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Emissions
Test Report

EUT Name: Wireless ADSL Residential Gateway

Model No.: i38HG

CFR 47 Part 15.247:2010 and RSS 210:2010

Prepared for:

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Report/Issue Date: March 28 2011
Report Number: 31150946.001

Statement of Compliance

Manufacturer:	Pace Americas 310 Providence Mine Road Nevada City, CA 95959 (530) 274-5440
Requester / Applicant:	Mark Rieger
Name of Equipment:	Wireless ADSL Residential Gateway
Model No.	i38HG
Type of Equipment:	Intentional Radiator
Application of Regulations:	CFR 47 Part 15.247:2010 and RSS 210:2010
Test Dates:	22 March 2011 to 23 March 2011

Guidance Documents:

Emissions: ANSI C63.10: 2009

Test Methods:

Emissions: ANSI C63.10: 2009

The electromagnetic compatibility test and documented data described in this report has been performed and recorded by TUV Rheinland, in accordance with the standards and procedures listed herein. As the responsible authorized agent of the EMC laboratory, I hereby declare that the equipment described above has been shown to be compliant with the EMC requirements of the stated regulations and standards based on these results. If any special accessories and/or modifications were required for compliance, they are listed in the Executive Summary of this report.

This report must not be used to claim product endorsement by NVLAP or any agency of the U.S. Government. This report contains data that are not covered by NVLAP accreditation. This report shall not be reproduced except in full, without the written authorization of TUV Rheinland of North America.

Jeremy Luong	29 March 2011	Conan Boyle	30 March 2011
Test Engineer	Date	NVLAP Signatory	Date

500011-0 **US5254** **2932M-1**

1 Executive Summary

1.1 Scope

This report is intended to document the status of conformance with the requirements of the CFR 47 Part 15.247:2010 and RSS 210:2010 based on the results of testing performed on 22 March 2011 through 23 March 2011 on the Wireless ADSL Residential Gateway Model i38HG manufactured by Pace Americas. This report only applies to the specific samples tested under the stated test conditions. It is the responsibility of the manufacturer to assure that additional production units of this model are manufactured with identical or EMI equivalent electrical and mechanical components. This report is further intended to document changes and modifications to the EUT throughout its life cycle. All documentation will be included as a supplement.

1.2 Purpose

Testing was performed to evaluate the EMC performance of the EUT in accordance with the applicable requirements, procedures, and criteria defined in the application of regulations and application of standards listed in this report.

1.3 Summary of Test Results

Table 1: Summary of Test Results

Test	Test Method ANSI C63.4	Test Parameters (from Standard)	Result
Spurious Emission in Received Mode	CFR47 15.109, RSS-GEN Sect.7.2.3	Class B	**Complied**
Spurious Emission in Transmitted Mode	CFR47 15.209, RSS-GEN Sect.7.2.3	Class B	**Complied**
Restricted Bands of Operation	CFR47 15.205, RSS 210 Sect.2.6	Class B	**Complied**
AC Power Conducted Emission	CFR47 15.207, RSS-GEN Sect.7.2.2	Class B	**Complied**
Occupied Bandwidth	CFR47 15.247 (a2), RSS GEN Sect.4.4.1	500 kHz Minimum	**Complied**
Maximum Transmitted Power	CFR47 15.247 (b3), RSS 210 Sect. A.8.4	30 dBm w/ 6 dBi antenna	**Complied**
Peak Power Spectral Density	CFR47 15.247 (e), RSS 210 Sect. A.8.2	8 dBm/ 3 kHz	**Complied**
Band Edge Measurement	CFR47 15.247 (d), RSS 210 Sect. A.8.5	20 dB	**Complied**
RF Exposure	CFR47 15.247 (i), 2.1091	General Population	**Complied**

1.4 Special Accessories

No special accessories were necessary in order to achieve compliance.

1.5 Equipment Modifications

None.

2 Laboratory Information

2.1 Accreditations & Endorsements

2.1.1 US Federal Communications Commission

TUV Rheinland of North America at 1279 Quarry Lane, Ste. A., Pleasanton, CA 94566, is accredited by the commission for performing testing services for the general public on a fee basis. These laboratory test facilities have been fully described in reports submitted to and accepted by the FCC (FRN # US5254). The laboratory scope of accreditation includes: Title 47 CFR Parts 15, 18, and 90. The accreditation is updated every 3 years.

2.1.2 NIST / NVLAP

TUV Rheinland of North America is accredited by the National Voluntary Laboratory Accreditation Program, which is administered under the auspices of the National Institute of Standards and Technology. The laboratory has been assessed and accredited in accordance with ISO Guide 17025:2005 and ISO 9002 (Lab Code 500011-0). The scope of laboratory accreditation includes emission and immunity testing. The accreditation is updated annually.

2.1.3 Canada – Industry Canada

Industry Canada

TUV Rheinland of North America at the 1279 Quarry Ln, Pleasanton, CA 94566 address is accredited by Industry Canada for performing testing services for the general public on a fee basis. This laboratory test facilities have been fully described in reports submitted to and accepted by Industry Canada (File Number 2932M-1). This reference number is the indication to the Industry Canada Certification Officers that the site meets the requirements of RSS 212, Issue 1 (Provisional). The accreditation is updated every 3 years.

2.1.4 Japan – VCCI

The Voluntary Control Council for Interference by Information Technology Equipment (VCCI) is a group that consists of Information Technology Equipment (ITE) manufacturers and EMC test laboratories. The purpose of the Council is to take voluntary control measures against electromagnetic interference from Information Technology Equipment, and thereby contribute to the development of a socially beneficial and responsible state of affairs in the realm of Information Technology Equipment in Japan. TUV Rheinland of North America at 1279 Quarry Lane, Pleasanton, CA 94566 has been assessed and approved in accordance with the Regulations for Voluntary Control Measures. (Registration Nos. R-3269, C-3637, C-3638, T-1752, T-1753).

2.1.5 Acceptance by Mutual Recognition Arrangement

The United States has an established agreement with specific countries under the Asia Pacific Laboratory Accreditation Corporation (APLAC) Mutual Recognition Arrangement. Under this agreement, all TUV Rheinland at 1279 Quarry Lane, Pleasanton, CA 94566 test results and test reports within the scope of the laboratory NIST / NVLAP accreditation will be accepted by each member country.

2.2 Test Facilities

All of the test facilities are located at 1279 Quarry Lane, Ste. A, Pleasanton, California 94566, USA. The 2305 Mission College, Santa Clara, 95054, USA location is considered a Pleasanton annex.

2.2.1 Emission Test Facility

The Semi-Anechoic chamber and AC Line Conducted measurement facility used to collect the radiated and conducted data has been constructed in accordance with ANSI C63.7:1992. The site has been measured in accordance with and verified to comply with the theoretical normalized site attenuation requirements of ANSI C63.4:2003, at test distances of 3 and 5 meters. The site is listed with the FCC and accredited by NVLAP (Lab Code 500011-0). The 3/5-meter semi-anechoic chamber used to collect the radiated data has been verified to comply with the theoretical normalized site attenuation requirements of ANSI C63.4:2003, at test distances of 3 meters and 5 meters. A report detailing this site can be obtained from TUV Rheinland of North America.

2.2.2 Immunity Test Facility

ESD, EFT, Surge, PQF: These tests are performed in an environmentally controlled room with a 3.7 m x 4.8 m x 3.175 mm thick aluminum floor connected to PE ground.

For ESD testing, tabletop equipment is placed on an insulated mat with a surface resistivity of 10^9 Ohms/square on a 1.6 m x 0.8 m x 0.8 m high non-conductive table with a 3.175 mm aluminum top (Horizontal Coupling Plane). The HCP is connected to the main ground plane via a low impedance ground strap through two 470-kΩ resistors. The Vertical Coupling Plane consists of an aluminum plate 50 cm x 50 cm x 3.175 mm thick. The VCP is connected to the main ground plane via a low impedance ground strap through two 470-kΩ resistors.

For EFT, Surge, PQF, the HCP and VCP are removed.

RF Field Immunity testing is performed in a 7.3m x 4.3m x 4.1m anechoic chamber.

RF Conducted and Magnetic Field Immunity testing is performed on a 4.8m x 3.7m x 3.175mm thick aluminum ground plane.

All test areas allow a minimum distance of 1 meter from the EUT to walls or conducting objects.

2.3 Measurement Uncertainty

Two types of measurement uncertainty are expressed in this report, per *ISO Guide To The Expression Of Uncertainty In Measurement*, 1st Edition, 1995.

The Combined Standard Uncertainty is the standard uncertainty of the result of a measurement when that result is obtained from the values of a number of other quantities; it is equal to the positive square root of the sum of the variances or co-variances of these other quantities, weighted according to how the measurement result varies with changes in these quantities. The term *standard uncertainty* is the result of a measurement expressed as a standard deviation.

The Expanded Uncertainty defines an interval about the result of a measurement that may be expected to encompass a large fraction of the distribution of values that could reasonably be attributed to the measurand. The fraction may be viewed as the coverage probability or level of confidence of the interval.

2.3.1 Sample Calculation – radiated & conducted emissions

The field strength is calculated by subtracting the Amplifier Gain and adding the Cable Loss and Antenna Correction Factor to the measured reading. The basic equation is as follows:

Field Strength (dBμV/m) = RAW - AMP + CBL + ACF

Where: RAW = Measured level before correction (dBμV)

AMP = Amplifier Gain (dB)

CBL = Cable Loss (dB)

ACF = Antenna Correction Factor (dB/m)

$$\mu V/m = 10^{\frac{dB\mu V/m}{20}}$$

Sample radiated emissions calculation @ 30 MHz

Measurement +Antenna Factor–Amplifier Gain+Cable loss=Radiated Emissions (dBuV/m)

25 dBuV/m + 17.5 dB – 20 dB + 1.0 dB = 23.5 dBuV/m

2.3.2 Measurement Uncertainties

Table 2: Summary of Uncertainties

	U_{lab}	U_{cispr}
Radiated Disturbance		
30 MHz – 25,000 MHz	3.2 dB	5.2 dB
Conducted Disturbance @ Mains Terminals		
150 kHz – 30 MHz	2.4 dB	3.6 dB
Disturbance Power		
30 MHz – 300 MHz	3.92 dB	4.5 dB

Note: U_{lab} is the calculated Combined Standard Uncertainty
U_{cispr} is the measurement uncertainty requirement per CISPR 16.

Measurement Uncertainty Immunity

The estimated combined standard uncertainty for ESD immunity measurements is ± 4.1%.
The estimated combined standard uncertainty for radiated immunity measurements is ± 2.7dB.
The estimated combined standard uncertainty for conducted immunity measurements is ± 1.4dB.
The estimated combined standard uncertainty for damped oscillatory wave immunity measurements is ± 8.8%.
The estimated combined standard uncertainty for harmonic current and flicker measurements is ± 0.45%.

The expanded uncertainty at a level of 95% confidence is obtained by multiplying the combined standard uncertainty by a coverage factor of 2. Compliance criteria are not based on measurement uncertainty.

2.4 Calibration Traceability

All measurement instrumentation is traceable to the National Institute of Standards and Technology (NIST). Measurement method complies with ANSI/NCSL Z540-1-1994 and ISO Guide 17025:2005.

3 Product Information

3.1 Product Description

Pace Americas i38HG is a home networking hub that provides an 802.11b/g Wi-Fi access point and ethernet switch function for connecting personal computers and other in-home networked devices to the service provider's network. The i38HG features:

- 1 Modem Port
- 4 Ethernet Ports
- 802.11b/g Wireless Access Point

3.2 Equipment Configuration

A description of the equipment configuration is given in Table 14 and Table 15. The EUT was tested as called for in the test standard and was configured and operated in a manner consistent with its intended use. The EUT was connected to rated power and allowed to reach intended operating conditions. The placement of the EUT system components was guided by the test standard and selected to represent typical installation conditions.

In the case of an EUT that can operate in more than one configuration, preliminary testing was performed to determine the configuration that produced maximum radiation.

The final configuration was selected to produce the worst case radiation for emissions testing and to place the EUT in the most susceptible state for immunity testing.

3.3 Operating Mode

A description of the operation mode is given in Table 14 and Table 15. In the case of an EUT that can operate in more than one state, preliminary testing was performed to determine the operating mode that produced maximum radiation.

The final operating mode was selected to produce the worst case radiation for emissions testing and to place the EUT in the most susceptible state for immunity testing.

3.4 Unique Antenna Connector

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of CFR47 Parts 15.211, 15.213, 15.217, 15.219, or 15.221.

3.4.1 Results

The i38HG uses the permanently attached antenna inside the device.

4 Emissions

Testing was performed in accordance with CFR 47 Part 15.247:2010 and RSS 210 Annex 8:2010. These test methods are listed under the laboratory's NVLAP Scope of Accreditation. This test measures the levels emanating from the EUT, thus evaluating the potential for the EUT to cause radio frequency interference to other electronic devices. Procedures described in ANSI C63.10: 2009 were used.

4.1 Output Power Requirements

The maximum peak output power requirement is the maximum equivalent isotropic radiated power delivering at the transmitting antenna under specified conditions of measurements in the presence of modulation.

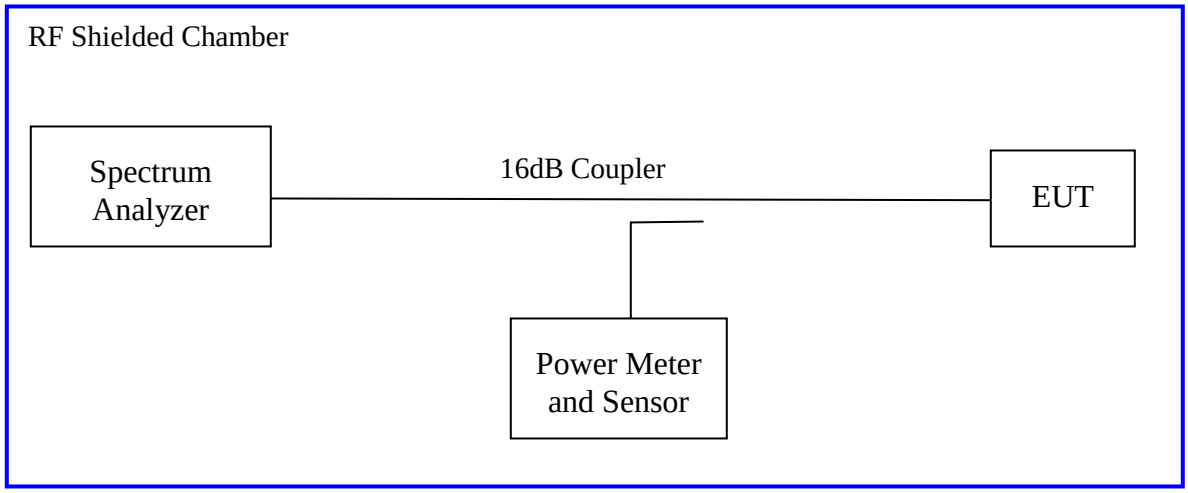
The maximum output power and harmonics shall not exceed CFR47 Part 15.247 (b3):2010 and RSS 210 A.8.4: 2010

The maximum transmitted power is +30 dBm or 1 Watt.

4.1.1 Test Method

The conducted method was used to measure the channel power output according to ANSI C63.10:2009 Section 6.10.3.1. The measurement was performed with modulation per CFR47 Part15.247 (b3):2010 and RSS 210 A.8.4: 2010. This test was conducted on 3 channels of Sample, S/N 221029024922. The worst mode result indicated below.

Test Setup:



Method #1 of "Measurement of Digital Transmission Systems Operating under Section 15.247" applies since the i38HG *continuously transmit; where T, Transmission Duration Pulse, is greater than analyzer sweep time. Sample detector was used.*

4.1.2 Results

As originally tested, the EUT was found to be compliant to the requirements of the test standard(s).

Table 3: RF Output Power at the Antenna Port – Test Results

Test Conditions: Conducted Measurement, Normal Temperature			
Antenna Type: Integrated		**Power Setting:** See test plan	
Max. Antenna Gain: +3.0 dBi		**Signal State:** Modulated	
Ambient Temp.: 21 °C		**Relative Humidity:**34%	
802.11b (1 Mbit/s)			
Operating Channel	**Limit [dBm]**	**Output Level [dBm]**	**Margin [dB]**
2412 MHz	+30.00	17.94	-12.06
2437 MHz	+30.00	23.97	-6.03
2462 MHz	+30.00	17.84	-12.16
Note: The highest output power observed in 802.11b mode was 1Mbps.			
802.11g (6 Mbit/s)			
Operating Channel	**Limit [dBm]**	**Output Level [dBm]**	**Margin [dB]**
2412 MHz	+30.00	17.86	-12.14
2437 MHz	+30.00	22.90	-7.10
2462 MHz	+30.00	17.53	-12.47
Note: The highest output power observed in 802.11g mode was 6Mbps			

Table 4: Average Output Power at the Antenna Port – Test Results

Test Conditions: Conducted Measurement, Normal Temperature			
Antenna Type: Integrated		**Power Setting:** See test plan	
Max. Antenna Gain: +3.0 dBi		**Signal State:** Modulated	
Ambient Temp.: 21 °C		**Relative Humidity:**34%	
802.11b (1 Mbit/s)			
Operating Channel	**Limit [dBm]**	**Output Level [dBm]**	**Margin [dB]**
2412 MHz	Na	19.28	Na
2437 MHz	Na	25.29	Na
2462 MHz	Na	19.01	Na
Note: none.			
802.11g (6 Mbit/s)			
Operating Channel	**Limit [dBm]**	**Output Level [dBm]**	**Margin [dB]**
2412 MHz	Na	18.84	Na
2437 MHz	Na	24.43	Na
2462 MHz	Na	18.73	Na
Note: The average output power was measured for information only.			

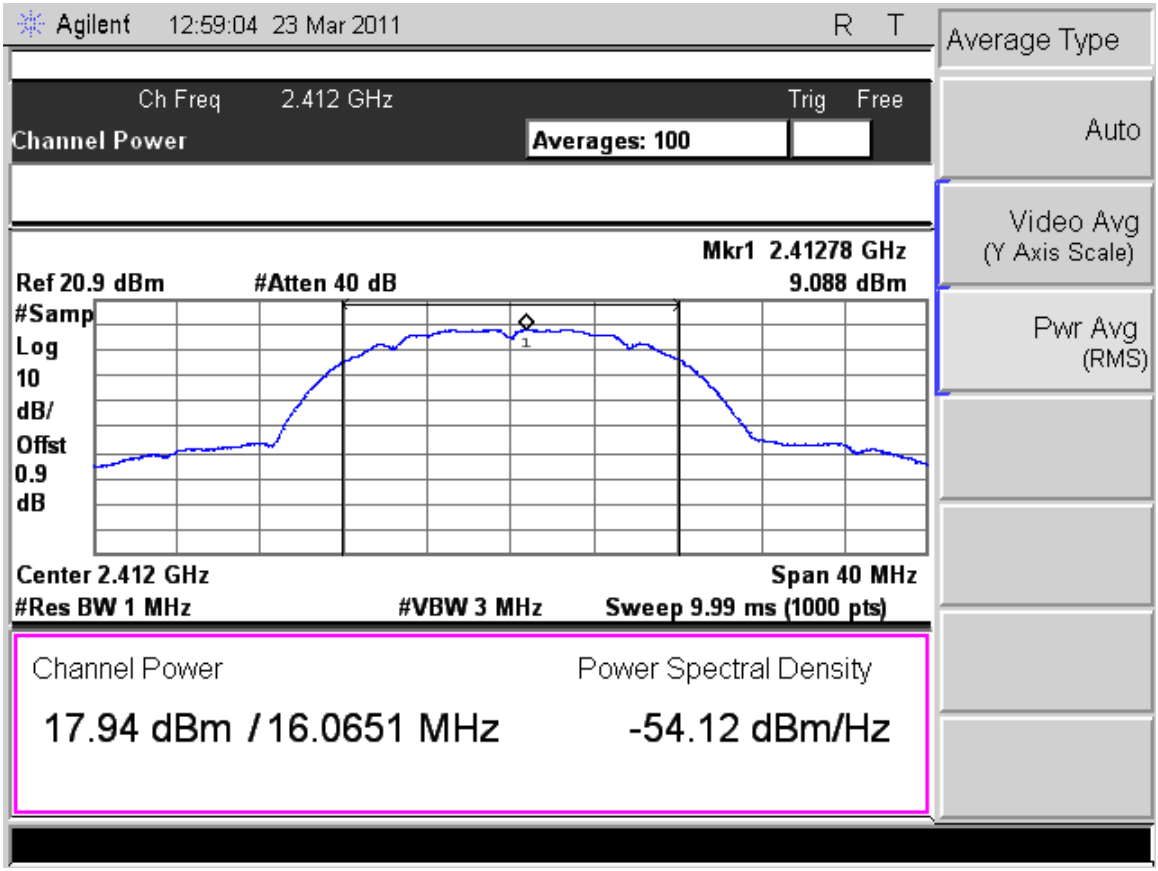


Figure 1: Maximum Transmitted Power, Lowest Channel 2412 MHz of 802.11b

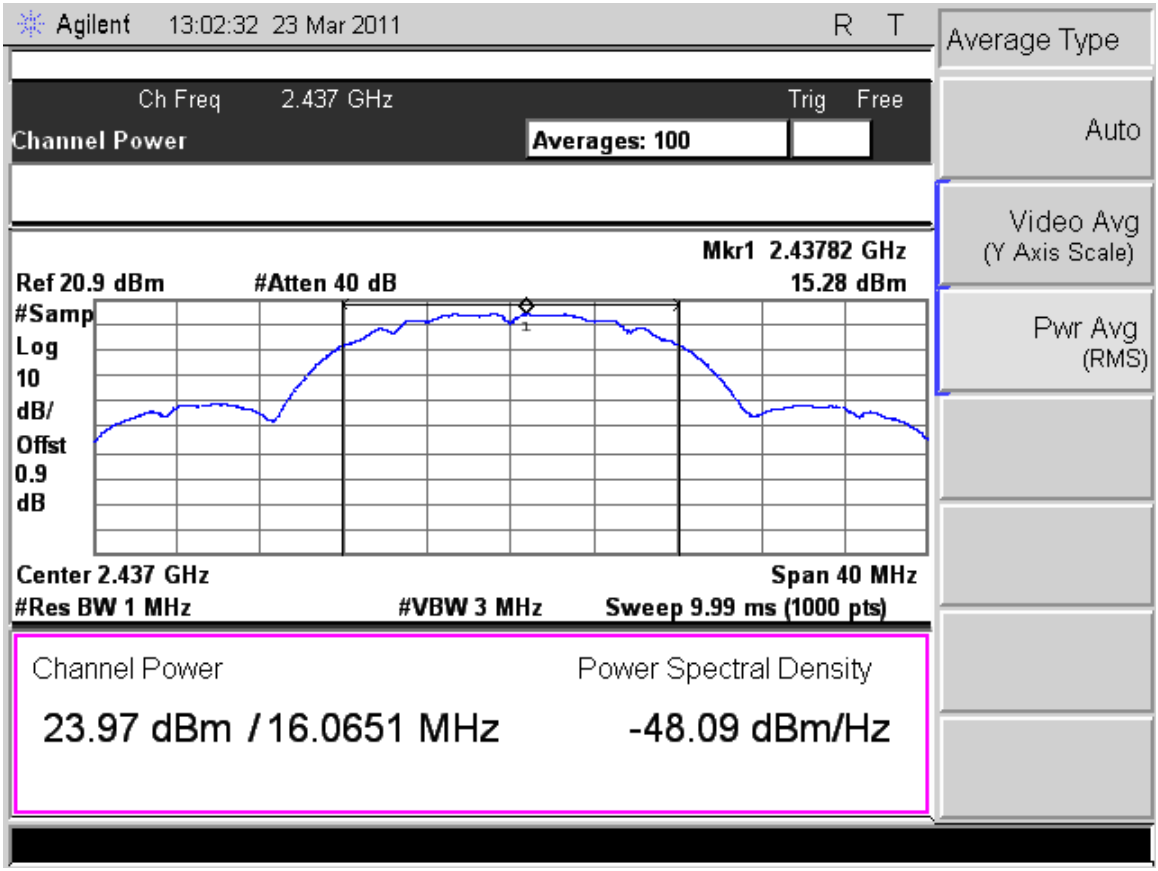


Figure 2: Maximum Transmitted Power, Middle Channel 2437 MHz of 802.11b

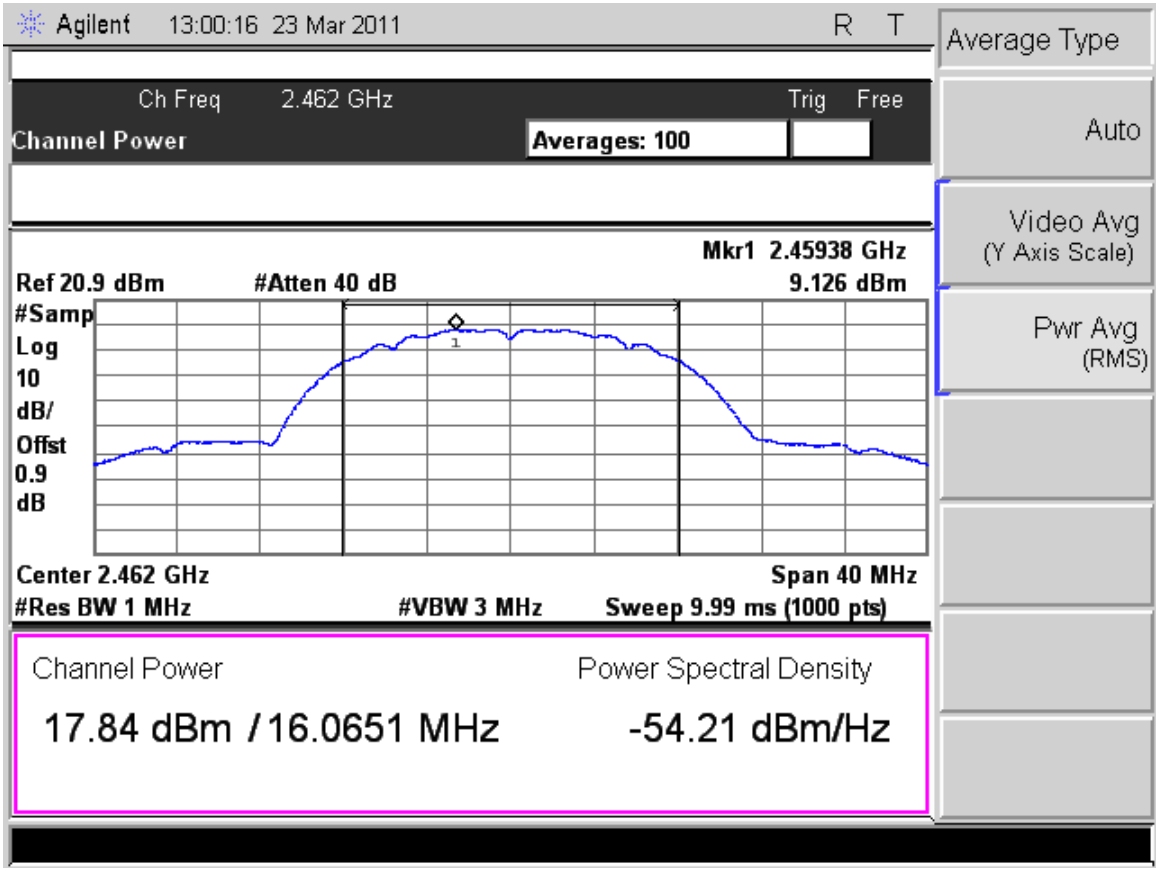


Figure 3: Maximum Transmitted Power, Highest Channel 2462 MHz of 802.11b

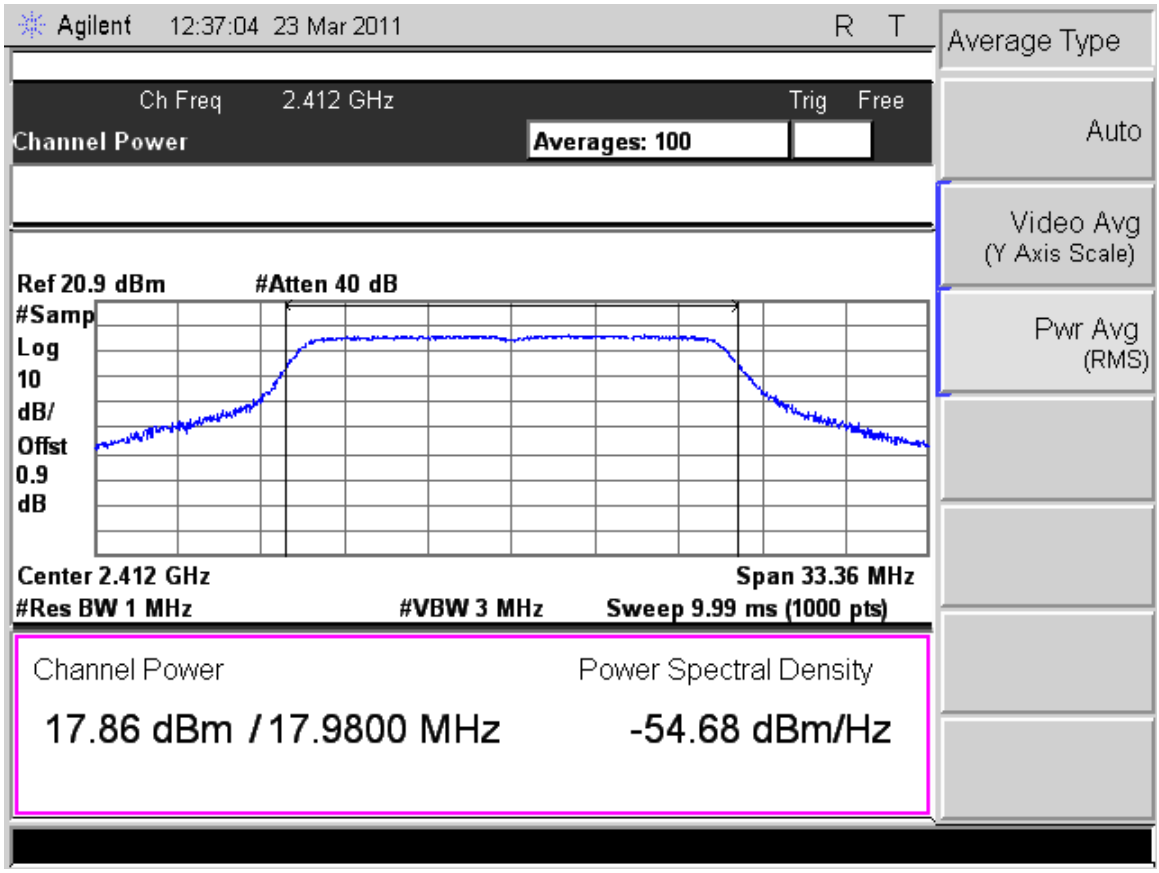


Figure 4: Maximum Transmitted Power, Lowest Channel 2412 MHz of 802.11g

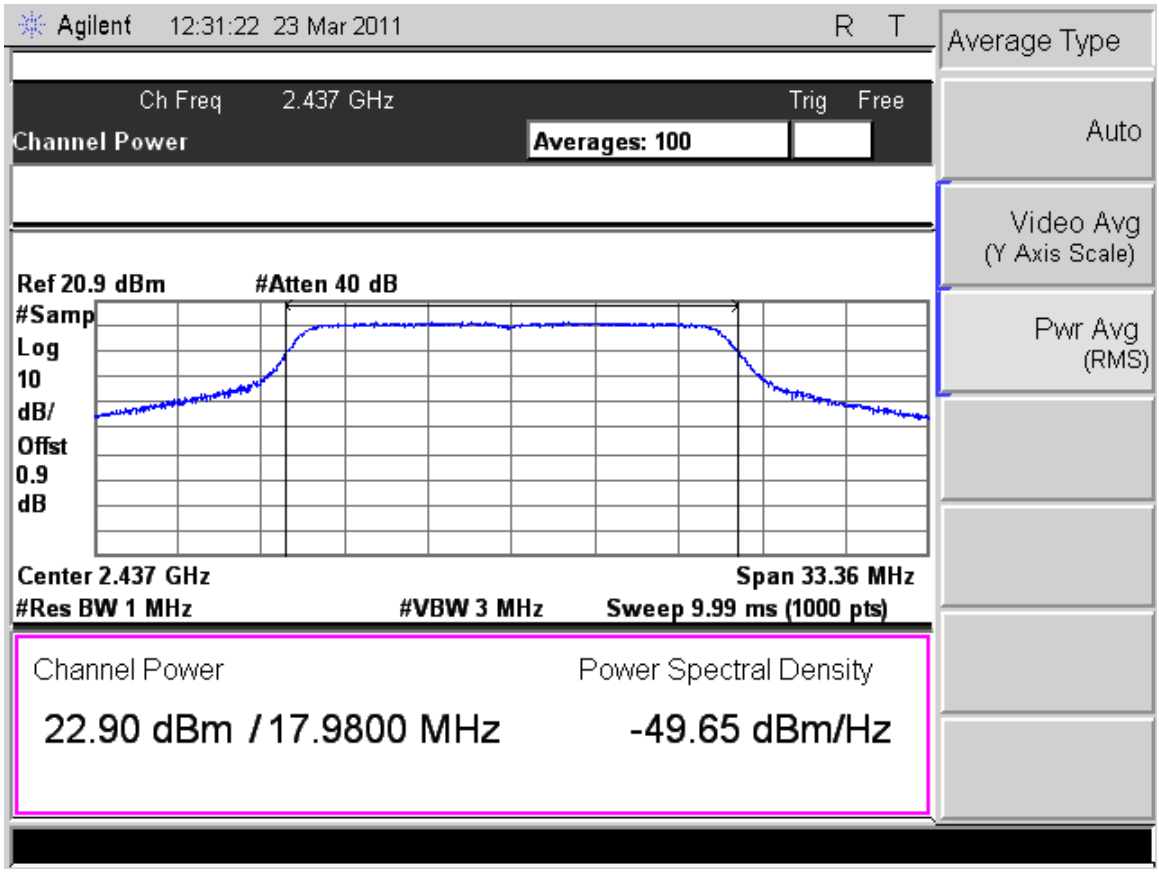


Figure 5: Maximum Transmitted Power, Middle Channel 2437 MHz of 802.11g

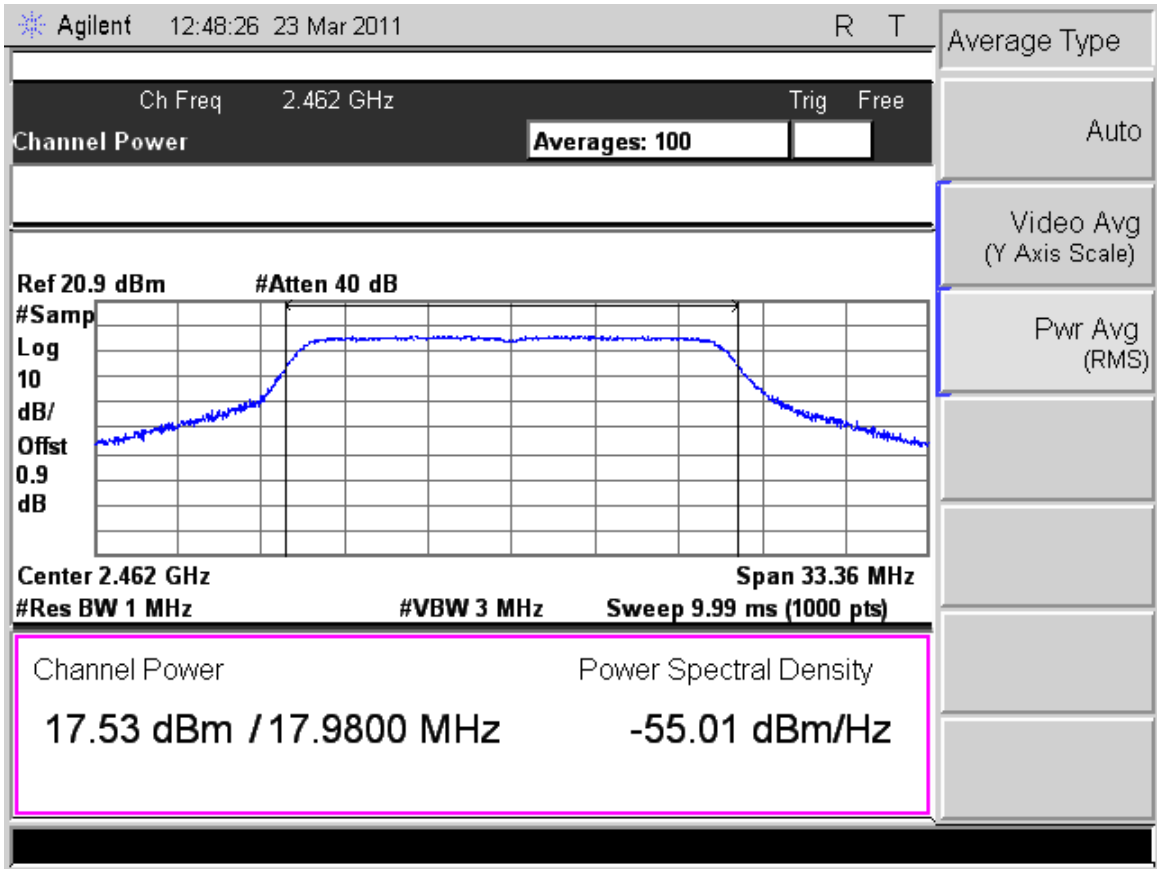


Figure 6: Maximum Transmitted Power, Highest Channel 2462 MHz of 802.11g

4.2 Occupied Bandwidth

The occupied bandwidth is measured at an amplitude level reduced from the reference level by a specified ratio. The reference level is the level of the highest amplitude signal observed from the transmitter at the fundamental frequency.

The 99% bandwidth is the bandwidth in which 99% of the transmitted power occupied.

