

TEST REPORT

Report Number: 3168437MPK-001

Project Number: 3168437

February 5, 2009

Testing performed on the
802.11a WLAN
Model Number: Wi-9P 9215
FCC ID: MCQ-50M1589
IC: 1846A-W9P9215
to

FCC Part 15, Subpart E
RSS-210 Annex 9

for

Digi International GmbH Branch Breisach

Test Performed by:
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1.0 Introduction

1.1 Summary of Tests

FCC ID: MCQ-50M1589

IC ID: 1846A-W9P9215

Test	Reference FCC	Reference RSS-210	Result
Output power	15.407(a)(2)	A9.2(1)	Complies
26 dB/Occupied Bandwidth	15.407(a)(2)	A9.2(1)	
Peak power spectral density	15.407(a)(2)	A9.2(1)	Complies
Out-of-band Antenna Conducted Emission	15.407(b)(3)	A9.3(1)	Complies
Peak excursion	15.407(a)(6)	-	Complies
Radiated Emission above 1 GHz	15.209, 15.205	A9.3(1)	Complies
Radiated Emission below 1 GHz	15.209	A9.3(1)	Complies
AC Line-conducted Emission	15.207	RSS-Gen	Complies
Frequency stability	15.407(g)	A9.5(5)	Complies
Channel move time	15.407(h)(iii)	A9.4(b)(iii)	Complies
Channel closing time	15.407(h)(iii)	A9.4(b)(iv)	Complies
Non-occupancy period	15.407(h)(iv)	A9.4(b)(v)	Complies
RF Exposure Requirement	2.1091	RSS-102	Complies, see exhibit "RF Exposure"
Antenna Requirement	15.203	RSS-Gen	Complies. Unique antenna connector is used

EUT receive date: November 4, 2008

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

Test start date: November 4, 2008

Test completion date: February 10, 2009

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

2.0 General Description

2.1 Product Description

The Equipment under Test (EUT) is an 802.11a WLAN radio module operating in 5.2 GHz, 5.3 GHz, 5.6 GHz and 5.8 GHz bands. The EUT supports data rates from 6 Mbps to 54 Mbps.

As declared by the Applicant, the EUT is a Client device without DFS capability.

The information about the radio, installed in the model Wi-9P 9215, is presented below.

Applicant	Digi International GmbH Branch Breisach
Model No.	Wi-9P 9215
FCC Identifier	MCQ-50M1589
IC Identifier	1846A-W9P9215
Use of Product	WLAN
Modulation Technique	OFDM
Rated RF Output	20 mW (average)
Frequency Range	5150 – 5250 MHz 5250 – 5350 MHz 5470 – 5725 MHz 5725 – 5825 MHz
Type of modulation	DSSS: DBPSK, DQPSK, CCK OFDM: BPSK, QPSK, 16QAM, 64QAM
Number of Channel(s)	4 – in 5150 – 5250 MHz band 4 – in 5250 – 5350 MHz band 11 – in 5470 – 5725 MHz band 4 – in 5725 – 5825 MHz band
Antenna(s) & Gain,	Dipole: Operating frequencies: 4.9 – 5.825 GHz Peak gain: 5.5 dBi typ. Reverse SMA connector.
Manufacturer Name & Address	Digi International GmbH Branch Breisach Kueferstr. 8, 79206, Breisach, Germany

List of channels:

√ - available

X - tested

Number	Frequency, MHz	Channels to be tested
Channels in 5.2 GHz band		
36	5180	x
40	5200	x
44	5220	
48	5240	x
Channels in 5.3 GHz band		
52	5260	x
56	5280	x
60	5300	
64	5320	x
Channels in 5.6 GHz band		
100	5500	x
.	.	.
120	5600	x
.	.	.
140	5700	x
Channels in 5.8 GHz band		
149	5745	x
153	5765	
157	5785	x
161	5805	x

2.2 Related Submittal(s) Grants

None.

2.3 Test Methodology

Both conducted and radiated emissions measurements were performed according to the procedures in ANSI C63.4. 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 parts 2 and 15 of CFR 47.

2.4 Test Facility

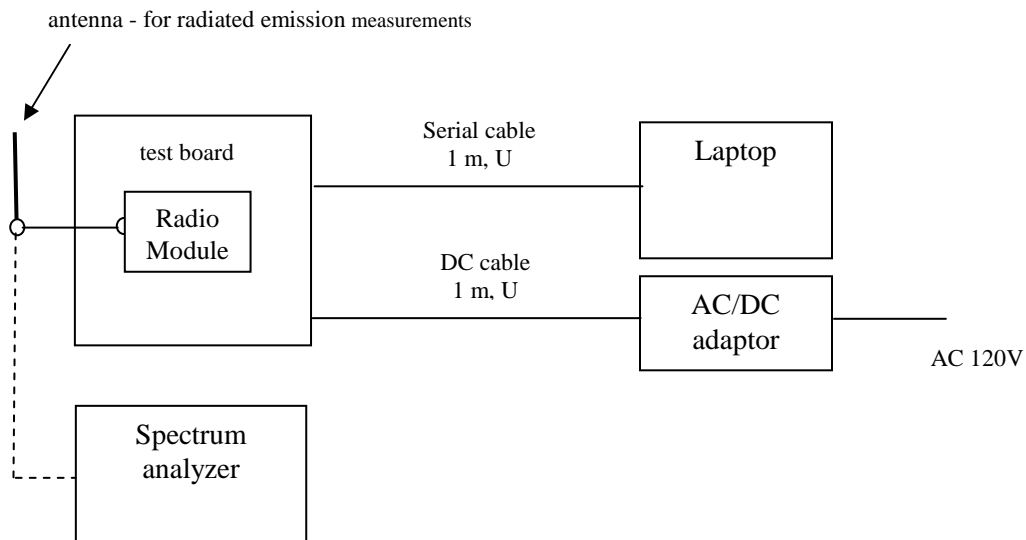
The test site and conducted measurement facility used to collect the radiated data is site 1, a 10 meter semi-anechoic chamber. This test facility and site measurement data have been fully placed on file with the FCC and A2LA accredited.

3.0 System Test Configuration

3.1 Support Equipment

Description	Model No.	Serial No.
Laptop	Armada 7400	Series 2910B

3.2 Block Diagram of Test Setup



AC/DC Adaptor: model TR10R120 manufactured by Cincon Electronics Co., Ltd.

Note: This block diagram was used for all tests except for DFS tests.

S = Shielded	F = With Ferrite
U = Unshielded	m = Meter

3.3 Justification

Preliminary testing was performed for all modulation/data rate modes. The highest power was detected in the mode with 6 Mbps; therefore, 6 Mbps was selected for final measurements.

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.

3.6 Additions, deviations and exclusions from standards

No additions, deviations or exclusion have been made from standard.

4.0 Measurement Results

4.1 26-dB Bandwidth and Occupied Bandwidth

Procedure

The Procedure, described in the FCC Public Notice DA 02-2138, was used.

The antenna port of the EUT was connected to the input of a spectrum analyzer (SA). 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 26 dB lower than PEAK level. The 26-dB bandwidth was determined from where the channel output spectrum intersected the display line.

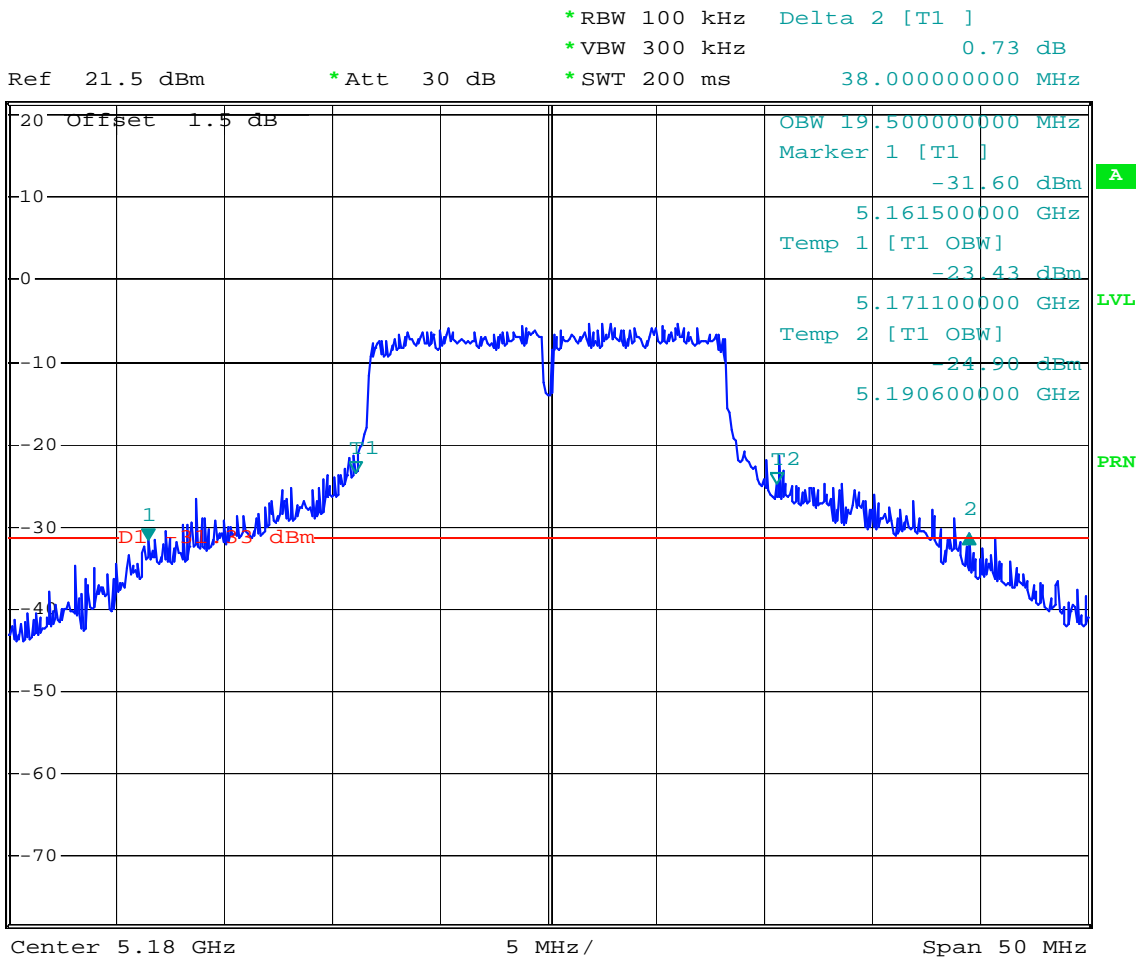
In addition, the occupied bandwidth was measured using the build-in spectrum analyzer facility for 99% power bandwidth measurement.

Test Result

The test results are presented on the following plots 1.1 – 1.12 and summarized in the table below.

Channel	Frequency MHz	26-dB Bandwidth, MHz	Occupied Bandwidth, MHz	Plot #
36	5180	38.0	19.5	1.1
40	5200	37.7	19.8	1.2
48	5240	38.8	12.1	1.3
52	5260	32.1	16.7	1.4
56	5280	33.9	16.7	1.5
64	5320	34.1	16.9	1.6
100	5500	38.5	21.7	1.7
120	5600	36.9	19.0	1.8
140	5700	35.4	17.2	1.9
149	5745	37.3	19.0	1.10
157	5785	37.9	18.8	1.11
161	5805	35.7	17.5	1.12

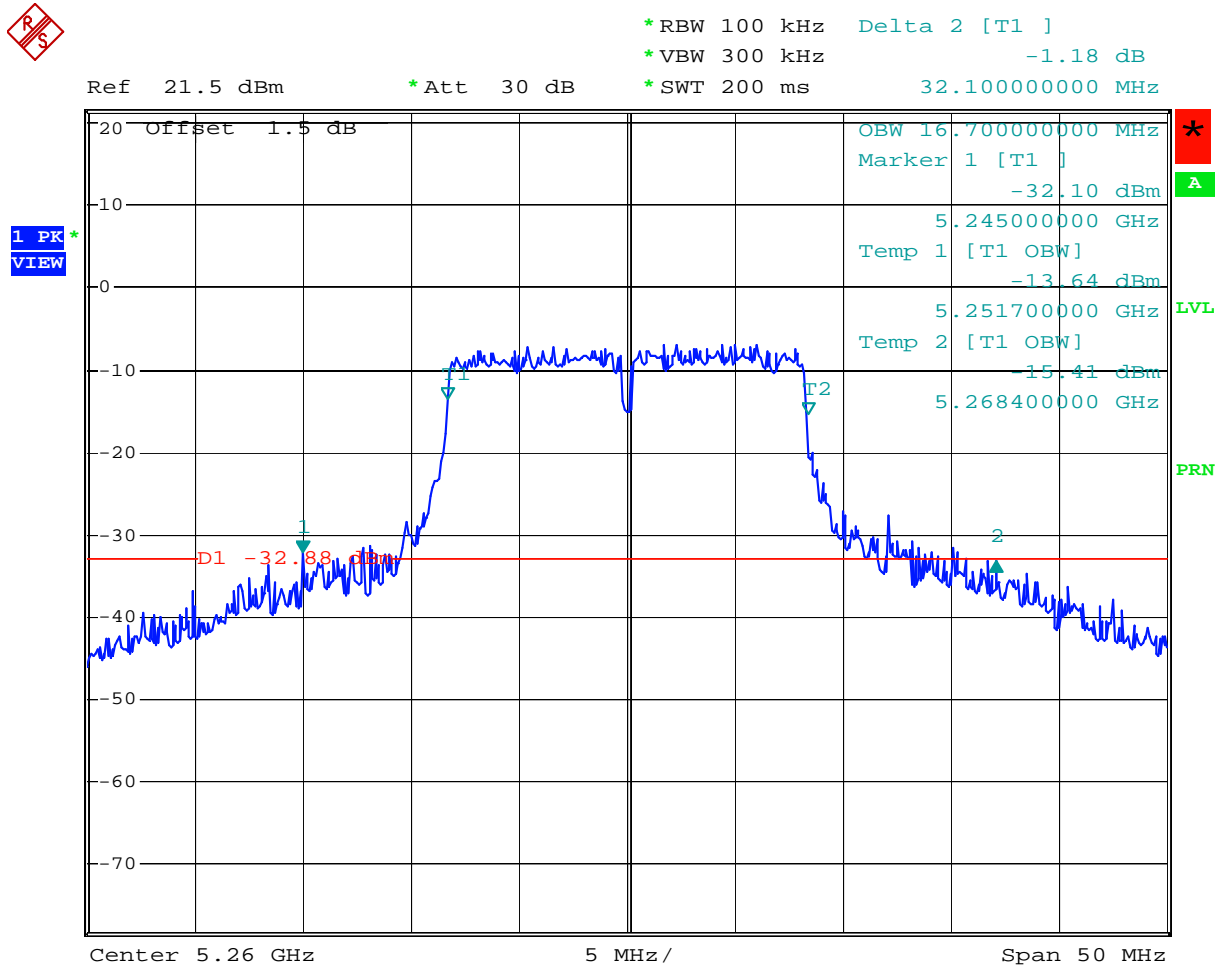
Plot 1.1



Comment: 26-dB bandwidth and OCB, 6 Mbps
 Date: 8.NOV.2008 11:56:58



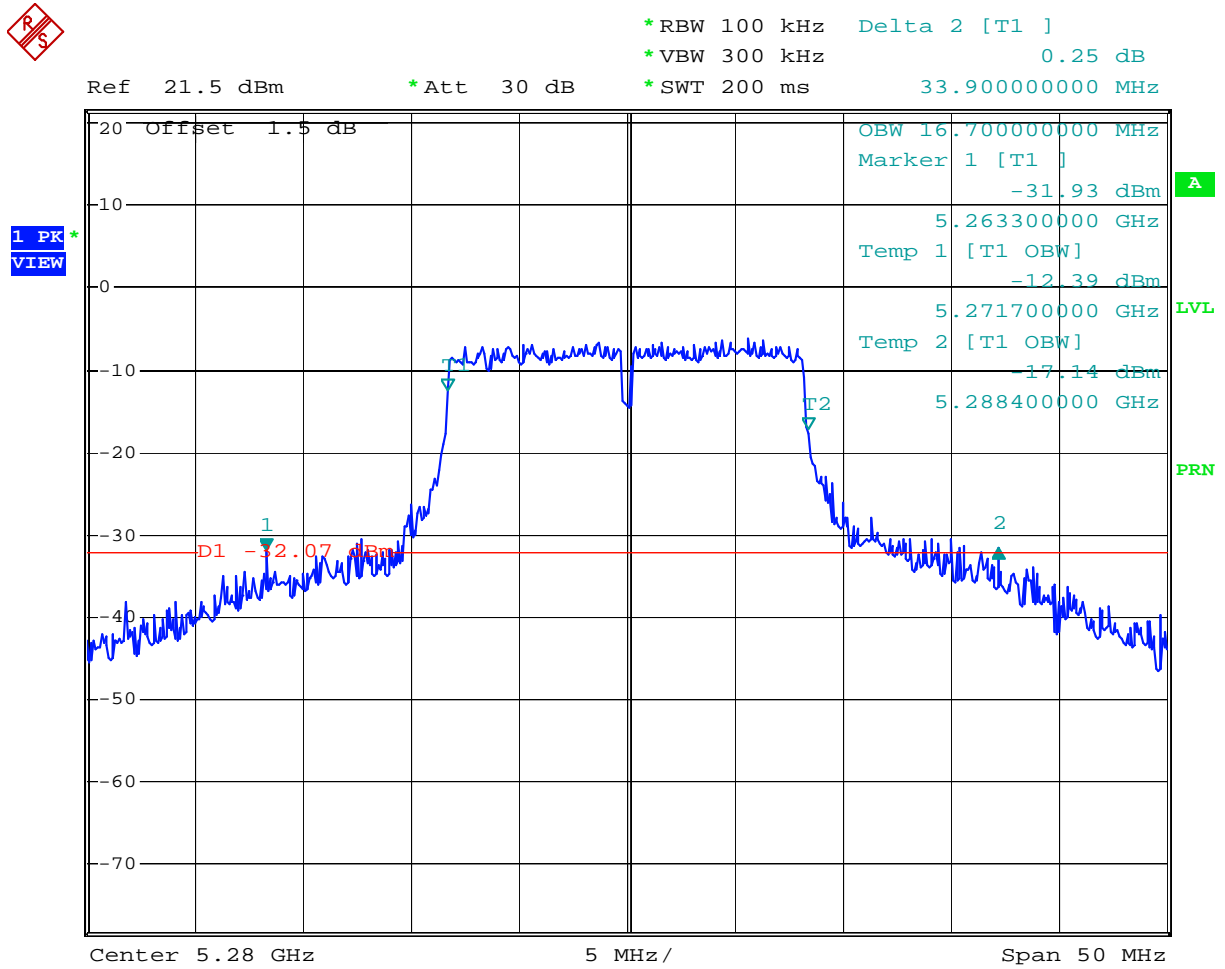
Plot 1.4



Comment: 26-dB bandwidth and OCB, 6 Mbps
Date: 8.NOV.2008 12:07:34

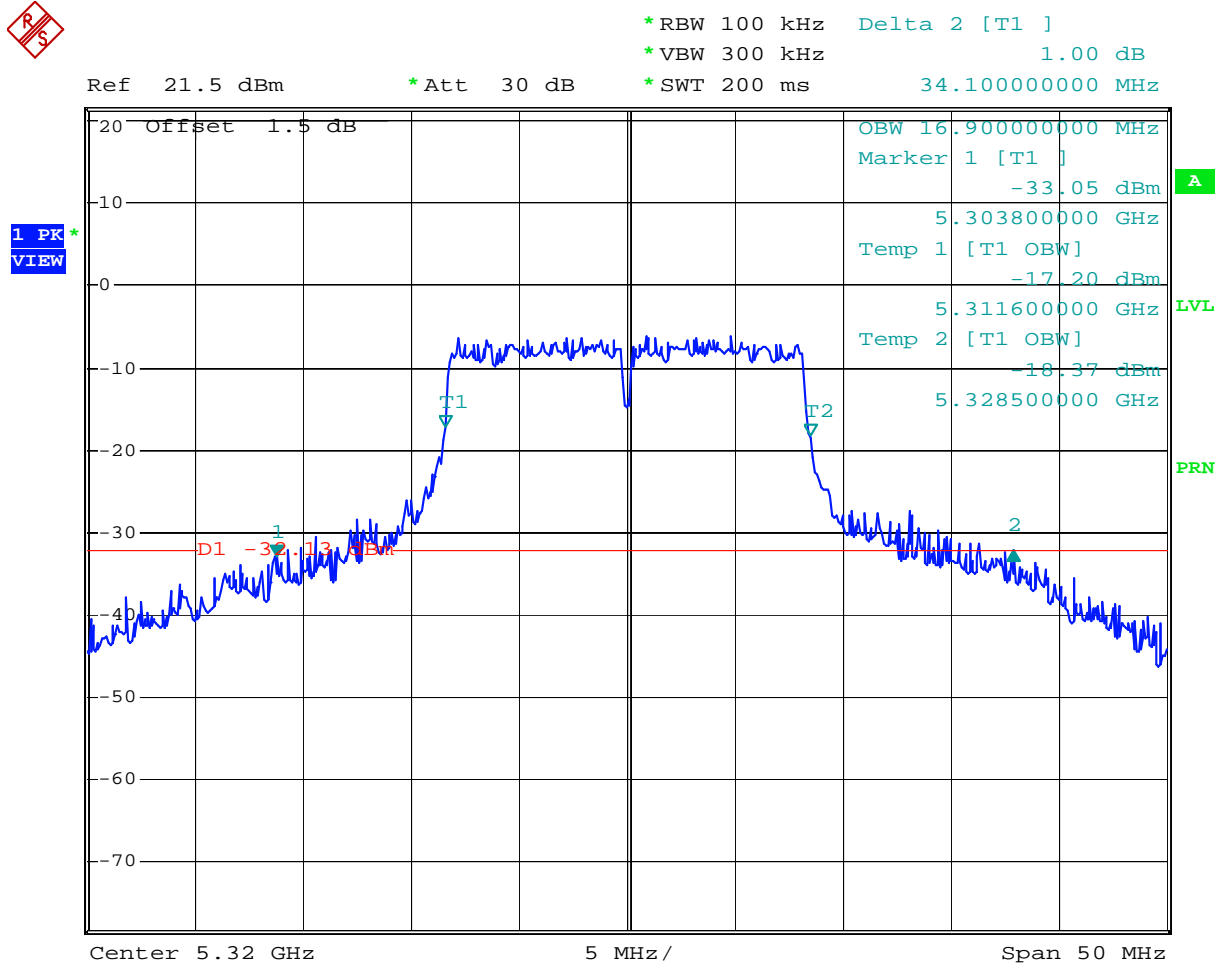


Plot 1.5



Comment: 26-dB bandwidth and OCB, 6 Mbps
Date: 8.NOV.2008 12:09:40

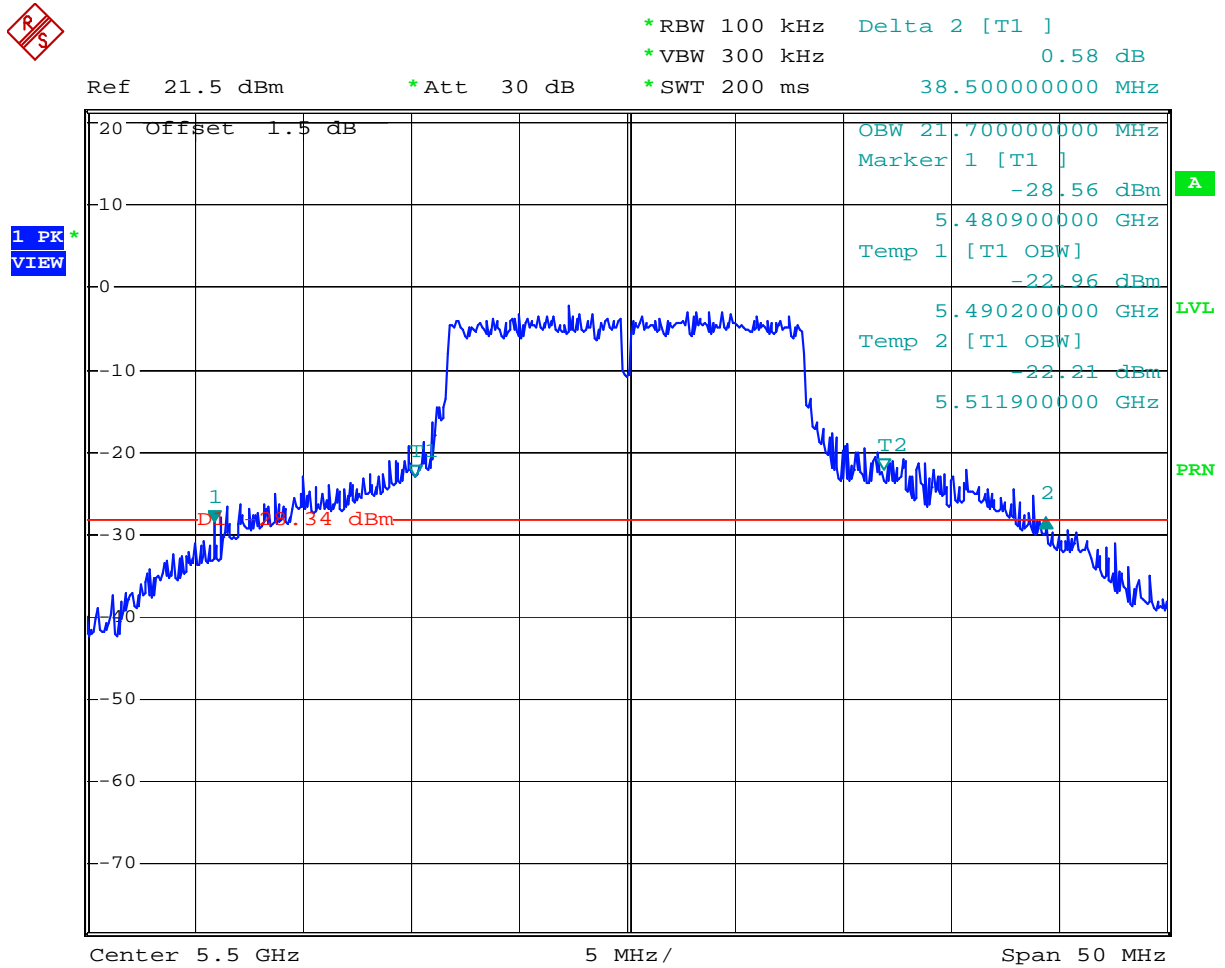
Plot 1.6



Comment: 26-dB bandwidth and OCB, 6 Mbps
 Date: 8.NOV.2008 12:33:23



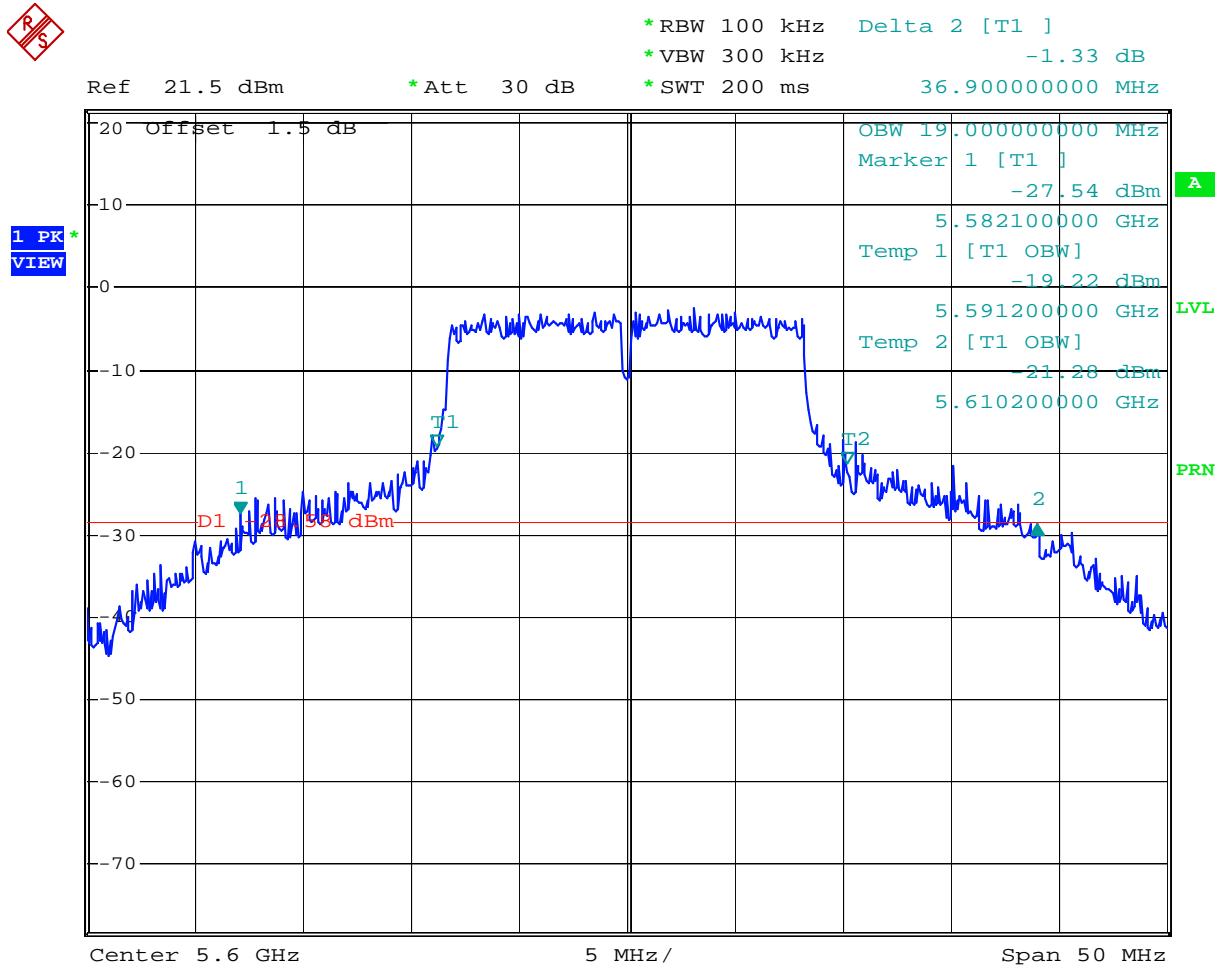
Plot 1.7



Comment: 26-dB bandwidth and OCB, 6 Mbps
Date: 8.NOV.2008 12:36:04



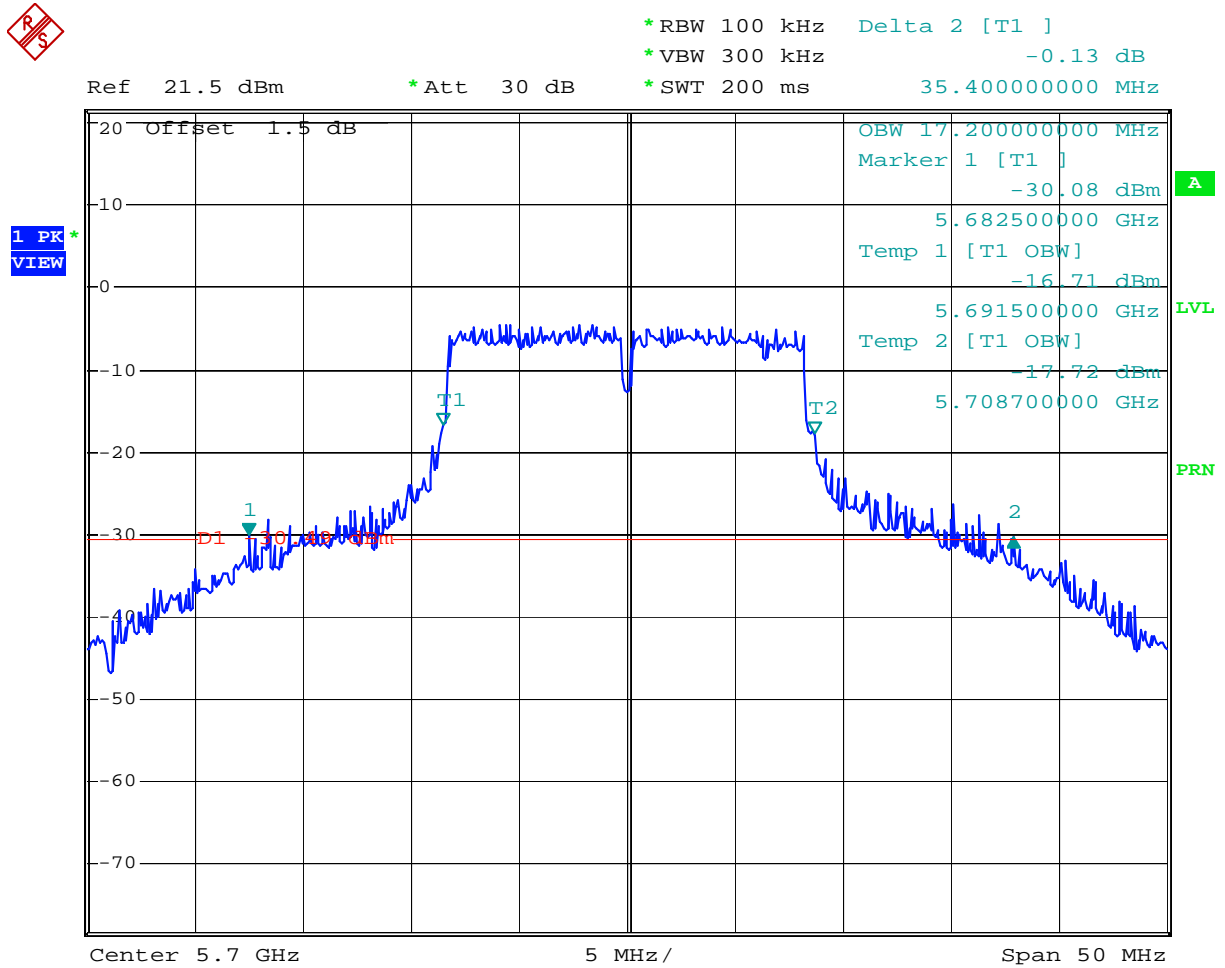
Plot 1.8



Comment: 26-dB bandwidth and OCB, 6 Mbps
Date: 8.NOV.2008 12:28:05

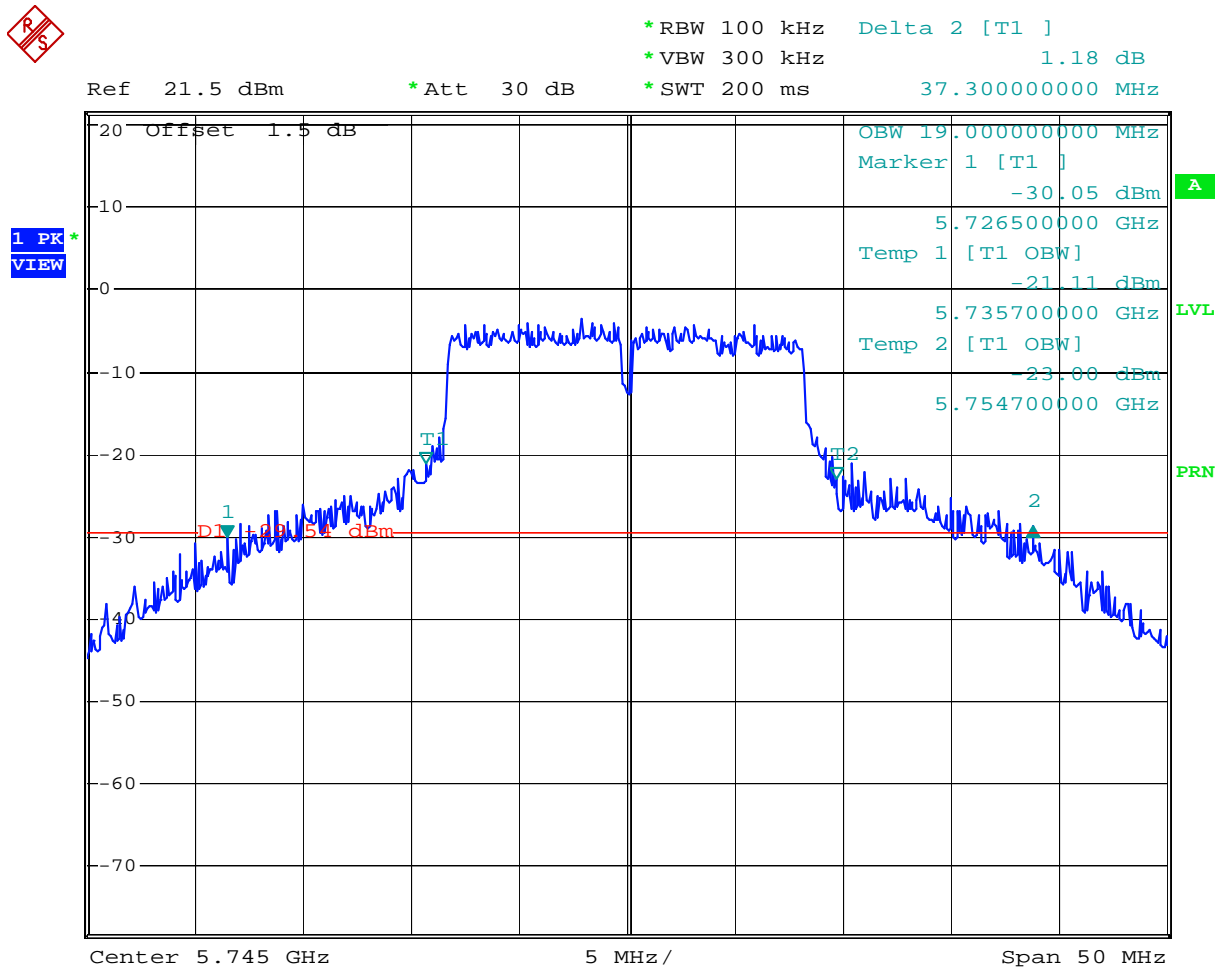


Plot 1.9



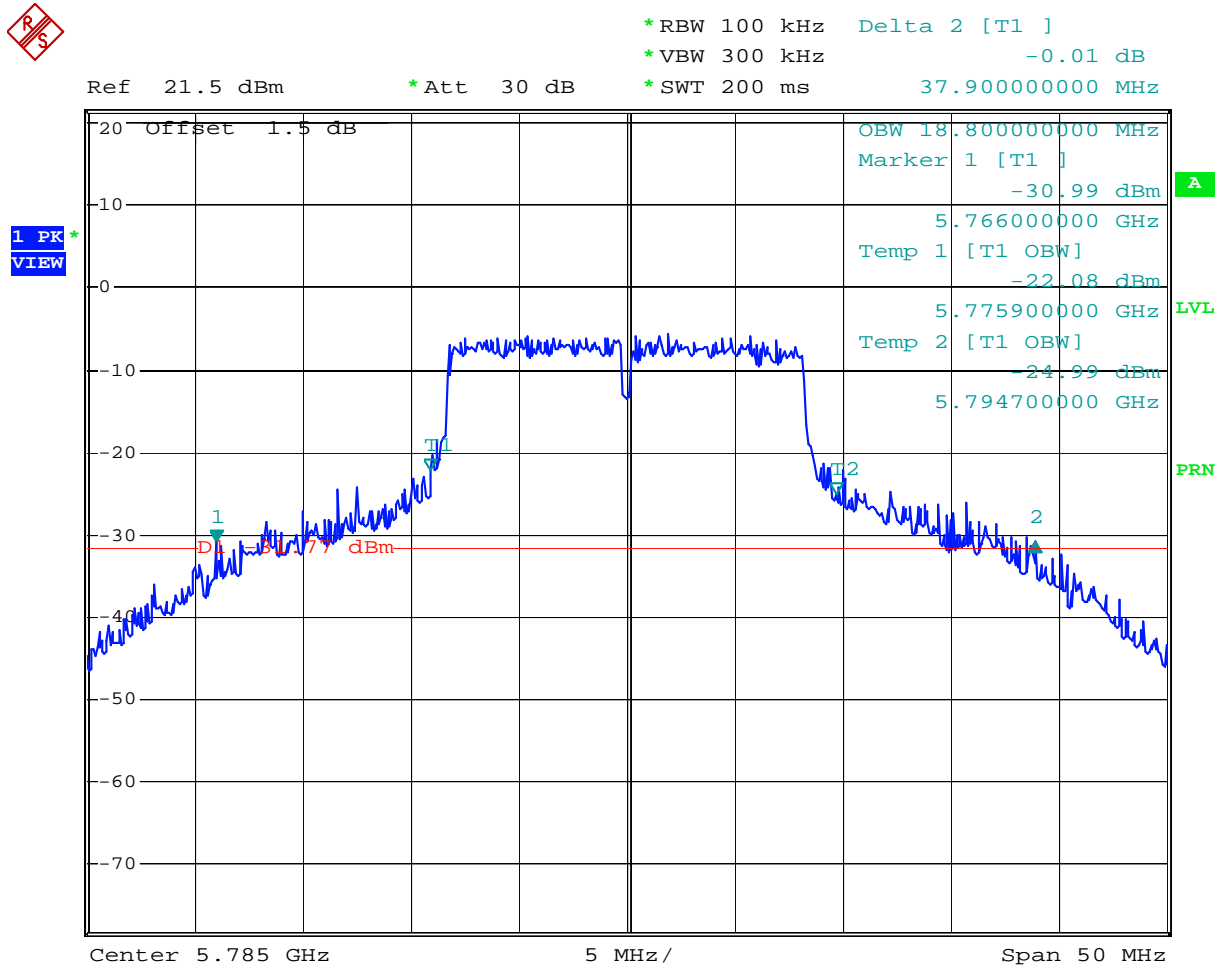
Comment: 26-dB bandwidth and OCB, 6 Mbps
Date: 8.NOV.2008 12:38:51

Plot 1.10



Comment: 26-dB bandwidth and OCB, 6 Mbps
 Date: 8.NOV.2008 12:42:45

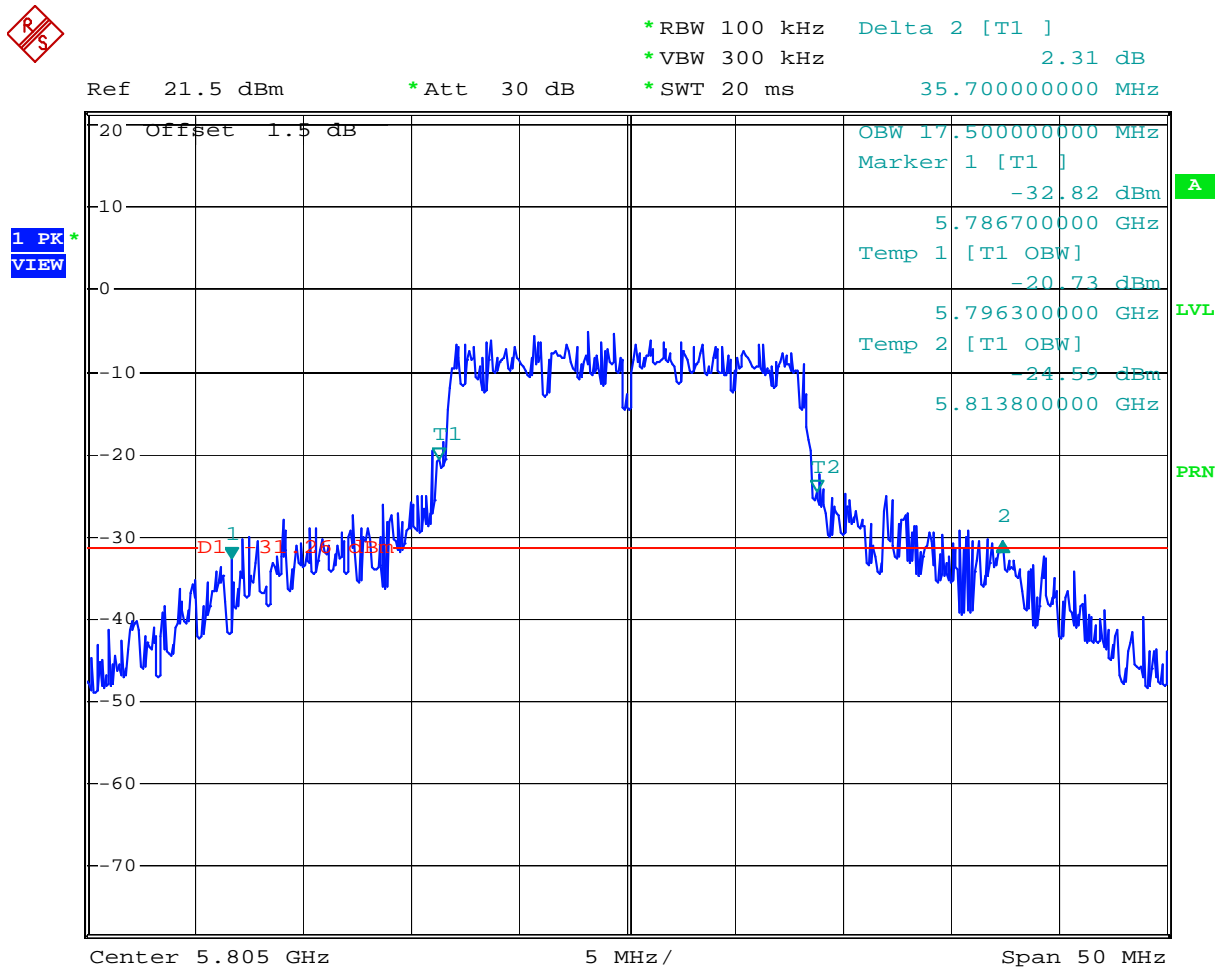
Plot 1.11



Comment: 26-dB bandwidth and OCB, 6 Mbps
 Date: 8.NOV.2008 12:45:03



Plot 1.12



Comment: 26-dB bandwidth and OCB, 5805 MHz, 6 Mbps
Date: 23.NOV.2008 09:48:00

4.2 Conducted Output Power
FCC Rule: 15.407(a)(1)(2)(3)

Requirement

The maximum conducted output power over the frequency band of operation shall not exceed the lesser of:
50 mW or (4 dBm + 10Log B) - for the 5.15–5.25 GHz band;
250 mW or (11 dBm + 10 log B) - for the 5.25–5.35 GHz and 5.47–5.725 GHz bands;
1 W or (17 dBm + 10 log B) - for the 5.725–5.825 GHz band,
where B is the 26-dB bandwidth in Megahertz. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Procedure

The Procedure, described in the FCC Public Notice DA 02-2138, was used.

The antenna port of the EUT was connected to the input of a spectrum analyzer (SA).

Transmitter operates continuously; therefore, the Method #1 was selected for the measurement. A built-in SA channel power measurement facility with a sample detector and averaging 100 traces in power averaging mode (linear power terms) was used. The channel bandwidth was set to 26-dB bandwidth.

Test Results

The test results are presented on the following plots 2.1 – 2.12 and summarized in the tables below.

