



FCC Part 15.247 Certification Application

**Industrie Canada RSS210 Certification
Application**

**EMI Test Report
on
IEEE 802.11 Access Point.
Series: 2332
Model: 2332-A1**

FCC ID: [RVW2332](#)

IC ID: [332R-2332](#)

Report: NOR2332

Prepared by:
David Waitt
21565 Mary Alice Way
Los Gatos, CA
david@waitt.us
(408) 832 7053

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General Information

Unit(s) Under Test: IEEE 802.11 Access Point (AP)
Model(s): 2332-A1

Product Description: "IEEE 802.11 A/B/G Access Point"

FCC ID: RVW2332
IC ID: 332R-2332

Tested For: Nortel Networks
4655 Great America Parkway
Santa Clara, CA 95054

Tested At: Elliott Laboratories
684 West Maude Ave
Sunnyvale, CA 94086

Tested By: Rafael Veralas, Test Engineer, Elliott Laboratories
Juan Martinez, Test Engineer, Elliott Laboratories
David Waitt, (Independent Consultant)

Test Specifications: FCC CFR 47, Part 15.247, 2.4 GHz / 5.8 GHz

Test Date: May / June 2007

**Requested
Certifications:** FCC Part 15 Subpart C certification application
IC RSS-210 Issue 7 Certification application

Detailed Product Information

The access point radio is an IEEE 802.11 A/B/G access point (AP) intended to be professionally installed and configured in corporate and industrial environments. The unit has internal antennas and is also capable of being configured to use external antennas.

This certification application follows FCC policy that allows use of antennas of the same type of equal or lesser gain to be used with the product from various manufacturers. All of the antennas listed below were actually tested with the unit, however only the data associated with the highest gain antenna of each type is presented in this report for brevity. **The highest gain antenna of each type for each band is highlighted in GREEN.**

The last column indicates the maximum power setting that is allowed to be used with the particular type of antenna in order to ensure compliance with FCC rules. The combination with the highest EIRP (based on power setting and antenna PK gain is highlighted in **RED text**. **NOTE: The actual RF Transmit power is LOWER than the power setting implies**

Antenna	Freq Band [GHz]	Peak Gain (dBi)	Net Gain (dBi)	Type	Comment	Power Setting
5.0 GHz Antennas						L - M - H
SQ5153WPN36RSM	5.15 - 5.25	3.5	3.2	Monopole	Monopole pattern similar to SQ2403	21
	5.725 - 5.85	0.1	0.1			21
S5153WPN36RSM	5.15 - 5.25	4.9	4.5	Dipole	Co-linear Omni, 2 co-located dipoles,	21
	5.725 - 5.85	4.4	4.4			21
S4901790PN36RS	5.15 - 5.25	15.6	15.7	Panel	90 degree directional antenna	15 - 21 - 21
	5.725 - 5.85	16.1	15.8			21 - 21 - 20
SR49120DAN36RS	5.15 - 5.25	10.1	10	Panel	120 degree , directional antenna	
	5.725 - 5.85	10	9.5			
S51514WPN36RSM	5.15 - 5.25	13.4	13.1	Panel	60 degree , directional antenna	
	5.725 - 5.85	12.9	12.9			
Internal	5.15 - 5.25	2		Dipole	Omni Pattern,	
	5.725 - 5.85	0.65				
2.4 GHz Antennas						CH 1; 2-10; 11
S2403BPXN36RSM	2.4 - 2.5	5.8	4.9	Dipole	Co-linear Omni, 2 co-located dipoles	B: 21-21-21 G: 20.5-21-20.5
SQ2405DDN36RSM	2.4 - 2.5	5.2	5.1	Panel	Panel, similar to 2402 / 2409	
SL2402PN36RSM	2.4 - 2.5	0.3	0	Panel	Panel	
S2406PN36RSM	2.4 - 2.5	6.7	6.5	Panel	Panel	
S2409PN36RSM	2.4 - 2.5	8.8	8.8	Panel	Panel, higher gain S2402 @ 60 deg	
S241290PN36RSM	2.4 - 2.5	12.1	11.7	Panel	Panel, higher gain S2409 @ 90 deg	B:15-20-13 G:12-20-10.5
SR24120DN36RSM	2.4 - 2.5	11.7	11.5	Panel	Panel, higher gain S2409 @ 120 deg	
PC2415NA36RSM	2.4 - 2.5	14.3	14.1	Yagi	Multi-element	B: 14-21-12 G: 12.5-21-10
Internal	2.4 - 2.5	3.86		Dipole	Omni Pattern,	
2.4/5.0 GHz Dual Antenna						
S24493DSN36RSM	2.4-2.5	3.6	3	Monopole	Similar radiation pattern to a squint	
	5.15 - 5.25	4.2	3.9	Monopole	Similar radiation pattern to a squint	
	5.725 - 5.85	2.6	2.6			

Internal Antennas

The AP utilizes integral antennas for use with 802.11 A/B/G. The access point includes four broad band antennas. Two of the antennas are used for 802.11 B/G operation, the remaining two are used for 802.11 A operation. For a given band, the AP switches rapidly between the two antennas associated with that band and when a signal is detected, the access point uses the antenna offering the best transmission characteristics. At any one time, there is only one antenna connected to the internal transceiver for that band

Test Results Summary

This report presents the results of the tests that verify compliance with FCC Part 15.247 & RSS210 / 7

A brief results summary of all the in this report is below.

Part 15 Paragraph	RSS-210/7 Paragraph	Test	Results
15.247(a)(3)	A8.4(4)	Maximum Power Output	20 dBm Max
15.247(a)(2)	A8.2(a)	6dB Bandwidth 99% Bandwidth	11.72 MHz Min
15.247(e)	A8.2(b)	Power Spectral Density	-1.03 dBm/3kHz Max
15.247(c)	A2.2(c)	Out of Band Spurious Emissions	-30.55dBc
15.205	A2.2(b)	Radiated Emissions in Restricted bands	.1 dB in spec @2483.5MHz
15.109		AC Line Conducted Emissions	-19.1 dB below limit

Test Facilities

The tests were performed at:

Elliott Laboratories
41039 Boyce Road
Fremont, CA 94538

The tests performed at Elliott include:

- All radiated emissions tests required in FCC Part 15.247 (15.205, 15.209) for 2.4GHz and 5.8 GHz.
- RF Conducted Tests. (BW, Pout, PSD,...) (for 2.4 GHz & 5.8 GHz)

General:

Final 802.11 B/G/A radiated test measurements were taken at Elliott Laboratories Chambers #4 & #5.

The test site contains separate areas for radiated and conducted emissions testing. Pursuant to section 2.948 of the Rules, construction, calibration, and equipment data has been filed with the Commission.

The FCC recommends that ambient noise at the test site be at least 6 dB below the allowable limits. Ambient levels are below this requirement with the exception of predictable local TV, radio, and mobile communications traffic. The test site contains separate areas for radiated and conducted emissions testing. Considerable engineering effort has been expended to ensure that the facilities conform to all pertinent FCC requirements.

OATS:

The FCC has determined that radiation measurements made in a shielded enclosure are not suitable for determining levels of radiated emissions. Radiated emissions are performed in an open field environment. The test site is maintained free of conductive objects within the CISPR defined elliptical area incorporated in ANSI C63.4 Guidelines.

Antenna, Antenna Mast and Turntable

The Horn antennas that are use to measure radiated emissions above 1000MHz are amounted on a non-conductive antenna mast equipped with a motor drive to vary the antenna height.

ANSI C63.4 specifies that the test height above the ground plane shall be 80cm unless the equipment is intended to be floor mounted. During the radiated emissions tests the equipment is positioned on a motorized turntable in conformance with the ANSI requirement.

Equipment Lists

Instrument Calibration

All test equipment is regularly checked to ensure that performance is maintained in accordance with the manufacturer's specifications. All antennas are calibrated at regular intervals with respect to tuned half-wave dipoles. An exhibit of this report contains the list of test equipment used and calibration information.

The following test equipment was used to perform the testing

Elliott Test Equipment (Test Dates 19 April - 24 May 2007)

<u>Manufacturer</u>	<u>Description</u>	<u>Model #</u>	<u>Asset #</u>	<u>Cal Due</u>
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	263	16-Mar-08
EMCO	Antenna, Horn, 1-18 GHz (SA40-Blu)	3115	1386	11-Jul-08
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1630	11-Jan-08
Micro-Tronics	Band Reject Filter, 2400-2500 MHz	BRM50702-02	1731	09-Jun-07
Hewlett Packard	SpecAn 9 kHz - 40 GHz, (SA40) Purple	8564E (84125C)	1771	11-Jul-07

Test Methods

The tests are performed at a low, middle and high channel of the applicable band. The typical frequencies used for the Part15.247 ISM tests are shown in the table to the right. Unless otherwise noted, all testing was performed on these channels / frequencies

ISM 802.11 B / G 2400 – 2483.5 MHz

Channel		Freq(MHz)
Low	Chan 1	2412
Mid	Chan 6	2437
High	Chan 11	2462

ISM 802.11 A 5725 - 5825 MHz

Channel	Freq(MHz)
Low	5745
Mid	5805
High	5825

In order to comply with the “radiated emissions in restricted bands” requirements the transmit power had to be lowered on some of the channels at the edges of the operating band. The maximum power setting that allowed compliance with the radiated emissions requirements will be programmed into the configuration firmware of the access point ensuring that maximum possible power setting will be correct for each channel.

Given that the access point will normally be operated at these power settings, these same settings were also used during the “bench top” conducted RF tests (Spectral density, bandwidth etc).

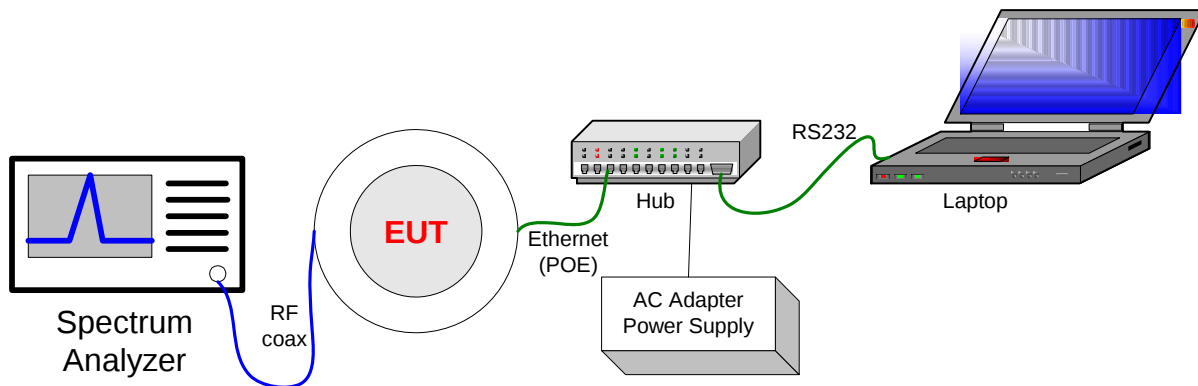
The tests listed below are performed using the basic “conducted” test setup shown below unless otherwise noted. In most cases, the EUT was running special diagnostic software to allow it to transmit random data on a particular channel indefinitely.

Part 15

15.247(e)
15.247(a)(2)
15.247(a)(3)

Test

Power Spectral Density
6 and 99% Bandwidth
RF Transmit Power



Basic Conducted RF Bench Test Setup

Unless otherwise noted, the support equipment for the bench tests is listed below.

Support Equipment				
Description	Model number	FCC ID or SN	Manufacturer	Power Cable
Laptop	Satellite	DOC	Toshiba	Laptop PS
Ethernet Switch	2350	DoC	Nortel	48 VDC Adapter below
48VDC AC adapter	Generic		Generic	CAT 5 Ethernet cable

Test Results

Detailed test procedures and test results are contained in the following sections. In cases where the test setup differs from the Conducted RF test setup shown earlier, the test setup is also presented.

Test Conditions			
Temperature	22C	Humidity:	72%
ATM pressure	1020 mBar	Grounding:	None
Tested By	David Waitt	Date of Test:	May 2007
Test Reference	Refer to individual test results		
Tested Range	Test Dependent		
Test Voltage	48 VDC to the Switch / AP		
Modifications	No modifications were made to the unit during the tests		

802.11 B/G/A Maximum RF Power Output at Antenna Terminals

Specifications:

FCC Specification: Paragraph: 15.247(a)(3)

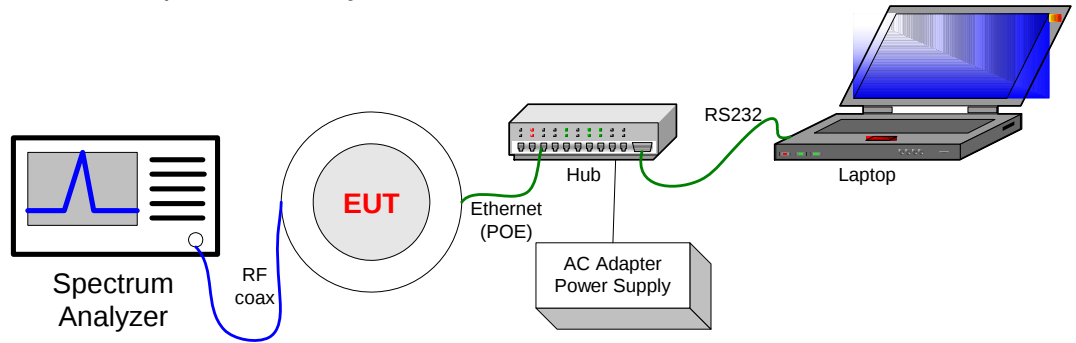
IC Specification: RSS-210 / 7 A8.4(4)

Procedure:

The test was configured as shown below. The unit was tuned to the test channels and configured to transmit random data at a 100% duty cycle. The integrated channel RF transmit power was then measured with a spectrum analyzer.

There are different power settings used for operation on 2.4 and 5.8 GHz. The power setting used is dependent on the antenna used with the AP.

Generally, higher power settings are used with lower gain antennas and lower power settings are used with higher gain antennas. Utilization of these different power levels ensures compliance with the FCC ISM “restricted band” emission requirements while attempting to maximize EIRP for field performance. See the table in this earlier in this report that outlines applicable power setting for each of the external antennas. In no case is the power setting set higher than 21, thus, data for that power setting is presented below. All other power settings will produce a lower transmit power



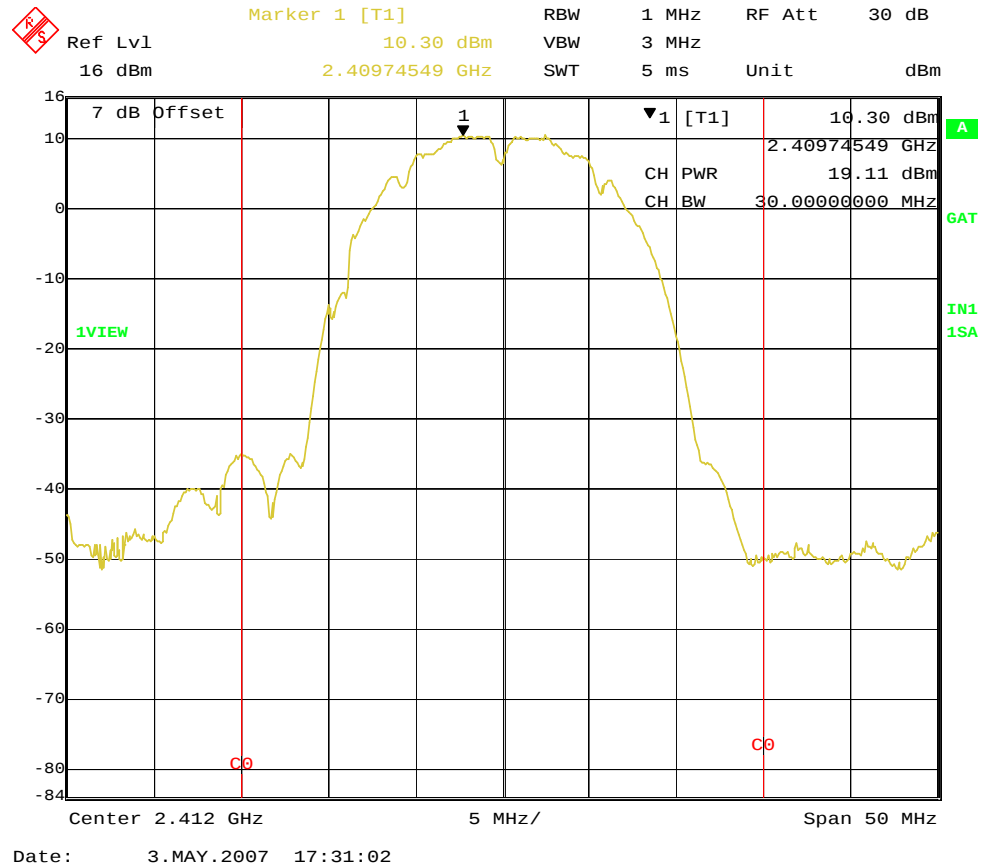
Results:

The integrated RF power levels for power setting of 21 were measured using a spectrum analyzer with the following settings: RBW=1 MHz, VBW=3MHz, with a sample detector and power averaging.

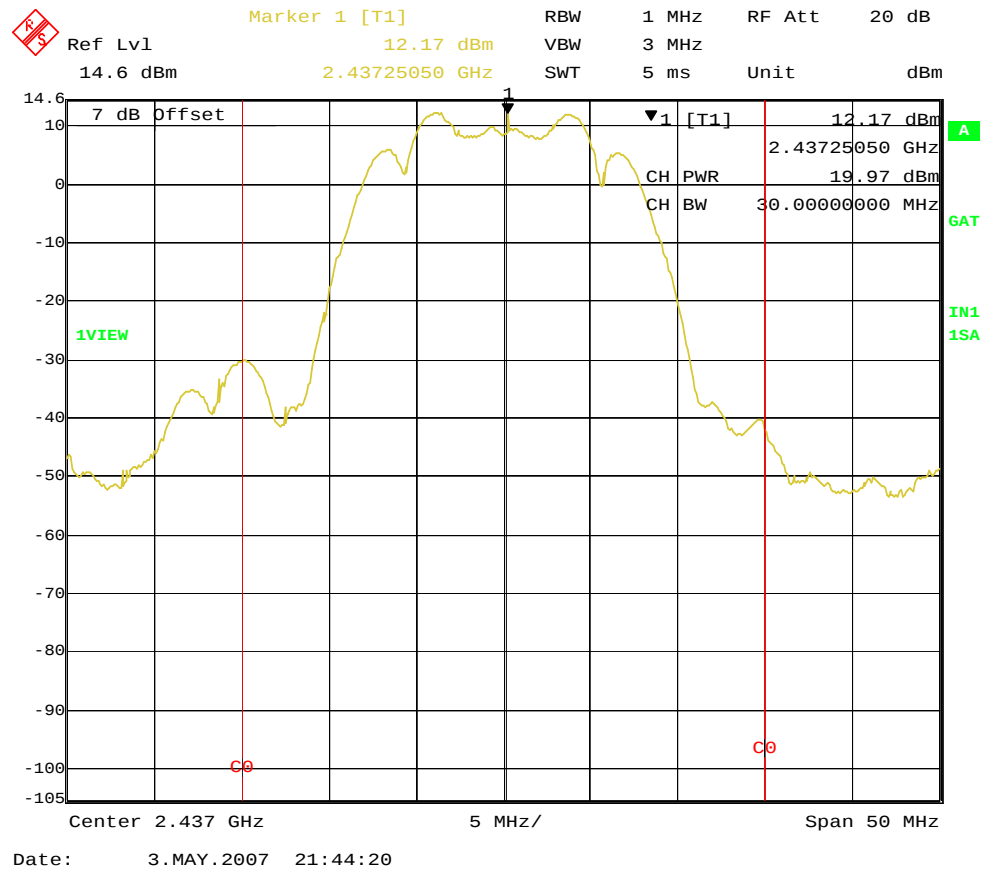
The EIRP shown in the table corresponds to the EIRP associated with the highest gain antenna used in that band (See antenna table for antenna detail)

Power Stg 21	Freq (MHz)	Power (mW)	Power (dBm)	Power (Max EIRP)
802.11 B	2412	81.47	19.11	33.41
	2437	99.31	19.97	34.27
	2462	95.28	19.79	34.09
802.11 G	2412	100.00	20.00	34.30
	2437	97.95	19.91	34.21
	2462	96.38	19.84	34.14
802.11 A	5745	15.03	11.77	27.87
	5805	14.62	11.65	27.75
	5825	18.92	12.77	28.87

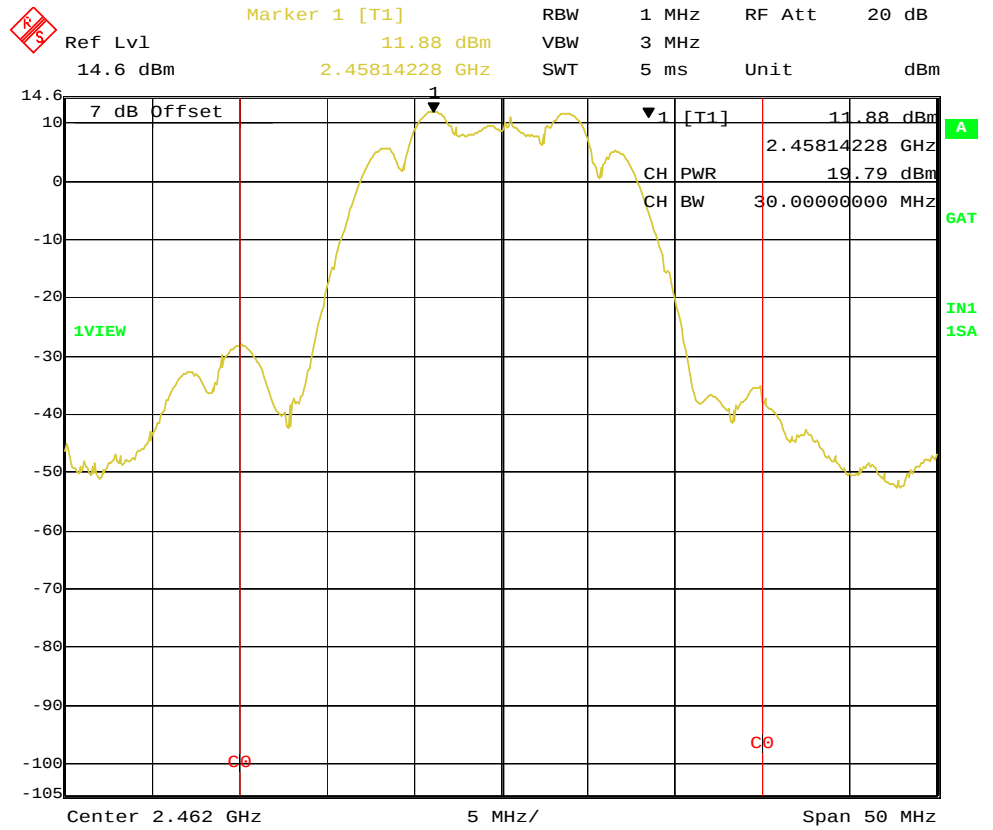
Channel 1, 802.11 B,
Power setting 21



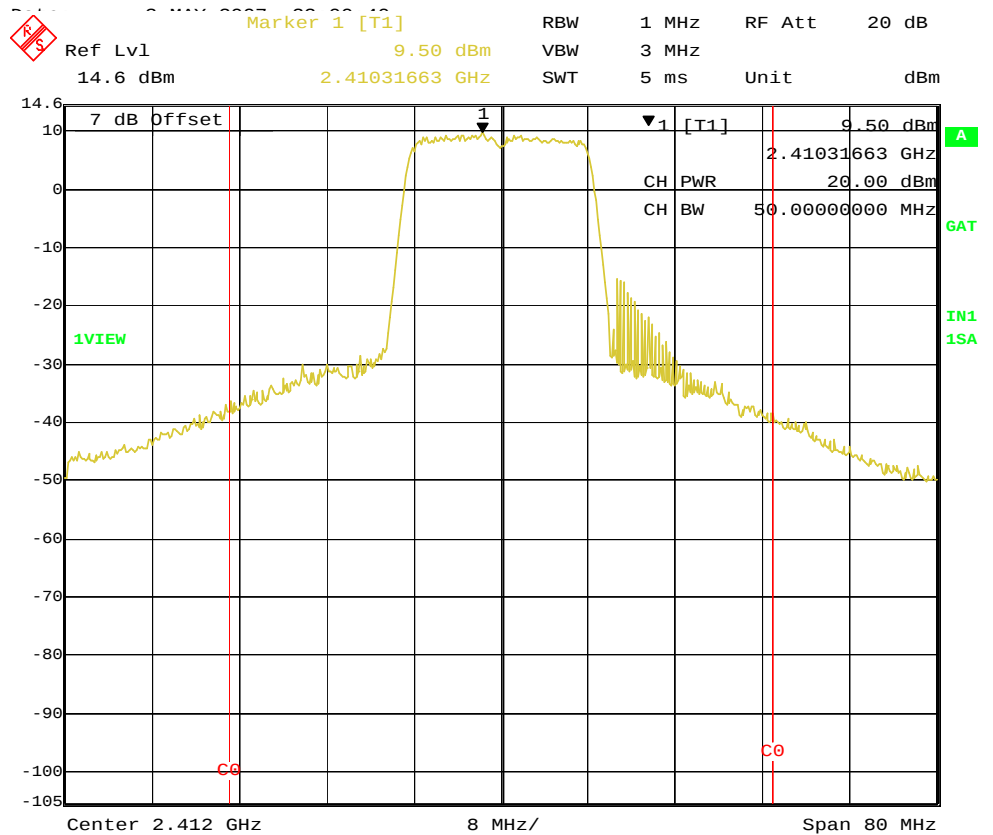
Channel 6, 802.11 B,
Power setting 21



Channel 11, 802.11 B,
Power setting 21

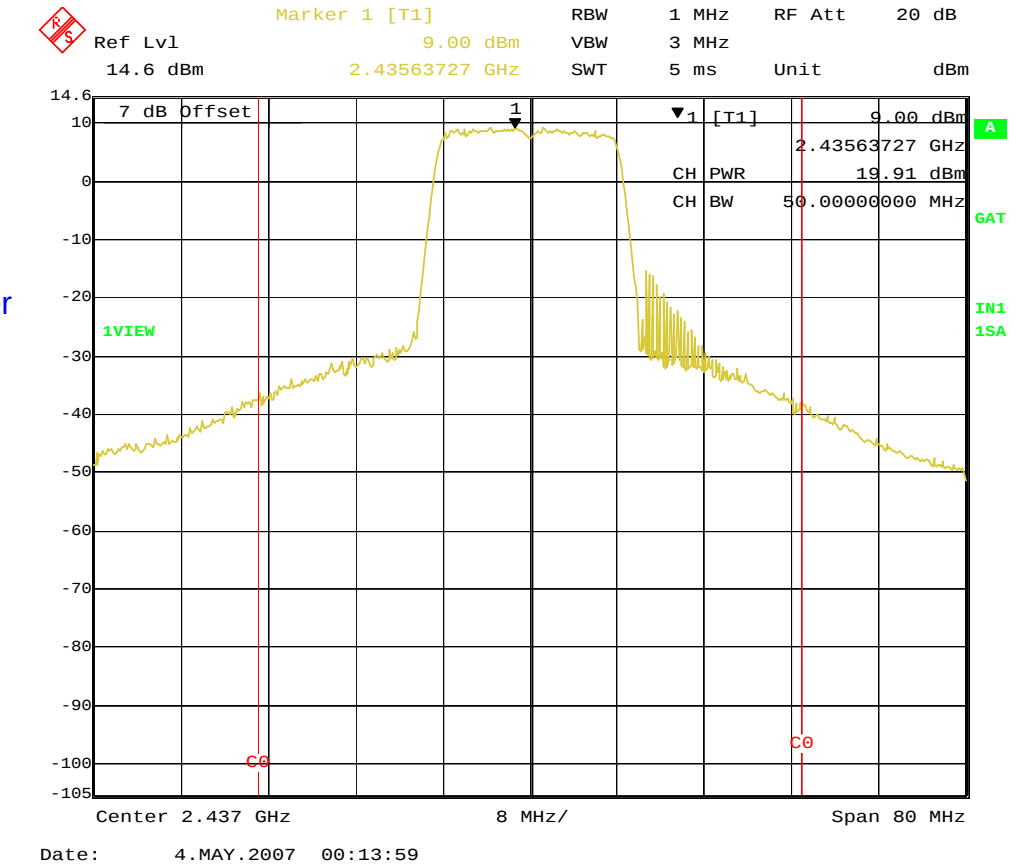


Channel 1, 802.11 G,
Power setting 21

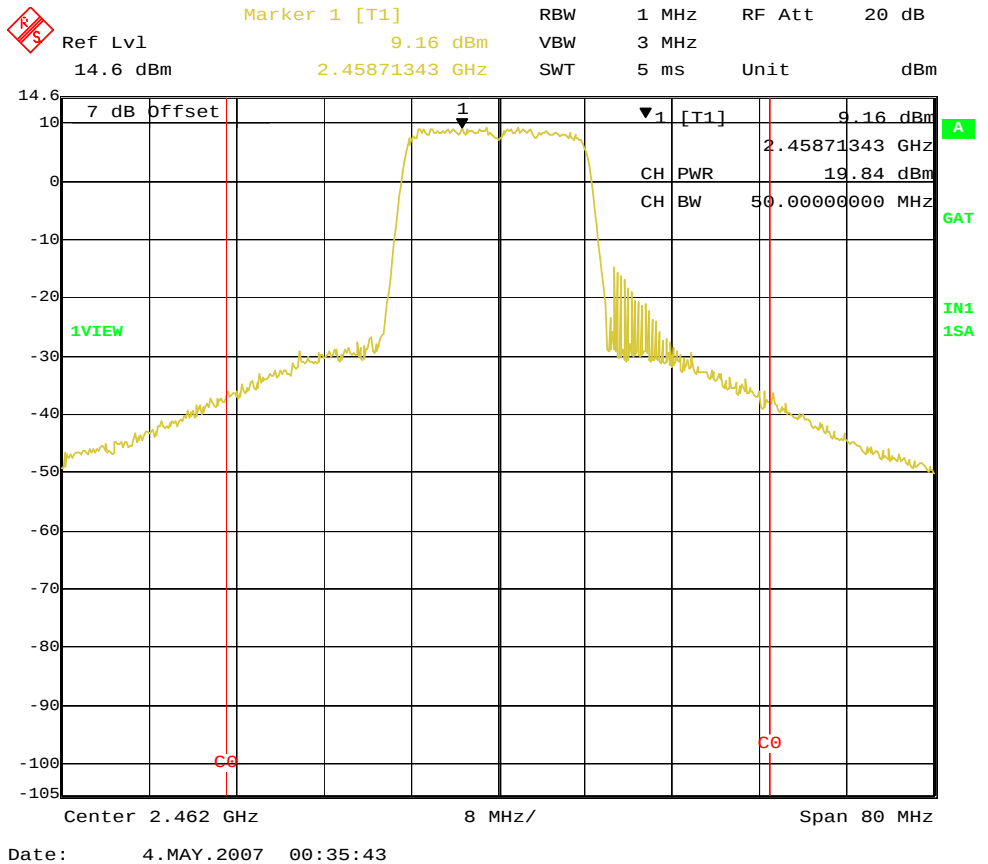


Date: 3.MAY.2007 23:11:18

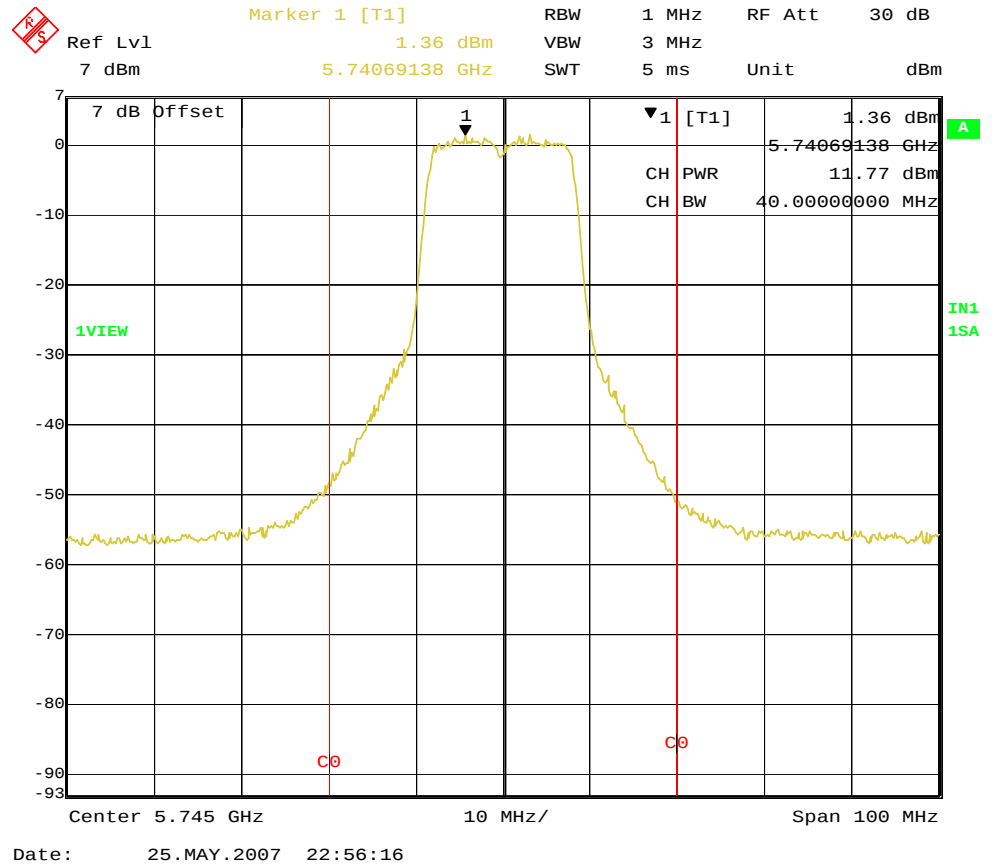
Channel 6, 802.11 G, Power setting 21



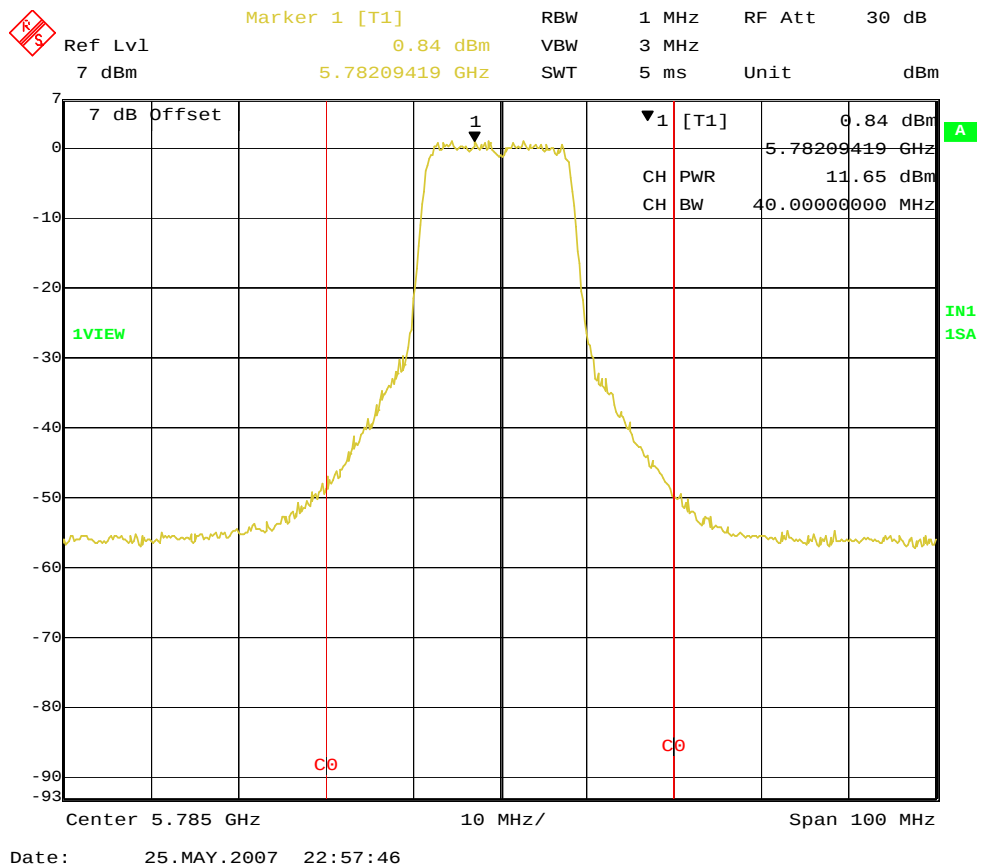
Channel 11, 802.11 G, Power setting 21



5745MHz , 802.11 A,
Power setting 21

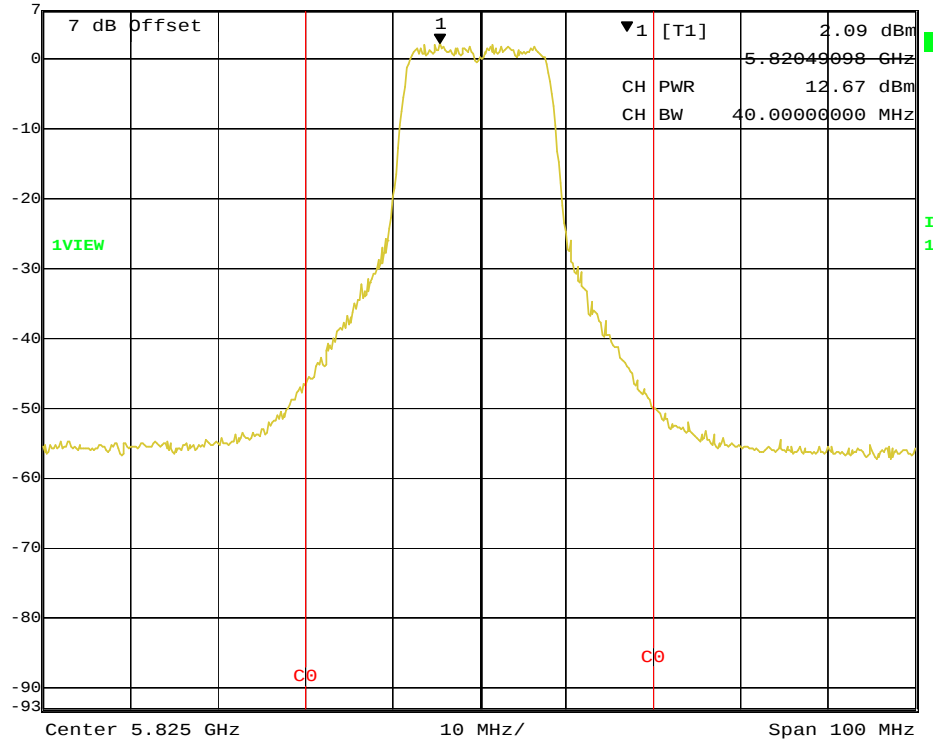


5785MHz , 802.11 A,
Power setting 21





Ref Lvl 7 dBm
 Marker 1 [T1] 2.09 dBm
 5.82049098 GHz
 RBW 1 MHz RF Att 30 dB
 VBW 3 MHz
 SWT 5 ms Unit dBm



5825 MHz , 802.11 A,
 Power setting 21

Date: 25.MAY.2007 23:00:39

6 dB and 99% Bandwidth

Specifications

FCC Specification: Paragraph 15.247(a)(2)

IC Specification: RSS-210 / 7 A8.2(a)

Procedure:

The access point operates on the standard IEEE 802.11 A / B / G test channels. The 6dB bandwidth was measured on the low middle and high channels of the 2.4 and 5.8 GHz ISM bands using the conducted RF test setup. The spectrum analyzer was configured for MAX HOLD and the trace allowed to stabilize. A peak search was performed and the then "Delta-Marker" used to locate the points at -6dB below the peak. Additionally, the "Channel Bandwidth" function of the spectrum analyzer was used to measure the 99% occupied bandwidth

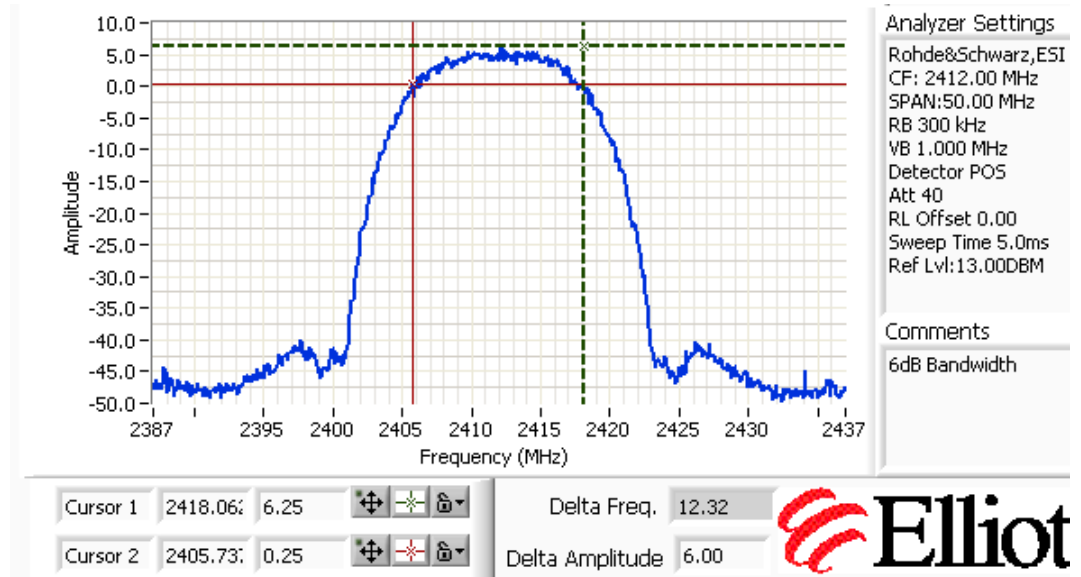
The bandwidth test was performed at the high power settings that will be used in the final system.

