



# Commissioning report

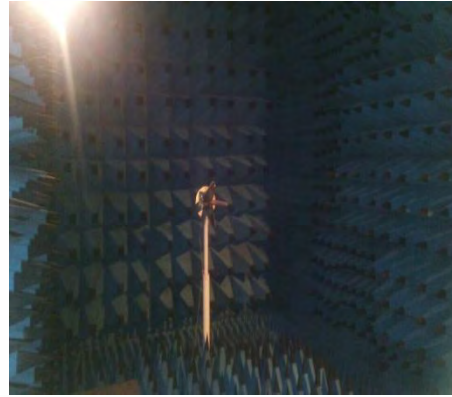
Edition: V1.0

Shenzhen ZTX Communication Technology Co., Ltd			
Radio frequency	Lin Yiqing	Structure	Lai Ningping
Examine and verify	Wei Jin	Vocational work	
Company address	No. 34 Shilong Avenue, Shiyan Street, Bao'an District, Shenzhen		
Project information			
Entry name	X60 PRO	Model version	
Antenna type	External antenna	Solution company	
Antenna system	Dual frequency2.4/5G	Date	2022.05.31
Remarks:			

Add:No. 34 Shilong Avenue, Shiyan Street, Bao'an District, Shenzhen  
TEL:0755-27588360 /27572127 FAX:0755-27588320  
Website:www.chinaztx.com



- ◇ R&D equipment
- ◇ noun interpretation
- ◇ Assembly instructions
- ◇ Test data
- ◇ Matching circuit
- ◇ Project summary



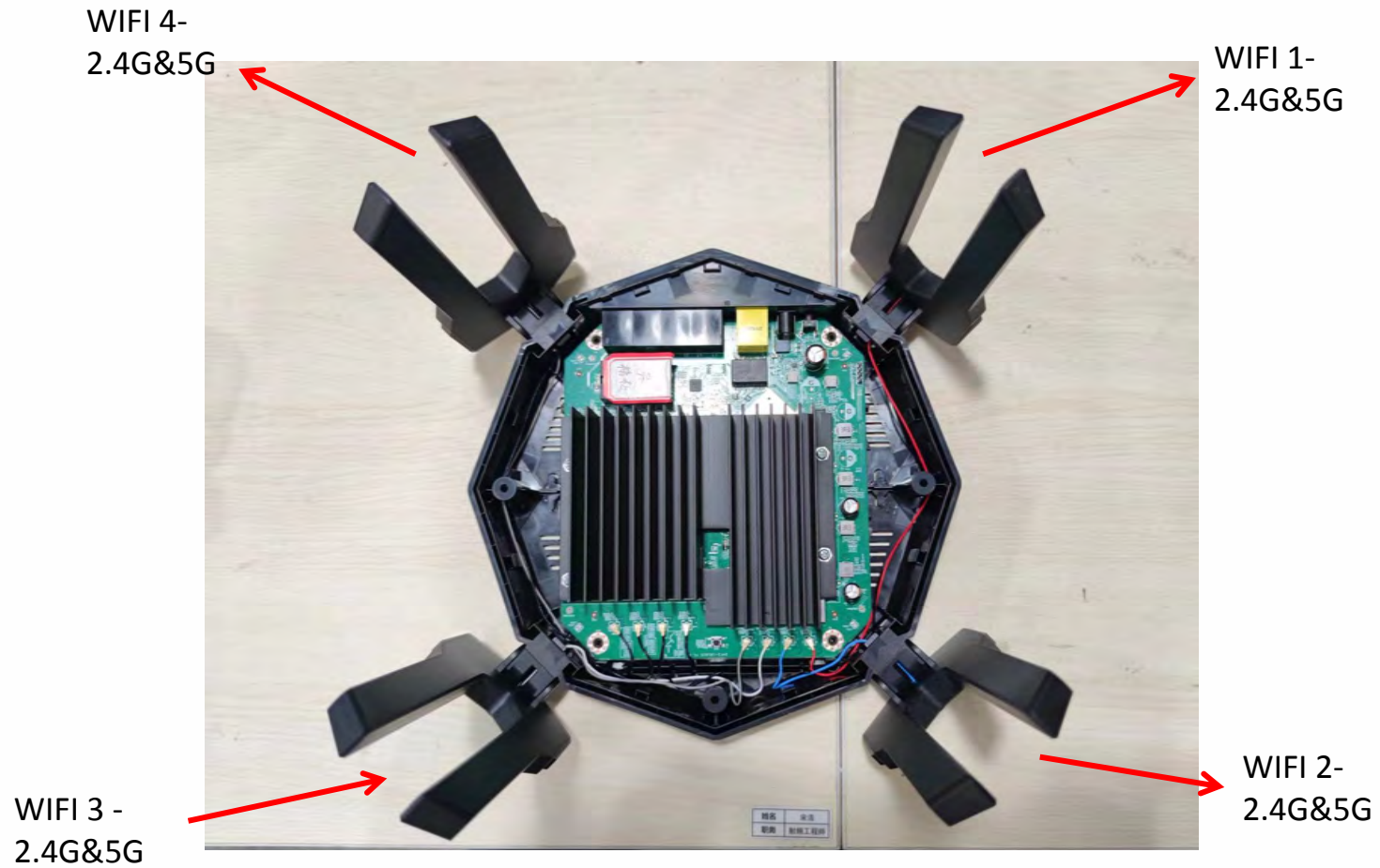
The company has one set of Satimo SG24 OTA test system, two sets of ETS OTA standard test system, one set of Bluetest reverberation anechoic chamber, and one set of MicroPross NFC test system, which is the most advanced in the communication industry. It can provide customers with accurate test reports quickly and stably, fully in line with the CTIA standard, and supports the active passive test of GSM/CDMA/WCDMA/TD/LTE/WIFI/BT/GPS/MIMO and other systems.

MicroPross NFC system can meet the test requirements of all operators, conduct fast performance test on NFC equipment, and output formal certification test report.



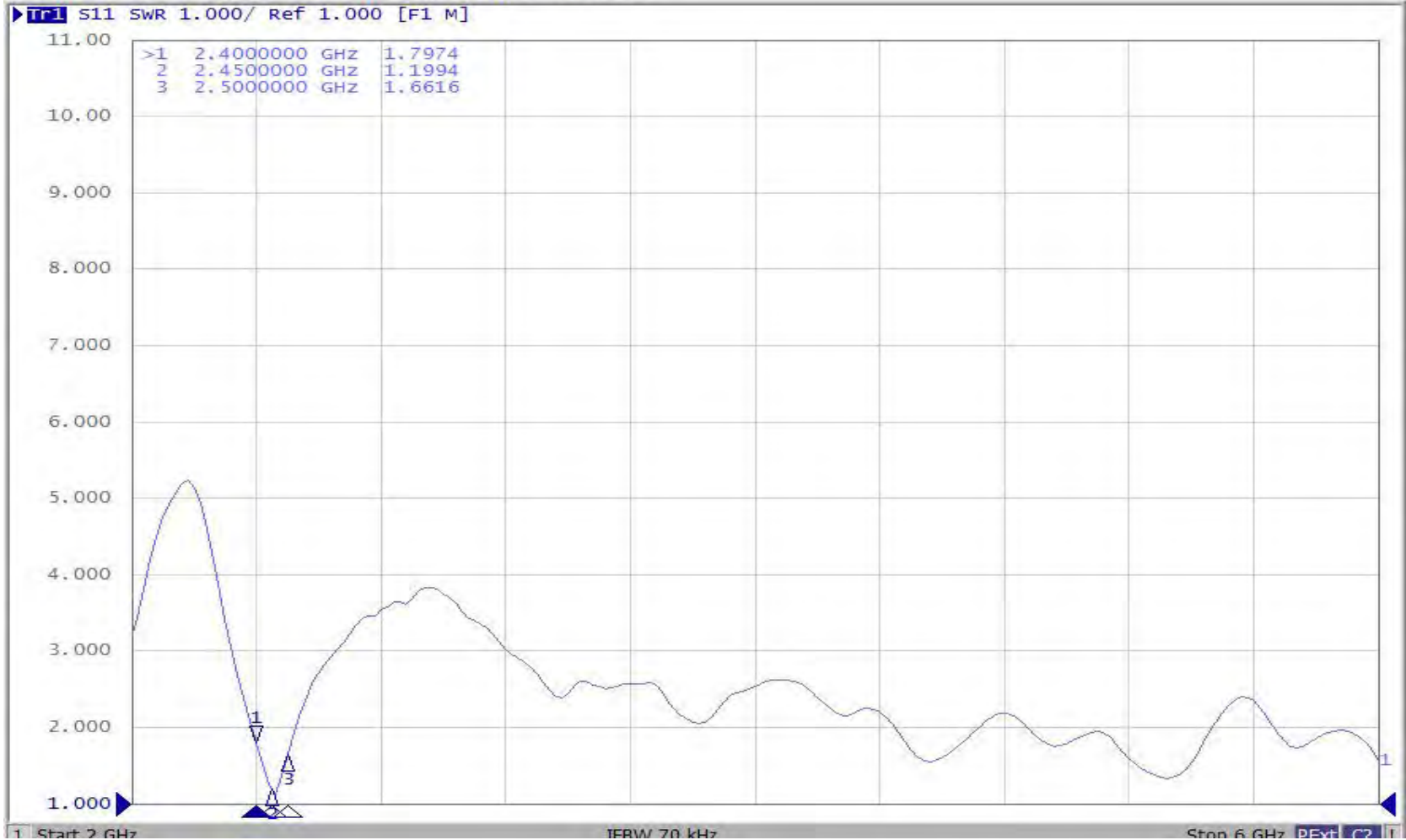
## Noun interpretation

dBi	Decibel relative isotropic antenna
Tx	Transmit frequency
Rx	Receive frequency
TRP	Total Radiated Power
TIS	Total Isotropic Sensitivity
VSWR	Voltage Standing Wave Ratio
GSM	Global Service for Mobile communication
DCS	Digital Communication System
PCS	Personal Communication System
PHS	Personal Handy-phone System
SAR	Specific Absorption Rate
PCB	Printed Circuit Board
CDMA	Code Division Multiple Access
WCDMA	Wideband Code Division Multiple Access
LTE	Long Term Evolution



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1 Active Ch/Trace 2 Response 3 Stimulus 4 Mkr/Analysis 5 Instr State



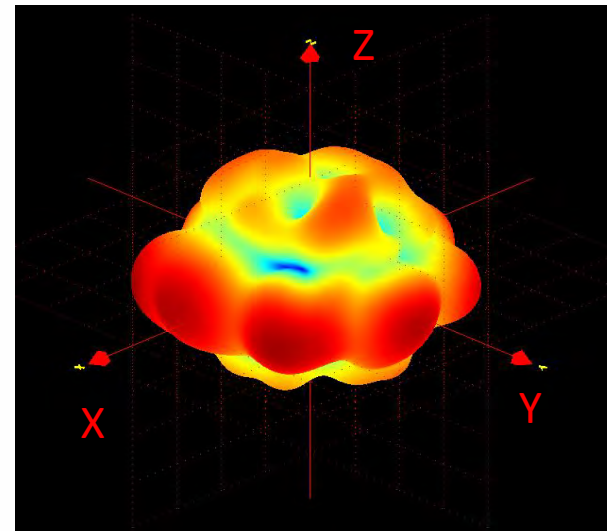
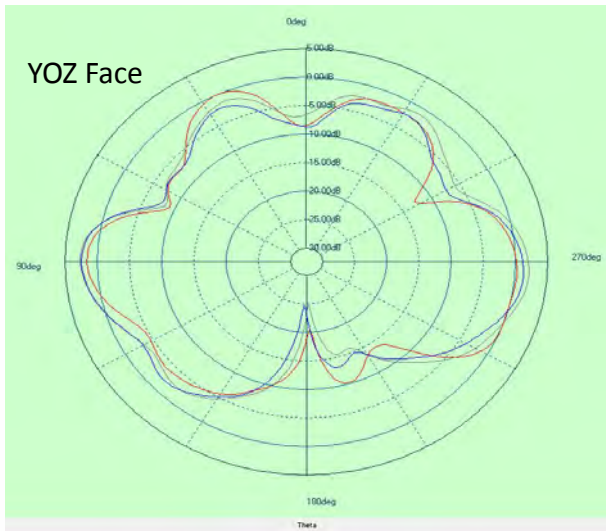
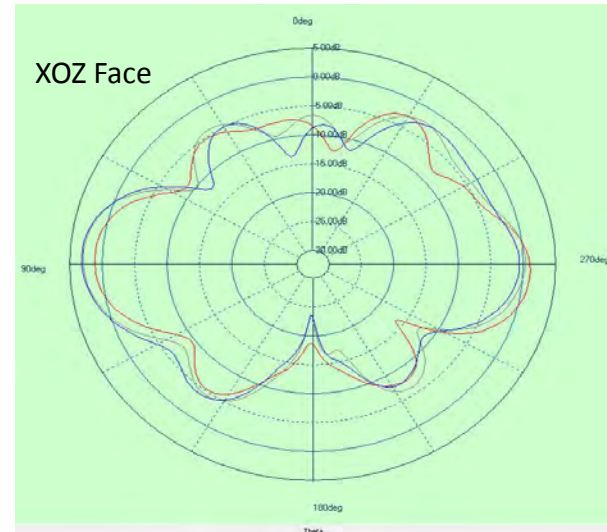
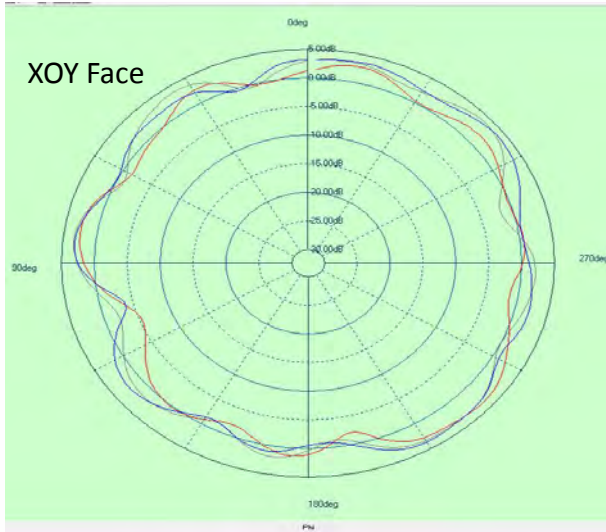
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### Efficiency and Gain

