

# FortiAP-431G Antenna Test Report-P2

**WNC**

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# General Information

## ■ Antenna Information:

- Brand: WNC

## ■ Antenna Type:

– Wi-Fi 2/5G: PIFA

– Wi-Fi 5/6G and Scanning: PIFA

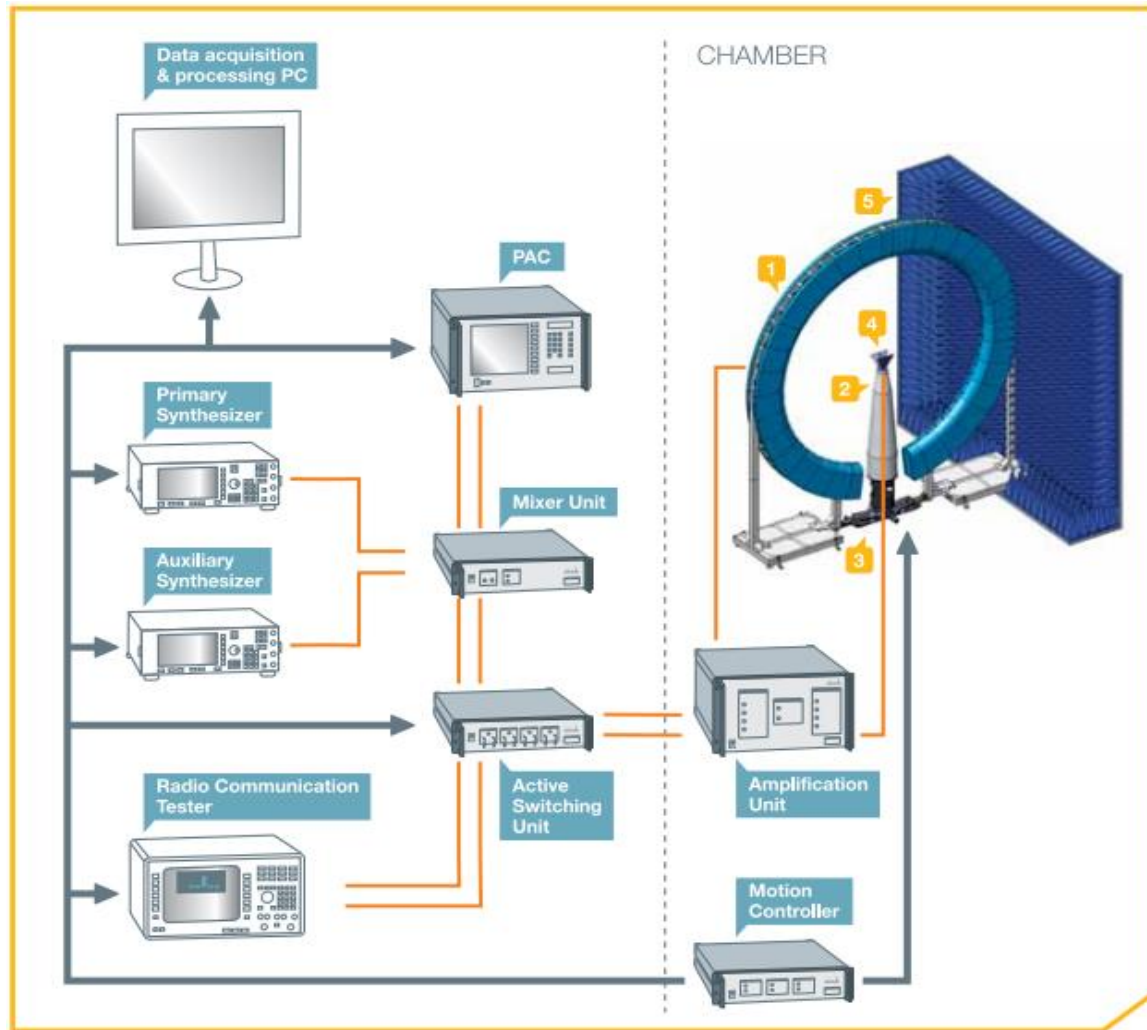
– BLE/ Zigbee: PIFA

## ■ Test Date and Member

Date: 2022/ 04/01

Member: Alvin Hsu

# Test Setup and Diagram



SG 64 uses analog RF signal generators to emit EM waves from the probe array to the antenna under test (AUT) or vice versa.

It uses the NPAC as an RF receiver for antenna measurements. The NPAC also drives the electronic scanning of the probe array.

The NPAC includes the fastest and most accurate sources and receivers on the market.

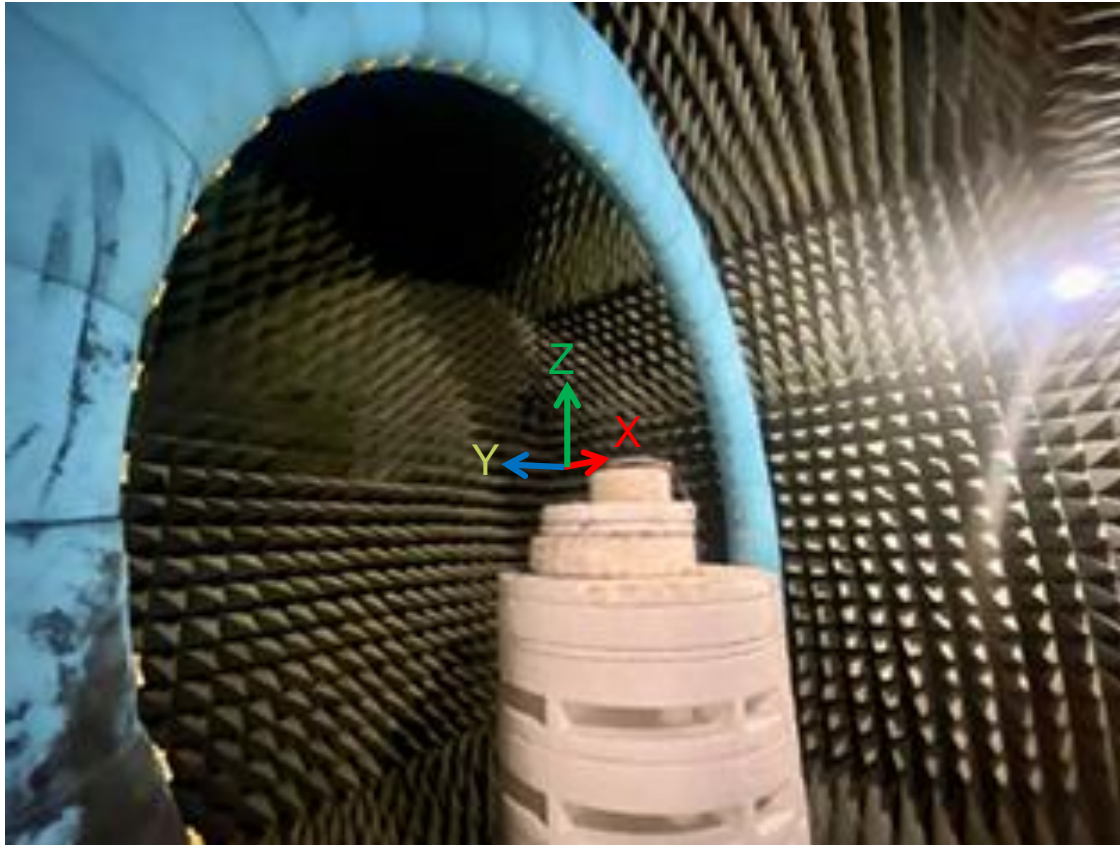
# Equipment

Device	Type/Model	Serial#	Manufacturer	Calibrated Date	Calibrated Until
SG64 Chamber	Standard	SG64	MVG	2022/03/30	2023/03/30
Turn Table	Customization	-	Machinery Dept.	2022/03/30	2023/03/30
New Probe Array Controller	N/A	1102341-4535	MVG	2022/03/30	2023/03/30
Power Supply Unit	N/A	1103211-13204	MVG	2022/03/30	2023/03/30
Active Switching Unit	N/A	1102347-7214	MVG	2022/03/30	2023/03/30
TX Amplification Unit	N/A	1102527-5909	MVG	2022/03/30	2023/03/30
RX Amplification Unit	N/A	1102536-3823	MVG	2022/03/30	2023/03/30
Transfer Swittching Unit	N/A	1102183-3351	MVG	2022/03/30	2023/03/30
Mixer Unit	N/A	1102545-7208	MVG	2022/03/30	2023/03/30
Power And Control Unit	N/A	1102706-7209	MVG	2022/03/30	2023/03/30
Antenna Probe	DP 400-6000	-	MVG	2022/03/30	2023/03/30
Cable 13.7m - 400MHz to 18GHz	SS402	00100A1F5A1XXS	Woken	2022/03/30	2023/03/30
Temperature & Humidity Meter	HTC-01	-	Metravi	2022/03/30	2023/03/30

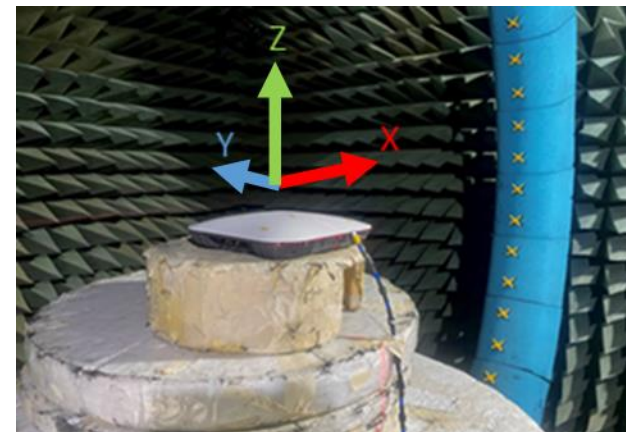
Note:

1. There are 63 set ANT probes in WNC's SG64 Chamber.

# Test Setup and Procedure

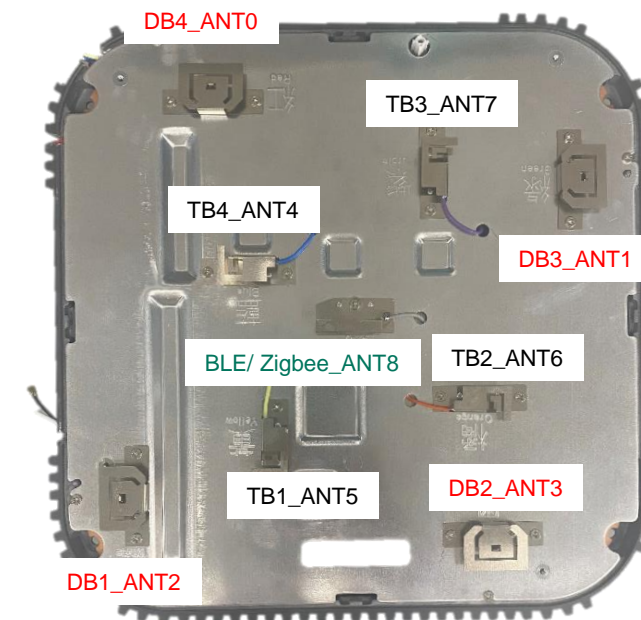


- Place the device at the center of the chamber.
- Connect the antenna cable to RF cable of the chamber
- Run Satimo test SW (**NPAC Spherical Measurement, v1.5.4 (GIT-E6965664)**)
- Get 3D data in 2.8125 degree step from phi  $0^{\circ}$ ~ $360^{\circ}$  and theta  $-90^{\circ}$ ~ $+90^{\circ}$ , including efficiency, peak gain, 2D & 3D radiation pattern.
- This is far field test for **FortiAP-431G** antenna verification.
- This is passive measurement, which means the device is off and not in any operating mode.



