# Electromagnetic Compatibility Test Report

***Prepared in accordance with***

## FCC Part 15

On

# 802.11 b/g wireless adapter

# MS24895

Prepared for:

Draeger Medical Systems, Inc.

6 Tech Drive

Andover, MA 01810

Prepared by:

## TUV Rheinland of North America, Inc.

| | | | |
|---|---|---|---|
| ***Auftraggeber:*** *Client:* | Draeger Medical Systems, Inc.<br>6 Tech Drive<br>Andover, MA 01810 | Georgios Kokovidis<br>978-379-8148 / 978-379-8338<br>george.kokvidis@draeger.com | |
| **Bezeichnung:** *Identification:* | 802.11 b/g wireless adapter | **Serien-Nr.:** *Serial No.* | B7ZTH |
| ***Gegenstand der Prüfung:*** *Test item:* | MS24895 | **Prüfdatum:** *Date tested:* | November 21, 2008 |
| **Prüfort:** *Testing location:* | TUV Rheinland of North America<br>336 Initiative Drive<br>Rochester, NY 14624<br>U.S.A. | | |
| **Prüfgrundlage:** *Test specification:* | Emissions: FCC Part 15.247<br>FCC Part 15.209(a)<br>FCC Part 15.247(a)(2), FCC Part 15.247(b)(3)<br>Immunity: RSS-210 Issue 7,<br>FCC Part 15.247(b)(4), FCC Part 15.247(c),<br>FCC Part 15.247(e), FCC Part 15.247(c), FCC Part 15.31(m),<br>FCC Part 15.203, FCC Part 15.247(j) | | |
| **Prüfergebnis:** *Test Result* | **Der vorstehend beschriebene Prüfgegenstand wurde geprüft und entspricht oben genannter Prüfgrundlage. The above product was found to be Compliant to the above test standard(s)** | | |
| **geprüft** / *tested by:* Randall Masline | | | |
| Randall E Masline<br>6 April 2009<br>**Datum** *Date* **Name** *Name* **Unterschrift** *Signature* | | | |
| **Sonstiges :** *Other Aspects:* | **None** | | |

| | |
|---|---|
| Abkürzungen: OK, Pass, Compliant, Complies = entspricht Prüfgrundlage<br>Fail, Not Compliant, Does not Comply = entspricht nicht Prüfgrundlage<br>N/A = nicht anwendbar | Abbreviations: OK, Pass, Compliant, Complies = passed<br>Fail, Not Compliant, Does Not Comply = failed<br>N/A = not applicable |

| | | | |
|---|---|---|---|
| FC | NVLAP | **Industry Canada** | **BSMI** |
| **US90575** | **200313-0** | **3466C-1** | **SL2-IN-E-050R** |

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# 1 General Information

## 1.1 Scope

This report is intended to document the status of conformance with the requirements of the FCC Part 15, based on the results of testing performed on November 21, 2008 on the 802.11 b/g wireless adapter, Model No. MS24895, manufactured by Draeger Medical Systems, Inc.. 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 (Equipment Under Test) 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*

| | | | | | |
|---|---|---|---|---|---|
| **Applicant** | Draeger Medical Systems, Inc.<br>6 Tech Drive<br>Andover, MA 01810 | **Tel** | 978-379-8148 | **Contact** | Georgios Kokovidis |
| | | **Fax** | 978-379-8338 | **e-mail** | george.kokvidis@draeger.com |

| | | | |
|---|---|---|---|
| **Description** | 802.11 b/g wireless adapter | **Model Number** | MS24895 |
| **Serial Number** | B7ZTH | **Test Voltage/Freq.** | Battery Operated |
| **Test Date Completed:** | November 21, 2008 | **Test Engineer** | Randall Masline |

| Standards | Description | Severity Level or Limit | Criteria | Test Result |
|---|---|---|---|---|
| RSS-210 Issue 7 | Industry Canada - Low-power License-exempt Radiocommunication Devices | See called out basic standards below | See Below | **Complies** |
| FCC Part 15.247 | Operation within the 2400 - 2483.5 MHz bands | See called out basic standards below | See Below | **Complies** |
| FCC Part 15.209(a) | Radiated Emissions | Class B, 30 - 1000 MHz | Limit | **Complies** |
| FCC Part 15.207(c) | Conducted Emissions | Class B, 150kHz - 30MHz | Limit | **Complies** |
| FCC Part 15.247(a)(2) | 6dB Bandwidth | BW at least 500 kHz | Limit | **Complies** |
| FCC Part 15.247(b)(3) | Output Power | 15 dBm | Limit | **Complies** |
| FCC Part 15.247(b)(4) | Antenna Gain | ≤ 6dBi | Limit | **Complies** |
| FCC Part 15.247(c) | Band Edge Measurement | -20dB | Limit | **Complies** |
| FCC Part 15.247(e) | Peak Power Spectral Density | ≤ 8dBm at 10kHz BW | Limit | **Complies** |
| FCC Part 15.247(c) | Spurious Emissions | Table FCC Part 15.209 | Limit | **Complies** |
| FCC Part 15.31(m) | Tunable | Measurements on Low, Mid and Highest Frequencies | Limit | **Complies** |
| FCC Part 15.203 | Antenna Requirements | | Limit | **Complies** |
| FCC Part 15.247(j) | Maximum Permissable Exposure | See section 4.9 | Limit | **Complies** |

# 2 Laboratory Information

## 2.1 Accreditations & Endorsements

### 2.1.1 US Federal Communications Commission

TUV Rheinland of North America located at 336 Initiative Dr, Rochester NY is accredited by the commission 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 the FCC (Registration No US90575). The laboratory scope of accreditation includes: Title 47 CFR Part 15, and 18. The accreditation is updated every 3 years.

### 2.1.2 NIST / NVLAP

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 Standard 17025:2005 (Lab code: 200313-0). The scope of laboratory accreditation includes emission and immunity testing. The accreditation is updated annually.

### 2.1.3 VCCI

VCCI Accredited test lab. Registration numbers R-1065, C-1120, C-1121

### 2.1.4 Industry Canada

Registration No.: 3466C-1. The OATS has been accepted by Industry Canada to perform testing to 3 and to 10m, based on the test procedures described in ANSI C63.4-2003.

### 2.1.5 BSMI

Registration No.: SL2-IN-E-050R. The BSMI accreditation was obtained by NIST MRA with the BSMI.

## 2.2 Measurement Uncertainty

**General**

| | |
|---|---|
| ☐ | The estimated combined standard uncertainty for ESD immunity measurements is ± 0.43%. |
| ☐ | The estimated combined standard uncertainty for radiated immunity measurements is ± 2.0dB. |
| ☐ | The estimated combined standard uncertainty for EFT fast transient immunity measurements is ± 6.0%. |
| ☐ | The estimated combined standard uncertainty for surge immunity measurements is ± 5.0%. |
| ☐ | The estimated combined standard uncertainty for conducted immunity measurements is ± 2.0 dB. |
| ☐ | The estimated combined standard uncertainty for power frequency magnetic field immunity measurements is ± 2.57%. |
| ☐ | The estimated combined standard uncertainty for voltage variation and interruption measurements is ± 4.89%. |
| ☒ | The estimated combined standard uncertainty for radiated emissions measurements is ± 4.6 dB. |
| ☐ | The estimated combined standard uncertainty for conducted emissions measurements is ± 2.6 dB. |
| ☐ | The estimated combined standard uncertainty for harmonic current ± 7.27% and flicker measurements is ± 3.87%. |

## 2.3 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 Standard 17025:2005. Equipment calibration records are kept on file at the test facility.

## 2.4 Measurement Equipment Used

| Equipment | Manufacturer | Model # | Ref./Serial # | | Last Cal dd/mm/yy | Next Cal dd/mm/yy | Test |
|---|---|---|---|---|---|---|---|
| BiLog | Chase | CBL6112A | | 2125 | N/A | N/A | RI |
| BiLog | Chase | CBL6111 | | 1169 | 29-June-07 | 29-June-09 | RE |
| BiLog | Chase | CBL6111 | | 1170 | 29-June-07 | 29-June-09 | RE |
| Horn | EMCO | 3115 | C025 | 9512-4630 | 14-Jun-07 | 14-Jun-09 | RE |
| Horn | EMCO | 3115 | C031 | 9812-5635 | 7-Feb-08 | 7-Feb-10 | RE |
| LISN | Schwarzbeck | 8121-200 | C102 | 200 | 15-Jan-08 | 15-Jan-10 | CE |
| LISN | Schwarzbeck | 8121-131 | C111 | 131 | 20-Dec-07 | 20-Dec-09 | CE |
| LISN | Schwarzbeck | 8121-128 | C114 | 128 | 24-Jul-08 | 24-Jul-10 | CE |
| ESD Gun | Schaffner | NSG 435 | C200 | 1495 | 22-Jul-08 | 22-Jul-09 | ESD |
| Precision Power Source | California Instruments | MDL 225500L/5 | C210 | | N/A | N/A | HAR, FLI, VDSI |
| Power Analyzer | Voltech | PM3000A | C211 | 8992 | 6-May-08 | 6-May-09 | FLI |
| Wideband (.01-230) | IFI | M75 | C212 | A295-0497 | N/A | N/A | CI |
| Signal Generator | Marconi | 2024 | C213 | 112223122 | 19-Dec-07 | 19-Dec-08 | RI |
| Signal Generator | HP | 8657A | C214 | 312A04354 | 19-Dec-07 | 19-Dec-08 | CI |
| Power Meter | HP | 437B | C215 | 3125010240 | 19-Dec-07 | 19-Dec-08 | CI |
| Power Supply & Control Module | IFI | PS 5000/28/40 | C219 | 049-4146 | N/A | N/A | RI |
| Wideband Amp (.01-1000) | IFI | M5580 | C220 | 0492-4146 | N/A | N/A | RI |
| Coupling Decoupling 1 PH | FCC | FCC-801-M3-32 | C221 | 106 | 07-Jan-08 | 07-Jan-09 | CI |
| Attenuator 6dB (0-1000MHz) 100W | JFW | | C223 | | N/A | N/A | CI |
| Directional Coupler | | 62630 | C224 | 5326 | N/A | N/A | CI |
| CDN Adapter Kit | FCC | 801-150-50 CDN | C225 | 752/753 | 04-Jan-08 | 04-Jan-09 | CI |
| Calibration Fixture | FCC | 801-2031-CF | C226 | 135 | 03-Jan-08 | 03-Jan-09 | CI |
| EM Injection Clamp | FCC | F-2031 | C227 | 259 | 03-Jan-08 | 03-Jan-09 | CI |
| PS/Control Module | IFI | 5000/28/40 | C228 | 2245-1296 | N/A | N/A | RI |
| Wideband Amp | IFI | CMX5001 | C229 | 2244-1296 | N/A | N/A | RI |
| Leveling PreAmplifier | IFI | LPA-5B | C230 | 2265-1296 | N/A | N/A | RI |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Field Monitor | Amplifier Research | FM5004 | | 308114 | N/A | N/A | RI |
| RF 900MHz Pulse Modulator | Schaffner | CPM9830 | C240 | 1026 | N/A | N/A | RI |
| Induction Coil (2.0m x 2.6m) | Haefely | | C241 | | N/A | N/A | MF |
| Magnetic Field Test System | Haefely | MAG 100.1 | C243 | 080-136-03 | N/A | N/A | MF |
| Triaxial Field Meter | F.W.BELL | 4080 | C244 | | 25-Apr-07 | 25-Apr-09 | MF |
| Directional Coupler 0.8-4.2GHz | Amplifier Research | DC7144A | C251 | 307343 | N/A | N/A | RI |
| Digitizing Oscilloscope 1GHz | Tektronix | TDS 784C | C254 | B010847 | 17 Dec-07 | 17 Dec-08 | SI, EFT VDSI |
| Field sensor | Amplifier Research | FP6001 | C255 | 305319 | 6 Jun 08 | 6 Jun 09 | RI |
| Power Sensor (100KHz-4.2GHz) | Agilent | 8482A | C256 | MY41093835 | 18 Dec-07 | 18 Dec-08 | CI |
| Power Meter | Gigatronics | 8541B | C257 | 1828546 | 28-May-08 | 28-May-09 | RI |
| Peak Power Sensor | Gigatronics | 80350A | C258 | 1829770 | 16-May-08 | 16-May-09 | RI |
| Coupling Decoupling 2 PH | FCC | FCC-801-M4 -32A | C260 | 07005 | 10-Jun-08 | 10-Jun-09 | CI |
| Coupling Decoupling 1 PH | FCC | FCC-801-M3 -16A | C261 | 07021 | 10-Jun-08 | 10-Jun-09 | CI |
| EMI Receiver | Rohde & Schwarz | ESVS 30 | C310 | 826006/015 | 19-Dec-07 | 19-Dec-08 | RE |
| Analyzer w RF Filter Section 85460A | HP | 8546A | C311 | 3325A00127 | 23-Jul-08 | 23-Jul-09 | RE, CE |
| Receiver (20Hz-40GHz) | Rohde & Schwarz | ESI 40 | C320 | 839283/005 | 22-Jul-08 | 22-Jul-09 | RE,CE |
| Receiver (20Hz-40GHz) | Rohde & Schwarz | ESIB 40 | C321 | 100180 | 20-Jan-08 | 20-Jan-09 | RE,CE |
| EMI Receiver | Rohde & Schwarz | ESHS 30 | C323 | 831954/012 | 19-Dec-07 | 19-Dec-08 | CE |
| Multimeter | Fluke | 87 | C405 | 49050672 | 5-May-08 | 5-May-09 | All Tests |
| Clamp On Meter | Amprobe | RS-3 | C410 | | 17-Dec-07 | 17-Dec-08 | MF |
| | | | | | | | |
| Temp./Humidity Chart Recorder | Honeywell | | C418 | 637592 | 9-Jan-08 | 9-Jan-09 | RE |
| Temp./Humidity Chart Recorder | Honeywell | | C419 | 639971 | 8-Jan-08 | 8-Jan-09 | Re |
| Passive HV Probe 100X | Fluke | 80K-40 | C434 | | 24-Jul-08 | 24-Jul-09 | ESD |
| Oscilloscope | Tektronics | 2430 | C435 | 8010532 | 23-Jul-08 | 23-Jul-09 | EFT |
| Multimeter | Fluke | 83 | C437 | 48162892 | 24-Jul-08 | 24-Jul-09 | RE |
| Amplifier (1-26.5 GHz.) | Agilent | 8449B | C438 | 3008A01842 | 18-Dec-07 | 18-Dec-08 | RE |
| Amplifier 1 - 18GHz | Rohde & Schwarz | TS-PR18 | C439 | 122002/001 | 18-Jan-08 | 18-Jan-10 | RE |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Signal Generator (10M-40GHz) | Rohde & Schwarz | SMR40 | C440 | 100195 | 19-Dec-07 | 19-Dec-08 | RI |
| Amplifier (18-26.5GHz) | Rohde & Schwarz | TS-PR18 | C443 | 100005 | 22-Jul-08 | 22-Jul-08 | RE |
| Digital Pressure/Temp/RH | Davis | Perception II | C444 | 40917 | 08-Jan-08 | 08-Jan-09 | All tests |
| Multimeter | Fluke | 87 | C445 | 59890224 | 18-Dec-07 | 18-Dec-08 | All tests |
| Power Analyzer | Voltech | PM6000 | C446 | 100006700195 | 13-Dec-07 | 13-Dec-08 | HAR, FLI, VDSI |
| Analyzer w RF Filter Section 85460A | HP | 8546A | D004 | 3625A00356 | 23-Jul-08 | 23-Jul-08 | RE, CE |
| ESD Gun | Schaffner | NSG 435 | D005 | 1891 | 12 Dec-07 | 12 Dec-08 | ESD |
| Fast Transient / Burst Generator | Schaffner | NSG2025 | D007 | 109 | 18-Sep-07 | 18-Sep-08 | EFT |
| Surge Immunity Test System | Schaffner | NSG2050 | D008 | 199930-007SC | 18-Sep-07 | 18-Sep-08 | SI |
| Pulse Coupling Network | Schaffner | CDN 133 | D009 | 102 | 24-Sep-07 | 24-Sep-08 | SI |

Note: CE = Conducted Emissions, CI= Conducted Immunity, DP=Disturbance Power, EFT=Electrical Fast Transients, ESD = Electrostatic Discharge, FLI=Flicker, HAR=Harmonics, MF=Magnetic Field Immunity, RE=Radiated Emissions, RI=Radiated Immunity, SI=Surge Immunity, VDSI=Voltage Dips and Short Interruptions

# 3 Product Information

## 3.1 Product Description

See Section 6.4.

## 3.2 Equipment Modifications

No modifications were needed to bring product into compliance.

## 3.3 Test Plan

The EUT product information, test configuration, mode of operation, test types, test procedures, test levels, pass/failure criteria, in this report were carried out per the product test plan located in appendix A of this report.

The radio in this report was tested in two of Draeger Medical System, Inc. Products. The 2 products vary in size but the radio and antennae remained identical. The two models in which this radio was tested was M300 and the M540. The radio behaved identically in both models.


Figure 1 – External Photo of EUT

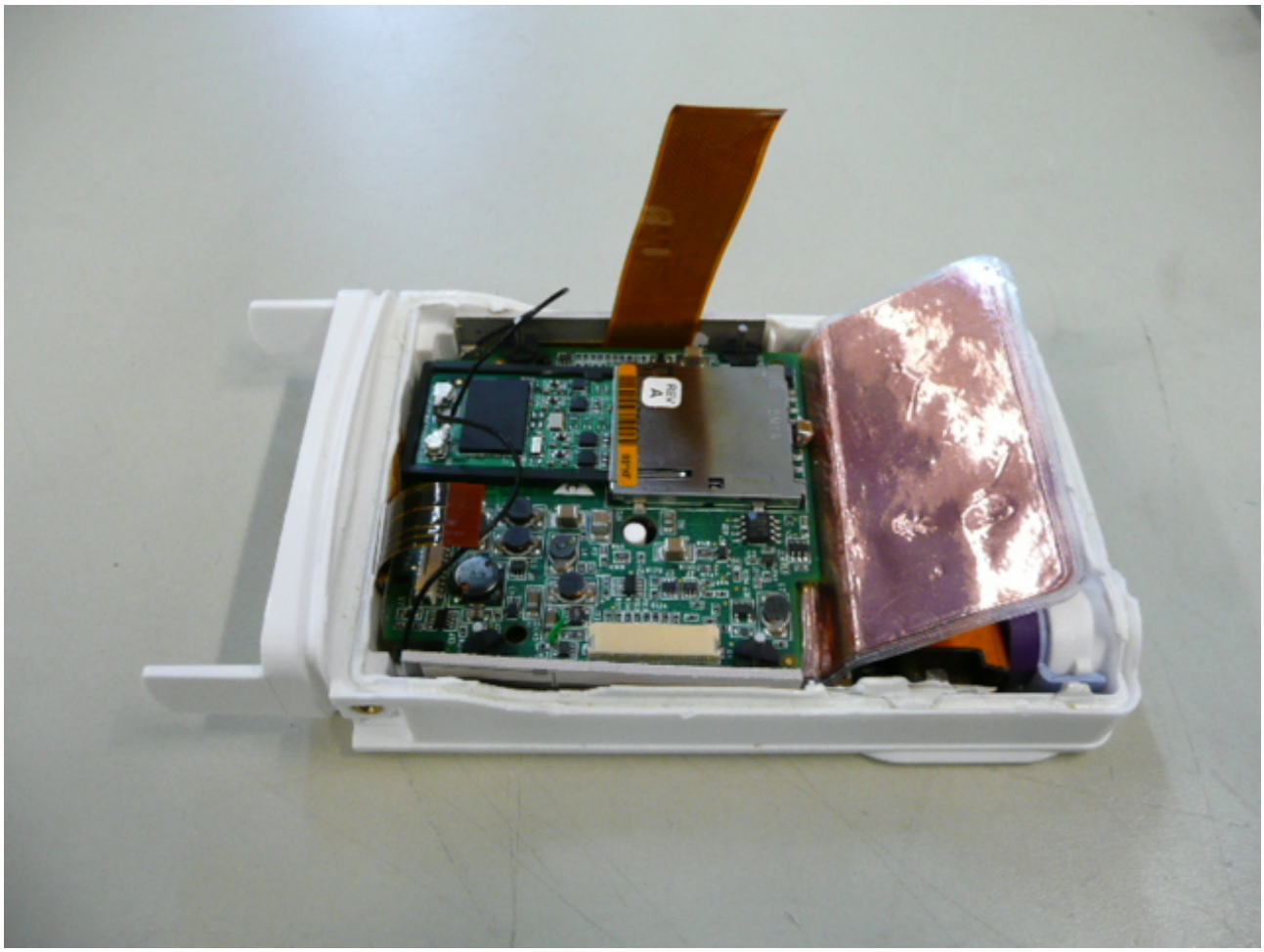


Figure 2 – Internal Photo of EUT

# 4 Emissions

## 4.1 Radiated Emissions

This test measures the electromagnetic levels of spurious signals generated by the EUT that radiated from the EUT and may affect the performance of other nearby electronic equipment.

Testing was performed in accordance with 47 CFR Part 15, ANSI C63.4:2005, RSS-210 Issue 7. 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.

### 4.1.1 Over View of Test

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Results** | **Complies** (as tested per this report) | | | | **Date** | 11/21/08 | |
| **Standard** | FCC Part 15.209(a) | | | | | | |
| **Product Model** | MS24895 | | | **Serial#** | B7ZTH | | |
| **Configuration** | See test plan for details | | | | | | |
| **Test Set-up** | Tested on 10m O.A.T.S. placed on turn-table, see test plans for details | | | | | | |
| **EUT Powered By** | Battery Operated | **Temp** | 23ºC | **Humidity** | 54% | **Pressure** | 1013mbar |
| **Frequency Range** | 30 - 1000 MHz @ 10m | | | | | | |
| **Criteria** | Class B. (Below Limit) | | **Perf. Verification** | | Readings Under Limit | | |
| **Mod. to EUT** | None | | **Test Performed By** | | Randall Masline | | |

### 4.1.2 Test Procedure

Radiated and FCC emissions tests were performed using the procedures of ANSI C63.4 including methods for signal maximizations and EUT configuration. The photos included with the report show the EUT in its maximized configuration.

