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COLLOCATION TEST REPORT

Manufacturer: Nextfour Solutions Oy
Voimakatu 18
20520 Turku, FINLAND

Applicant: Same as Above

Product Name: WiFi/BT M.2 Module

Product Description: Wi-Fi/BT Module

Model: 9260NGW

FCC ID: 2AYT7-9260

Testing Commenced: 2021-05-19

Testing Ended: 2021-06-09

Summary of Test Results: **In Compliance**

The EUT complies with the EMC requirements when manufactured identically as the unit tested in this report, including any required modifications and/or manufacturer's statement. Any changes to the design or build of this unit subsequent to this testing may deem it non-compliant.

Standards:

- **FCC Part 15 Subpart C, Section 15.247**
- **FCC Part 15.31(e)**
- **ANSI C63.10:2013**



Order Number: F2P24629

Applicant: Nextfour Solutions Oy
Model: 9260NGW

Evaluation Conducted by:

Julius Chiller, EMC/Wireless Engineer

Report Reviewed by:

Ken Littell, Vice President of EMC

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1 ADMINISTRATIVE INFORMATION

1.1 Measurement Location:

F2 Labs in Middlefield, Ohio. Site description and attenuation data are on file with the FCC's Sampling and Measurement Branch at the FCC Laboratory in Columbia, MD.

1.2 Measurement Procedure:

All measurements were performed according to the 2013 version of ANSI C63.10 and recommended FCC procedure of measurement of DTS operating under Section 15.247 and in KDB558074. A list of the measurement equipment can be found in Section 5.

1.3 Uncertainty Budget:

The uncertainty in EMC measurements arises from several factors which affect the results, some associated with environmental conditions in the measurement room, the test equipment being used, and the measurement techniques adopted.

The measurement uncertainty budgets detailed below are calculated from the test and calibration data and are expressed with a 95% confidence factor. Note: Only measurements listed below which relate to tests included in this Test Report are applicable to it.

Measurement Range	Expanded Uncertainty	Combined Uncertainty
Radiated Emissions <1 GHz @ 3m	±5.07dB	±2.54
Radiated Emissions <1 GHz @10m	±5.09dB	±2.55
Radiated Emissions 1 GHz to 2.7 GHz	±3.62dB	±1.81
Radiated Emissions 2.7 GHz to 18 GHz	±3.10dB	±1.55
AC Power Line Conducted Emissions, 150kHz to 30 MHz	±2.76dB	±1.38

This Uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

1.4 Document History

Document Number	Description	Issue Date	Approved By
F2P24629-01E	First Issue	2021-06-09	K. Littell



2 SUMMARY OF TEST RESULTS

Test Name	Standard(s)	Results
Radiated Spurious Emission	CFR 47 Part 15.247(d) / Part 15.209 / KDB558074	Complies

Modifications Made to the Equipment
None



Order Number: F2P24629

**Applicant: Nextfour Solutions Oy
Model: 9260NGW**

3 ENGINEERING STATEMENT

This report has been prepared on behalf of Nextfour Solutions Oy to provide documentation for the testing described herein. This equipment has been tested and found to comply with Part 15.247 of the FCC Rules using ANSI C63.10:2013 and KDB558074 standards. The test results found in this test report relate only to the items tested.



4 EUT INFORMATION AND DATA

4.1 Equipment Under Test:

Product: **WiFi/BT M.2 Module**

Model: **9260NGW**

Serial No.: None Specified

FCC ID: **2AYT7-9260**

4.2 Trade Name:

Nextfour Solutions Oy

4.3 Power Supply for Test Board:

XP Power VEC65US12

4.4 Applicable Rules:

CFR 47, Part 15.247, subpart C

4.5 Equipment Category:

Radio Module-DTS

4.6 Antenna:

Internal non-removable

4.7 Accessories:

N/A

4.8 Test Item Condition:

The equipment to be tested was received in good condition.

4.9 Testing Algorithm:

EUT was set to transmit a modulated signal in the 2.4 GHz BLE and 2.4 GHz Wi-Fi band. Radiated spurious and band edge scans were then taken. EUT was powered 12VDC from client-provided power supply. The highest emissions were recorded in the data tables. The module was then set to transmit the Bluetooth at 2402 MHz, the Wi-Fi at 2422 MHz, and a Cellular module transmitting at 1909 MHz was added in to ensure EMC Collocation with a Cellular module would not be an issue.



5 LIST OF MEASUREMENT INSTRUMENTATION

Equipment Type	Asset Number	Manufacturer	Model	Serial Number	Calibration Due Date
Shielded Chamber	CL166-E	AlbatrossProjects	B83117-DF435-T261	US140023	2022-03-09
Temp/Hum. Recorder	CL261	Extech	RH520	04	2022-03-19
Receiver	CL151	Rohde & Schwarz	ESU40	100319	2021-10-06
Horn Antenna	CL098	Emco	3115	9809-5580	2022-01-08
Pre-Amplifier	CL250	Com-Power	PAM-118A	18040011	2022-07-07
Pre-Amplifier	CL285	AH Systems	PAM-0307	322	2021-11-04
Antenna, JB3 Combination	CL175	Sunol Sciences	JB3	A030315	2021-11-05
Amplifier w/Monopole & 18"	CL163-Mono	A.H. Systems, Inc.	EHA-52B	100	2021-10-12
Low Loss Cable Set	CL178, CL286	Pasternack	PE3C0666-252 / PE3C066-50CM	None Spec.	2023-10-12
Pre-Amplifier	CL153	Agilent	83006-69007	MY57280115	2022-02-12
Antenna, Horn	CL114	A. H. Systems, Inc.	SAS-572	237	2021-07-27
Software:	Tile Version 3.4.B.3.		Software Verified: 2021-05-19; 2021-06-09		
Software:	EMC 32, Version 8.53.0		Software Verified: 2021-05-19; 2021-06-09		



6 RADIATED SPURIOUS EMISSION

Radiated emissions were measured in a Semi-Anechoic Chamber. All emissions generated that fall in the restricted bands per FCC Part 15.205 were examined.

6.1 Requirements:

All emissions that fall in the restricted bands defined in FCC Part 15.205 shall not exceed the maximum field strength listed in FCC Part 15.209(a).



6.2 Radiated Spurious Emission Test Data

Test Date(s):	2021-05-19; 2021-06-09	Test Engineer:	J. Chiller
Standard(s):	CFR 47 Part 15.247(d); Part 15.209 / KDB558074	Air Temperature:	20.9°C
		Relative Humidity:	25%

Notes: Plots are peak, max hold prescan data included only to determine what frequencies to investigate and measure. The EUT was initially placed in a semi-anechoic chamber and rotated in all three orthogonal positions to maximize the emissions. Characterization measurements were then performed to determine at which frequencies significant emissions occurred. These graphs are shown below.

The equipment was fully exercised with all cabling attached to the EUT and was positioned for maximum emissions. While the equipment was energized, the receiving antenna was scanned from 1.0 meter to 4.0 meters in both vertical and horizontal polarities while the turntable was adjusted 360 degrees to determine the maximum field strength. The tables of measured results can be found below.

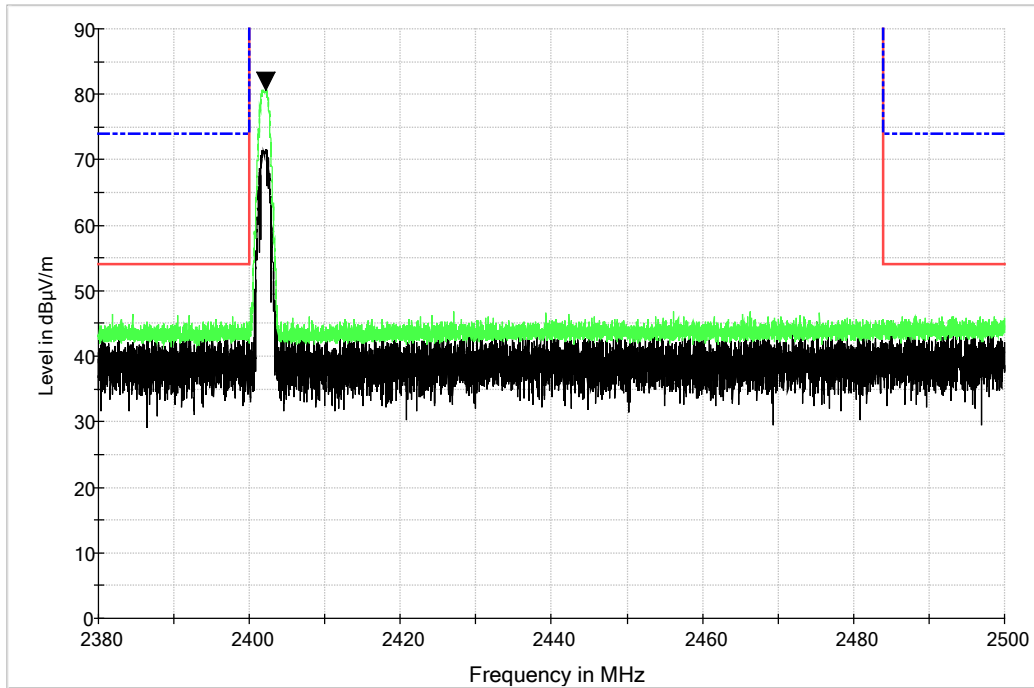
In the following plots, the black line indicates ambient noise, and the red line indicates the measurement with the EUT on. Emissions to be found by the EUT were measured and listed in tables. The plots are for reference only and the limit lines are not actual limit lines but merely a guide.

Scans were also made with all three radios transmitting a continuous modulated signal to ensure no EMC Collocation issues of simultaneous transmissions.

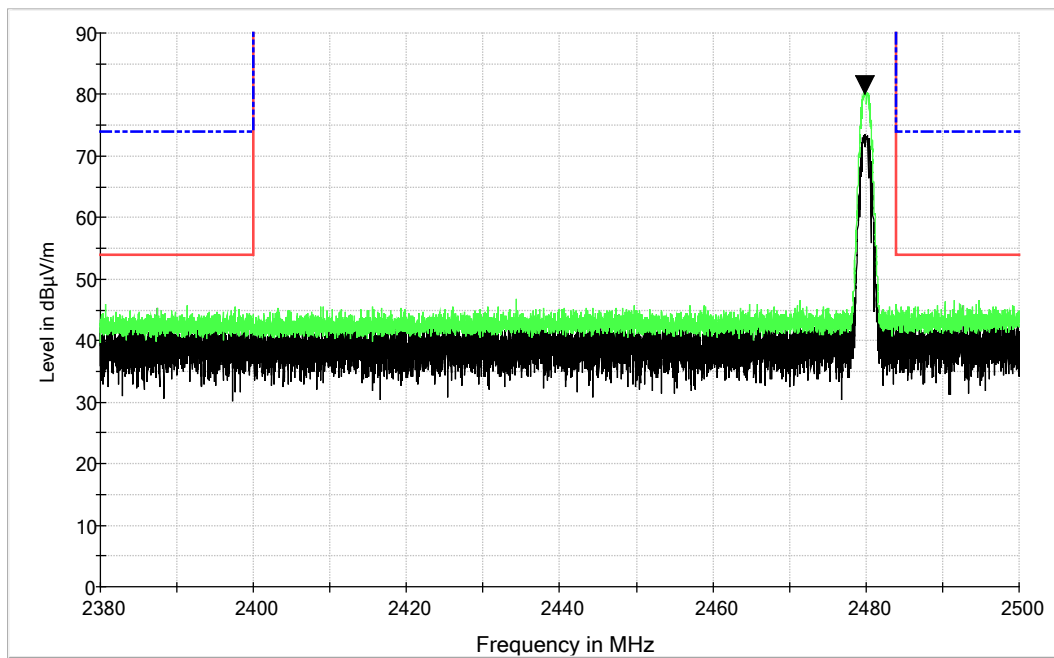


Band Edge: Bluetooth

Low Channel



High Channel





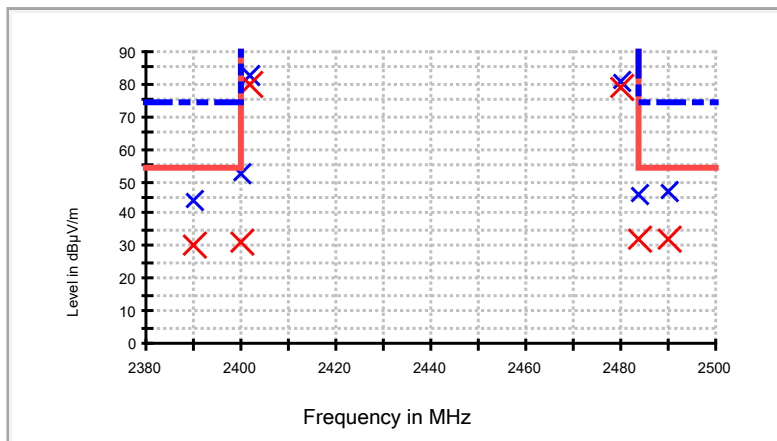
Band Edge: Bluetooth

Measurements – MaxPeak

Frequency (MHz)	Antenna Polarization	Antenna Height (cm)	Azimuth (deg)	Reading (dBµV)	Cable Loss & Antenna Factor (dB)	Emission (dBµV/m)	Limit (dBµV/m)	Margin (dB)
2390.000000	H	185.00	333.00	36.1	7.8	43.9	74.0	-30.1
2400.000000	H	185.00	333.00	44.5	7.6	52.1	74.0	-21.9
2402.000000	H	185.00	333.00	75.1	7.6	82.7	74.0	--
2480.000000	H	185.00	330.00	73.0	8.2	81.2	74.0	--
2483.500000	H	185.00	330.00	37.8	8.2	46.0	74.0	-28.0
2490.000000	H	185.00	330.00	38.3	8.3	46.6	74.0	-27.4

Measurements – AVG

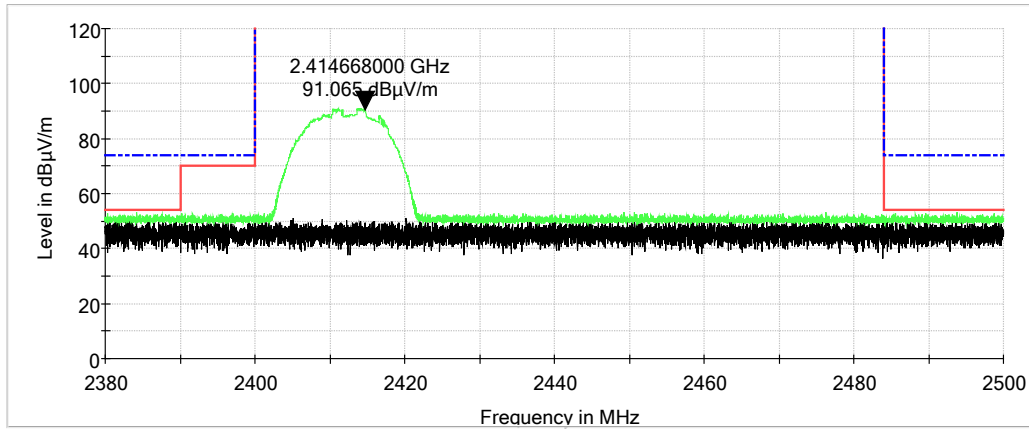
Frequency (MHz)	Antenna Polarization	Antenna Height (cm)	Azimuth (deg)	Reading (dBµV)	Cable Loss & Antenna Factor (dB)	Emission (dBµV/m)	Limit (dBµV/m)	Margin (dB)
2390.000000	H	185.00	333.00	22.8	7.8	30.6	54.0	-23.4
2400.000000	H	185.00	333.00	23.6	7.6	31.2	54.0	-22.8
2402.000000	H	185.00	333.00	72.7	7.6	80.3	54.0	--
2480.000000	H	185.00	330.00	70.6	8.2	78.8	54.0	---
2483.500000	H	185.00	330.00	24.2	8.2	32.4	54.0	-21.6
2490.000000	H	185.00	330.00	24.0	8.3	32.3	54.0	-21.7