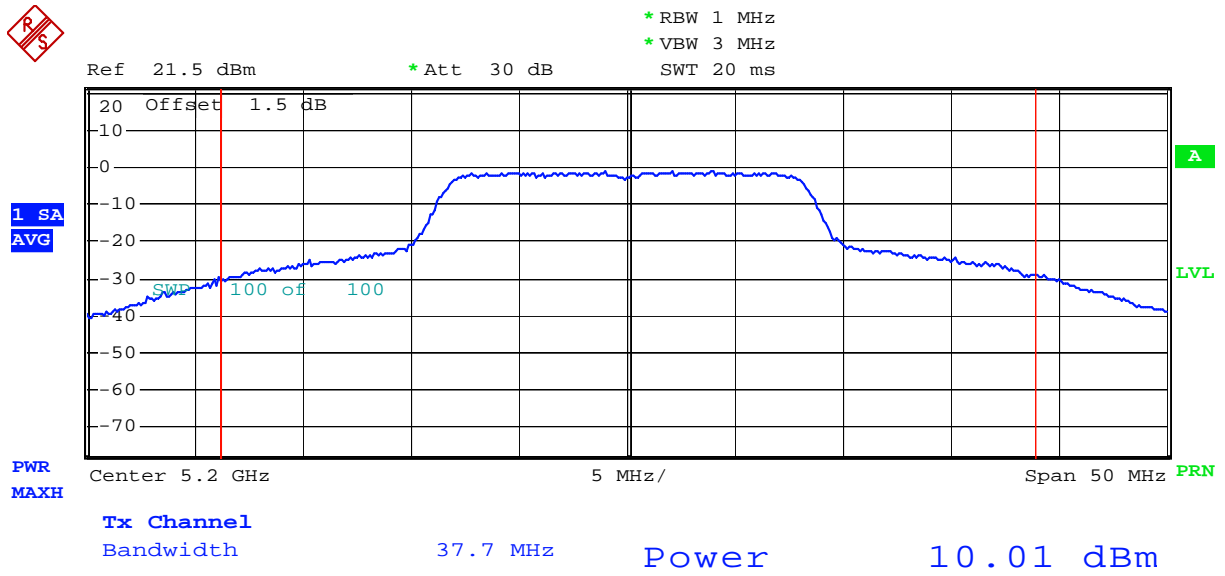
Note: to comply with radiated emission requirements in the restricted bands, the following power settings (p) are used:

- p = 55 - in the 5.15–5.25 GHz band
- p = 42 - in the 5.25–5.35 GHz band
- p = 50 - in the 5.47–5.725 GHz band
- p = 55 - in the 5.725–5.825 GHz band

Channel	Frequency MHz	Conducted power (average) dBm	Conducted power Limit dBm	Margin dB	Plot #
36	5180	9.4	17	-7.6	2.1
40	5200	10.0	17	-7.0	2.2
48	5240	9.9	17	-7.1	2.3
52	5260	8.0	24	-16.0	2.4
56	5280	8.7	24	-15.3	2.5
64	5320	9.2	24	-14.8	2.6
100	5500	12.3	24	-11.7	2.7
120	5600	12.9	24	-11.1	2.8
140	5700	11.0	24	-13.0	2.9
149	5745	11.5	30	-18.5	2.10
157	5785	9.7	30	-20.3	2.11
161	5805	9.4	30	-20.6	2.12

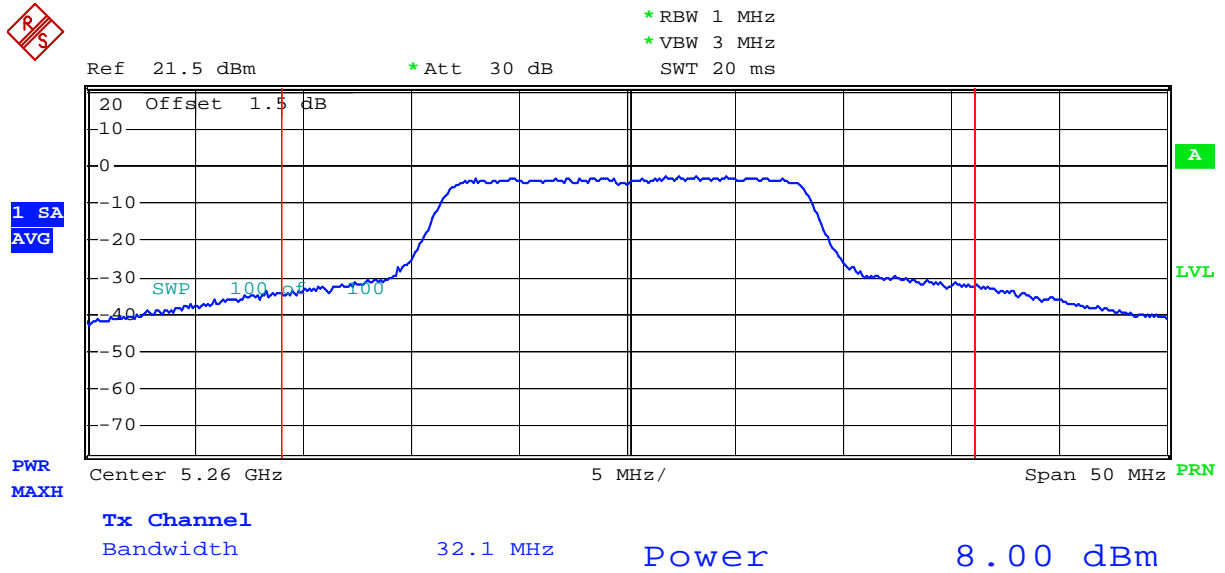


Plot 2.2



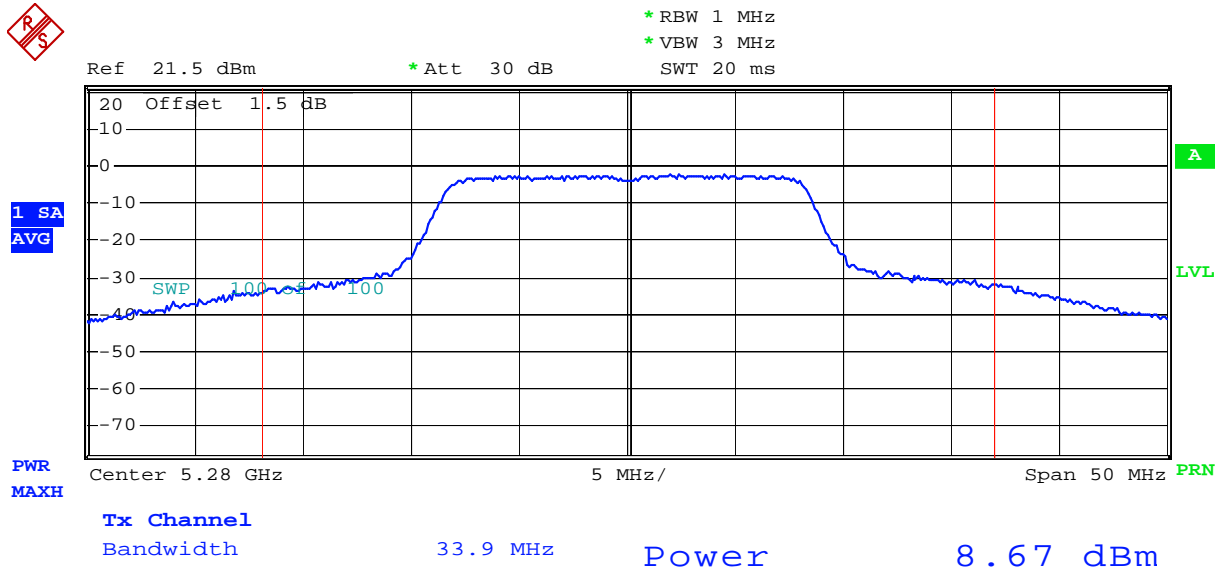
Comment: Channel power, 6 Mbps
Date: 23.NOV.2008 10:07:30

Plot 2.4



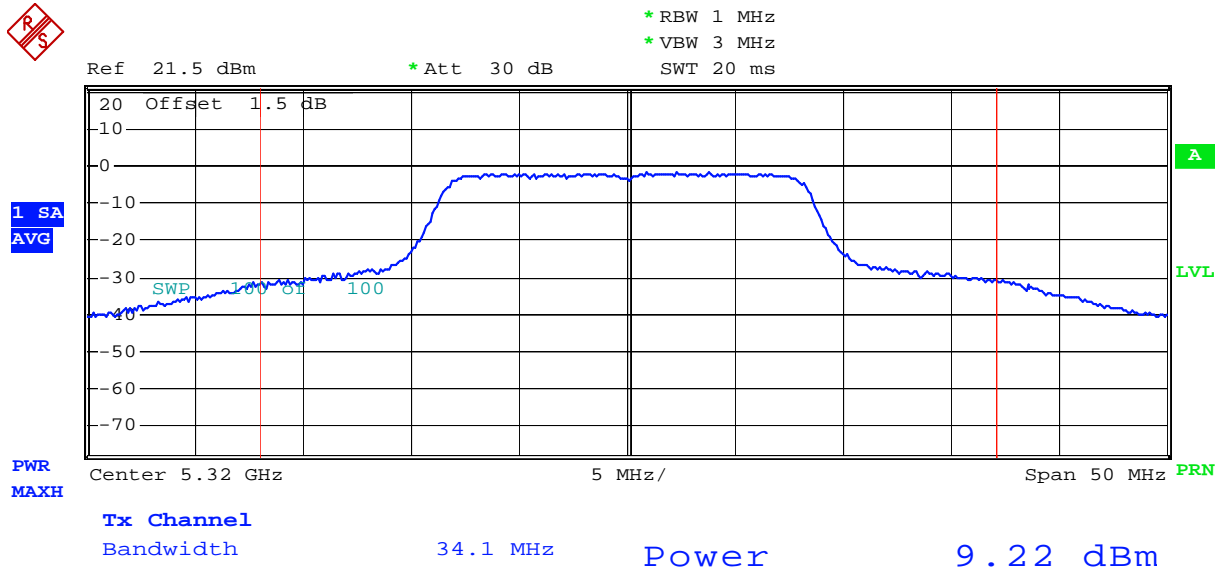
Comment: Channel power, 6 Mbps
 Date: 23.NOV.2008 10:10:03

Plot 2.5



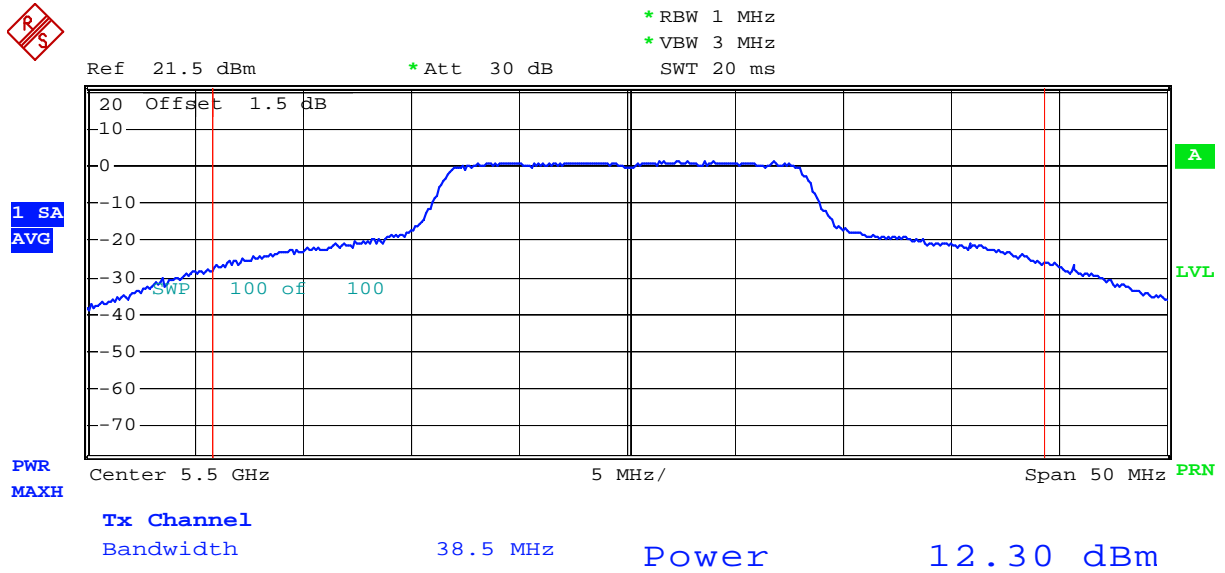
Comment: Channel power, 6 Mbps
 Date: 23.NOV.2008 10:11:09

Plot 2.6



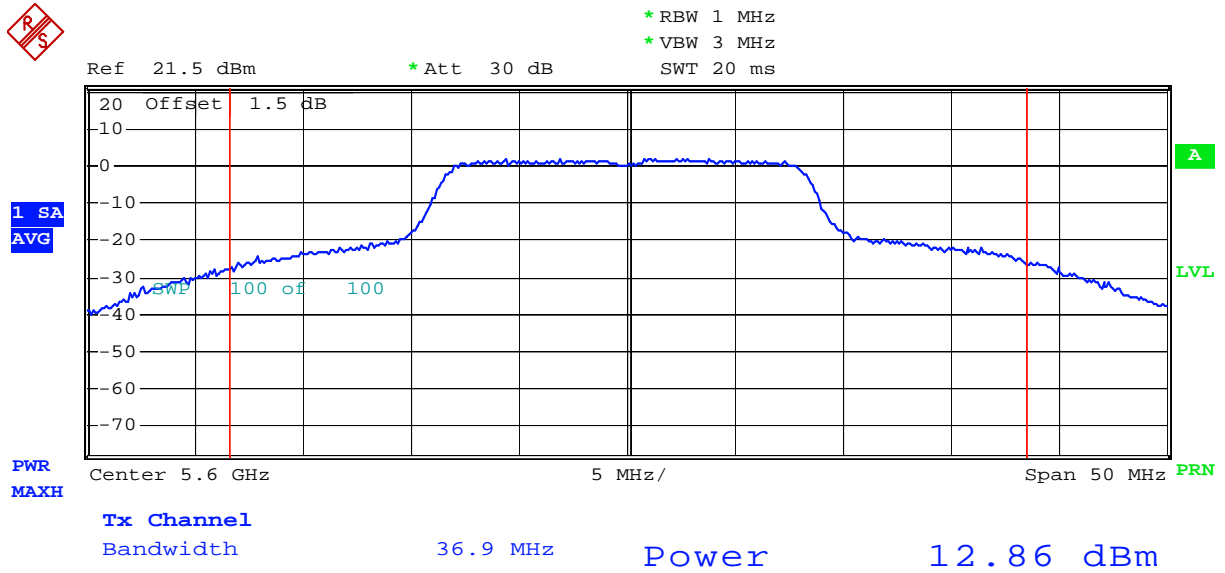
Comment: Channel power, 6 Mbps
 Date: 23.NOV.2008 10:12:12

Plot 2.7



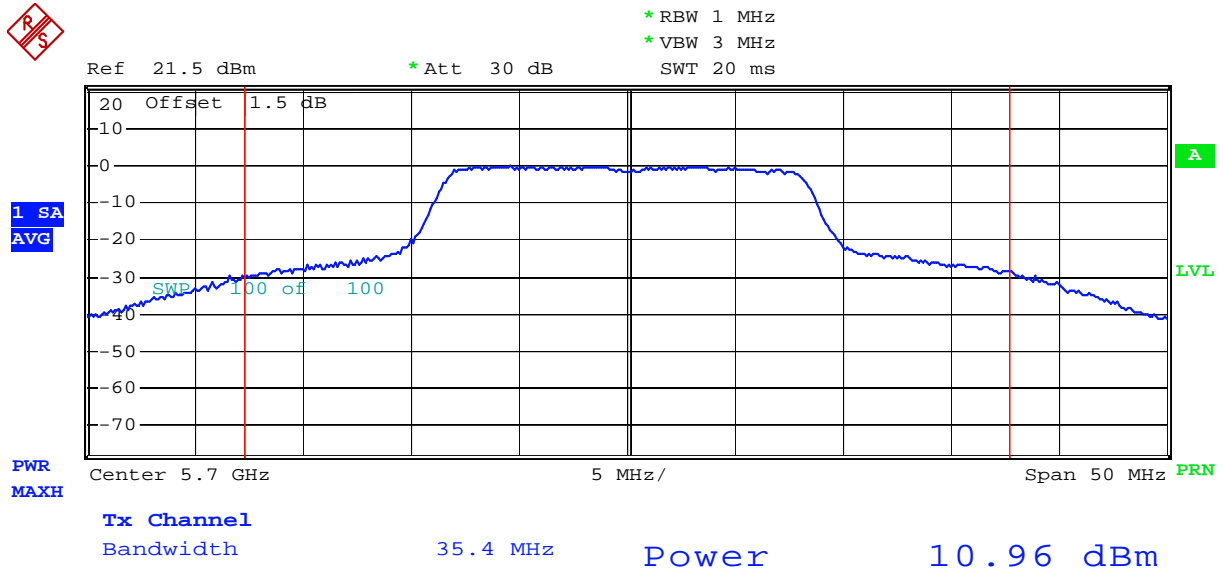
Comment: Channel power, 6 Mbps
 Date: 23.NOV.2008 10:13:37

Plot 2.8



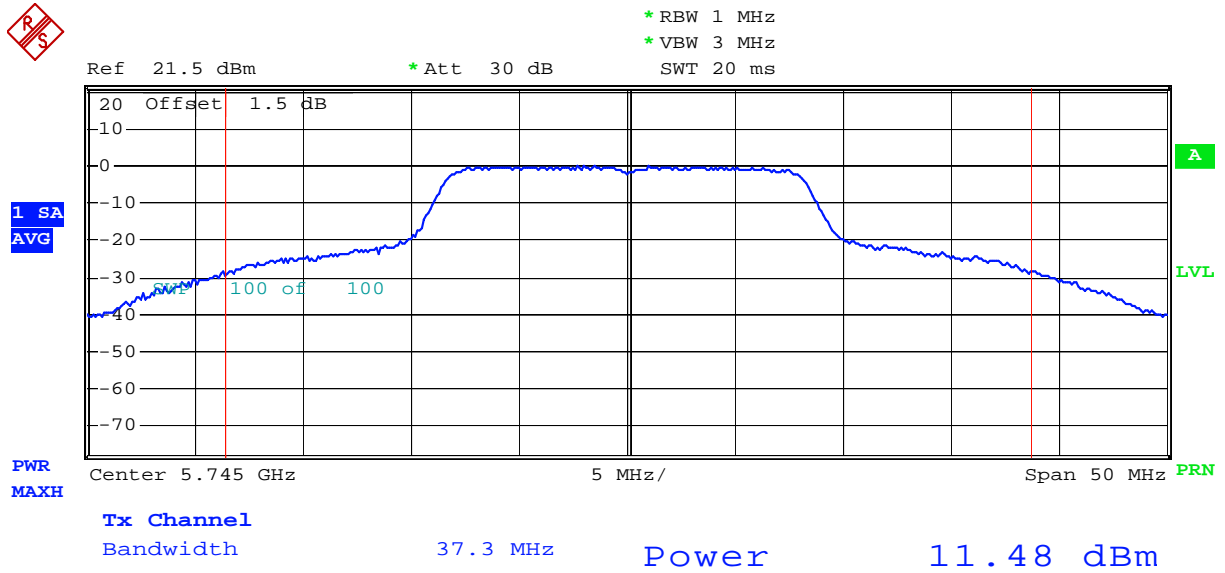
Comment: Channel power, 6 Mbps
 Date: 23.NOV.2008 10:14:37

Plot 2.9



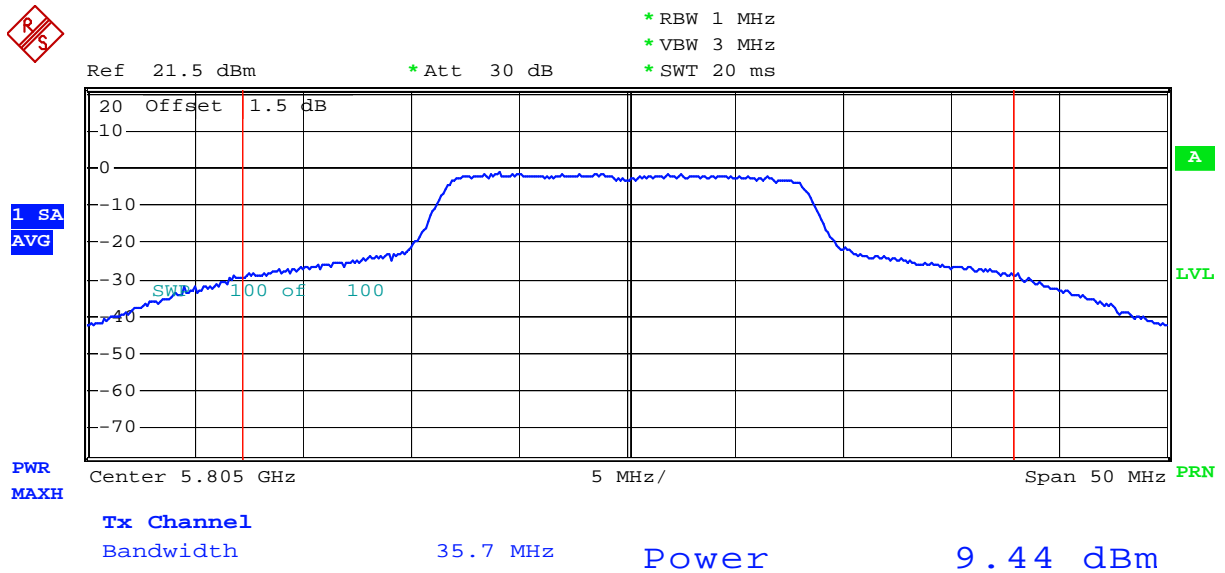
Comment: Channel power, 6 Mbps
 Date: 23.NOV.2008 10:15:34

Plot 2.10



Comment: Channel power, 6 Mbps
 Date: 23.NOV.2008 10:17:19

Plot 2.12



Comment: Channel power, 6 Mbps
 Date: 23.NOV.2008 09:52:49

4.3 Peak Power Spectral Density
FCC Rule: 15.407(a)(1) (2) (3)

Requirement

The peak power spectral density (PPSD) in any 1 MHz band shall not exceed:

- 4 dBm - for the 5.15–5.25 GHz band;
- 11 dBm - for the 5.25–5.35 GHz and 5.47–5.725 GHz bands;
- 17 dBm - for the 5.725–5.825 GHz band,

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

Procedure

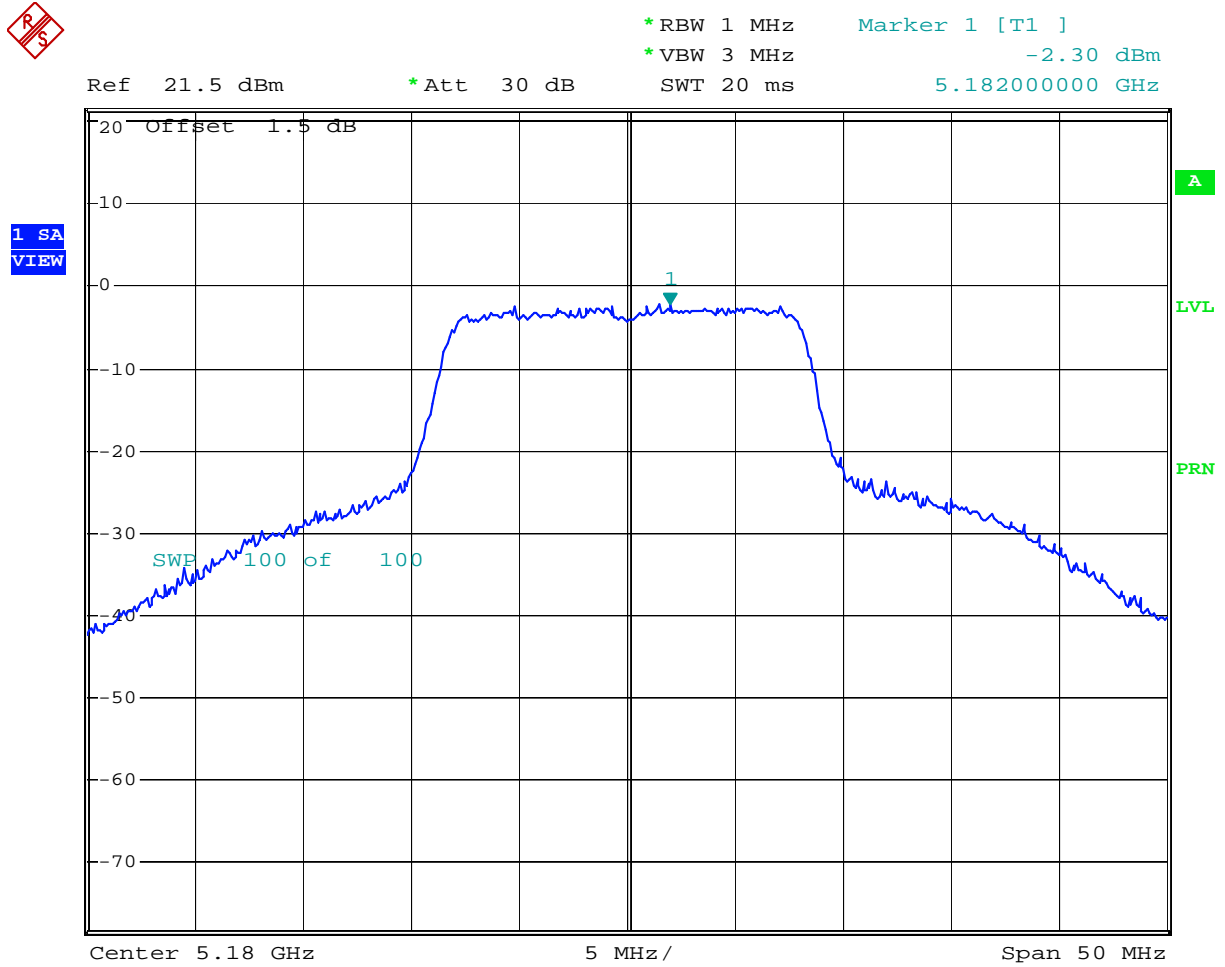
The Procedure, described in the FCC Public Notice DA 02-2138, was used. The Method #2 (with the sample detector and averaging over 100 sweeps) was selected for the measurement. The antenna port of the EUT was connected to the input of a spectrum analyzer. The spectrum analyzer Resolution Bandwidth was set to 1 MHz.

Test Result

The test results are presented on the following plots 3.1 – 3.12 and summarized in the table below.

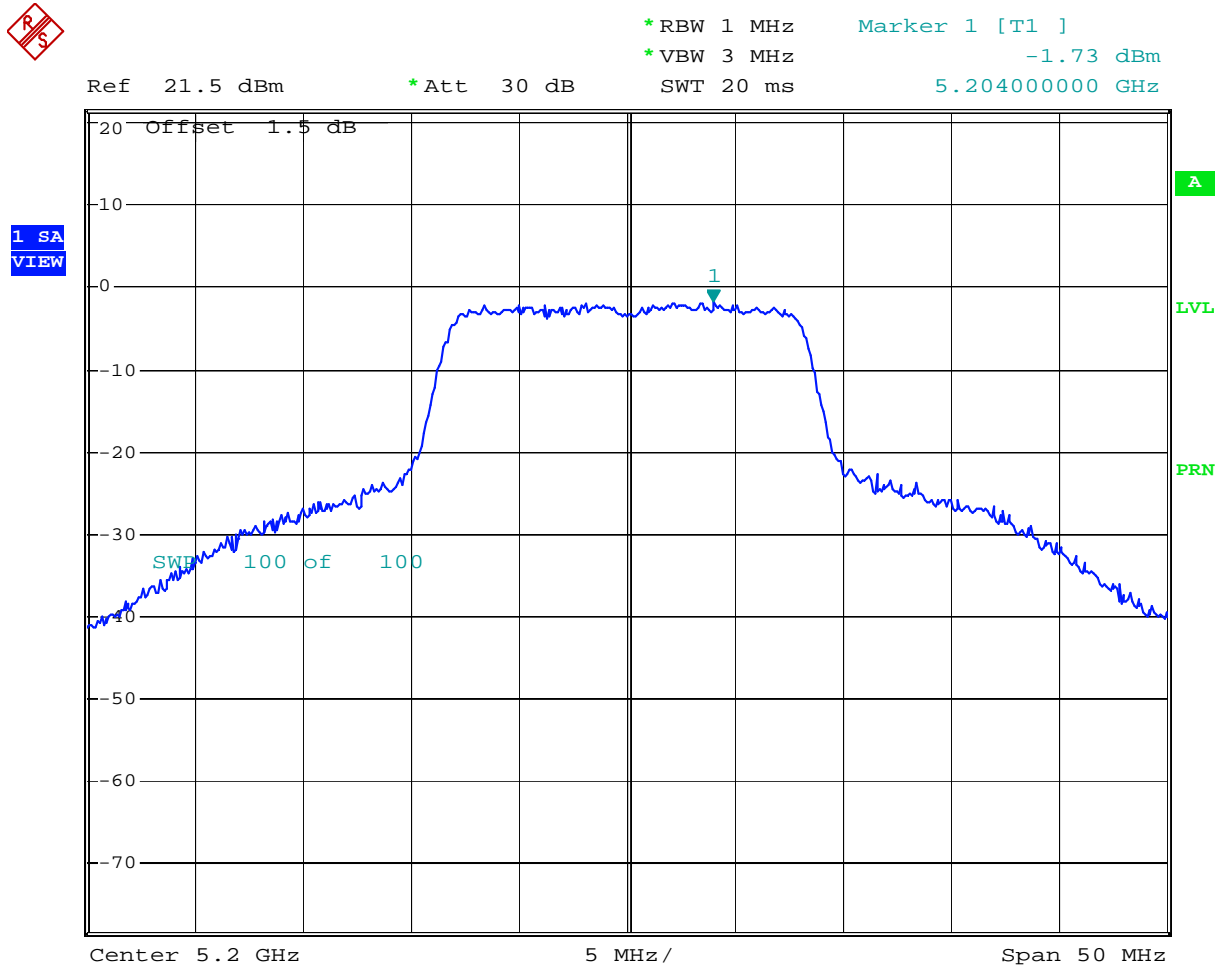
Channel	Frequency MHz	PPSD dBm	PPSD Limit dBm	Margin dB	Plot #
36	5180	-2.3	4	-6.3	3.1
40	5200	-1.7	4	-5.7	3.2
48	5240	-1.6	4	-5.6	3.3
52	5260	-3.7	11	-14.7	3.4
56	5280	-3.1	11	-14.1	3.5
64	5320	-2.7	11	-13.7	3.6
100	5500	0.8	11	-10.2	3.7
120	5600	0.9	11	-10.1	3.8
140	5700	-0.8	11	-11.8	3.9
149	5745	-0.7	17	-17.7	3.10
157	5785	-1.9	17	-18.9	3.11
161	5805	-1.3	17	-18.3	3.12

Plot 3.1



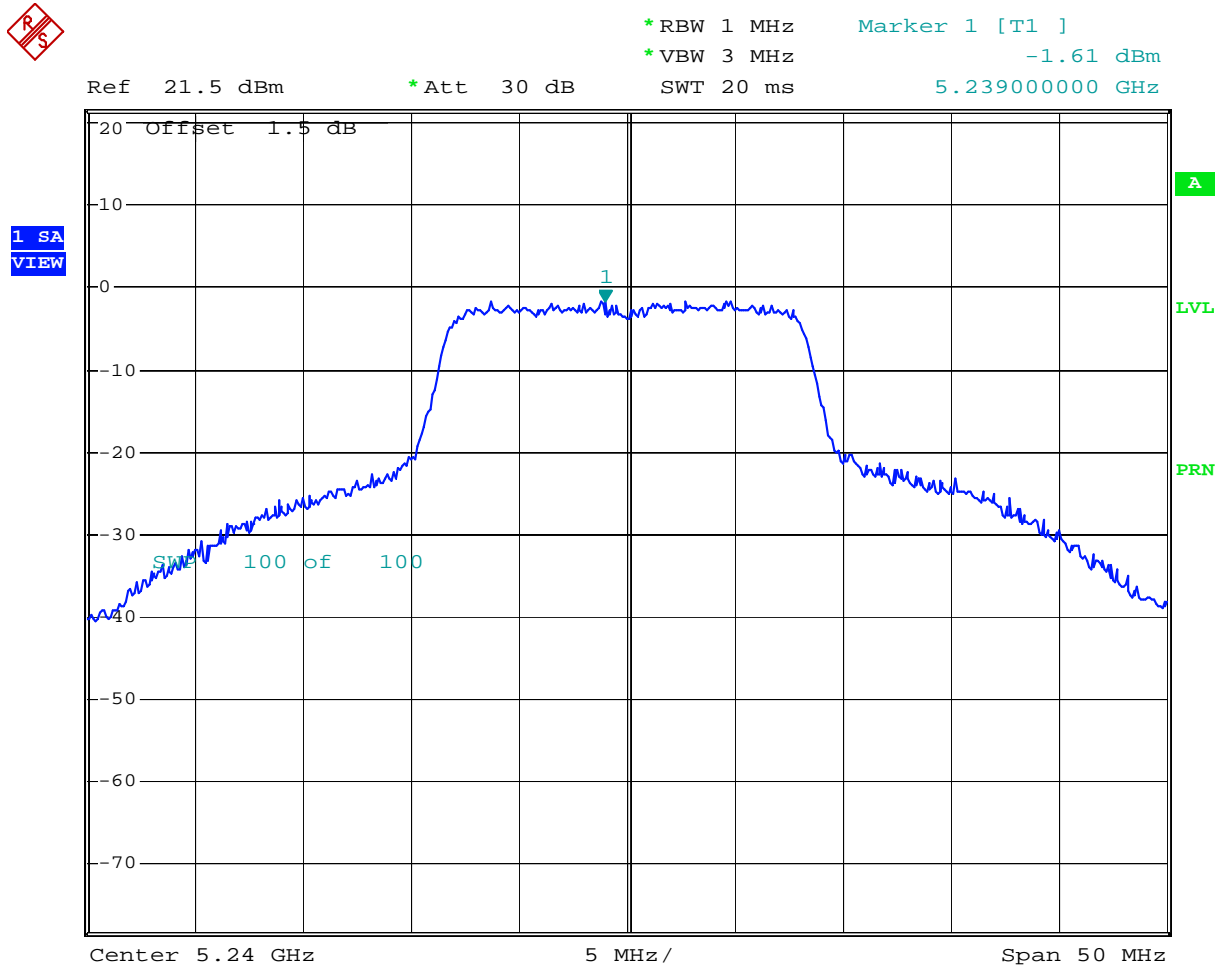
Comment: Peak power spectral density, 6 Mbps
Date: 8.NOV.2008 13:23:42

Plot 3.2



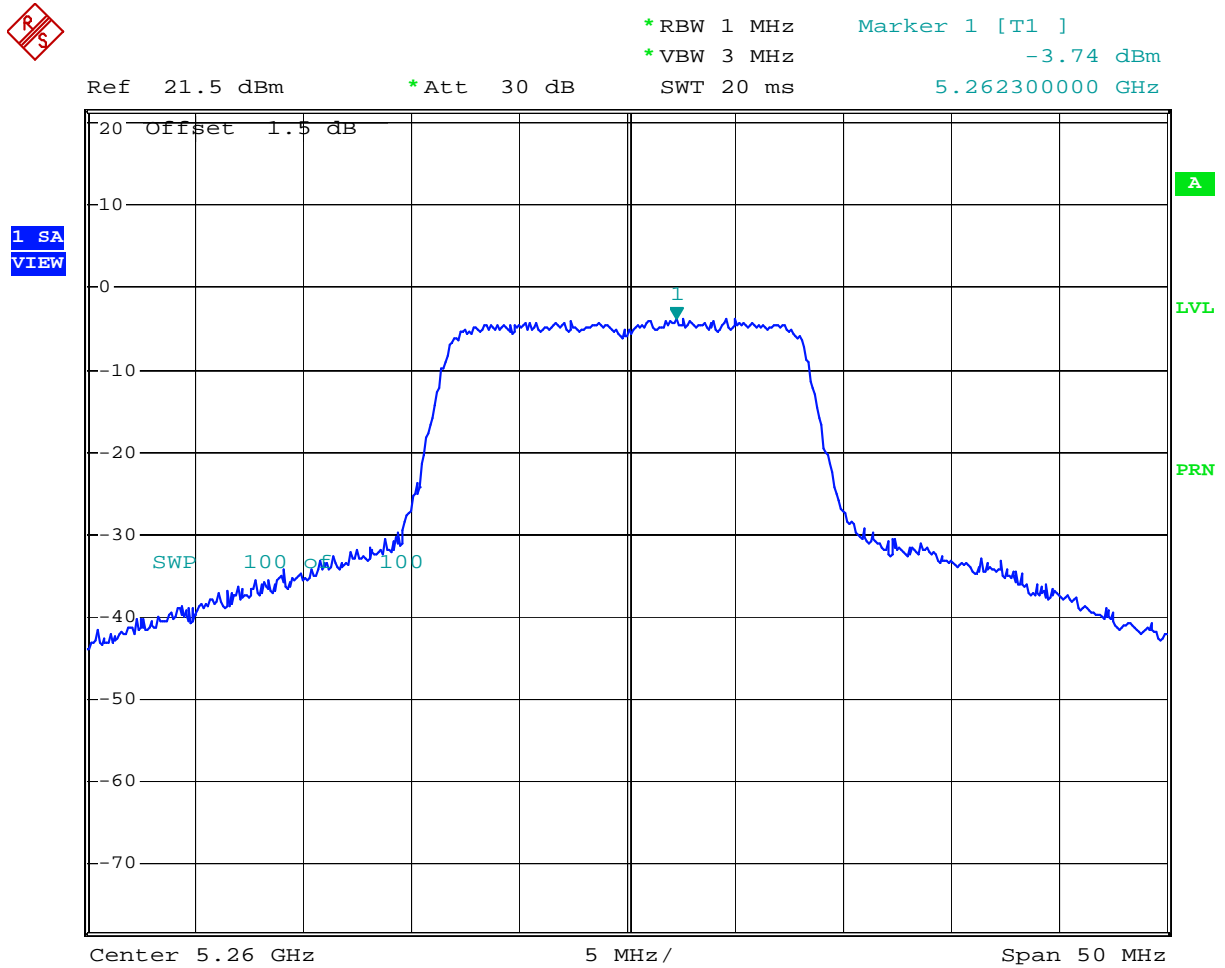
Comment: Peak power spectral density, 6 Mbps
Date: 8.NOV.2008 13:24:55

Plot 3.3



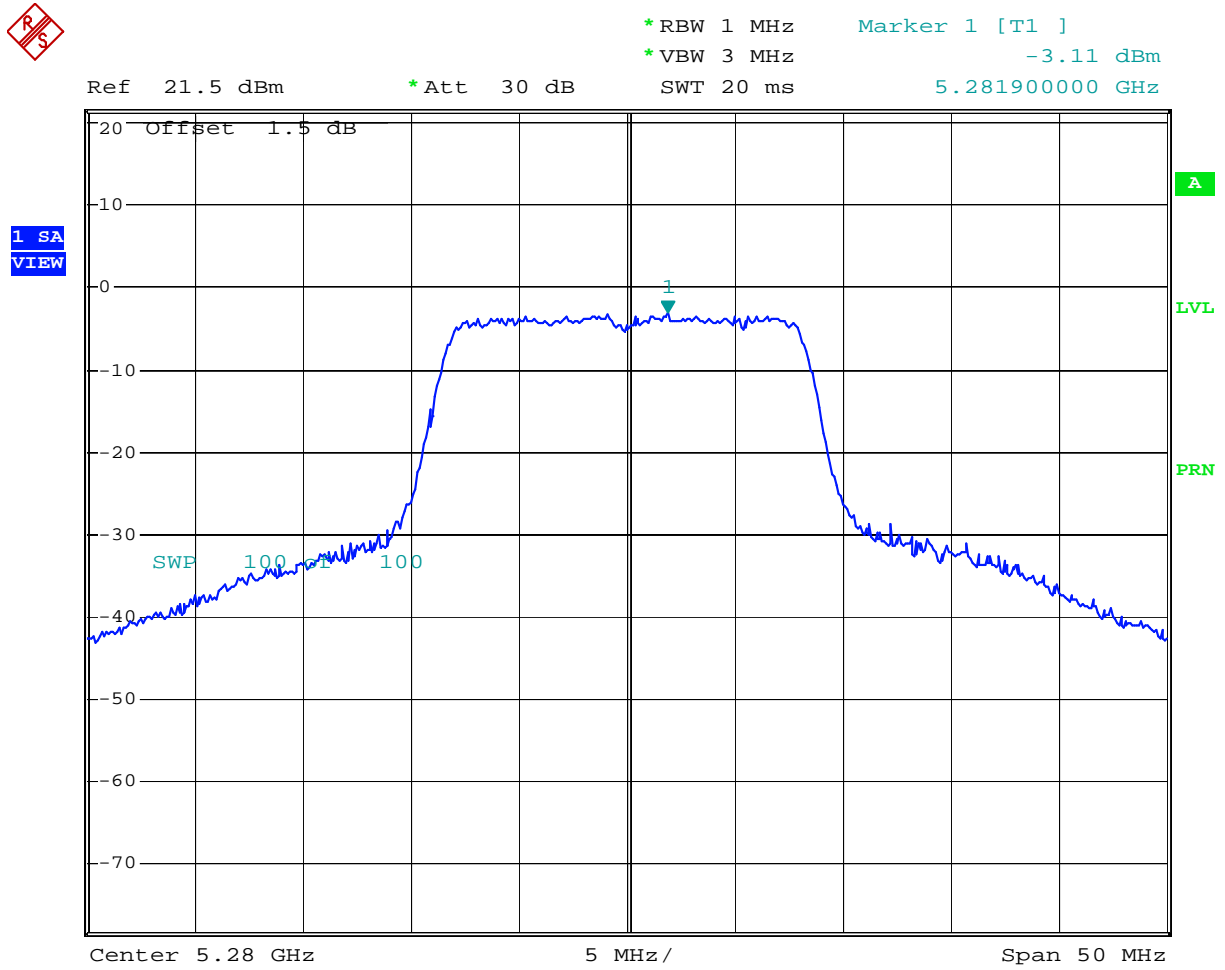
Comment: Peak power spectral density, 6 Mbps
 Date: 8.NOV.2008 13:26:27

Plot 3.4



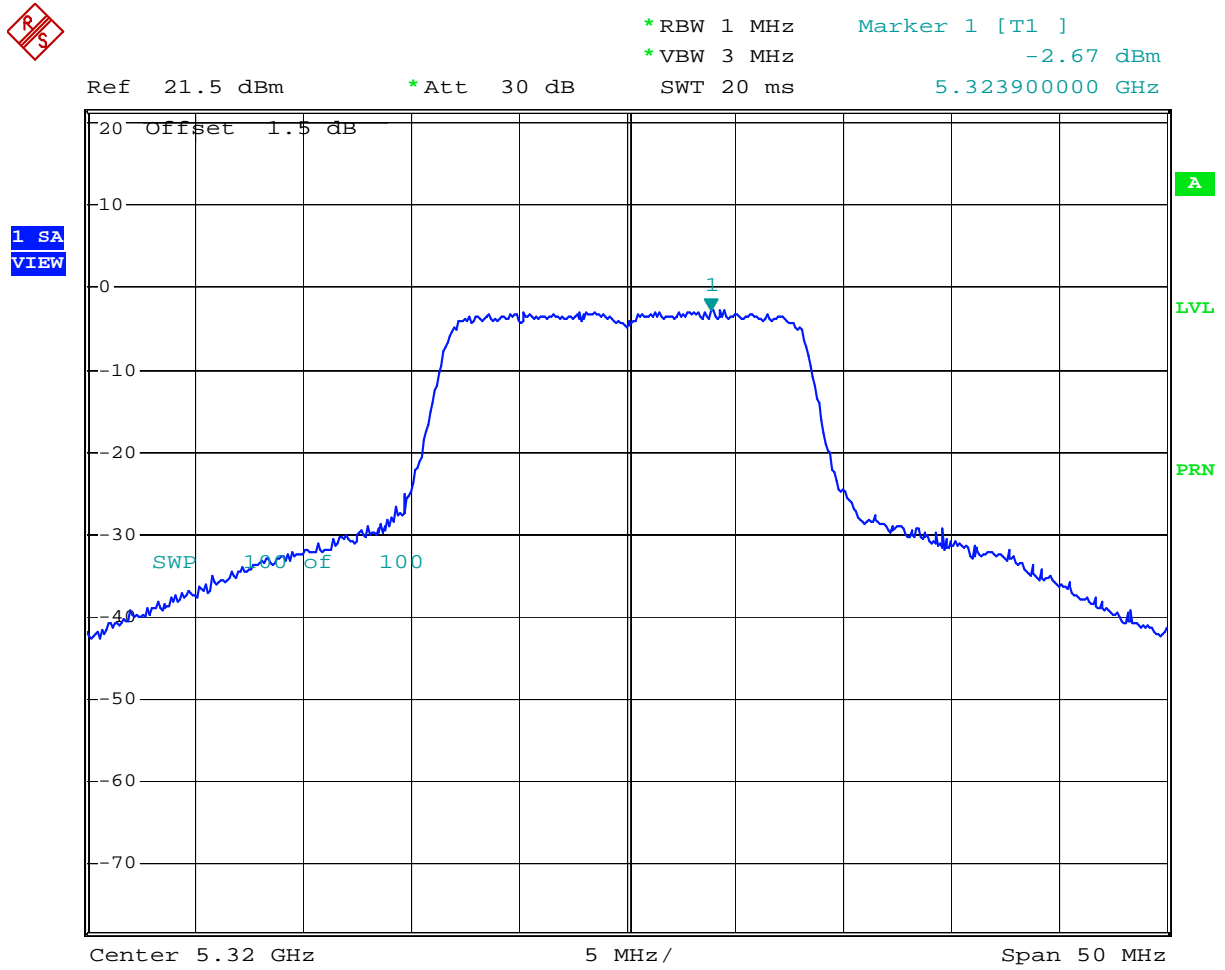
Comment: Peak power spectral density, 6 Mbps
Date: 8.NOV.2008 13:28:18

Plot 3.5



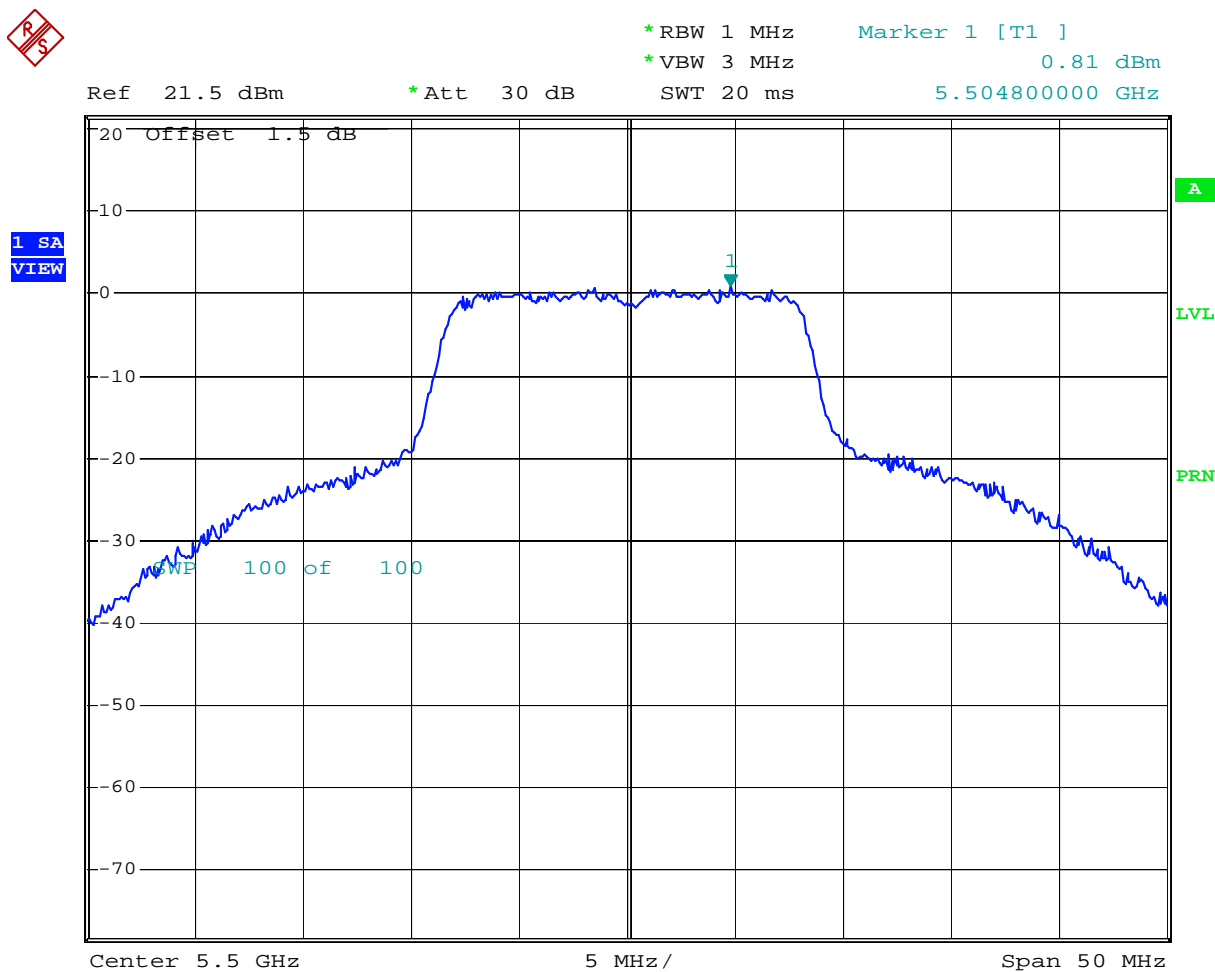
Comment: Peak power spectral density, 6 Mbps
Date: 8.NOV.2008 13:29:40

Plot 3.6



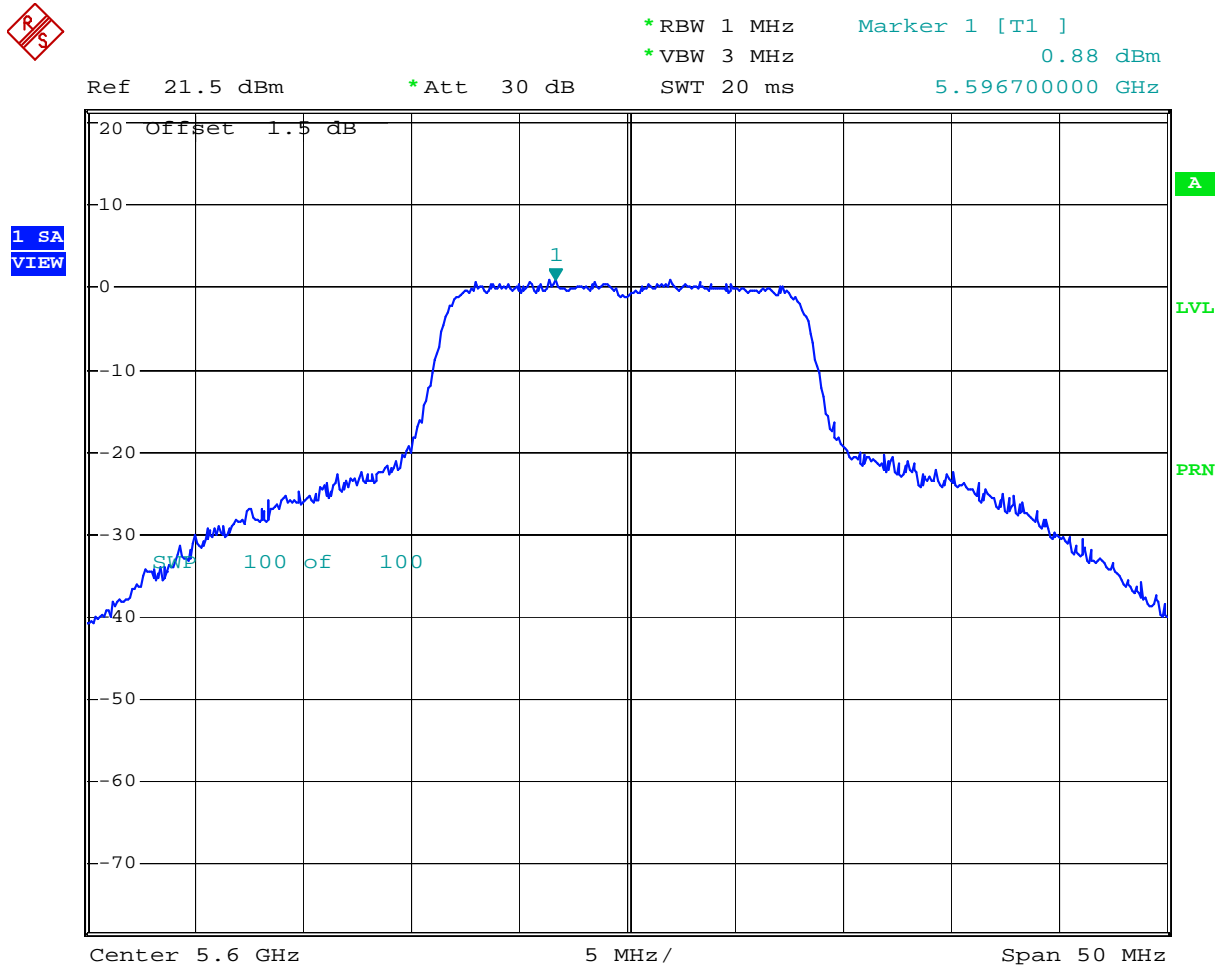
Comment: Peak power spectral density, 6 Mbps
 Date: 8.NOV.2008 13:30:49

Plot 3.7



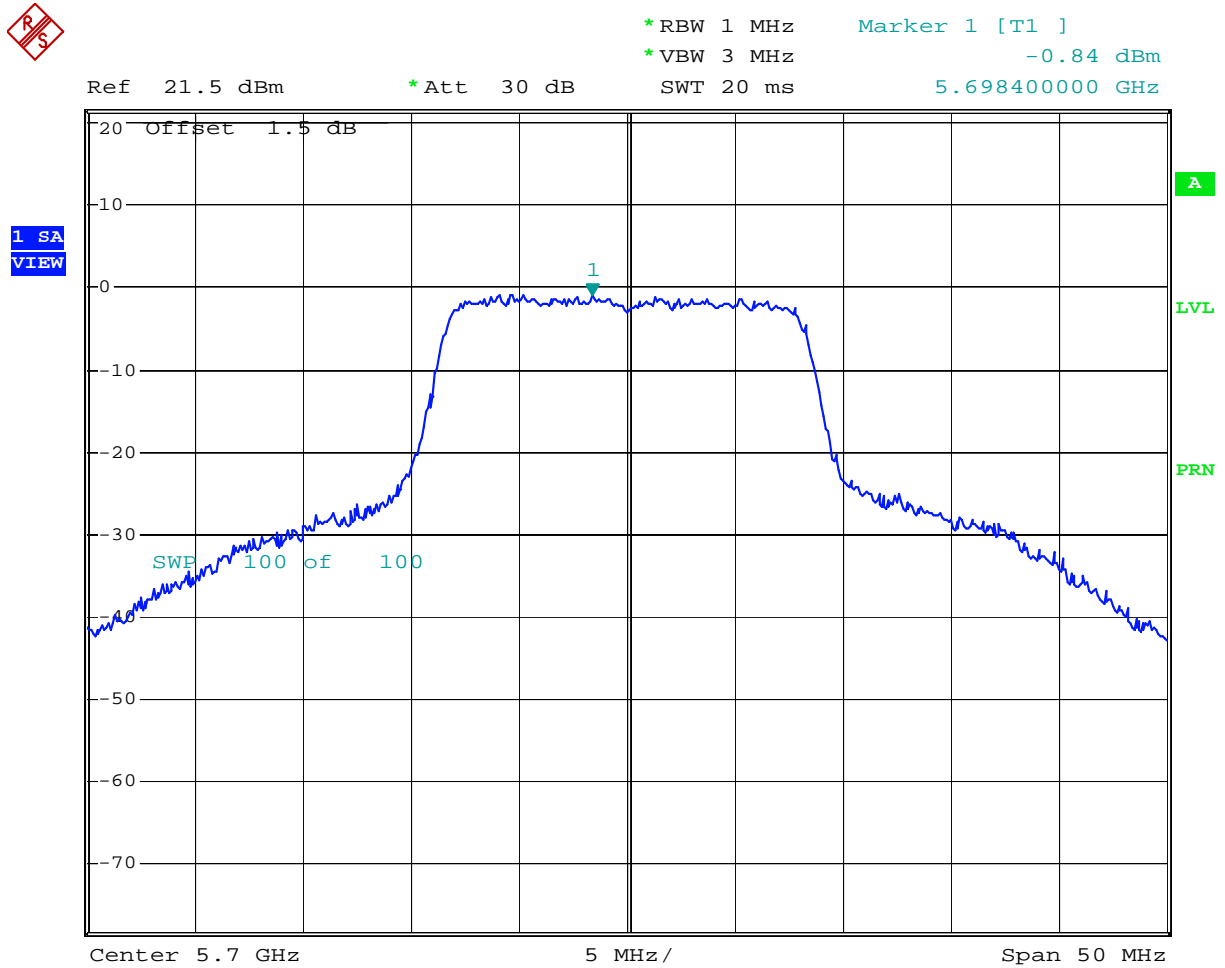
Comment: Peak power spectral density, 6 Mbps
Date: 8.NOV.2008 13:33:24

Plot 3.8



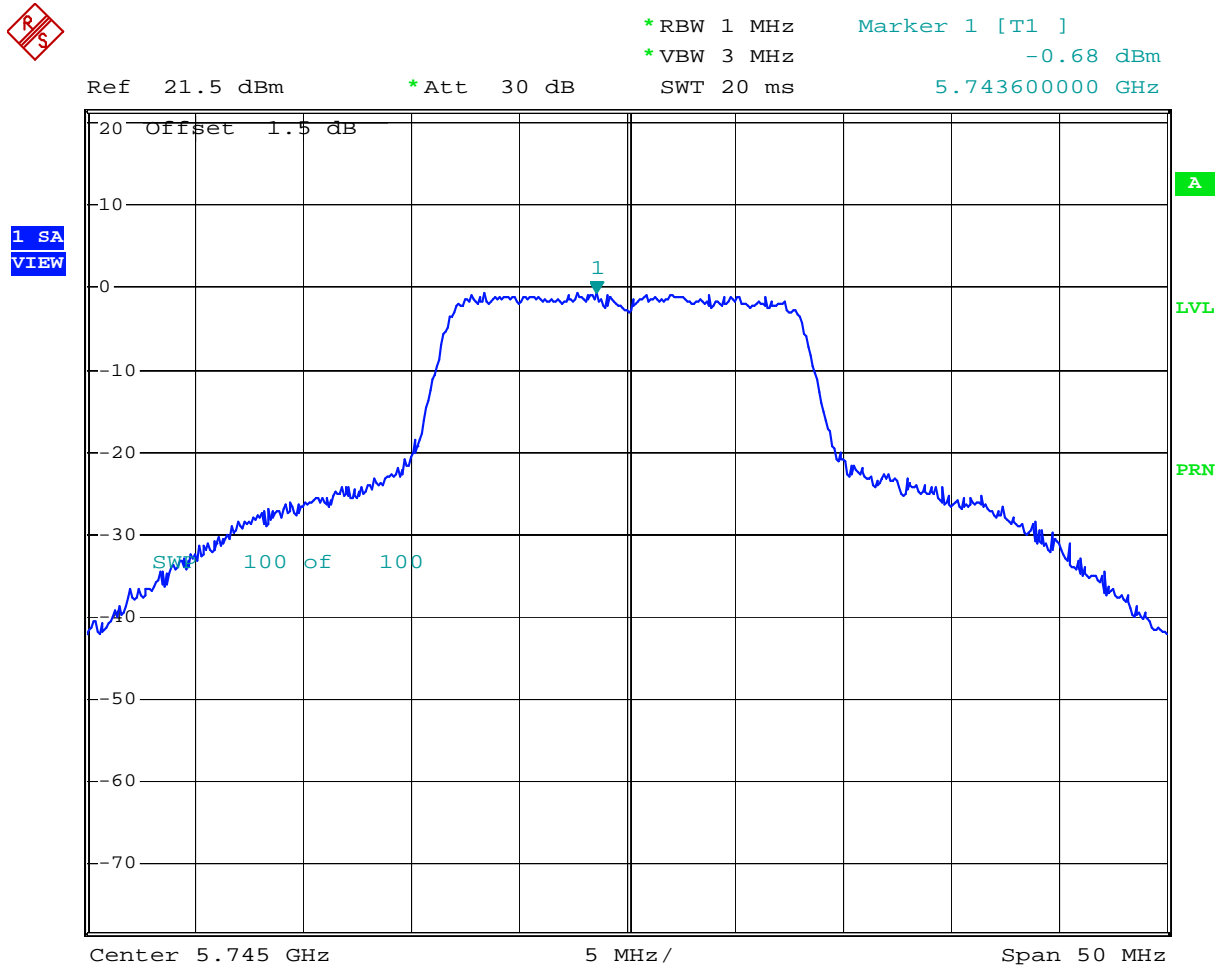
Comment: Peak power spectral density, 6 Mbps
Date: 8.NOV.2008 13:34:26