# Performance Summary

Frequency combination		VSWR	Peak Gain	Avg. Eff.	Isolation (within radio)	Isolation (Among radio)
Wi-Fi 2/5G (DB1-4)	2.4~2.5GHz 5.15~5.85GHz	< 2.0	< 2.8dBi < 4.9dBi	~ 54% ~ 63%	24dB 29dB	<i>Wifi_DB to Wifi_TB:</i> 20dB @2.4GHz, 25dB @5-7GHz
Wi-Fi 5/6G or Scanning (TB1-4)	2.4~2.5GHz 5.15~5.85GHz 5.925~7.225GHz	< 2.0	< 3.6dBi < 5.3dBi < 5.8dBi	~ 52% ~ 58% ~ 53%	20dB 21dB 25dB	<i>BT to Wifi_DB</i> 20dB @2.4GHz <i>BT to Wifi_TB (Scanning)</i> 12dB @2.4GHz
BLE/ Zigbee	2.4~2.5GHz	< 2.0	< 3.8dBi	~ 60%	NA	

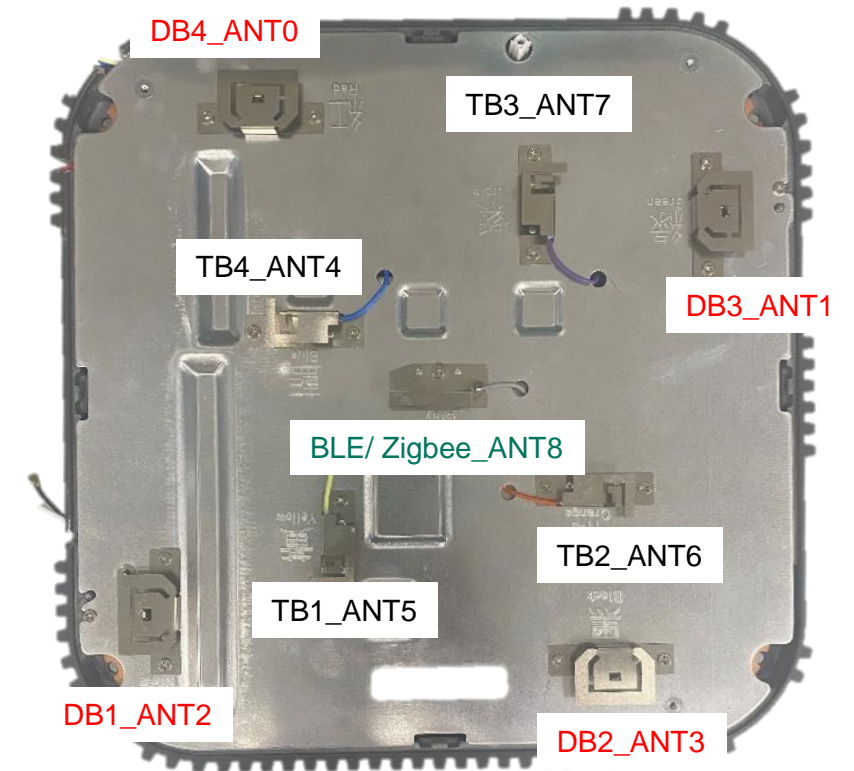


# Summary – Peak Gain

Freq.(MHz)	2450
BLE/ Zigbee_ANT8	3.8

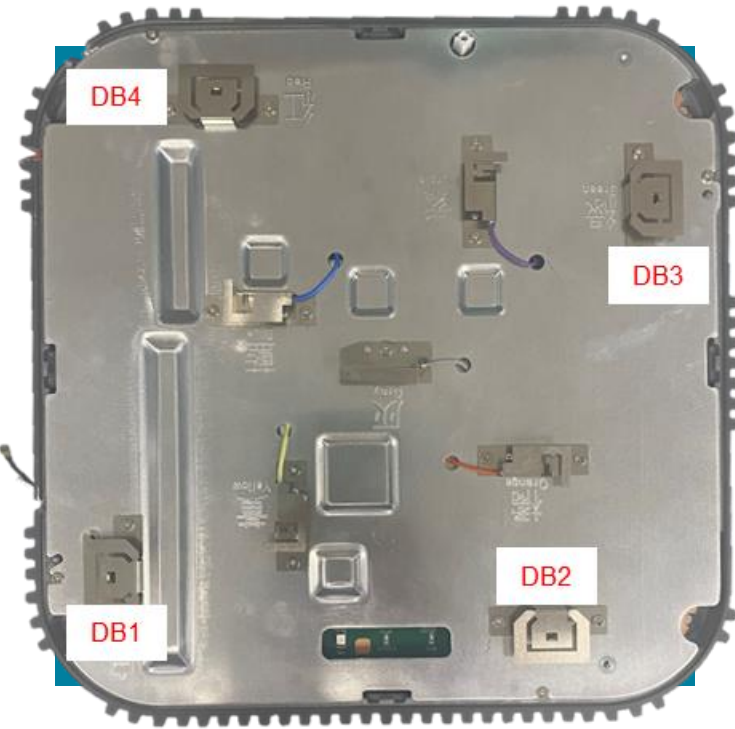
Freq.(MHz)	2450	5250	5350	5600	5725
DB1_ANT2	1.54	4.85	4.51	4.18	4.3
DB2_ANT3	2.38	3.48	3.52	3.58	3.55
DB3_ANT1	1.72	3.38	3.61	3.4	3.72
DB4_ANT0	1.41	4.62	4.35	4.12	3.91

Freq.(MHz)	2450	5250	5350	5600	5725	6050	6525	6725	7000
TB1_ANT5	2.8	4.48	4.76	4.47	4.38	4.2	4.32	4.72	4.84
TB2_ANT6	2.58	4.47	4.81	4.9	5.3	4.4	4.6	4.64	5.2
TB3_ANT7	2.85	4.91	4.96	5.09	5.09	4.2	3.94	3.89	4.5
TB4_ANT4	3.5	4.98	4.98	4.5	4.5	3.7	4.8	5.03	5.5





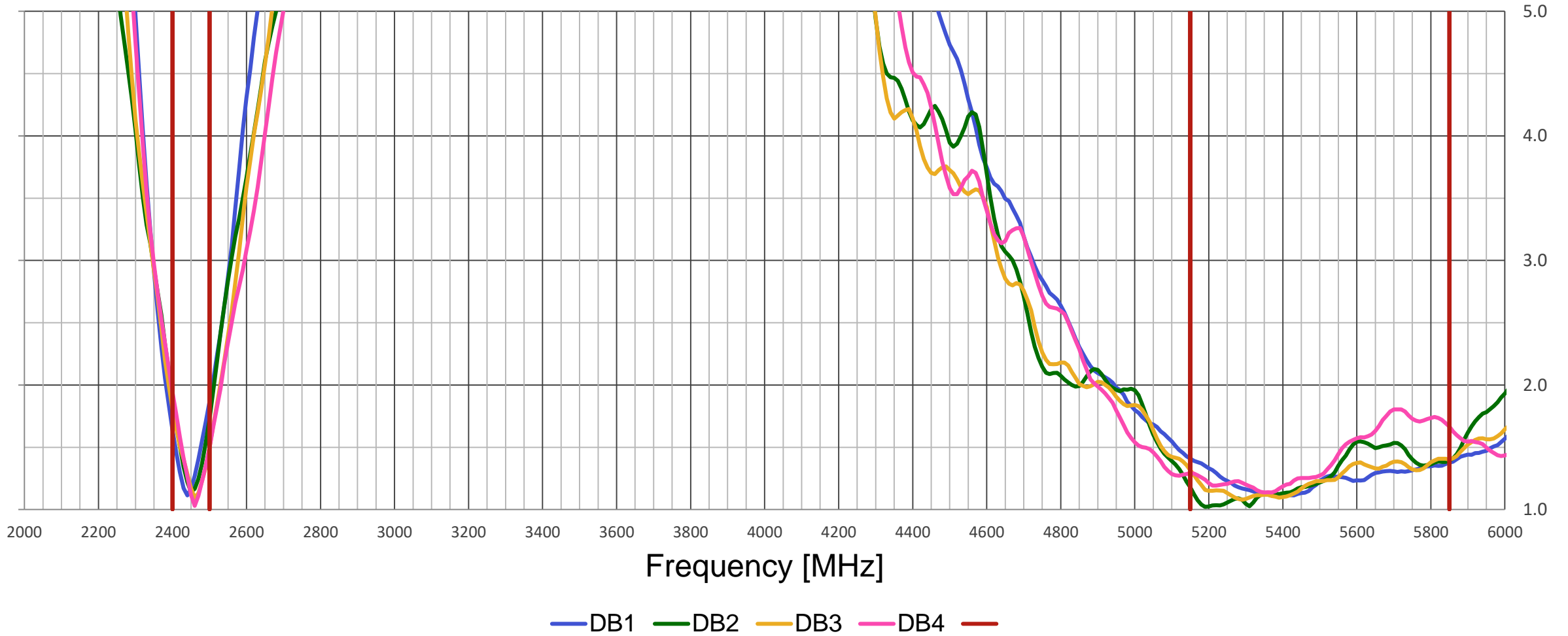
# Wi-Fi DB



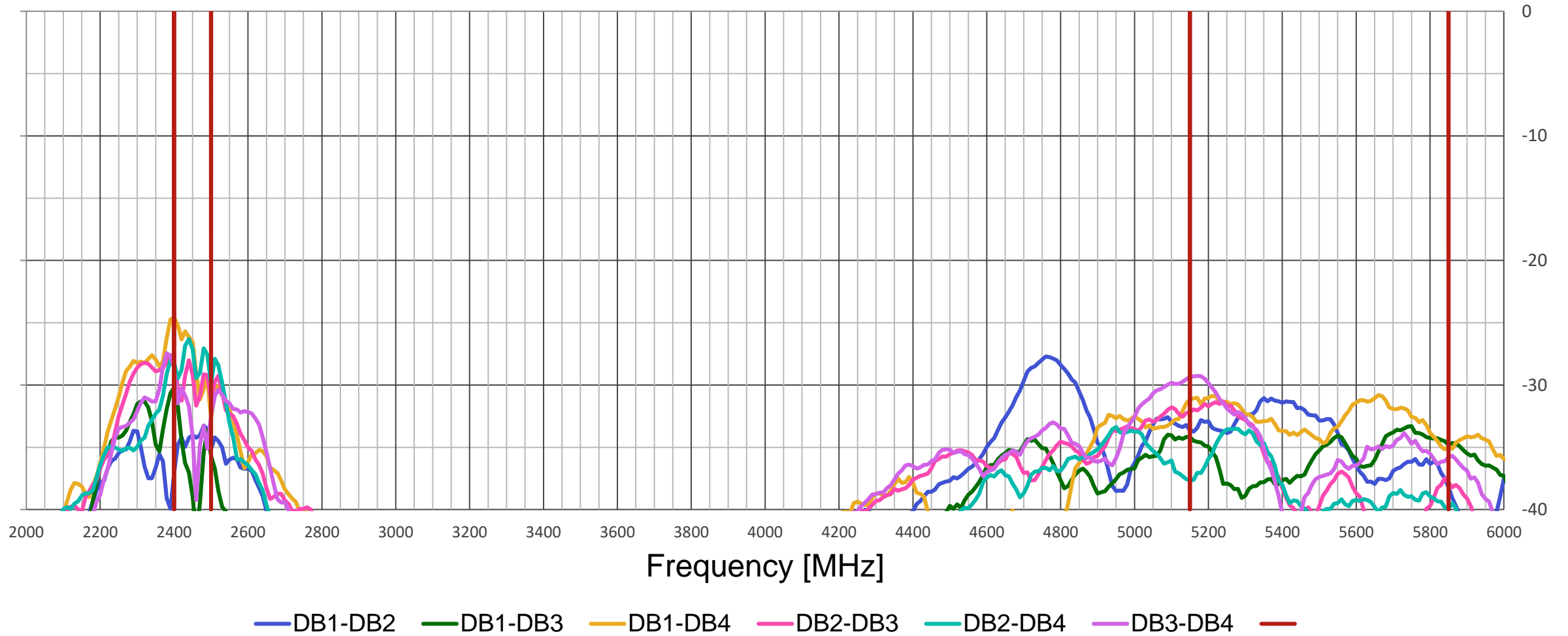
- **Maximum VSWR**
  - 1.8:1 on 2.4GHz / 1.8:1 on 5GHz
- **Minimum Isolation**
  - 24.6dB on 2.4GHz / 29.3dB on 5GHz
- **Average Efficiency**
  - ~54% on 2.4GHz / ~63% on 5GHz
- **Peak Gain**
  - 2.77dBi on 2.4GHz / 4.85dBi on 5GHz



