

# Sony TV

## Antenna WiFix2, BTx2

Tested Date: 2023/07/06

Tested By: Nice.Allen

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# Specification

## ➤ Requirements of Antenna Design

RF Function	Number of ANT	Frequency Band	Remark
WiFi(DB&6E)	2	2400 ~ 2500 MHz & 5150~5825 MHz & 5925~7125MHz	
BT(2G)	2	2400 ~ 2500 MHz	

# Specification

## ➤ Requirements of Measurement

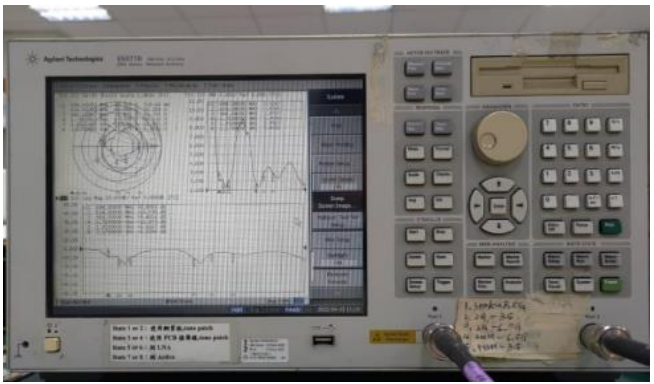
Test Item	Specification	Remark
Return Loss	<ol style="list-style-type: none"> <li>WiFi 0: 2GHz &lt;-4dB; 5GHz &lt;-2.5dB; 6GHz &lt;-7.0dB</li> <li>BT 0: 2GHz &lt;-6dB</li> <li>BT 1: 2GHz &lt;-7dB</li> <li>WiFi 1: 2GHz &lt;-6dB; 5GHz &lt;-3.9dB; 6GHz &lt;-2.7dB</li> </ol>	
Isolation	<ol style="list-style-type: none"> <li>2GHz &lt;-12dB</li> <li>5G&amp;6GHz &lt;-25dB</li> </ol>	
Peak gain	<ol style="list-style-type: none"> <li>WiFi: 2GHz &lt;3.5 dBi</li> <li>5GHz &lt;2.97 dBi</li> <li>6GHz &lt;3.66 dBi</li> <li>BT:2GHz &lt;1.5 dBi</li> </ol>	
Efficiency	<ol style="list-style-type: none"> <li>WiFi 0: 2GHz &gt;36%; 5GHz &gt;40%; 6GHz &gt;46%</li> <li>BT 0: 2GHz &gt;38%</li> <li>BT 1: 2GHz &gt;35%</li> <li>WiFi 1: 2GHz &gt;44%; 5GHz &gt;46%; 6GHz &gt;49%</li> </ol>	
Radiation pattern	Scale: +5 ~ 40dBi, Angle step size: 2 degree	

# Antenna Type

## ➤ PCB Antenna

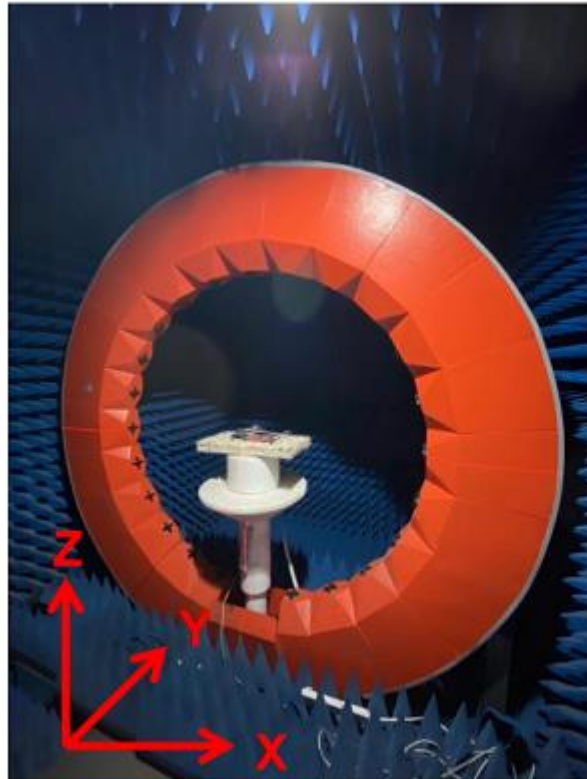
RF Function	Number of ANT	Antenna Design	Antenna Type
WiFi(DB&6E)	2	Printing	Monopole
BT(2G)	2	Printing	PIFA

