TEST REPORT
FROM
RFI GLOBAL SERVICES LTD

Test of: Vecima Networks AMG1020

FCC ID: OPP-AMG1020X

IC Certification Number: 2943A-AMG1020

To: FCC Part 15.247: 2011 Subpart C, Industry Canada RSS-210 Issue 8 December 2010 & RSS-Gen Issue 3 December 2010

Test Report Serial No:
RFI-RPT-RP77944JD30A V3.0

Version 3.0 Supersedes All Previous Versions

This Test Report Is Issued Under The Authority Of Chris Guy, Head of Global Approvals:	
Checked By:	Ian Watch
Signature:	
Date of Issue:	16 December 2011

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RFI Global Services Ltd
Pavilion A, Ashwood Park, Ashwood Way, Basingstoke, Hampshire RG23 8BG
Telephone: +44 (0)1256 312000 Facsimile: +44 (0)1256 312001
Email: info@rfi-global.com Website: www.rfi-global.com

Registered in England and Wales. Company number:2117901

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1. Customer Information

Company Name:	Connected Development LLC
Address:	5020 Weston Parkway Suite 215 Cary NC 27513 United States

2. Summary of Testing

2.1. General Information

Specification Reference:	47CFR15.247
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications) 2011: Part 15 Subpart C (Intentional Radiators) - Section 15.247
Specification Reference:	47CFR15.107 and 47CFR15.109
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications) 2011: Part 15 Subpart B (Unintentional Radiators) - Sections 15.107 and 15.109
Specification Reference:	47CFR15.207 and 47CFR15.209
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications) 2011: Part 15 Subpart C (Intentional Radiators) - Sections 15.207 and 15.209
Specification Reference:	RSS-Gen Issue 3 December 2010
Specification Title:	General Requirements and Information for the Certification of Radio Apparatus
Specification Reference:	RSS-210 Issue 8 December 2010
Specification Title:	Licence-exempt Radio Apparatus (All Frequency Bands): Category I Equipment.
Site Registration:	FCC: 209735; Industry Canada: 3245B-2
Location of Testing:	RFI Global Services Ltd, Wade Road, Basingstoke, Hampshire, RG24 8AH.
Test Dates:	04 August 2011 to 08 August 2011

2.2. Summary of Test Results

FCC Reference (47CFR)	IC Reference	Measurement	Result
Part 15.109	RSS-Gen 4.10/6.1	Receiver/Idle Mode Radiated Spurious Emissions	✓
Part 15.247(a)(2)	RSS-Gen 4.6.2 RSS-210 A8.2(a)	Transmitter 6 dB Bandwidth	✓
Part 2.1049	RSS-Gen 4.6.1/4.6.3	Transmitter 20 dB Bandwidth	✓
Part 15.247(e)	RSS-210 A8.2(b)	Transmitter Power Spectral Density	✓
Part 15.247(b)(3)	RSS-Gen 4.8 RSS-210 A8.4(4)	Transmitter Maximum Peak Output Power	✓
Part 15.247(d)/ 15.209(a)	RSS-Gen 4.9 RSS-210 A8.5	Transmitter Radiated Emissions	✓
Part 15.247(d)/ 15.209(a)	RSS-Gen 4.9 RSS-210 A8.5	Transmitter Band Edge Radiated Emissions	✓

Key to Results

✓ = Complied ✗ = Did not comply

2.3. Methods and Procedures

Reference:	ANSI C63.4 (2009)
Title:	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
Reference:	ANSI C63.10 (2009)
Title:	American National Standard for Testing Unlicensed Wireless Devices

2.4. Deviations from the Test Specification

For the measurements contained within this test report, there were no deviations from, additions to, or exclusions from the test specification identified above.

3. Equipment Under Test (EUT)

3.1. Identification of Equipment Under Test (EUT)

Brand Name:	Vecima Networks
Model Name or Number:	AMG1020
Serial number:	2887879 (radiated sample) 2887883 (conducted sample)
Hardware Version Number:	4.06
Software Version Number:	4_1_8
FCC ID:	OPP-AMG1020X
IC Certification Number:	2943A-AMG1020

3.2. Description of EUT

The equipment under test was a Multi Mode Radio Telematics unit for vehicular use. It contains a GSM/CDMA, Wi-Fi 802.11b/g and GPS capabilities. The Wi-Fi antenna is integral and the Customer stated the gain as -1.8 dBi.

3.3. Modifications Incorporated in the EUT

No modifications were made to the EUT during testing.

3.4. Additional Information Related to Testing

Technology Tested:	Digital Transmission System		
Type of Unit:	Transceiver		
Modulation:	BPSK, QPSK, 16 QAM and 64QAM		
Data Rate:	1, 2, 5.5, 11, 6, 9, 12, 18, 24, 36, 48 and 54 Mbps		
Power Supply Requirement(s):	Nominal	13.8 V	
Maximum Conducted Peak Output Power:	24.4 dBm		
Transmit Frequency Range:	2412 MHz to 2462 MHz		
Transmit Channels Tested:	**Channel ID**	**Channel Number**	**Channel Frequency (MHz)**
	Bottom	1	2412
	Middle	6	2437
	Top	11	2462
Receive Frequency Range:	2412 MHz to 2462 MHz		
Receive Channels Tested:	**Channel ID**	**Channel Number**	**Channel Frequency (MHz)**
	Bottom	1	2412
	Middle	6	2437
	Top	11	2462

3.5. Support Equipment

The following support equipment was used to exercise the EUT during testing:

Description:	Laptop
Brand Name:	Dell
Model Name or Number:	D610
Serial Number:	CN-0C4708-48632-625-3186

Description:	Laptop – ftp server
Brand Name:	Lenovo
Model Name or Number:	G560
Serial Number:	CBL3805393

Description:	External Wi-Fi router
Brand Name:	Linksys by Cisco
Model Name or Number:	WRT120N
Serial Number:	JUT00K843036

4. Operation and Monitoring of the EUT during Testing

4.1. Operating Modes

The EUT was tested in the following operating mode(s):

- Receive/idle mode.
- Constantly transmitting a WiFi 802.11 signal on Bottom, middle and top channels at maximum power.

4.2. Configuration and Peripherals

The EUT was tested in the following configuration(s):

- Spurious Emissions: The EUT was placed into a conducted Wi-Fi link with an external Wi-Fi router. A laptop was connected to this router supplying an ftp server function. Large files were then sent from the EUT to the ftp server via the conducted link and measurements taken whilst this transfer occurred. The channel number and selection of 802.11 b or g mode was set and controlled by the external Wi-Fi router.
- Transmitter Spurious Emission prescans were performed with the EUT transmitting with a data rate of 1 Mbps, as this was found to have the highest power on top channel and therefore determined to be the worst case.
- Maximum Peak Output Power, Peak Power Spectral Density and Transmitter Band Edge were tested at the highest data rates supported of BPSK, QPSK, 16 QAM and 64QAM as detailed in FCC KDB 708876.
- 20dB Bandwidth and 6dB Bandwidth were tested on all data rates.
- Sample 2887879 was used for Transmitter/Idle spurious emission and transmitter band edge, while all other tests were performed using sample 2887883.

5. Measurements, Examinations and Derived Results

5.1. General Comments

Measurement uncertainties are evaluated in accordance with current best practice. Our reported expanded uncertainties are based on standard uncertainties, which are multiplied by an appropriate coverage factor to provide a statistical confidence level of approximately 95%. Please refer to *Section 6. Measurement Uncertainty* for details.

5.2. Test Results

5.2.1. Receiver/Idle Mode Radiated Spurious Emissions

Test Summary:

Test Engineer:	Nick Steele	**Test Date:**	04 August 2011
Test Sample Serial No:	2887879		

FCC Part:	15.109
Test Method Used:	As detailed in ANSI C63.10 Sections 6.3 and 6.5 referencing ANSI C63.4
Frequency Range:	30 MHz to 1000 MHz

Environmental Conditions:

Temperature (°C):	29
Relative Humidity (%):	35

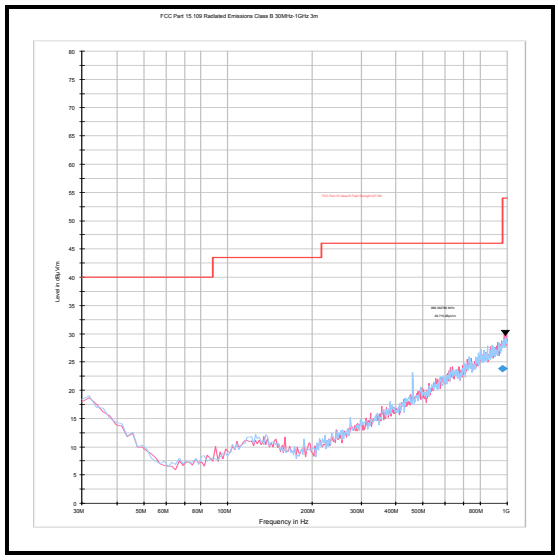
Results: Quasi Peak

Frequency (MHz)	Antenna Polarity	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
986.393	Vertical	29.7	54.0	24.3	Complied

Note(s):

1. The final measured value, for the given emission, in the table above incorporates the calibrated antenna factor and cable loss.
2. Measurements below 1 GHz were performed in a semi-anechoic chamber (RFI Asset Number K0001) at a distance of 3 metres. The EUT was placed at a height of 80 cm above the reference ground plane in the centre of the chamber turntable. Maximum emission levels were determined by height searching the measurement antenna over the range 1 metre to 4 metres.
3. No spurious emissions were detected above the noise floor of the measuring receiver therefore the highest peak noise floor reading of the measuring receiver was recorded as shown in the table above.

Receiver/Idle Mode Radiated Spurious Emissions (continued)



Receiver/Idle Mode Radiated Spurious Emissions (continued)

Test Summary:

Test Engineer:	Crawford Lindsay	**Test Date:**	04 August 2011
Test Sample Serial No:	2887879		

FCC Part:	15.109
Test Method Used:	As detailed in ANSI C63.10 Sections 6.3 and 6.6 referencing ANSI C63.4
Frequency Range:	1 GHz to 12.5 GHz

Environmental Conditions:

Temperature (°C):	29
Relative Humidity (%):	31

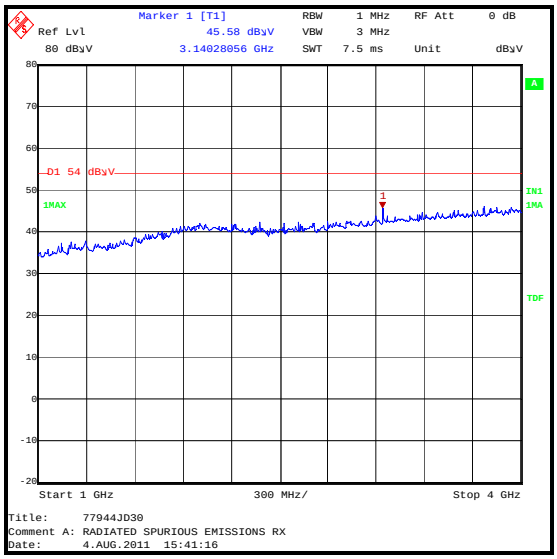
Results:

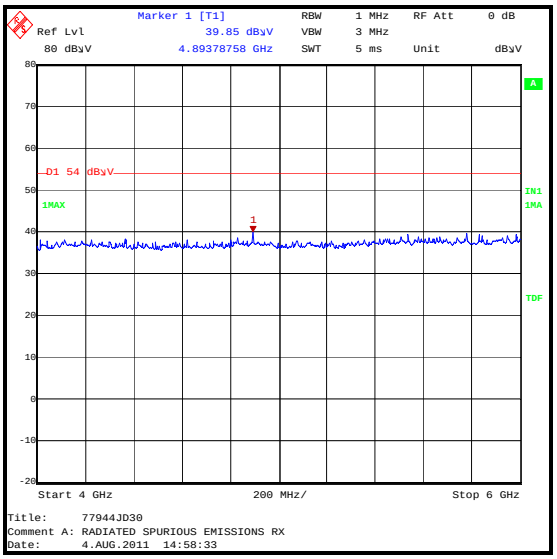
Frequency (MHz)	Antenna Polarity	Peak Level (dBµV/m)	Average Limit (dBµV/m)	Margin (dB)	Result
3140.281	Vertical	45.6	54.0	8.4	Complied

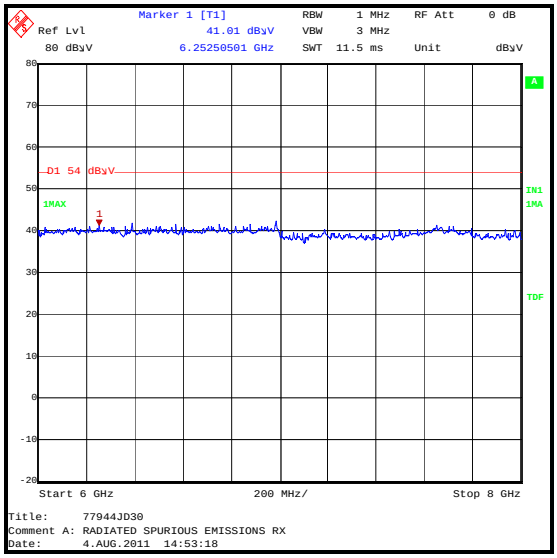
Note(s):

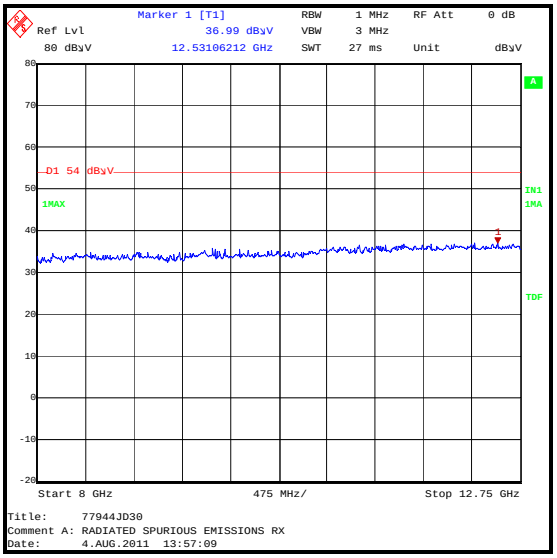
1. The final measured value, for the given emission, in the table above incorporates the calibrated antenna factor and cable loss.
2. Pre-scans above 1 GHz were performed in a fully anechoic chamber (RFI Asset Number K0002) at a distance of 3 metres. The EUT was placed at a height of 1.5 metres above the test chamber floor in the centre of the chamber turntable. All measurement antennas were placed at a fixed height of 1.5 metres above the test chamber floor, in line with the EUT. Final measurements above 1 GHz were performed in a semi-anechoic chamber (RFI Asset Number K0001) at a distance of 3 metres. The EUT was placed at a height of 80 cm above the reference ground plane in the centre of the chamber turntable. Maximum emission levels were determined by height searching the measurement antenna over the range 1 metre to 4 metres.
3. No spurious emissions were detected above the noise floor of the measuring receiver therefore the highest peak noise floor reading of the measuring receiver was recorded as shown in the table above. The peak level was compared to the average limit as opposed to being compared to the peak limit because this is the more onerous limit.

Receiver/Idle Mode Radiated Spurious Emissions (continued)









5.2.2. Transmitter 6 dB Bandwidth

Test Summary:

Test Engineer:	Crawford Lindsay	**Test Date:**	08 August 2011
Test Sample Serial No:	2887883		

FCC Part:	15.247(a)(2)
Test Method Used:	As detailed in ANSI C63.10 Section 6.9.1

Environmental Conditions:

Temperature (°C):	29
Relative Humidity (%):	23

Results: 802.11b 1 Mbps

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	10.641	≥0.5	10.141	Complied
Middle	10.621	≥0.5	10.121	Complied
Top	10.261	≥0.5	9.761	Complied

Results: 802.11b 2 Mbps

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	10.912	≥0.5	10.412	Complied
Middle	10.891	≥0.5	10.391	Complied
Top	10.531	≥0.5	10.031	Complied

Results: 802.11b 5.5 Mbps

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	10.731	≥0.5	10.231	Complied
Middle	10.802	≥0.5	10.302	Complied
Top	9.990	≥0.5	9.490	Complied

Results: 802.11b 11 Mbps

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	11.002	≥0.5	10.502	Complied
Middle	10.802	≥0.5	10.302	Complied
Top	9.810	≥0.5	9.310	Complied

Transmitter 6 dB Bandwidth (continued)

Results: 802.11g 6 Mbps

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	16.412	≥0.5	15.912	Complied
Middle	16.483	≥0.5	15.983	Complied
Top	16.483	≥0.5	15.983	Complied

Results: 802.11g 9 Mbps

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	16.593	≥0.5	16.093	Complied
Middle	16.573	≥0.5	16.073	Complied
Top	16.573	≥0.5	16.073	Complied

Results: 802.11g 12 Mbps

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	16.593	≥0.5	16.093	Complied
Middle	16.393	≥0.5	15.893	Complied
Top	16.483	≥0.5	15.983	Complied

Results: 802.11g 18 Mbps

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	16.503	≥0.5	16.003	Complied
Middle	16.323	≥0.5	15.823	Complied
Top	16.663	≥0.5	16.163	Complied

Results: 802.11g 24 Mbps

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	16.323	≥0.5	15.823	Complied
Middle	16.232	≥0.5	15.732	Complied
Top	16.483	≥0.5	15.983	Complied

Results: 802.11g 36 Mbps

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	16.593	≥0.5	16.093	Complied
Middle	16.413	≥0.5	15.913	Complied
Top	16.483	≥0.5	15.983	Complied

Transmitter 6 dB Bandwidth (continued)

Results: 802.11g 48 Mbps

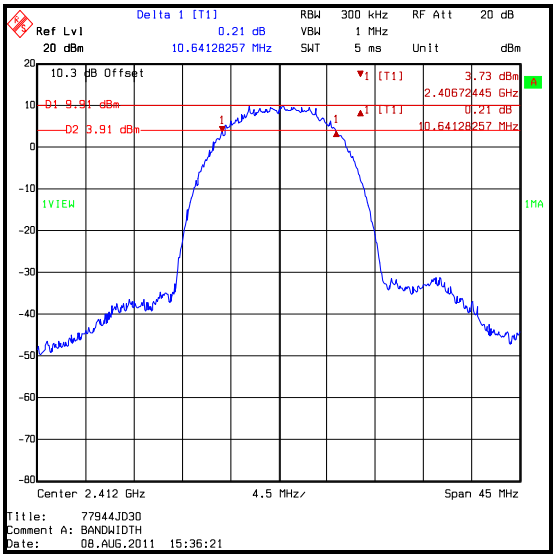
Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	16.323	≥0.5	15.823	Complied
Middle	16.323	≥0.5	15.823	Complied
Top	16.303	≥0.5	15.803	Complied

