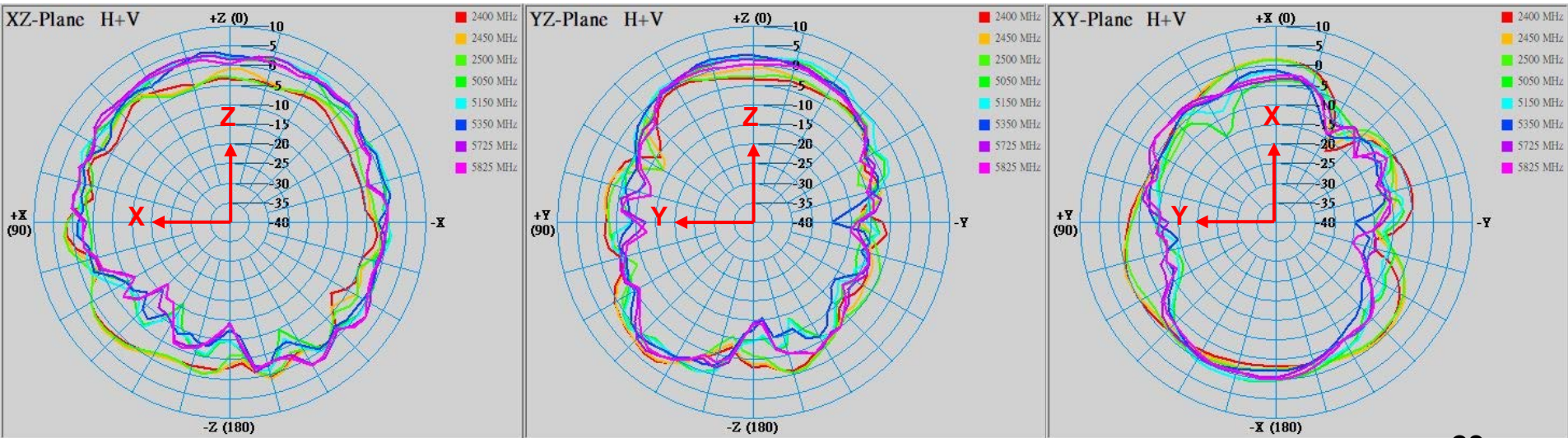


Isolation Results

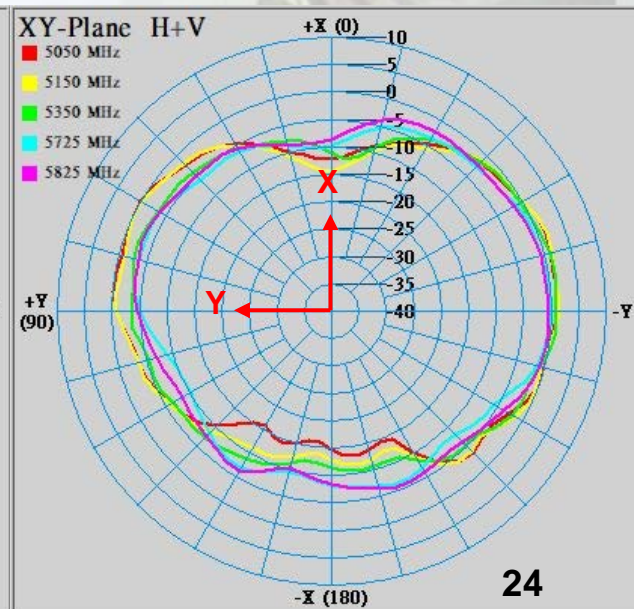
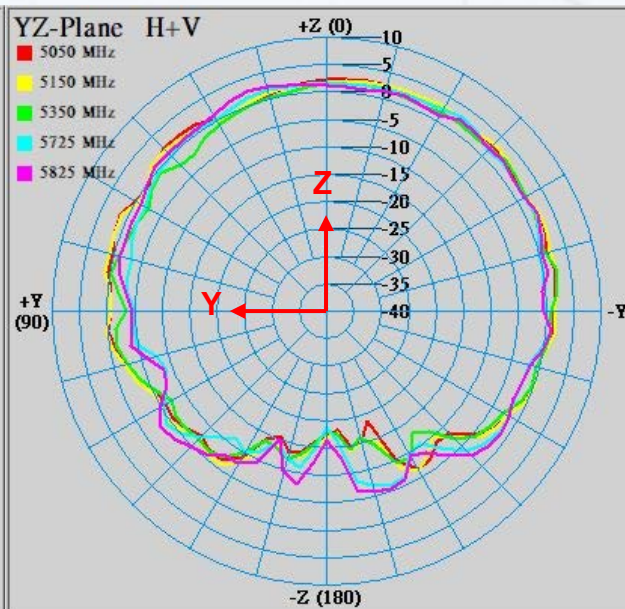
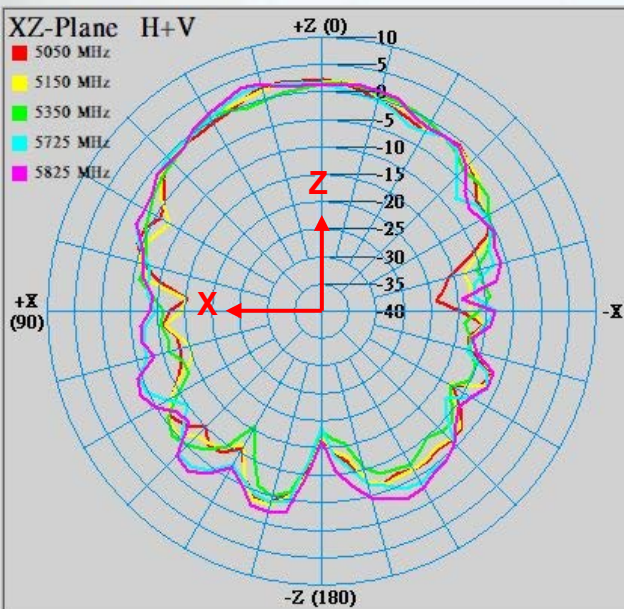
WIFI 6E