Results:

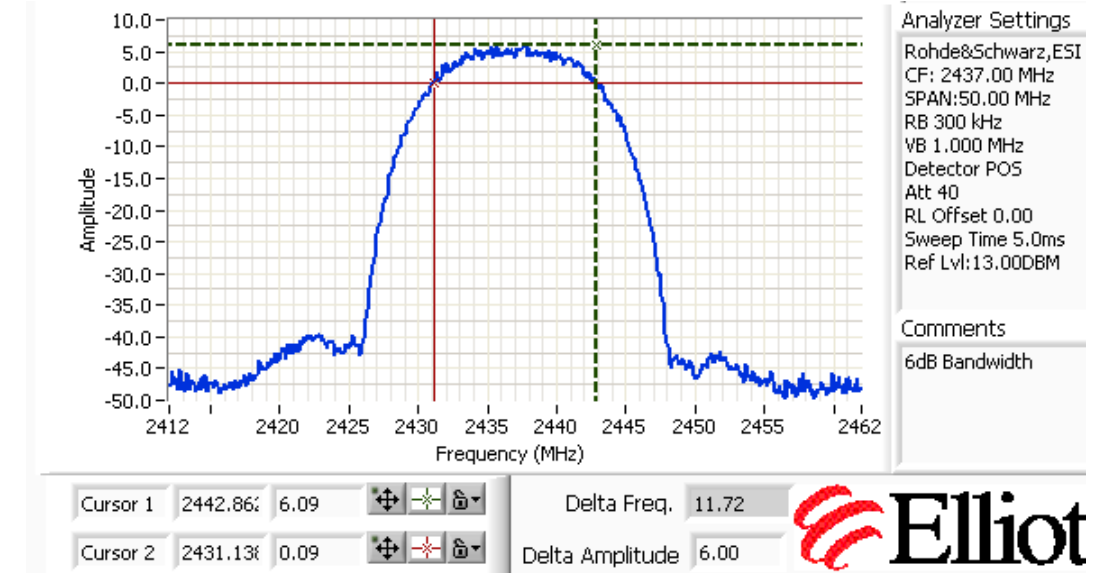
The BW was measured using the test lab SW and the 6 and 99% BW function of the spectrum analyzer. The measurements were made using a RBW=300kHz and VBW=1MHz (approx 3 * RBW)

BANDWIDT H	Freq (MHz)	6dB (MHz)	99% (MHz)	Spec (MHz)
802.11 B	2412	12.32	15.80	0.50
	2437	11.72	15.70	0.50
	2462	11.82	15.80	0.50
802.11 G	2412	16.53	18.10	0.50
	2437	16.53	18.20	0.50
	2462	16.63	18.10	0.50
802.11 A	5745	16.67	16.97	0.50
	5805	16.58	17.22	0.50
	5825	16.50	16.97	0.50

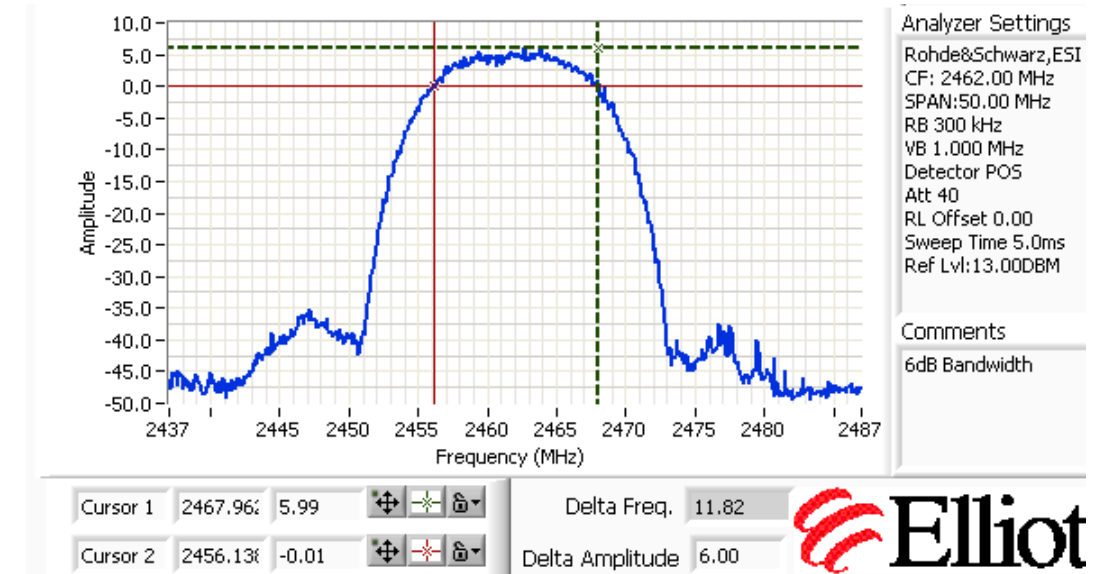
6 dB BW, 2412, B Mode

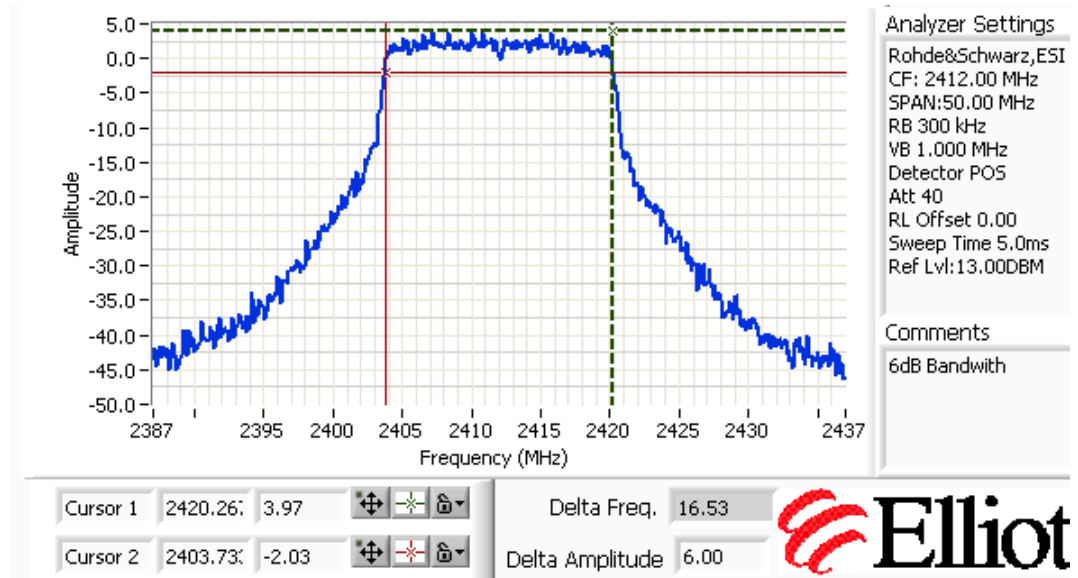
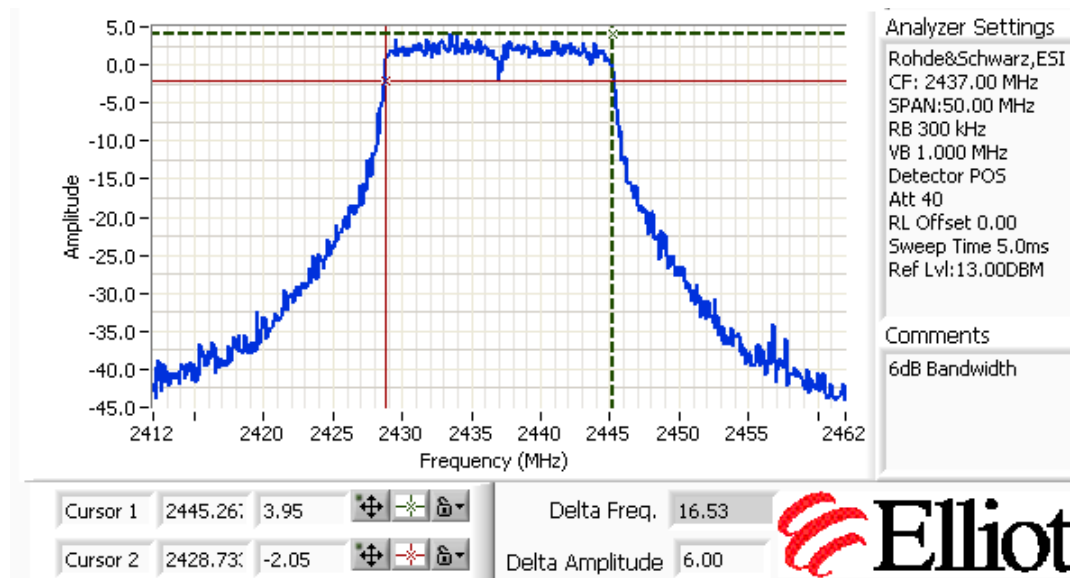
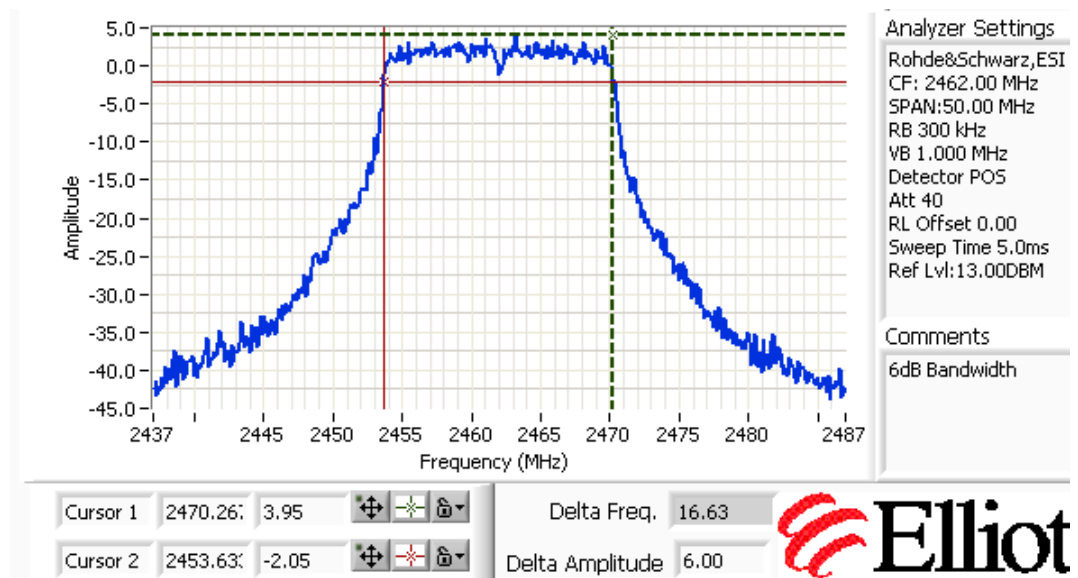


6 dB BW, 2437, B Mode

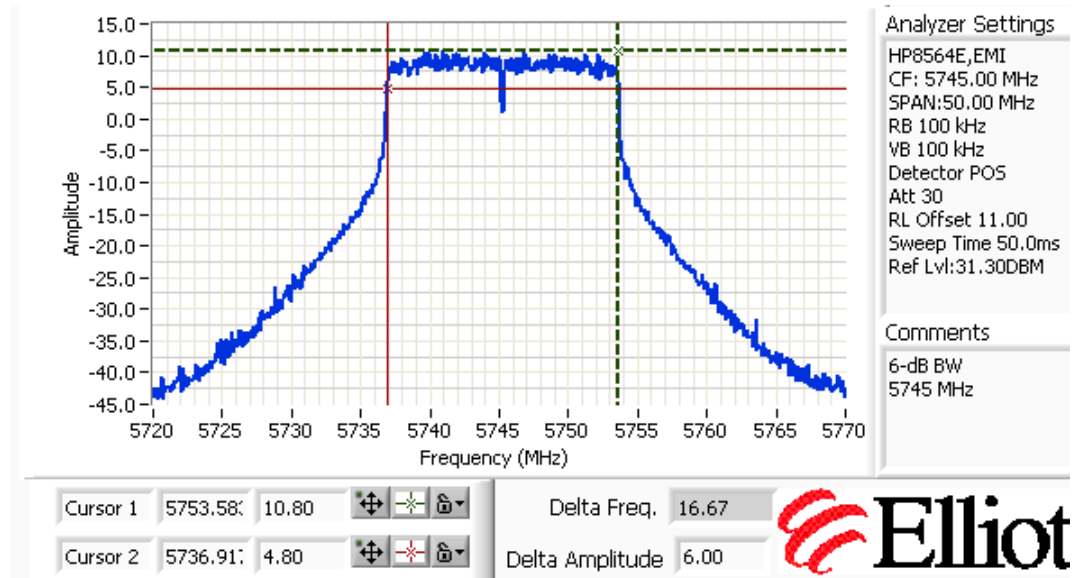


6 dB BW, 2462, B Mode

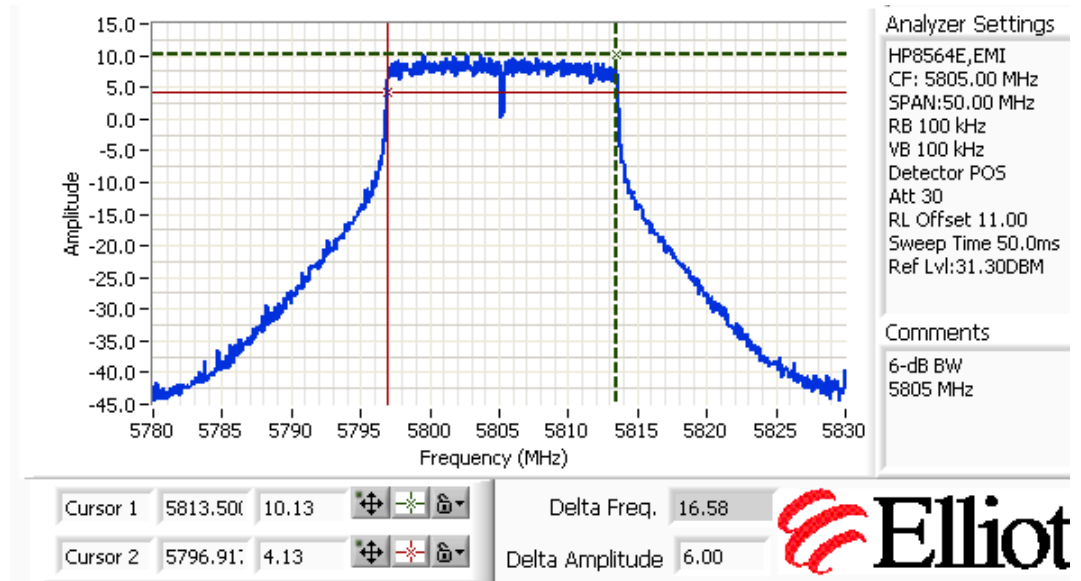


6 dB BW, 2412, G Mode6 dB BW, 2437 G Mode6 dB BW, 2462 G Mode

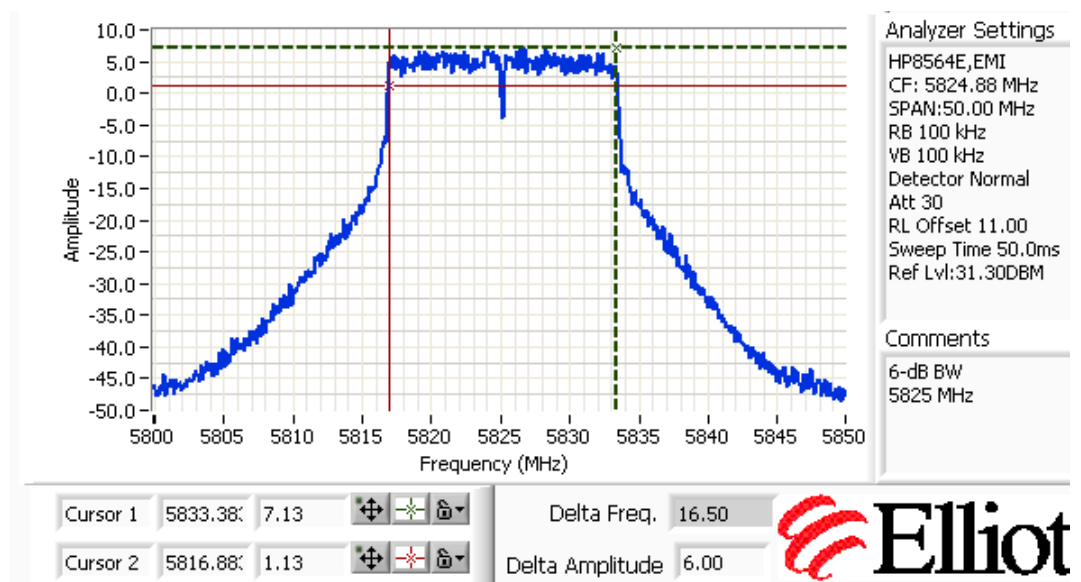
6dB BW, 5745 MHz

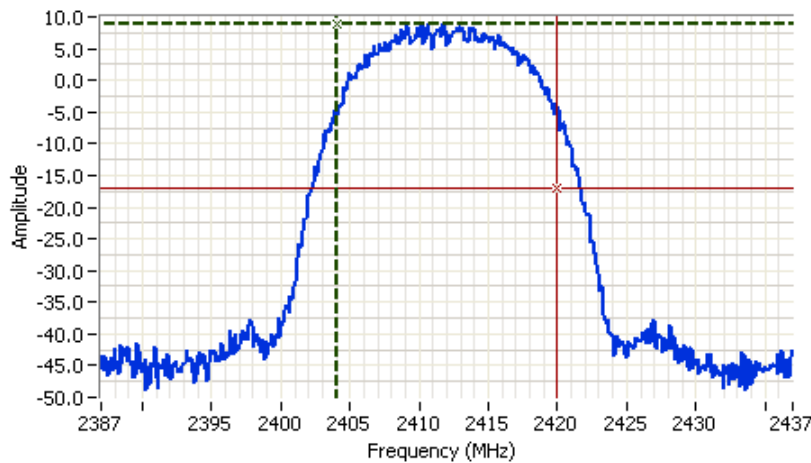


6dB BW, 5805 MHz



6dB BW, 5825 MHz





Analyzer Settings

Rohde&Schwarz,ESI
 CF: 2412.00 MHz
 SPAN:50.00 MHz
 RB 1.000 MHz
 VB 3.000 MHz
 Detector AutoPeak
 Att 40
 RL Offset 0.00
 Sweep Time 5.0ms
 Ref Lvl:13.00DBM

99% BW, 2412, B

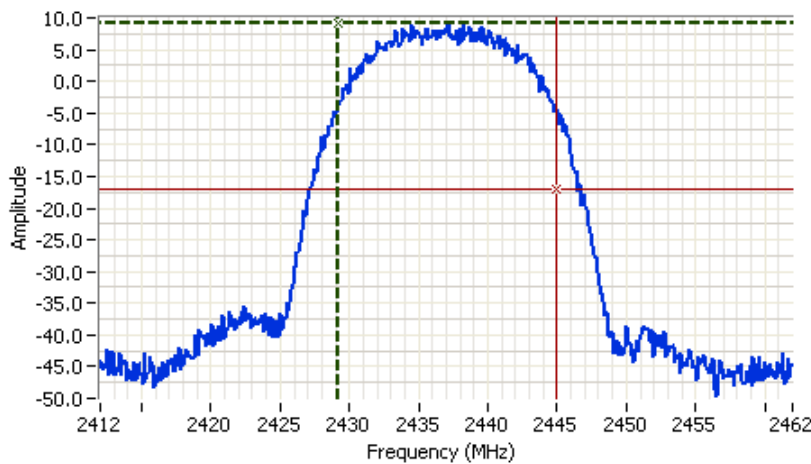
Comments

99% power bandwidth
 15.80 MHz

Cursor 1 2404.10 8.92
 Cursor 2 2419.90 -17.08

Delta Freq. 15.80

Delta Amplitude 26.00



Analyzer Settings

Rohde&Schwarz,ESI
 CF: 2437.00 MHz
 SPAN:50.00 MHz
 RB 1.000 MHz
 VB 3.000 MHz
 Detector AutoPeak
 Att 40
 RL Offset 0.00
 Sweep Time 5.0ms
 Ref Lvl:13.00DBM

99% BW, 2437, B

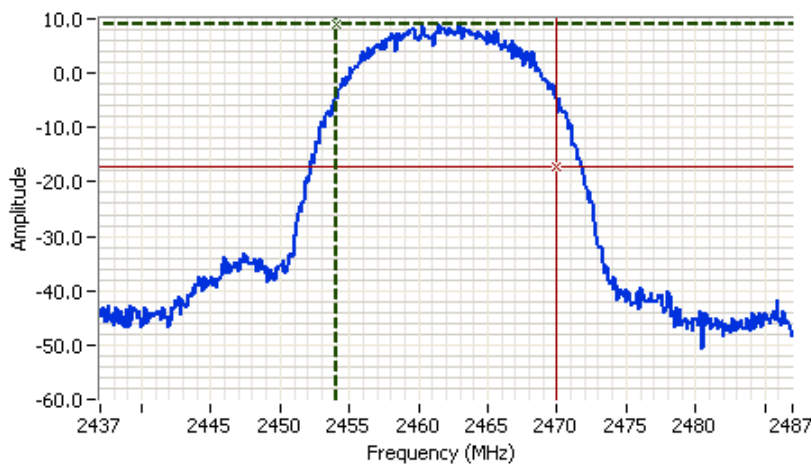
Comments

99% power bandwidth
 15.70 MHz

Cursor 1 2429.20 9.04
 Cursor 2 2444.90 -16.96

Delta Freq. 15.70

Delta Amplitude 26.00



Analyzer Settings

Rohde&Schwarz,ESI
 CF: 2462.00 MHz
 SPAN:50.00 MHz
 RB 1.000 MHz
 VB 3.000 MHz
 Detector AutoPeak
 Att 40
 RL Offset 0.00
 Sweep Time 5.0ms
 Ref Lvl:13.00DBM

99% BW, 2462, B

Comments

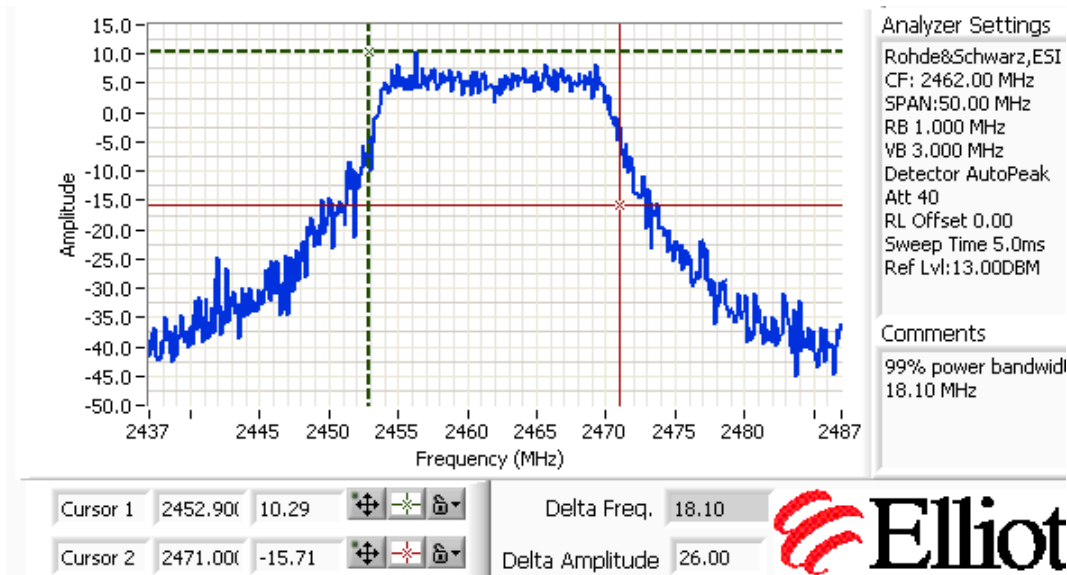
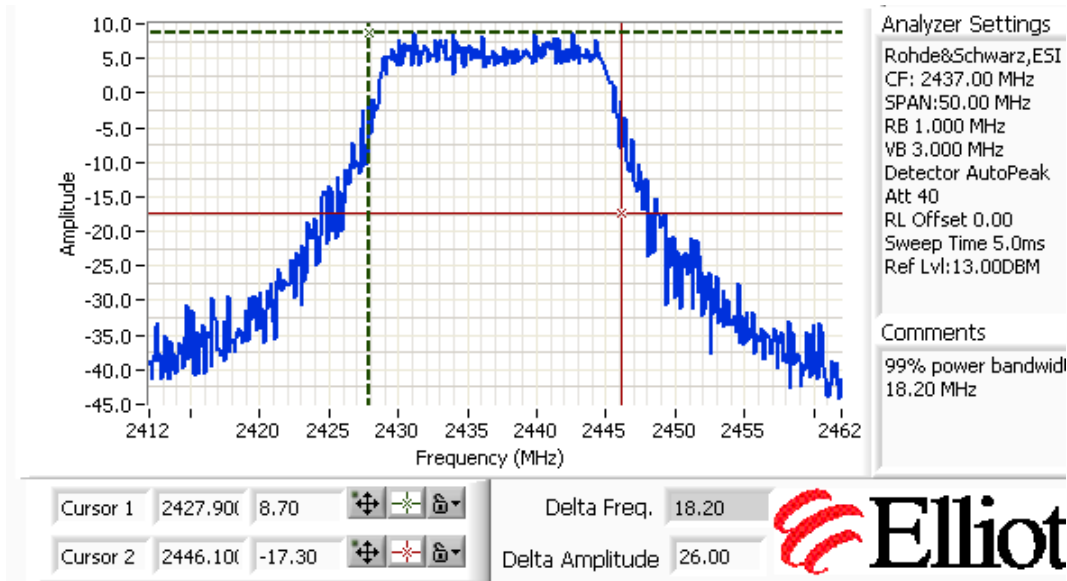
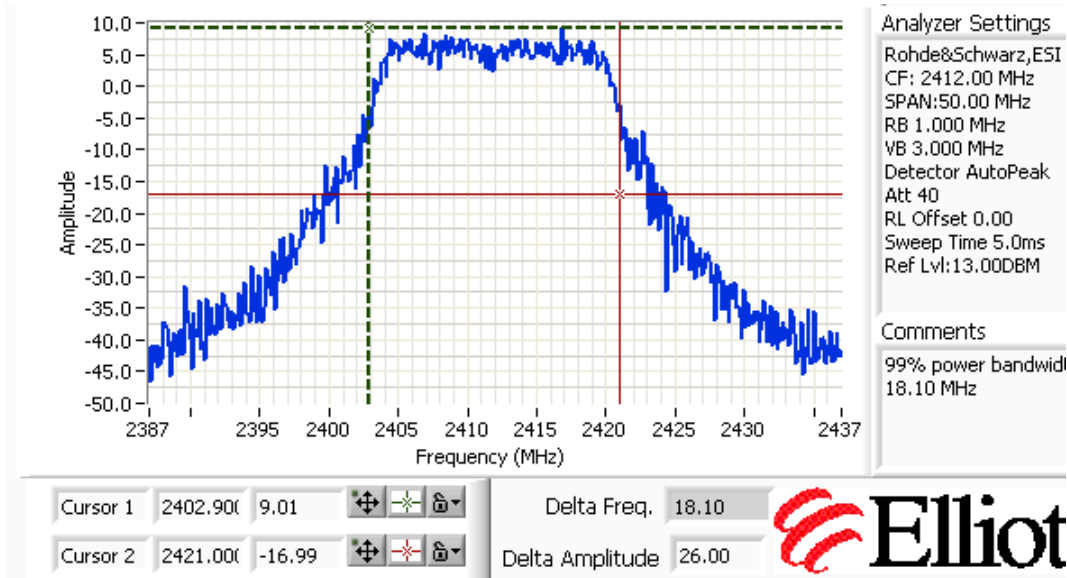
99% power bandwidth
 15.80 MHz

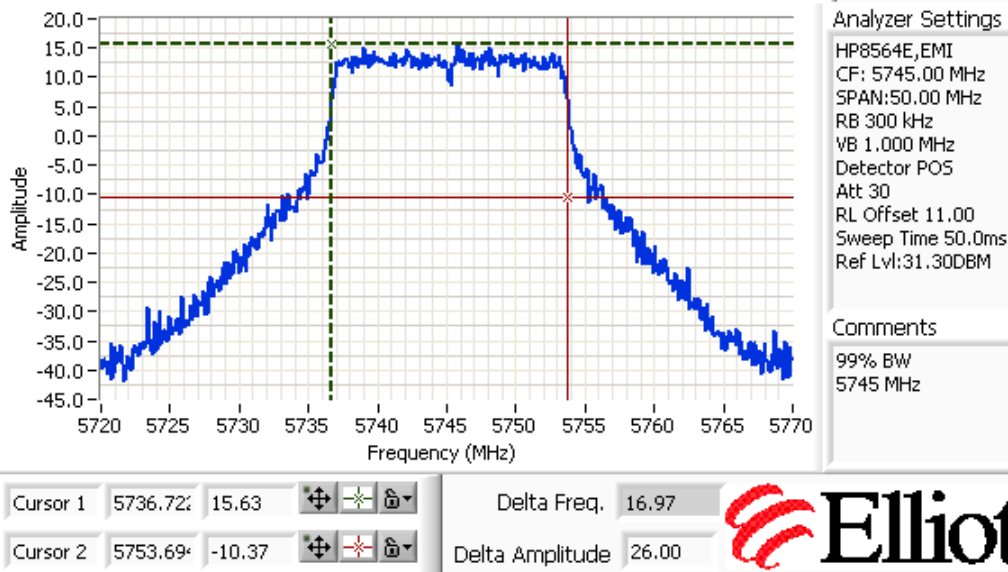
Cursor 1 2454.10 8.91
 Cursor 2 2469.90 -17.09

Delta Freq. 15.80

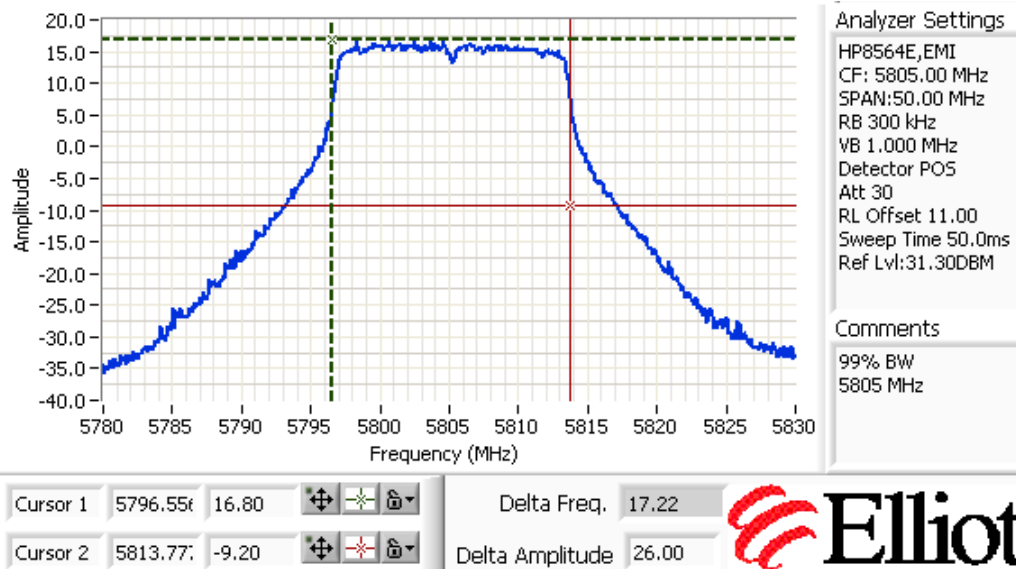
Delta Amplitude 26.00



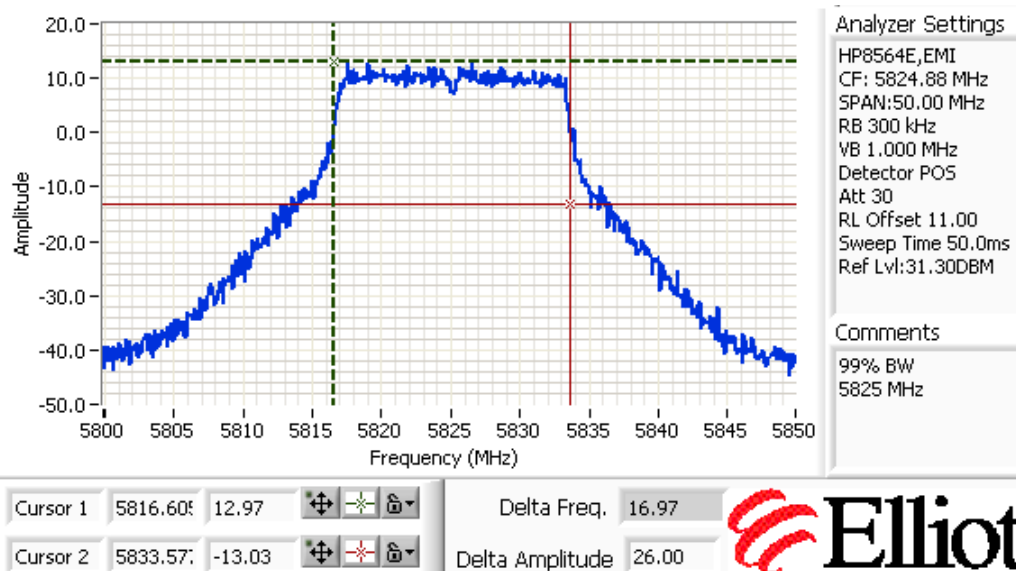




5745MHz, 99% BW



5805MHz, 99% BW



5825MHz, 99% BW

Power Spectral Density

Specifications:

FCC Specification: Paragraph 15.247(e)

IC Specification: RSS-210 / 7 A8.2(b)

Procedure:

The test setup was configured as shown in the conducted test setup. The UUT was configured to continuously transmit random data packets. Initially the bandwidth of the entire channel was examined. Using MAX HOLD, the trace was allowed to stabilize. Once the trace was stable, a peak search was performed and the frequency with the maximum power was determined.

