ENGINEERING TEST REPORT

160627 Wi/Fi g
Model No.: 160627
FCC ID: T89-160627

Applicant:

Epson Canada Limited
185 Renfrew Drive
Markham, Ontario
Canada L3R 6G3

In Accordance With

Federal Communications Commission (FCC)
Part 15, Subpart C, Section 15.247
Digital Modulation Systems (DTS) Operating in 2400 – 2483.5 MHz Band

UltraTech's File No.: EPS-115F15C247

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

Date: June 1, 2011

Report Prepared by: Dan Huynh Issued Date: June 1, 2011	Tested by: Mr. Hung Trinh Test Dates: April 12-26, 2011

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

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FCC	VCCI	Industry Canada Industrie Canada Approved Test Facility	NVLAP	BSMI	Korea KCC-RRL
91038	1309	46390-2049	NvLap Lab Code 200093-0	SL2-IN-E-1119R	CA2049

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EXHIBIT 1. INTRODUCTION

1.1. SCOPE

Reference:	FCC Part 15, Subpart C, Section 15.247
Title:	Code of Federal Regulations (CFR), Title 47 – Telecommunication, Part 15
Purpose of Test:	Equipment Certification for Digital Modulation Systems (DTS) Transmitter Operating in the Frequency Band 2400-2483.5 MHz.
Test Procedures:	▪ ANSI C63.4-2003 ▪ FCC, KDB Publication No. 558074
Environmental Classification:	[x] Commercial, industrial or business environment [ ] Residential environment

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

None.

1.3. NORMATIVE REFERENCES

Publication	Year	Title
47 CFR Parts 0-19	2010	Code of Federal Regulations (CFR), Title 47 – Telecommunication
ANSI C63.4	2003 2009	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
ANSI C63.10	2009	American National Standard for Testing Unlicensed Wireless Devices
CISPR 22 & EN 55022	2008-09, Edition 6.0 2006	Information Technology Equipment - Radio Disturbance Characteristics - Limits and Methods of Measurement
CISPR 16-1-1 +A1 +A2	2006 2006 2007	Specification for radio disturbance and immunity measuring apparatus and methods. Part 1-1: Measuring Apparatus
CISPR 16-1-2 +A1 +A2	2003 2004 2006	Specification for radio disturbance and immunity measuring apparatus and methods. Part 1-2: Conducted disturbances
FCC, KDB Publication No. 558074	2005	Guidance on Measurements for Digital Transmission Systems (47 CFR 15.247)

EXHIBIT 2. PERFORMANCE ASSESSMENT

2.1. CLIENT INFORMATION

APPLICANT	
Name:	Epson Canada Limited
Address:	185 Renfrew Drive Markham, Ontario Canada L3R 6G3
Contact Person:	Mr. Dan Lehotsky Phone #: 905-944-3936 Fax #: 905-944-3772 Email Address: Dan_lehotsky@ea.epson.com

MANUFACTURER	
Name:	Epson Canada Limited
Address:	185 Renfrew Drive Markham, Ontario Canada L3R 6G3
Contact Person:	Mr. William Gugg Phone #: 905-944-3932 Fax #: 905-944-3772 Email Address: William_gugg@ea.epson.com

2.2. EQUIPMENT UNDER TEST (EUT) INFORMATION

The following information (with the exception of the Date of Receipt) has been supplied by the applicant.

Brand Name:	Epson Canada Limited
Product Name:	160627 Wi/Fi g
Model Name or Number:	160627
Serial Number:	Test Sample
Type of Equipment:	Digital Transmission System (DTS)
Input Power Supply Type:	3.3V DC derived from the Printer
Primary User Functions of EUT:	Wi/Fi b/g Interface Module

2.3. EUT'S TECHNICAL SPECIFICATIONS

TRANSMITTER	
Equipment Type:	• Mobile • Base Station (fixed use)
Intended Operating Environment:	Commercial, industrial or business
Power Supply Requirement:	3.3 VDC
RF Output Power Rating:	802.11b: 7.99 dBm (6.30 mW) Peak Conducted 802.11g: 13.42 dBm (21.98 mW) Peak Conducted
Operating Frequency Range:	2412 - 2462 MHz
RF Output Impedance:	50 Ω
Channel Spacing:	5 MHz for 802.11b 20 MHz for 802.11g
Duty Cycle:	100%
Modulation Type:	DSSS, OFDM
Oscillator Frequencies:	40 MHz
Antenna Connector Types:	Intergral
Antenna Description:	Manufacturer: Taiyo Yuden Type: Circuit Board Mounted (Chip Antenna) Model No.: AH104F245001-T Freq. Range: 2.412 – 2.462 GHz Gain: 2dBi

2.4. LIST OF EUT'S PORTS

Port Number	EUT's Port Description	Number of Identical Ports	Connector Type	Cable Type (Shielded/Non-shielded)
None.				

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:

Ancillary Equipment # 1	
Description:	Printer
Brand name:	Epson
Model Name or Number:	M244A
Serial Number:	MXAF000189
Connected to EUT's Port:	I/O port of interface board

Ancillary Equipment # 2	
Description:	AC/DC Power Adapter
Brand name:	Epson
Model Name or Number:	M159A
Serial Number:	CYYZ46626F
Connected to EUT's Port:	DC jack of Epson printer

Ancillary Equipment # 3	
Description:	Laptop
Brand name:	Dell
Model Name or Number:	PPL
Serial Number:	0009321C
Connected to EUT's Port:	Serial port of interface board

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 to 23 °C
Humidity:	45 to 58%
Pressure:	102 kPa
Power Input Source:	3.3 Vdc

3.2. OPERATIONAL TEST CONDITIONS & ARRANGEMENT FOR TESTS

Operating Modes:	Each of lowest, middle and highest channel frequencies transmits continuously for emissions measurements.
Special Test Software:	Special software and hardware provided by the Applicant to operate the EUT at each channel frequency continuously. For example, the transmitter will be operated at each of the lowest, middle and highest frequencies individually continuously during testing.
Special Hardware Used:	The RF Module could be tested outside of the enclosure using Epson interface board Test Jig connected to EUT.
Transmitter Test Antenna:	The EUT is tested with the antenna fitted in a manner typical of normal intended use as integral antenna equipment as described with the test results.

Transmitter Test Signals	
Frequency Band(s):	2412 - 2462 MHz
Frequency(ies) Tested: (Near lowest, near middle & near highest frequencies in the frequency range of operation.)	2412, 2437 and 2462 MHz
RF Power Output: (measured maximum output power at antenna terminals)	802.11b: 7.99 dBm (6.30 mW) Peak 802.11g: 13.42 dBm (21.98 mW) Peak
Normal Test Modulation:	DSSS/OFDM
Modulating Signal Source:	Internal

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 Power Line Conducted Emissions were performed in UltraTech's shielded room, 24'(L) by 16'(W) by 8'(H).

- Radiated Emissions were performed at the Ultratech's 3-10 TDK Semi-Anechoic Chamber situated in the Town of Oakville, province of Ontario. This test site 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 3-10 TDK Semi-Anechoic Chamber has been filed with FCC office (FCC File No.: 91038) and Industry Canada office (Industry Canada File No.: 2049A-3). Expiry Date: 2014-04-04.

4.2. APPLICABILITY & SUMMARY OF EMC EMISSION TEST RESULTS

FCC Section(s)	Test Requirements	Compliance (Yes/No)
15.203	Antenna requirements	Yes*
15.207(a)	AC Power Line Conducted Emissions	Yes
15.247(a)(2)	6 dB Bandwidth	Yes
15.247(b)(3)	Peak Conducted Output Power - DTS	Yes
15.247(d)	Band-Edge and RF Conducted Spurious Emissions at the Transmitter Antenna Terminal	Yes
15.247(d), 15.209 & 15.205	Transmitter Spurious Radiated Emissions	Yes
15.247(e)	Power Spectral Density	Yes
15.247(i) 1.1307, 1.1310 & 2.1091	RF Exposure	Yes

* The EUT complies with the requirement; it employs a permanently mounted integral antenna.

4.3. MODIFICATIONS INCORPORATED IN THE EUT FOR COMPLIANCE PURPOSES

None.

EXHIBIT 5. MEASUREMENTS, EXAMINATIONS & TEST DATA FOR EMC EMISSIONS

5.1. TEST PROCEDURES

This section contains test results only. Details of test methods and procedures can be found in ANSI C63.4-2003 and FCC KDB Publication No. 558074: Guidance on Measurements for Digital Transmission Systems.

5.2. MEASUREMENT UNCERTAINTIES

The measurement uncertainties stated were calculated in accordance with the requirements of CISPR 16-4-2 @ IEC:2003 and JCGM 100:2008 (GUM 1995) – Guide to the Expression of Uncertainty in Measurement.
Refer to Exhibit 7 for Measurement Uncertainties.

5.3. MEASUREMENT EQUIPMENT USED

The measurement equipment used complied with the requirements of the Standards referenced in the Methods & Procedures ANSI C63.4 and CISPR 16-1-1.

5.4. ESSENTIAL/PRIMARY FUNCTIONS AS DECLARED BY THE MANUACTURER

The 160627 is an 802.11b/g radio module that can be used for adding Wi/Fi functionality to Epson products.

5.5. AC POWER LINE CONDUCTED EMISSIONS [§15.207(a)]

5.5.1. Limit(s)

The equipment shall meet the limits of the following table:

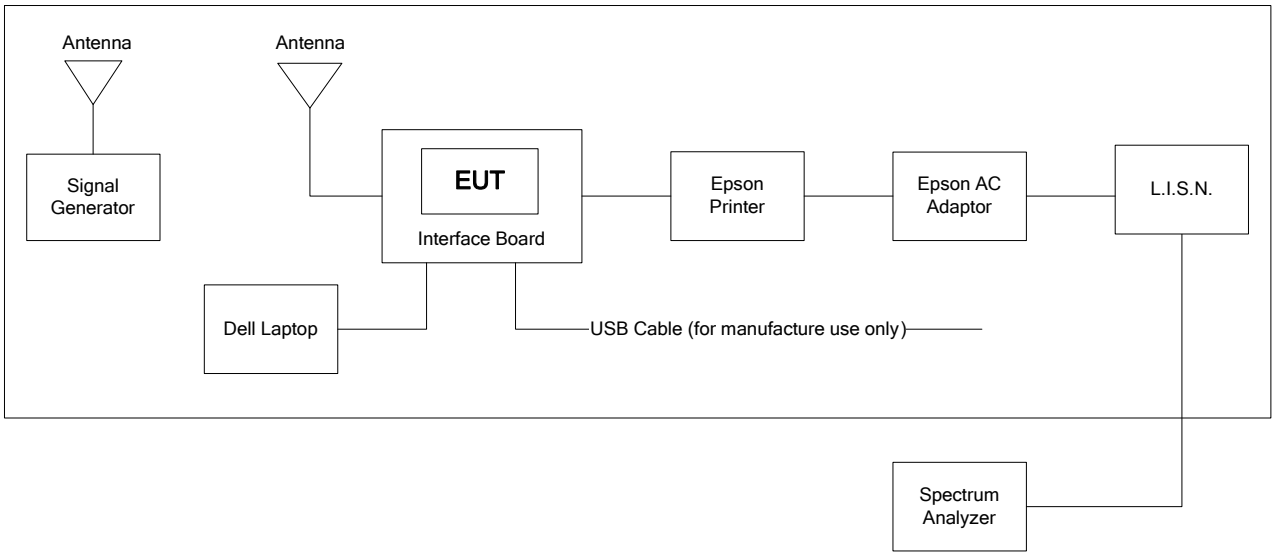
Frequency of emission (MHz)	Conducted Limits (dBμV)	
	Quasi-peak	Average
0.15–0.5	66 to 56*	56 to 46*
0.5–5	56	46
5-30	60	50

*Decreases linearly with the logarithm of the frequency

5.5.2. Method of Measurements

ANSI C63.4-2003

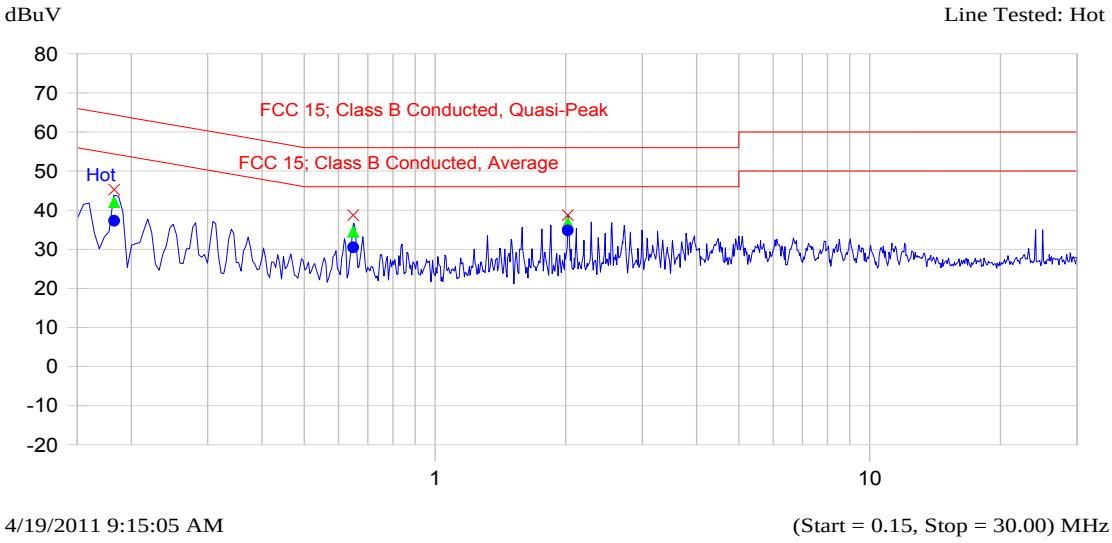
5.5.3. Test Arrangement



5.5.4. Test Data

Plot 5.5.4.1. Power Line Conducted Emissions (Tx Mode)
Line Voltage: 120 VAC 60 Hz
Line Tested: Hot

Current Graph

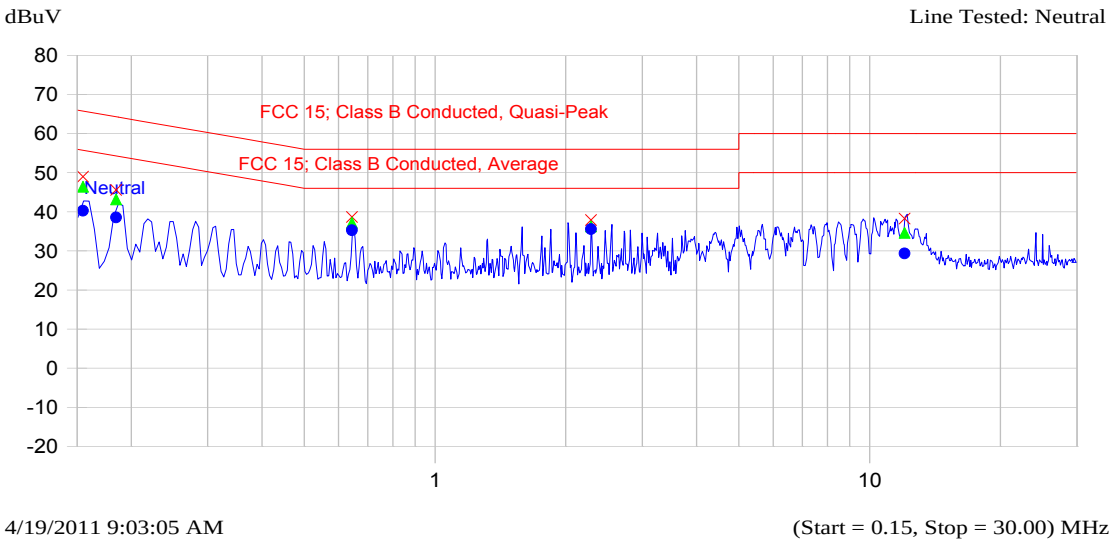


Current List

Frequency MHz	Peak dBuV	QP dBuV	Delta QP-QP Limit dB	Avg dBuV	Delta Avg-Avg Limit dB	Trace Name
0.183	45.2	42.1	-23.0	37.3	-17.8	Hot
0.648	38.7	34.5	-21.5	30.5	-15.5	Hot
2.021	38.7	36.7	-19.3	34.8	-11.2	Hot

Plot 5.5.4.2. Power Line Conducted Emissions (Tx Mode)
Line Voltage: 120 VAC 60 Hz
Line Tested: Neutral

Current Graph

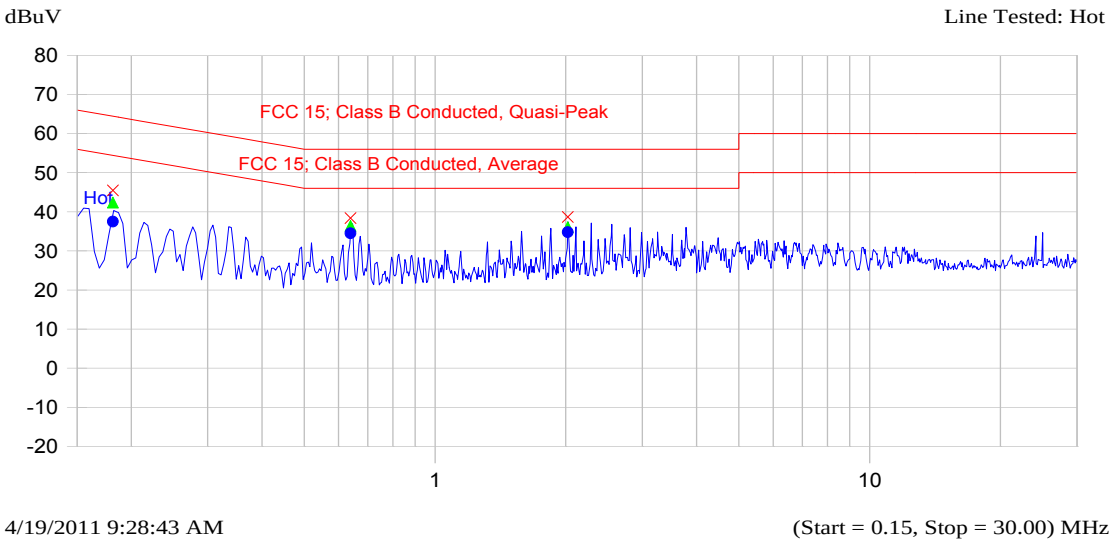


Current List

Frequency MHz	Peak dBuV	QP dBuV	Delta QP-QP Limit dB	Avg dBuV	Delta Avg-Avg Limit dB	Trace Name
0.155	49.0	46.4	-19.5	40.2	-15.6	Neutral
0.185	45.6	43.2	-21.8	38.5	-16.5	Neutral
0.644	38.6	37.2	-18.8	35.2	-10.8	Neutral
2.283	37.9	36.2	-19.8	35.5	-10.5	Neutral
12.035	38.2	34.6	-25.4	29.3	-20.7	Neutral

Plot 5.5.4.3. Power Line Conducted Emissions (Rx Mode)
Line Voltage: 120 VAC 60 Hz
Line Tested: Hot

Current Graph

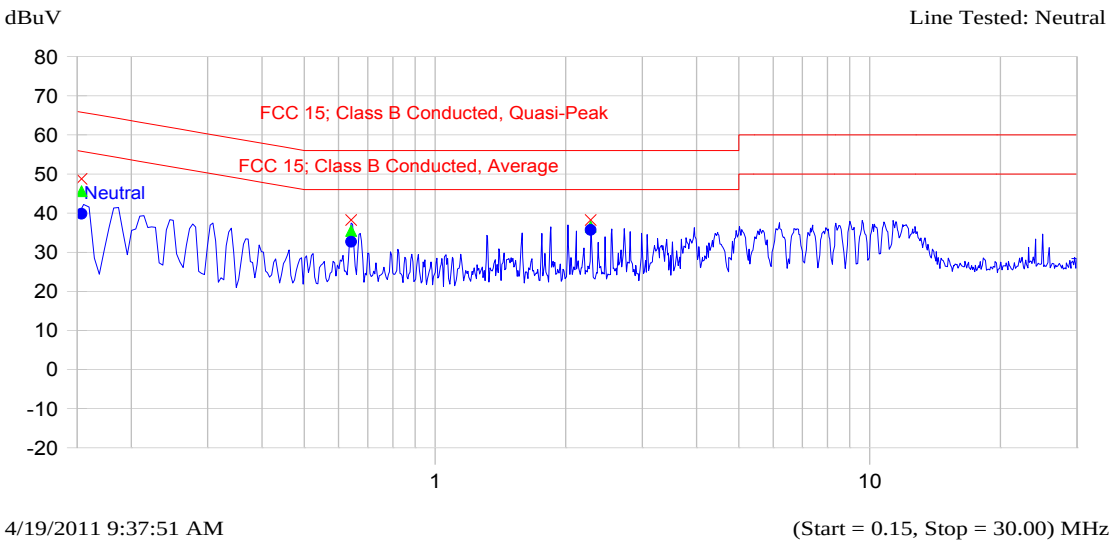


Current List

Frequency MHz	Peak dBuV	QP dBuV	Delta QP-QP Limit dB	Avg dBuV	Delta Avg-Avg Limit dB	Trace Name
0.182	45.5	42.3	-22.7	37.5	-17.6	Hot
0.639	38.4	36.4	-19.6	34.5	-11.5	Hot
2.021	38.6	36.0	-20.0	34.8	-11.2	Hot

Plot 5.5.4.4. Power Line Conducted Emissions (Rx Mode)
Line Voltage: 120 VAC 60 Hz
Line Tested: Neutral

Current Graph



Current List

Frequency MHz	Peak dBuV	QP dBuV	Delta QP-QP Limit dB	Avg dBuV	Delta Avg-Avg Limit dB	Trace Name
0.154	48.7	45.6	-20.3	39.8	-16.1	Neutral
0.642	38.2	35.5	-20.5	32.6	-13.4	Neutral
2.282	38.3	36.5	-19.5	35.7	-10.3	Neutral

5.6. OCCUPIED BANDWIDTH [§ 15.247(a)(2)]

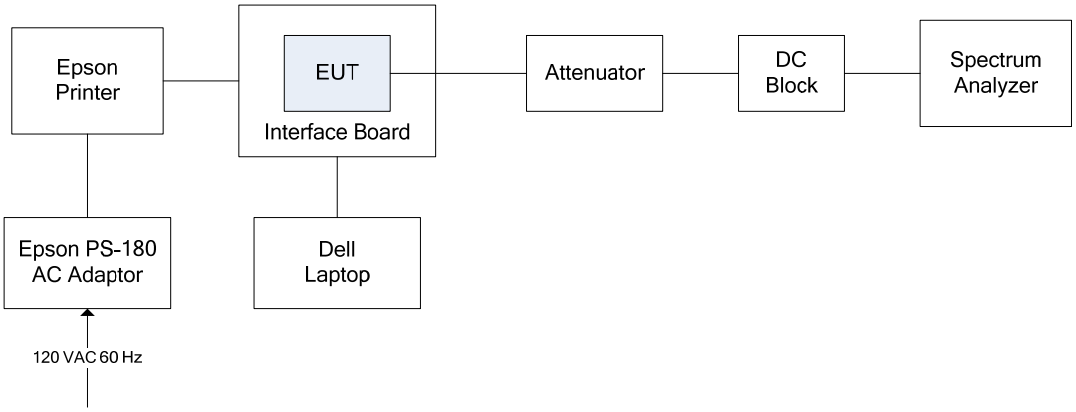
5.6.1. Limit(s)

For a Digital Modulation System, the minimum 6 dB bandwidth shall be at least 500 KHz.

5.6.2. Method of Measurements

KDB Publication No. 558074: Guidance on Measurements for Digital Transmission Systems (47 CFR 15.247) and ANSI C63.4-2003.

5.6.3. Test Arrangement



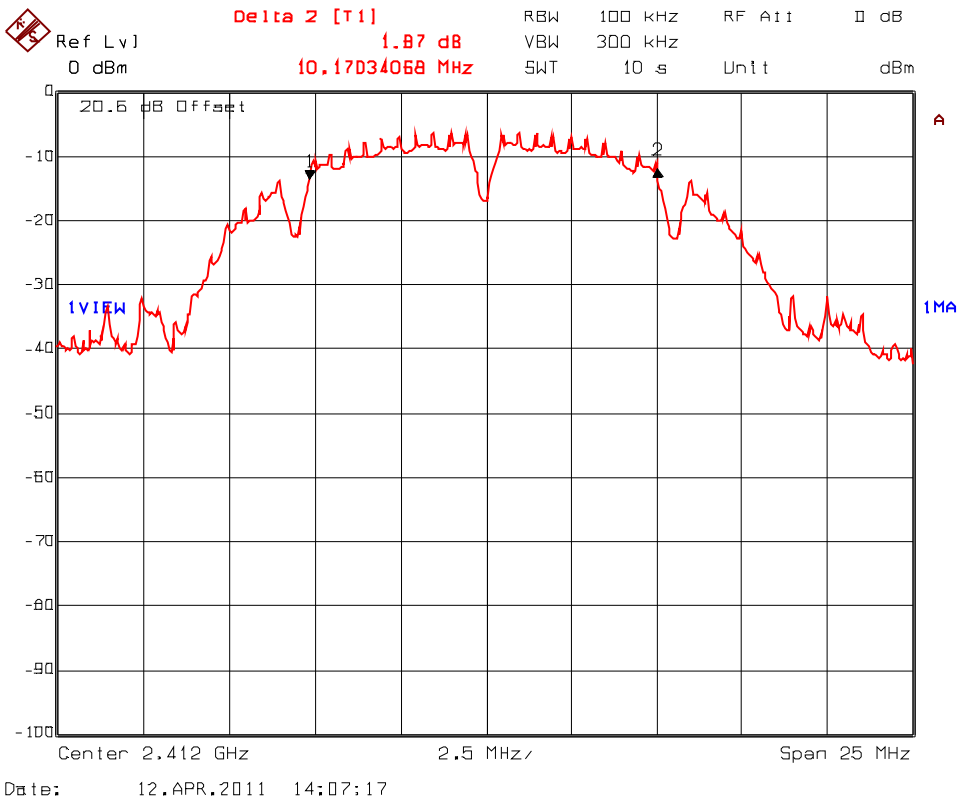
5.6.4. Test Data

802.11b Mode				
Frequency (MHz)	**Modulation**	**Data Rate (Mbps)**	**6 dB Bandwidth (MHz)**	**99% Occupied Bandwidth (MHz)**
2412	DBPSK	1	10.17	14.19
	DQPSK	2	10.17	14.25
	CCK	11	10.32	14.19
2437	DBPSK	1	10.22	14.19
	DQPSK	2	10.17	14.25
	CCK	11	10.37	14.13
2462	DBPSK	1	10.17	14.19
	DQPSK	2	10.17	14.19
	CCK	11	10.32	14.13

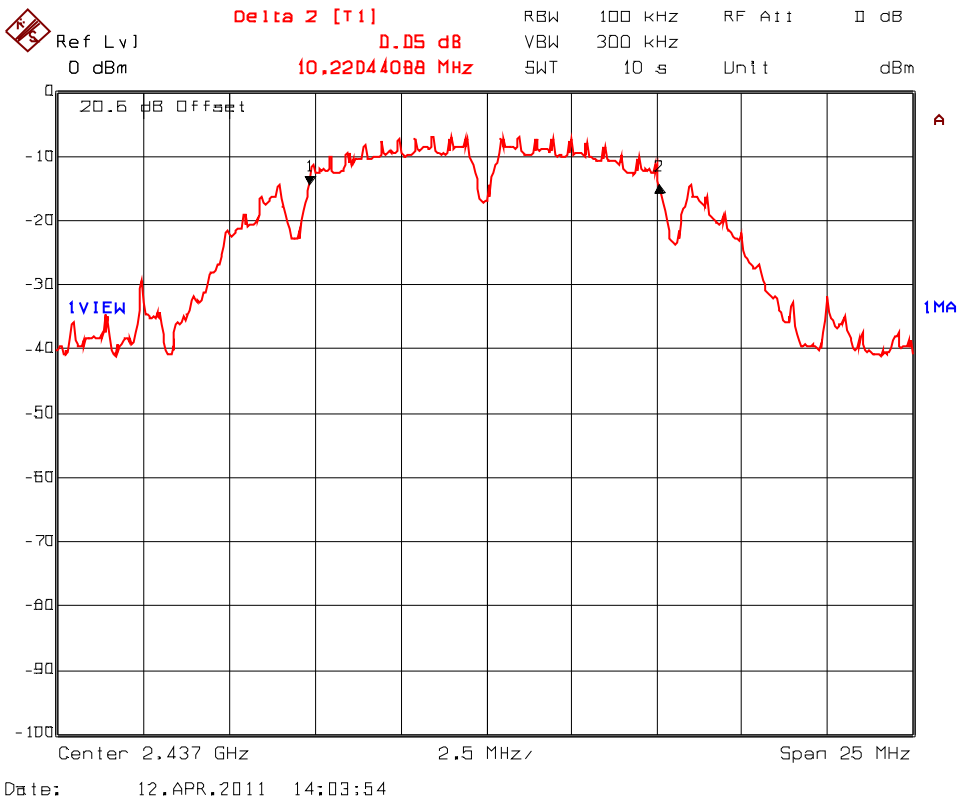
802.11g Mode				
Frequency (MHz)	**Modulation**	**Data Rate (Mbps)**	**6 dB Bandwidth (MHz)**	**99% Occupied Bandwidth (MHz)**
2412	BPSK	9	16.51	17.56
	QPSK	18	16.51	17.07
	16-QAM	36	16.59	17.00
	64-QAM	54	16.59	17.00
2437	BPSK	9	16.51	17.64
	QPSK	18	16.59	17.07
	16-QAM	36	16.59	17.07
	64-QAM	54	16.59	17.00
2462	BPSK	9	16.51	17.56
	QPSK	18	16.59	17.00
	16-QAM	36	16.59	17.00
	64-QAM	54	16.59	17.07

See the following plots for detailed measurements.