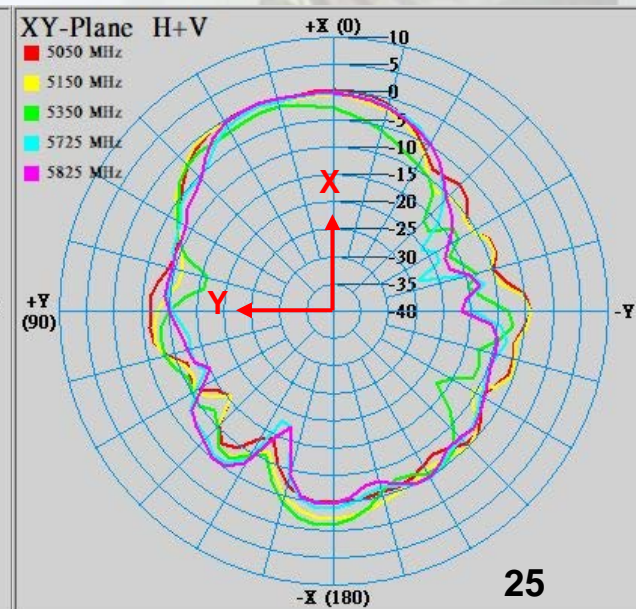
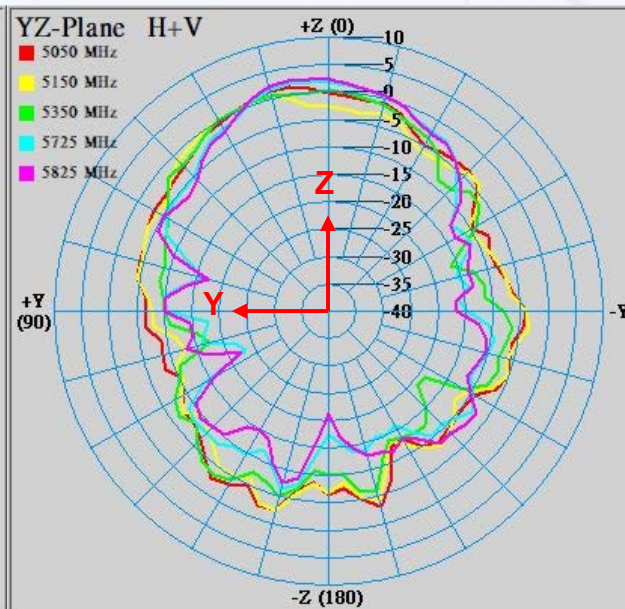
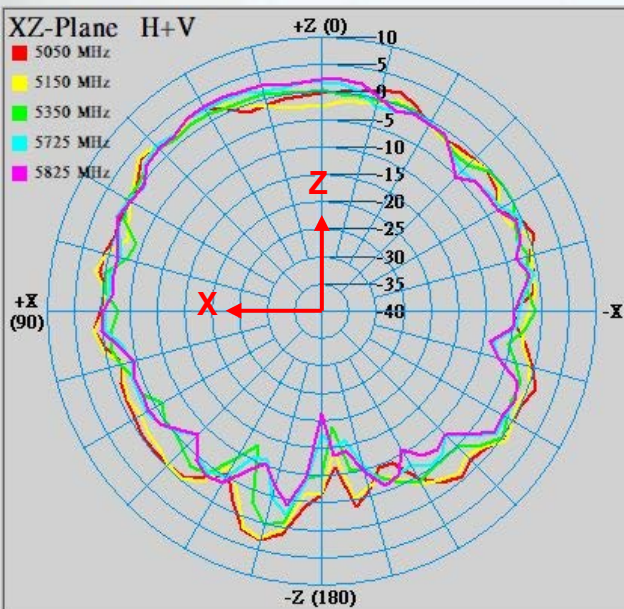
2D Radiation Pattern Results



