

TEST REPORT

Report Number: 3160445MPK-001

Project Number: 3160445

September 30, 2008

Testing performed on the
802.11a/b/g/n Access Point

Model Number: XP3E6W

FCC ID: Q6G-XP3E6W

IC ID: 4657A-XP3E6W

to

FCC Part 15 Subpart C (15.247)

RSS-210 Annex 8

LP0002

for

WatchGuard Technologies, Inc.

Test Performed by:

Intertek Testing Services
1365 Adams Court
Menlo Park, CA 94025

Test Authorized by:

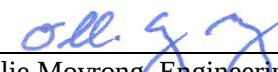
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1.0 Summary of Tests

Test	Reference FCC	Reference RSS	Reference LP0002	Result
RF output power	15.247(b)	A8.4	3.10.1.(2)	Complies
6 dB Bandwidth	15.247(a)(2)	A8.2(1)	3.10.1.(6.2.1)	Complies
Power Density	15.247(d)	A8.2(2)	3.10.1.(6.2.2)	Complies
Out of Band Antenna Conducted Emission	15.247(c)	A8.5		Complies
Out of Band Radiated Emission (except emissions in restricted bands)	15.247(c)	A8.5		Not performed. The EUT passed out-of-band antenna conducted emission
Radiated Emission in Restricted Bands	15.247(c), 15.209, 15.205	A8.5	2.8	Complies
AC Conducted Emission	15.207	RSS-Gen		Complies
Radiated Emission from Digital Part and Receiver	15.109	RSS-Gen		Complies
Antenna Requirement	15.203	RSS-Gen		Complies. The EUT uses unique antenna connector

EUT receive date: September 4, 2008

EUT receive condition: The EUT was received in good condition with no apparent damage.

Test start date: September 8, 2008

Test completion date: September 30, 2008

The test results in this report pertain only to the item tested.

2.0 General Information

2.1 Product Description

The Equipment under Test (EUT) is an 802.11a/b/g/n Access Point operating in 2.4 GHz, 5.2 GHz, and 5.8 GHz bands. The EUT supports a wide range of data rates:

- from 1 Mbps to 11 Mbps in 802.11b mode
- from 6 Mbps to 54 Mbps in 802.11g mode
- from 6 Mbps to 54 Mbps in 802.11a mode
- from 6.5 Mbps to 130 Mbps in 802.11n HT20 mode
- from 13.5 Mbps to 270 Mbps in 802.11n HT40 mode

Note: in 802.11n HT20 and 802.11n HT40 modes the nominal bandwidth is 20 MHz and 40 MHz respectively.

The EUT incorporates a MIMO function and contains three complete transmitters (Tx), receivers (Rx) and antennas.

The information about the radio, installed in the model XP3E6W, is presented below.

Applicant	WatchGuard Technologies Inc.
Model No.	XP3E6W
FCC Identifier	FCC ID: Q6G-XP3E6W
IC Identifier	IC ID: 4657A-XP3E6W
Use of Product	802.11a/b/g/n Access Point
Modulation Technique	DSSS, OFDM
Rated RF Output	500 mW (peak)
Frequency Range	<u>2.4 GHz band:</u> 2400 – 2483.5 MHz, <u>5 GHz band:</u> 5150 – 5250 MHz 5725 – 5850 MHz
Type of modulation	DSSS: DBPSK, DQPSK, CCK OFDM: BPSK, QPSK, 16QAM, 64QAM
Number of Channel(s)	<u>2.4 GHz band:</u> 11 – in 802.11b/g and 802.11n HT20 modes 7 – in 802.11n HT40 mode <u>5 GHz band:</u> 9 – in 802.11a and 802.11n HT20 modes 4 – in 802.11n HT40 mode
Antenna(s) & Gain,	Omni-directional. Operating frequencies: 2.4 – 2.5 GHz and 4.9 – 5.825 GHz Peak gain: 2.0 dBi typ. Reverse SMA connector.
Manufacturer Name & Address	WatchGuard Technologies, Inc. 505 5 th Ave.S. Suite 500 Seattle, WA 98104 USA

The EUT supports the following configurations:

	2400 – 2483.5 MHz		5150 – 5250 MHz		5725 – 5850 MHz	
	1 Tx	3 Tx	1 Tx	3 Tx	1 Tx	3 Tx
802.11a			√		√	
802.11b	√					
802.11g	√					
802.11n HT20		√		√		√
802.11n HT40		√		√		√

List of channels:

√ - available

X - tested

Channels in 2.4 GHz band					
Number	Frequency, MHz	b/g/n HT20 mode		n HT40 mode	
1	2412	√	X		
2	2417	√			
3	2422	√		√	X
4	2427	√		√	
5	2432	√		√	
6	2437	√	X	√	X
7	2442	√		√	
8	2447	√		√	
9	2452	√		√	X
10	2457	√			
11	2462	√	X		

Channels in 5.2 GHz band					
Number	Frequency, MHz	a/n HT20 mode		n HT40 mode	
36	5180	√	X		
40	5200	√	X	√	X
44	5220	√	X	√	X
48	5240	√	X		

Channels in 5.8 GHz band					
Number	Frequency, MHz	a/n HT20 mode		n HT40 mode	
149	5745	√	X		
153	5765	√		√	X
157	5785	√	X	√	X
161	5805	√		√	X
165	5825	√	X		

Note: Testing of 5.2 GHz band is addressed in a separate report, 3160445MPK-002.

2.2 Related Submittal(s) Grants

None.

2.3 Test Methodology

Antenna conducted measurements were performed according to the procedure "Measurement of Digital Transmission Systems Operating under Section 15.247".

Both AC mains line-conducted and radiated emissions measurements were performed according to the procedures in ANSI C63.4 (2003). Radiated tests were performed at an antenna to EUT distance of 3 meters, unless stated otherwise in the "**Data Sheet**" of this Application.

All other measurements were made in accordance with the procedures in part 2 of CFR 47.

2.4 Test Facility

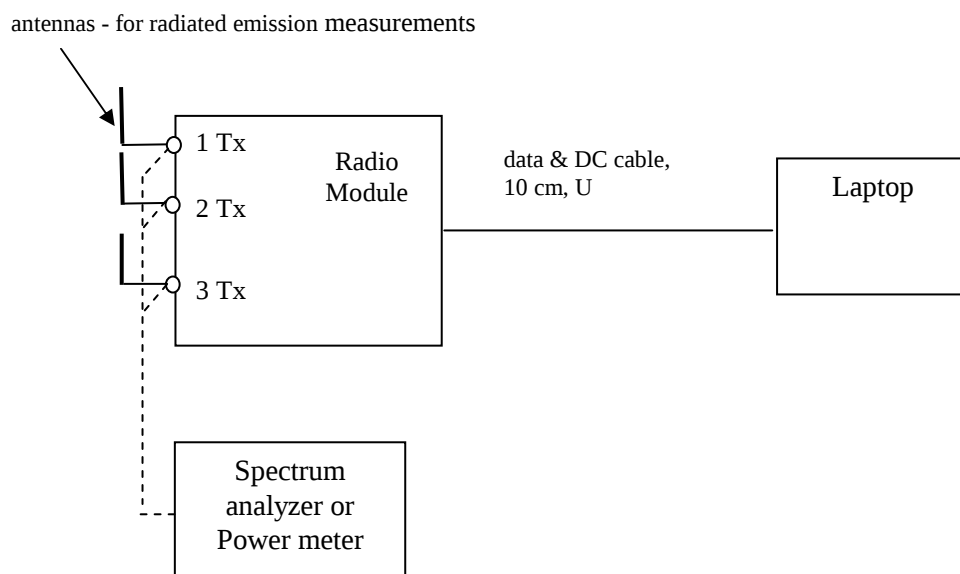
The open area test site and conducted measurement facility used to collect the radiated data is site 1 (10-m semi-anechoic chamber). This test facility and site measurement data have been fully placed on file with the FCC, IC and A2LA accredited.

3.0 System Test Configuration

3.1 Support Equipment

Description	Model No.	Serial No.
Toshiba Laptop	Tesra 8200	51213458PU

3.2 Block Diagram of Test Setup



S = Shielded
U = Unshielded

F = With Ferrite
m = Length in Meters

3.3 Justification

Preliminary testing was performed for all modulation/data rate modes. The following modes, in which the highest power was detected, were selected for final measurements:

CCK 11 Mbps – for 802.11b

OFDM 6 Mbps – for 802.11g

OFDM 6 Mbps – for 802.11a

OFDM 6.5 Mbps – for 802.11n HT20

OFDM 13.5 Mbps – for 802.11n HT40

3.4 Mode of Operation During Test

During testing, the transmitter was setup to transmit continuously at maximum RF power on low, middle and high channels.

3.5 Modifications Required for Compliance

Intertek installed no modifications during compliance testing in order to bring the product into compliance (Please note that this does not include changes made specifically by WatchGuard prior to compliance testing)

3.6 Additions, deviations and exclusions from standards

No additions, deviations or exclusions from the standard were made.

4.0 Measurement Results

4.1 Maximum Conducted Output Power at Antenna Terminals FCC Rule 15.247(b)

4.1.1 Requirement

For antennas with gains of 6 dBi or less, maximum allowed transmitter output is 1 watt (+30 dBm).
For antennas with gains greater than 6 dBi, transmitter output level must be decreased by an amount equal to (GAIN - 6) dBm.

4.1.2 Procedure

The antenna port of the EUT was connected to the input of a spectrum analyzer/power meter to measure the Peak Transmitter Output Power.

For conducted power measurement for FCC Part 15C testing, the procedure “**Measurement of Digital Transmission Systems Operating under Section 15.247**” is used. In particular – the **Power Output Option 1, Method #1**, - Peak power measurement with peak power meter.

In 802.11n modes (3 Tx transmit simultaneously), the output power is summarized for all 3 transmitters.

4.1.3 Test Result

The results are presented on the following tables.

Note: to comply with radiated emission requirements in the restricted bands, the following power settings (ps) are used:

2.4 GHz band

ps = 18 in 802.11b/g modes
ps = 14 in 802.11n HT20 mode
ps = 11 in 802.11n HT40 mode

5.725 – 5.850 GHz band

ps = 18 in all modes

Channel	Frequency MHz	Standard/ Data rate		Conducted power (peak) mW	Σ power mW	Σ power dBm	Conducted power Limit dBm	Margin dB
1	2412	802.11b 11 Mbps	Output 1	56	-	-	30	-11.5
			Output 2	70 *				
			Output 3	61				
1	2412	802.11g 6 Mbps	Output 1	160	-	-	30	-7.7
			Output 2	168 *				
			Output 3	165				
1	2412	802.11n HT20 6.5 Mbps	Output 1	72	223	23.5	30	-6.5
			Output 2	76				
			Output 3	75				

6	2437	802.11b 11 Mbps	Output 1	58	-	-	30	-11.4
			Output 2	73 *				
			Output 3	56				
6	2437	802.11g 6 Mbps	Output 1	165	-	-	30	-7.7
			Output 2	168 *				
			Output 3	160				
6	2437	802.11n HT20 6.5 Mbps	Output 1	75	221	23.4	30	-6.6
			Output 2	77				
			Output 3	69				
6	2437	802.11n HT40 13.5 Mbps	Output 1	50	149	21.7	30	-8.3
			Output 2	52				
			Output 3	47				

11	2462	802.11b 11 Mbps	Output 1	51	-	-	30	-11.5
			Output 2	70 *				
			Output 3	63				
11	2462	802.11g 6 Mbps	Output 1	157	-	-	30	-7.0
			Output 2	200 *				
			Output 3	169				
11	2462	802.11n HT20 6.5 Mbps	Output 1	71	253	24.0	30	-6.0
			Output 2	110				
			Output 3	72				

3	2422	802.11n HT40 13.5 Mbps	Output 1	48	142	21.5	30	-8.5
			Output 2	50				
			Output 3	44				
9	2452	802.11n HT40 13.5 Mbps	Output 1	48	153	21.8	30	-8.2
			Output 2	58				
			Output 3	47				

* The highest level to be compared to the limit

Channel	Frequency MHz	Standard/ Data rate		Conducted power (peak) mW	Σ power mW	Σ power dBm	Conducted power Limit dBm	Margin dB
149	5745	802.11a 6 Mbps	Output 1	171	-	-	30	-7.5
			Output 2	156				
			Output 3	178 *				
149	5745	802.11n HT20 6.5 Mbps	Output 1	155	466	26.7	30	-3.3
			Output 2	148				
			Output 3	163				

157	5785	802.11a 6 Mbps	Output 1	173	-	-	30	-7.4
			Output 2	157				
			Output 3	182 *				
157	5785	802.11n HT20 6.5 Mbps	Output 1	165	486	26.9	30	-3.1
			Output 2	151				
			Output 3	170				
157	5785	802.11n HT40 13.5 Mbps	Output 1	126	376	25.8	30	-4.2
			Output 2	117				
			Output 3	133				

165	5825	802.11a 6 Mbps	Output 1	178	-	-	30	-7.3
			Output 2	155				
			Output 3	188 *				
165	5825	802.11n HT20 6.5 Mbps	Output 1	167	497	27.0	30	-3.0
			Output 2	150				
			Output 3	180				

153	5765	802.11n HT40 13.5 Mbps	Output 1	125	387	25.9	30	-4.1
			Output 2	130				
			Output 3	132				
161	5805	802.11n HT40 13.5 Mbps	Output 1	128	380	25.8	30	-4.2
			Output 2	117				
			Output 3	135				

* The highest level to be compared to the limit

4.2 6-dB RF Bandwidth and Occupied Bandwidth FCC Rule 15.247(a)(2)

4.2.1 Requirement

The minimum 6-dB bandwidth shall be at least 500 kHz

4.2.2 Procedure

The antenna port of the EUT was connected to the input of a spectrum analyzer. Analyzer RES BW was set to 100 kHz. For each RF output channel investigated, the spectrum analyzer center frequency was set to the channel carrier. A PEAK output reading was taken, a DISPLAY line was drawn 6 dB lower than PEAK level. The 6-dB bandwidth was determined from where the channel output spectrum intersected the display line.

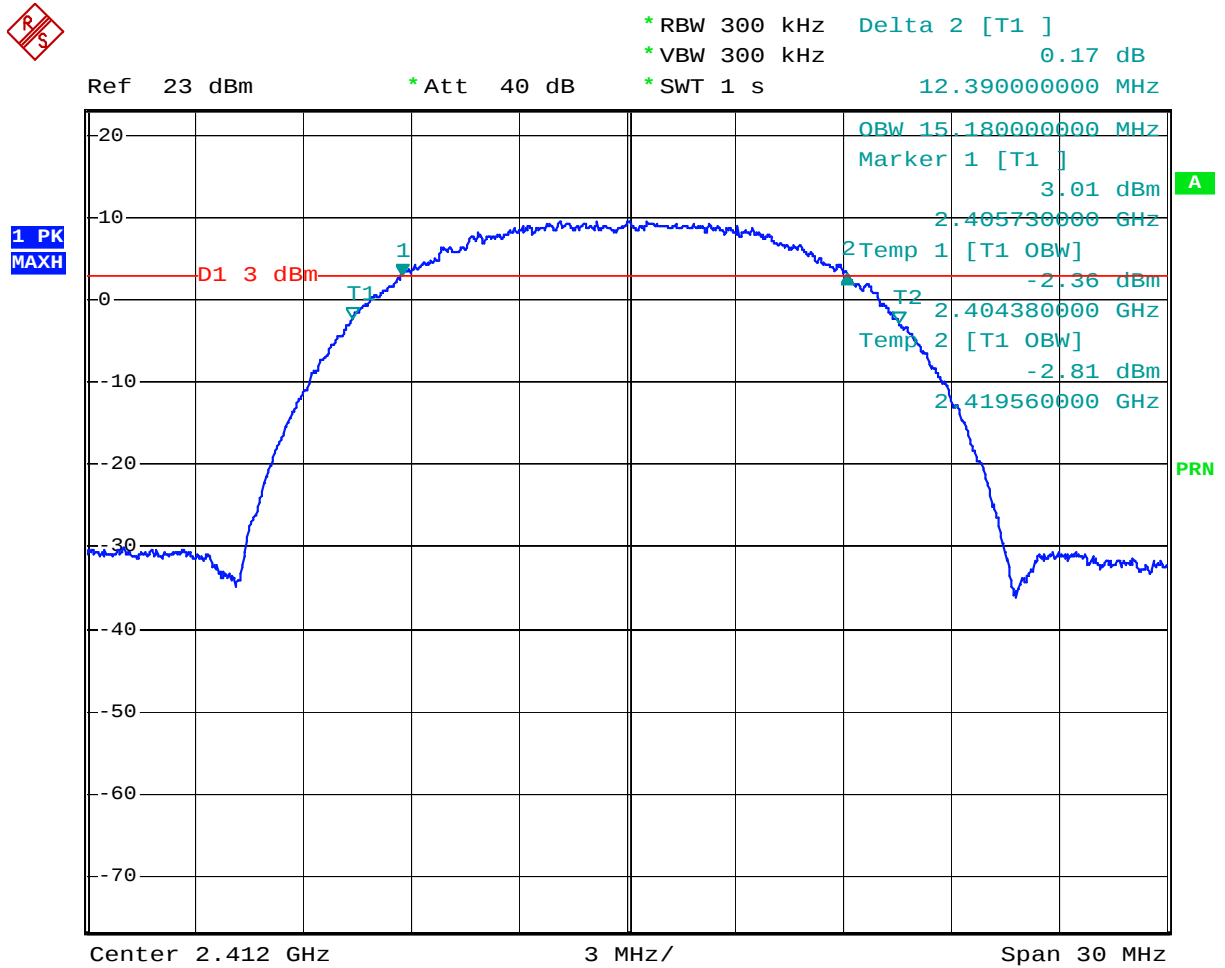
The Occupied bandwidth was measured using the build-in spectrum analyzer facility for 99% power bandwidth measurement.

4.2.3 Test Result

The results are presented on the following plots 2.1 – 2.9 and summarized in the table below.

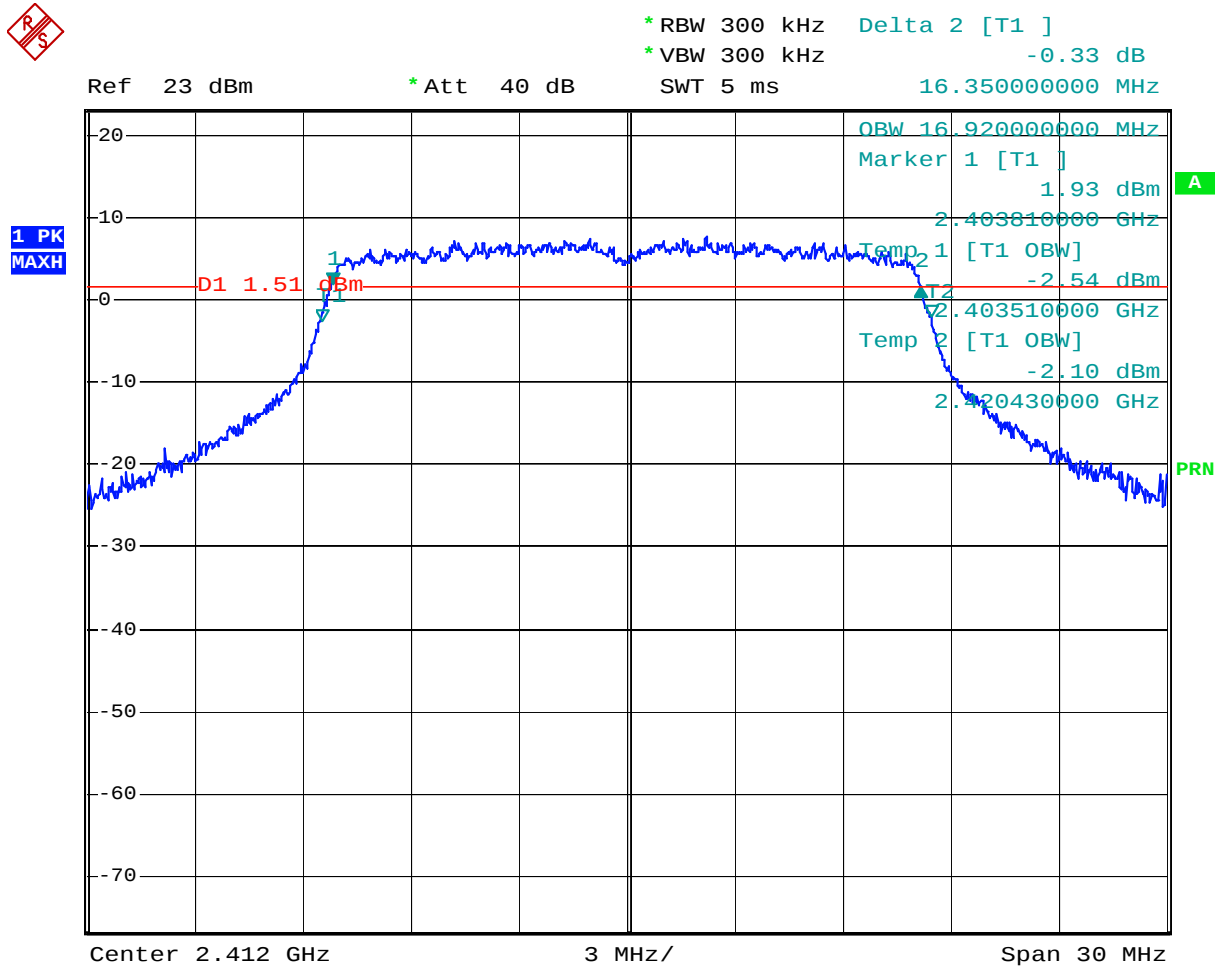
Channel	Frequency MHz	Standard	Date rate Mbps	6-dB Bandwidth MHz	Occupied Bandwidth MHz	Plot
1	2412	802.11b	11	12.4	15.2	2.1
1	2412	802.11g	6	16.4	16.9	2.2
1	2412	802.11n HT20	6.5	17.6	18.0	2.3
6	2437	802.11b	11	12.0	15.2	2.4
6	2437	802.11g	6	16.4	17.0	2.5
6	2437	802.11n HT20	6.5	17.6	18.0	2.6
6	2437	802.11n HT40	13.5	36.7	36.4	2.7
11	2462	802.11b	11	10.8	15.2	2.8
11	2462	802.11g	6	16.4	16.9	2.9
11	2462	802.11n HT20	6.5	17.6	18.0	2.10
3	2422	802.11n HT40	13.5	36.5	36.4	2.11
9	2452	802.11n HT40	13.5	36.5	36.4	2.12
149	5745	802.11a	6	16.7	17.0	2.13
149	5745	802.11n HT20	6.5	17.7	18.1	2.14
157	5785	802.11n HT20	6.5	17.4	18.1	2.15
157	5785	802.11n HT40	13.5	36.5	36.5	2.16
153	5765	802.11n HT40	13.5	36.6	36.5	2.17
161	5805	802.11n HT40	13.5	36.2	36.5	2.18
165	5825	802.11a	6	16.3	17.0	2.19
165	5825	802.11n HT20	6.5	17.6	18.1	2.20

Plot 2.1



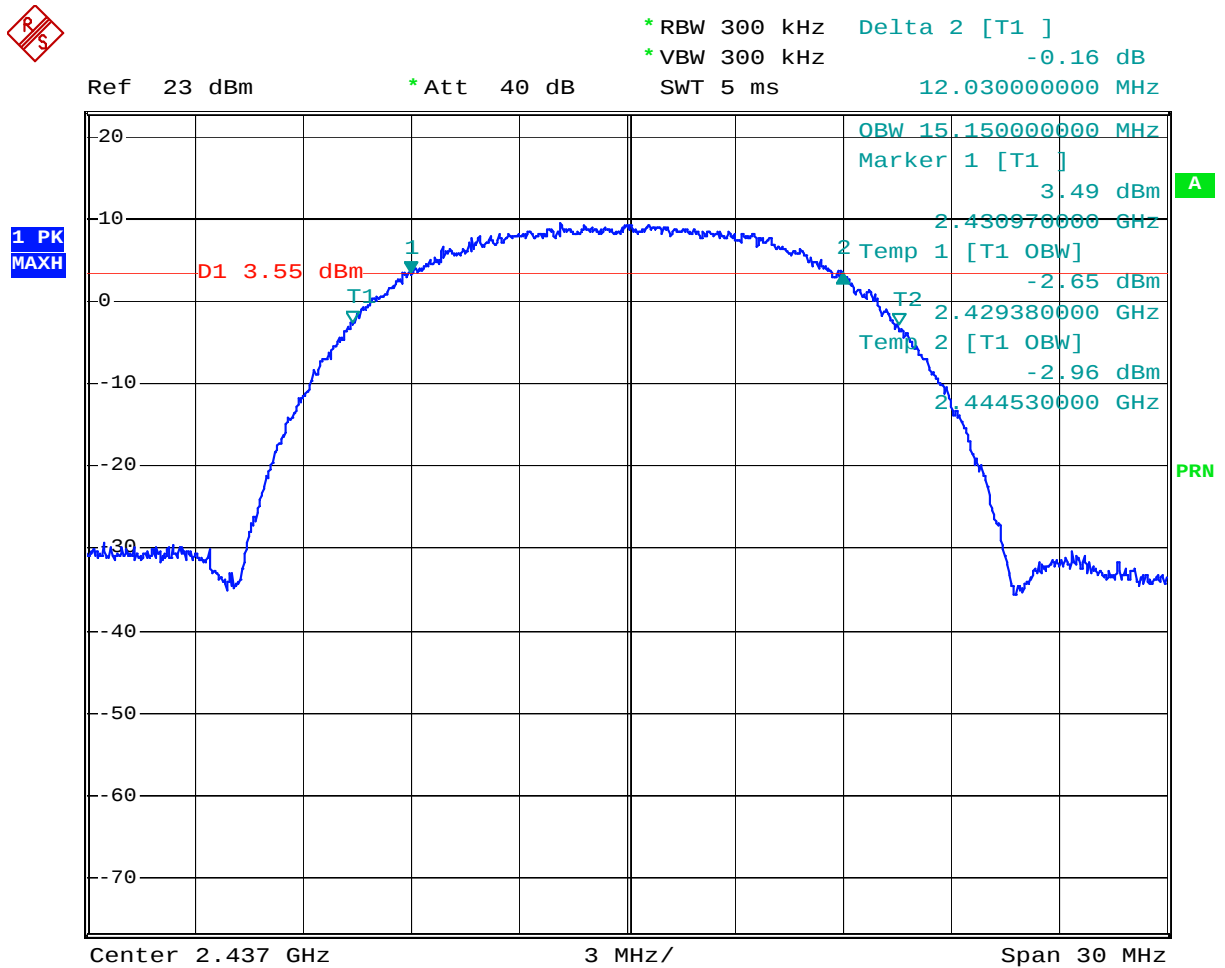
Comment: 6-dB bandwidth and OBW, 802.11b, 11 Mbps
Date: 9.SEP.2008 08:53:25

Plot 2.2



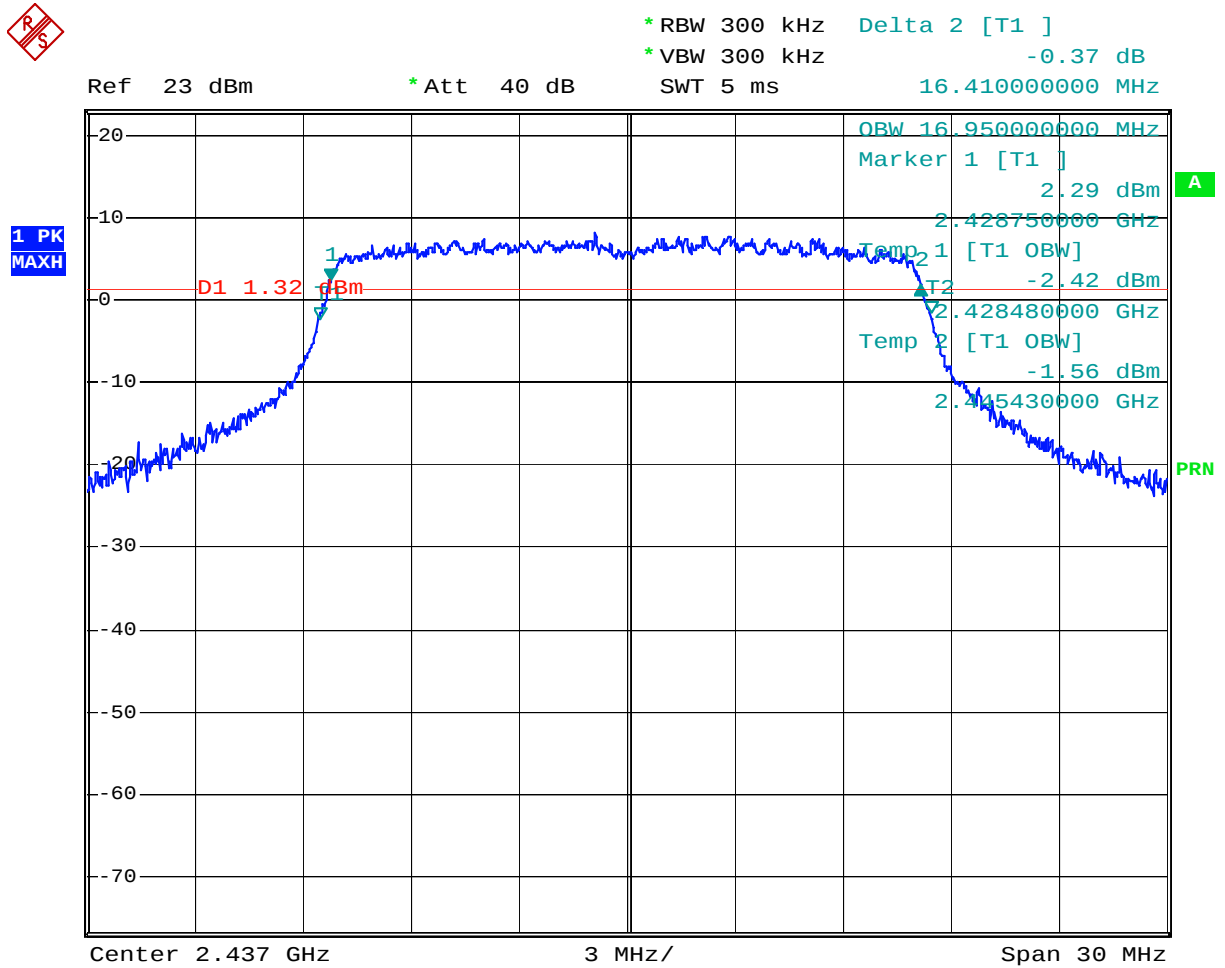
Comment: 6-dB bandwidth and OBW, 802.11g, 6 Mbps
Date: 9.SEP.2008 08:58:04

Plot 2.4



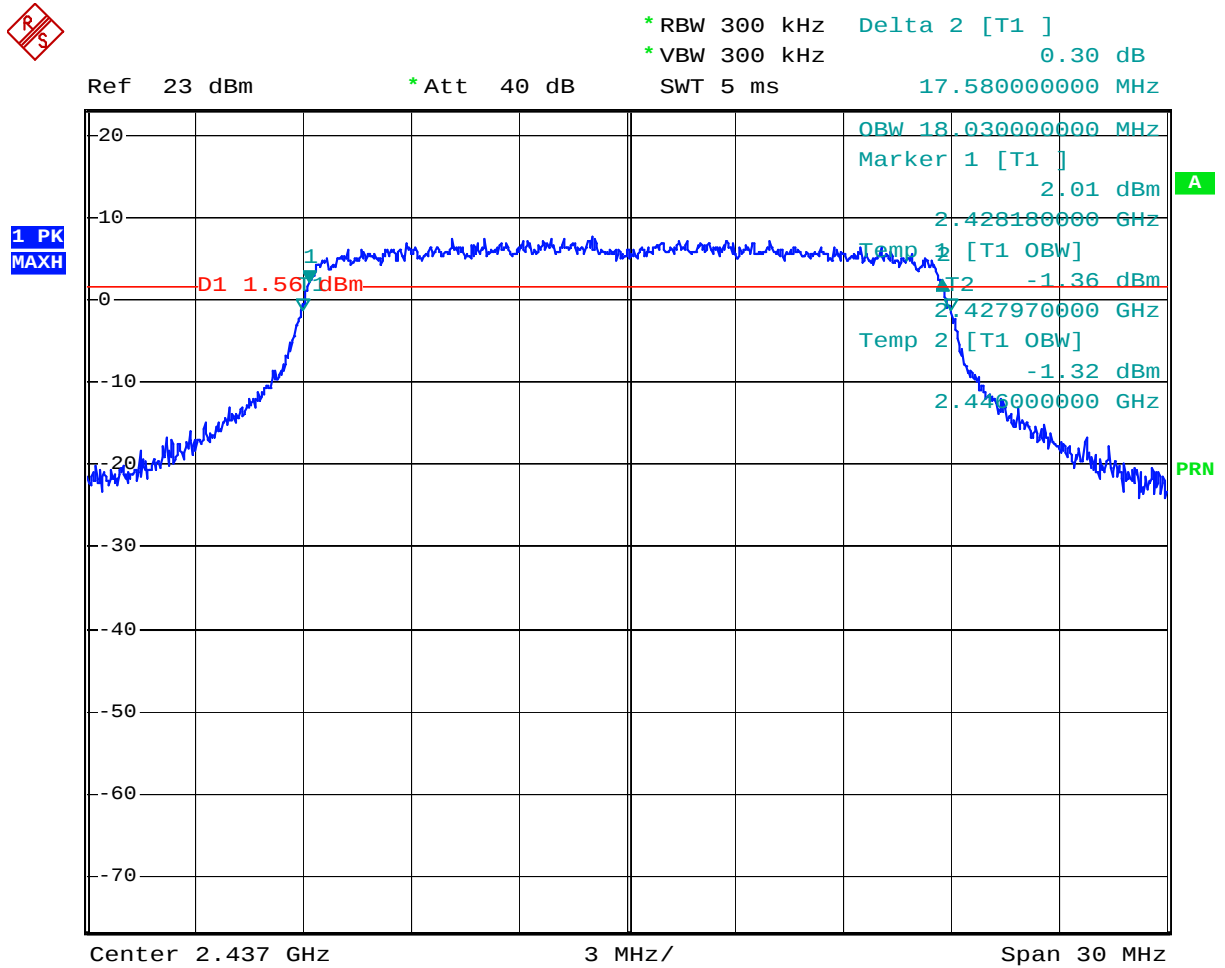
Comment: 6-dB bandwidth and OBW, 802.11b, 11 Mbps
Date: 9.SEP.2008 09:04:59

Plot 2.5



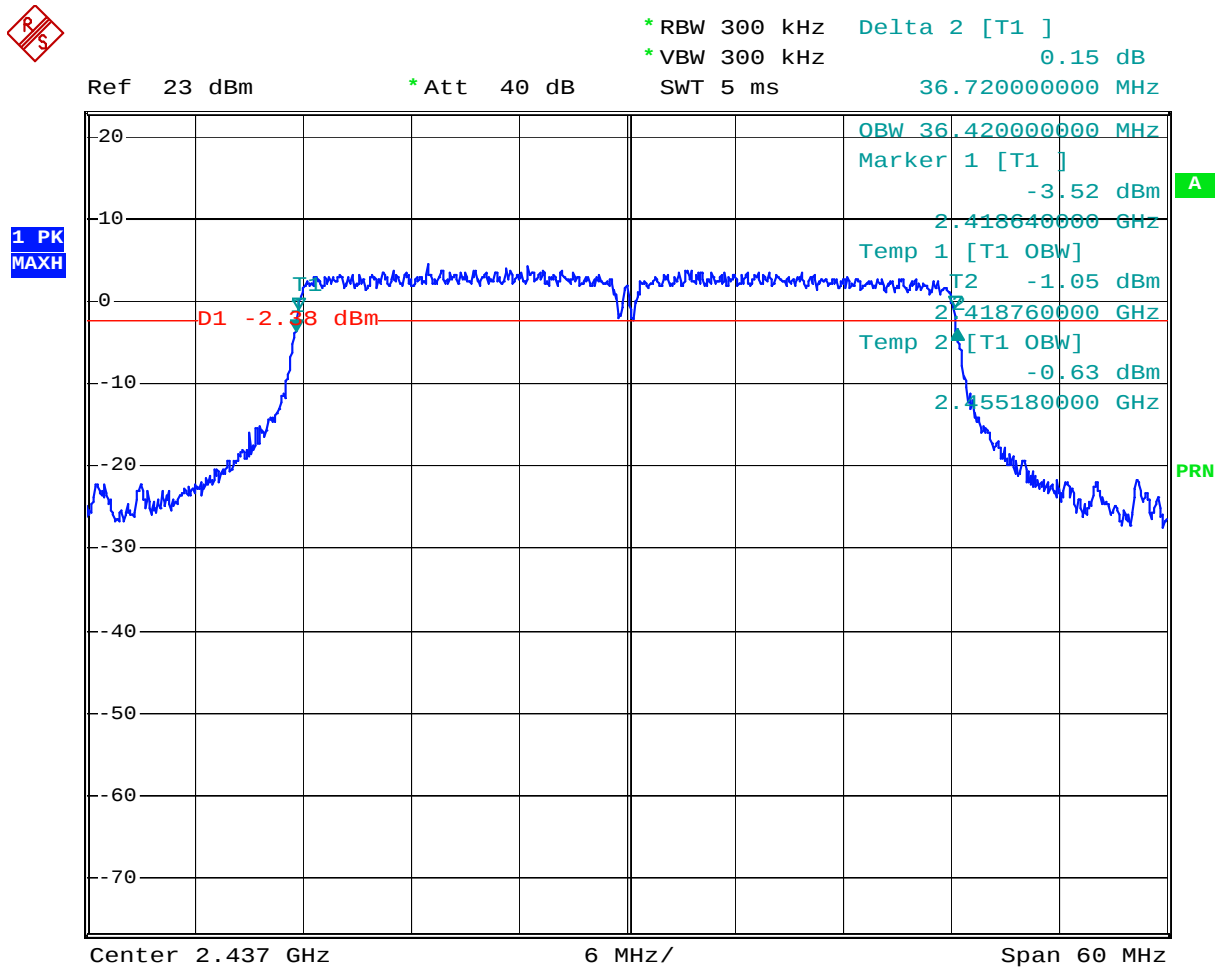
Comment: 6-dB bandwidth and OBW, 802.11g, 6 Mbps
Date: 9.SEP.2008 09:07:09

Plot 2.6



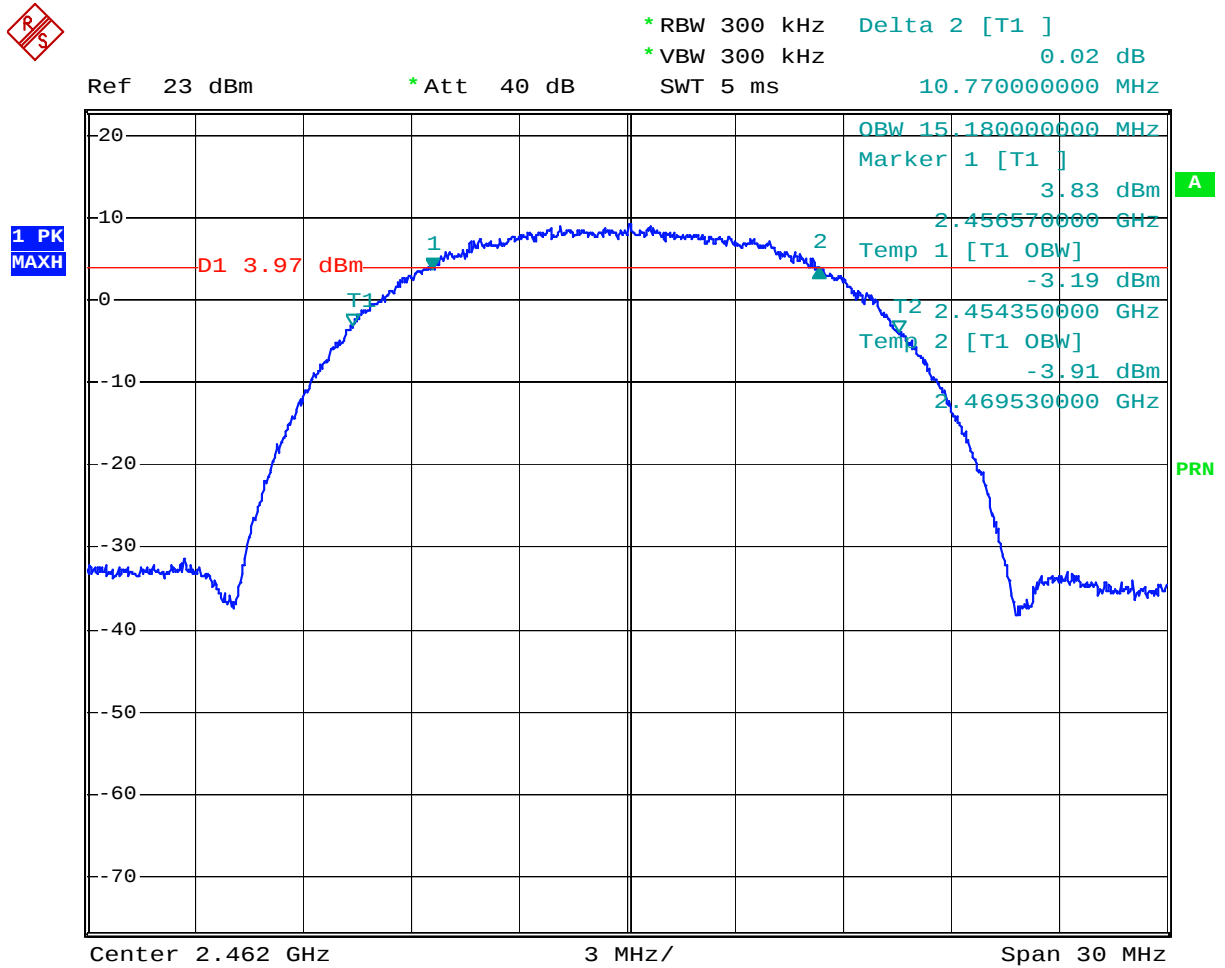
Comment: 6-dB bandwidth and OBW, 802.11n, HT20, 6.5 Mbps
Date: 9.SEP.2008 09:16:25

Plot 2.7



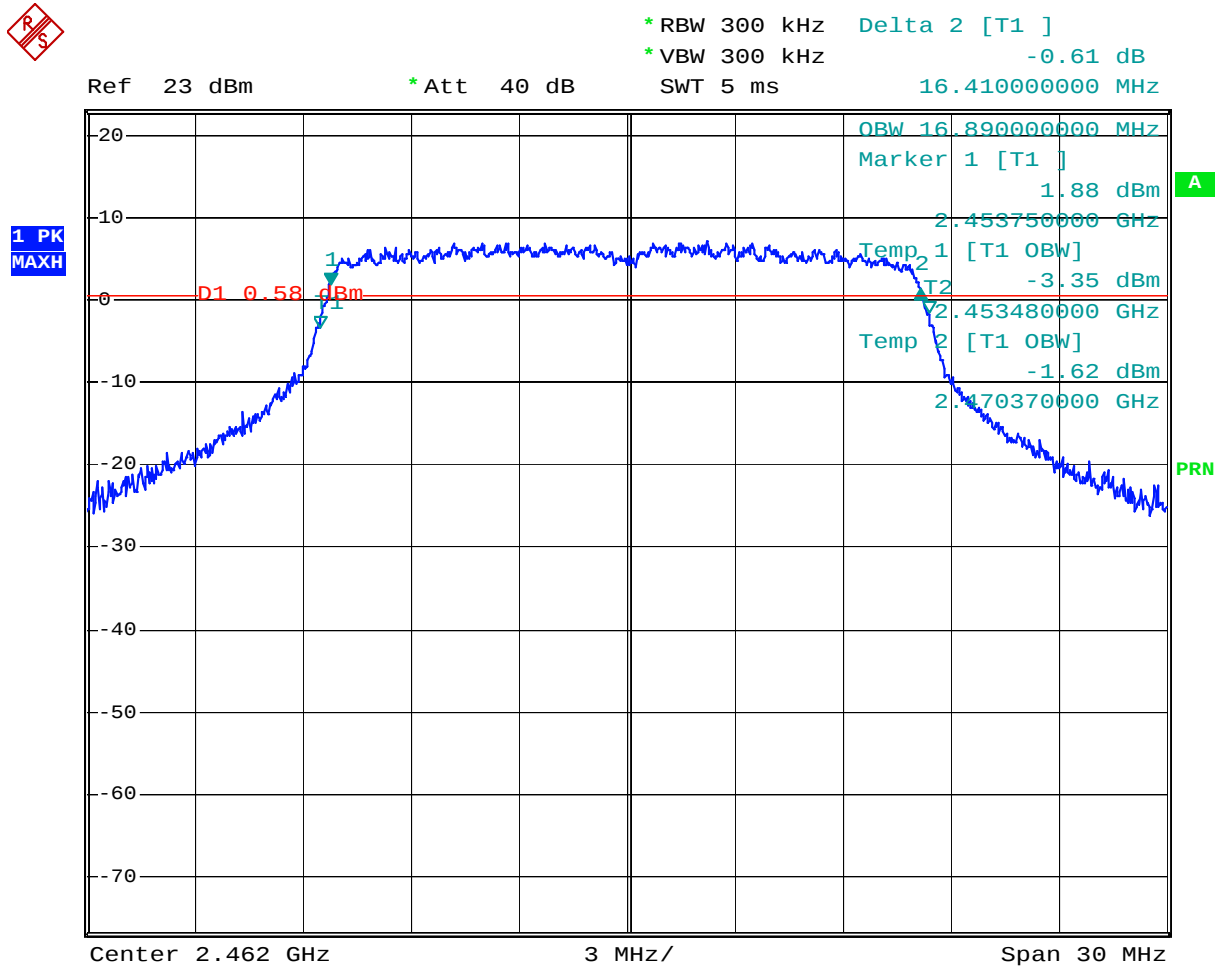
Comment: 6-dB bandwidth and OBW, 802.11n, HT40, 13.5 Mbps
 Date: 9.SEP.2008 09:12:14

Plot 2.8



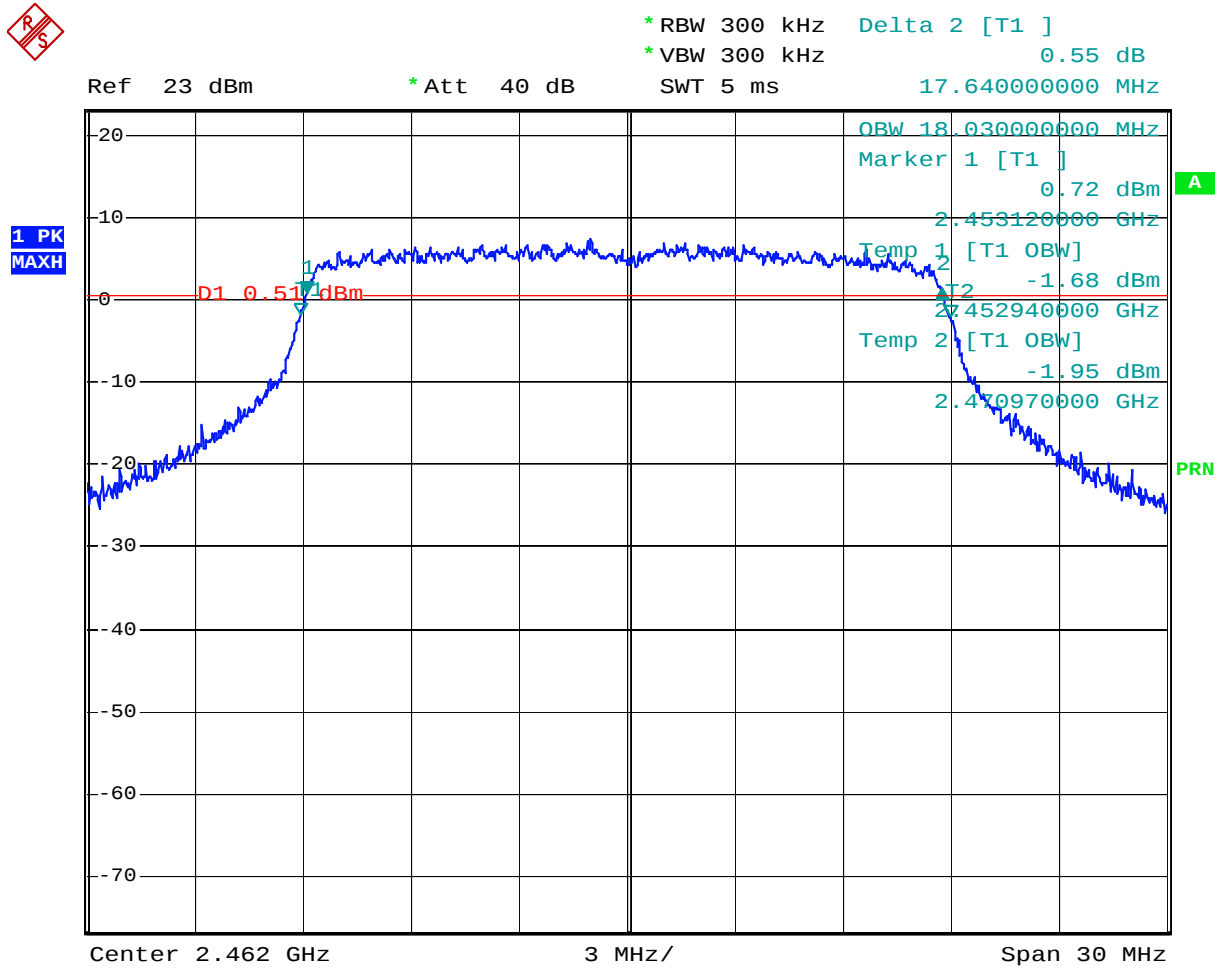
Comment: 6-dB bandwidth and OBW, 802.11b, 11 Mbps
Date: 9.SEP.2008 10:37:50

Plot 2.9



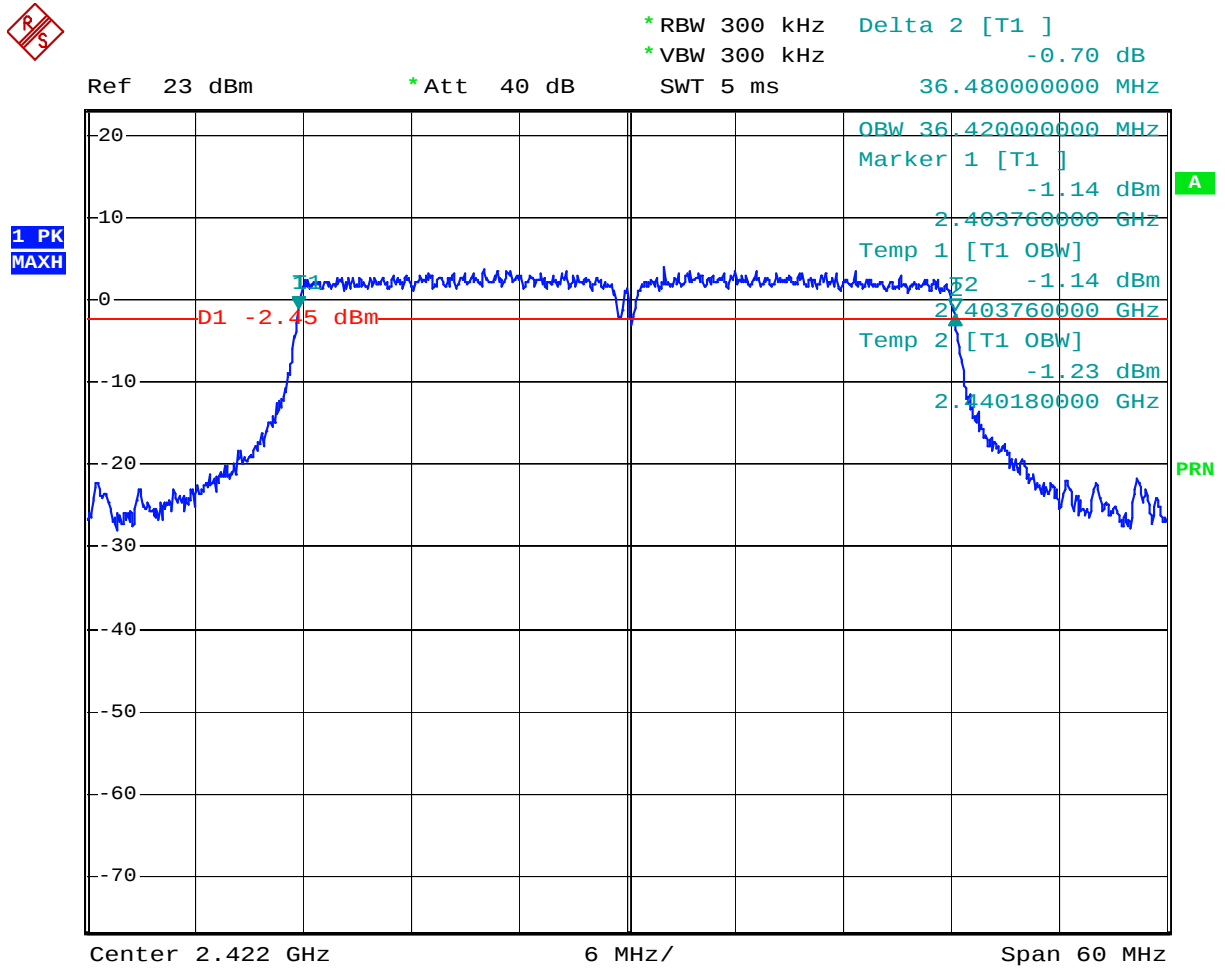
Comment: 6-dB bandwidth and OBW, 802.11g, 6 Mbps
Date: 9.SEP.2008 10:39:51

Plot 2.10



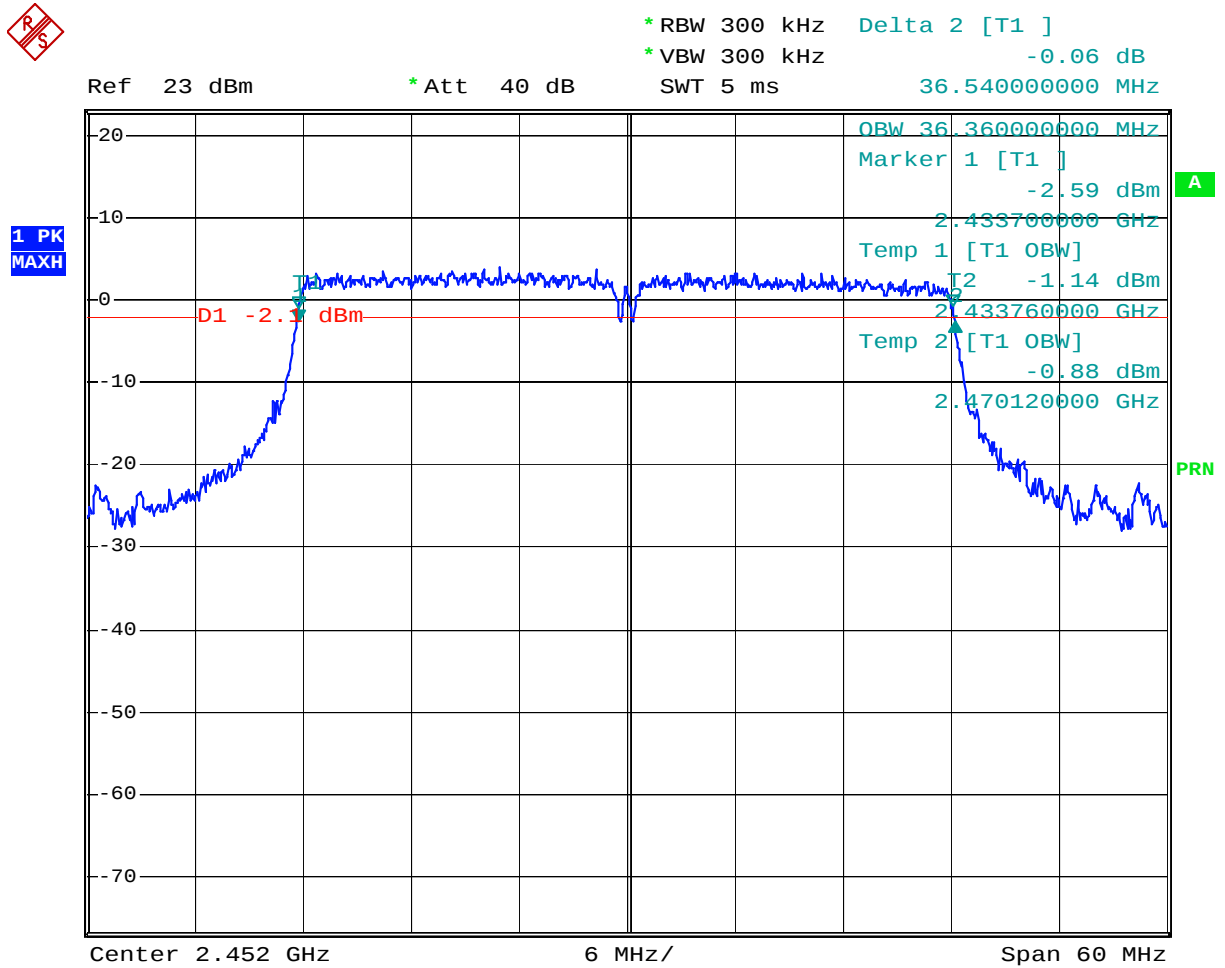
Comment: 6-dB bandwidth and OBW, 802.11n HT20, 6.5 Mbps
 Date: 9.SEP.2008 10:41:56

Plot 2.11



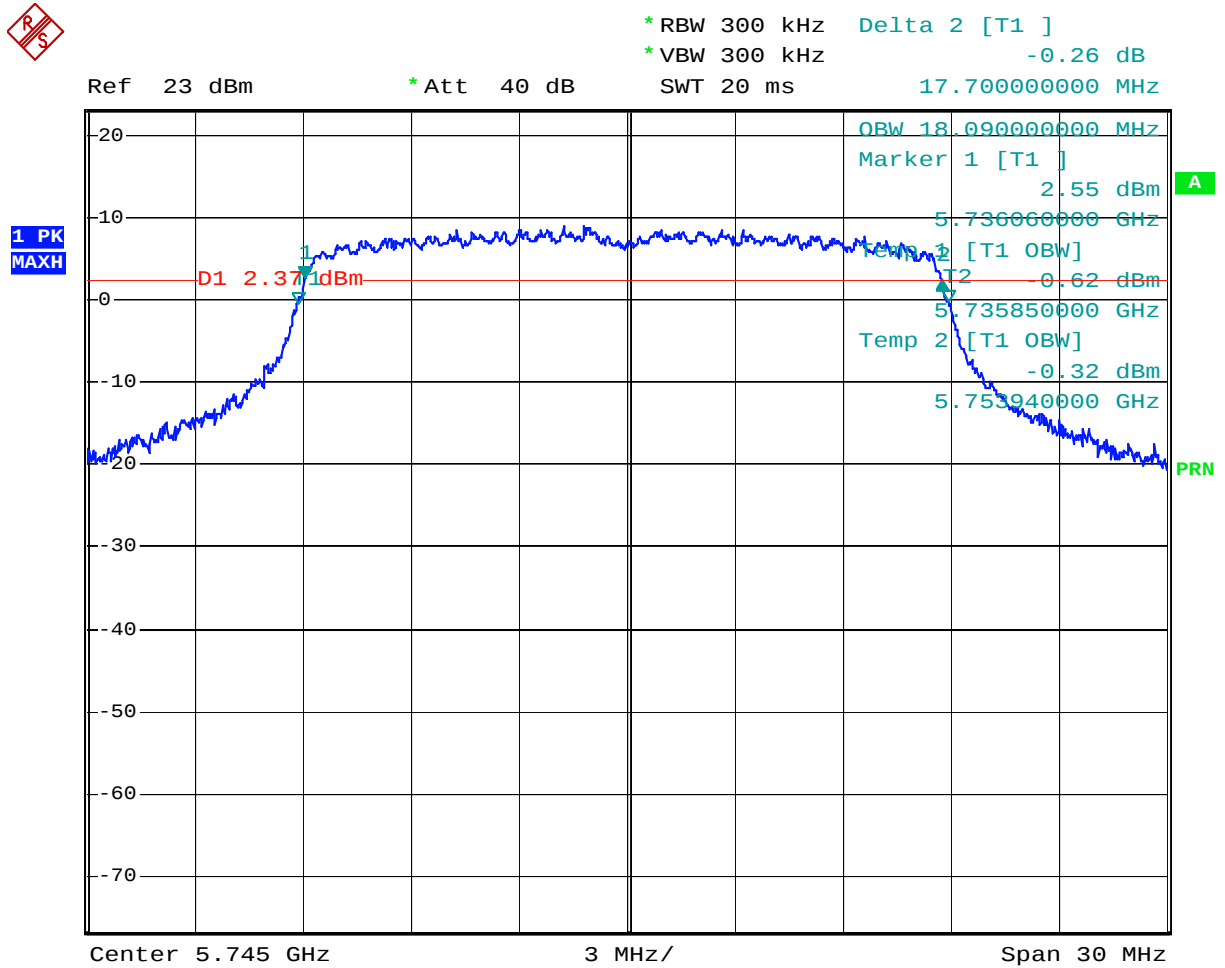
Comment: 6-dB bandwidth and OBW, 802.11n HT40, 13.5 Mbps
Date: 9.SEP.2008 10:44:55

Plot 2.12



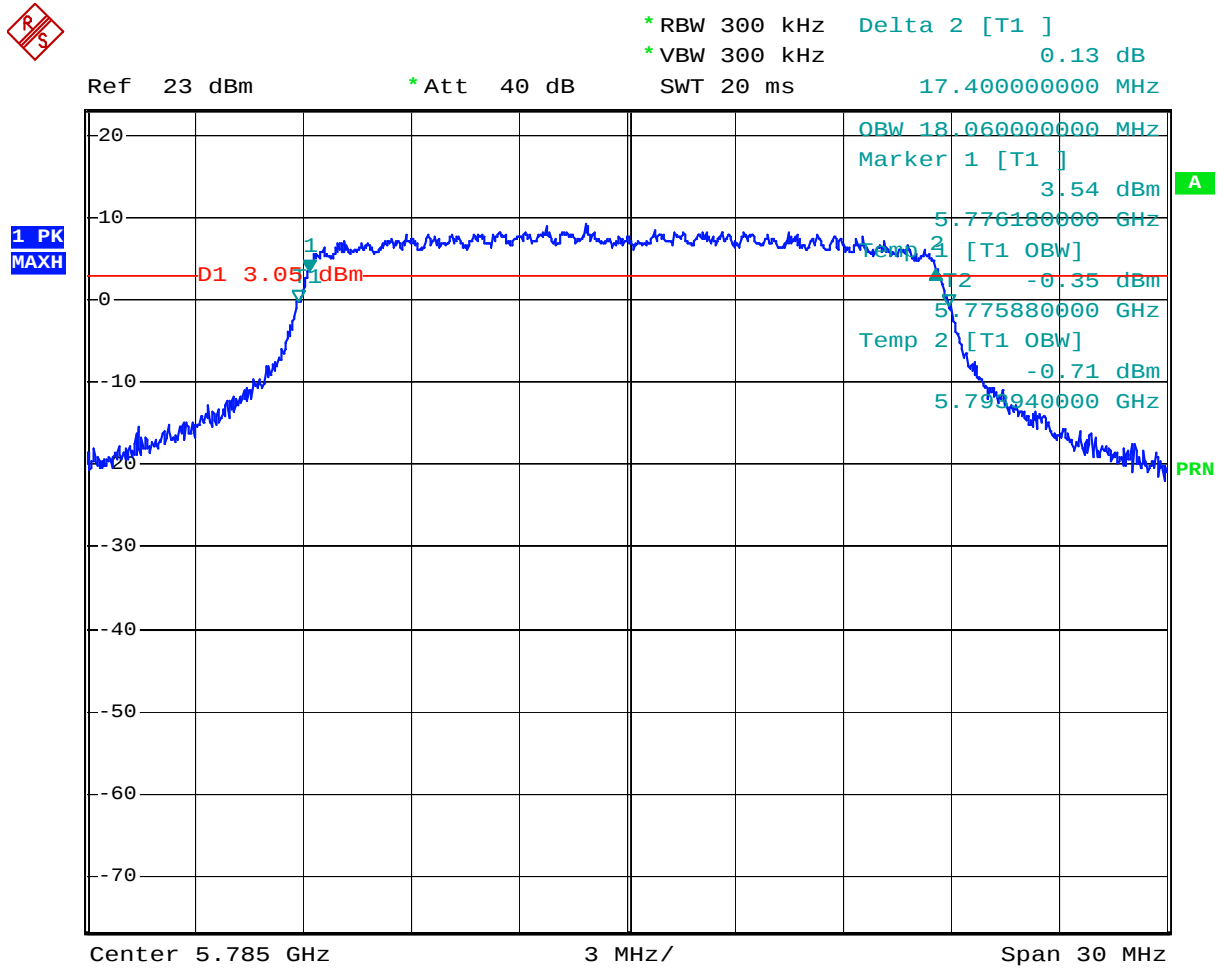
Comment: 6-dB bandwidth and OBW, 802.11n HT40, 13.5 Mbps
Date: 9.SEP.2008 10:46:55

