



Nemko Test Report: 10238007RUS1rev2

Applicant: SyChip, LLC
4441 Sigma Road
Dallas, TX 75244
USA


**Equipment Under Test:
(E.U.T.)** WiFi SN8000 and SN8000UFL

FCC Identifier: QPU8000


Industry Canada Identifier: 4523A-SN8000

In Accordance With: **FCC Part 15, Subpart C, 15.247 and
Industry Canada RSS-210, Issue 8**
Digital Transmission Systems

Tested By: Nemko USA, Inc.
802 N. Kealy
Lewisville, Texas 75057-3136

TESTED BY:  **DATE:** 08 May 2013

David Light, Senior Wireless Engineer

APPROVED BY:  **DATE:** 06 June 2013

Michael Cantwell, Reviewer

Number of Pages: 67

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Section 1. Summary of Test Results

Manufacturer: SyChip, LLC
Model No.: SN8000 and SN8000UFL*
Serial No.: None

*Note: Model SN8000 uses chip antenna and model SN8000UFL uses external 5 dBi dipole antenna.

General: **All measurements are traceable to national standards.**

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15, Subpart C, Paragraph 15.247 and Industry Canada RSS-210, Issue 8 for Digital Transmission Systems. Radiated tests were conducted in accordance with ANSI C63.4-2003. Radiated emissions are made on an open area test site. A description of the test facility is on file with the FCC and Industry Canada.

- | | | | |
|-------------------------------------|----------------------------|-------------------------------------|---------------------|
| <input checked="" type="checkbox"/> | New Submission | <input checked="" type="checkbox"/> | Production Unit |
| <input type="checkbox"/> | Class II Permissive Change | <input type="checkbox"/> | Pre-Production Unit |

THIS TEST REPORT RELATES ONLY TO THE ITEM(S) TESTED.

THE FOLLOWING DEVIATIONS FROM, ADDITIONS TO, OR EXCLUSIONS FROM THE TEST SPECIFICATIONS HAVE BEEN MADE.
See " Summary of Test Data".



This report must not be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government. Nemko USA, Inc. is a NVLAP accredited laboratory.

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Summary Of Test Data

NAME OF TEST	PARA. NO.	RESULT
Powerline Conducted Emissions	15.207(a) / RSS-Gen 7.2.4	Complies
Minimum 6 dB Bandwidth	15.247(a)(2) / RSS-210 A8.2(a)	Complies
Maximum Peak Power Output	15.247(b)(3) / RSS-210 A8.4(4)	Complies
Spurious Emissions (Antenna Conducted)	15.247(d) / RSS-210 A8.5	Complies
Spurious Emissions (Restricted Bands)	15.247(d)/15.209(a) / RSS-Gen 7.2.2	Complies
Peak Power Spectral Density	15.247(e) / RSS-210 A8.2(b)	Complies

Footnotes:

Revisions:

Rev1 Corrected typographical error on model number.


Rev2 Corrected antenna type and customer address.

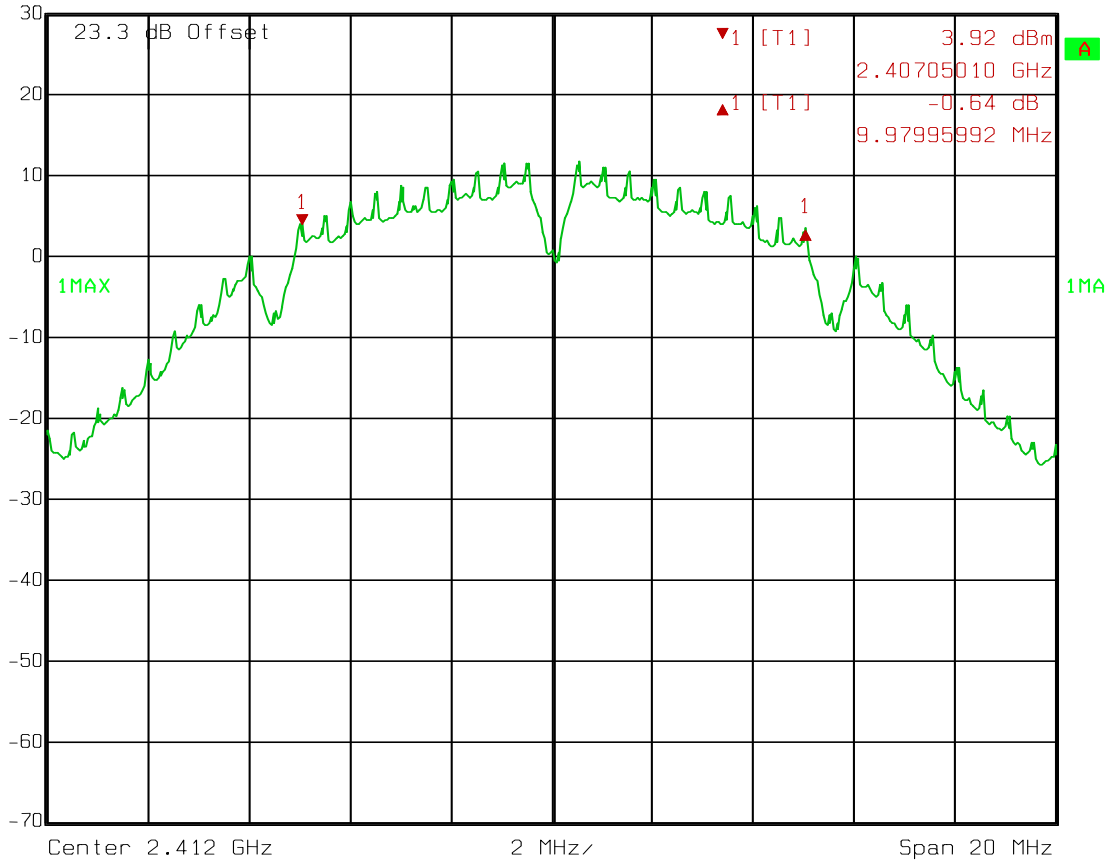
Test Data – Occupied Bandwidth

6 dB Bandwidth

802.11b

Low Channel

	Delta 1 [T1]	RBW	100 kHz	RF Att	30 dB
	Ref Lvl	-0.64 dB	VBW	300 kHz	
	30 dBm	9.97995992 MHz	SWT	5 ms	Unit dBm