Plot 5.6.4.1. 6 dB Bandwidth, 802.11b, DBPSK 1 Mbps
Test Frequency: 2412 MHz

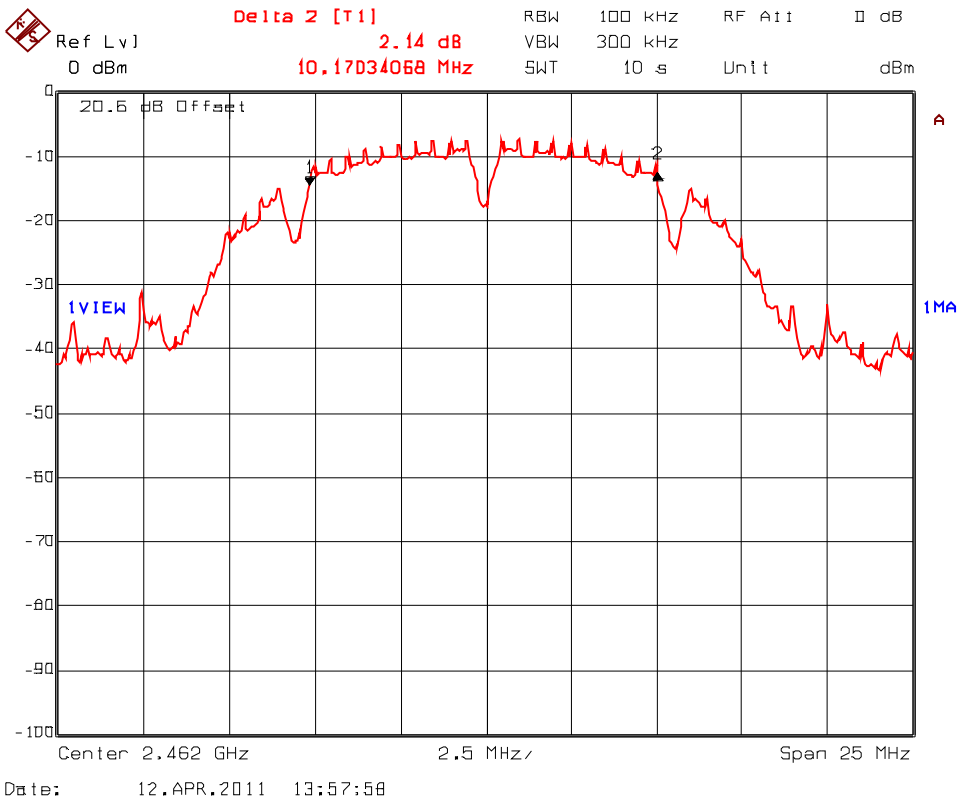


Plot 5.6.4.2. 6 dB Bandwidth, 802.11b, DBPSK 1 Mbps
Test Frequency: 2437 MHz

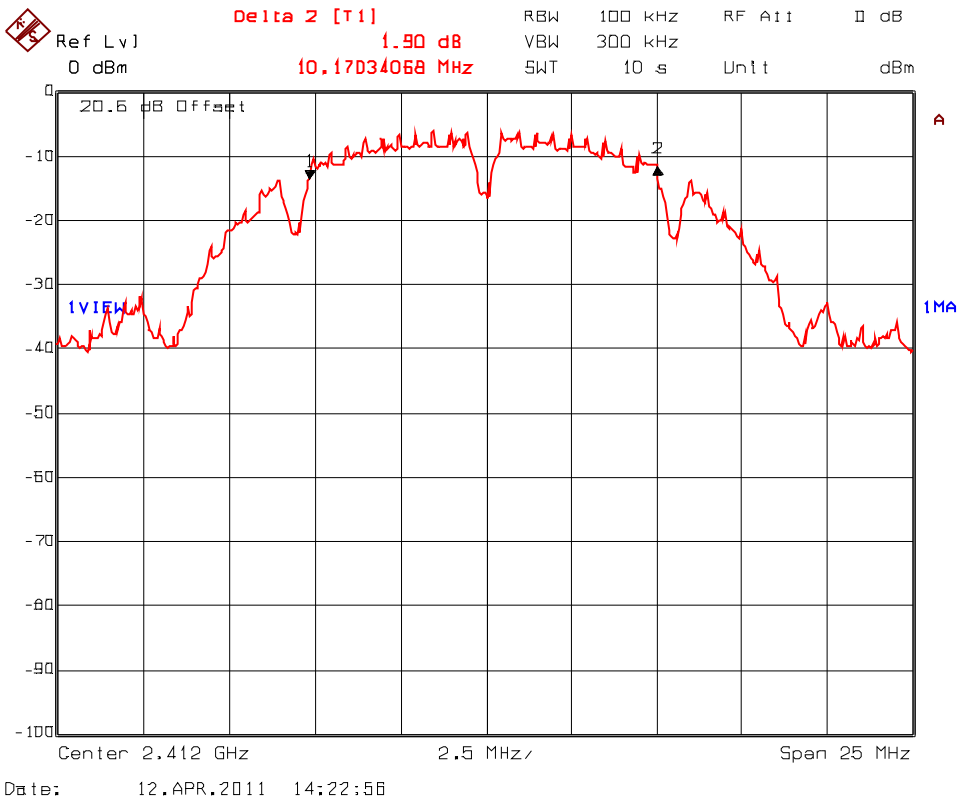


All test results contained in this engineering test report are traceable to National Institute of Standards and Technology (NIST)

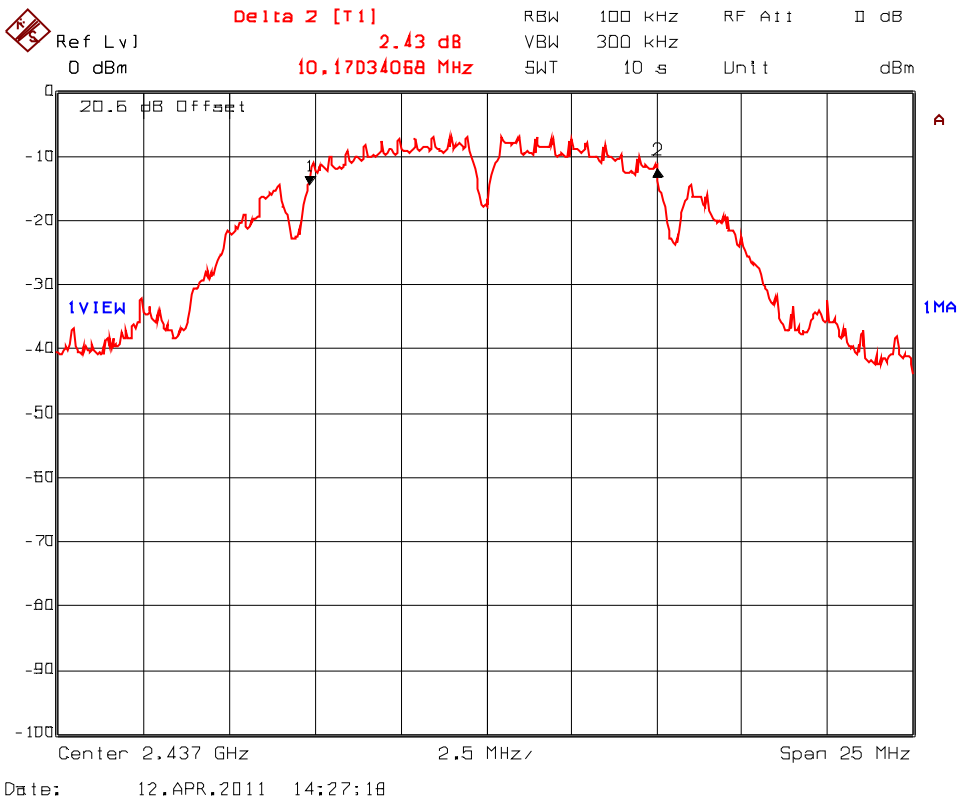
Plot 5.6.4.3. 6 dB Bandwidth, 802.11b, DBPSK 1 Mbps
Test Frequency: 2462 MHz



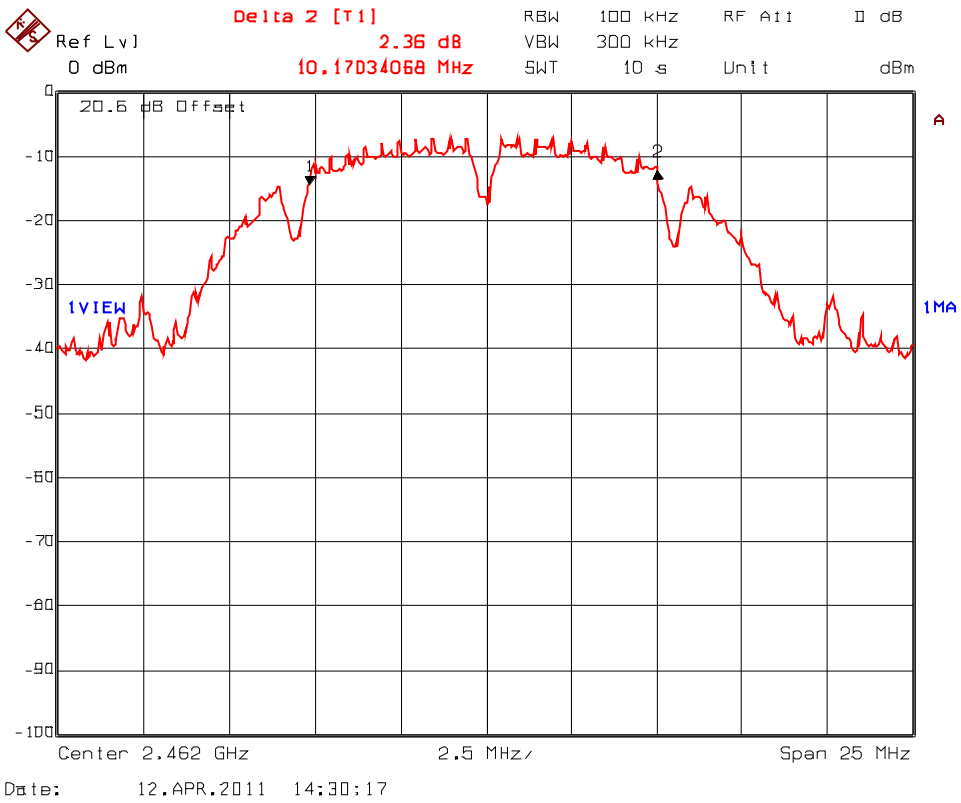
Plot 5.6.4.4. 6 dB Bandwidth, 802.11b, DQPSK 2 Mbps
Test Frequency: 2412 MHz



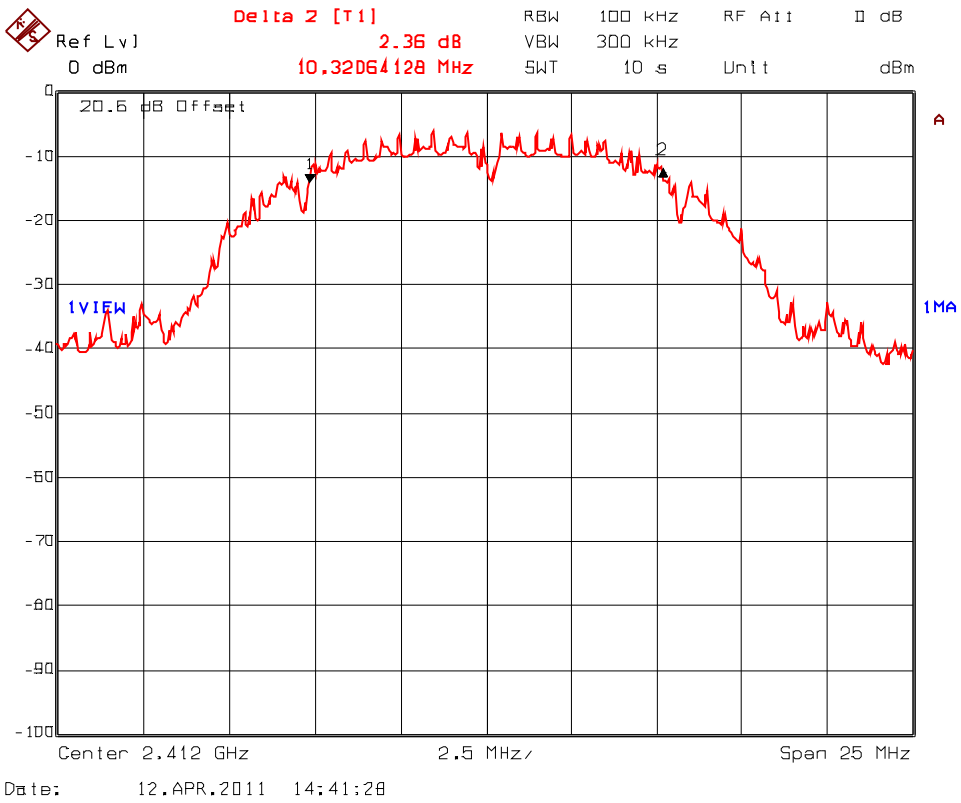
Plot 5.6.4.5. 6 dB Bandwidth, 802.11b, DQPSK 2 Mbps
Test Frequency: 2437 MHz



Plot 5.6.4.6. 6 dB Bandwidth, 802.11b, DQPSK 2 Mbps
Test Frequency: 2462 MHz

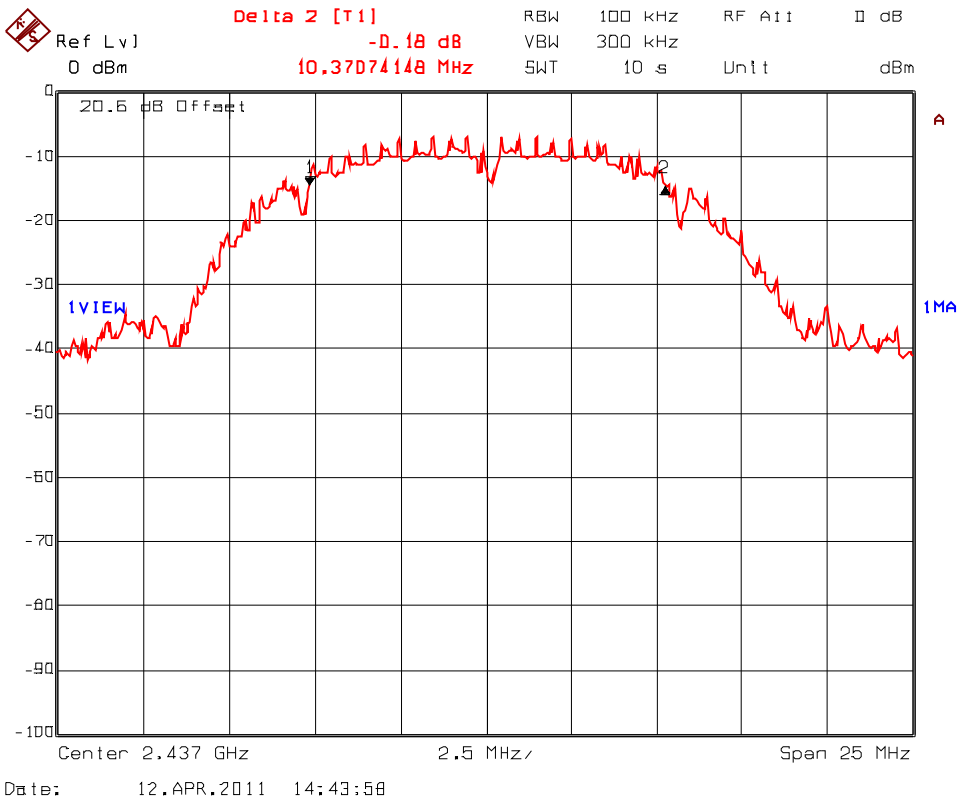


Plot 5.6.4.7. 6 dB Bandwidth, 802.11b, CCK 11 Mbps
Test Frequency: 2412 MHz

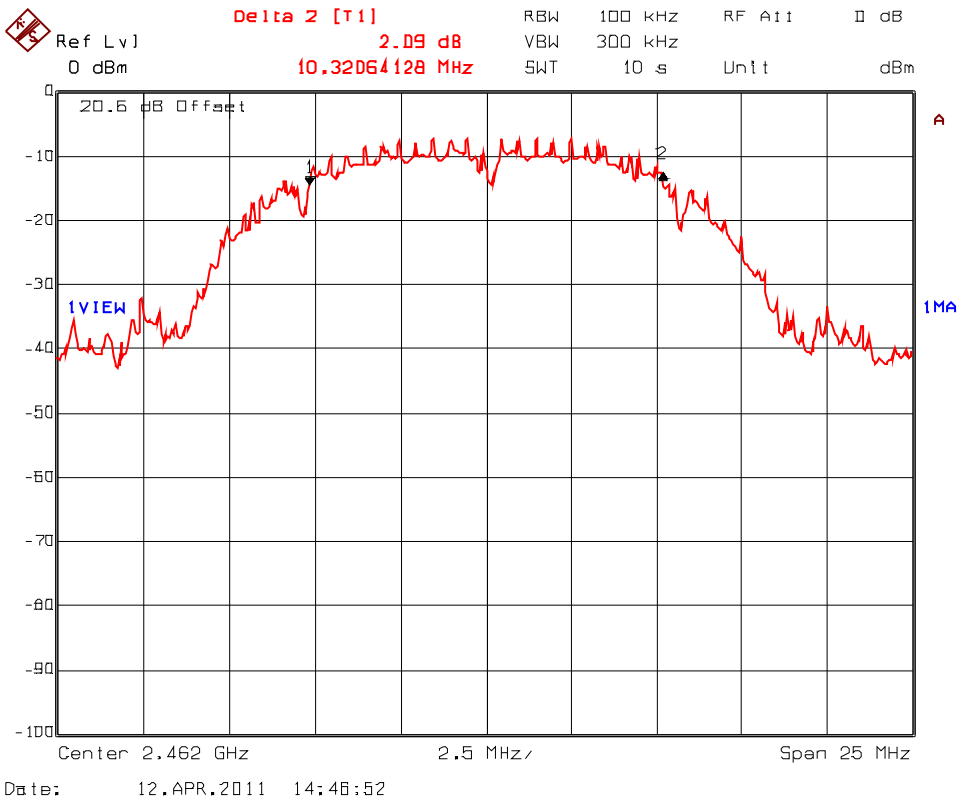


All test results contained in this engineering test report are traceable to National Institute of Standards and Technology (NIST)

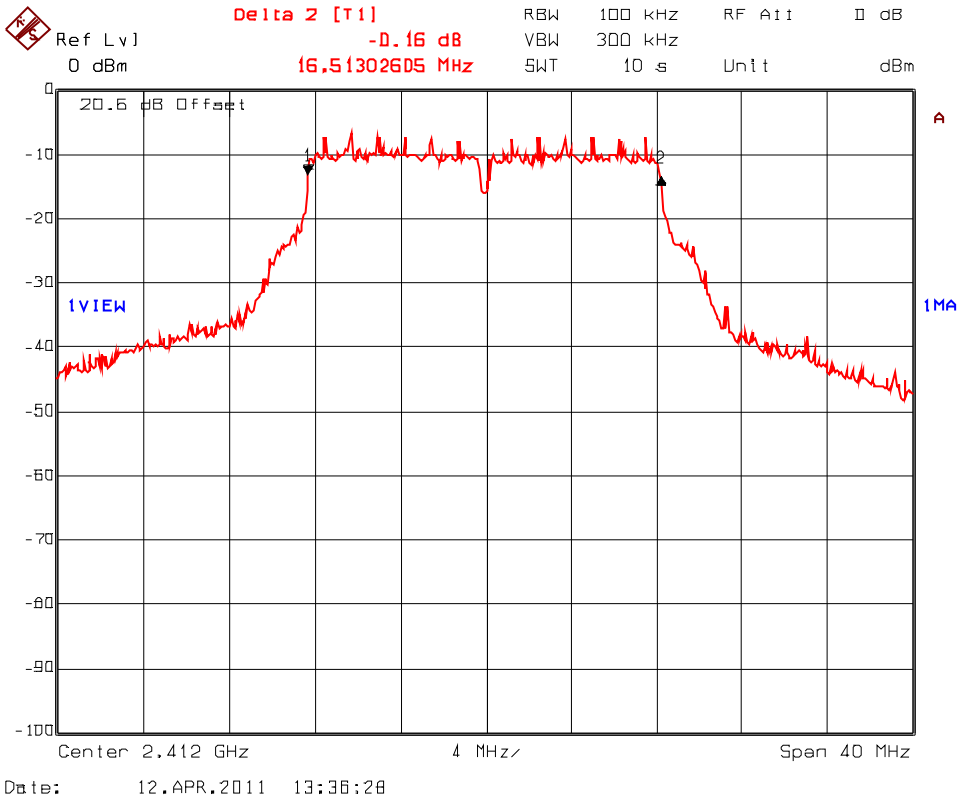
Plot 5.6.4.8. 6 dB Bandwidth, 802.11b, CCK 11 Mbps
Test Frequency: 2437 MHz



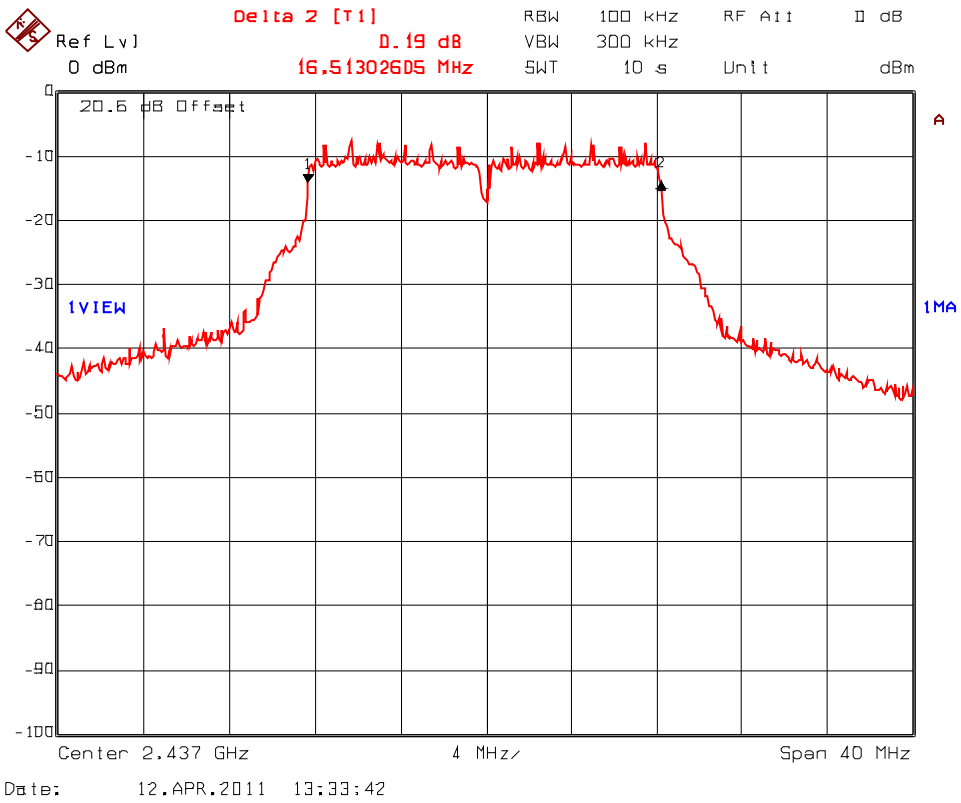
Plot 5.6.4.9. 6 dB Bandwidth, 802.11b, CCK 11 Mbps
Test Frequency: 2462 MHz



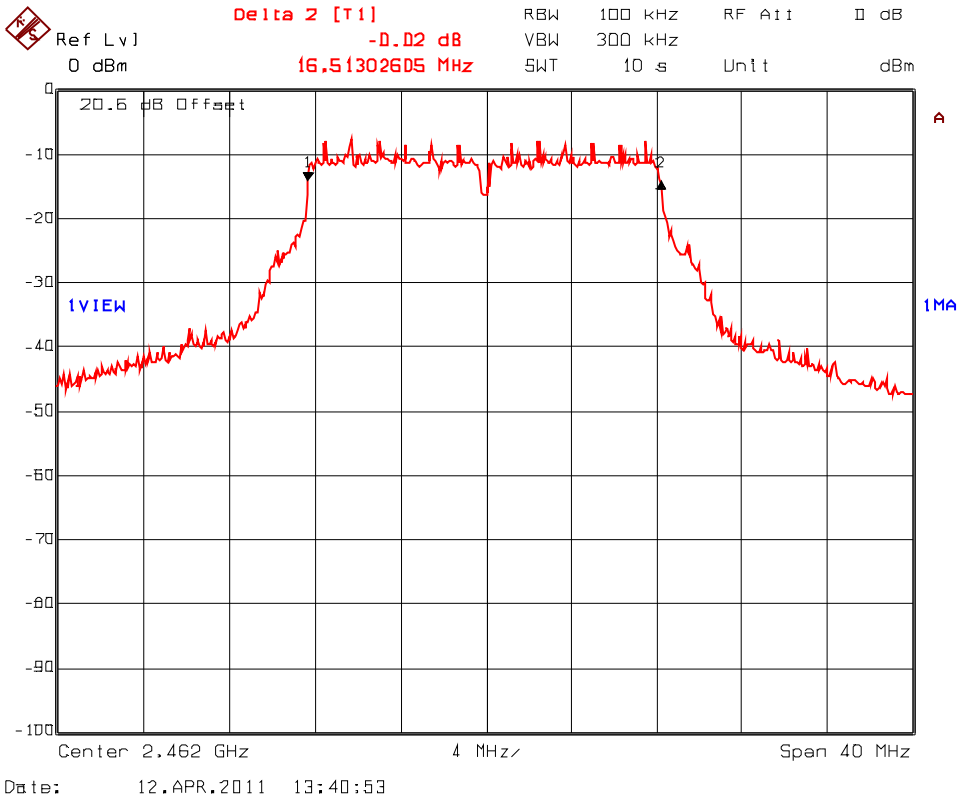
Plot 5.6.4.10. 6 dB Bandwidth, 802.11g, BPSK 9 Mbps
Test Frequency: 2412 MHz



