



1250 Peterson Dr., Wheeling, IL 60090

Company: RF Technologies, Inc.
Model Tested: 0800-0304
Report Number: 12322

FCC Rules and Regulations / Intentional Radiators

Operational in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz, Bands

Part 15, Subpart C, Section 15.247

THE FOLLOWING "**MEETS**" THE ABOVE TEST SPECIFICATION

Formal Name: Reset Required Universal Transceiver

Kind of Equipment: Nurse Call and Security Device

Test Configuration: Wireless Connection (Tested at 3 vdc)

Model Number(s): 0800-0301, 0800-0303, 0800-0304

Model(s) Tested: 0800-0304

Serial Number(s): NA

Date of Tests: June 19, 22 & 23, 2006

Test Conducted For: RF Technologies, Inc.
3125 N. 126th Street
Brookfield, Wisconsin 53066

NOTICE: "This report must not be used by the client to claim product endorsement by NVLAP or any agency of the U.S. Government". Please see the "Additional Description of Equipment Under Test" page listed inside of this report.

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Model Tested: 0800-0304
Report Number: 12322

SIGNATURE PAGE

Report By:

Arnom C. Rowe
Test Engineer
EMC-001375-NE

Reviewed By:

William Stumpf
OATS Manager

Approved By:

Brian Mattson
General Manager

Company Official:

RF Technologies, Inc.



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United States Department of Commerce
National Institute of Standards and Technology



Certificate of Accreditation to ISO/IEC 17025:1999

NVLAP LAB CODE: 100276-0

D.L.S. Electronic Systems, Inc.
Wheeling, IL

is recognized by the National Voluntary Laboratory Accreditation Program for conformance with criteria set forth in
NIST Handbook 150:2001 and all requirements of ISO/IEC Guide 17025:1999.
Accreditation is granted for specific services, listed on the Scope of Accreditation, for:

ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS

2005-10-01 through 2006-09-30

Effective dates



For the National Institute of Standards and Technology

NVLAP-01C (REV. 2005-05-19)



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Model Tested: 0800-0304
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1.0 SUMMARY OF TEST REPORT

It was found that the Reset Required Universal Transceiver, Model Number(s) 0800-0304, "**meets**" the radio interference radiated emission requirements of the FCC "Rules and Regulations", Part 15, Subpart C, Section 15.247 for operational in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz, Bands. The conducted emissions test was not required because the Reset Required Universal Transceiver is powered from a D.C. power source. It does not have a line cord to plug into the A.C. power line.

This test report relates only to the items tested and contains the following number of pages.

Text: 71

2.0 INTRODUCTION

On June 19, 22 & 23, 2006, a series of radio frequency interference measurements was performed on Reset Required Universal Transceiver, Model Number(s) 0800-0304, Serial Number: NA. The tests were performed according to the procedures of the FCC as stated in the "Methods of Measurement of Radio-Noise Emissions for Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz" found in the American National Standards Institute, ANSI C63.4-2003. Tests were performed by personnel of D.L.S. Electronic Systems, Inc. who are responsible to Donald L. Sweeney, Senior EMC Engineer.

D.L.S. Electronic Systems, Inc. is a full service EMC/Safety Testing Laboratory accredited to ISO 17025. NVLAP Certificate and Scope can be viewed at <http://www.dlsemc.com/certificate>. Our facilities are registered with the FCC, Industry Canada, and VCCI.

3.0 OBJECT

The purpose of this series of tests was to determine if the test sample could meet the radio frequency interference emission requirements of the FCC "Rules and Regulations", Part 15, Subpart C, Sections 15.205, 15.209 & 15.247 for Intentional Radiators operating in the Bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz.



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4.0 TEST SET-UP

All emission tests were performed at D.L.S. Electronic Systems, Inc. and set up according to the American National Standards Institute, ANSI C63.4-2003, Section 8, (Figures 11a and 11b).

All radiated emissions tests were performed with the test item placed on a 80 cm high rotating non-conductive table, located in the test room. Equipment normally operated on the floor was placed on a metal covered turntable which is flush with the surrounding conducting ground plane. The ground plane has an electrical isolation layer over its surface approximately 7 mm thick. The EUT is separated from the turntable ground plane by a non-conductive layer. The equipment under test was set up according to ANSI C63.4-2003, Sections 6 and 8.

5.0 TEST EQUIPMENT (Bandwidths and Detector Function)

All preliminary data below 1000 MHz was automatically plotted using the HP Spectrum Analyzer or ESI 26/40 Fixed Tuned Receiver. The data was taken using Peak, Quasi-Peak or the Average Detector Functions as required. This information was then used to determine the frequencies of maximum emissions. Above 1000 MHz, final data was taken using the Average Detector.

Below 1000 MHz, final data was taken using the HP Spectrum Analyzer and/or ESI 26/40 Fixed Tuned Receiver. These plots were made using the Peak or Quasi-Peak Detector functions, with manual measurements performed on the questionable frequencies using the Quasi-Peak or the Average Detector Function of the Analyzer or ESI 26/40 Fixed Tuned Receiver as required. Above 1000 MHz, final data was taken using the Average Detector on the Spectrum Analyzer.

The bandwidths shown below are specified by ANSI C63.4-2003, Section 4.2.

Frequency Range	Bandwidth (-6 dB)
10 to 150 kHz	200 Hz
150 kHz to 30 MHz	9 kHz
30 MHz to 1 GHz	120 kHz
Above 1 GHz	1 MHz

A list of the equipment used can be found in Table 1. All primary equipment was calibrated against known reference standards with a verified traceable path to NIST.



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6.0 AMBIENT MEASUREMENTS

For emissions measurements, broadband antennas and an EMI Test Receiver with a panoramic spectrum display are used. First the frequency range is scanned and displayed on the test receiver display. Next the scanned frequency range is divided into smaller ranges, and then it is manually tuned through to determine the emissions from the EUT. A headset or loudspeaker is connected to the test receiver's AM/FM demodulated output as an aid in detecting ambient signals and finding frequencies of significant emission from the EUT. If there is any doubt as to the source of the emission, it is further investigated by rotating the EUT, or by disconnecting the power from the EUT.

The EUT is set up in its typical configuration and operated in its various modes. For tabletop systems, cables are manipulated within the range of likely configurations. For floor-standing equipment, the cables are located in the same manner as the user would install them and no further manipulation is made. If the manner of cable installation is not known, or if it changes with each installation, cables or wires for floor-standing equipment shall be manipulated to the extent possible to produce the maximum level of emissions. For each mode of operation, the frequency spectrum is monitored. Variations in antenna height, antenna polarization, EUT azimuth, and cable or wire placement (each variable within bounds specified elsewhere) are explored to produce the emissions that have the highest amplitude relative to the limit. These methods are performed to the specifications in MP-5 or ANSI C63.4-2003, as appropriate.



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7.0 DESCRIPTION OF TEST SAMPLE: (See also Paragraph 8.0)

7.1 Description:

This test sample is a transceiver that can be placed on items where movement of the test sample away from a fixed location will alarm a caregiver or security personnel that someone has moved the test sample. The test sample will stay in the alarm state until the test sample is reset. The device can be wired to a device with a relay that when its state is changed the test sample will recognize this and send a signal. In addition, the test sample within a mesh network or receivers can give relative position, presence at a location and low battery indication.

The device can have wires attached for attaching to a switch. These wires can be 3" long, 48" long. The test will review each permutation of no wires, 3" wires and 48" wires to verify that the wire has no detrimental impact on test results.

7.2 PHYSICAL DIMENSIONS OF EQUIPMENT UNDER TEST

Length: 42 mm x Width: 35 mm x Height: 17 mm

7.3 LINE FILTER USED:

NA

7.4 INTERNAL CLOCK FREQUENCIES:

Switching Power Supply Frequencies:

NA

Clock Frequencies:

16 MHz

7.5 DESCRIPTION OF ALL CIRCUIT BOARDS:

1. ZigBee Universal Tx PCB Assembly

PN: 0830-0037 Rev. A



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8.0 ADDITIONAL DESCRIPTION OF TEST SAMPLE:
(See also Paragraph 7.0)

1: There were no additional descriptions noted at the time of test.