Plot 3.9



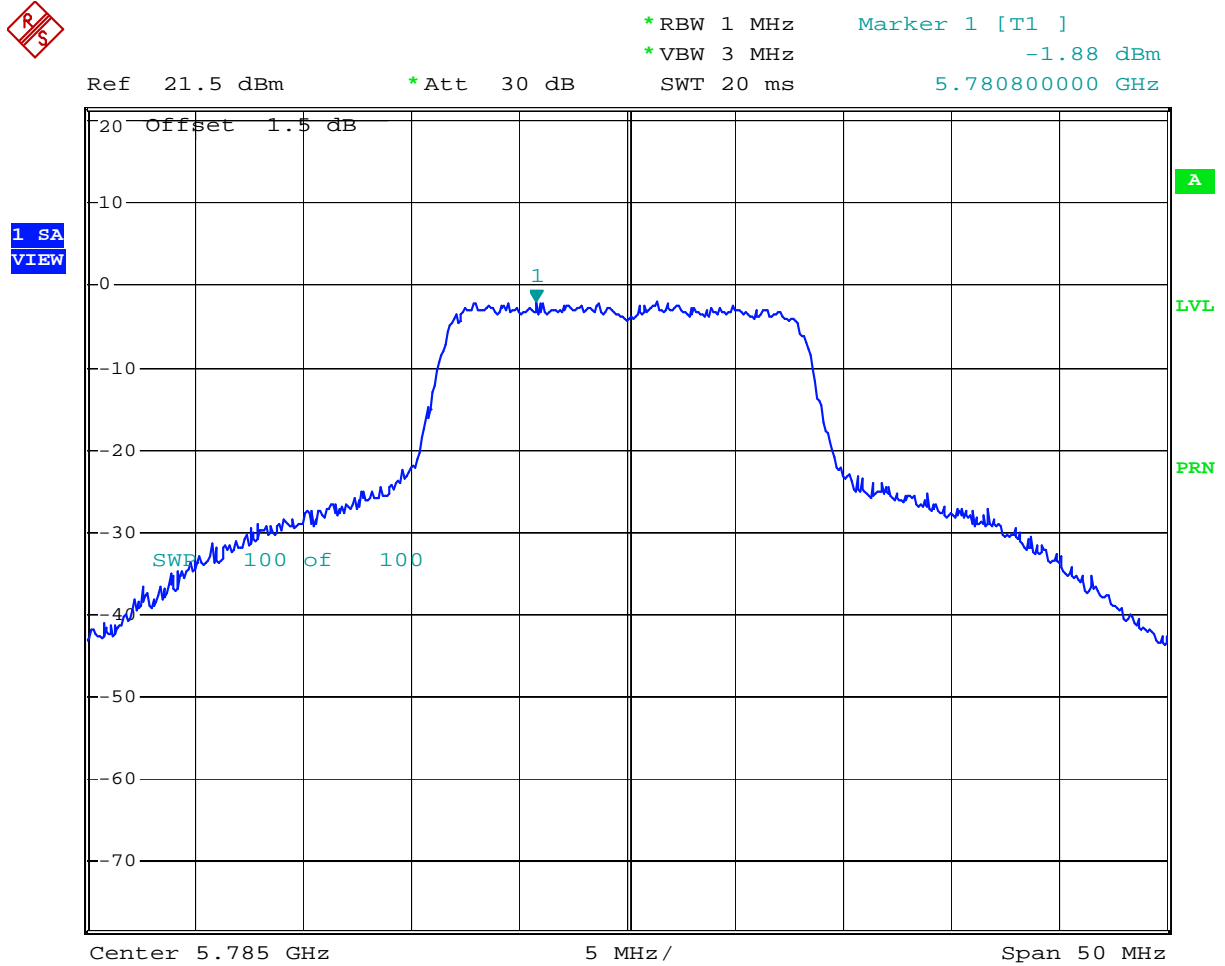
Comment: Peak power spectral density, 6 Mbps
 Date: 8.NOV.2008 13:36:17

Plot 3.10



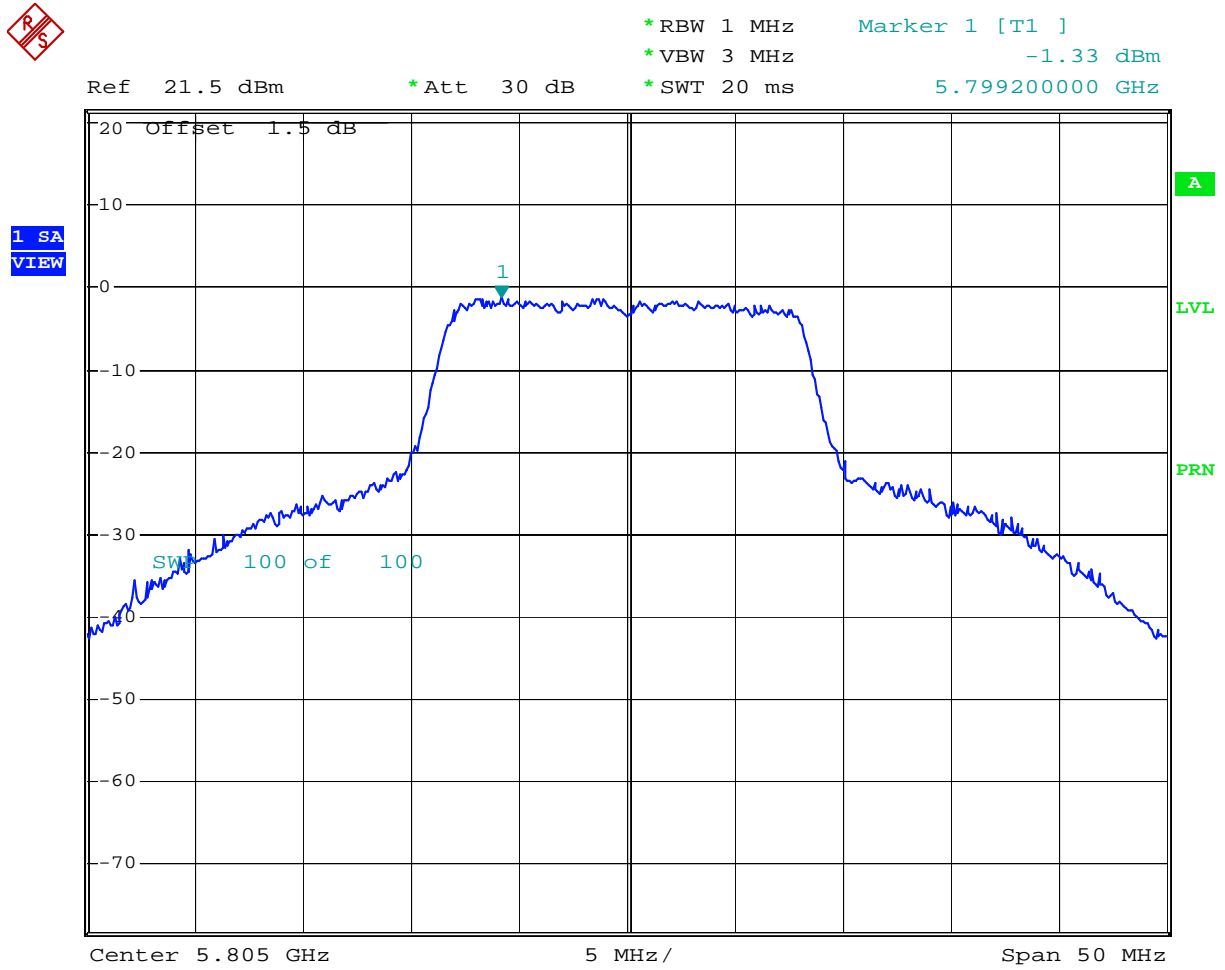
Comment: Peak power spectral density, 6 Mbps
 Date: 8.NOV.2008 13:38:14

Plot 3.11



Comment: Peak power spectral density, 6 Mbps
Date: 8.NOV.2008 13:39:20

Plot 3.12



Comment: Peak power spectral density, 6 Mbps
 Date: 23.NOV.2008 09:55:29

4.4 Ratio of the peak excursion of the modulation envelope
FCC Rule: 15.407(a)(6)

Requirement

The Ratio of the peak excursion of the modulation envelope to the maximum conducted output power shall not exceed 13 dB across any 1 megahertz bandwidth.

Procedure

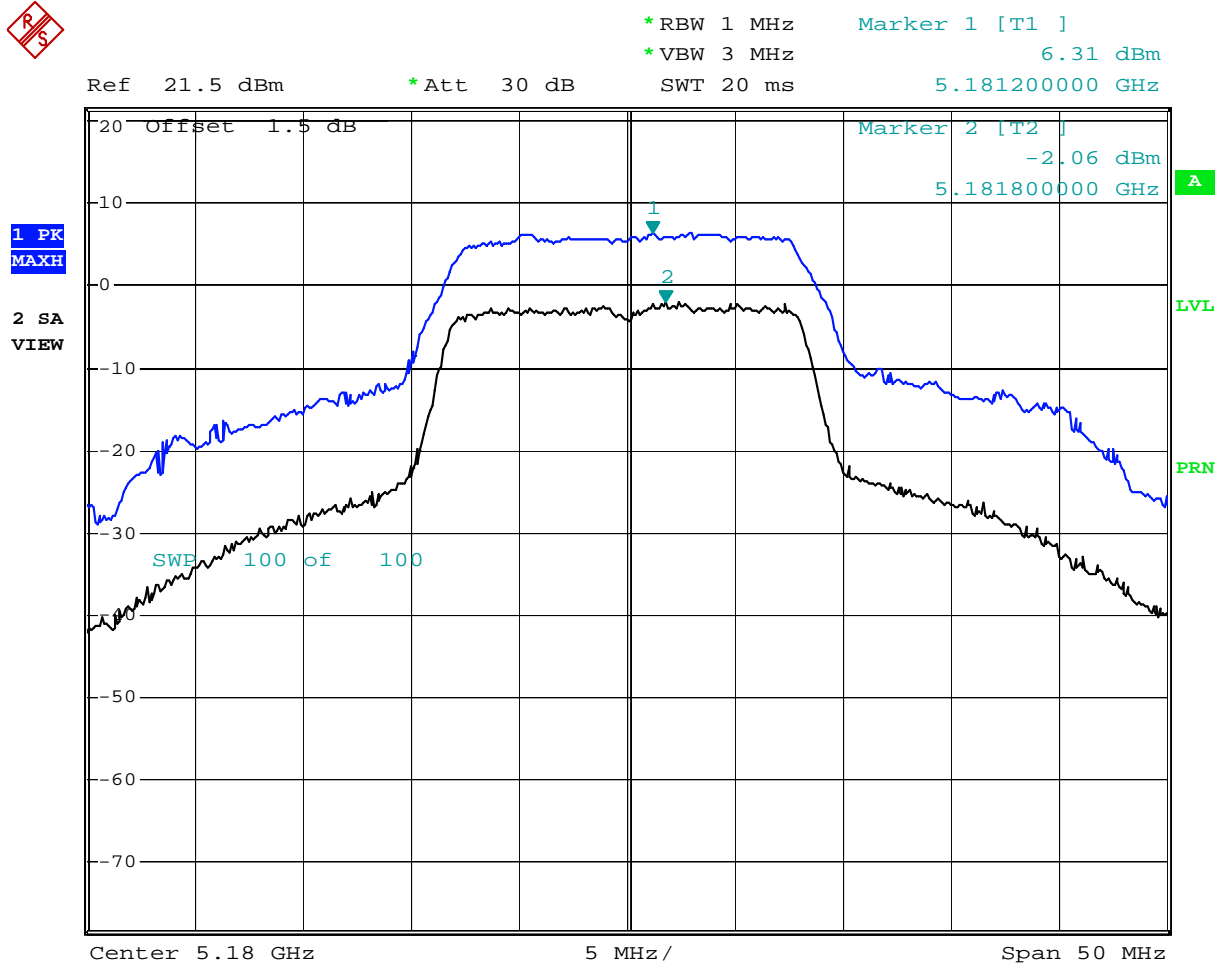
The Procedure, described in the FCC Public Notice DA 02-2138, was used.

Results

The test results are presented on the following plots 4.1 – 4.12 and summarized in the table below.

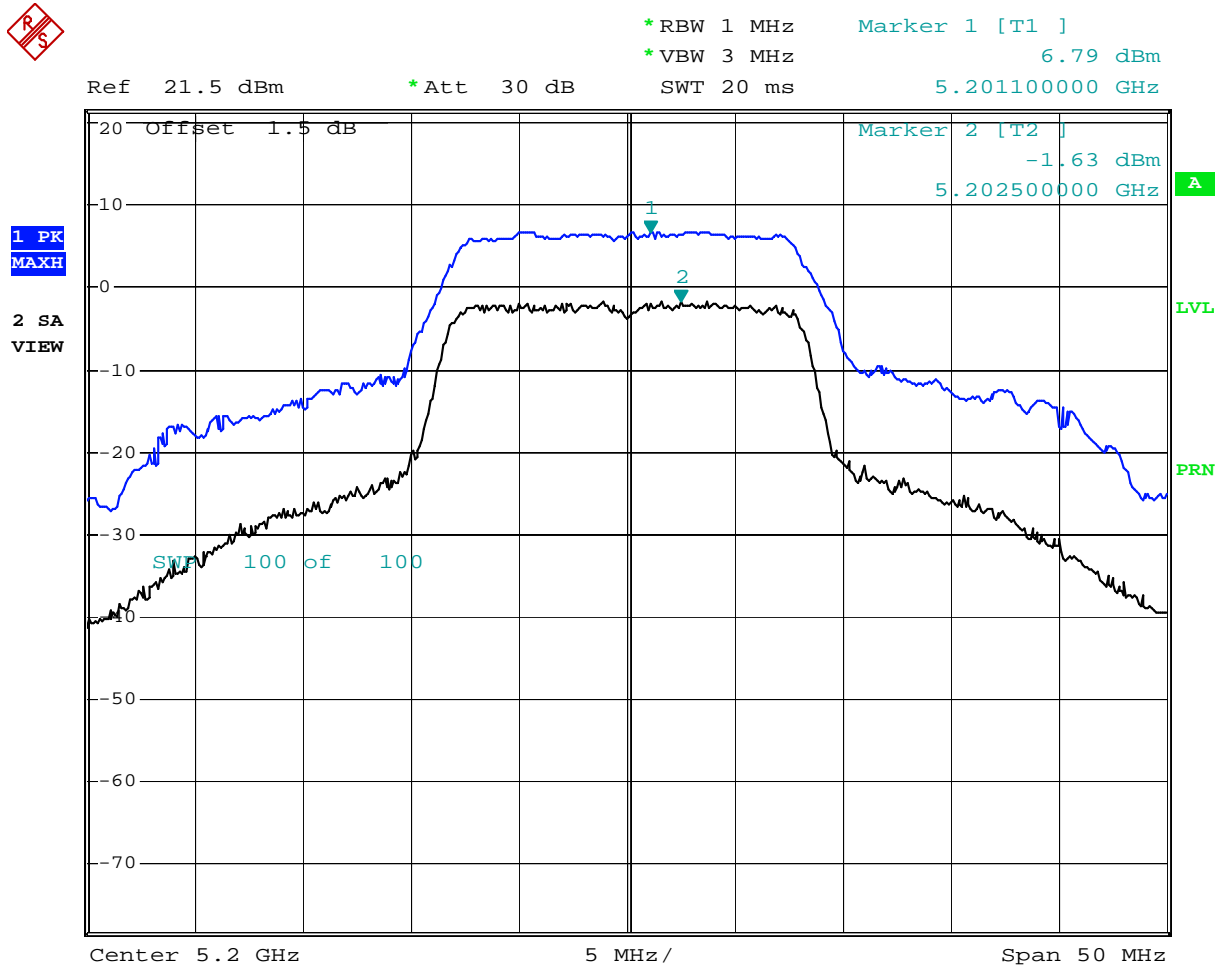
Channel	Frequency MHz	Ratio of the peak excursion dBm	Margin to 13 dBm limit dB	Plot #
36	5180	8.4	-4.6	4.1
40	5200	8.4	-4.6	4.2
48	5240	8.2	-4.8	4.3
52	5260	8.4	-4.6	4.4
56	5280	8.7	-4.3	4.5
64	5320	8.8	-4.2	4.6
100	5500	8.3	-4.7	4.7
120	5600	8.5	-4.5	4.8
140	5700	8.7	-4.3	4.9
149	5745	8.6	-4.4	4.10
157	5785	8.5	-4.5	4.11
161	5805	8.8	-4.2	4.12

Plot 4.1



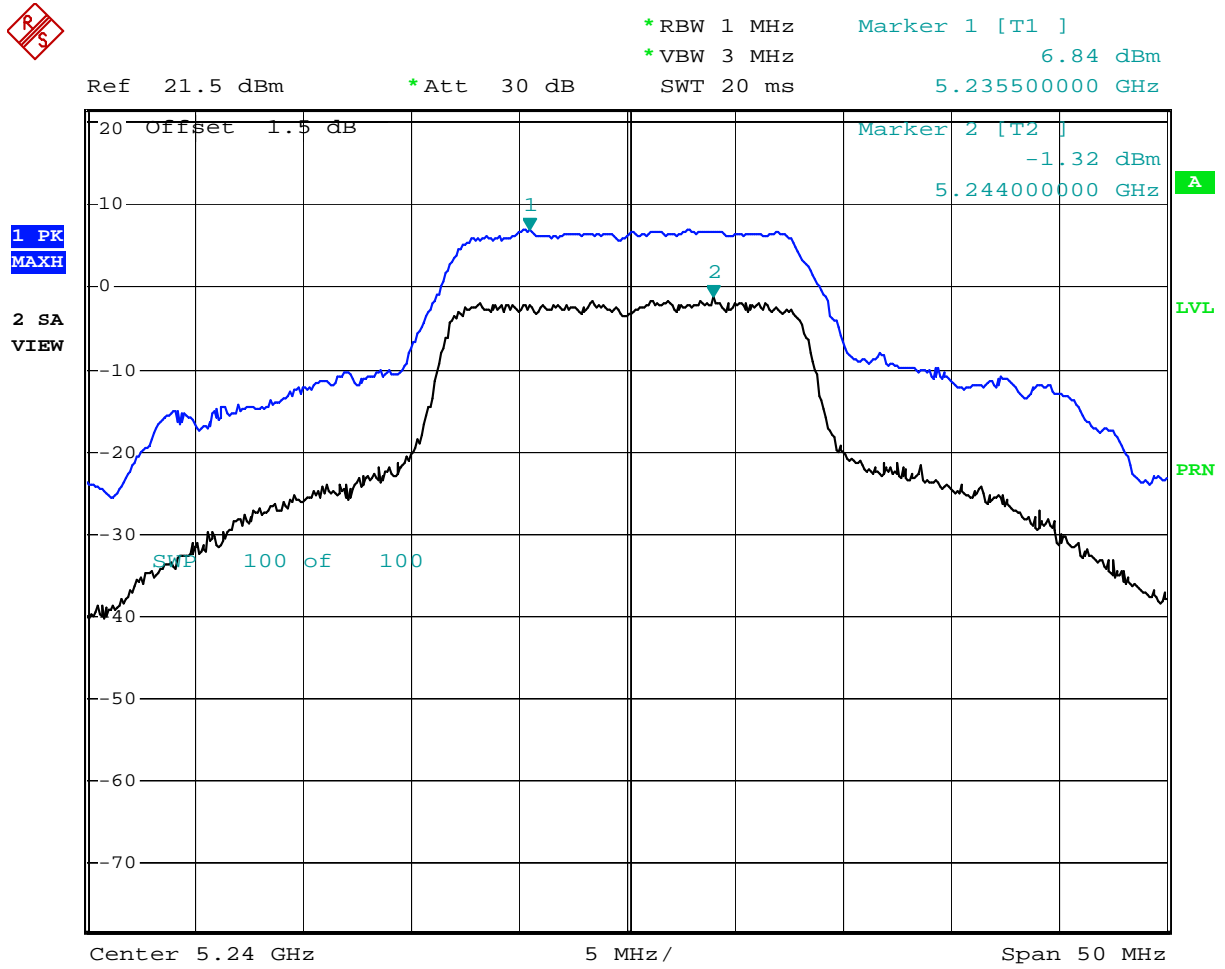
Comment: Peak excursion, 6 Mbps
 Date: 8.NOV.2008 14:24:55

Plot 4.2



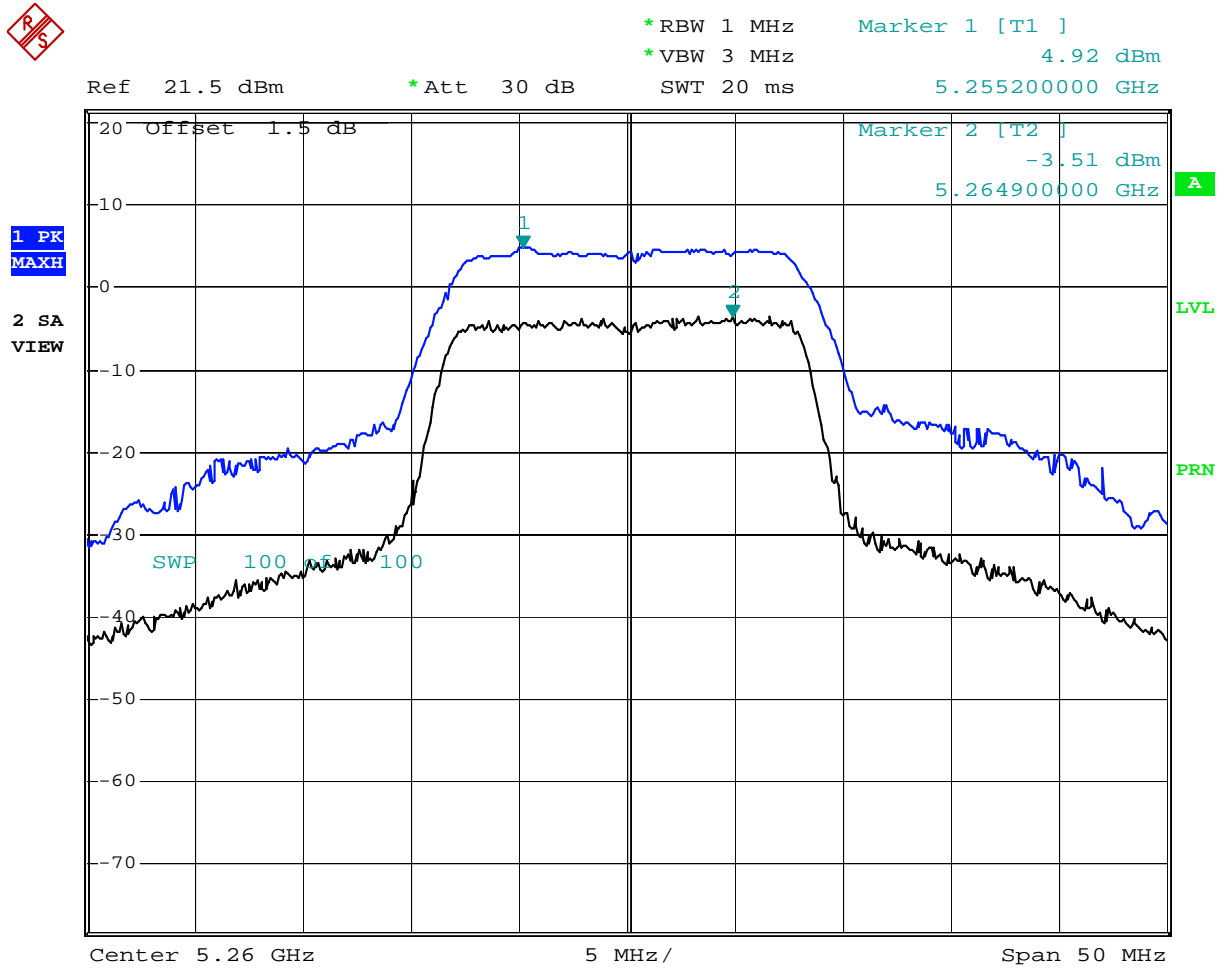
Comment: Peak excursion, 6 Mbps
 Date: 8.NOV.2008 14:23:20

Plot 4.3



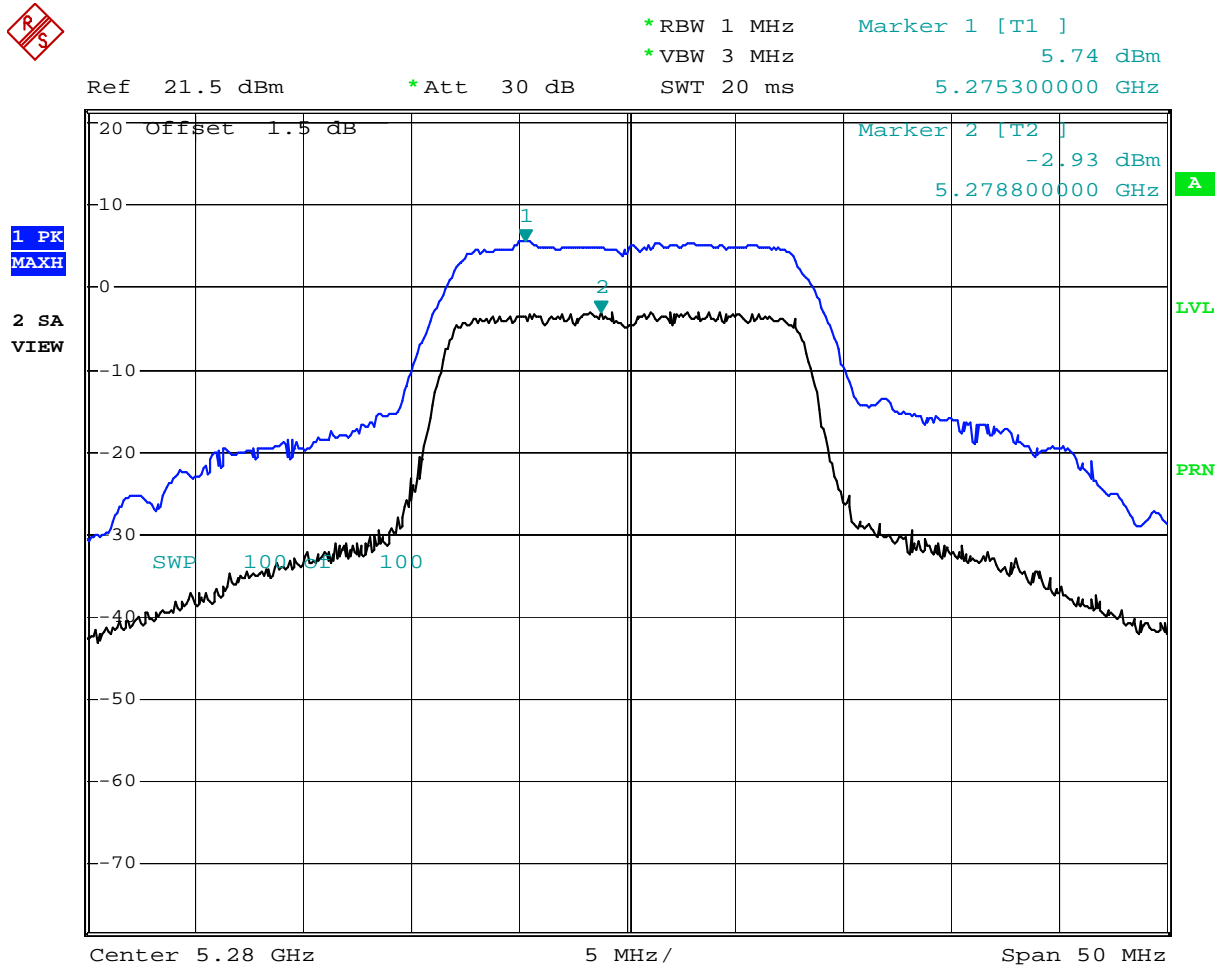
Comment: Peak excursion, 6 Mbps
 Date: 8.NOV.2008 14:21:25

Plot 4.4



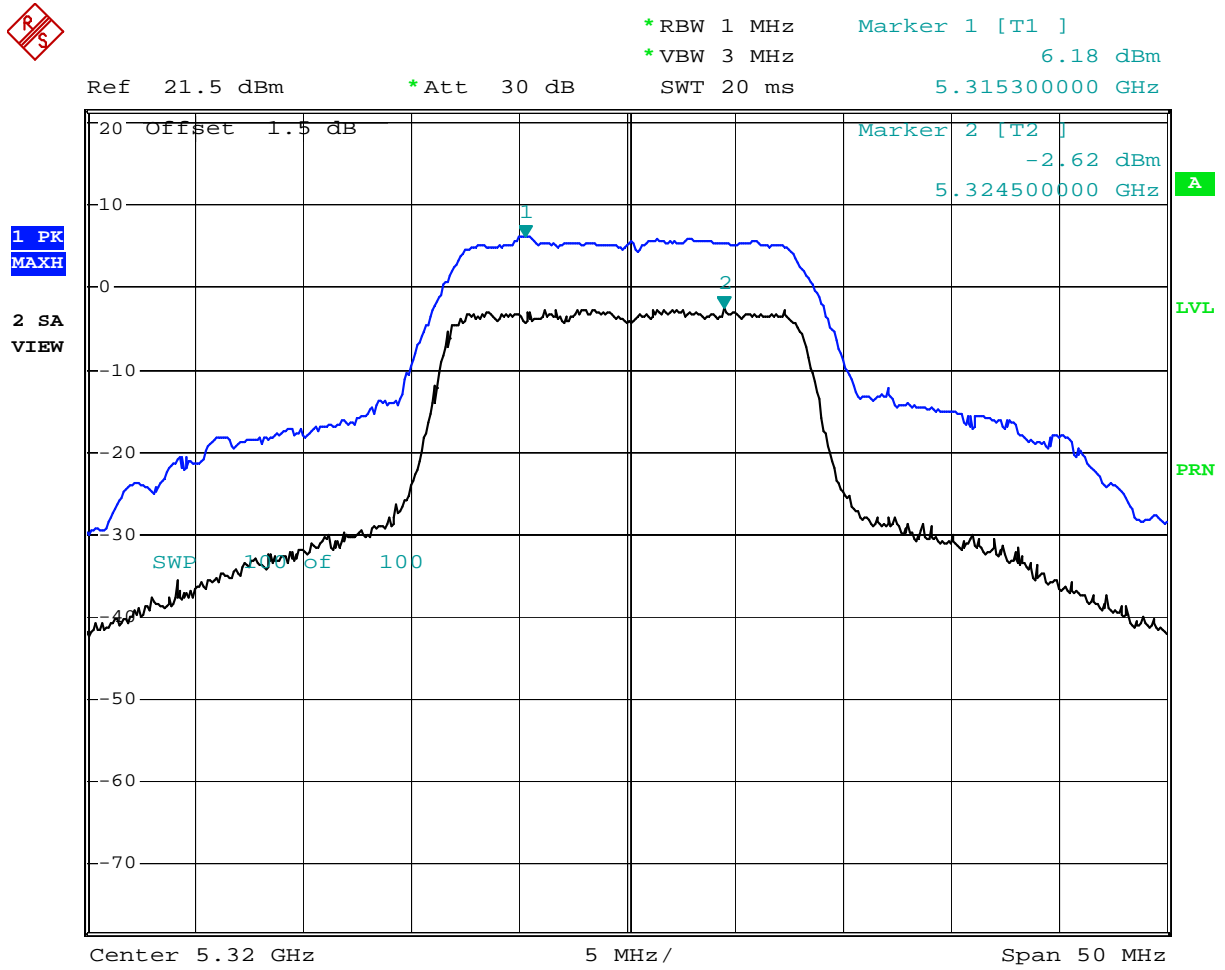
Comment: Peak excursion, 6 Mbps
 Date: 8.NOV.2008 14:19:11

Plot 4.5



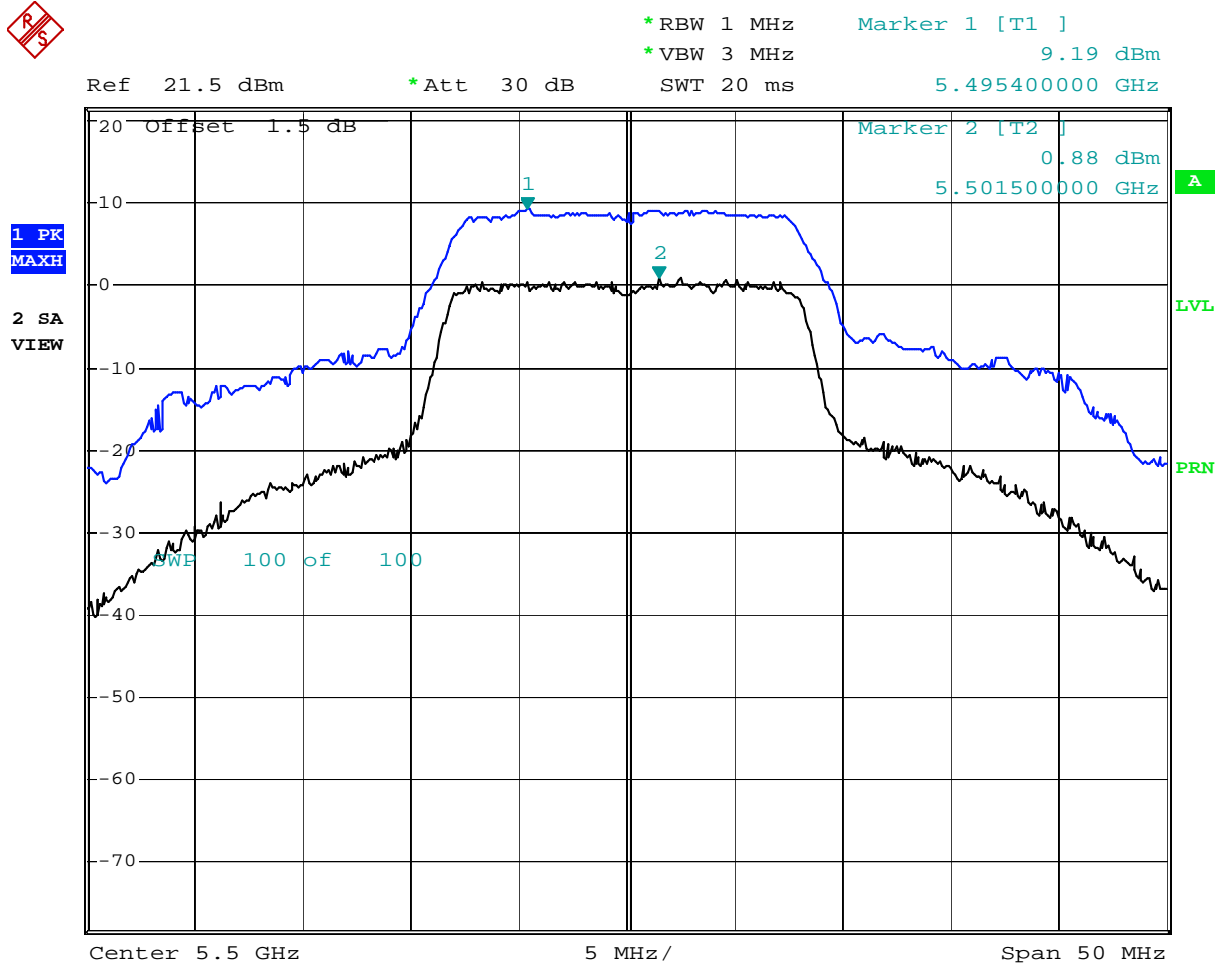
Comment: Peak excursion, 6 Mbps
 Date: 8.NOV.2008 14:17:23

Plot 4.6



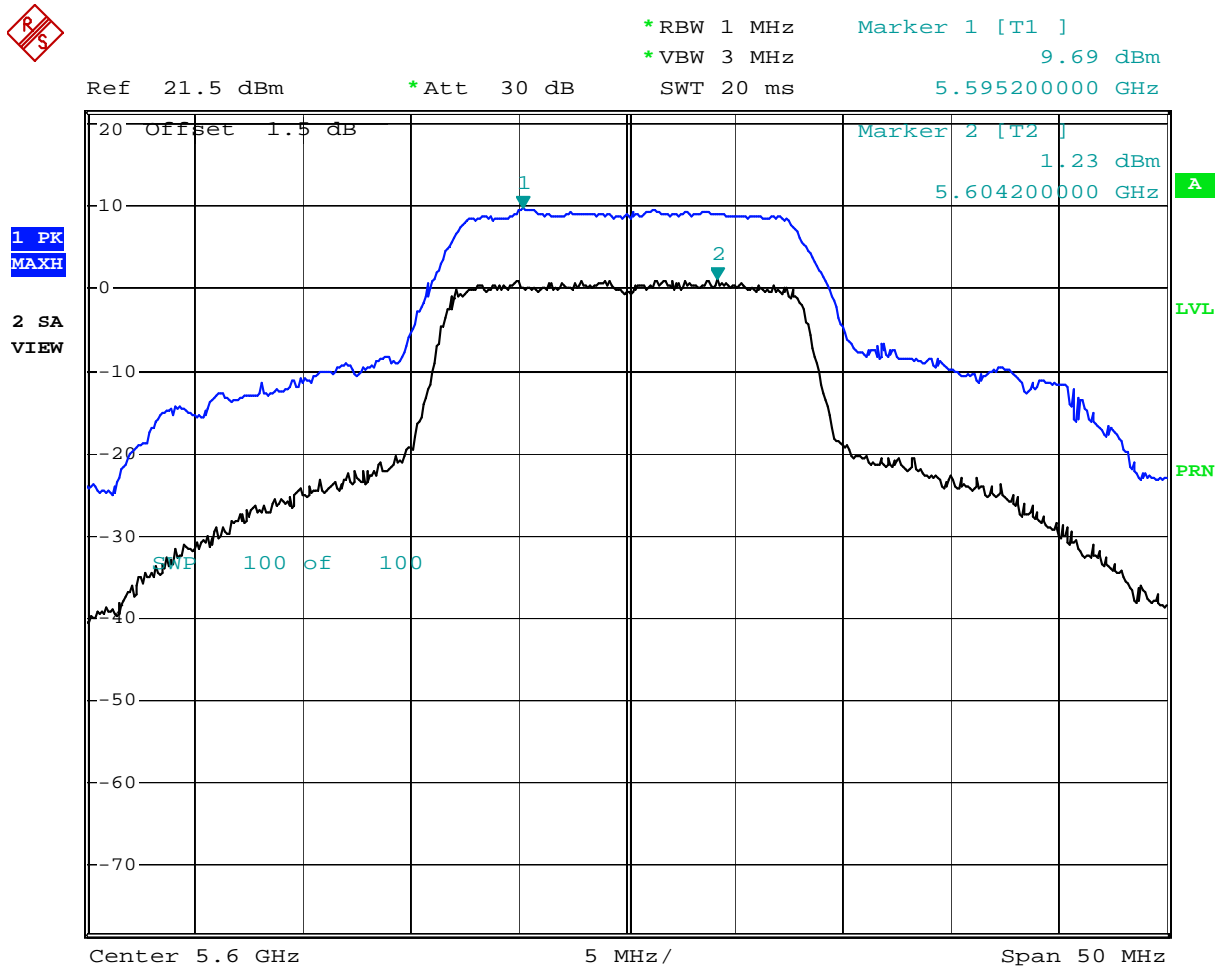
Comment: Peak excursion, 6 Mbps
 Date: 8.NOV.2008 14:15:19

Plot 4.7



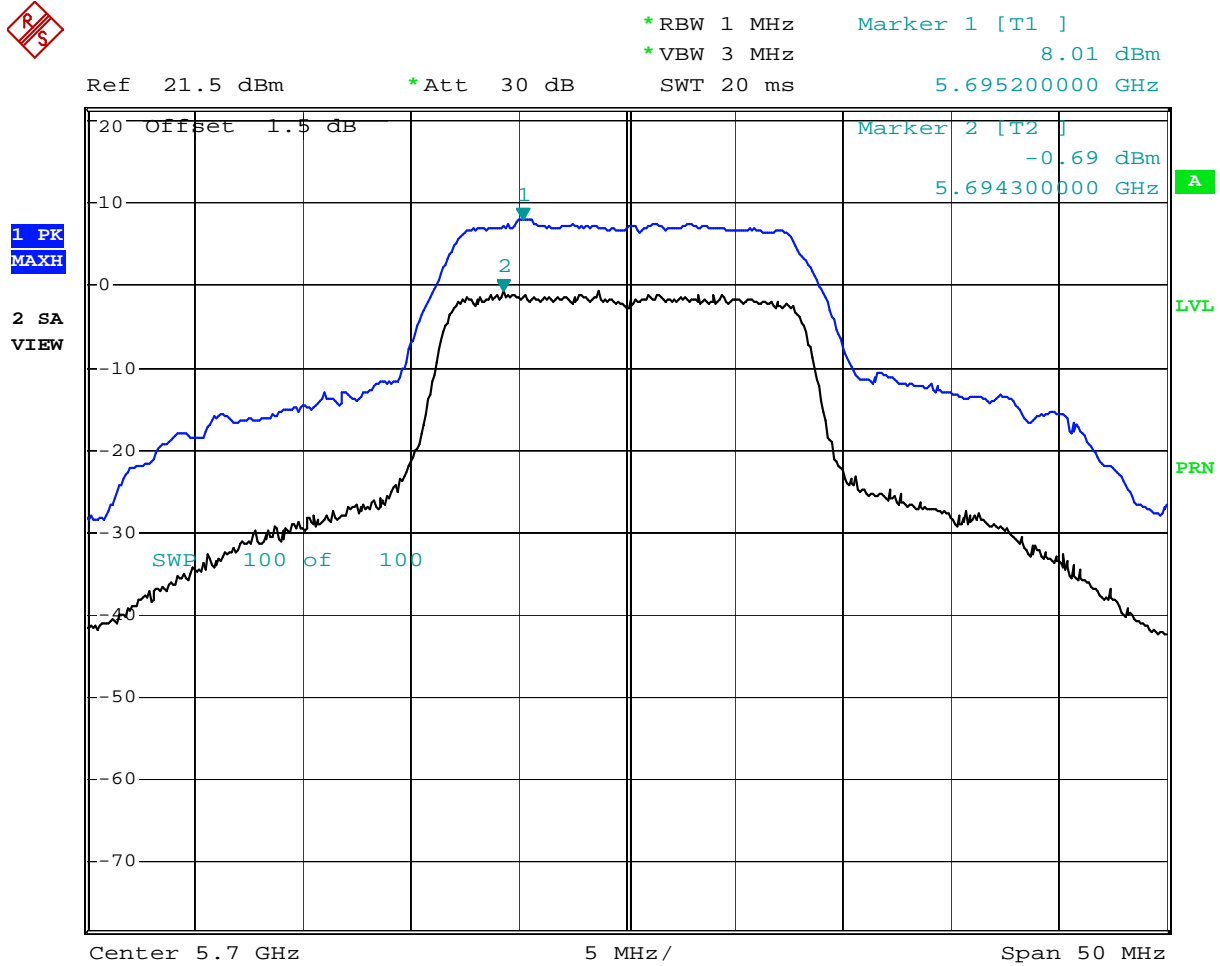
Comment: Peak excursion, 6 Mbps
 Date: 8.NOV.2008 14:13:04

Plot 4.8



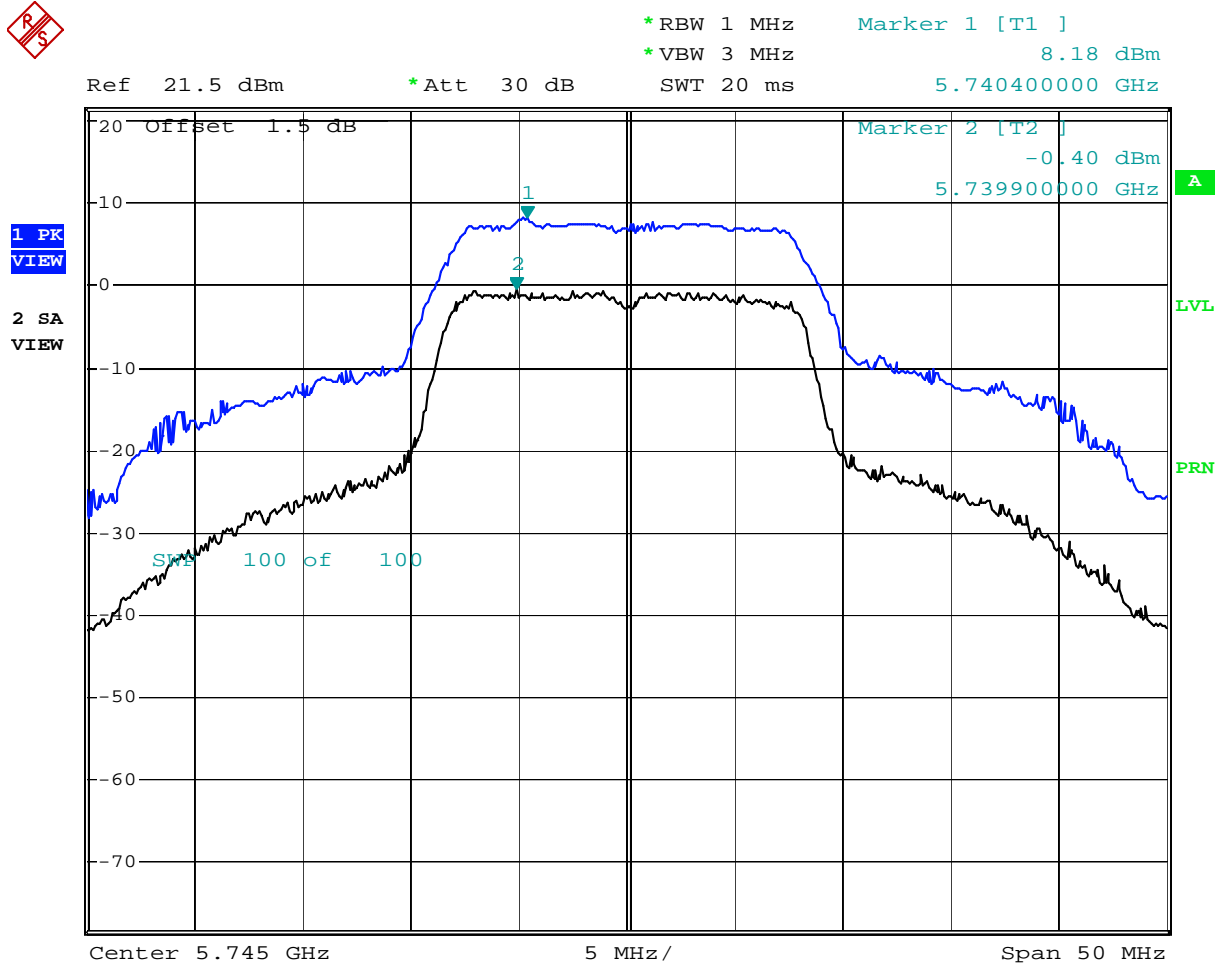
Comment: Peak excursion, 6 Mbps
 Date: 8.NOV.2008 14:10:45

Plot 4.9



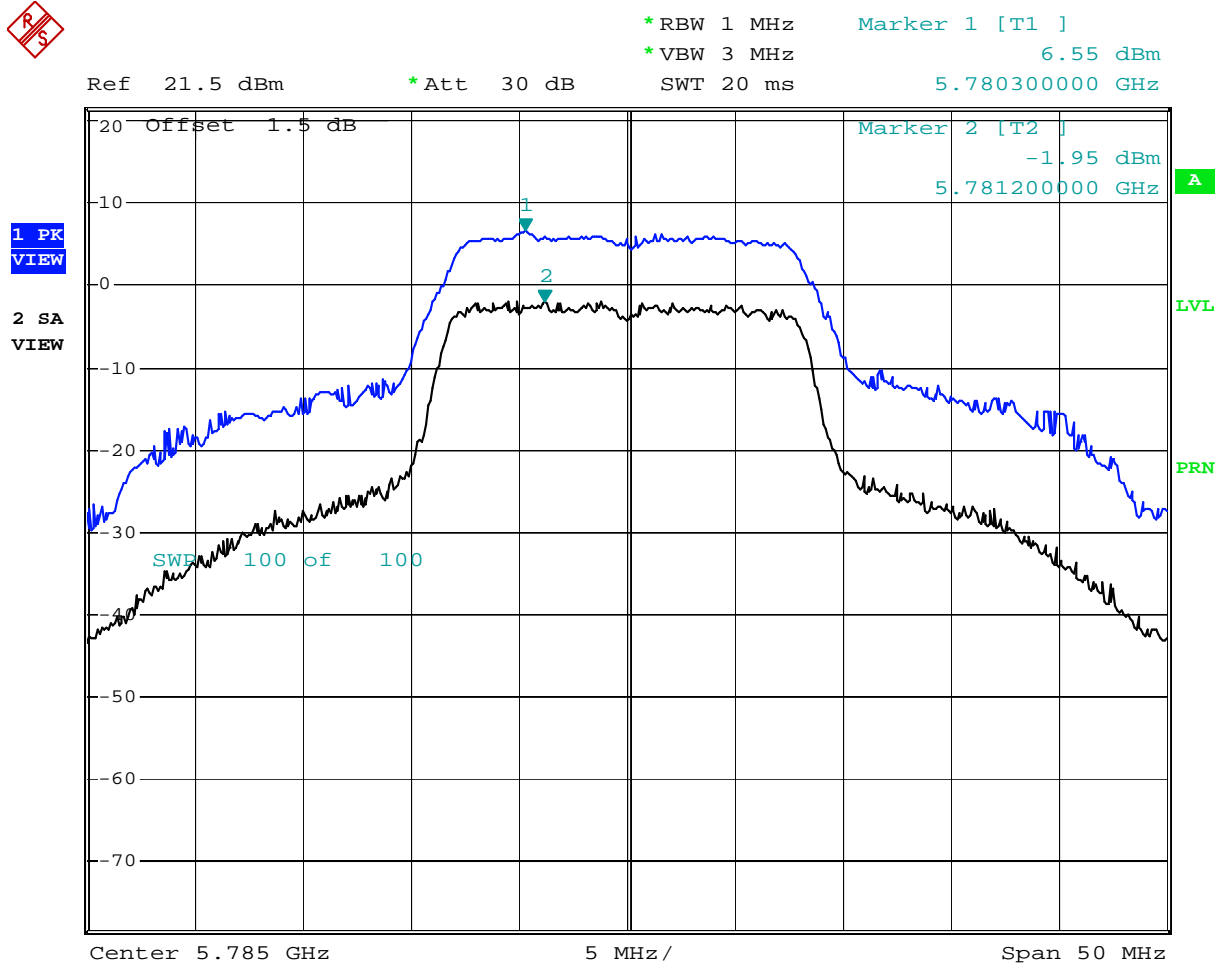
Comment: Peak excursion, 6 Mbps
 Date: 8.NOV.2008 14:08:26

Plot 4.10



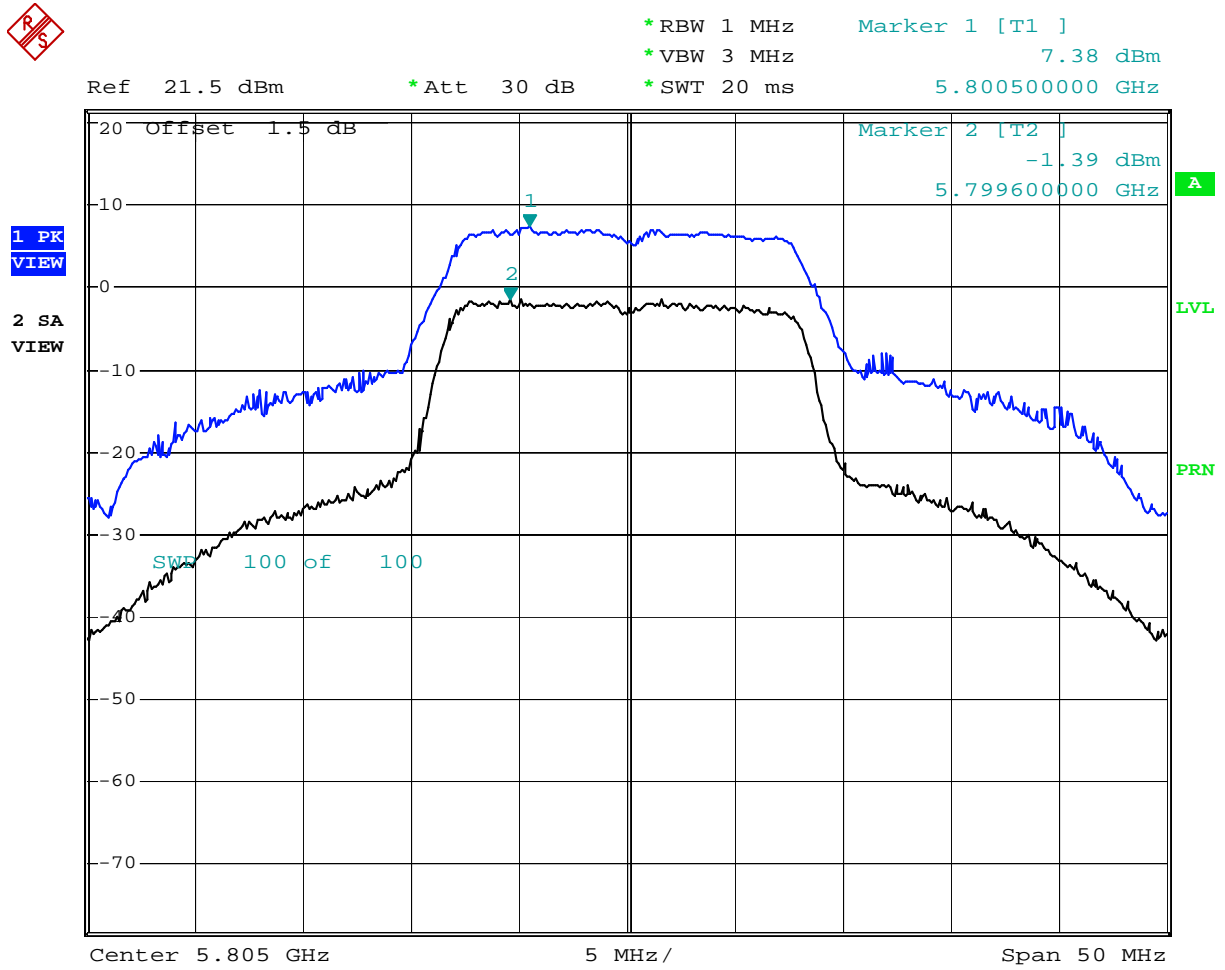
Comment: Peak excursion, 6 Mbps
 Date: 8.NOV.2008 14:05:23

Plot 4.11



Comment: Peak excursion, 6 Mbps
 Date: 8.NOV.2008 14:02:18

Plot 4.12



Comment: Peak excursion, 6 Mbps
 Date: 8.NOV.2008 10:02:41

4.5 Out-of-Band Conducted Emissions FCC Rule: 15.407(b)

Requirements

For transmitters operating in the 5.15–5.25 GHz band: all emissions outside of the 5.15–5.35 GHz band shall not exceed an EIRP of -27 dBm/MHz.