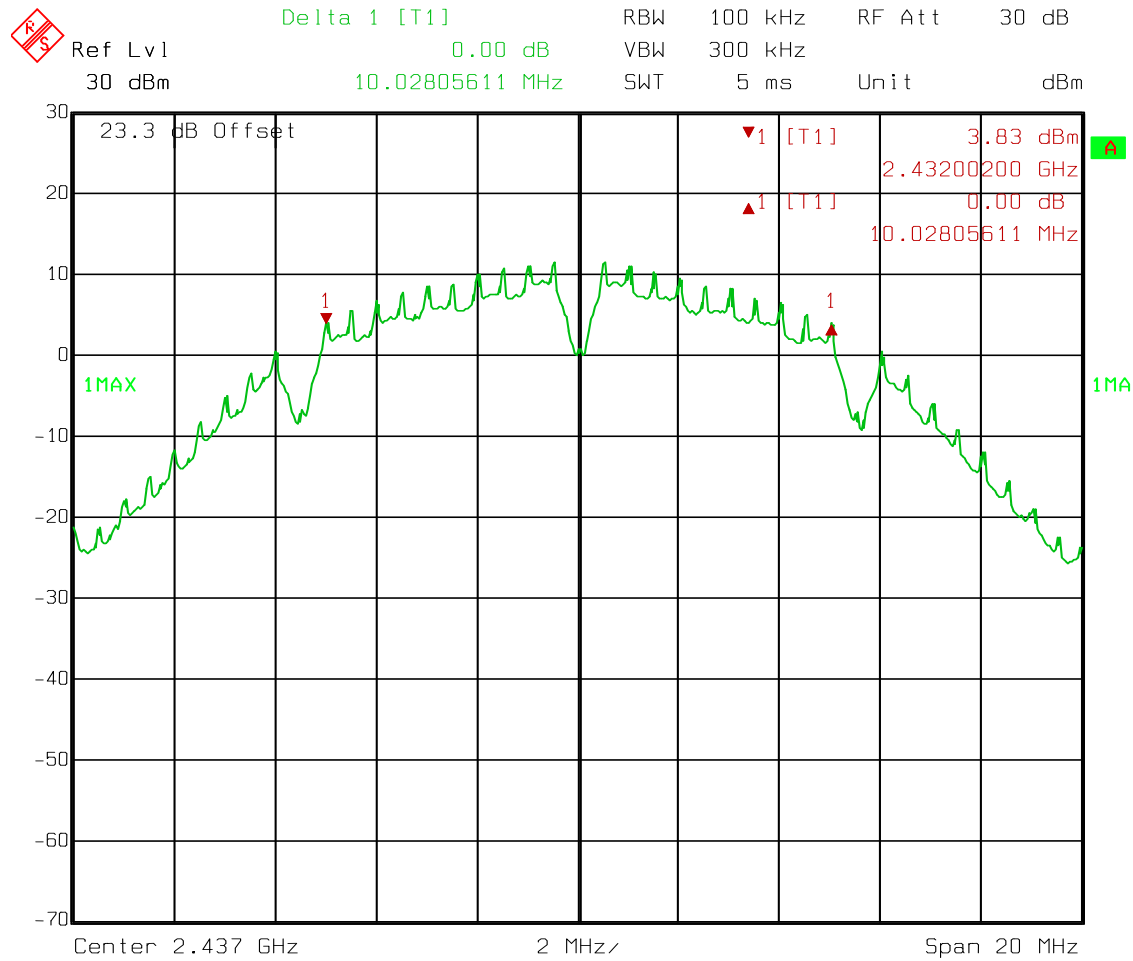
Date: 29.APR.2013 10:23:38

Test Data – Occupied Bandwidth

6 dB Bandwidth

802.11b

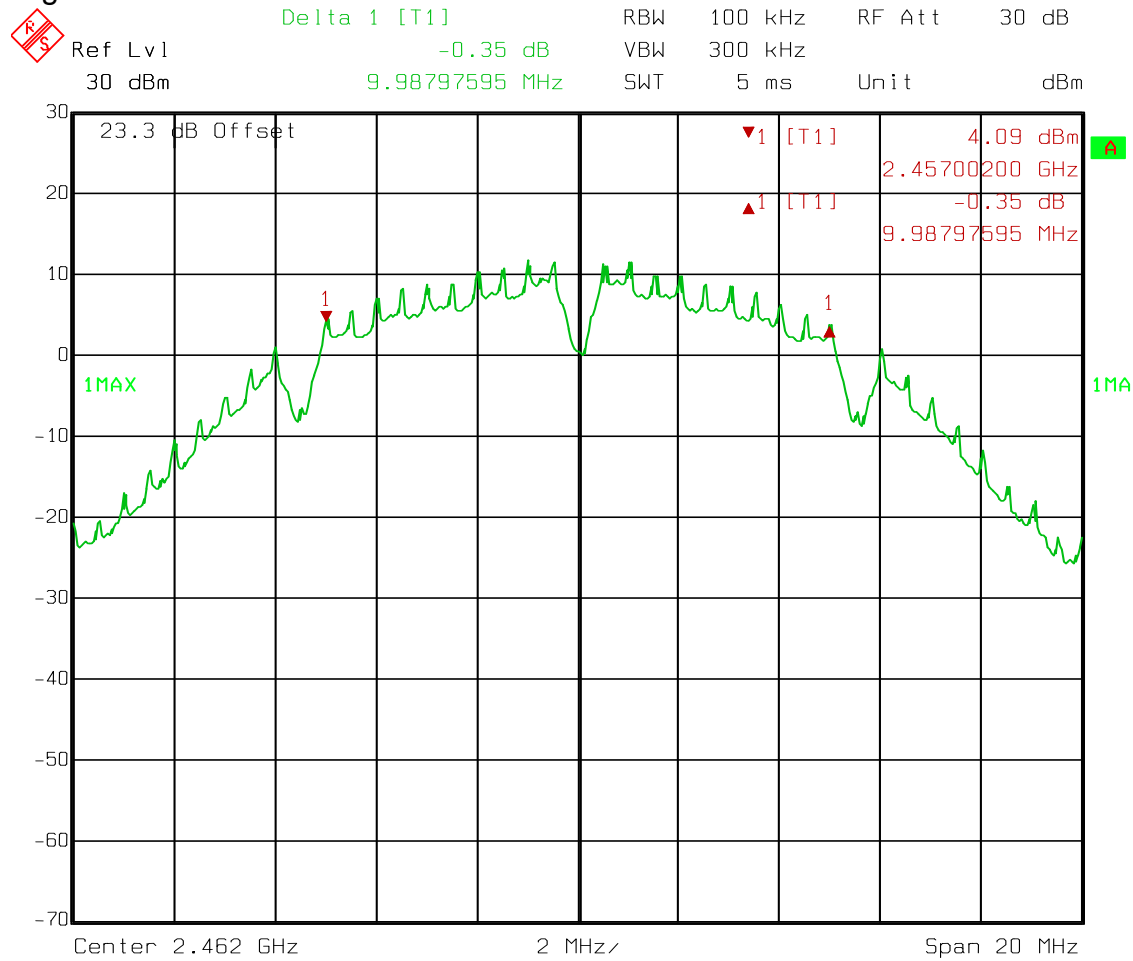
Mid Channel



Date: 29.APR.2013 10:29:29

Test Data – Occupied Bandwidth

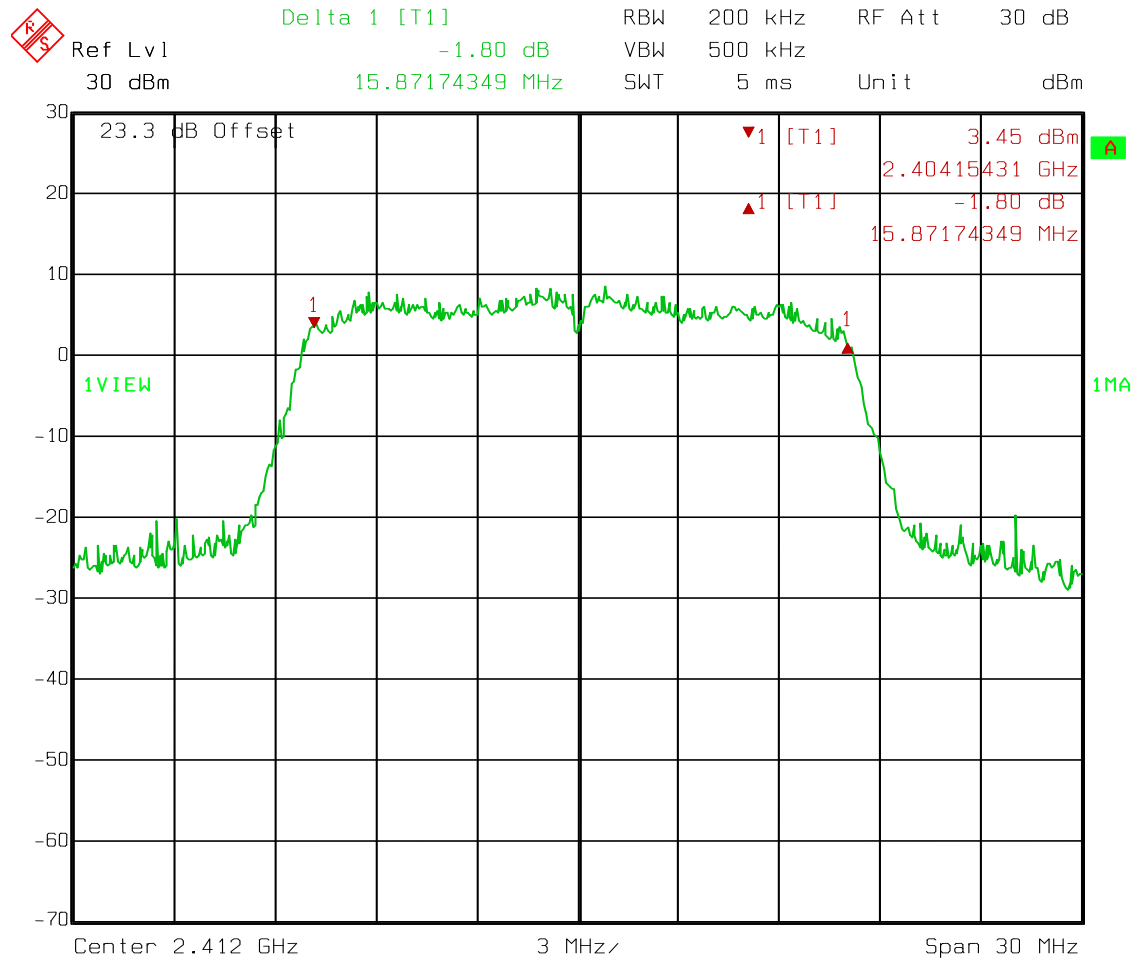
6 dB Bandwidth
802.11b
High Channel



Date: 29.APR.2013 10:33:24

Test Data – Occupied Bandwidth

6 dB Bandwidth
802.11g
Low Channel



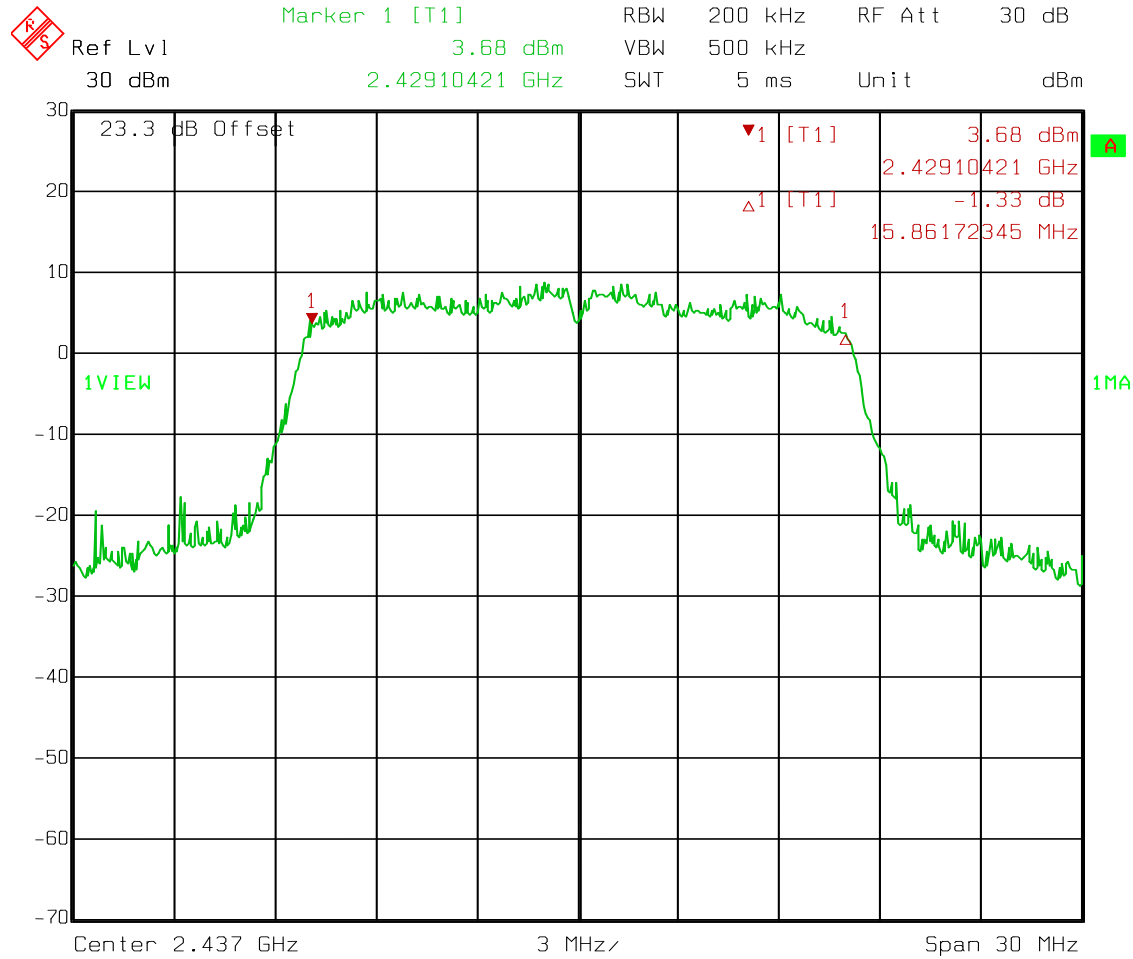
Date: 29.APR.2013 10:42:32

Test Data – Occupied Bandwidth

6 dB Bandwidth

802.11g


Mid Channel

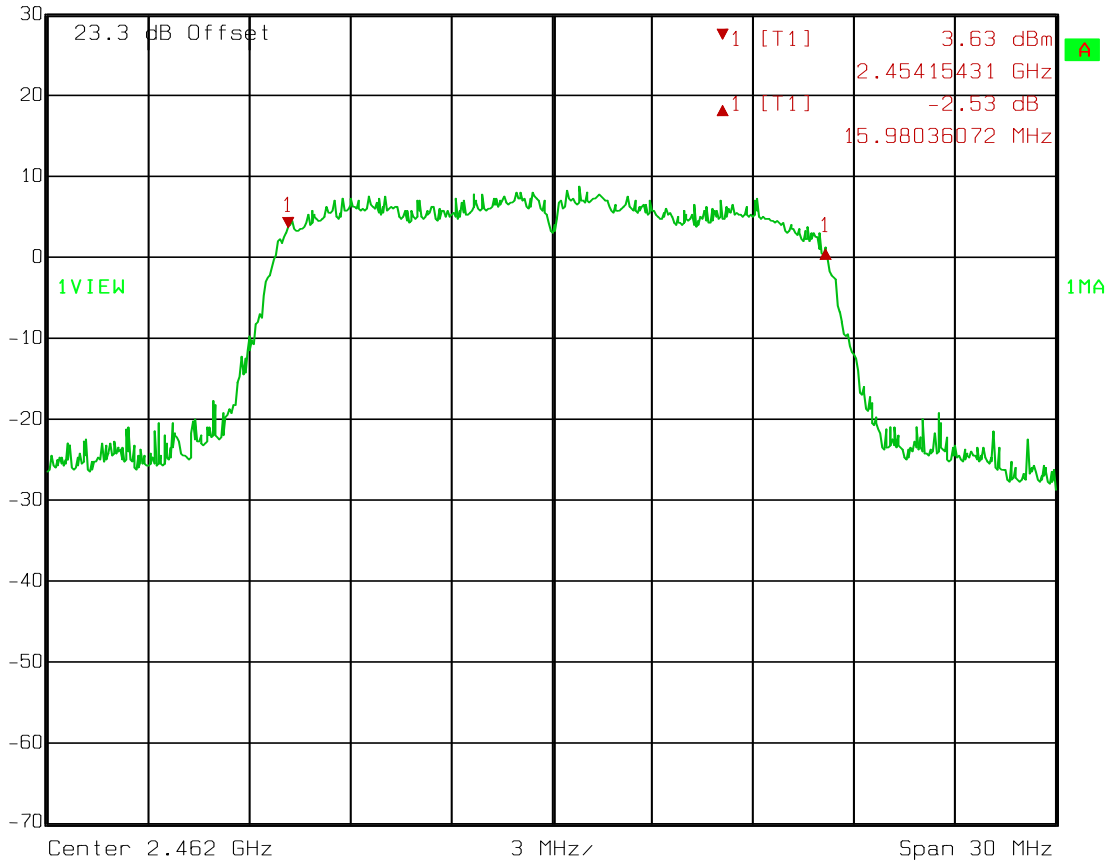


Date: 29.APR.2013 10:48:04

Test Data – Occupied Bandwidth

6 dB Bandwidth
802.11g
High Channel

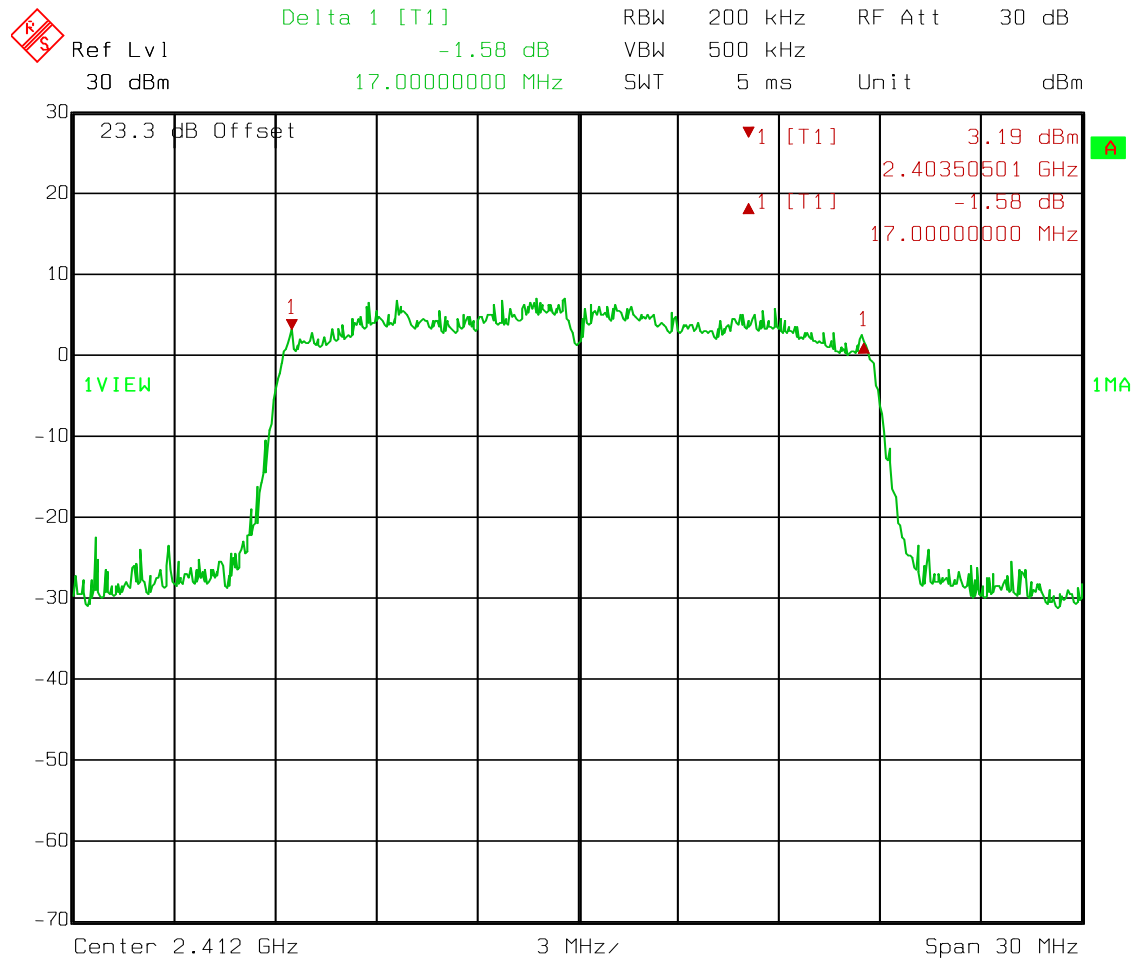
	Delta 1 [T1]	RBW	200 kHz	RF Att	30 dB
	Ref Lvl	-2.53 dB	VBW	500 kHz	
	30 dBm	15.98036072 MHz	SWT	5 ms	Unit dBm



Date: 29.APR.2013 10:53:34

Test Data – Occupied Bandwidth

6 dB Bandwidth
802.11n
Low Channel



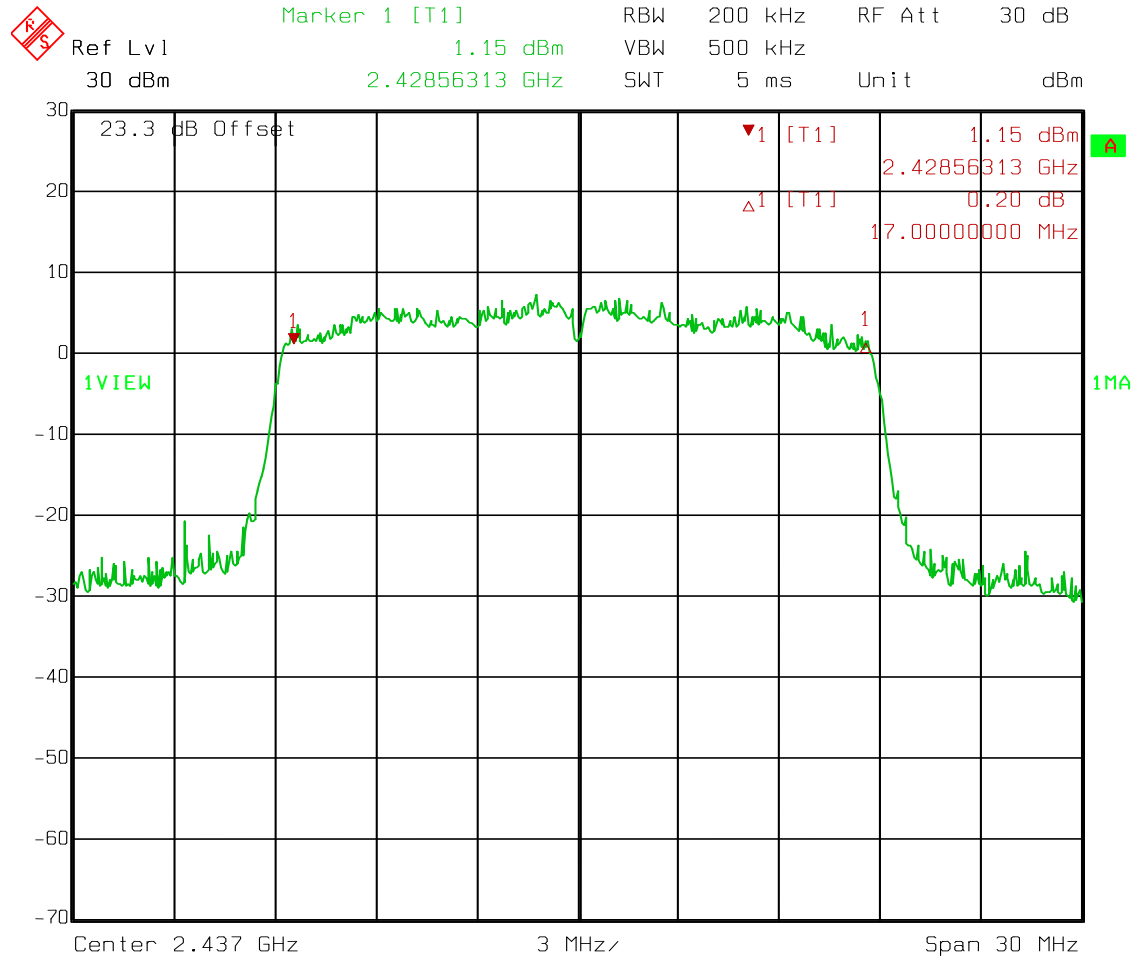
Date: 29.APR.2013 11:01:57

Test Data – Occupied Bandwidth

6 dB Bandwidth

802.11n

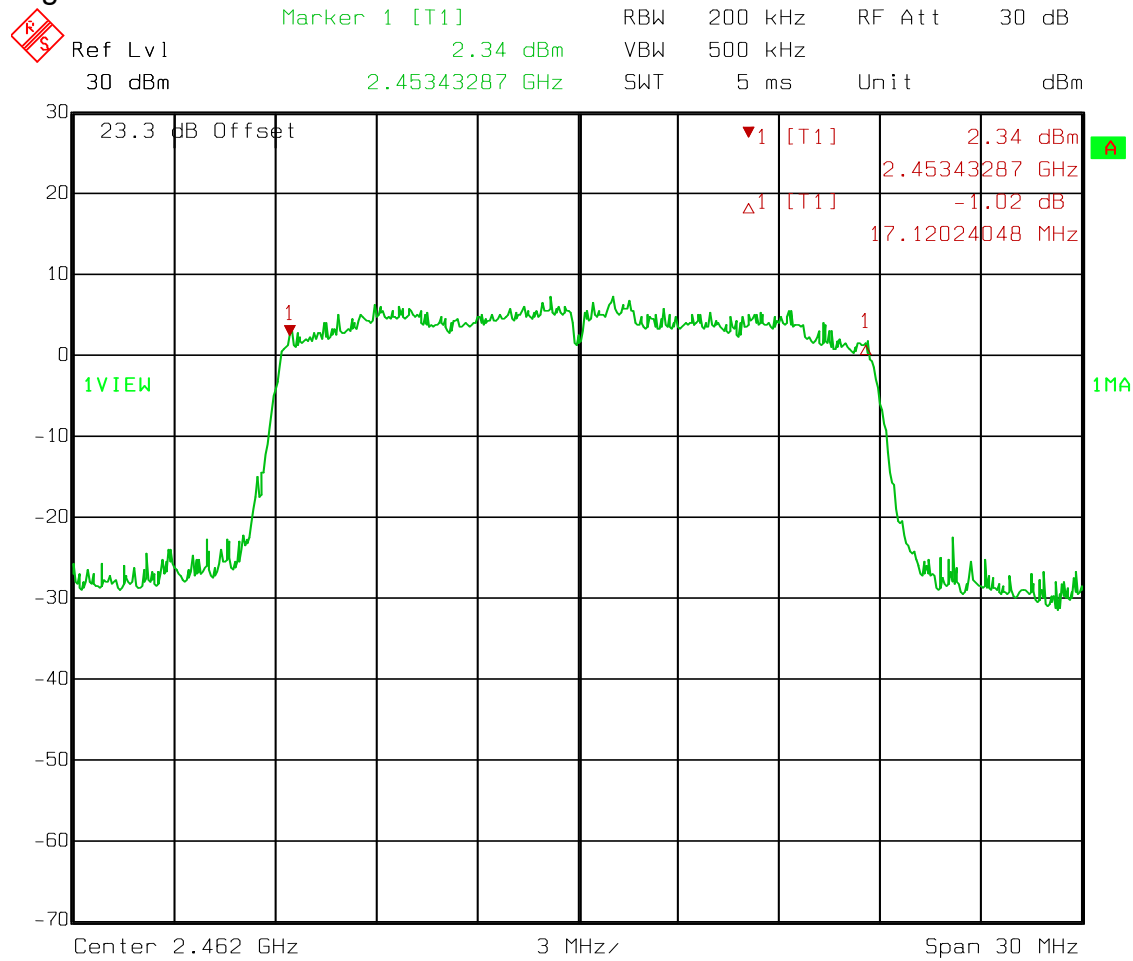
Mid Channel



Date: 29.APR.2013 11:06:29

Test Data – Occupied Bandwidth

6 dB Bandwidth
802.11n
High Channel

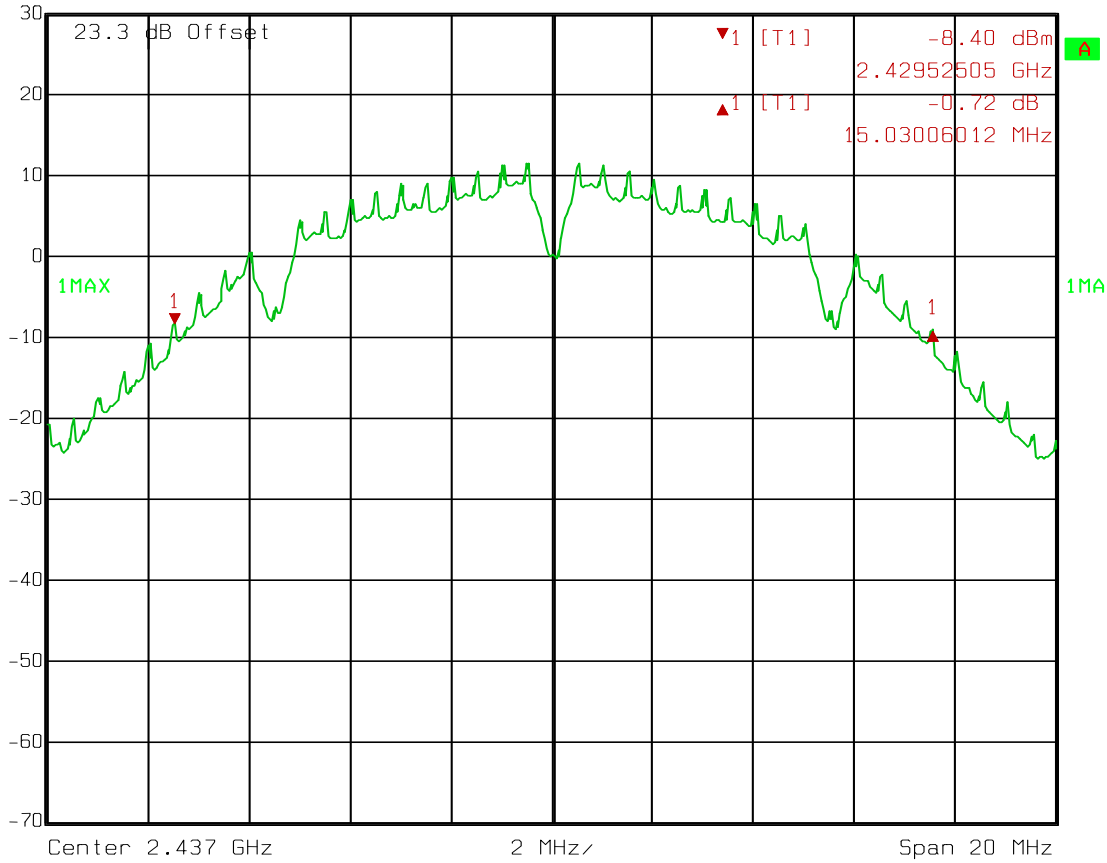


Date: 29.APR.2013 11:13:20

Test Data – Occupied Bandwidth

20 dB Bandwidth
802.11b

	Delta 1 [T1]	RBW	100 kHz	RF Att	30 dB
	Ref Lvl	-0.72 dB	VBW	300 kHz	
	30 dBm	15.03006012 MHz	SWT	5 ms	Unit dBm

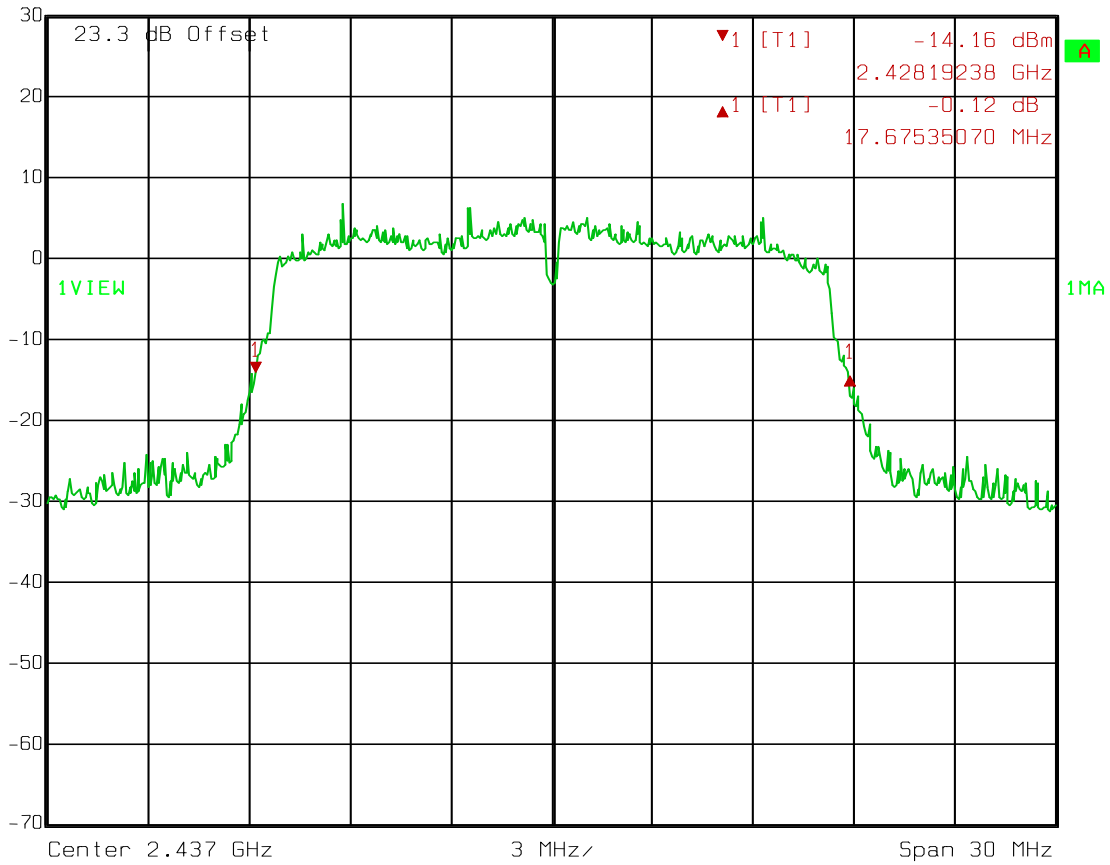


Date: 29.APR.2013 10:41:05

Test Data – Occupied Bandwidth

20 dB Bandwidth
802.11g

	Delta 1 [T1]	RBW	100 kHz	RF Att	30 dB
	Ref Lvl	-0.12 dB	VBW	300 kHz	
	30 dBm	17.67535070 MHz	SWT	7.5 ms	Unit

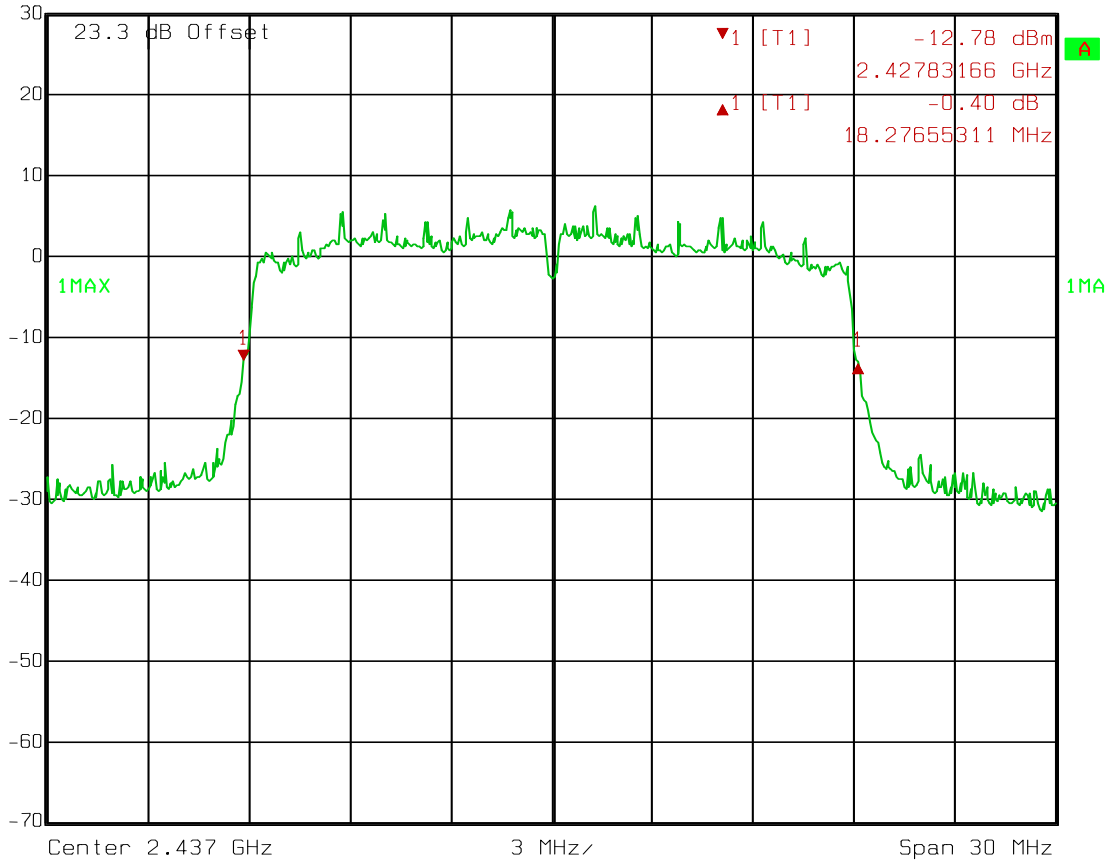


Date: 29.APR.2013 10:49:03

Test Data – Occupied Bandwidth

20 dB Bandwidth
802.11n

	Ref Lvl	Delta 1 [T1]	RBW	100 kHz	RF Att	30 dB
	30 dBm	-0.40 dB	VBW	300 kHz		
		18.27655311 MHz	SWT	7.5 ms	Unit	dBm