NOTE:

The test was run in the Continuous Transmit and Received Mode on Channels 11, 18 & 26.

I certify that the above, as described in paragraph 7.0, describes the equipment tested and will be manufactured as stated.

By: _____
Signature Title

For: _____
Company Date



Company: RF Technologies, Inc.
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9.0 PHOTO INFORMATION AND TEST SET-UP

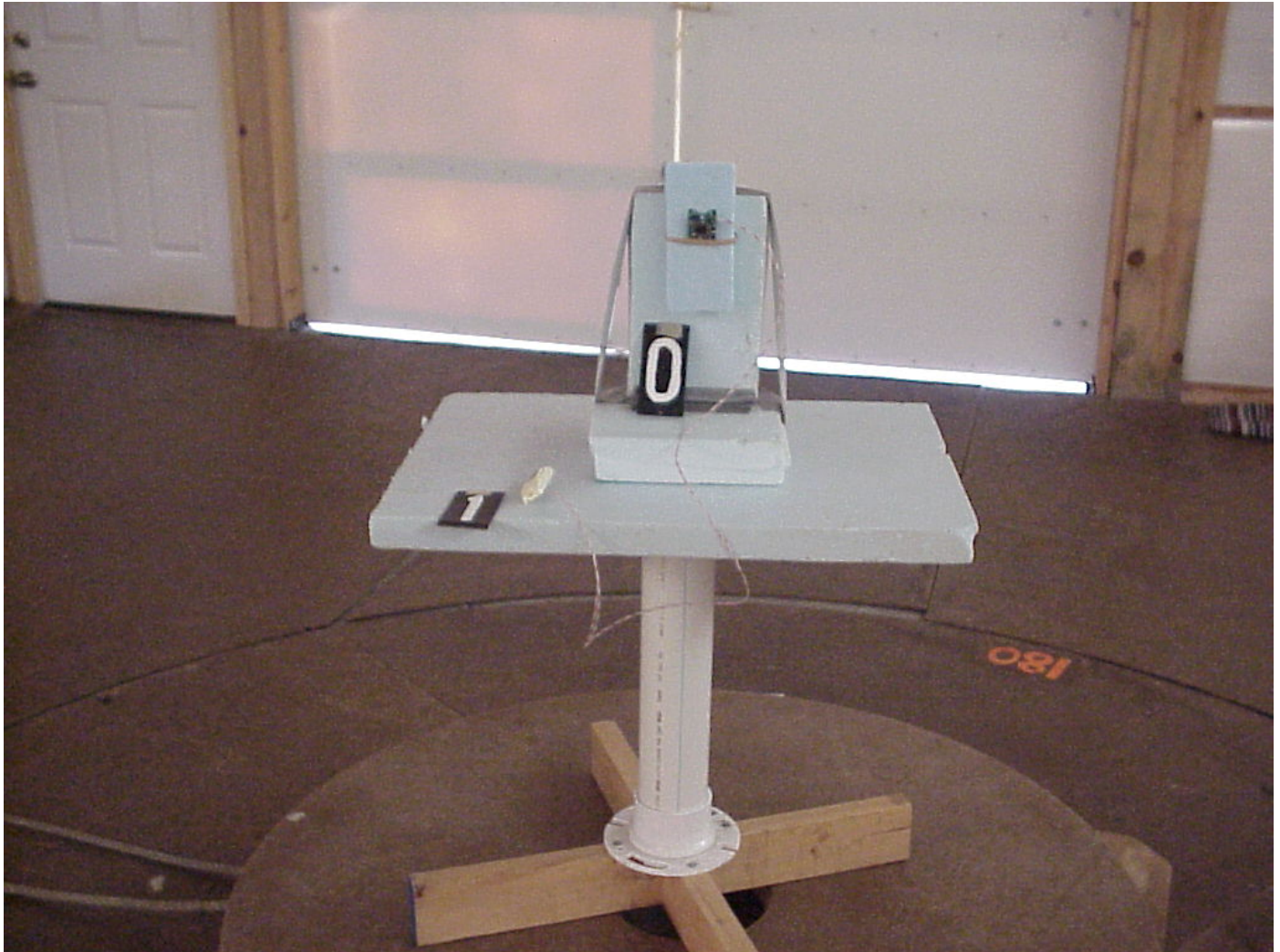
Item 0 Reset Required Universal Transceiver
Model Number: 0800-0304 Serial Number: NA



Company: RF Technologies, Inc.
Model Tested: 0800-0304
Report Number: 12322

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10.0 RADIATED PHOTOS TAKEN DURING TESTING

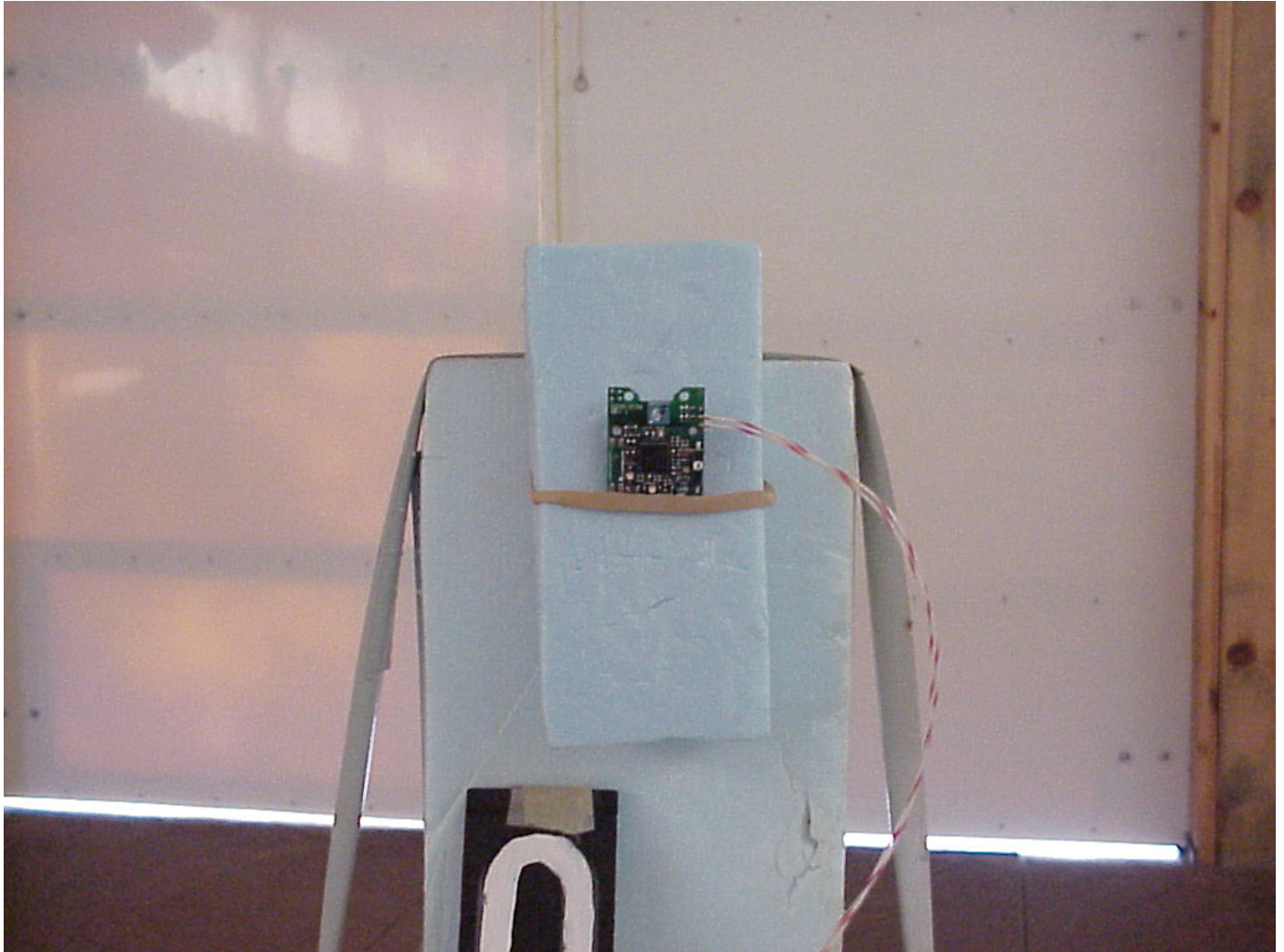




Company: RF Technologies, Inc.
Model Tested: 0800-0304
Report Number: 12322

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10.0 RADIATED PHOTOS TAKEN DURING TESTING (CON'T)