Frequency	Efficiency	Efficiency. dB	Gain . dB
2400000000	56%	-2.54	4.47
2410000000	57%	-2.48	4.42
2420000000	58%	-2.35	4.54
2430000000	59%	-2.28	4.90
2440000000	61%	-2.10	5.03
2450000000	62%	-2.07	4.81
2460000000	62%	-2.09	5.09
2470000000	61%	-2.17	4.98
2480000000	58%	-2.34	4.65
2490000000	57%	-2.42	4.57
2500000000	57%	-2.47	4.65

## Directional pattern



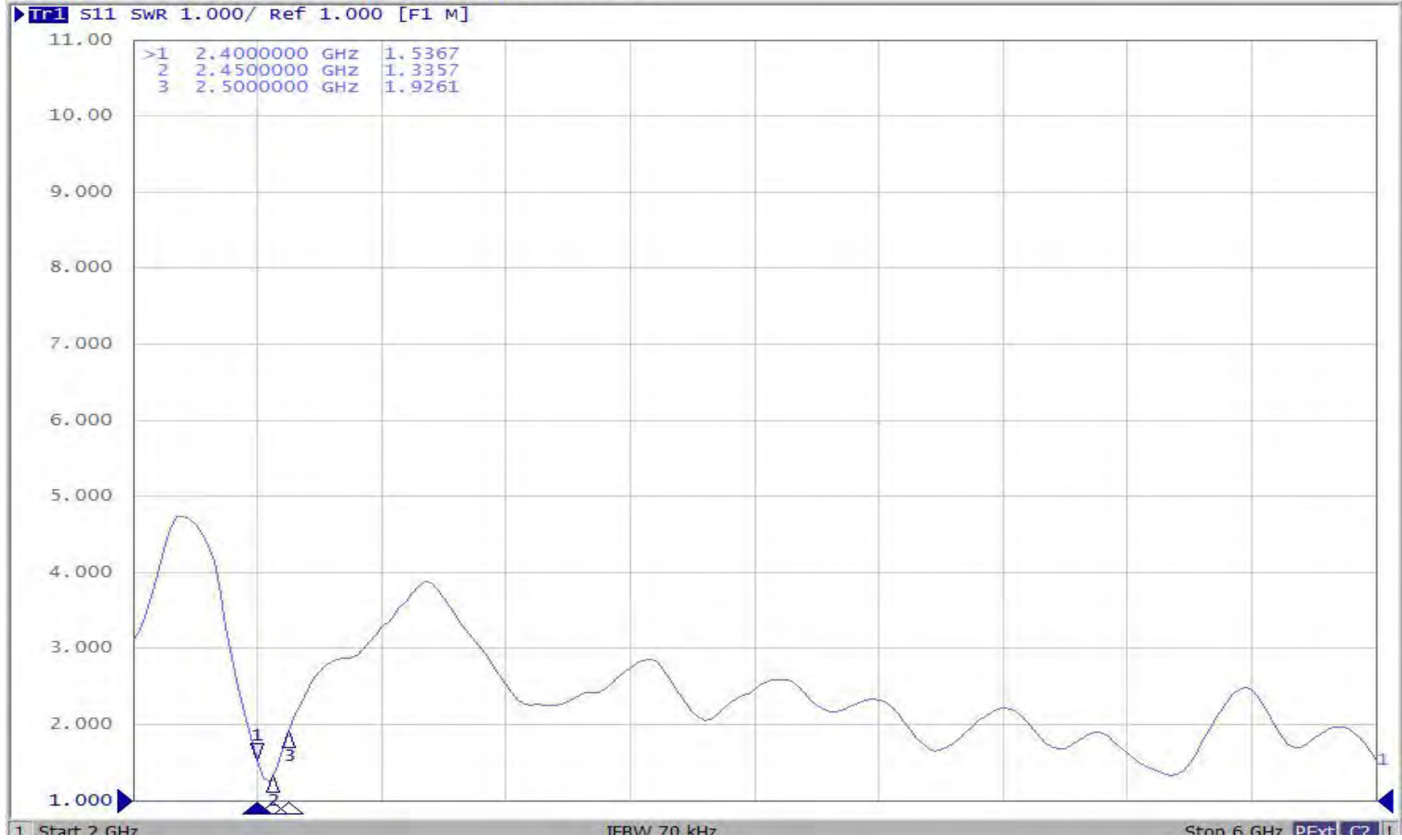




# 2.4G WIFI-2 Antenna test data

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1 Active Ch/Trace 2 Response 3 Stimulus 4 Mkr/Analysis 5 Instr State

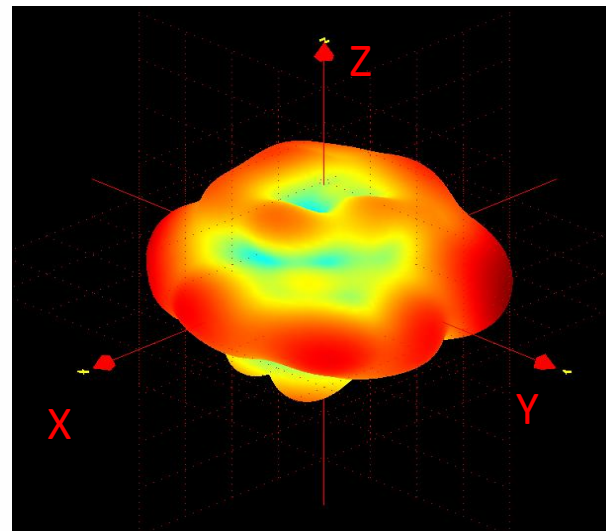
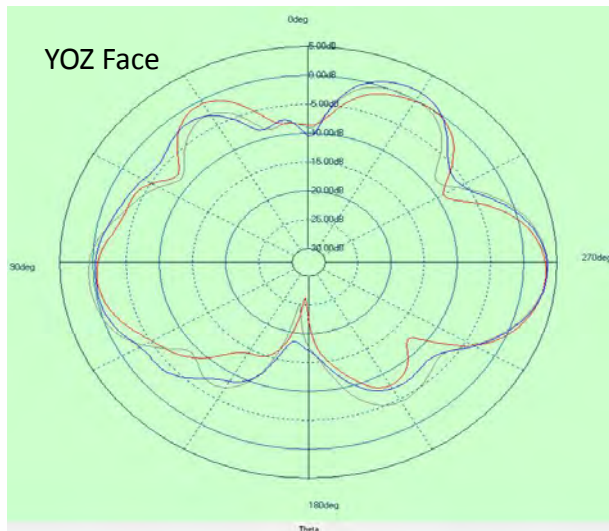
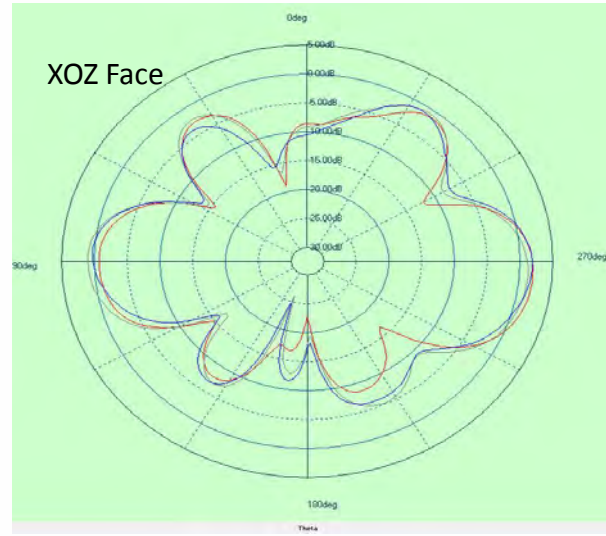
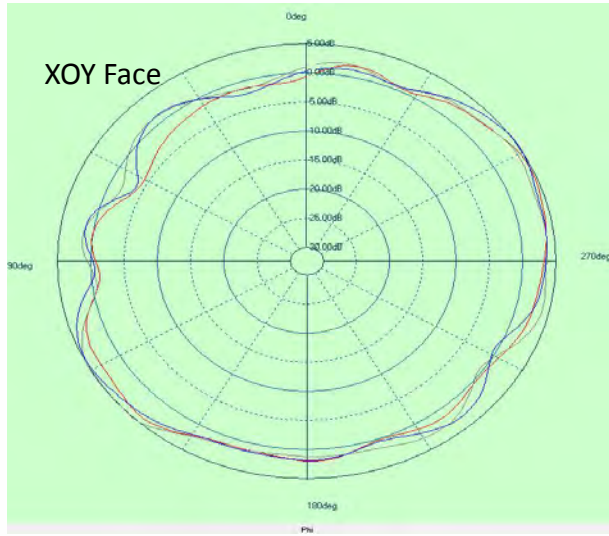


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## Efficiency and Gain

Frequency	Efficiency	Efficiency. dB	Gain . dB
2400000000	62%	-2.07	4.94
2410000000	65%	-1.87	5.01
2420000000	66%	-1.81	5.16
2430000000	67%	-1.76	5.49
2440000000	68%	-1.70	5.76
2450000000	69%	-1.59	5.87
2460000000	70%	-1.52	5.63
2470000000	69%	-1.59	5.60
2480000000	67%	-1.76	5.28
2490000000	64%	-1.91	5.02
2500000000	63%	-2.02	5.09

## Directional pattern



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# 2.4G WIFI-3 Antenna test data

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1 Active Ch/Trace 2 Response 3 Stimulus 4 Mkr/Analysis 5 Instr State



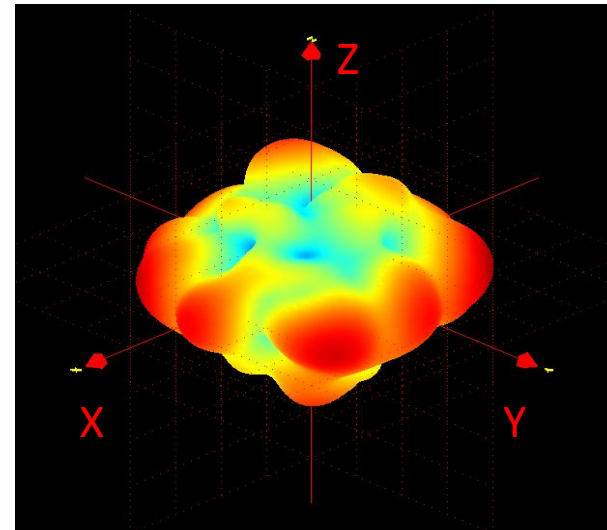
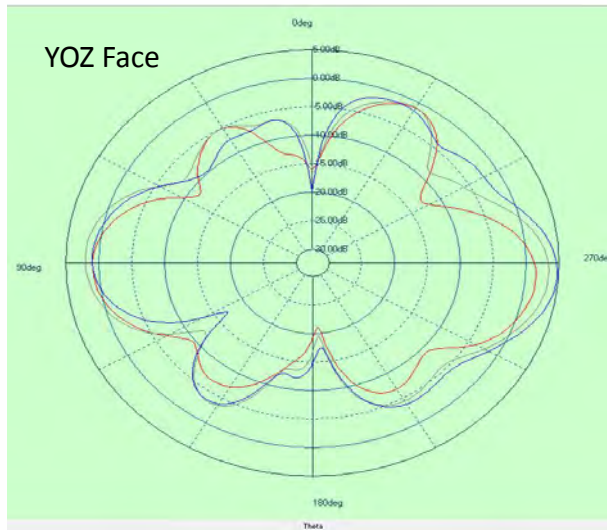
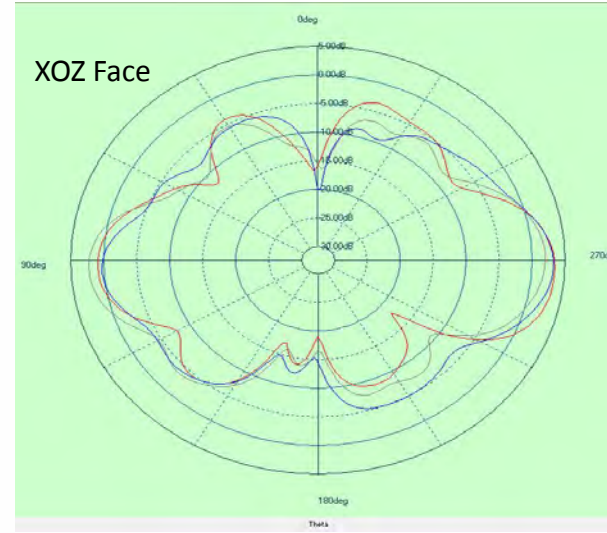
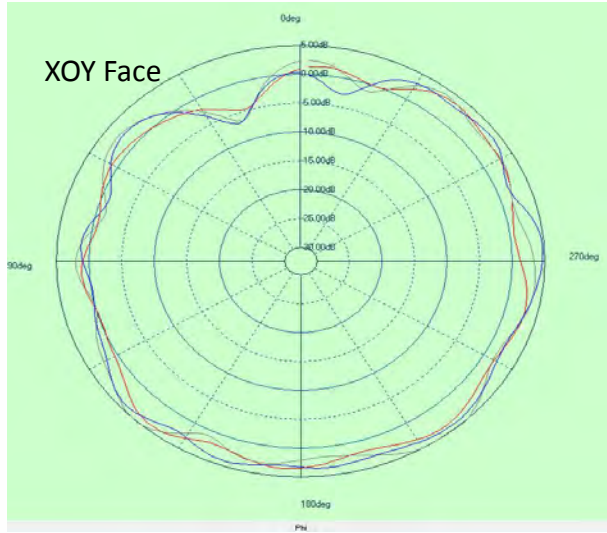
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### Efficiency and Gain