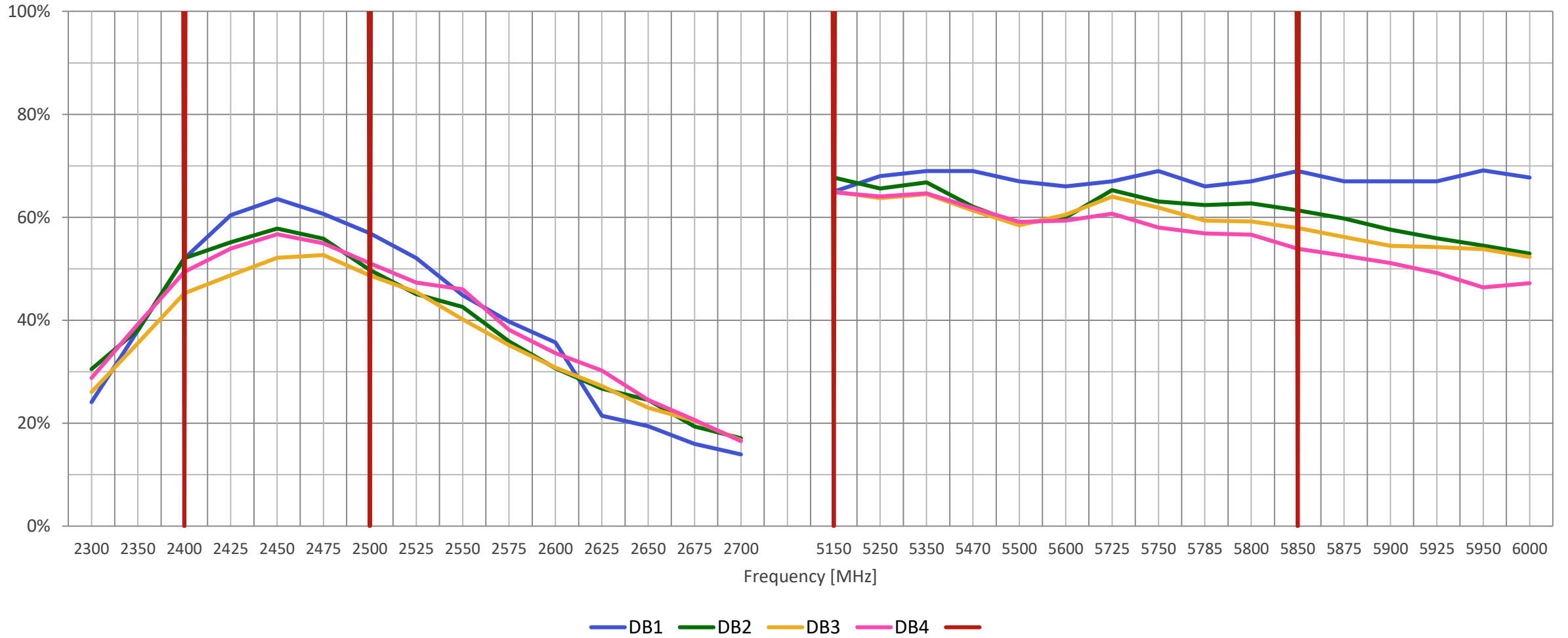
# VSWR Wi-Fi DB



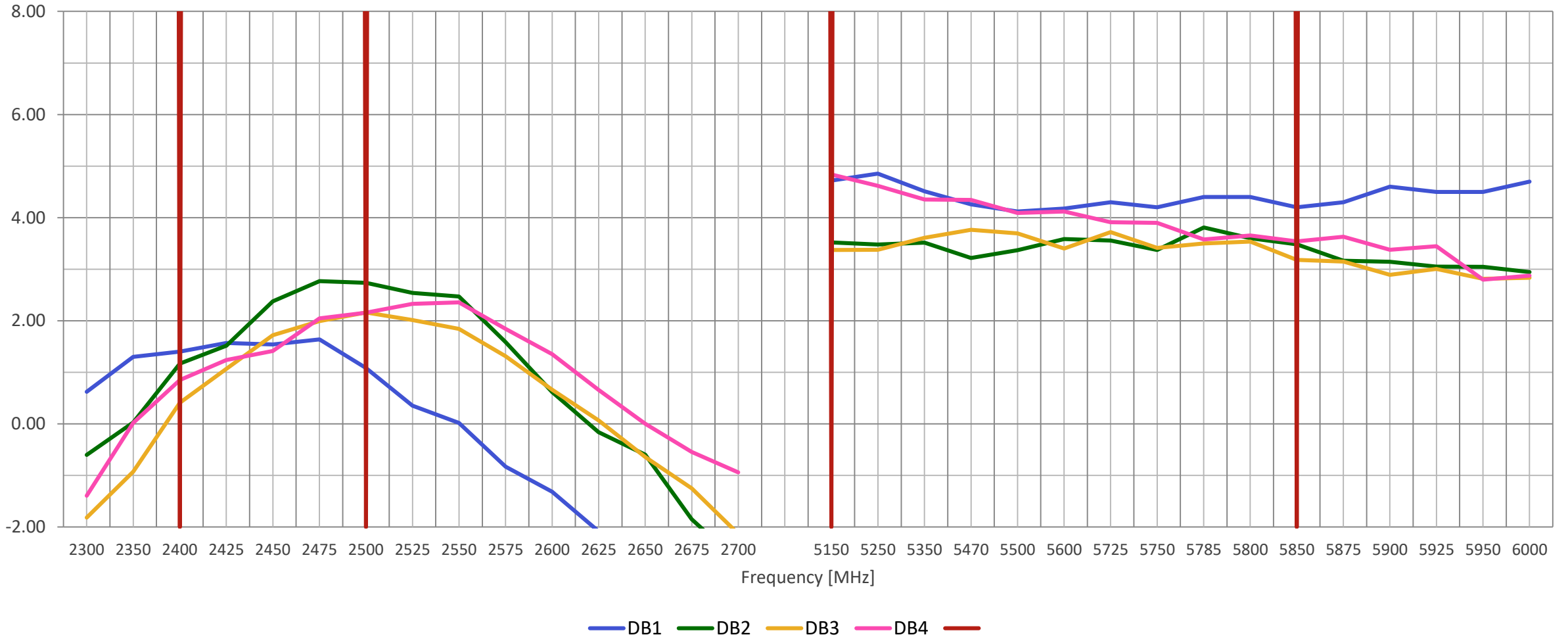
# Isolation Wi-Fi DB



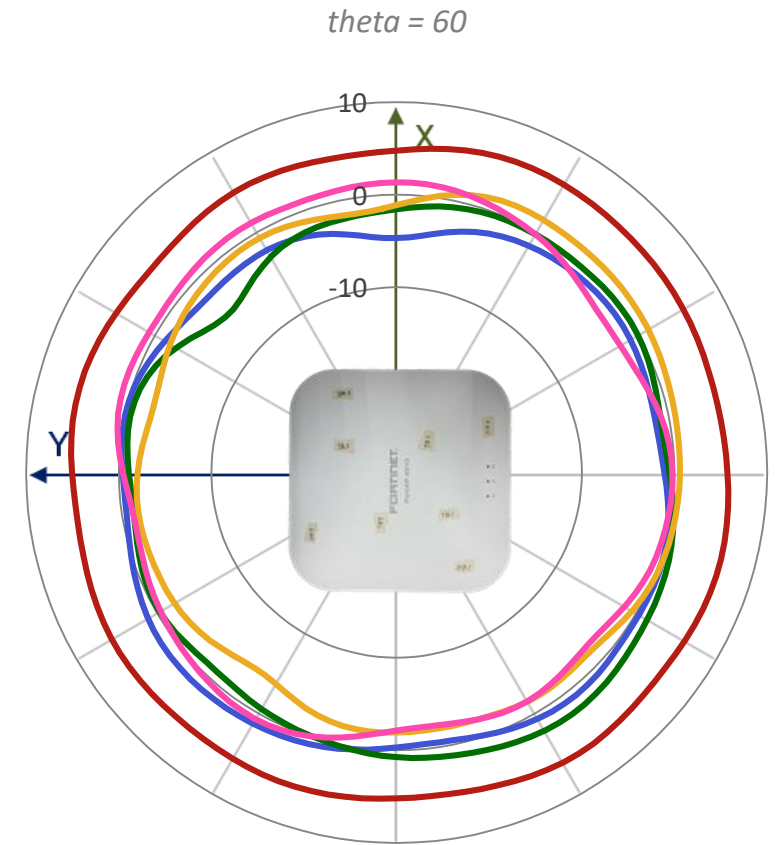
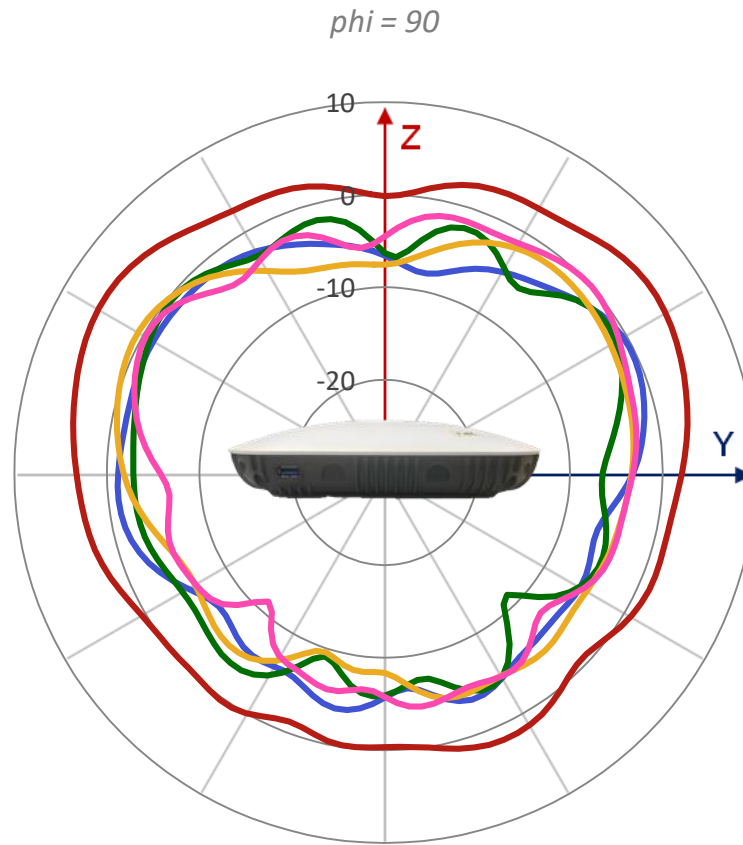
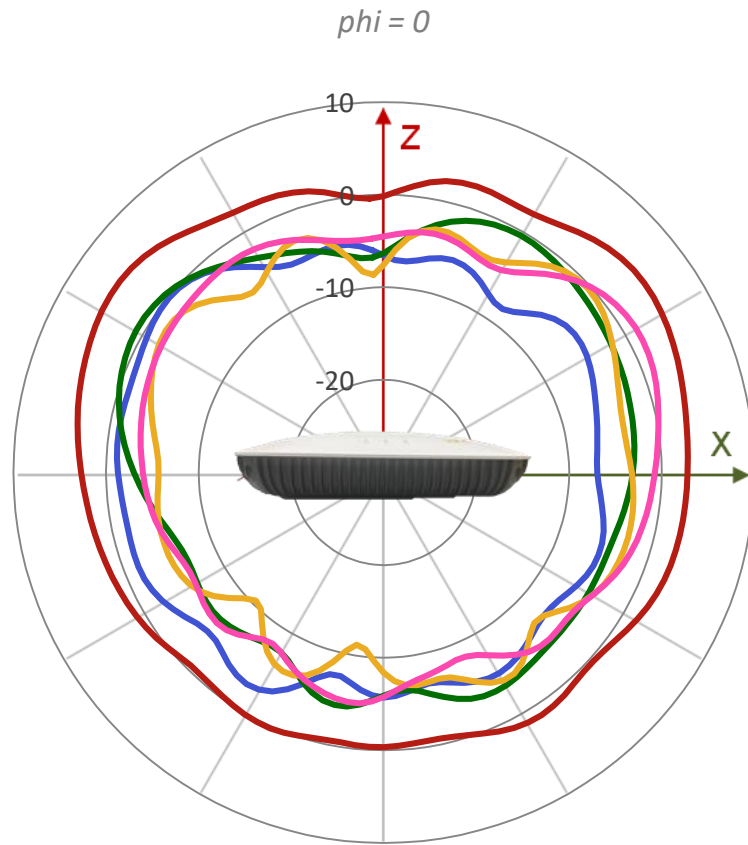
# Efficiency Wi-Fi DB



# Peak Gain Wi-Fi DB



# Realized Gain Pattern Wi-Fi DB @2450MHz for Gtotal

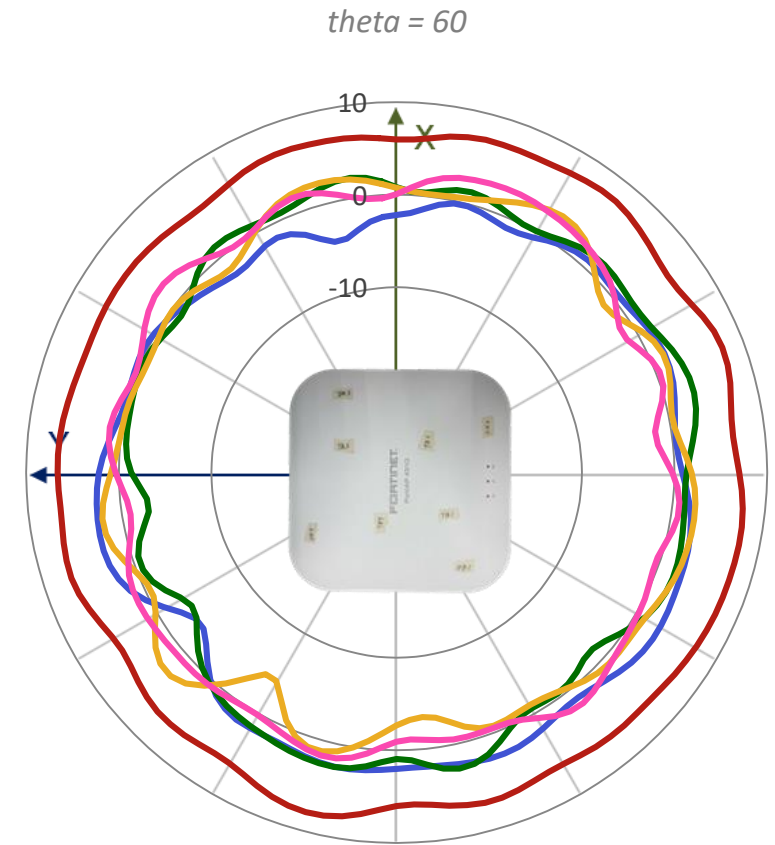
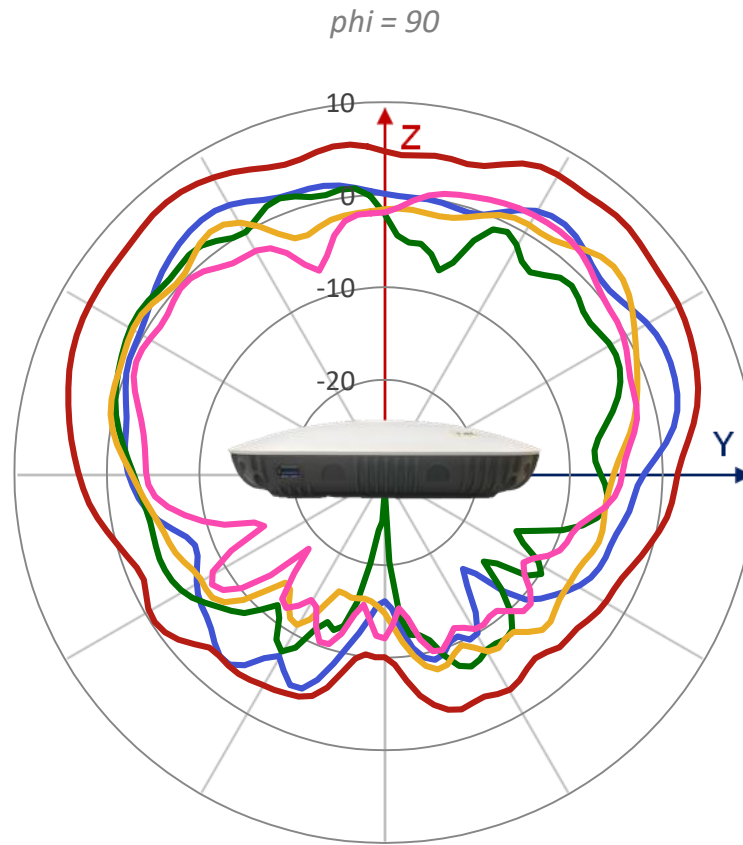
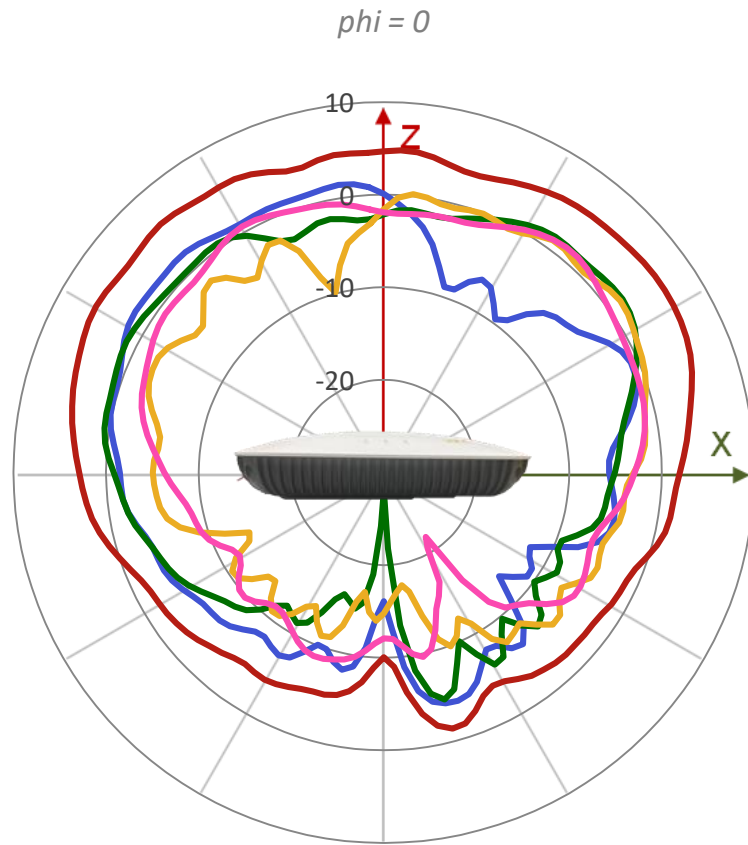