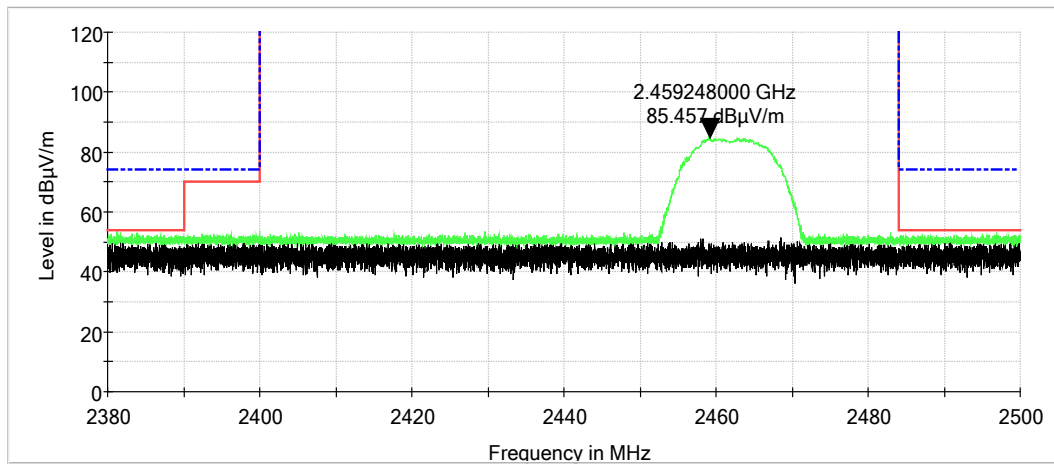


Band Edge: Wi-Fi

Low Channel



High Channel





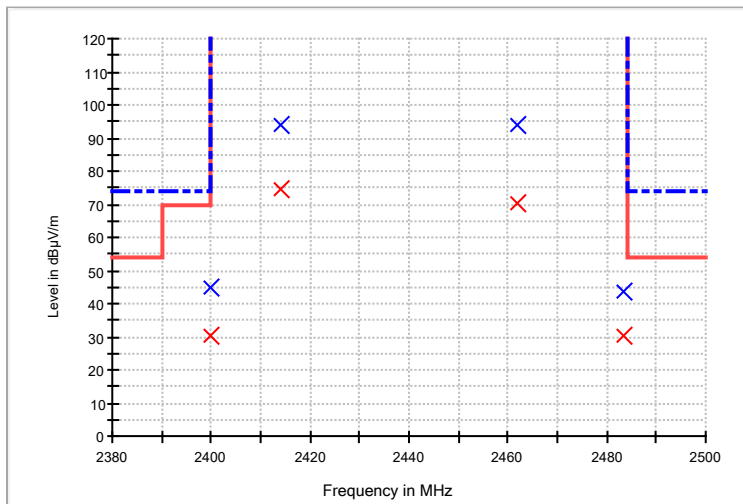
Band Edge: Wi-Fi

Measurements – MaxPeak

Frequency (MHz)	Antenna Polarization	Antenna Height (cm)	Azimuth (deg)	Reading (dBμV)	Cable Loss & Antenna Factor (dB)	Emission (dBμV/m)	Limit (dBμV/m)	Margin (dB)
2400.000000	V	225.00	205.00	39.1	5.8	44.9	74.0	-29.1
2412.000000	V	225.00	205.00	88.3	5.8	94.1	74.0	--
2462.000000	V	200.00	217.00	87.8	5.8	93.6	74.0	--
2483.500000	V	200.00	217.00	38.0	5.8	43.8	74.0	-30.2

Measurements – AVG

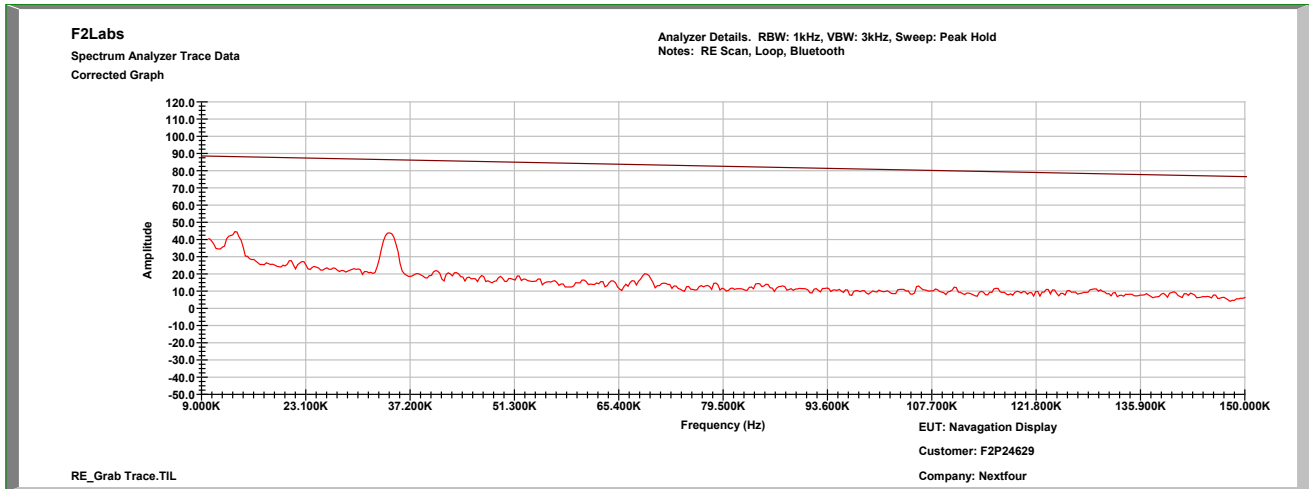
Frequency (MHz)	Antenna Polarization	Antenna Height (cm)	Azimuth (deg)	Reading (dBμV)	Cable Loss & Antenna Factor (dB)	Emission (dBμV/m)	Limit (dBμV/m)	Margin (dB)
2400.000000	V	225.00	205.00	24.8	5.8	30.6	54.0	-23.4
2412.000000	V	225.00	205.00	68.9	5.8	74.7	54.0	--
2462.000000	V	200.00	217.00	64.2	5.8	70.0	54.0	--
2483.500000	V	200.00	217.00	24.3	5.8	30.1	54.0	-23.9



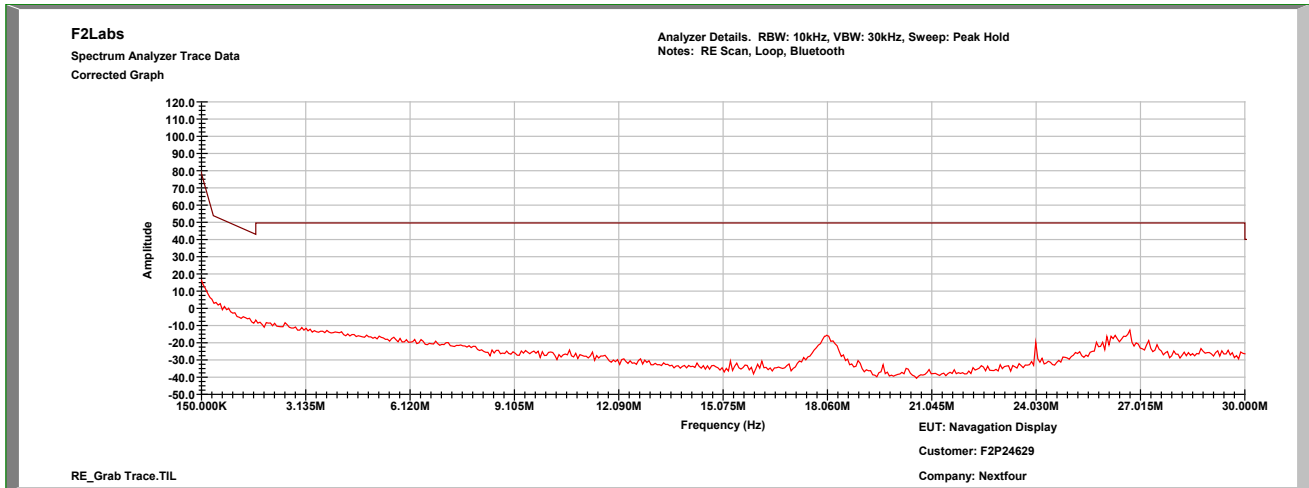


Bluetooth

Characterization Scan: 0.009 MHz to 0.15 MHz



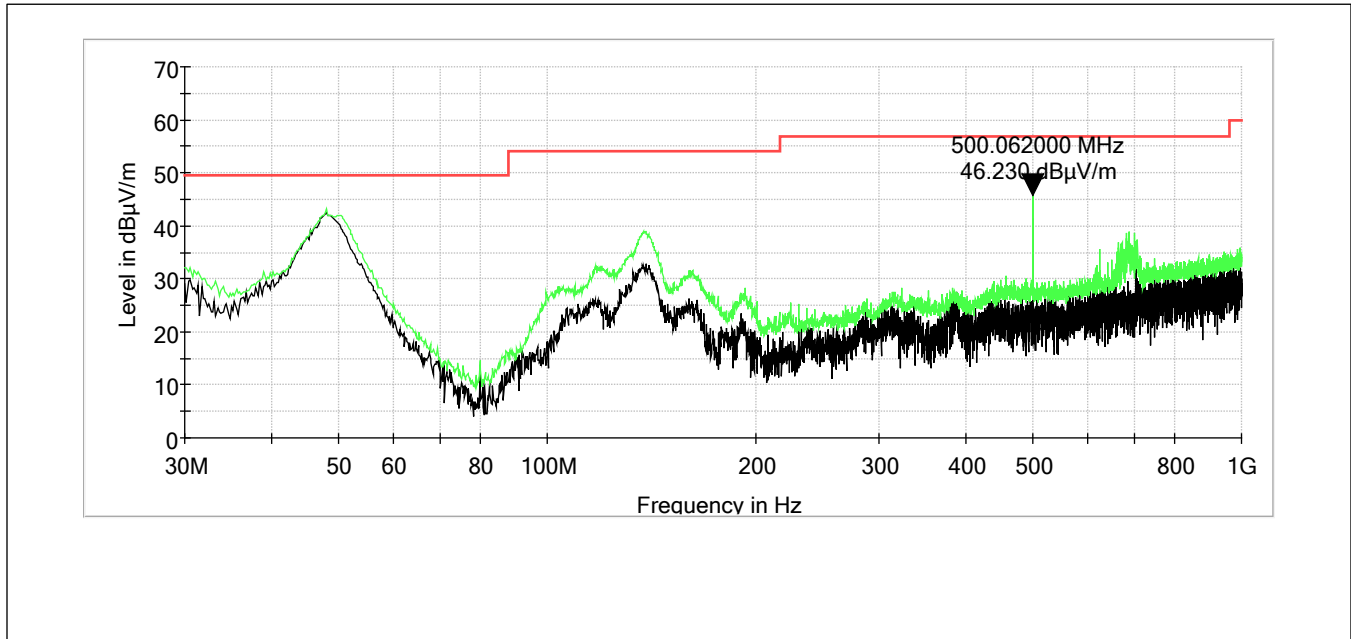
Characterization Scan: 0.15 MHz to 30 MHz



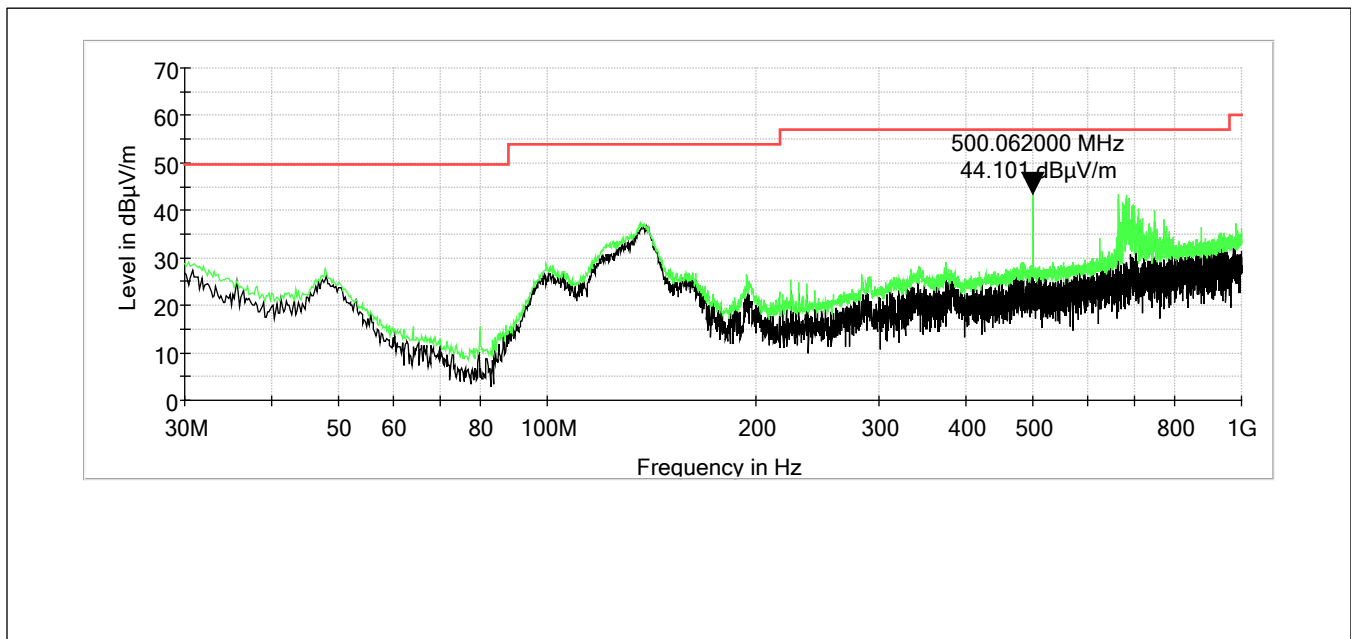


Bluetooth

Characterization Scan: 30 MHz to 1000 MHz, Vertical



Characterization Scan: 30 MHz to 1000 MHz, Horizontal



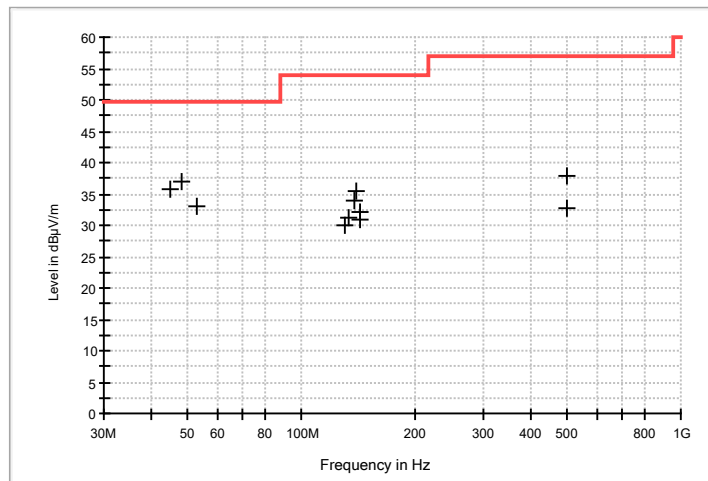


Bluetooth Measurements

Note: Measurements include data from all channels.

QuasiPeak

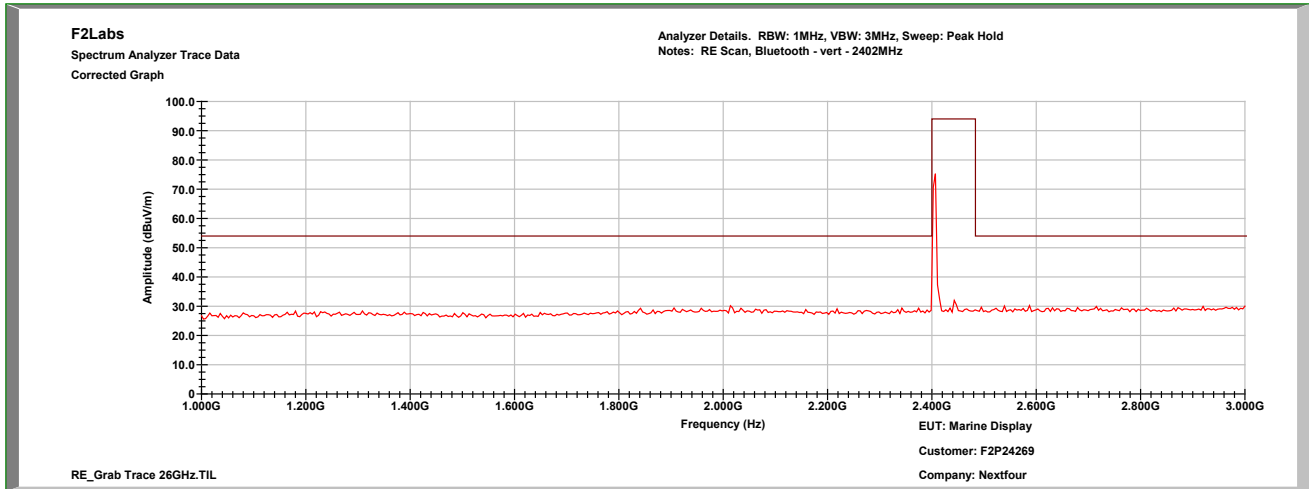
Frequency (MHz)	Antenna Polarization	Antenna Height (cm)	Azimuth (deg)	Reading (dBµV)	Cable Loss & Antenna Factor (dB)	Emission (dBµV/m)	Limit (dBµV/m)	Margin (dB)
44.940000	V	100.00	53.00	47.9	-12.0	35.90	49.6	-13.7
48.040000	V	100.00	334.00	50.5	-13.6	36.90	49.6	-12.7
52.500000	V	100.00	11.00	47.6	-14.6	33.00	49.6	-16.6
130.490000	V	100.00	244.00	38.4	-8.3	30.10	54.0	-23.9
133.400000	H	100.00	260.00	39.6	-8.4	31.20	54.0	-22.8
137.480000	H	100.00	260.00	42.7	-8.7	34.00	54.0	-20.0
138.640000	V	100.00	184.00	44.1	-8.8	35.30	54.0	-18.7
141.550000	H	100.00	260.00	39.9	-9.0	30.90	54.0	-23.1
142.910000	V	100.00	267.00	41.3	-9.1	32.20	54.0	-21.8
500.060000	H	100.00	243.00	40.0	-2.1	37.90	56.9	-19.0
500.060000	V	100.00	236.00	34.9	-2.1	32.80	56.9	-24.1