The measurement span was then narrowed to 300kHz and centered on the “MAX power” frequency, the RBW was then set to 3 kHz with a 100 second sweep. The analyzer was then set to MAX HOLD and a display line placed at +8dBm.

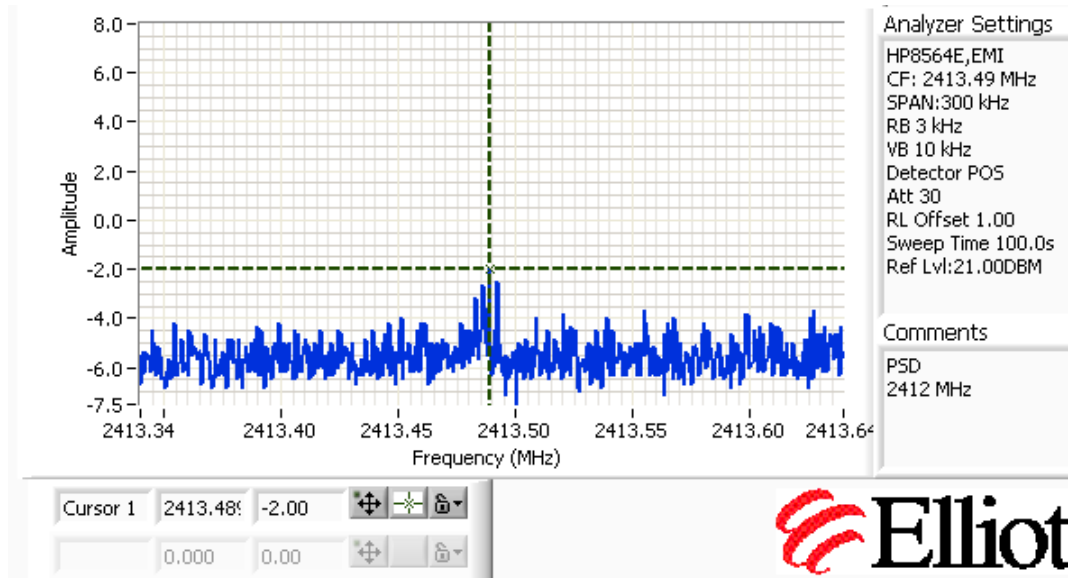
The power spectral density was measured at the low, middle and high-test channels with the appropriate power setting for the given test channel. [The power spectral density data was gathered at the high power setting \(Setting 21\) all other power setting will produce a lower PSD..](#)

Results:

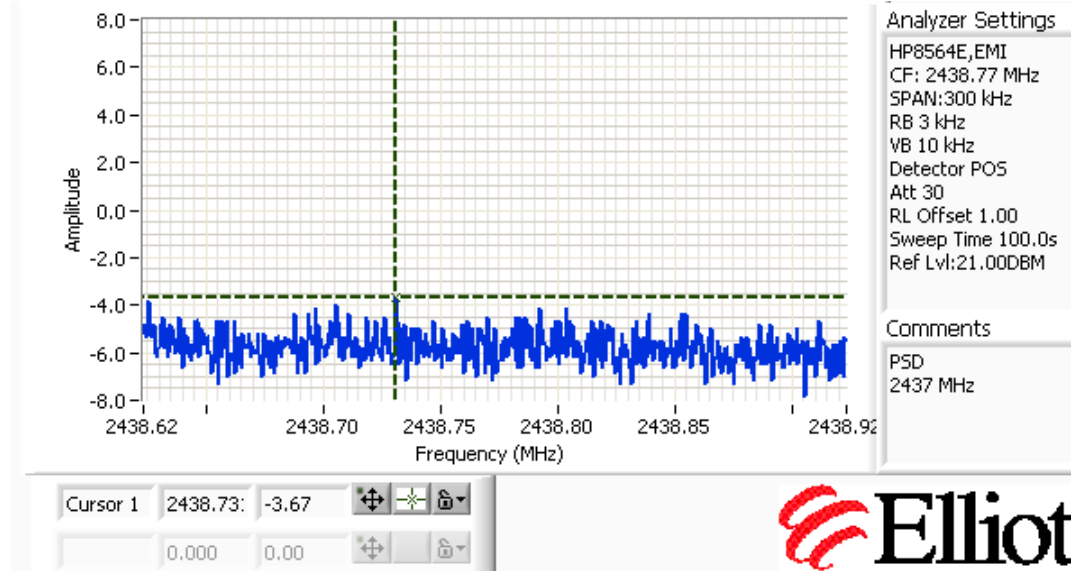
The power spectral density was measured at the highest power setting for each band / mode that will be used in the operation of the radio.

Power Setting 21				
PSD	Freq (MHz)	dBm /3kHz/Sec	Spec (MHz)	Delta Spec (dB)
802.11 B	2412	-2.00	8.00	10.00
	2437	-3.67	8.00	11.67
	2462	-2.17	8.00	10.17
802.11 G	2412	-3.67	8.00	11.67
	2437	-4.17	8.00	12.17
	2462	-4.67	8.00	12.67
802.11 A	5745	-1.03	8.00	9.03
	5805	-1.03	8.00	9.03
	5825	-3.70	8.00	11.70

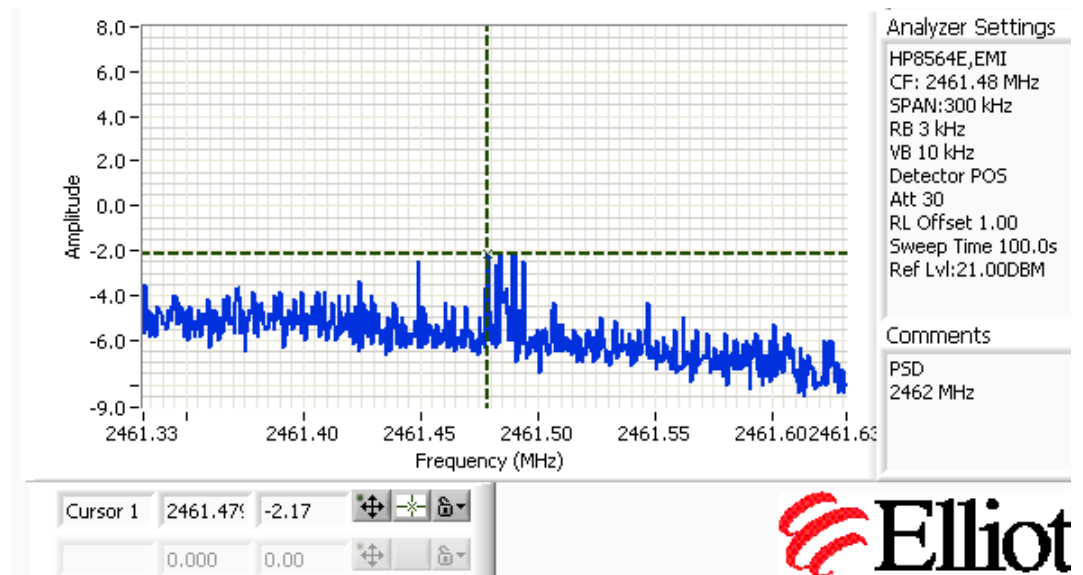
Power Spectral
Density, 802.11 B, ISM
2412MHz, Power
setting 21



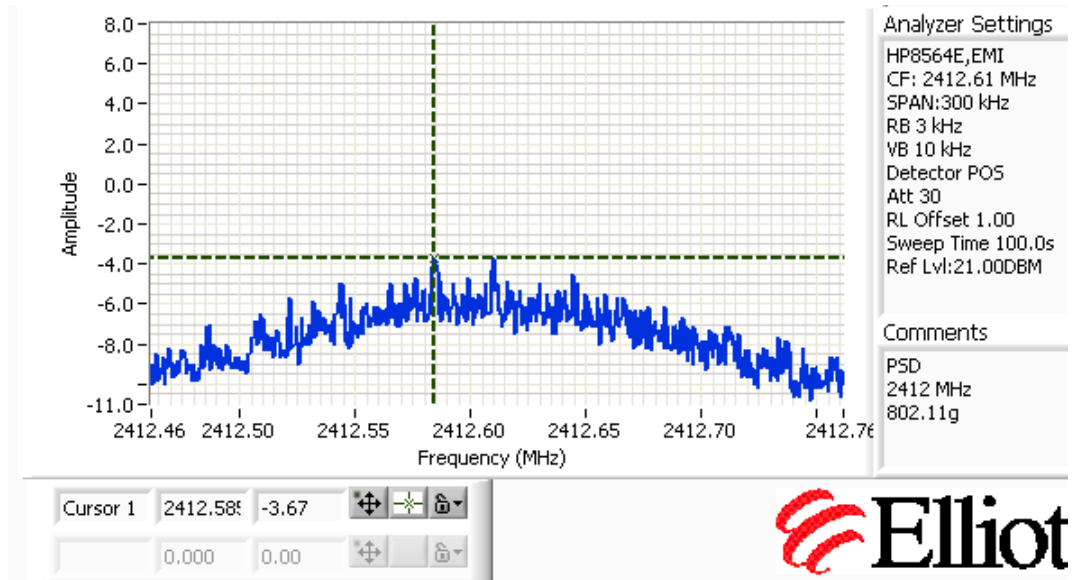
Power Spectral Density,
802.11 B, ISM
2437MHz, Power
setting 21



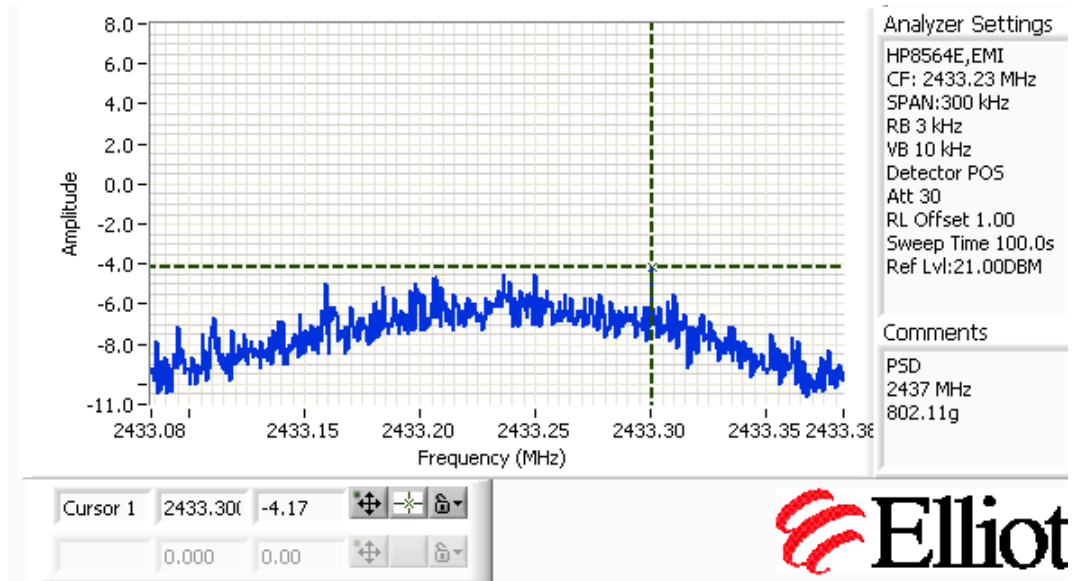
Power Spectral Density,
802.11 B, ISM
2462MHz, Power
setting 21



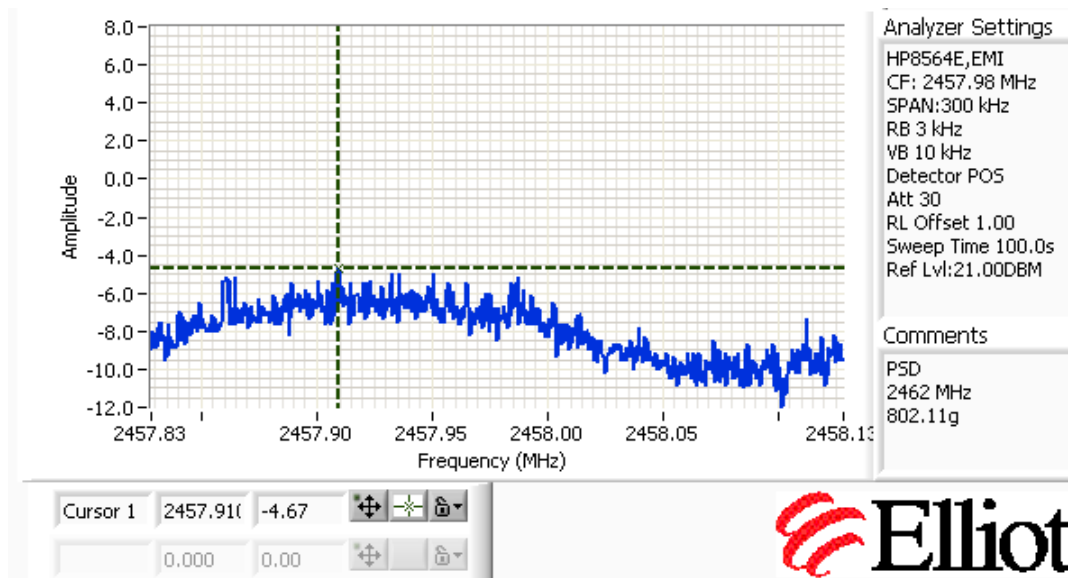
Power Spectral
Density, 802.11 G,
ISM 2412MHz, Power
setting 21



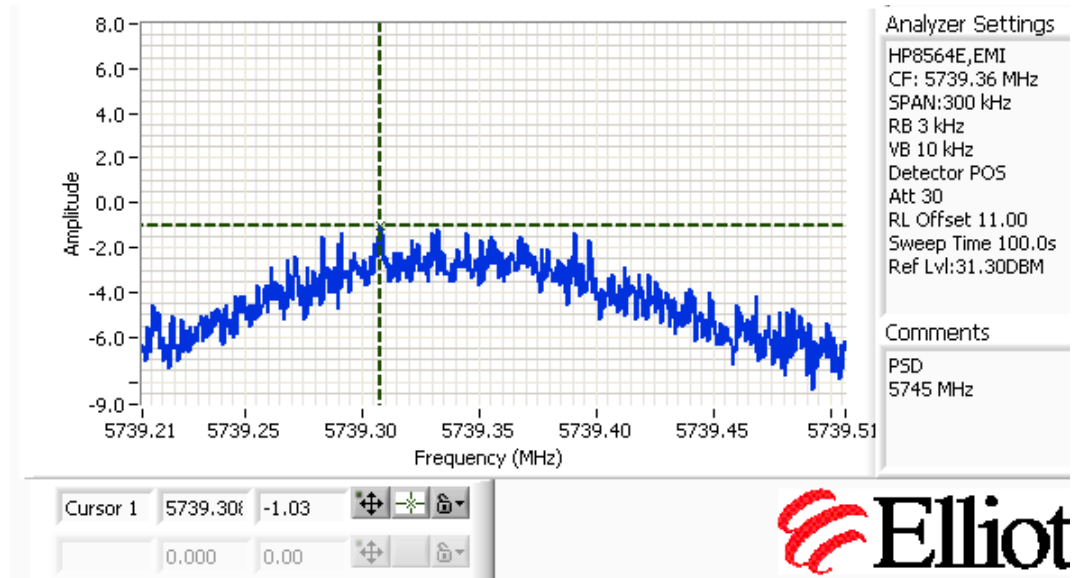
Power Spectral
Density, 802.11 G,
ISM 2437 MHz, Power
setting 21



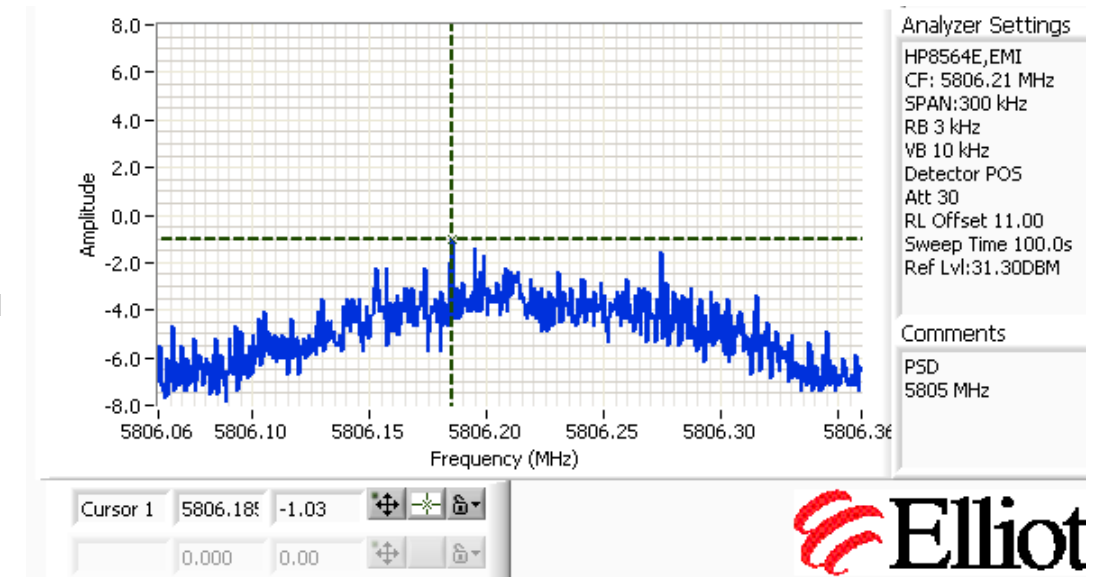
Power Spectral
Density, 802.11 G,
ISM 2462MHz, Power
setting 21



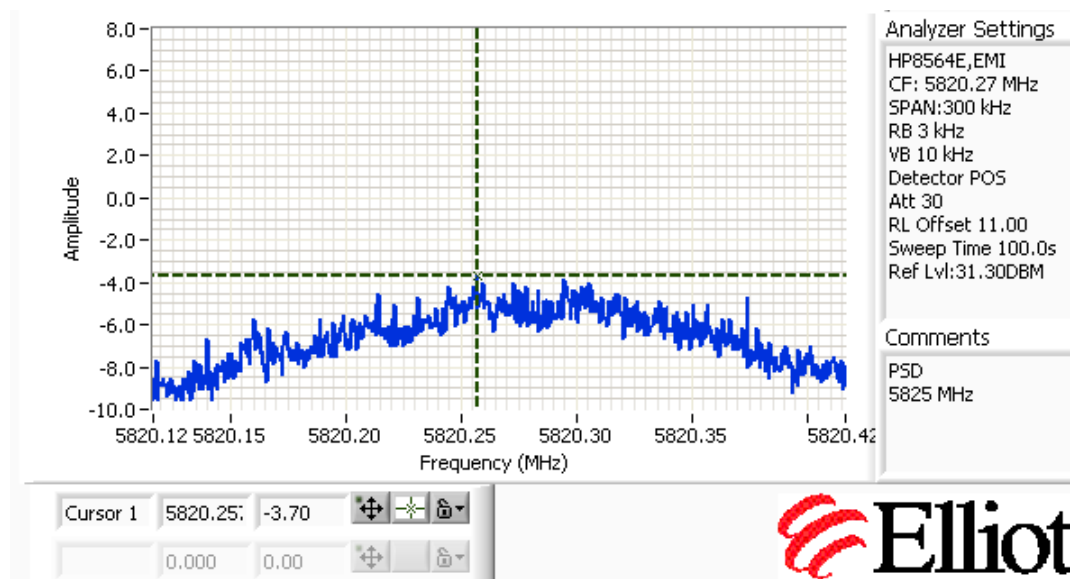
Power Spectral
Density, 802.11 A,
ISM 5745MHz, Power
setting 21



Power Spectral
Density, 802.11 A, ISM
5805MHz; , Power
setting 21



Power Spectral
Density, 802.11 A,
ISM 5825MHz; ,
Power setting 21



5.725 & 5.85 GHz Band Edge

Specifications:

FCC Specification: Paragraph 15.247(d)

IC Specification: RSS-210 / 7 A2.2(c)

Procedure:

The test setup was configured as shown in the conducted test setup. The UUT was configured to continuously transmit random data packets. The span of the analyzer was centered on the 5.725 and 5.85 GHz band edge respectively.

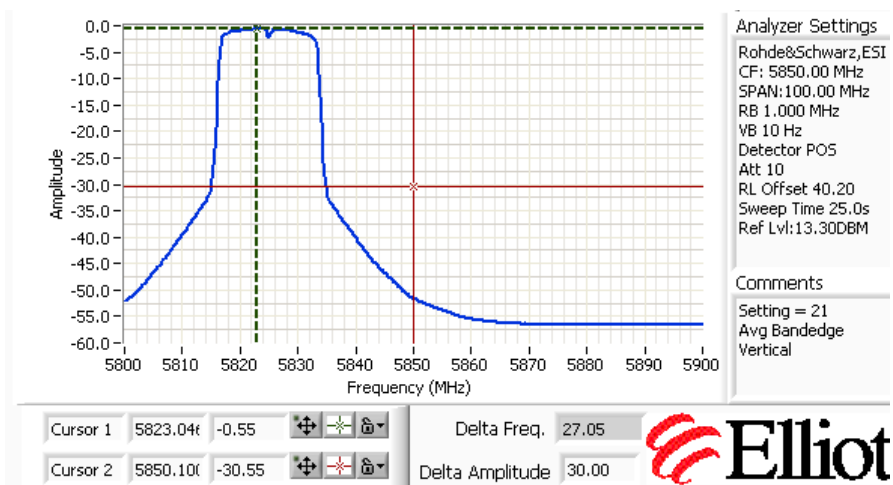
The RBW = 1 MHz and VBW = 10Hz. The trace was allowed to stabilize then a Peak-search and a marker delta to the band edge was performed to determine that the carrier power at the band edge was at least 20 dB below the peak of the modulated fundamental level.

Results:

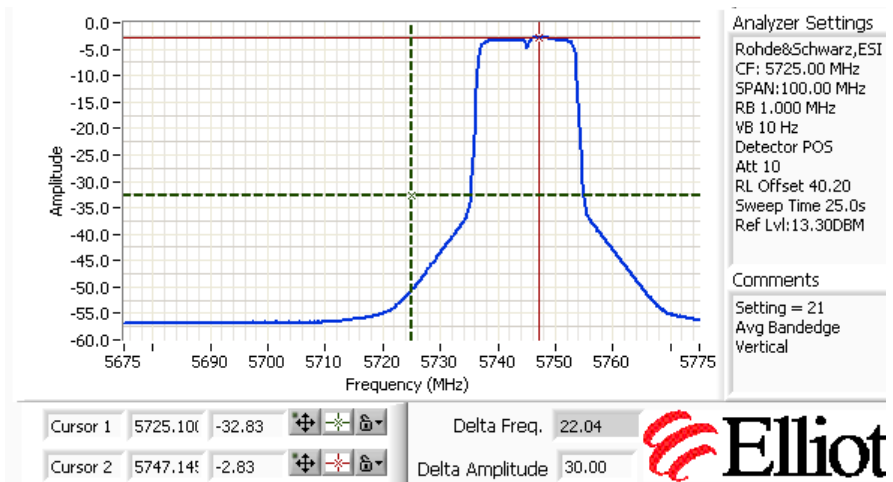
Level at 5.725 GHz: -32.83dBc Spec -20 dBc

Level at 5.85 GHz: -30.55dBc Spec -20 dBc

5.85GHz Bandedge,
Power setting 21



5.725GHz Bandedge,
Power setting 21



Radiated Emissions In Restricted Bands

Out Of Band Radiated Emissions

Radiated Emissions at the Band Edges (2390 and 2483.5 MHz)

Specifications:

FCC Specification: Paragraph 15.247(c)

IC Specification: RSS-210 / 7 2.2(b)

Procedure:

This test was conducted inside a semi-anechoic chamber at Elliott Laboratories. The unit was placed on a rotating wooden table 80cm above the ground plane. A Horn antenna was secured to a mast 3 meters away. The unit was tested at each of the Low, Mid and High channels. The UUT was running in the diagnostic mode and set to transmit at maximum power on each of the channels. The test equipment was configured as shown below.

Out of band emissions starting at 1GHz were measured. A notch or a high pass filter prior to the pre-amplifier was required to prevent the large signal level of the fundamental frequency from overloading the front end preamplifier and creating harmonics within the analyzer.

The EUT was rotated 360 degrees and the height of the antenna adjusted from 1 to 4 meters above the ground plane to determine the maximum level of the emission. The level of the harmonic emission was measured in two modes, "Peak" and "Average".

The spectrum analyzer reading made by the test software and the appropriate correction factors (antenna factor, cable loss, pre-amplifier gain, HPF loss...) were then applied by Elliott Lab's Software to obtain a final corrected measurement.

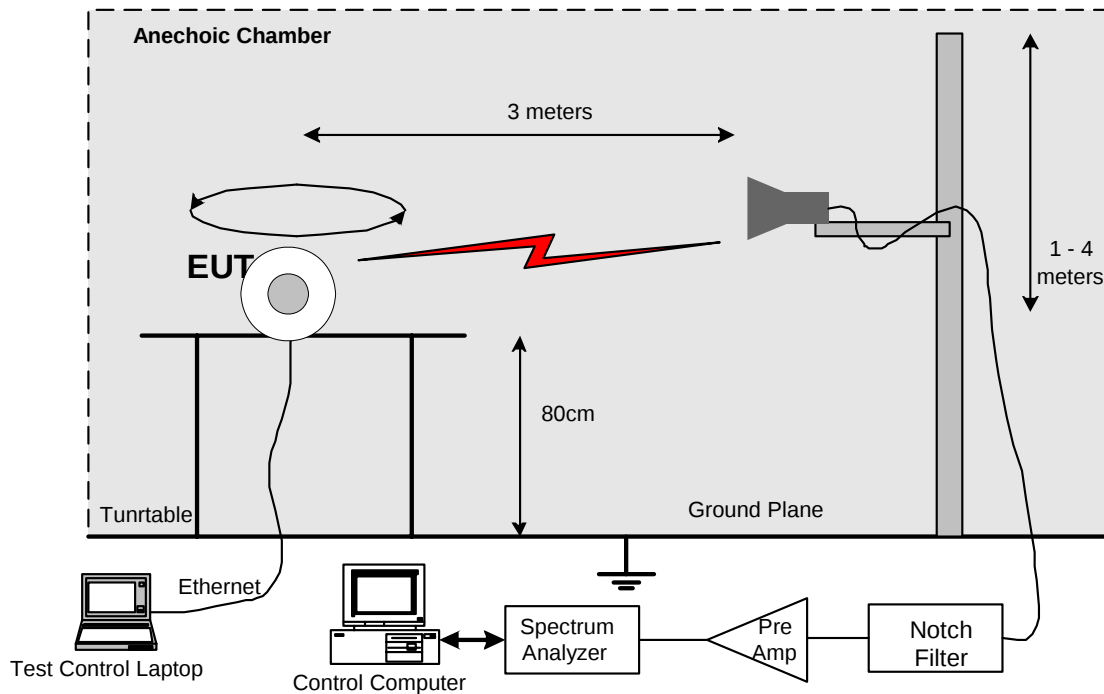
This procedure was performed for all of the channels outlined in the Test Methods section of this report.

The band up to 40 GHz was examined, however there were no spurious emissions noted above approximately 18 GHz. The table below indicates the harmonics that fall within restricted bands. In many cases an emission that did not actually fall within a restricted band had the more stringent restricted band limit applied for simplicity.

Harmonic									
Fund	2	3	4	5	6	7	8	9	10
2412	4824	7236	9648	12060	14472	16884	19296	21708	24120
2437	4874	7311	9748	12185	14622	17059	19496	21933	24370
2462	4924	7386	9848	12310	14772	17234	19696	22158	24620
5745	11490	17235	22980	28725	34470	40215	45960	51705	57450
5805	11610	17415	23220	29025	34830	40635	46440	52245	58050
5825	11650	17475	23300	29125	34950	40775	46600	52425	58250

15.205 Harmonic test tables

NOTE: **RED** indicates a harmonic that falls within a restricted band and is subject to 15.205. The harmonics in **Green** are NOT in restricted bands and are subject to 15.20. **Orange** is in a restricted band that does not require testing.



Radiated Emissions in Restricted Bands Test Setup

Support Equipment				
Description	Model number	FCC ID or SN	Manufacturer	Power Cable
Laptop	Satellite	DOC	Toshiba	Laptop PS
Ethernet Switch	2350	DoC	Nortel	48 VDC Adapter below
48VDC AC adapter	Generic		Generic	CAT 5 Ethernet cable

Test Conditions			
Temperature	24 C	Humidity:	63%
ATM pressure	1031 mBar	Grounding:	None
Tested By	Test Engineers of Elliott Labs (R Veralas, J Martinez)	Date of Test:	May 2007
Test Reference	FCC Part 15.205 IC RSS210 / 7		
Setup Method	ANSI C63.4 / 2003		
Tested Range	1 GHz to 25GHz (Data for 1 – 18GHz presented, No describable emissions above 18 GHz)		
Test Voltage	48 VDC		
Modifications	No modifications were made to the unit		

No Emissions were detected above 18 GHz

Restricted Band Peak Measurements: Resolution and Video BW: 1 MHz

Restricted Band Average Measurements: Resolution BW: 1MHz and Video BW: 10 Hz.

All other measurements, RBW = 1MHz and VBW = 3MHz.

Radiated Emissions in Restricted bands (2.4 GHz Band Edges) (Direct Measurement Method)

FCC Specification: Paragraph 15.247(c)

IC Specification: RSS-210 / 7 2.2(b)



There is a restricted band that begins immediately at the high end of the operating band and another that ends 10 MHz below the low end of the 2.4 GHz operating band.

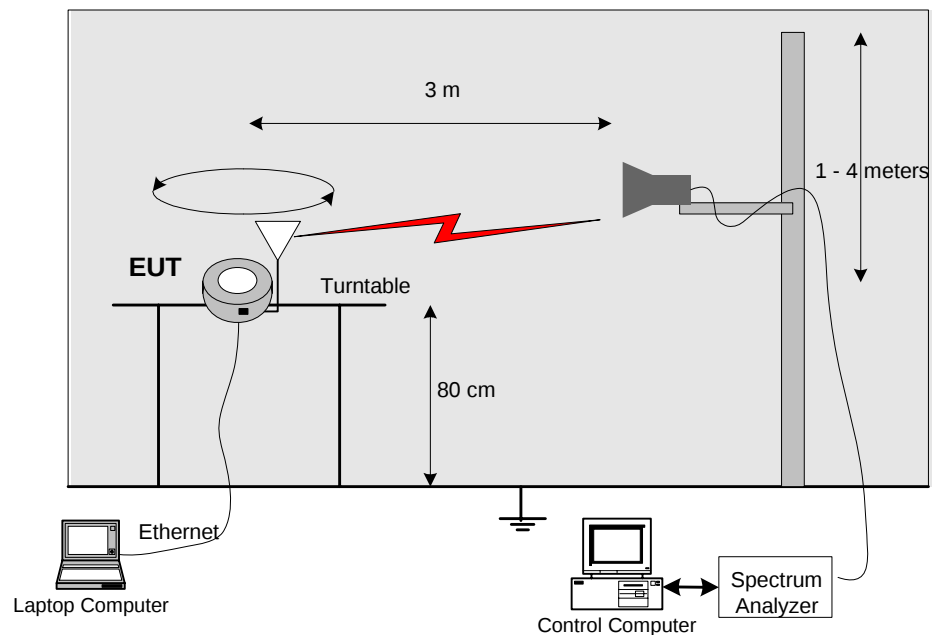
The PK and AVG radiated levels in these “band edge” restricted bands were measured directly.

PEAK: RBW=1 MHz, VBW = 1MHz

AVG: RBW=1 MHz, VBW = 10Hz

The highest level appearing in the restricted band was then measured.

The test equipment was configured as shown below.



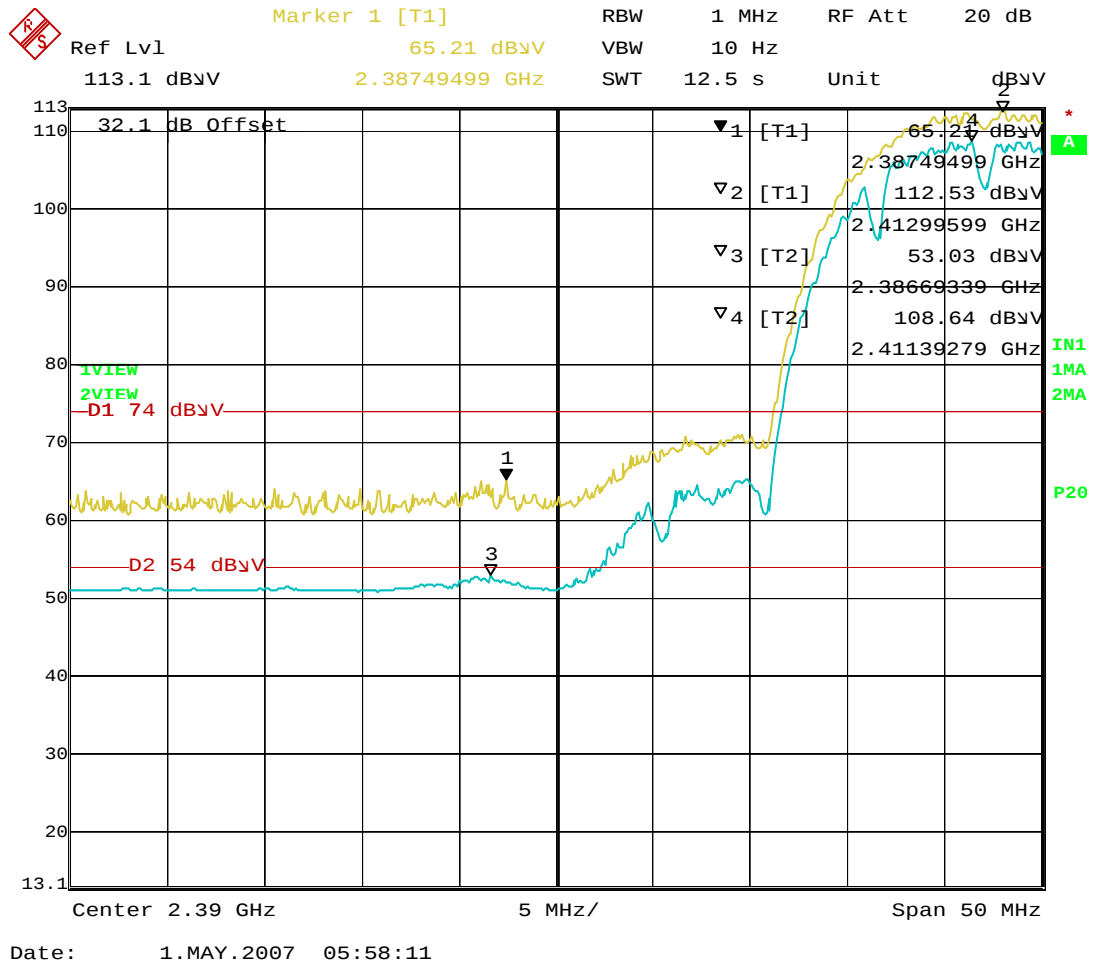
Results:

The tables and plots below presents a summary of the radiated emission in restricted bands for the low, middle and high channels for 802.11 B , 802.11 G and 802.11 A (ISM band) modes of operation. Data is presented for the highest gain antenna of each type that will be used with the access point. See antenna table at the beginning of this report for additional information.

