**F2 Labs**
**16740 Peters Road**
**Middlefield, Ohio 44062**
**United States of America**
**www.f2labs.com**

# CERTIFICATION TEST REPORT

| | |
|---|---|
| **Manufacturer:** | **Structured Mining Systems, Inc.**<br>**d.b.a. Cervis Inc.**<br>**170 Thorn Hill Road**<br>**Warrendale, Pennsylvania 15086**<br>**United States of America** |
| **Applicant:** | **Same As Above** |
| **Product:** | **Radio Module, DSSS, 2.4GHz, 100mW** |
| **Model:** | **SRF305** |
| **FCC ID:** | **LOBSRF305** |
| **Testing Commenced:** | **Jan. 17, 2014** |
| **Testing Ended:** | **Apr. 21, 2014** |
| **Summary of Test Results:** | **Page 5** |

**Standards**:

- **FCC Part 15 Subpart C, Section 15.247**
- **FCC Part 15, Subpart C, Section 15.207**
- **FCC Part 15, Subpart C, Section 15.209**

**Evaluation Conducted by:**

Joe Knepper, EMC Proj. Eng.

Michael Toth, Senior EMC Eng.

Ken Littell, EMC Tech. Mgr.

**Report Reviewed by:**

Wendy Fuster, President

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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 2003 version of ANSI C63.4 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 6.

## 1.3 Uncertainty Budget:

Radiated Emission

- Combined Uncertainty (+ or -) 2.67 dB
- Expanded Uncertainty (+ or -) 5.35 dB

Conducted Emissions

- Combined Uncertainty (+ or -) 1.88 dB
- Expanded Uncertainty (+ or -) 3.75 dB

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 |
|---|---|---|---|
| F2LQ5898A-01E | First Issue | Apr. 28, 2014 | W. Fuster |
| | | | |
| | | | |
| | | | |

## 2 SUMMARY OF TEST RESULTS

| Test Name | Standard(s) | Results |
|---|---|---|
| -6dB Occupied Bandwidth | CFR 47 Part 15.247(a)(2) / KDB558074 | Complies |
| Conducted Output Power | CFR 47 Part 15.247(b)(3) / KDB558074 | Complies |
| Conducted Spurious Emissions | CFR 47 Part 15.247(d) / Part 15.209 / KDB558074 | Complies |
| Radiated Spurious Emission with 3.8dBi Integral Antenna | CFR 47 Part 15.247(d) / Part 15.209 / KDB558074 | Complies |
| Radiated Spurious Emission with 9dBi Whip Antenna | CFR 47 Part 15.247(d) / Part 15.209 / KDB558074 | Complies |
| Peak Power Spectral Density | CFR 47 Part 15.247(e) / KDB558074 | Complies |
| Conducted Emissions | CFR 47 Part 15.207(a) | Complies |

Note: product was operated using AAA batteries. There is an option for the Host product to be powered from other DC sources, so Voltage Variation testing in 15.31(3)(e) was performed using 12VDC as the nominal voltage, and then the 85% and 115% of that voltage was tested also. The output power at the High, Mid, and Low channels was measured to verify how much the power and frequency was affected by the variation of the input power. No shift in frequency or power was measured at either of the varied voltages on any of the channels.

| Modifications Made to the Equipment |
|---|
| None |

## 3 TABLE OF MEASURED RESULTS

| Test | High Channel 2.480GHz | Mid Channel 2.440GHz | Low Channel 2.405GHz |
|---|---|---|---|
| Conducted Output Power | 97.50mW (19.89dBm) | 98.86mW (19.95dBm) | 95.72mW (19.81dBm) |
| Conducted Output Power Limit | 1 Watt, (30dBm) | 1 Watt, (30dBm) | 1 Watt, (30dBm) |
| Conducted Output Power Limit with 3.8dBi Integral Antenna | 233.88mW (23.69dBm) | 237.14mW (23.75dBm) | 229.61mW (23.61dBm) |
| E.I.R.P. with 9dBi Whip Antenna | 774.46mW (28.89dBm) | 785.24mW (28.95dBm) | 760.33mW (28.81dBm) |
| E.I.R.P. Limit | 4 Watts, (36.02dBm) | 4 Watts, (36.02dBm) | 4 Watts, (36.02dBm) |
| Peak Power Spectral Density | 6.54 dBm | 7.21 dBm | 7.74 dBm |
| Peak Power Spectral Density Limit | 8 dBm | 8 dBm | 8 dBm |
| -6dB Occupied Bandwidth | 1.603MHz | 1.593MHz | 1.583MHz |
| -6dB Occupied Bandwidth Limit | ≥ 500KHz | ≥ 500KHz | ≥ 500KHz |

# 4 ENGINEERING STATEMENT

This report has been prepared on behalf of Cervis Inc. to provide documentation for the testing described herein. This equipment has been tested and found to comply with parts 15.247, 15.207 and 15.209 of the FCC Rules using ANSI C63.4 2009 and KDB558074 standards. The test results found in this test report relate only to the items tested.

# 5 EUT INFORMATION AND DATA

## 5.1 Equipment Under Test:

Product: Radio Module, DSSS, 2.4GHz
Model: SRF305
Serial No.: None
FCC ID: LOBSRF305

## 5.2 Trade Name:

Structured Mining Systems, Inc. d.b.a. Cervis Inc.

## 5.3 Power Supply:

Non-rechargeable AAA Batteries

## 5.4 Applicable Rules:

CFR 47, Part 15.247, subpart C
CFR 47, Part 15.207
CFR 47, Part 15.209

## 5.5 Equipment Category:

Radio Transmitter-DTS

## 5.6 Antenna:

3.8dBi gain Integral Antenna
9dBi gain Whip Antenna

## 5.7 Accessories:

**N/A**

## 5.8 Test Item Condition:

The equipment to be tested was received in good condition.

## 5.9 Testing Algorithm:

EUT was set up in a normal operating mode, with device transmitting in three different channels (low, mid, high).

# 6 FCC PART 15.247(a)(2) – OCCUPIED BANDWIDTH

## 6.1 Requirements:

The 6dB bandwidth shall be greater than 500 kHz.

Bandwidth measurements were made at the low (2.405 GHz), mid (2.440 GHz) and upper (2.480 GHz) frequencies. The bandwidth was measured using the analyzer's marker function.

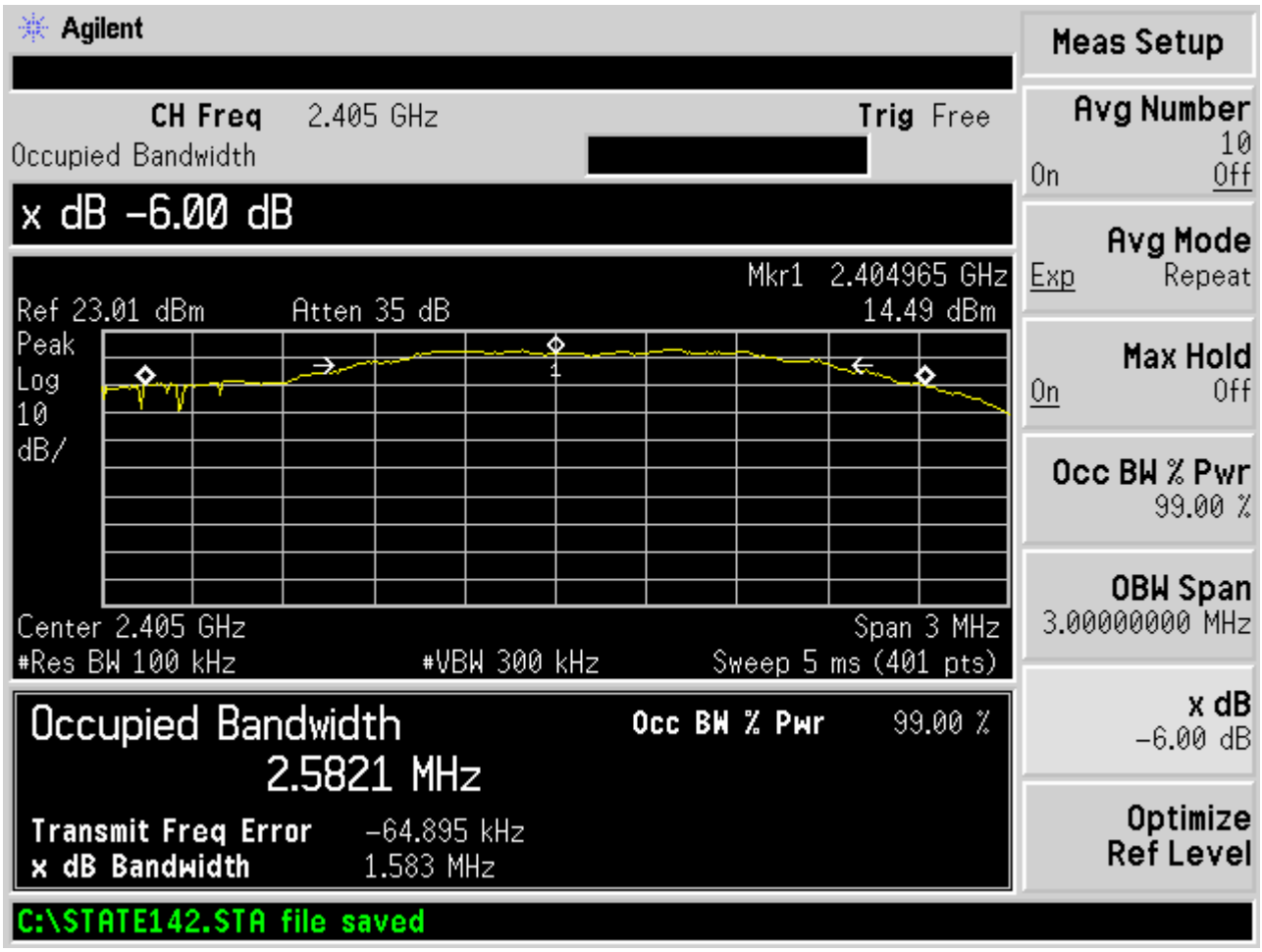
## 6.2 Equipment Used:

| Equipment Type | Asset Number | Manufacturer | Model | Serial Number | Calibration Due Date |
|---|---|---|---|---|---|
| Temp/Hum. Recorder | CL137 | Extech | RH520 | CH16992 | Apr. 17, 2014 |
| Receiver | CL151 | Rohde & Schwarz | ESU40 | 100319 | Oct. 31, 2014 |
| Cable: 0.3m Low Loss | CL116 | A.H. Systems, Inc. | SAC-26G-0.3 | 206 | Mar. 1, 2014 |
| Spectrum Analyzer | CL138 | Agilent Technologies | E4407B | US41192779 | Oct. 29, 2014 |

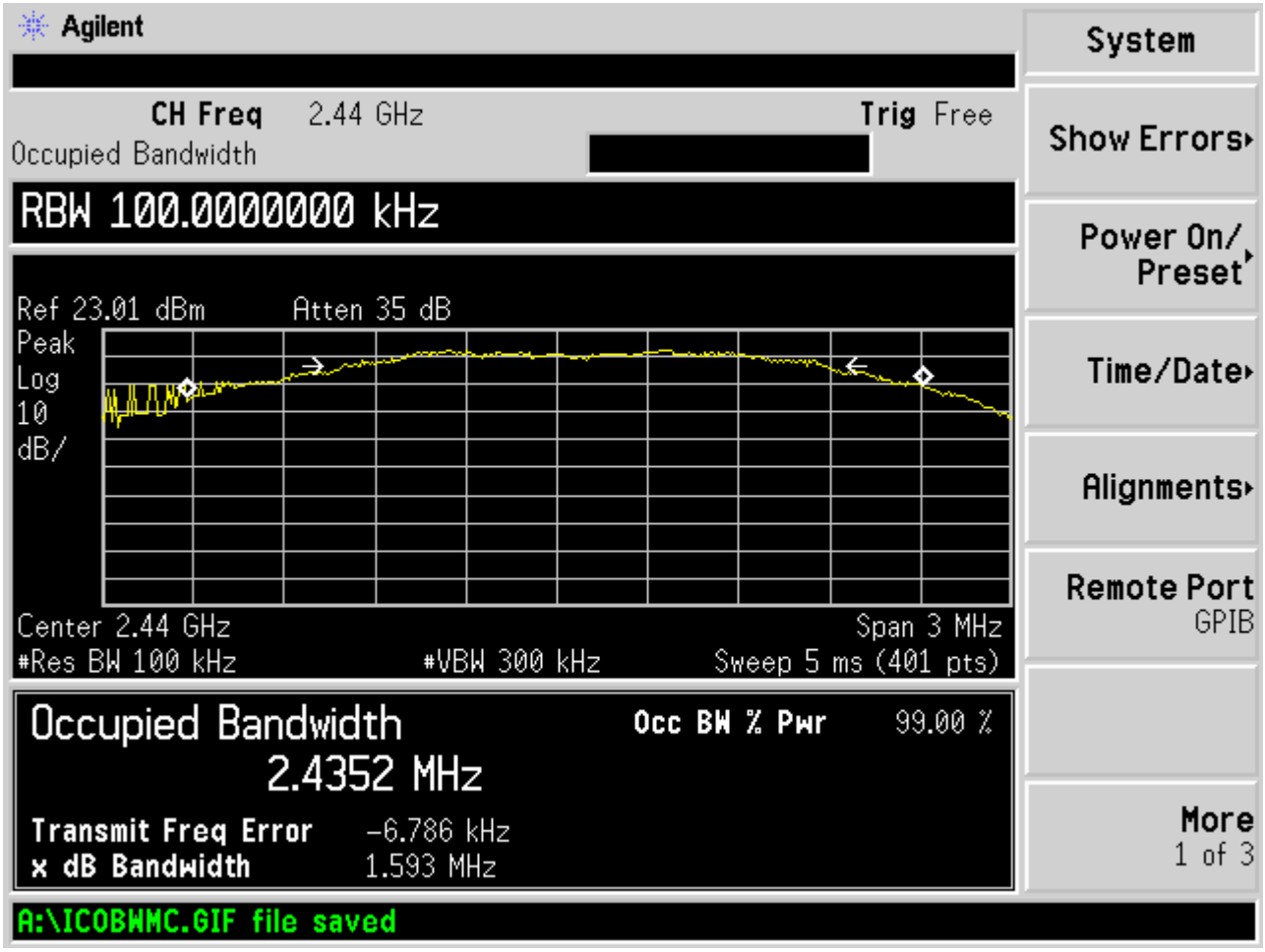
## 6.3 Occupied Bandwidth Test Data

| Test Date: | Jan. 17-30, 2014 | Test Engineers: | M. Toth; K. Littell |
|---|---|---|---|
| Standards: | CFR 47 Part 15.247(a)(2); KDB558074 | Air Temperature: | 20.4ºC |
| | | Relative Humidity: | 43% |

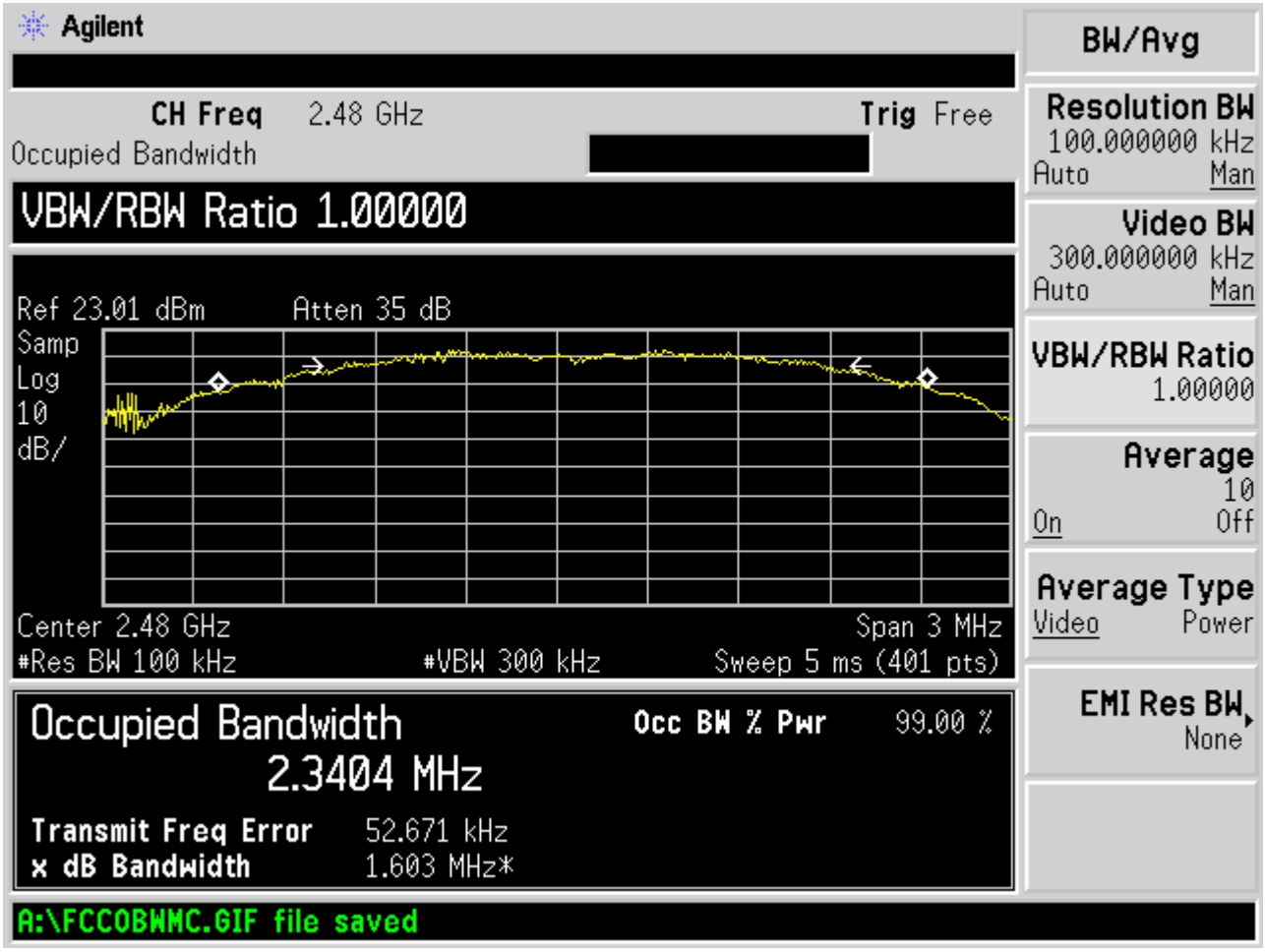
**Low Channel**



## Mid Channel


Agilent
CH Freq 2.44 GHz
Trig Free
Occupied Bandwidth
RBW 100.0000000 kHz
Ref 23.01 dBm
Atten 35 dB
Peak
Log
10
dB/
Center 2.44 GHz
Span 3 MHz
#Res BW 100 kHz
#VBW 300 kHz
Sweep 5 ms (401 pts)
Occupied Bandwidth
2.4352 MHz
Occ BW % Pwr 99.00 %
Transmit Freq Error -6.786 kHz
x dB Bandwidth 1.593 MHz
A:\ICOBWMC.GIF file saved
System
Show Errors
Power On/ Preset
Time/Date
Alignments
Remote Port
GPIB
More
1 of 3

## High Channel



# 7 FCC PART 15.247(b)(3) – CONDUCTED OUTPUT POWER

The EUT antenna port was fitted with an SMA connector and directly connected to the input of the receiver. The peak power output was measured.

## 7.1 Requirements:

The peak power output shall be 1 watt (30 dBm) or less when using an antenna with a gain of less than 6dBi. For antennas having a gain of more than 6dBi, the limit is reduced by 1dB for every dB the antenna gain is over 6dBi.

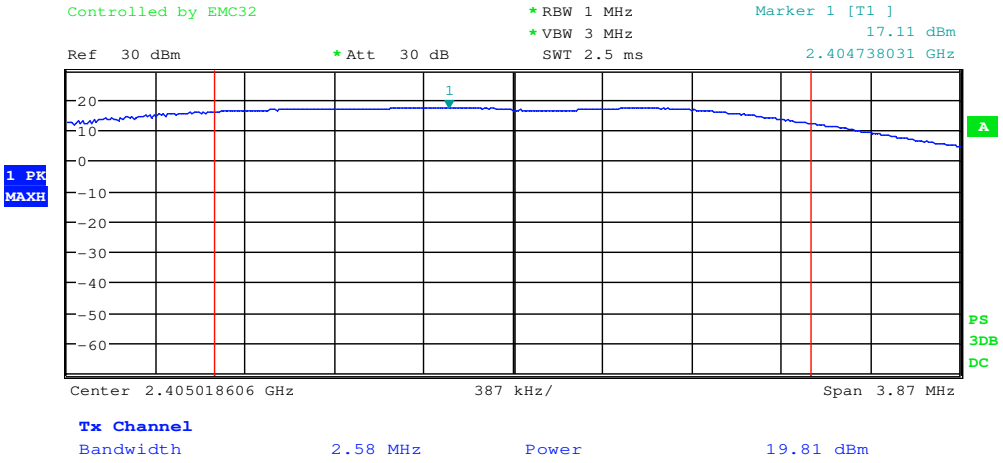
## 7.2 Equipment Used:

| Equipment Type | Asset Number | Manufacturer | Model | Serial Number | Calibration Due Date |
|---|---|---|---|---|---|
| Temp/Hum. Recorder | CL137 | Extech | RH520 | CH16992 | Apr. 17, 2014 |
| Receiver | CL151 | Rohde & Schwarz | ESU40 | 100319 | Oct. 31, 2014 |
| Cable: 0.3m Low Loss | CL116 | A.H. Systems, Inc. | SAC-26G-0.3 | 206 | Mar. 1, 2014 |

## 7.3 Conducted Output Power Test Data

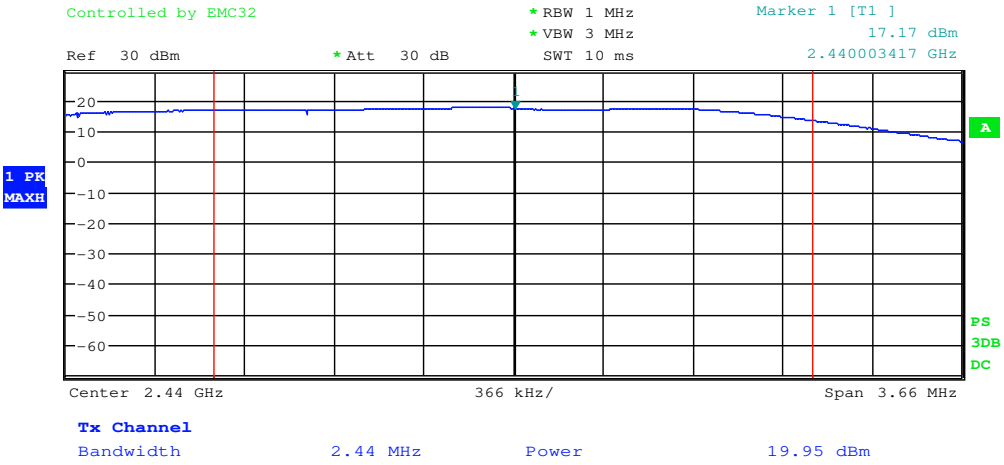
| | | | |
|---|---|---|---|
| **Test Date:** | Jan. 30, 2014 | **Test Engineers:** | M. Toth; K. Littell |
| **Standards:** | CFR 47 Part 15.247(b)(3); KDB558074 | **Air Temperature:** | 21.1ºC |
| | | **Relative Humidity:** | 41% |

### Low Channel



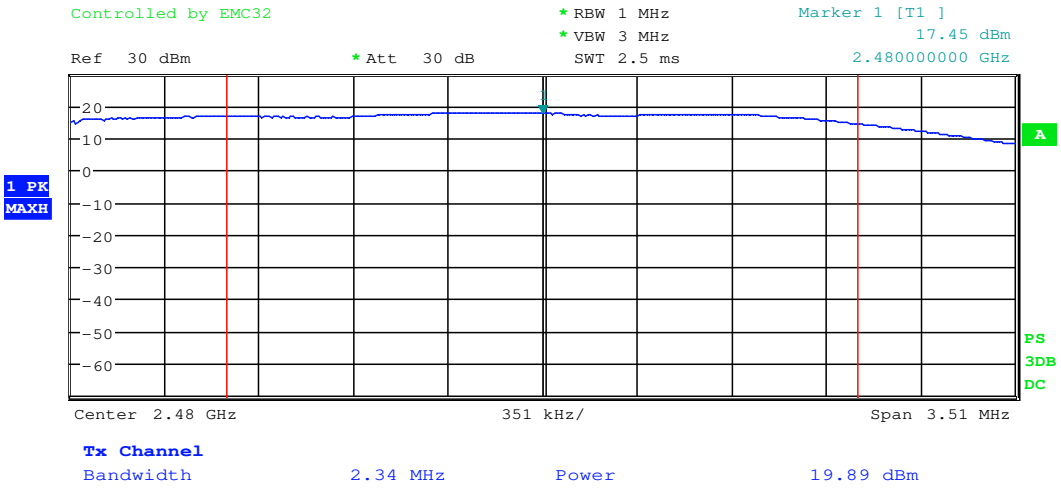

Date: 30.JAN.2014 10:42:19

## Mid Channel




Date: 30.JAN.2014 11:07:26

## High Channel




Date: 30.JAN.2014 11:22:39

# 8 FCC Part 15.247(c) – CONDUCTED SPURIOUS EMISSIONS

The following tests were performed to demonstrate compliance.

**RF Antenna Conducted Test**
The EUT antenna port was fitted with an SMA connector and directly connected to the input of the spectrum analyzer.

## 8.1 Requirements:

All Spurious Emissions must be at least 20dB down from the highest emission level measured within the authorized band up through the tenth harmonic.

Spurious emissions measurements were made at the low, mid, and upper channels with the appropriate spectrum analyzer impulse bandwidth. Additionally, 20dB down points were measured for the low and high channels to verify band edge compliance.

## 8.2 Equipment Used:

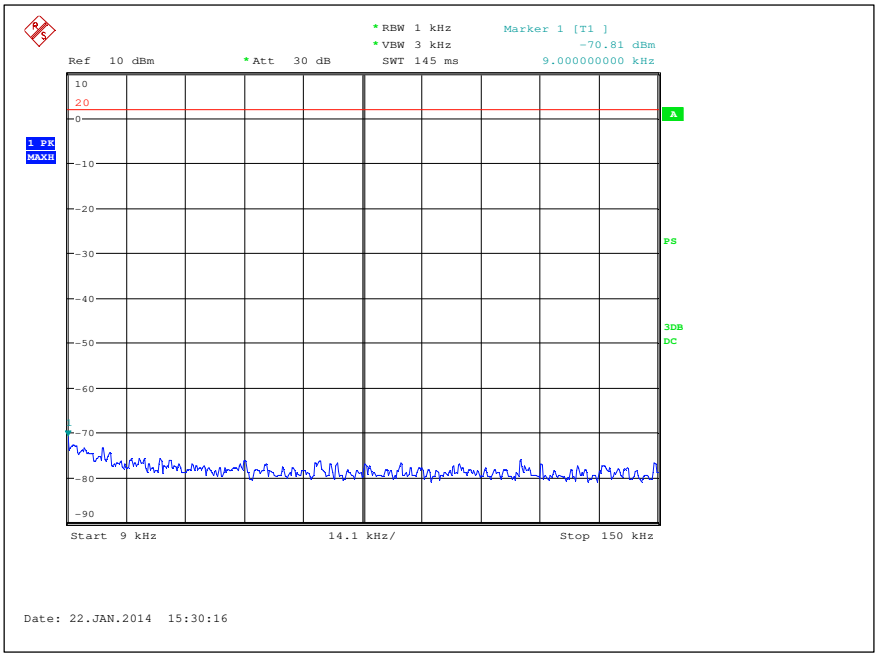
| Equipment Type | Asset Number | Manufacturer | Model | Serial Number | Calibration Due Date |
|---|---|---|---|---|---|
| Temp/Hum. Recorder | CL137 | Extech | RH520 | CH16992 | Apr. 17, 2014 |
| Spectrum Analyzer | CL138 | Agilent Technologies | E4407B | US41192779 | Oct. 29, 2014 |
| Cable: 0.3m Low Loss | CL116 | A.H. Systems, Inc. | SAC-26G-0.3 | 206 | Mar. 1, 2014 |

## 8.3 Test Data – CONDUCTED SPURIOUS EMISSIONS

| | | | |
|---|---|---|---|
| **Test Date:** | Jan. 22, 2014 | **Test Engineers:** | M. Toth; K. Littell |
| **Standards:** | CFR 47 Part 15.247(d) / Part 15.209; KDB558074 | **Air Temperature:** | 21.1ºC |
| | | **Relative Humidity:** | 41% |

### Low Channel: 9 kHz to 150 kHz

.




### Low Channel: 150 kHz to 30 MHz

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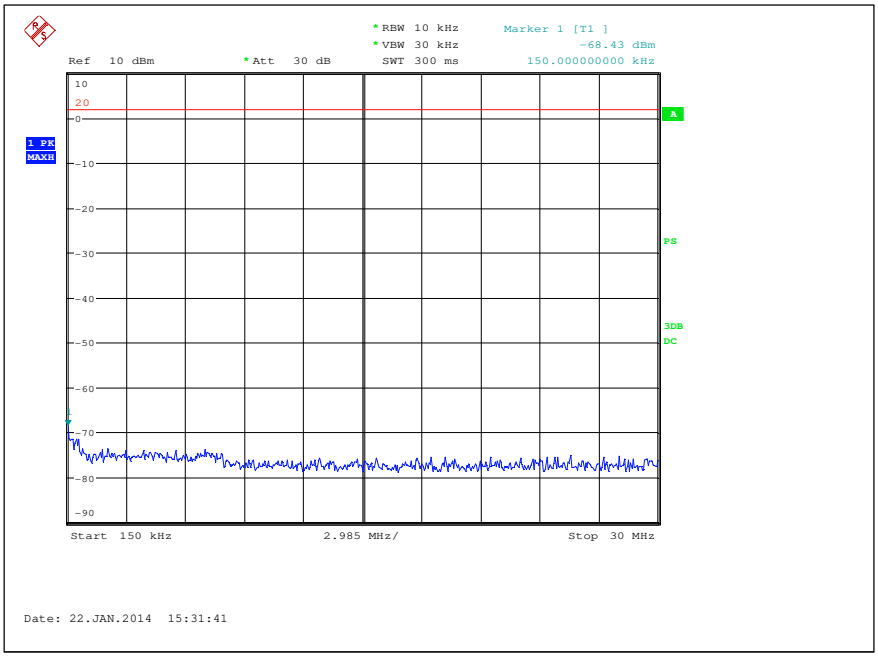

## Low Channel: 30 MHz to 1 GHz

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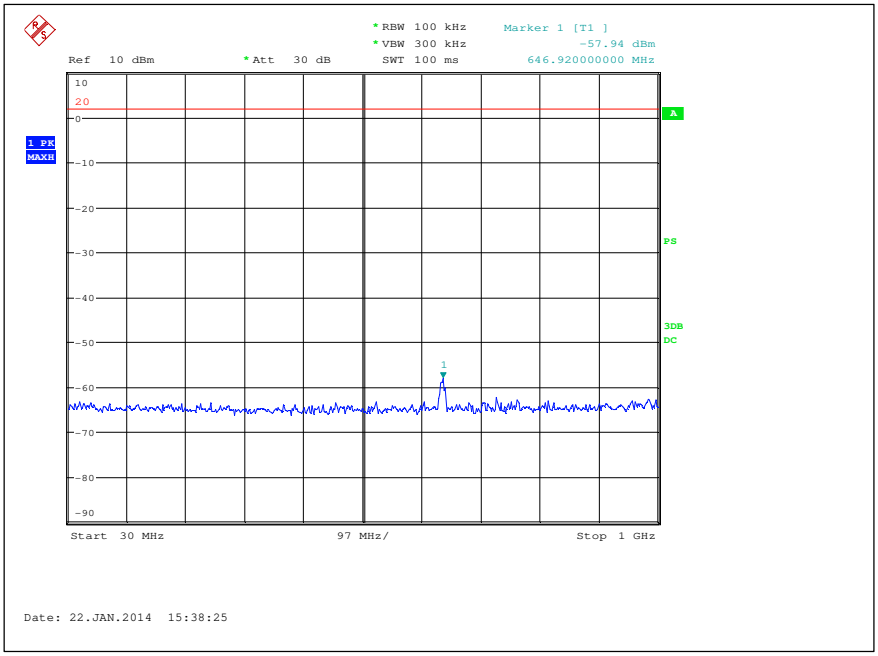


## Low Channel: 1 GHz to 2.39 GHz

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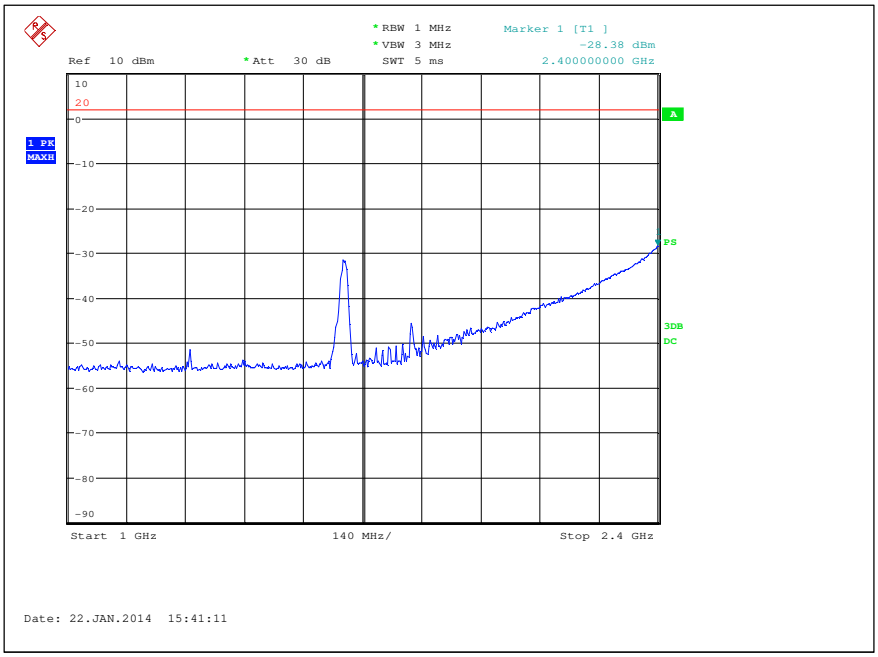

## Low Channel: 2.3 GHz to 2.6 GHz

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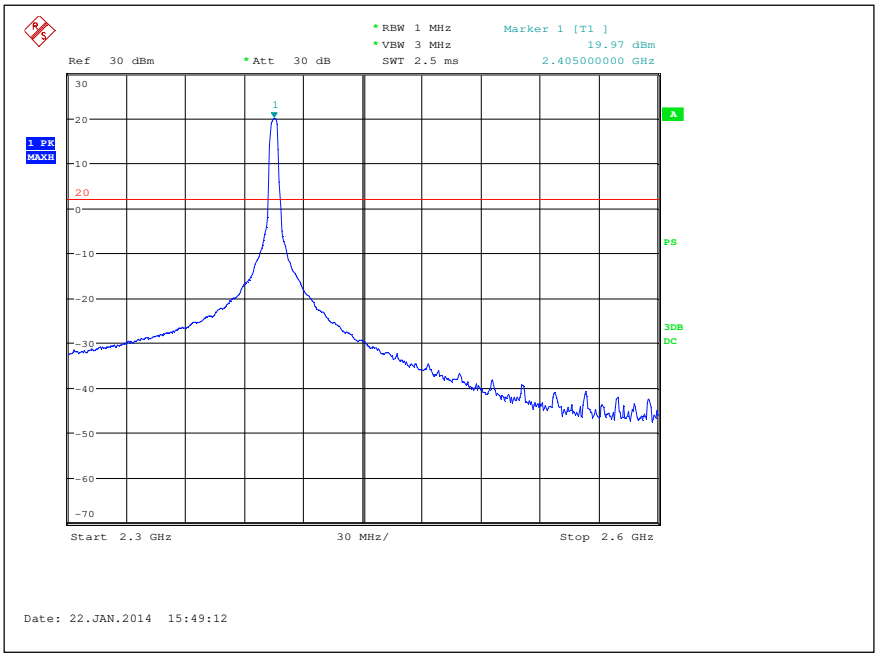
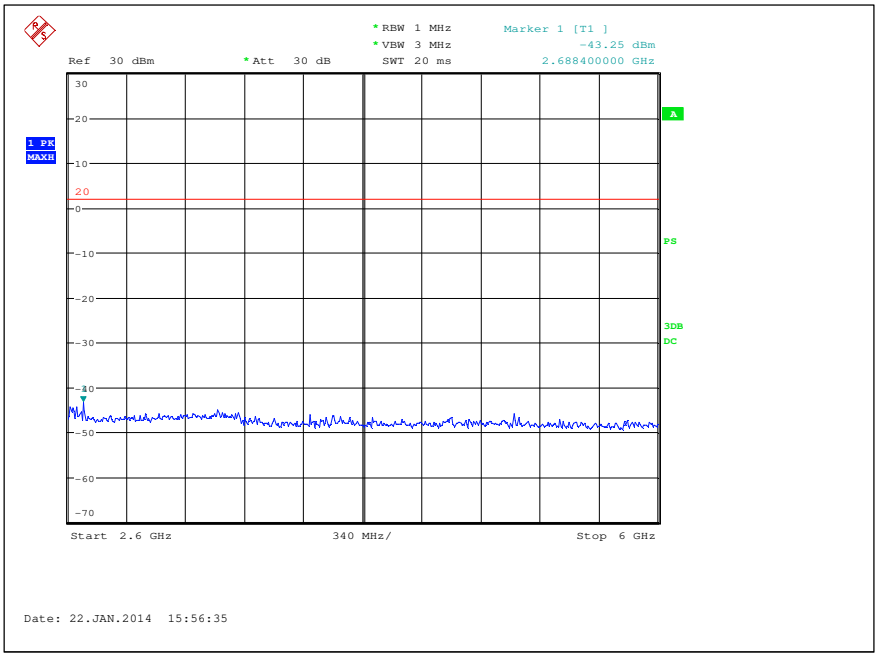


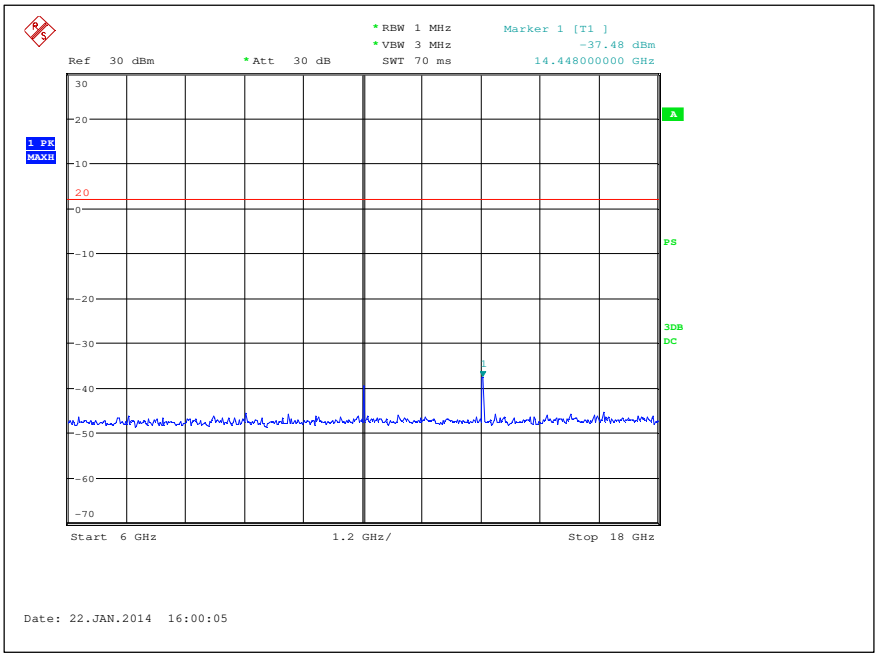

## Low Channel: 2.6 GHz to 6 GHz

.