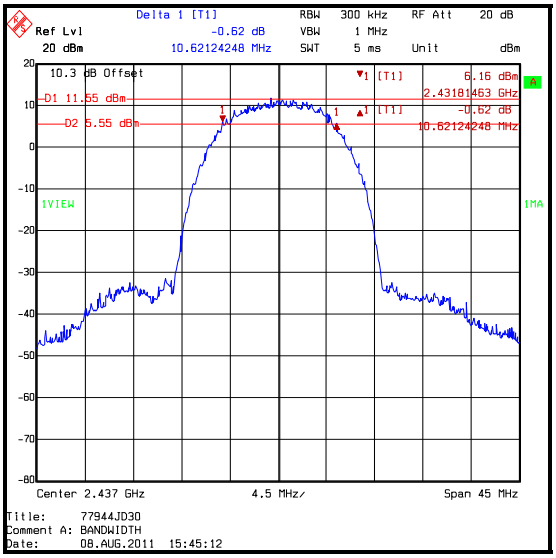
Results: 802.11g 54 Mbps

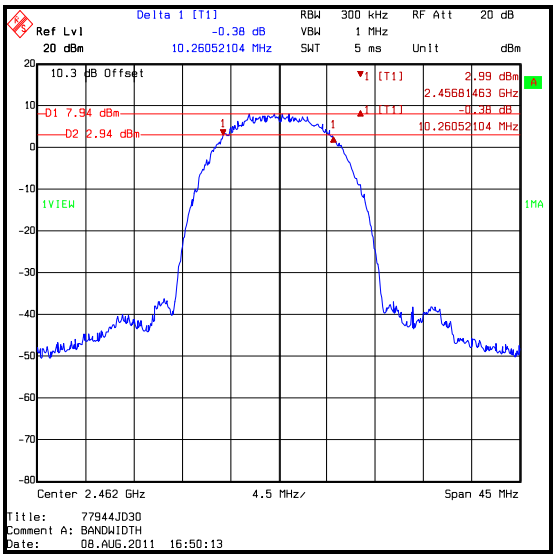
Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	16.503	≥0.5	16.003	Complied
Middle	16.413	≥0.5	15.913	Complied
Top	16.303	≥0.5	15.803	Complied

Transmitter 6 dB Bandwidth (continued)

Results: 802.11b 1 Mbps

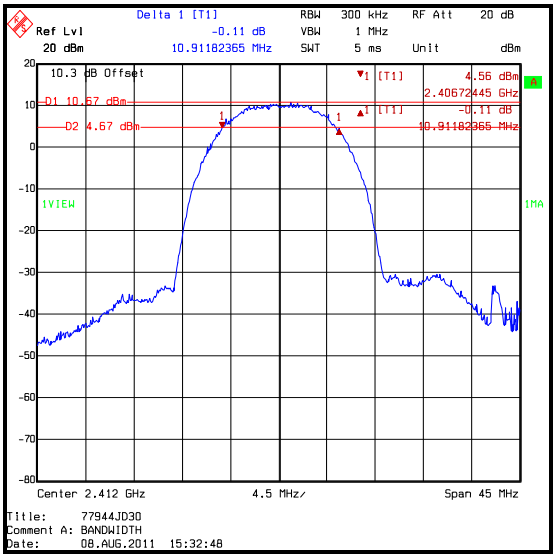


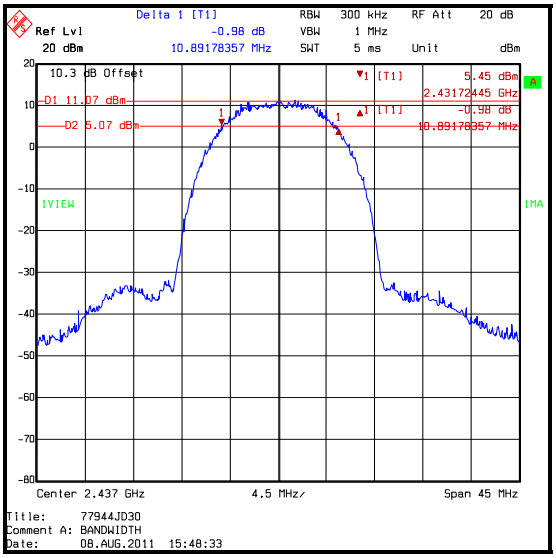


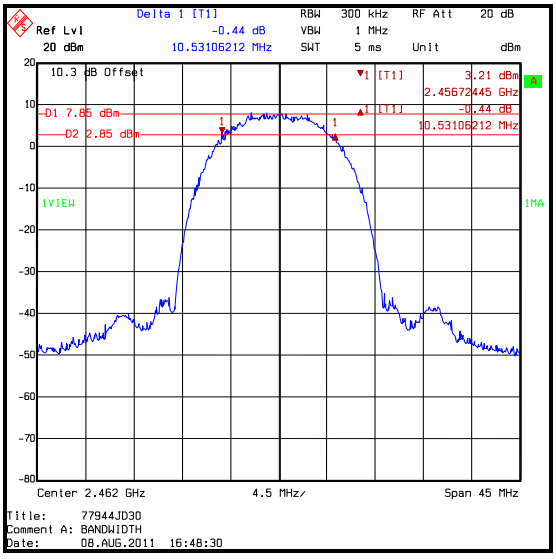


Transmitter 6 dB Bandwidth (continued)

Results: 802.11b 2 Mbps

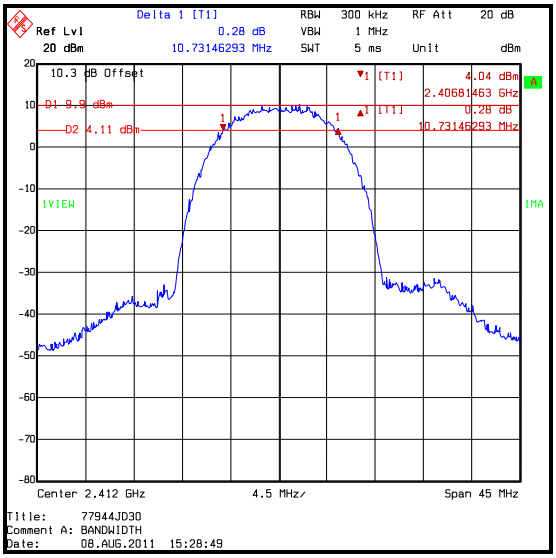


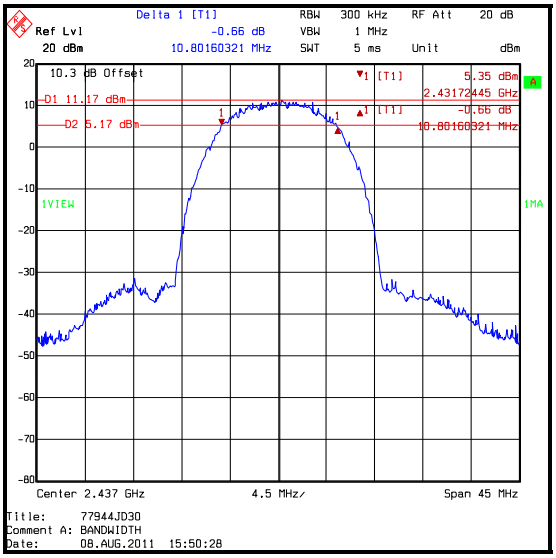


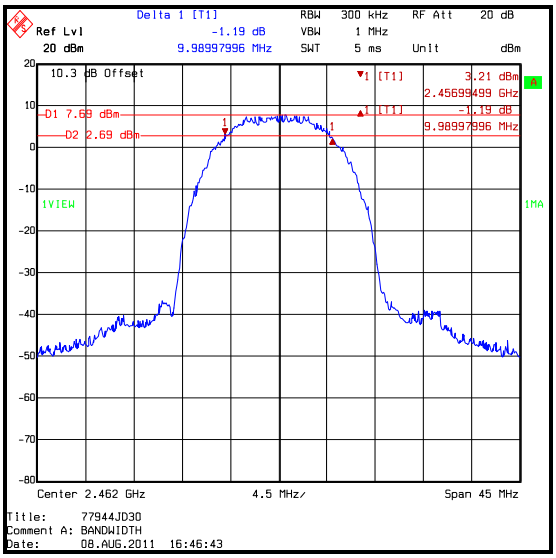


Transmitter 6 dB Bandwidth (continued)

Results: 802.11b 5.5 Mbps

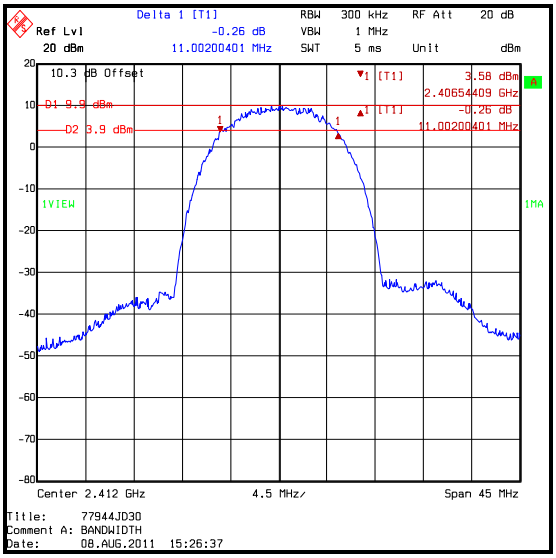


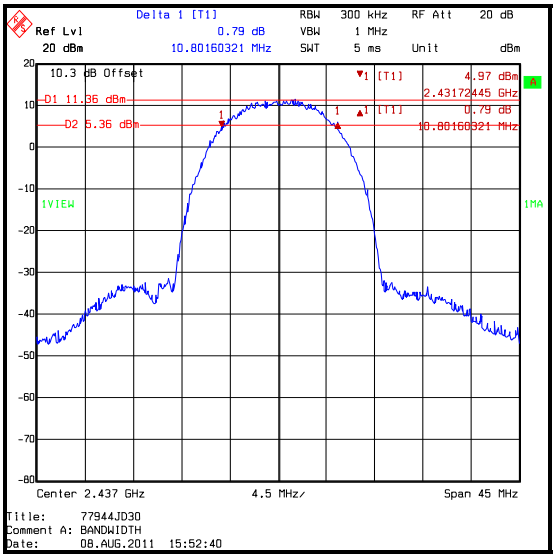


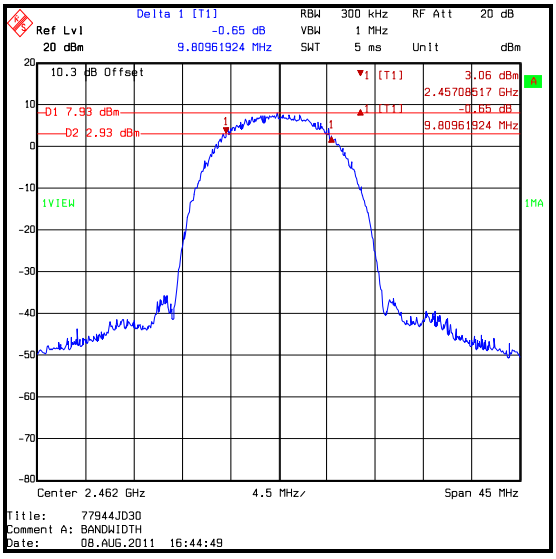


Transmitter 6 dB Bandwidth (continued)

Results: 802.11b 11 Mbps

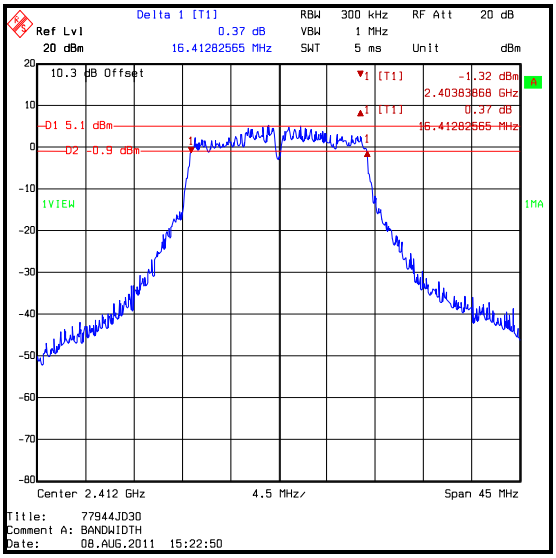


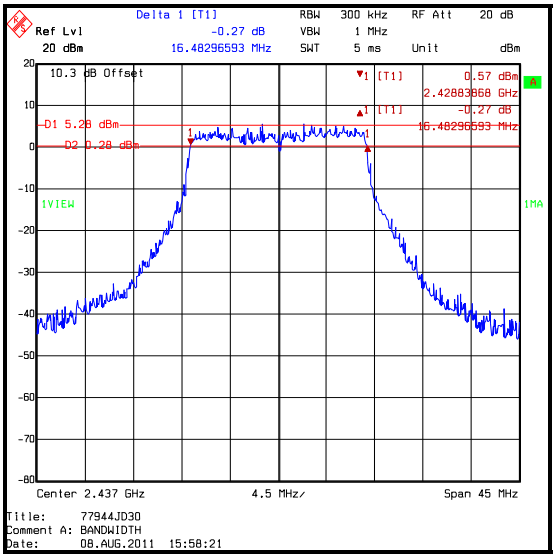


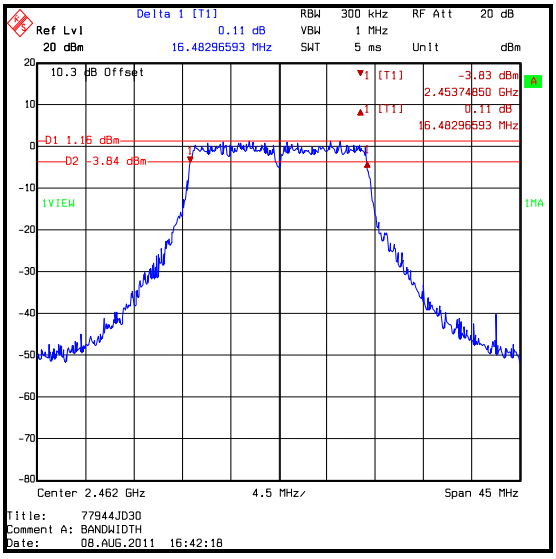


Transmitter 6 dB Bandwidth (continued)

Results: 802.11g 6 Mbps

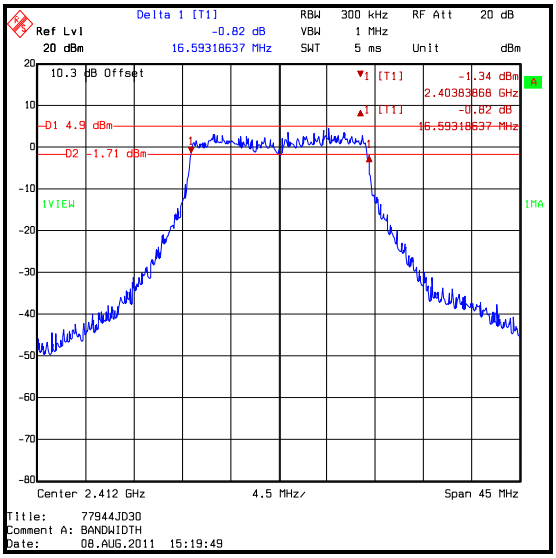


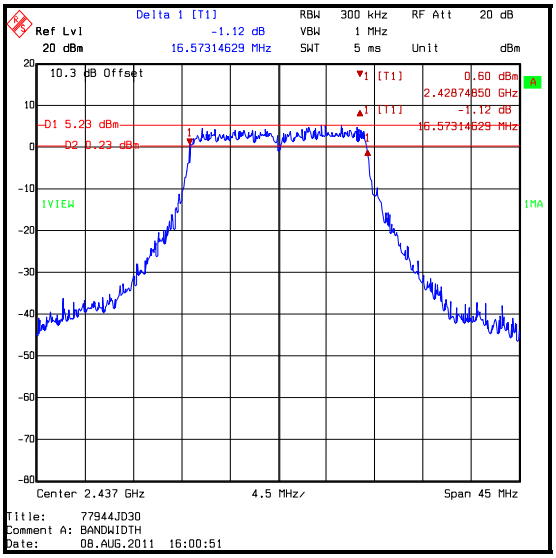


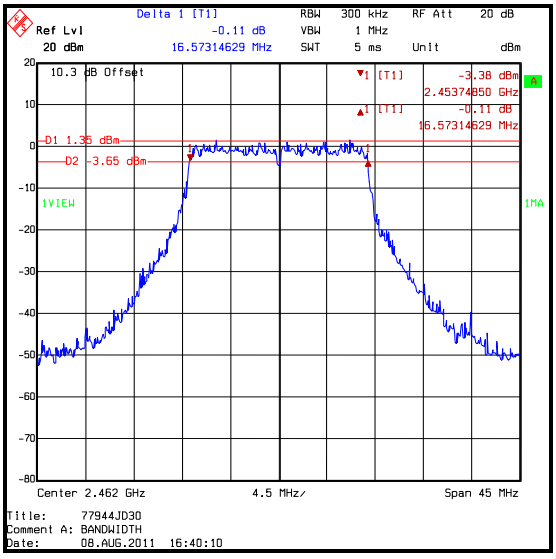


Transmitter 6 dB Bandwidth (continued)

Results: 802.11g 9 Mbps

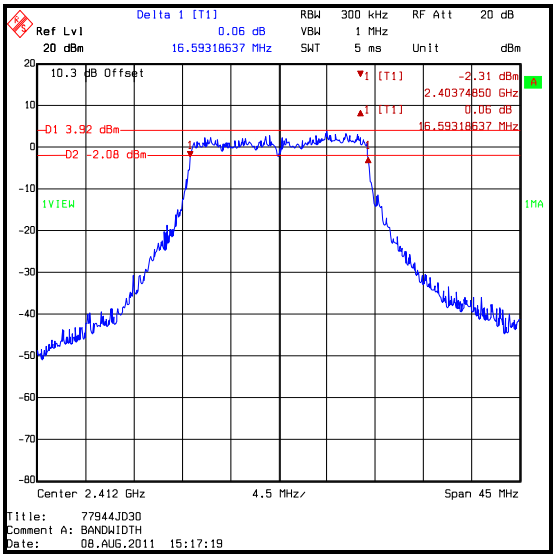


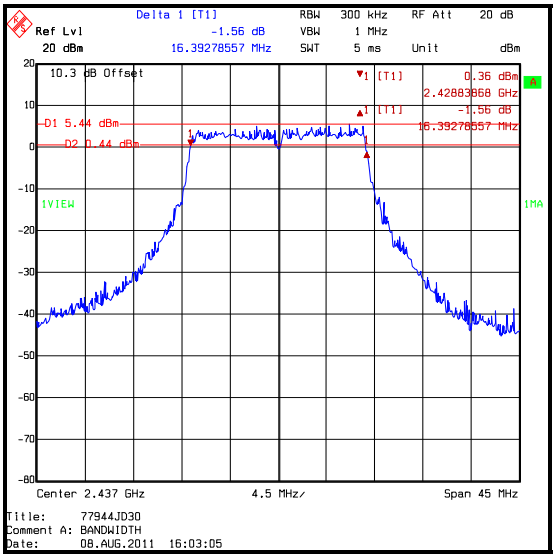


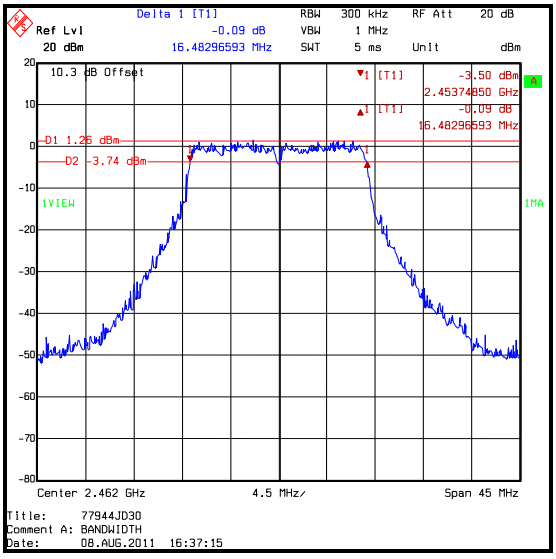


Transmitter 6 dB Bandwidth (continued)