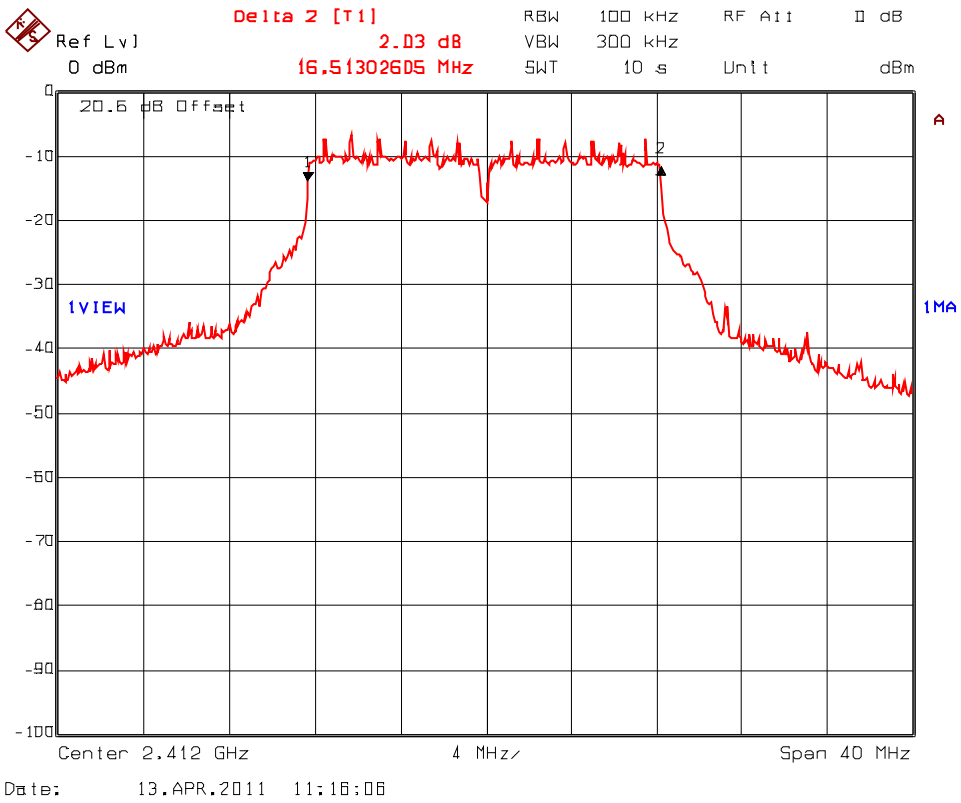
Plot 5.6.4.11. 6 dB Bandwidth, 802.11g, BPSK 9 Mbps
Test Frequency: 2437 MHz



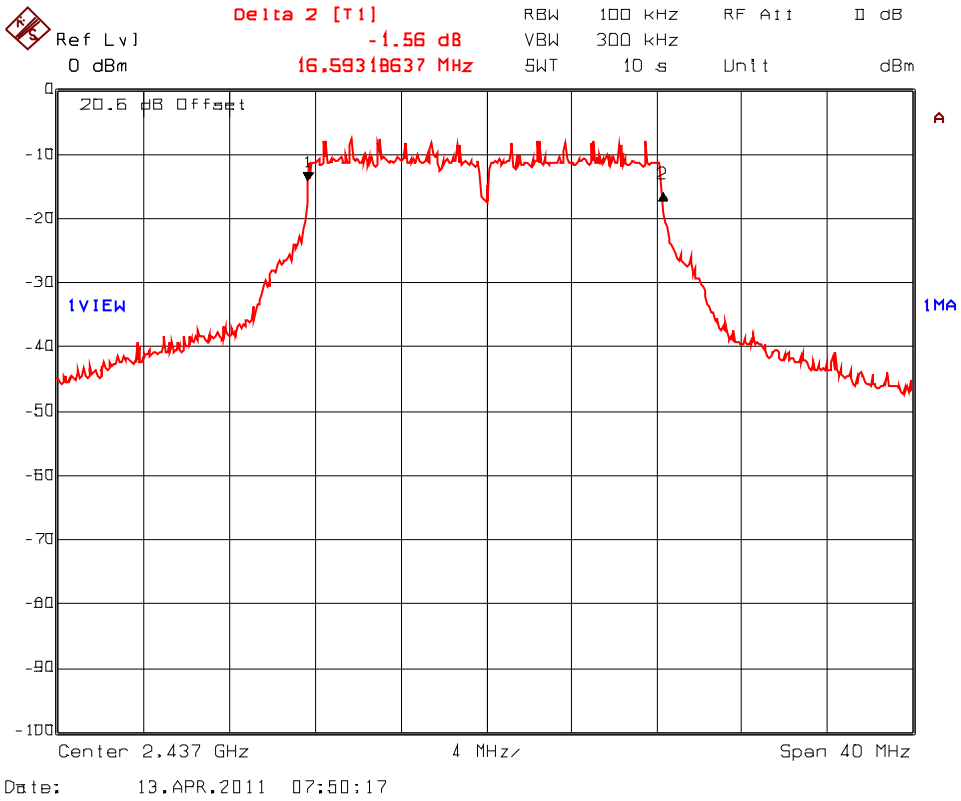
Plot 5.6.4.12. 6 dB Bandwidth, 802.11g, BPSK 9 Mbps
Test Frequency: 2462 MHz



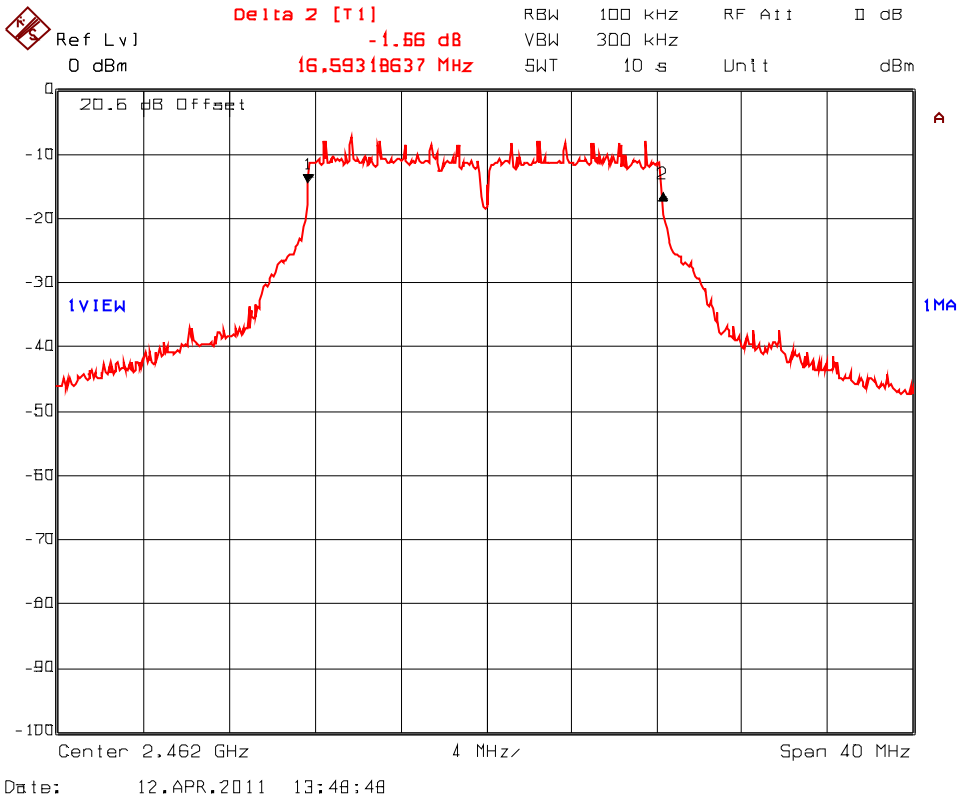
Plot 5.6.4.13. 6 dB Bandwidth, 802.11g, QPSK 18 Mbps
Test Frequency: 2412 MHz



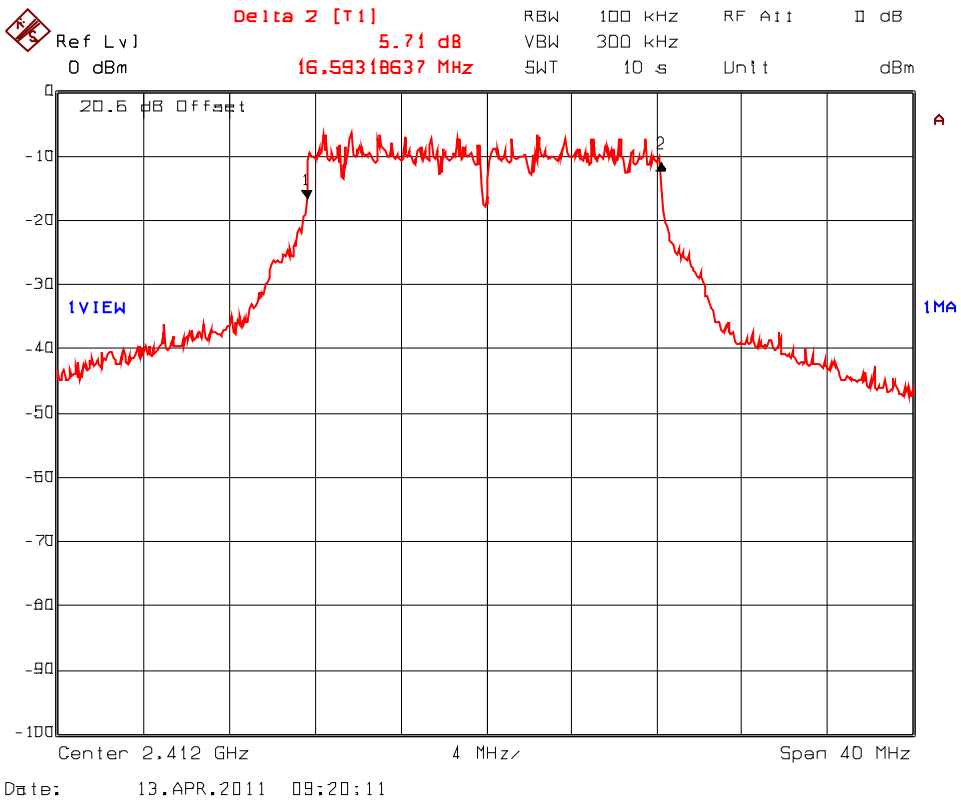
Plot 5.6.4.14. 6 dB Bandwidth, 802.11g, QPSK 18 Mbps
Test Frequency: 2437 MHz



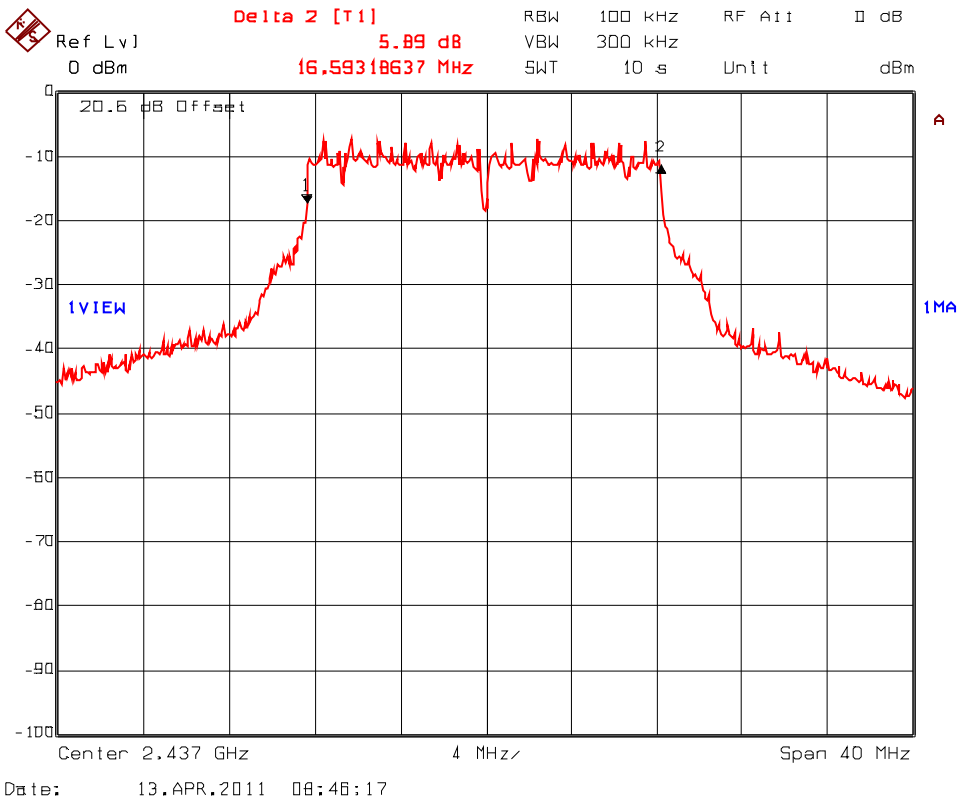
Plot 5.6.4.15. 6 dB Bandwidth, 802.11g, QPSK 18 Mbps
Test Frequency: 2462 MHz



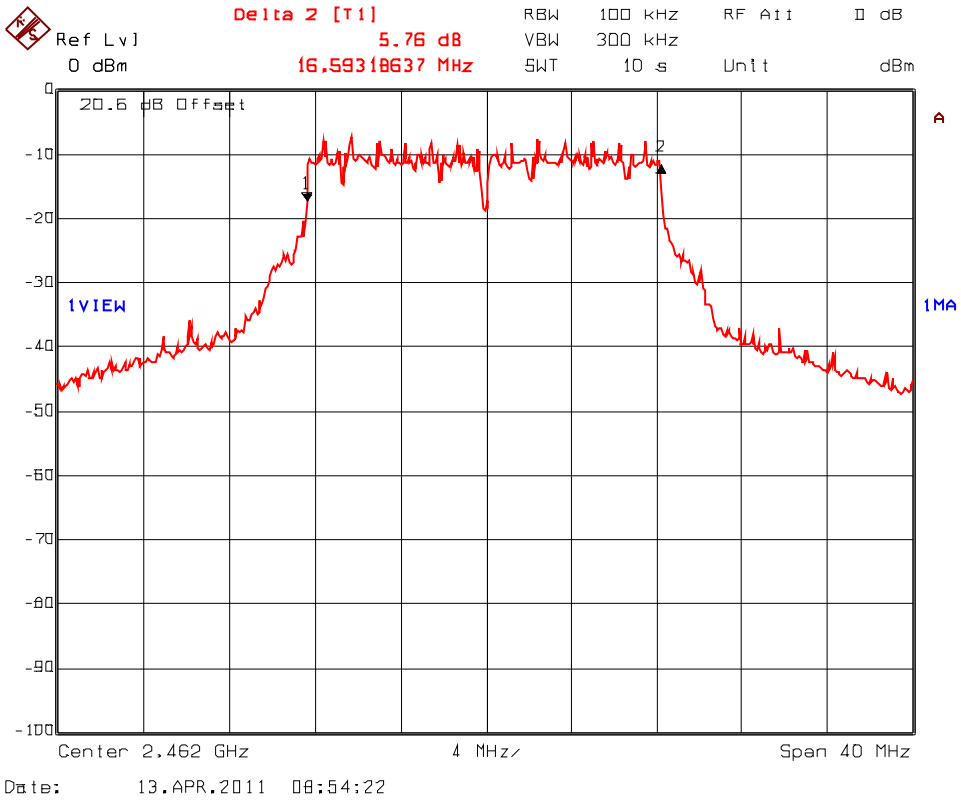
Plot 5.6.4.16. 6 dB Bandwidth, 802.11g, 16-QAM 36 Mbps
Test Frequency: 2412 MHz



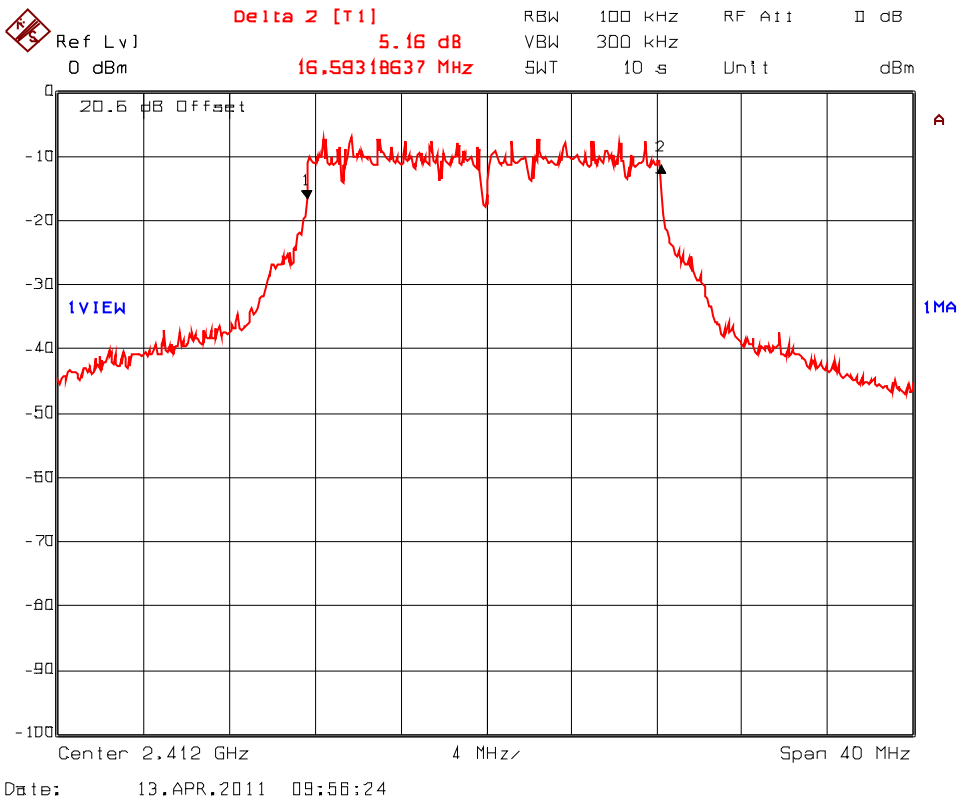
Plot 5.6.4.17. 6 dB Bandwidth, 802.11g, 16-QAM 36 Mbps
Test Frequency: 2437 MHz



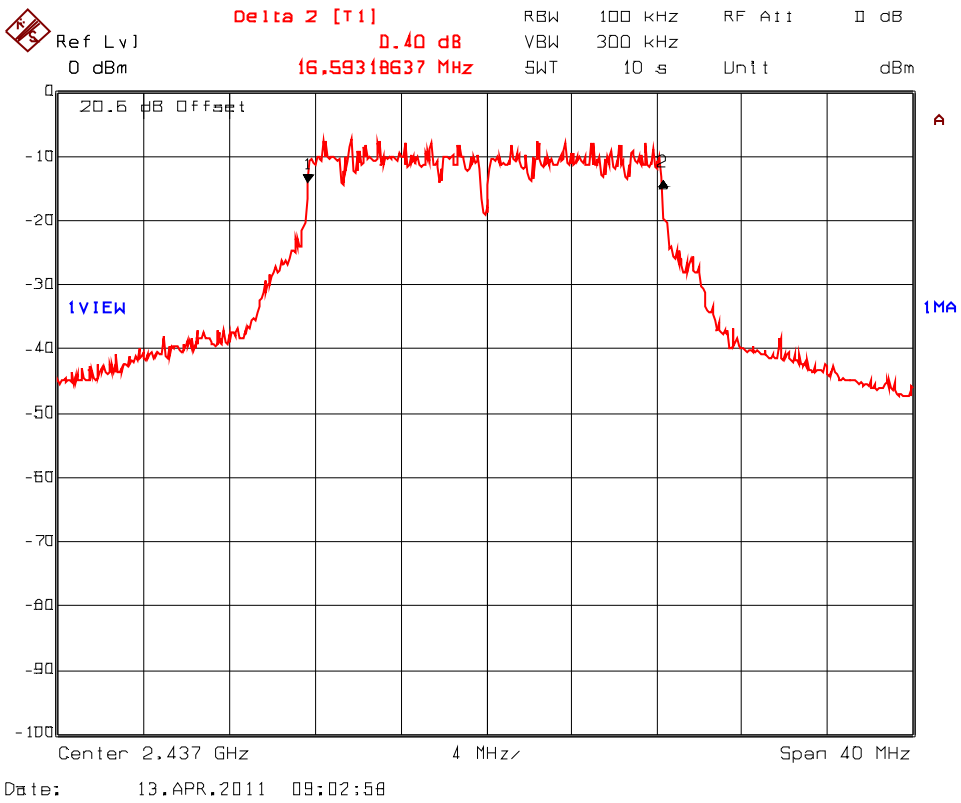
Plot 5.6.4.18. 6 dB Bandwidth, 802.11g, 16-QAM 36 Mbps
Test Frequency: 2462 MHz



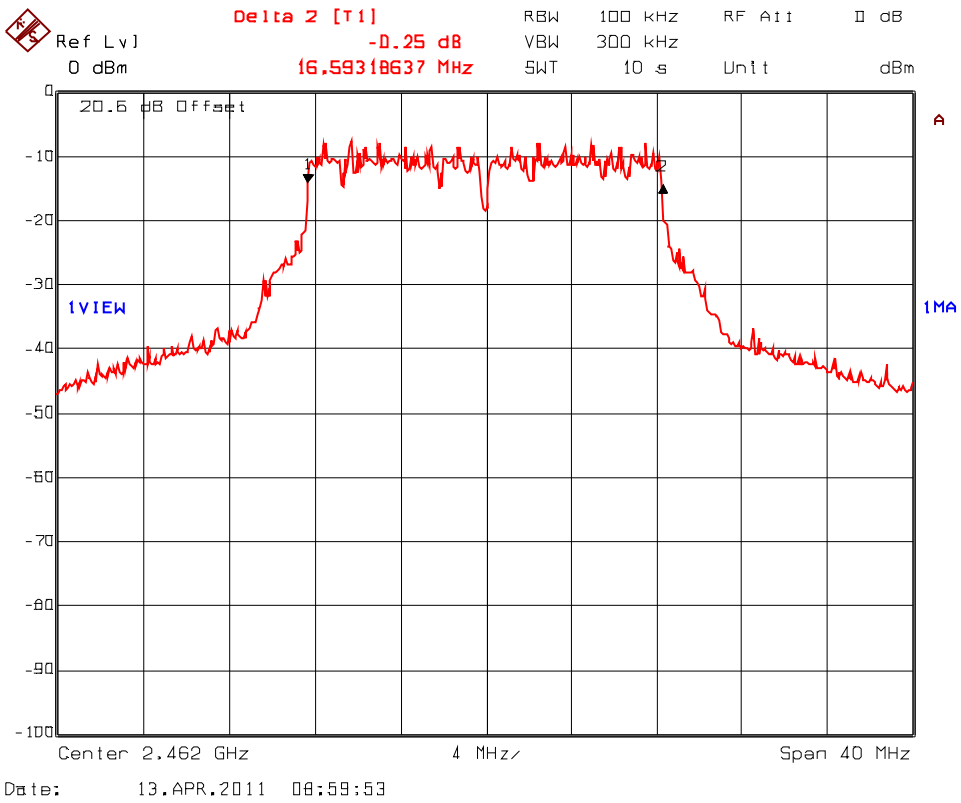
Plot 5.6.4.19. 6 dB Bandwidth, 802.11g, 64-QAM 54 Mbps
Test Frequency: 2412 MHz



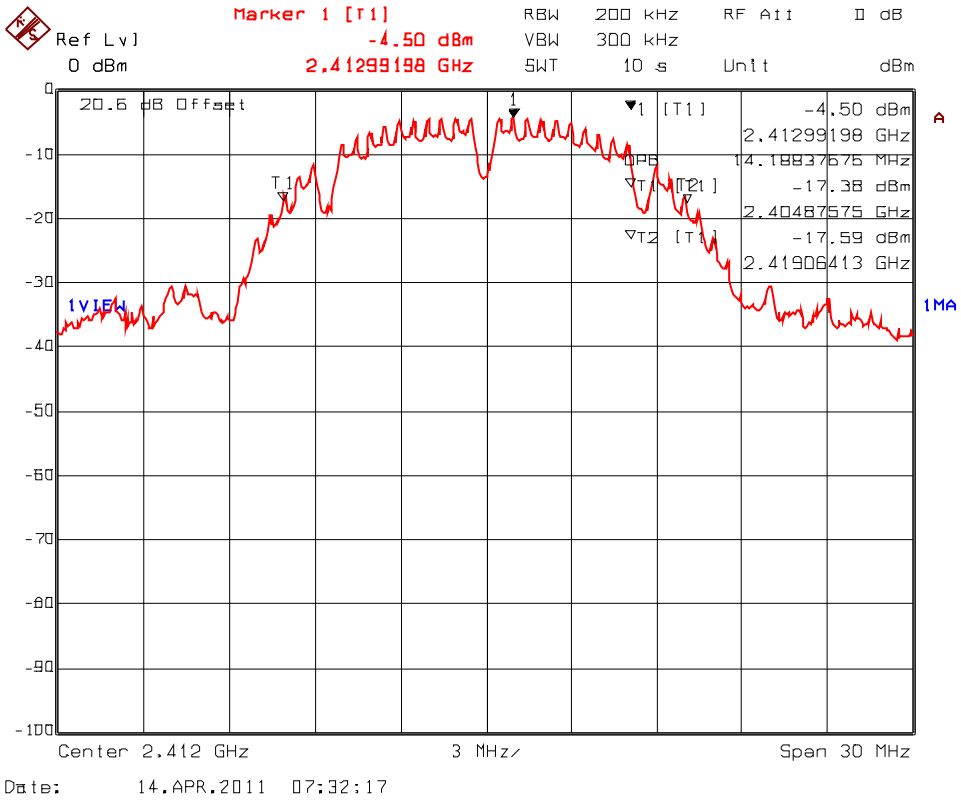
Plot 5.6.4.20. 6 dB Bandwidth, 802.11g, 64-QAM 54 Mbps
Test Frequency: 2437 MHz



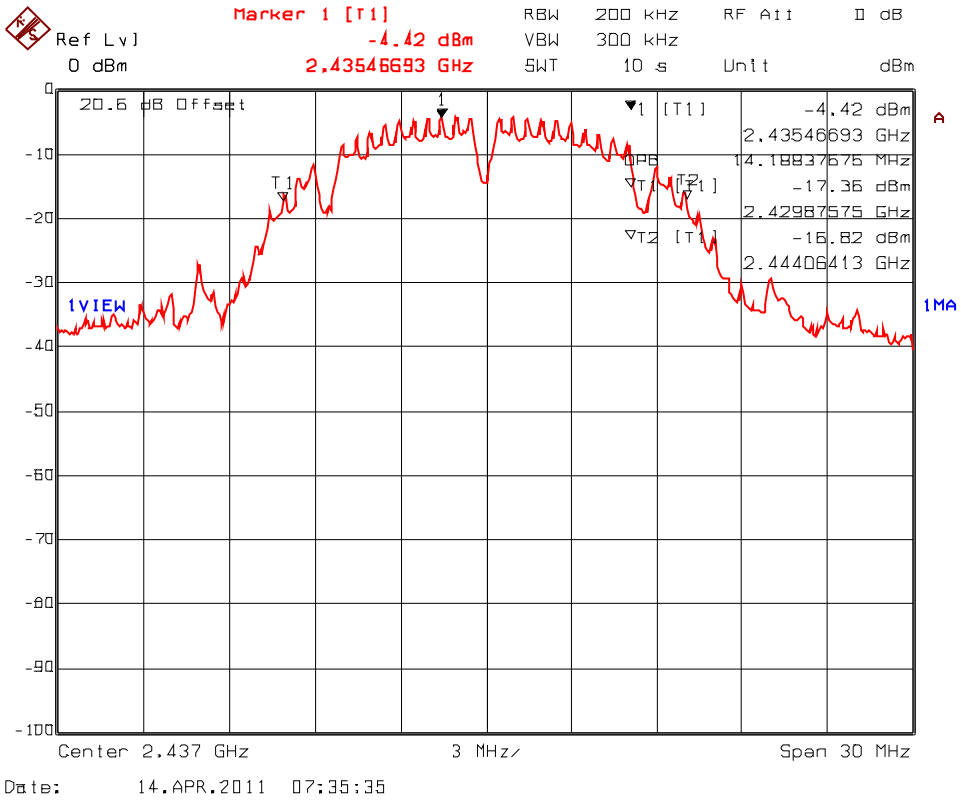
Plot 5.6.4.21. 6 dB Bandwidth, 802.11g, 64-QAM 54 Mbps
Test Frequency: 2462 MHz