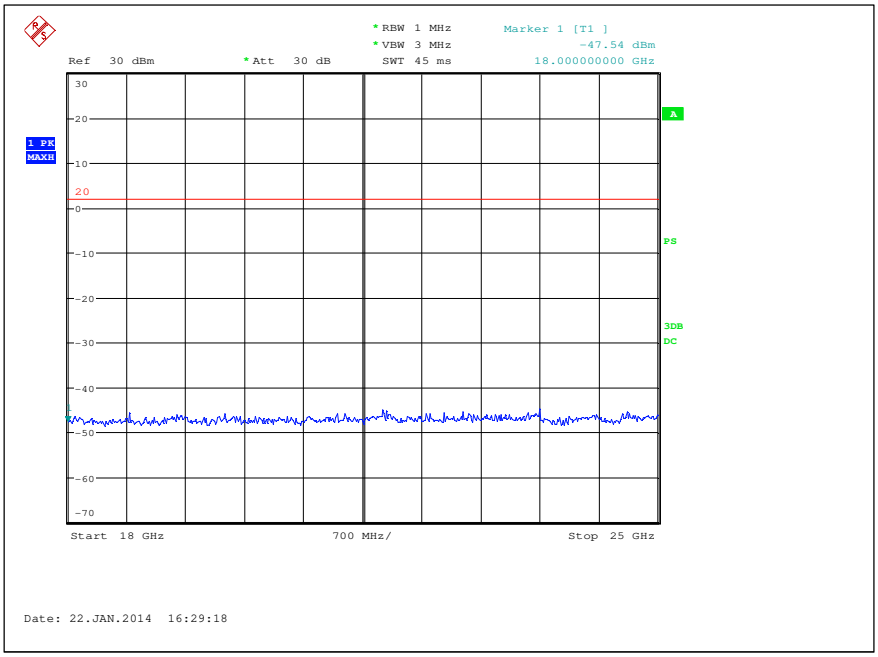
## Low Channel: 6 GHz to 18 GHz

.



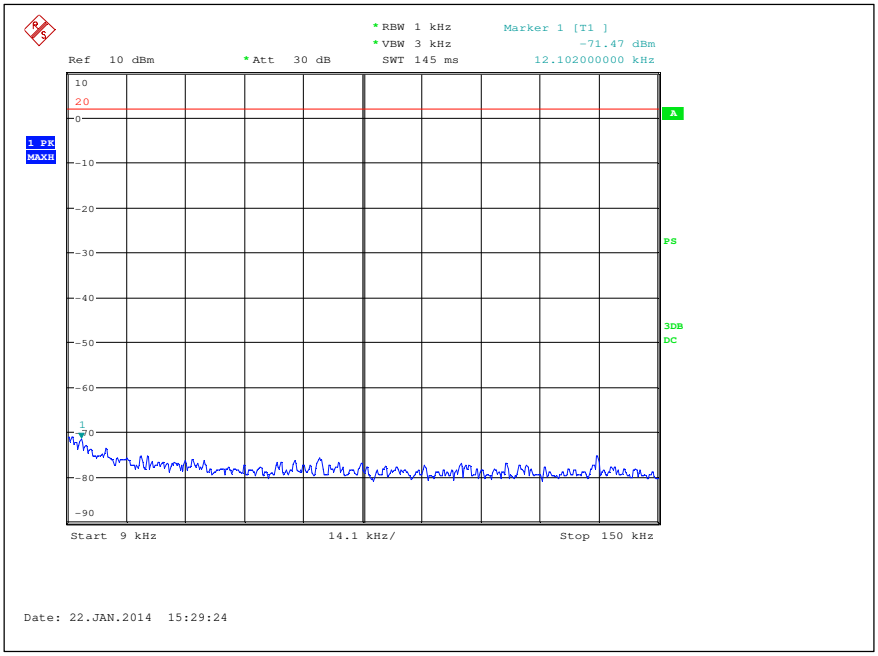

## Low Channel: 18 GHz to 25 GHz

.



## Mid Channel: 9 kHz to 150 kHz

.




## Mid Channel: 150 kHz to 30 MHz

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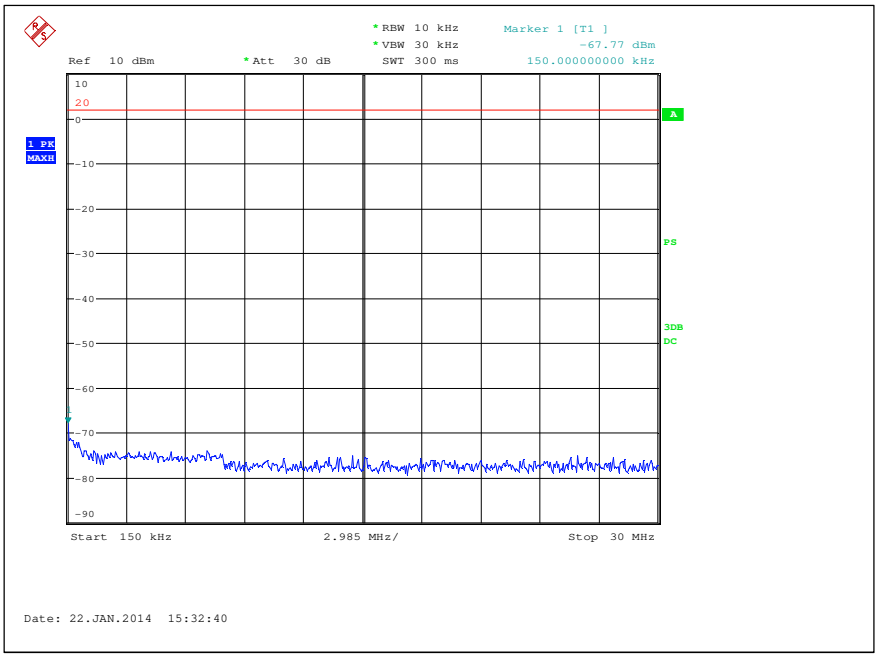
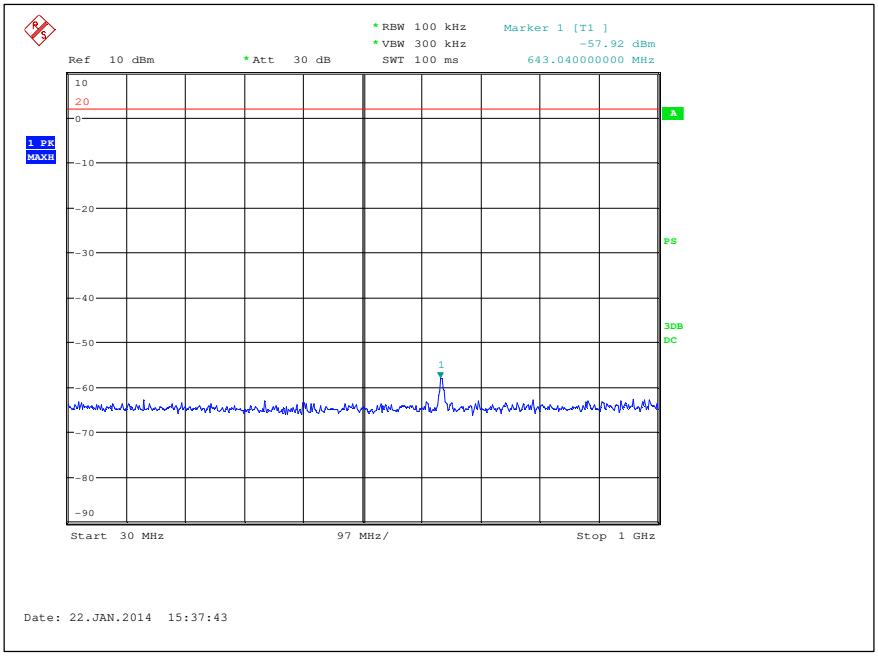


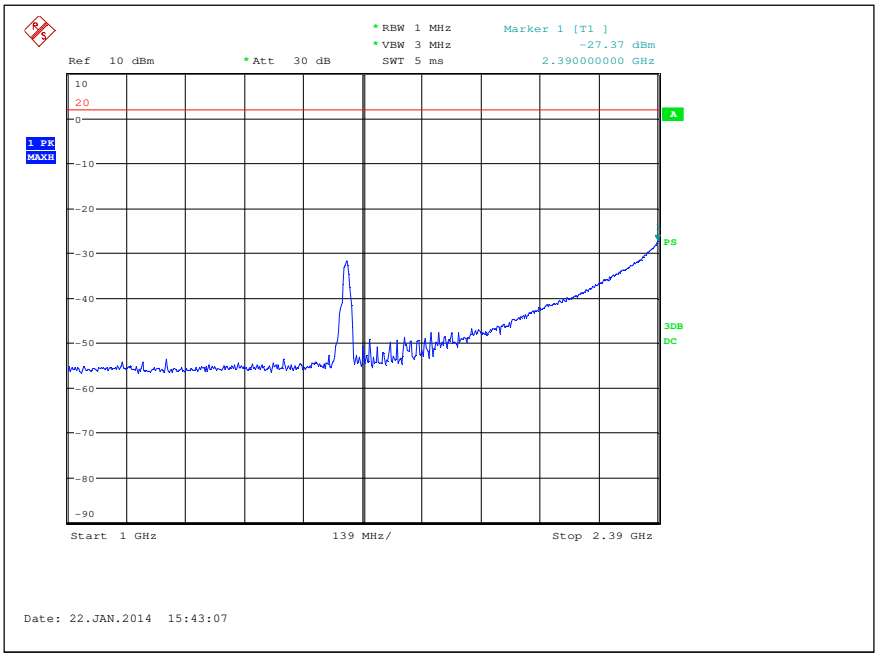
## Mid Channel: 30 MHz to 1 GHz

.




## Mid Channel: 1 GHz to 2.39 GHz

.



## Mid Channel: 2.3 GHz to 2.6 GHz

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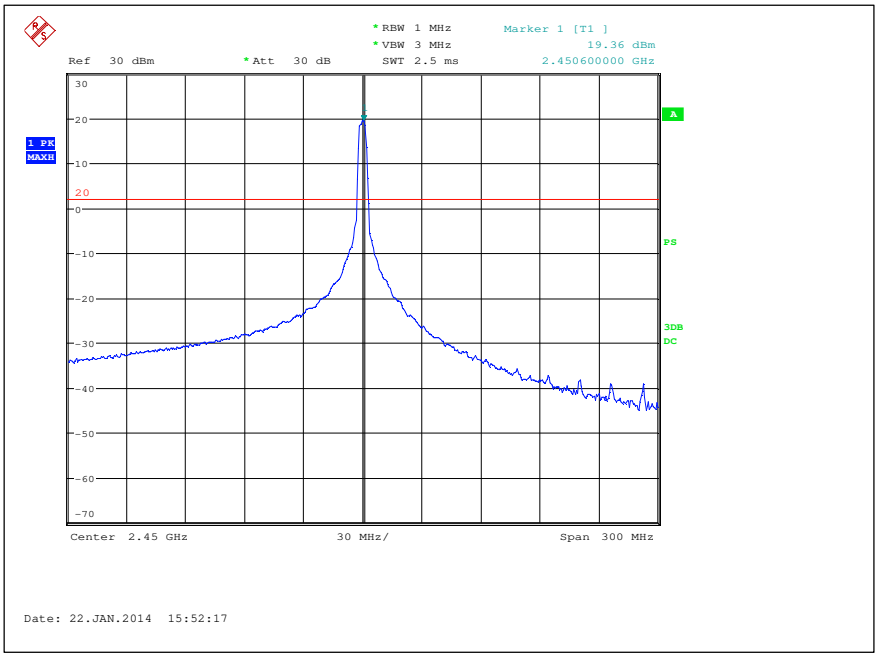
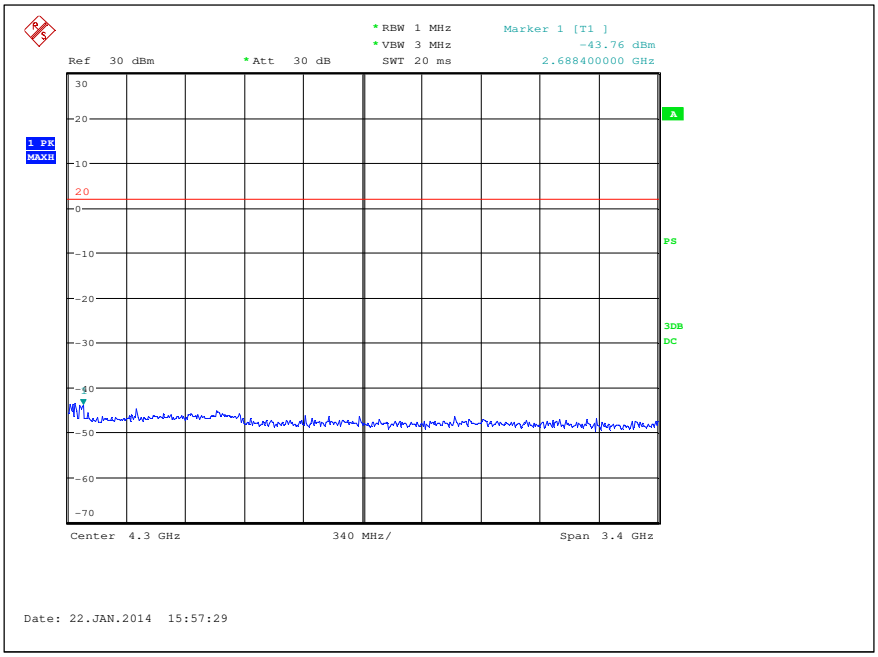



## Mid Channel: 2.6 GHz to 6 GHz

.



## Mid Channel: 6 GHz to 18 GHz

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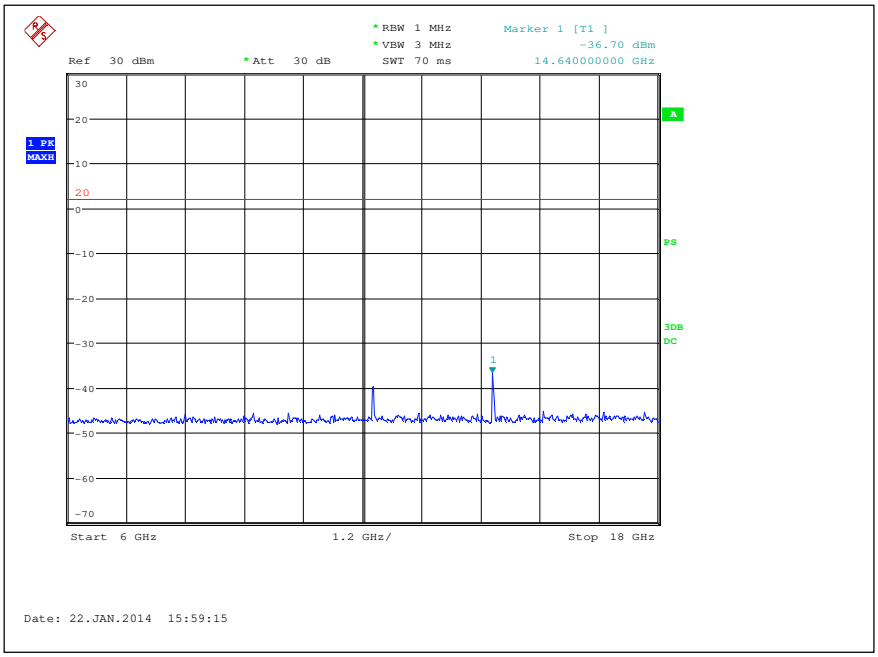


## Mid Channel: 18 GHz to 25 GHz

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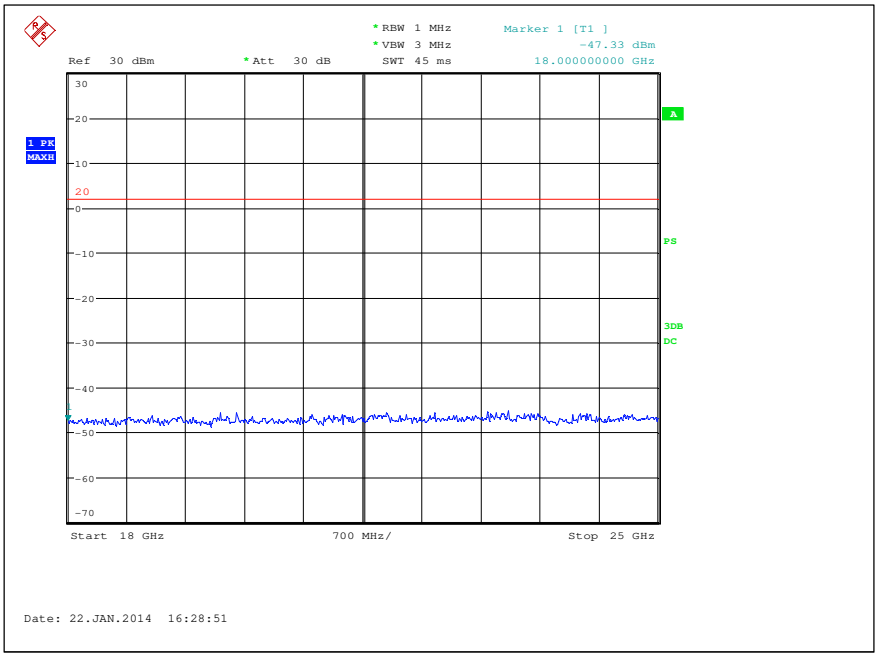
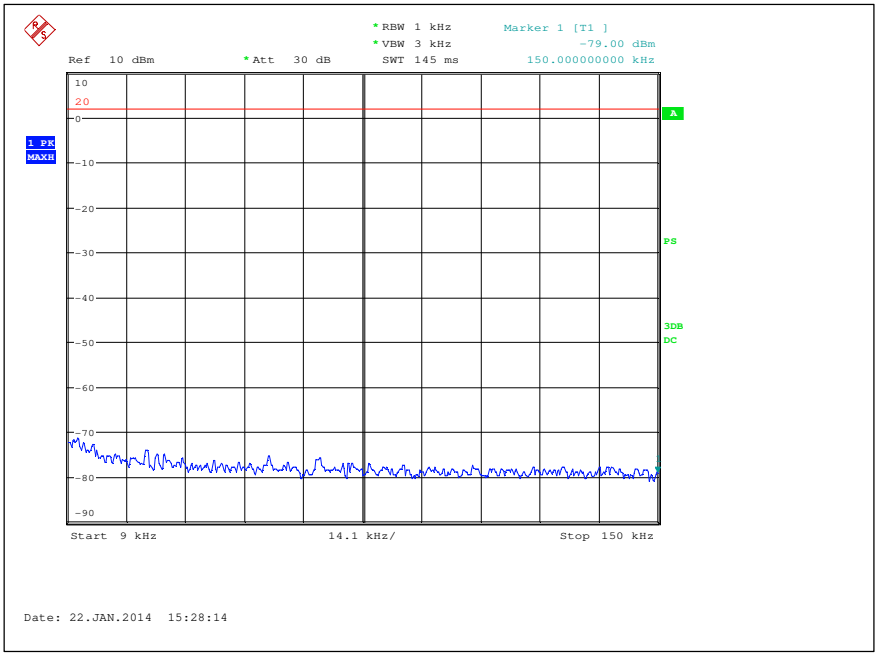


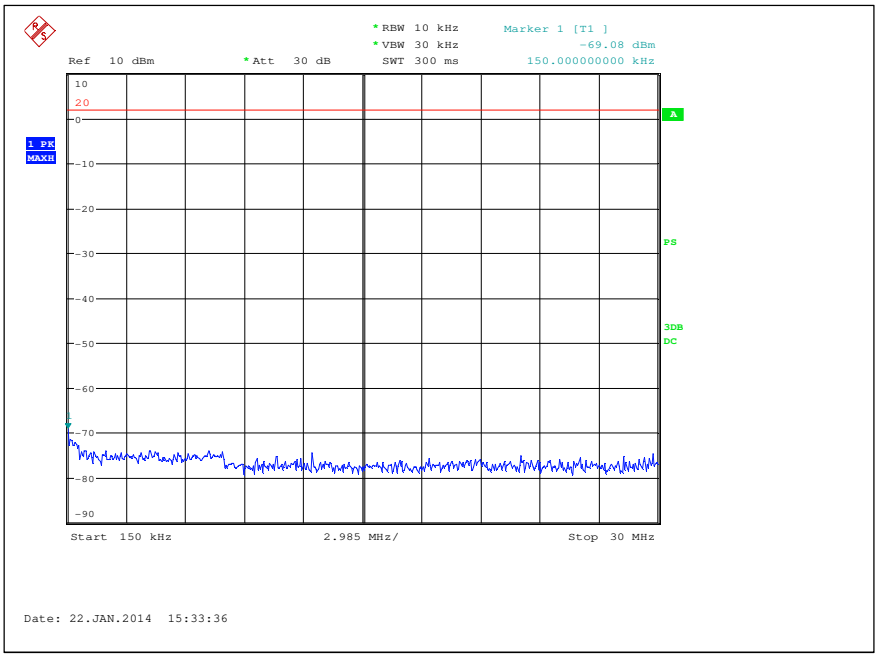
## High Channel: 9 kHz to 150 kHz

.



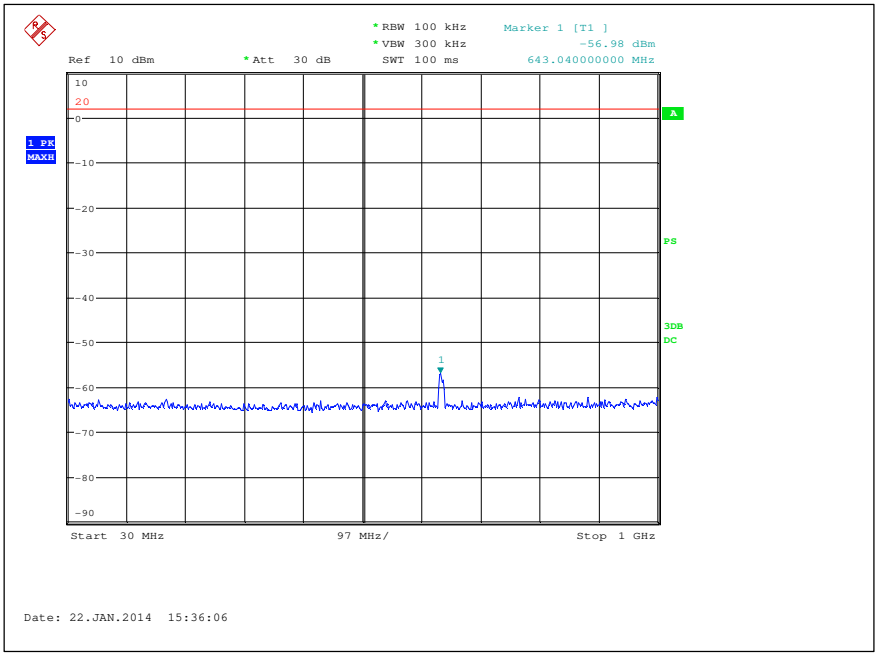

## High Channel: 150 kHz to 30 MHz

.



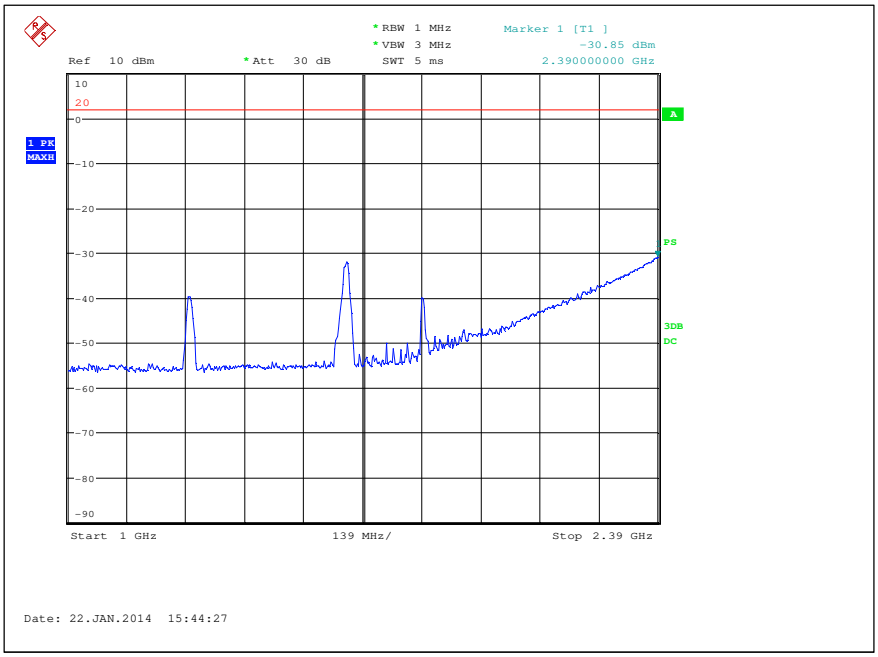
## High Channel: 30 MHz to 1 GHz

.




## High Channel: 1 GHz to 2.39 GHz

.



## High Channel: 2.39 GHz to 2.6 GHz

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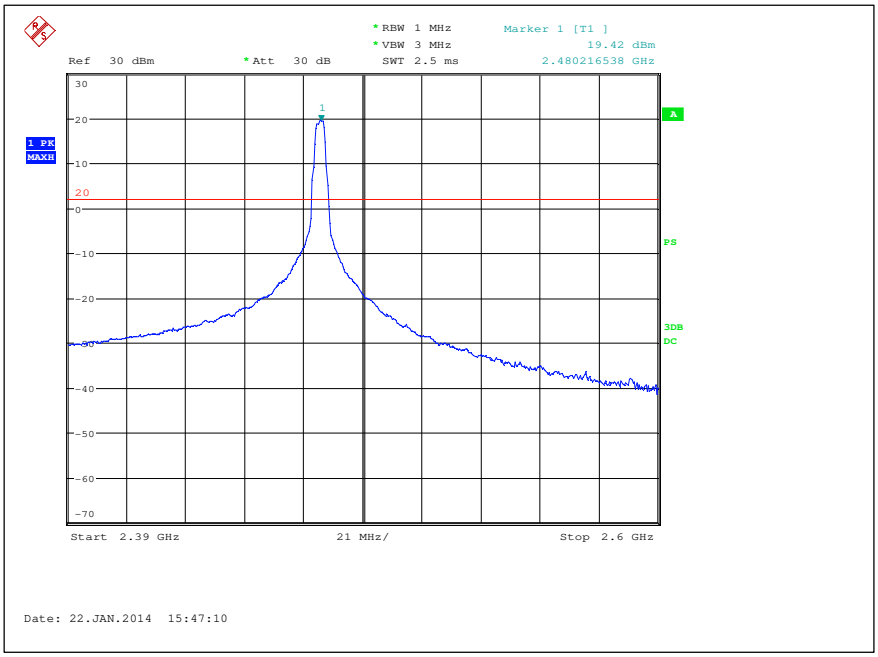

## High Channel: 2.6 GHz to 6 GHz

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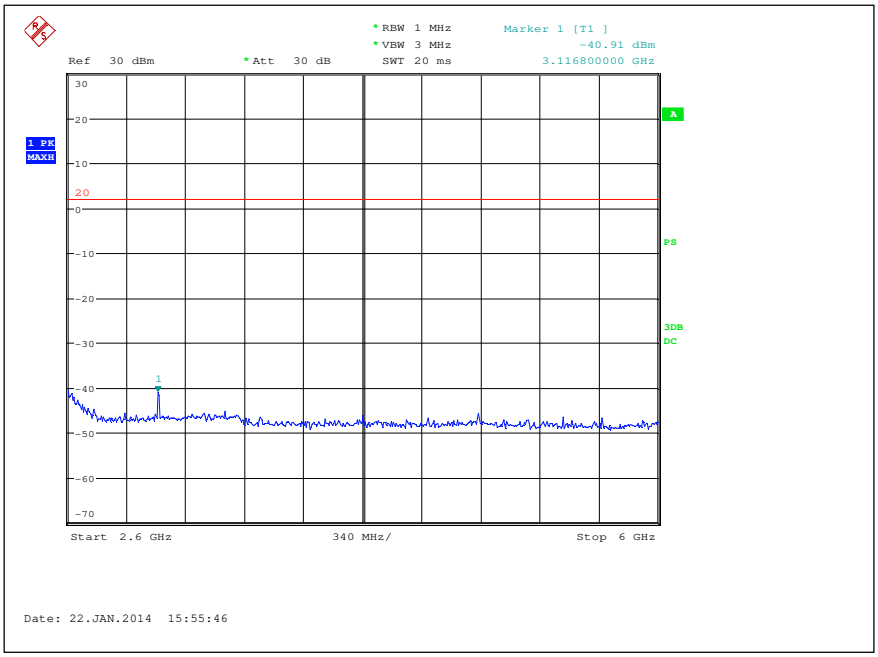


## High Channel: 6 GHz to 18 GHz

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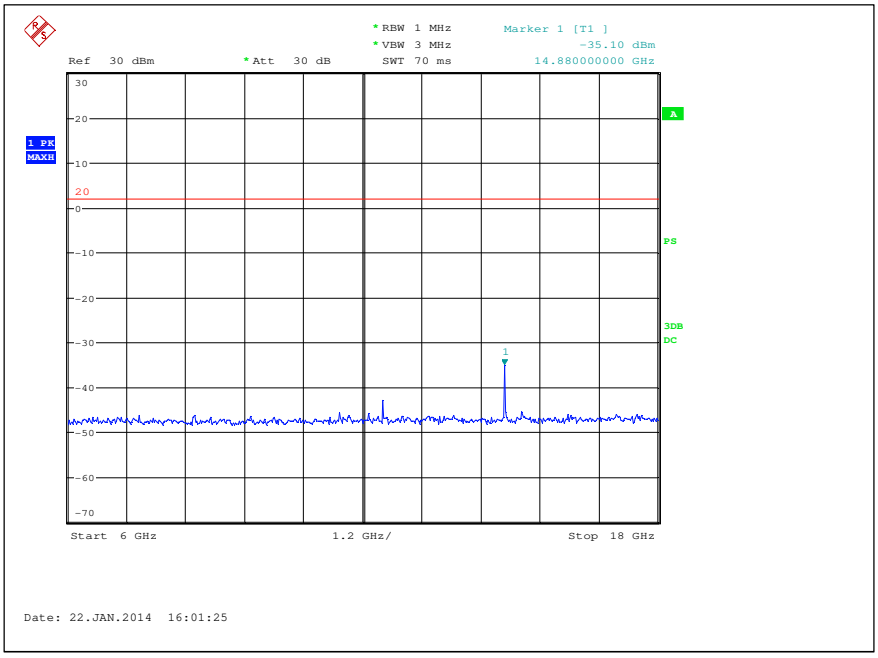
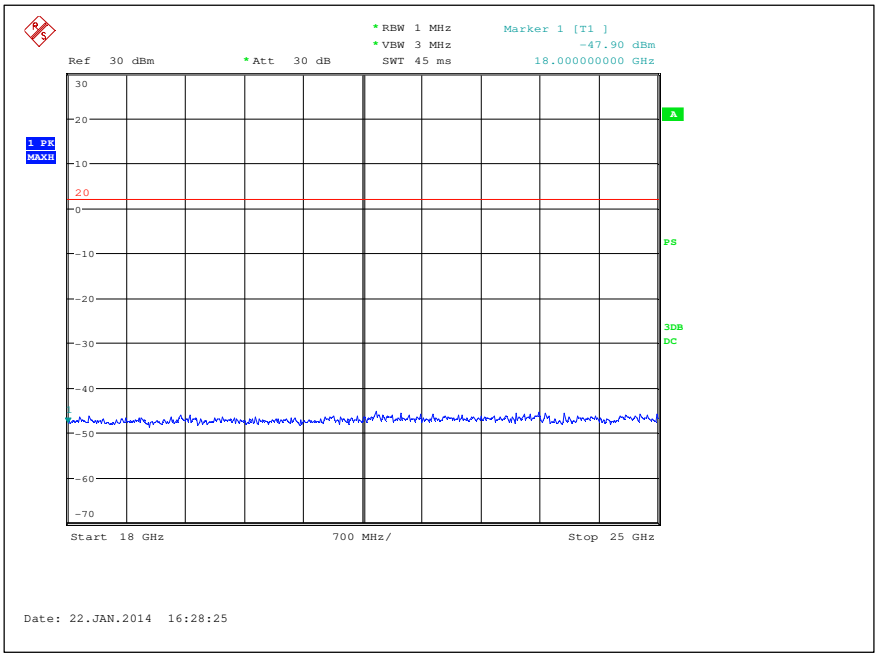


## High Channel: 18 GHz to 25 GHz

.



# 9 RADIATED SPURIOUS EMISSION

The EUT antenna port was fitted with its integral/internal chip and 9dBi whip antennae. Radiated emissions were measured on the Open Area Test Site (OATS). All emissions generated that fall in the restricted bands per FCC Part 15.205 were examined.