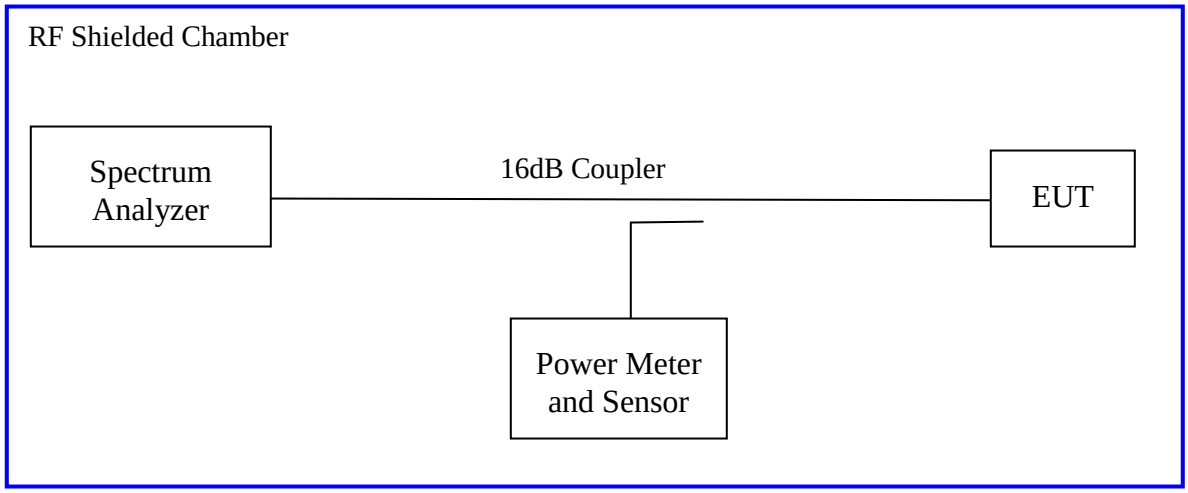
The 6 dB bandwidth is defined the bandwidth of 6 dBr from highest transmitted level of the fundamental frequency.

The bandwidth shall be at least 500 kHz per Section CFR47 15.247(a2) 2010 and RSS Gen Sect. 4.4.1: 2010.

4.2.1 Test Method

The conducted method was used to measure the occupied bandwidth according to ANSI C63.10:2009 Section 6.9.1. The measurement was performed with modulation per CFR47 15.247(a2) 2010 and RSS Gen Sect. 4.4.1:2010. This test was conducted on 3 channels of Sample SN 221029024922. The worst sample result indicated below.

Test Setup:



4.2.2 Results

As originally tested, the EUT was found to be compliant to the requirements of the test standard(s).

Table 5: Occupied Bandwidth – Test Results

Test Conditions: Conducted Measurement, Normal Temperature and Voltage only				
Antenna Type: Integrated		**Power Setting:** See test plan		
Max. Antenna Gain: +3.0 dBi		**Signal State:** Modulated		
Ambient Temp.: 21 °C		**Relative Humidity:**33%		
99% Bandwidth (MHz)				
Operating Freq.	**Limit**	**802.11b**	**802.11g**	**Results**
2412 MHz	Na	15.5521	17.2840	Na
2437 MHz	Na	15.7104	17.3161	Na
2462 MHz	Na	15.6134	17.2998	Na
6dB Bandwidth (MHz)				
Operating Channel	**Limit**	**802.11b**	**802.11g**	**Results**
2412 MHz	500kHz	12.130	16.449	Pass
2437 MHz	500kHz	12.154	16.527	Pass
2462 MHz	500kHz	12.153	16.461	Pass
Note: The occupied bandwidth was observed at 802.11b 1Mbps and 802.11g 6Mbps				

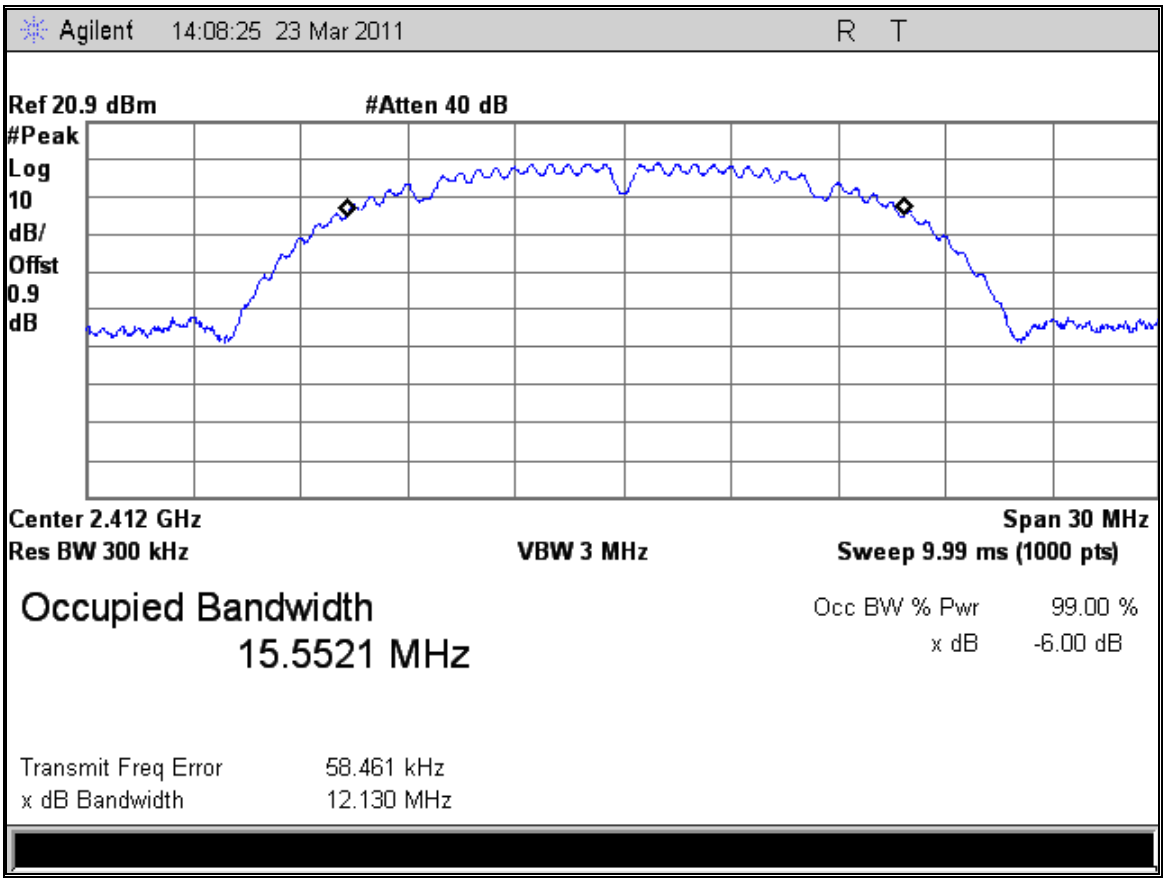


Figure 7: Occupied Bandwidth at 1Mbit/s – Operating Channel 2412 MHz

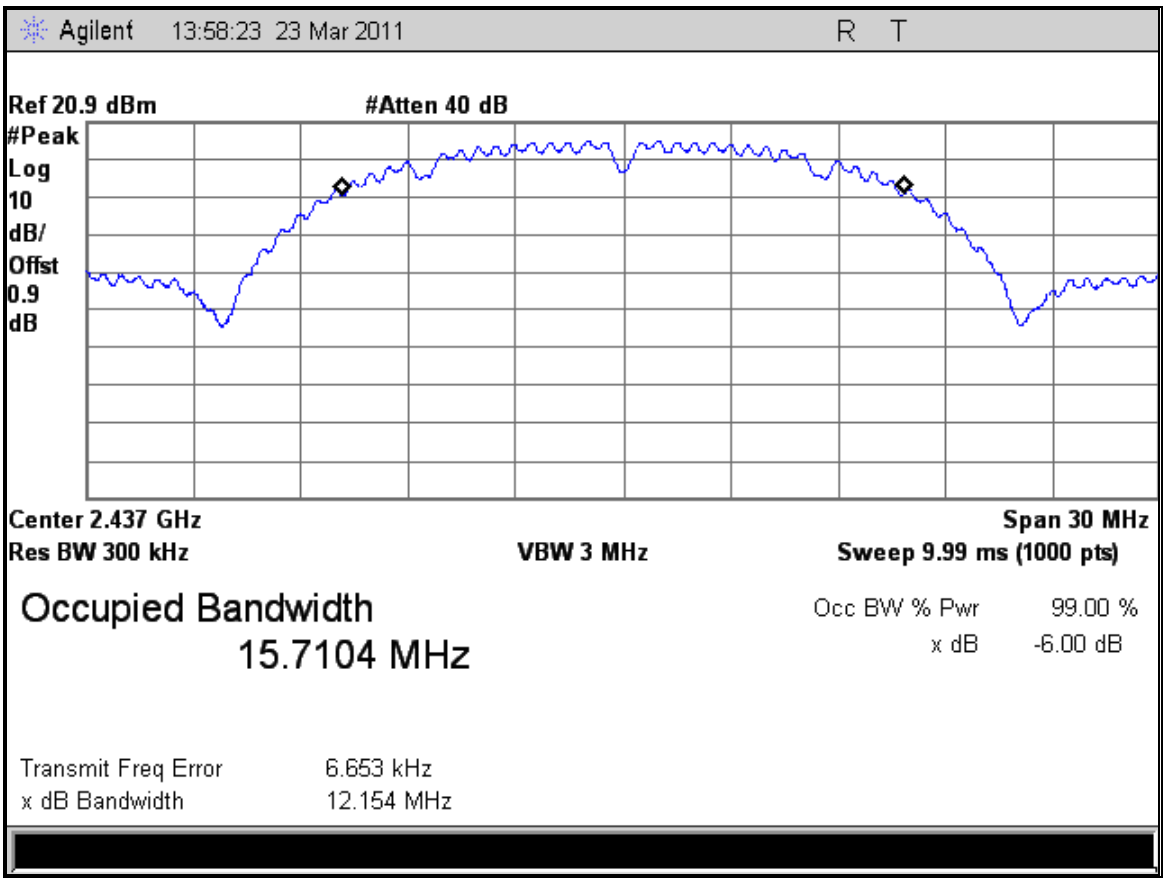


Figure 8: Occupied Bandwidth at 1Mbit/s – Operating Channel 2437 MHz

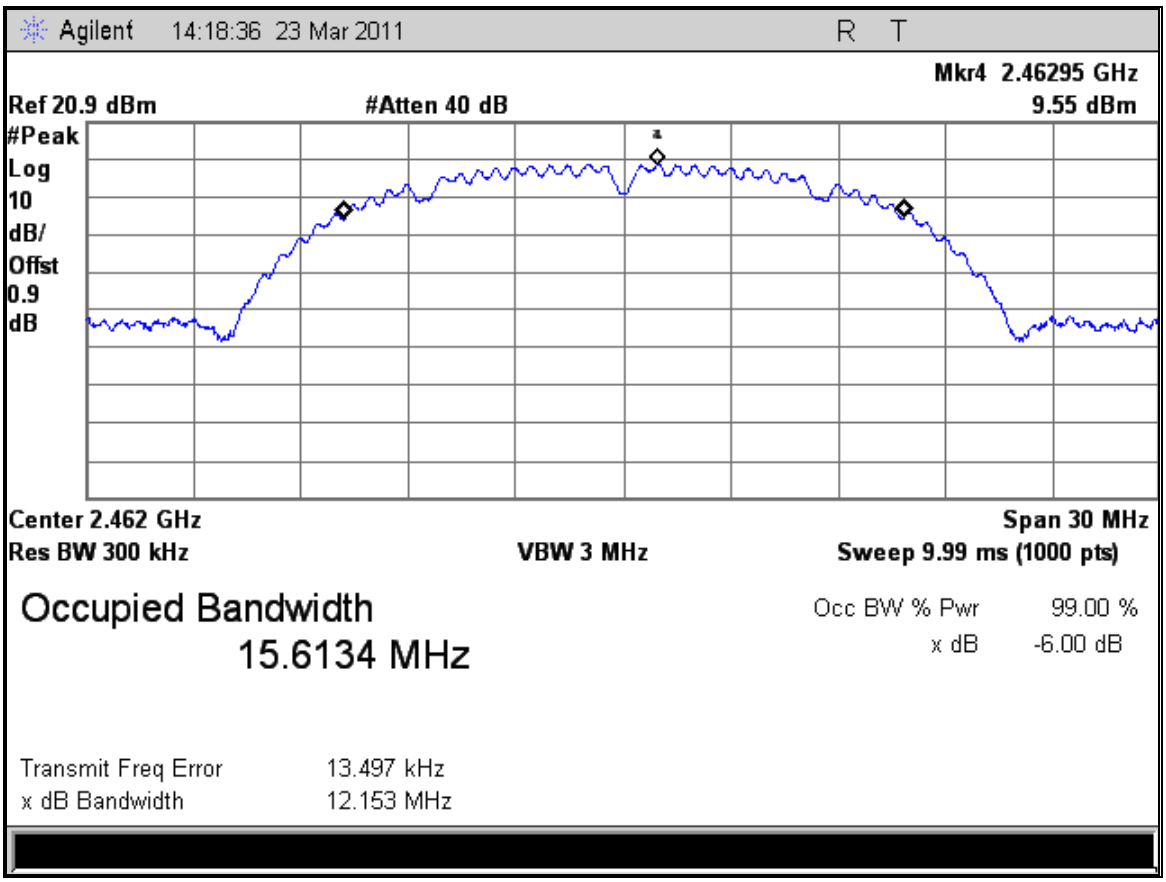


Figure 9: Occupied Bandwidth at 1Mbit/s – Operating Channel 2462 MHz

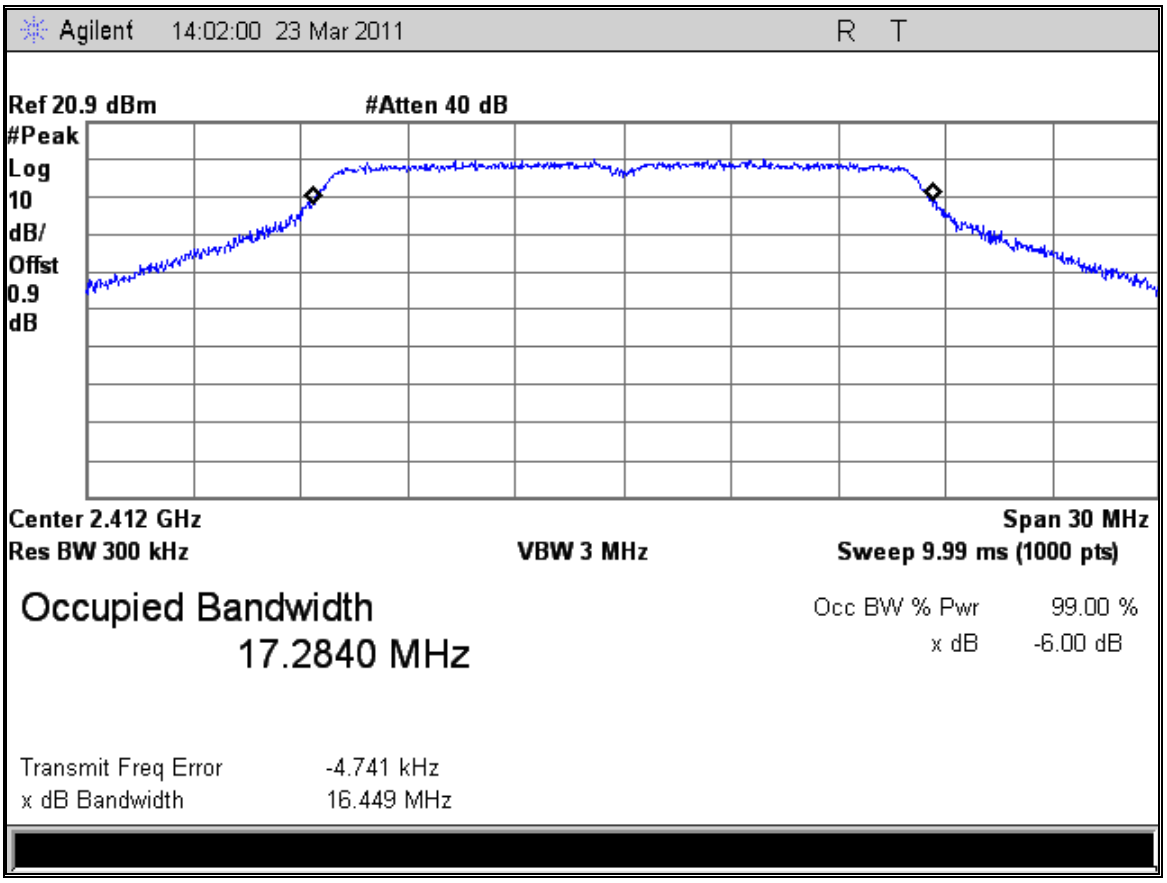


Figure 10: Occupied Bandwidth at 6Mbit/s – Operating Channel 2412 MHz

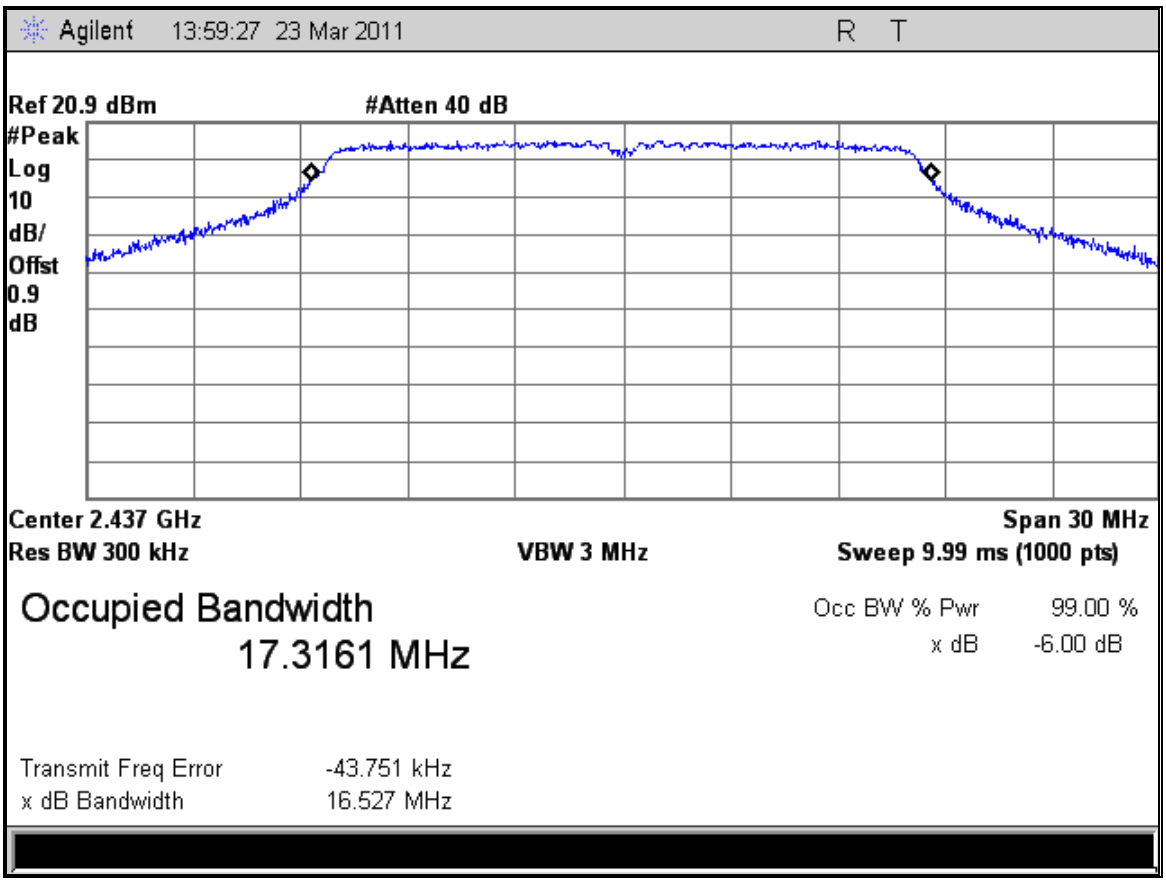


Figure 11: Occupied Bandwidth at 6Mbit/s – Operating Channel 2437 MHz

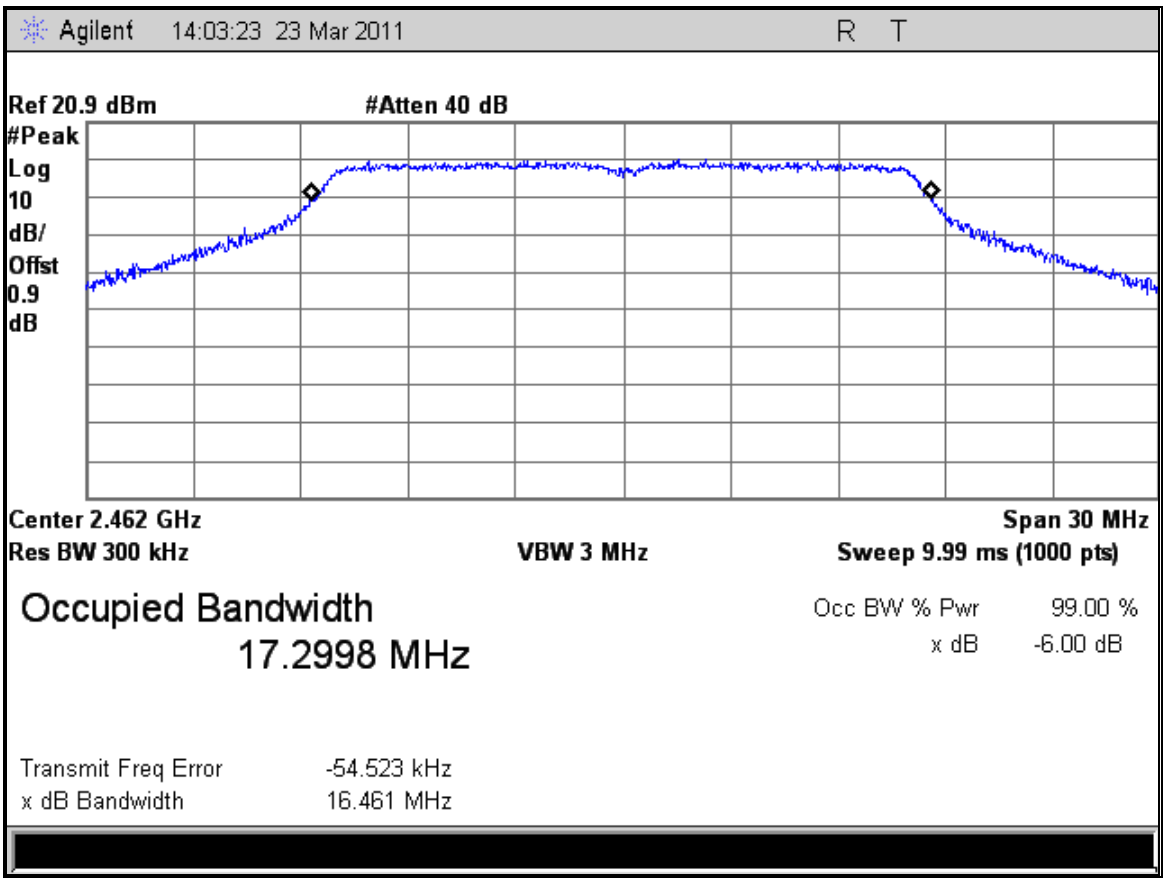


Figure 12: Occupied Bandwidth at 6Mbit/s – Operating Channel 2462 MHz

4.3 Out-of-Band Emissions

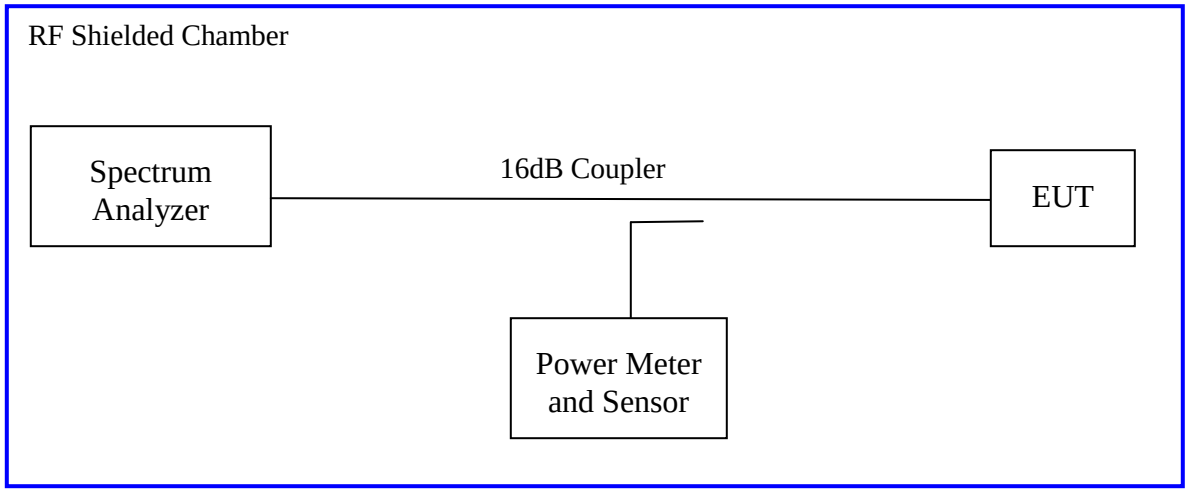
The setup was identical to RF output power measurement. Intentional radiators operating under the alternative provisions to the general emission limits, must be designed to ensure that the 20 dB or 30 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated. The requirement to contain the designated bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If the frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

Since the transmitter complies with the conducted power limits base on the use of RMS averaging per CFR47 Part 15.247(b)(3), any frequency outside the band of 2400MHz to 2483.5MHz, the power output level must be below 30 db from the in-band transmitting signal; CFR 47 Part 15.215, 15.247(d) and RSS 210 A8.5

4.3.1 Test Method

The conducted method was used to measure the out-of-band emission requirement. The measurement was performed with modulation per CFR47 15.247(4)(d) 2010 and *RSS 210 A8.5: 2010*. This test was conducted on 3 channels of Sample SN 221029024922. The worst sample result indicated below.

Test Setup:



4.3.2 Test Result

As originally tested, the EUT was found to be compliant to the requirements of the test standard(s).

Table 6: Emissions at the Band-Edge – Test Results

Test Conditions: Conducted Measurement, Normal Temperature and Voltage only				
Antenna Type: Integrated		**Power Setting:** See test plan		
Max. Antenna Gain: +3.0 dBi		**Signal State:** Modulated		
Ambient Temp.: 21 °C		**Relative Humidity:**34%		
Band-Edge Results				
Operating Channel	**Mode**	**Band-edge Level (dBm)**	**30 dB Level (dBm)**	**Margin (dB)**
2412 MHz	11Mbps	-34.34	-19.16	-15.18
2437 MHz	11Mbps	-39.48	-15.06	-24.42
2462 MHz	11Mbps	-50.36	-20.79	-29.57
2412 MHz	54Mbps	-22.79	-21.64	-1.15
2437 MHz	54Mbps	-38.79	-16.53	-22.26
2462 MHz	54Mbps	-41.69	-22.2	-19.49
Note: The band-edge level must lower than the 30dBr level.				

Table 7: Out of band Conducted Emission – Test Results

Test Conditions: Conducted Measurement, Normal Temperature and Voltage only					
Antenna Type: Integrated			**Power Setting:** See test plan		
Max. Antenna Gain: +3.0 dBi			**Signal State:** Modulated		
Ambient Temp.: 21 °C			**Relative Humidity:**34%		
Output of Band Results					
Operating Channel	**Mode**	**Band 1 30MHz- 1GHz**	**Band 2 1GHz-10GHz**	**Band 3 10GHz-25GHz**	**Result**
2412 MHz	11Mbps	Figure 19	Figure 20	Figure 21	Pass
2437 MHz	11Mbps	Figure 22	Figure 23	Figure 24	Pass
2462 MHz	11Mbps	Figure 25	Figure 26	Figure 27	Pass
2412 MHz	54Mbps	Figure 28	Figure 29	Figure 30	Pass
2437 MHz	54Mbps	Figure 31	Figure 32	Figure 33	Pass
2462 MHz	54Mbps	Figure 34	Figure 35	Figure 36	Pass