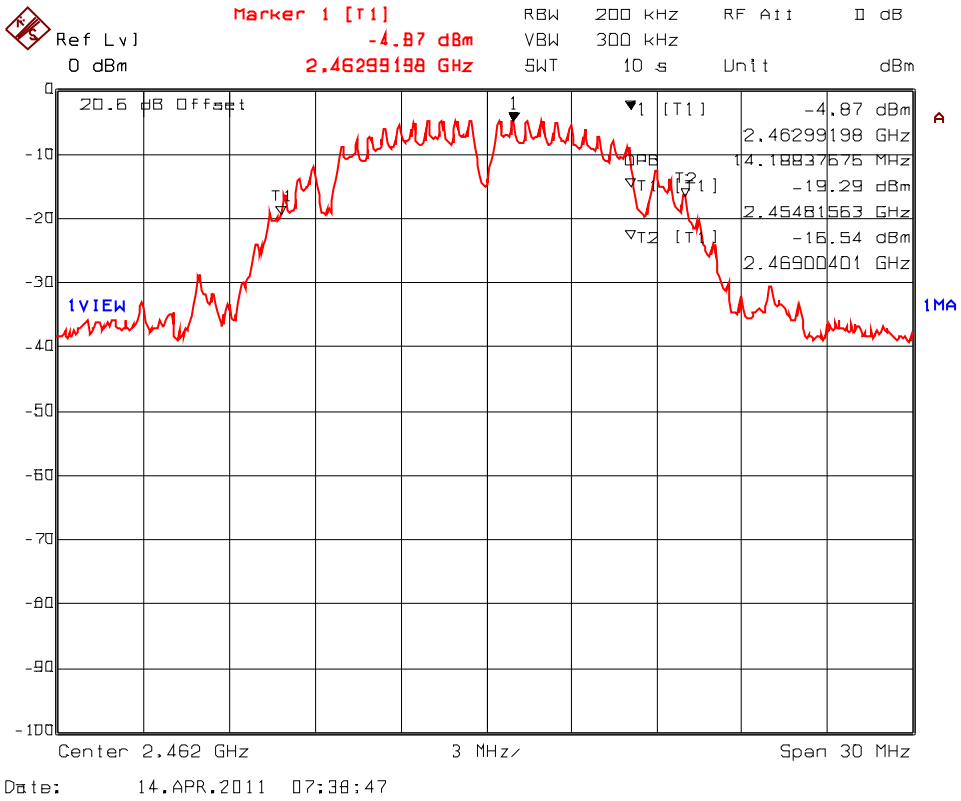
Plot 5.6.4.22. 99% Occupied Bandwidth, 802.11b, DBPSK 1 Mbps
Test Frequency: 2412 MHz



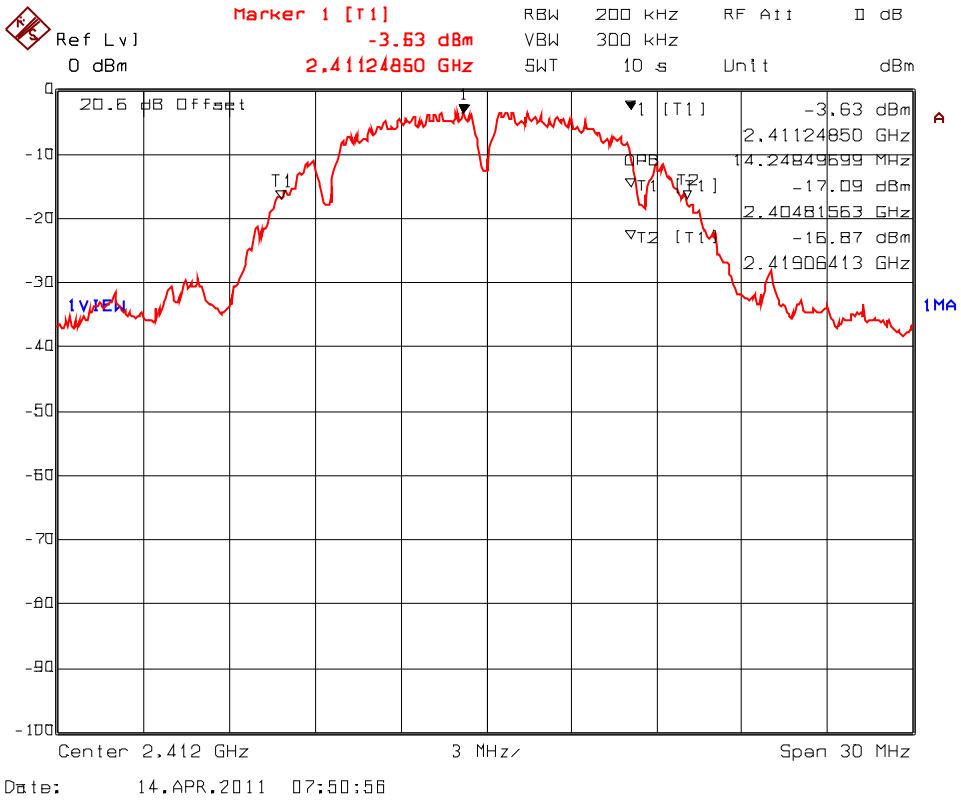
Plot 5.6.4.23. 99% Occupied Bandwidth, 802.11b, DBPSK 1 Mbps
Test Frequency: 2437 MHz



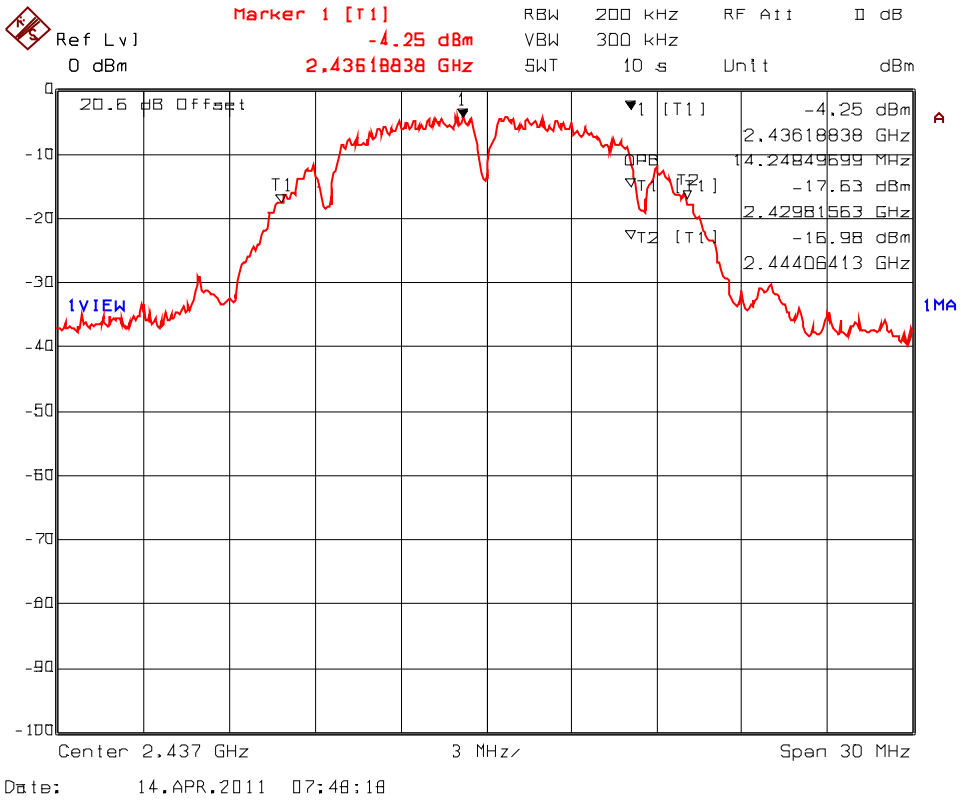
Plot 5.6.4.24. 99% Occupied Bandwidth, 802.11b, DBPSK 1 Mbps
Test Frequency: 2462 MHz



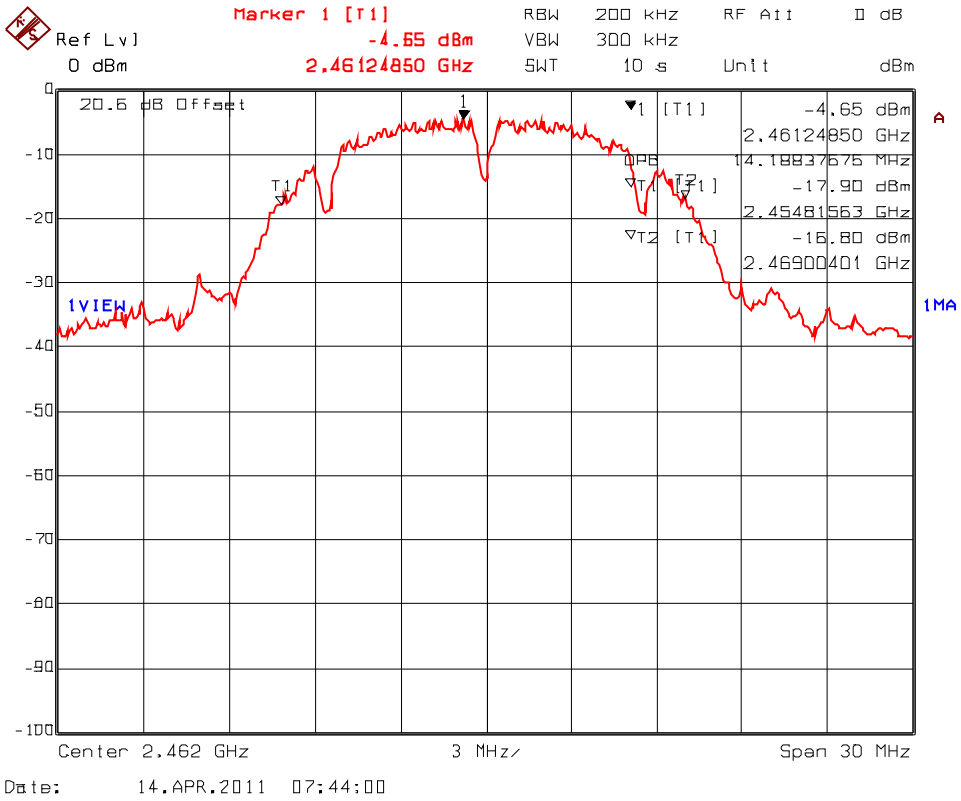
Plot 5.6.4.25. 99% Occupied Bandwidth, 802.11b, DQPSK 2 Mbps
Test Frequency: 2412 MHz



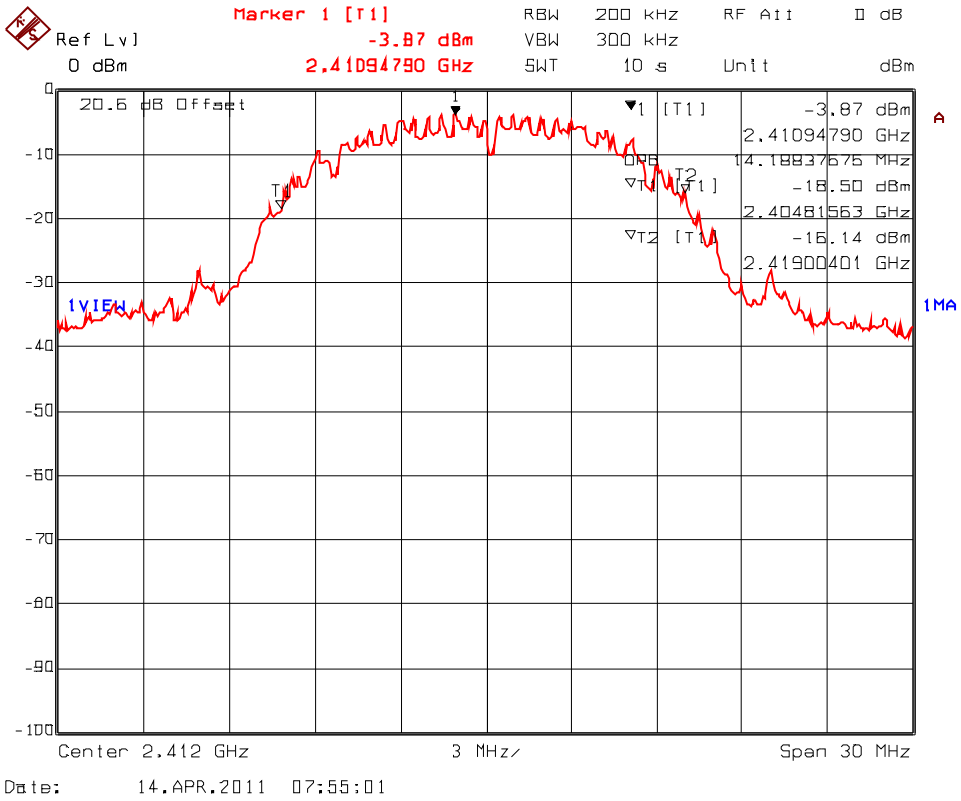
Plot 5.6.4.26. 99% Occupied Bandwidth, 802.11b, DQPSK 2 Mbps
Test Frequency: 2437 MHz



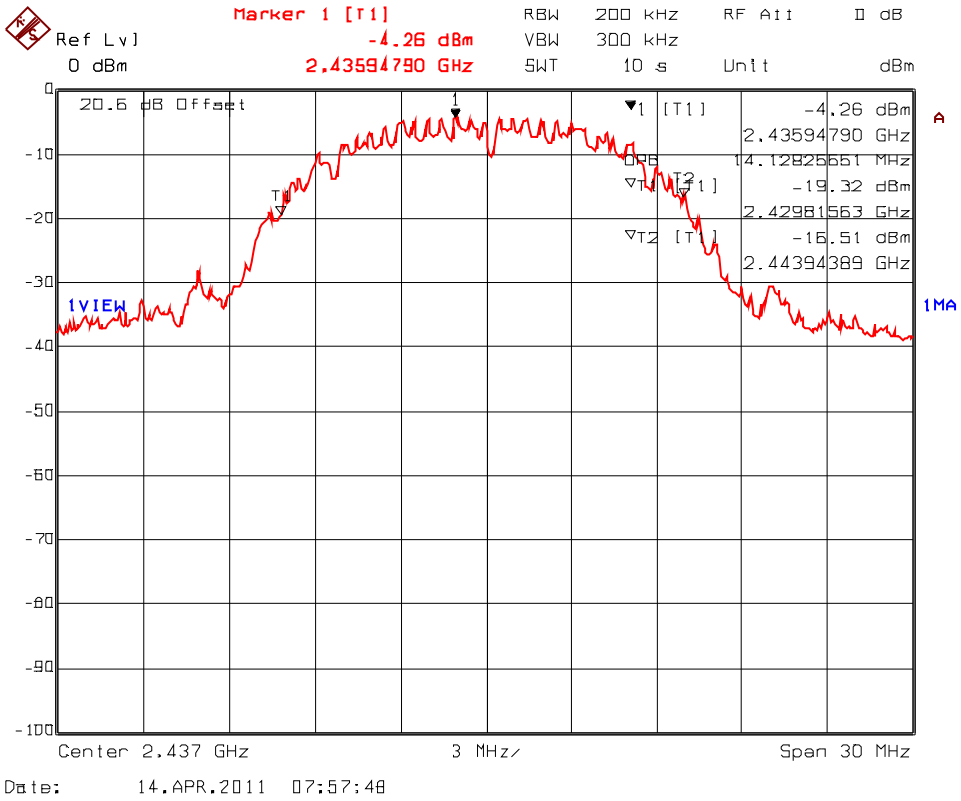
Plot 5.6.4.27. 99% Occupied Bandwidth, 802.11b, DQPSK 2 Mbps
Test Frequency: 2462 MHz



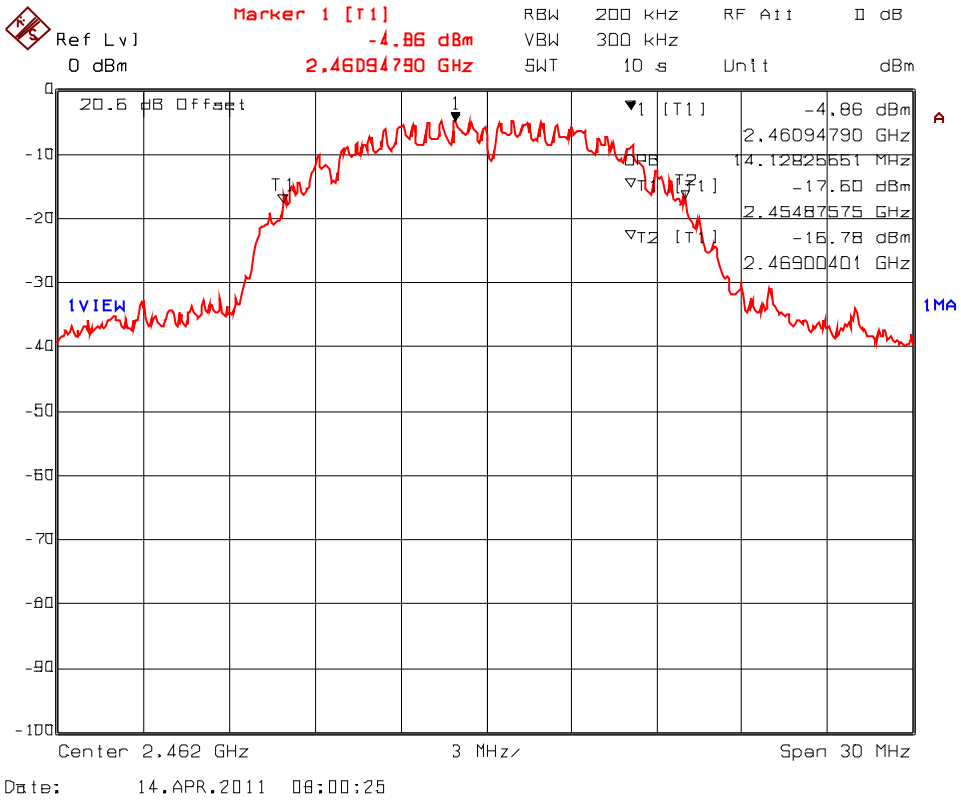
Plot 5.6.4.28. 99% Occupied Bandwidth, 802.11b, CCK 11 Mbps
Test Frequency: 2412 MHz



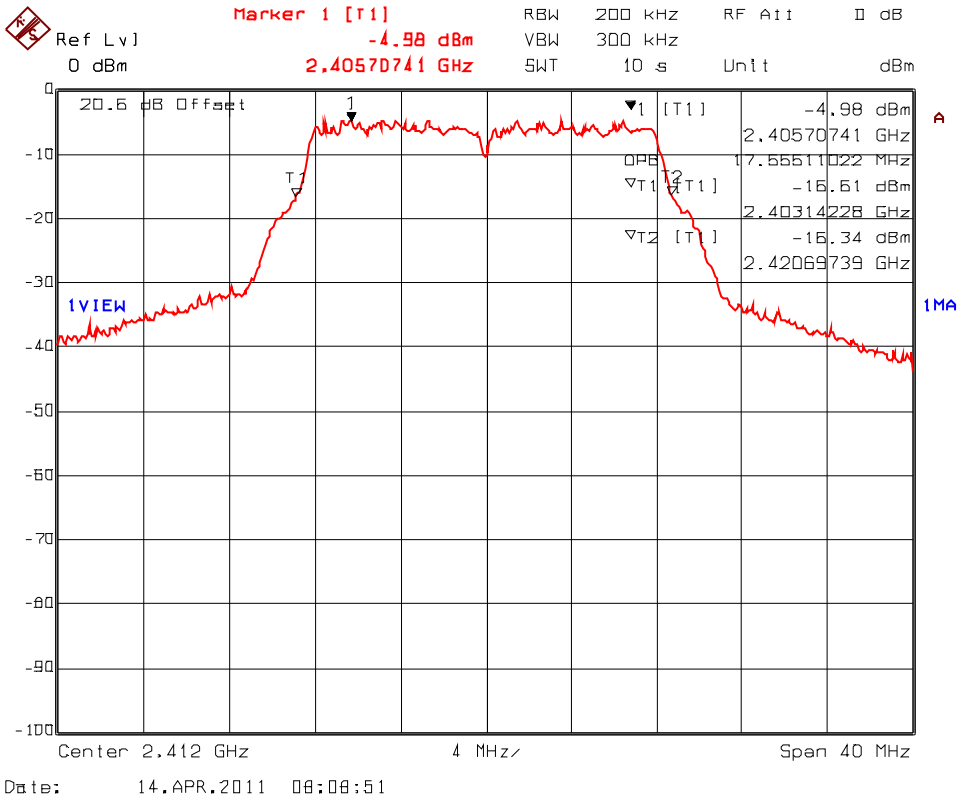
Plot 5.6.4.29. 99% Occupied Bandwidth, 802.11b, CCK 11 Mbps
Test Frequency: 2437 MHz



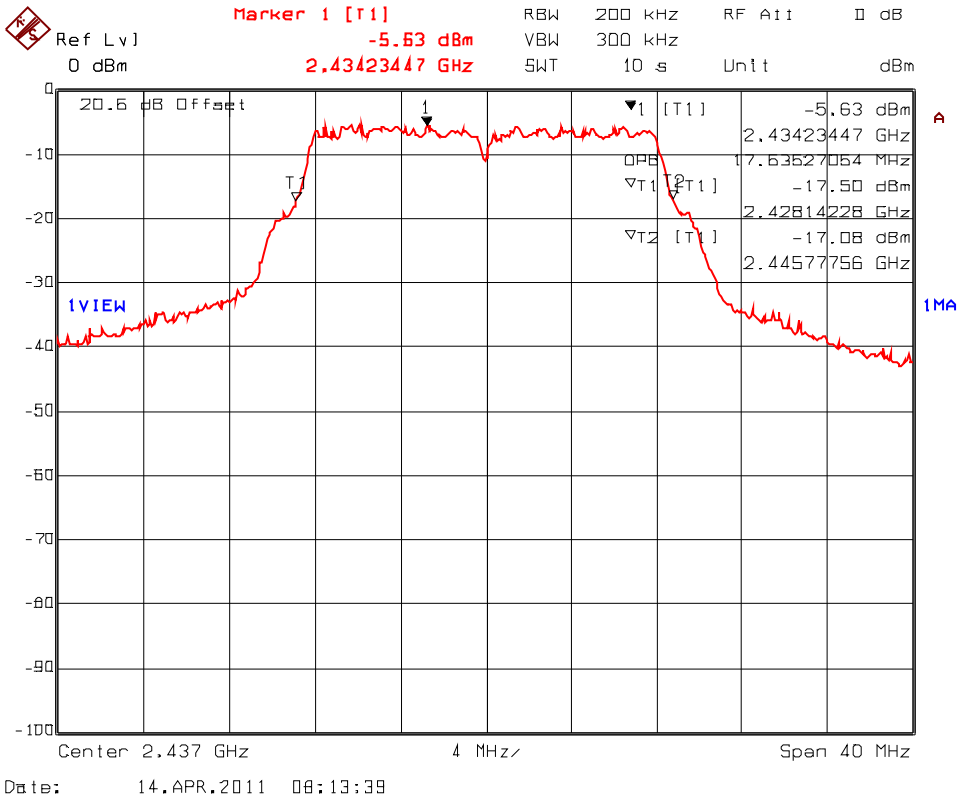
Plot 5.6.4.30. 99% Occupied Bandwidth, 802.11b, CCK 11 Mbps
Test Frequency: 2462 MHz



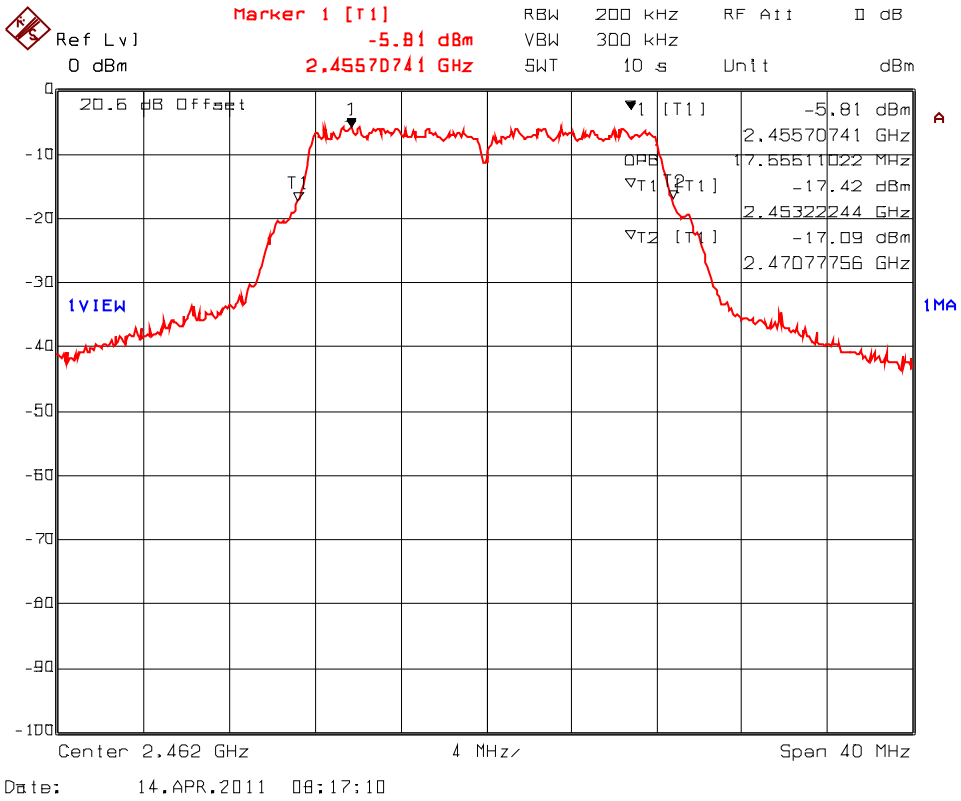
Plot 5.6.4.31. 99% Occupied Bandwidth, 802.11g, BPSK 9 Mbps
Test Frequency: 2412 MHz



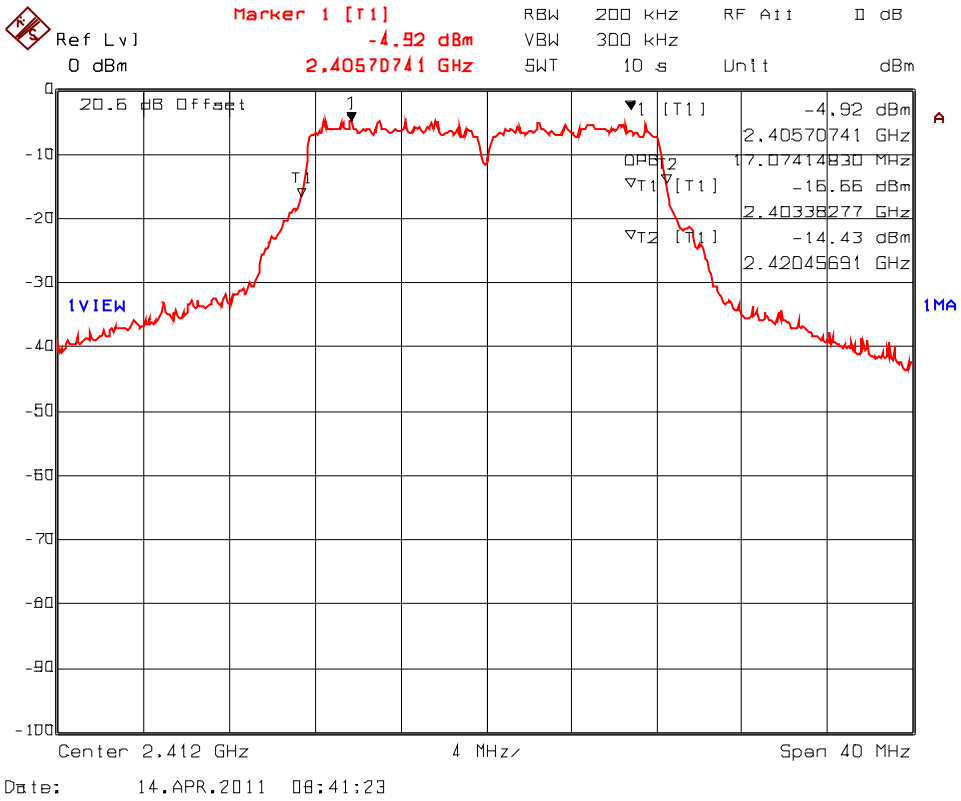
Plot 5.6.4.32. 99% Occupied Bandwidth, 802.11g, BPSK 9 Mbps
Test Frequency: 2437 MHz



