

# ENGINEERING TEST REPORT



**HiPath Wireless Access Point**  
**Model No.: AP2620 and AP2640**  
**(Class II Permissive Changes for Additional Antennas)**

**FCC ID: REB-APXXX1**

*Applicant:*

**Chantry Networks Inc. - A Siemens Company**  
1900 Minnesota Court, Suite 125  
Mississauga, Ontario  
Canada L5N 3C9

*In Accordance With*

**FEDERAL COMMUNICATIONS COMMISSION (FCC)**  
**Part 15, Subpart C, Section 15.247 - Digital Modulation Transmitters Operating in the**  
**Frequency Band 2400 - 2483.5 MHz and 5.725-5.850 GHz**  
**&**  
**Part 15, Subpart E**  
**Unlicensed National Information Infrastructure Devices**  
**Operating in Frequency Bands 5.15-5.25 GHz (indoor operation only) and 5.25-5.35 GHz**

**UltraTech's File No.: CNI-086FCC15CE-C2PC**

This Test report is Issued under the Authority of  
Tri M. Luu, Professional Engineer,  
Vice President of Engineering  
UltraTech Group of Labs

Date: December 19, 2006



Report Prepared by: Dan Huynh

Tested by: Mr. Hung Trinh, RFI Technologist

Issued Date: December 19, 2006

Test Dates: October 9 – November 21, 2006

- The results in this Test Report apply only to the sample(s) tested, and the sample tested is randomly selected.*
- This report must not be used by the client to claim product endorsement by NVLAP or any agency of the US Government.*

## UltraTech

3000 Bristol Circle, Oakville, Ontario, Canada, L6H 6G4

Tel.: (905) 829-1570 Fax.: (905) 829-8050

Website: [www.ultratech-labs.com](http://www.ultratech-labs.com), Email: [vic@ultratech-labs.com](mailto:vic@ultratech-labs.com), Email: [tri@ultratech-labs.com](mailto:tri@ultratech-labs.com)



0685



31040/SIT



C-1376



46390-2049



200093-0



SL2-IN-E-1119R

## TABLE OF CONTENTS

<b>EXHIBIT 1. INTRODUCTION.....</b>	<b>1</b>
1.1. SCOPE .....	1
1.2. RELATED SUBMITTAL(S)/GRANT(S).....	1
1.3. NORMATIVE REFERENCES .....	2
<b>EXHIBIT 2. PERFORMANCE ASSESSMENT .....</b>	<b>3</b>
2.1. CLIENT INFORMATION.....	3
2.2. EQUIPMENT UNDER TEST (EUT) INFORMATION .....	3
2.3. EUT'S TECHNICAL SPECIFICATIONS .....	4
2.4. LIST OF EUT'S PORTS.....	5
2.5. ANCILLARY EQUIPMENT .....	5
2.6. GENERAL TEST SETUP.....	6
<b>EXHIBIT 3. EUT OPERATING CONDITIONS AND CONFIGURATIONS DURING TESTS.....</b>	<b>7</b>
3.1. CLIMATE TEST CONDITIONS .....	7
3.2. OPERATIONAL TEST CONDITIONS & ARRANGEMENT FOR TESTS.....	7
<b>EXHIBIT 4. SUMMARY OF TEST RESULTS.....</b>	<b>8</b>
4.1. LOCATION OF TESTS.....	8
4.2. MODIFICATIONS INCORPORATED IN THE EUT FOR COMPLIANCE PURPOSES.....	8
4.3. APPLICABILITY & SUMMARY OF EMC EMISSION TEST RESULTS @ FCC 15.247 .....	8
4.4. APPLICABILITY & SUMMARY OF EMC EMISSION TEST RESULTS @ FCC 15.407 .....	9
4.5. RF EXPOSURE & INTERMODULATION FOR MULTIPLE TRANSMISSION @ FCC 15.247 & 15.407.....	9
<b>EXHIBIT 5. TEST DATA [§ 15.247 – OPERATION WITHIN THE BANDS 2400-2483.5 MHz and 5725-5850 MHz] .....</b>	<b>10</b>
5.1. OUTPUT POWER (CONDUCTED) [§ 15.247(b)] .....	10
5.2. SPURIOUS EMISSIONS (RADIATED @ 3 METERS) [§§ 15.247(c), 15.209 & 15.205] .....	19
<b>EXHIBIT 6. TEST DATA [§ 15.407 – OPERATION IN 5.15-5.35 GHz] .....</b>	<b>203</b>
6.1. POWER LIMITS [§ 15.407(a)].....	203
6.2. UNDESIRED EMISSIONS (RADIATED @ 3 METERS) [§ 15.407(b)] .....	211
6.3. RF EXPOSURE REQUIRMENTS [§ 15.407(f), 1.1310 & 2.1091] .....	226
6.4. INTERMODULATION FOR MULTIPLE TRANSMISSION ON A TRANSMITTING ANTENNA.....	228
<b>EXHIBIT 7. MEASUREMENT UNCERTAINTY.....</b>	<b>231</b>
7.1. RADIATED EMISSION MEASUREMENT UNCERTAINTY.....	231
<b>EXHIBIT 8. MEASUREMENT METHODS.....</b>	<b>232</b>
8.1. GENERAL TEST CONDITIONS.....	232
8.2. SPURIOUS EMISSIONS (RADIATED).....	233

## EXHIBIT 1. INTRODUCTION

### 1.1. SCOPE

<b>Reference:</b>	<ul style="list-style-type: none"><li>FCC Part 15, Subpart C, Section 15.247</li><li>FCC Part 15, Subpart E - Unlicensed National Information Infrastructure Devices</li></ul>
<b>Title:</b>	Code of Federal Regulations (CFR) Title 47 - Telecommunication, Part 15
<b>Purpose of Test:</b>	Class II Permissive Change for additional antennas; see Table 1.1.1 Antennas List for details.
<b>Environmental Classification:</b>	<ul style="list-style-type: none"><li>Residential</li><li>Commercial, industrial or business</li></ul>

**Table 1.1.1 Antennas List**

Antenna #	Type	Model	Frequency Range (MHz)	Gain (dBi)	Coax Cable Length/Type	RF Connector Type
<b>Cushcraft Corporation</b>						
1	Directional	SR2405135D	2400-2500	5	3 feet / 19AWG CMP(ETL) C(ETL) 9700851	RPSMA
2	Omni, 2 inputs	S24493DS	2400-2500 & 4900-5900	3	3 feet / 19AWG CMP(ETL) C(ETL) 9700851	RPSMA, 2ea.
3	Omni	SL24513P	2400-2500 & 5150-5350	3	3 feet / 19AWG CMP(ETL) C(ETL) 9700851	RPSMA
4	Directional	S24497P	2400-2500 & 4900-5990	7	3 feet / 19AWG CMP(ETL) C(ETL) 9700851	RPSMA
<b>Hyperlink Technologies</b>						
5	Omni	HG2458CU	2300-2600 & 4900-6000	3	1 foot / 20AWG Coleman Cable 921021	N-Female
<b>Maxrad</b>						
6	Omni, 2 inputs	MDO24005PTRPMSMA	2400-2485	5.2	3 feet / 19AWG CMP(ETL) C(ETL) 9700851	RPSMA, 2ea

### 1.2. RELATED SUBMITTAL(S)/GRANT(S)

None.

### 1.3. NORMATIVE REFERENCES

Publication	Year	Title
FCC CFR Part 15	2006	Code of Federal Regulations – Telecommunication
ANSI C63.4	2003	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
CISPR 22 EN 55022 +A1 +A2	2003-04-10 1998 2000 2003	Information Technology Equipment - Radio Disturbance Characteristics - Limits and Methods of Measurement
CISPR 16-1-1	2003	Specification for Radio Disturbance and Immunity measuring apparatus and methods
FCC Test Procedures	Mar. 23, 2005	Measurement of Digital Transmission Systems. Operating under Section 15.247
FCC Docket	2003	Revision of Parts 2 and 15 of Commission's Rules to permit Unlicensed National Information Infrastructure (U-NII) Devices in the 5 GHz band
FCC Procedures	2001	Guidelines for Assessing Unlicensed National Information Infrastructure Devices (UNII)-Part 15 Subpart E - November 2001

## EXHIBIT 2. PERFORMANCE ASSESSMENT

### 2.1. CLIENT INFORMATION

APPLICANT	
<b>Name:</b>	Chantry Networks Inc. - A Siemens Company
<b>Address:</b>	1900 Minnesota Court, Suite 125 Mississauga, Ontario Canada, L5N 3C9
<b>Contact Person:</b>	Mr. Steve Franjic Phone #: 905-363-6400 (6417) Fax #: 905-567-0099 Email Address: steve.franjic@siemens.com

MANUFACTURER	
<b>Name:</b>	Celestica Kladno SRO
<b>Address:</b>	Billundská 311 27201 Kladno Czech Republic
<b>Contact Person:</b>	Jozef Trabalka Phone #: 420 312 821 100 Fax #: n/a

### 2.2. EQUIPMENT UNDER TEST (EUT) INFORMATION

<b>Brand Name:</b>	Chantry Networks Inc. - A Siemens Company
<b>Product Name:</b>	HiPath Wireless Access Point
<b>Model Name or Number:</b>	AP2620 and AP2640
<b>Serial No.:</b>	0500006092051177
<b>Part No.:</b>	S30122-X8000-X11 REV: 5
<b>CPU's Frequencies:</b>	25 MHz and 40 MHz
<b>Power input source:</b>	Generic External AC/DC Adapter

## 2.3. EUT'S TECHNICAL SPECIFICATIONS

TRANSMITTER	
<b>Equipment Type:</b>	Base / Mobile
<b>Intended Operating Environment:</b>	<ul style="list-style-type: none"> <li>▪ Residential</li> <li>▪ Commercial, light industry &amp; heavy industry</li> </ul>
<b>Power Supply Requirement:</b>	6.0V @ 2.0A at input of unit using a generic FCC, IC & CE approved external AC-DC adaptor.
<b>RF Output Power Rating:</b>  <b>Model AP2620/AP2640 with External Antennas:</b> <ul style="list-style-type: none"> <li>▪ 802.11b (2412-2462 MHz):</li> <li>▪ 802.11g (2412-2462 MHz):</li> <li>▪ 802-11a (5180-5240 MHz):</li> <li>▪ 802-11a (5260-5320 MHz):</li> <li>▪ 802-11a (5745-5825 MHz):</li> </ul>	<b>Model AP2620/AP2640 with External Antennas:</b> <ul style="list-style-type: none"> <li>▪ 17.5 to 21.0 dBm (Power Settings: 16.0 to 20.0 dBm)</li> <li>▪ 16.7 to 23.3 dBm (Power Settings: 10.5 to 20.0 dBm)</li> <li>▪ 14.6 to 14.9 dBm (Power Settings: 18 dBm)</li> <li>▪ 14.8 to 14.9 dBm (Power Settings: 18 dBm)</li> <li>▪ 20.8 to 23.0 dBm (Power Settings: 15.0 to 19.0 dBm)</li> </ul> <p>See output power measurements in this test report for details</p>
<b>Operating Frequency Range:</b>	<ul style="list-style-type: none"> <li>▪ 802.11b (2412-2462 MHz)</li> <li>▪ 802.11g (2412-2462 MHz)</li> <li>▪ 802-11a (5180-5240 MHz)</li> <li>▪ 802-11a (5260-5320 MHz)</li> <li>▪ 802-11a (5745-5825 MHz)</li> </ul>
<b>RF Output Impedance:</b>	50 ohms
<b>Channel Spacing:</b>	<ul style="list-style-type: none"> <li>▪ 5 MHz for 802.11b/g</li> <li>▪ 20MHz for 802.11a</li> </ul>
<b>Occupied Bandwidths:</b>	<ul style="list-style-type: none"> <li>▪ 802.11b (2412-2462 MHz):</li> <li>▪ 802.11g (2412-2462 MHz):</li> <li>▪ 802-11a (5180-5240 MHz):</li> <li>▪ 802-11a (5260-5320 MHz):</li> <li>▪ 802-11a (5745-5825 MHz):</li> </ul> <ul style="list-style-type: none"> <li>▪ 11.6 MHz (6 dB BW)</li> <li>▪ 16.6 MHz (6 dB BW)</li> <li>▪ 16.6 MHz (6 dB BW)</li> <li>▪ 26.1 MHz (26 dB BW)</li> <li>▪ 27.2 MHz (26 dB BW)</li> </ul>
<b>Duty Cycle:</b>	100%
<b>Modulation Type:</b>	BPSK, QPSK, CCK and OFDM
<b>Antenna Connector Type:</b>	Non-integral (2 external antennas, using RPSMA connectors for mating).

<b>RECEIVER</b>	
<b>Operating Frequency Range:</b>	<ul style="list-style-type: none"><li>▪ 802.11b (2412-2462 MHz)</li><li>▪ 802.11g (2412-2462 MHz)</li><li>▪ 802-11a (5180-5240 MHz)</li><li>▪ 802-11a (5260-5320 MHz)</li><li>▪ 802-11a (5745-5825 MHz)</li></ul>
<b>RF Output Impedance:</b>	50 ohms
<b>Channel Spacing:</b>	5 MHz for 802.11b/g and 20MHz for 802.11a
<b>Antenna Connector Type:</b>	Same as transmitter
<b>Antenna Description:</b>	Same as transmitter

## 2.4. LIST OF EUT'S PORTS

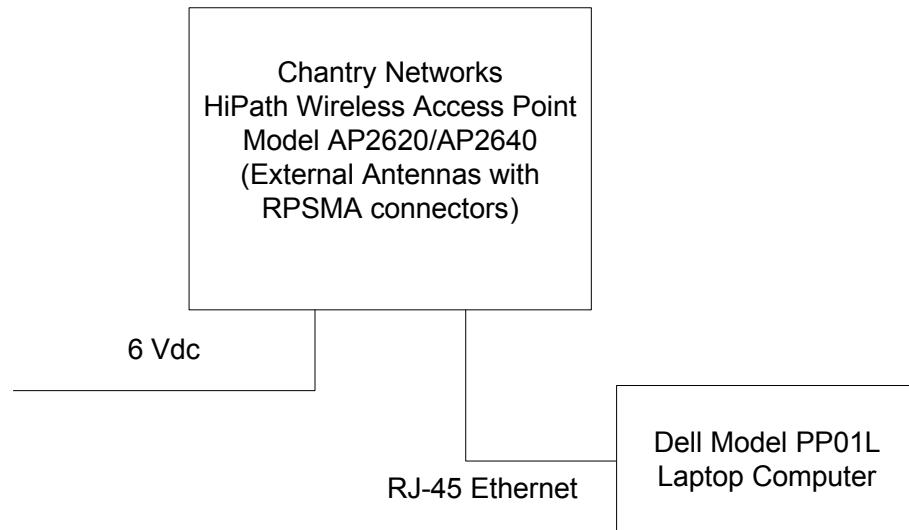
Port Number	EUT's Port Description	Number of Identical Ports	Connector Type	Cable Type (Shielded/Non-shielded)
1	Ethernet port	1	RJ45	Non-shielded
2	DC in port	1	RAPC712 equivalent	Non-shielded
3	RF Antenna port (external antenna version only)	2	Reverse-polarity SMA (RPSMA)	N/A – mates directly to antennae or shielded antenna cable

## 2.5. ANCILLARY EQUIPMENT

The EUT was tested while connected to the following representative configuration of ancillary equipment necessary to exercise the ports during tests:

<b>Ancillary Equipment # 1</b>	
Description:	Laptop Computer
Brand name:	Dell
Model Name or Number:	PP01L
FCC Approval:	FCC Class B -DoC
Connected to EUT's Port:	RJ-45 Ethernet

## 2.6. GENERAL TEST SETUP



## EXHIBIT 3. EUT OPERATING CONDITIONS AND CONFIGURATIONS DURING TESTS

### 3.1. CLIMATE TEST CONDITIONS

The climate conditions of the test environment are as follows:

Temperature:	21°C
Humidity:	51%
Pressure:	102 kPa
Power input source:	6 Vdc using external AC/DC adaptor

### 3.2. OPERATIONAL TEST CONDITIONS & ARRANGEMENT FOR TESTS

<b>Operating Modes:</b>	<ul style="list-style-type: none"><li>Each of lowest, middle and highest channel frequencies transmits continuously for emissions measurements.</li><li>The EUT operates in normal Direct Sequence mode for occupancy duration, and frequency separation.</li></ul>
<b>Special Test Software:</b>	Special software is provided by the Applicant to select and operate the EUT at each channel frequency continuously and for co-location testing, simultaneously on both 2.4 and 5 GHz. For example, the transmitter will be operated at each of lowest, middle and highest frequencies individually continuously during testing.
<b>Special Hardware Used:</b>	N/A
<b>Transmitter Test Antenna:</b>	The EUT is tested with the antenna fitted in a manner typical of normal intended use.

<b>Transmitter Test Signals</b>
<b>Frequency(ies) Tested:</b> <ul style="list-style-type: none"><li>802.11b/g (2412-2462 MHz): 2412, 2417, 2422, 2427, 2432, 2437, 2442, 2447 2452, 2457 and 2462 MHz</li><li>802.11a (5180-5240 MHz): 5180, 5220 and 5240 MHz</li><li>802.11a (5260-5320 MHz): 5260, 5300 and 5320 MHz</li><li>802.11a (5745-5825 MHz): 5745, 5765, 5785, 5805 and 5825 MHz</li></ul>
<b>Transmitter Wanted Output Test Signals (Model AP2620/AP2640 with External Antennas):</b> <ul style="list-style-type: none"><li>802.11b (2412-2462 MHz): 17.5 to 21.0 dBm (Power Settings: 16.0 to 20.0 dBm)</li><li>802.11g (2412-2462 MHz): 16.7 to 23.3 dBm (Power Settings: 10.5 to 20.0 dBm)</li><li>802.11a (5180-5240 MHz): 14.6 to 14.9 dBm (Power Settings: 18 dBm)</li><li>802.11a (5260-5320 MHz): 14.8 to 14.9 dBm (Power Settings: 18 dBm)</li><li>802.11a (5745-5825 MHz): 20.8 to 23.0 dBm (Power Settings: 15.0 to 19.0 dBm)</li></ul>

## EXHIBIT 4. SUMMARY OF TEST RESULTS

### 4.1. LOCATION OF TESTS

All of the measurements described in this report were performed at Ultratech Group of Labs located in the city of Oakville, Province of Ontario, Canada.

- AC Powerline Conducted Emissions were performed in UltraTech's shielded room, 16'(L) by 12'(W) by 12'(H).
- Radiated Emissions were performed at the Ultratech's 3-10 Meter Open Field Test Site (OFTS) situated in the Town of Oakville, province of Ontario. This test site has been calibrated in accordance with ANSI C63.4, and found to be in compliance with the requirements of Sec. 2.948 of the FCC Rules. The descriptions and site measurement data of the Oakville Open Field Test Site has been filed with FCC office (FCC File No.: 31040/SIT 1300B3) and Industry Canada office (Industry Canada File No.: IC2049). Last Date of Site Calibration: Jan. 10, 2006.

### 4.2. MODIFICATIONS INCORPORATED IN THE EUT FOR COMPLIANCE PURPOSES

None.

### 4.3. APPLICABILITY & SUMMARY OF EMC EMISSION TEST RESULTS @ FCC 15.247

FCC Section(s)	Test Requirements	Compliance (Yes/No)
15.107(a) & 15.207	AC Power Conducted Emissions	N/A
15.247(a)(2)	6dB Bandwidth of a Digital Modulation System	N/A
15.247(b) & 1.1310	Maximum Peak Power (Conducted)	Yes
15.247(c)	RF Conducted Spurious Emissions at the Transmitter Antenna Terminal	N/A
15.247(d)	Transmitted Power Density of a Digital Modulation System	N/A
15.247(c), 15.209 & 15.205	Transmitter Radiated Emissions	Yes
15.109	Class B Radiated Emissions	Yes

#### 4.4. APPLICABILITY & SUMMARY OF EMC EMISSION TEST RESULTS @ FCC 15.407

FCC Section(s)	Test Requirements	Compliance (Yes/No)
15.203 & 15.204(c)	Antenna requirements	Yes.
15.407(e)	Within the 5.15-5.25 GHz band, U-NII devices will be restricted to indoor operations to reduce any potential for harmful interference to co-channel MSS operations	Yes.
15.407(c)	The device shall automatically discontinue transmission in case of either absence of information to transmit or operational failure. These provisions are not intended to preclude the transmission of control or signalling information or the use of repetitive codes used by certain digital technologies to complete frame or burst intervals. Applicants shall include in their application for equipment authorization a description of how this requirement is met.	Yes.
15.407(g)	Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the users manual	Yes.
15.407(a)	Power Limits (Peak Transmit Power and Power Spectral Density) & 26 dB Bandwidth	Yes, only Transmit Power need to be re-test to ensure the continuing compliance with the original grant
15.407(b)	Band-edge & Undesired Emissions (Conducted)	N/A for Class II Permissive Change
15.407(b), 15.205 & 15.209	Band-edge & Undesired Emissions (Radiated)	Yes.
15.107 & 15.207	Class B - AC Power Conducted Emissions on Tx, Rx and standby modes	Yes. A separate test report will be provided upon request.
15.109(a)	Class B - Radiated Emissions from Unintentional Radiators	Yes. A separate test report will be provided upon request.

#### 4.5. RF EXPOSURE & INTERMODULATION FOR MULTIPLE TRANSMISSION @ FCC 15.247 & 15.407

FCC Section(s)	Test Requirements	Compliance (Yes/No)
15.407(f), 1.1307, 1.1310, 2.1091 & 2.1093	RF Exposure Limit	Yes.
N/A	Intermodulation	Yes

## EXHIBIT 5. TEST DATA [§ 15.247 – OPERATION WITHIN THE BANDS 2400-2483.5 MHz and 5725-5850 MHz]

### 5.1. OUTPUT POWER (CONDUCTED) [§ 15.247(b)]

#### 5.1.1. Limits

- **FCC 15.247(b)(3):** Maximum peak output power of the transmitter shall not exceed 1 Watt.
- **FCC 15.247(b)(4):** If transmitting antennas of directional gain greater than 6 dBi are used the peak output power from the intentional radiator shall be reduced below the stated values, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

#### 5.1.2. Test Equipment List

Test Instruments	Manufacturer	Model No.	Serial No.	Frequency Range
Spectrum Analyzer/ EMI Receiver	Rohde & Schwarz	FSEK20/B4/B21	834157/005	9 kHz – 40 GHz with external mixer
RF Signal Generator	Hewlett Packard	HP 83752B	3610A00457	0.01 – 20 GHz
67297 RF Detector (Diode Detector)	Herotex	DZ122-553	63400	..
Storage Oscilloscope	Philips	PM3320A	ST9907959	--

#### 5.1.3. Method of Measurements & Test Arrangement

Refer to "FCC Measurement of Digital Transmission Systems Operating under Section 15.247 - March 23, 2005"

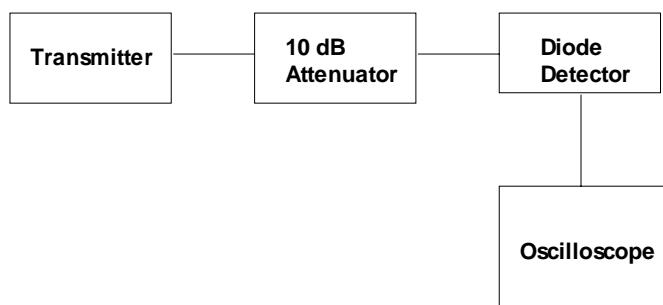
This is an RF conducted test. Use a direct connection between the antenna port of the transmitter, peak diode detector and oscilloscope, through suitable attenuation. Power Output Option 1, total peak output power measurement, was used to test this DTS device.

#### Power Output Option 1:

The total peak power was measured using peak detector diode method as described below:

##### Step 1:

- Connect the transmitter output to a diode detector through an attenuator
- Connect the diode detector to the vertical channel of an oscilloscope.
- Observe and record the y parameter of the DC level on the oscilloscope.



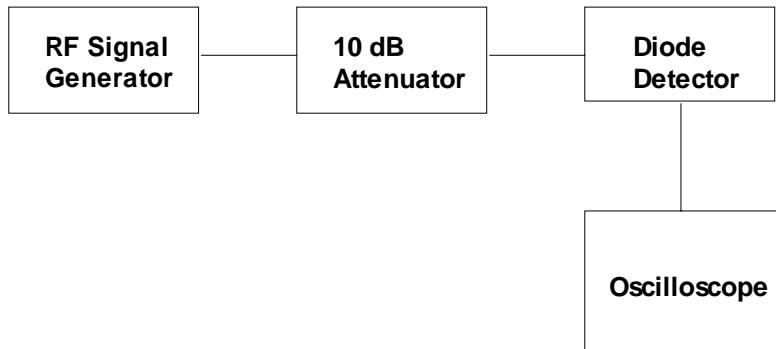
**Step 2: Peak Power Measurements**

- Replace the transmitter by a RF signal generator
- Set the signal generator frequency be the same as the transmitter frequency
- Adjust the rf output level of the RF signal generator until the DC level on the oscilloscope is same as that (y) recorded in step 1.
- Measure the RF signal generator output level using a power meter
- Calculate the total peak power (Pp) by adding the signal generator level with the attenuator value and the cable loss.
- Calculate the peak EIRP:  $EIRP = Pp + G$

Where: EIRP: Effective isotropic radiated power in dBm

Pp: Peak conducted power in dBm

G: Transmitter antenna gain in dBi



#### 5.1.4. Test Data

##### Method of Output Power Measurements:

Option #1: Total Peak Power using Peak Diode Detector for 802.11b, 802.11g and 802.11a

##### **5.1.4.1. Test Configuration #1: Power Setting for Antenna #1 Cushcraft Directional Antenna (Model SR2405135D, 5 dBi gain), 802.11b Modulation (CCK @ 11 Mbps)**

Frequency (MHz)	Art Software Setting (dBm)	Peak Power at Antenna Terminals	
		(dBm)	(mW)
2412	16.5	17.60	57.54
2417	17.5	17.80	60.26
2422	20.0	20.80	120.23
2427	20.0	21.00	125.89
2432	20.0	20.10	102.33
2437	20.0	20.30	107.15
2442	20.0	20.00	100.00
2447	20.0	20.10	102.33
2452	20.0	20.10	102.33
2457	19.0	20.00	100.00
2462	19.5	19.80	95.50

##### **5.1.4.2. Test Configuration #2: Power Setting for Antenna #2 Cushcraft Omni Antenna (Model S24493DS, 3 dBi gain), 802.11b Modulation (CCK @ 11 Mbps)**

Frequency (MHz)	Art Software Setting (dBm)	Peak Power at Antenna Terminals	
		(dBm)	(mW)
2412	18.0	17.90	61.66
2417	17.5	17.80	60.26
2422	20.0	20.80	120.23
2427	20.0	21.00	125.89
2432	20.0	20.10	102.33
2437	20.0	20.30	107.15
2442	20.0	20.00	100.00
2447	20.0	20.10	102.33
2452	20.0	20.10	102.33
2457	20.0	20.10	102.33
2462	20.0	19.90	97.72

**5.1.4.3. Test Configuration #3: Power Setting for Antenna #3 Cushcraft Omni Antenna (Model SL24513P, 3 dBi gain), 802.11b Modulation (CCK @ 11 Mbps)**

Frequency (MHz)	Art Software Setting (dBm)	Peak Power at Antenna Terminals (dBm)	(mW)
2412	17.5	17.80	60.26
2417	17.5	17.80	60.26
2422	20.0	20.80	120.23
2427	20.0	21.00	125.89
2432	20.0	20.10	102.33
2437	20.0	20.30	107.15
2442	20.0	20.00	100.00
2447	20.0	20.10	102.33
2452	20.0	20.10	102.33
2457	20.0	20.10	102.33
2462	20.0	19.90	97.72

**5.1.4.4. Test Configuration #4: Power Setting for Antenna #4 Cushcraft Directional Antenna (Model S24497P, 7 dBi gain), 802.11b Modulation (CCK @ 11 Mbps)**

Frequency (MHz)	Art Software Setting (dBm)	Peak Power at Antenna Terminals (dBm)	(mW)
2412	16.5	17.60	57.54
2417	16.0	17.50	56.23
2422	20.0	20.80	120.23
2427	20.0	21.00	125.89
2432	20.0	20.10	102.33
2437	20.0	20.30	107.15
2442	20.0	20.00	100.00
2447	20.0	20.10	102.33
2452	20.0	20.10	102.33
2457	20.0	20.10	102.33
2462	20.0	19.90	97.72

**5.1.4.5. Test Configuration #5: Power Setting for Antenna #5 Hyperlink Technologies Omni Antenna (Model HG2458CU, 3 dBi gain), 802.11b Modulation (CCK @ 11 Mbps)**

Frequency (MHz)	Art Software Setting (dBm)	Peak Power at Antenna Terminals (dBm) (mW)	
2412	17.5	17.80	60.26
2417	17.5	17.80	60.26
2422	20.0	20.80	120.23
2427	20.0	21.00	125.89
2432	20.0	20.10	102.33
2437	20.0	20.30	107.15
2442	20.0	20.00	100.00
2447	20.0	20.10	102.33
2452	20.0	20.10	102.33
2457	20.0	20.10	102.33
2462	20.0	19.90	97.72

**5.1.4.6. Test Configuration #6: Power Setting for Antenna #6 Maxrad Omni, 2 Inputs Antenna (Model MDO24005PTRPMSMA, 5.2 dBi gain), 802.11b Modulation (CCK @ 11 Mbps)**

Frequency (MHz)	Art Software Setting (dBm)	Peak Power at Antenna Terminals (dBm) (mW)	
2412	17.5	17.80	60.26
2417	17.5	17.80	60.26
2422	20.0	20.80	120.23
2427	20.0	21.00	125.89
2432	20.0	20.10	102.33
2437	20.0	20.30	107.15
2442	20.0	20.00	100.00
2447	20.0	20.10	102.33
2452	20.0	20.10	102.33
2457	20.0	20.10	102.33
2462	20.0	19.90	97.72

**5.1.4.7. Test Configuration #7: Power Setting for Antenna #1 Cushcraft Directional Antenna (Model SR2405135D, 5 dBi gain), 802.11g Modulation (64QAM @ 54Mbps)**

Frequency (MHz)	Art Software Setting (dBm)	Peak Power at Antenna Terminals (dBm)	(mW)
2412	10.5	16.70	46.77
2417	14.0	20.50	112.20
2422	15.5	21.50	141.25
2427	16.0	22.00	158.49
2432	16.0	22.20	165.96
2437	16.5	22.30	169.82
2442	20.0	23.30	213.80
2447	19.0	22.90	194.98
2452	18.5	22.30	169.82
2457	17.0	22.00	158.49
2462	14.5	20.60	114.82

**5.1.4.8. Test Configuration #8: Power Setting for Antenna #2 Cushcraft Omni Antenna (Model S24493DS, 3 dBi gain), 802.11g Modulation (64QAM @ 54Mbps)**

Frequency (MHz)	Art Software Setting (dBm)	Peak Power at Antenna Terminals (dBm)	(mW)
2412	13.0	19.30	85.11
2417	15.0	21.50	141.25
2422	16.0	22.20	165.96
2427	18.0	22.90	194.98
2432	18.5	23.00	199.53
2437	19.5	23.20	208.93
2442	20.0	23.30	213.80
2447	19.5	22.90	194.98
2452	18.5	22.60	181.97
2457	17.5	22.30	169.82
2462	15.5	21.00	125.89

**5.1.4.9. Test Configuration #9: Power Setting for Antenna #3 Cushcraft Omni Antenna (Model SL24513P, 3 dBi gain), 802.11g Modulation (64QAM @ 54Mbps)**

Frequency (MHz)	Art Software Setting (dBm)	Peak Power at Antenna Terminals (dBm)	(mW)
2412	13.5	19.60	91.20
2417	15.5	21.70	147.91
2422	16.5	22.50	177.83
2427	18.0	22.90	194.98
2432	19.0	23.10	204.17
2437	19.5	23.20	208.93
2442	20.0	23.30	213.80
2447	19.0	22.80	190.55
2452	18.5	22.60	181.97
2457	17.5	22.30	169.82
2462	15.5	21.00	125.89

**5.1.4.10. Test Configuration #10: Power Setting for Antenna #4 Cushcraft Directional Antenna (Model S24497P, 7 dBi gain), 802.11g Modulation (64QAM @ 54Mbps)**

Frequency (MHz)	Art Software Setting (dBm)	Peak Power at Antenna Terminals (dBm)	(mW)
2412	10.5	16.70	46.77
2417	14.0	20.50	112.20
2422	15.0	21.20	131.83
2427	16.0	22.00	158.49
2432	17.5	22.80	190.55
2437	17.5	22.70	186.21
2442	19.0	23.10	204.17
2447	18.5	22.80	190.55
2452	18.0	22.10	162.18
2457	17.0	22.00	158.49
2462	14.5	20.60	114.82

**5.1.4.11. Test Configuration #11: Power Setting for Antenna #5 Hyperlink Technologies Omni Antenna (Model HG2458CU, 3 dBi gain), 802.11g Modulation (64QAM @ 54Mbps)**

Frequency (MHz)	Art Software Setting (dBm)	Peak Power at Antenna Terminals (dBm)	(mW)
2412	12.5	19.20	83.18
2417	15.0	21.30	134.90
2422	16.5	22.50	177.83
2427	17.5	22.80	190.55
2432	18.5	22.90	194.98
2437	19.0	23.00	199.53
2442	20.0	23.30	213.80
2447	19.0	22.80	190.55
2452	18.0	22.40	173.78
2457	17.5	22.30	169.82
2462	15.5	21.00	125.89

**5.1.4.12. Test Configuration #12: Power Setting for Antenna #6 Maxrad Omni, 2 Inputs Antenna (Model MDO24005PTRPMSMA, 5.2 dBi gain), 802.11g Modulation (64QAM @ 54Mbps)**

Frequency (MHz)	Art Software Setting (dBm)	Peak Power at Antenna Terminals (dBm)	(mW)
2412	13.0	19.30	85.11
2417	14.5	21.20	131.83
2422	16.5	22.50	177.83
2427	17.0	22.60	181.97
2432	18.0	22.80	190.55
2437	19.5	23.20	208.93
2442	20.0	23.30	213.80
2447	20.0	23.30	213.80
2452	18.5	22.60	181.97
2457	18.0	22.10	162.18
2462	15.5	21.00	125.89

**5.1.4.13. Test Configuration #13: Power Setting for Antenna #2 Cushcraft Omni Antenna (Model S24493DS, 3 dBi gain), 802.11a Modulation (64QAM @ 54Mbps)**

Frequency (MHz)	Art Software Setting (dBm)	Peak Power at Antenna Terminals (dBm) (mW)	
5745	19.0	22.96	197.70
5765	18.0	22.86	193.20
5785	15.0	21.06	127.64
5805	16.0	21.46	139.96
5825	16.5	21.56	143.22

**5.1.4.14. Test Configuration #14: Power Setting for Antenna #4 Cushcraft Directional Antenna (Model S24497P, 7 dBi gain), 802.11a Modulation (64QAM @ 54Mbps)**

Frequency (MHz)	Art Software Setting (dBm)	Peak Power at Antenna Terminals (dBm) (mW)	
5745	19.0	22.96	197.70
5765	19.0	22.96	197.70
5785	18.0	22.46	176.20
5805	17.5	22.26	168.27
5825	18.5	22.56	180.30

**5.1.4.15. Test Configuration #15: Power Setting for Antenna #5 Hyperlink Technologies Omni Antenna (Model HG2458CU, 3 dBi gain), 802.11a Modulation (64QAM @ 54Mbps)**

Frequency (MHz)	Art Software Setting (dBm)	Peak Power at Antenna Terminals (dBm) (mW)	
5745	19.0	22.96	197.70
5765	17.0	22.16	164.44
5785	15.0	21.06	127.64
5805	15.0	20.76	119.12
5825	15.5	21.16	130.62

## 5.2. SPURIOUS EMISSIONS (RADIATED @ 3 METERS) [§§ 15.247(c), 15.209 & 15.205]

### 5.2.1. Limits

In any 100 KHz bandwidth outside the operating frequency band, the radio frequency power that is produced by modulation products of the spreading sequence, the information sequence and the carrier frequency shall be either at least 20 dB below that in any 100 KHz bandwidth within the band that contains the highest level of the desired power or shall not exceed the general levels specified in @ 15.209(a), which lesser attenuation.

All other emissions inside restricted bands specified in @ 15.205(a) shall not exceed the general radiated emission limits specified in @ 15.209(a)

#### Remarks:

- Applies to harmonics/spurious emissions that fall in the restricted bands listed in Section 15.205. The maximum permitted average field strength is listed in Section 15.209.
- **@ FCC CFR 47, Para. 15.237(c)** - The emission limits as specified above are based on measurement instrument employing an average detector. The provisions in **@15.35** for limiting peak emissions apply.

FCC 47 CFR § 15.205(a) - Restricted Frequency Bands

MHz	MHz	MHz	GHz
0.090 - 0.110	162.0125 - 167.17	2310 - 2390	9.3 - 9.5
0.49 – 0.51	167.72 - 173.2	2483.5 - 2500	10.6 - 12.7
2.1735 - 2.1905	240 - 285	2655 - 2900	13.25 - 13.4
8.362 - 8.366	322 - 335.4	3260 - 3267	14.47 - 14.5
13.36 - 13.41	399.9 - 410	3332 - 3339	14.35 - 16.2
25.5 – 25.67	608 - 614	3345.8 - 3358	17.7 - 21.4
37.5 – 38.25	960 - 1240	3600 - 4400	22.01 - 23.12
73 - 75.4	1300 - 1427	4500 - 5250	23.6 - 24.0
108 – 121.94	1435 - 1626.5	5350 - 5460	31.2 - 31.8
123 – 138	1660 - 1710	7250 - 7750	36.43 - 36.5
149.9 – 150.05	1718.8 - 1722.2	8025 - 8500	Above 38.6
156.7 – 156.9	2200 - 2300	9000 - 9200	

FCC 47 CFR § 15.209(a)  
-- Field Strength Limits within Restricted Frequency Bands --

Frequency (MHz)	Field Strength Limits (microvolts/m)	Distance (Meters)
0.009 - 0.490	2,400 / F (KHz)	300
0.490 - 1.705	24,000 / F (KHz)	30
1.705 - 30.0	30	30
30 – 88	100	3
88 – 216	150	3
216 – 960	200	3
Above 960	500	3

### 5.2.2. Method of Measurements

Refer to "FCC Measurement of Digital Transmission Systems Operating under Section 15.247 - March 23, 2005" and Ultratech Test Procedures, File # ULTR P003-2004 and ANSI C63.4 for measurement methods

**Radiated emission test:** Applies to harmonics/spurs that fall in the restricted bands listed in Section 15.205. The maximum permitted average field strength is listed in Section 15.209. A pre-amp (and possibly a high-pass filter) is necessary for this measurement. For measurements above 1 GHz, set RBW = 1MHz, VBW = 10 Hz, Sweep: Auto. If the emission is pulsed, modify the unit for continuous operation; use the settings shown above, then correct the reading by subtracting the peak-average correction factor, derived from the appropriate duty cycle calculation. See Section 15.35(b) and (c).