The frequency range from 30 - 1000 MHz was investigated for radiated emissions.

Radiated emission testing was first performed at a distance of 3 meters in the semi-anechoic chamber in order to identify the specific frequencies for which these measurements will be made on the 10 m OATS.

### 4.1.3 Deviations

There were no deviations from the test methodology listed in the test plan for the radiated emission test.

### 4.1.4 Final Test

All final radiated emissions measurements were below (in compliance) the limits.

### 4.1.5 Final Graphs

| *Radiated Emissions Measurements* | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| ***Standard:*** | EN 55022: 1998 Class B/FCC Part 15.209(a | | | | Finals | ***Date:*** | 11/21/2008 | | |
| ***Device Tested:*** | Draeger Medical | | | | 3m | ***File .xls:*** | | | |
| | | | | | | | | | |
| | Measured Level | | | | | | | | |
| Meas # | Freq (MHz) | Quasi-Peak | Quasi-Peak Limit | Quasi-Peak Δ | Result | Antenna Polarization | Angle (degrees) | Antenna Height (meters) | Comment |
| **1** | **60.2820** | **22.00** | **30.00** | **-8.00** | **Complied** | **Vertical** | **0** | **1.00** | **Maximum Emissio** |
| 2 | 87.1920 | 19.20 | 30.00 | -10.80 | Complied | Vertical | 0 | 1.00 | |
| 3 | 242.2710 | 21.60 | 37.00 | -15.40 | Complied | Vertical | 0 | 1.00 | |
| 4 | 352.4430 | 25.90 | 37.00 | -11.10 | Complied | Vertical | 0 | 1.00 | |
| 5 | 160.6540 | 20.00 | 30.00 | -10.00 | Complied | Horizontal | 0 | 1.00 | |
| 6 | 253.7400 | 23.20 | 37.00 | -13.80 | Complied | Horizontal | 0 | 1.00 | |

### 4.1.6 Photos

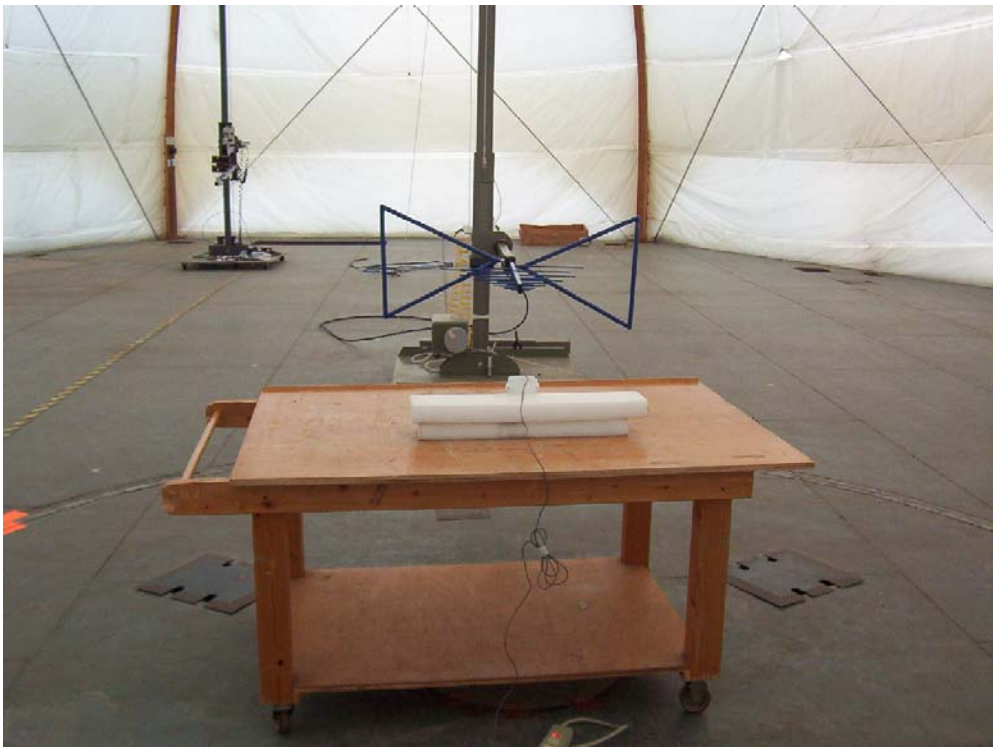
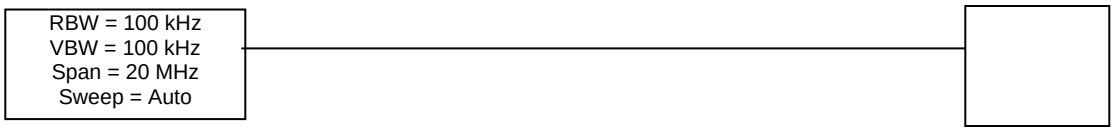


Figure 3 - Radiated Emissions Test Setup

## *4.2 6dB and 99% Bandwidths; §15.247(a)(1), RSS-210 §5.9.1*

The bandwidths are measured with a spectrum analyzer connected directly to the antenna termination, while the EUT is operating in transmission mode at the appropriate center frequency. Since the bin width is less than 0.5 RBW and the analyzer has 500 measurement points in the spectrum display, the sample detector was selected.




Spectrum Analyzer RF Output connection

Measurement Test set up

| 802.11b | | | |
|---|---|---|---|
| **Channel** | **Center Frequency (GHz)** | **6dB Bandwidth (MHz)** | **99% Power Bandwidth (MHz)** |
| **1** | 2.412 | 10.39 | 14.28 |
| **6** | 2.437 | 10.42 | 14.16 |
| **11** | 2.462 | 10.51 | 14.16 |

| 802.11g | | | |
|---|---|---|---|
| **Channel** | **Center Frequency (GHz)** | **6dB Bandwidth (MHz)** | **99% Power Bandwidth (MHz)** |
| **1** | 2.412 | 16.56 | 17.93 |
| **6** | 2.437 | 16.56 | 18.05 |
| **11** | 2.462 | 16.56 | 18.16 |