## 9.1 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).

## 9.2 Equipment Used:

| Equipment Type | Asset Number | Manufacturer | Model | Serial Number | Calibration Due Date |
|---|---|---|---|---|---|
| Shield Room | 0175 | Ray Proof | N/A | 11645 | Verified |
| Temp/Hum. Recorder | CL137 | Extech | RH520 | CH16992 | Apr. 17, 2014 |
| OATS-3m | CL017 | Compliance Labs | N/A | 001 | Dec. 12, 2014 |
| Receiver | CL151 | Rohde & Schwarz | ESU40 | 100319 | Oct. 30, 2014 |
| Antenna 1-Chamber | 0142 | ETS/EMCO | 3142B | 9811-1330 | Verified |
| Antenna 2-OATS | 0105 | Sunol Sciences | JB1 | A101101 | May 7, 2015 |
| Pre-Amplifier | 0139 | Hewlett Packard | 83006A | 3104A00500 | Feb. 20, 2014 |
| Active 18” Loop Antenna | CL082 | A.H. Systems, Inc. | SAS-562B | 241 | Sept. 6, 2014 |
| Antenna, Horn | CL098 | Emco | 3115 | 9809-5580 | Dec. 3, 2015 |
| Cable: 0.3m Low Loss | CL117 | A.H. Systems, Inc. | SAC-26G-3 | 207 | Jan. 16, 2015 |
| Coaxial Cable | CL139 | Thermax | M17/128-RG400 | JB (Brown) | Feb,. 21, 2014 |
| Coaxial Cable | CL140 | Thermax | M17/128-RG400 | JC (Brown) | Feb. 21, 2014 |

## 9.3 Radiated Spurious Emission Test Data

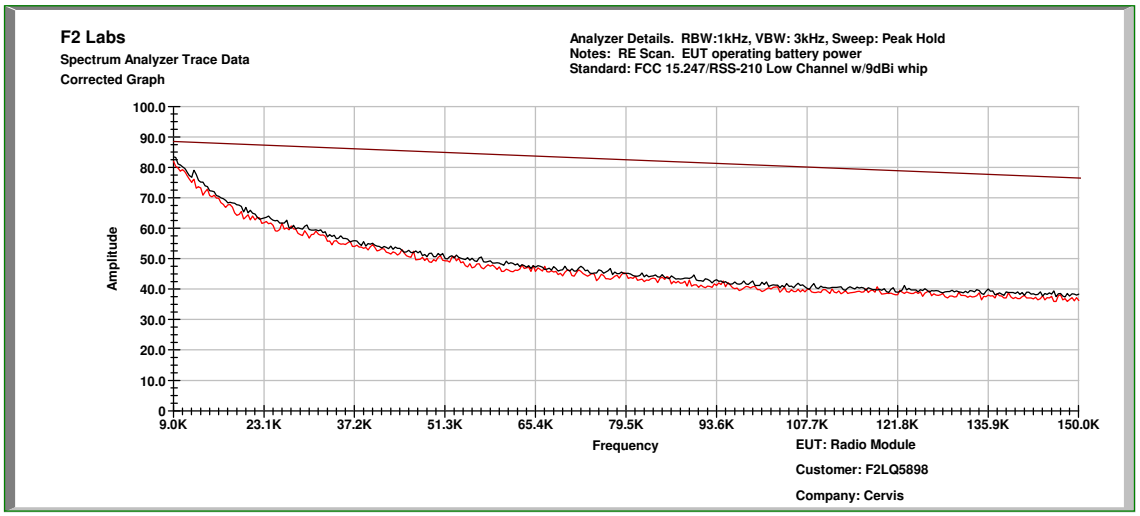
| | | | |
|---|---|---|---|
| **Test Dates:** | Jan. 22-28, 2014 | **Test Engineers:** | J. Knepper; K. Littell |
| **Standards:** | CFR 47 Part 15.247(d); Part 15.209 / KDB558074 | **Air Temperature:** | 10.8ºC |
| | | **Relative Humidity:** | 36% |

Notes: Plots are peak, max hold pre-scan data included only to determine what frequencies to investigate and measure. During the pre-scan evaluation, the EUT was rotated in all possible directions to find the maximum emissions. The orthogonal position that showed the highest emissions was used. At some frequencies, no emissions from the EUT were measurable over the ambient noise floor. The readings did not change with EUT on and EUT off.

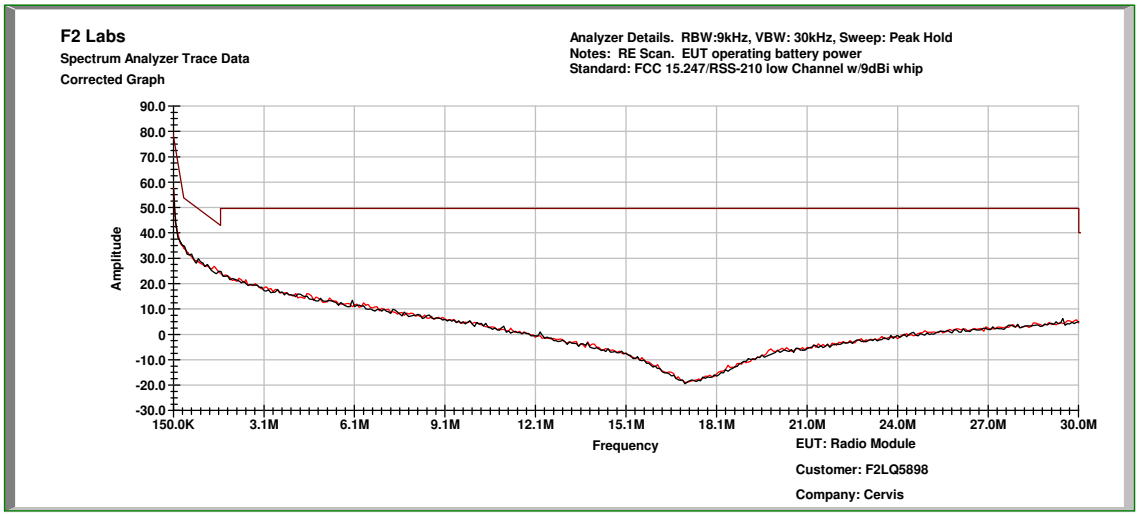
At least 6 of the highest frequencies were measured per ANSI 63.4 on the Open Area Test Site. Frequencies below 1GHz were measured using a quasi-peak detector. The antenna was raised between 1 and 4 meters and the EUT turntable was rotated 360 degrees to maximize the emissions. Some of the frequencies did not change with the EUT on or off. At those frequencies, the test distance was shortened to 1 meter and still no emissions from the EUT were visible or over the ambient or limit.

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 below.

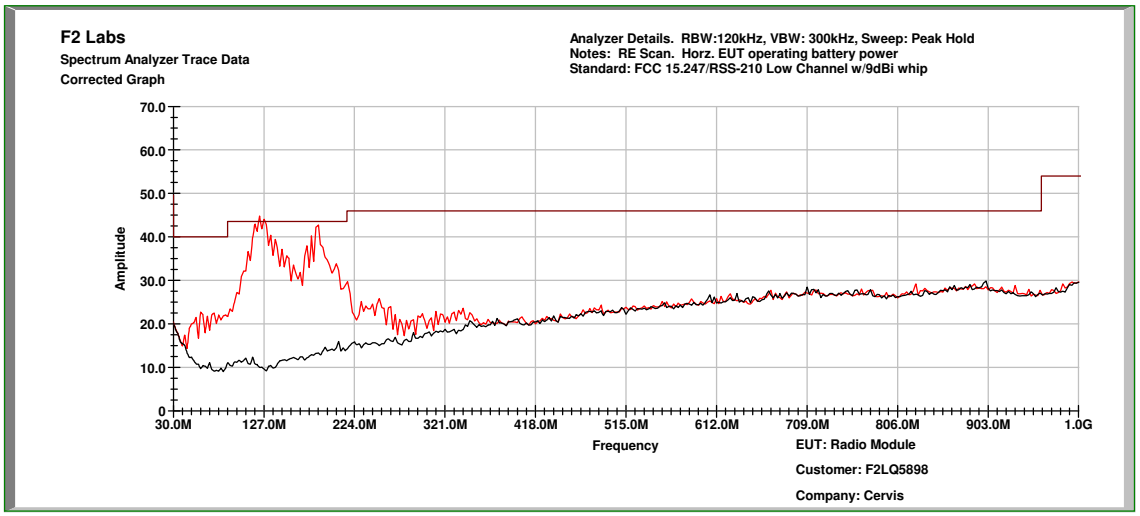
## 9dBi Whip Antenna, Low Channel, .009 to 0.15 MHz



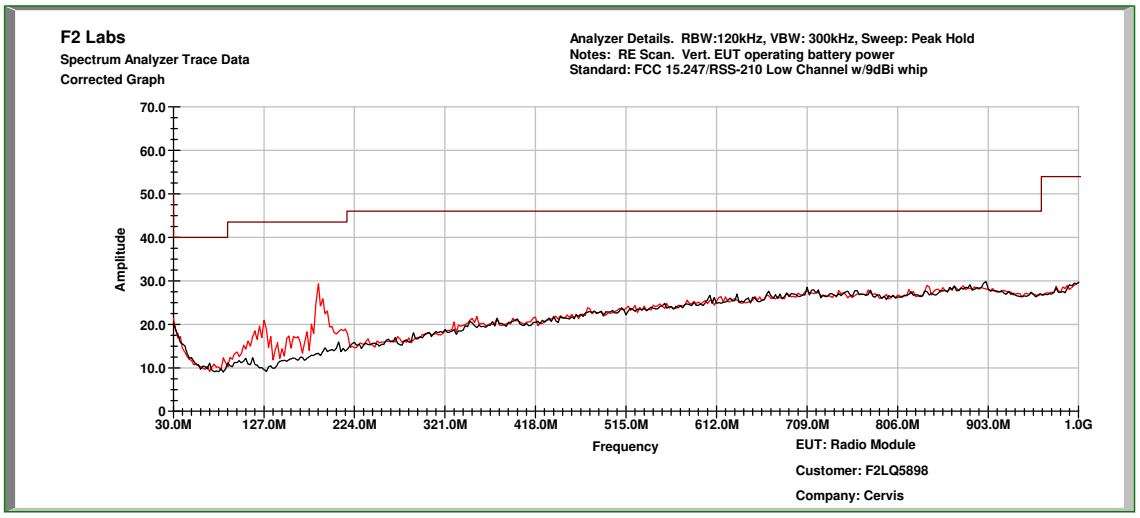

## 9dBi Whip Antenna, Low Channel, 0.15 MHz to 30 MHz



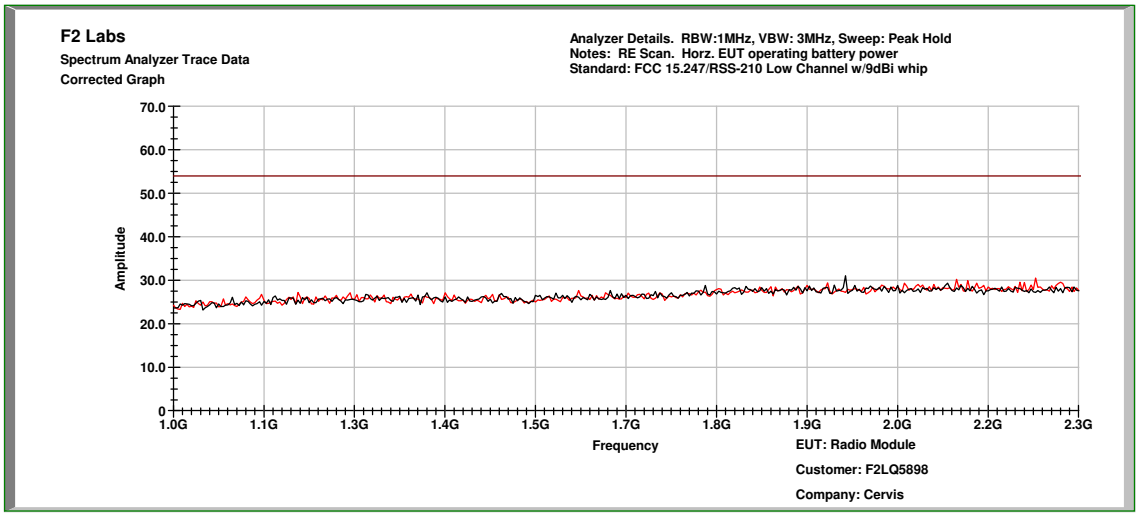
## 9dBi Whip Antenna, Low Channel, 30 MHz to 1 GHz, Horizontal



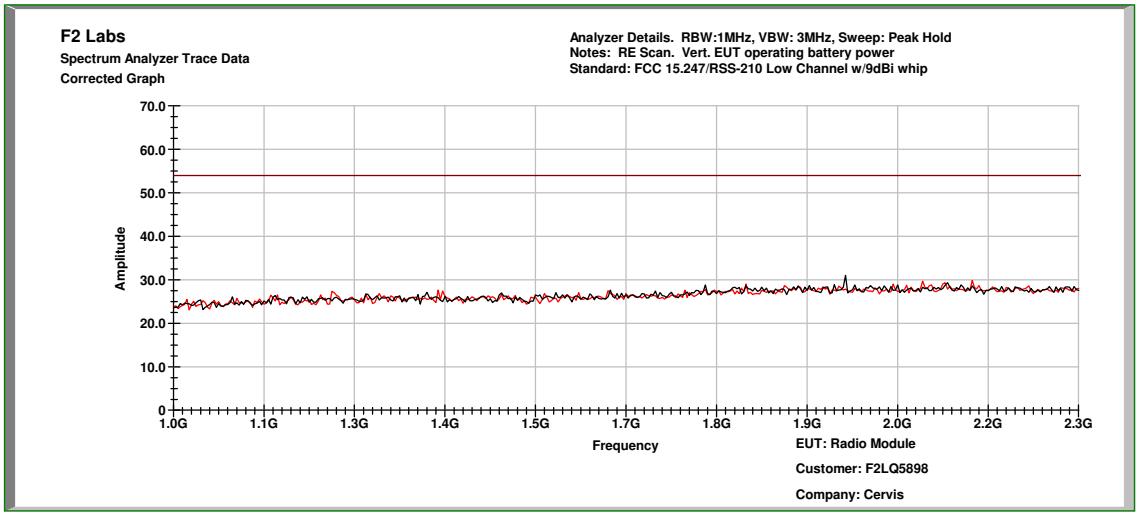

## 9dBi Whip Antenna, Low Channel, 30 MHz to 1 GHz, Vertical



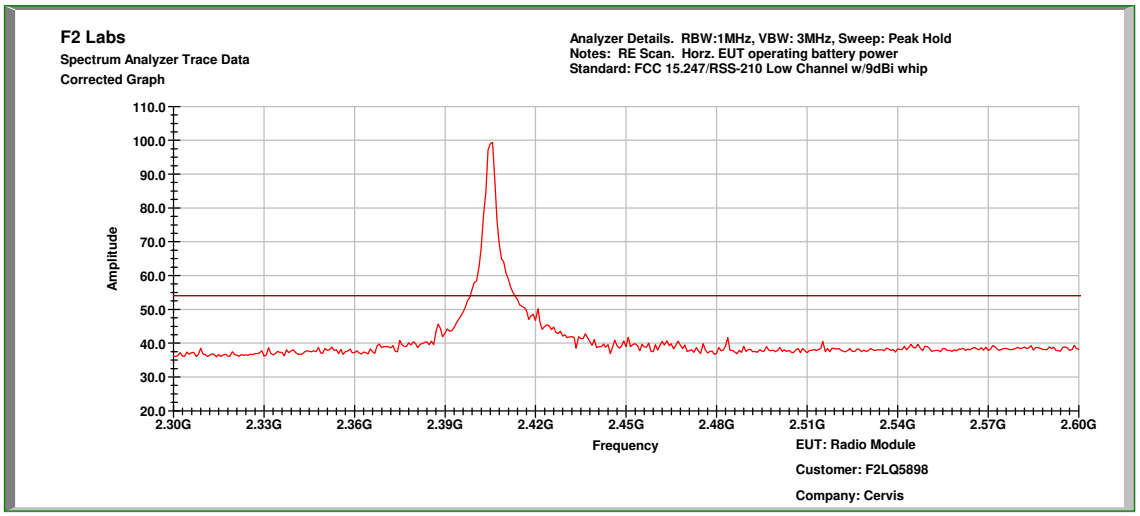
## 9dBi Whip Antenna, Low Channel, 1 GHz to 2.3 GHz, Horizontal



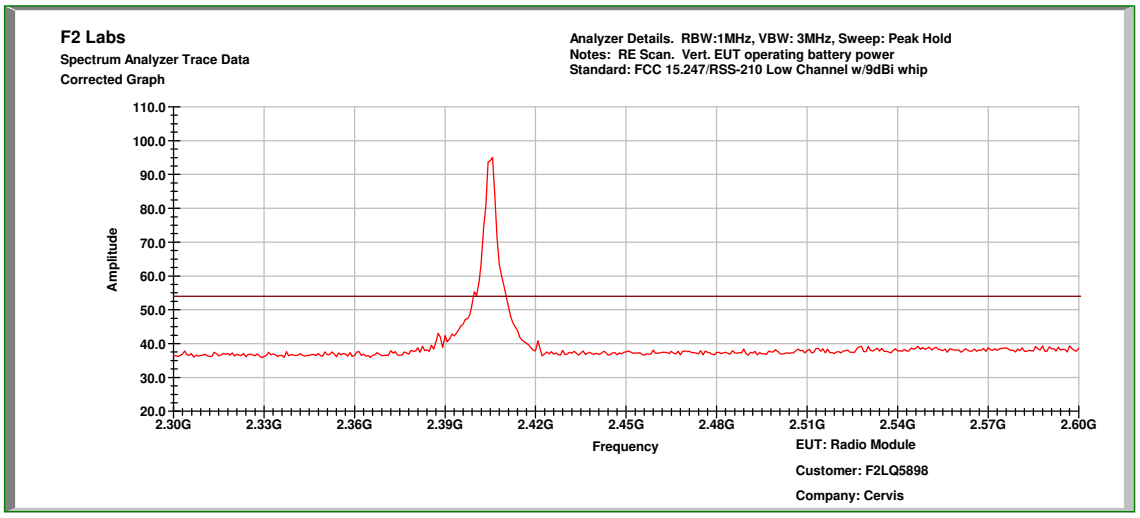

## 9dBi Whip Antenna, Low Channel, 1 GHz to 2.3 GHz, Vertical



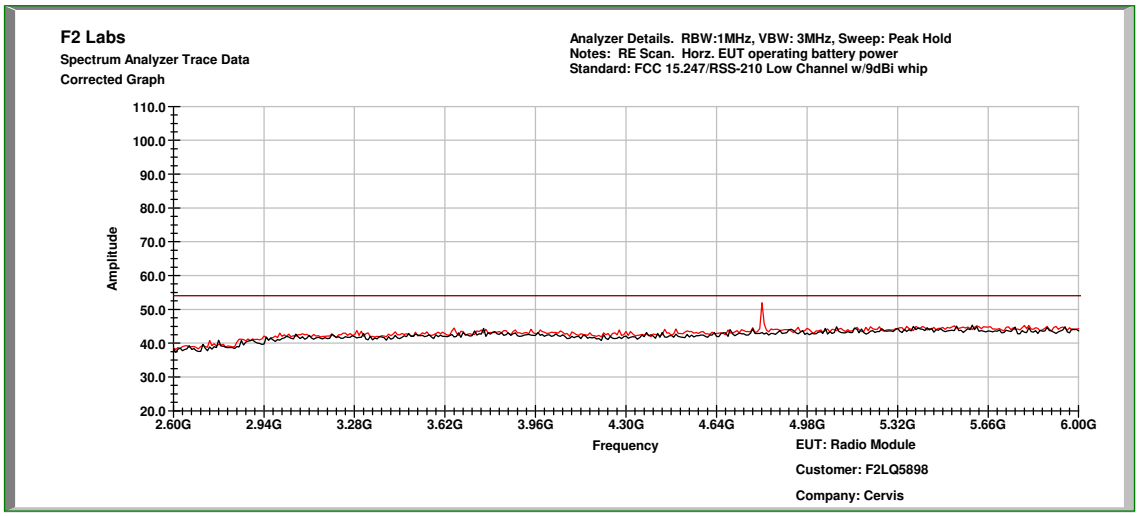
## 9dBi Whip Antenna, Low Channel, 2.3 GHz to 2.6 GHz, Horizontal



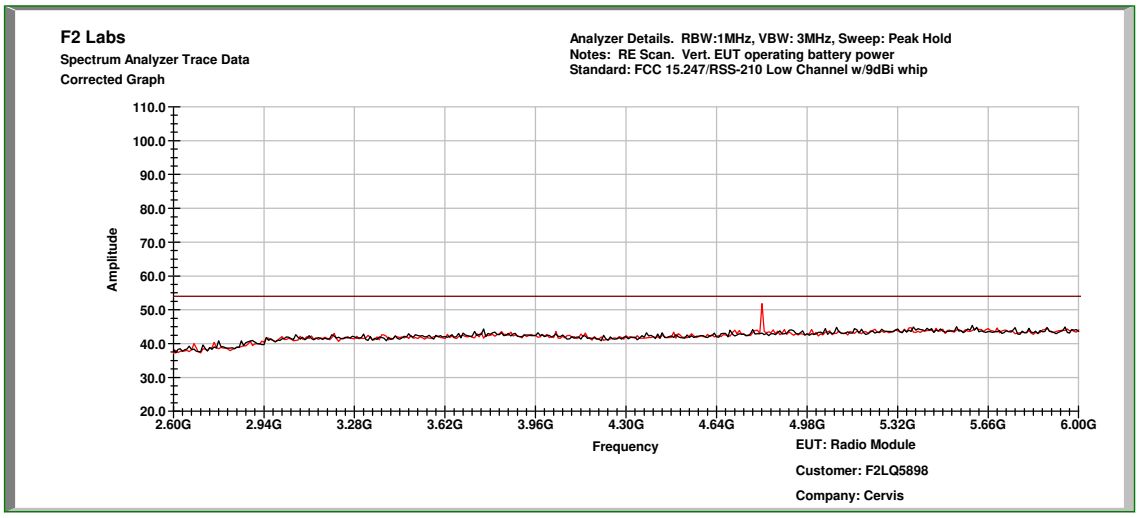

## 9dBi Whip Antenna, Low Channel, 2.3 GHz to 2.6 GHz, Vertical



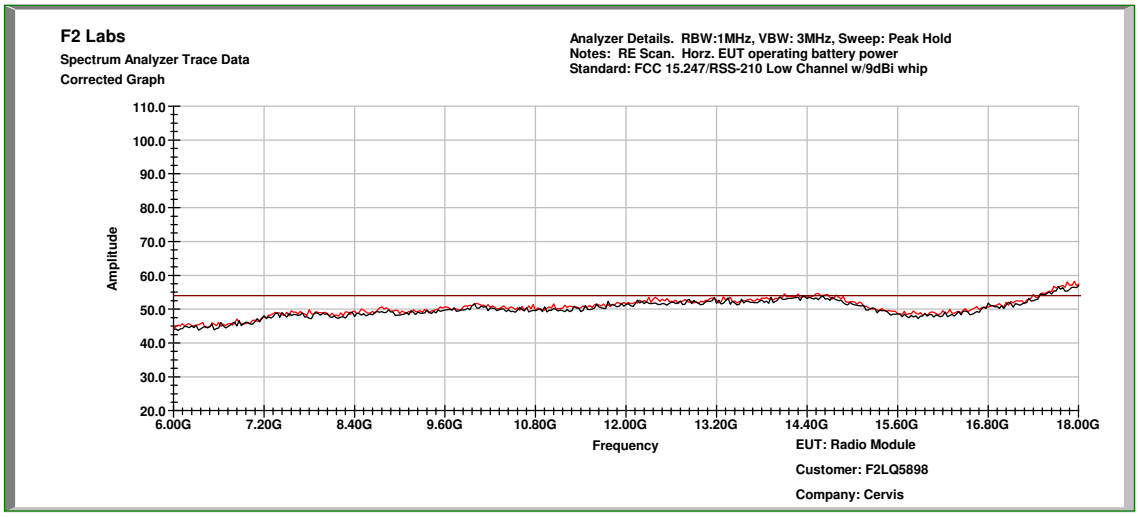
## 9dBi Whip Antenna, Low Channel, 2.6 GHz to 6 GHz, Horizontal



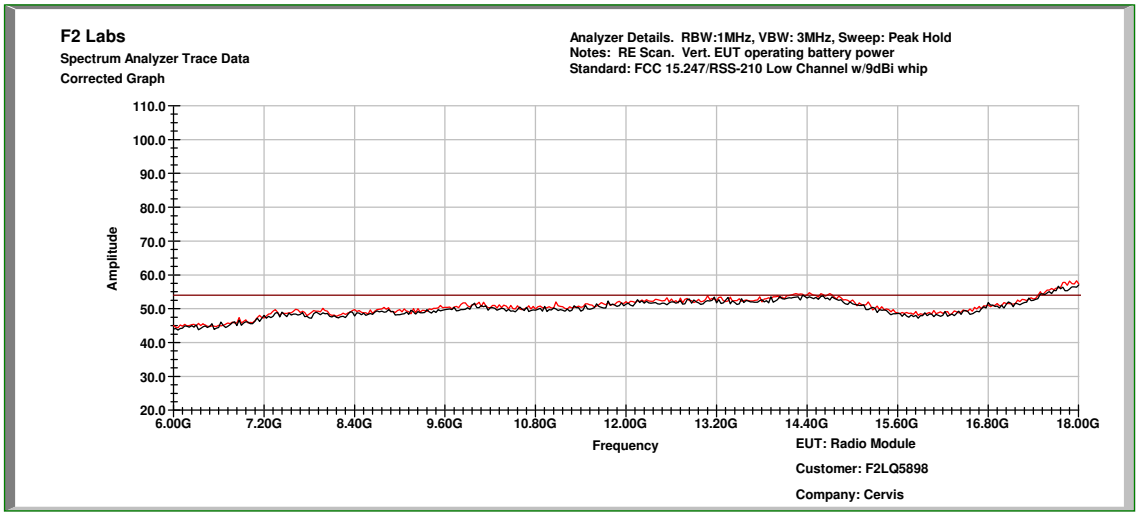

## 9dBi Whip Antenna, Low Channel, 2.6 GHz to 6 GHz, Vertical



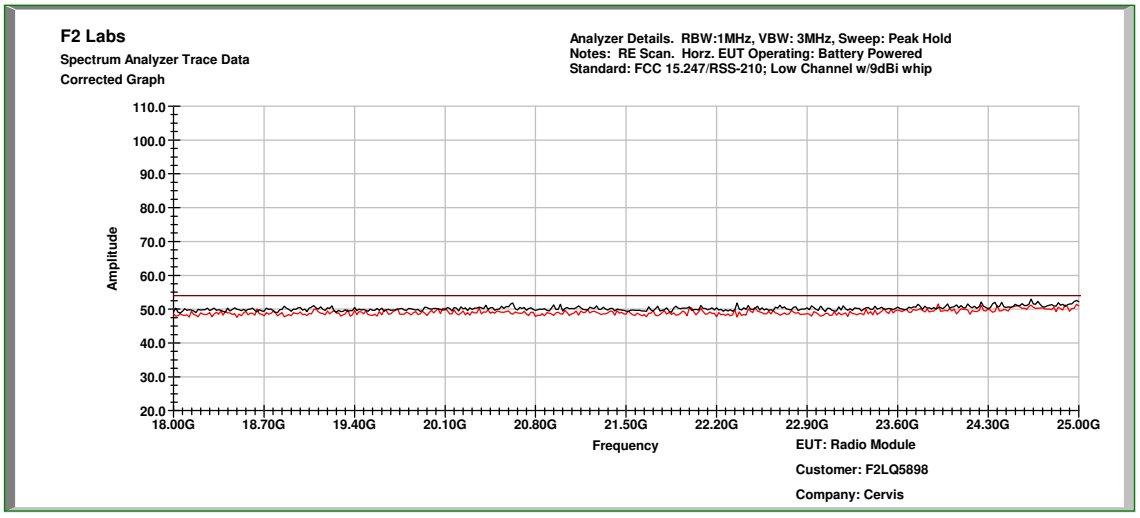
## 9dBi Whip Antenna, Low Channel, 6 GHz to 18 GHz, Horizontal



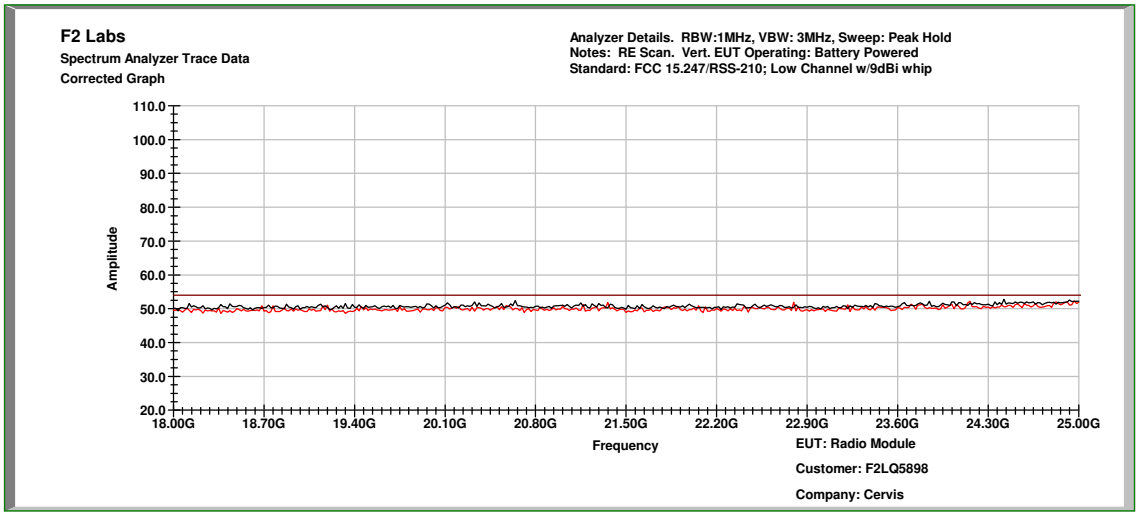

## 9dBi Whip Antenna, Low Channel, 6 GHz to 18 GHz, Vertical



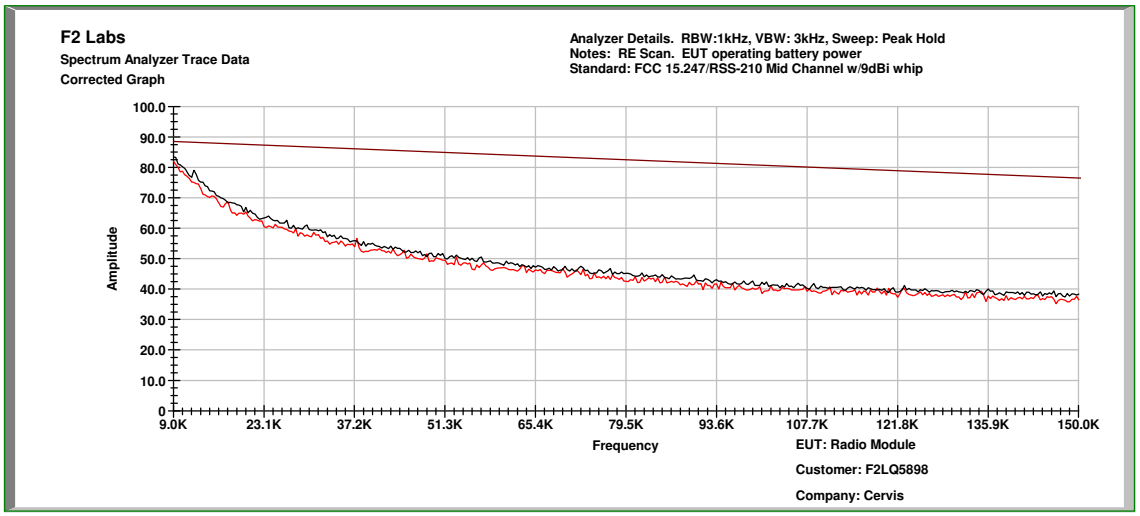
## 9dBi Whip Antenna, Low Channel, 18 GHz to 25 GHz, Horizontal



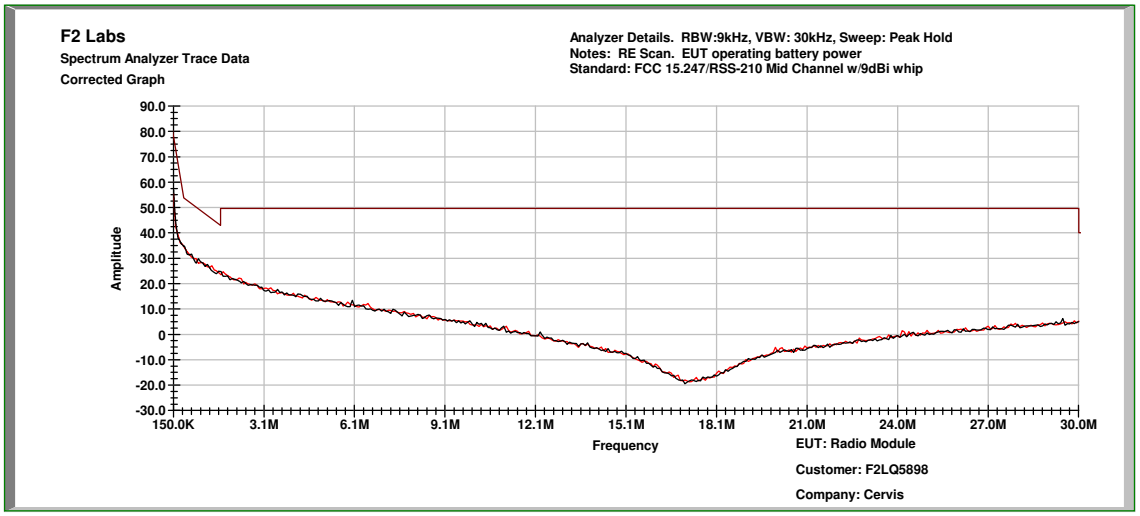

## 9dBi Whip Antenna, Low Channel, 18 GHz to 25 GHz, Vertical



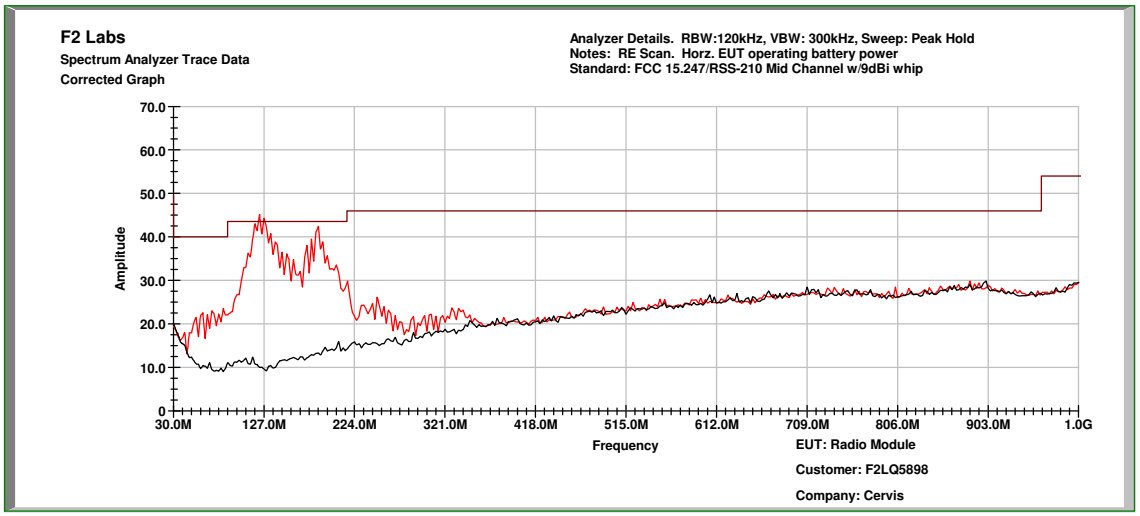
## 9dBi Whip Antenna, Mid Channel, .009 to 0.15 MHz