### 5.2.3. Test Equipment List

Test Instruments	Manufacturer	Model No.	Serial No.	Frequency Range
Spectrum Analyzer	Rohde & Schwarz	FSEK20/B4/B21	834157/005	9 kHz – 40 GHz
Microwave Amplifier	Hewlett Packard	HP 83017A		1 GHz to 26.5 GHz
Biconilog Antenna	EMCO	3143	1029	20 MHz to 2 GHz
Horn Antenna	EMCO	3155	9701-5061	1 GHz – 18 GHz
Horn Antenna	EMCO	3160-09	..	18 GHz – 26.5 GHz

## 5.2.4. Test Data

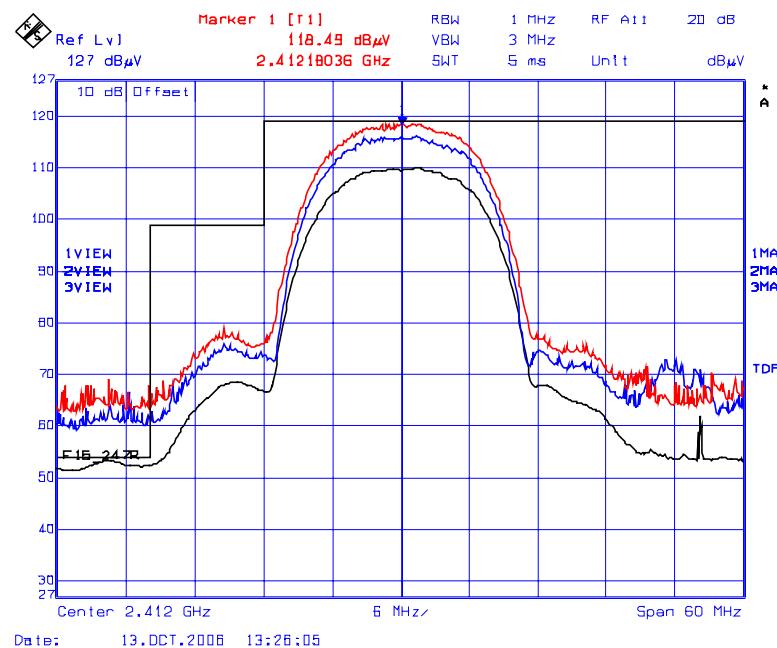
### 5.2.4.1. Band-edges Emissions (Radiated at 3 Meters)

#### 5.2.4.1.1. EUT with Antenna #1 Cushcraft Directional Antenna (Model SR2405135D, 5 dBi gain), 802.11b Modulation (CCK @ 11 Mbps)

Plot 5.2.4.1.1.1 Lower Band-Edge Transmitter Radiated Emissions @ 3 Meters, Horizontal Polarization

Frequency: 2412 MHz; Power Setting: 16.5dBm

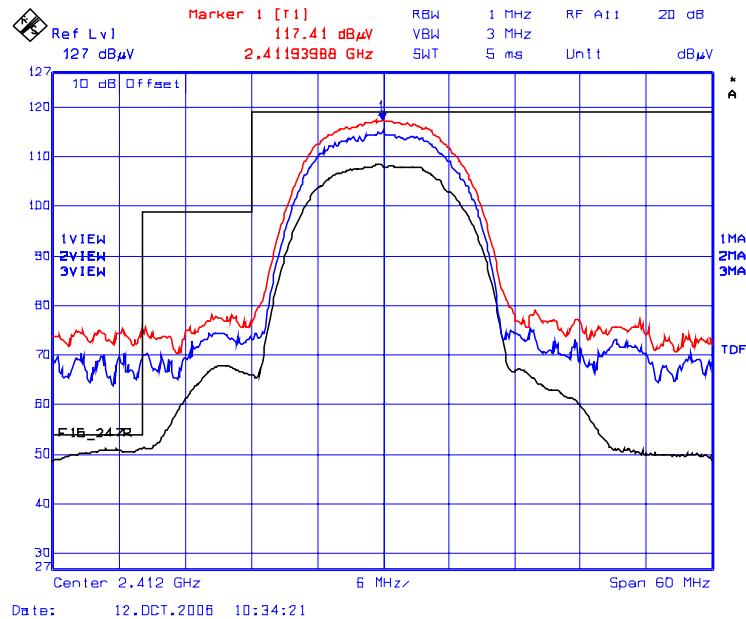
Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz



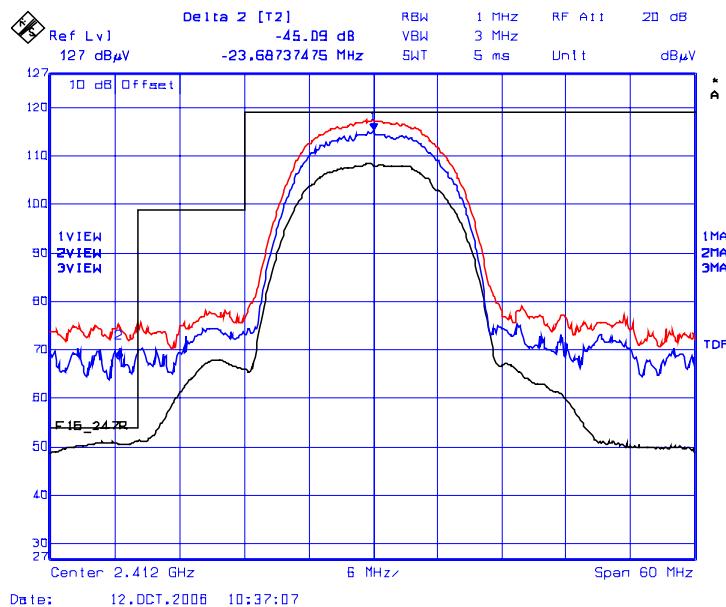
**Plot 5.2.4.1.1.2a** Lower Band-Edge Transmitter Radiated Emissions @ 3 Meters, Vertical Polarization

Frequency: 2412 MHz; Power Setting 16.5dBm

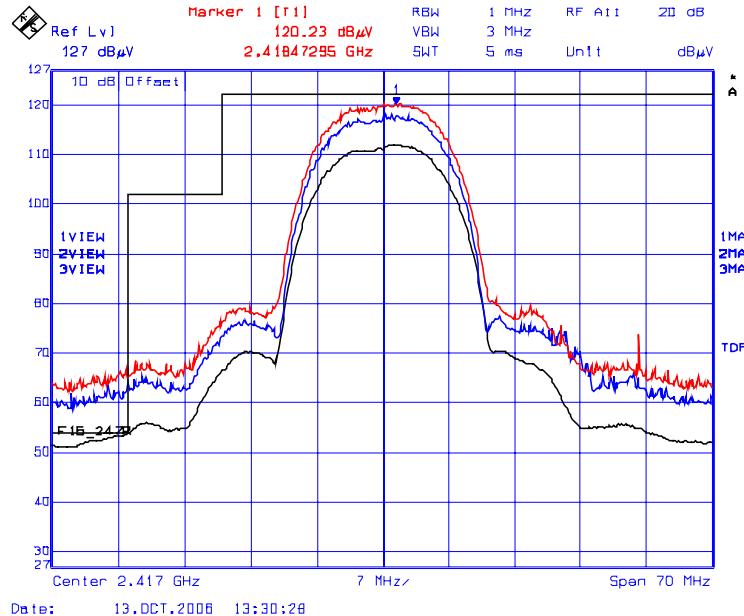
Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz, Trace 3: RBW = 1 MHz, VBW = 10 Hz  
 Band-Edge Level at 2390 MHz: 117.41 dB $\mu$ V/m – 45.09 dB = 72.32 dB $\mu$ V/m < Limit (74 dB $\mu$ V/m)



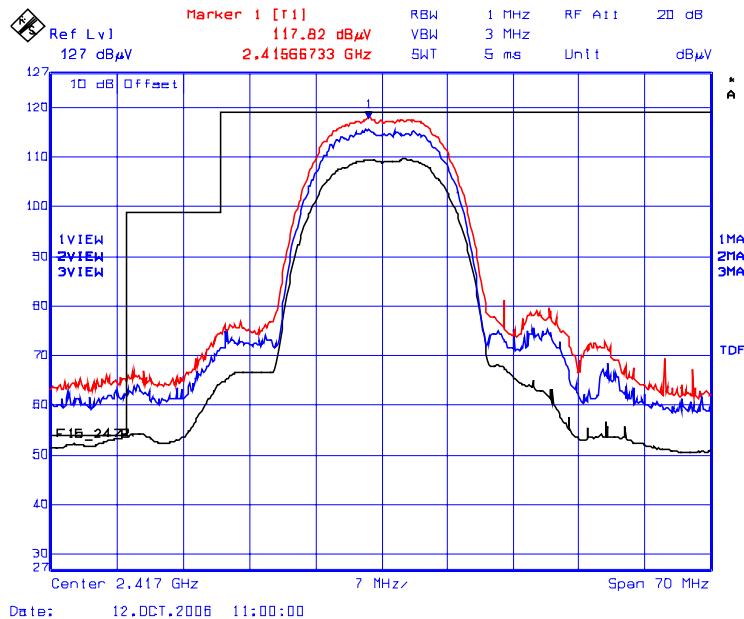
**Plot 5.2.4.1.1.2b** Lower Band-Edge Transmitter Radiated Emissions @ 3 Meters, Vertical Polarization  
 Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz, Trace 3: RBW = 1 MHz, VBW = 10 Hz  
 Delta (Peak to Band-Edge): 45.09 dB



**Plot 5.2.4.1.1.3** Lower Band-Edge Transmitter Radiated Emissions @ 3 Meters, Horizontal Polarization  
 Frequency: 2417 MHz; Power Setting: 17.5dBm  
 Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz



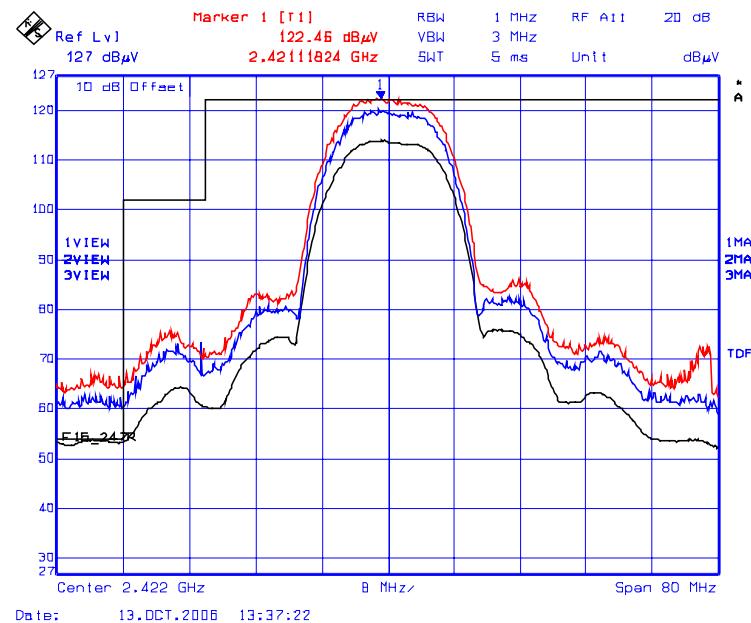
**Plot 5.2.4.1.1.4** Lower Band-Edge Transmitter Radiated Emissions @ 3 Meters, Vertical Polarization  
 Frequency: 2417 MHz; Power Setting: 17.5dBm  
 Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz



**Plot 5.2.4.1.1.5 Lower Band-Edge Transmitter Radiated Emissions @ 3 Meters, Horizontal Polarization**

Frequency: 2422 MHz; Power Setting 20.0dBm

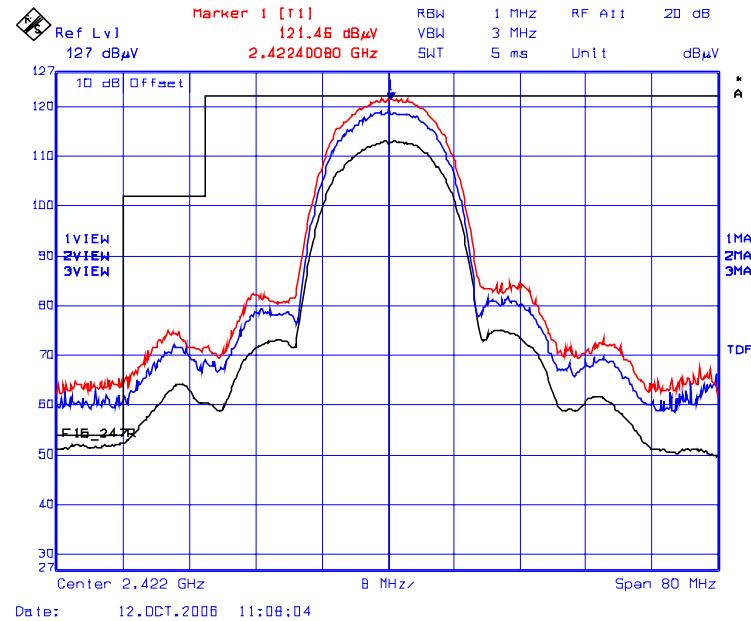
Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz



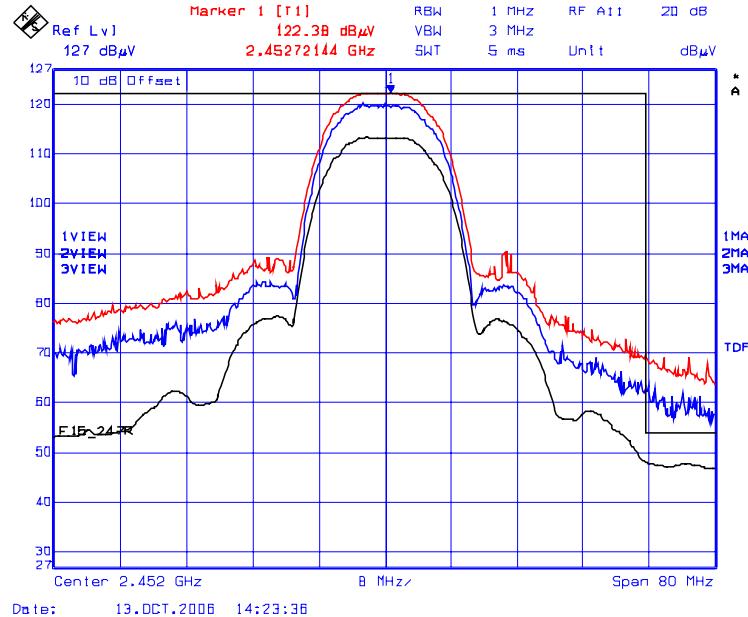
**Plot 5.2.4.1.1.6 Lower Band-Edge Transmitter Radiated Emissions @ 3 Meters, Vertical Polarization**

Frequency: 2422 MHz; Power Setting 20.0dBm

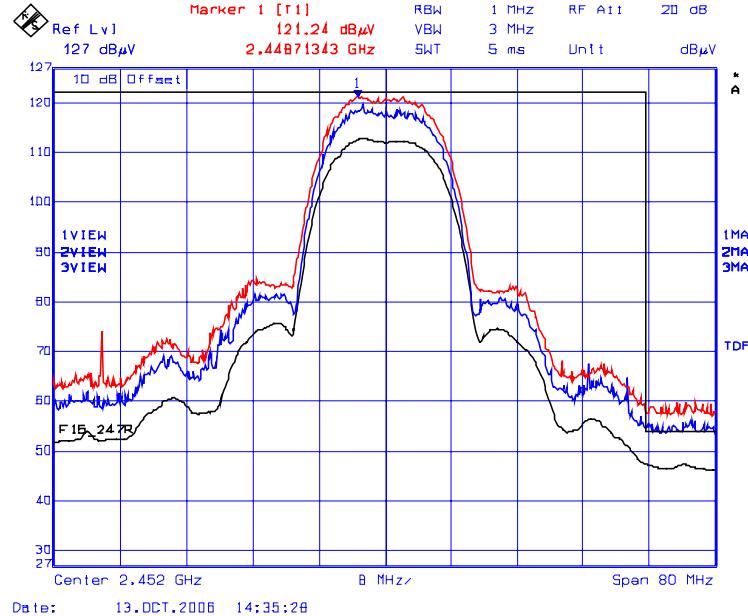
Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz



**Plot 5.2.4.1.1.7** Upper Band-Edge Transmitter Radiated Emissions @ 3 Meters, Horizontal Polarization  
 Frequency: 2452 MHz; Power Setting 20.0dBm  
 Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz



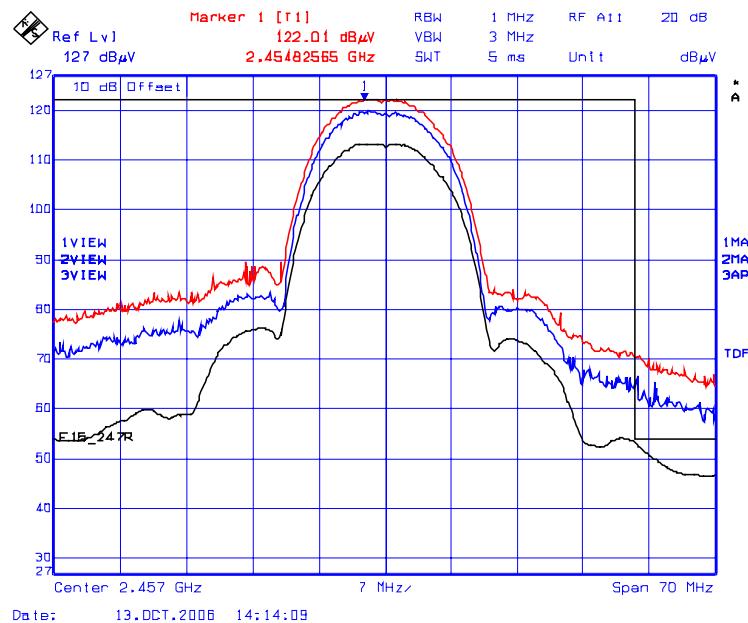
**Plot 5.2.4.1.1.8** Upper Band-Edge Transmitter Radiated Emissions @ 3 Meters, Vertical Polarization  
 Frequency: 2452 MHz; Power Setting 20.0dBm  
 Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz



**Plot 5.2.4.1.1.9** Upper Band-Edge Transmitter Radiated Emissions @ 3 Meters, Horizontal Polarization

Frequency: 2457 MHz; Power Setting 19.0dBm

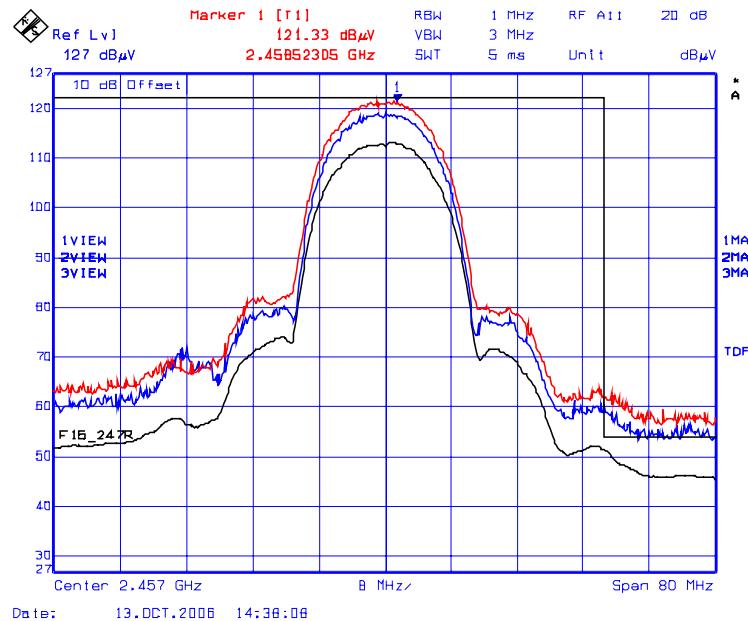
Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz



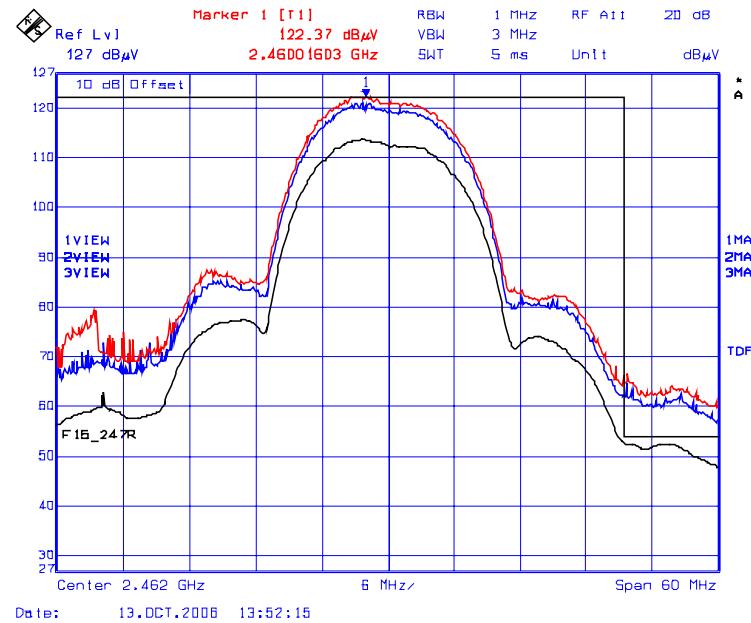
**Plot 5.2.4.1.1.10** Upper Band-Edge Transmitter Radiated Emissions @ 3 Meters, Vertical Polarization

Frequency: 2457 MHz; Power Setting 19.0dBm

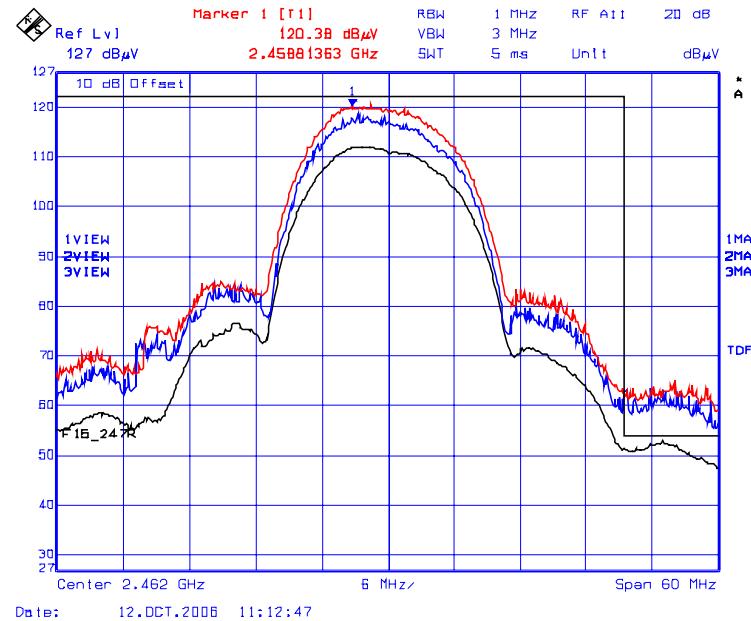
Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW= 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW= 10 Hz



**Plot 5.2.4.1.1.11** Upper Band-Edge Transmitter Radiated Emissions @ 3 Meters, Horizontal Polarization  
 Frequency: 2462 MHz; Power Setting 19.5dBm  
 Trace 1: RBW= 1 MHz, VBW= 3 MHz; Trace 2: RBW= 500 kHz, VBW= 1 MHz; Trace 3: RBW= 1 MHz, VBW= 10 Hz



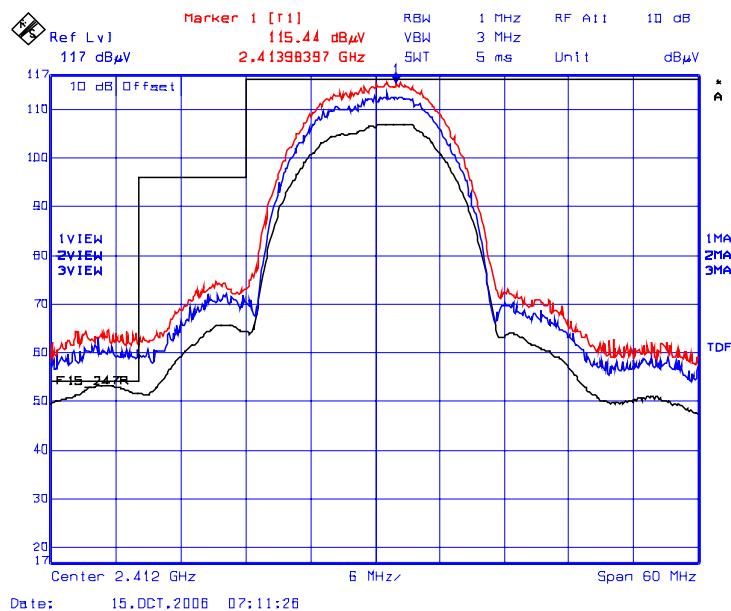
**Plot 5.2.4.1.1.12** Upper Band-Edge Transmitter Radiated Emissions @ 3 Meters, Vertical Polarization  
 Frequency: 2462 MHz; Power Setting 19.5dBm  
 Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz



**5.2.4.1.2. EUT with Antenna #2 Cushcraft Omni Antenna (Model S24493DS, 3 dBi gain), 802.11b Modulation (CCK @ 11 Mbps)**

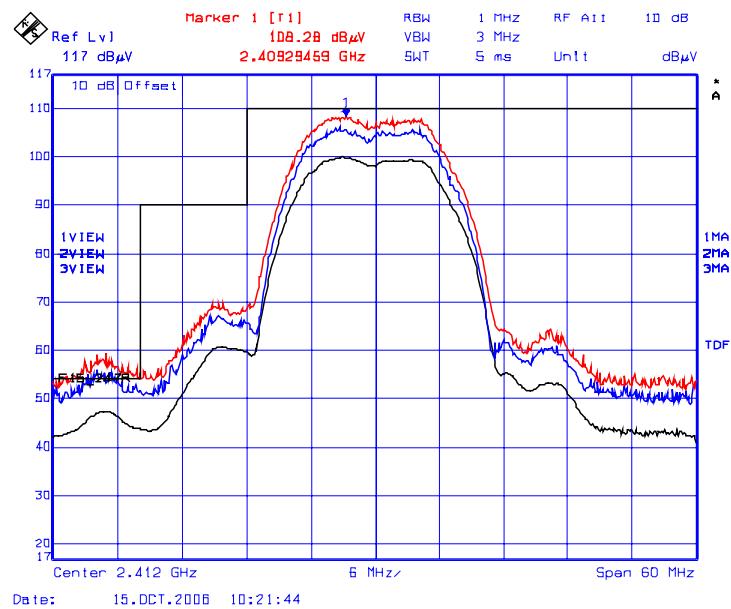
**Plot 5.2.4.1.2.1** Lower Band-Edge Transmitter Radiated Emissions @ 3 Meters, Horizontal Polarization  
 Frequency: 2412 MHz; Power Setting 18.0dBm

Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz

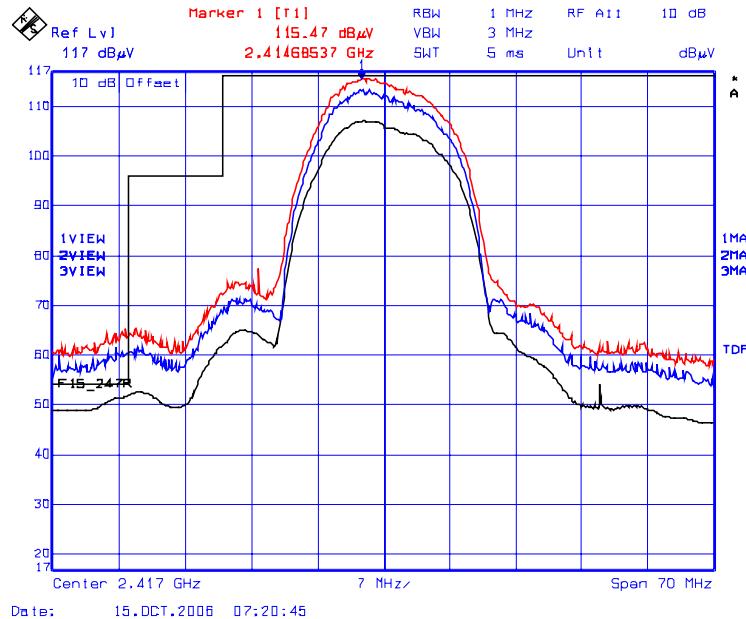


**Plot 5.2.4.1.2.2** Lower Band-Edge Transmitter Radiated Emissions @ 3 Meters, Vertical Polarization  
 Frequency: 2412 MHz; Power Setting 18.0dBm

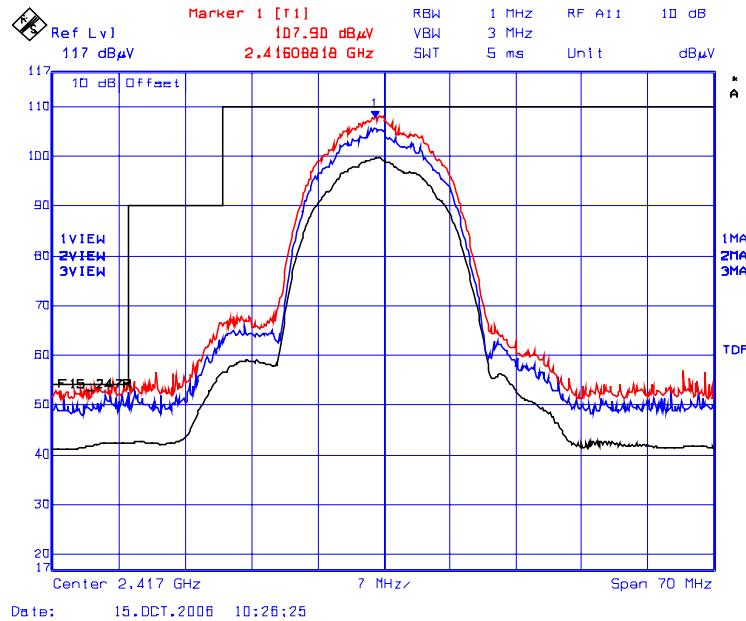
Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz



**Plot 5.2.4.1.2.3** Lower Band-Edge Transmitter Radiated Emissions @ 3 Meters, Horizontal Polarization  
 Frequency: 2417 MHz; Power Setting 17.5dBm  
 Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz



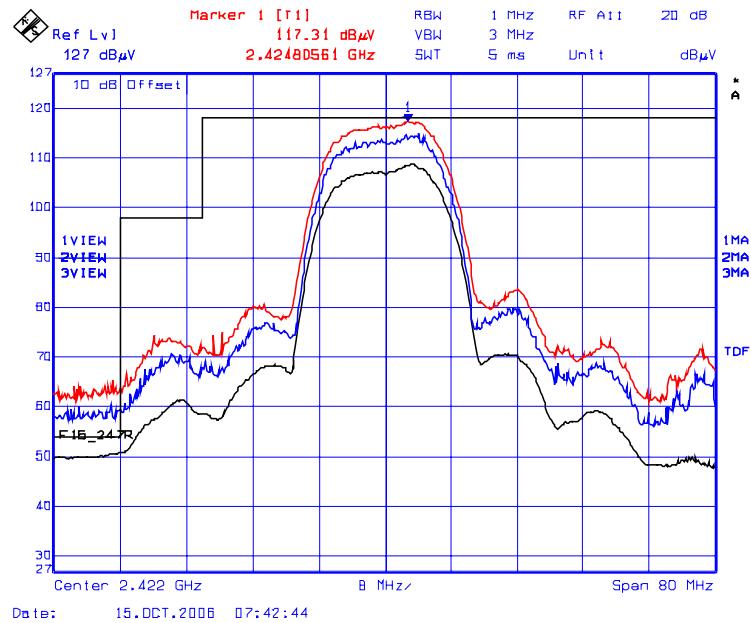
**Plot 5.2.4.1.2.4** Lower Band-Edge Transmitter Radiated Emissions @ 3 Meters, Vertical Polarization  
 Frequency: 2417 MHz; Power Setting 17.5dBm  
 Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz



**Plot 5.2.4.1.2.5 Lower Band-Edge Transmitter Radiated Emissions @ 3 Meters, Horizontal Polarization**

Frequency: 2422 MHz; Power Setting: 20.0dBm

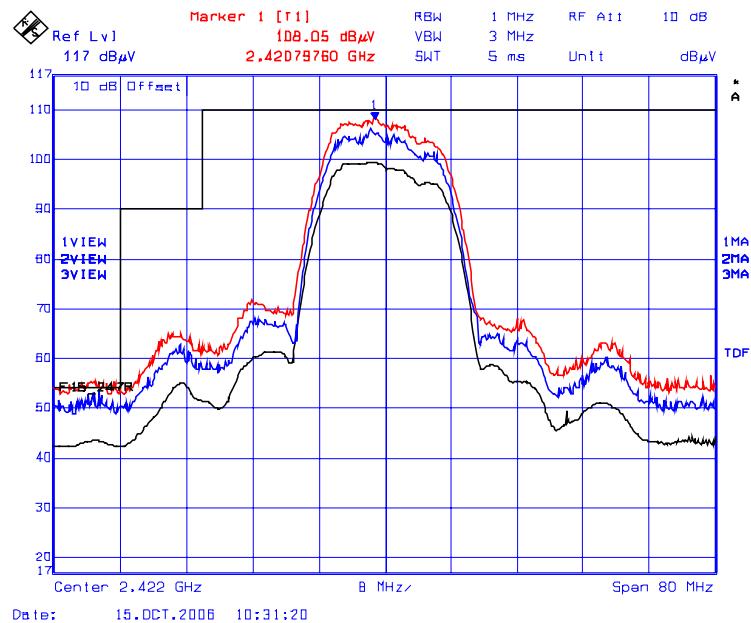
Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz



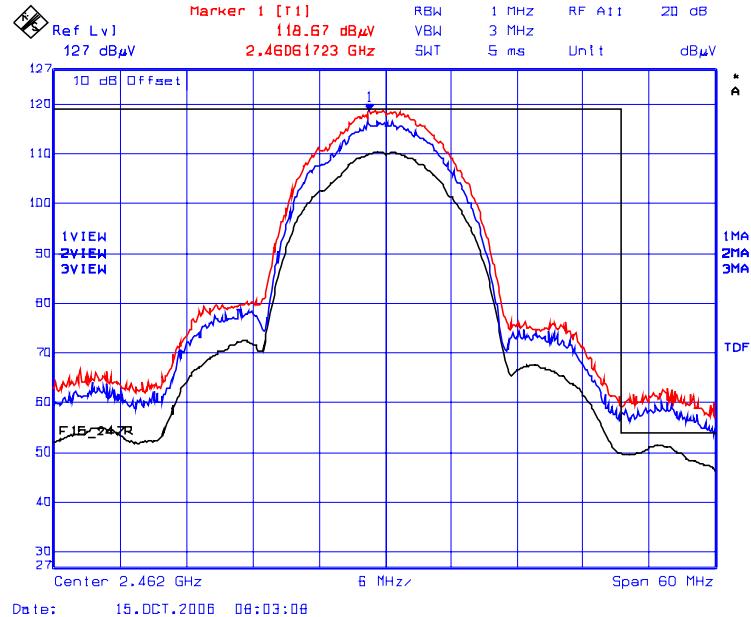
**Plot 5.2.4.1.2.6 Lower Band-Edge Transmitter Radiated Emissions @ 3 Meters, Vertical Polarization**

Frequency: 2422 MHz; Power Setting 20.0dBm

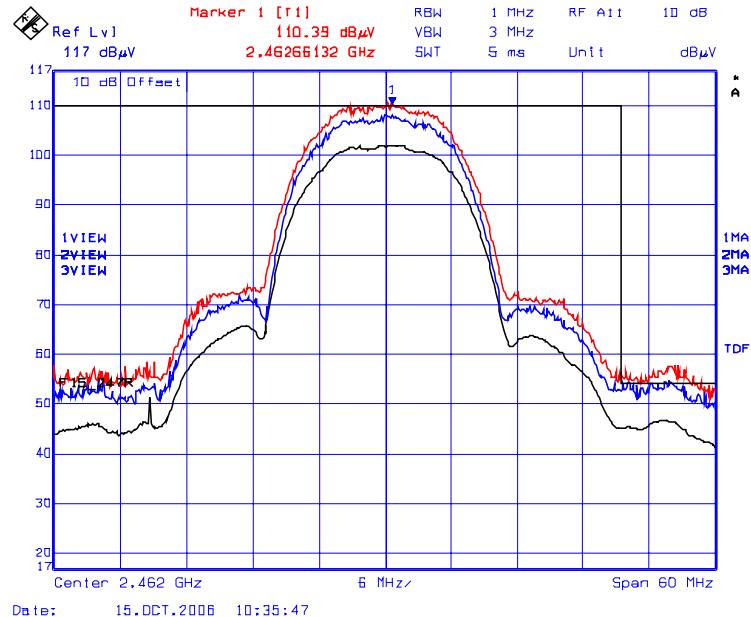
Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz



**Plot 5.2.4.1.2.7** Upper Band-Edge Transmitter Radiated Emissions @ 3 Meters, Horizontal Polarization  
 Frequency: 2462 MHz; Power Setting 20.0dBm  
 Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz



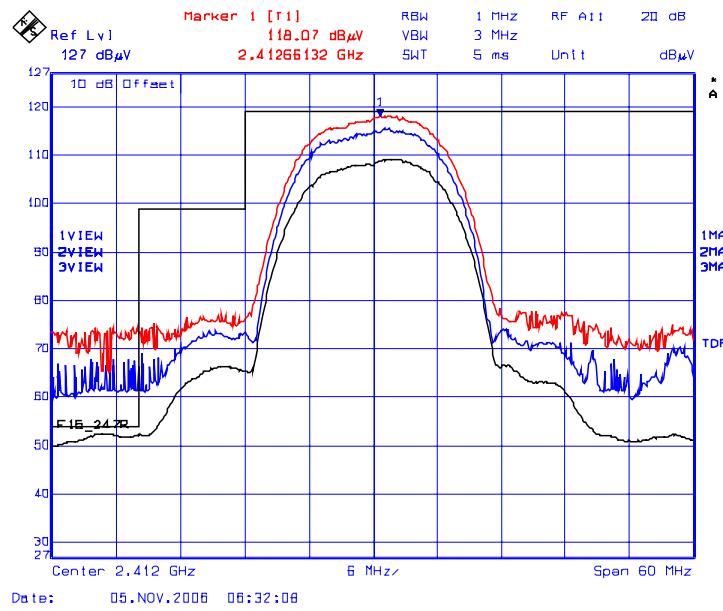
**Plot 5.2.4.1.2.8** Upper Band-Edge Transmitter Radiated Emissions @ 3 Meters, Vertical Polarization  
 Frequency: 2462 MHz; Power Setting 20.0dBm  
 Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz



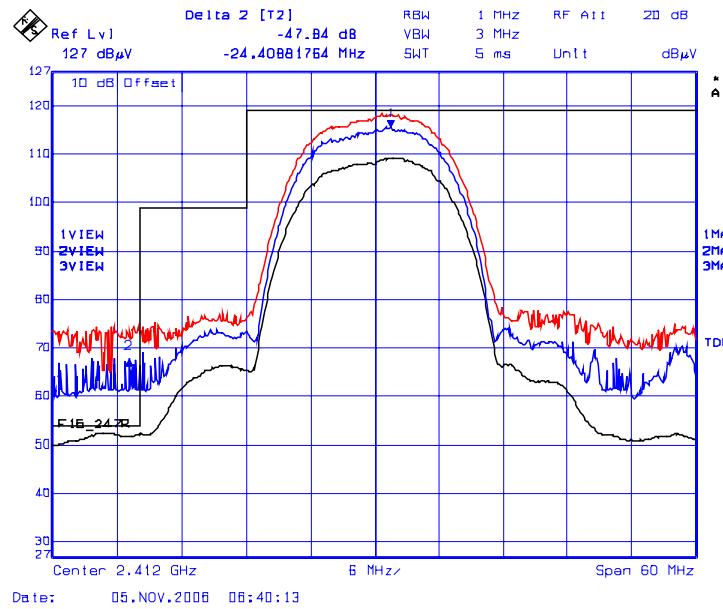
5.2.4.1.3. EUT with Antenna #3 Cushcraft Omni Antenna (Model SL24513P, 3 dBi gain), 802.11b Modulation (CCK @ 11 Mbps)

**Plot 5.2.4.1.3.1a** Lower Band-Edge Transmitter Radiated Emissions @ 3 Meters, Horizontal Polarization  
 Frequency: 2412 MHz; Power Setting 17.5dBm

Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz  
 Band-Edge Level at 2390 MHz: 118.07 dB $\mu$ V/m – 47.84 dB = 70.23 dB $\mu$ V/m < Limit (74dB $\mu$ /m)