# Test Setup for S-parameter Measurement



Equipment	Brand	Model	S/N
Network Analyzer	Keysight	E5071B	MY42403554

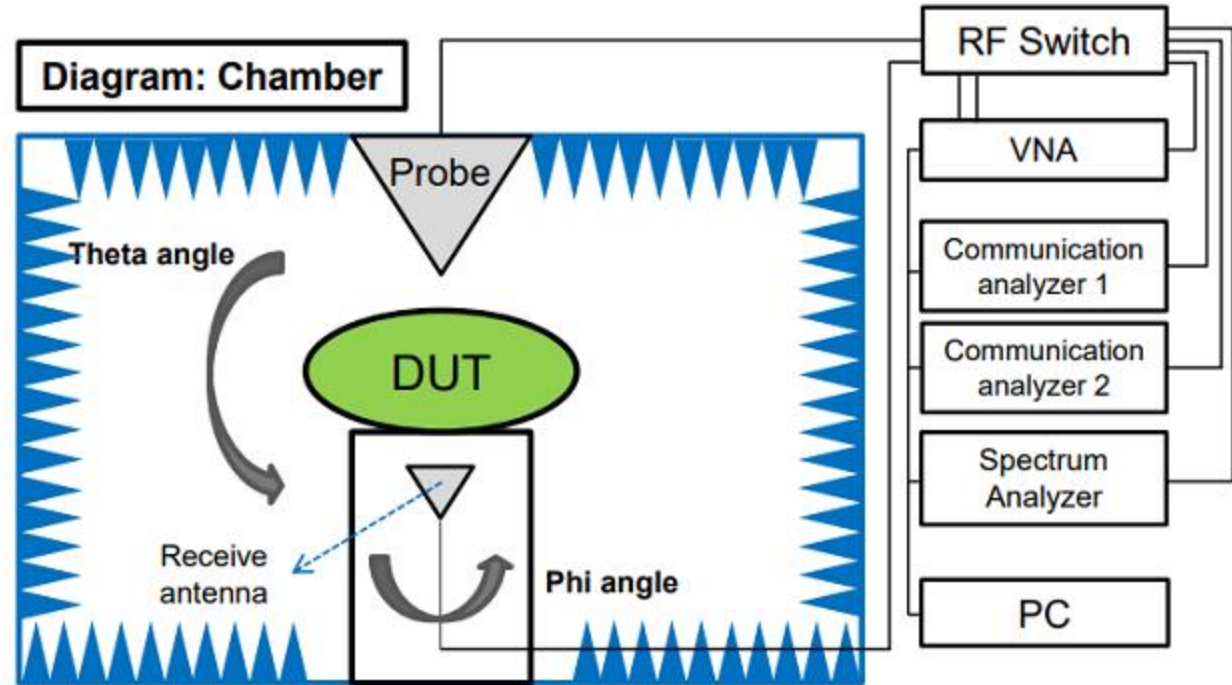
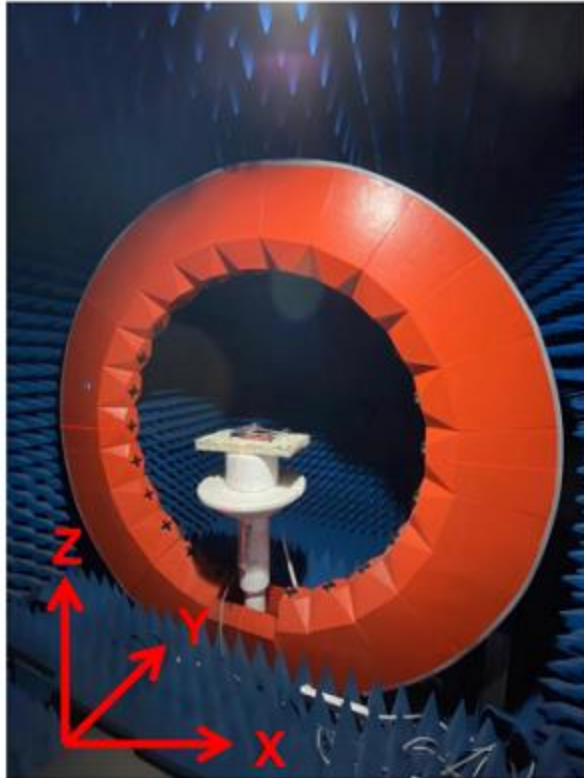
# Equipment list & calibration information & Test setup diagram