Plot 2.14



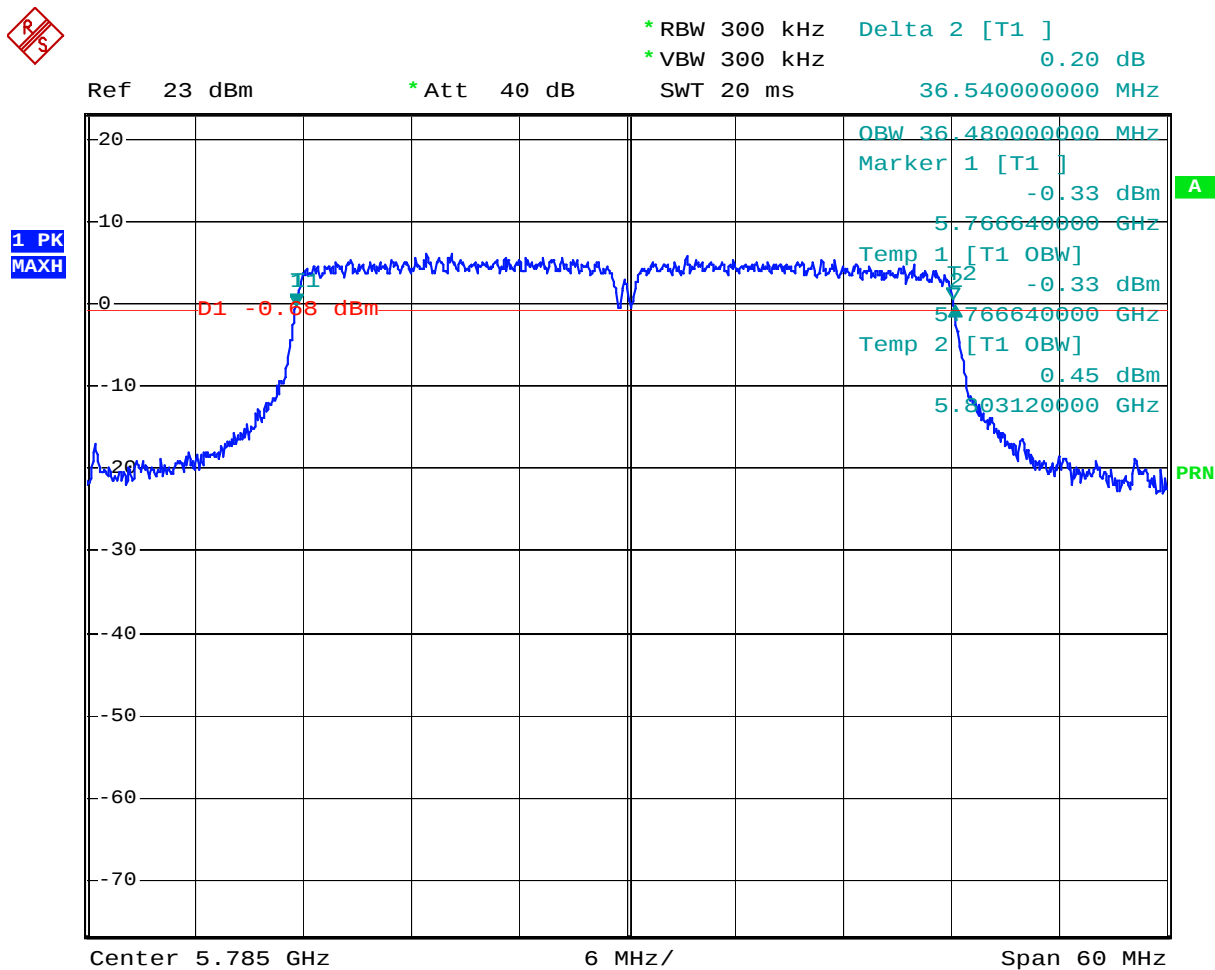
Comment: 6-dB bandwidth and OBW, 802.11n, HT20, 6.5 Mbps
 Date: 9.SEP.2008 10:56:03

Plot 2.15



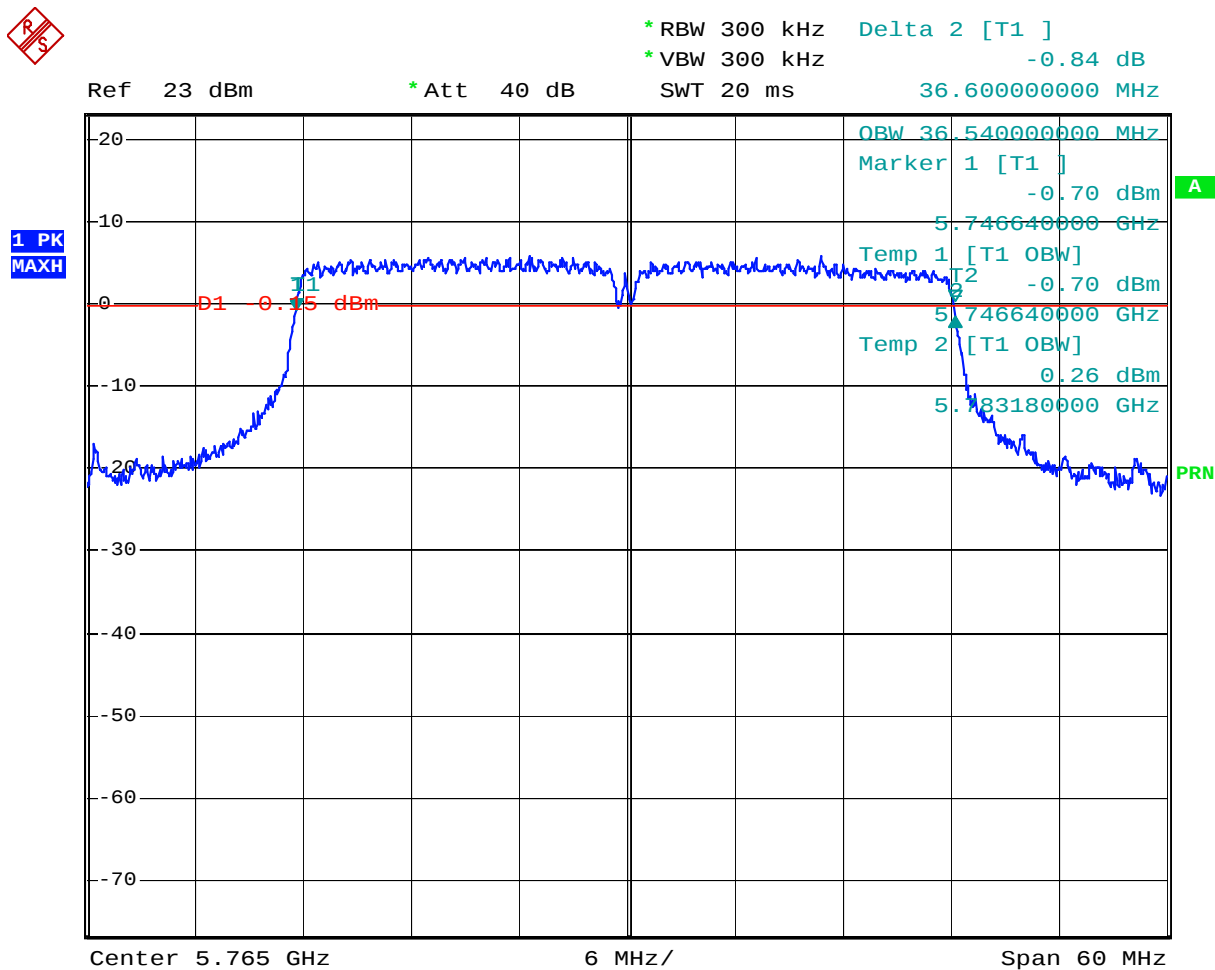
Comment: 6-dB bandwidth and OBW, 802.11n, HT20, 6.5 Mbps
Date: 9.SEP.2008 10:59:39

Plot 2.16



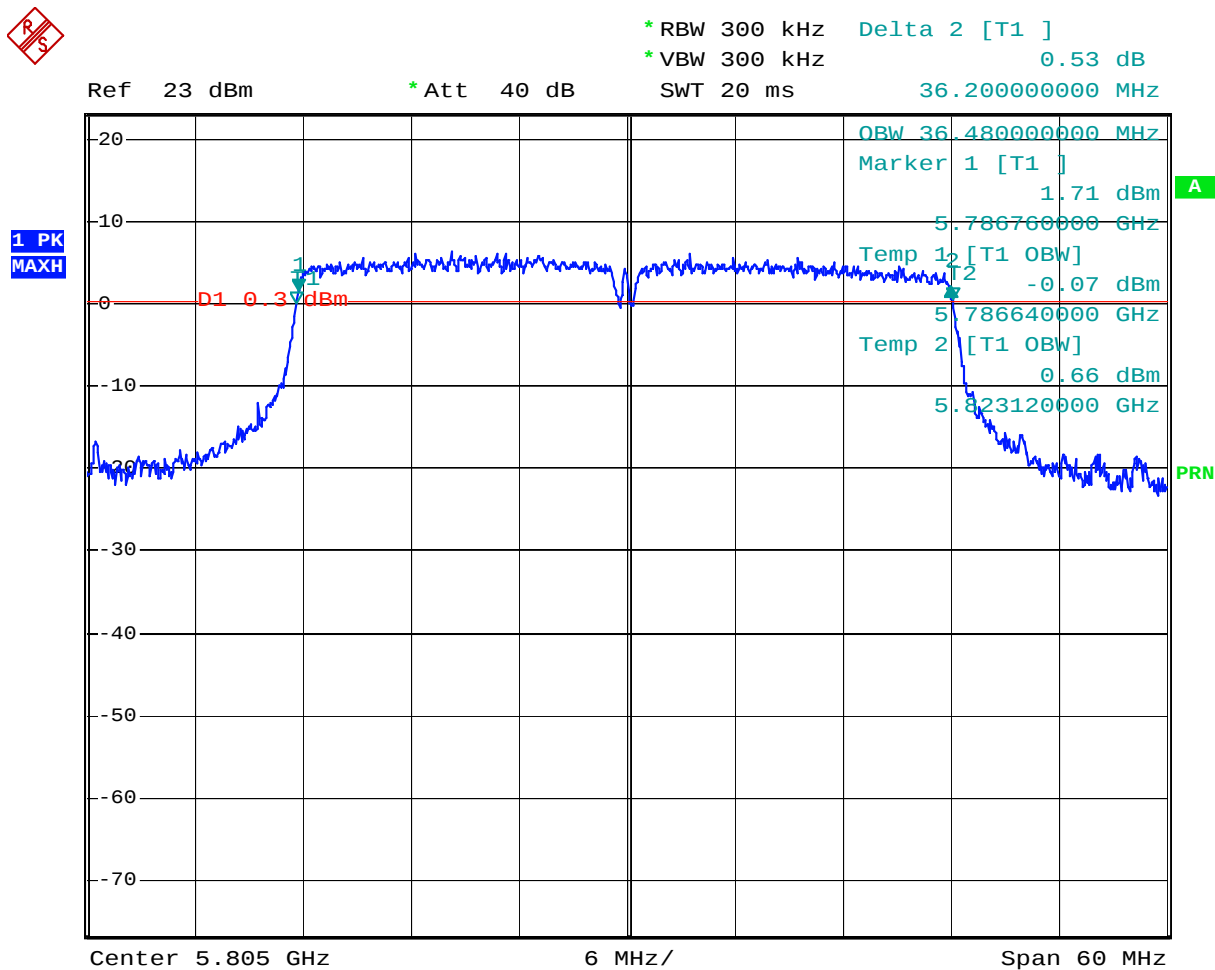
Comment: 6-dB bandwidth and OBW, 802.11n, HT40, 13.5 Mbps
 Date: 9.SEP.2008 11:02:14

Plot 2.17



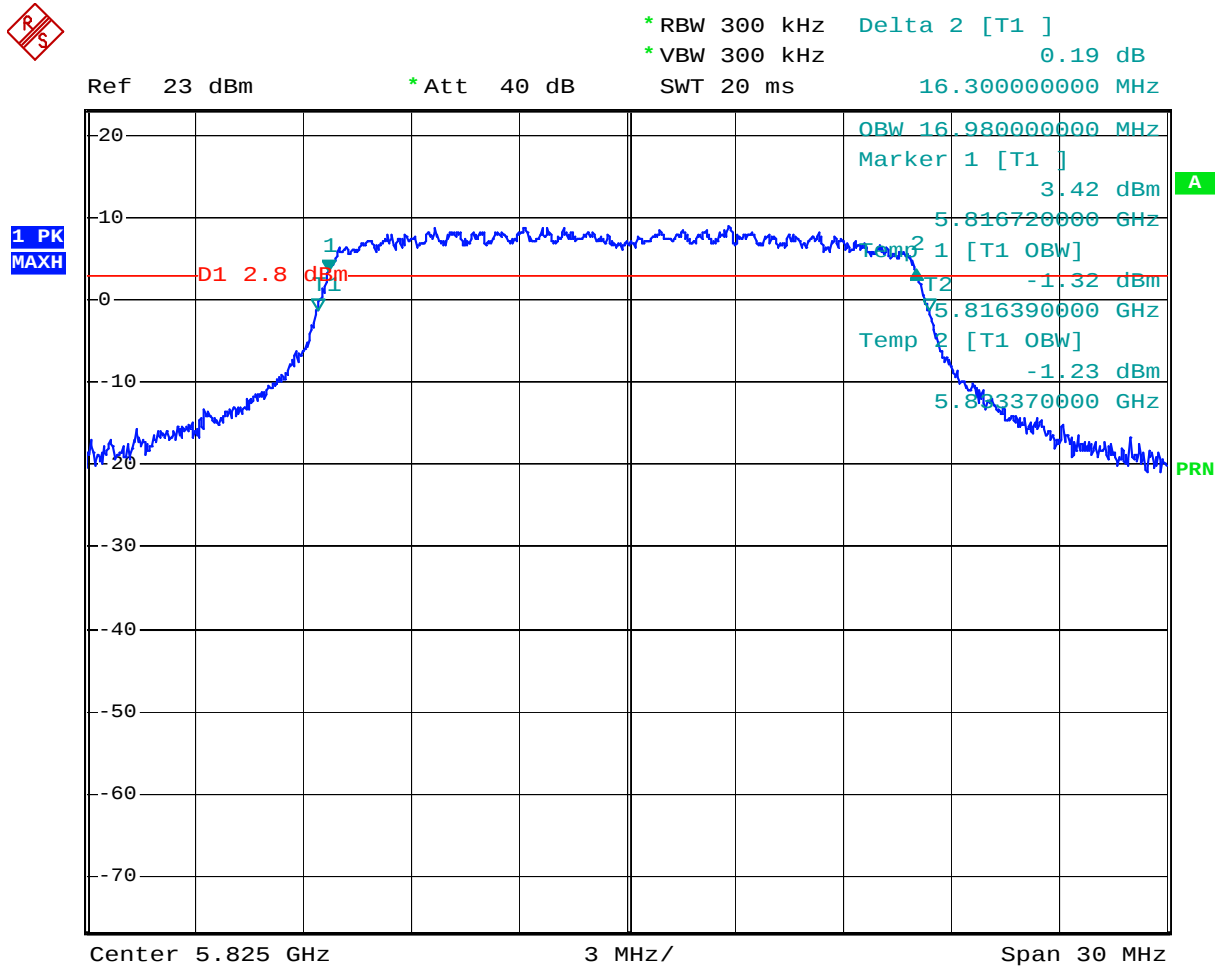
Comment: 6-dB bandwidth and OBW, 802.11n, HT40, 13.5 Mbps
Date: 9.SEP.2008 11:04:54

Plot 2.18



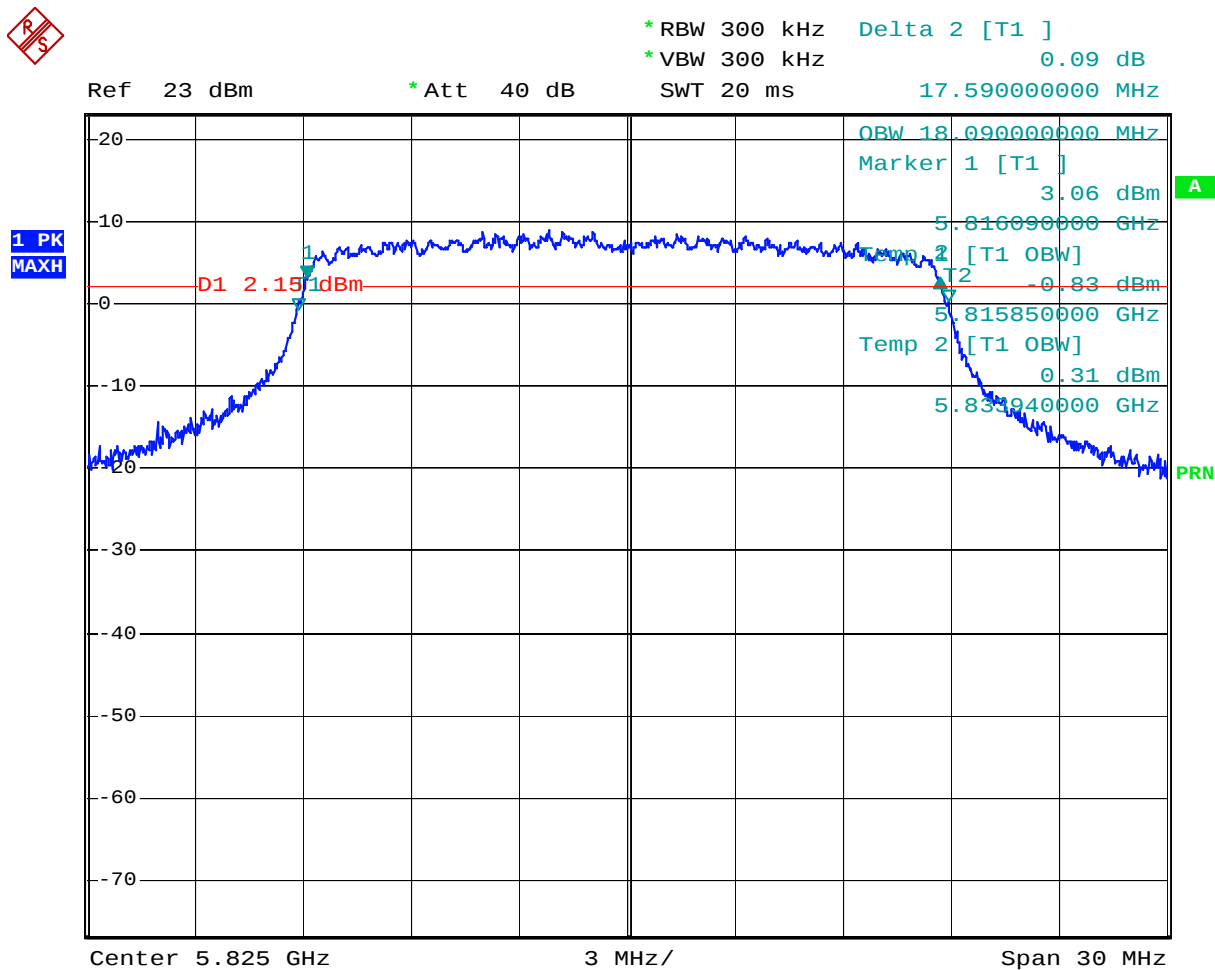
Comment: 6-dB bandwidth and OBW, 802.11n, HT40, 13.5 Mbps
 Date: 9.SEP.2008 11:06:42

Plot 2.19



Comment: 6-dB bandwidth and OBW, 802.11a, 6 Mbps
Date: 9.SEP.2008 11:09:50

Plot 2.20



Comment: 6-dB bandwidth and OBW, 802.11n, HT20, 6.5 Mbps
Date: 9.SEP.2008 11:11:51

4.3 Power Spectral Density FCC Rule 15.247(d)

4.3.1 Requirement

The peak power spectral density (PSD) shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

4.3.2 Procedure

The antenna port of the EUT was connected to the input of a spectrum analyzer to measure the Peak Transmitter Power Density (PSD).

For conducted power measurement for FCC Part 15C testing, the procedure “**Measurement of Digital Transmission Systems Operating under Section 15.247**” is used. In particular – the **PSD Option 1**, - with peak detector, spectrum analyzer resolution bandwidth of 3 kHz, scan of 1.5 MHz and sweep time of 500 s.

Separate measurements were made on each of the 3 Output Ports. Measurement plots from the worst case port are shown in the test report.

In 802.11n modes (3 Tx transmit simultaneously), the peak power spectral density (PPSD) is summarized for all 3 transmitters.

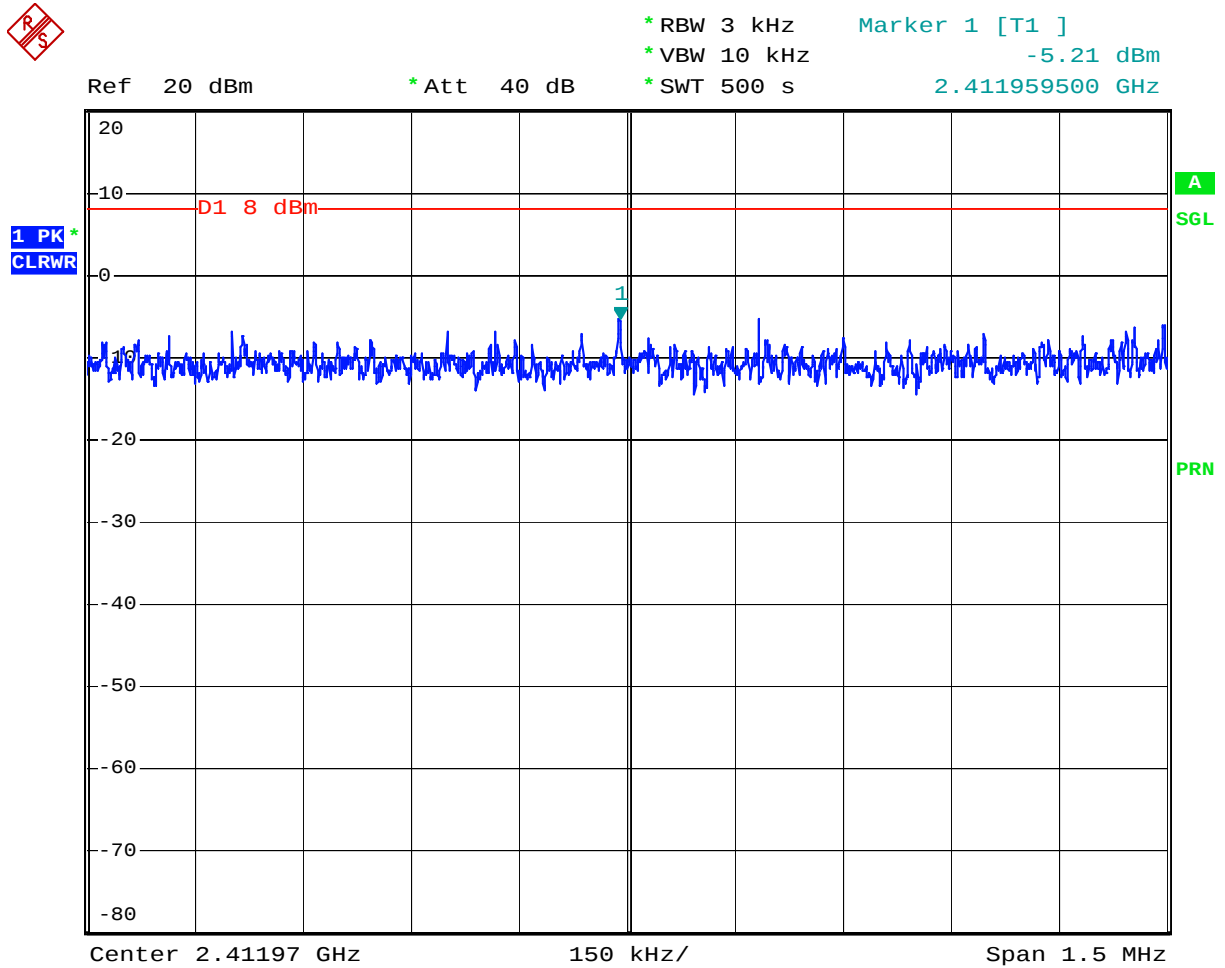
4.3.3 Test Result

The results are presented on the following plots 3.1 – 3.20 and summarized in the table below.

Channel	Frequency MHz	Standard	Date rate Mbps	PSD (average) dBm	Σ PSD dBm	PSD Limit dBm	Margin dB	Plot
1	2412	802.11b	11	-5.2	-	8.0	-13.2	3.1
1	2412	802.11g	6	-7.6	-	8.0	-15.6	3.2
1	2412	802.11n HT20	6.5	-7.0 (Output 2) -7.23 (Output 1) -7.05 (Output 3)	-2.29	8.0	-10.29	3.3
6	2437	802.11b	11	-4.5	-	8.0	-12.5	3.4
6	2437	802.11g	6	-7.0	-	8.0	-15.0	3.5
6	2437	802.11n HT20	6.5	-7.5 (Output 2) -7.61 (Output 1) -7.97 (Output 3)	-2.92	8.0	-10.92	3.6
6	2437	802.11n HT40	13.5	-9.0 (Output 2) -9.17 (Output 1) -9.44 (Output 3)	-4.44	8.0	-12.44	3.7
11	2462	802.11b	11	-4.6	-	8.0	-12.6	3.8
11	2462	802.11g	6	-6.1	-	8.0	-14.1	3.9
11	2462	802.11n HT20	6.5	-6.8 (Output 2) -8.7 (Output 1) -8.64 (Output 3)	-3.19	8.0	-11.19	3.10
3	2422	802.11n HT40	13.5	-10.4 (Output 2) -10.58 (Output 1) -10.96 (Output 3)	-5.85	8.0	-13.85	3.11
9	2452	802.11n HT40	13.5	-10.1 (Output 2) -10.92 (Output 1) -11.01 (Output 3)	-5.85	8.0	-13.85	3.12

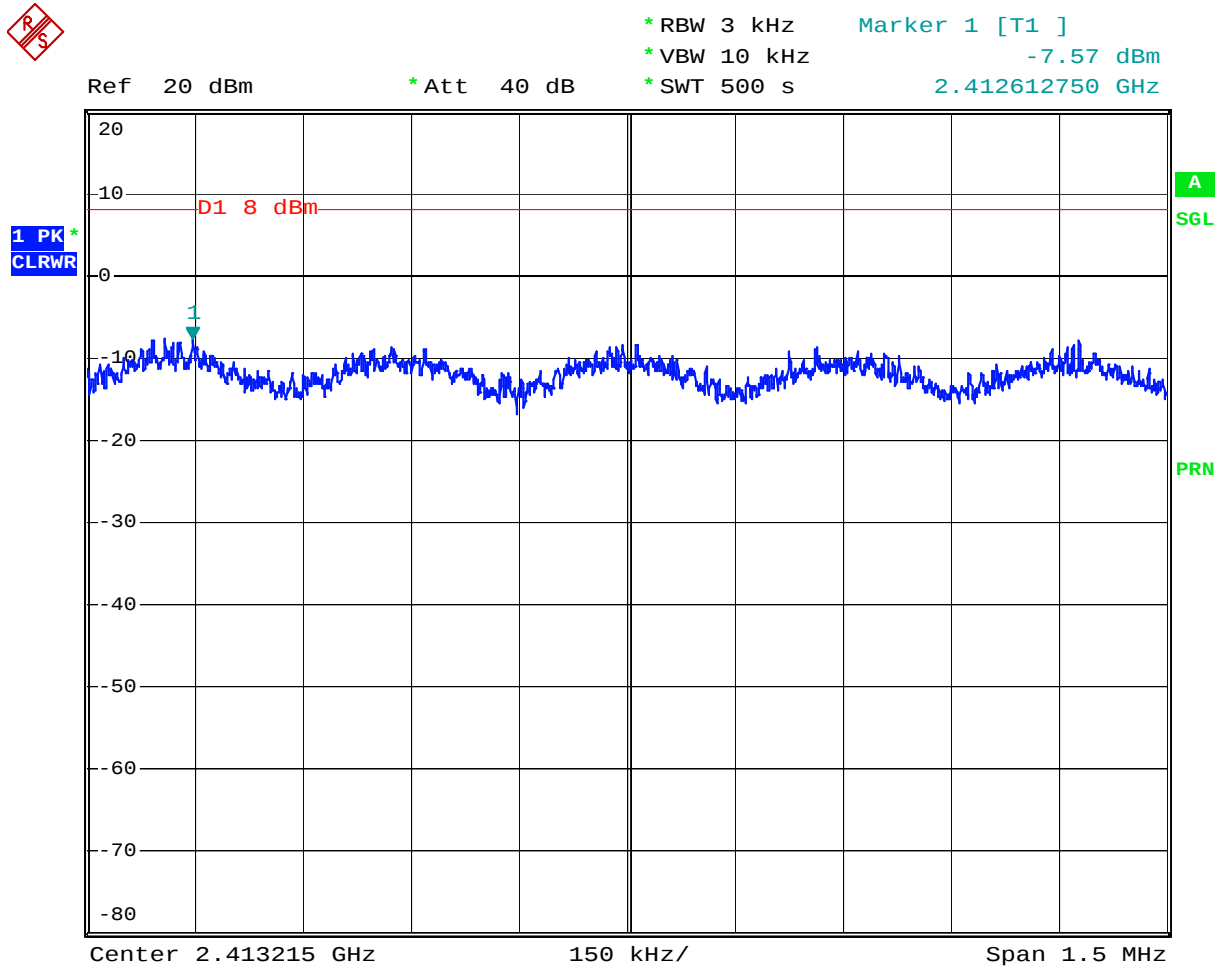
Channel	Frequency MHz	Standard	Date rate Mbps	PSD (average) dBm	Σ PSD dBm	PSD Limit dBm	Margin dB	Plot
149	5745	802.11a	6	-7.6	-	8.0	-15.6	3.13
149	5745	802.11n HT20	6.5	-8.3 (Output 3) -8.52 (Output 1) -8.72 (Output 2)	-3.77	8.0	-11.77	3.14
157	5785	802.11a	6	-7.2	-	8.0	-15.2	3.15
157	5785	802.11n HT20	6.5	-6.6 (Output 3) -6.73 (Output 1) -7.11 (Output 2)	-2.08	8.0	-10.08	3.16
165	5825	802.11a	6	-6.4	-	8.0	-14.4	3.17
165	5825	802.11n HT20	6.5	-6.9 (Output 3) -7.22 (Output 1) -7.69 (Output 2)	-2.52	8.0	-10.52	3.18
153	5765	802.11n HT40	13.5	-9.8 (Output 3) -10.04 (Output 1) -9.87 (Output 2)	-5.23	8.0	-13.23	3.19
161	5805	802.11n HT40	13.5	-9.6 (Output 3) -9.83 (Output 1) -10.22 (Output 2)	-5.09	8.0	-13.09	3.20

Plot 3.1



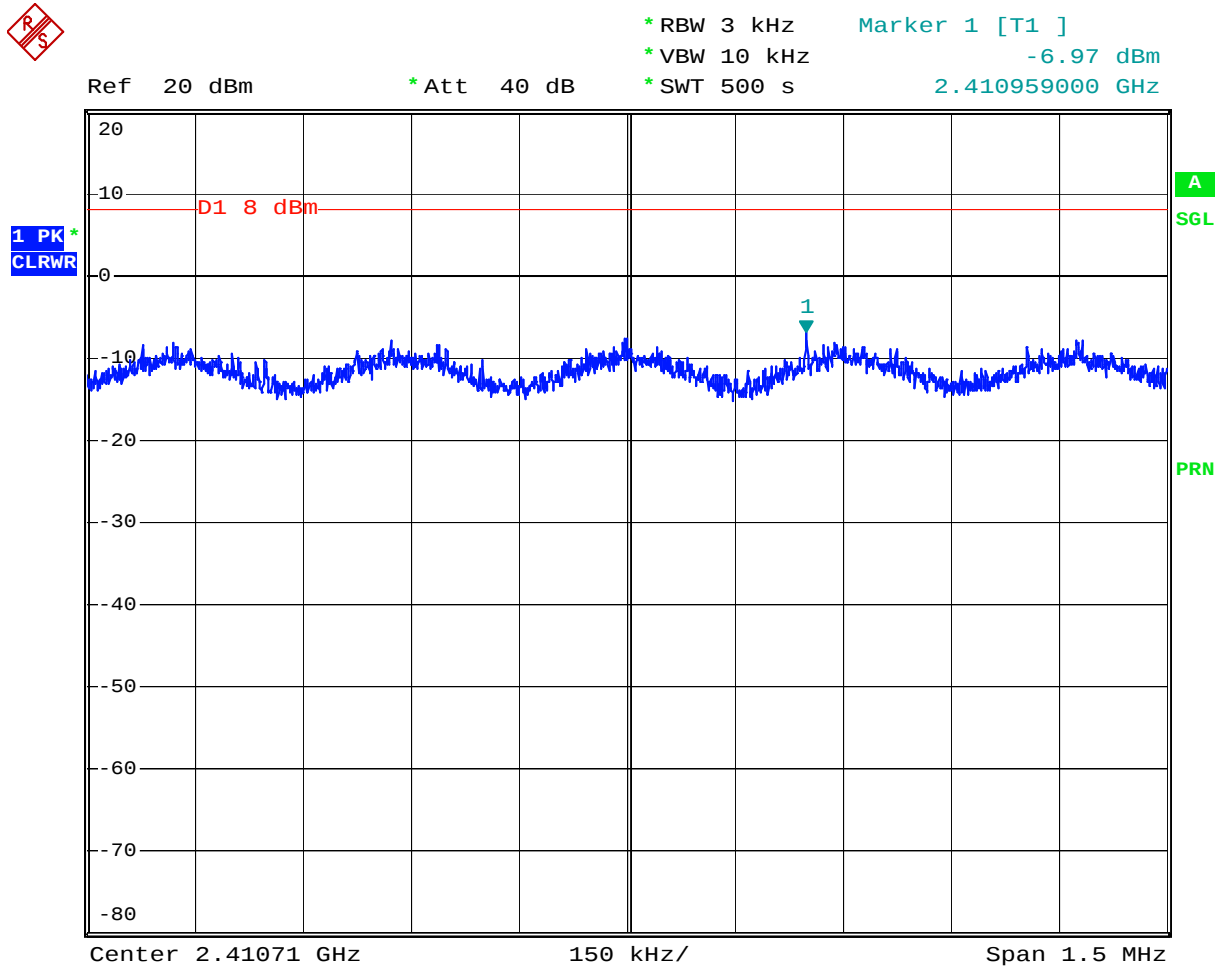
Comment: Power spectral density, 802.11b, 11 Mbps, output 2
 Date: 11.SEP.2008 09:17:25

Plot 3.2



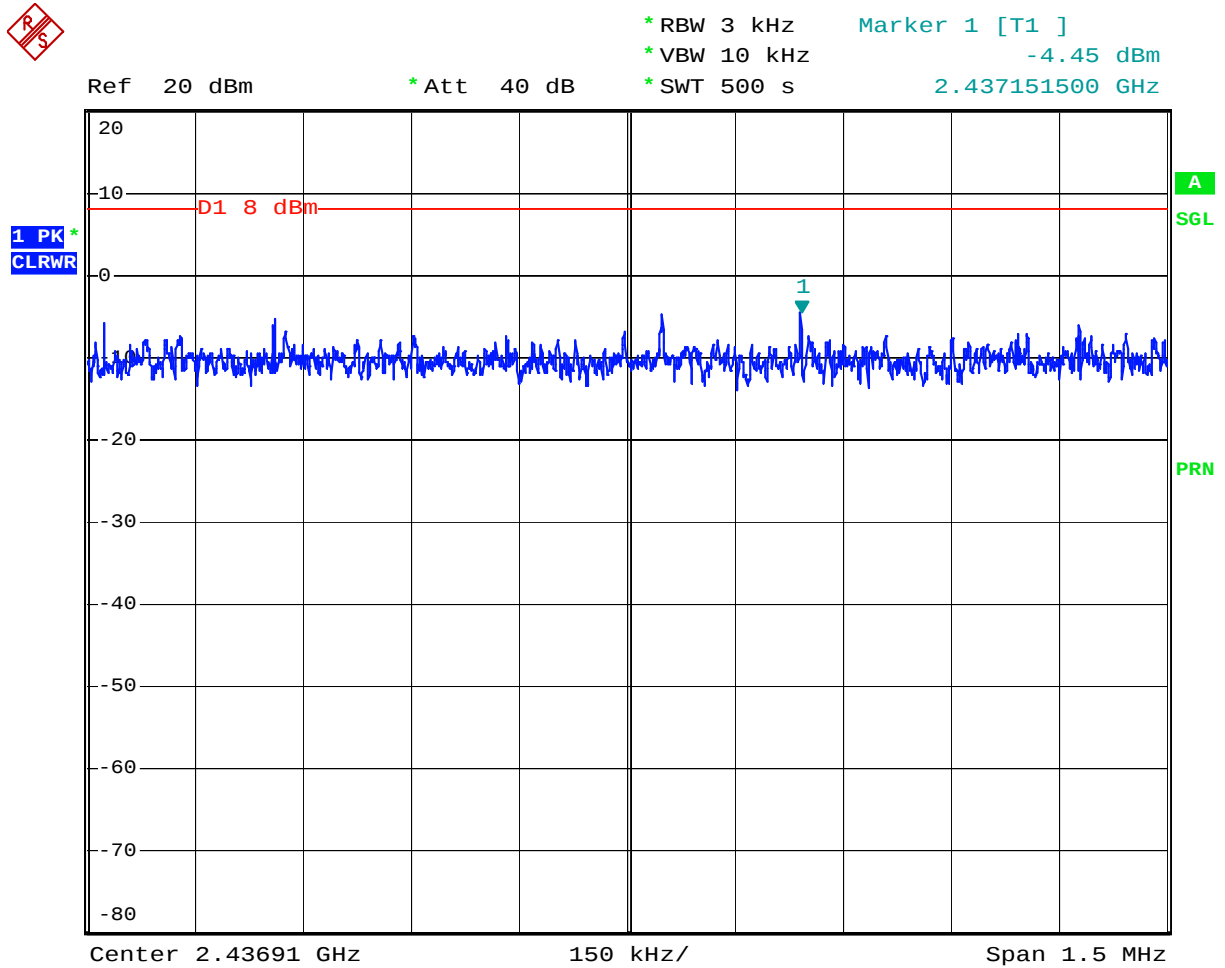
Comment: Power spectral density, 802.11g, 6 Mbps, output 2
Date: 11.SEP.2008 11:07:03

Plot 3.3



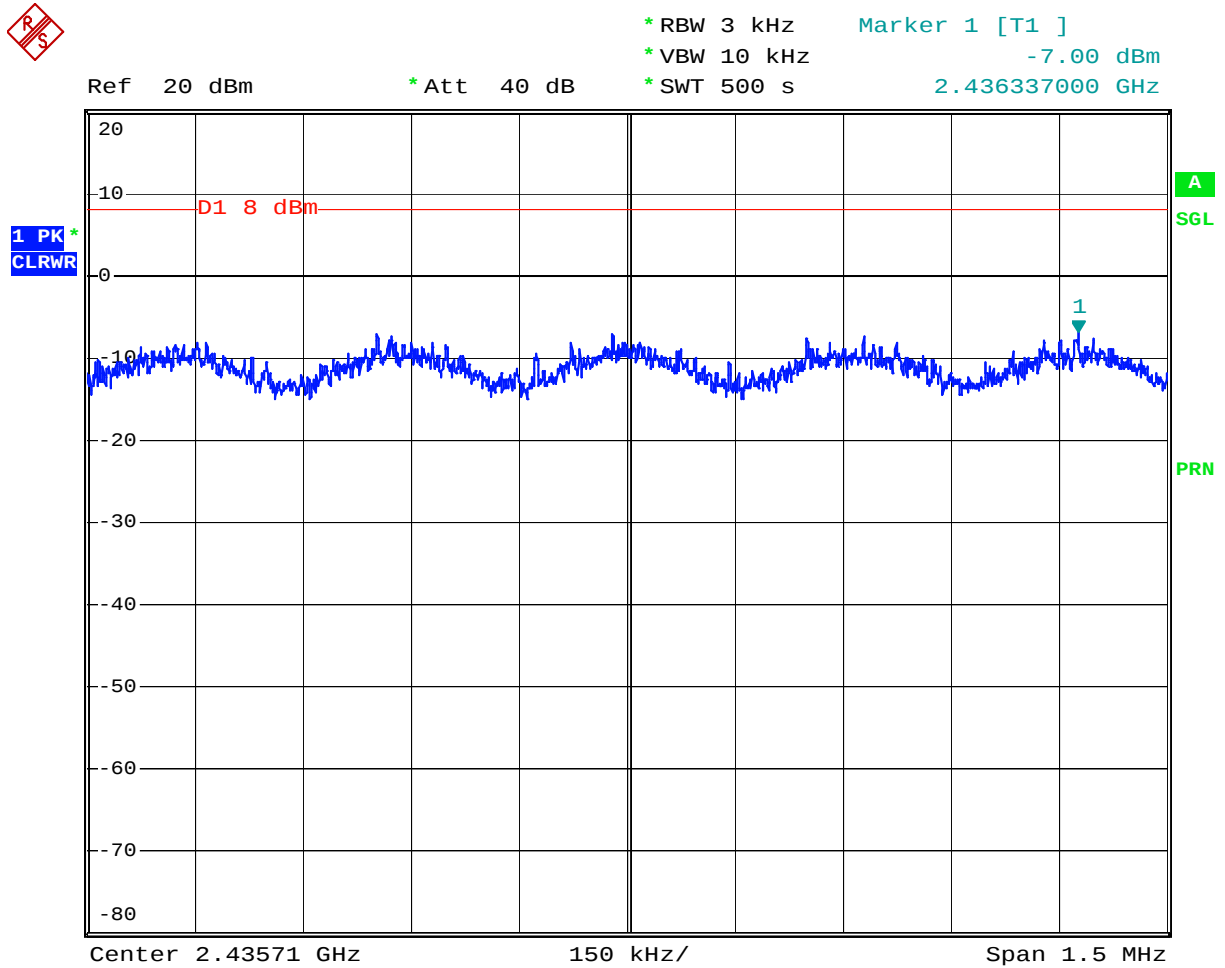
Comment: Power spectral density, 802.11n, HT20, 6.5 Mbps, output 2
 Date: 11.SEP.2008 11:18:16

Plot 3.4



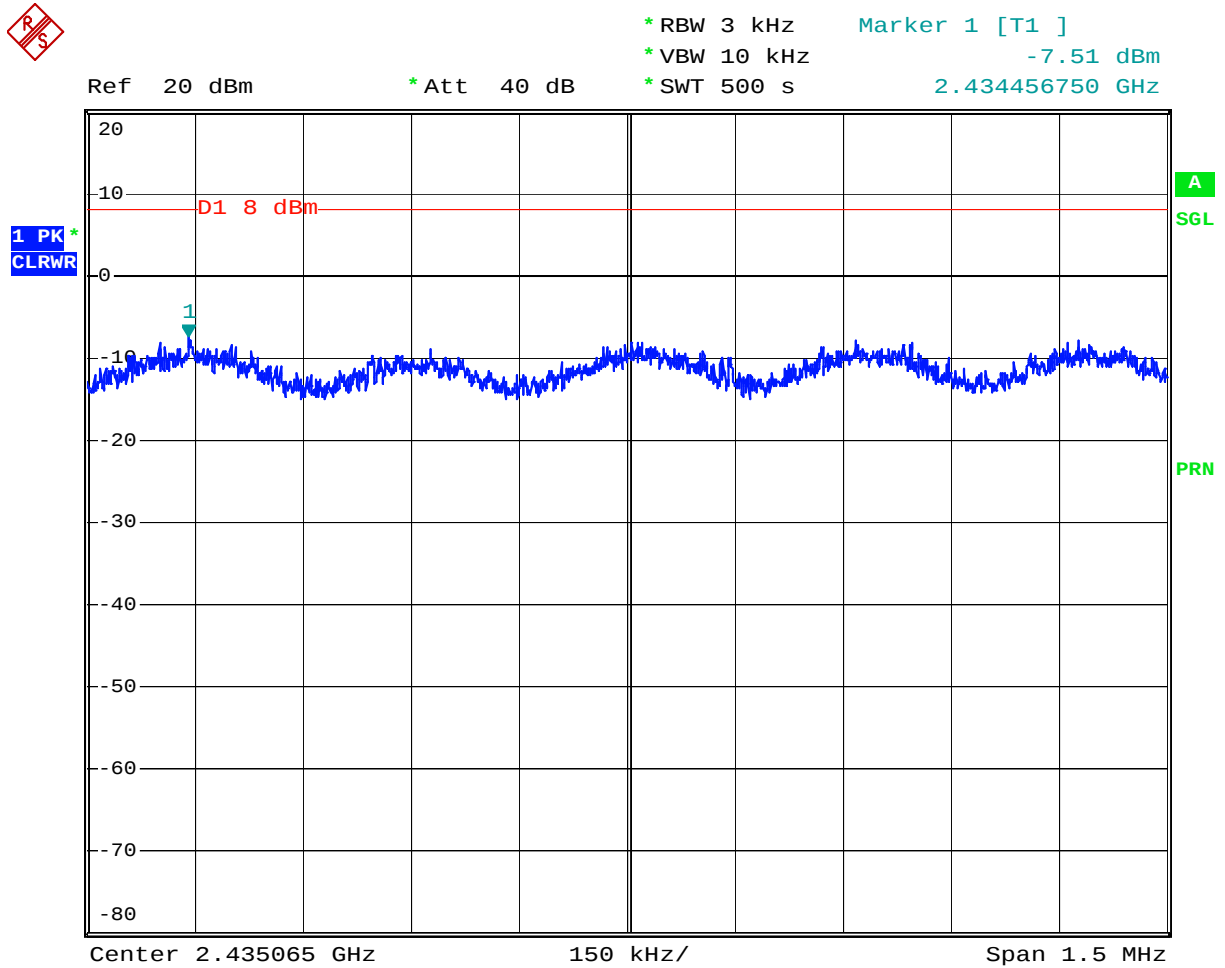
Comment: Power spectral density, 802.11b, 11 Mbps, output 2
 Date: 11.SEP.2008 09:32:54

Plot 3.5



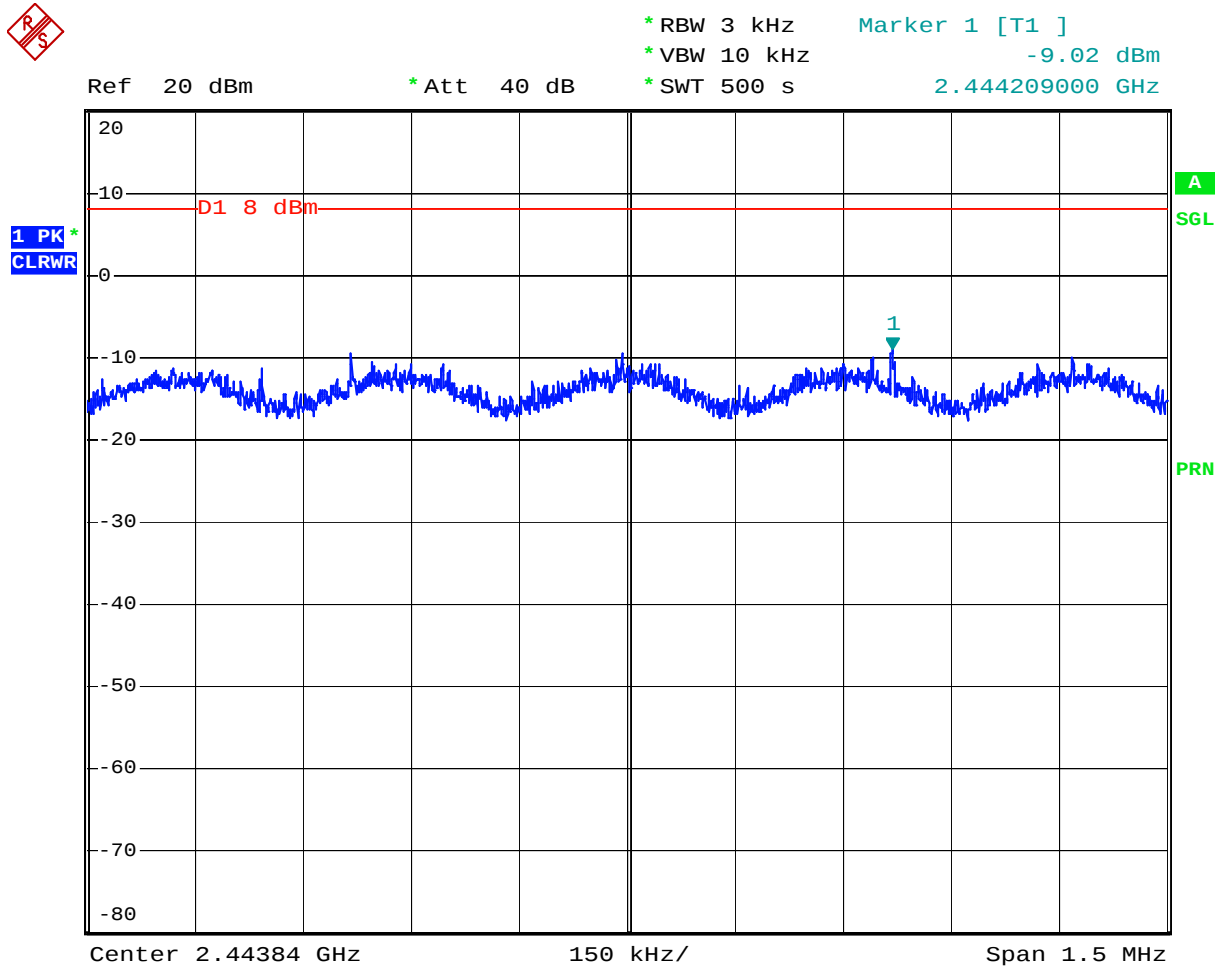
Comment: Power spectral density, 802.11g, 6 Mbps, output 2
 Date: 11.SEP.2008 10:54:03

Plot 3.6



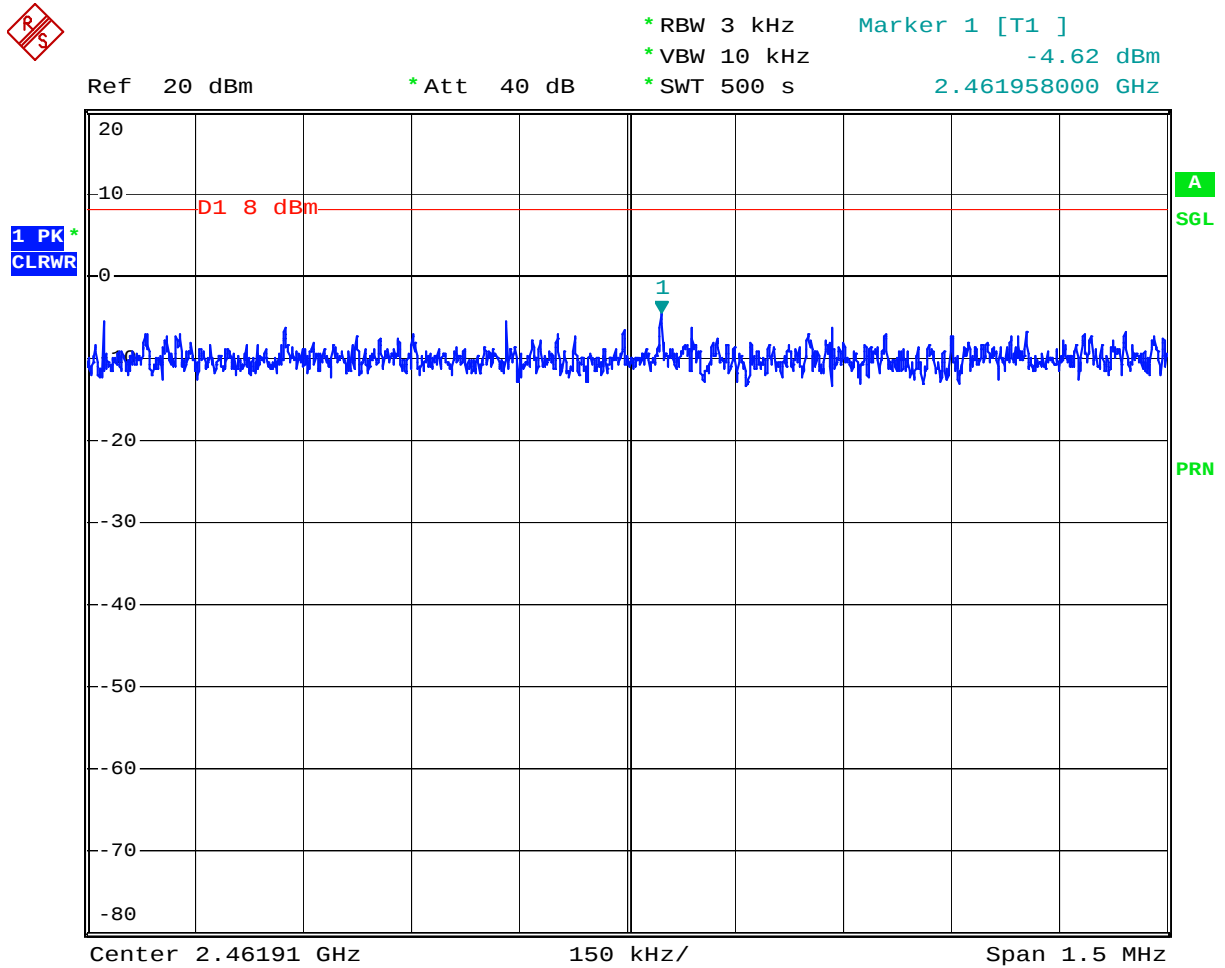
Comment: Power spectral density, 802.11n, HT20, 6.5 Mbps, output 2
 Date: 11.SEP.2008 11:36:46

Plot 3.7



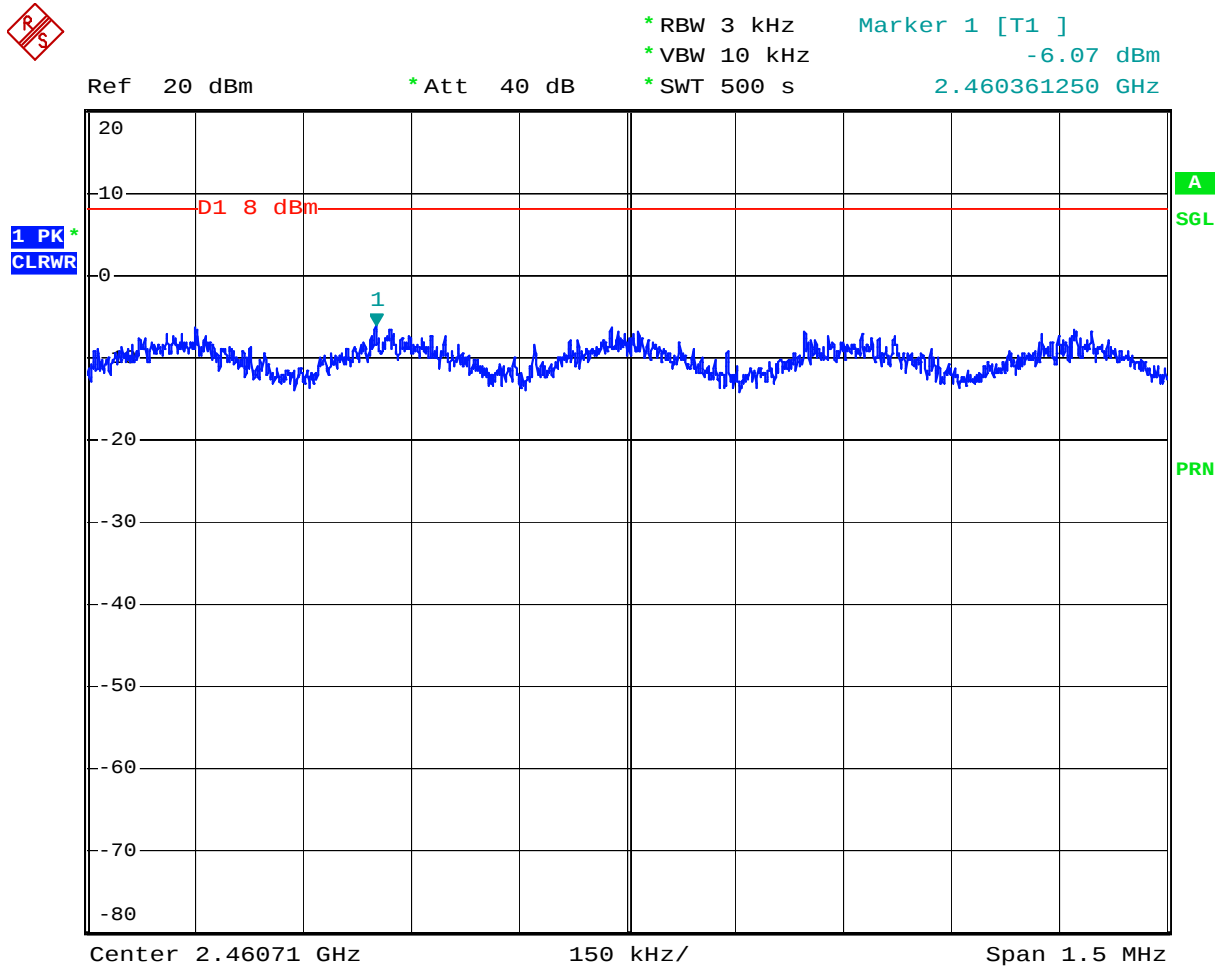
Comment: Power spectral density, 802.11n, HT40, 13.5 Mbps, output 2
 Date: 11.SEP.2008 12:03:49

Plot 3.8



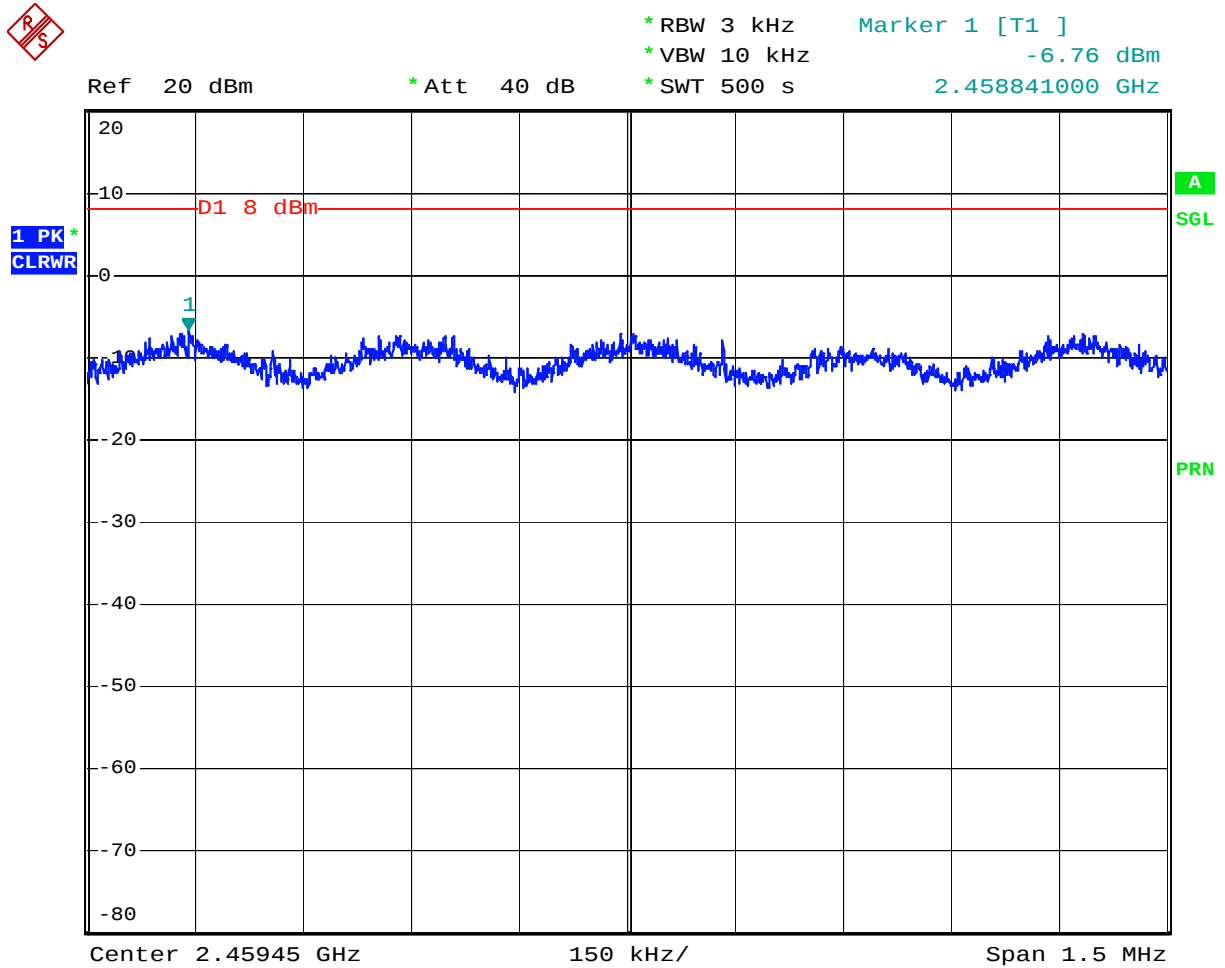
Comment: Power spectral density, 802.11b, 11 Mbps, output 2
 Date: 11.SEP.2008 09:43:09

Plot 3.9



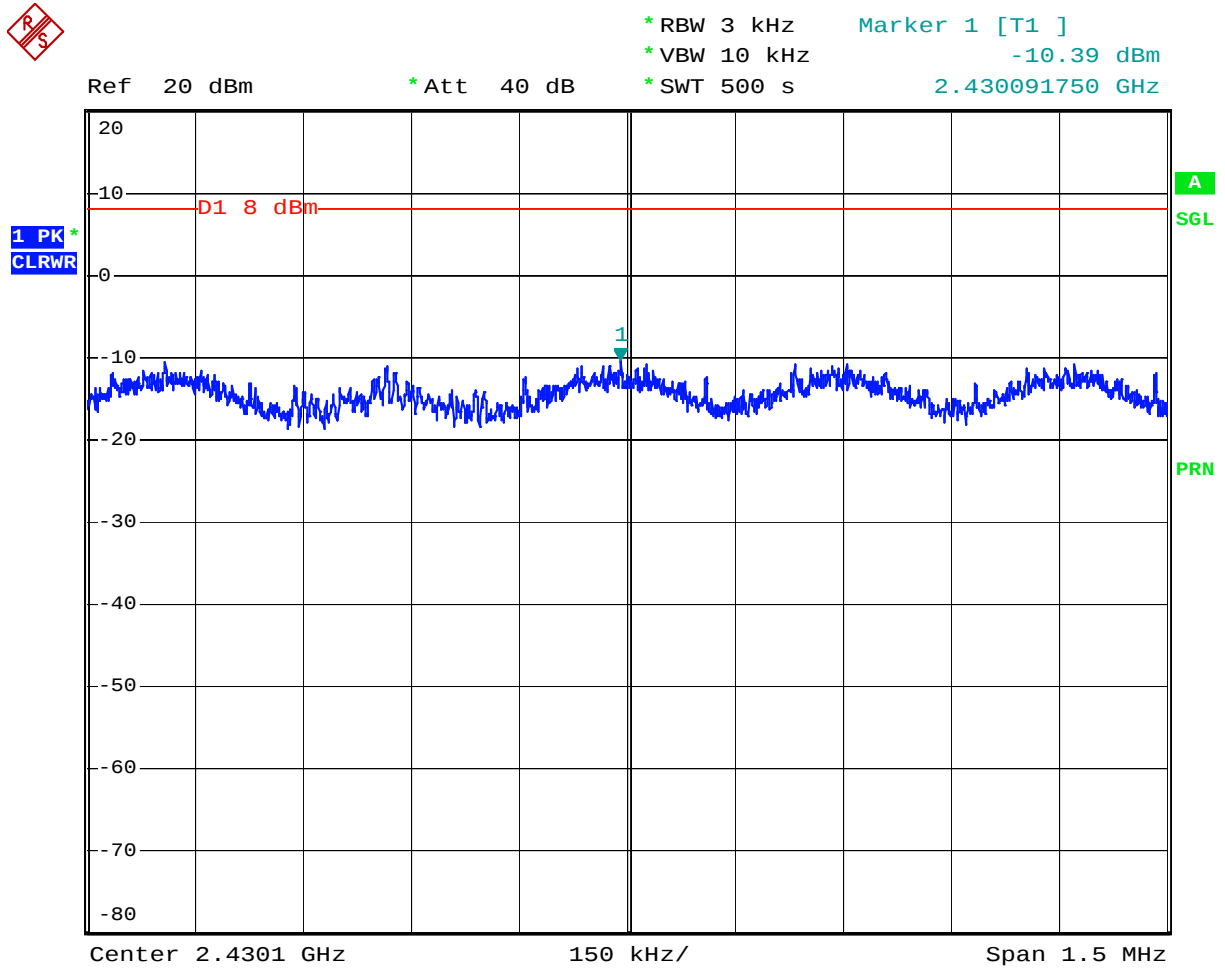
Comment: Power spectral density, 802.11g, 6 Mbps, output 2
Date: 11.SEP.2008 10:40:23