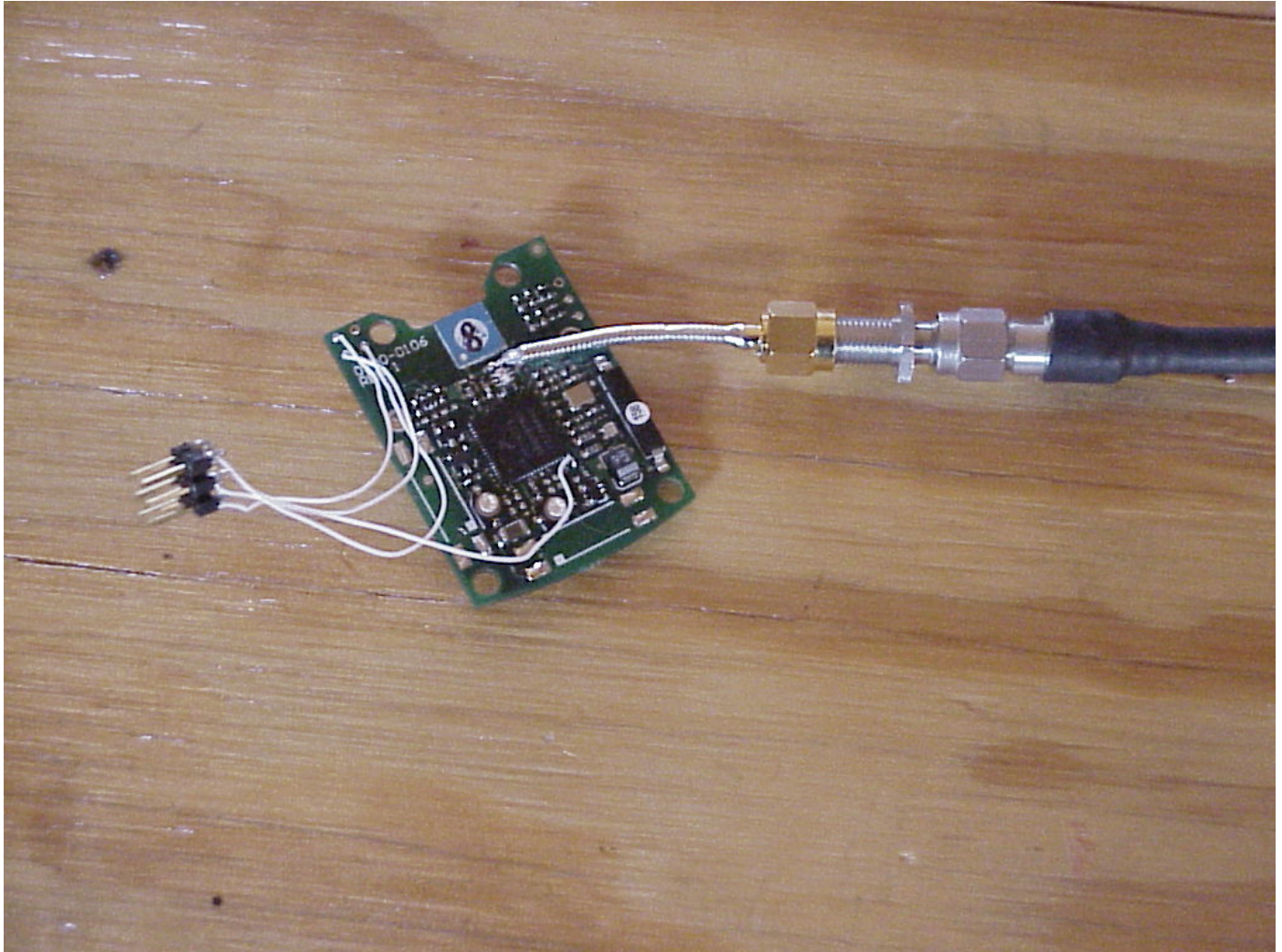




Company: RF Technologies, Inc.
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10.0 RADIATED PHOTOS TAKEN DURING TESTING (CON'T)



RF CONDUCTED



Company: RF Technologies, Inc.
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11.0 RESULTS OF TESTS

The radio interference emission charts results can be seen on the pages at the end of this report. Data sheets indicating the test measurements taken during testing can also be found at the end of this report. Points on the emission charts shown with a yellow mark are background frequencies that were verified during testing.

12.0 CONCLUSION

It was found that the Reset Required Universal Transceiver, Model Number(s) 0800-0304 "meets" the radio interference radiated emission requirements of the FCC "Rules and Regulations", Part 15, Subpart C, Section 15.247 for operational in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz, Bands. The conducted emissions test was not required because the Reset Required Universal Transceiver is powered from a D.C. power source. It does not have a line cord to plug into the A.C. power line.



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TABLE 1 – EQUIPMENT LIST

Test Equipment	Manufacturer	Model Number	Serial Number	Frequency Range	Cal Due Dates
Receiver	Rohde & Schwarz	ESI 26	837491/010	20 Hz – 26 GHz	11/06
Receiver	Rohde & Schwarz	ESI 40	837808/006	20 Hz – 40 GHz	12/06
Receiver	Rohde & Schwarz	ESI 40	837808/005	20 Hz – 40 GHz	12/06
Antenna	EMCO	3104C	00054891	20 MHz – 200 MHz	2/07
Antenna	Electrometrics	LPA-25	1114	200 MHz – 1 GHz	3/07
Antenna	EMCO	3104C	00054892	20 MHz – 200 MHz	3/07
Antenna	Electrometrics	3146	1205	200 MHz – 1 GHz	3/07
Antenna	EMCO	3104C	97014785	20 MHz – 200 MHz	2/07
Antenna	EMCO	3146	97024895	200 MHz – 1 GHz	3/07
Antenna	EMCO	3115	2479	1 GHz – 18 GHz	8/06
Antenna	EMCO	3115	99035731	1 GHz – 18 GHz	4/07
Antenna	Rohde & Schwarz	HUF-Z1	829381001	20 MHz – 1 GHz	2/07
Antenna	Rohde & Schwarz	HUF-Z1	829381005	20 MHz – 1 GHz	8/06

All primary equipment is calibrated against known reference standards with a verified traceable path to NIST.



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TABLE 1 – EQUIPMENT LIST

Test Equipment	Manufacturer	Model Number	Serial Number	Frequency Range	Cal Due Dates
LISN	Solar	8012-50-R-24-BNC	8305116	10 MHz – 30 MHz	8/06
LISN	Solar	8012-50-R-24-BNC	814548	10 MHz – 30 MHz	8/06
LISN	Solar	9252-50-R-24-BNC	961019	10 MHz – 30 MHz	12/06
LISN	Solar	9252-50-R-24-BNC	971612	10 MHz – 30 MHz	10/06
LISN	Solar	9252-50-R-24-BNC	92710620	10 MHz – 30 MHz	7/06

All primary equipment is calibrated against known reference standards with a verified traceable path to NIST.