For transmitters operating in the 5.25–5.35 GHz band: all emissions outside of the 5.15–5.35 GHz band shall not exceed an EIRP of -27 dBm/MHz. Devices operating in the 5.25–5.35 GHz band that generate emissions in the 5.15–5.25 GHz band must meet all applicable technical requirements for operation in the 5.15–5.25 GHz band (including indoor use) or alternatively meet an out-of-band emission EIRP limit of -27 dBm/MHz in the 5.15–5.25 GHz band.

For transmitters operating in the 5.47–5.725 GHz band: all emissions outside of the 5.47–5.725 GHz band shall not exceed an EIRP of -27 dBm/MHz.

For transmitters operating in the 5.725–5.825 GHz band: all emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an EIRP of -17 dBm/MHz; for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an EIRP of -27 dBm/MHz.

Procedure

A spectrum analyzer was connected to the antenna port of the transmitter. Analyzer Resolution Bandwidth was set to 1 MHz. The out-of-band emissions were measured from 30 MHz to 40 GHz for low, middle and high channels.

To compare to the EIRP limits, for emissions detected inside the 5 GHz band, the antenna gain of 5.5 dBi must be added to the spectrum analyzer readings on the following plots.

Test Result

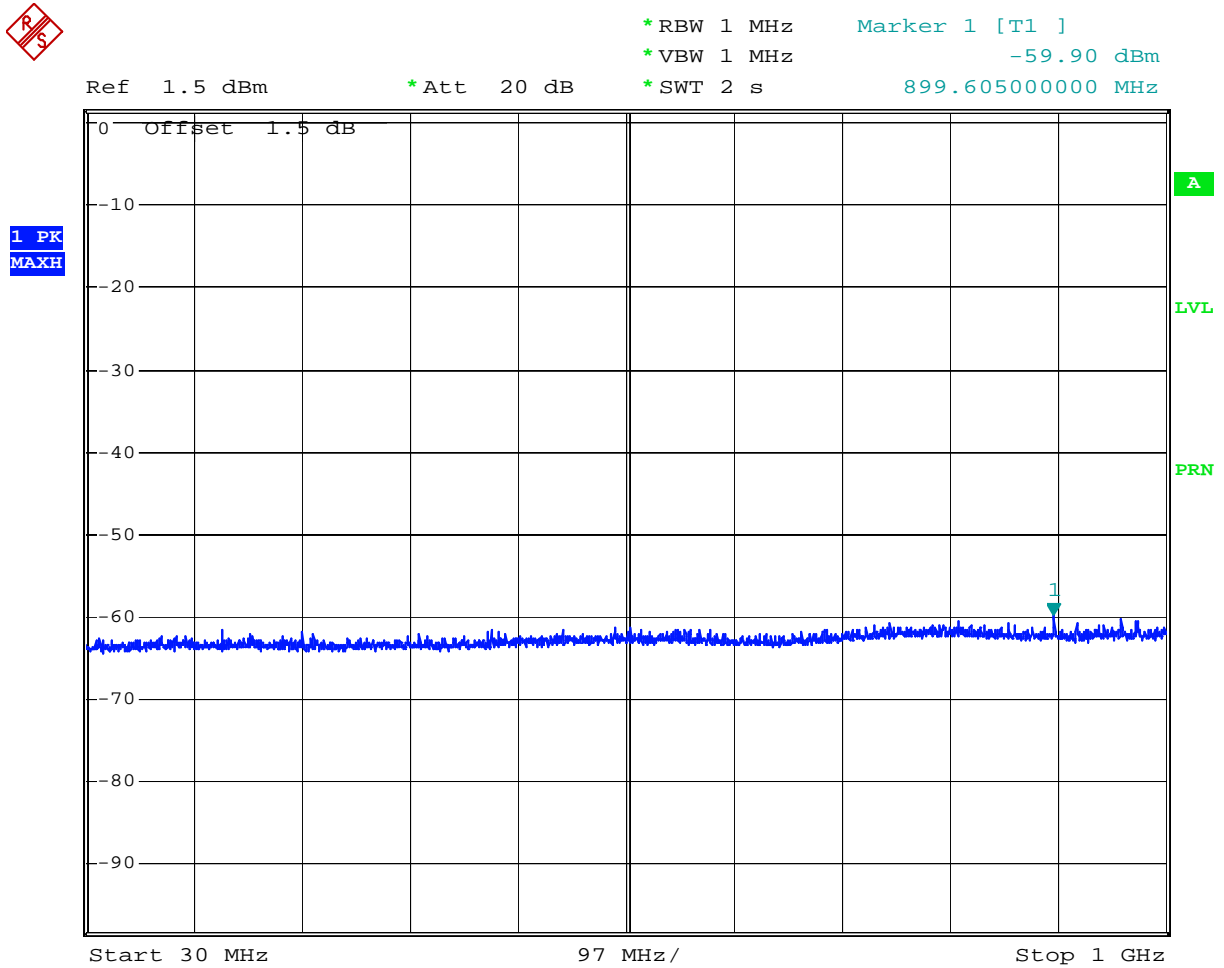
Refer to the plots below for the test result.

The EUT passed by 2.3 dB.

Frequency MHz	Description	Margin to -27dBm/MHz EIRP limit dB	Plot #
5180	Scan 30 MHz – 1 GHz	-	5.1
	Scan 1 GHz – 5.15 GHz	-2.3	5.2
	Scan 5.35 GHz – 12 GHz	-15.5	5.3
	Scan 12 GHz – 40 GHz	-	5.4
5200	Scan 30 MHz – 1 GHz	-	5.5
	Scan 1 GHz – 5.15 GHz	-8.0	5.6
	Scan 5.35 GHz – 12 GHz	-13.5	5.7
	Scan 12 GHz – 40 GHz	-	5.8
5240	Scan 30 MHz – 1 GHz	-	5.9
	Scan 1 GHz – 5.15 GHz	-12.7	5.10
	Scan 5.35 GHz – 12 GHz	-6.9	5.11
	Scan 12 GHz – 40 GHz	-	5.12
5260	Scan 30 MHz – 1 GHz	-	5.13
	Scan 1 GHz – 5.15 GHz	-3.9	5.14
	Scan 5.35 GHz – 12 GHz	-5.7	5.15
	Scan 12 GHz – 40 GHz	-	5.16
5280	Scan 30 MHz – 1 GHz	-	5.17
	Scan 1 GHz – 5.15 GHz	-10.6	5.18
	Scan 5.35 GHz – 12 GHz	-7.3	5.19
	Scan 12 GHz – 40 GHz	-	5.20
5320	Scan 30 MHz – 1 GHz	-	5.21
	Scan 1 GHz – 5.15 GHz	-9.7	5.22
	Scan 5.35 GHz – 12 GHz	-15.0	5.23
	Scan 12 GHz – 40 GHz	-	5.24
5500	Scan 30 MHz – 1 GHz	-	5.25
	Scan 1 GHz – 5.47 GHz	-7.6	5.26
	Scan 5.725 GHz – 12 GHz	-7.8	5.27
	Scan 12 GHz – 40 GHz	-	5.28
5600	Scan 30 MHz – 1 GHz	-	5.29
	Scan 1 GHz – 5.47 GHz	-10.8	5.30
	Scan 5.725 GHz – 12 GHz	-7.9	5.31
	Scan 12 GHz – 40 GHz	-	5.32
5700	Scan 30 MHz – 1 GHz	-	5.33
	Scan 1 GHz – 5.47 GHz	-11.6	5.34
	Scan 5.725 GHz – 12 GHz	-11.1	5.35
	Scan 12 GHz – 40 GHz	-	5.36

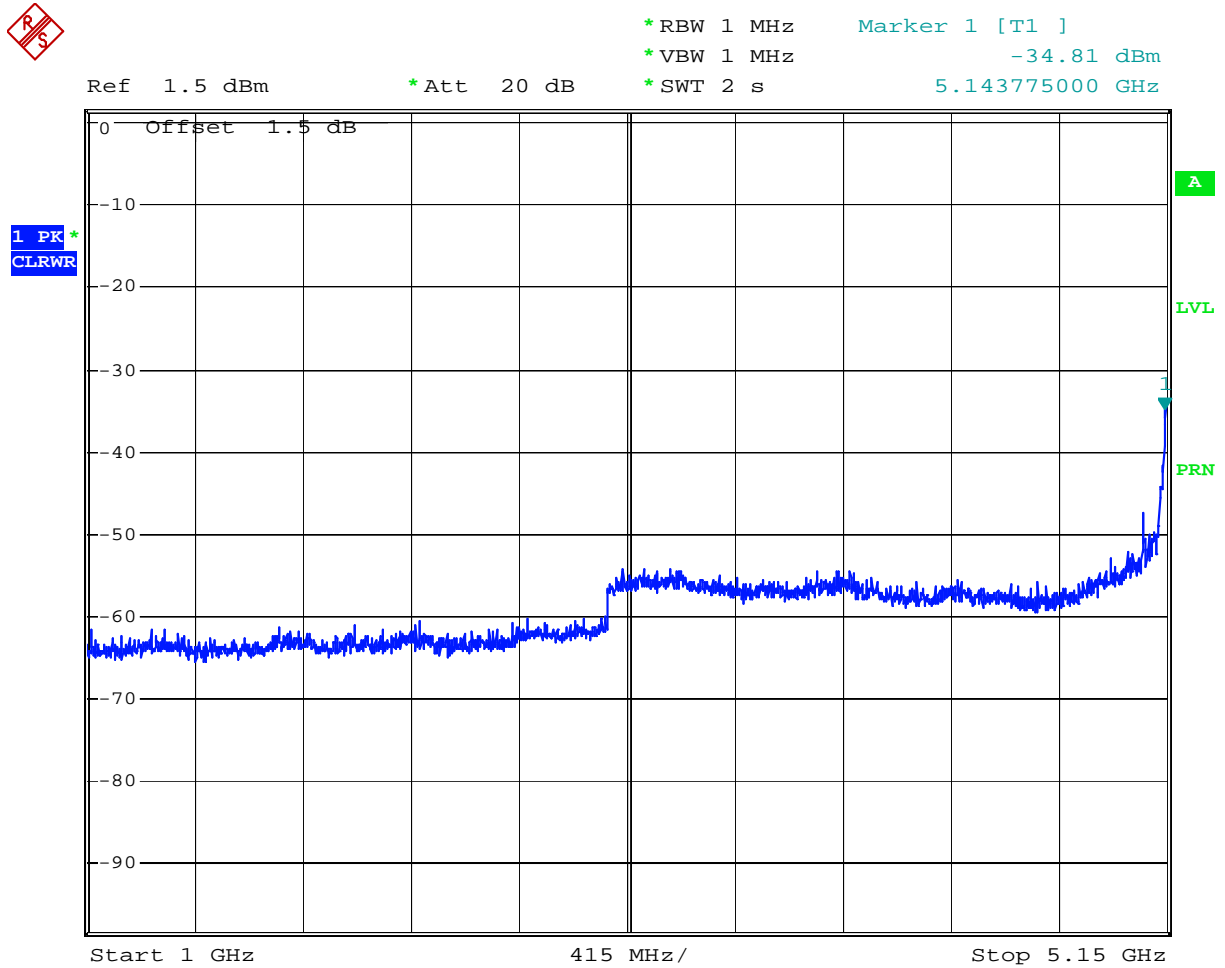
Frequency MHz	Description	Margin to EIRP limit dB	Plot #
5745	Scan 30 MHz – 1 GHz	-	5.37
	Scan 1 GHz – 5.715 GHz	-13.1	5.38
	Scan 5.715 GHz – 5.725 GHz	-12.0	5.39
	Scan 5.825 GHz – 12 GHz	-19.8	5.40
	Scan 12 GHz – 40 GHz	-	5.41
5785	Scan 30 MHz – 1 GHz	-	5.42
	Scan 1 GHz – 5.725 GHz	-7.5	5.43
	Scan 5.825 GHz – 12 GHz	-12.5	5.44
	Scan 12 GHz – 40 GHz	-	5.45
5805	Scan 30 MHz – 1 GHz	-	5.46
	Scan 1 GHz – 5.725 GHz	-7.7	5.47
	Scan 5.825 GHz – 12 GHz	-10.2	5.48
	Scan 12 GHz – 40 GHz	-	5.49

Plot 5.1



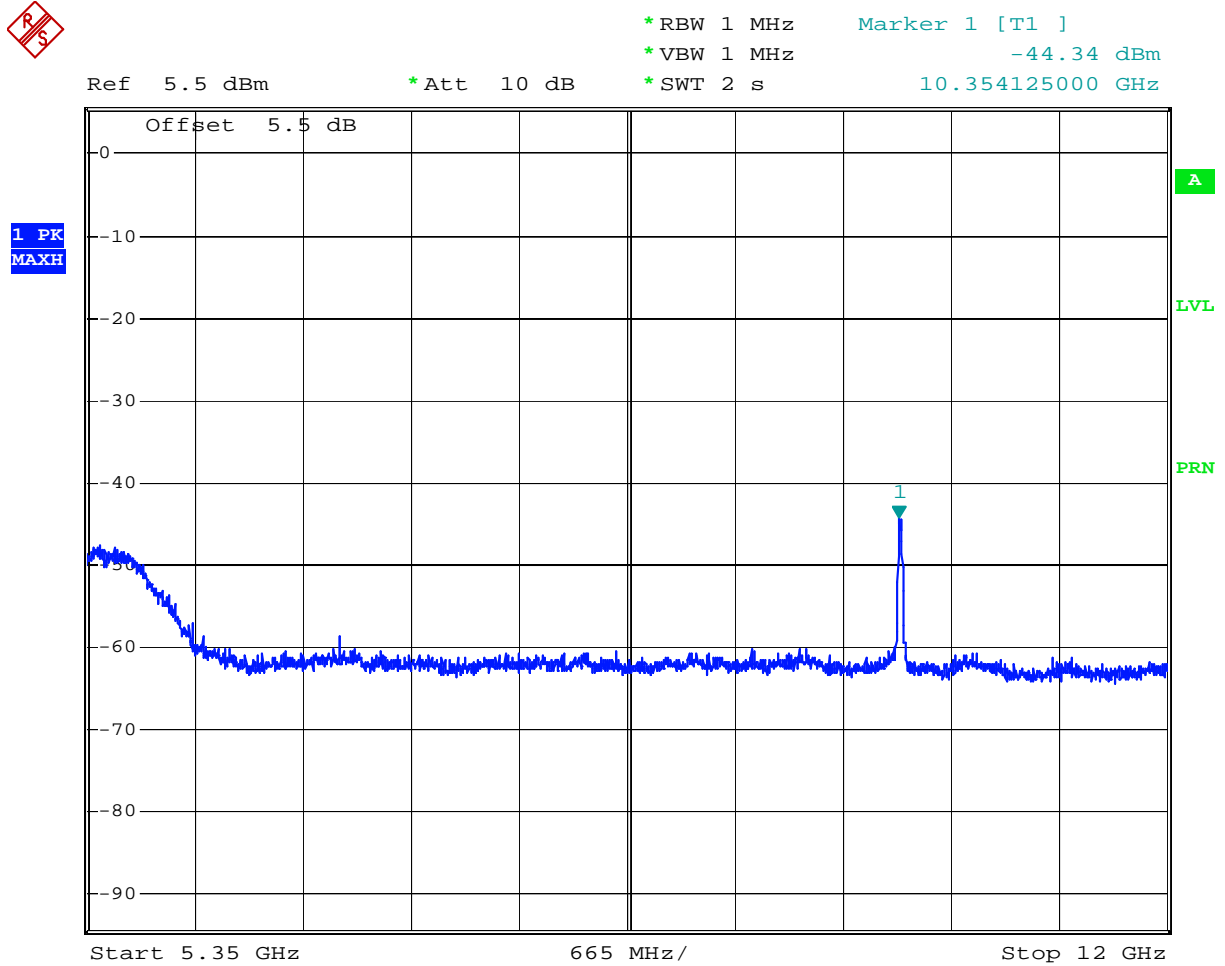
Comment: Undesirable emissions, 5180 MHz, 6 Mbps
 Date: 23.NOV.2008 17:32:42

Plot 5.2



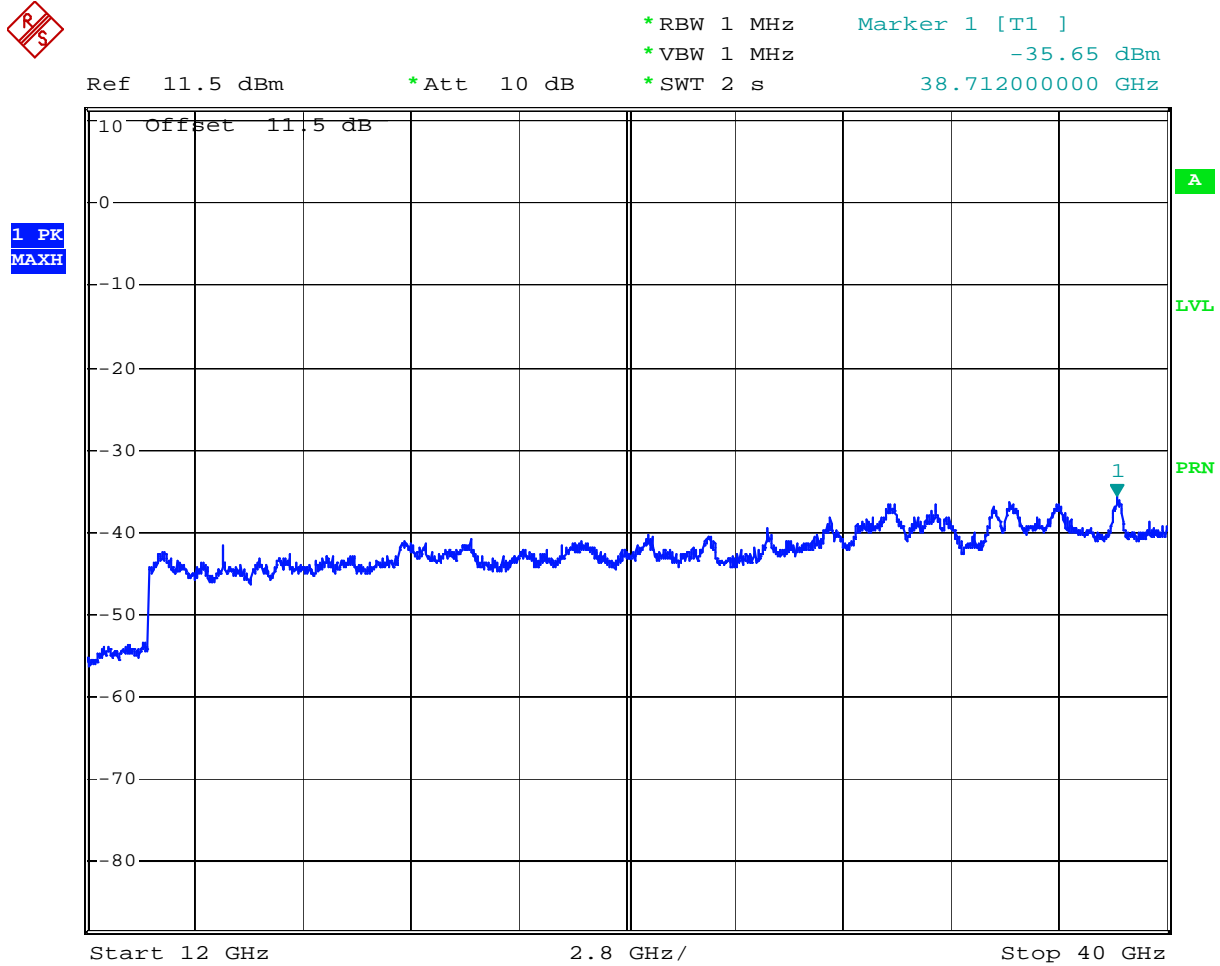
Comment: Undesirable emissions, 5180 MHz, 6 Mbps
Date: 23.NOV.2008 17:53:15

Plot 5.3



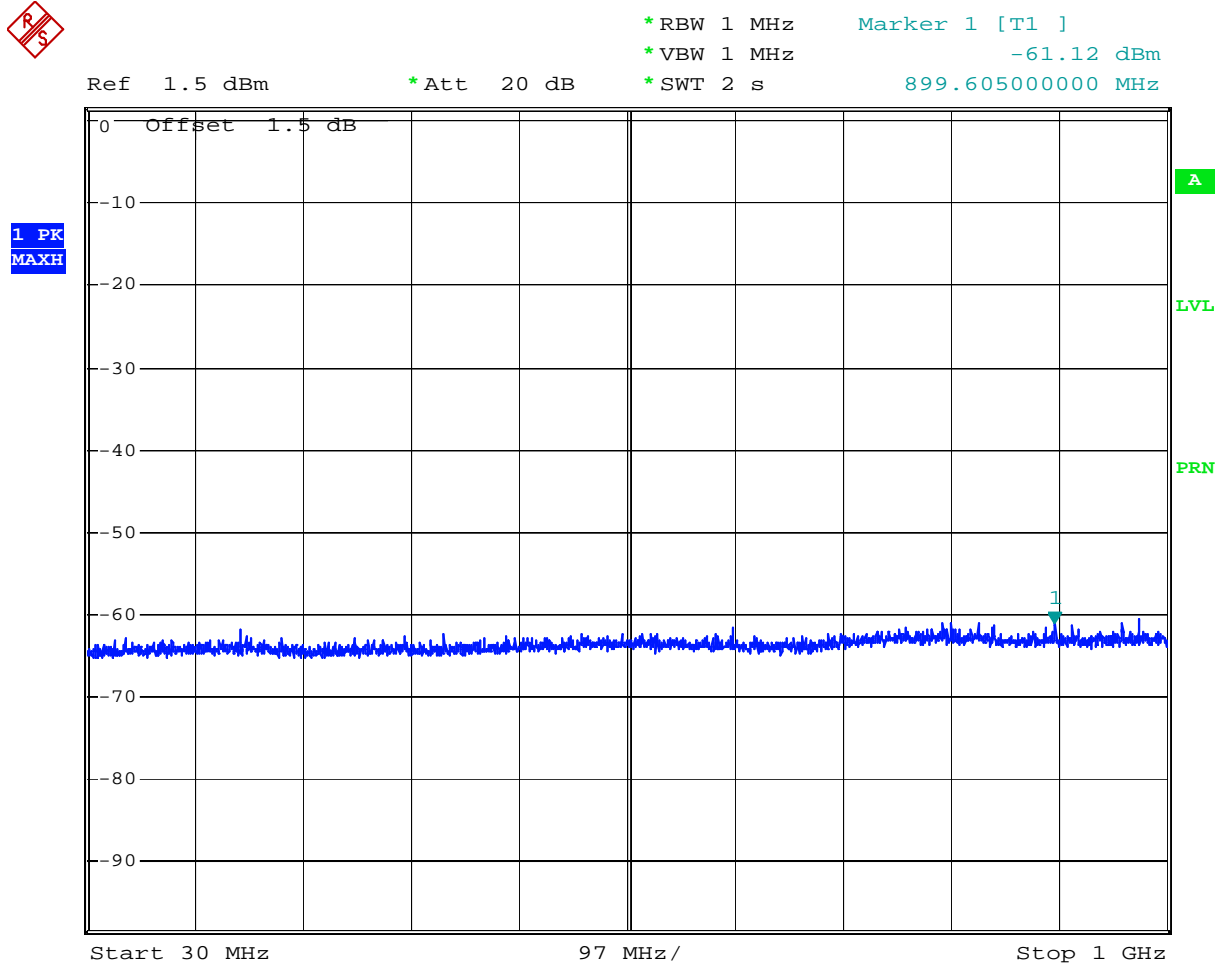
Comment: Undesirable emissions, 5180 MHz, 6 Mbps
Date: 23.NOV.2008 18:33:23

Plot 5.4



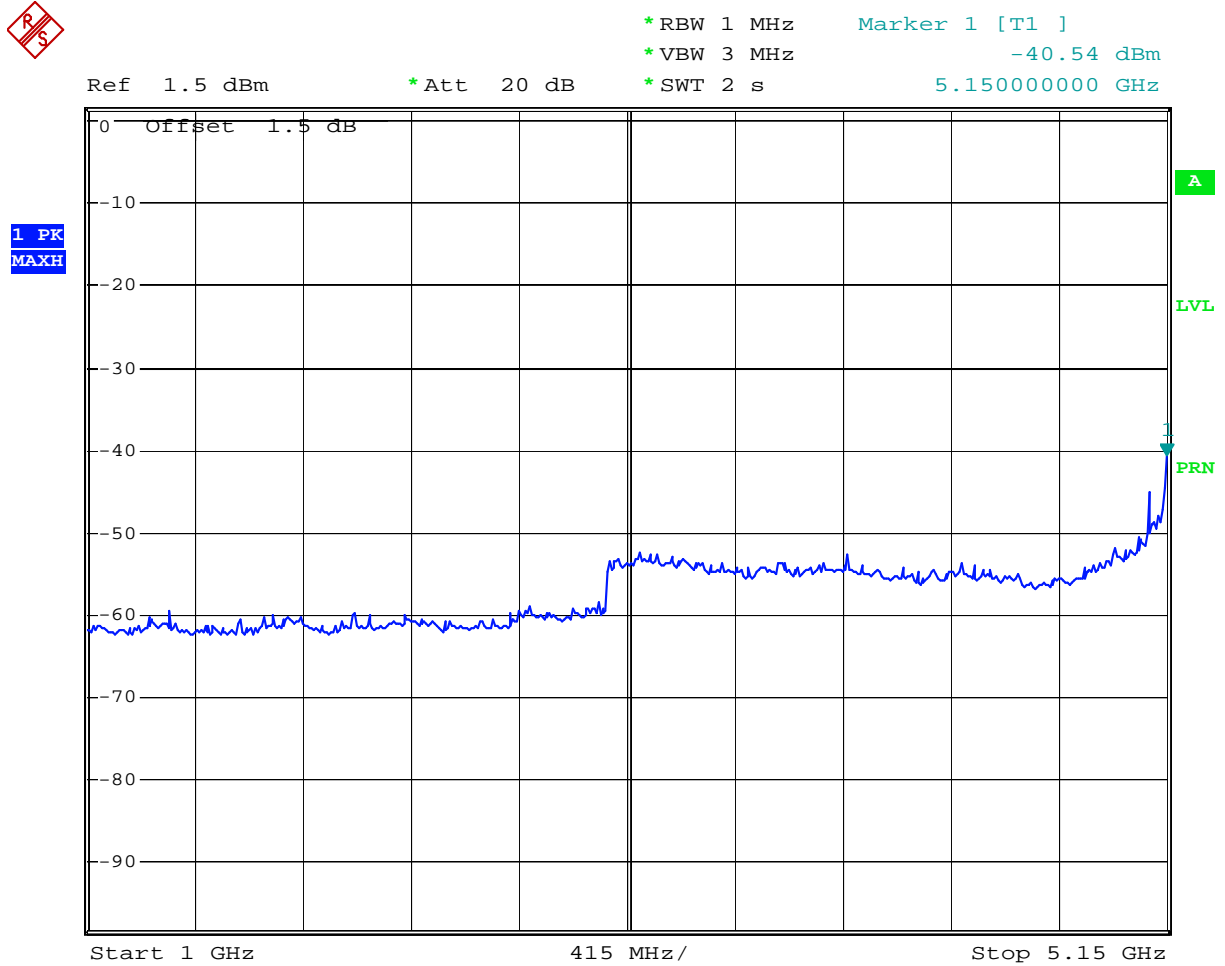
Comment: Undesirable emissions, 5180 MHz, 6 Mbps
Date: 23.NOV.2008 18:11:05

Plot 5.5



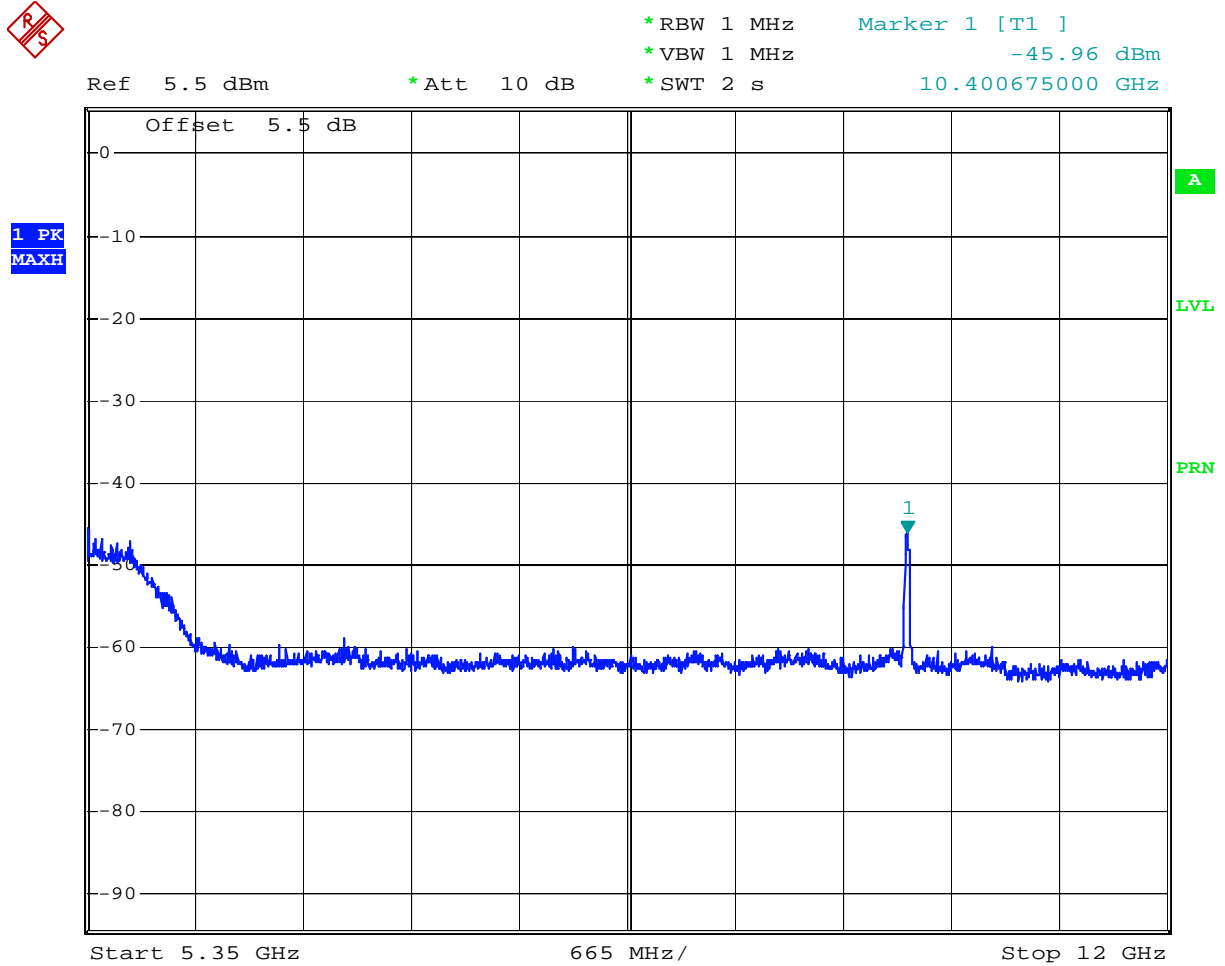
Comment: Undesirable emissions, 5200 MHz, 6 Mbps
 Date: 23.NOV.2008 17:33:40

Plot 5.6



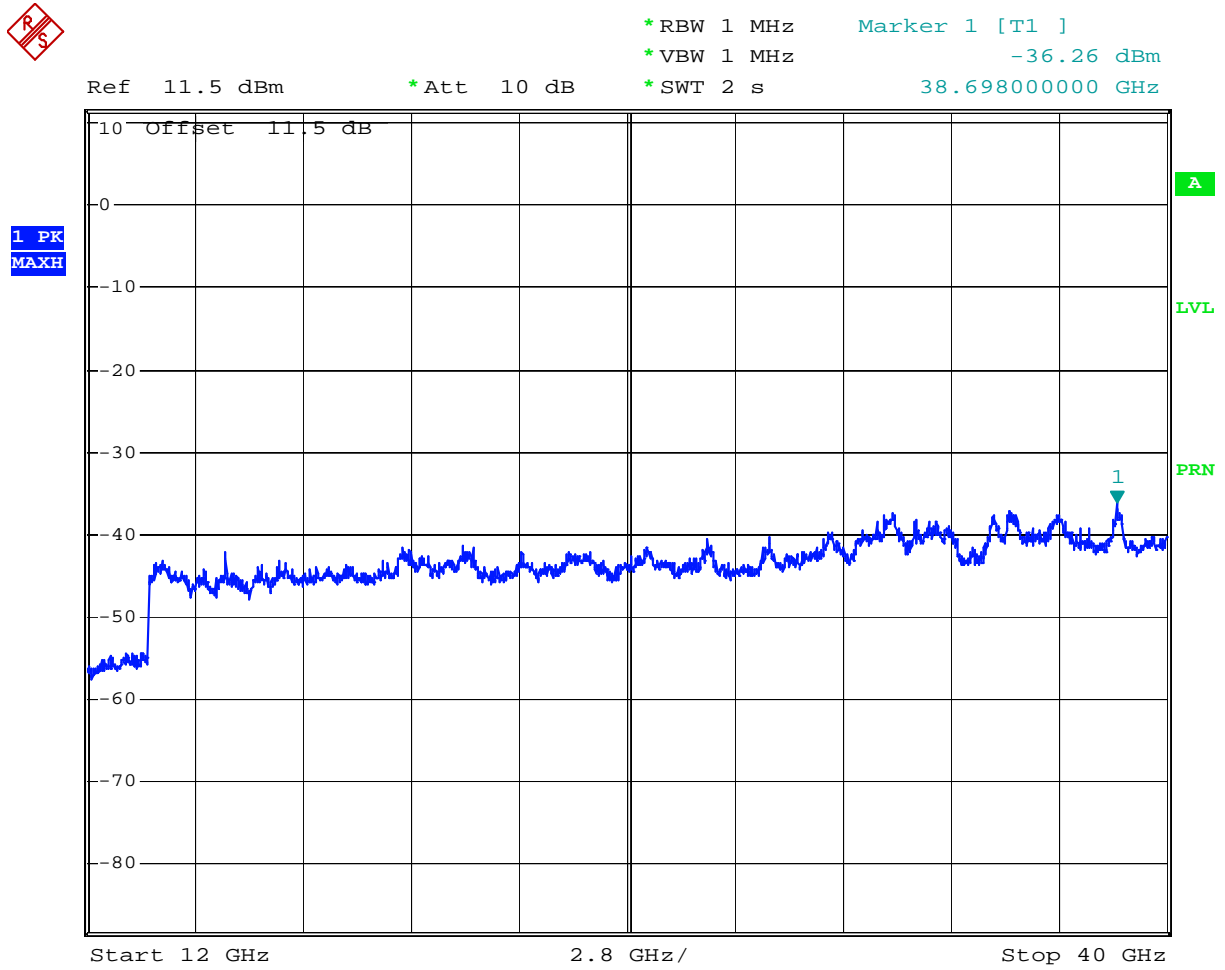
Comment: Undesirable emissions, 5200 MHz, 6 Mbps
Date: 23.NOV.2008 10:18:41

Plot 5.7



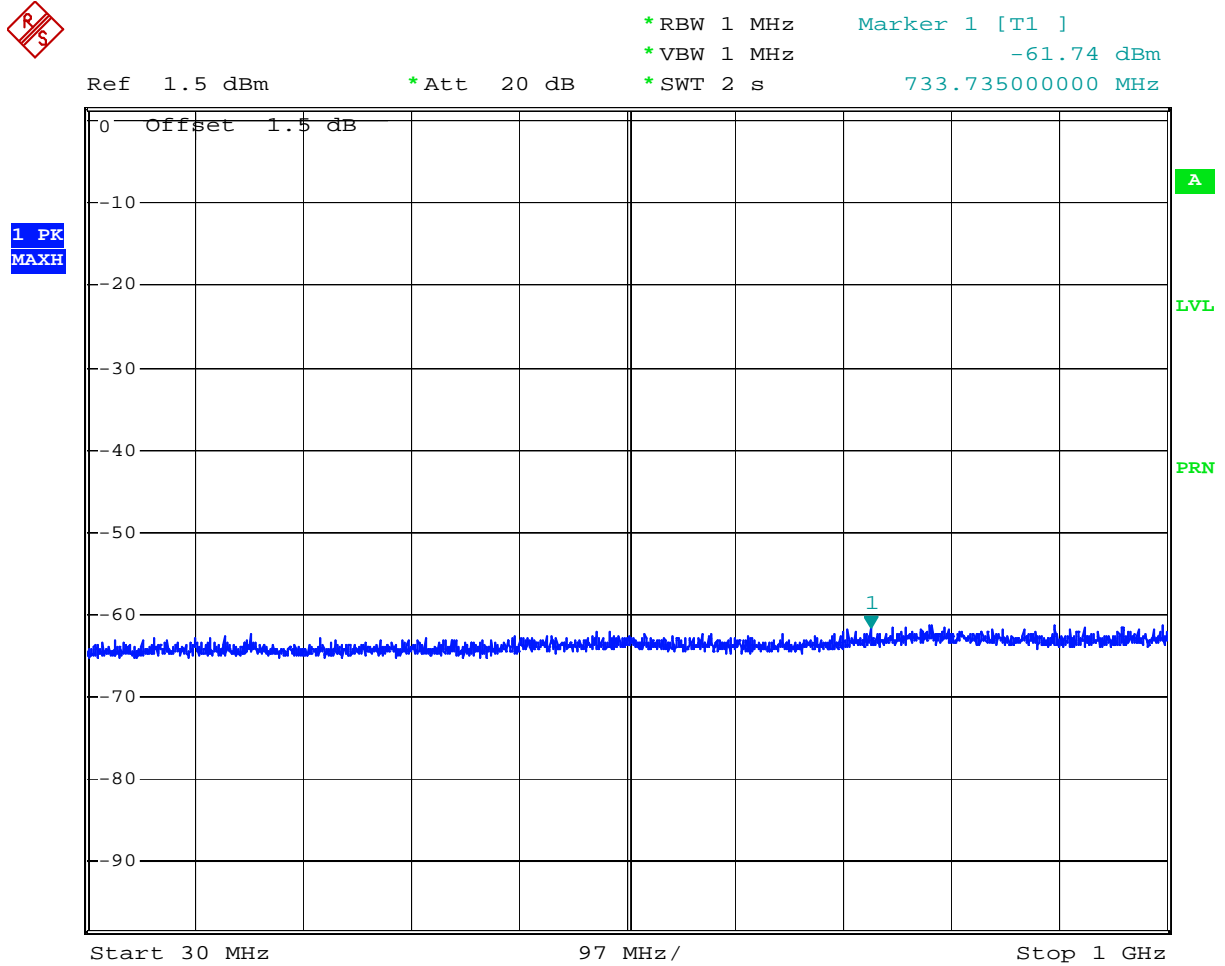
Comment: Undesirable emissions, 5200 MHz, 6 Mbps
Date: 23.NOV.2008 18:34:35

Plot 5.8



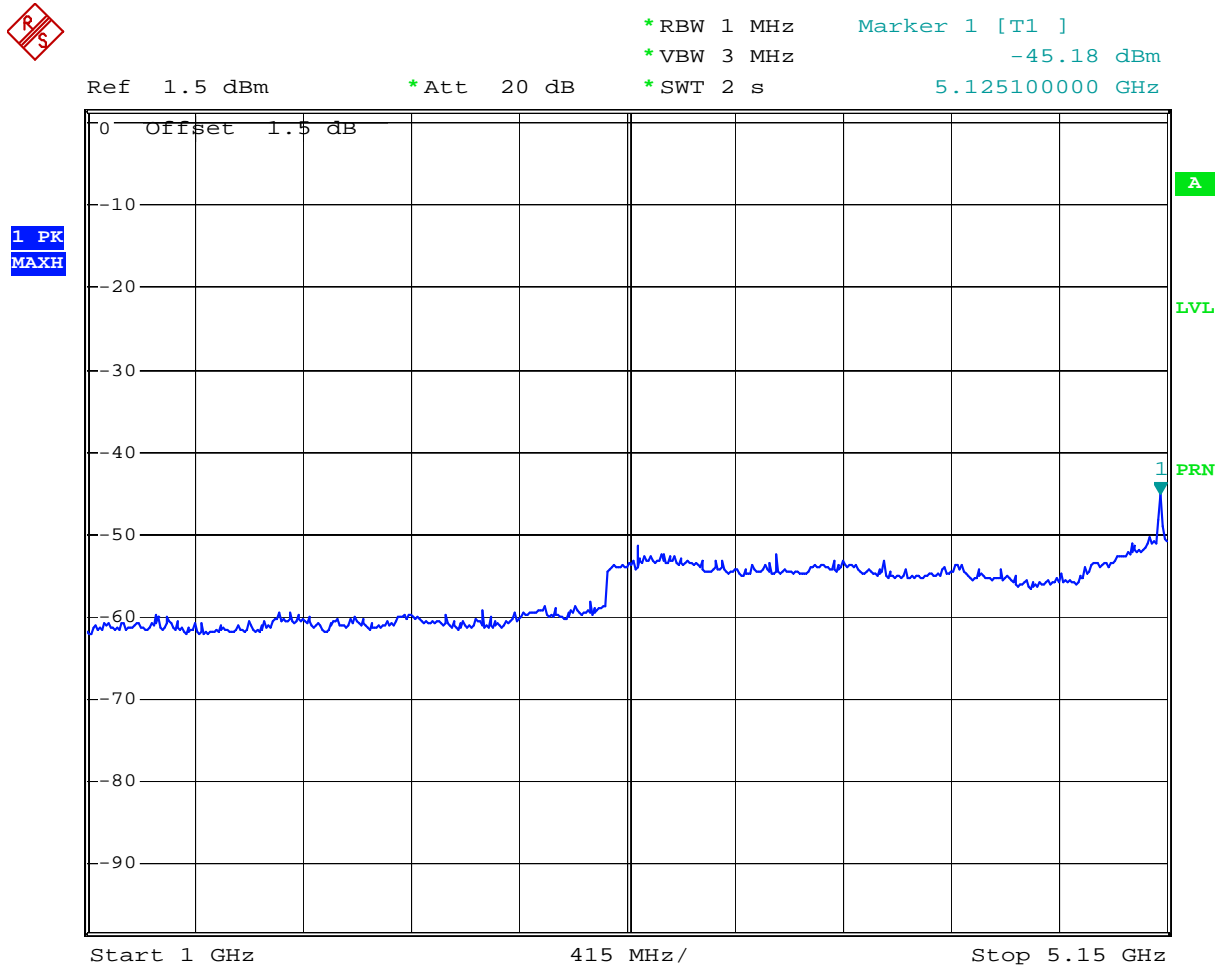
Comment: Undesirable emissions, 5200 MHz, 6 Mbps
 Date: 23.NOV.2008 18:12:05

Plot 5.9



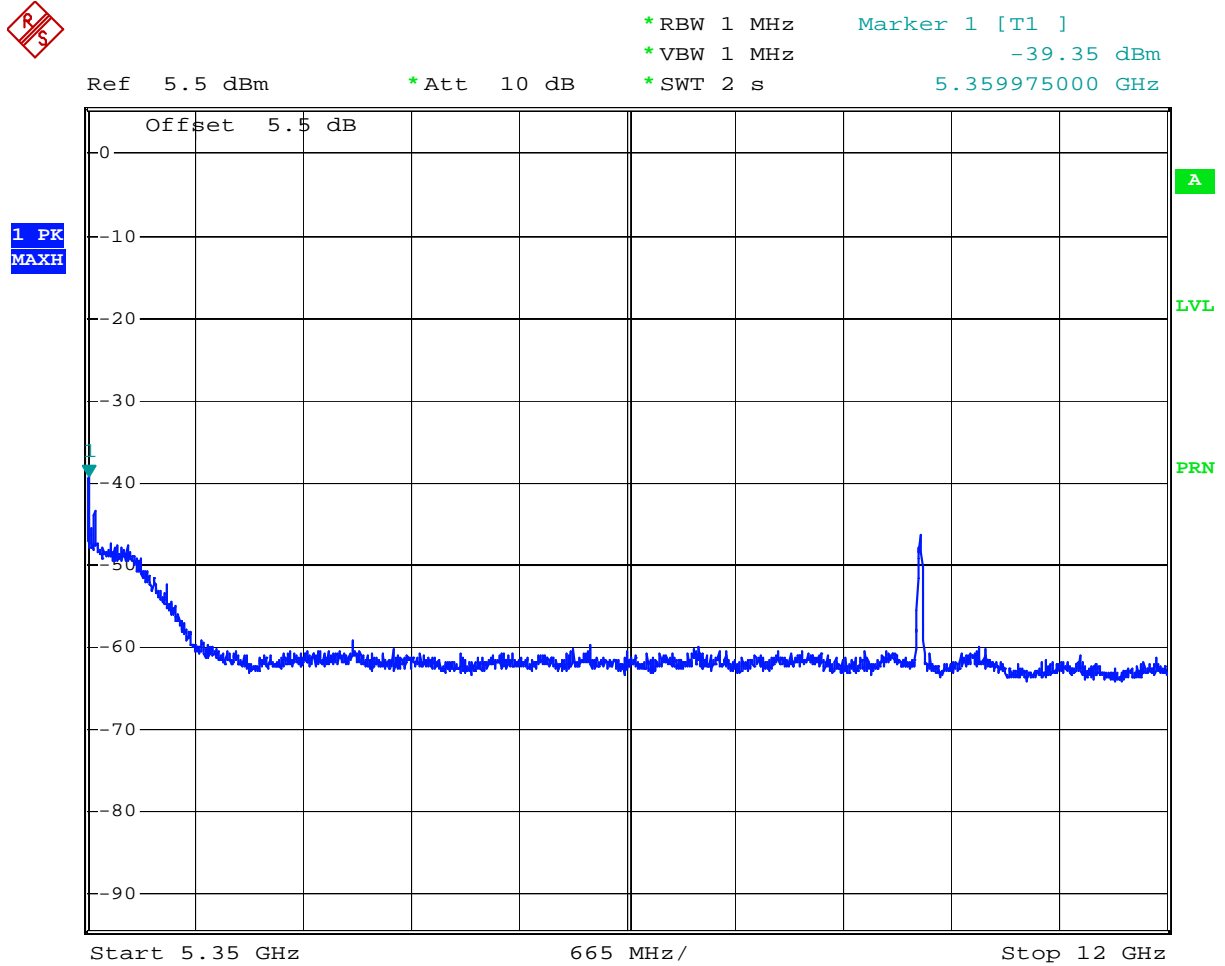
Comment: Undesirable emissions, 5240 MHz, 6 Mbps
Date: 23.NOV.2008 17:34:22

Plot 5.10



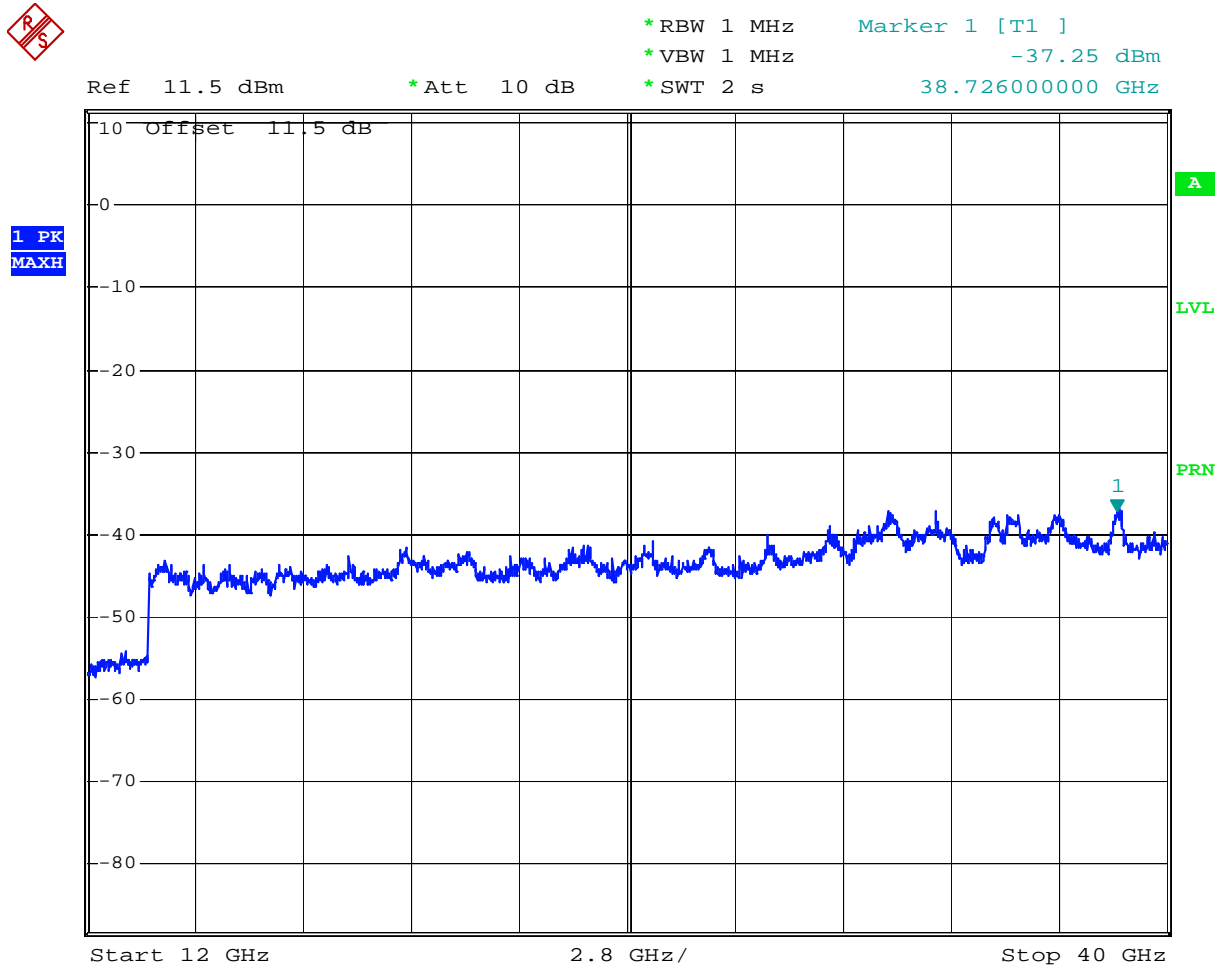
Comment: Undesirable emissions, 5240 MHz, 6 Mbps
Date: 23.NOV.2008 10:20:29