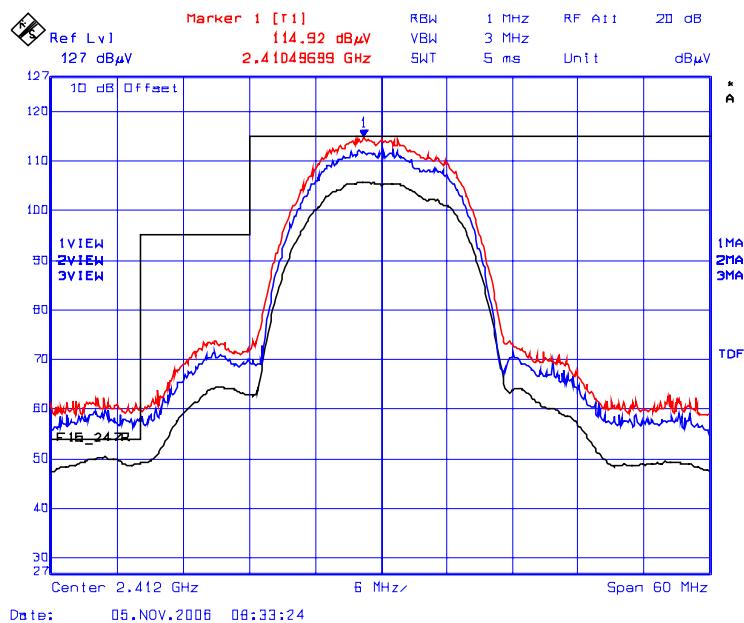
**Plot 5.2.4.1.3.1b** Lower Band-Edge Transmitter Radiated Emissions @ 3 Meters, Horizontal Polarization  
 Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz  
 Delta (Peak to Band-Edge): 47.84 dB



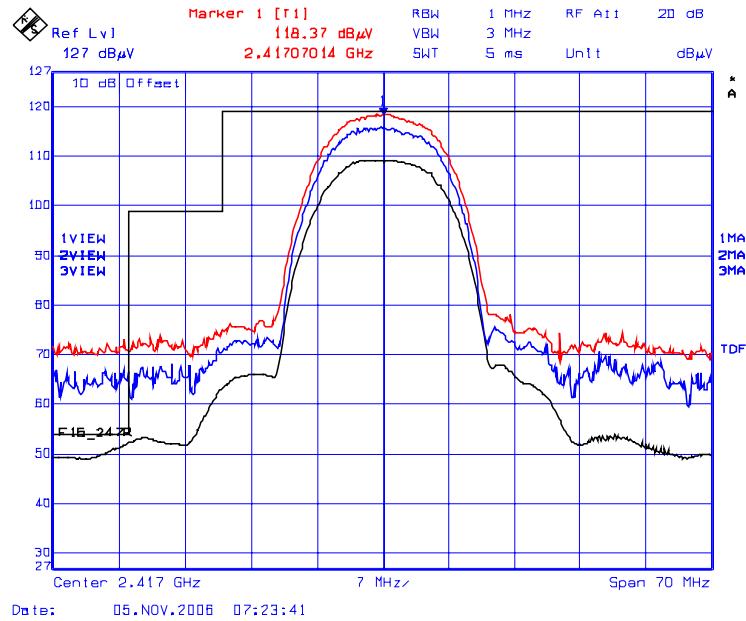
### Plot 5.2.4.1.3.2 Lower Band-Edge Transmitter Radiated Emissions @ 3 Meters, Vertical Polarization

Frequency: 2412 MHz; Power Setting 17.5dBm

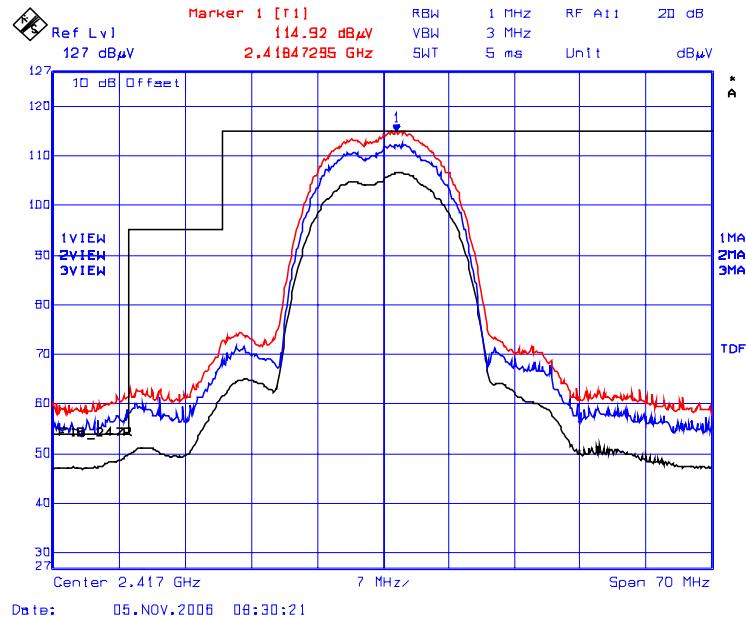
Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz



**Plot 5.2.4.1.3.3 Lower Band-Edge Transmitter Radiated Emissions @ 3 Meters, Horizontal Polarization**  
 Frequency: 2417 MHz; Power Setting 17.5dBm  
 Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz



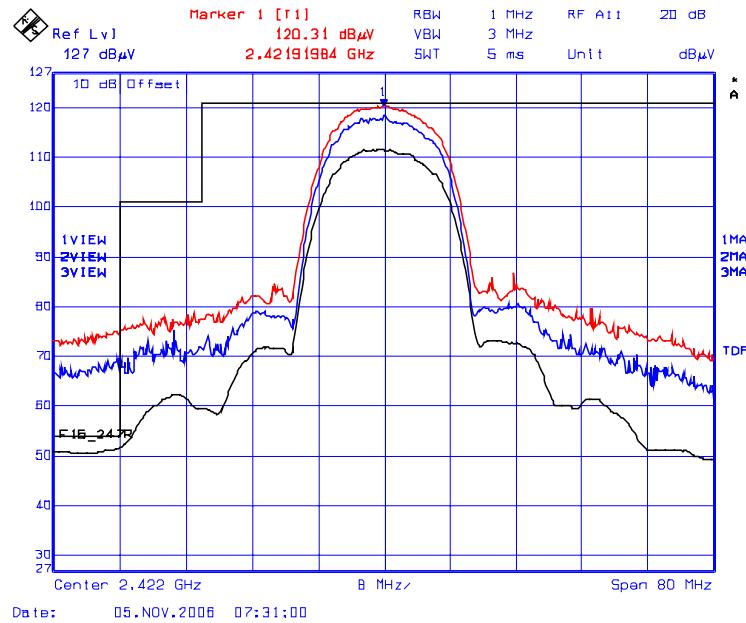
**Plot 5.2.4.1.3.4 Lower Band-Edge Transmitter Radiated Emissions @ 3 Meters, Vertical Polarization**  
 Frequency: 2417 MHz; Power Setting 17.5dBm  
 Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz



**Plot 5.2.4.1.3.5a** Lower Band-Edge Transmitter Radiated Emissions @ 3 Meters, Horizontal Polarization

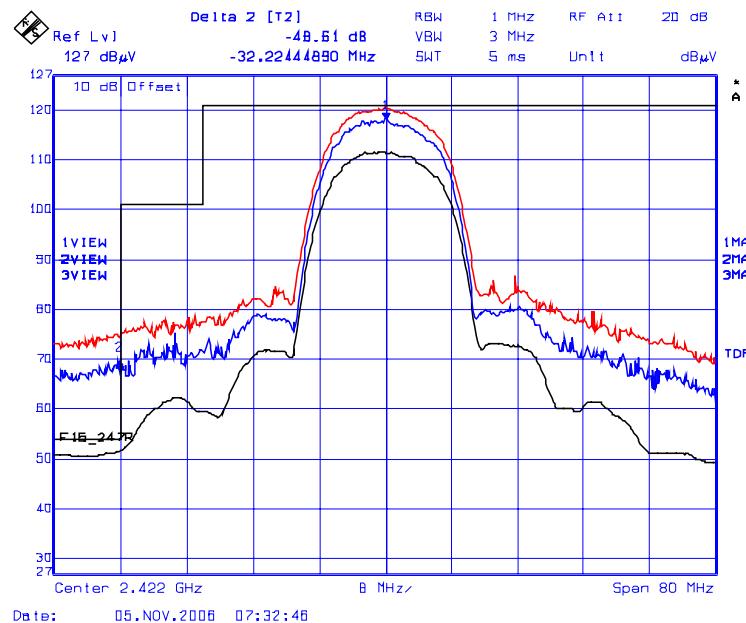
Frequency: 2422 MHz; Power Setting 20.0dBm

Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz  
 Band-Edge Level at 2390 MHz: 120.31dB $\mu$ V/m – 48.61 dB = 71.70dB $\mu$ V/m < Limit (74dB $\mu$ /m)



**Plot 5.2.4.1.3.5b** Lower Band-Edge Transmitter Radiated Emissions @ 3 Meters, Horizontal Polarization

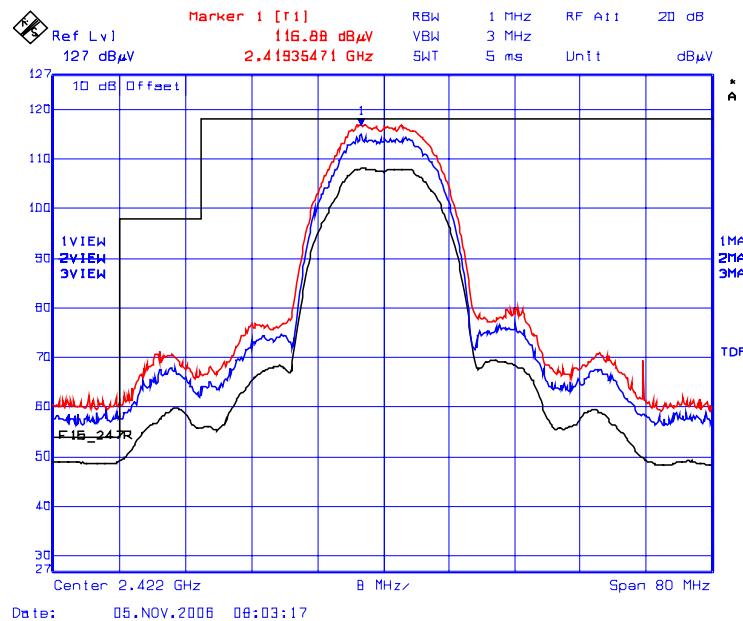
Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz  
 Delta (Peak to Band-Edge): 48.61 dB



**Plot 5.2.4.1.3.6 Lower Band-Edge Transmitter Radiated Emissions @ 3 Meters, Vertical Polarization**

Frequency: 2422 MHz; Power Setting 20.0dBm

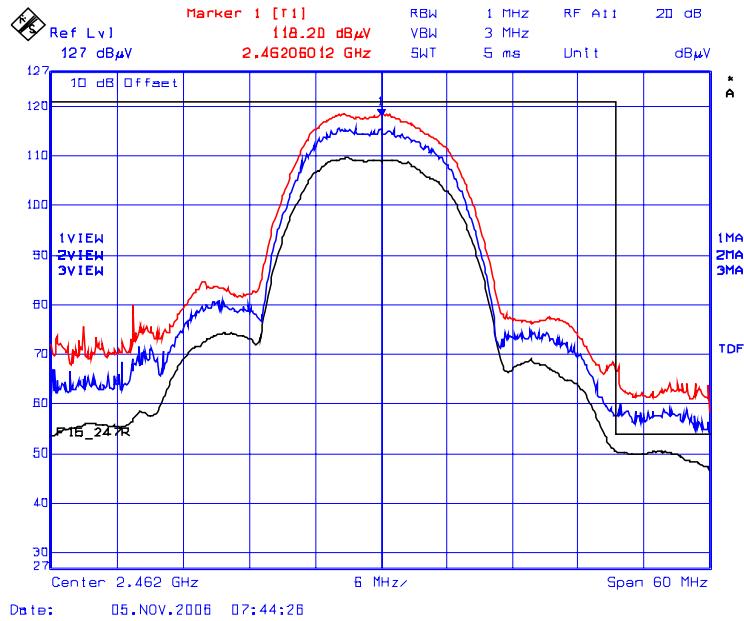
Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz



### Plot 5.2.4.1.3.7 Upper Band-Edge Transmitter Radiated Emissions @ 3 Meters, Horizontal Polarization

Frequency: 2462 MHz; Power Setting 20.0dBm

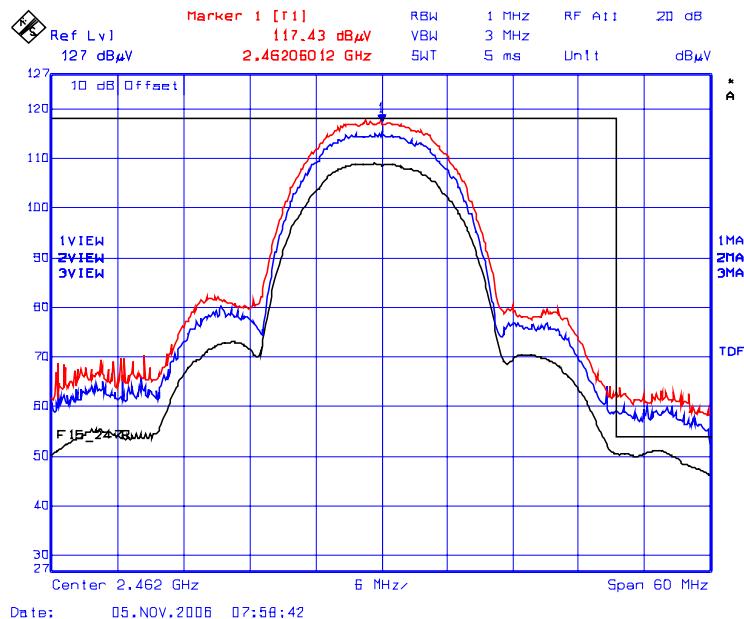
Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz



### Plot 5.2.4.1.3.8 Upper Band-Edge Transmitter Radiated Emissions @ 3 Meters, Vertical Polarization

Frequency: 2462 MHz; Power Setting 20.0dBm

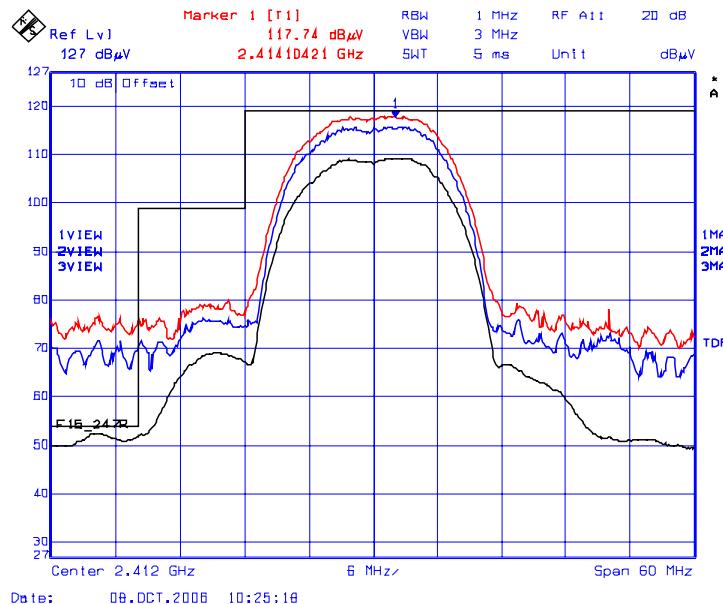
Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz



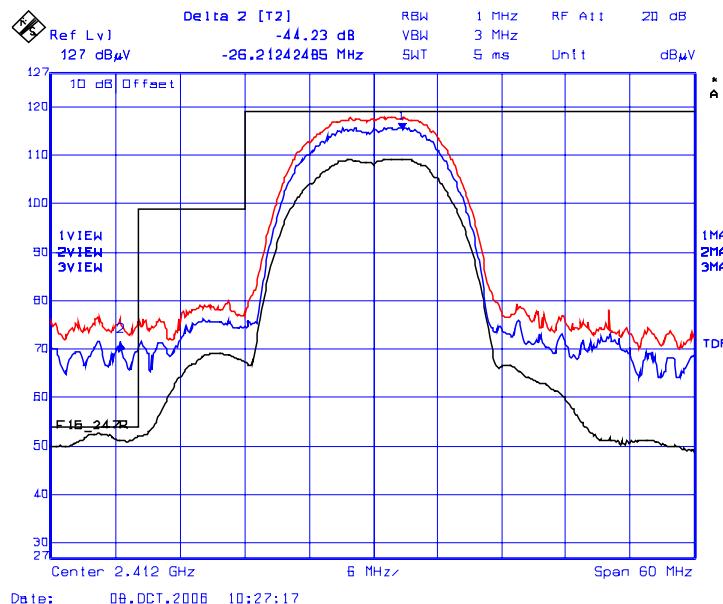
#### 5.2.4.1.4. EUT with Antenna #4 Cushcraft Directional Antenna (Model S24497P, 7 dBi gain), 802.11b Modulation (CCK @ 11 Mbps)

**Plot 5.2.4.1.4.1a** Lower Band-Edge Transmitter Radiated Emissions @ 3 Meters, Horizontal Polarization  
Frequency: 2412 MHz; Power Setting 16.5dBm

Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz  
 Band-Edge Level at 2390 MHz: 117.74 dB<sub>P</sub>V/m – 44.23 dB = 73.51 dB<sub>P</sub>V/m < Limit (74 dB<sub>P</sub>V/m)



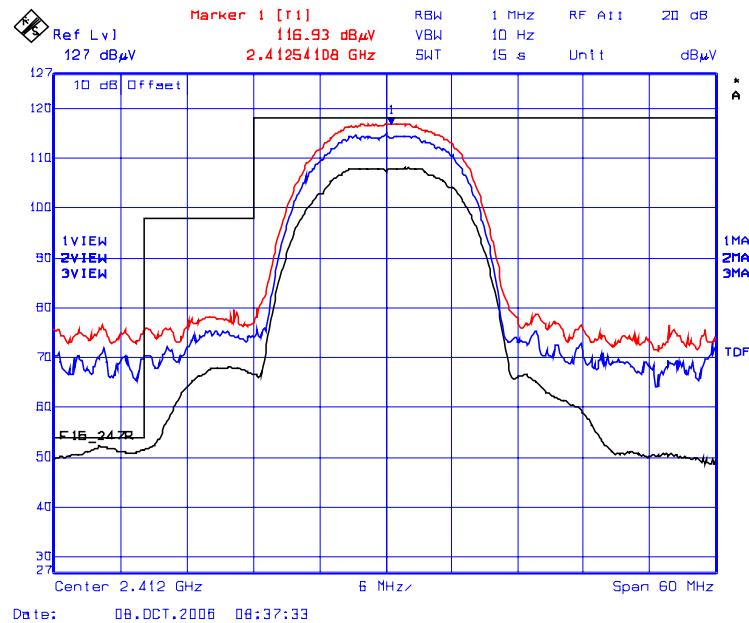
**Plot 5.2.4.1.4.1b** Lower Band-Edge Transmitter Radiated Emissions @ 3 Meters, Horizontal Polarization  
Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz  
Delta (Peak to Band-Edge): 44.23 dB



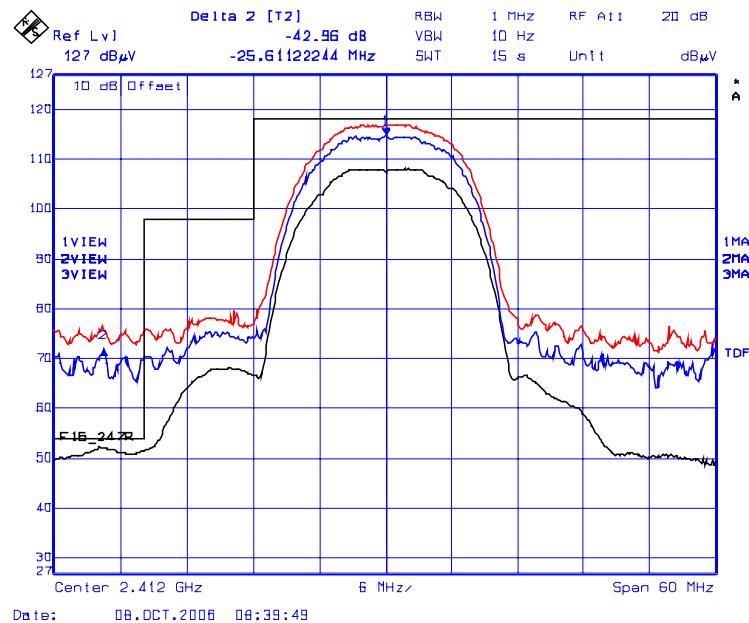
**Plot 5.2.4.1.4.2a** Lower Band-Edge Transmitter Radiated Emissions @ 3 Meters, Vertical Polarization

Frequency: 2412 MHz; Power Setting 16.5dBm

Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz  
 Band-Edge Level at 2390 MHz: 116.93 dB $\mu$ V/m – 42.96 dB = 73.97 dB $\mu$ V/m < Limit (74 dB $\mu$ V/m)



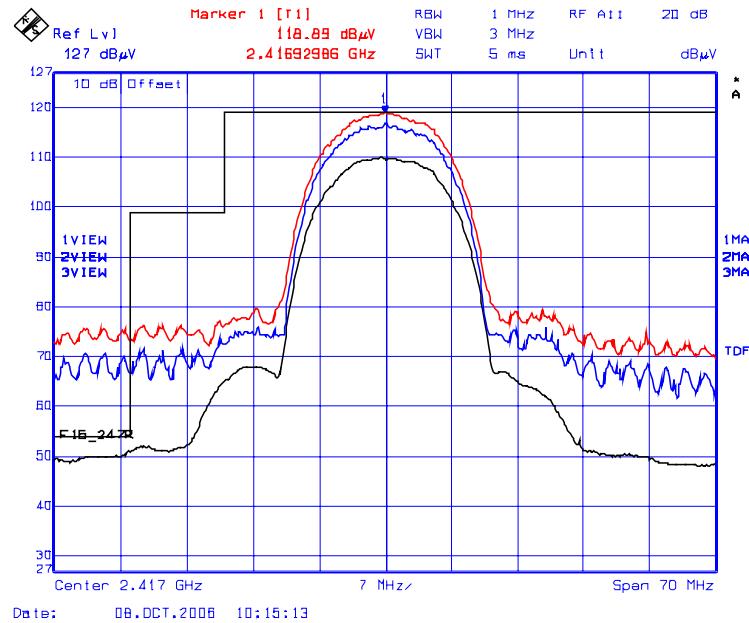
**Plot 5.2.4.1.4.2b** Lower Band-Edge Transmitter Radiated Emissions @ 3 Meters, Vertical Polarization  
 Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz  
 Delta (Peak to Band-Edge): 42.96 dB



**Plot 5.2.4.1.4.3a** Lower Band-Edge Transmitter Radiated Emissions @ 3 Meters, Horizontal Polarization

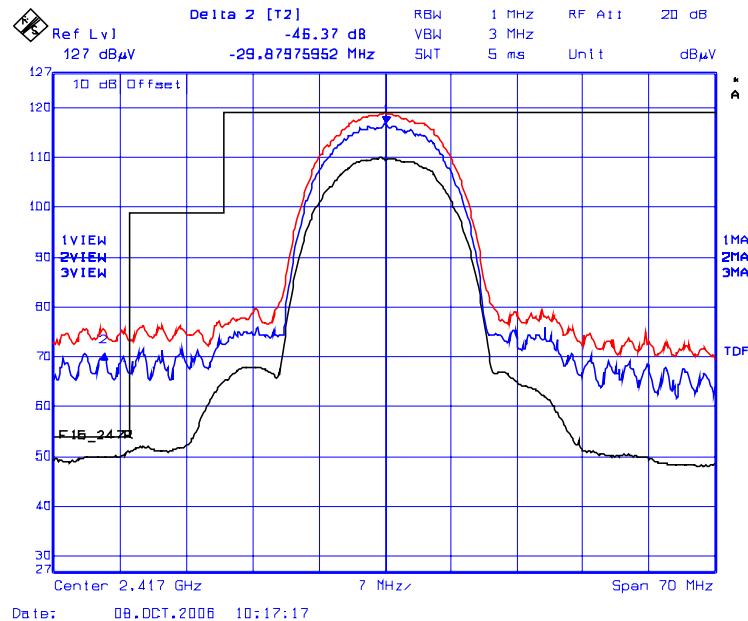
Frequency: 2417 MHz; Power Setting 16.0dBm

Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz  
 Band-Edge Level at 2390 MHz: 118.89 dB $\mu$ V/m – 46.37 dB = 72.52 dB $\mu$ V/m < Limit (74 dB $\mu$ V/m)



**Plot 5.2.4.1.4.3b** Lower Band-Edge Transmitter Radiated Emissions @ 3 Meters, Horizontal Polarization

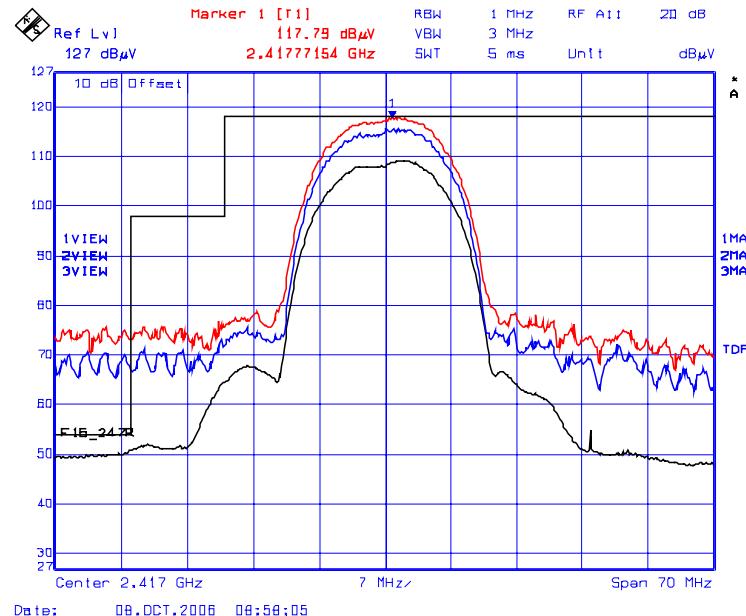
Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz  
 Delta (Peak to Band-Edge): 46.37 dB



**Plot 5.2.4.1.4.4a** Lower Band-Edge Transmitter Radiated Emissions @ 3 Meters, Vertical Polarization

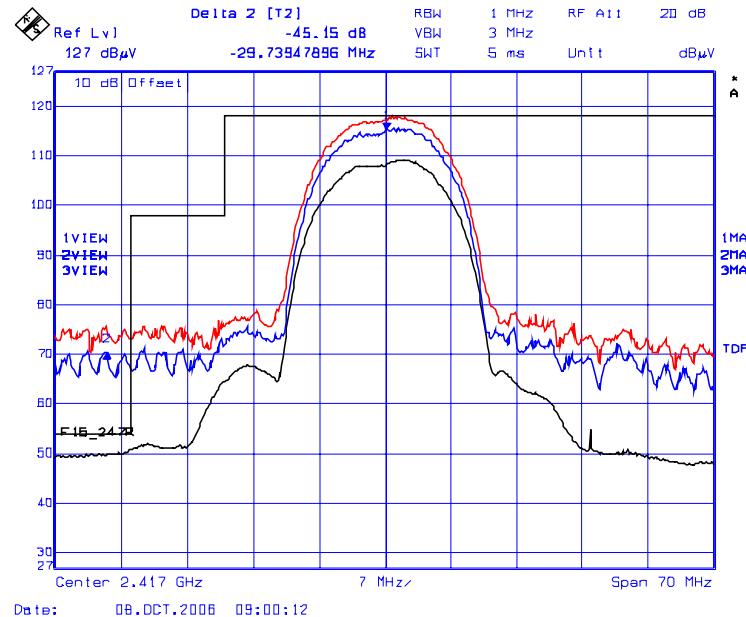
Frequency: 2417 MHz; Power Setting 16.0dBm

Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz, Trace 3: RBW = 1 MHz, VBW = 10 Hz  
 Band-Edge Level at 2390 MHz: 117.79 dB $\mu$ V/m – 45.15 dB = 72.64 dB $\mu$ V/m < Limit (74 dB $\mu$ V/m)

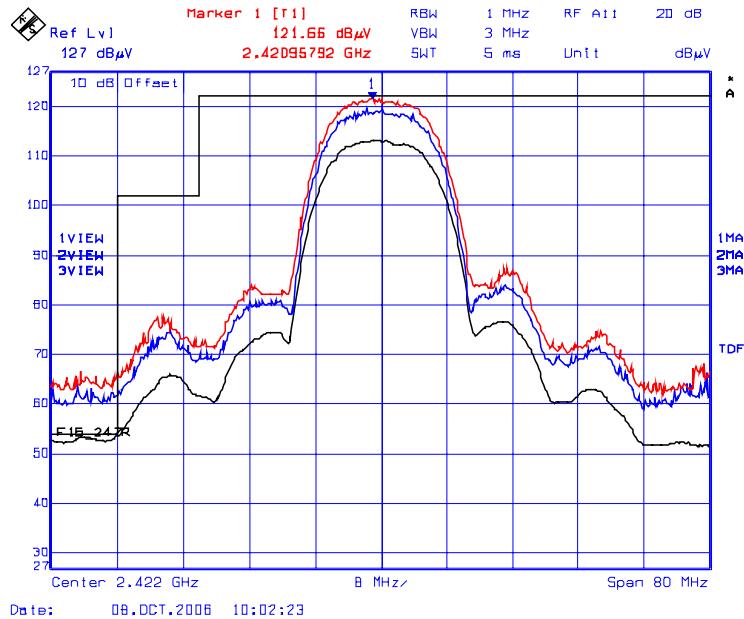


**Plot 5.2.4.1.4.4b** Lower Band-Edge Transmitter Radiated Emissions @ 3 Meters, Vertical Polarization

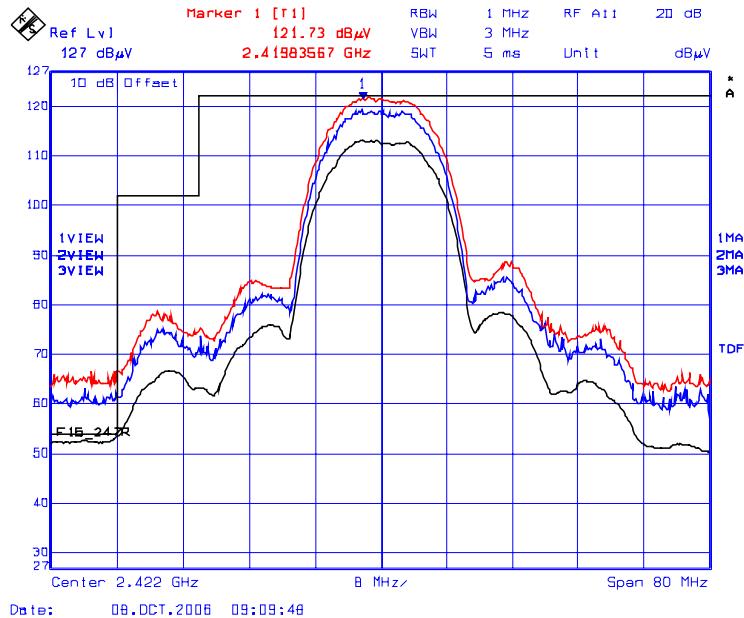
Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz, Trace 3: RBW = 1 MHz, VBW = 10 Hz  
 Delta (Peak to Band-Edge): 45.15 dB



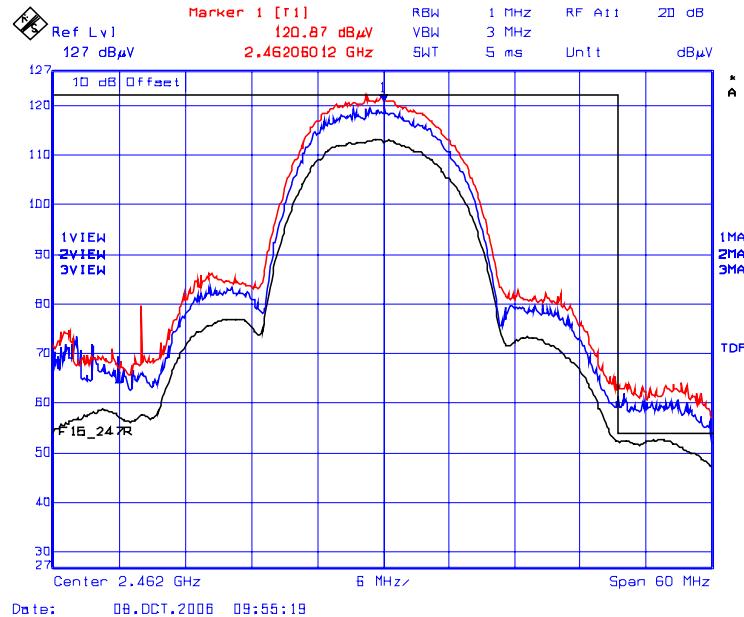
**Plot 5.2.4.1.4.5** Lower Band-Edge Transmitter Radiated Emissions @ 3 Meters, Horizontal Polarization  
 Frequency: 2422 MHz; Power Setting 20.0dBm  
 Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz



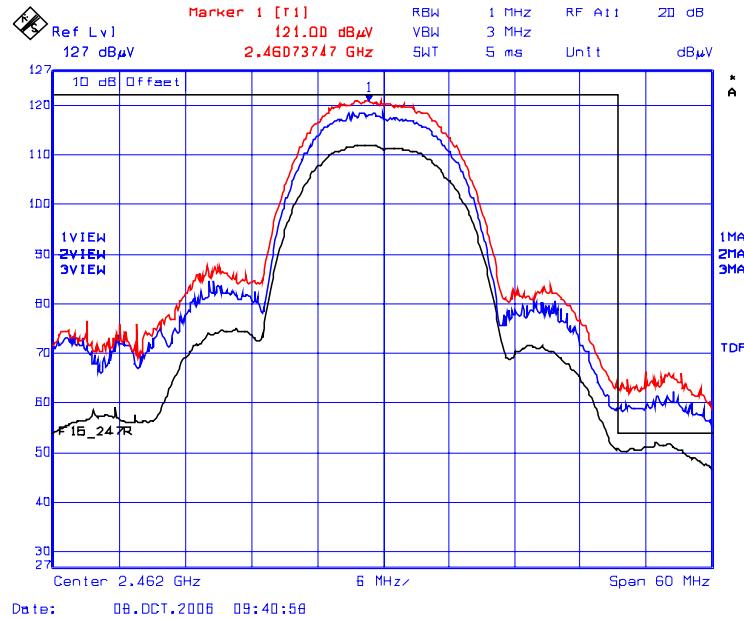
**Plot 5.2.4.1.4.6** Lower Band-Edge Transmitter Radiated Emissions @ 3 Meters, Vertical Polarization  
 Frequency: 2422 MHz; Power Setting 20.0dBm  
 Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz



**Plot 5.2.4.1.4.7** Upper Band-Edge Transmitter Radiated Emissions @ 3 Meters, Horizontal Polarization  
 Frequency: 2462 MHz; Power Setting 20.0dBm  
 Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz



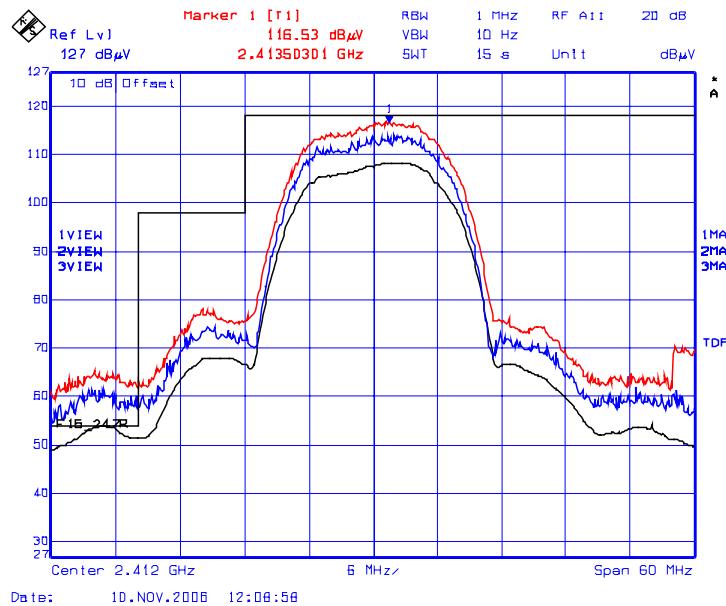
**Plot 5.2.4.1.4.8** Upper Band-Edge Transmitter Radiated Emissions @ 3 Meters, Vertical Polarization  
 Frequency: 2462 MHz; Power Setting 20.0dBm  
 Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz



**5.2.4.1.5. EUT with Antenna #5 Hyperlink Technologies Omni Antenna (Model HG2458CU, 3 dBi gain), 802.11b Modulation (CCK @ 11 Mbps)**

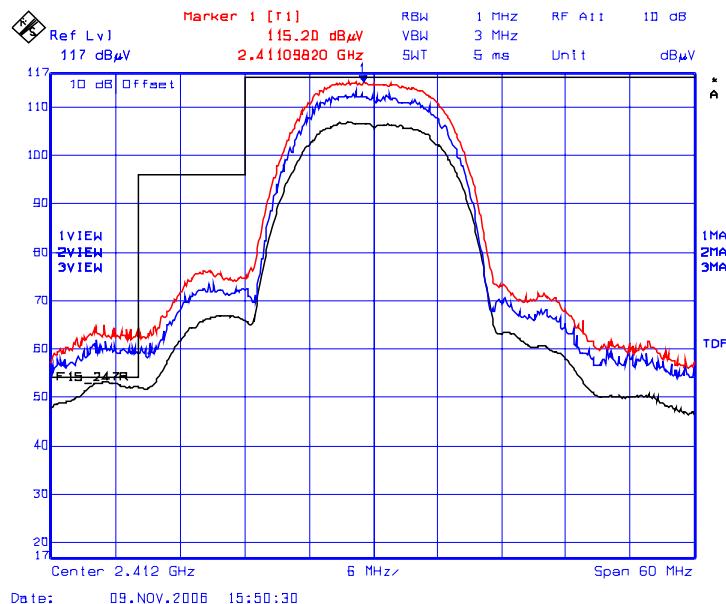
**Plot 5.2.4.1.5.1 Lower Band-Edge Transmitter Radiated Emissions @ 3 Meters, Horizontal Polarization**  
 Frequency: 2412 MHz; Power Setting 17.5dBm

Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz

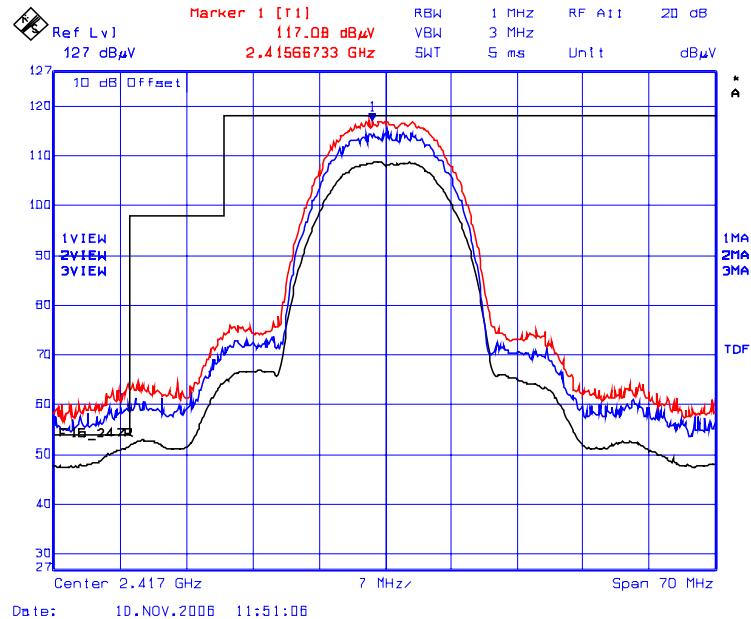


**Plot 5.2.4.1.5.2 Lower Band-Edge Transmitter Radiated Emissions @ 3 Meters, Vertical Polarization**  
 Frequency: 2412 MHz; Power Setting 17.5dBm