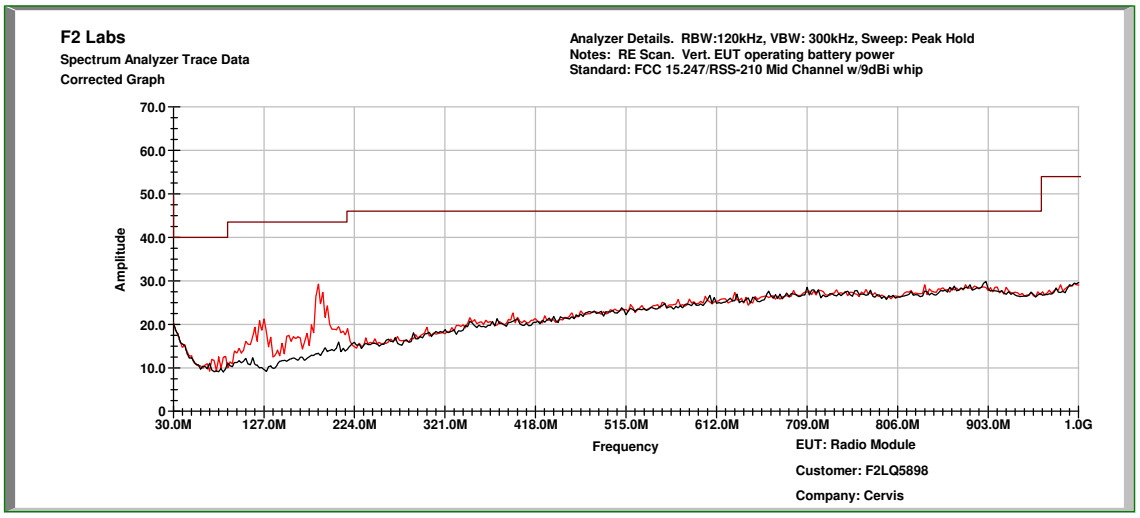

## 9dBi Whip Antenna, Mid Channel, 0.15 MHz to 30 MHz



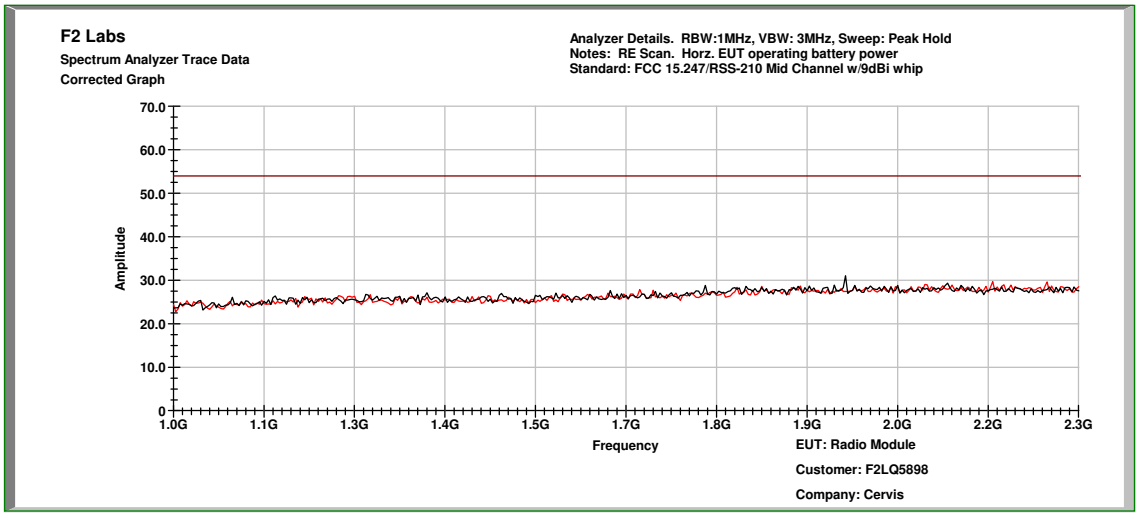
## 9dBi Whip Antenna, Mid Channel, 30 MHz to 1 GHz, Horizontal



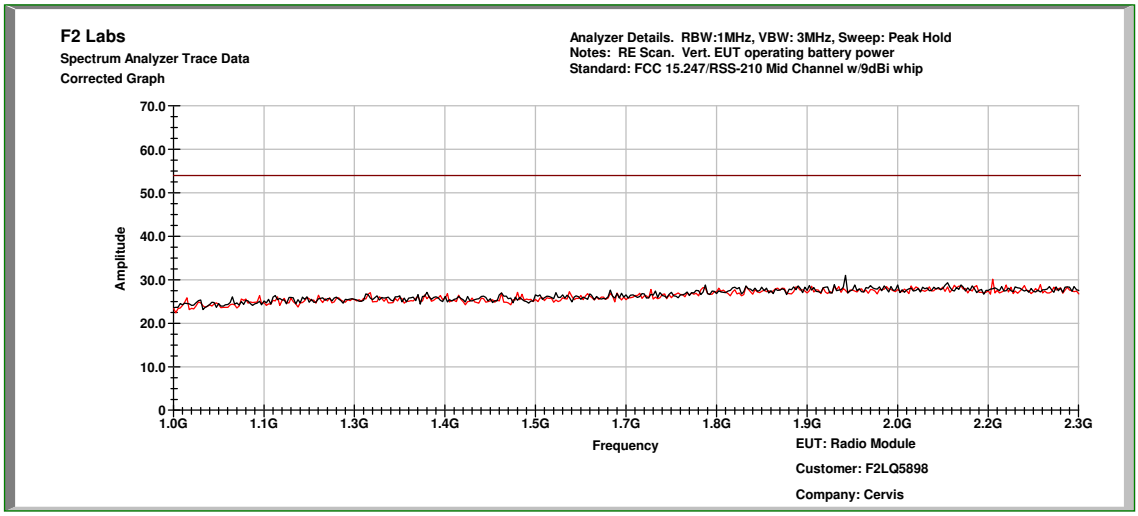

## 9dBi Whip Antenna, Mid Channel, 30 MHz to 1 GHz, Vertical



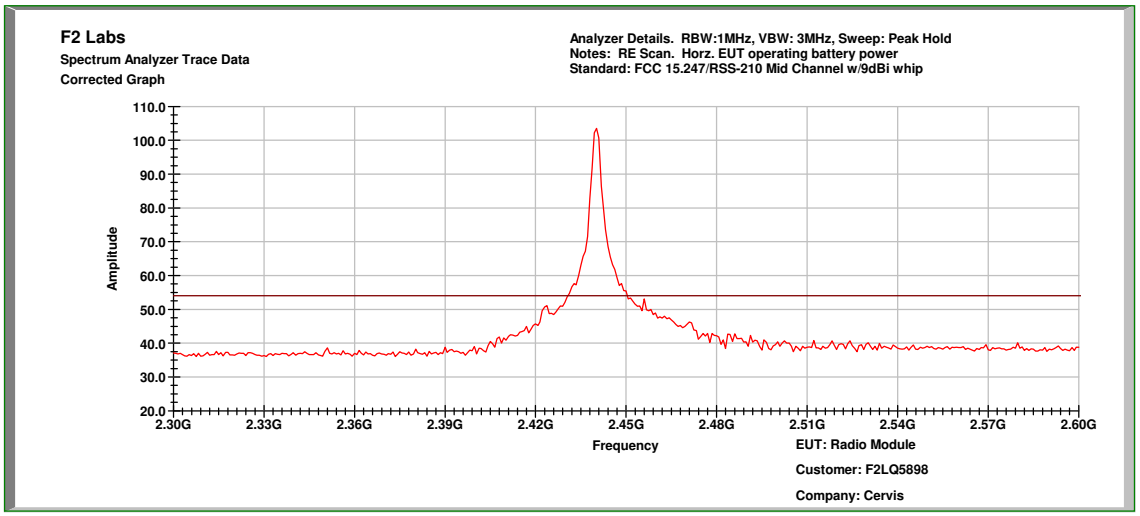
## 9dBi Whip Antenna, Mid Channel, 1 GHz to 2.3 GHz, Horizontal



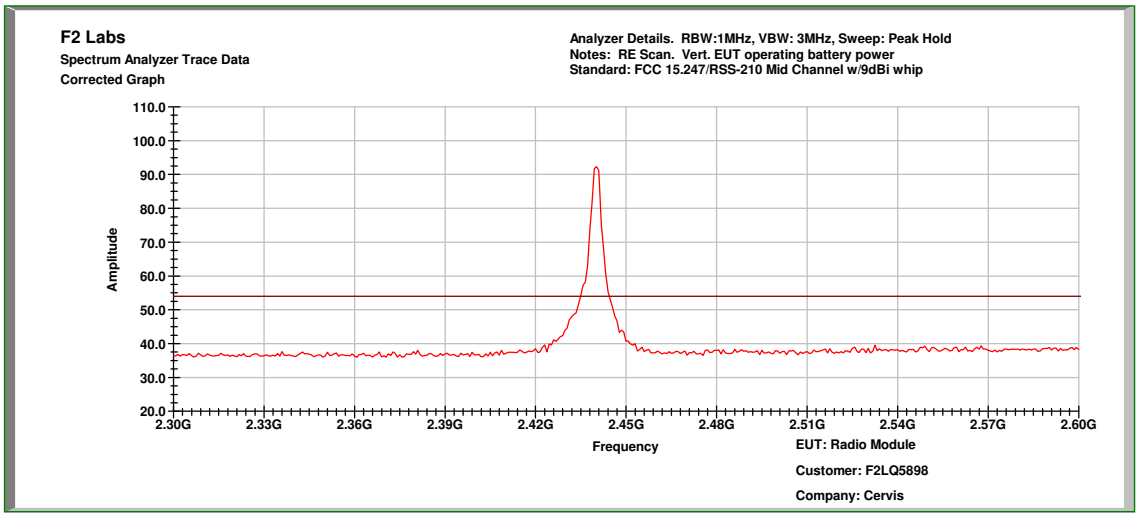

## 9dBi Whip Antenna, Mid Channel, 1 GHz to 2.3 GHz, Vertical



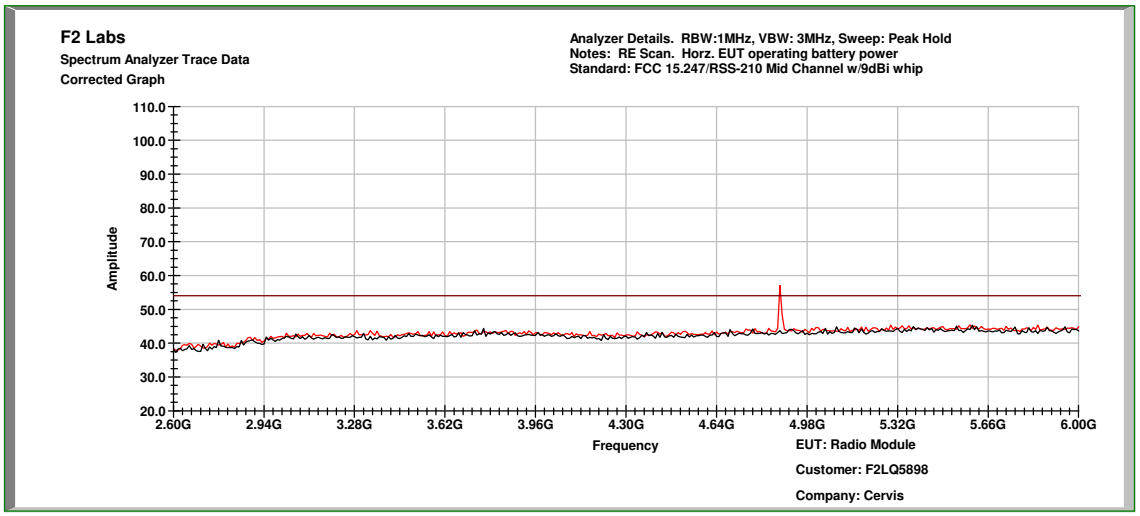
## 9dBi Whip Antenna, Mid Channel, 2.3 GHz to 2.6 GHz, Horizontal



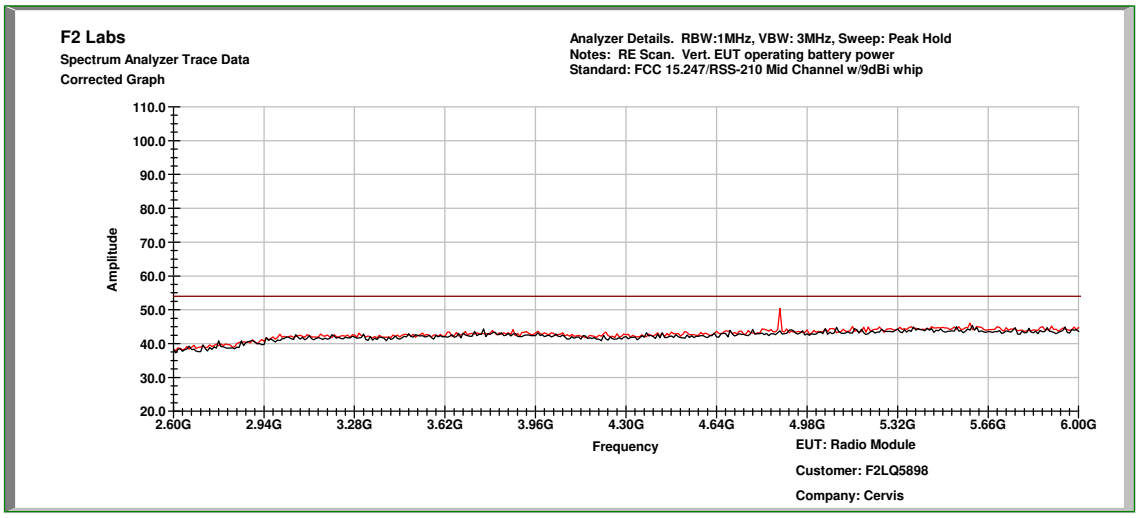

## 9dBi Whip Antenna, Mid Channel, 2.3 GHz to 2.6 GHz, Vertical



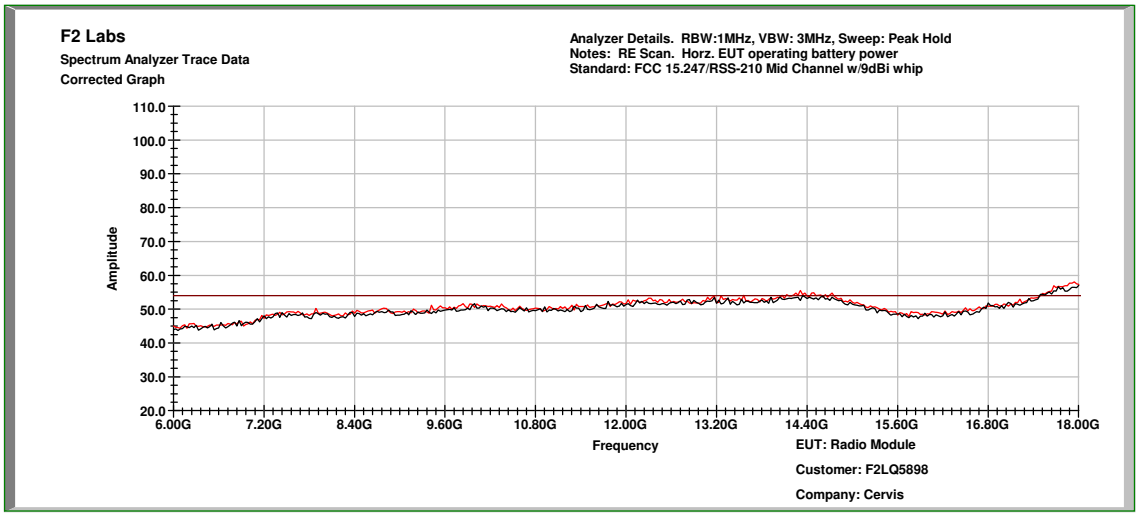
## 9dBi Whip Antenna, Mid Channel, 2.6 GHz to 6 GHz, Horizontal



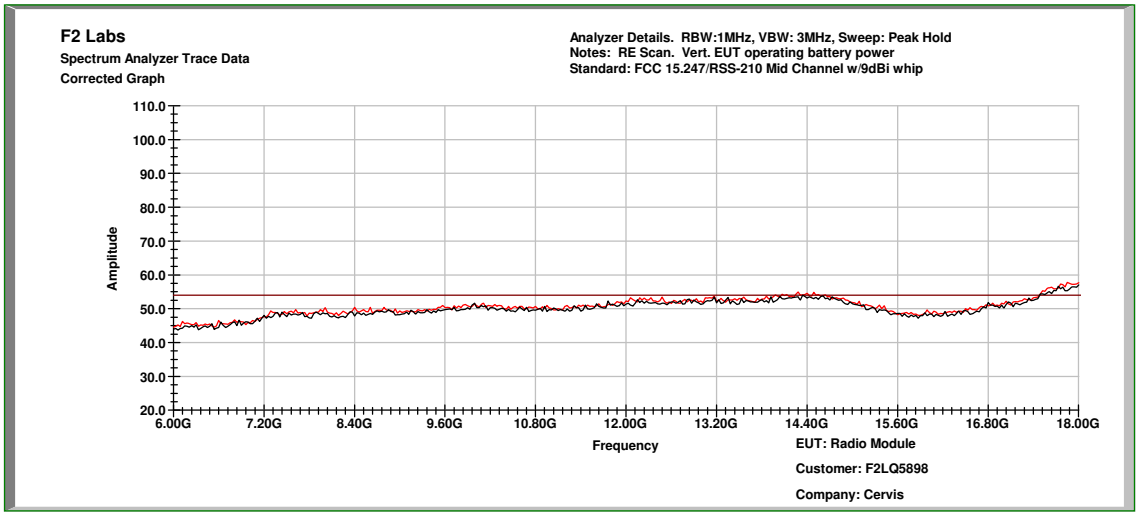

## 9dBi Whip Antenna, Mid Channel, 2.6 GHz to 6 GHz, Vertical



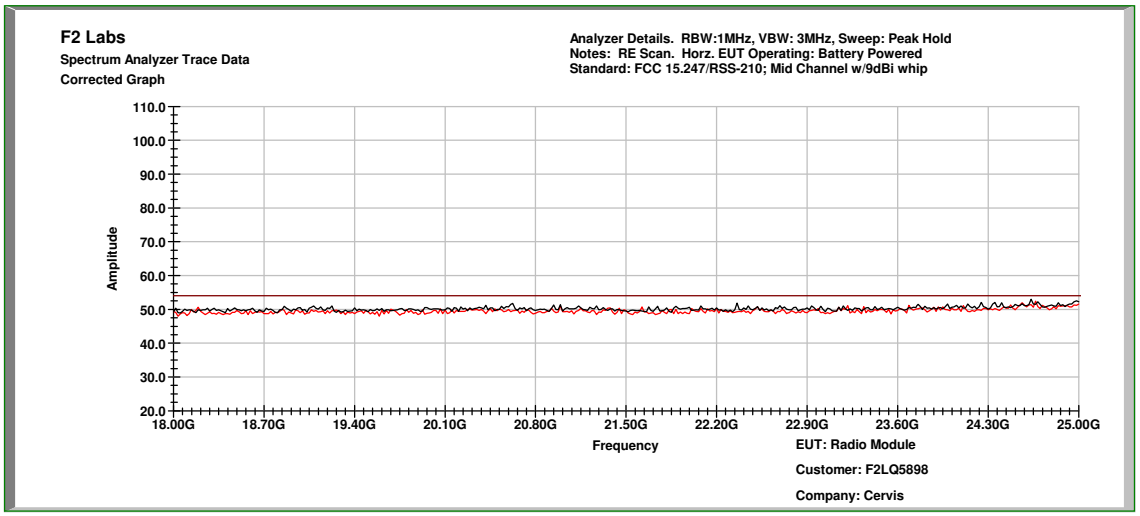
## 9dBi Whip Antenna, Mid Channel, 6 GHz to 18 GHz, Horizontal



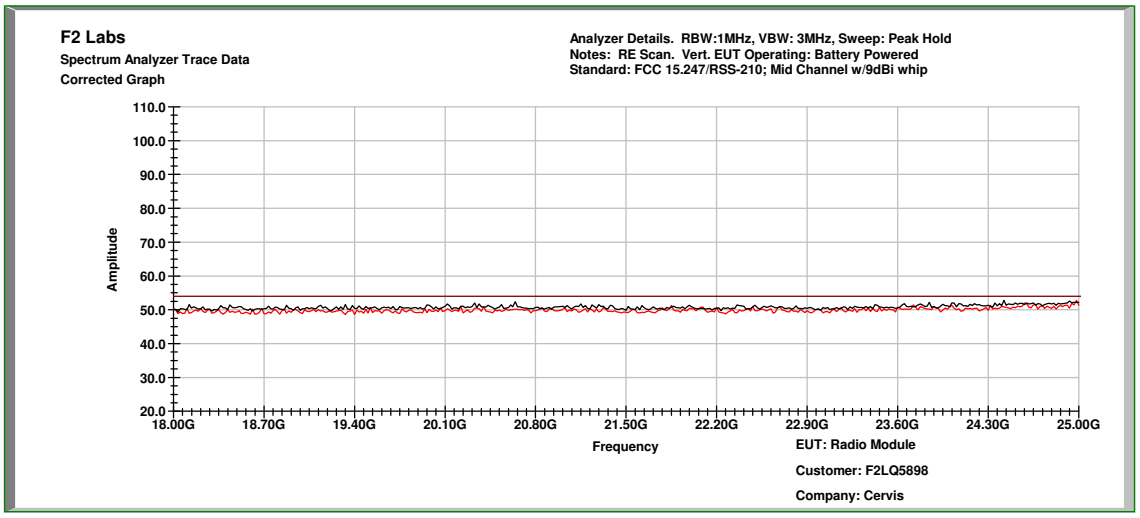

## 9dBi Whip Antenna, Mid Channel, 6 GHz to 18 GHz, Vertical



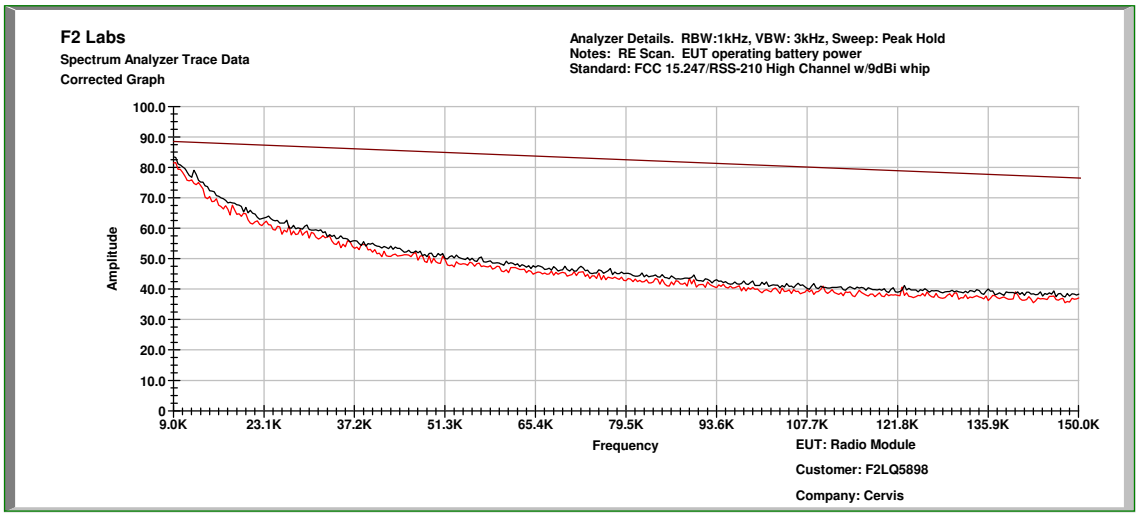
## 9dBi Whip Antenna, Mid Channel, 18 GHz to 25 GHz, Horizontal



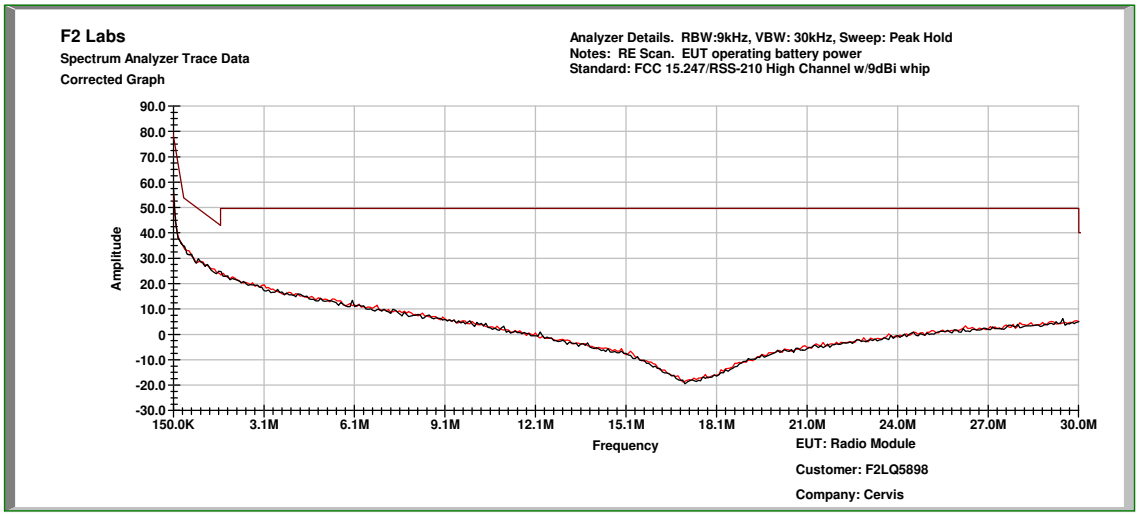

## 9dBi Whip Antenna, Mid Channel, 18 GHz to 25 GHz, Vertical



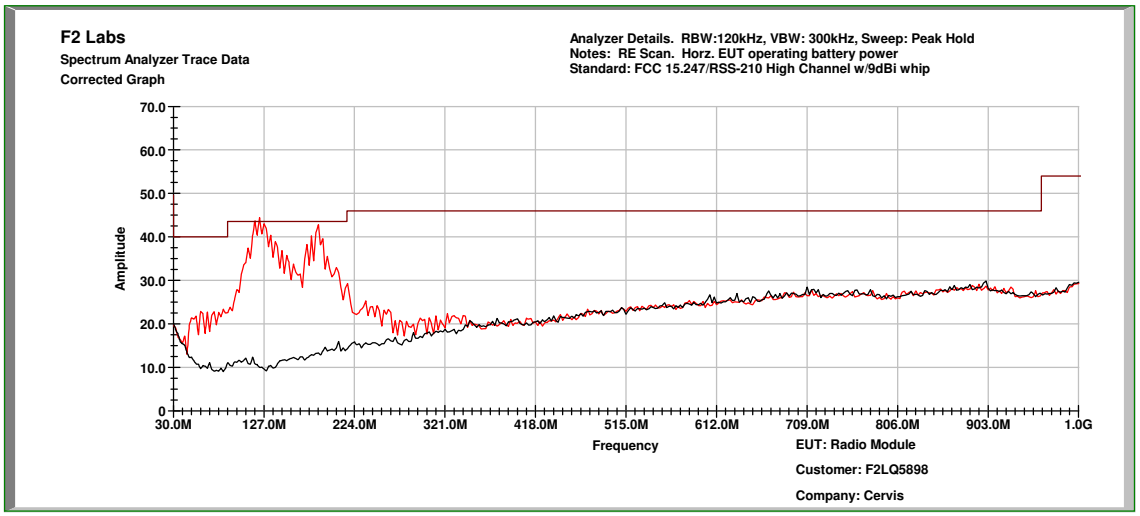
## 9dBi Whip Antenna, High Channel, .009 to 0.15 MHz



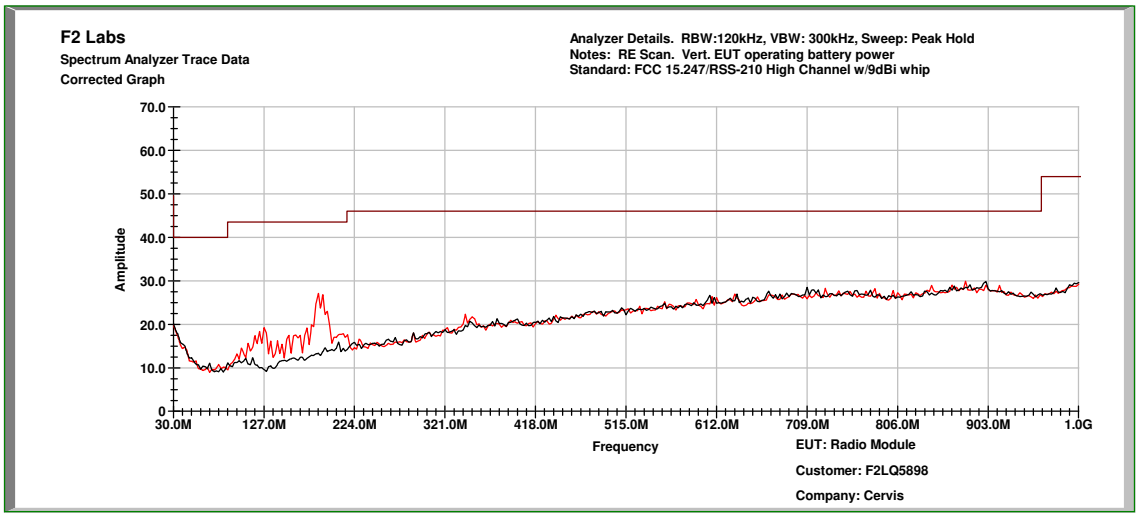

## 9dBi Whip Antenna, High Channel, 0.15 MHz to 30 MHz



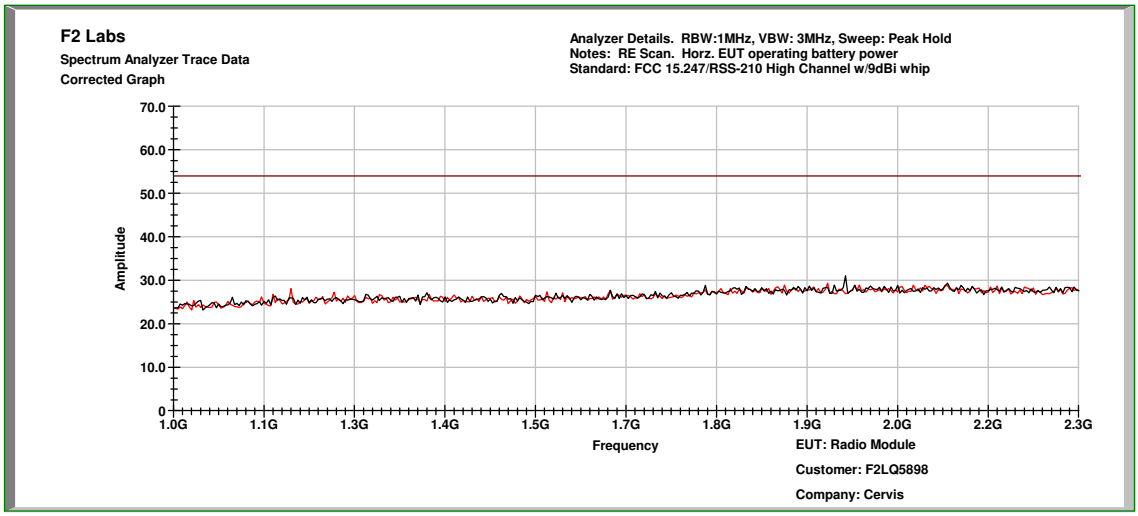
## 9dBi Whip Antenna, High Channel, 30 MHz to 1 GHz, Horizontal



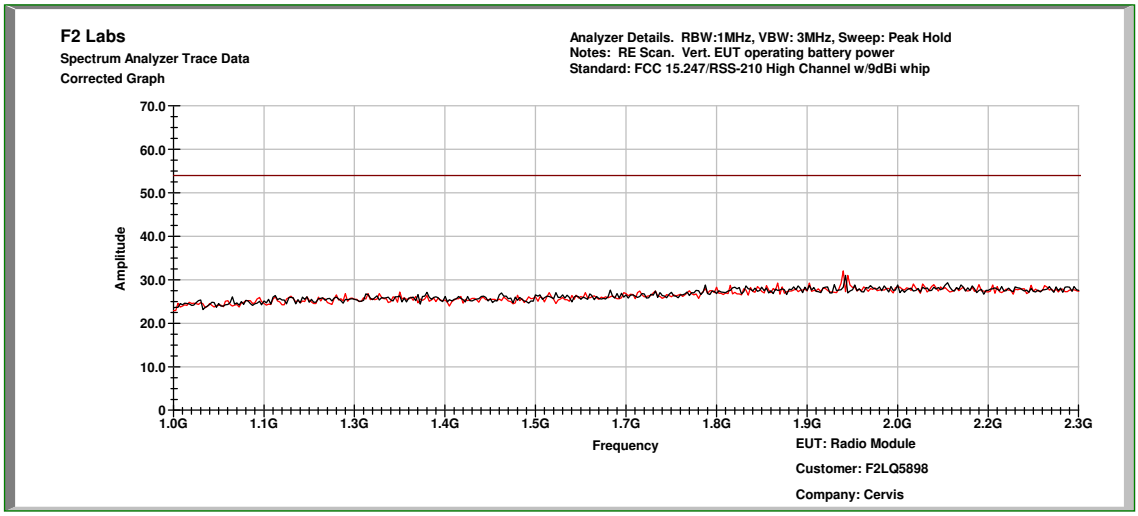

## 9dBi Whip Antenna, High Channel, 30 MHz to 1 GHz, Vertical



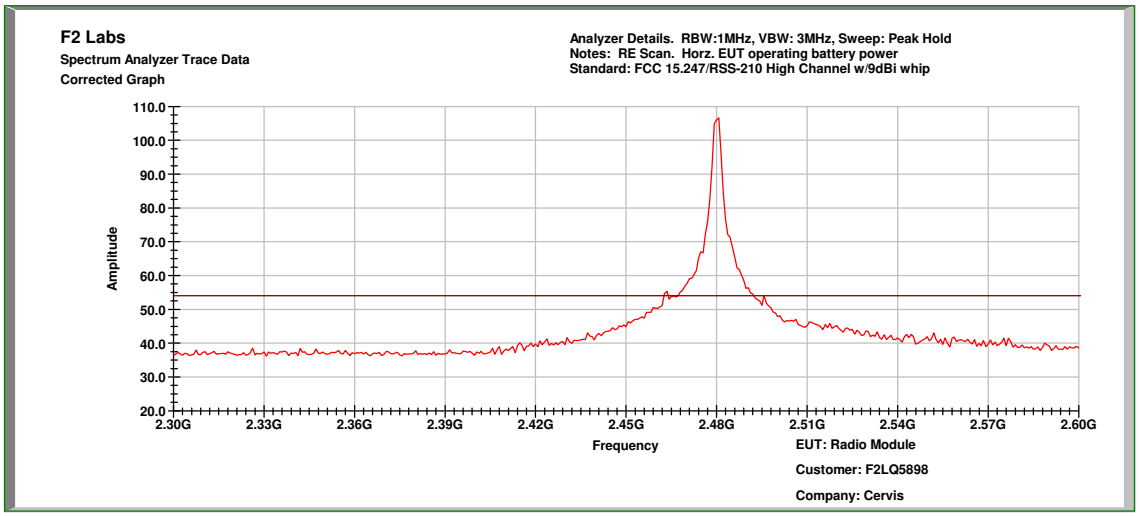
## 9dBi Whip Antenna, High Channel, 1 GHz to 2.3 GHz, Horizontal



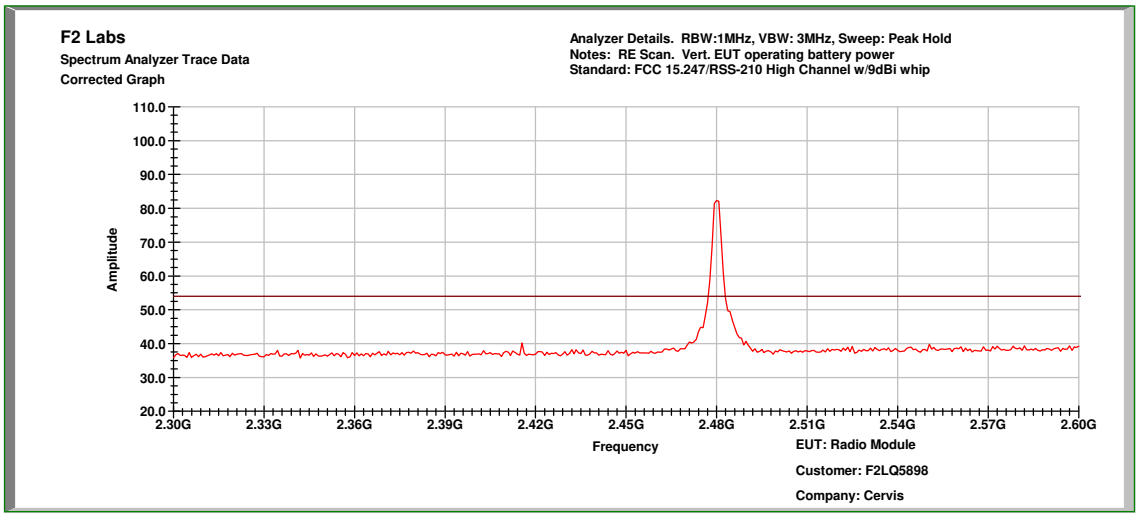

## 9dBi Whip Antenna, High Channel, 1 GHz to 2.3 GHz, Vertical



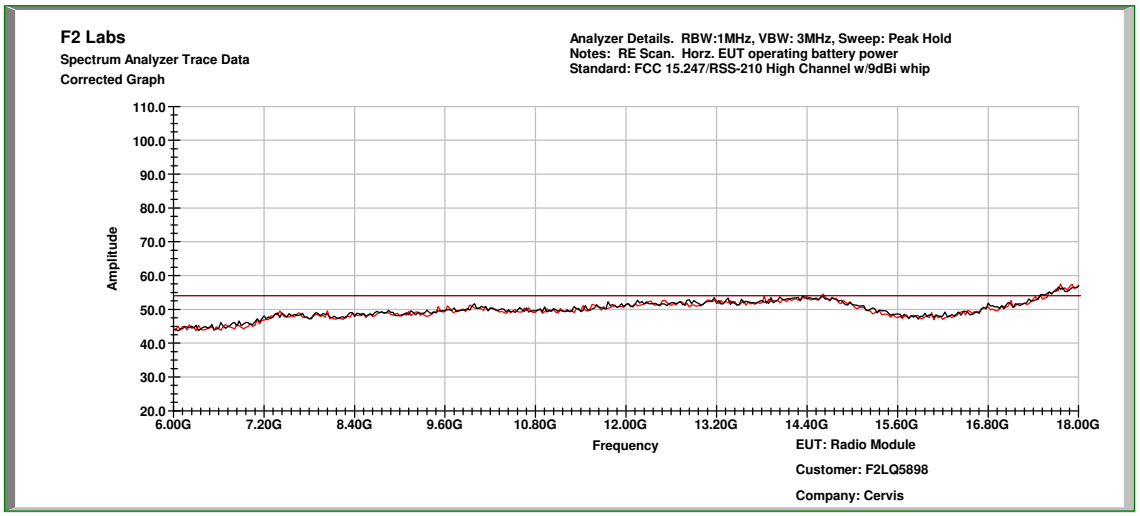
## 9dBi Whip Antenna, High Channel, 2.3 GHz to 2.6 GHz, Horizontal