Plot 5.11



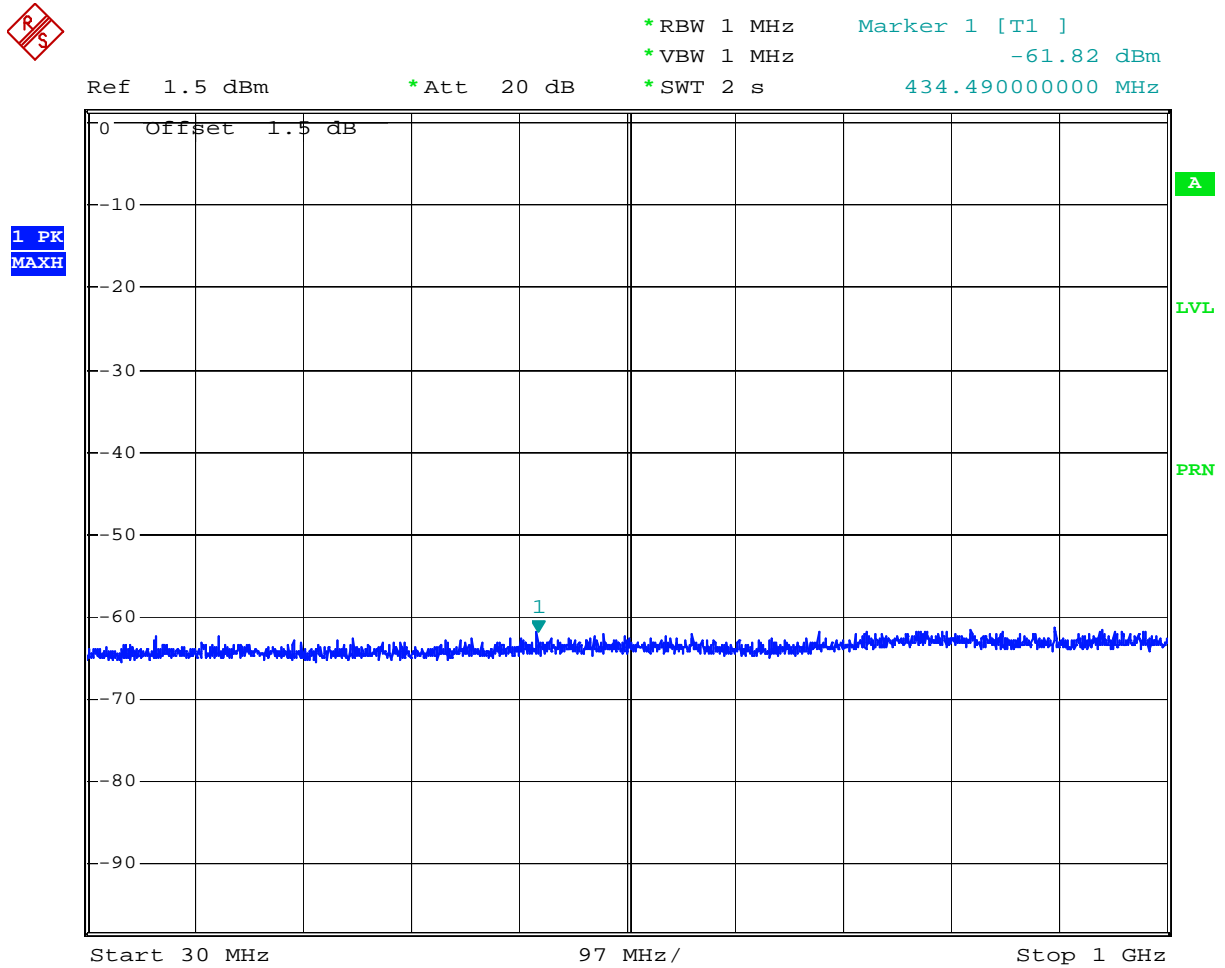
Comment: Undesirable emissions, 5240 MHz, 6 Mbps
Date: 23.NOV.2008 18:36:03

Plot 5.12



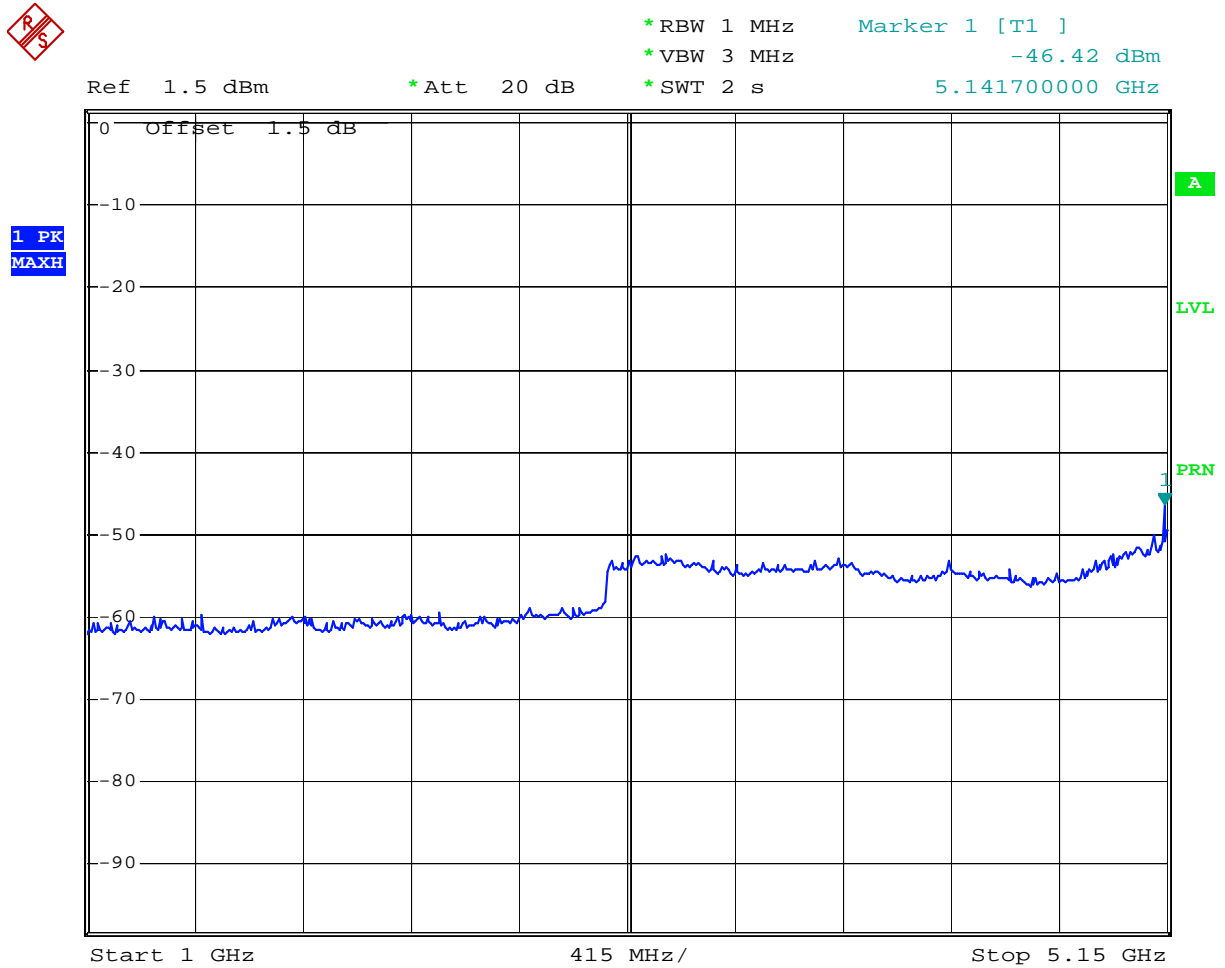
Comment: Undesirable emissions, 5240 MHz, 6 Mbps
 Date: 23.NOV.2008 18:12:57

Plot 5.13



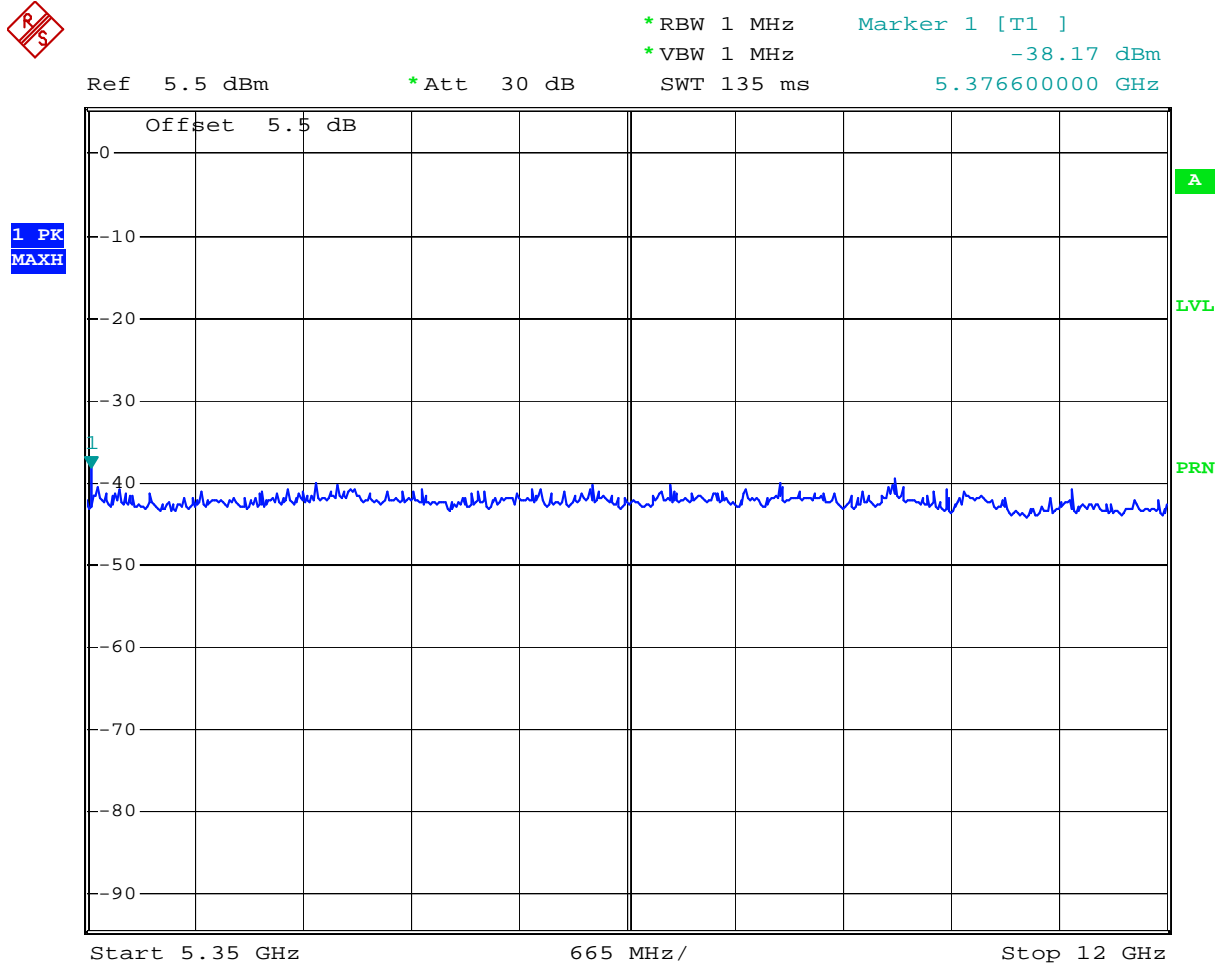
Comment: Undesirable emissions, 5260 MHz, 6 Mbps
Date: 23.NOV.2008 17:35:04

Plot 5.14



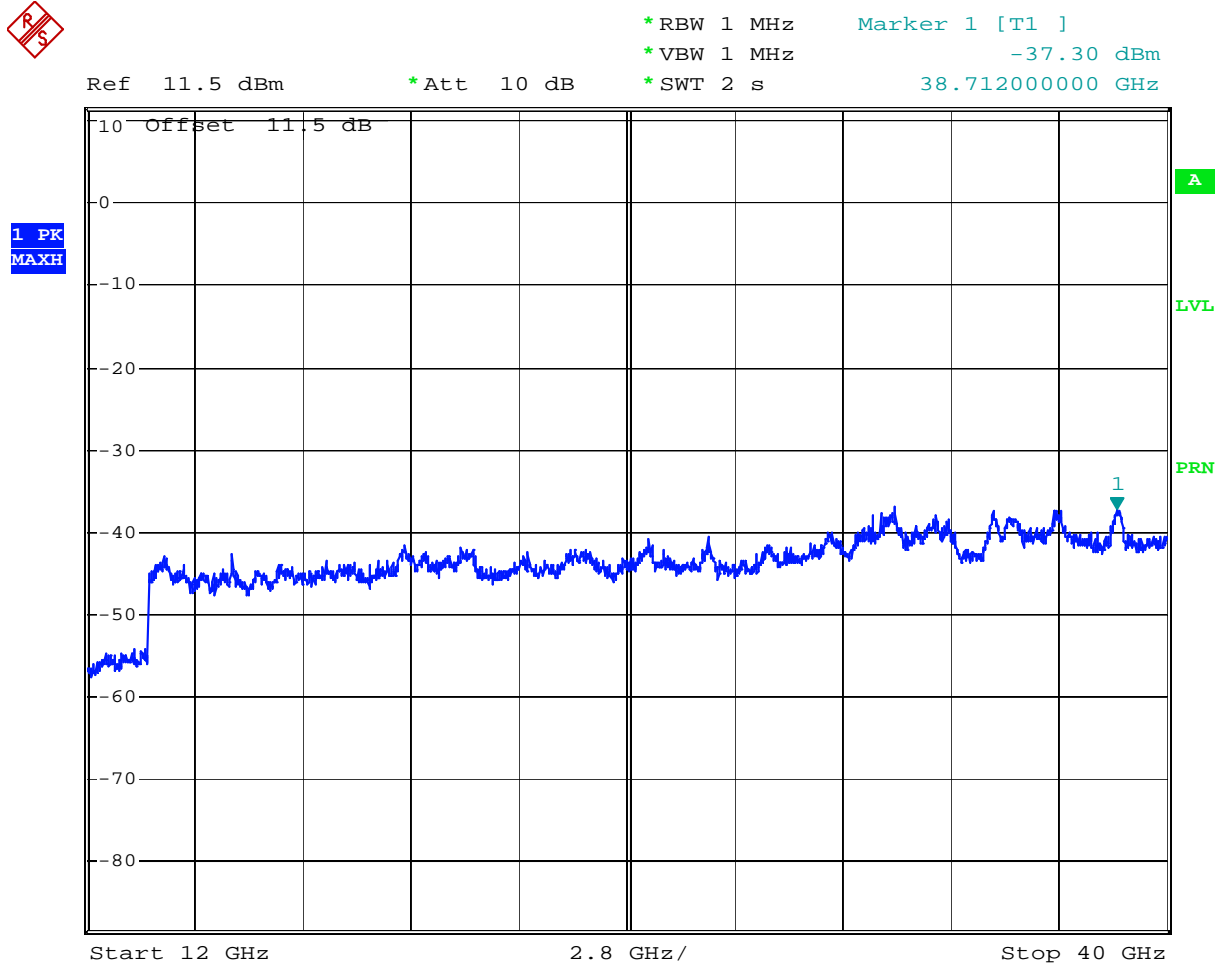
Comment: Undesirable emissions, 5260 MHz, 6 Mbps
Date: 23.NOV.2008 10:22:24

Plot 5.15



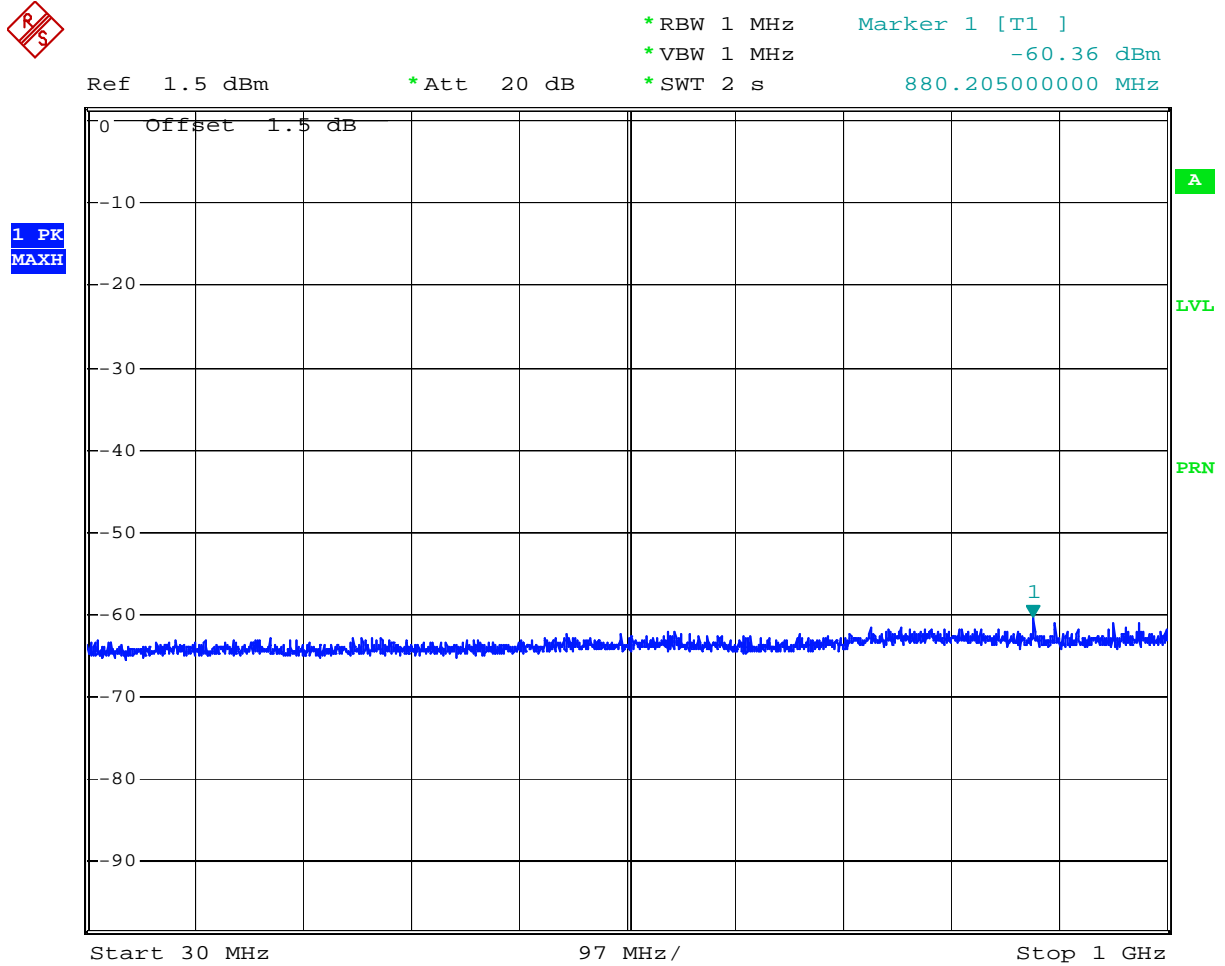
Comment: Undesirable emissions, 5260 MHz, 6 Mbps
Date: 23.NOV.2008 19:14:44

Plot 5.16



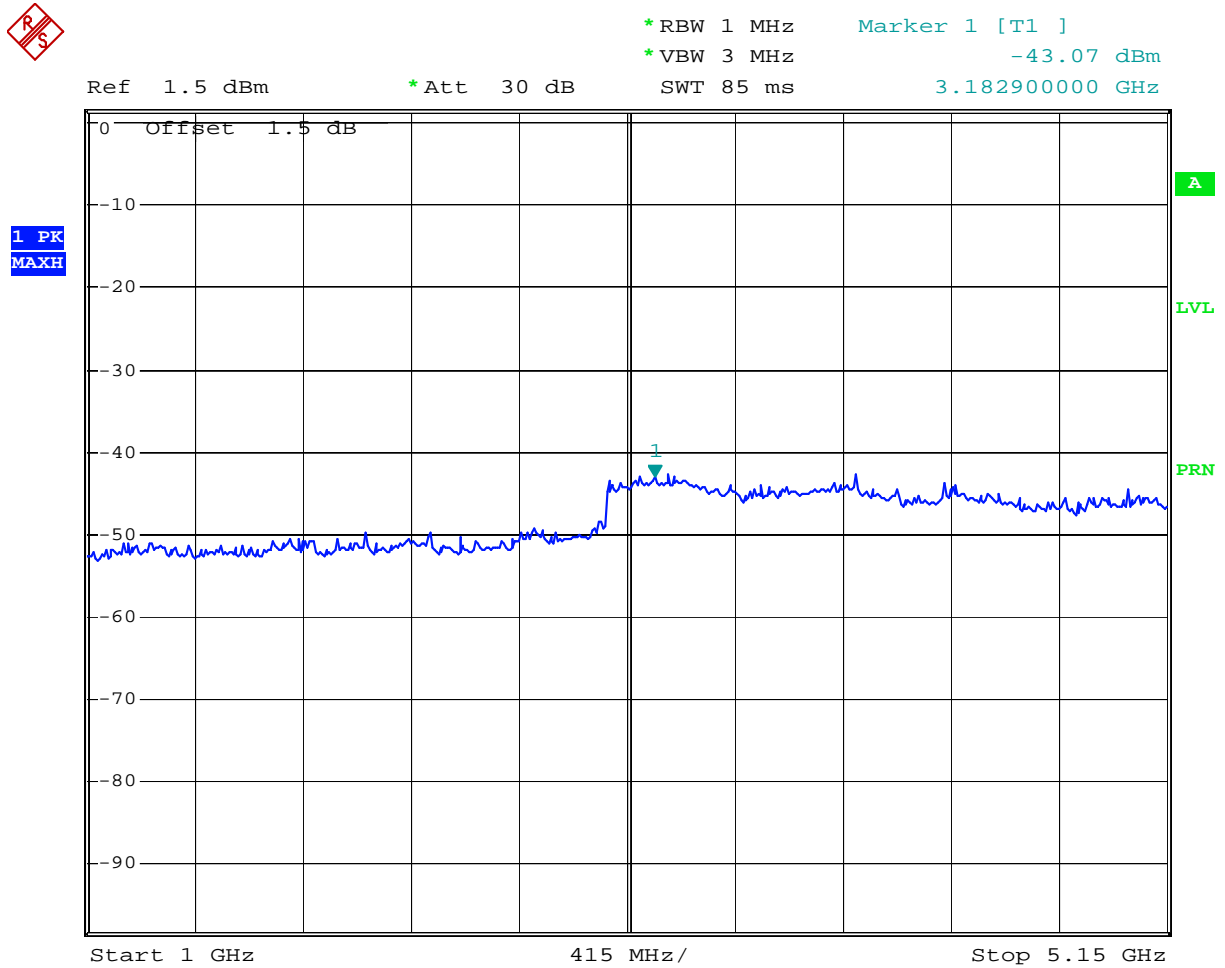
Comment: Undesirable emissions, 5260 MHz, 6 Mbps
Date: 23.NOV.2008 18:13:43

Plot 5.17



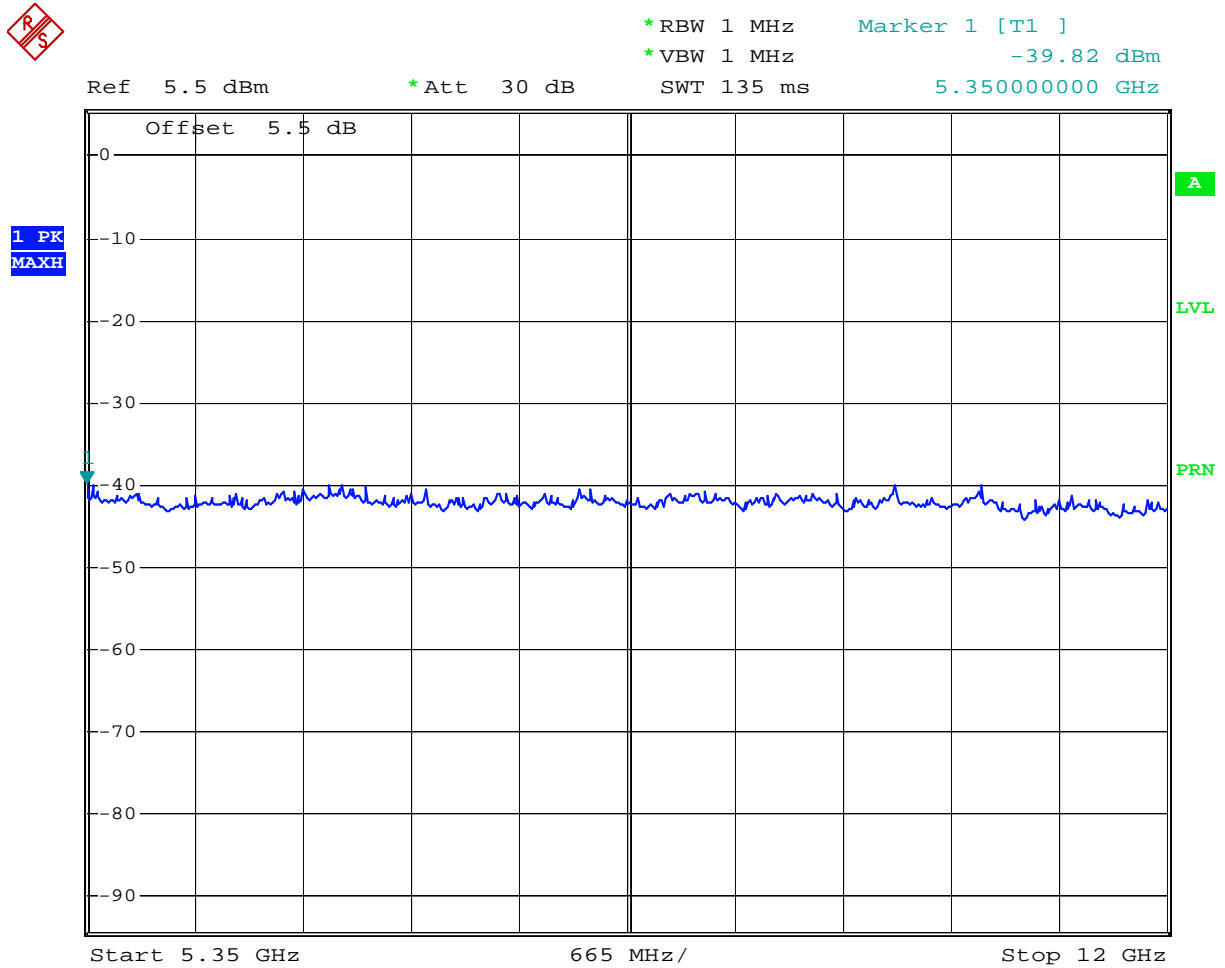
Comment: Undesirable emissions, 5280 MHz, 6 Mbps
Date: 23.NOV.2008 17:35:50

Plot 5.18



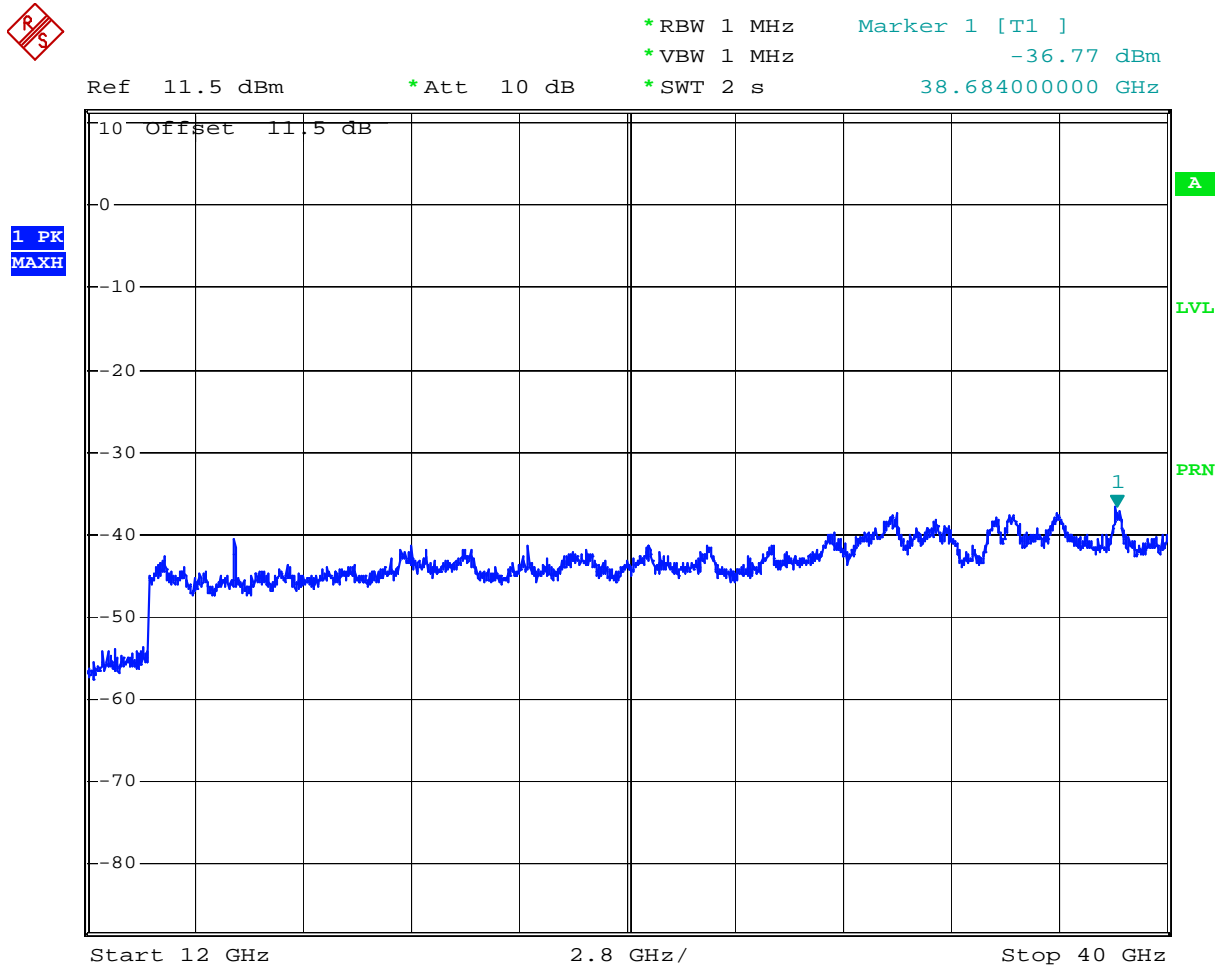
Comment: Undesirable emissions, 5280 MHz, 6 Mbps
 Date: 23.NOV.2008 12:40:29

Plot 5.19



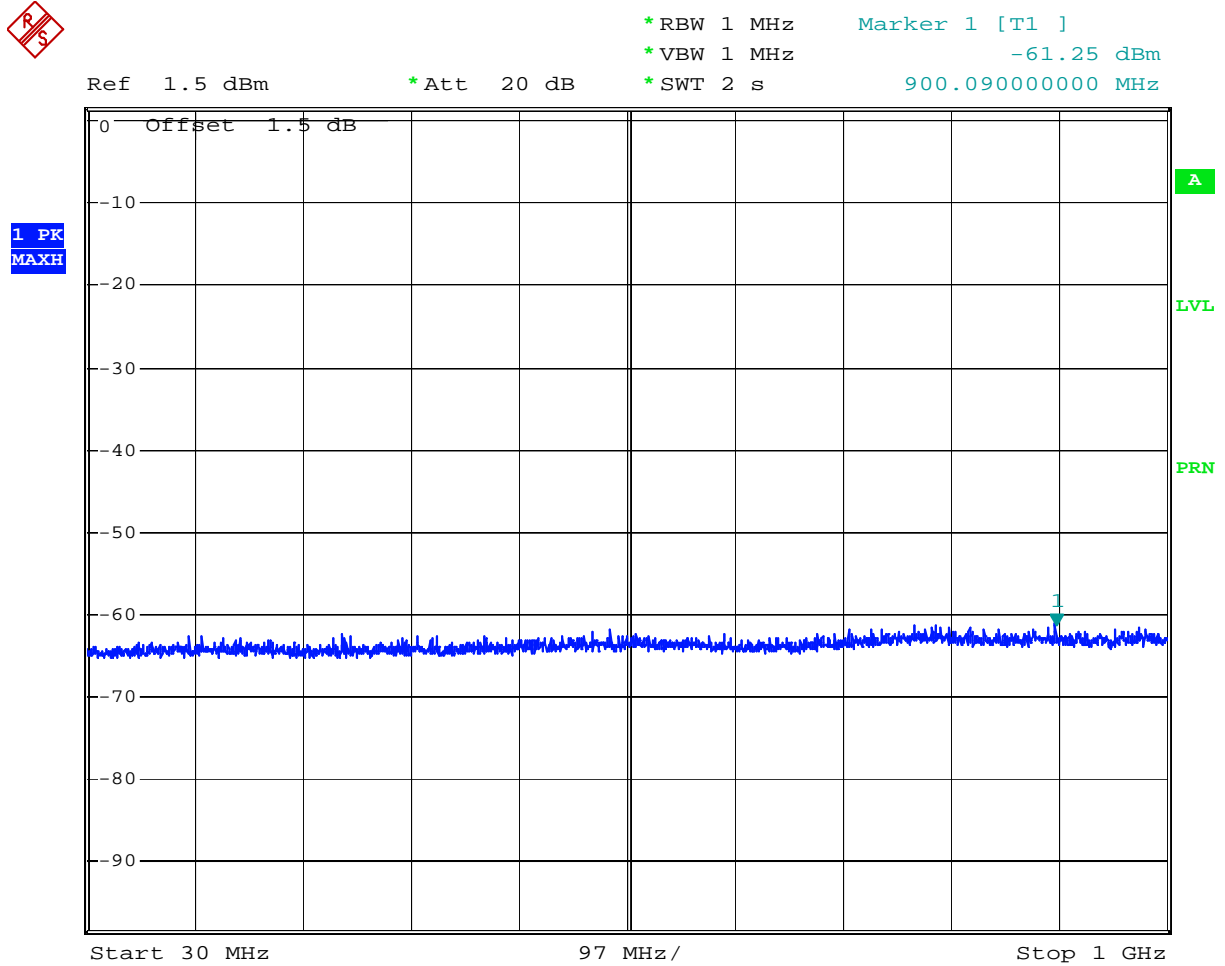
Comment: Undesirable emissions, 5280 MHz, 6 Mbps
Date: 23.NOV.2008 19:14:07

Plot 5.20



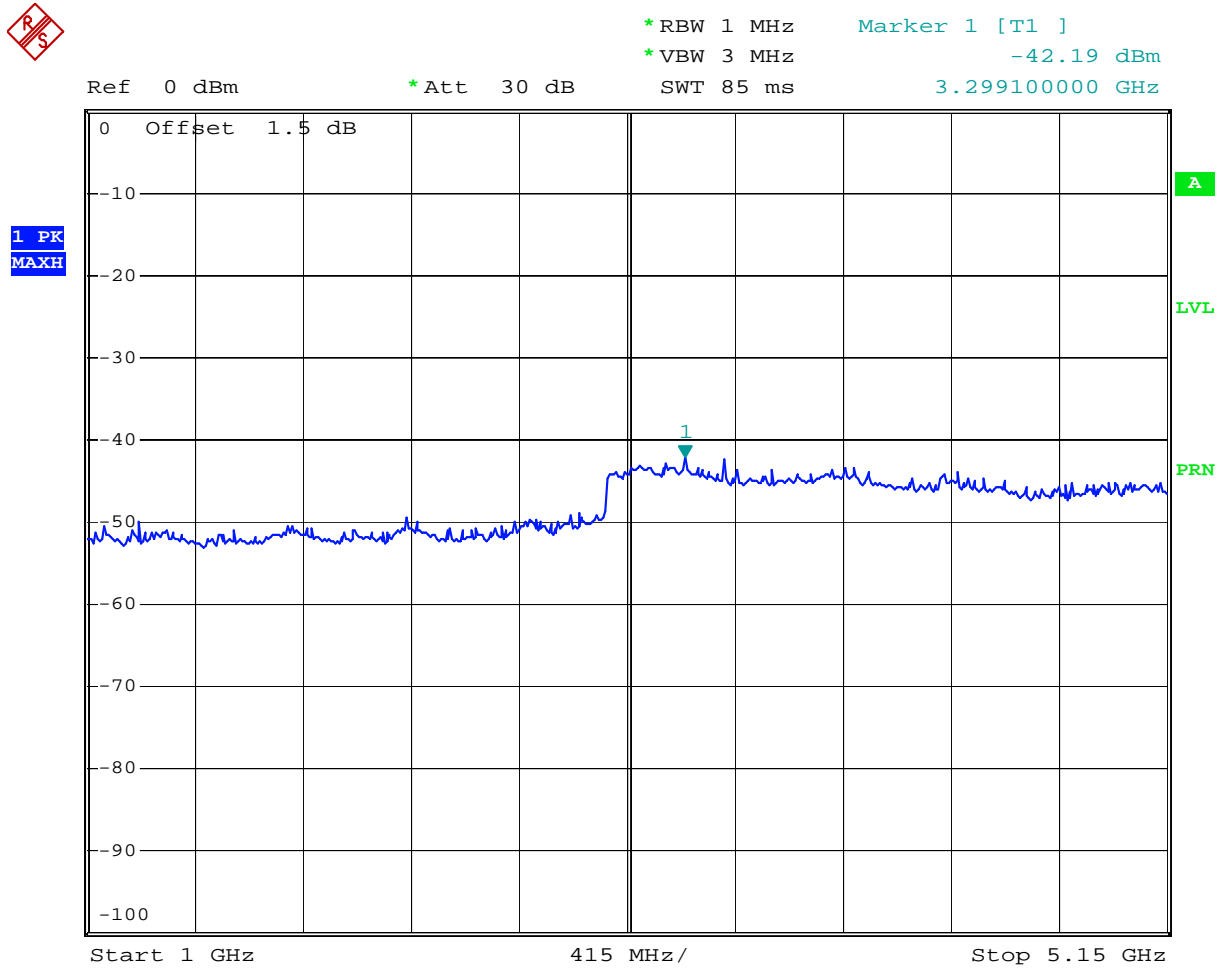
Comment: Undesirable emissions, 5280 MHz, 6 Mbps
Date: 23.NOV.2008 18:14:41

Plot 5.21



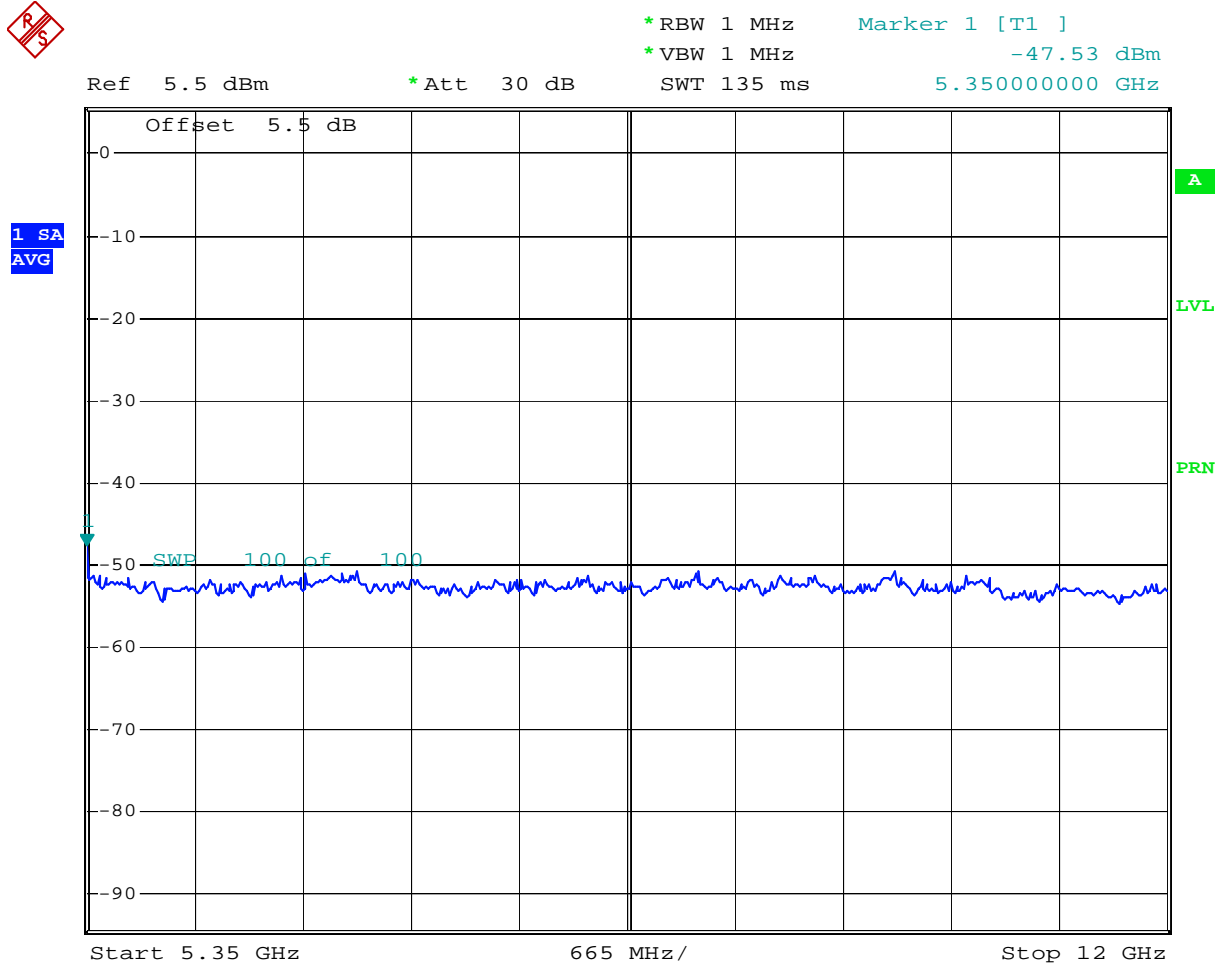
Comment: Undesirable emissions, 5320 MHz, 6 Mbps
Date: 23.NOV.2008 17:36:38

Plot 5.22



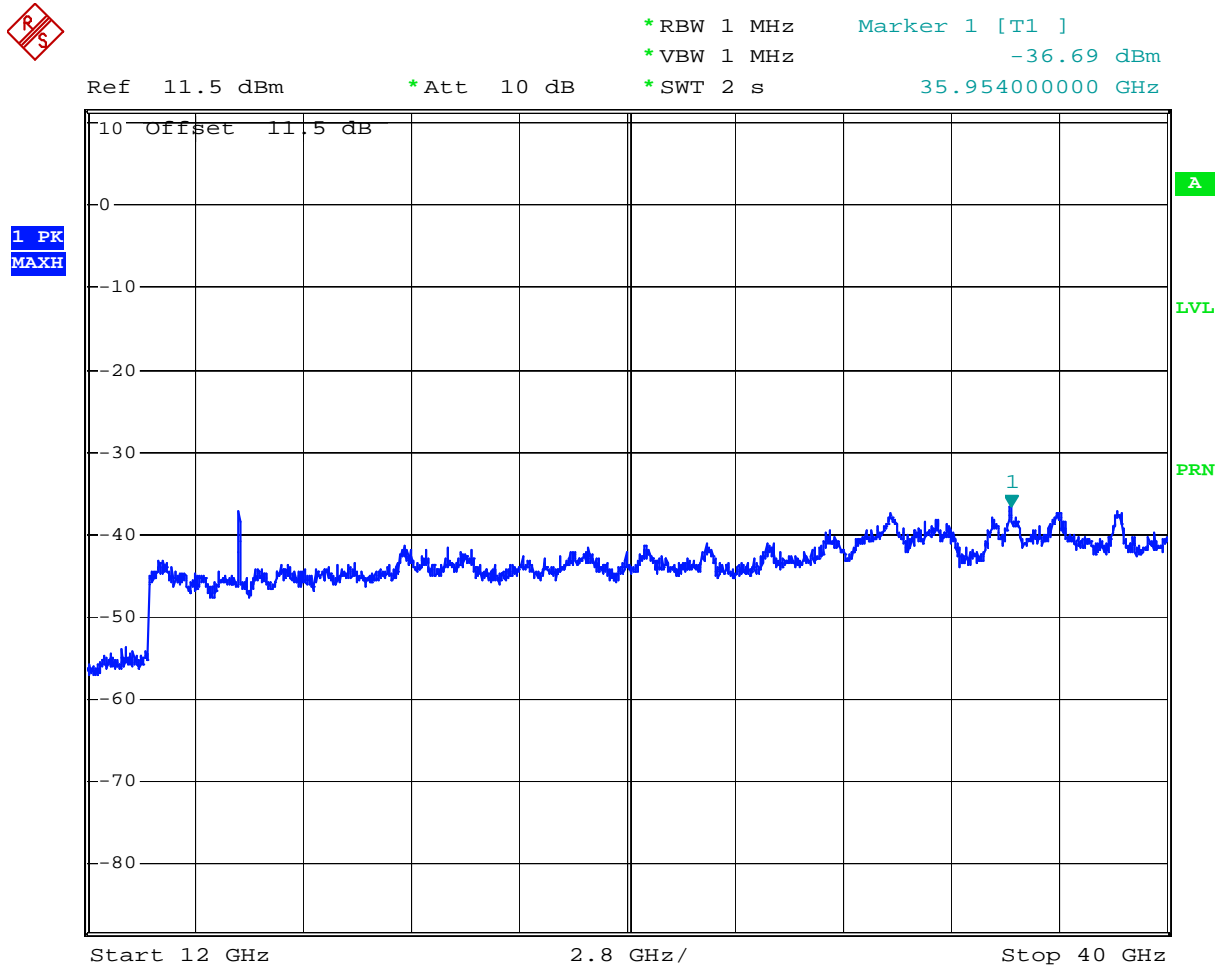
Comment: Undesirable emissions, 5320 MHz, 6 Mbps
Date: 23.NOV.2008 12:44:48

Plot 5.23



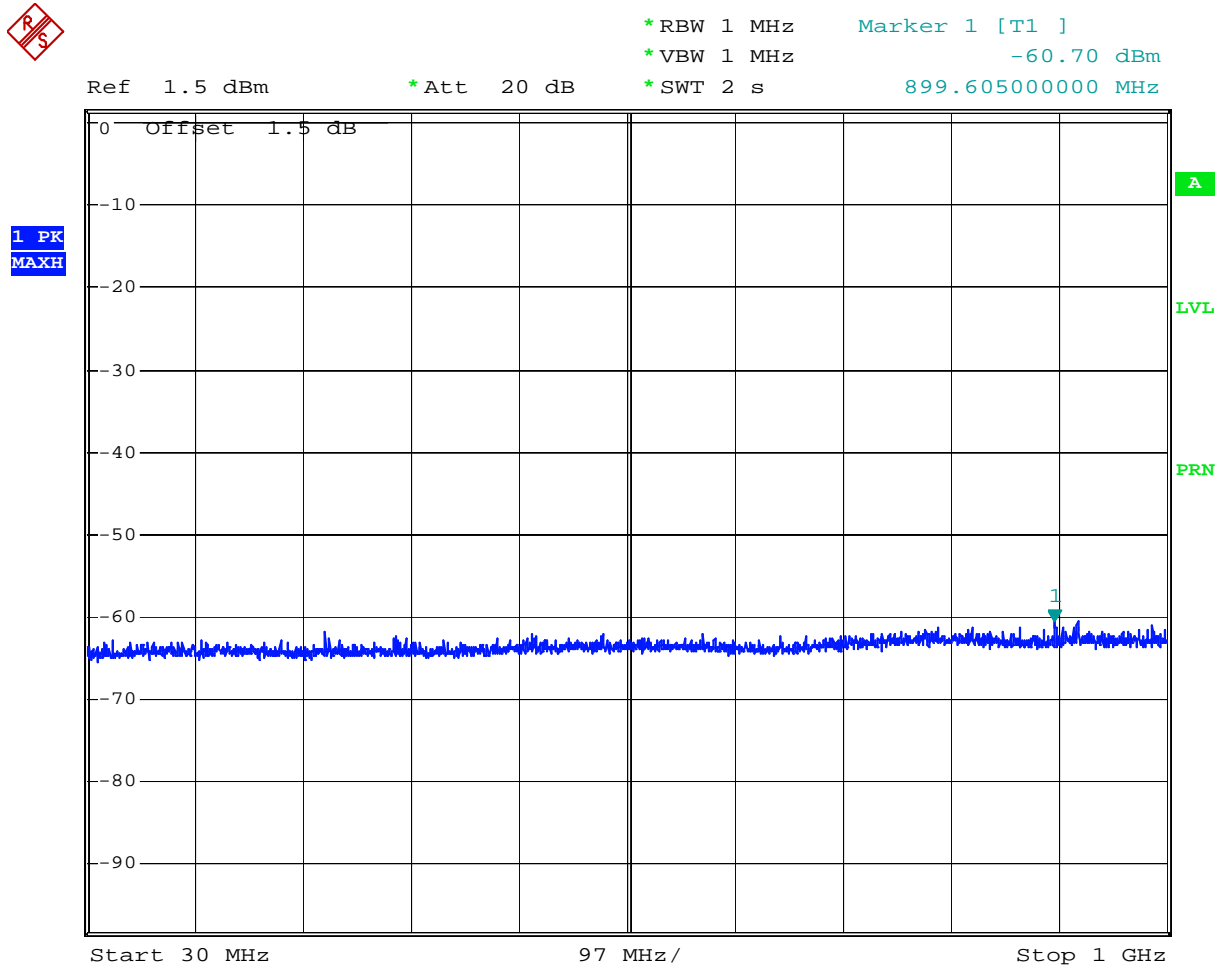
Comment: Undesirable emissions, 5320 MHz, 6 Mbps
Date: 23.NOV.2008 19:12:55

Plot 5.24



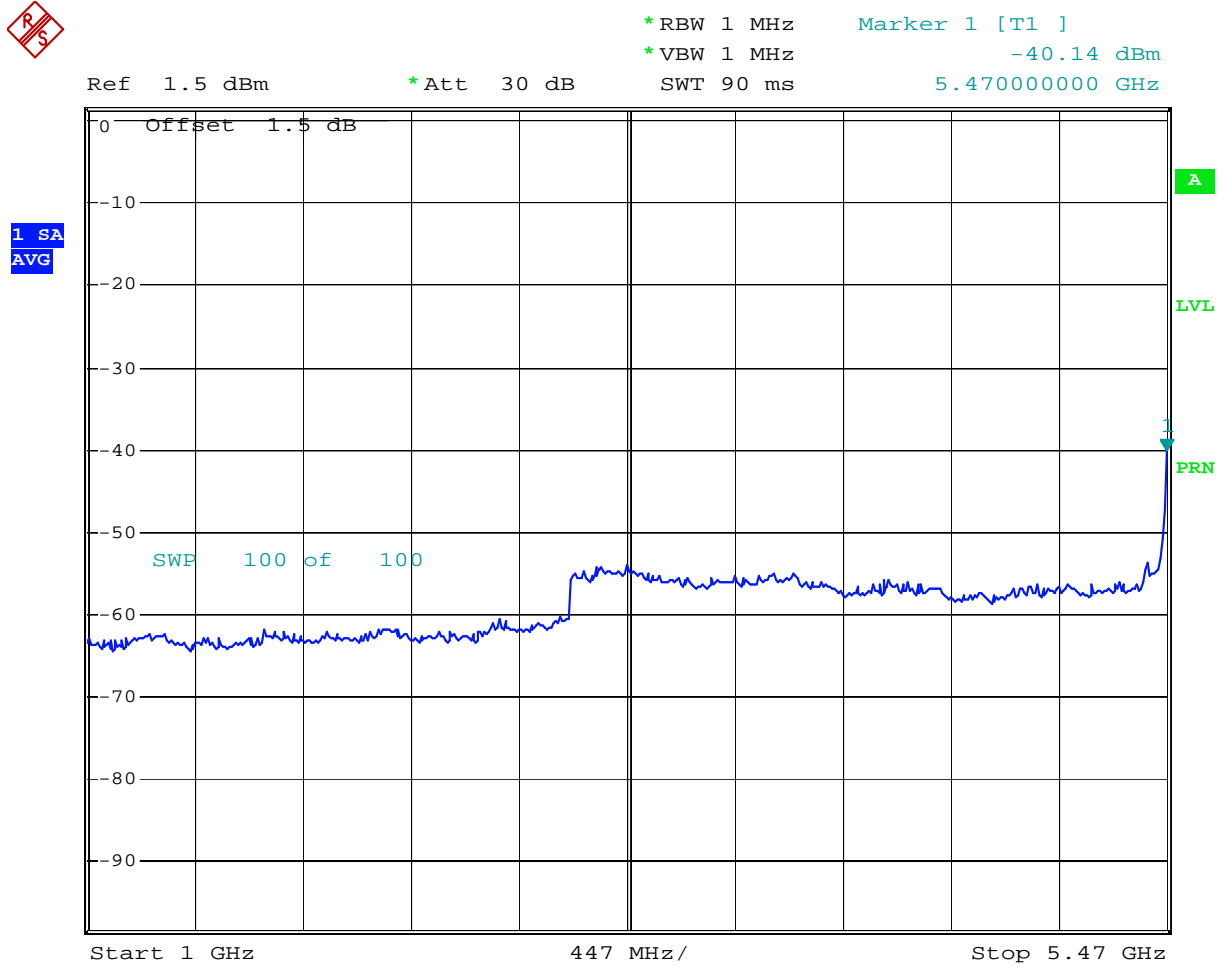
Comment: Undesirable emissions, 5320 MHz, 6 Mbps
Date: 23.NOV.2008 18:15:42