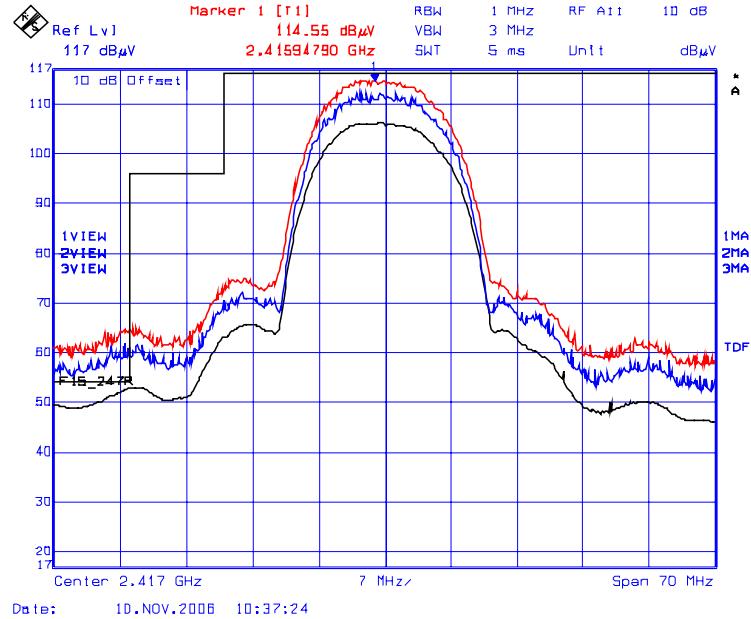
Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz



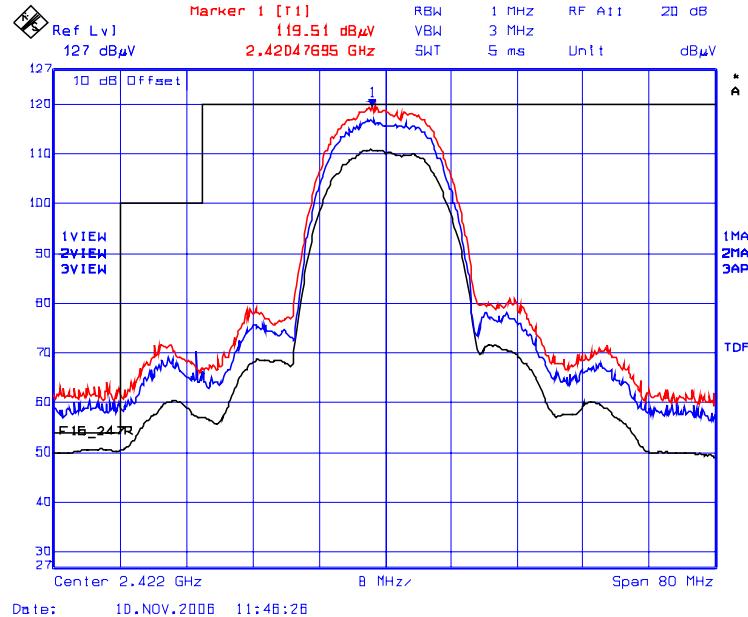
**Plot 5.2.4.1.5.3** Lower Band-Edge Transmitter Radiated Emissions @ 3 Meters, Horizontal Polarization  
 Frequency: 2417 MHz; Power Setting: 17.5dBm  
 Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz



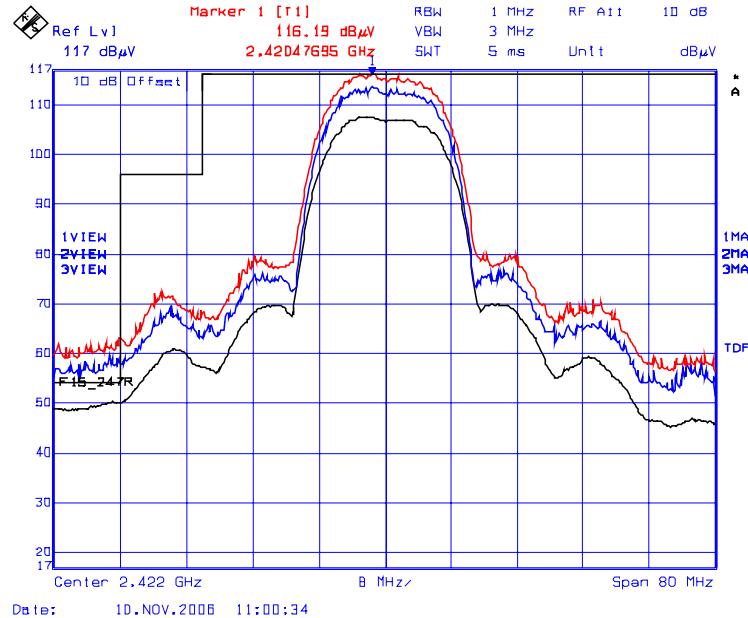
**Plot 5.2.4.1.5.4** Lower Band-Edge Transmitter Radiated Emissions @ 3 Meters, Vertical Polarization  
 Frequency: 2417 MHz; Power Setting 17.5dBm  
 Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz



**Plot 5.2.4.1.5.5** Lower Band-Edge Transmitter Radiated Emissions @ 3 Meters, Horizontal Polarization  
 Frequency: 2422 MHz; Power Setting 20.0dBm  
 Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz



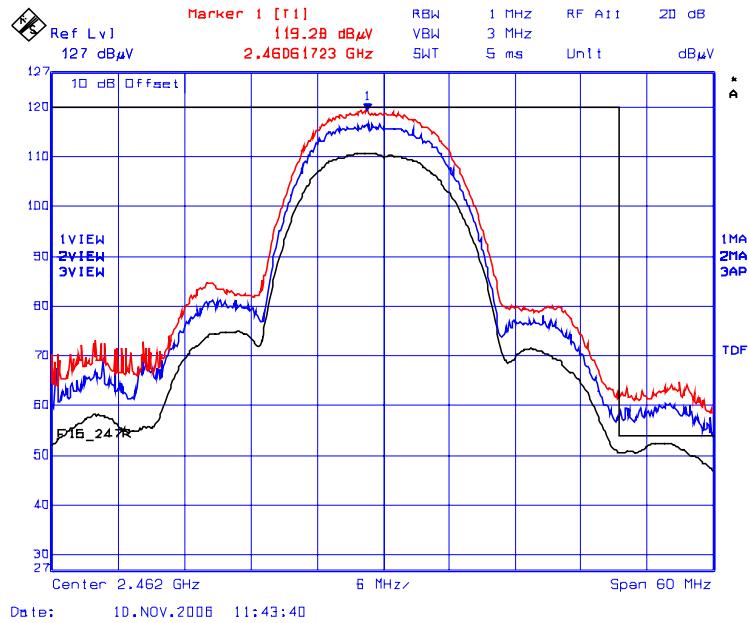
**Plot 5.2.4.1.5.6** Lower Band-Edge Transmitter Radiated Emissions @ 3 Meters, Vertical Polarization  
 Frequency: 2422 MHz; Power Setting 20.0dBm  
 Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz



### Plot 5.2.4.1.5.7 Upper Band-Edge Transmitter Radiated Emissions @ 3 Meters, Horizontal Polarization

Frequency: 2462 MHz; Power Setting 20.0dBm

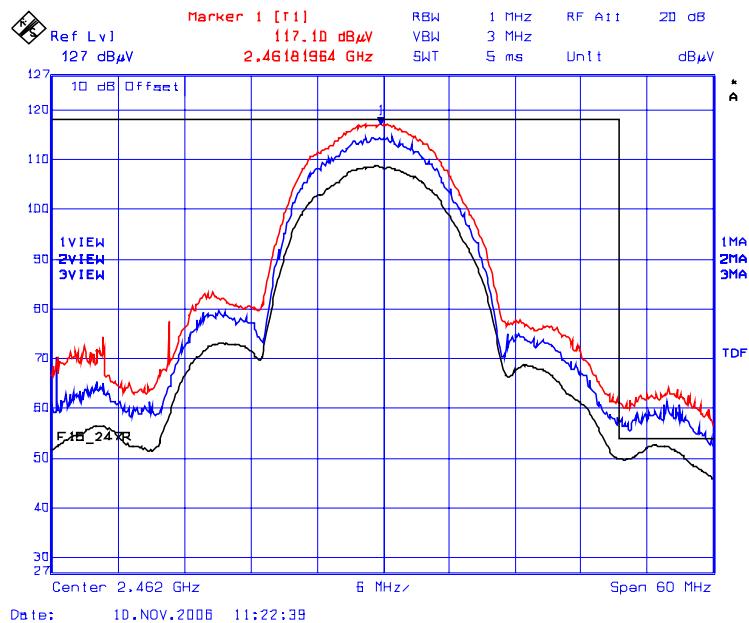
Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz



### **Plot 5.2.4.1.5.8 Upper Band-Edge Transmitter Radiated Emissions @ 3 Meters, Vertical Polarization**

Frequency: 2462 MHz; Power Setting 20.0dBm

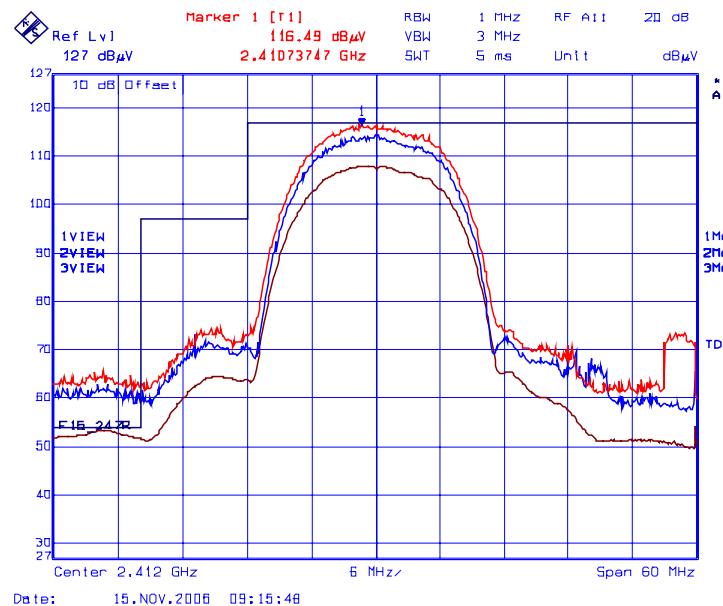
Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz



**5.2.4.1.6. EUT with Antenna #6 Maxrad Omni, 2 Inputs Antenna (Model MDO24005PTRPMSMA, 5.2 dBi gain), 802.11b Modulation (CCK @ 11 Mbps)**

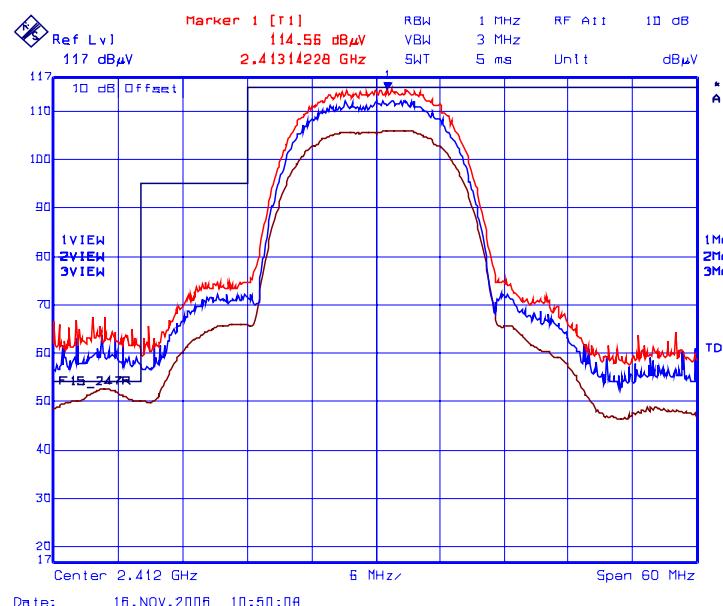
**Plot 5.2.4.1.6.1** Lower Band-Edge Transmitter Radiated Emissions @ 3 Meters, Horizontal Polarization  
 Frequency: 2412 MHz; Power Setting 17.5dBm

Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz

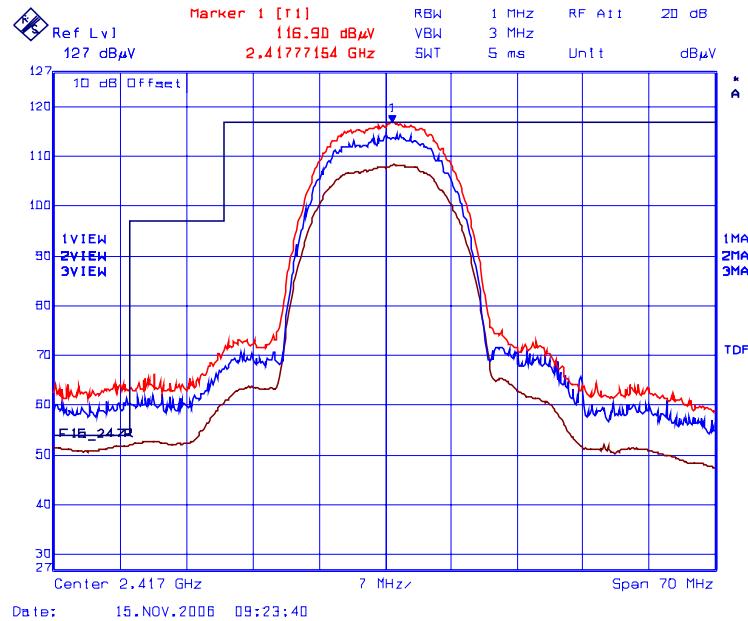


**Plot 5.2.4.1.6.2** Lower Band-Edge Transmitter Radiated Emissions @ 3 Meters, Vertical Polarization  
 Frequency: 2412 MHz; Power Setting 17.5dBm

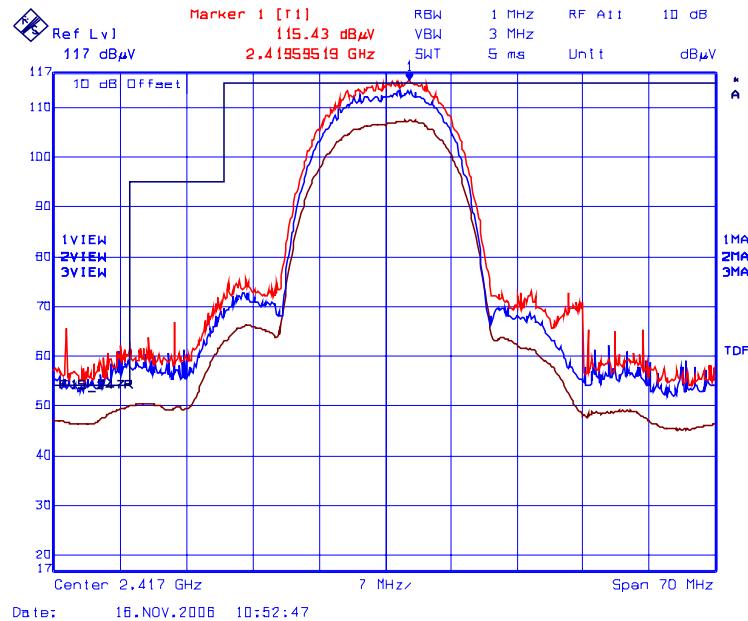
Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz



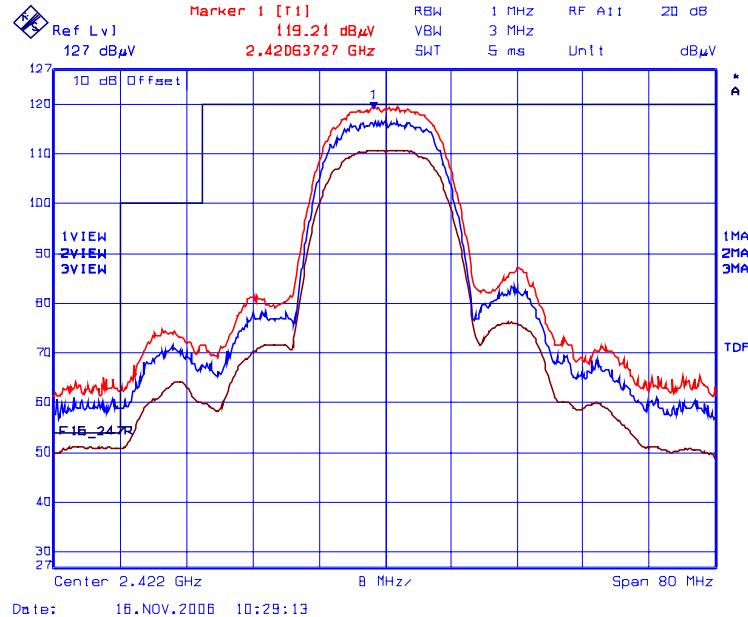
**Plot 5.2.4.1.6.3** Lower Band-Edge Transmitter Radiated Emissions @ 3 Meters, Horizontal Polarization  
 Frequency: 2417 MHz; Power Setting 17.5dBm  
 Trace 1: RBW = 1 MHz, VBW= 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz



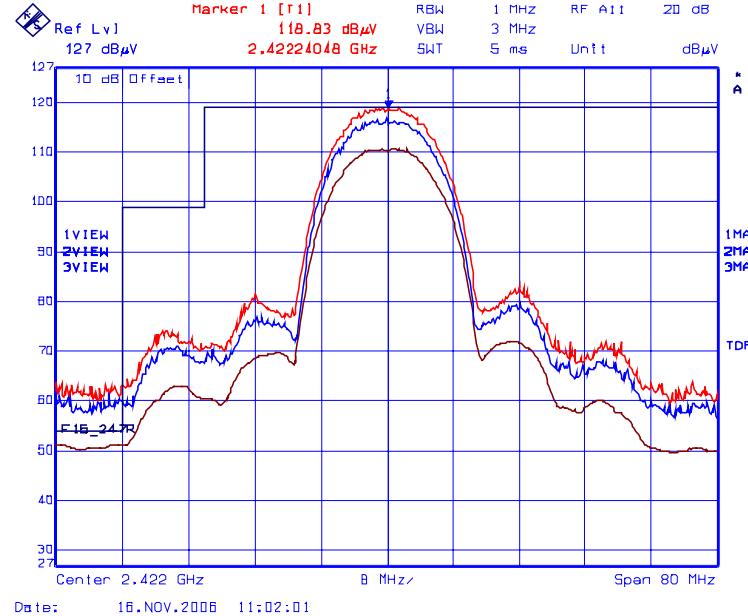
**Plot 5.2.4.1.6.4** Lower Band-Edge Transmitter Radiated Emissions @ 3 Meters, Vertical Polarization  
 Frequency: 2417 MHz; Power Setting 17.5dBm  
 Trace 1: RBW = 1 MHz, VBW= 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz



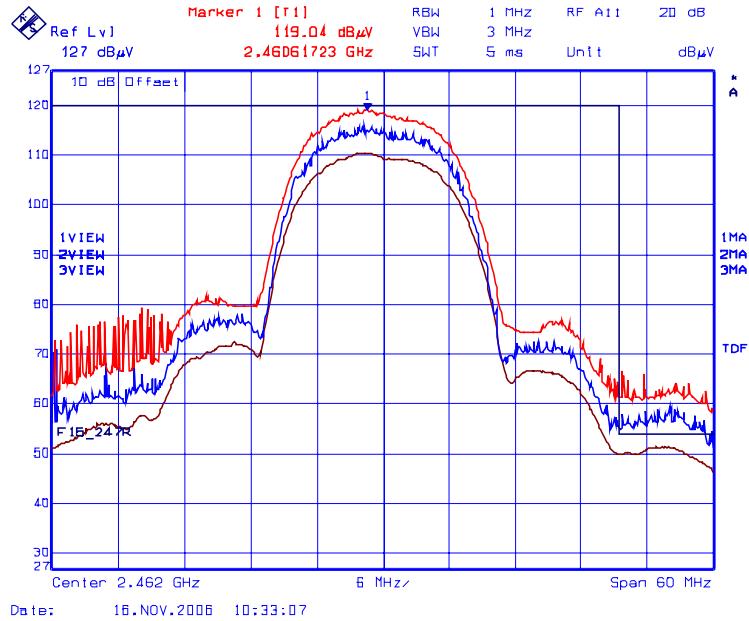
**Plot 5.2.4.1.6.5** Lower Band-Edge Transmitter Radiated Emissions @ 3 Meters, Horizontal Polarization  
 Frequency: 2422 MHz; Power Setting: 20.0dBm  
 Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz



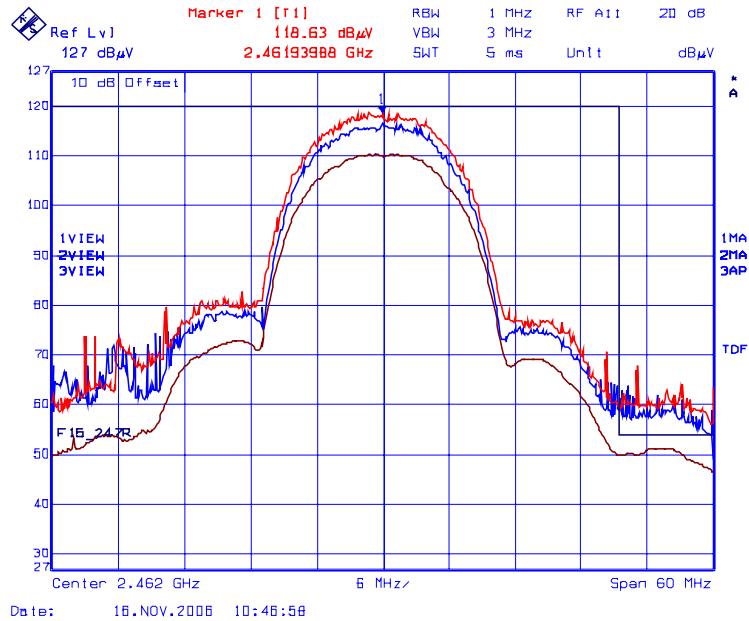
**Plot 5.2.4.1.6.6** Lower Band-Edge Transmitter Radiated Emissions @ 3 Meters, Vertical Polarization  
 Frequency: 2422 MHz; Power Setting: 20.0dBm  
 Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz



**Plot 5.2.4.1.6.7** Upper Band-Edge Transmitter Radiated Emissions @ 3 Meters, Horizontal Polarization  
 Frequency: 2462 MHz; Power Setting: 20.0dBm  
 Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz



**Plot 5.2.4.1.6.8** Upper Band-Edge Transmitter Radiated Emissions @ 3 Meters, Vertical Polarization  
 Frequency: 2462 MHz; Power Setting: 20.0dBm  
 Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz

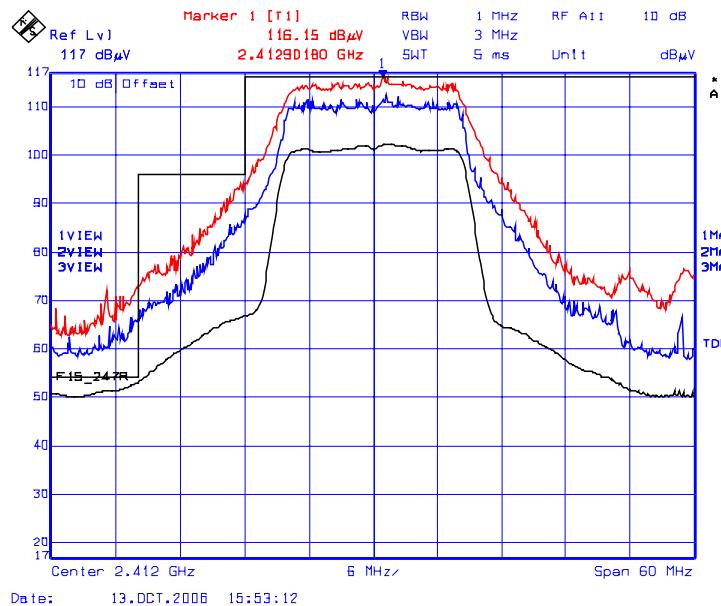


**5.2.4.1.7. EUT with Antenna #1 Cushcraft Directional Antenna (Model SR2405135D, 5 dBi gain), 802.11g Modulation (64QAM @ 54Mbps)**

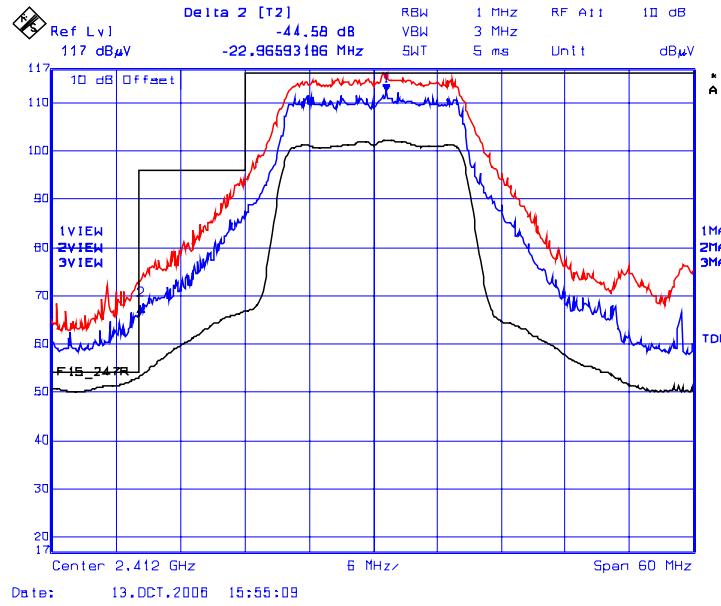
**Plot 5.2.4.1.7.1a** Lower Band-Edge Transmitter Radiated Emissions @ 3 Meters, Horizontal Polarization

Frequency: 2412 MHz, Power Setting: 10.5dBm

Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz  
 Band-Edge Level at 2390 MHz: 116.15 dB $\mu$ V/m – 44.58 dB = 71.57 dB $\mu$ V/m < Limit (74dB $\mu$ V/m)



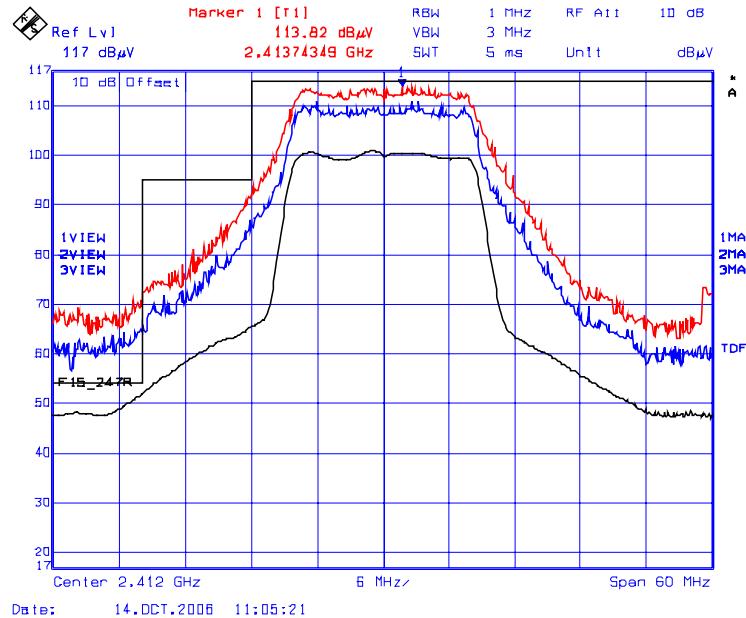
**Plot 5.2.4.1.7.1b** Lower Band-Edge Transmitter Radiated Emissions @ 3 Meters, Horizontal Polarization  
 Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz  
 Delta (Peak to Band-Edge) = 44.58 dB



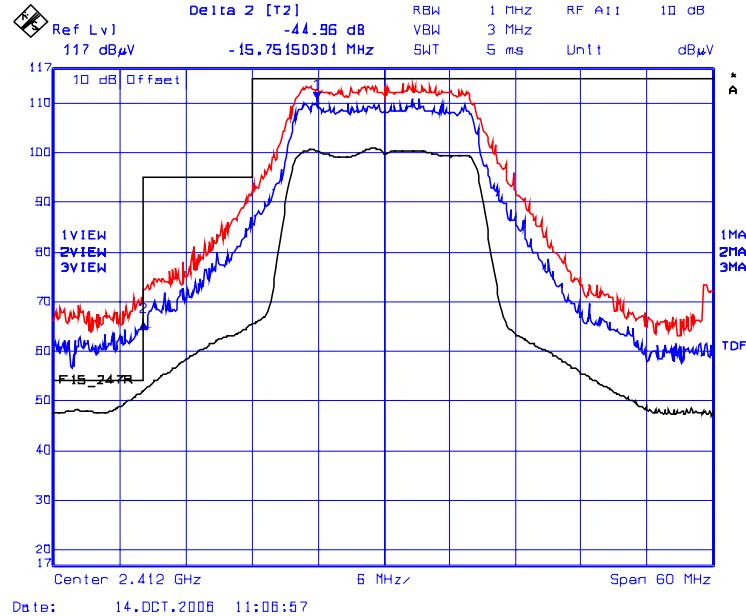
**Plot 5.2.4.1.7.2a** Lower Band-Edge Transmitter Radiated Emissions @ 3 Meters, Vertical Polarization

Frequency: 2412 MHz, Power Setting: 10.5dBm

Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz  
 Band-Edge Level at 2390 MHz: 113.82 dB $\mu$ V/m – 44.96 dB = 68.86 dB $\mu$ V/m < Limit (74dB $\mu$ /m)



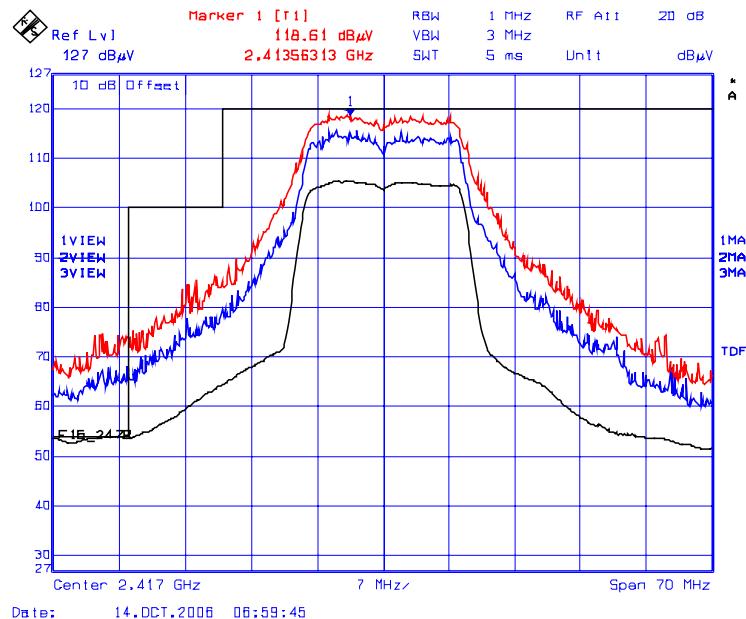
**Plot 5.2.4.1.7.2b** Lower Band-Edge Transmitter Radiated Emissions @ 3 Meters, Vertical Polarization  
 Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz  
 Delta (Peak to Band-Edge) = 44.96 dB



**Plot 5.2.4.1.7.3a** Lower Band-Edge Transmitter Radiated Emissions @ 3 Meters, Horizontal Polarization

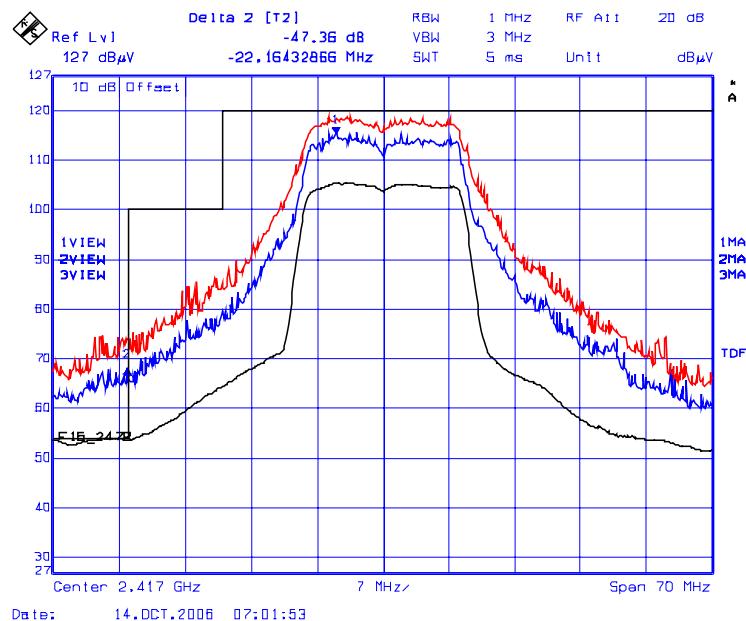
Frequency: 2417 MHz, Power Setting: 14.0dBm

Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz  
 Band-Edge Level at 2390 MHz: 118.61 dB $\mu$ V/m – 47.36 dB = 71.254 dB $\mu$ V/m < Limit (74dB $\mu$ V/m), Average 53.95dB $\mu$ V/m



**Plot 5.2.4.1.7.3b** Lower Band-Edge Transmitter Radiated Emissions @ 3 Meters, Horizontal Polarization

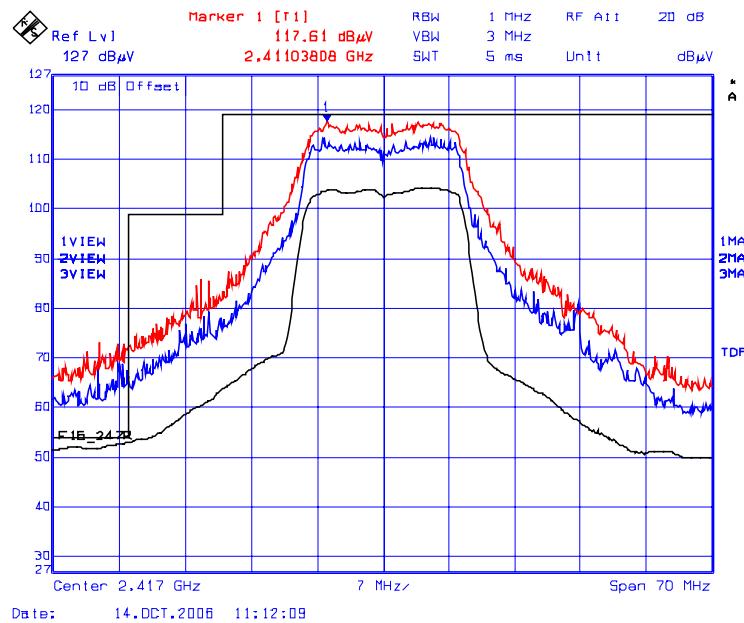
Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz  
 Delta (Peak to Band-Edge) = 47.36 dB



**Plot 5.2.4.1.7.4 Lower Band-Edge Transmitter Radiated Emissions @ 3 Meters, Vertical Polarization**

Frequency: 2417 MHz, Power Setting: 14.0dBm

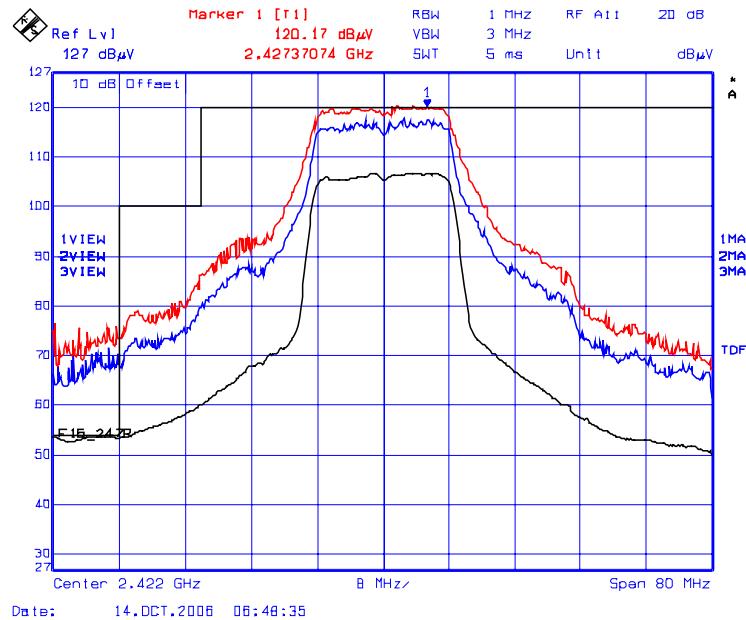
Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz



**Plot 5.2.4.1.7.5a** Lower Band-Edge Transmitter Radiated Emissions @ 3 Meters, Horizontal Polarization

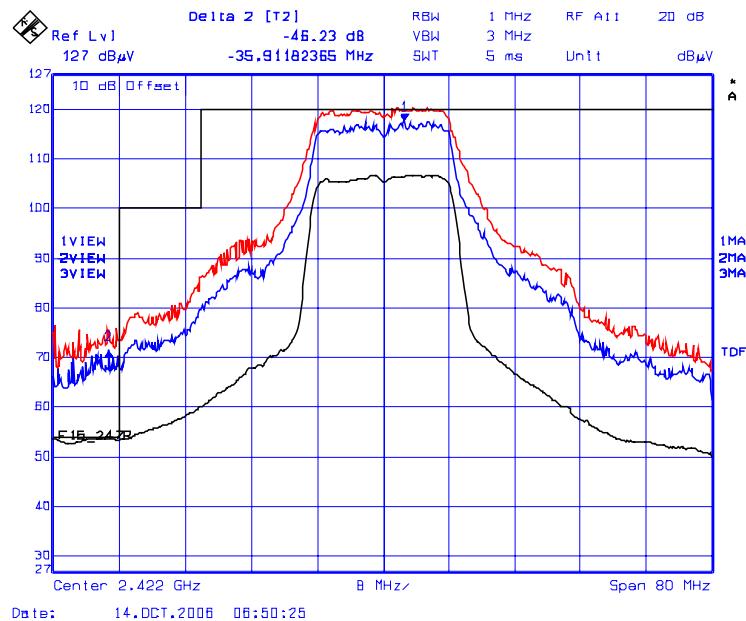
Frequency: 2422 MHz, Power Setting: 15.5dBm

Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz  
 Band-Edge Level at 2390 MHz: 120.17dB $\mu$ V/m – 46.23 dB = 73.94dB $\mu$ V/m < Limit (74 dB $\mu$ V/m), Average 53.68dB $\mu$ V/m



**Plot 5.2.4.1.7.5b** Lower Band-Edge Transmitter Radiated Emissions @ 3 Meters, Horizontal Polarization

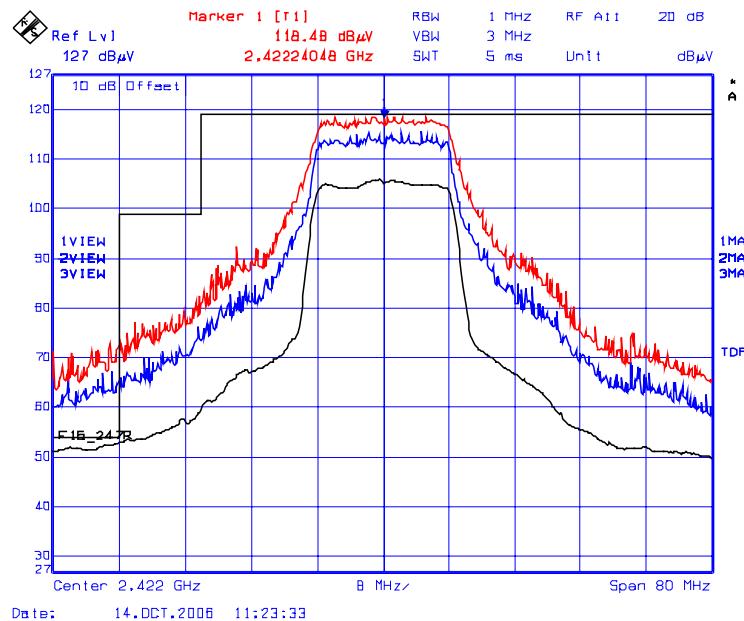
Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz  
 Delta (Peak to Band-Edge) = 46.23 dB