Results: 802.11g 12 Mbps

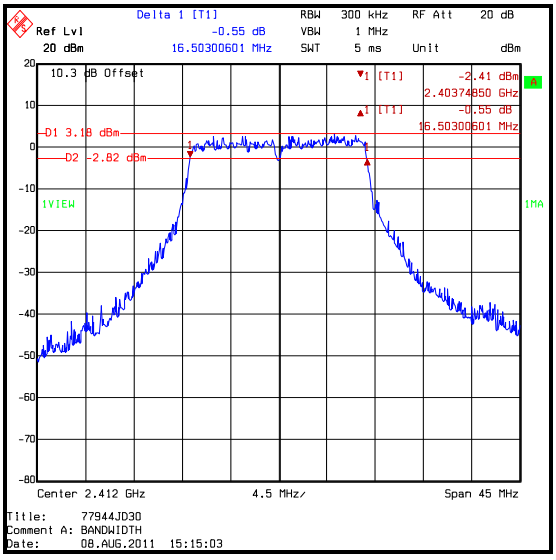


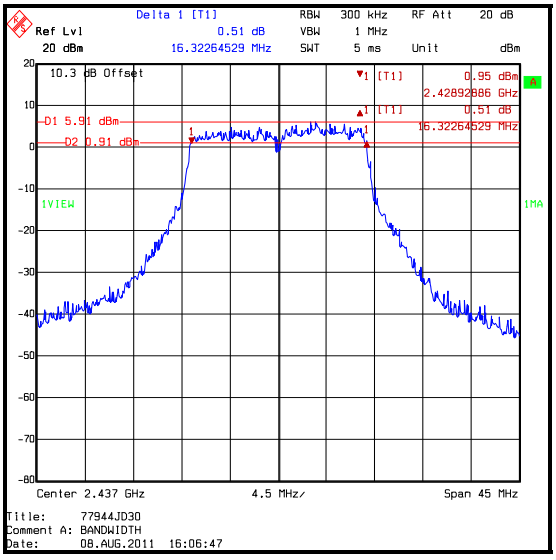


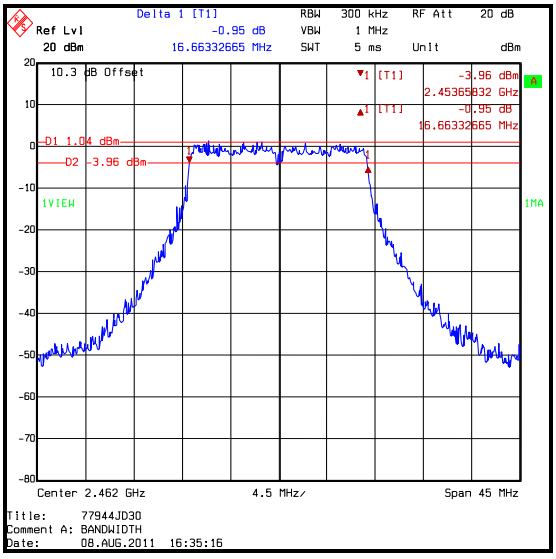


Transmitter 6 dB Bandwidth (continued)

Results: 802.11g 18 Mbps

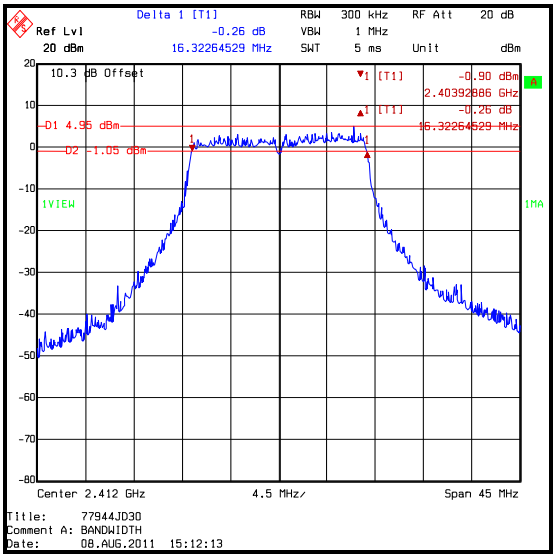


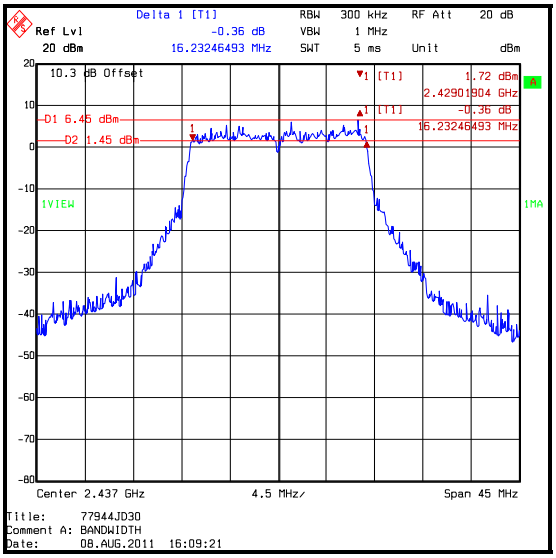


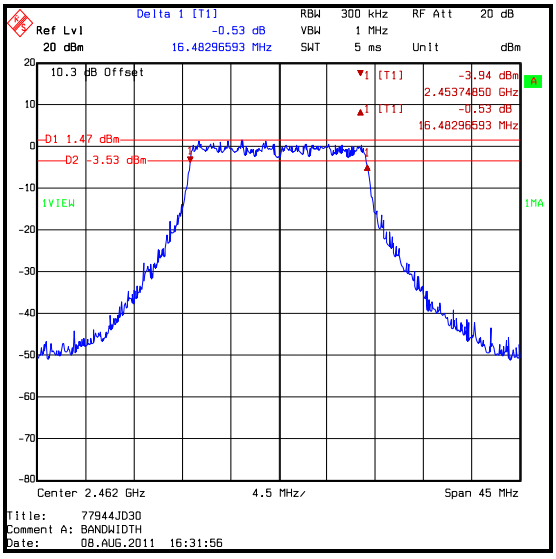


Transmitter 6 dB Bandwidth (continued)

Results: 802.11g 24 Mbps

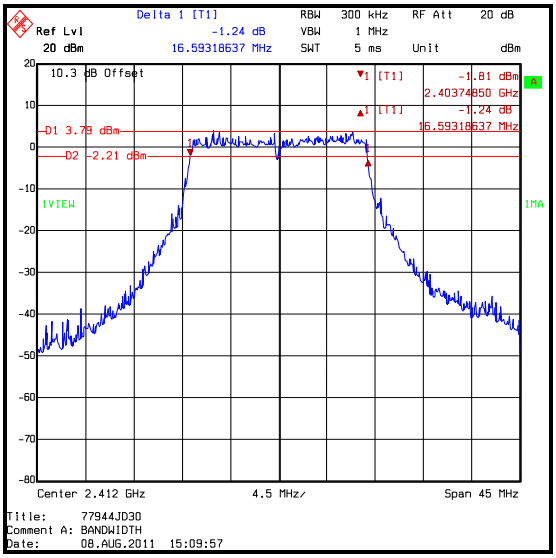


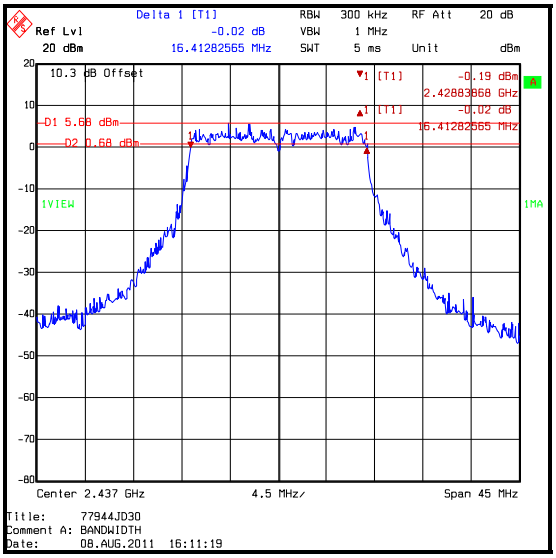


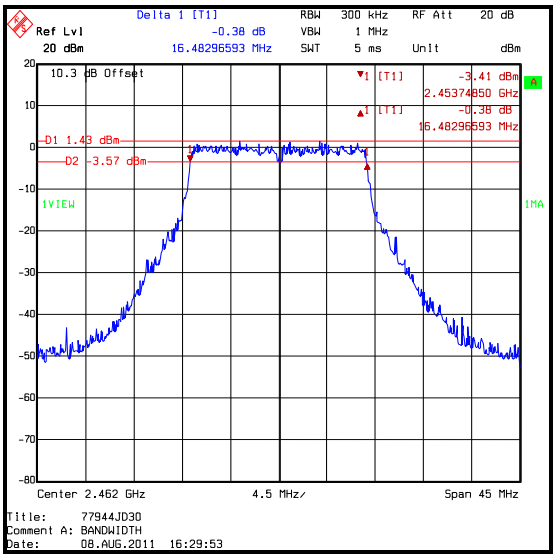


Transmitter 6 dB Bandwidth (continued)

Results: 802.11g 36 Mbps

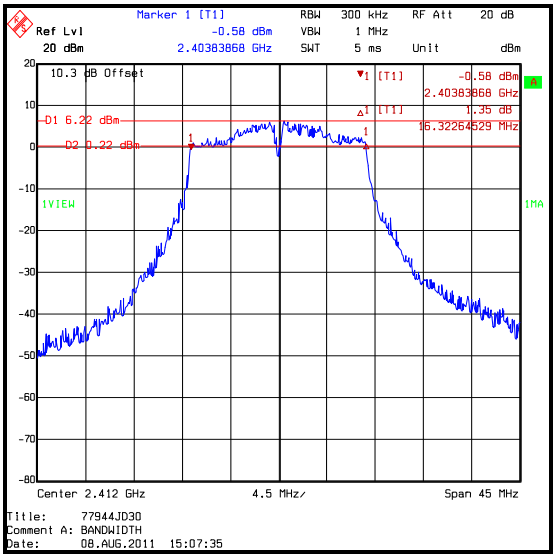


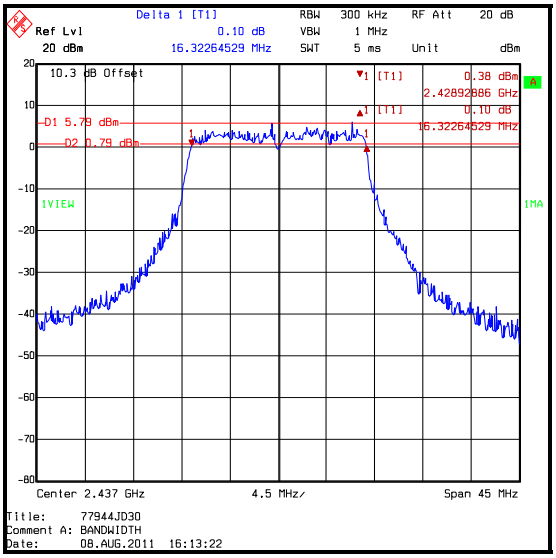


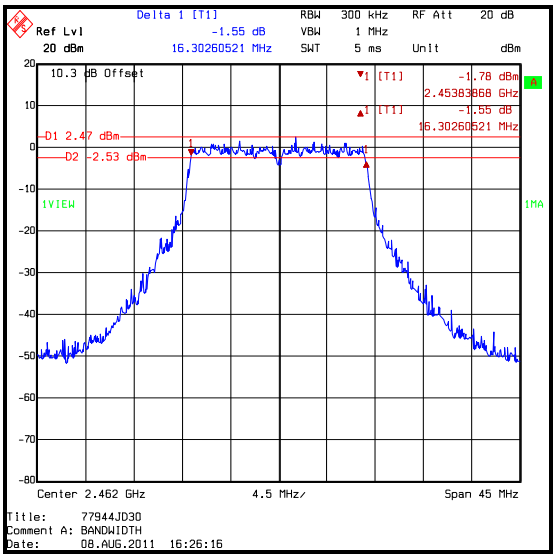


Transmitter 6 dB Bandwidth (continued)

Results: 802.11g 48 Mbps

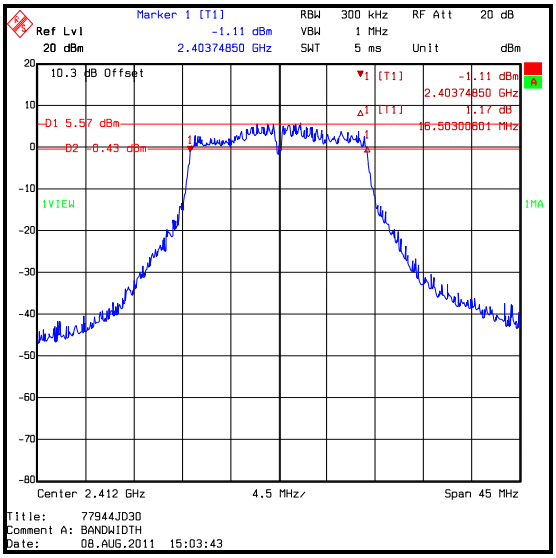


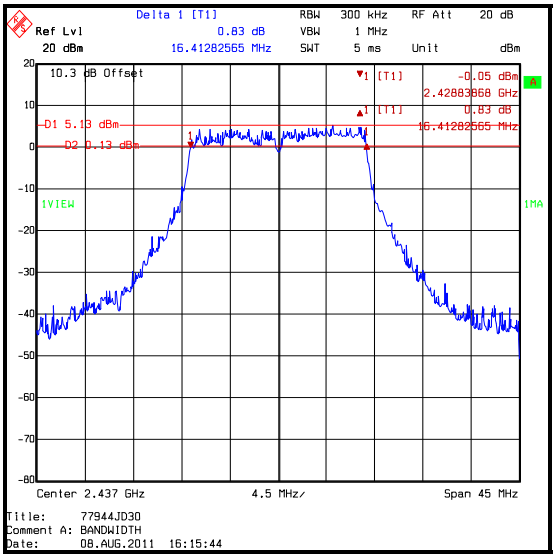


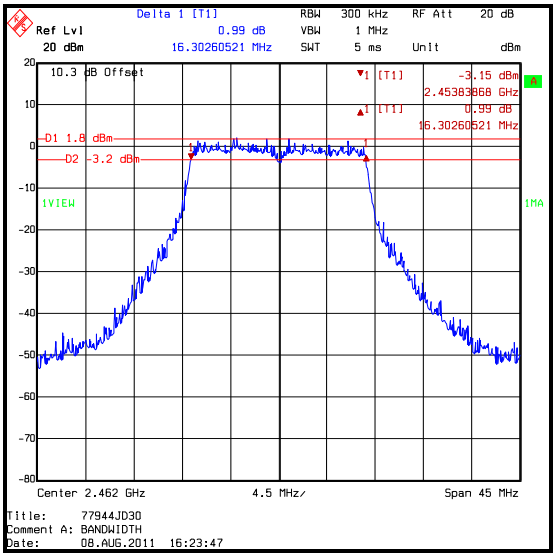


Transmitter 6 dB Bandwidth (continued)

Results: 802.11g 54 Mbps







5.2.3. Transmitter 20 dB Bandwidth

Test Summary:

Test Engineer:	Crawford Lindsay	**Test Date:**	08 August 2011
Test Sample Serial No:	2887883		

FCC Part:	2.1049
Test Method Used:	As detailed in ANSI C63.10 Section 6.9.1

Environmental Conditions:

Temperature (°C):	29
Relative Humidity (%):	23

Results: 802.11b 1 Mbps

Channel	20 dB Bandwidth (MHz)
Bottom	15.962
Middle	15.762
Top	16.032

Results: 802.11b 2Mbps

Channel	20 dB Bandwidth (MHz)
Bottom	16.323
Middle	15.942
Top	16.032

Results: 802.11b 5.5Mbps

Channel	20 dB Bandwidth (MHz)
Bottom	15.962
Middle	15.851
Top	15.852

Results: 802.11b 11Mbps

Channel	20 dB Bandwidth (MHz)
Bottom	15.962
Middle	16.032
Top	15.762

Transmitter 20 dB Bandwidth (continued)

Results: 802.11g 6 Mbps

Channel	20 dB Bandwidth (MHz)
Bottom	18.490
Middle	19.008
Top	18.918

Results: 802.11g 9 Mbps

Channel	20 dB Bandwidth (MHz)
Bottom	19.840
Middle	19.369
Top	19.188

Results: 802.11g 12 Mbps

Channel	20 dB Bandwidth (MHz)
Bottom	19.299
Middle	19.369
Top	20.000

Results: 802.11g 18 Mbps

Channel	20 dB Bandwidth (MHz)
Bottom	18.938
Middle	18.938
Top	19.279

Results: 802.11g 24 Mbps

Channel	20 dB Bandwidth (MHz)
Bottom	18.848
Middle	18.487
Top	19.910

Results: 802.11g 36 Mbps

Channel	20 dB Bandwidth (MHz)
Bottom	20.020
Middle	18.938
Top	19.188

Transmitter 20 dB Bandwidth (continued)

Results: 802.11g 48 Mbps

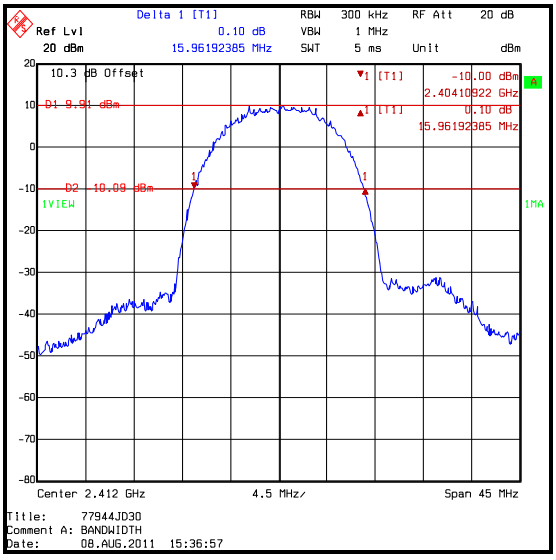
Channel	20 dB Bandwidth (MHz)
Bottom	18.577
Middle	18.667
Top	18.918