Plot 5.25



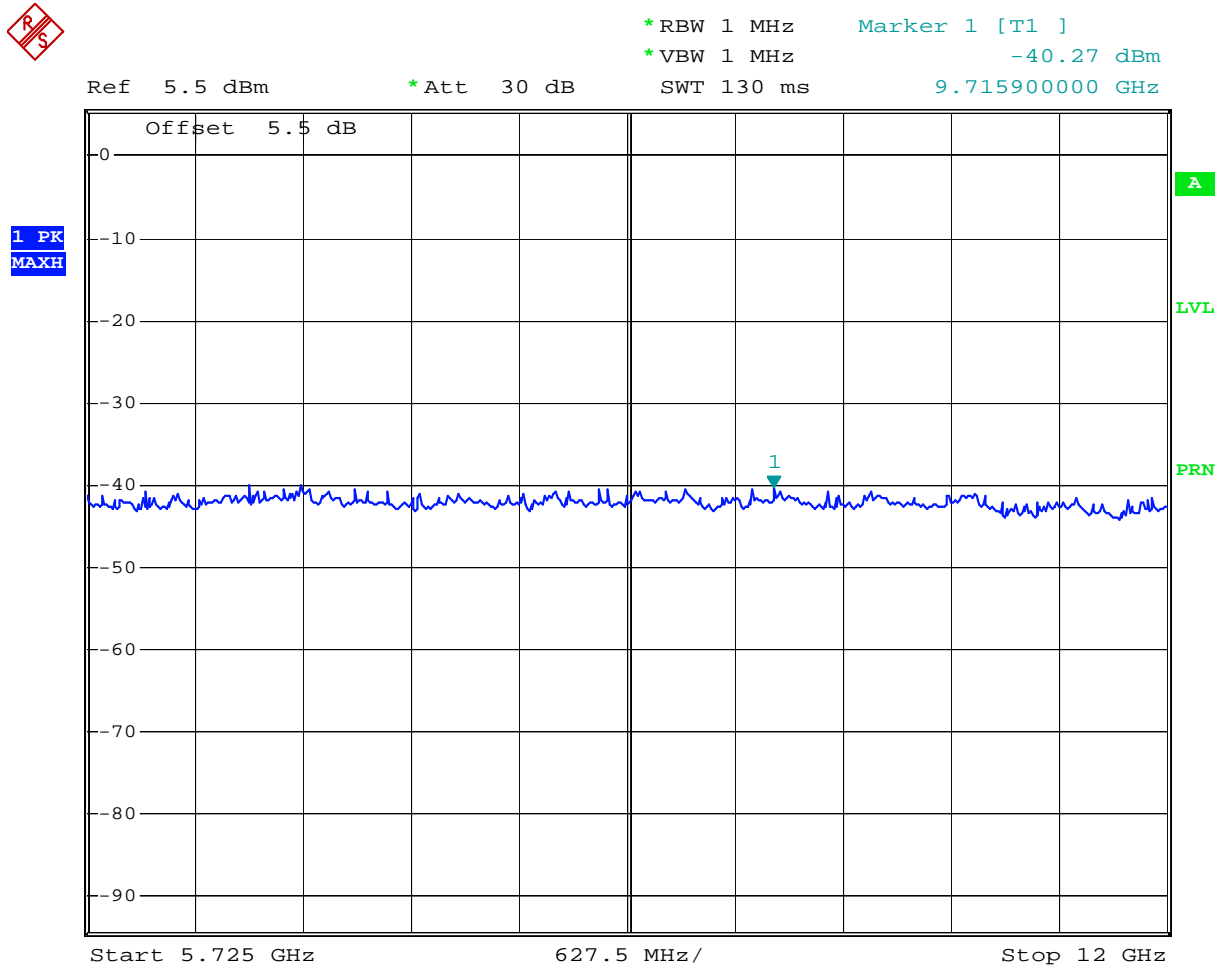
Comment: Undesirable emissions, 5500 MHz, 6 Mbps
Date: 23.NOV.2008 17:37:31

Plot 5.26



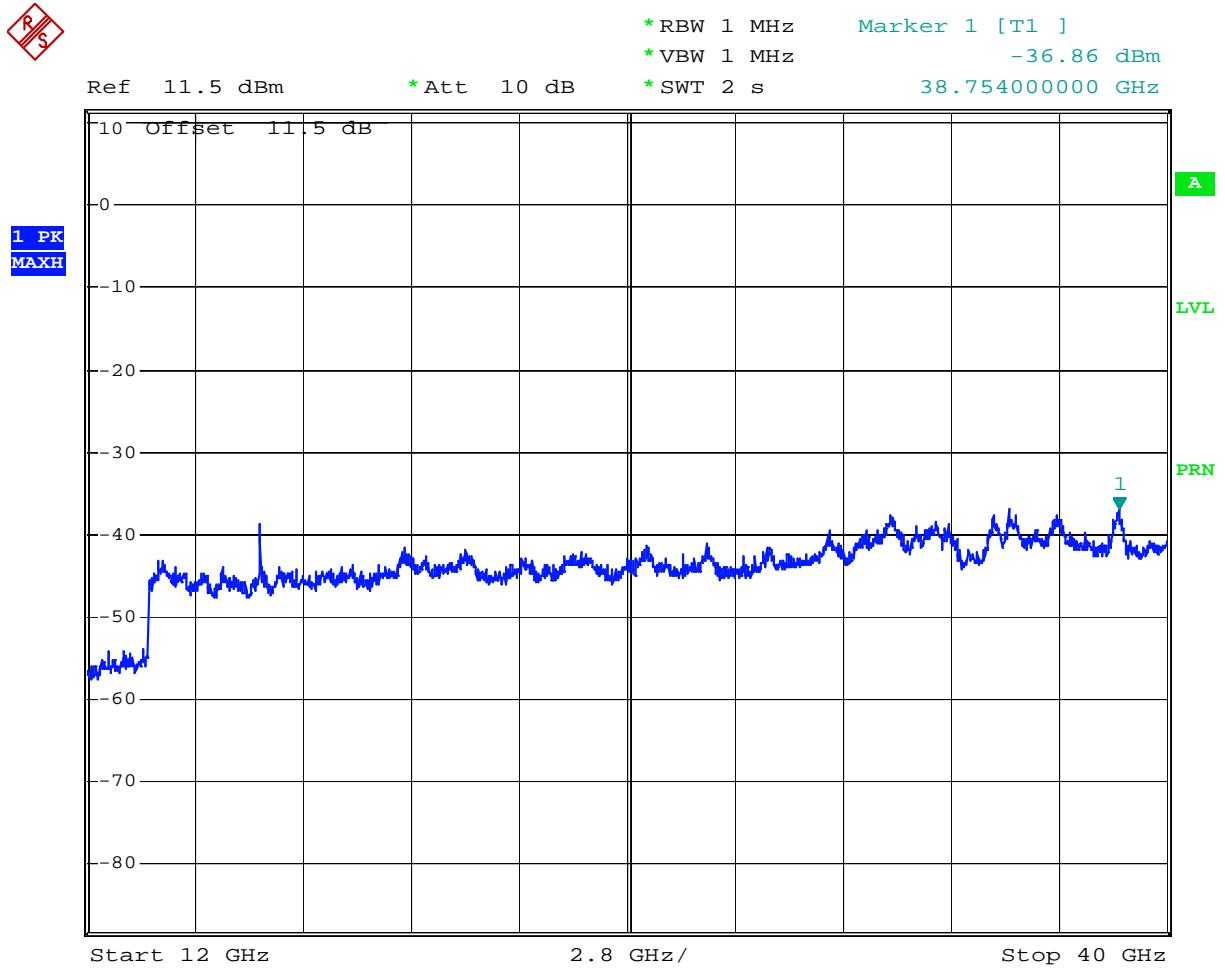
Comment: Undesirable emissions, 5500 MHz, 6 Mbps
Date: 23.NOV.2008 19:20:24

Plot 5.27



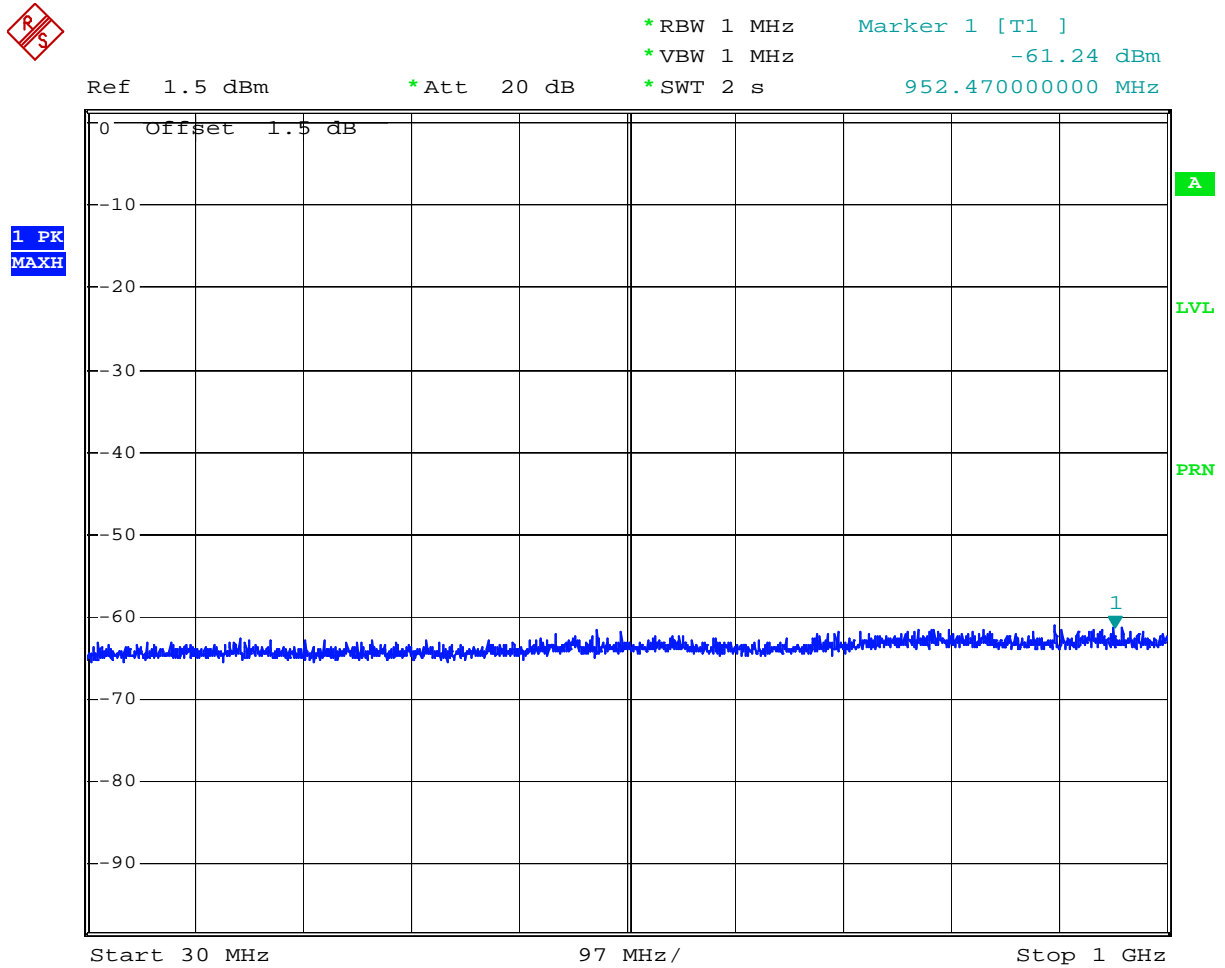
Comment: Undesirable emissions, 5500 MHz, 6 Mbps
Date: 23.NOV.2008 19:31:02

Plot 5.28



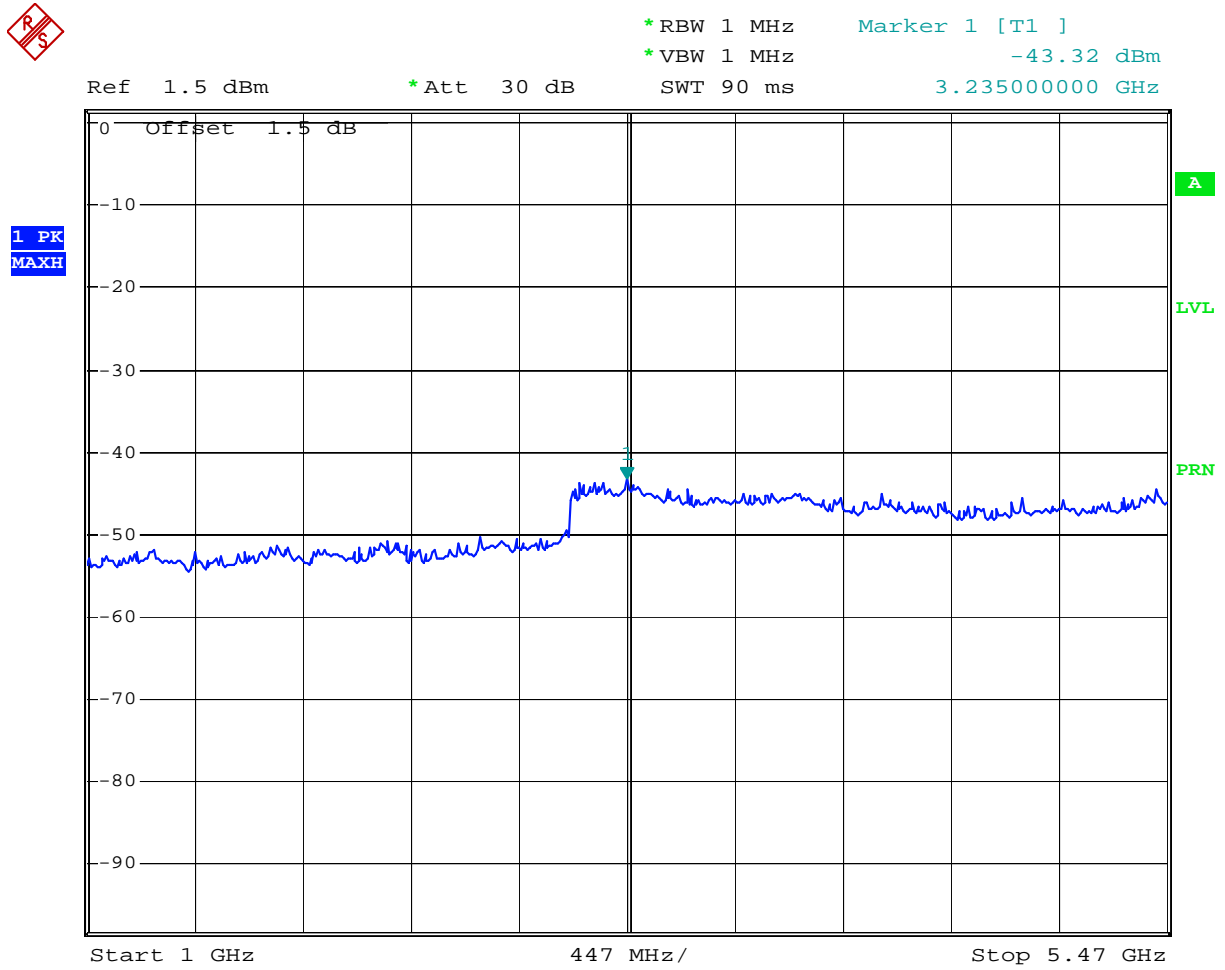
Comment: Undesirable emissions, 5500 MHz, 6 Mbps
 Date: 23.NOV.2008 18:20:02

Plot 5.29



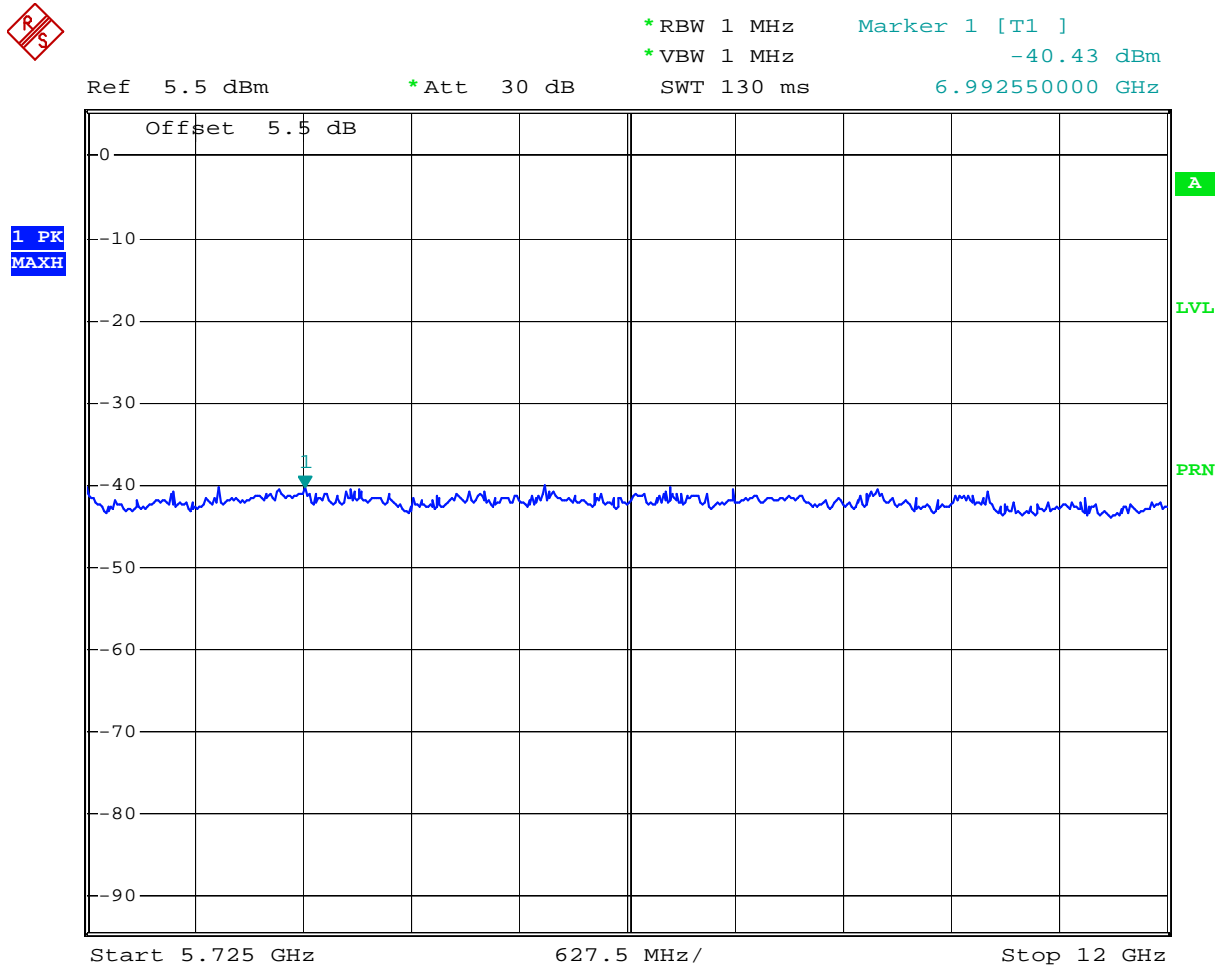
Comment: Undesirable emissions, 5600 MHz, 6 Mbps
Date: 23.NOV.2008 17:47:41

Plot 5.30



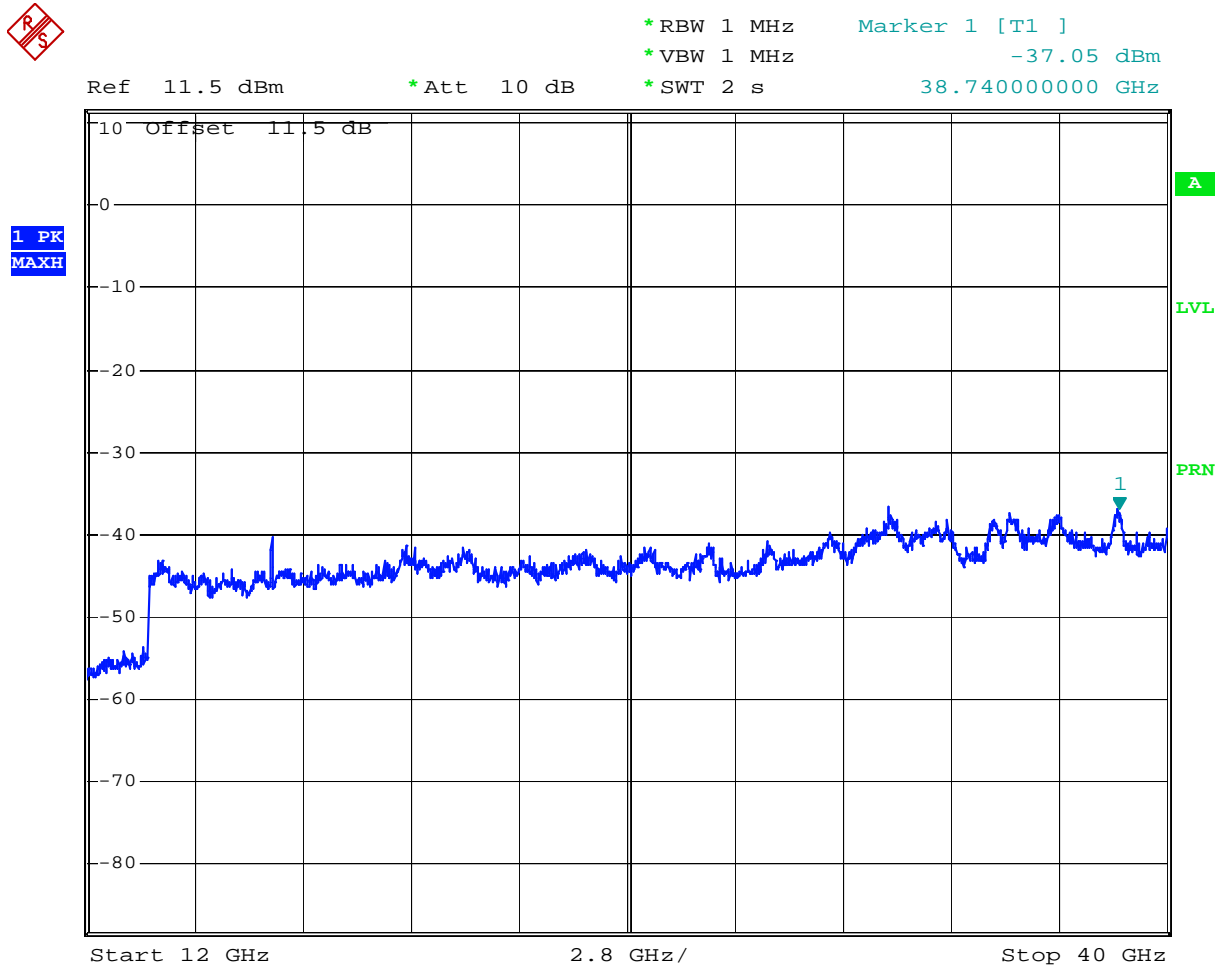
Comment: Undesirable emissions, 5600 MHz, 6 Mbps
Date: 23.NOV.2008 19:26:52

Plot 5.31



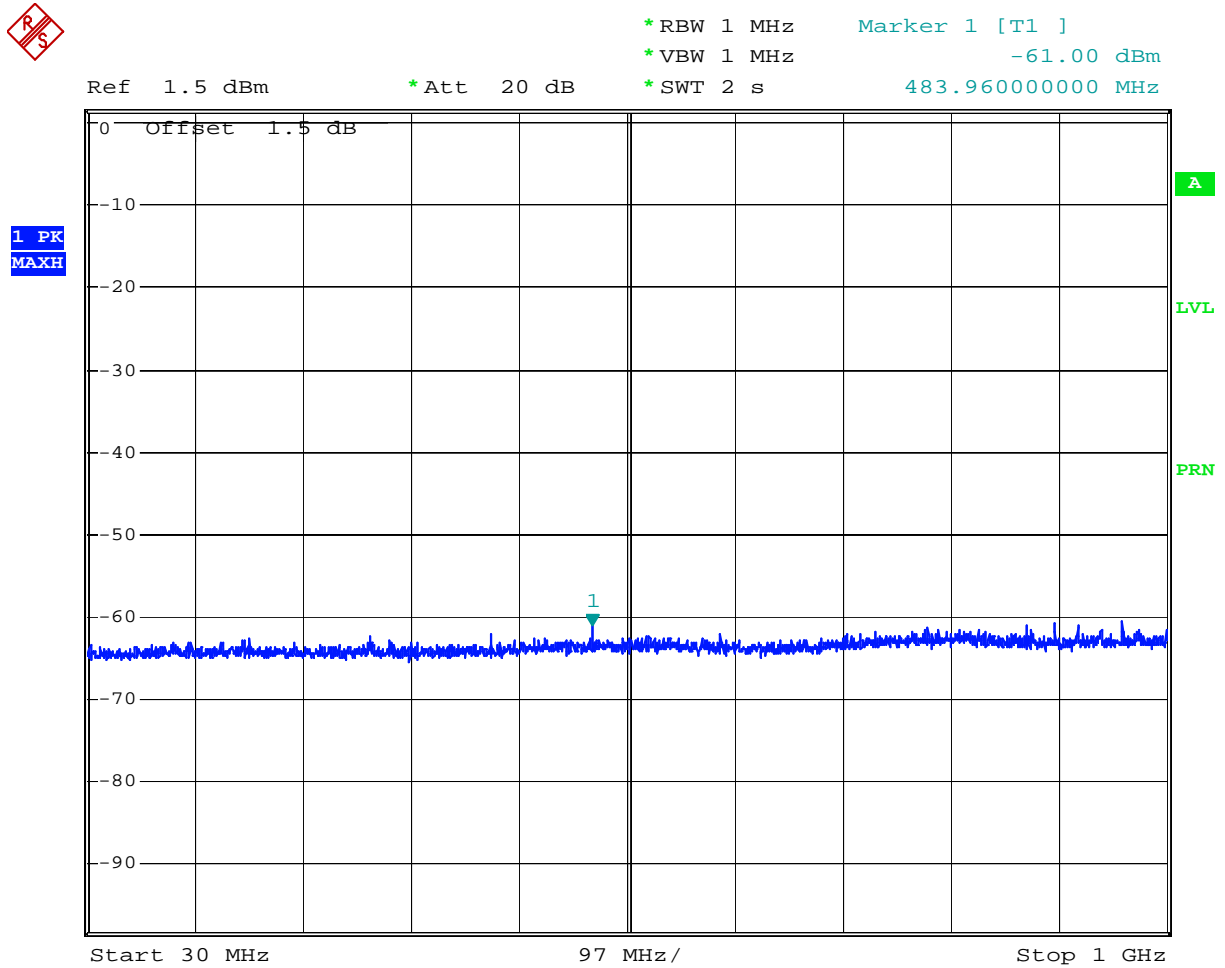
Comment: Undesirable emissions, 5600 MHz, 6 Mbps
 Date: 23.NOV.2008 19:24:45

Plot 5.32



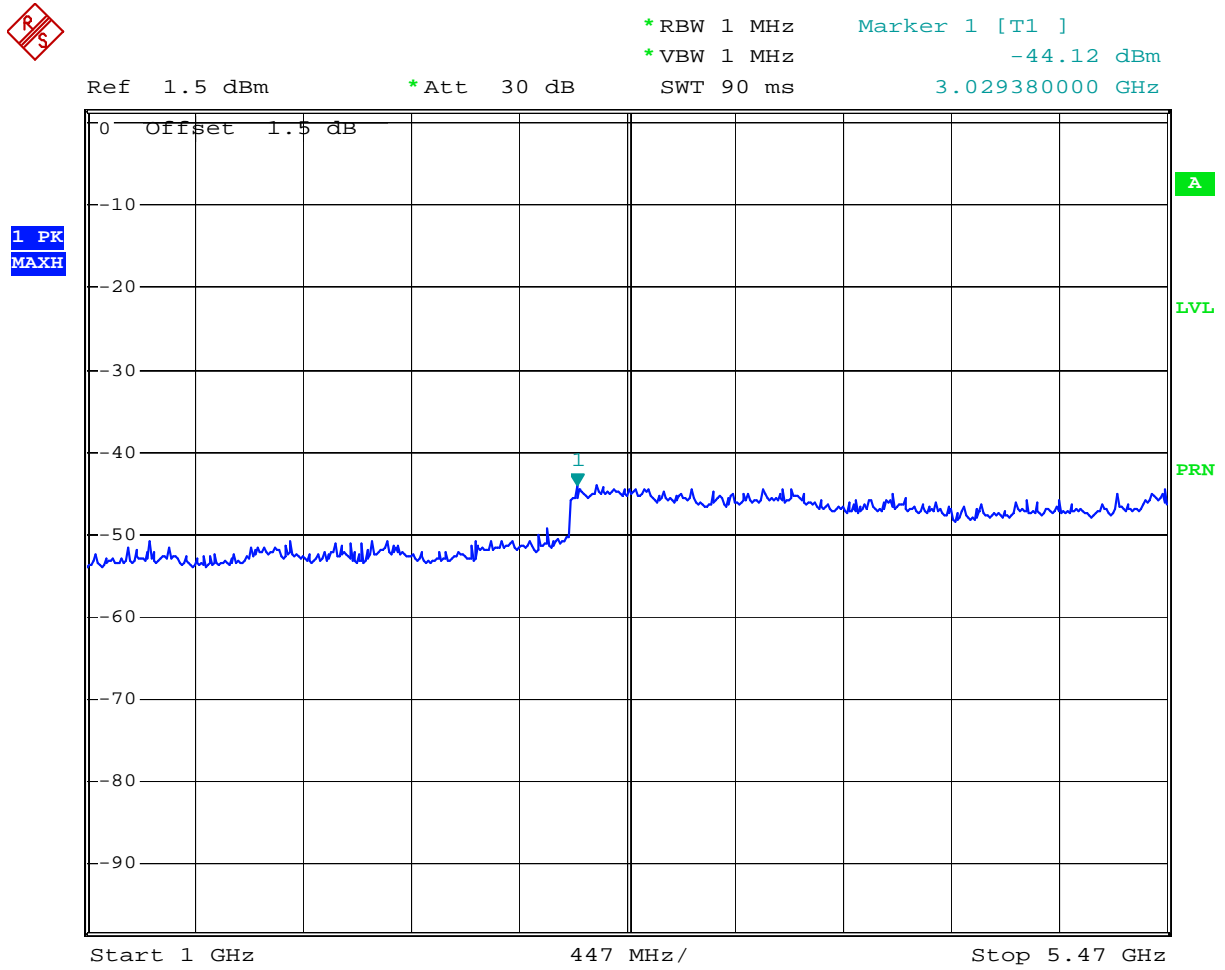
Comment: Undesirable emissions, 5600 MHz, 6 Mbps
Date: 23.NOV.2008 18:20:50

Plot 5.33



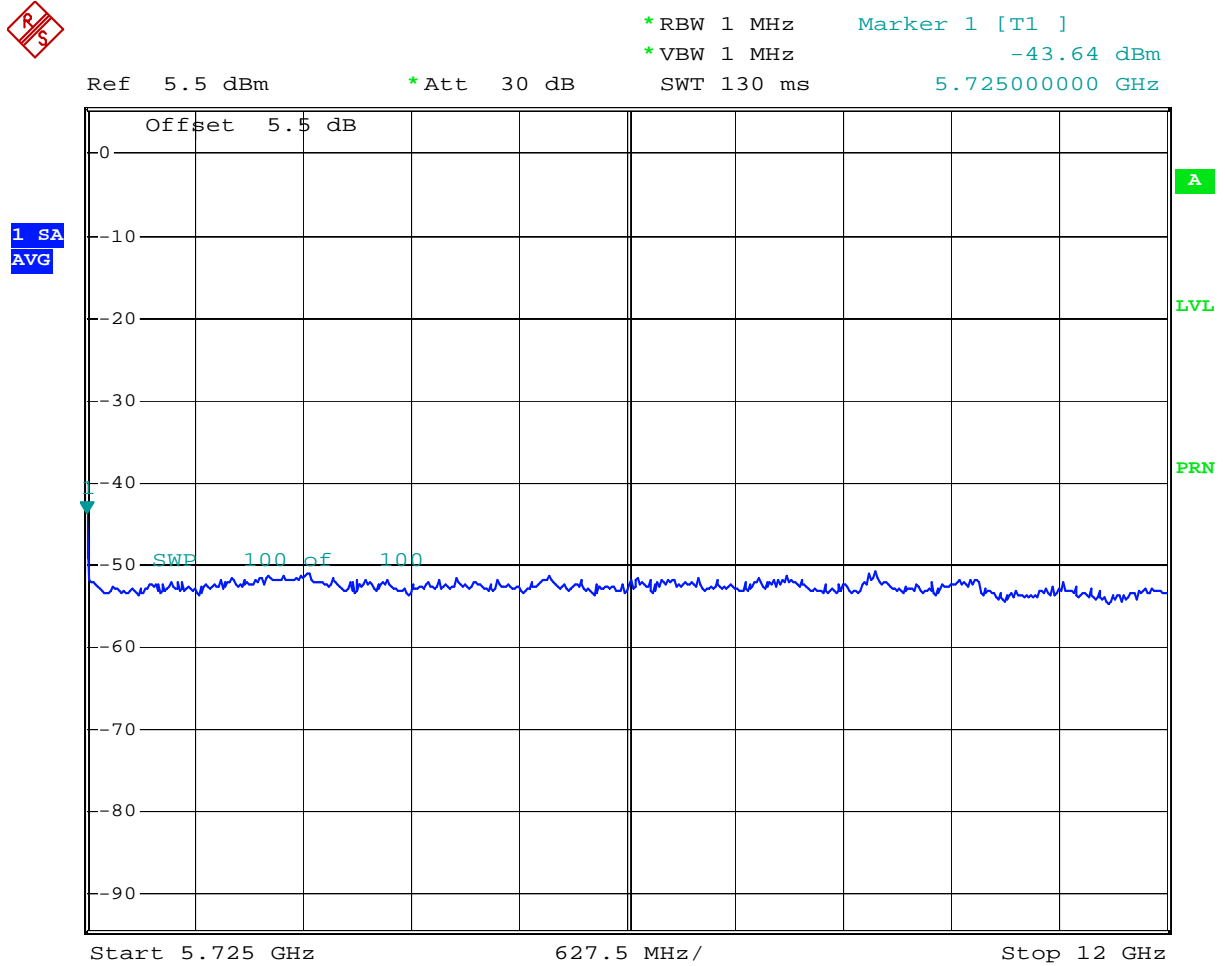
Comment: Undesirable emissions, 5700 MHz, 6 Mbps
Date: 23.NOV.2008 17:48:40

Plot 5.34



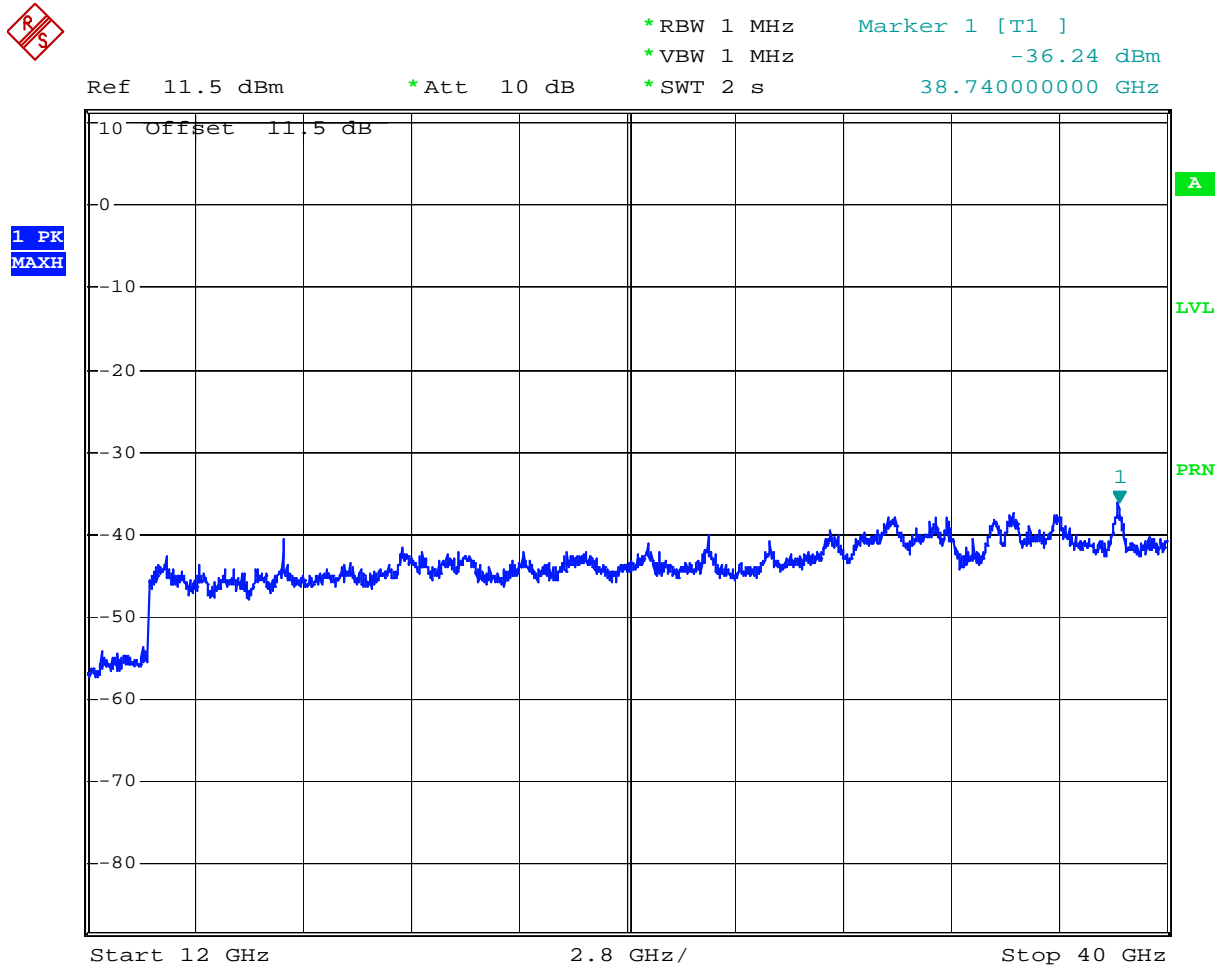
Comment: Undesirable emissions, 5700 MHz, 6 Mbps
 Date: 23.NOV.2008 19:29:21

Plot 5.35



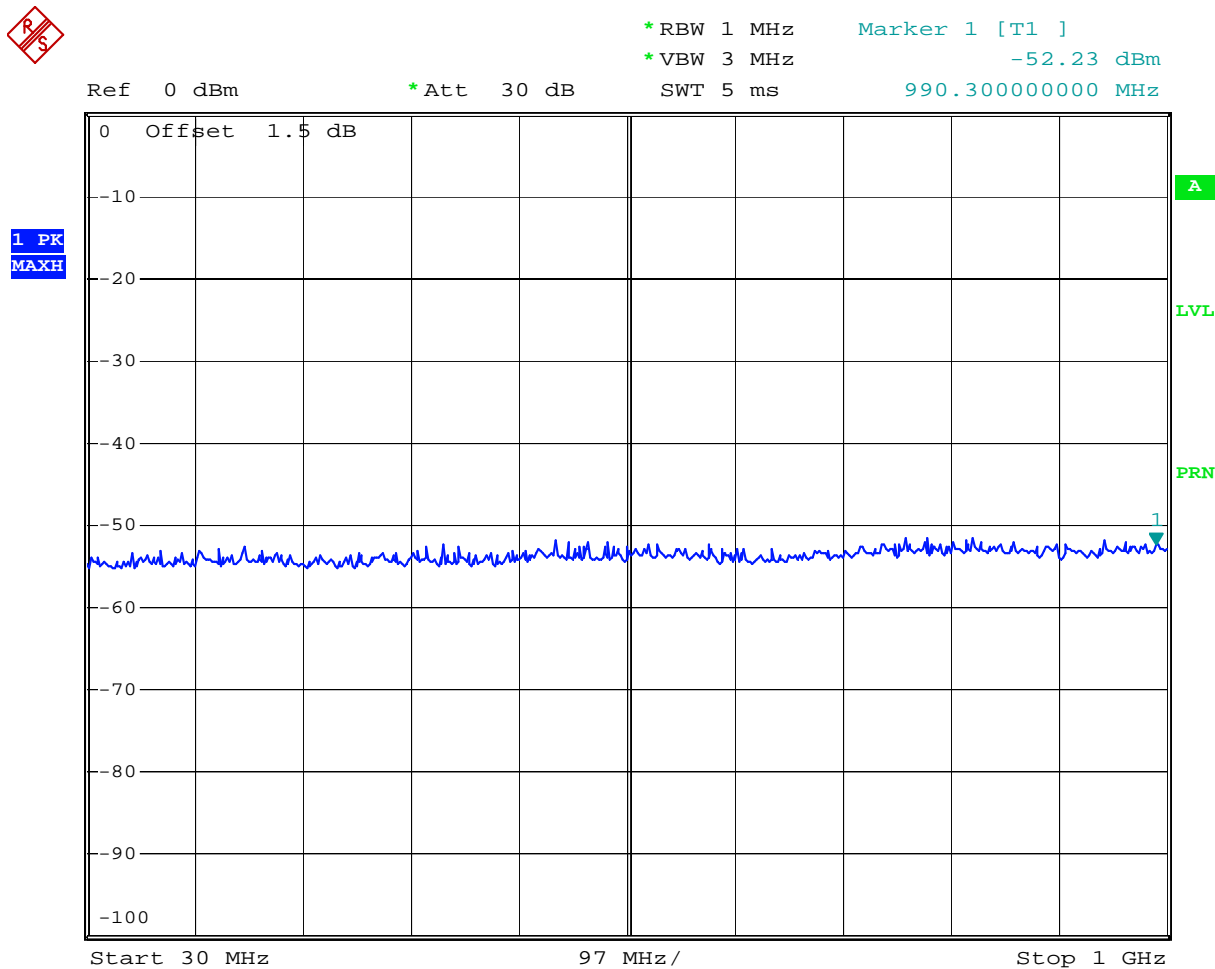
Comment: Undesirable emissions, 5700 MHz, 6 Mbps
Date: 23.NOV.2008 19:23:03

Plot 5.36



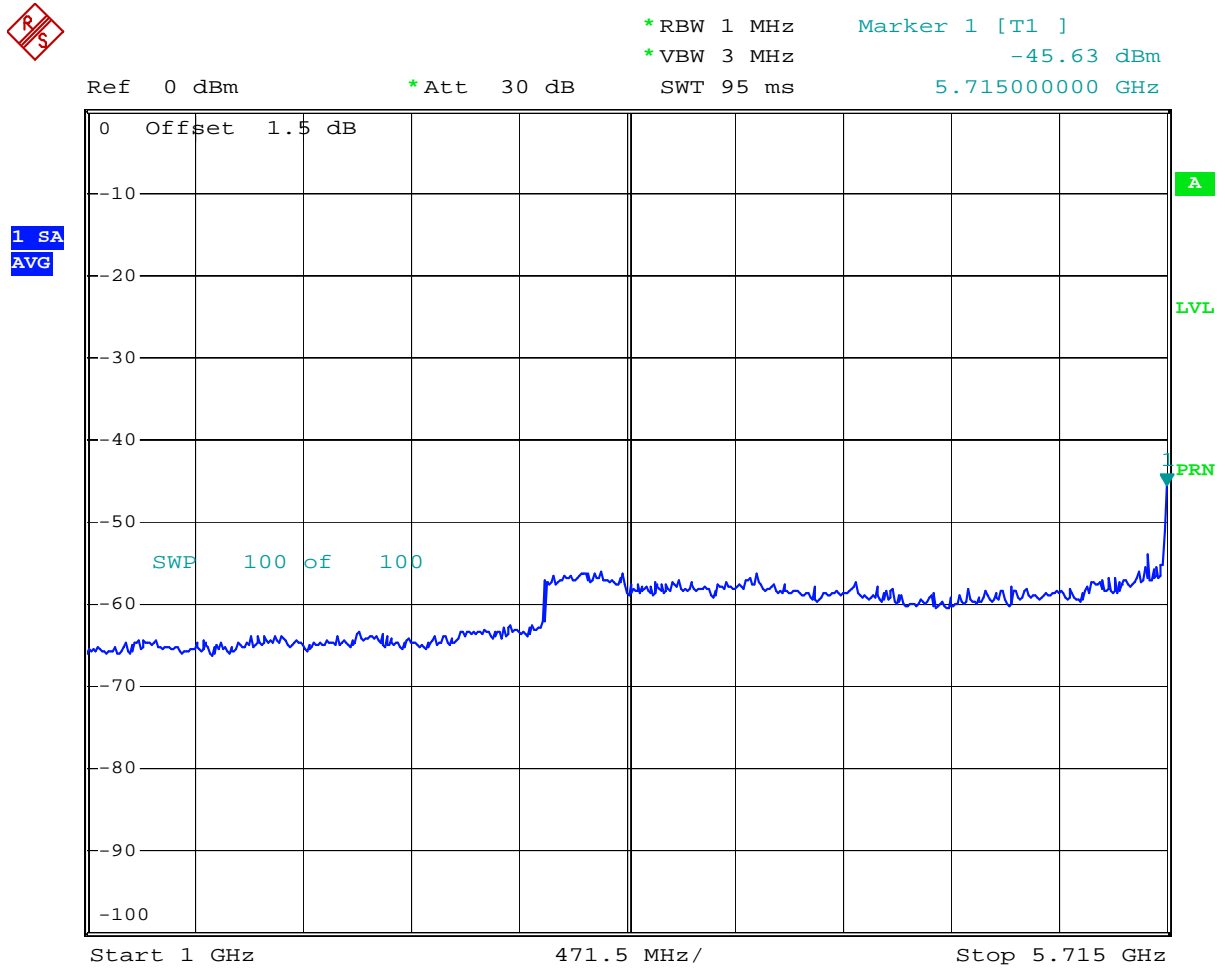
Comment: Undesirable emissions, 5700 MHz, 6 Mbps
Date: 23.NOV.2008 18:21:34

Plot 5.37



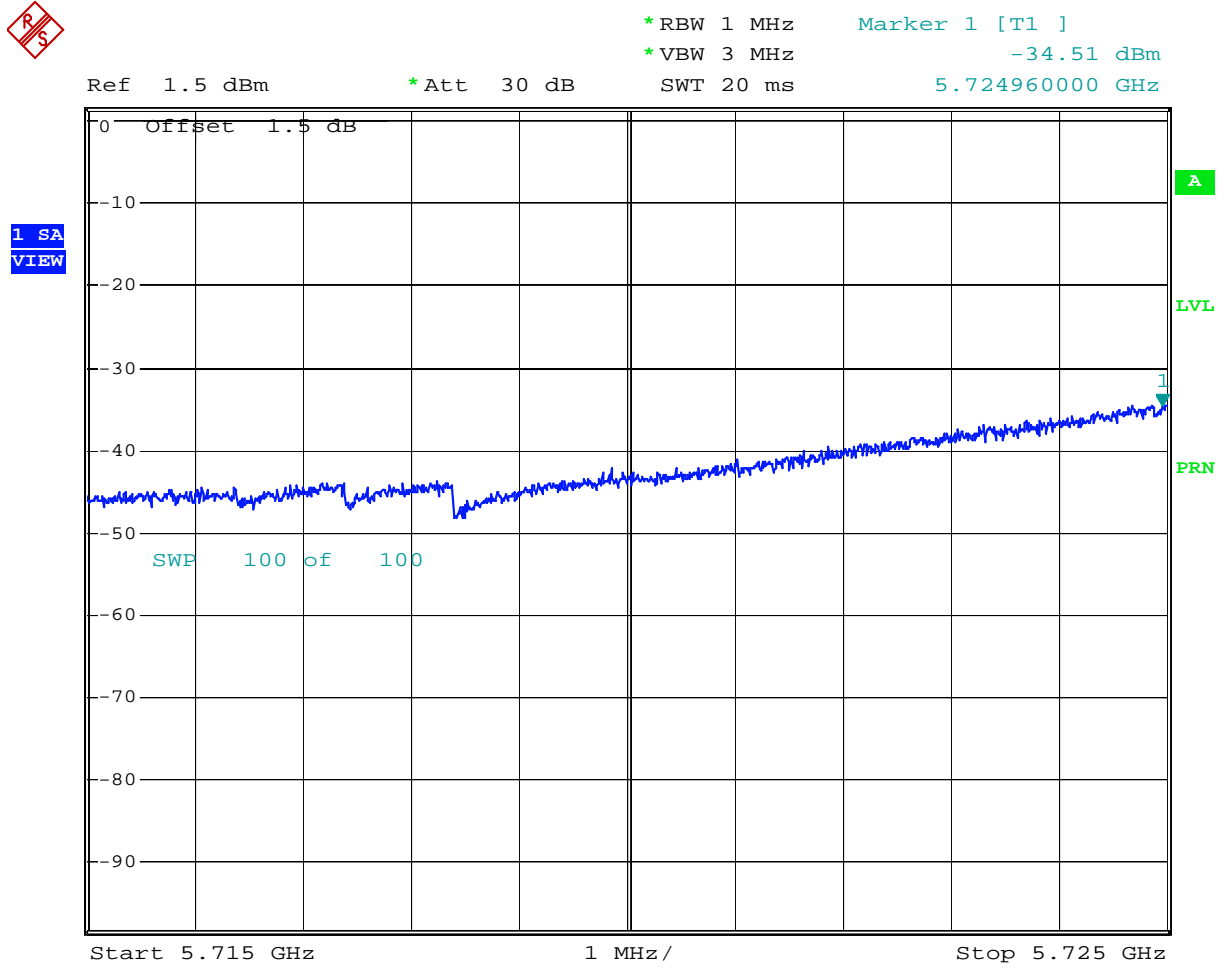
Comment: Undesirable emissions, 5745 MHz, 6 Mbps
 Date: 23.NOV.2008 12:51:06

Plot 5.38



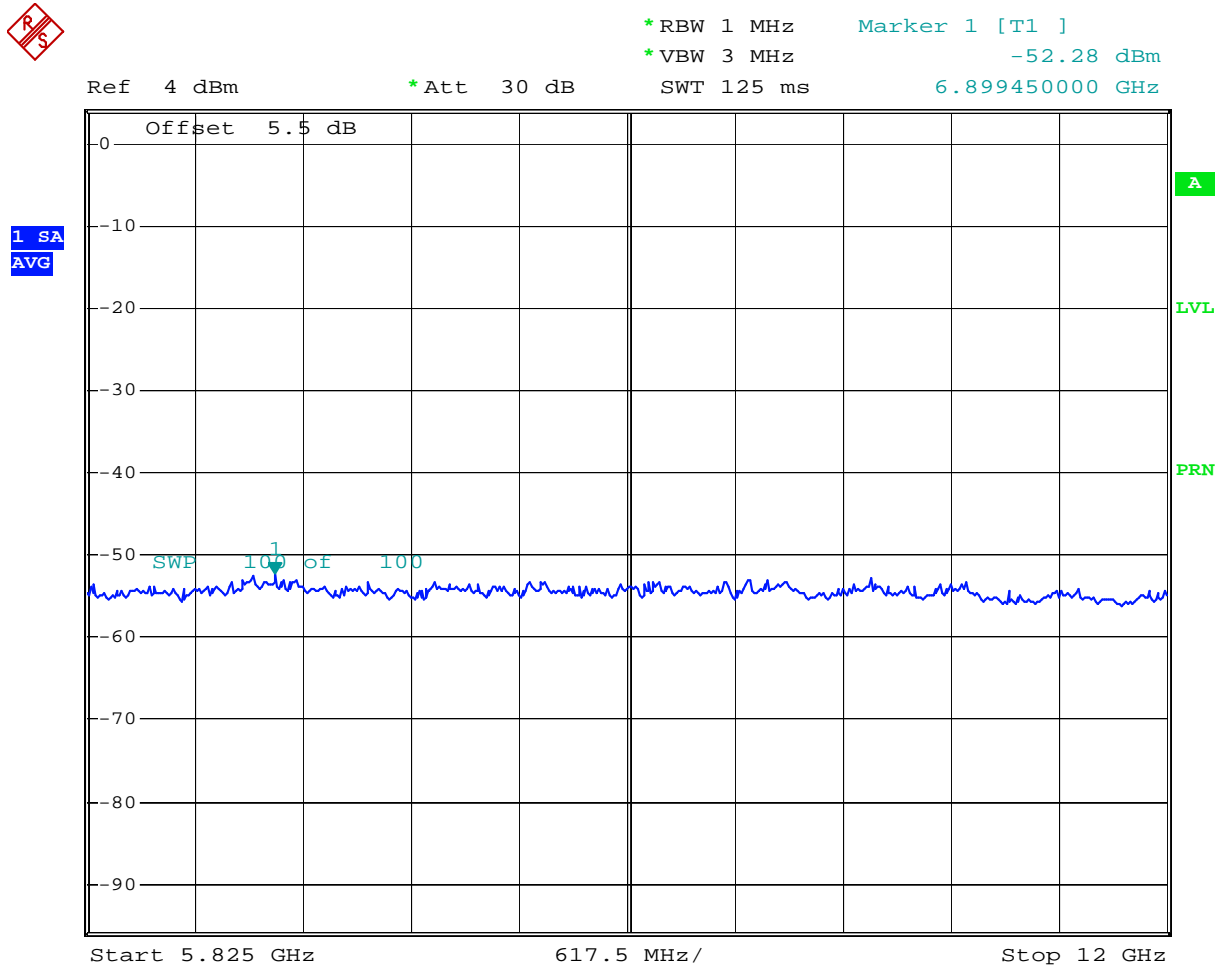
Comment: Undesirable emissions, 5745 MHz, 6 Mbps
Date: 23.NOV.2008 12:53:39