Table 1 – Table of Results

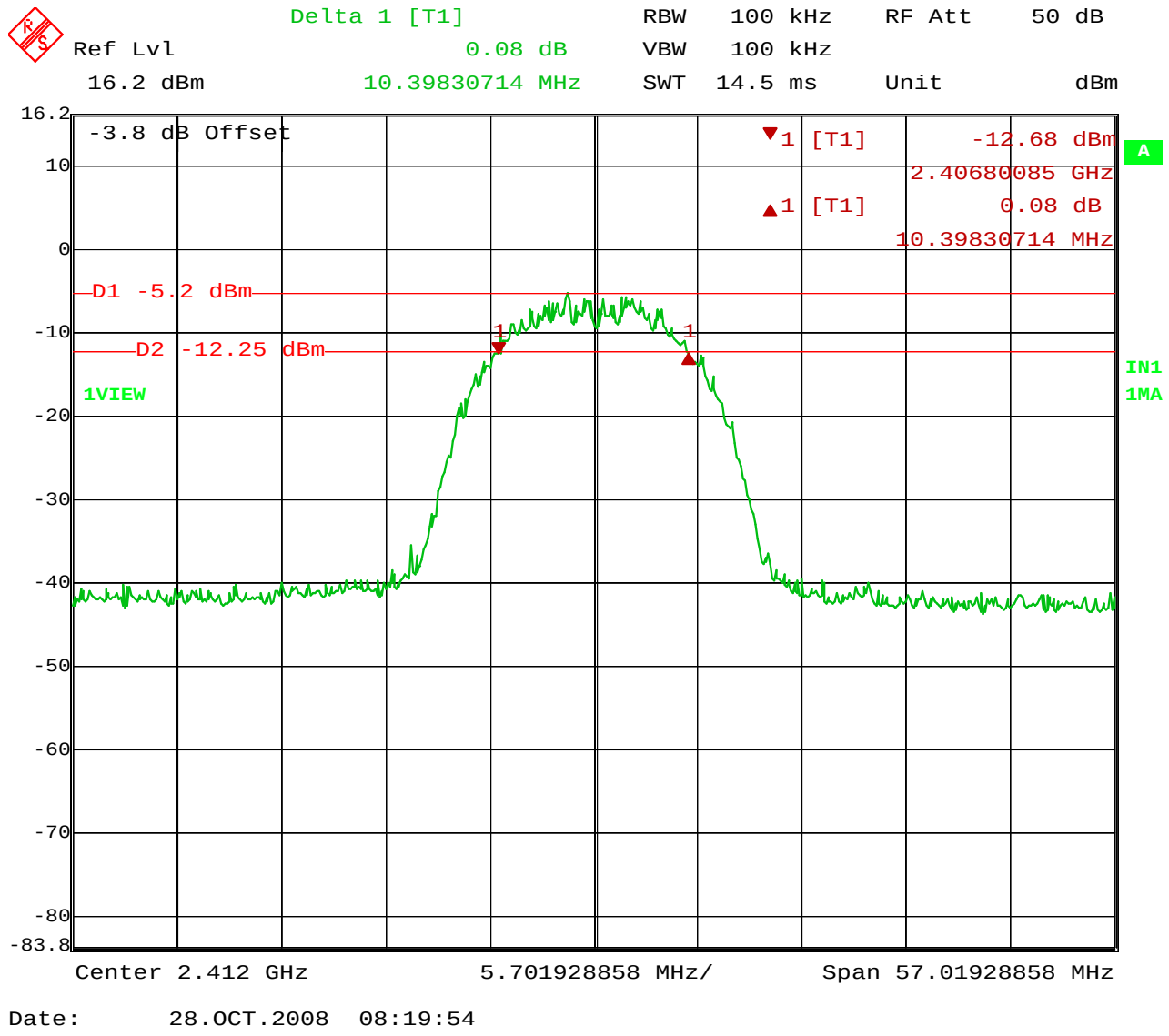



Figure 4 - Plot of 802.11b Ch 1- 6dB bandwidth at 2.412 GHz Center Frequency

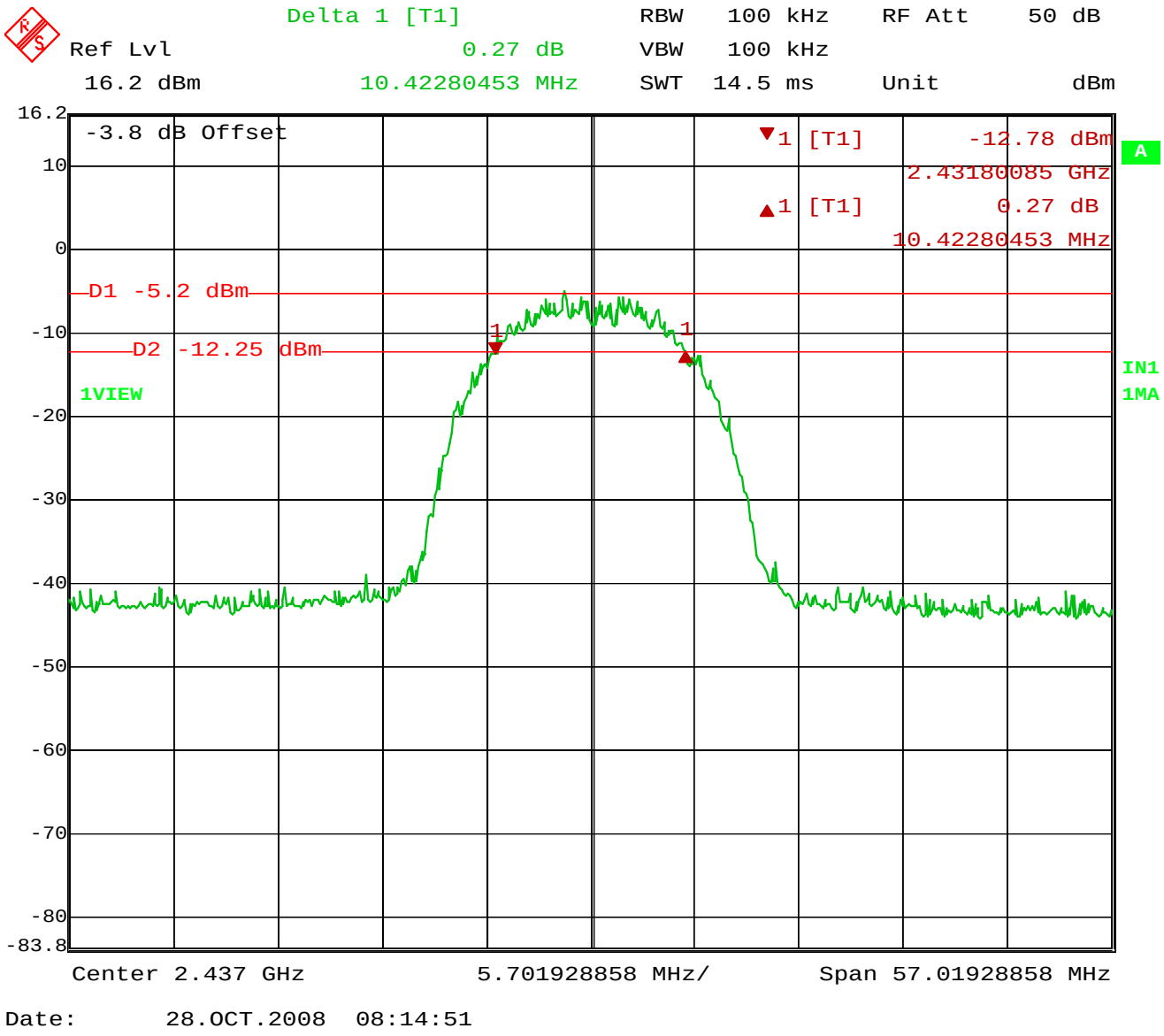



Figure 5 - Plot of 802.11b Ch 6 - 6dB bandwidth at 2.437 GHz Center Frequency

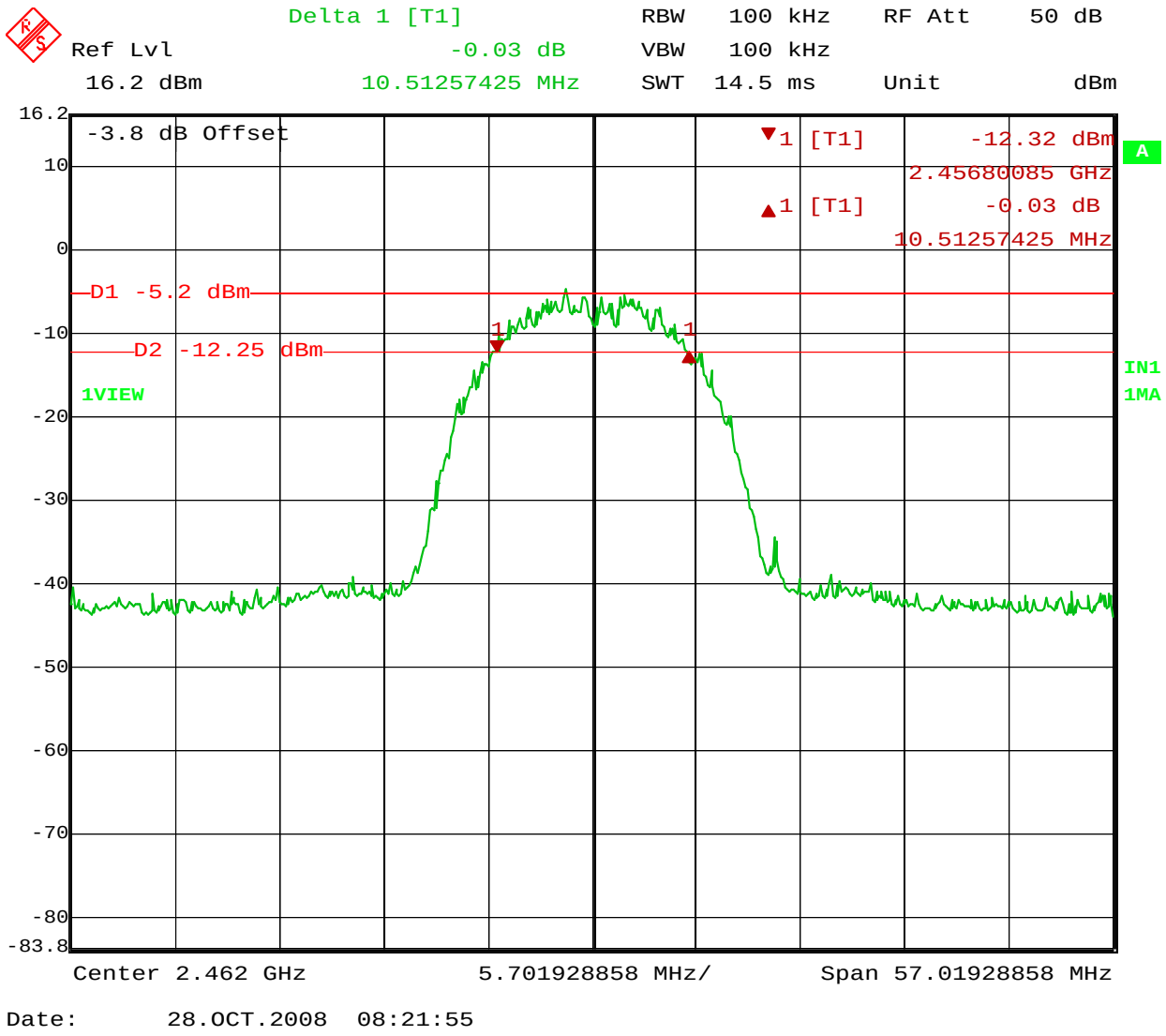



Figure 6 - Plot of 802.11b Ch 11- 6dB bandwidth at 2.462 GHz Center Frequency

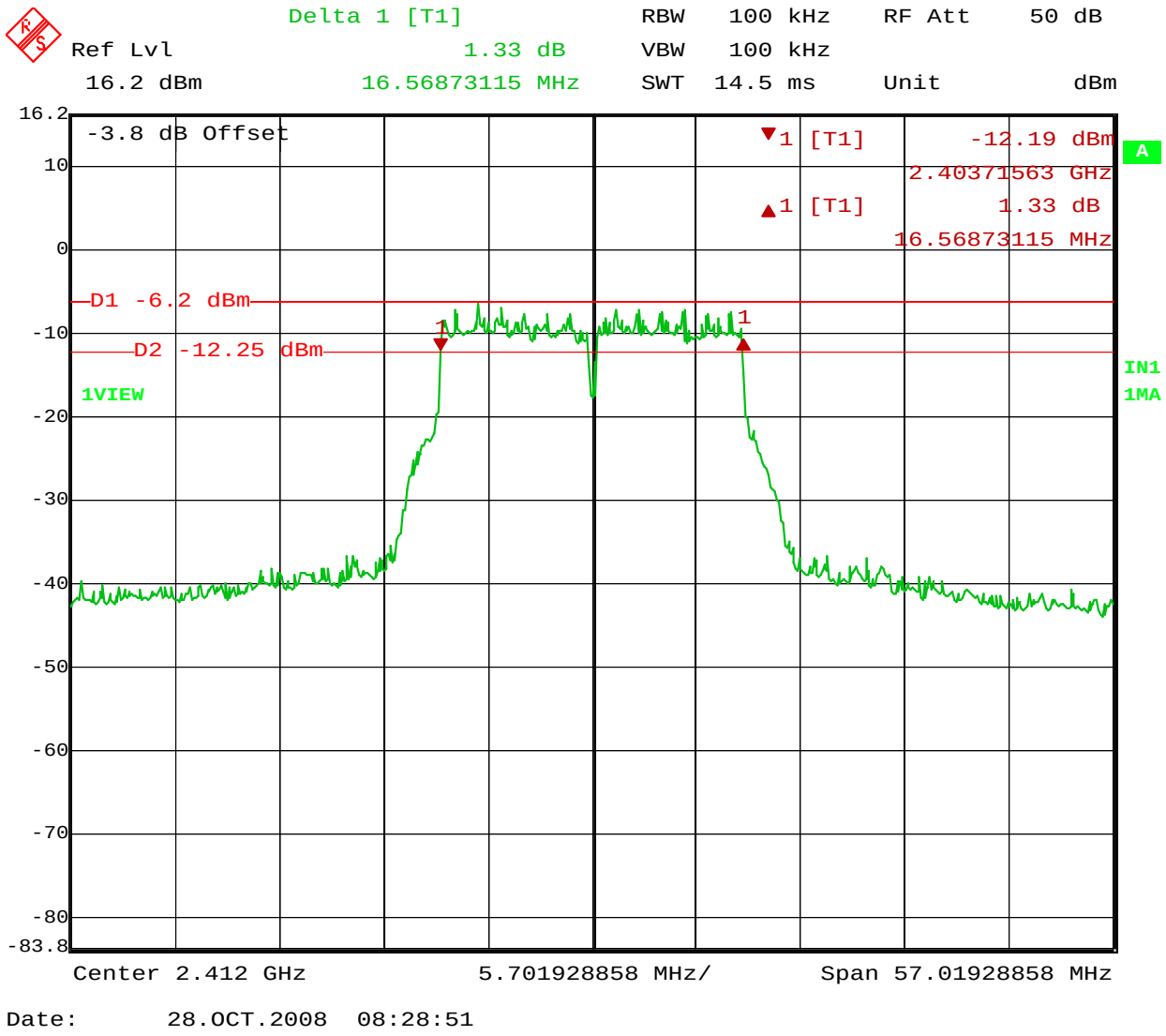



Figure 7 - Plot of 802.11g Ch 1 - 6dB bandwidth at 2.412 GHz Center Frequency

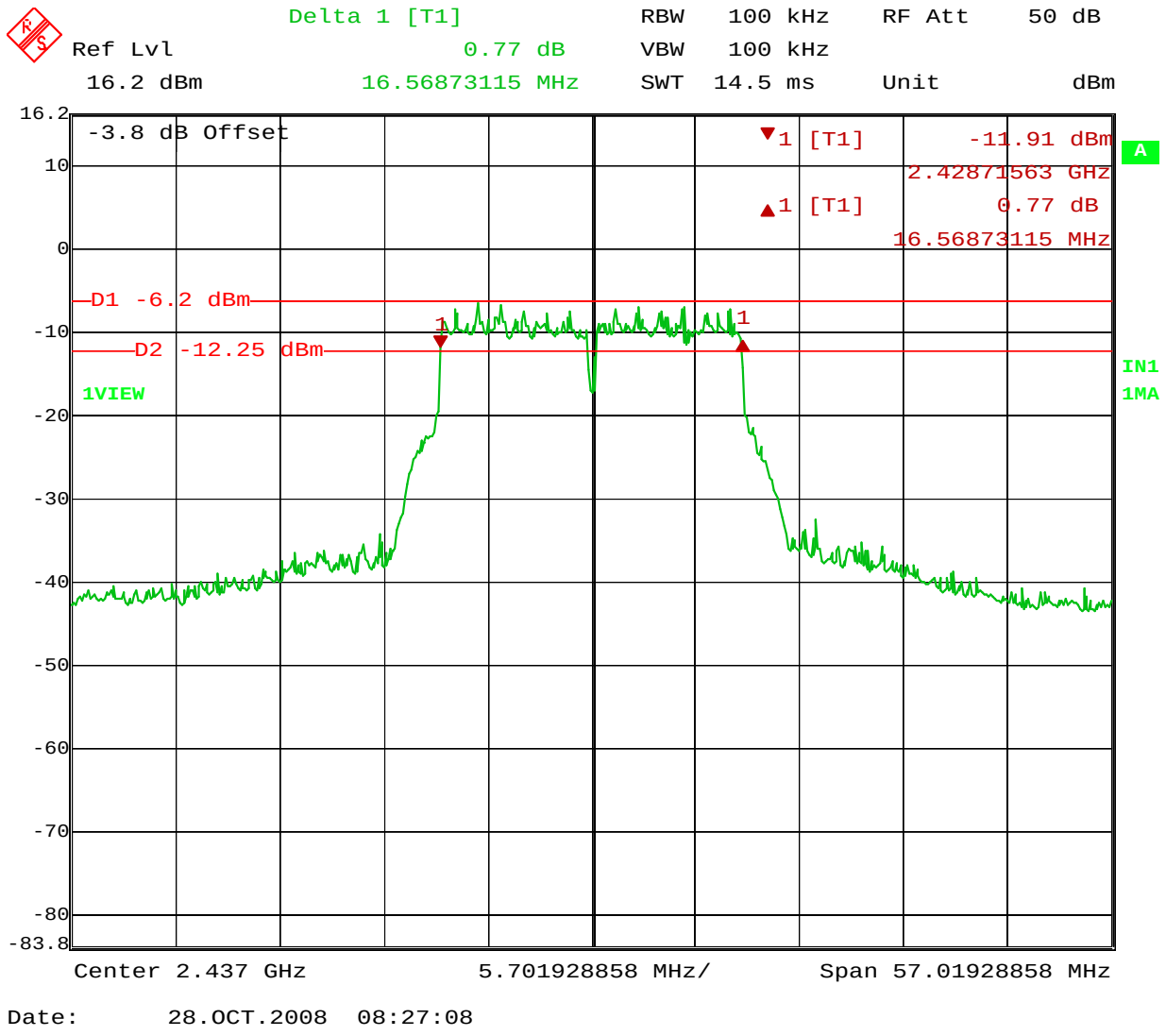



Figure 8 - Plot of 802.11g Ch 6 - 6dB bandwidth at 2.437 GHz Center Frequency

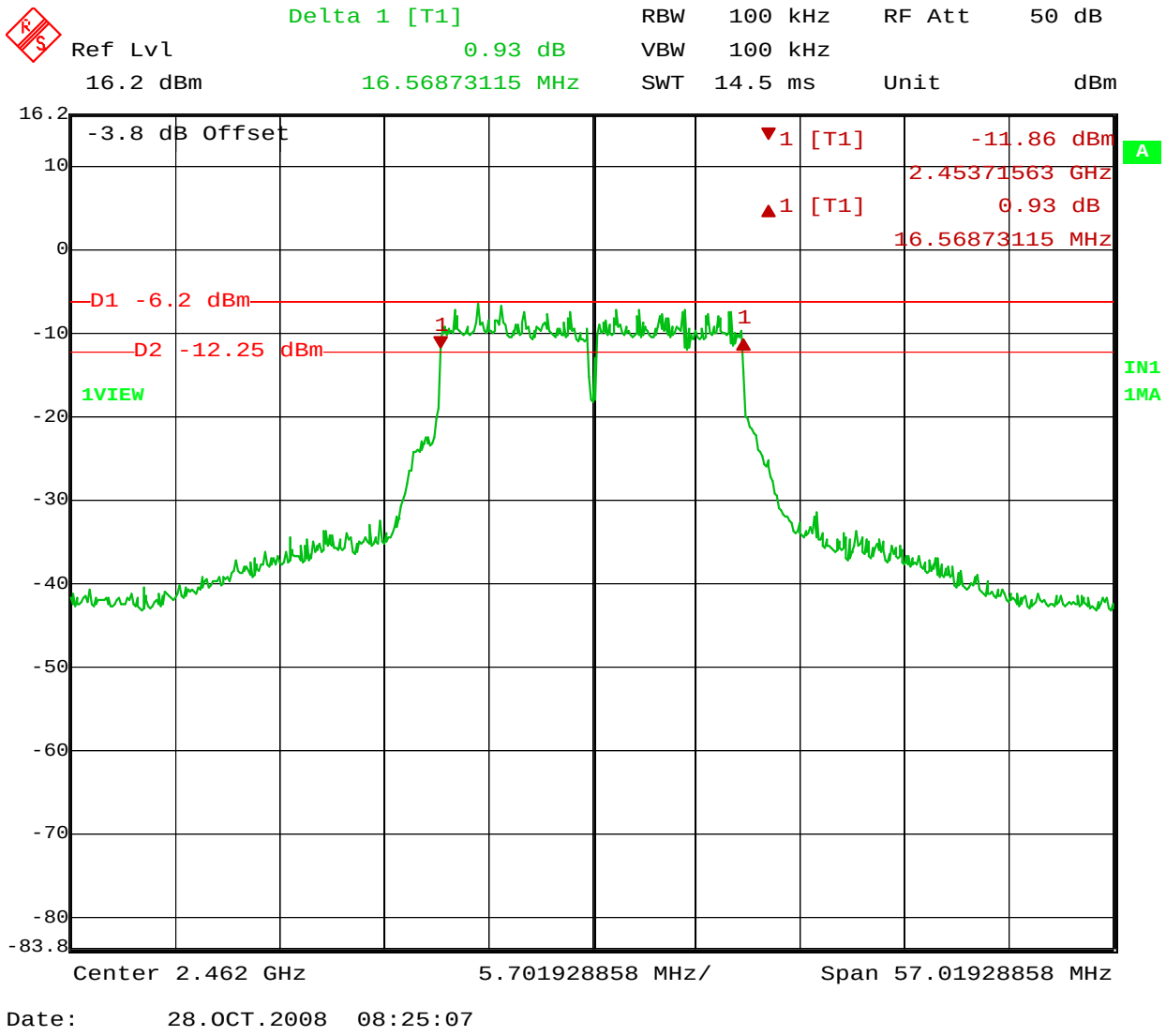



Figure 9 - Plot of 802.11g CH 11- 6dB bandwidth at 2.462 GHz Center Frequency

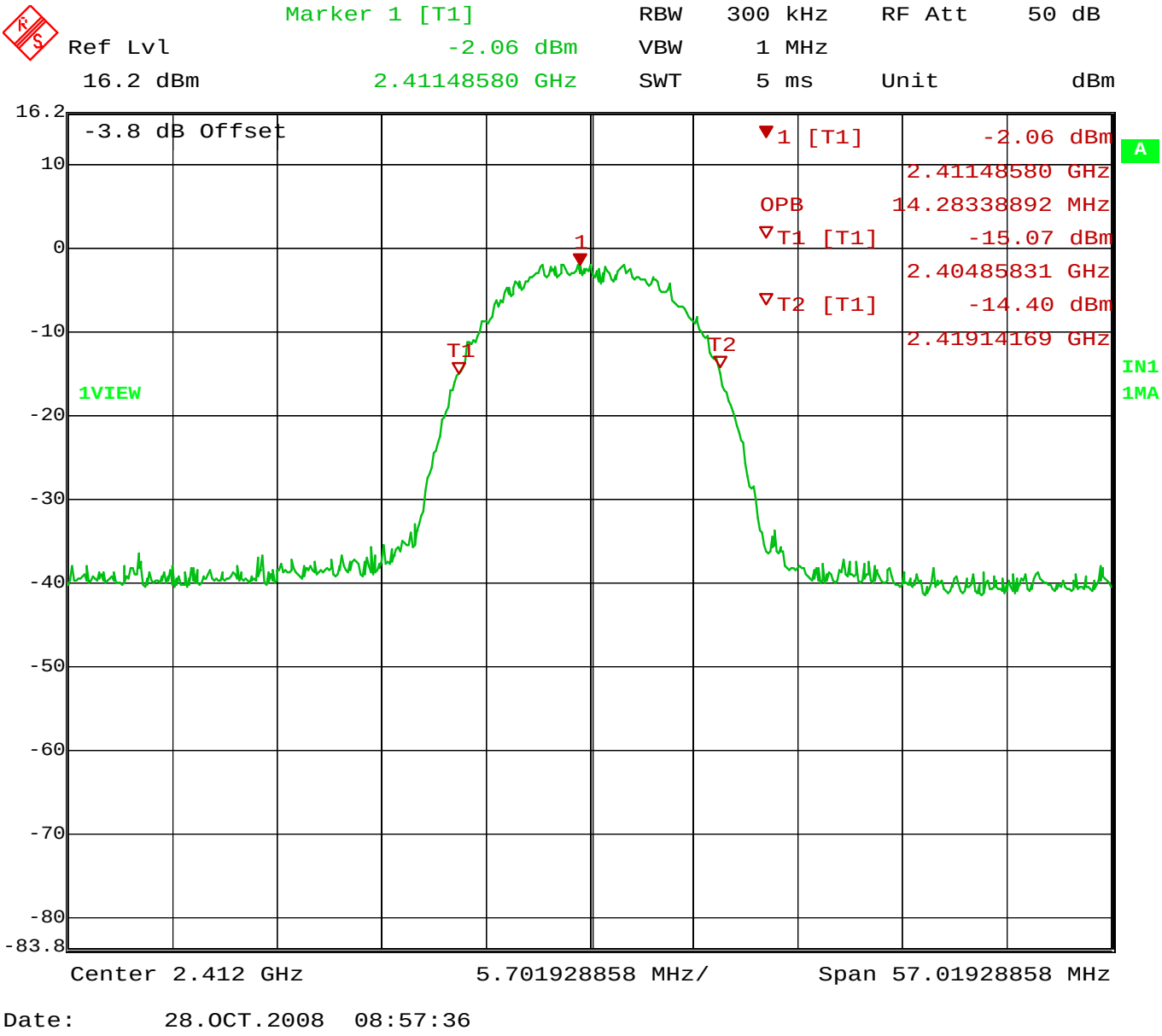



Figure 10 - Plot of 802.11b Ch 1 99% bandwidth at 2.412 GHz Center Frequency

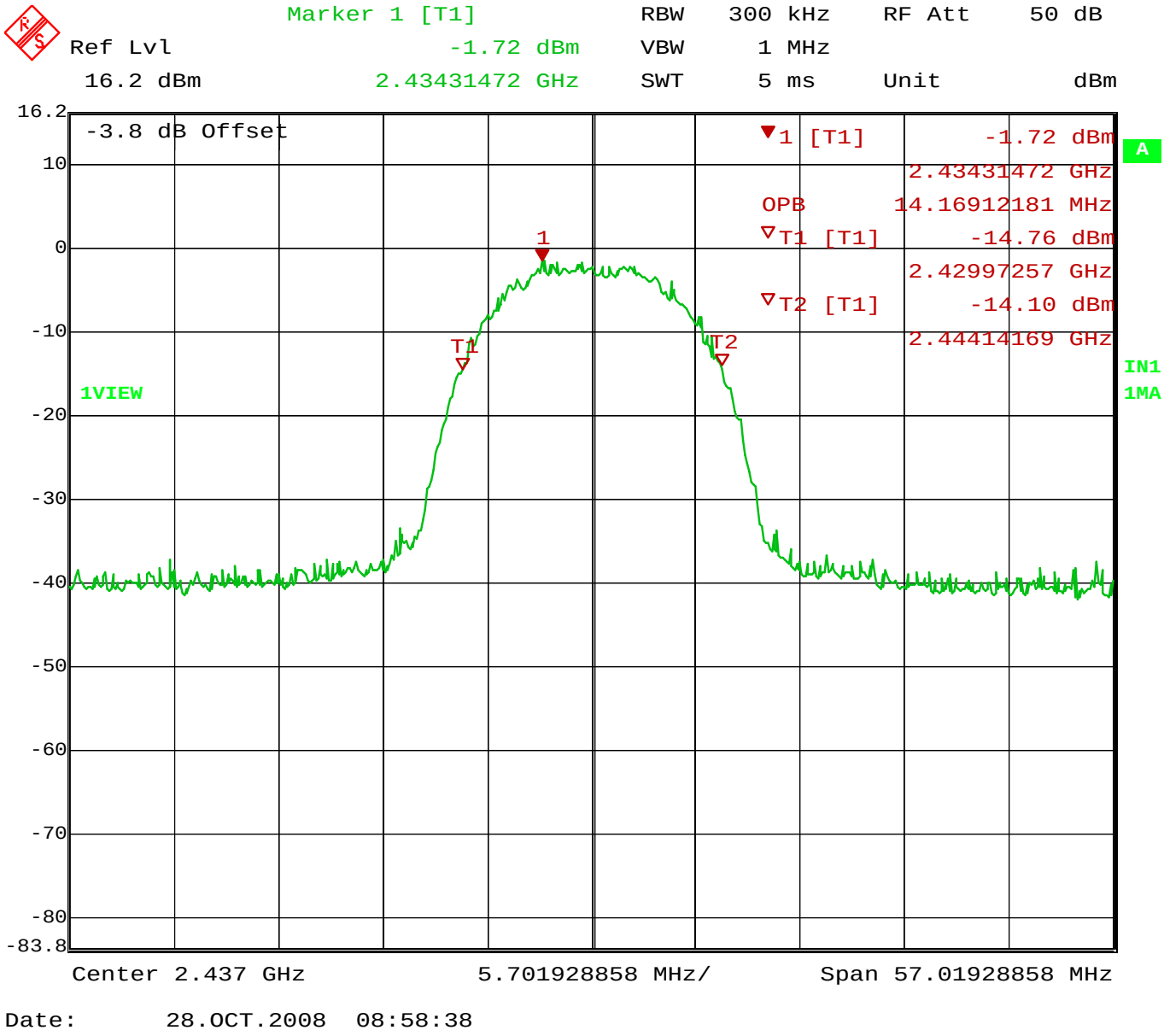



Figure 11 - Plot of 802.11b Ch 6 99% bandwidth at 2.437 GHz Center Frequency

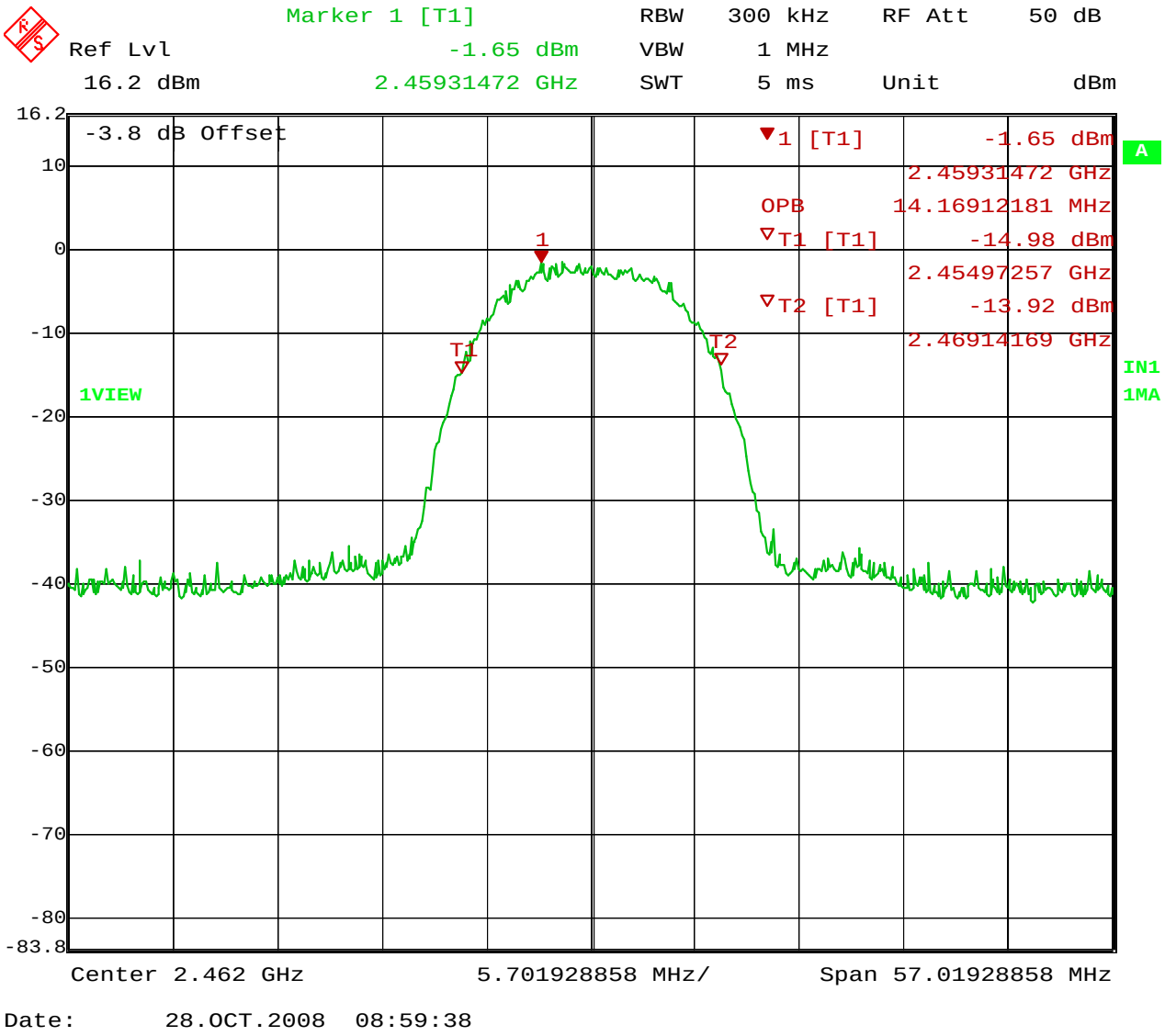



Figure 12 - Plot of 802.11b Ch 11 99% bandwidth at 2.462 GHz Center Frequency

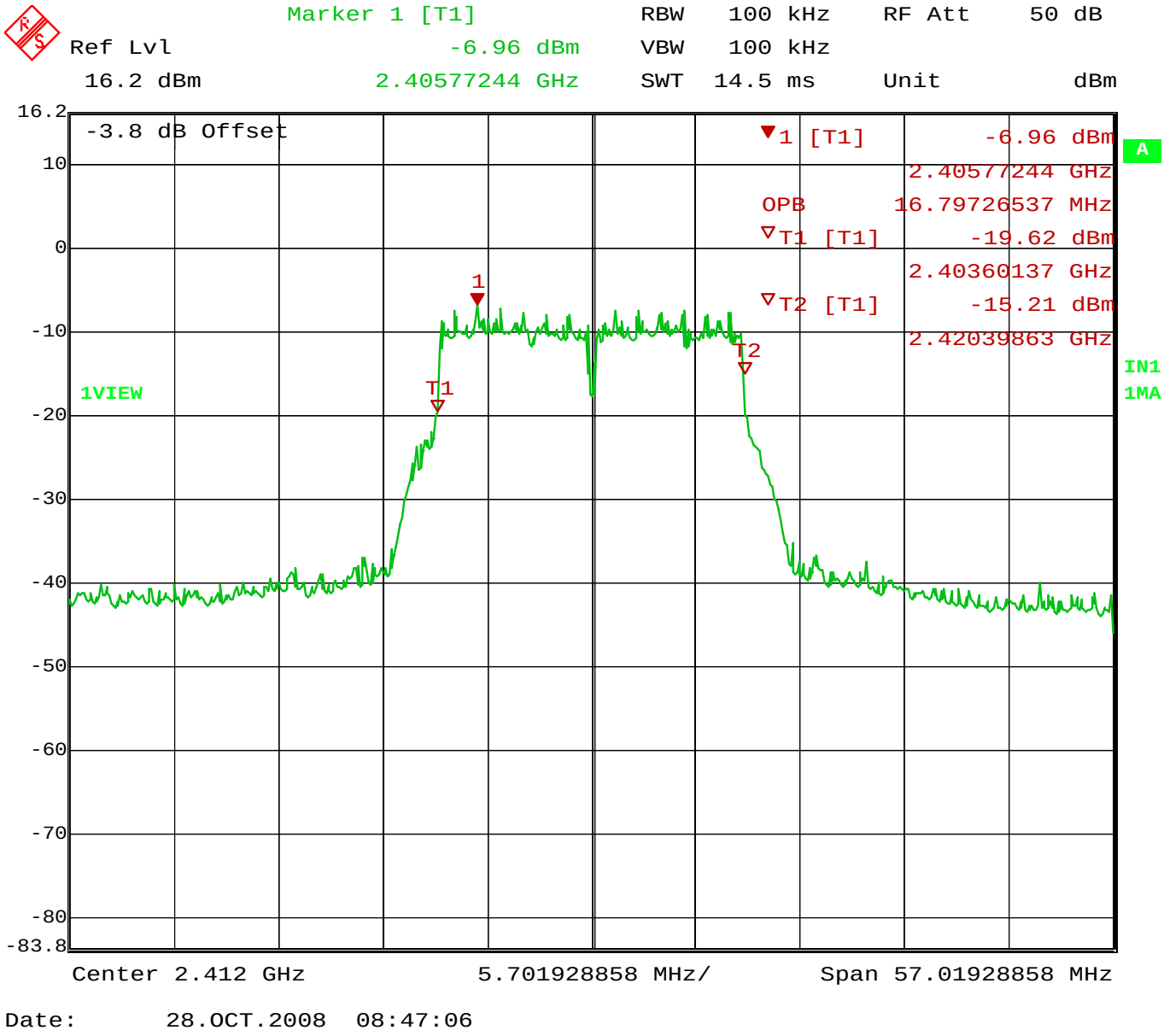



Figure 13 - Plot of 802.11bg Ch 1 99% bandwidth at 2.412 GHz Center Frequency

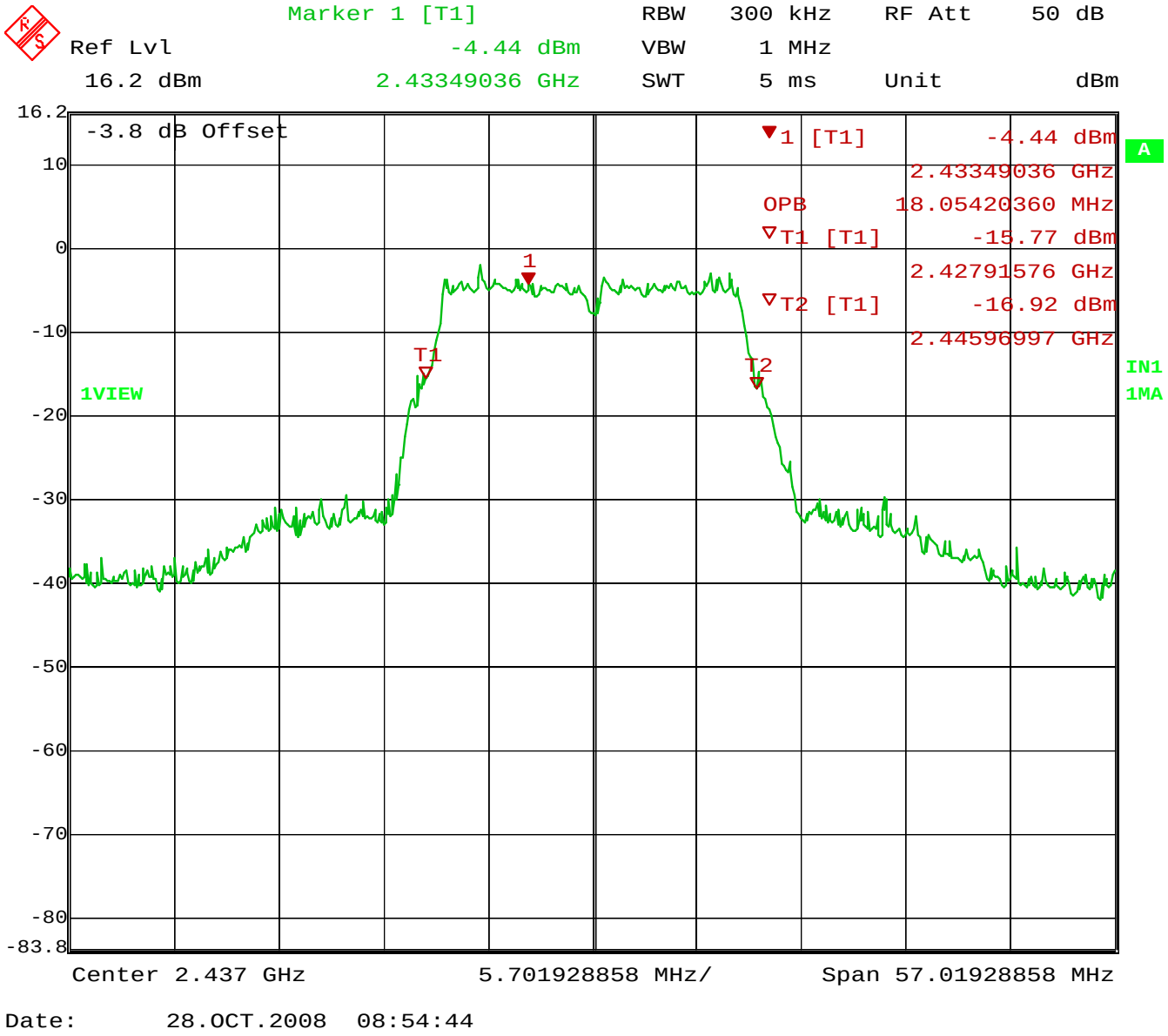



Figure 14 - Plot of 802.11g Ch 6 99% bandwidth at 2.437 GHz Center Frequency

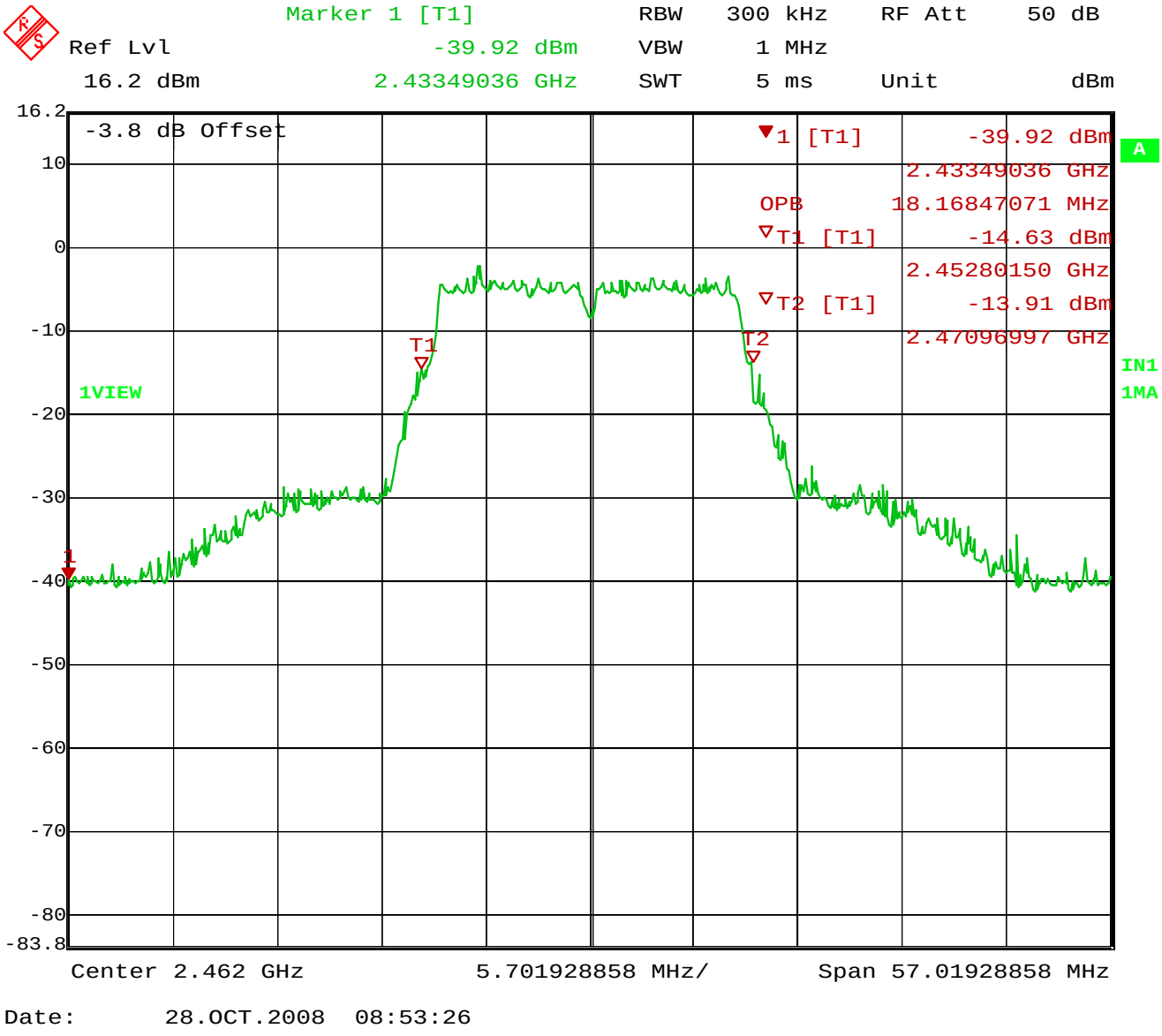



Figure 15 - Plot of 802.11g Ch 11 99% bandwidth at 2.462 GHz Center Frequency