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APPENDIX A

TEST PROCEDURE

Part 15, Subpart C, Section 15.247 (a-h)

OPERATION WITHIN THE BAND 902-928 MHz,

2400-2483.5 MHz AND 5725-5857 MHz



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APPENDIX A

1.0 CONDUCTED EMISSION MEASUREMENTS

If applicable, the conducted emissions were measured over the frequency range from 150 kHz to 30 MHz in accordance with the power line measurements as specified in the American National Standards Institute, ANSI C63.4-2003, Section 12. Since the device is operated from the public utility lines, the 115 Vac 60 Hz power leads, high and low sides, were to be measured by connecting the measuring equipment to the appropriate meter terminal of the LISN. All signals were then recorded. The allowed levels for Intentional Radiators cannot exceed 250 uV (47.96 dBuV) at any frequency between 150 kHz and 30 MHz, as stated in Section 15.207a.

NOTE:

This test was not run because the device is battery operated.



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APPENDIX A

2.0 SPURIOUS EMISSIONS AT ANTENNA TERMINALS – PART 15.247(c)

Spurious conducted emissions were measured at the antenna terminals. Plots were made showing the amplitude of each harmonic emission with the equipment operated. As shown by the radiated charts there was no reason to believe that there were any spurious emissions other than the harmonics that were than individually investigated when doing the conducted test at the antenna terminals. Measurements were made up to the 10th harmonic of the fundamental.

The allowed emissions for transmitters operating in the bands for Reset Required Universal Transceiver equipment are found under Part 15, Section 15.247(c). This paragraph states that in any 100 kHz bandwidth outside the frequency band which the spread spectrum intentional radiator is operating, the radio frequency power 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 the desired power.

NOTE:

The Help Alert Pull Cord uses a Meander Type Chip Antenna (Fractus).



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CONDUCTED EMISSION DATA AND GRAPH(S)

TAKEN FOR

SPURIOUS EMISSION MEASUREMENTS MADE

AT THE ANTENNA TERMINALS

PART 15.247(c)

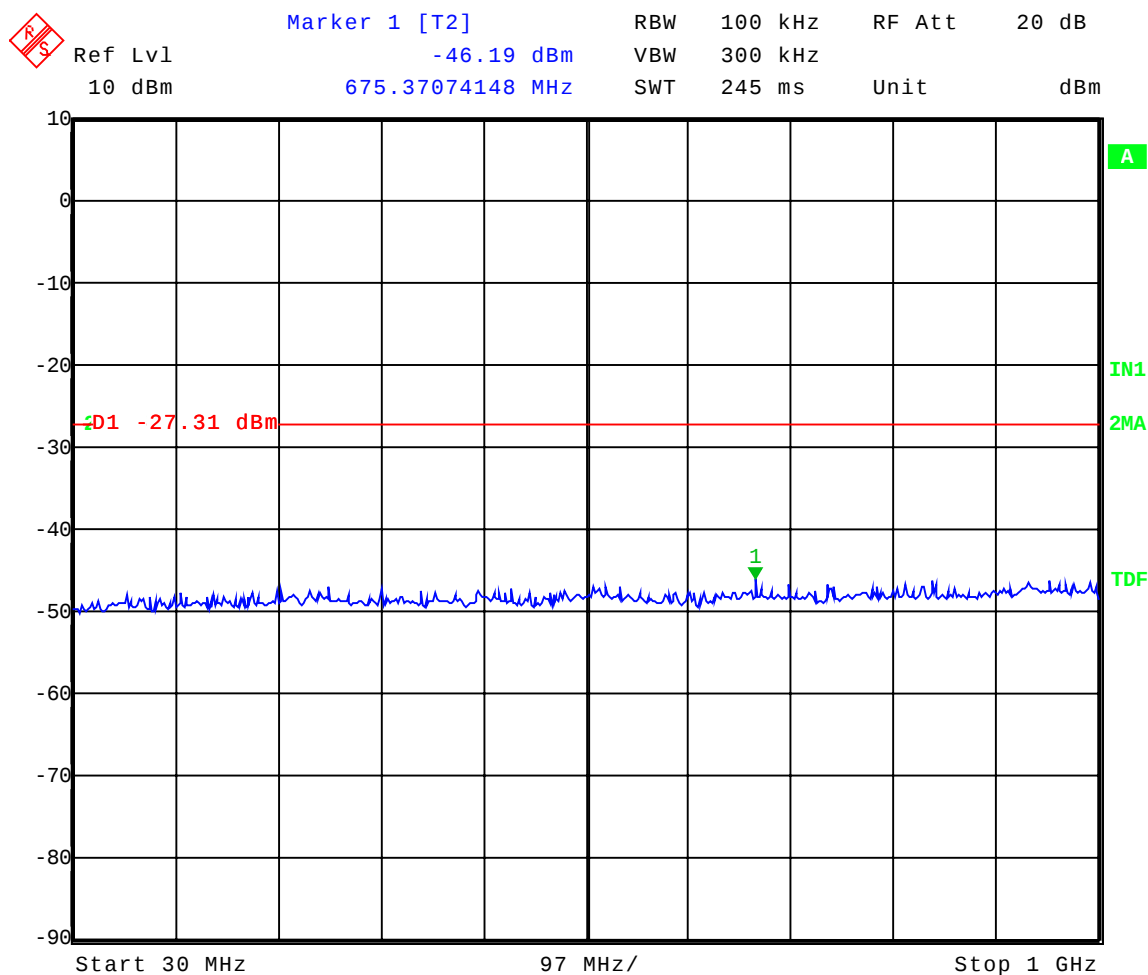


Company: RF Technologies, Inc.
Model Tested: 0800-0285
Report Number: 12318

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Test Date: 06-22-2006
Company: RF Technologies
EUT: Reset Required Universal Transmitter Model: 0800-0304
Test: Spurious Emissions - Conducted
Operator: Craig Brandt
Comment: Low Channel Transmit = 2.405 GHz
Frequency Range: 30 to 1000 MHz
Limit = -27.31 dBm