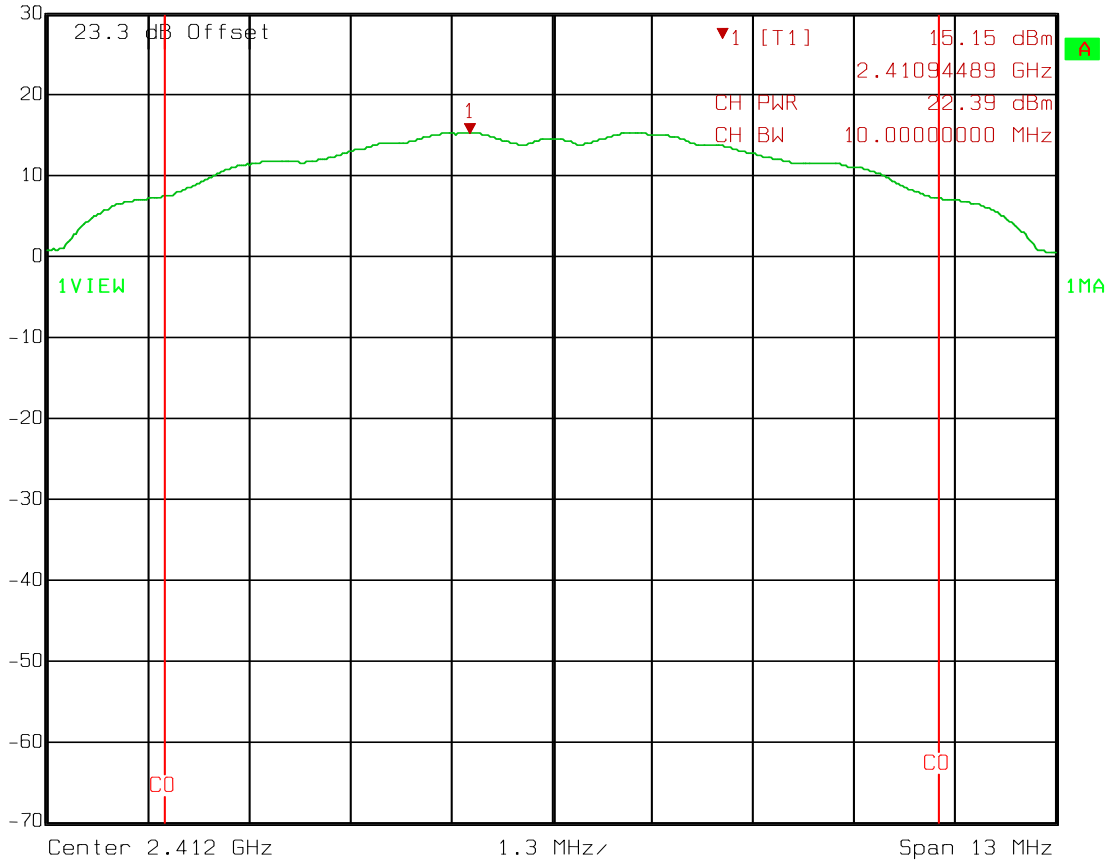


Date: 29.APR.2013 11:07:32

Test Data – Peak Power

Peak Power
802.11b
Low Channel

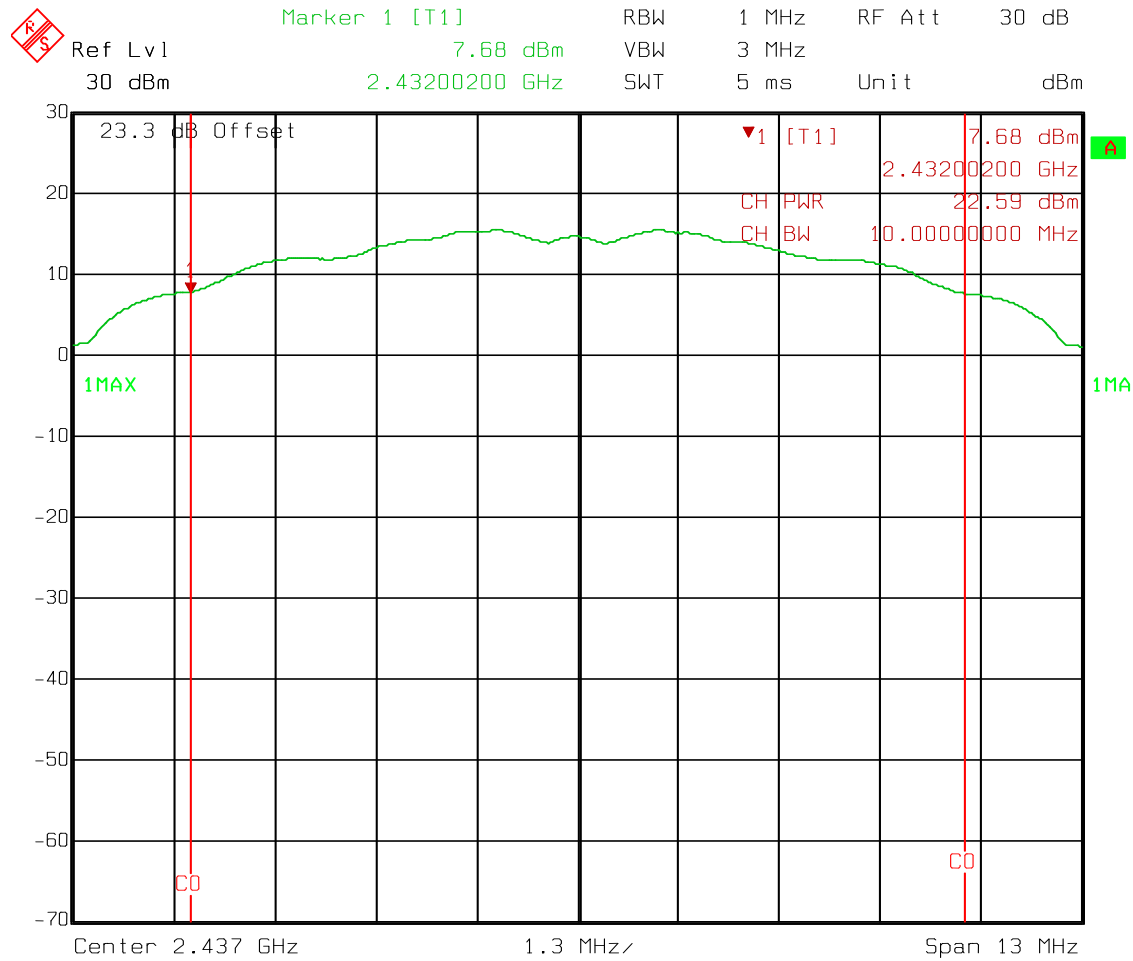
	Marker 1 [T1]	RBW	1 MHz	RF Att	30 dB
	Ref Lvl	15.15 dBm	VBW	3 MHz	
	30 dBm	2.41094489 GHz	SWT	5 ms	Unit



Date: 29.APR.2013 10:22:29

Test Data – Peak Power


Peak Power
802.11b
Mid Channel

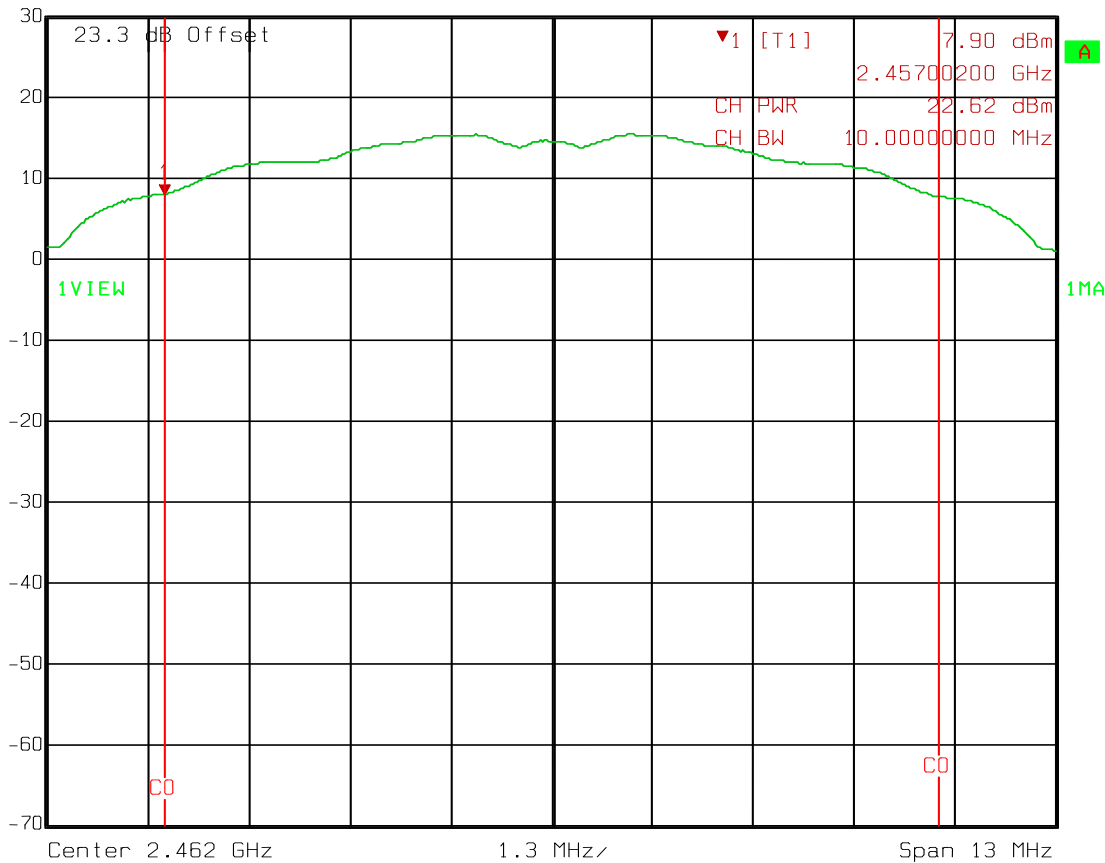


Date: 29.APR.2013 10:30:28

Test Data – Peak Power

Peak Power
802.11b
High Channel

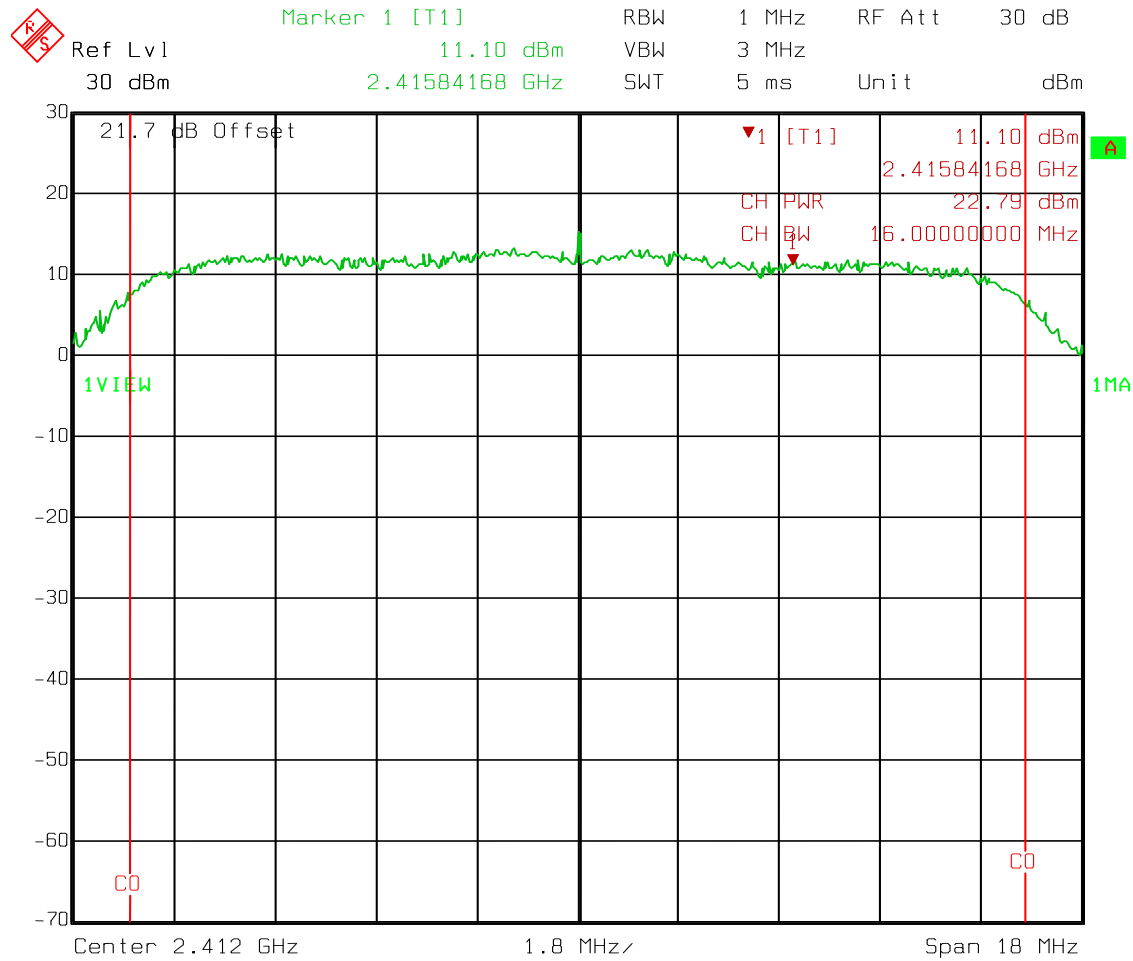
 Marker 1 [T1] RBW 1 MHz RF Att 30 dB
Ref Lvl 7.90 dBm VBW 3 MHz
30 dBm 2.45700200 GHz SWT 5 ms Unit dBm