## *4.3 Output Power; FCC §§15.247(b), 15.31(e), RSS-210 §6.2.2(o)(b)*

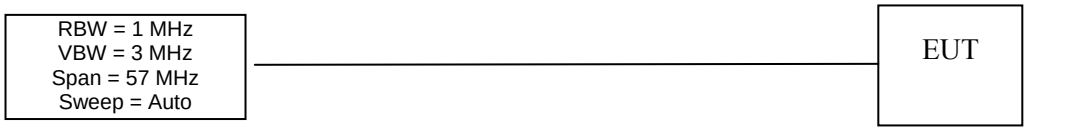
The transmitter output was connected to the input of a spectrum analyzer. The measurement is made while the EUT is operating in a continuous transmission mode at the appropriate center frequency. Since the bin width is less than 0.5 RBW and the analyzer has 500 measurement points in the spectrum display, the sample detector was selected.

### 4.3.1 Test Procedure

In accordance with The Measurement of Digital Transmission System Operating under Section 15.247 released March 23, 2005 the following method was used for Power Output Measurements.

Power Output Option 1 - Method #1 – Span to encompass the entire emission bandwidth (EBW) of the signal. The spectrum analyzer's built-in Channel Power function was used to measure peak power for the -26dB emission bandwidth.

Test Setup:




Spectrum Analyzer RF Output connection

#### *4.3.1.1 Results*

| 802.11g | | | |
|---|---|---|---|
| **Channel** | **Center Frequency (GHz)** | **-26dB Bandwidth (MHz)** | **Peak Power (dBm)** |
| **1** | **2.412** | **25** | **12.75** |
| **6** | **2.437** | **25** | **12.76** |
| **11** | **2.462** | **25** | **12.76** |
| **802.11b** | | | |
| **Channel** | **Center Frequency (GHz)** | **-26dB Bandwidth (MHz)** | **Peak Power (dBm)** |
| **1** | **2.412** | **18.5** | **10.15** |
| **6** | **2.437** | **18.5** | **10.50** |
| **11** | **2.462** | **18.5** | **10.95** |