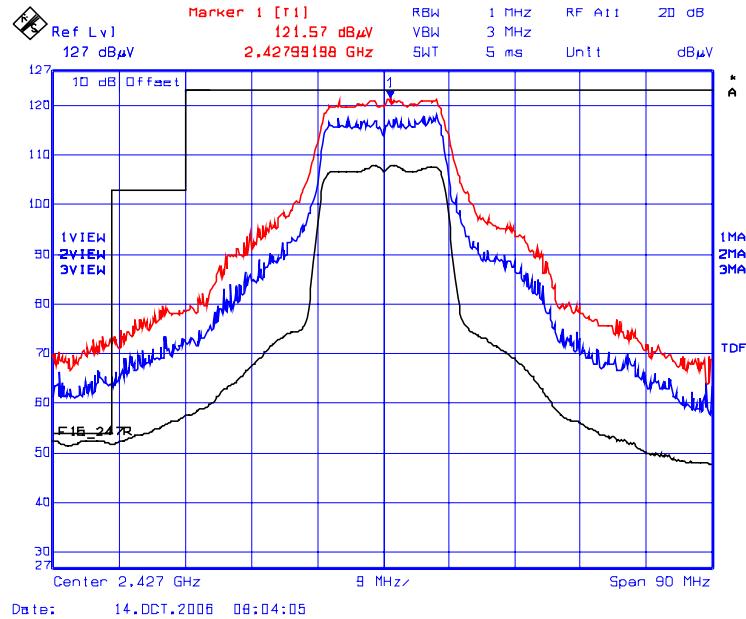
**Plot 5.2.4.1.7.6 Lower Band-Edge Transmitter Radiated Emissions @ 3 Meters, Vertical Polarization**

Frequency: 2422 MHz, Power Setting: 15.5dBm

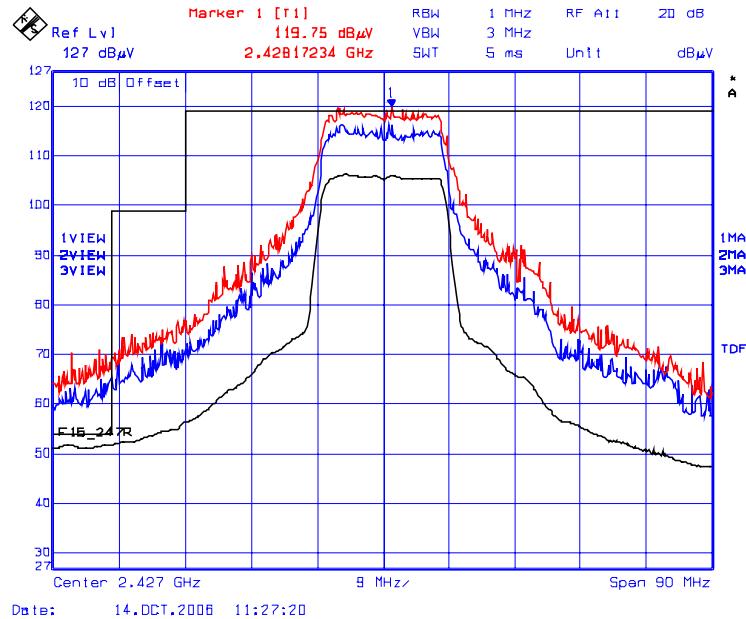
Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz



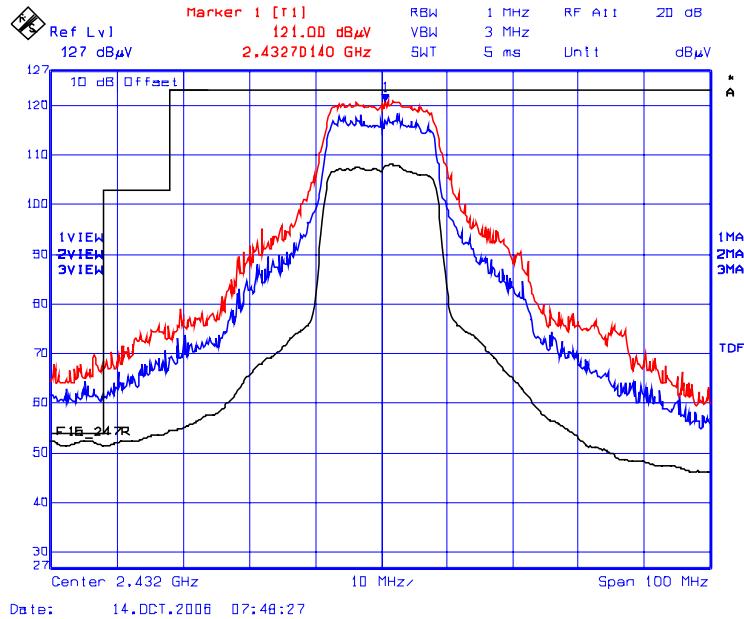
**Plot 5.2.4.1.7.7 Lower Band-Edge Transmitter Radiated Emissions @ 3 Meters, Horizontal Polarization**  
 Frequency: 2427 MHz, Power Setting: 16.0dBm  
 Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz



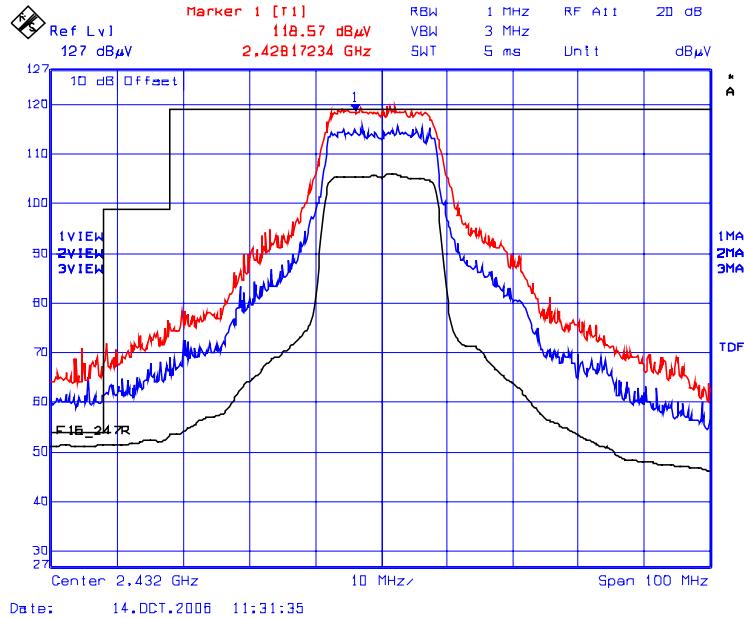
**Plot 5.2.4.1.7.8 Lower Band-Edge Transmitter Radiated Emissions @ 3 Meters, Vertical Polarization**  
 Frequency: 2427 MHz, Power Setting: 16.0dBm  
 Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz



**Plot 5.2.4.1.7.9** Lower Band-Edge Transmitter Radiated Emissions @ 3 Meters, Horizontal Polarization  
 Frequency: 2432 MHz, Power Setting: 16.0dBm  
 Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz



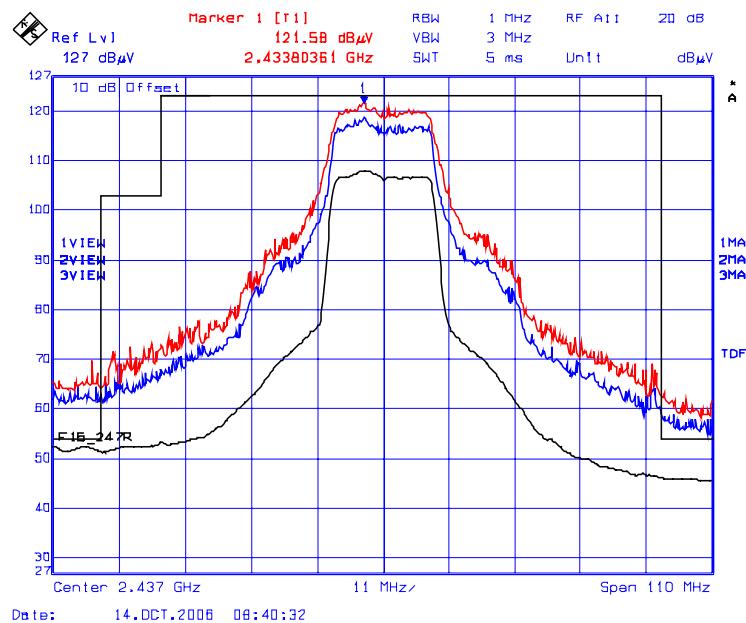
**Plot 5.2.4.1.7.10** Lower Band-Edge Transmitter Radiated Emissions @ 3 Meters, Vertical Polarization  
 Frequency: 2432 MHz, Power Setting: 16.0dBm  
 Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz



**Plot 5.2.4.1.7.11 Lower Band-Edge Transmitter Radiated Emissions @ 3 Meters, Horizontal Polarization**

Frequency: 2437 MHz, Power Setting: 16.5dBm

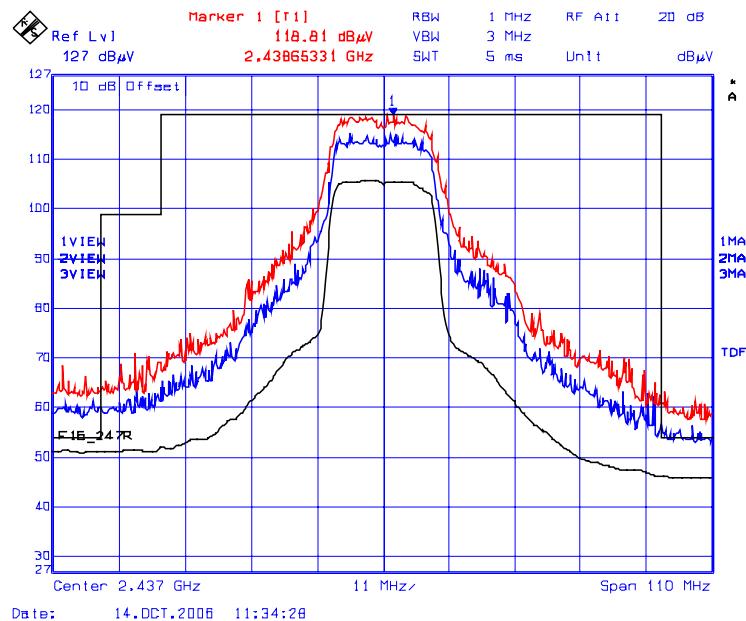
Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz



**Plot 5.2.4.1.7.12 Lower Band-Edge Transmitter Radiated Emissions @ 3 Meters, Vertical Polarization**

Frequency: 2437 MHz, Power Setting: 16.5dBm

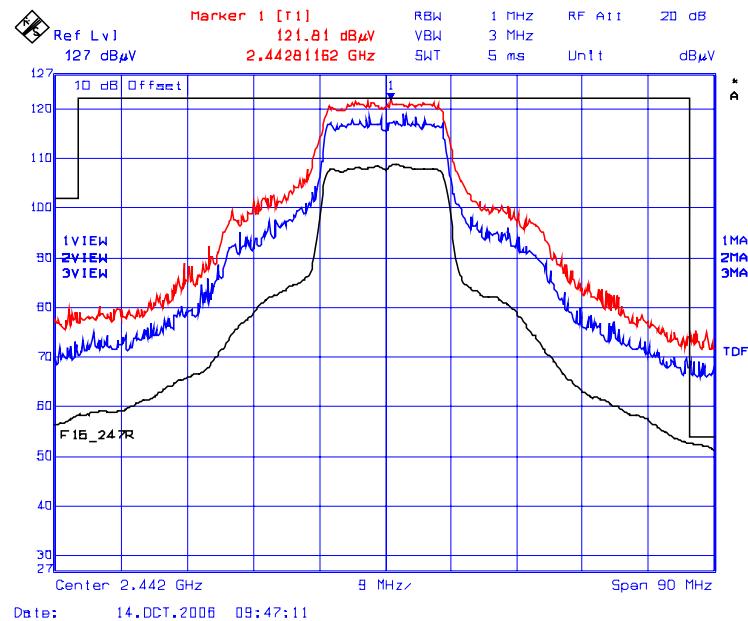
Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz



**Plot 5.2.4.1.7.13a** Upper Band-Edge Transmitter Radiated Emissions @ 3 Meters, Horizontal Polarization

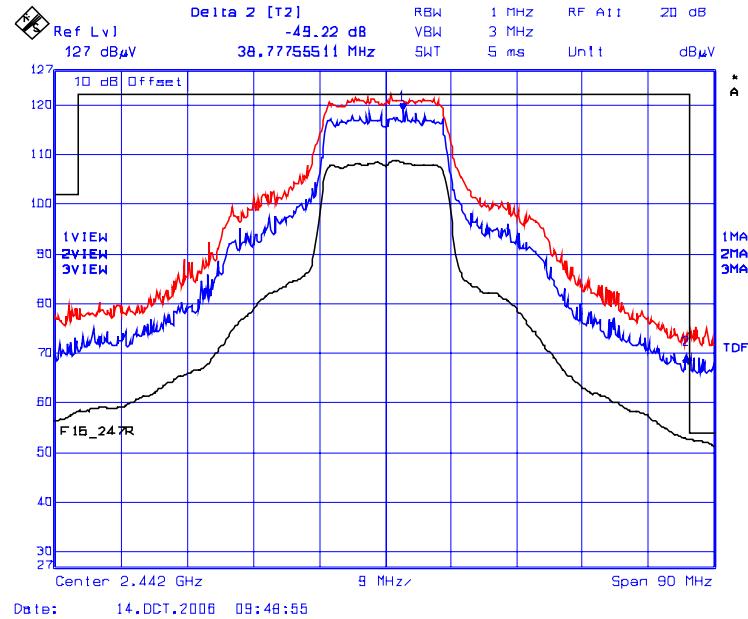
Frequency: 2442MHz, Power Setting: 20.0dBm

Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz  
 Band-Edge Level at 2483.5 MHz:  $121.81 \text{ dB}\mu\text{V} - 49.22 = 72.59 \text{ dB}\mu\text{V/m} < \text{Limit (74 dB}\mu\text{V/m)}$



**Plot 5.2.4.1.7.13b** Upper Band-Edge Transmitter Radiated Emissions @ 3 Meters, Horizontal Polarization

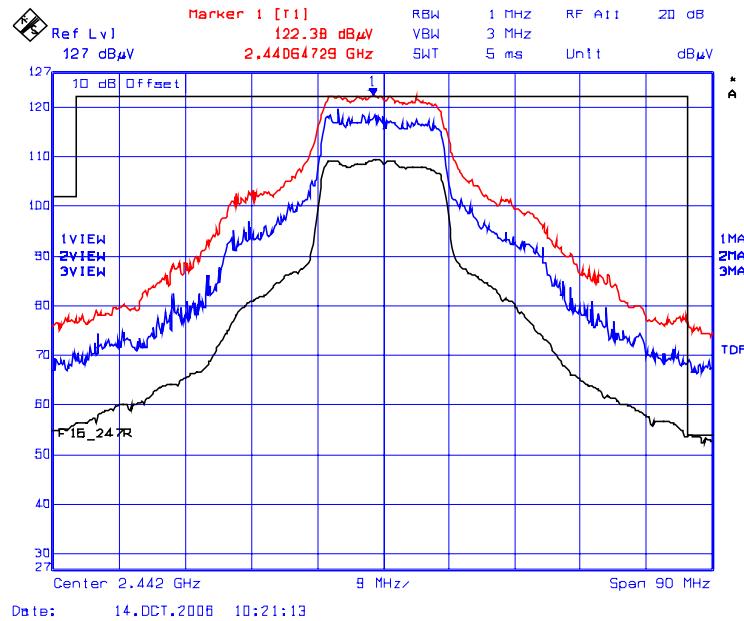
Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz  
 Delta (Peak to Band-Edge) = 49.22



**Plot 5.2.4.1.7.14a** Upper Band-Edge Transmitter Radiated Emissions @ 3 Meters, Vertical Polarization

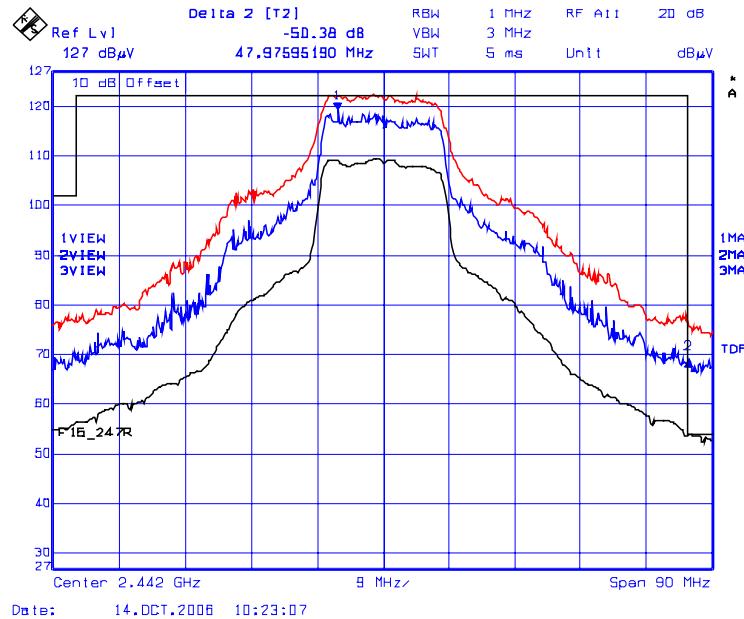
Frequency: 2442MHz, Power Setting: 20.0dBm

Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz  
 Band-Edge Level at 2483.5 MHz:  $122.38 \text{ dB}\mu\text{V}/\text{m} - 50.38 = 72.00 \text{ dB}\mu\text{V}/\text{m} < \text{Limit (74 dB}\mu\text{V}/\text{m)}$



**Plot 5.2.4.1.7.14b** Upper Band-Edge Transmitter Radiated Emissions @ 3 Meters, Vertical Polarization

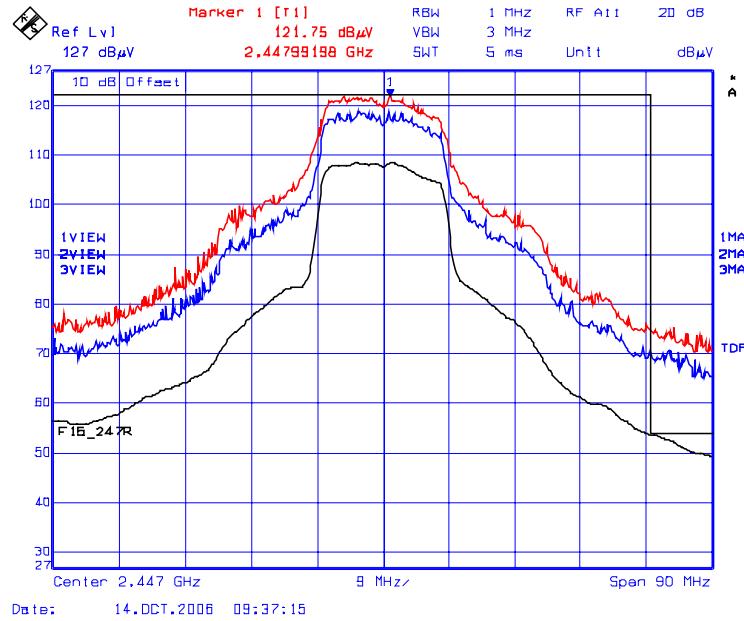
Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz  
 Delta (Peak to Band-Edge) = 50.38



### Plot 5.2.4.1.7.15a Upper Band-Edge Transmitter Radiated Emissions @ 3 Meters, Horizontal Polarization

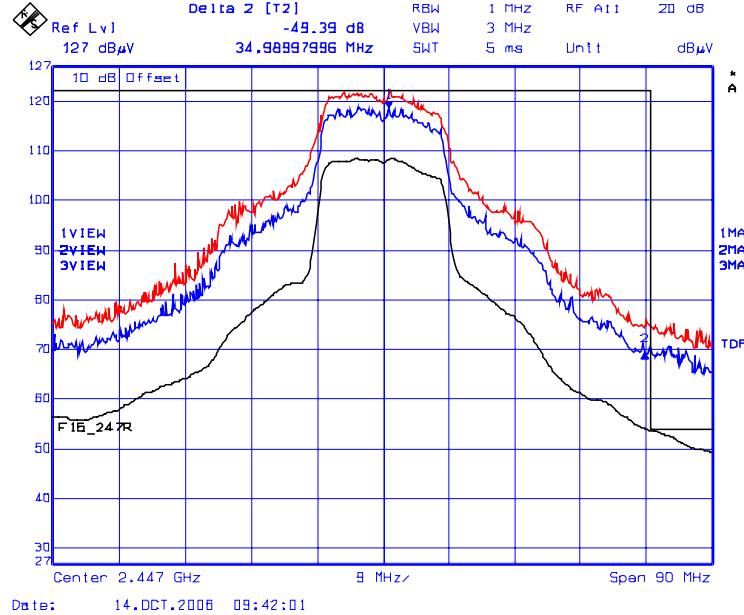
Frequency: 2447 MHz, Power Setting: 19.0dBm

Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz  
Band-Edge Level at 2483.5 MHz: 121.75 dB $\mu$ V/m - 49.39 = 72.36 dB $\mu$ V/m < Limit (74 dB $\mu$ V/m)



#### Plot 5.2.4.1.7.15b Upper Band-Edge Transmitter Radiated Emissions @ 3 Meters, Horizontal Polarization

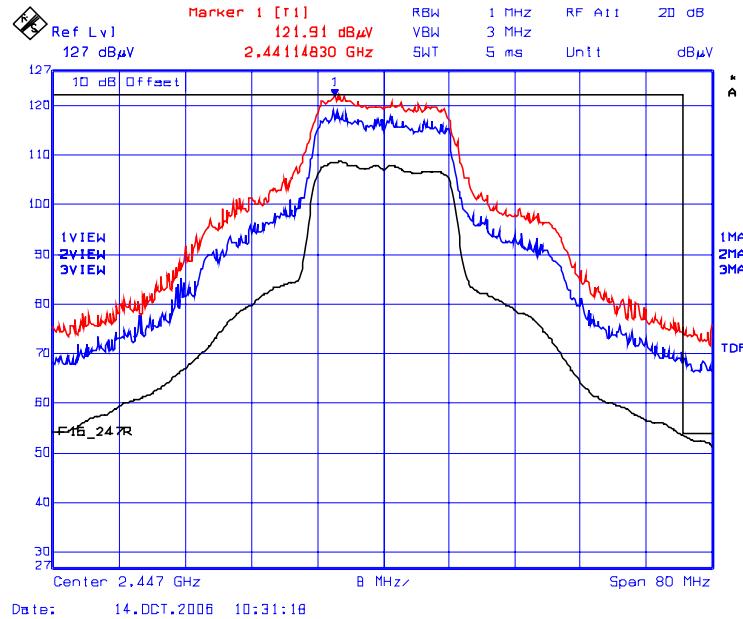
Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz  
Delta (Peak to Band-Edge) = 49.39



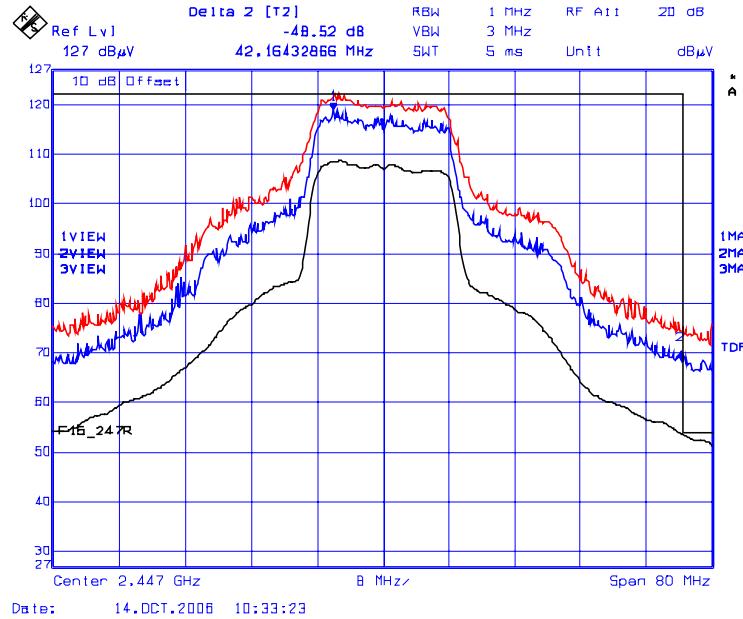
**Plot 5.2.4.1.7.16a** Upper Band-Edge Transmitter Radiated Emissions @ 3 Meters, Vertical Polarization

Frequency: 2447 MHz, Power Setting: 19.0dBm

Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz  
 Band-Edge Level at 2483.5 MHz: 121.91 dB $\mu$ V/m – 48.52 = 73.39 dB $\mu$ V/m < Limit (74 dB $\mu$ V/m)



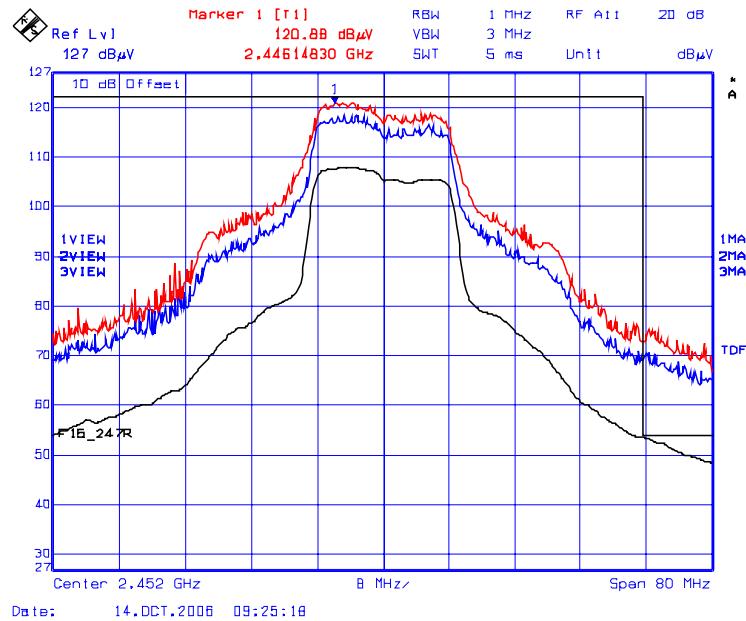
**Plot 5.2.4.1.7.16b** Upper Band-Edge Transmitter Radiated Emissions @ 3 Meters, Vertical Polarization  
 Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz  
 Delta (Peak to Band-Edge) = 48.52



**Plot 5.2.4.1.7.17a** Upper Band-Edge Transmitter Radiated Emissions @ 3 Meters, Horizontal Polarization

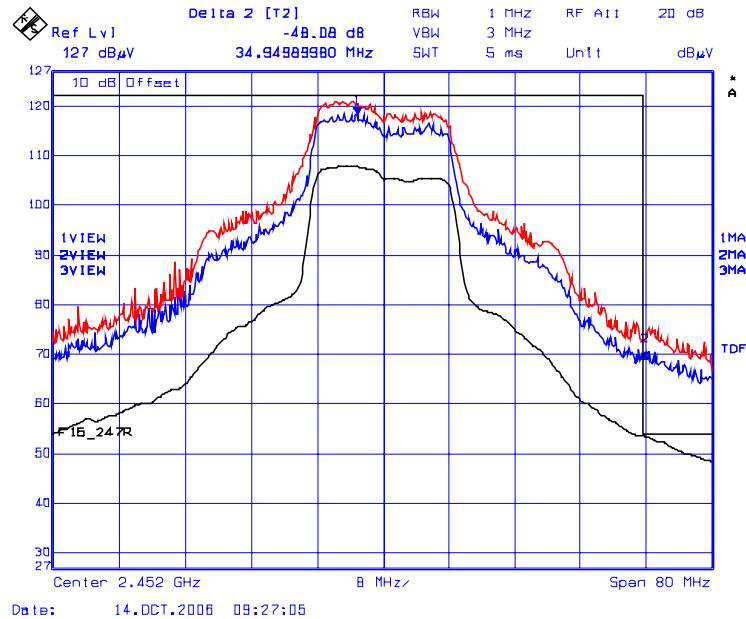
Frequency: 2452 MHz, Power Setting: 18.5dBm

Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz  
 Band-Edge Level at 2483.5 MHz: 120.88 dB $\mu$ V/m – 48.08 dB = 72.80 dB $\mu$ V/m < Limit (74 dB $\mu$ V/m)



**Plot 5.2.4.1.7.17b** Upper Band-Edge Transmitter Radiated Emissions @ 3 Meters, Horizontal Polarization

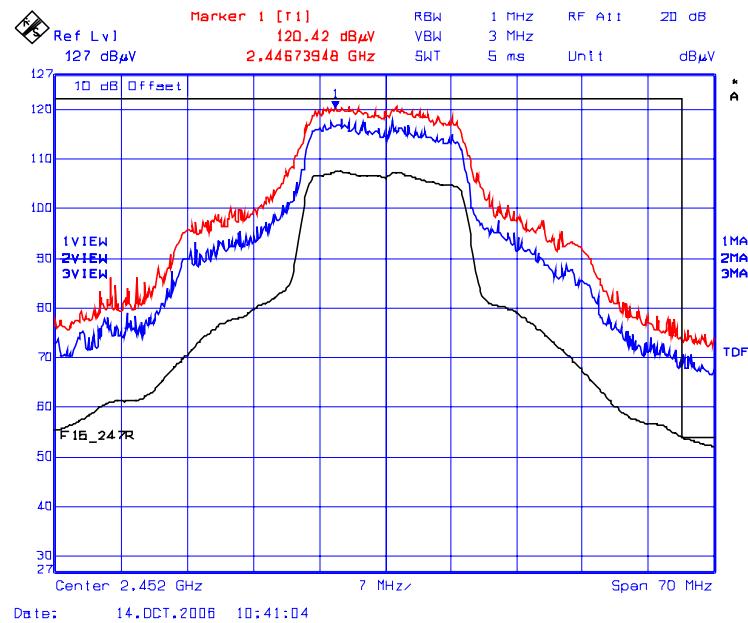
Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz  
 Delta (Peak to Band-Edge) = 48.08 dB



**Plot 5.2.4.1.7.18a** Upper Band-Edge Transmitter Radiated Emissions @ 3 Meters, Vertical Polarization

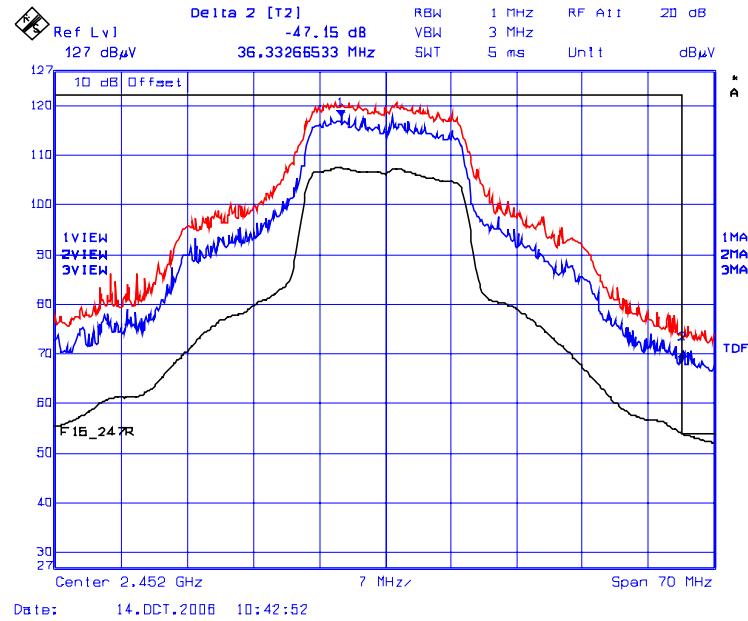
Frequency: 2452 MHz, Power Setting: 18.5dBm

Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz  
 Band-Edge Level at 2483.5 MHz: 120.42 dB $\mu$ V/m – 47.15 dB = 73.27 dB $\mu$ V/m < Limit (74 dB $\mu$ V/m), Average 53.81 dB $\mu$ V/m



**Plot 5.2.4.1.7.18b** Upper Band-Edge Transmitter Radiated Emissions @ 3 Meters, Vertical Polarization

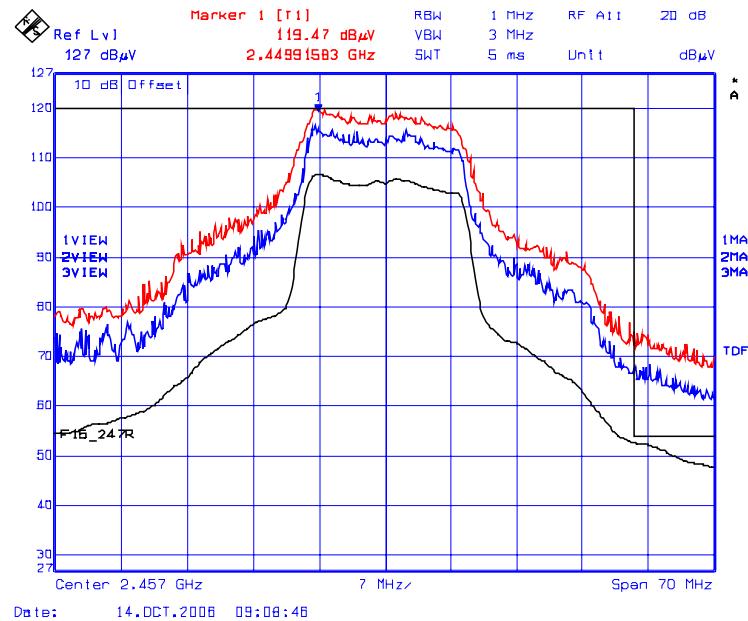
Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz  
 Delta (Peak to Band-Edge) = 47.15 dB



**Plot 5.2.4.1.7.19a** Upper Band-Edge Transmitter Radiated Emissions @ 3 Meters, Horizontal Polarization

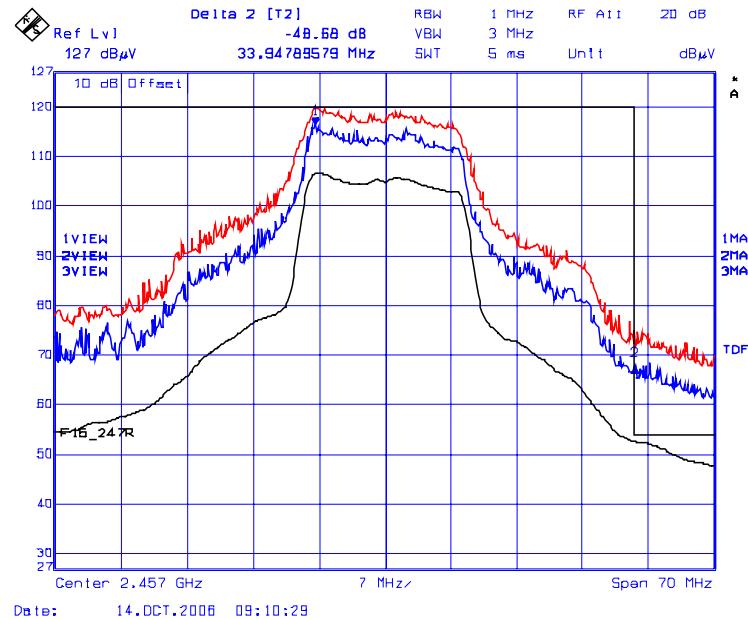
Frequency: 2457 MHz, Power Setting: 17.0dBm

Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz  
 Band-Edge Level at 2483.5 MHz: 119.47dB $\mu$ V/m – 48.68 dB = 70.79 dB $\mu$ V/m < Limit (74 dB $\mu$ V/m)



**Plot 5.2.4.1.7.19b** Upper Band-Edge Transmitter Radiated Emissions @ 3 Meters, Horizontal Polarization

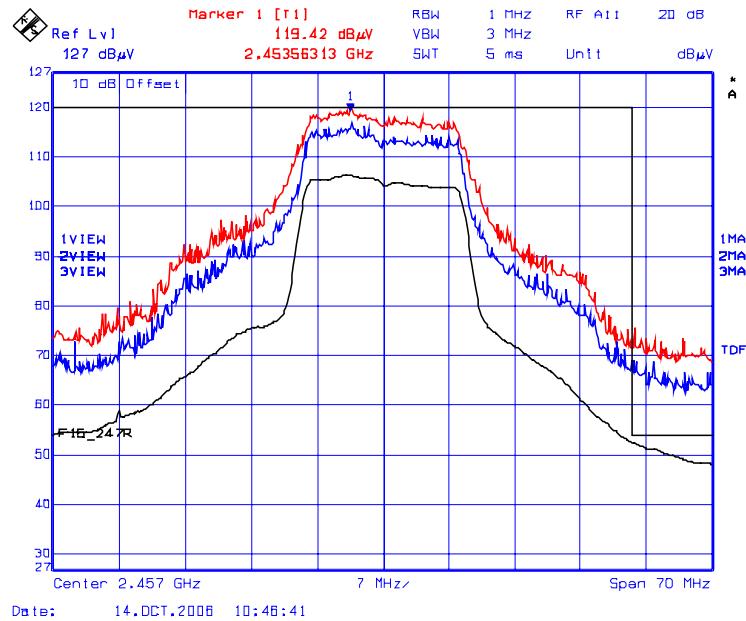
Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz  
 Delta (Peak to Band-Edge) = 48.68 dB



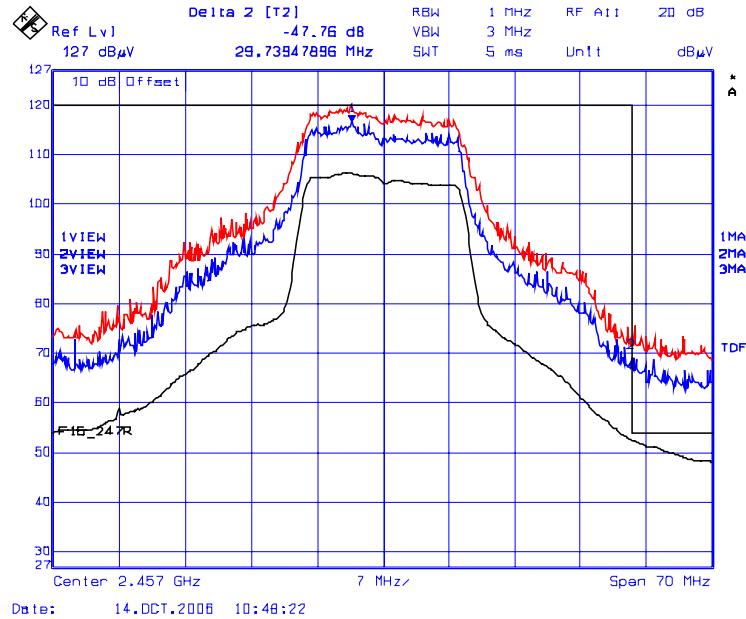
**Plot 5.2.4.1.7.20a** Upper Band-Edge Transmitter Radiated Emissions @ 3 Meters, Vertical Polarization

Frequency: 2457 MHz, Power Setting: 17.0 dBm

Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz  
 Band-Edge Level at 2483.5 MHz: 119.42 dB $\mu$ V/m – 47.76 dB = 71.66 dB $\mu$ V/m < Limit (74 dB $\mu$ V/m)



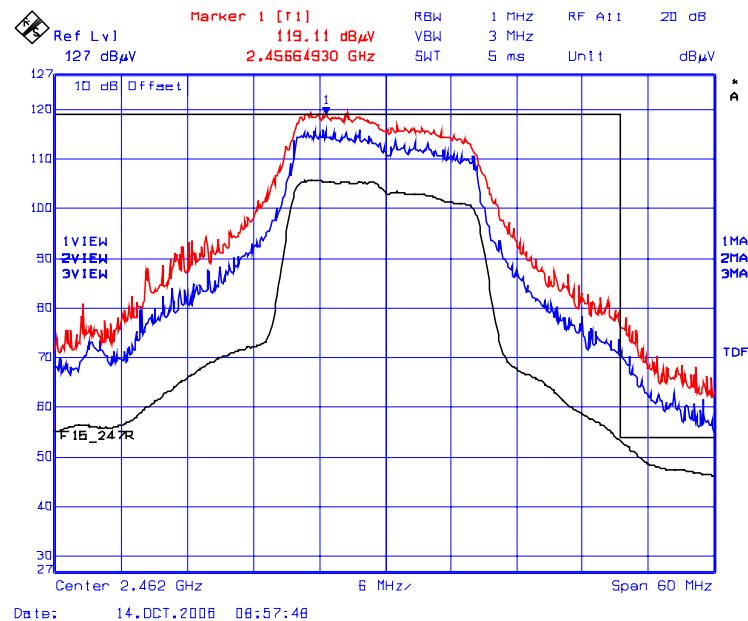
**Plot 5.2.4.1.7.20b** Upper Band-Edge Transmitter Radiated Emissions @ 3 Meters, Vertical Polarization  
 Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz  
 Delta (Peak to Band-Edge) = 47.76 dB