## OTA chamber TEM-24 system (Multi-Probe)

1. Antenna passive test 700MHz~6000MHz
2. Long Term Evolution (LTE SISO) OTA Test
3. GSM/GPRS/EDGE on 850/900/1800/1900 OTA Test
4. WCDMA/HSDPA/HSUPA on FDD I~IX OTA Test
5. CDMA2000/1xEV-DO on 850/1900/AWS OTA Test
6. ECC
7. GPS Performance
8. Active Measurement: TRP, EIRP, EIS, TIS, Throughput, WiFi, BT, Non-Signaling

# Equipment list & calibration information & Test setup diagram



Equipment	Spectrum Analyzer	Communication analyzer 1	Communication analyzer 2	VNA	RF Switch
Brand	Keysight	R&S(CMW500)	Agilent(8960) · (E5071C)		TEMRADIO



# Test procedure

## 1. Test Criteria

### Test Criteria

Radiation gain measurement shall be made with the antennas installed in the intended AIOsystem. 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.

# Test software&Calibration date listed

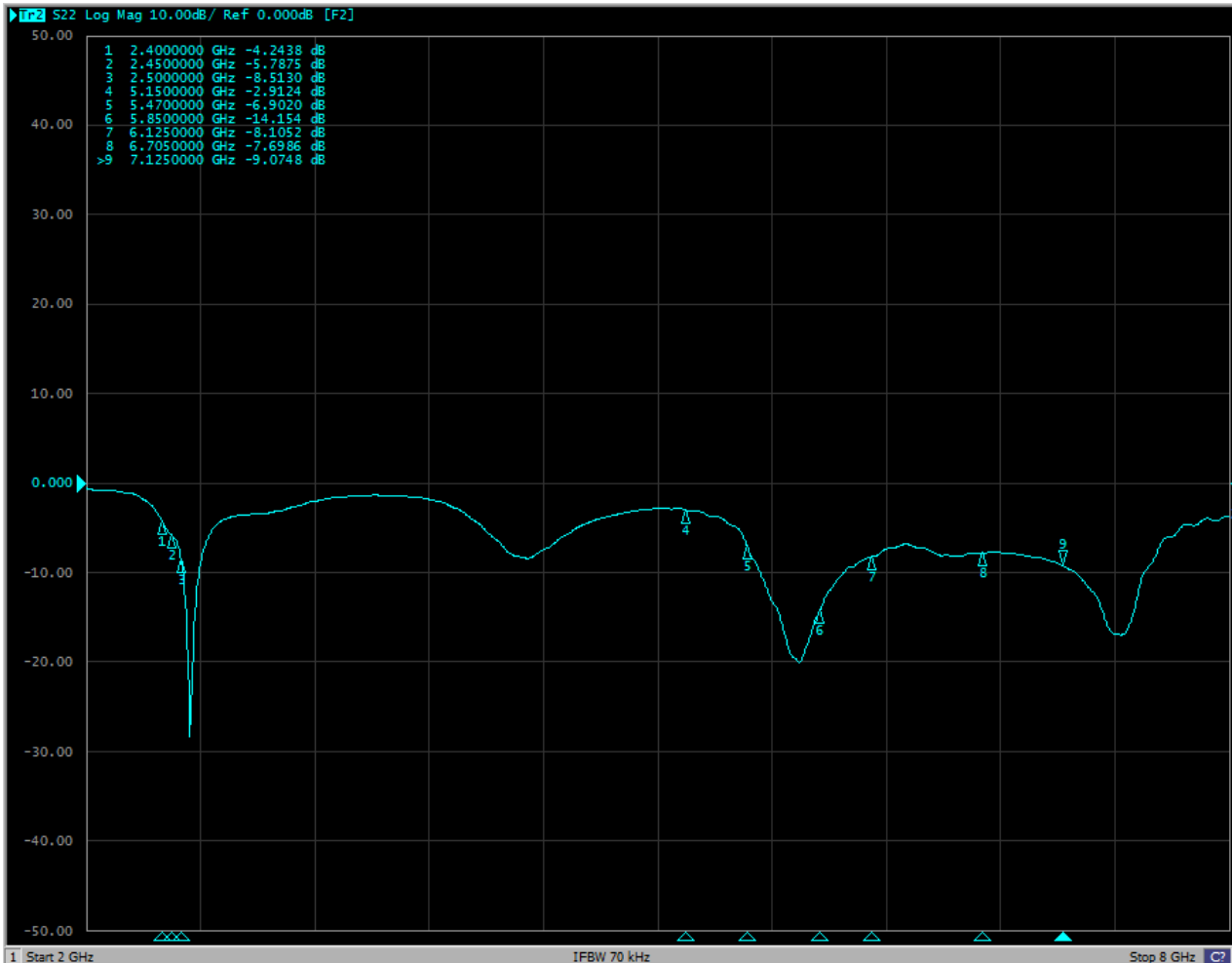
Equipment Description	Manufacturer	Identification no.	Current calibration date	Next calibration date
Network analyzer	Agilent	E5071C	2023/1/7	2024/1/7
Measurement software	ETS-Lindgren	EMQuest	2023/3/3	2024/3/3
Multi axis positioning system(MAPSTM)	ETS-Lindgren	EMCO 2115	2023/3/3	2024/3/3
Multi axis positioning system(MAPSTM)	ETS-Lindgren	EMCO 2110	2023/3/3	2024/3/3
MAPSTM controller	ETS-Lindgren	EMCO 2090	2022/3/3	2024/3/3
Horn antenna	ETS-Lindgren	Oct-64	2023/3/3	2024/3/3
Cable 40cm 18 GHz	Jmtt	201EH012010400	2023/4/7	2024/4/7
Cable 6m 18 GHz	Jmtt	201EH012016000	2023/4/7	2024/4/7
Cable 6m 18 GHz	Jmtt	201EH012016000	2023/4/7	2024/4/7
Cable 3.5m 18 GHz	Jmtt	201EH012013500	2023/4/7	2024/4/7
Cable 1.5m 18 GHz	Jmtt	201EH012011500	2023/4/7	2024/4/7