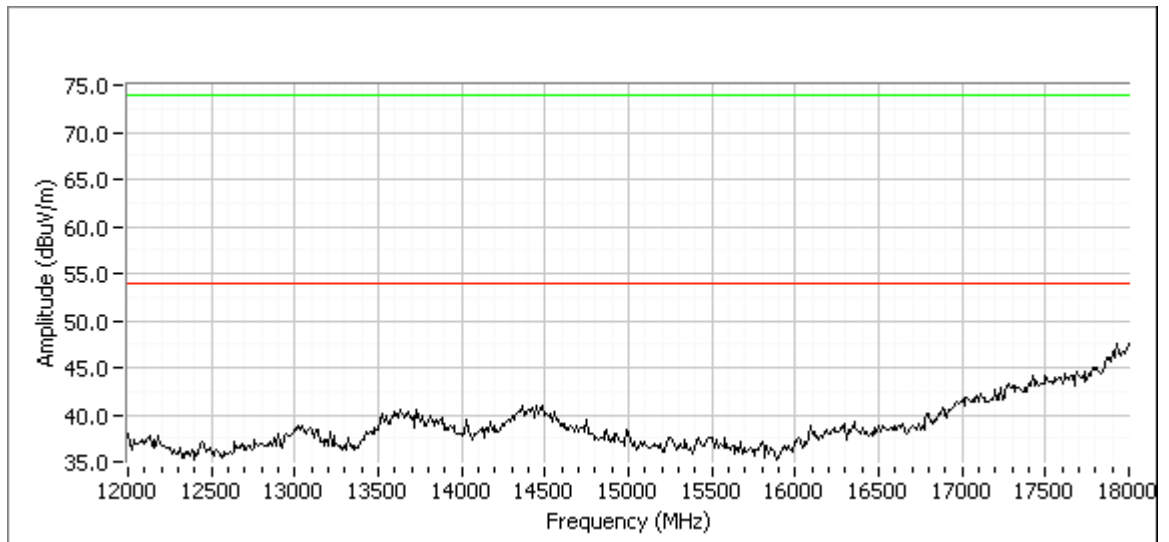
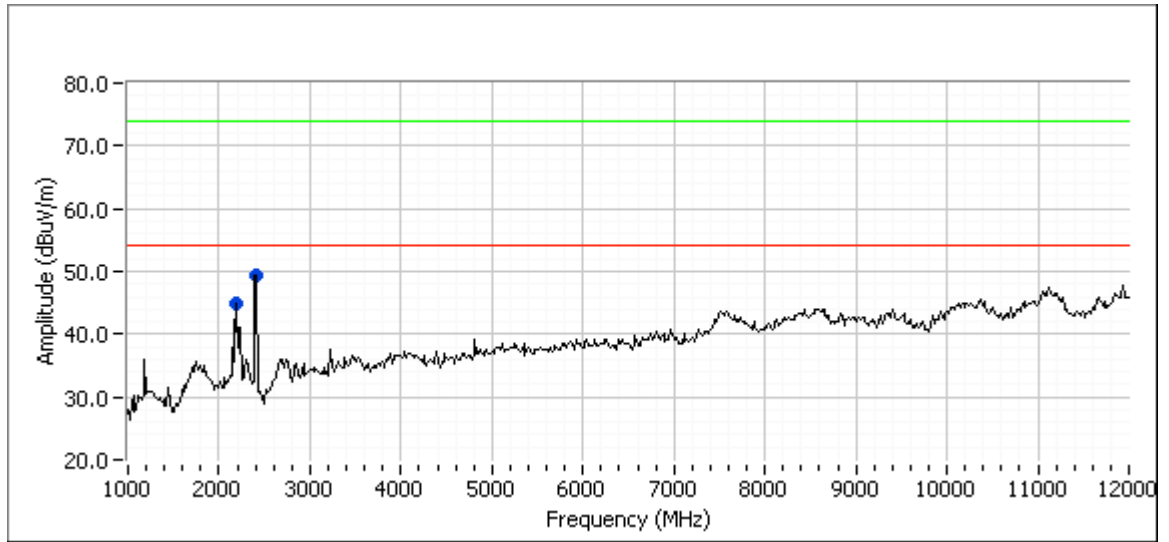
Band edge data is presented for the restricted bands just above and below the 2.4 GHz band. In no case were there describable emissions above 18GHz

802.11 B Yagi Antenna (PC2415)

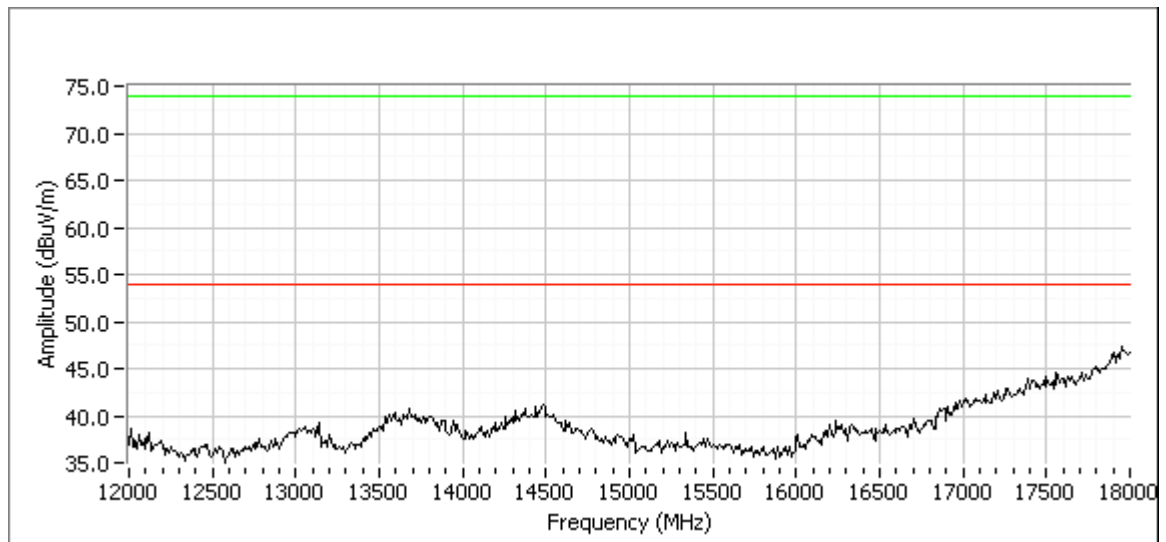
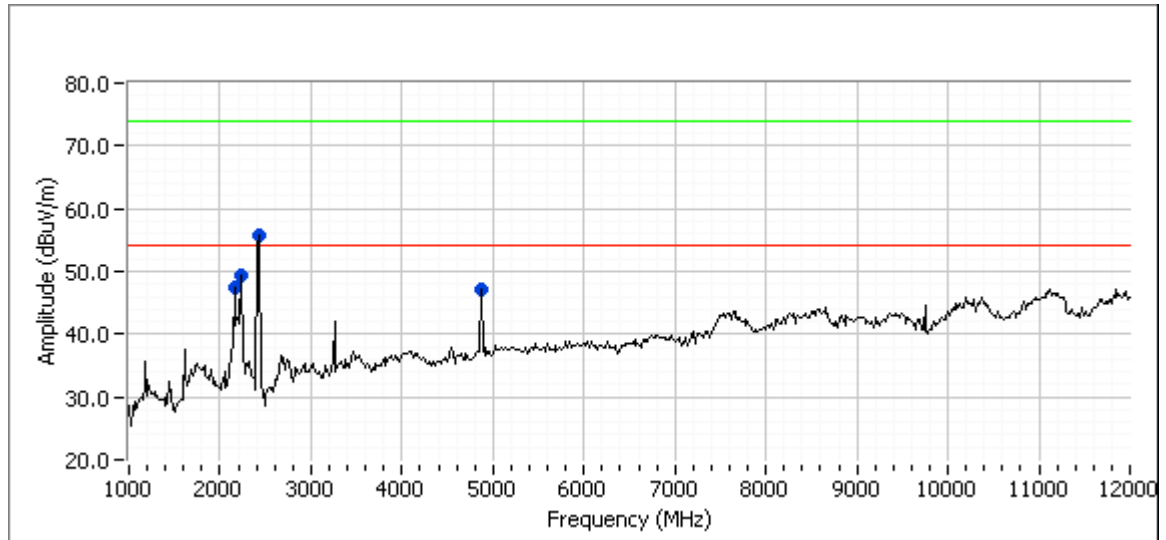
**Band Edge,
2412 MHz B Yagi,
(PC2415) Power
setting 14**



Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2390.000	65.2	v	74.0	-8.8	Pk	0	1.5	
2390.000	53.0	v	54.0	-1.0	Avg	0	1.5	
2390.000	53.7	h	74.0	-20.3	Pk	250	1.7	
2390.000	40.1	h	54.0	-13.9	Avg	250	1.7	

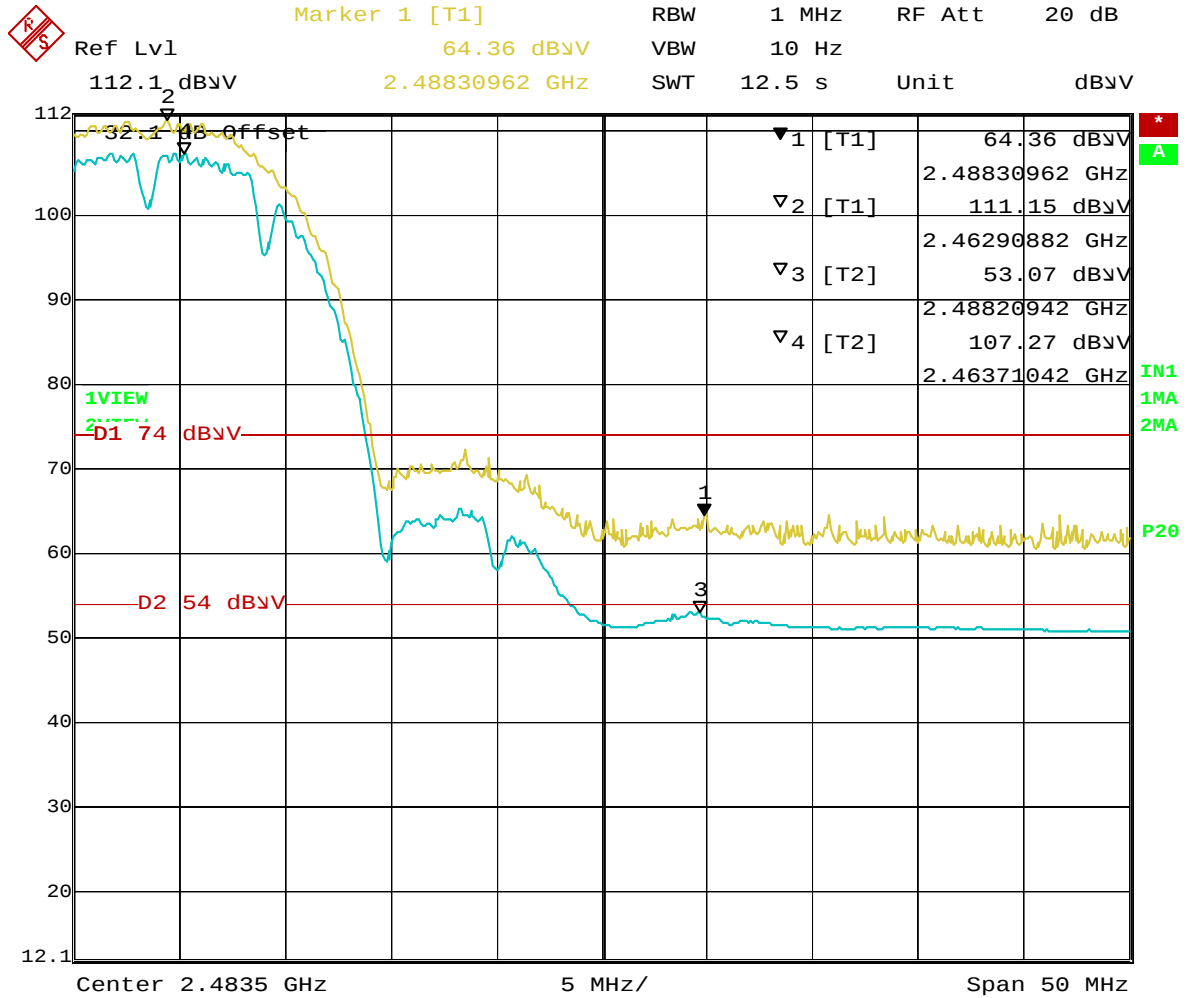
2412 MHz B Yagi, (PC2415) Power setting 14

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2210.710	42.8	V	54.0	-11.2	AVG	13	1.6	
2210.710	47.7	V	74.0	-26.3	PK	13	1.6	
2413.610	48.6	V	54.0	-5.4	AVG	357	1.6	
2413.610	52.7	V	74.0	-21.3	PK	357	1.6	

2437 MHz B Yagi, (PC2415) Power setting 21

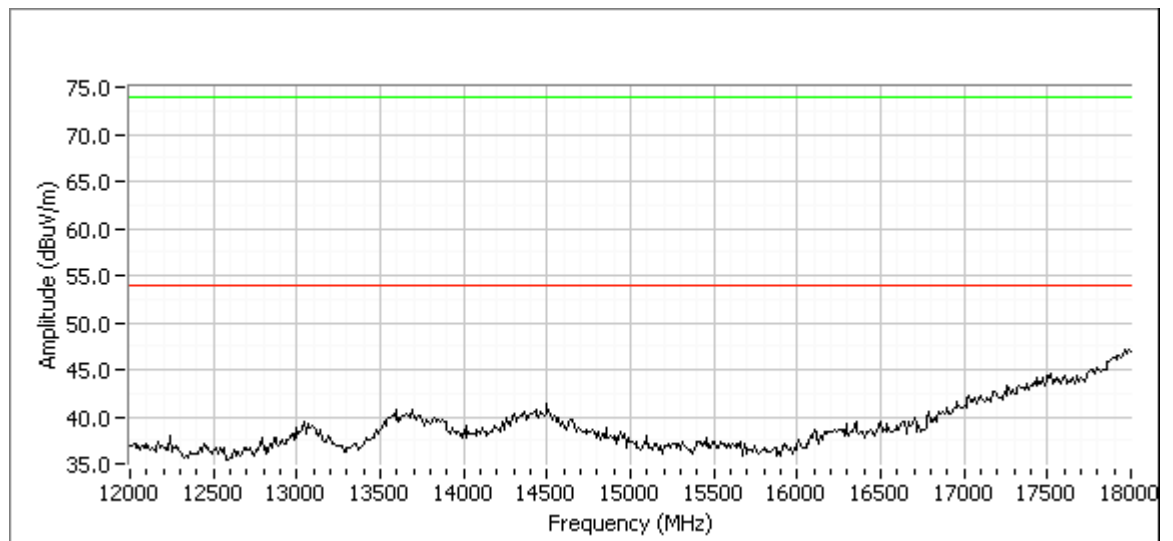
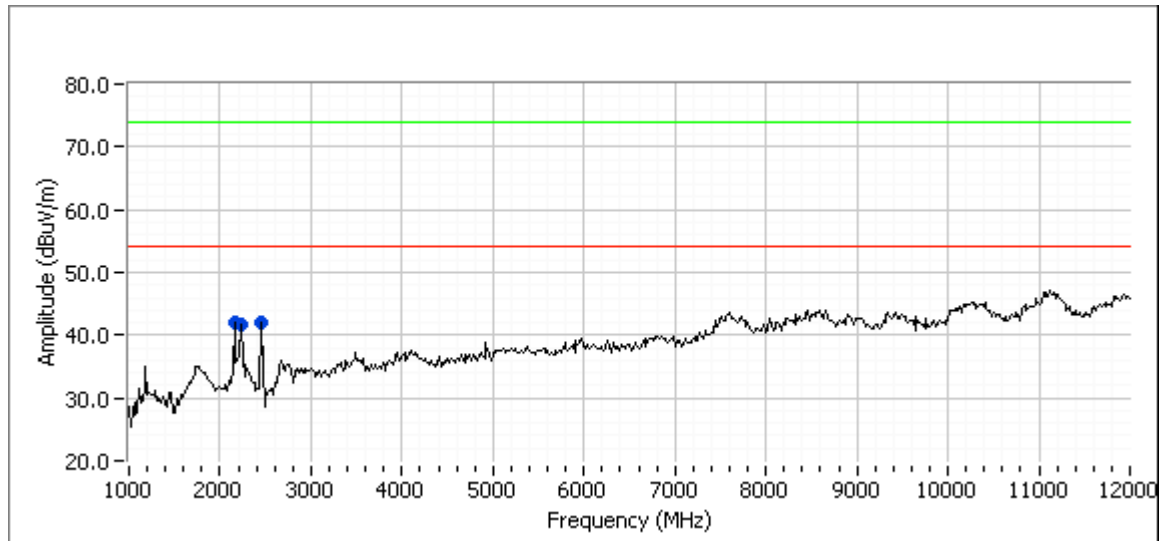
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2438.600	52.5	V	54.0	-1.5	AVG	357	1.9	
2438.600	56.0	V	74.0	-18.0	PK	357	1.9	
2233.470	46.4	V	54.0	-7.6	AVG	357	1.9	
2233.470	51.9	V	74.0	-22.1	PK	357	1.9	
2160.060	45.4	V	54.0	-8.6	AVG	346	1.9	
2160.060	49.9	V	74.0	-24.1	PK	346	1.9	
4873.960	45.9	V	54.0	-8.1	AVG	271	1.3	
4873.960	49.6	V	74.0	-24.4	PK	271	1.3	

Band Edge- 2462 MHz B Yagi, (PC2415) Power setting 12



Date: 1.MAY.2007 05:40:58

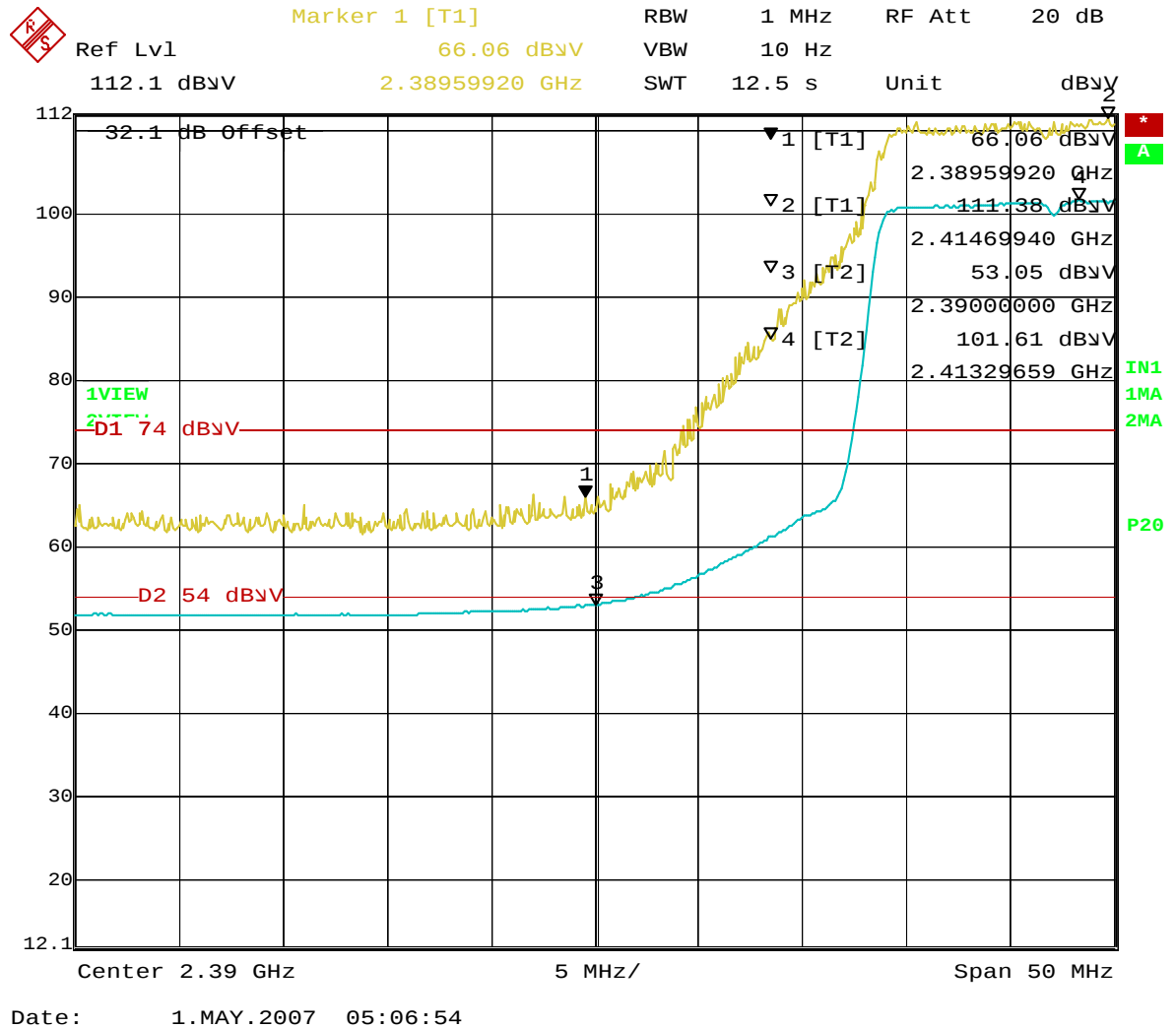
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2483.500	64.4	v	74.0	-9.6	Pk	0	1.5	
2483.500	53.1	v	54.0	-0.9	Avg	0	1.5	
2483.500	53.8	h	74.0	-20.2	Pk	220	1.3	
2483.500	40.2	h	54.0	-13.8	Avg	220	1.3	

2462 MHz B Yagi, (PC2415) Power setting 12

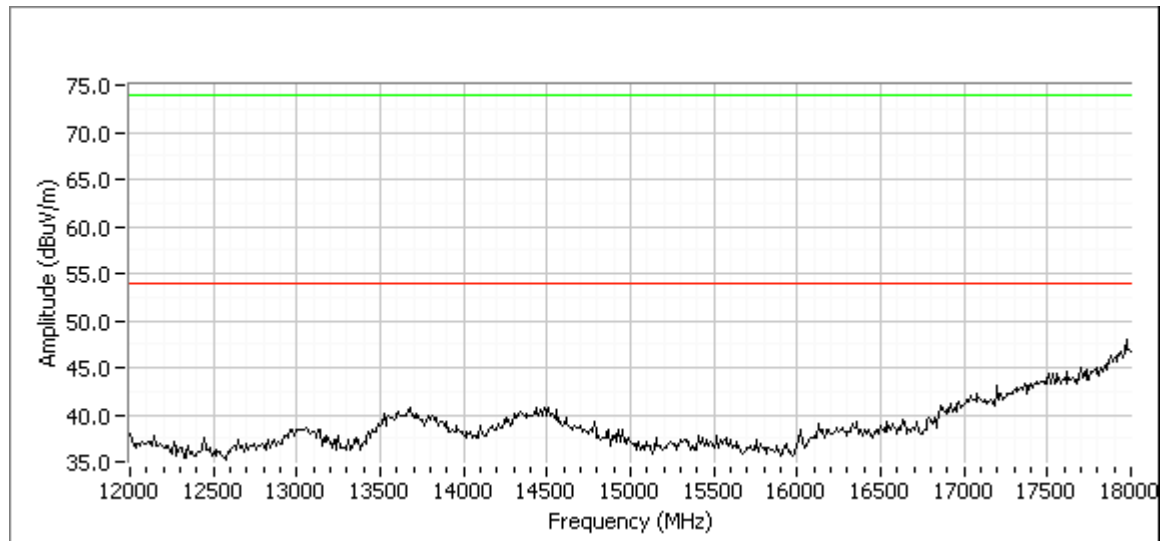
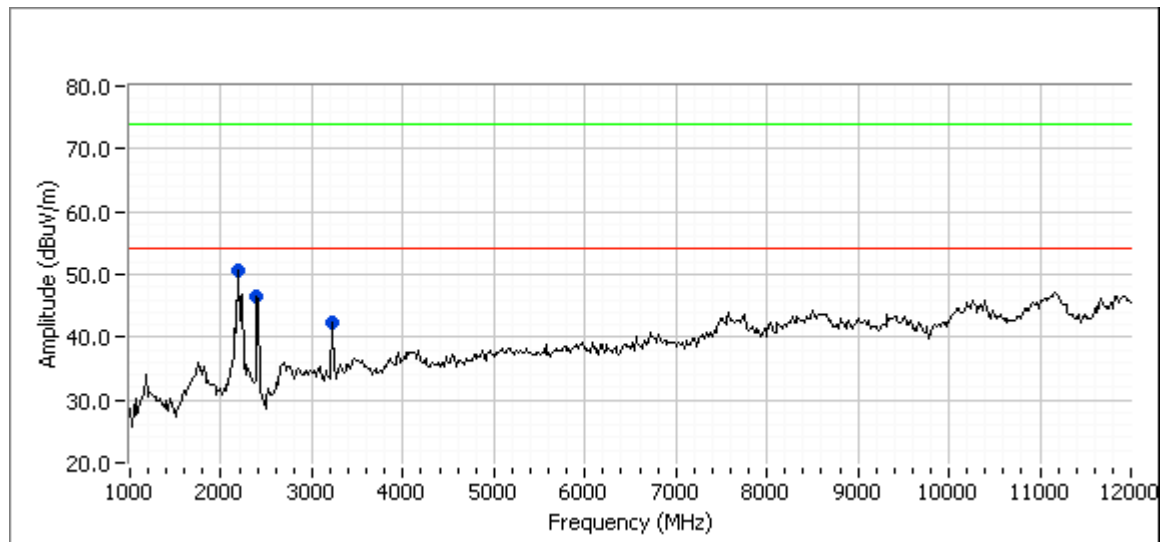
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2463.030	41.8	V	54.0	-12.2	AVG	360	1.6	
2463.030	46.0	V	74.0	-28.0	PK	360	1.6	
2239.960	40.2	V	54.0	-13.8	AVG	347	1.6	
2239.960	46.2	V	74.0	-27.8	PK	347	1.6	
2159.990	38.9	V	54.0	-15.1	AVG	339	1.9	
2159.990	44.6	V	74.0	-29.4	PK	339	1.9	

802.11 G Yagi Antenna (PC2415)

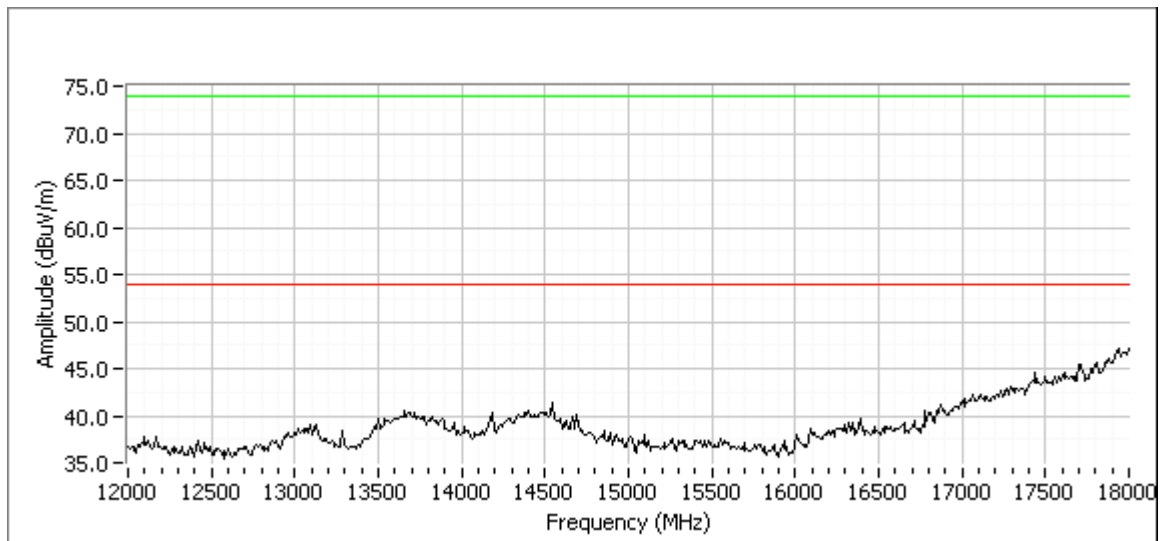
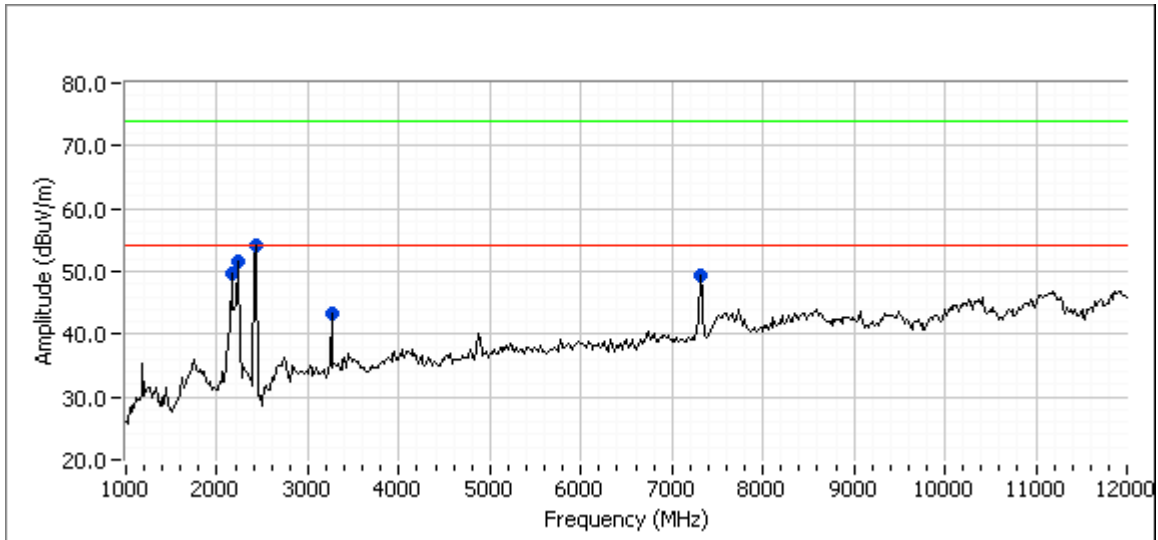
Band Edge-
2412 MHz G Yagi, (PC2415) Power setting 12.5



Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2390.000	66.1	v	74.0	-7.9	Pk	0	1.8	
2390.000	53.1	v	54.0	-0.9	Avg	0	1.8	
2390.000	53.3	h	74.0	-20.7	Pk	250	1.1	
2390.000	40.2	h	54.0	-13.8	Avg	250	1.1	

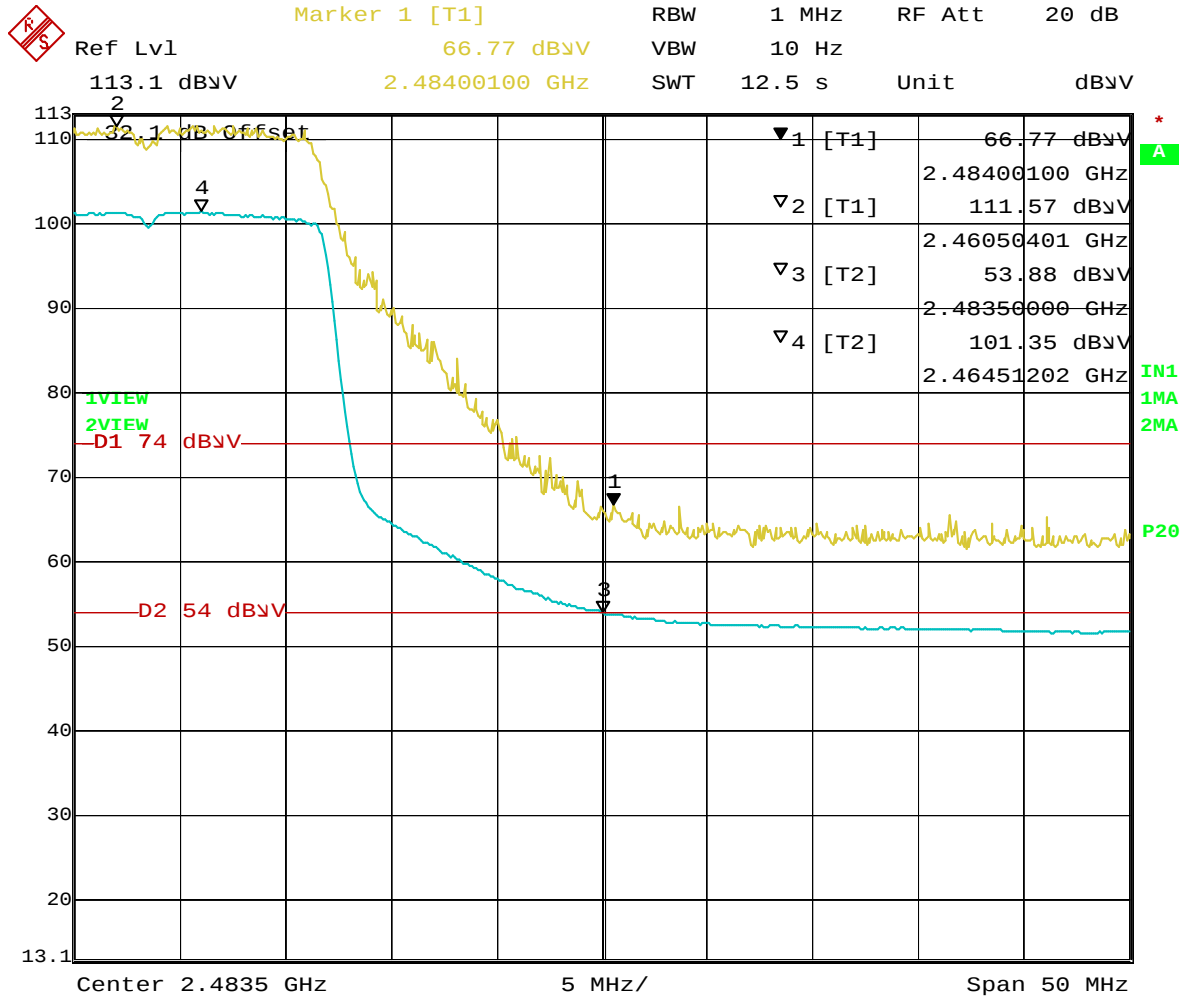
2412 MHz G Yagi, (PC2415) Power setting 12.5

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
3216.010	38.9	V	54.0	-15.1	AVG	80	1.3	
3216.010	44.1	V	74.0	-29.9	PK	80	1.3	
2412.990	42.4	V	54.0	-11.6	AVG	360	1.9	
2412.990	50.9	V	74.0	-23.1	PK	360	1.9	
2210.710	48.6	V	54.0	-5.4	AVG	360	1.9	
2210.710	52.8	V	74.0	-21.2	PK	360	1.9	