**Plot 5.2.4.1.7.21a** Upper Band-Edge Transmitter Radiated Emissions @ 3 Meters, Horizontal Polarization

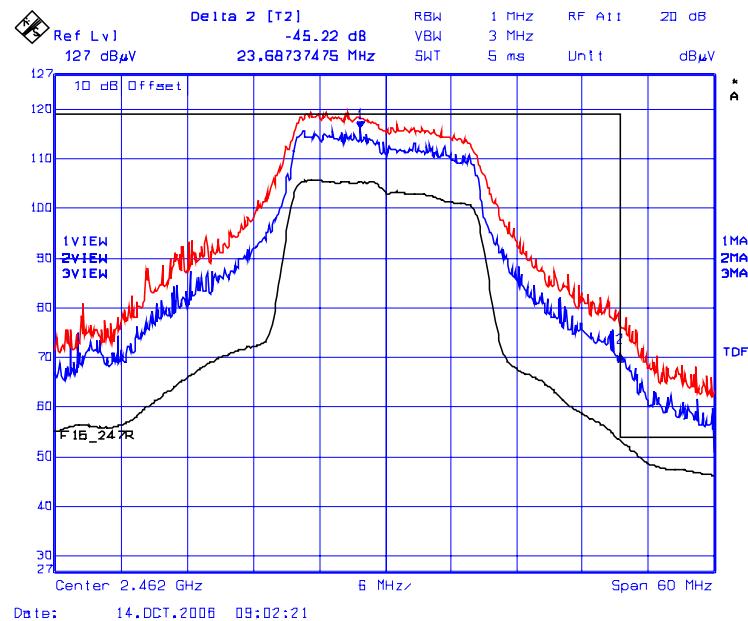
Frequency: 2462 MHz, Power Setting: 14.5dBm

Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz  
 Band-Edge Level at 2483.5 MHz: 119.11dB $\mu$ V/m - 45.22 dB = 73.89 dB $\mu$ V/m < Limit (74 dB $\mu$ V/m)



**Plot 5.2.4.1.7.21b** Upper Band-Edge Transmitter Radiated Emissions @ 3 Meters, Horizontal Polarization

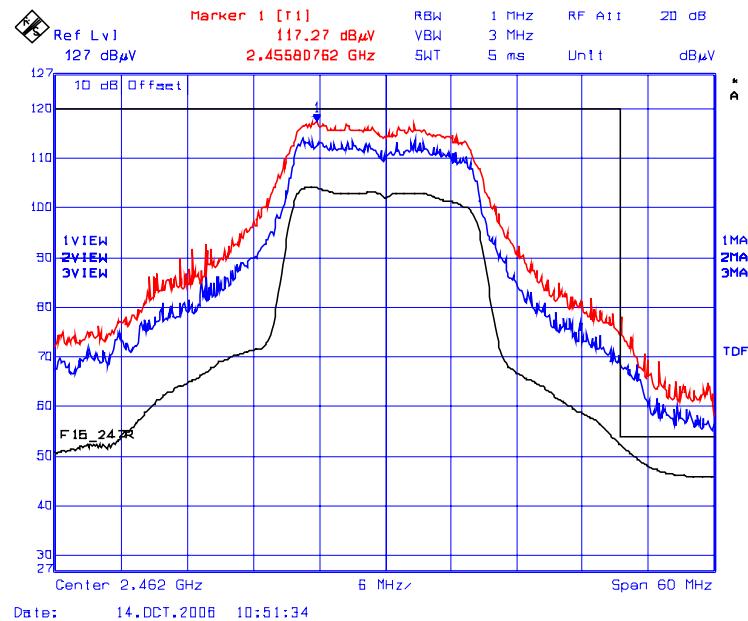
Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz  
 Delta (Peak to Band-Edge) = 45.22 dB



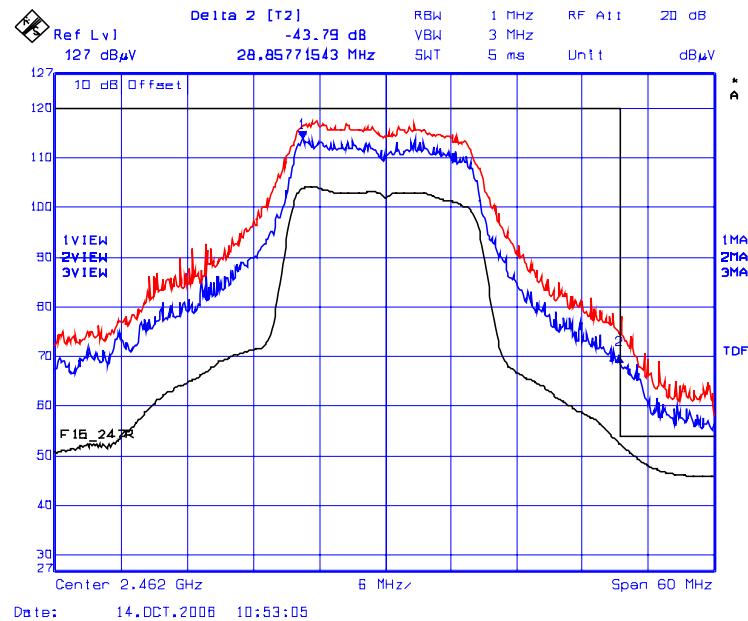
**Plot 5.2.4.1.7.22a** Upper Band-Edge Transmitter Radiated Emissions @ 3 Meters, Vertical Polarization

Frequency: 2462 MHz, Power Setting: 14.5dBm

Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz  
 Band-Edge Level at 2483.5 MHz: 117.27 dB $\mu$ V/m – 43.79 dB = 73.48 dB $\mu$ V/m < Limit (74 dB $\mu$ V/m)



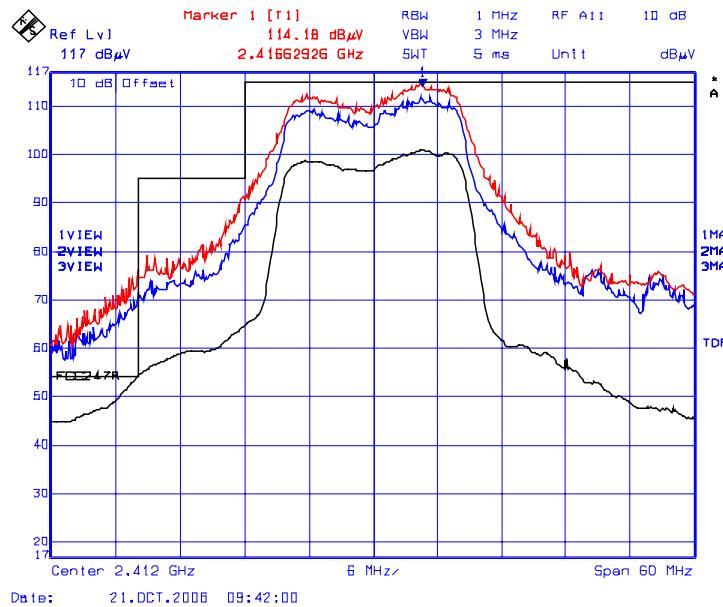
**Plot 5.2.4.1.7.22b** Upper Band-Edge Transmitter Radiated Emissions @ 3 Meters, Vertical Polarization  
 Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz  
 Delta (Peak to Band-Edge) = 43.79 dB



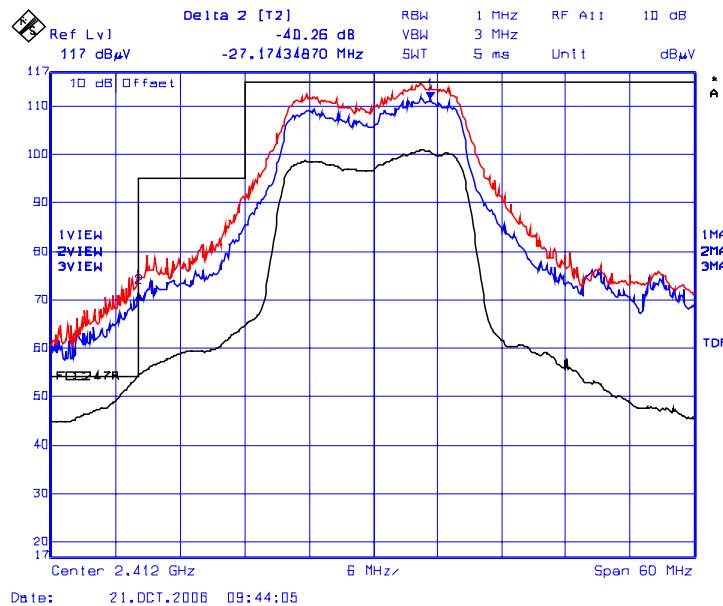
5.2.4.1.8. EUT with Antenna #2 Cushcraft Omni Antenna (Model S24493DS, 3 dBi gain), 802.11g Modulation (64QAM @ 54Mbps)

**Plot 5.2.4.1.8.1a** Lower Band-Edge Transmitter Radiated Emissions @ 3 Meters, Horizontal Polarization  
 Frequency: 2412 MHz, Power Setting: 13.0dBm

Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz  
 Band-Edge Level at 2390 MHz: 114.18 dB $\mu$ V/m – 40.26 dB = 73.92 dB $\mu$ V/m < Limit (74 dB $\mu$ V/m)



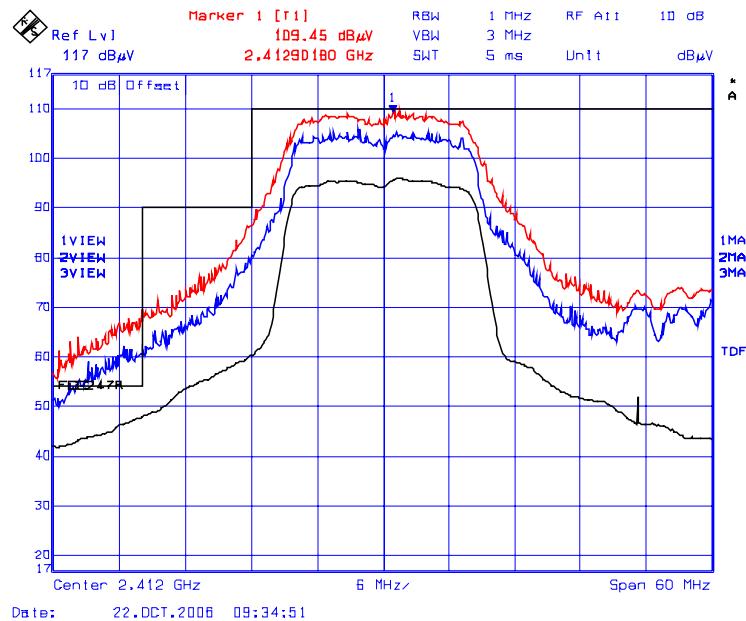
**Plot 5.2.4.1.8.1b** Lower Band-Edge Transmitter Radiated Emissions @ 3 Meters, Horizontal Polarization  
 Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz  
 Delta (Peak to Band-Edge) = 40.26 dB



**Plot 5.2.4.1.8.2 Lower Band-Edge Transmitter Radiated Emissions @ 3 Meters, Vertical Polarization**

Frequency: 2412 MHz, Power Setting: 13.0dBm

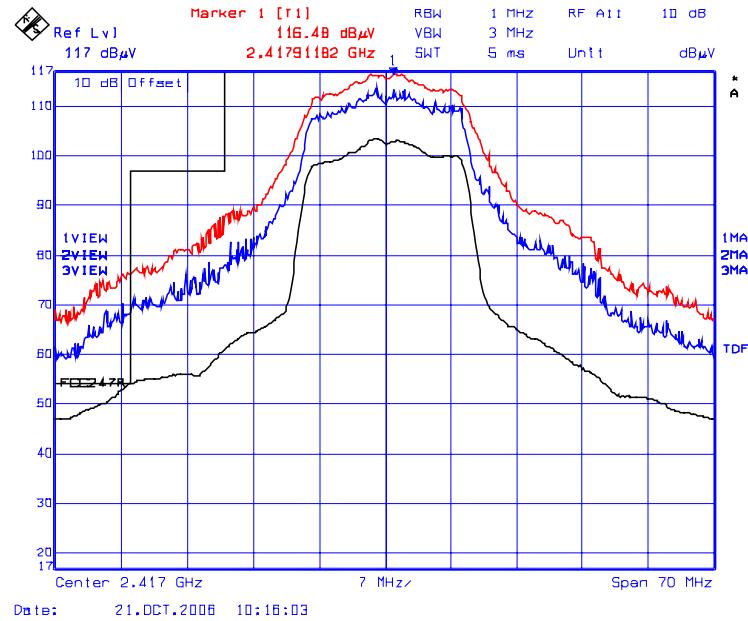
Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz



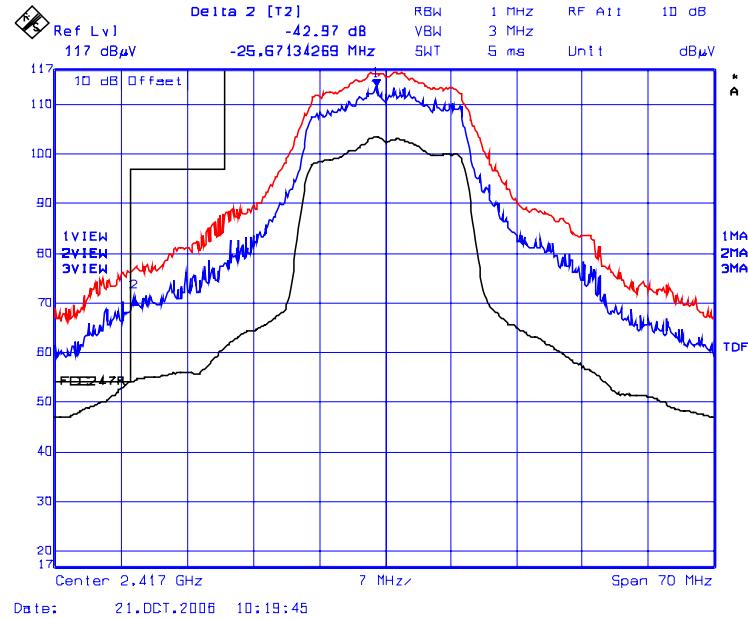
**Plot 5.2.4.1.8.3a** Lower Band-Edge Transmitter Radiated Emissions @ 3 Meters, Horizontal Polarization

Frequency: 2417 MHz, Power Setting: 15.0dBm

Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz  
 Band-Edge Level at 2390 MHz: 116.48 dB $\mu$ V/m – 42.97 dB = 73.51 dB $\mu$ V/m < Limit (74 dB $\mu$ V/m)



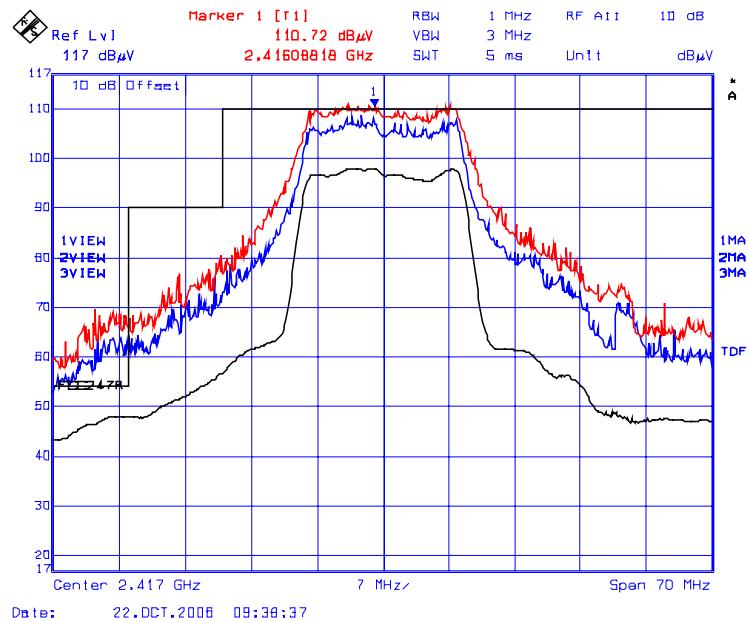
**Plot 5.2.4.1.8.3b** Lower Band-Edge Transmitter Radiated Emissions @ 3 Meters, Horizontal Polarization  
 Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz  
 Delta (Peak to Band-Edge) = 42.97 dB



**Plot 5.2.4.1.8.4 Lower Band-Edge Transmitter Radiated Emissions @ 3 Meters, Vertical Polarization**

Frequency: 2417 MHz, Power Setting: 15.0dBm

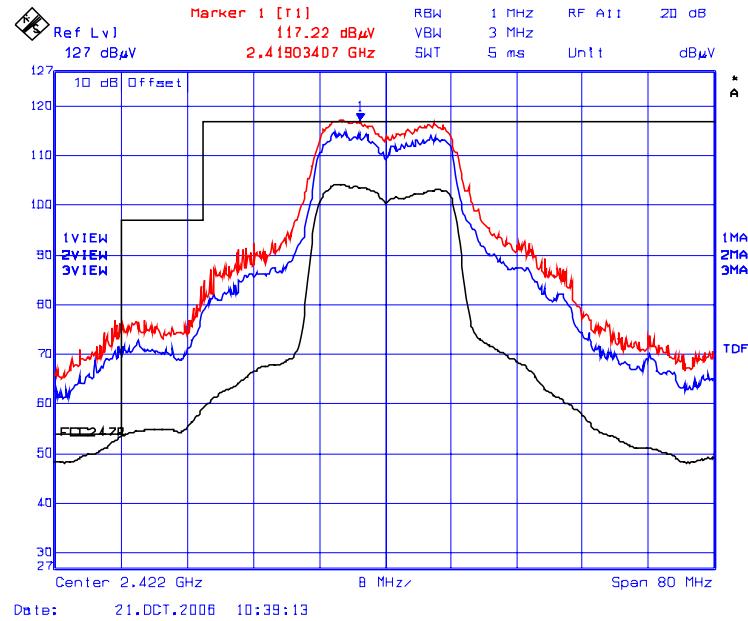
Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz



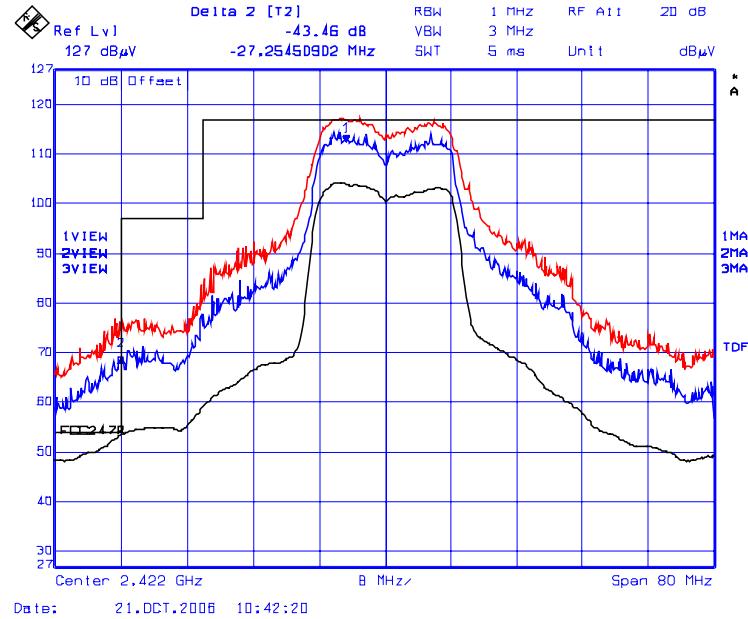
**Plot 5.2.4.1.8.5a** Lower Band-Edge Transmitter Radiated Emissions @ 3 Meters, Horizontal Polarization

Frequency: 2422 MHz, Power Setting: 16.0dBm

Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz  
 Band-Edge Level at 2390 MHz: 117.22 dB $\mu$ V/m – 43.46 dB = 73.76 dB $\mu$ V/m < Limit (74 dB $\mu$ V/m)



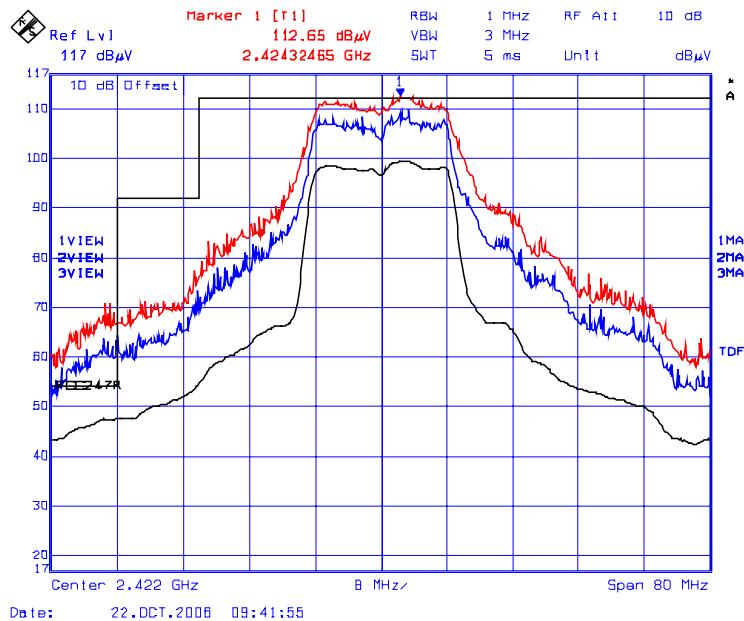
**Plot 5.2.4.1.8.5b** Lower Band-Edge Transmitter Radiated Emissions @ 3 Meters, Horizontal Polarization  
 Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz  
 Delta (Peak to Band-Edge) = 43.46 dB



**Plot 5.2.4.1.8.6 Lower Band-Edge Transmitter Radiated Emissions @ 3 Meters, Vertical Polarization**

Frequency: 2422 MHz, Power Setting: 16.0dBm

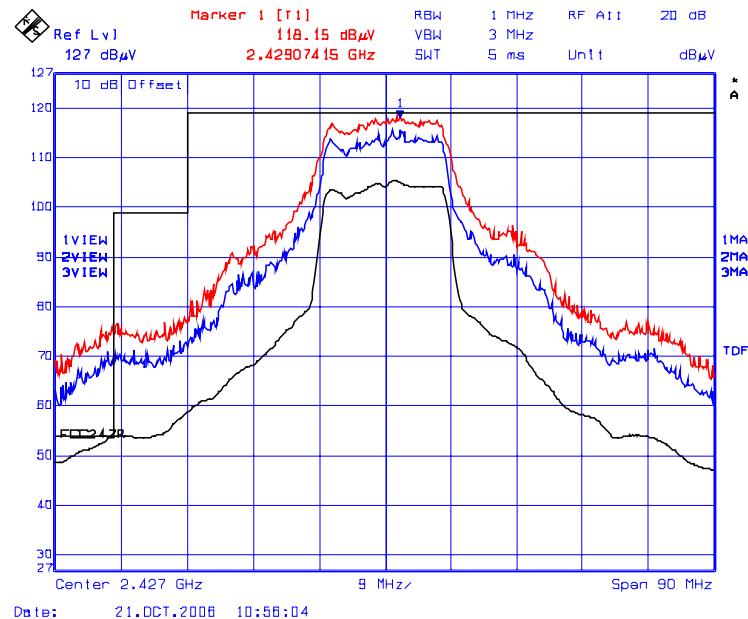
Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz



**Plot 5.2.4.1.8.7a** Lower Band-Edge Transmitter Radiated Emissions @ 3 Meters, Horizontal Polarization

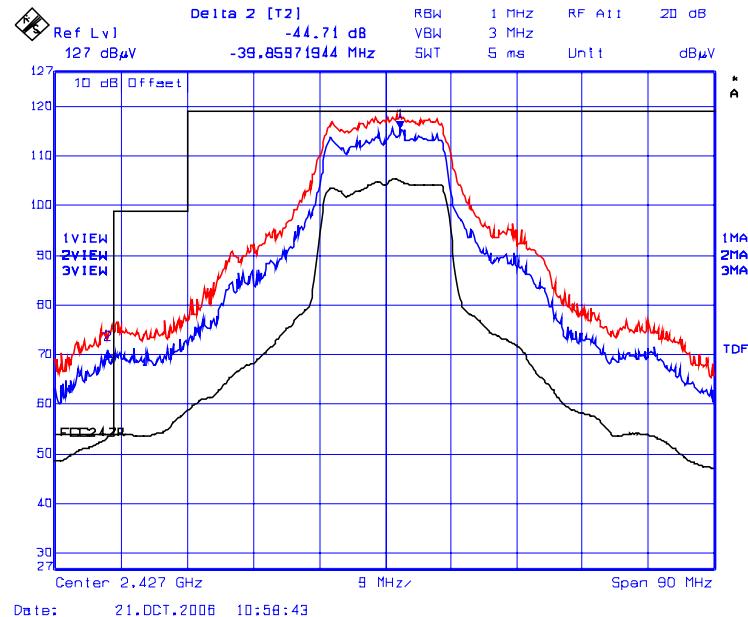
Frequency: 2427 MHz, Power Setting: 18.0dBm

Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz  
 Band-Edge Level at 2390 MHz: 118.15 dB $\mu$ V/m – 44.71 dB = 73.44dB $\mu$ V/m < Limit (74 dB $\mu$ V/m)



**Plot 5.2.4.1.8.7b** Lower Band-Edge Transmitter Radiated Emissions @ 3 Meters, Horizontal Polarization

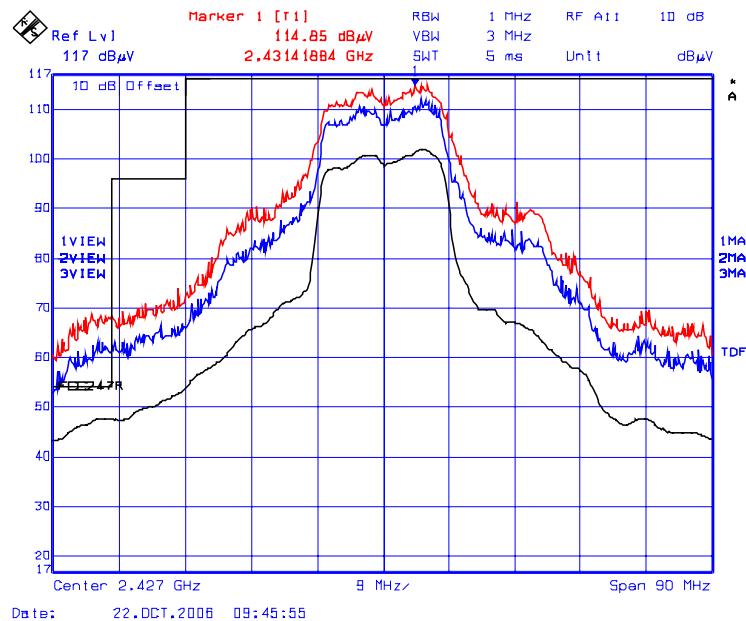
Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz  
 Delta (Peak to Band-Edge) = 44.71 dB



**Plot 5.2.4.1.8.8 Lower Band-Edge Transmitter Radiated Emissions @ 3 Meters, Vertical Polarization**

Frequency: 2427 MHz, Power Setting: 18.0dBm

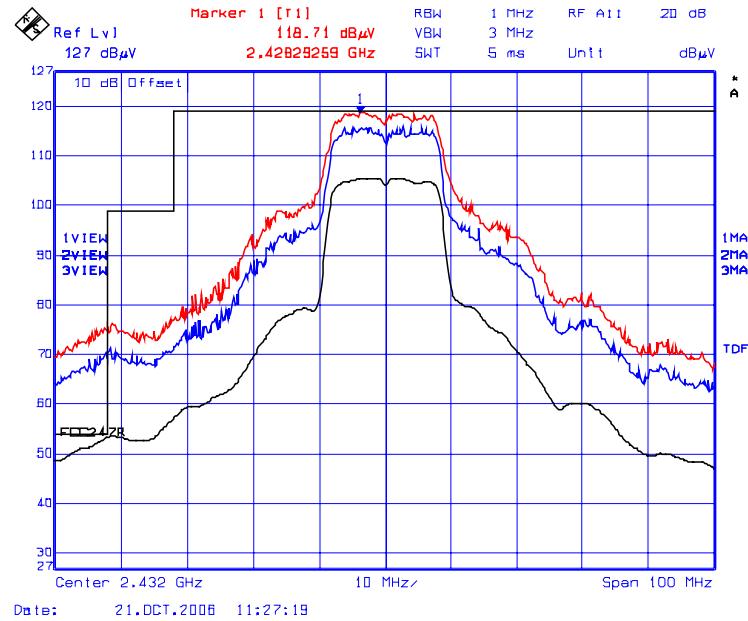
Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz



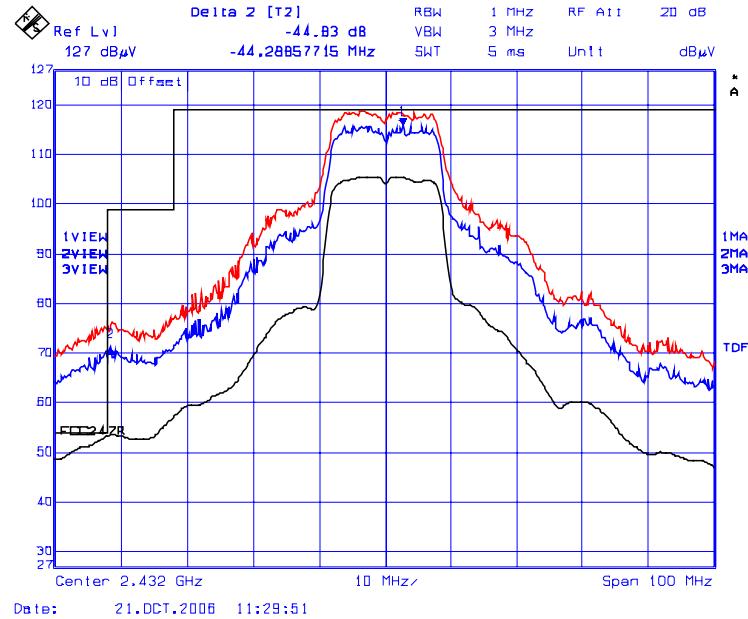
**Plot 5.2.4.1.8.9a** Lower Band-Edge Transmitter Radiated Emissions @ 3 Meters, Horizontal Polarization

Frequency: 2432 MHz, Power Setting: 18.5dBm

Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz  
 Band-Edge Level at 2390 MHz: 118.71dB $\mu$ V/m – 44.83 dB = 73.88 dB $\mu$ V/m < Limit (74 dB $\mu$ V/m)



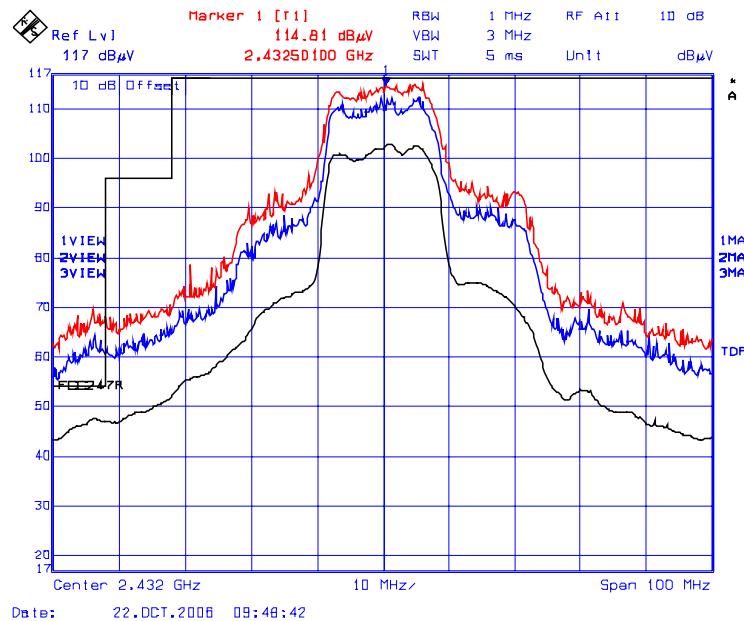
**Plot 5.2.4.1.8.9b** Lower Band-Edge Transmitter Radiated Emissions @ 3 Meters, Horizontal Polarization  
 Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz  
 Delta (Peak to Band-Edge) = 44.83 dB



**Plot 5.2.4.1.8.10 Lower Band-Edge Transmitter Radiated Emissions @ 3 Meters, Vertical Polarization**

Frequency: 2432 MHz, Power Setting: 18.5dBm

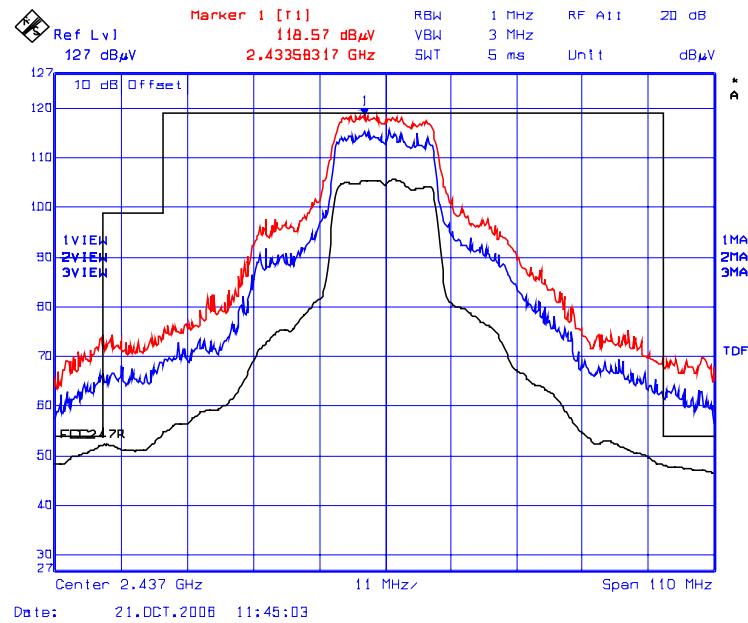
Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz



**Plot 5.2.4.1.8.11a** Lower Band-Edge Transmitter Radiated Emissions @ 3 Meters, Horizontal Polarization

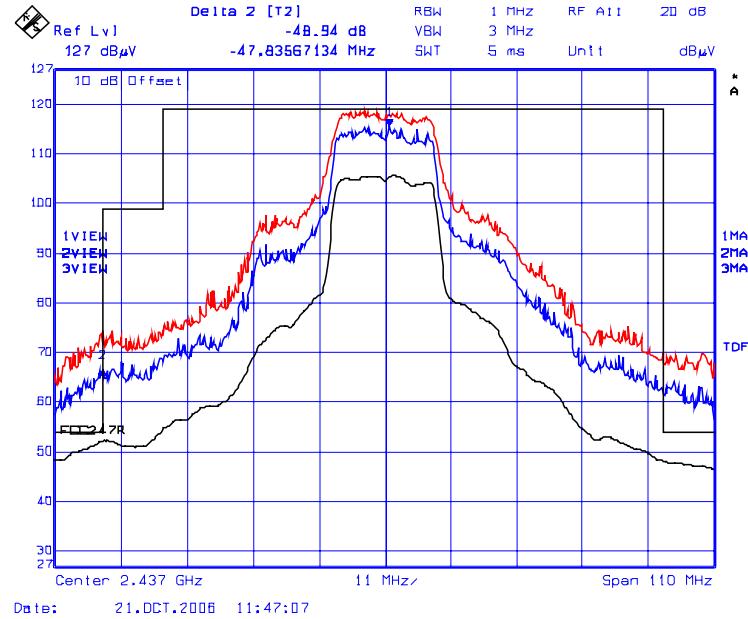
Frequency: 2437 MHz, Power Setting: 19.5dBm

Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz  
 Band-Edge Level at 2390 MHz: 118.57 dB $\mu$ V/m – 48.94 dB = 69.63 dB $\mu$ V/m < Limit (74 dB $\mu$ V/m)



**Plot 5.2.4.1.8.11b** Lower Band-Edge Transmitter Radiated Emissions @ 3 Meters, Horizontal Polarization

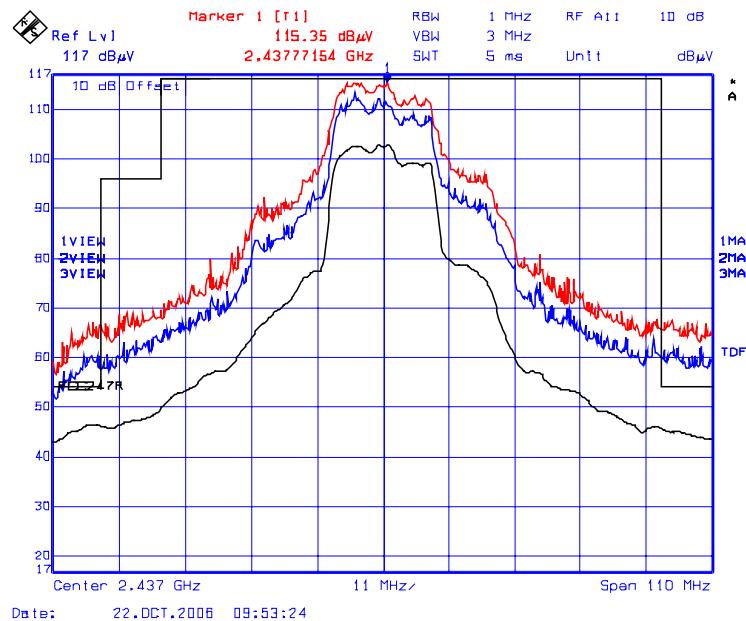
Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz  
 Delta (Peak to Band-Edge) = 48.94 dB



**Plot 5.2.4.1.8.12 Lower Band-Edge Transmitter Radiated Emissions @ 3 Meters, Vertical Polarization**

Frequency: 2437 MHz, Power Setting: 19.5dBm

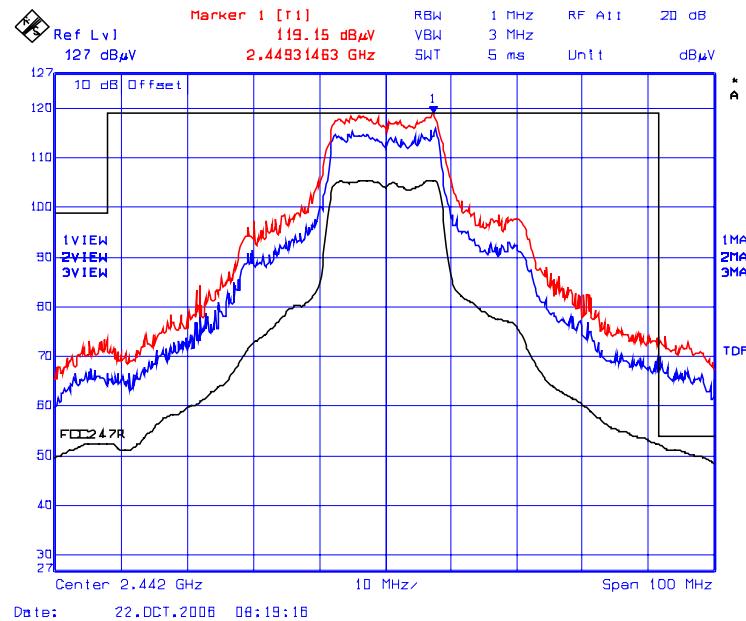
Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz