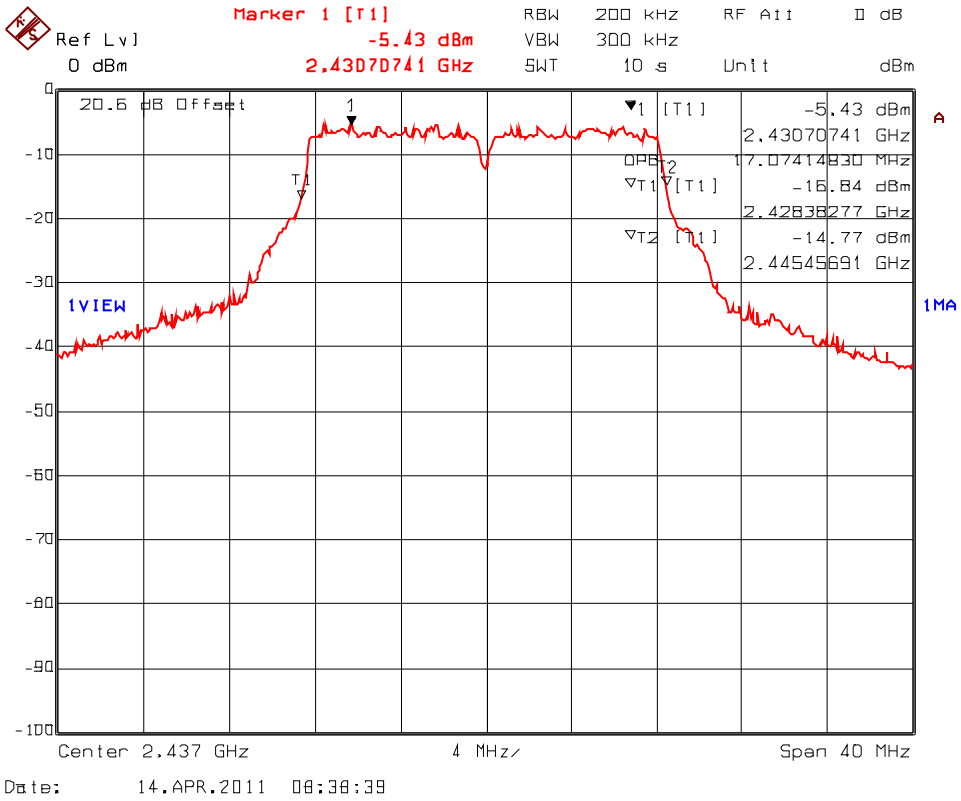
Plot 5.6.4.33. 99% Occupied Bandwidth, 802.11g, BPSK 9 Mbps
Test Frequency: 2462 MHz



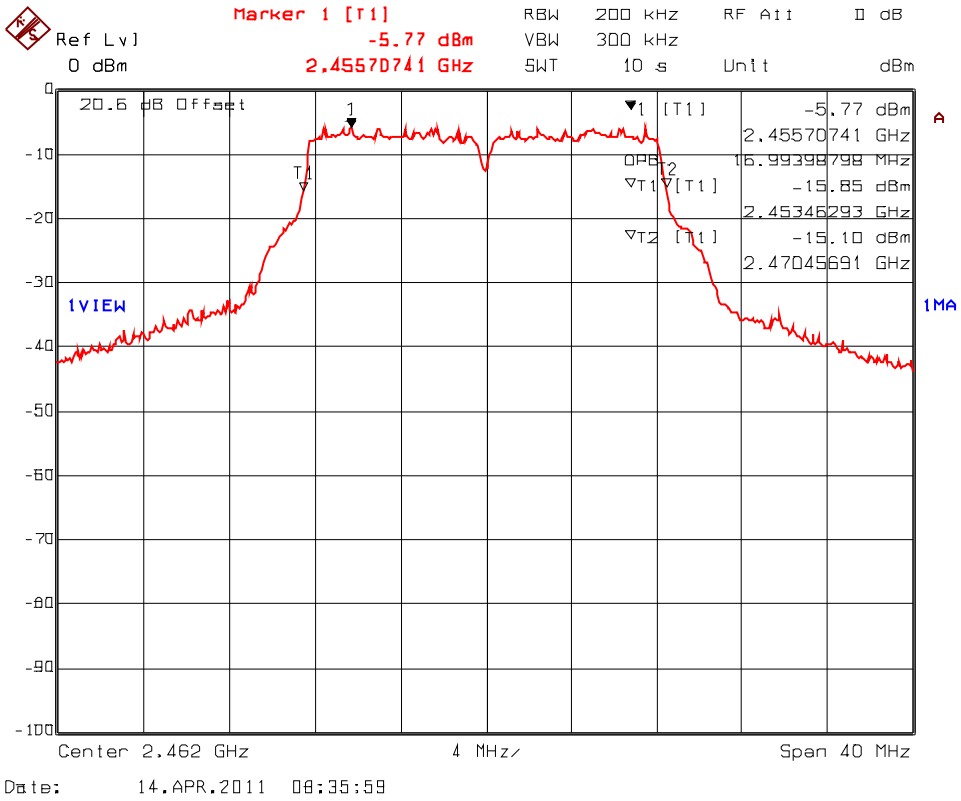
Plot 5.6.4.34. 99% Occupied Bandwidth, 802.11g, QPSK 18 Mbps
Test Frequency: 2412 MHz



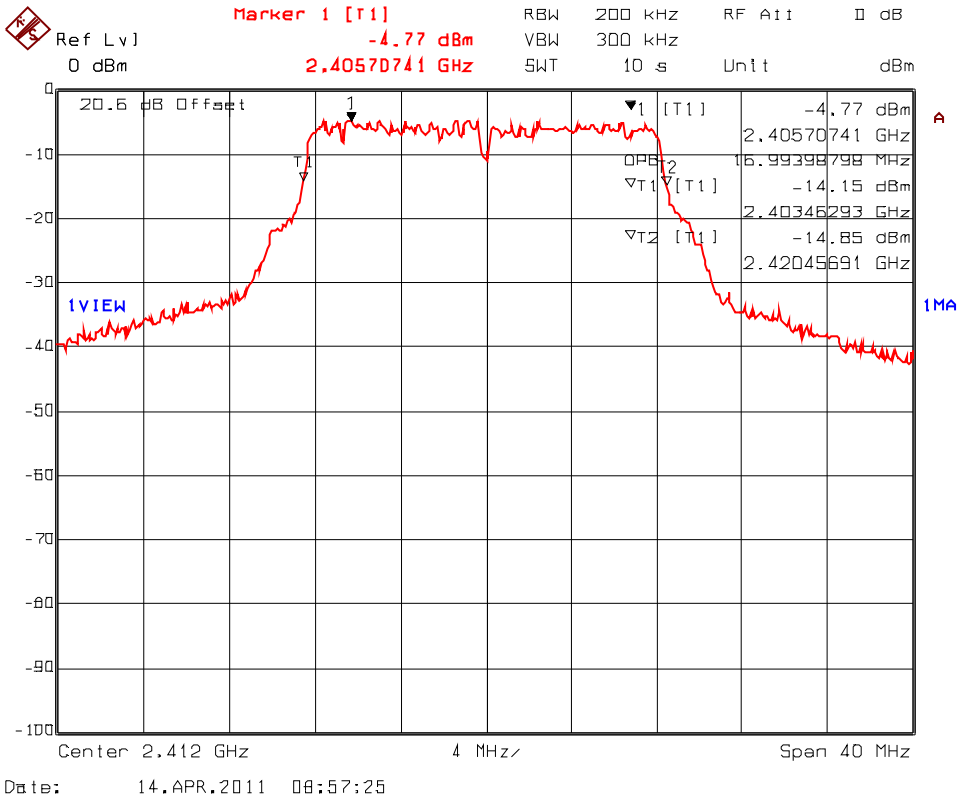
Plot 5.6.4.35. 99% Occupied Bandwidth, 802.11g, QPSK 18 Mbps
Test Frequency: 2437 MHz



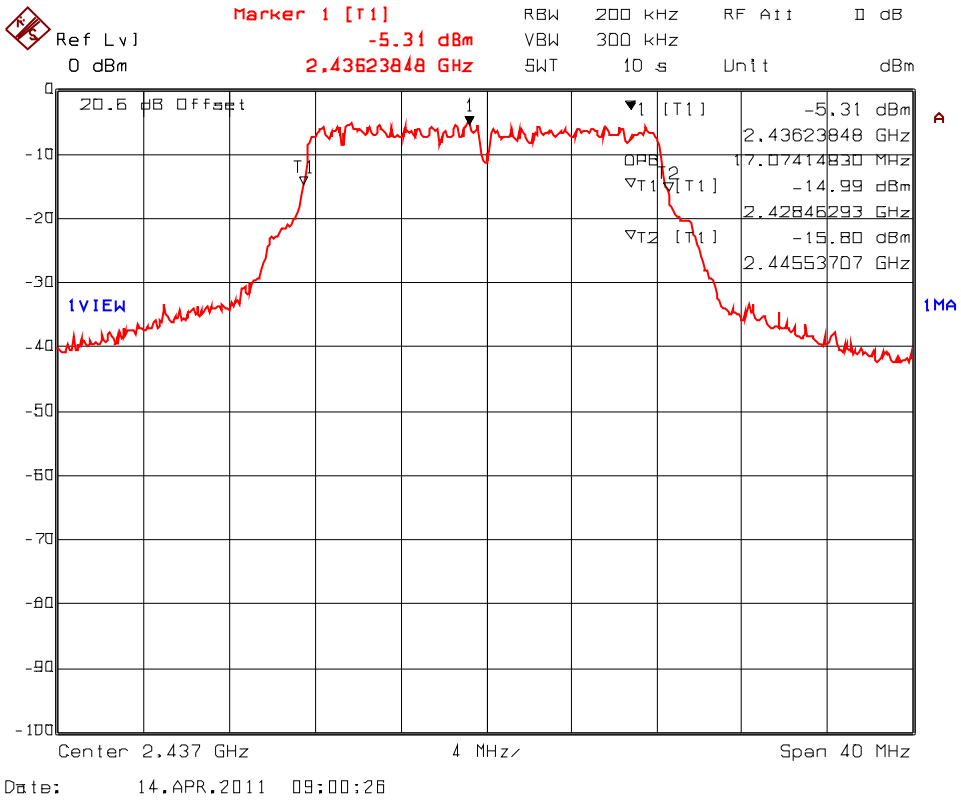
Plot 5.6.4.36. 99% Occupied Bandwidth, 802.11g, QPSK 18 Mbps
Test Frequency: 2462 MHz



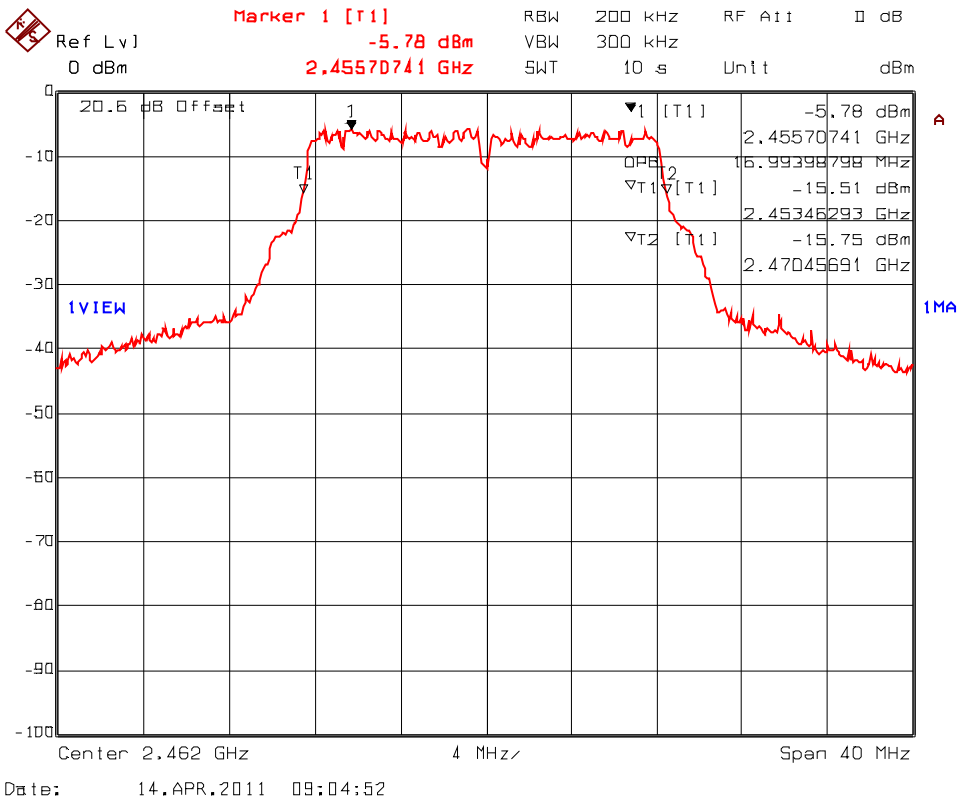
Plot 5.6.4.37. 99% Occupied Bandwidth, 802.11g, 16-QAM 36 Mbps
Test Frequency: 2412 MHz



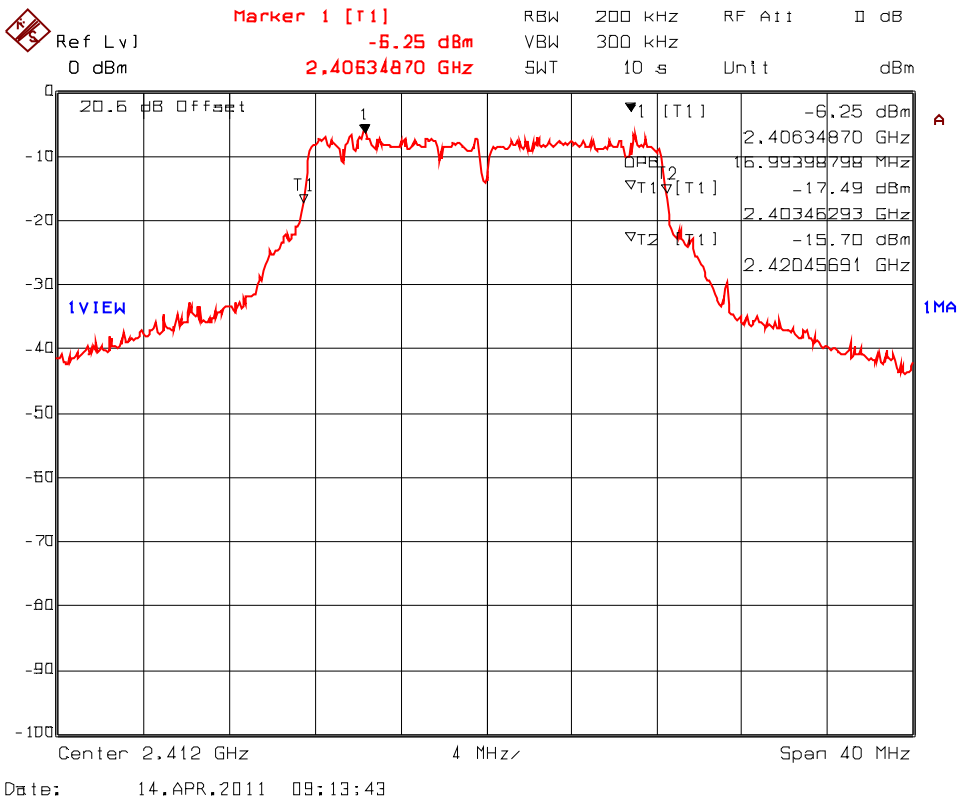
Plot 5.6.4.38. 99% Occupied Bandwidth, 802.11g, 16-QAM 36 Mbps
Test Frequency: 2437 MHz



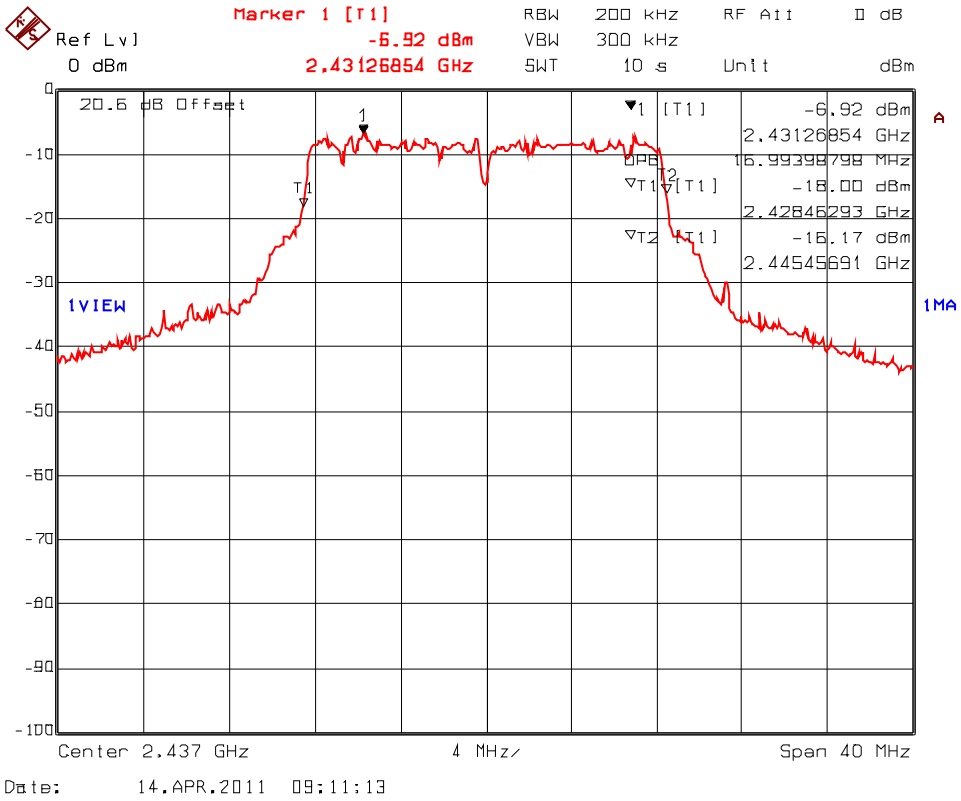
Plot 5.6.4.39. 99% Occupied Bandwidth, 802.11g, 16-QAM 36 Mbps
Test Frequency: 2462 MHz



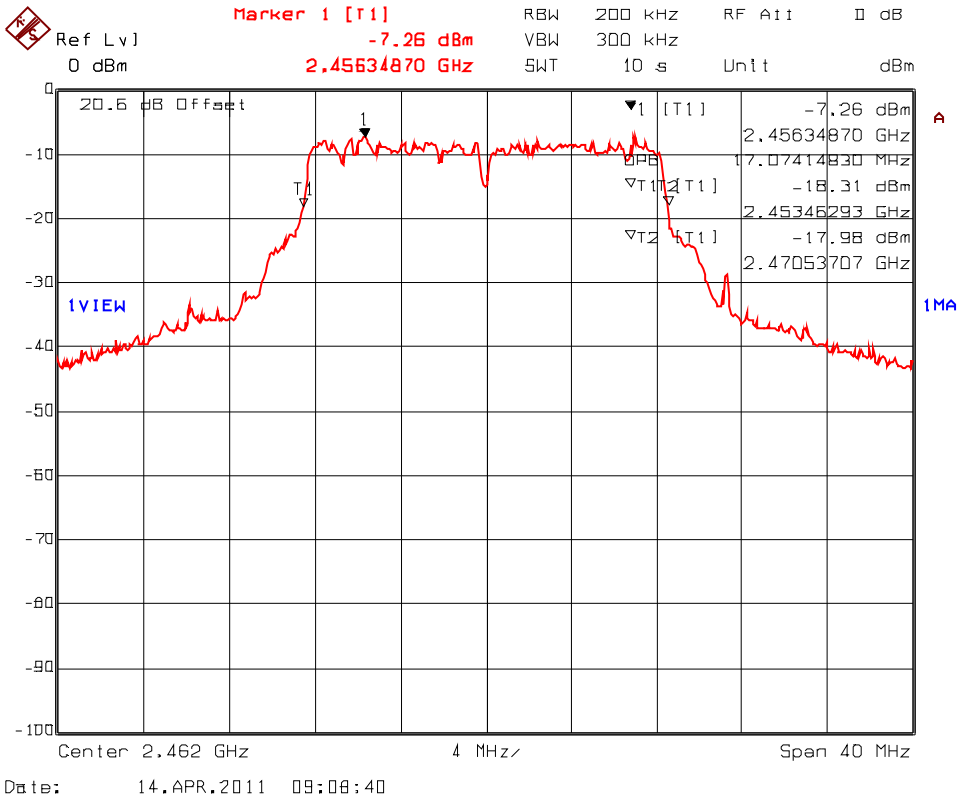
Plot 5.6.4.40. 99% Occupied Bandwidth, 802.11g, 64-QAM 54 Mbps
Test Frequency: 2412 MHz



Plot 5.6.4.41. 99% Occupied Bandwidth, 802.11g, 64-QAM 54 Mbps
Test Frequency: 2437 MHz



Plot 5.6.4.42. 99% Occupied Bandwidth, 802.11g, 64-QAM 54 Mbps
Test Frequency: 2462 MHz



5.7. PEAK CONDUCTED OUTPUT POWER - DTS [§ 15.247(b)(3)]

5.7.1. Limit(s)

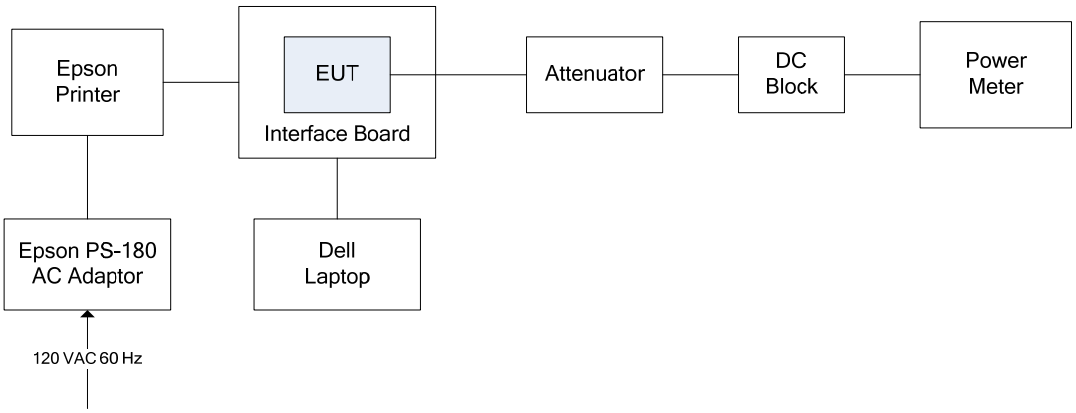
§ 15.247(b)(3): For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the *maximum conducted output power* is the highest total transmit power occurring in any mode.

§15.247(b)(4): The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

5.7.2. Method of Measurements & Test Arrangement

KDB Publication No. 558074: Guidance on Measurements for Digital Transmission Systems (47 CFR 15.247).

5.7.3. Test Arrangement



5.7.4. Test Data

Remark(s):

Test method used: Power output option 1, peak measurement.

Frequency (MHz)	Modulation	Data Rate (Mbps)	Peak Conducted Power (dBm)	Peak EIRP(Note 1, 2) (dBm)	Peak Conducted Power Limit (dBm)	EIRP Limit (dBm)
802.11b Mode						
2412	DBPSK	1	7.40	9.40	30	36
	DQPSK	2	7.99	9.99	30	36
	CCK	11	7.63	9.63	30	36
2437	DBPSK	1	7.32	9.32	30	36
	DQPSK	2	7.85	9.85	30	36
	CCK	11	7.63	9.63	30	36
2462	DBPSK	1	7.08	9.08	30	36
	DQPSK	2	7.71	9.71	30	36
	CCK	11	7.40	9.40	30	36
802.11g Mode						
2412	BPSK	9	13.42	15.42	30	36
	QPSK	18	12.28	14.04	30	36
	16-QAM	36	12.43	14.04	30	36
	64-QAM	54	12.99	14.81	30	36
2437	BPSK	9	13.03	15.03	30	36
	QPSK	18	12.04	14.04	30	36
	16-QAM	36	12.04	14.04	30	36
	64-QAM	54	12.81	14.81	30	36
2462	BPSK	9	12.70	14.70	30	36
	QPSK	18	11.61	13.61	30	36
	16-QAM	36	11.64	13.64	30	36
	64-QAM	54	12.43	14.43	30	36

Note 1: The Peak EIRP is calculated as the sum of Peak Conducted Power in dBm and antenna assembly gain of EUT in dBi (antenna gain – cable loss).
Note 2: The maximum assembly antenna gain: 2 dBi

5.8. TRANSMITTER BAND-EDGE & SPURIOUS CONDUCTED EMISSIONS [§ 15.247(d)]

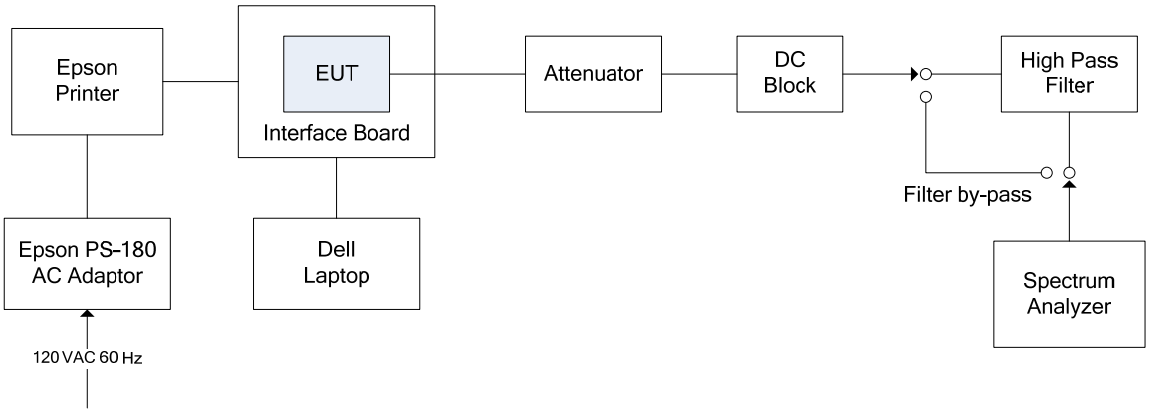
5.8.1. Limit(s)

§ 15.247 (d): In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

5.8.2. Method of Measurements

KDB Publication No. 558074: Guidance on Measurements for Digital Transmission Systems (47 CFR 15.247).