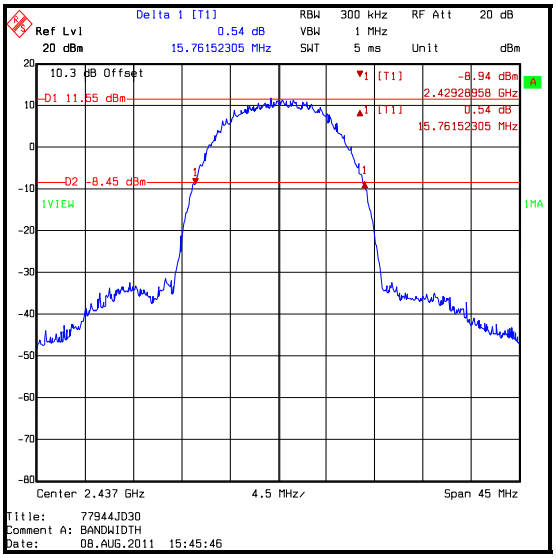
Results: 802.11g 54 Mbps

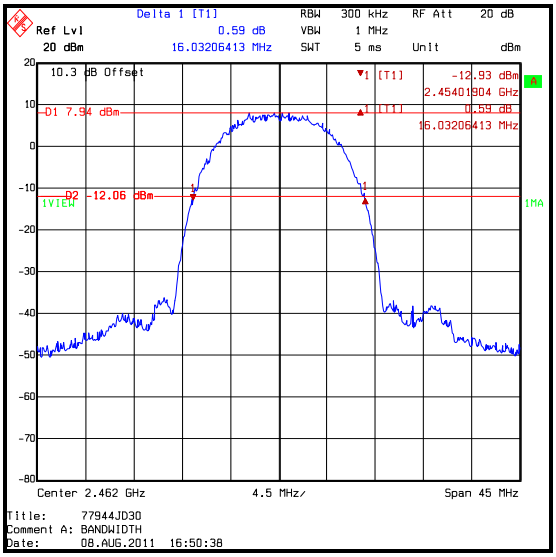
Channel	20 dB Bandwidth (MHz)
Bottom	18.758
Middle	19.479
Top	19.369

Transmitter 20 dB Bandwidth (continued)

Results: 802.11b 1 Mbps

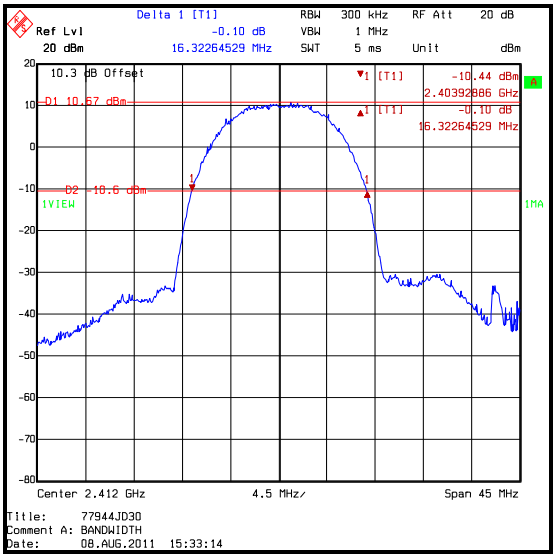


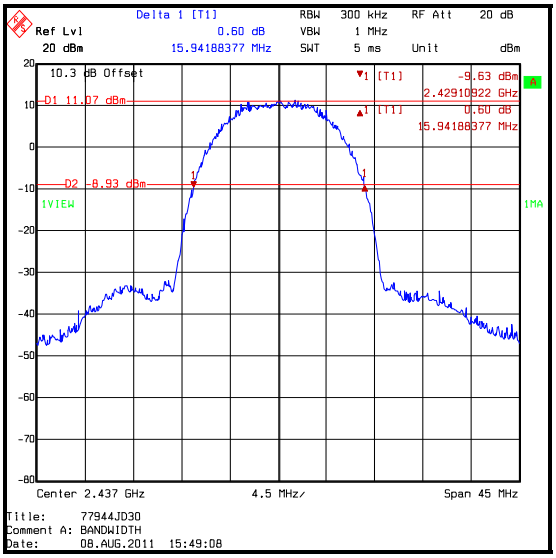


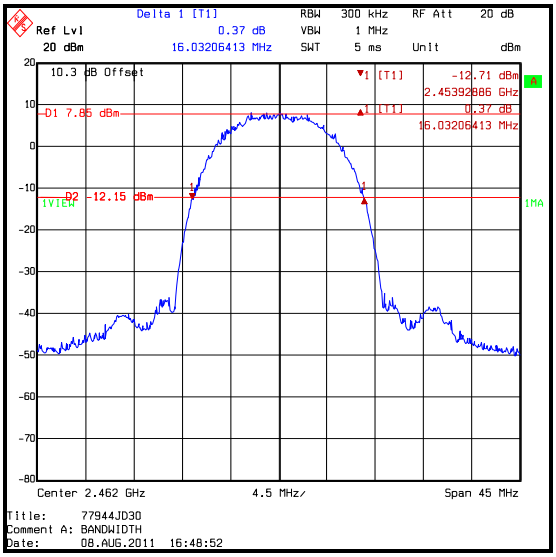


Transmitter 20 dB Bandwidth (continued)

Results: 802.11b 2 Mbps

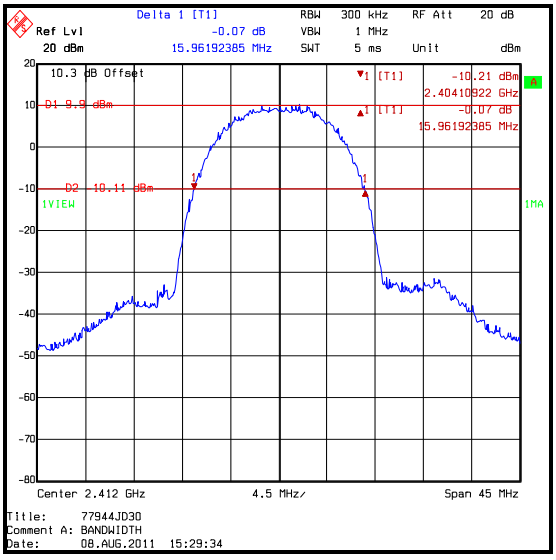


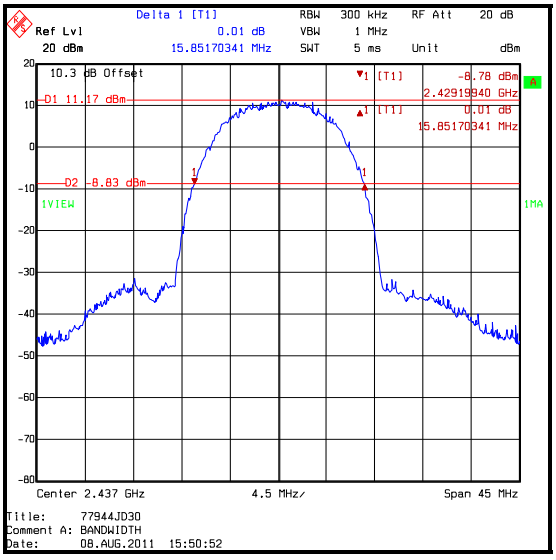


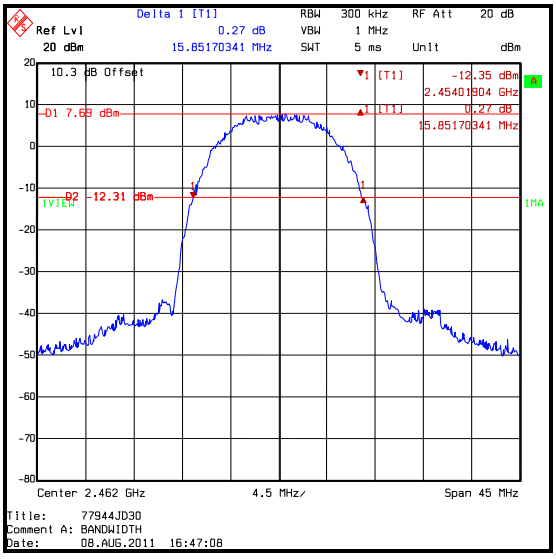


Transmitter 20 dB Bandwidth (continued)

Results: 802.11b 5.5 Mbps

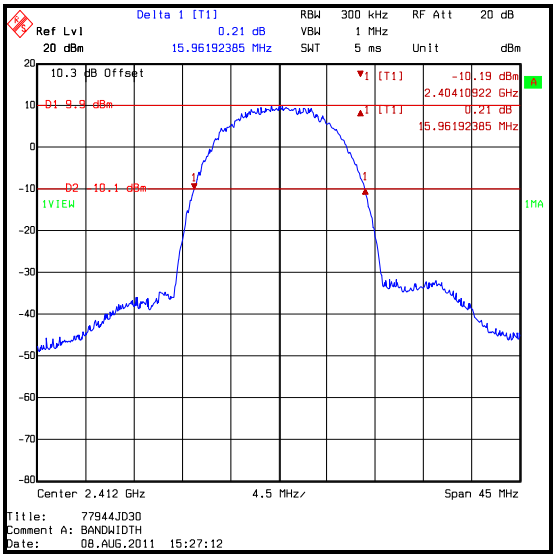


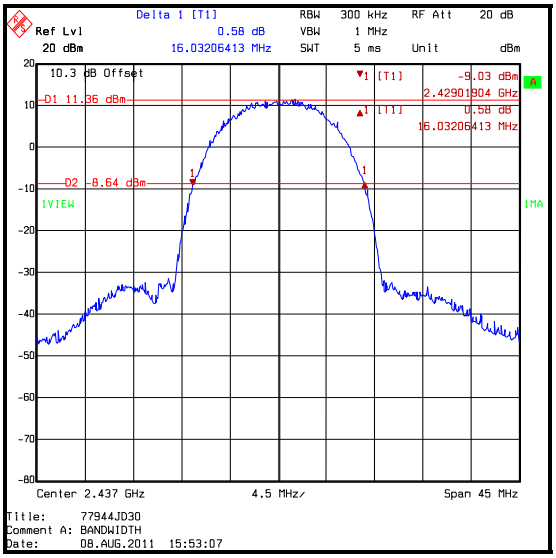


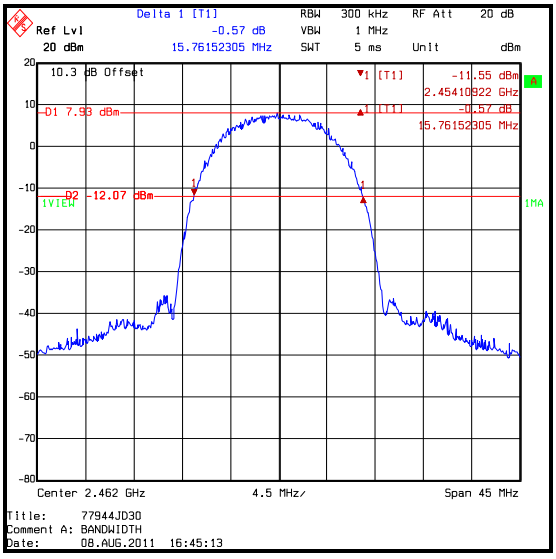


Transmitter 20 dB Bandwidth (continued)

Results: 802.11b 11 Mbps

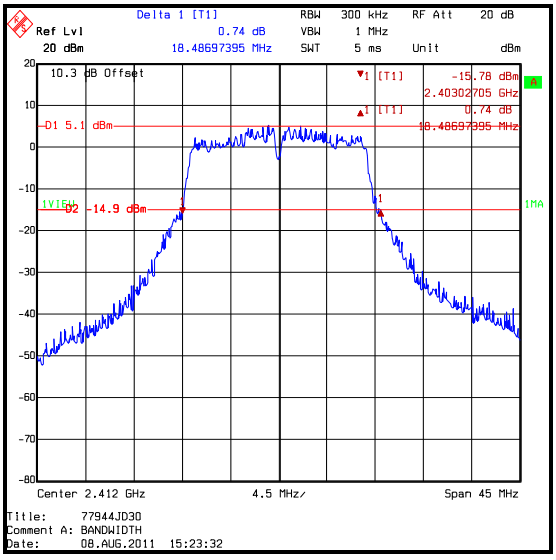


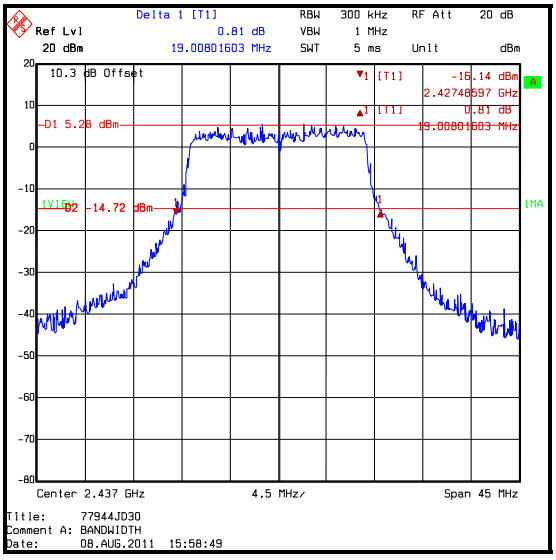


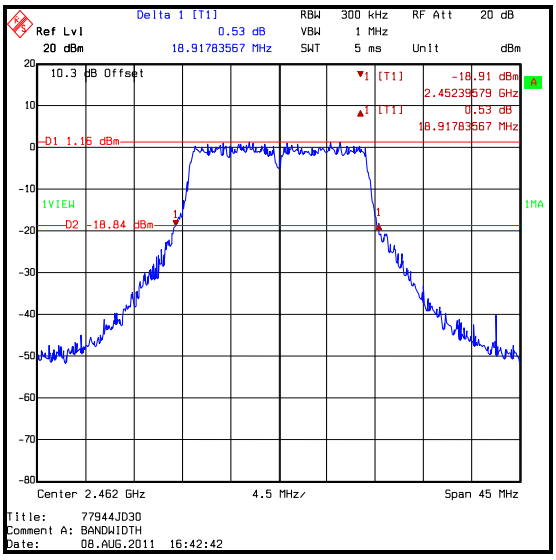


Transmitter 20 dB Bandwidth (continued)

Results: 802.11g 6 Mbps

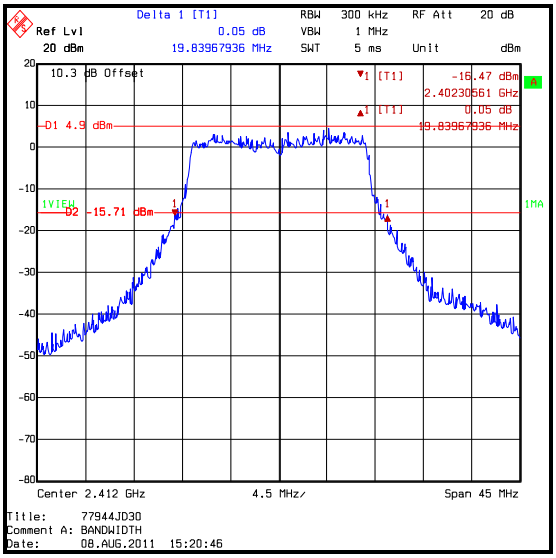


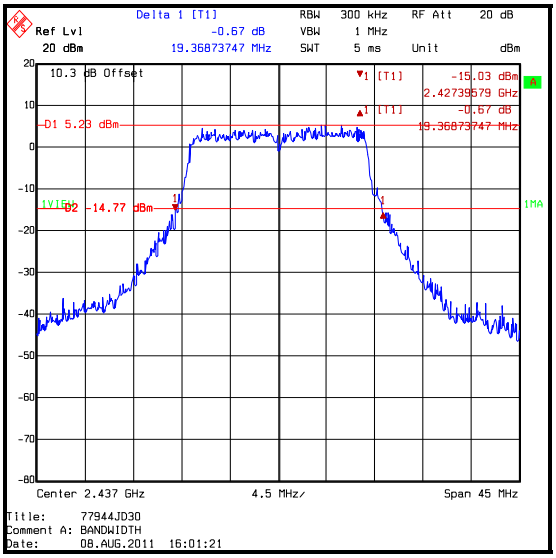


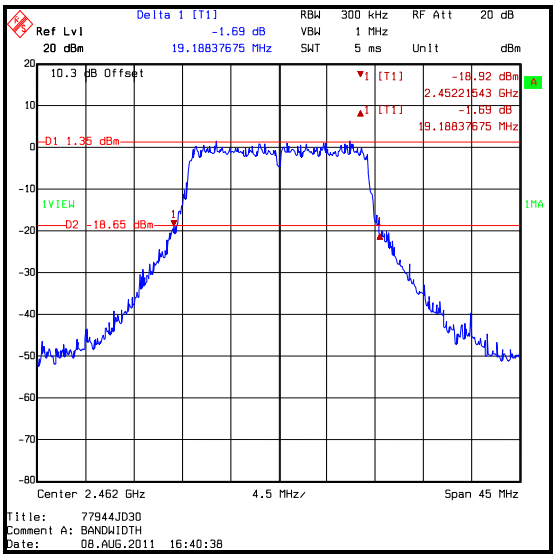


Transmitter 20 dB Bandwidth (continued)