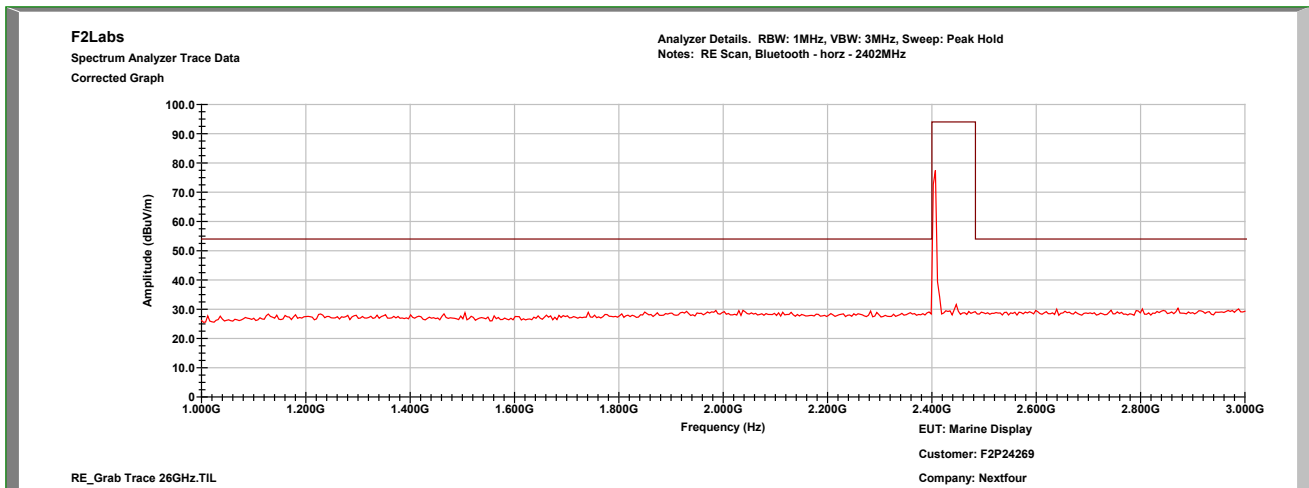


Bluetooth

Characterization Scan: Low Channel, 1 GHz to 3 GHz, Vertical



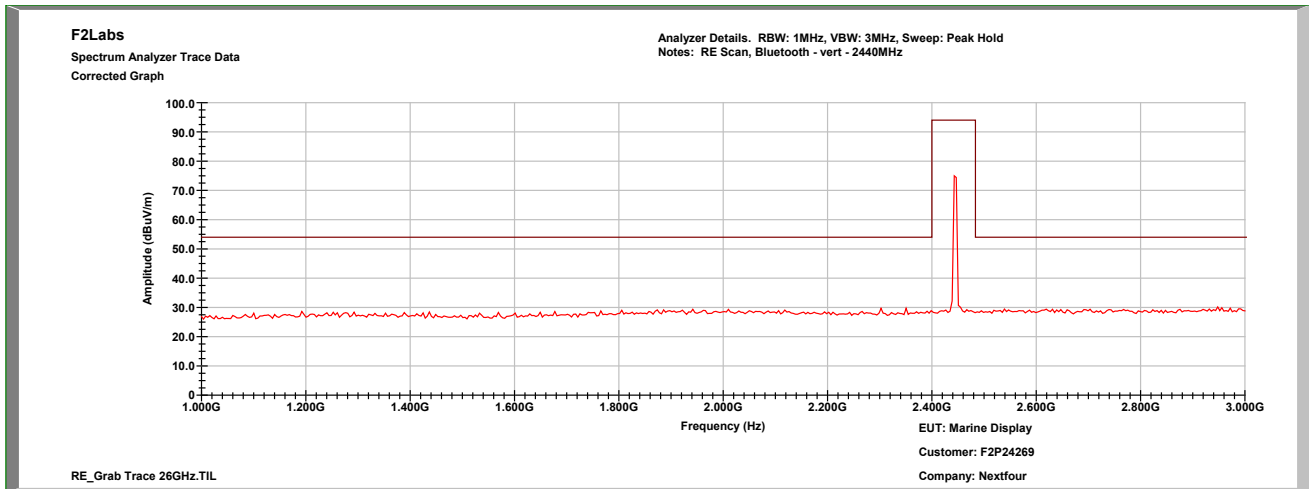
Characterization Scan: Low Channel, 1 GHz to 3 GHz, Horizontal



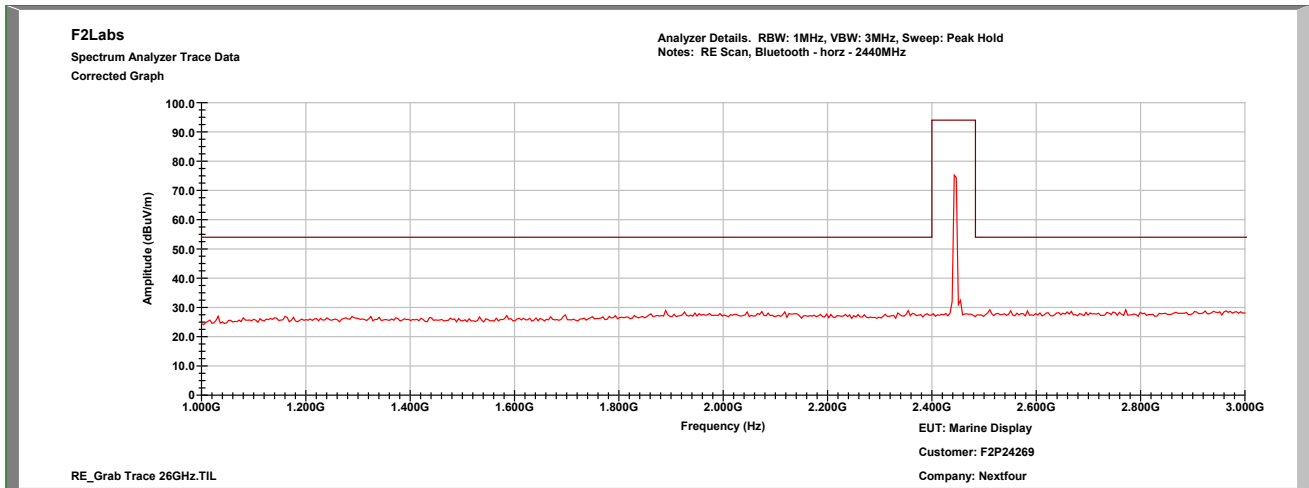


Bluetooth

Characterization Scan: Mid Channel, 1 GHz to 3 GHz, Vertical



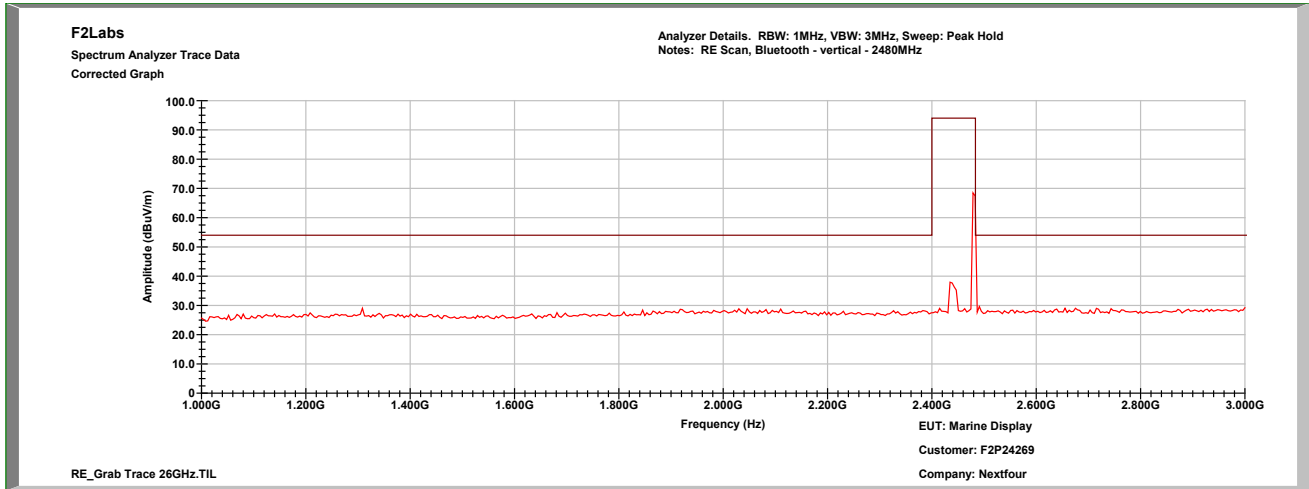
Characterization Scan: Mid Channel, 1 GHz to 3 GHz, Horizontal



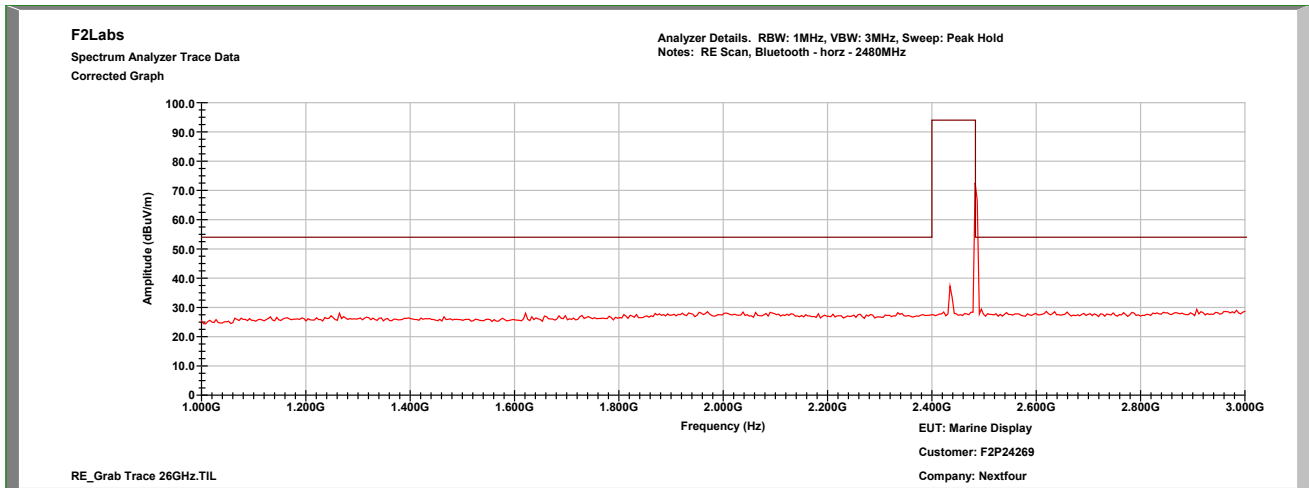


Bluetooth

Characterization Scan: High Channel, 1 GHz to 3 GHz, Vertical



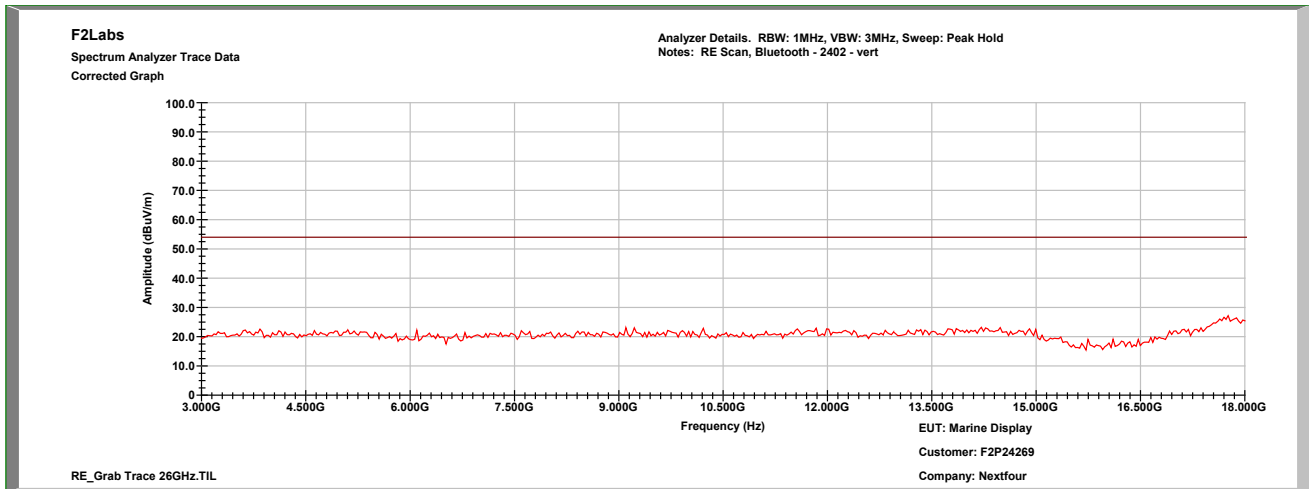
Characterization Scan: High Channel, 1 GHz to 3 GHz, Horizontal



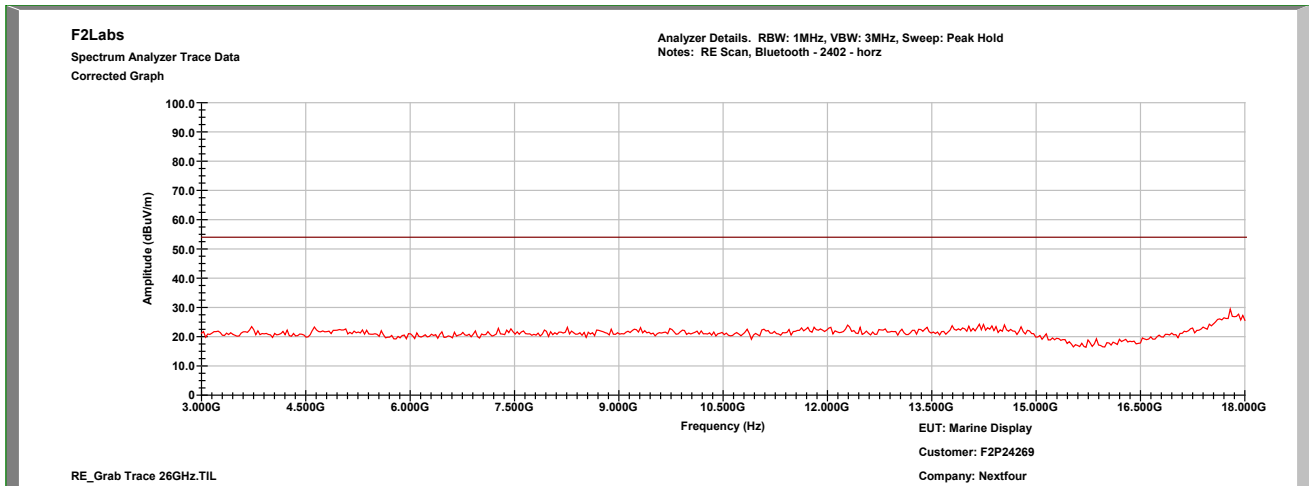


Bluetooth

Characterization Scan: Low Channel, 3 GHz to 18 GHz, Vertical



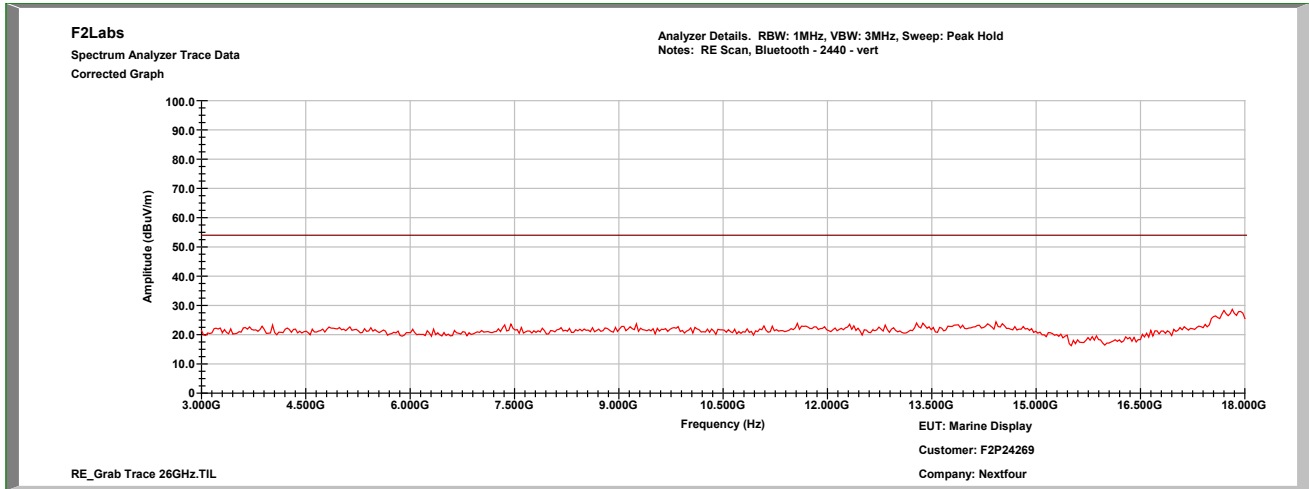
Characterization Scan: Low Channel, 3 GHz to 18 GHz, Horizontal