Plot 3.10



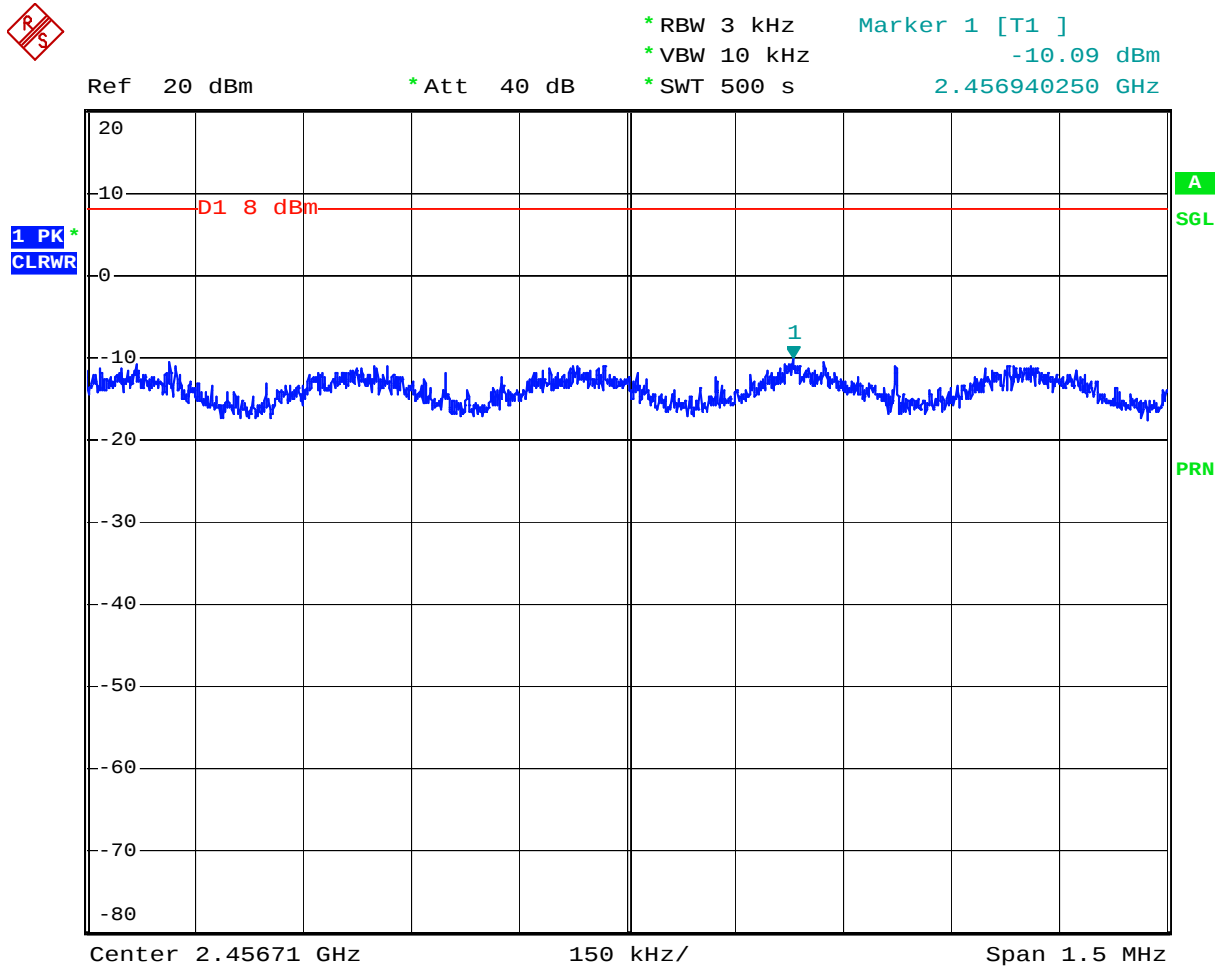
Comment: Power spectral density, 802.11n, HT20, 6.5 Mbps, output 2
 Date: 11.SEP.2008 11:46:52

Plot 3.11



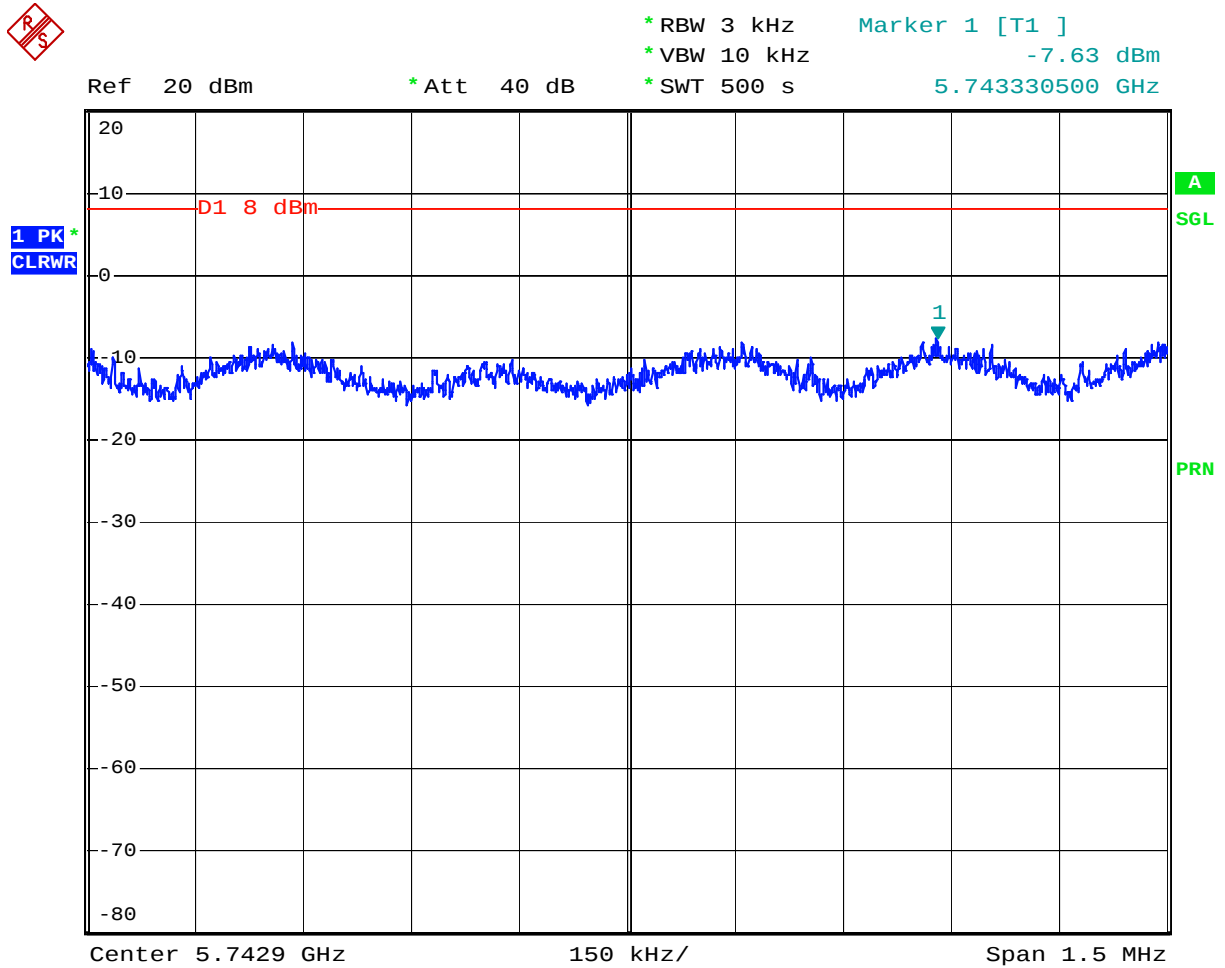
Comment: Power spectral density, 802.11n, HT40, 13.5 Mbps, output 2
 Date: 11.SEP.2008 12:18:54

Plot 3.12



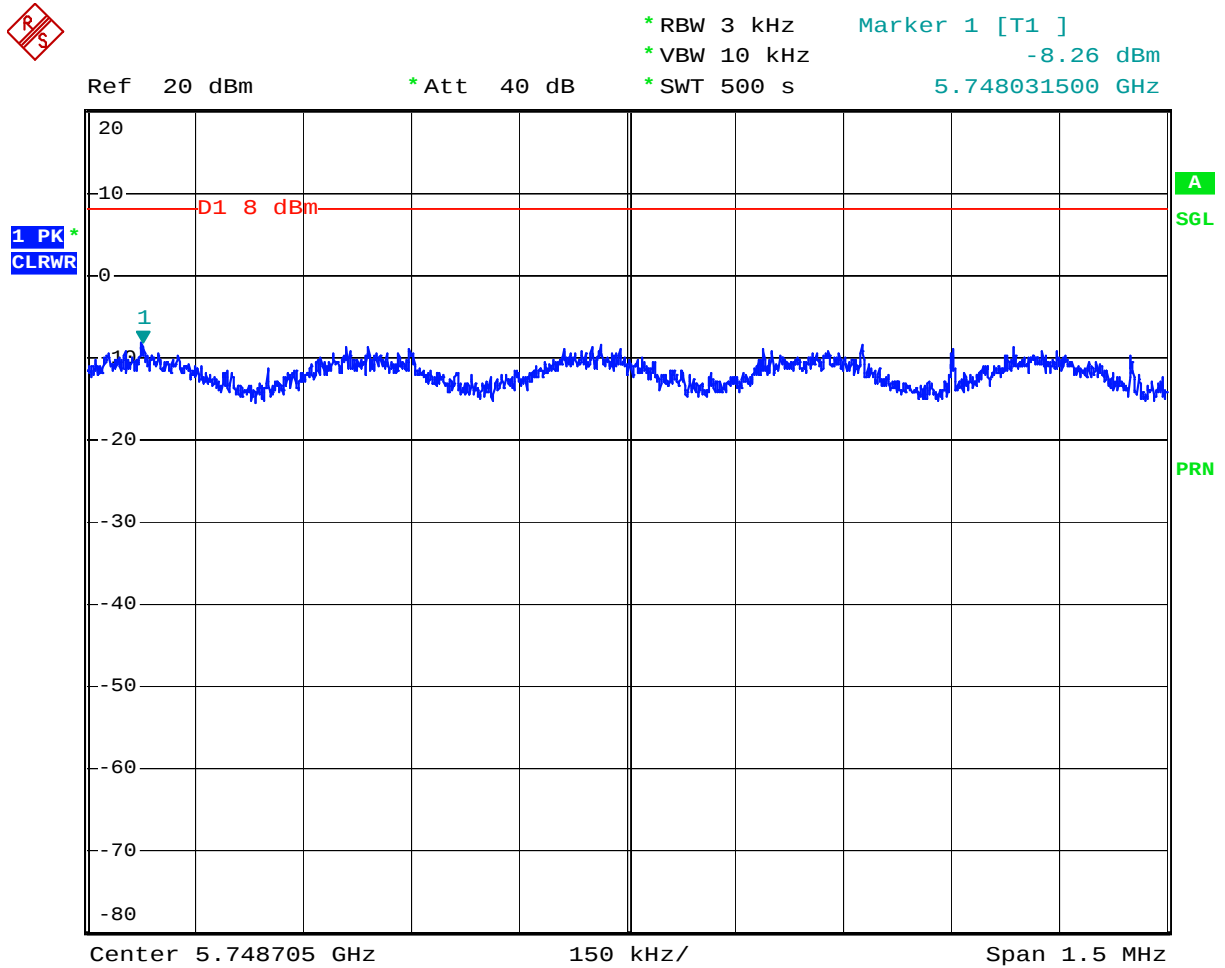
Comment: Power spectral density, 802.11n, HT40, 13.5 Mbps, output 2
 Date: 11.SEP.2008 12:41:05

Plot 3.13



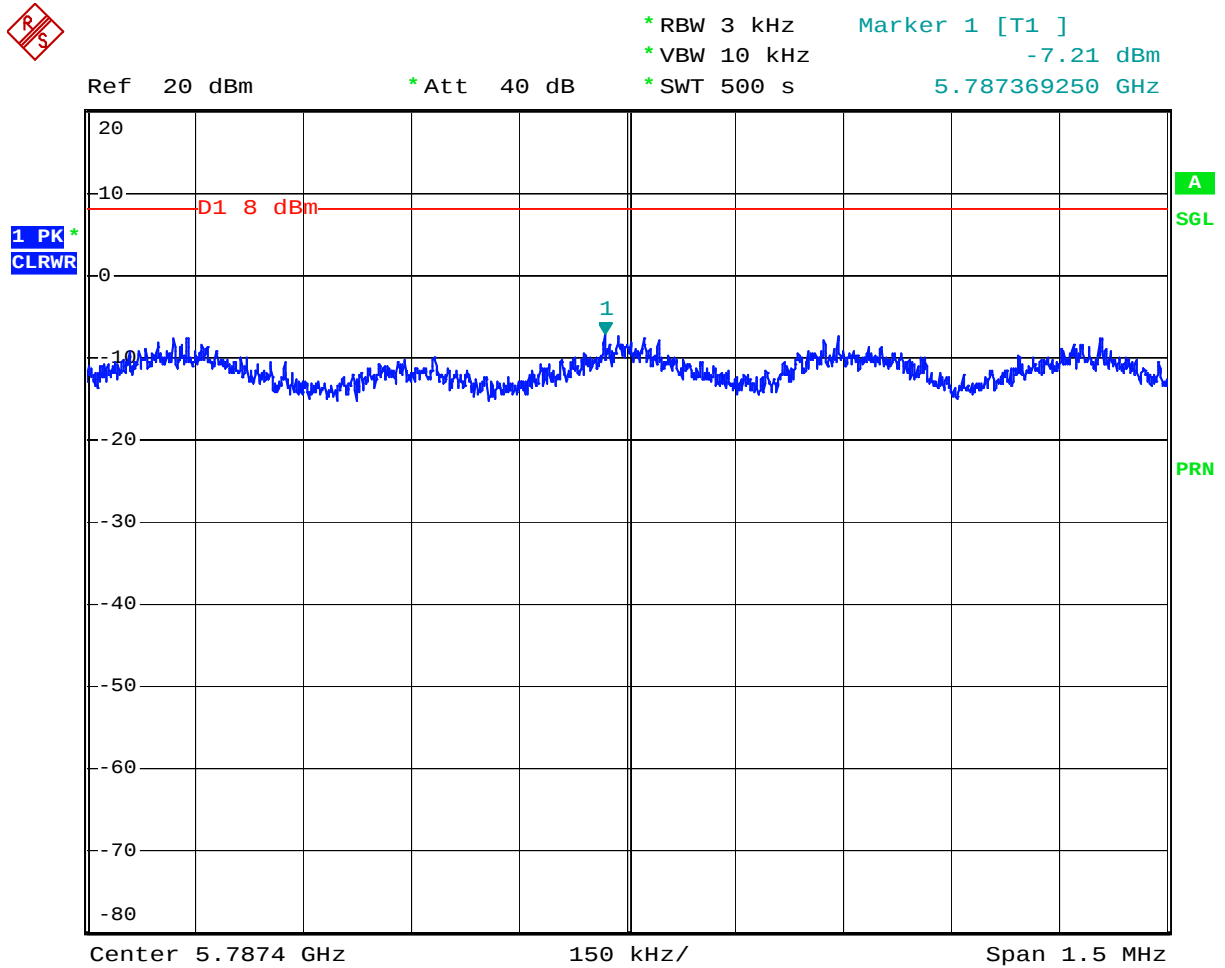
Comment: Power spectral density, 802.11a, 6 Mbps, output 3
 Date: 10.SEP.2008 16:47:12

Plot 3.14



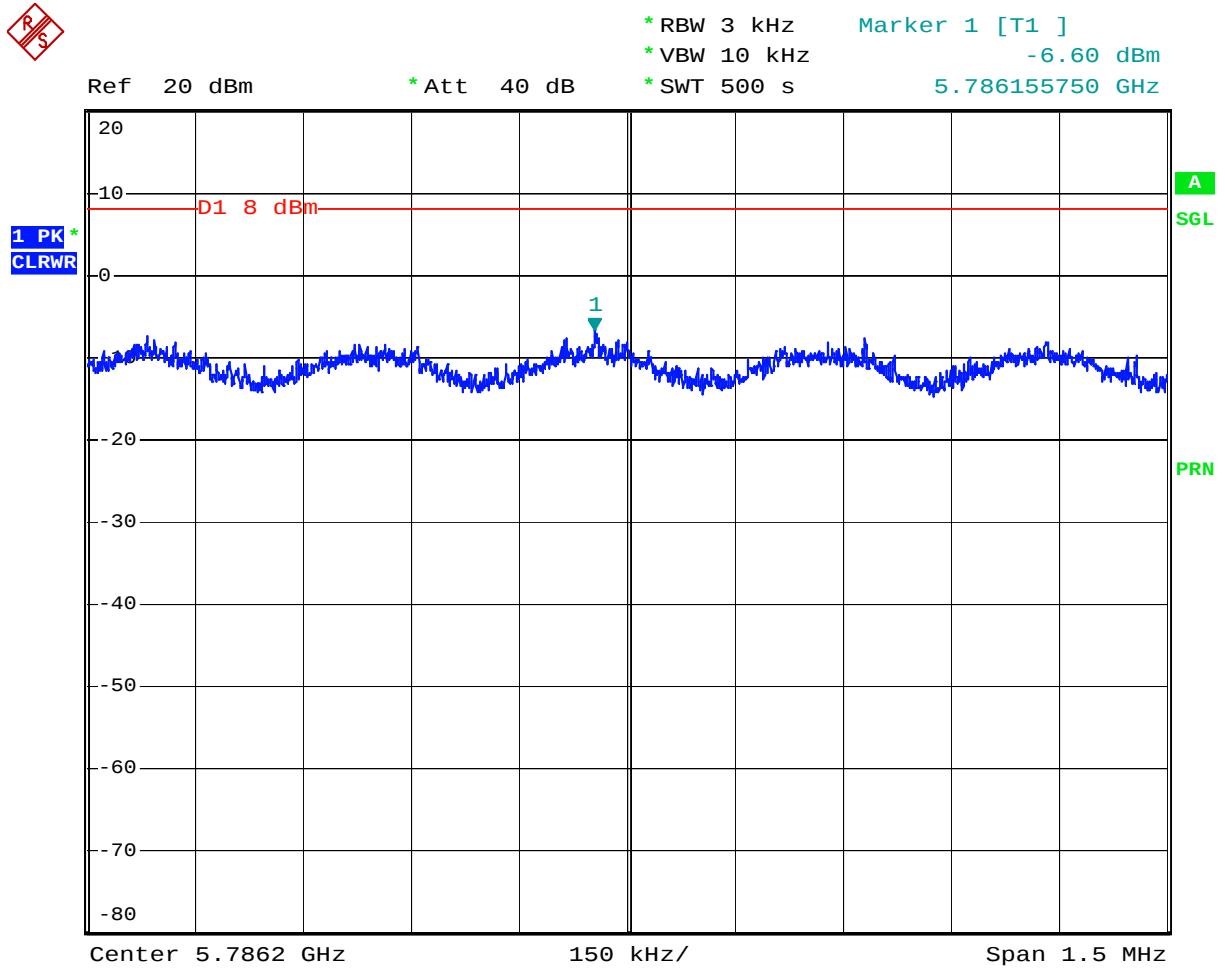
Comment: Power spectral density, 802.11n, HT20, 6.5 Mbps, output 3
 Date: 10.SEP.2008 18:17:30

Plot 3.15



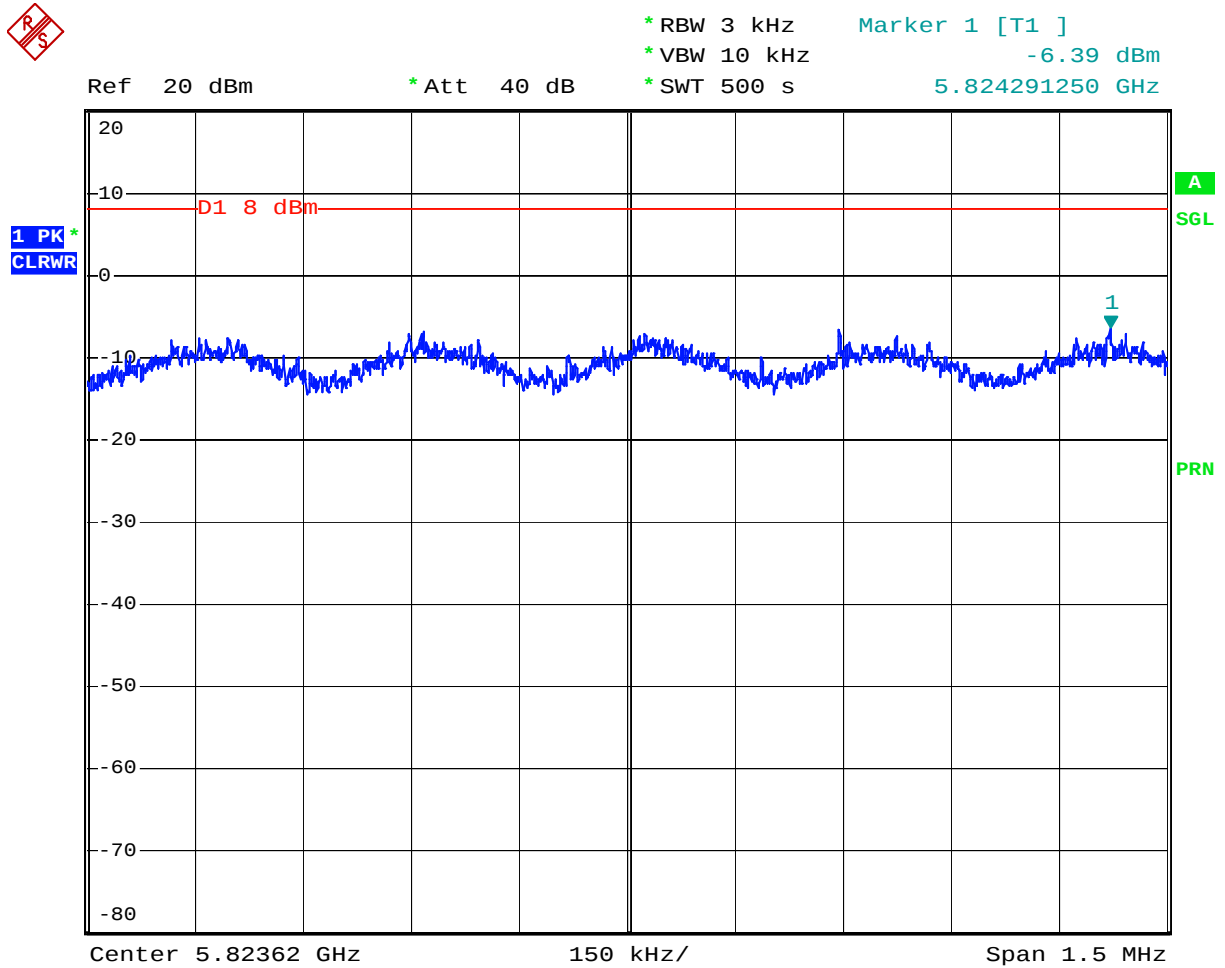
Comment: Power spectral density, 802.11a, 6 Mbps, output 3
 Date: 10.SEP.2008 16:58:49

Plot 3.16



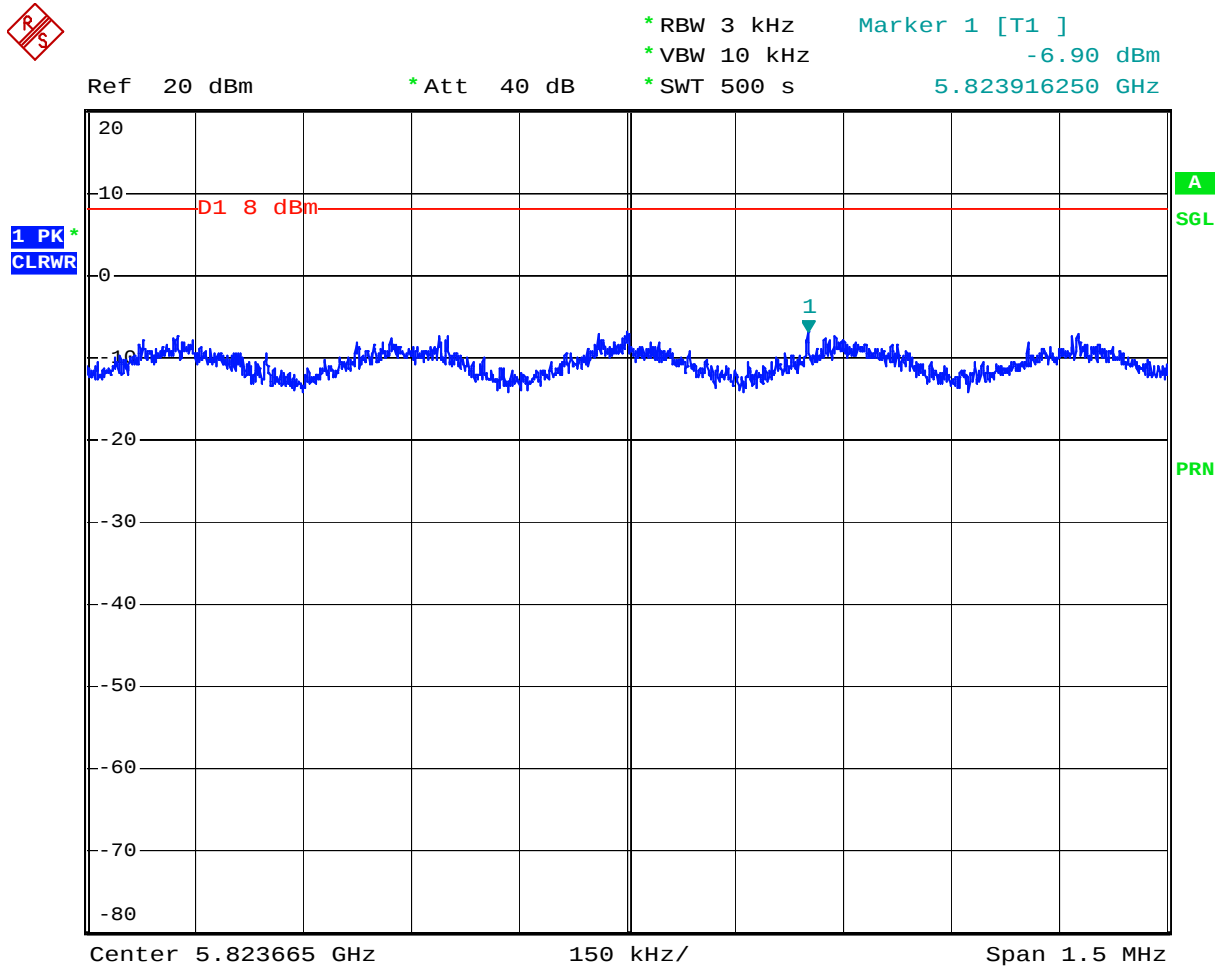
Comment: Power spectral density, 802.11n, 6.5 Mbps, output 3
Date: 10.SEP.2008 17:50:00

Plot 3.17



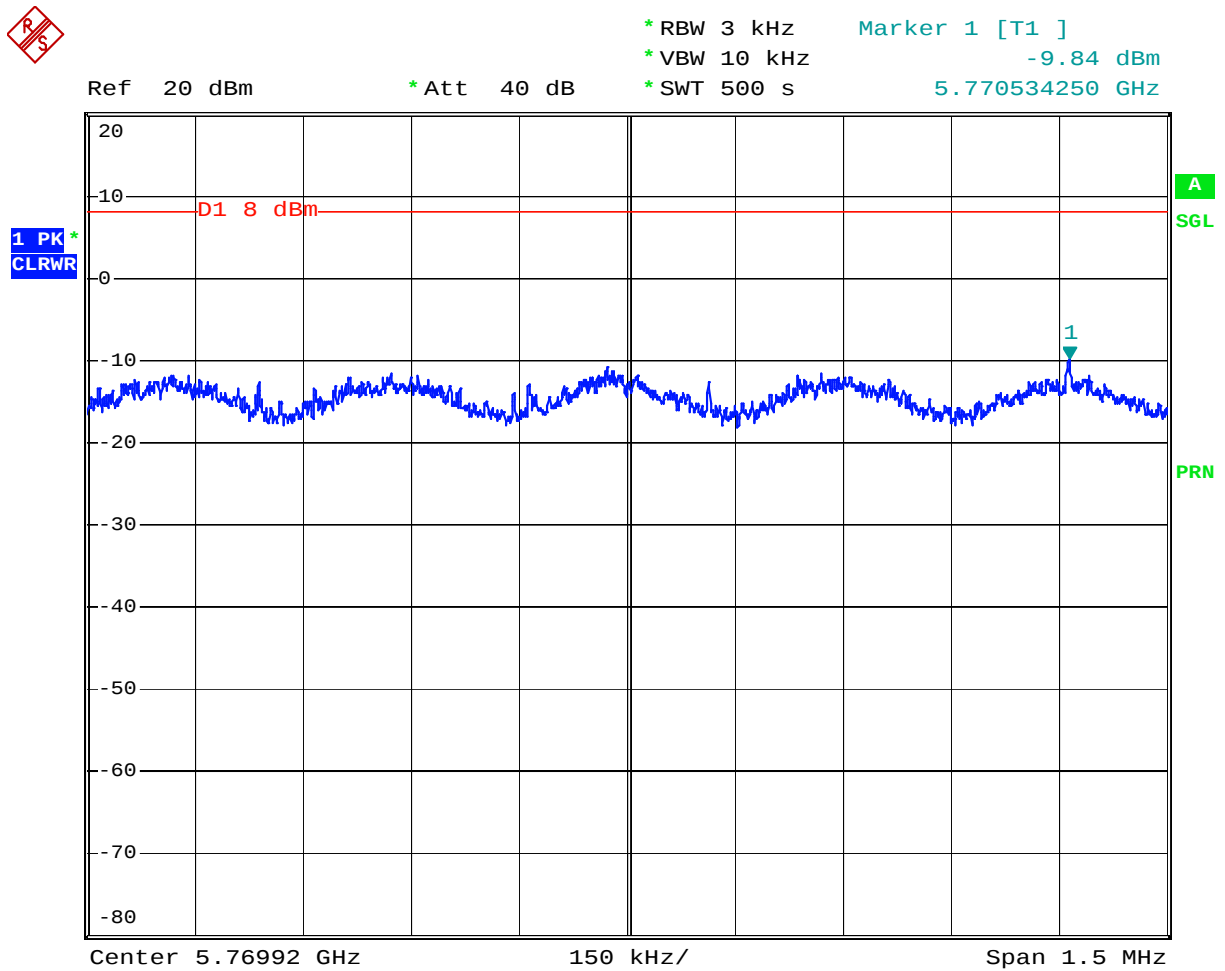
Comment: Power spectral density, 802.11a, 6 Mbps, output 3
Date: 10.SEP.2008 17:12:23

Plot 3.18



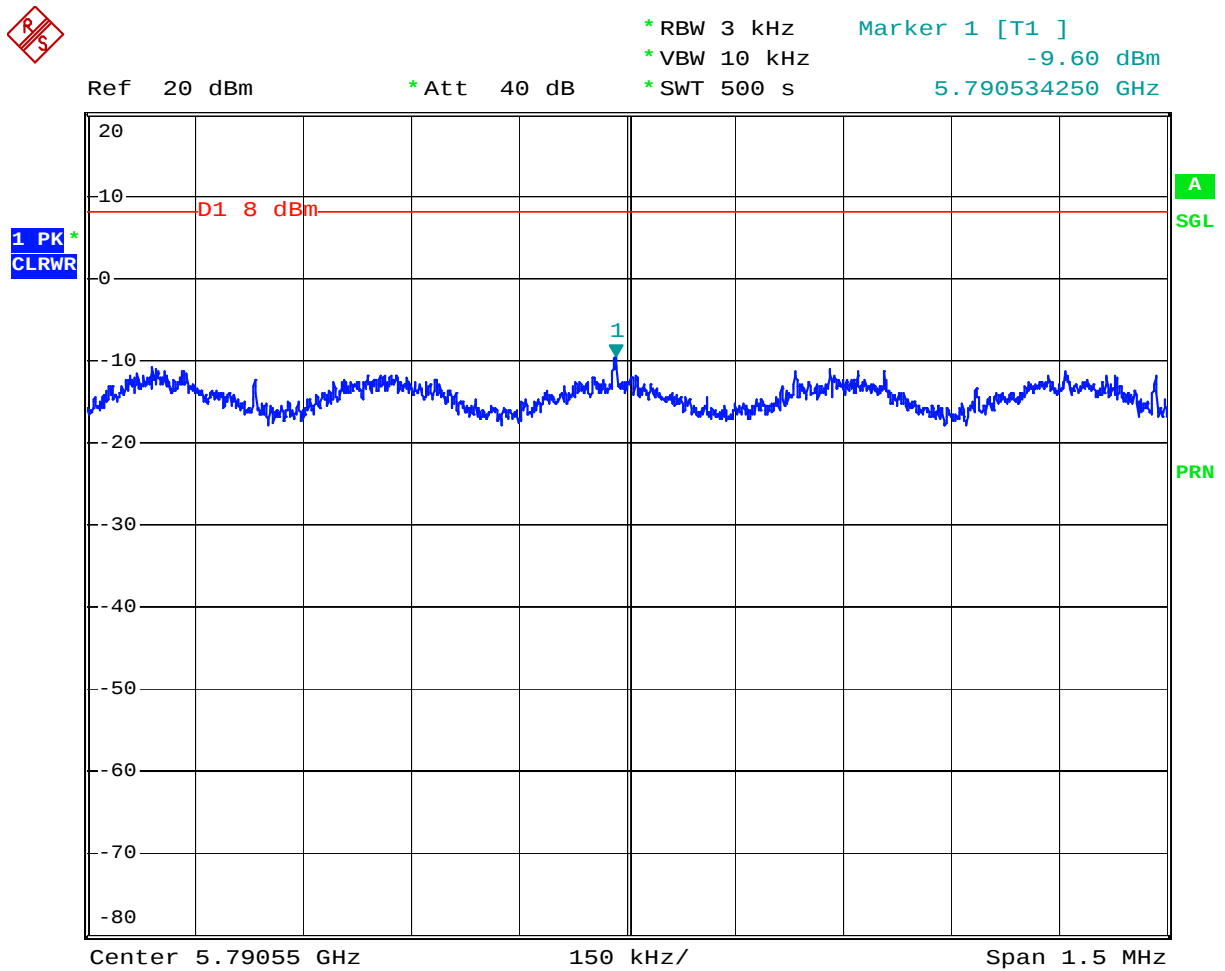
Comment: Power spectral density, 802.11n, 6.5 Mbps, output 3
 Date: 10.SEP.2008 17:38:28

Plot 3.19



Comment: Power spectral density, 802.11n, HT40, 13.5 Mbps, output 3
 Date: 10.SEP.2008 18:56:35

Plot 3.20



Comment: Power spectral density, 802.11n, HT40, 13.5 Mbps, output 3
 Date: 10.SEP.2008 18:45:41

4.4 Out-of-Band Conducted Emissions FCC Rule 15.247(d)

4.4.1 Requirement

In any 100 kHz bandwidths outside the EUT pass-band, the RF power shall be at least 20 dB below that of the maximum in-band 100 kHz emissions.

4.4.2 Procedure

A spectrum analyzer was connected to the antenna port of the transmitter. Analyzer Resolution Bandwidth was set to 100 kHz. For each channel investigated, the in-band and out-of-band emission measurements were performed. The out-of-band emissions were measured from 30 MHz to 40 GHz.

4.4.3 Test Result

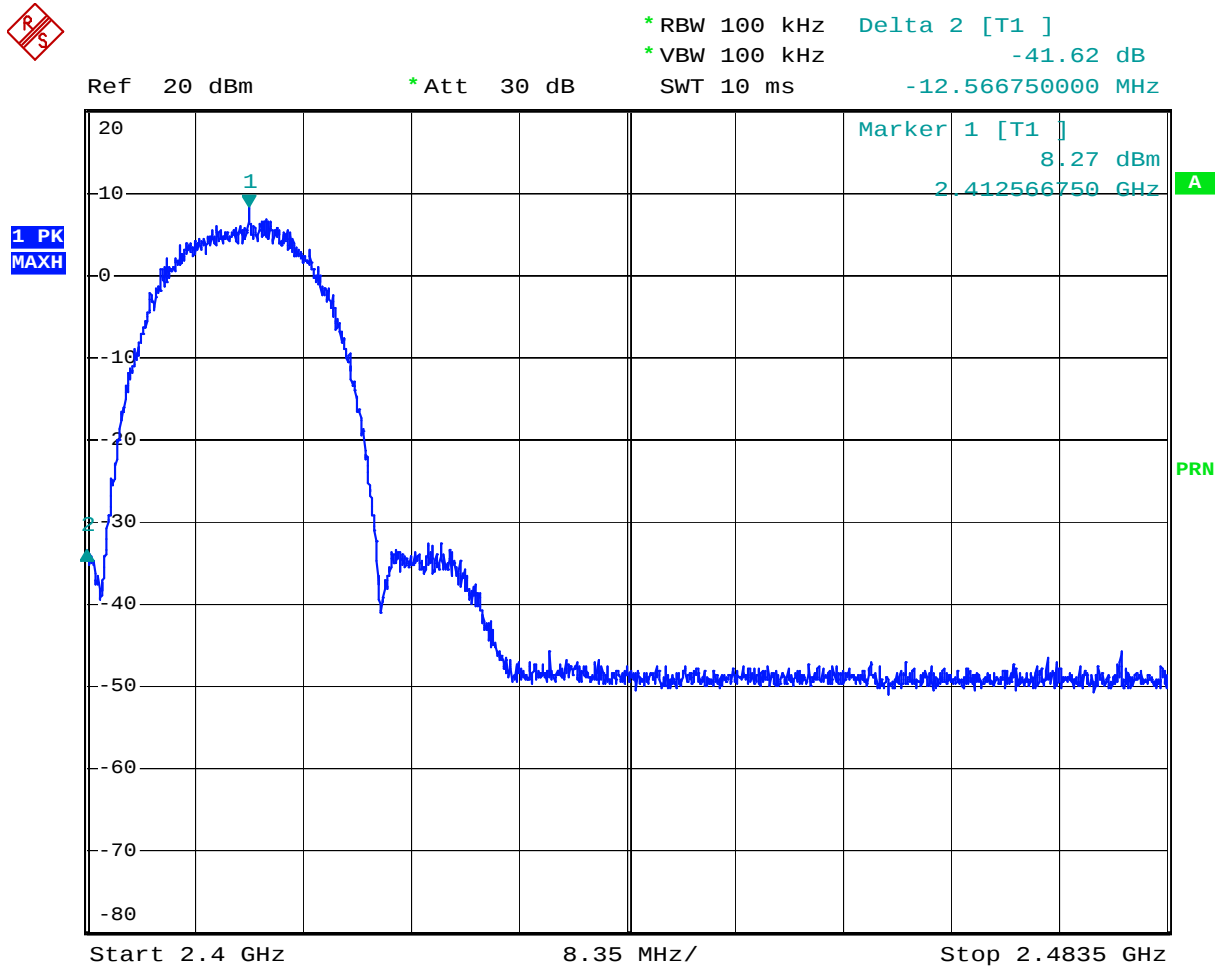
Refer to the table below and plots 4.1 – 4.67.

The EUT complies by more than 6 dB

Frequency (MHz)	Channel	Standard	Data rate Mbps	Description	Plot
2412	1	802.11b	11	In-band	4.1
	1	802.11g	6	In-band	4.2
	1	802.11n HT20	6.5	In-band	4.3
	1	802.11b	11	Scan 30 MHz – 2.4 GHz	4.4
	1	802.11g	6	Scan 30 MHz – 2.4 GHz	4.5
	1	802.11n HT20	6.5	Scan 30 MHz – 2.4 GHz	4.6
	1	802.11b	11	Scan 2.4835 GHz – 25Hz	4.7
	1	802.11g	6	Scan 2.4835 GHz – 25Hz	4.8
	1	802.11n HT20	6.5	Scan 2.4835 GHz – 25Hz	4.9
2437	6	802.11b	11	In-band	4.10
	6	802.11g	6	In-band	4.11
	6	802.11n HT20	6.5	In-band	4.12
	6	802.11b	11	Scan 30 MHz – 2.4 GHz	4.13
	6	802.11g	6	Scan 30 MHz – 2.4 GHz	4.14
	6	802.11n HT20	6.5	Scan 30 MHz – 2.4 GHz	4.15
	6	802.11b	11	Scan 2.4835 GHz – 25Hz	4.16
	6	802.11g	6	Scan 2.4835 GHz – 25Hz	4.17
	6	802.11n HT20	6.5	Scan 2.4835 GHz – 25Hz	4.18
2462	11	802.11b	11	In-band	4.19
	11	802.11g	6	In-band	4.20
	11	802.11n HT20	6.5	In-band	4.21
	11	802.11b	11	Scan 30 MHz – 2.4 GHz	4.22
	11	802.11g	6	Scan 30 MHz – 2.4 GHz	4.23
	11	802.11n HT20	6.5	Scan 30 MHz – 2.4 GHz	4.24
	11	802.11b	11	Scan 2.4835 GHz – 25Hz	4.25
	11	802.11g	6	Scan 2.4835 GHz – 25Hz	4.26
	11	802.11n HT20	6.5	Scan 2.4835 GHz – 25Hz	4.27
2422	3	802.11n HT40	13.5	In-band	4.28
	3	802.11n HT40	13.5	Scan 30 MHz – 2.4 GHz	4.29
	3	802.11n HT40	13.5	Scan 2.4835 GHz – 25Hz	4.30
2452	9	802.11n HT40	13.5	In-band	4.31
	9	802.11n HT40	13.5	Scan 30 MHz – 2.4 GHz	4.32
	9	802.11n HT40	13.5	Scan 2.4835 GHz – 25Hz	4.33

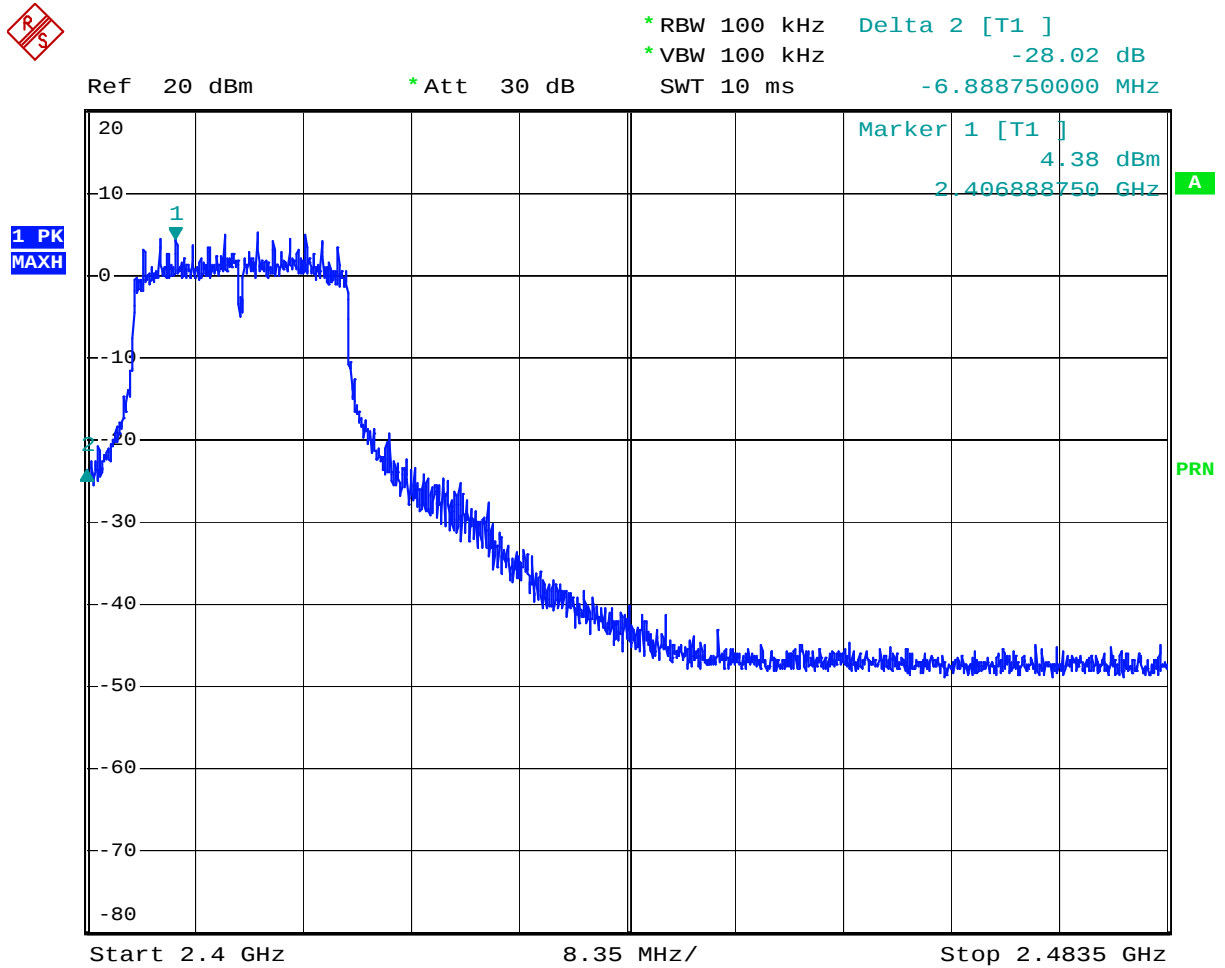
Frequency (MHz)	Channel	Standard	Data rate Mbps	Description	Plot
5745	149	802.11a	6	In-band	4.34
	149	802.11n HT20	6.5	In-band	4.35
	149	802.11a	6	Scan 30 MHz – 1 GHz	4.36
	149	802.11n HT20	6.5	Scan 30 MHz – 1 GHz	4.37
	149	802.11a	6	Scan 1 GHz – 5.85 GHz	4.38
	149	802.11n HT20	6.5	Scan 1 GHz – 5.85 GHz	4.39
	149	802.11a	6	Scan 5.85 GHz – 20 GHz	4.40
	149	802.11n HT20	6.5	Scan 10 GHz – 20 GHz	4.41
	149	802.11n HT20	6.5	Scan 20 GHz – 40 GHz	4.42
5785	157	802.11a	6	In-band	4.43
	157	802.11n HT20	6.5	In-band	4.44
	157	802.11n HT40	13.5	In-band	4.45
	157	802.11a	6	Scan 30 MHz – 1 GHz	4.46
	157	802.11n HT40	6.5	Scan 30 MHz – 1 GHz	4.47
	157	802.11a	6	Scan 1 GHz – 5.725 GHz	4.48
	157	802.11n HT40	13.5	Scan 1 GHz – 5.725 GHz	4.49
	157	802.11a	6	Scan 5.85 GHz – 20 GHz	4.50
	157	802.11n HT40	13.5	Scan 5.85 GHz – 20 GHz	4.51
	157	802.11a	6	Scan 20 GHz – 40 GHz	5.52
5825	165	802.11a	6	In-band	4.53
	165	802.11n HT20	6.5	In-band	5.54
	165	802.11a	6	Scan 5.85 GHz – 20 GHz	4.55
	165	802.11n HT20	6.5	Scan 5.85 GHz – 20 GHz	4.56
	165	802.11a	6	Scan 20 GHz – 40 GHz	4.57
	165	802.11n HT20	6.5	Scan 20 GHz – 40 GHz	4.58
5765	153	802.11n HT40	13.5	In-band	4.59
	153	802.11n HT40	13.5	Scan 30 MHz – 1 GHz	4.60
	153	802.11n HT40	13.5	Scan 1 GHz – 5.725 GHz	4.61
	153	802.11n HT40	13.5	Scan 5.85 GHz – 20 GHz	4.62
5805	161	802.11n HT40	13.5	In-band	4.63
	161	802.11n HT40	13.5	Scan 30 MHz – 1 GHz	4.64
	161	802.11n HT40	13.5	Scan 1 GHz – 5.725 GHz	4.65
	161	802.11n HT40	13.5	Scan 5.85 GHz – 20 GHz	4.66
	161	802.11n HT40	13.5	Scan 20 GHz – 40 GHz	4.67

Plot 4.1



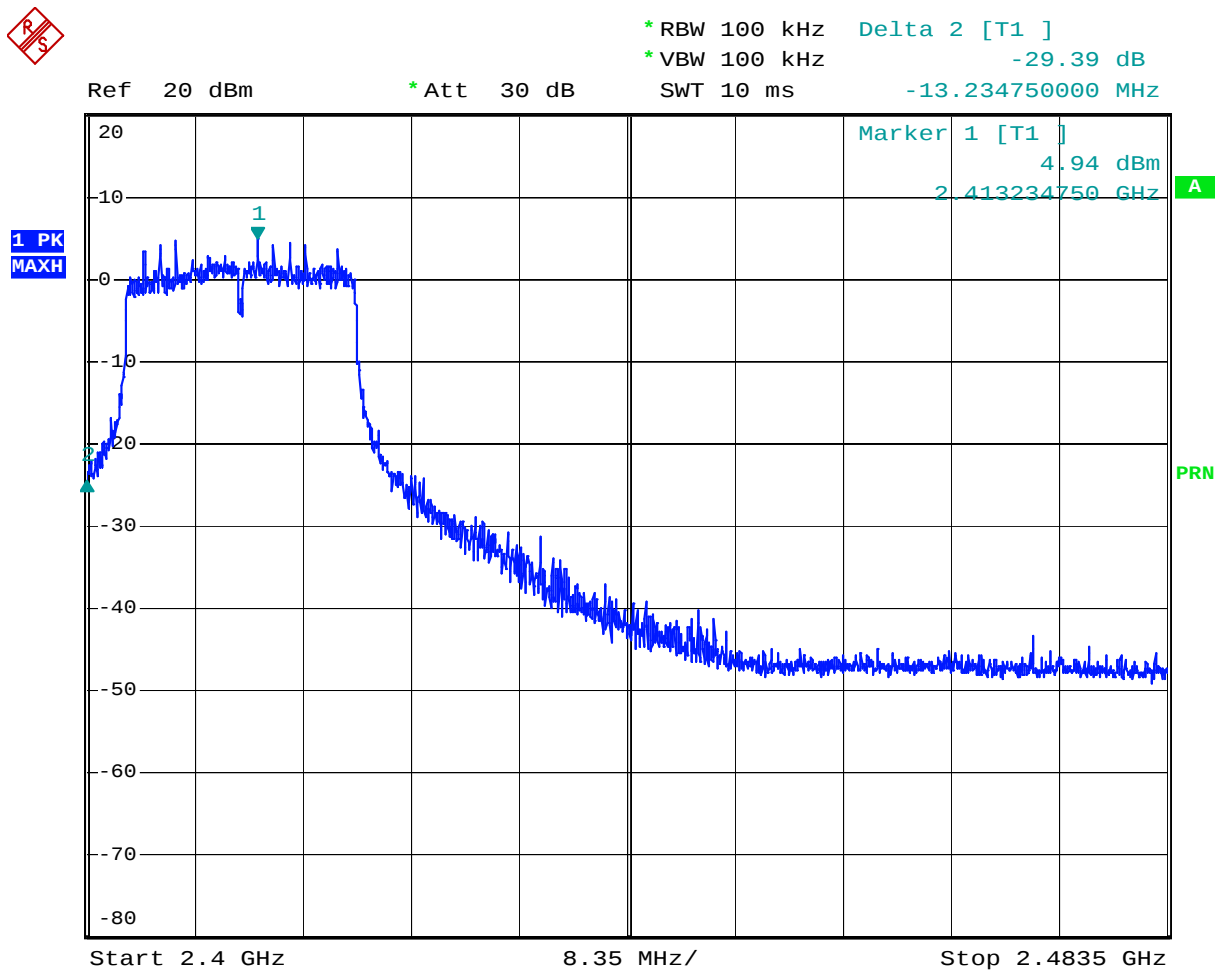
Comment: Out-of-band emis. 2412 MHz, 802.11b 11Mbps, output 2
 Date: 18.SEP.2008 17:28:40

Plot 4.2



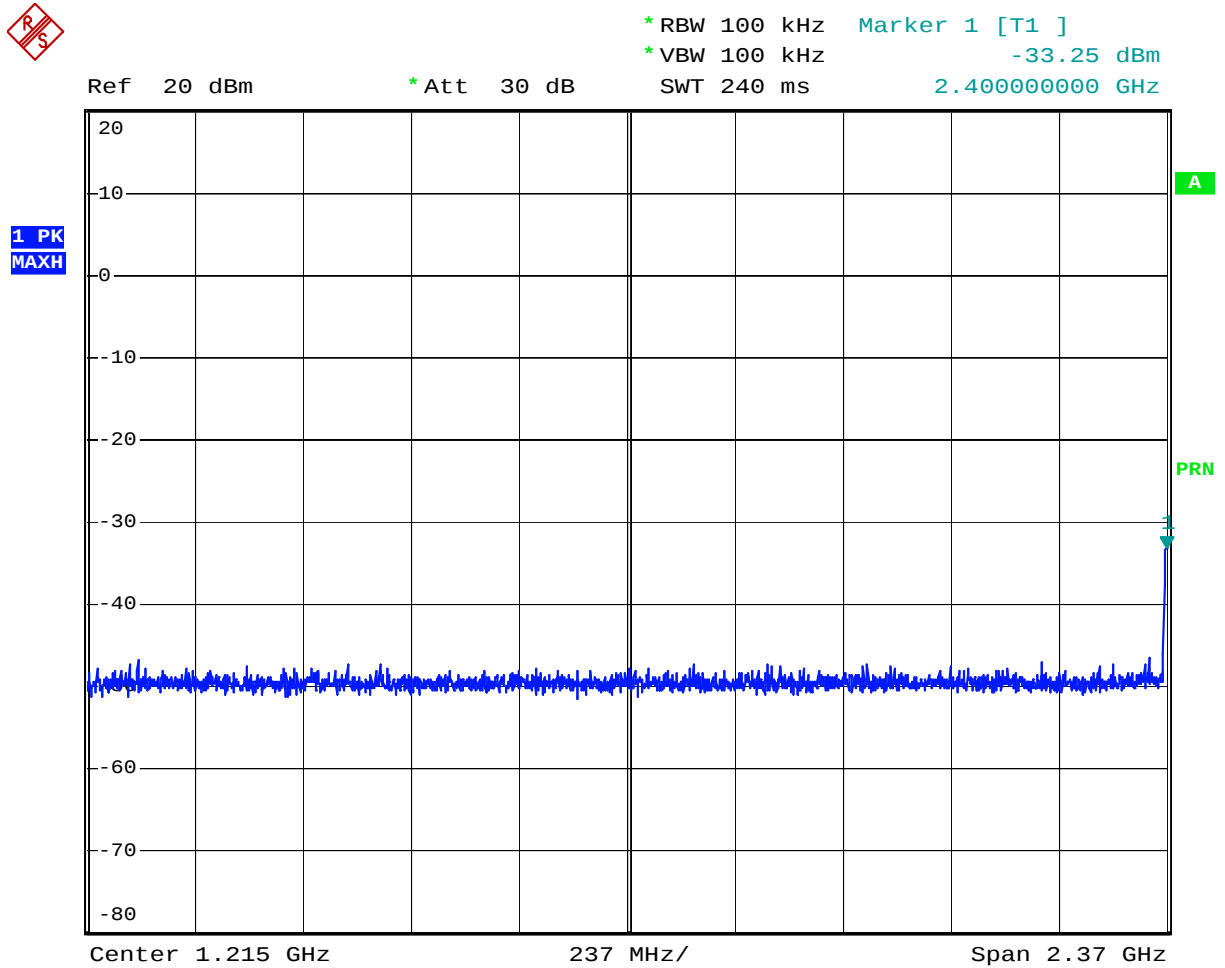
Comment: Out-of-band emis. 2412 MHz, 802.11g 6Mbps, output 2
 Date: 18.SEP.2008 17:30:18

Plot 4.3



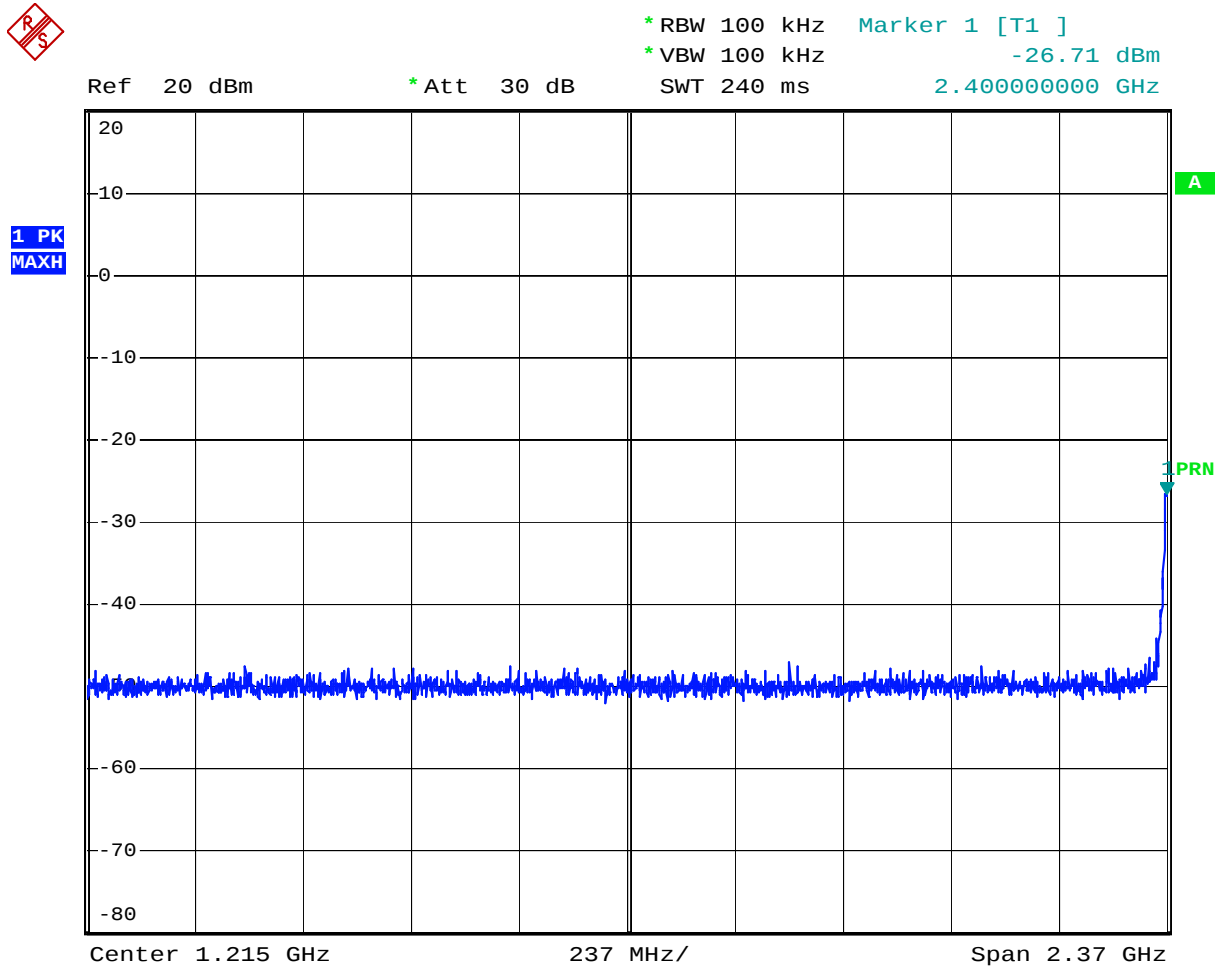
Comment: Out-of-band emis. 2412 MHz, 802.11n HT20, 6Mbps, output 2
 Date: 18.SEP.2008 17:32:08

Plot 4.4



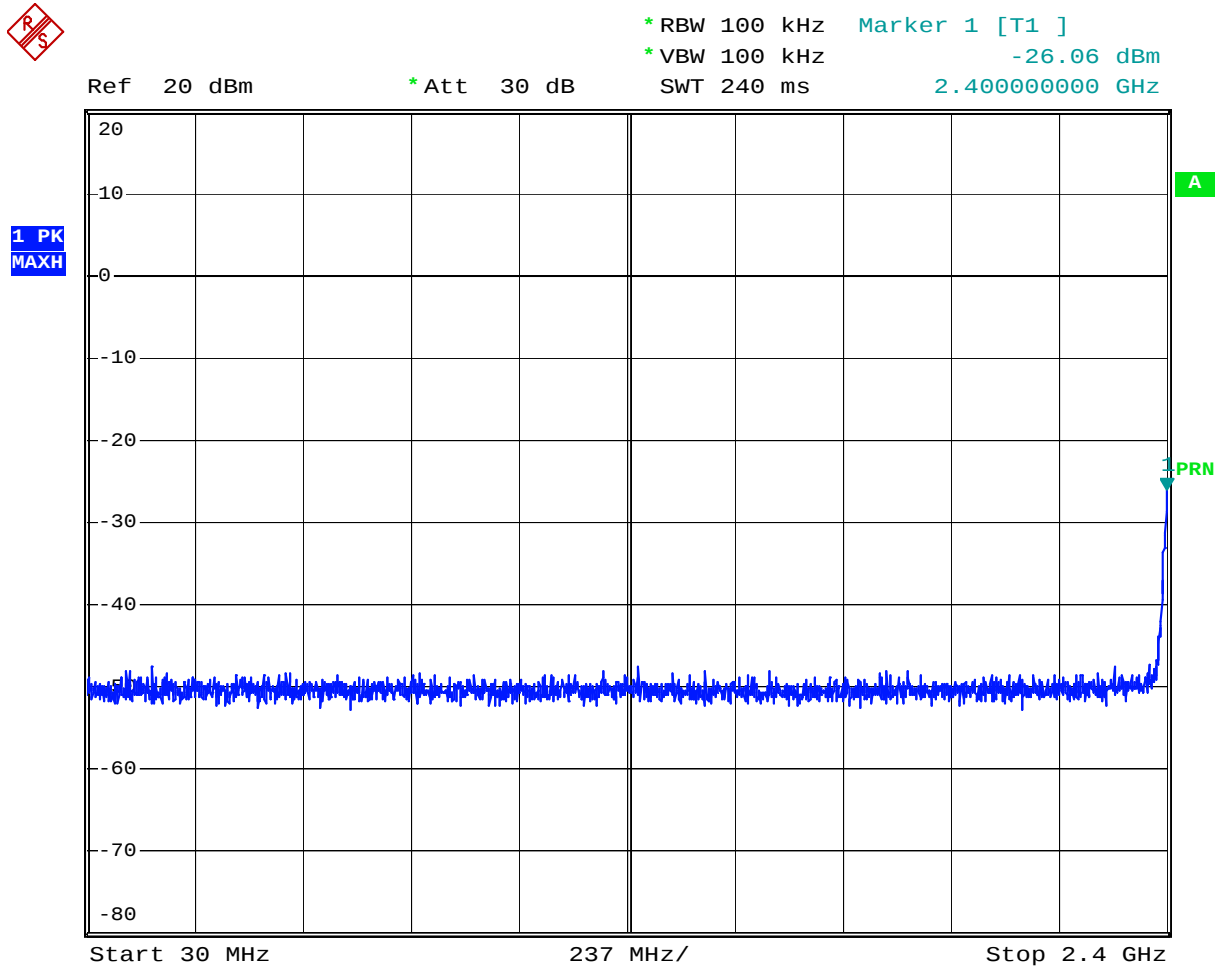
Comment: Out-of-band emis. 2412 MHz, 802.11b 11Mbps, output 2
 Date: 18.SEP.2008 17:39:39