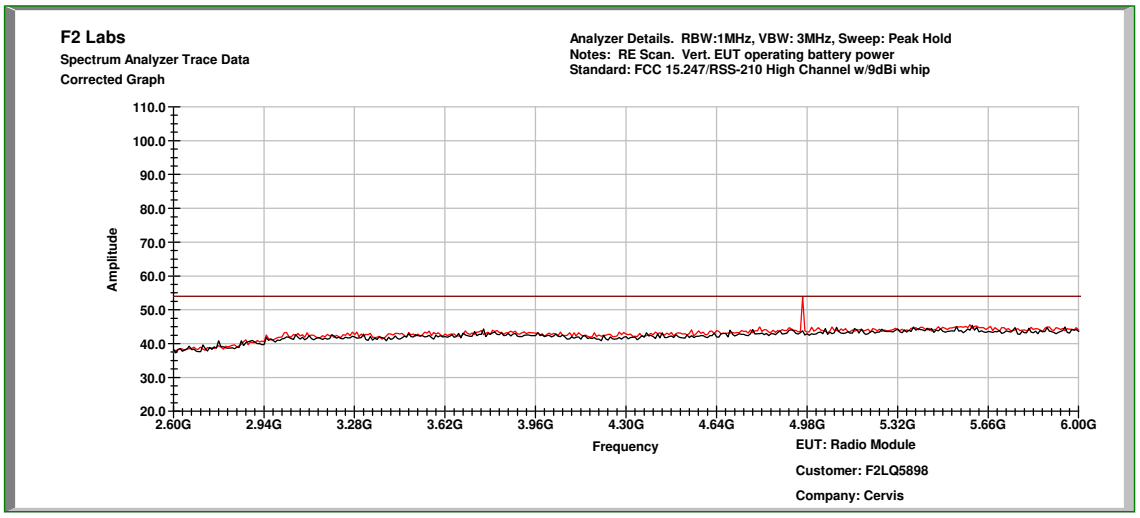

## 9dBi Whip Antenna, High Channel, 2.3 GHz to 2.6 GHz, Vertical



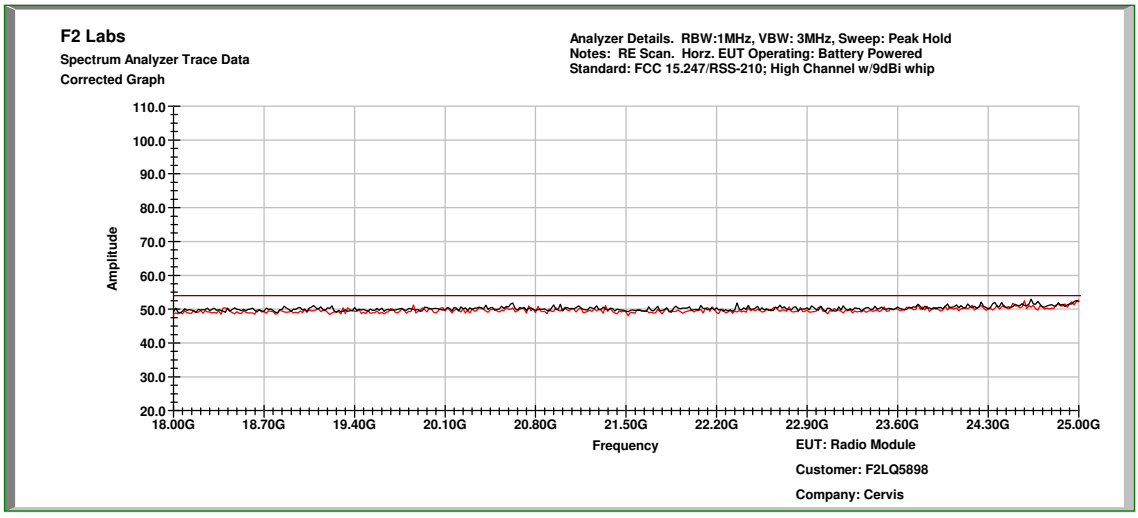
## 9dBi Whip Antenna, High Channel, 2.6 GHz to 6 GHz, Horizontal



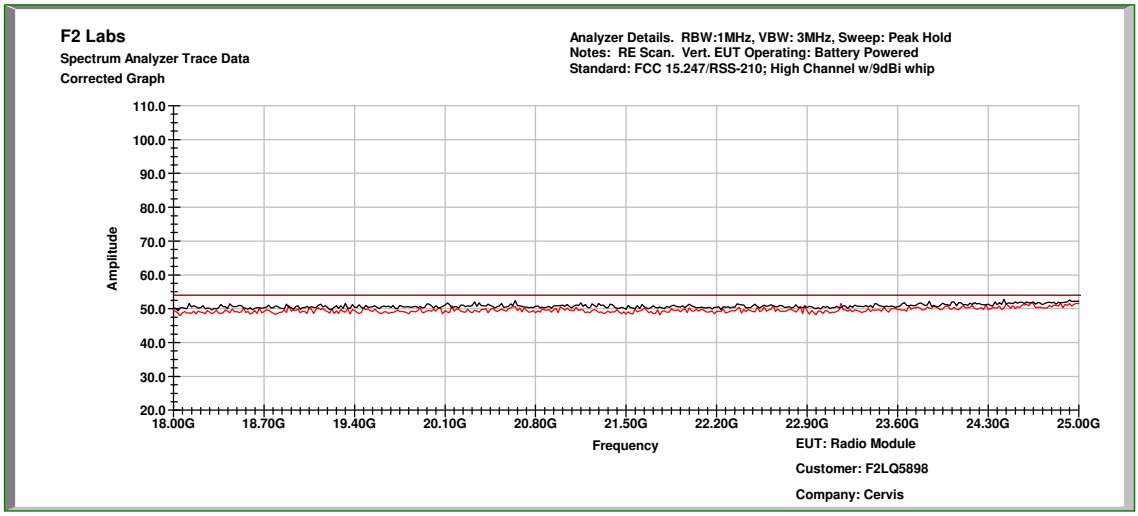

## 9dBi Whip Antenna, High Channel, 2.6 GHz to 6 GHz, Vertical



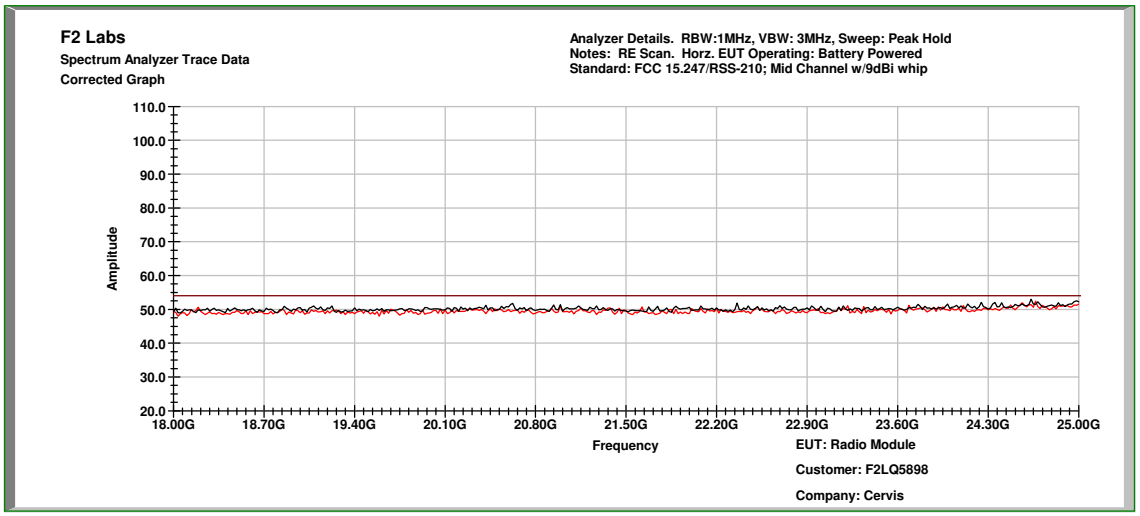
## 9dBi Whip Antenna, High Channel, 6 GHz to 18 GHz, Horizontal



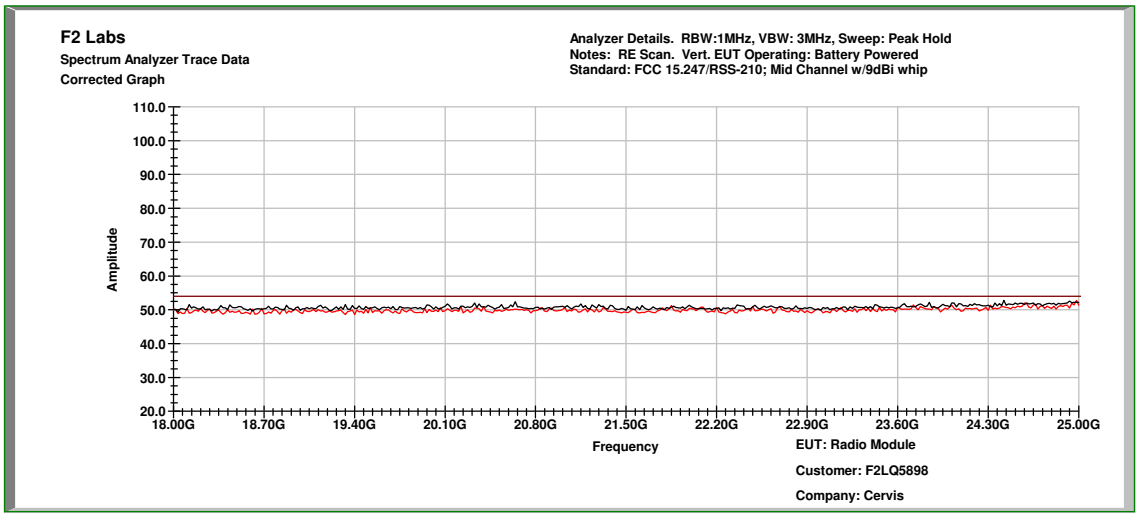

## 9dBi Whip Antenna, High Channel, 6 GHz to 18 GHz, Vertical



## 9dBi Whip Antenna, High Channel, 18 GHz to 25 GHz, Horizontal

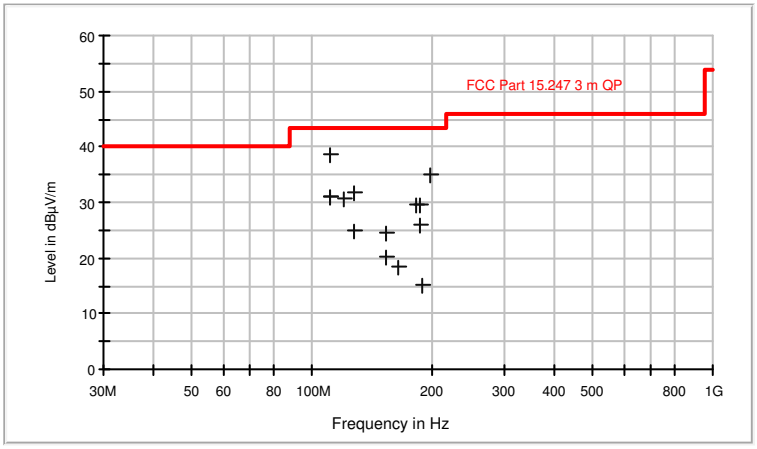



## 9dBi Whip Antenna, High Channel, 18 GHz to 25 GHz, Vertical



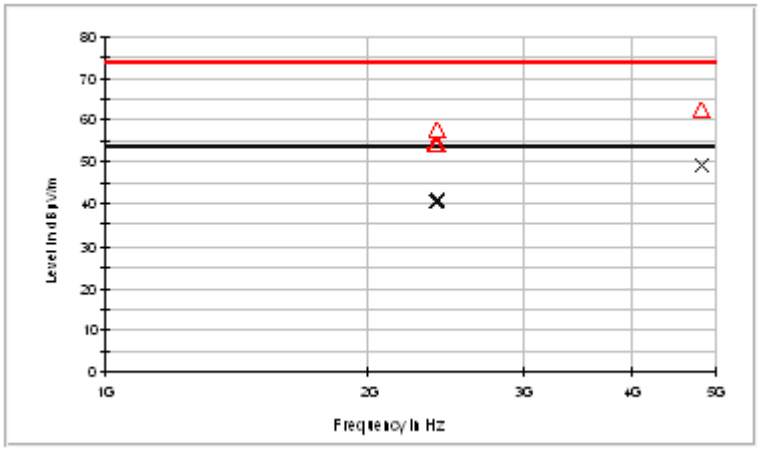
## Measurements

### 9dBi Whip Antenna, Low Channel




| Frequency (MHz) | QuasiPeak (dBµV/m) | Limits (dBµV/m) | Bandwidth (kHz) | Polarity | Corr. (dB) |
|---|---|---|---|---|---|
| 110.010000 | 38.6 | 43.5 | 120.000 | H | 14.2 |
| 110.700000 | 31.2 | 43.5 | 120.000 | V | 14.6 |
| 110.700000 | 31.2 | 43.5 | 120.000 | V | 14.6 |
| 119.500000 | 30.6 | 43.5 | 120.000 | V | 15.9 |
| 127.410000 | 24.9 | 43.5 | 120.000 | V | 15.7 |
| 127.410000 | 31.9 | 43.5 | 120.000 | H | 15.2 |
| 151.880000 | 20.2 | 43.5 | 120.000 | V | 14.2 |
| 151.880000 | 24.6 | 43.5 | 120.000 | H | 14.0 |
| 164.030000 | 18.3 | 43.5 | 120.000 | V | 14.1 |
| 182.010000 | 29.6 | 43.5 | 120.000 | H | 12.8 |
| 185.090000 | 25.9 | 43.5 | 120.000 | V | 12.9 |
| 185.490000 | 29.7 | 43.5 | 120.000 | H | 12.9 |
| 188.700000 | 15.2 | 43.5 | 120.000 | V | 12.8 |
| 197.220000 | 35.0 | 43.5 | 120.000 | H | 14.5 |

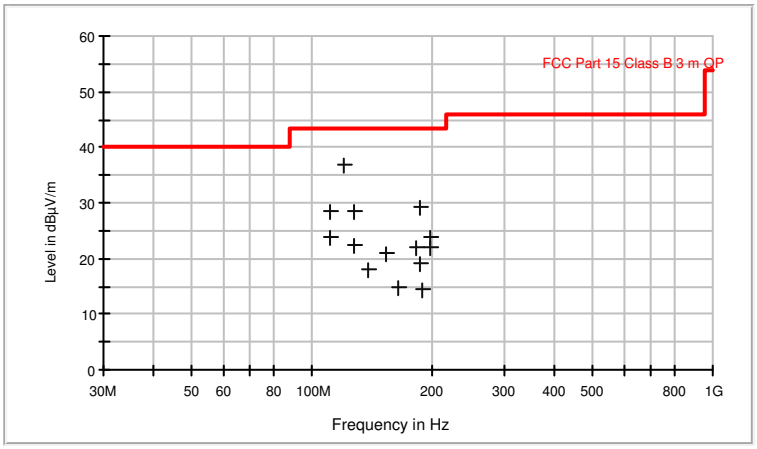
## 9dBi Whip Antenna, Low Channel, cont'd




**X = AVG; Δ = Max Peak**

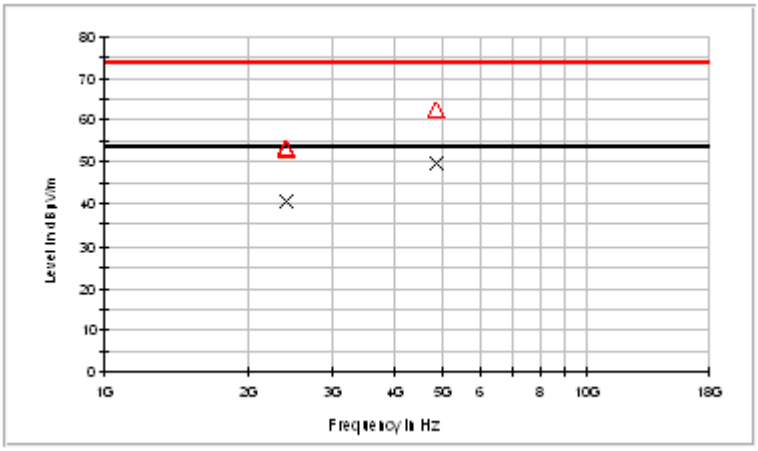
| Frequency (MHz) | MaxPeak (dBµV/m) | Limits (dBµV/m) | Average (dBµV/m) | Limits (dBµV/m) | Bandwidth (kHz) | Polarity | Corr. (dB) |
|---|---|---|---|---|---|---|---|
| 2384.96000 | 54.4 | 74.0 | 40.4 | 54.0 | 1000.000 | H | 28.3 |
| 2390.00000 | 54.5 | 74.0 | 40.5 | 54.0 | 1000.000 | H | 28.3 |
| 2390.00000 | 54.5 | 74.0 | 40.5 | 54.0 | 1000.000 | H | 28.3 |
| 2390.24000 | 57.8 | 74.0 | 40.8 | 54.0 | 1000.000 | H | 28.3 |
| 4811.28000 | 62.7 | 74.0 | 49.3 | 54.0 | 1000.000 | H | 32.9 |
| 4819.00000 | 62.6 | 74.0 | 49.1 | 54.0 | 1000.000 | H | 32.9 |

## 9dBi Whip Antenna, Mid Channel




| Frequency (MHz) | QuasiPeak (dBµV/m) | Limits (dBµV/m) | Bandwidth (kHz) | Polarity | Corr. (dB) |
|---|---|---|---|---|---|
| 110.010000 | 28.4 | 43.5 | 120.000 | V | 14.4 |
| 110.700000 | 23.8 | 43.5 | 120.000 | H | 14.5 |
| 119.500000 | 36.8 | 43.5 | 120.000 | H | 15.5 |
| 127.410000 | 22.5 | 43.5 | 120.000 | V | 15.7 |
| 127.410000 | 28.5 | 43.5 | 120.000 | H | 15.2 |
| 136.800000 | 18.2 | 43.5 | 120.000 | H | 14.6 |
| 151.880000 | 20.8 | 43.5 | 120.000 | V | 14.2 |
| 164.030000 | 14.7 | 43.5 | 120.000 | H | 13.9 |
| 182.010000 | 22.1 | 43.5 | 120.000 | V | 13.0 |
| 185.090000 | 29.2 | 43.5 | 120.000 | H | 12.8 |
| 185.490000 | 19.0 | 43.5 | 120.000 | V | 13.0 |
| 188.700000 | 14.6 | 43.5 | 120.000 | H | 12.8 |
| 197.220000 | 22.1 | 43.5 | 120.000 | V | 14.2 |
| 197.220000 | 23.9 | 43.5 | 120.000 | V | 14.2 |

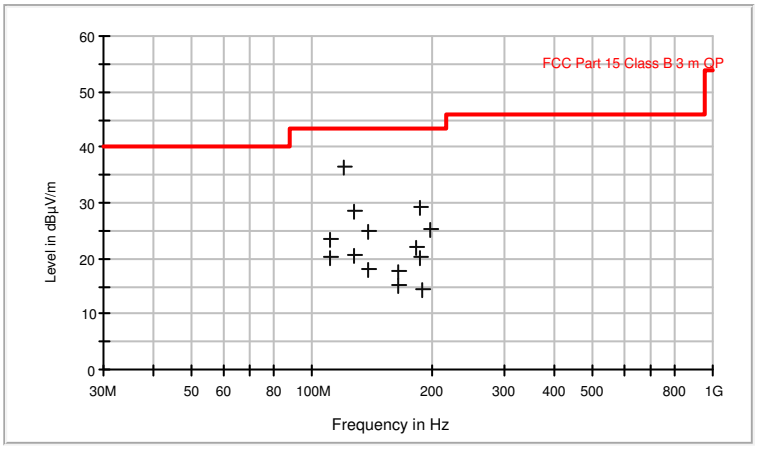
## 9dBi Whip Antenna, Mid Channel, cont'd




**X = AVG; Δ = Max Peak**

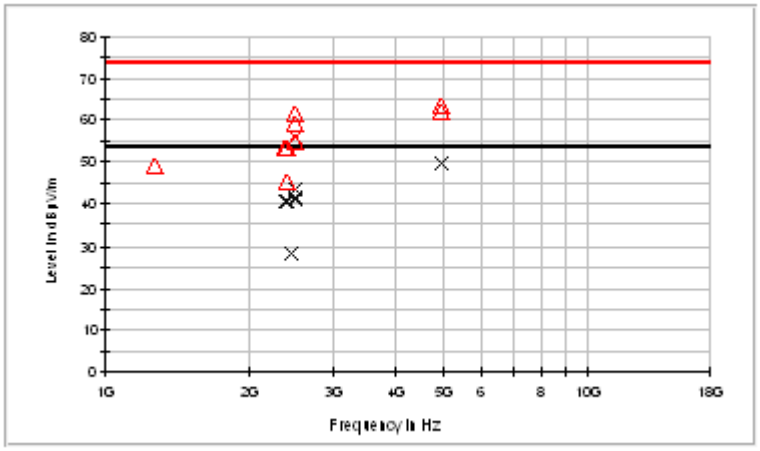
| Frequency (MHz) | MaxPeak (dBµV/m) | Limits (dBµV/m) | Average (dBµV/m) | Limits (dBµV/m) | Bandwidth (kHz) | Polarity | Corr. (dB) |
|---|---|---|---|---|---|---|---|
| 2385.08000 | 53.2 | 74.0 | 40.6 | 54.0 | 1000.000 | V | 28.3 |
| 2385.36000 | 53.3 | 74.0 | 40.5 | 54.0 | 1000.000 | H | 28.3 |
| 2391.08000 | 53.5 | 74.0 | 40.6 | 54.0 | 1000.000 | V | 28.3 |
| 4889.28000 | 62.6 | 74.0 | 49.7 | 54.0 | 1000.000 | V | 33.1 |

## 9dBi Whip Antenna, High Channel




| Frequency (MHz) | QuasiPeak (dBµV/m) | Limits (dBµV/m) | Bandwidth (kHz) | Polarity | Corr. (dB) |
|---|---|---|---|---|---|
| 110.010000 | 20.4 | 43.5 | 120.000 | V | 14.4 |
| 110.700000 | 23.5 | 43.5 | 120.000 | H | 14.5 |
| 119.500000 | 36.6 | 43.5 | 120.000 | H | 15.5 |
| 127.410000 | 28.6 | 43.5 | 120.000 | H | 15.2 |
| 127.410000 | 20.4 | 43.5 | 120.000 | V | 15.7 |
| 136.800000 | 24.8 | 43.5 | 120.000 | V | 14.6 |
| 136.800000 | 18.2 | 43.5 | 120.000 | H | 14.6 |
| 164.030000 | 17.9 | 43.5 | 120.000 | V | 14.1 |
| 164.030000 | 15.3 | 43.5 | 120.000 | H | 13.9 |
| 182.010000 | 22.0 | 43.5 | 120.000 | V | 13.0 |
| 185.090000 | 29.4 | 43.5 | 120.000 | H | 12.8 |
| 185.490000 | 20.4 | 43.5 | 120.000 | V | 13.0 |
| 188.700000 | 14.5 | 43.5 | 120.000 | H | 12.8 |
| 197.220000 | 25.1 | 43.5 | 120.000 | V | 14.2 |

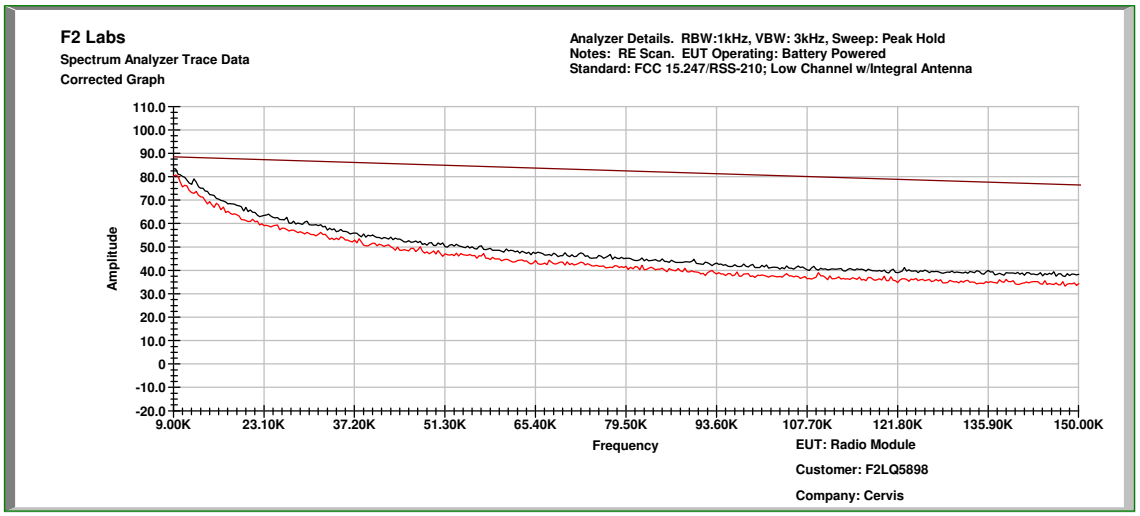
## 9dBi Whip Antenna, High Channel, cont'd



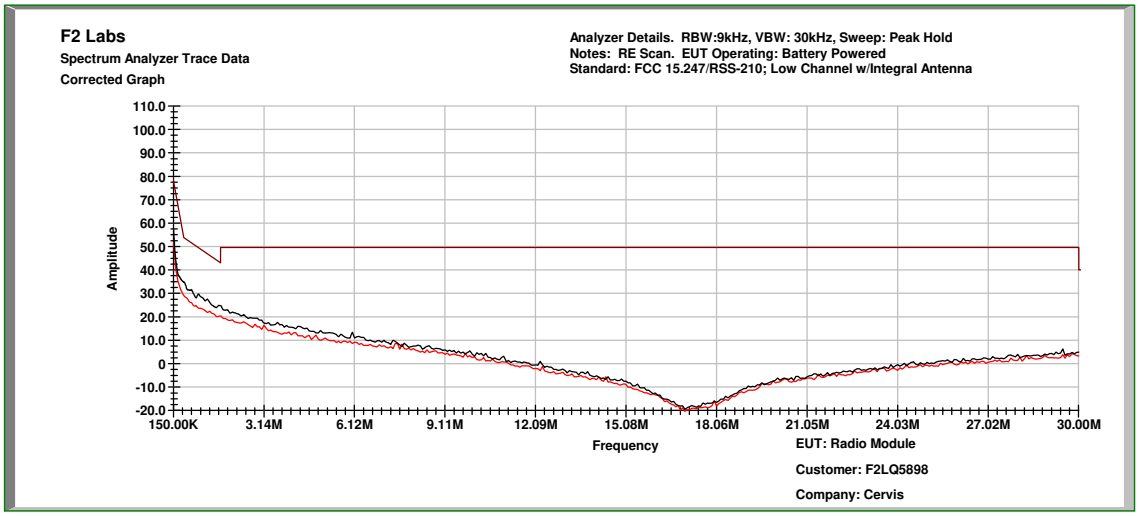

**X = AVG; Δ = Max Peak**

| Frequency (MHz) | MaxPeak (dBµV/m) | Limit (dBµV/m) | Average (dBµV/m) | Limit (dBµV/m) | Bandwidth (kHz) | Polarity | Corr. (dB) |
|---|---|---|---|---|---|---|---|
| 1270.00000 | 49.3 | 74.0 | 36.7 | 54.0 | 1000.000 | H | 25.5 |
| 2380.00000 | 53.6 | 74.0 | 40.4 | 54.0 | 1000.000 | H | 28.2 |
| 2384.88000 | 53.5 | 74.0 | 40.4 | 54.0 | 1000.000 | V | 28.3 |
| 2483.76000 | 44.9 | 74.0 | 27.3 | 54.0 | 1000.000 | H | 28.4 |
| 2483.76000 | 59.3 | 74.0 | 43.4 | 54.0 | 1000.000 | V | 28.4 |
| 2500.00000 | 61.8 | 74.0 | 41.4 | 54.0 | 1000.000 | H | 28.4 |
| 2500.00000 | 55.0 | 74.0 | 40.9 | 54.0 | 1000.000 | V | 28.4 |
| 4959.08000 | 62.2 | 74.0 | 49.6 | 54.0 | 1000.000 | H | 33.2 |
| 4959.08000 | 63.7 | 74.0 | 49.6 | 54.0 | 1000.000 | V | 33.2 |

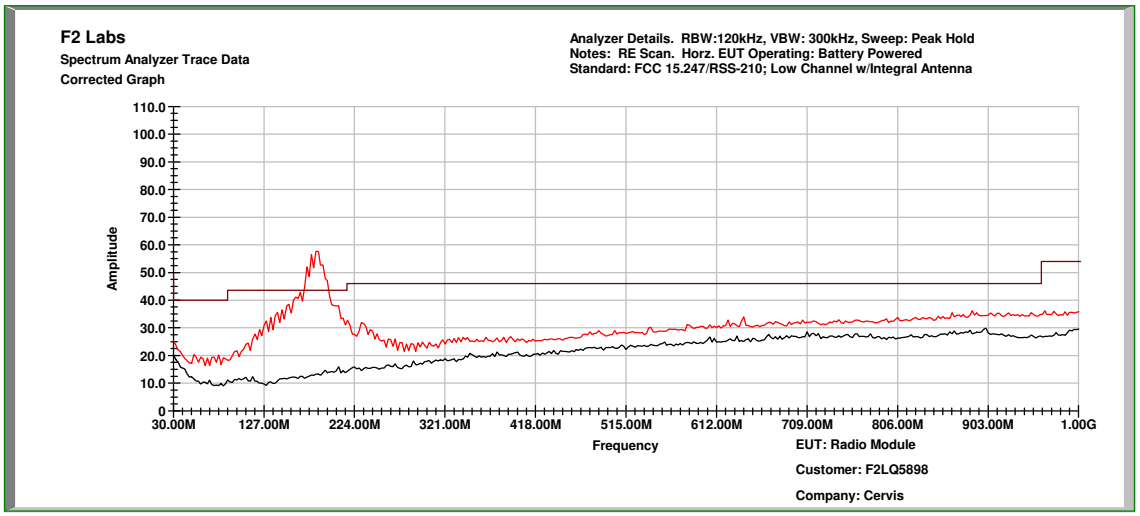
## 3.8dBi Integral Antenna, Low Channel, .009 to 0.15 MHz



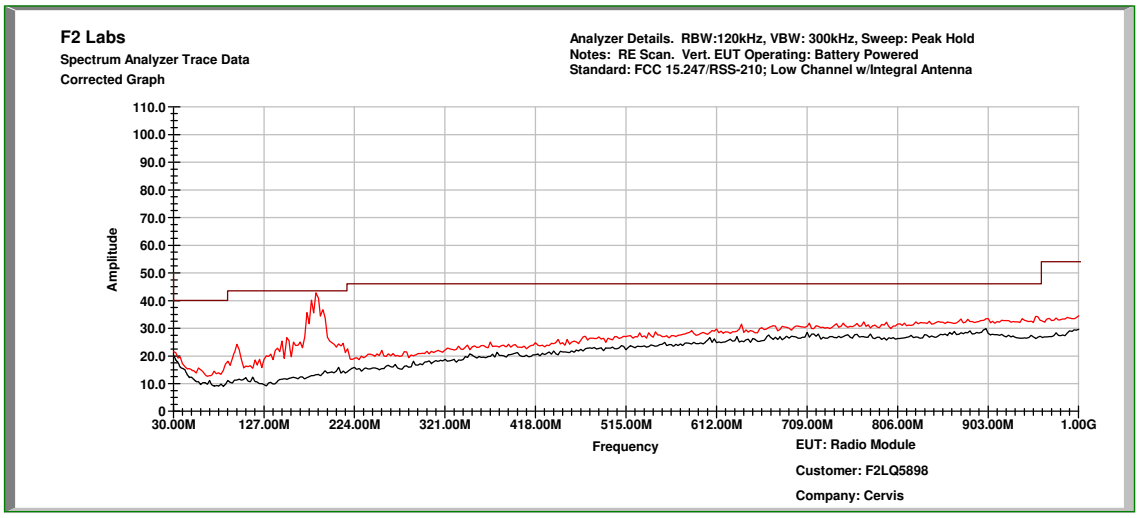

## 3.8dBi Integral Antenna, Low Channel, 0.15 MHz to 30 MHz



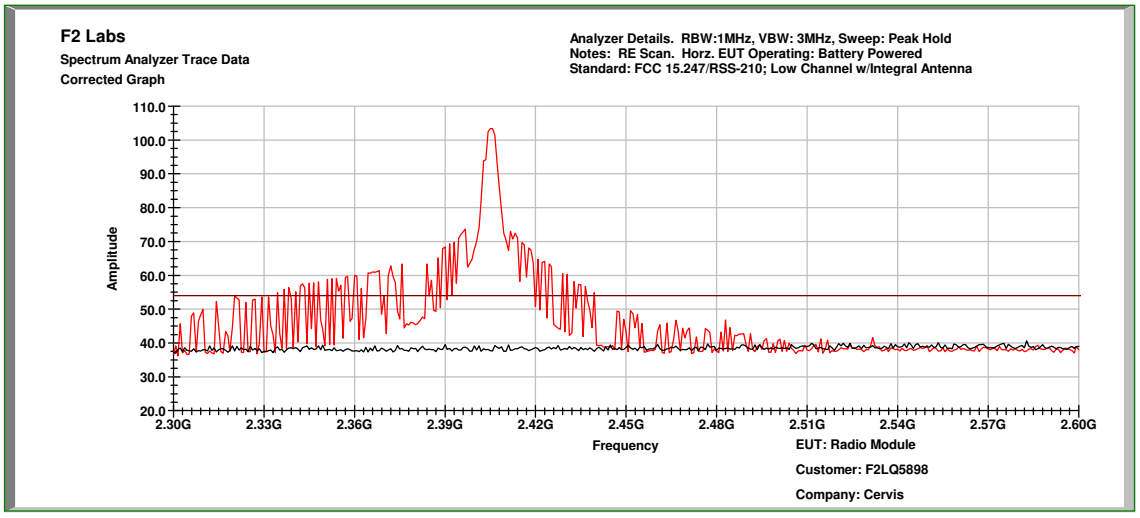
## 3.8dBi Integral Antenna, Low Channel, 30 MHz to 1 GHz, Horizontal