Date: 29.APR.2013 10:34:03

Test Data – Peak Power

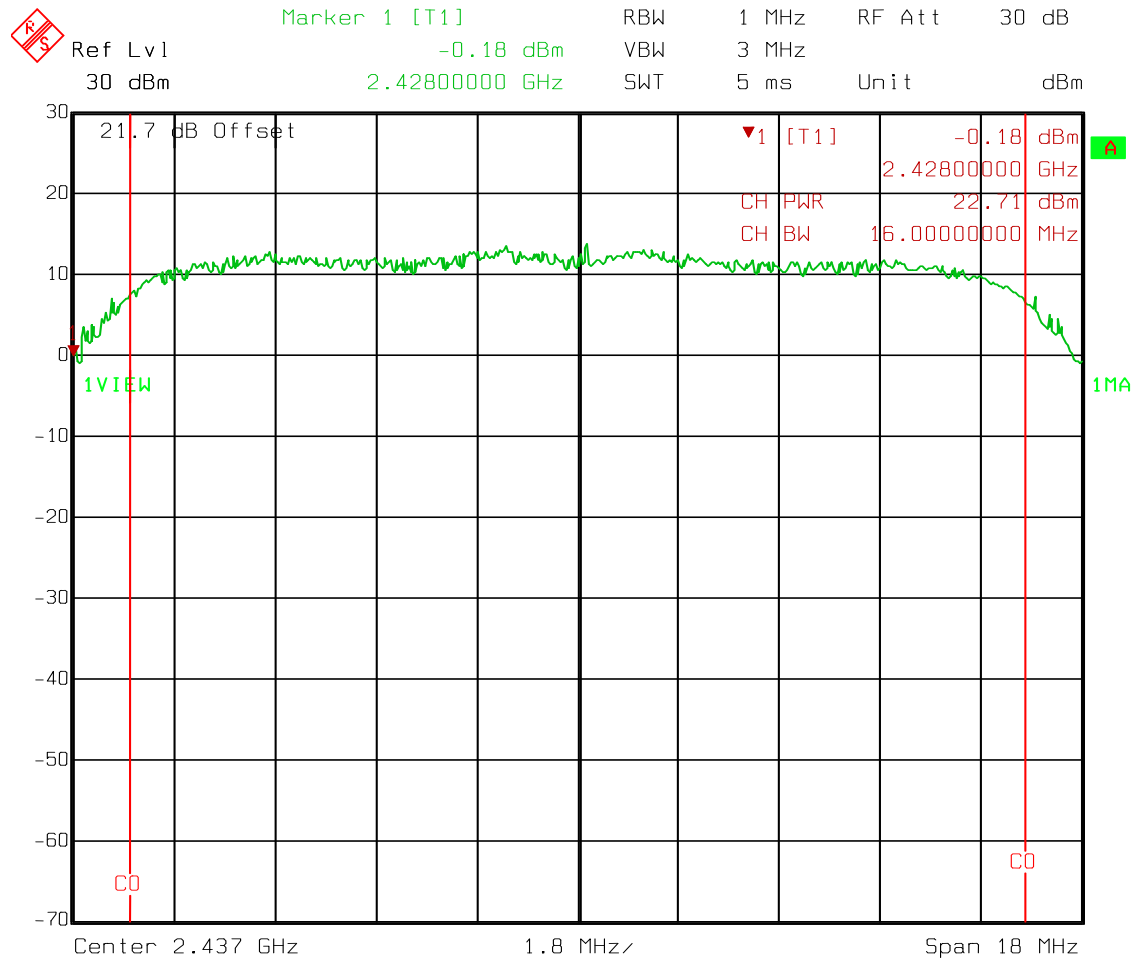
Peak Power
802.11g
Low Channel



Date: 08.MAY 2013 09:41:00

Test Data – Peak Power

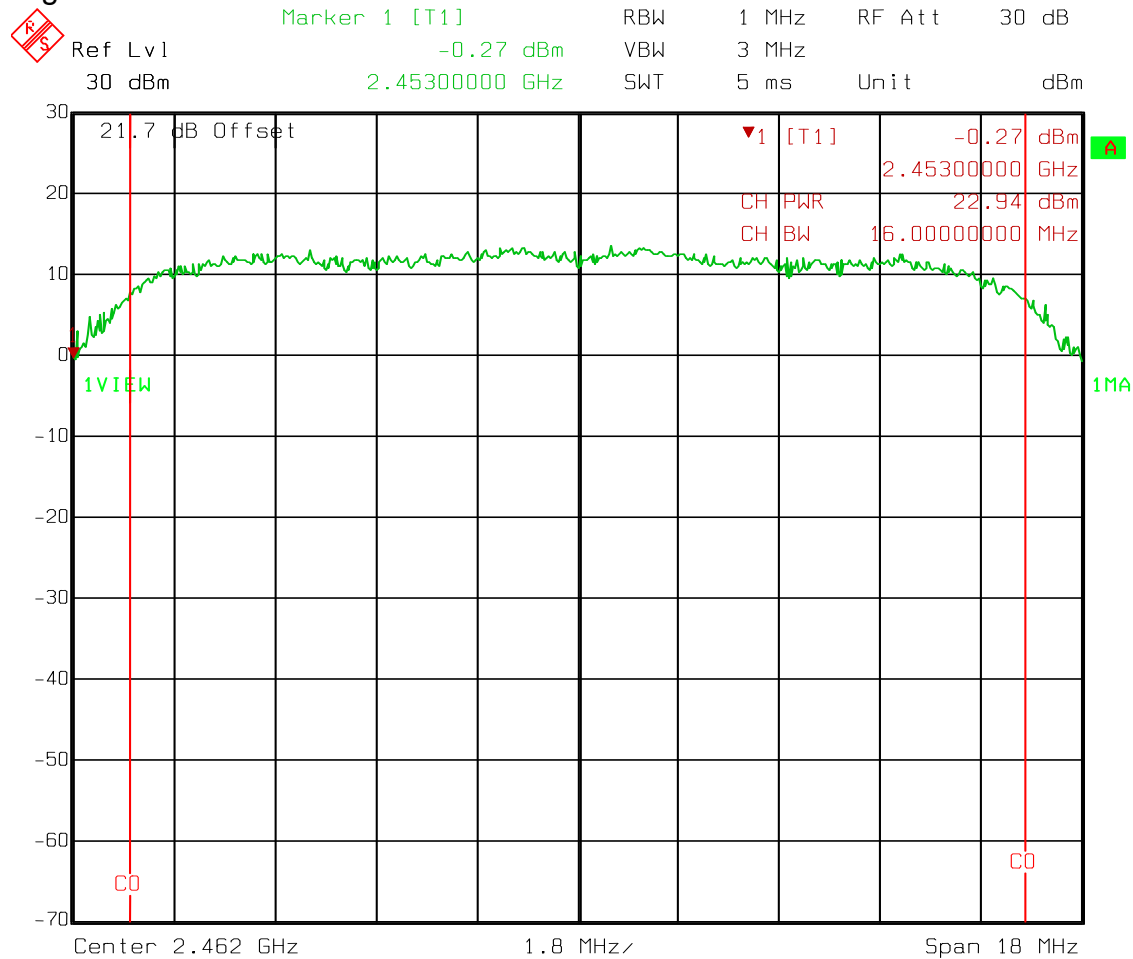
Peak Power
802.11g
Mid Channel



Date: 08.MAY 2013 09:41:39

Test Data – Peak Power

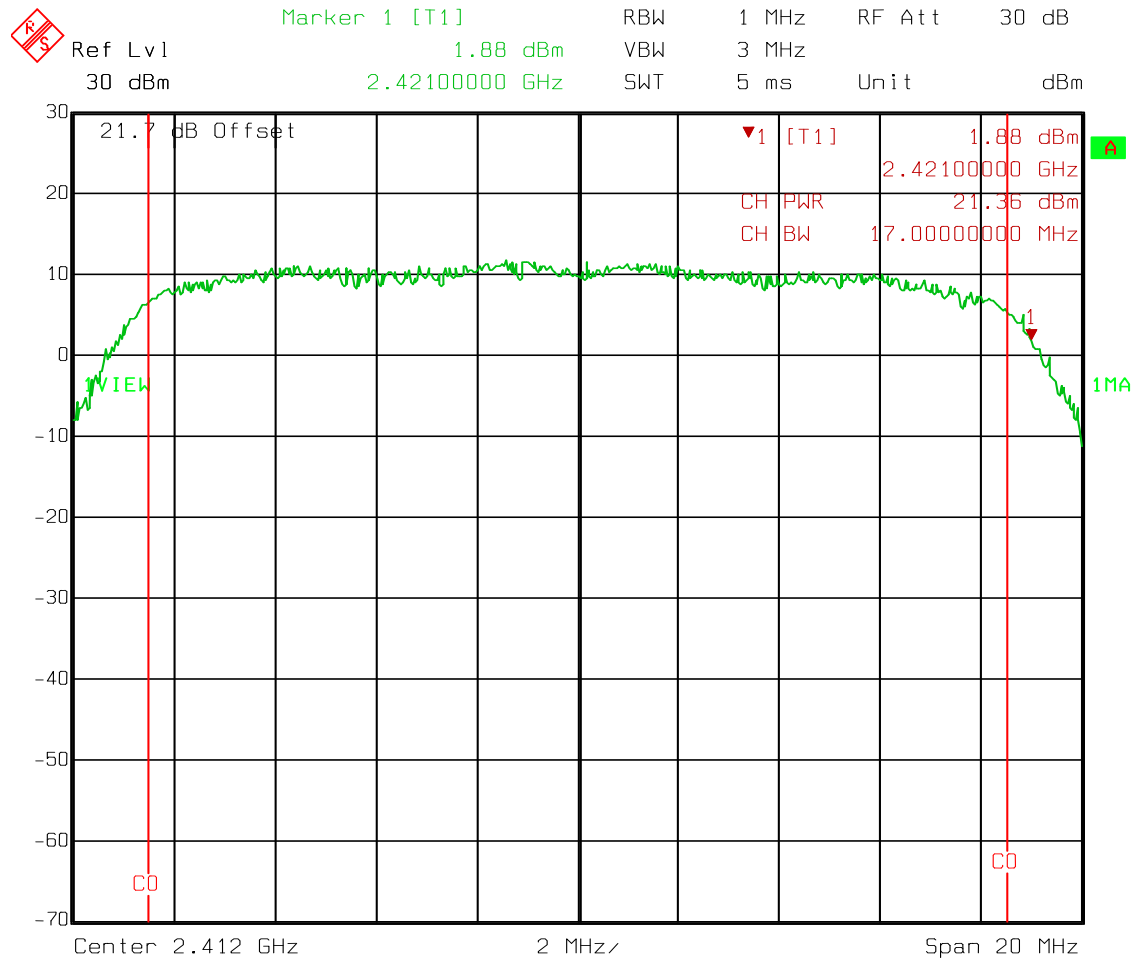
Peak Power
802.11g
High Channel



Date: 08.MAY 2013 09:42:09

Test Data – Peak Power

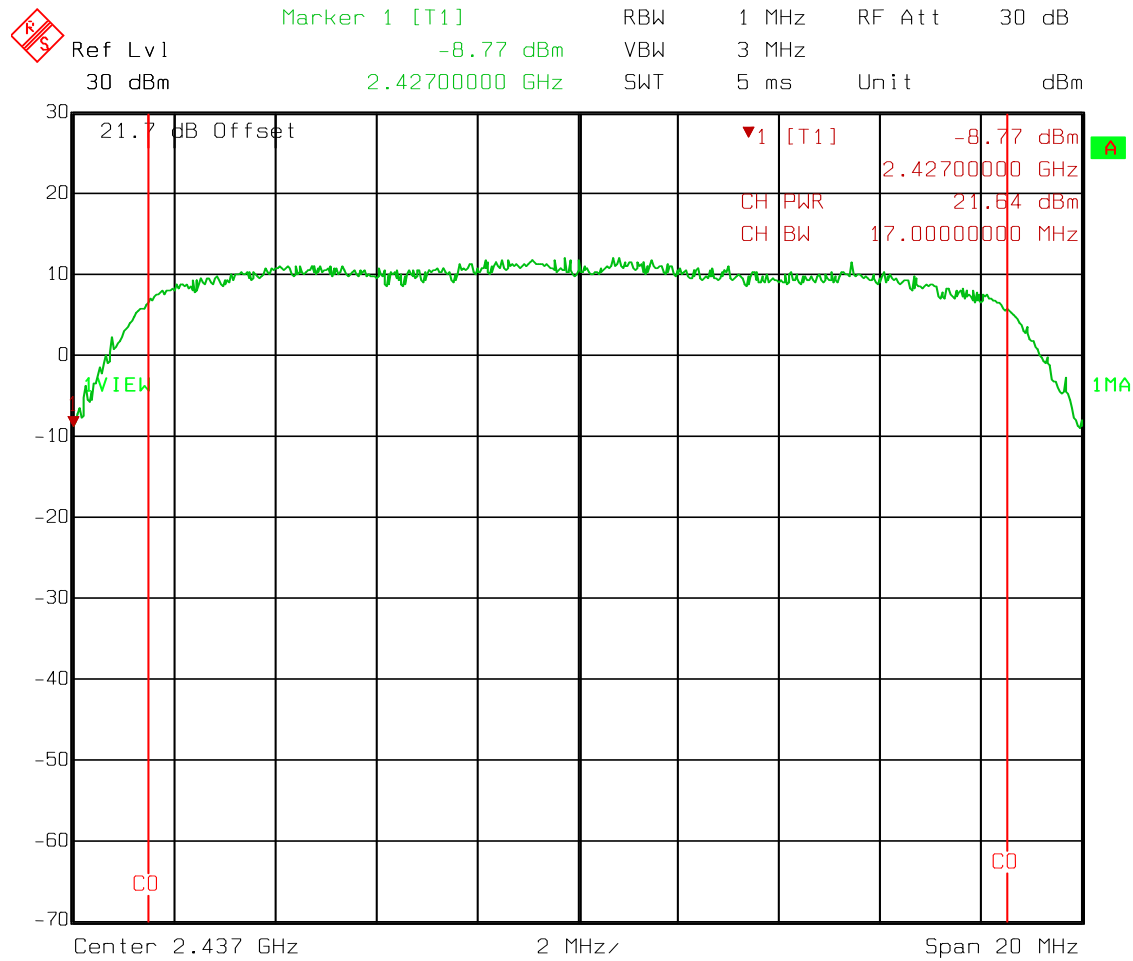
Peak Power
802.11n
Low Channel



Date: 08.MAY 2013 09:43:01

Test Data – Peak Power

Peak Power
 802.11n
 Mid Channel



Date: 08.MAY 2013 09:43:31

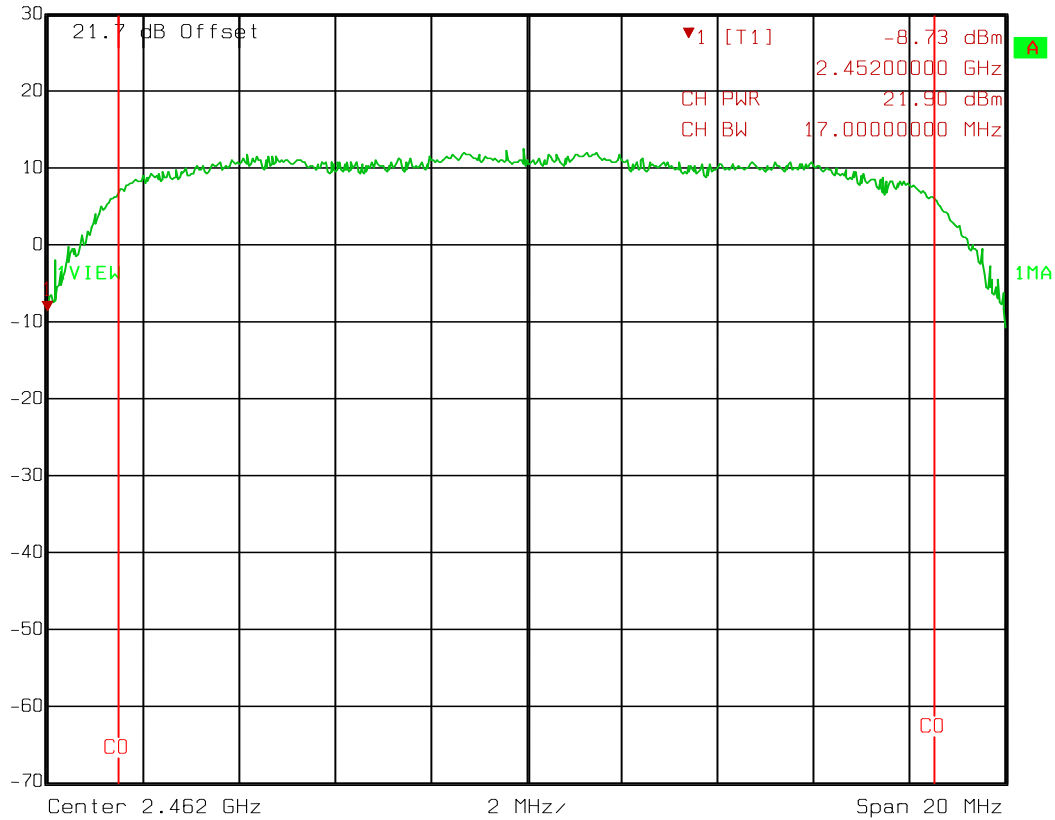
Test Data – Peak Power

Peak Power

802.11n

High Channel

	Ref Lvl	Marker 1 [T1]	RBW	1 MHz	RF Att	30 dB
	30 dBm	-8.73 dBm	VBW	3 MHz		
		2.45200000 GHz	SWT	5 ms	Unit	dBm



Date: 08.MAY 2013 09:44:32

Section 5 Spurious Emissions at Antenna Terminals

NAME OF TEST: Spurious Emissions at Antenna	PARA. NO.: FCC 15.247 (d) RSS-210 A8.5
TESTED BY: David Light	DATE: 29 April 2013

Test Results: Complies.

Measurement Data: See attached plots.

Test Conditions: 47 %RH
 25 °C

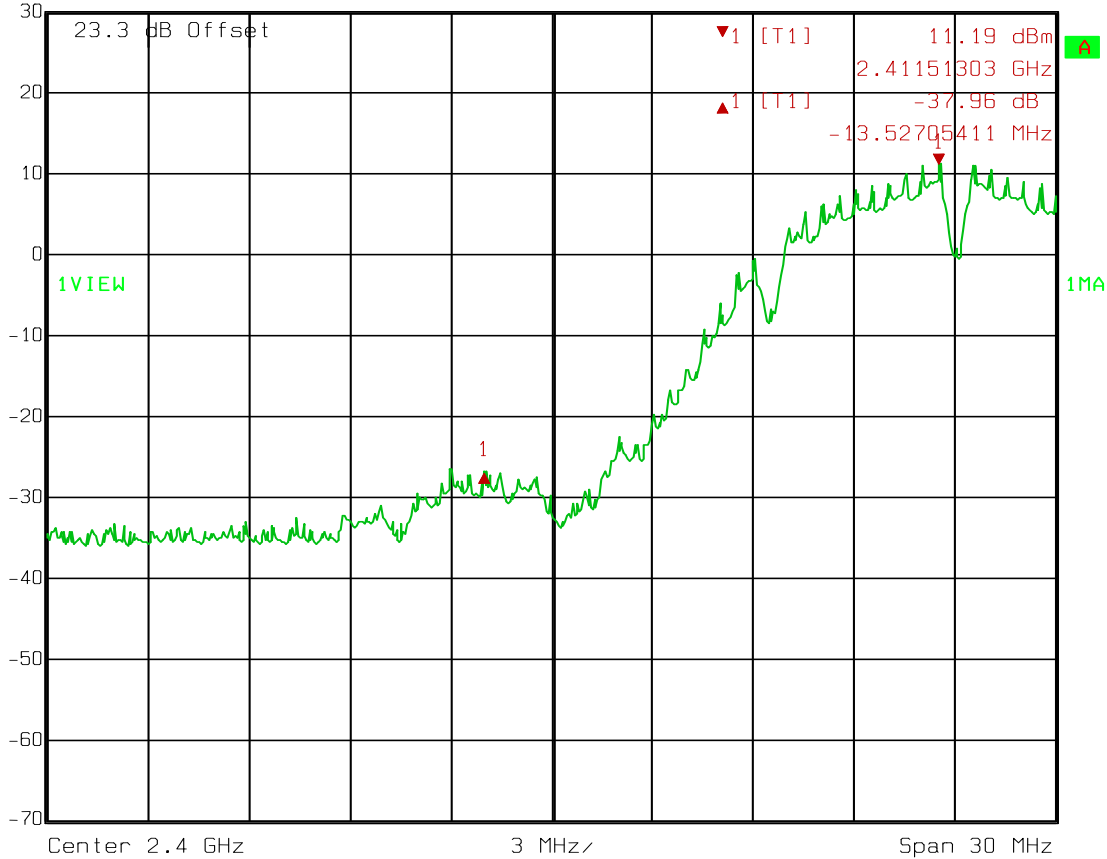
Measurement Uncertainty: +/-1.7 dB

Test Equipment Used: 1036-1082-1472

Test Data – Spurious Emissions at Antenna Terminals

Lower Band Edge
802.11b


RS	Delta 1 [T1]	RBW	100 kHz	RF Att	30 dB
	Ref Lvl	-37.96 dB	VBW	300 kHz	
	30 dBm	-13.52705411 MHz	SWT	7.5 ms	Unit dBm

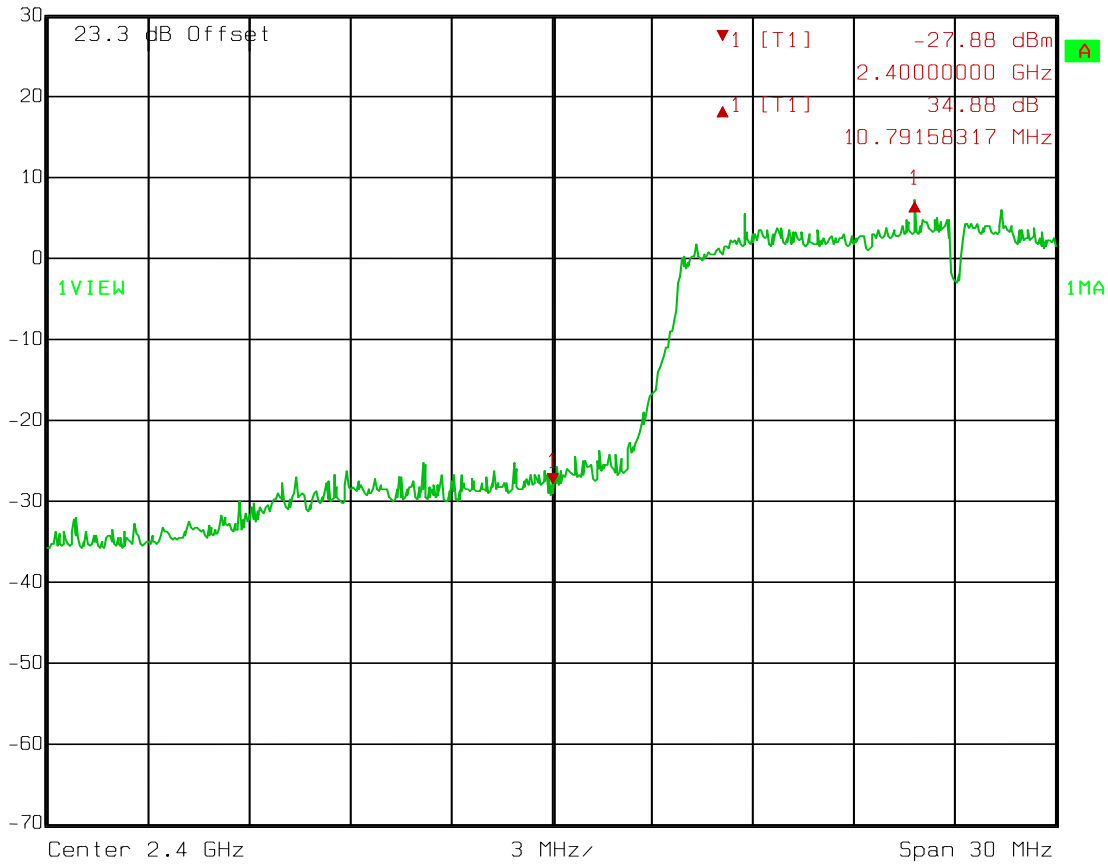


Date: 29.APR.2013 10:24:36

Test Data – Spurious Emissions at Antenna Terminals

Lower Band Edge
802.11g

	Delta 1 [T1]	RBW	100 kHz	RF Att	30 dB
	Ref Lvl	34.88 dB	VBW	300 kHz	
	30 dBm	10.79158317 MHz	SWT	7.5 ms	Unit dBm

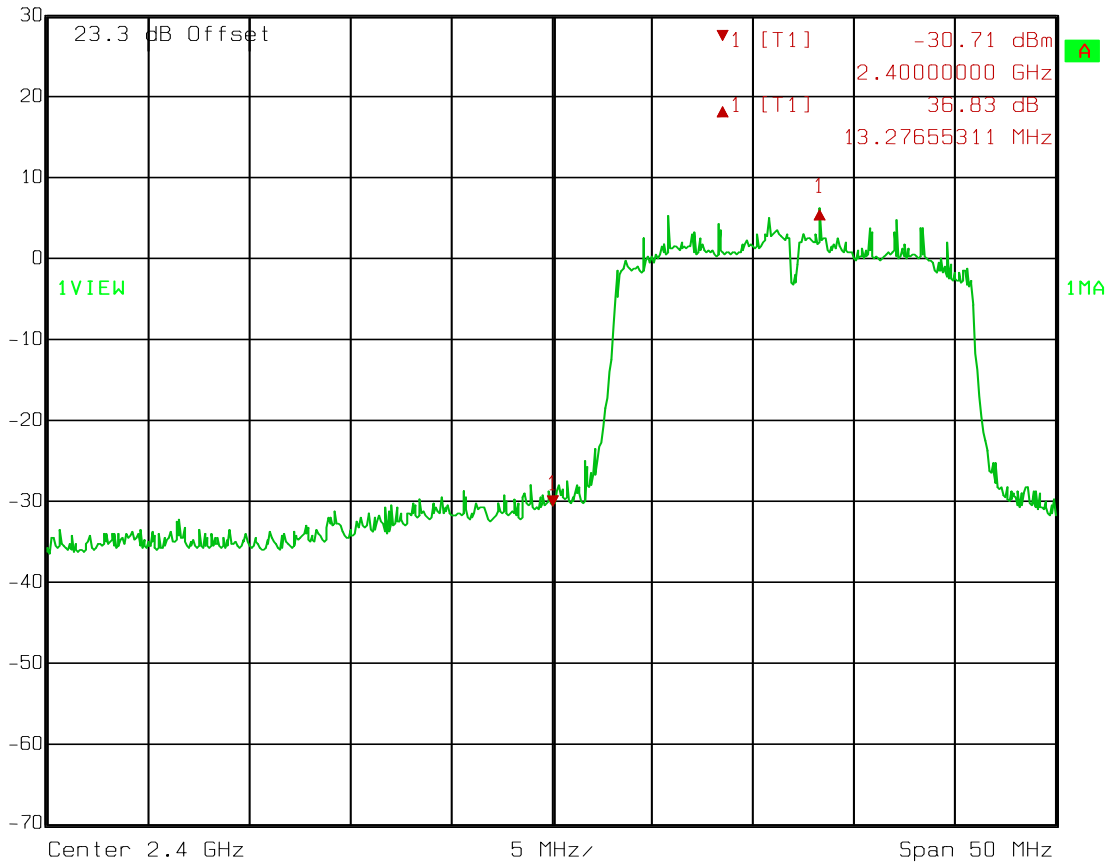


Date: 29.APR.2013 10:44:55

Test Data – Spurious Emissions at Antenna Terminals

Lower Band Edge
802.11n

 Delta 1 [T1] RBW 100 kHz RF Att 30 dB
Ref Lvl 36.83 dB VBW 300 kHz
30 dBm 13.27655311 MHz SWT 12.5 ms Unit dBm