# Antenna information

Antenna information	Antenna related parameters
Thickness	PCBA:0.8mm Copper thickness:30um Dielectric thickness between ground plane (layer3) and track(layer4):81.56um
Dielectric Constant	4.4
Impedance	50ohm

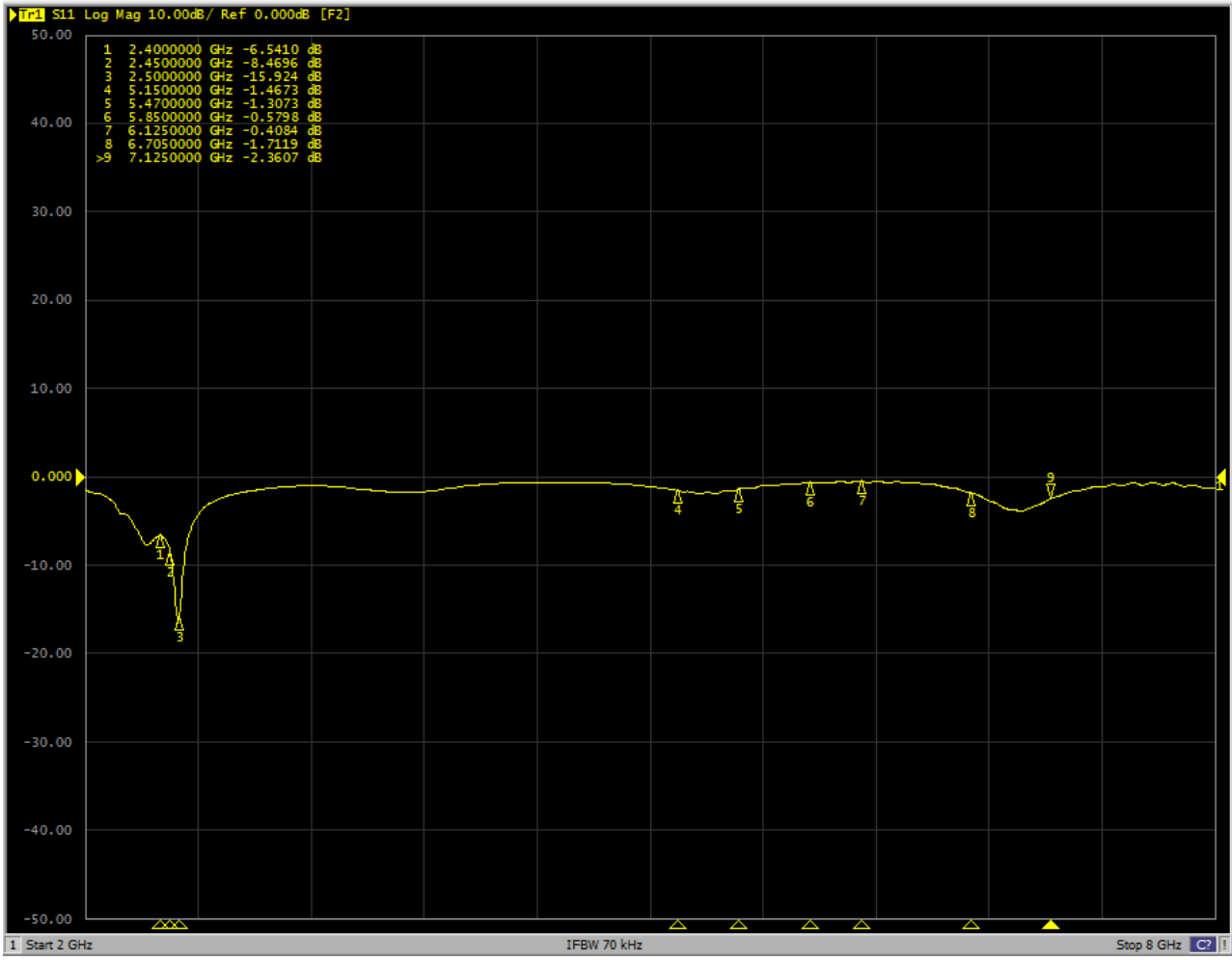
# Return Loss Results- WiFi 0

ANT.1 (2400MHz – 2500MHz; 5150MHz – 5825MHz ; 5925MHz – 7125MHz )