— DB1    — DB2    — DB3  
— DB4    — Composite

— DB1    — DB2    — DB3  
— DB4    — Composite

— DB1    — DB2    — DB3  
— DB4    — Composite

# Realized Gain Pattern Wi-Fi DB @5500MHz for Gtotal

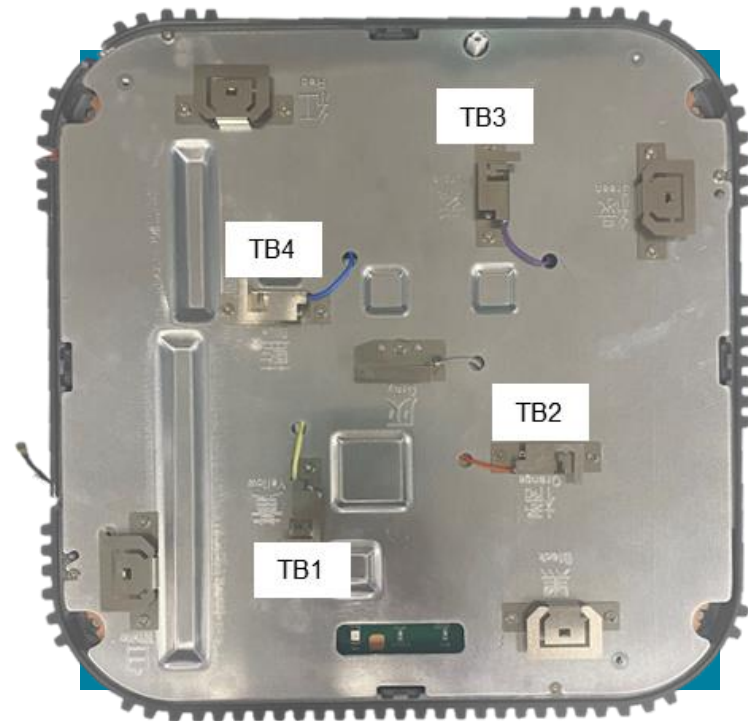


— DB1    — DB2    — DB3  
— DB4    — Composite

— DB1    — DB2    — DB3  
— DB4    — Composite

— DB1    — DB2    — DB3  
— DB4    — Composite

# Wi-Fi 5/6G and Scanning



- **Maximum VSWR**

- 1.8:1 on 2.4GHz / 1.9:1 on 5GHz / 2.0:1 on 6GHz

- **Minimum Isolation**

- 20.6dB on 2.4GHz / 21.6dB on 5GHz / 25.3dB on 6GHz