All Spurious Emissions at Least 20 dB below Peak Level of In Band Frequency



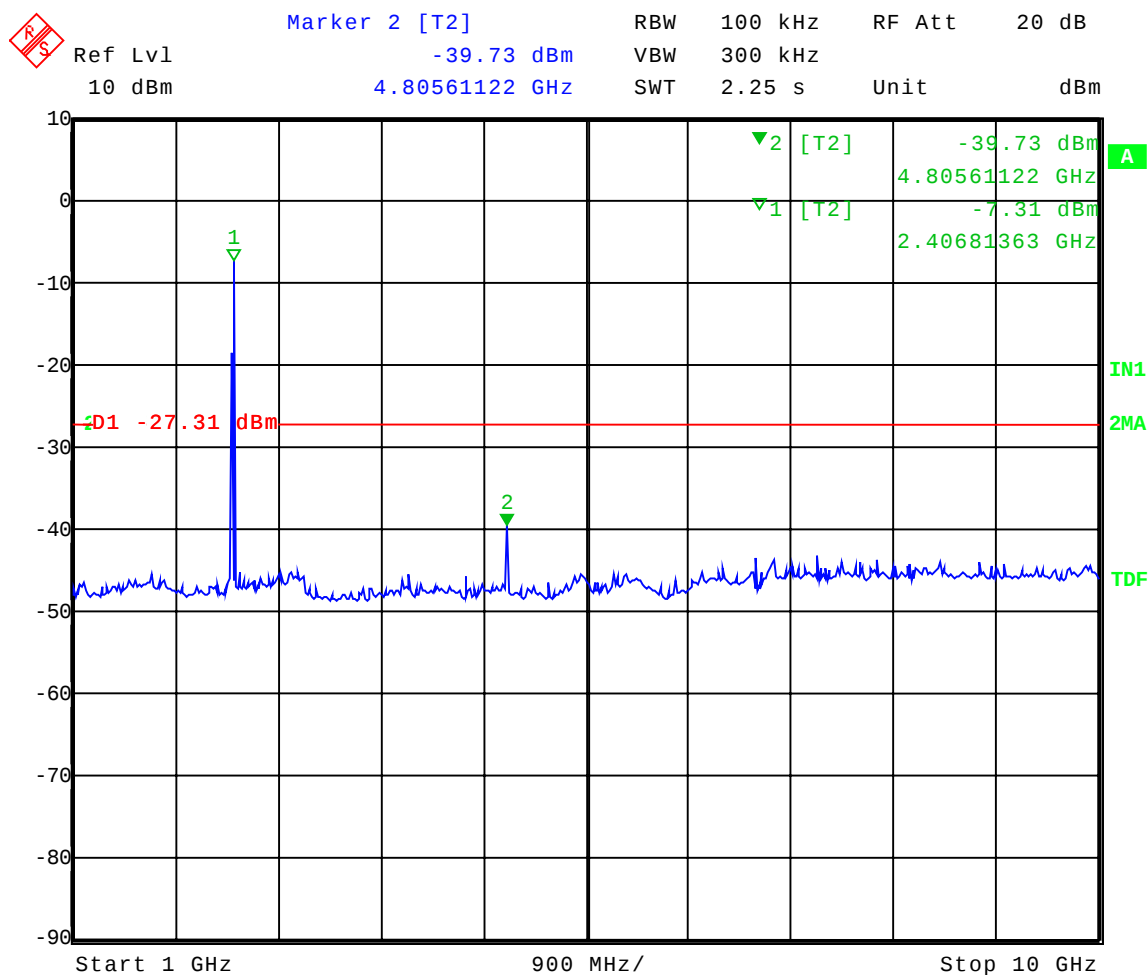


Company: RF Technologies, Inc.
Model Tested: 0800-0285
Report Number: 12318

1250 Peterson Dr., Wheeling, IL 60090

Test Date: 06-22-2006
Company: RF Technologies
EUT: Reset Required Universal Transmitter Model: 0800-0304
Test: Spurious Emissions - Conducted
Operator: Craig Brandt
Comment: Low Channel Transmit = 2.405 GHz
Frequency Range: 1 to 10 GHz
Limit = -27.31 dBm

All Spurious Emissions at Least 20 dB below Peak Level of In Band Frequency



Date: 22.JUN.2006 12:18:36

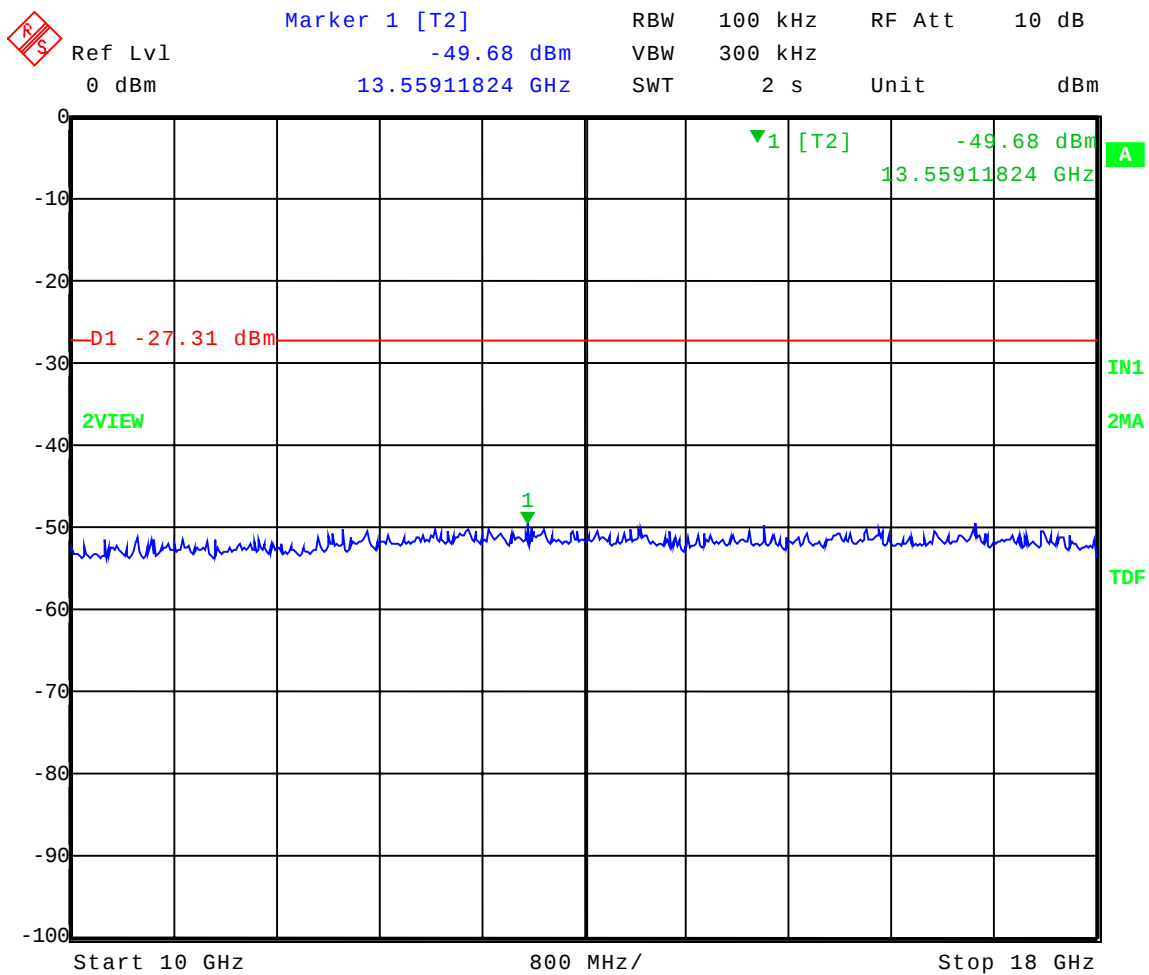


Company: RF Technologies, Inc.
Model Tested: 0800-0285
Report Number: 12318

1250 Peterson Dr., Wheeling, IL 60090

Test Date: 06-22-2006
Company: RF Technologies
EUT: Reset Required Universal Transmitter Model: 0800-0304
Test: Spurious Emissions - Conducted
Operator: Craig Brandt
Comment: Low Channel Transmit = 2.405 GHz
Frequency Range: 10 to 18 GHz
Limit = -27.31 dBm