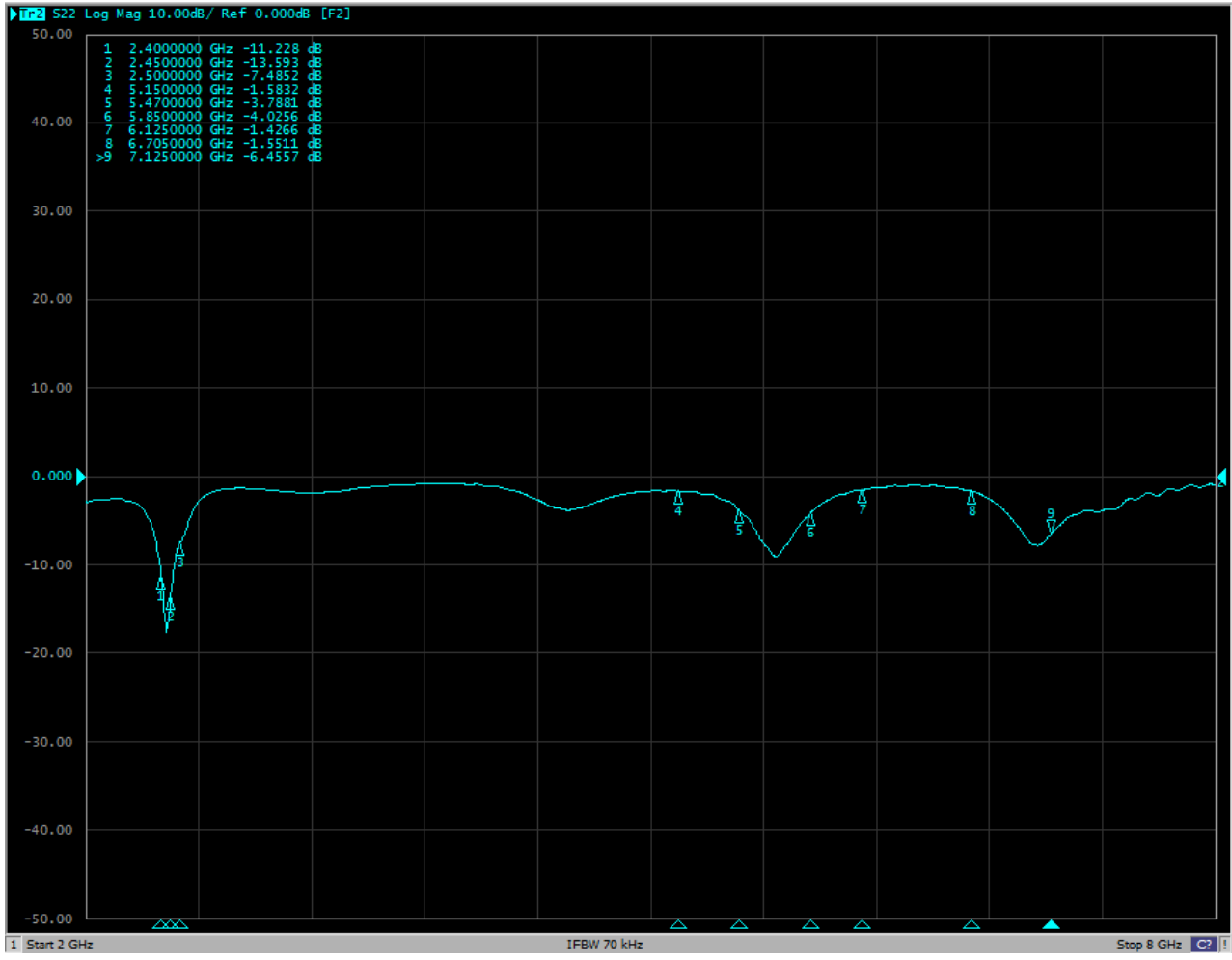
# Return Loss Results-BT 0

ANT.2 (2400MHz – 2500MHz)