Table 2 – Peak Output Power

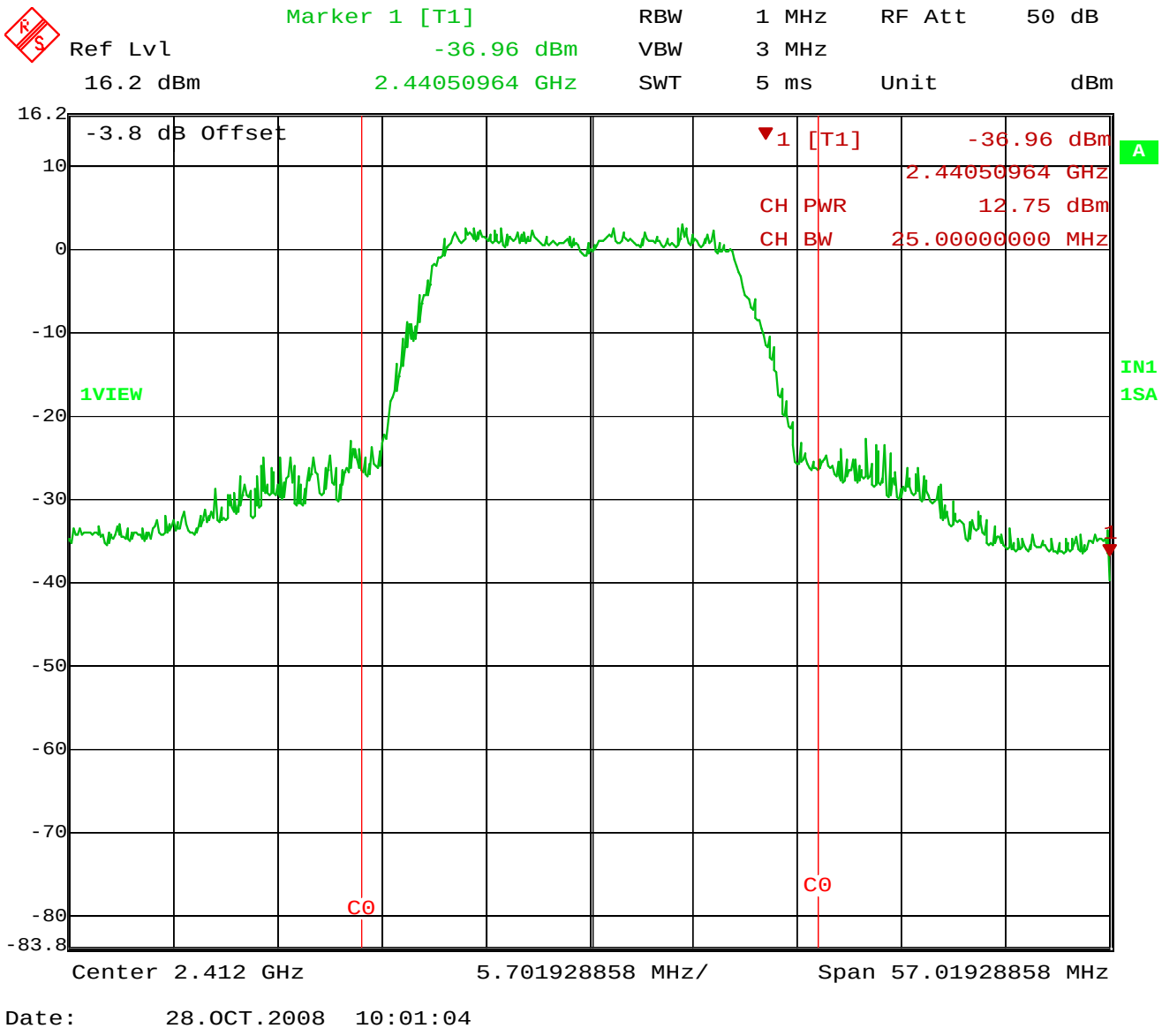



Figure 16 - Peak Power Output for 802.11g Ch 1

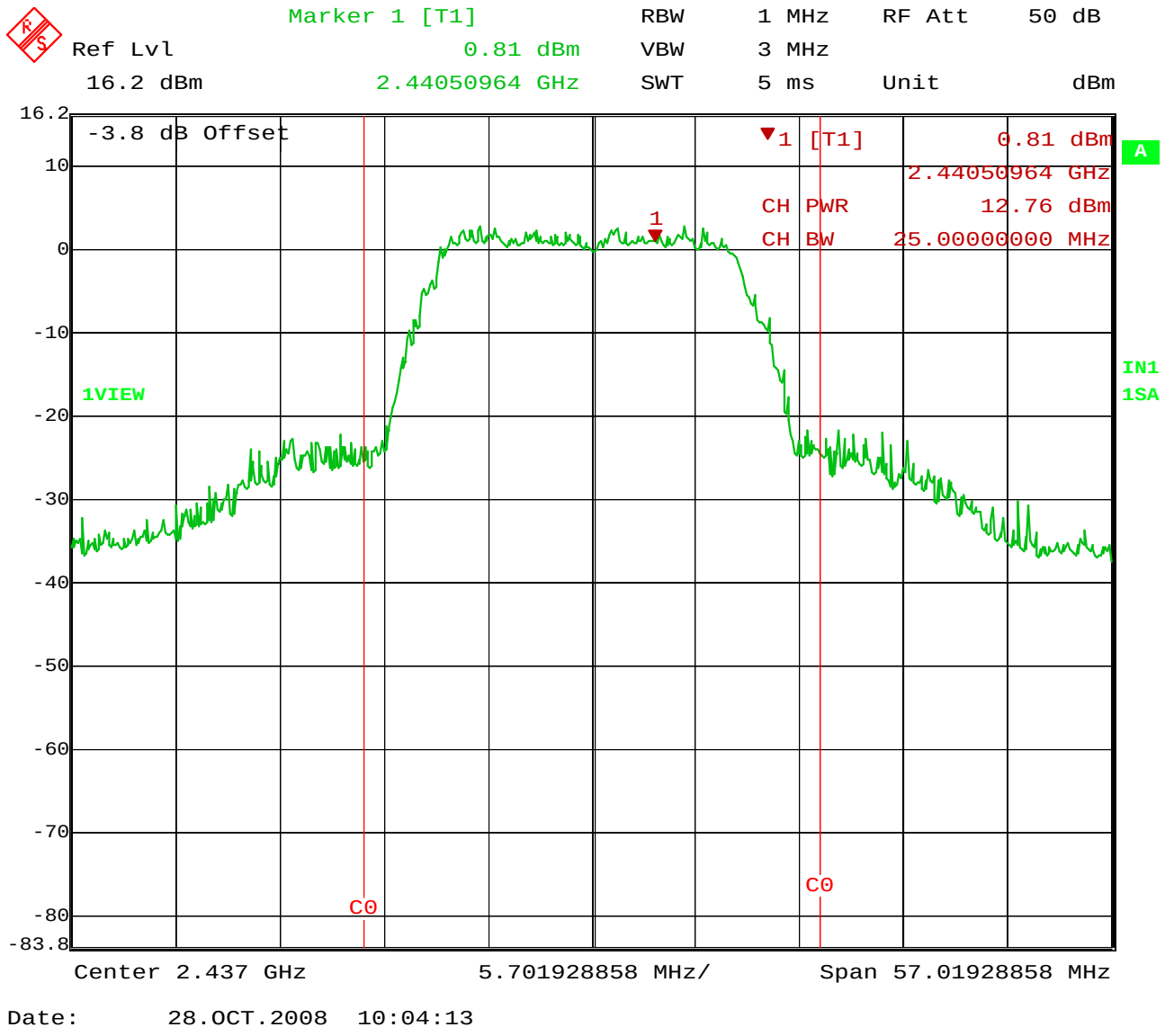



Figure 17 - Peak Power Output for 802.11g Ch 6

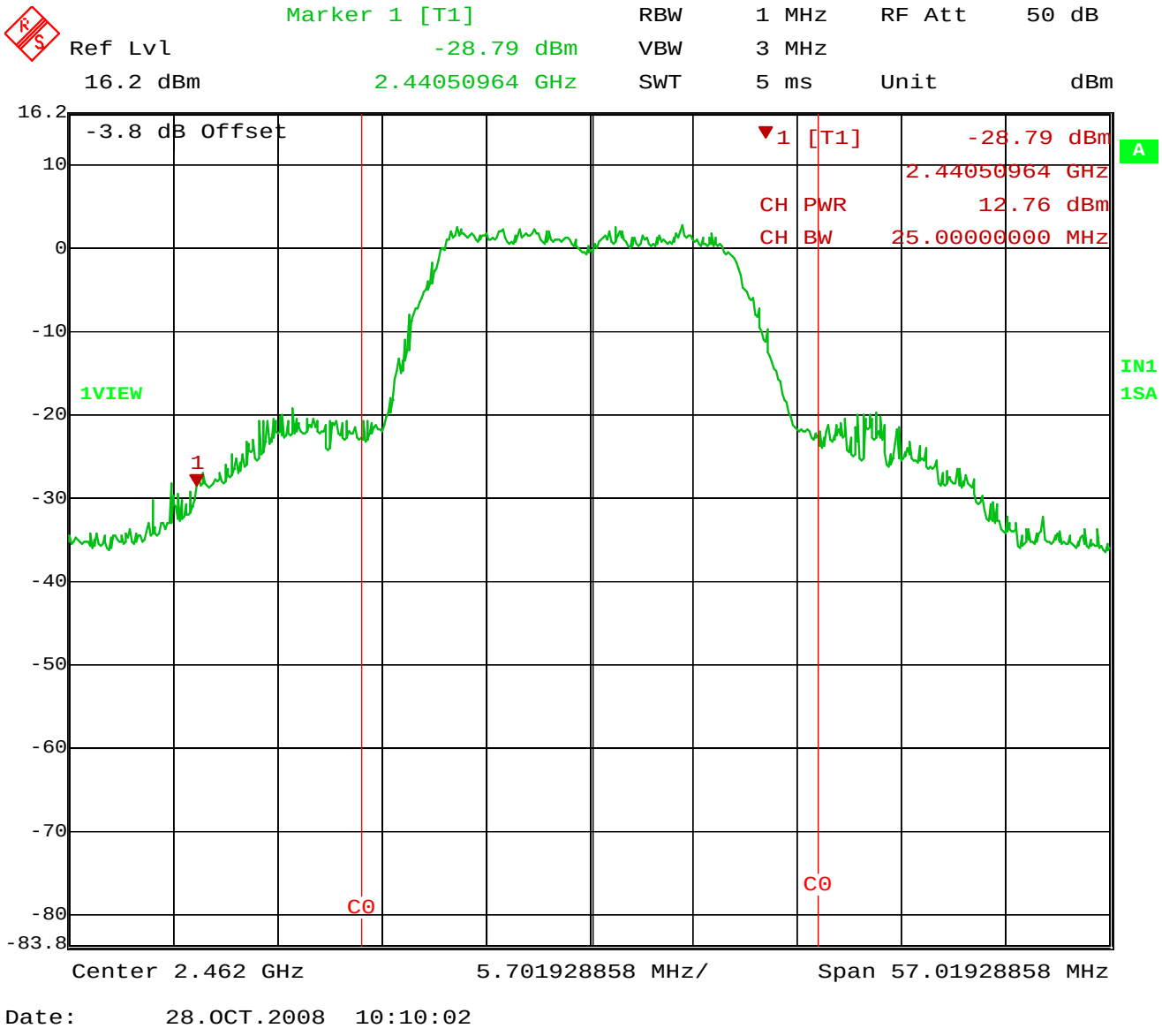



Figure 18 - Peak Power Output for 802.11g Ch 11

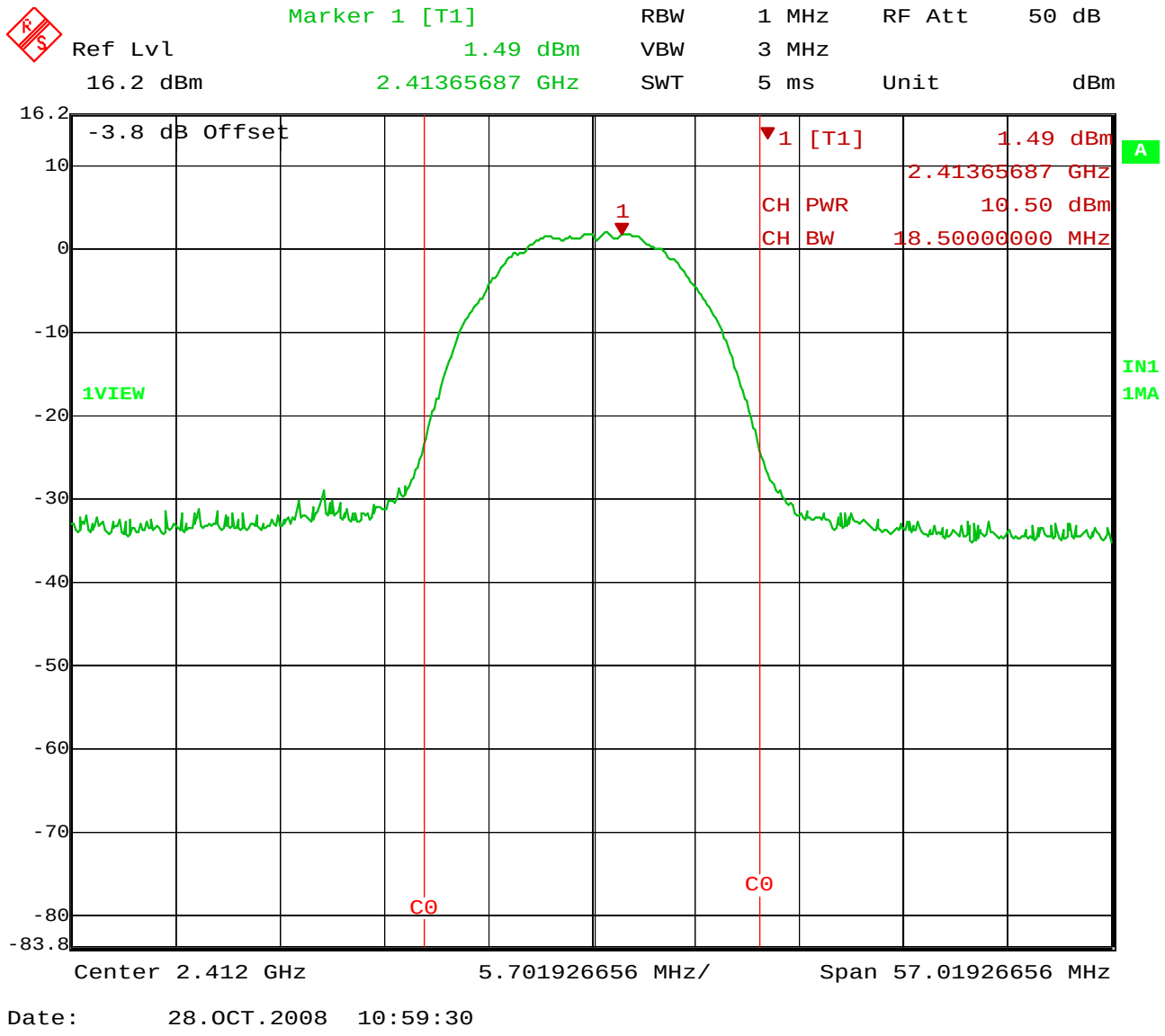



Figure 19 - Peak Power Output for 802.11b Ch 1

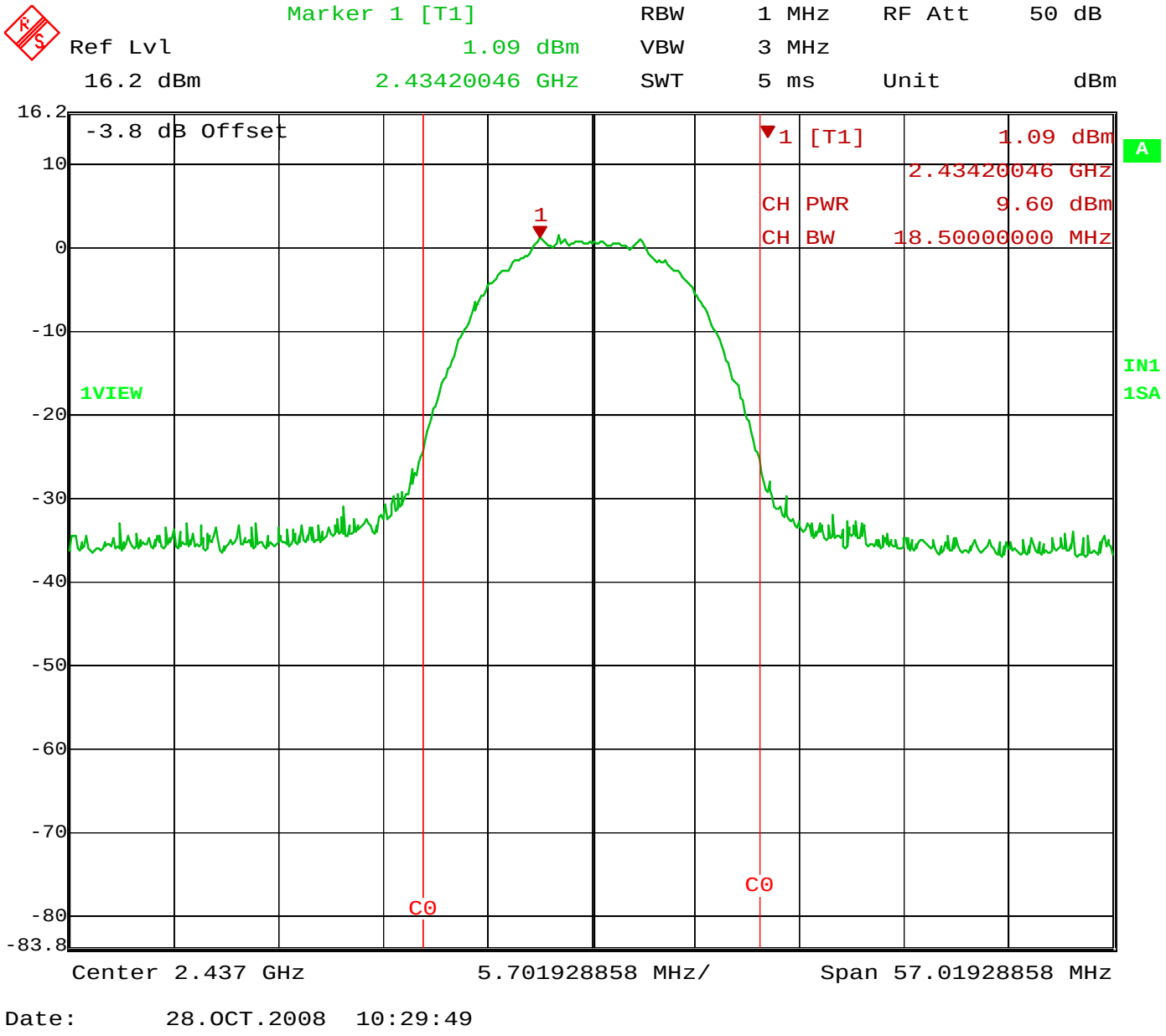



Figure 20 - Peak Power Output for 802.11b Ch 6

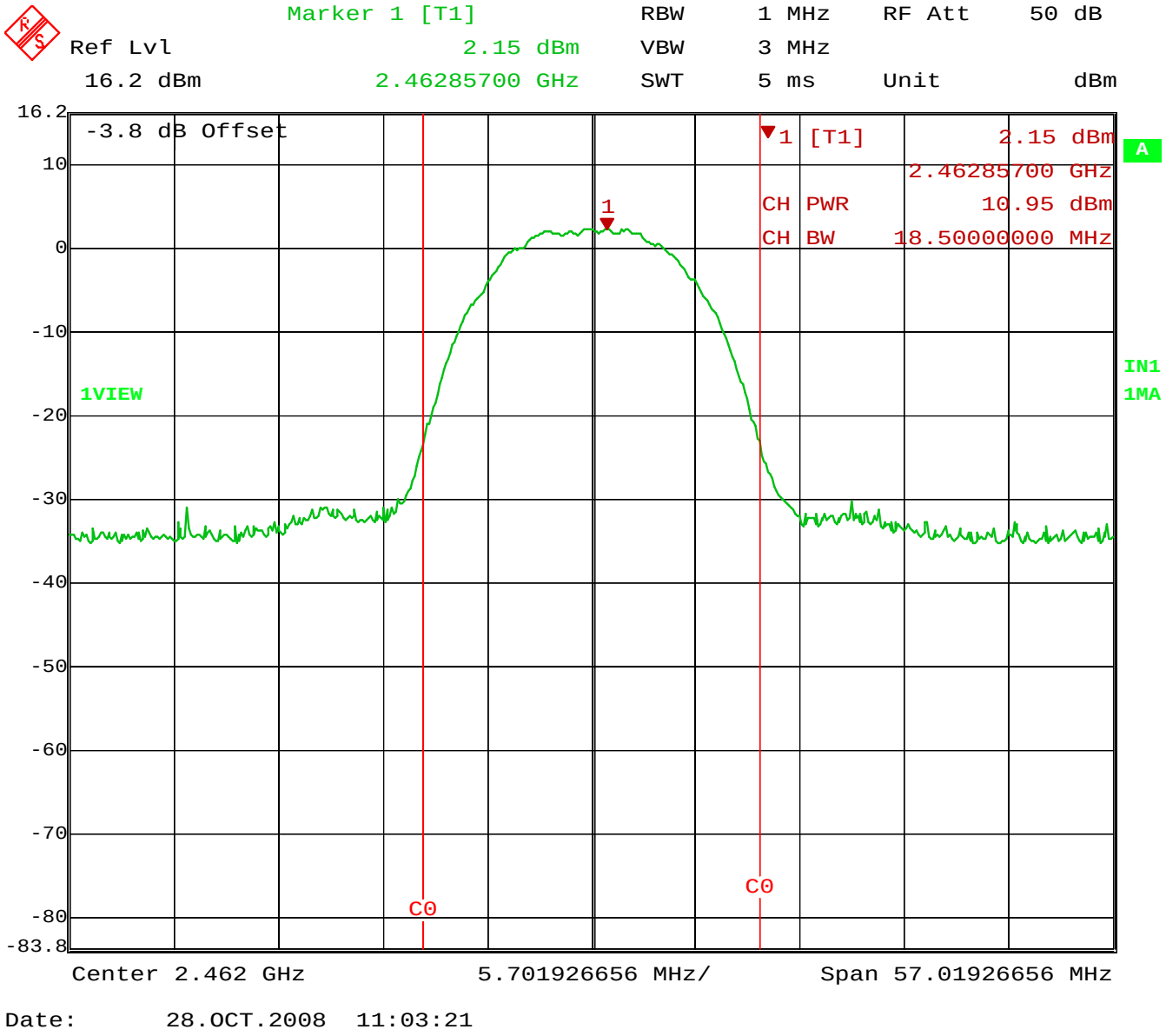



Figure 21 - Peak Power Output for 802.11b Ch 11

### 4.3.2 Peak Power Antenna Gain

The transmitting antennas do not have gains greater than 6dBi. Therefore per FCC §15.247(b)(4), the intentional radiator's power output need not be reduced, and the maximum peak output power of the intentional radiator will remain at 30dBm. The following antenna data was provided by the applicant:

The antennas are supplied by a third party, with the following maximum gains:

2.4GHz Band: 2.4dBi

The antenna structure utilizes a dipole-like structure for each band and is thus ground independent. The dual antennas allow switched diversity, however antenna combining and/or active beam-forming is not possible (only one antenna may transmit at a time for each band).

Power Limit References

**§15.247(b)** The maximum peak output power of the intentional radiator shall not exceed the following:

**§15.247(b)(3)** For systems using digital modulation in the 902-928MHz, 2400-2483.5MHz and 5725-5850MHz bands: 1 Watt (30dBm)

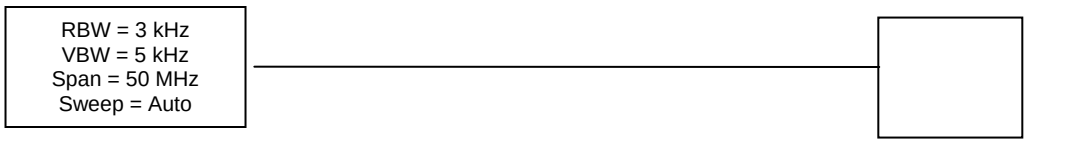
**§15.247(b)(4)** Except as shown in paragraphs (b)(3)(i), (ii), and (iii) of this section, if transmitting antennas of directional gain greater than 6dBi are used the peak output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1) or (b)(2) of this section, as appropriate by the amount in dB that the directional gain of the antenna exceeds 6dBi.

**§6.2.2(o)(b)** For the band 2400-2483.5 MHz, the transmitter output power shall not exceed 1.0 watt.

## *4.4 Peak Power Spectral Density; FCC §15.247(e), RSS-210 §6.2.2(o)(b)*

### 4.4.1 Test Procedure

The transmitter output is connected to a spectrum analyzer. The sample detector and power averaging (not video averaging) mode was used. The analyzer was set with; RBW= 3 kHz and VBW > 3 kHz. The PPSD is the highest level found across the emission in any 3-kHz band after 100 sweeps of averaging. This method is permitted only if the transmission pulse or sequence of pulses remains at maximum transmit power throughout each of the 100 sweeps of averaging and that the interval between pulses is not included in any of the sweeps (e.g., 100 sweeps should occur during one transmission, or each sweep gated to occur during a transmission). The Peak Power Spectral Density measurements were performed using the sample detector and power averaging mode.




Measurement Test set up

Table 3 – Table of PPSD Results

| 802.11b | | |
|---|---|---|
| Center Frequency (GHz) | Peak Frequency (GHz) | Peak Power Spectral Density (dBm) |
| **2.412 - low** | 2.4137 | -18.82 |
| **2.426 - mid** | 2.4387 | -18.43 |
| **2.467 - high** | 2.4637 | -18.53 |

| 802.11g | | |
|---|---|---|
| Center Frequency (GHz) | Peak Frequency (GHz) | Peak Power Spectral Density (dBm) |
| **2.412 - low** | 2.4195 | -21.57 |
| **2.426 - mid** | 2.4313 | -23.37 |
| **2.467 - high** | 2.4638 | -22.72 |