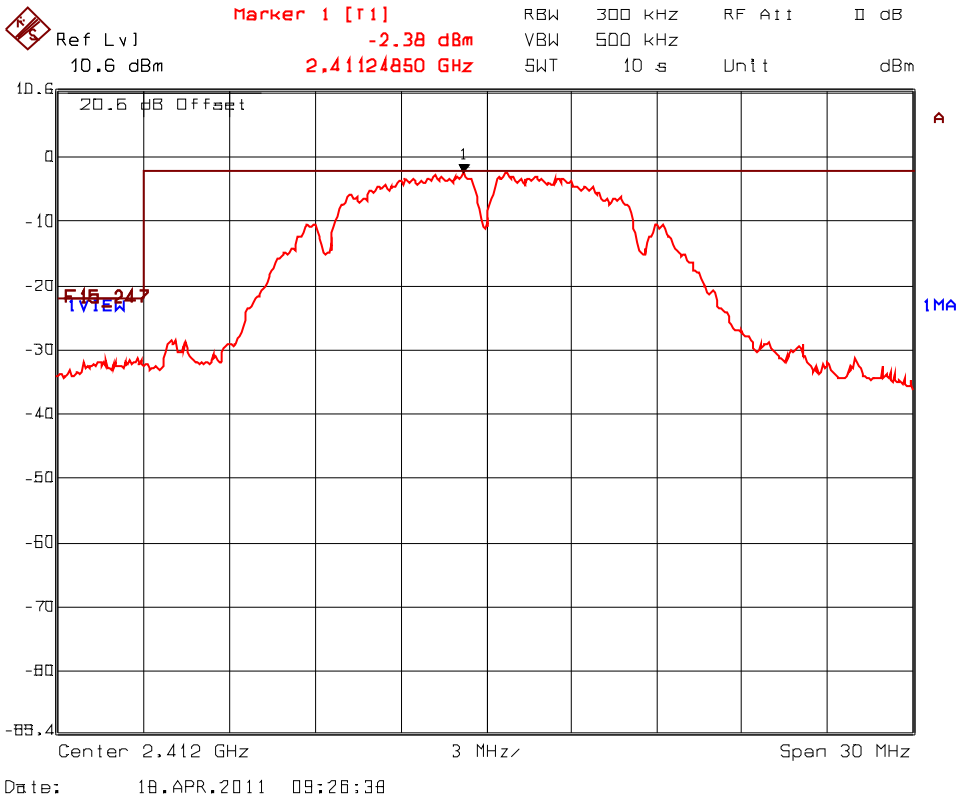
5.8.3. Test Arrangement



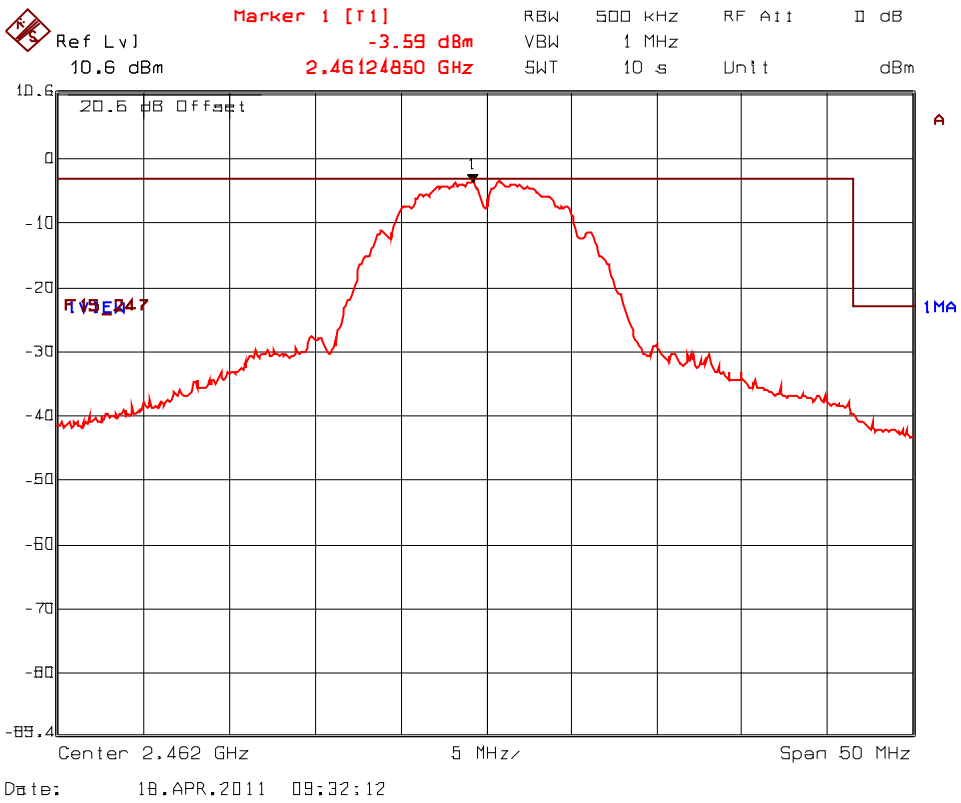
5.8.4. Test Data

5.8.4.1. Band-Edge RF Conducted Emissions

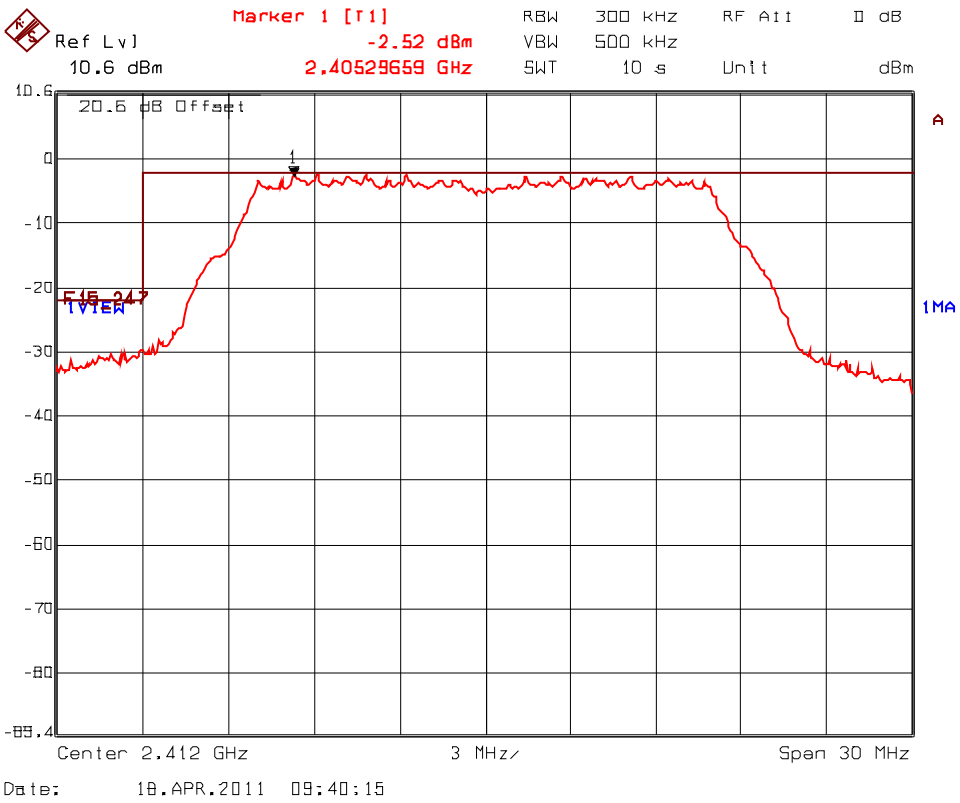
Plot 5.8.4.1.1. Band-Edge RF Conducted Emissions, 802.11b, CCK 11 Mbps
Low End of Frequency Band (2412 MHz)



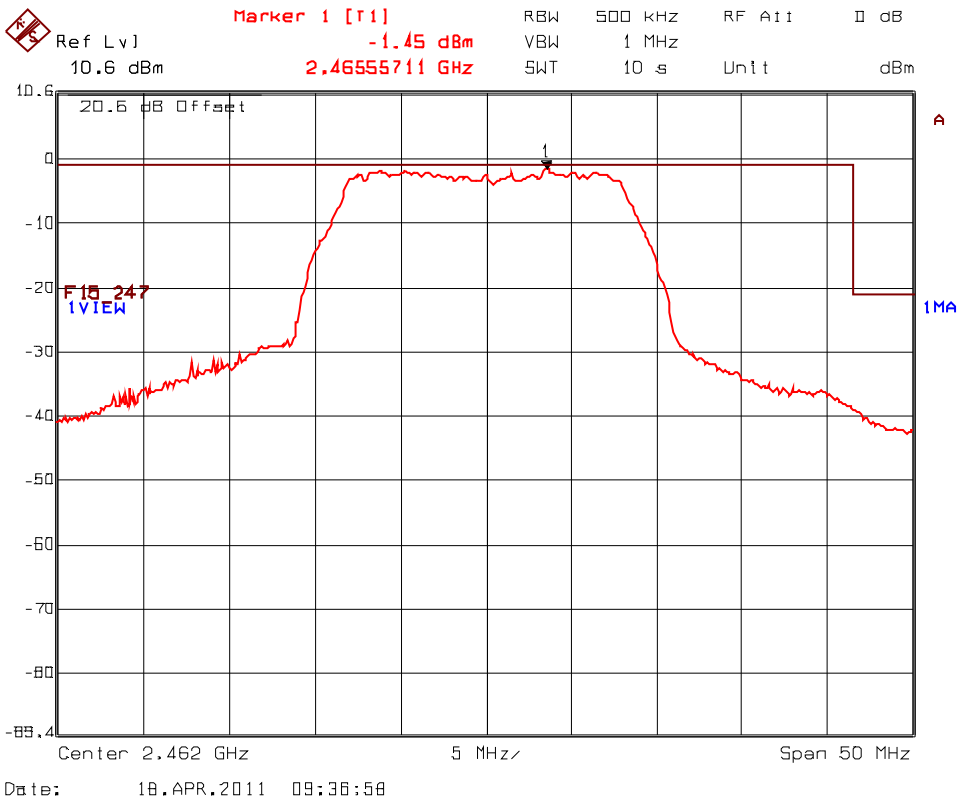
Plot 5.8.4.1.2. Band-Edge RF Conducted Emissions, 802.11b, CCK 11 Mbps
High End of Frequency Band (2462 MHz)



Plot 5.8.4.1.3. Band-Edge RF Conducted Emissions, 802.11g, 64-QAM 54 Mbps
Low End of Frequency Band (2412 MHz)

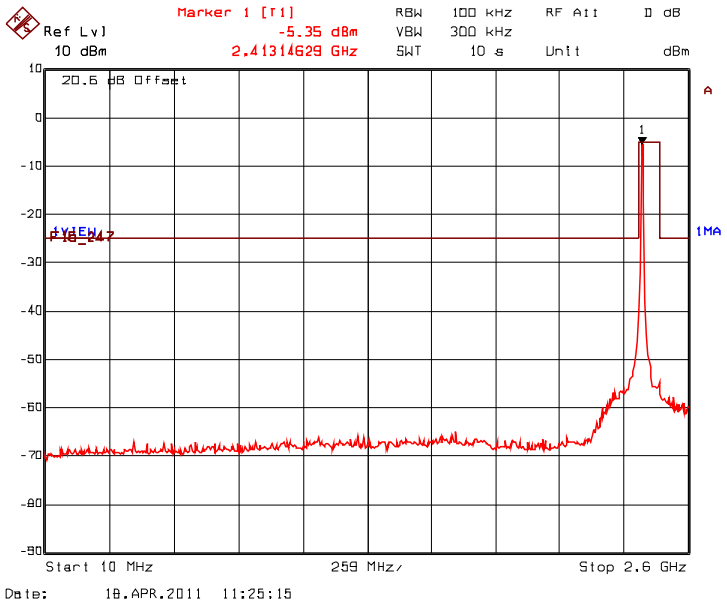


Plot 5.8.4.1.4. Band-Edge RF Conducted Emissions, 802.11g, 64-QAM 54 Mbps
High End of Frequency Band (2462 MHz)

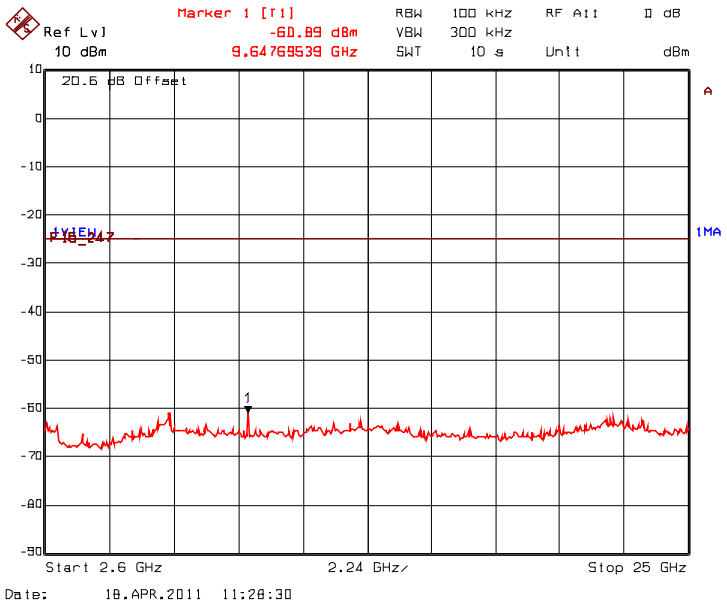


5.8.4.2. Spurious RF Conducted Emissions

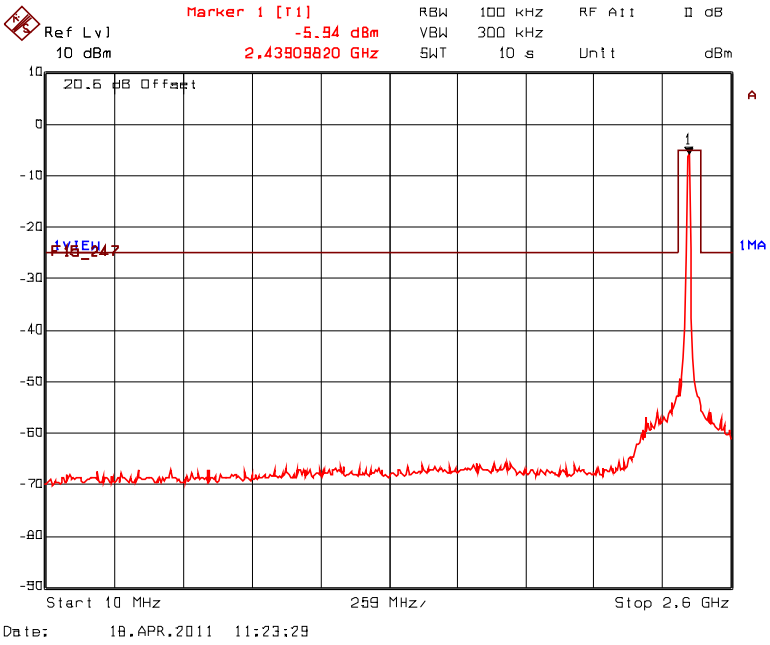
Plot 5.8.4.2.1. Spurious RF Conducted Emissions, 802.11b, CCK 11 Mbps, 10 MHz - 2.6 GHz
Transmitter Frequency: 2412 MHz



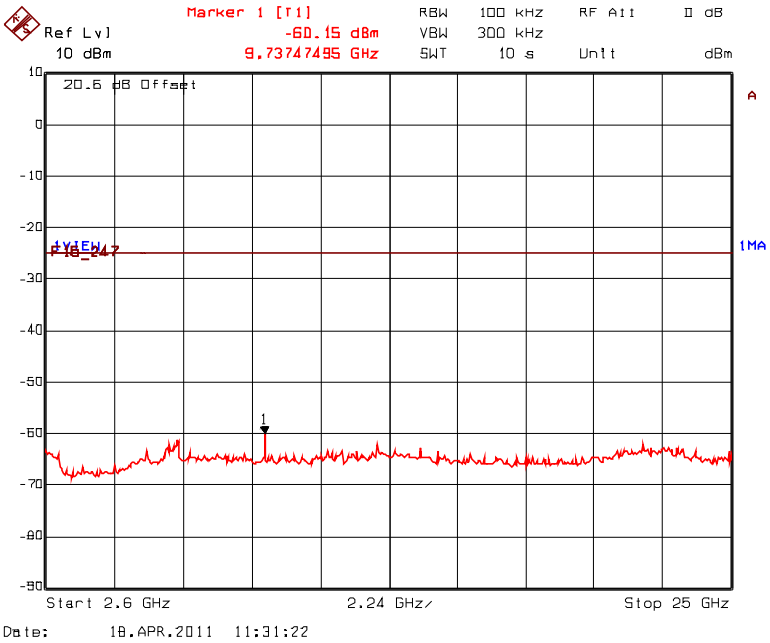
Plot 5.8.4.2.2. Spurious RF Conducted Emissions, 802.11b, CCK 11 Mbps, 2.6 GHz - 25 GHz
Transmitter Frequency: 2412 MHz



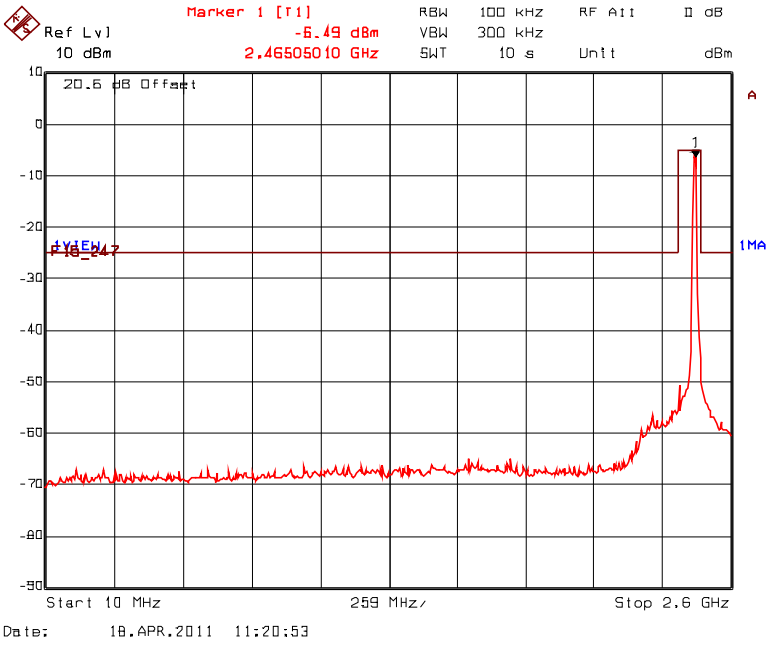
Plot 5.8.4.2.3. Spurious RF Conducted Emissions, 802.11b, CCK 11 Mbps, 10 MHz - 2.6 GHz
Transmitter Frequency: 2437 MHz



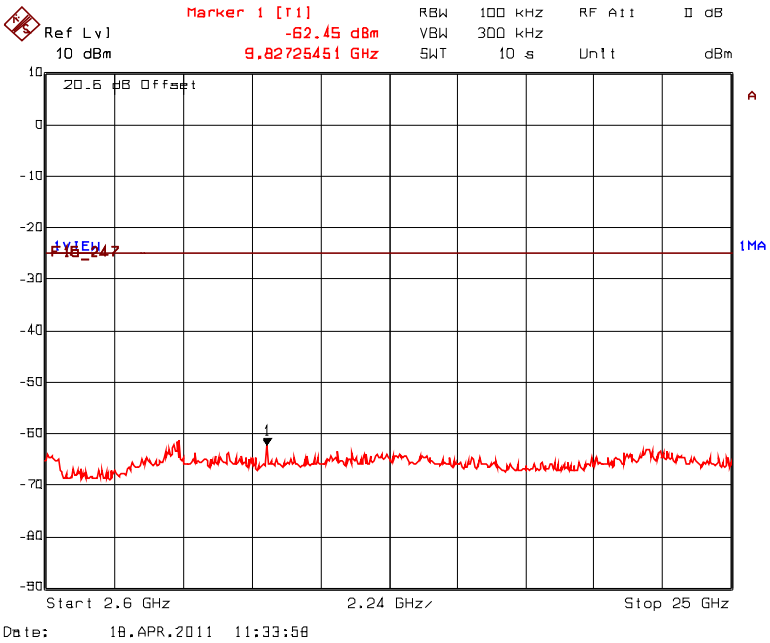
Plot 5.8.4.2.4. Spurious RF Conducted Emissions, 802.11b, CCK 11 Mbps, 2.6 GHz - 25 GHz
Transmitter Frequency: 2437 MHz



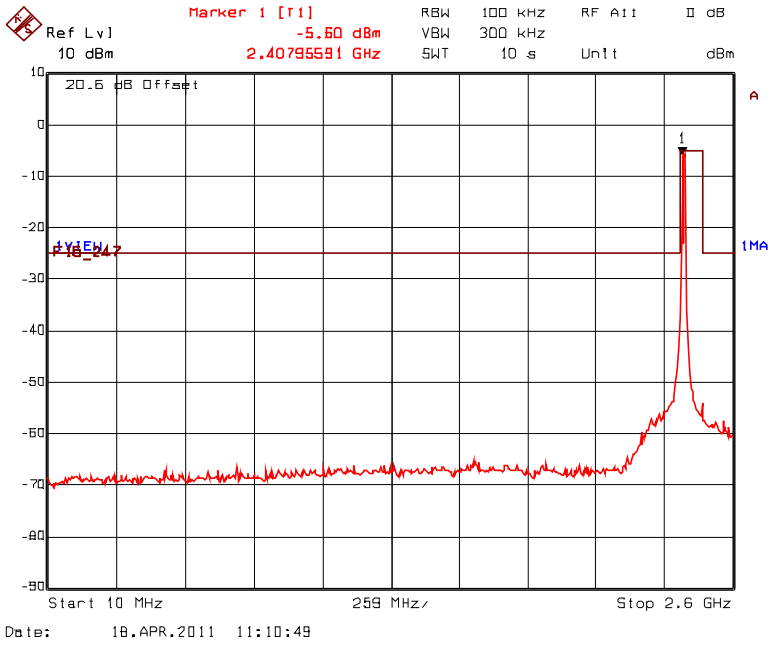
Plot 5.8.4.2.5. Spurious RF Conducted Emissions, 802.11b, CCK 11 Mbps, 10 MHz - 2.6 GHz
Transmitter Frequency: 2462 MHz



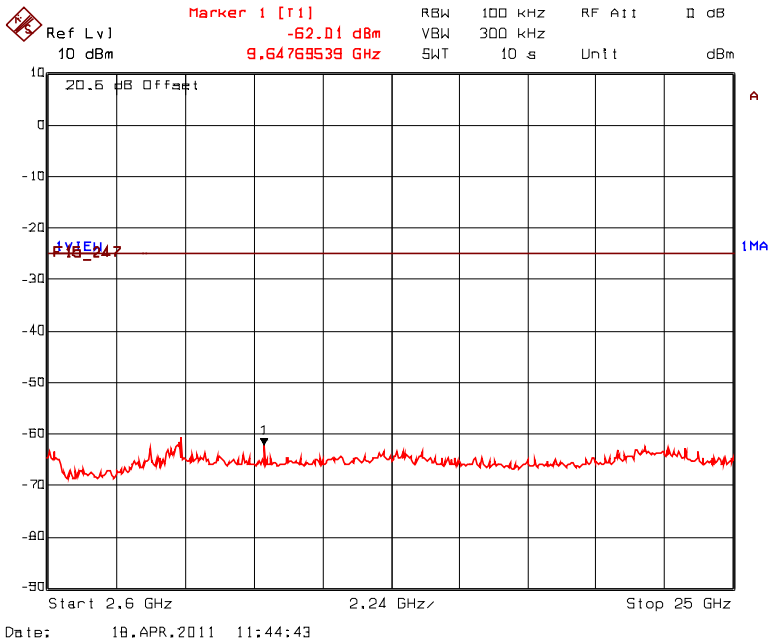
Plot 5.8.4.2.6. Spurious RF Conducted Emissions, 802.11b, CCK 11 Mbps, 2.6 GHz - 25 GHz
Transmitter Frequency: 2462 MHz



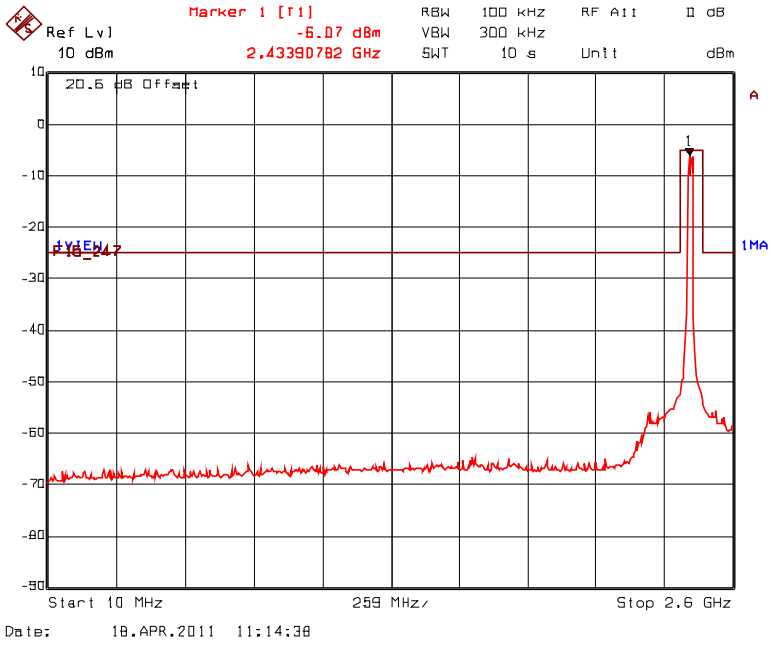
Plot 5.8.4.2.7. Spurious RF Conducted Emissions, 802.11g, 64-QAM 54 Mbps, 10 MHz - 2.6 GHz
Transmitter Frequency: 2412 MHz



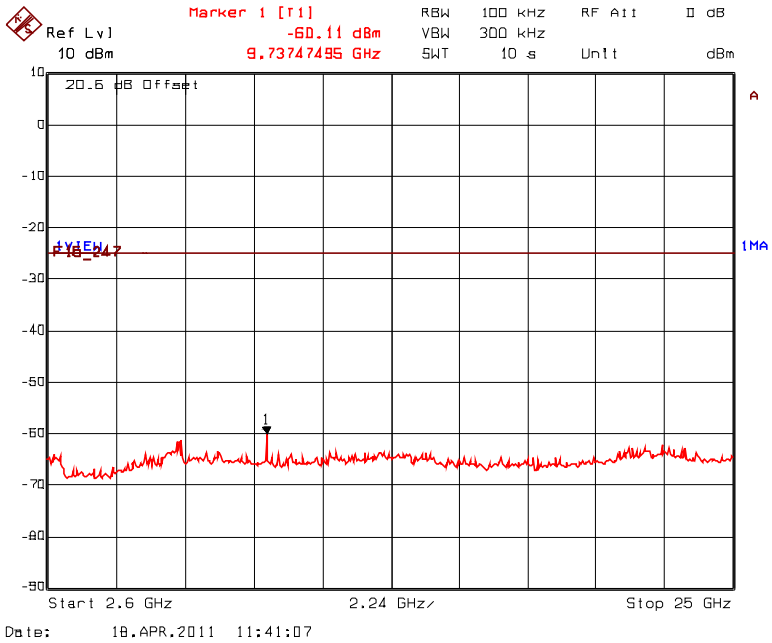
Plot 5.8.4.2.8. Spurious RF Conducted Emissions, 802.11g, 64-QAM 54 Mbps, 2.6 GHz - 25 GHz
Transmitter Frequency: 2412 MHz



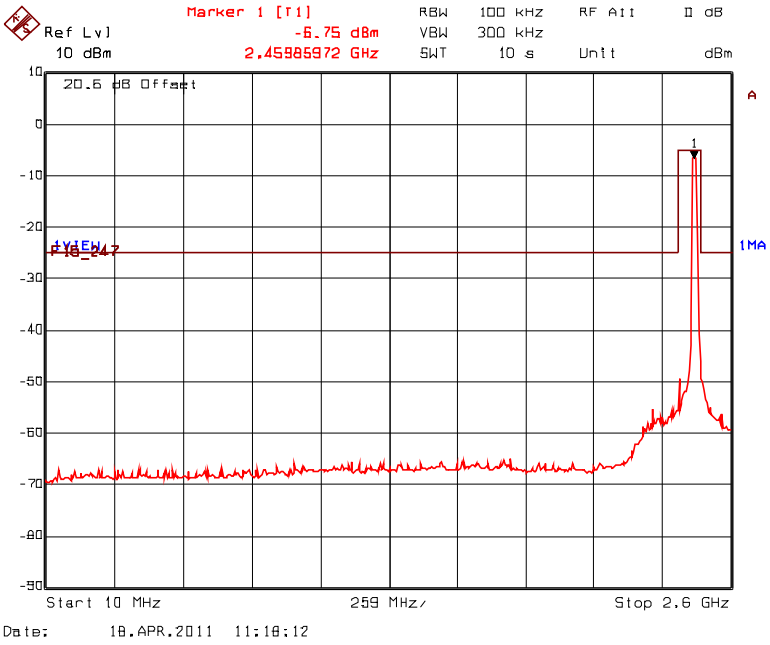
Plot 5.8.4.2.9. Spurious RF Conducted Emissions, 802.11g, 64-QAM 54 Mbps, 10 MHz - 2.6 GHz
Transmitter Frequency: 2437 MHz