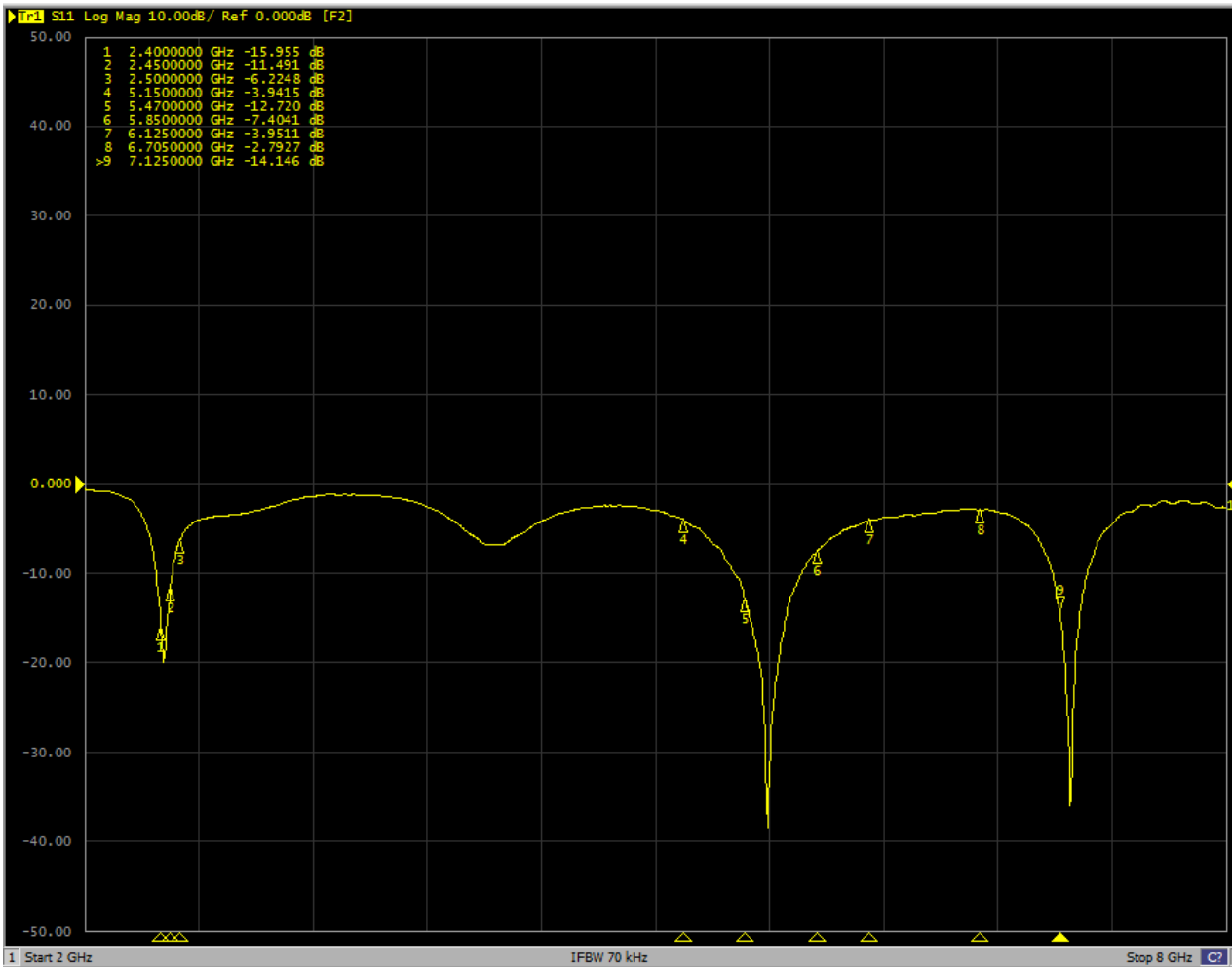
# Return Loss Results-BT 1

ANT.3 (2400MHz – 2500MHz)