- **Average Efficiency**

- ~52% on 2.4GHz / ~58% on 5GHz / ~53% on 6GHz

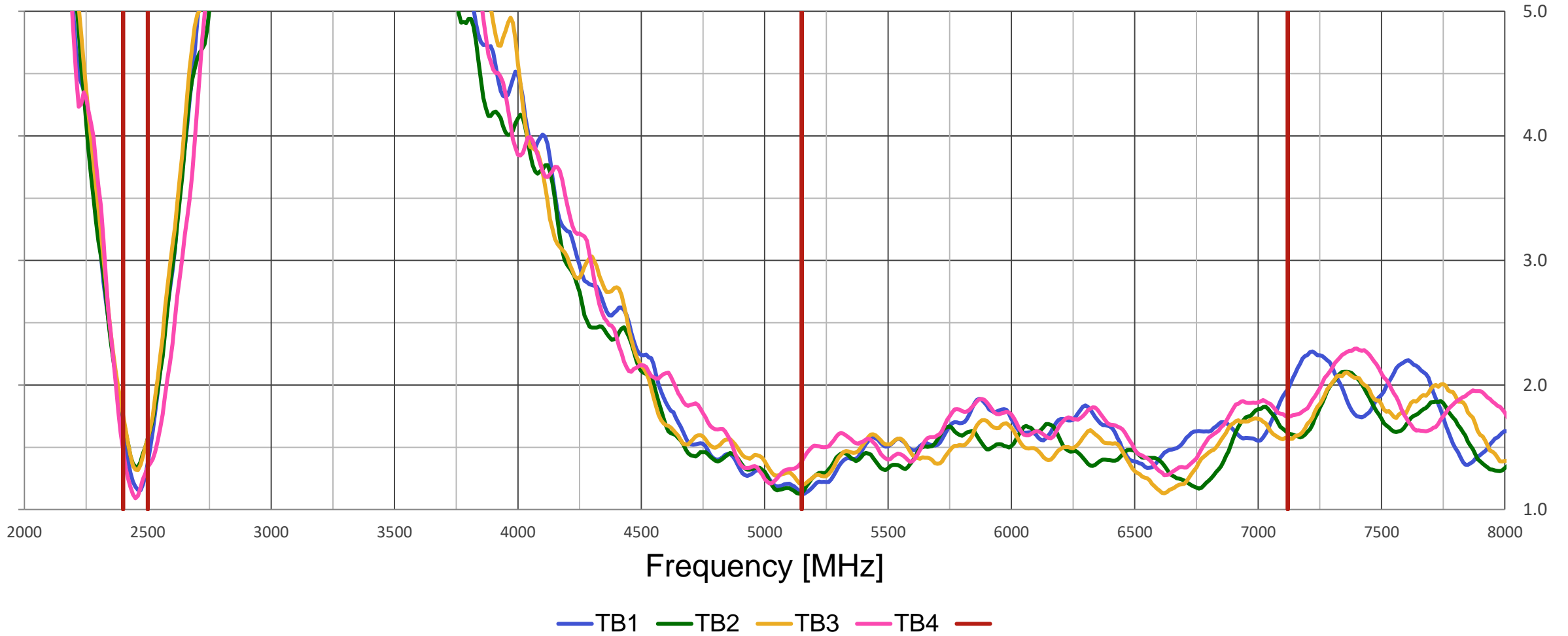
- **Peak Gain**

- 3.6dBi on 2.4GHz / 5.3dBi on 5GHz / 5.8dBi on 6GHz

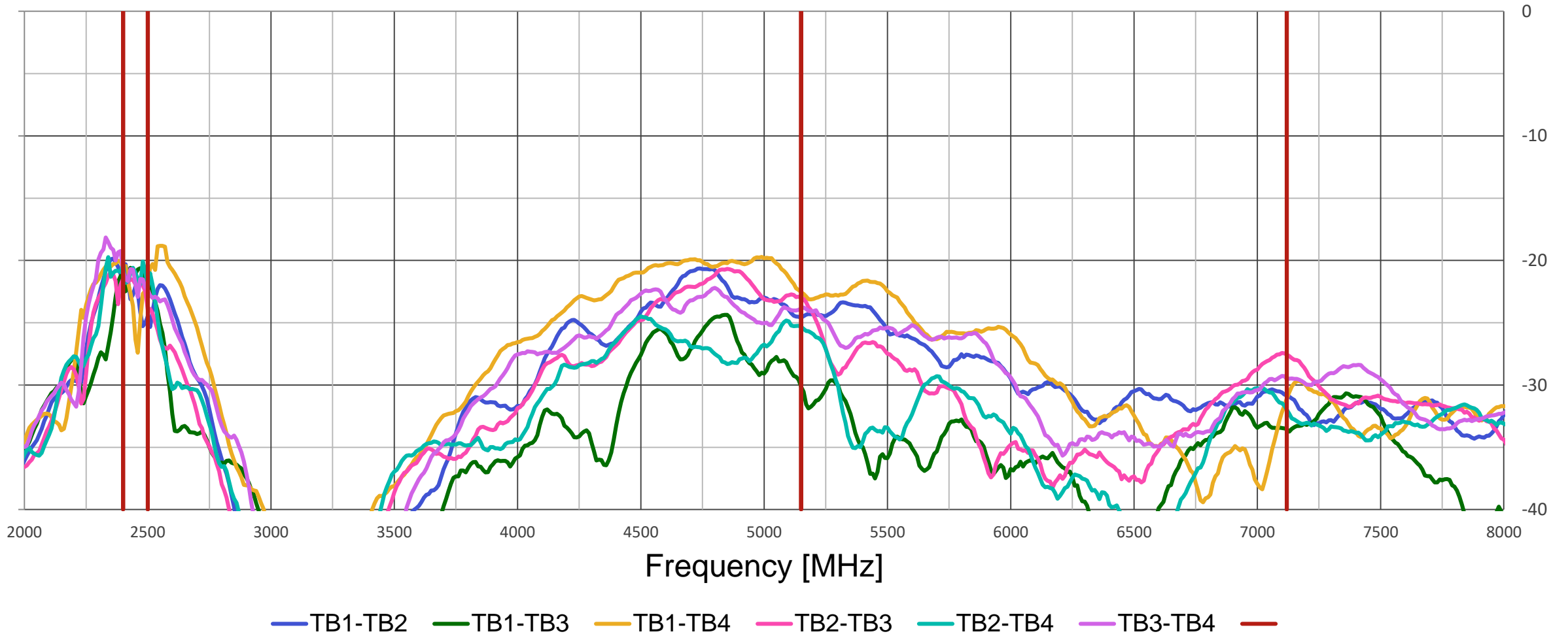




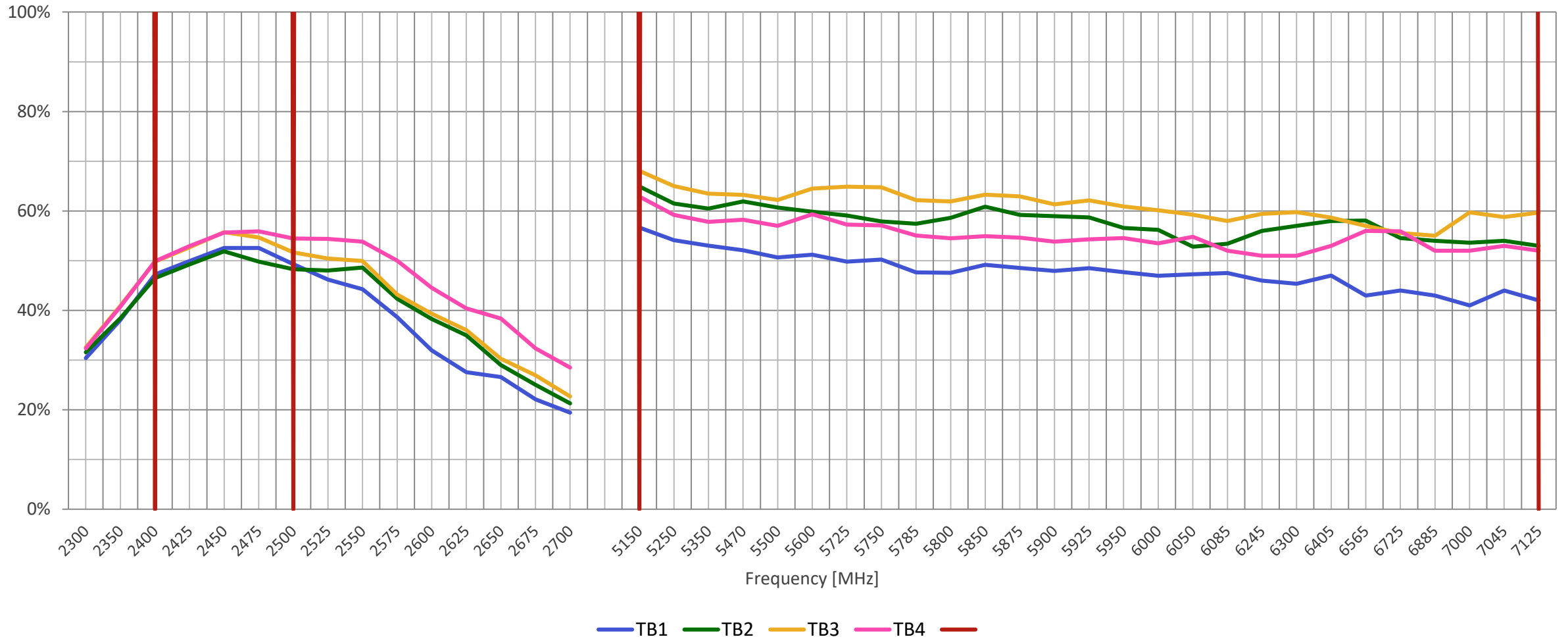
# VSWR Wi-Fi 5/6G and Scanning



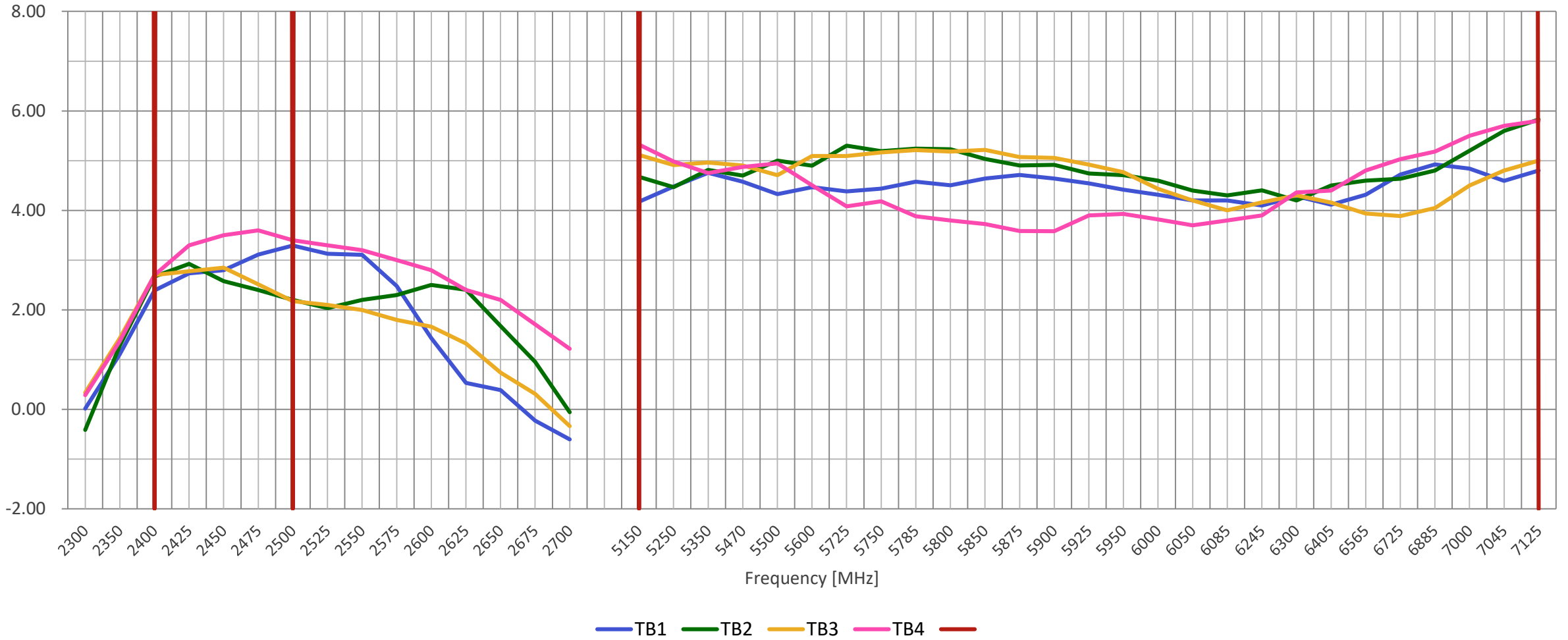
# Isolation Wi-Fi 5/6G and Scanning



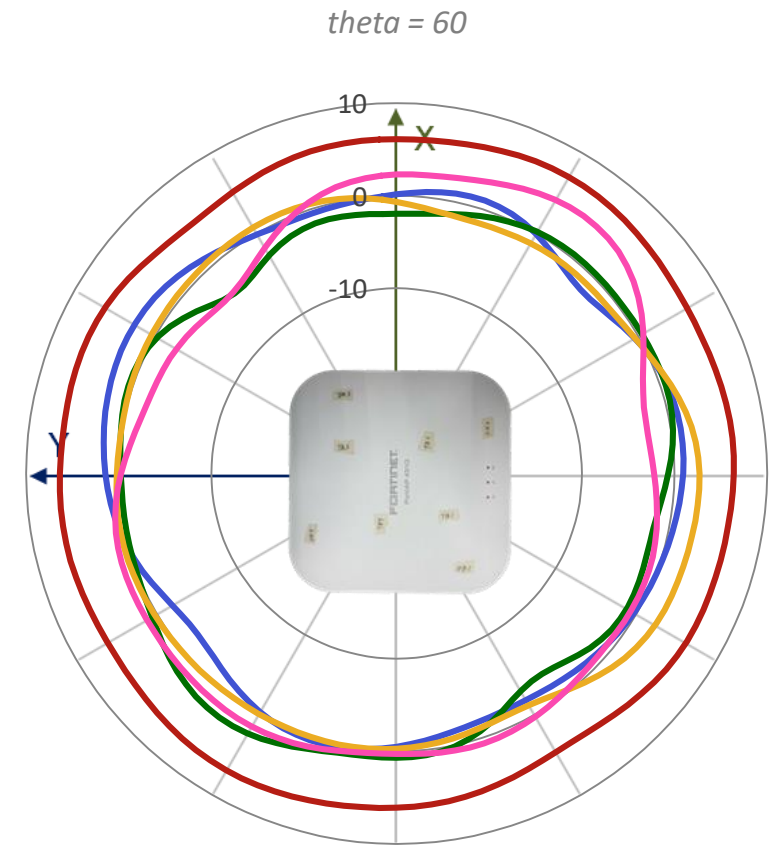
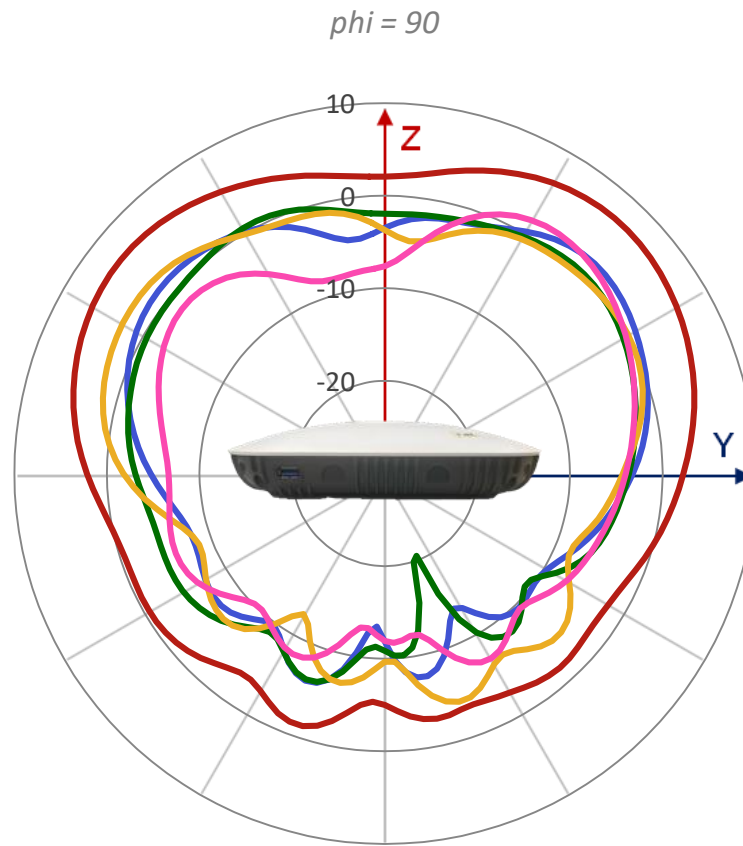
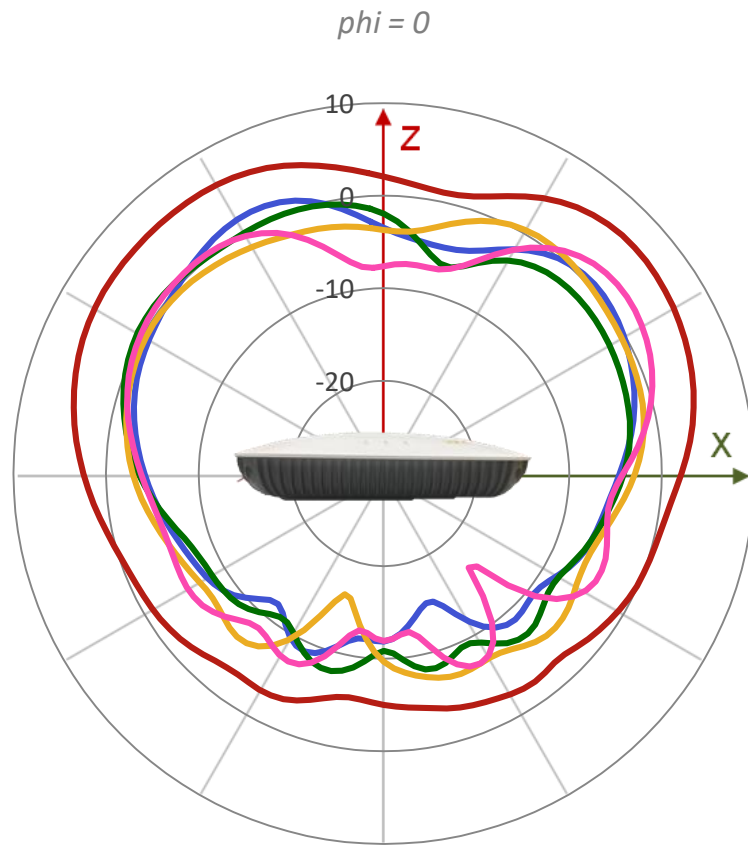
# Efficiency Wi-Fi 5/6G and Scanning