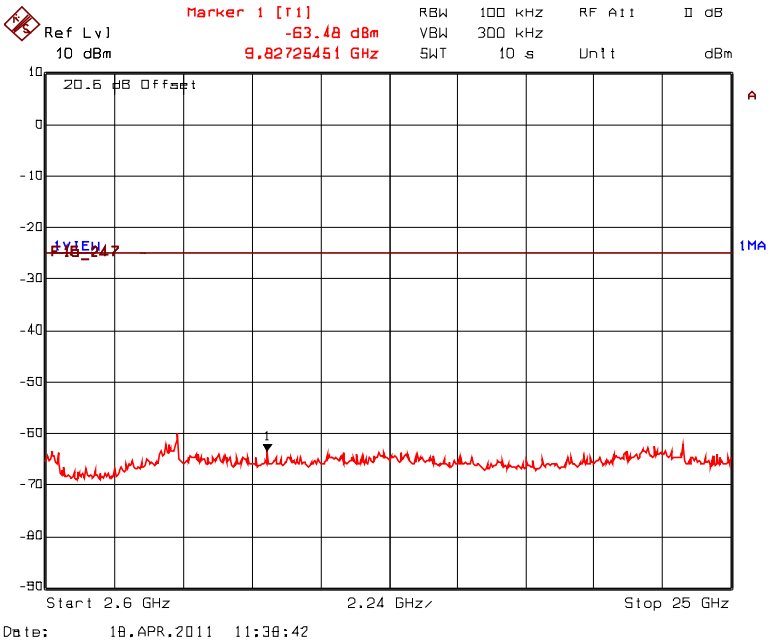
Plot 5.8.4.2.10. Spurious RF Conducted Emissions, 802.11g, 64-QAM 54 Mbps, 2.6 GHz - 25 GHz
Transmitter Frequency: 2437 MHz



Plot 5.8.4.2.11. Spurious RF Conducted Emissions, 802.11g, 64-QAM 54 Mbps, 10 MHz - 2.6 GHz
Transmitter Frequency: 2462 MHz



Plot 5.8.4.2.12. Spurious RF Conducted Emissions, 802.11g, 64-QAM 54 Mbps, 2.6 GHz - 25 GHz
Transmitter Frequency: 2462 MHz



5.9. TRANSMITTER SPURIOUS RADIATED EMISSIONS AT 3 METERS [§§ 15.247(d), 15.209 & 15.205]

5.9.1. Limit(s)

§ 15.247 (d): In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

Section 15.205(a) - Restricted Bands of Operation

MHz	MHz	MHz	GHz
0.090–0.110	16.42–16.423	399.9–410	4.5–5.15
[1] 0.495–0.505	16.69475–16.69525	608–614	5.35–5.46
2.1735–2.1905	16.80425–16.80475	960–1240	7.25–7.75
4.125–4.128	25.5–25.67	1300–1427	8.025–8.5
4.17725–4.17775	37.5–38.25	1435–1626.5	9.0–9.2
4.20725–4.20775	73–74.6	1645.5–1646.5	9.3–9.5
6.215–6.218	74.8–75.2	1660–1710	10.6–12.7
6.26775–6.26825	108–121.94	1718.8–1722.2	13.25–13.4
6.31175–6.31225	123–138	2200–2300	14.47–14.5
8.291–8.294	149.9–150.05	2310–2390	15.35–16.2
8.362–8.366	156.52475–156.52525	2483.5–2500	17.7–21.4
8.37625–8.38675	156.7–156.9	2655–2900	22.01–23.12
8.41425–8.41475	162.0125–167.17	3260–3267	23.6–24.0
12.29–12.293	167.72–173.2	3332–3339	31.2–31.8
12.51975–12.52025	240–285	3345.8–3358	36.43–36.5
12.57675–12.57725	322–335.4	3600–4400	([2])
13.36–13.41.			

[1] Until February 1, 1999, this restricted band shall be 0.490–0.510 MHz.
[2] Above 38.6

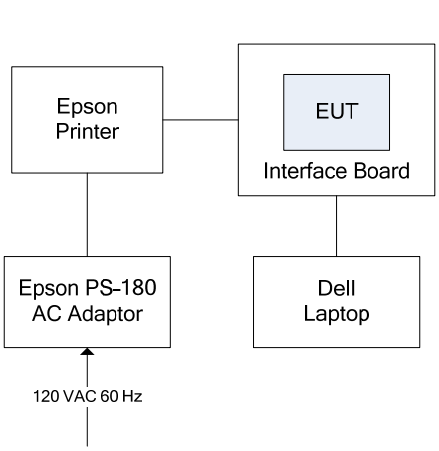
Section 15.209(a)
-- Field Strength Limits within Restricted Frequency Bands --

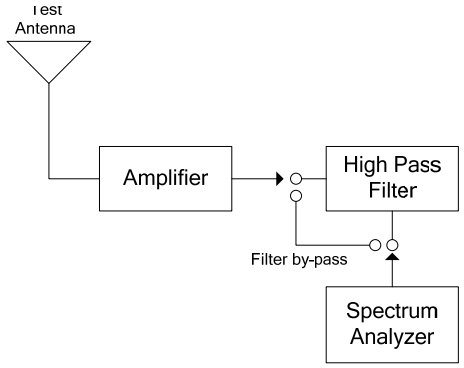
Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 - 0.490	2,400 / F (kHz)	300
0.490 - 1.705	24,000 / F (kHz)	30
1.705 - 30.0	30	30
30 – 88	100	3
88 – 216	150	3
216 – 960	200	3
Above 960	500	3

5.9.2. Method of Measurements

KDB Publication No. 558074: Guidance on Measurements for Digital Transmission Systems (47 CFR 15.247) and ANSI C63.4-2003.

5.9.3. Test Arrangement





5.9.4. Test Data

Remarks:
- All spurious emissions that are in excess of 20 dB below the specified limit shall be recorded.
- EUT shall be tested in three orthogonal positions.
- The following test results are the worst-case measurements, with the EUT set to 802.11g mode at 64-QAM 54 Mbps

Fundamental Frequency: 2412 MHz
Test Frequency Range: 30 MHz – 25 GHz

Frequency (MHz)	RF Peak Level (dBµV/m)	RF Avg Level (dBµV/m)	Antenna Plane (H/V)	Limit 15.209 (dBµV/m)	Limit 15.247 (dBµV/m)	Margin (dB)	Pass/ Fail
2412	100.48	--	V	--	--	--	--
2412	100.63	--	H	--	--	--	--
4824	54.53	49.77	V	54.0	80.6	-4.2	Pass*
4824	54.99	52.05	H	54.0	80.6	-2.0	Pass*

*Field strength of emissions appearing within restricted frequency bands shall not exceed the limits in § 15.209.

Fundamental Frequency: 2437 MHz
Test Frequency Range: 30 MHz – 25 GHz

Frequency (MHz)	RF Peak Level (dBµV/m)	RF Avg Level (dBµV/m)	Antenna Plane (H/V)	Limit 15.209 (dBµV/m)	Limit 15.247 (dBµV/m)	Margin (dB)	Pass/ Fail
2437	99.45	--	V	--	--	--	--
2437	99.85	--	H	--	--	--	--
4874	53.74	49.49	V	54.00	79.9	-4.51	Pass*
4874	55.65	52.61	H	54.00	79.9	-1.39	Pass*

*Field strength of emissions appearing within restricted frequency bands shall not exceed the limits in § 15.209.

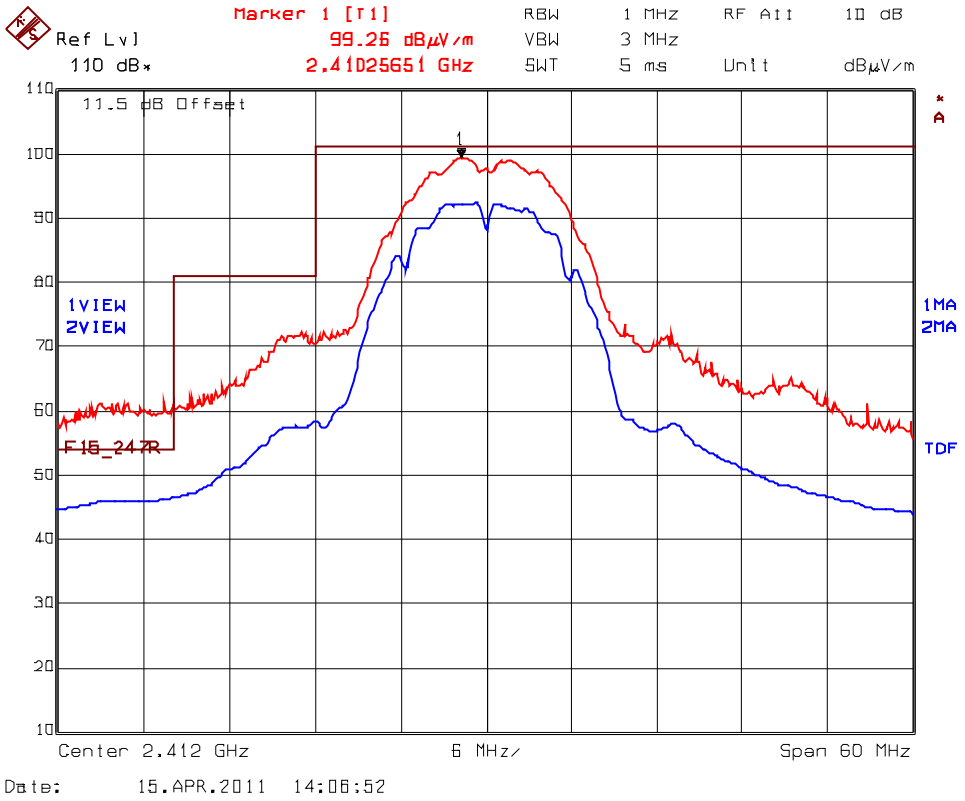
Fundamental Frequency: 2462 MHz
Test Frequency Range: 30 MHz – 25 GHz

Frequency (MHz)	RF Peak Level (dBµV/m)	RF Avg Level (dBµV/m)	Antenna Plane (H/V)	Limit 15.209 (dBµV/m)	Limit 15.247 (dBµV/m)	Margin (dB)	Pass/ Fail
2462	99.39	--	V	--	--	--	--
2462	99.26	--	H	--	--	--	--
4924	54.82	49.67	V	54.0	79.4	-4.3	Pass*
4924	55.30	52.85	H	54.0	79.4	-1.2	Pass*

*Field strength of emissions appearing within restricted frequency bands shall not exceed the limits in § 15.209.

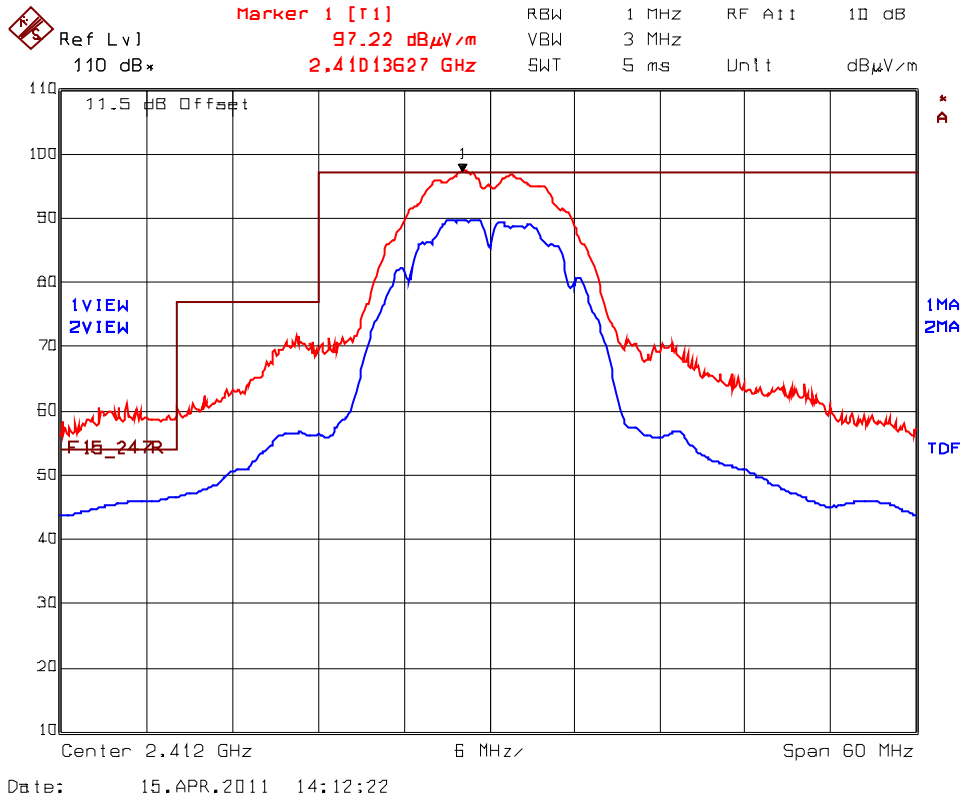
See the following test data plots for band-edge emissions.

Plot 5.9.4.1. Band-Edge RF Radiated Emissions @ 3 m, 802.11b CCK 11 Mbps
Low End of Frequency Band (2412 MHz)
Rx Antenna Orientation: Horizontal



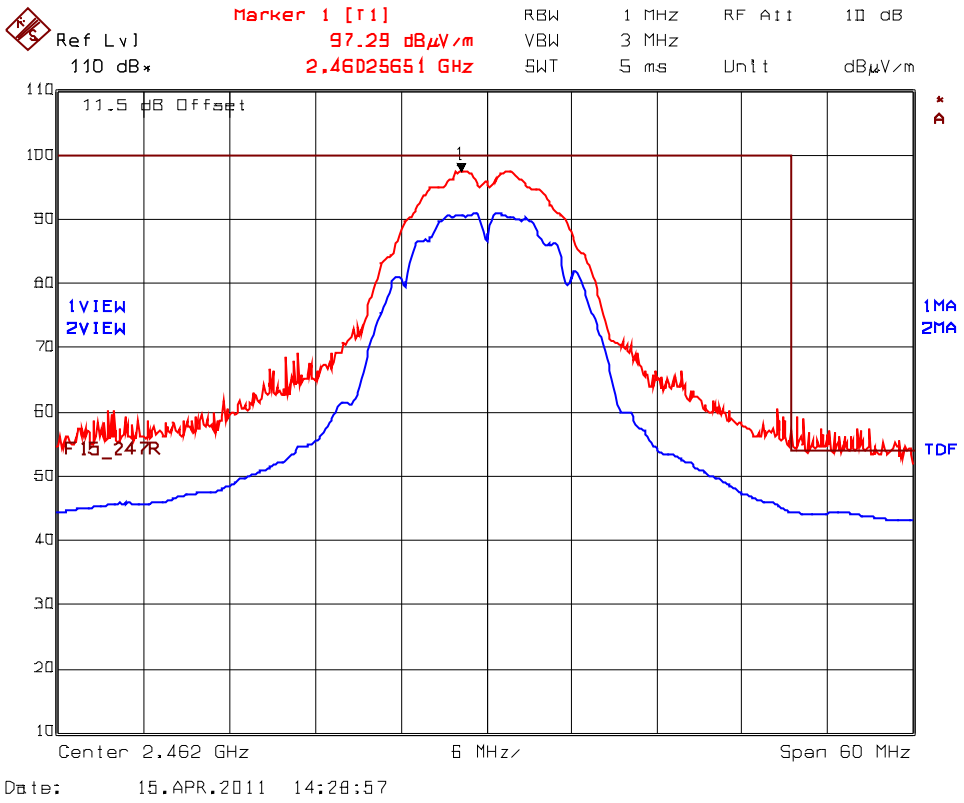
Trace 1: RBW = 1 MHz, VBW = 3 MHz
Trace 2: RBW = 1 MHz, VBW = 10 Hz

Plot 5.9.4.2. Band-Edge RF Radiated Emissions @ 3 m, 802.11b CCK 11 Mbps
Low End of Frequency Band, 2412 MHz
Rx Antenna Orientation: Vertical



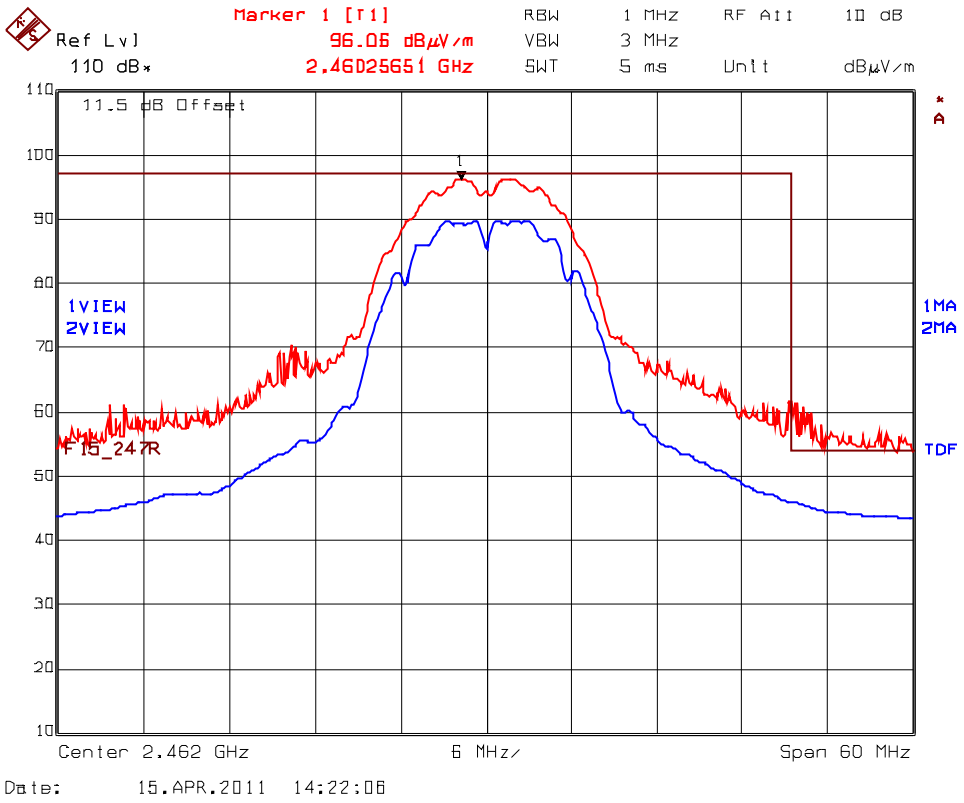
Trace 1: RBW = 1 MHz, VBW = 3 MHz
Trace 2: RBW = 1 MHz, VBW = 10 Hz

Plot 5.9.4.3. Band-Edge RF Radiated Emissions @ 3 m, 802.11b CCK 11 Mbps
Low End of Frequency Band (2462 MHz)
Rx Antenna Orientation: Horizontal



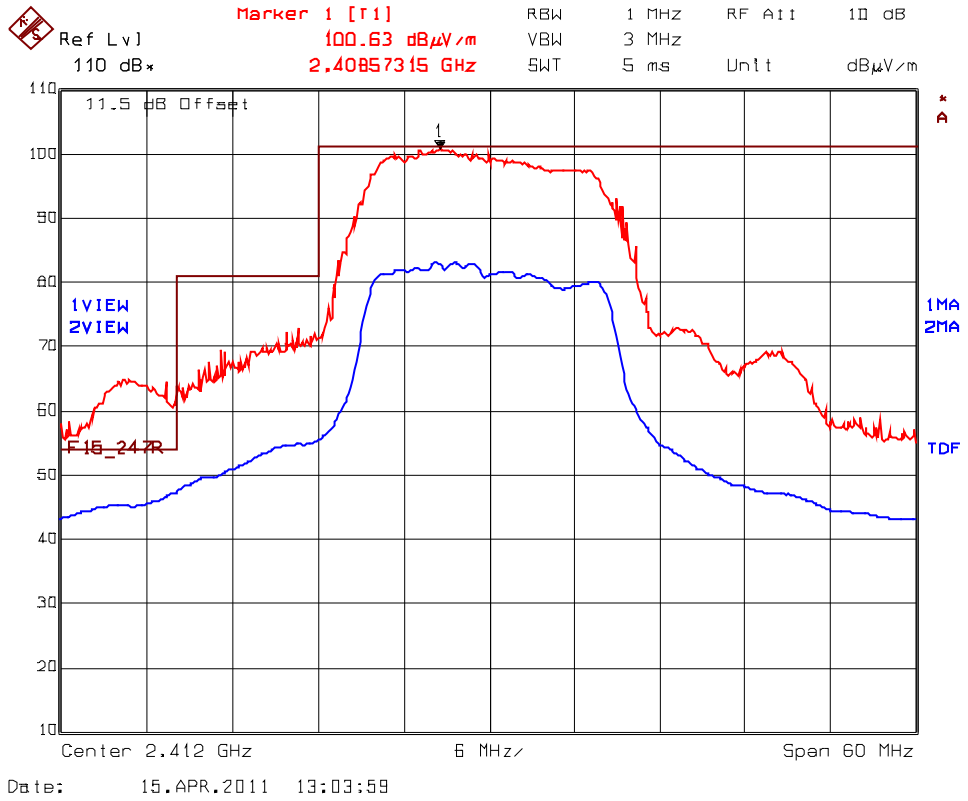
Trace 1: RBW = 1 MHz, VBW = 3 MHz
Trace 2: RBW = 1 MHz, VBW = 10 Hz

Plot 5.9.4.4. Band-Edge RF Radiated Emissions @ 3 m, 802.11b CCK 11 Mbps
Low End of Frequency Band (2462 MHz)
Rx Antenna Orientation: Vertical



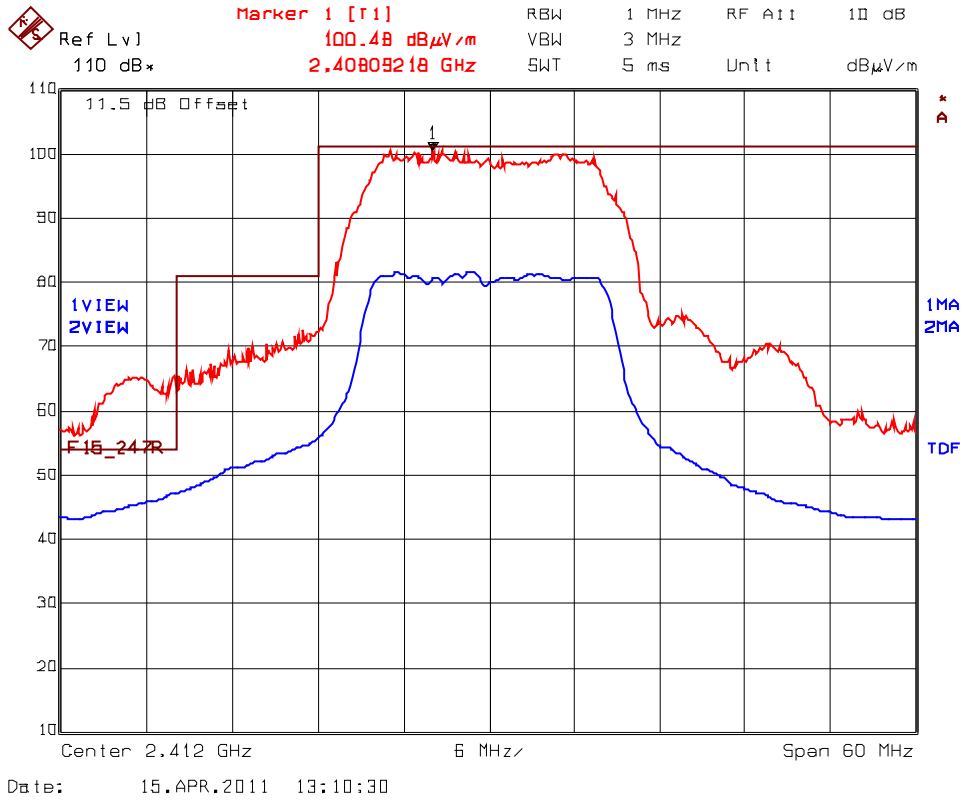
Trace 1: RBW = 1 MHz, VBW = 3 MHz
Trace 2: RBW = 1 MHz, VBW = 10 Hz

Plot 5.9.4.5. Band-Edge RF Radiated Emissions @ 3 m, 802.11g 64-QAM 54 Mbps
Low End of Frequency Band (2412 MHz)
Rx Antenna Orientation: Horizontal



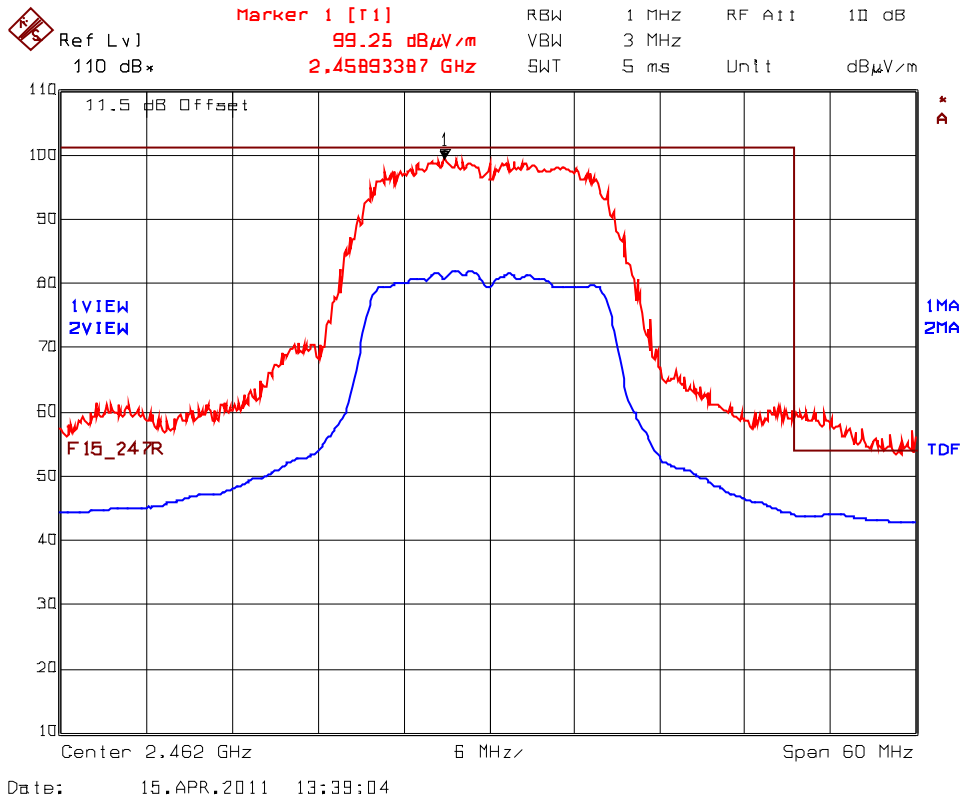
Trace 1: RBW = 1 MHz, VBW = 3 MHz
Trace 2: RBW = 1 MHz, VBW = 10 Hz

Plot 5.9.4.6. Band-Edge RF Radiated Emissions @ 3 m, 802.11g 64-QAM 54 Mbps
Low End of Frequency Band, 2412 MHz
Rx Antenna Orientation: Vertical