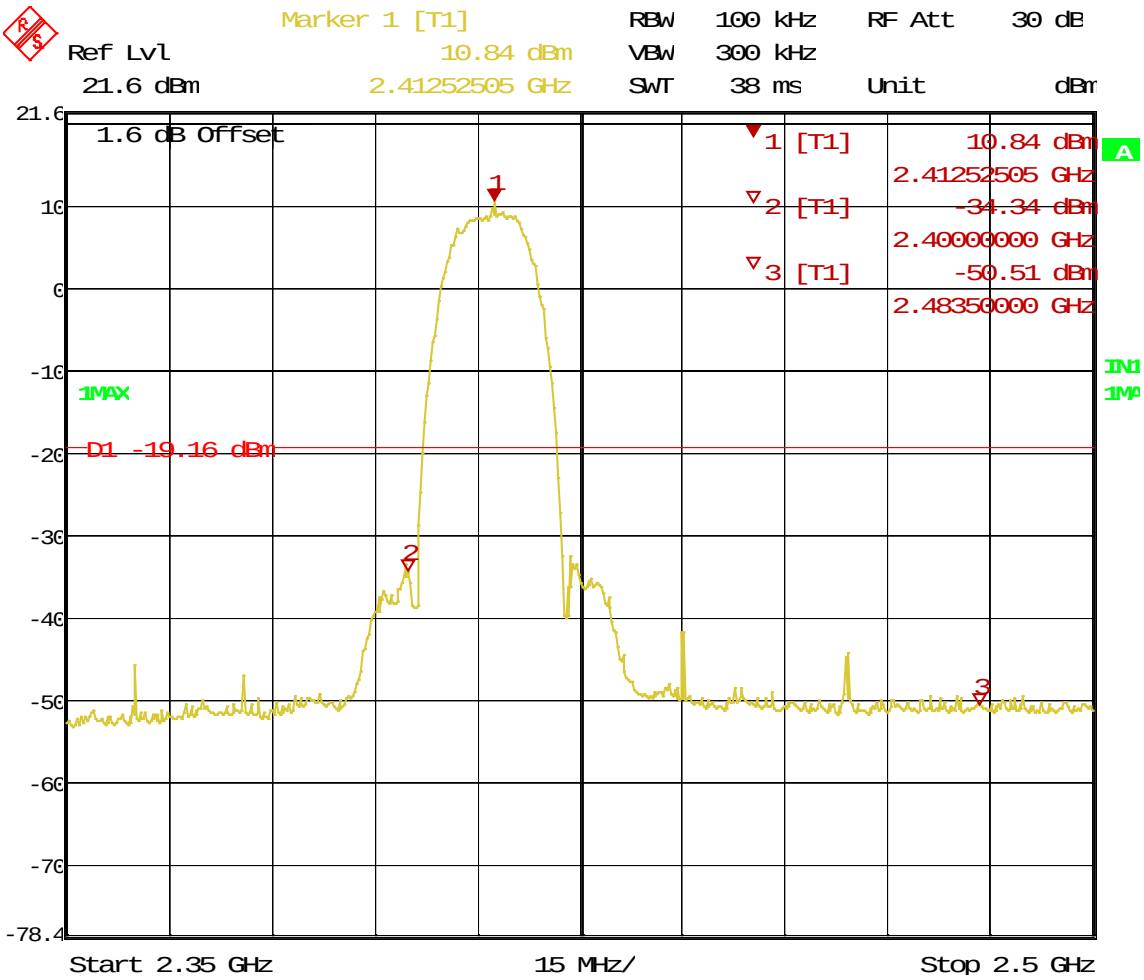


Figure 13: Band-edge Requirement at Operating Channel 2412 MHz, 11MBit/s

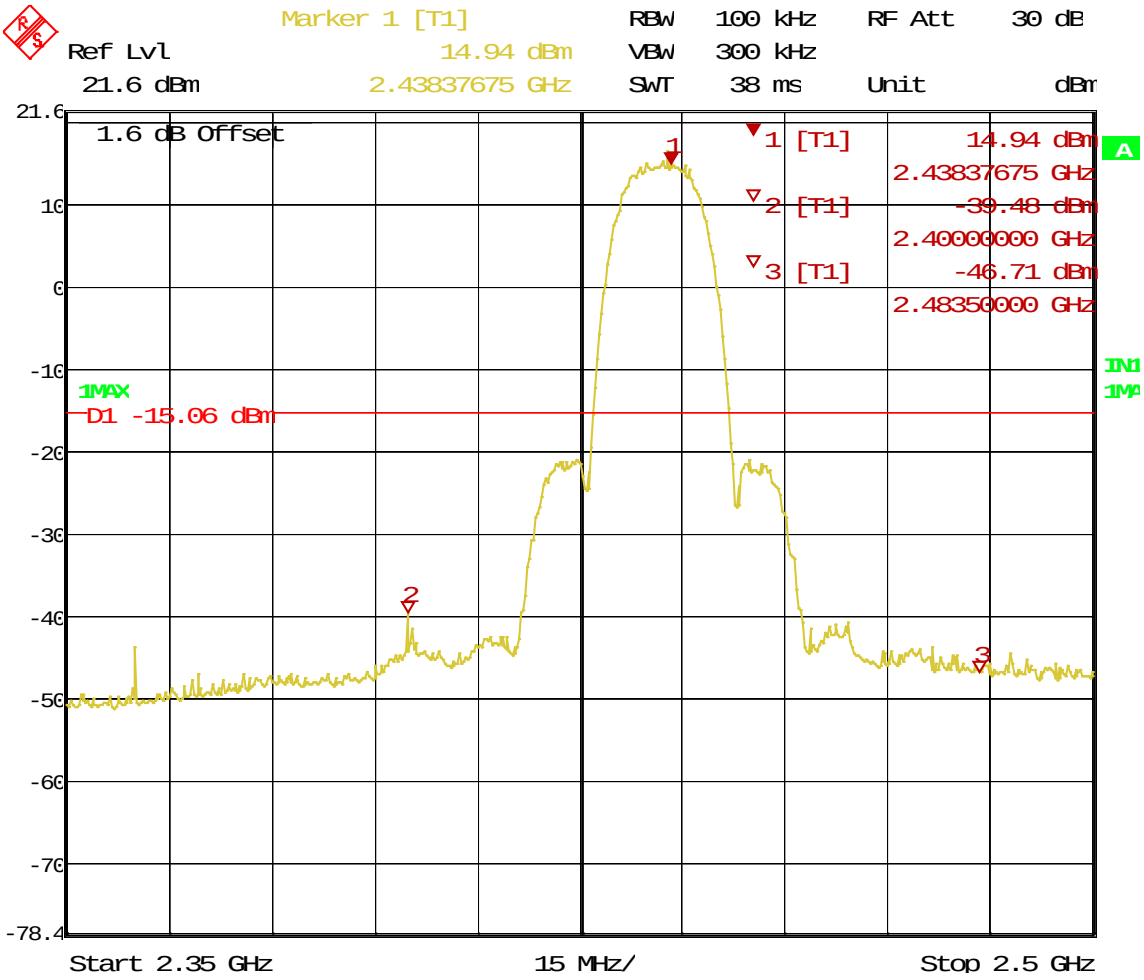


Figure 14: Band-edge Requirement at Operating Channel 2437 MHz, 11MBit/s

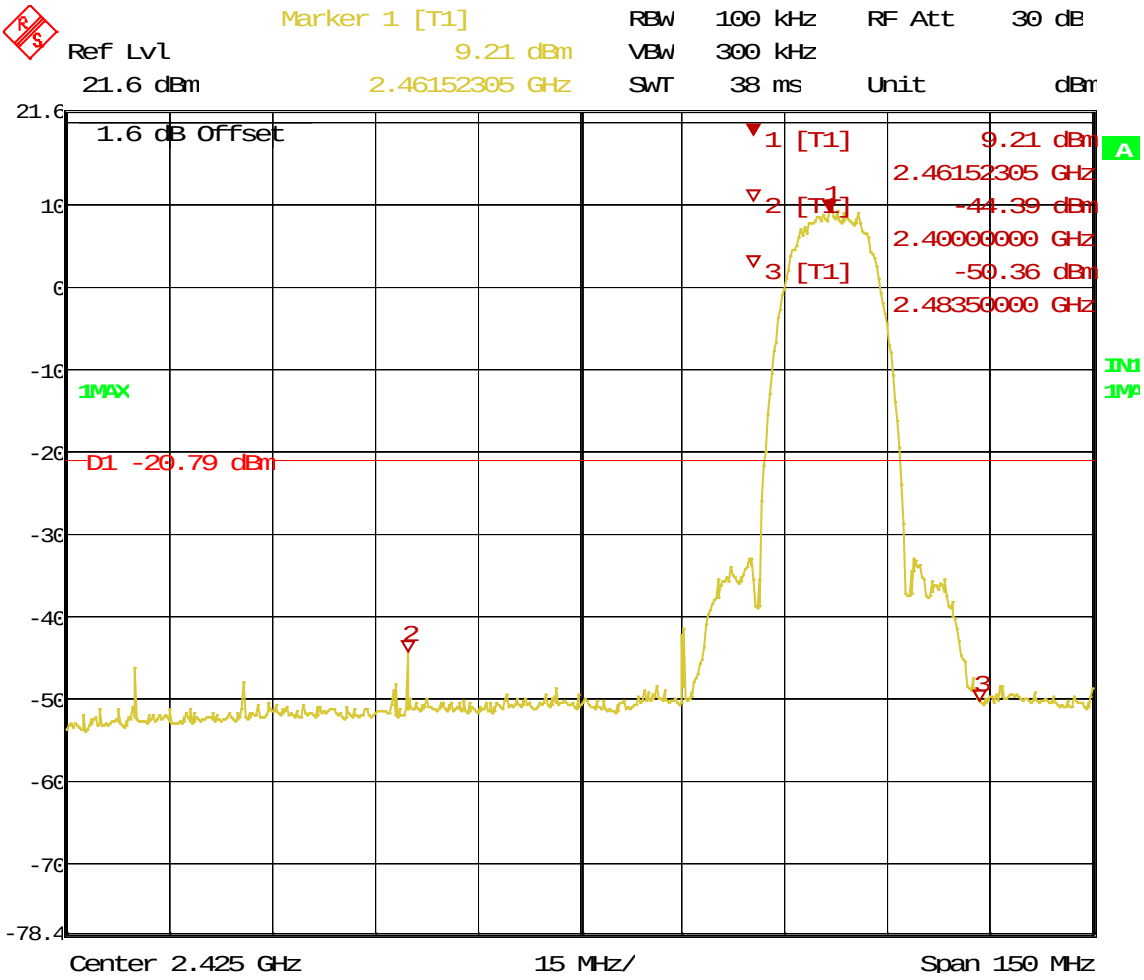


Figure 15: Band-edge Requirement at Operating Channel 2462 MHz, 11MBit/s

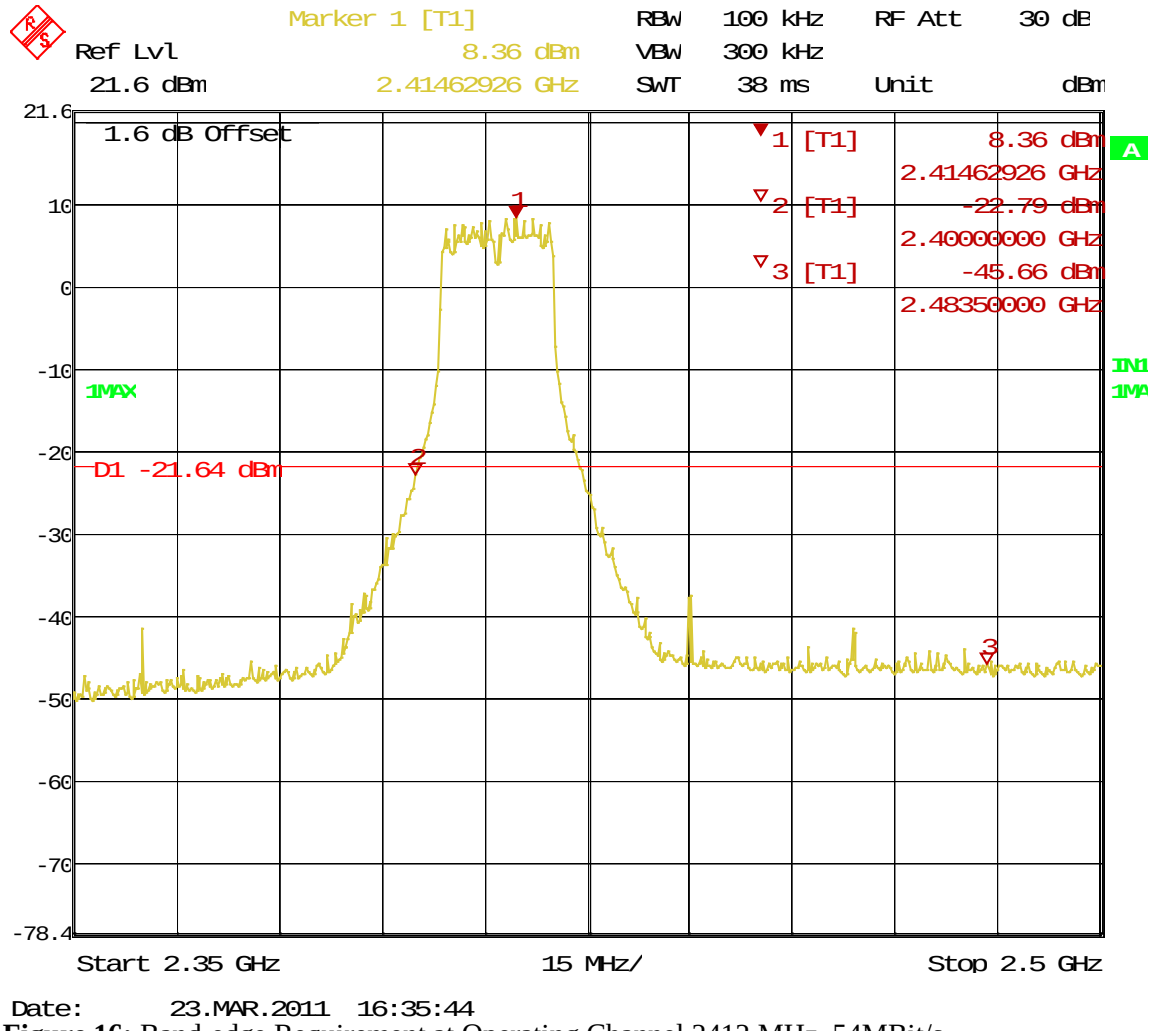


Figure 16: Band-edge Requirement at Operating Channel 2412 MHz, 54MBit/s

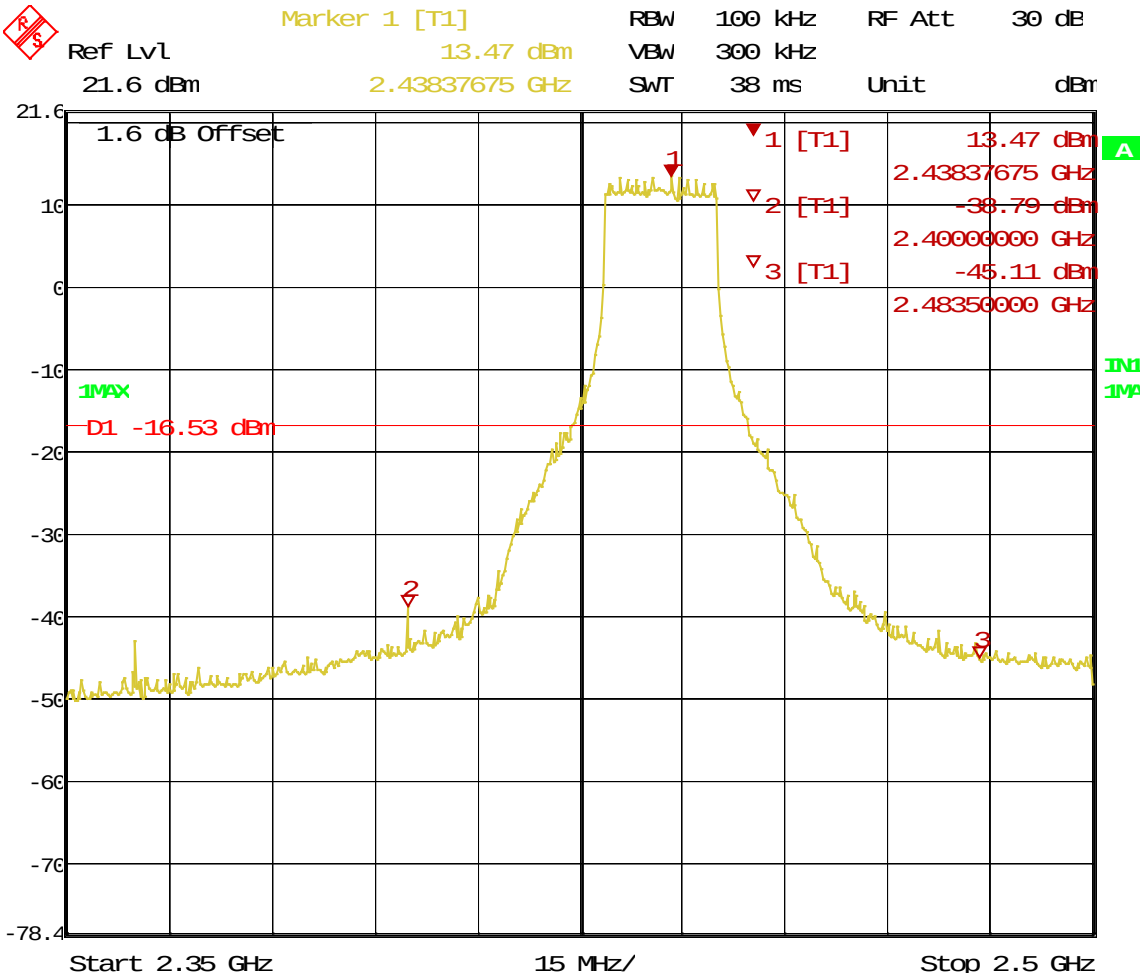


Figure 17: Band-edge Requirement at Operating Channel 2437 MHz, 54MBit/s

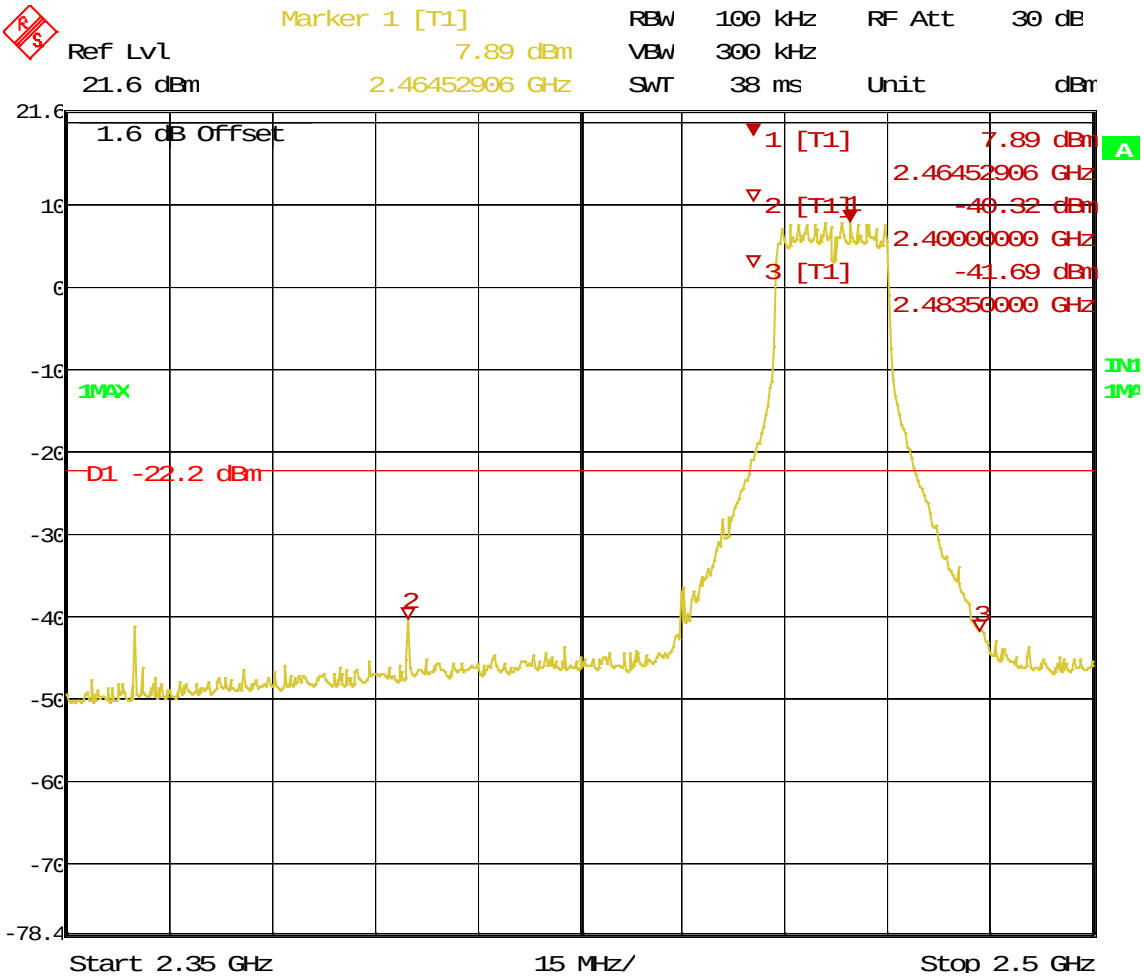


Figure 18: Band-edge Requirement at Operating Channel 2462 MHz, 54MBit/s

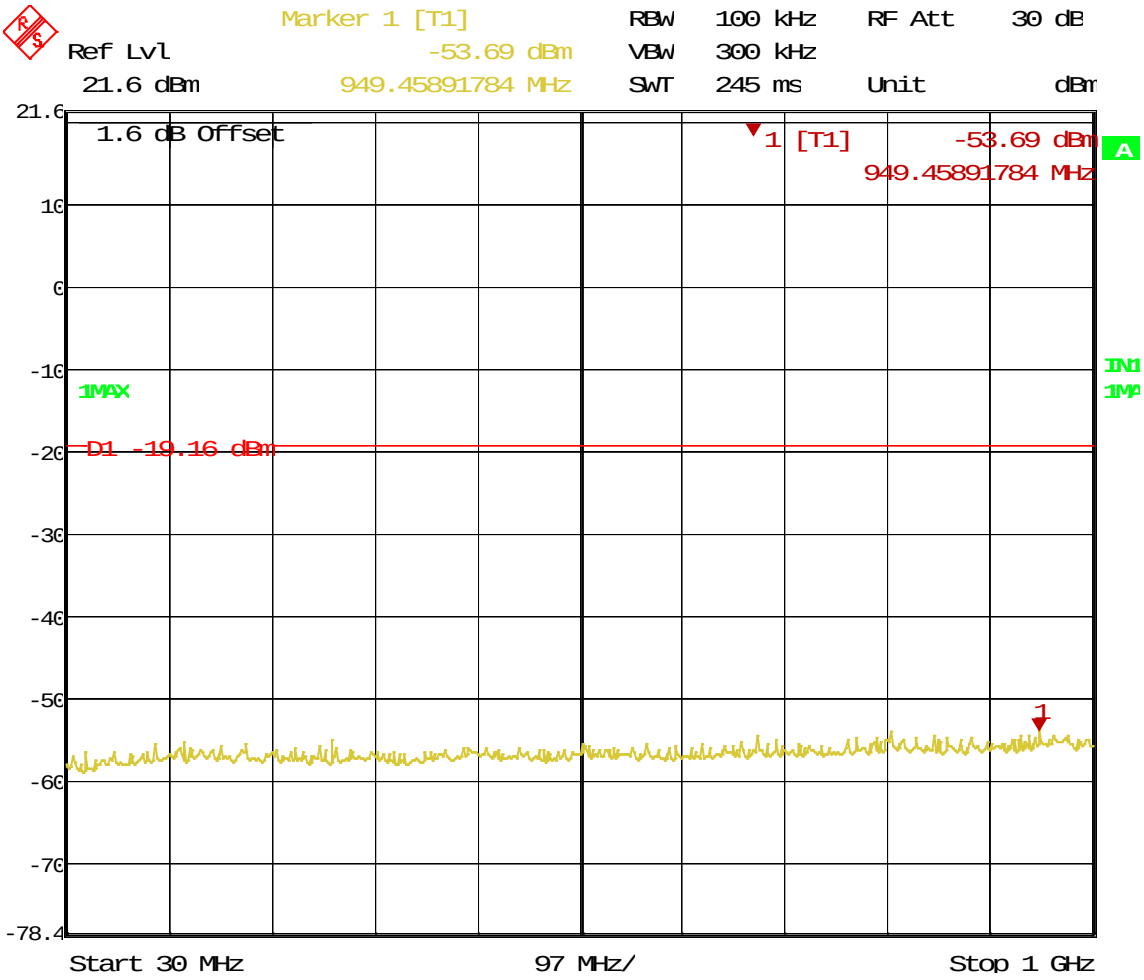


Figure 19: Out of Band Emission for Channel 2412 MHz at 11Mbit/s – Band 1

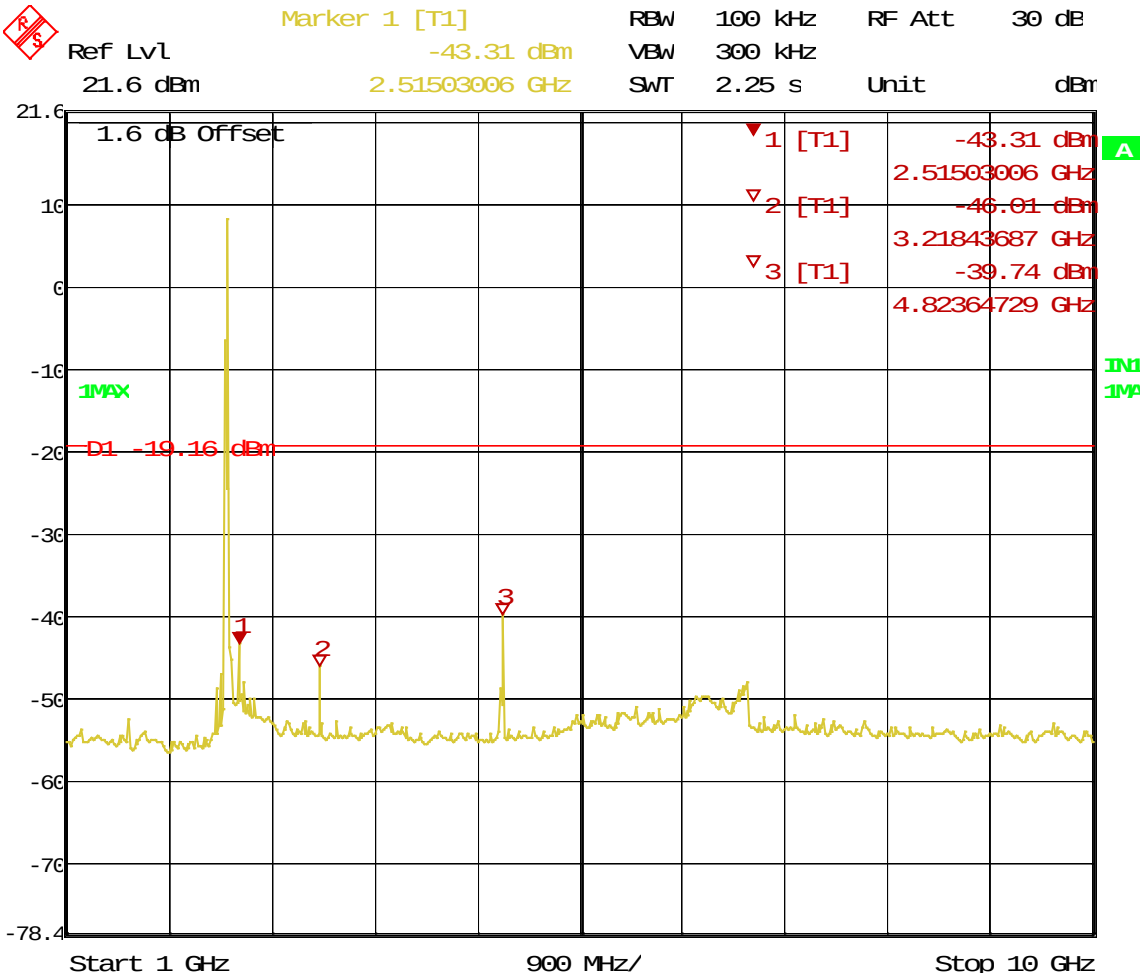


Figure 20: Out of Band Emission for Channel 2412 MHz at 11Mbit/s – Band 2

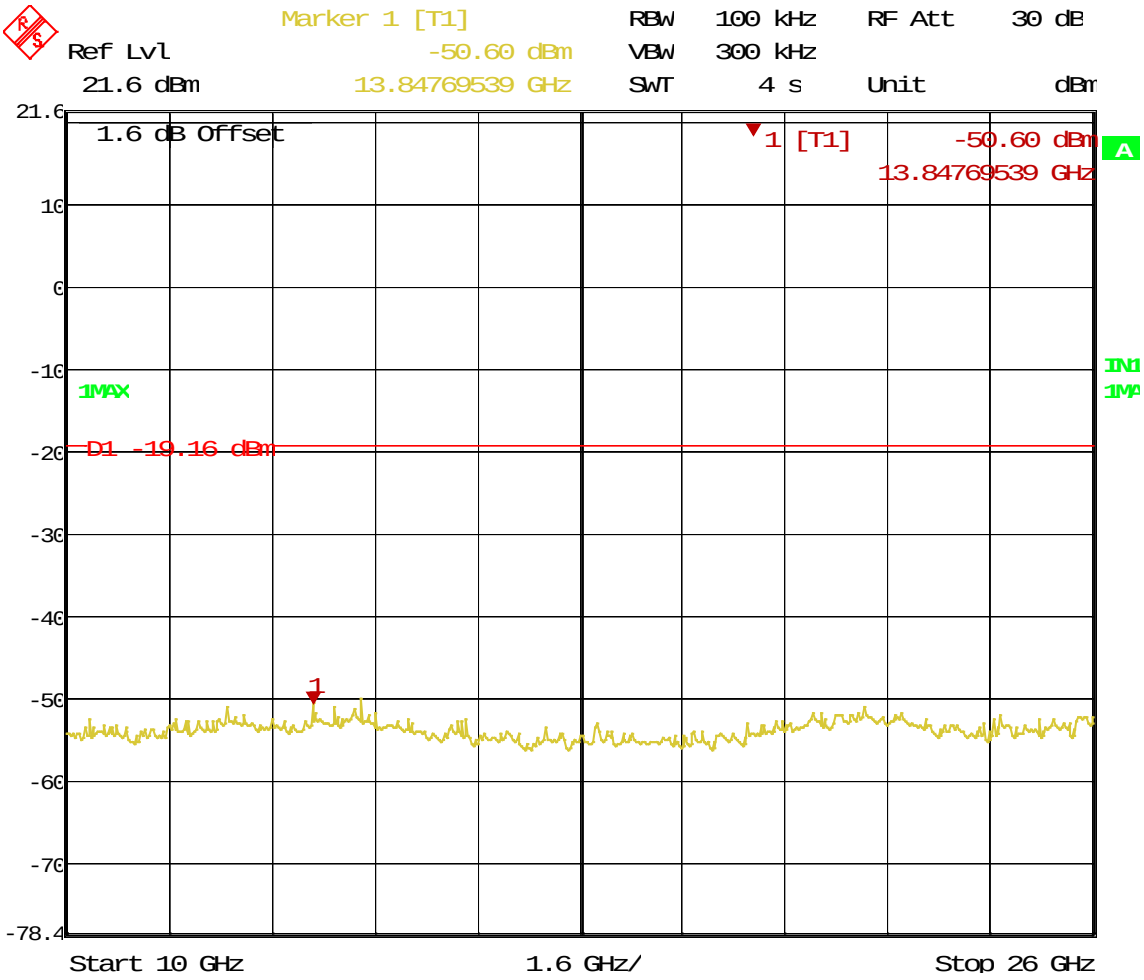


Figure 21: Out of Band Emission for Channel 2412 MHz at 11Mbit/s – Band 3

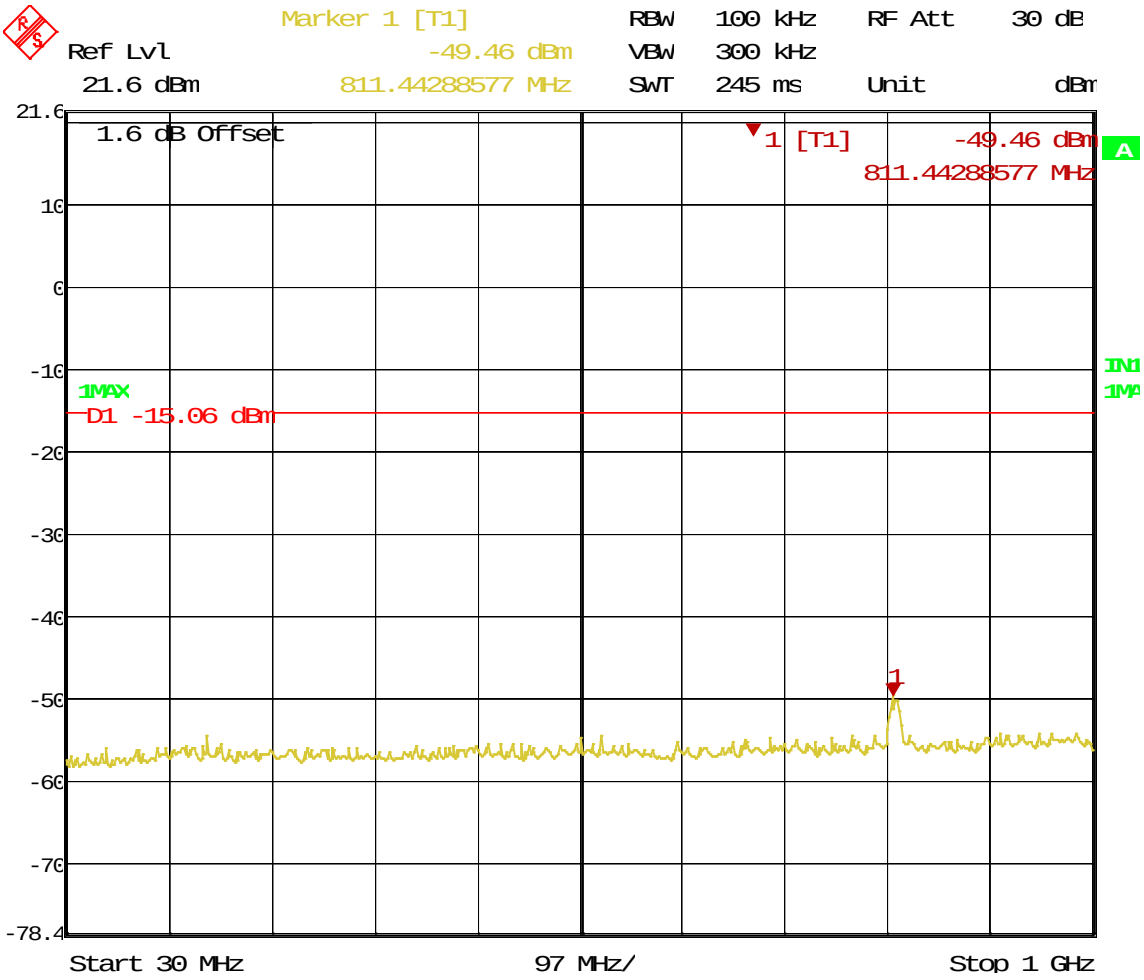


Figure 22: Out of Band Emission for Channel 2437 MHz at 11Mbit/s – Band 1

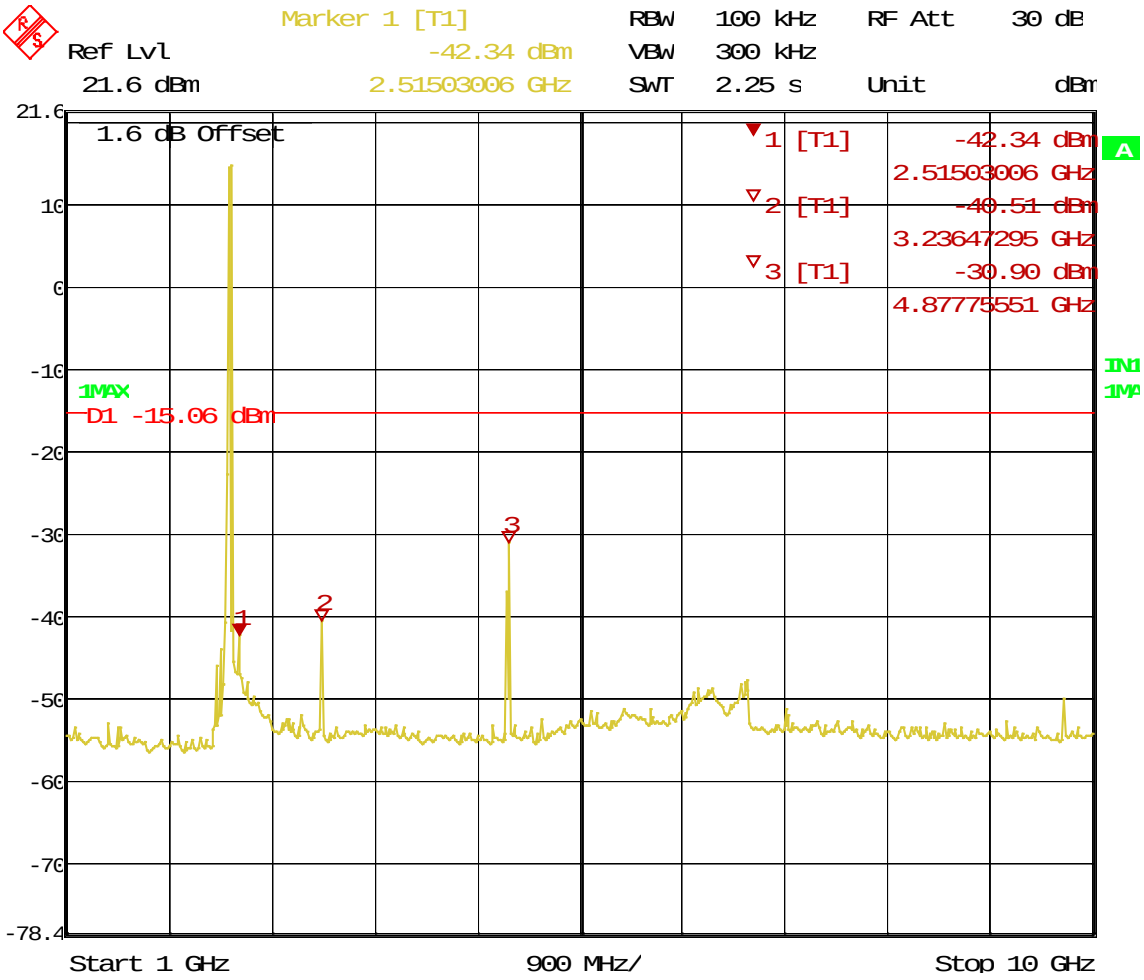


Figure 23: Out of Band Emission for Channel 2437 MHz at 11Mbit/s – Band 2

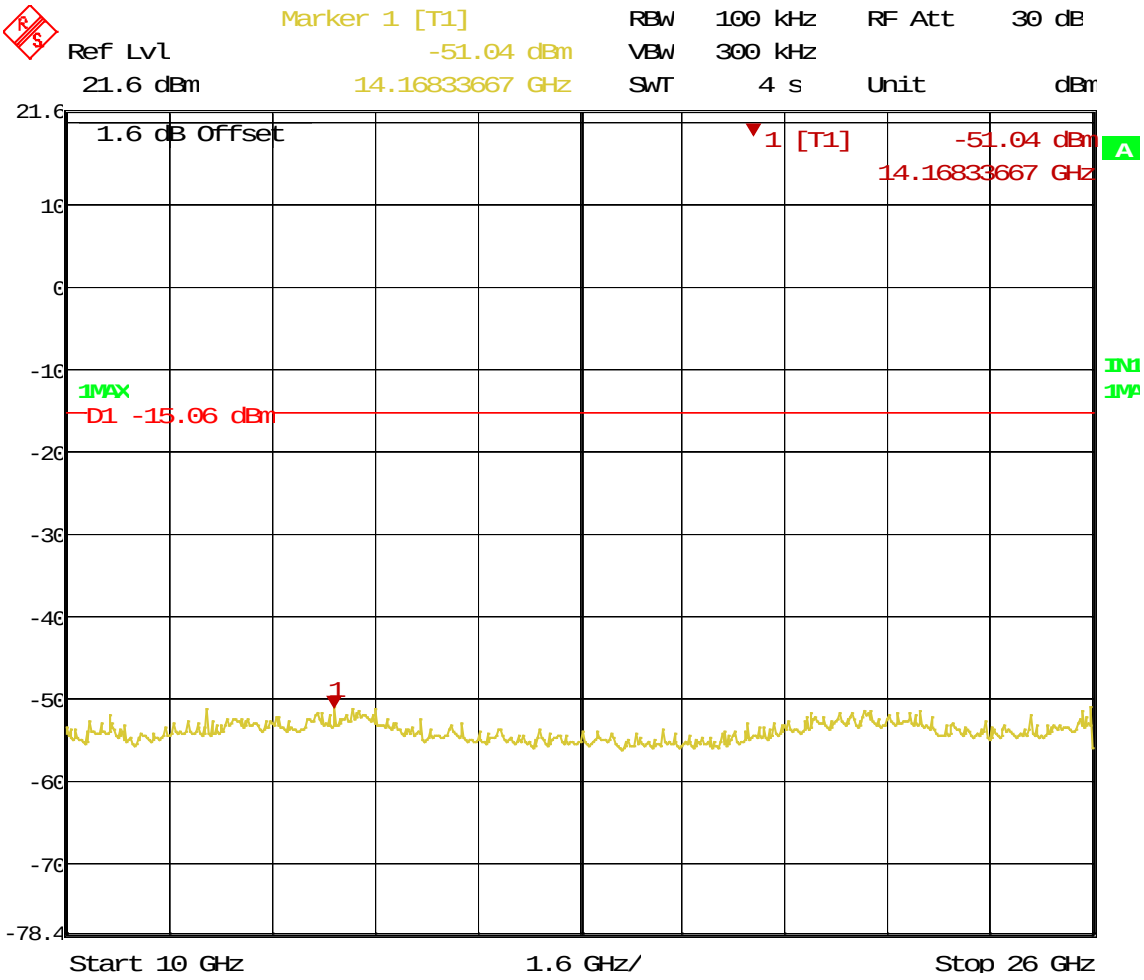


Figure 24: Out of Band Emission for Channel 2437 MHz at 11Mbit/s – Band 3

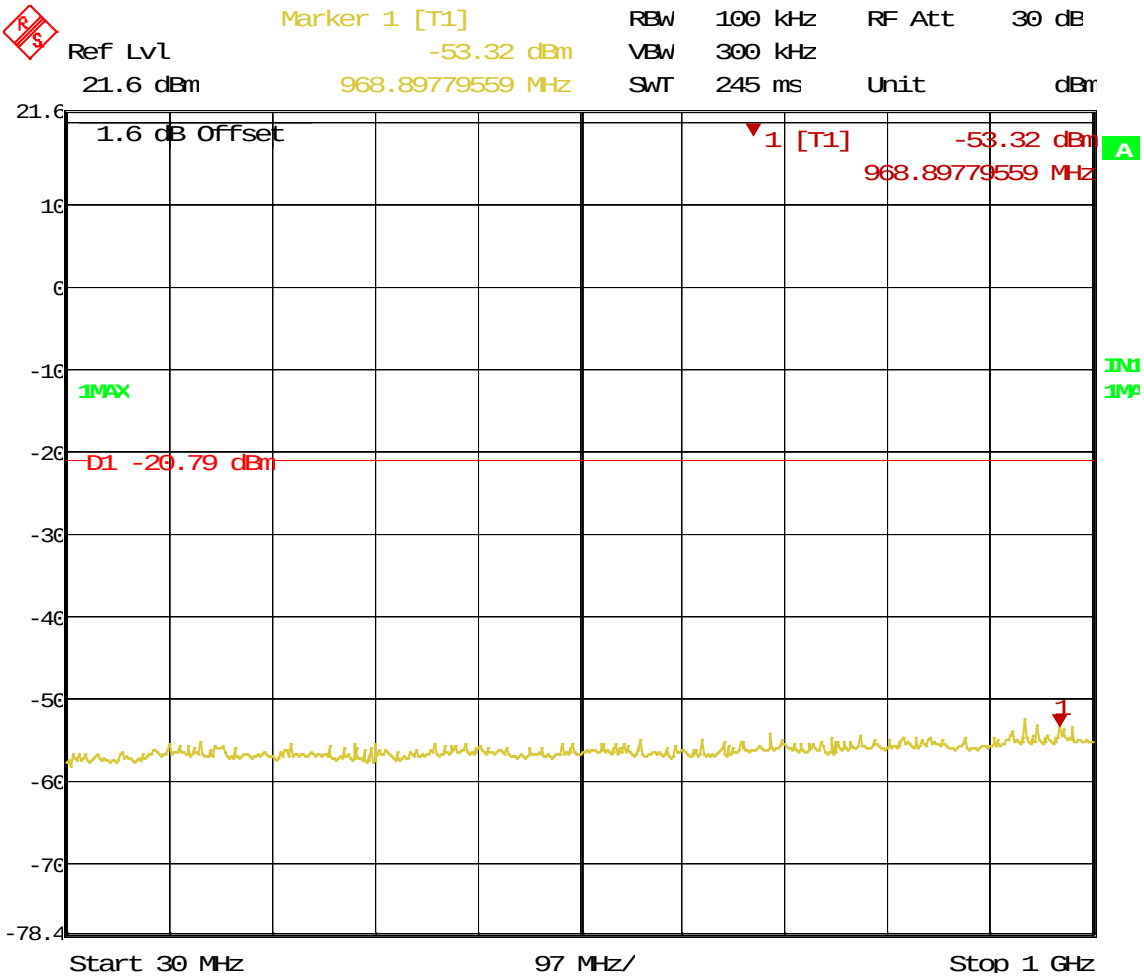


Figure 25: Out of Band Emission for Channel 2462 MHz at 11Mbit/s – Band 1

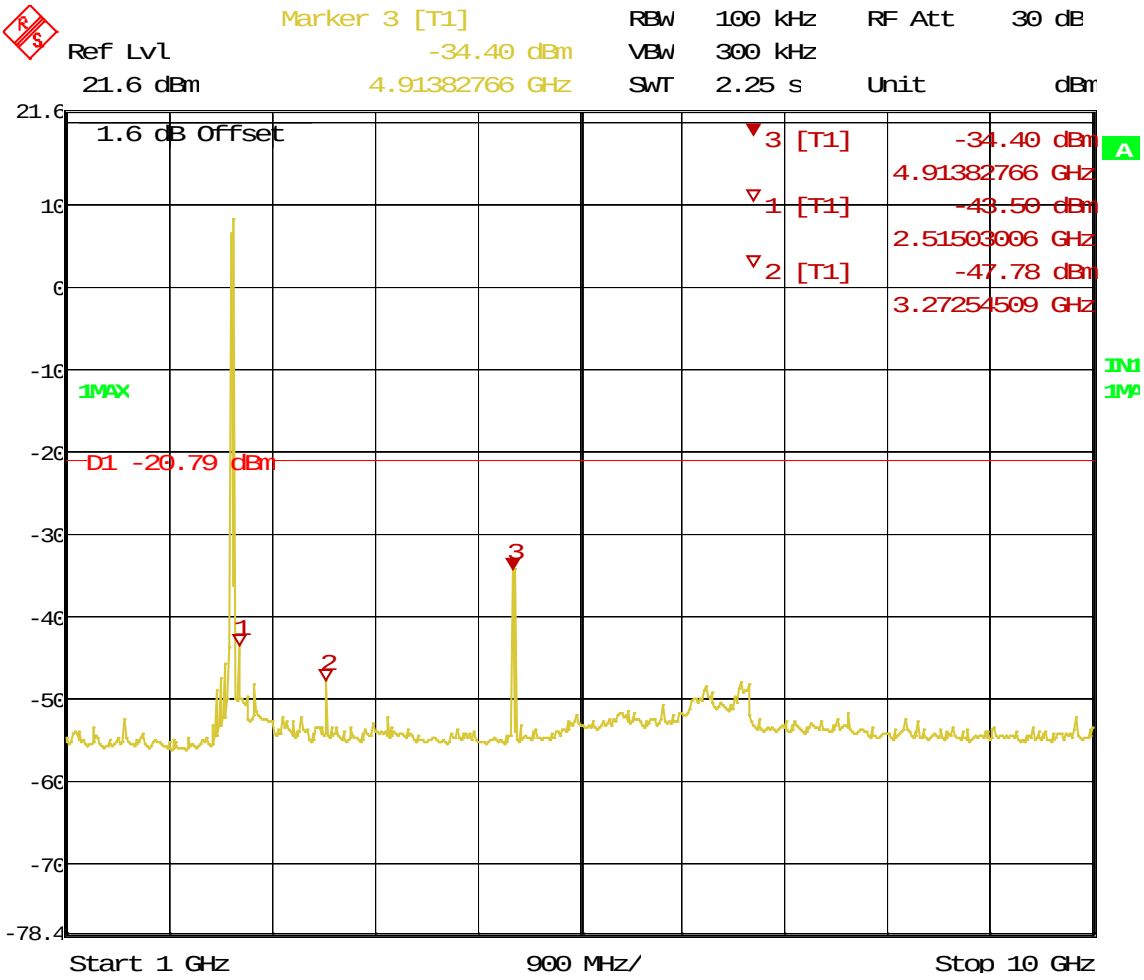


Figure 26: Out of Band Emission for Channel 2462 MHz at 11Mbit/s – Band 2

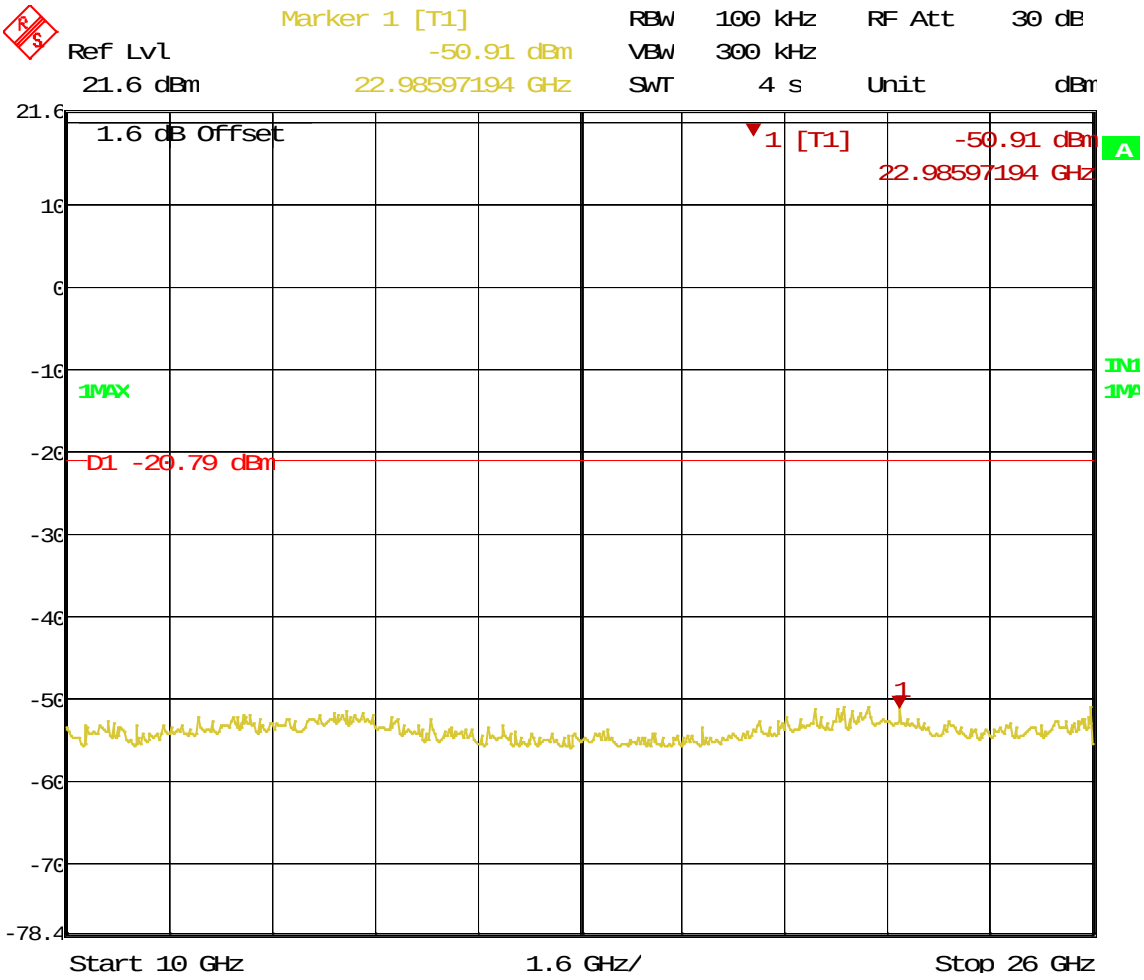