Date: 29.APR.2013 11:03:35

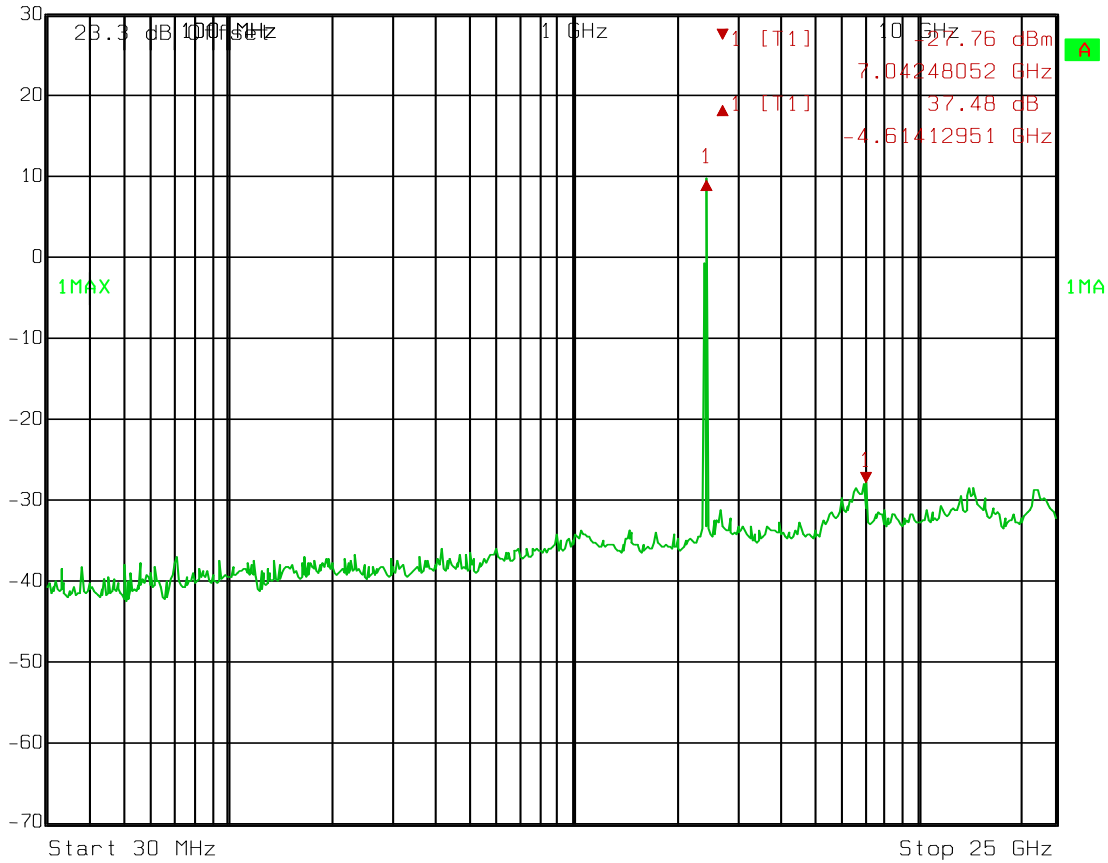
Test Data – Spurious Emissions at Antenna Terminals

Spurious Emissions

802.11b

Low Channel

	Delta 1 [T1]	RBW	100 kHz	RF Att	30 dB
	Ref Lvl	37.48 dB	VBW	300 kHz	
	30 dBm	-4.61412951 GHz	SWT	6.4 s	Unit dBm



Date: 29.APR.2013 10:25:28

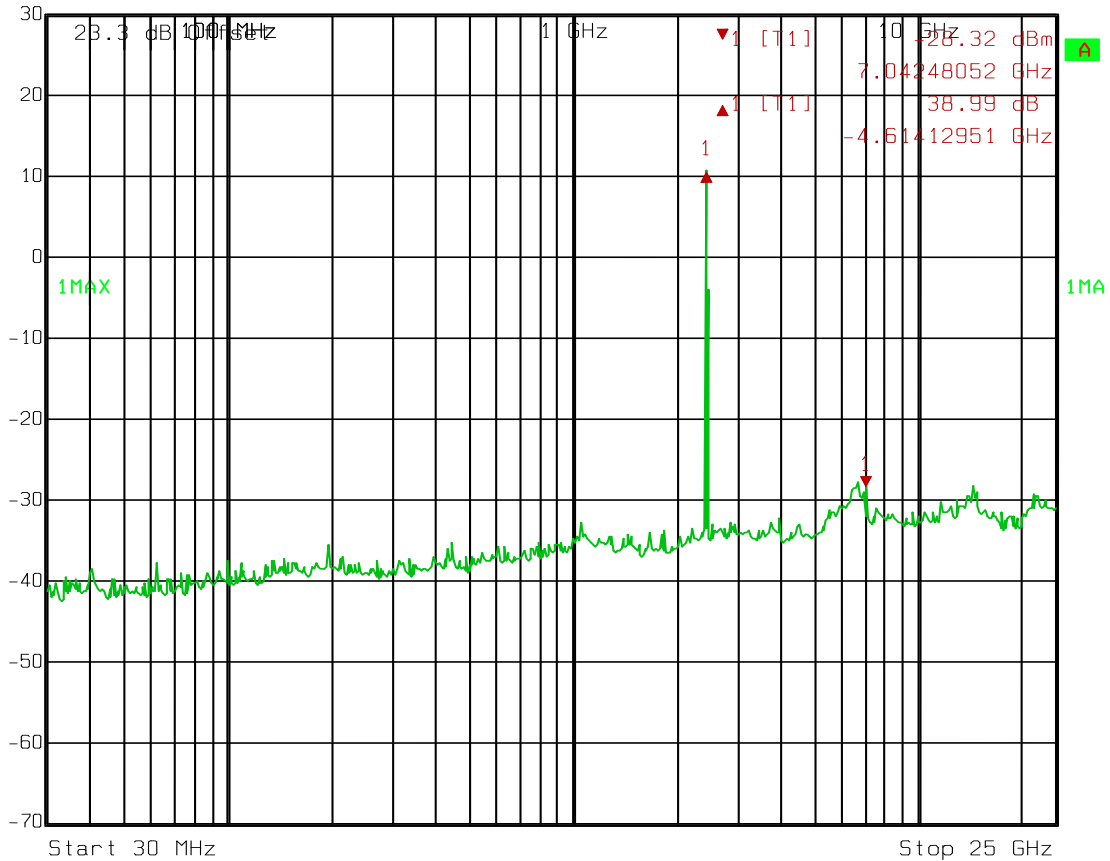
Test Data – Spurious Emissions at Antenna Terminals

Spurious Emissions

802.11b

Mid Channel

	Delta 1 [T1]	RBW	100 kHz	RF Att	30 dB
	Ref Lvl	38.99 dB	VBW	300 kHz	
	30 dBm	-4.61412951 GHz	SWT	6.4 s	Unit dBm

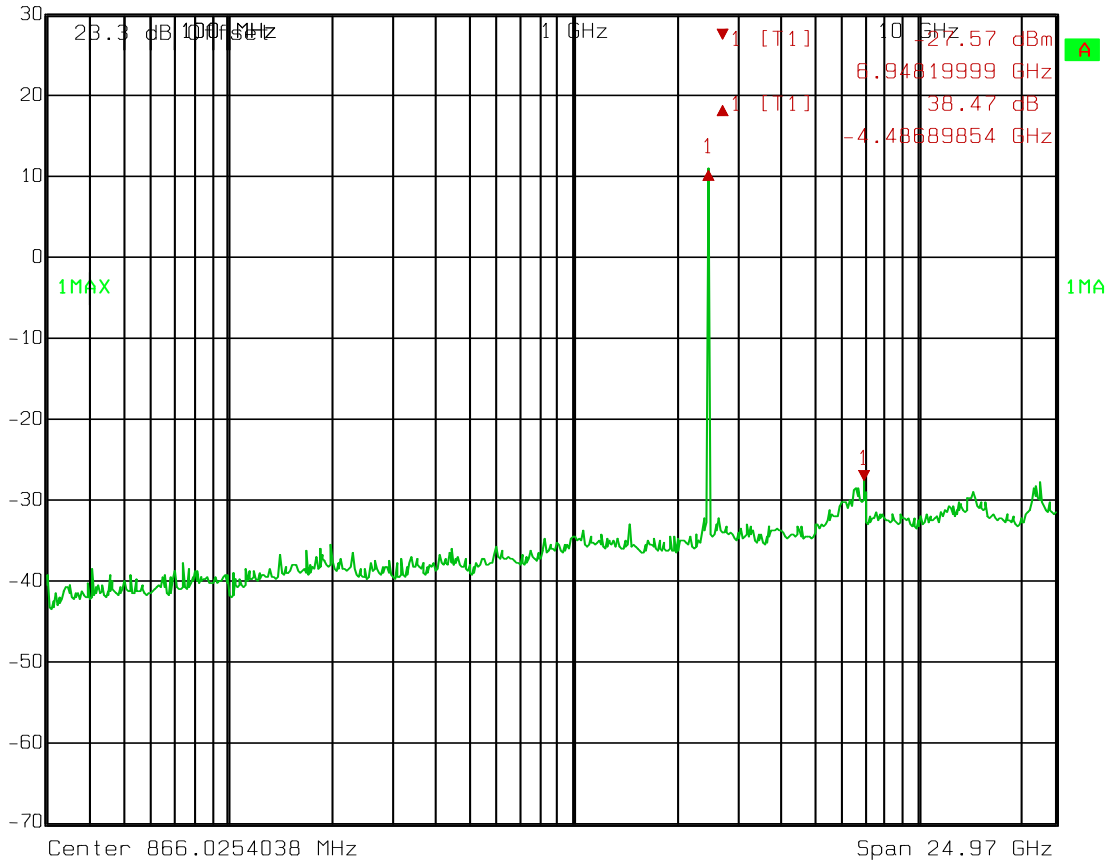


Date: 29.APR.2013 10:31:32

Test Data – Spurious Emissions at Antenna Terminals

Spurious Emissions
802.11b
High Channel

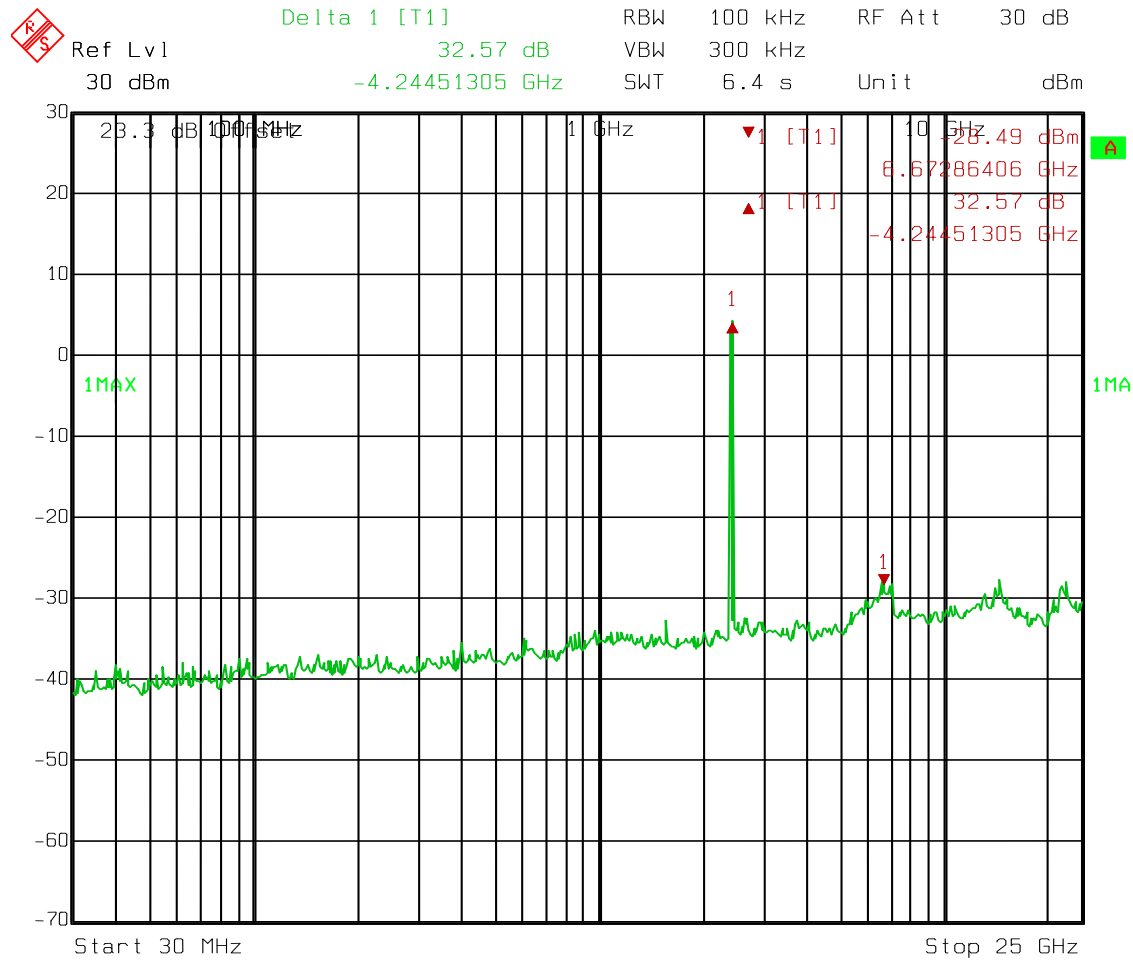
	Delta 1 [T1]	RBW	100 kHz	RF Att	30 dB
	Ref Lvl	38.47 dB	VBW	300 kHz	
	30 dBm	-4.48689854 GHz	SWT	6.4 s	Unit dBm



Date: 29.APR.2013 10:39:26

Test Data – Spurious Emissions at Antenna Terminals

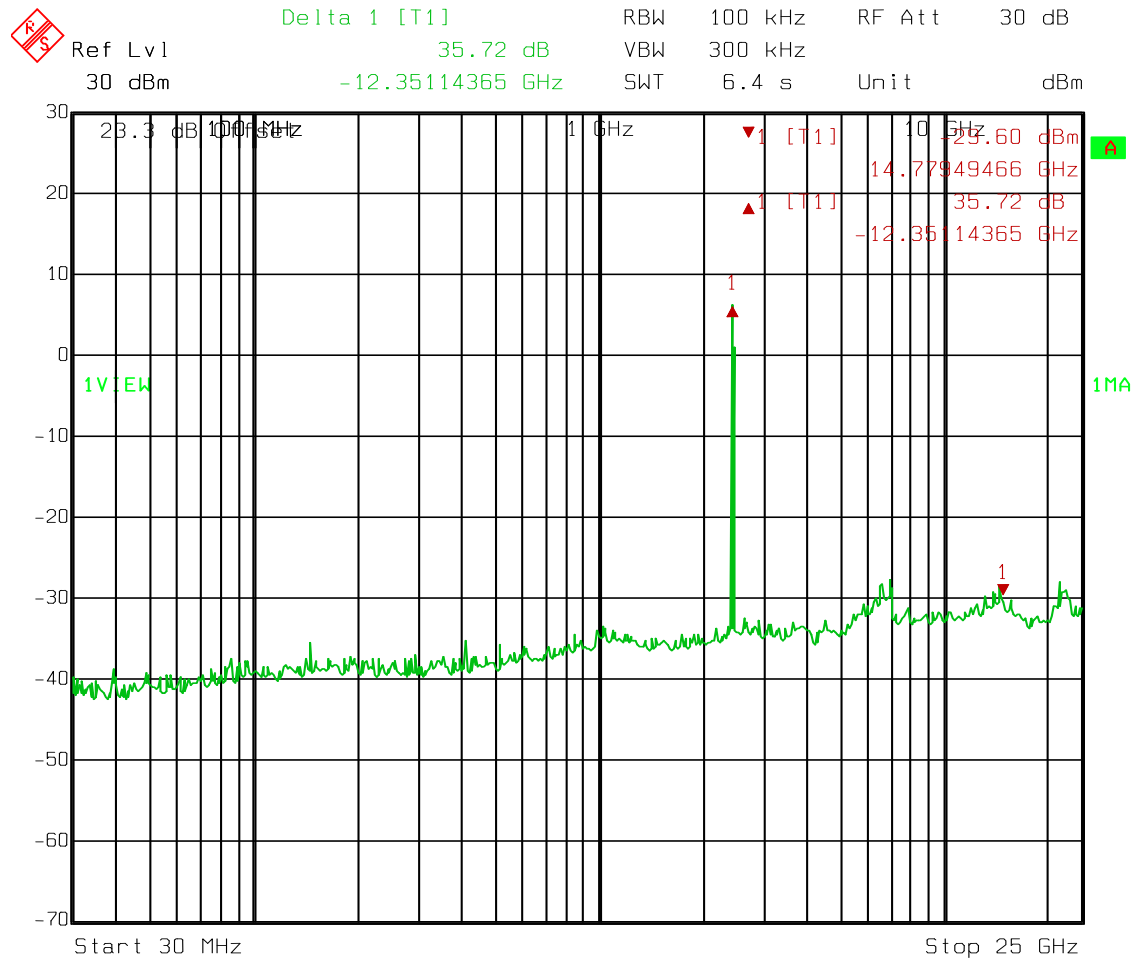
Spurious Emissions
802.11g
Low Channel



Date: 29.APR.2013 10:45:53

Test Data – Spurious Emissions at Antenna Terminals


Spurious Emissions
802.11g
Mid Channel

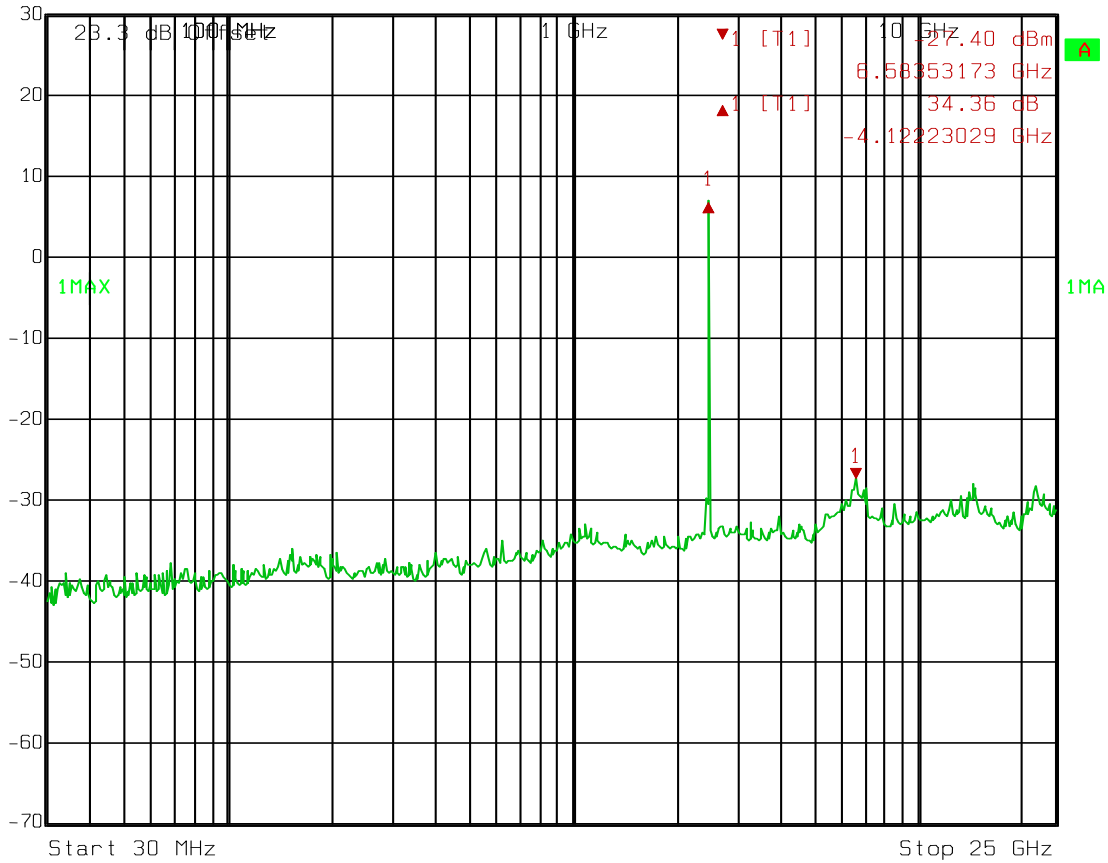


Date: 29.APR.2013 10:51:17

Test Data – Spurious Emissions at Antenna Terminals

Spurious Emissions
802.11g
High Channel

	Delta 1 [T1]	RBW	100 kHz	RF Att	30 dB
	Ref Lvl	34.36 dB	VBW	300 kHz	
	30 dBm	-4.12223029 GHz	SWT	6.4 s	Unit dBm