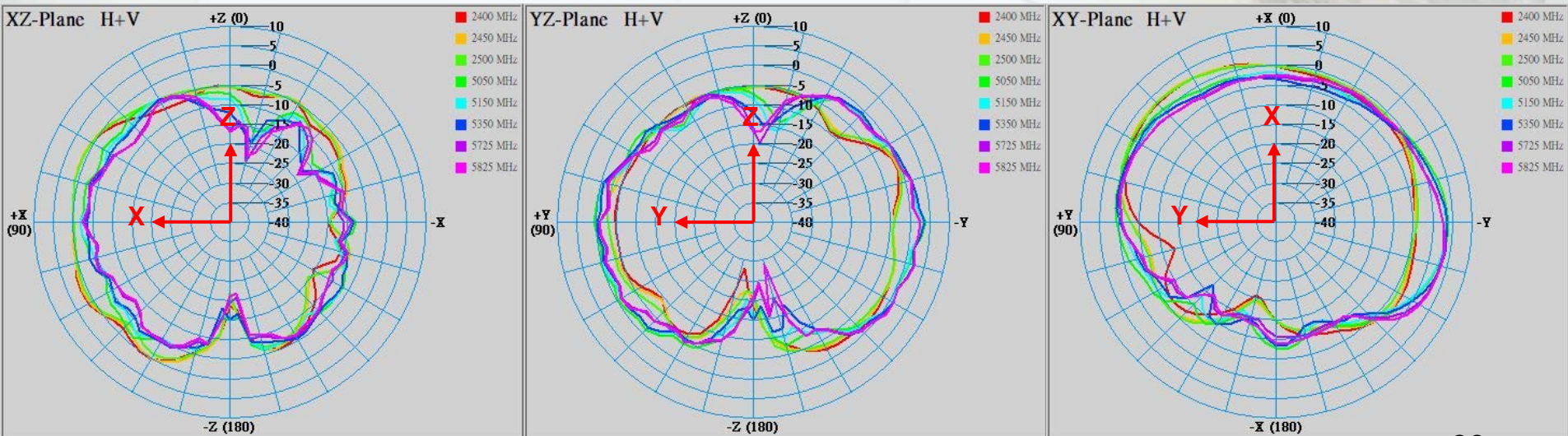
2D Radiation Pattern Results



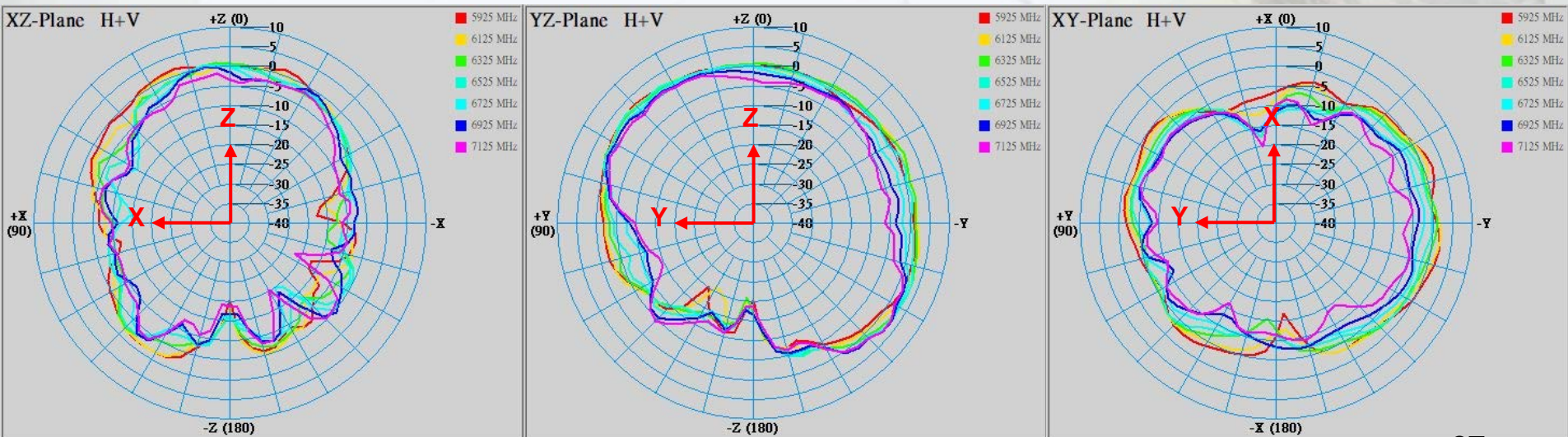