Plot 5.39



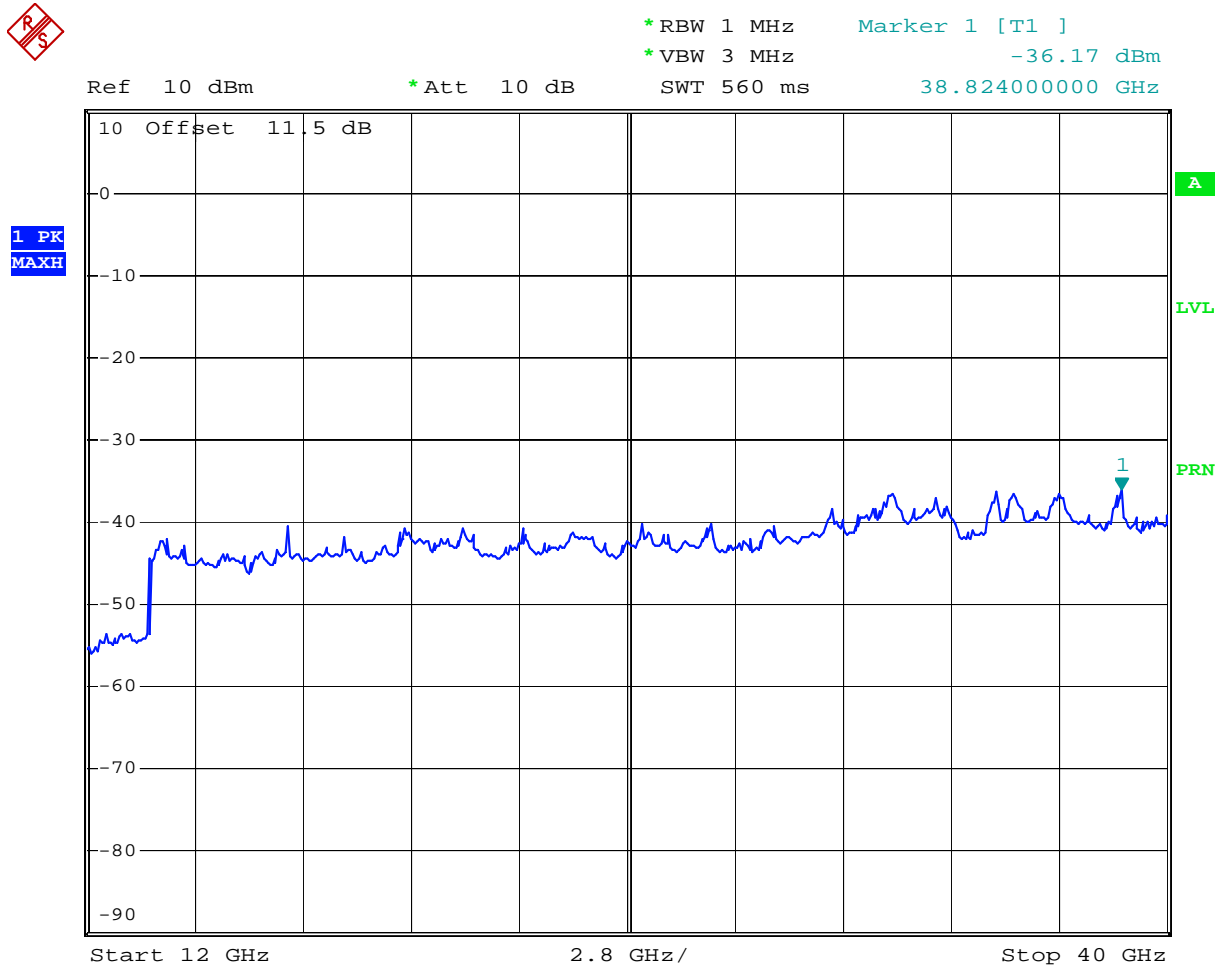
Comment: Undesirable emissions, 5745 MHz, 6 Mbps
Date: 23.NOV.2008 13:49:18

Plot 5.40



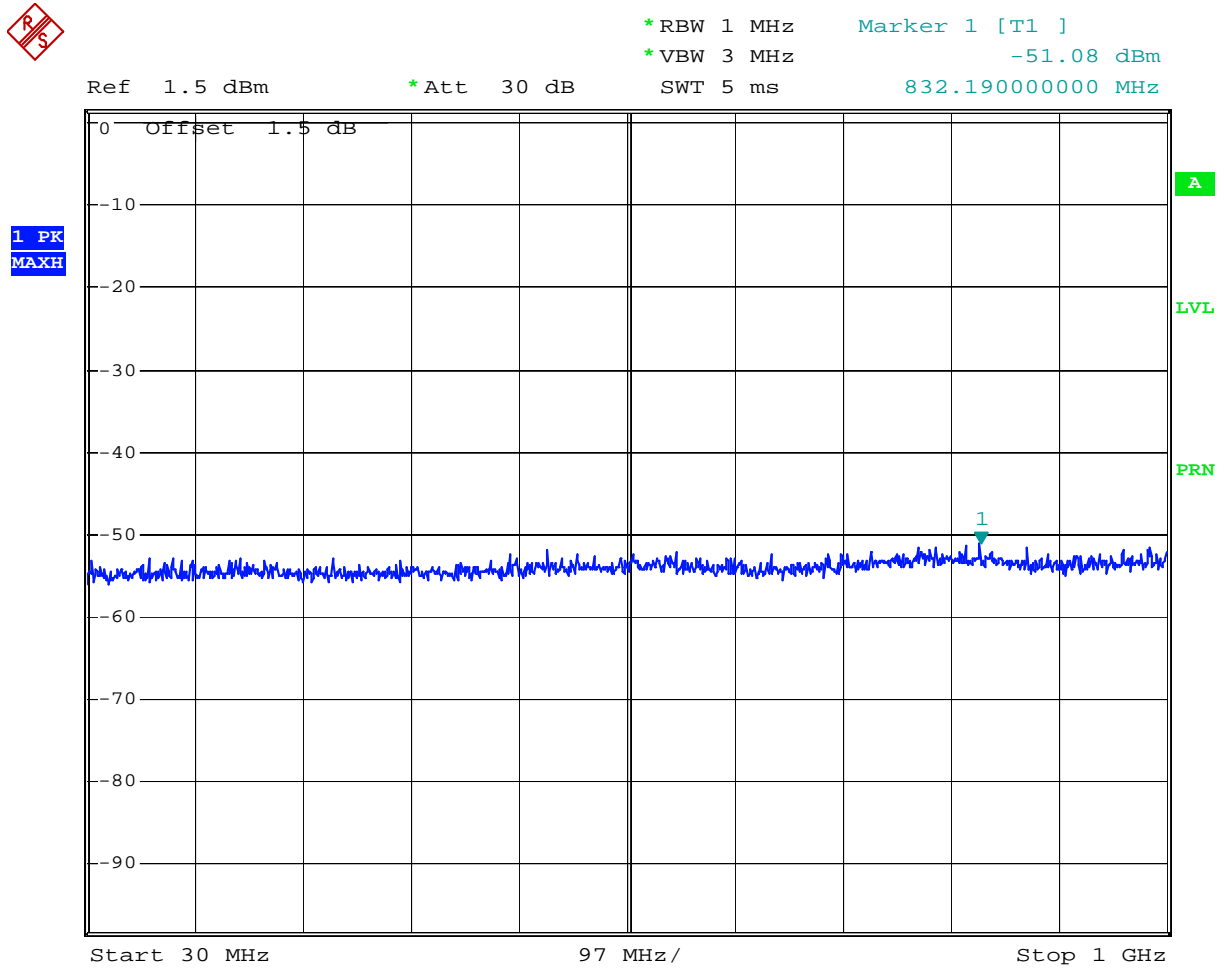
Comment: Undesirable emissions, 5745 MHz, 6 Mbps
 Date: 23.NOV.2008 13:01:17

Plot 5.41



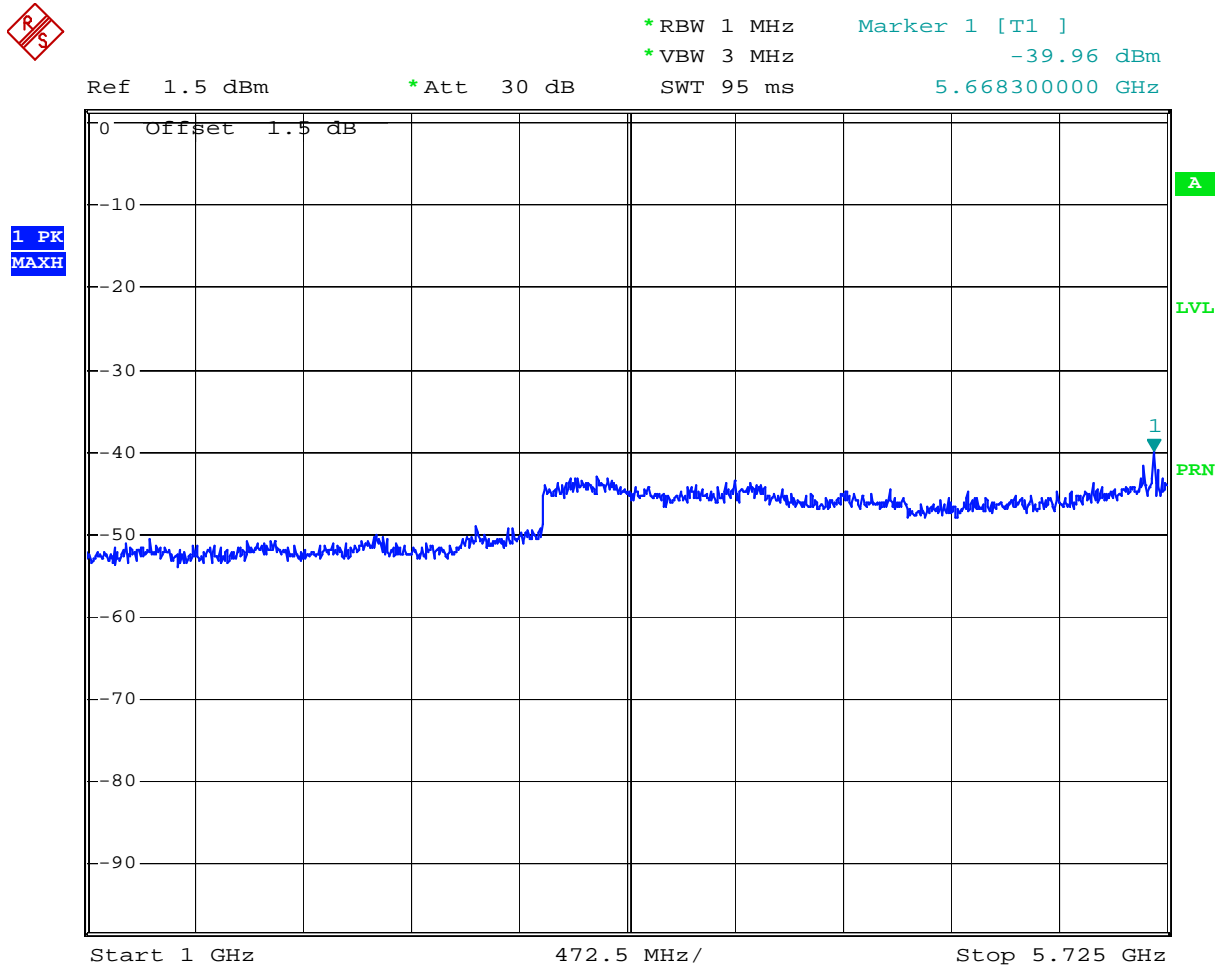
Comment: Undesirable emissions, 5745 MHz, 6 Mbps
Date: 23.NOV.2008 13:04:51

Plot 5.42



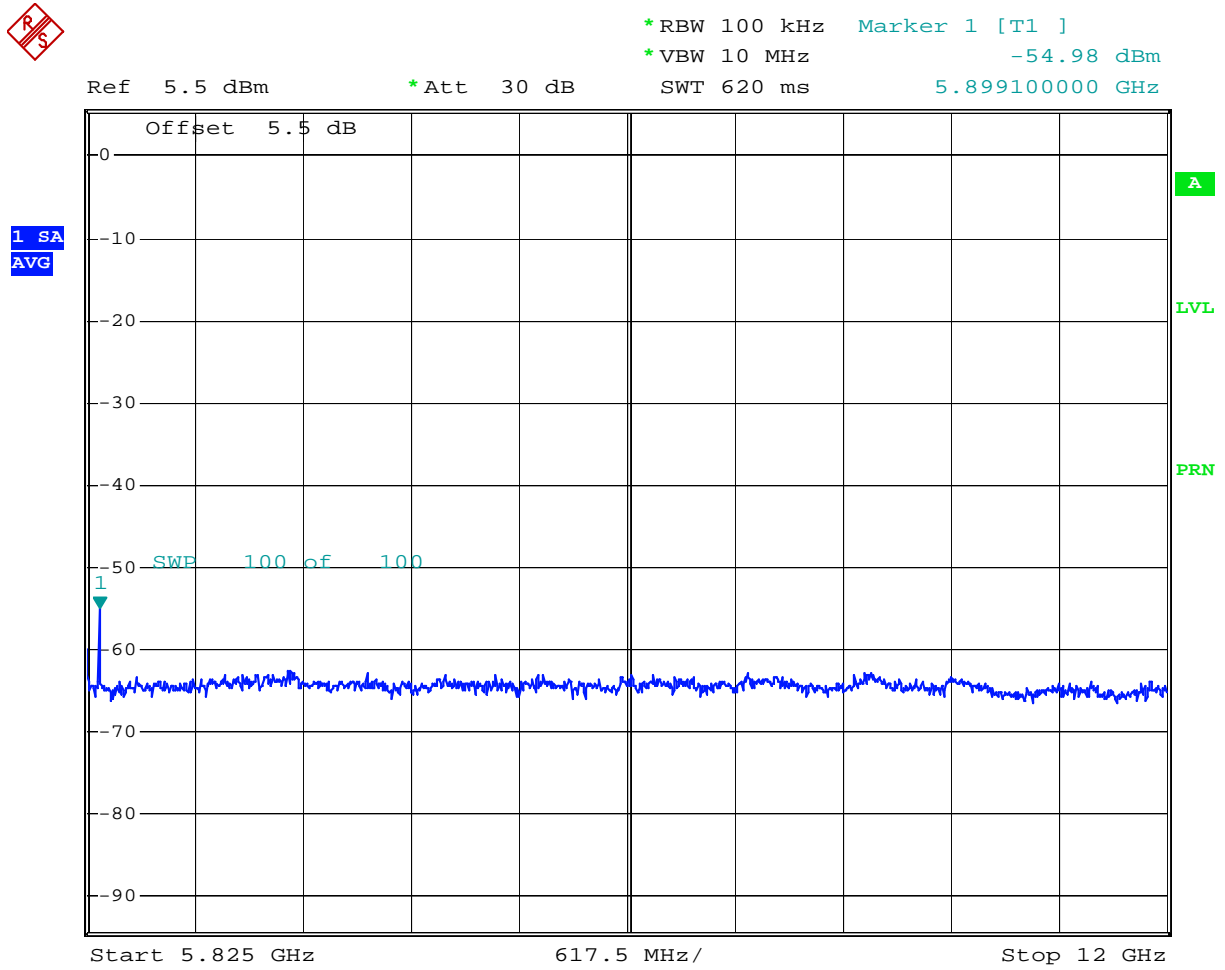
Comment: Undesirable emissions, 5785 MHz, 6 Mbps
Date: 23.NOV.2008 13:50:30

Plot 5.43



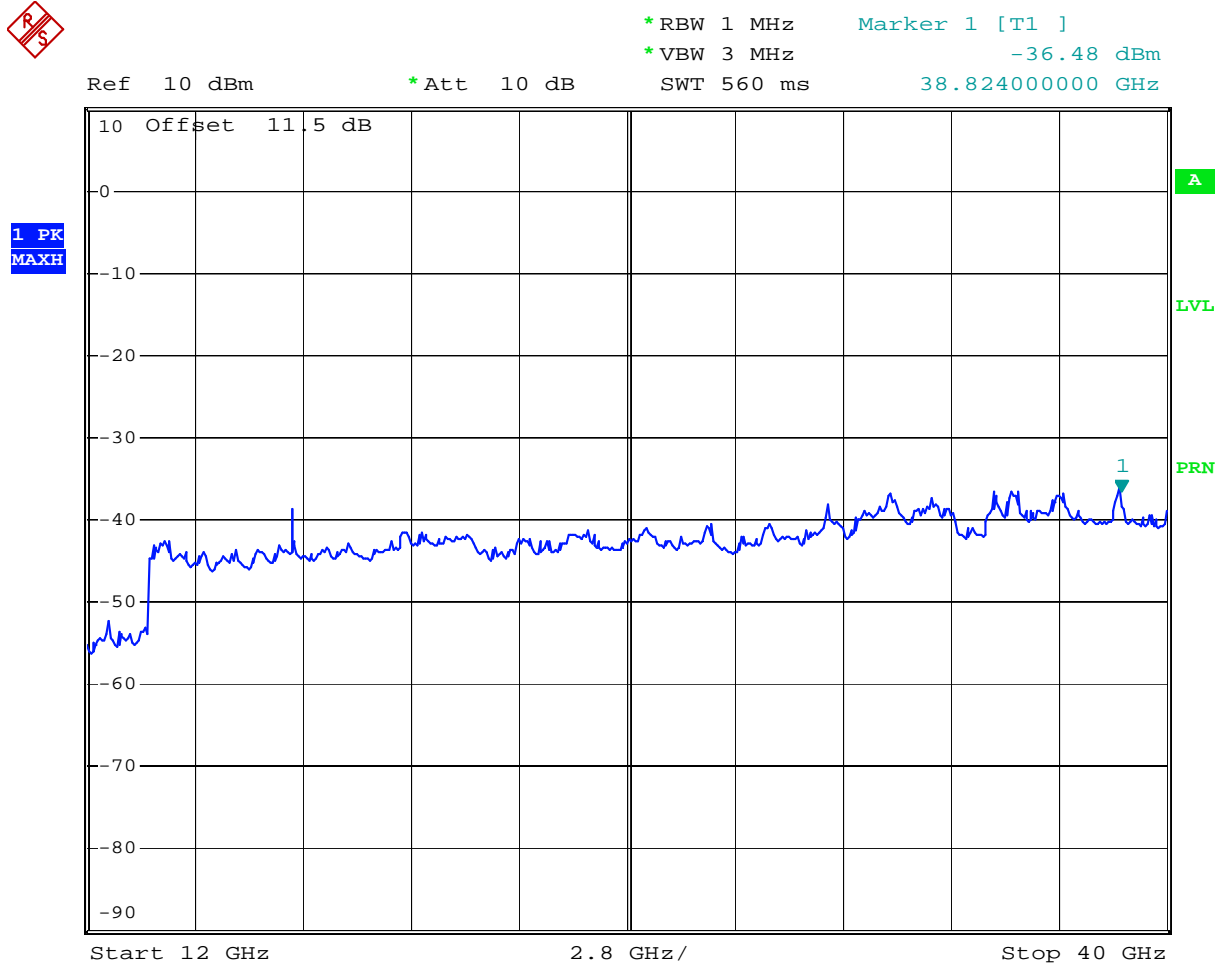
Comment: Undesirable emissions, 5785 MHz, 6 Mbps
Date: 23.NOV.2008 13:51:25

Plot 5.44



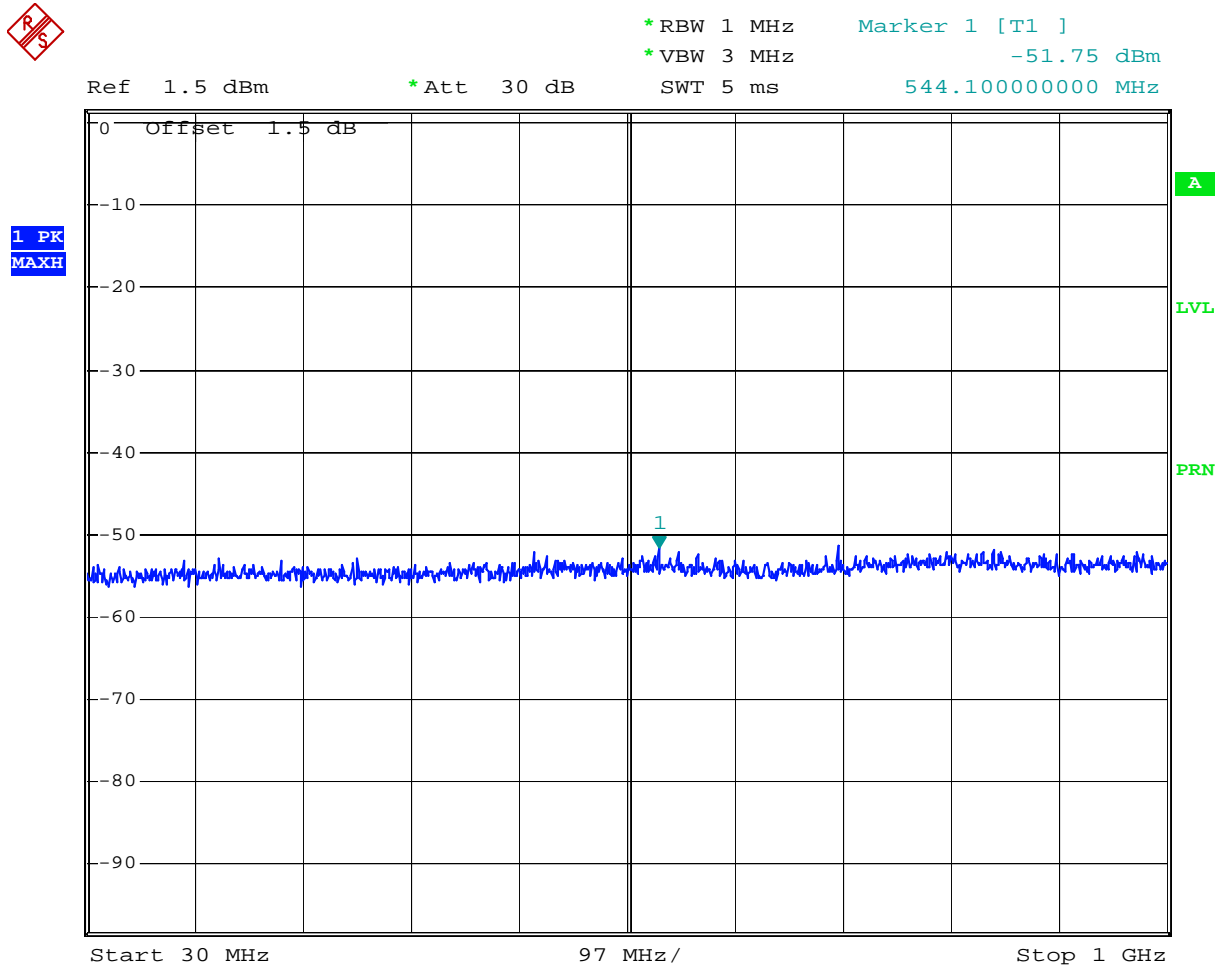
Comment: Undesirable emissions, 5785 MHz, 6 Mbps
Date: 23.NOV.2008 14:15:56

Plot 5.45



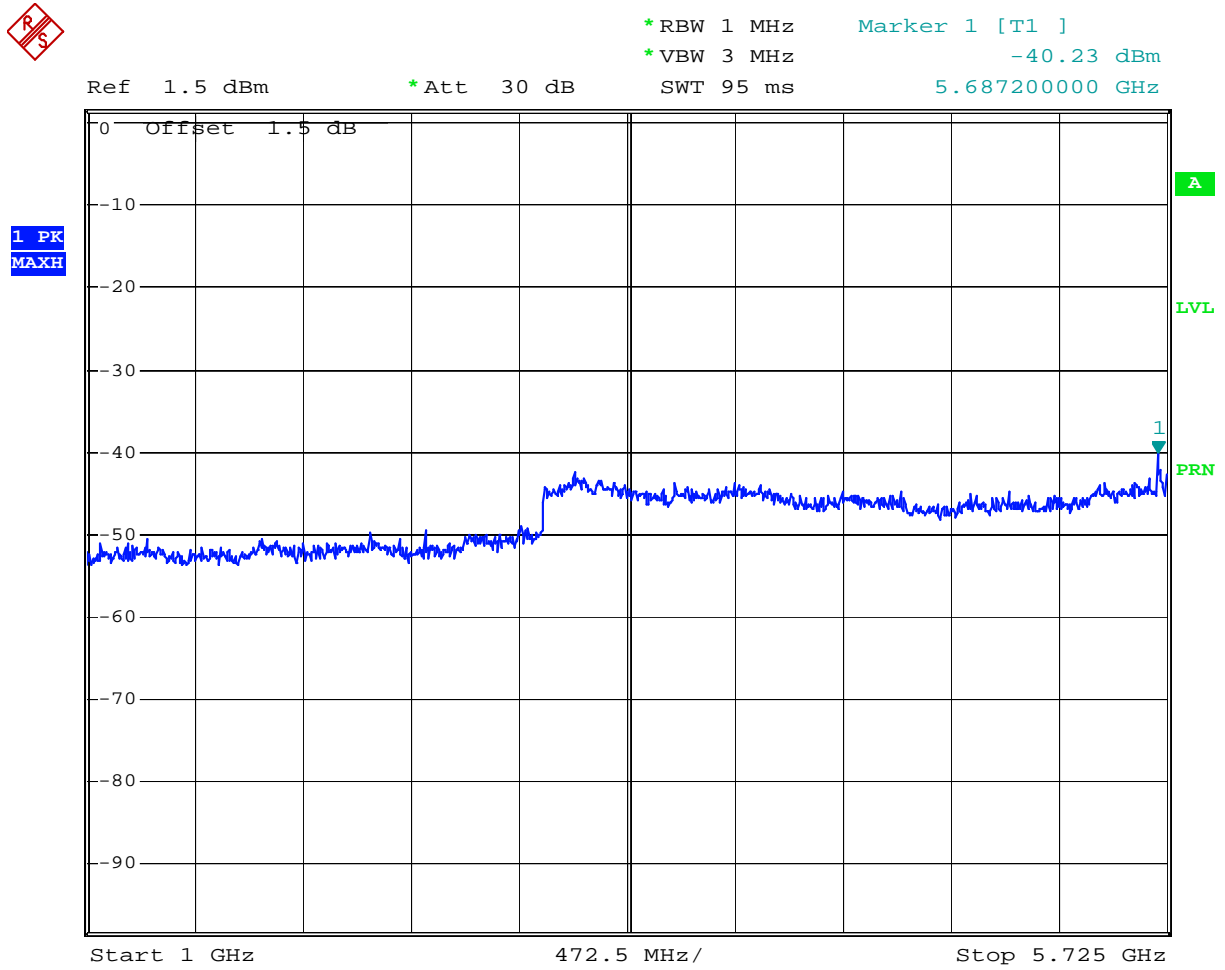
Comment: Undesirable emissions, 5785 MHz, 6 Mbps
Date: 23.NOV.2008 13:05:45

Plot 5.46



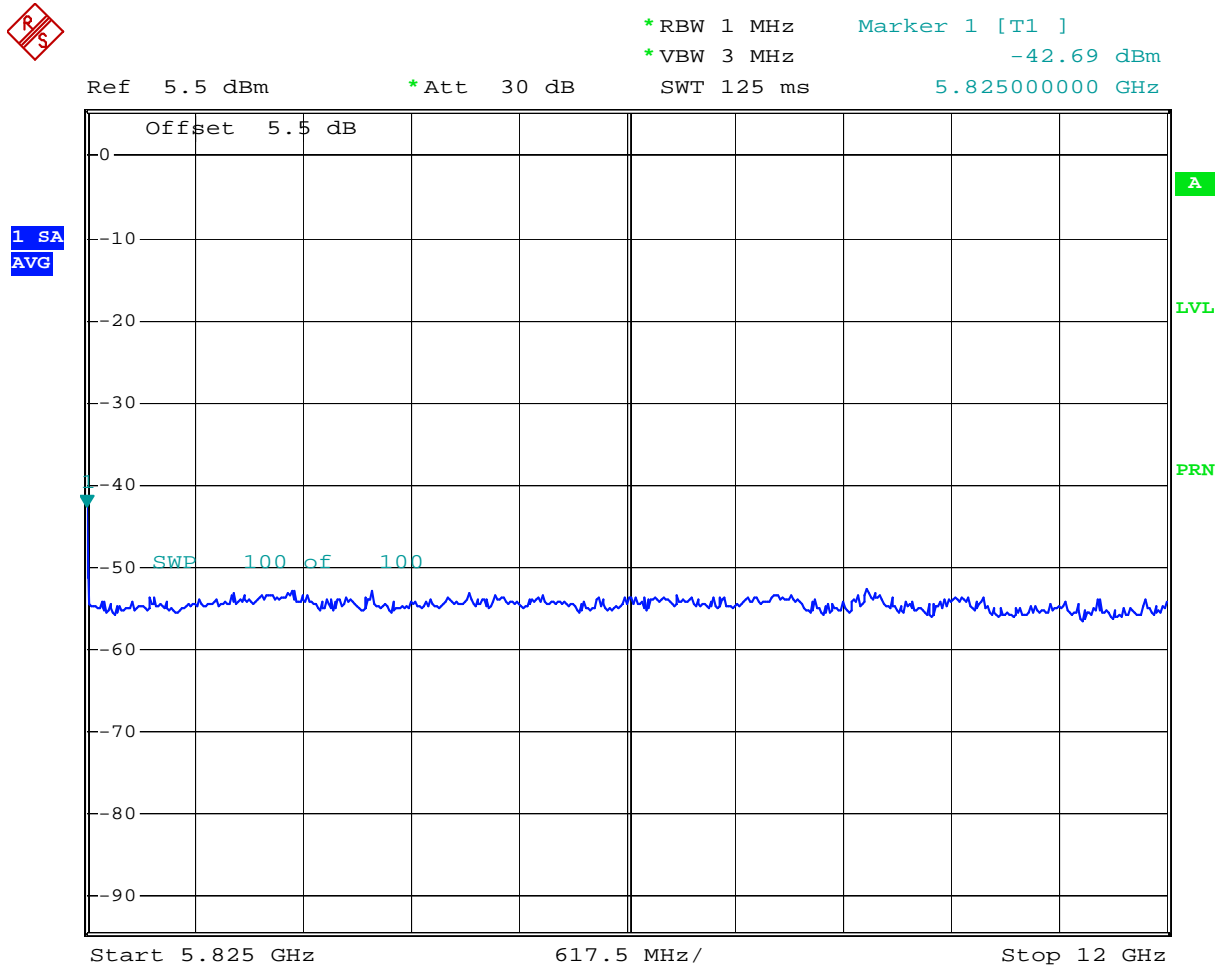
Comment: Undesirable emissions, 5805 MHz, 6 Mbps
Date: 23.NOV.2008 13:52:57

Plot 5.47



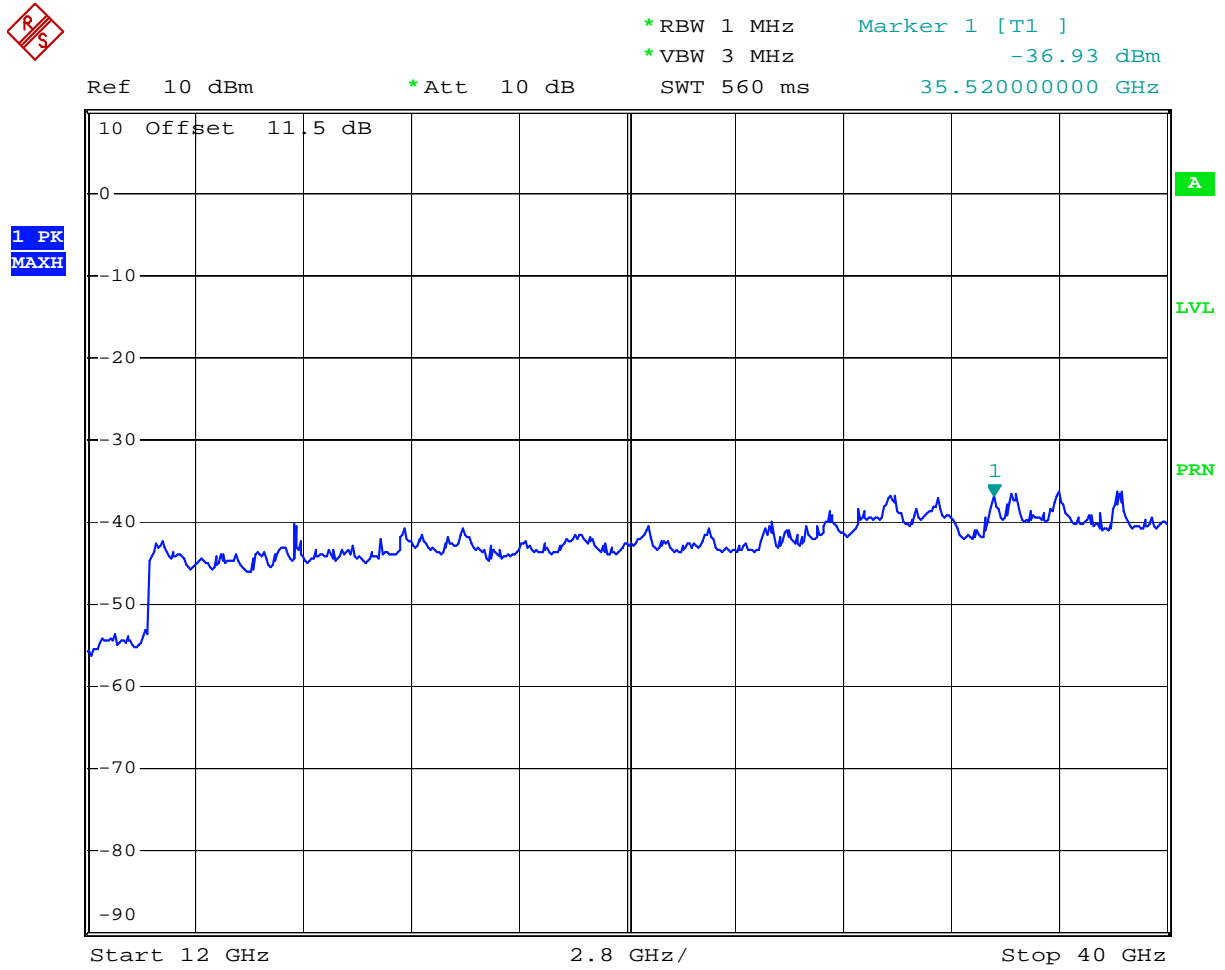
Comment: Undesirable emissions, 5805 MHz, 6 Mbps
Date: 23.NOV.2008 13:52:19

Plot 5.48



Comment: Undesirable emissions, 5805 MHz, 6 Mbps
Date: 23.NOV.2008 13:10:05

Plot 5.49



Comment: Undesirable emissions, 5805 MHz, 6 Mbps
 Date: 23.NOV.2008 13:06:42

4.6 Radiated Emissions above 1 GHz
FCC Rules: 15.407(b)(3)(7), 15.205, 15.209

Requirement

All emissions outside of the 5.15 –5.35 GHz band shall not exceed an EIRP of –27 dBm/MHz.
Note: Except for emissions in restricted bands, that corresponds to the field strength level of 68.3 dB(μ V/m) at 3 m distance when measure with 1 MHz resolution bandwidth.

Emissions in restricted bands shall not exceed 15.209 limits.

Procedure

Radiated emission measurements were performed from 30 MHz to 40,000 MHz. Spectrum Analyzer Resolution Bandwidth is 1 MHz for frequencies above 1000 MHz.

The EUT is placed on the wooden 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 3 m 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). A sample calculation, configuration photographs and data tables of the emissions are included.

Field Strength Calculation

$$FS = RA + AF + CF - AG$$

Where FS = Field Strength in dB(μ V/m)

RA = Receiver Amplitude (including preamplifier) in dB(μ V)

CF = Cable Attenuation Factor in dB

AF = Antenna Factor in dB(1/m)

AG = Amplifier Gain in dB

Assume a receiver reading of 52.0 dB(μ V) is obtained. The antenna factor of 7.4 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 dB(μ V/m). This value in dB(μ V/m) was converted to Intertek corresponding level in μ V/m.

RA = 52.0 dB(μ V); CF = 1.6 dB; AF = 7.4 dB(1/m); AG = 29.0 dB

FS = 52 + 7.4 + 1.6 - 29 = 32 dB(μ V/m)

Level in μ V/m = Common Antilogarithm [(32 dB(μ V/m)/20) = 39.8 μ V/m

Result

The data listed on the following tables list the significant emission frequencies, the limit and the margin of compliance.

The data listed on the following tables were the only emissions found in the investigation up to 40 GHz. No other emissions were found above the system noise floor, which is at least 6 dB below the regulatory limit. Note: the EIRP limit of -27 dBm/MHz corresponds to the average field strength of 68.3 dB(uV/m) at 3 m distance.

All radiated spurious emissions in the restricted bands, including the emissions in the adjacent restricted bands, are below the limits listed in FCC section 15.205 (see plots 6.1 – 6.8). On these plots the antenna factor, cable loss and preamplifier gain are included in spectrum analyzer OFFSET; therefore, the marker readings on the band-edge frequencies are the field strength at 3 m distance.

The EUT passed by 0.9 dB.

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. 36, 5180 MHz							
10360	Peak	72.5	59.2	25.6	38.9	88.3	-15.8
10360	Average	56.9	43.6	25.6	38.9	68.3	-11.4
15540 **	Peak	57.5	42.9	23.8	38.4	74.0	-16.5
15540 **	Average	44.3	29.7	23.8	38.4	54.0	-9.7
20720	Peak	51.7	51.3	39.9	40.3	88.3	-36.6
20720	Average	35.7	35.3	39.9	40.3	68.3	-32.6
25900	Peak	59.2	48.2	29.5	40.5	88.3	-29.1
25900	Average	45.1	34.1	29.5	40.5	68.3	-23.2
31080	Peak	58.6	48.3	33.2	43.5	88.3	-29.7
31080	Average	44.6	34.3	33.2	43.5	68.3	-23.7
36260	Peak	61.3	50.4	32.6	43.5	88.3	-27.0
36260	Average	46.8	35.9	32.6	43.5	68.3	-21.5
Ch 40, 5200 MHz							
10400	Peak	72.0	58.7	25.5	38.8	88.3	-16.3
10400	Average	55.8	42.5	25.5	38.8	68.3	-12.5
15600 **	Peak	57.3	42.0	23.3	38.6	74.0	-16.7
15600 **	Average	43.8	28.5	23.3	38.6	54.0	-10.2
20800	Peak	51.1	52.1	41.3	40.3	88.3	-37.2
20800	Average	35.5	36.5	41.3	40.3	68.3	-32.8
26000	Peak	59.3	49.1	30.3	40.5	88.3	-29.0
26000	Average	45.3	35.1	30.3	40.5	68.3	-23.0
31200	Peak	59.2	48.4	32.7	43.5	88.3	-29.1
31200	Average	45.4	34.6	32.7	43.5	68.3	-22.9
36400	Peak	60.6	49.7	32.7	43.6	88.3	-27.6
36400	Average	46.3	35.4	32.7	43.6	68.3	-20.8
Ch 48, 5240 MHz							
10480	Peak	71.1	58.0	25.7	38.8	88.3	-17.2
10480	Average	55.0	41.9	25.7	38.8	68.3	-13.3
15720 **	Peak	58.8	42.2	22.1	38.7	74.0	-15.2
15720 **	Average	45.0	28.4	22.1	38.7	54.0	-9.0
20960	Peak	51.6	50.2	38.9	40.3	88.3	-36.7
20960	Average	36.2	34.8	38.9	40.3	68.3	-32.1
26200	Peak	58.9	49.6	31.2	40.5	88.3	-29.4
26200	Average	45.2	35.9	31.2	40.5	68.3	-23.1
31440	Peak	59.2	51.1	35.4	43.5	88.3	-29.1
31440	Average	43.6	35.5	35.4	43.5	68.3	-24.7
36680	Peak	60.4	50.0	33.2	43.6	88.3	-27.9
36680	Average	46.4	36.0	33.2	43.6	68.3	-21.9

* Correction factor = AG-CF

** In restricted band

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 52, 5260 MHz							
10520	Peak	63.1	49.9	25.6	38.8	88.3	-25.2
10520	Average	48.6	35.4	25.6	38.8	68.3	-19.7
15780 **	Peak	58.1	41.9	22.4	38.6	74.0	-15.9
15780 **	Average	44.0	27.8	22.4	38.6	54.0	-10.0
21040	Peak	53.7	49.1	35.7	40.3	88.3	-34.6
21040	Average	38.2	33.6	35.7	40.3	68.3	-30.1
26300	Peak	61.9	49.2	27.8	40.5	88.3	-26.4
26300	Average	48.0	35.3	27.8	40.5	68.3	-20.3
31560	Peak	57.7	48.9	34.7	43.5	88.3	-30.6
31560	Average	40.6	34.8	37.7	43.5	68.3	-27.7
36820	Peak	60.1	50.5	34.0	43.6	88.3	-28.2
36820	Average	46.0	36.4	34.0	43.6	68.3	-22.3
Ch 56, 5280 MHz							
10560	Peak	62.2	49.1	25.7	38.8	88.3	-26.1
10560	Average	47.2	34.1	25.7	38.8	68.3	-21.1
15840 **	Peak	58.4	42.7	22.9	38.6	74.0	-15.6
15840 **	Average	43.4	27.7	22.9	38.6	54.0	-10.6
21120	Peak	52.7	51.3	38.9	40.3	88.3	-35.6
21120	Average	37.2	35.8	38.9	40.3	68.3	-31.1
26400	Peak	59.9	49.6	30.2	40.5	88.3	-28.4
26400	Average	46.3	36.0	30.2	40.5	68.3	-22.0
31680	Peak	57.7	47.9	33.7	43.5	88.3	-30.6
31680	Average	43.7	33.9	33.7	43.5	68.3	-24.6
36960	Peak	61.5	51.6	33.8	43.7	88.3	-27.6
36960	Average	46.5	36.6	33.8	43.7	68.3	-20.8
Ch 64, 5320 MHz							
10640	Peak	63.7	50.2	25.4	38.9	88.3	-24.6
10640	Average	47.5	34.0	25.4	38.9	68.3	-20.8
15960 **	Peak	56.0	41.5	24.3	38.8	74.0	-18.0
15960 **	Average	42.3	27.8	24.3	38.8	54.0	-11.7
21280	Peak	51.3	51.2	40.2	40.3	88.3	-37.0
21280	Average	35.9	35.8	40.2	40.3	68.3	-32.4
26600	Peak	58.5	50.5	32.5	40.5	88.3	-29.8
26600	Average	44.9	36.9	32.5	40.5	68.3	-23.4
31920	Peak	56.7	49.3	36.1	43.5	88.3	-31.6
31920	Average	42.7	35.3	36.1	43.5	68.3	-25.6
37240	Peak	60.9	53.0	35.8	43.7	88.3	-27.4
37240	Average	45.9	38.0	35.8	43.7	68.3	-22.4

* Correction factor = AG-CF

** In restricted band

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. 100, 5500 MHz							
11000	Peak	62.2	48.9	25.3	38.6	88.3	-26.1
11000	Average	46.6	33.3	25.3	38.6	68.3	-21.7
16500 **	Peak	57.0	43.0	25.1	39.1	74.0	-17.0
16500 **	Average	42.7	28.7	25.1	39.1	54.0	-11.3
22000	Peak	53.3	51.6	38.6	40.3	88.3	-35.0
22000	Average	38.5	36.8	38.6	40.3	68.3	-29.8
27500	Peak	57.8	48.8	34.4	43.4	88.3	-30.5
27500	Average	43.9	34.9	34.4	43.4	68.3	-24.4
33000	Peak	58.3	50.4	35.7	43.6	88.3	-30.0
33000	Average	44.6	36.7	35.7	43.6	68.3	-23.7
38500	Peak	59.0	51.0	35.7	43.7	88.3	-29.3
38500	Average	44.7	36.7	35.7	43.7	68.3	-23.6
Ch 120, 5600 MHz							
11200	Peak	62.4	49.0	25.4	38.8	88.3	-25.9
11200	Average	48.6	35.2	25.4	38.8	68.3	-19.7
16800 **	Peak	57.1	41.1	24.0	40.0	74.0	-16.9
16800 **	Average	43.3	27.3	24.0	40.0	54.0	-10.7
22400	Peak	52.0	51.5	39.9	40.4	88.3	-36.3
22400	Average	36.8	36.3	39.9	40.4	68.3	-31.5
28000	Peak	57.7	49.8	35.5	43.4	88.3	-30.6
28000	Average	43.3	35.4	35.5	43.4	68.3	-25.0
33600	Peak	57.6	50.0	36.0	43.6	88.3	-30.7
33600	Average	43.8	36.2	36.0	43.6	68.3	-24.5
39200	Peak	59.9	49.5	33.3	43.7	88.3	-27.6
39200	Average	45.9	35.5	33.3	43.7	68.3	-20.8
Ch 140, 5700 MHz							
11400	Peak	71.7	53.5	20.7	38.9	88.3	-16.6
11400	Average	56.8	38.6	20.7	38.9	68.3	-11.5
17100 **	Peak	60.0	42.7	24.7	42.0	74.0	-14.0
17100 **	Average	46.1	28.8	24.7	42.0	54.0	-7.9
22800	Peak	68.2	50.1	22.3	40.4	88.3	-20.1
22800	Average	54.2	36.1	22.3	40.4	68.3	-14.1
28500	Peak	57.6	48.8	34.7	43.5	88.3	-30.7
28500	Average	45.5	36.7	34.7	43.5	68.3	-22.8
34200	Peak	57.6	49.6	35.6	43.6	88.3	-30.7
34200	Average	43.8	35.8	35.6	43.6	68.3	-24.5
39900	Peak	58.3	50.1	35.6	43.8	88.3	-30.0
39900	Average	43.8	35.6	35.6	43.8	68.3	-24.5

* Correction factor = AG-CF

** In restricted band

Frequency MHz		FS at 3m dB(uV/m)	SA reading dB(uV)	Corr. Factor * dB	Antenna factor dB(1/m)	FS Limit dB(uV/m)	Margin dB
Ch. 149, 5745 MHz							
11490	Peak	68.8	56.0	26.2	39.0	88.3	-19.5
11490	Average	54.0	41.2	26.2	39.0	68.3	-14.3
17235 **	Peak	60.3	43.1	25.3	42.5	74.0	-13.7
17235 **	Average	46.0	28.8	25.3	42.5	54.0	-8.0
22980	Peak	50.6	49.6	39.4	40.4	88.3	-37.7
22980	Average	35.8	34.8	39.4	40.4	68.3	-32.5
28725	Peak	56.2	48.4	35.6	43.4	88.3	-32.1
28725	Average	42.4	34.6	35.6	43.4	68.3	-25.9
34470	Peak	57.9	50.0	35.7	43.6	88.3	-30.4
34470	Average	43.4	35.5	35.7	43.6	68.3	-24.9
Ch 157, 5785 MHz							
11570	Peak	69.2	56.4	26.2	39.0	88.3	-19.1
11570	Average	54.3	41.5	26.2	39.0	68.3	-14.0
17355 **	Peak	61.6	42.1	23.5	43.0	74.0	-12.4
17355 **	Average	47.5	28.0	23.5	43.0	54.0	-6.5
23140	Peak	51.6	50.5	39.3	40.4	88.3	-36.7
23140	Average	36.8	35.7	39.3	40.4	68.3	-31.5
28925	Peak	56.9	48.2	34.8	43.5	88.3	-31.4
28925	Average	43.1	34.4	34.8	43.5	68.3	-25.2
34710	Peak	56.6	48.5	35.5	43.6	88.3	-31.7
34710	Average	42.5	34.4	35.5	43.6	68.3	-25.8
Ch 161, 5805 MHz							
11610	Peak	68.6	55.5	26.0	39.1	88.3	-19.7
11610	Average	54.0	40.9	26.0	39.1	68.3	-14.3
17415 **	Peak	61.6	41.6	23.5	43.5	74.0	-12.4
17415 **	Average	47.9	27.9	23.5	43.5	54.0	-6.1
23220	Peak	51.8	50.4	39.0	40.4	88.3	-36.5
23220	Average	38.2	36.8	39.0	40.4	68.3	-30.1
29025	Peak	60.5	49.2	32.2	43.5	88.3	-27.8
29025	Average	45.6	34.3	32.2	43.5	68.3	-22.7
34830	Peak	60.1	48.9	32.4	43.6	88.3	-28.2
34830	Average	45.6	34.4	32.4	43.6	68.3	-22.7

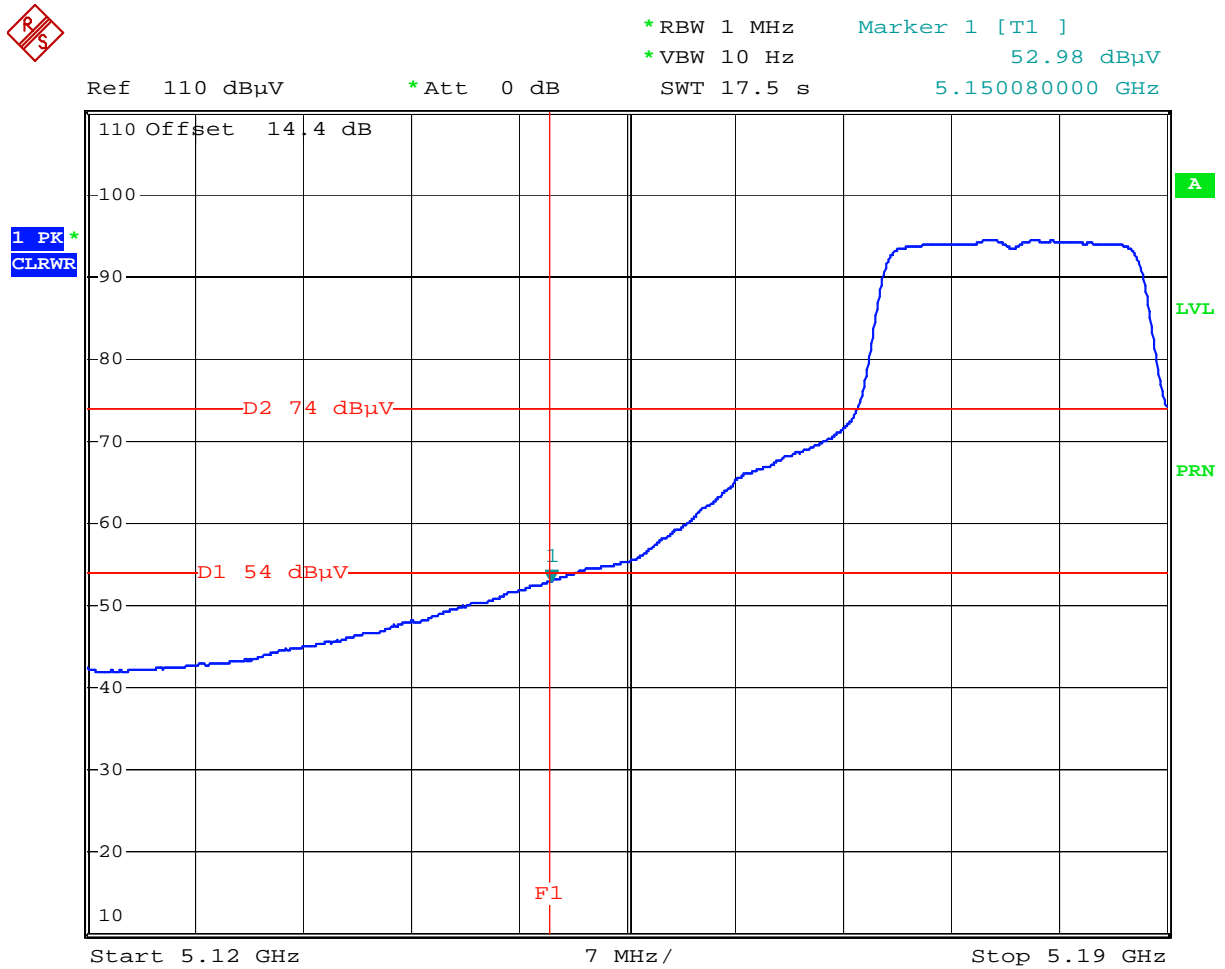
* Correction factor = AG-CF

** In restricted band



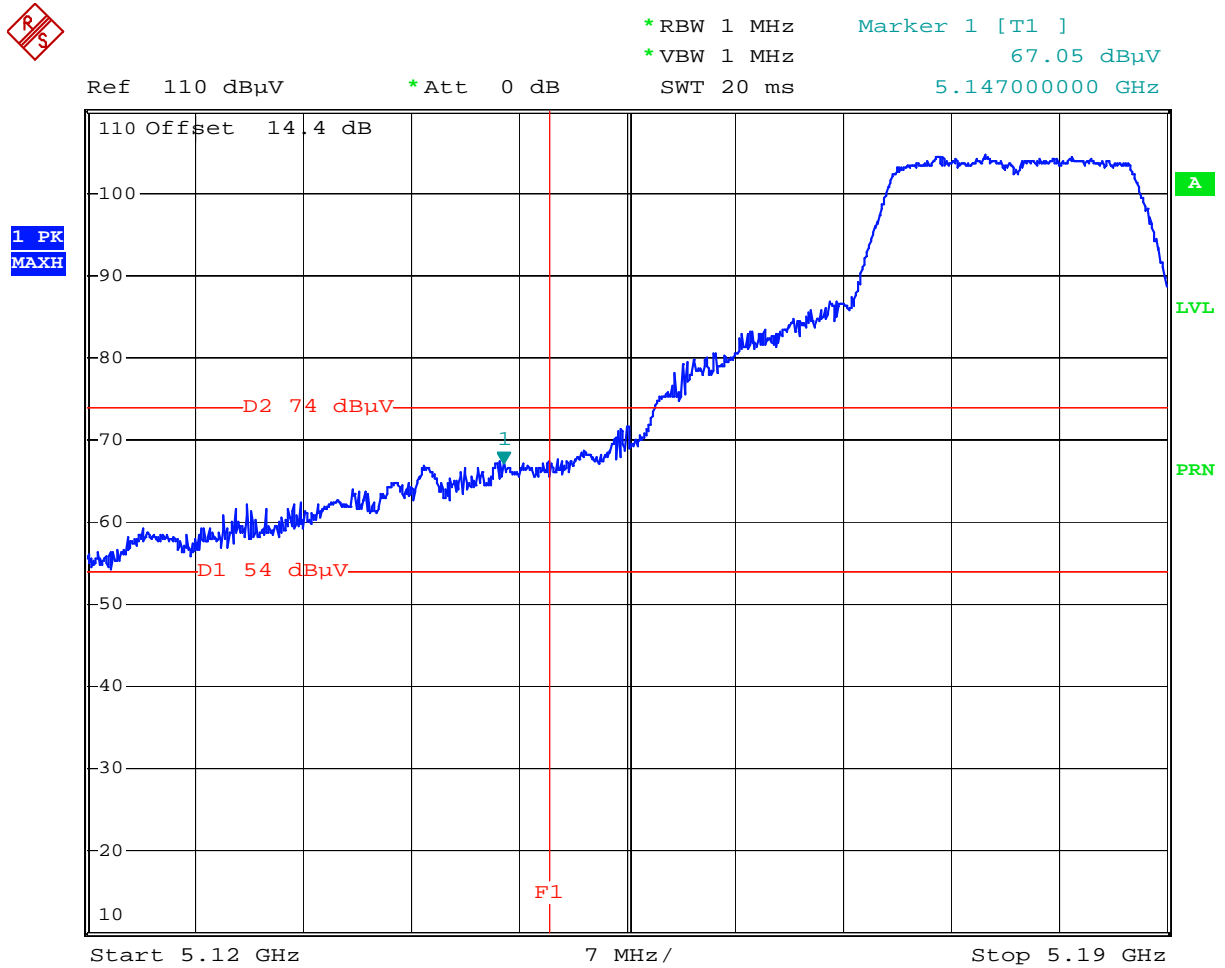
Result - restricted bands: 4.5 – 5.15 GHz and 5.35 – 5.46 GHz