Results: 802.11g 9 Mbps

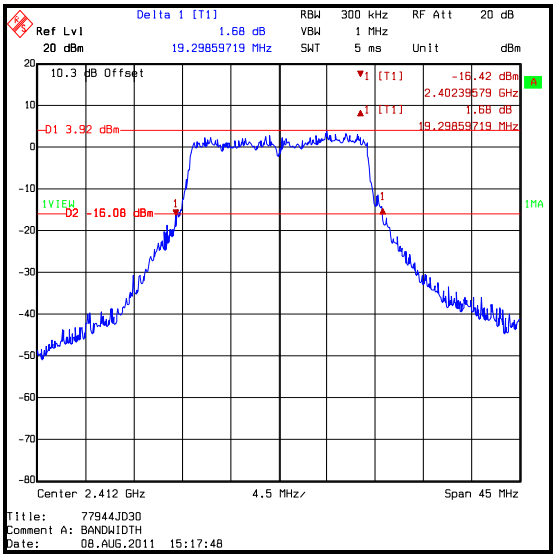


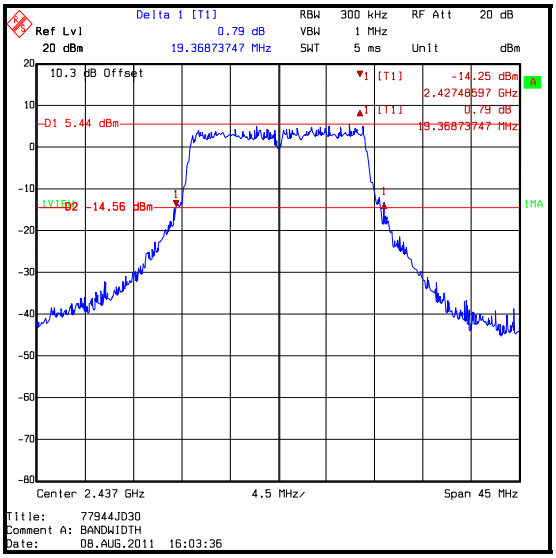


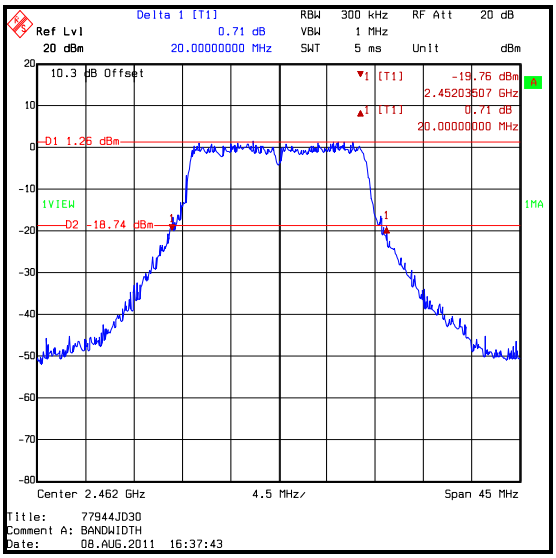


Transmitter 20 dB Bandwidth (continued)

Results: 802.11g 12 Mbps

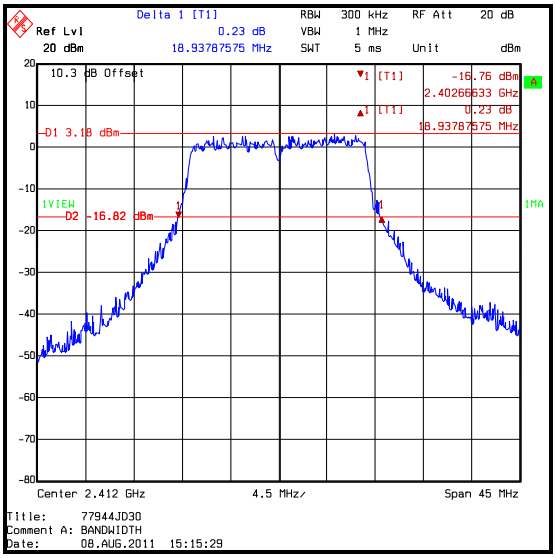


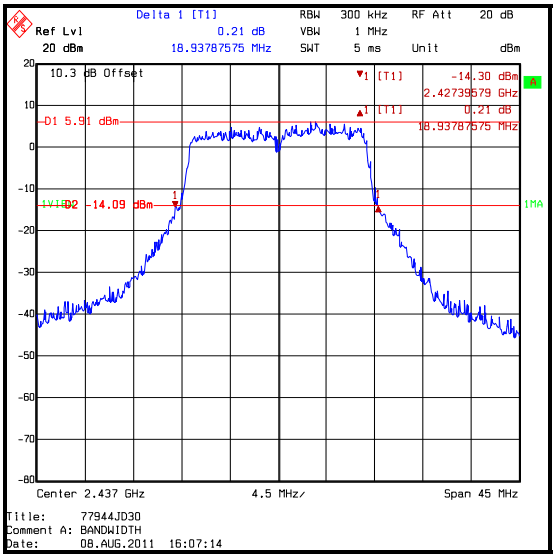


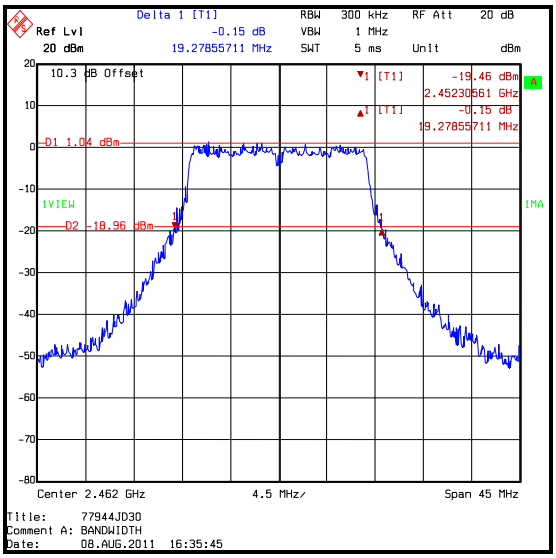


Transmitter 20 dB Bandwidth (continued)

Results: 802.11g 18 Mbps

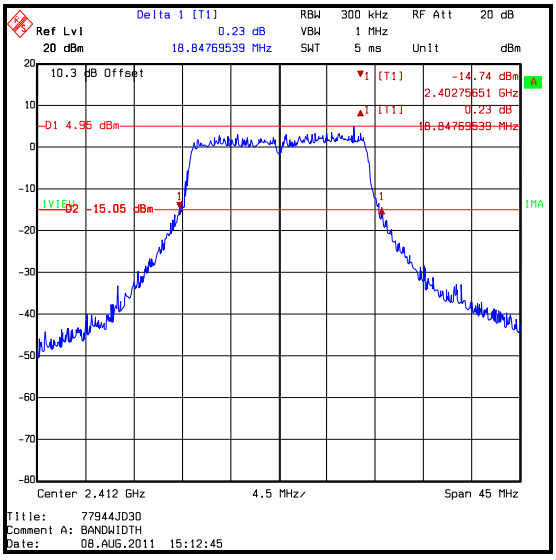


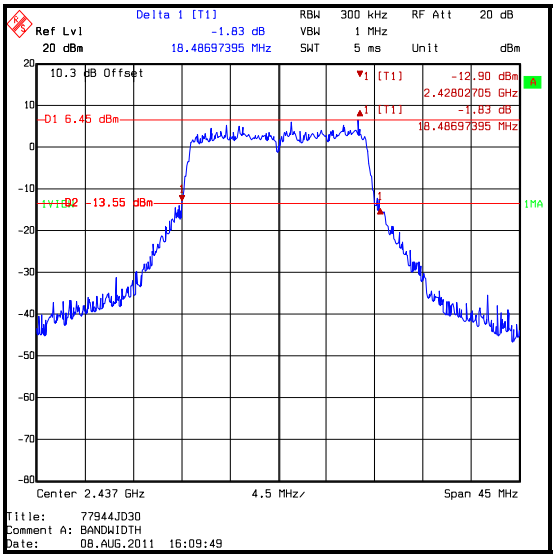


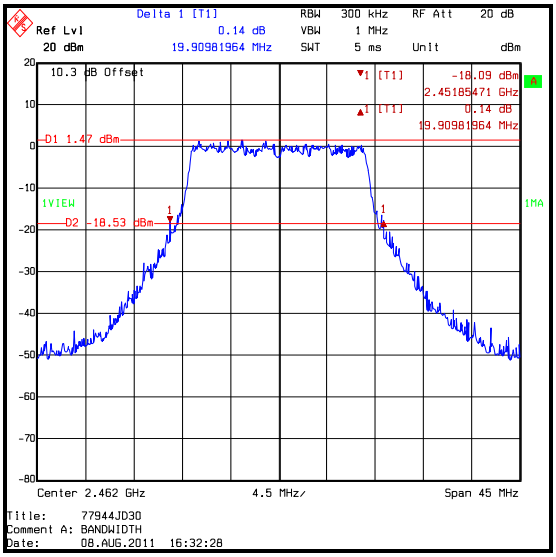


Transmitter 20 dB Bandwidth (continued)

Results: 802.11g 24 Mbps

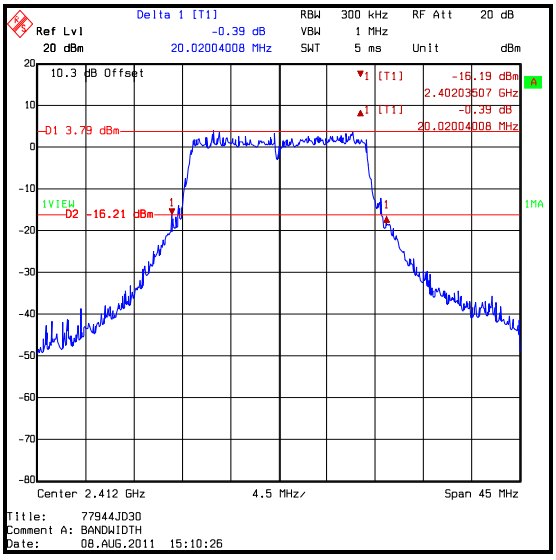


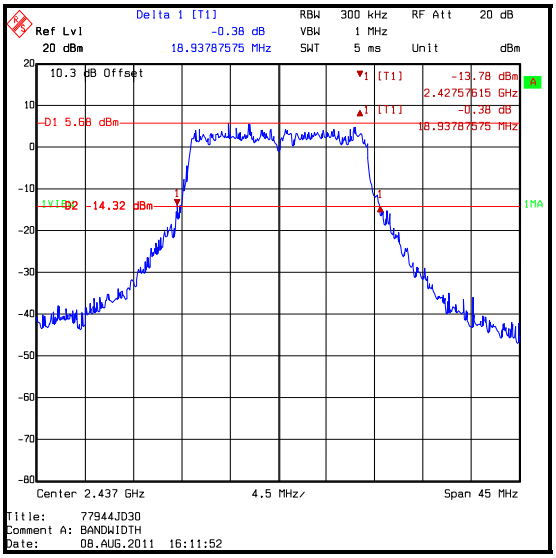


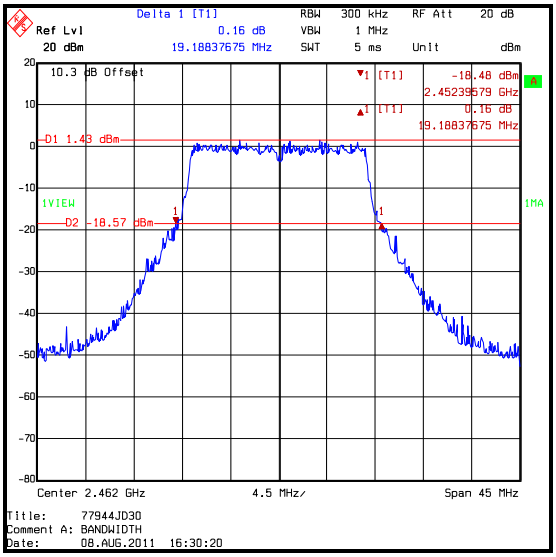


Transmitter 20 dB Bandwidth (continued)

Results: 802.11g 36 Mbps

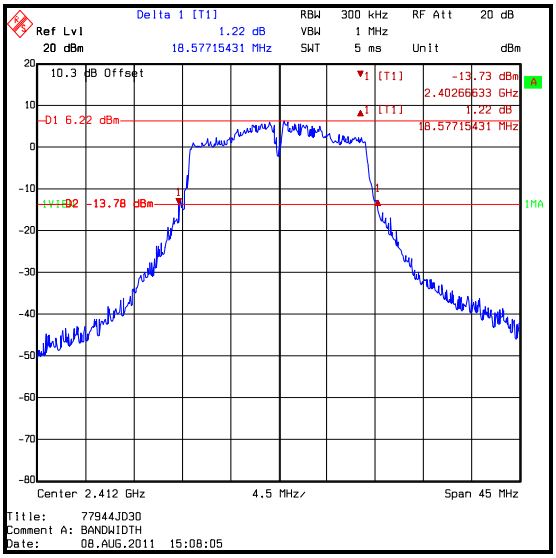


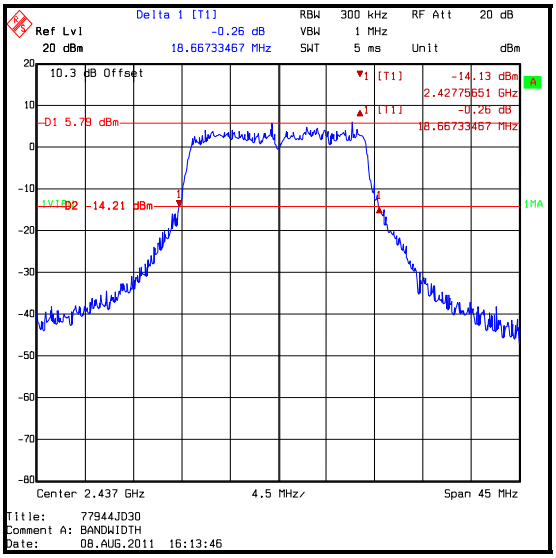


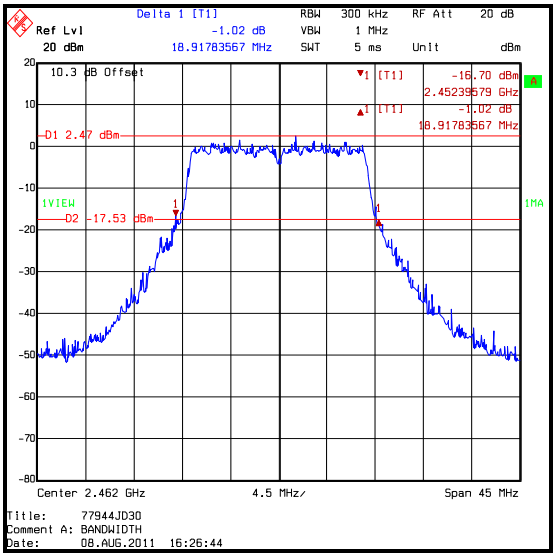


Transmitter 20 dB Bandwidth (continued)

Results: 802.11g 48 Mbps

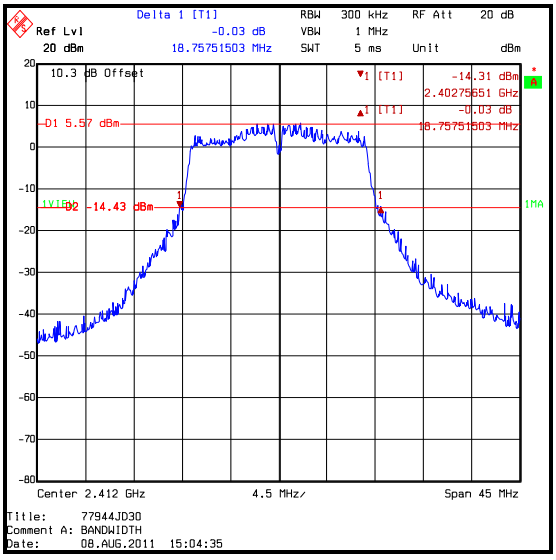


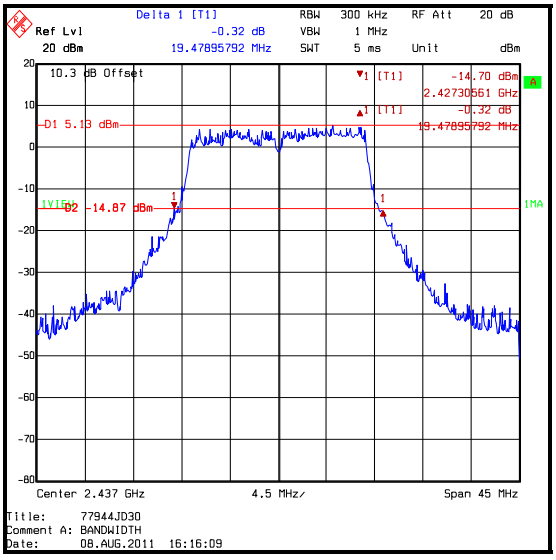


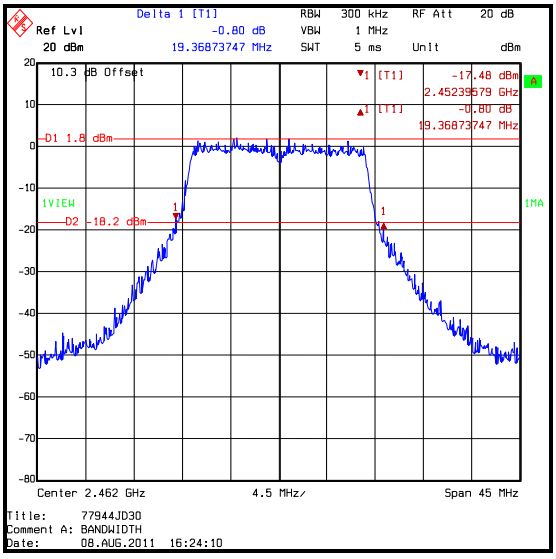


Transmitter 20 dB Bandwidth (continued)

Results: 802.11g 54 Mbps







5.2.4. Transmitter Power Spectral Density

Test Summary:

Test Engineer:	Crawford Lindsay	**Test Date:**	08 August 2011
Test Sample Serial No:	2887883		

FCC Part:	15.247(e)
Test Method Used:	As detailed in ANSI C63.10 Section 6.11.2

Environmental Conditions:

Temperature (°C):	29
Relative Humidity (%):	23

Results: 802.11b 11 Mbps

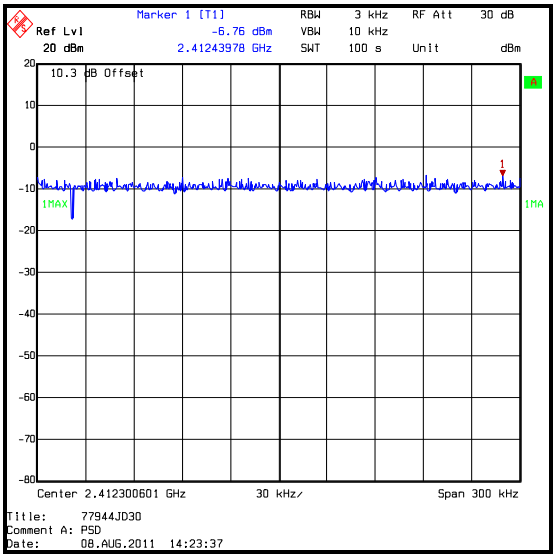
Channel	Output Power (dBm/3 kHz)	Limit (dBm/3 kHz)	Margin (dB)	Result
Bottom	-6.8	8.0	14.8	Complied
Middle	-5.2	8.0	13.2	Complied
Top	-8.6	8.0	16.6	Complied

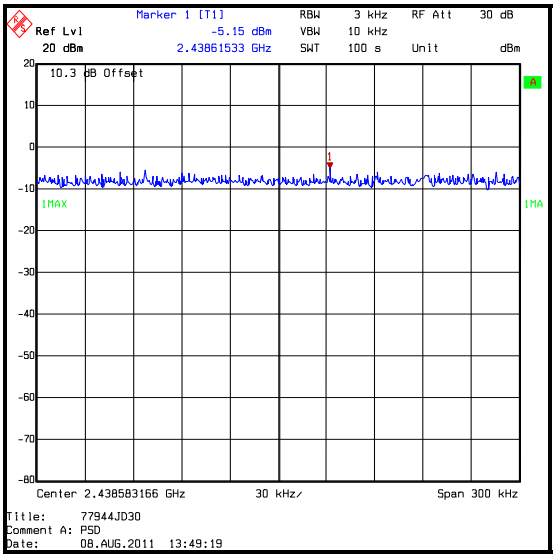
Note(s):

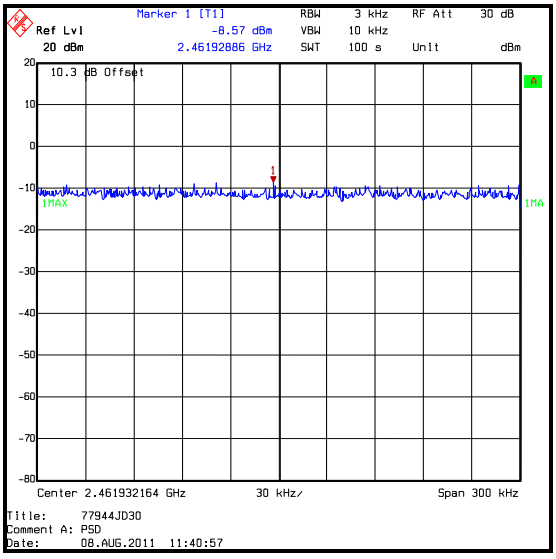
1. The results given in the above table are those for the mode and data rate which exhibited the highest power spectral density.