Frequency	Efficiency	Efficiency. dB	Gain . dB
2400000000	60%	-2.21	4.58
2410000000	62%	-2.07	4.95
2420000000	63%	-2.00	5.13
2430000000	65%	-1.86	5.44
2440000000	64%	-1.93	5.31
2450000000	66%	-1.79	5.64
2460000000	68%	-1.69	5.85
2470000000	67%	-1.74	5.69
2480000000	66%	-1.83	5.34
2490000000	65%	-1.85	4.84
2500000000	63%	-2.00	4.84

## Directional pattern



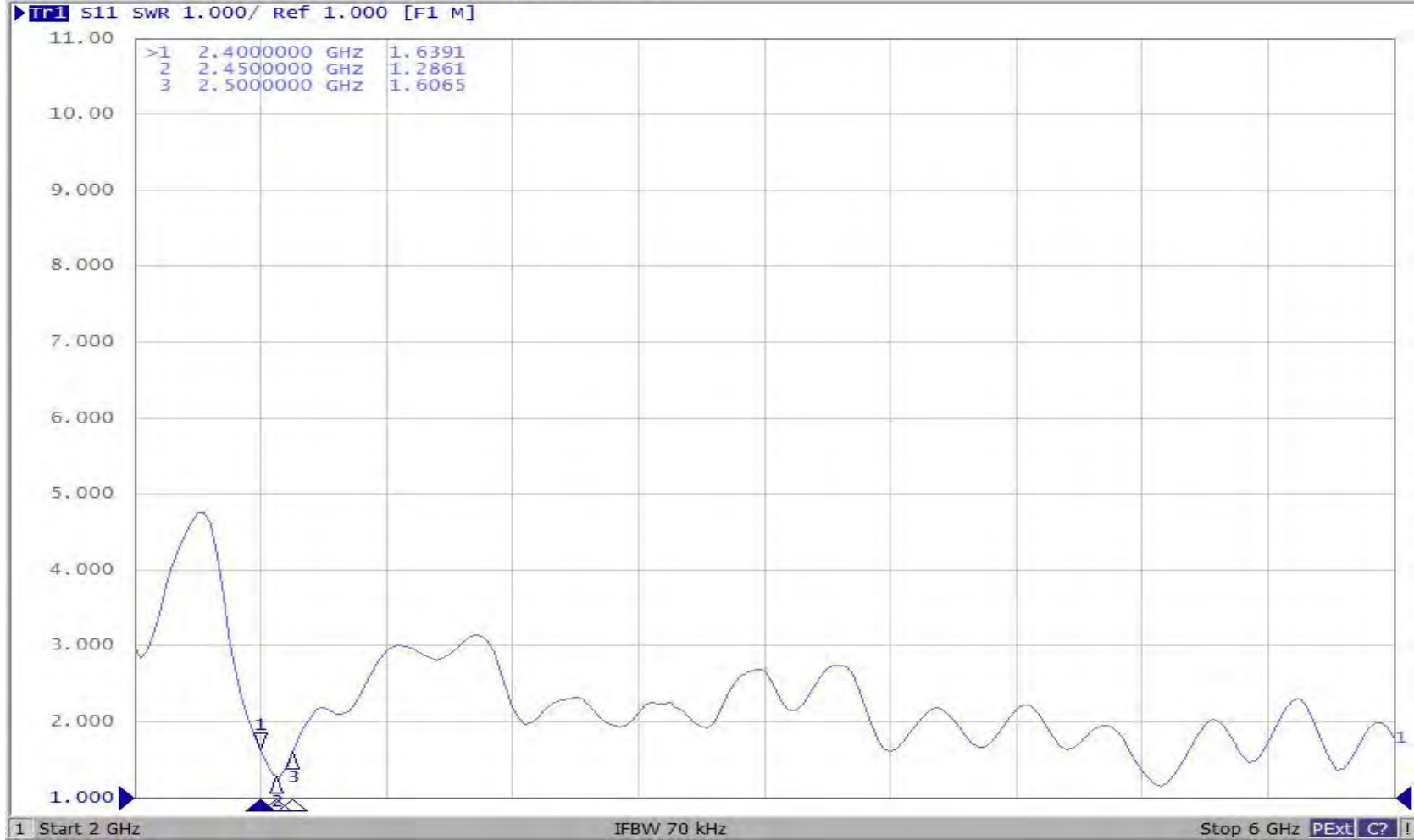
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# 2.4G WIFI-4 Antenna test data

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1 Active Ch/Trace 2 Response 3 Stimulus 4 Mkr/Analysis 5 Instr State



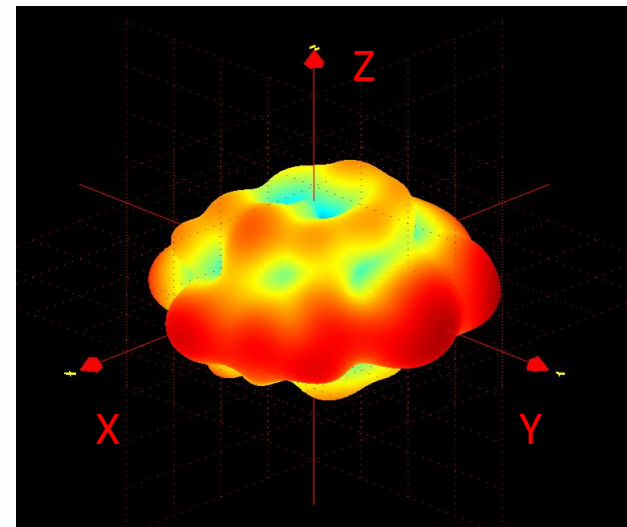
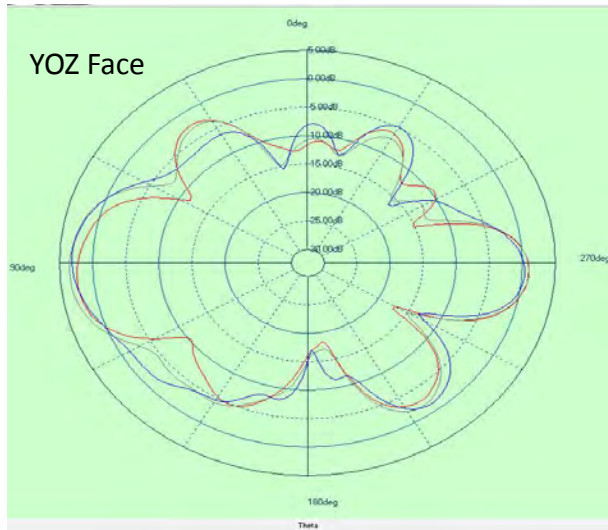
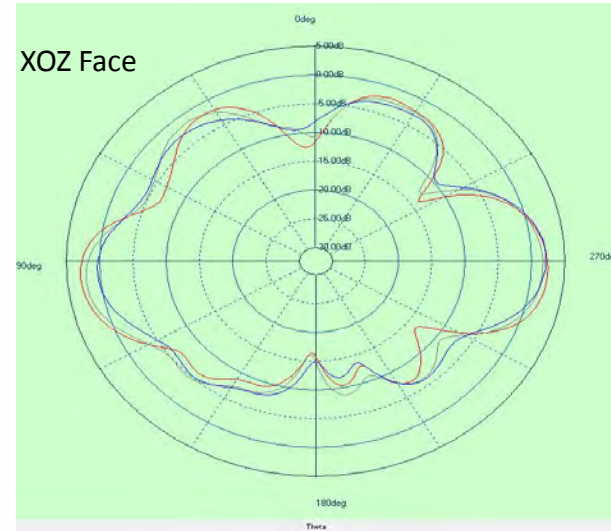
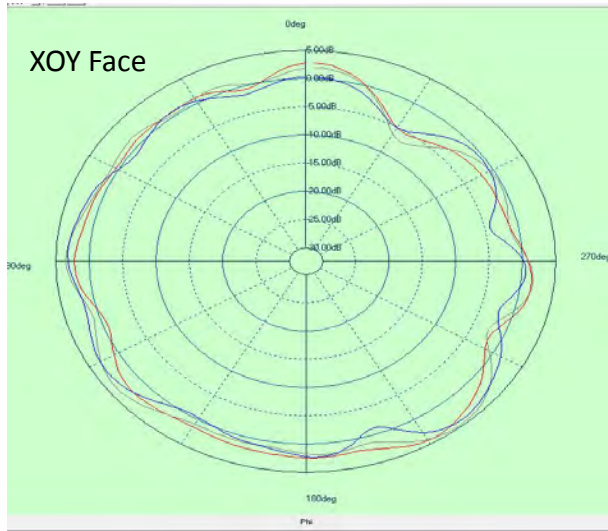
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## Efficiency and Gain

Frequency	Efficiency	Efficiency. dB	Gain . dB
2400000000	51%	-2.91	4.65
2410000000	51%	-2.88	4.81
2420000000	57%	-2.45	5.30
2430000000	59%	-2.29	5.39
2440000000	58%	-2.35	5.34
2450000000	57%	-2.43	5.11
2460000000	56%	-2.53	4.88
2470000000	57%	-2.45	4.94
2480000000	54%	-2.71	4.52
2490000000	53%	-2.76	4.40
2500000000	53%	-2.74	4.48