Plot 4.5



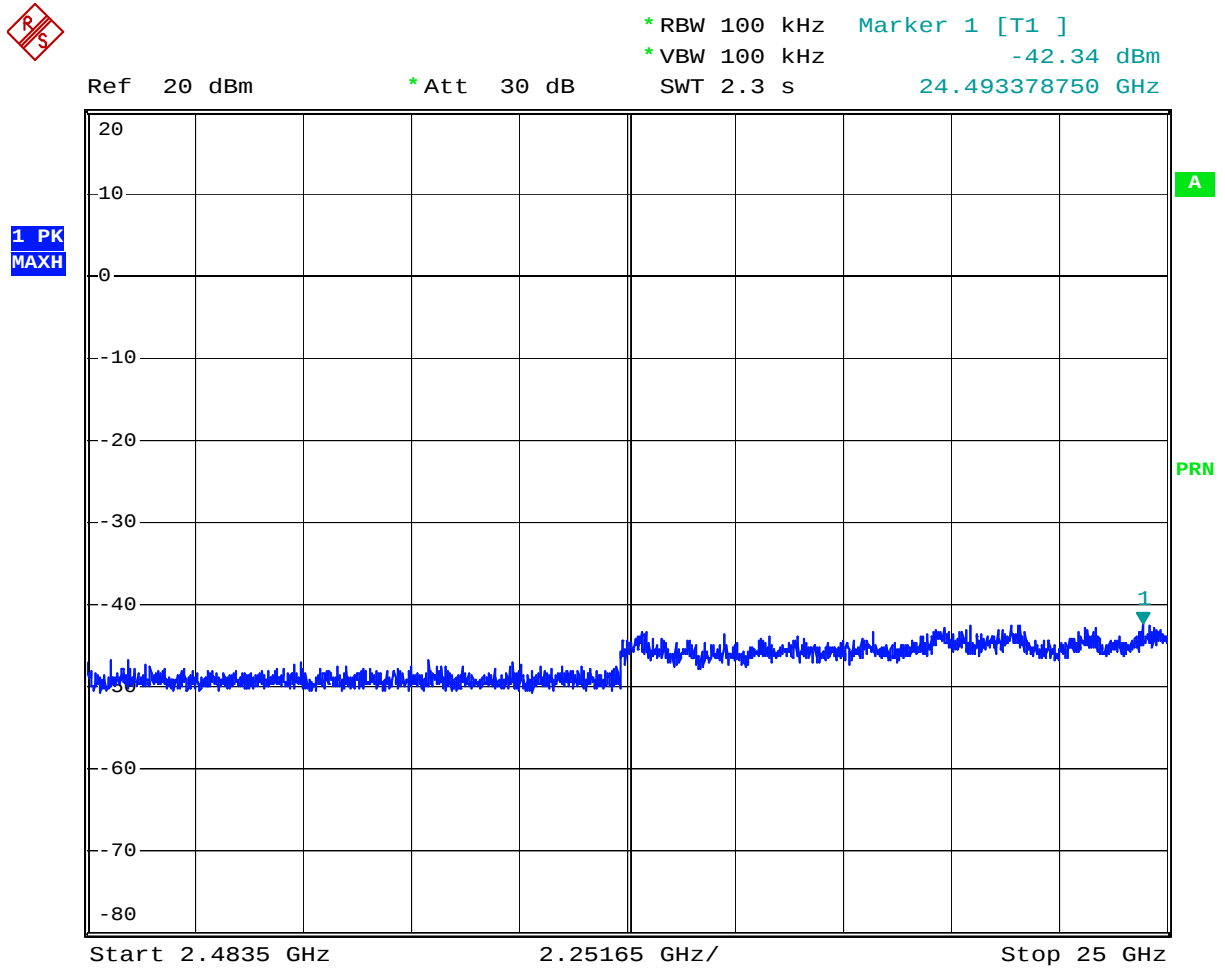
Comment: Out-of-band emis. 2412 MHz, 802.11g 6Mbps, output 2
 Date: 18.SEP.2008 17:40:18

Plot 4.6



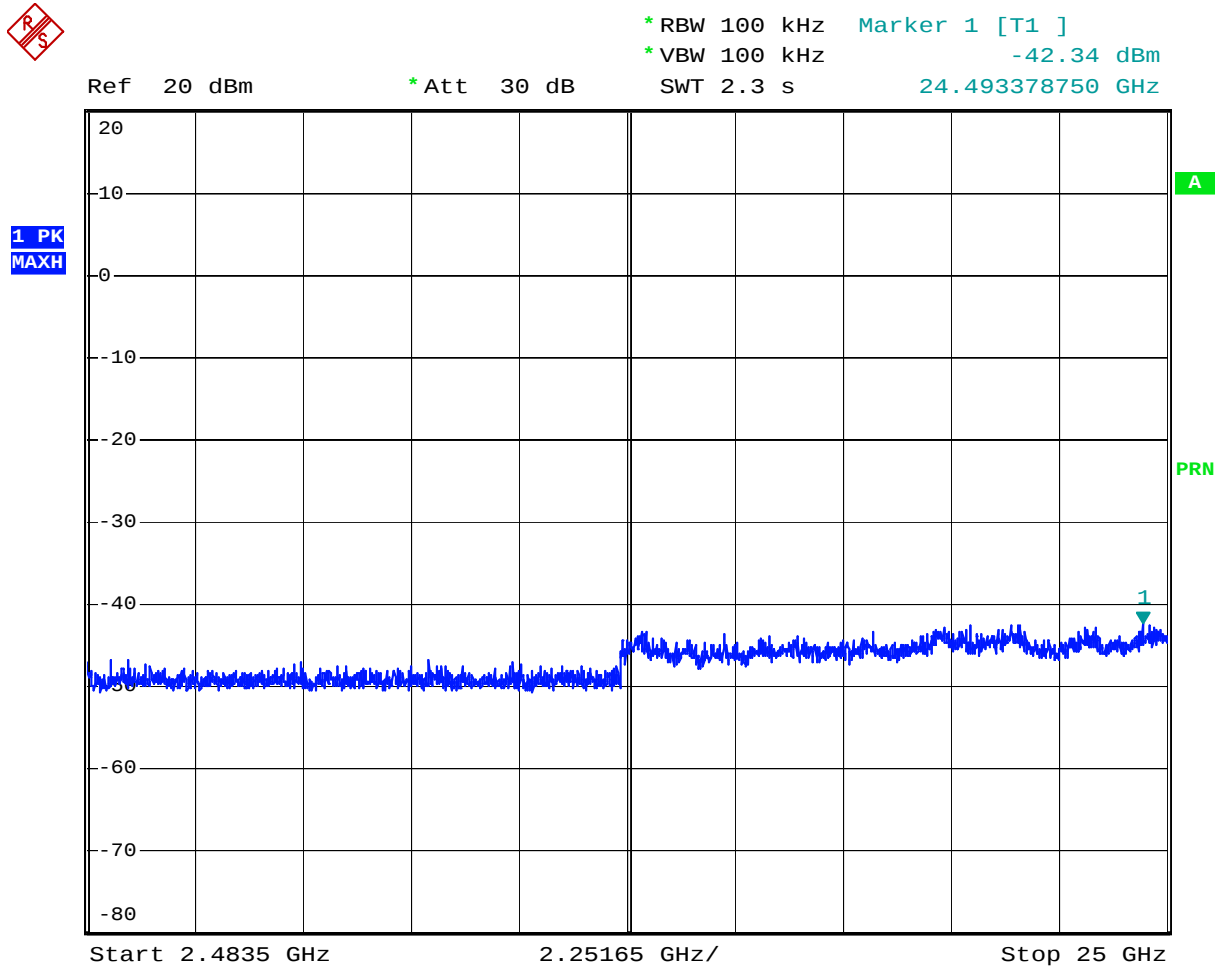
Comment: Out-of-band emis. 2412 MHz, 802.11n HT20, 6Mbps, output 2
 Date: 18.SEP.2008 17:38:09

Plot 4.7



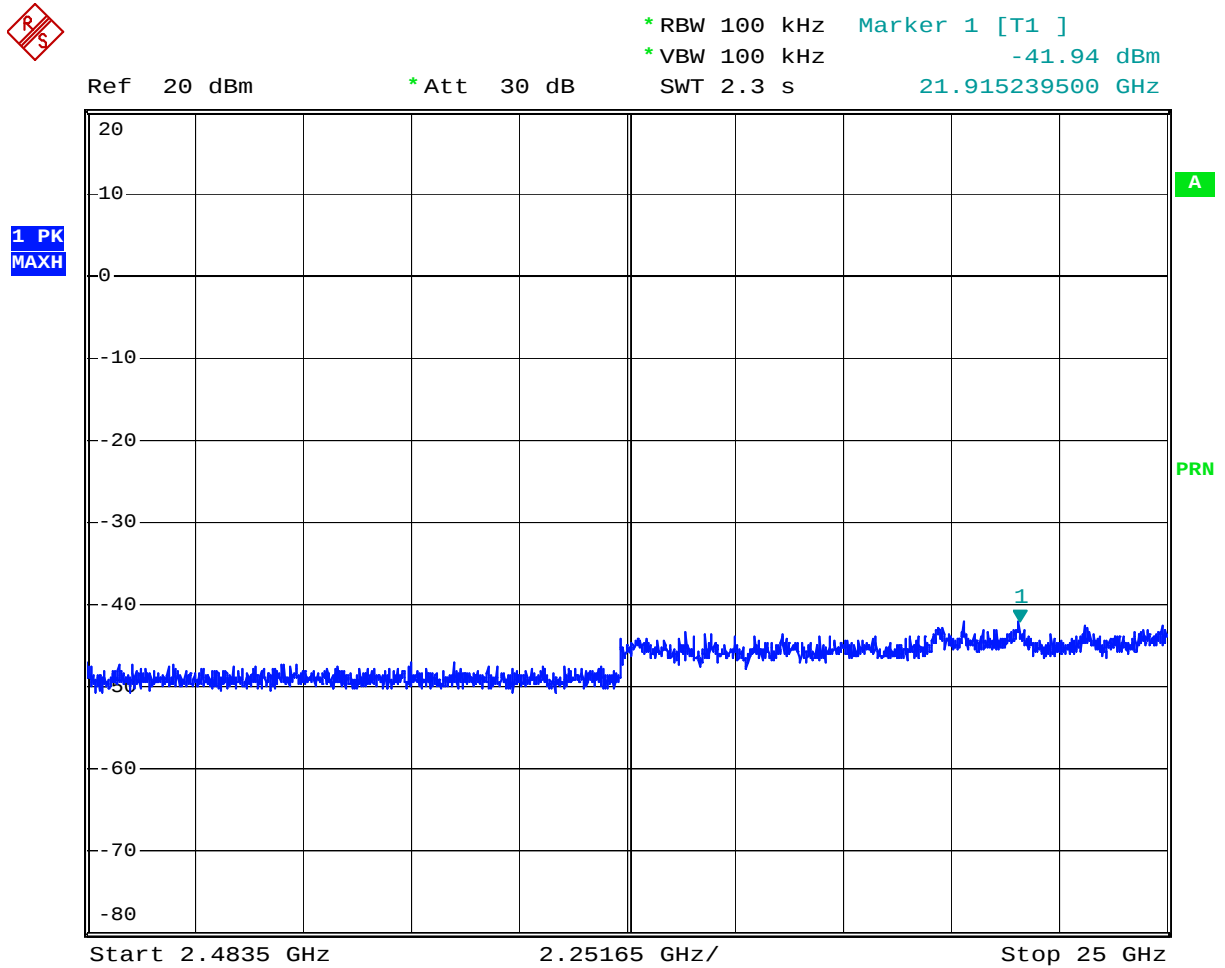
Comment: Out-of-band emis. 2412 MHz, 802.11g 6Mbps, output 2
Date: 18.SEP.2008 17:42:02

Plot 4.8



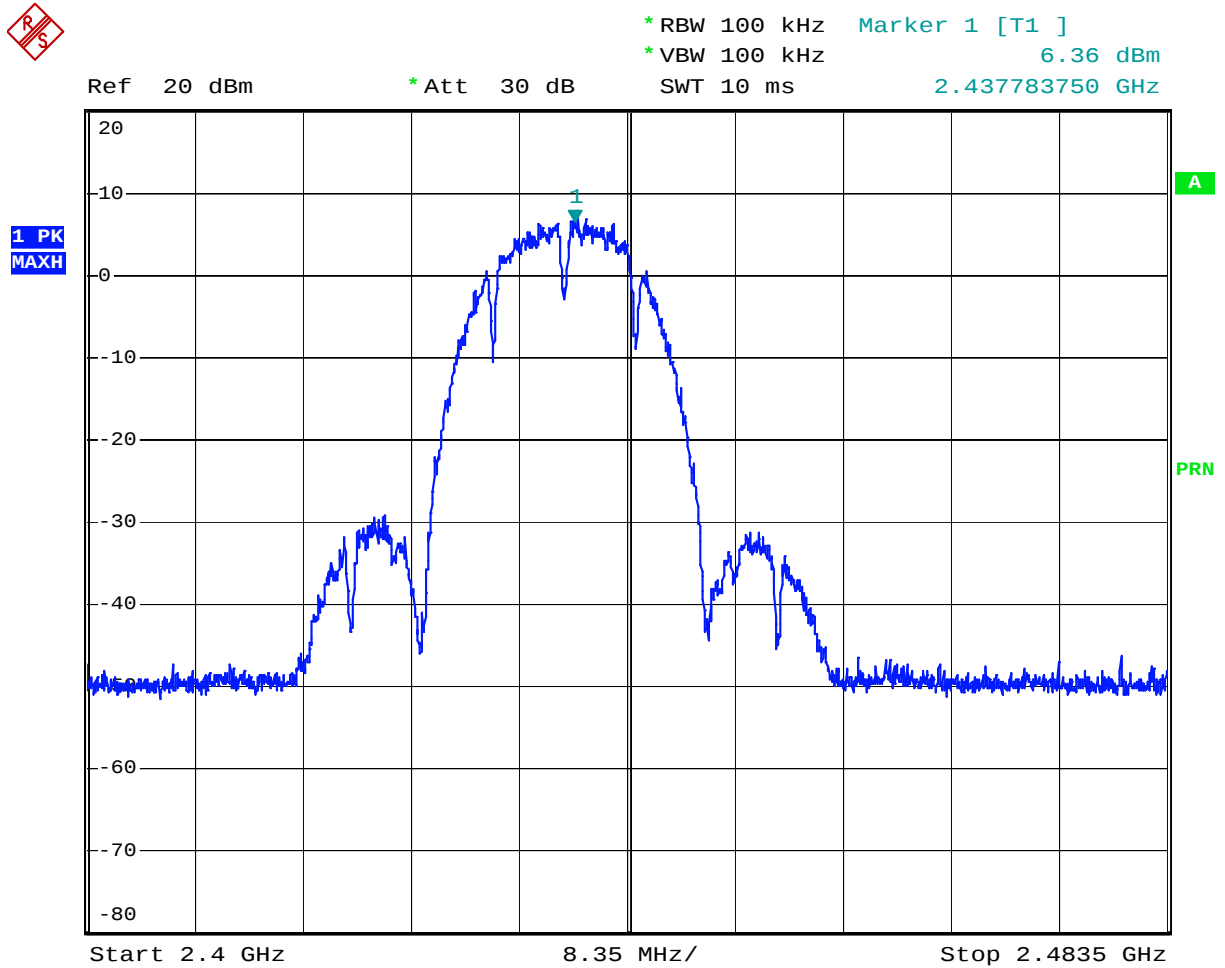
Comment: Out-of-band emis. 2412 MHz, 802.11g 6Mbps, output 2
Date: 18.SEP.2008 17:42:02

Plot 4.9



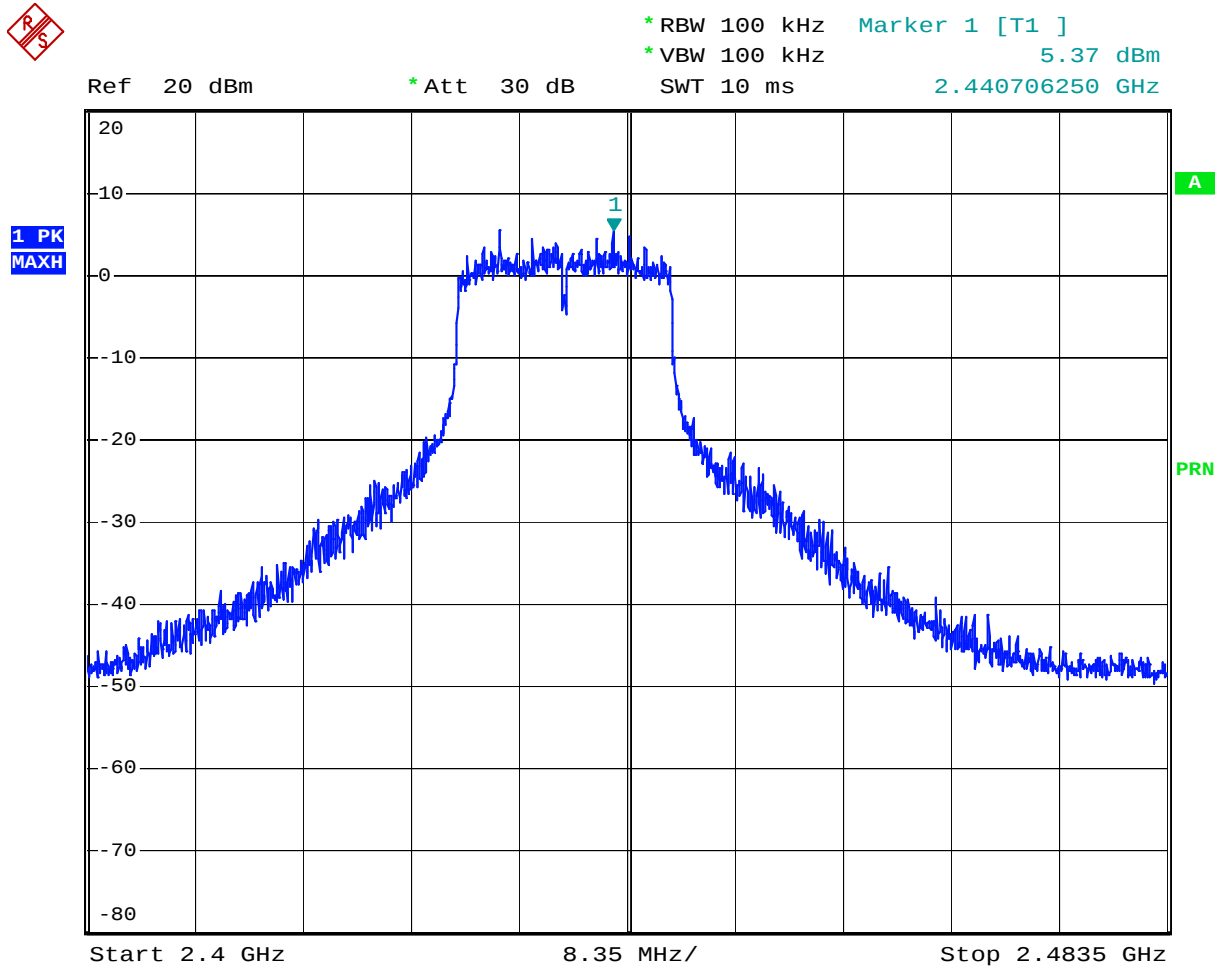
Comment: Out-of-band emis. 2412 MHz, 802.11n 6.5Mbps, output 2
 Date: 18.SEP.2008 17:44:01

Plot 4.10



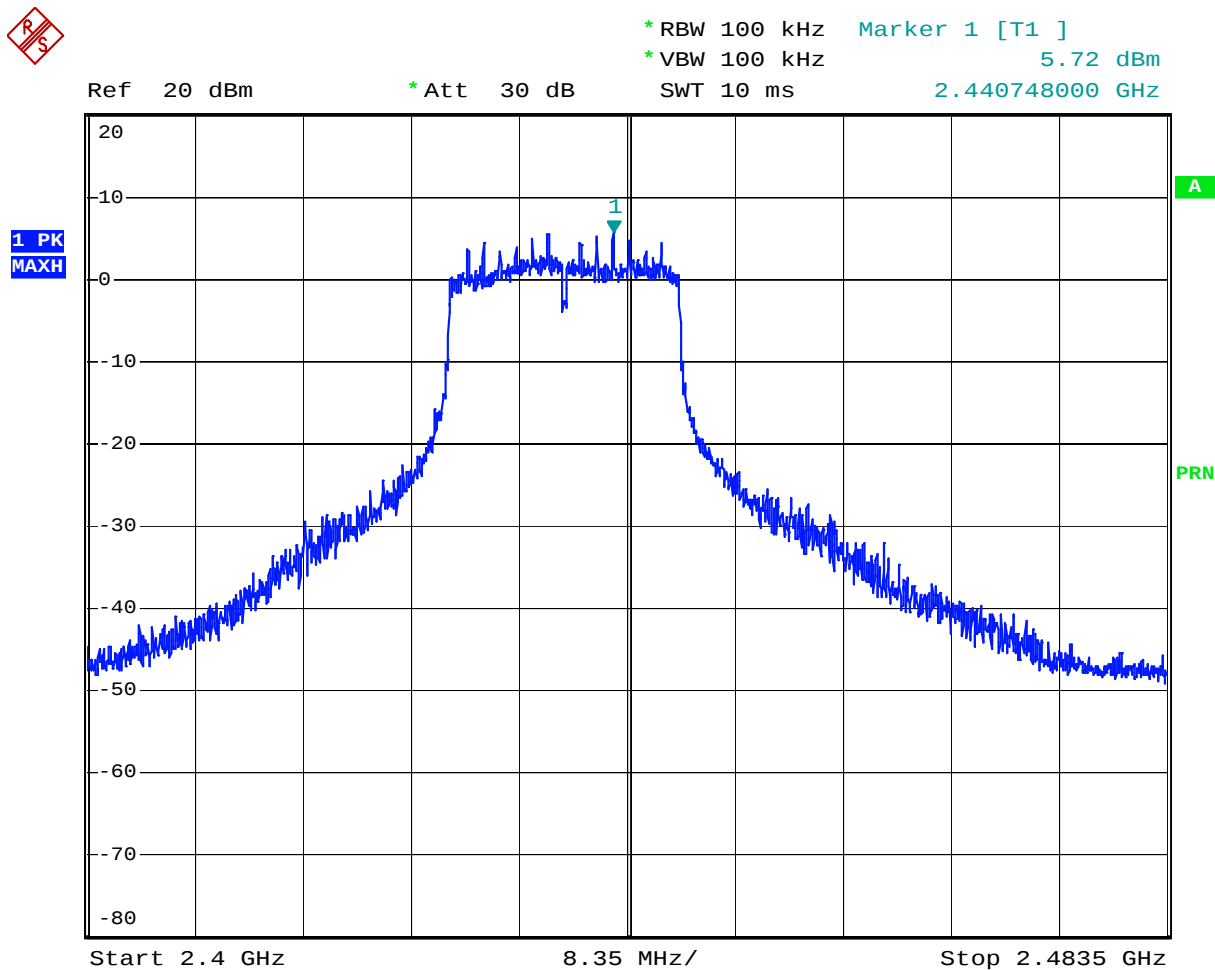
Comment: Out-of-band emis. 2437 MHz, 802.11b 11Mbps, output 2
 Date: 18.SEP.2008 17:49:43

Plot 4.11



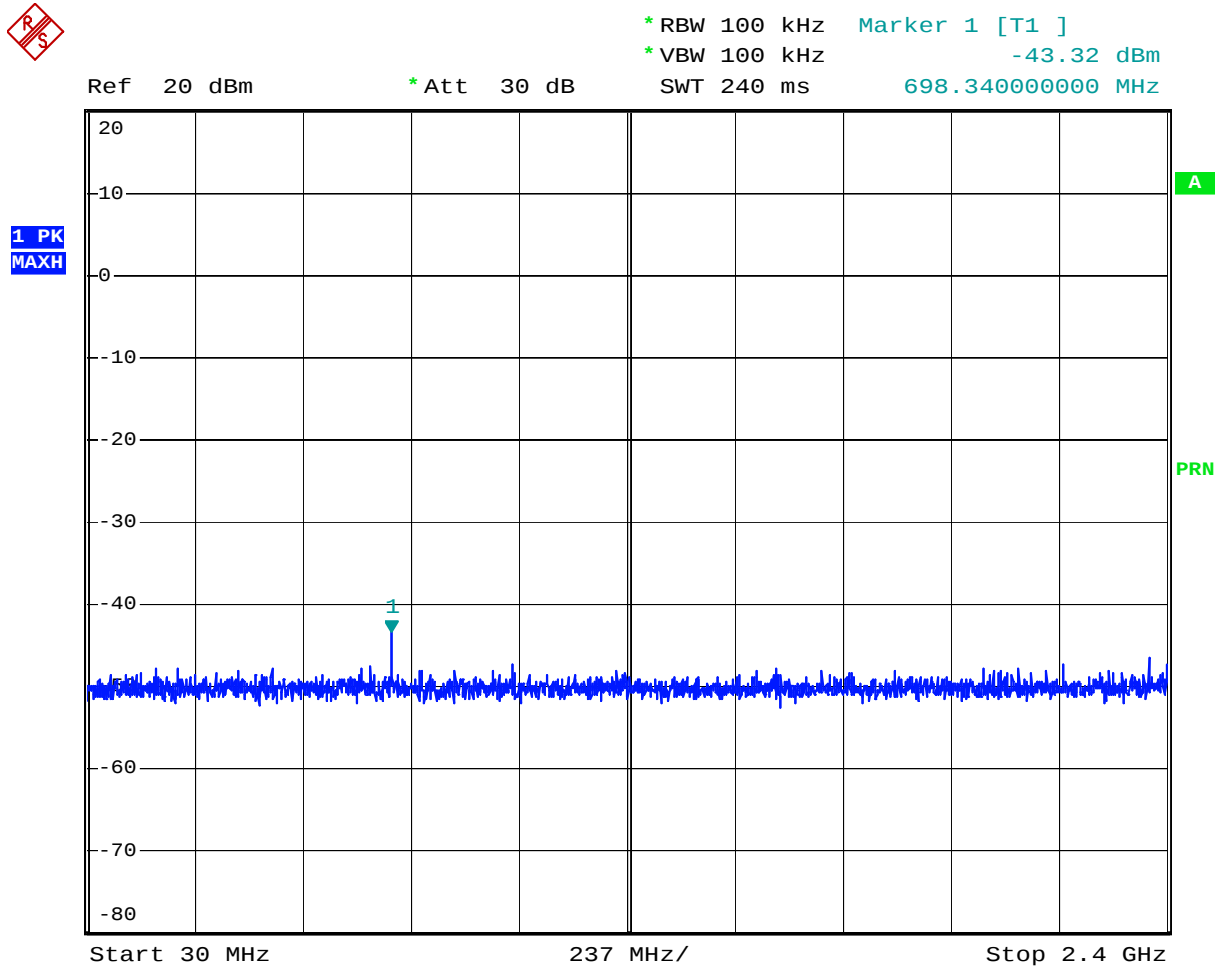
Comment: Out-of-band emis. 2437 MHz, 802.11g 6Mbps, output 2
 Date: 18.SEP.2008 17:55:23

Plot 4.12



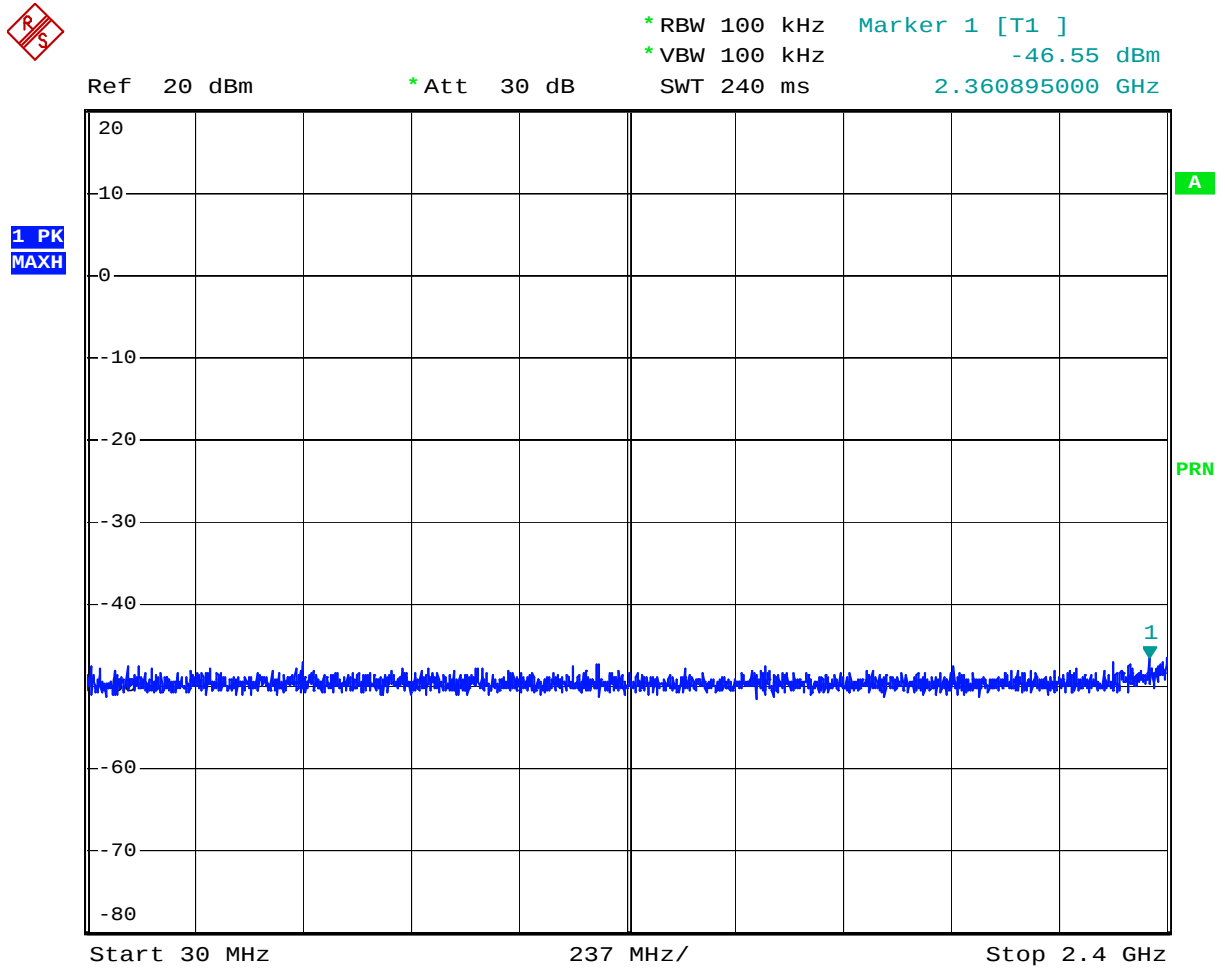
Comment: Out-of-band emis. 2437 MHz, 802.11n HT20, 6.5Mbps, output 2
 Date: 18.SEP.2008 17:47:46

Plot 4.13



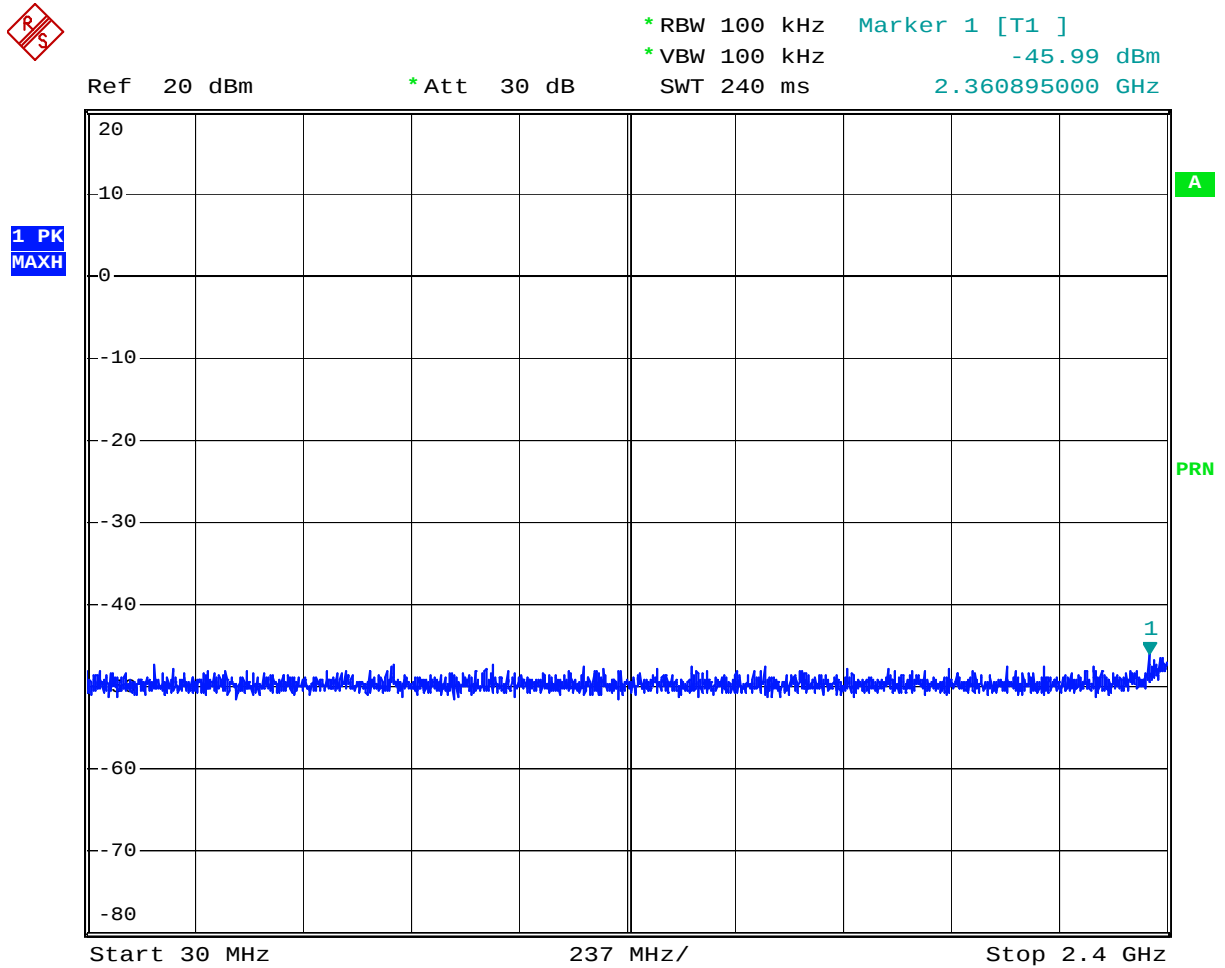
Comment: Out-of-band emis. 2437 MHz, 802.11b 11Mbps, output 2
Date: 18.SEP.2008 17:57:55

Plot 4.14



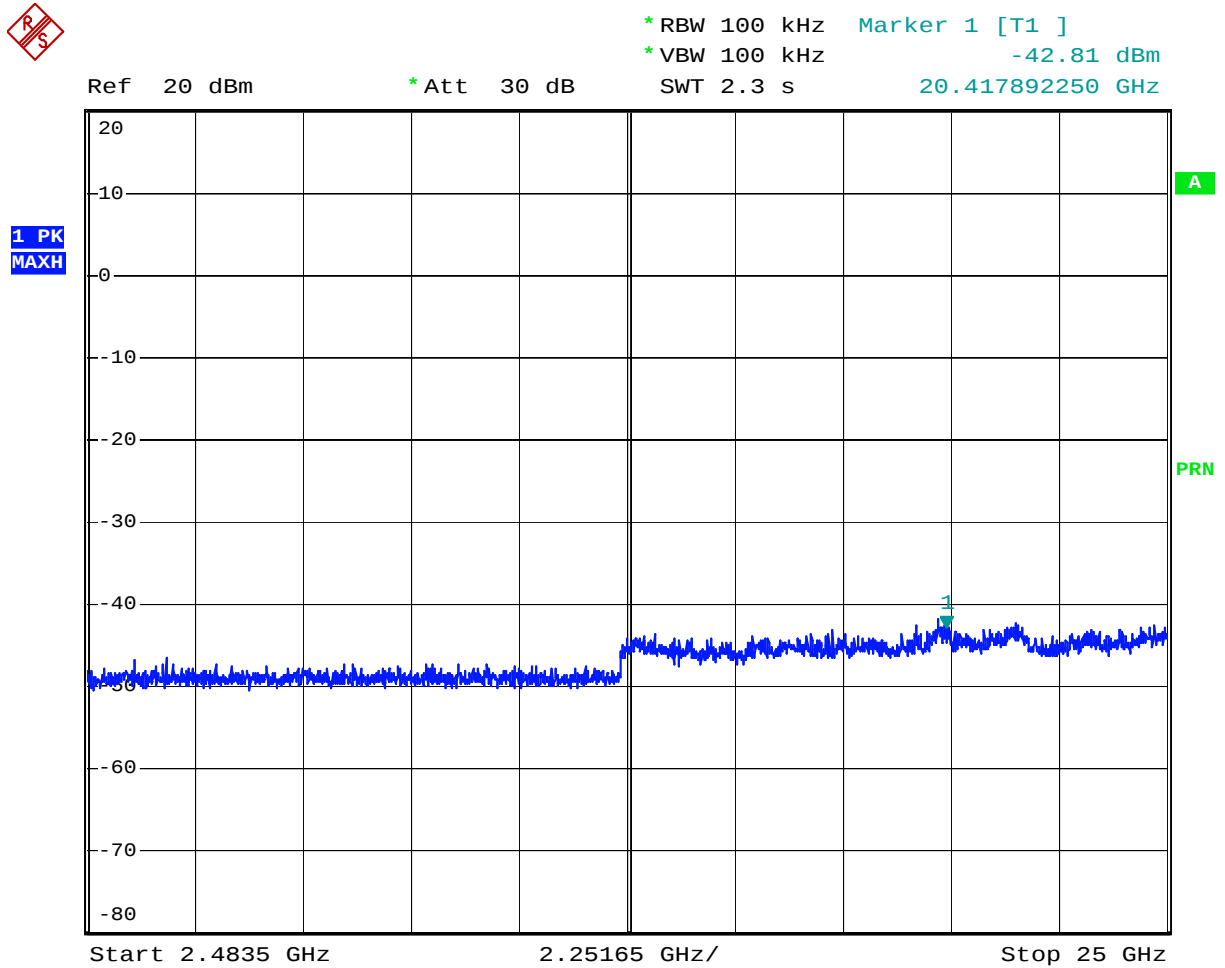
Comment: Out-of-band emis. 2437 MHz, 802.11g 6Mbps, output 2
Date: 18.SEP.2008 17:56:22

Plot 4.15



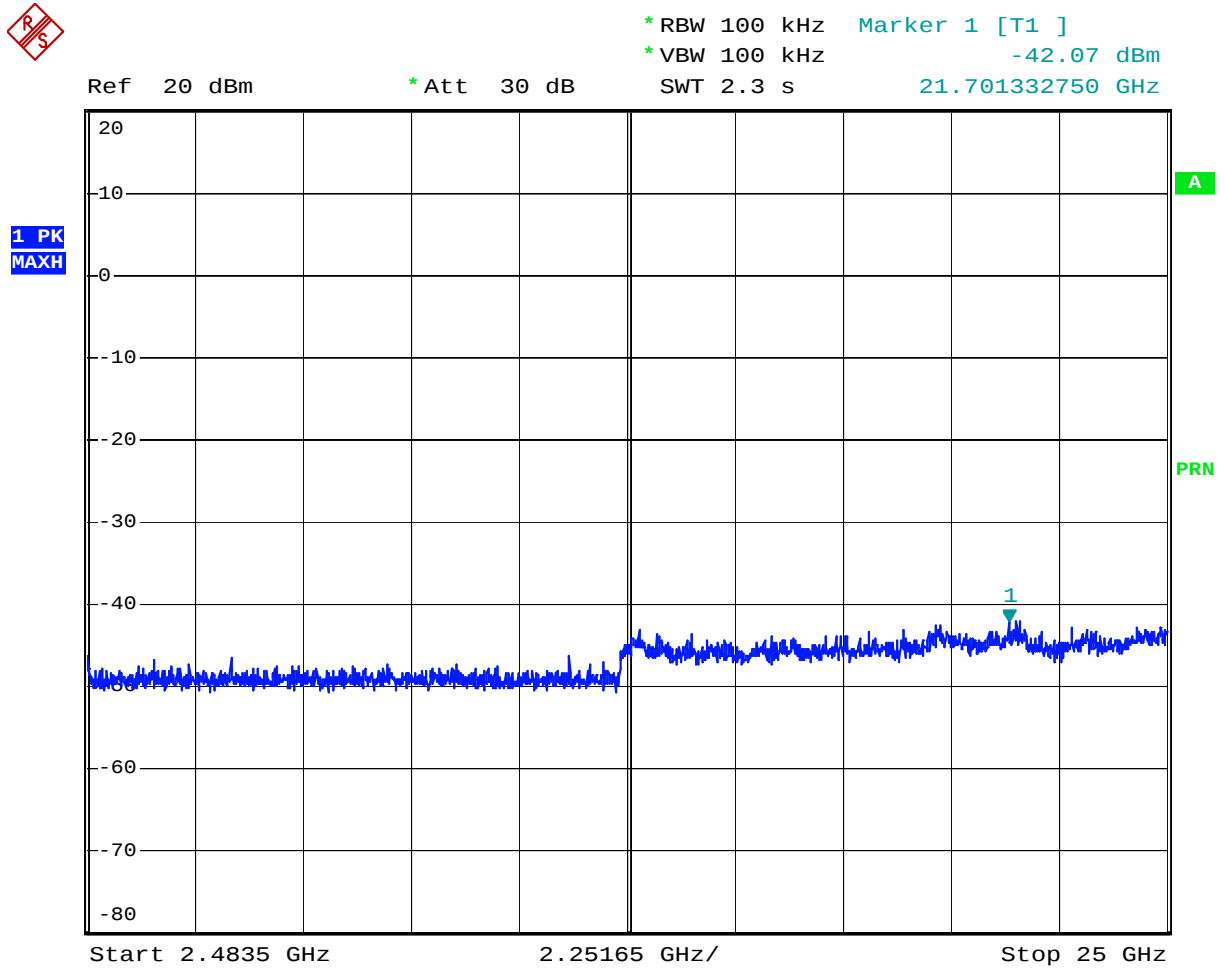
Comment: Out-of-band emis. 2437 MHz, 802.11n HT20, 6.5Mbps, output 2
 Date: 18.SEP.2008 17:58:46

Plot 4.16



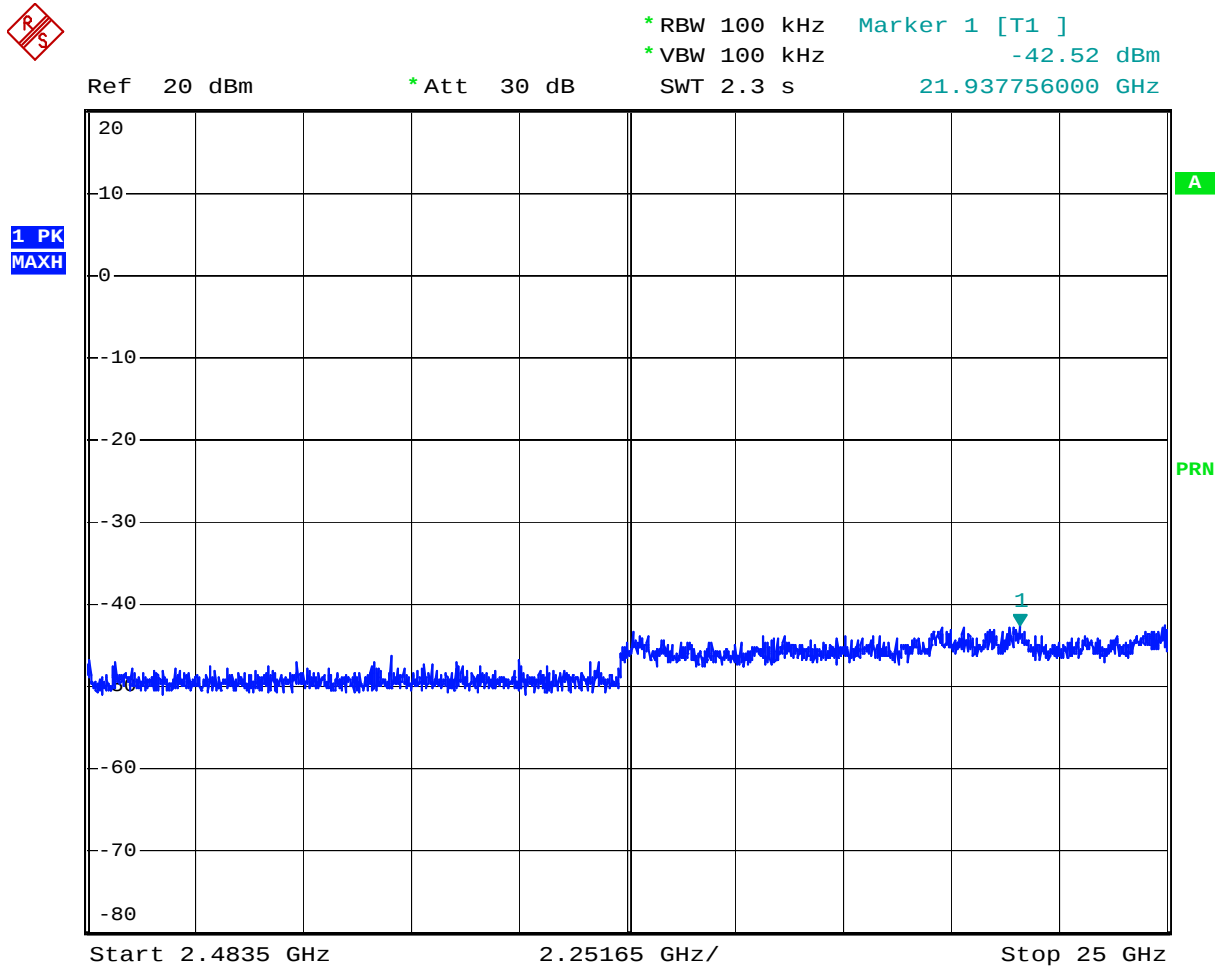
Comment: Out-of-band emis. 2437 MHz, 802.11b 11Mbps, output 2
 Date: 18.SEP.2008 18:01:00

Plot 4.17



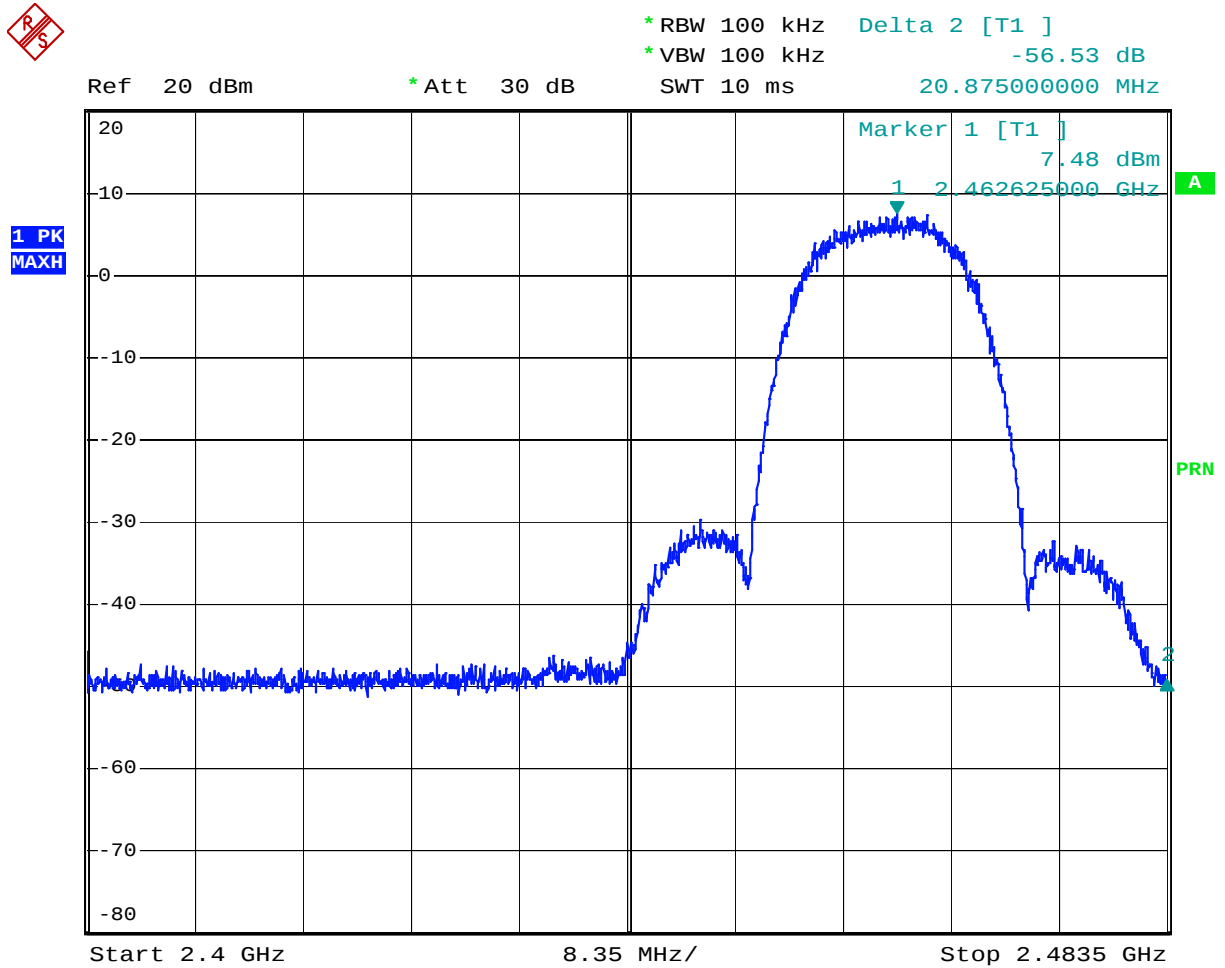
Comment: Out-of-band emis. 2437 MHz, 802.11g 6Mbps, output 2
 Date: 18.SEP.2008 18:02:07

Plot 4.18



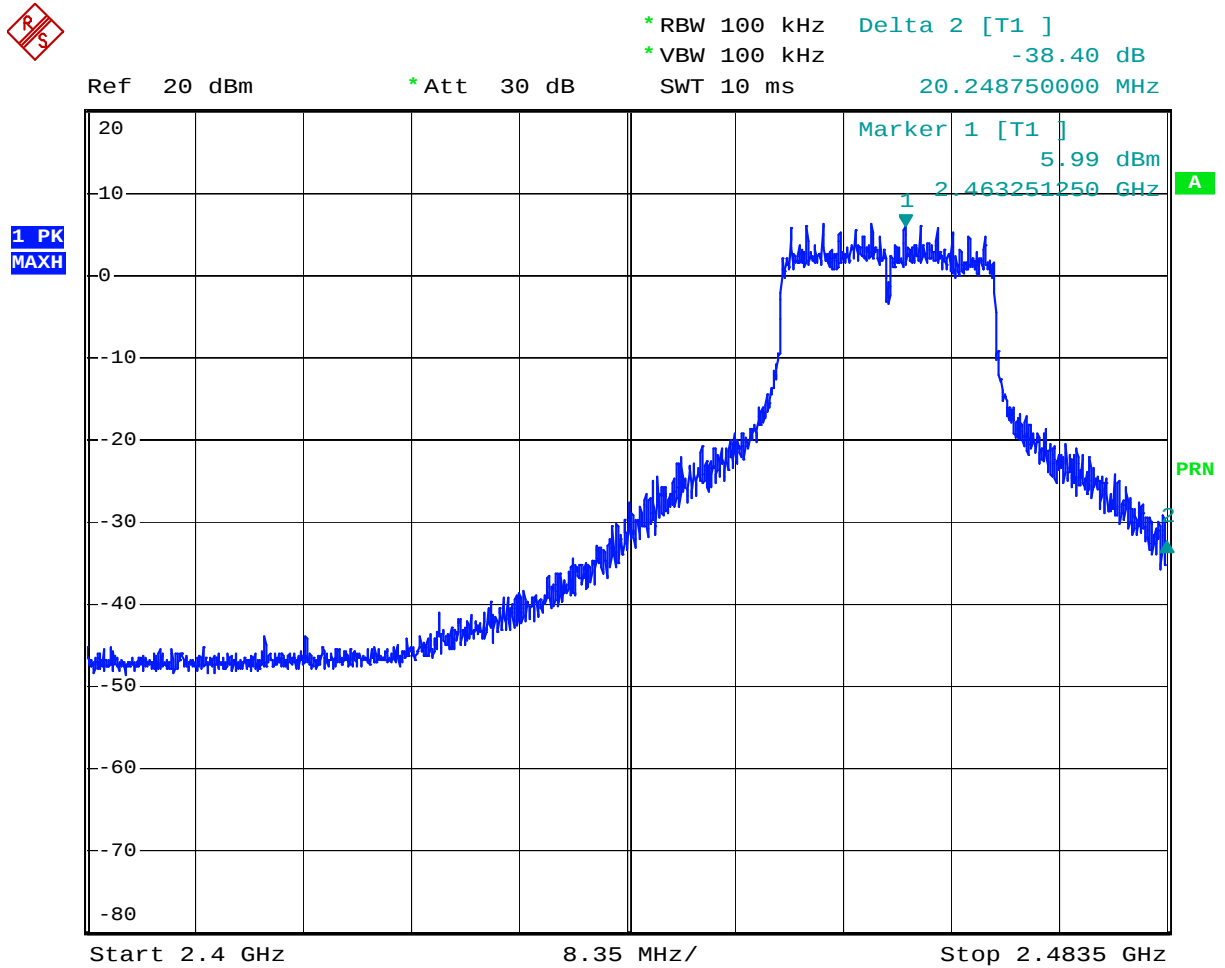
Comment: Out-of-band emis. 2437 MHz, 802.11n HT20, 6.5Mbps, output 2
 Date: 18.SEP.2008 17:59:49

Plot 4.19



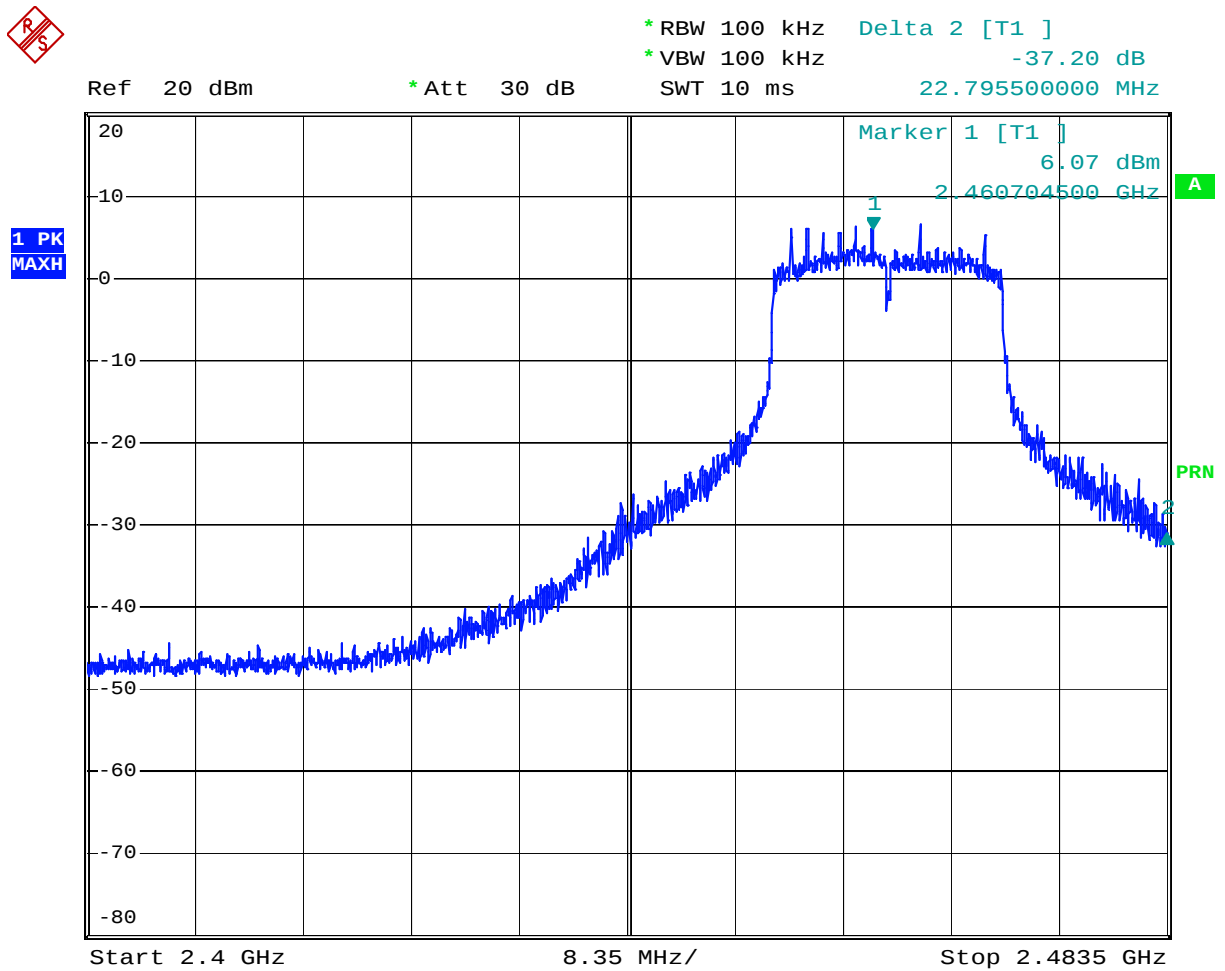
Comment: Out-of-band emis. 2462 MHz, 802.11b 11Mbps, output 2
 Date: 18.SEP.2008 18:06:53

Plot 4.20



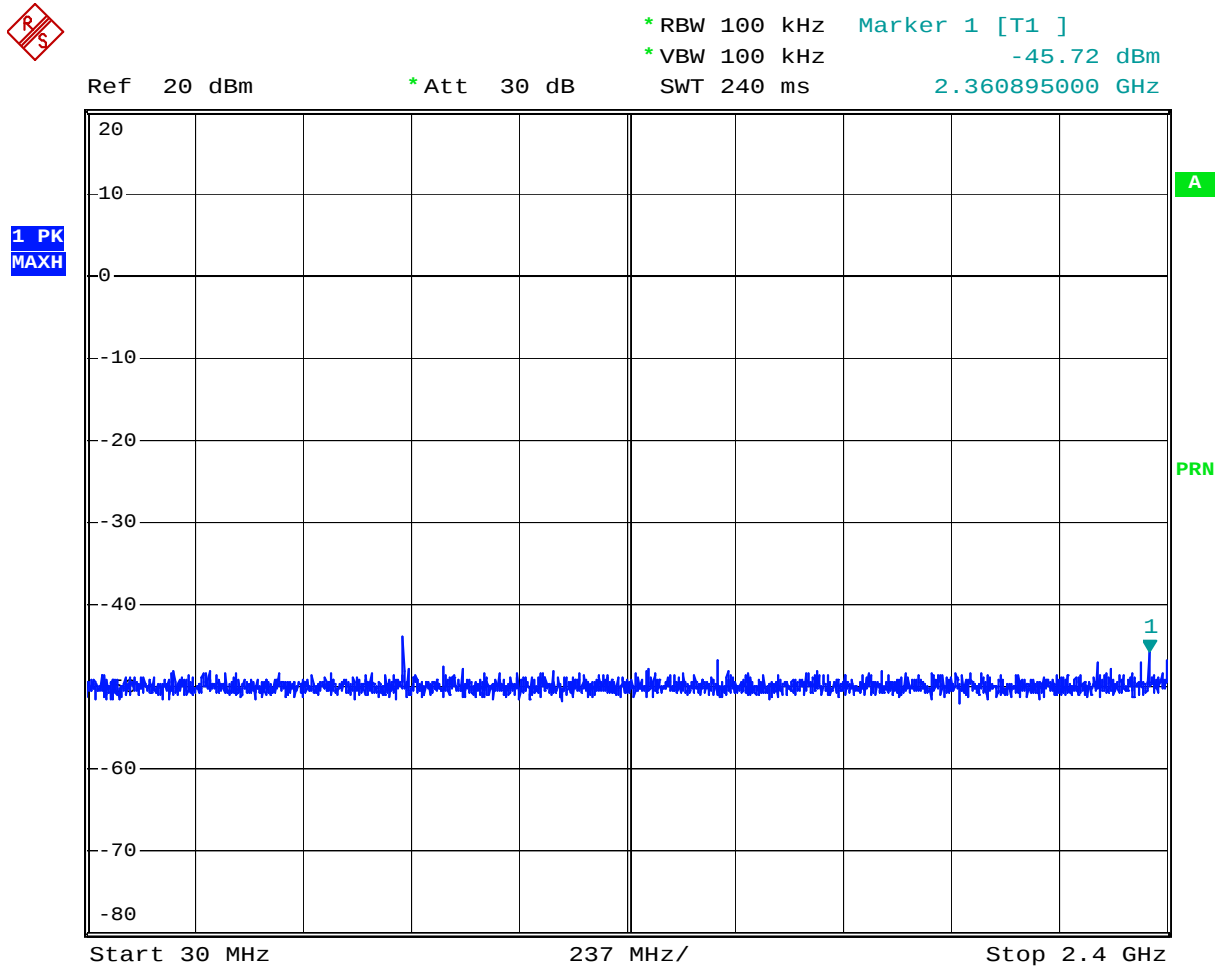
Comment: Out-of-band emis. 2462 MHz, 802.11g 6Mbps, output 2
 Date: 18.SEP.2008 18:04:28

Plot 4.21



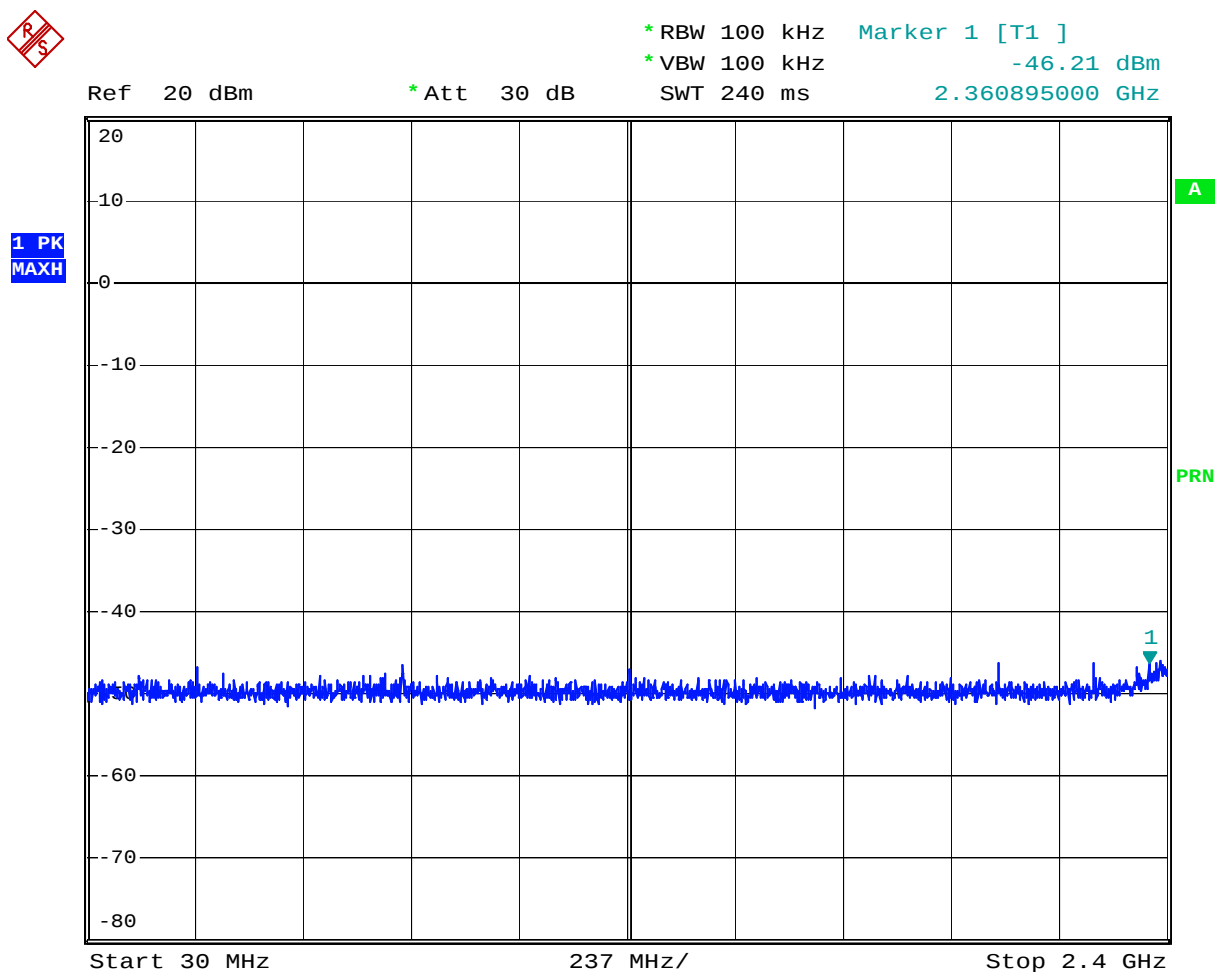
Comment: Out-of-band emis. 2462 MHz, 802.11n HT20, 6.5Mbps, output 2
 Date: 18.SEP.2008 18:08:24