2D Radiation Pattern Results



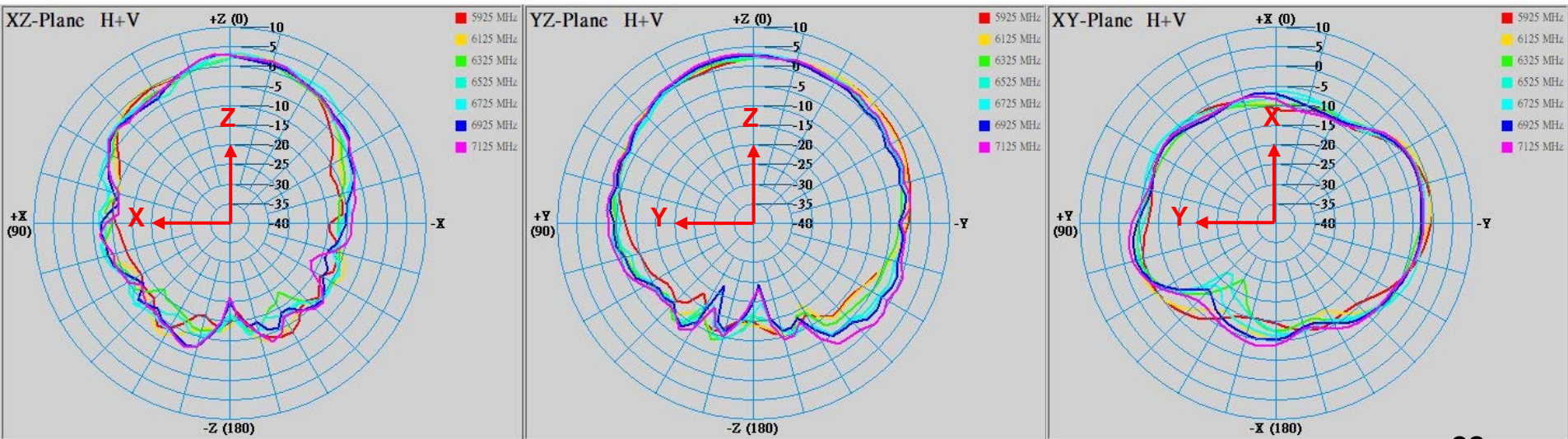
2D Radiation