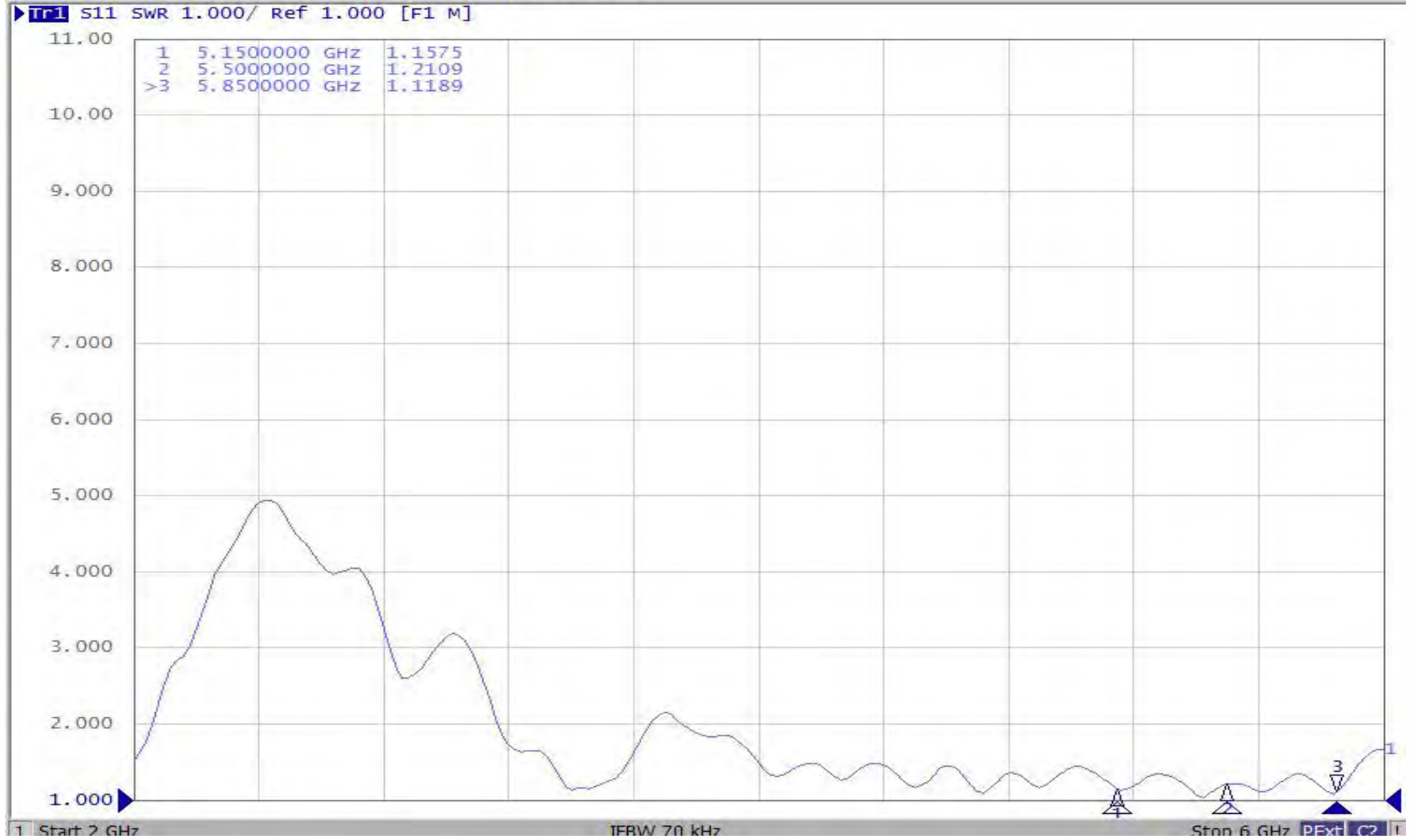


## Directional pattern



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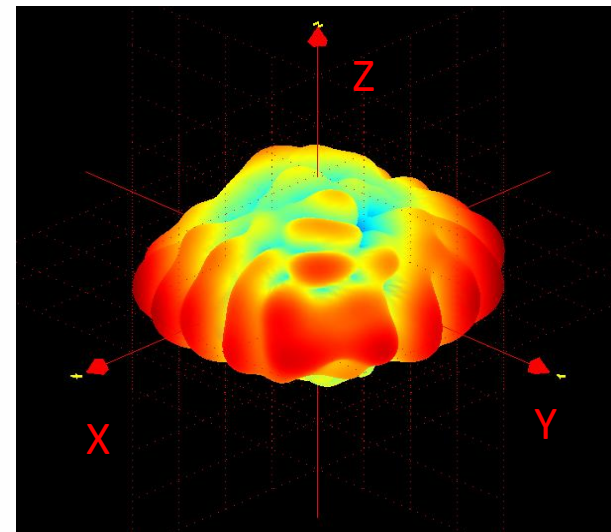
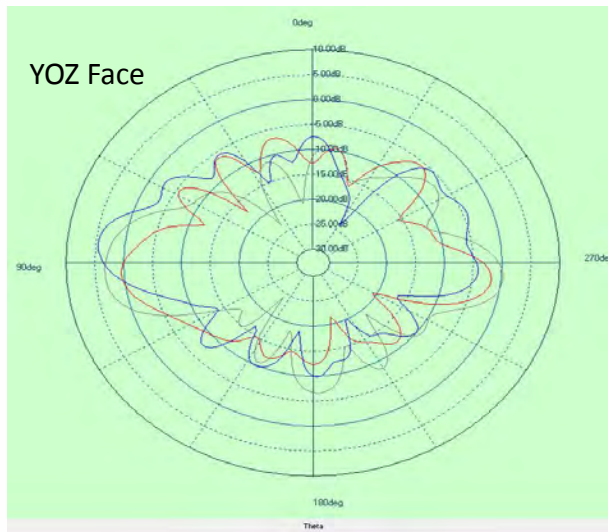
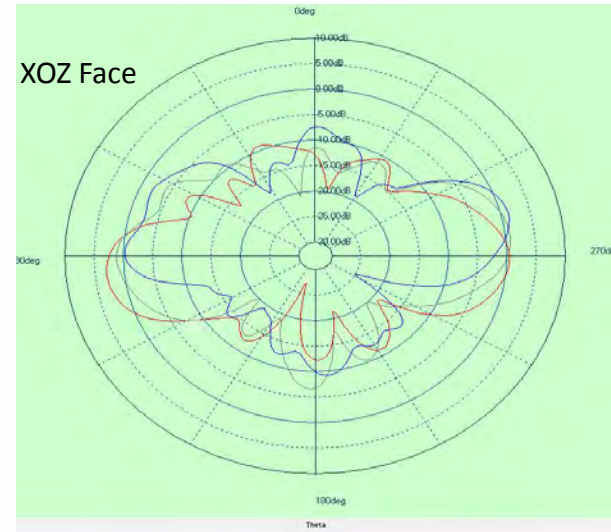
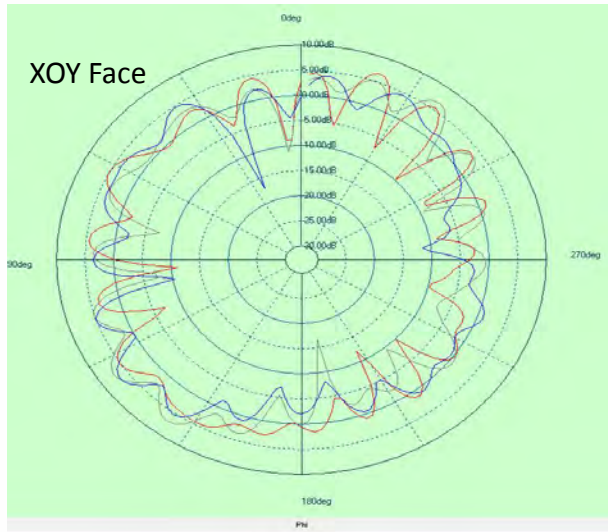
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### Efficiency and Gain

Frequency	Efficiency	Efficiency. dB	Gain . dB
5150000000	45%	-3.50	7.60
5200000000	43%	-3.69	7.64
5250000000	43%	-3.66	7.62
5300000000	42%	-3.74	7.12
5350000000	43%	-3.70	7.15
5400000000	44%	-3.59	7.10
5450000000	45%	-3.49	7.24
5500000000	45%	-3.46	7.53
5550000000	42%	-3.76	7.18
5600000000	42%	-3.81	6.90
5650000000	42%	-3.75	7.09
5700000000	40%	-3.97	6.64
5750000000	42%	-3.75	6.79
5800000000	40%	-3.93	6.83
5850000000	44%	-3.54	7.08

## Directional pattern



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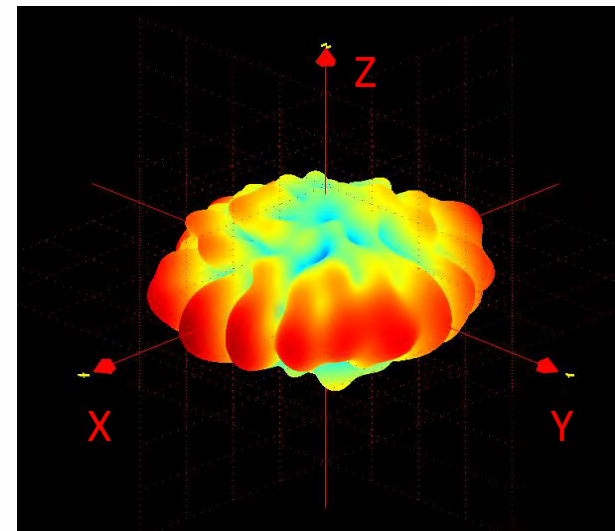
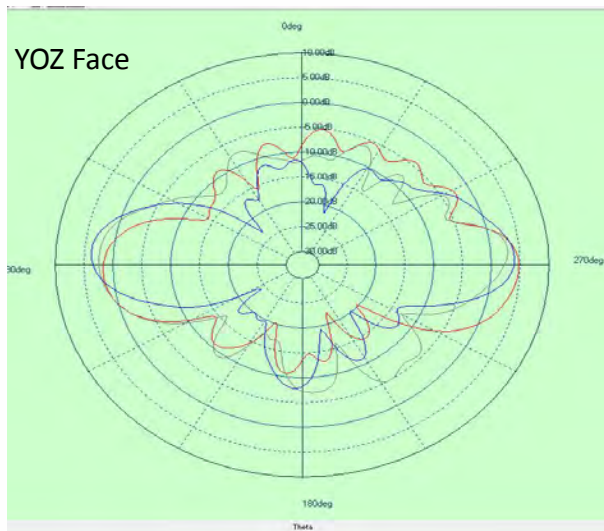
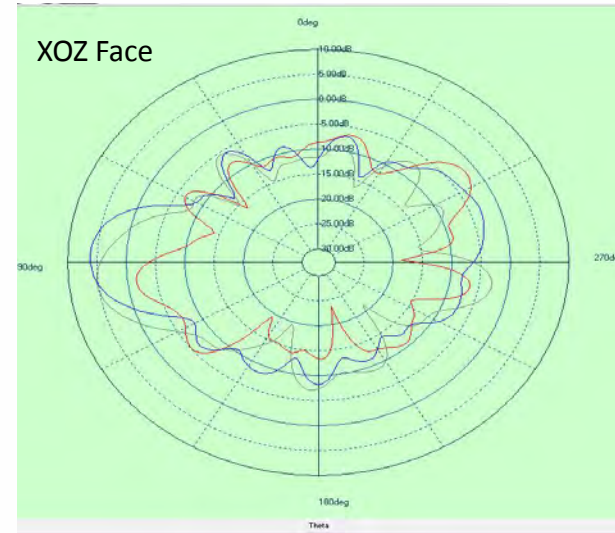
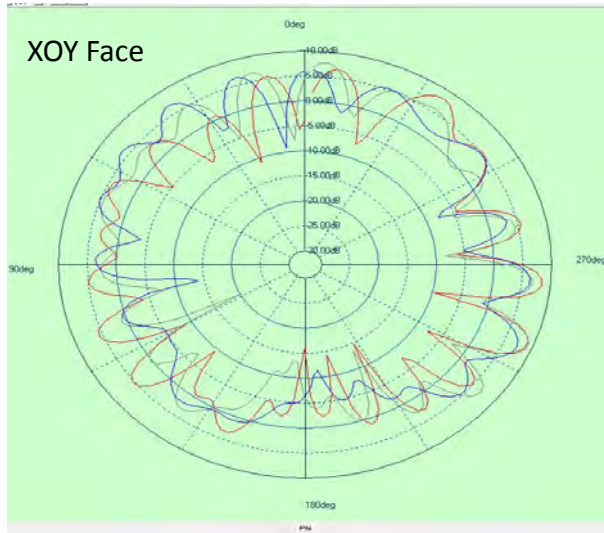




## Efficiency and Gain

Frequency	Efficiency	Efficiency. dB	Gain . dB
5150000000	57%	-2.45	9.20
5200000000	57%	-2.46	9.33
5250000000	58%	-2.37	9.39
5300000000	55%	-2.62	9.21
5350000000	53%	-2.78	9.35
5400000000	53%	-2.79	9.36
5450000000	54%	-2.68	9.39
5500000000	54%	-2.68	9.02
5550000000	54%	-2.65	8.38
5600000000	55%	-2.61	8.35
5650000000	56%	-2.49	8.26
5700000000	53%	-2.75	8.16
5750000000	54%	-2.68	7.92
5800000000	50%	-3.01	7.46
5850000000	51%	-2.89	7.59