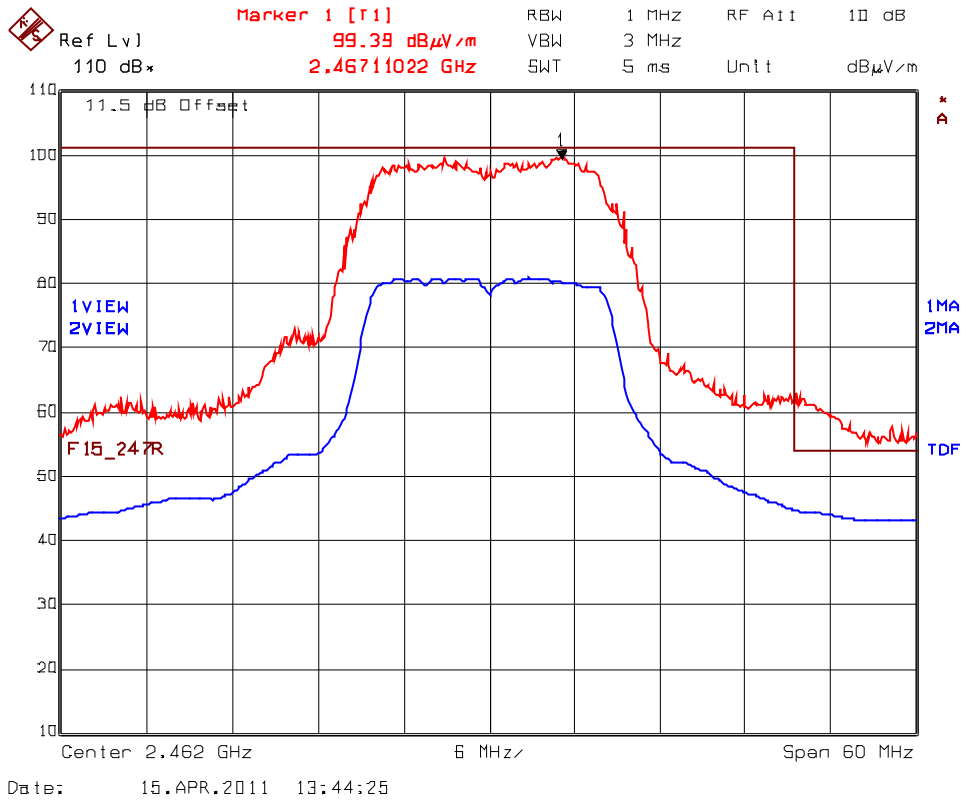
Trace 1: RBW = 1 MHz, VBW = 3 MHz
Trace 2: RBW = 1 MHz, VBW = 10 Hz

Plot 5.9.4.7. Band-Edge RF Radiated Emissions @ 3 m, 802.11g 64-QAM 54 Mbps
Low End of Frequency Band (2462 MHz)
Rx Antenna Orientation: Horizontal



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

Plot 5.9.4.8. Band-Edge RF Radiated Emissions @ 3 m, 802.11g 64-QAM 54 Mbps
Low End of Frequency Band (2462 MHz)
Rx Antenna Orientation: Vertical



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

5.10. POWER SPECTRAL DENSITY [§ 15.247(e)]

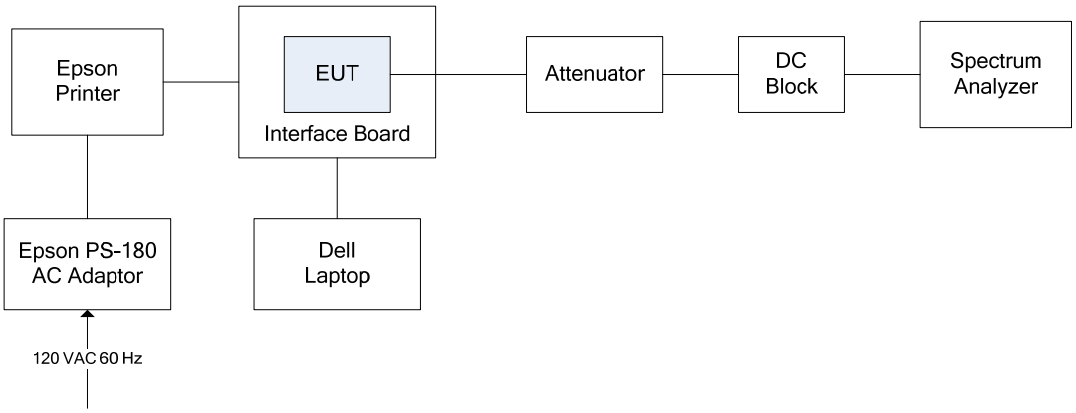
5.10.1. Limit(s)

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

5.10.2. Method of Measurements

KDB Publication No. 558074: Guidance on Measurements for Digital Transmission Systems (47 CFR 15.247).

5.10.3. Test Arrangement



5.10.4. Test Data

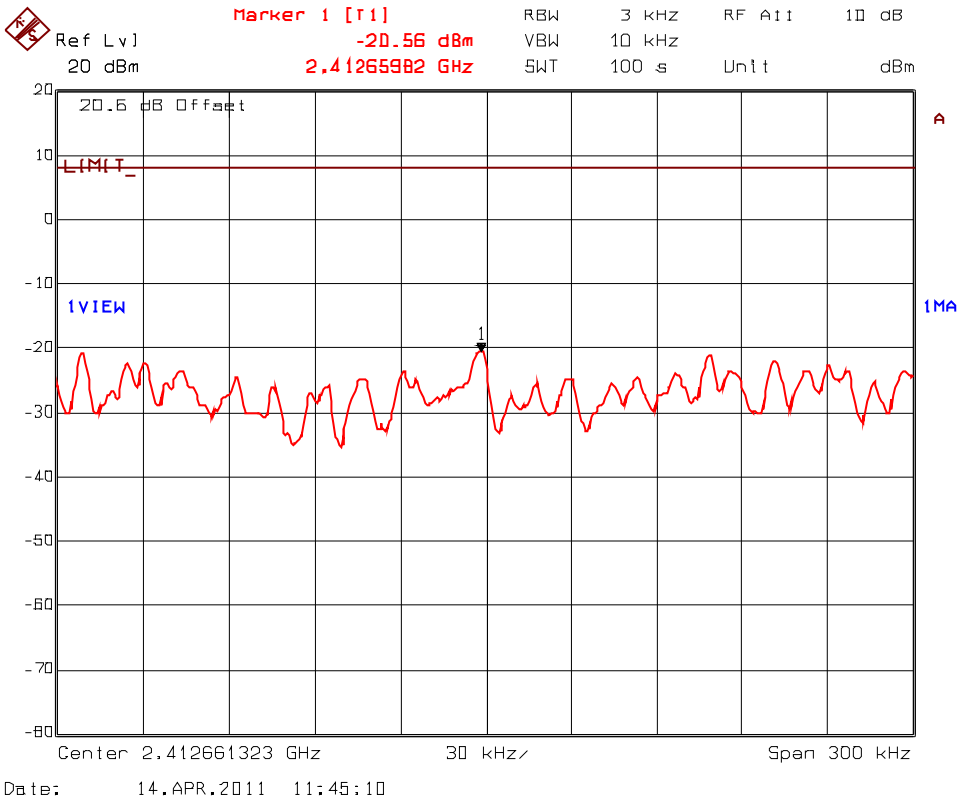
Remarks:

- Measurement method: Power spectral density (PSD) Option 1.
- Investigation of all combinations of modulations and data rates were carried out to determine the worst-case operation and the highest level is recorded in the following table.

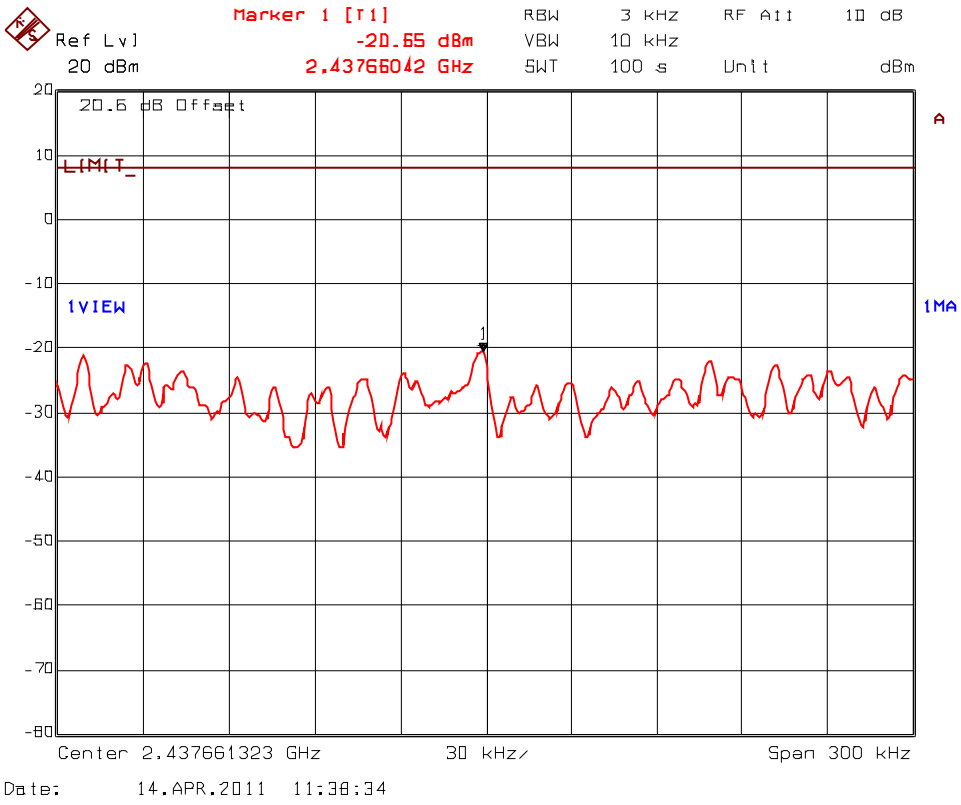
Frequency (MHz)	Modulation	Data Rate (Mbps)	*PSD in 3 kHz BW (dBm)	Limit (dBm)	Margin (dB)
802.11b Mode					
2412	DQPSK	2	-20.56	8	-28.56
2437	DQPSK	2	-20.65	8	-28.65
2462	DQPSK	2	-20.82	8	-28.82
802.11g Mode					
2412	16-QAM	36	-14.58	8	-22.58
2437	16-QAM	36	-14.86	8	-22.86
2462	16-QAM	36	-15.25	8	-23.25

*See the following plots for measurement details.

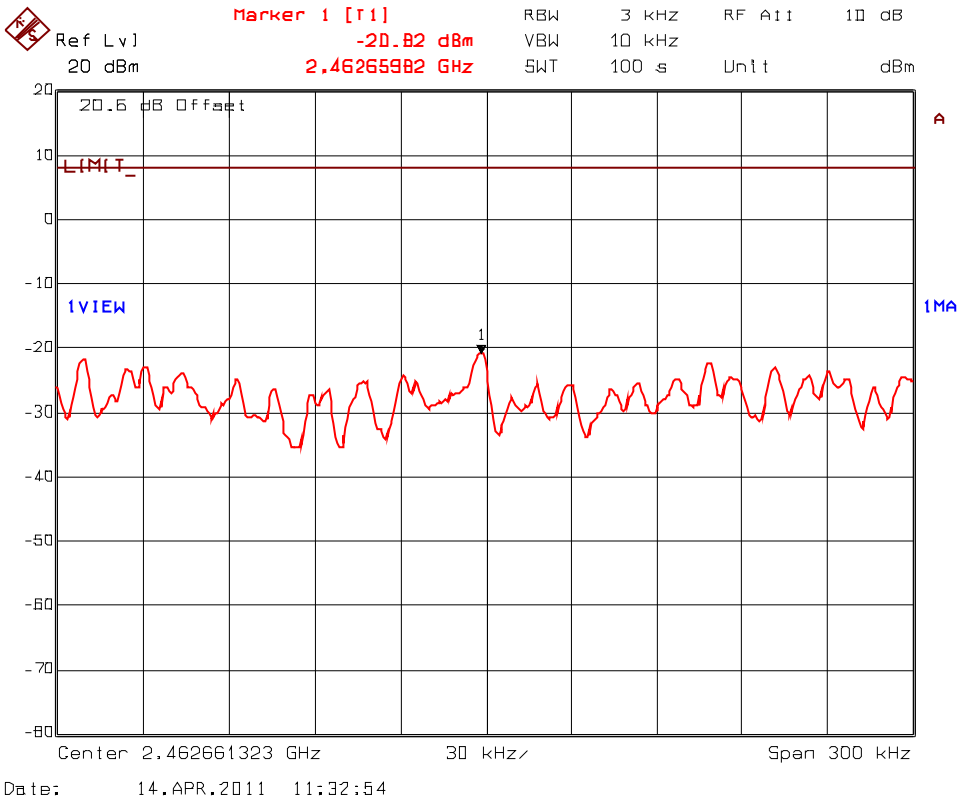
Plot 5.10.4.1. Power Spectral Density, 802.11b DQPSK 2 Mbps
Test Frequency: 2412 MHz



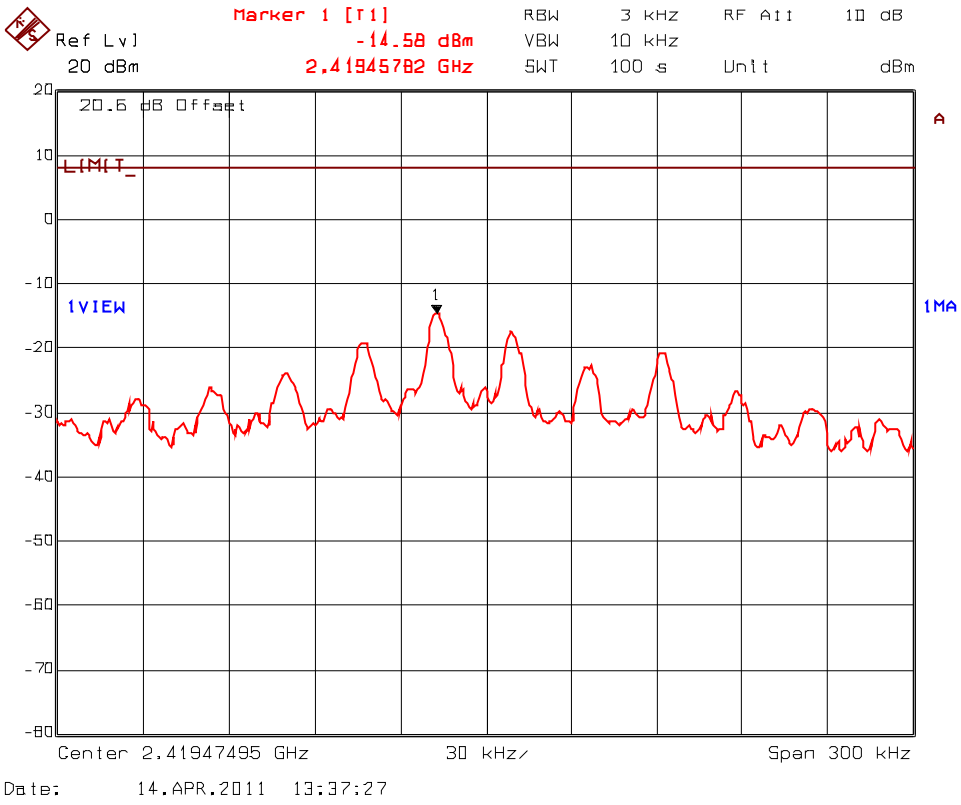
Plot 5.10.4.2. Power Spectral Density, 802.11b DQPSK 2 Mbps
Test Frequency: 2437 MHz



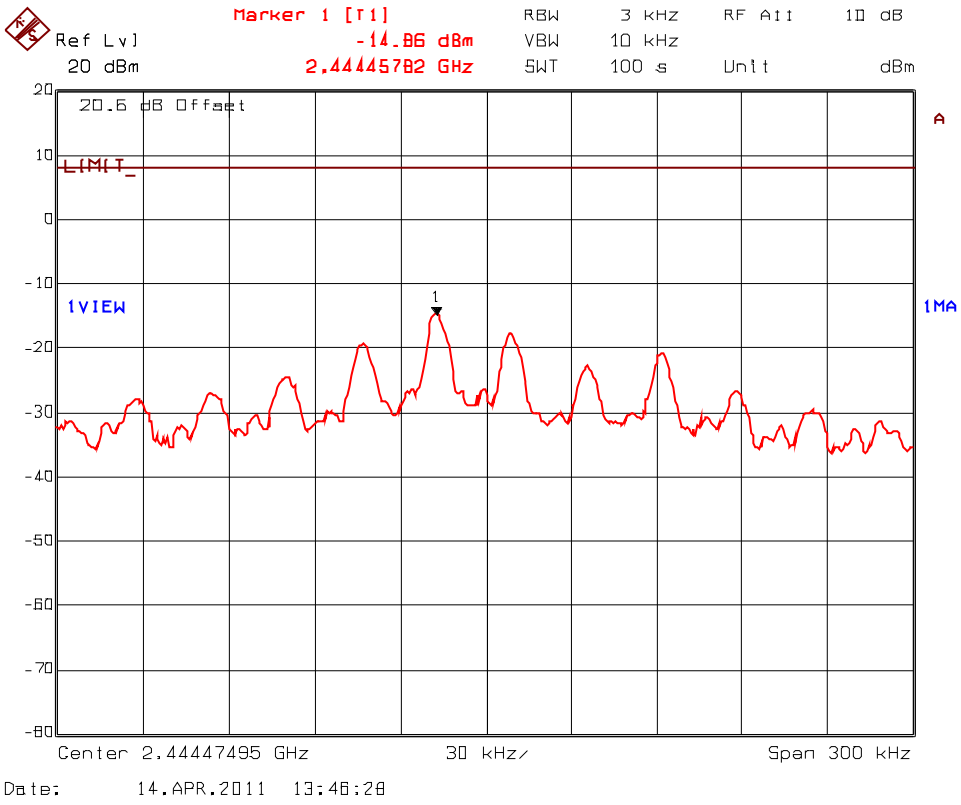
Plot 5.10.4.3. Power Spectral Density, 802.11b DQPSK 2 Mbps
Test Frequency: 2462 MHz



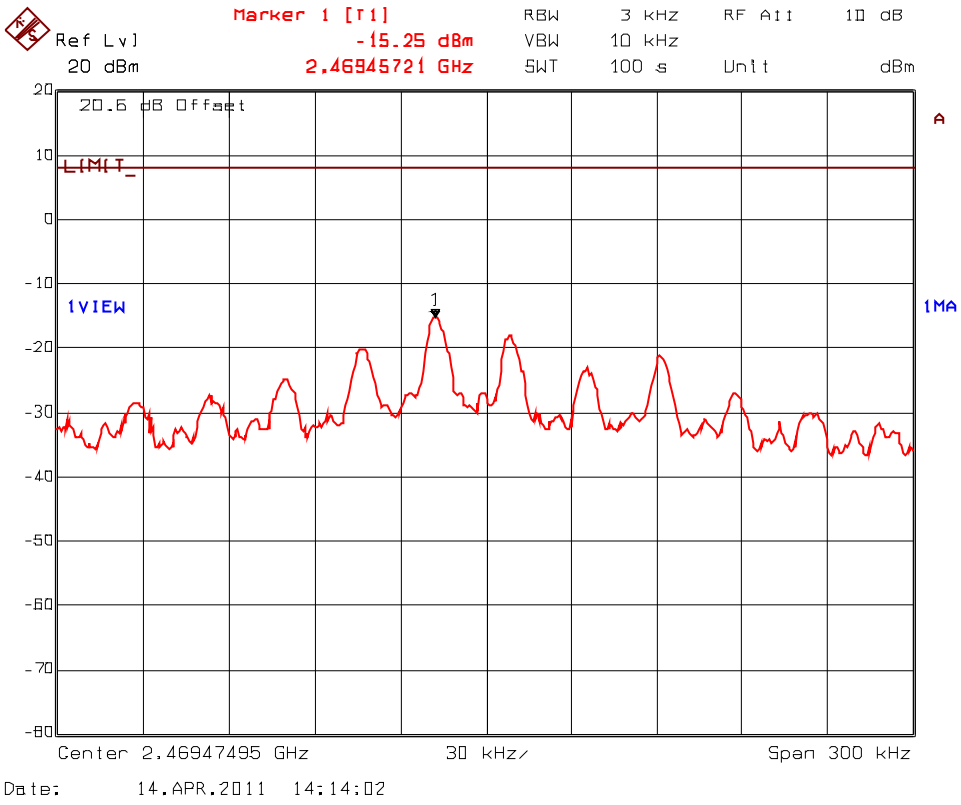
Plot 5.10.4.4. Power Spectral Density, 802.11g 16-QAM 36 Mbps
Test Frequency: 2412 MHz



Plot 5.10.4.5. Power Spectral Density, 802.11g 16-QAM 36 Mbps
Test Frequency: 2437 MHz



Plot 5.10.4.6. Power Spectral Density, 802.11g 16-QAM 36 Mbps
Test Frequency: 2462 MHz



5.11. RF EXPOSURE REQUIRMENTS [§§ 15.247(e)(i), 1.1310 & 2.1091]

The criteria listed in the following table shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation.

FCC 47 CFR § 1.1310:

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm^2)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3–3.0	614	1.63	*(100)	6
3.0–30	1842/f	4.89/f	*($900/f^2$)	6
30–300	61.4	0.163	1.0	6
300–1500	.....	.....	f/300	6
1500–100,000	.....	.....	5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3–1.34	614	1.63	*(100)	30
1.34–30	824/f	2.19/f	*($180/f^2$)	30
30–300	27.5	0.073	0.2	30
300–1500	.....	.....	f/1500	30
1500–100,000	.....	.....	1.0	30

f = frequency in MHz
* = Plane-wave equivalent power density

NOTE 1 TO TABLE 1: Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.

NOTE 2 TO TABLE 1: General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or can not exercise control over their exposure.

5.11.1. Method of Measurements

Refer to Sections 1.1310, 2.1091

In order to demonstrate compliance with MPE requirements (see Section 2.1091), the following information is typically needed:

(1) Calculation that estimates the minimum separation distance (20 cm or more) between an antenna and persons required to satisfy power density limits defined for free space.
(2) Antenna installation and device operating instructions for installers (professional/unskilled users), and the parties responsible for ensuring compliance with the RF exposure requirement
(3) Any caution statements and/or warning labels that are necessary in order to comply with the exposure limits
(4) Any other RF exposure related issues that may affect MPE compliance

Calculation Method of RF Safety Distance:

$$S = \frac{P \cdot G}{4 \cdot \pi \cdot r^2} = \frac{EIRP}{4 \cdot \pi \cdot r^2}$$

Where: P: power input to the antenna in mW
EIRP: Equivalent (effective) isotropic radiated power
S: power density mW/cm^2
G: numeric gain of antenna relative to isotropic radiator
r: distance to centre of radiation in cm

5.11.2. RF Evaluation

Evaluation of RF Exposure Compliance Requirements	
RF Exposure Requirements	**Compliance with FCC Rules**
Minimum calculated separation distance between antenna and persons required: ***1.7 cm**	Manufacturer' instruction for separation distance between antenna and persons required: **20 cm.**
Antenna installation and device operating instructions for installers (professional/unskilled users), and the parties responsible for ensuring compliance with the RF exposure requirement	Antenna installation and device operating instructions shall be provided to installers to maintain and ensure compliance with RF exposure requirements.
Caution statements and/or warning labels that are necessary in order to comply with the exposure limits	Refer to User's Manual for RF Exposure Information.
Any other RF exposure related issues that may affect MPE compliance	None.

*The minimum separation distance between the antenna and bodies of users are calculated using the following formula:

$$r = \sqrt{\frac{P \cdot G}{4 \cdot \pi \cdot S}} = \sqrt{\frac{EIRP}{4 \cdot \pi \cdot S}}$$

S = 1.0 mW/cm^2
EIRP = 15.42 dBm = 34.83 mW (Worst Case)

(Minimum Safe Distance, r) = $\sqrt{\frac{EIRP}{4 \cdot \pi \cdot S}} = \sqrt{\frac{34.83}{4 \cdot \pi \cdot (1.0)}} \approx 1.7cm$

EXHIBIT 6. TEST EQUIPMENT LIST

Test Instruments	Manufacturer	Model No.	Serial No.	Frequency Range	Cal. Due Date
Spectrum Analyzer	Rohde & Schwarz	FSEK30	100077	20 Hz – 40 GHz	14 Aug 2011
Spectrum Analyzer	Rohde & Schwarz	ESU40	100037	20 Hz – 40 GHz	15 Mar 2012
RF Amplifier	Hewlett Packard	84498	3008A00769	1 – 26.5 GHz	17 Feb 2012
RF Amplifier	AH System	PAM-0118	225	20 MHz – 18 GHz	15 Mar 2012
High Pass Filter	K & L	11SH10-4000/T12000	4	Cut off 2.4 GHz	Cal. on use
Horn Antenna	Emco	3155	6570	1 – 18 GHz	22 Feb 2012
Horn Antenna	Emco	3155	5955	1 – 18 GHz	09 Jan 2012
Biconi-Log Antenna	Emco	3142C	00026873	26 – 3000 MHz	26 Apr 2012
Dipole Antenna	Emco	3121C	434	26 – 1000 MHz	16 Aug 2011
Signal Generator	Hewlett Packard	8648C	3443U00391	100 kHz – 3200 MHz	16 Dec 2011
Power Divider	Mini-Circuits	15542	0235	DC – 18 GHz	Cal. on use
Attenuator	Narda	4768-20	-	DC – 40 GHz	Cal. on use
DC Block	Hewlett-Packard	11742A	12460	0.045 – 26.5 GHz	Cal. on use
Spectrum Analyzer	Agilent	E7401A	US40240432	9 kHz – 1.5 GHz	10 Jan 2012
LISN	Schwarzbeck	NSLK8127	8127276	10 kHz – 30 MHz	07 Apr 2012
Attenuator	Pasternack	PE7010-20	-	-	18 Jan 2012
Power Meter	Hewlett Packard	8900D	2131A01044	01 – 18 GHz	24 Jun 2011
Power Sensor	Hewlett Packard	84811A	2551A01484	01 – 18 GHz	24 Jun 2011

EXHIBIT 7. MEASUREMENT UNCERTAINTY

The measurement uncertainties stated were calculated in accordance with the requirements of CISPR 16-4-2 @ IEC:2003 and JCGM 100:2008 (GUM 1995) – Guide to the Expression of Uncertainty in Measurement.

7.1. LINE CONDUCTED EMISSION MEASUREMENT UNCERTAINTY

	Line Conducted Emission Measurement Uncertainty (150 kHz – 30 MHz):	**Measured**	**Limit**
u_c	**Combined standard uncertainty:** $u_c(y) = \sqrt{\sum_{I=1}^{m} u_i^2(y)}$	**± 1.57**	**± 1.8**
U	**Expanded uncertainty U:** $U = 2u_c(y)$	**± 3.14**	**± 3.6**

7.2. RADIATED EMISSION MEASUREMENT UNCERTAINTY

	Radiated Emission Measurement Uncertainty @ 3m, Horizontal (30-1000 MHz):	**Measured**	**Limit**
u_c	**Combined standard uncertainty:** $u_c(y) = \sqrt{\sum_{I=1}^{m} u_i^2(y)}$	**± 2.15**	**± 2.6**
U	**Expanded uncertainty U:** $U = 2u_c(y)$	**± 4.30**	**± 5.2**

	Radiated Emission Measurement Uncertainty @ 3m, Vertical (30-1000 MHz):	**Measured**	**Limit**
u_c	**Combined standard uncertainty:** $u_c(y) = \sqrt{\sum_{I=1}^{m} u_i^2(y)}$	**± 2.39**	**± 2.6**
U	**Expanded uncertainty U:** $U = 2u_c(y)$	**± 4.78**	**± 5.2**

	Radiated Emission Measurement Uncertainty @ 3 m, Horizontal & Vertical (1 – 18 GHz):	**Measured**	**Limit**
u_c	**Combined standard uncertainty:** $u_c(y) = \sqrt{\sum_{I=1}^{m} u_i^2(y)}$	**± 1.87**	Under consideration
U	**Expanded uncertainty U:** $U = 2u_c(y)$	**± 3.75**	Under consideration