Pattern Results



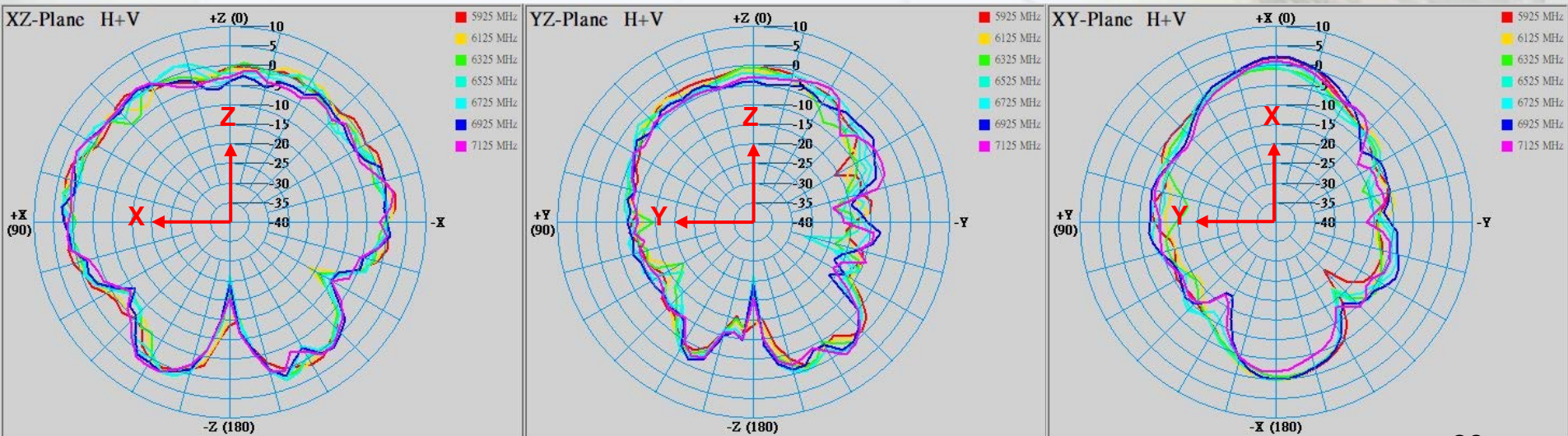
2D Radiation Pattern Results