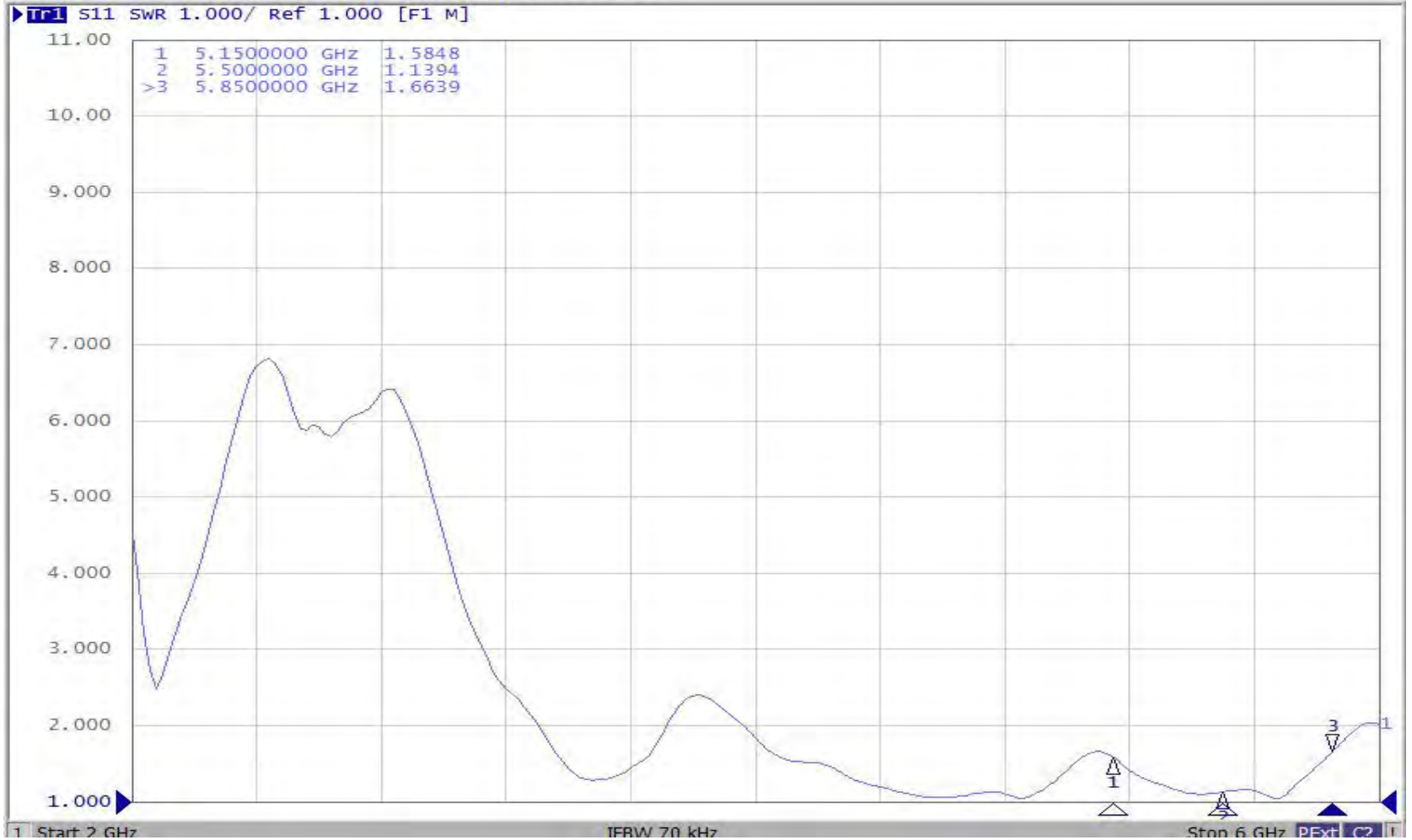
## Directional pattern



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1 Active Ch/Trace 2 Response 3 Stimulus 4 Mkr/Analysis 5 Instr State



Mobile terminal antenna manufacturing and technical service provider

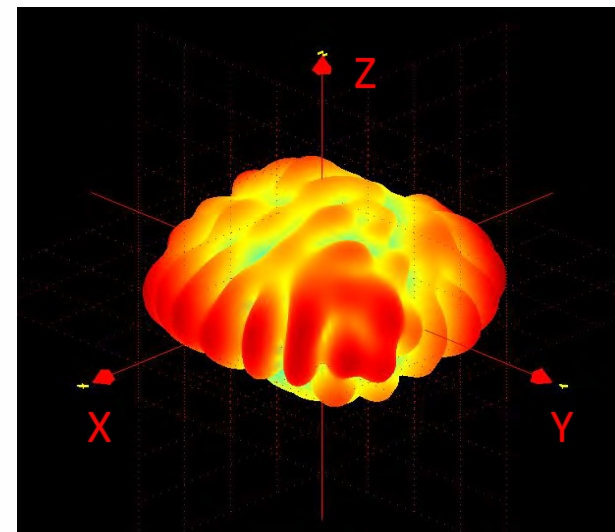
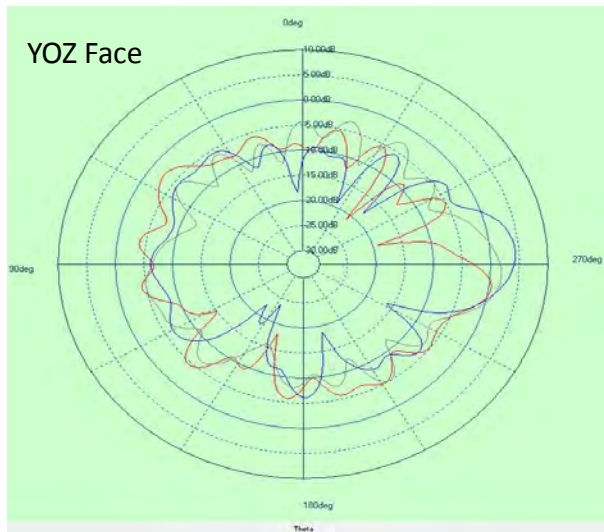
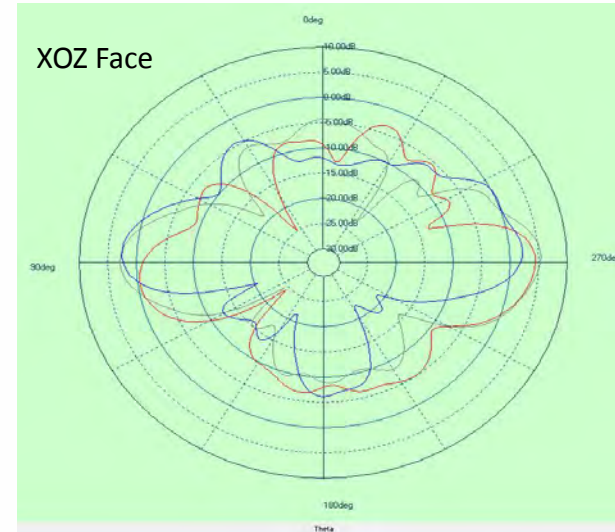
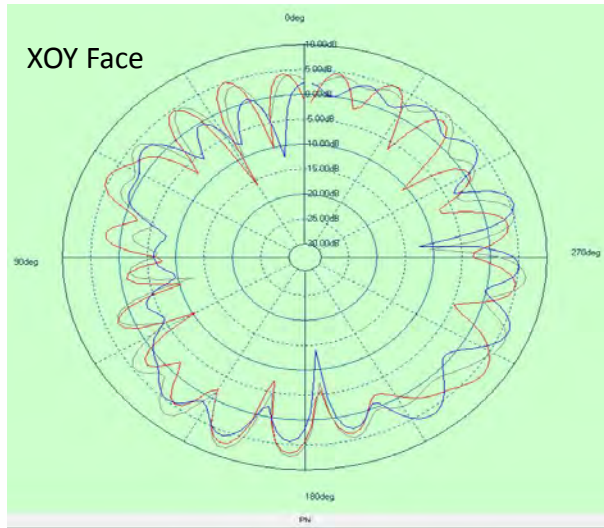




## Efficiency and Gain

Frequency	Efficiency	Efficiency. dB	Gain . dB
5150000000	56%	-2.53	7.40
5200000000	56%	-2.55	7.52
5250000000	57%	-2.43	7.77
5300000000	56%	-2.55	7.86
5350000000	55%	-2.58	8.22
5400000000	59%	-2.29	8.38
5450000000	61%	-2.15	8.46
5500000000	59%	-2.29	8.12
5550000000	59%	-2.29	7.63
5600000000	58%	-2.38	7.59
5650000000	59%	-2.26	7.61
5700000000	57%	-2.47	7.04
5750000000	56%	-2.51	7.12
5800000000	50%	-2.98	6.68
5850000000	53%	-2.76	6.83

## Directional pattern



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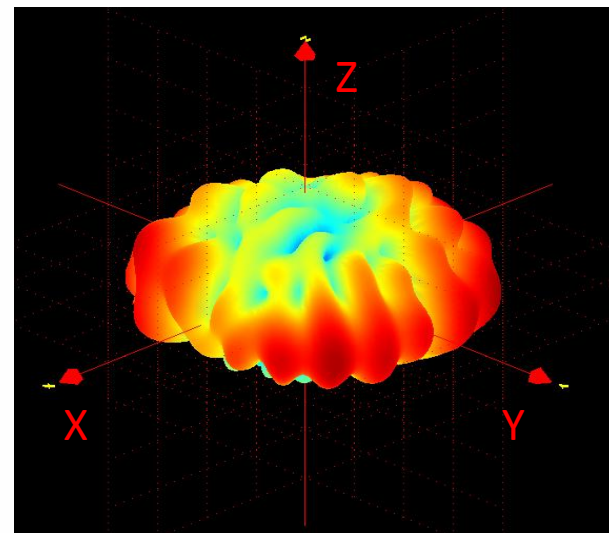
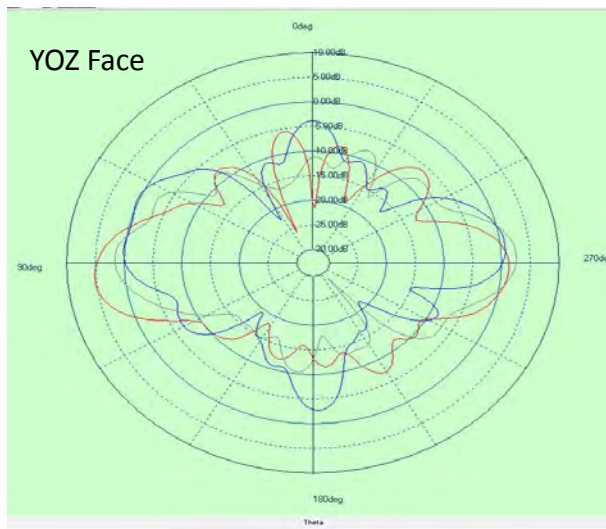
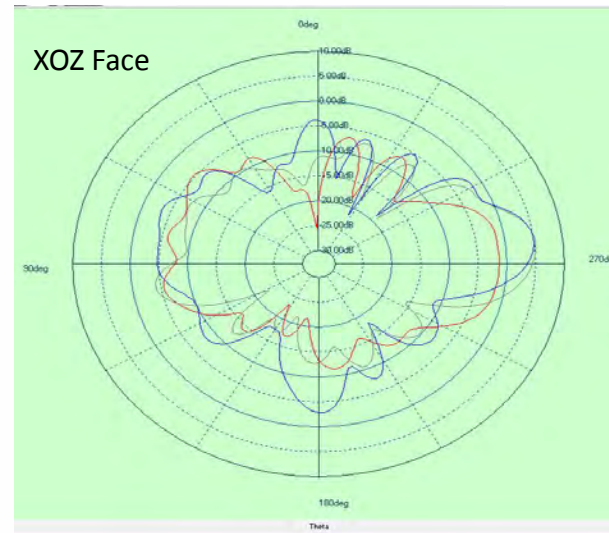
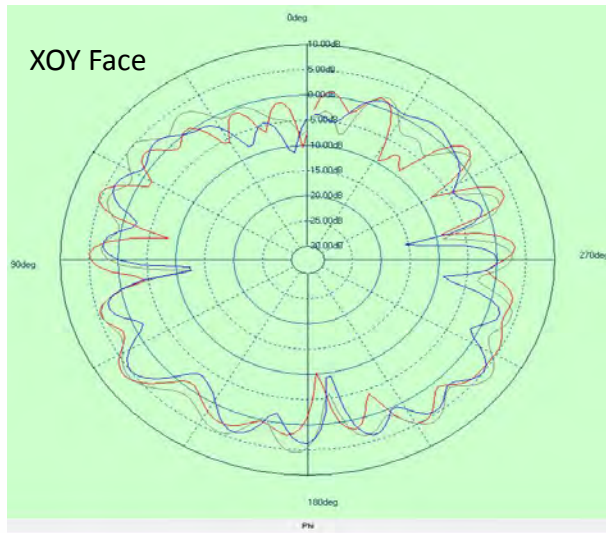
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## Efficiency and Gain

Frequency	Efficiency	Efficiency. dB	Gain . dB
5150000000	46%	-3.41	6.57
5200000000	47%	-3.24	6.76
5250000000	49%	-3.14	6.60
5300000000	48%	-3.23	6.72
5350000000	47%	-3.31	7.16
5400000000	47%	-3.24	6.95
5450000000	50%	-3.03	7.10
5500000000	51%	-2.96	6.75
5550000000	48%	-3.22	6.76
5600000000	44%	-3.57	6.72
5650000000	46%	-3.42	7.17
5700000000	44%	-3.62	7.14
5750000000	45%	-3.50	6.90
5800000000	41%	-3.83	6.43
5850000000	43%	-3.66	6.16