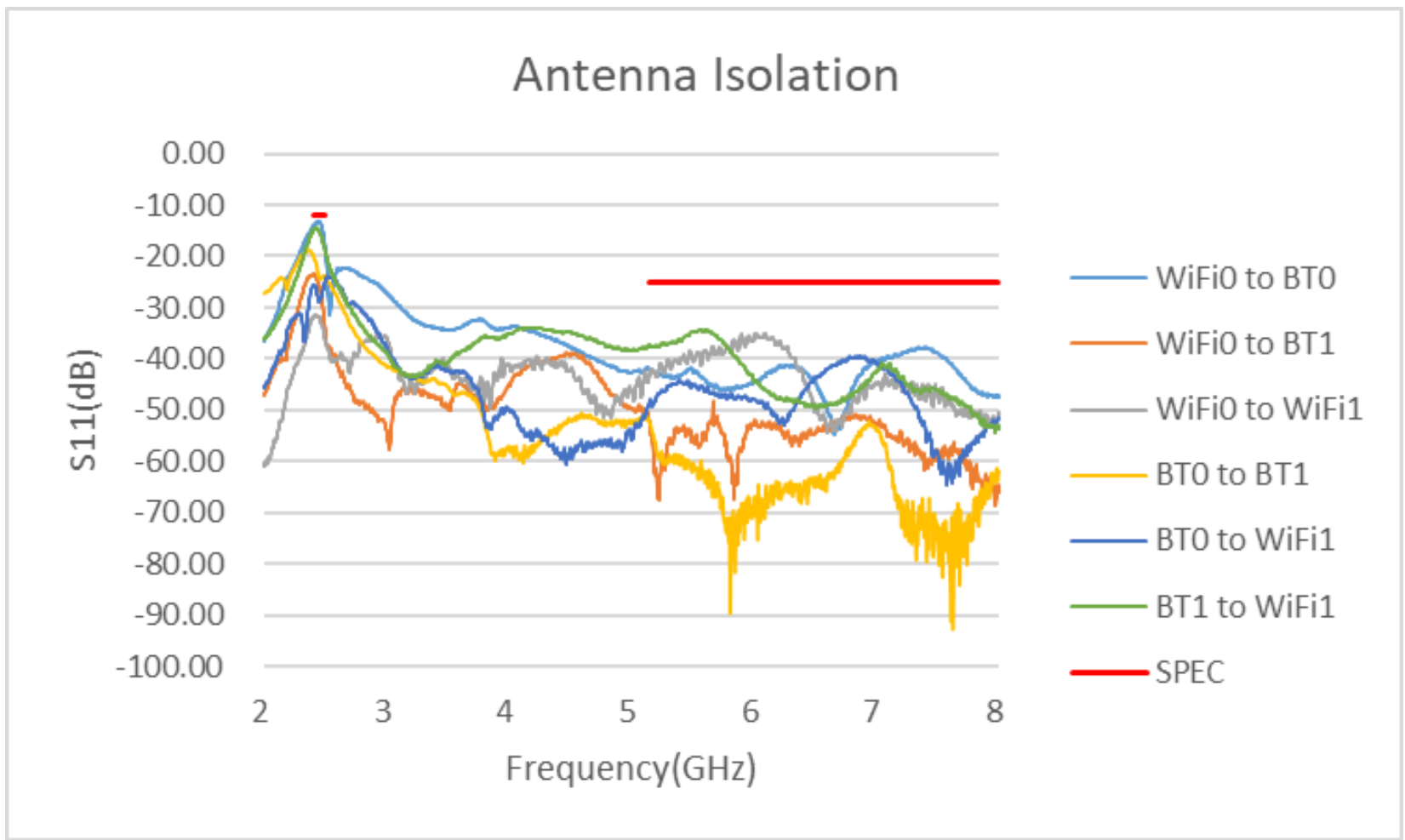


# Return Loss Results- WiFi 1

ANT.4 (2400MHz – 2500MHz; 5150MHz – 5825MHz ; 5925MHz – 7125MHz )



# Isolation Results





# Results Summary

## Return Loss

Frequency (MHz)	WiFi 0	BT 0	BT 1	WiFi 1
2400 MHz	-4.2	-6.5	-11.2	-16.0
2450 MHz	-5.8	-8.5	-13.6	-11.5
2500 MHz	-8.5	-15.9	-7.5	-6.2
5150 MHz	-2.9	-	-	-3.9
5470 MHz	-6.9	-	-	-12.7
5850 MHz	-14.2	-	-	-7.4
6125 MHz	-8.1	-	-	-4.0
6705 MHz	-7.7	-	-	-2.8
7125 MHz	-9.1	-	-	-14.1

# Results Summary

## Isolation

	WiFi 0 to BT 0	WiFi 0 to BT 1	WiFi 0 to WiFi 1	BT 0 to BT 1	BT 0 to WiFi 1	BT 1 to WiFi 1
2400 MHz	-14.2	-23.5	-31.8	-19.8	-25.5	-14.9
2450 MHz	-13.2	-25.7	-31.8	-24.1	-28.8	-15.2
2500 MHz	-18.3	-34.4	-36.7	-23.8	-25.0	-18.9
5150 MHz	-42.1	-52.1	-	-	-48.2	-37.3
5470 MHz	-42.2	-53.9	-	-	-44.5	-35.4
5850 MHz	-45.6	-63.2	-	-	-47.7	-39.6
6125 MHz	-42.8	-52.3	-	-	-49.6	-46.3
6705 MHz	-53.7	-51.7	-	-	-40.8	-48.4
7125 MHz	-39.8	-55.1	-	-	-42.9	-41.9