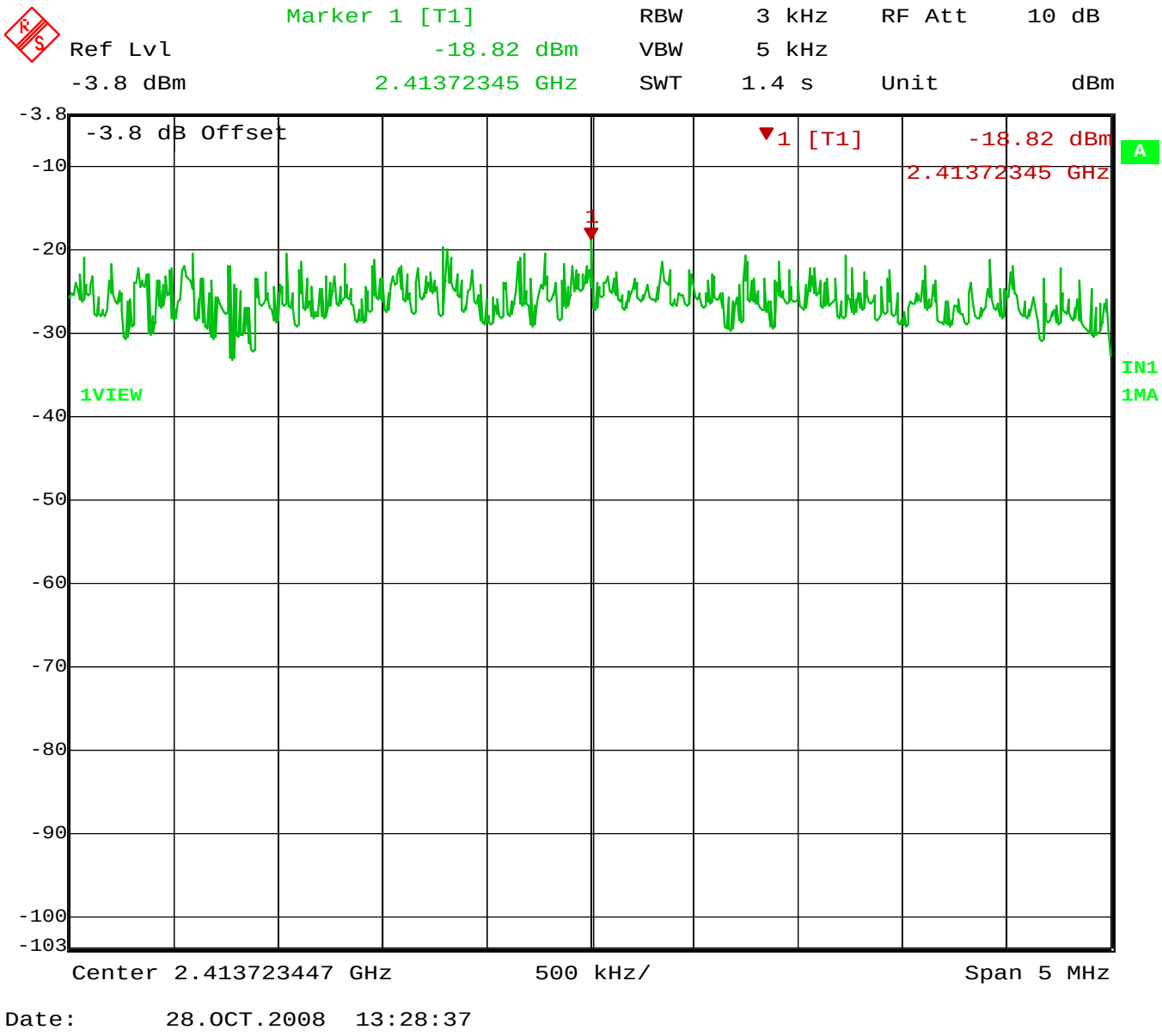



Figure 22 – 802.11b Ch 1Peak Power Spectral Density

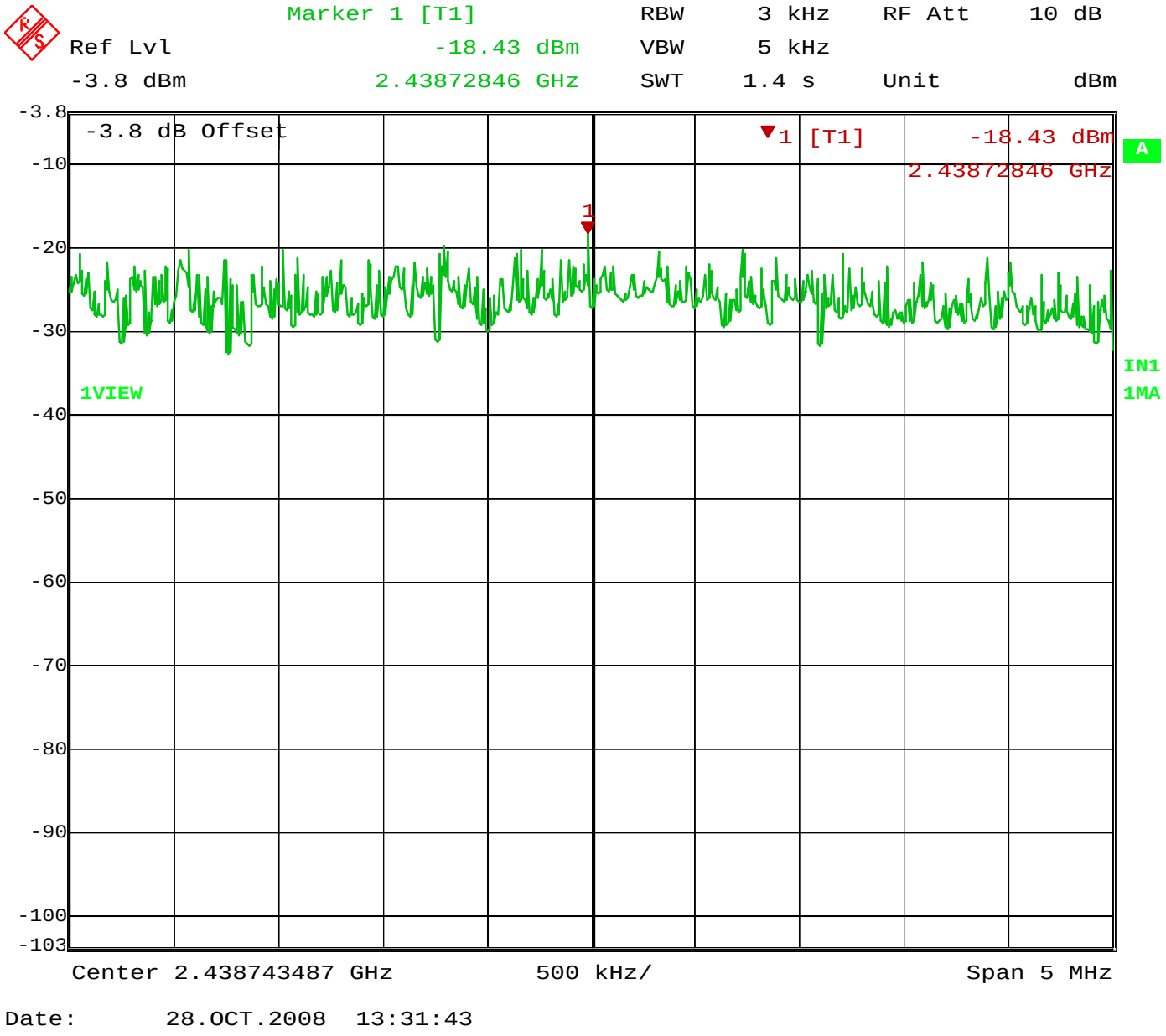



Figure 23 – 802.11b Ch 6 Peak Power Spectral Density

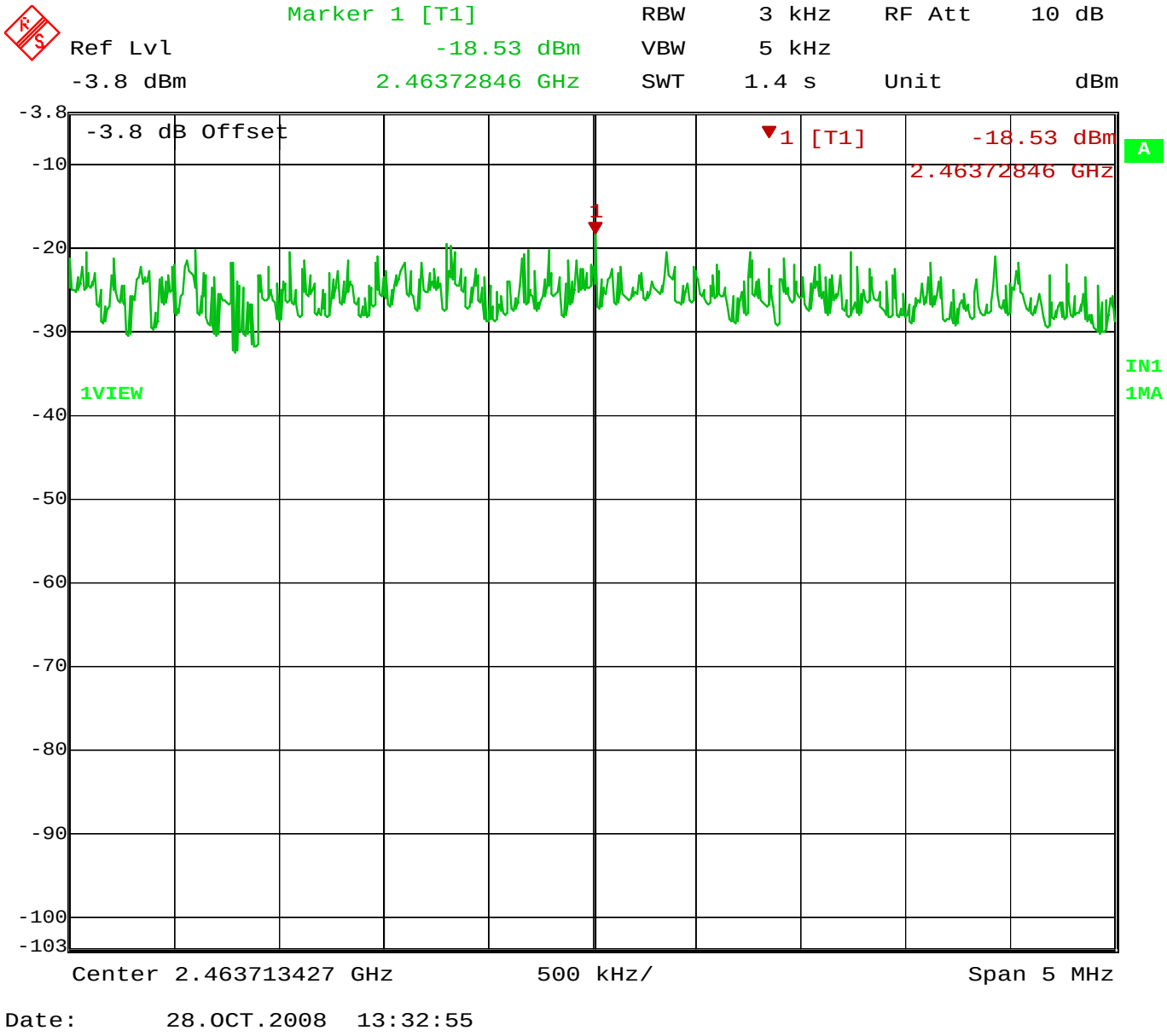



Figure 24 – 802.11b Ch 11 Peak Power Spectral Density

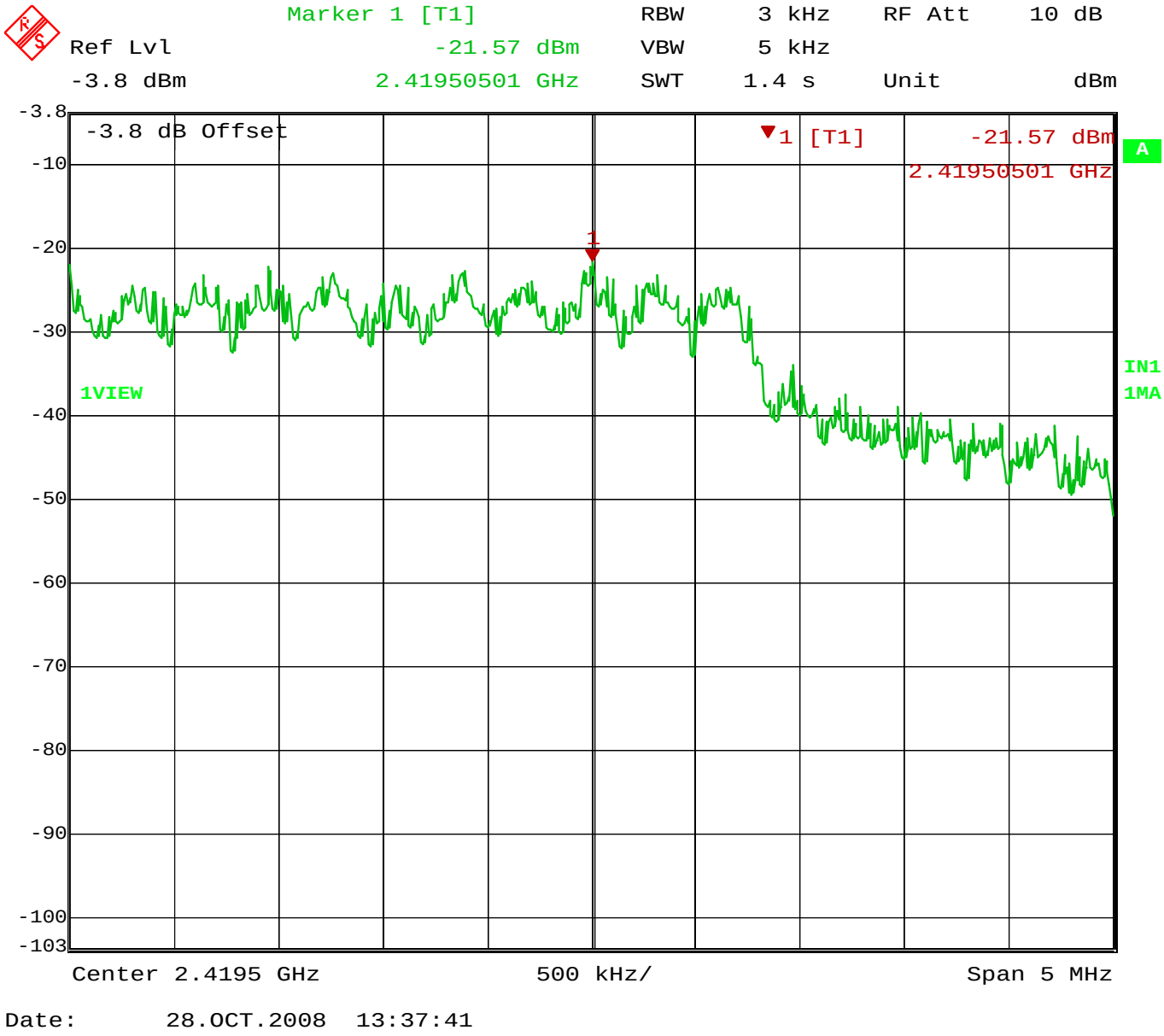



Figure 25 – 802.11g Ch 1 Peak Power Spectral Density

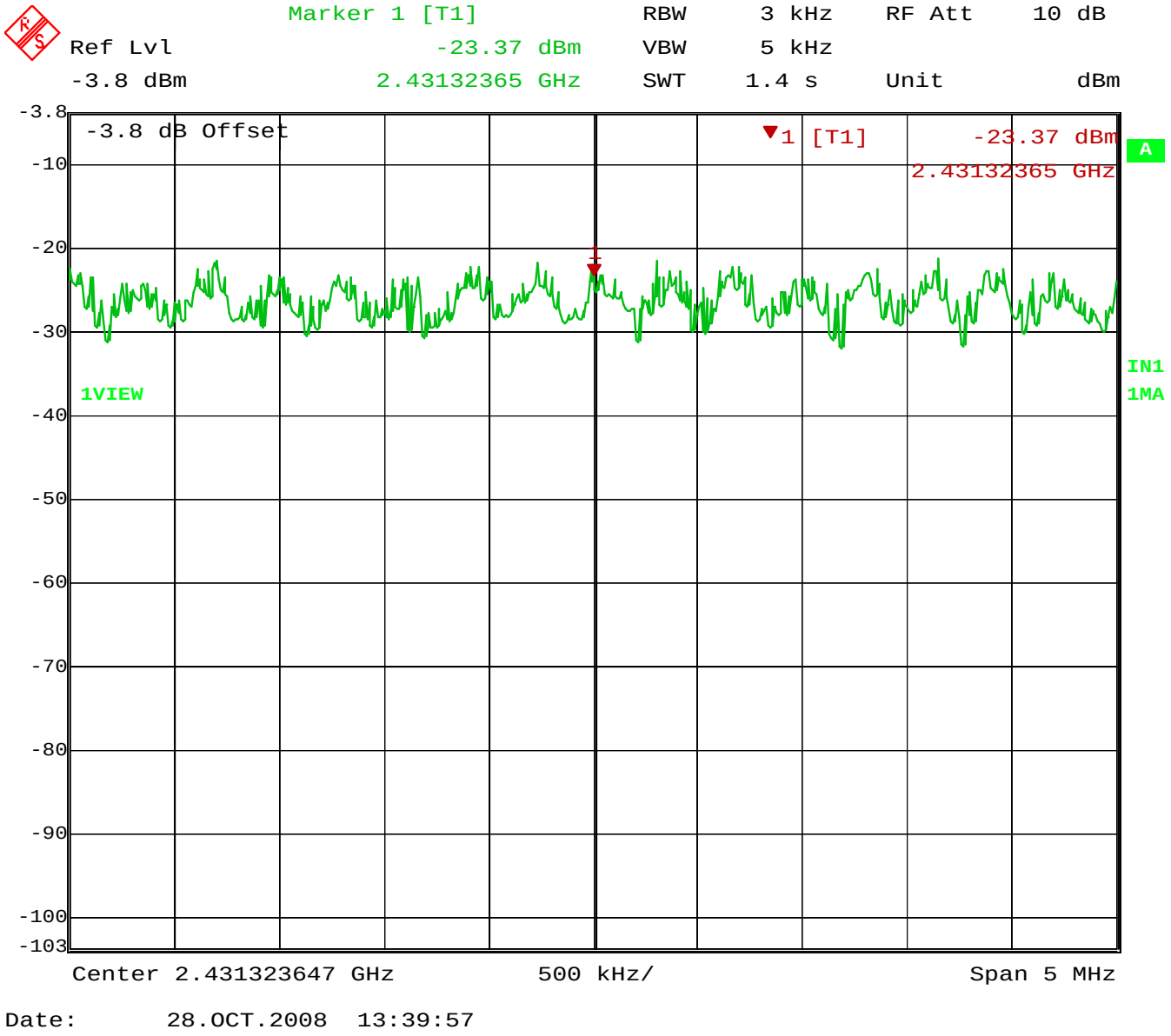



Figure 26 – 802.11g Ch 6 Peak Power Spectral Density

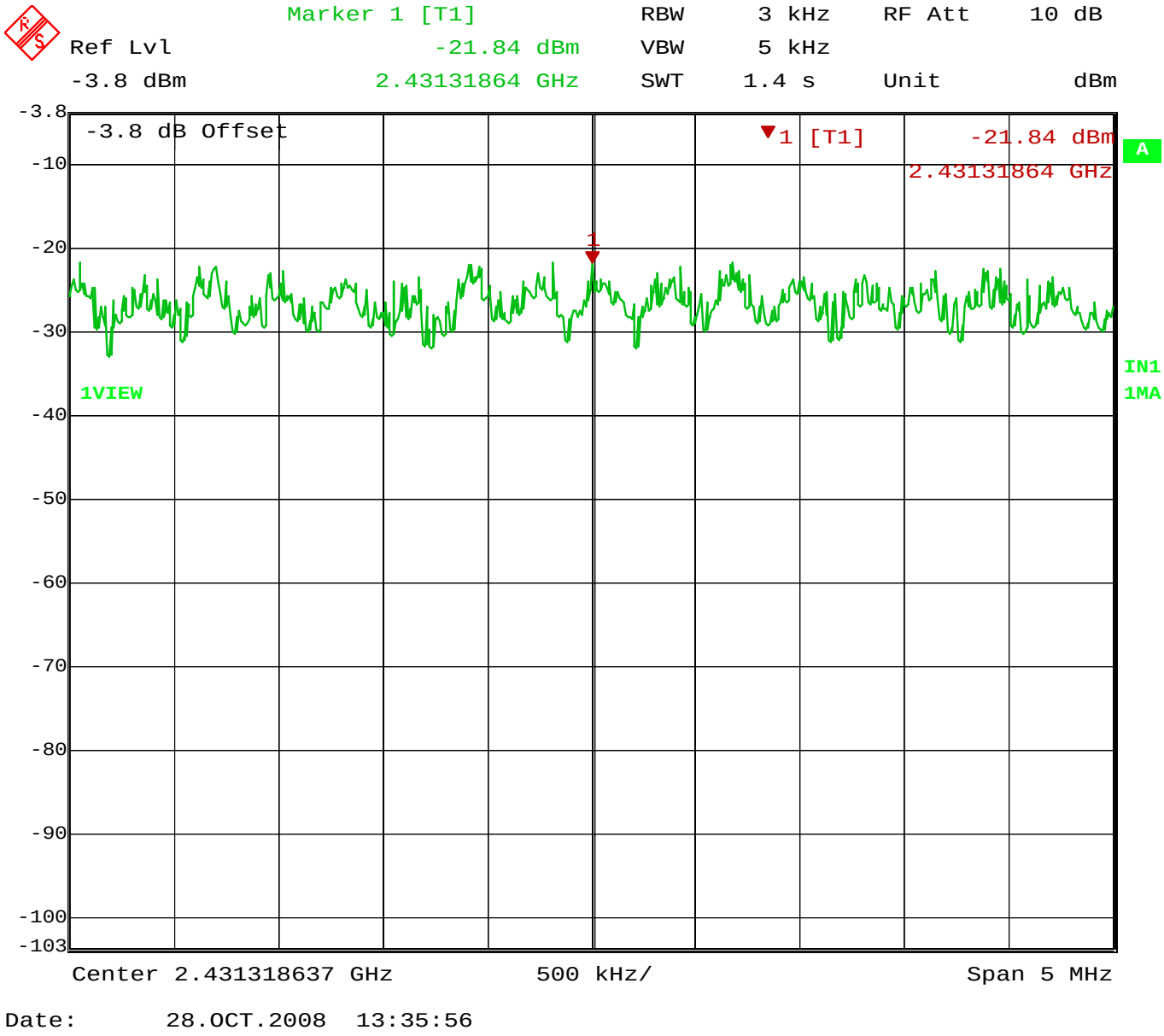



Figure 27 – 802.11g Ch 11 Peak Power Spectral Density

## *4.5 Band-Edge Measurement FCC §15.247(d), RSS-210 §6.2.2(o)(e1)*

### 4.5.1 Test Procedure

The conducted measurement method was used where the band-edge is measured at 20dB below the highest in-band density measured, while the EUT is operating in continuous transmissions mode at the appropriate center frequencies.

Conducted emissions band-edge measurements were made at the 2390 and 2483.5MHz restricted band edges in accordance with the requirements of §15.205 using the limits in 15.209.

Test Setup:

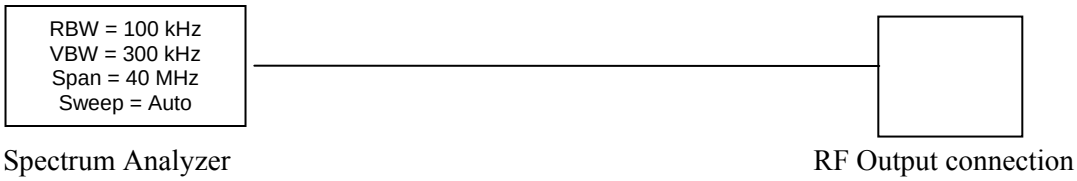



Table 4 –- Band-Edge Results

| 802.11g - Restricted band edge: | | | | | | | |
|---|---|---|---|---|---|---|---|
| Center Frequency (MHz) | Band Edge (MHz) | Amplitude at restricted band (dBµV)Pk | Amplitude at restricted band (dBµV)Av | Peak Limit at restricted band (dBµV) | Average Limit at restricted band (dBµV) | Margin to Peak Limit (dBµV) | Margin to Av. Limit (dBµV) |
| 2412 | 2390 | 54.48 | 46.54 | 74 | 54 | **-19.52** | **-7.46** |
| 2462 | 2483.5 | 55.61 | 43.56 | 74 | 54 | **-18.39** | **-10.44** |

| 802.11b - Restricted band edge: | | | | | | | |
|---|---|---|---|---|---|---|---|
| Center Frequency (MHz) | Band Edge (MHz) | Amplitude at restricted band (dBµV)Pk | Amplitude at restricted band (dBµV)Av | Peak Limit at restricted band (dBµV) | Average Limit at restricted band (dBµV) | Margin to Peak Limit (dBµV) | Margin to Av. Limit (dBµV) |
| 2412 | 2390 | 53.83 | 41.94 | 74 | 54 | **-20.17** | **-12.06** |
| 2462 | 2483.5 | 50.17 | 36.80 | 74 | 54 | **-23.83** | **-17.2** |

Note: The restricted band edge measurement was performed using the provision of FCC§15.35(b), the peak and average limits were used for this test. The peak limit is calculated to be 20dB higher than the average limit. The average limit at the restricted band is 54dBµV.

## *4.6 Spurious Emissions; FCC §15.247(c), RSS-210 Annex 9*

### 4.6.1 Test Procedure

#### *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 300 kHz and provide a reading at each frequency for each 6° 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.

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 Quasi-Peak (QP) detector was used for frequencies at or less than 1000 MHz.

Above 1000 MHz, the Average (Av) detector was used, and per part 15.35(b), the Peak limit is 20dB above the average limit.

#### *4.6.1.3 Deviations*

There were no deviations from this test methodology.

### 4.6.2 Test Results

All harmonic emissions are more than 20dB below the fundamental frequencies

All emissions including emissions in all restricted bands, other than the fundamental frequencies and their harmonics, are below the 15.209 limits. As originally tested, the EUT was found to be compliant to the requirements of the test standard(s).