## Directional pattern



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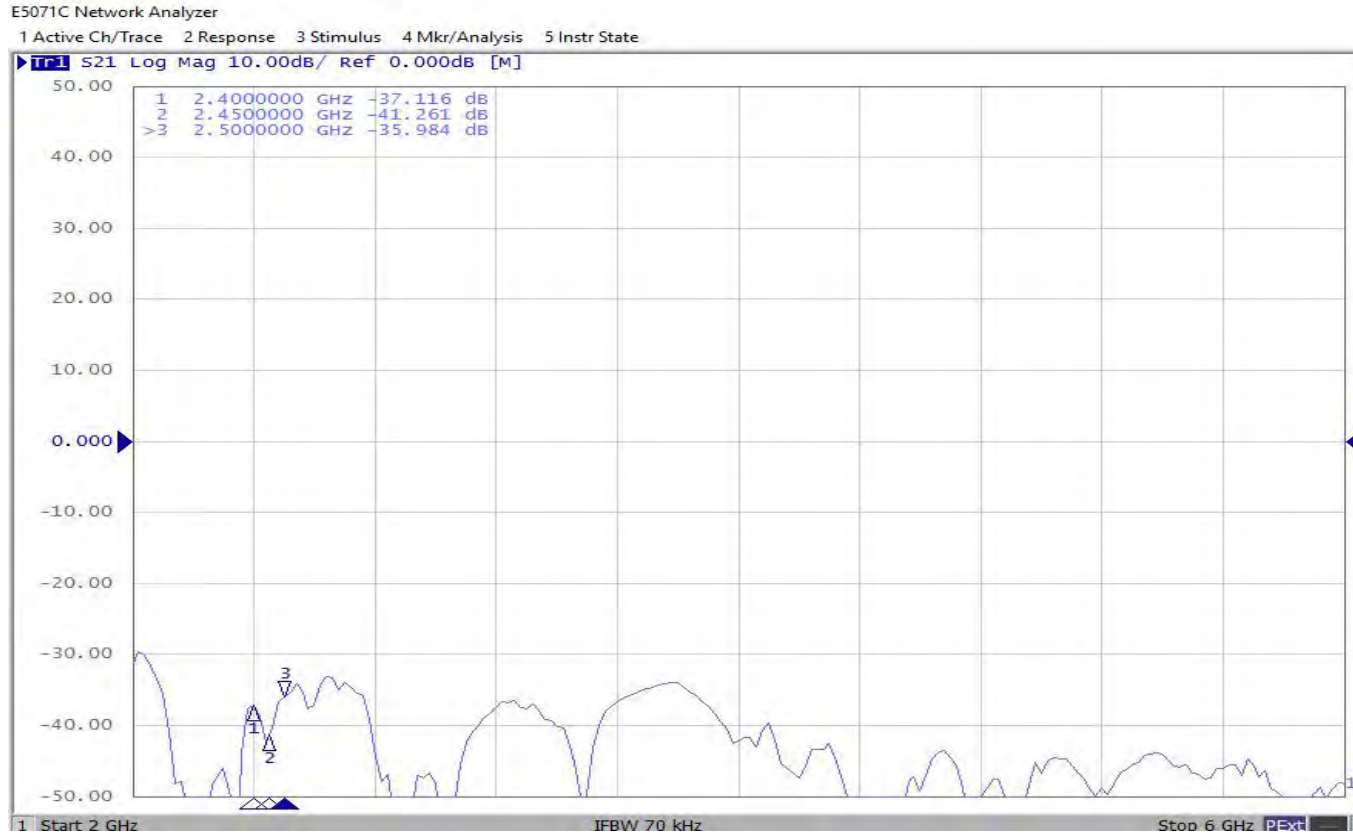
## 2.4G WIFI-1 and 2.4G WIFI-2 Isolation



Frequency (MHz)	2400	2450	2500
Isolation	-24.57	-22.22	-21.54

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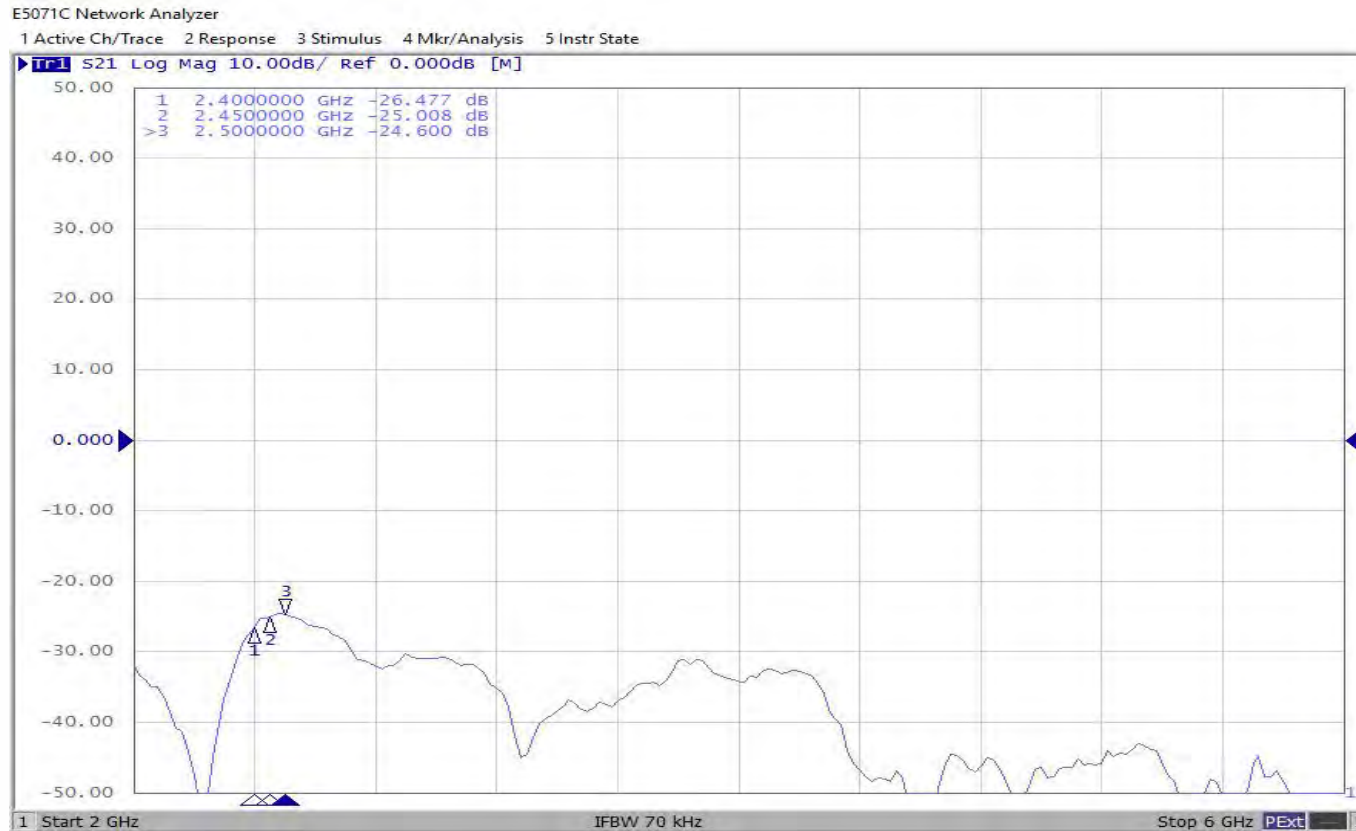
## 2.4G WIFI-1 and 2.4G WIFI-3 Isolation



Frequency (MHz)	2400	2450	2500
Isolation	-37.11	-41.26	-35.98

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## 2.4G WIFI-1 and 2.4G WIFI-4 Isolation



Frequency (MHz)	2400	2450	2500
Isolation	-26.47	-25.00	-24.60

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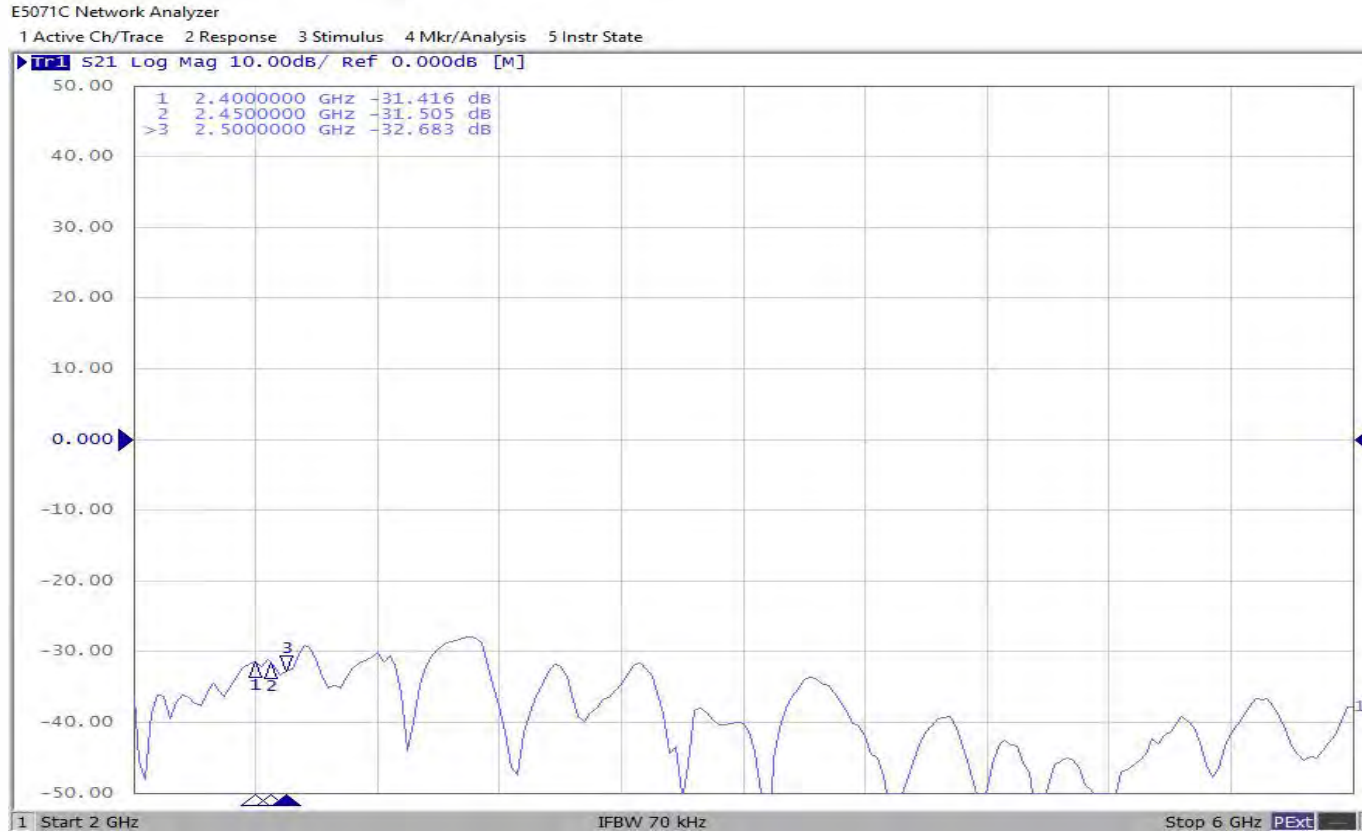
## 2.4G WIFI-2 and 2.4G WIFI-3 Isolation



Frequency (MHz)	2400	2450	2500
Isolation	-26.46	-23.16	-21.27

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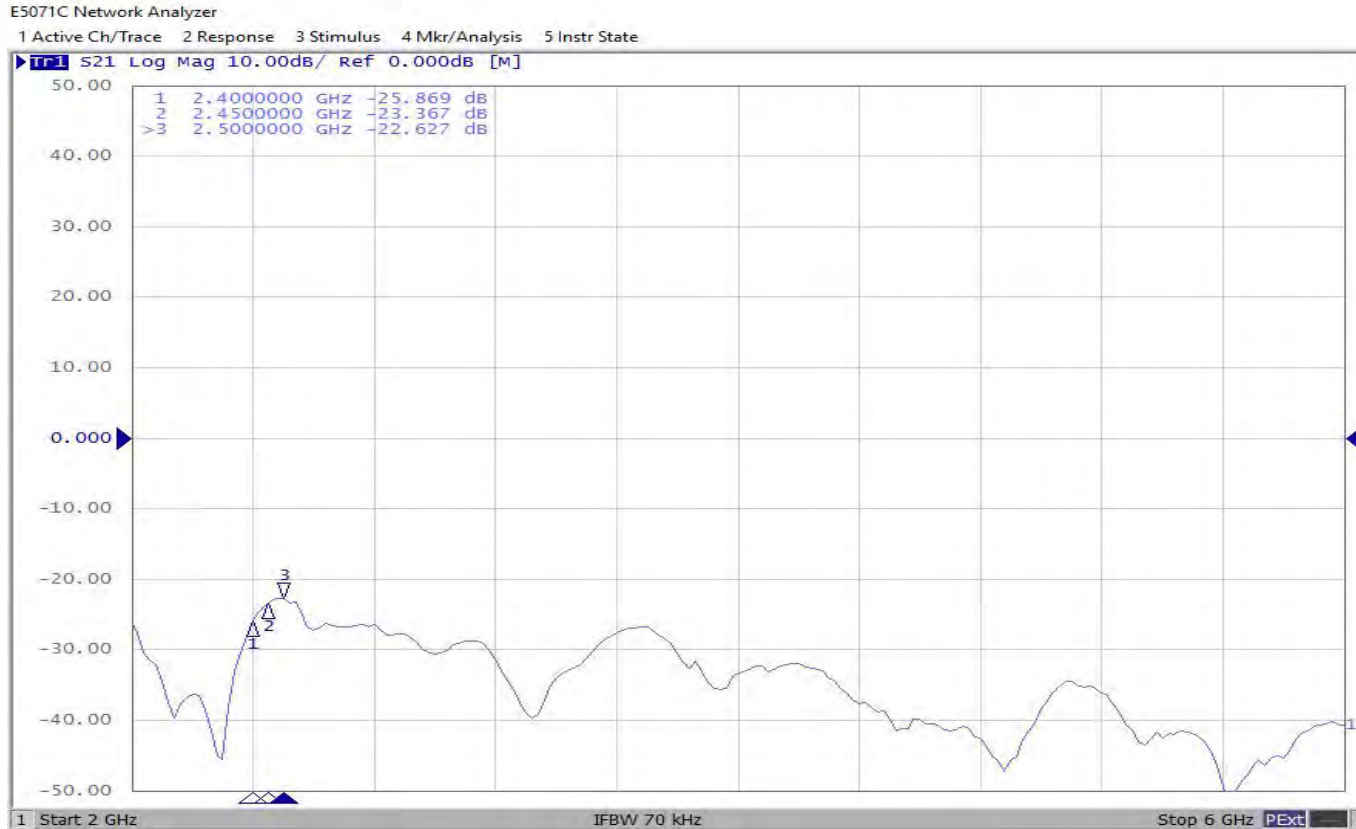
## 2.4G WIFI-2 and 2.4G WIFI-4 Isolation