Plot 4.22



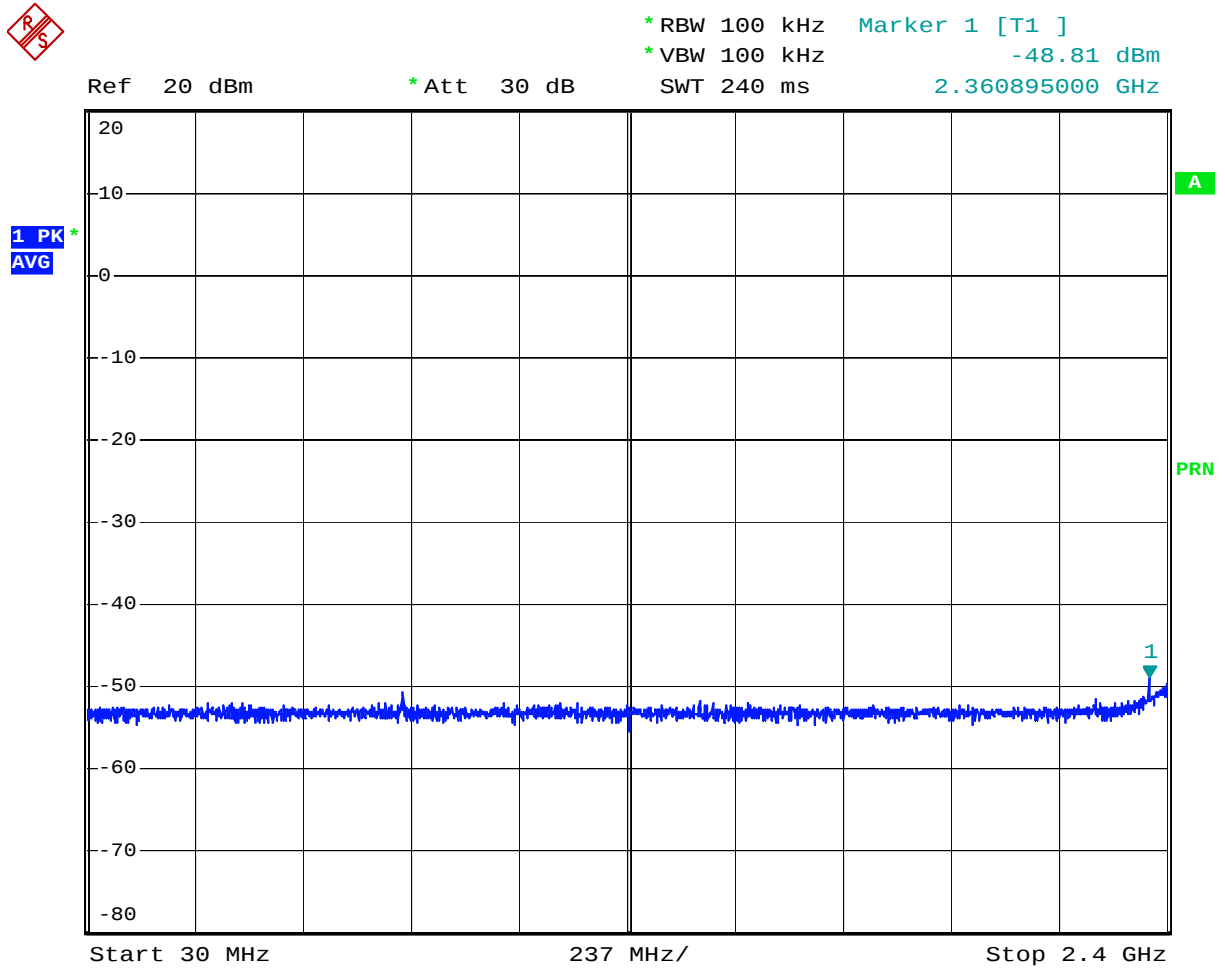
Comment: Out-of-band emis. 2462 MHz, 802.11b, 11Mbps, output 2
 Date: 18.SEP.2008 18:21:13

Plot 4.23



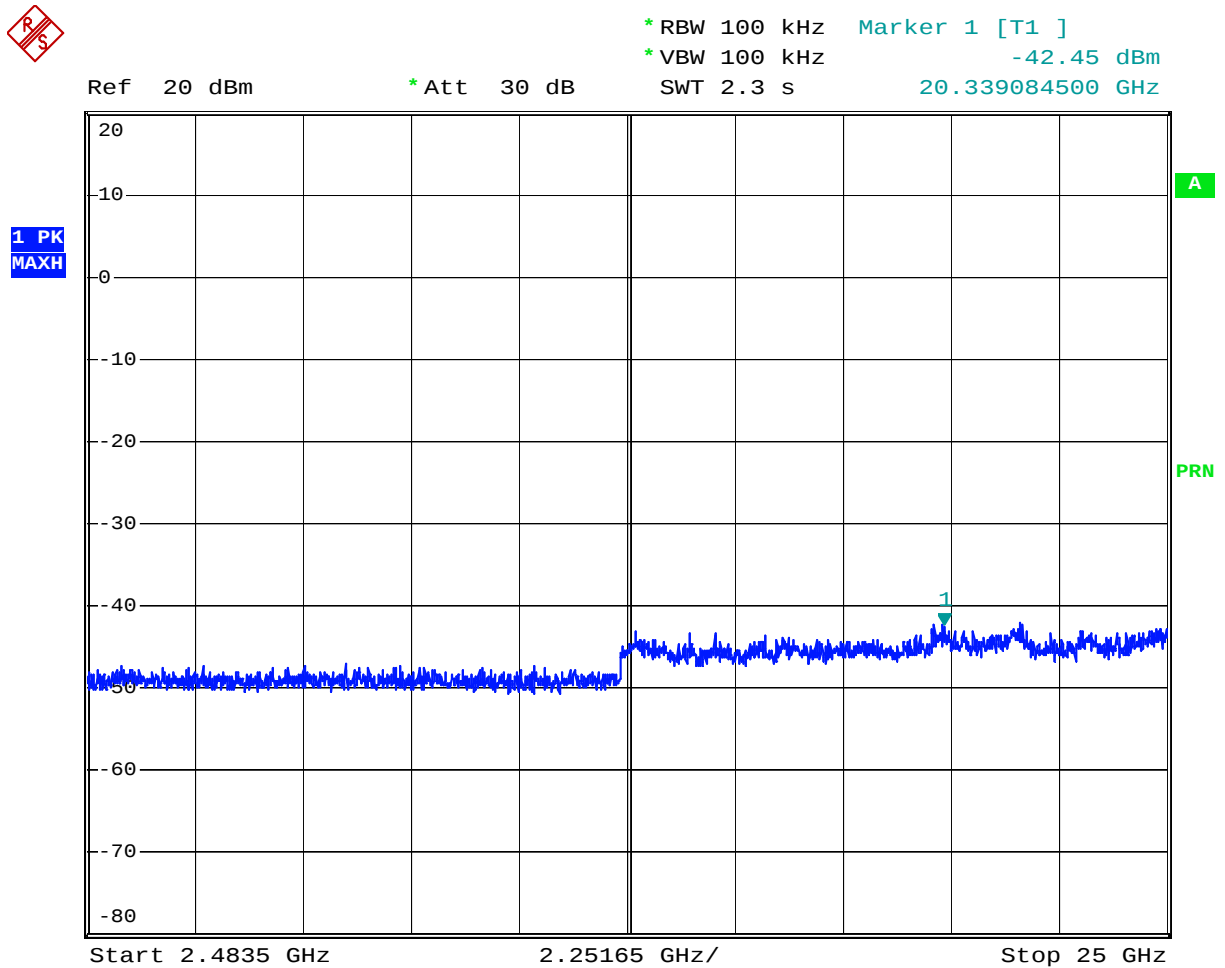
Comment: Out-of-band emis. 2462 MHz, 802.11g, 6Mbps, output 2
 Date: 18.SEP.2008 18:20:14

Plot 4.24



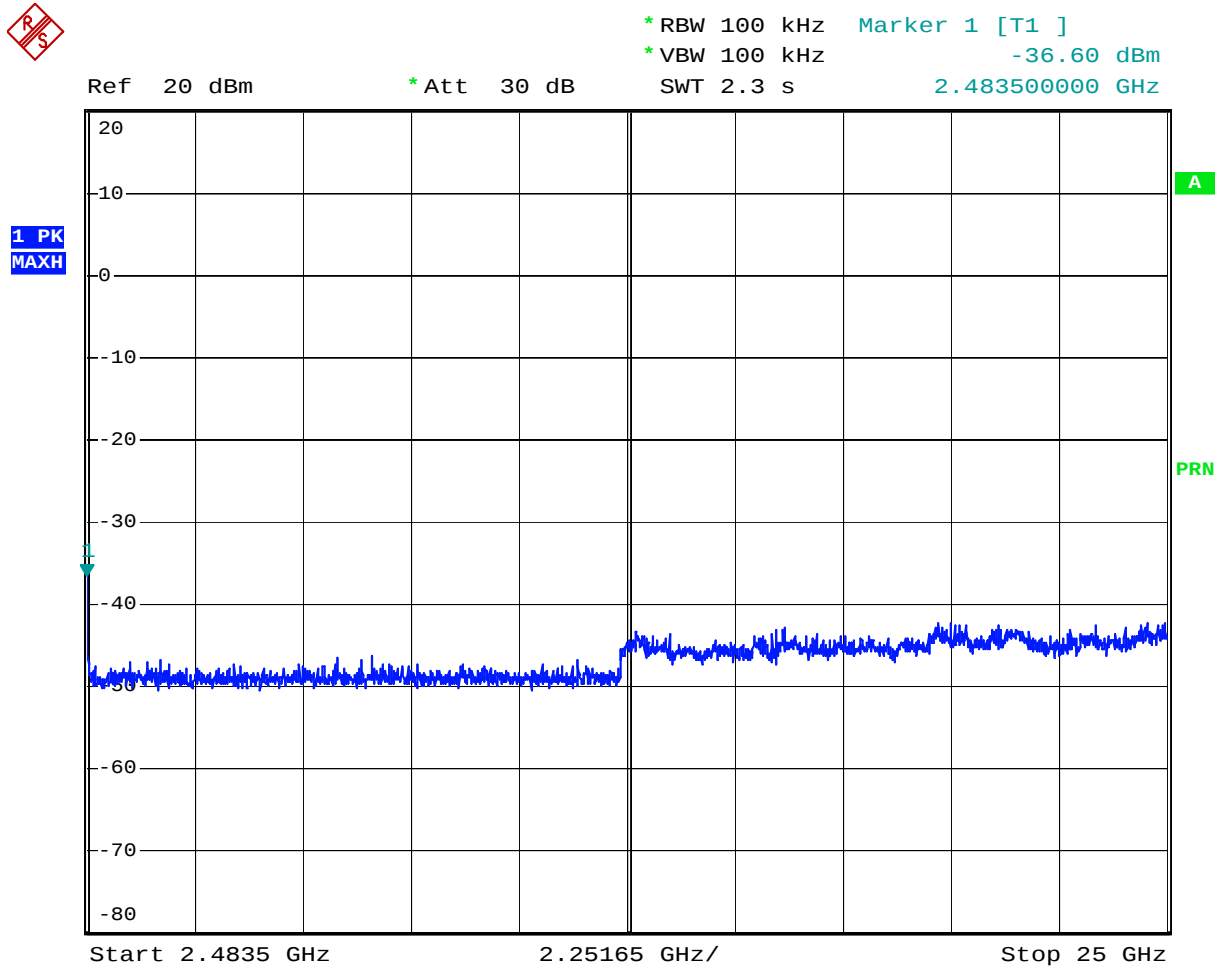
Comment: Out-of-band emis. 2462 MHz, 802.11n, HT20, 6.5Mbps, output 2
 Date: 18.SEP.2008 18:22:03

Plot 4.25



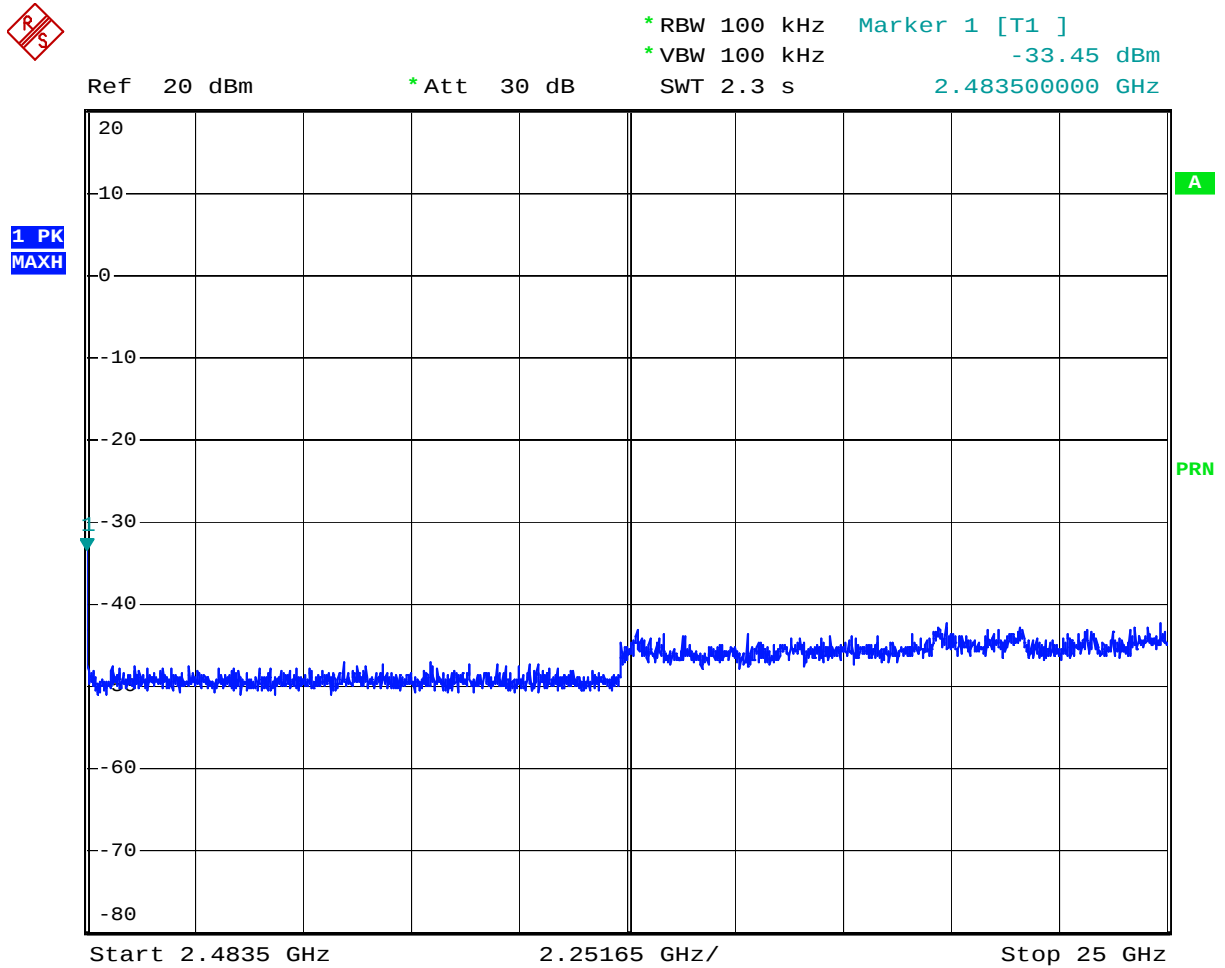
Comment: Out-of-band emis. 2462 MHz, 802.11b, 11Mbps, output 2
Date: 18.SEP.2008 18:10:36

Plot 4.26



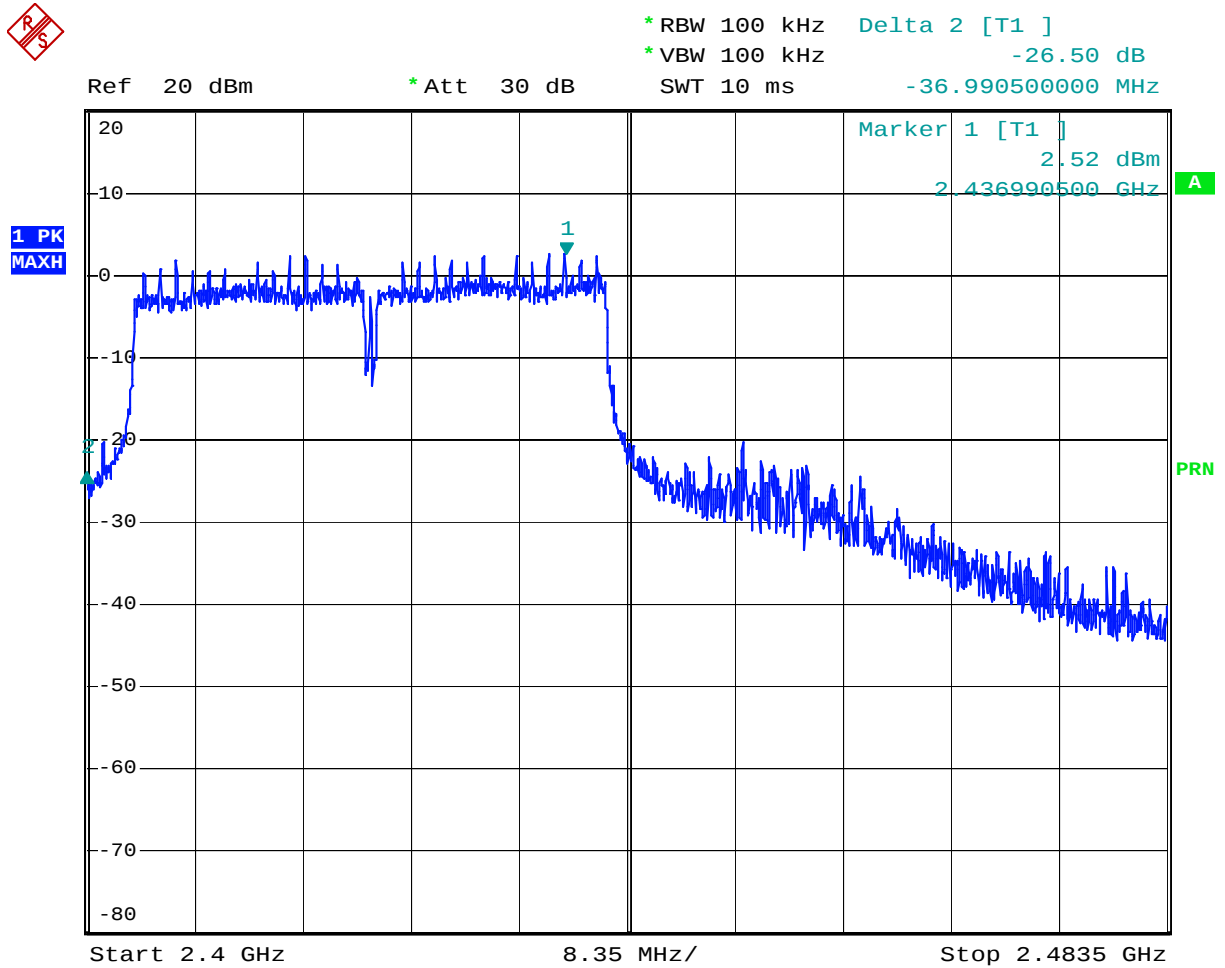
Comment: Out-of-band emis. 2462 MHz, 802.11g, 6Mbps, output 2
 Date: 18.SEP.2008 18:11:50

Plot 4.27



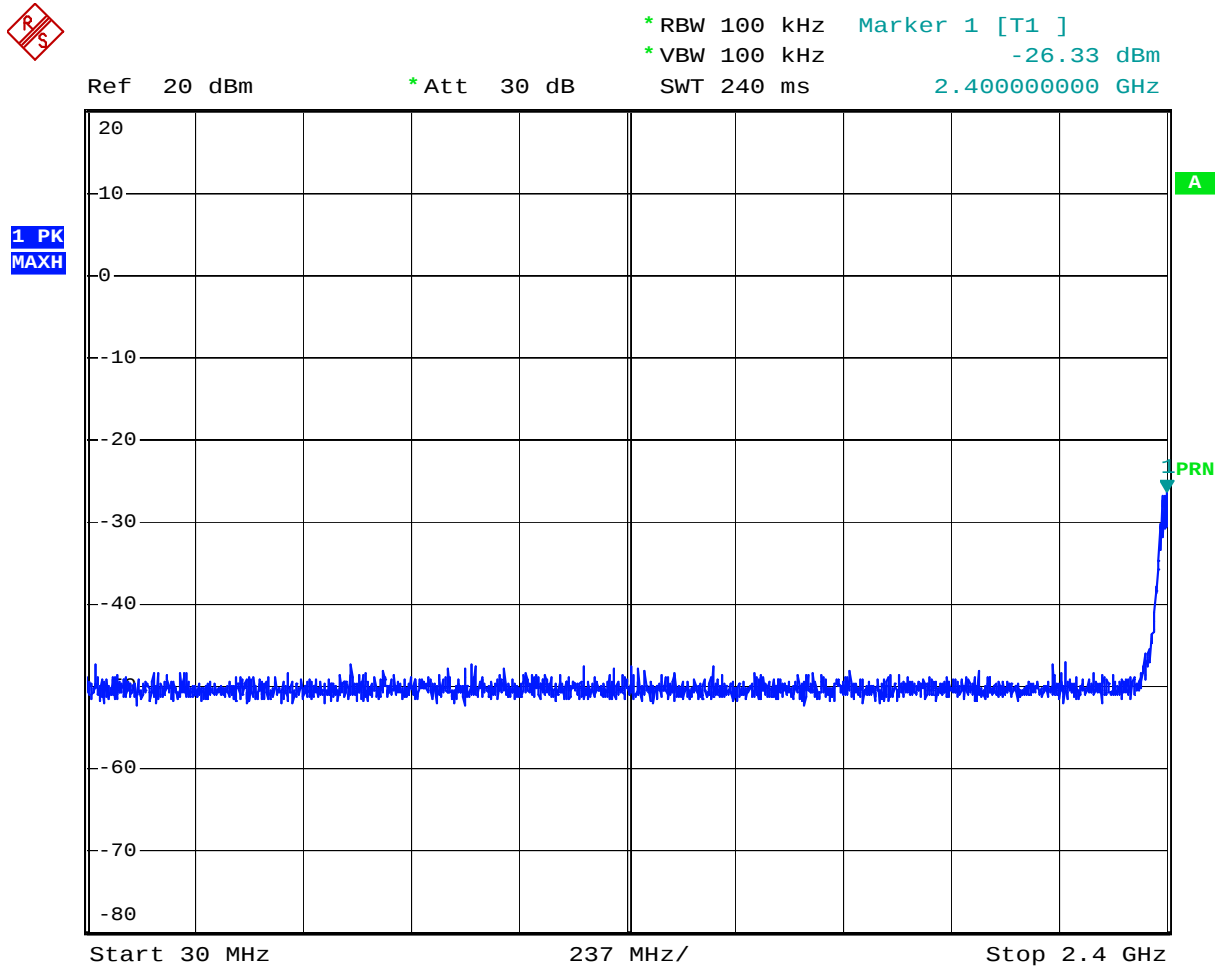
Comment: Out-of-band emis. 2462 MHz, 802.11n HT20, 6.5Mbps, output 2
 Date: 18.SEP.2008 18:09:37

Plot 4.28



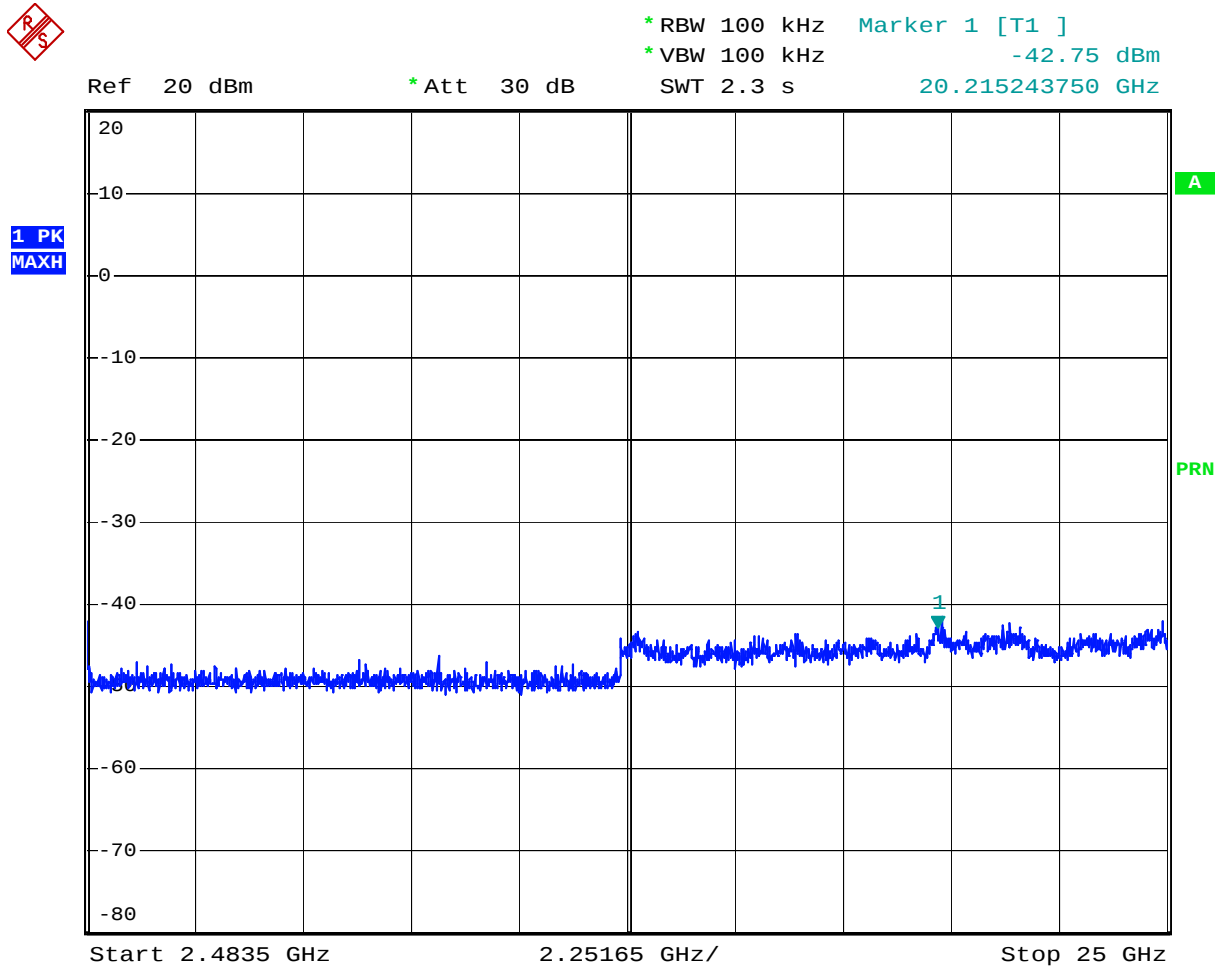
Comment: Out-of-band emis. 2422MHz, 802.11n, HT40, 13.5Mbps, output 2
 Date: 18.SEP.2008 18:25:27

Plot 4.29



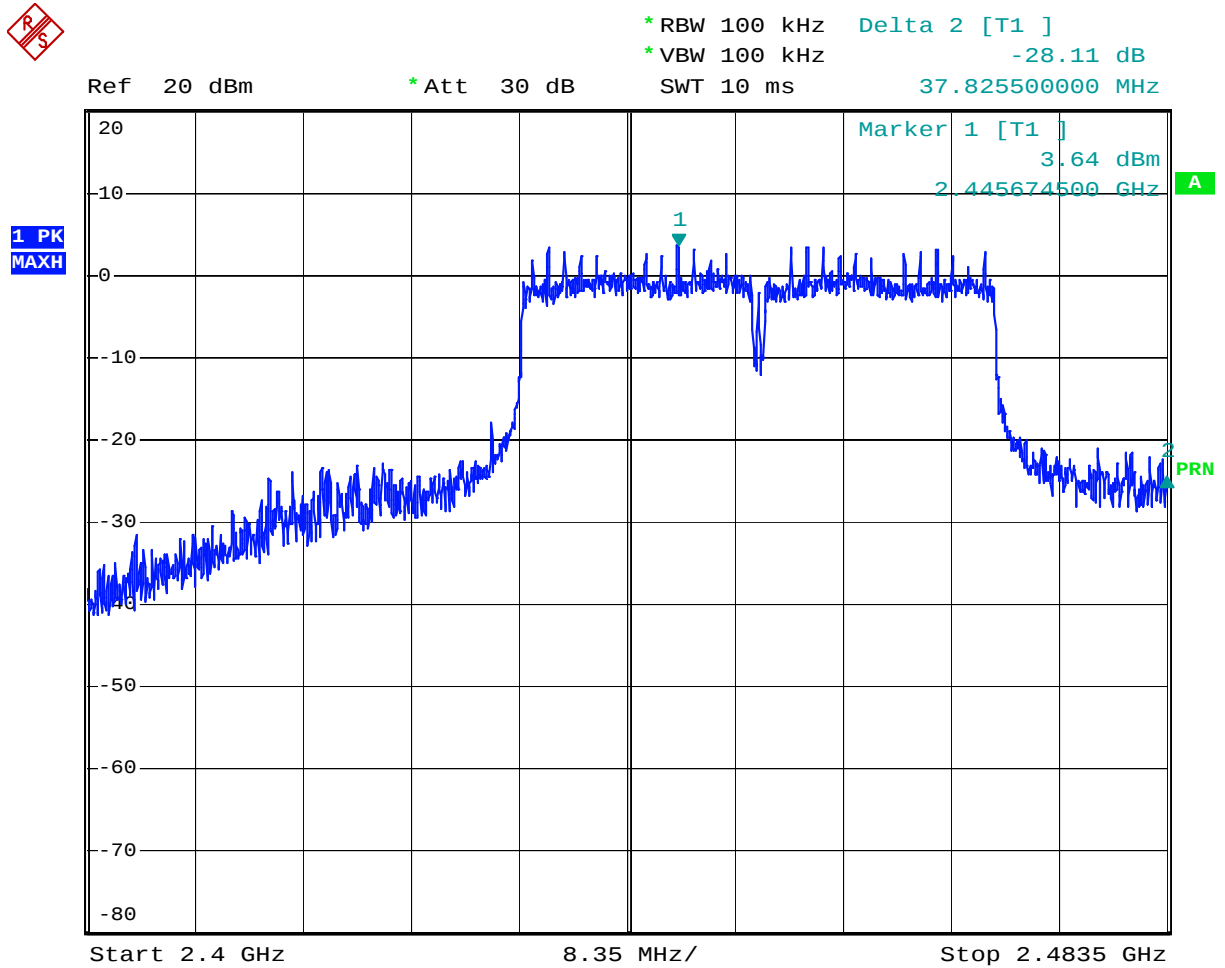
Comment: Out-of-band emis. 2422MHz, 802.11n, HT40, 13.5Mbps, output 2
 Date: 18.SEP.2008 18:29:48

Plot 4.30



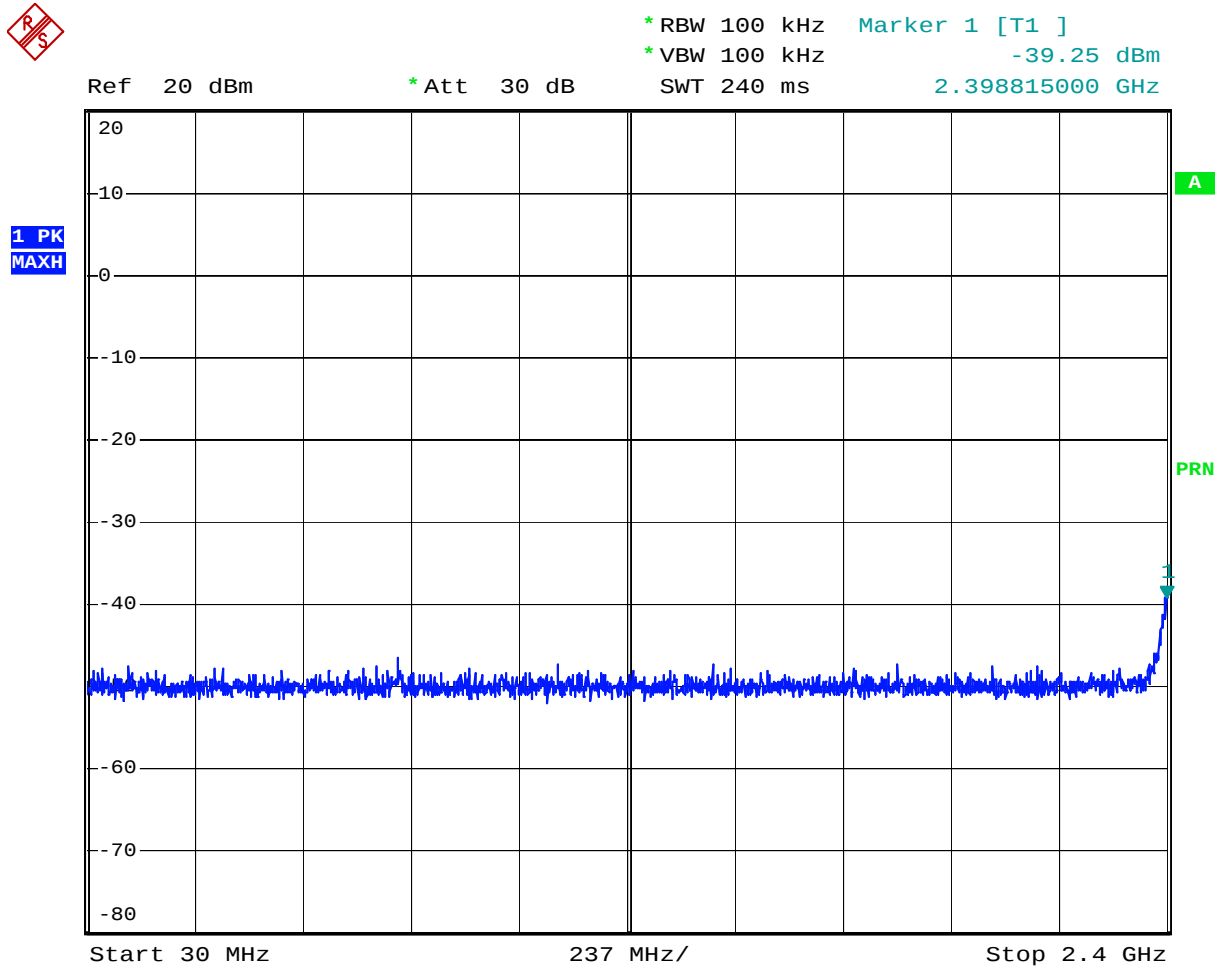
Comment: Out-of-band emis. 2422MHz, 802.11n, HT40, 13.5Mbps, output 2
 Date: 18.SEP.2008 18:30:58

Plot 4.31



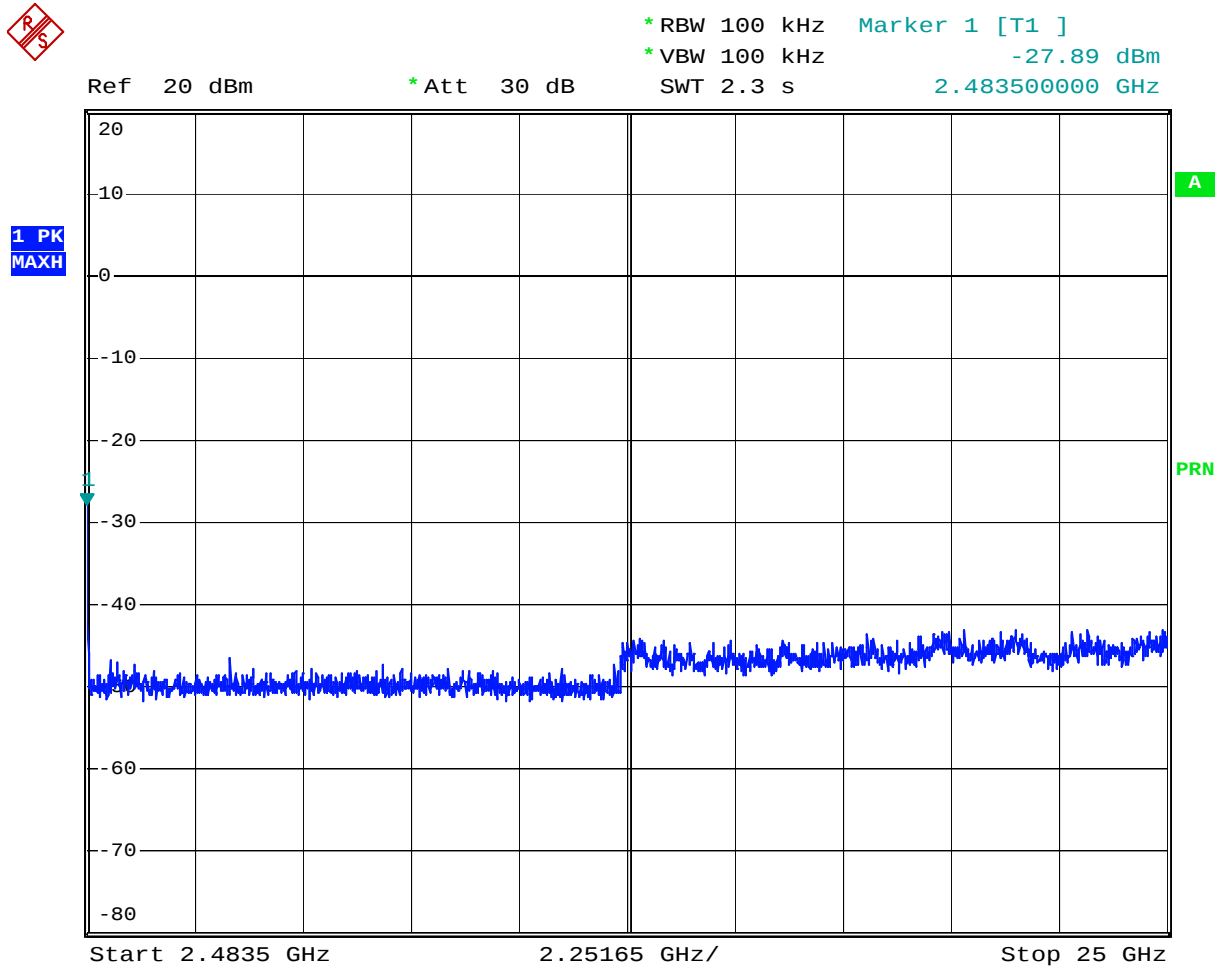
Comment: Out-of-band emis. 2452MHz, 802.11n, HT40, 13.5Mbps, output 2
 Date: 18.SEP.2008 18:35:25

Plot 4.32



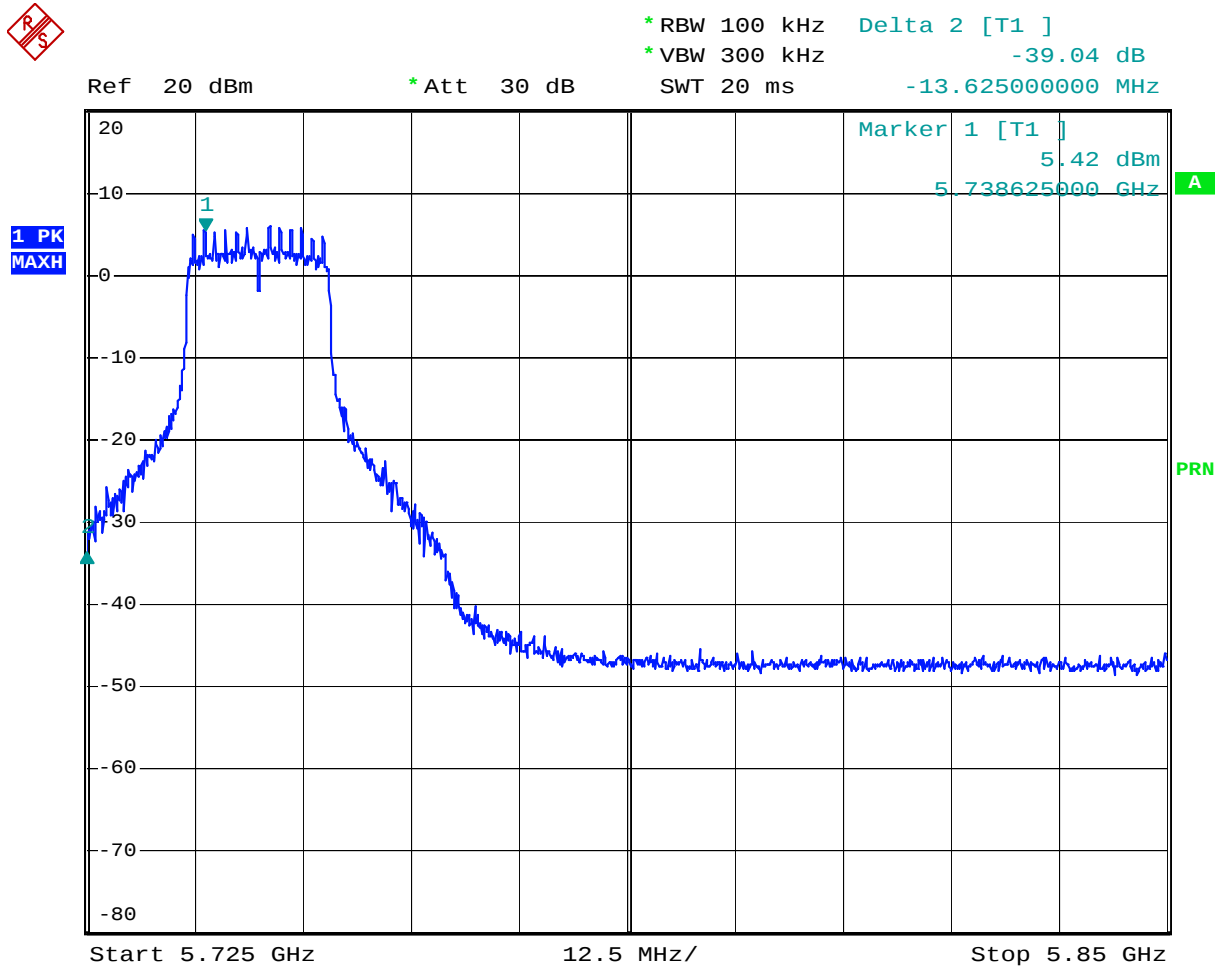
Comment: Out-of-band emis. 2452MHz, 802.11n, HT40, 13.5Mbps, output 2
 Date: 18.SEP.2008 18:36:06

Plot 4.33



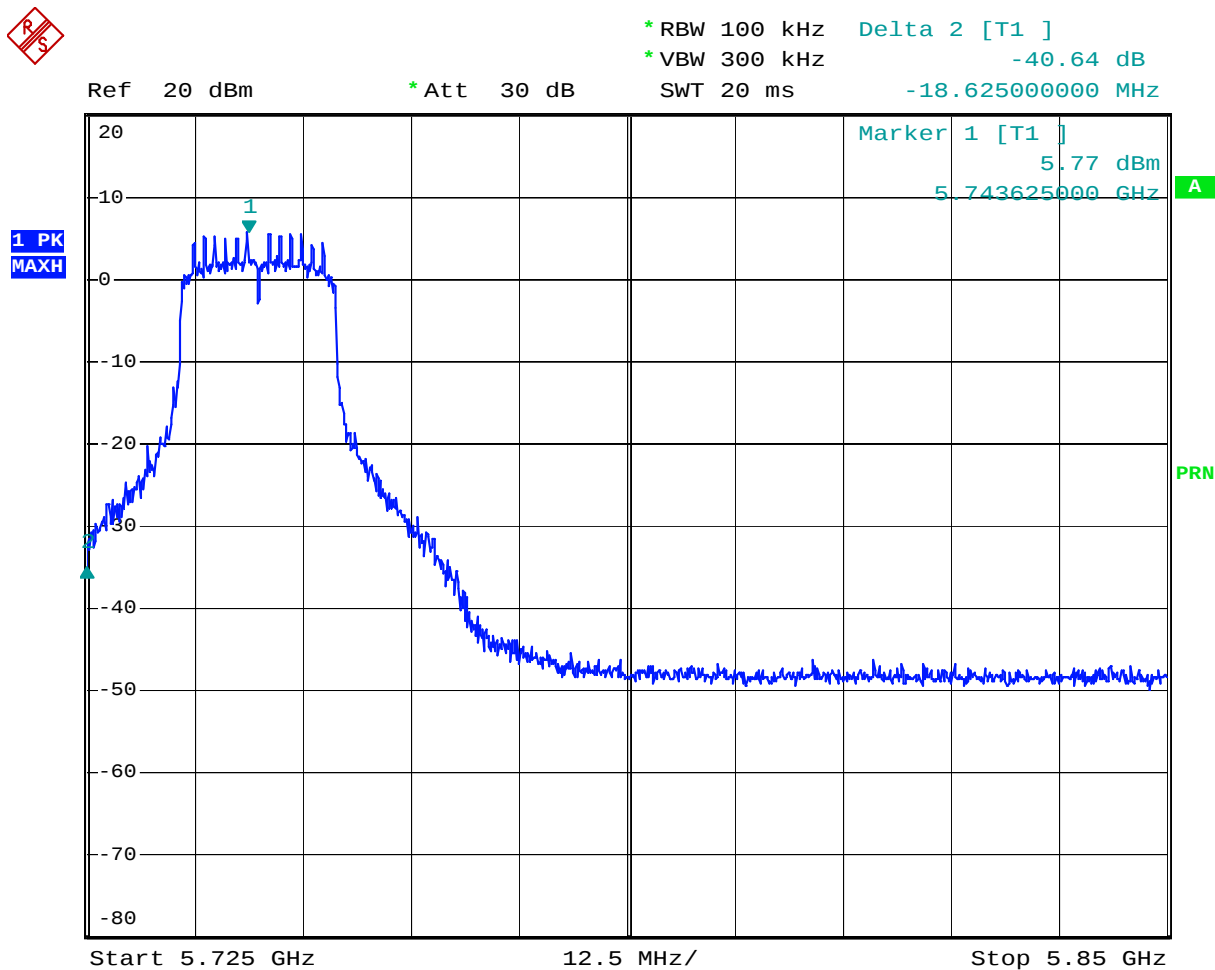
Comment: Out-of-band emis. 2452MHz, 802.11n, HT40, 13.5Mbps, output 2
 Date: 18.SEP.2008 18:33:40

Plot 4.34



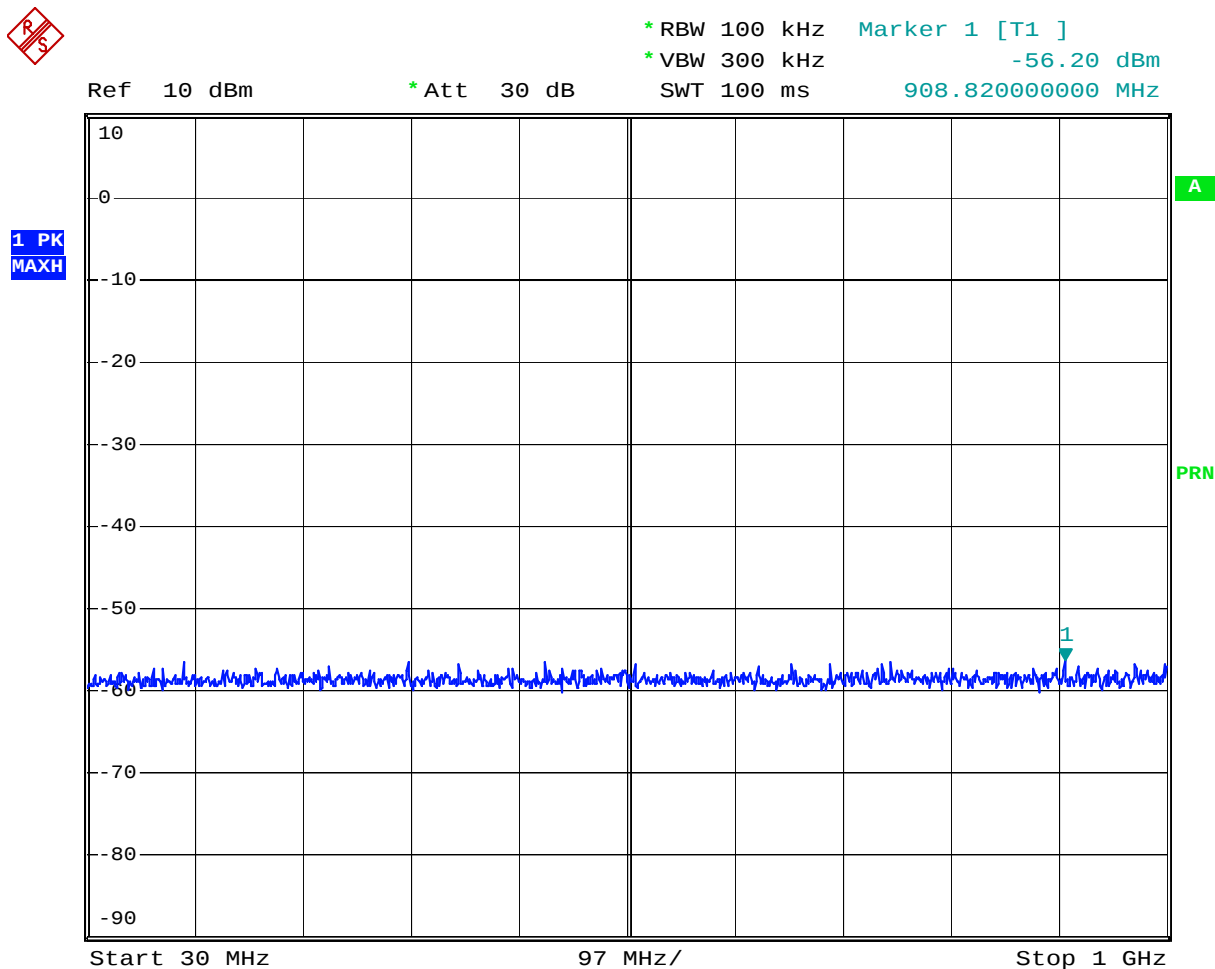
Comment: Out-of-band emis., 5745MHz, 802.11a, 6Mbps, output 3
 Date: 16.SEP.2008 09:57:02

Plot 4.35



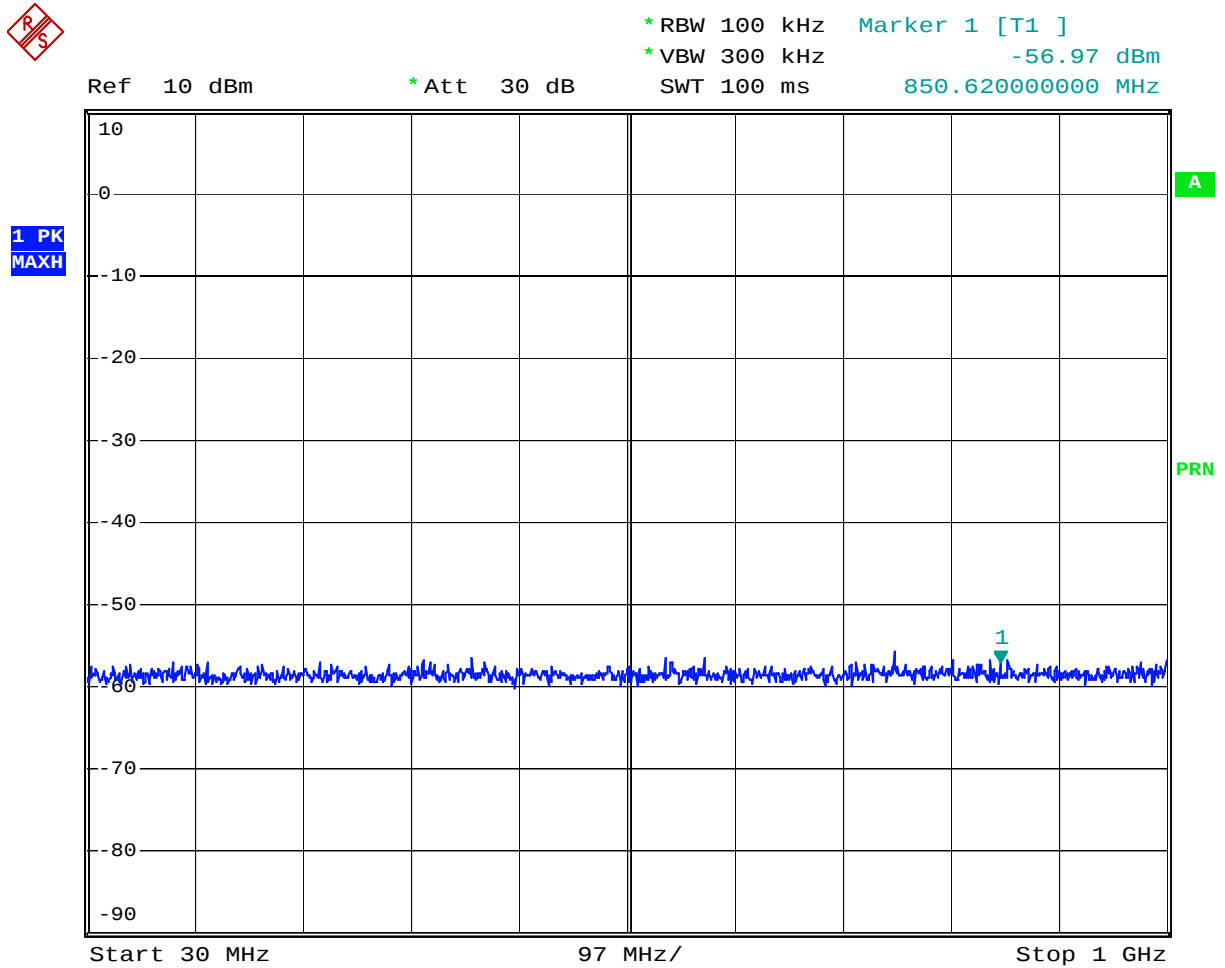
Comment: Out-of-band emis., 5745MHz, 802.11n, HT20, 6.5Mbps, output 3
Date: 16.SEP.2008 09:59:21

Plot 4.36



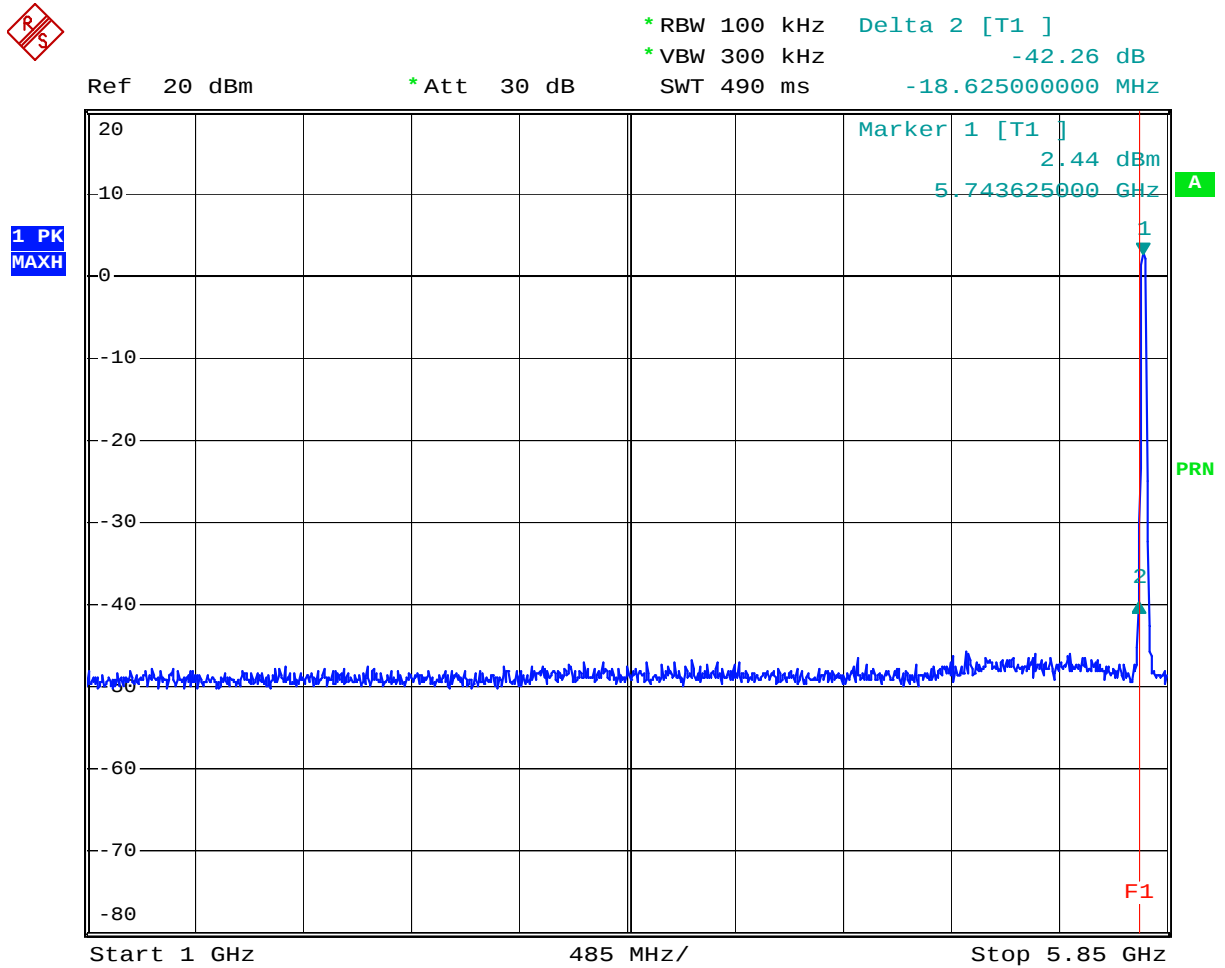
Comment: Out-of-band emis., 5745MHz, 802.11a, 6Mbps, output 3
Date: 16.SEP.2008 10:21:36

Plot 4. 37



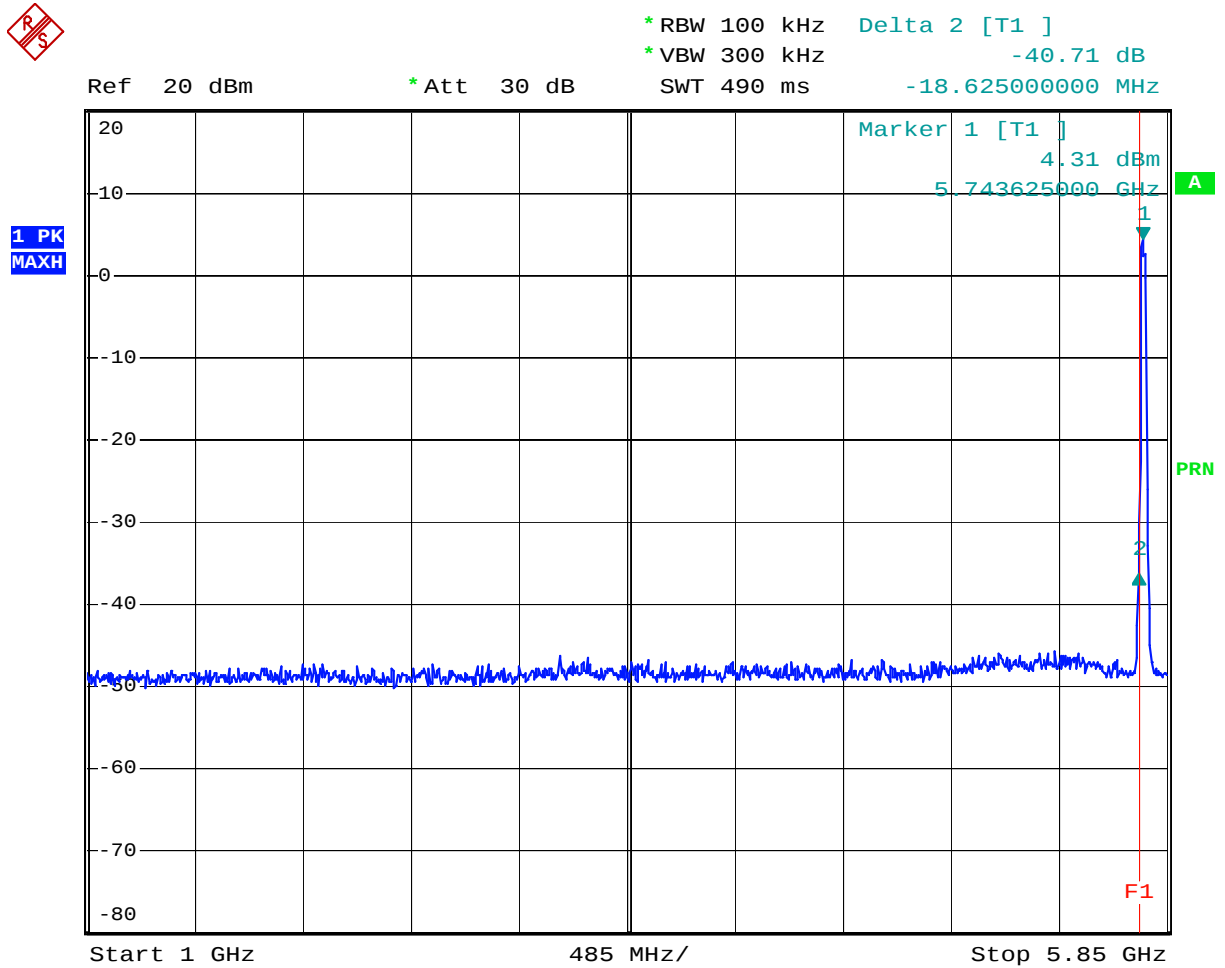
Comment: Out-of-band emis., 5745MHz, 802.11n, HT20, 6.5Mbps, output 3
 Date: 16.SEP.2008 10:20:46