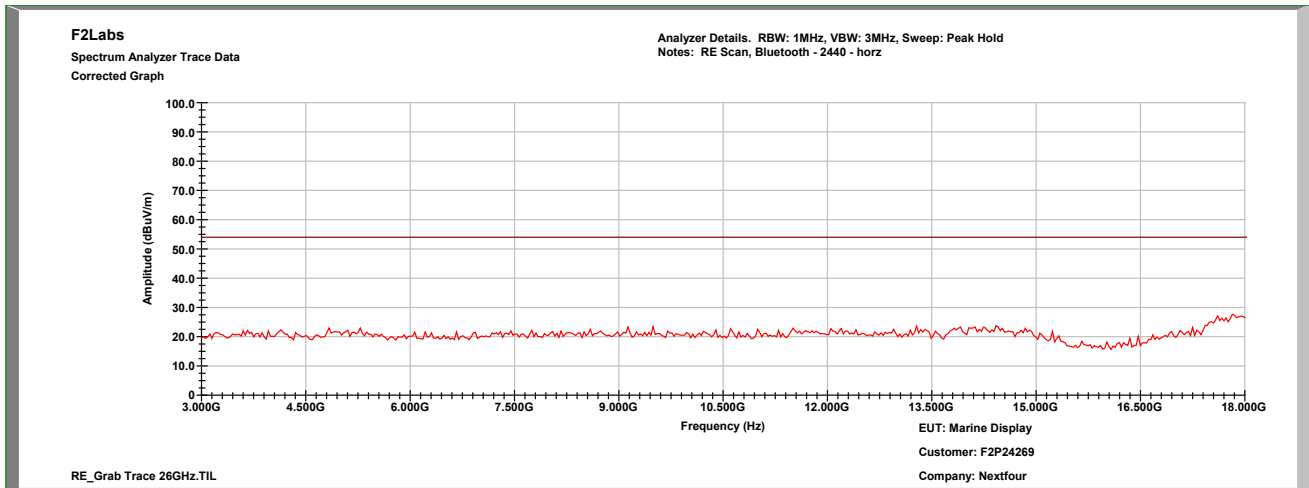


Bluetooth

Characterization Scan: Mid Channel, 3 GHz to 18 GHz, Vertical



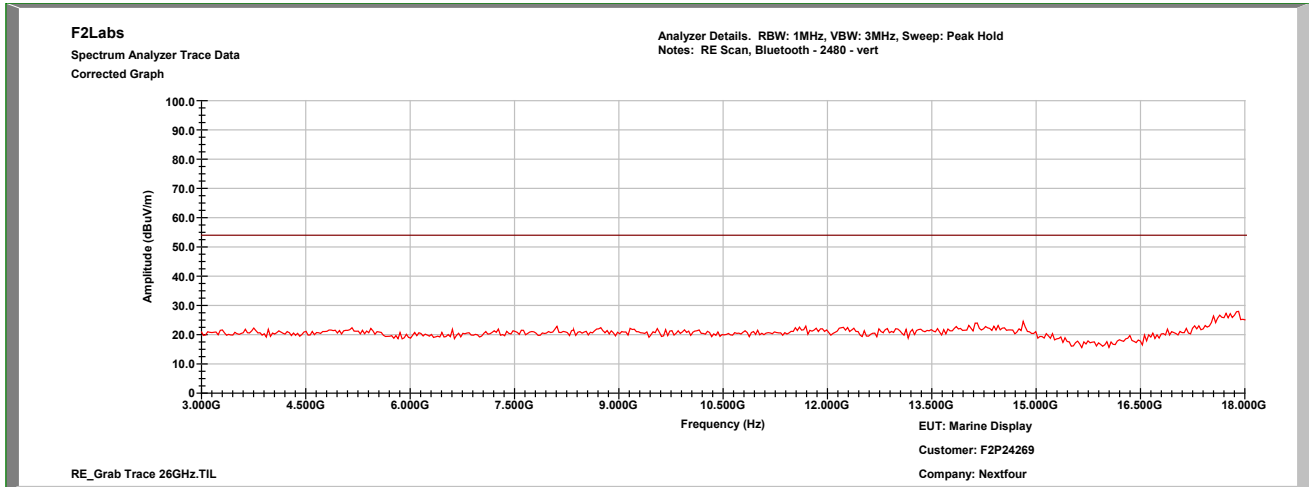
Characterization Scan: Mid Channel, 3 GHz to 18 GHz, Horizontal



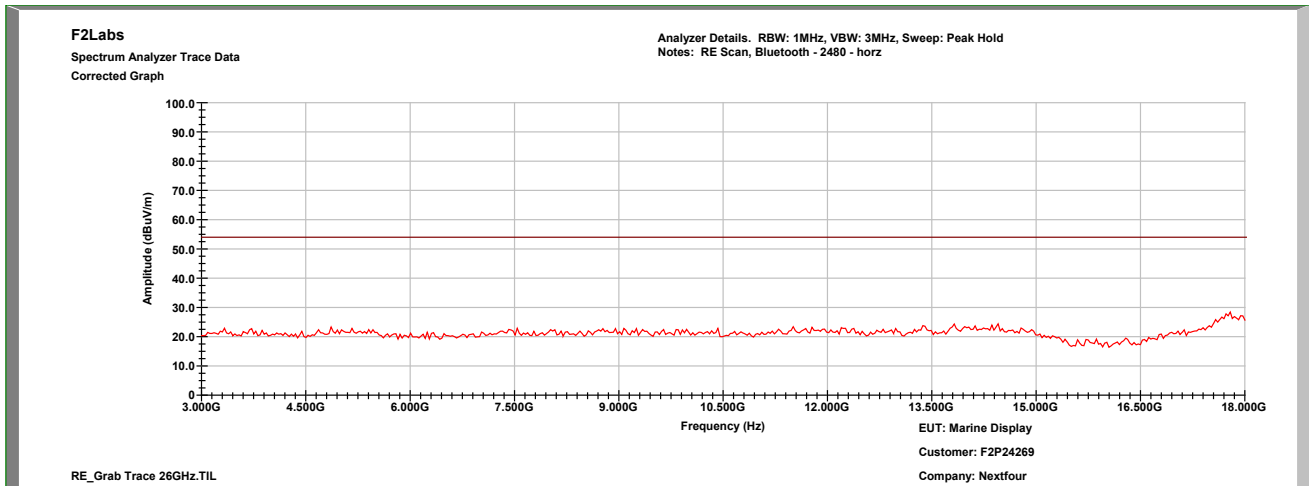


Bluetooth

Characterization Scan: High Channel, 3 GHz to 18 GHz, Vertical



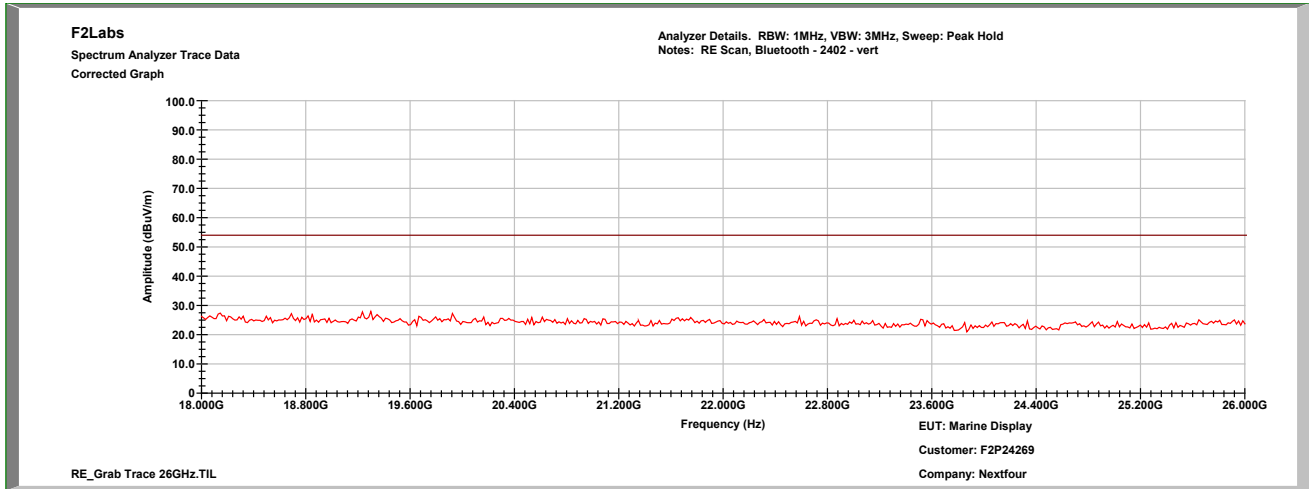
Characterization Scan: High Channel, 3 GHz to 18 GHz, Horizontal



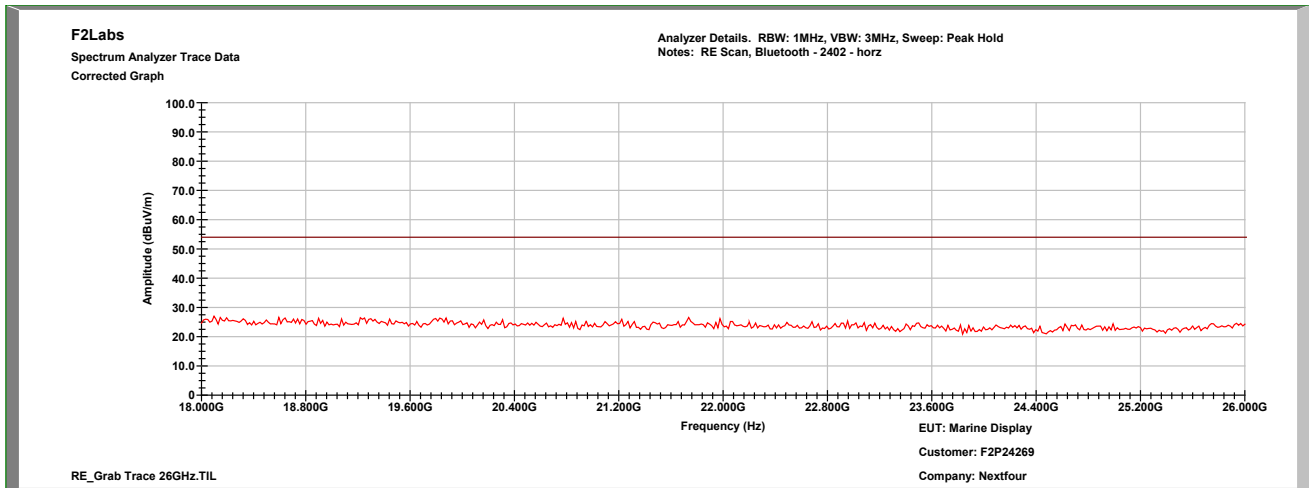


Bluetooth

Characterization Scan: Low Channel, 18 GHz to 26 GHz, Vertical



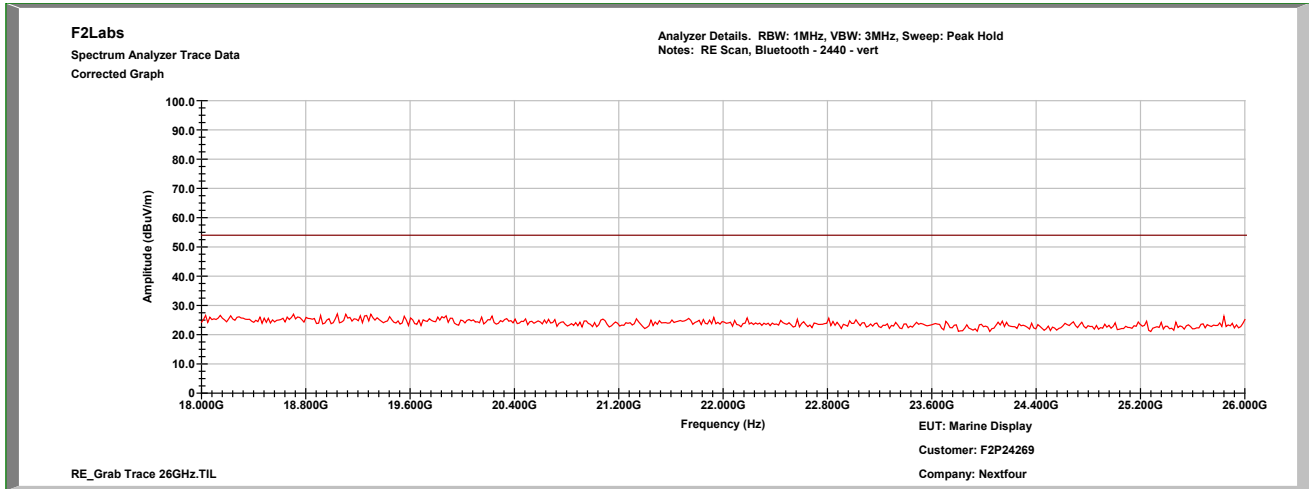
Characterization Scan: Low Channel, 18 GHz to 26 GHz, Horizontal



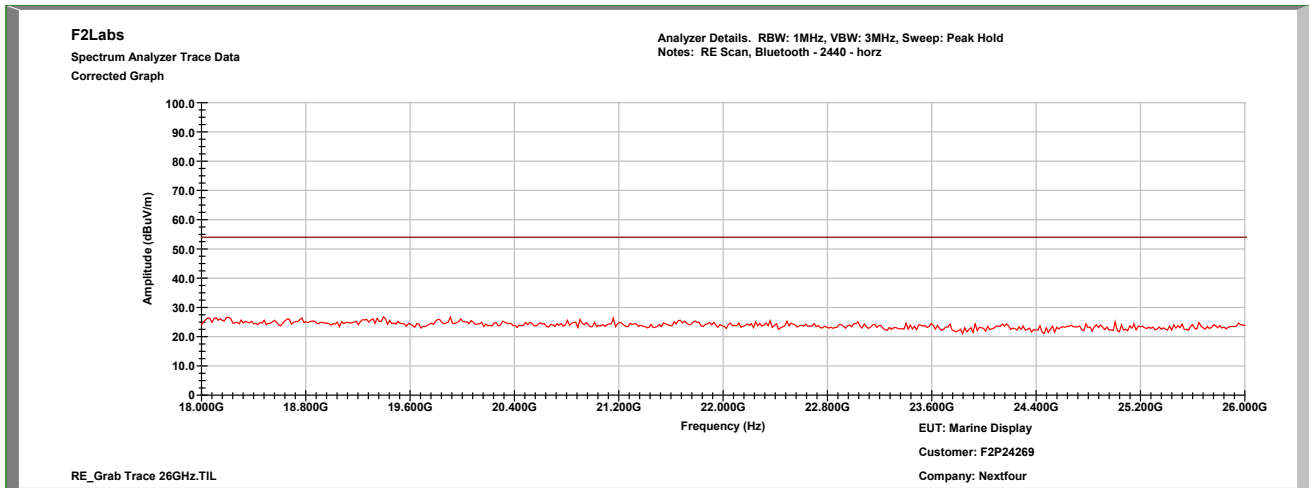


Bluetooth

Characterization Scan: Mid Channel, 18 GHz to 26 GHz, Vertical



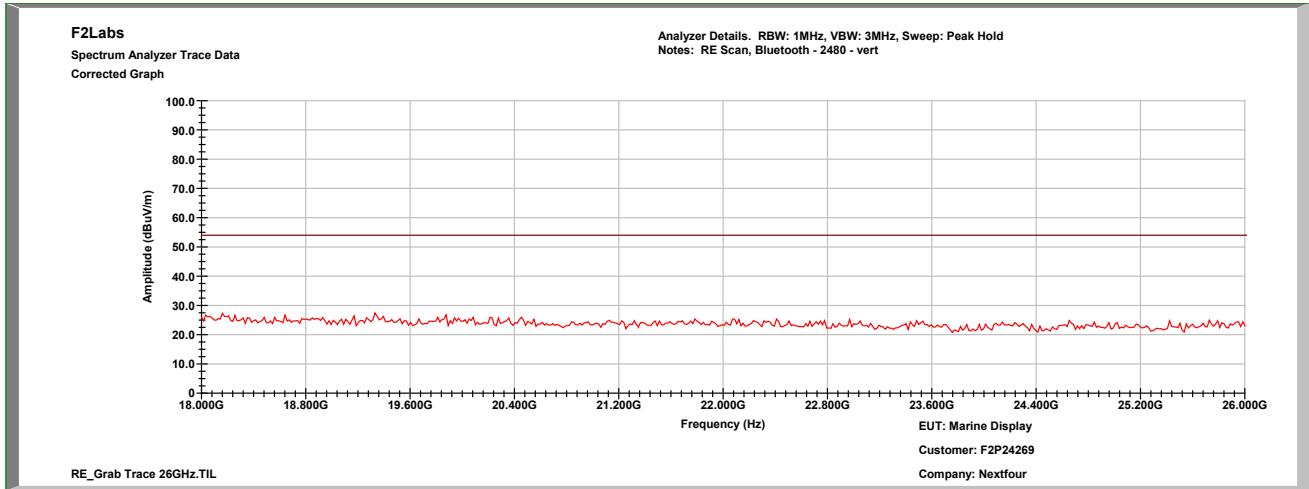
Characterization Scan: Mid Channel, 18 GHz to 26 GHz, Horizontal