Transmitter Power Spectral Density (continued)

Results: 802.11b 11 Mbps







5.2.5. Transmitter Maximum Peak Output Power

Test Summary:

Test Engineer:	Crawford Lindsay	**Test Date:**	08 August 2011
Test Sample Serial No:	2887883		

FCC Part:	15.247(b)(3)
Test Method Used:	As detailed in ANSI C63.10 Section 6.10.2

Environmental Conditions:

Temperature (°C):	29
Relative Humidity (%):	23

Note(s):

1. The declared antenna gain was added to the measured conducted power to calculate the EIRP.

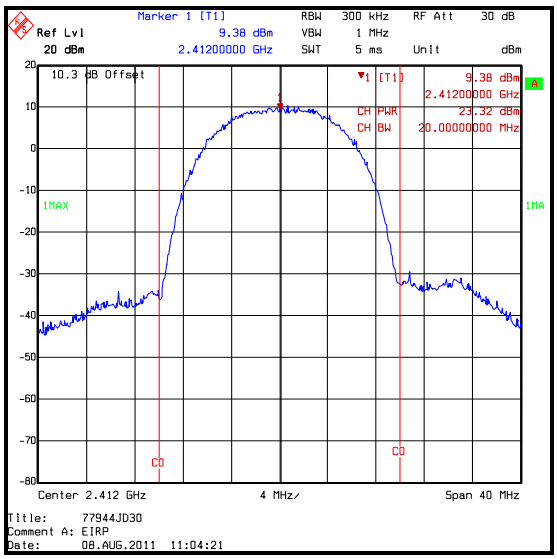
EIRP = Conducted peak power + Declared antenna gain

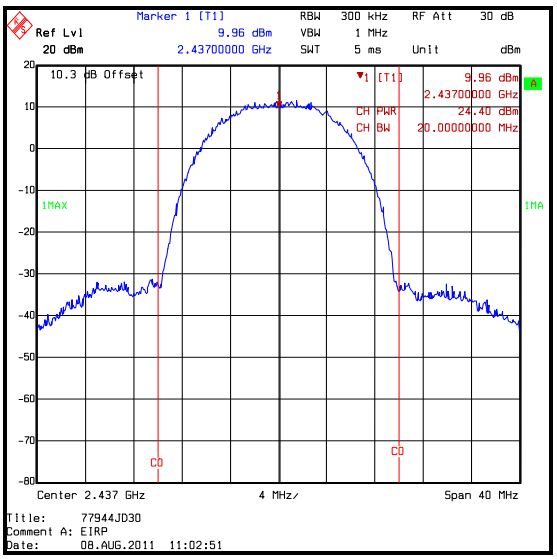
Results: 802.11b – 1 Mbps

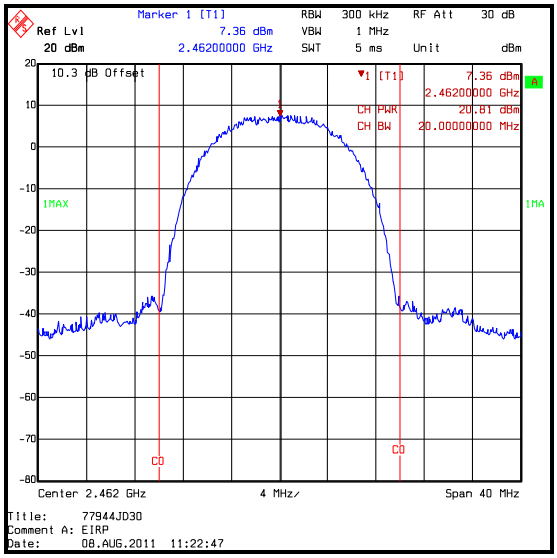
Channel	Conducted Peak Power (dBm)	Conducted Peak Power Limit (dBm)	Margin (dB)	Result
Bottom	23.3	30.0	6.7	Complied
Middle	24.4	30.0	5.6	Complied
Top	20.8	30.0	9.2	Complied

Channel	Conducted Peak Power (dBm)	Declared Antenna Gain (dBi)	EIRP (dBm)	De Facto EIRP Limit (dBm)	Margin (dB)	Result
Bottom	23.3	-1.8	21.5	36.0	14.5	Complied
Middle	24.4	-1.8	22.6	36.0	13.4	Complied
Top	20.8	-1.8	19.0	36.0	17.0	Complied

Transmitter Maximum Peak Output Power (continued)
802.11b – 1 Mbps







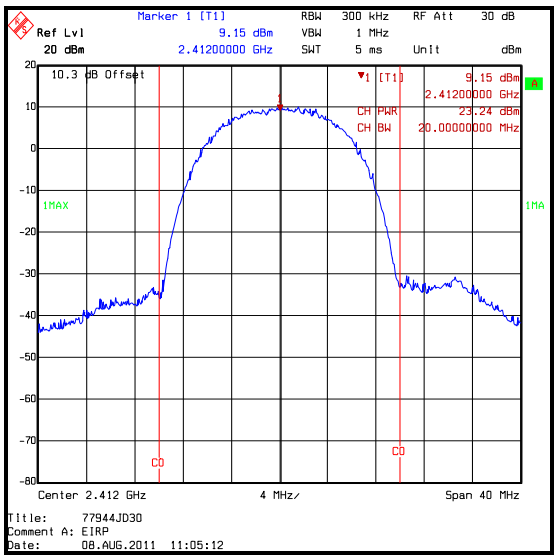
Transmitter Maximum Peak Output Power (continued)

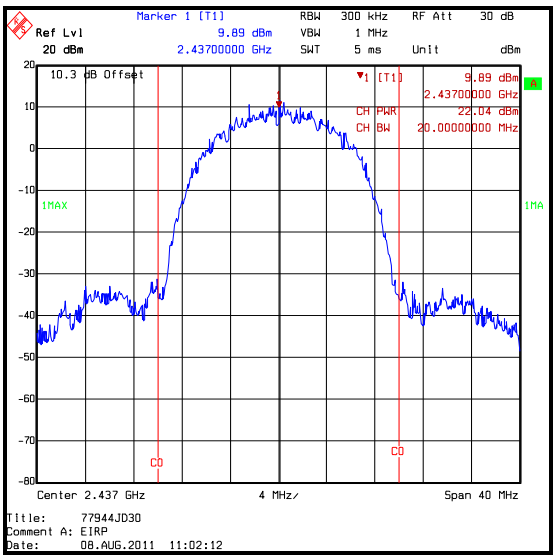
Results: 802.11b – 11 Mbps

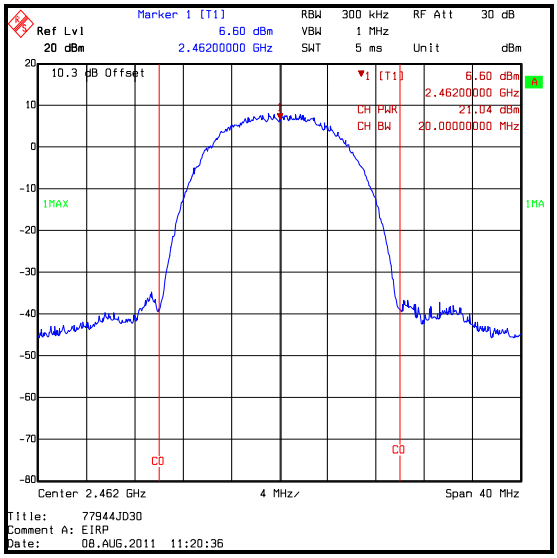
Channel	Conducted Peak Power (dBm)	Conducted Peak Power Limit (dBm)	Margin (dB)	Result
Bottom	23.2	30.0	6.8	Complied
Middle	22.0	30.0	8.0	Complied
Top	21.0	30.0	9.0	Complied

Channel	Conducted Peak Power (dBm)	Declared Antenna Gain (dBi)	EIRP (dBm)	De Facto EIRP Limit (dBm)	Margin (dB)	Result
Bottom	23.2	-1.8	21.4	36.0	14.6	Complied
Middle	22.0	-1.8	20.2	36.0	15.8	Complied
Top	21.0	-1.8	19.2	36.0	16.8	Complied

Transmitter Maximum Peak Output Power (continued)
802.11b – 11 Mbps







Transmitter Maximum Peak Output Power (continued)

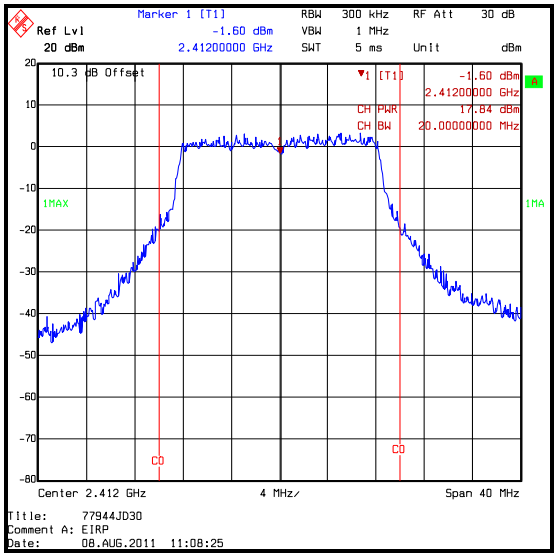
Results: 802.11g – 9 Mbps

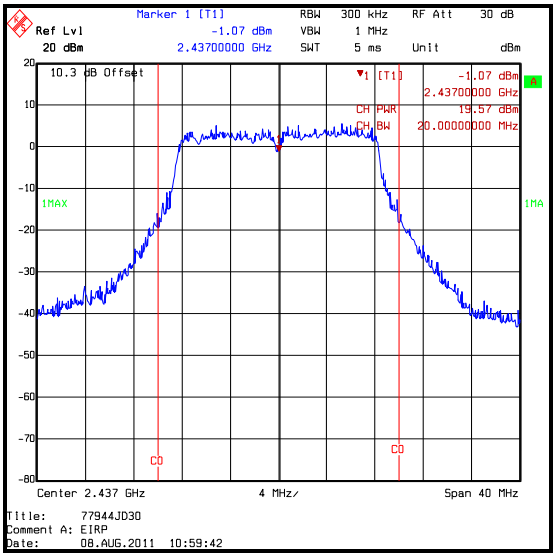
Channel	Conducted Peak Power (dBm)	Conducted Peak Power Limit (dBm)	Margin (dB)	Result
Bottom	17.8	30.0	12.2	Complied
Middle	19.6	30.0	10.4	Complied
Top	15.8	30.0	16.2	Complied

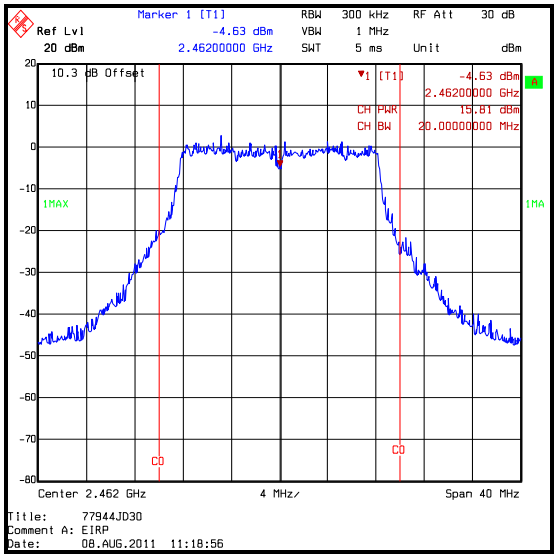
Channel	Conducted Peak Power (dBm)	Declared Antenna Gain (dBi)	EIRP (dBm)	De Facto EIRP Limit (dBm)	Margin (dB)	Result
Bottom	17.8	-1.8	16.0	36.0	20.0	Complied
Middle	19.6	-1.8	17.8	36.0	18.2	Complied
Top	15.8	-1.8	14.0	36.0	22.0	Complied

Transmitter Maximum Peak Output Power (continued)

Results: 802.11g – 9 Mbps







Transmitter Maximum Peak Output Power (continued)

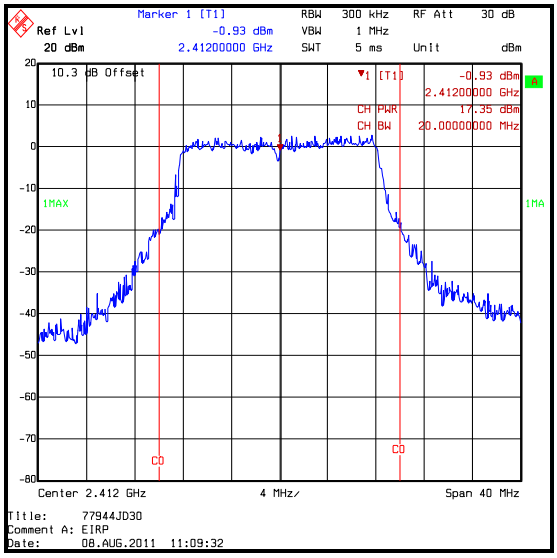
Results: 802.11g – 18 Mbps

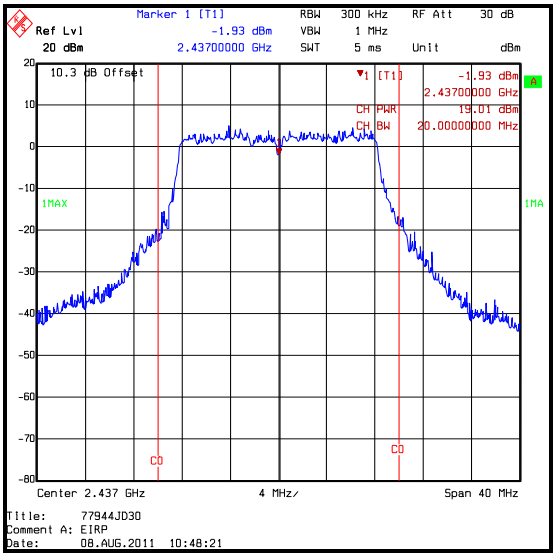
Channel	Conducted Peak Power (dBm)	Conducted Peak Power Limit (dBm)	Margin (dB)	Result
Bottom	17.4	30.0	12.6	Complied
Middle	19.0	30.0	11.0	Complied
Top	15.6	30.0	14.4	Complied

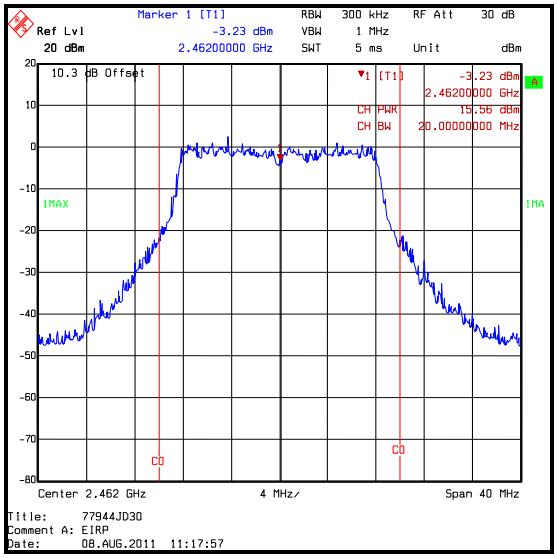
Channel	Conducted Peak Power (dBm)	Declared Antenna Gain (dBi)	EIRP (dBm)	De Facto EIRP Limit (dBm)	Margin (dB)	Result
Bottom	17.4	-1.8	15.6	36.0	20.4	Complied
Middle	19.0	-1.8	17.2	36.0	18.8	Complied
Top	15.6	-1.8	13.8	36.0	22.2	Complied

Transmitter Maximum Peak Output Power (continued)

Results: 802.11g – 18 Mbps







Transmitter Maximum Peak Output Power (continued)

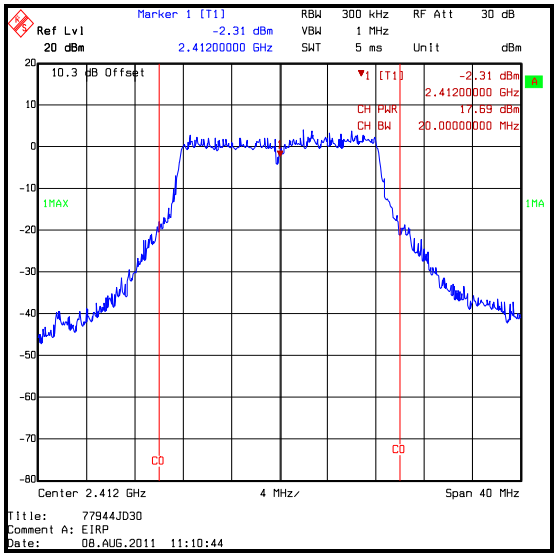
Results: 802.11g – 48 Mbps

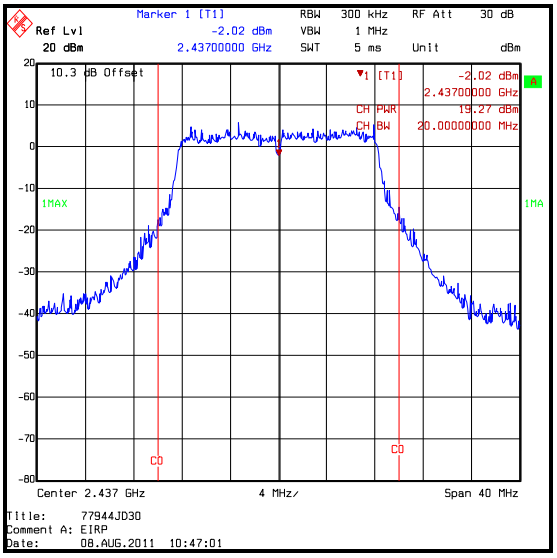
Channel	Conducted Peak Power (dBm)	Conducted Peak Power Limit (dBm)	Margin (dB)	Result
Bottom	17.2	30.0	12.8	Complied
Middle	19.3	30.0	10.7	Complied
Top	15.8	30.0	14.2	Complied