Plot 4.38



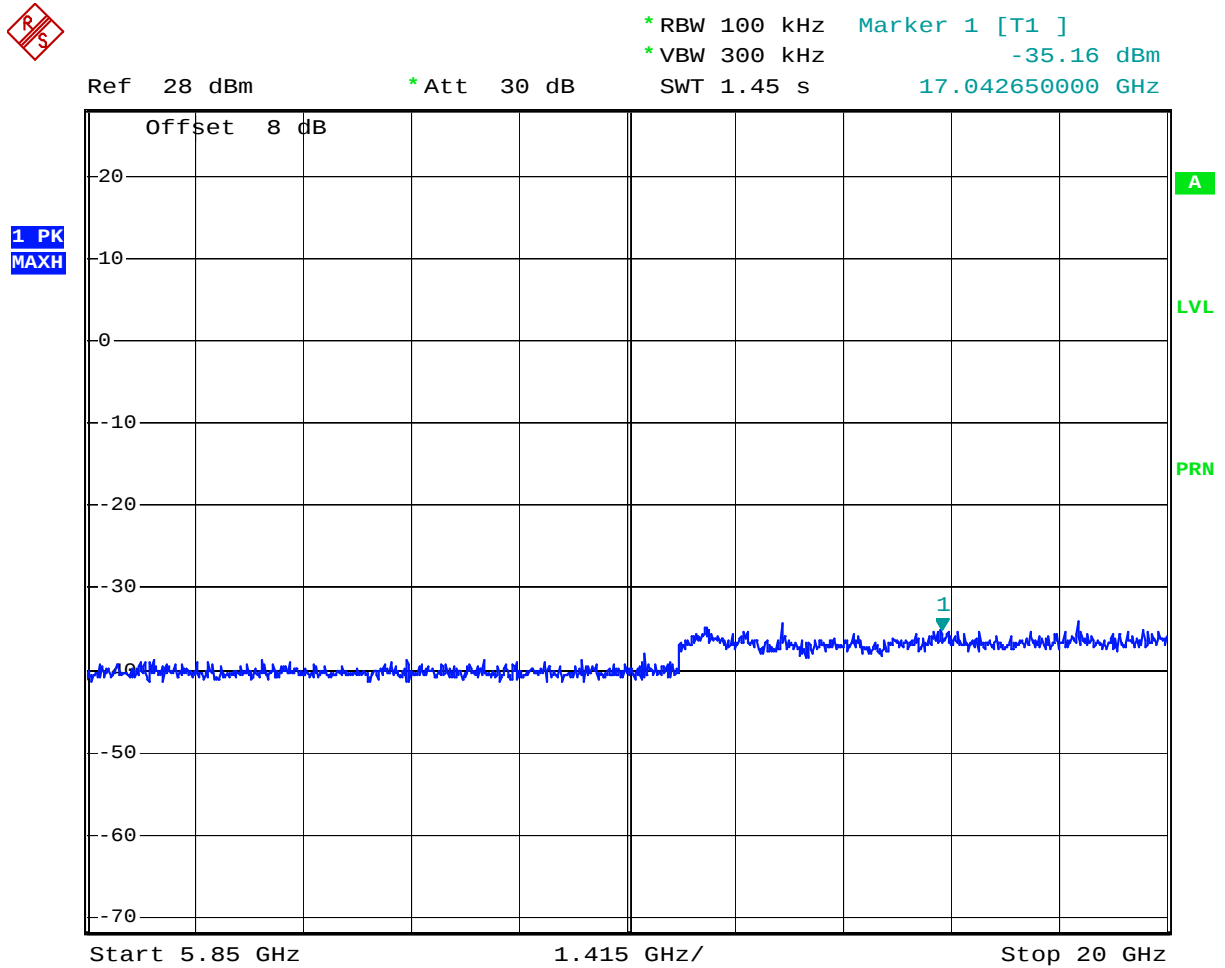
Comment: Out-of-band emis., 5745MHz, 802.11a, 6Mbps, output 3
 Date: 16.SEP.2008 10:02:58

Plot 4.39



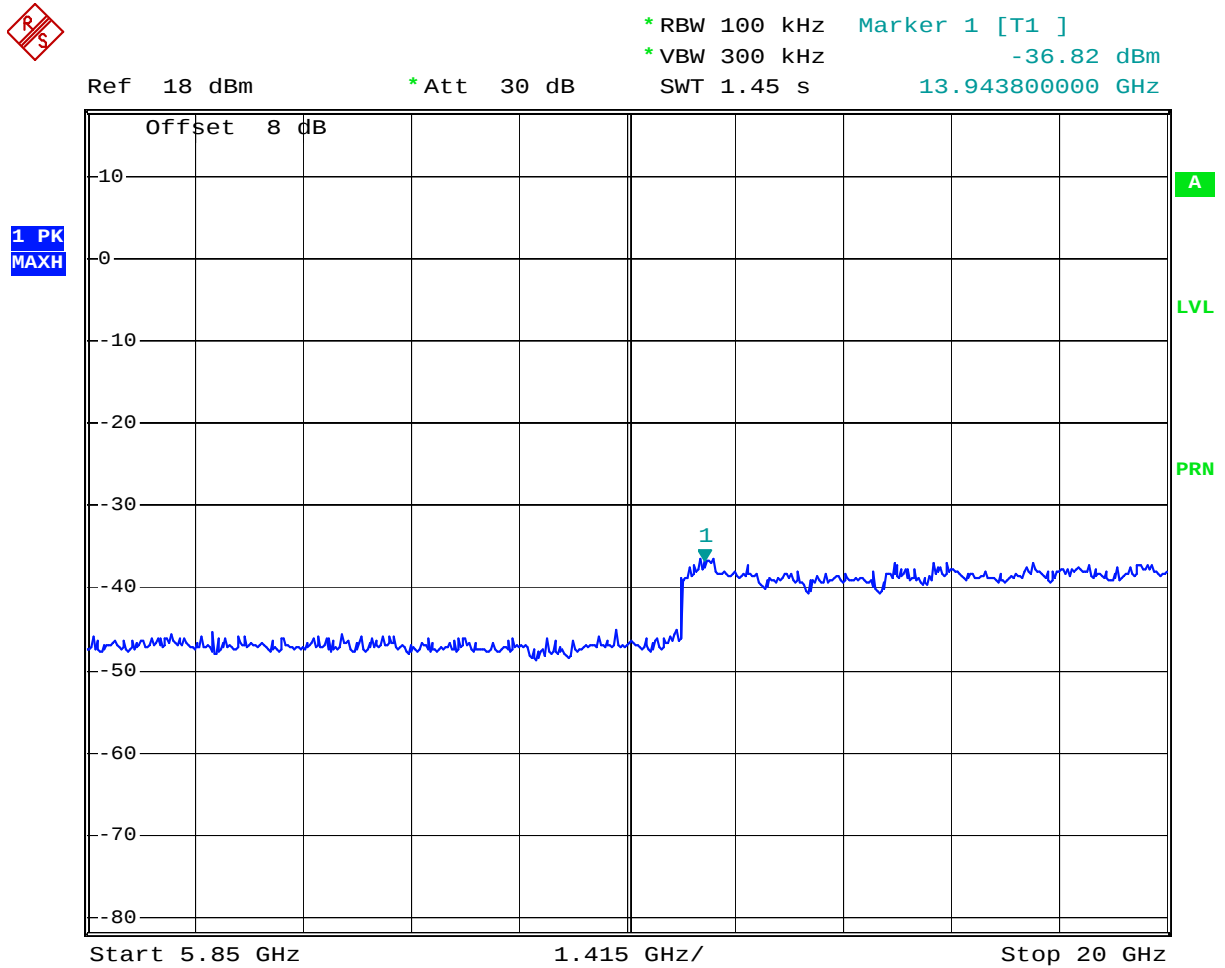
Comment: Out-of-band emis., 5745MHz, 802.11n, HT20, 6.5Mbps, output 3
 Date: 16.SEP.2008 10:02:00

Plot 4.40



Comment: Out-of-band emis., 5745MHz, 802.11a, 6Mbps, output 3
 Date: 16.SEP.2008 10:13:51

Plot 4.41

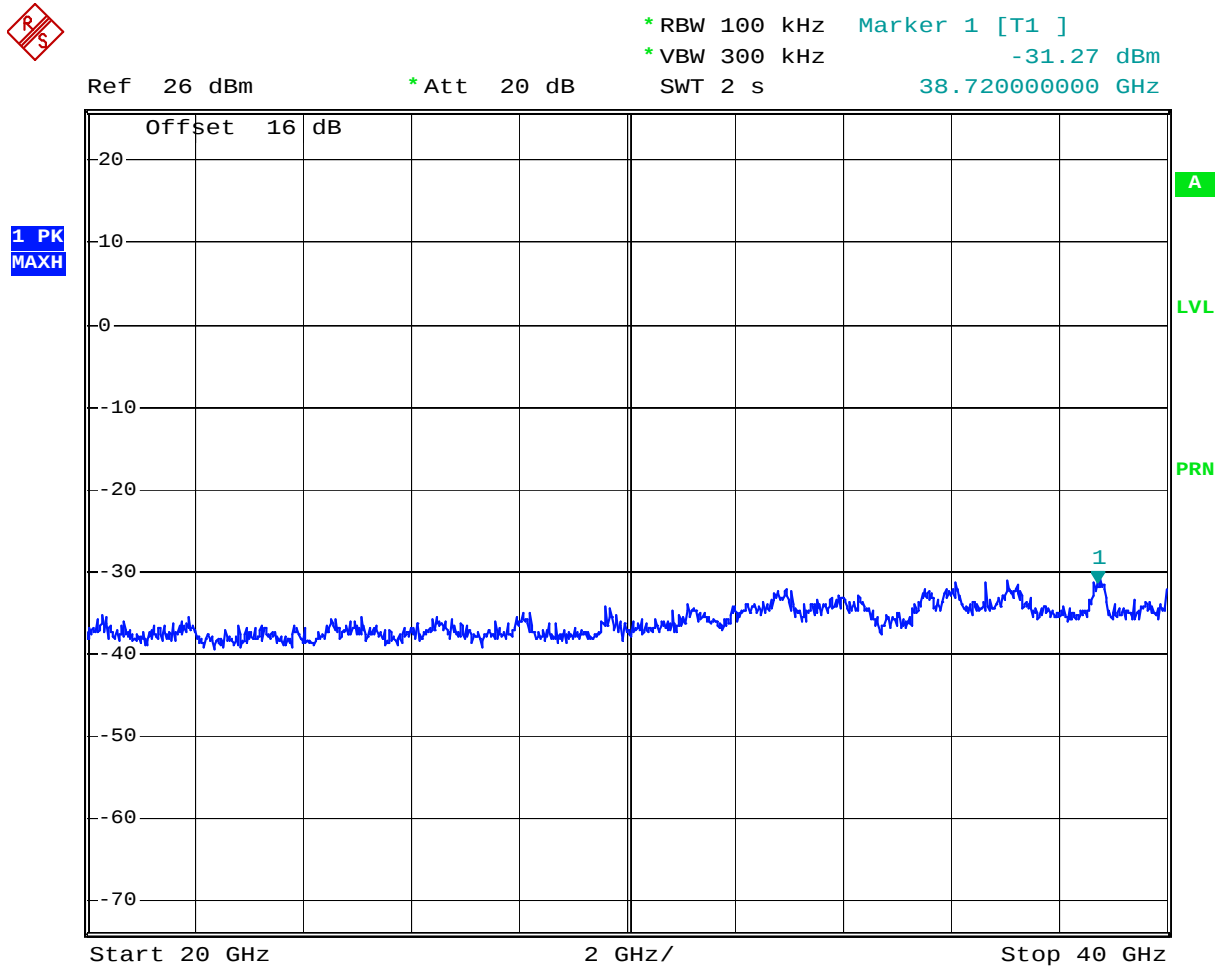


Comment: Out-of-band emis., 5745MHz, 802.11n, HT20, 6.5 Mbps, output

Comment: 3

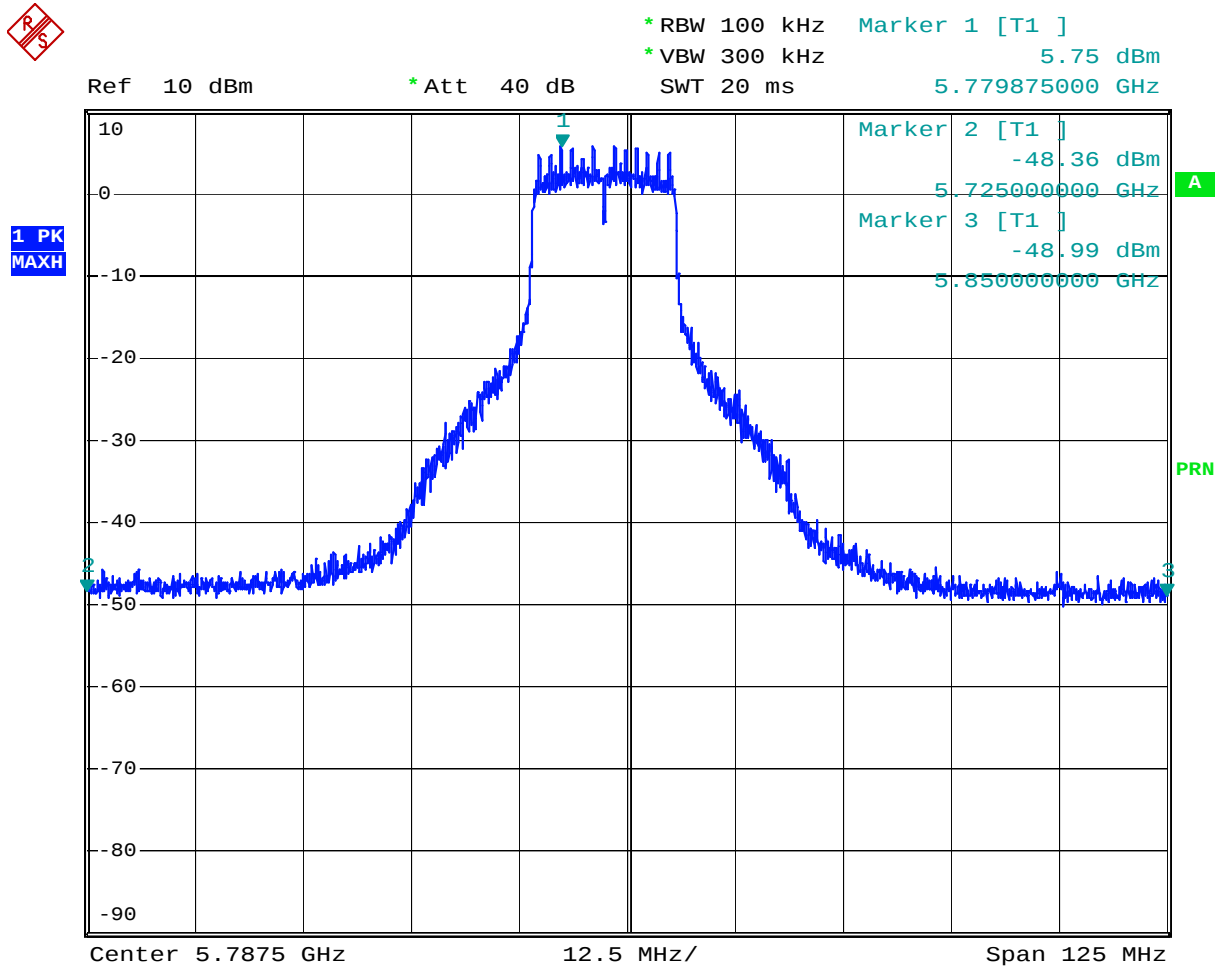
Date: 16.SEP.2008 11:43:10

Plot 4.42



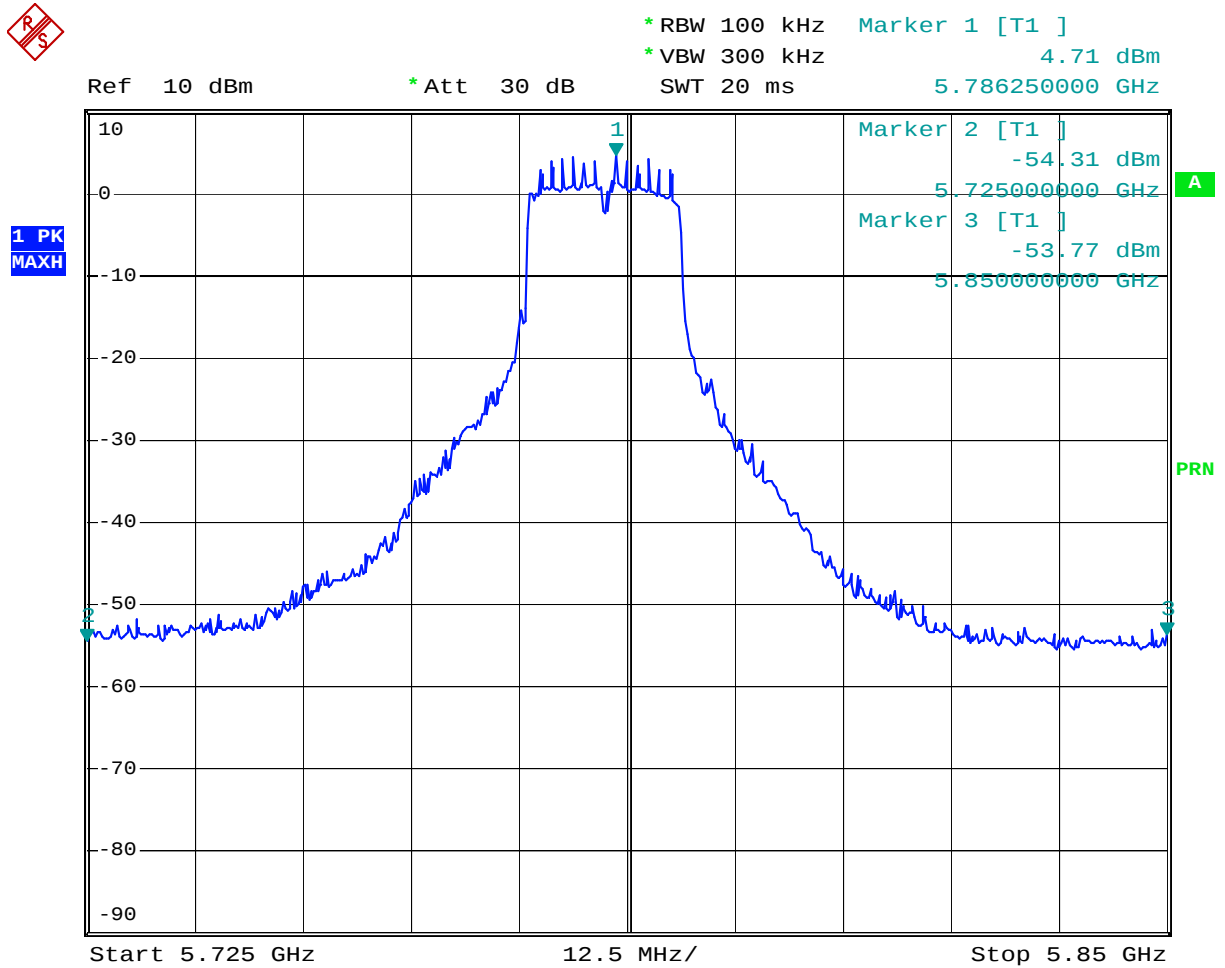
Comment: Out-of-band emis., 5745MHz, 802.11n, HT20, 6.5Mbps, output 3
 Date: 16.SEP.2008 10:17:28

Plot 4.43



Comment: Out-of-band emis., 5785MHz, 802.11a, 6Mbps, output 3
 Date: 16.SEP.2008 10:50:35

Plot 4.44

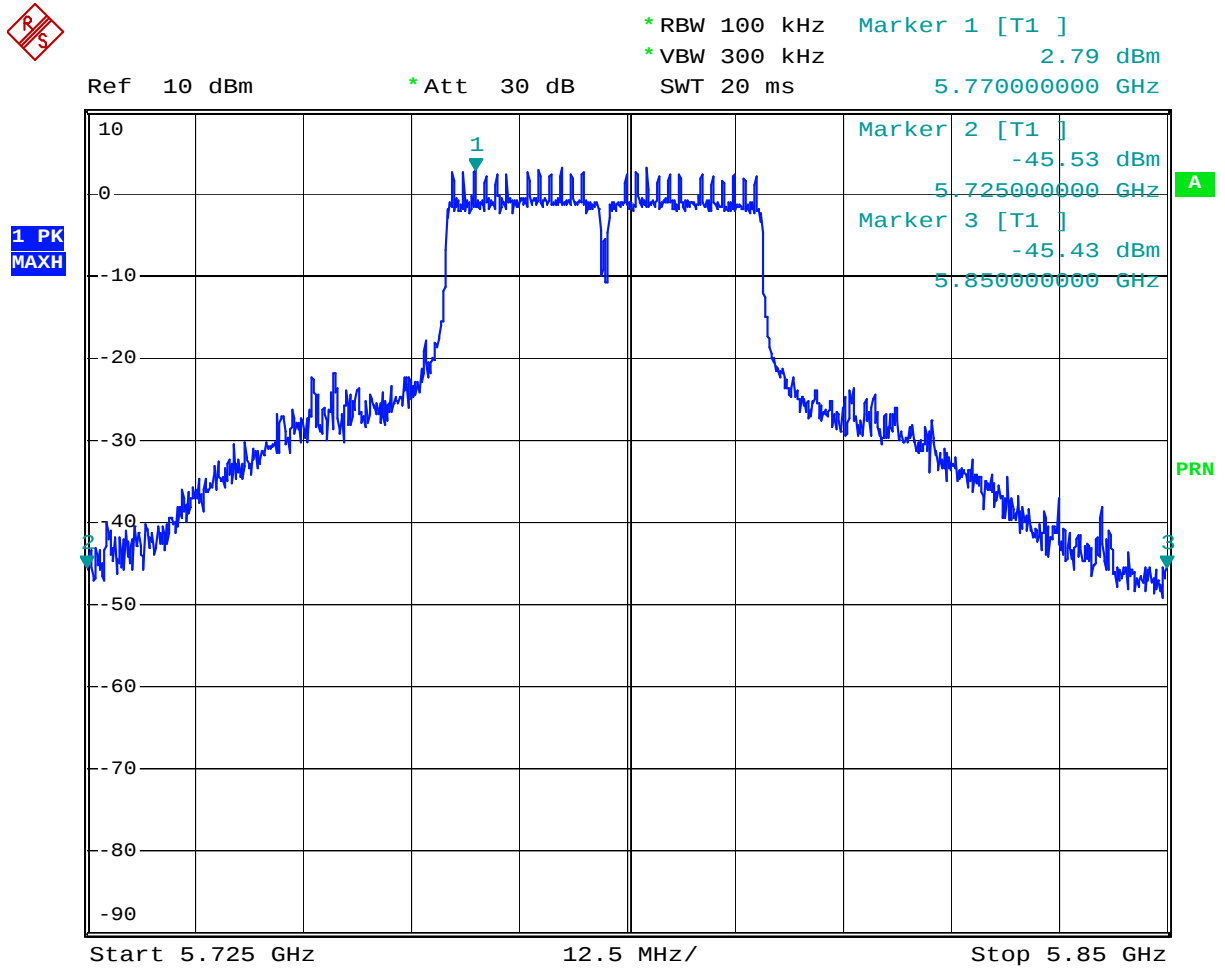


Comment: Out-of-band emis., 5785MHz, 802.11n, HT20, 6.5 Mbps, output

Comment: 3

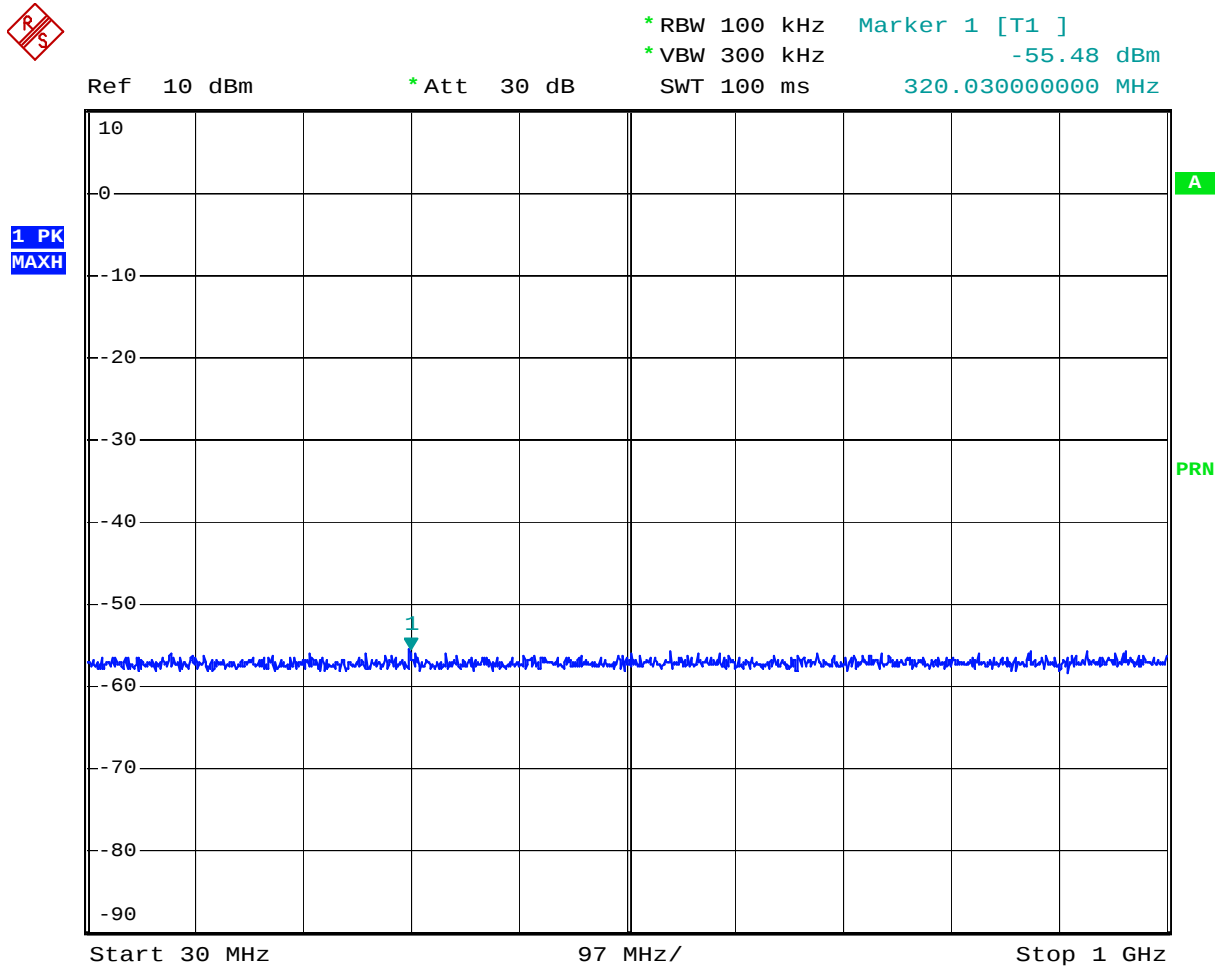
Date: 16.SEP.2008 11:39:48

Plot 4.45



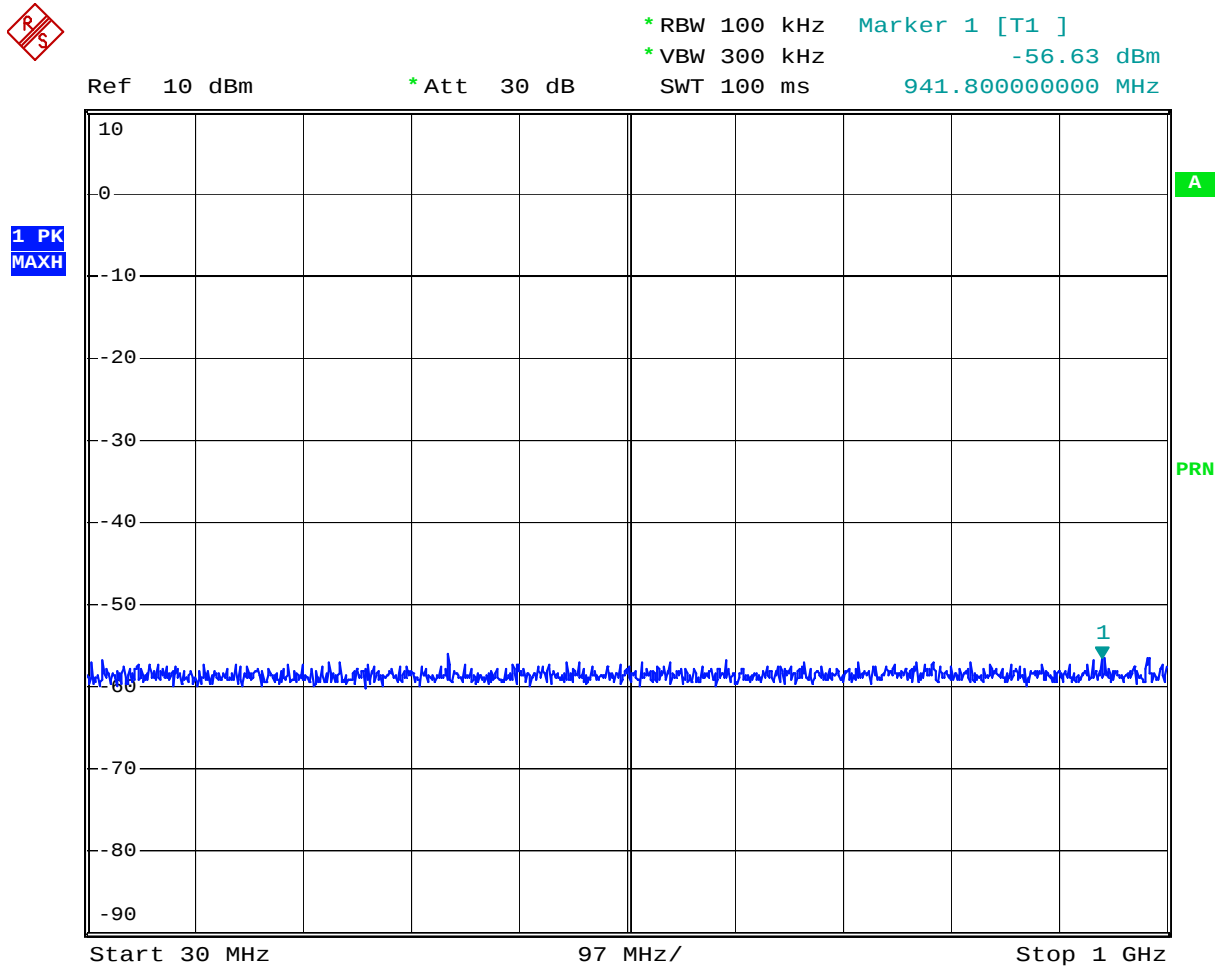
Comment: Out-of-band emis., 5785MHz, 802.11n, HT40, 13.5Mbps, output 3
 Date: 16.SEP.2008 11:07:13

Plot 4.46



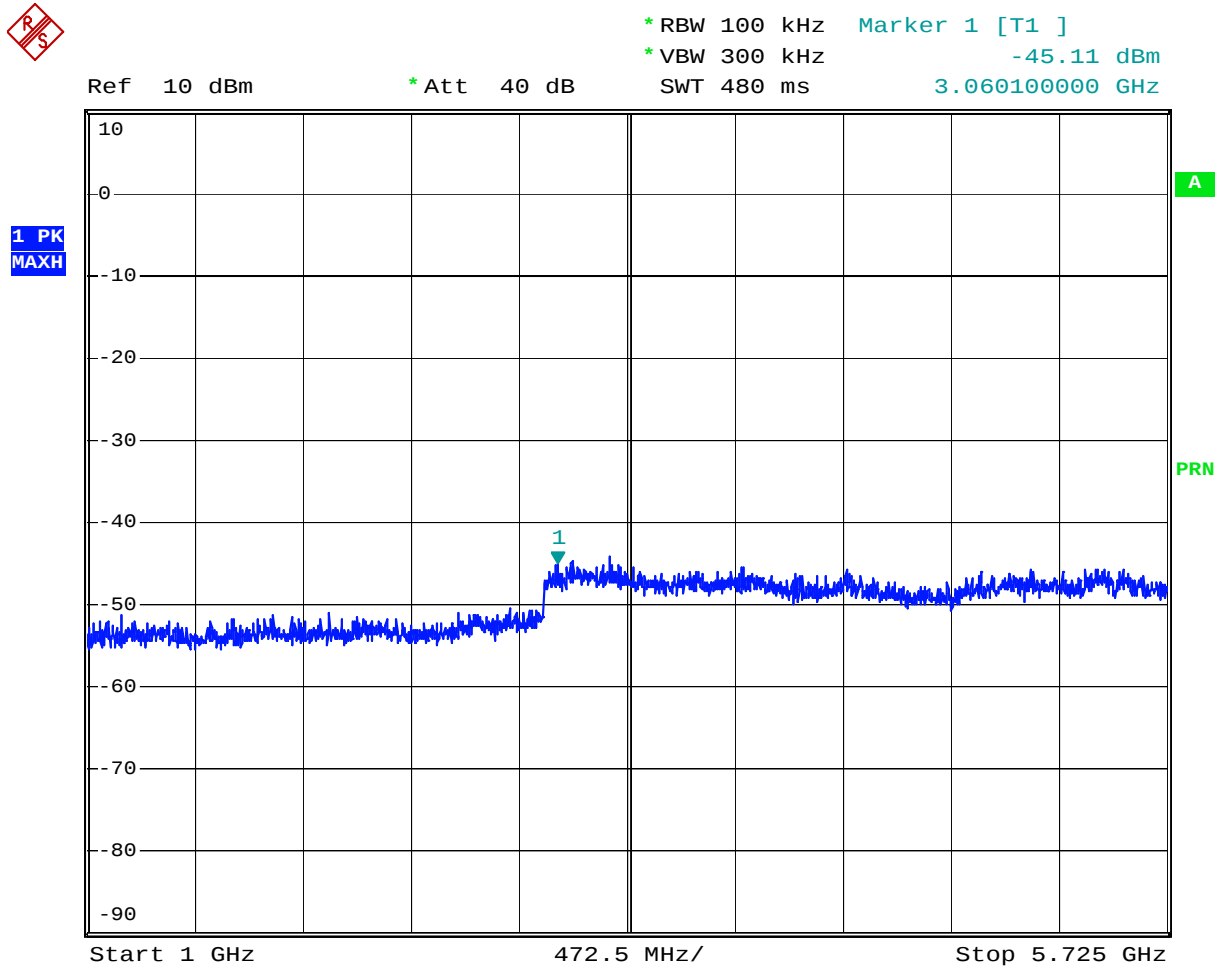
Comment: Out-of-band emis., 5785MHz, 802.11a, 6Mbps, output 3
 Date: 16.SEP.2008 10:39:53

Plot 4.47



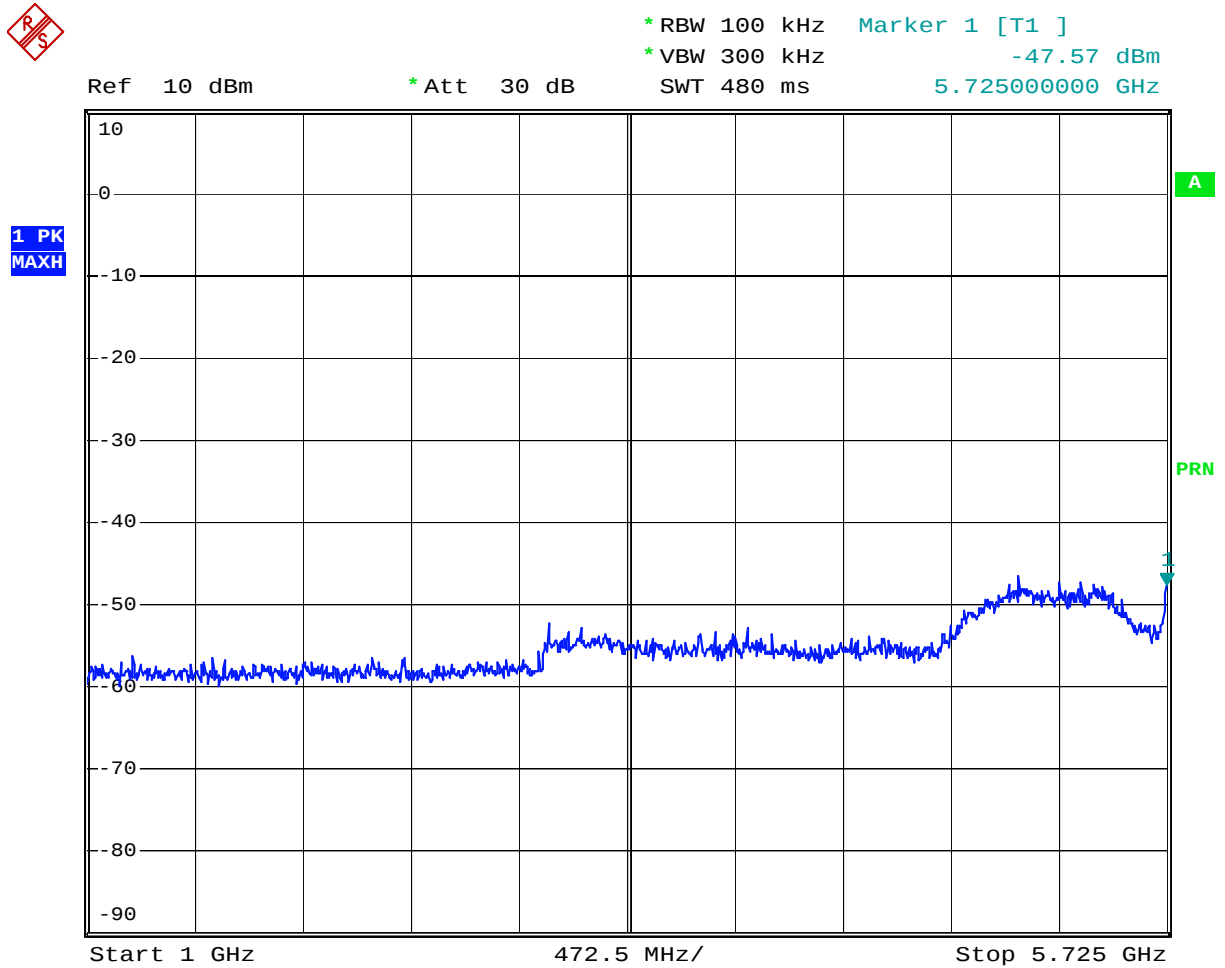
Comment: Out-of-band emis., 5785MHz, 802.11n, HT40, 13.5Mbps, output 3
 Date: 16.SEP.2008 13:27:31

Plot 4.48



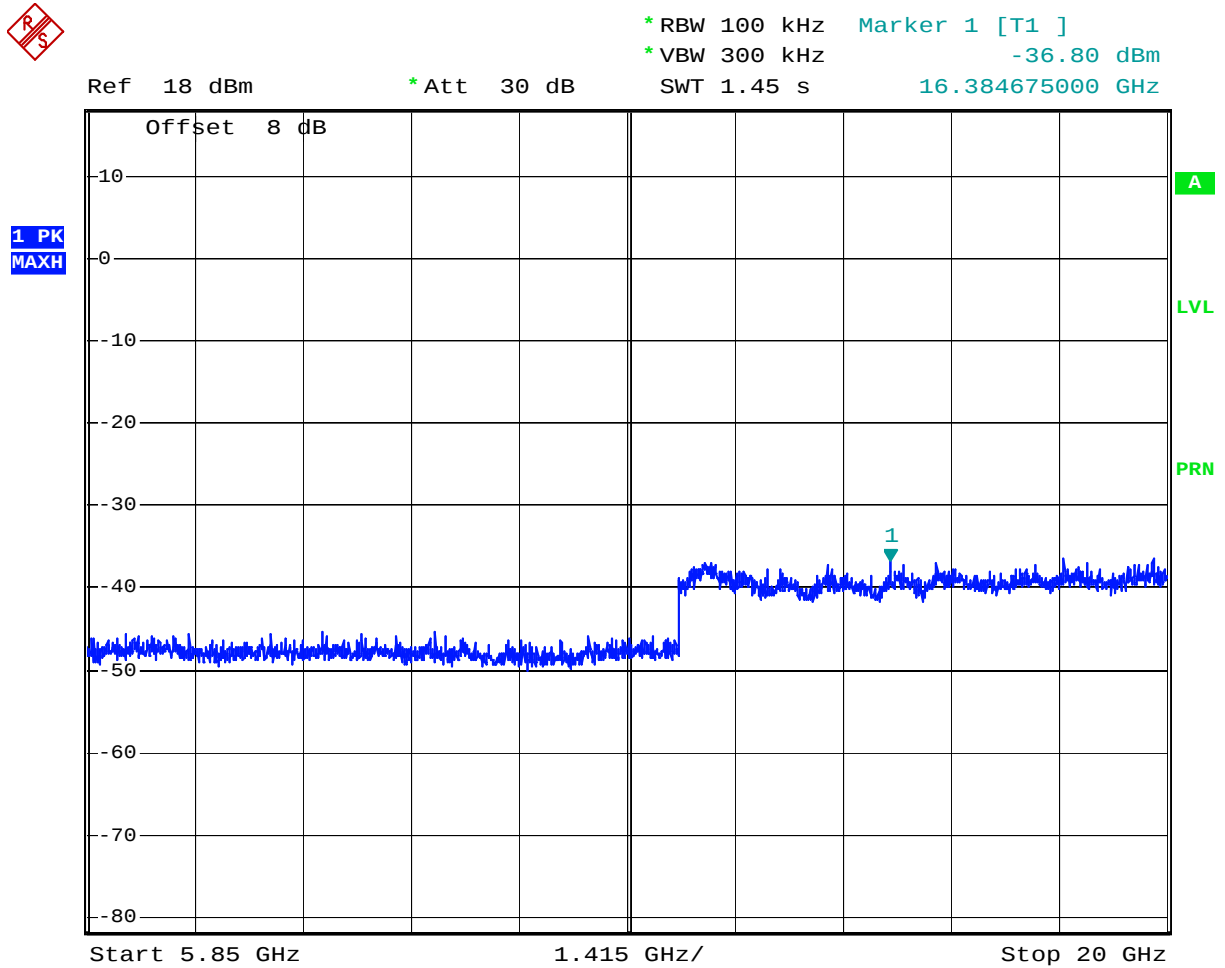
Comment: Out-of-band emis., 5785MHz, 802.11a, 6Mbps, output 3
Date: 16.SEP.2008 10:48:23

Plot 4.49



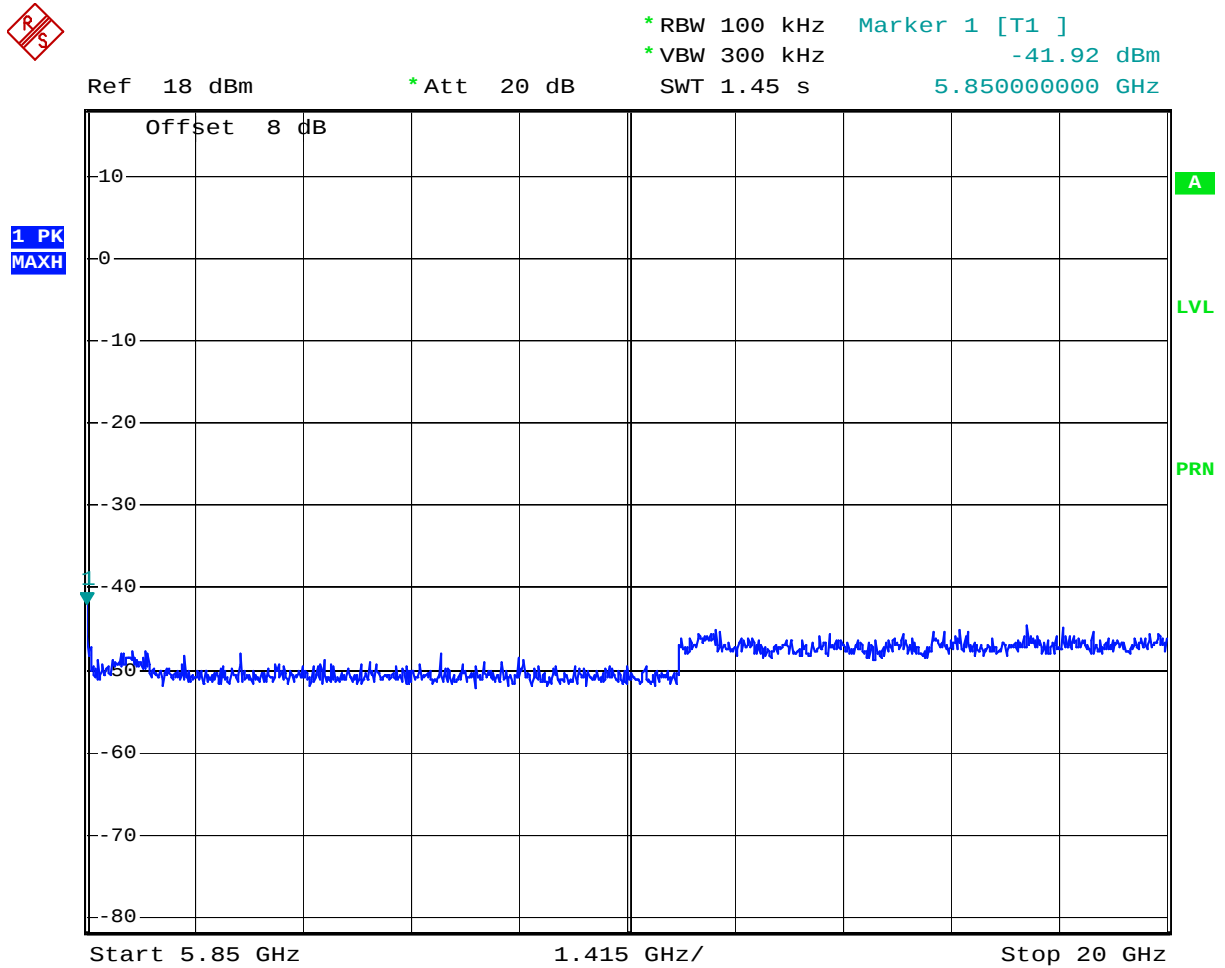
Comment: Out-of-band emis., 5785MHz, 802.11n, HT40, 13.5Mbps, output 3
 Date: 16.SEP.2008 11:08:39

Plot 4.50



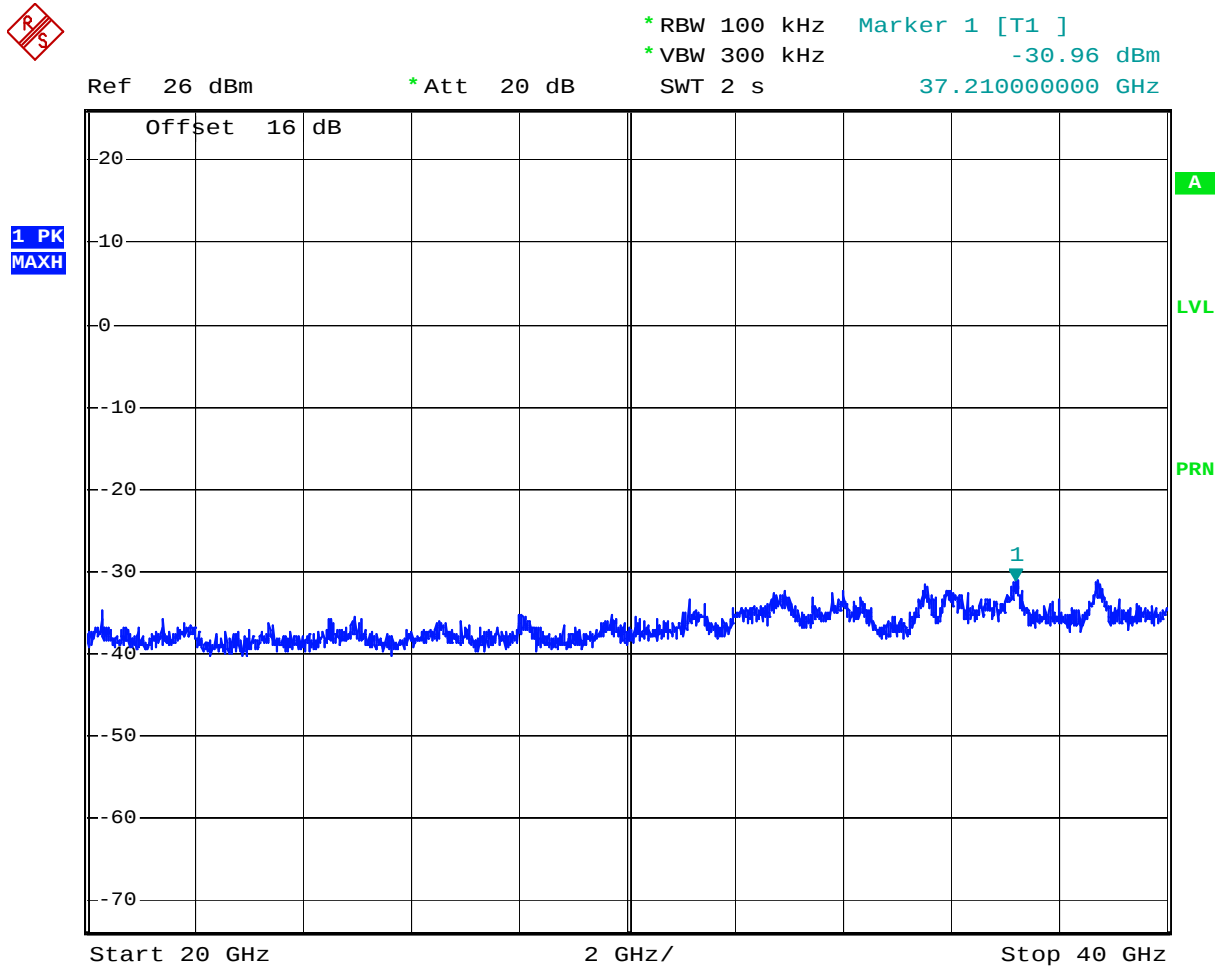
Comment: Out-of-band emis., 5785MHz, 802.11a, 6Mbps, output 3
 Date: 16.SEP.2008 10:52:08

Plot 4.51



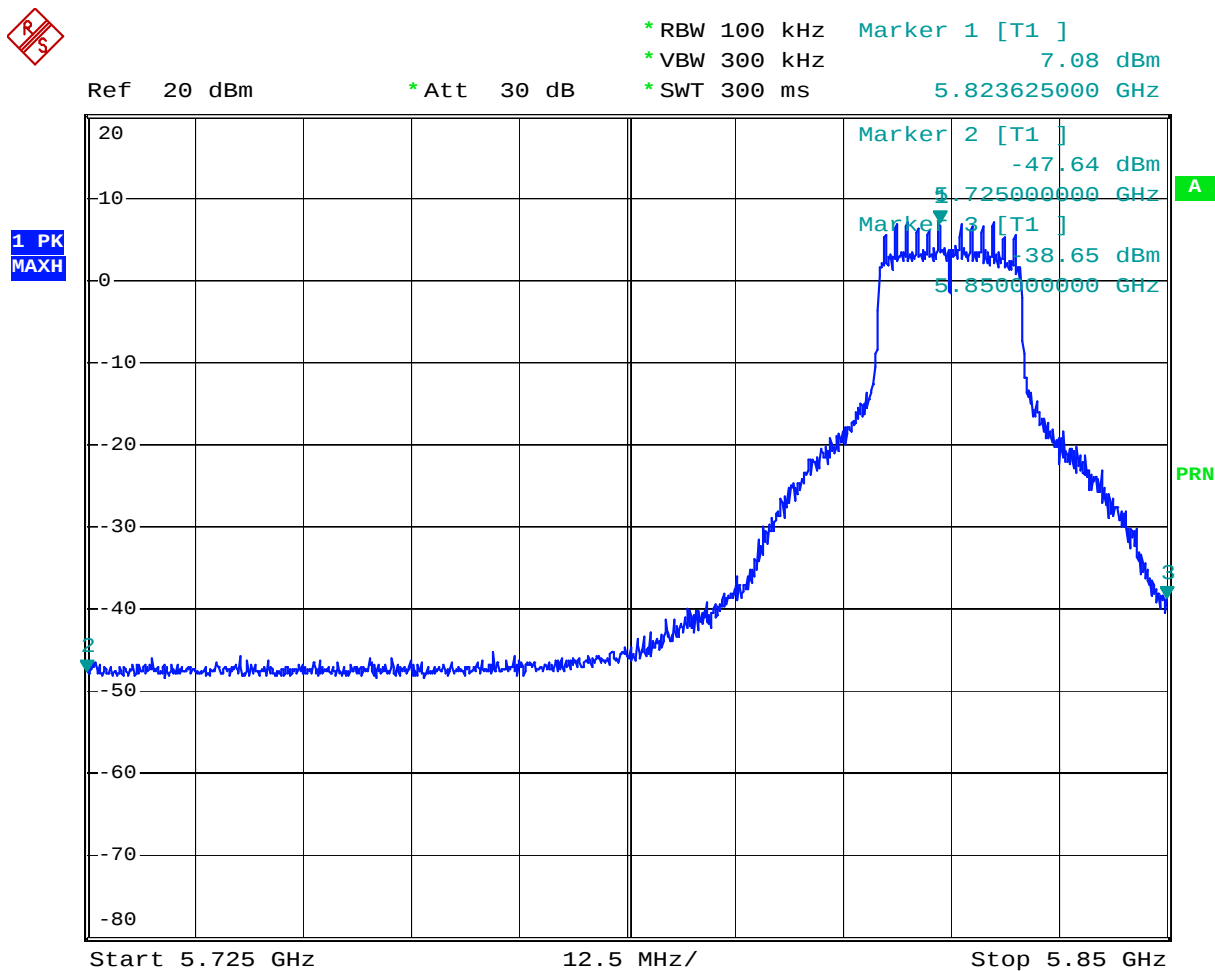
Comment: Out-of-band emis., 5785MHz, 802.11n, HT40, 13.5Mbps, output 3
 Date: 16.SEP.2008 11:09:53

Plot 4.52



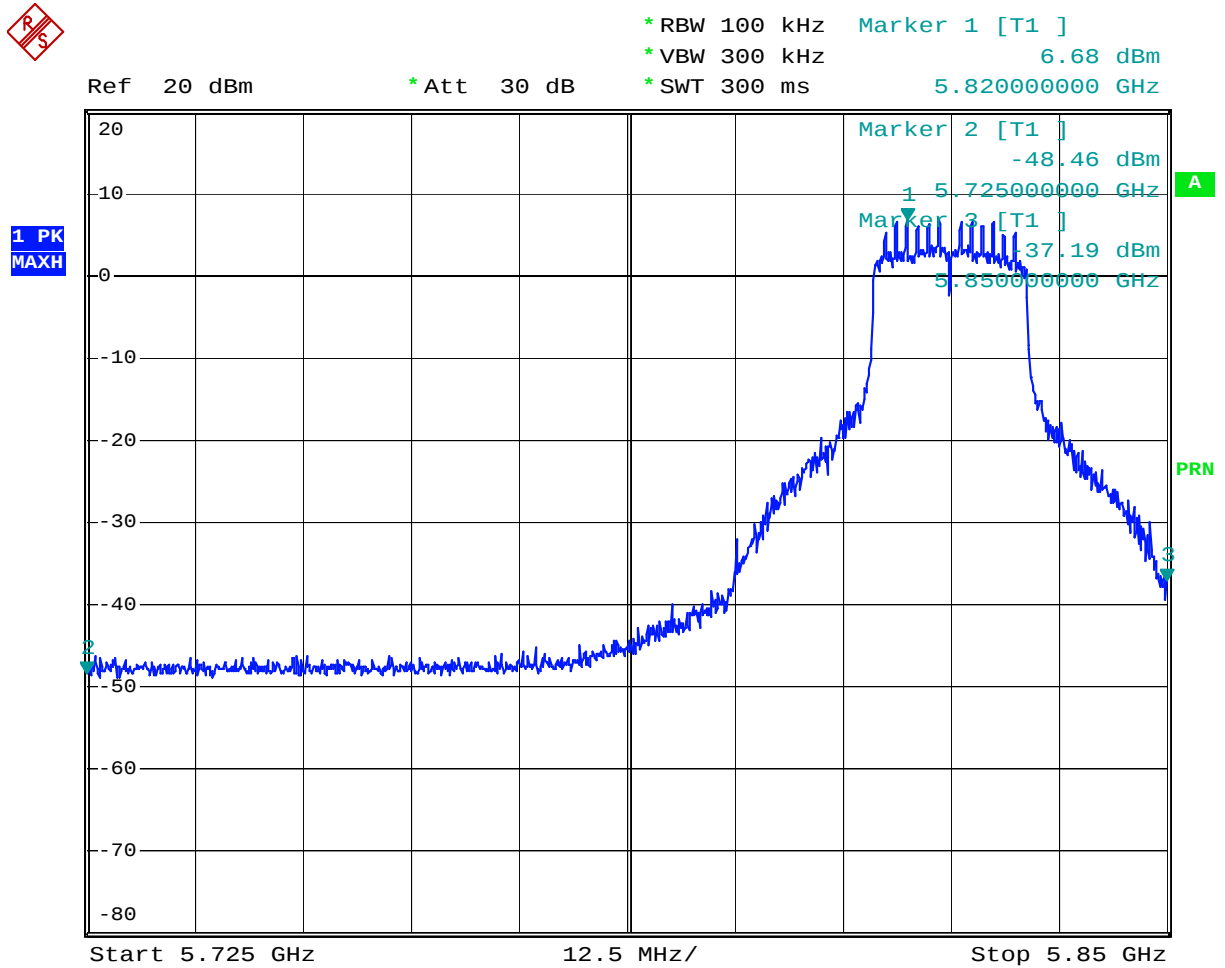
Comment: Out-of-band emis., 5785MHz, 802.11a, 6Mbps, output 3
Date: 16.SEP.2008 10:53:29

Plot 4.53



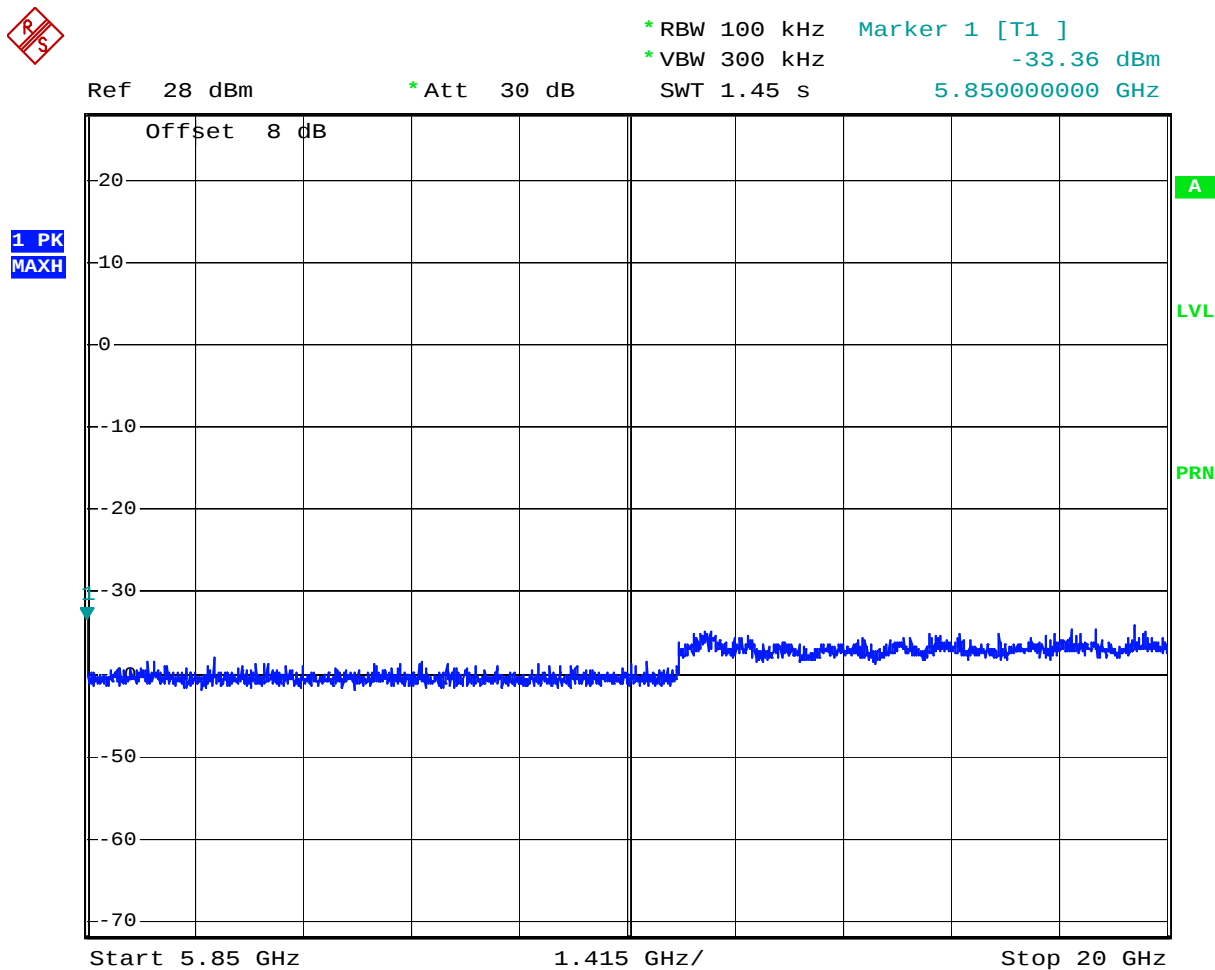
Comment: Out-of-band emis., 5825 MHz, 802.11a, 6 Mbps, output 3
 Date: 16.SEP.2008 15:50:30

Plot 4.54



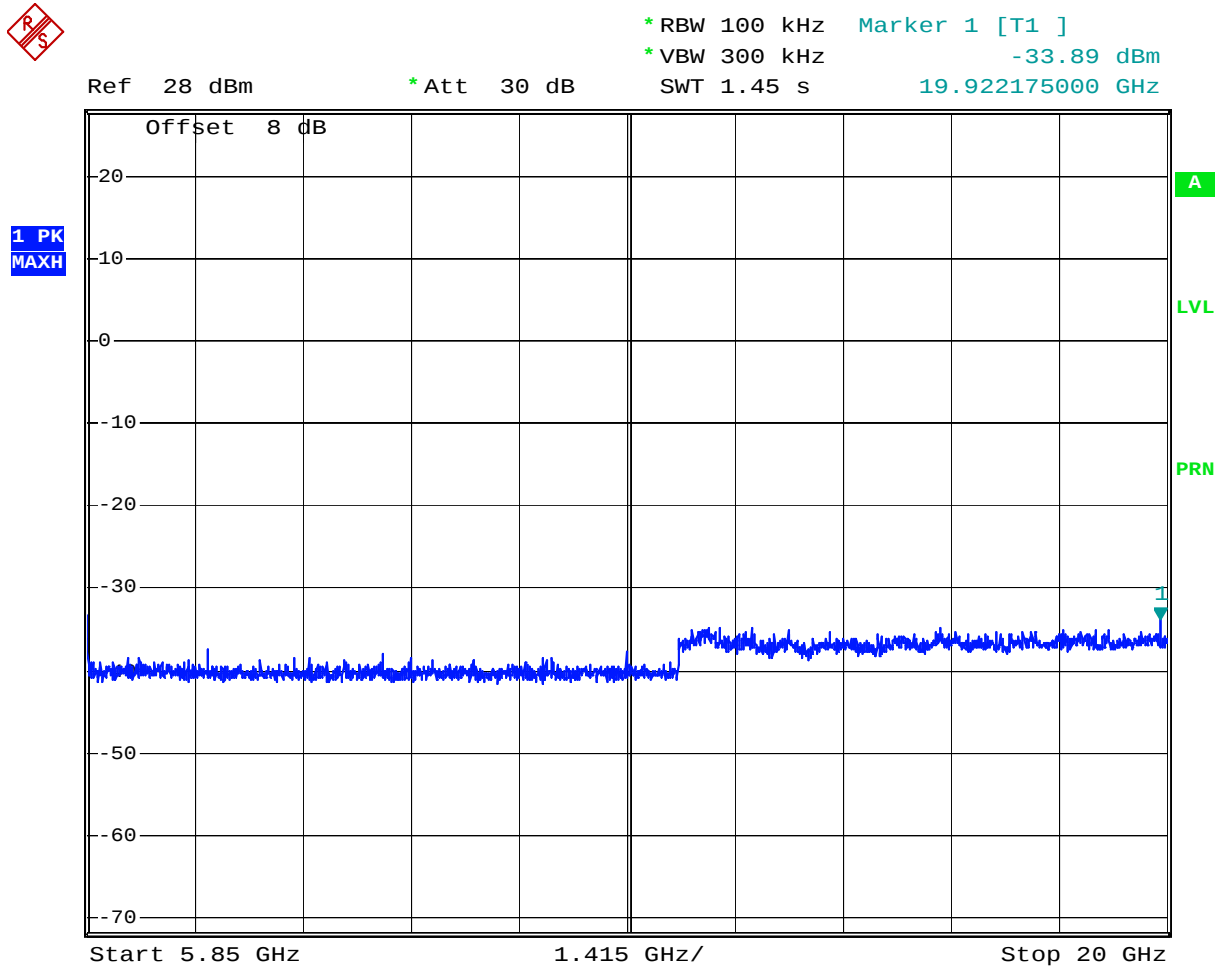
Comment: Out-of-band emis., 5825 MHz, 802.11n HT20, 6.5Mbps, output 3
Date: 16.SEP.2008 15:52:06