2437 MHz G Yagi, (PC2415) Power setting 21

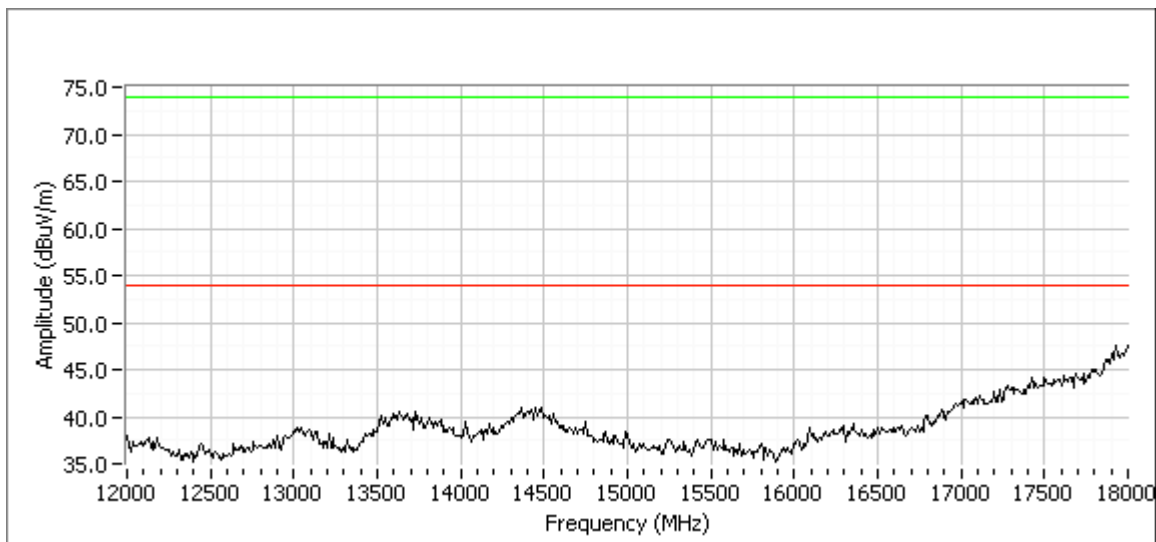
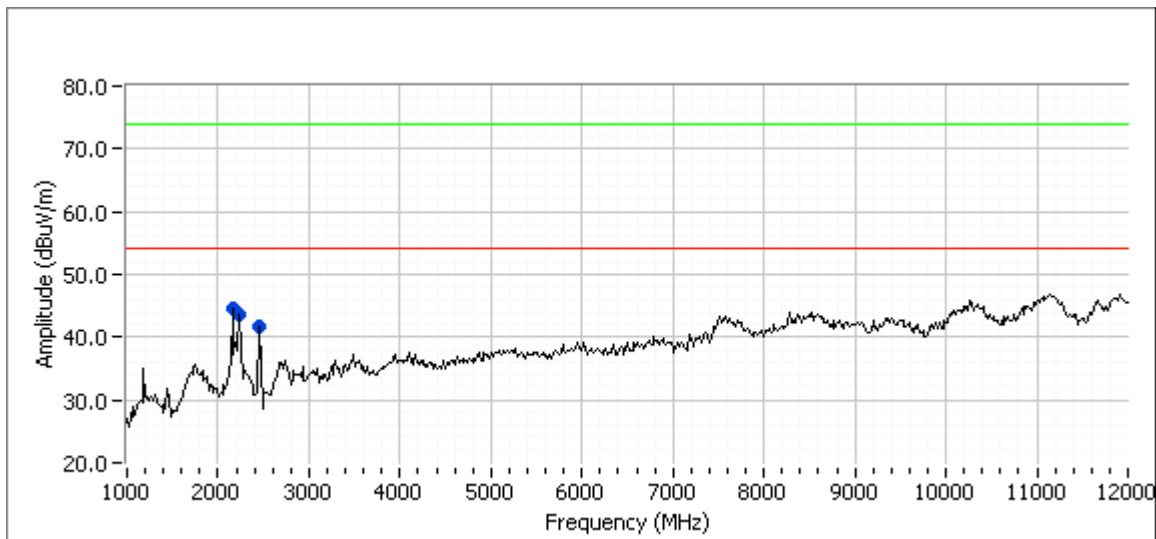
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2160.040	47.3	V	54.0	-6.7	AVG	360	1.6	
2160.040	52.3	V	74.0	-21.7	PK	360	1.6	
2233.350	47.2	V	54.0	-6.8	AVG	360	1.9	
2233.350	53.2	V	74.0	-20.8	PK	360	1.9	
2442.330	52.5	V	54.0	-1.5	AVG	354	1.6	
2442.330	62.3	V	74.0	-11.7	PK	354	1.6	
3249.310	41.5	V	54.0	-12.5	AVG	112	1.6	
3249.310	45.7	V	74.0	-28.3	PK	112	1.6	
7313.360	35.5	H	54.0	-18.5	AVG	60	1.3	
7313.360	56.0	H	74.0	-18.0	PK	60	1.3	

Band Edge- 2462 MHz G Yagi, (PC2415) Power setting 10



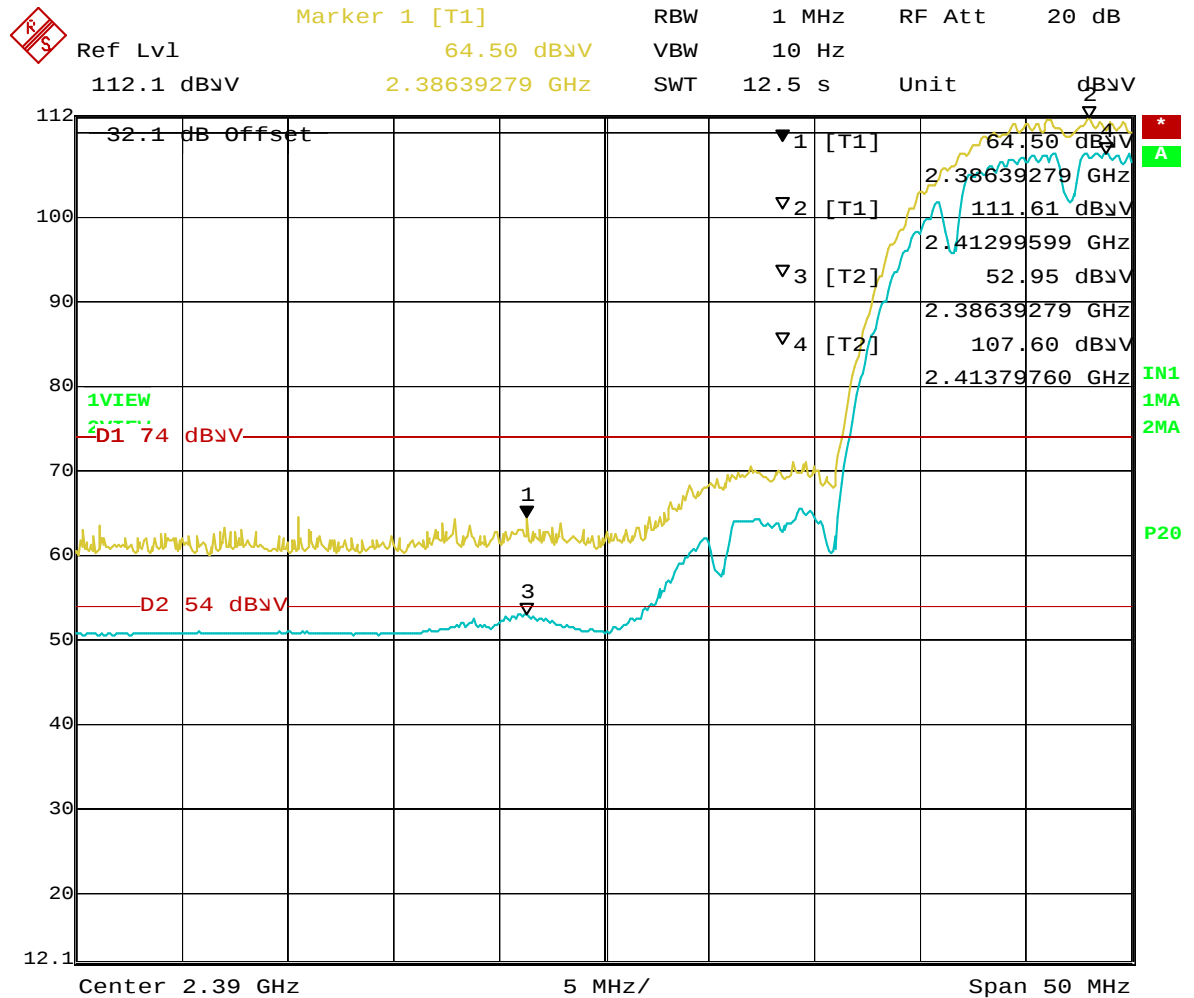
Date: 1.MAY.2007 05:26:42

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2483.500	66.8	v	74.0	-7.2	Pk	0	1.5	
2483.500	53.9	v	54.0	-0.1	Avg	0	1.5	
2483.500	53.2	h	74.0	-20.8	Pk	215	1.4	
2483.500	40.2	h	54.0	-13.9	Avg	215	1.4	

2462 MHz G Yagi, (PC2415) Power setting 10

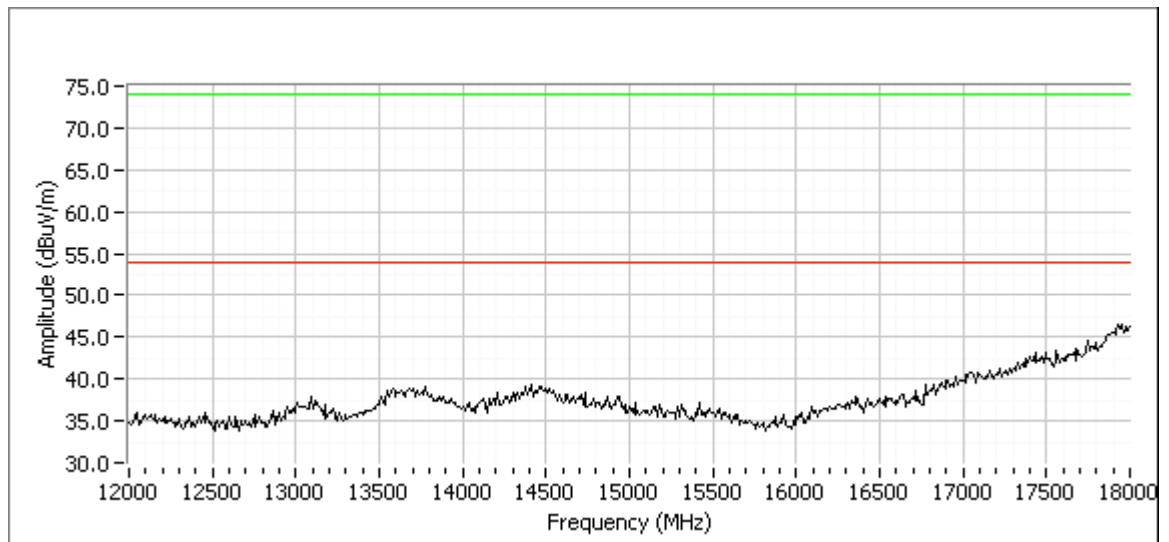
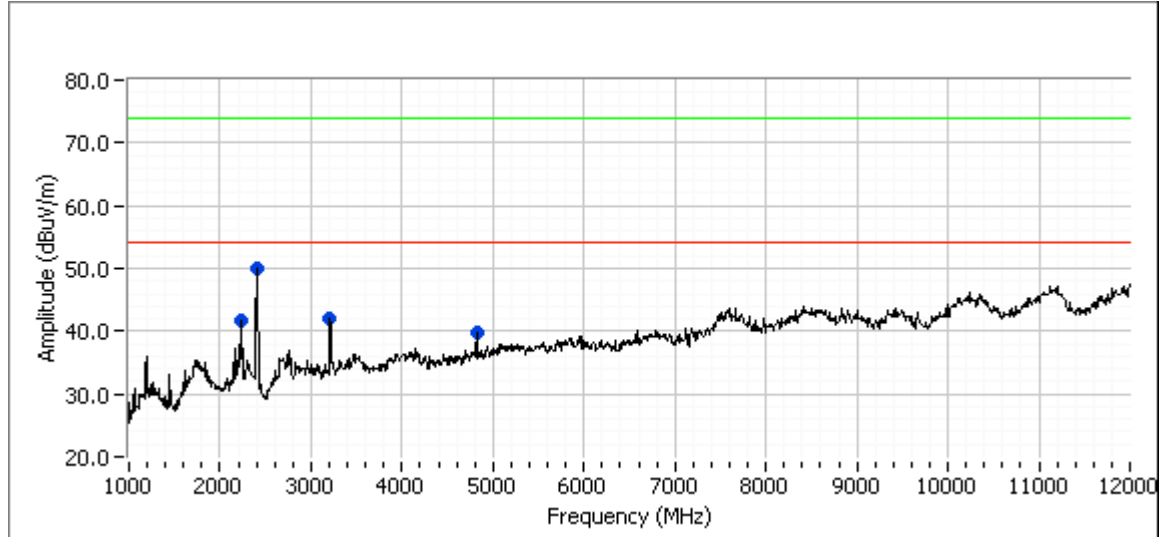
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2467.700	34.7	V	54.0	-19.3	AVG	0	2.0	
2467.700	44.2	V	74.0	-29.8	PK	0	2.0	
2240.020	42.2	V	54.0	-11.8	AVG	0	2.0	
2240.020	47.8	V	74.0	-26.2	PK	0	2.0	
2159.960	44.3	V	54.0	-9.7	AVG	347	1.5	
2159.960	49.0	V	74.0	-25.0	PK	347	1.5	

802.11 B Panel Antenna (S241290)

Band Edge-
2412 MHz B Panel, (S241290)) Power setting 15

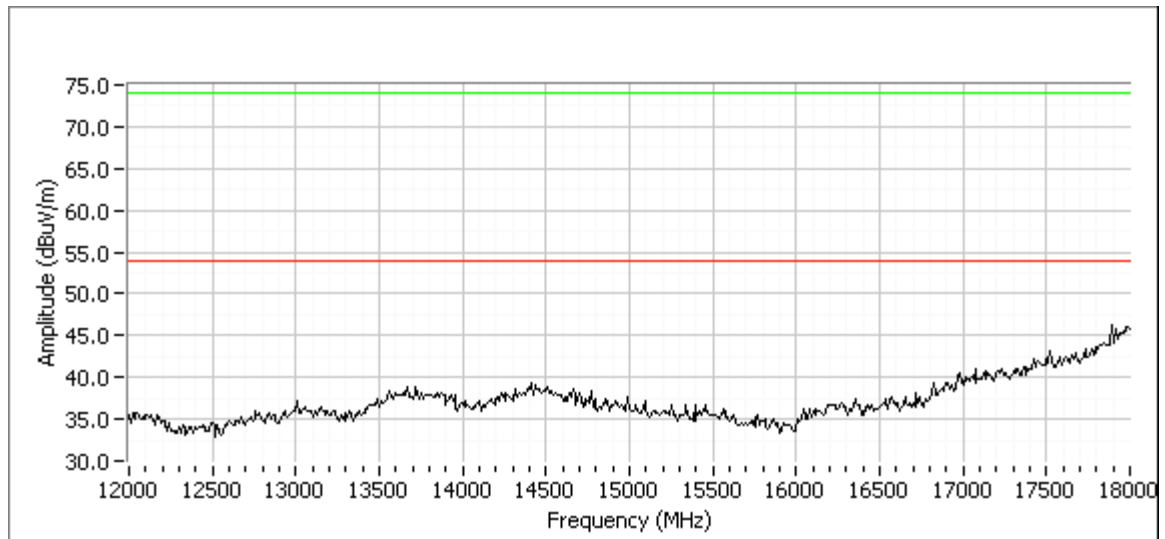
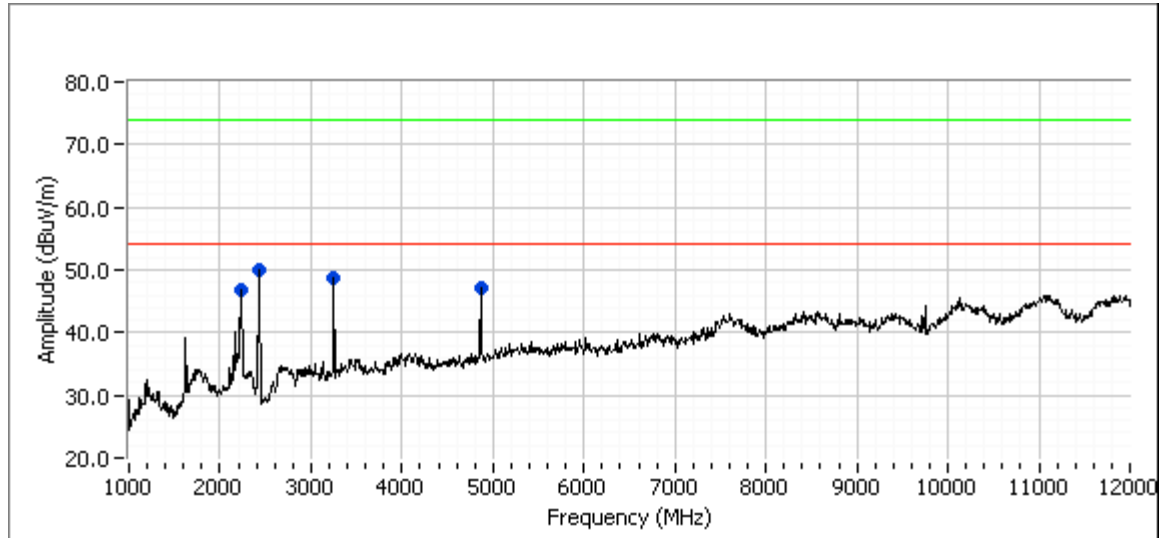
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Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2390.000	64.5	v	74.0	-9.5	Pk	355	1.0	
2390.000	53.0	v	54.0	-1.0	Avg	355	1.0	
2390.000	53.2	h	74.0	-20.9	Pk	45	1.9	
2390.000	41.1	h	54.0	-12.9	Avg	45	1.9	

2412 MHz B Panel, (S241290)) Power setting 15

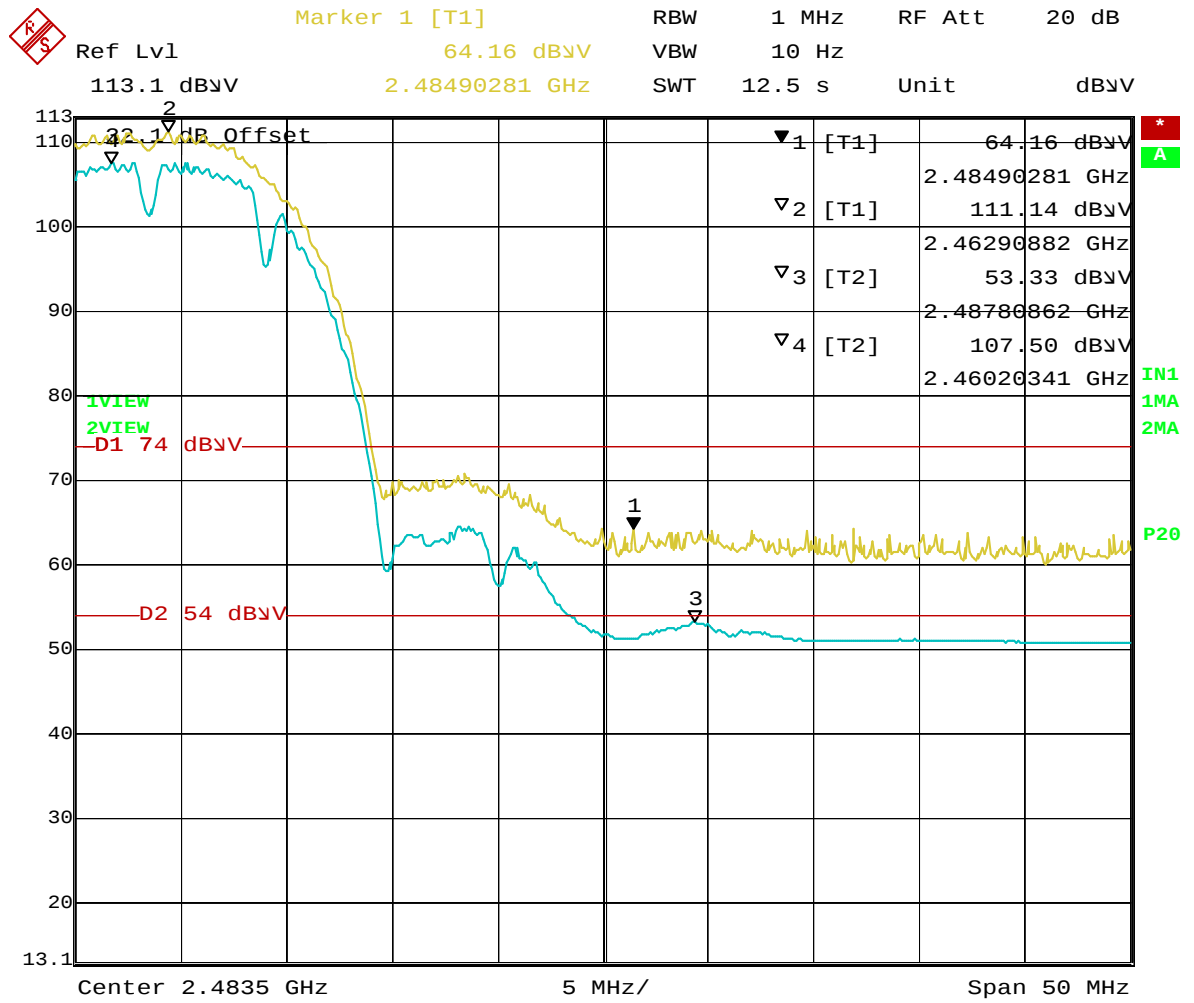
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2409.460	49.6	V	54.0	-4.4	AVG	0	1.0	Note 2
2409.460	52.9	V	74.0	-21.1	PK	0	1.0	Note 2
4825.200	30.4	V	54.0	-23.6	AVG	0	1.6	
4825.200	42.3	V	74.0	-31.7	PK	0	1.6	
3216.070	40.7	H	54.0	-13.3	AVG	37	1.0	Note 2
3216.070	45.0	H	74.0	-29.0	PK	37	1.0	Note 2
2240.070	39.8	V	54.0	-14.2	AVG	353	1.6	
2240.070	46.3	V	74.0	-27.7	PK	353	1.6	

NOTE 2: Signal is not in a restricted band but the more stringent restricted band limit was used.

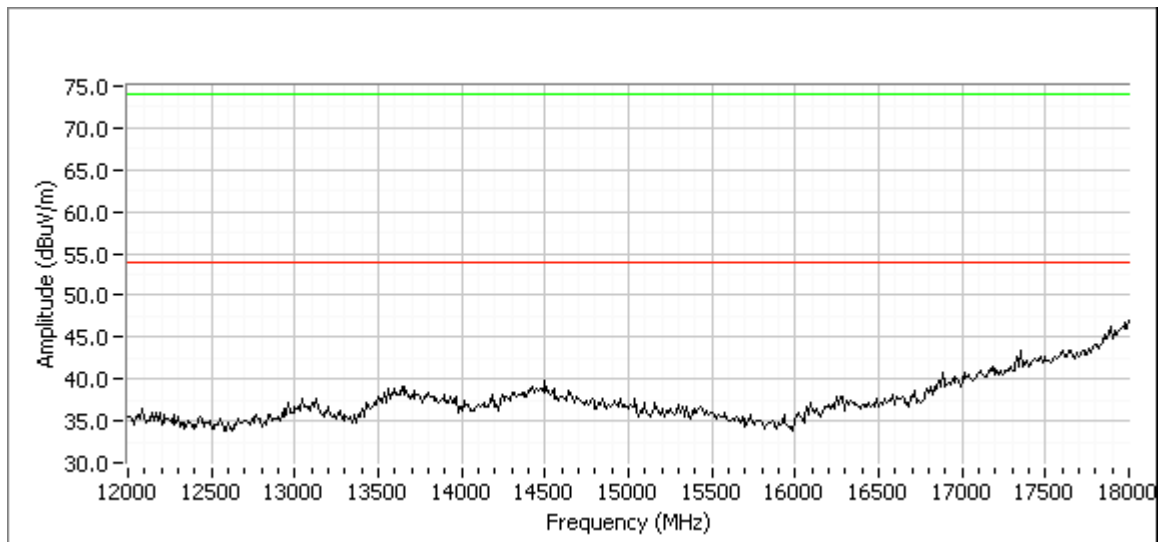
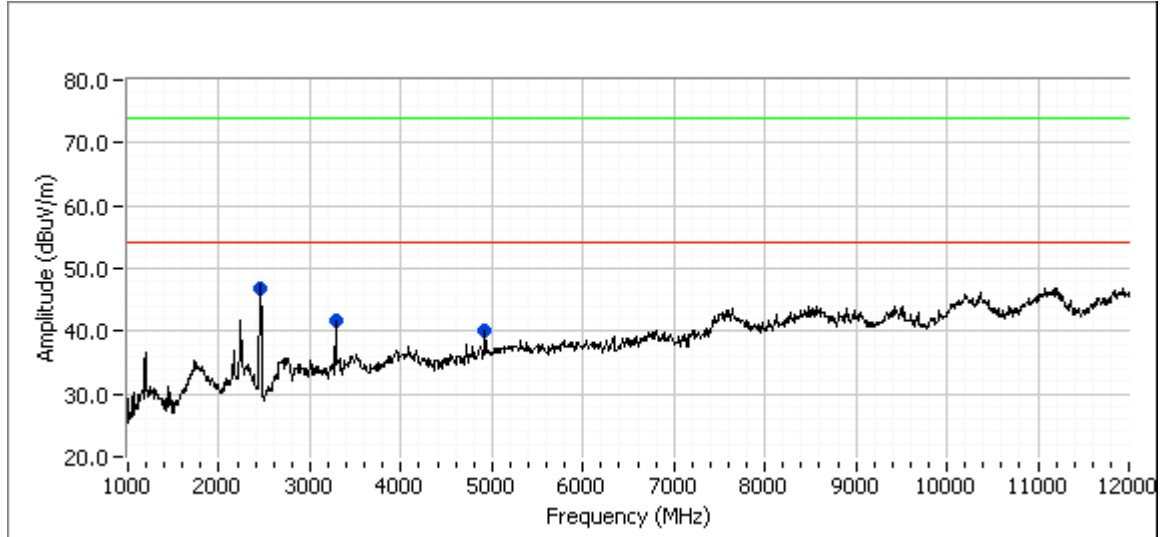
2437 MHz B Panel, (S241290)) Power setting 20

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2233.350	44.3	V	54.0	-9.7	AVG	6	1.6	
2233.350	50.9	V	74.0	-23.1	PK	6	1.6	
3249.260	49.2	H	54.0	-4.8	AVG	39	1.3	Note 2
3249.260	50.9	H	74.0	-23.1	PK	39	1.3	Note 2
4874.010	44.7	H	54.0	-9.3	AVG	88	1.3	
4874.010	48.6	H	74.0	-25.4	PK	88	1.3	
2434.580	44.3	V	54.0	-9.7	AVG	360	1.3	Note 2
2434.580	48.4	V	74.0	-25.6	PK	360	1.3	Note 2

NOTE 2: Signal is not in a restricted band but the more stringent restricted band limit was used.

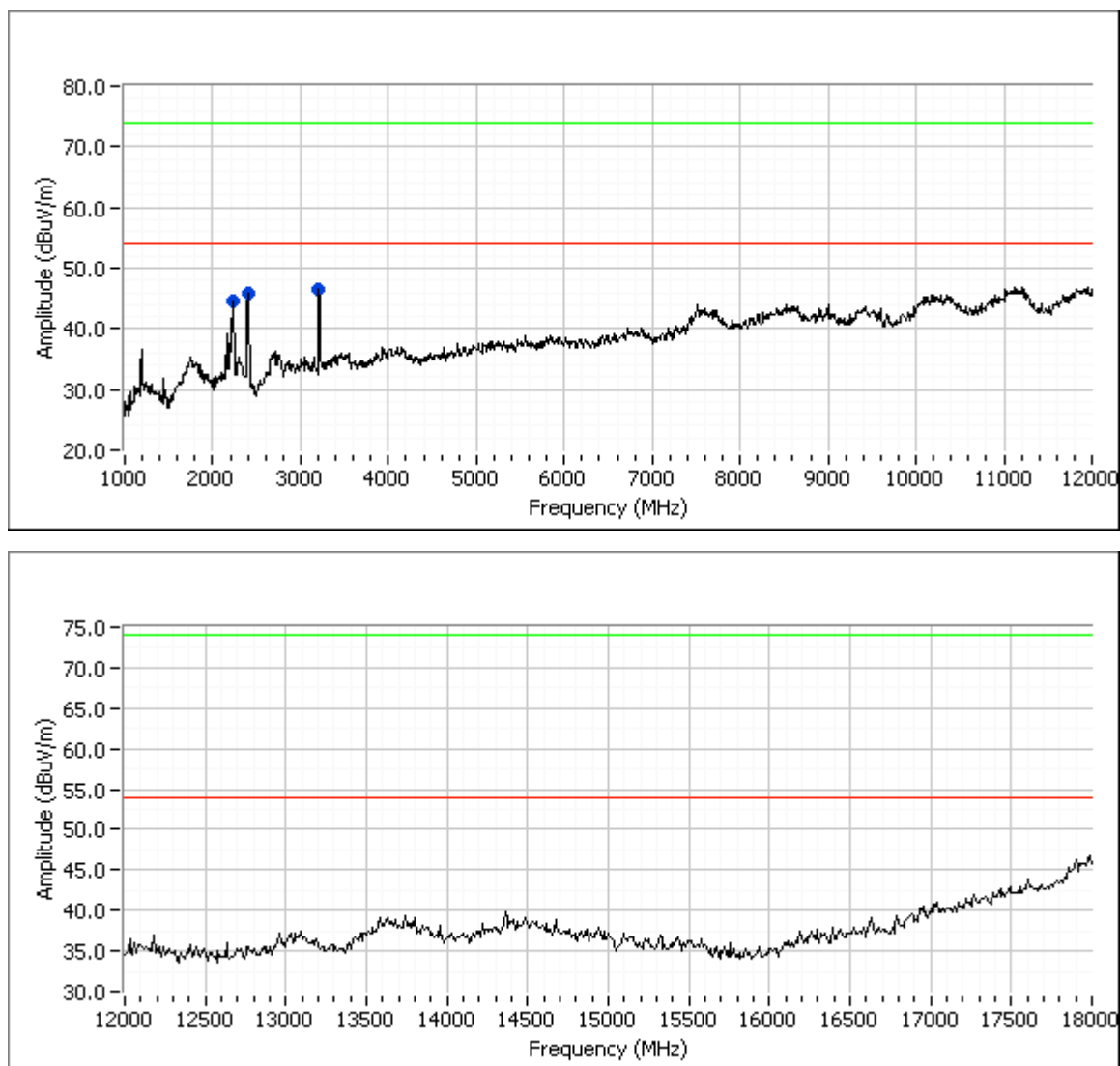
Bandedge**2462 MHz B Panel, (S241290)) Power setting 20**

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2483.500	64.2	v	74.0	-9.8	Pk	355	1.0	
2483.500	53.3	v	54.0	-0.7	Avg	355	1.0	
2483.500	53.6	h	74.0	-20.4	Pk	30	1.8	
2483.500	40.4	h	54.0	-13.6	Avg	30	1.8	

2462 MHz B Panel, (S241290)) Power setting 20

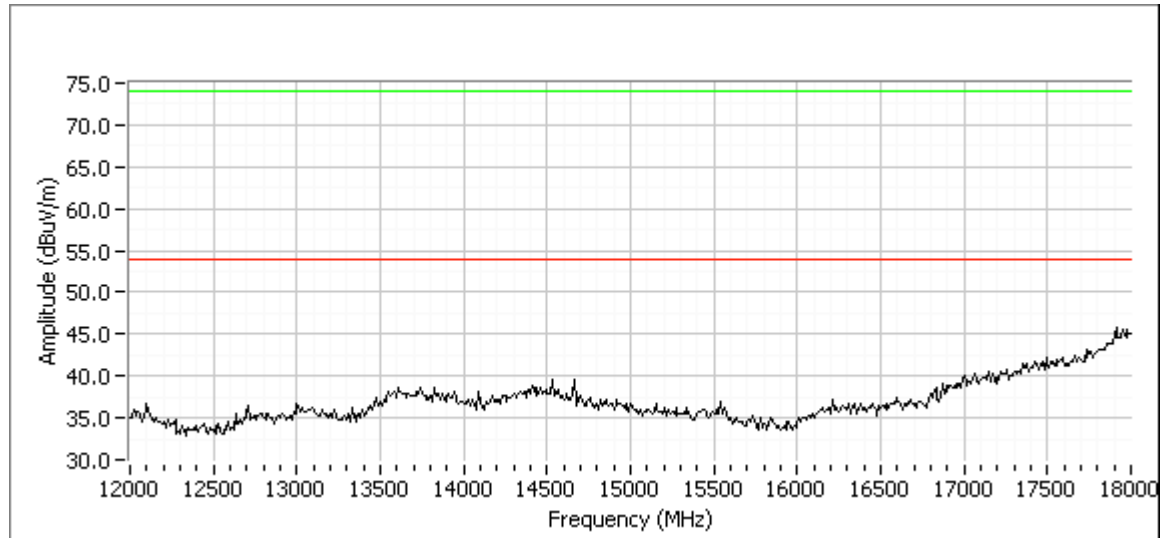
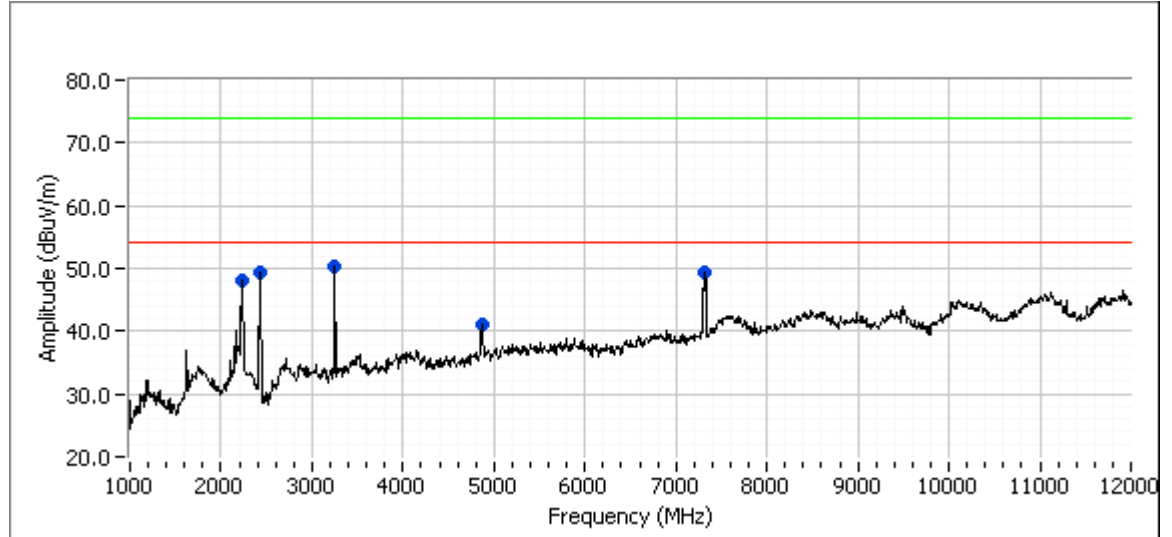
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2461.050	46.2	V	54.0	-7.8	AVG	347	1.3	Note 2
2461.050	50.5	V	74.0	-23.5	PK	347	1.3	Note 2
3282.560	40.3	V	54.0	-13.7	AVG	338	1.9	Note 2
3282.560	44.8	V	74.0	-29.2	PK	338	1.9	Note 2
4924.030	40.3	V	54.0	-13.7	AVG	260	1.3	
4924.030	46.2	V	74.0	-27.8	PK	260	1.3	

NOTE 2: Signal is not in a restricted band but the more stringent restricted band limit was used.

2412 MHz G Panel, (S241290)) Power setting 12

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2239.890	42.8	V	54.0	-11.2	AVG	8	1.6	
2239.890	49.0	V	74.0	-25.0	PK	8	1.6	
2415.030	44.1	V	54.0	-9.9	AVG	349	1.0	Note 2
2415.030	53.6	V	74.0	-20.4	PK	349	1.0	Note 2
3216.070	45.7	H	54.0	-8.3	AVG	38	1.6	Note 2
3216.070	48.1	H	74.0	-25.9	PK	38	1.6	Note 2

NOTE 2: Signal is not in a restricted band but the more stringent restricted band limit was used.