# Peak Gain Wi-Fi 5/6G and Scanning



# Realized Gain Pattern Wi-Fi 5/6G and Scanning @2450MHz for Gtotal

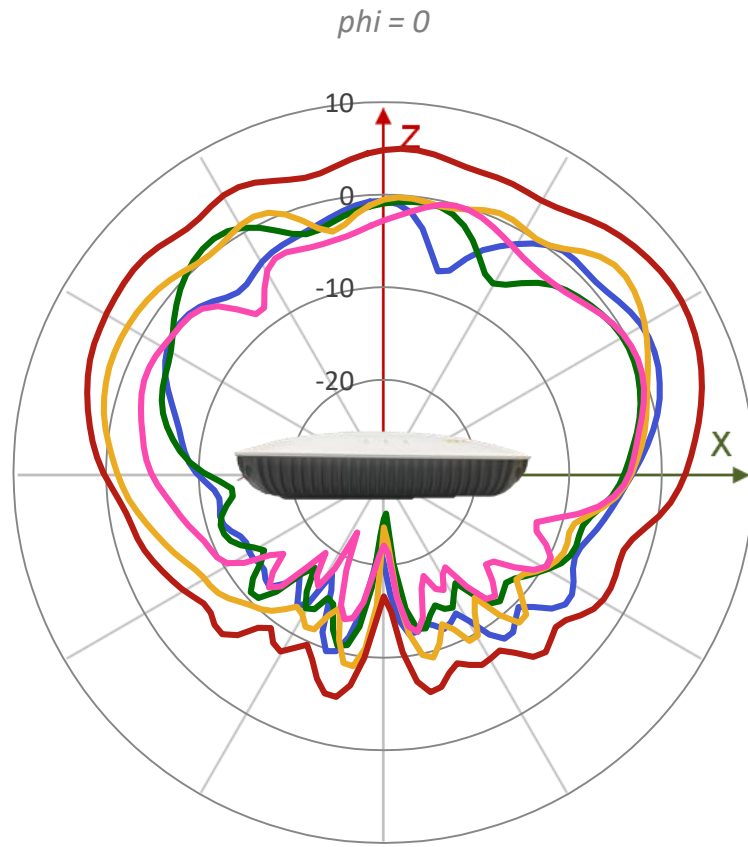


— TB1 — TB2 — TB3 — TB4 — Composite

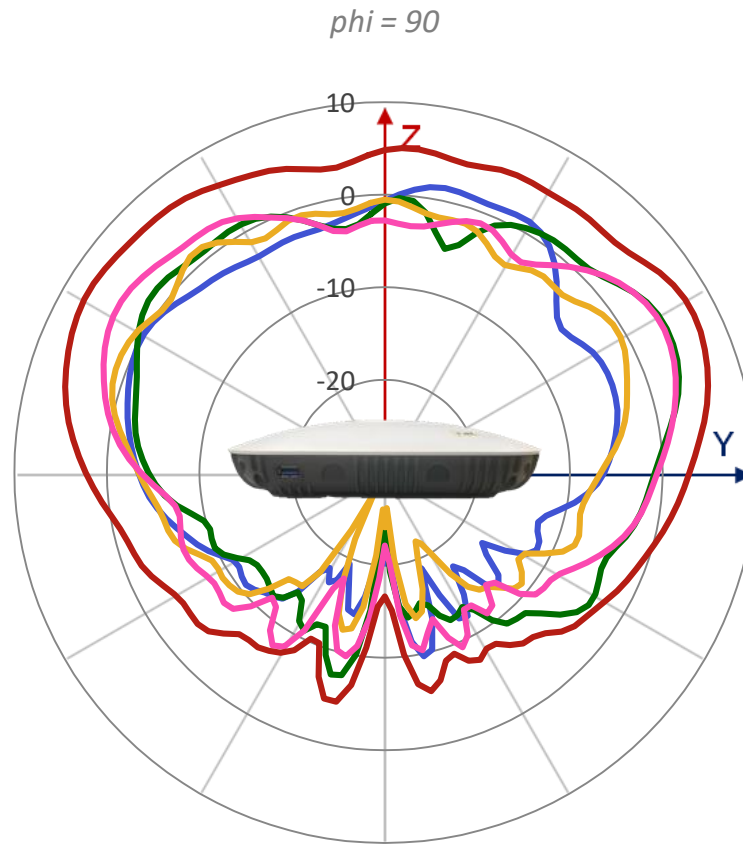
— TB1 — TB2 — TB3 — TB4 — Composite

— TB1 — TB2 — TB3 — TB4 — Composite

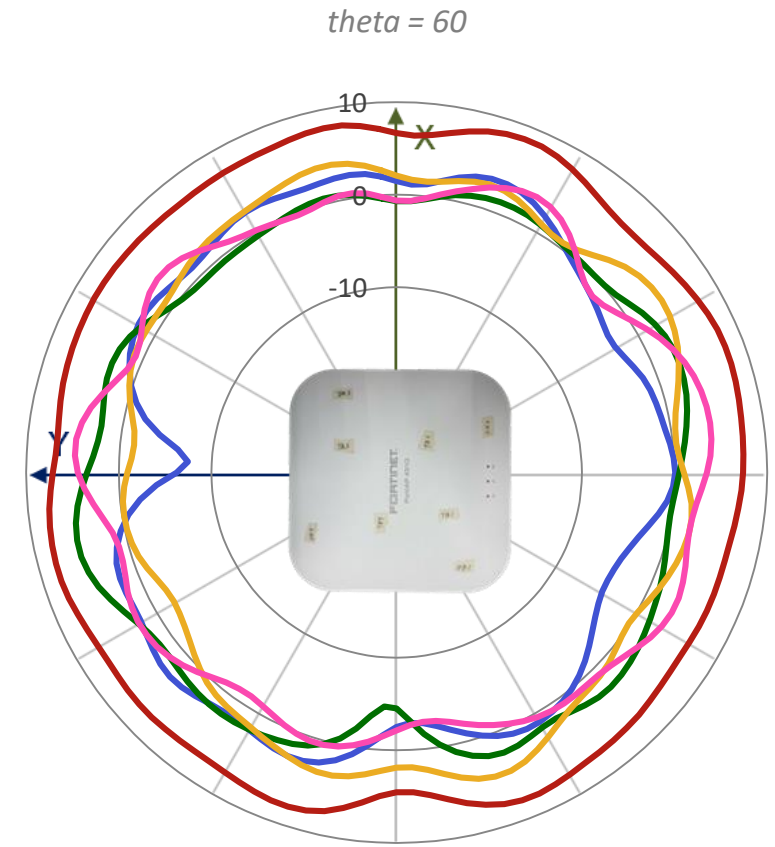
# Realized Gain Pattern Wi-Fi 5/6G and Scanning @5500MHz for Gtotal



— TB1 — TB2 — TB3 — TB4 — Composite

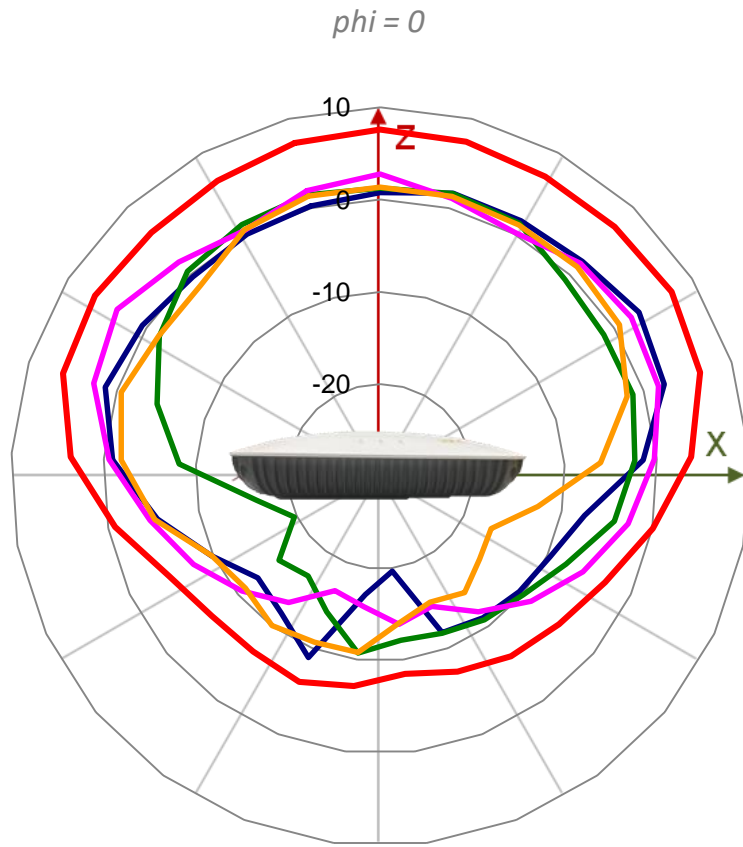


— TB1 — TB2 — TB3 — TB4 — Composite

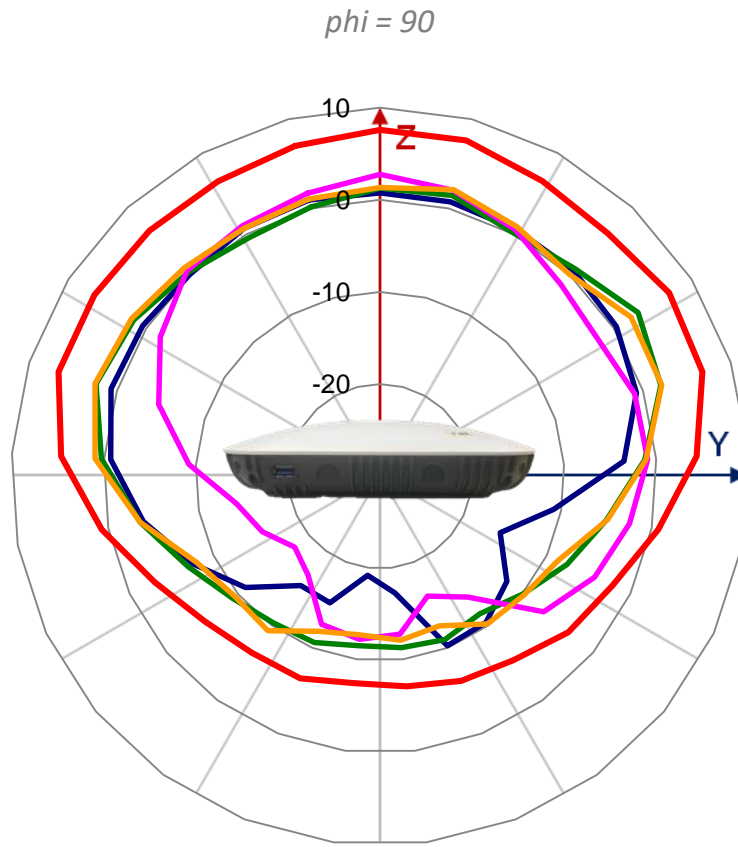


— TB1 — TB2 — TB3 — TB4 — Composite

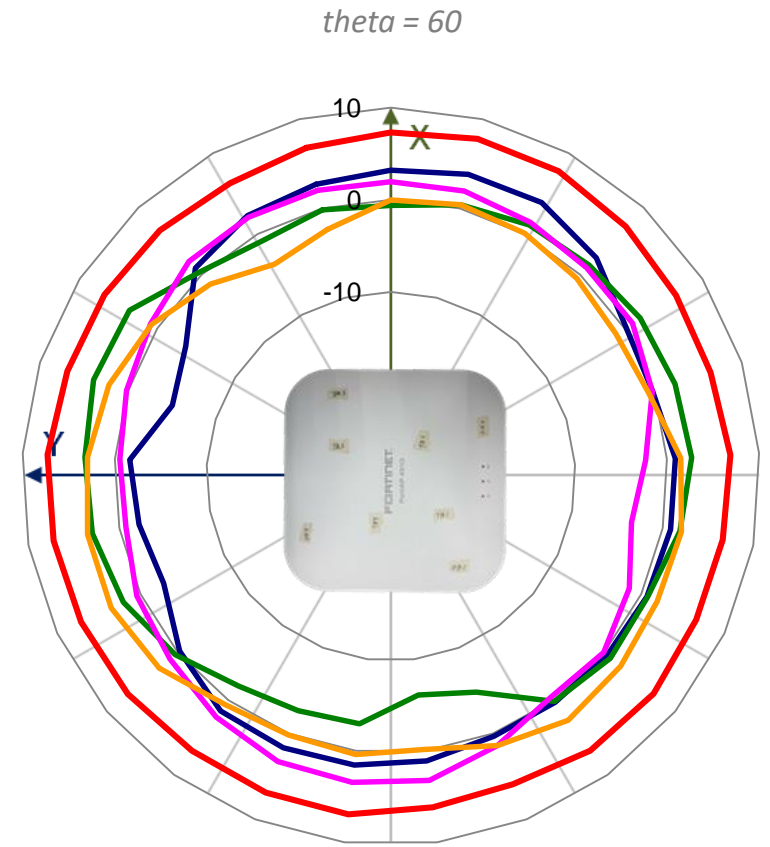
# Realized Gain Pattern Wi-Fi 5/6G and Scanning @6560MHz for Gtotal