Plot 4.55



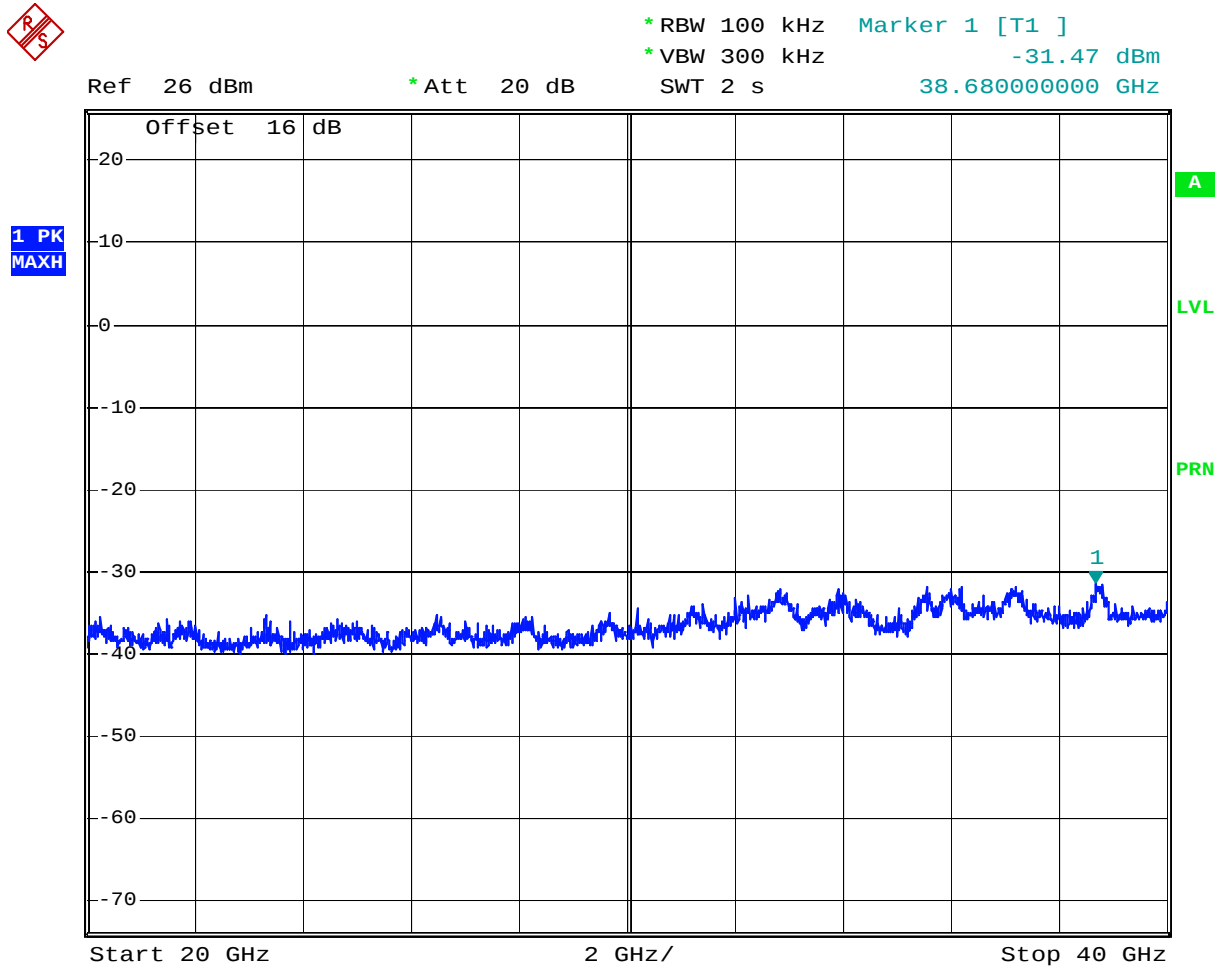
Comment: Out-of-band emis., 5825 MHz, 802.11a, 6 Mbps, output 3
 Date: 16.SEP.2008 15:56:09

Plot 4.56



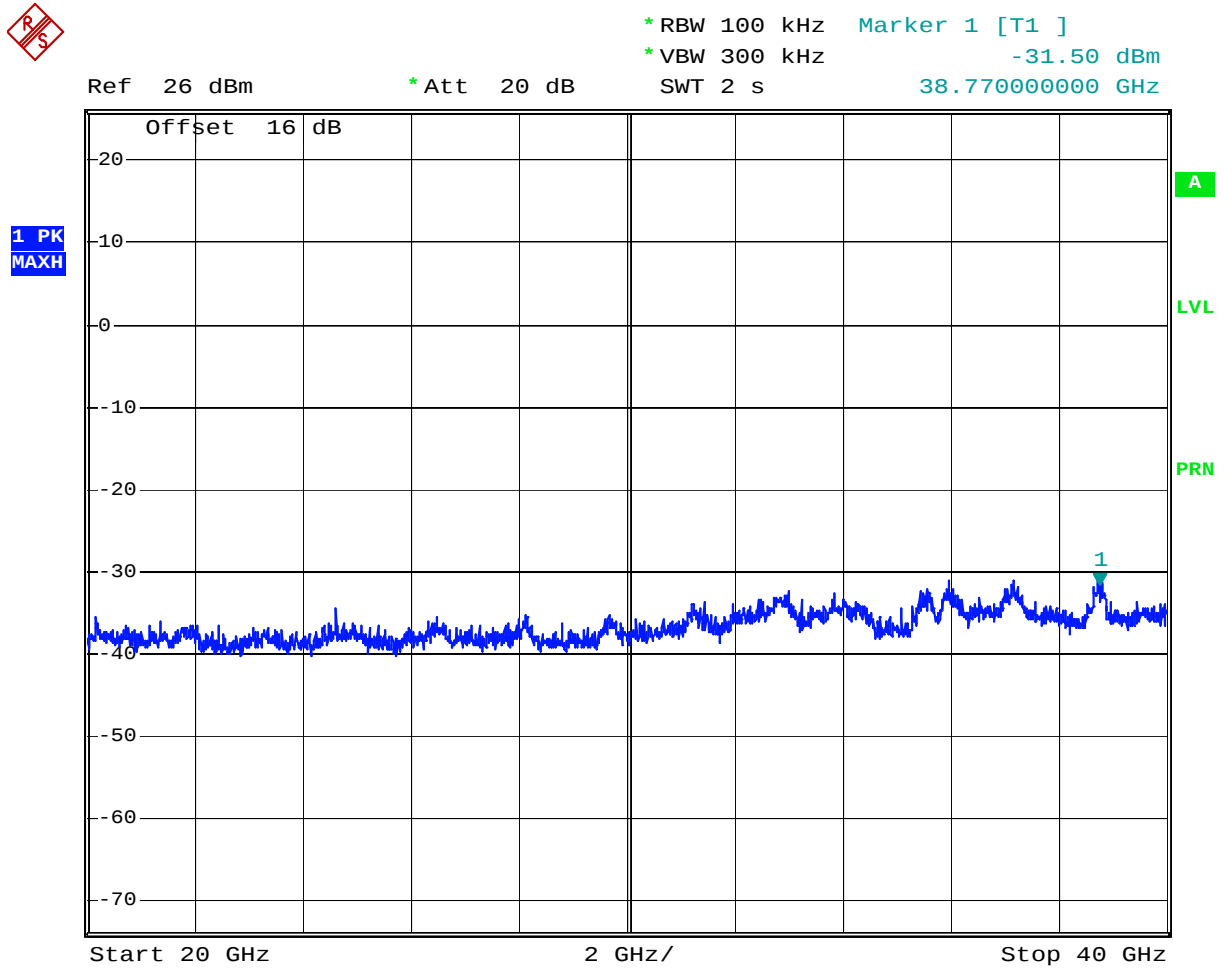
Comment: Out-of-band emis., 5825 MHz, 802.11n HT20, 6.5Mbps, output 3
 Date: 16.SEP.2008 15:58:30

Plot 4.57



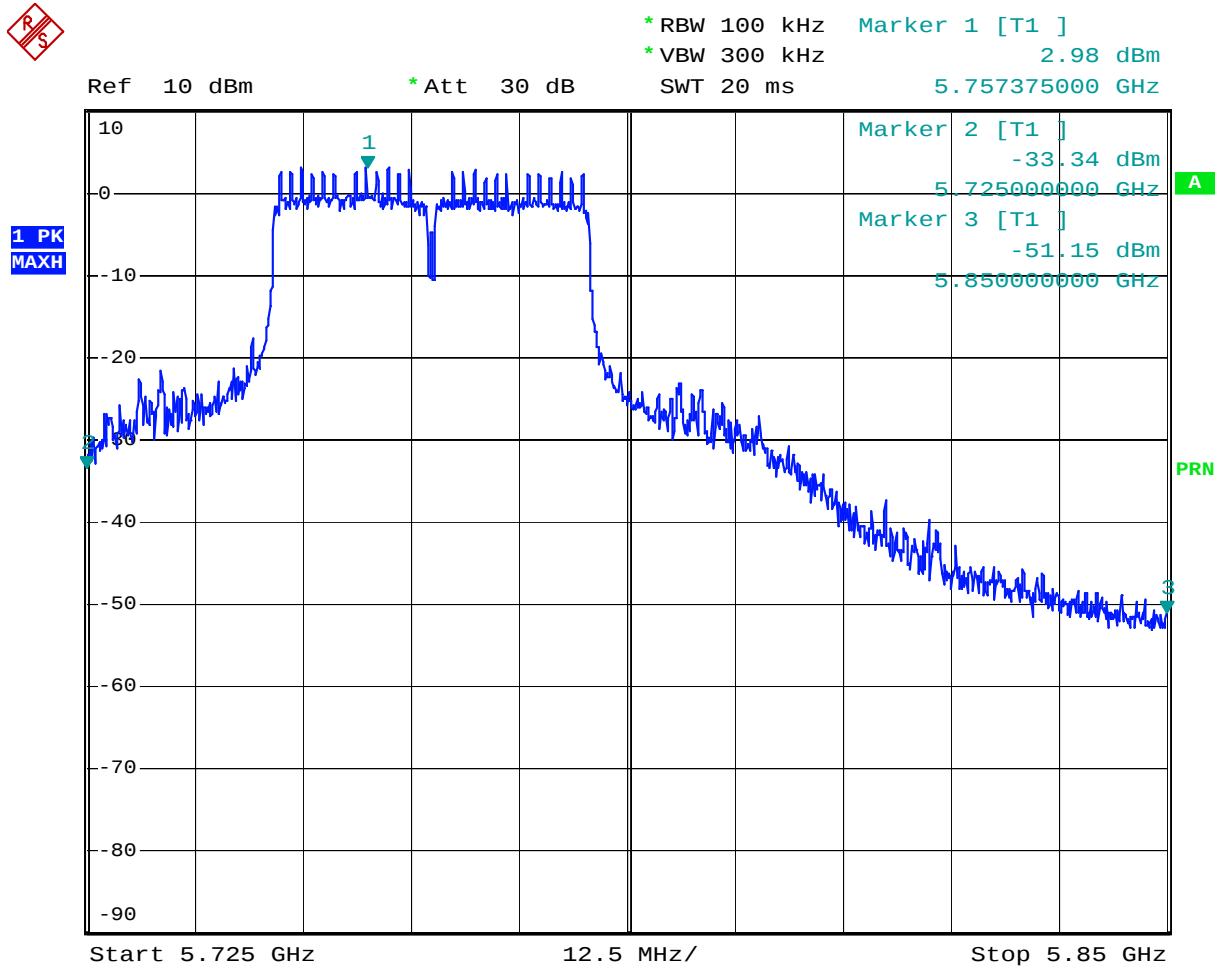
Comment: Out-of-band emis., 5825 MHz, 802.11a, 6Mbps, output 3
 Date: 16.SEP.2008 16:01:25

Plot 4.58



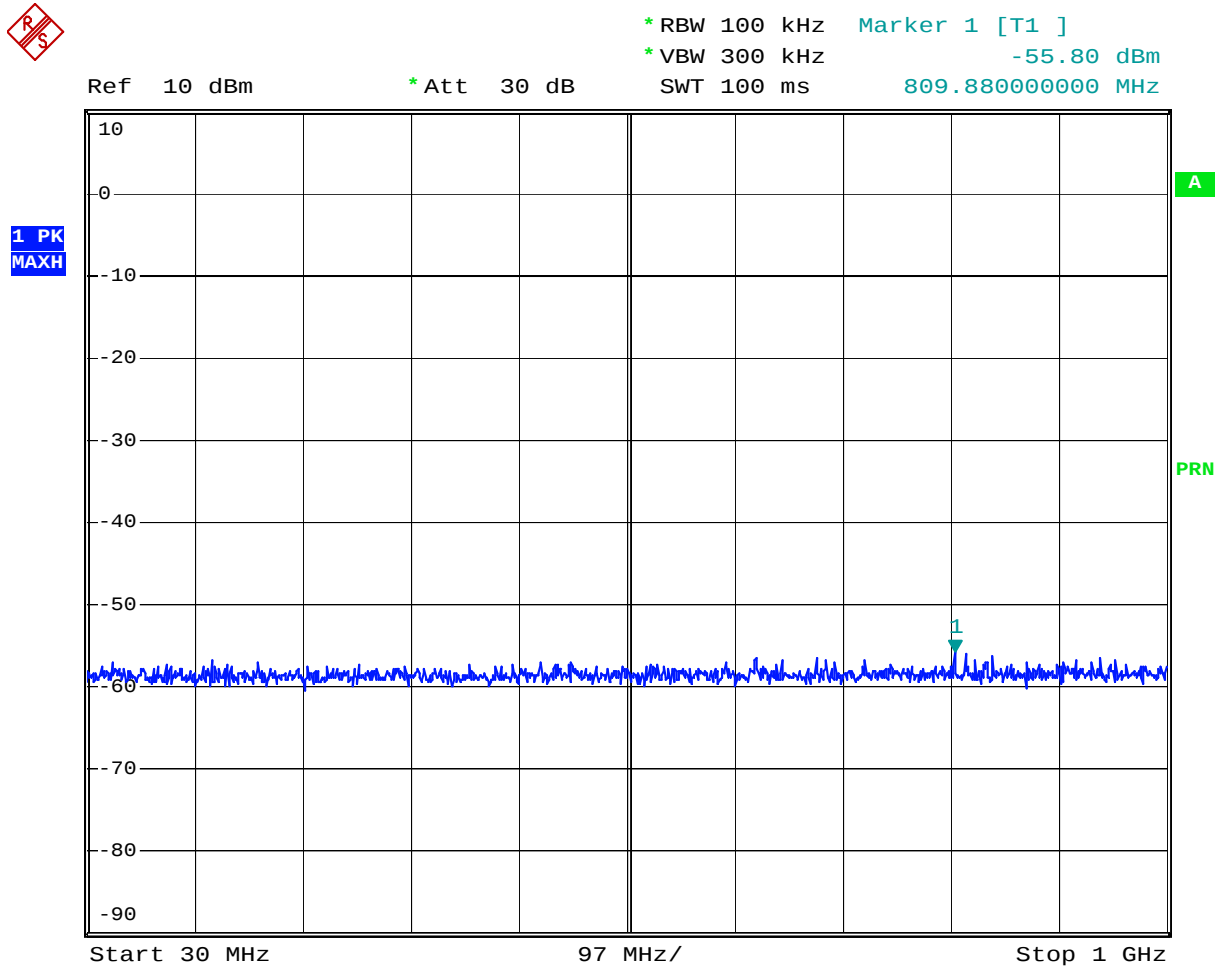
Comment: Out-of-band emis., 5825 MHz, 802.11n HT20, 6.5Mbps, output 3
 Date: 16.SEP.2008 16:00:19

Plot 4.59



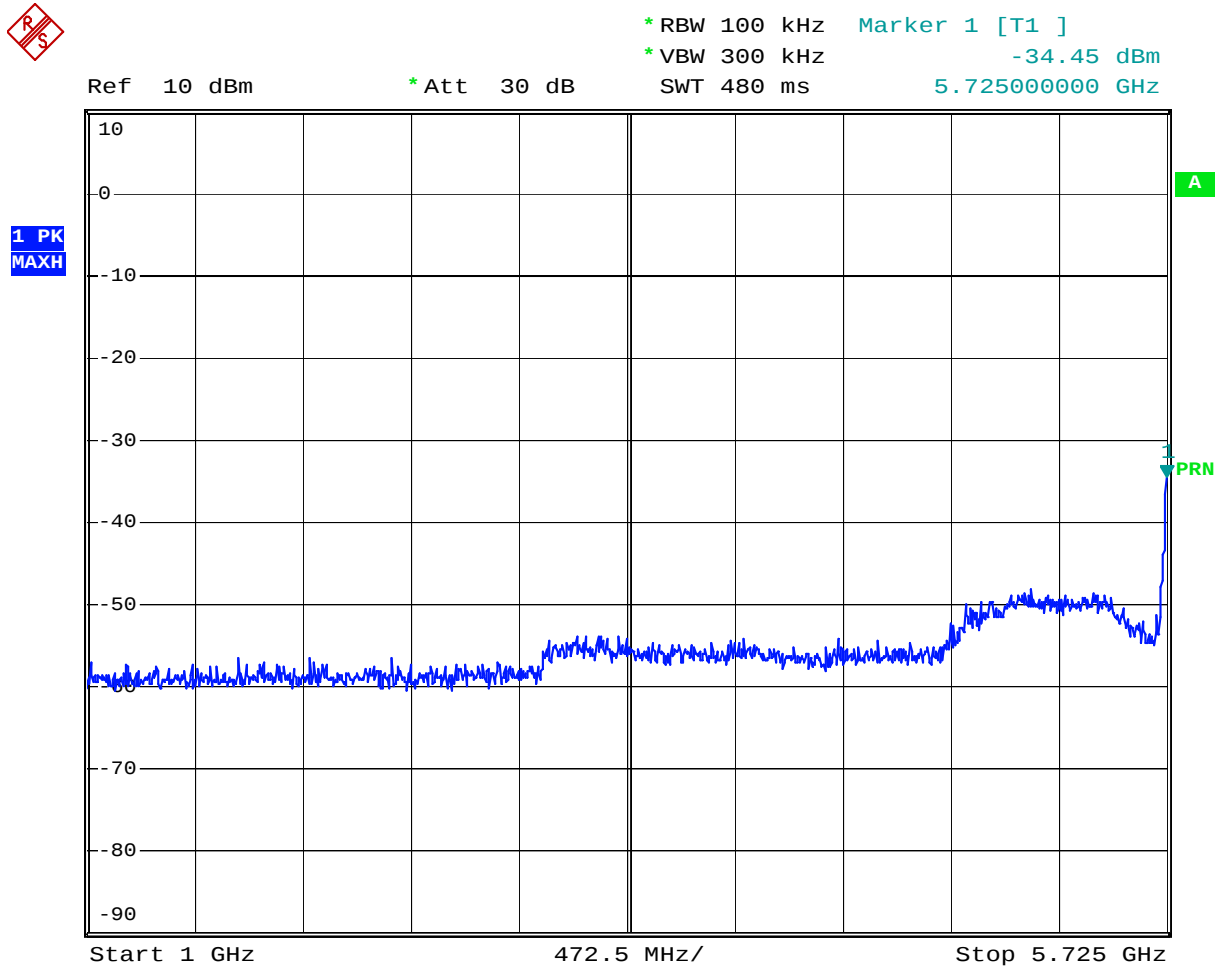
Comment: Out-of-band emis., 5765MHz, 802.11n, HT40, 13.5Mbps, output 3
 Date: 16.SEP.2008 13:09:41

Plot 4.60



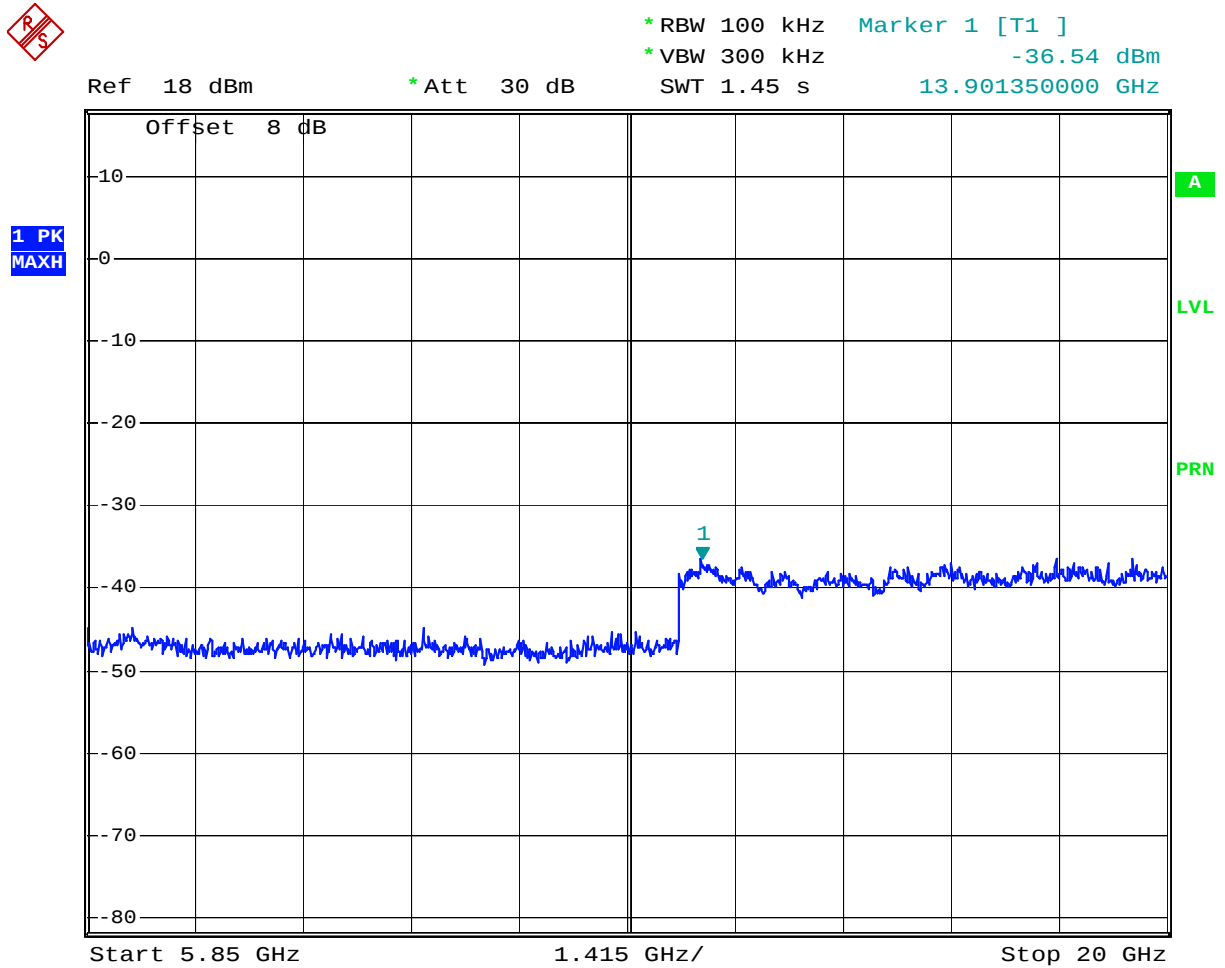
Comment: Out-of-band emis., 5765MHz, 802.11n, HT40, 13.5Mbps, output 3
 Date: 16.SEP.2008 13:26:35

Plot 4.61



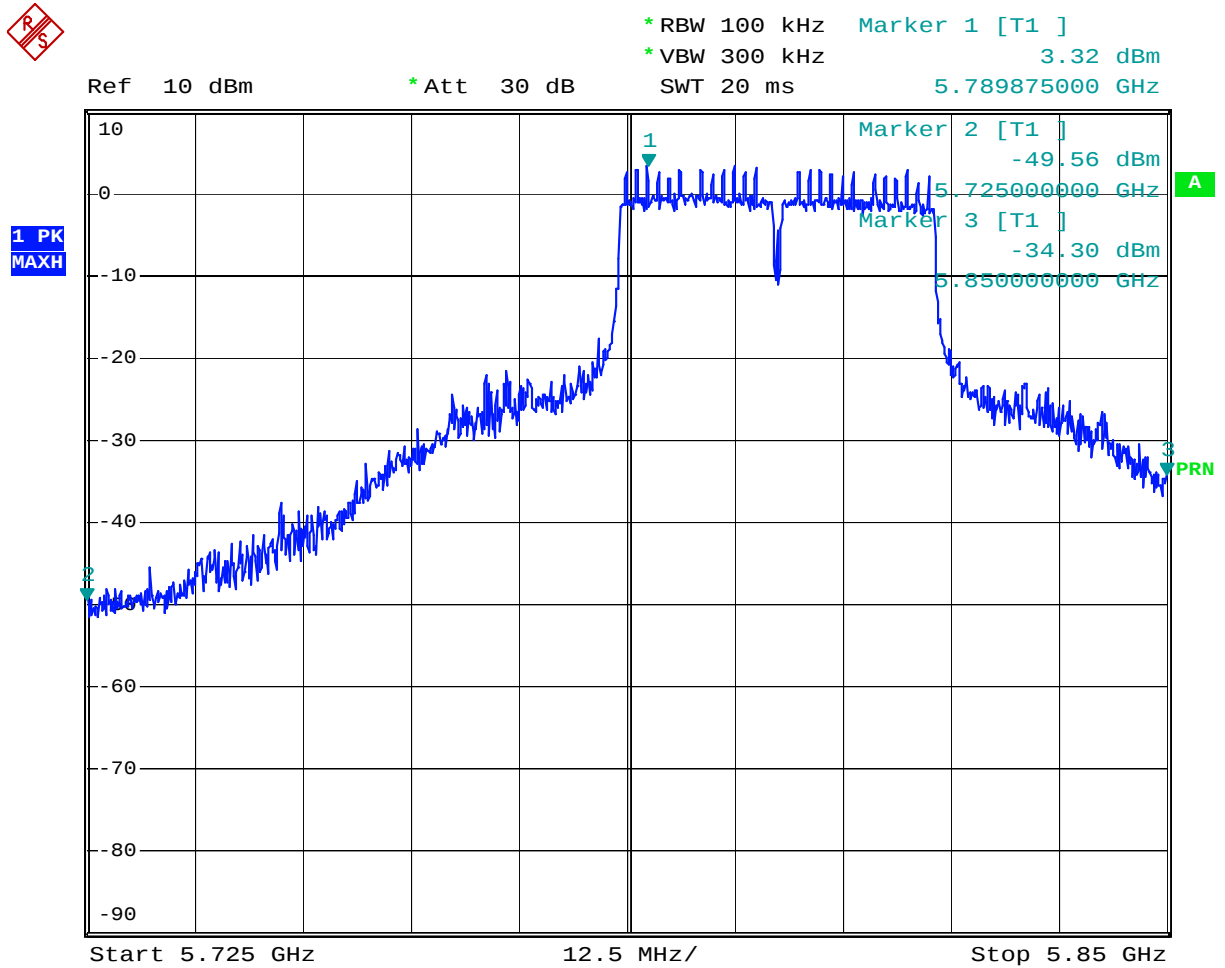
Comment: Out-of-band emis., 5765MHz, 802.11n, HT40, 13.5Mbps, output 3
 Date: 16.SEP.2008 13:22:23

Plot 4.62



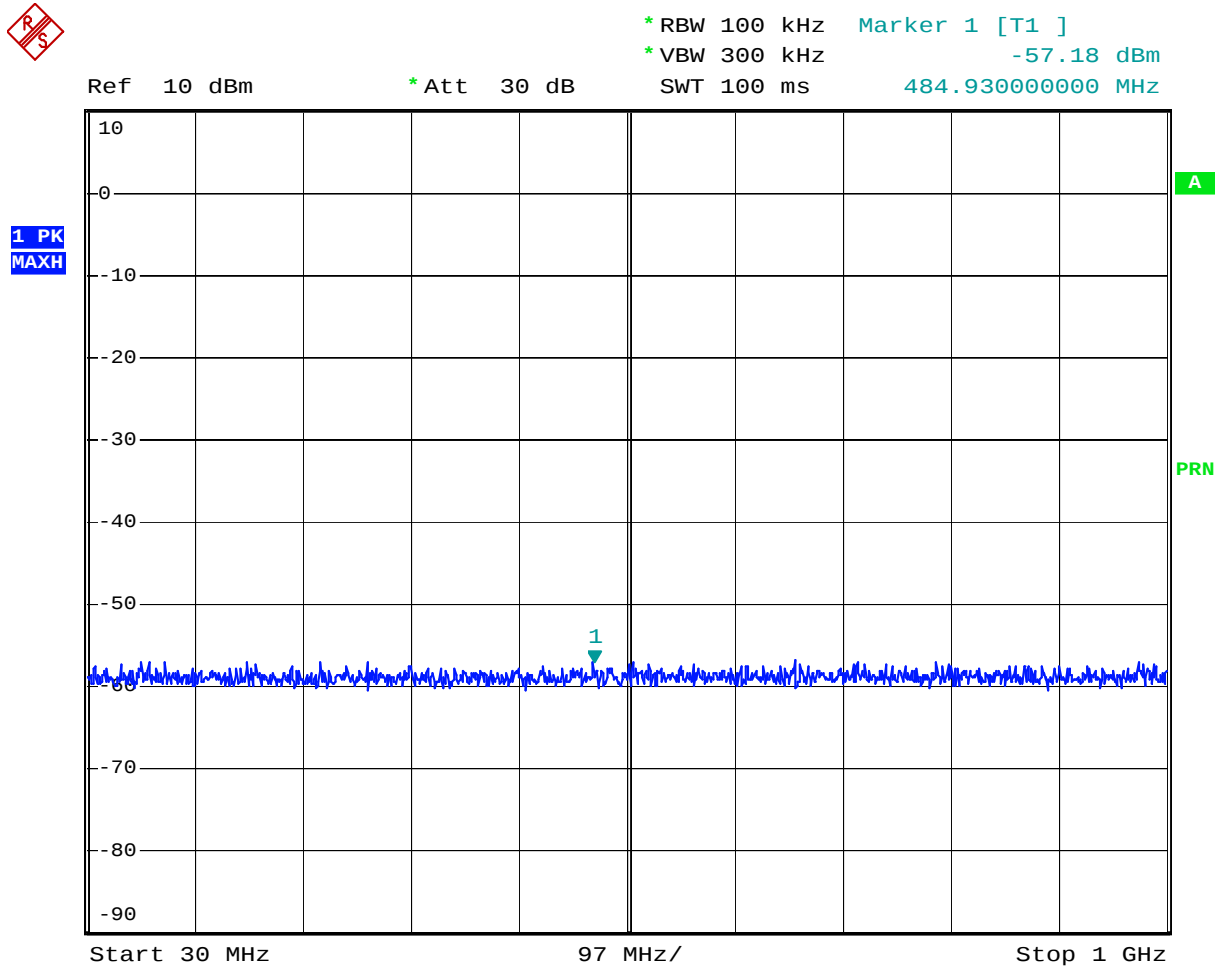
Comment: Out-of-band emis., 5765MHz, 802.11n, HT40, 13.5Mbps, output 3
 Date: 16.SEP.2008 13:15:25

Plot 4.63



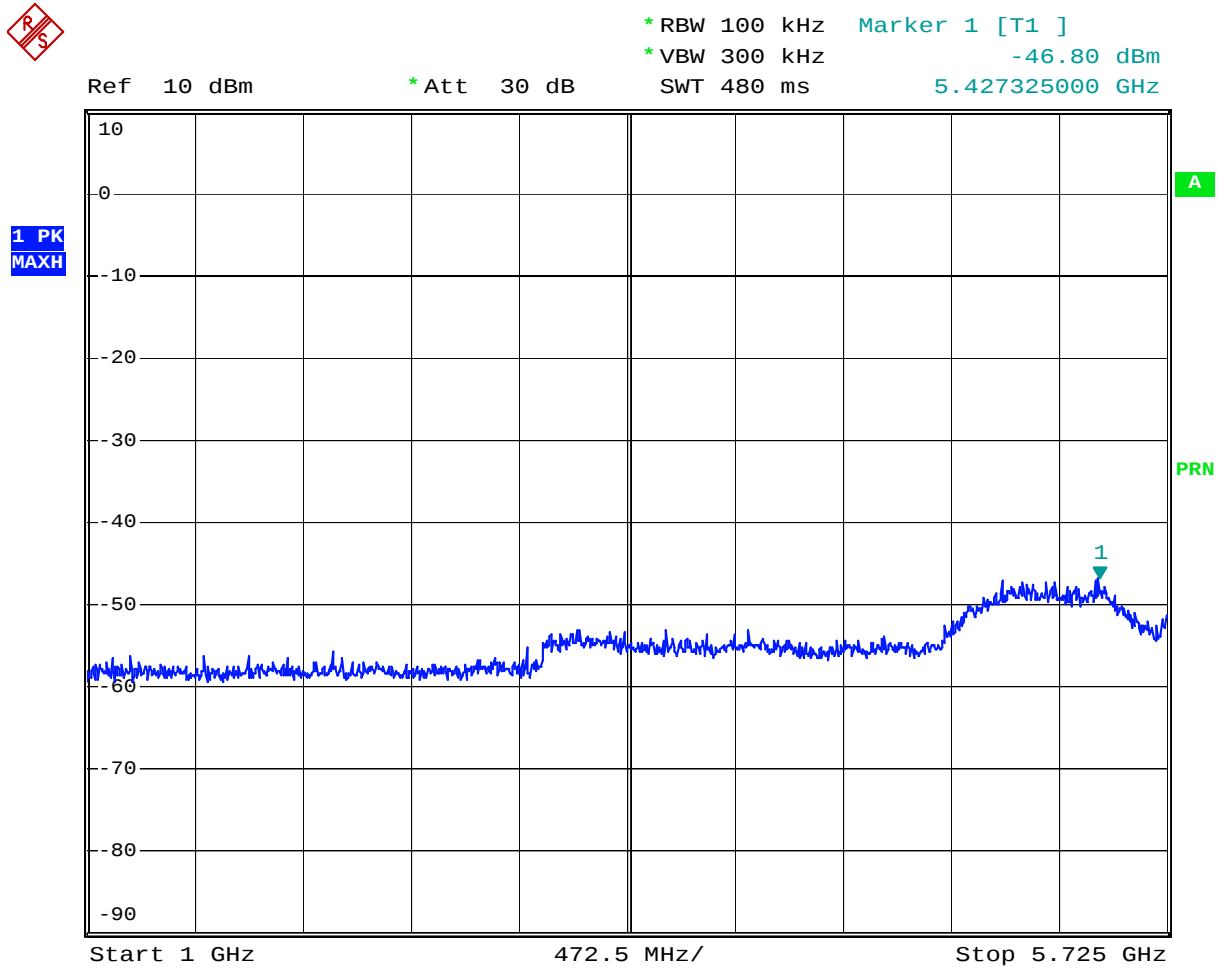
Comment: Out-of-band emis., 5805MHz, 802.11n, HT40, 13.5Mbps, output 3
 Date: 16.SEP.2008 13:11:57

Plot 4.64



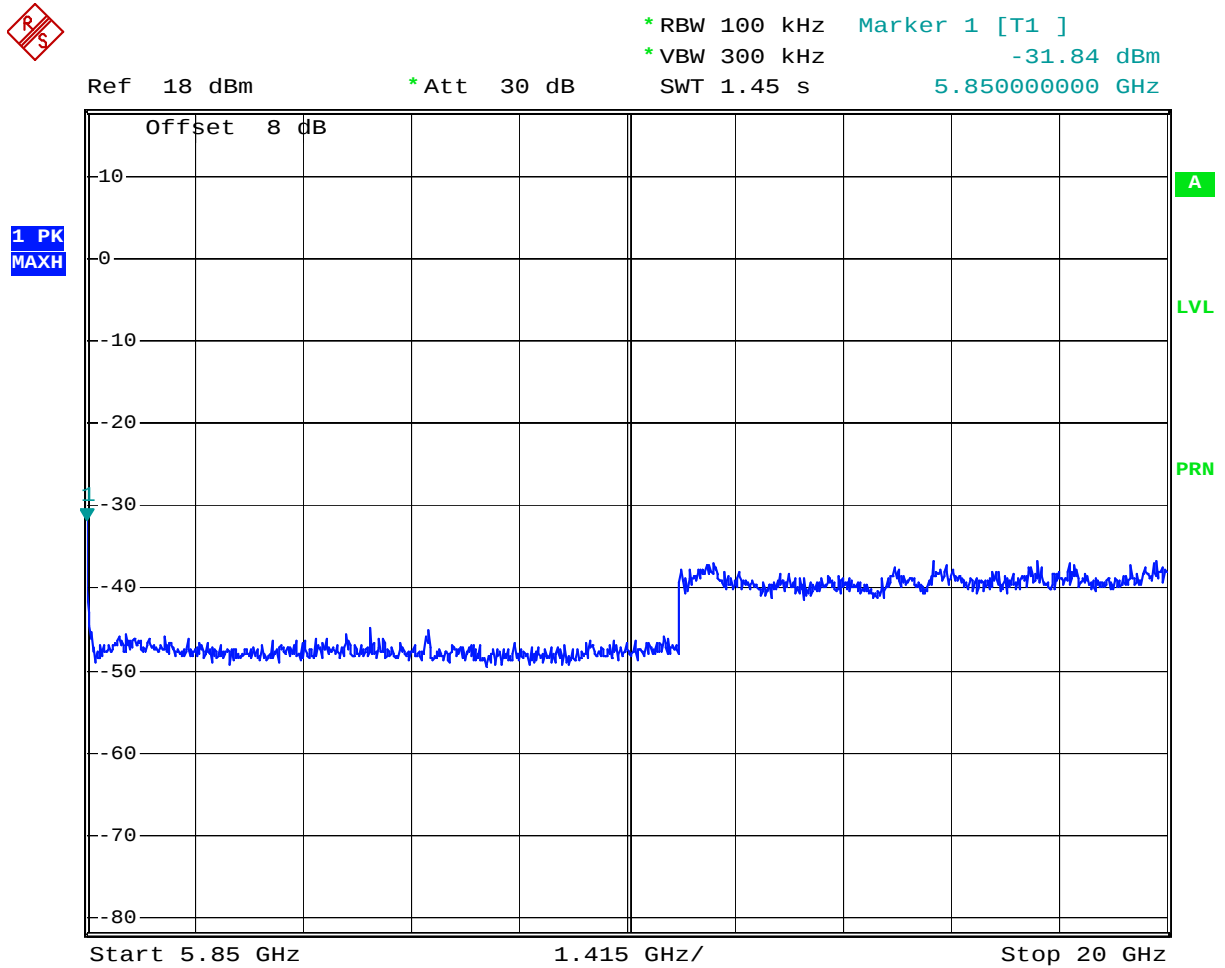
Comment: Out-of-band emis., 5805MHz, 802.11n, HT40, 13.5Mbps, output 3
 Date: 16.SEP.2008 13:25:41

Plot 4.65



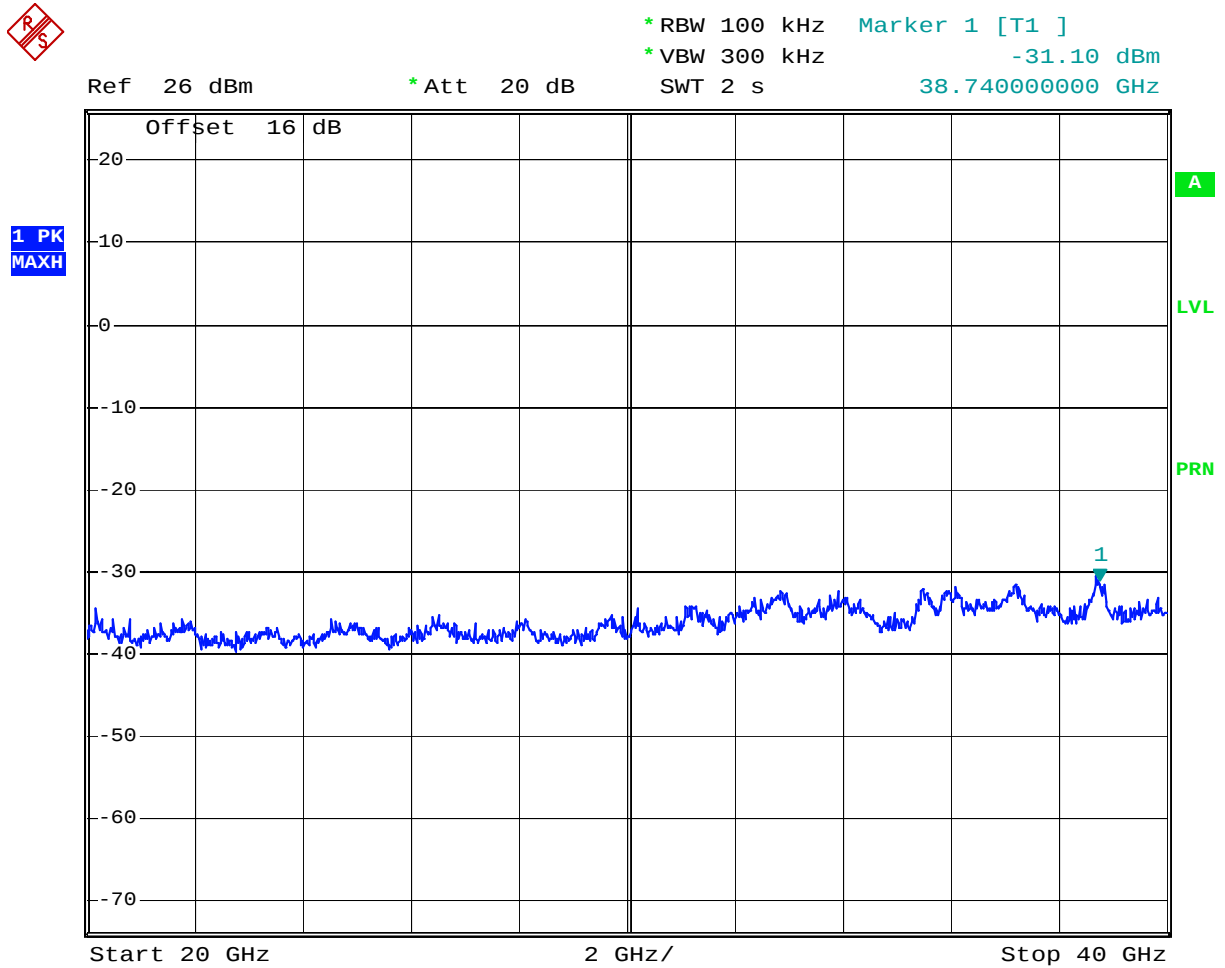
Comment: Out-of-band emis., 5805MHz, 802.11n, HT40, 13.5Mbps, output 3
 Date: 16.SEP.2008 13:23:55

Plot 4.66



Comment: Out-of-band emis., 5805MHz, 802.11n, HT40, 13.5Mbps, output 3
 Date: 16.SEP.2008 13:14:11

Plot 4.67



Comment: Out-of-band emis., 5805MHz, 802.11n, HT40, 13.5Mbps, output 3
 Date: 16.SEP.2008 13:19:48

4.5 Out of Band Radiated Emissions (except emissions in restricted bands) FCC Rule 15.247(d)

4.5.1 Procedure

For out of band radiated emissions (except for frequencies in restricted bands) that are close to or that exceed the 20 dB attenuation requirement described in the specification, radiated measurements were performed at a 3 m separation distance to determine whether these emissions complied with the general radiated emission requirement.

4.5.2 Test Result

Test was not performed, the EUT passed out-of-band antenna conducted emission test.

4.6 Transmitter Radiated Emissions in Restricted Bands FCC Rule 15.247(d), 15.209, 15.205

4.6.1 Requirement

Radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

4.6.2 Procedure

Radiated emission measurements were performed from 30 MHz to 25,000 MHz. Spectrum Analyzer Resolution Bandwidth is 100 kHz or greater for frequencies 30 MHz to 1000 MHz, 1 MHz - for frequencies above 1000 MHz.

The EUT is placed on a plastic turntable. If the EUT attaches to peripherals, they are connected and operational (as typical as possible). During testing, all cables were manipulated to produce worst-case emissions. The signal is maximized through rotation. The antenna height and polarization are varied during the search for maximum signal level. The antenna height is varied from 1 to 4 meters.

Radiated emissions are taken at three meters unless the signal level is too low for measurement at that distance. If necessary, a pre-amplifier is used and/or the test is conducted at a closer distance. All readings are extrapolated back to the equivalent three-meter reading using inverse scaling with distance.

Data is included of the worst-case configuration (the configuration which resulted in the highest emission levels).

4.6.3 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follows:

$FS = RA + AF + CA - AG$; if measurement is performed at a distance other than specified in the rule, a Distance Correction Factor (DCF) shall be added.

Where FS = Field Strength in $dB(\mu V/m)$

RA = Receiver Amplitude (including preamplifier) in $dB(\mu V)$; AF = Antenna Factor in $dB(1/m)$

CA = Cable Attenuation in dB ; AG = Amplifier Gain in dB

Assume a receiver reading of $52.0\text{ dB}(\mu V)$ is obtained. The antennas factor of $7.4\text{ dB}(1/m)$ and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted, giving field strength of $32\text{ dB}(\mu V/m)$. This value in $dB(\mu V/m)$ was converted to its corresponding level in $\mu V/m$.

$RA = 52.0\text{ dB}(\mu V)$

$AF = 7.4\text{ dB}(1/m)$

$CA = 1.6\text{ dB}$

$AG = 29.0\text{ dB}$

$FS = 52.0 + 7.4 + 1.6 - 29.0 = 32\text{ dB}(\mu V/m)$.

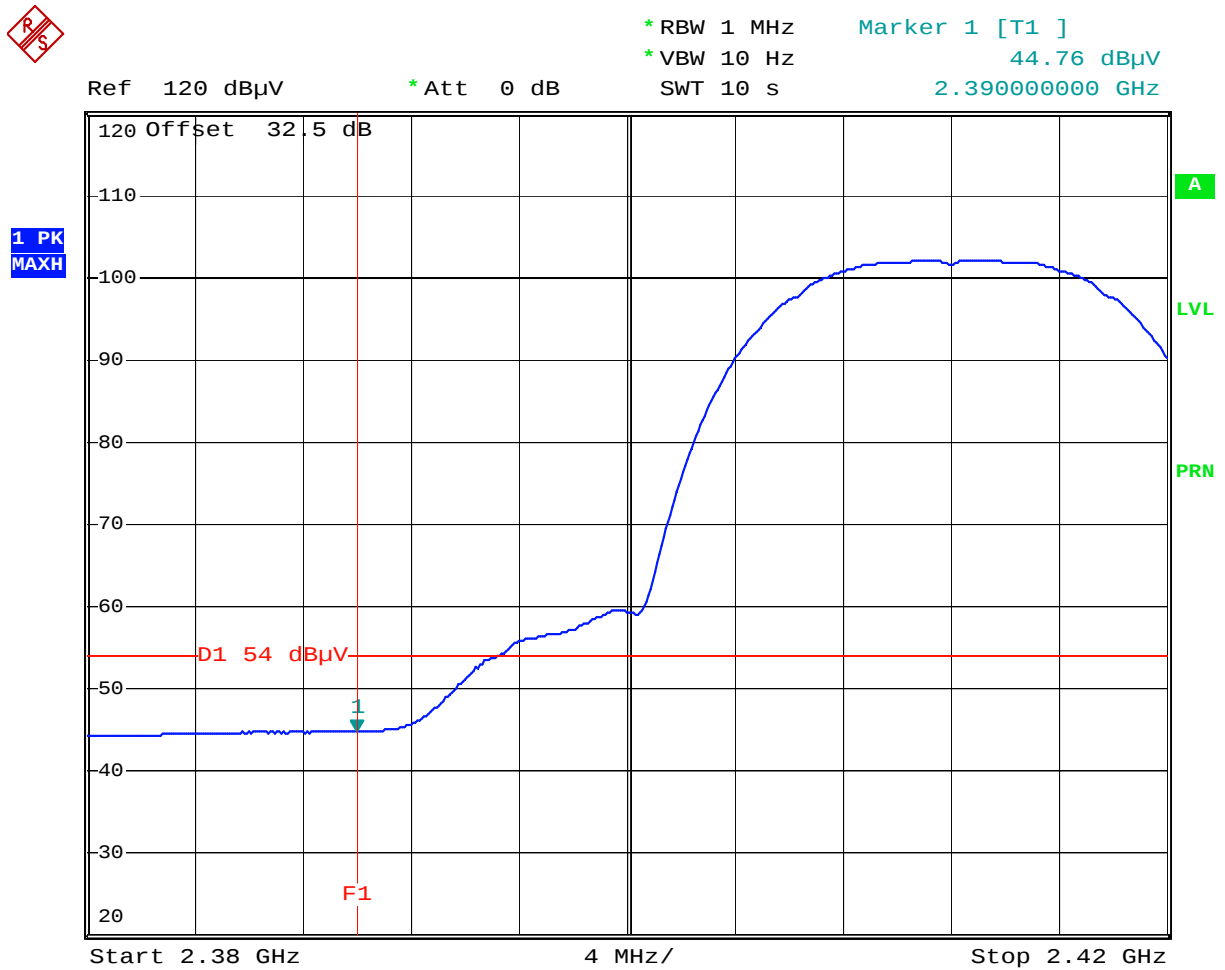
Level in $\mu V/m$ = Common Antilogarithm $[(32\text{ dB}\mu V/m)/20] = 39.8\text{ }\mu V/m$.

4.6.4 Test Result – bands: 2310 – 2390 MHz and 2483.5 – 2500 MHz

On the following graphs 6.1 – 6.18 the antenna factor and cable attenuation are included in the spectrum analyzer reference level OFFSET. Therefore, the Marker Reading shows the Field Strength at 3m distance.

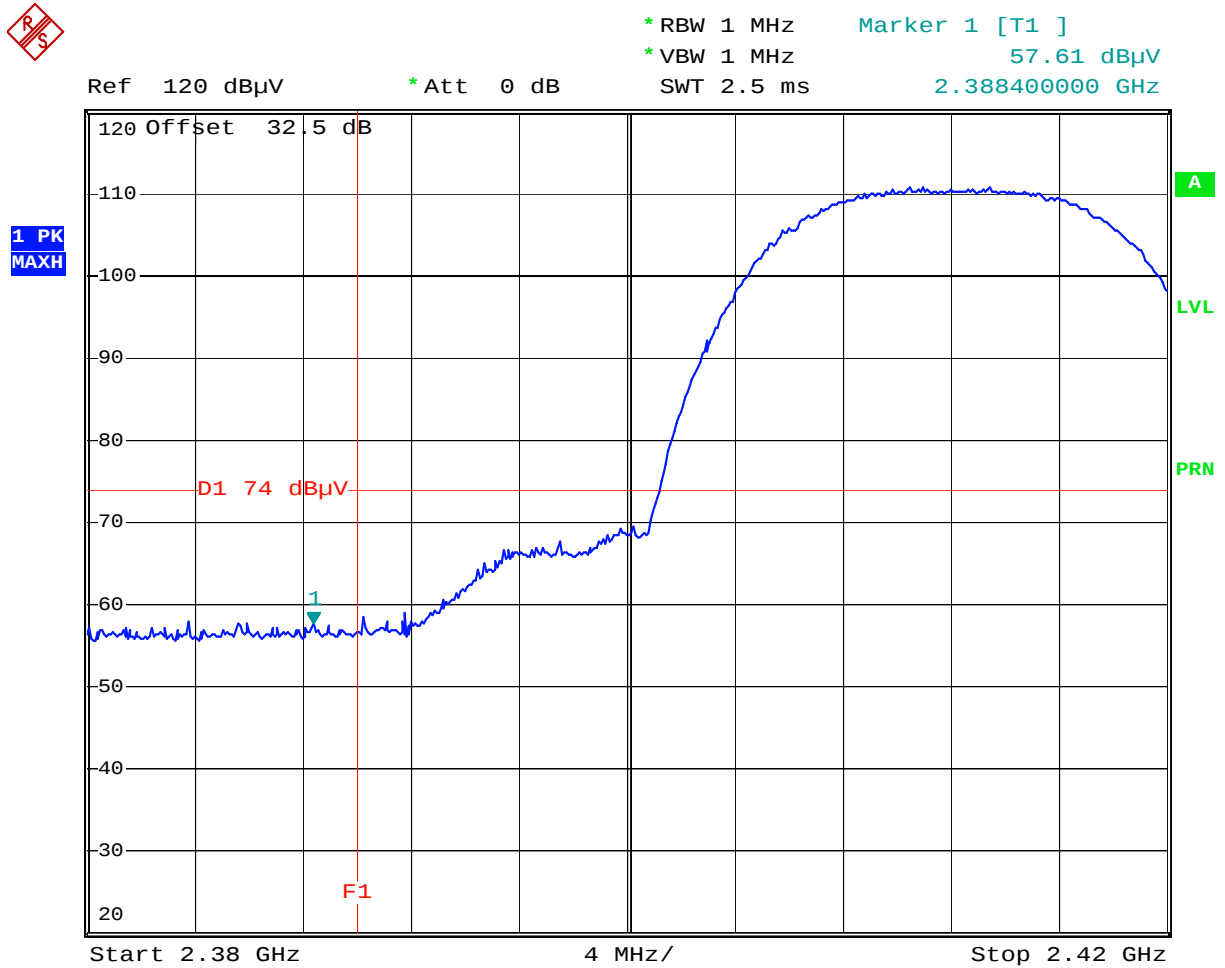
The EUT passed the test by 0.8 dB.

Plot 6.1



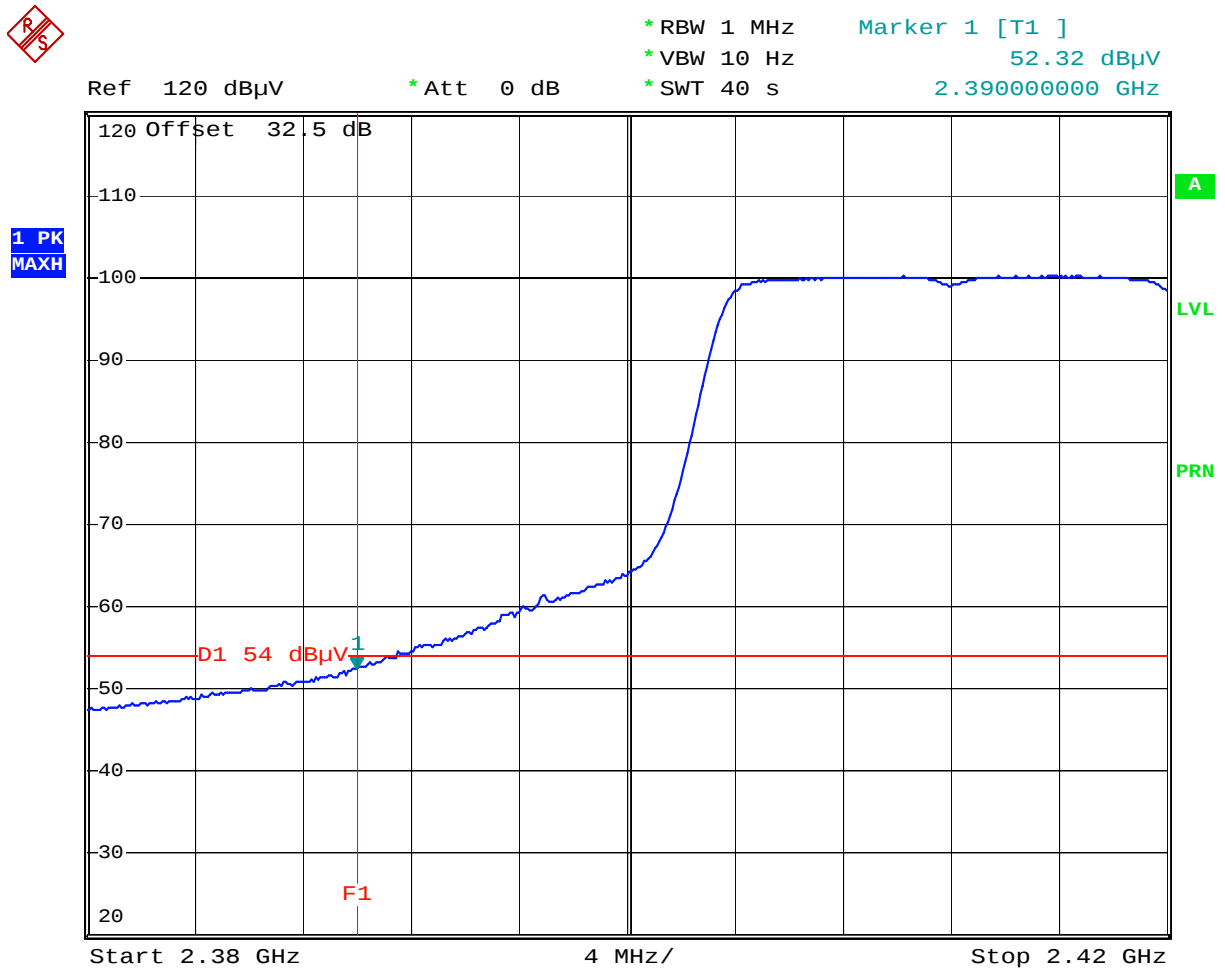
Comment: Radiated emissions, band-edge, 802.11b 11Mbps, average
Date: 27.OCT.2008 14:28:26

Plot 6.2



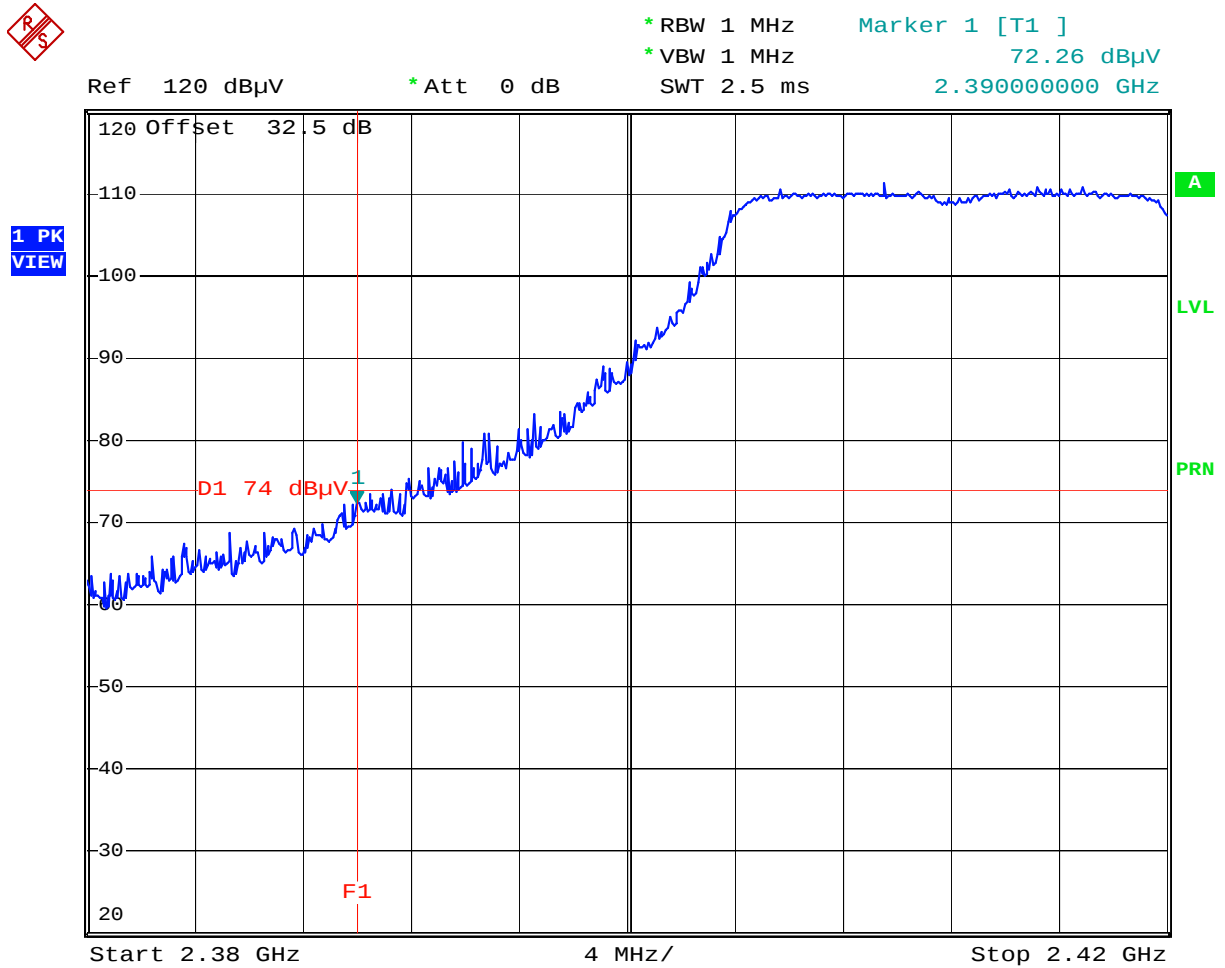
Comment: Radiated emissions, band-edge, 802.11b 11Mbps, peak
Date: 27.OCT.2008 14:27:05

Plot 6.3



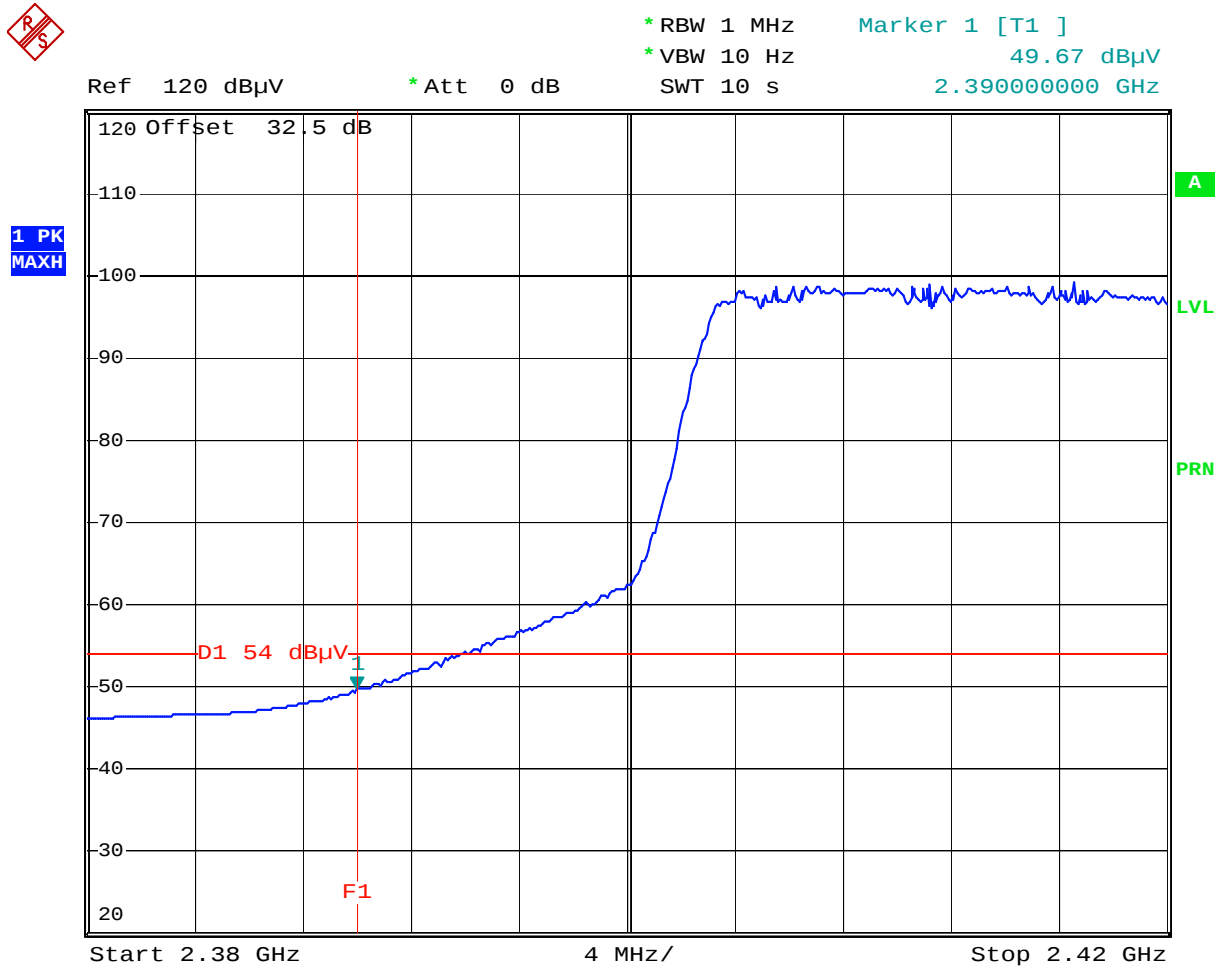
Comment: Radiated emissions, band-edge, 802.11g 6Mbps, average
 Date: 27.OCT.2008 14:23:35