Date: 29.APR.2013 10:55:12

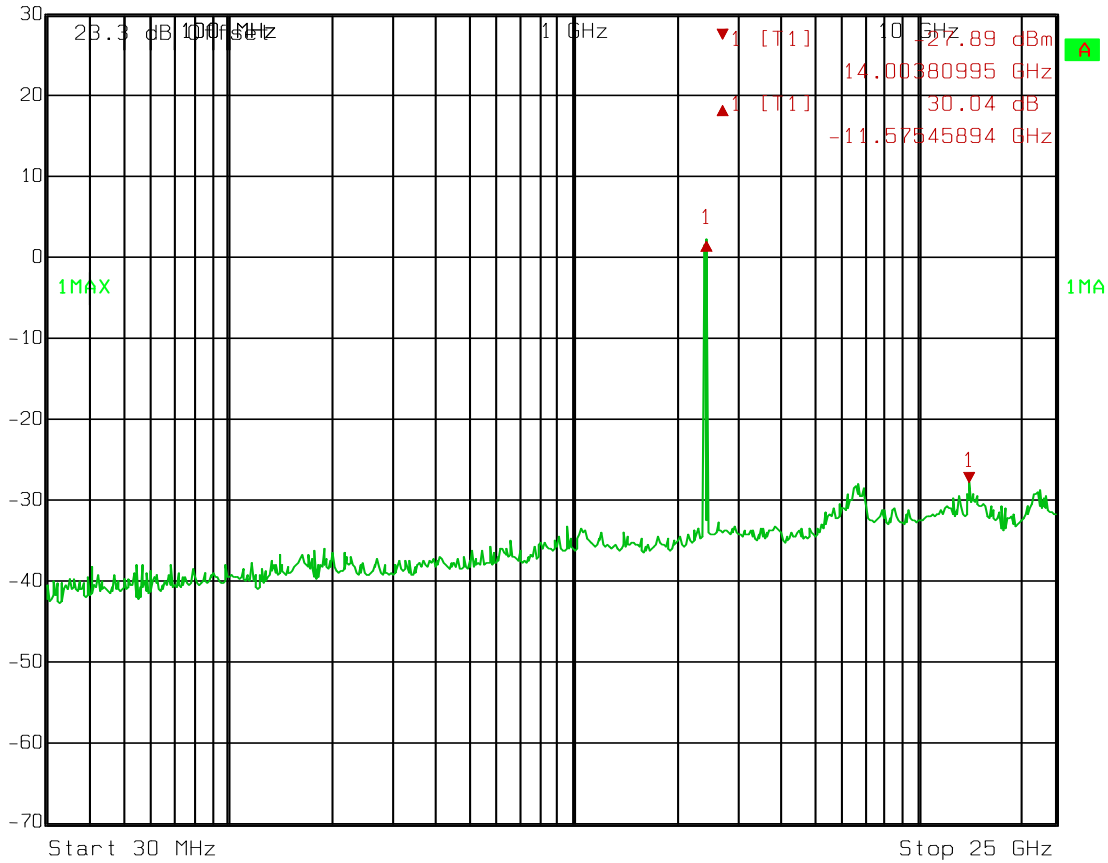
Test Data – Spurious Emissions at Antenna Terminals

Spurious Emissions

802.11n

Low Channel


 Delta 1 [T1] RBW 100 kHz RF Att 30 dB
Ref Lvl 30.04 dB VBW 300 kHz
30 dBm -11.57545894 GHz SWT 6.4 s Unit dBm

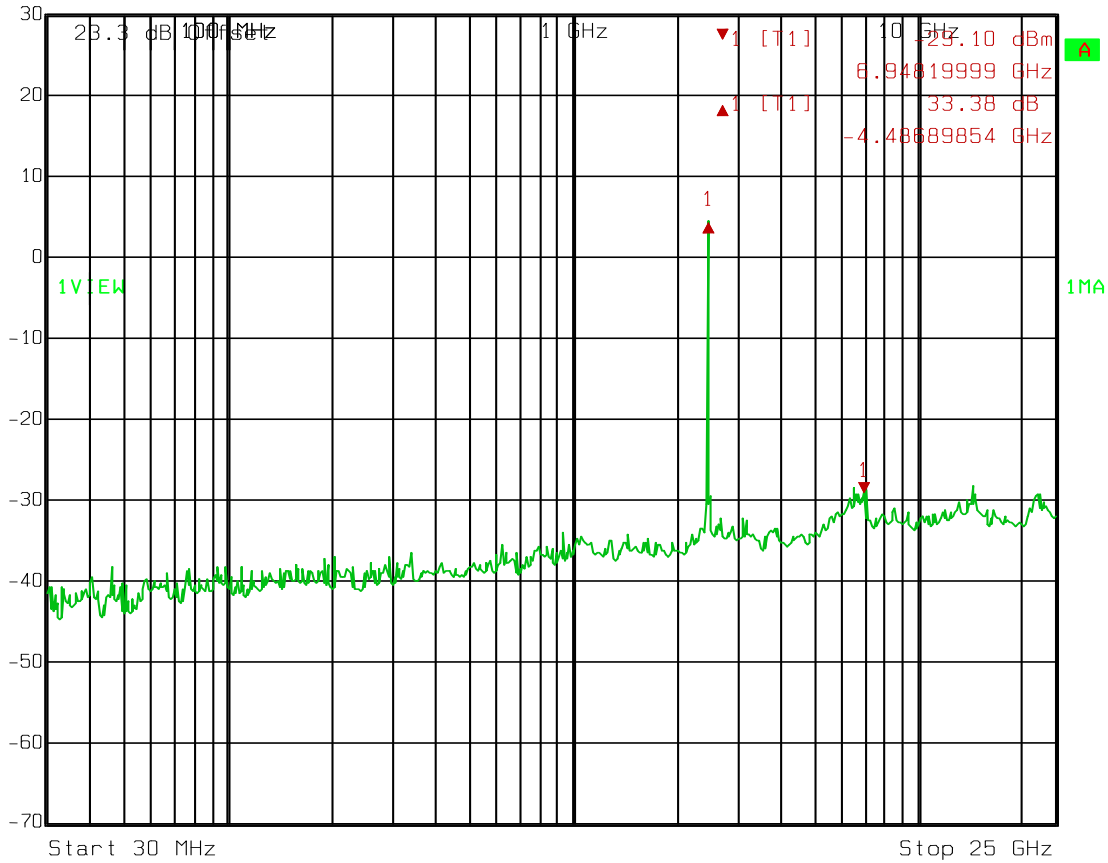


Date: 29.APR.2013 11:04:26

Test Data – Spurious Emissions at Antenna Terminals

Spurious Emissions
802.11n
High Channel

	Delta 1 [T1]	RBW	100 kHz	RF Att	30 dB
Ref Lvl	33.38 dB	VBW	300 kHz		
30 dBm	-4.48689854 GHz	SWT	6.4 s	Unit	dBm



Date: 29.APR.2013 11:11:18

Section 6. Radiated Emissions

NAME OF TEST: Radiated Emissions	PARA. NO.: 15.247 (d) RSS-Gen 7.2.2
TESTED BY: David Light	DATE: 08 May 2013

Test Results: Complies.

Measurement Data: See attached table.

Test Conditions: 47 %RH
 25 °C

Measurement Uncertainty: +/-1.7 dB

Test Equipment Used: 1480-993-1067-1016-791-1783

Notes:

- For handheld devices, the EUT was tested on three orthogonal axis'
- The device was tested from 30 MHz to the tenth harmonic of the highest fundamental frequency per 15.33
- The device was tested on three channels per 15.31(l).
- No emissions were detected within 20 dB of the specification limit therefore none are reported per 15.31(o). Band edge data is presented below.

Measured Frequency (MHz)	RBW	VBW	Detector	Requirement
<1000	100 kHz		Peak	QP
>1000	1 MHz	3 MHz	Peak	Peak
>1000	1 MHz	3 MHz	Sample	Average

Radiated Emissions

Meas. Freq. (MHz)	Ant. Pol. (H/V)	Det. Atten. (dB)	Meter Reading (dBuV)	Antenna Factor (dB)	Path Loss (dB)	RF Gain (dB)	Corrected Reading (dBuV/m)	Spec. limit (dBuV/m)	CR/SL Diff. (dB)	Pass Fail Unc.	Comment
											802.11b
2483.5	H	0.0	53.0	29.0	3.1	31.8	53.3	74.0	-20.7	Pass	
2483.5	H	0.0	43.0	29.0	3.1	31.8	43.3	54.0	-10.7	Pass	
2483.5	V	0.0	47.9	29.0	3.1	31.8	48.2	74.0	-25.8	Pass	
2483.5	V	0.0	36.0	29.0	3.1	31.8	36.3	54.0	-17.7	Pass	
											802.11g
2483.5	H	0.0	65.0	29.0	3.1	31.8	65.3	74.0	-8.7	Pass	
2483.5	H	0.0	49.1	29.0	3.1	31.8	49.4	54.0	-4.6	Pass	
2483.5	V	0.0	59.3	29.0	3.1	31.8	59.6	74.0	-14.4	Pass	
2483.5	V	0.0	46.2	29.0	3.1	31.8	46.5	54.0	-7.5	Pass	
											802.11n
2483.5	H	0.0	63.2	29.0	3.1	31.8	63.5	74.0	-10.5	Pass	
2483.5	H	0.0	47.5	29.0	3.1	31.8	47.8	54.0	-6.2	Pass	
2483.5	V	0.0	58.0	29.0	3.1	31.8	58.3	74.0	-15.7	Pass	
2483.5	V	0.0	44.9	29.0	3.1	31.8	45.2	54.0	-8.8	Pass	
											SN8000

Meas. Freq. (MHz)	Ant. Pol. (H/V)	Atten. (dB)	Meter Reading (dBuV)	Antenna Factor (dB)	Path Loss (dB)	RF Gain (dB)	Corrected Reading (dBuV/m)	Spec. limit (dBuV/m)	CR/SL Diff. (dB)	Pass Fail Unc.	Comment
											802.11b
2483.5	H	0.0	50.0	29.0	3.1	31.8	50.3	74.0	-23.7	Pass	
2483.5	H	0.0	42.0	29.0	3.1	31.8	42.3	54.0	-11.7	Pass	
2483.5	V	0.0	59.6	29.0	3.1	31.8	59.9	74.0	-14.1	Pass	
2483.5	V	0.0	48.1	29.0	3.1	31.8	48.4	54.0	-5.6	Pass	
											802.11g
2483.5	H	0.0	55.8	29.0	3.1	31.8	56.1	74.0	-17.9	Pass	
2483.5	H	0.0	39.9	29.0	3.1	31.8	40.2	54.0	-13.8	Pass	
2483.5	V	0.0	70.0	29.0	3.1	31.8	70.3	74.0	-3.7	Pass	
2483.5	V	0.0	50.3	29.0	3.1	31.8	50.6	54.0	-3.4	Pass	
											802.11n
2483.5	H	0.0	55.4	29.0	3.1	31.8	55.7	74.0	-18.3	Pass	
2483.5	H	0.0	38.9	29.0	3.1	31.8	39.2	54.0	-14.8	Pass	
2483.5	V	0.0	67.8	29.0	3.1	31.8	68.1	74.0	-5.9	Pass	
2483.5	V	0.0	51.4	29.0	3.1	31.8	51.7	54.0	-2.3	Pass	
											SN8000UFL

Section 7. Peak Power Spectral Density

NAME OF TEST: Peak Power Spectral Density	PARA. NO.: FCC 15.247(e) RSS-210 A8.2(b)
TESTED BY: David Light	DATE: 29 April 2013

Test Results: Complies.

Measurement Data: See attached data..