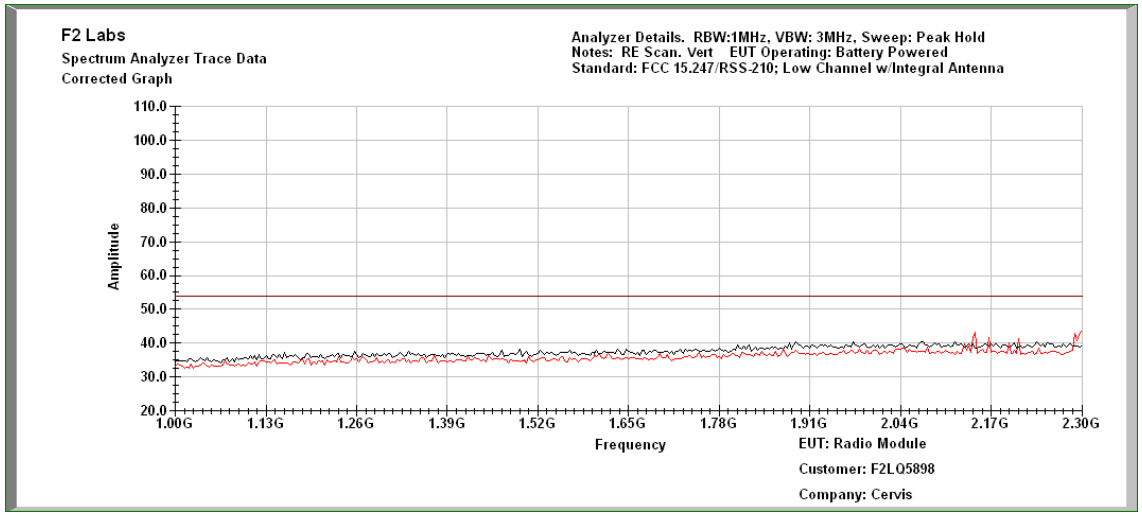

## 3.8dBi Integral Antenna, Low Channel, 30 MHz to 1 GHz, Vertical



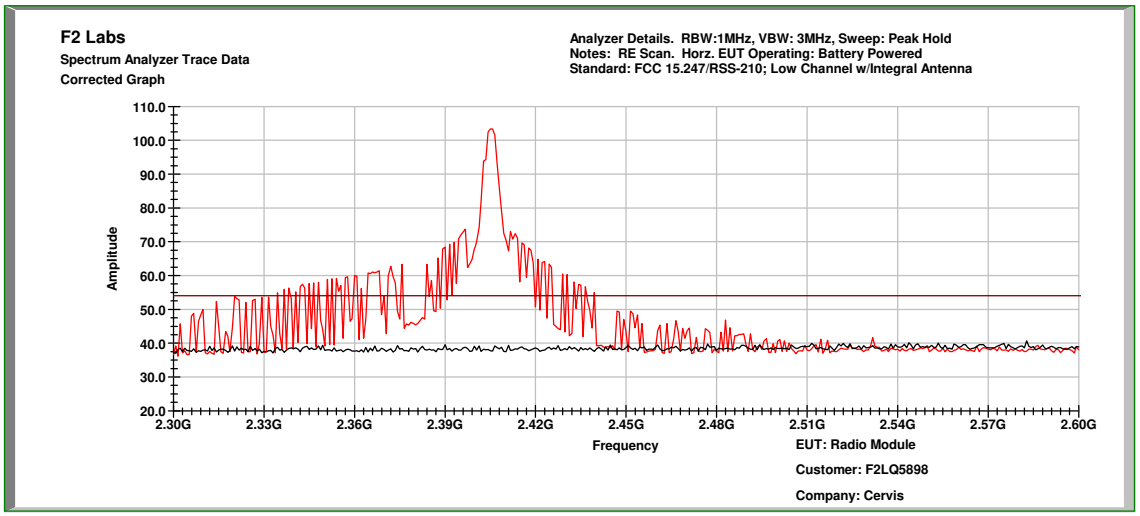
## 3.8dBi Integral Antenna, Low Channel, 1 GHz to 2.3 GHz, Horizontal



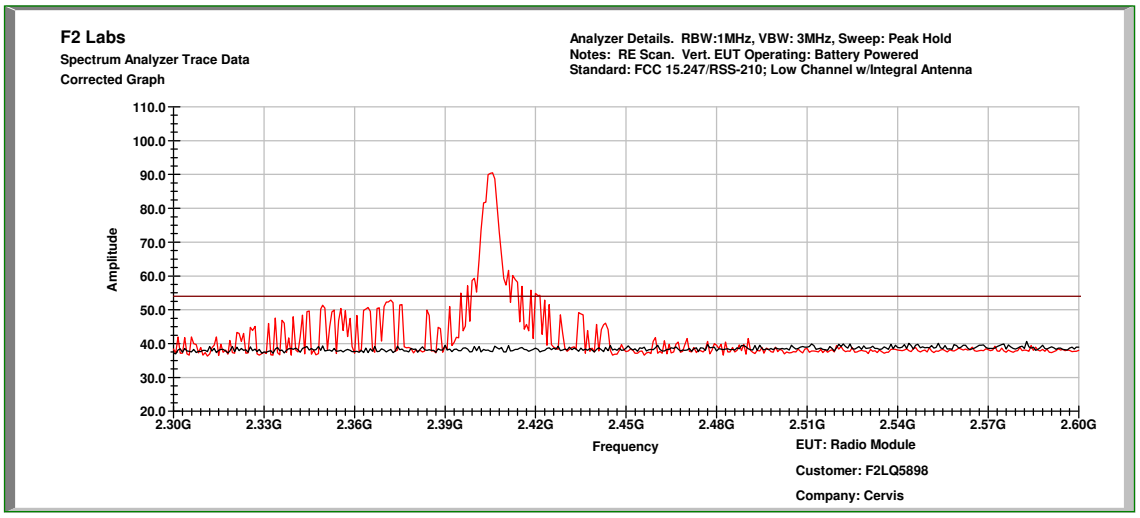

## 3.8dBi Integral Antenna, Low Channel, 1 GHz to 2.3 GHz, Vertical



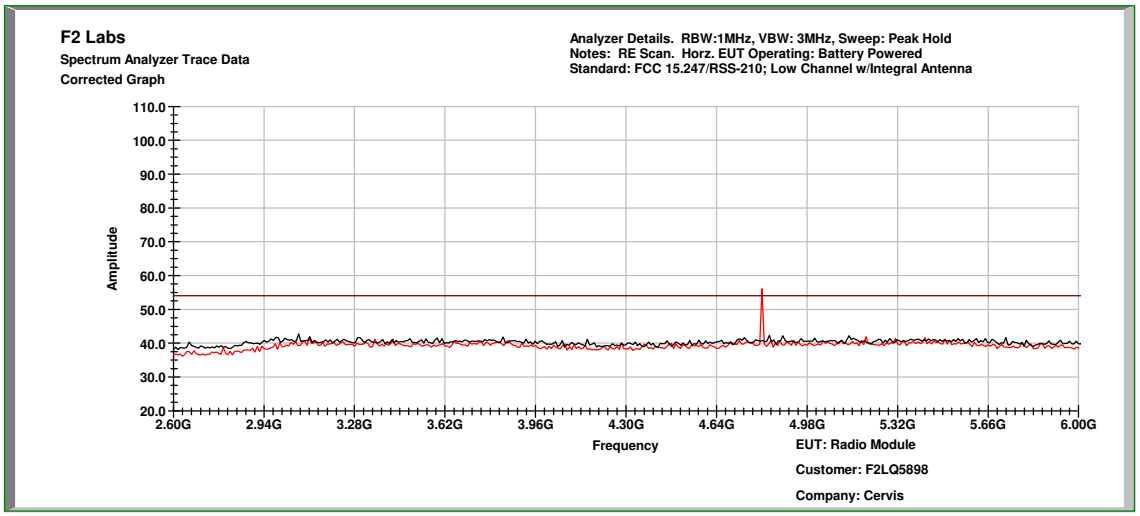
## 3.8dBi Integral Antenna, Low Channel, 2.3 GHz to 2.6 GHz, Horizontal



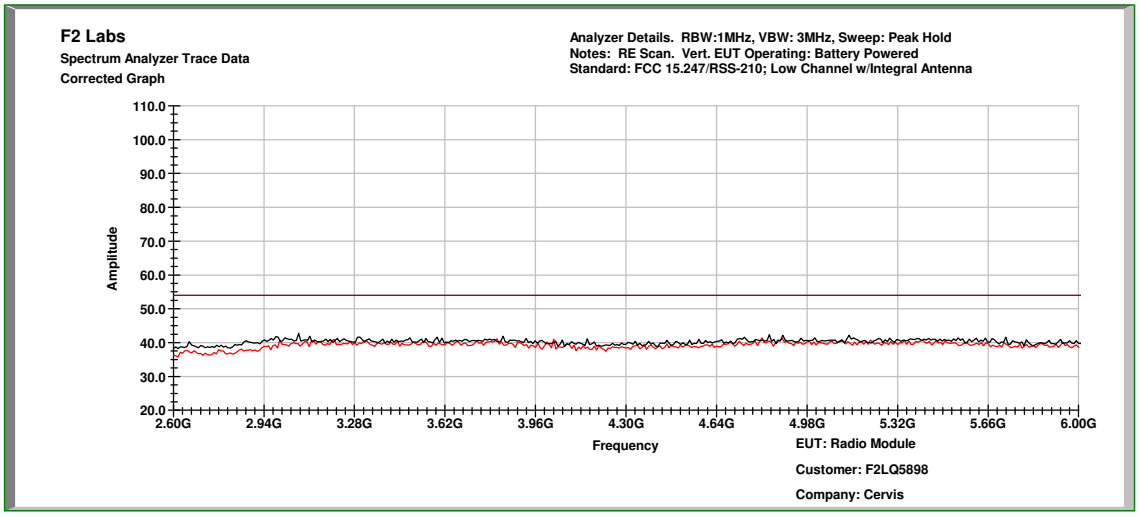

## 3.8dBi Integral Antenna, Low Channel, 2.3 GHz to 2.6 GHz, Vertical



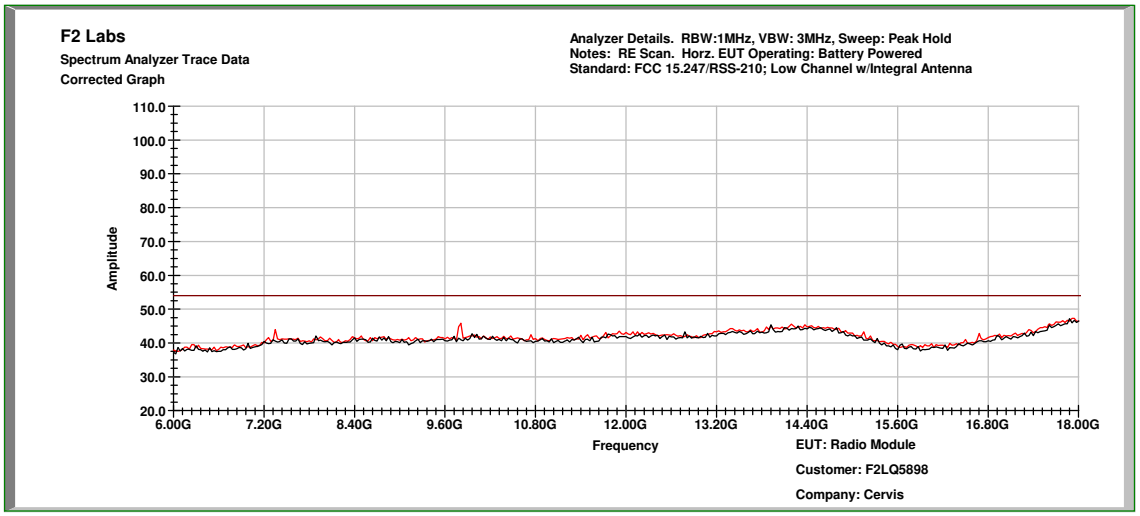
## 3.8dBi Integral Antenna, Low Channel, 2.6 GHz to 6 GHz, Horizontal



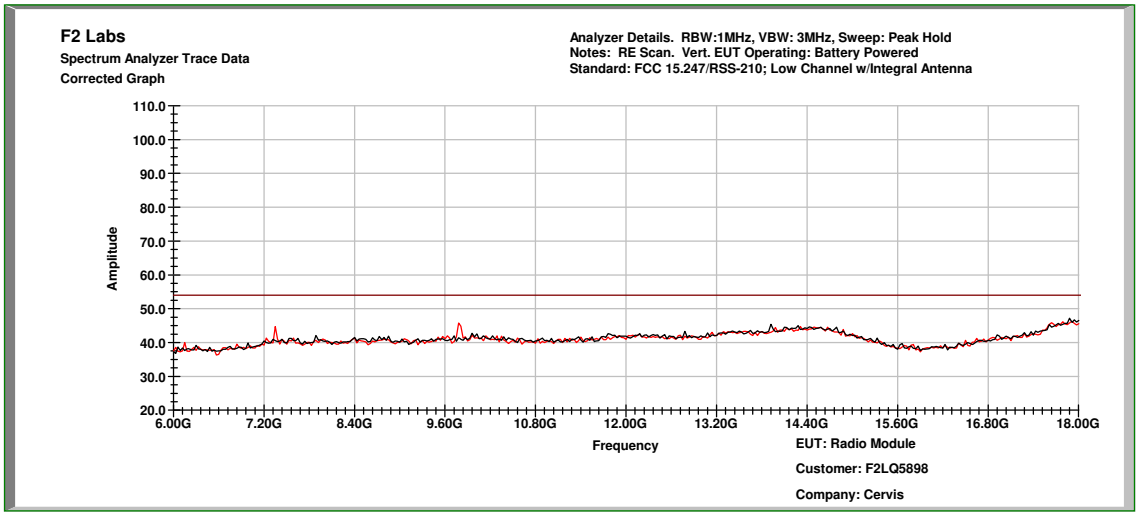

## 3.8dBi Integral Antenna, Low Channel, 2.6 GHz to 6 GHz, Vertical



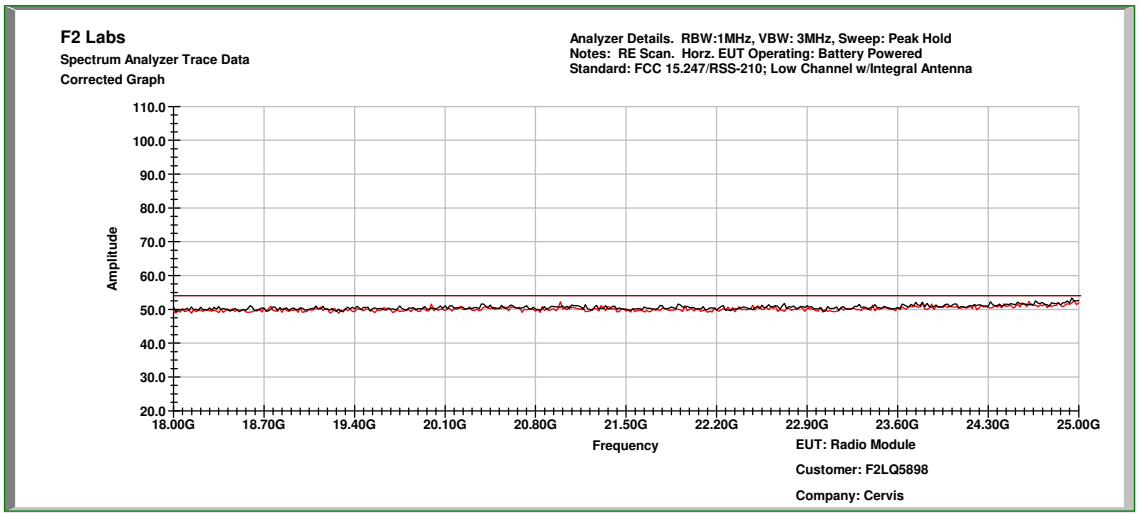
## 3.8dBi Integral Antenna, Low Channel, 6 GHz to 18 GHz, Horizontal



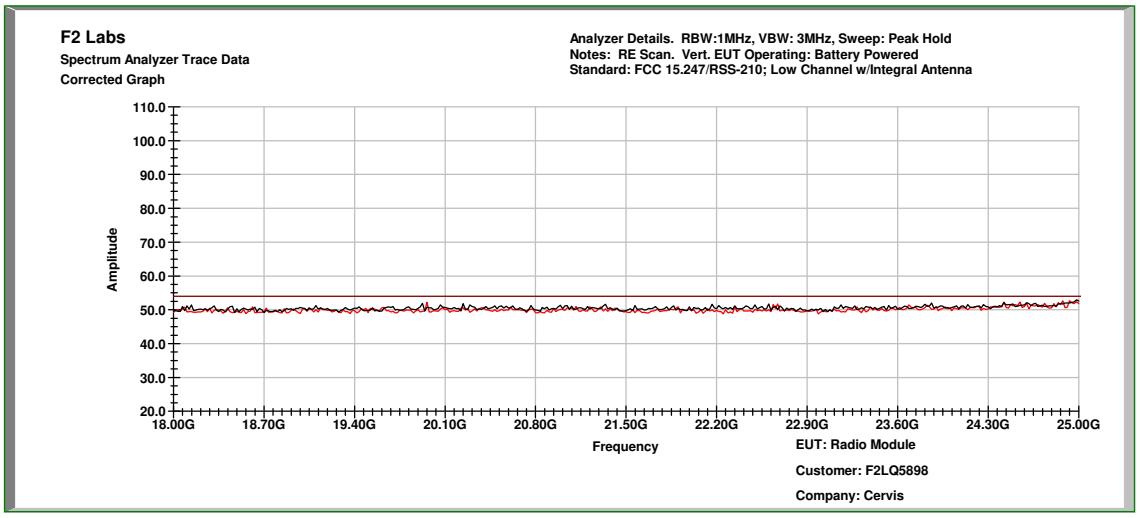

## 3.8dBi Integral Antenna, Low Channel, 6 GHz to 18 GHz, Vertical



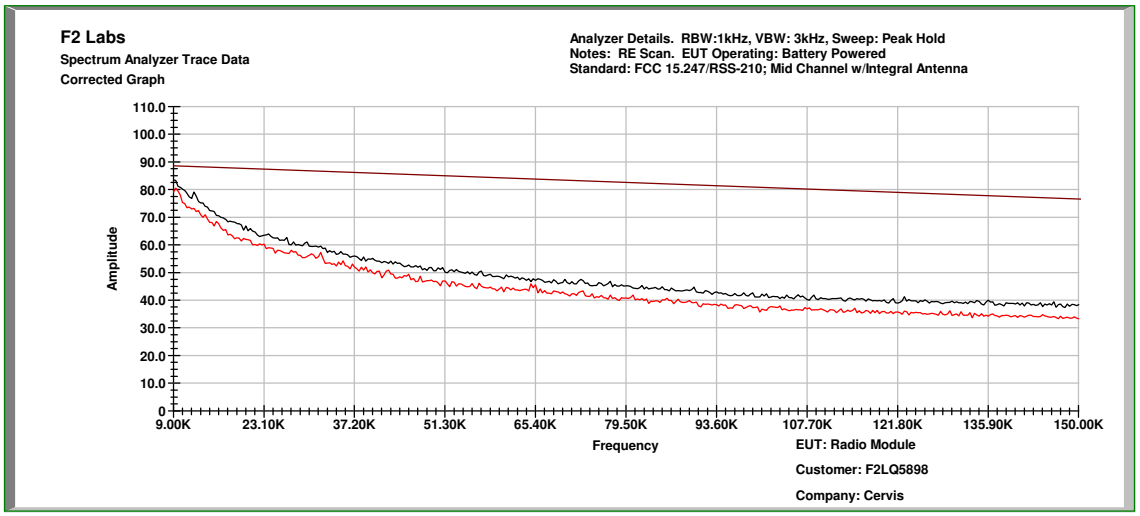
## 3.8dBi Integral Antenna, Low Channel, 18 GHz to 25 GHz, Horizontal



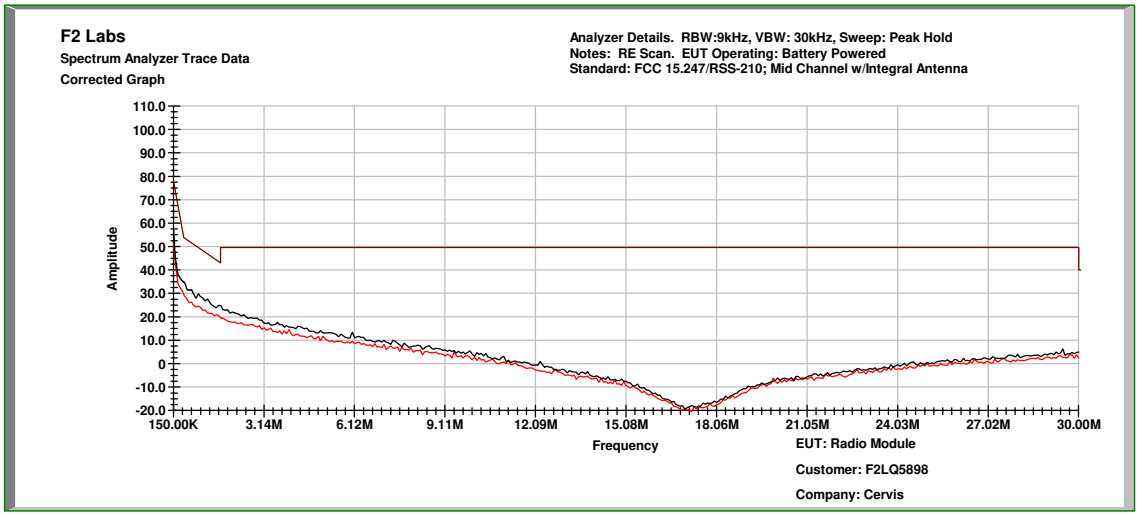

## 3.8dBi Integral Antenna, Low Channel, 18 GHz to 25 GHz, Vertical



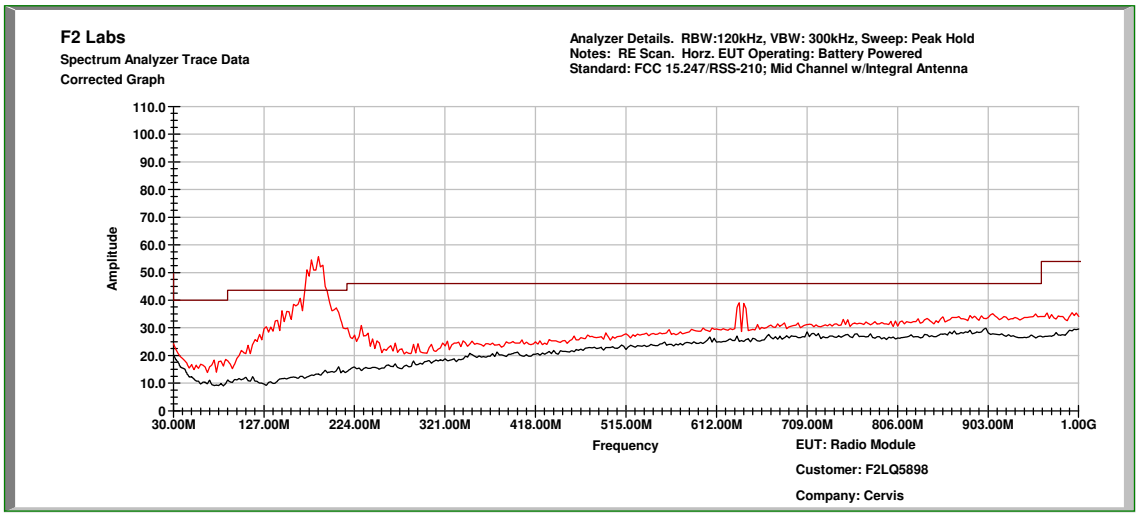
## 3.8dBi Integral Antenna, Mid Channel, .009 to 0.15 MHz



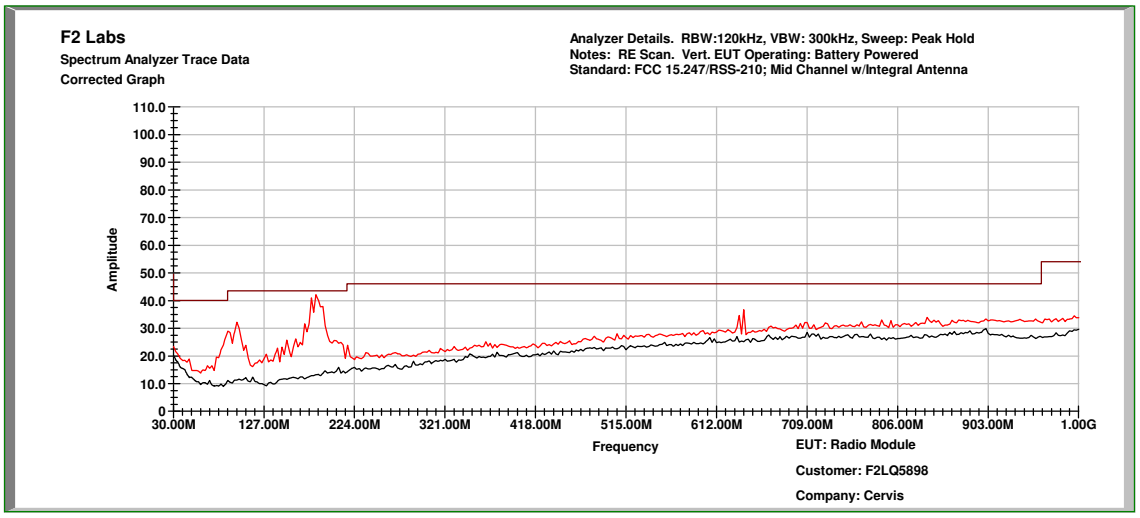

## 3.8dBi Integral Antenna, Mid Channel, 0.15 MHz to 30 MHz



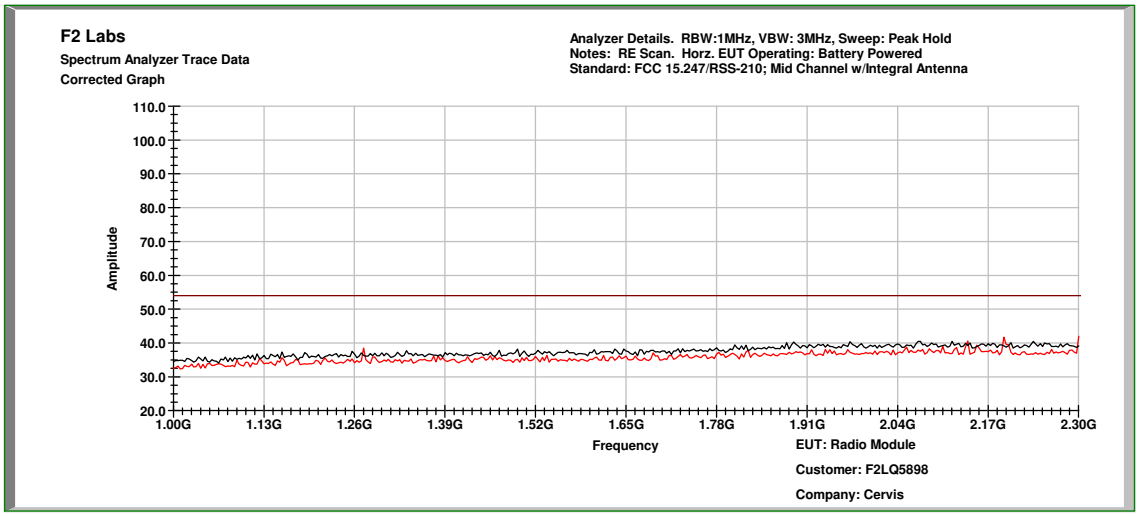
## 3.8dBi Integral Antenna, Mid Channel, 30 MHz to 1 GHz, Horizontal



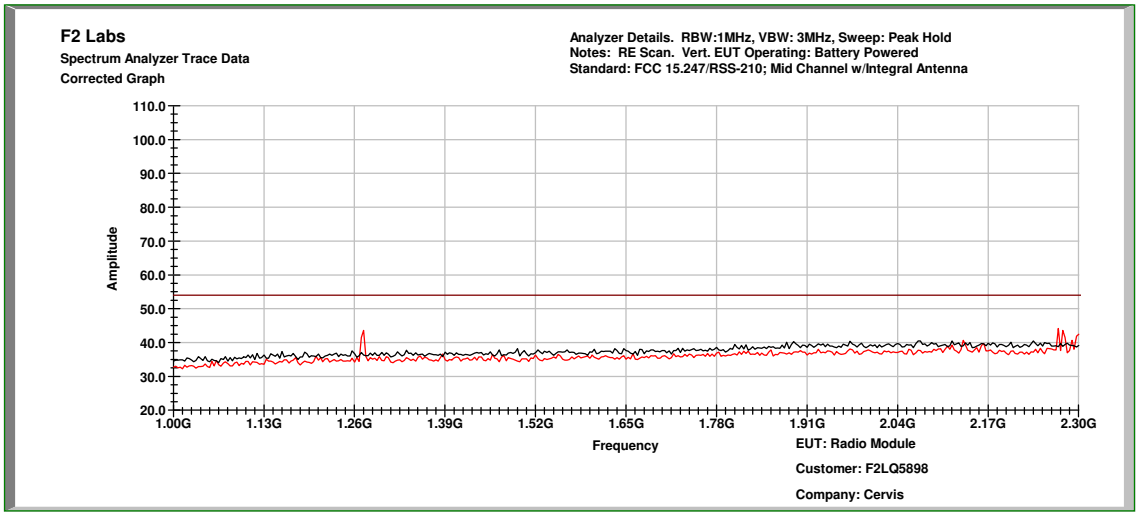

## 3.8dBi Integral Antenna, Mid Channel, 30 MHz to 1 GHz, Vertical



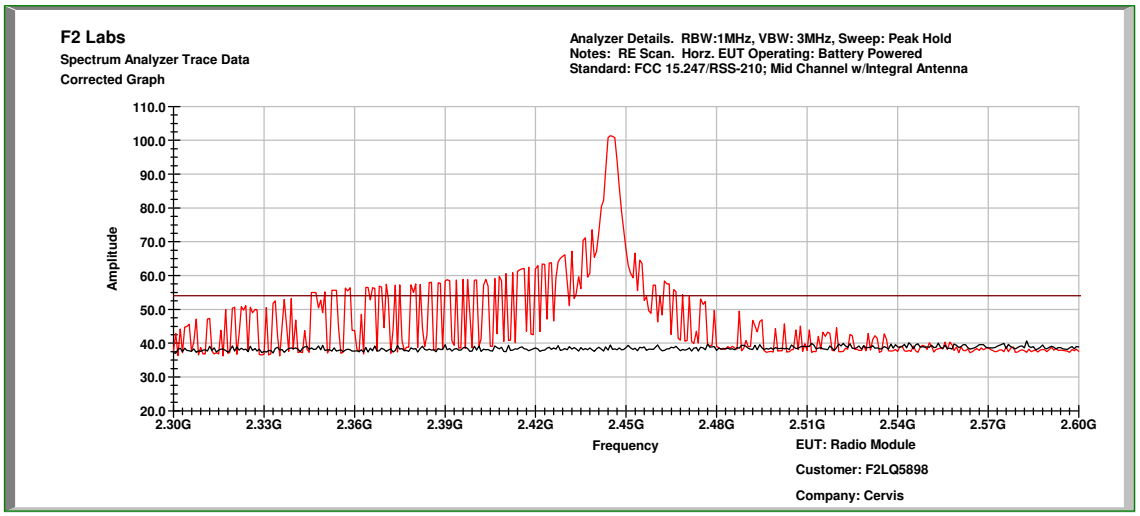
## 3.8dBi Integral Antenna, Mid Channel, 1 GHz to 2.3 GHz, Horizontal



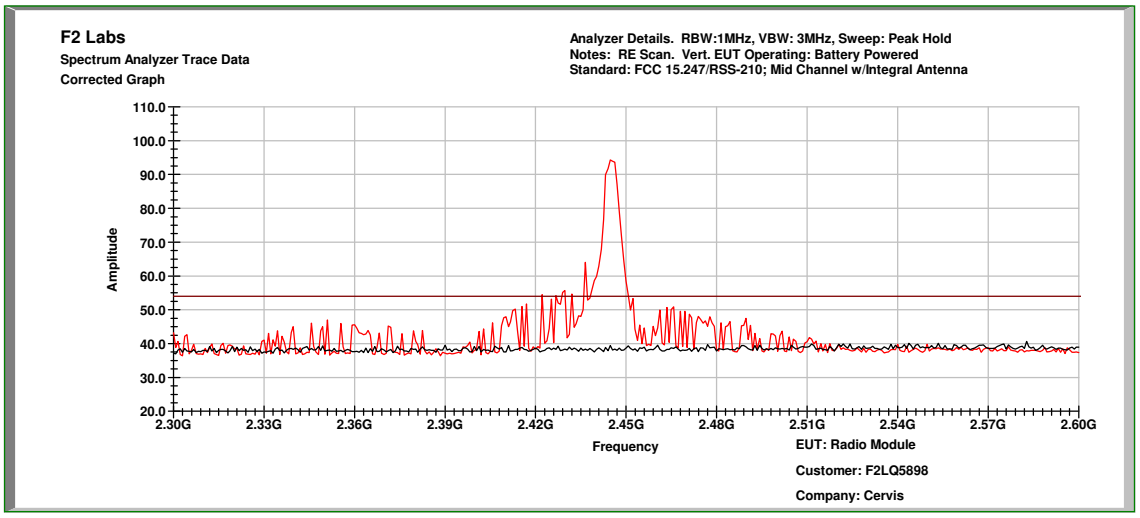

## 3.8dBi Integral Antenna, Mid Channel, 1 GHz to 2.3 GHz, Vertical



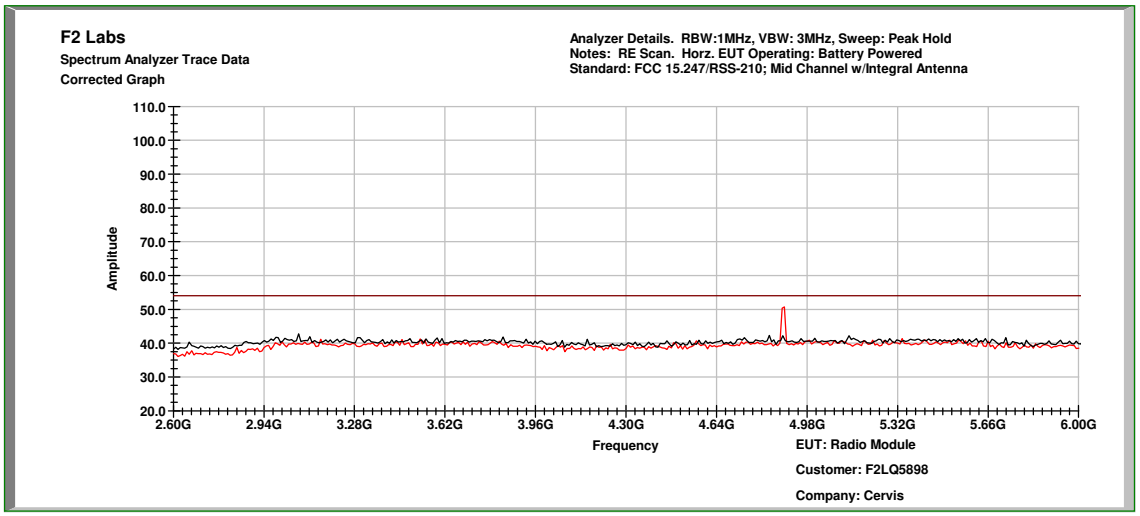
## 3.8dBi Integral Antenna, Mid Channel, 2.3 GHz to 2.6 GHz, Horizontal



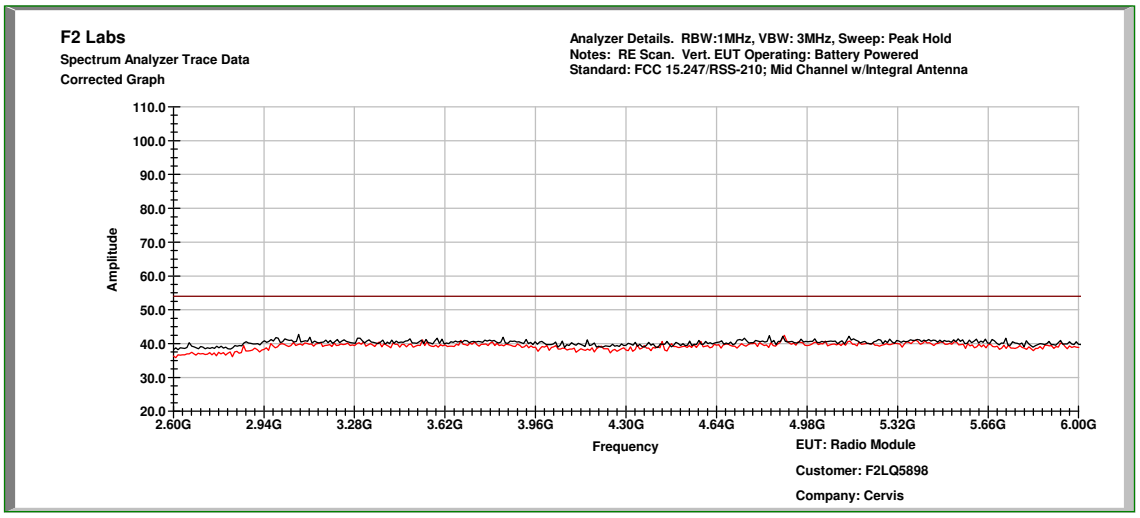

## 3.8dBi Integral Antenna, Mid Channel, 2.3 GHz to 2.6 GHz, Vertical



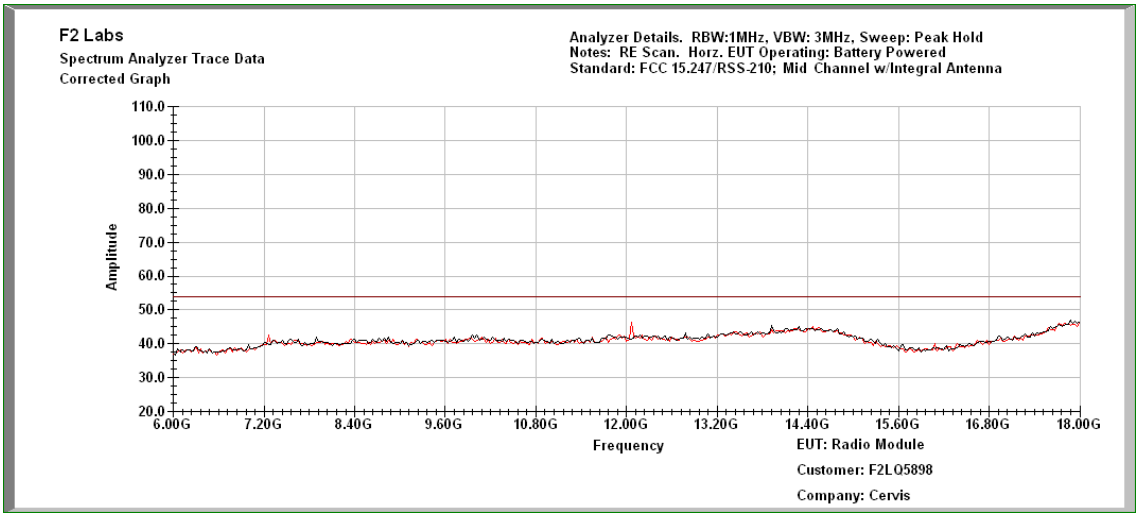
## 3.8dBi Integral Antenna, Mid Channel, 2.6 GHz to 6 GHz, Horizontal