Frequency (MHz)	2400	2450	2500
Isolation	-31.41	-31.50	-32.68

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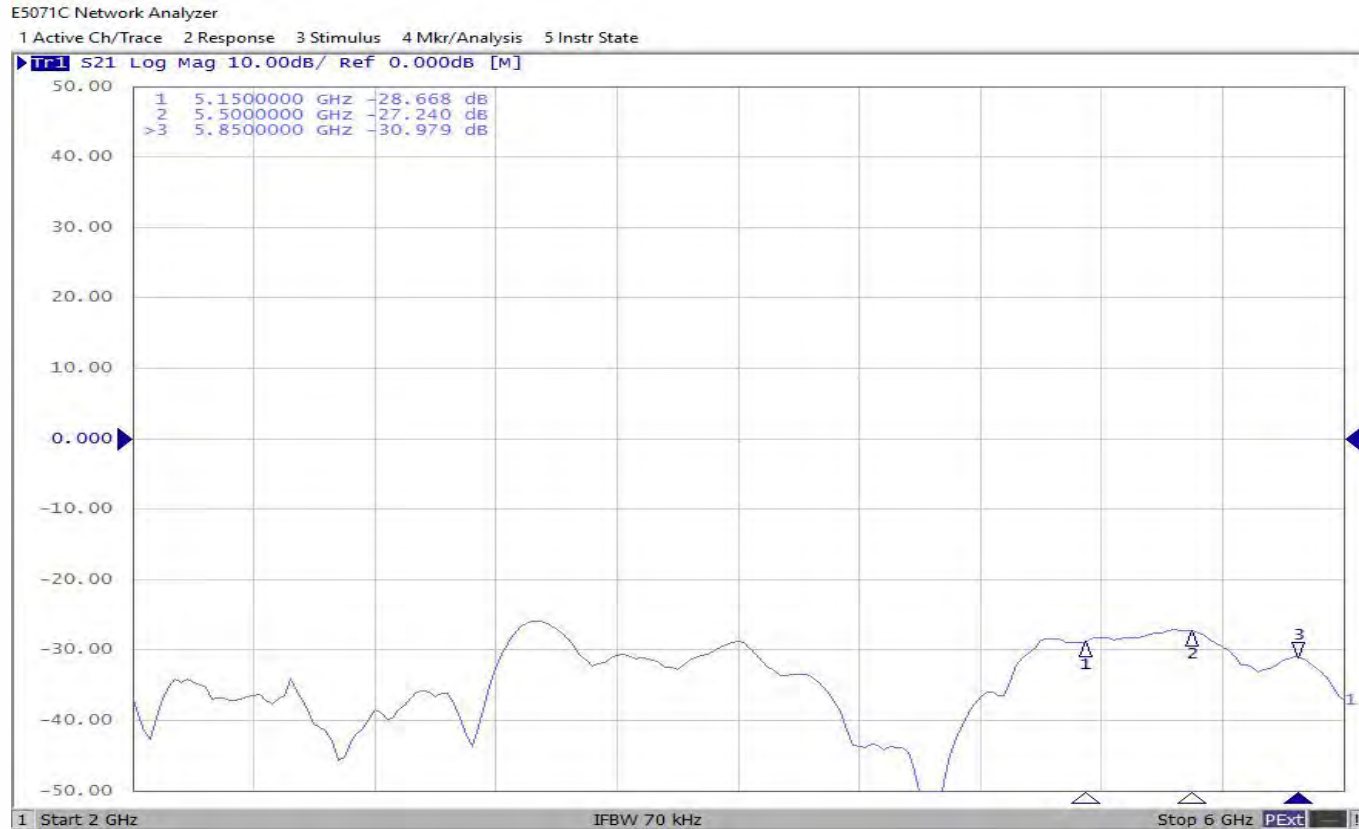
## 2.4G WIFI-3 and 2.4G WIFI-4 Isolation



Frequency (MHz)	2400	2450	2500
Isolation	-25.86	-23.36	-22.62

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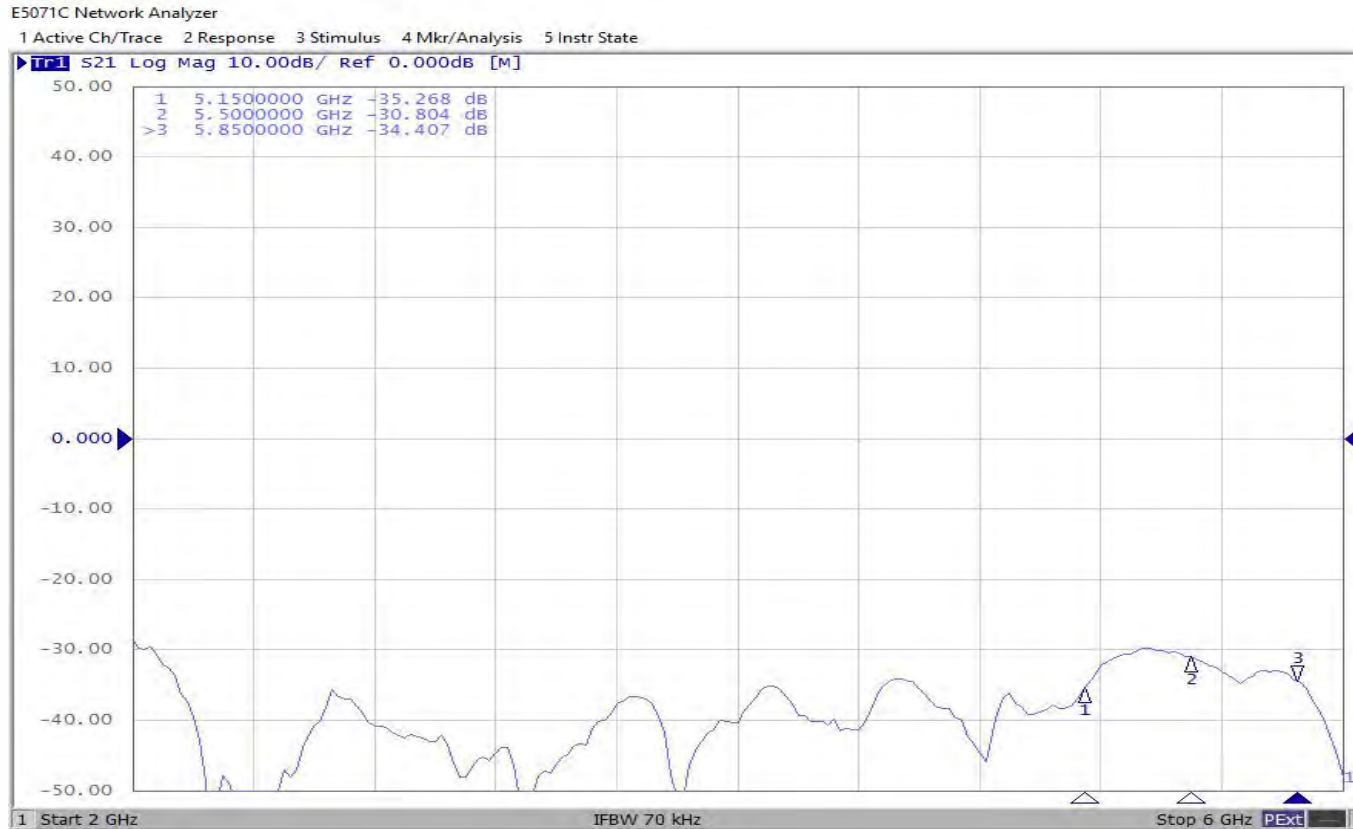
## 5G WIFI-1 and 5G WIFI-2 Isolation



Frequency (MHz)	5150	5500	5850
Isolation	-28.66	-27.24	-30.97

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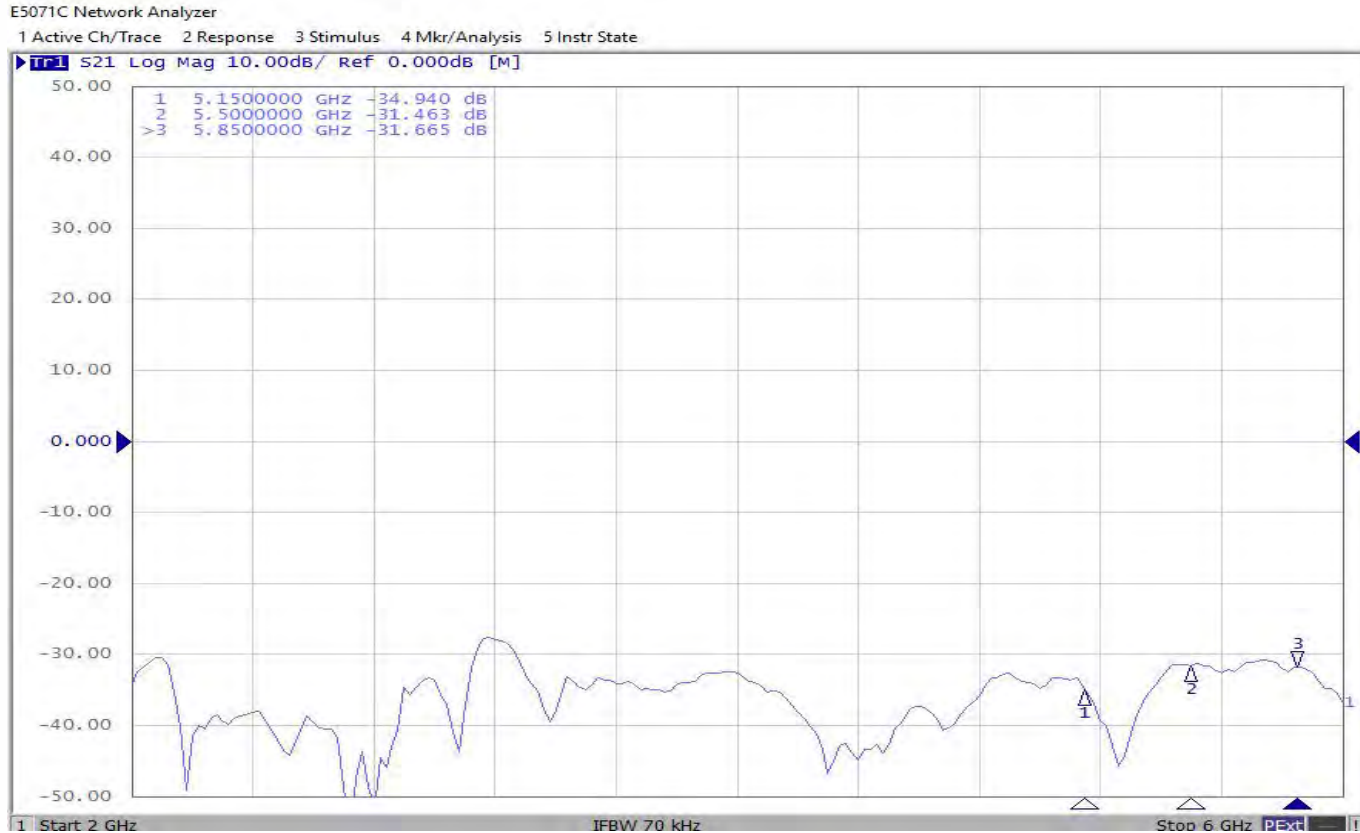
## 5G WIFI-1 and 5G WIFI-3 Isolation



Frequency (MHz)	5150	5500	5850
Isolation	-35.26	-30.80	-34.40

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## 5G WIFI-1 and 5G WIFI-4 Isolation