Test Conditions: 47 %RH
 25 °C

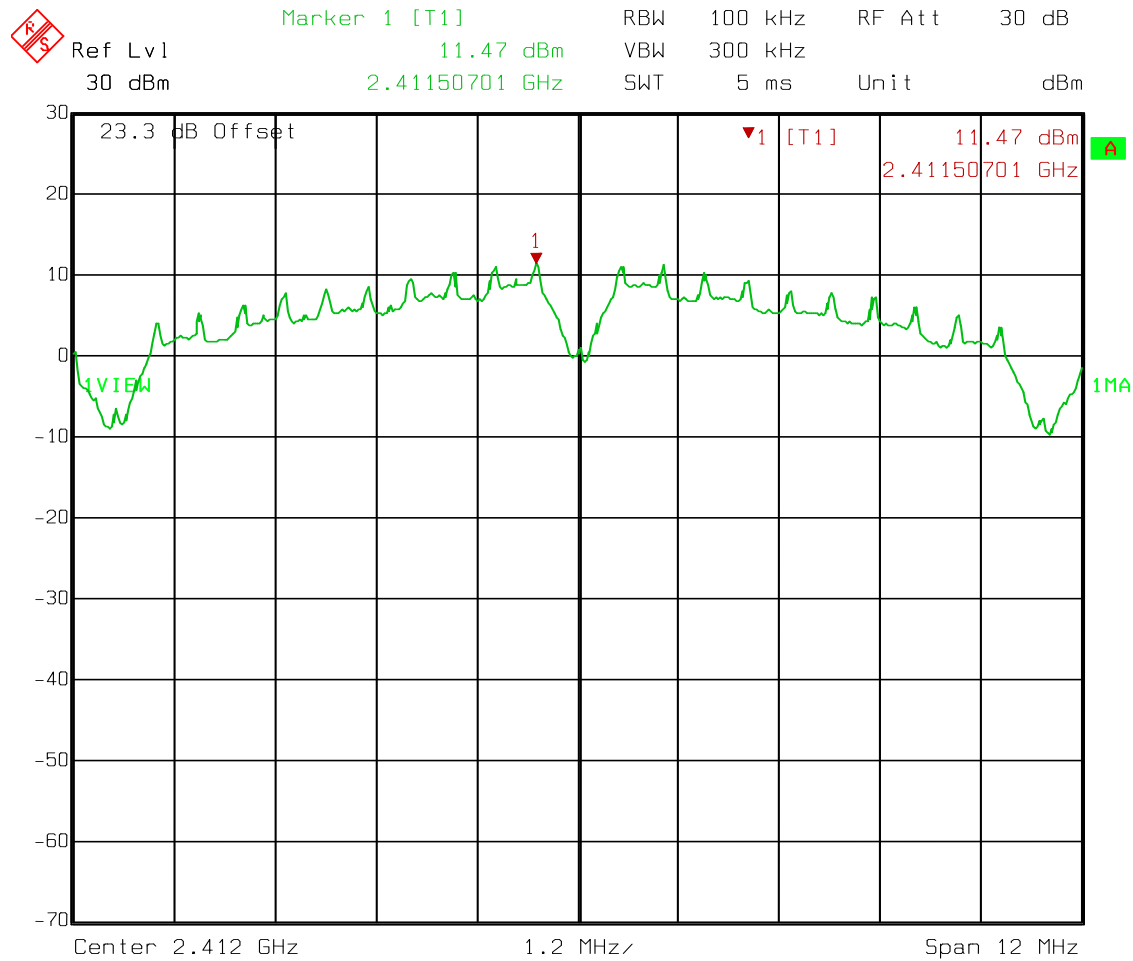
Measurement Uncertainty: +/-1.7 dB

Test Equipment Used: 1036-1082-1472

Peak Power Spectral Density

Spectral Density
802.11b
Low Channel

Density = 11.5 - 15.2 = -3.7

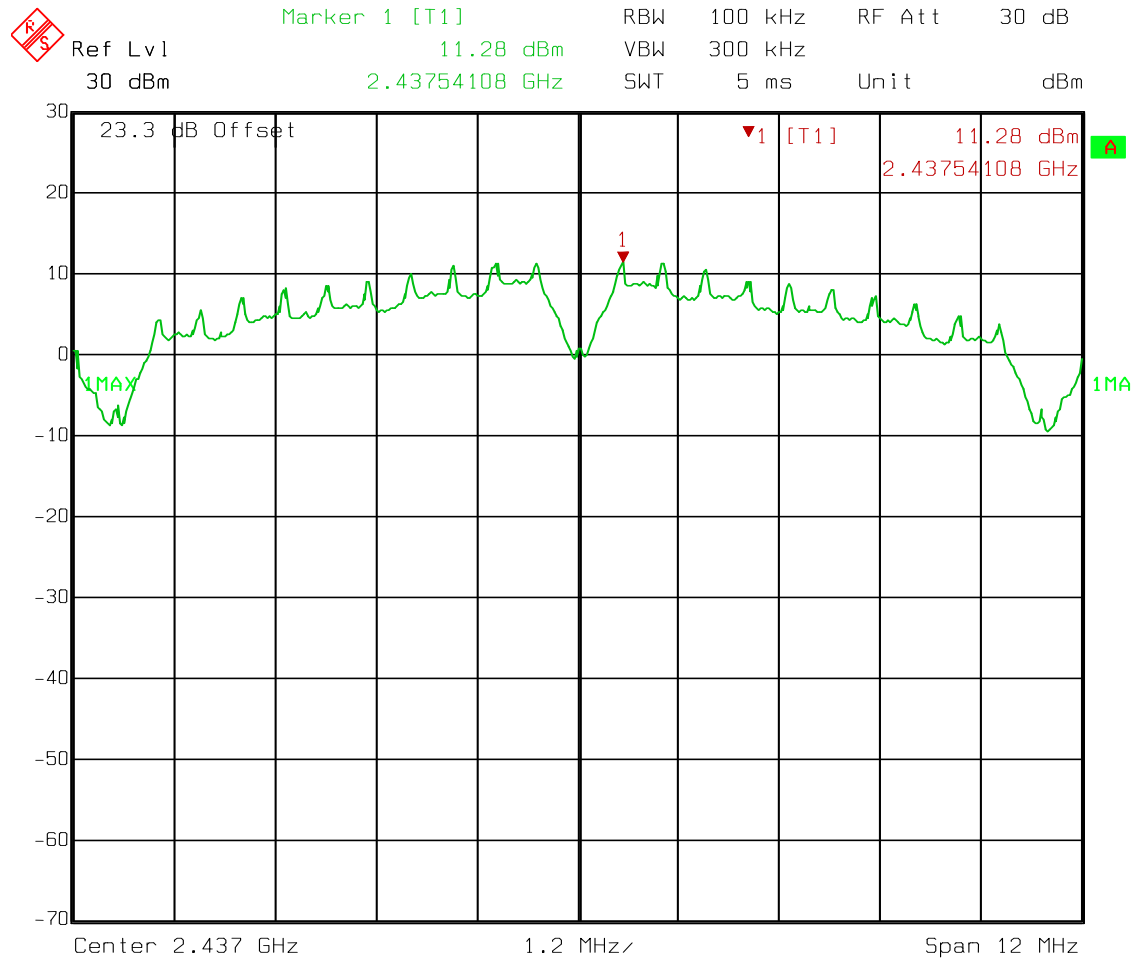


Date: 29.APR.2013 10:27:37

Peak Power Spectral Density

Spectral Density
802.11b
Mid Channel

$$\text{Density} = 11.3 - 15.2 = -3.9$$

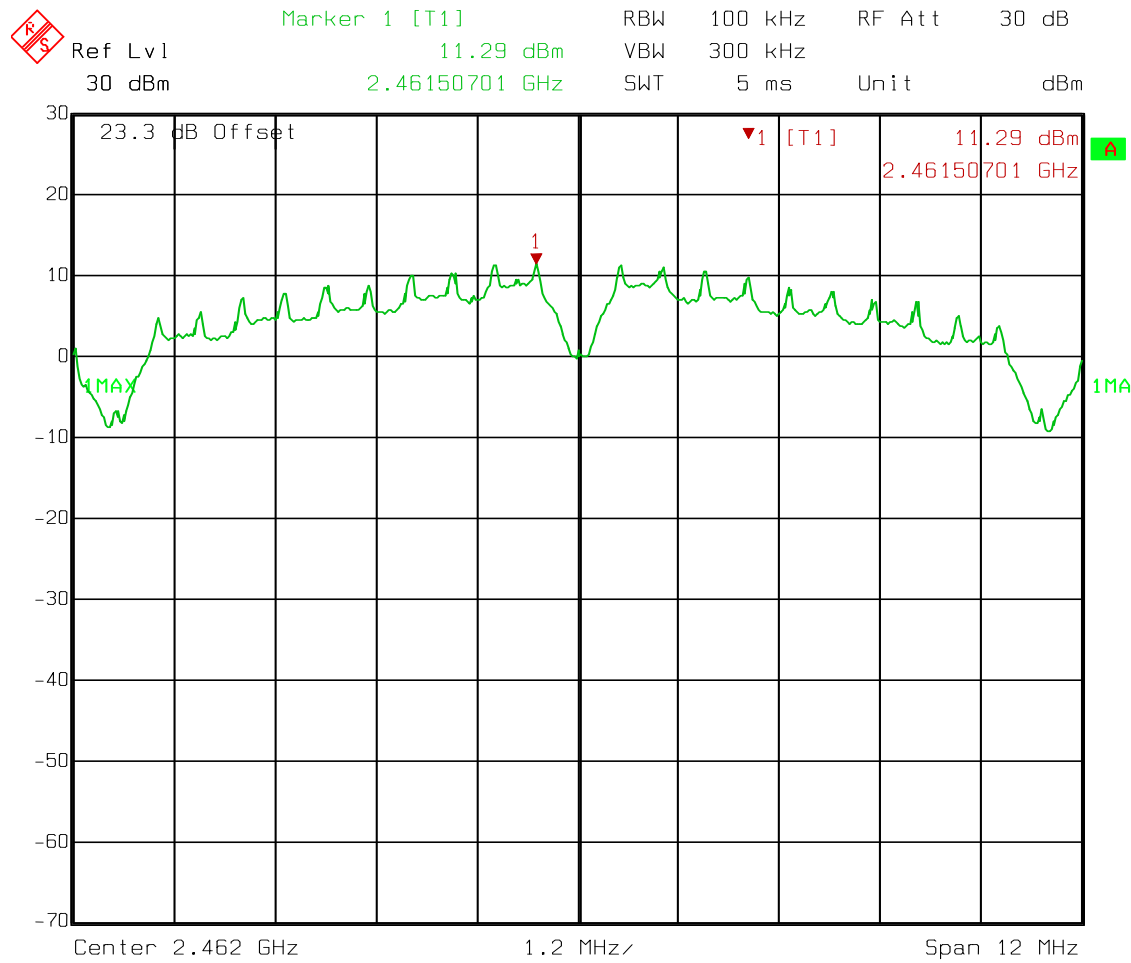


Date: 29.APR.2013 10:32:14

Peak Power Spectral Density

Spectral Density
802.11b
High Channel

$$\text{Density} = 11.3 - 15.2 = -3.9$$



Date: 29.APR.2013 10:35:50

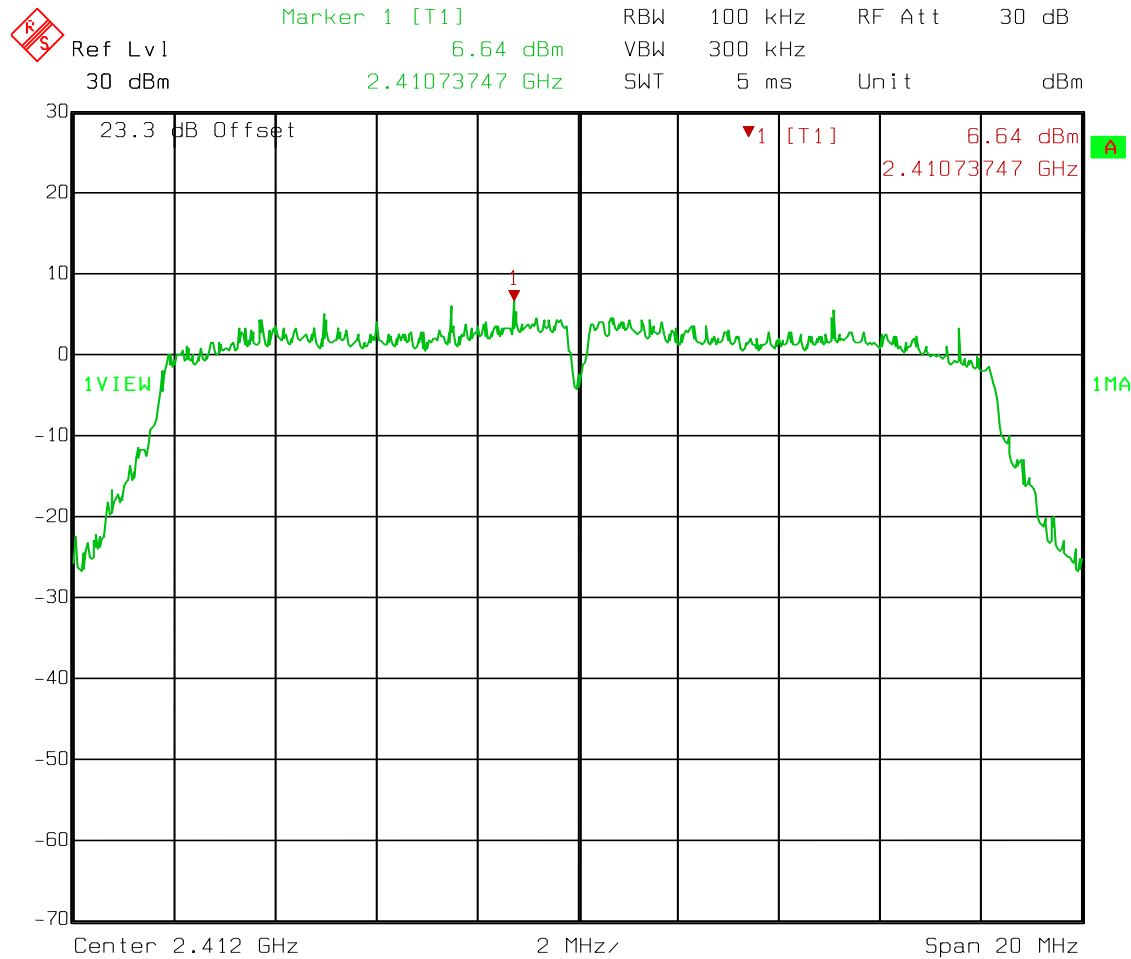
Peak Power Spectral Density

Spectral Density

802.11g

Low Channel

$$\text{Density} = 6. - 15.2 = -8.6$$

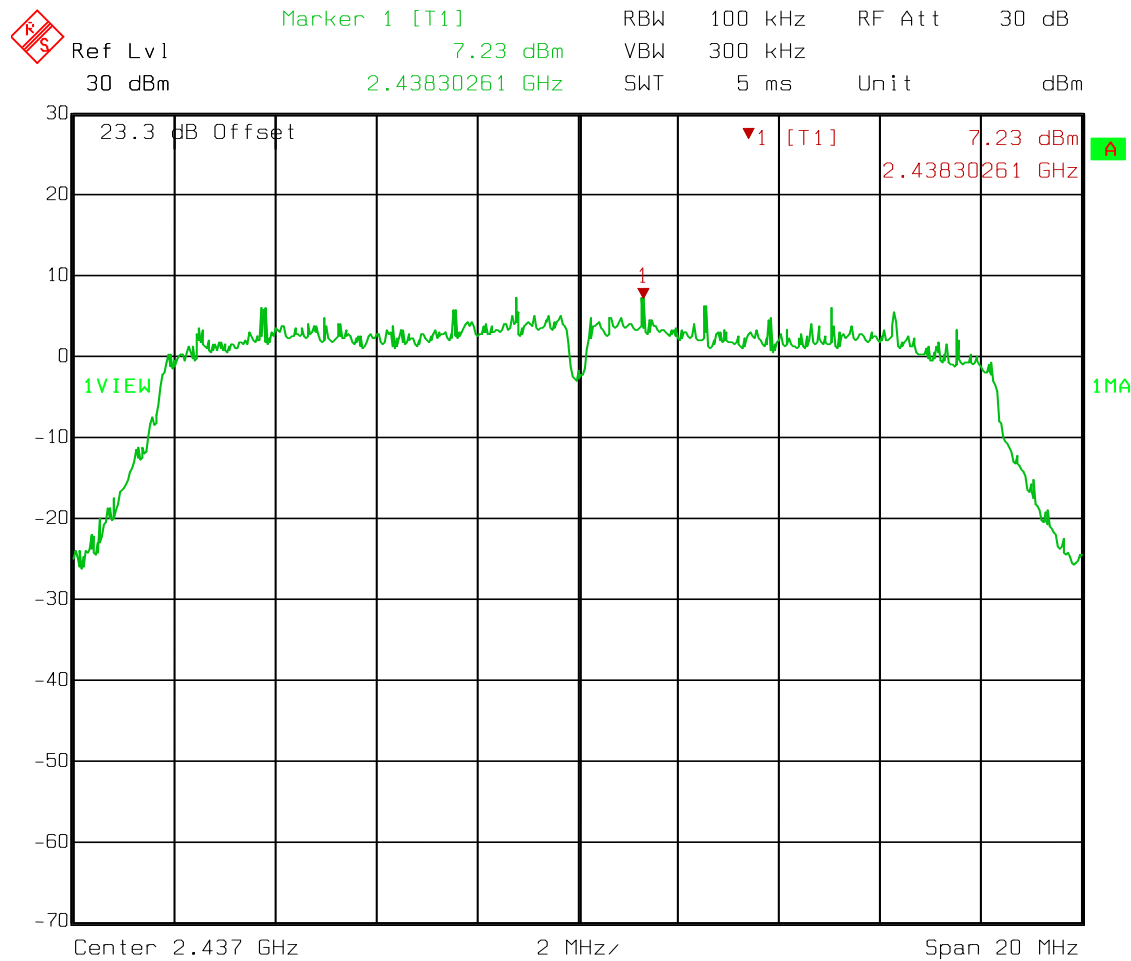


Date: 29.APR.2013 10:46:46

Peak Power Spectral Density

Spectral Density
802.11g
Mid Channel

$$\text{Density} = 7.2 - 15.2 = -8.0$$

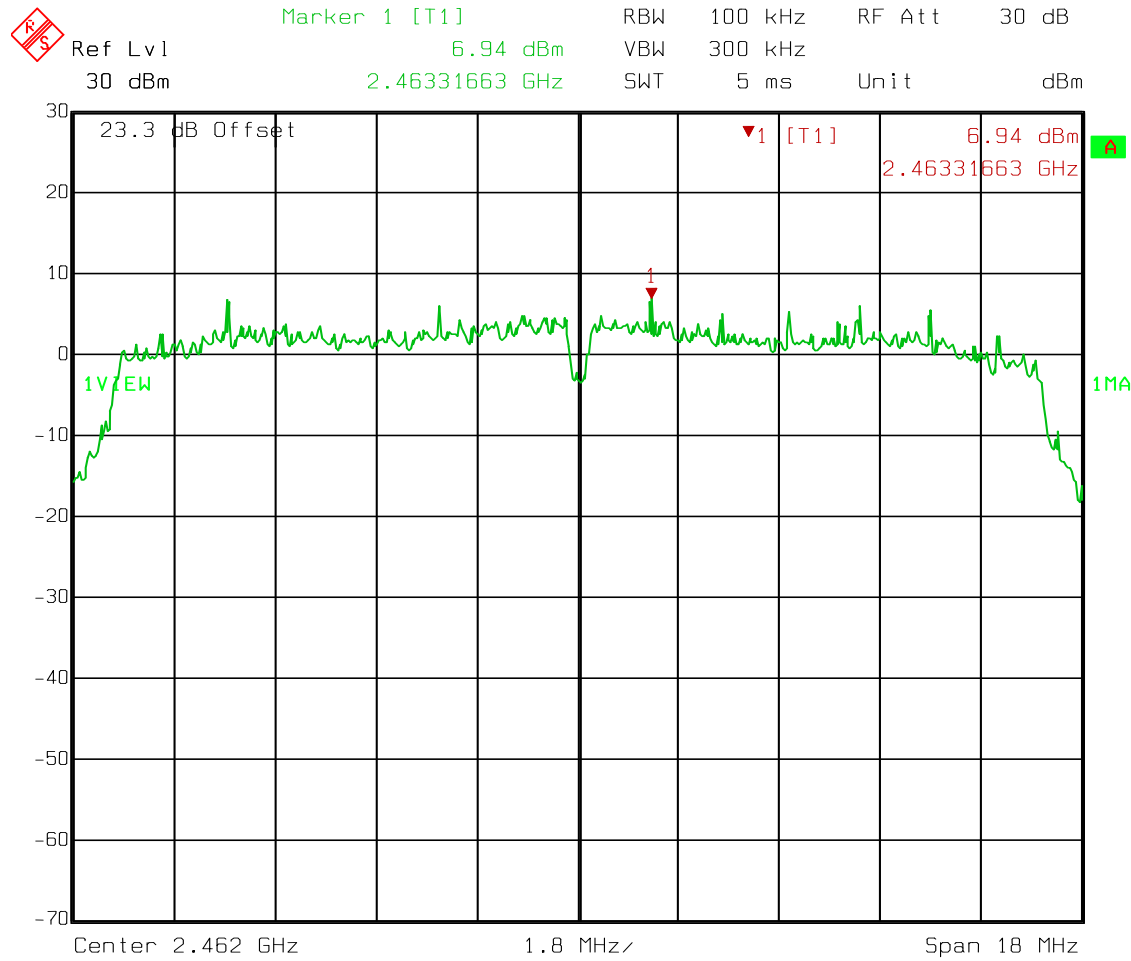


Date: 29.APR.2013 10:52:01

Peak Power Spectral Density

Spectral Density
802.11g
High Channel

$$\text{Density} = 6.9 - 15.2 = -8.3$$

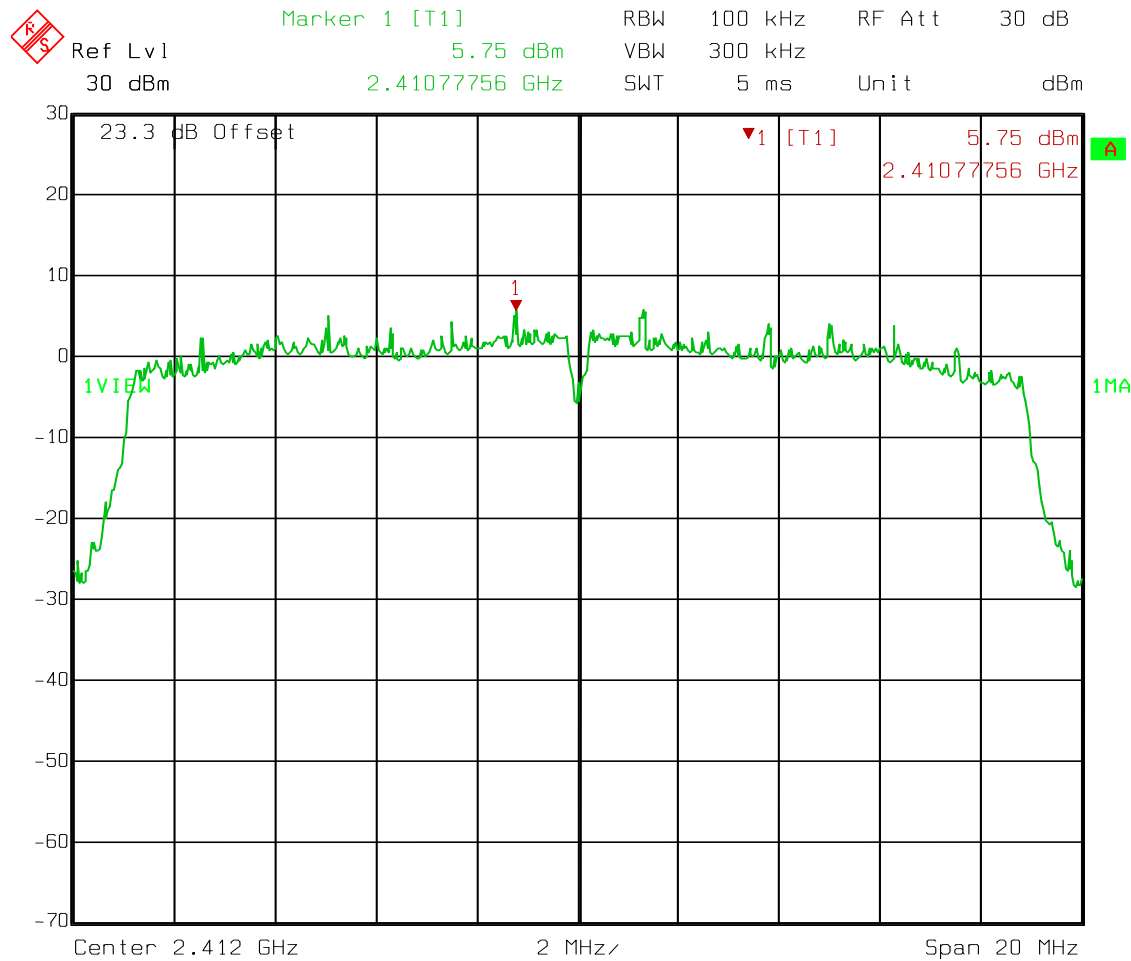


Date: 29.APR.2013 11:00:50

Peak Power Spectral Density

Spectral Density
802.11n
Low Channel

$$\text{Density} = 5.8 - 15.2 = -9.4$$



Date: 29.APR.2013 11:05:08

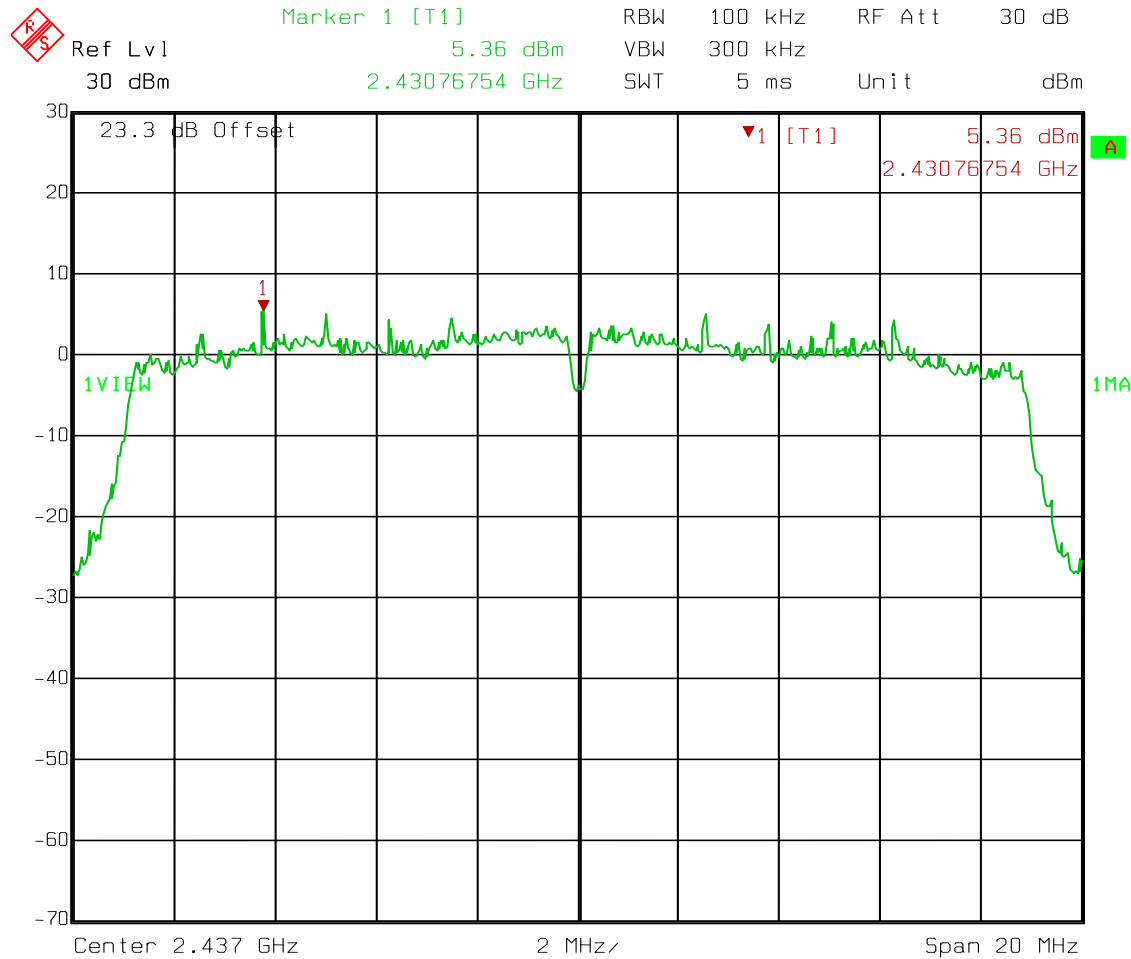
Peak Power Spectral Density

Spectral Density

802.11n

Mid Channel

Density = 5.4 – 15.2 = -9.8

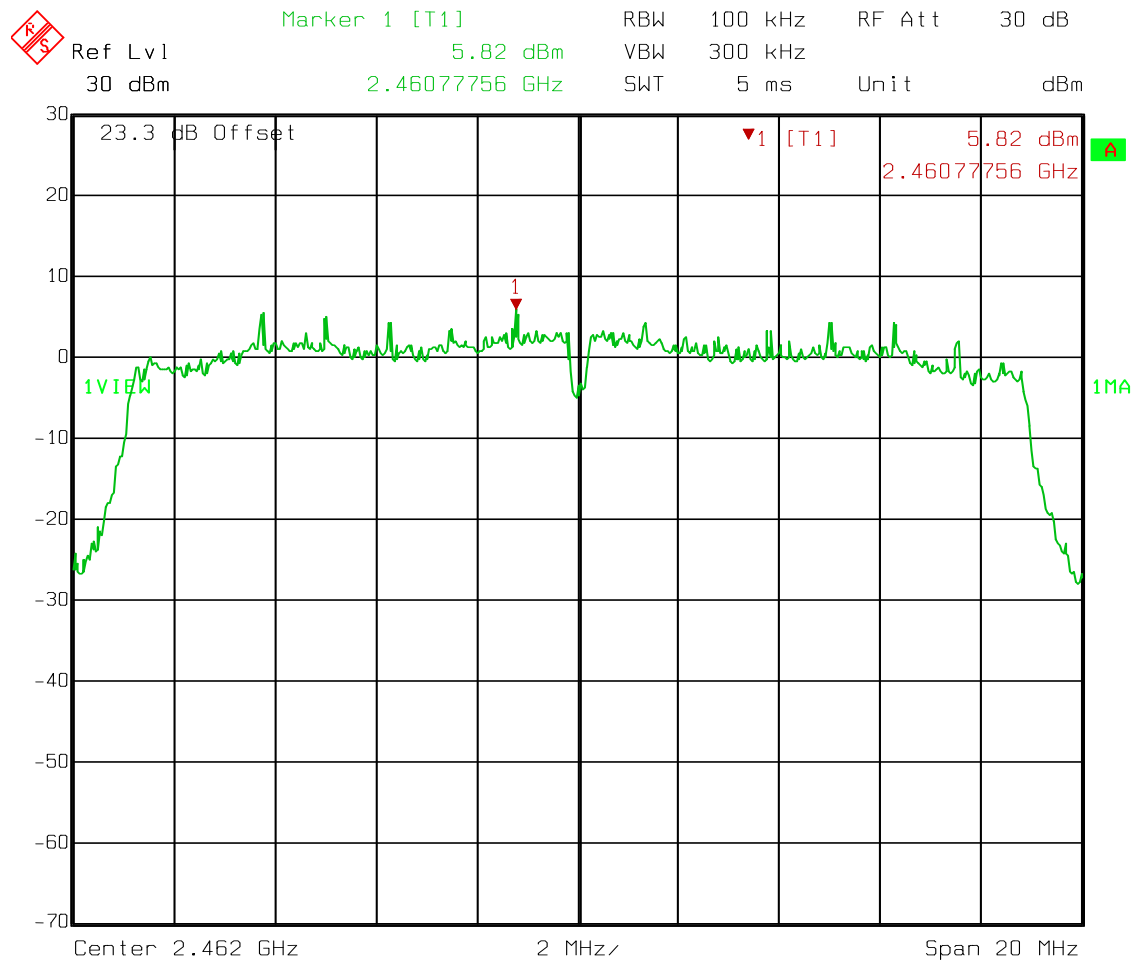


Date: 29.APR.2013 11:09:46

Peak Power Spectral Density

Spectral Density
802.11n
High Channel

$$\text{Density} = 5.8 - 15.2 = -9.4$$



Date: 29.APR.2013 11:10:22

Section 8. Powerline Conducted Emissions

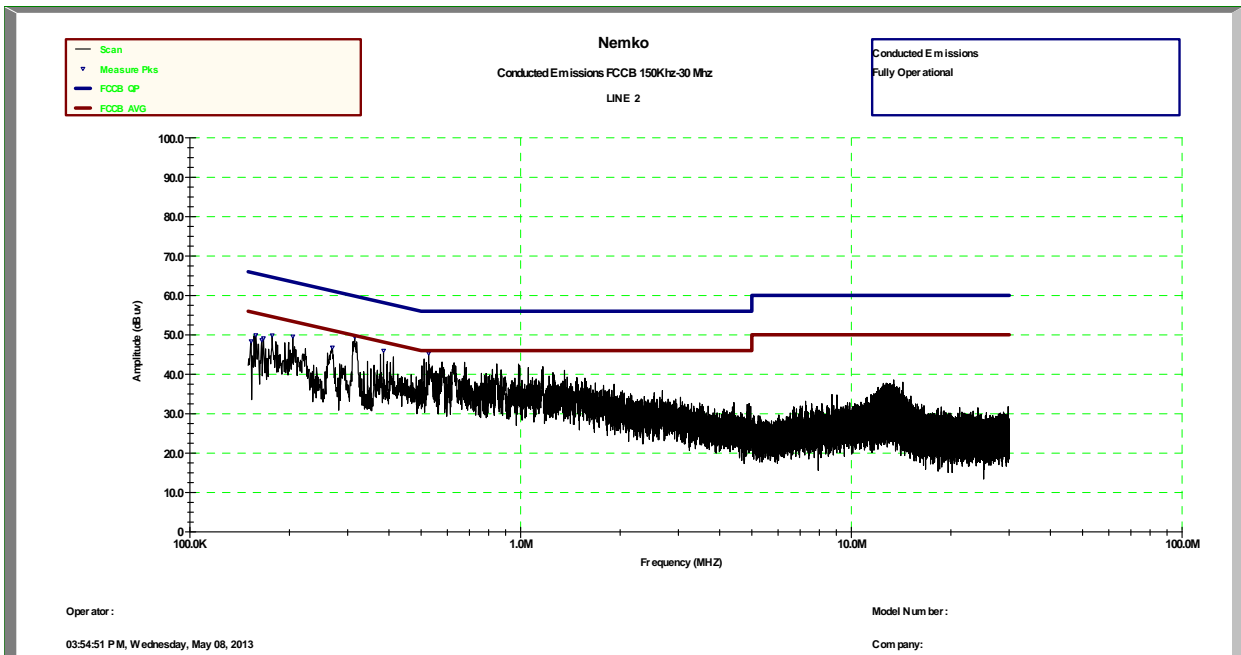
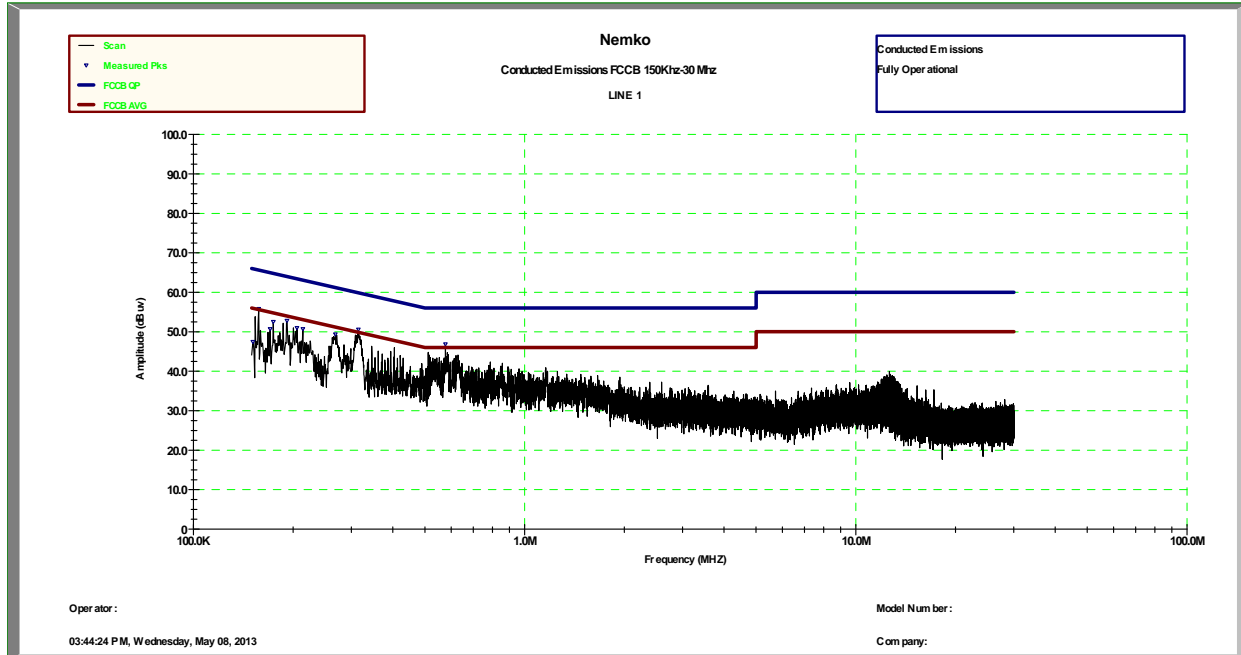
NAME OF TEST: Powerline Conducted Emissions	PARA. NO.: FCC 15.207(a) RSS-Gen 7.2.4
TESTED BY: David Light	DATE: 08 May 2013

Test Results: Complies.

Measurement Data: See attached plots.

Measurement Uncertainty: +/- 1.7 dB

Test Data – Powerline Conducted Emissions



Test Data – Powerline Conducted Emissions

Line 1

Frequency MHz	FCCB QP LIMIT	FCCB AVG LIMIT	AVG Meas	AVG Margin	QP Meas	QP Margin
0.156	65.8	55.8	38.8	-17.0	51.1	-14.8
0.193	64.8	54.8	37.6	-17.1	47.6	-17.2
0.312	61.4	51.4	46.1	-5.3	48.1	-13.3
0.579	56.0	46.0	40.3	-5.7	42.7	-13.3
0.312	61.4	51.4	46.1	-5.3	48.1	-13.3
0.193	64.8	54.8	37.6	-17.1	47.6	-17.2
0.156	65.8	55.8	38.8	-17.0	51.1	-14.8

Line 2

Frequency MHz	FCCB QP Limit	FCCB AVG Limit	AVG Meas	AVG Margin	QP Meas	QP Margin
0.311	61.4	51.4	45.1	-6.3	47.2	-14.2
0.523	56.0	46.0	32.3	-13.8	39.7	-16.3
0.311	61.4	51.4	45.1	-6.3	47.2	-14.2

Section 9. Test Equipment List

Asset Tag	Description	Manufacturer	Model	Serial #	Last Cal	Next Cal
993	Antenna, Horn	A.H. Systems	SAS-200/571	162	22-Sep-2011	22-Sep-2013
1016	Preamplifier	Hewlett Packard	8449A	2749A00159	23-Jul-2012	23-Jul-2013
1036	Spectrum Analyzer	Rohde & Schwartz	FSEK30	830844/006	23-Dec-2011	23-Dec-2013
1067	Cable, 4m Blue	Storm	PR90-010-144		05-May-2012	05-May-2013
1082	Cable, 2m	Astrolab	32027-2- 29094-72TC		N/R	
1083	Cable, 2m	Astrolab	32027-2- 29094-72TC		N/R	
1258	LISN .15mhz- 30mhz	EMCO	3825/2	1305	04-Mar-2013	04-Mar-2014
1472	Attenuator	Omni Spectra	20600-20db		N/R	
1480	Antenna, Bilog	Schaffner- Chase	CBL6111C	2572	25-Feb-2013	25-Feb-2014
1555	High Pass Filter	Solar Electronics	7930-5.0	933125	24-Jul-2012	24-Jul-2013
791	30MHz to 1GHz Pre Amplifier	Nemko, USA	CRA69 321003 9605	119	19-Oct-2012	19-Oct-2013
1949	Transient Limiter 150kHz - 30 MHz	Com-Power	LIT-153	531129	07-Jan-2013	07-Jan-2014
1950	Spectrum Analyzer	Rohde & Schwartz	FSP	100037	17-Jan-2013	17-Jan-2014

ANNEX A - TEST DETAILS

NAME OF TEST: Powerline Conducted Emissions

Minimum Standard: Conducted limits.

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

Frequency of Conducted Emission (MHz)	Limit (dBmV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency.

(b) The limit shown in paragraph (a) of this section shall not apply to carrier current systems operating as intentional radiators on frequencies below 30 MHz. In lieu thereof, these carrier current systems shall be subject to the following standards:

(1) For carrier current systems containing their fundamental emission within the frequency band 535-1705 kHz and intended to be received using a standard AM broadcast receiver: no limit on conducted emissions.

(2) For all other carrier current systems: 1000 mV within the frequency band 535-1705 kHz, as measured using a 50 mH/50 ohms LISN.

(3) Carrier current systems operating below 30 MHz are also subject to the radiated emission limits as provided in §15.205 and §§15.209, 15.221, 15.223, 15.225 or 15.227, as appropriate.

(c) Measurements to demonstrate compliance with the conducted limits are not required for devices which only employ battery power for operation and which do not operate from the AC power lines or contain provisions for operation while connected to the AC power lines. Devices that include, or make provision for, the use of battery chargers which permit operating while charging, AC adaptors or battery eliminators or that connect to the AC power lines indirectly, obtaining their power through another device which is connected to the AC power lines, shall be tested to demonstrate compliance with the conducted limits.

NAME OF TEST: Maximum Peak Output Power

Minimum Standard: The maximum peak output power shall not exceed 1 watt.

If transmitting antennas of directional gain greater than 6 dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Systems operating in the 2400-2483.5 MHz band that are used exclusively for fixed, point to point operation may employ transmitting antennas with directional gain greater than 6 dBi provided the maximum peak output power is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceed 6 dBi.