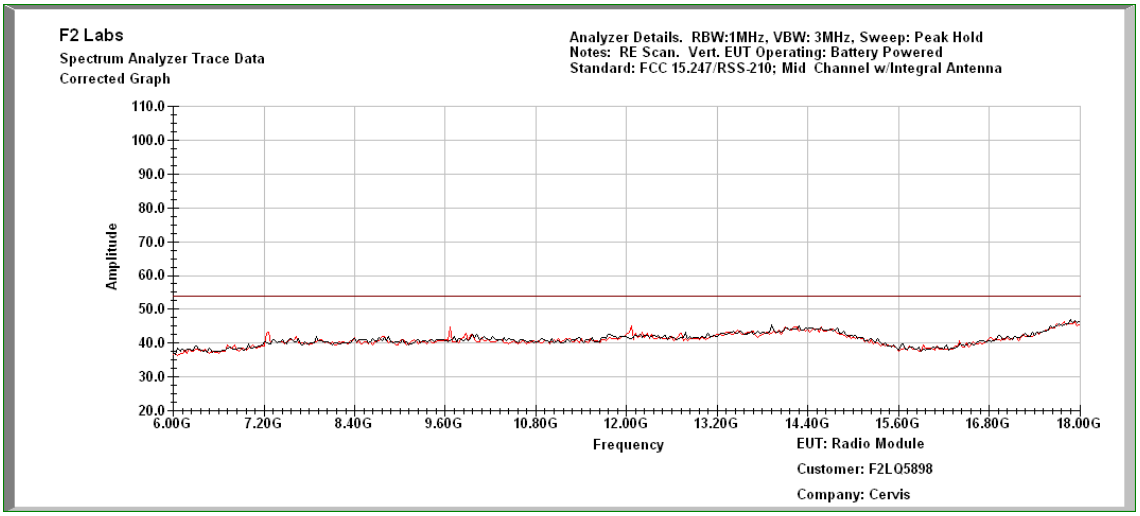

## 3.8dBi Integral Antenna, Mid Channel, 2.6 GHz to 6 GHz, Vertical



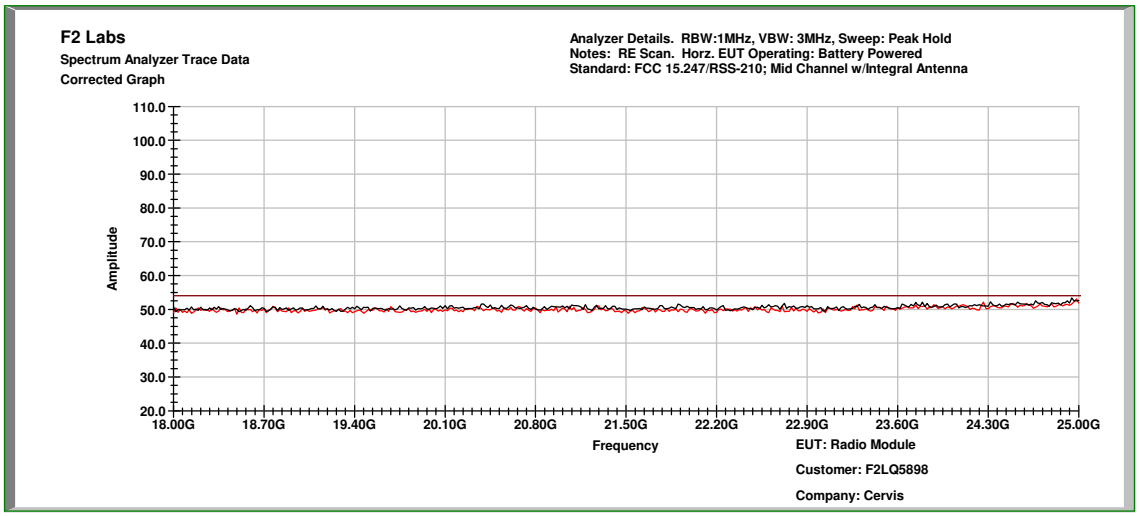
## 3.8dBi Integral Antenna, Mid Channel, 6 GHz to 18 GHz, Horizontal



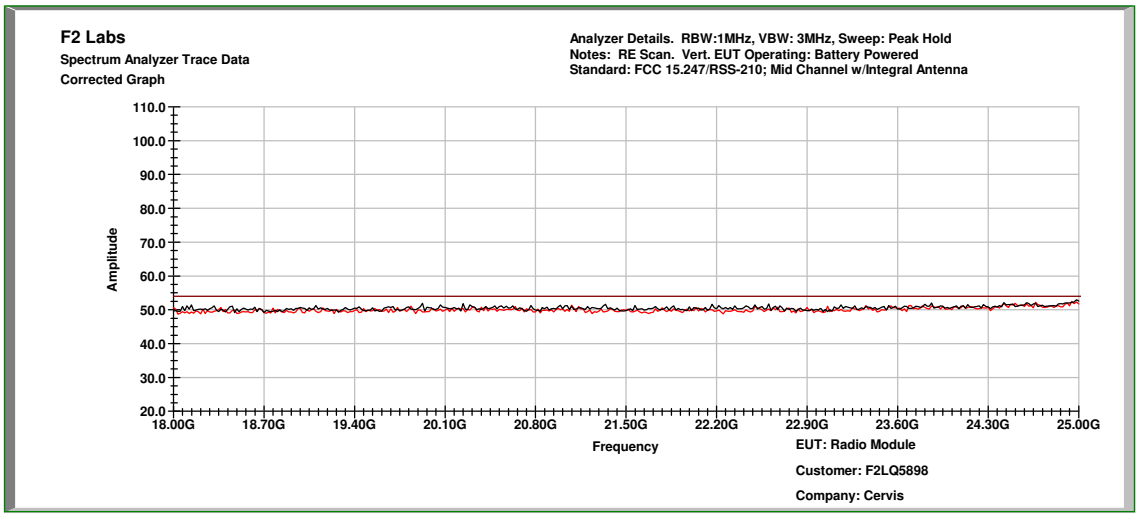

## 3.8dBi Integral Antenna, Mid Channel, 6 GHz to 18 GHz, Vertical



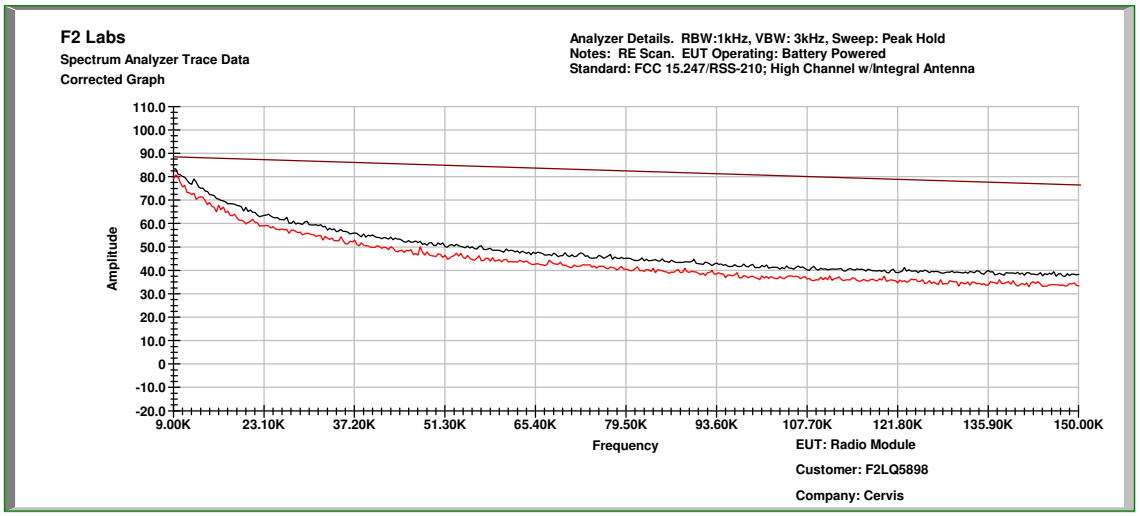
## 3.8dBi Integral Antenna, Mid Channel, 18 GHz to 25 GHz, Horizontal



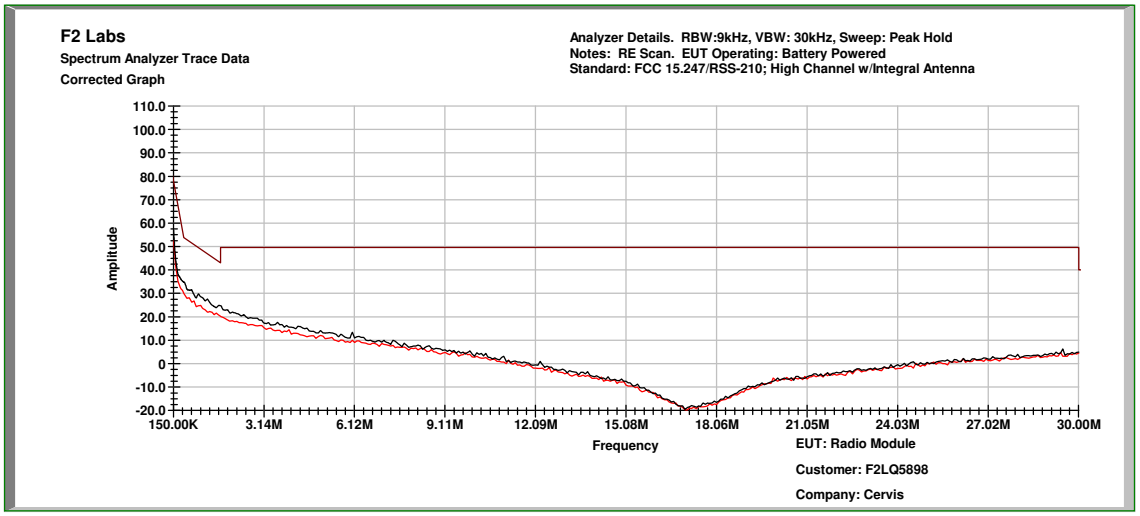

## 3.8dBi Integral Antenna, Mid Channel, 18 GHz to 25 GHz, Vertical



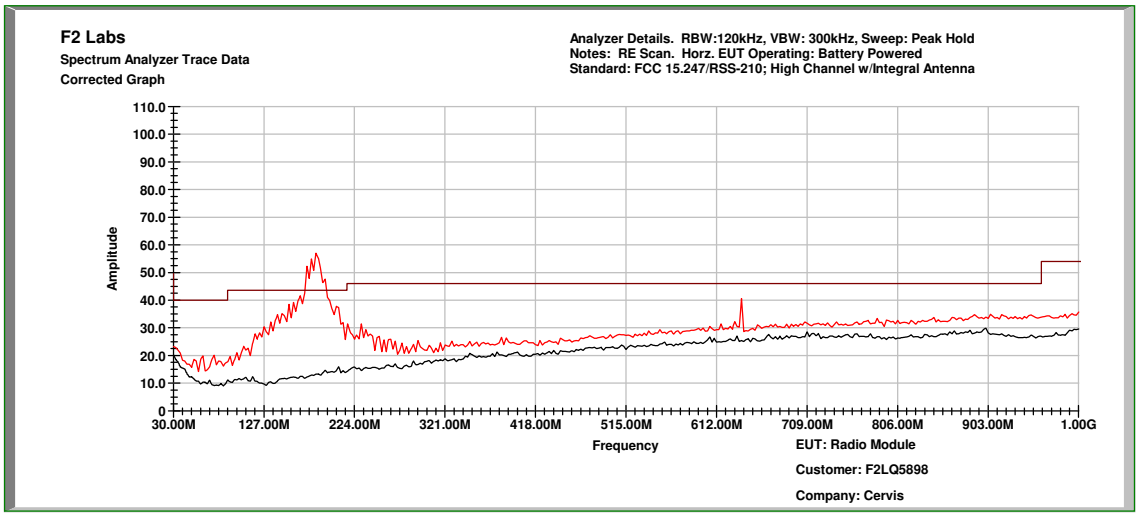
## 3.8dBi Integral Antenna, High Channel, .009 to 0.15 MHz



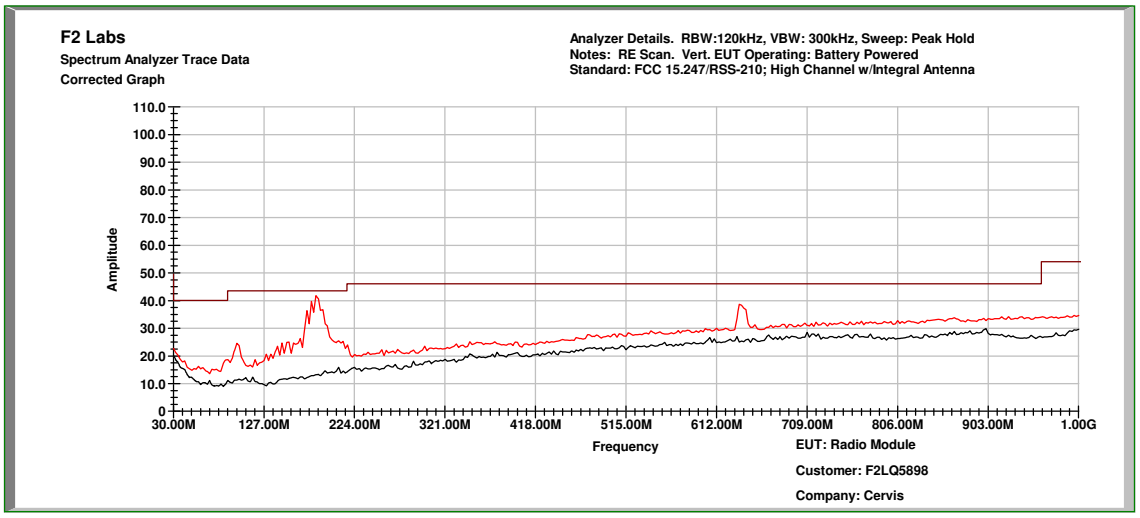

## 3.8dBi Integral Antenna, High Channel, 0.15 MHz to 30 MHz



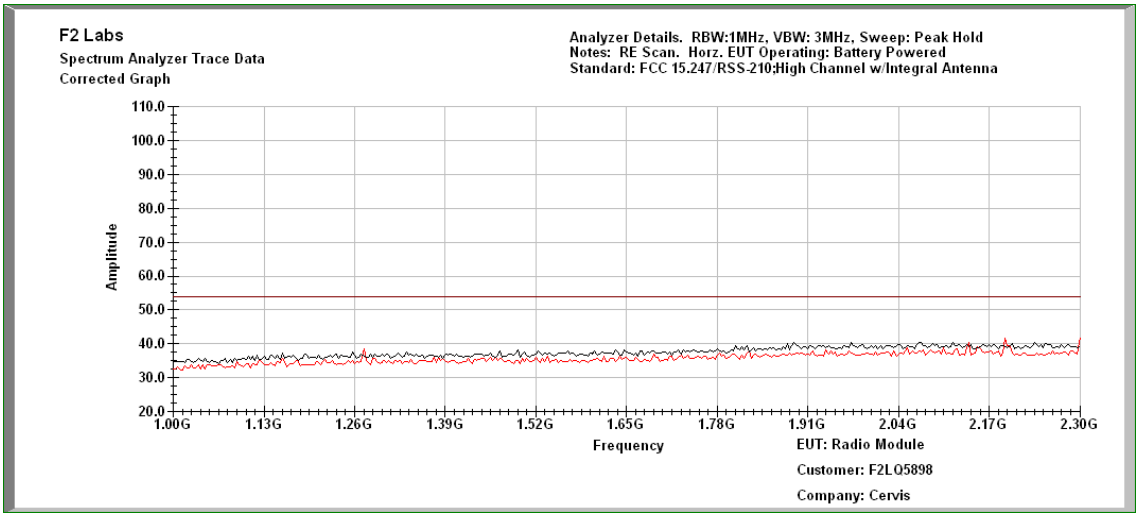
## 3.8dBi Integral Antenna, High Channel, 30 MHz to 1 GHz, Horizontal



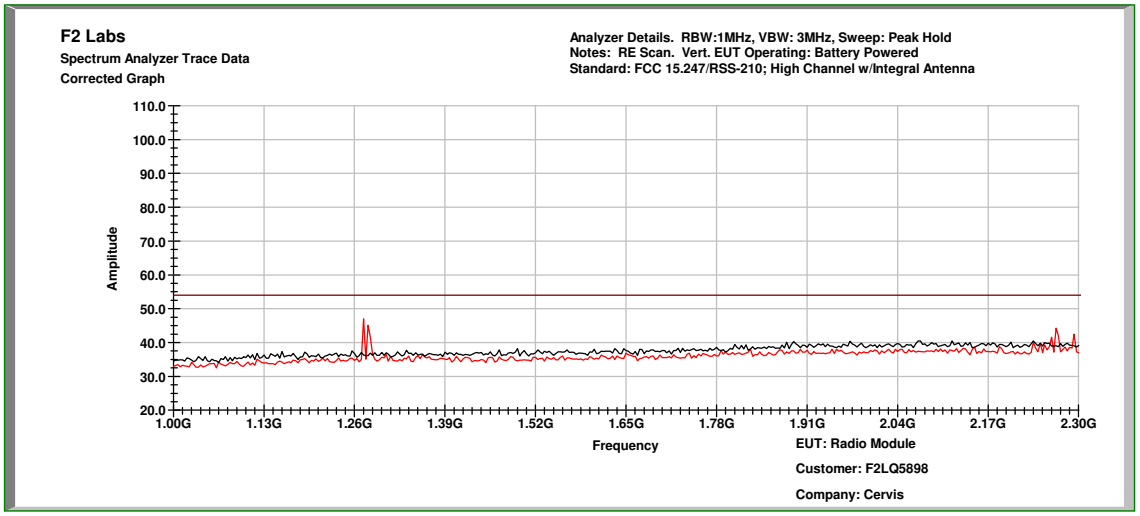

## 3.8dBi Integral Antenna, High Channel, 30 MHz to 1 GHz, Vertical



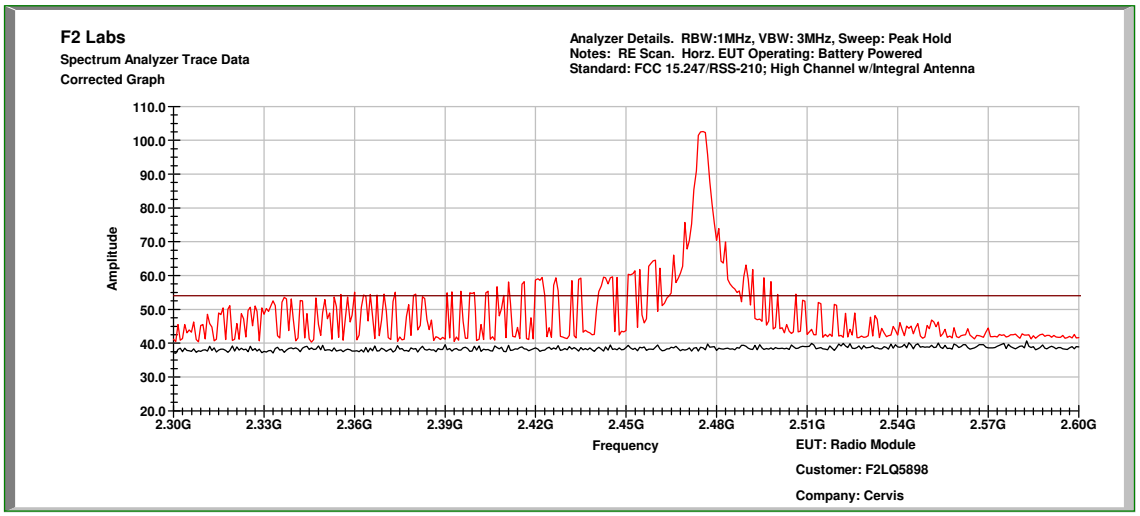
## 3.8dBi Integral Antenna, High Channel, 1 GHz to 2.3 GHz, Horizontal



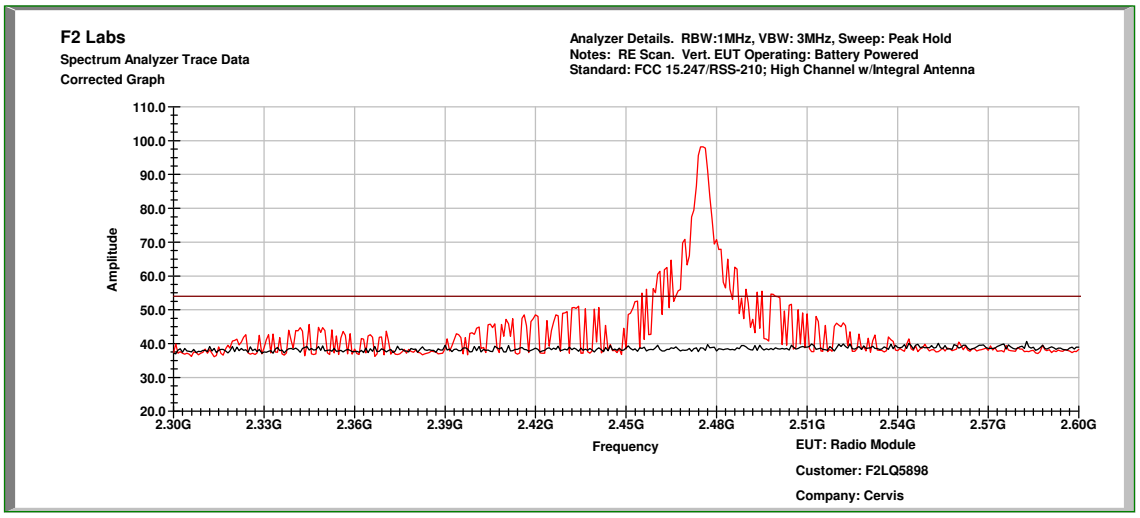

## 3.8dBi Integral Antenna, High Channel, 1 GHz to 2.3 GHz, Vertical



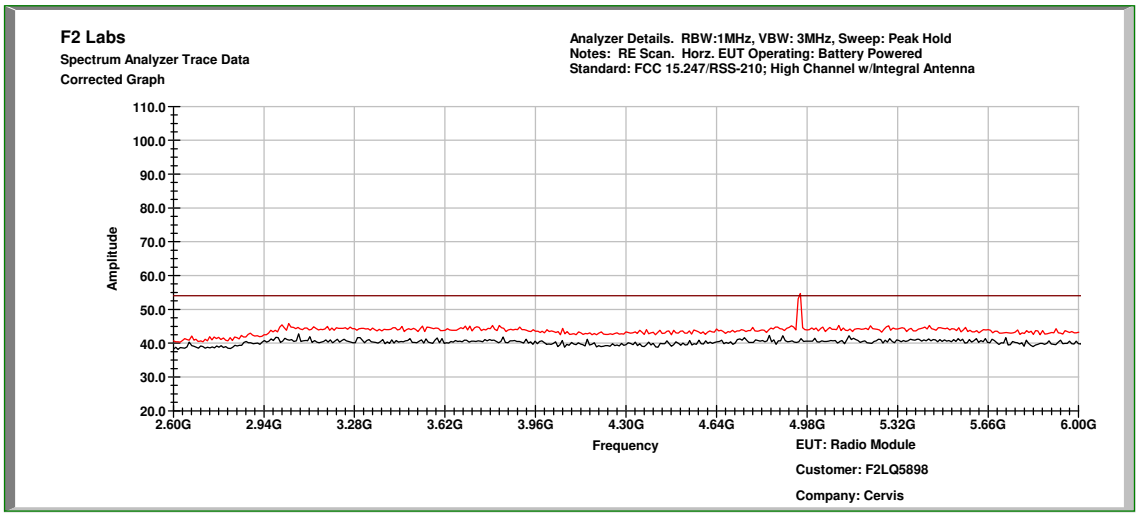
## 3.8dBi Integral Antenna, High Channel, 2.3 GHz to 2.6 GHz, Horizontal



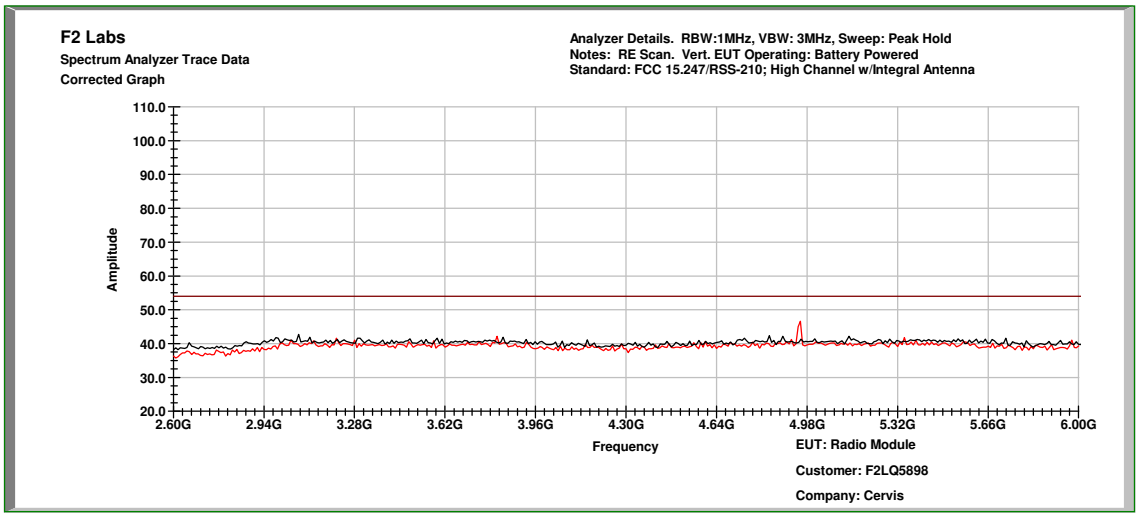

## 3.8dBi Integral Antenna, High Channel, 2.3 GHz to 2.6 GHz, Vertical



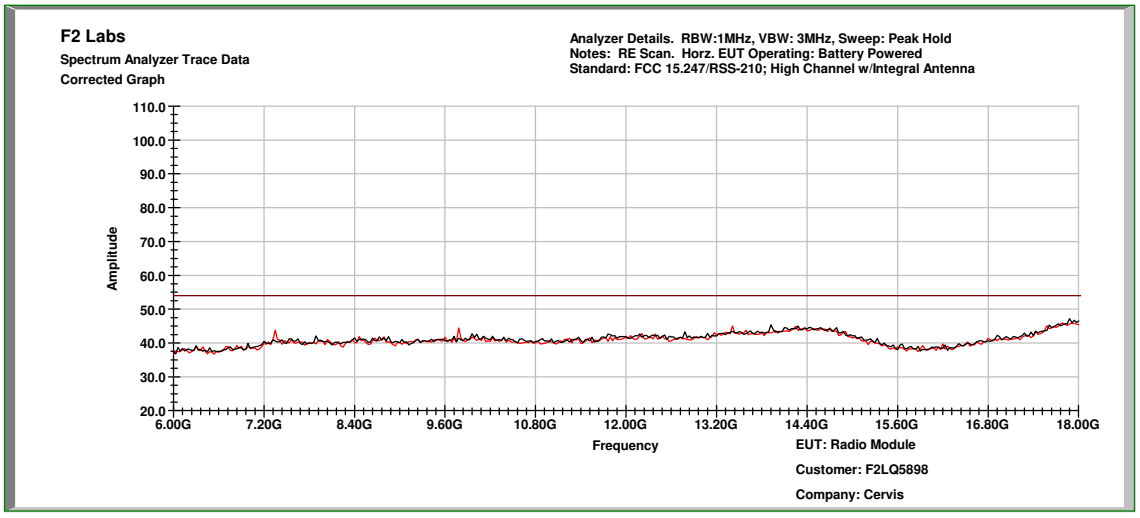
## 3.8dBi Integral Antenna, High Channel, 2.6 GHz to 6 GHz, Horizontal



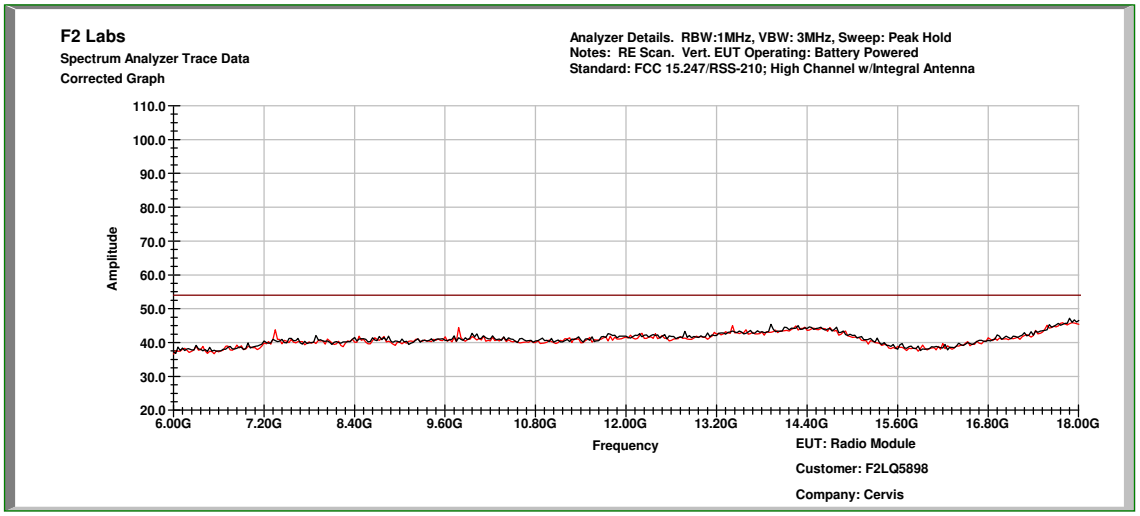

## 3.8dBi Integral Antenna, High Channel, 2.6 GHz to 6 GHz, Vertical



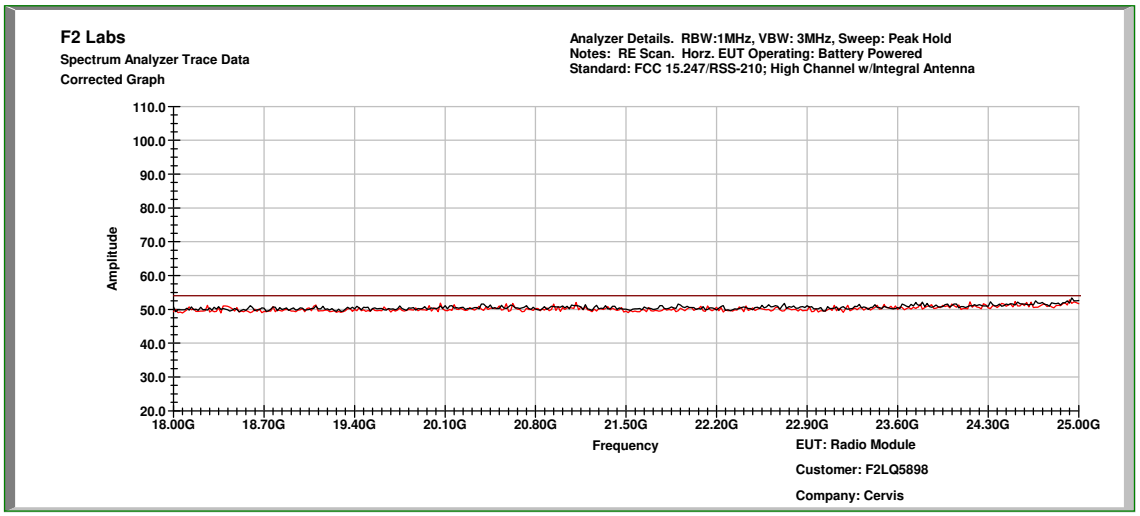
## 3.8dBi Integral Antenna, High Channel, 6 GHz to 18 GHz, Horizontal



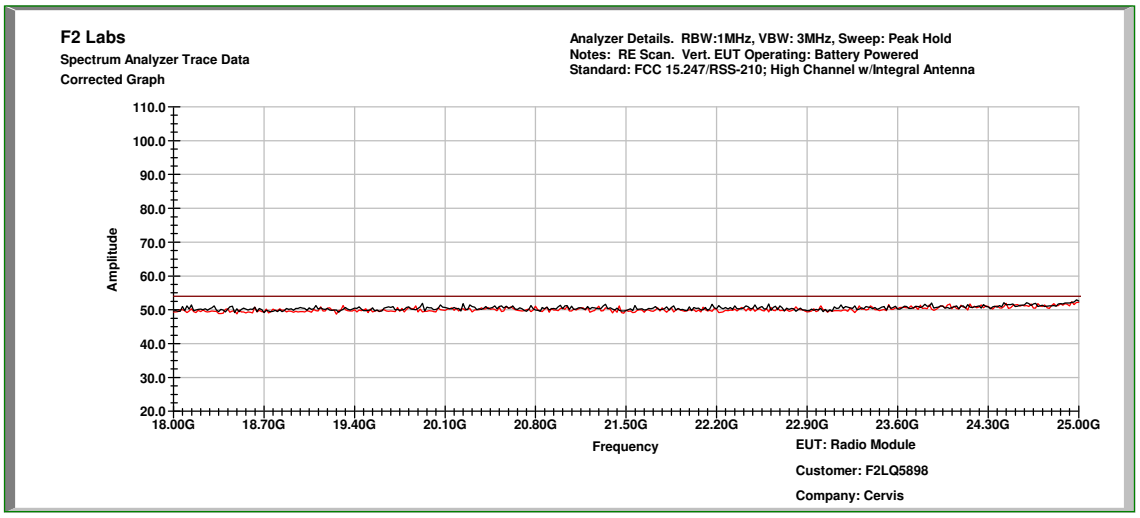

## 3.8dBi Integral Antenna, High Channel, 6 GHz to 18 GHz, Vertical



## 3.8dBi Integral Antenna, High Channel, 18 GHz to 25 GHz, Horizontal

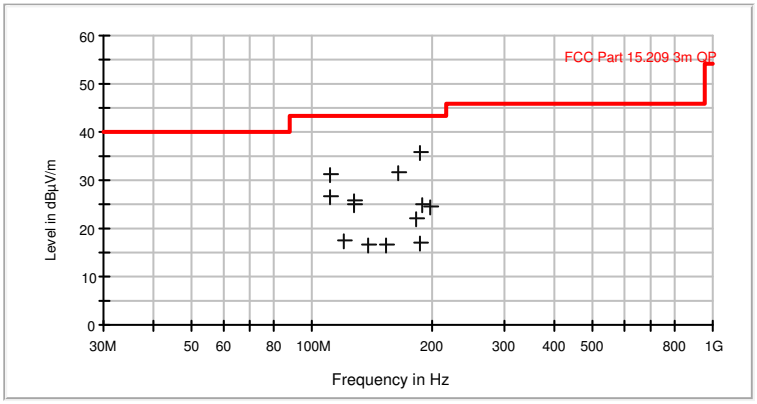



## 3.8dBi Integral Antenna, High Channel, 18 GHz to 25 GHz, Vertical



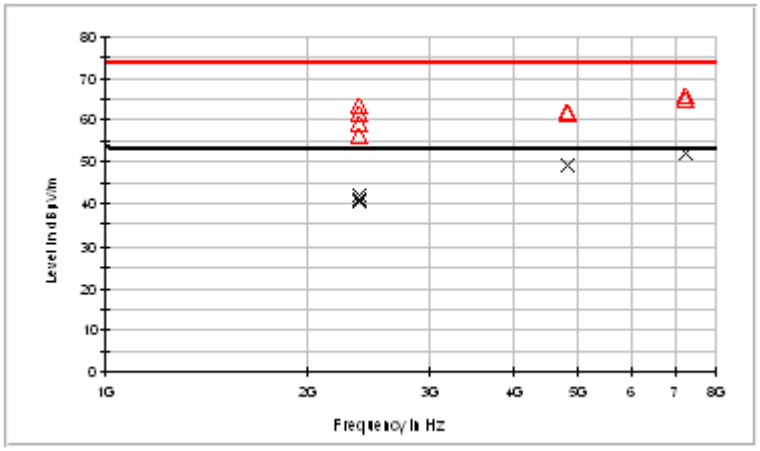
## Measurements

### 3.8dBi Integral Antenna, Low Channel




| Frequency (MHz) | QuasiPeak (dBµV/m) | Limit (dBµV/m) | Bandwidth (kHz) | Polarity | Corr. (dB) |
|---|---|---|---|---|---|
| 110.010000 | 31.0 | 43.5 | 120.000 | V | 14.4 |
| 110.700000 | 26.5 | 43.5 | 120.000 | H | 14.5 |
| 119.500000 | 17.4 | 43.5 | 120.000 | H | 15.5 |
| 127.410000 | 24.9 | 43.5 | 120.000 | V | 15.7 |
| 127.410000 | 25.8 | 43.5 | 120.000 | H | 15.8 |
| 136.800000 | 16.7 | 43.5 | 120.000 | H | 14.6 |
| 151.880000 | 16.8 | 43.5 | 120.000 | V | 14.2 |
| 164.030000 | 31.9 | 43.5 | 120.000 | H | 13.9 |
| 182.010000 | 22.1 | 43.5 | 120.000 | V | 13.0 |
| 185.090000 | 36.0 | 43.5 | 120.000 | H | 12.8 |
| 185.490000 | 17.1 | 43.5 | 120.000 | V | 13.0 |
| 188.700000 | 25.1 | 43.5 | 120.000 | H | 12.8 |
| 197.220000 | 24.7 | 43.5 | 120.000 | V | 14.2 |