Plot 6.4



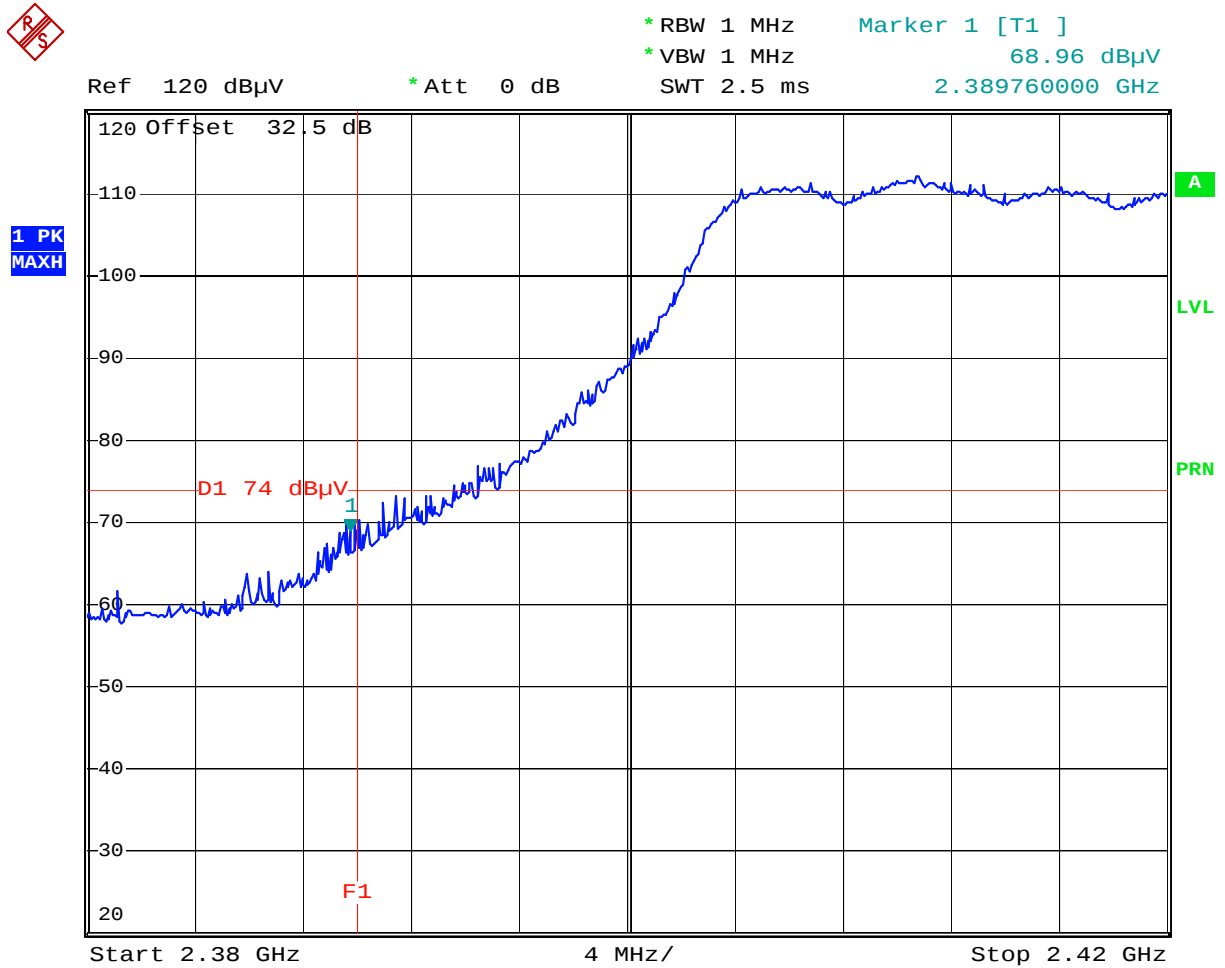
Comment: Radiated emissions, band-edge, 802.11g 6Mbps, peak
 Date: 27.OCT.2008 14:25:16

Plot 6.5



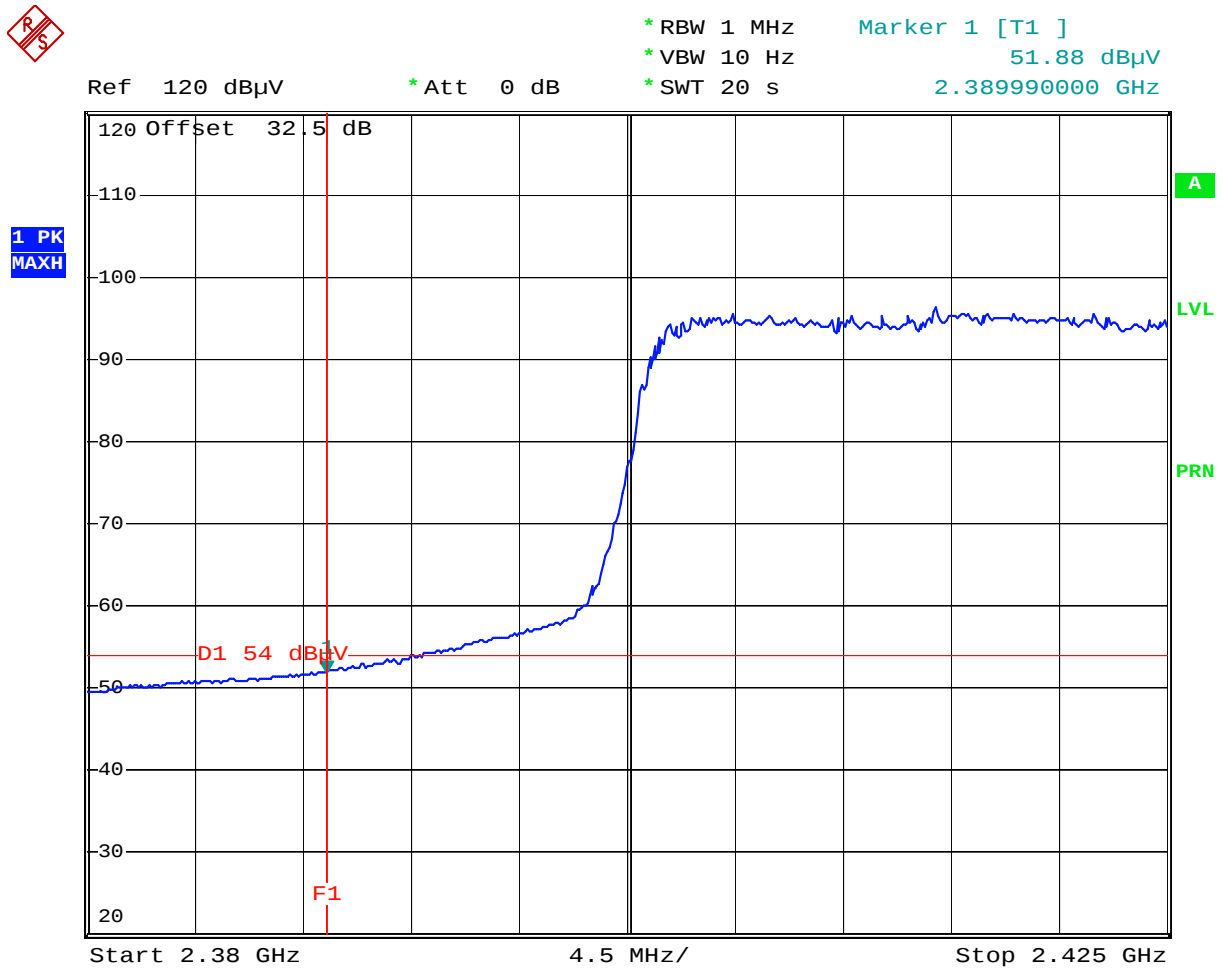
Comment: Radiated emissions, band-edge, 802.11n 6.5Mbps, average
Date: 27.OCT.2008 14:46:10

Plot 6.6



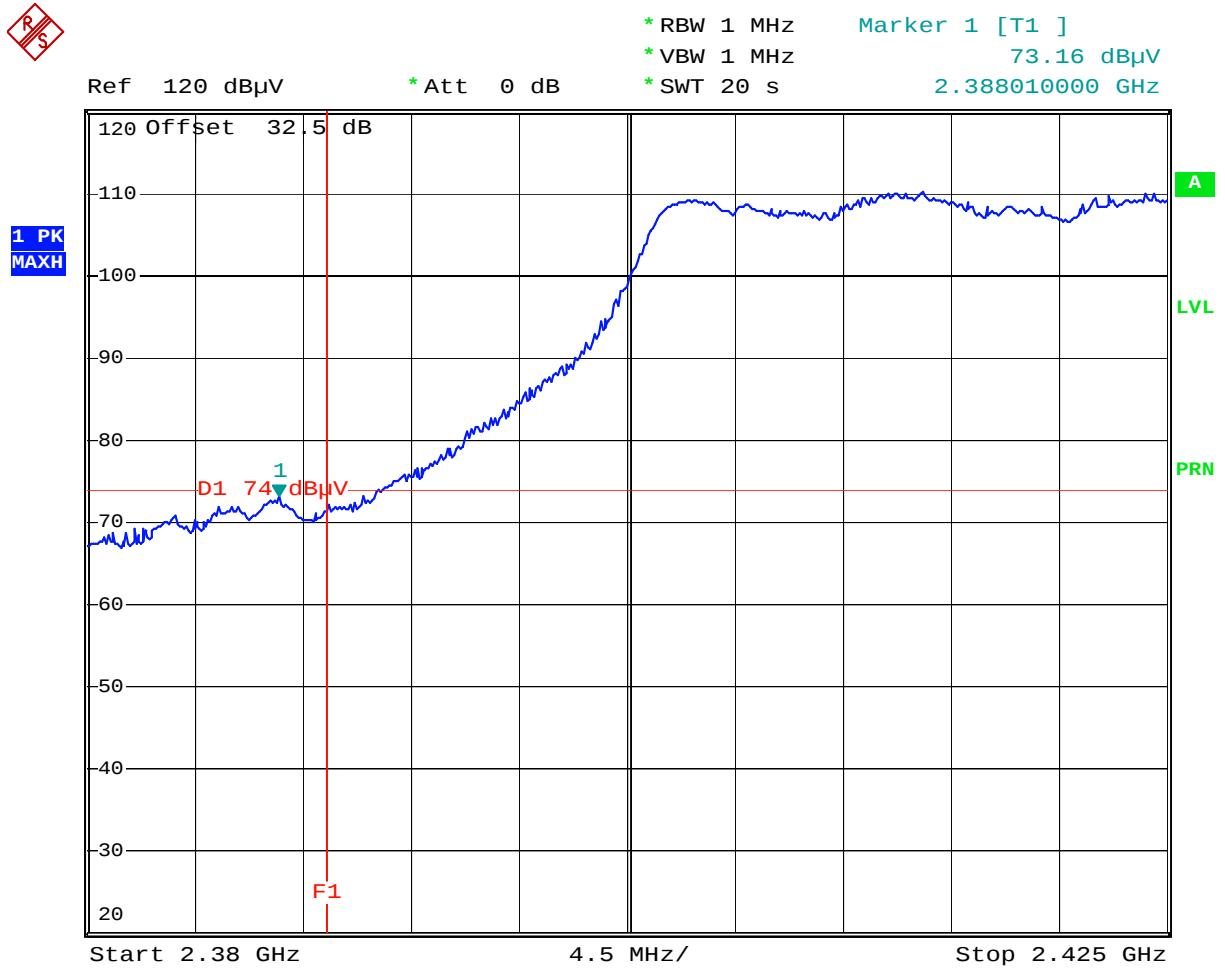
Comment: Radiated emissions, band-edge, 802.11n HT20 6.5Mbps, peak
Date: 27.OCT.2008 14:48:01

Plot 6.7



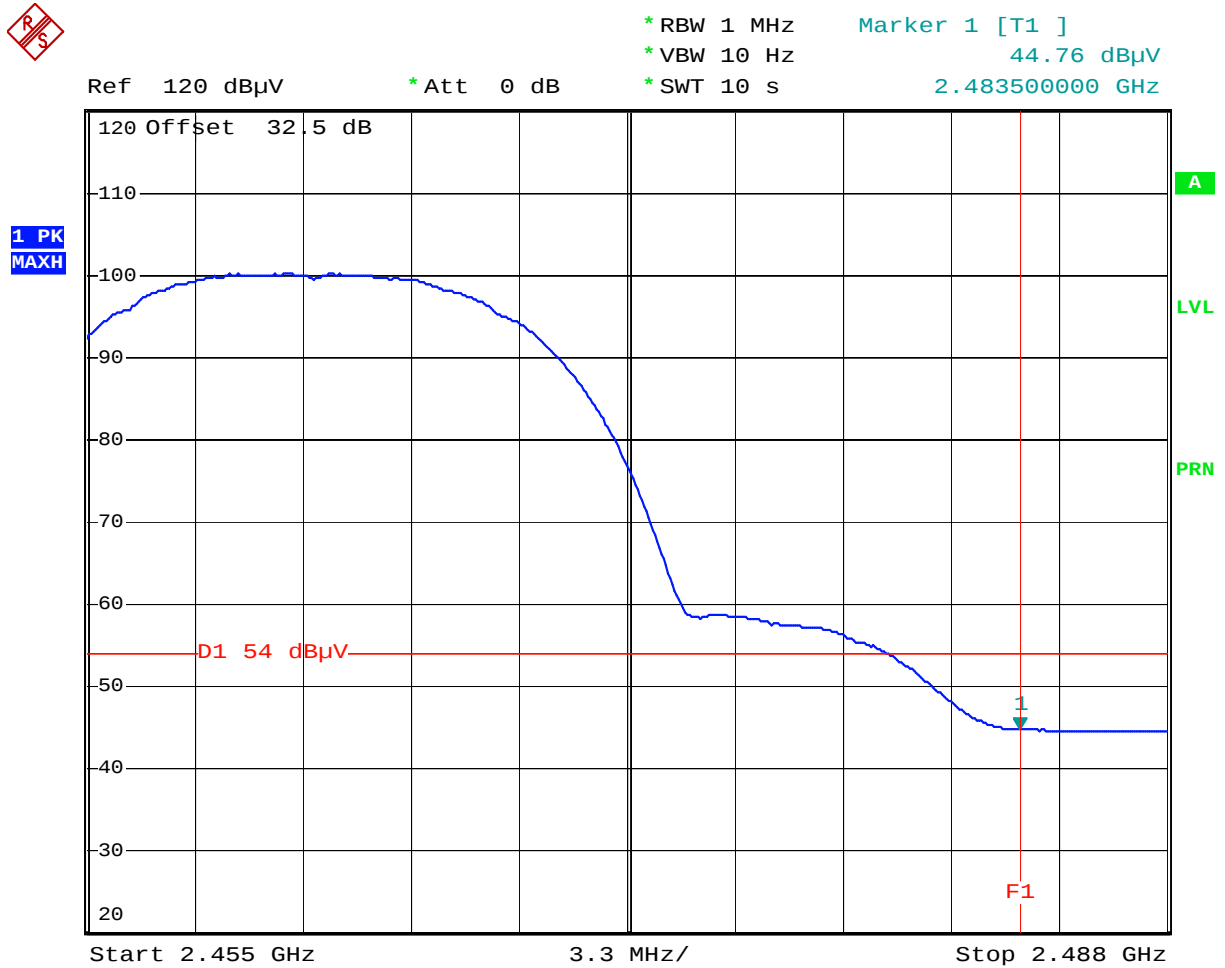
Comment: Radiated emissions, band-edge, 802.11n HT40 13.5Mbps, average
Date: 27.OCT.2008 16:37:45

Plot 6.8



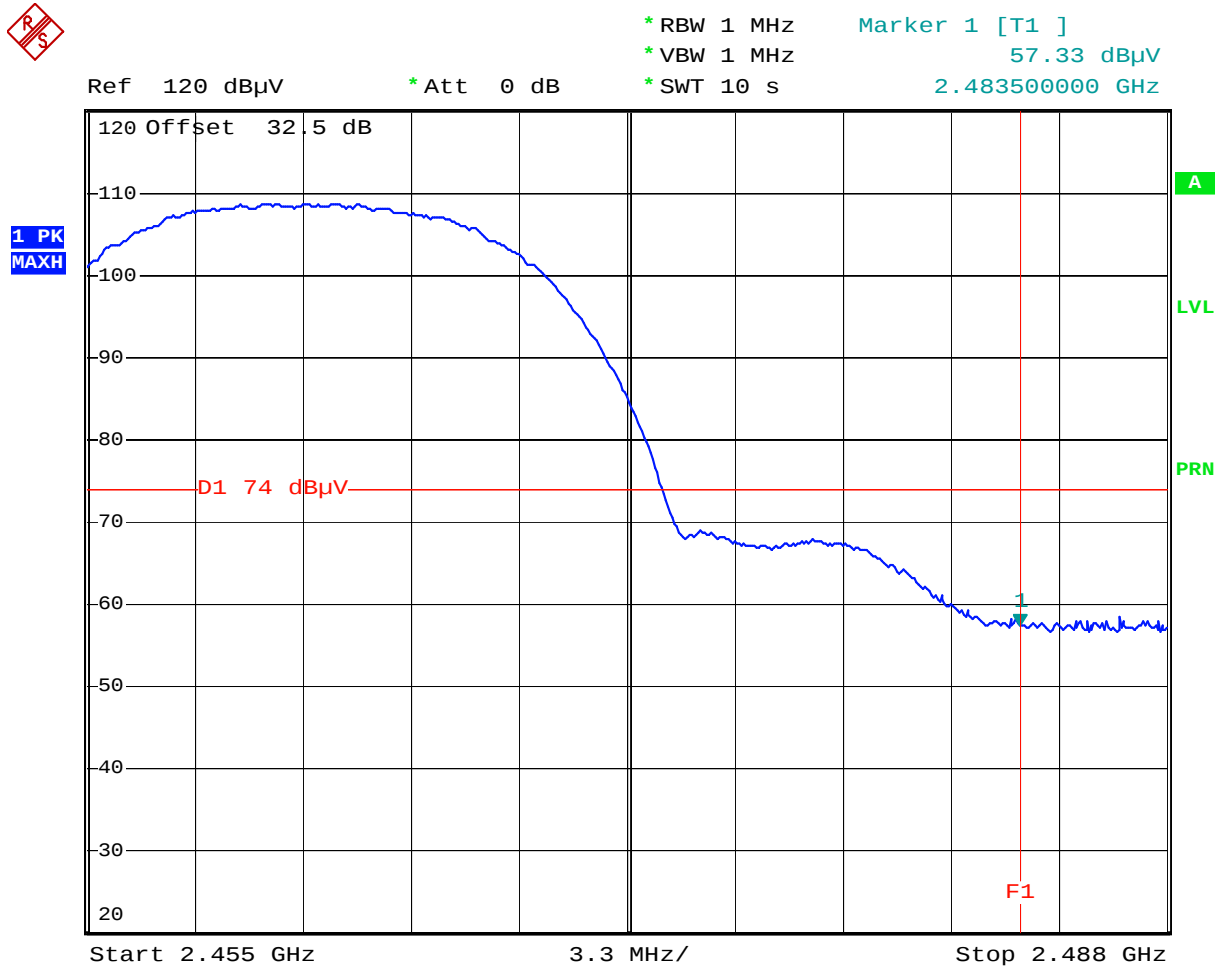
Comment: Radiated emissions, band-edge, 802.11n HT40 13.5Mbps, peak
 Date: 27.OCT.2008 16:34:52

Plot 6.9



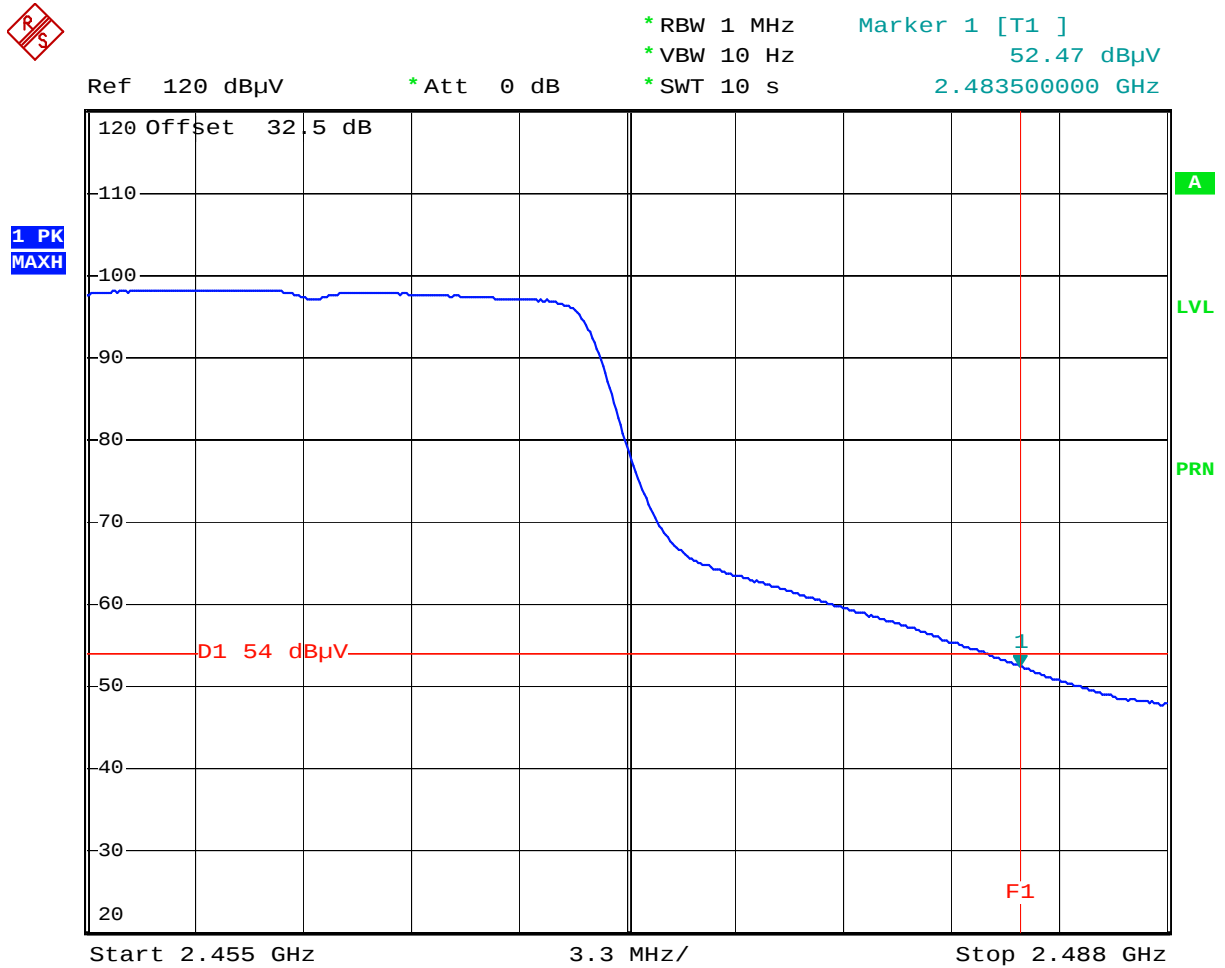
Comment: Radiated emissions, band-edge, 802.11b 11Mbps, average
Date: 27.OCT.2008 13:12:41

Plot 6.10



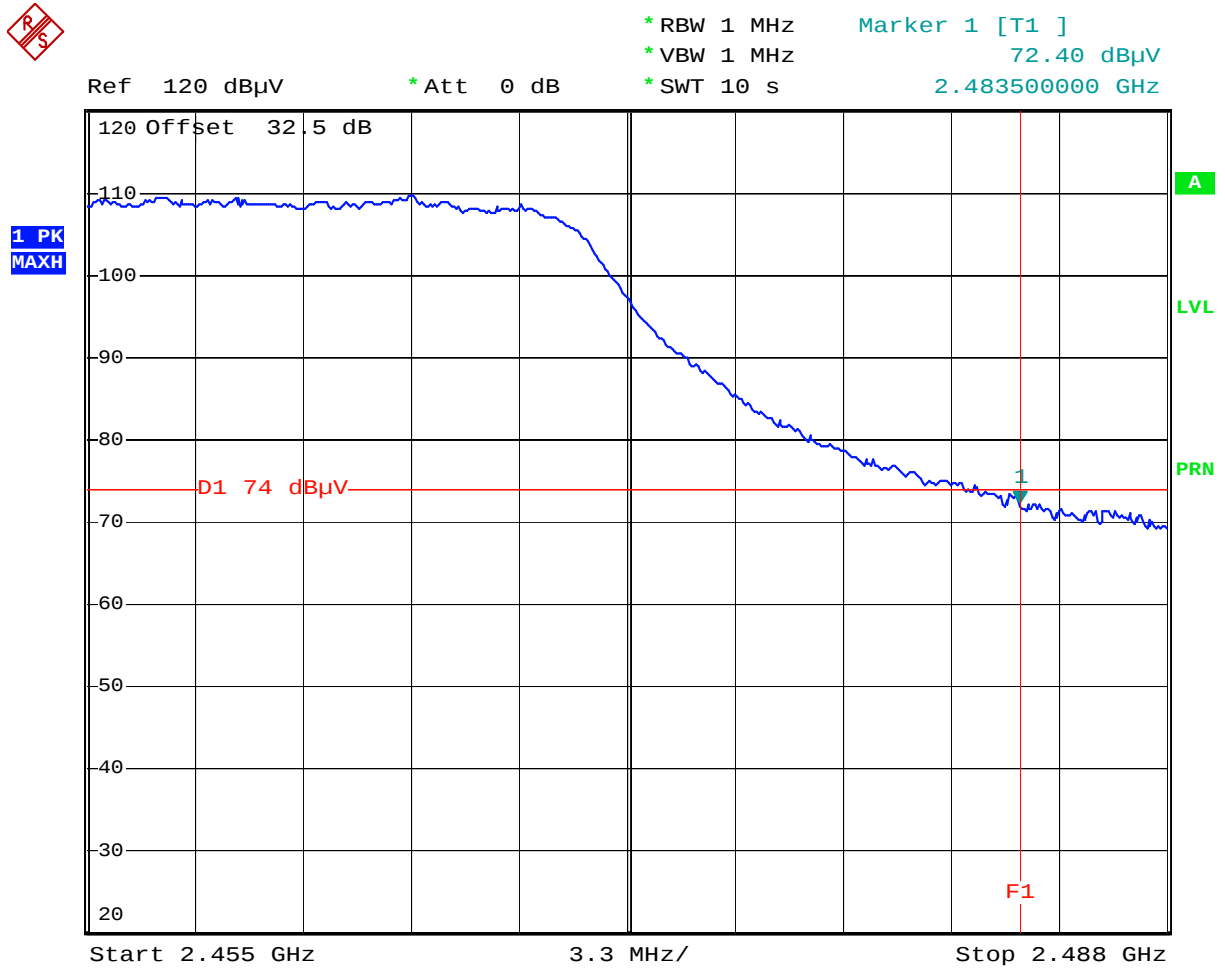
Comment: Radiated emissions, band-edge, 802.11b 11Mbps, peak
Date: 27.OCT.2008 13:11:23

Plot 6.11



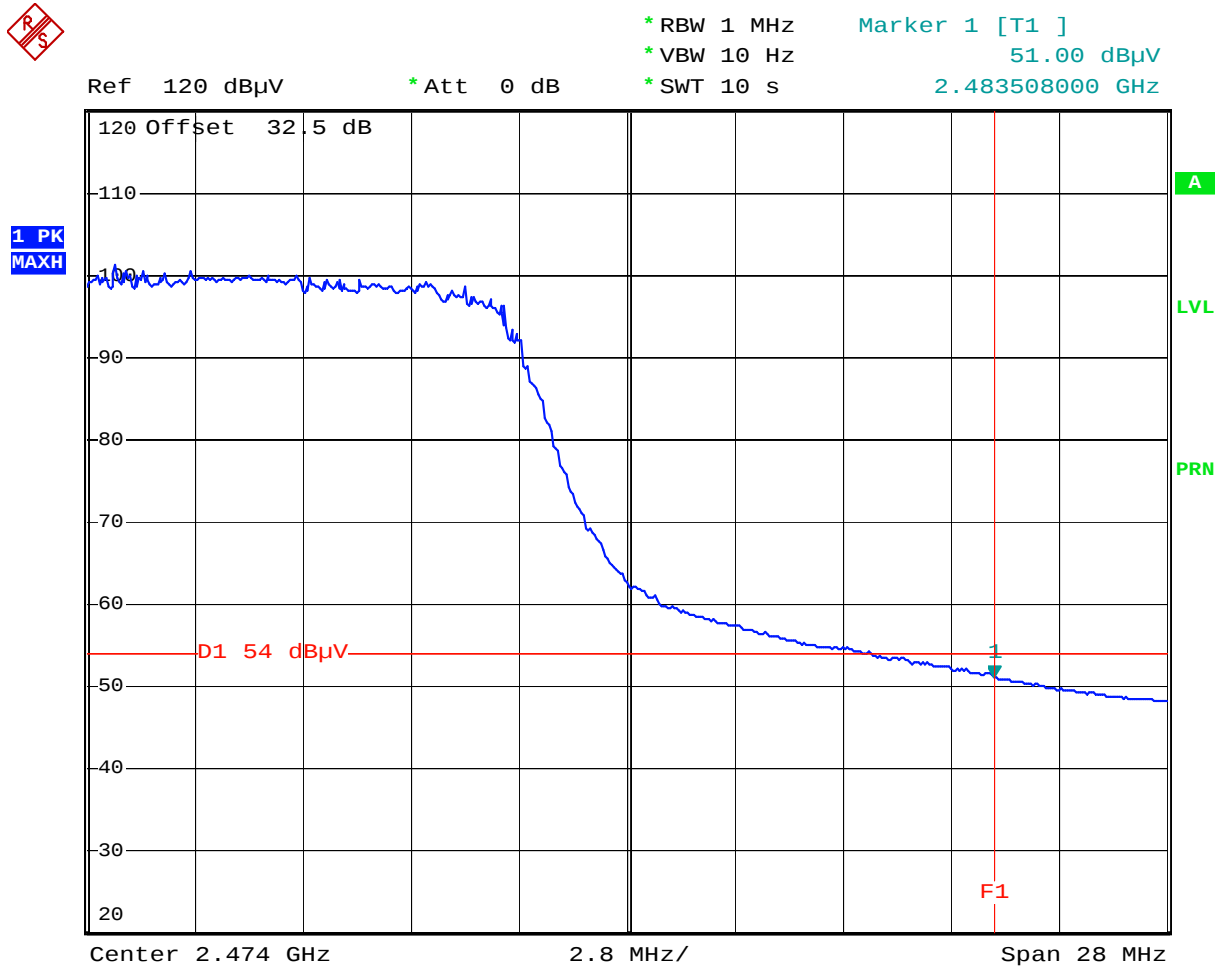
Comment: Radiated emissions, band-edge, 802.11g 6Mbps, average
 Date: 27.OCT.2008 13:07:15

Plot 6.12



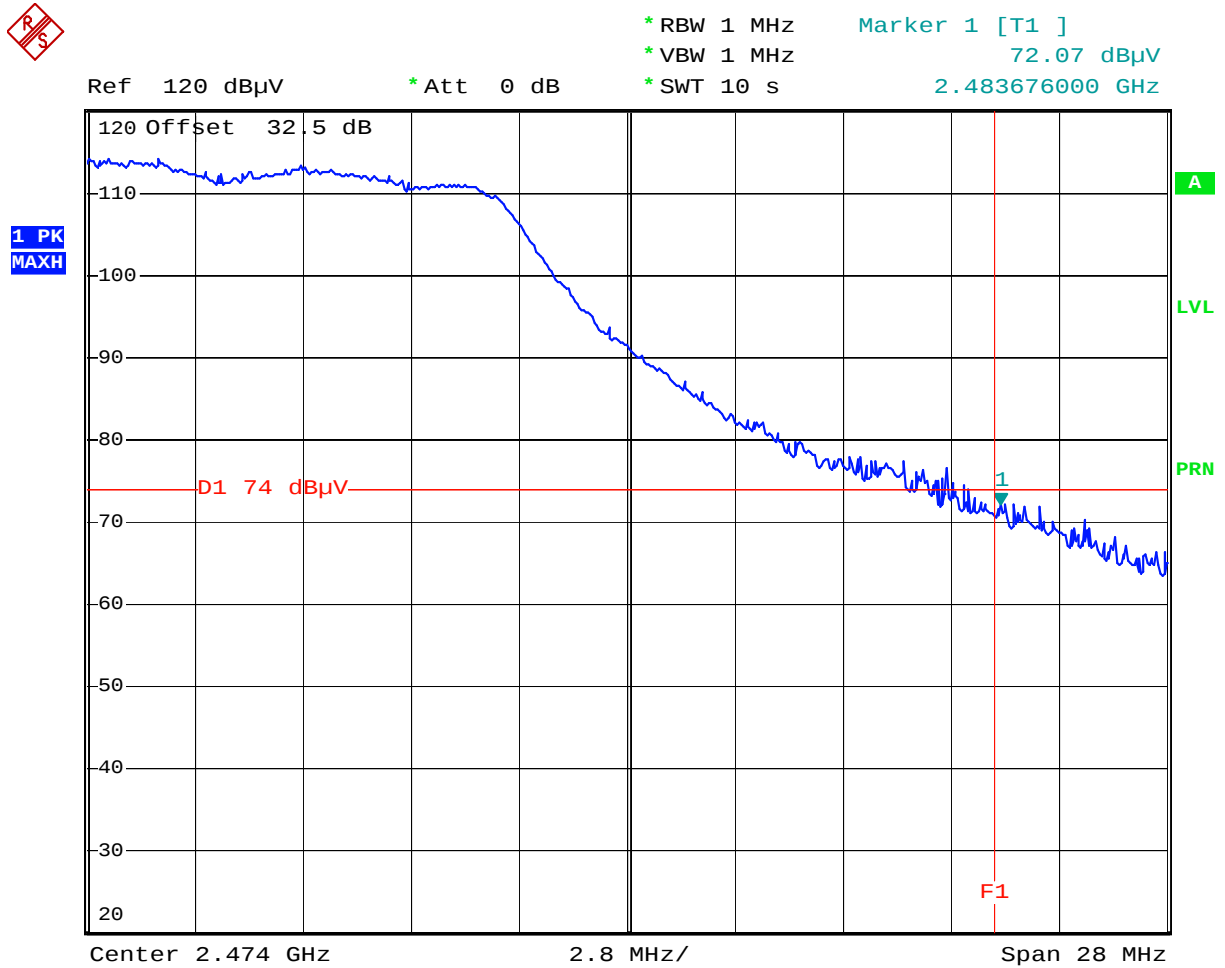
Comment: Radiated emissions, band-edge, 802.11g 6Mbps, peak
Date: 27.OCT.2008 13:09:12

Plot 6.13



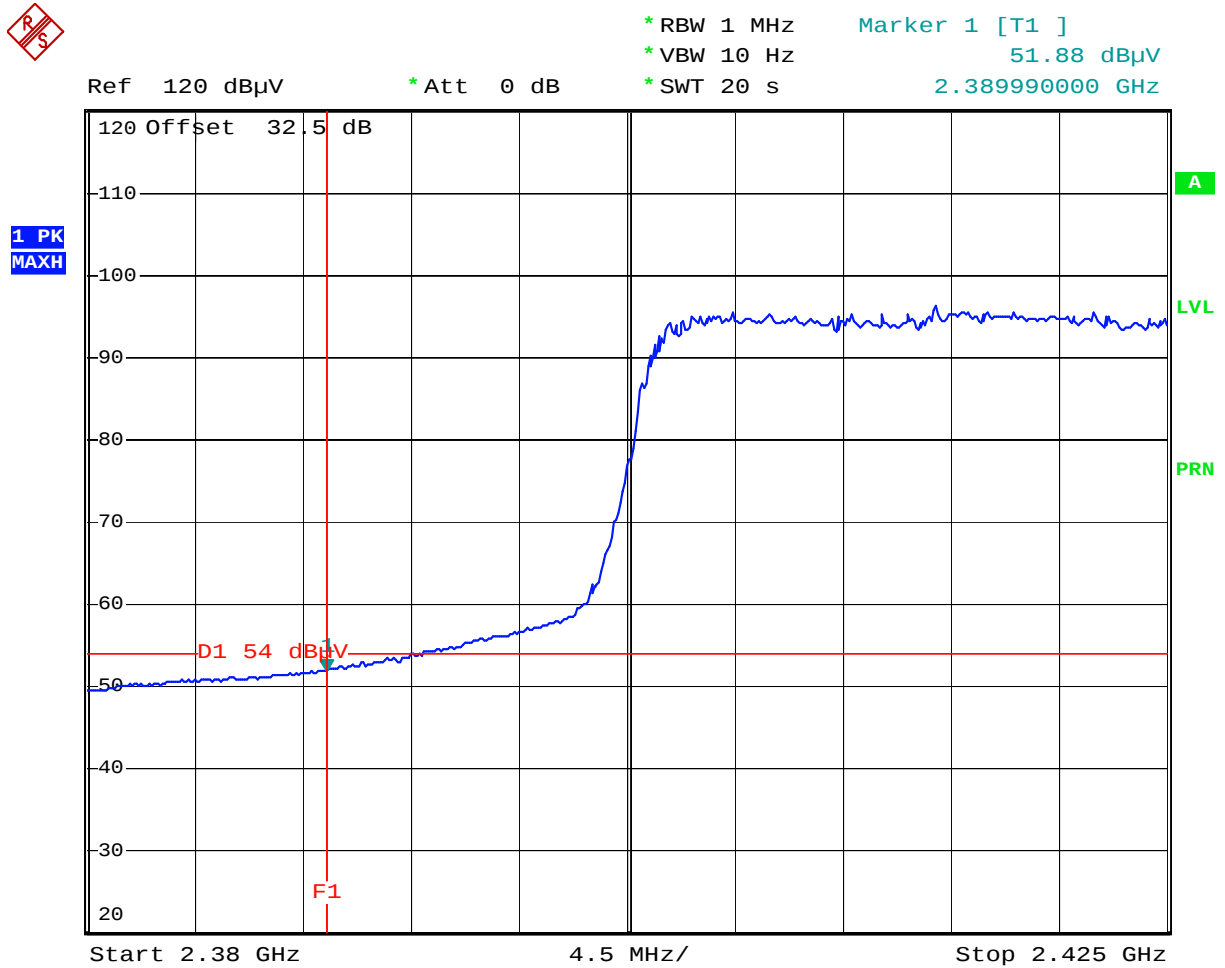
Comment: Radiated emissions, band-edge, 802.11n HT20 6.5Mbps, average
 Date: 27.OCT.2008 12:53:30

Plot 6.14



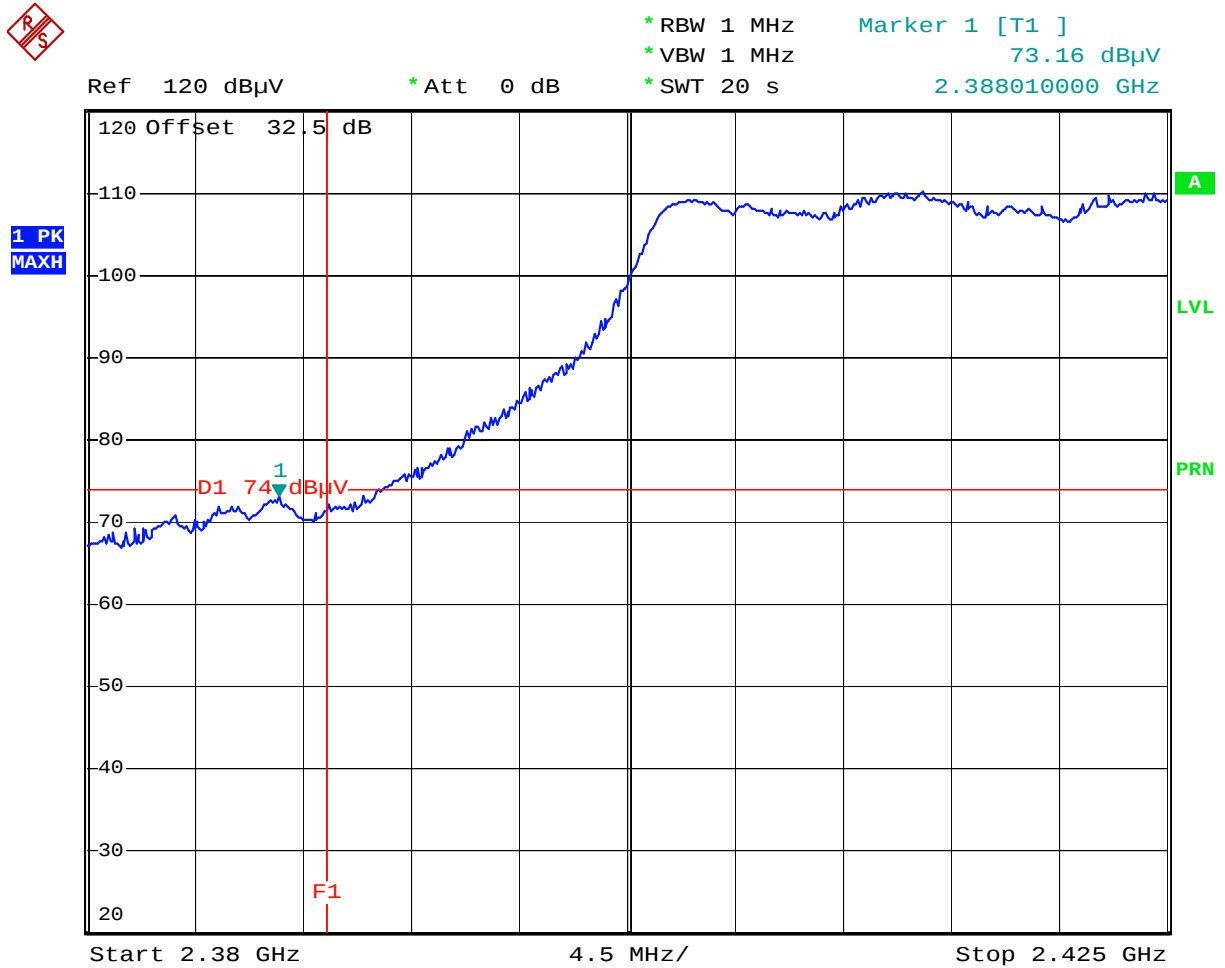
Comment: Radiated emissions, band-edge, 802.11n HT20 6.5Mbps, peak
 Date: 27.OCT.2008 12:51:29

Plot 6.15



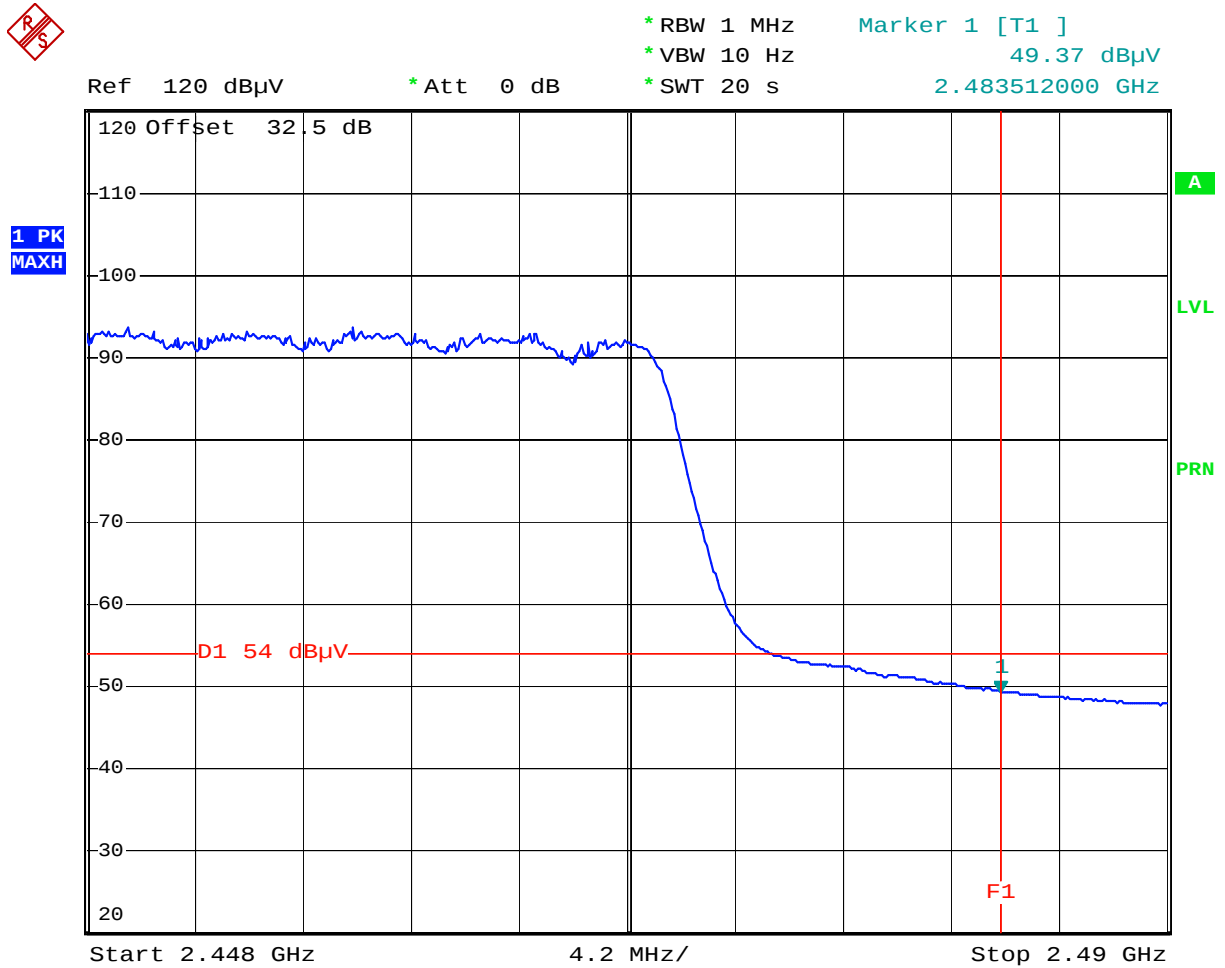
Comment: Radiated emissions, band-edge, 802.11n HT40 13.5Mbps, average
 Date: 27.OCT.2008 16:37:45

Plot 6.16



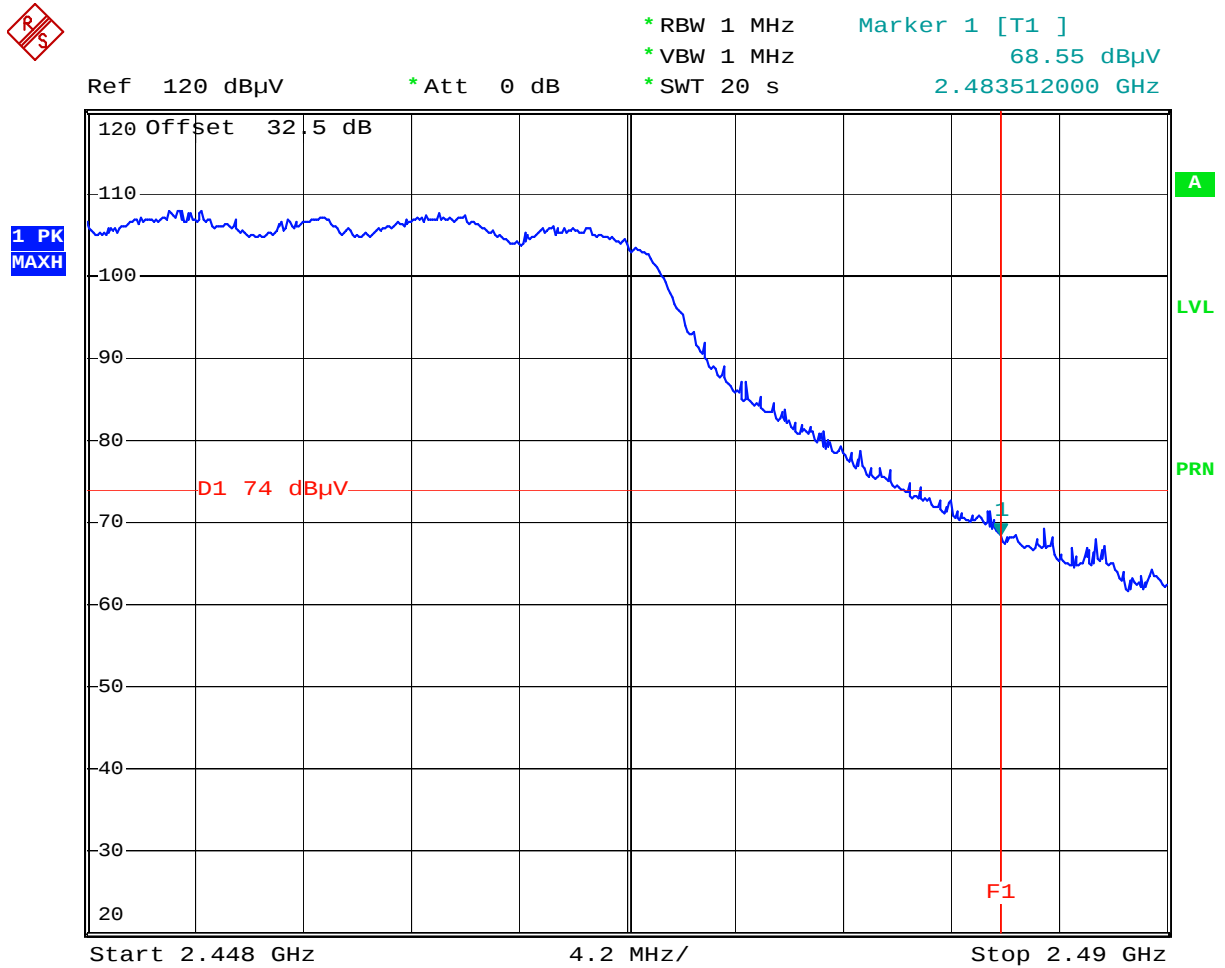
Comment: Radiated emissions, band-edge, 802.11n HT40 13.5Mbps, peak
 Date: 27.OCT.2008 16:34:52

Plot 6.17



Comment: Radiated emissions, band-edge, 802.11n HT40 13.5Mbps, average
 Date: 27.OCT.2008 16:51:26

Plot 6.18



Comment: Radiated emissions, band-edge, 802.11n HT40 13.5Mbps, peak
 Date: 27.OCT.2008 16:53:30

4.6.5 Test Result - other restricted bands

The data on the following pages lists the significant emission frequencies, the limit and the margin of compliance for the worst-case configuration.

Results	Complies by 7.9 dB
----------------	---------------------------

Temperature: 20.5 C	Company: WatchGuard
Humidity: 49.5 %	Model: XP3E6W
Measurement distance: 3 m	Date: October 23, 2008; Engineer: DC

Frequency		FS at 3m	SA reading	Corr. Factor *	Antenna factor	FS Limit	Margin
MHz		dB(uV/m)	dB(uV)	dB	dB(1/m)	dB(uV/m)	dB
Ch. 1, 2412 MHz							
4824	Peak	53.1	48.9	29.2	33.4	74	-20.9
4824	Average	38.1	33.9	29.2	33.4	54	-15.9
7236	Peak	48.8	39.1	26.6	36.3	74	-25.2
7236	Average	32.1	22.4	26.6	36.3	54	-21.9
12060	Peak	45.8	35.8	28.8	38.8	74	-28.2
12060	Average	35.3	22.3	25.8	38.8	54	-18.7
Ch. 6, 2437 MHz							
4874	Peak	47.4	43.1	29.5	33.8	74	-26.6
4874	Average	37.2	32.9	29.5	33.8	54	-16.8
7311	Peak	50.1	39.0	26.0	37.1	74	-23.9
7311	Average	36.2	25.1	26.0	37.1	54	-17.8
12185	Peak	48.8	35.7	26.1	39.2	74	-25.2
12185	Average	35.4	22.3	26.1	39.2	54	-18.6
Ch. 11, 2462 MHz							
4924	Peak	52.9	47.9	29.5	34.5	74	-21.1
4924	Average	39.6	34.6	29.5	34.5	54	-14.4
7386	Peak	49.8	38.7	26.7	37.8	74	-24.2
7386	Average	36.4	25.3	26.7	37.8	54	-17.6
12310	Peak	49.3	36.1	26.3	39.5	74	-24.7
12310	Average	35.5	22.3	26.3	39.5	54	-18.5
Ch. 3, 2422 MHz							
4844	Peak	46.8	42.9	29.6	33.5	74	-27.2
4844	Average	33.5	29.6	29.6	33.5	54	-20.5
7266	Peak	49.3	39.0	26.2	36.5	74	-24.7
7266	Average	35.4	25.1	26.2	36.5	54	-18.6
12110	Peak	48.8	35.9	26.1	39.0	74	-25.2
12110	Average	35.3	22.4	26.1	39.0	54	-18.7
Ch. 9, 2452 MHz							
4904	Peak	46.1	41.6	29.6	34.1	74	-27.9
4904	Average	33.1	28.6	29.6	34.1	54	-20.9
7356	Peak	49.1	37.9	26.1	37.3	74	-24.9
7356	Average	35.0	23.8	26.1	37.3	54	-19.0
12260	Peak	49.3	36.0	26.1	39.4	74	-24.7
12260	Average	35.4	22.1	26.1	39.4	54	-18.6

* Correction factor = CA - AG

All other emissions not reported are at least 10 dB below the limit.

Temperature: 20.5 C	Company: WatchGuard
Humidity: 49.5 %	Model: XP3E6W
Measurement distance: 3 m	Date: October 23, 2008; Engineer: DC

Frequency		FS at 3m	SA reading	Corr. Factor *	Antenna factor	FS Limit	Margin
MHz		dB(uV/m)	dB(uV)	dB	dB(1/m)	dB(uV/m)	dB
Ch. 149, 5745 MHz							
11490	Peak	59.6	47.1	26.5	39	74	-14.4
11490	Average	46.1	33.6	26.5	39	54	-7.9
22980	Peak	49.0	48.7	40.1	40.4	74.0	-25.0
22980	Average	35.9	35.6	40.1	40.4	54.0	-18.1
Ch. 157, 5785 MHz							
11570	Peak	57.9	45.3	26.5	39.1	74	-16.1
11570	Average	45.5	32.9	26.5	39.1	54	-8.5
Ch. 165, 5825 MHz							
11650	Peak	59.5	47	26.6	39.1	74	-14.5
11650	Average	43.6	31.1	26.6	39.1	54	-10.4
Ch. 153, 5765 MHz							
11530	Peak	55.6	42.8	26.3	39.1	74	-18.4
11530	Average	43.9	31.1	26.3	39.1	54	-10.1
23060	Peak	48.3	48.5	40.6	40.4	74.0	-25.7
23060	Average	35.3	35.5	40.6	40.4	54.0	-18.7
Ch. 161, 5805 MHz							
11610	Peak	57.3	44.8	26.6	39.1	74	-16.7
11610	Average	44.7	32.2	26.6	39.1	54	-9.3

* Correction factor = CA - AG

All other emissions not reported are at least 10 dB below the limit.

4.7 AC Line Conducted Emission, FCC Rule 15.207

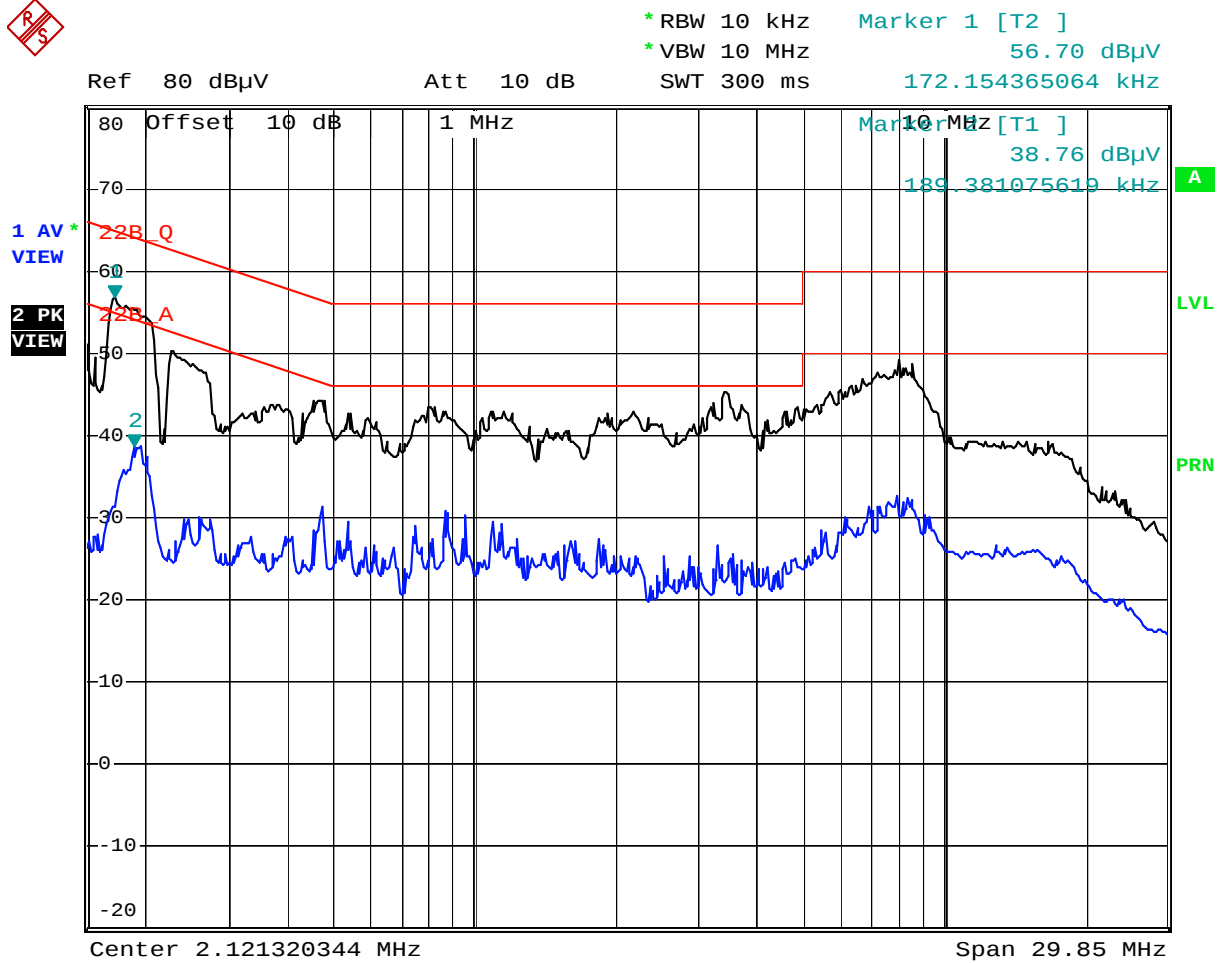
4.7.1 Procedure

AC line conducted emission test was performed according the ANSI C63.4 standard. The EUT was connected to AC Line through the LISN.

4.7.2 Test Result

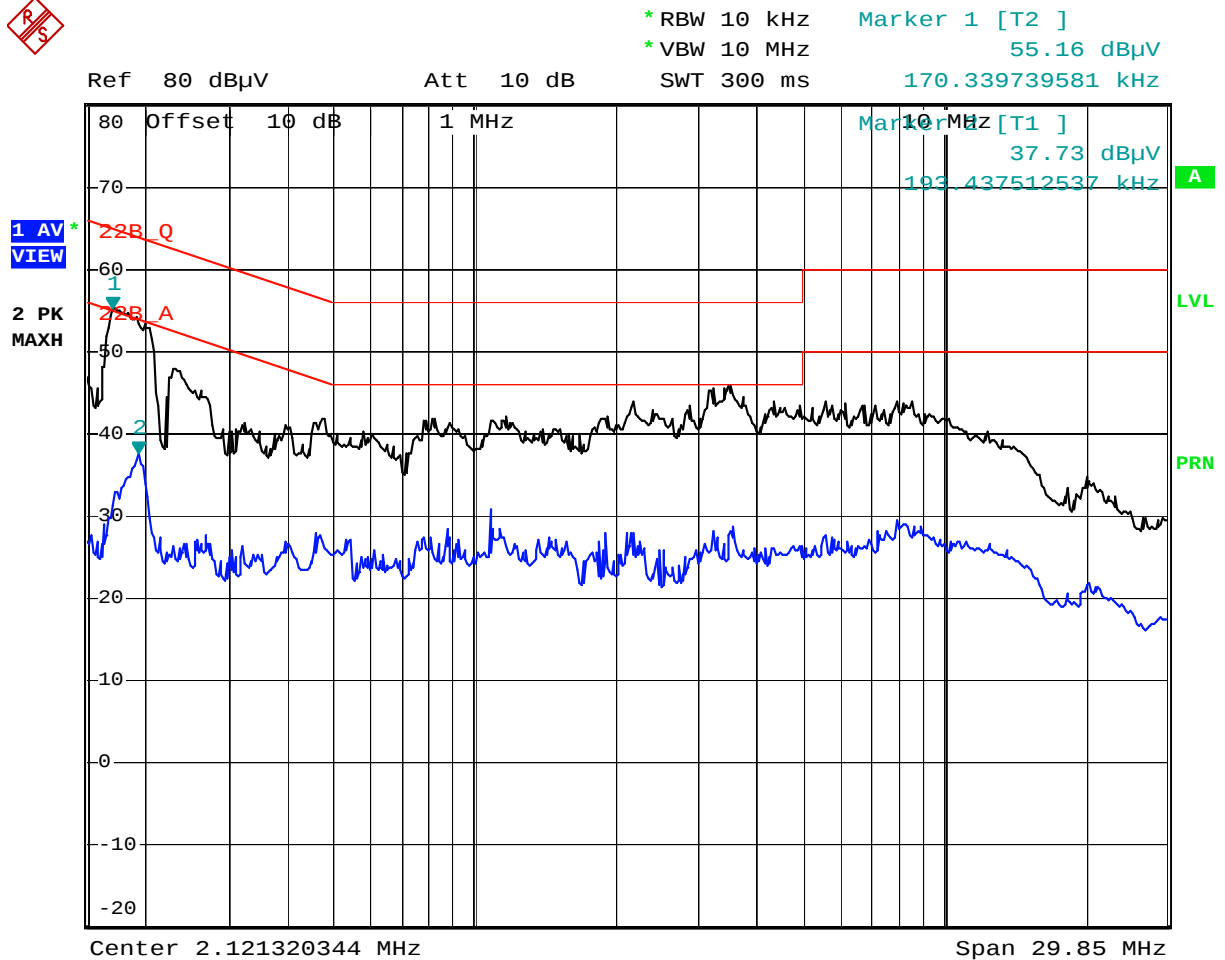
Refer to following Plots

Results	Complies by 8.0 dB
----------------	---------------------------



Comment: AC line conducted, Line 1, 120 V, 60 Hz
 Date: 4.NOV.2008 16:02:17

Black trace – Peak
 Blue trace – Average



Comment: AC line conducted, Line 2, 120 V, 60 Hz
 Date: 4.NOV.2008 16:05:46

Black trace – Peak
 Blue trace - Average

4.8 Radiation exposure evaluation

The model XP3E6W is a Wireless Access Point. It is desktop or wall-mounted device used with AC power adapter in mobile application, at least 20 cm from any body part of the user or nearby persons.

The maximum conducted peak power is 27.0 dBm, antenna is fix-mounted, 2 dBi gain (maximum). Therefore, to comply with RF Exposure Requirement, the MPE is calculated.

The maximum EIRP calculated is 0.8 W. The Power Density can be calculated using the formula

$$S = \text{EIRP} / 4\pi D^2$$

Where: S is Power Density in W/m^2

D is the distance from the antenna.

At distance of 0.2 m, $S = 1.6 \text{ W/m}^2$ which is below MPE Limit of 10 W/m^2

5.0 List of Test Equipment

Measurement equipment used for emission compliance testing utilized the equipment on the following list:

Equipment	Manufacturer	Model/Type	Serial #	Cal Int	Cal Due
EMI Receiver	Hewlett Packard	8546A	3710A00373	12	10/03/09
Spectrum Analyzer	R & S	FSP40	036612004	12	10/03/09
BI-Log Antenna	Antenna Research	LPB-2513	1154	12	06/11/09
Double-rigged Horn Antenna	EMCO	3115	8812-3049	12	07/29/09
Pyramidal Horn Antenna	EMCO	3160-09	Not Labeled	#	#
Pyramidal Horn Antenna	EMCO	3160-10	Not Labeled	#	#
Pre-Amplifier	Hewlett Packard	HP8447D	2944A09519	12	07/01/09
Pre-Amplifier	Miteq	AMF-4D-001180-24-10P	799159	12	07/28/09
LISN	FCC	FCC-LISN-50-50-M-H	2012	12	09/19/09

No Calibration required



6.0 Document History

Revision/ Job Number	Writer Initials	Date	Change
1.0 / 3160445	DC	September 30, 2008	Original document