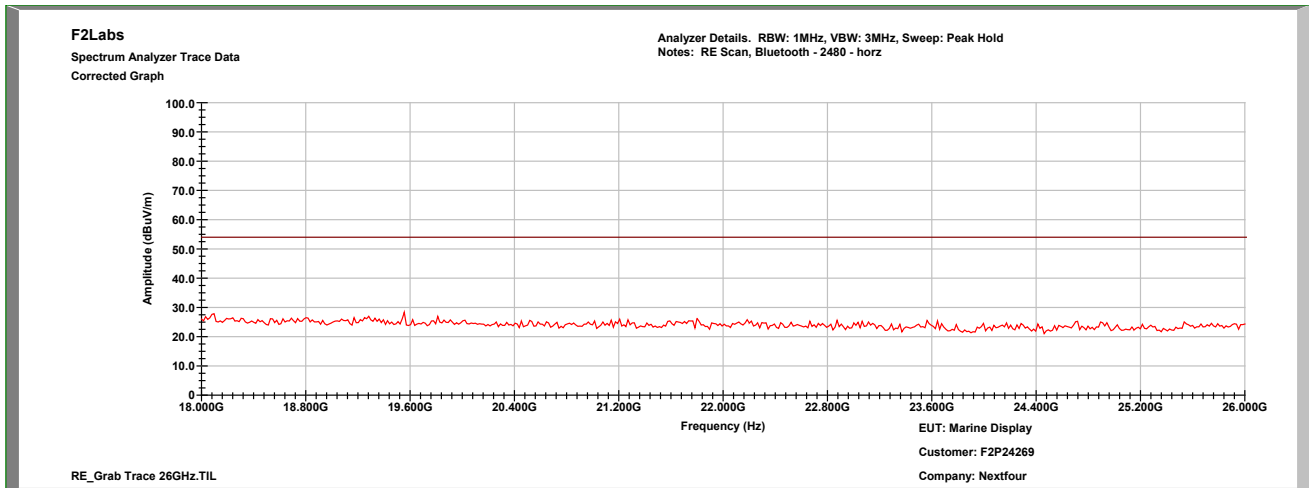


Bluetooth

Characterization Scan: High Channel, 18 GHz to 26 GHz, Vertical



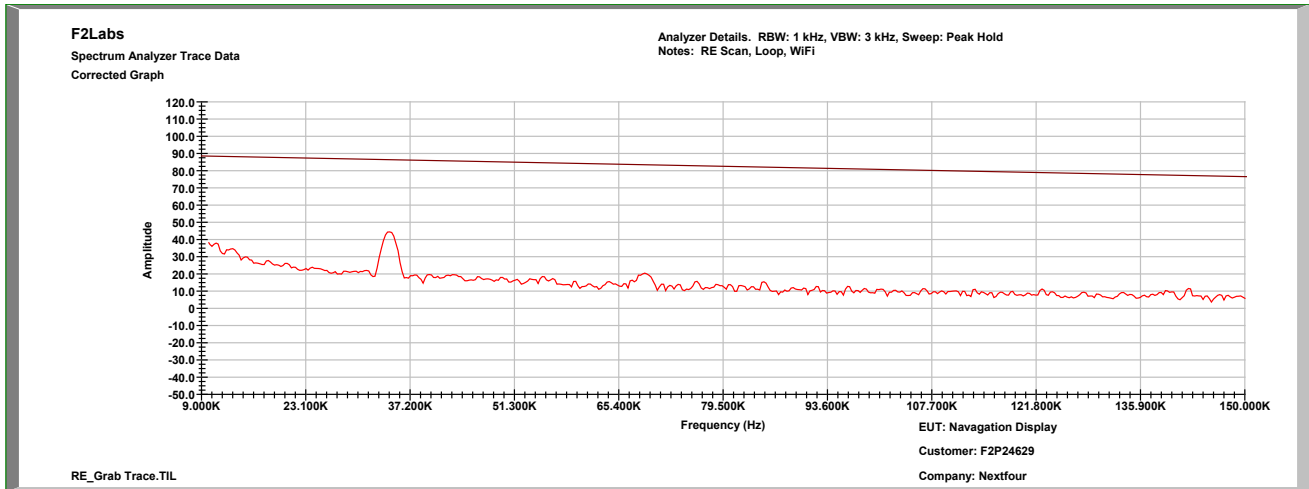
Characterization Scan: High Channel, 18 GHz to 26 GHz, Horizontal



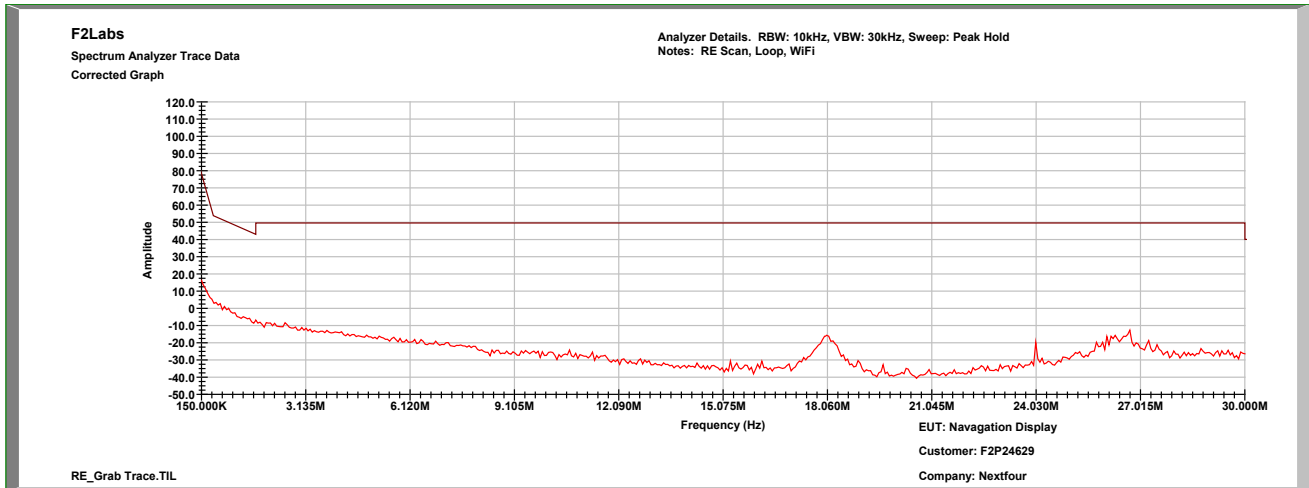


Wi-Fi

Characterization Scan: 0.009 MHz to 0.15 MHz



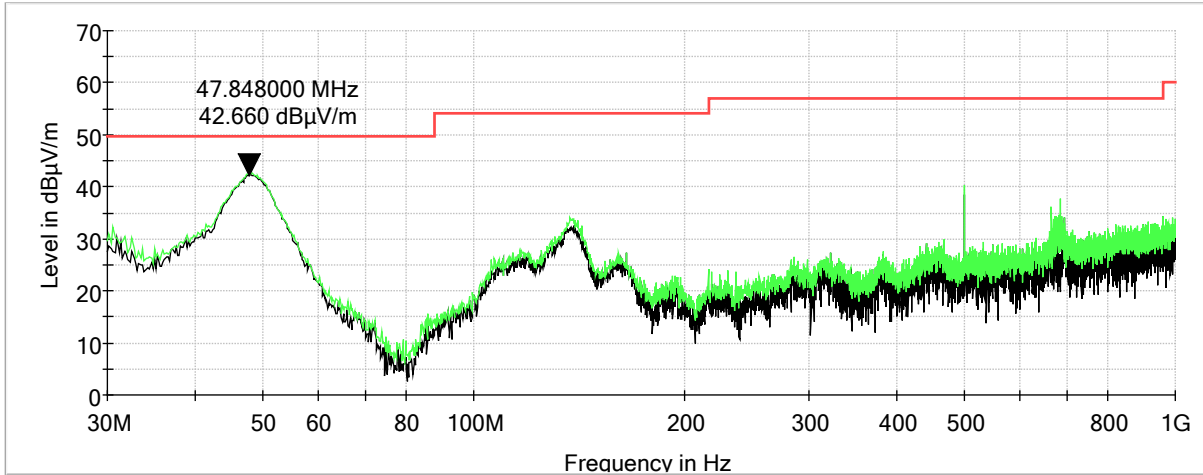
Characterization Scan: 0.15 MHz to 30 MHz



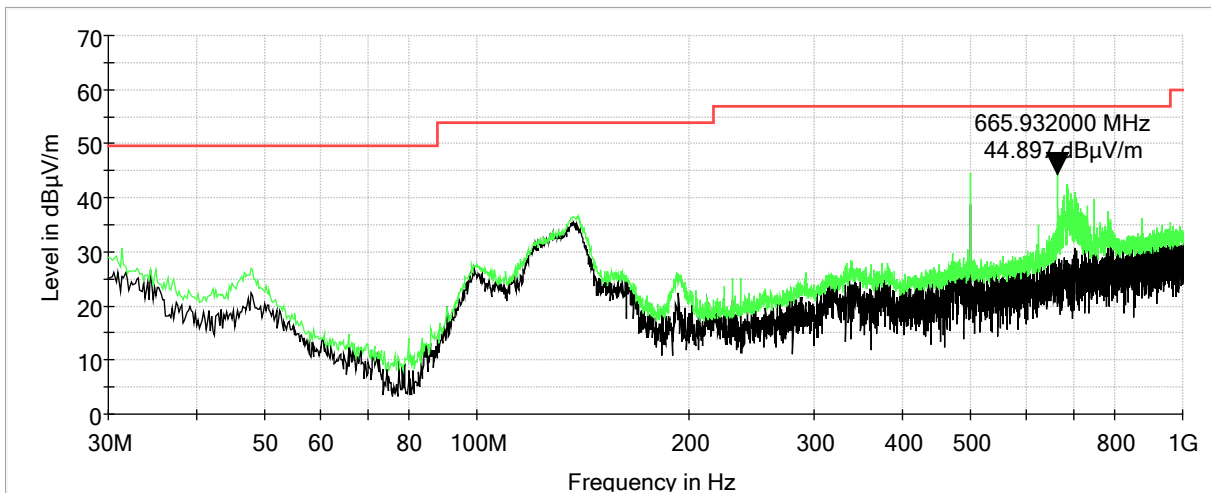


Wi-Fi

Characterization Scan: 30 MHz to 1000 MHz, Vertical



Characterization Scan: 30 MHz to 1000 MHz, Horizontal



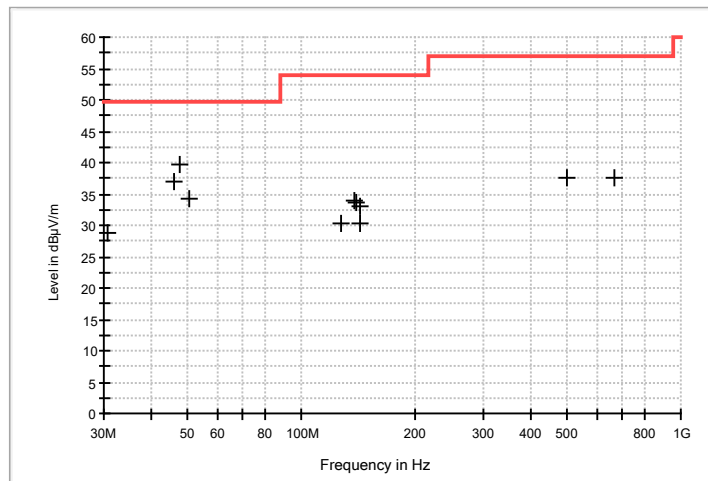


Wi-Fi Measurements

Note: Measurements include data from all channels.

QuasiPeak

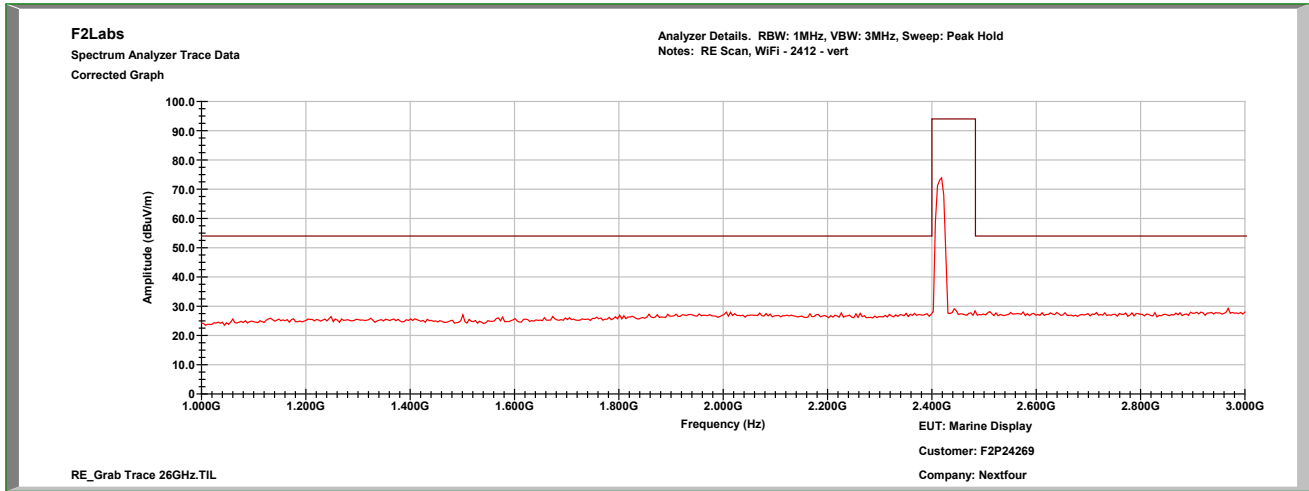
Frequency (MHz)	Antenna Polarization	Antenna Height (cm)	Azimuth (deg)	Reading (dBµV)	Cable Loss & Antenna Factor (dB)	Emission (dBµV/m)	Limit (dBµV/m)	Margin (dB)
30.580000	V	100.00	290.00	30.3	-1.6	28.70	49.6	-20.9
45.710000	V	100.00	257.00	49.6	-12.5	37.10	49.6	-12.5
47.840000	V	100.00	279.00	53.1	-13.5	39.60	49.6	-10.0
50.560000	V	100.00	77.00	178.5	-144.3	34.20	49.6	-15.4
127.580000	H	100.00	93.00	38.5	-8.3	30.20	54.0	-23.8
137.090000	V	100.00	278.00	42.7	-8.6	34.10	54.0	-19.9
138.450000	H	100.00	93.00	42.3	-8.8	33.50	54.0	-20.5
141.740000	H	100.00	93.00	39.3	-9.0	30.30	54.0	-23.7
141.940000	V	100.00	202.00	42.1	-9.0	33.10	54.0	-20.9
500.060000	H	100.00	271.00	39.7	-2.1	37.60	56.9	-19.3
665.900000	H	100.00	219.00	36.6	1.1	37.70	56.9	-19.2