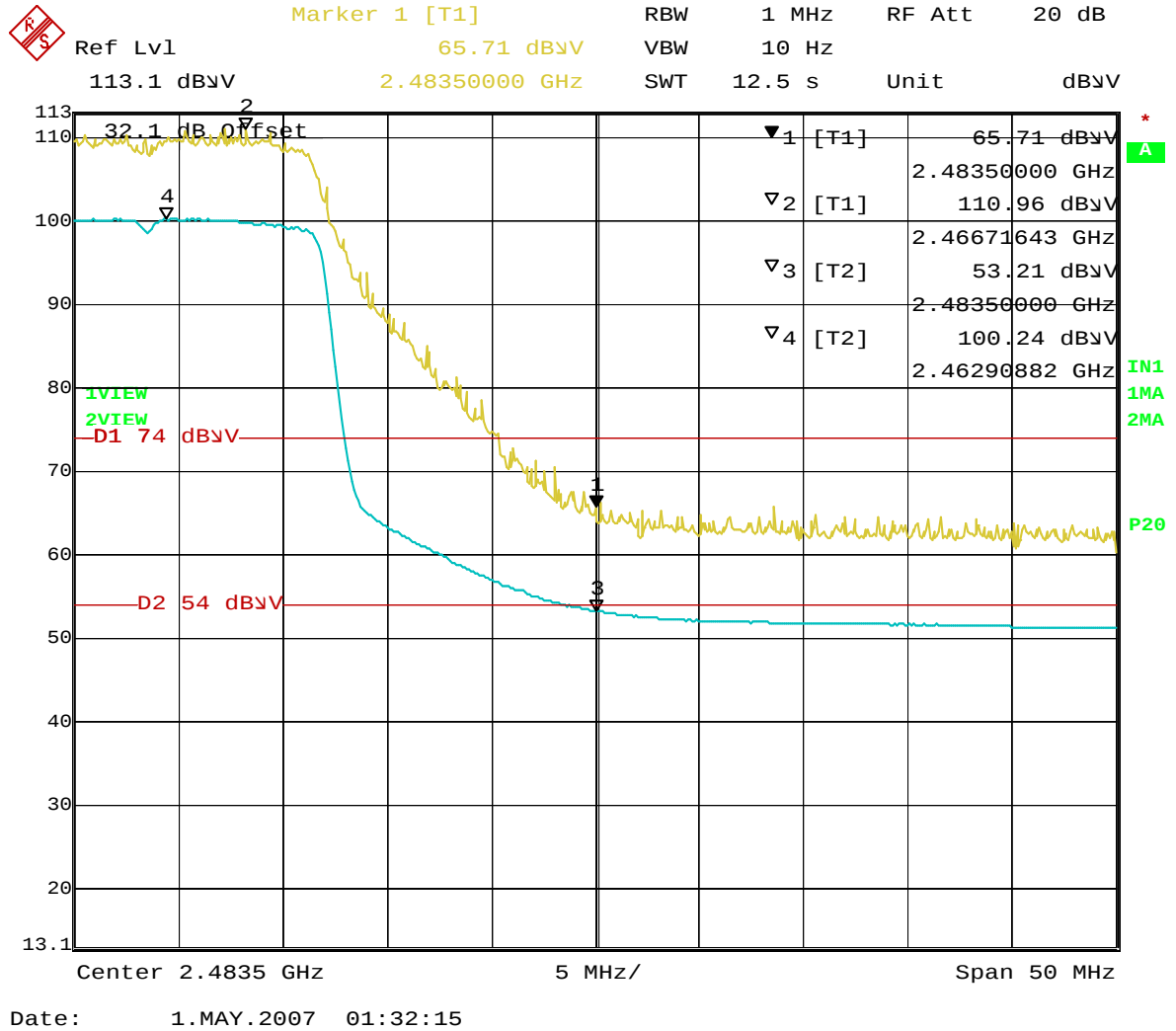
2437 MHz G Panel, (S241290)) Power setting 20

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2429.390	46.7	V	54.0	-7.3	AVG	14	1.0	Note 2
2429.390	54.9	V	74.0	-19.1	PK	14	1.0	Note 2
2233.290	46.3	V	54.0	-7.7	AVG	9	1.6	
2233.290	52.5	V	74.0	-21.5	PK	9	1.6	
3249.320	50.0	H	54.0	-4.0	AVG	41	1.3	Note 2
3249.320	51.6	H	74.0	-22.4	PK	41	1.3	Note 2
4869.010	35.4	H	54.0	-18.6	AVG	89	1.3	
4869.010	48.1	H	74.0	-25.9	PK	89	1.3	
7314.930	36.4	H	54.0	-17.6	AVG	108	1.3	
7314.930	59.9	H	74.0	-14.1	PK	108	1.3	

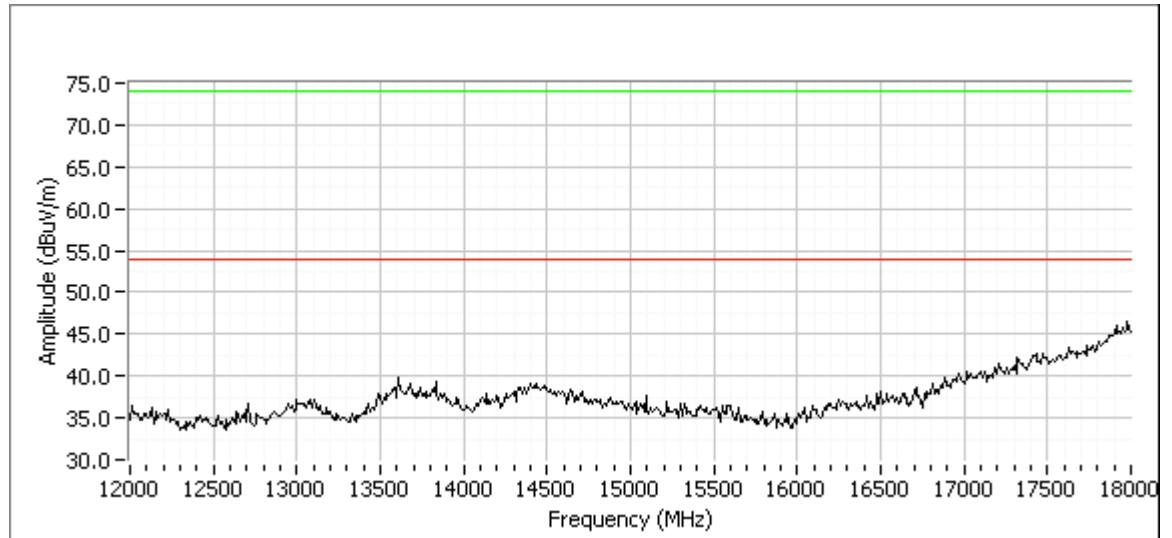
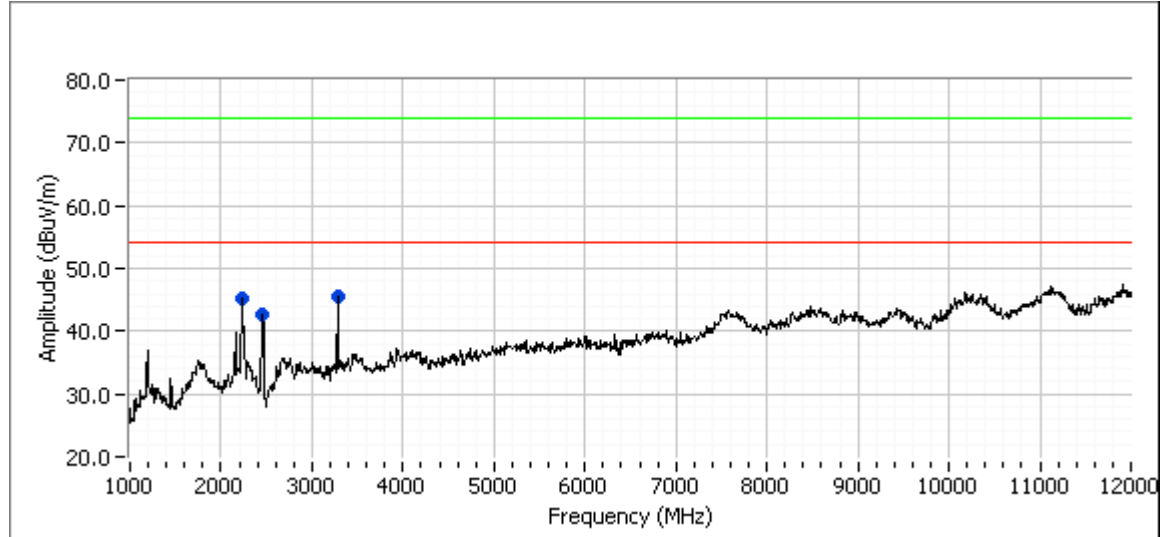
NOTE 2: Signal is not in a restricted band but the more stringent restricted band limit was used

Bandedge

2462 MHz G Panel, (S241290)) Power setting 10.5



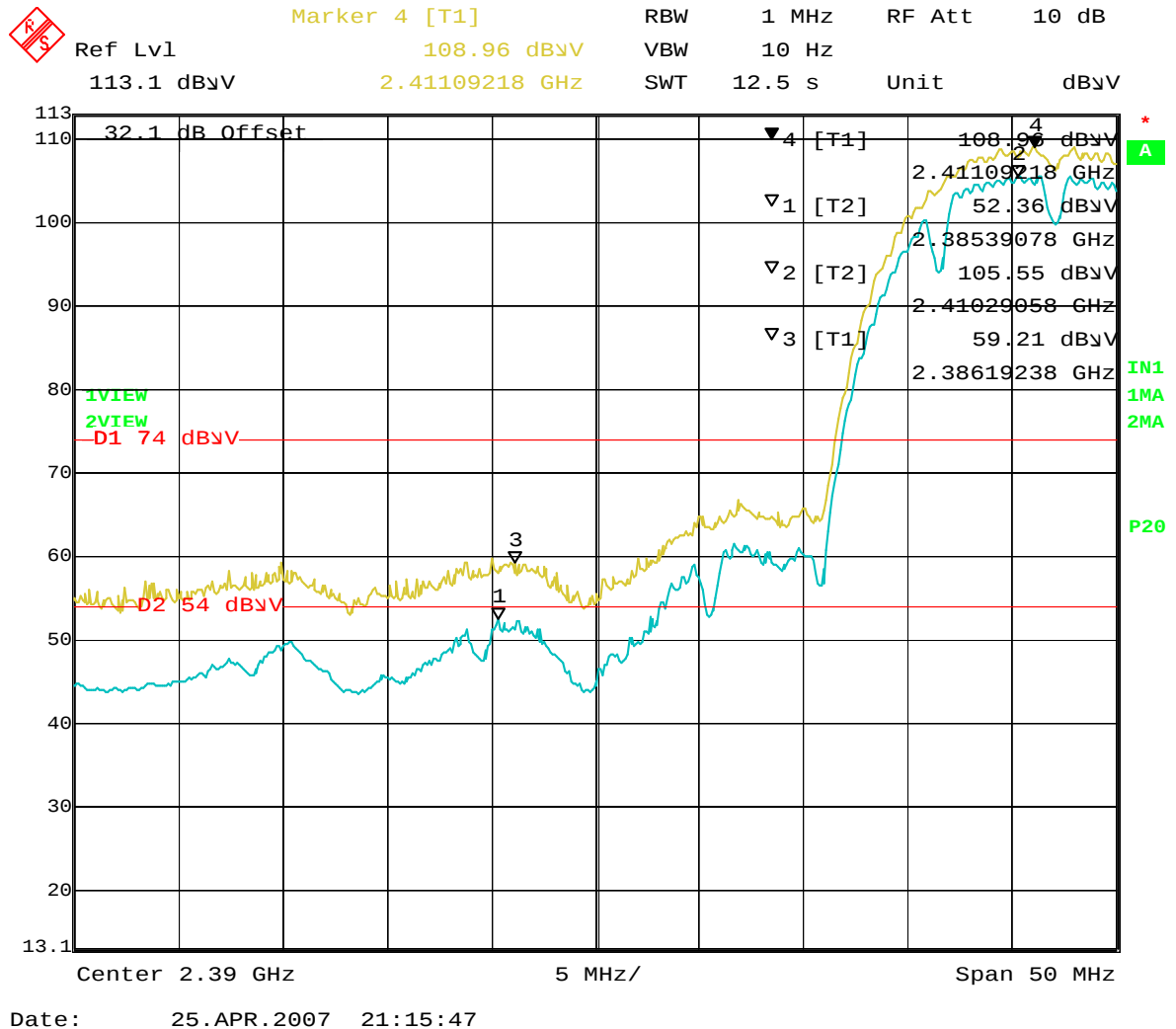
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2483.500	65.7	v	74.0	-8.3	Pk	0	1.0	
2483.500	53.2	v	54.0	-0.8	Avg	0	1.0	
2483.500	53.2	h	74.0	-20.8	Pk	30	1.8	
2483.500	40.5	h	54.0	-13.5	Avg	30	1.8	

2462 MHz G Panel, (S241290)) Power setting 10.5

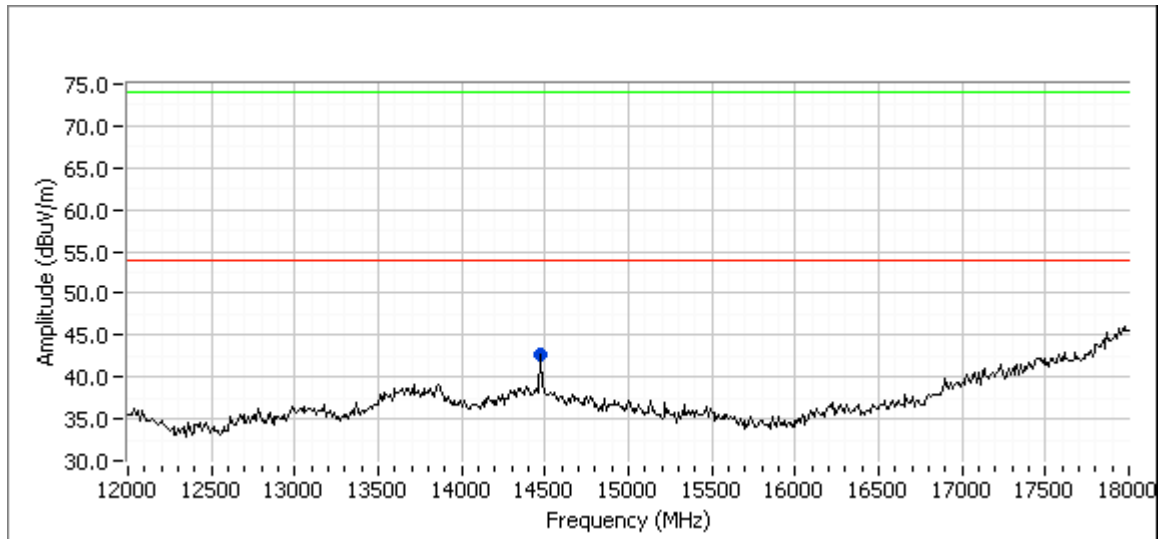
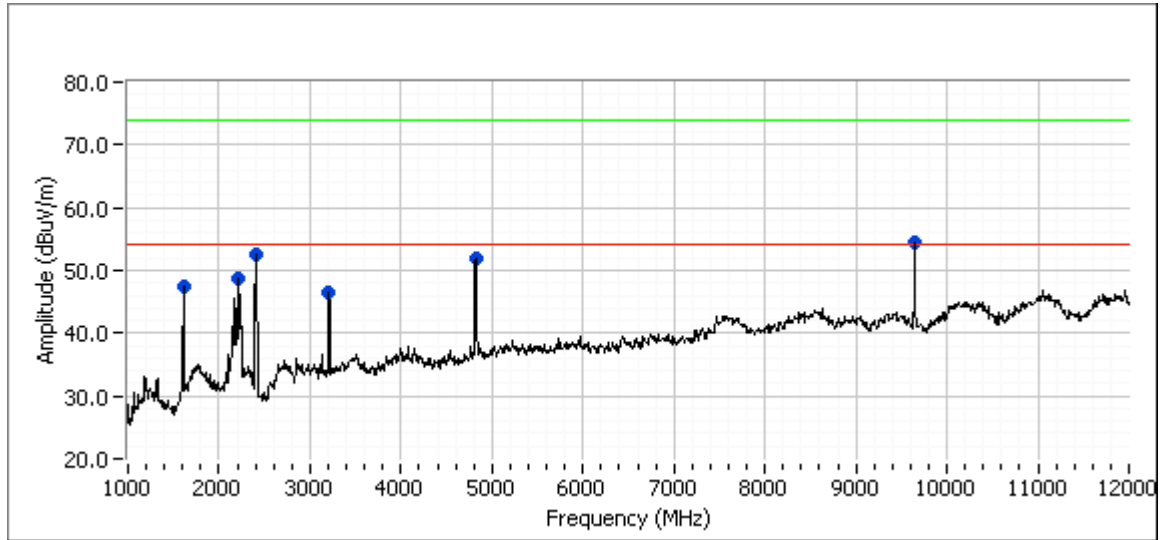
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
3282.650	45.4	V	54.0	-8.6	AVG	5	1.9	Note 2
3282.650	48.1	V	74.0	-25.9	PK	5	1.9	Note 2
2239.850	41.5	V	54.0	-12.5	AVG	357	1.9	
2239.850	47.3	V	74.0	-26.7	PK	357	1.9	
2469.220	40.7	V	54.0	-13.3	AVG	360	1.3	Note 2
2469.220	49.3	V	74.0	-24.7	PK	360	1.3	Note 2

NOTE 2: Signal is not in a restricted band but the more stringent restricted band limit was used.

802.11 B Dipole Antenna (S2403)

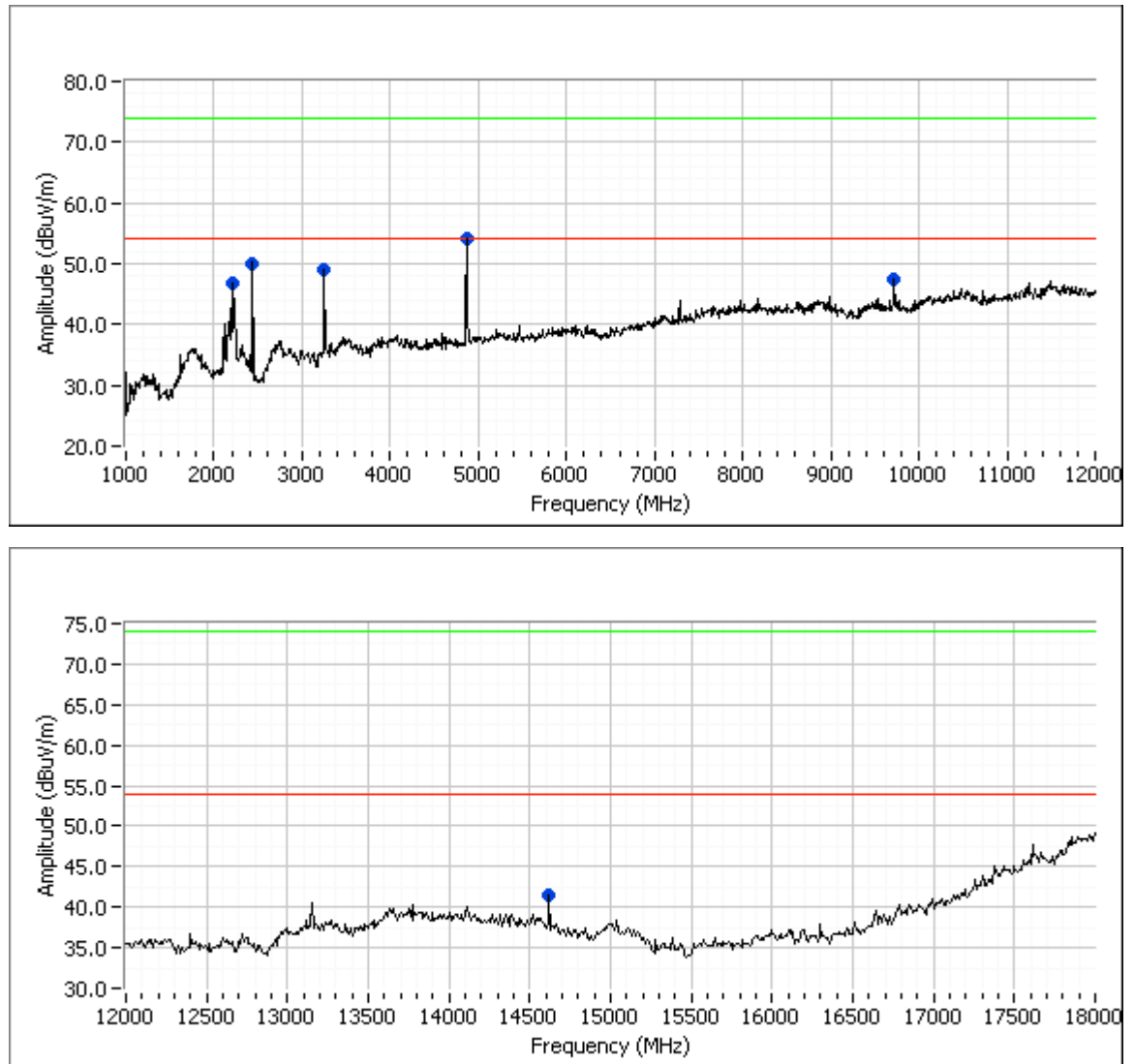
Band Edge-
2412 MHz B Dipole, (S2403) Power setting 21

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2390.000	59.2	v	74.0	-14.8	Pk	96	1.0	
2390.000	52.4	v	54.0	-1.6	Avg	96	1.0	
2390.000	52.7	h	74.0	-21.3	Pk	130	1.0	
2390.000	40.6	h	54.0	-13.4	Avg	130	1.0	

2412 MHz B Dipole, (S2403) Power setting 21

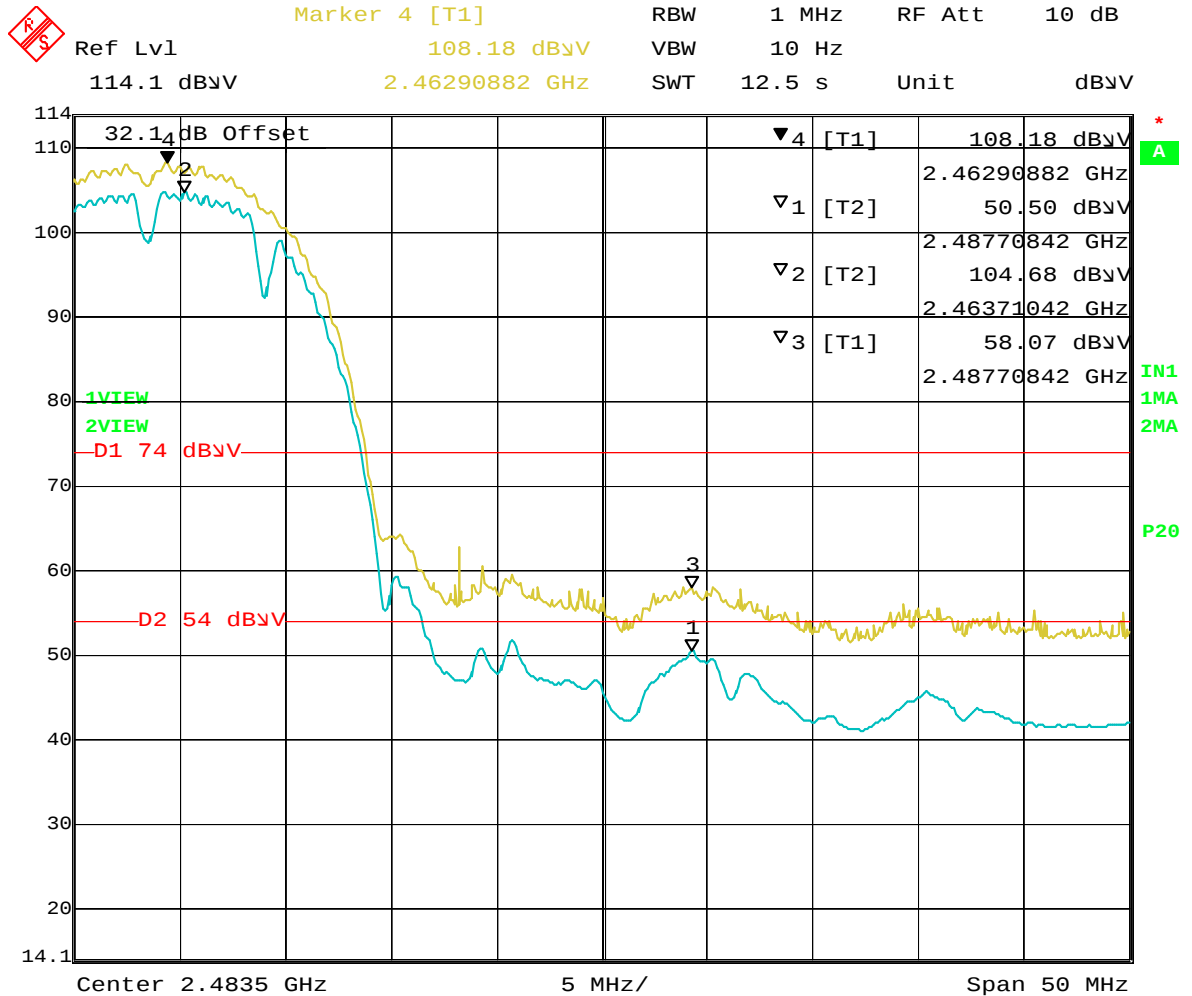
NOTE 2: Signal is not in a restricted band but the more stringent restricted band limit was used.

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
9647.910	52.3	V	54.0	-1.7	AVG	33	1.3	Note 2
9647.910	55.5	V	74.0	-18.5	PK	33	1.3	Note 2
2413.810	51.5	V	54.0	-2.5	AVG	71	1.0	Note 2
2413.810	55.1	V	74.0	-18.9	PK	71	1.0	Note 2
4823.940	52.5	H	54.0	-1.5	AVG	100	1.6	
4823.940	53.9	H	74.0	-20.1	PK	100	1.6	
3216.010	45.7	V	54.0	-8.3	AVG	124	1.9	Note 2
3216.010	48.7	V	74.0	-25.3	PK	124	1.9	Note 2
1607.990	47.0	V	54.0	-7.0	AVG	216	1.3	Note 2
1607.990	48.5	V	74.0	-25.5	PK	216	1.3	Note 2
2210.590	46.5	V	54.0	-7.5	AVG	298	1.0	
2210.590	51.4	V	74.0	-22.6	PK	298	1.0	
14471.840	38.9	V	54.0	-15.1	AVG	34	1.0	
14471.840	46.4	V	74.0	-27.6	PK	34	1.0	

2437 MHz B Dipole, (S2403) Power setting 21

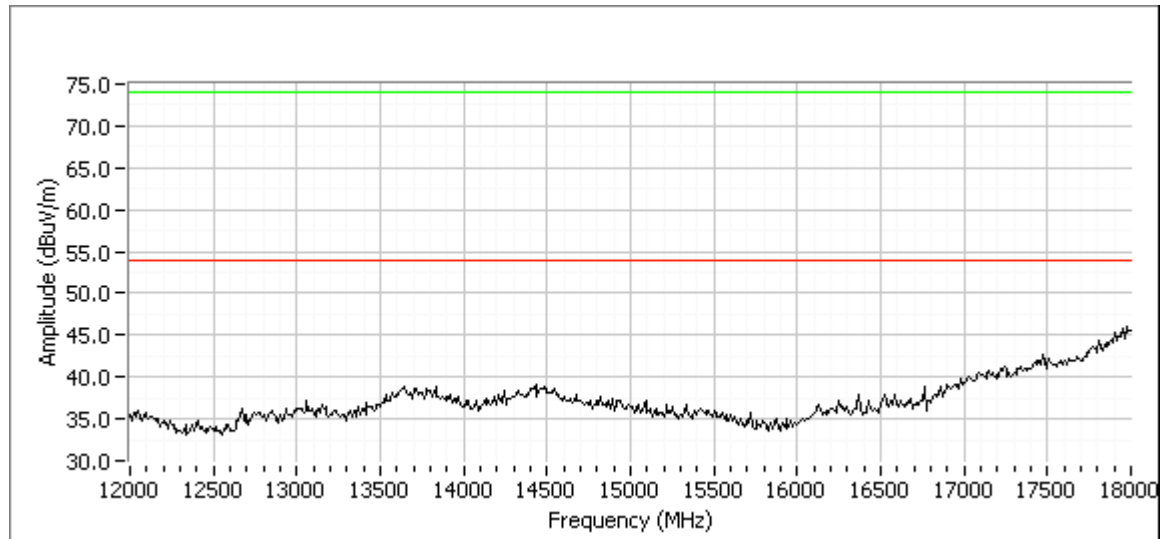
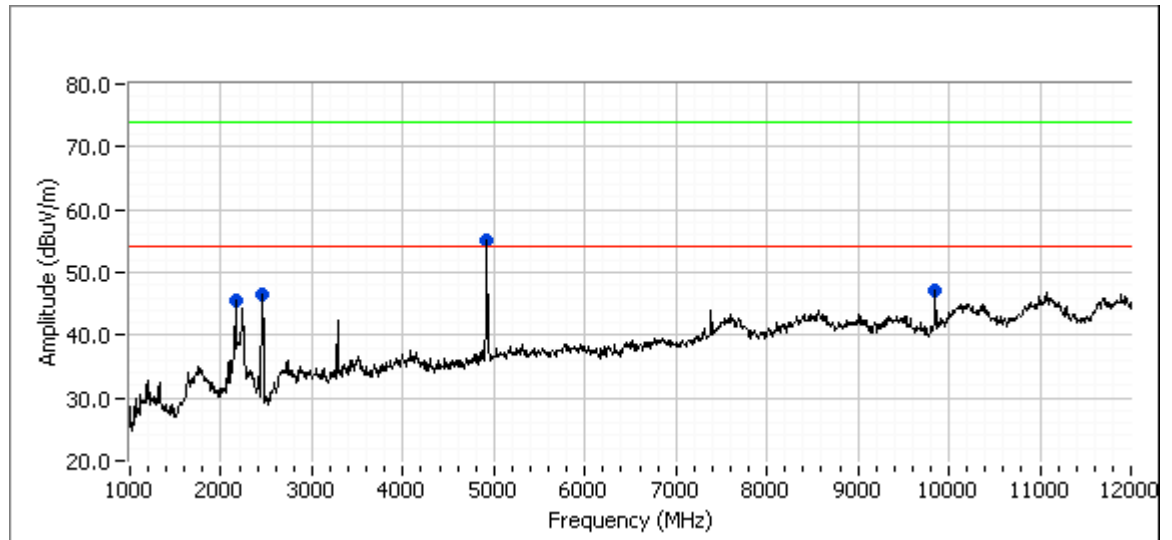
NOTE 2: Signal is not in a restricted band but the more stringent restricted band limit was used.

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2435.060	51.8	H	54.0	-2.2	AVG	25	1.4	Note 2
2435.060	55.7	H	74.0	-18.3	PK	25	1.4	Note 2
4874.060	52.5	H	54.0	-1.5	AVG	67	1.4	
4874.060	55.1	H	74.0	-18.9	PK	67	1.4	
3249.330	49.0	H	54.0	-5.0	AVG	80	1.4	Note 2
3249.330	51.6	H	74.0	-22.4	PK	80	1.4	Note 2
2200.020	45.1	H	54.0	-8.9	AVG	359	2.0	
2200.020	51.0	H	74.0	-23.0	PK	359	2.0	
14622.470	39.6	H	54.0	-14.4	AVG	309	1.0	Note 2
14622.470	46.9	H	74.0	-27.1	PK	309	1.0	Note 2

Bandedge**2462 MHz B Dipole, (S2403) Power setting 21**

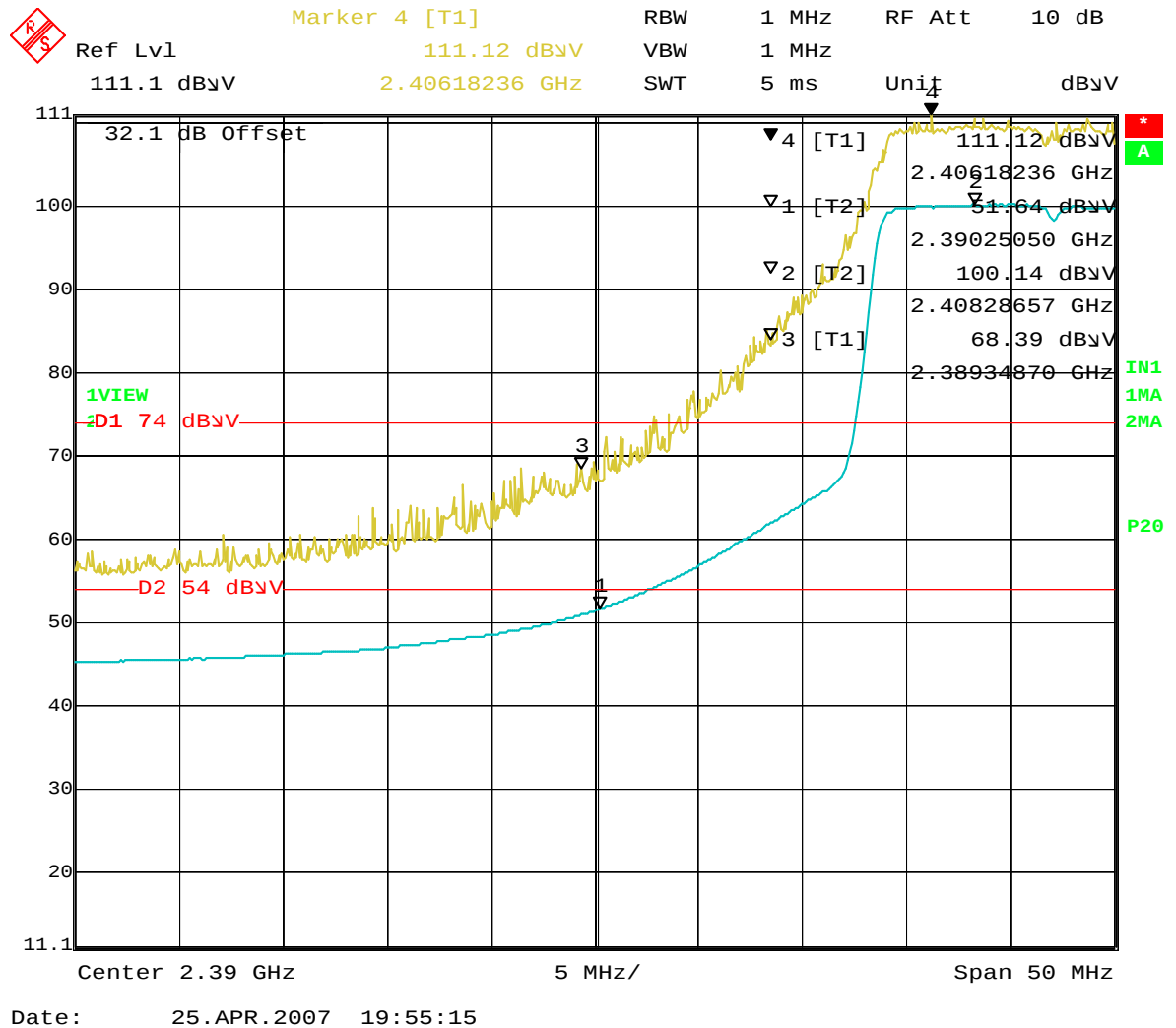
Date: 25.APR.2007 20:58:36

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2483.500	58.1	v	74.0	-15.9	Pk	100	1.2	
2483.500	50.5	v	54.0	-3.5	Avg	100	1.2	
2483.500	54.4	h	74.0	-19.6	Pk	125	1.0	
2483.500	40.0	h	54.0	-14.0	Avg	125	1.0	

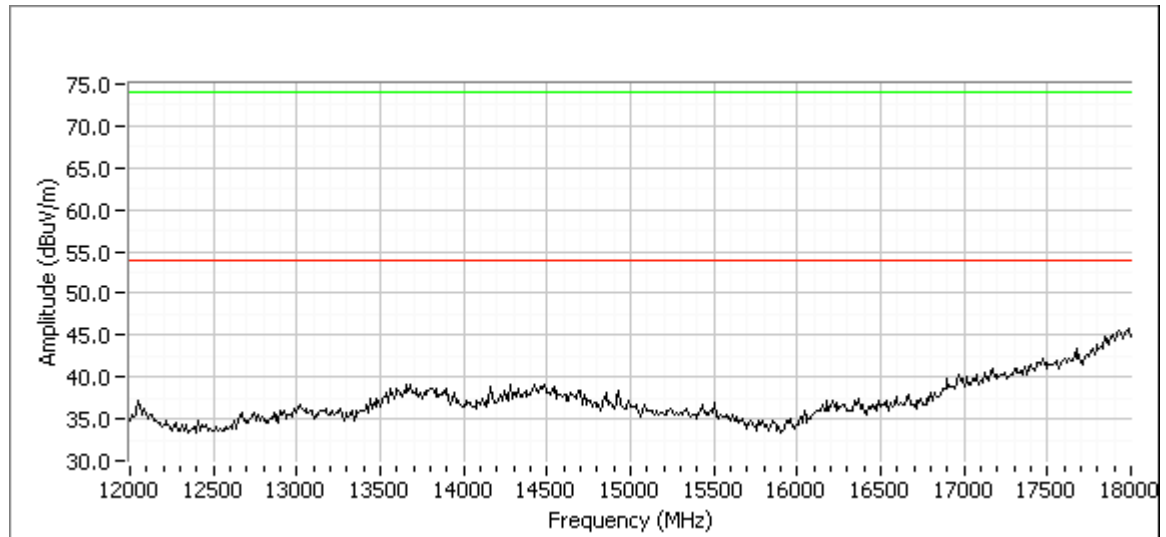
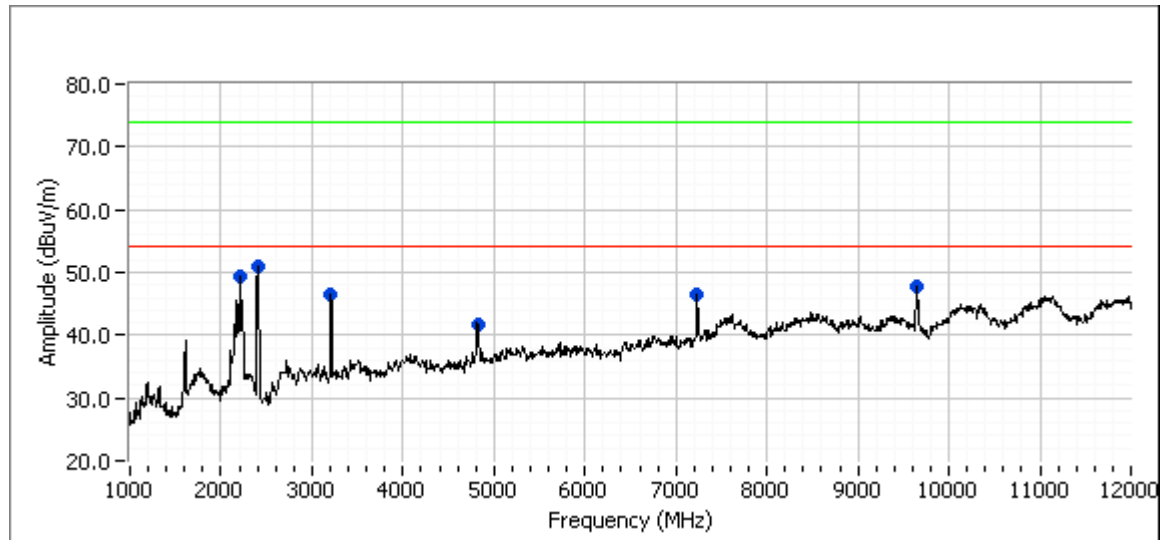
2462 MHz B Dipole, (S2403) Power setting 20