### 4.6.3 Finals for Radiated Emissions from 30-1000 MHz

| *Radiated Emissions Measurements* | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| ***Standard:*** | EN 55022: 1998 Class B/FCC Part 15.209(a) | | | | Finals | ***Date:*** | 11/21/2008 | | |
| ***Device Tested:*** | Draeger Medical | | | | 3m | ***File .xls:*** | | | |
| | | | | | | | | | |
| | Measured Level | | | | | | | | |
| Meas # | Freq (MHz) | Quasi-Peak | Quasi-Peak Limit | Quasi-Peak Δ | Result | Antenna Polarization | Angle (degrees) | Antenna Height (meters) | Comment |
| **1** | **60.2820** | **22.00** | **30.00** | **-8.00** | **Complied** | **Vertical** | **0** | **1.00** | **Maximum Emissio** |
| 2 | 87.1920 | 19.20 | 30.00 | -10.80 | Complied | Vertical | 0 | 1.00 | |
| 3 | 242.2710 | 21.60 | 37.00 | -15.40 | Complied | Vertical | 0 | 1.00 | |
| 4 | 352.4430 | 25.90 | 37.00 | -11.10 | Complied | Vertical | 0 | 1.00 | |
| 5 | 160.6540 | 20.00 | 30.00 | -10.00 | Complied | Horizontal | 0 | 1.00 | |
| 6 | 253.7400 | 23.20 | 37.00 | -13.80 | Complied | Horizontal | 0 | 1.00 | |

### 4.6.4 Finals for Spurious Emissions from 1 – 26.5 GHz

A spectrum analyzer/EMI Test receiver is connected to the output of the transmitter via a suitable attenuator while the EUT was operating in transmit mode using the assigned frequency.

Measurements were made using the conducted method. The EUT Transmit in both 802.11 b & g modes

It was found that 802.11g produces a higher emission and therefore all measurements were made while transmitting in 802.11g mode.

Spurious Emission measurements were made up to 26.5 GHz, nothing was found after the highest emissions listed below

Analyzer settings: For spurious emission not in restricted bands.

Detector: Max hold

RBW: 100 kHz

VBW: ≥ RBW

Sweep Time: Coupled

Detector Function: Peak

Analyzer settings: For spurious emission in restricted bands.

Detector: Max hold

RBW: 1 MHz

VBW: ≥ RBW

Sweep Time: Coupled

Detector Function: Peak

Table 5 – Spurious Emissions

| 802.11g | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Channel** | **Restricted Band (X)** | **Measured Frequency (MHz)** | **Level PK (dBµV)** | **Level AV (dBµV)** | **Limit PK (dBµV)** | **Limit AV (dBµV)** | **PK Delta (dB)** | **AV Delta (dB)** |
| **1** | **X** | 4824 | 58.60 | 48.32 | 74 | 54 | -15.4 | -5.68 |
| **1** | | 6993 | 48.08 | 32.93 | 74 | 54 | -25.92 | -21.07 |
| **1** | **X** | 12062 | 52.13 | 28.40 | 74 | 54 | -21.87 | -25.6 |
| | | | | | | | | |
| **6** | **X** | 4869 | 58.35 | 47.61 | 74 | 54 | -15.65 | -6.39 |
| **6** | | 6615 | 49.01 | 28.9 | 74 | 54 | -24.99 | -25.1 |
| **6** | **X** | 12185 | 55.11 | 33.5 | 74 | 54 | -18.89 | -20.5 |
| | | | | | | | | |
| **11** | **X** | 4920 | 58.50 | 47.63 | 74 | 54 | -15.5 | -6.37 |
| **11** | | 6615 | 48.18 | 35.49 | 74 | 54 | -25.82 | -18.51 |
| **11** | **X** | 12304 | 59.0 | 43.74 | 74 | 54 | -15 | -10.26 |

### *4.6.4.1 Radiated Emissions outside the Frequency Band*

In any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of desired power, based on radiated measurements.

The EUT was scanned up to 40 GHz for Spurious Emissions. No emissions were found beyond 26.5 GHz