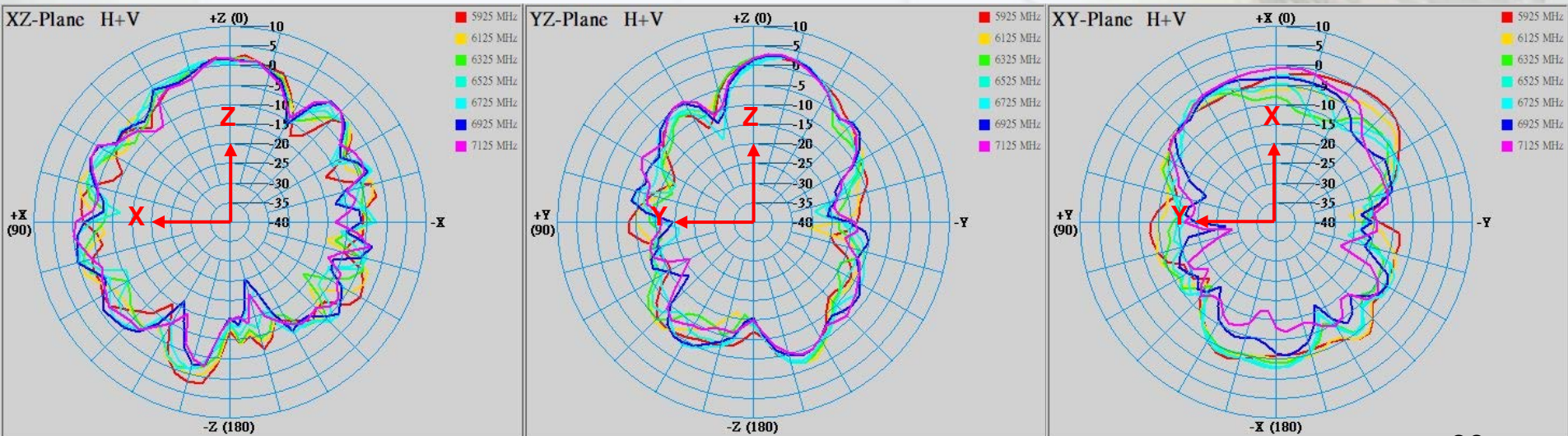
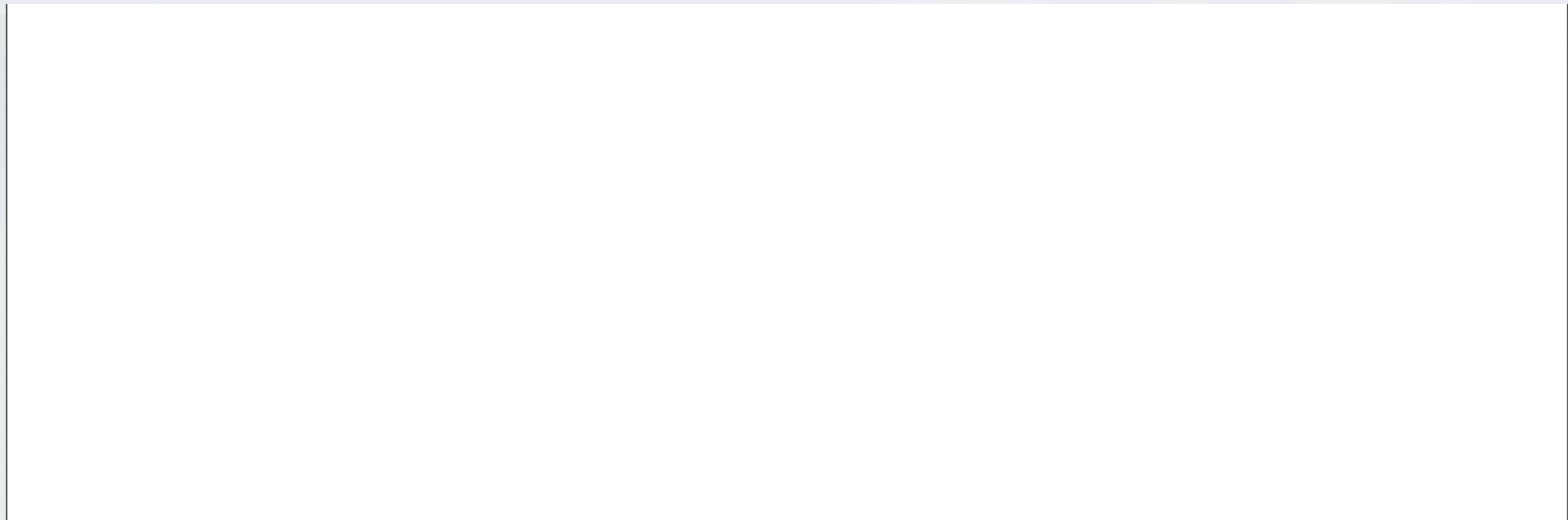
2D Radiation Pattern Results