# Results Summary

## Peak gain & Efficiency – WiFi 0

Frequency (MHz)	Peak Gain (dBi)	Efficiency (%)
2400 MHz	-0.92	38
2450 MHz	-0.52	40
2500 MHz	0.19	36
5150 MHz	1.74	40
5250 MHz	1.41	40
5470 MHz	2.97	48
5850 MHz	2.2	52
6125 MHz	2.5	55
6475 MHz	2.76	46
6705 MHz	2.9	46
7125 MHz	2.74	55

# Results Summary

Peak gain & Efficiency – BT 0

Frequency (MHz)	Peak Gain (dBi)	Efficiency (%)
2400 MHz	1.5	40
2450 MHz	0.5	38
2500 MHz	0.6	42
5150 MHz	-	-
5470 MHz	-	-
5850 MHz	-	-
6125 MHz	-	-
6705 MHz	-	-
7125 MHz	-	-

# Results Summary

## Peak gain & Efficiency – BT 1

Frequency (MHz)	Peak Gain (dBi)	Efficiency (%)
2400 MHz	0.2	41
2450 MHz	0.2	42
2500 MHz	-1.1	35
5150 MHz	-	-
5470 MHz	-	-
5850 MHz	-	-
6125 MHz	-	-
6705 MHz	-	-
7125 MHz	-	-

# Results Summary

## Peak gain & Efficiency – WiFi 1

Frequency (MHz)	Peak Gain (dBi)	Efficiency (%)
2400 MHz	2.8	61
2450 MHz	3.5	56
2500 MHz	2.9	44
5150 MHz	1.84	46
5250 MHz	1.9	52
5470 MHz	2.3	51
5850 MHz	2.1	49
6125 MHz	2.3	50
6475 MHz	1.11	46
6705 MHz	1.83	46
7125 MHz	3.66	55

# Thank You!