All Spurious Emissions at Least 20 dB below Peak Level of In Band Frequency



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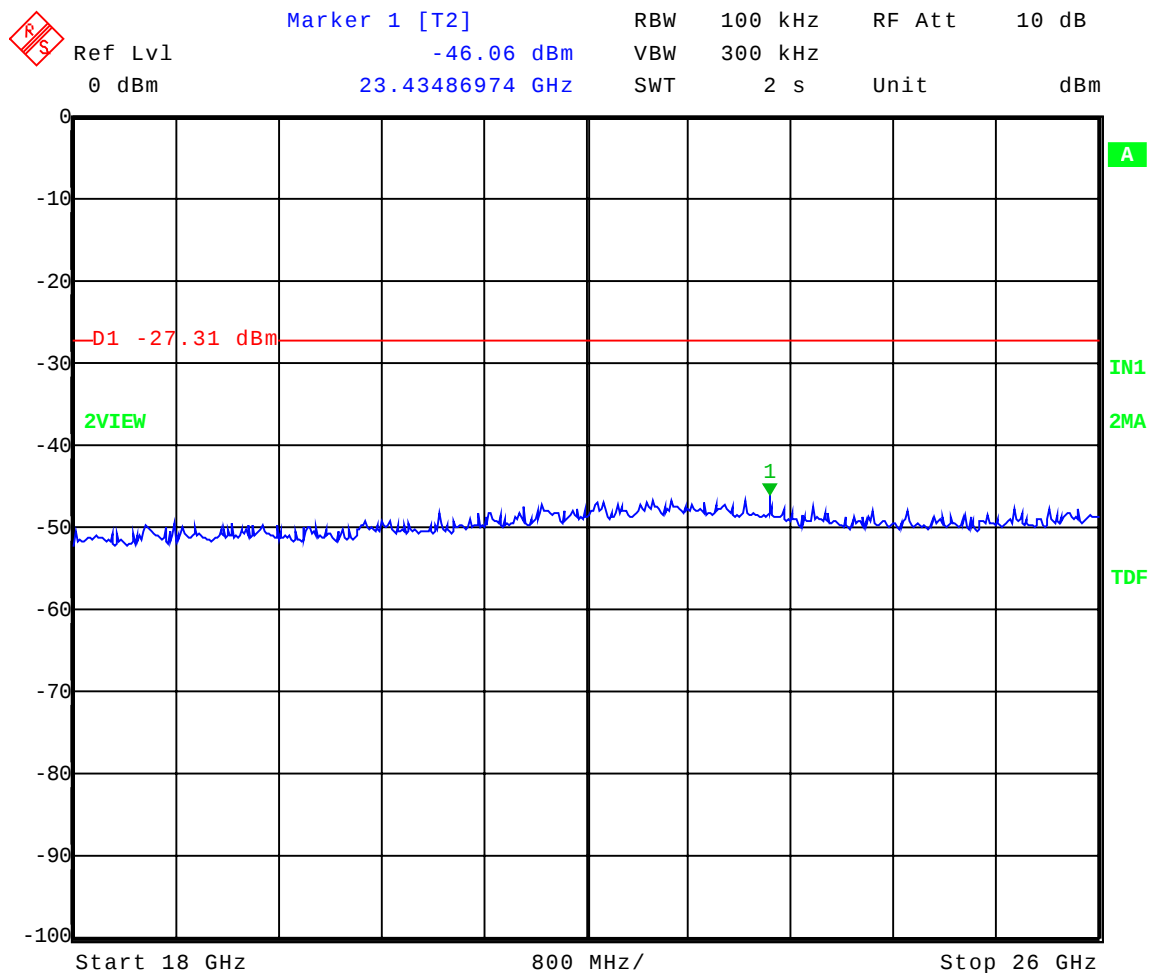


Company: RF Technologies, Inc.
Model Tested: 0800-0285
Report Number: 12318

1250 Peterson Dr., Wheeling, IL 60090

Test Date: 06-22-2006
Company: RF Technologies
EUT: Reset Required Universal Transmitter Model: 0800-0304
Test: Spurious Emissions - Conducted
Operator: Craig Brandt
Comment: Low Channel Transmit = 2.405 GHz
Frequency Range: 18 to 26 GHz
Limit = -27.31 dBm

All Spurious Emissions at Least 20 dB below Peak Level of In Band Frequency



Date: 22.JUN.2006 13:17:27

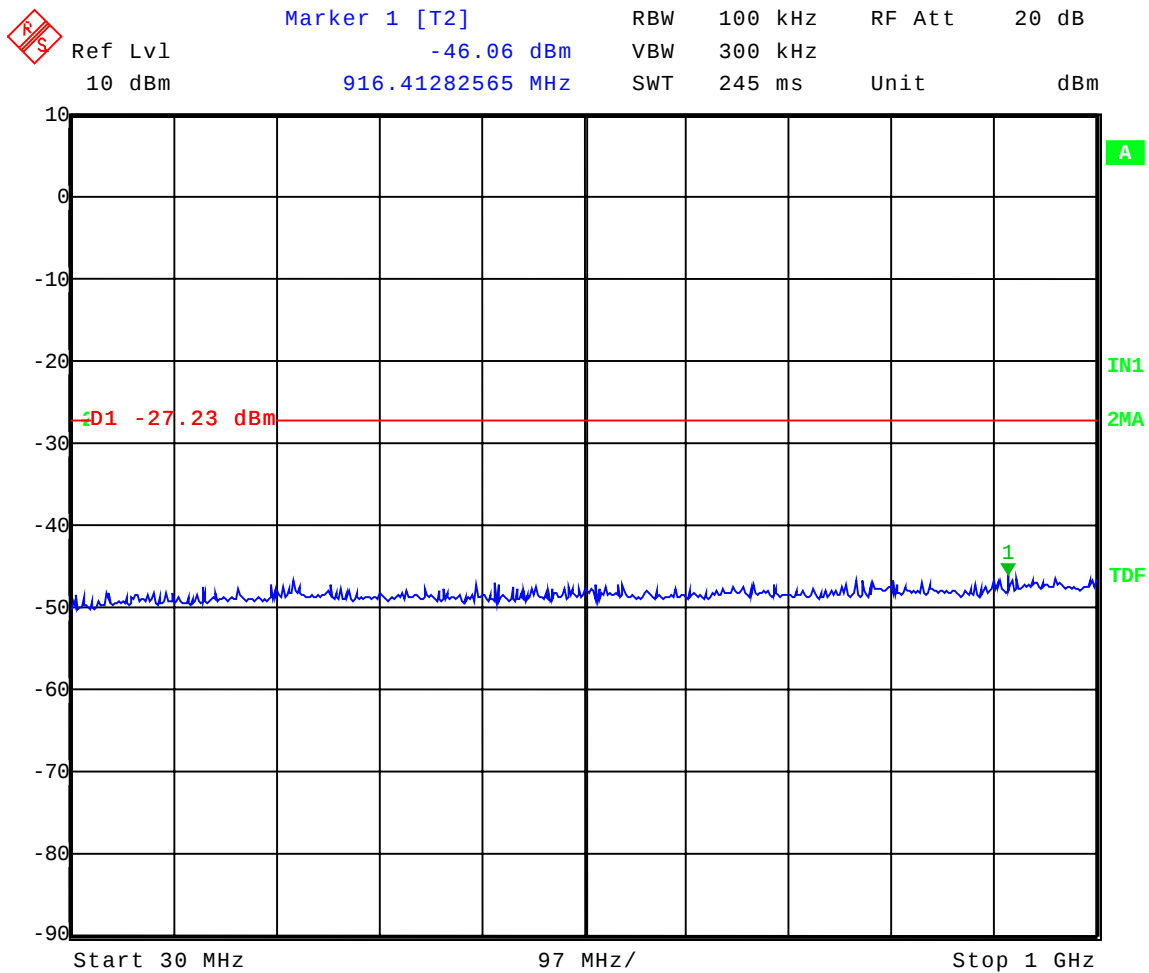


Company: RF Technologies, Inc.
Model Tested: 0800-0285
Report Number: 12318

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Test Date: 06-22-2006
Company: RF Technologies
EUT: Reset Required Universal Transmitter Model: 0800-0304
Test: Spurious Emissions - Conducted
Operator: Craig Brandt
Comment: Middle Channel Transmit = 2.440 GHz
Frequency Range: 30 to 1000 MHz
Limit = -27.23 dBm