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4923.920	53.6	H	54.0	-0.4	AVG	90	1.5	
4923.920	55.0	H	74.0	-19.0	PK	90	1.5	
2460.540	44.1	V	54.0	-9.9	AVG	65	1.0	
2460.540	48.0	V	74.0	-26.0	PK	65	1.0	
9847.920	42.7	H	54.0	-11.3	AVG	83	1.3	
9847.920	50.4	H	74.0	-23.6	PK	83	1.3	
2159.990	42.8	V	54.0	-11.2	AVG	297	1.0	
2159.990	48.1	V	74.0	-25.9	PK	297	1.0	

802.11 G Dipole Antenna (S2403)

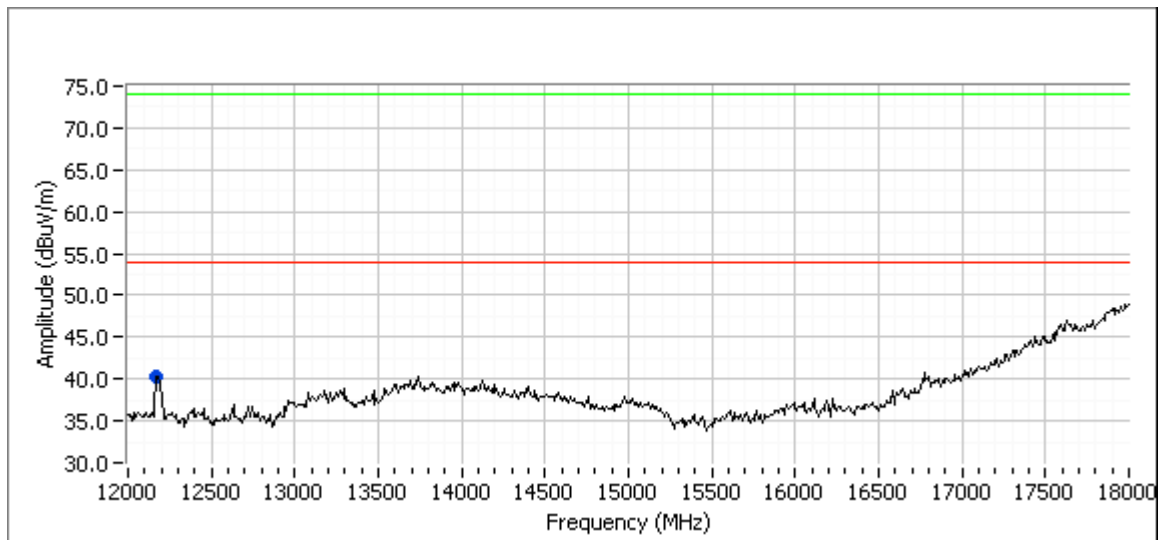
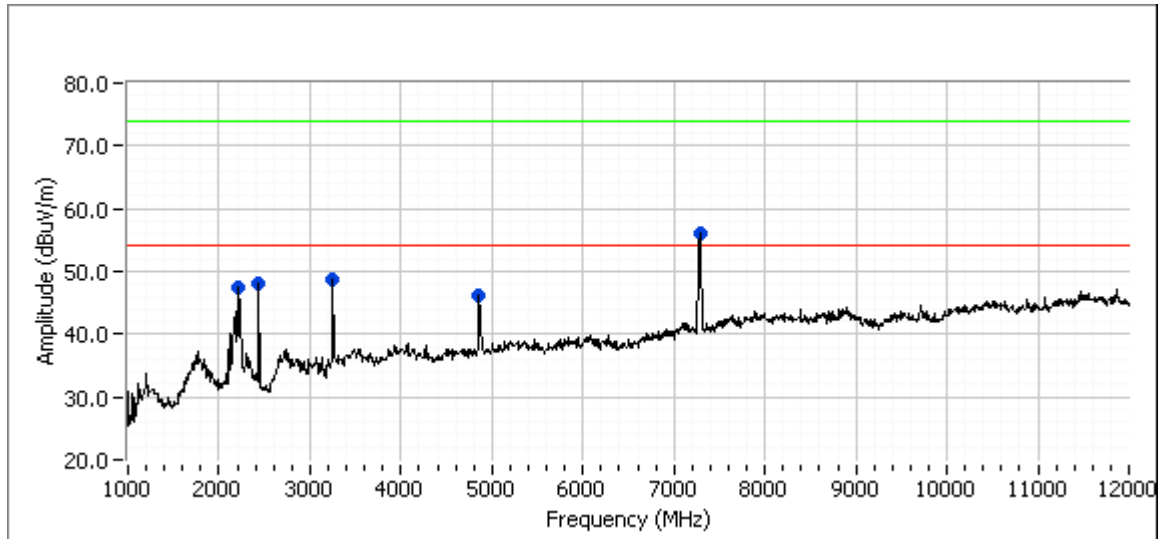
Band Edge-
2412 MHz G Dipole, (S2403) Power setting 20.5

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2390.000	68.4	v	74.0	-5.6	PK	92	1.0	
2390.000	51.6	v	54.0	-2.4	Avg	92	1.0	
2390.000	58.2	h	74.0	-15.8	PK	120	1.0	
2390.000	40.6	h	54.0	-13.4	Avg	120	1.0	

2412 MHz G Dipole, (S2403) Power setting 20.5

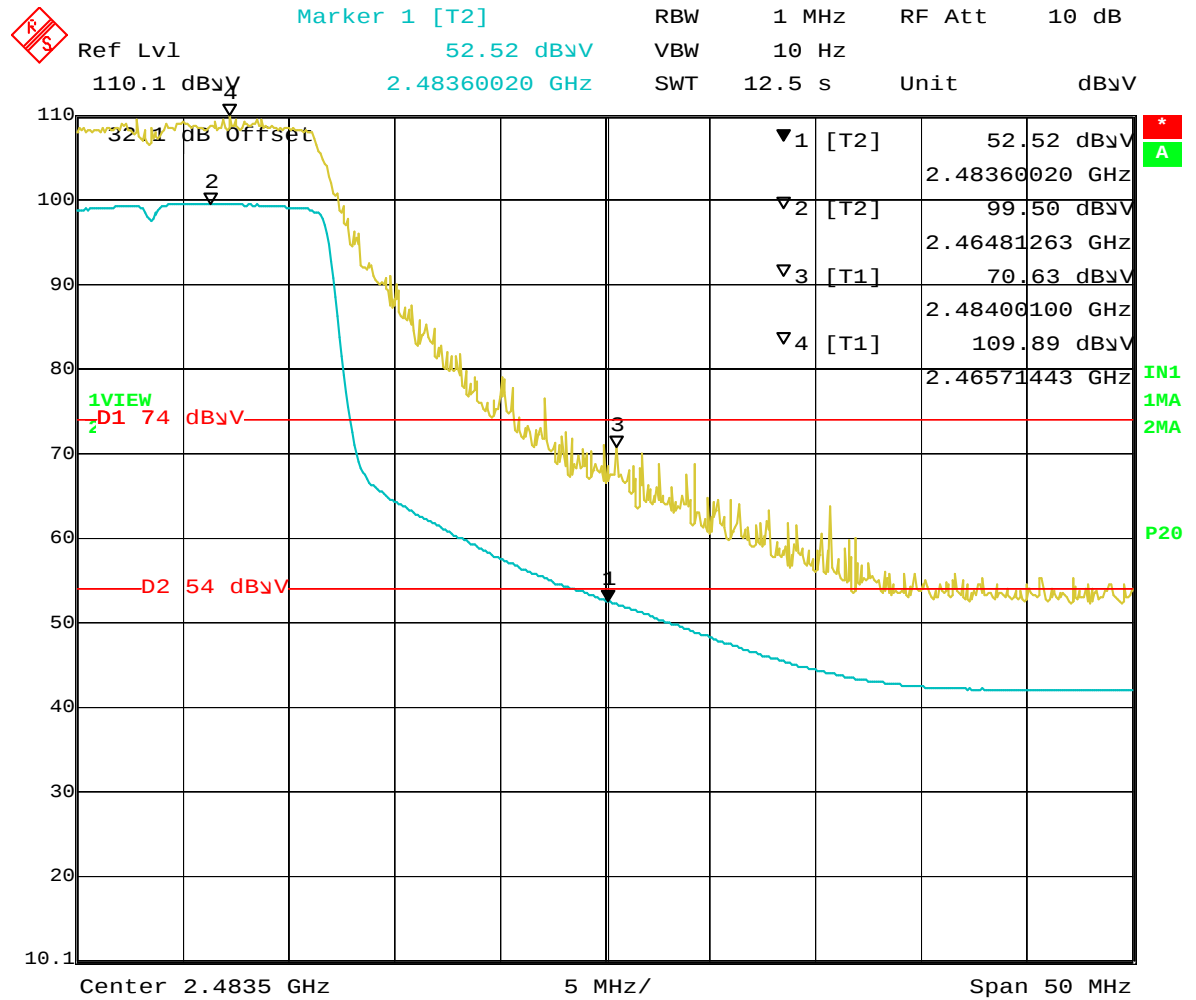
NOTE 2: Signal is not in a restricted band but the more stringent restricted band limit was used.

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
9647.530	42.5	V	54.0	-11.5	AVG	41	1.3	Note 2
9647.530	56.3	V	74.0	-17.7	PK	41	1.3	Note 2
2418.760	48.7	V	54.0	-5.3	AVG	101	1.0	Note 2
2418.760	57.2	V	74.0	-16.8	PK	101	1.0	Note 2
7235.590	36.0	H	54.0	-18.0	AVG	118	1.3	Note 2
7235.590	55.3	H	74.0	-18.7	PK	118	1.3	Note 2
3215.970	46.2	V	54.0	-7.8	AVG	126	1.9	Note 2
3215.970	49.4	V	74.0	-24.6	PK	126	1.9	Note 2
4823.420	37.6	H	54.0	-16.4	AVG	132	1.6	
4823.420	50.7	H	74.0	-23.3	PK	132	1.6	
2210.660	47.2	V	54.0	-6.8	AVG	295	1.0	
2210.660	52.8	V	74.0	-21.2	PK	295	1.0	

2437 MHz G Dipole, (S2403) Power setting 21

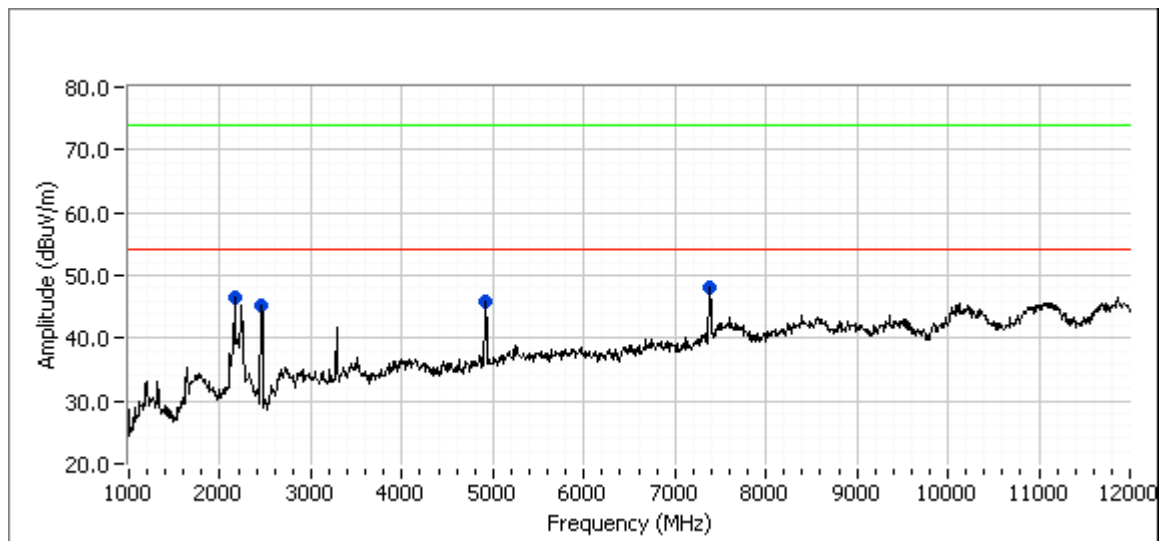
NOTE 2: Signal is not in a restricted band but the more stringent restricted band limit was used.

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2200.080	44.8	H	54.0	-9.2	AVG	11	1.7	
2200.080	50.6	H	74.0	-23.4	PK	11	1.7	
2443.240	46.3	H	54.0	-7.7	AVG	59	1.4	Note 2
2443.240	55.4	H	74.0	-18.6	PK	59	1.4	Note 2
4875.540	41.9	H	54.0	-12.1	AVG	65	1.4	
4875.540	54.3	H	74.0	-19.7	PK	65	1.4	
3249.360	49.6	H	54.0	-4.4	AVG	80	1.4	Note 2
3249.360	51.9	H	74.0	-22.1	PK	80	1.4	Note 2
7310.620	49.0	H	54.0	-5.0	AVG	111	1.4	
7310.620	68.5	H	74.0	-5.5	PK	111	1.4	
12183.960	37.1	V	54.0	-16.9	AVG	66	1.0	
12183.960	52.5	V	74.0	-21.5	PK	66	1.0	

Bandedge**2462 MHz G Dipole, (S2403) Power setting 21**

Date: 25.APR.2007 20:31:48

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2483.500	70.6	v	74.0	-3.4	Pk	100	1.3	
2483.500	52.5	v	54.0	-1.5	Avg	100	1.3	
2483.500	55.5	h	74.0	-18.6	Pk	130	1.0	
2483.500	41.9	h	54.0	-12.1	Avg	130	1.0	

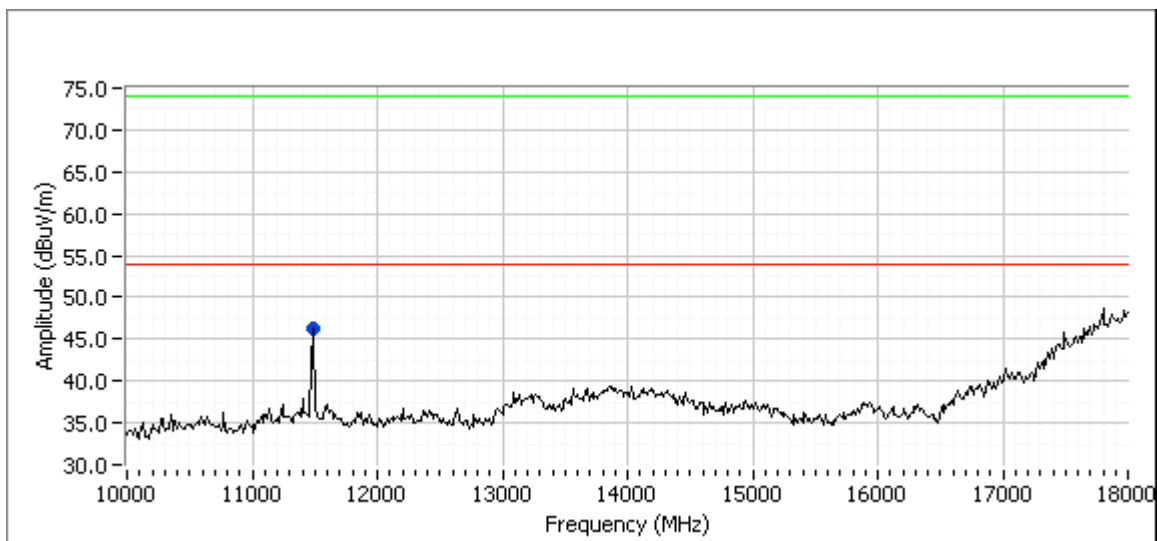
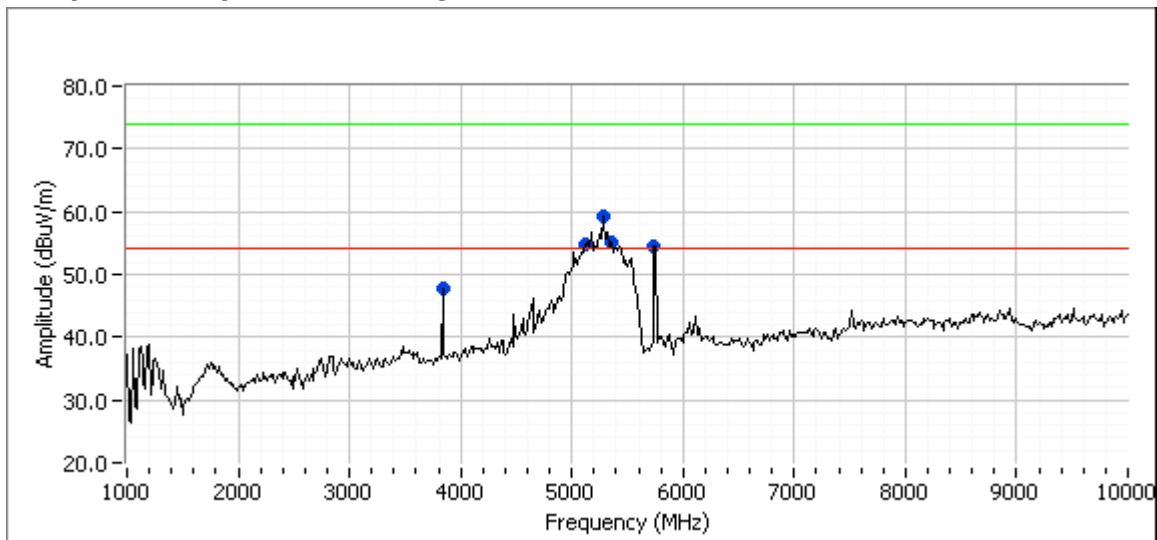
2462 MHz G Dipole, (S2403) Power setting 21**No Visible emissions above 12 GHz**

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4921.080	41.7	H	54.0	-12.3	AVG	80	1.6	
4921.080	54.1	H	74.0	-19.9	PK	80	1.6	
7379.000	37.0	V	54.0	-17.0	AVG	120	1.6	
7379.000	61.0	V	74.0	-13.0	PK	120	1.6	
2160.040	42.3	V	54.0	-11.7	AVG	280	1.0	Note 2
2160.040	47.8	V	74.0	-26.2	PK	280	1.0	Note 2
2469.210	42.5	V	54.0	-11.5	AVG	357	1.0	Note 2
2469.210	51.2	V	74.0	-22.8	PK	357	1.0	Note 2

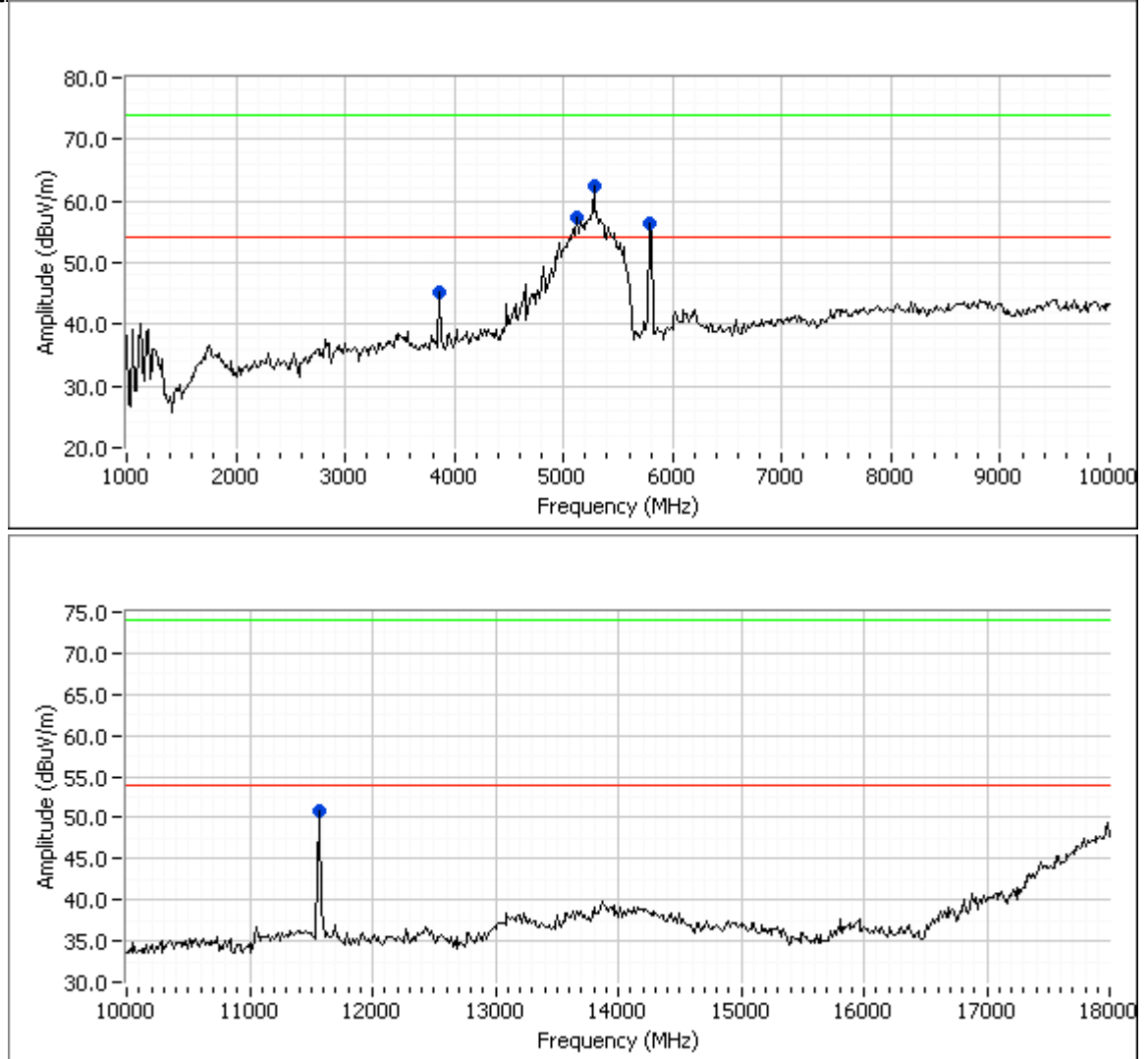
NOTE 2: Signal is not in a restricted band but the more stringent restricted band limit was used.

802.11 A Panel Antenna (S4901790)

5745 MHz A Panel, (S4901790) Power setting 21



Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBμV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
5273.570	51.5	V	54.0	-2.5	AVG	199	1.3	
5273.570	63.0	V	74.0	-11.0	PK	199	1.3	
5324.820	51.5	V	54.0	-2.5	AVG	188	1.3	
5324.820	62.9	V	74.0	-11.1	PK	188	1.3	
5146.610	51.6	V	54.0	-2.4	AVG	188	1.3	
5146.610	63.3	V	74.0	-10.7	PK	188	1.3	
3835.000	47.9	V	54.0	-6.1	Peak	181	1.3	
5740.350	54.6	H	-	-	Peak	221	1.9	Fundamental
11480.00	46.3	V	54.0	-7.7	Peak	93	1.0	

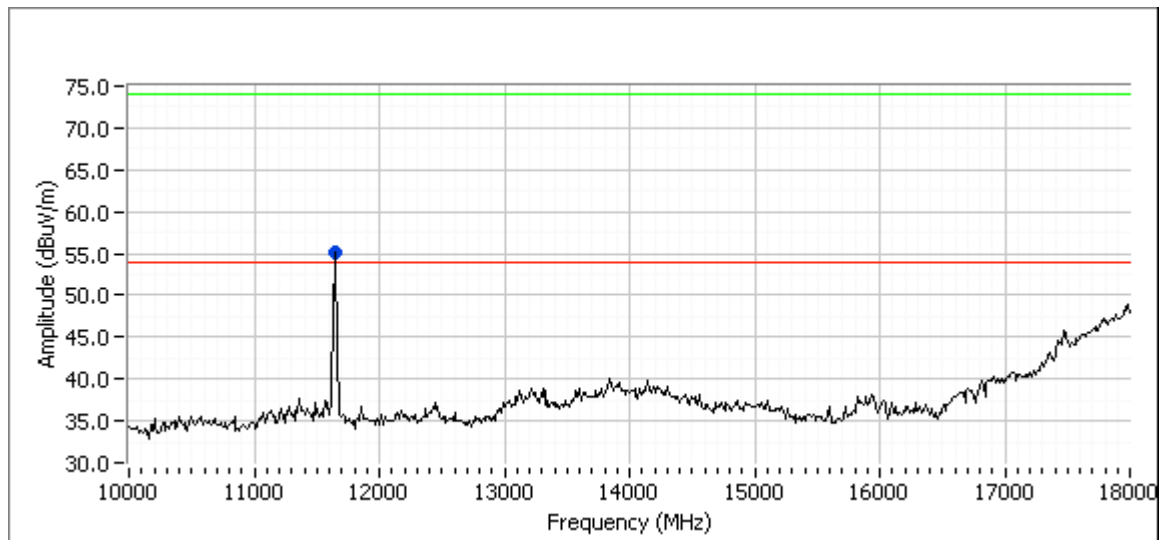
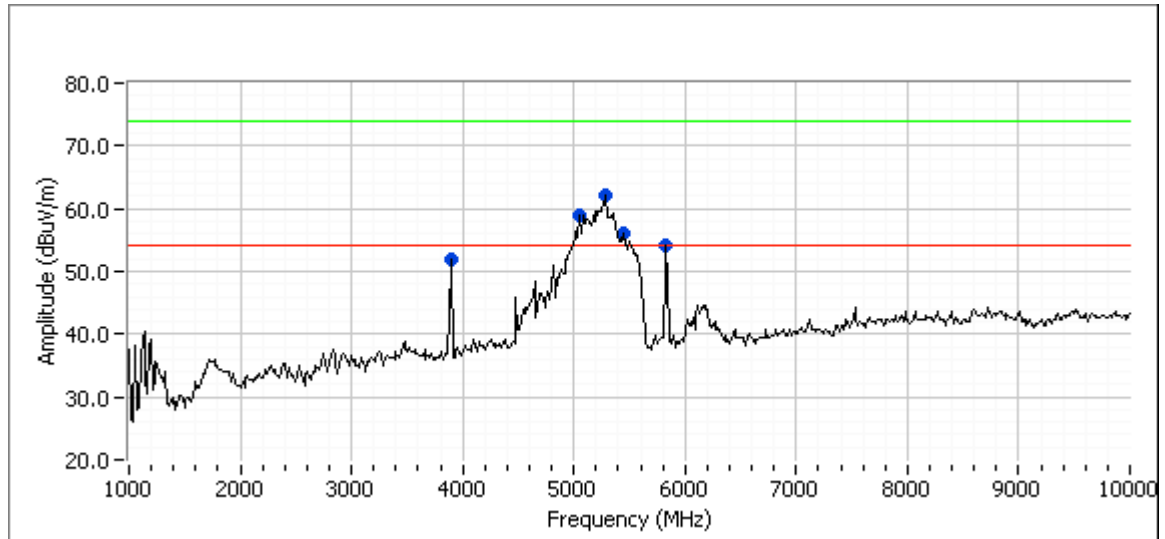
5805 MHz A Panel. (S4901790) Power setting 21

Fundamental emission level @ 3m in 100kHz RBW:	112	dB μ V/m
Limit for emissions outside of restricted bands:	92	dB μ V/m
Limit for emissions outside of restricted bands:	82	dB μ V/m

Limit is -20dBc (Peak power measurement)

Limit is -30dBc (UNII power measurement)

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
11567.930	47.4	V	54.0	-6.6	AVG	255	1.0	
11567.930	58.9	V	74.0	-15.1	PK	255	1.0	
5107.130	51.4	V	54.0	-2.6	AVG	185	1.3	Restricted
5107.130	62.3	V	74.0	-11.7	PK	185	1.3	Restricted
5280.000	61.6	V	92.0	-30.4	PK	195	1.3	RBW=VBW=100kHz
3865.000	45.1	V	54.0	-8.9	Peak	197	1.3	

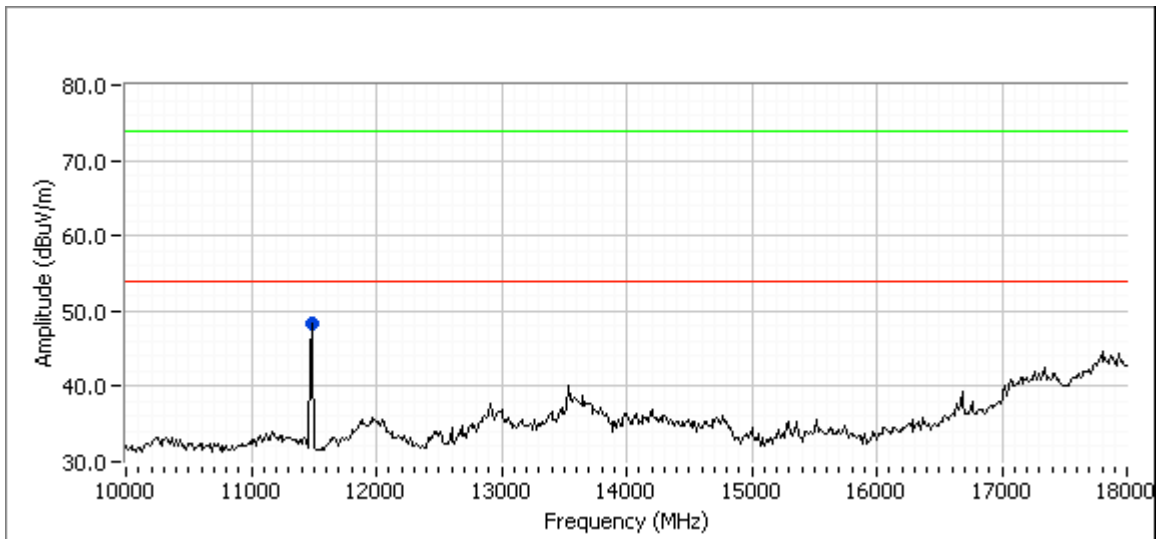
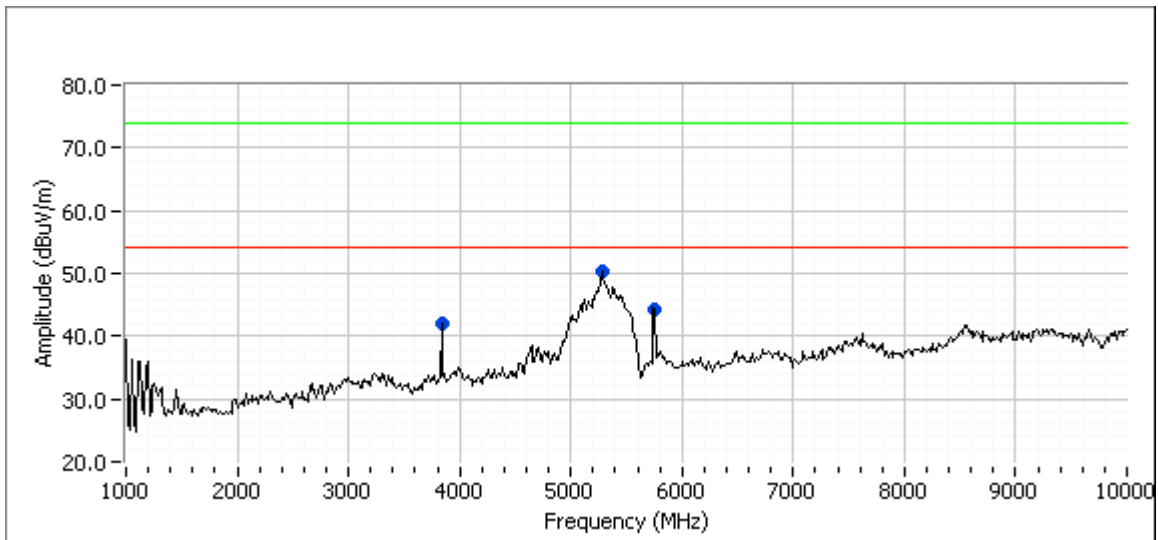
5825 MHz A Panel, (S4901790) Power setting 20

Fundamental emission level @ 3m in 100kHz RBW:	110.5	dB μ V/m	Limit is -20dBc (Peak power measurement) Limit is -30dBc (UNII power measurement)
Limit for emissions outside of restricted bands:	90.5	dB μ V/m	
Limit for emissions outside of restricted bands:	80.5	dB μ V/m	

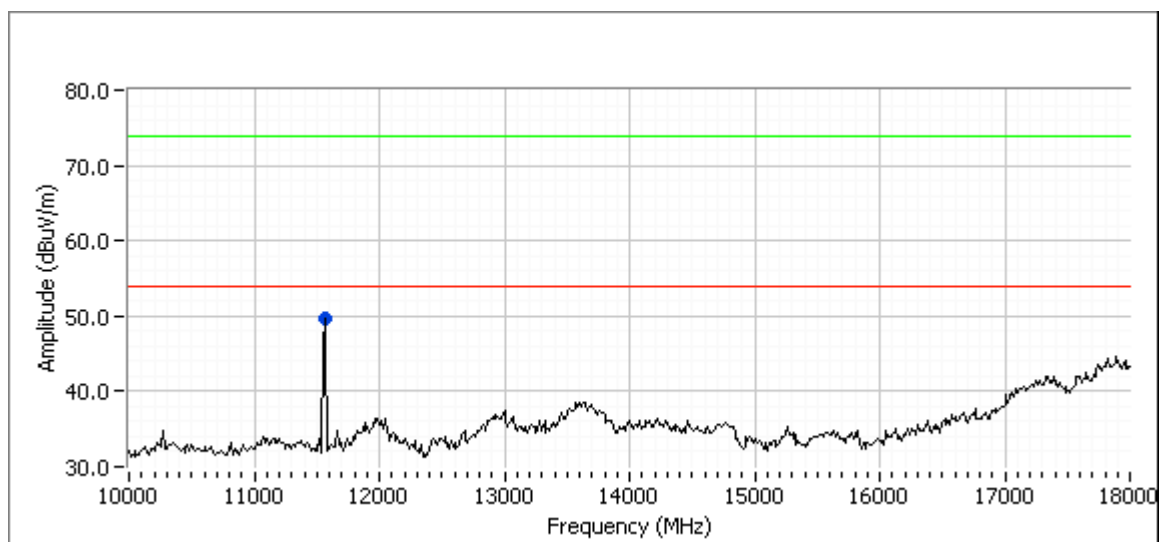
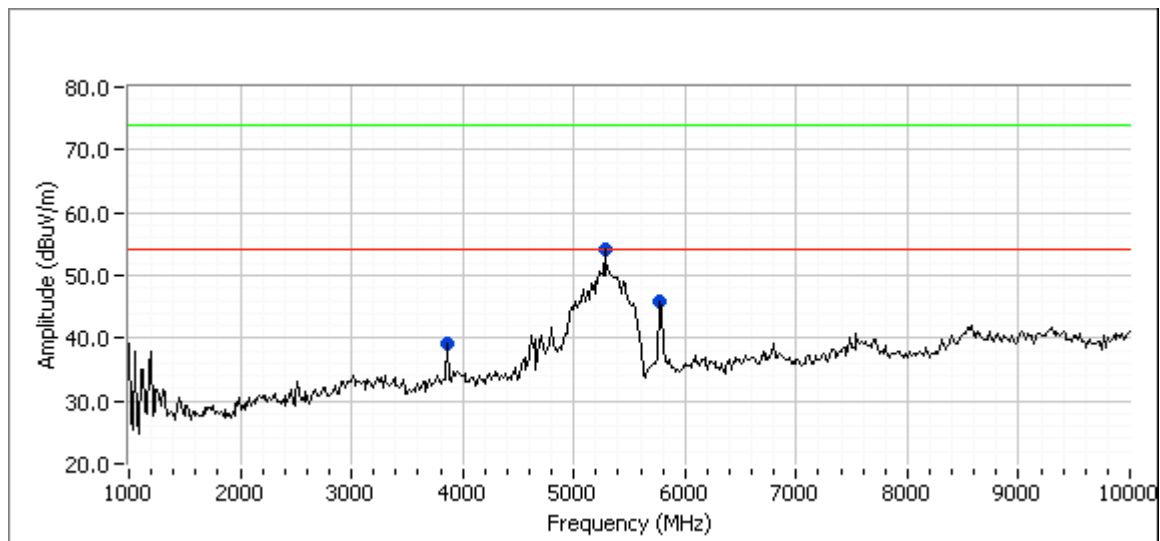
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	V/H	Limit	Margin	PK/QP/Avg	degrees	meters	
5046.330	52.7	V	54.0	-1.3	AVG	195	1.3	
5046.330	64.3	V	74.0	-9.7	PK	195	1.3	
5439.860	51.4	V	54.0	-2.6	AVG	180	1.3	
5439.860	62.9	V	74.0	-11.1	PK	180	1.3	
5279.980	62.7	V	90.5	-27.8	PK	192	1.3	RBW=VBW = 100kHz