Figure 27: Out of Band Emission for Channel 2462 MHz at 11Mbit/s – Band 3

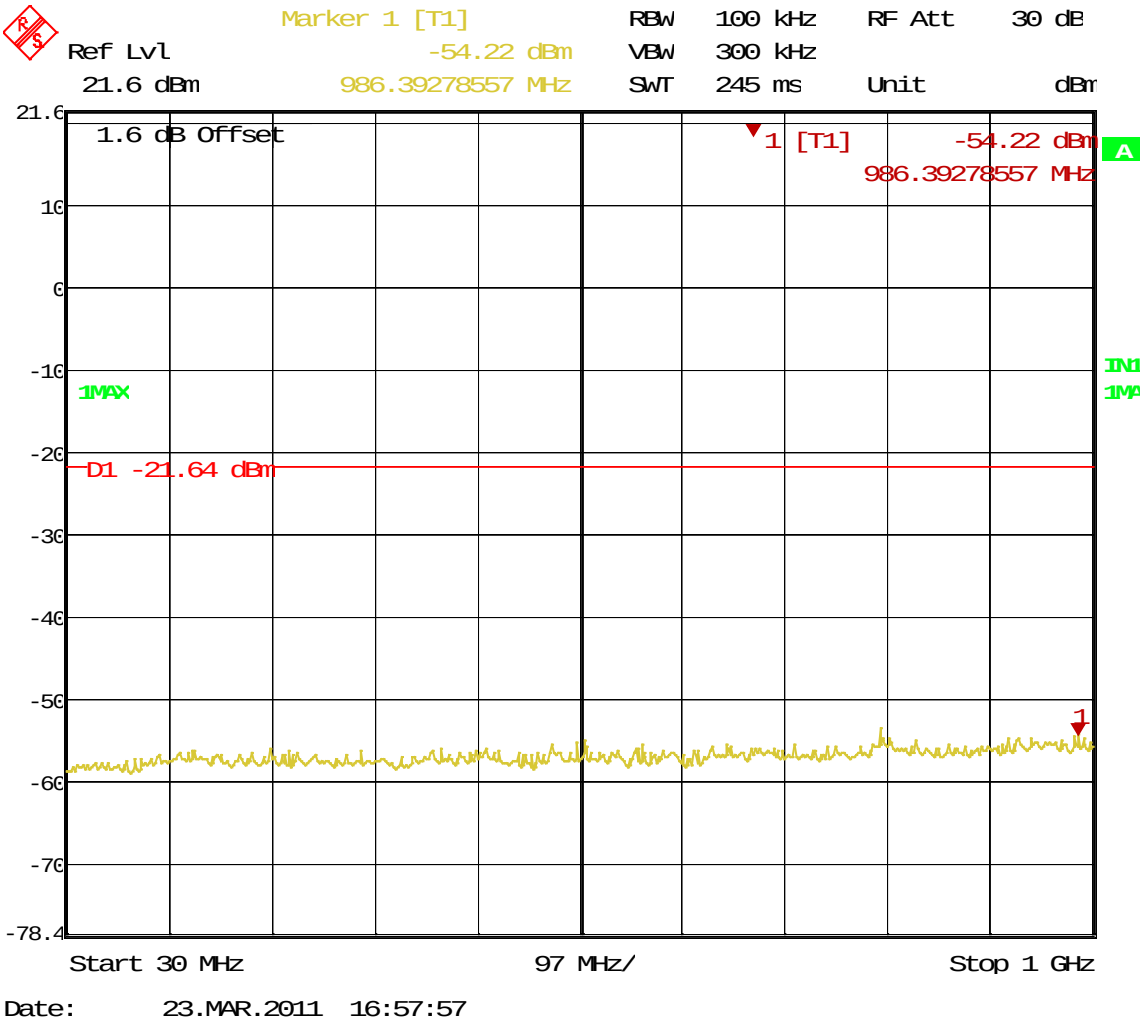


Figure 28: Out of Band Emission for Channel 2412 MHz at 54Mbit/s – Band 1

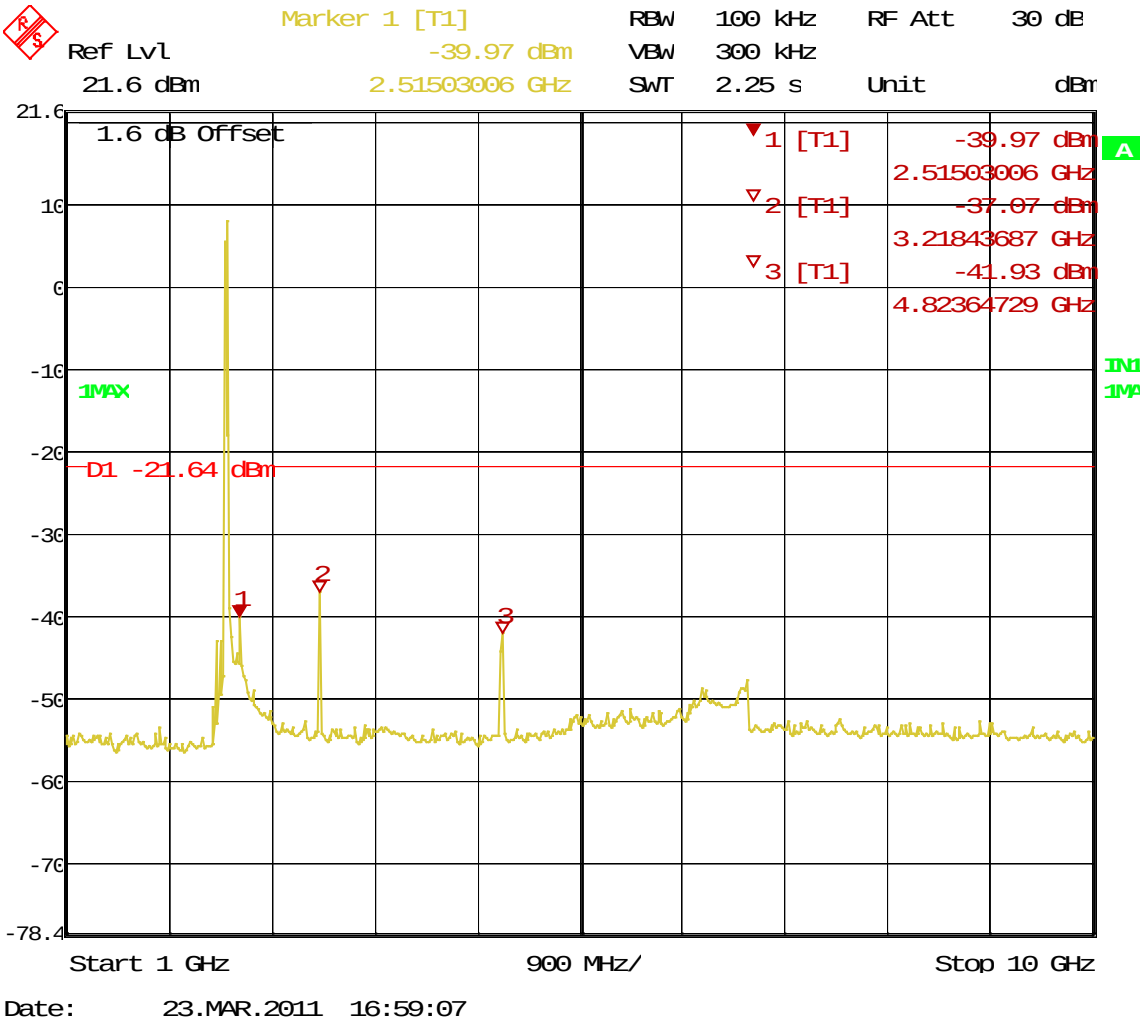


Figure 29: Out of Band Emission for Channel 2412 MHz at 54Mbit/s – Band 2

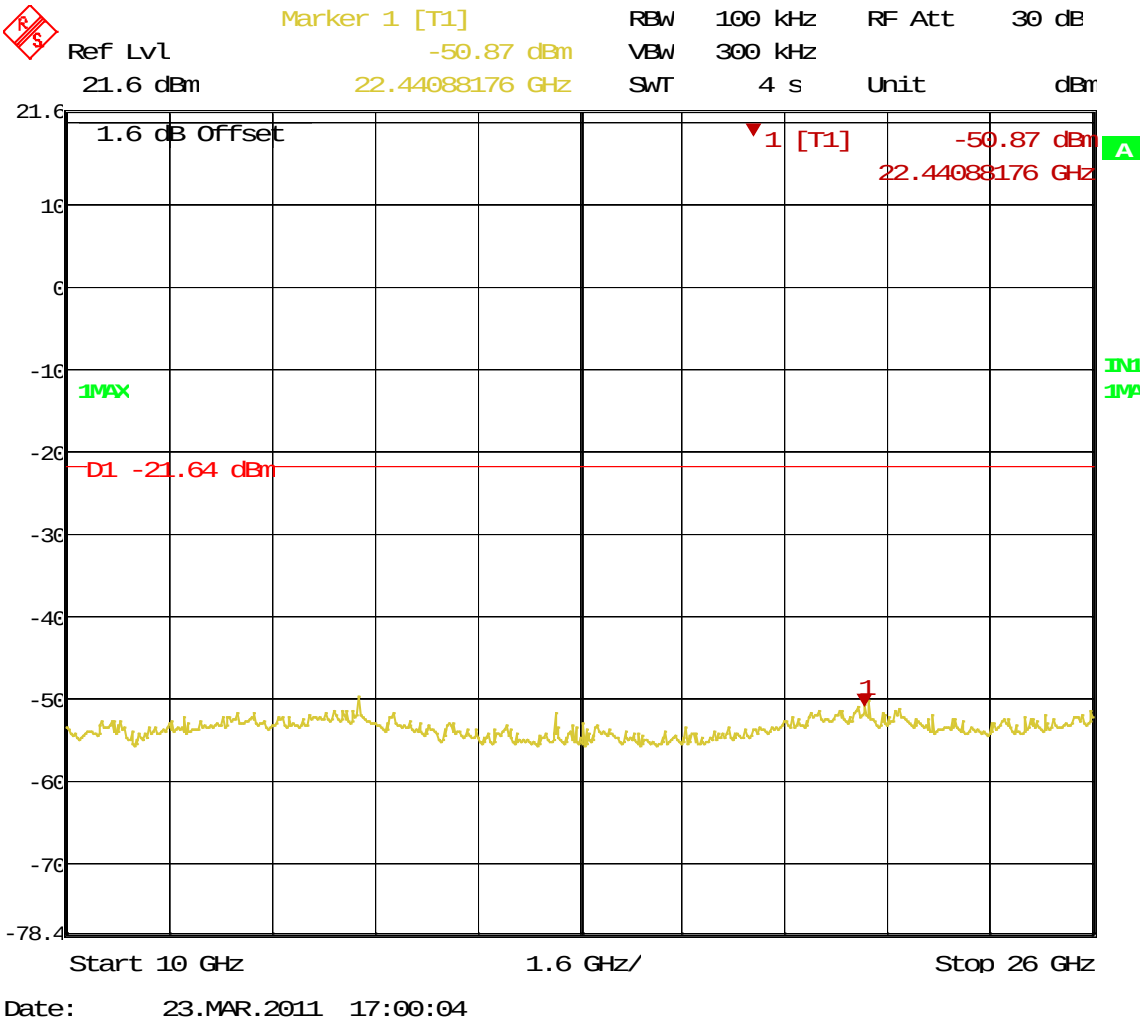


Figure 30: Out of Band Emission for Channel 2412 MHz at 54Mbit/s – Band 3

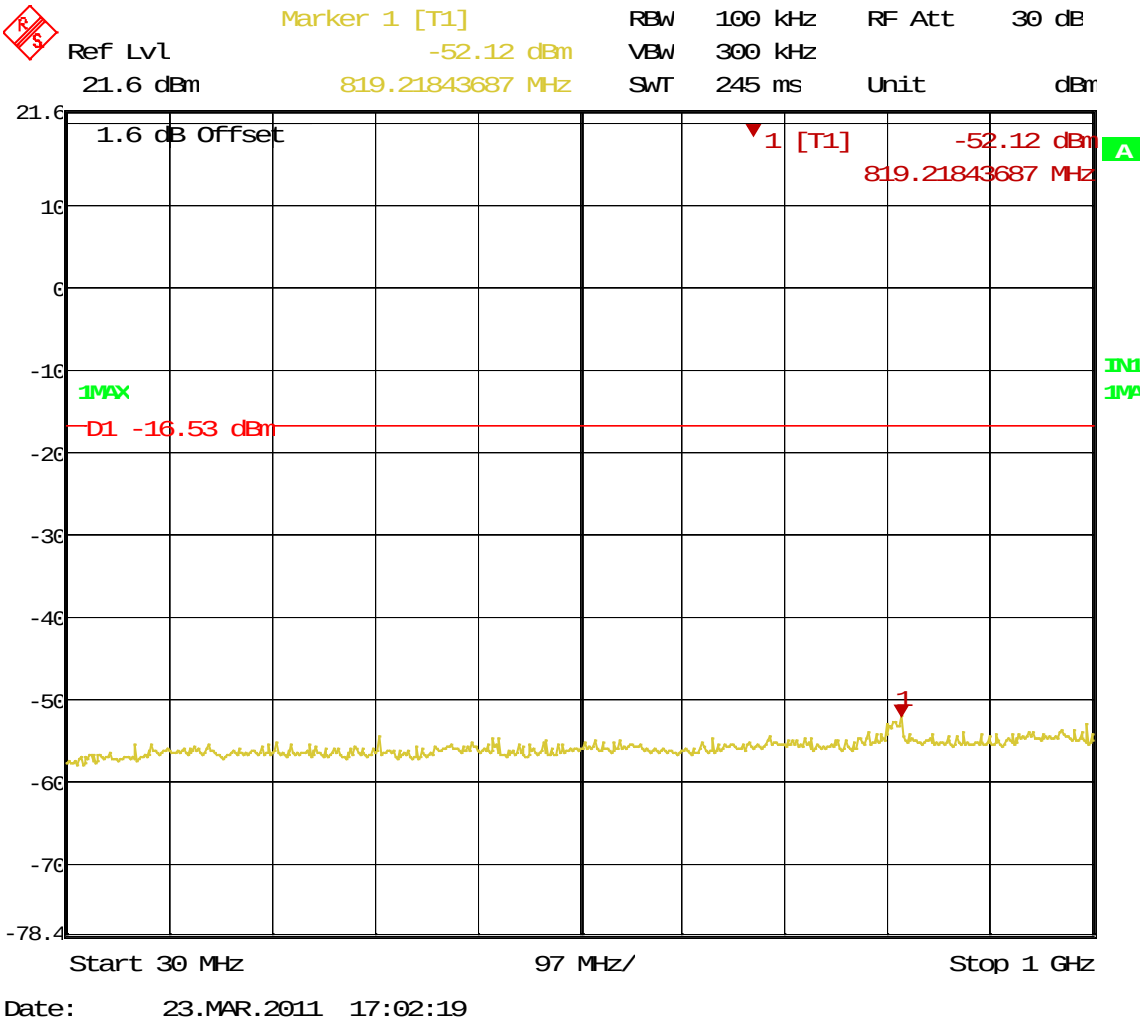


Figure 31: Out of Band Emission for Channel 2437 MHz at 54Mbit/s – Band 1

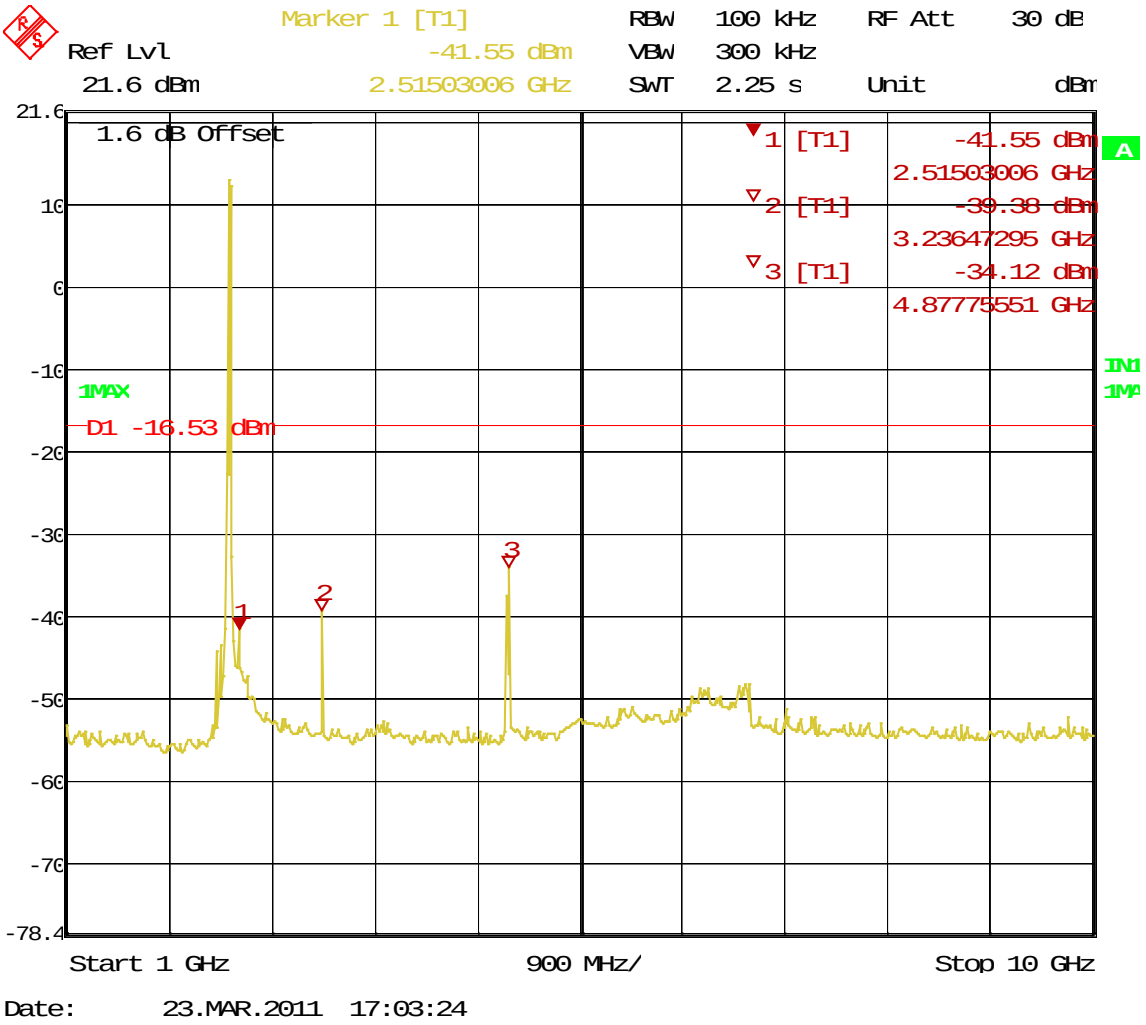


Figure 32: Out of Band Emission for Channel 2437 MHz at 54Mbit/s – Band 2

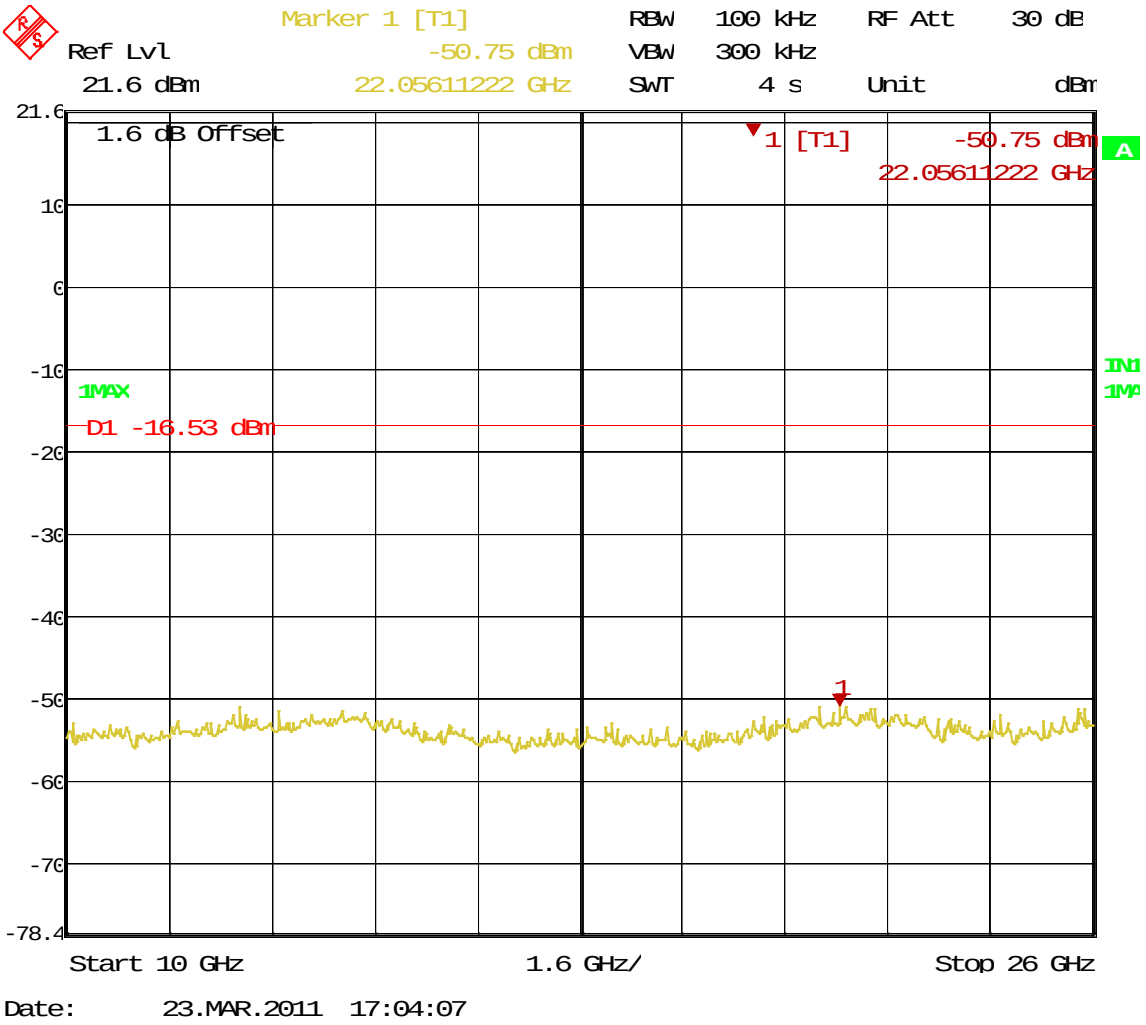


Figure 33: Out of Band Emission for Channel 2437 MHz at 54Mbit/s – Band 3

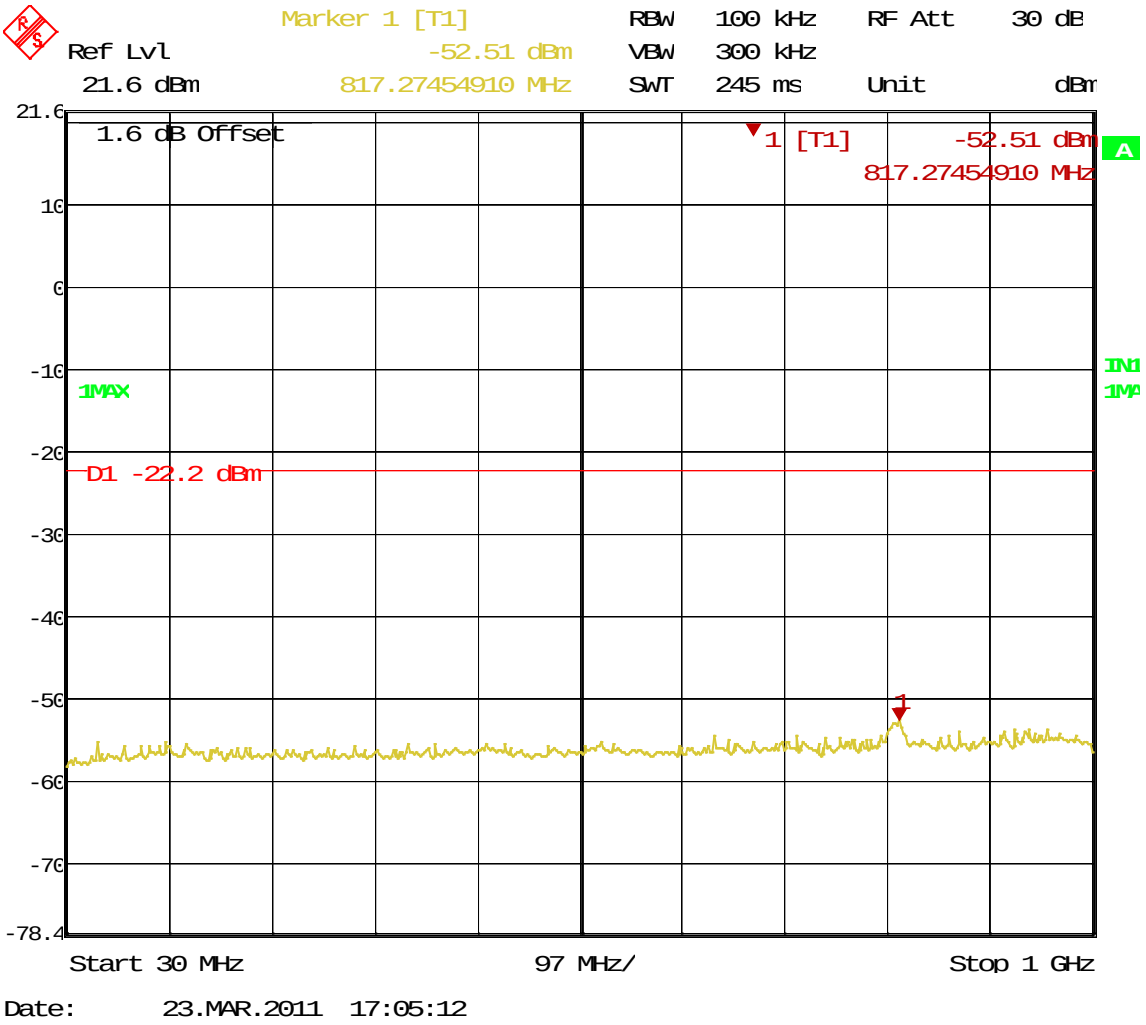


Figure 34: Out of Band Emission for Channel 2462 MHz at 54Mbit/s – Band 1

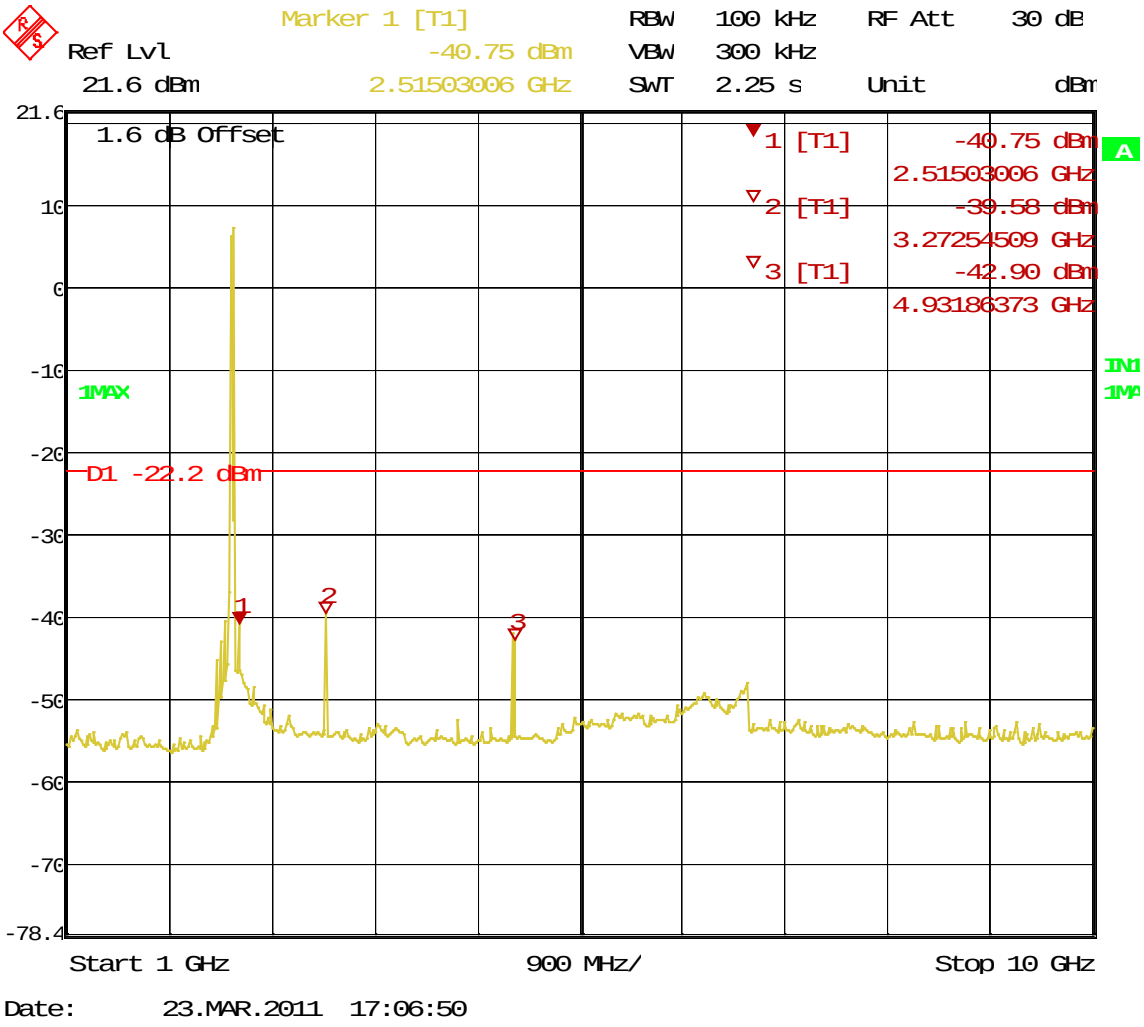


Figure 35: Out of Band Emission for Channel 2462 MHz at 54Mbit/s – Band 2

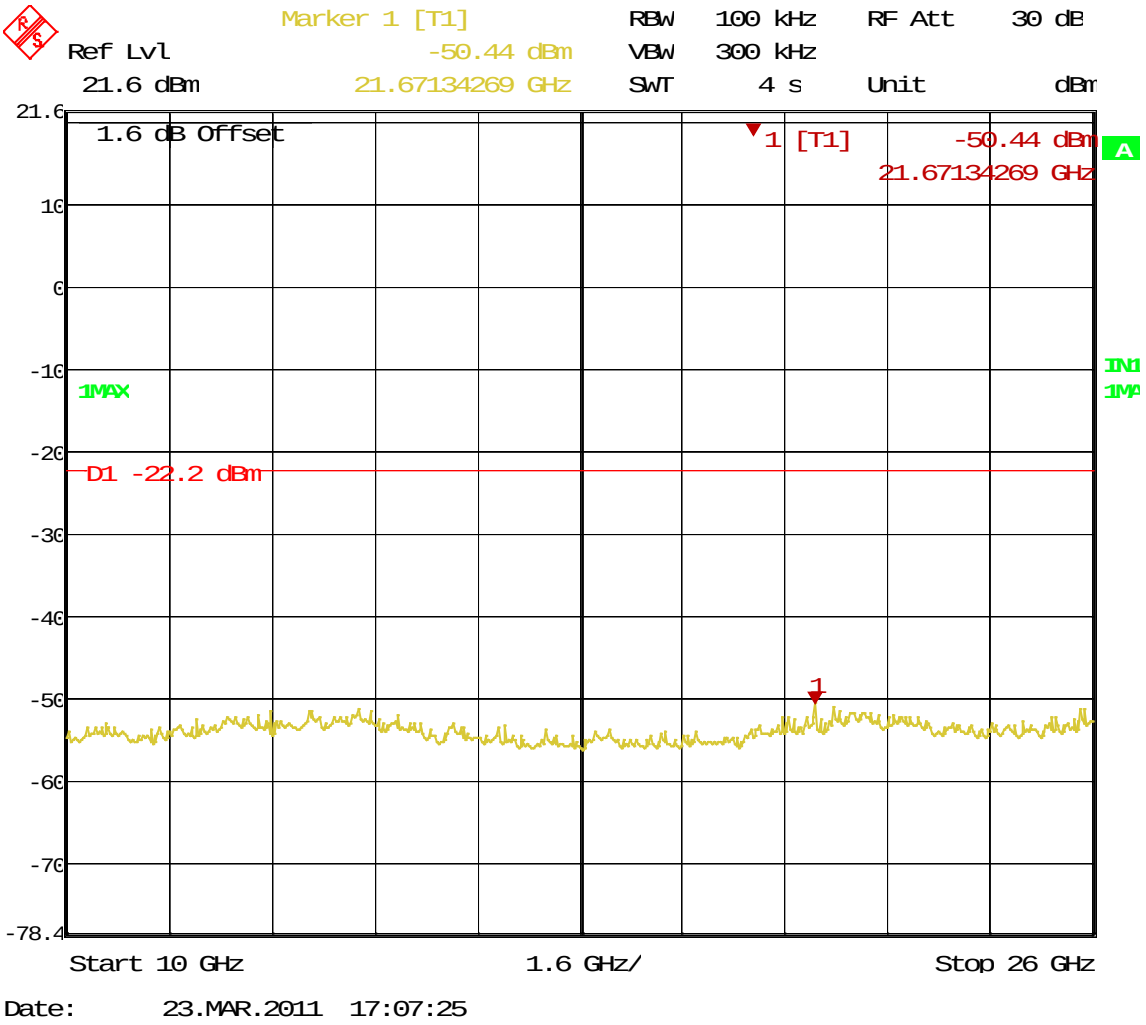


Figure 36: Out of Band Emission for Channel 2462 MHz at 54Mbit/s – Band 3

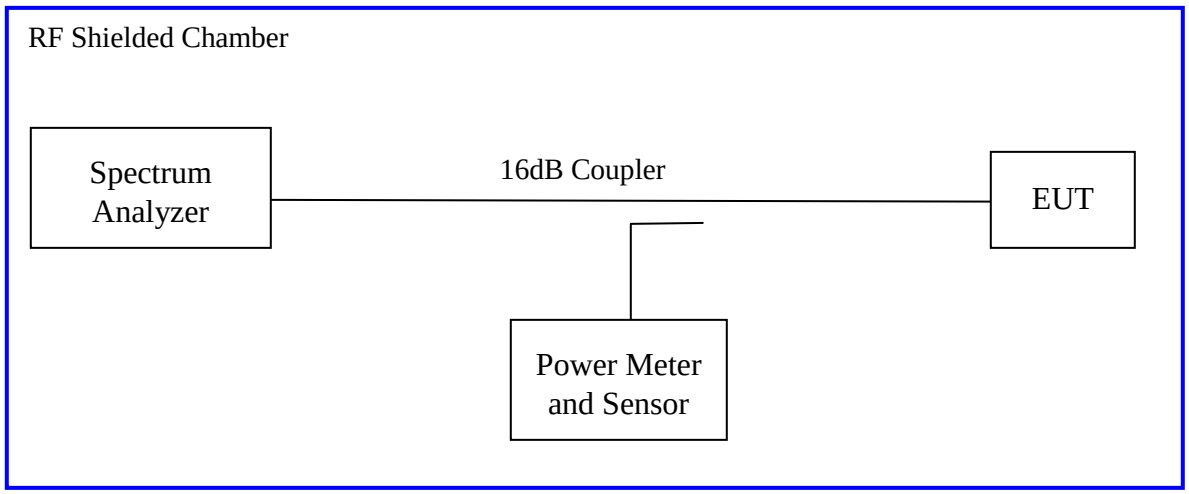
4.4 Peak Power Spectral Density

According to the CFR47 Part 15.247 (e) and RSS 210 (A8.2), the spectral power density output of the antenna port shall be less than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

4.4.1 Test Method

The conducted method was used to measure the channel power output per ANSI C63.10:2009 Section 6.11.2. The measurement was performed with modulation per CFR47 Part 15.247 (e) and RSS 210 (A8.2). This test was conducted on 3 channels of Sample SN 221029024922. The worst sample result indicated below.