All Spurious Emissions at Least 20 dB below Peak Level of In Band Frequency



Date: 22.JUN.2006 13:35:22

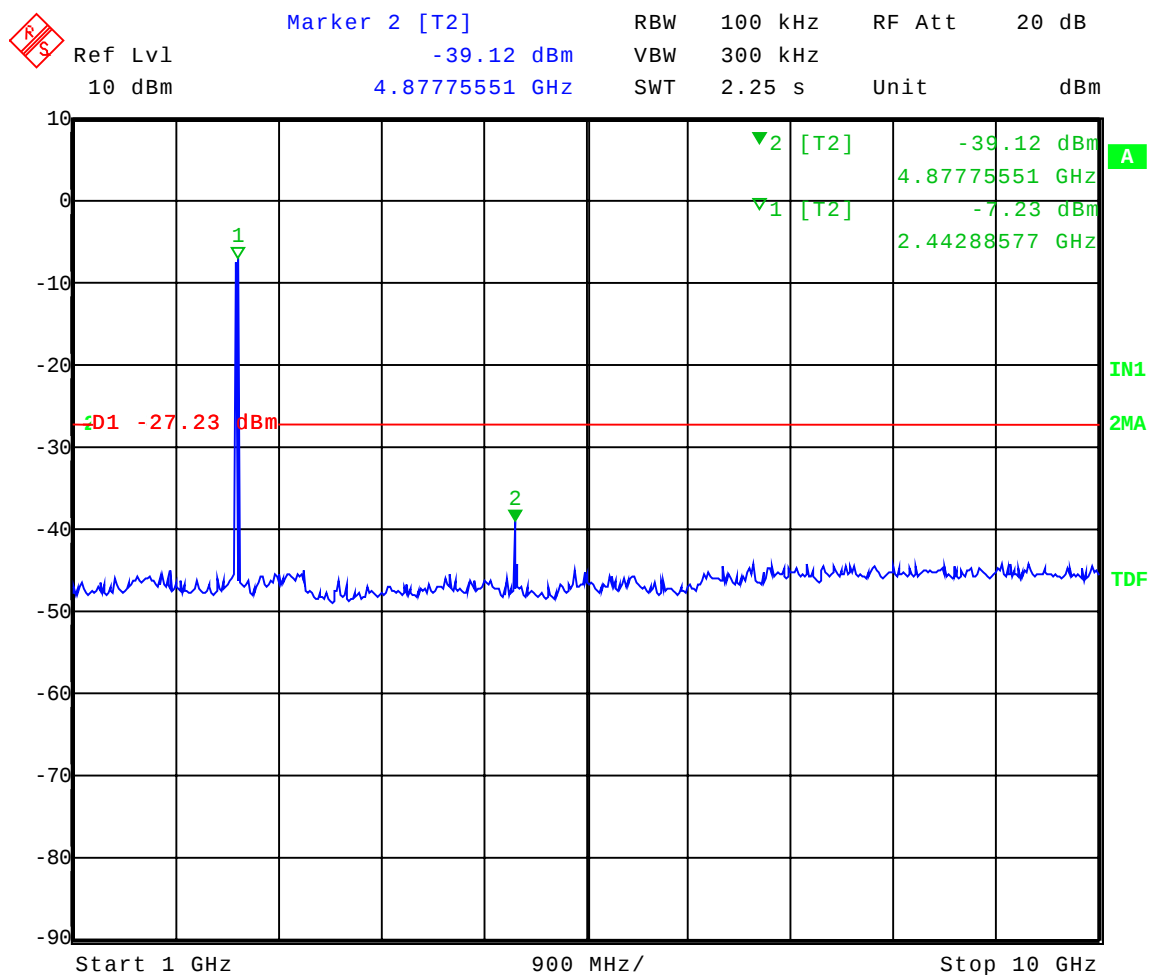


Company: RF Technologies, Inc.
Model Tested: 0800-0285
Report Number: 12318

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Test Date: 06-22-2006
Company: RF Technologies
EUT: Reset Required Universal Transmitter Model: 0800-0304
Test: Spurious Emissions - Conducted
Operator: Craig Brandt
Comment: Middle Channel Transmit = 2.440 GHz
Frequency Range: 1 to 10 GHz
Limit = -27.23 dBm

All Spurious Emissions at Least 20 dB below Peak Level of In Band Frequency



Date: 22.JUN.2006 12:21:42

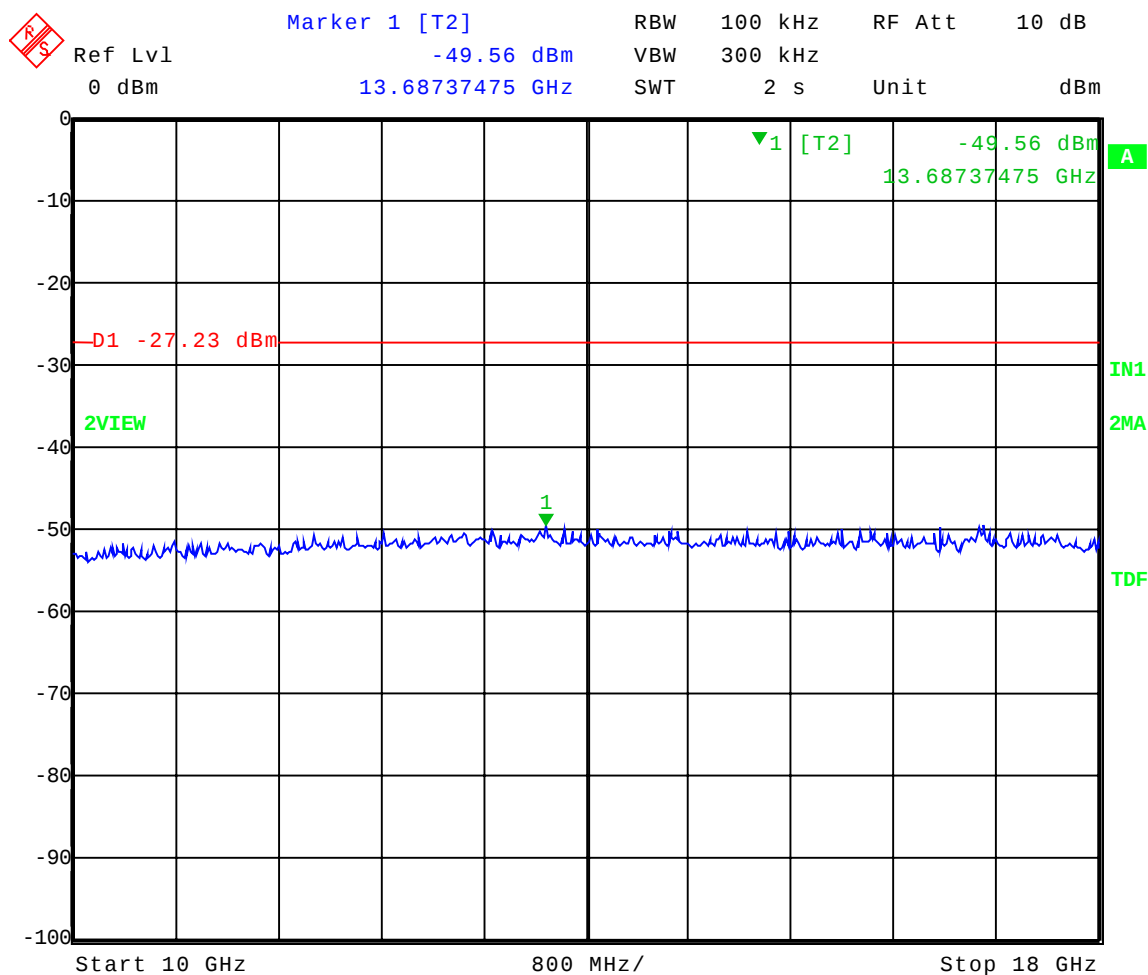


Company: RF Technologies, Inc.
Model Tested: 0800-0285
Report Number: 12318

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Test Date: 06-22-2006
Company: RF Technologies
EUT: Reset Required Universal Transmitter Model: 0800-0304
Test: Spurious Emissions - Conducted
Operator: Craig Brandt
Comment: Middle Channel Transmit = 2.440 GHz
Frequency Range: 10 to 18 GHz
Limit = -27.23 dBm