— TB1 — TB2 — TB3 — TB4 — Composite

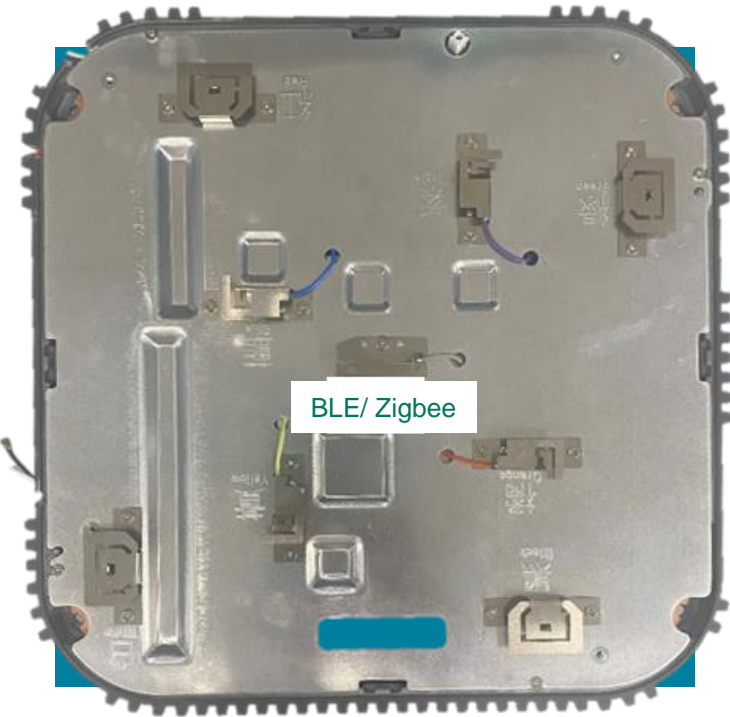


— TB1 — TB2 — TB3 — TB4 — Composite



— TB1 — TB2 — TB3 — TB4 — Composite

# BLE/ Zigbee

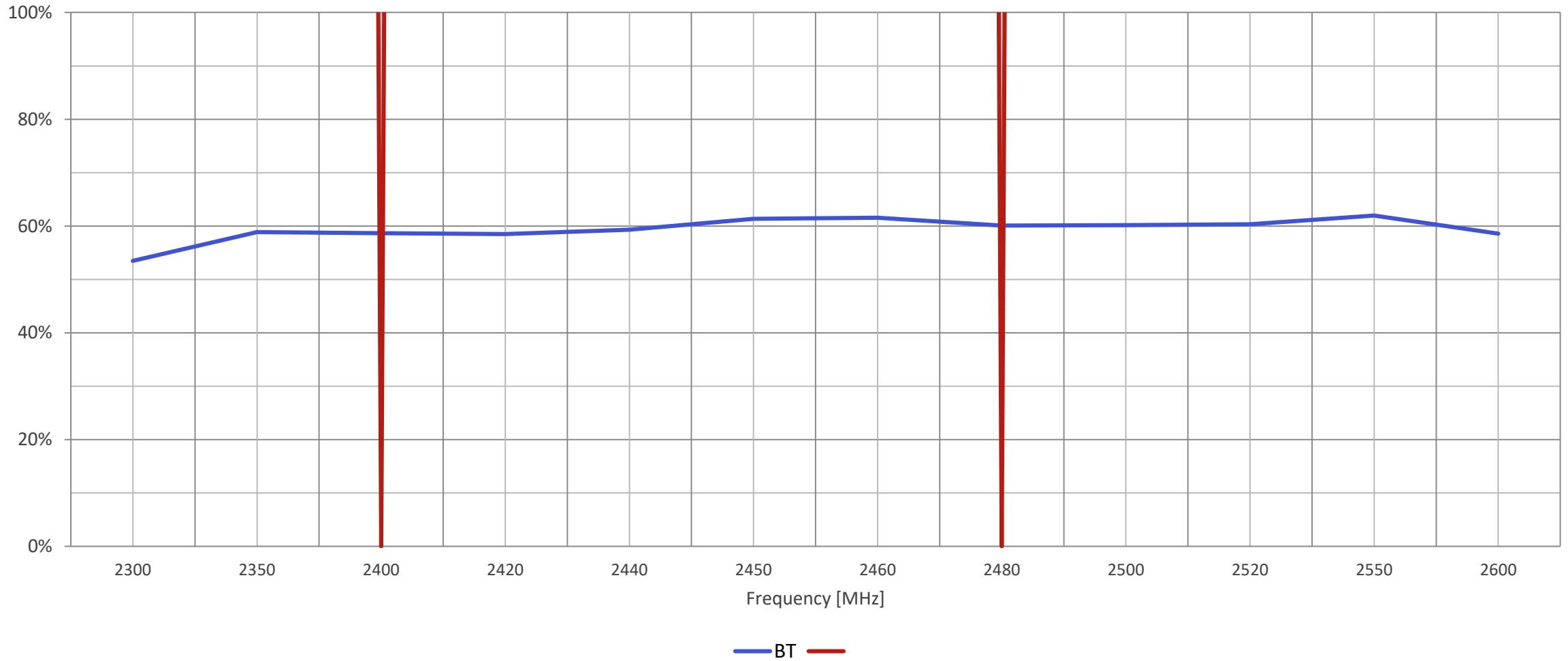


- **Average Efficiency**
  - ~60% on 2.4GHz
- **Peak Gain**
  - 3.8dBi on 2.4GHz
- **Maximum VSWR**
  - 1.2:1 on 2.4GHz

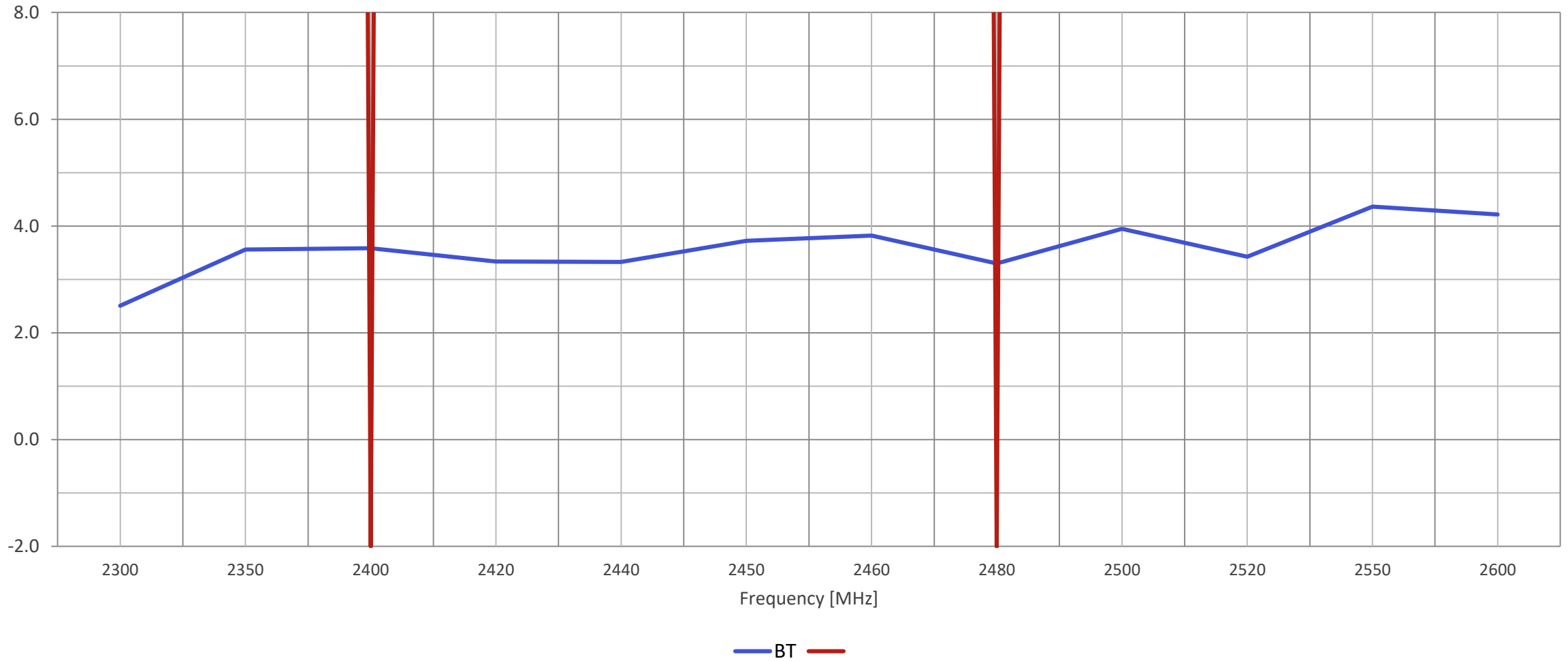




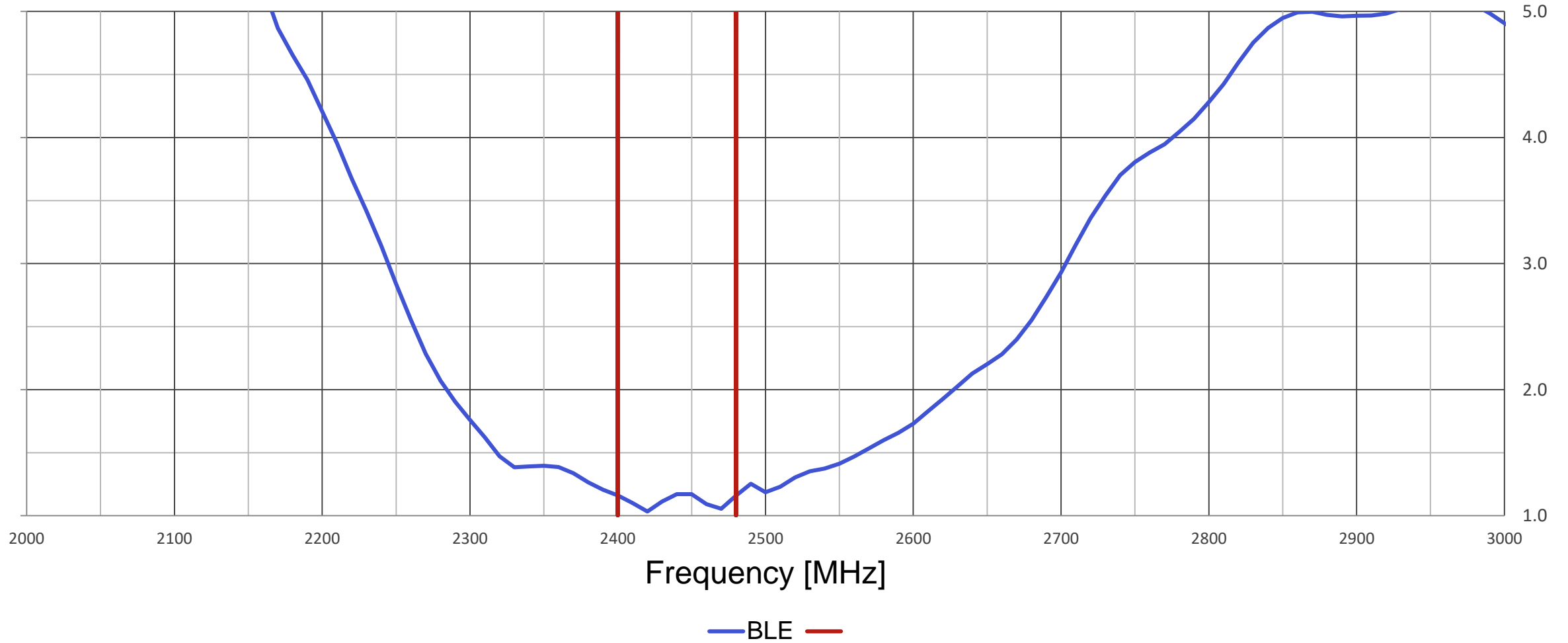
# Efficiency BLE/ Zigbee



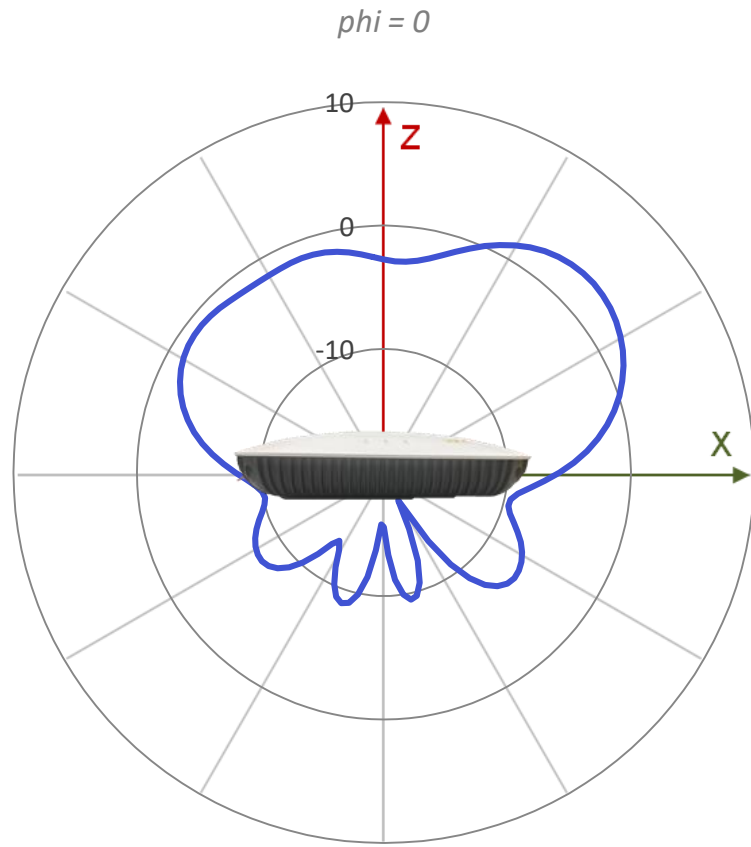
# Peak Gain BLE/ Zigbee



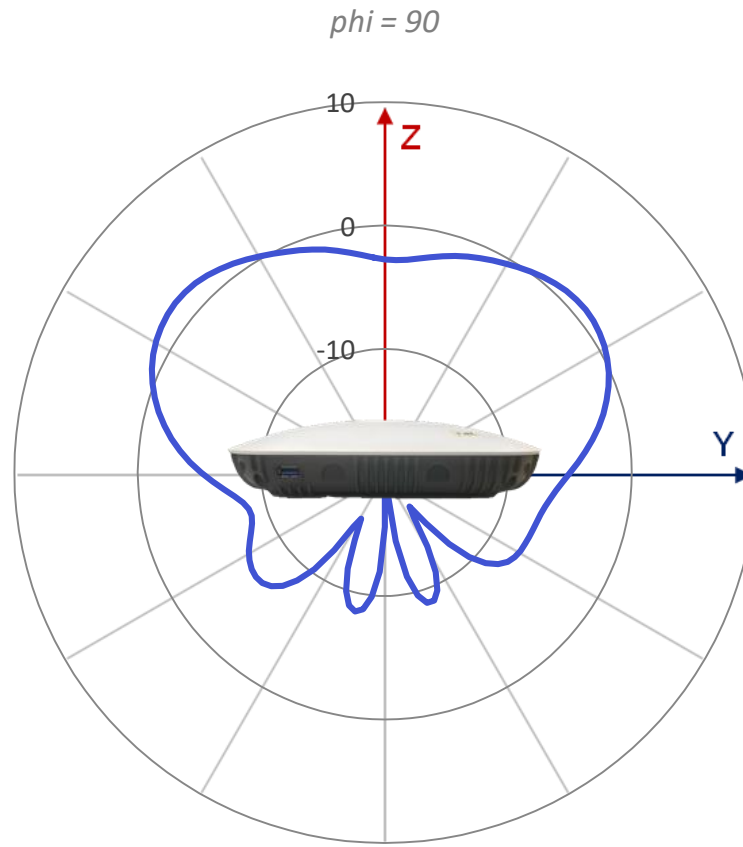
# VSWR BLE/ Zigbee



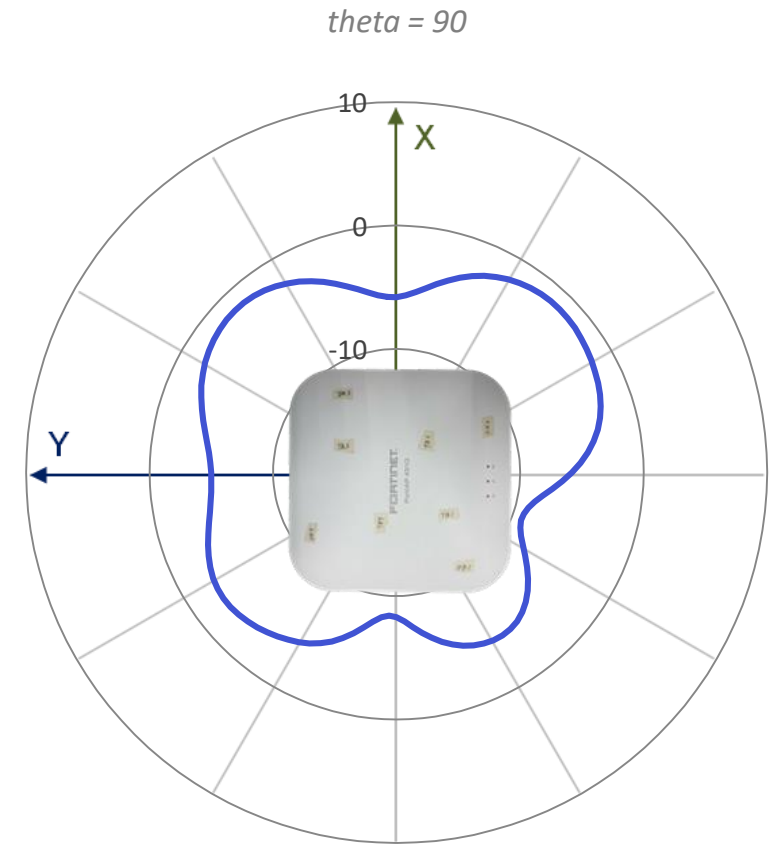
# Realized Gain Pattern BLE/ Zigbee @2450MHz for Gtotal