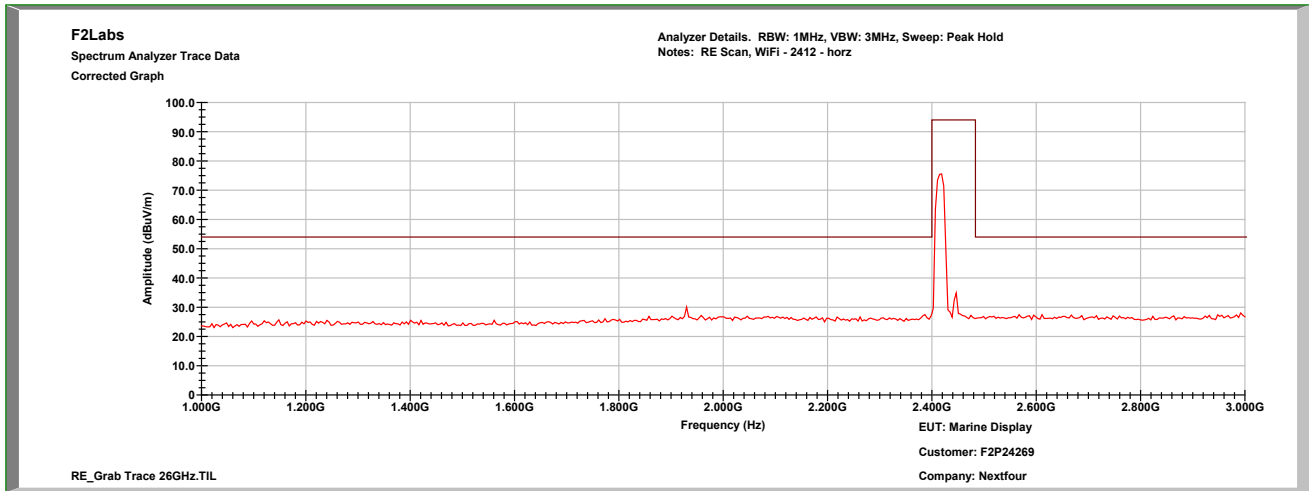


Wi-Fi

Characterization Scan: Low Channel, 1 GHz to 3 GHz, Vertical



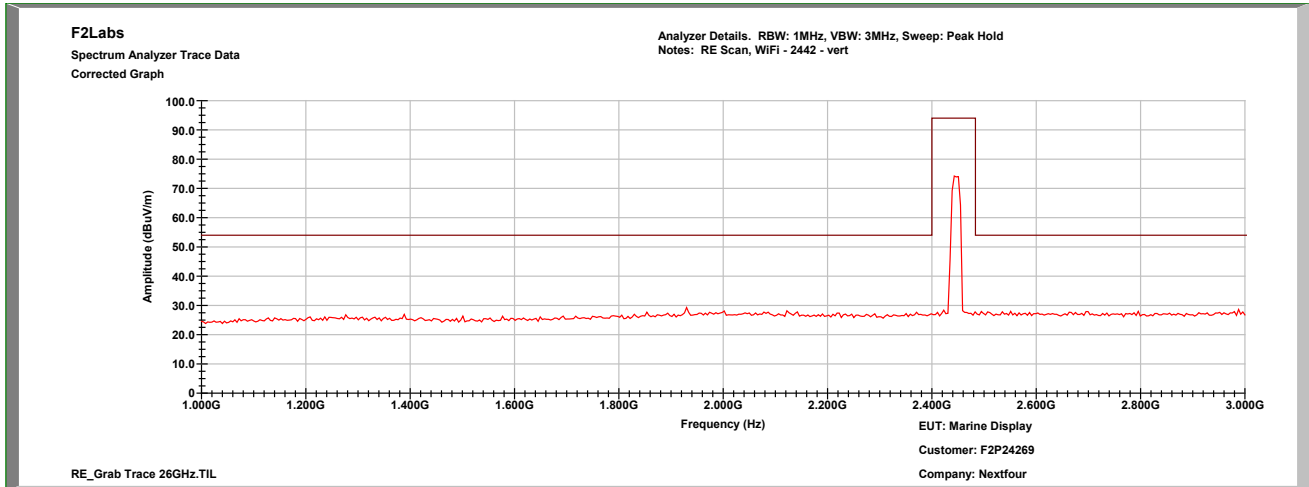
Characterization Scan: Low Channel, 1 GHz to 3 GHz, Horizontal



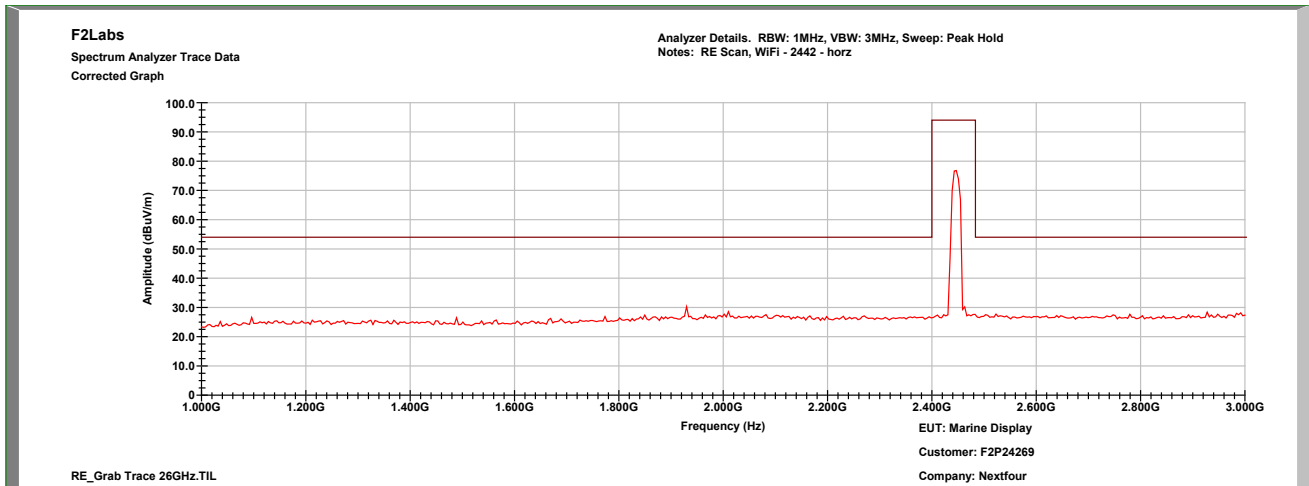


Wi-Fi

Characterization Scan: Mid Channel, 1 GHz to 3 GHz, Vertical



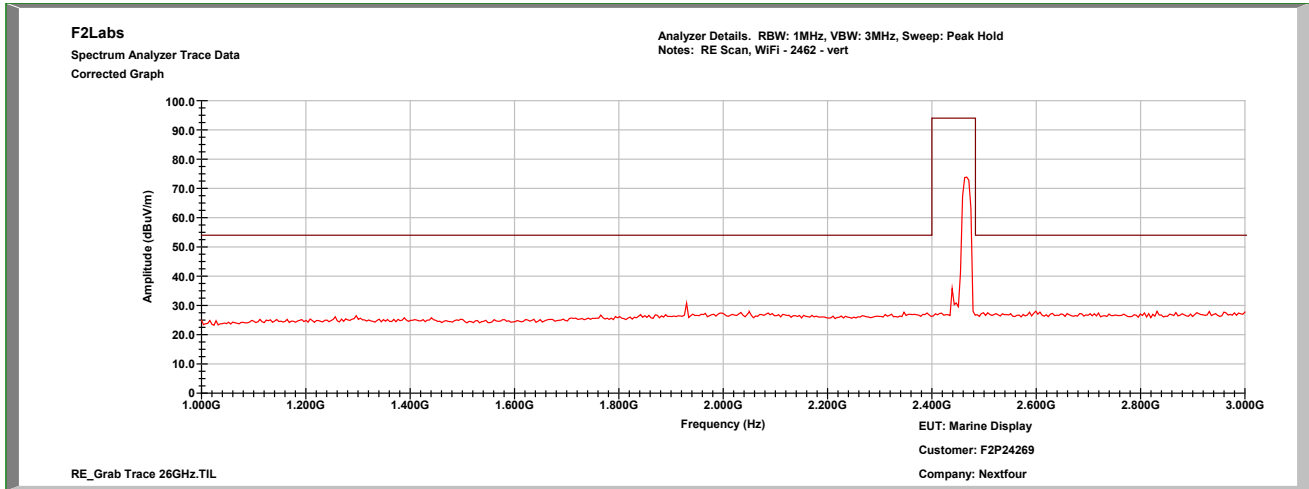
Characterization Scan: Mid Channel, 1 GHz to 3 GHz, Horizontal



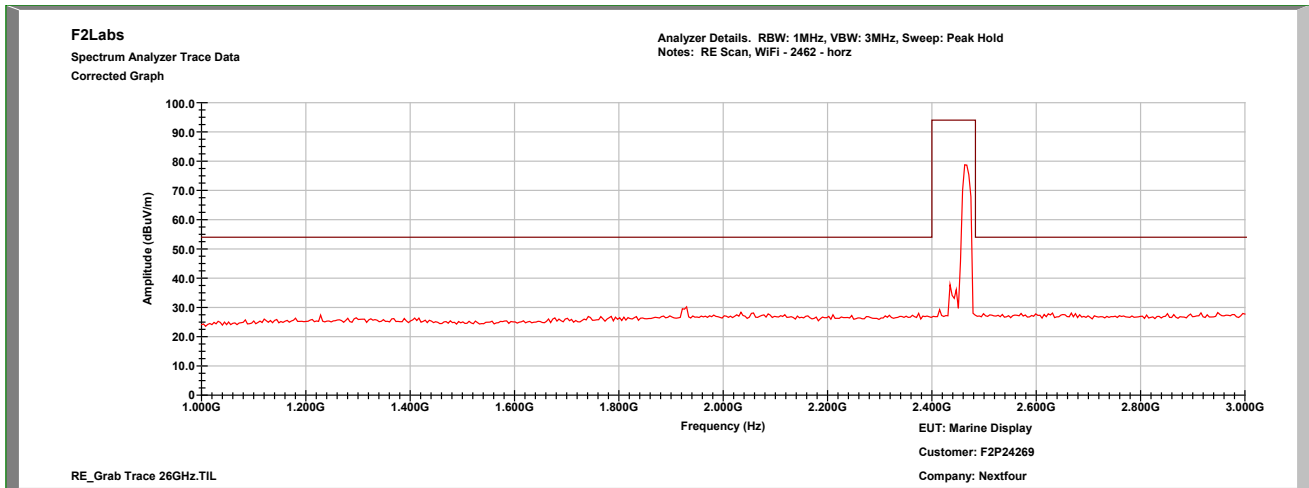


Wi-Fi

Characterization Scan: High Channel, 1 GHz to 3 GHz, Vertical



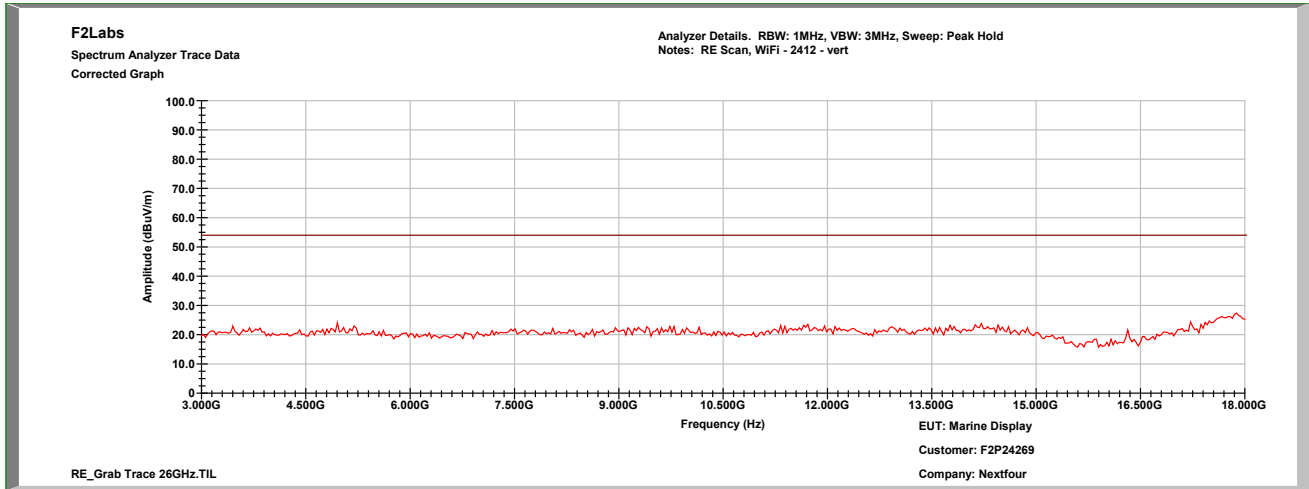
Characterization Scan: High Channel, 1 GHz to 3 GHz, Horizontal



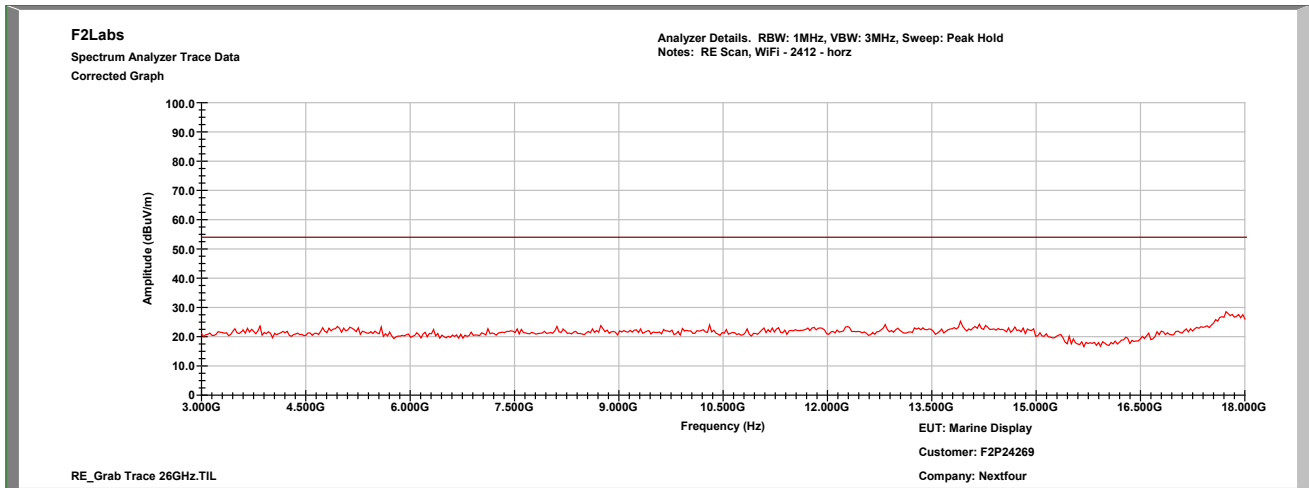


Wi-Fi

Characterization Scan: Low Channel, 3 GHz to 18 GHz, Vertical



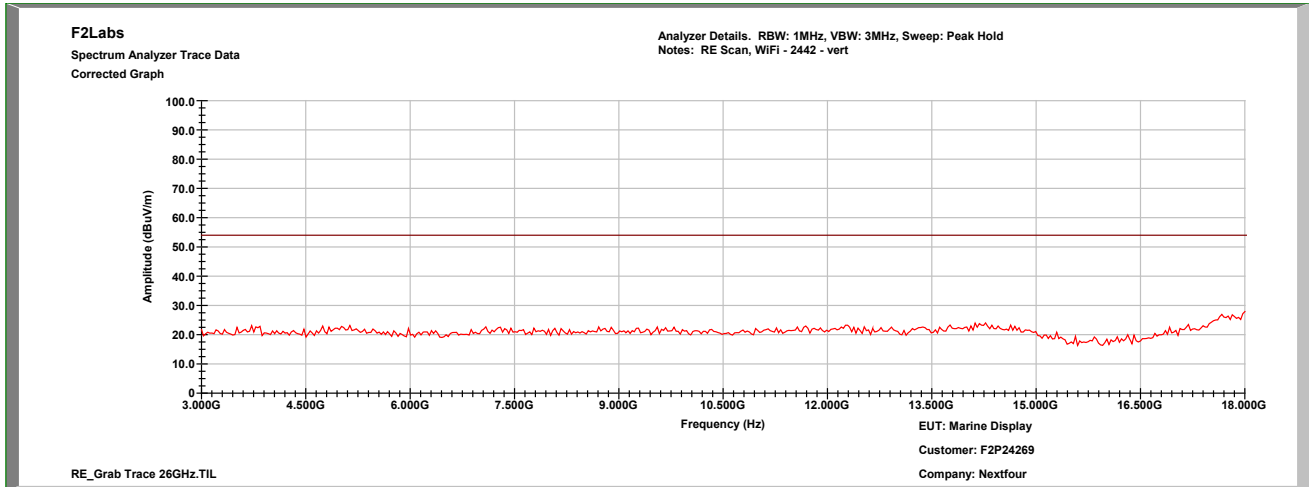
Characterization Scan: Low Channel, 3 GHz to 18 GHz, Horizontal