**Plot 5.2.4.1.8.13a** Upper Band-Edge Transmitter Radiated Emissions @ 3 Meters, Horizontal Polarization

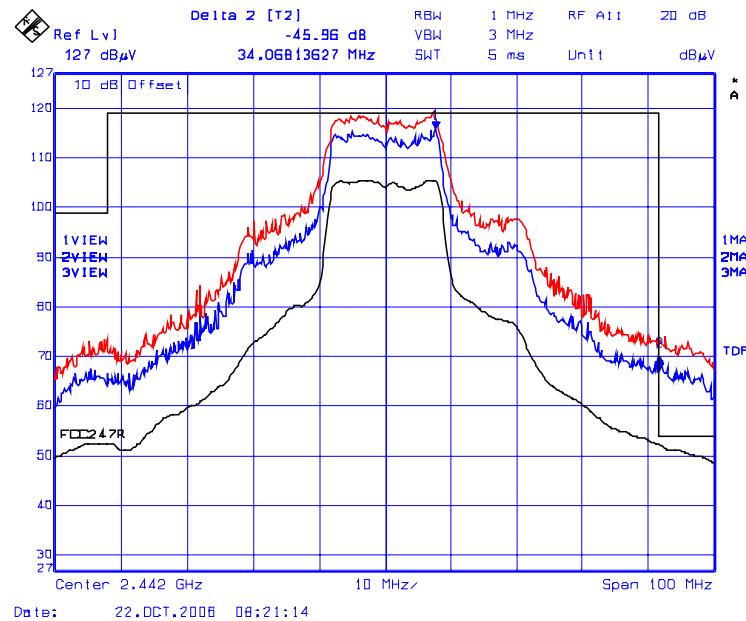
Frequency: 2442 MHz, Power Setting: 20.0dBm

Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz  
 Band-Edge Level at 2483.5 MHz: 119.15 dB $\mu$ V/m – 45.96 dB = 73.19 dB $\mu$ V/m < Limit (74 dB $\mu$ V/m)



**Plot 5.2.4.1.8.13b** Upper Band-Edge Transmitter Radiated Emissions @ 3 Meters, Horizontal Polarization

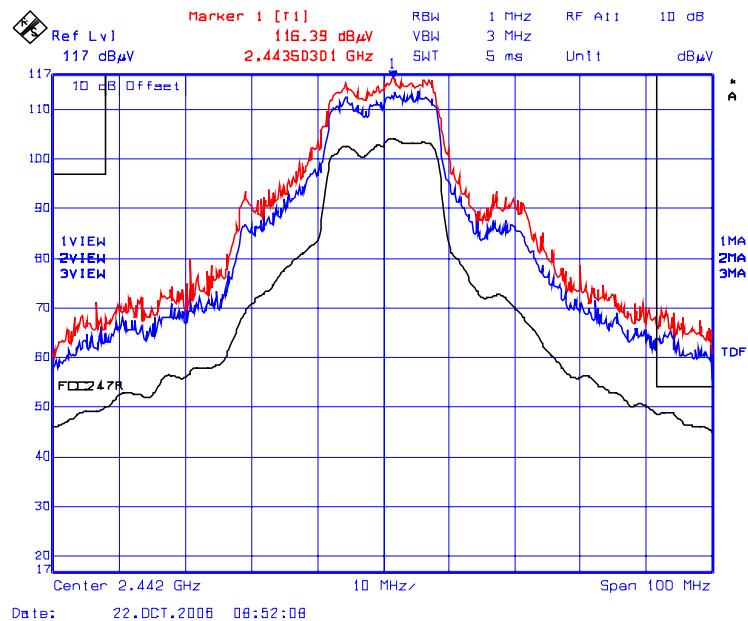
Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz  
 Delta (Peak to Band-Edge) = 45.96 dB



**Plot 5.2.4.1.8.14** Upper Band-Edge Transmitter Radiated Emissions @ 3 Meters, Vertical Polarization

Frequency: 2442 MHz, Power Setting: 20.0dBm

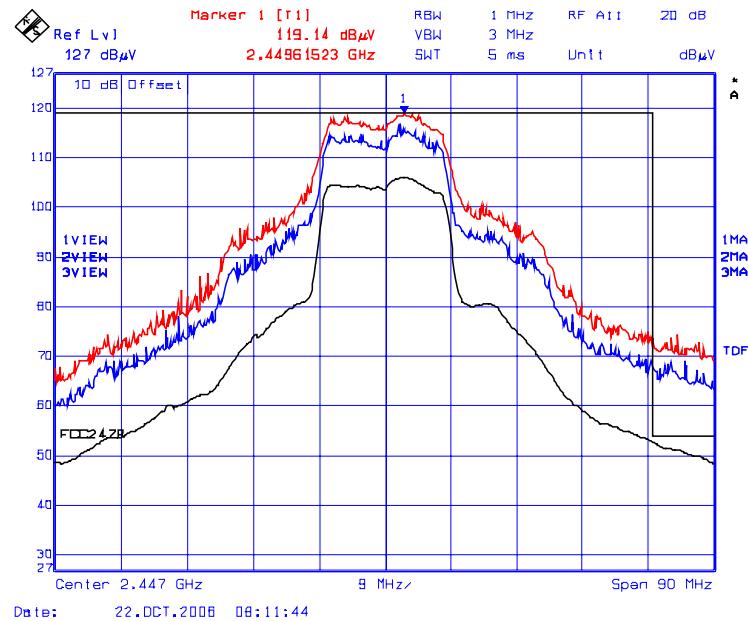
Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz



**Plot 5.2.4.1.8.15a** Upper Band-Edge Transmitter Radiated Emissions @ 3 Meters, Horizontal Polarization

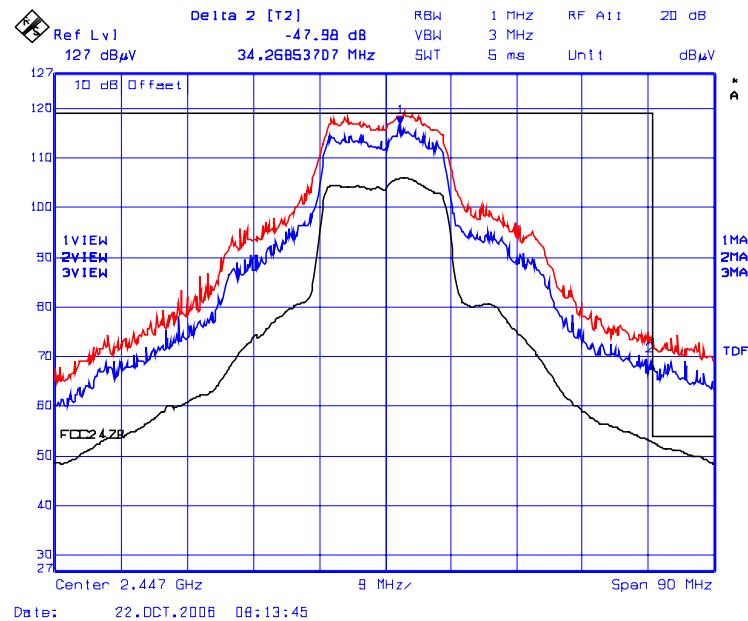
Frequency: 2447 MHz, Power Setting: 19.5dBm

Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz  
 Band-Edge Level at 2483.5 MHz: 119.14 dB $\mu$ V/m – 47.98 dB = 71.16 dB $\mu$ V/m < Limit (74 dB $\mu$ V/m)



**Plot 5.2.4.1.8.15b** Upper Band-Edge Transmitter Radiated Emissions @ 3 Meters, Horizontal Polarization

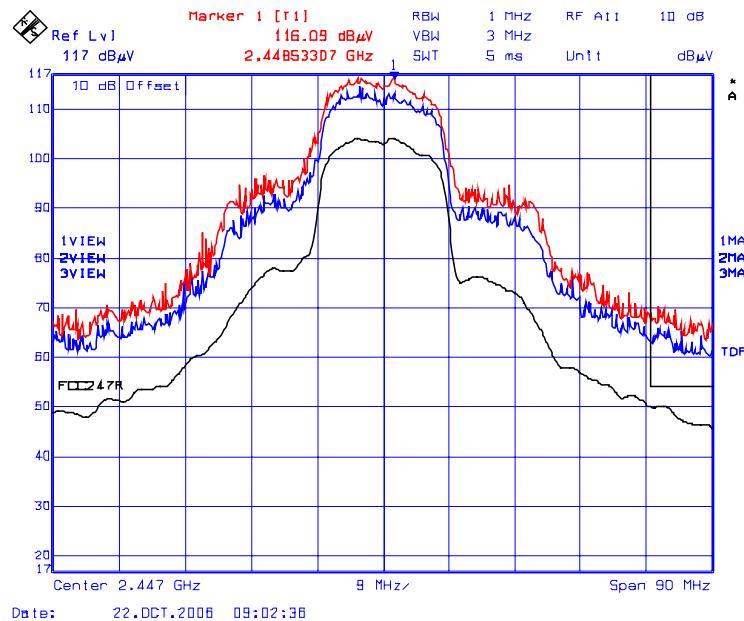
Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz  
 Delta (Peak to Band-Edge) = 47.98 dB



**Plot 5.2.4.1.8.16** Upper Band-Edge Transmitter Radiated Emissions @ 3 Meters, Vertical Polarization

Frequency: 2447 MHz, Power Setting: 19.5dBm

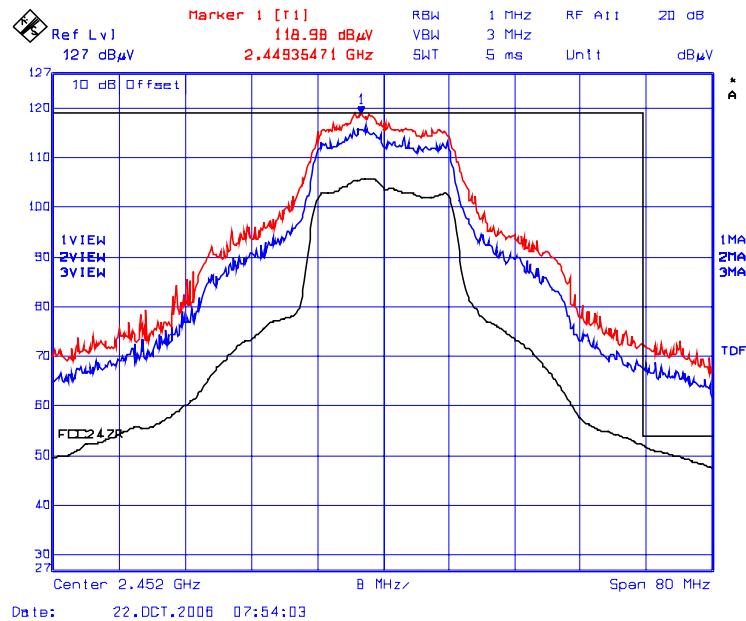
Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz



**Plot 5.2.4.1.8.17a** Upper Band-Edge Transmitter Radiated Emissions @ 3 Meters, Horizontal Polarization

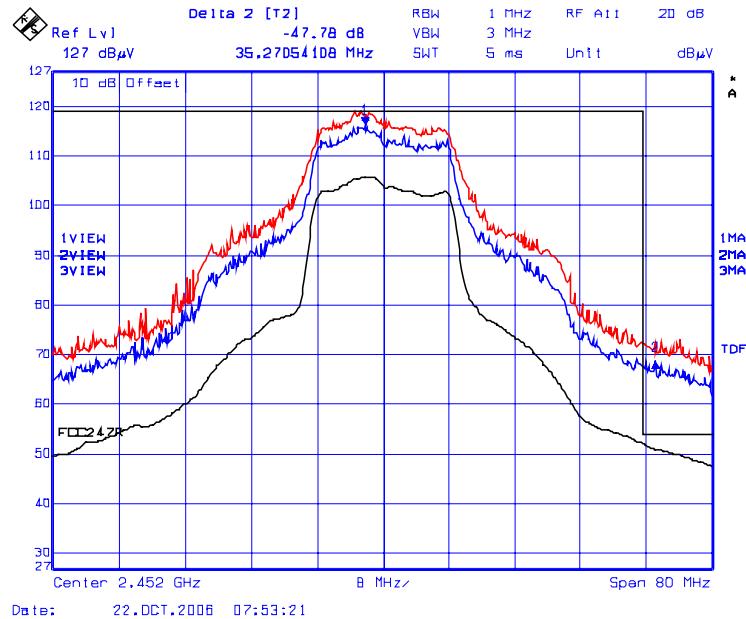
Frequency: 2452 MHz, Power Setting: 18.5dBm

Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz  
 Band-Edge Level at 2483.5 MHz: 118.98 dB $\mu$ V/m – 47.78 dB = 71.20 dB $\mu$ V/m < Limit (74 dB $\mu$ V/m)



**Plot 5.2.4.1.8.17b** Upper Band-Edge Transmitter Radiated Emissions @ 3 Meters, Horizontal Polarization

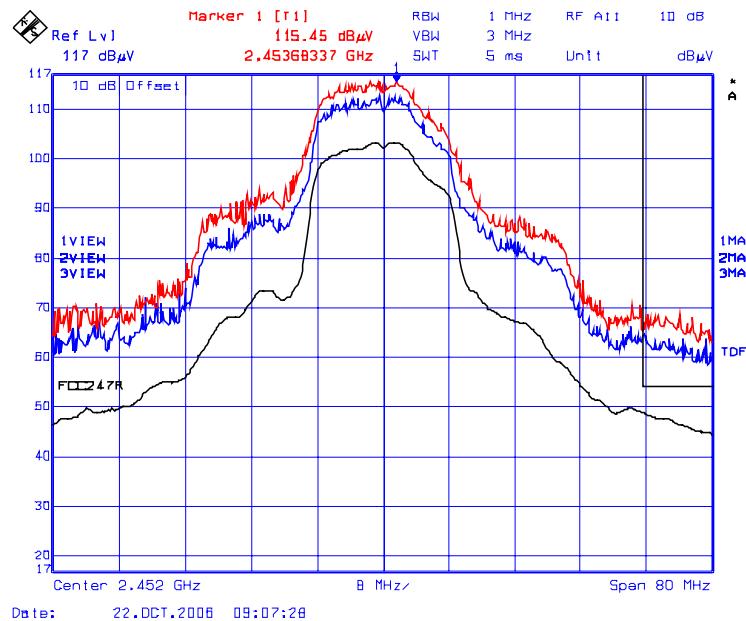
Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz  
 Delta (Peak to Band-Edge) = 47.78 dB



**Plot 5.2.4.1.8.18** Upper Band-Edge Transmitter Radiated Emissions @ 3 Meters, Vertical Polarization

Frequency: 2452 MHz, Power Setting: 18.5dBm

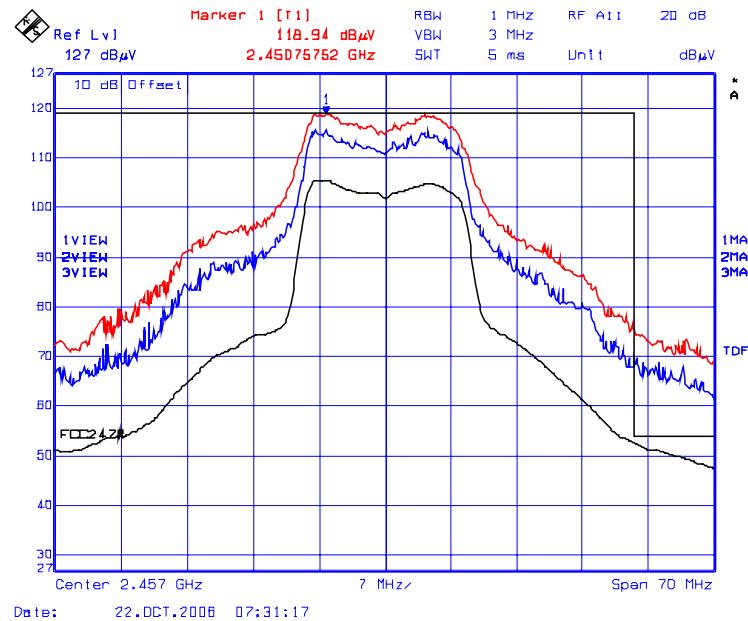
Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz



**Plot 5.2.4.1.8.19a** Upper Band-Edge Transmitter Radiated Emissions @ 3 Meters, Horizontal Polarization

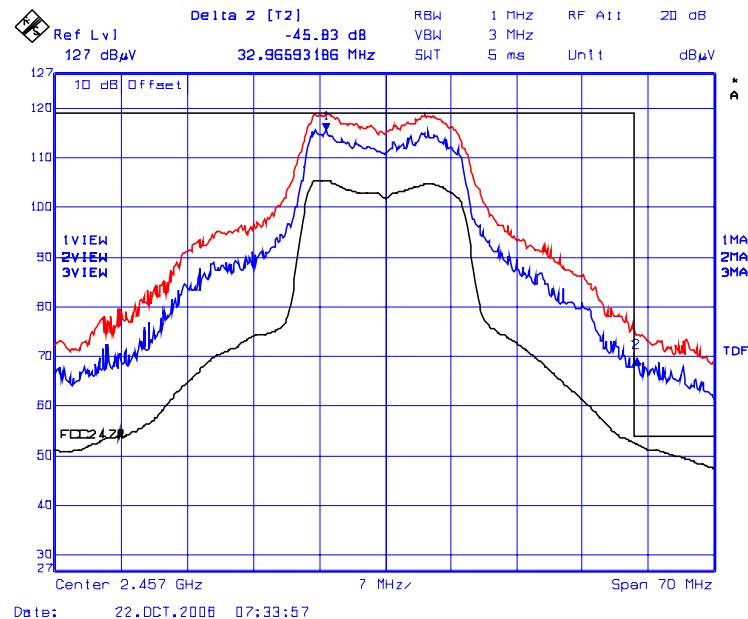
Frequency: 2457 MHz, Power Setting: 17.5dBm

Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz  
 Band-Edge Level at 2483.5 MHz: 118.94 dB $\mu$ V/m – 45.83 dB = 73.11 dB $\mu$ V/m < Limit (74 dB $\mu$ V/m)



**Plot 5.2.4.1.8.19b** Upper Band-Edge Transmitter Radiated Emissions @ 3 Meters, Horizontal Polarization

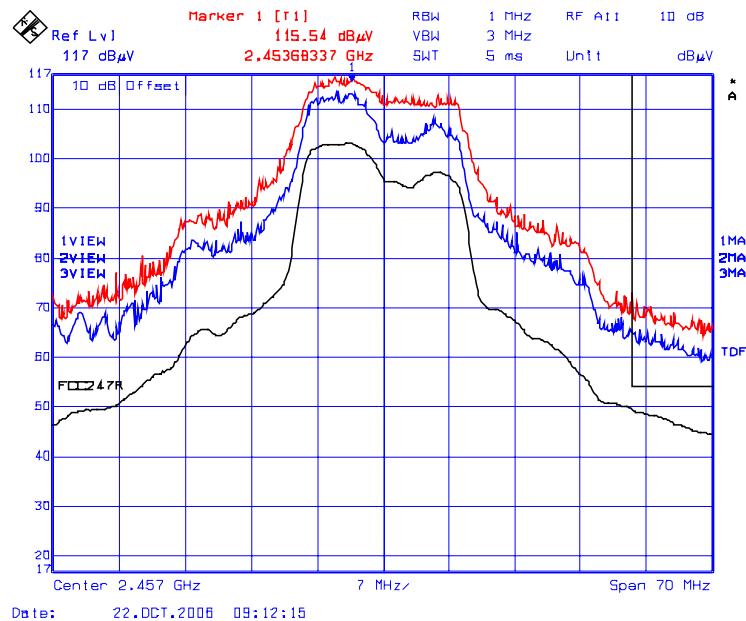
Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz  
 Delta (Peak to Band-Edge) = 45.83 dB



**Plot 5.2.4.1.8.20** Upper Band-Edge Transmitter Radiated Emissions @ 3 Meters, Vertical Polarization

Frequency: 2457 MHz, Power Setting: 17.5dBm

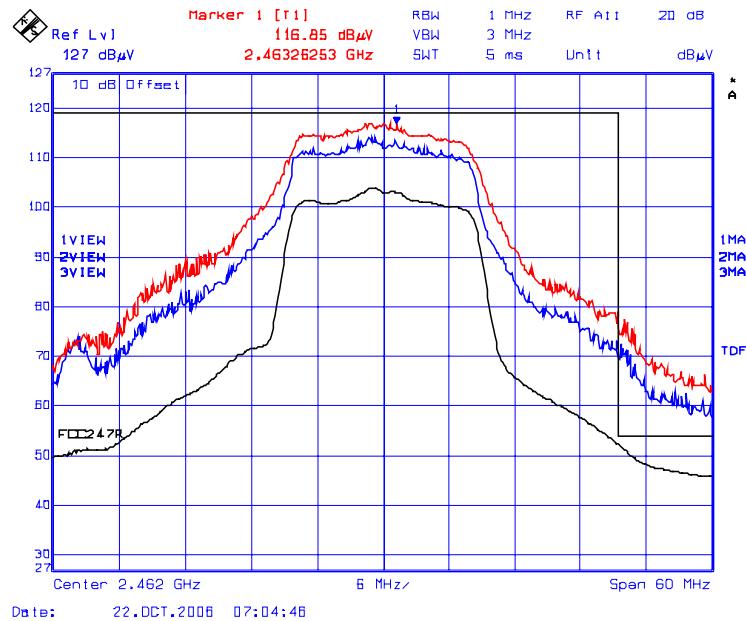
Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz



**Plot 5.2.4.1.8.21a** Upper Band-Edge Transmitter Radiated Emissions @ 3 Meters, Horizontal Polarization

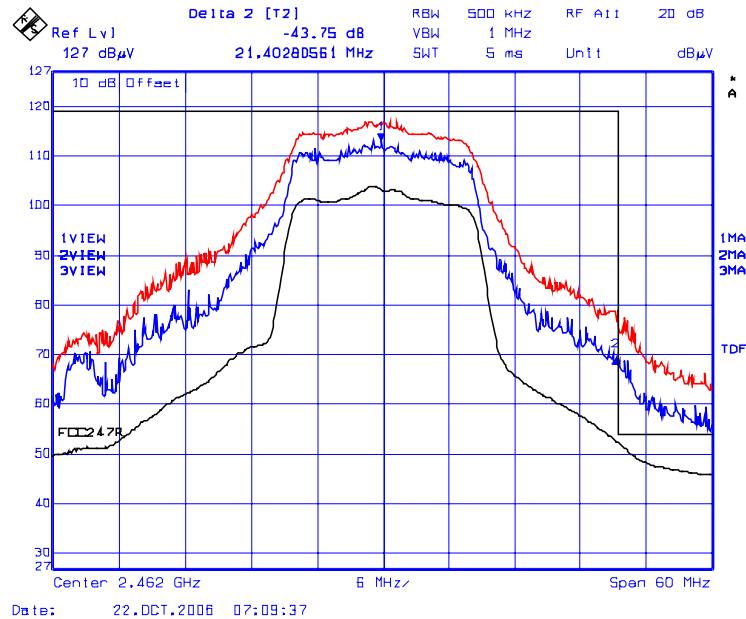
Frequency: 2462 MHz, Power Setting: 15.5dBm

Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz  
 Band-Edge Level at 2483.5 MHz: 116.85 dB $\mu$ V/m – 43.75 dB = 73.10 dB $\mu$ V/m < Limit (74 dB $\mu$ V/m)



**Plot 5.2.4.1.8.21b** Upper Band-Edge Transmitter Radiated Emissions @ 3 Meters, Horizontal Polarization

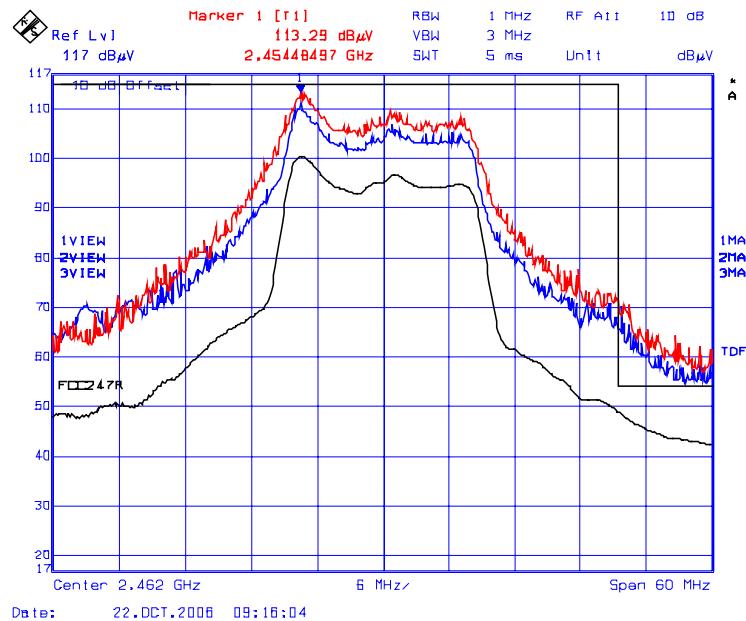
Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz  
 Delta (Peak to Band-Edge) = 43.75 dB



**Plot 5.2.4.1.8.22** Upper Band-Edge Transmitter Radiated Emissions @ 3 Meters, Vertical Polarization

Frequency: 2462 MHz, Power Setting: 15.5dBm

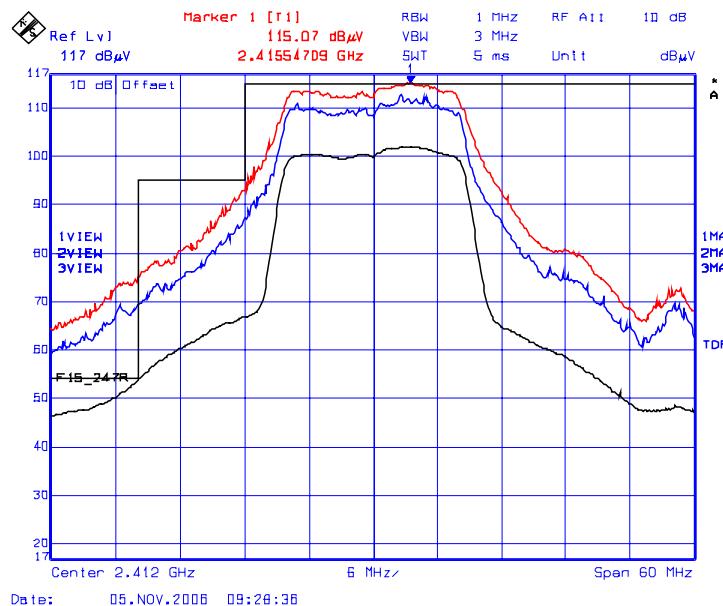
Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz



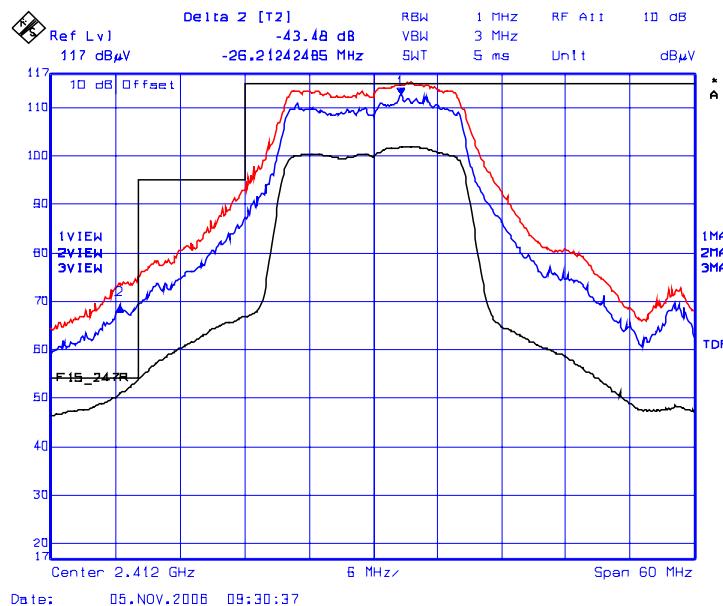
5.2.4.1.9. EUT with Antenna #3 Cushcraft Omni Antenna (Model SL24513P, 3 dBi gain), 802.11g Modulation (64QAM @ 54Mbps)

**Plot 5.2.4.1.9.1a** Lower Band-Edge Transmitter Radiated Emissions @ 3 Meters, Horizontal Polarization  
 Frequency: 2412 MHz, Power Setting: 13.5dBm

Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz  
 Band-Edge Level at 2390 MHz: 115.07 dB $\mu$ V/m – 43.48 dB = 71.59 dB $\mu$ V/m < Limit (74 dB $\mu$ V/m), Average 53.92dB $\mu$ V/m



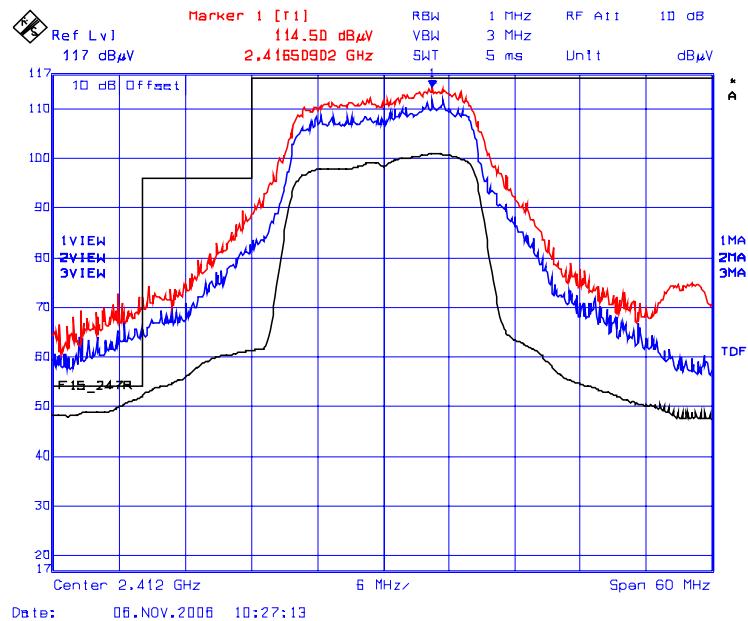
**Plot 5.2.4.1.9.1b** Lower Band-Edge Transmitter Radiated Emissions @ 3 Meters, Horizontal Polarization  
 Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz  
 Delta (Peak to Band-Edge) = 43.48 dB



**Plot 5.2.4.1.9.2 Lower Band-Edge Transmitter Radiated Emissions @ 3 Meters, Vertical Polarization**

Frequency: 2412 MHz, Power Setting: 13.5dBm

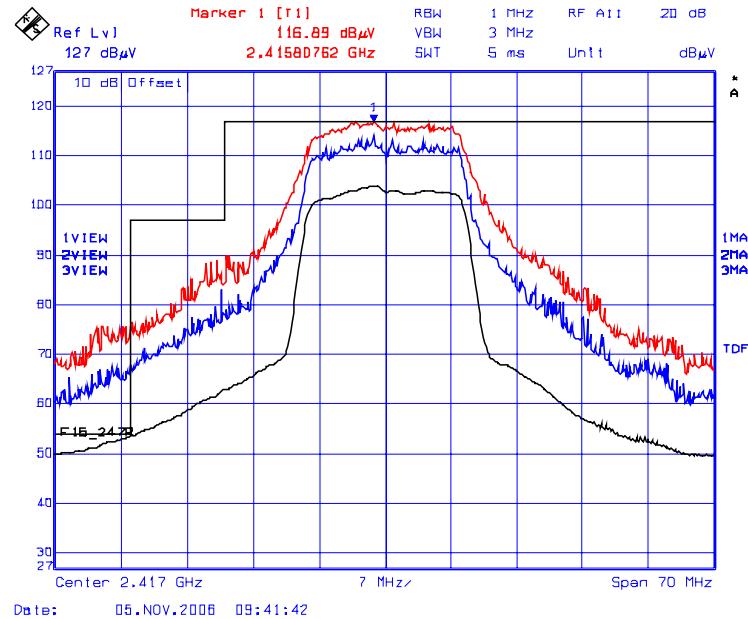
Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz



**Plot 5.2.4.1.9.3a** Lower Band-Edge Transmitter Radiated Emissions @ 3 Meters, Horizontal Polarization

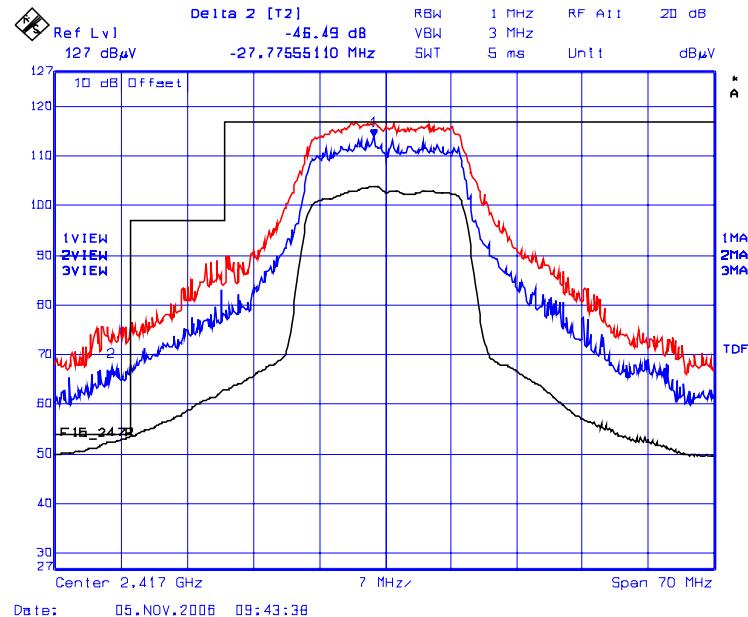
Frequency: 2417 MHz, Power Setting: 15.5dBm

Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz  
 Band-Edge Level at 2390 MHz: 116.89 dB $\mu$ V/m – 46.49 dB = 70.40 dB $\mu$ V/m < Limit (74 dB $\mu$ V/m)



**Plot 5.2.4.1.9.3b** Lower Band-Edge Transmitter Radiated Emissions @ 3 Meters, Horizontal Polarization

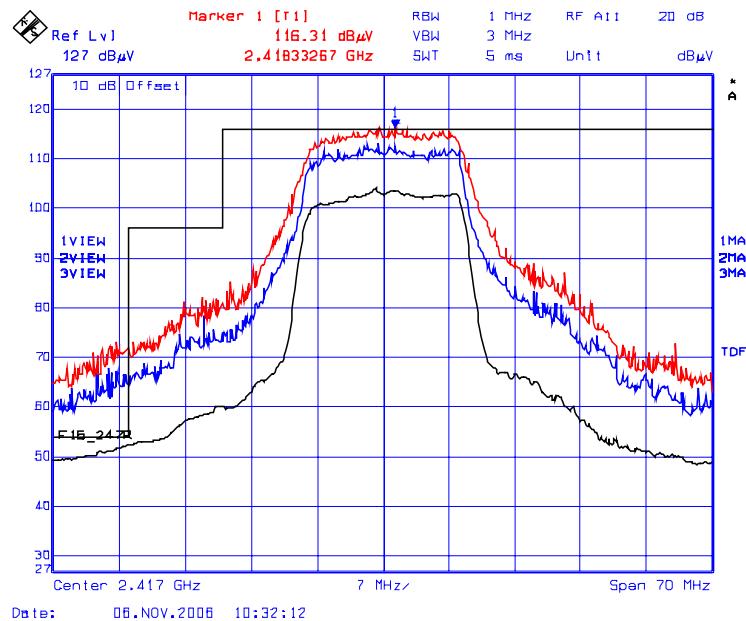
Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz  
 Delta (Peak to Band-Edge) = 46.49 dB



**Plot 5.2.4.1.9.4 Lower Band-Edge Transmitter Radiated Emissions @ 3 Meters, Vertical Polarization**

Frequency: 2417 MHz, Power Setting: 15.5dBm

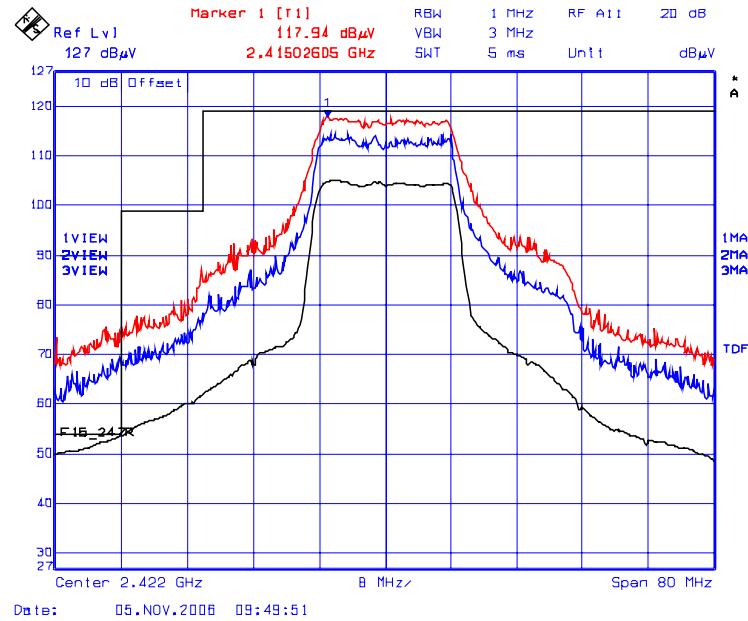
Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz



**Plot 5.2.4.1.9.5a** Lower Band-Edge Transmitter Radiated Emissions @ 3 Meters, Horizontal Polarization

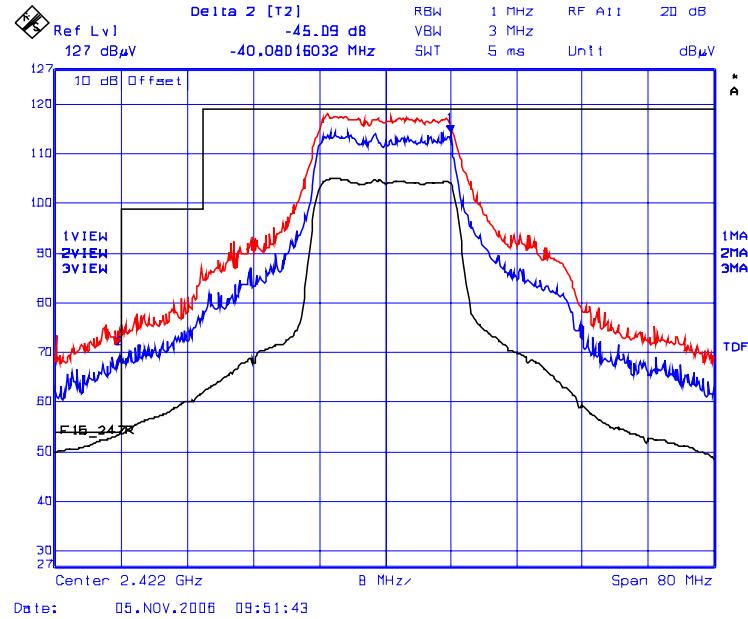
Frequency: 2422 MHz, Power Setting: 16.5dBm

Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz  
 Band-Edge Level at 2390 MHz: 117.94 dB $\mu$ V/m – 45.09 dB = 72.85 dB $\mu$ V/m < Limit (74 dB $\mu$ V/m)



**Plot 5.2.4.1.9.5b** Lower Band-Edge Transmitter Radiated Emissions @ 3 Meters, Horizontal Polarization

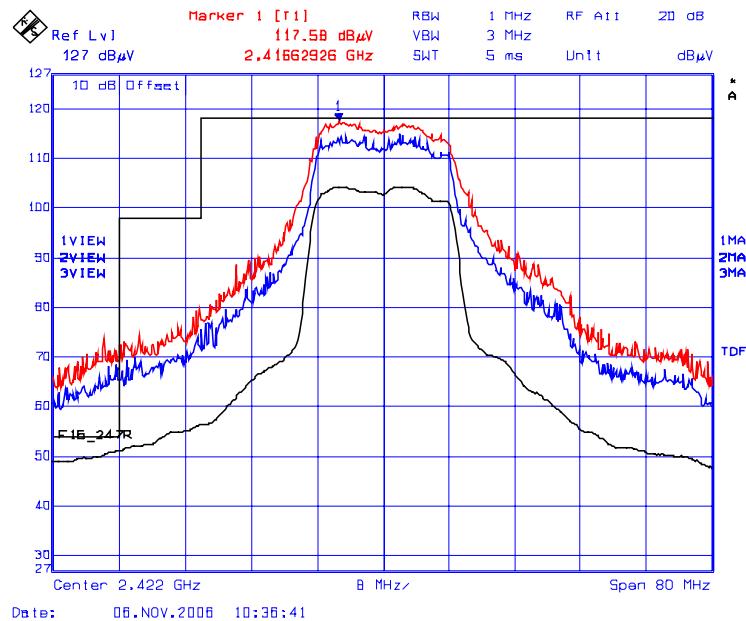
Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz  
 Delta (Peak to Band-Edge) = 45.09 dB