— BT

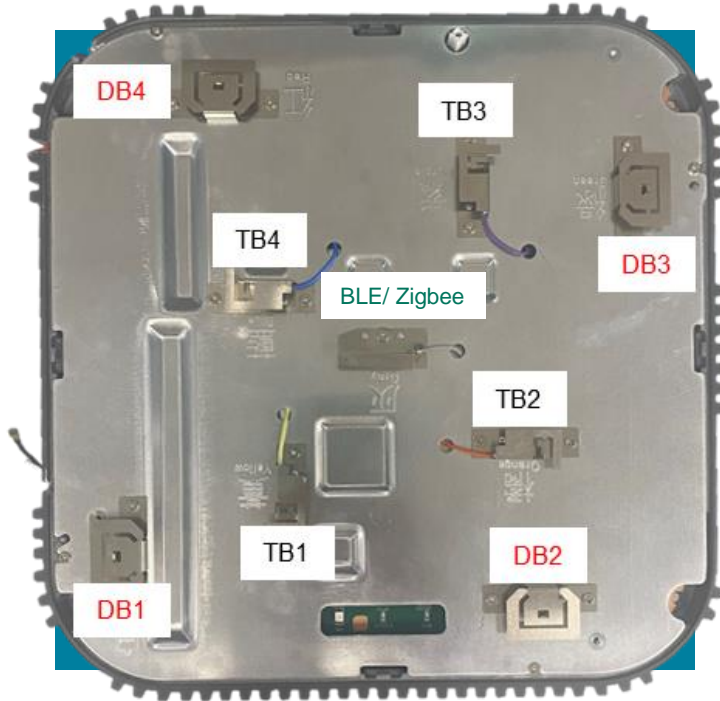


— BT



— BT

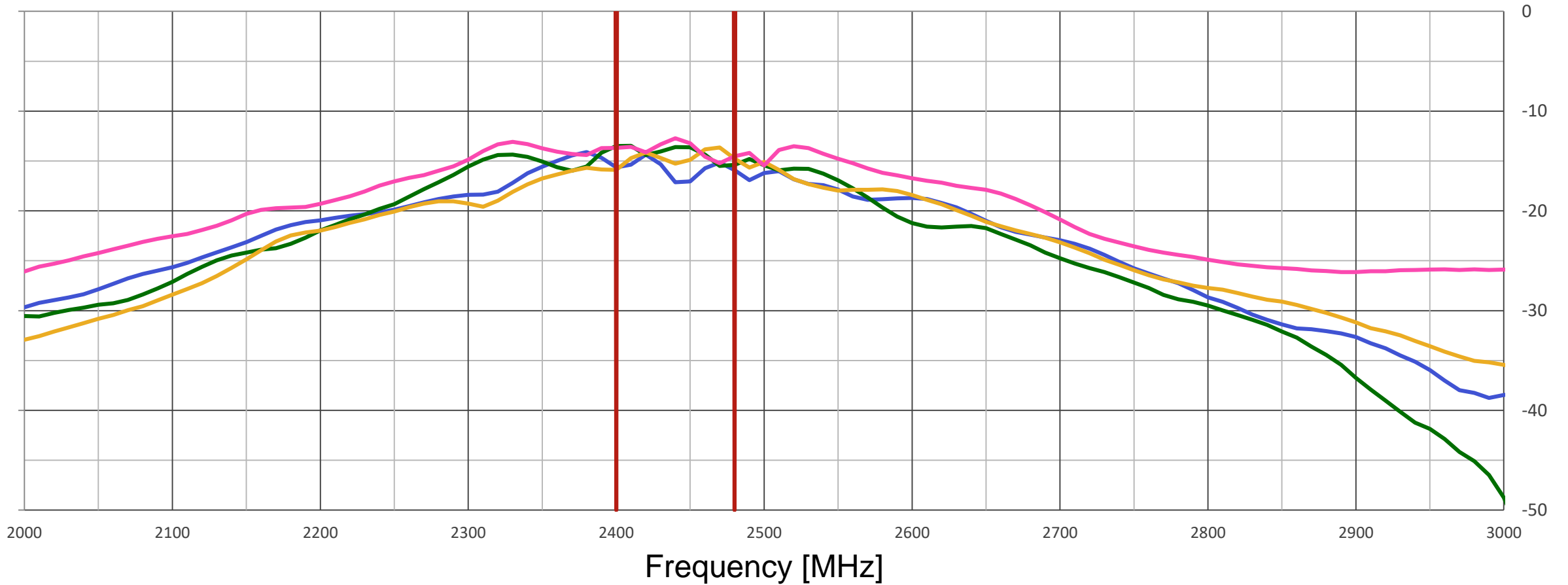
# Isolation among Radios



- **Minimum Isolation (DB to TB)**
  - 12.7dB on 2.4GHz
- **Minimum Isolation (BLE/ Zigbee to DB)**
  - 20.3dB on 2.4GHz
- **Minimum Isolation (BLE/ Zigbee to TB)**
  - 20.2dB on 2.4GHz / 25dB on 5GHz / 25.3dB on 6GHz

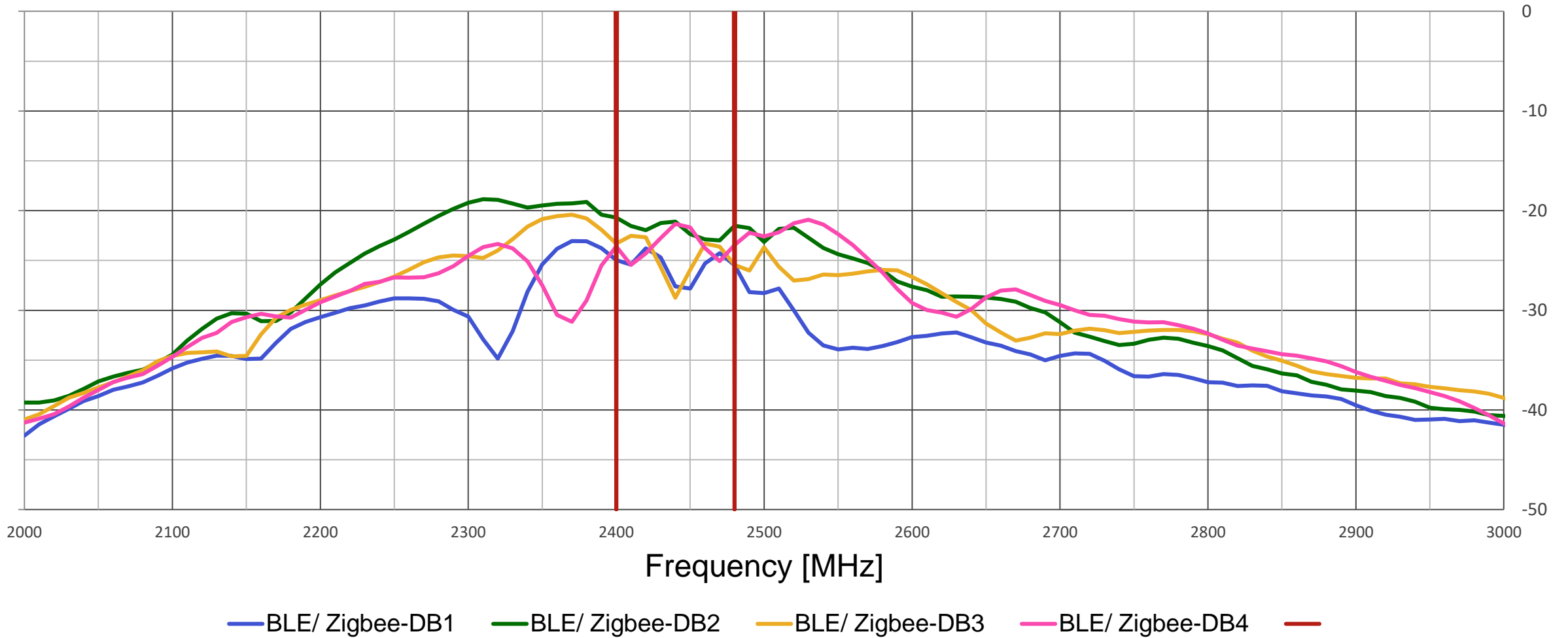


# Isolation BLE/ Zigbee to TB

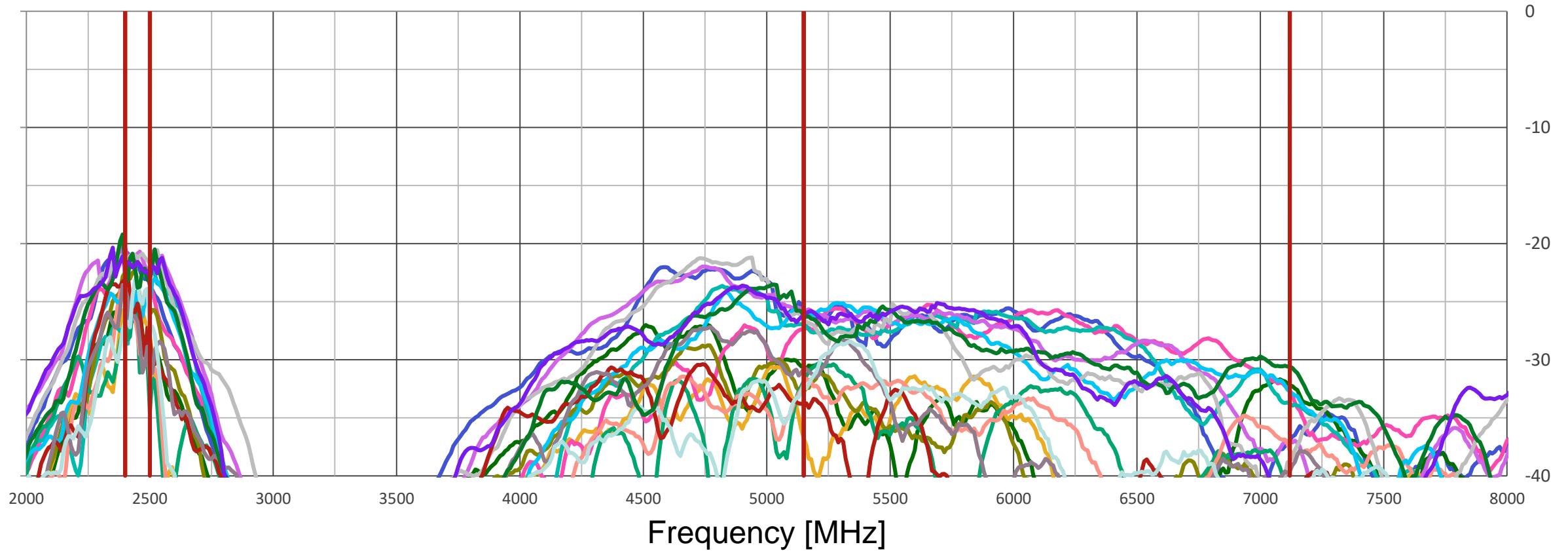


— BLE/ Zigbee-TB1 — BLE/ Zigbee-TB2 — BLE/ Zigbee-TB3 — BLE/ Zigbee-TB4 —

# Isolation BLE/ Zigbee to DB



# Isolation DB to TB



— DB1-TB1 — DB1-TB2 — DB1-TB3 — DB1-TB4 — DB2-TB1 — DB2-TB2 — DB2-TB3 — DB2-TB4 — DB3-TB1  
— DB3-TB2 — DB3-TB3 — DB3-TB4 — DB4-TB1 — DB4-TB2 — DB4-TB3 — DB4-TB4 —



The logo consists of the letters 'WNC' in a bold, blue, italicized sans-serif font. The 'W' and 'C' have a slight curve, and the 'N' is a simple block letter. The background is a bright, sunny outdoor scene with a modern glass building and green foliage.

**WNC**

***Wistron NeWeb Corp.***