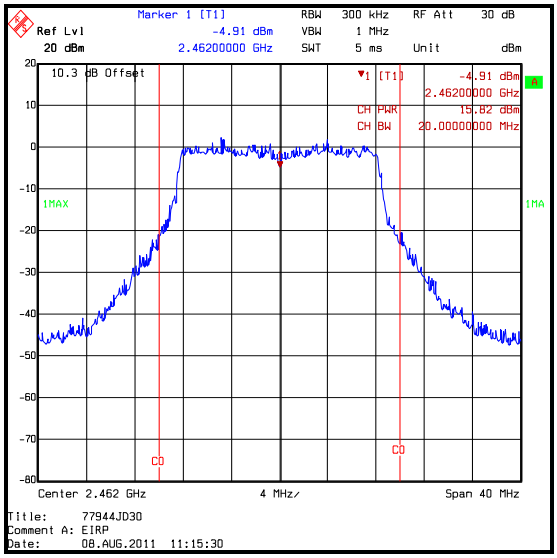
Channel	Conducted Peak Power (dBm)	Declared Antenna Gain (dBi)	EIRP (dBm)	De Facto EIRP Limit (dBm)	Margin (dB)	Result
Bottom	17.2	-1.8	15.4	36.0	20.6	Complied
Middle	19.3	-1.8	17.5	36.0	18.5	Complied
Top	15.8	-1.8	14.0	36.0	22.0	Complied

Transmitter Maximum Peak Output Power (continued)

Results: 802.11g – 48 Mbps







Transmitter Maximum Peak Output Power (continued)

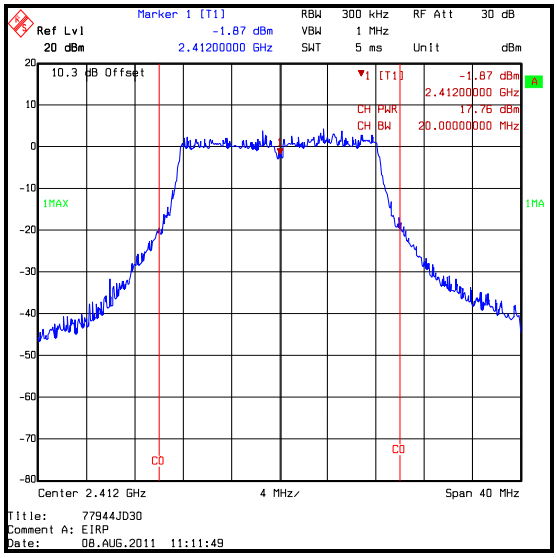
Results: 802.11g – 54 Mbps

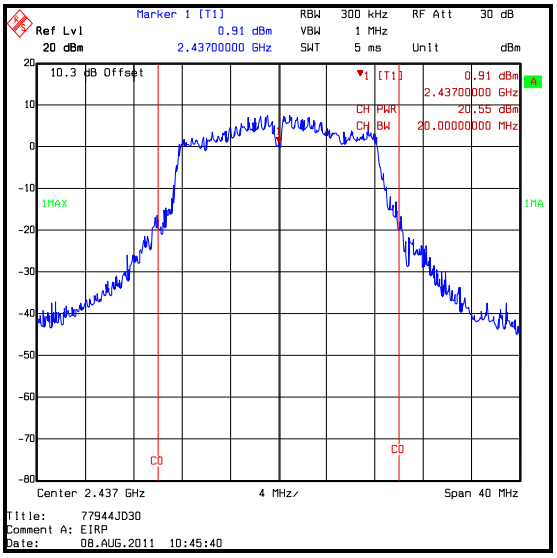
Channel	Conducted Peak Power (dBm)	Conducted Peak Power Limit (dBm)	Margin (dB)	Result
Bottom	17.8	30.0	12.2	Complied
Middle	20.6	30.0	9.4	Complied
Top	15.7	30.0	16.3	Complied

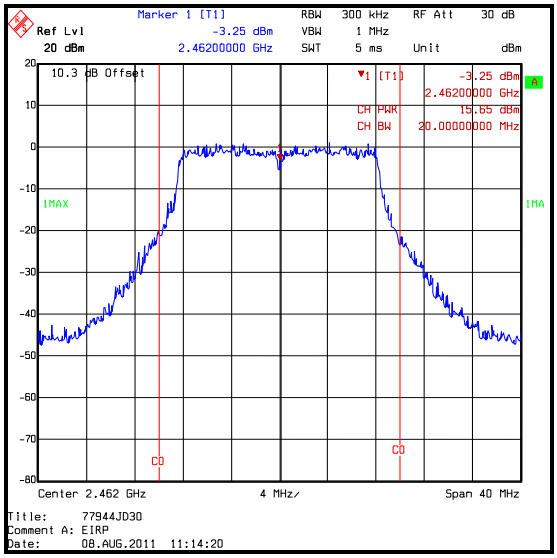
Channel	Conducted Peak Power (dBm)	Declared Antenna Gain (dBi)	EIRP (dBm)	De Facto EIRP Limit (dBm)	Margin (dB)	Result
Bottom	17.8	-1.8	16.0	36.0	20.0	Complied
Middle	20.6	-1.8	18.8	36.0	17.2	Complied
Top	15.7	-1.8	13.9	36.0	22.1	Complied

Transmitter Maximum Peak Output Power (continued)

Results: 802.11g – 54 Mbps







5.2.6. Transmitter Radiated Emissions

Test Summary:

Test Engineer:	Nick Steele	**Test Date:**	04 August 2011
Test Sample Serial No:	2887879		

FCC Part:	15.247(d) & 15.209(a)
Test Method Used:	As detailed in ANSI C63.10 Sections 6.3 and 6.5 referencing ANSI C63.4
Frequency Range	30 MHz to 1000 MHz

Environmental Conditions:

Temperature (°C):	29
Relative Humidity (%):	35

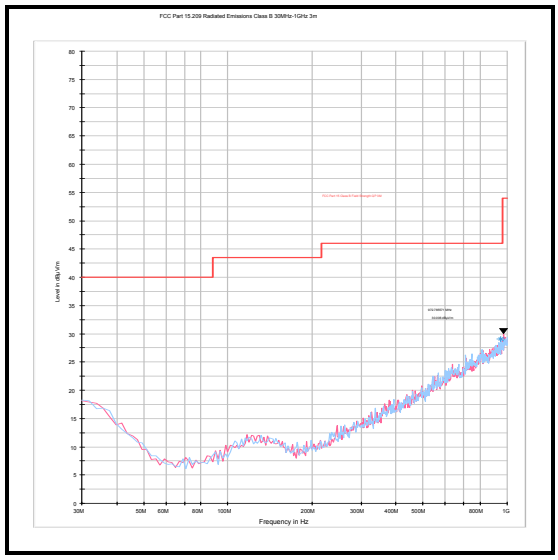
Results: Top Channel

Frequency (MHz)	Antenna Polarity	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
972.786	Vertical	30.0	54.0	24.0	Complied

Note(s):

1. The final measured value, for the given emission, in the table above incorporates the calibrated antenna factor and cable loss.
2. Measurements below 1 GHz were performed in a semi-anechoic chamber (RFI Asset Number K0001) at a distance of 3 metres. The EUT was placed at a height of 80 cm above the reference ground plane in the centre of the chamber turntable. Maximum emission levels were determined by height searching the measurement antenna over the range 1 metre to 4 metres.
3. No spurious emissions were detected above the noise floor of the measuring receiver therefore the highest peak noise floor reading of the measuring receiver was recorded as shown in the table above.

Transmitter Radiated Emissions (continued)



Note: This plot is a pre-scan and for indication purposes only. For final measurements, see accompanying table.

Transmitter Radiated Emissions (continued)

Test Summary:

Test Engineer:	Crawford Lindsay	**Test Date:**	04 August 2011
Test Sample Serial No:	2887879		

FCC Part:	15.247(d) & 15.209(a)
Test Method Used:	As detailed in ANSI C63.10 Sections 6.3 and 6.6 referencing ANSI C63.4
Frequency Range	1 GHz to 25 GHz

Environmental Conditions:

Temperature (°C):	29
Relative Humidity (%):	31

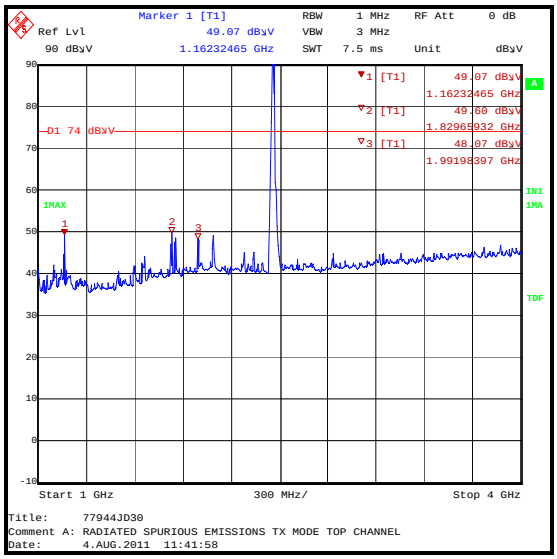
Results:

Frequency (GHz)	Antenna Polarity	Peak Level (dBµV/m)	Average Limit (dBµV/m)	Margin (dB)	Result
1829.659	V	47.3	54.0	6.7	Complied

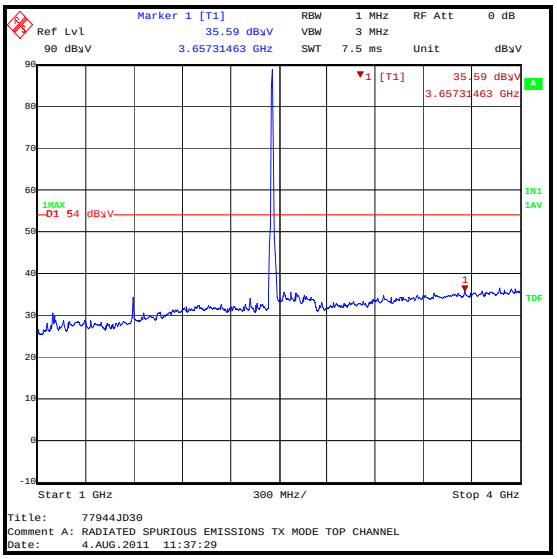
Note(s):

1. The final measured value, for the given emission, in the table above incorporates the calibrated antenna factor and cable loss
2. No spurious emissions were detected above the noise floor of the measuring receiver therefore the highest peak noise floor reading of the measuring receiver was recorded as shown in the table above. The peak level was compared to the average limit as opposed to being compared to the peak limit because this is the more onerous limit.
3. The emission shown at 2462 MHz on the 1 GHz to 4 GHz plot is the EUT fundamental.
4. Pre-scans above 1 GHz were performed in a fully anechoic chamber (RFI Asset Number K0002) at a distance of 3 metres. The EUT was placed at a height of 1.5 metres above the test chamber floor in the centre of the chamber turntable. All measurement antennas were placed at a fixed height of 1.5 metres above the test chamber floor, in line with the EUT. Final measurements above 1 GHz were performed in a semi-anechoic chamber (RFI Asset Number K0001) at a distance of 3 metres. The EUT was placed at a height of 80 cm above the reference ground plane in the centre of the chamber turntable. Maximum emission levels were determined by height searching the measurement antenna over the range 1 metre to 4 metres.

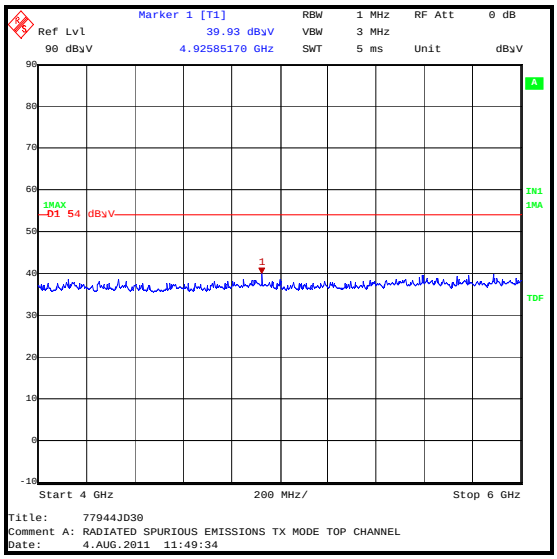
Transmitter Radiated Emissions (continued)

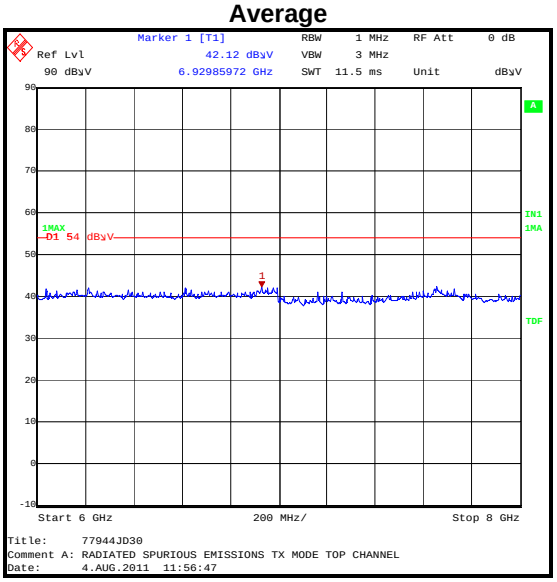


Peak

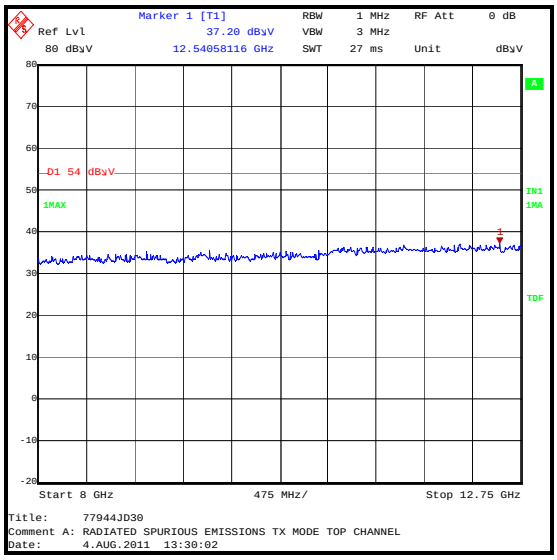


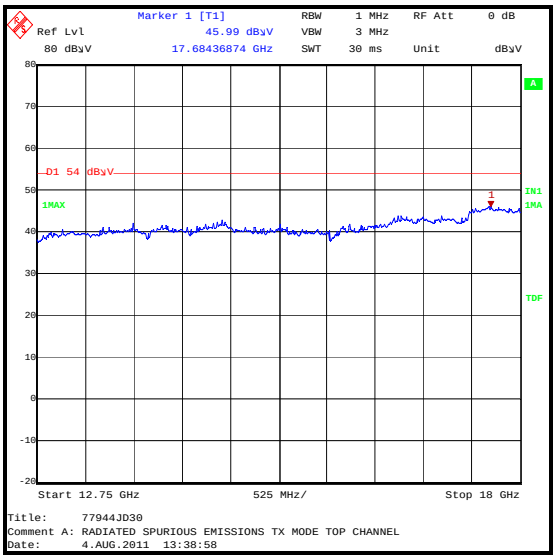
Average

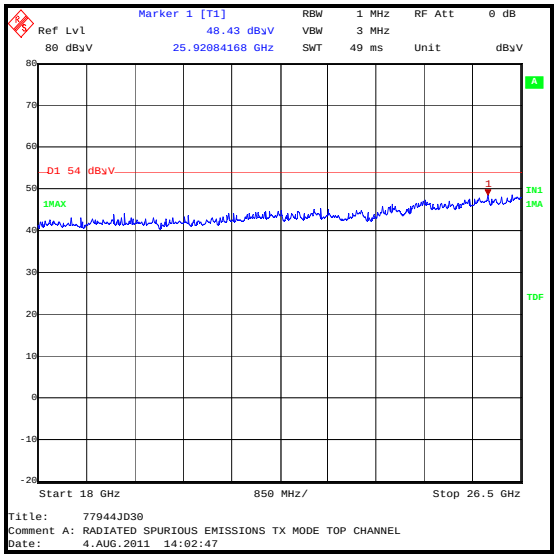




Transmitter Radiated Emissions (continued)







5.2.7. Transmitter Band Edge Radiated Emissions

Test Summary:

Test Engineer:	Nick Steele	**Test Date:**	04 August 2011
Test Sample Serial No:	2887879		

FCC Part:	15.247(d) & 15.209(a)
Test Method Used:	As detailed in ANSI C63.10 Section 6.9.2

Environmental Conditions:

Temperature (°C):	28
Relative Humidity (%):	29

Results: 802.11b 11Mbps Peak

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
2400	43.6	*70.0**	26.4	Complied
2483.5	51.5	74.0	22.5	Complied

Results: 802.11b 11Mbps Average

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
2483.5	38.4	54.0	15.6	Complied

Results: 802.11g 9Mbps Peak

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
2400	61.2	*69.6**	8.4	Complied
2483.5	56.2	74.0	17.8	Complied

Results: 802.11g 9Mbps Average

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
2483.5	38.4	54.0	15.6	Complied

Transmitter Band Edge Radiated Emissions (continued)

Results: 802.11g 18Mbps Peak

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
2400	54.8	*68.3**	13.5	Complied
2483.5	57.1	74.0	16.9	Complied

Results: 802.11g 18Mbps Average

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
2483.5	40.8	54.0	13.2	Complied

Results: 802.11g 48Mbps Peak

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
2400	55.8	*69.3**	13.5	Complied
2483.5	58.6	74.0	15.4	Complied

Results: 802.11g 48Mbps Average

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
2483.5	40.2	54.0	13.8	Complied

Results: 802.11g 54Mbps Peak

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
2400	58.0	*69.3**	11.3	Complied
2483.5	55.9	74.0	18.1	Complied

Results: 802.11g 54Mbps Average

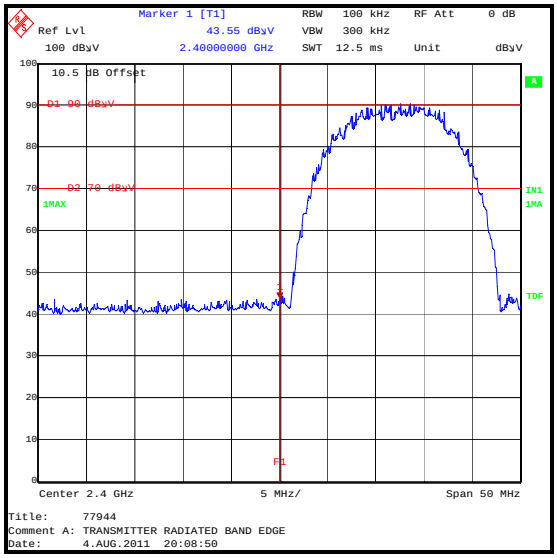
Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
2483.5	39.0	54.0	15.0	Complied

Note(s):

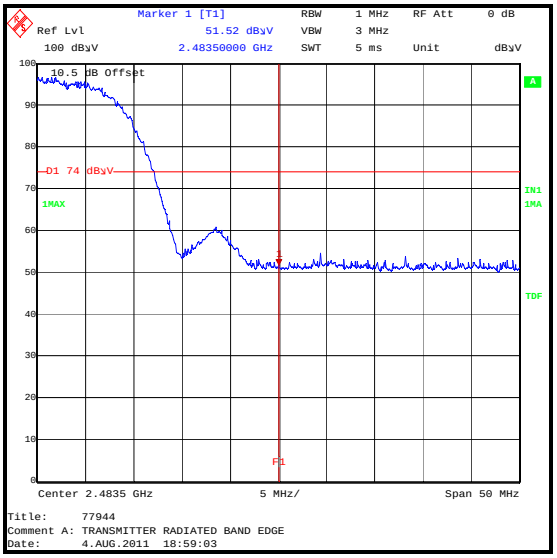
1. The final measured value, for the given emission, in the table above incorporates the calibrated antenna factor and cable loss.
2. * -20 dBc limit.