Test Setup:



4.4.2 Results

As originally tested, the EUT was found to be compliant to the requirements of the test standard(s).

Table 8: Peak Power Spectral Density – Test Results

Test Conditions: Conducted Measurement, Normal Temperature and Voltage only				
Antenna Type: Integrated		**Power Setting:** See test plan		
Max. Antenna Gain: +3.0 dBi		**Signal State:** Modulated		
Ambient Temp.: 21 °C		**Relative Humidity:**34%		
Peak Power Spectral Density Test Results				
Operating Channel	**Mode**	**PPSD [dBm]**	**Limit [dBm]**	**Margin [dB]**
2412 MHz	11 Mbps	-5.30	8.0	-13.30
2437 MHz	11 Mbps	4.92	8.0	-3.08
2462 MHz	11 Mbps	-3.66	8.0	-11.66
2412 MHz	54 Mbps	-6.12	8.0	-14.12
2437 MHz	54 Mbps	-1.06	8.0	-9.06
2462 MHz	54 Mbps	-4.28	8.0	-12.28
Note: None				

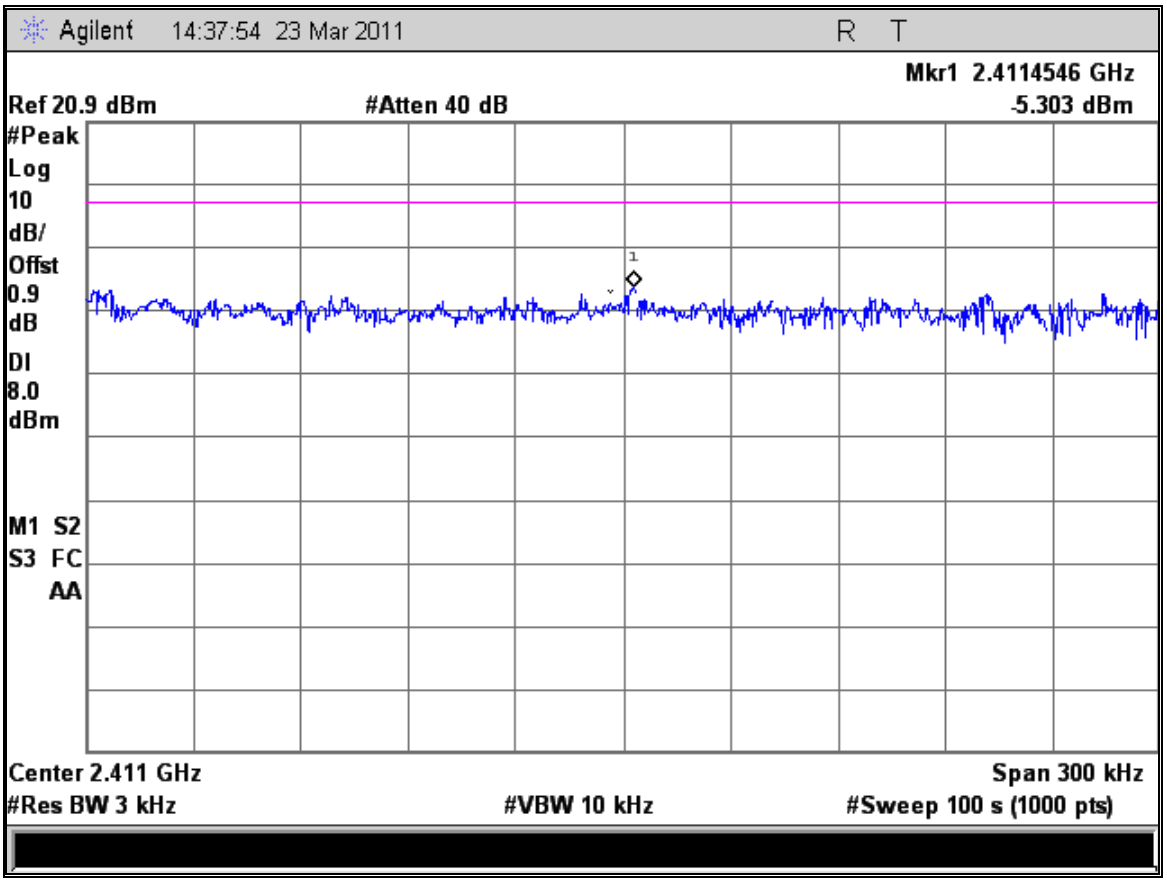


Figure 37: Peak Power Spectral Density for Operating Channel 2412 MHz – 11 Mbps

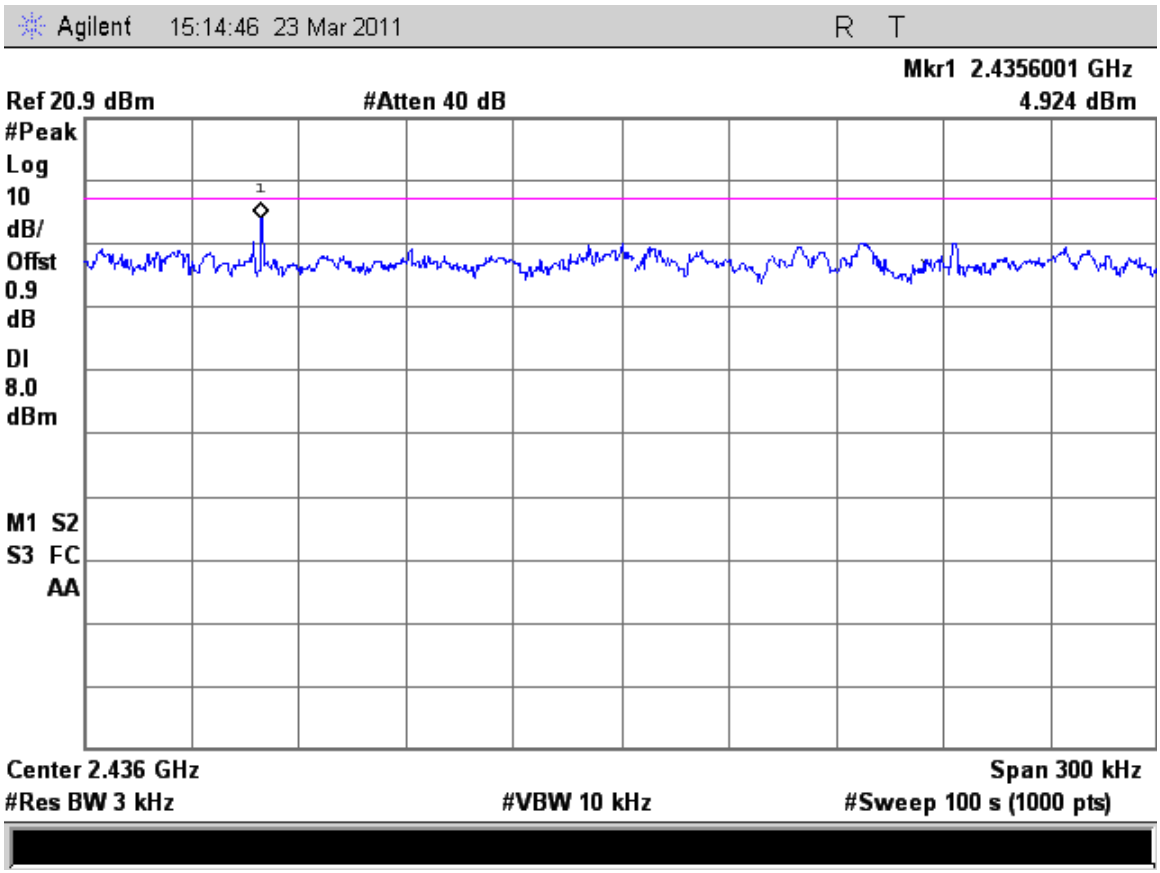


Figure 38: Peak Power Spectral Density for Operating Channel 2437 MHz – 11 Mbps

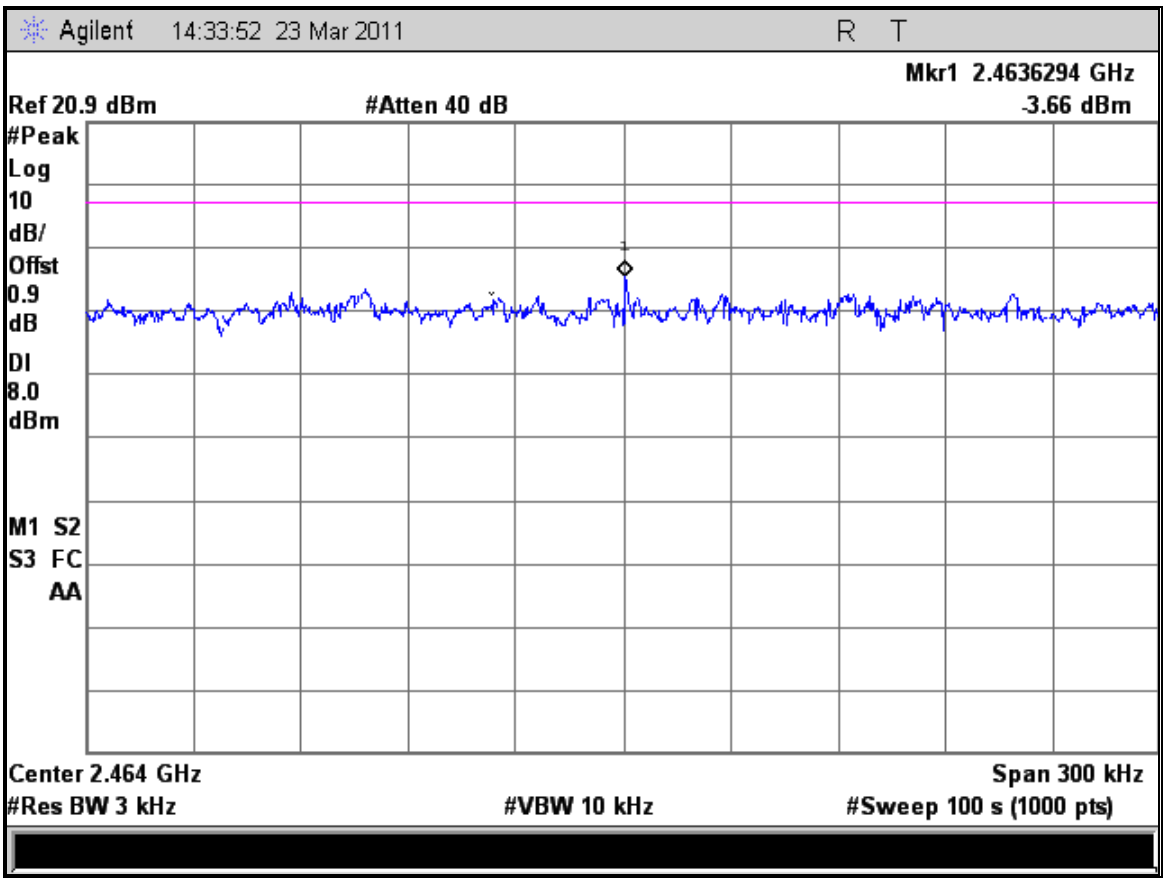


Figure 39: Peak Power Spectral Density for Operating Channel 2462 MHz – 11 Mbps

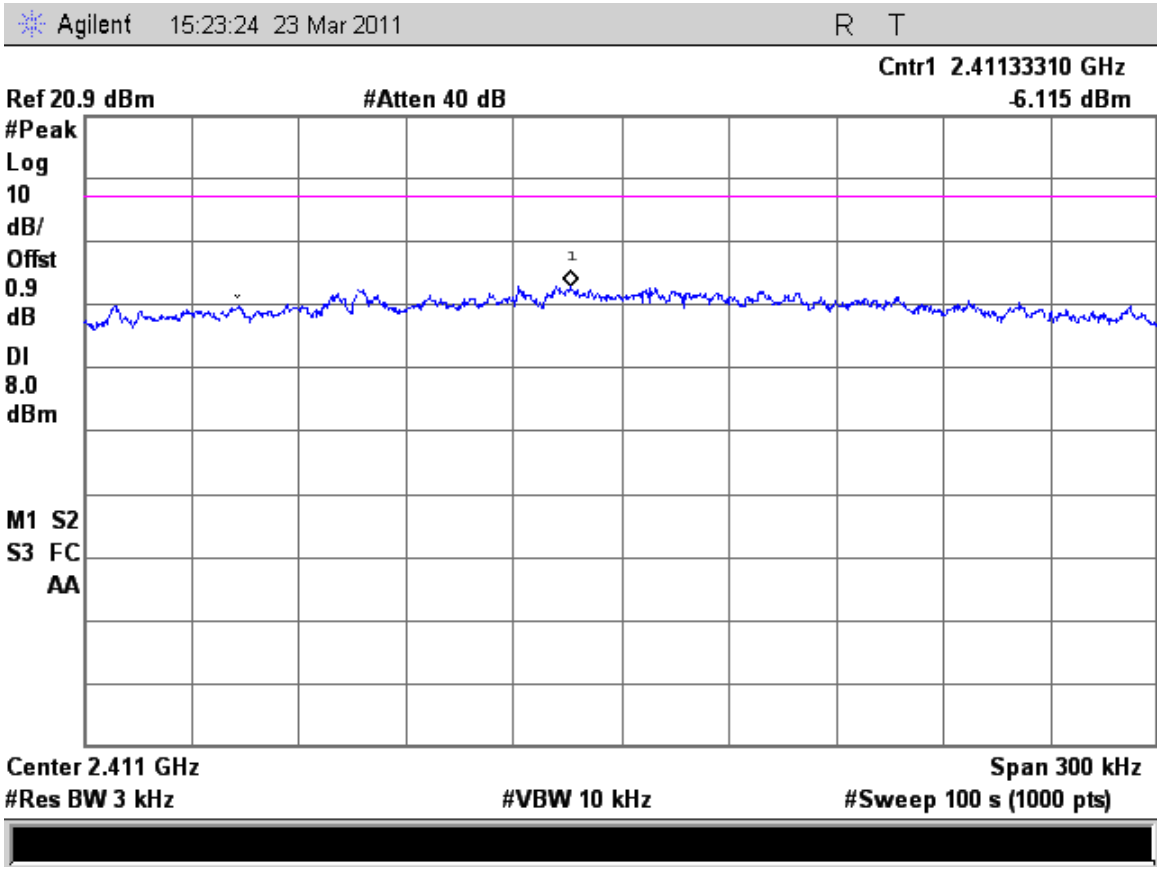


Figure 40: Peak Power Spectral Density for Operating Channel 2412 MHz – 54 Mbps

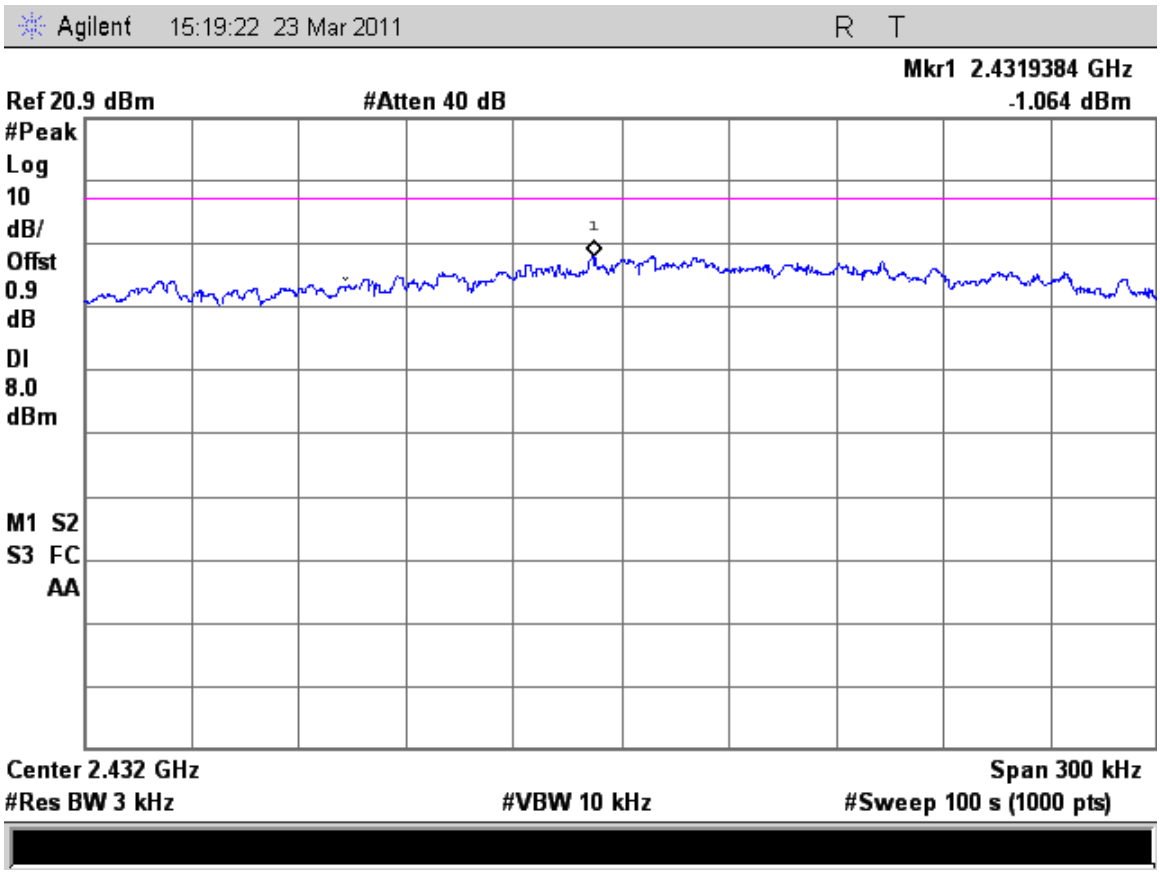


Figure 41: Peak Power Spectral Density for Operating Channel 2437 MHz – 54 Mbps

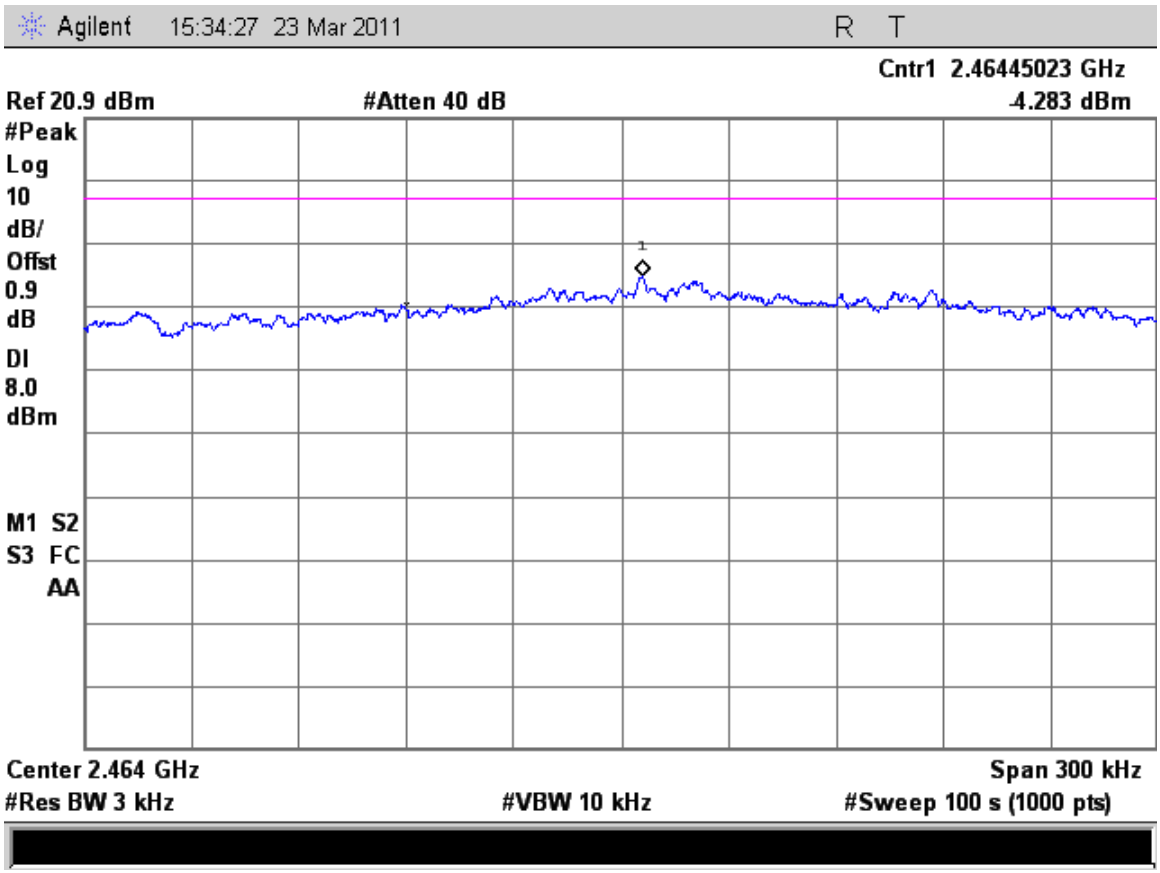


Figure 42: Peak Power Spectral Density for Operating Channel 2462 MHz – 54 Mbps

4.5 Maximum Permissible Exposure

4.5.1 Test Methodology

In this document, we try to prove the safety of radiation harmfulness to the human body for our product. The limit for Maximum Permissible Exposure (MPE) specified in FCC 1.1310 is followed. The Gain of the antenna used in this product is measured in a Semi-Anechoic Chamber, and also the maximum total power input to the antenna is measured. Through the Friis transmission formula and the maximum gain of the antenna, we can calculate the distance, away from the product, where the limit of MPE is reached.

Although the Friis transmission formula is a far field assumption, the calculated result of that is an over-prediction for near field power density. We will take that as the worst case to specify the safety range.

4.5.2 RF Exposure Limit

According to FCC 1.1310 table 1: The criteria listed in the following table shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified in 1.1307(b)

LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm^2)	Average Time (minutes)
(A)Limits For Occupational / Control Exposures				
300 - 1500	…	…	F/300	6
1500 - 100,000	…	…	5	6
(B)Limits For General Population / Uncontrolled Exposure				
300 - 1500	…	…	F/1500	6
1500 - 100,000	…	…	1.0	30

F = Frequency in MHz

4.5.3 EUT Operating Condition

The software provided by Manufacturer enabled the EUT to transmit data at lowest, middle and highest channel individually.

4.5.4 Classification

The antenna of the product, under normal use condition, is at least 20cm away from the body of the user. Warning statement to the user for keeping at least 20cm or more separation distance with the antenna should be included in users manual. So, this device is classified as a **Mobile Device**.

4.5.5 Test Results

4.5.5.1 Antenna Gain

The transmitting antenna was integrated. The antenna gain was +3.0 dBi or 2.0 (numeric).

4.5.5.2 Output Power into Antenna & RF Exposure value at distance 20cm:

Calculations for this report are based on highest power measurement.

Limit for MPE (from FCC part 1.1310 table1) is 1.0 mW/cm^2

The highest measured power is +25.29 dBm or 338.06mW

Using the Friss transmission formula, the EIRP is Pout*G, and R is 20cm.

Pd = (338.06*2.0) / (1600π) = 0.1346 mW/cm2, which is 0.8654 mW/cm2 below to the limit.

As originally tested, the EUT was found to be compliant to the requirements of the test standard(s).

4.5.6 Sample Calculation

The Friis transmission formula: $Pd = (Pout*G) / (4*\pi*R^2)$

Where;

Pd = power density in mW/cm^2
Pout = output power to antenna in mW
G = gain of antenna in linear scale
$\pi \approx 3.1416$
R = distance between observation point and center of the radiator in cm

Ref. : David K. Cheng, *Field and Wave Electromagnetics*, Second Edition, Page 640, Eq. (11-133).

4.6 Transmitter Spurious Emissions

Transmitter spurious emissions are emissions outside the frequency range of the equipment when the equipment is in transmit mode; per requirement of CFR47 15.205, 15.209, 15.247(d), RSS 210 Sect. A.8.5

4.6.1 Test Methodology

4.6.1.1 Preliminary Test

A test program that controls instrumentation and data logging was used to automate the preliminary RF emission test procedure. The frequency range of interest was divided into sub-ranges to yield a frequency resolution of approximately 120 kHz and provide a reading at each frequency for no more than 12° of turntable rotation. For each frequency sub-range the turntable was rotated 360° while peak emission data was recorded and plotted over the frequency range of interest in horizontal and vertical antenna polarization's.

Preliminary emission profile testing was performed inside the anechoic chamber. The EUT was placed on a 1.0m x 1.5m non-conductive table 80cm above the floor. The EUT was positioned as shown in the setup photographs. The receiving antenna was placed at a distance of 3m at a fixed height of 1m. Measurement equipment was located outside of the chamber. A video camera was placed inside the chamber to view the EUT.

4.6.1.2 Final Test

For each frequency measured, the peak emission was maximized by manipulating the receiving antenna from 1 to 4 meters above the ground plane and placing it at the position that produced the maximum signal strength reading. The turntable was then rotated through 360° while observing the peak signal and placing the EUT at the position that produced maximum radiation. The six highest emissions relative to the limit were measured unless such emissions were more than 20 dB below the limit. If less than six emissions are within 20 dB of the limit, than the noise level of the receiver is measured at frequencies where emissions are expected. Multiples of all oscillator and microprocessor frequencies were also checked.

Final testing was performed on an NSA compliant test site. The EUT was placed on a 1.0m x 1.5m non-conductive table 80cm above the ground plane. The placement of EUT and cables were the same as for preliminary testing and is shown in the setup photographs.

The final spurious emission scans performed on the worst axis for three operating channels;

For 30MHz to 1GHz EUT positioned vertically, and scans were performed at 2412 MHz, 2437 MHz, and 2462 MHz at 1Mbit/s for 802.11b mode.

For above 1GHz EUT positioned horizontally, and scans were performed at 2412 MHz, 2437 MHz, and 2462 MHz at 1Mbit/s for 802.11b mode.

The final band-edge radiated emission scans performed on the worst axis for three operating channels; 2412 MHz, 2437 MHz, and 2462 MHz at 6Mbit/s for 802.11g mode with EUT positioned vertically.

4.6.1.3 Deviations

None.

4.6.2 Transmitter Spurious Emission Limit

The spurious emissions of the transmitter shall not exceed the values in CFR47 Part 15.205, 15.209: 2010 and RSS 210 A1.1.2 2010.

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490.....	2400/F(kHz)	300
0.490-1.705.....	24000/F(kHz)	30
1.705-30.0.....	30	30
30-88.....	100 **	3
88-216.....	150 **	3
216-960.....	200 **	3
Above 960.....	500	3

All harmonics and spurious emission which are outside of the restricted band shall be 20dB below the in-band peak emission.

4.6.3 Test Results

The final measurement data was taken under the worst case operating modes, configurations, and/or cable positions. It also reflects the results including any modifications and/or special accessories listed in Sections 1.4 and 1.5.

As originally tested, the EUT was found to be compliant to the requirements of the test standard(s).

Table 9: Transmit Spurious Emission at Band-Edge Requirements

Test Conditions: Radiated Measurement, Normal Temperature and Voltage only							
Antenna Type: Integrated			**Power Setting:** See test plan				
Max. Antenna Gain: + 3.0 dBi			**Signal State:** Modulated				
Ambient Temp.: 22 °C			**Relative Humidity:**34%				
Band-Edge Results							
Operating Channel	**EUT Position**	**Polarity**	**Pk Plots**	**Peak Limit**	**Ave. Plots**	**Ave. Limit**	**Result**
2412 MHz	Y-Axis	Horizontal	Fig. 43	74.00	Fig. 44	54.00	Pass
2412 MHz	Y-Axis	Vertical	Fig. 45	74.00	Fig. 46	54.00	Pass
2437 MHz	Y-Axis	Horizontal	Fig. 47	74.00	Fig. 48	54.00	Pass
2437 MHz	Y-Axis	Vertical	Fig. 49	74.00	Fig. 50	54.00	Pass
2462 MHz	Y-Axis	Horizontal	Fig. 51	74.00	Fig. 52	54.00	Pass
2462 MHz	Y-Axis	Vertical	Fig. 53	74.00	Fig. 54	54.00	Pass

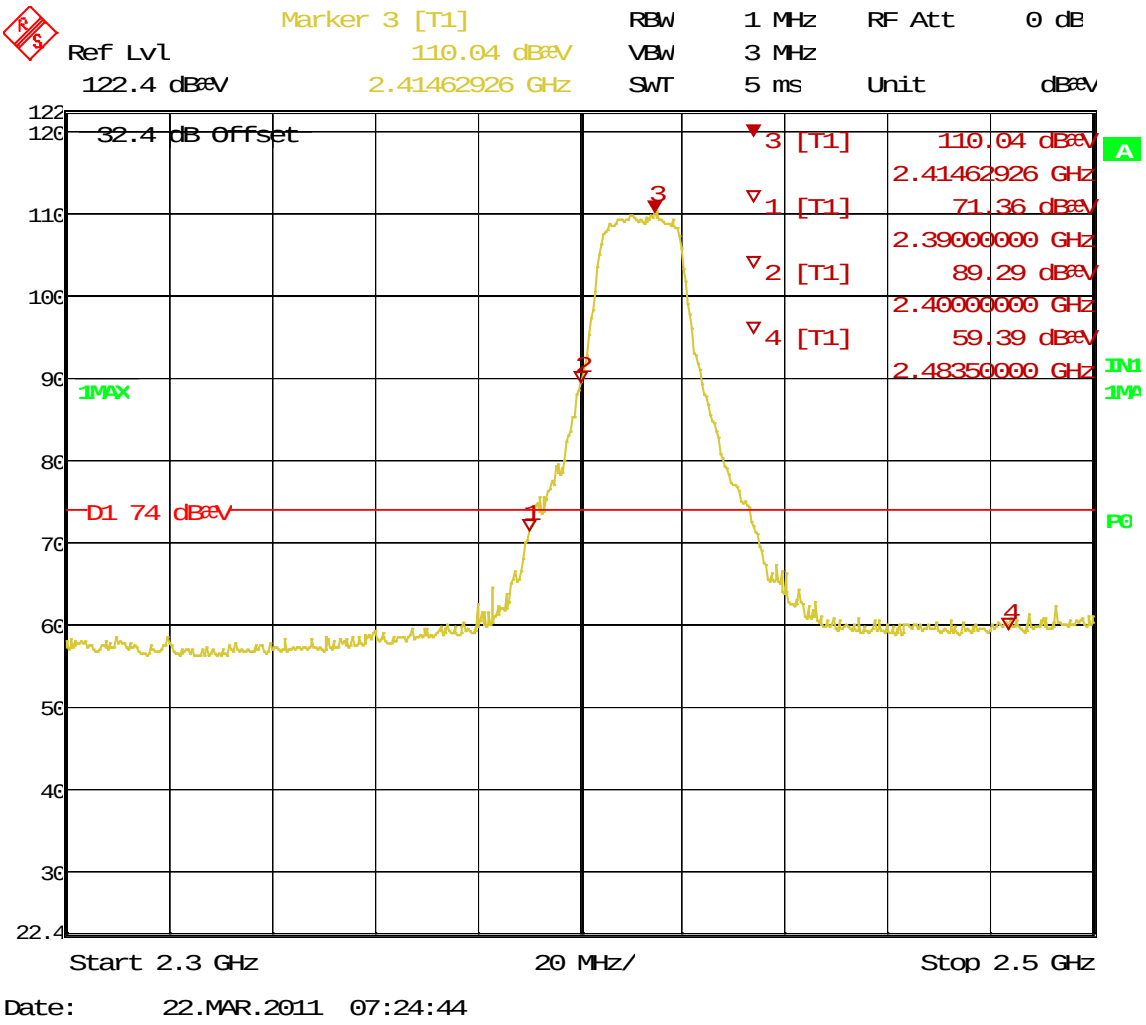


Figure 43: Radiated Emission at the Edge for Channel 2412 MHz at 6 Mbps – Horizontal (Peak)

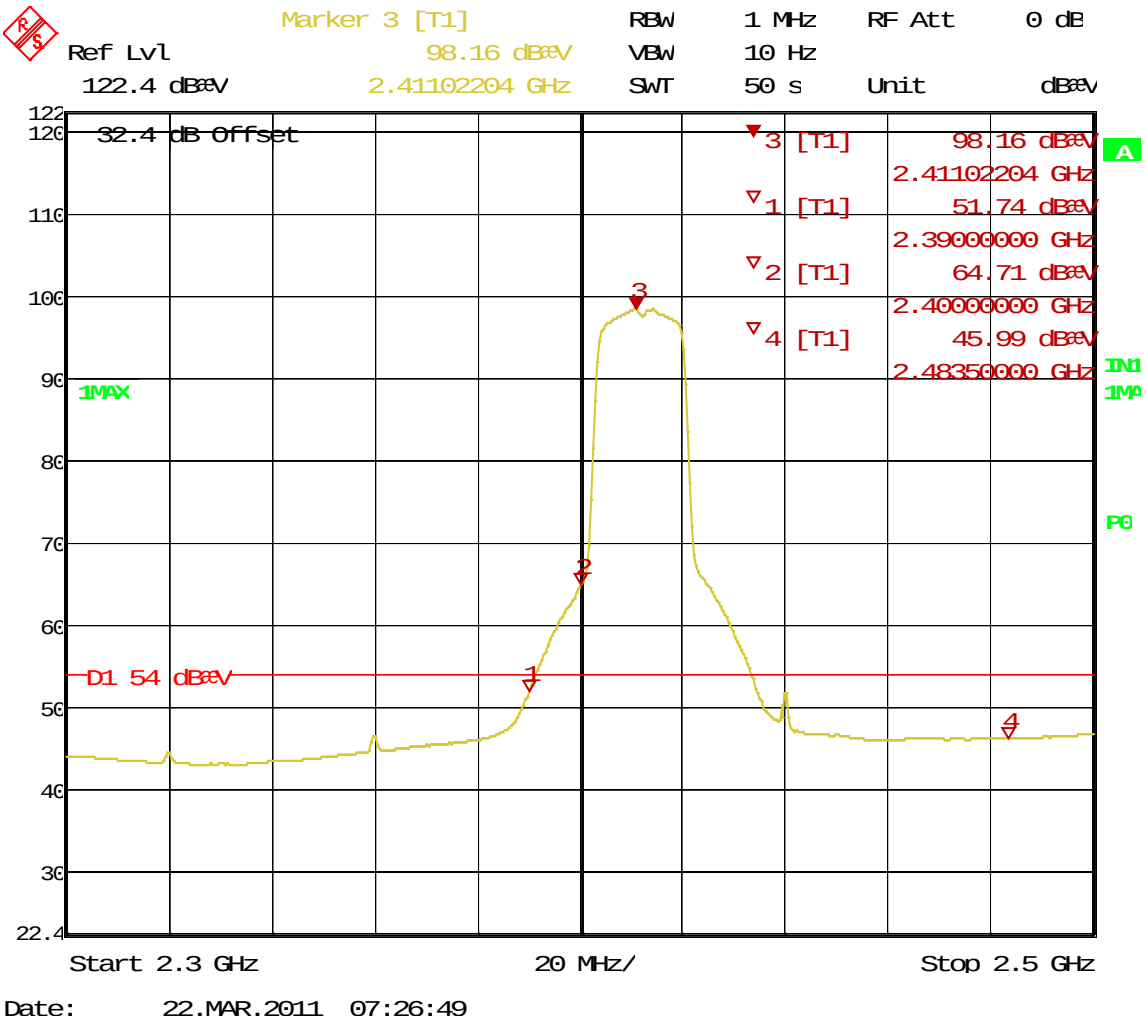


Figure 44: Radiated Emission at the Edge for Channel 2412 MHz at 6 Mbps – Horizontal (Ave.)