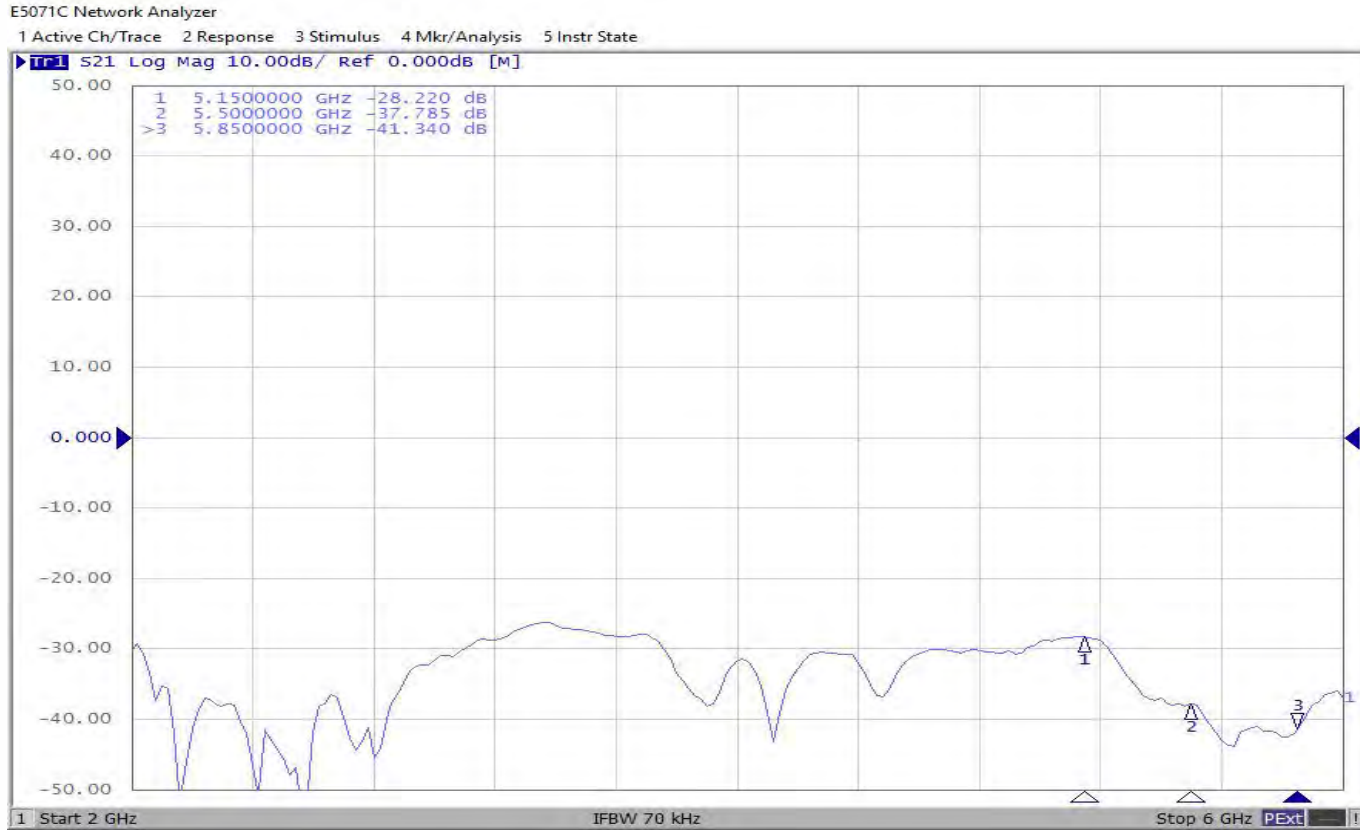


Frequency (MHz)	5150	5500	5850
Isolation	-34.94	-31.46	-31.66

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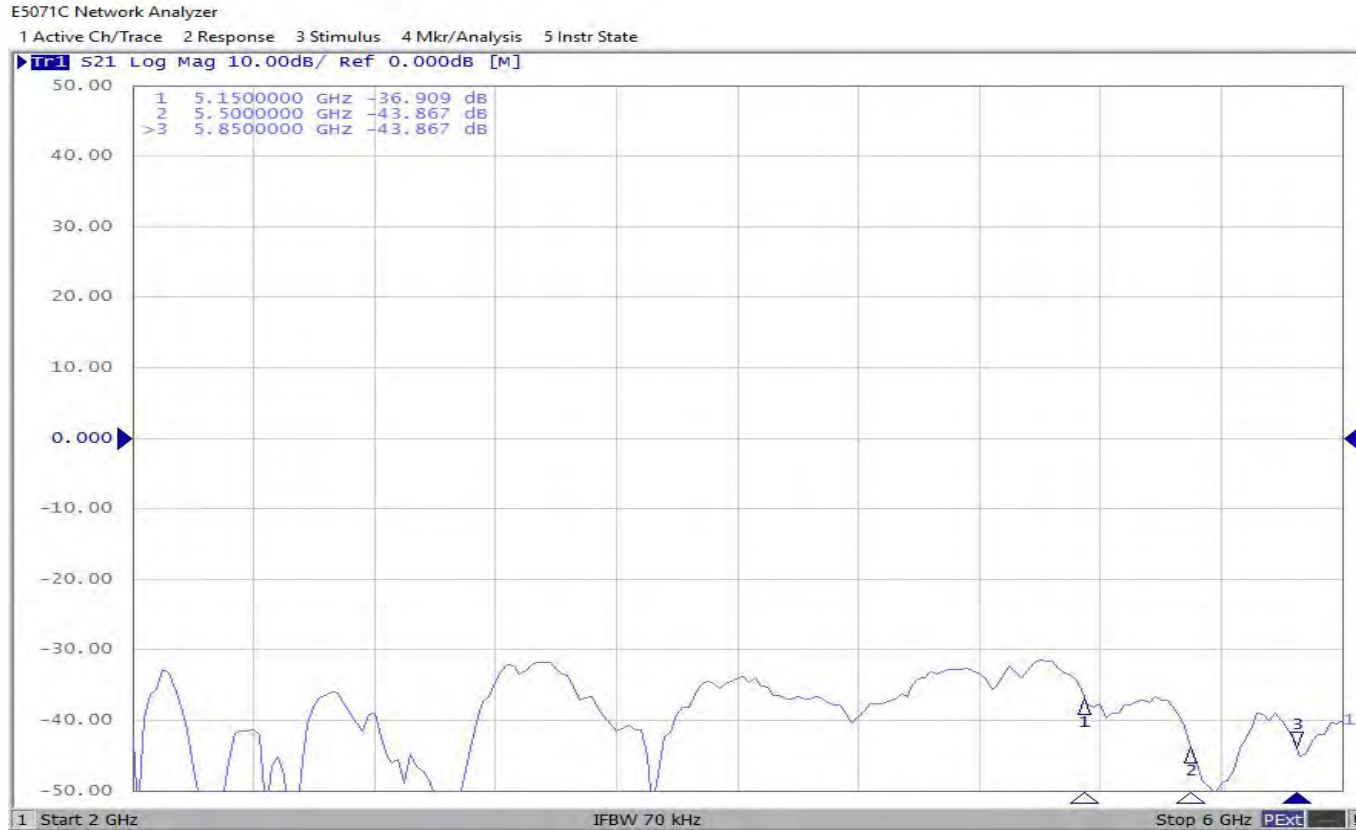
## 5G WIFI-2 and 5G WIFI-3 Isolation



Frequency (MHz)	5150	5500	5850
Isolation	-28.22	-37.78	-41.34

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## 5G WIFI-2 and 5G WIFI-4 Isolation

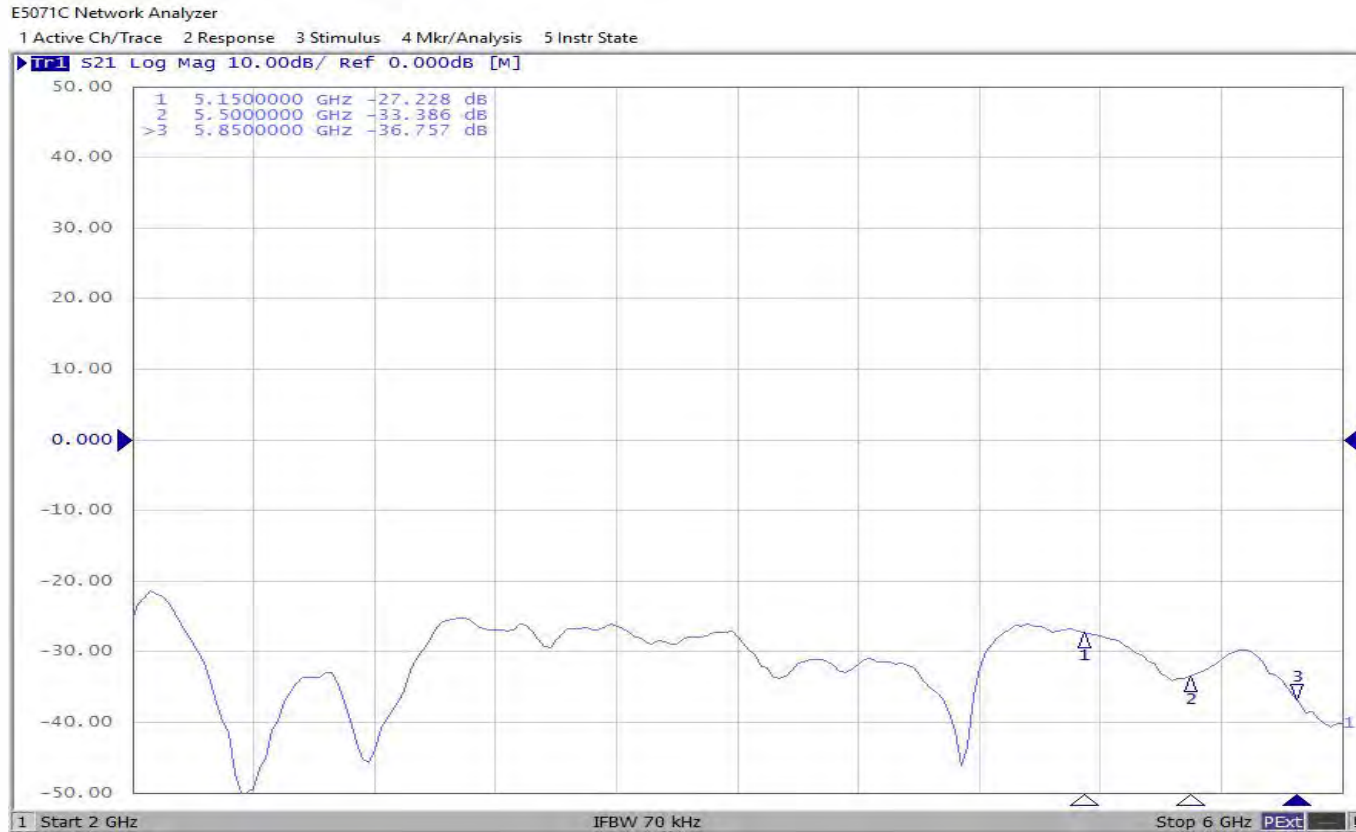


Frequency (MHz)	5150	5500	5850
Isolation	-36.90	-43.86	-43.86

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## 5G WIFI-3 and 5G WIFI-4 Isolation



Frequency (MHz)	5150	5500	5850
Isolation	-27.22	-33.38	-36.75

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## 2.4G OTA Test Data

Bandwidth	3D Test Data		802.11b-HT20-11M			
		Channel	1	7	13	Rate
20M	2.4G	TRP	27.15	26.94	26.9	1Mbps
		TIS	-91.8	-92.4	-92.19	11Mbps
Bandwidth	3D Test Data		802.11g-HT20-54M			
		Channel	1	7	13	Rate
20M	2.4G	TRP	24.66	25.21	25.28	6Mbps
		TIS	-81.03	-81.79	-80.81	54Mbps
Bandwidth	3D Test Data		802.11n-HT20-65M			
		Channel	1	7	13	Rate
20M	2.4G	TRP	23.7	24.02	23.96	6.5Mbps
		TIS	-76.52	-76.49	-76.24	65Mbps



### 5G OTA Test Data

Bandwidth	3D Test Data		802.165a-HT20-54M			
20M	5G	Channel	36	149	161	Rate
		TRP	25.79	25.88	26.08	6Mbps
		TIS	-80.7	-76.32	-78.2	54Mbps
Bandwidth	3D Test Data		802.165n-HT20-65M			
20M	5G	Channel	36	149	161	Rate
		TRP	24.8	24.64	25.3	6.5Mbps
		TIS	-75.53	-73.14	-72.68	65Mbps



## Throughput Test Data

Antenna distance testing router 3.5M																	
Channel	Attenuation (dB)	0°		45°		90°		135°		180°		225°		270°		315°	
		TX	RX	TX	RX	TX	RX	TX	RX	TX	RX	TX	RX	TX	RX	TX	RX
2.4G (40M)																	
1	0	452	660	513	641	587	694	643	631	452	555	416	516	494	645	519	640
	30	411	561	572	580	525	598	579	608	412	483	425	497	440	535	535	609
6	0	508	651	460	614	493	608	690	658	474	507	412	502	464	608	483	580
	30	408	568	574	599	405	554	575	629	442	487	479	512	404	581	530	566
11	0	462	645	483	634	514	635	623	662	481	523	409	521	470	598	523	567
	30	422	567	542	564	465	535	546	621	443	498	434	505	432	548	562	545
5G (80M)																	
36	0	846	949	898	949	837	940	835	948	864	941	889	949	862	945	891	949
	30	770	883	855	948	795	894	812	945	806	866	822	947	763	914	856	947
64	0	914	933	894	949	753	924	841	939	851	926	891	948	822	930	886	948
	30	749	816	832	943	787	887	804	926	719	814	849	937	816	898	806	938
157	0	826	838	891	948	833	807	886	947	859	796	854	948	847	782	887	947
	30	793	820	818	945	796	789	803	937	778	735	812	946	787	735	806	896



Thank you!

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