Transmitter Band Edge Radiated Emissions (continued)

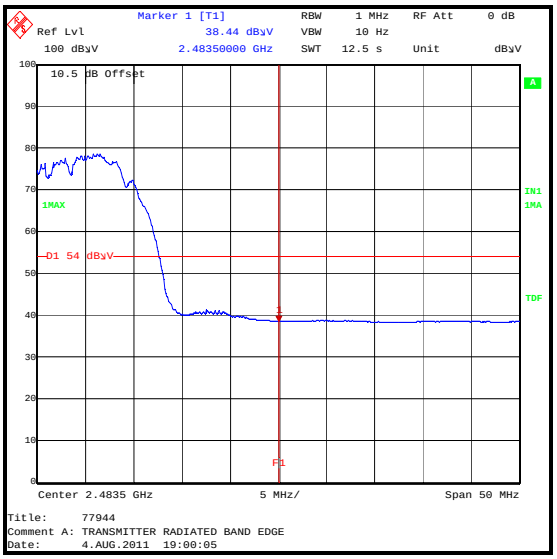
802.11b 11Mbps



Lower Band Edge Peak Measurement



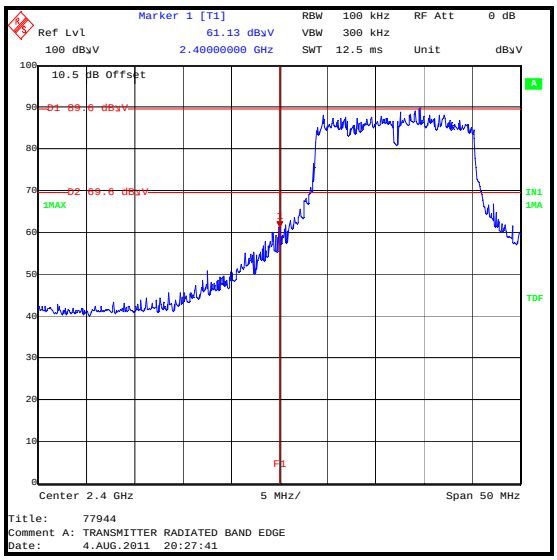
Upper Band Edge Peak Measurement



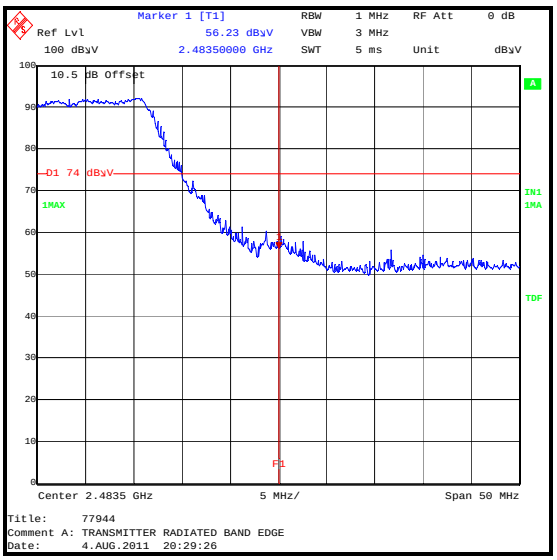
Upper Band Edge Average Measurement

Transmitter Band Edge Radiated Emissions (continued)

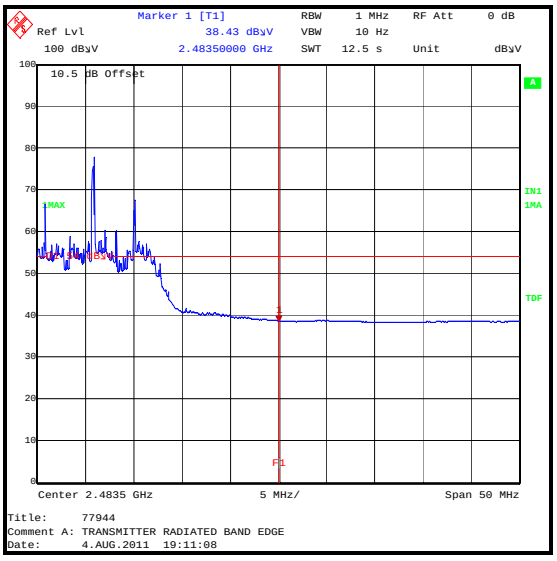
802.11b 9Mbps



Lower Band Edge Peak Measurement



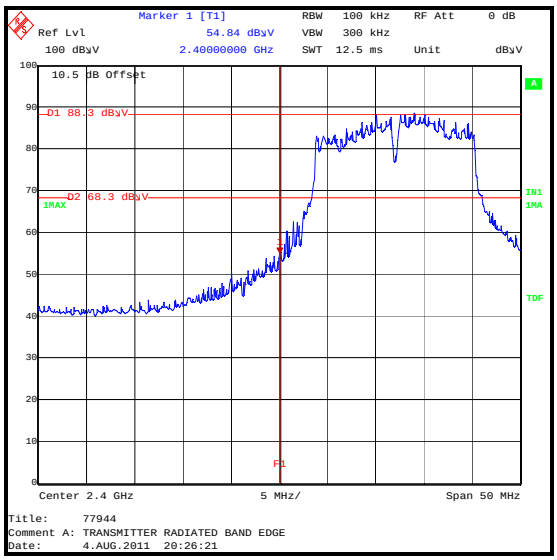
Upper Band Edge Peak Measurement



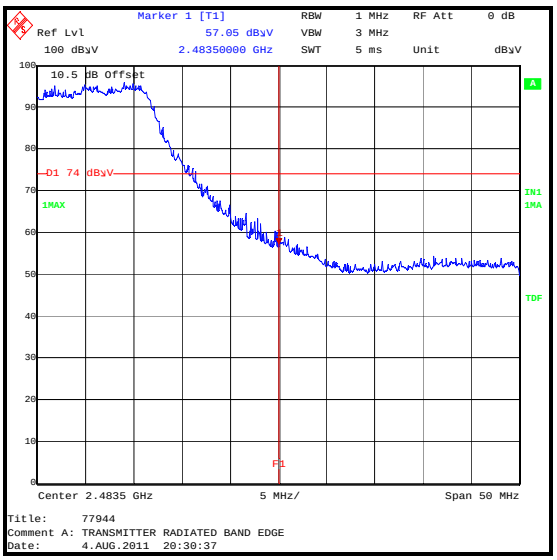
Upper Band Edge Average Measurement

Transmitter Band Edge Radiated Emissions (continued)

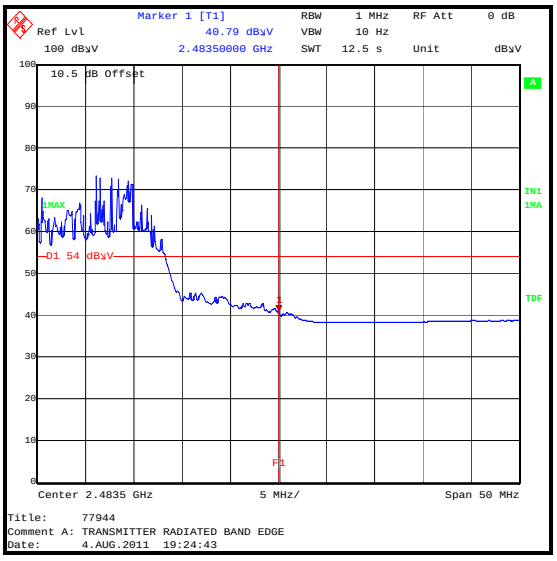
802.11b 18Mbps



Lower Band Edge Peak Measurement



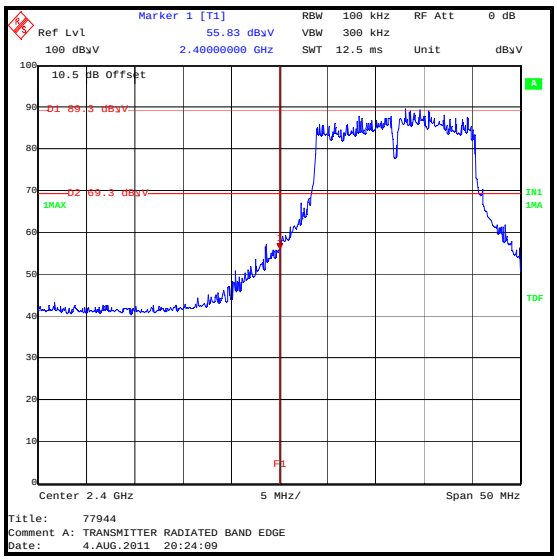
Upper Band Edge Peak Measurement



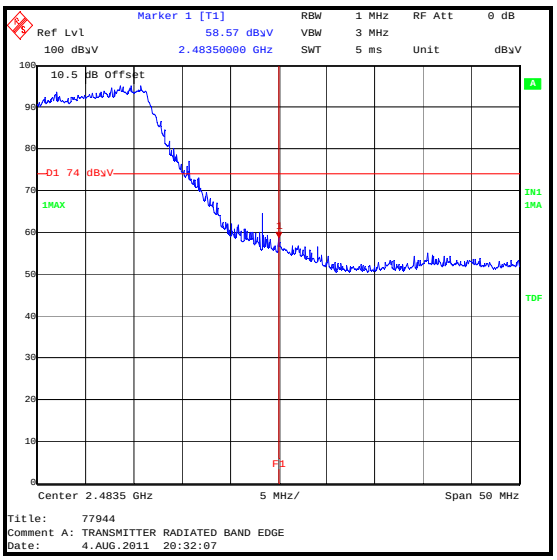
Upper Band Edge Average Measurement

Transmitter Band Edge Radiated Emissions (continued)

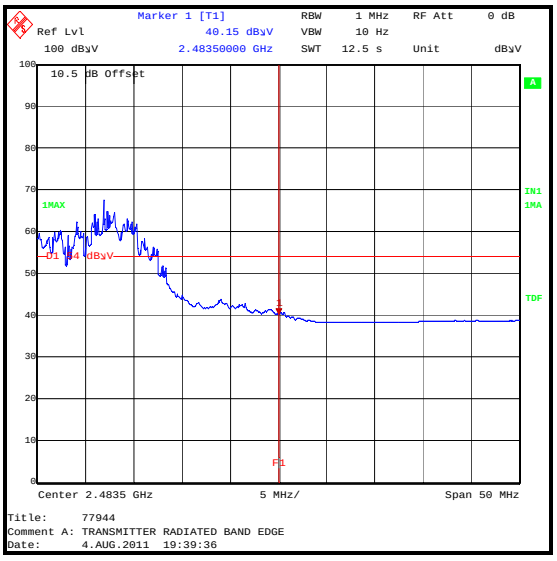
802.11b 48Mbps



Lower Band Edge Peak Measurement



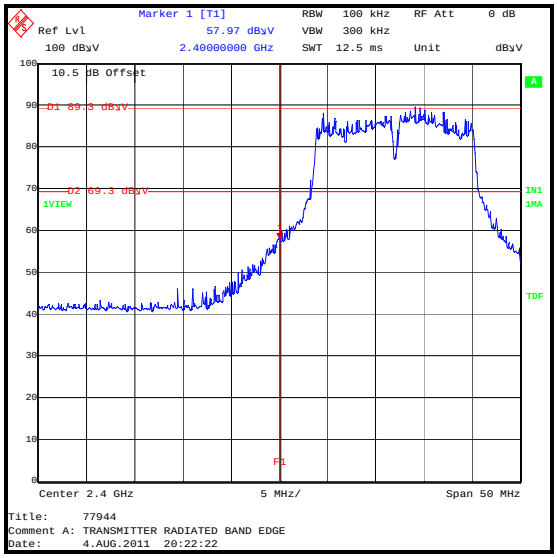
Upper Band Edge Peak Measurement



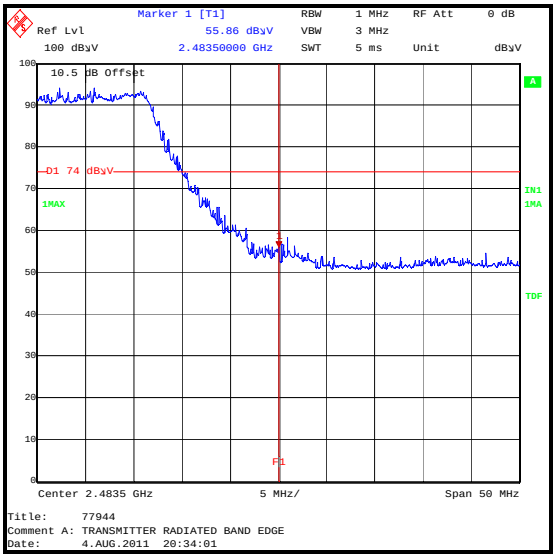
Upper Band Edge Average Measurement

Transmitter Band Edge Radiated Emissions (continued)

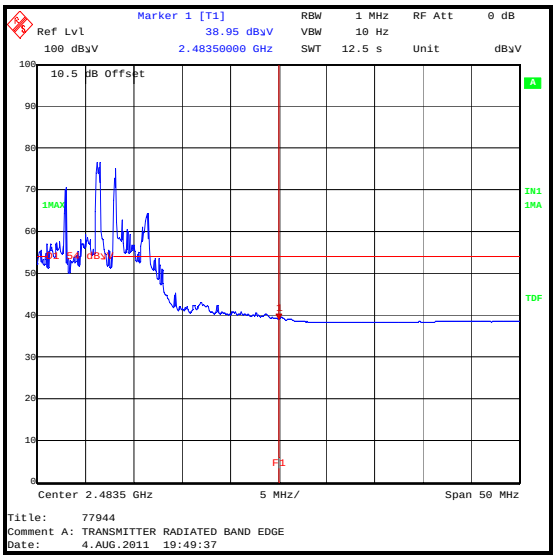
802.11g 54Mbps



Lower Band Edge Peak Measurement



Upper Band Edge Peak Measurement



Upper Band Edge Average Measurement

6. Measurement Uncertainty

No measurement or test can ever be perfect and the imperfections give rise to error of measurement in the results. Consequently the result of a measurement is only an approximation to the value of the measurand (the specific quantity subject to measurement) and is only complete when accompanied by a statement of the uncertainty of the approximation.

The expression of uncertainty of a measurement result allows realistic comparison of results with reference values and limits given in specifications and standards.

The uncertainty of the result may need to be taken into account when interpreting the measurement results.

The reported expanded uncertainties below are based on a standard uncertainty multiplied by an appropriate coverage factor such that a confidence level of approximately 95% is maintained. For the purposes of this document “approximately” is interpreted as meaning “effectively” or “for most practical purposes”.

Measurement Type	Range	Confidence Level (%)	Calculated Uncertainty
Conducted Maximum Peak Output Power	2.4 GHz to 2.4835 GHz	95%	±0.27 dB
Spectral Power Density	2.4 GHz to 2.4835 GHz	95%	±2.94 dB
6 dB Bandwidth	2.4 GHz to 2.4835 GHz	95%	±0.92 ppm
20 dB Bandwidth	2.4 GHz to 2.4835 GHz	95%	±0.92 ppm
Radiated Spurious Emissions	30 MHz to 26.5 GHz	95%	±2.94 dB

The methods used to calculate the above uncertainties are in line with those recommended within the various measurement specifications. Where measurement specifications do not include guidelines for the evaluation of measurement uncertainty the published guidance of the appropriate accreditation body is followed.

Appendix 1. Test Equipment Used

RFI No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval Months
A1368	Directional Coupler	Pasternack Enterprises.	PE2214-10	None	Calibrated before use	-
A1396	Attenuator	Huber + Suhner	757987	6810.17.B	08 Jul 2012	12
A1534	Pre Amplifier	Hewlett Packard	8449B	3008A00405	20 Jun 2012	12
A1818	Antenna	EMCO	3115	00075692	05 Sep 2011	12
A1834	Attenuator	Hewlett Packard	8491B	10444	26 Jul 2012	12
A253	Antenna	Flann Microwave	12240-20	128	05 Sep 2011	12
A254	Antenna	Flann Microwave	14240-20	139	05 Sep 2011	12
A255	Antenna	Flann Microwave	16240-20	519	05 Sep 2011	12
A256	Antenna	Flann Microwave	18240-20	400	05 Sep 2011	12
A436	Antenna	Flann Microwave	20240-20	330	05 Sep 2011	12
A553	Antenna	Chase	CBL6111A	1593	26 Mar 2012	12
K0001	5m Semi-Anechoic Chamber	Rainford EMC	N/A	N/A	29 May 2012	12
K0002	3m RSE Chamber	Rainford EMC	N/A	N/A	05 Sep 2011	12
M1124	Test Receiver	Rohde & Schwarz	ESI26	100046K	29 Jun 2012	12
M1242	Spectrum Analyser	Rohde & Schwarz	FSEM30	845986/022	03 Dec 2011	12
M1273	Test Receiver	Rohde & Schwarz	ESIB 26	100275	04 Feb 2012	12
S011	DC Power Supply	Instek	PR-3010H	9401270	Calibrated before use	-

NB In accordance with UKAS requirements all the measurement equipment is on a calibration schedule.