2D Radiation Pattern Results



2D Radiation Pattern Results



Results Summary

Return Loss

Frequency (MHz)	DB1	5G2	5G3	DB4
2400 MHz	15.0	-	-	22.0
2450 MHz	14.0	-	-	25.9
2500 MHz	15.0	-	-	19.1
5050 MHz	29.6	11.4	16.6	12.0
5150 MHz	23.4	11.4	17.8	13.6
5350 MHz	17.8	18.2	24.9	19.0
5725 MHz	19.2	14.3	15.4	27.2
5825 MHz	17.4	15.2	13.9	30.8

Results Summary

Return Loss

Frequency (MHz)	6G5	6G6	6G7	6G8
5925 MHz	12.7	15.2	22.1	13.4
6125 MHz	13.5	14.3	23.3	12.9
6325 MHz	14.0	14.1	11.2	16.1
6525 MHz	14.8	15.8	19.2	22.4
6725 MHz	13.5	16.7	15.3	18.8
6925 MHz	13.2	15.4	16.2	18.7
7125 MHz	14.0	14.1	16.0	22.1

Results Summary

Isolation

	DB1 to 5G2	DB1 to 5G3	DB1 to DB4	DB1 to 6G5	DB1 to 6G6	DB1 to 6G7	DB1 to 6G8
2400 MHz	35	36	31	29	29	46	40
2450 MHz	29	35	30	31	27	42	38
2500 MHz	27	40	37	33	27	40	43
5050 MHz	42	49	46	32	31	27	57
5350 MHz	37	40	45	36	29	29	50
5725 MHz	51	33	44	32	44	28	58
5825 MHz	51	35	55	32	44	29	43
5925 MHz	-	-	-	34	37	29	43
6125 MHz	-	-	-	48	40	30	41
6325 MHz	-	-	-	35	54	31	47
6725 MHz	-	-	-	37	41	38	39
7125 MHz	-	-	-	34	44	33	38

Results Summary

Isolation

	5G2 to 5G3	5G2 to DB4	5G2 to 6G5	5G2 to 6G6	5G2 to 6G7	5G2 to 6G8
2400 MHz	-	30	-	-	-	-
2450 MHz	-	32	-	-	-	-
2500 MHz	-	26	-	-	-	-
5050 MHz	28	43	43	40	30	34
5350 MHz	26	44	40	47	37	34
5725 MHz	25	51	38	40	35	32
5825 MHz	25	48	45	42	30	33
5925 MHz	-	-	48	48	29	35
6125 MHz	-	-	36	38	32	48
6325 MHz	-	-	43	41	35	40
6725 MHz	-	-	35	32	30	34
7125 MHz	-	-	39	40	30	34

Results Summary

Isolation

	5G3 to DB4	5G3 to 6G5	5G3 to 6G6	5G3 to 6G7	5G3 to 6G8
2400 MHz	32	-	-	-	-
2450 MHz	36	-	-	-	-
2500 MHz	31	-	-	-	-
5050 MHz	41	34	52	27	27
5350 MHz	41	37	42	32	31
5725 MHz	44	32	41	31	27
5825 MHz	42	41	41	28	27
5925 MHz	-	37	39	29	27
6125 MHz	-	38	40	27	27
6325 MHz	-	40	37	27	27
6725 MHz	-	52	48	30	30
7125 MHz	-	56	47	31	29