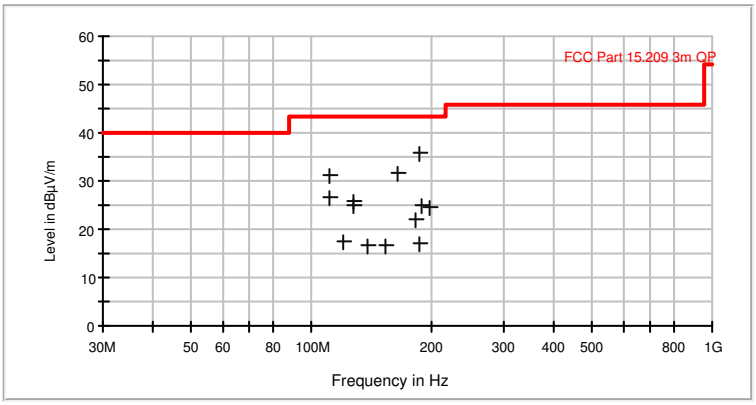
## 3.8dBi Integral Antenna, Low Channel, cont'd




**X = AVG; Δ = Max Peak**

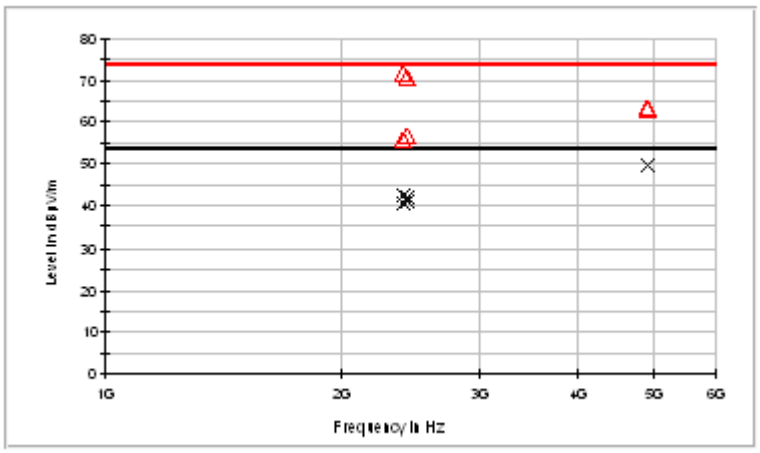
| Frequency (MHz) | MaxPeak (dBµV/m) | Limit (dBµV/m) | Average (dBµV/m) | Limit (dBµV/m) | Bandwidth (kHz) | Polarity | Corr. (dB) |
|---|---|---|---|---|---|---|---|
| 2385.00000 | 56.2 | 74.0 | 40.5 | 54.0 | 1000.000 | V | 28.3 |
| 2385.00000 | 61.9 | 74.0 | 40.9 | 54.0 | 1000.000 | H | 28.3 |
| 2390.00000 | 59.1 | 74.0 | 40.8 | 54.0 | 1000.000 | V | 28.3 |
| 2390.00000 | 63.7 | 74.0 | 41.7 | 54.0 | 1000.000 | H | 28.3 |
| 4810.00000 | 62.4 | 74.0 | 49.1 | 54.0 | 1000.000 | V | 32.9 |
| 4810.00000 | 61.9 | 74.0 | 49.1 | 54.0 | 1000.000 | H | 32.9 |
| 7216.48000 | 65.1 | 74.0 | 50.9 | 54.0 | 1000.000 | H | 35.7 |
| 7216.64000 | 65.8 | 74.0 | 50.2 | 54.0 | 1000.000 | V | 35.7 |

## 3.8dBi Integral Antenna, Mid Channel




| Frequency (MHz) | QuasiPeak (dBµV/m) | Limit (dBµV/m) | Bandwidth (kHz) | Polarity | Corr. (dB) |
|---|---|---|---|---|---|
| 110.010000 | 32.1 | 43.5 | 120.000 | V | 14.4 |
| 110.700000 | 26.0 | 43.5 | 120.000 | H | 14.5 |
| 119.500000 | 18.9 | 43.5 | 120.000 | H | 15.5 |
| 127.410000 | 23.5 | 43.5 | 120.000 | V | 15.7 |
| 127.410000 | 25.2 | 43.5 | 120.000 | H | 15.8 |
| 136.800000 | 18.1 | 43.5 | 120.000 | H | 14.6 |
| 151.880000 | 17.6 | 43.5 | 120.000 | V | 14.2 |
| 164.030000 | 32.0 | 43.5 | 120.000 | H | 13.9 |
| 182.010000 | 24.1 | 43.5 | 120.000 | V | 13.0 |
| 185.090000 | 35.7 | 43.5 | 120.000 | H | 12.8 |
| 185.490000 | 18.3 | 43.5 | 120.000 | V | 13.0 |
| 188.700000 | 26.4 | 43.5 | 120.000 | H | 12.8 |
| 197.220000 | 25.7 | 43.5 | 120.000 | V | 14.2 |

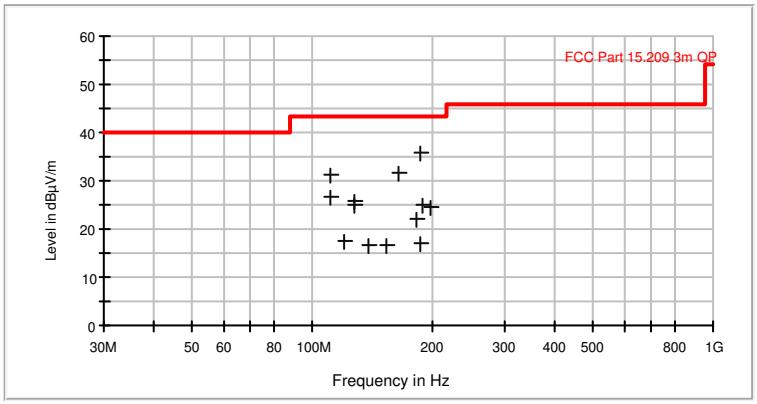
## 3.8dBi Integral Antenna, Mid Channel, cont'd




**X = AVG; Δ = Max Peak**

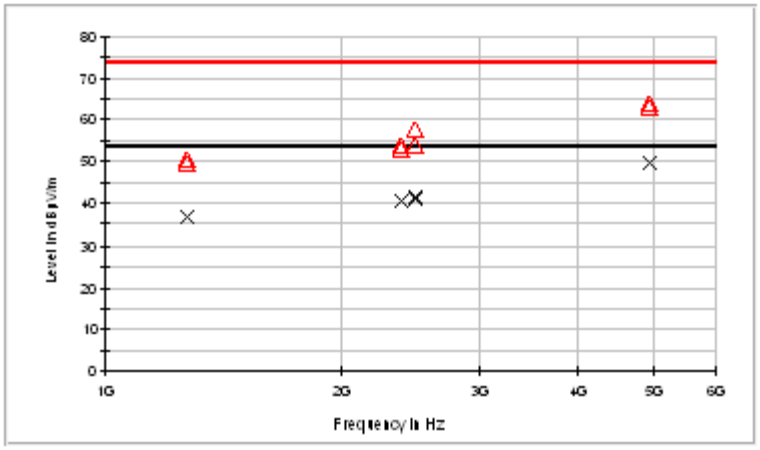
| Frequency (MHz) | MaxPeak (dBµV/m) | Limit (dBµV/m) | Average (dBµV/m) | Limit (dBµV/m) | Bandwidth (kHz) | Polarity | Corr. (dB) |
|---|---|---|---|---|---|---|---|
| 2389.40000 | 71.6 | 74.0 | 42.4 | 54.0 | 1000.000 | V | 28.3 |
| 2389.40000 | 55.8 | 74.0 | 40.6 | 54.0 | 1000.000 | H | 28.3 |
| 2418.68000 | 56.9 | 74.0 | 40.8 | 54.0 | 1000.000 | V | 28.3 |
| 2418.68000 | 70.8 | 74.0 | 42.1 | 54.0 | 1000.000 | H | 28.3 |
| 4901.28000 | 63.4 | 74.0 | 49.8 | 54.0 | 1000.000 | H | 33.1 |
| 4901.28000 | 63.3 | 74.0 | 49.6 | 54.0 | 1000.000 | V | 33.1 |

## 3.8dBi Integral Antenna, High Channel




| Frequency (MHz) | QuasiPeak (dBµV/m) | Limit (dBµV/m) | Bandwidth (kHz) | Polarity | Corr. (dB) |
|---|---|---|---|---|---|
| 110.010000 | 28.7 | 43.5 | 120.000 | V | 14.4 |
| 110.700000 | 25.1 | 43.5 | 120.000 | H | 14.5 |
| 119.500000 | 18.1 | 43.5 | 120.000 | H | 15.5 |
| 127.410000 | 23.8 | 43.5 | 120.000 | V | 15.7 |
| 127.410000 | 26.9 | 43.5 | 120.000 | H | 15.8 |
| 136.800000 | 15.4 | 43.5 | 120.000 | H | 14.6 |
| 151.880000 | 17.3 | 43.5 | 120.000 | V | 14.2 |
| 164.030000 | 30.7 | 43.5 | 120.000 | H | 13.9 |
| 182.010000 | 23.2 | 43.5 | 120.000 | V | 13.0 |
| 185.090000 | 34.7 | 43.5 | 120.000 | H | 12.8 |
| 185.490000 | 18.2 | 43.5 | 120.000 | V | 13.0 |
| 188.700000 | 26.0 | 43.5 | 120.000 | H | 12.8 |
| 197.220000 | 22.3 | 43.5 | 120.000 | V | 14.2 |

## 3.8dBi Integral Antenna, High Channel, cont'd




**X = AVG; Δ = Max Peak**

| Frequency (MHz) | MaxPeak (dBµV/m) | Limit (dBµV/m) | Average (dBµV/m) | Limit (dBµV/m) | Bandwidth (kHz) | Polarity | Corr. (dB) |
|---|---|---|---|---|---|---|---|
| 1270.00000 | 50.6 | 74.0 | 36.7 | 54.0 | 1000.000 | H | 25.5 |
| 1270.00000 | 49.5 | 74.0 | 36.7 | 54.0 | 1000.000 | V | 25.5 |
| 2380.00000 | 53.2 | 74.0 | 40.4 | 54.0 | 1000.000 | V | 28.2 |
| 2380.00000 | 53.7 | 74.0 | 40.4 | 54.0 | 1000.000 | H | 28.2 |
| 2483.76000 | 54.0 | 74.0 | 41.1 | 54.0 | 1000.000 | V | 28.4 |
| 2483.76000 | 57.9 | 74.0 | 41.5 | 54.0 | 1000.000 | H | 28.4 |
| 4951.04000 | 63.0 | 74.0 | 49.6 | 54.0 | 1000.000 | V | 33.2 |
| 4951.04000 | 64.0 | 74.0 | 49.7 | 54.0 | 1000.000 | H | 33.2 |

## 10 FCC PART 15.247 – PEAK POWER SPECTRAL DENSITY (PSD)

Peak power spectral density measurements were performed.

### 10.1 Requirements:

The peak power spectral density shall not exceed +8dBm in any 3 kHz band during any time interval of continuous transmission.

Power spectral density measurements were performed at a resolution bandwidth of 3 kHz (video bandwidth set at 10 KHz). The peak spectral densities were measured at the low, mid, and upper channels.

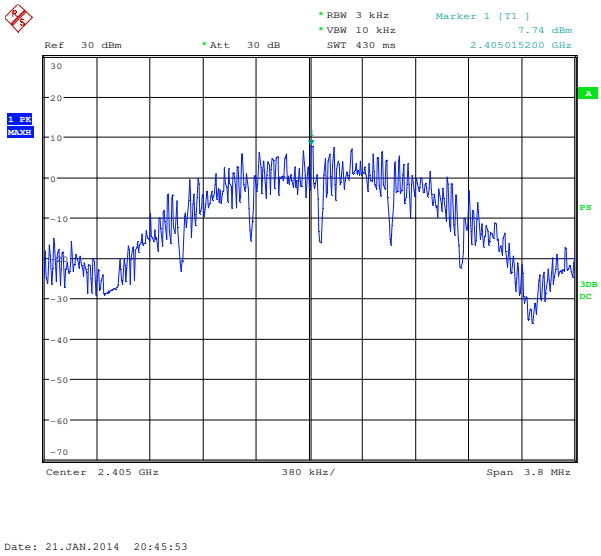
### 10.2 Equipment Used:

| Equipment Type | Asset Number | Manufacturer | Model | Serial Number | Calibration Due Date |
|---|---|---|---|---|---|
| Temp/Hum. Recorder | CL137 | Extech | RH520 | CH16992 | Apr. 17, 2014 |
| Receiver | CL151 | Rohde & Schwarz | ESU40 | 100319 | Oct. 31, 2014 |
| Cable: 0.3m Low Loss | CL116 | A.H. Systems, Inc. | SAC-26G-0.3 | 206 | Mar. 1, 2014 |

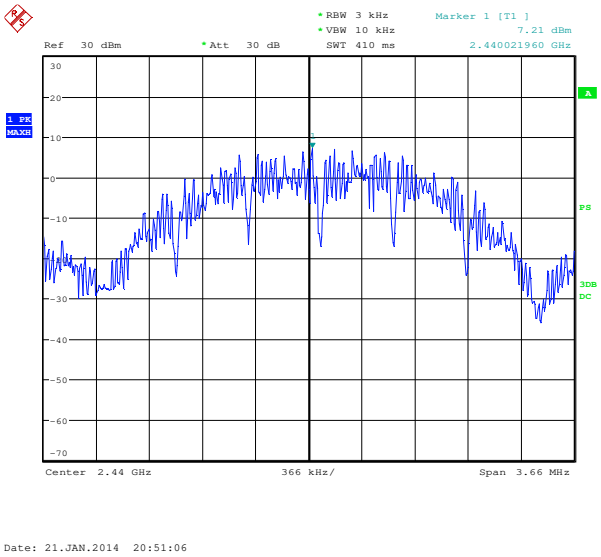
## 10.3 Peak Power Spectral Density Test Data

| Test Date: | Jan. 21, 2014 | Test Engineers: | M. Toth; K. Littell |
|---|---|---|---|
| Standards: | CFR 47 Part 15.247; KDB558074 | Air Temperature: | 21.2ºC |
| | | Relative Humidity: | 36% |

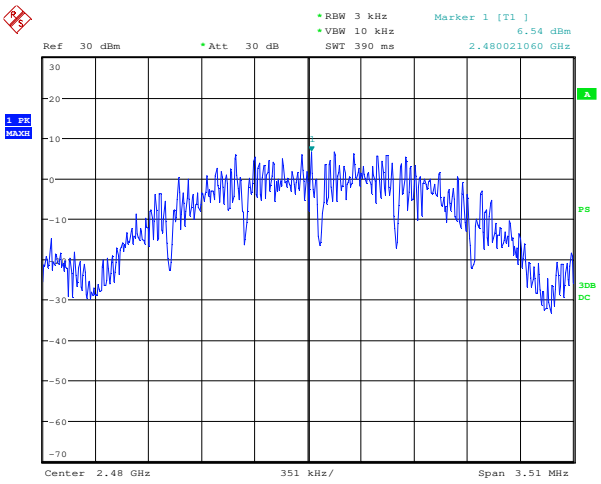
### Low Channel




### Mid Channel



## High Channel



# 11 CONDUCTED EMISSIONS

## 11.1 Requirements

In accordance with FCC CFR 47 Part 15.207(a), “Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 µH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

| Frequency of emission (MHz) | Conducted limit (dBµV) | |
|---|---|---|
| | Quasi-peak | Average |
| 0.15-0.5 | 66 to 56* | 56 to 46* |
| 0.5-5 | 56 | 46 |
| 5-30 | 60 | 50 |

*Decreases with the logarithm of the frequency.

## 11.2 Procedure

The EUT was placed on a 1.0 x 1.5 meter non-conductive table, 0.8 meter above a horizontal ground plane and 0.4 meter from a vertical ground plane. Power was provided to the EUT through a LISN bonded to a 3 x 2 meter ground plane. The LISN and peripherals were supplied power through a filtered AC power source. The output of the LISN was connected to the input of the receiver via a transient limiter, and emissions in the range 150 kHz to 30 MHz were measured. The measurements were recorded using the quasi-peak and average detectors as directed by the standard, and the resolution bandwidth during testing was 9 kHz. The raw measurements were corrected to allow for attenuation from the LISN, transient limiter and cables.

## 11.3 Equipment Used:

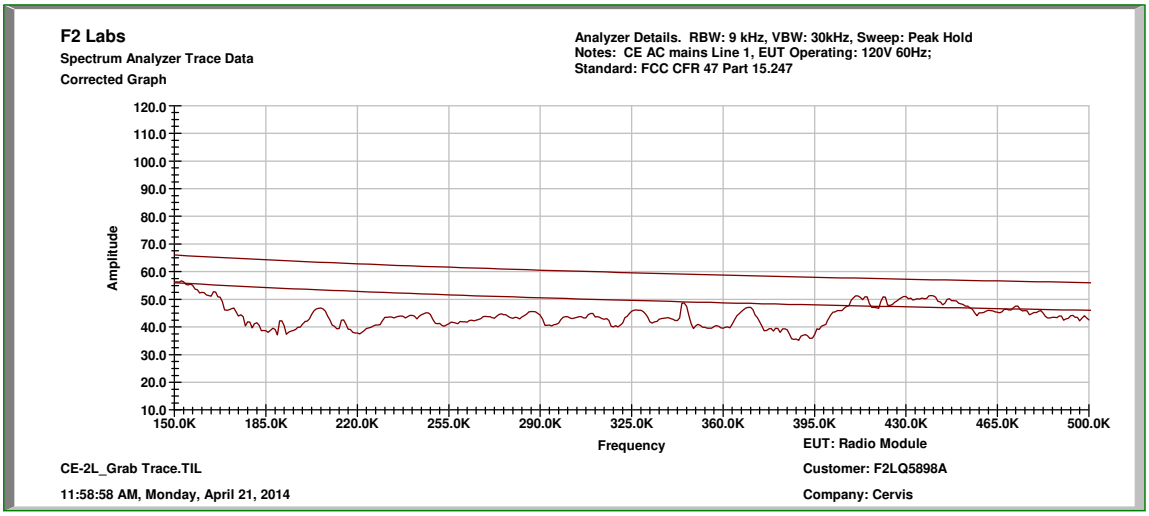
| Equipment Type | Asset Number | Manufacturer | Model | Serial Number | Calibration Due Date |
|---|---|---|---|---|---|
| Temp/Hum. Rec. | CL119 | Extech | RH520 | H005869 | Jan. 8, 2015 |
| Transient Limiter | CL102 | Hewlett Packard | 11947A | 3107A03325 | Feb. 11, 2015 |
| LISN 2 | 0147 | Solar | 8028-50-TS-24-BNC | 1128 | Jan. 16, 2017 |
| LISN 4 | 0146 | Solar | 8028-50-TS-24-BNC | 1127 | Jan. 16, 2017 |
| Spectrum Analyzer | CL147 | Agilent | E7402A | MY45101241 | Oct. 24, 2014 |
| Software: | Tile Version 1.0 | | Software Verified: Apr. 21, 2014 | | |

## 11.4 Conducted Emissions Test Data

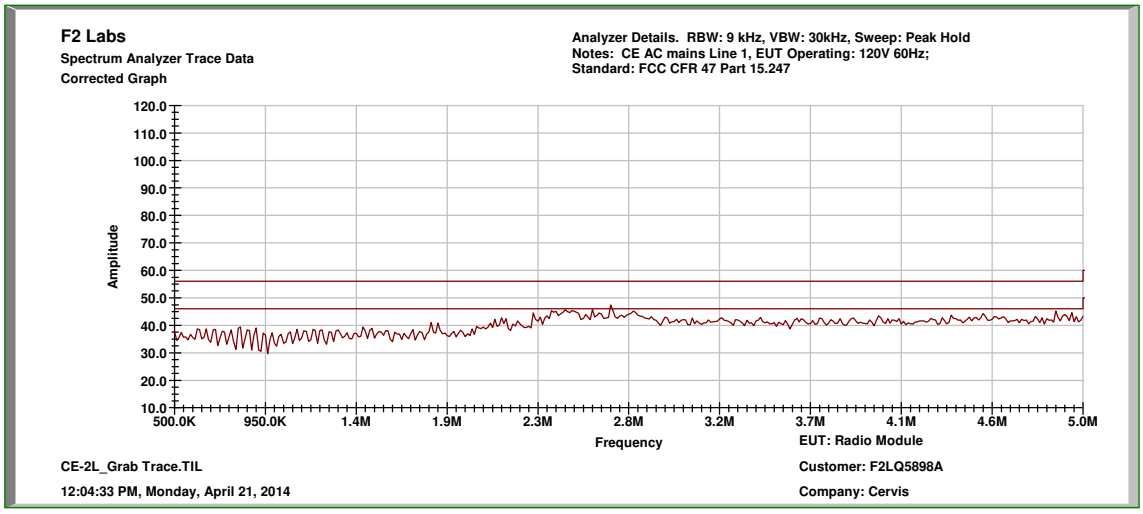
| | | | |
|---|---|---|---|
| **Test Date:** | Apr. 21, 2014 | **Test Engineer:** | J. Knepper |
| **Rule:** | 15.207(a) | **Air Temperature:** | 24.4º C |
| **Test Results:** | Pass | **Relative Humidity:** | 46.2% |

Note: The data below represents worst case results of all three channels.

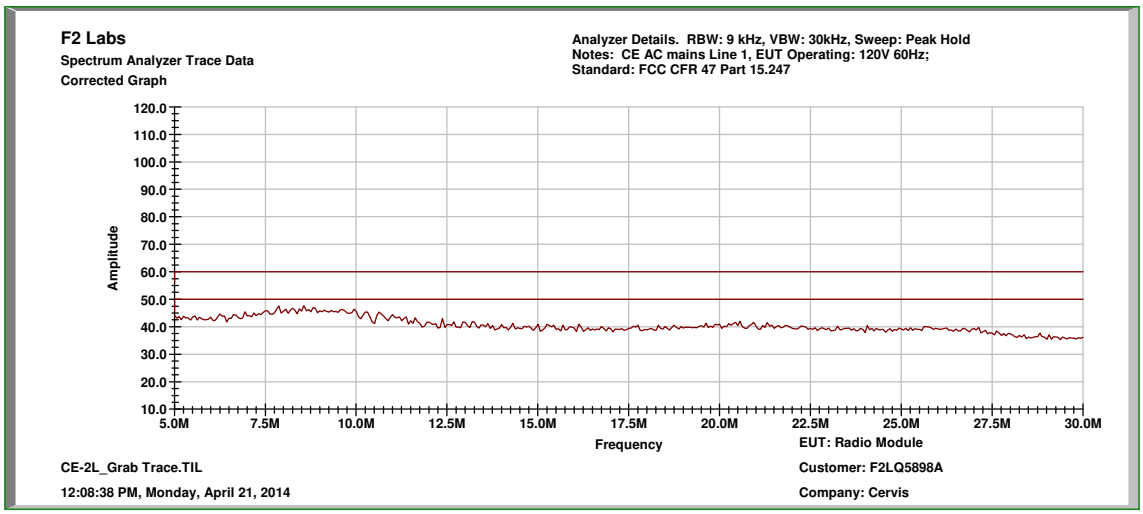
### Conducted Test – Line 1: 0.15 MHz to 0.5 MHz




### Conducted Test – Line 1: 0.5 MHz to 5.0 MHz

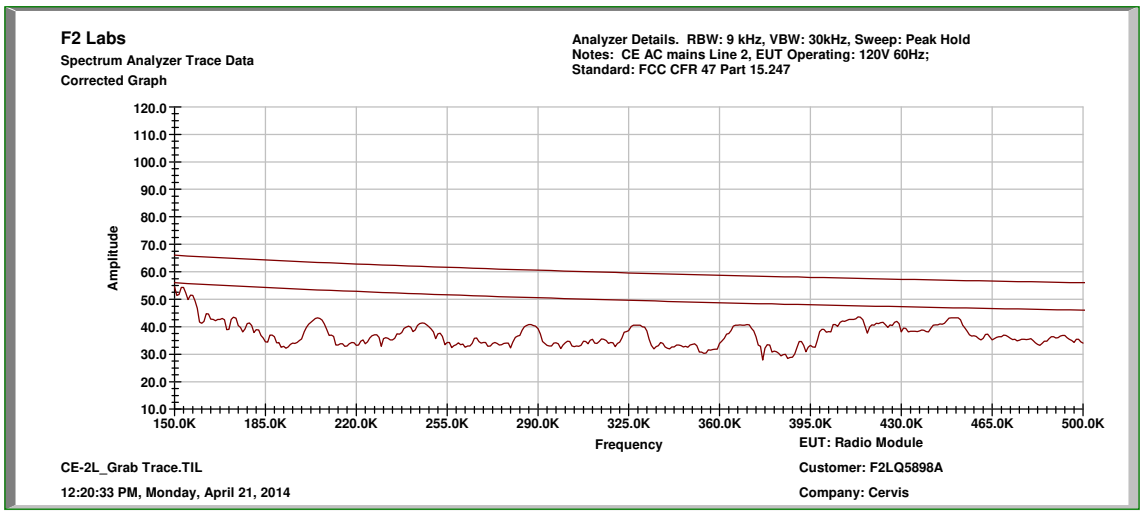


## Conducted Test – Line 1: 5.0 MHz to 30.0 MHz

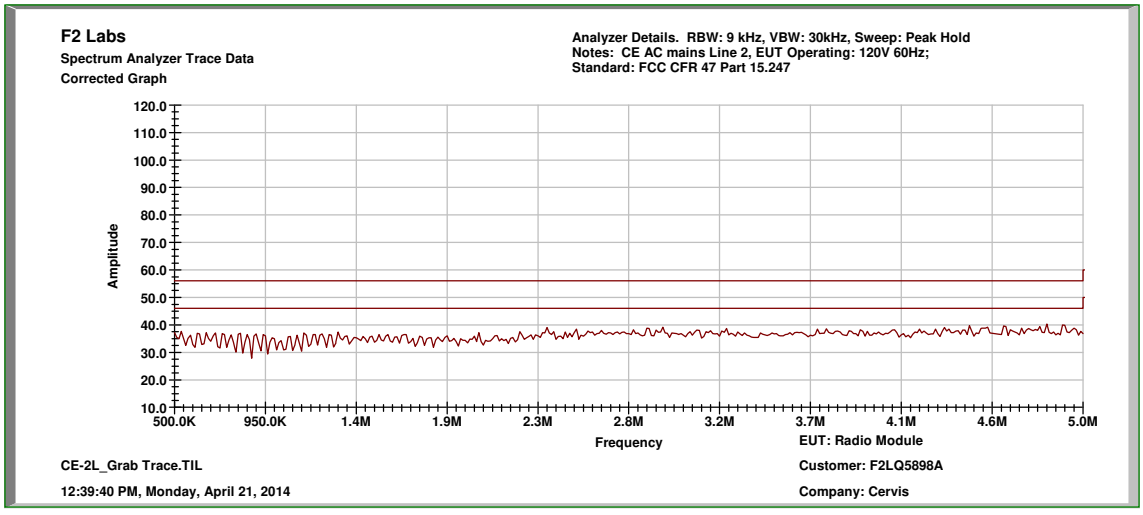



| Top Discrete Measurements | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| No. | Conductor | Frequency (MHz) | Detector | Level (dBµV) | Adjustment (dB) | Results (dBµV) | Limit (dBµV) | Margin (dB) |
| 1 | Line 1 | 0.152 | Quasi-Peak | 36.67 | 11.0 | 47.67 | 65.87 | -18.2 |
| | | | Average | 11.71 | 11.0 | 22.71 | 55.87 | -33.2 |
| 2 | Line 1 | 0.344 | Quasi-Peak | 19.54 | 11.0 | 30.54 | 59.1 | -28.6 |
| | | | Average | 10.69 | 11.0 | 21.69 | 49.1 | -27.4 |
| 3 | Line 1 | 0.411 | Quasi-Peak | 28.05 | 11.0 | 39.05 | 57.63 | -18.6 |
| | | | Average | 19.51 | 11.0 | 30.51 | 47.63 | -17.1 |
| 4 | Line 1 | 0.440 | Quasi-Peak | 28.8 | 11.0 | 39.8 | 57.06 | -17.3 |
| | | | Average | 20.38 | 11.0 | 31.38 | 47.06 | -15.7 |
| 5 | Line 1 | 0.450 | Quasi-Peak | 28.84 | 11.0 | 39.84 | 56.88 | -17.0 |
| | | | Average | 20.33 | 11.0 | 31.33 | 46.88 | -15.6 |
| 6 | Line 1 | 2.36 | Quasi-Peak | 27.48 | 11.0 | 38.48 | 56 | -17.5 |
| | | | Average | 14.91 | 11.0 | 25.91 | 46 | -20.1 |
| 7 | Line 1 | 2.66 | Quasi-Peak | 28.78 | 11.0 | 39.78 | 56 | -16.2 |
| | | | Average | 19.44 | 11.0 | 30.44 | 46 | -15.6 |
| 8 | Line 1 | 8.56 | Quasi-Peak | 31.78 | 11.0 | 42.78 | 60 | -17.2 |
| | | | Average | 21.74 | 11.0 | 32.74 | 50 | -17.3 |

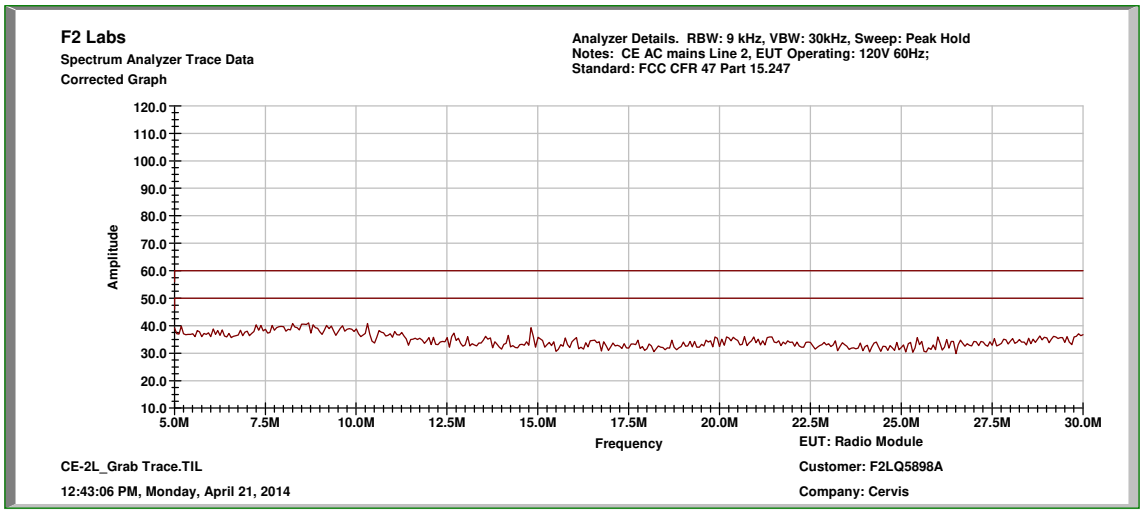
## Conducted Test – Line 2: 0.15 MHz to 0.5 MHz




## Conducted Test – Line 2: 0.5 MHz to 5.0 MHz



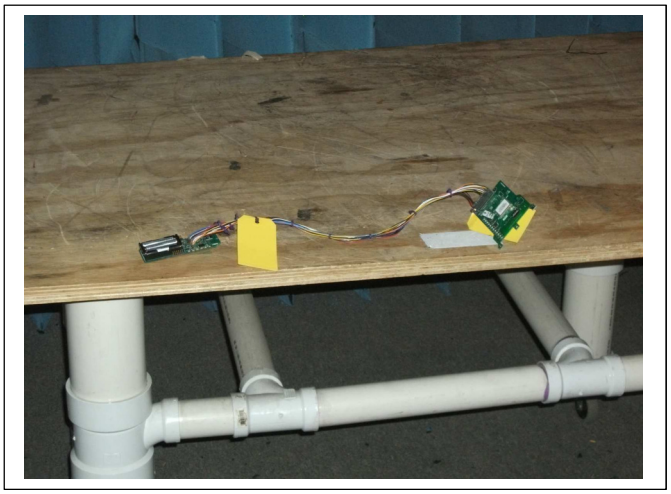
## Conducted Test – Line 2: 5.0 MHz to 30.0 MHz




| Top Discrete Measurements | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **No.** | **Conductor** | **Frequency (MHz)** | **Detector** | **Level (dBµV)** | **Adjustment (dB)** | **Results (dBµV)** | **Limit (dBµV)** | **Margin (dB)** |
| 1 | Line 2 | 0.153 | Quasi-Peak | 38.1 | 11.0 | 49.1 | 65.81 | -16.7 |
| | | | Average | 12.22 | 11.0 | 23.22 | 55.81 | -32.6 |
| 2 | Line 2 | 0.414 | Quasi-Peak | 29.87 | 11.0 | 40.87 | 57.56 | -16.7 |
| | | | Average | 21.46 | 11.0 | 32.46 | 47.56 | -15.1 |
| 3 | Line 2 | 0.449 | Quasi-Peak | 28.16 | 11.0 | 39.16 | 56.89 | -17.7 |
| | | | Average | 21.3 | 11.0 | 32.3 | 46.89 | -14.6 |
| 4 | Line 2 | 4.82 | Quasi-Peak | 21.67 | 11.0 | 32.67 | 56 | -23.3 |
| | | | Average | 14.46 | 11.0 | 25.46 | 46 | -20.5 |
| 5 | Line 2 | 7.75 | Quasi-Peak | 24.44 | 11.0 | 35.44 | 60 | -24.6 |
| | | | Average | 16.73 | 11.0 | 27.73 | 50 | -22.3 |

## 12 PHOTOGRAPHS/EXHIBITS – PRODUCT PHOTOS, TEST SETUPS

### Radiated Spurious Emission with 3.8dBi Integral Antenna: Prescan

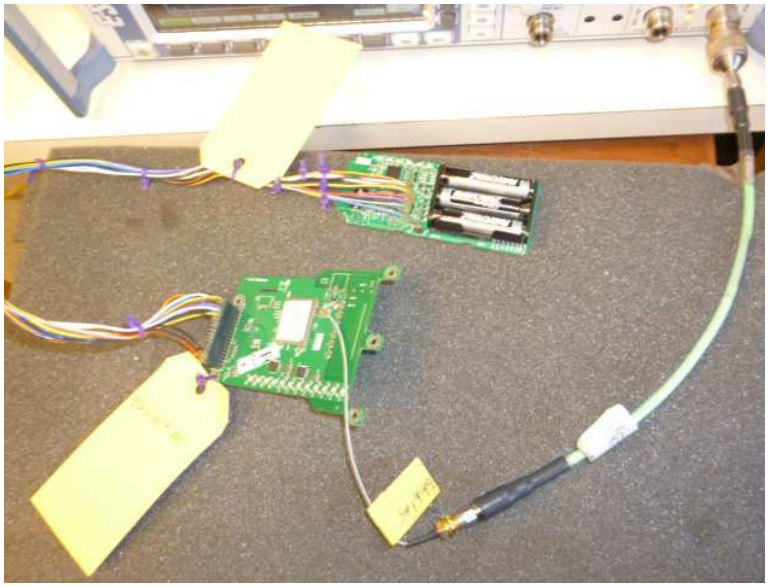


### Radiated Spurious Emission with 3.8dBi Integral Antenna: OATS

## Radiated Spurious Emission with 9dBi Whip Antenna: Prescan

## Radiated Spurious Emission with 9dBi Whip Antenna: OATS

## Conducted Output Power, Occupied Bandwidth, Conducted Spurious, Peak Power Spectral Density



## Conducted Emissions