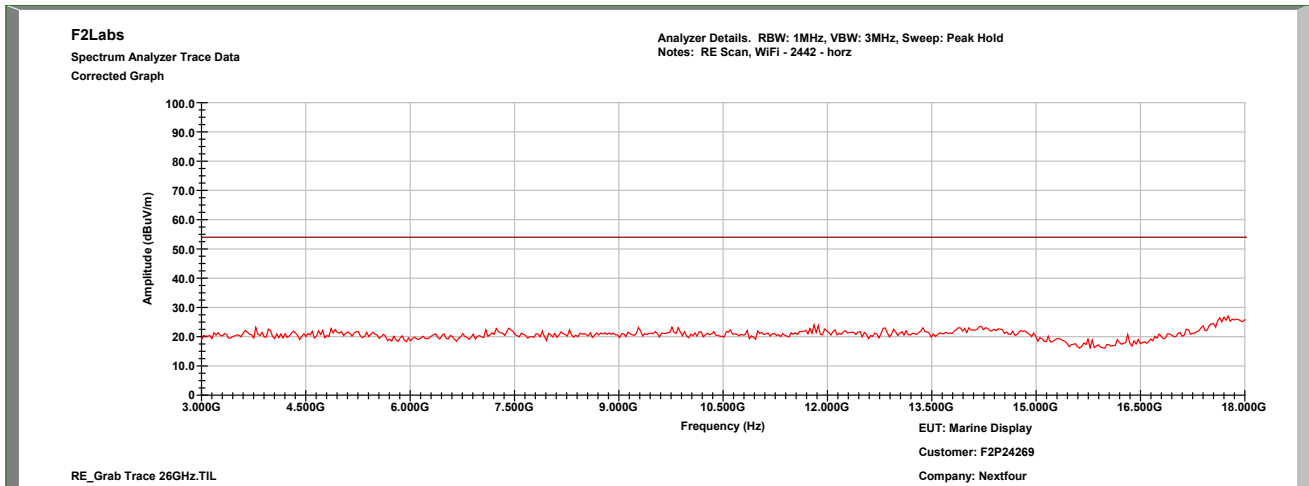


Wi-Fi

Characterization Scan: Mid Channel, 3 GHz to 18 GHz, Vertical



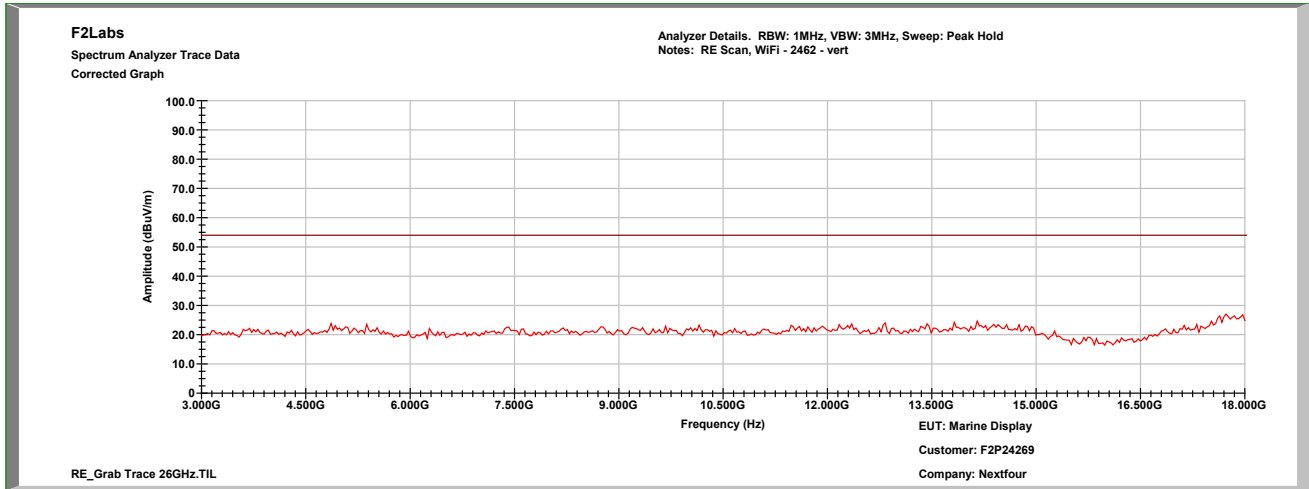
Characterization Scan: Mid Channel, 3 GHz to 18 GHz, Horizontal



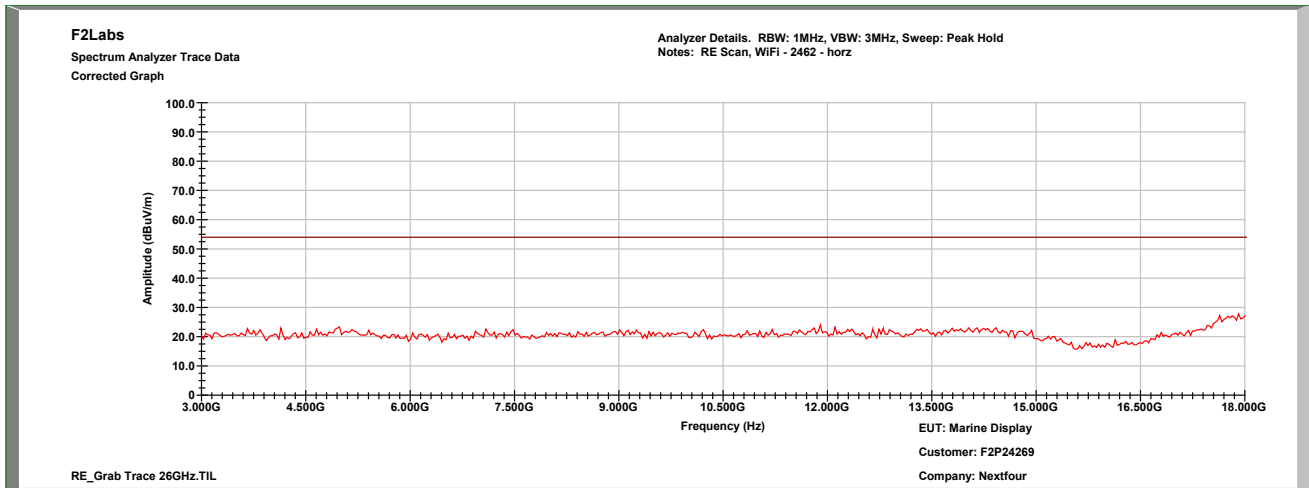


Wi-Fi

Characterization Scan: High Channel, 3 GHz to 18 GHz, Vertical



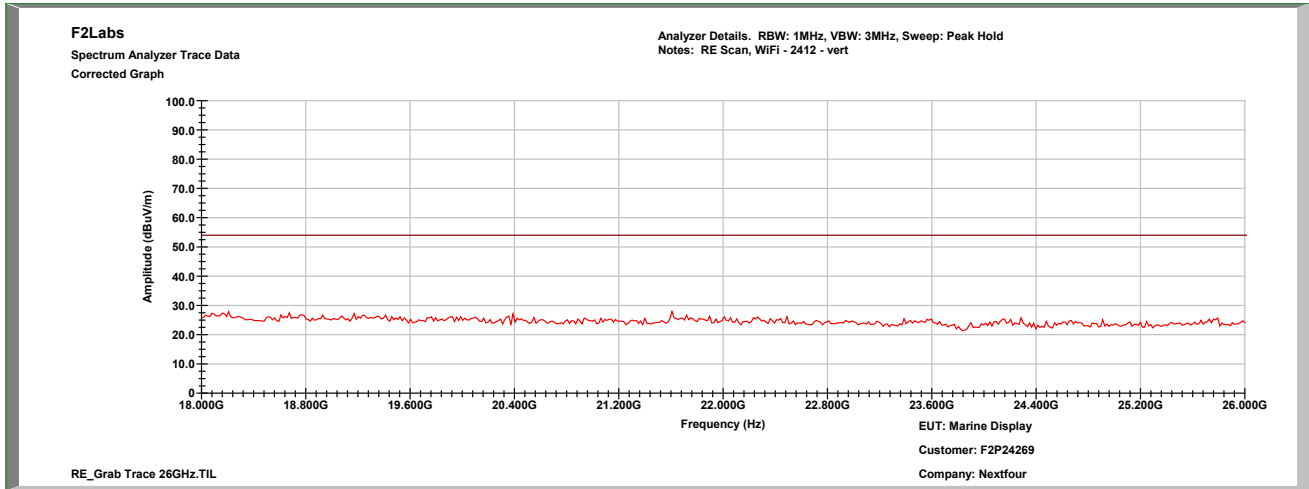
Characterization Scan: High Channel, 3 GHz to 18 GHz, Horizontal



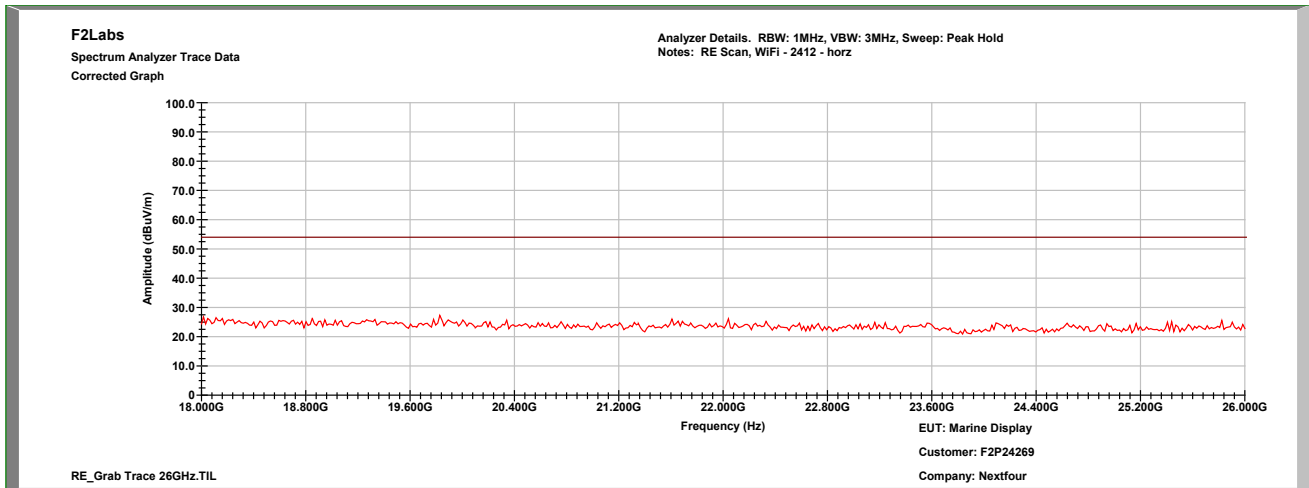


Wi-Fi

Characterization Scan: Low Channel, 18 GHz to 26 GHz, Vertical



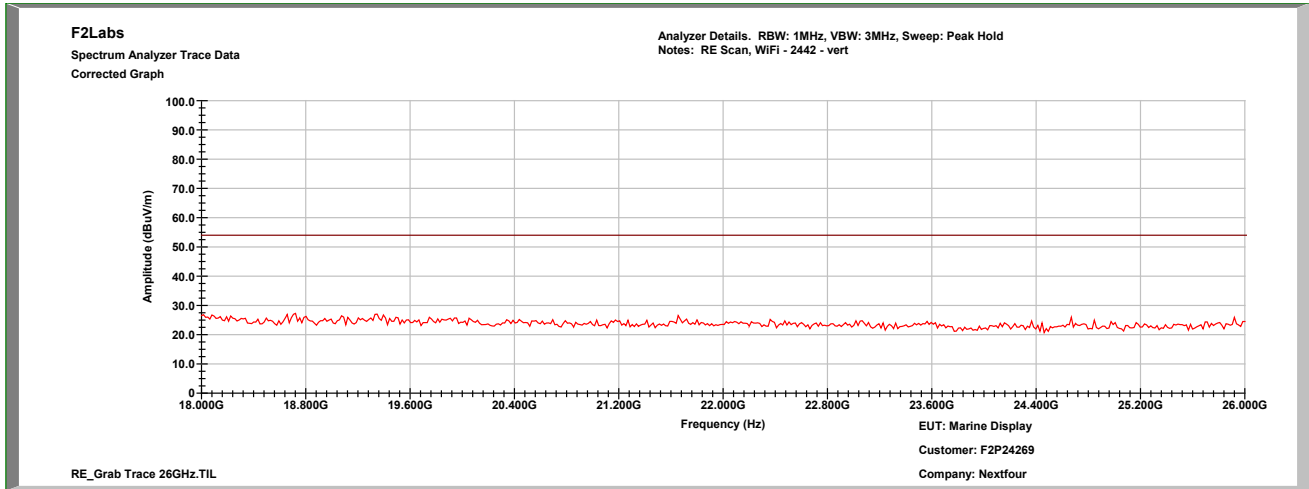
Characterization Scan: Low Channel, 18 GHz to 26 GHz, Horizontal



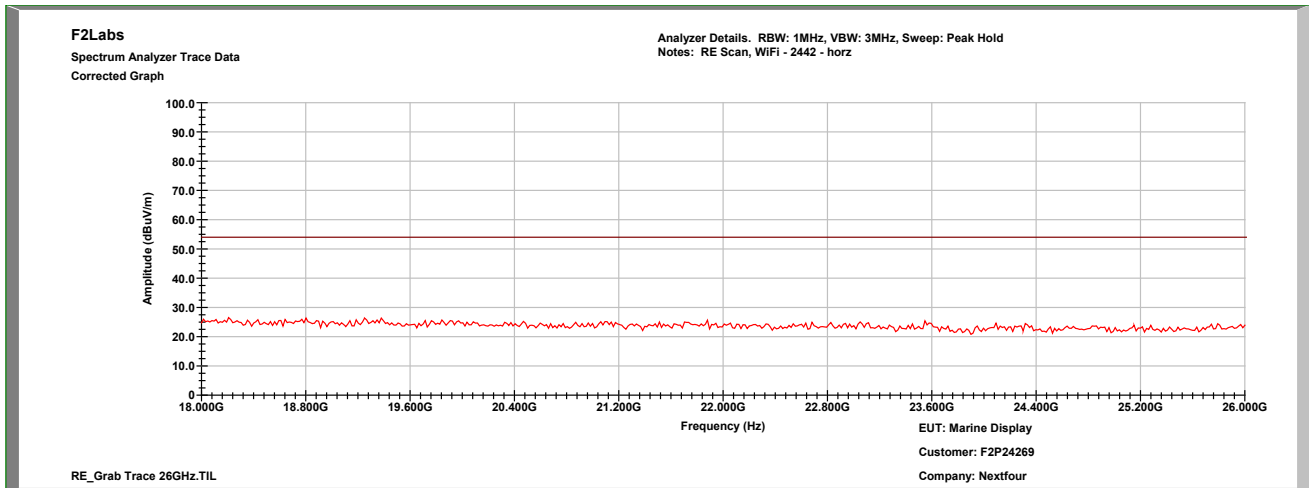


Wi-Fi

Characterization Scan: Mid Channel, 18 GHz to 26 GHz, Vertical



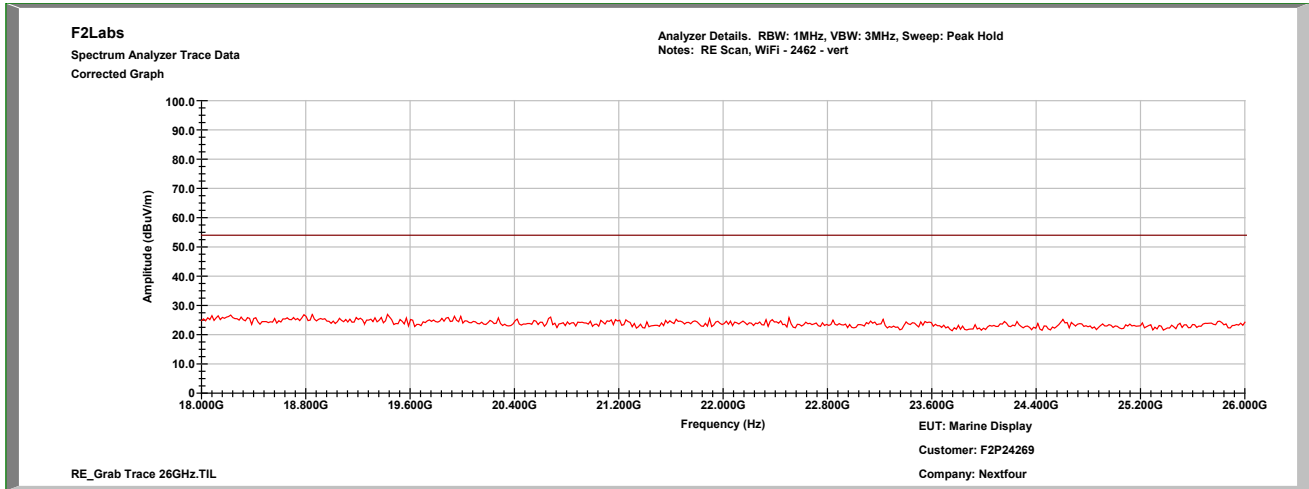
Characterization Scan: Mid Channel, 18 GHz to 26 GHz, Horizontal