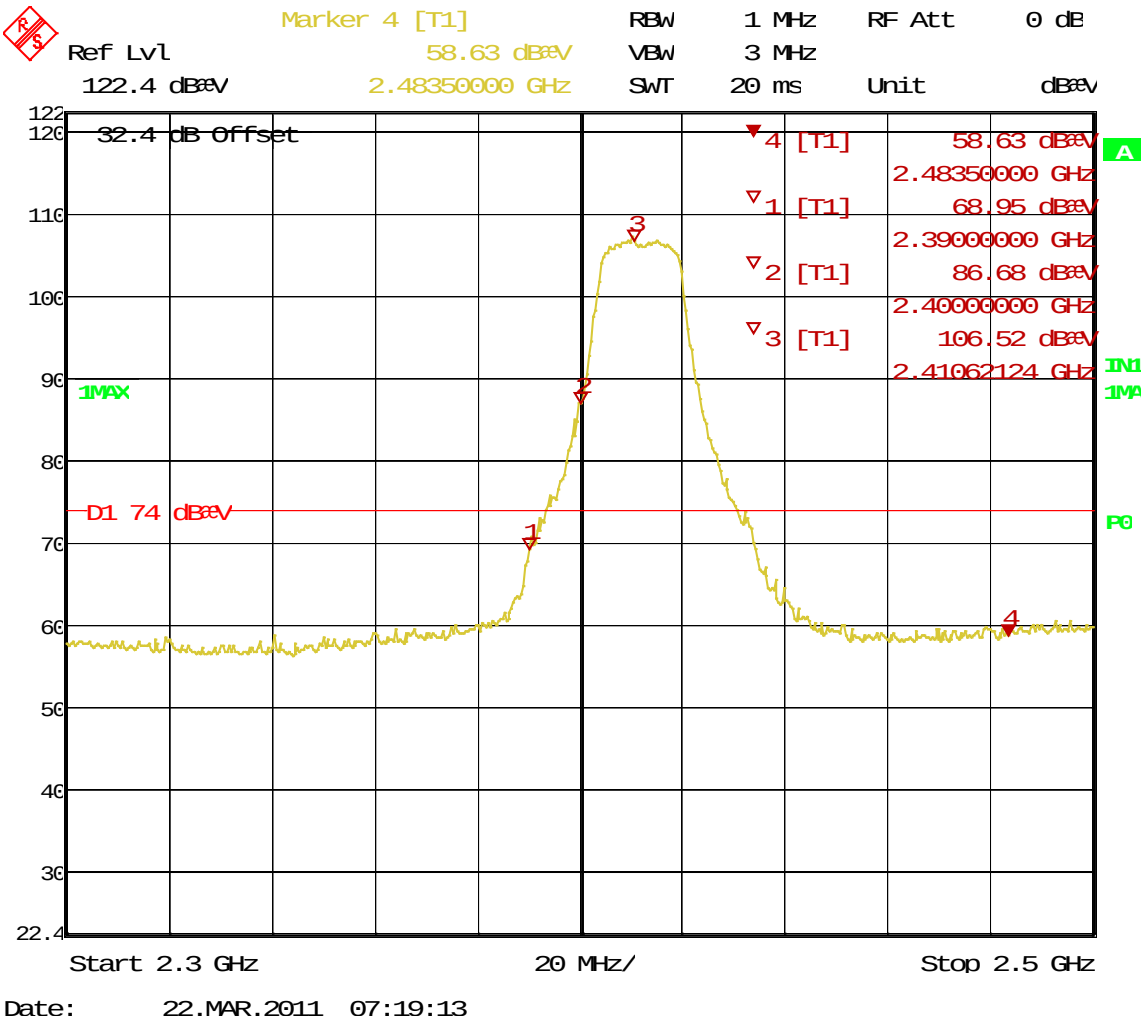


Figure 45: Radiated Emission at the Edge for Channel 2412 MHz at 6 Mbps – Vertical (Peak)

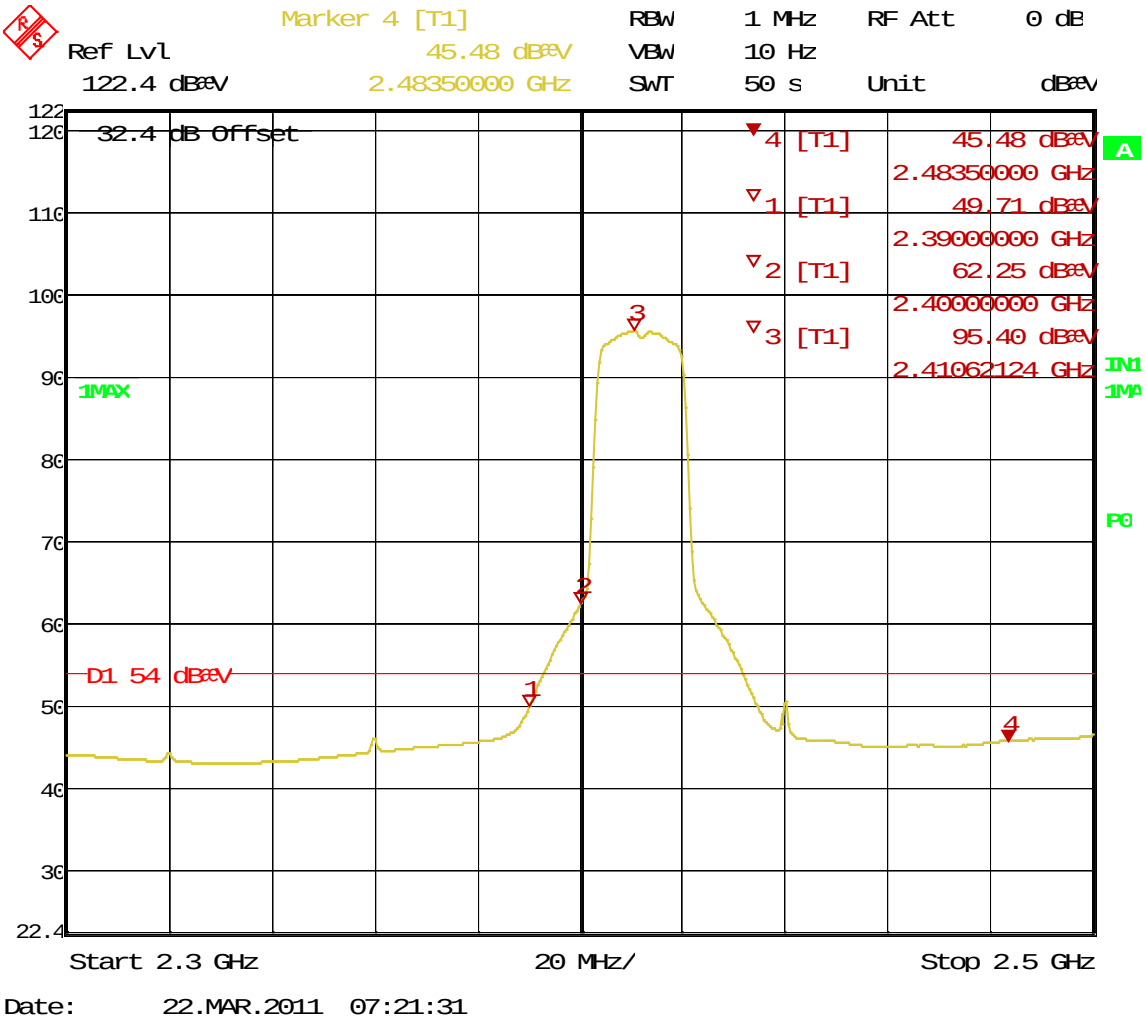


Figure 46: Radiated Emission at the Edge for Channel 2412 MHz at 6 Mbps – Vertical (Ave.)

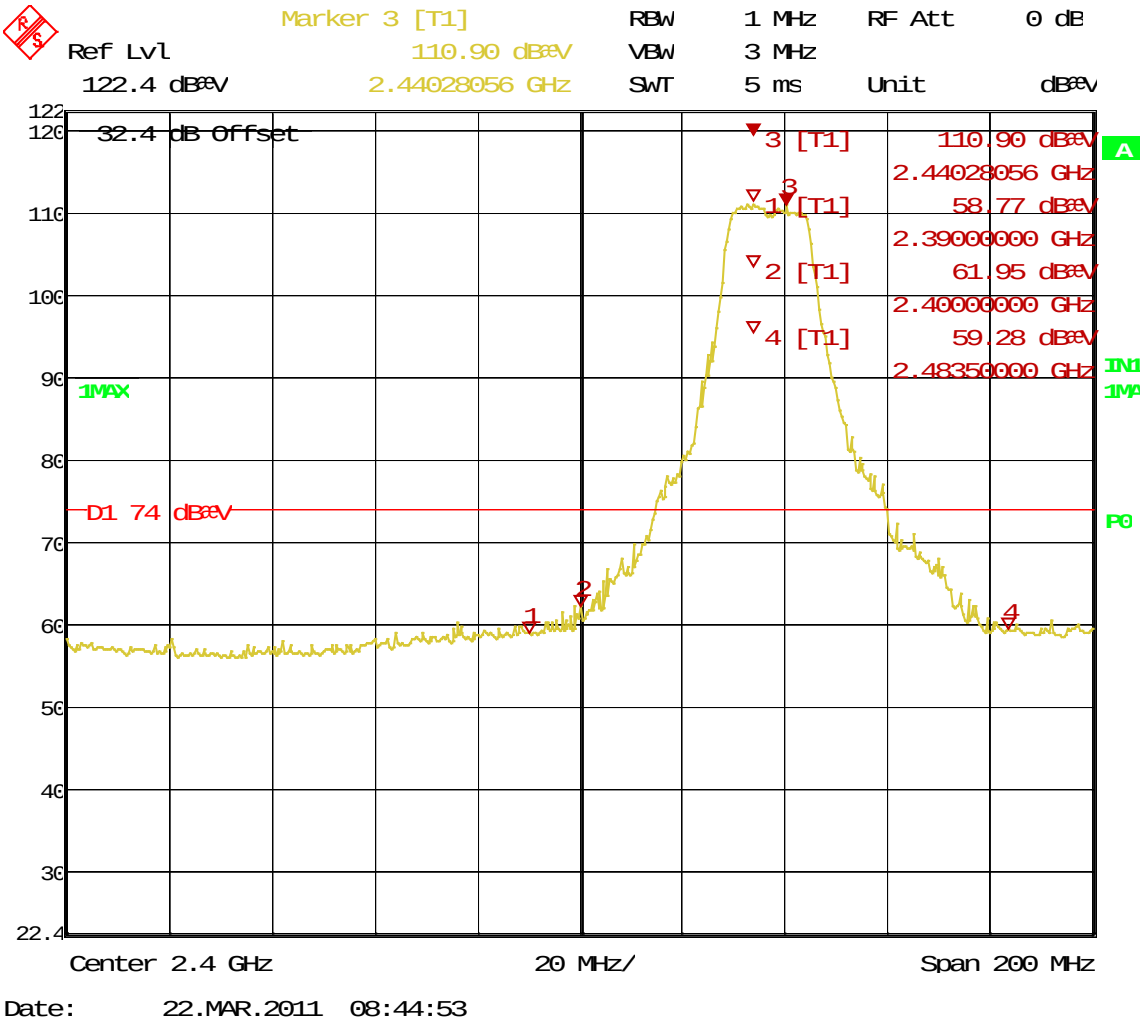


Figure 47: Radiated Emission at the Edge for Channel 2437 MHz at 6 Mbps – Horizontal (Peak)

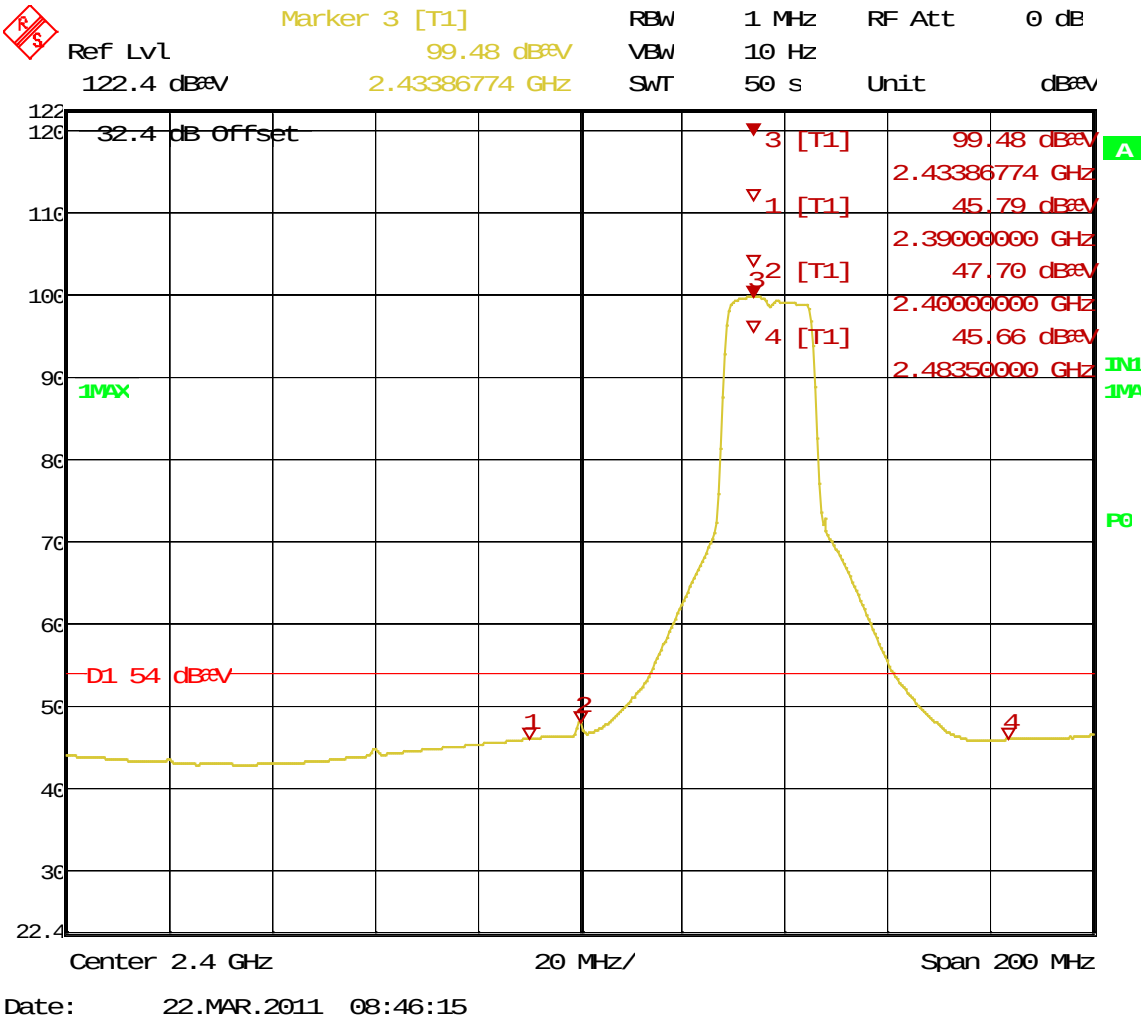


Figure 48: Radiated Emission at the Edge for Channel 2437 MHz at 6 Mbps – Horizontal (Ave.)

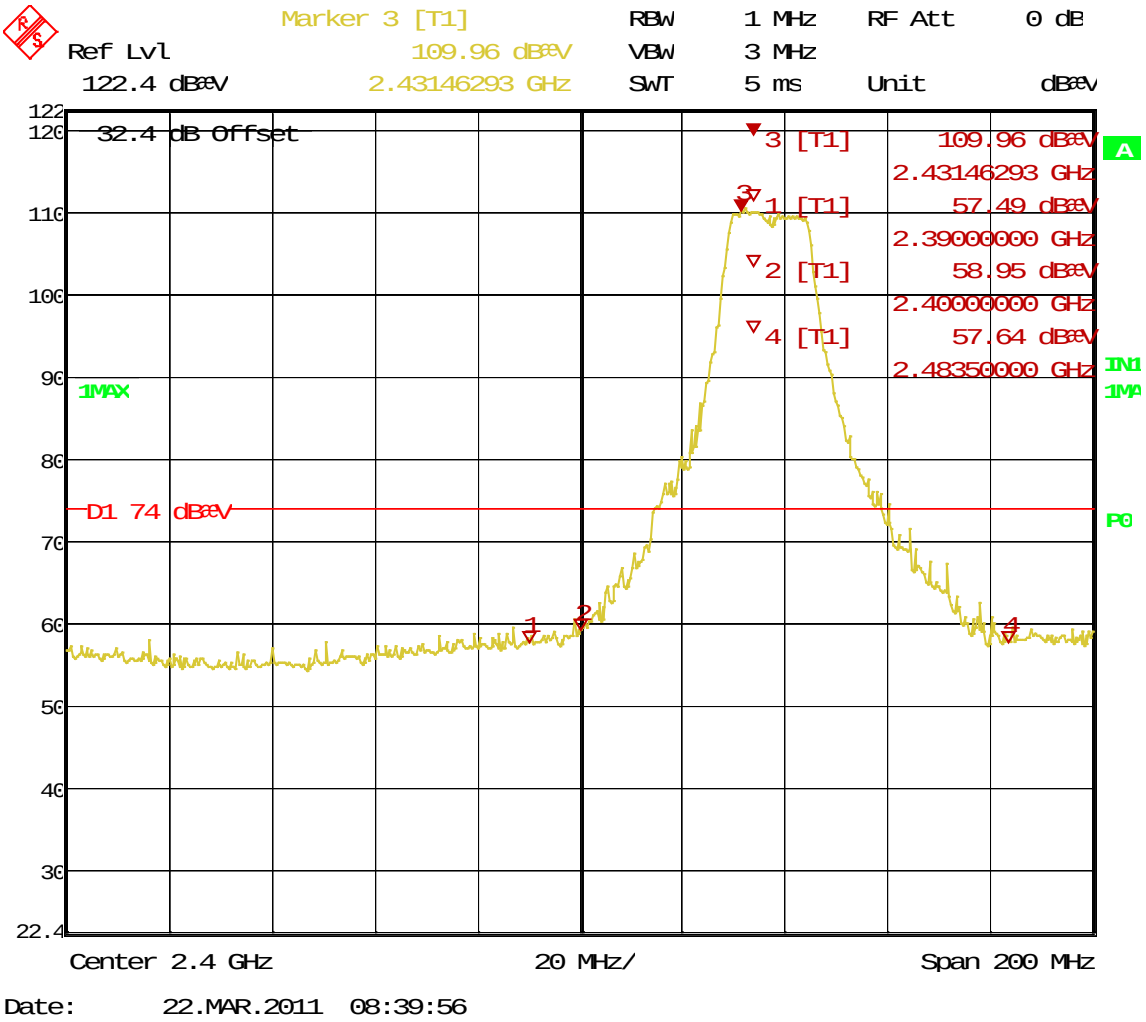


Figure 49: Radiated Emission at the Edge for Channel 2437 MHz at 6 Mbps – Vertical (Peak)

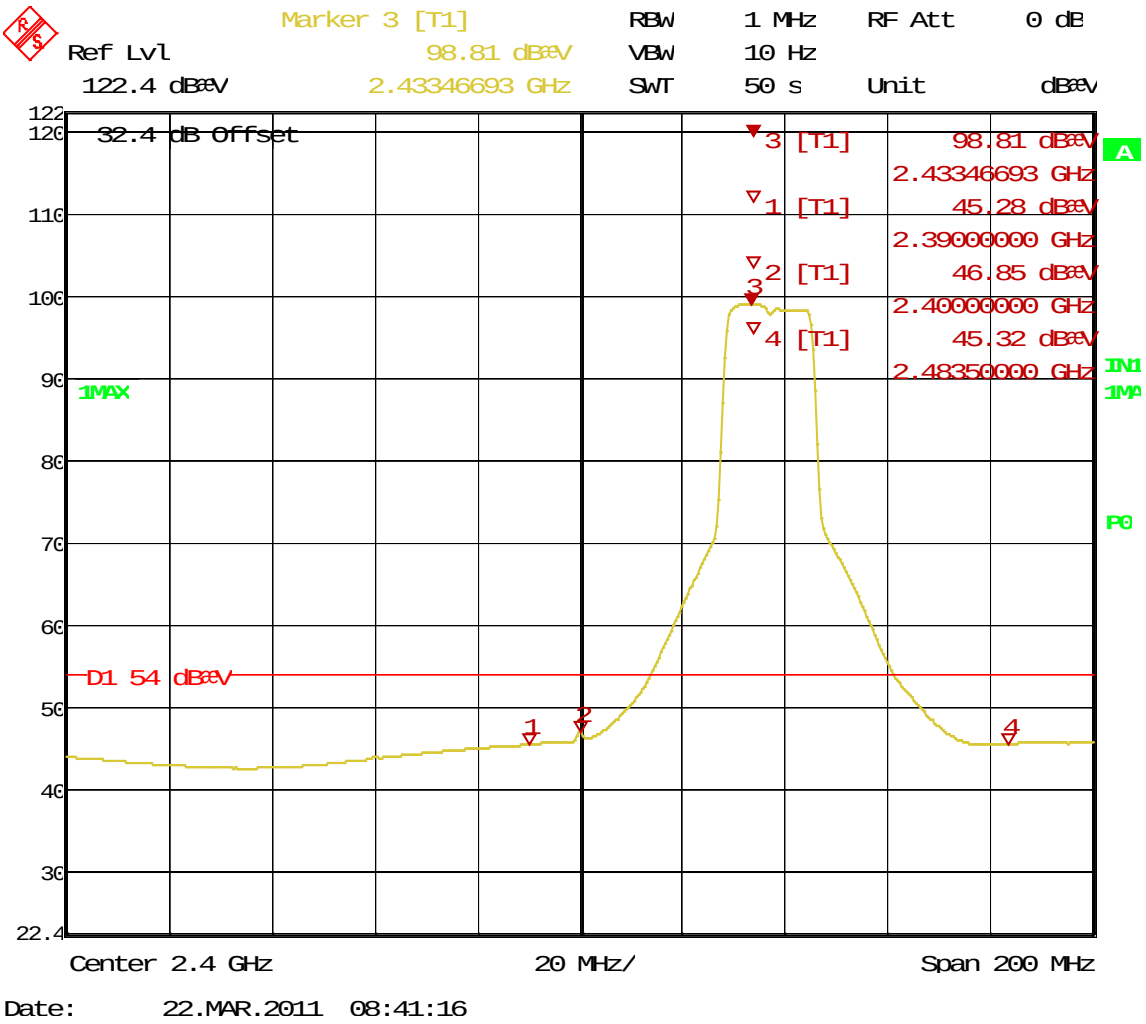


Figure 50: Radiated Emission at the Edge for Channel 2437 MHz at 6 Mbps – Vertical (Ave.)

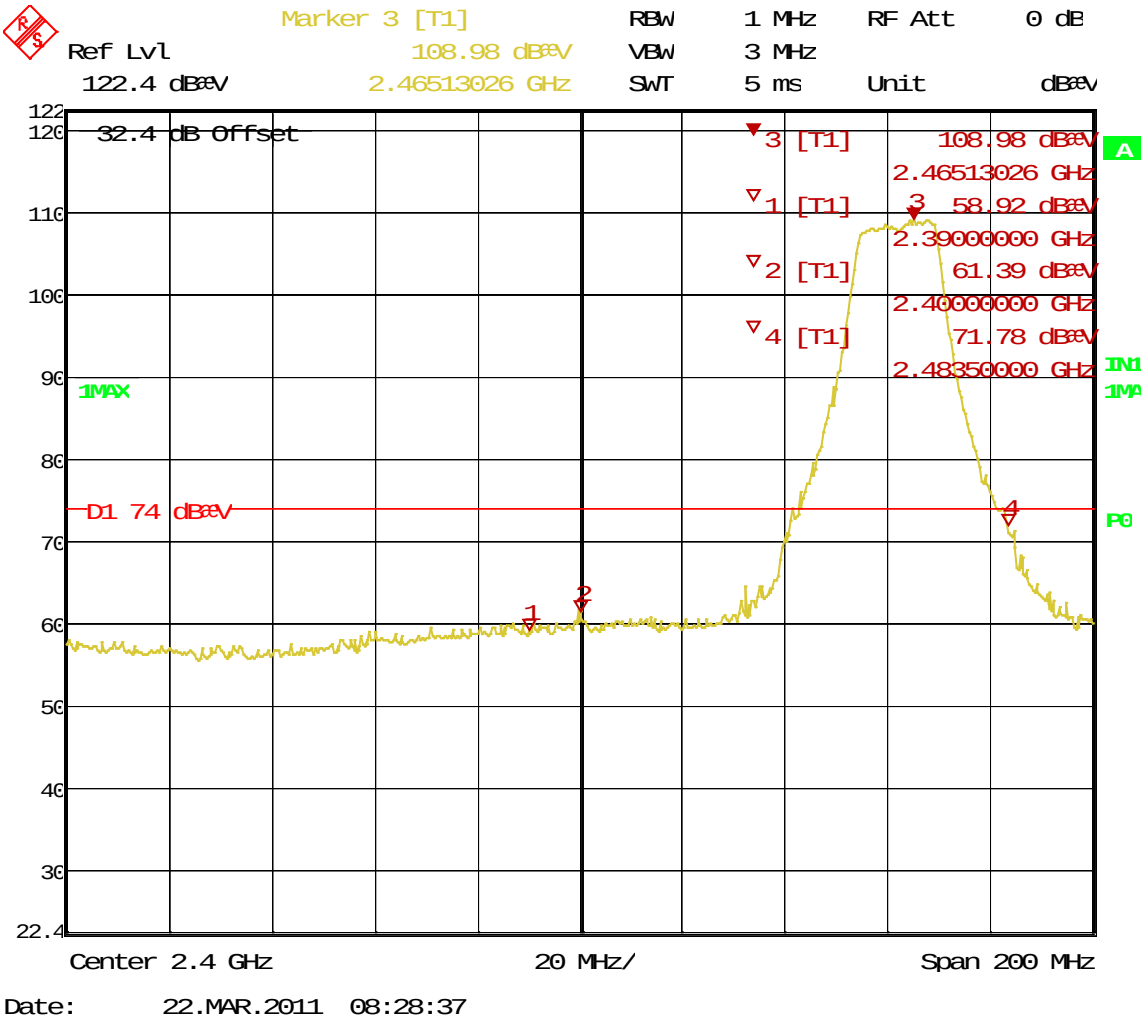


Figure 51: Radiated Emission at the Edge for Channel 2462 MHz at 6 Mbps – Horizontal (Peak)

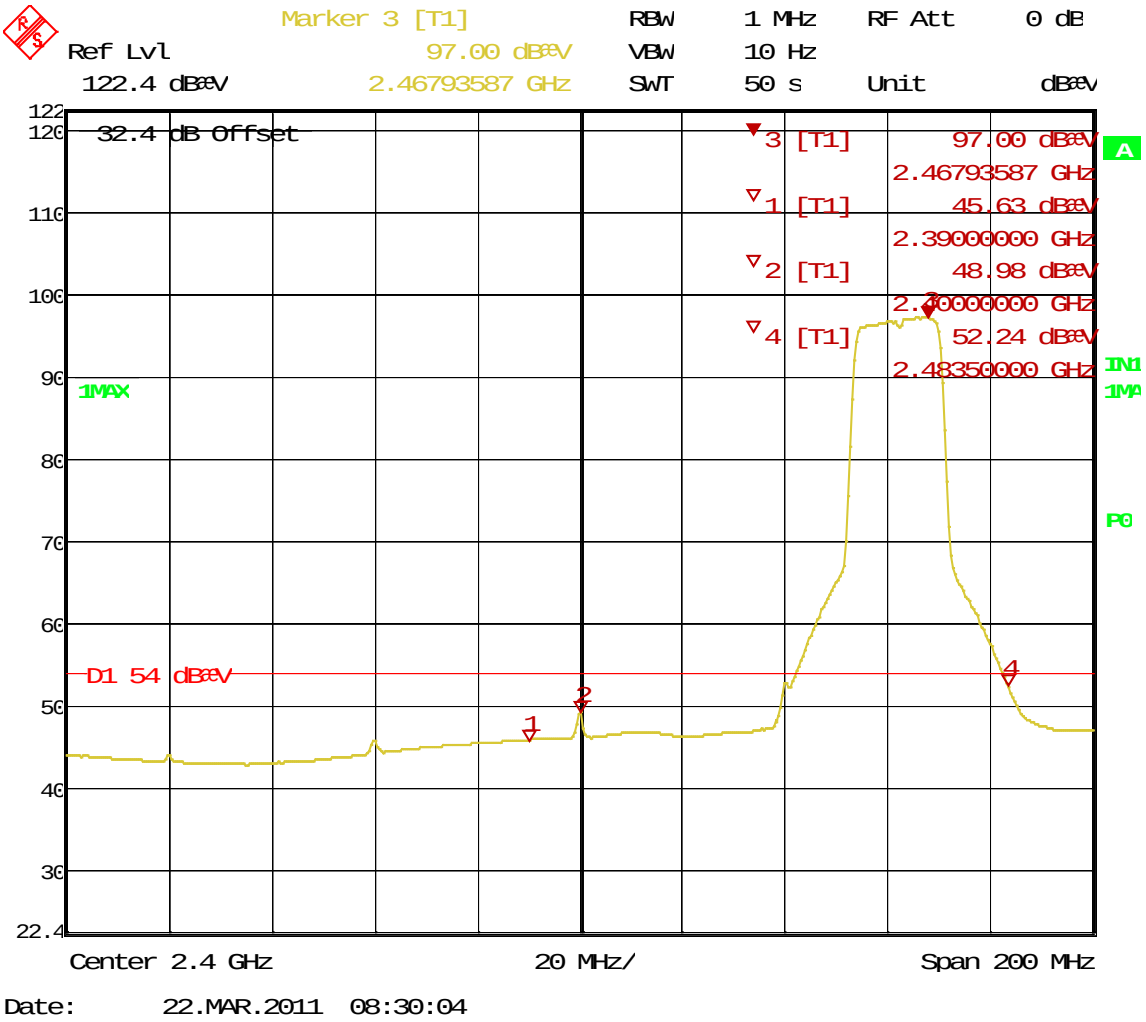


Figure 52: Radiated Emission at the Edge for Channel 2462 MHz at 6 Mbps – Horizontal (Ave.)

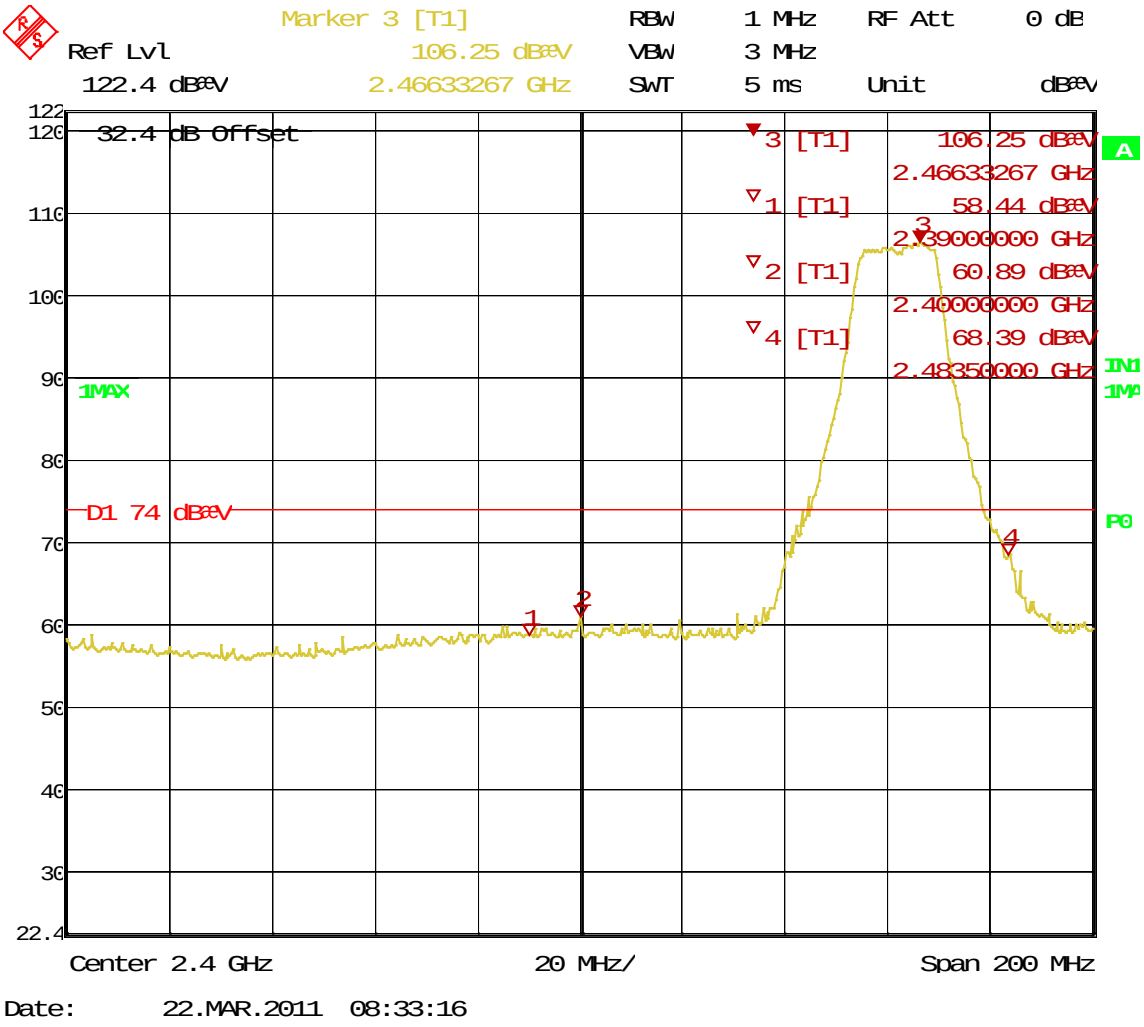


Figure 53: Radiated Emission at the Edge for Channel 2462 MHz at 6 Mbps – Vertical (Peak)

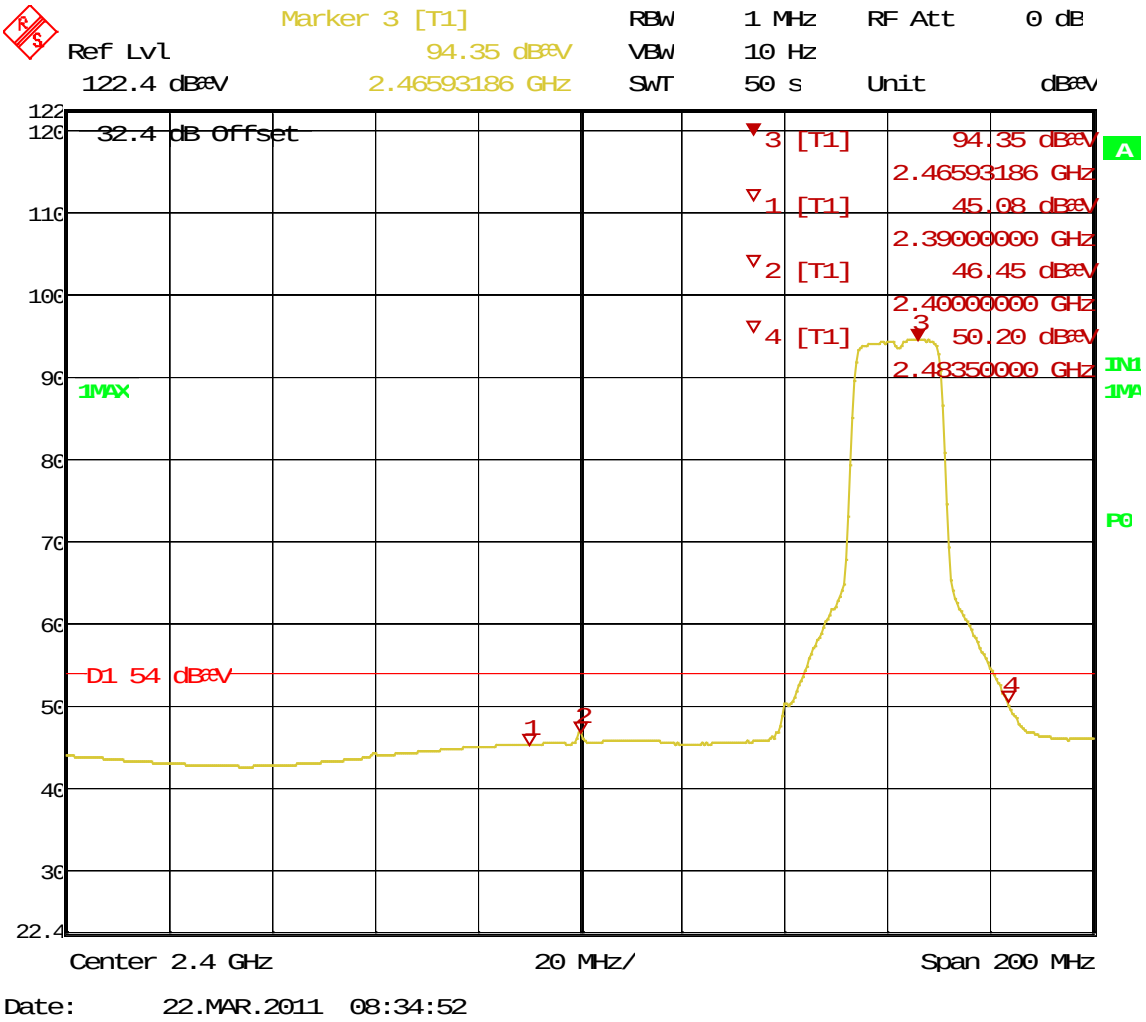


Figure 54: Radiated Emission at the Edge for Channel 2462 MHz at 6 Mbps – Vertical (Ave.)