Systems operating in the 5725 – 5850 MHz band that are used exclusively for fixed, point-to-point operation may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter peak output power.

Direct Measurement Method For Detachable Antennas:

If the antenna is detachable, a peak power meter is used to measure the power output with the transmitter operating into a 50 ohm load. The dBi gain of the antenna(s) employed shall be reported.

Substitution Antenna Method for Integral Antennas:

The peak field strength of the carrier is measured in a worst-case configuration with a RBW > 5 times the occupied bandwidth of the transmitted waveform. For cases where the RBW of the test instrument is not sufficient, the power is measured using a peak power meter instead of the spectrum analyzer.

The RBW of the spectrum analyzer shall be set to a value greater than the measured 6 dB occupied bandwidth of the E.U.T.

Number of channels tested:

Tuning range	Number of channels tested	Channel location in band
1 MHz or less	1	middle
1 to 10 MHz	2	top and bottom
more than 10 MHz	3	top, middle, bottom

NAME OF TEST: Occupied Bandwidth

Minimum Standard: Systems using digital modulation techniques may operate in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

Method Of Measurement:

The spectrum analyzer is set as follows:

- RBW = VBW = 100 kHz.
- Span: Sufficient to display 6 dB bandwidth
- LOG dB/div.: 10 dB
- Sweep: Auto

Number of channels tested:

Tuning range	Number of channels tested	Channel location in band
1 MHz or less	1	middle
1 to 10 MHz	2	top and bottom
more than 10 MHz	3	top, middle, bottom

NAME OF TEST: Spurious Emissions(conducted)

Minimum Standard: In any 100kHz bandwidth outside the frequency band in which the transmitter is operating, emissions shall be at least 20 dB below the fundamental emission or shall not exceed the following field strength limits. Emissions falling in the restricted bands of 15.205 shall not exceed the following field strength limits:

Frequency (MHz)	Field Strength (µV/m @ 3m)	Field Strength (dB @ 3m)
30 - 88	100	40.0
88 - 216	150	43.5
216 - 960	200	46.0
Above 960	500	54.0

THE SPECTRUM IS SEARCHED TO THE 10th HARMONIC OF THE HIGHEST FREQUENCY GENERATED IN THE EUT.

Method Of Measurement:

30 MHz - 10th harmonic plot

RBW: 100 kHz
VBW: 300 kHz
Sweep: Auto
Display line: -20 dBc

Lower Band Edge

RBW: At least 1% of span/div.
VBW: >RBW
Span: As necessary to display any spurious at band edge.
Sweep: Auto
Center Frequency: 902 MHz, 2400 MHz, or 5725 MHz
Marker: Peak of fundamental emission
Marker Δ: Peak of highest spurious level below center frequency.

Upper Band Edge

RBW: At least 1% of span/div.
VBW: >RBW
Span: As necessary to display any spurious at band edge.
Sweep: Auto
Center Frequency: 928 MHz, 2483.5 MHz, or 5850 MHz
Marker: Peak of fundamental emission
Marker Δ: Peak of highest spurious level above center frequency.

Number of channels tested:

Tuning range	Number of channels tested	Channel location in band
1 MHz or less	1	middle
1 to 10 MHz	2	top and bottom
more than 10 MHz	3	top, middle, bottom

NAME OF TEST: Radiated Spurious Emissions

Minimum Standard: In any 100kHz bandwidth outside the frequency band in which the transmitter is operating, emissions shall be at least 20 dB below the fundamental emission or shall not exceed the following field strength limits:

Emissions falling in the restricted bands of 15.205 shall not exceed the following field strength limits:

Frequency (MHz)	Field Strength (µV/m @ 3m)	Field Strength (dB @ 3m)
30 - 88	100	40.0
88 - 216	150	43.5
216 - 960	200	46.0
Above 960	500	54.0

THE SPECTRUM WAS SEARCHED TO THE 10th HARMONIC

15.205 Restricted Bands

MHz	MHz	MHz	GHz
0.09-0.11	16.42-16.423	399.9-410	4.5-5.25
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
6.125-6.218	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	Above 38.6
13.36-13.41	1718		

Number of channels tested:

Tuning range	Number of channels tested	Channel location in band
1 MHz or less	1	middle
1 to 10 MHz	2	top and bottom
more than 10 MHz	3	top, middle, bottom

NAME OF TEST: Transmitter Power Density

Minimum Standard: The transmitted power density averaged over any 1 second interval shall not be greater than +8 dBm in any 3 kHz bandwidth.

Method Of Measurement: The spectrum analyzer is set as follows:

- RBW: 3 kHz
- VBW: >3 kHz
- Span: => measured 6 dB bandwidth
- Sweep: Span(kHz)/3 (i.e. for a span of 1.5 MHz the sweep rate is 1500/3 = 500 sec.
- LOG dB/div.: 2 dB

Note: For devices with spectrum line spacing =< 3 kHz, the RBW of the analyzer is reduced until the spectral lines are resolved. The measurement data is normalized to 3 kHz by summing the power of all the individual spectral lines within a 3 kHz band in linear power units.

For Devices With Integral Antenna:

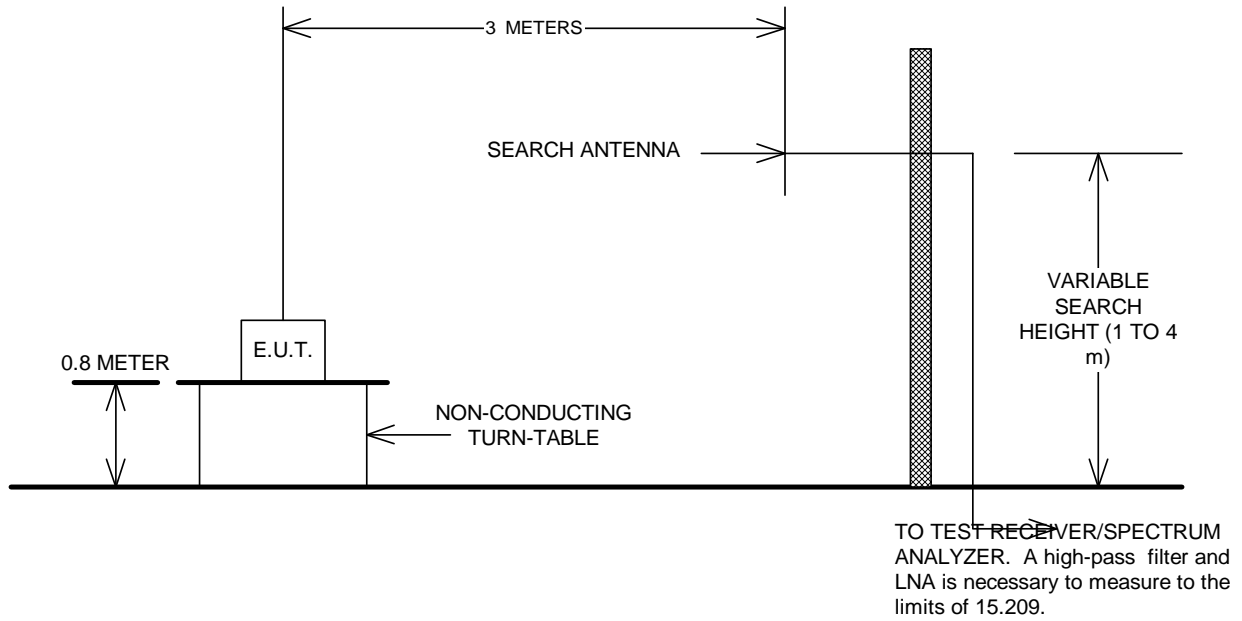
For devices with non-detachable antennas, the received field strength is peaked and the spectrum analyzer is set as above. The peak emission level is then measured and converted to a field strength by adding the appropriate antenna factor and cable loss. This field strength is then converted to an equivalent isotropic radiated power using the same method as described for Peak Power output.

Number of channels tested:

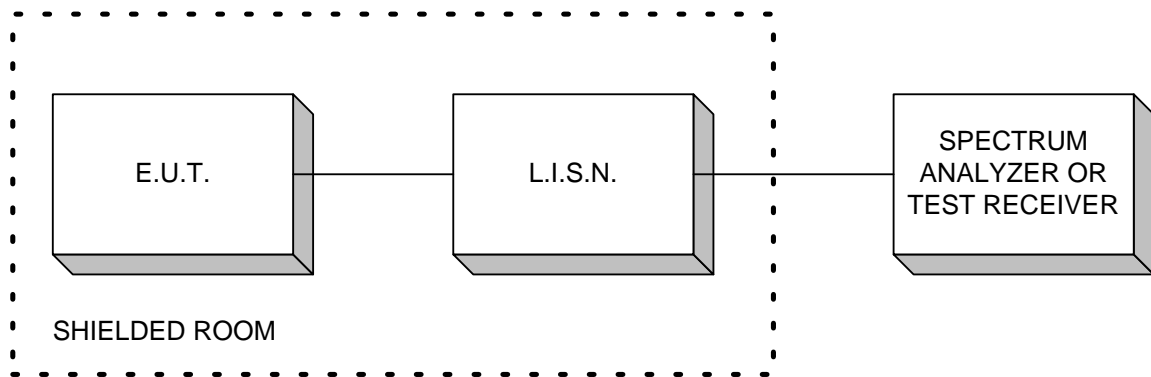
Tuning Range	Number Of Channels Tested	Channel Location In Band
1 MHz or Less	1	Middle
1 to 10 MHz	2	Top And Bottom
More Than 10 MHz	3	Top, Middle, Bottom

ANNEX B - TEST DIAGRAMS

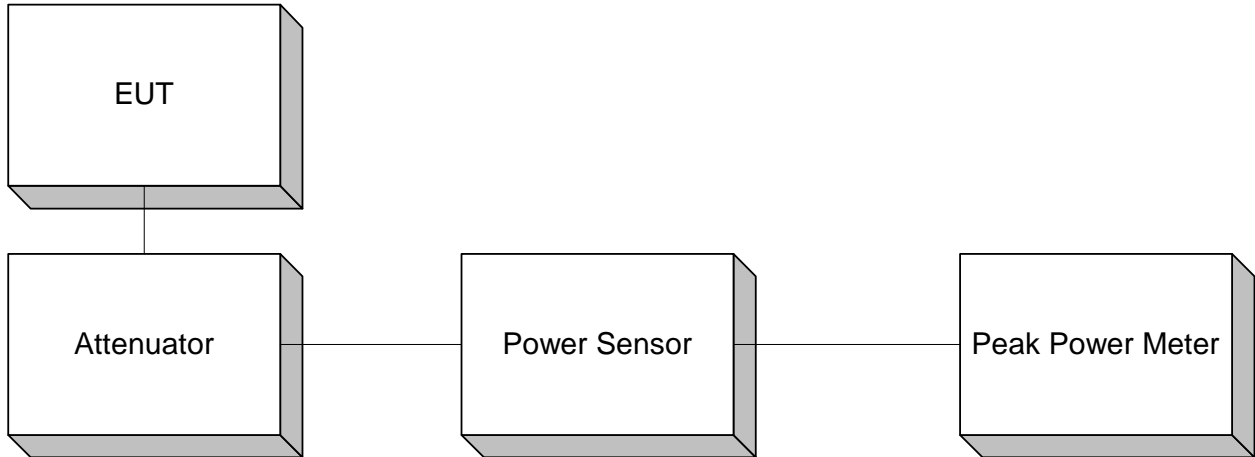
Test Site For Radiated Emissions



Conducted Emissions



Peak Power at Antenna Terminals



Note: A spectrum analyzer may be substituted for Peak Power Meter given that the measurement bandwidth is sufficient to capture the 60 dB bandwidth of the transmitter.

**Minimum 6 dB Bandwidth
Peak Power Spectral Density
Spurious Emissions (conducted)**