**Plot 5.2.4.1.9.6 Lower Band-Edge Transmitter Radiated Emissions @ 3 Meters, Vertical Polarization**

Frequency: 2422 MHz, Power Setting: 16.5dBm

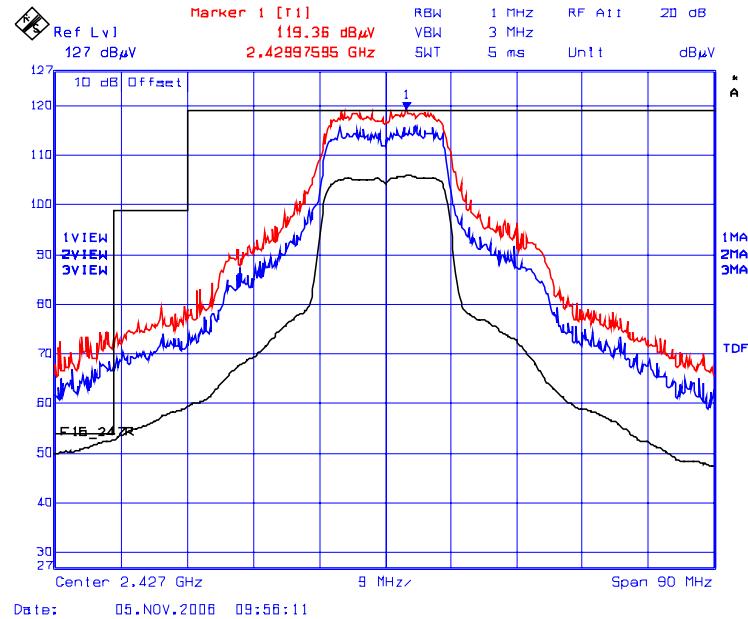
Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz



**Plot 5.2.4.1.9.7a** Lower Band-Edge Transmitter Radiated Emissions @ 3 Meters, Horizontal Polarization

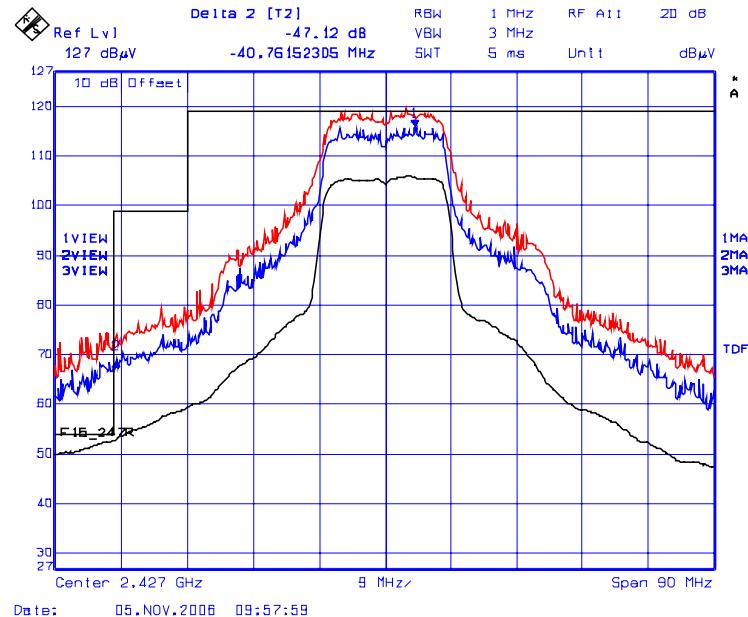
Frequency: 2427 MHz, Power Setting: 18.0dBm

Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz  
 Band-Edge Level at 2390 MHz: 119.36dB $\mu$ V/m – 47.12 dB = 72.24 dB $\mu$ V/m < Limit (74 dB $\mu$ V/m)



**Plot 5.2.4.1.9.7b** Lower Band-Edge Transmitter Radiated Emissions @ 3 Meters, Horizontal Polarization

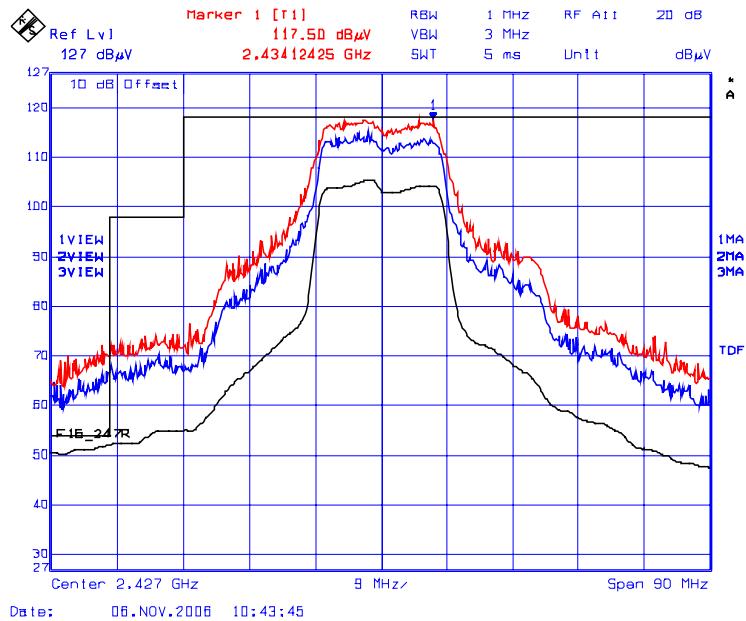
Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz  
 Delta (Peak to Band-Edge) = 47.12 dB



**Plot 5.2.4.1.9.8 Lower Band-Edge Transmitter Radiated Emissions @ 3 Meters, Vertical Polarization**

Frequency: 2427 MHz, Power Setting: 18.0dBm

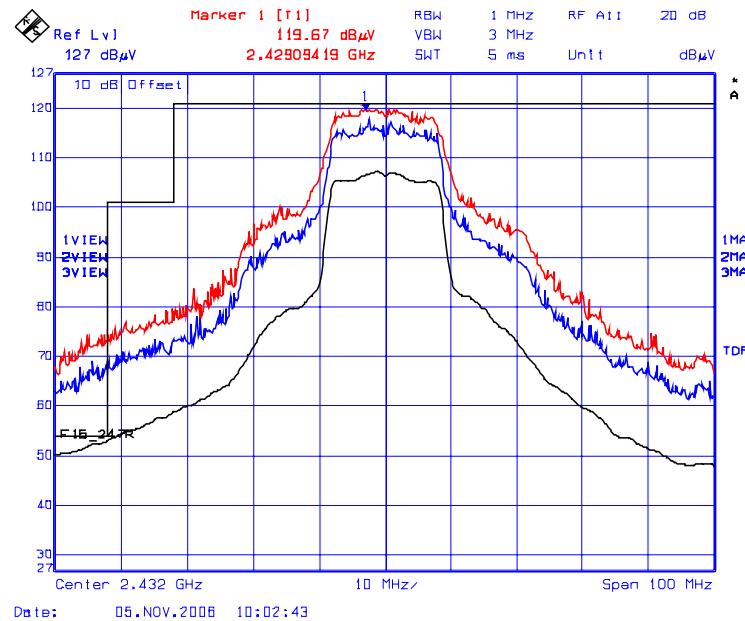
Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz



**Plot 5.2.4.1.9.9a** Lower Band-Edge Transmitter Radiated Emissions @ 3 Meters, Horizontal Polarization

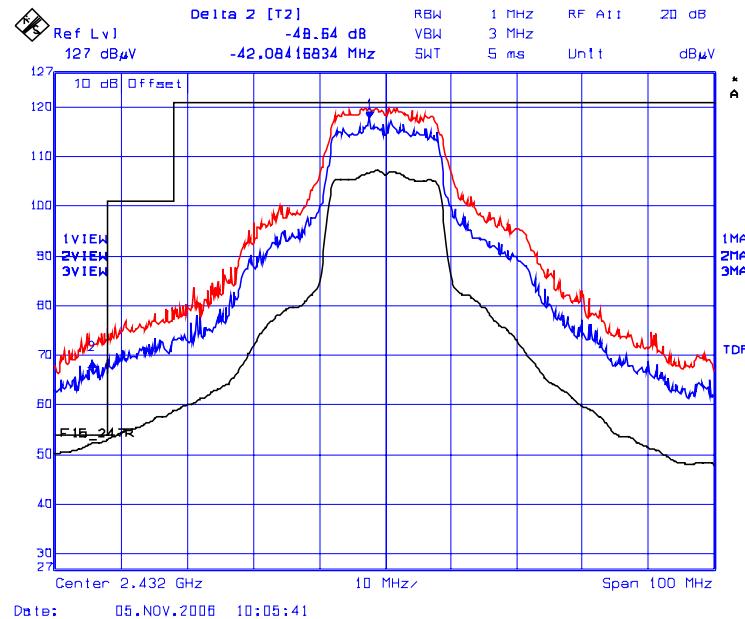
Frequency: 2432 MHz, Power Setting: 19.0dBm

Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz  
 Band-Edge Level at 2390 MHz: 119.67 dB $\mu$ V/m – 48.64 dB = 71.03 dB $\mu$ V/m < Limit (74 dB $\mu$ V/m)



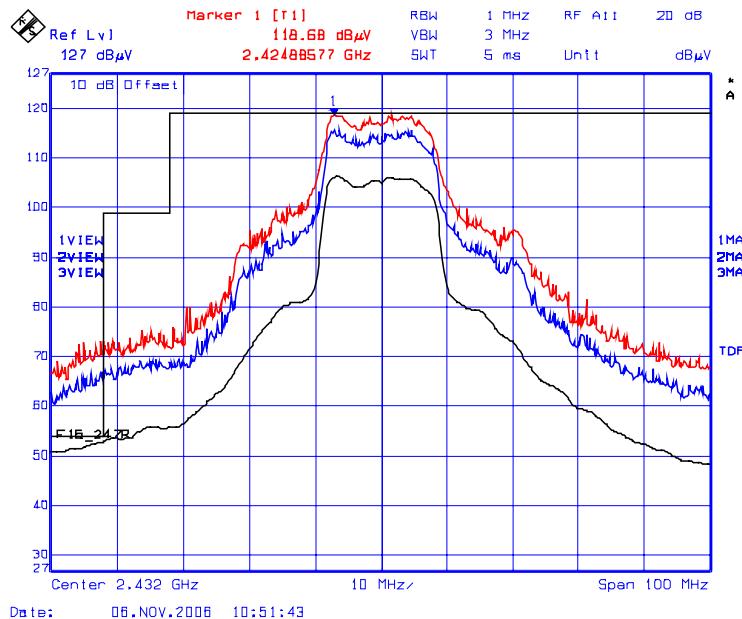
**Plot 5.2.4.1.9.9b** Lower Band-Edge Transmitter Radiated Emissions @ 3 Meters, Horizontal Polarization

Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz  
 Delta (Peak to Band-Edge) = 48.64 dB



**Plot 5.2.4.1.9.10** Lower Band-Edge Transmitter Radiated Emissions @ 3 Meters, Vertical Polarization  
Frequency: 2432 MHz, Power Setting: 19.0dBm

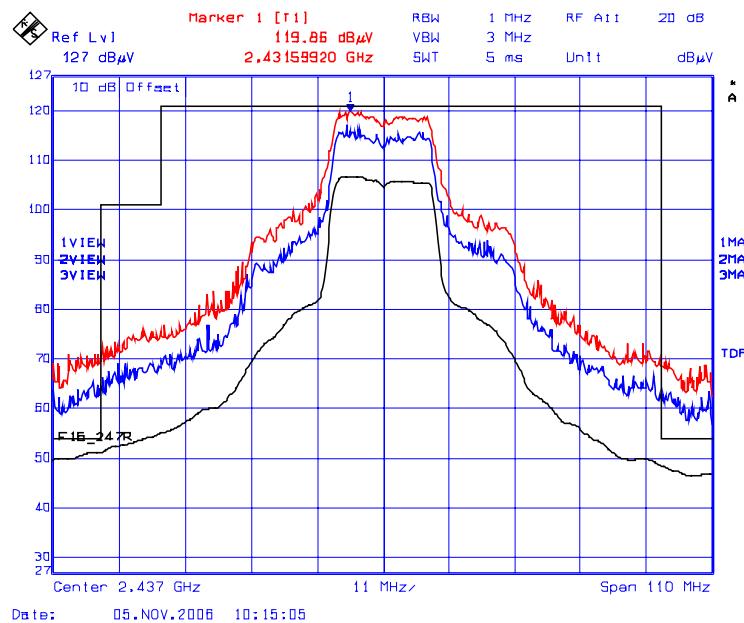
Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz



**Plot 5.2.4.1.9.11 Lower Band-Edge Transmitter Radiated Emissions @ 3 Meters, Horizontal Polarization**

Frequency: 2437 MHz, Power Setting: 19.5dBm

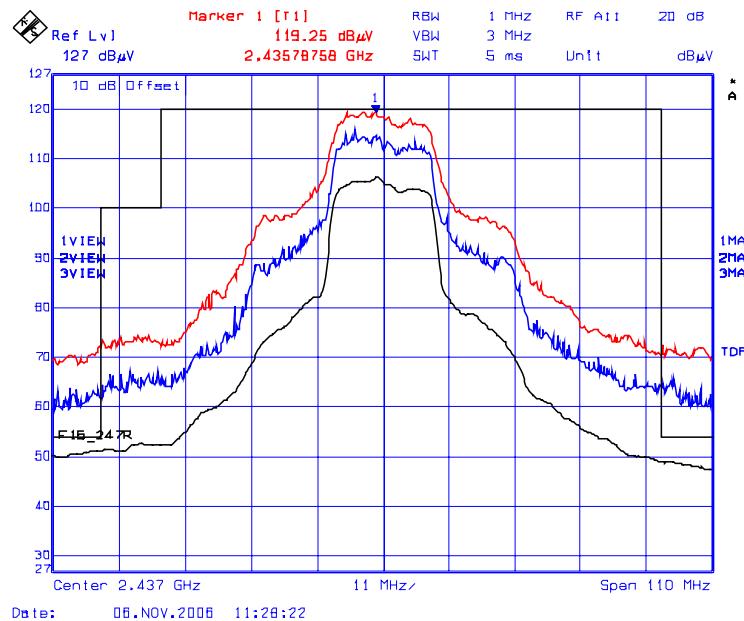
Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz



**Plot 5.2.4.1.9.12 Lower Band-Edge Transmitter Radiated Emissions @ 3 Meters, Vertical Polarization**

Frequency: 2437 MHz, Power Setting: 19.5dBm

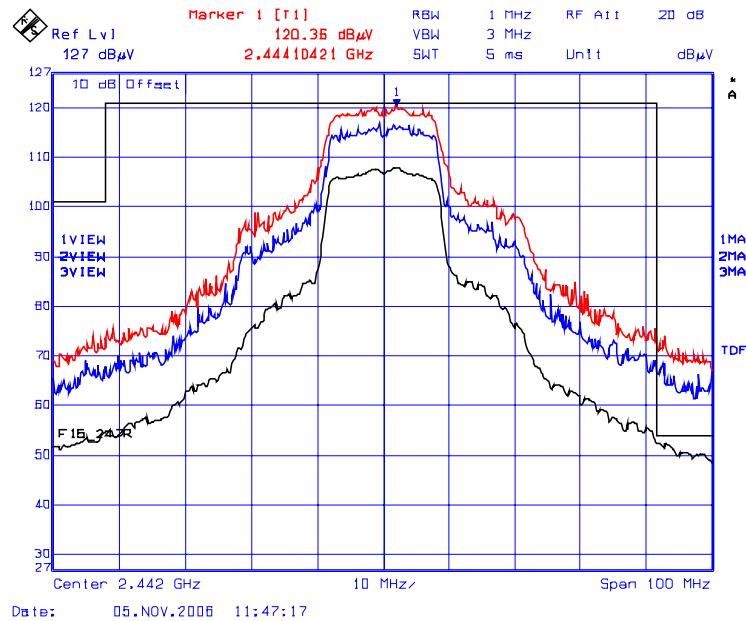
Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz



**Plot 5.2.4.1.9.13a** Upper Band-Edge Transmitter Radiated Emissions @ 3 Meters, Horizontal Polarization

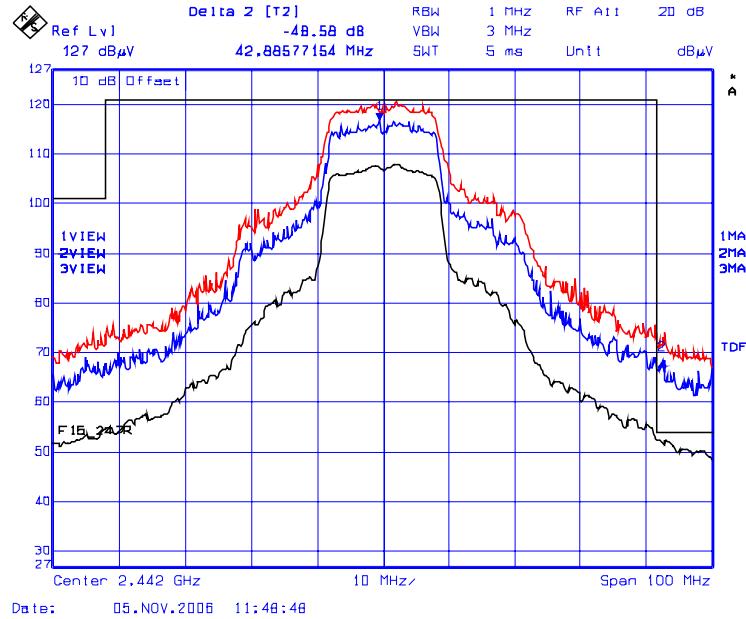
Frequency: 2442 MHz, Power Setting: 20.0dBm

Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz  
Band-Edge Level at 2483.5 MHz: 120.36 dB $\mu$ V/m - 48.58 dB = 71.78 dB $\mu$ V/m < Limit (74 dB $\mu$ V/m)



#### Plot 5.2.4.1.9.13b Upper Band-Edge Transmitter Radiated Emissions @ 3 Meters, Horizontal Polarization

Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz  
Delta (Peak to Band-Edge) = 48.58 dB



## **ULTRATECH GROUP OF LABS**

**3000 Bristol Circle, Oakville, Ontario, Canada L6H 6G4**

Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: [vic@ultratech-labs.com](mailto:vic@ultratech-labs.com), Website: <http://www.ultratech-labs.com>

---

File #: CNI-086FCC15CE-C2PC

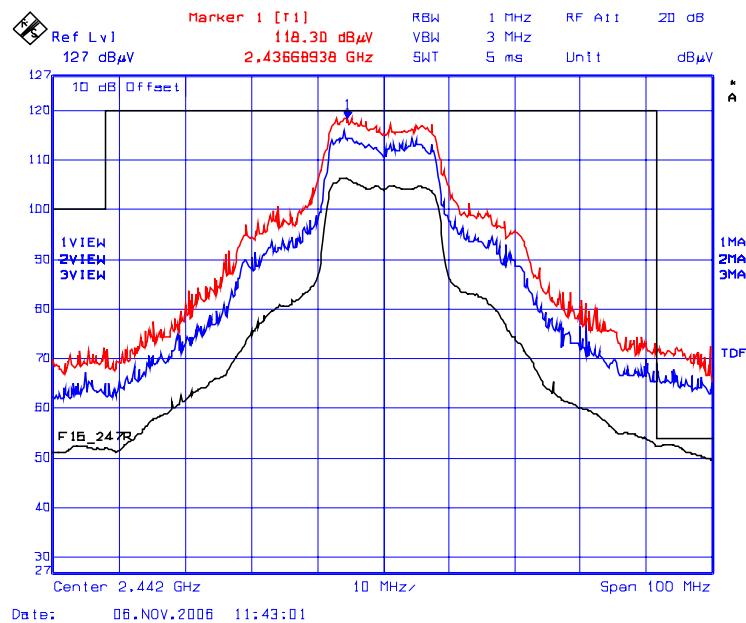
December 19, 2006

- All test results contained in this engineering test report are traceable to National Institute of Standards and Technology (NIST)

**Plot 5.2.4.1.9.14** Upper Band-Edge Transmitter Radiated Emissions @ 3 Meters, Vertical Polarization

Frequency: 2442 MHz, Power Setting: 20.0dBm

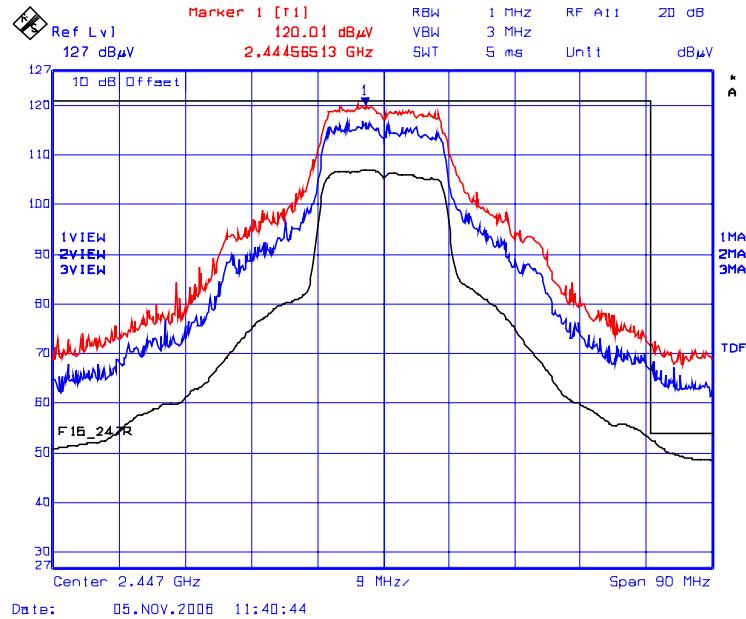
Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz



### Plot 5.2.4.1.9.15a Upper Band-Edge Transmitter Radiated Emissions @ 3 Meters, Horizontal Polarization

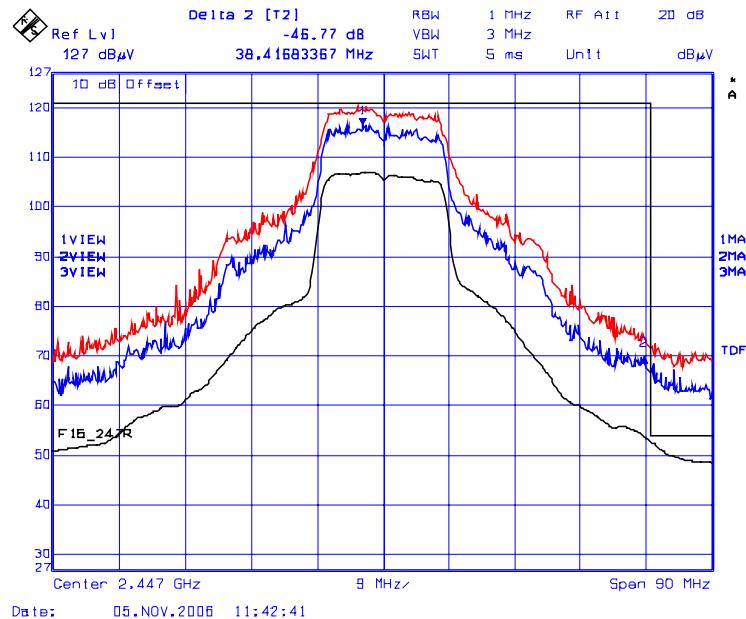
Frequency: 2447 MHz, Power Setting: 19.0dBm

Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz  
Band-Edge Level at 2483.5 MHz: 120.01 dB $\mu$ V/m - 46.77 dB = 73.24 dB $\mu$ V/m < Limit (74 dB $\mu$ V/m)



#### Plot 5.2.4.1.9.15b Upper Band-Edge Transmitter Radiated Emissions @ 3 Meters, Horizontal Polarization

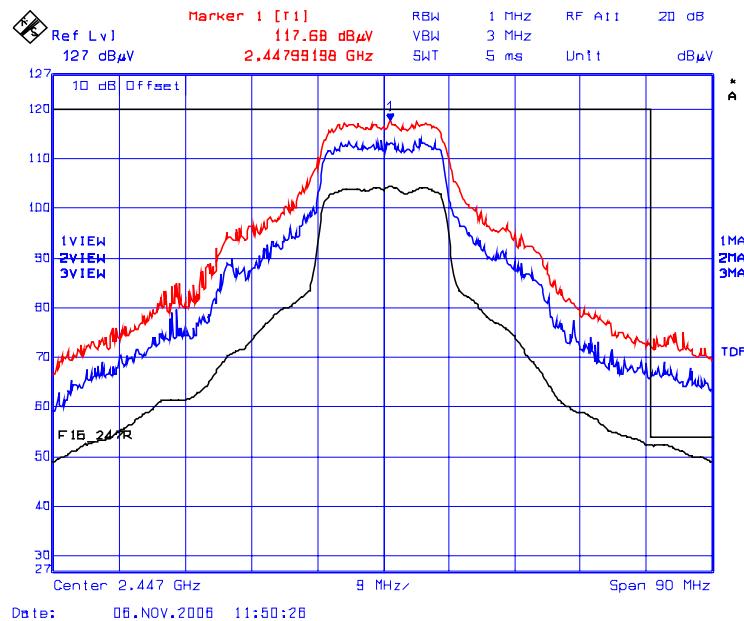
Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz  
Delta (Peak to Band-Edge) = 46.77 dB



**Plot 5.2.4.1.9.16** Upper Band-Edge Transmitter Radiated Emissions @ 3 Meters, Vertical Polarization

Frequency: 2447 MHz, Power Setting: 19.0dBm

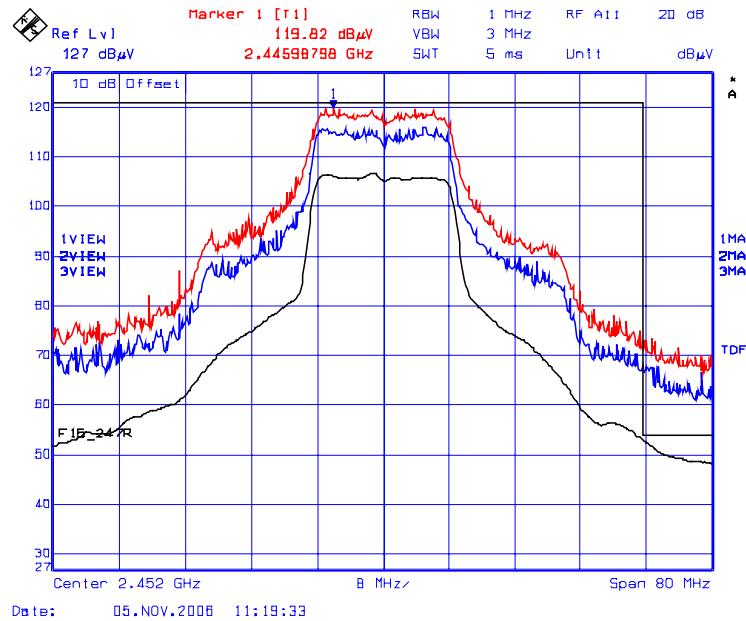
Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz



**Plot 5.2.4.1.9.17a** Upper Band-Edge Transmitter Radiated Emissions @ 3 Meters, Horizontal Polarization

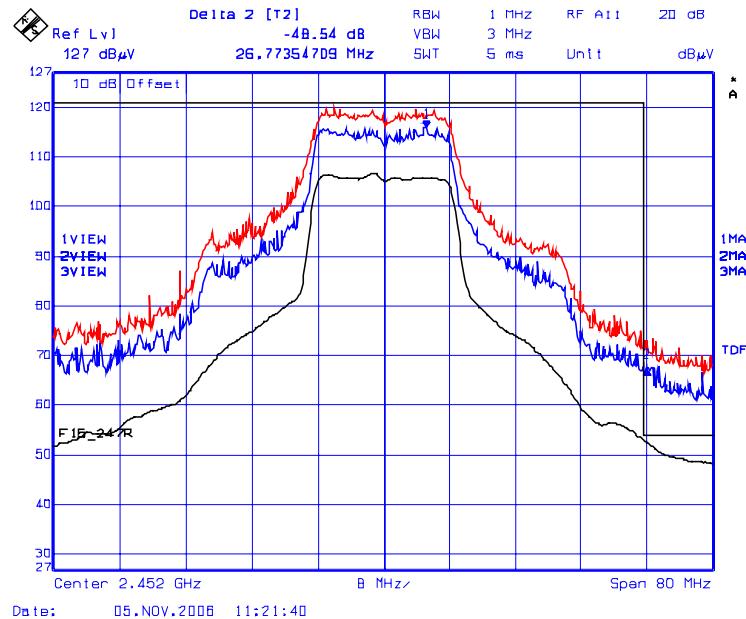
Frequency: 2452 MHz, Power Setting: 18.5dBm

Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz  
 Band-Edge Level at 2483.5 MHz: 119.82 dB $\mu$ V/m – 48.54 dB = 71.28 dB $\mu$ V/m < Limit (74 dB $\mu$ V/m)



**Plot 5.2.4.1.9.17b** Upper Band-Edge Transmitter Radiated Emissions @ 3 Meters, Horizontal Polarization

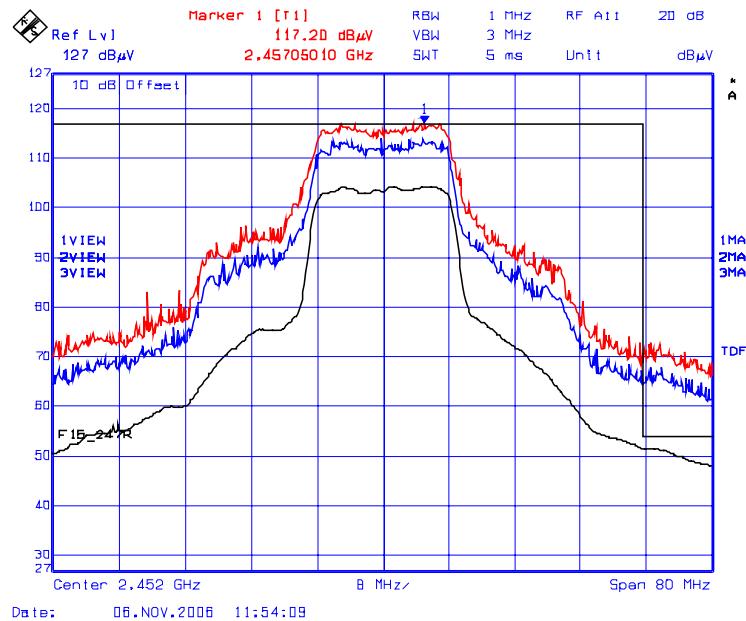
Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz  
 Delta (Peak to Band-Edge) = 48.54 dB



**Plot 5.2.4.1.9.18** Upper Band-Edge Transmitter Radiated Emissions @ 3 Meters, Vertical Polarization

Frequency: 2452 MHz, Power Setting: 18.5dBm

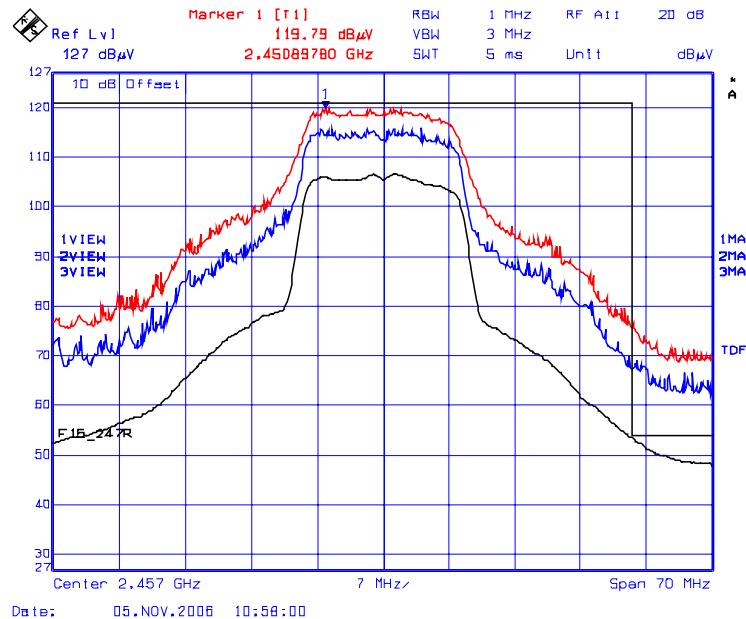
Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz



**Plot 5.2.4.1.9.19a** Upper Band-Edge Transmitter Radiated Emissions @ 3 Meters, Horizontal Polarization

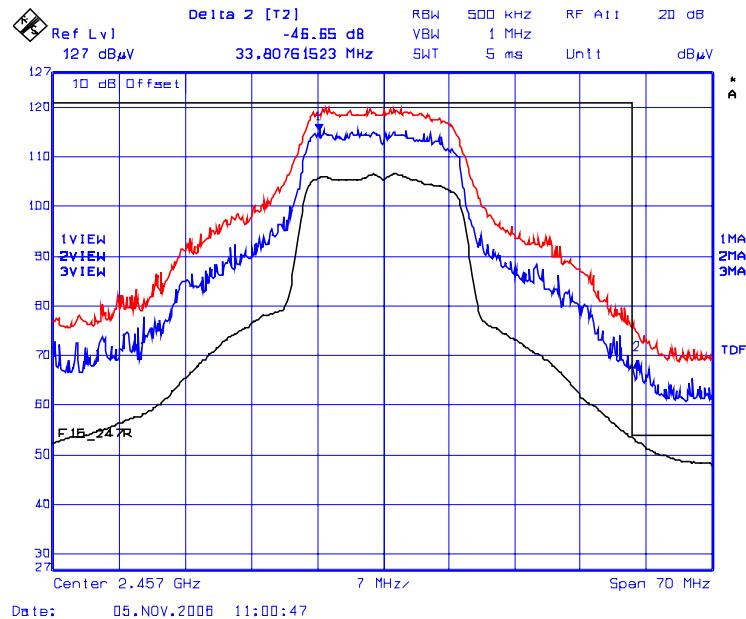
Frequency: 2457 MHz, Power Setting: 17.5dBm

Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz  
 Band-Edge Level at 2483.5 MHz: 119.79 dB $\mu$ V/m – 46.65 dB = 73.14 dB $\mu$ V/m < Limit (74 dB $\mu$ V/m)



**Plot 5.2.4.1.9.19b** Upper Band-Edge Transmitter Radiated Emissions @ 3 Meters, Horizontal Polarization

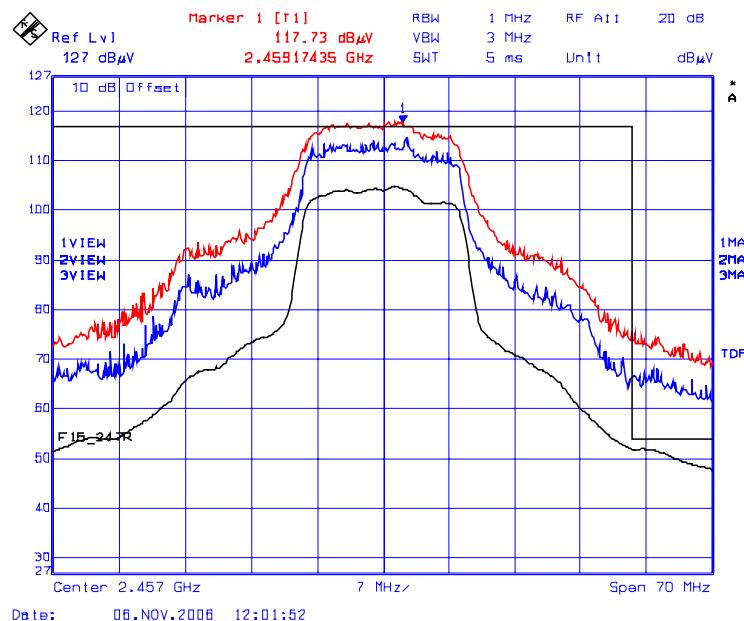
Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz  
 Delta (Peak to Band-Edge) = 46.65 dB



**Plot 5.2.4.1.9.20** Upper Band-Edge Transmitter Radiated Emissions @ 3 Meters, Vertical Polarization

Frequency: 2457 MHz, Power Setting: 17.5dBm

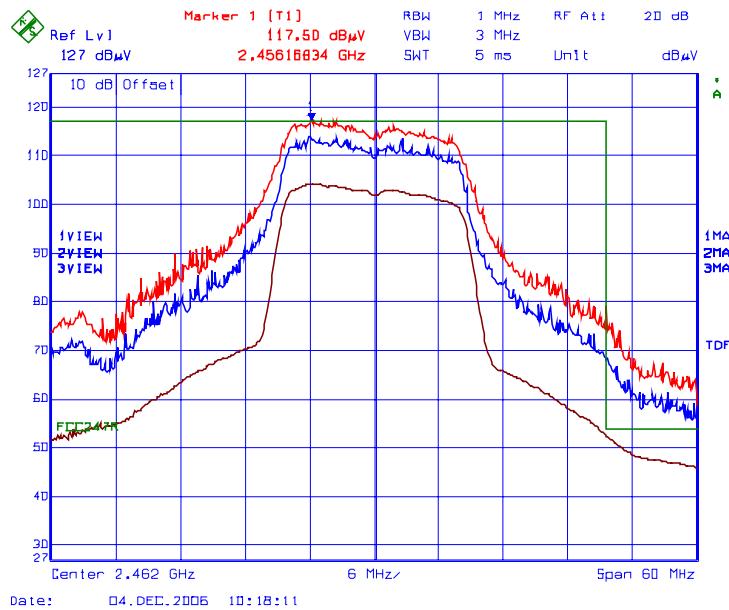
Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz



**Plot 5.2.4.1.9.21a** Upper Band-Edge Transmitter Radiated Emissions @ 3 Meters, Horizontal Polarization

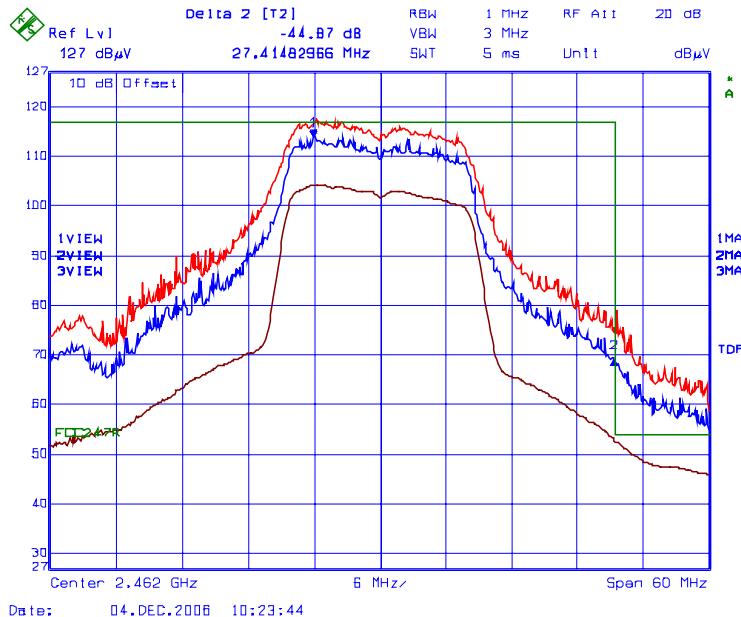
Frequency: 2462 MHz, Power Setting: 15.5dBm

Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz  
 Band-Edge Level at 2483.5 MHz: 117.50 dB $\mu$ V/m – 44.87 dB = 72.63 dB $\mu$ V/m < Limit (74dB $\mu$ V/m)



**Plot 5.2.4.1.9.21b** Upper Band-Edge Transmitter Radiated Emissions @ 3 Meters, Horizontal Polarization

Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz  
 Delta (Peak to Band-Edge) = 44.87 dB



**Plot 5.2.4.1.9.22** Upper Band-Edge Transmitter Radiated Emissions @ 3 Meters, Vertical Polarization

Frequency: 2462 MHz, Power Setting: 15.5dBm

Trace 1: RBW = 1 MHz, VBW = 3 MHz; Trace 2: RBW = 500 kHz, VBW = 1 MHz; Trace 3: RBW = 1 MHz, VBW = 10 Hz