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EUT Name	Wireless ADSL Residential Gateway	**Date**	March 22, 2010
EUT Model	i38HG	**Temp / Hum in**	23°C / 39%rh
EUT Serial	221029024922	**Temp / Hum out**	N/A
EUT Config.	802.11b, 1Mbps at Y-Axis (30MHz-1GHz)	**Line AC / Freq**	120Vac/60Hz
Standard	CFR47 Part 15 Subpart C	**RBW / VBW**	120 kHz/ 300 kHz
Dist/Ant Used	3m / JB3	**Performed by**	Jeremy Luong

Emission Freq (MHz)	ANT Polar (H/V)	ANT Pos (cm)	Table Pos (deg)	FIM (Pk) Pk (dBuV/m)	FIM QP (dBuV/m)	Total CF dBuV	E-Field QP (dBuV/m)	Spec Limit (dBuV/m)	Spec Margin (dB)	Type
Transmitted Data at 2412 MHz										
51.19	V	124	6	53.31	50.42	-19.40	31.02	40.00	-8.98	Spurious
52.58	V	105	45	56.40	52.43	-19.36	33.07	40.00	-6.93	Spurious
58.70	V	138	326	52.78	49.93	-18.19	31.74	40.00	-8.26	Spurious
66.30	V	109	127	50.48	47.55	-18.60	28.95	40.00	-11.05	Spurious
106.77	V	121	280	45.85	39.41	-14.31	25.10	43.52	-18.42	Spurious
125.03	V	110	354	35.60	36.52	-11.53	24.99	43.52	-18.53	Spurious
51.89	H	355	250	38.35	33.40	-18.56	14.84	40.00	-25.16	Spurious
106.77	H	308	210	38.84	34.59	-13.93	20.66	43.52	-22.86	Spurious
124.99	H	228	17	31.85	31.35	-11.73	19.62	43.52	-23.90	Spurious
250.00	H	132	228	33.80	32.29	-12.59	19.70	46.02	-26.32	Spurious
749.99	H	117	287	33.87	32.44	-3.18	29.26	46.02	-16.76	Spurious
799.99	H	103	88	29.85	28.84	-2.42	26.42	46.02	-19.60	Spurious
Transmitted Data at 2437 MHz										
52.07	H	394	268	36.89	32.58	-18.60	13.98	40.00	-26.02	Spurious
106.74	H	303	232	37.44	33.55	-13.93	19.62	43.52	-23.90	Spurious
125.00	H	247	39	31.56	29.96	-11.73	18.23	43.52	-25.29	Spurious
250.00	H	169	219	33.58	32.22	-12.59	19.63	46.02	-26.39	Spurious
749.98	H	106	319	33.70	31.46	-3.18	28.28	46.02	-17.74	Spurious
800.00	H	314	320	27.22	25.02	-2.42	22.60	46.02	-23.42	Spurious
51.08	V	108	82	51.88	50.12	-19.40	30.72	40.00	-9.28	Spurious
52.47	V	114	58	54.55	51.69	-19.36	32.33	40.00	-7.67	Spurious
58.70	V	115	316	53.39	50.25	-18.19	32.06	40.00	-7.94	Spurious
66.30	V	126	121	49.89	47.12	-18.60	28.52	40.00	-11.48	Spurious
106.77	V	119	269	45.39	39.17	-14.31	24.86	43.52	-18.66	Spurious
125.00	V	106	91	38.05	37.16	-11.53	25.63	43.52	-17.89	Spurious
Transmitted Data at 2462 MHz										
51.88	V	118	8	53.87	51.15	-19.38	31.77	40.00	-8.23	Spurious
52.60	V	106	50	55.26	51.86	-19.36	32.50	40.00	-7.50	Spurious
54.19	V	107	19	54.89	51.21	-19.14	32.07	40.00	-7.93	Spurious
58.56	V	109	254	51.14	48.39	-18.23	30.16	40.00	-9.84	Spurious
66.46	V	124	133	48.98	46.44	-18.60	27.84	40.00	-12.16	Spurious
106.76	V	119	263	45.11	42.63	-14.31	28.32	43.52	-15.20	Spurious
125.00	V	121	95	38.22	36.86	-11.53	25.33	43.52	-18.19	Spurious
107.91	H	364	70	34.71	33.59	-13.72	19.87	43.52	-23.65	Spurious
749.99	H	110	312	33.46	31.82	-3.18	28.64	46.02	-17.38	Spurious

Spec Margin = E-Field QP - Limit, E-Field QP = FIM QP+ Total CF ± Uncertainty
Total CF= Amp Gain + Cable Loss + ANT Factor

Combined Standard Uncertainty $u_c(y)$ = ± 3.2 dB Expanded Uncertainty $U = ku_c(y)$ k = 2 for 95% confidence

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EUT Name	Wireless ADSL Residential Gateway	**Date**	March 22, 2010
EUT Model	i38HG	**Temp / Hum in**	21°C / 33%rh
EUT Serial	221029024922	**Temp / Hum out**	N/A
EUT Config.	802.11b, 1Mbps at X-Axis (above 1GHz)	**Line AC / Freq**	120Vac/60Hz
Standard	CFR47 Part 15 Subpart C	**RBW / VBW**	1MHz / 3MHz
Dist/Ant Used	3m / EMCO3115	**Performed by**	Jeremy Luong

Emission Freq (MHz)	ANT Polar (H/V)	ANT Pos (cm)	Table Pos (deg)	FIM (Pk) Pk (dBuV/m)	FIM Ave. (dBuV/m)	Total CF dBuV	E-Field Pk/Ave. (dBuV/m)	Spec Limit (dBuV/m)	Spec Margin (dB)	Type
Transmitted Data at 2412 MHz at 802.11b, 1Mbit/s										
1200.13	V	99	198	55.79	48.50	-8.00	40.50	53.98	-13.48	Restricted
3216.05	V	159	212	44.56	40.45	0.03	40.48	53.98	-13.50	Restricted
4823.94	H	110	206	43.68	38.22	2.42	40.64	53.98	-13.34	Restricted
4824.06	V	161	186	44.64	41.33	2.42	43.75	53.98	-10.23	Restricted
9647.87	H	115	191	37.63		10.59	48.22	90.90	-42.68	Unrestricted
9647.95	V	229	115	38.14		10.59	48.73	90.90	-42.17	Unrestricted
Transmitted Data at 2437 MHz at 802.11b, 1Mbit/s										
1200.05	V	99	176	55.48	49.50	-8.00	41.50	53.98	-12.48	Restricted
3249.35	V	152	210	45.94	42.31	0.11	42.42	53.98	-11.56	Restricted
4873.98	V	132	263	50.19	48.29	2.52	50.81	53.98	-3.17	Restricted
4873.98	H	226	206	52.13	50.41	2.52	52.93	53.98	-1.05	Restricted
7311.77	H	209	10	42.51	33.46	8.29	41.75	53.98	-12.23	Restricted
9747.97	H	193	164	47.03		10.66	57.69	90.90	-33.21	Unrestricted
9747.97	V	179	165	48.94		10.66	59.60	90.90	-31.30	Unrestricted
14621.90	H	132	194	36.11		18.75	54.86	90.90	-36.04	Unrestricted
19495.90	V	99	153	61.74	57.03	11.55	45.48	63.98	-18.50	Restricted
19495.90	H	99	345	65.78	61.08	11.55	49.53	63.98	-14.45	Restricted
24369.80	H	99	445	65.39		11.74	53.65	90.90	-37.25	Unrestricted
24369.90	V	99	101	63.69		11.74	51.95	90.90	-38.95	Unrestricted
Transmitted Data at 2462 MHz at 802.11b, 1Mbit/s										
1200.07	V	100	188	55.76	47.58	-8	39.58	53.98	-14.40	Restricted
1866.29	V	126	170	41.06	26.05	-4.9	21.14	53.98	-32.84	Restricted
2000.06	V	187	193	47.54	42.72	-4.74	37.98	53.98	-16.00	Restricted
3282.72	V	183	209	45.25	39.84	0.23	40.07	53.98	-13.91	Restricted
4924.01	V	160	216	46.53	42.3	2.6	44.90	53.98	-9.08	Restricted
4924.04	H	187	266	46.96	44.68	2.60	47.28	53.98	-6.70	Restricted
9847.95	H	167	187	38.96		11.13	50.09	90.90	-40.81	Unrestricted
9847.95	V	133	195	38.99		11.13	50.12	90.90	-40.78	Unrestricted

Spec Margin = E-Field Ave. - Limit, E-Field Ave. = FIM Ave. + Total CF ± Uncertainty
Total CF= Amp Gain + Cable Loss + ANT Factor

Combined Standard Uncertainty $u_c(y)$ = ± 3.2dB Expanded Uncertainty $U = ku_c(y)$ k = 2 for 95% confidence

Notes: 20dBr limit applied to the unrestricted band emission; highest peak field strength was 110.9 dBuV/m at 3 meter distance.

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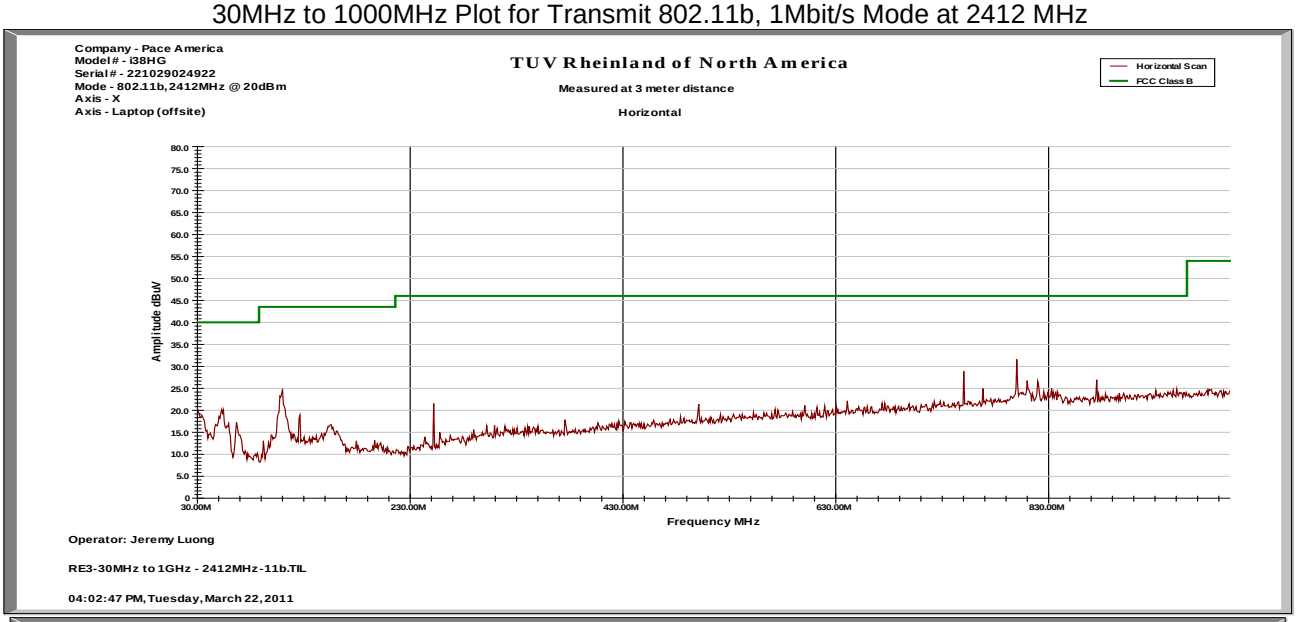
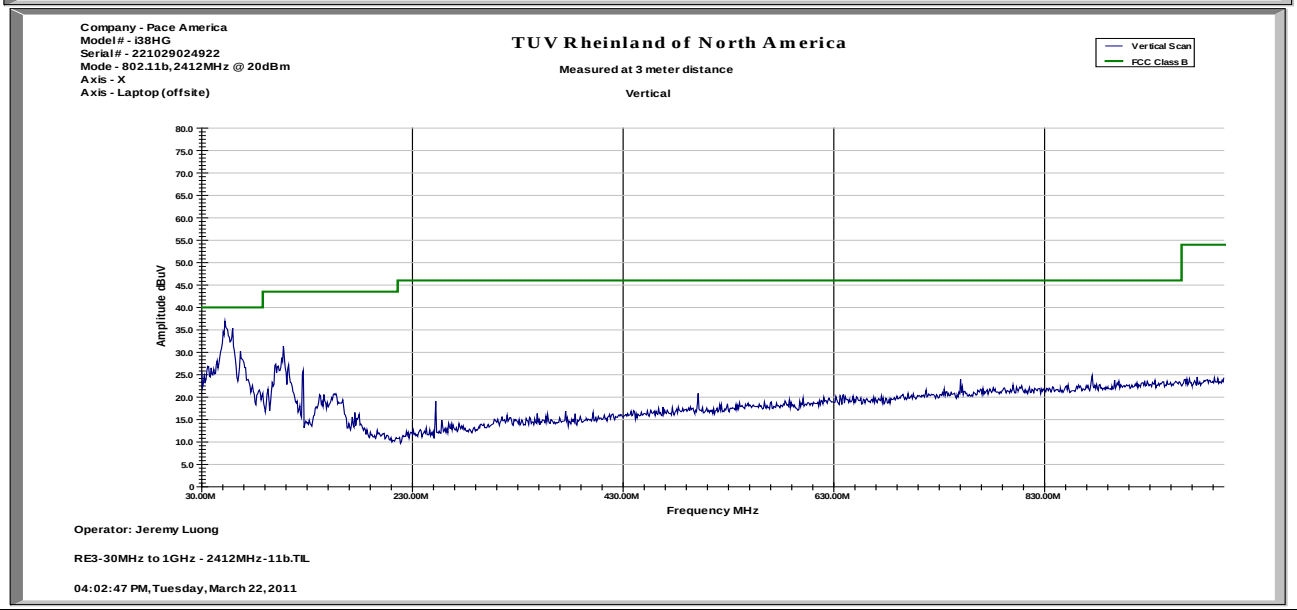
EUT Name	Wireless ADSL Residential Gateway	**Date**	March 22, 2011
EUT Model	i38HG	**Temp / Hum in**	21°C / 33%rh
EUT Serial	221029024922	**Temp / Hum out**	N/A
EUT Config.	802.11b, 1Mbps at Y-Axis	**Line AC**	120Vac 60Hz
Standard	CFR47 Part 15 Subpart C	**RBW / VBW**	120kHz / 300kHz
Dist/Ant Used	3m / JB3	**Performed by**	Jeremy Luong

30MHz to 1000MHz Plot for Transmit 802.11b, 1Mbit/s Mode at 2412 MHz





Notes: None.

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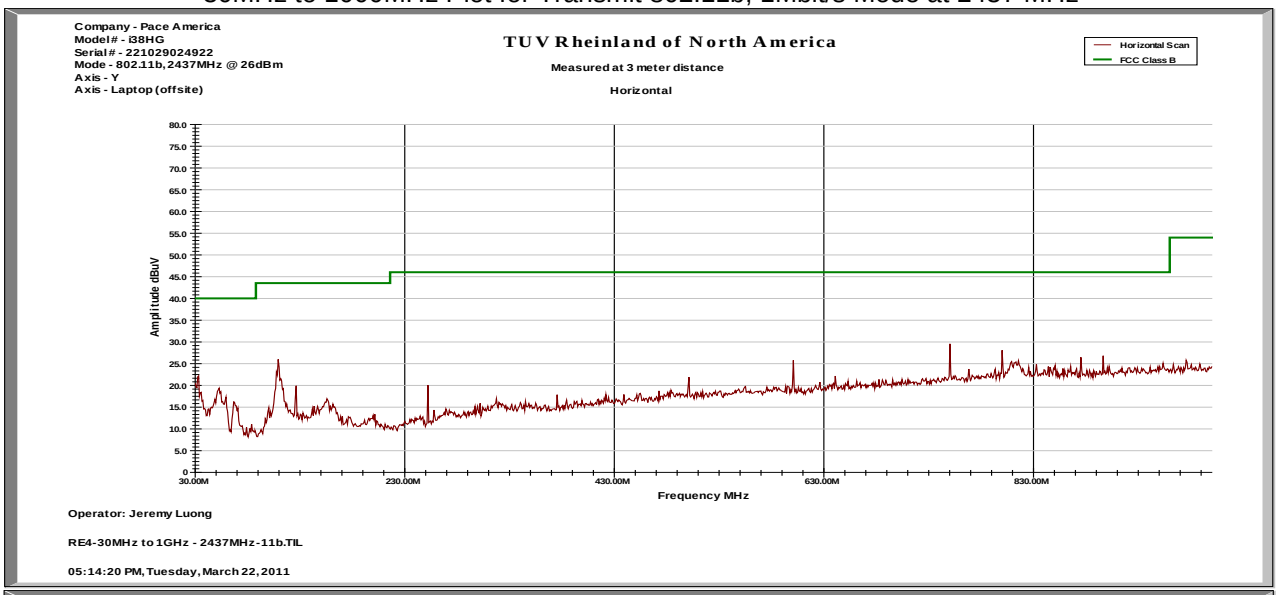
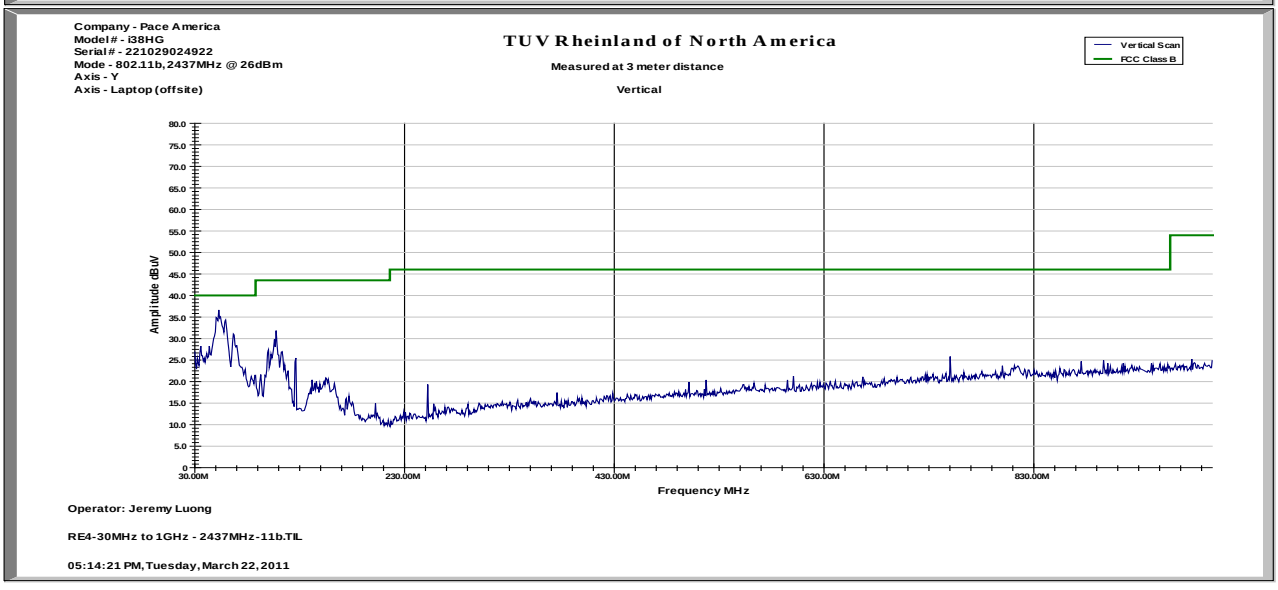
EUT Name	Wireless ADSL Residential Gateway	**Date**	March 22, 2011
EUT Model	i38HG	**Temp / Hum in**	21°C / 33%rh
EUT Serial	221029024922	**Temp / Hum out**	N/A
EUT Config.	802.11b, 1Mbps at Y-Axis	**Line AC**	120Vac 60Hz
Standard	CFR47 Part 15 Subpart C	**RBW / VBW**	120kHz / 300kHz
Dist/Ant Used	3m / JB3	**Performed by**	Jeremy Luong

30MHz to 1000MHz Plot for Transmit 802.11b, 1Mbit/s Mode at 2437 MHz





Notes: None.

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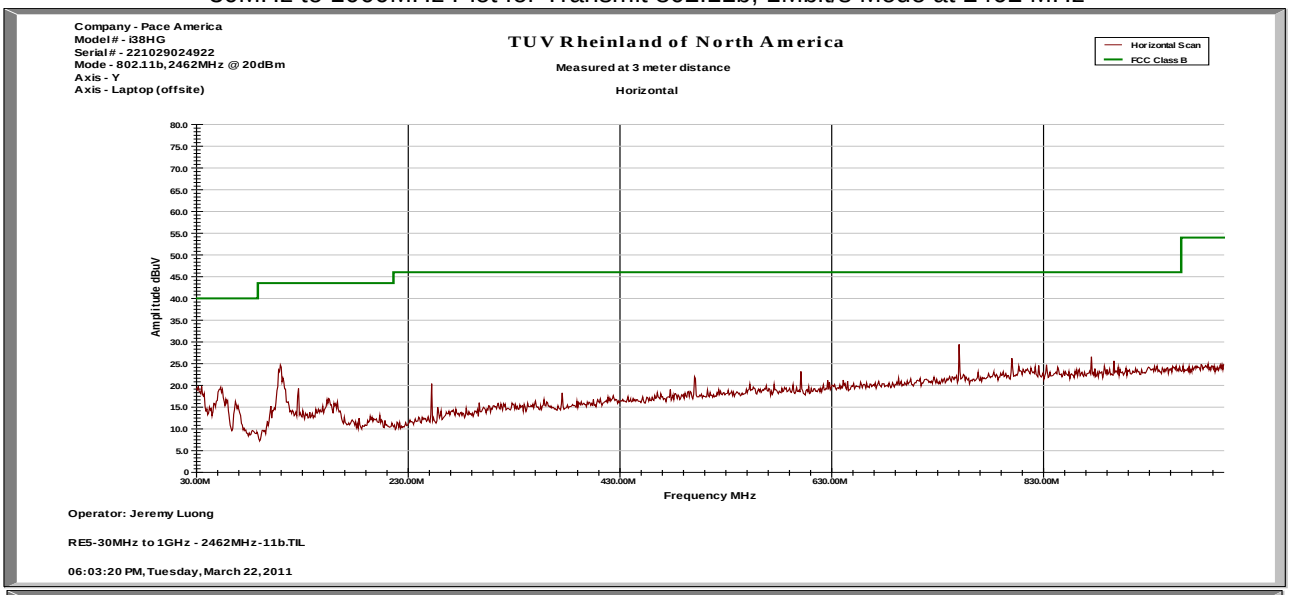
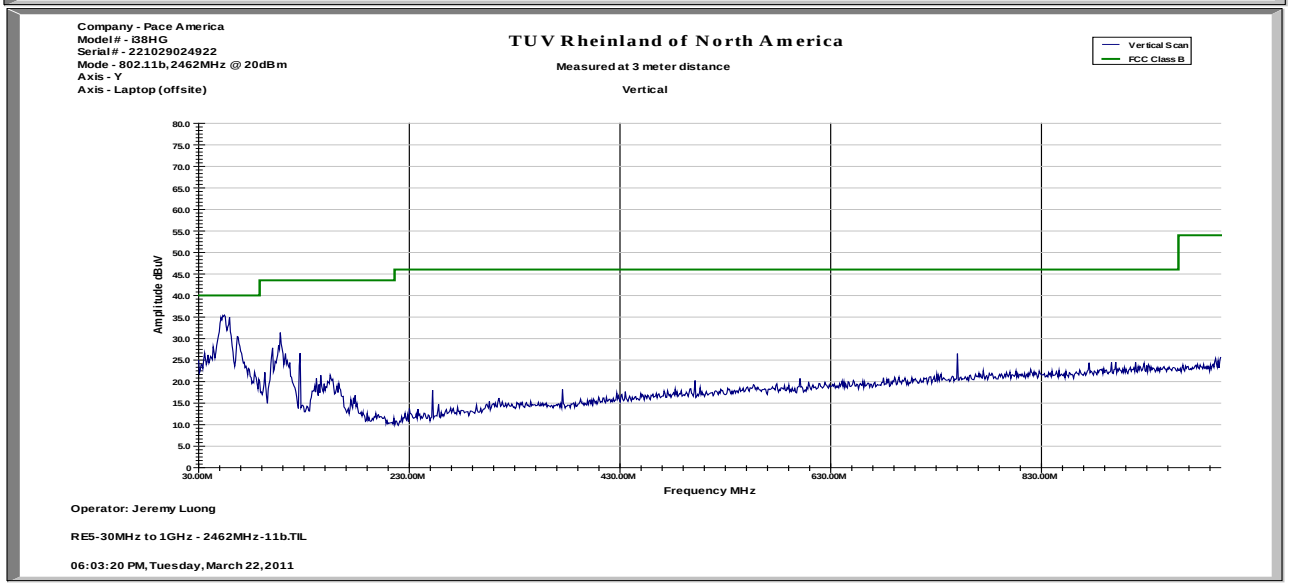
EUT Name	Wireless ADSL Residential Gateway	**Date**	March 22, 2011
EUT Model	i38HG	**Temp / Hum in**	21°C / 33%rh
EUT Serial	221029024922	**Temp / Hum out**	N/A
EUT Config.	802.11b, 1Mbps at Y-Axis	**Line AC**	120Vac 60Hz
Standard	CFR47 Part 15 Subpart C	**RBW / VBW**	120kHz / 300kHz
Dist/Ant Used	3m / JB3	**Performed by**	Jeremy Luong

30MHz to 1000MHz Plot for Transmit 802.11b, 1Mbit/s Mode at 2462 MHz





Notes: None.

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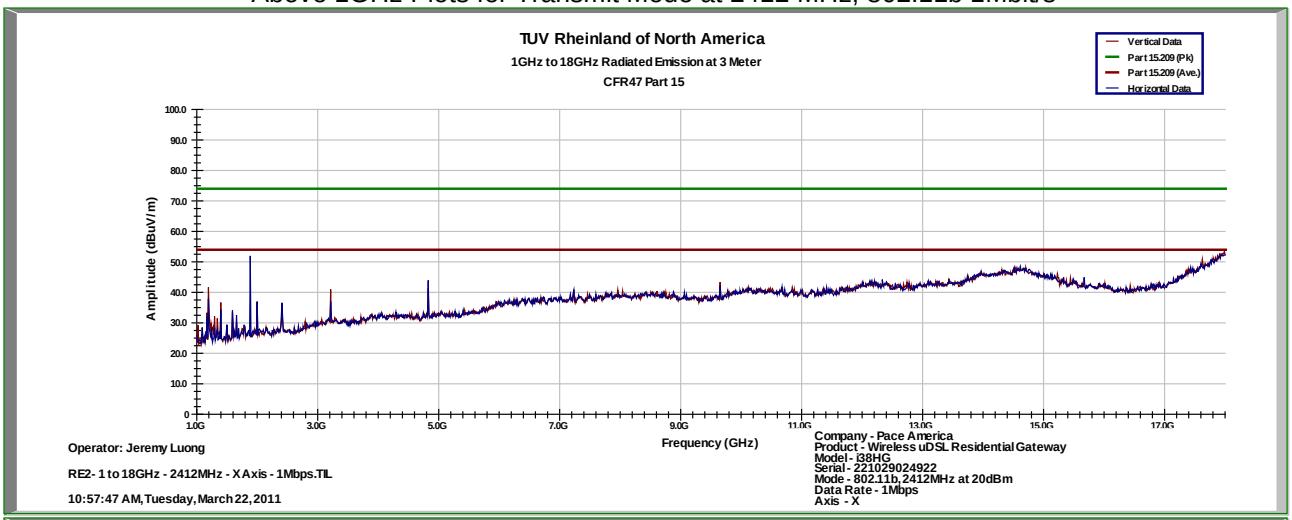
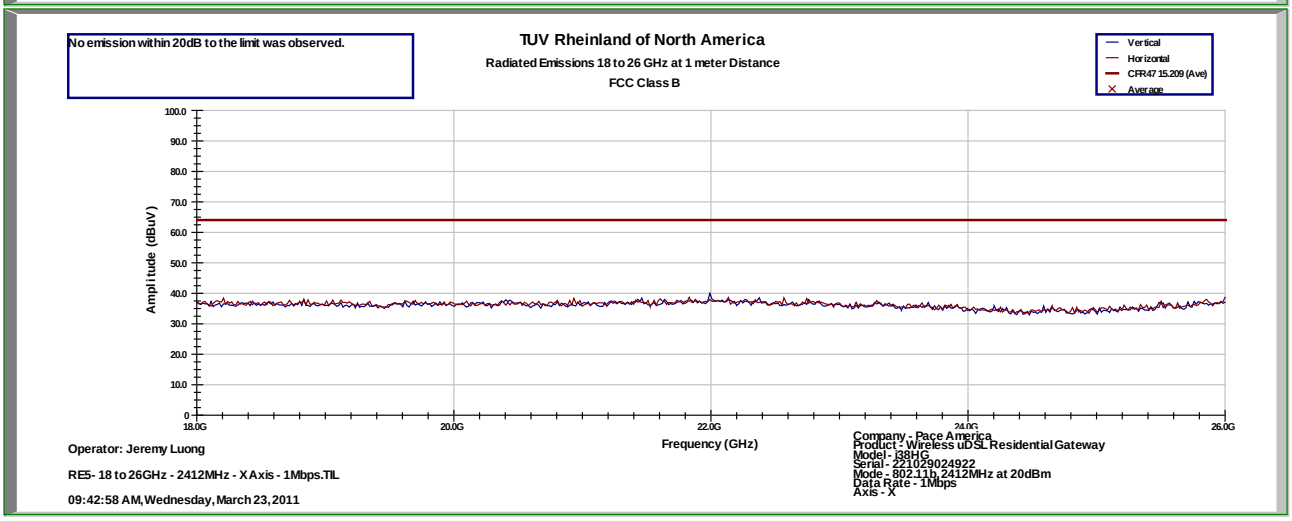
EUT Name	Wireless ADSL Residential Gateway	**Date**	March 22, 2011
EUT Model	i38HG	**Temp / Hum in**	21°C / 33%rh
EUT Serial	221029024922	**Temp / Hum out**	N/A
EUT Config.	802.11b, 1Mbps at X-Axis	**Line AC**	120Vac 60Hz
Standard	CFR47 Part 15 Subpart C	**RBW / VBW**	1MHz / 3MHz
Dist/Ant Used	3m - EMCO3115 / 1m - RA42-K-F-4B-C	**Performed by**	Jeremy Luong

Above 1GHz Plots for Transmit Mode at 2412 MHz, 802.11b 1Mbit/s





Notes: Limit was extrapolated to 1m distance for 18GHz – 25GHz range.
1GHz – 25GHz Setting: RBW = 1MHz/ VBW = 3MHz

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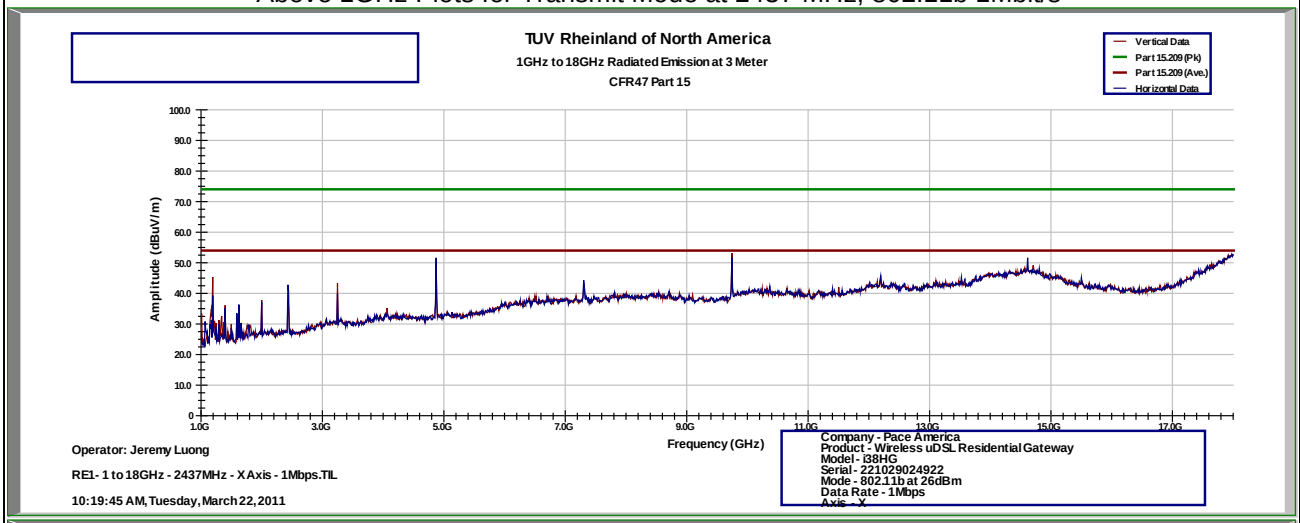
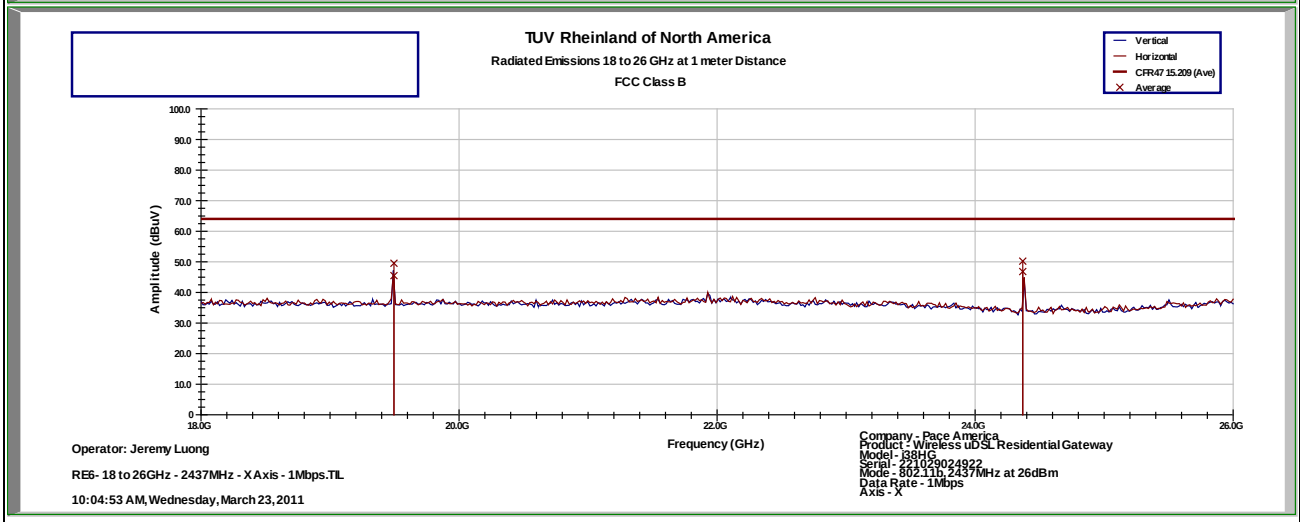
EUT Name	Wireless ADSL Residential Gateway	**Date**	March 22, 2011
EUT Model	i38HG	**Temp / Hum in**	21°C / 33%rh
EUT Serial	221029024922	**Temp / Hum out**	N/A
EUT Config.	802.11b, 1Mbps at X-Axis	**Line AC**	120Vac 60Hz
Standard	CFR47 Part 15 Subpart C	**RBW / VBW**	1MHz / 3MHz
Dist/Ant Used	3m - EMCO3115 / 1m - RA42-K-F-4B-C	**Performed by**	Jeremy Luong

Above 1GHz Plots for Transmit Mode at 2437 MHz, 802.11b 1Mbit/s





Notes: Limit was extrapolated to 1m distance for 18GHz – 25GHz range.
1GHz – 25GHz Setting: RBW = 1MHz/ VBW = 3MHz

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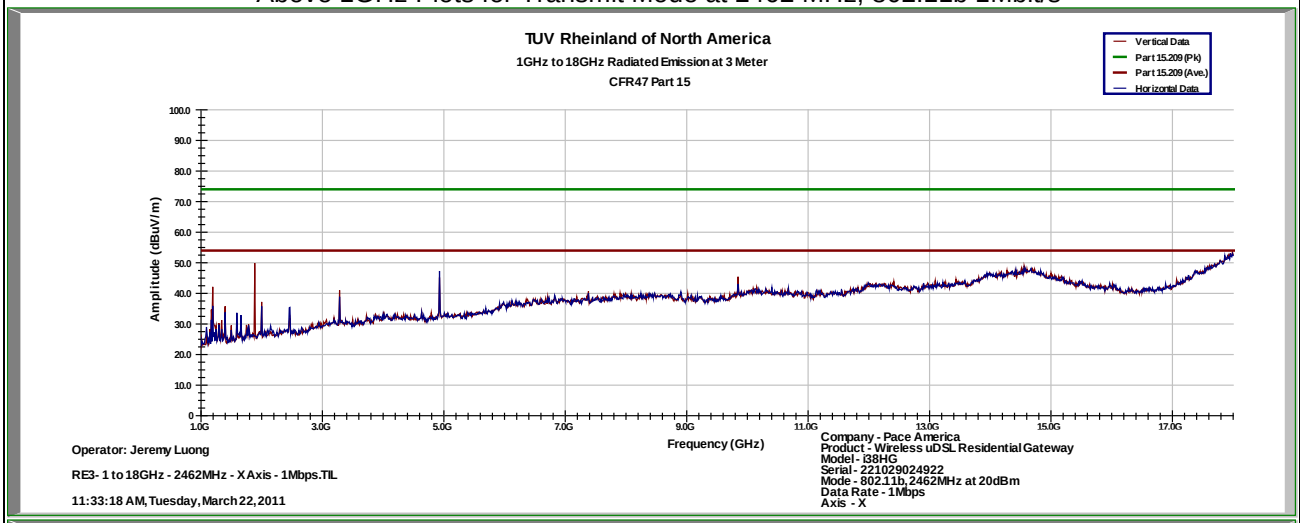
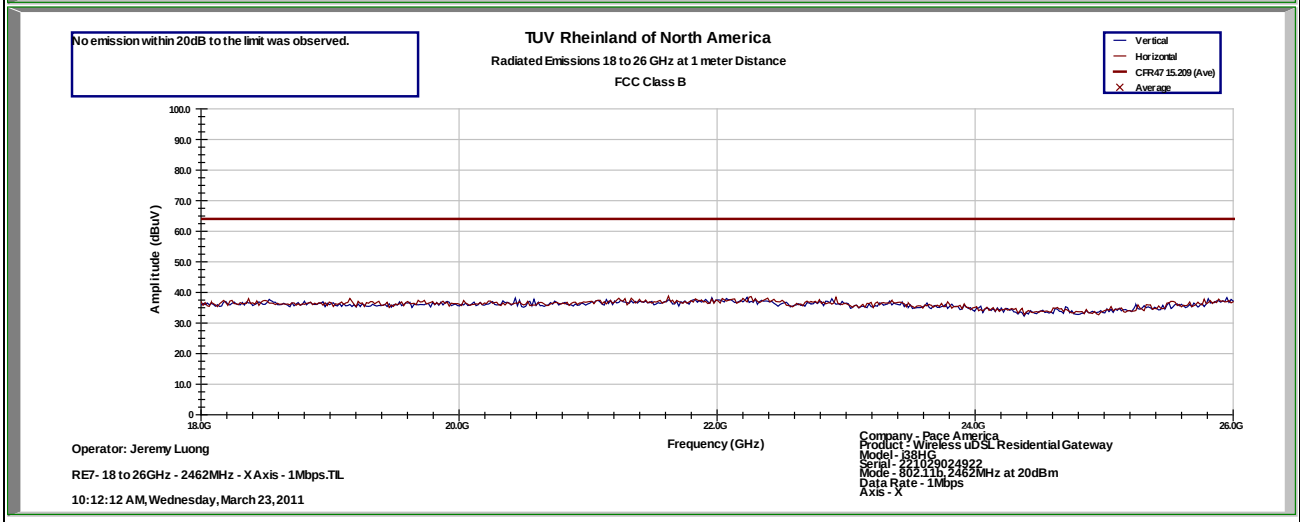
EUT Name	Wireless ADSL Residential Gateway	**Date**	March 22, 2011
EUT Model	i38HG	**Temp / Hum in**	21°C / 33%rh
EUT Serial	221029024922	**Temp / Hum out**	N/A
EUT Config.	802.11b, 1Mbps at X-Axis	**Line AC**	120Vac 60Hz
Standard	CFR47 Part 15 Subpart C	**RBW / VBW**	1MHz / 3MHz
Dist/Ant Used	3m - EMCO3115 / 1m - RA42-K-F-4B-C	**Performed by**	Jeremy Luong

Above 1GHz Plots for Transmit Mode at 2462 MHz, 802.11b 1Mbit/s





Notes: Limit was extrapolated to 1m distance for 18GHz – 25GHz range.
1GHz – 25GHz Setting: RBW = 1MHz/ VBW = 3MHz

4.6.4 Sample Calculation

The field strength is calculated by subtracting the Amplifier Gain and adding the Cable Loss and Antenna Correction Factor to the measured reading. The basic equation is as follows:

Field Strength (dBμV/m) = FIM - AMP + CBL + ACF

Where: FIM = Field Intensity Meter (dBμV)
AMP = Amplifier Gain (dB)
CBL = Cable Loss (dB)
ACF = Antenna Correction Factor (dB/m)

$$\mu V/m = 10^{\frac{dB\mu V/m}{20}}$$

4.7 Receiver Spurious Emissions

Receiver spurious emissions are emissions at any frequency when the equipment is in receive mode.