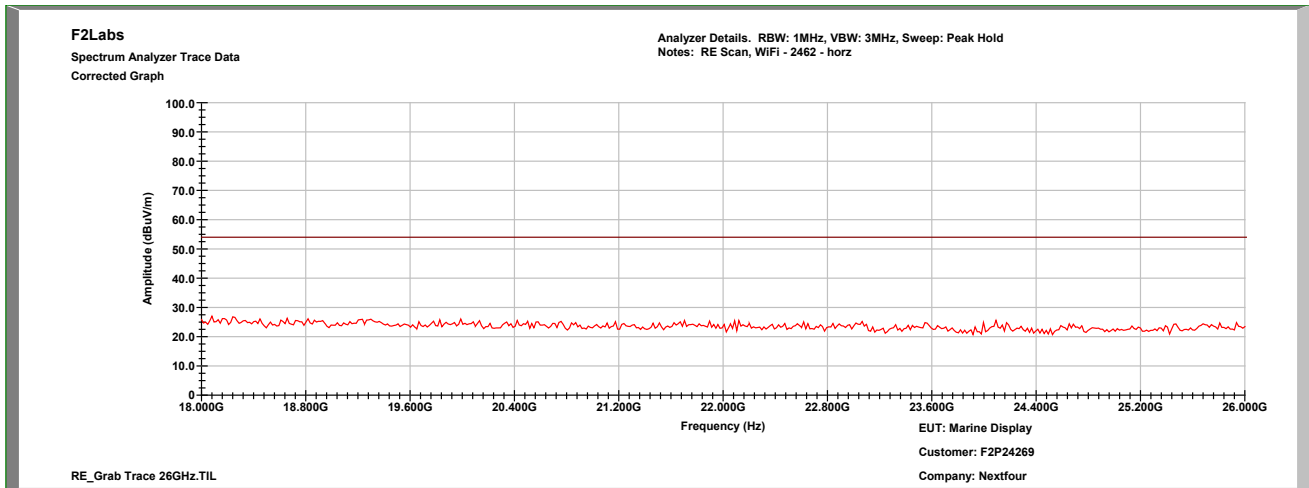


Wi-Fi

Characterization Scan: High Channel, 18 GHz to 26 GHz, Vertical



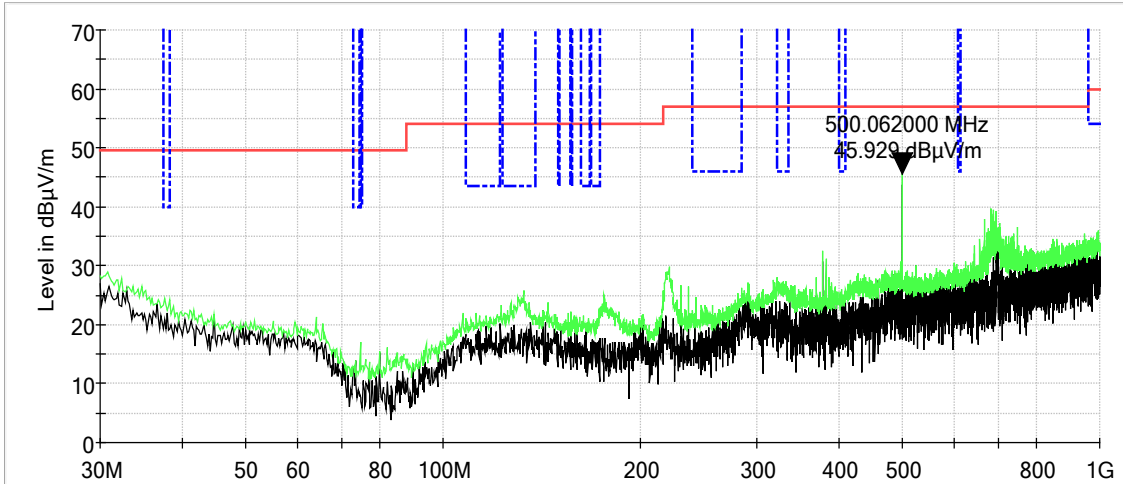
Characterization Scan: High Channel, 18 GHz to 26 GHz, Horizontal



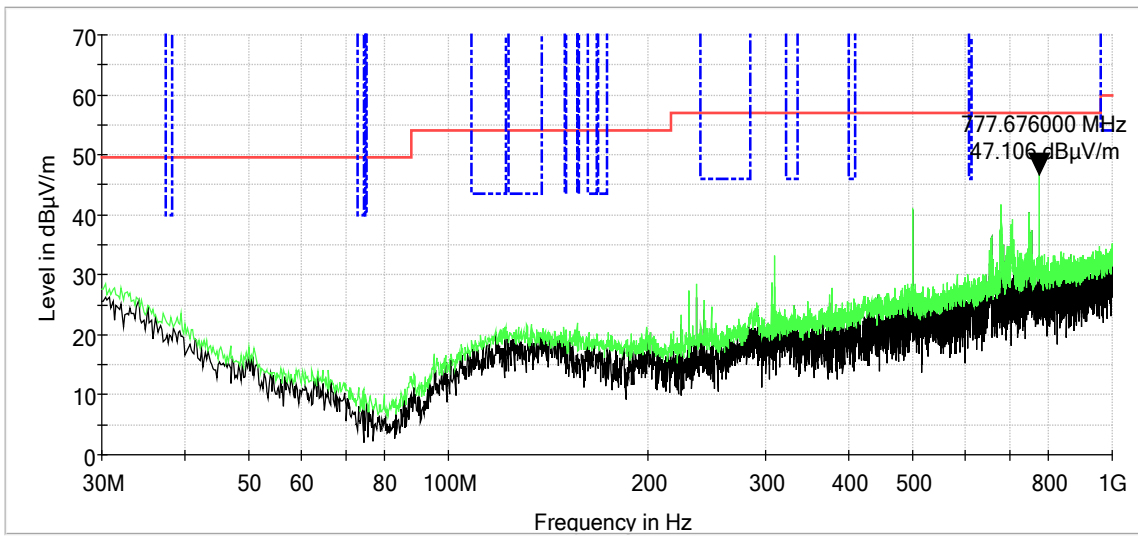


Collocation

Characterization Scan: High Channel, 30 MHz to 1000 MHz, Vertical



Characterization Scan: High Channel, 30 MHz to 1000 MHz, Horizontal



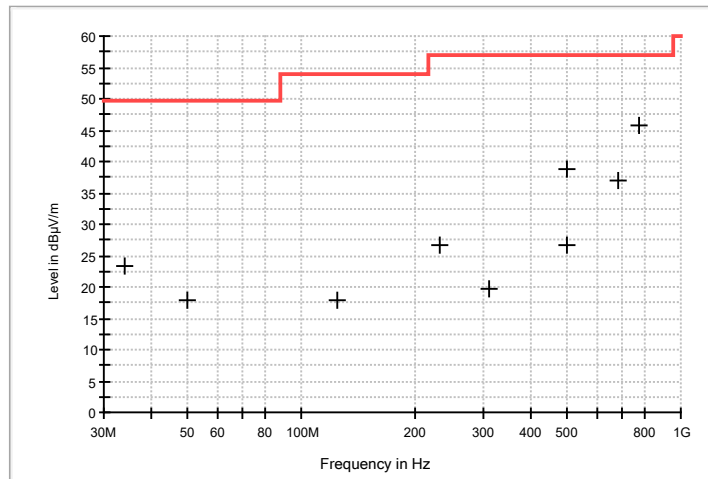


Collocation Measurements

Note: Measurements include data from all channels.

QuasiPeak

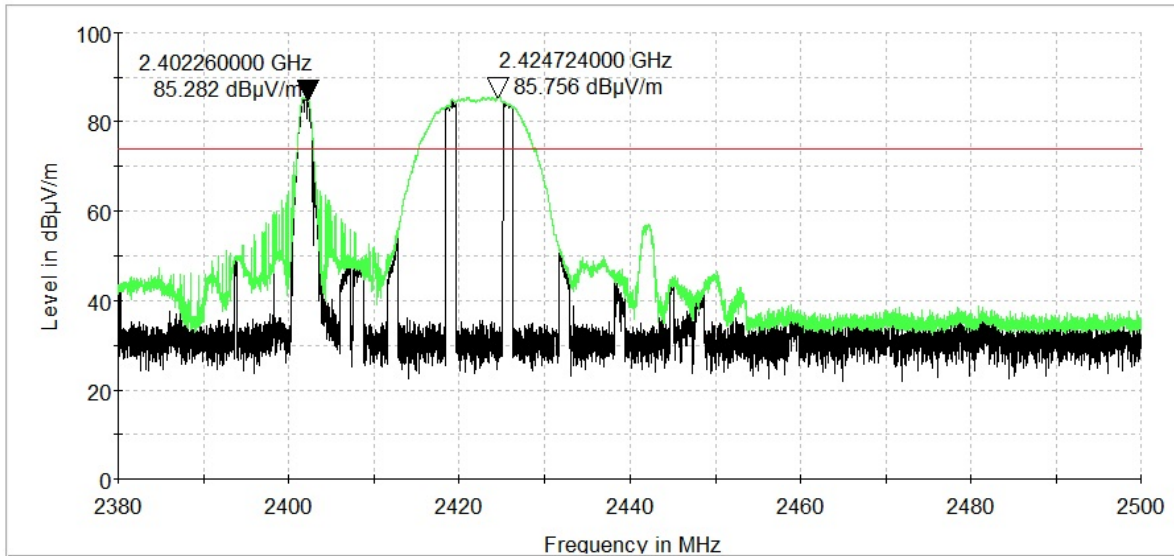
Frequency (MHz)	Antenna Polarization	Antenna Height (cm)	Azimuth (deg)	Reading (dBµV)	Cable Loss & Antenna Factor (dB)	Emission (dBµV/m)	Limit (dBµV/m)	Margin (dB)
33.880000	V	100.00	2.00	27.3	-4.1	23.20	49.6	-26.4
49.790000	V	100.00	2.00	32.1	-14.2	17.90	49.6	-31.7
124.480000	V	100.00	2.00	26.1	-8.3	17.80	54.0	-36.2
230.400000	V	100.00	2.00	36.7	-10.0	26.70	56.9	-30.2
310.140000	H	100.00	31.00	26.7	-7.0	19.70	56.9	-37.2
500.060000	H	100.00	104.00	28.9	-2.1	26.80	56.9	-30.1
500.060000	V	100.00	84.00	40.9	-2.1	38.80	56.9	-18.1
680.290000	H	100.00	228.00	35.7	1.3	37.00	56.9	-19.9
777.670000	H	100.00	317.00	42.9	2.9	45.80	56.9	-11.1



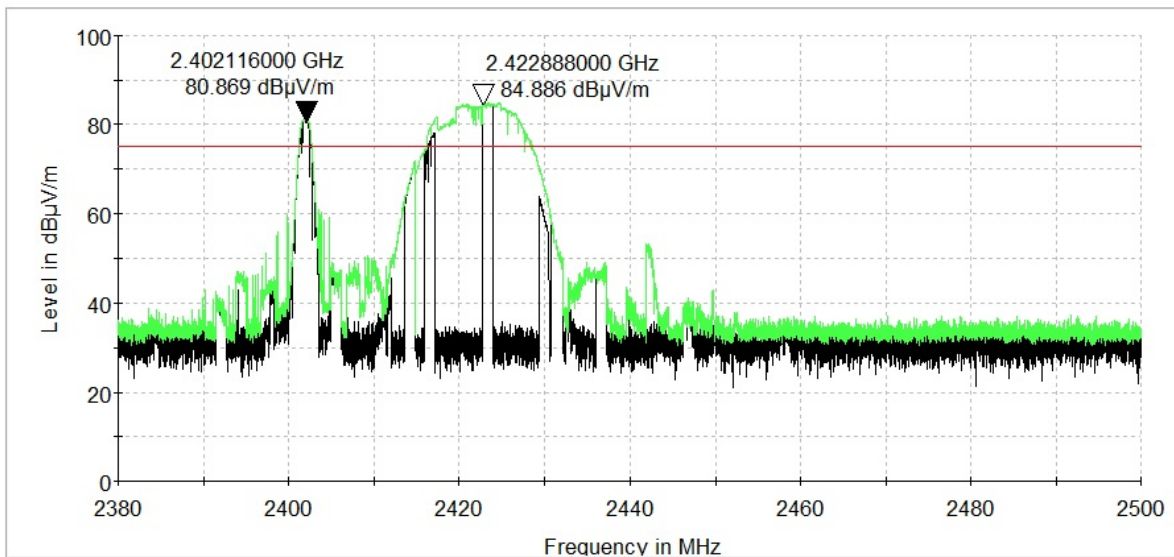


Collocation

2.4 GHz, Vertical



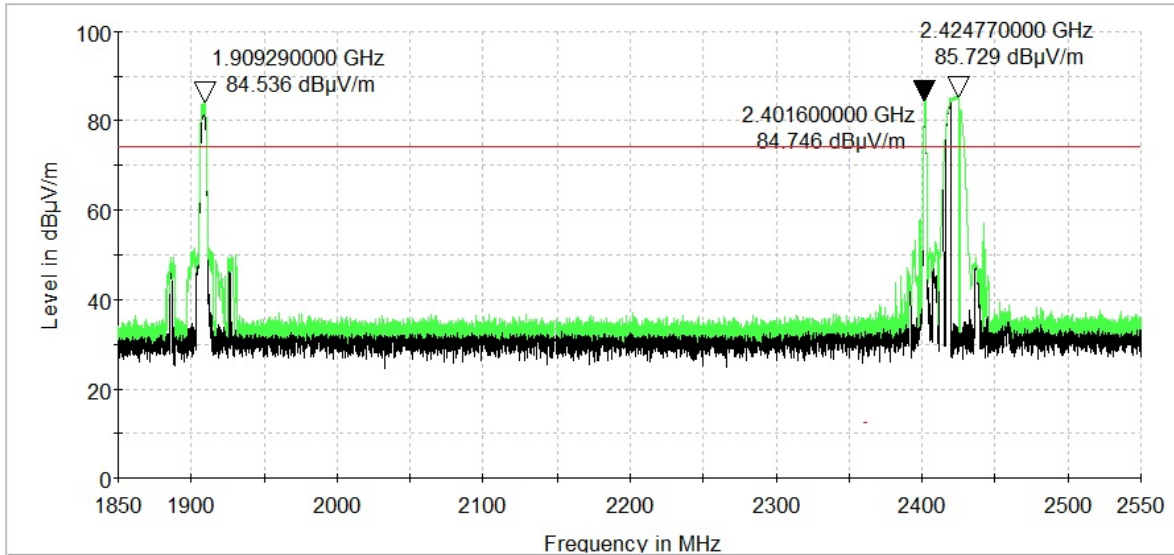
2.4 GHz, Horizontal



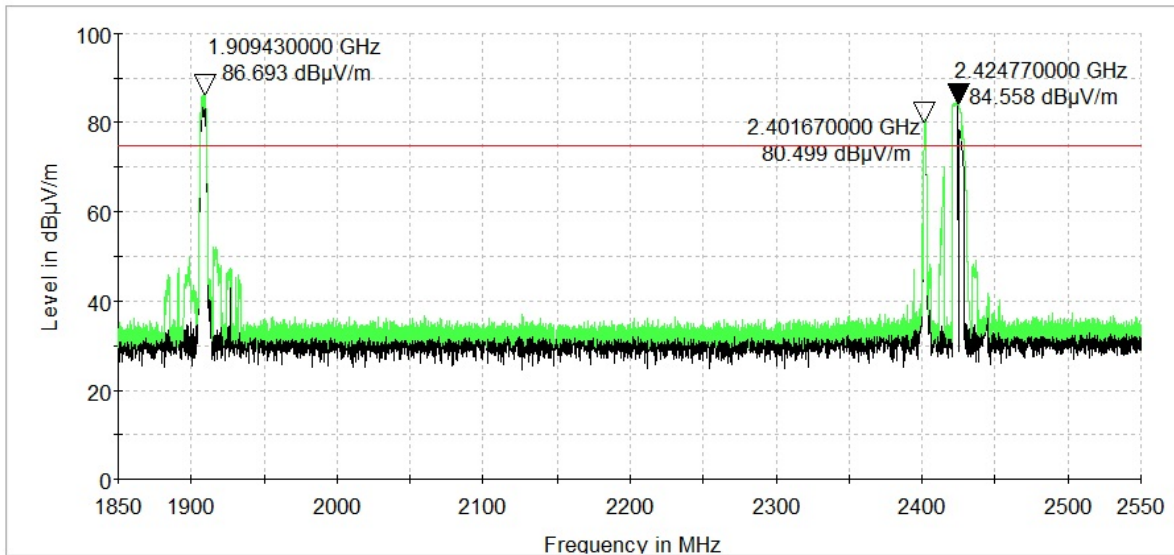


Collocation

3 Transmitters, Vertical

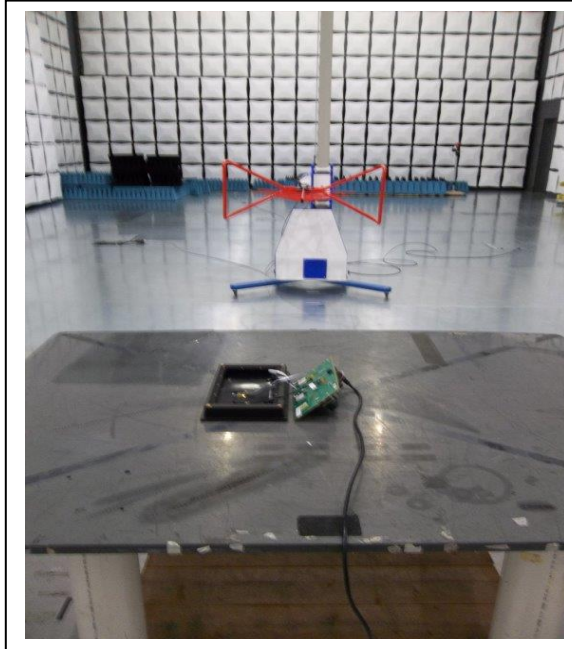


3 Transmitters, Horizontal



7 PHOTOGRAPHS

Radiated Spurious Emission, Less than 1 GHz



Radiated Spurious Emission, Greater than 1 GHz