Results Summary

Isolation

	DB4 to 6G5	DB4 to 6G6	DB4 to 6G7	DB4 to 6G8
2400 MHz	47	33	55	35
2450 MHz	40	36	52	34
2500 MHz	35	38	63	35
5050 MHz	56	42	47	33
5350 MHz	48	41	43	29
5725 MHz	54	43	41	30
5825 MHz	49	41	47	36
5925 MHz	46	52	36	47
6125 MHz	57	45	47	36
6325 MHz	56	56	39	32
6725 MHz	49	49	48	29
7125 MHz	47	46	50	31

Results Summary

Isolation

	6G5 to 6G6	6G5 to 6G7	6G5 to 6G8	6G6 to 6G7	6G6 to 6G8	6G7 to 6G8
2400 MHz	-	-	-	-	-	-
2450 MHz	-	-	-	-	-	-
2500 MHz	-	-	-	-	-	-
5050 MHz	-	-	-	-	-	-
5350 MHz	-	-	-	-	-	-
5725 MHz	-	-	-	-	-	-
5825 MHz	-	-	-	-	-	-
5925 MHz	35	30	35	35	36	27
6125 MHz	32	29	34	35	37	30
6325 MHz	29	38	39	44	36	29
6725 MHz	33	55	41	37	45	26
7125 MHz	29	45	38	34	45	28

Results Summary

Peak gain & Efficiency – DB1

Frequency (MHz)	Peak Gain (dBi)	Efficiency (%)
2400 MHz	3.5	71
2450 MHz	3.5	72
2500 MHz	2.6	72
5050 MHz	3.9	74
5150 MHz	3.9	74
5350 MHz	3.7	72
5725 MHz	3.9	73
5825 MHz	4.0	73

Results Summary

Peak gain & Efficiency – 5G2

Frequency (MHz)	Peak Gain (dBi)	Efficiency (%)
5050 MHz	3.1	73
5150 MHz	3.3	71
5350 MHz	3.4	74
5725 MHz	3.2	71
5825 MHz	3.4	73

Results Summary

Peak gain & Efficiency – 5G3

Frequency (MHz)	Peak Gain (dBi)	Efficiency (%)
5050 MHz	3.3	72
5150 MHz	3.4	71
5350 MHz	3.3	74
5725 MHz	3.3	71
5825 MHz	3.4	72

Results Summary

Peak gain & Efficiency – DB4

Frequency (MHz)	Peak Gain (dBi)	Efficiency (%)
2400 MHz	3.2	75
2450 MHz	3.3	74
2500 MHz	3.3	74
5050 MHz	3.8	71
5150 MHz	3.3	72
5350 MHz	3.8	73
5725 MHz	3.5	75
5825 MHz	3.8	75

Results Summary

Peak gain & Efficiency – 6G5

Frequency (MHz)	Peak Gain (dBi)	Efficiency (%)
5925 MHz	3.4	72
6125 MHz	3.3	71
6325 MHz	3.4	71
6525 MHz	3.5	70
6725 MHz	3.1	71
6925 MHz	3.4	70
7125 MHz	3.2	71

Results Summary

Peak gain & Efficiency – 6G6

Frequency (MHz)	Peak Gain (dBi)	Efficiency (%)
5925 MHz	3.3	75
6125 MHz	3.3	71
6325 MHz	3.1	74
6525 MHz	3.2	71
6725 MHz	3.3	71
6925 MHz	3.1	70
7125 MHz	3.4	70

Results Summary

Peak gain & Efficiency – 6G7

Frequency (MHz)	Peak Gain (dBi)	Efficiency (%)
5925 MHz	3.4	75
6125 MHz	3.3	71
6325 MHz	3.4	74
6525 MHz	3.2	70
6725 MHz	3.3	70
6925 MHz	3.1	72
7125 MHz	3.2	70

Results Summary

Peak gain & Efficiency – 6G8

Frequency (MHz)	Peak Gain (dBi)	Efficiency (%)
5925 MHz	3.2	71
6125 MHz	3.2	71
6325 MHz	3.1	72
6525 MHz	3.1	73
6725 MHz	3.3	72
6925 MHz	3.4	71
7125 MHz	3.2	71