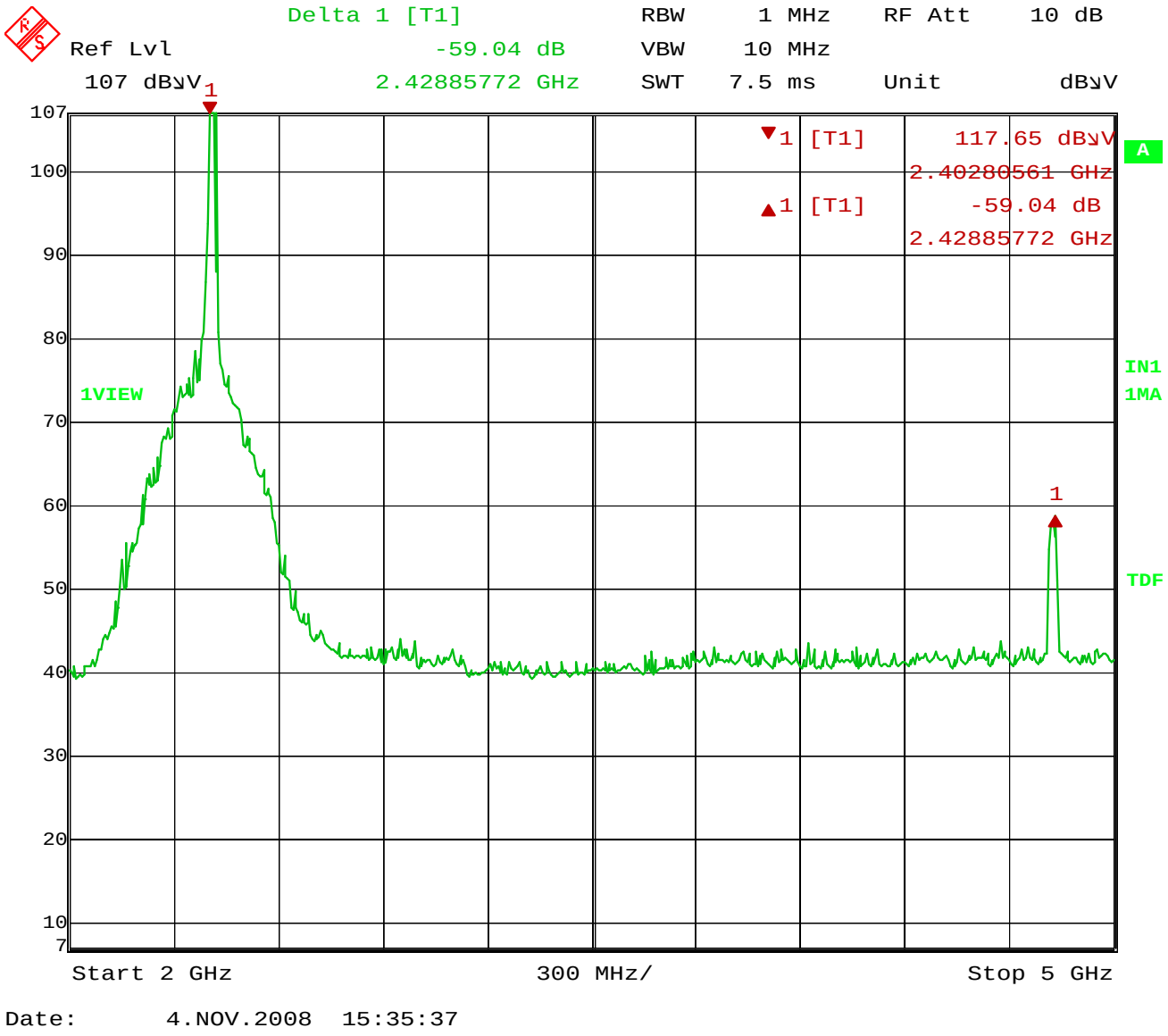



Figure 28 – 802.11g Ch 1

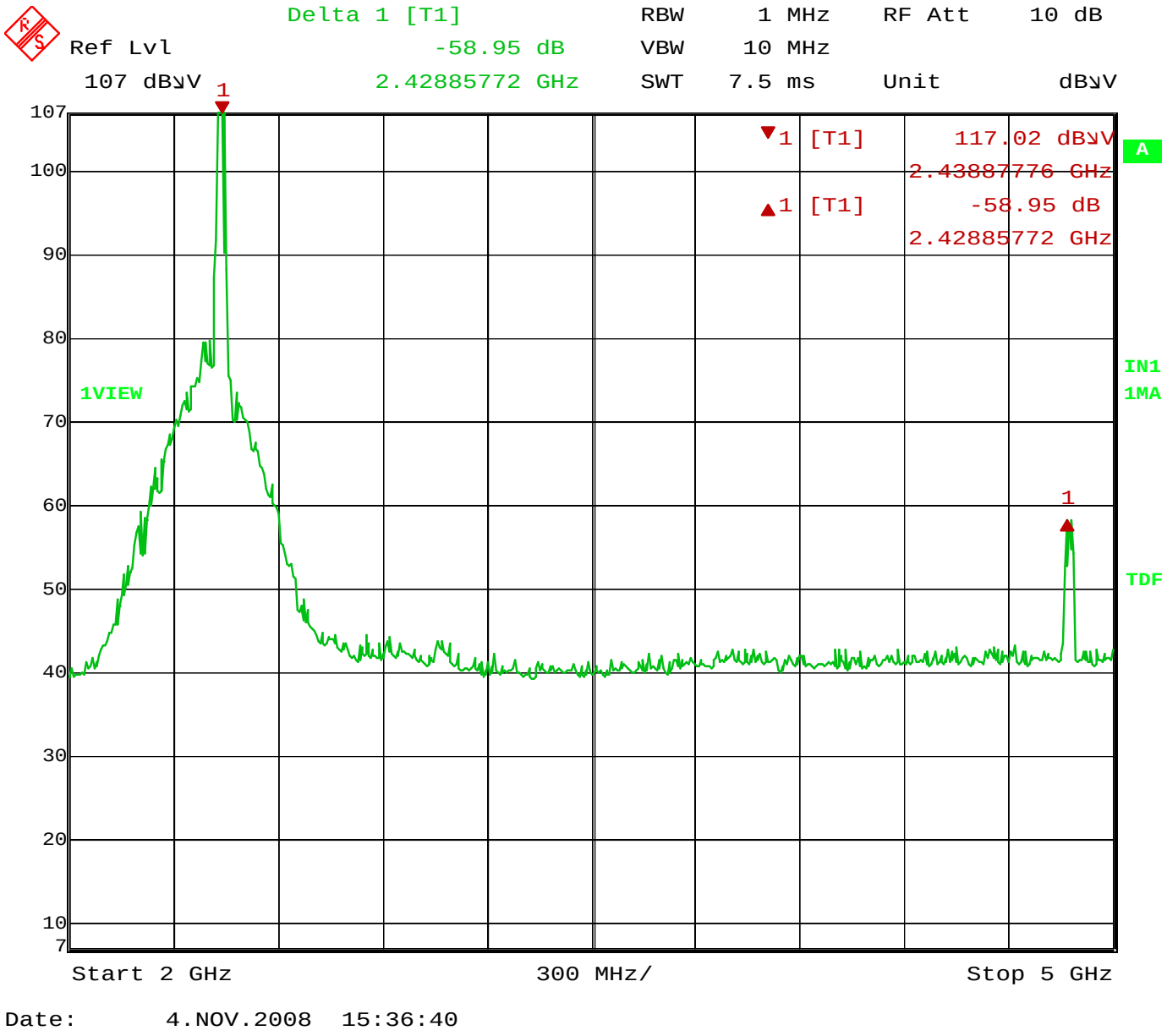



Figure 29 – 802.11g Ch 6

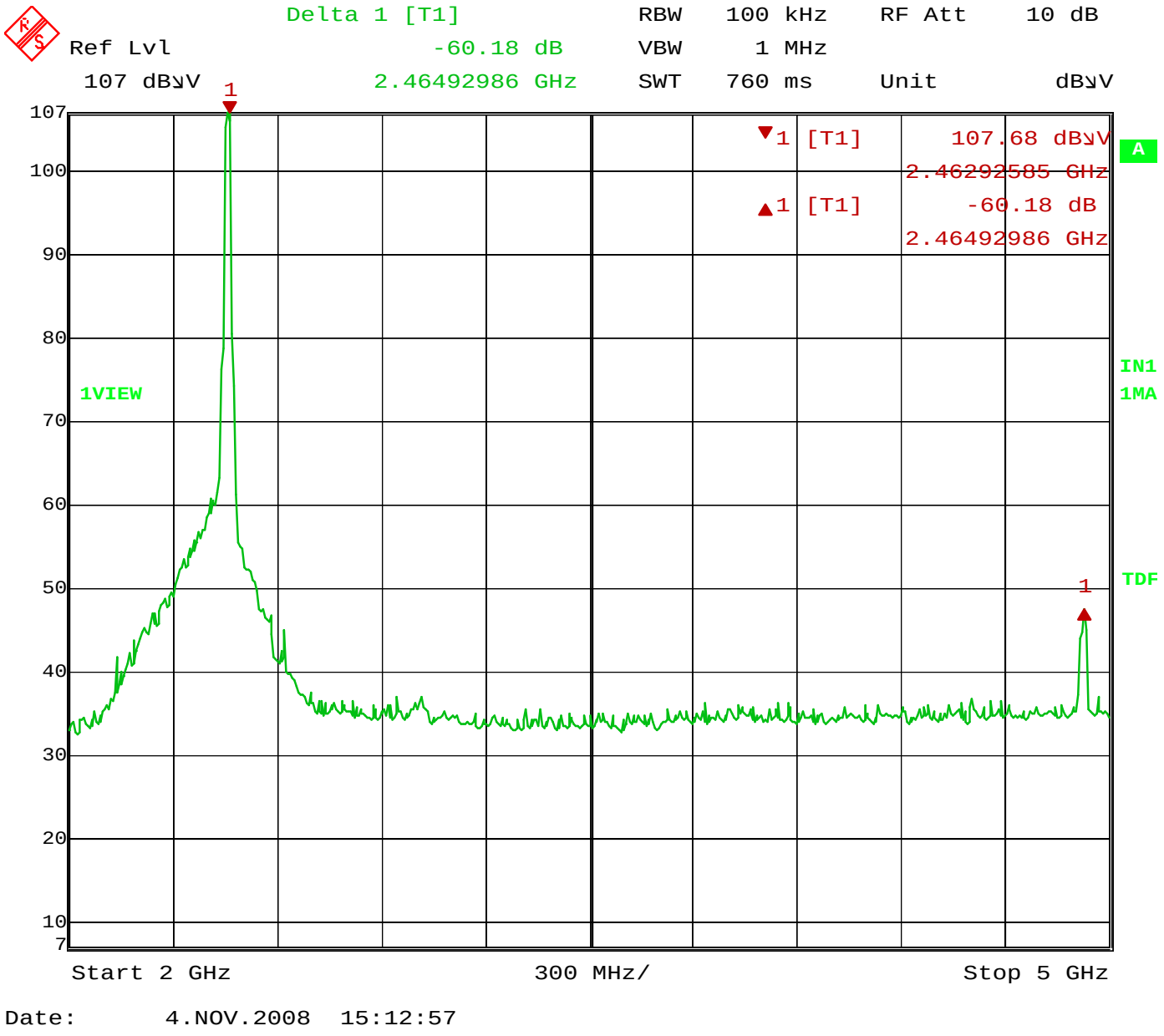



Figure 30 – 802.11g Ch 11

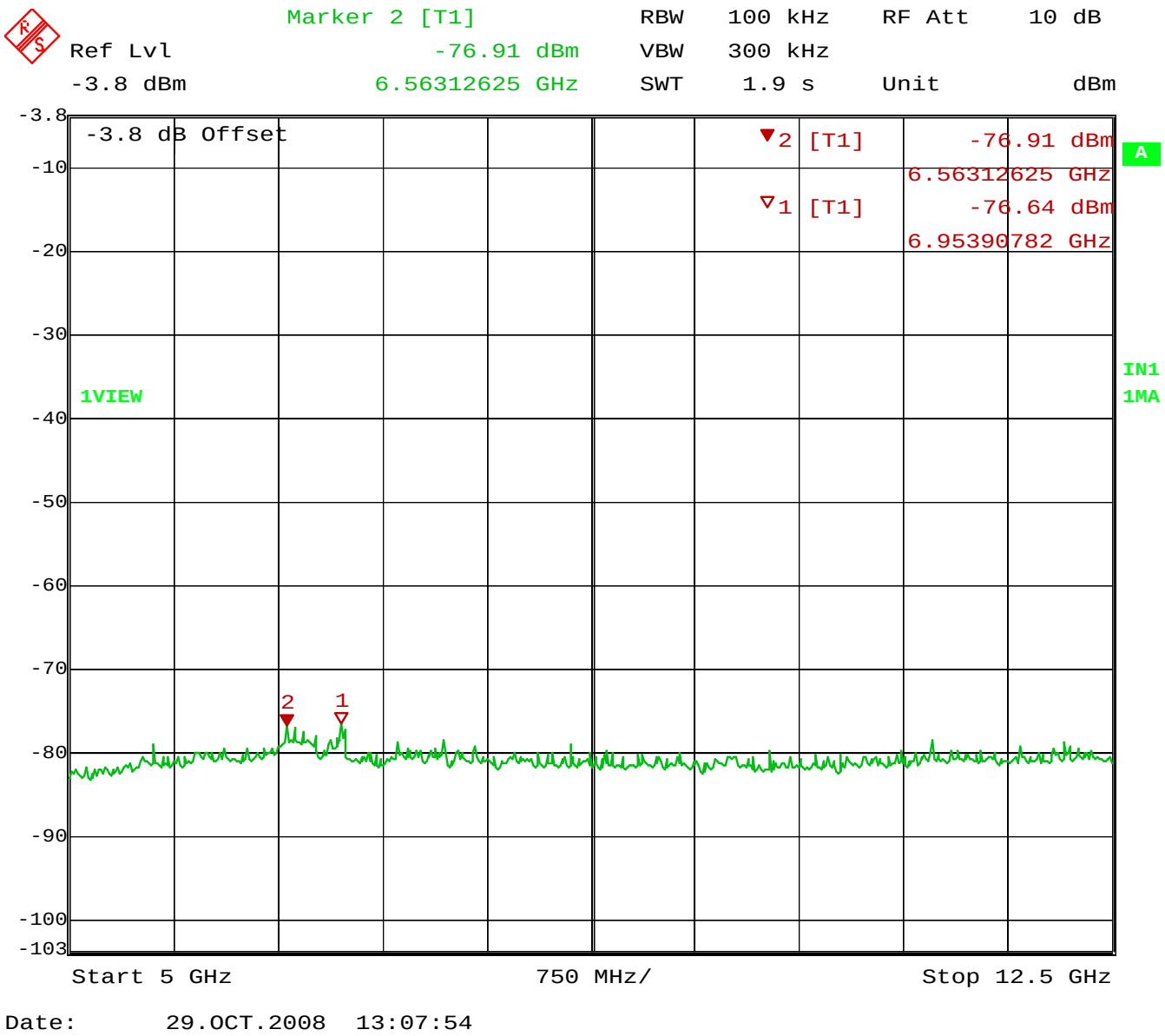



Figure 31 – 802.11g Ch 11, 5GHz – 12.5 GHz

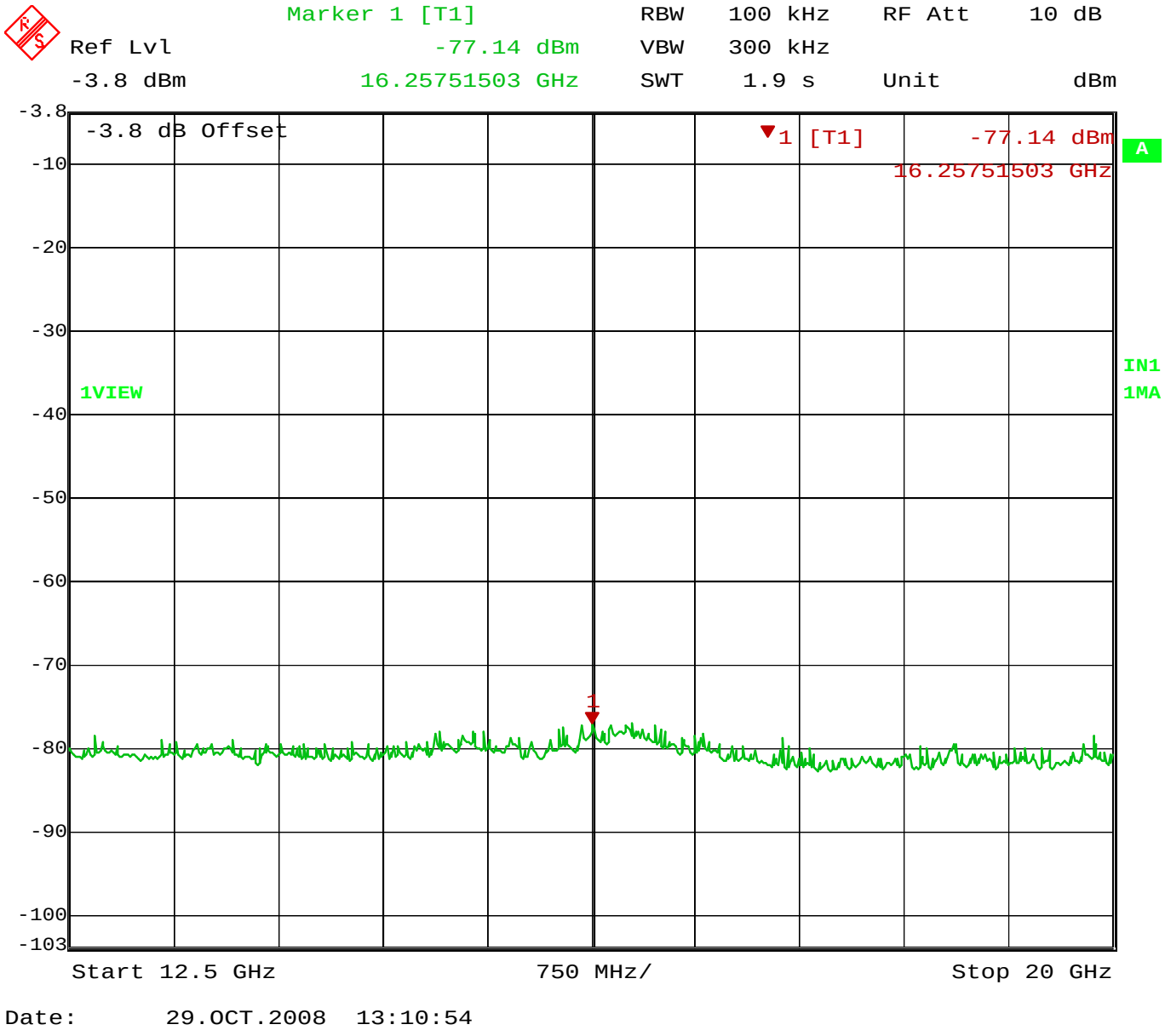



Figure 32 – 802.11g Ch 11, 12.5GHz – 20 GHz

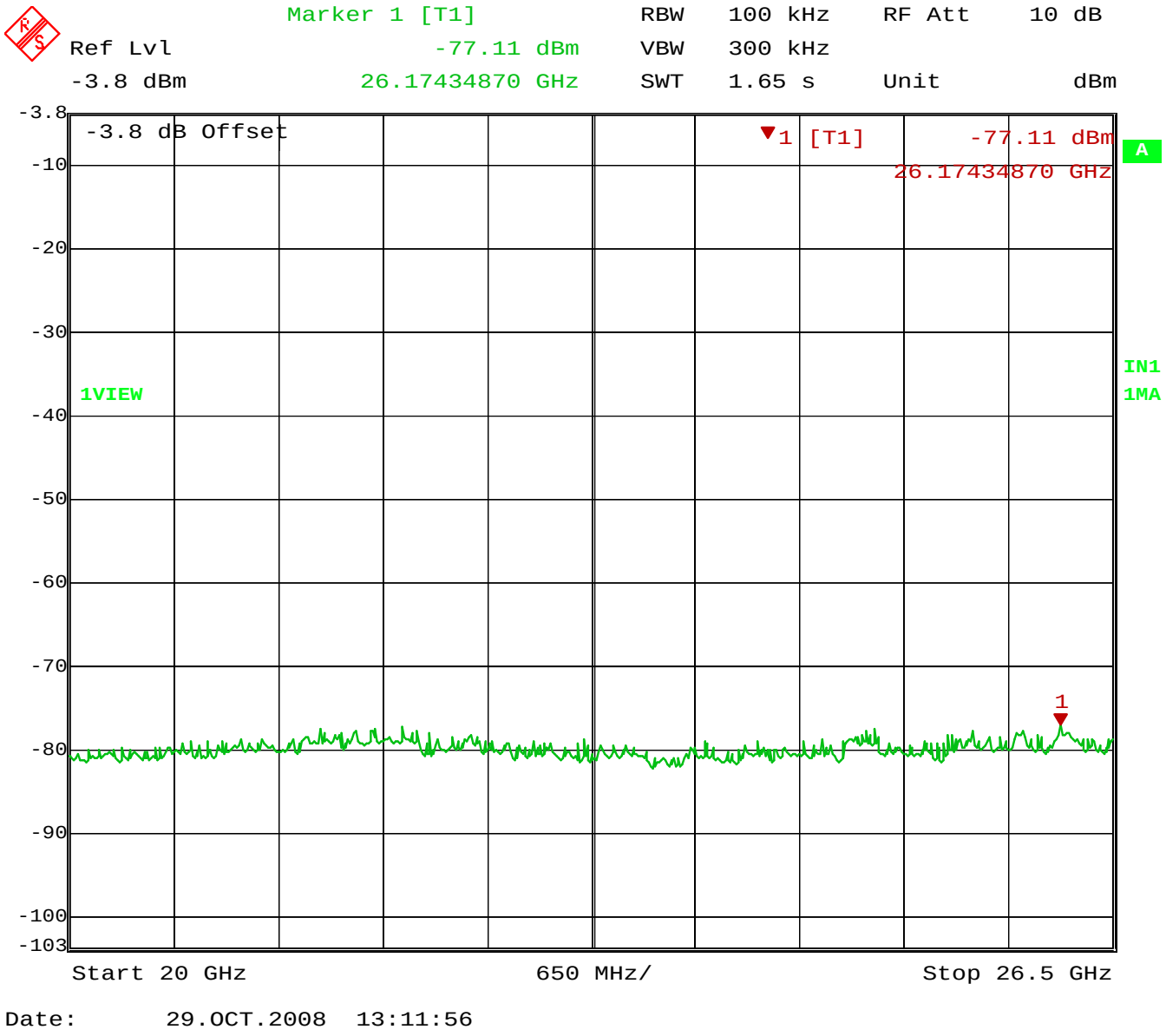



Figure 33 – 802.11g Ch 11, 20 GHz – 26.5 GHz

## 4.7 Conducted Emissions

This test measures the electromagnet levels of spurious signals generated by the EUT on the AC power line that may affect the performance of other near by electronic equipment.

### 4.7.1 Over View of Test

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Results** | **Complies** (as tested per this report) | | | | **Date** | 11/21/08 | |
| **Standard** | FCC Part 15.209(a) | | | | | | |
| **Product Model** | MS24895 | | | **Serial#** | B7ZTH | | |
| **Configuration** | See test plan for details | | | | | | |
| **Test Set-up** | Tested in shielded room EUT placed on table see test plans for details | | | | | | |
| **EUT Powered By** | Battery Operated | **Temp** | 23º C | **Humidity** | 54% | **Pressure** | 1013mbar |
| **Frequency Range** | **150kHz - 30MHz** | | | | | | |
| **Criteria** | **Class B** (Below Limit ) | | | **Perf. Verification** | Readings Under Limit for L1 and L2 | | |
| **Mod. to EUT** | None | | | **Test Performed By** | Randall Masline | | |

### 4.7.2 Test Procedure

Conducted and FCC emissions tests were performed using the procedures of ANSI C63.4 including methods for signal maximizations and EUT configuration. The photos included with the report show the EUT in its maximized configuration.

The frequency range from **150kHz - 30MHz** was investigated for conducted emissions.

Conducted Emissions measurements were performed in the shielded room using procedures specified in the test plan and standard.

### 4.7.3 Deviations

There were no deviations from the test methodology listed in the test plan for the conducted emission test.

### 4.7.4 Final Test

All final conducted emissions measurements were below (in compliance) the limits.

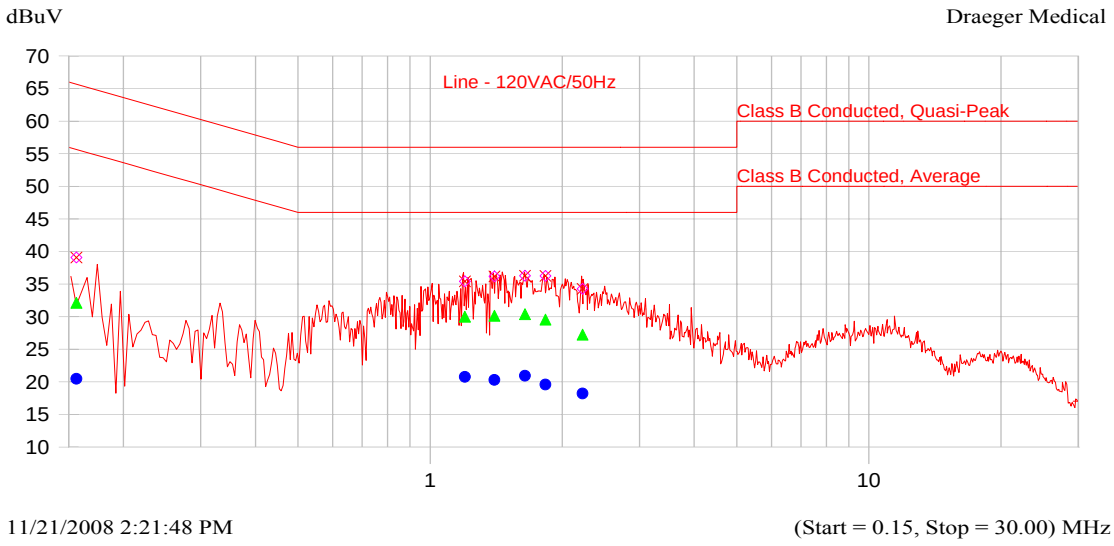
### 4.7.5 Final Graphs

NOTES:

**Conducted Emissions @ 120V/60Hz**

**Line / Neutral**

## Line - 120VAC/50Hz

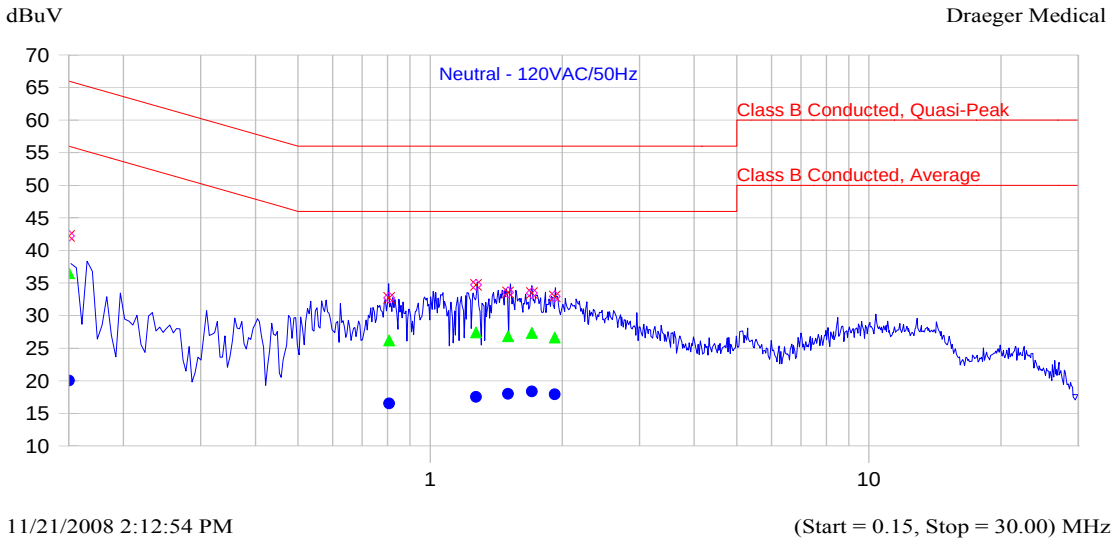



| Frequency MHz | Peak dBuV | QP dBuV | Delta QP-QP Limit dB | Avg dBuV | Delta Avg-Avg Limit dB | Transducer Correction dB | Cable Correction dB |
|---|---|---|---|---|---|---|---|
| 0.156 | 39.1 | 32.1 | -33.5 | 20.5 | -35.2 | 0.1 | 0.0 |
| 1.201 | 35.4 | 30.0 | -26.0 | 20.8 | -25.2 | 0.1 | 0.3 |
| 1.401 | 36.2 | 30.1 | -25.9 | 20.3 | -25.7 | 0.1 | 0.3 |
| 1.645 | 36.3 | 30.4 | -25.6 | 20.9 | -25.1 | 0.1 | 0.3 |
| 1.832 | 36.2 | 29.5 | -26.5 | 19.6 | -26.4 | 0.1 | 0.3 |
| 2.226 | 34.3 | 27.2 | -28.8 | 18.2 | -27.8 | 0.1 | 0.3 |

NOTES:

**Conducted Emissions @ 120V/60Hz**
**Line / Neutral**

## Neutral - 120VAC/50Hz




| Frequency MHz | Peak dBuV | QP dBuV | Delta QP-QP Limit dB | Avg dBuV | Delta Avg-Avg Limit dB | Transducer Correction dB | Cable Correction dB |
|---|---|---|---|---|---|---|---|
| 0.150 | 42.2 | 36.5 | -29.5 | 20.0 | -35.9 | 0.1 | 0.0 |
| 0.807 | 32.7 | 26.2 | -29.8 | 16.5 | -29.5 | 0.1 | 0.2 |
| 1.273 | 34.7 | 27.4 | -28.6 | 17.5 | -28.5 | 0.1 | 0.3 |
| 1.505 | 33.6 | 26.8 | -29.2 | 18.0 | -28.0 | 0.1 | 0.3 |
| 1.706 | 33.5 | 27.4 | -28.6 | 18.4 | -27.6 | 0.1 | 0.3 |
| 1.923 | 32.9 | 26.6 | -29.4 | 17.9 | -28.1 | 0.1 | 0.3 |

### 4.7.6 Photos

Figure 34 –Conducted Emissions Test Setup (front)

## *4.8 Frequency Stability FCC §15.215(c),*

### 4.8.1 Test procedure

The manufacturer of the equipment is responsible for ensuring that the frequency stability is such that emissions are always maintained within the band of operation under all conditions.

### 4.8.2 Voltage Variation

The ac supply voltage was varied between 85% and 115% of the nominal rated supply voltage. No change in fundamental frequency was observed during the variation. The equipment was found to be compliant.

### 4.8.3 Temperature Testing

The EUT was placed in a temperature chamber that was increased in 10º steps from the extremes of equipment operation from 0ºC to +30ºC (For equipment intended for use indoors). No change in fundamental frequency or bandwidth was observed during this period. The equipment complied with the specification.

| Temperature (ºC) | Channel | Frequency (GHz) | Frequency Range (GHz) | e.i.r.p (dBm) | e.i.r.p Limit -20dBm |
|---|---|---|---|---|---|
| 0ºC | 1 | 2.412 | 2.4 – 2.4835 | 15.15 | -4.85 |
| 0ºC | 6 | 2.437 | 2.4 – 2.4835 | 15.16 | -4.84 |
| 0ºC | 11 | 2.462 | 2.4 – 2.4835 | 15.16 | -4.84 |
| +10 & +20ºC | 1 | 2.412 | 2.4 – 2.4835 | 15.15 | -4.85 |
| +10 & +20ºC | 6 | 2.437 | 2.4 – 2.4835 | 15.16 | -4.84 |
| +10 & +20ºC | 11 | 2.462 | 2.4 – 2.4835 | 15.16 | -4.84 |
| +35ºC | 1 | 2.412 | 2.4 – 2.4835 | 15.15 | -4.85 |
| +35ºC | 6 | 2.437 | 2.4 – 2.4835 | 15.16 | -4.84 |
| +35ºC | 11 | 2.462 | 2.4 – 2.4835 | 15.16 | -4.84 |

Table 6 – Temperature Table for equipment intended for indoor use only

Transmit using highest emissions at 802.11g

### 4.8.4 Photos

Figure 35 –Temperature Test Setup

## *4.9 RF Exposure Measurement (Portable Device) 15.247(i)*

### 4.9.1 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 (see section 4.9.6) 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.

### 4.9.2 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

### 4.9.3 EUT Operating condition

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

### 4.9.4 Classification

The antenna of the product, under normal use condition, may be located within 20cm from the body of the user. So, this device is classified as a **Portable Device**.

### 4.9.5 Test Results

#### *4.9.5.1 Antenna Gain*

The maximum Gain measured in Semi-Anechoic Chamber is 2.4 dBi or 1.73 (numeric).

#### *4.9.5.2 Output Power into Antenna & RF Exposure value at distance 20cm:*

Calculations for this report are based on highest power measurement and the highest gain of the antenna. Limit for MPE (from FCC part 1.1310 table 1) is 1.0 $mW/cm^2$

Highest Pout is 12.76mW, highest antenna gain (in linear scale) is 1.73, and R is 20cm.

Pd = (12.76*1.73) / (4* $\pi$* 400) = **0.00439 $mW/cm^2$**, which is 0.99561 $mW/cm^2$ below to the limit.

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

### 4.9.6 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

If we know the maximum Gain of the antenna and the total power input to the antenna, through the calculation, we will know the MPE value at distance r.

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

# Appendix A

## 5 Test Plan

This test report is intended to follow this test plan outlined here in unless other wise stated in this here report. The following test plan will give details on product information, standards to be used, test set ups and refer to TUV test procedures. The test procedures will give the steps to be taken when performing the stated test. The product information below came via client, product manual, product itself and or the internet.

### 5.1 General Information

| | |
|---|---|
| **Client** | Draeger Medical Systems, Inc. |
| **Address** | 6 Tech Drive |
| **Address** | Andover, MA 01810 |
| **Contact Person** | Georgios Kokovidis |
| **Telephone** | 978-379-8148 |
| **Fax** | 978-379-8338 |
| **e-mail** | george.kokvidis@draeger.com |

### 5.2 Model(s) Name

| |
|---|
| MS24895 |

### 5.3 Type of Product

| |
|---|
| 802.11 b/g wireless adapter |

## 5.4 Equipment Under Test (EUT) Description

The EUT is an 802.11b/g wireless adapter.

## 5.5 Modifications

No modifications were needed for Compliance with respective standards.

## 5.6 Product Environment

| | | | |
|---|---|---|---|
| ☐ | **Residential** | ☒ | **Hospital** |
| ☐ | **Light Industrial** | ☒ | **Small Clinic** |
| ☐ | **Industrial** | ☒ | **Doctor's office** |
| ☐ | **Other** | | |

*Check all that apply

## 5.7 Countries

| | |
|---|---|
| ☒ | **USA** |
| ☐ | **Taiwan** |
| ☐ | **Japan** |
| ☐ | **Europe** |

*Check all that apply

## 5.8 General Product Information

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Size** | **H** | 0.5cm | **W** | 1.2cm | **L** | 1.8cm | |
| **Weight** | <1kg | | **Fork-Lift Needed** | | No | | |
| **Notes** | | | | | | | |

## 5.9 EUT Electrical Powered Information

### 5.9.1 Electrical Power Type

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| ☐ | **AC** | ☐ | **DC** | ☒ | **Batteries** | ☐ | **Host -** |

### 5.9.2 Electrical Power Information

| **Name** | **Type** | **Voltage** | | **Frequency** | **Current** | **Notes** |
|---|---|---|---|---|---|---|
| | | **min** | **max** | | | |
| Charger | AC | 100 | 240 | 50/60 | | |
| | | | | | | |
| **Notes** | The EUT operated by battery only but can be placed in a battery charger that operated on AC | | | | | |

## 5.10 Electrical Support Equipment

| Type | Manufacture | Model | Connected To |
|---|---|---|---|
| PC | | | EUT via USB cable for testing only |
| | | | |
| | | | |

## 5.11 Non - Electrical Support Equipment

| Item | Notes |
|---|---|
| Gas | N/A |
| Water | N/A |
| | |

## 5.12 EUT Equipment/Cabling Information

| EUT Port | Connected To | Location | Cable Type | | |
|---|---|---|---|---|---|
| | | | Length | Shielded | Bead |
| N/A | | | | | |
| | | | | | |
| | | | | | |

## 5.13 EUT Test Program

The EUT was connected via USB to a PC for testing only, the testing software is PCTI_Text.exe Version 1.3.0 Build ID-34659 made by connectBlue, Malmo, Sweden.

## 5.14 Monitoring of EUT during Testing

The EUT via front panel display and while in chamber cameras were used to ensure operation.

## 5.15 Block Diagram

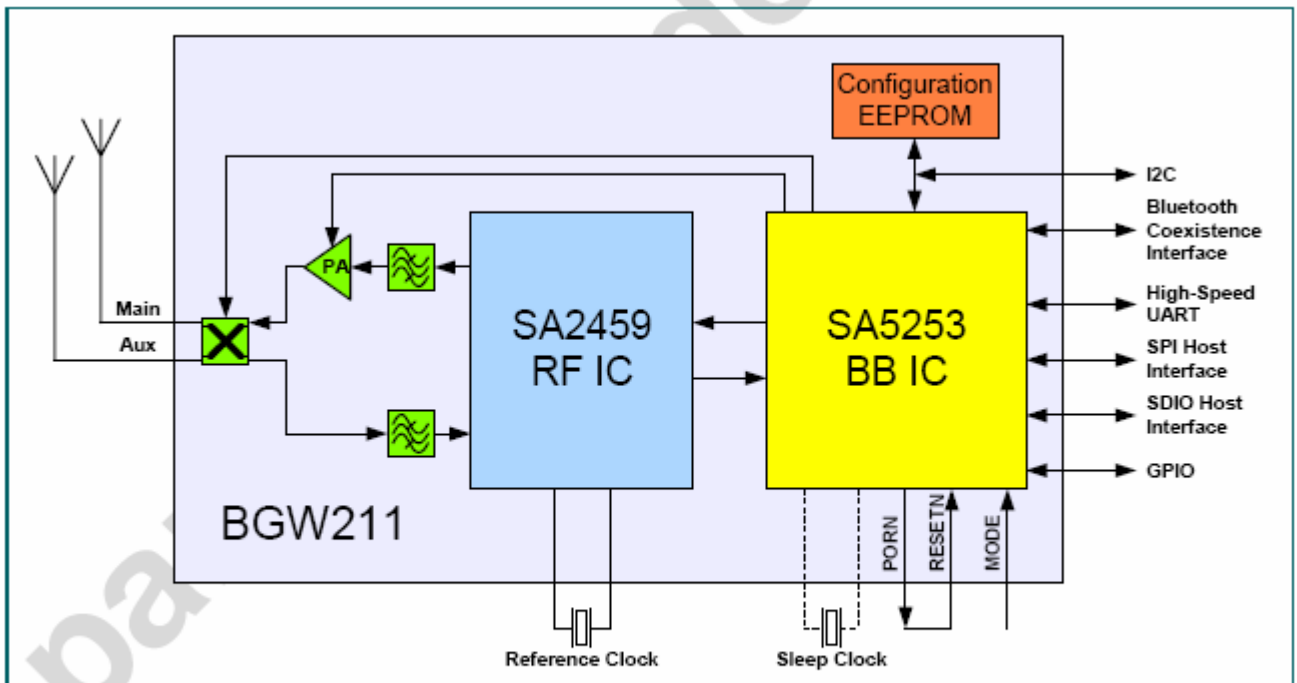



Fig 1. Block diagram