Plot 6.1



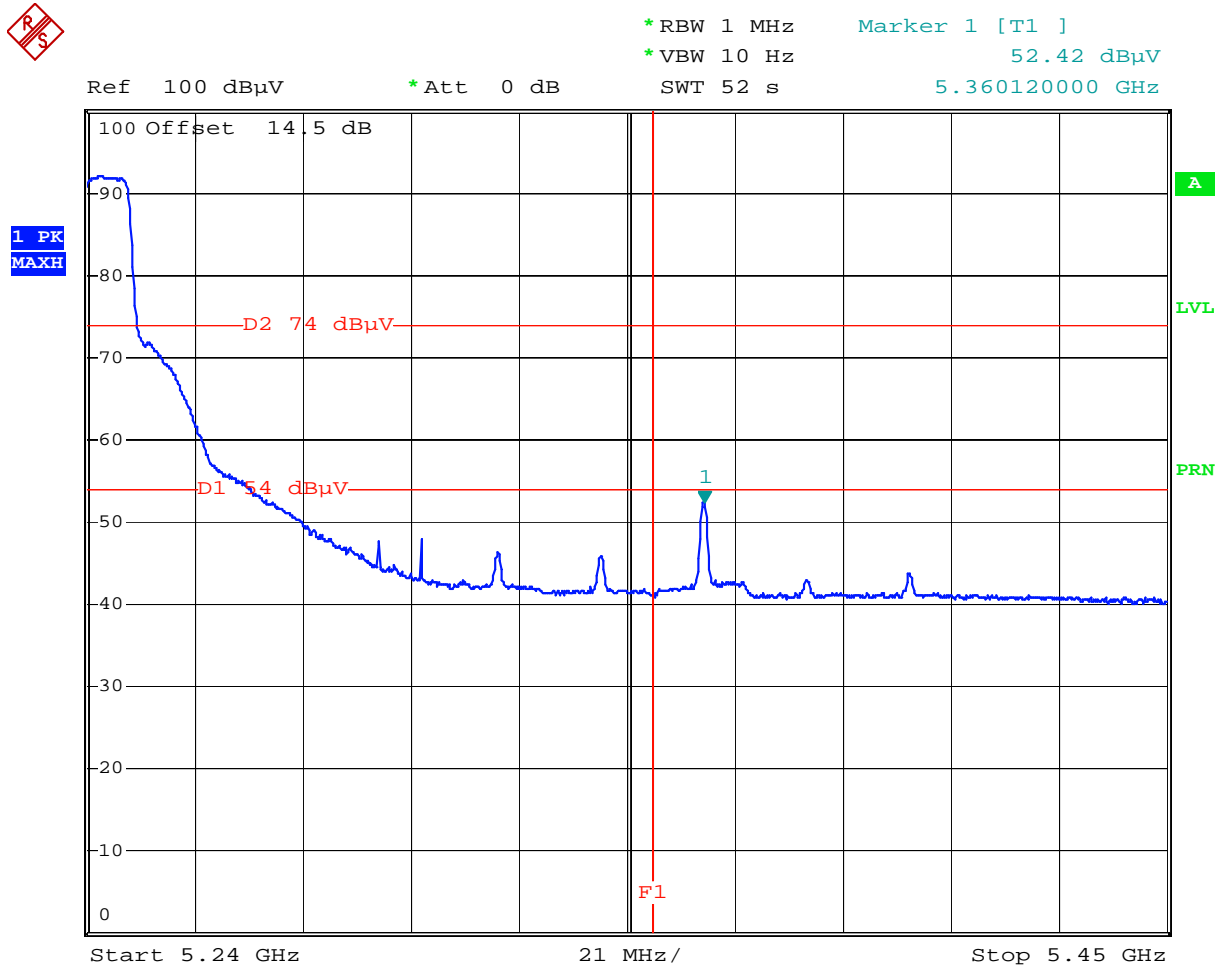
Comment: Radiated emissions, band-edge fr, 6 Mbps
Date: 7.NOV.2008 11:55:43

Plot 6.2



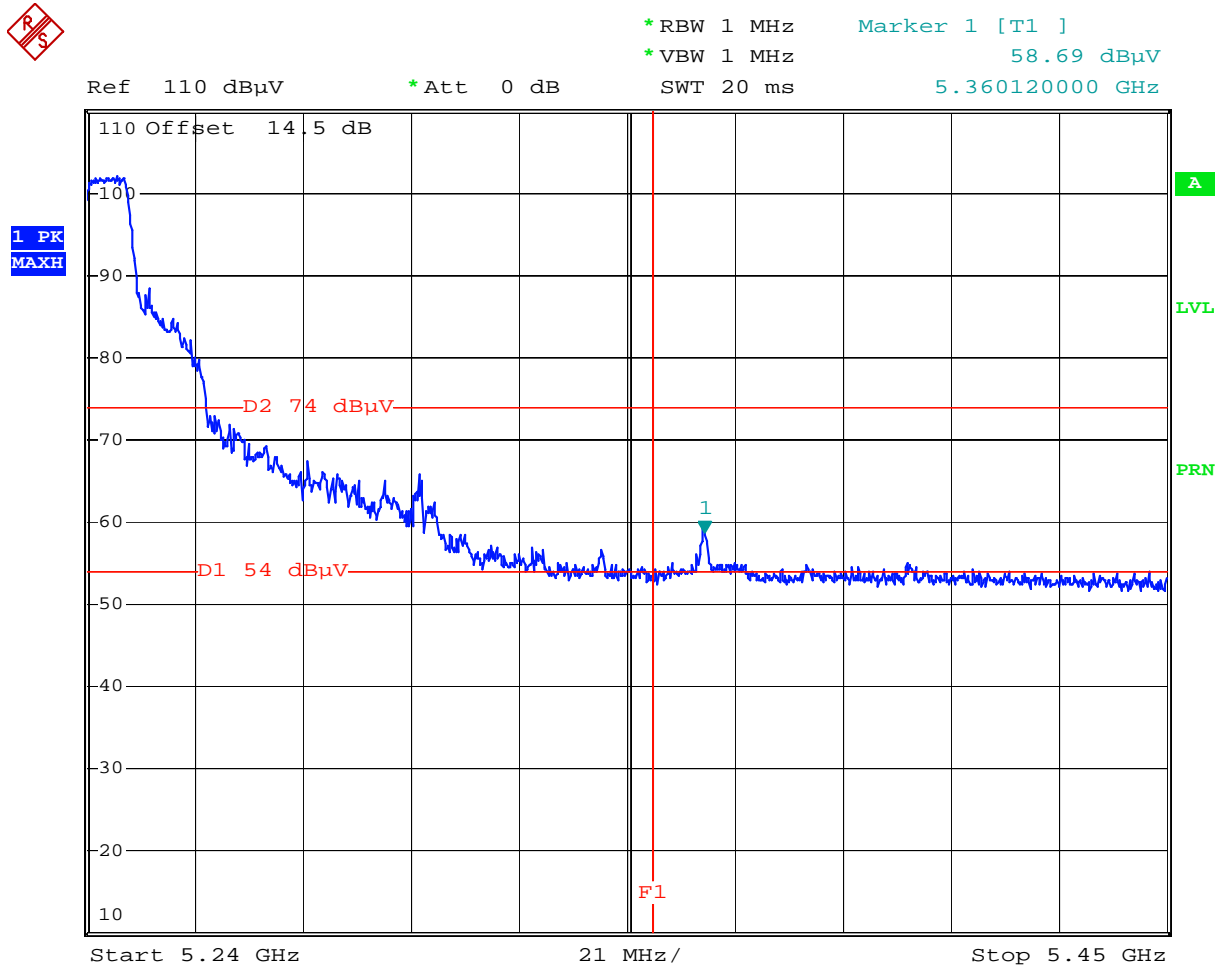
Comment: Radiated emissions, band-edge fr, 6 Mbps
 Date: 7.NOV.2008 11:54:26

Plot 6.3



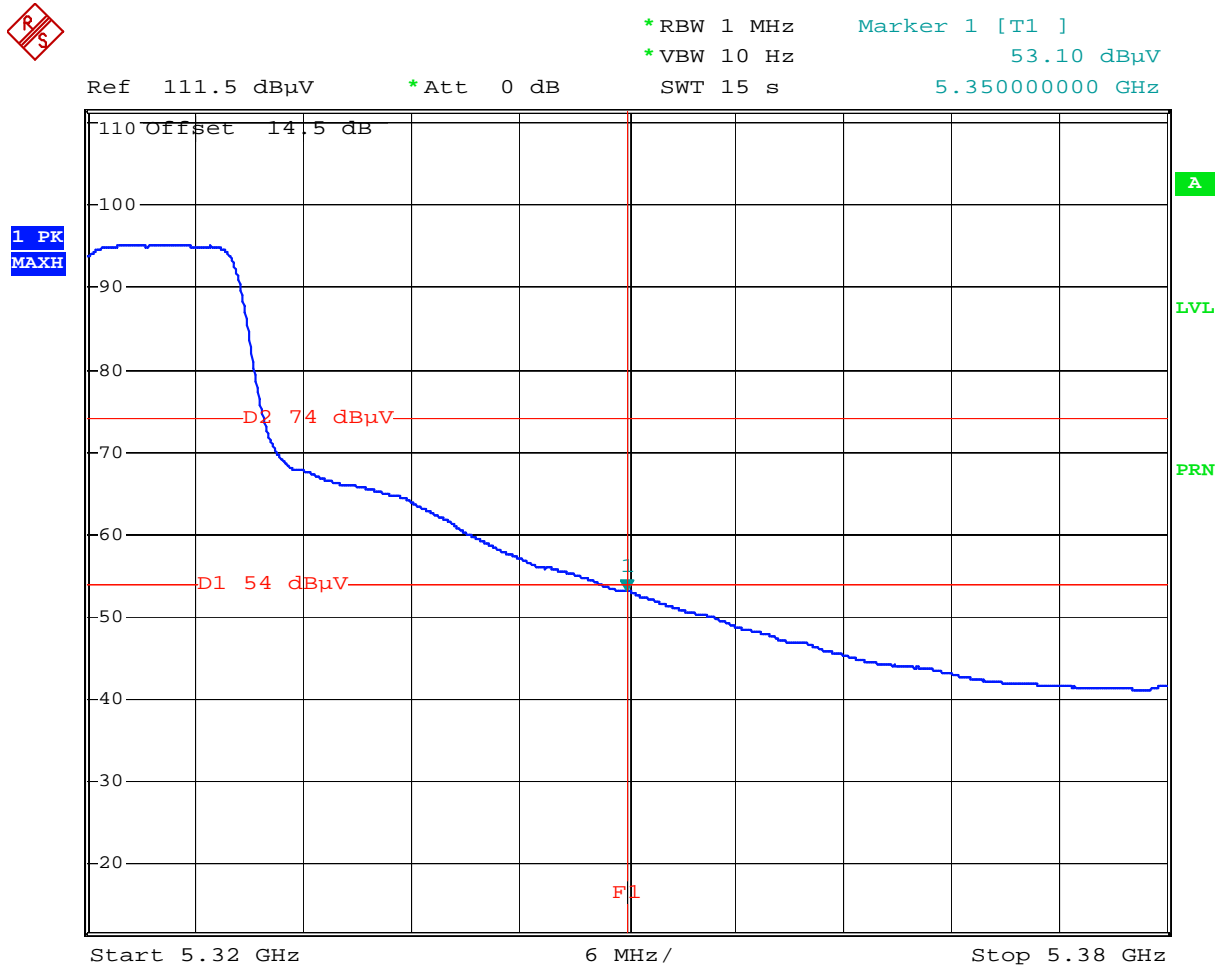
Comment: Radiated emissions, band-edge fr, 6 Mbps
 Date: 7.NOV.2008 13:21:46

Plot 6.4



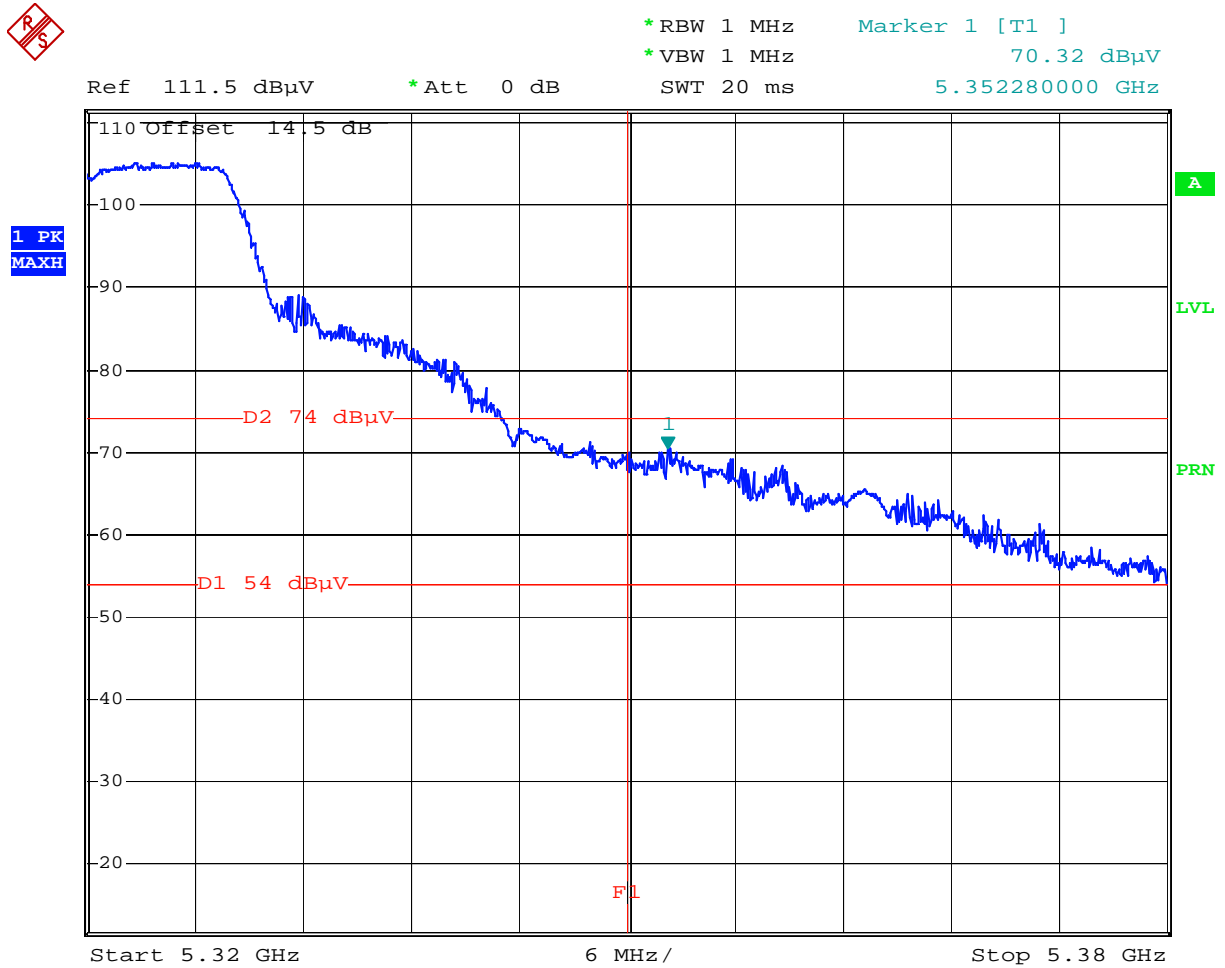
Comment: Radiated emissions, band-edge fr, 6 Mbps
 Date: 7.NOV.2008 13:23:07

Plot 6.5



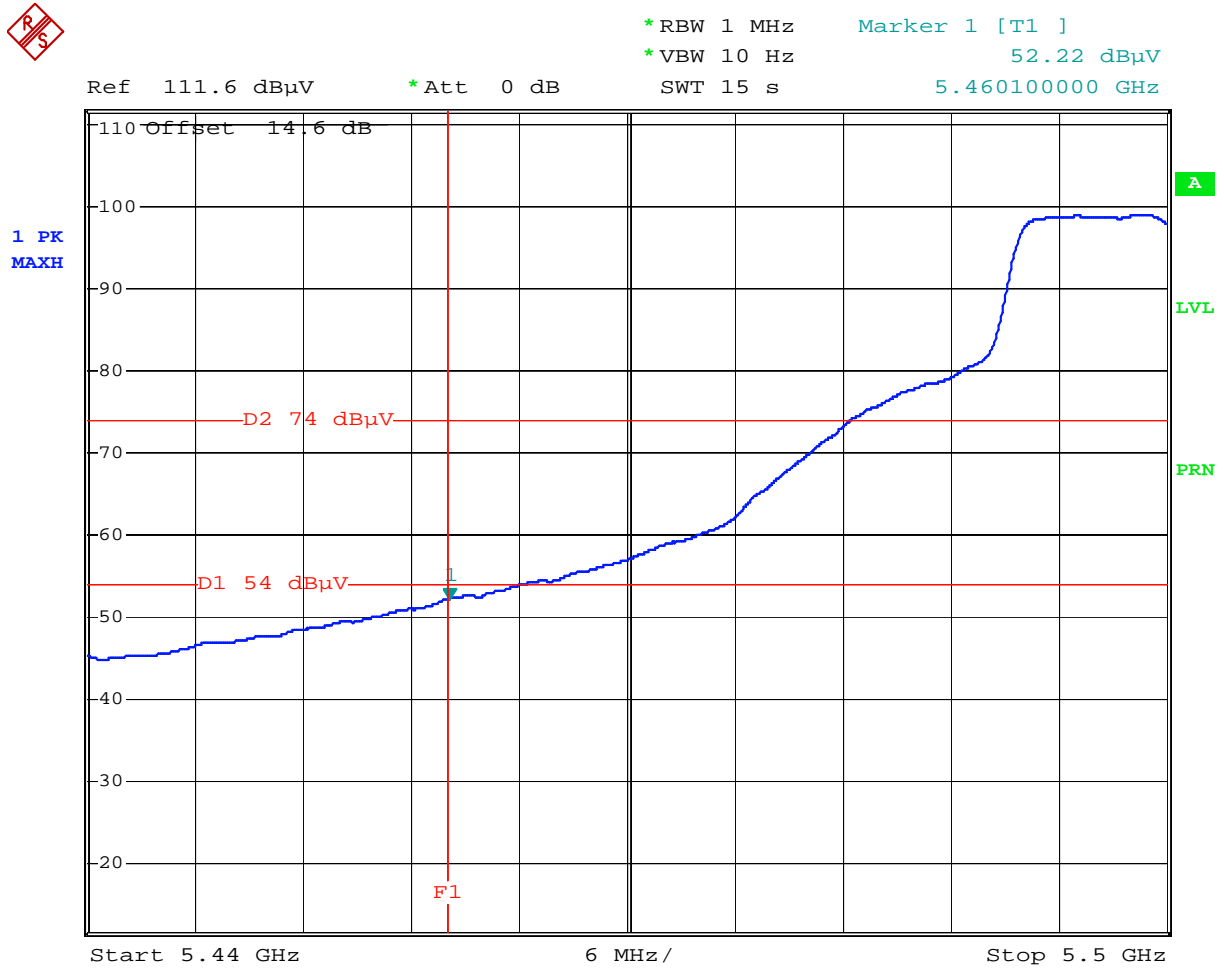
Comment: Radiated emissions, band-edge fr, 6 Mbps
 Date: 7.NOV.2008 12:54:22

Plot 6.6



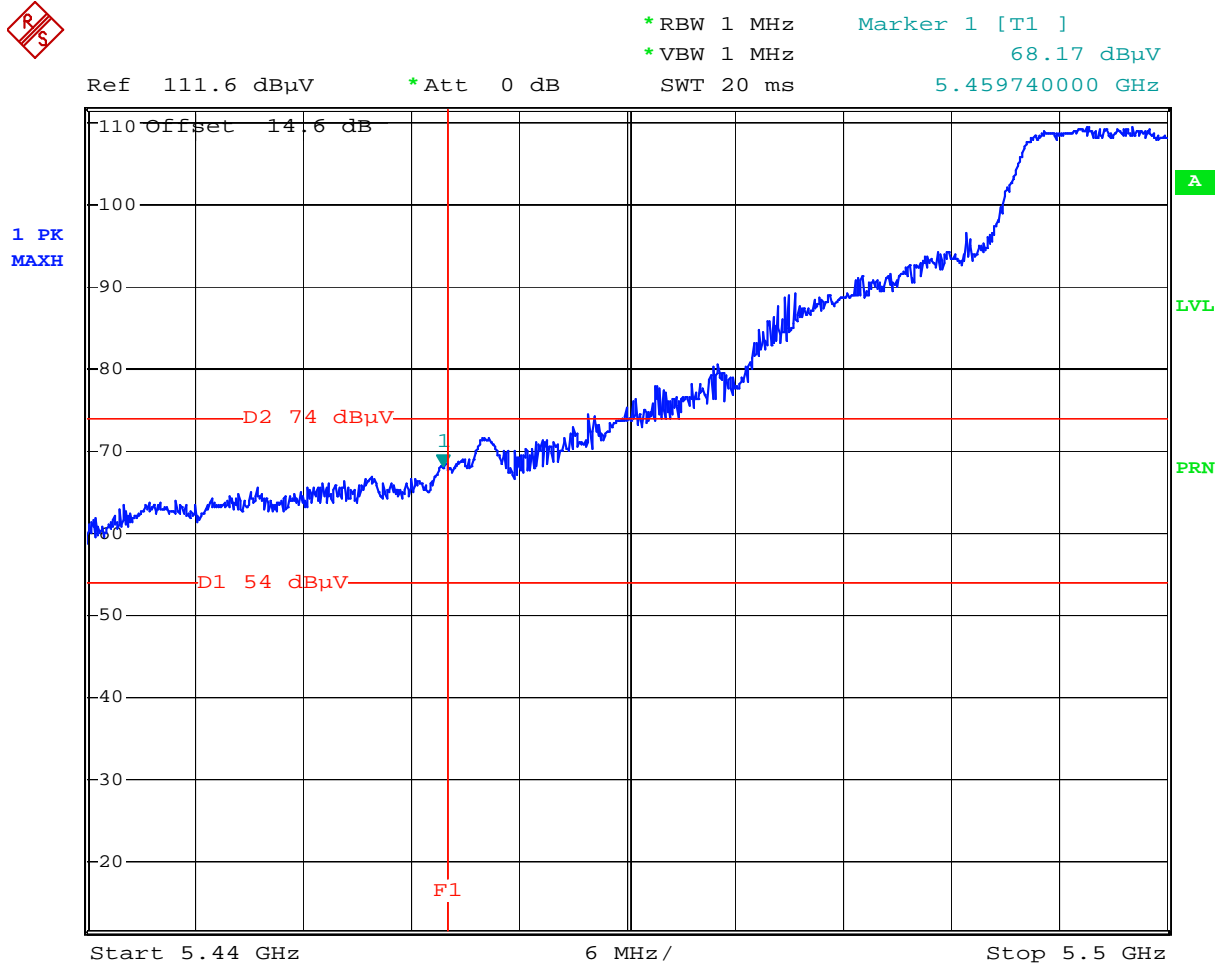
Comment: Radiated emissions, band-edge fr, 6 Mbps
 Date: 7.NOV.2008 12:55:29

Plot 6.7



Comment: Radiated emissions, band-edge fr, 6 Mbps
 Date: 7.NOV.2008 13:38:40

Plot 6.8



Comment: Radiated emissions, band-edge fr, 6 Mbps
 Date: 7.NOV.2008 13:39:25



4.7 Radiated Emissions below 1 GHz
FCC Ref: 15.209

Procedure

Radiated emission measurements were performed from 30 MHz to 1000 MHz. Spectrum Analyzer Resolution Bandwidth is 120 kHz. See also section 4.6 for the test procedure and field strength calculation.

Result

The worst-case result is presented on the table below.
The EUT passed by 0.3 dB

Radiated Emissions 30 MHz - 1000 MHz
FCC Part 15 Class B, Quasi-peak

Operator: BG
December 11, 2008
Test distance: 3m

Frequency MHz	Quasi Pk FS dB(uV/m)	Limit@10m dB(uV/m)	Margin dB	RA dB(uV)	AG dB	CF dB	AF dB(1/m)
181.97	27.4	43.5	-16.1	47.8	31.9	1.4	10.1
188.10	37.9	43.5	-5.6	58.4	31.9	1.4	10.0
195.90	43.2	43.5	-0.3	63.6	31.9	1.4	10.1
230.47	23.4	46.0	-22.6	41.5	31.9	1.6	12.2
256.33	21.4	46.0	-24.6	38.8	31.9	1.7	12.8
264.42	25.2	46.0	-20.8	42.4	31.9	1.7	13.0

Test Mode: Tx on Channel 36
Temperature: 20 C
Humidity: 49.5 %

4.8 Frequency stability
FCC 15.407(g)

Requirement

An emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

Procedure

The EUT was placed in a temperature chamber and setup to transmit a carrier without modulation.

The carrier frequency was measured with the spectrum analyzer resolution bandwidth of 300 Hz. The temperature was varied from 0⁰C to 40⁰C, as stated in the user manual.

Result

Nominal Frequency: 5180 MHz

Temperature, ⁰ C	Frequency, MHz	Deviation, ppm
0	5179.994640	-1.0
10	5179.996640	-0.6
20	5179.998520	-0.3
30	5179.999480	-0.1
40	5180.003600	0.7

Nominal Frequency: 5320 MHz

Temperature, ⁰ C	Frequency, MHz	Deviation, ppm
0	5319.994240	-1.1
10	5319.996120	-0.7
20	5319.998200	-0.3
30	5319.999120	-0.2
40	5320.003240	0.6

Nominal Frequency: 5500 MHz

Temperature, °C	Frequency, MHz	Deviation, ppm
0	5499.993240	-1.2
10	5499.995360	-0.8
20	5499.997360	-0.5
30	5499.998560	-0.3
40	5500.002560	0.5

Nominal Frequency: 5700 MHz

Temperature, °C	Frequency, MHz	Deviation, ppm
0	5699.993350	-1.2
10	5699.995290	-0.8
20	5699.997610	-0.4
30	5699.998610	-0.2
40	5700.002620	0.5

Nominal Frequency: 5785 MHz

Temperature, °C	Frequency, MHz	Deviation, ppm
0	5784.993680	-1.1
10	5784.995760	-0.7
20	5784.998160	-0.3
30	5784.999280	-0.1
40	5785.002840	0.5

No change in carrier frequency was observed when the power voltage was varied $\pm 10\%$ from the nominal.

4.9 AC Line Conducted Emission
FCC Rule 15.207:

Requirement

The following line conducted emission limits apply to Class B devices:

Frequency Band MHz	Class B Limit dB (μ V)	
	Quasi-Peak	Average
0.15-0.50	66 to 56 Decreases linearly with the logarithm of the frequency	56 to 46 Decreases linearly with the logarithm of the frequency
0.50-5.00	56	46
5.00-30.00	60	50

Note: At the transition frequency the lower limit applies.

Test Procedure

These measurements were performed in accordance with the test arrangements and methods defined in ANSI C63-4 (2003).

Measurements are carried out using quasi-peak and average detector receivers in accordance with CISPR 16. A LISN is required to provide a defined impedance at high frequencies across the power feed at the point of measurement of terminal voltage and also to provide isolation of the circuit under test from the ambient noise on the power lines. A LISN as defined in CISPR 16 shall be used.

The EUT is located so that the distance between the boundary of the EUT and the closest surface of the LISN is 0.8m.

Where a flexible mains cord is provided by the manufacturer, this shall be 1m long or if in excess of 1m, the excess cable is folded back and forth as far as possible so as to form a bundle not exceeding 0.4m in length.

The EUT is arranged and connected with cables terminated in accordance with the product specification.

Conducted disturbance is measured between the phase lead and the reference ground, and between the neutral lead and the reference ground. Both measured values are reported.

The EUT, where intended for tabletop use, is placed on a table whose top is 0.8m above the ground plane. A vertical, metal reference plane is placed 0.4m from the EUT. The vertical metal reference-plane is at least 2m by 2m. The EUT shall be kept at least 0.8m from any other metal surface or other ground plane not being part of the EUT. The table is constructed of non-conductive materials. Its dimensions are 1m by 1.5m, but may be extended for larger EUT.

Floor standing EUTs are placed on a horizontal metal ground plane and isolated from the ground plane by 3 to



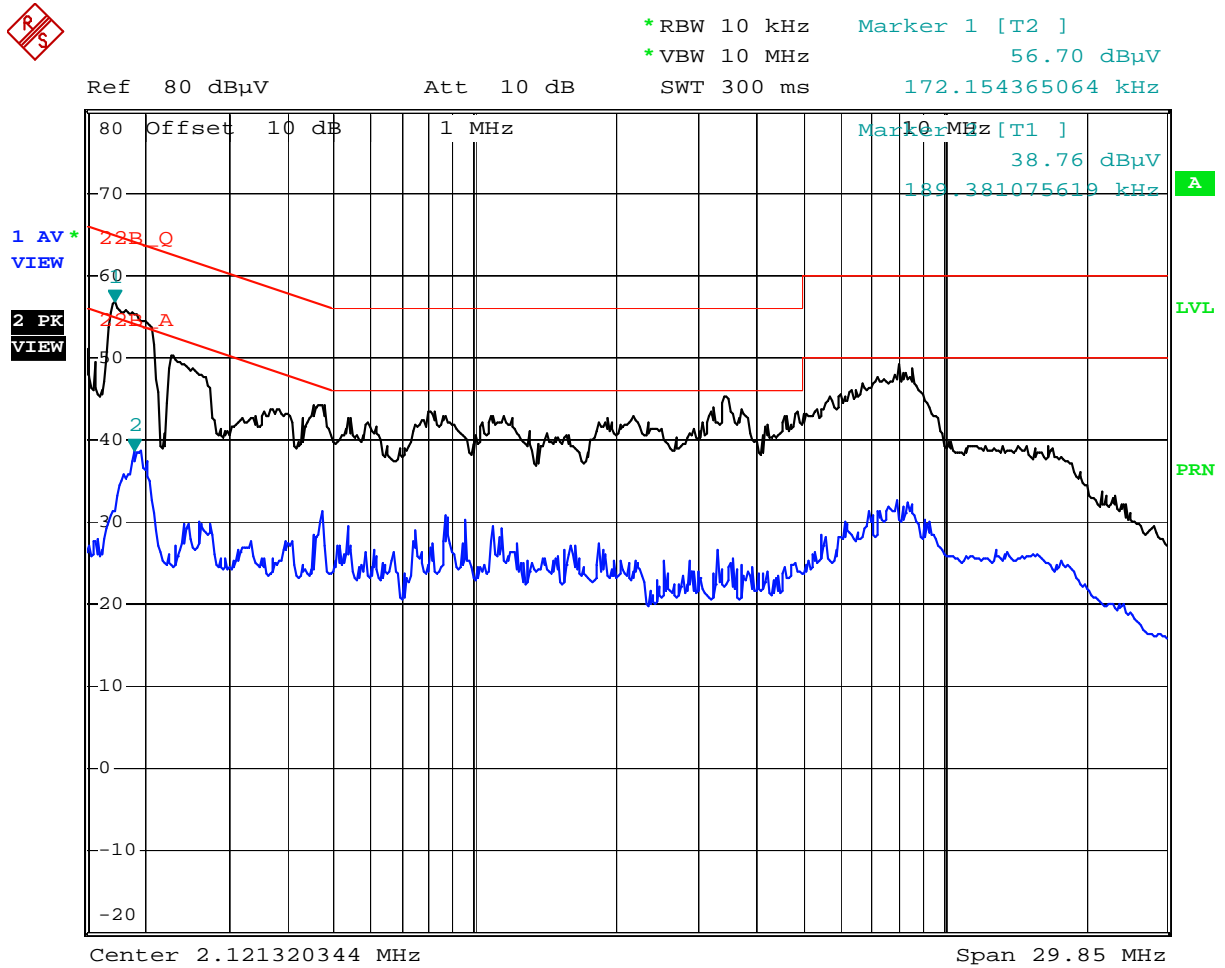
12 mm of insulating material. The metal ground plane extends at least 0.5m beyond the boundaries of the EUT and has minimum dimensions of 2m by 2m.

Test Result

The test result is presented on the following plots 8.1. and 8.2
The EUT passed by 8 dB



Plot 8.1

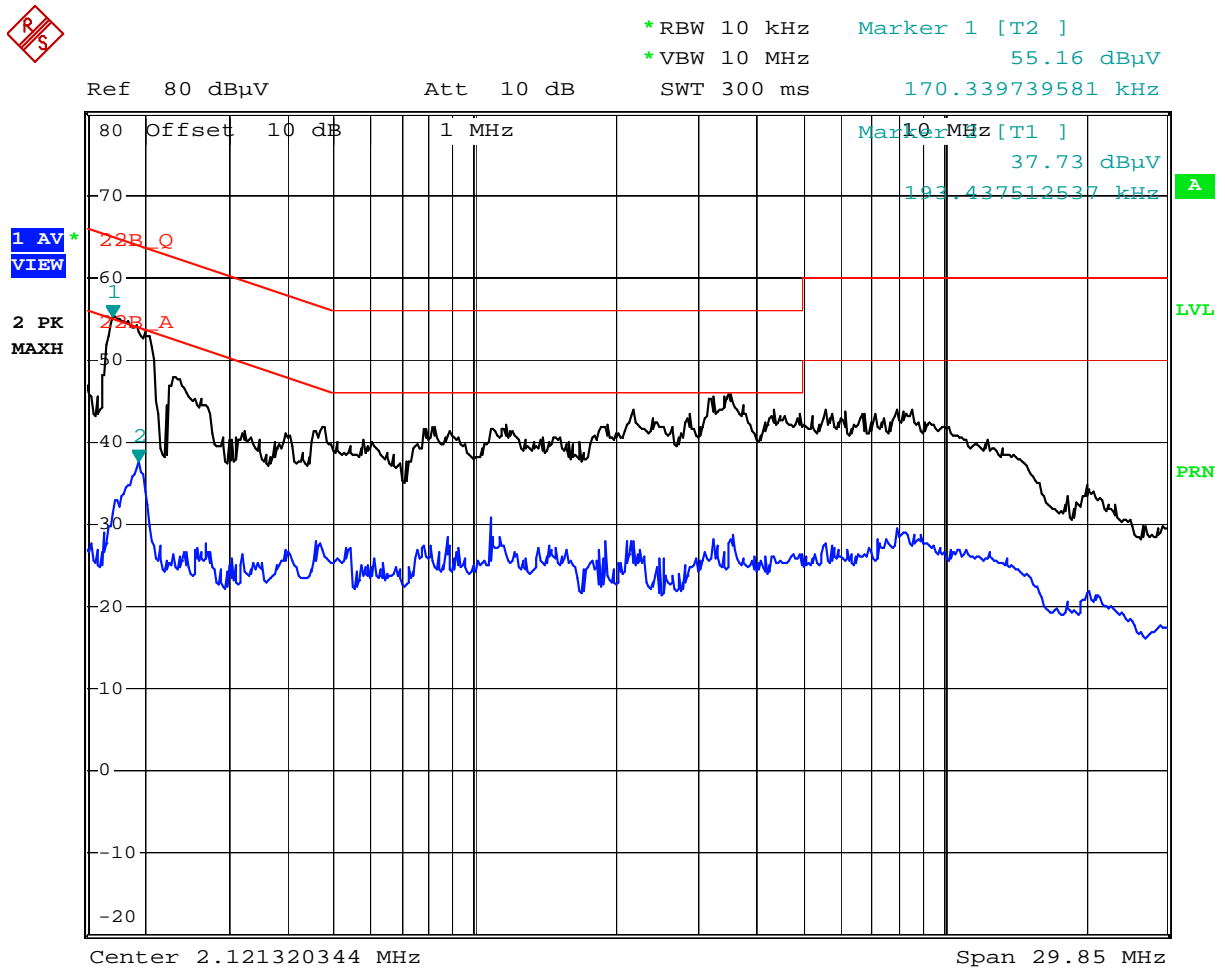


Comment: AC line conducted, Line 1, 120 V, 60 Hz
 Date: 4.NOV.2008 16:02:17

Black trace – peak
 Blue trace - average



Plot 8.2



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

Black trace – peak
Blue trace - average

4.10 Channel move time FCC Rule 15.407(h)

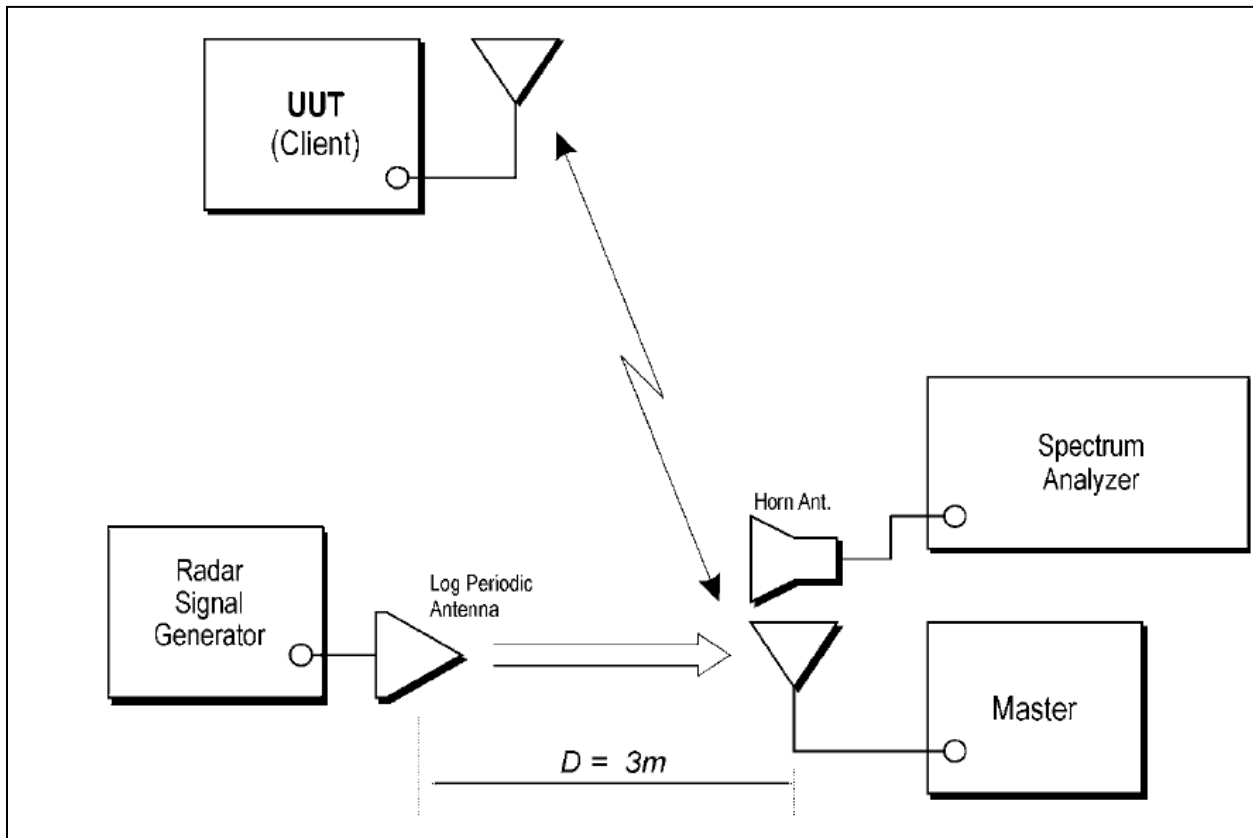
Requirements

The EUT is a client without DFS capabilities; therefore, the only requirements to be tested are Channel Closing Transmission Time, Channel Move Time and Non-occupancy Period. The Channel Protocol of the EUT is IP Based.

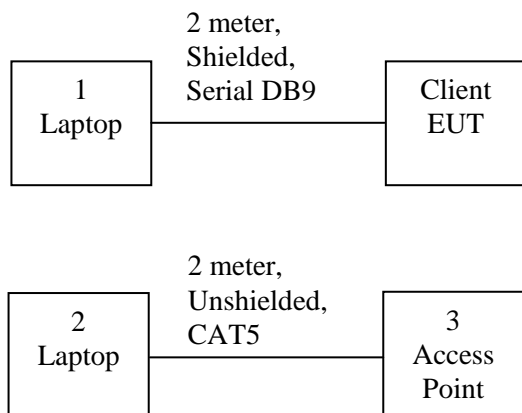
Parameter	Value
Channel Move Time	10 Seconds
Channel Closing Transmission Time	200 mS + an aggregate of 60 mS over remaining 10 Second period.
Non-occupancy Period	Minimum 30 minutes

Procedure

The radiated test method was used and the test setup was made as depicted in the diagram below.



The diagram below depicts the setup of the EUT along with associated support equipment.



Item	Description	Model	Serial
1	Compaq Laptop Computer	EVO N610C	7E32KT8Z8Y9Y
2	Compaq Laptop Computer	EVO N610C	7E32KT8Z8Y9Y
3	Cisco Systems Access Point FCC ID: LDK102054E	AIR-AP1131AG-A-K9	FTX1244N25E

The Master and Client (EUT) were placed in a semi-anechoic chamber. The simulated radar waveform was transmitted from a horn antenna towards the Master. The signal level of the simulated radar waveform was set to -63dBm and was applied to the Master. The horn antenna connected to the spectrum analyzer was positioned towards the client with the level 10 dB higher than emissions from the Master.

A Rhode & Schwarz Vector Signal Generator with Pulse Sequencer Software was used to generate the DFS radar signals. A Rhode & Schwarz Spectrum Analyzer with DFS Analysis Tool software was used to monitor the transmissions of the Client. The trigger of the spectrum analyzer was aligned with the end of the radar waveform burst from the signal generator.

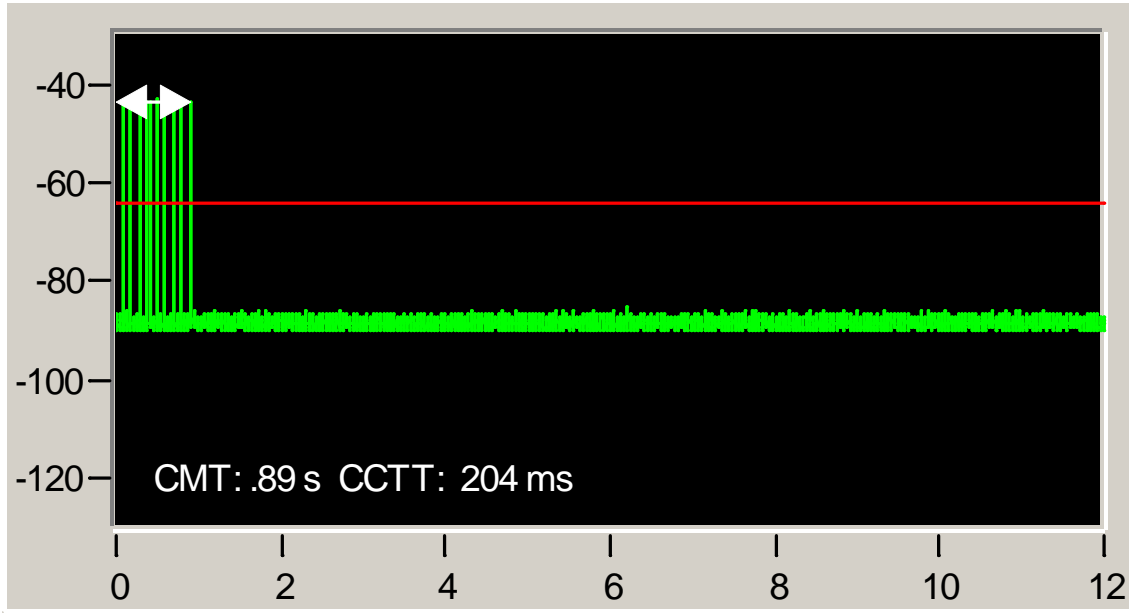
Channel closing transmission time and channel move time were measured by applying a radar signal to the Master device. The EUT transmissions were observed while Type 1 and Type 5 Radar waveforms were applied. The time between the end of the applied radar waveform and the final transmission on the channel is the channel move time. The channel closing transmission time comprises only those fragments of the channel move time during which the EUT transmits.

The EUT (client without DFS) was configured to communicate with a Master. The FCC MPEG test file was streamed from the Master to the Client.

Test Results

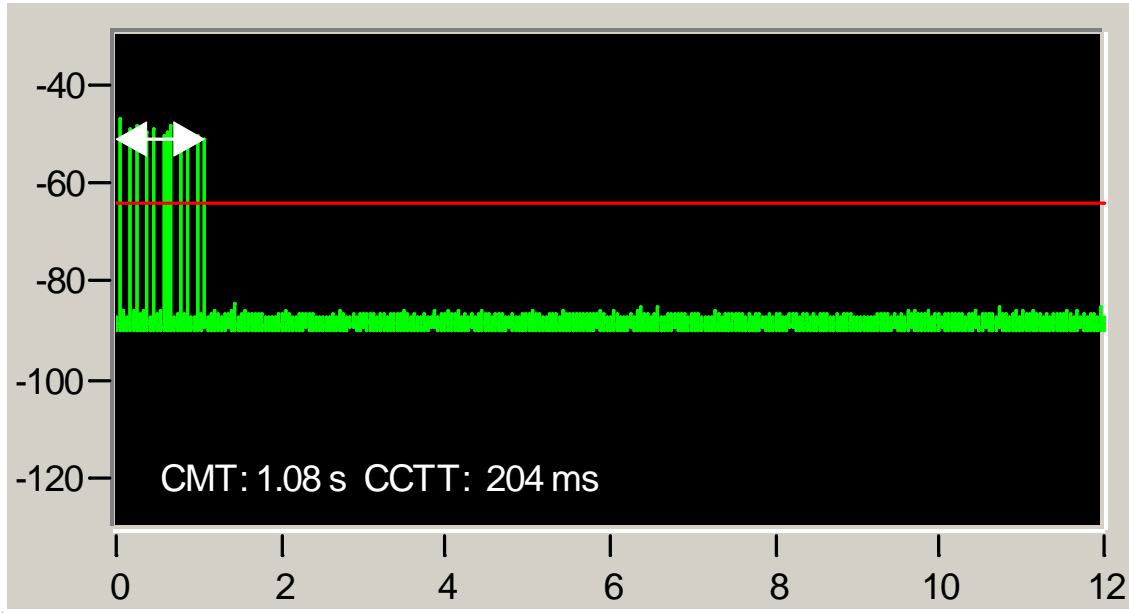
Test Summary					
Description	Radar Type	Frequency MHz	Measured Value	Requirement	Results
Channel closing transmission time	1	5300	204mS	260mS	Pass
Channel move time	1	5300	0.89S	10S	Pass
Channel closing transmission time	5	5300	204mS	260mS	Pass
Channel move time	5	5300	1.08S	10S	Pass

Channel Closing Transmission Time(CCTT) and Channel Move Time(CMT), Radar Type 1 @ 5300 MHz
Client link is established with the Master @ 5300 MHz



RBW: 3 MHz, VBW: 3 MHz, Span: 0, RF Attenuation: 0 dB,
Detector: Peak, Sweep Points: 30001, Sweep time: 12 Seconds
Test Date: February 5, 2009

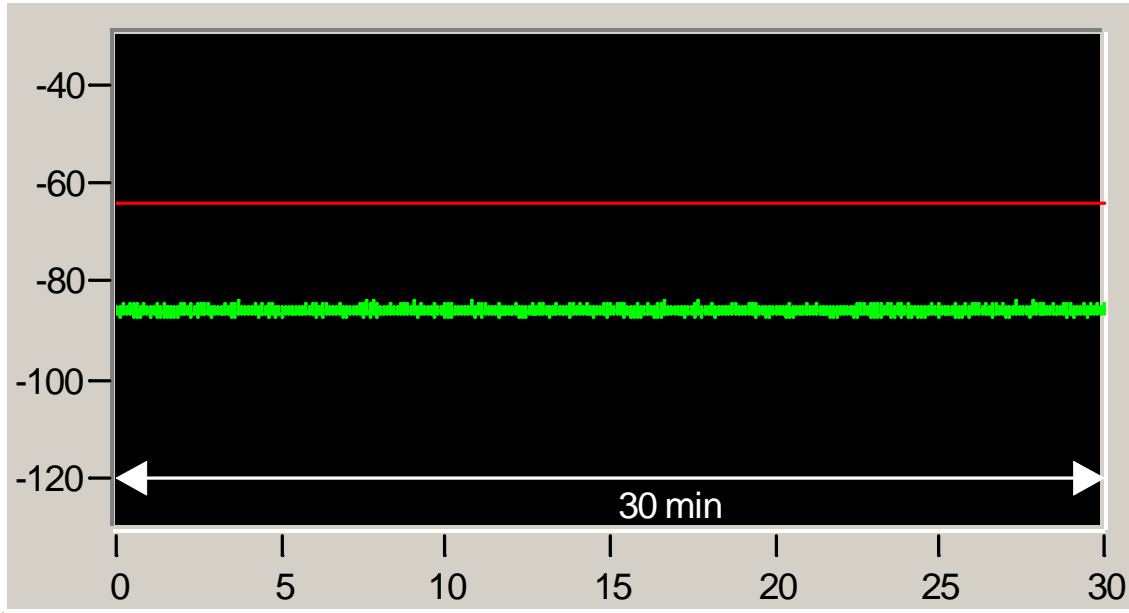
Channel Closing Transmission Time(CCTT) and Channel Move Time(CMT), Radar Type 5 @ 5300 MHz
Client link is established with the Master @ 5300 MHz



RBW: 3 MHz, VBW: 3 MHz, Span: 0, RF Attenuation: 0 dB,
Detector: Peak, Sweep Points: 30001, Sweep time: 12 Seconds
Test Date: February 5, 2009

Non-occupancy period, Radar Type 1 @ 5300 MHz

Client link is established with the Master @ 5300 MHz. The sweep starts after moving to another channel.
No transmissions were observed over a 30 minute period.



RBW: 3 MHz, VBW: 3 MHz, Span: 0, RF Attenuation: 0 dB,
Detector: Peak, Sweep time: 1800 Seconds
Test Date: February 10, 2009

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	Rohde&Schwarz	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
Double-rigged Horn Antenna	EMCO	3115	9107-3712	12	10/22/09
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
Spectrum Analyzer	Rohde&Schwarz	FSU26	200482	12	11/20/09
Vector Signal Generator	Rohde&Schwarz	SMU200A	102499	12	10/7/09

No Calibration required

6.0 Document History

Revision/ Job Number	Writer Initials	Date	Change
1.0 / 3168437	DC and KV	February 10, 2009	Original document