802.11 A Dipole Antenna (S5153)

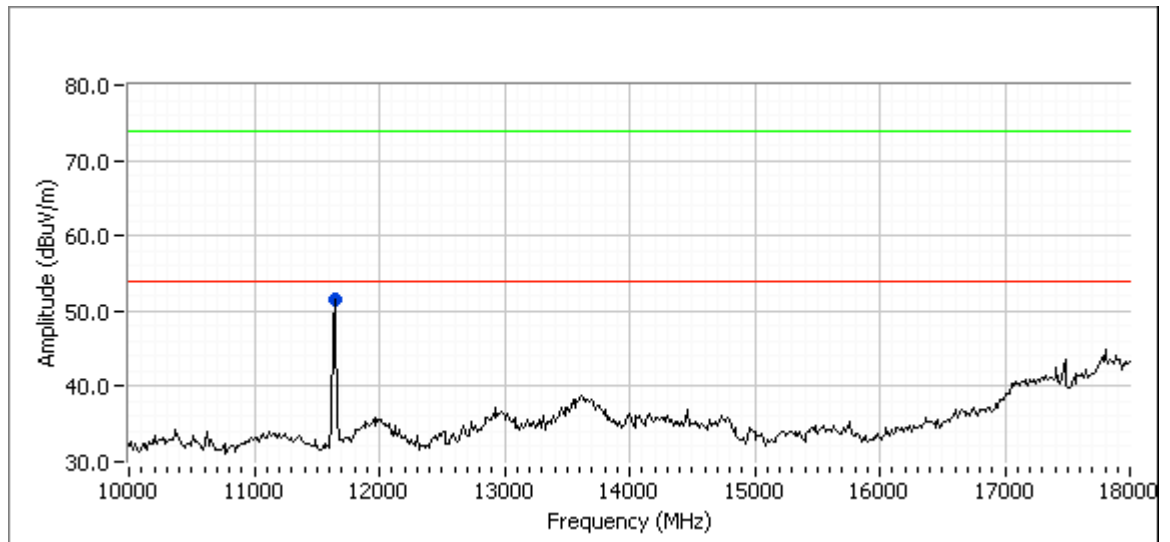
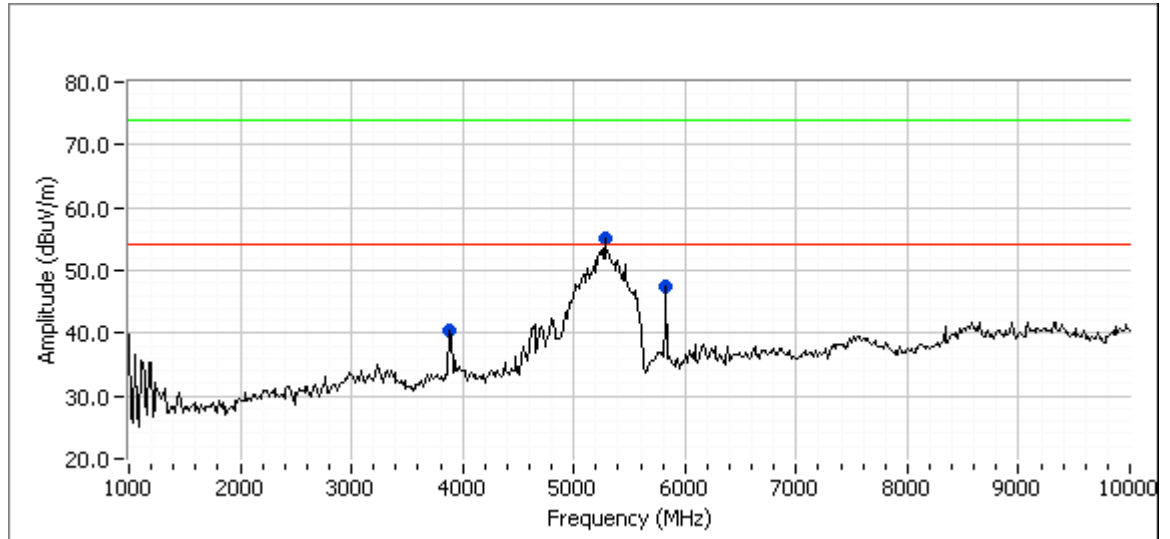
5745 MHz A Dipole, (S5153) Power setting 21



Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBμV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
5279.900	49.3	V	54.0	-4.7	AVG	293	1.0	
5279.900	57.5	V	74.0	-16.5	PK	293	1.0	
3835.000	42.0	V	54.0	-12.0	Peak	227	1.0	
5745.000	44.2	H	-	-	Peak	63	1.3	Fundamental
11488.670	42.1	V	54.0	-11.9	AVG	90	1.0	
11488.670	55.1	V	74.0	-18.9	PK	90	1.0	

5805 MHz A Dipole, (S5153) Power setting 21

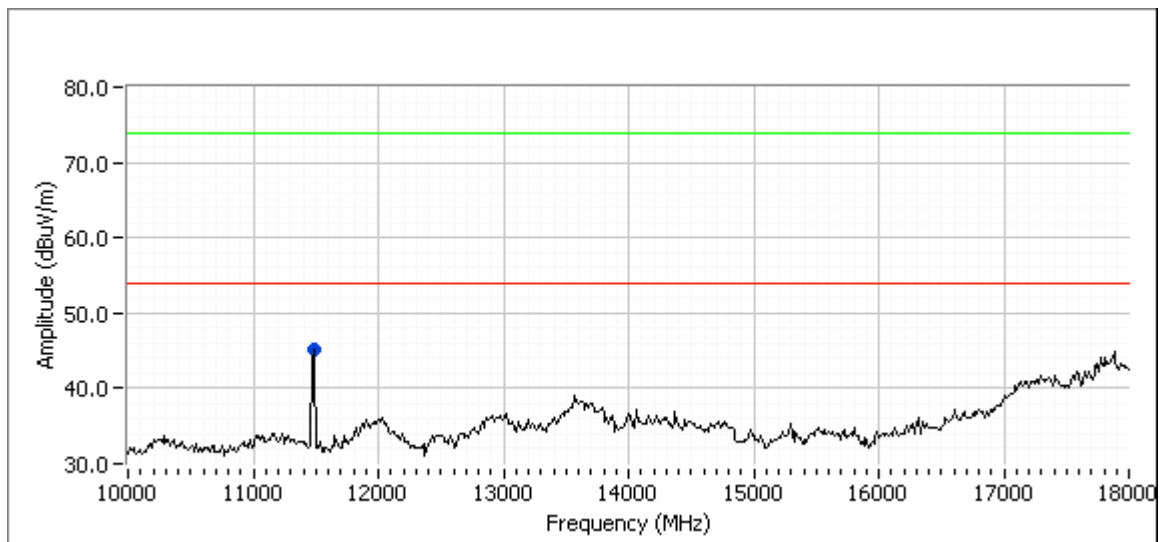
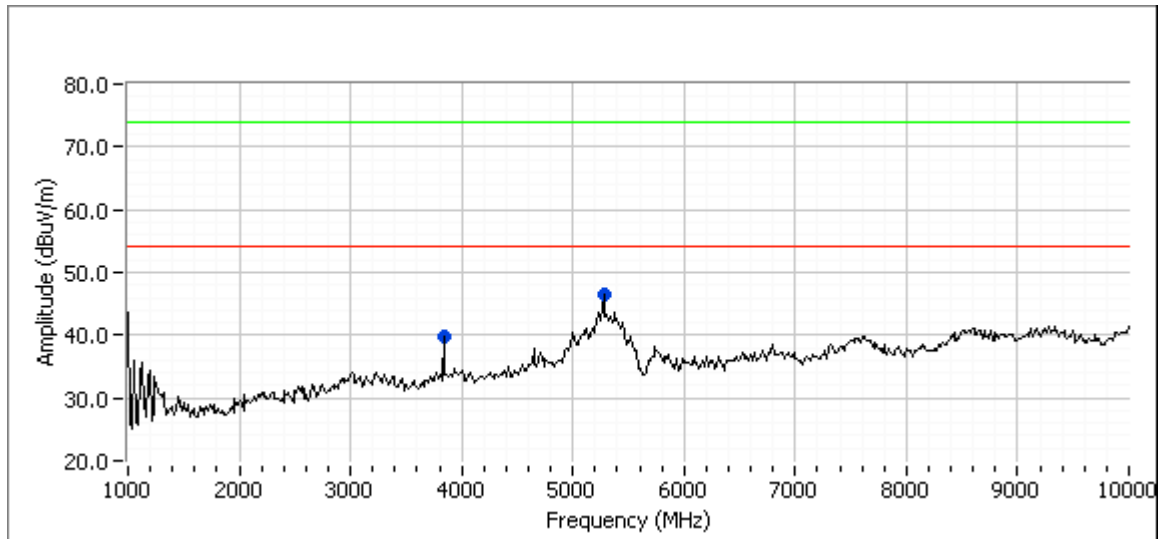
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
5275.650	46.3	V	54.0	-7.7	AVG	292	1.0	
5275.650	58.0	V	74.0	-16.0	PK	292	1.0	
3865.000	39.3	V	54.0	-14.7	Peak	344	1.3	
5785.000	45.7	V	-	-	Peak	278	1.0	Fundamental
11568.540	45.8	V	54.0	-8.2	AVG	95	1.0	
11568.540	58.7	V	74.0	-15.3	PK	95	1.0	

5825 MHz A Dipole, (S5153) Power setting 21

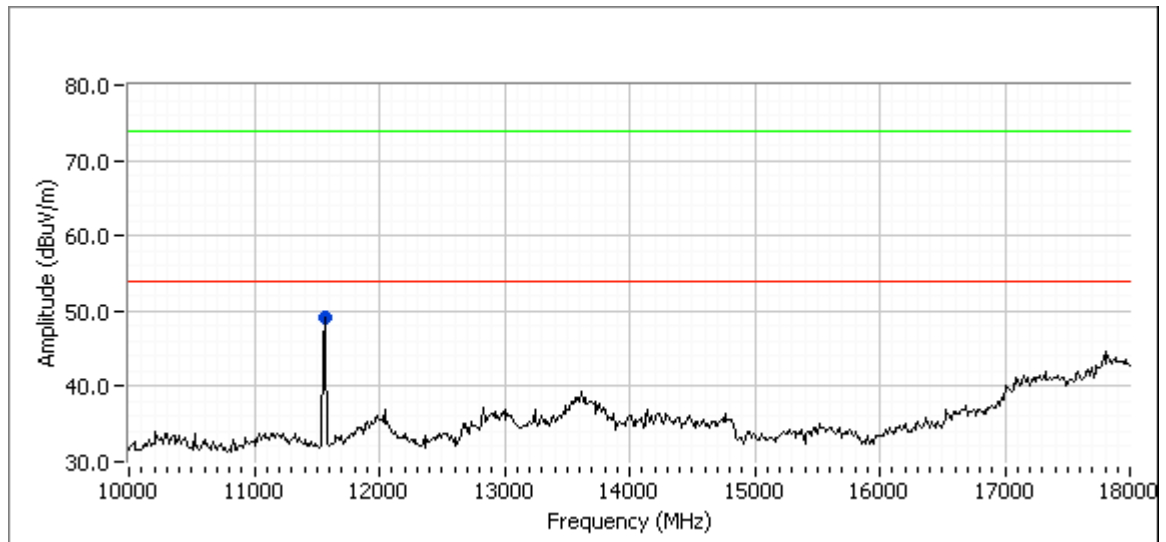
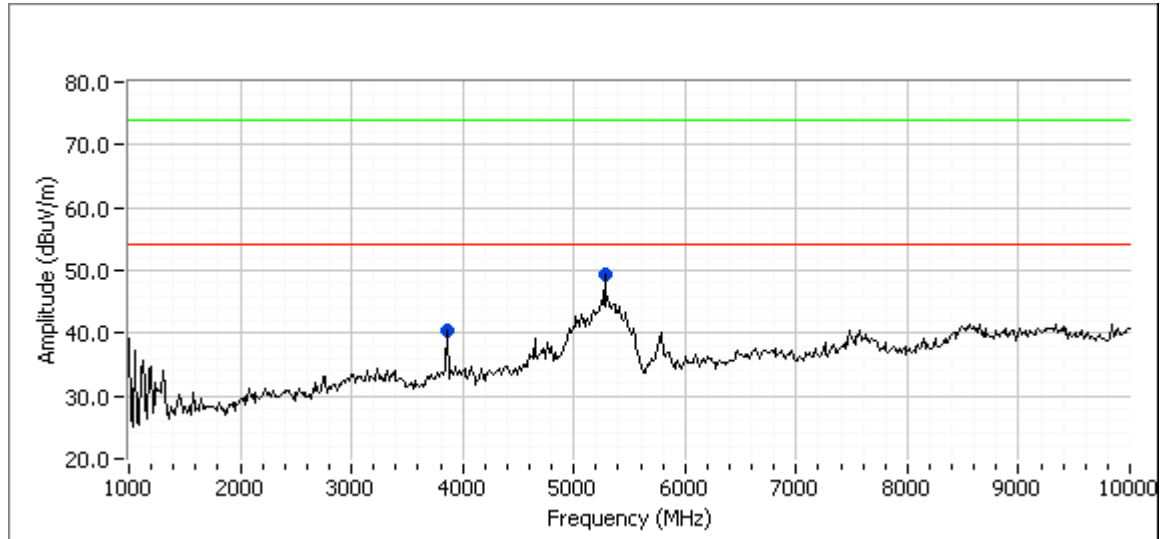
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
3880.000	40.5	V	54.0	-13.5	Peak	326	1.9	
5825.000	47.5	V	-	-	Peak	212	1.0	Fundamental
5274.310	48.4	V	54.0	-5.6	AVG	296	1.0	
5274.310	60.1	V	74.0	-13.9	PK	296	1.0	
11649.320	48.3	V	54.0	-5.7	AVG	95	1.0	
11649.320	60.8	V	74.0	-13.2	PK	95	1.0	

802.11 A Monopole Antenna (SQ5153)

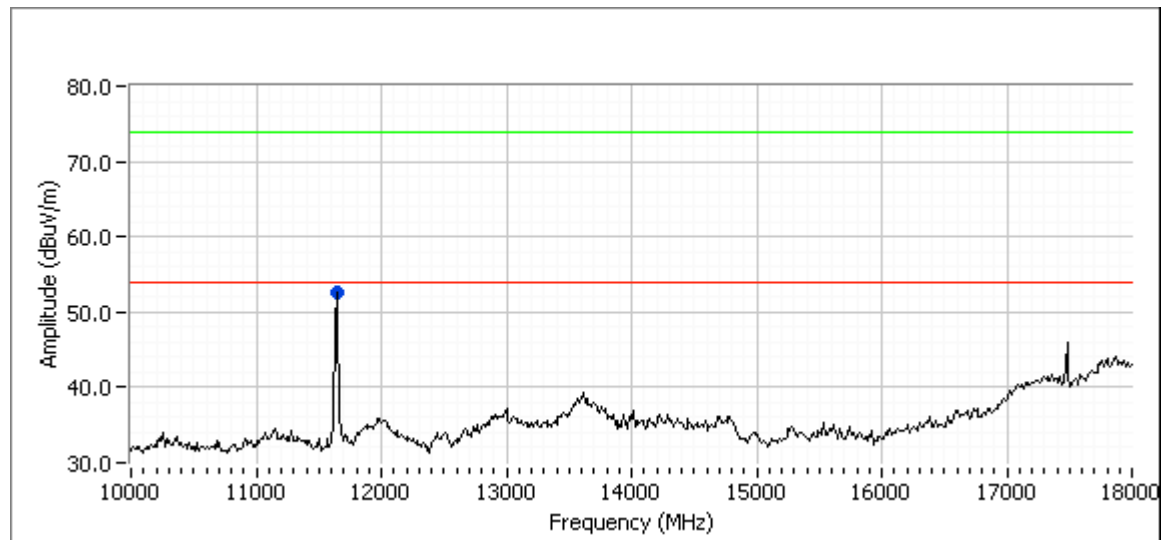
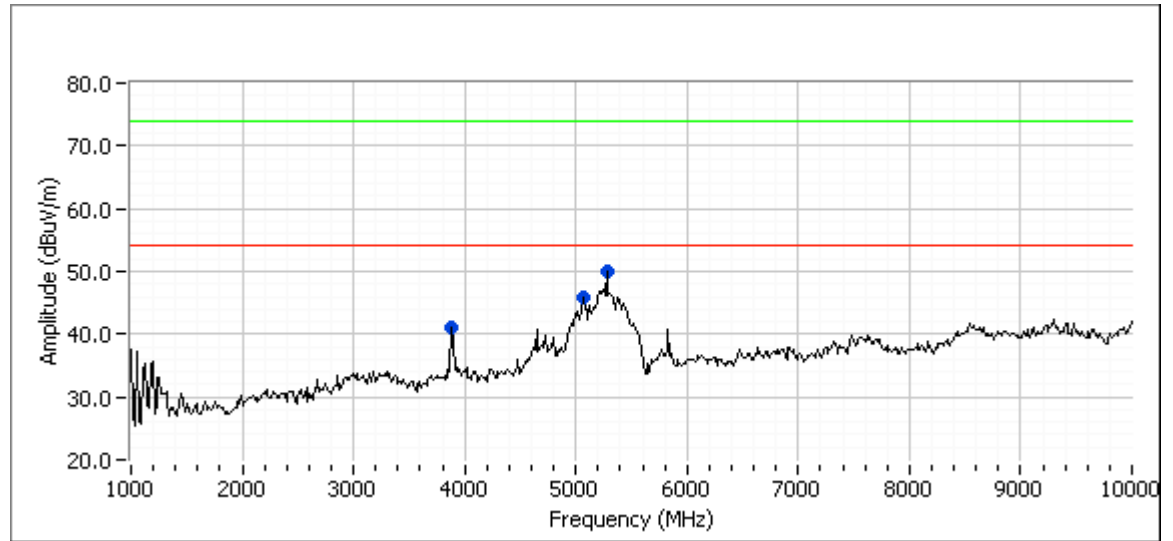
5745 MHz A Monopole, (SQ5153) Power setting 21



Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
11490.00	45.2	V	54.0	-8.8	Peak	86	1.0	
3835.00	39.7	V	54.0	-14.3	Peak	40	1.6	
5275.00	46.4	V	54.0	-7.6	Peak	263	1.6	

5785 MHz A Monopole, (SQ5153) Power setting 21

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
11569.870	46.0	V	54.0	-8.0	AVG	79	1.0	
11569.870	57.6	V	74.0	-16.4	PK	79	1.0	
5279.940	46.9	V	54.0	-7.1	AVG	261	1.3	
5279.940	55.1	V	74.0	-18.9	PK	261	1.3	
3865.000	40.3	V	54.0	-13.7	Peak	314	1.6	

5825 MHz A Monopole, (SQ5153) Power setting 21

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBμV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
11650.560	47.2	V	54.0	-6.8	AVG	128	1.3	
11650.560	58.5	V	74.0	-15.5	PK	128	1.3	
5279.940	46.1	V	54.0	-7.9	AVG	222	1.6	
5279.940	54.3	V	74.0	-19.7	PK	222	1.6	
3880.000	41.0	V	54.0	-13.0	Peak	316	1.6	
5065.000	46.0	V	54.0	-8.0	Peak	326	1.3	

Receiver Spurious Radiated Emissions Digital Emissions

Specification:

15.109(f)

Procedure:

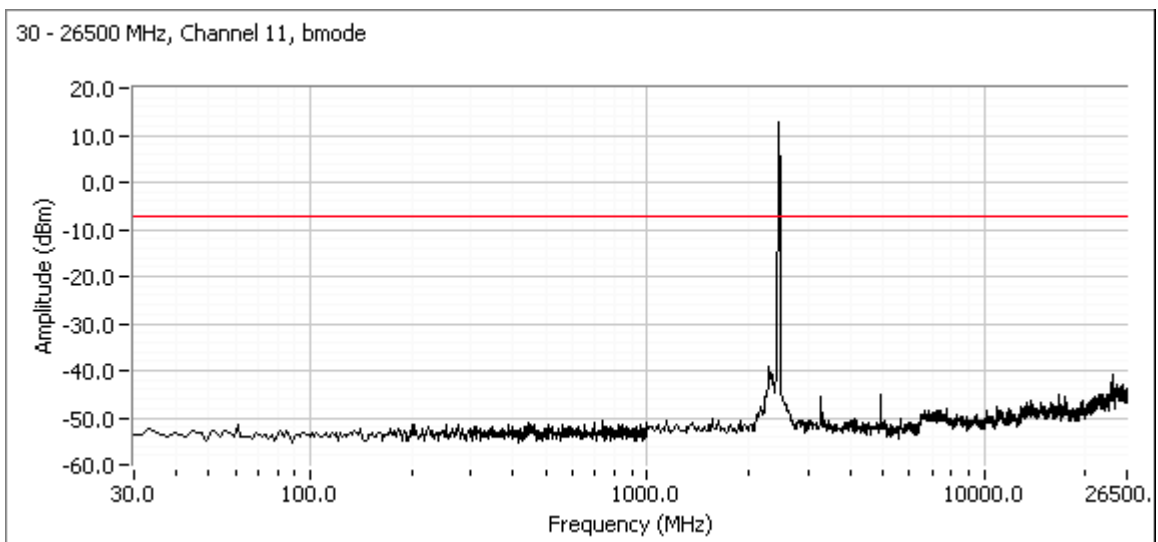
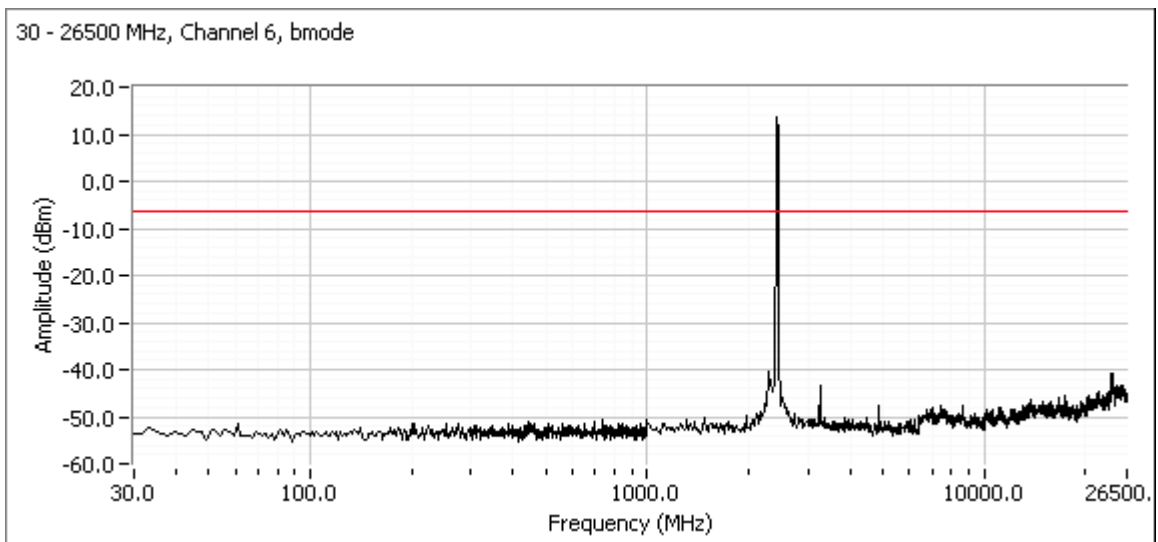
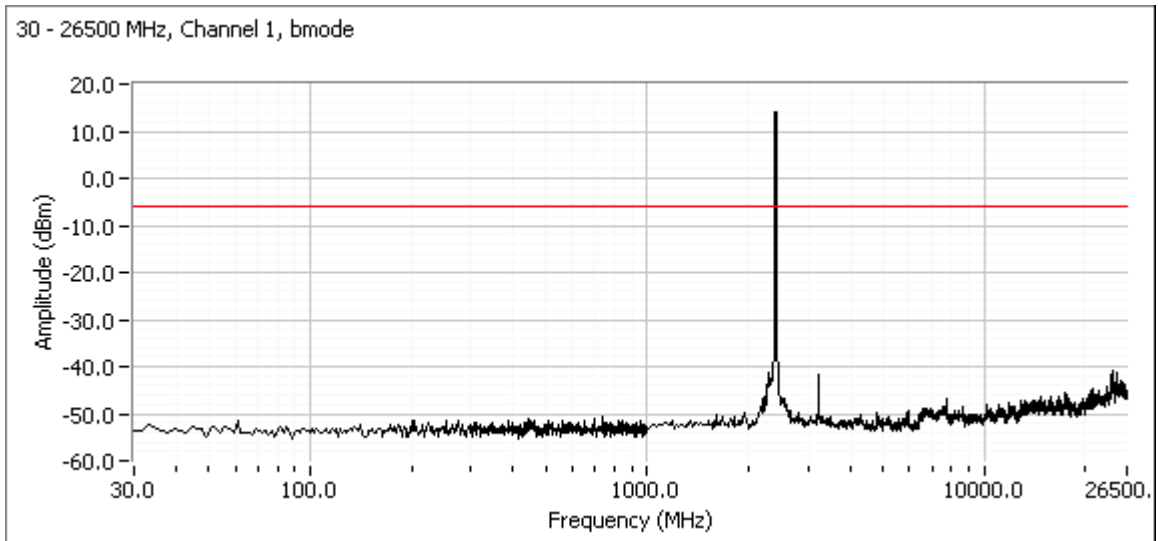
The test was configured as a standard EN55022 Class B radiated emissions test setup. Emissions were measured on the entire access point, not only the receiver. The access point was transmitting at the time, however all the frequency generating circuitry of the receiver as well as the digital circuitry was also powered on.. The frequency range of 30 to 26.5 GHz was scanned.

Results:

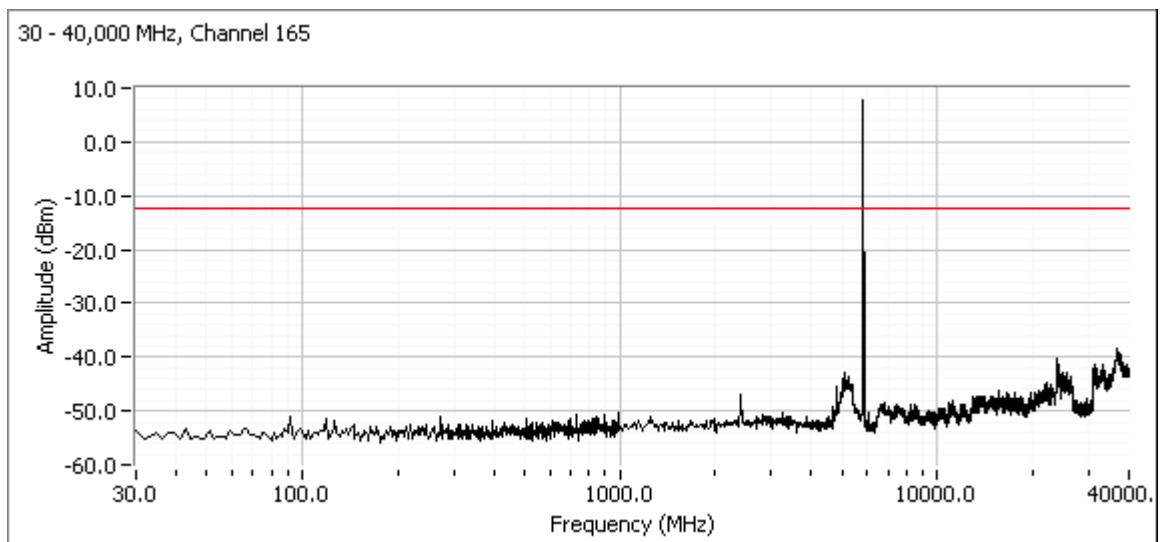
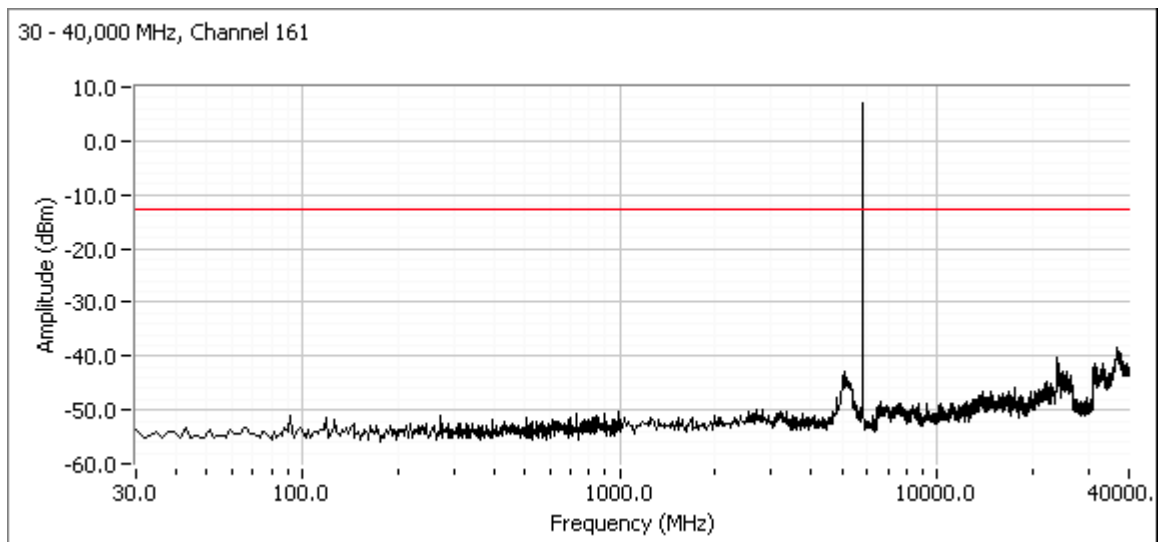
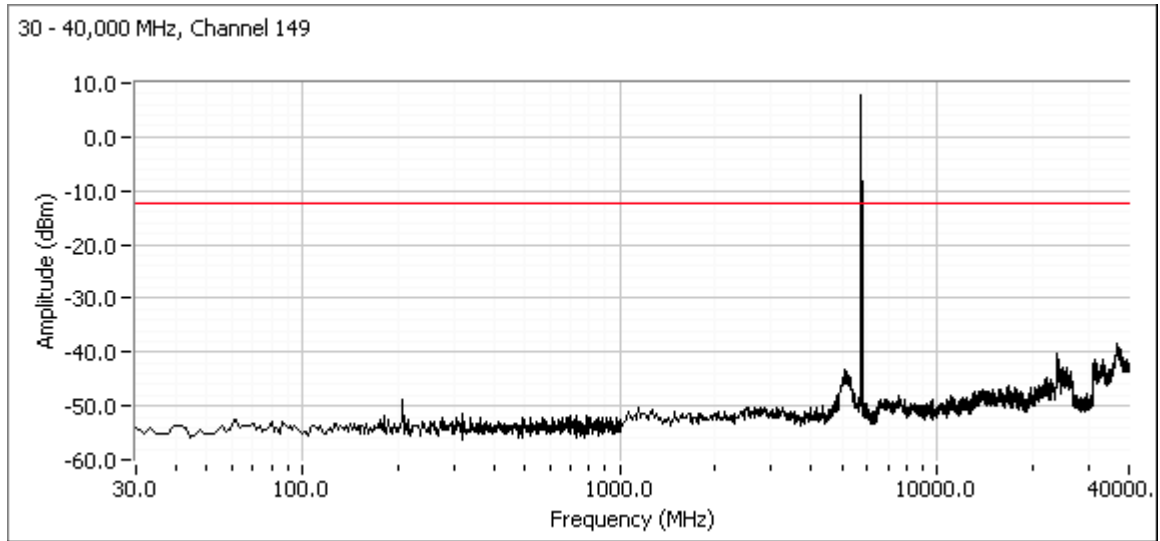
The detected emissions are presented in the plots below. In no case was an emission visible near the limit..

Transmitting on Channels 1 , 6, and 11, 802.11 G Mode

Transmitting on Channels 1 , 6, and 11, 802.11 B Mode



Transmitting on Channels 149, 161, 165, 802.11 A Mode



AC Line Conducted Emissions

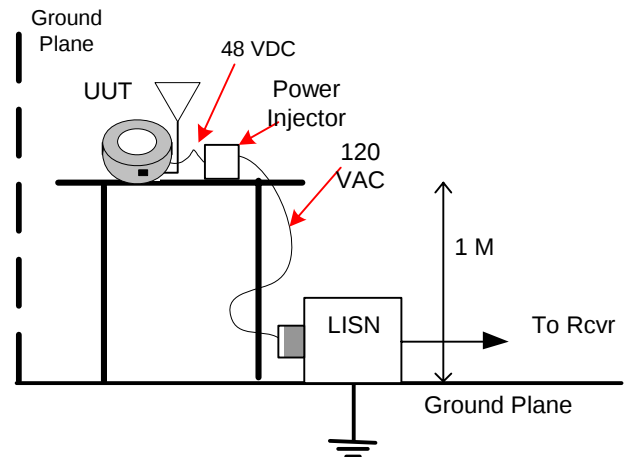
Specification:

Specification: CISPR 22 / EN55022 B

Procedure:

The test was set up according to the guidelines set forth in EN55022:1998 and FCC Part 2 for AC Line Conducted Emissions. The measurement used a LISN line on each AC line and an EMI receiver. A peak scan was made over the measurement frequency range (150 kHz to 30 MHz). The highest peaks were then marked and re-measured and quasi-peaked and averaged.

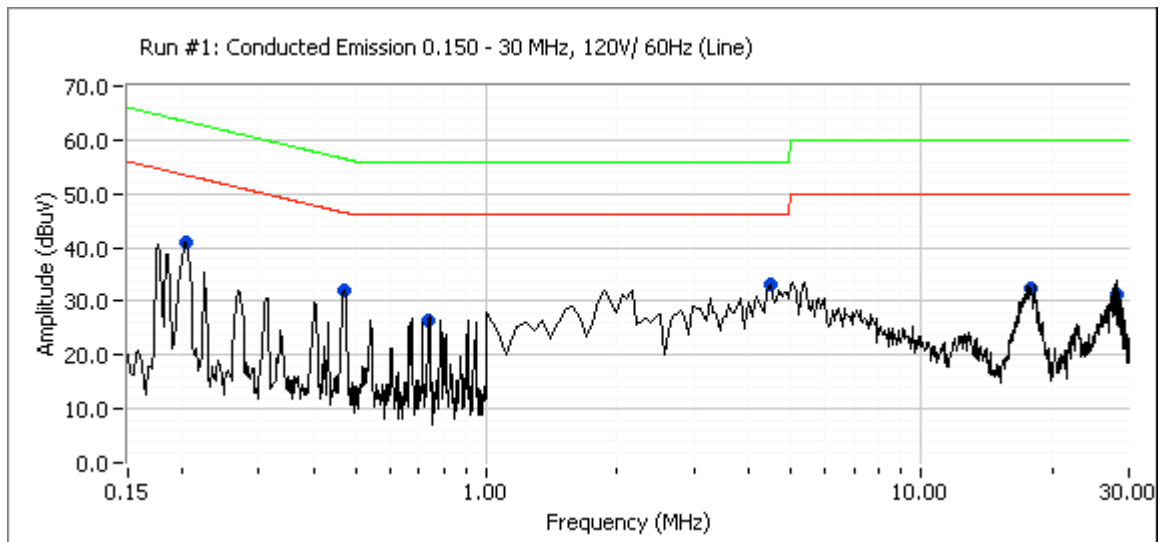
The test was configured as shown below. The product was tested with “power injector” running on 120 VAC @ 60 Hz. The power injector provides -48VDC onto an Ethernet cable to power the access point. The AP was configured to transmit high power on both 2.4 and 5 GHz simultaneously. This presents the largest t load to the power supply and results in the worst case conducted emissions.



AC line Conducted Emissions Results

Frequency MHz	Level dBμV	AC Line	EN55022 B		Detector QP/Ave
			Limit	Margin	
0.469	27.4	Line	46.5	-19.1	Average
4.478	26.9	Neutral	46.0	-19.1	Average
0.469	26.2	Neutral	46.5	-20.3	Average
2.206	24.7	Line	46.0	-21.3	Average
17.440	28.2	Line	50.0	-21.8	Average
0.200	30.4	Neutral	53.6	-23.2	Average
0.200	40.0	Neutral	63.6	-23.6	QP
4.478	31.6	Neutral	56.0	-24.4	QP
0.202	38.5	Line	63.5	-25.0	QP
0.469	31.2	Line	56.5	-25.4	QP
0.469	31.1	Neutral	56.5	-25.5	QP
0.736	20.5	Neutral	46.0	-25.5	Average
0.202	27.8	Line	53.5	-25.8	Average
2.206	27.9	Line	56.0	-28.2	QP
17.440	30.4	Line	60.0	-29.6	QP
0.164	35.4	Line	65.3	-29.8	QP
0.736	25.3	Neutral	56.0	-30.7	QP
0.164	13.4	Line	55.3	-41.8	Average

AC Line conducted emissions, LINE



AC Line conducted emissions, NEUTRAL