The spurious emissions of the receiver shall not exceed the values in CFR47 Part 15.109 and RSS 210 Sect 2.7.

4.7.1 Test Methodology

4.7.1.1 Preliminary Test

A test program that controls instrumentation and data logging was used to automate the preliminary RF emission test procedure. The frequency range of interest was divided into sub-ranges to yield a frequency resolution of approximately 120 kHz and provide a reading at each frequency for no more than 12° of turntable rotation. For each frequency sub-range the turntable was rotated 360° while peak emission data was recorded and plotted over the frequency range of interest in horizontal and vertical antenna polarization's.

Preliminary emission profile testing was performed inside the anechoic chamber. The EUT was placed on a 1.0m x 1.5m non-conductive table 80cm above the floor. The EUT was positioned as shown in the setup photographs. The receiving antenna was placed at a distance of 3m at a fixed height of 1m. Measurement equipment was located outside of the chamber. A video camera was placed inside the chamber to view the EUT.

Preliminary scans performed with EUT positioned horizontal and vertically. Horizontal position was worse.

4.7.1.2 Final Test

For each frequency measured, the peak emission was maximized by manipulating the receiving antenna from 1 to 4 meters above the ground plane and placing it at the position that produced the maximum signal strength reading. The turntable was then rotated through 360° while observing the peak signal and placing the EUT at the position that produced maximum radiation. The six highest emissions relative to the limit were measured unless such emissions were more than 20 dB below the limit. If less than six emissions are within 20 dB of the limit, than the noise level of the receiver is measured at frequencies where emissions are expected. Multiples of all oscillator and microprocessor frequencies were also checked.

Final testing was performed on an NSA compliant test site. The EUT was placed on a 1.0m x 1.5m non-conductive table 80cm above the ground plane. The placement of EUT and cables were the same as for preliminary testing and is shown in the setup photographs.

The final scans performed on Channel 6; 2437 MHz with EUT positioned horizontally.

4.7.1.3 Deviations

None.

4.7.2 Receiver Spurious Emission Limit

The spurious emissions of the receiver shall not exceed the values in CFR47 Part 15.205, 15.209: 2010 and RSS 210 A1.1.2 2010.

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490.....	2400/F(kHz)	300
0.490-1.705.....	24000/F(kHz)	30
1.705-30.0.....	30	30
30-88.....	100 **	3
88-216.....	150 **	3
216-960.....	200 **	3
Above 960.....	500	3

4.7.3 Test Results

The final measurement data indicates the worst case operating modes, configurations, and/or cable positions. It also reflects the results including any modifications and/or special accessories listed in Sections 1.4 and 1.5.

As originally tested, the EUT was found to be compliant to the requirements of the test standard(s).

4.7.3.1 Final Data

The data recorded in this section contains the final results under the worst-case conditions and without any modifications or special accessories implemented as the manufacturer intends.

SOP 1 Radiated Emissions

Tracking # Pending.001 Page 1 of 4

EUT Name	Wireless ADSL Residential Gateway	**Date**	March 23, 2011
EUT Model	i38HG	**Temp / Hum in**	22° C / 33% rh
EUT Serial	221029024922	**Temp / Hum out**	N/A
EUT Config.	RX on Y-Axis	**Line AC / Freq**	120Vac 60Hz
Standard	CFR47 Part 15 Subpart C	**RBW / VBW**	120kHz / 300kHz
Dist/Ant Used	3m / JB3	**Performed by**	Jeremy Luong

Emission Freq (MHz)	ANT Polar (H/V)	Table Pos (deg)	ANT Pos (cm)	FIM (Pk) Pk (dBuV/m)	FIM QP (dBuV/m)	Total CF dBuV	E-Field QP (dBuV/m)	Spec Limit (dBuV/m)	Spec Margin (dB)	Type
Receive Mode at 2437 MHz										
106.79	H	311	218	37.00	33.57	-13.93	19.64	43.52	-23.88	Spurious
124.98	H	351	10	32.15	31.06	-11.73	19.33	43.52	-24.19	Spurious
500.00	H	190	135	31.55	29.28	-7.17	22.11	46.02	-23.91	Spurious
749.99	H	111	62	34.40	32.32	-3.18	29.14	46.02	-16.88	Spurious
52.61	V	124	40	54.26	51.53	-19.36	32.17	40.00	-7.83	Spurious
53.88	V	143	6	54.19	51.50	-19.16	32.34	40.00	-7.66	Spurious
58.72	V	111	298	51.58	49.43	-18.18	31.25	40.00	-8.75	Spurious
66.61	V	140	174	49.37	46.96	-18.60	28.36	40.00	-11.64	Spurious
106.76	V	123	235	43.07	39.82	-14.31	25.51	43.52	-18.01	Spurious
124.98	V	117	217	36.87	36.83	-11.53	25.30	43.52	-18.22	Spurious

Spec Margin = E-Field QP - Limit, E-Field QP = FIM QP+ Total CF ± Uncertainty
Total CF= Amp Gain + Cable Loss + ANT Factor

Combined Standard Uncertainty $u_c(y)$ = ± 1.6dB Expanded Uncertainty $U = ku_c(y)$ k = 2 for 95% confidence

Notes: RX mode at 2437 MHz

SOP 1 Radiated Emissions

Tracking # Pending.001 Page 2 of 4

EUT Name	Wireless ADSL Residential Gateway	**Date**	March 22, 2011
EUT Model	i38HG	**Temp / Hum in**	22° C / 33% rh
EUT Serial	221029024922	**Temp / Hum out**	N/A
EUT Config.	RX on X-Axis	**Line AC / Freq**	120Vac/60Hz
Standard	CFR47 Part 15 Subpart C	**RBW / VBW**	1MHz / 3MHz
Dist/Ant Used	3m / EMCO3115	**Performed by**	Jeremy Luong

Emission Freq (MHz)	ANT Polar (H/V)	Table Pos (deg)	ANT Pos (cm)	FIM (Pk) Pk (dBuV/m)	FIM Ave (dBuV/m)	Total CF dBuV	E-Field Ave (dBuV/m)	Spec Limit (dBuV/m)	Spec Margin (dB)	Type
Transmitted Data at 2437 MHz										
1199.92	H	142	437	51.7	46.22	-8.00	38.22	53.98	-15.76	Spurious
1200.10	V	99	175	55.3	49.90	-8.00	41.90	53.98	-12.08	Spurious
1400.06	V	136	157	49.37	44.86	-7.48	37.38	53.98	-16.60	Spurious
2000.00	V	129	205	47.52	42.66	-4.74	37.92	53.98	-16.06	Spurious
2000.06	H	108	380	47.39	41.47	-4.74	36.73	53.98	-17.25	Spurious
3249.35	V	127	107	42.69	35.13	0.11	35.24	53.98	-18.74	Spurious

Spec Margin = E-Field Ave - Limit, E-Field Ave = FIM Ave+ Total CF ± Uncertainty
Total CF= Amp Gain + Cable Loss + ANT Factor

Combined Standard Uncertainty $u_c(y)$ = ± 1.6 dB Expanded Uncertainty $U = ku_c(y)$ k = 2 for 95% confidence

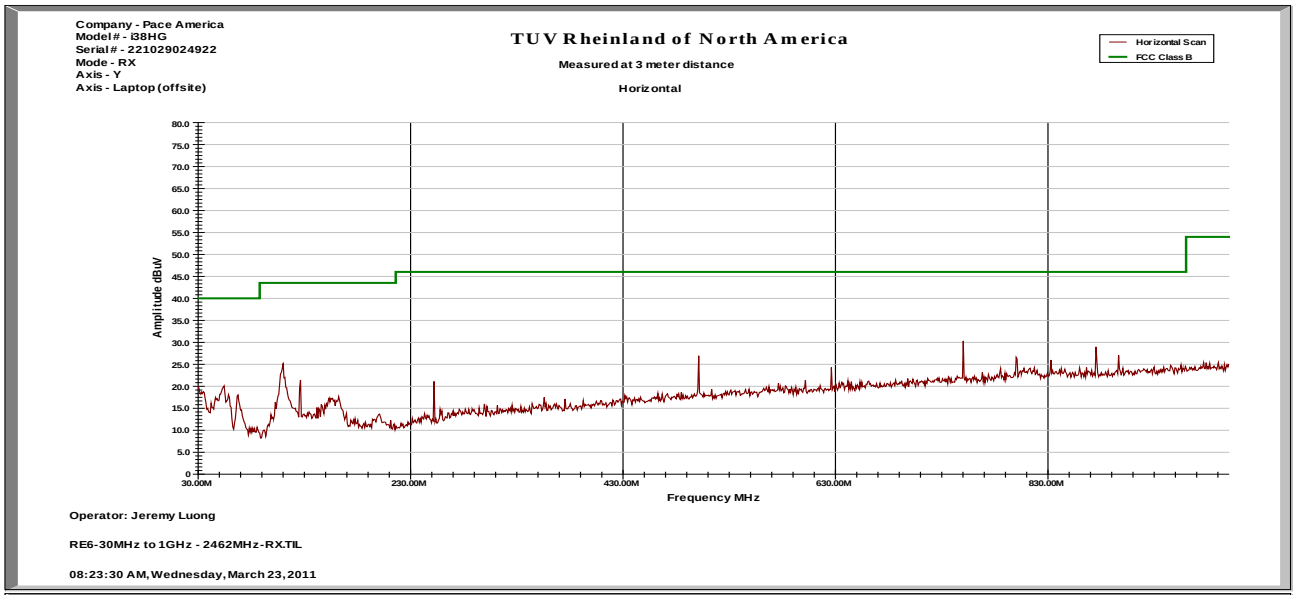
Notes RX mode at 2437 MHz

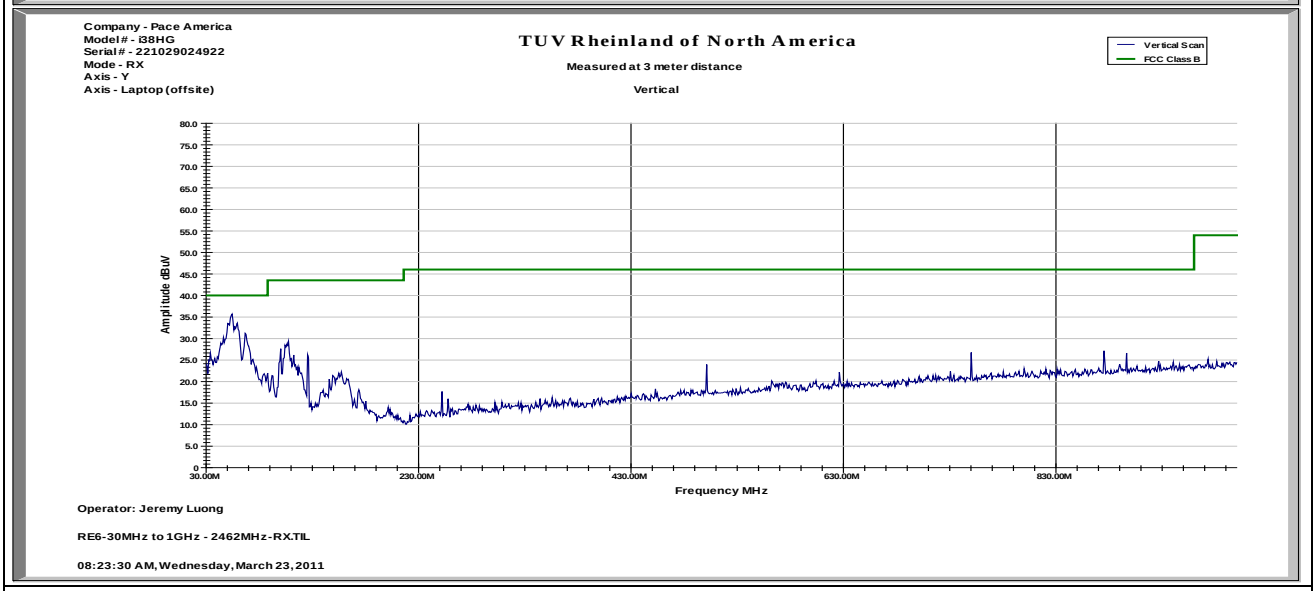
SOP 1 Radiated Emissions

Tracking # Pending.001 Page 3 of 4

EUT Name	Wireless ADSL Residential Gateway	**Date**	March 23, 2011
EUT Model	i38HG	**Temp / Hum in**	22° C / 33% rh
EUT Serial	221029024922	**Temp / Hum out**	N/A
EUT Config.	RX on Y-Axis	**Line AC**	120Vac 60Hz
Standard	CFR47 Part 15 Subpart C	**RBW / VBW**	120kHz / 300kHz
Dist/Ant Used	3m / JB3	**Performed by**	Jeremy Luong

30 MHz to 1000 MHz Plot for Receive Mode at 2437 MHz





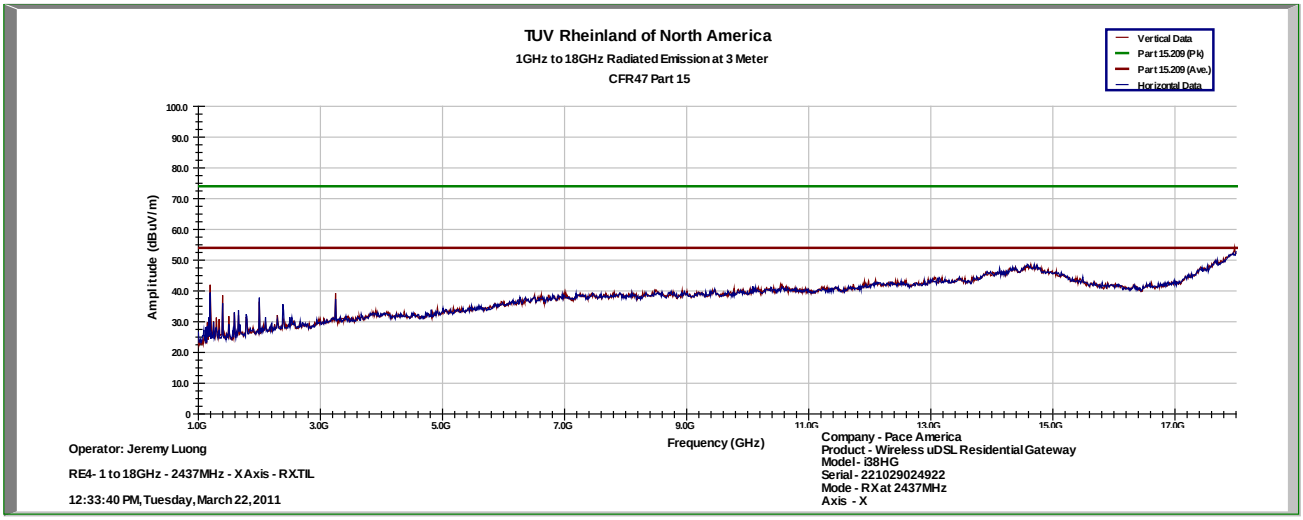
Notes: None.

SOP 1 Radiated Emissions

Tracking # Pending.001 Page 4 of 4

EUT Name	Wireless ADSL Residential Gateway	**Date**	March 22, 2011
EUT Model	i38HG	**Temp / Hum in**	22° C / 33% rh
EUT Serial	221029024922	**Temp / Hum out**	N/A
EUT Config.	RX on X-Axis	**Line AC**	120Vac 60Hz
Standard	CFR47 Part 15 Subpart C	**RBW / VBW**	1MHz / 3MHz
Dist/Ant Used	3m / EMCO3115	**Performed by**	Jeremy Luong

1 GHz to 13 GHz Plot for Receive Mode at 2437 MHz



Notes: Radiated emission was performed up to the fifth harmonics of the highest clock; less than 18GHz.

4.8 AC Conducted Emissions

Testing was performed in accordance with ANSI C63.4: 2003. These test methods are listed under the laboratory's NVLAP Scope of Accreditation.

This test measures the levels emanating from the EUT's AC input port, thus evaluating the potential for the EUT to cause radio frequency interference to other electronic devices.

The AC conducted emissions of equipment under test shall not exceed the values in CFR47 Part 15.207: 2010 and RSS 210: 2010.

4.8.1 Test Methodology

A test program that controls instrumentation and data logging was used to automate the AC Power Line Conducted emission test procedure. The frequency range of interest was divided into sub-ranges such as to yield a frequency resolution of 9 kHz. Each phase and neutral of the AC power line were measured with respect to ground. Measurements were performed using a set of 50µH / 50Ω LISNs.

Testing is either performed in Lab 2. The setup photographs clearly identify which site was used. The vertical ground plane used in the semi-anechoic chamber is a 2m x 2m solid aluminum frame and panel, and it is bonded to the horizontal ground plane.

In the case of tabletop equipment, the EUT is placed on a 1.0m x 1.5m non-conductive table 80cm above the ground plane and 40cm from a vertical ground reference plane. The rear of the EUT was positioned flush with the backside of the table and directly over the LISNs. The power and I/O cables were routed over the edge of the table and bundled approximately 40cm from the ground plane. Support equipment was powered from a separate LISN.

4.8.1.1 Deviations

There were no deviations from this test methodology.

4.8.2 Test Results

As originally tested, the EUT was found to be compliant to the requirements of the test standard(s).

Table 10: AC Conducted Emissions – Test Results

Test Conditions: Conducted Measurement at Normal Conditions only		
Antenna Type: Attached	**Power Level:** +26dBm at 2437 MHz	
AC Power: 120 Vac/60 Hz	**Configuration:** Tabletop	
Ambient Temperature: 22° C	**Relative Humidity:** 34% RH	
Configuration	**Frequency Range**	**Test Result**
Line 1 (Hot)	0.15 to 30 MHz	Pass
Line 2 (Neutral)	0.15 to 30 MHz	Pass

SOP 2 Conducted Emissions

Tracking # Pending.001 Page 1 of 4

EUT Name	Wireless ADSL Residential Gateway	**Date**	March 23, 2011
EUT Model	i38HG	**Temp / Hum in**	23° C / 34% rh
EUT Serial	221029024922	**Temp / Hum out**	N/A
EUT Config.	Attached Antenna	**Line AC / Freq**	120Vac/60Hz
Standard	CFR47 Part 15.207	**RBW / VBW**	9kHz / 30kHz
Lab/LISN	Lab #5 / Solar 9348-50-R-24-BNC, Line 1	**Performed by**	Jeremy Luong

Frequency	QP	Ave.	QP Limit	Ave. Limit	QP Margin	Ave Margin
MHz	dBuV	dBuV	dBuV	dBuV	dB	dBuV
0.248	52.03	34.89	63.19	53.19	-11.16	-18.29
0.261	48.82	35.61	62.83	52.83	-14.01	-17.21
0.331	52.57	34.66	60.82	50.82	-8.25	-16.15
0.441	51.80	36.32	57.70	47.70	-5.90	-11.38
0.464	55.14	37.01	57.03	47.03	-1.89	-10.02
0.665	54.33	35.10	56.00	46.00	-1.67	-10.90
1.836	44.84	27.98	56.00	46.00	-11.16	-18.02
10.171	29.02	16.52	60.00	50.00	-30.98	-33.48
20.256	29.16	20.36	60.00	50.00	-30.84	-29.64

Spec Margin = QP./Ave. - Limit, ± Uncertainty

Combined Standard Uncertainty $u_c(y)$ = ± 1.2 dB Expanded Uncertainty $U = ku_c(y)$ k = 2 for 95% confidence

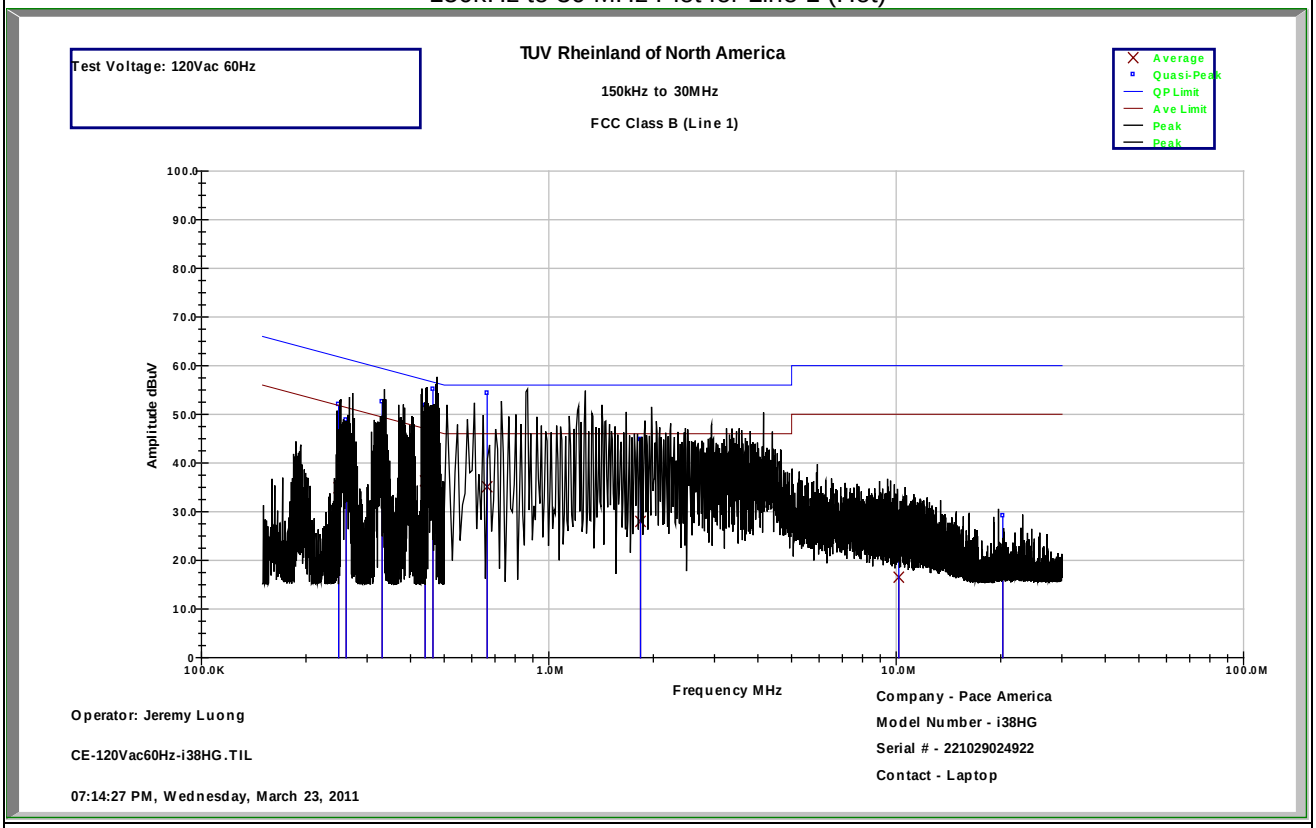
Notes: EUT was setup as table top equipment.

SOP 2 Conducted Emissions

Tracking # Pending.001 Page 2 of 4

EUT Name	Wireless ADSL Residential Gateway	**Date**	March 23, 2011
EUT Model	i38HG	**Temp / Hum in**	23° C / 34% rh
EUT Serial	221029024922	**Temp / Hum out**	N/A
EUT Config.	Attached Antenna	**Line AC**	120Vac/60Hz
Standard	CFR47 Part 15.207	**RBW / VBW**	9kHz / 30kHz
Lab/LISN	Lab #5 / Solar 9348-50-R-24-BNC, Line 1	**Performed by**	Jeremy Luong

150kHz to 30 MHz Plot for Line 1 (Hot)



Notes: Meet FCC Class B limit.

SOP 2 Conducted Emissions

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EUT Name	Wireless ADSL Residential Gateway	**Date**	March 23, 2011
EUT Model	i38HG	**Temp / Hum in**	23° C / 34% rh
EUT Serial	221029024922	**Temp / Hum out**	N/A
EUT Config.	Attached Antenna	**Line AC / Freq**	120Vac/60Hz
Standard	CFR47 Part 15.107	**RBW / VBW**	9kHz / 30kHz
Lab/LISN	Lab #5 / Solar 9348-50-R-24-BNC, Line 2	**Performed by**	Jeremy Luong

Frequency MHz	QP dBuV	Ave. dBuV	QP Limit dBuV	Ave. Limit dBuV	QP Margin dB	Ave Margin dBuV
0.263	52.29	36.14	62.77	52.77	-10.48	-16.63
0.329	51.96	34.26	60.88	50.88	-8.92	-16.62
0.458	54.63	37.24	57.19	47.19	-2.56	-9.96
0.524	52.14	33.39	56.00	46.00	-3.86	-12.61
0.652	53.84	36.17	56.00	46.00	-2.16	-9.83
0.850	51.83	32.95	56.00	46.00	-4.17	-13.05
1.211	43.80	25.45	56.00	46.00	-12.20	-20.55
3.632	40.64	25.44	56.00	46.00	-15.36	-20.56
10.491	27.46	13.59	60.00	50.00	-32.54	-36.41

Spec Margin = QP./Ave. - Limit, ± Uncertainty

Combined Standard Uncertainty $u_c(y)$ = ± 1.2 dB Expanded Uncertainty $U = ku_c(y)$ k = 2 for 95% confidence

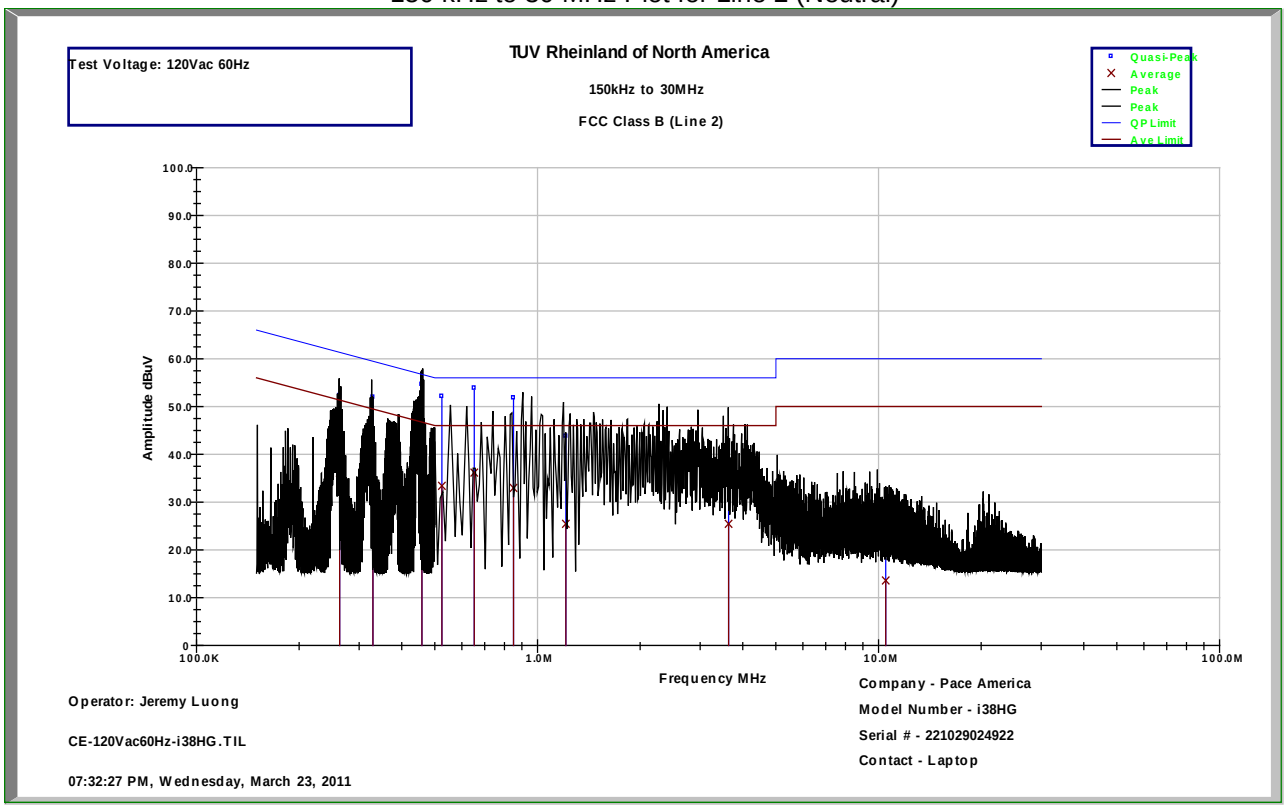
Notes: EUT was setup as table top equipment.

SOP 2 Conducted Emissions

Tracking # Pending.001 Page 4 of 4

EUT Name	Wireless ADSL Residential Gateway	**Date**	March 23, 2011
EUT Model	i38HG	**Temp / Hum in**	23° C / 34% rh
EUT Serial	221029024922	**Temp / Hum out**	N/A
EUT Config.	Attached Antenna	**Line AC**	120Vac/60Hz
Standard	CFR47 Part 15.107	**RBW / VBW**	9kHz / 30kHz
Lab/LISN	Lab #5/ Solar 9348-50-R-24-BNC, Line 2	**Performed by**	Jeremy Luong

150 kHz to 30 MHz Plot for Line 2 (Neutral)



Note: Meet FCC Class B Limit.

5 Test Equipment List

5.1 Equipment List

Equipment	Manufacturer	Model #	Serial/Inst #	Last Cal dd/mm/yy	Next Cal dd/mm/yy
Bilog Antenna	Sunol Science	JB3	A102606	2/18/2010	2/18/2012
Tuned Dipole Antenna	A.H Systems, Inc.	TDS-200/535-1	154	11/10/2010	11/10/2011
Tuned Dipole Antenna	A.H Systems, Inc.	TDS-200/535-2	154	11/10/2010	11/10/2011
Tuned Dipole Antenna	A.H Systems, Inc.	TDS-200/535-3	154	11/10/2010	11/10/2011
Tuned Dipole Antenna	A.H Systems, Inc.	TDS-200/535-4	154	11/10/2010	11/10/2011
Horn Antenna	Sunol Scienece	DRH-118	A040806	9/29/2010	9/29/2012
Antenna (18-26GHz)	CMT	RA42-K-F-4B-C	020131-004	10/15/2010	10/15/2011
EMI Receiver	Hewlett Packard	8546A	3807A00445	2/5/2011	2/5/2012
Preselector	Hewlett Packard	85460A	3704A00407	2/5/2011	2/5/2012
Amplifier	Hewlett Packard	8447D	2944A07996	1/17/2011	1/17/2012
Spectrum Analyzer	Rhode&Schwarz	ESIB	832427/002	1/18/2011	1/18/2012
Spectrum Analyzer	Agilent	E4404B	MY41440636	8/19/2010	8/19/2011
Amplifier	Rhode&Schwarz	TS-PR18	3545.7008.03	9/29/2010	9/29/2012
Amplifier	Rhode&Schwarz	TS-PR26	100011	10/15/2010	10/15/2011
Signal Generator	Anritsu	MG3694A	42803	1/26/2011	1/26/2012
Notch Filter	Micro-Tronics	BRM50702	37	1/19/2011	1/19/2012
High Pass Filter (3.5 GHz)	Hewlett Packard	84300-80038	820004	1/19/2011	1/19/2012
High Pass Filter (8.5 GHz)	Micro-Tronics	HPM50107	4	1/19/2011	1/19/2012
Power Supplier	Kikosui	PCR8000W	CM000912	1/19/2011	1/19/2012
Digital Multimeter	Fluke	177	92780314	1/18/2011	1/18/2012
Power Meter	Agilent	E4418B	MY45103902	1/18/2011	1/18/2012
Power Sensor	Hewlett Packard	8482A	55-5131	10/27/2010	10/27/2011
EMI Receiver	Hewlett Packard	8546A	3942A00514	11/22/2010	11/22/2011
Preselector	Hewlett Packard	85460A	3704A00485	11/22/2010	11/22/2011
LISN	Solar Electronics	Type 9348-50-R-24-BNC	68509	1/17/2011	1/17/2012

* Calibration of equipment past due for re-calibration will be performed expeditiously. If any equipment is found to be out of tolerance at that time, affected customers will be notified accordingly**.**

6 EMC Test Plan

6.1 Introduction

This section provides a description of the Equipment Under Test (EUT), configurations, operating conditions, and performance acceptance criteria. It is an overview of information provided by the manufacturer so that the test laboratory may perform the requested testing.

6.2 Customer

Table 11: Customer Information

Company Name	Pace Americas
Address	310 Providence Mine Road
City, State, Zip	Nevada City, CA 95959
Country	USA
Phone	(530) 274-5440
Fax	(530) 273-6340

Table 12: Technical Contact Information

Name	Mark Rieger
E-mail	mrieger@pace.com
Phone	(530) 274-5440
Fax	(530) 273-6340

6.3 Equipment Under Test (EUT)

Table 13: EUT Specifications

EUT Specification	
i38HG Dimensions	7.50” x 6.00” x 1.32”
AC Adapter (M/N: ACWS011A4-05U)	Input Voltage: 100 – 120 Vac Input Current: 400 mA Output Voltage: 5 Vdc Output Current: 2.0 A
Environment	Indoor
Operating Temperature Range:	0 to 40 degrees C
Multiple Feeds:	☐ Yes and how many ☒ No
Hardware Version	Ver.004, Rev. 08, X-Patch: 18
Part Number	4200-001331-001
RF Software Version	6.2.9.15
Operating Mode	802.11b, g
Transmitter Frequency Band	2.412 GHz to 2.462 GHz (DSSS)
Max. Rated Power Output	400 mW (+26 dBm)
Power Setting @ Operating Channel	2412 MHz (20 dBm), 2417 MHz (26 dBm), 2422 MHz (26 dBm), 2427 MHz (26 dBm), 2432 MHz (26 dBm), 2437 MHz (26 dBm), 2442 MHz (26 dBm), 2447 MHz (26 dBm), 2452 MHz (26 dBm), 2457 MHz (26 dBm), 2462 MHz (20 dBm).
Antenna Type	Attached on board
Modulation Type	☐ AM ☐ FM ☐ Phase ☒ Other describe: DSSS
Date Rate	802.11b – 1 Mbit/s, 2 Mbit/s, 5.5 Mbit/s, 9 Mbit/s, 11 Mbit/s. 802.11g – 6 Mbit/s, 9 Mbit/s, 12 Mbit/s, 18 Mbit/s, 24 Mbit/s, 36 Mbit/s, 48 Mbit/s, 54 Mbit/s.
Type of Equipment	☒ Table Top ☐ Wall-mount ☐ Floor standing cabinet ☐ Other *describe:*
Note: At 48 Mbps and 54 Mbps, Chan. 2 to Chan. 10, the EUT target power reduced to 23 dBm.	

Table 14: Interface Specifications

Interface Type	Cabled with what type of cable?	Is the cable shielded?	Maximum potential length of the cable?	Metallic (M), Coax (C), Fiber (F), or Not Applicable?
Ethernet (x4)	CAT-5	☒ No	☒ Metric: 30m	☒ M
ADSL	Telephone (RJ11)	☒ No	☒ Metric: 1.8m	☒ M

Table 15: Supported Equipment

Equipment	Manufacturer	Model	Serial	Used for
Laptop	Dell Computer	PP23LB	32894765713	Set test mode

Table 16: Description of Sample used for Testing

Device	Serial Number	Configuration	Used For
i38HG	221029024922	Radiated Sample	Radiated Emission
i38HG	221029024922	Conducted Sample	Output Power, Bandwidth, Conducted Spurious Emission, Peak Power Spectral Density,
Note: None			

Table 17: Description of Test Configuration used for Radiated Measurement.

Device	Antenna	Mode	Setup Description
i38HG	Attached	Transmit & Receive	Tabletop. i38HG positioned horizontally.
i38HG	Attached	Transmit & Receive	Tabletop. i38HG positioned vertically.
Note: Test configuration was used in the preliminary testing.			

6.4 Test Specifications

Testing requirements

Table 18: Test Specifications

Emissions and Immunity	
Standard	Requirement
CFR 47 Part 15.247: 2010	All
RSS 210 Iss. 3 2010	All

END OF REPORT