All Spurious Emissions at Least 20 dB below Peak Level of In Band Frequency



Date: 22.JUN.2006 12:29:37

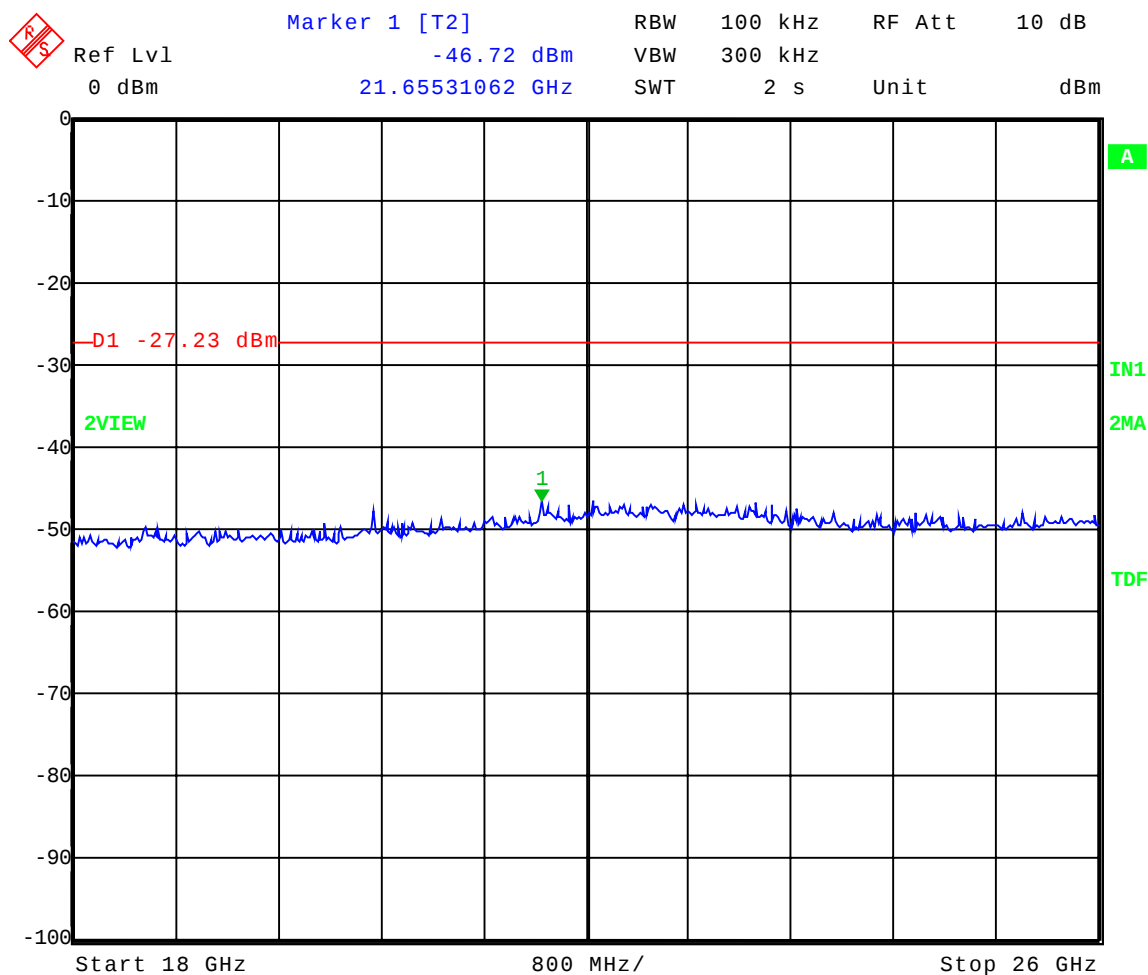


Company: RF Technologies, Inc.
Model Tested: 0800-0285
Report Number: 12318

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Test Date: 06-22-2006
Company: RF Technologies
EUT: Reset Required Universal Transmitter Model: 0800-0304
Test: Spurious Emissions - Conducted
Operator: Craig Brandt
Comment: Middle Channel Transmit = 2.440 GHz
Frequency Range: 18 to 26 GHz
Limit = -27.23 dBm

All Spurious Emissions at Least 20 dB below Peak Level of In Band Frequency



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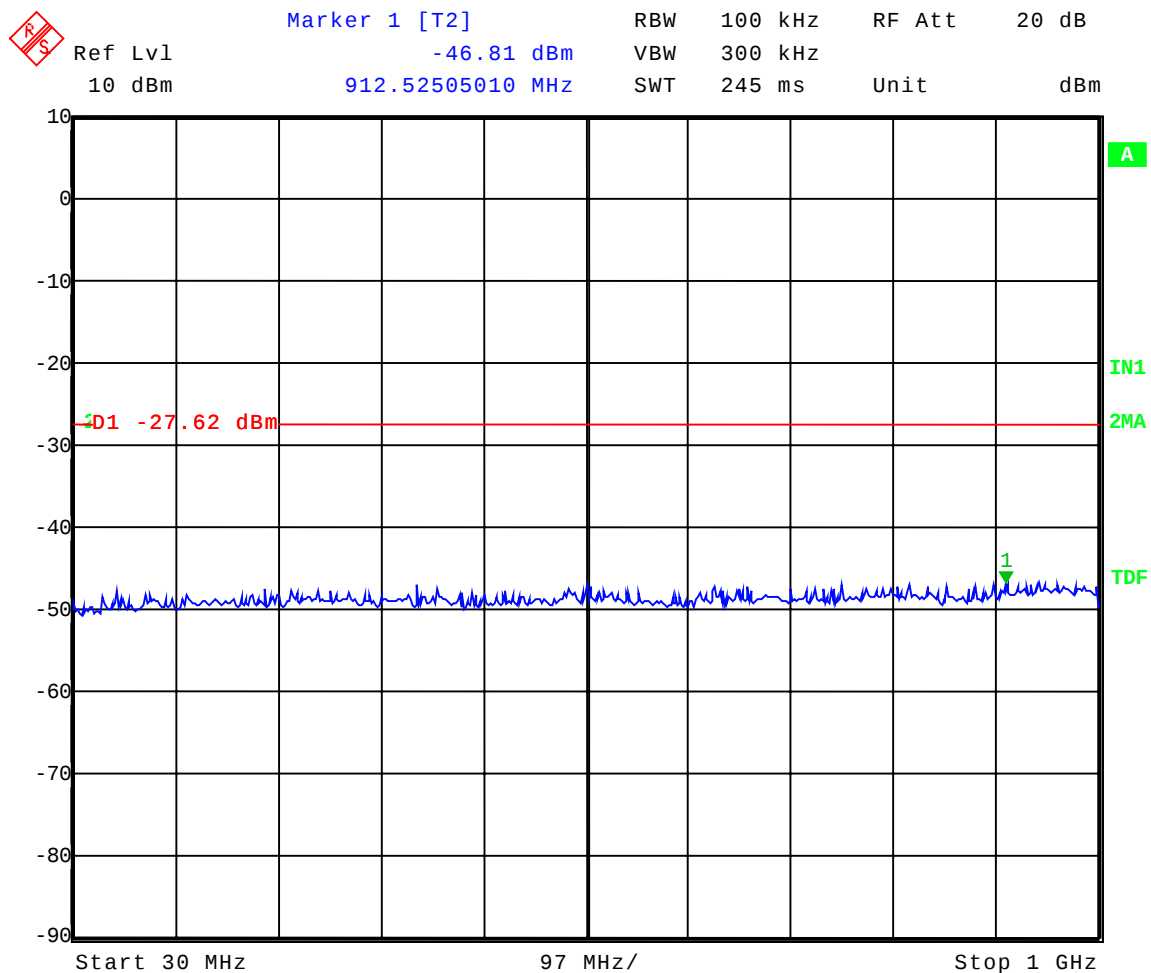


Company: RF Technologies, Inc.
Model Tested: 0800-0285
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Test Date: 06-22-2006
Company: RF Technologies
EUT: Reset Required Universal Transmitter Model: 0800-0304
Test: Spurious Emissions - Conducted
Operator: Craig Brandt
Comment: High Channel Transmit = 2.480 GHz
Frequency Range: 30 to 1000 MHz
Limit = -27.62 dBm

All Spurious Emissions at Least 20 dB below Peak Level of In Band Frequency



Date: 22.JUN.2006 13:31:51

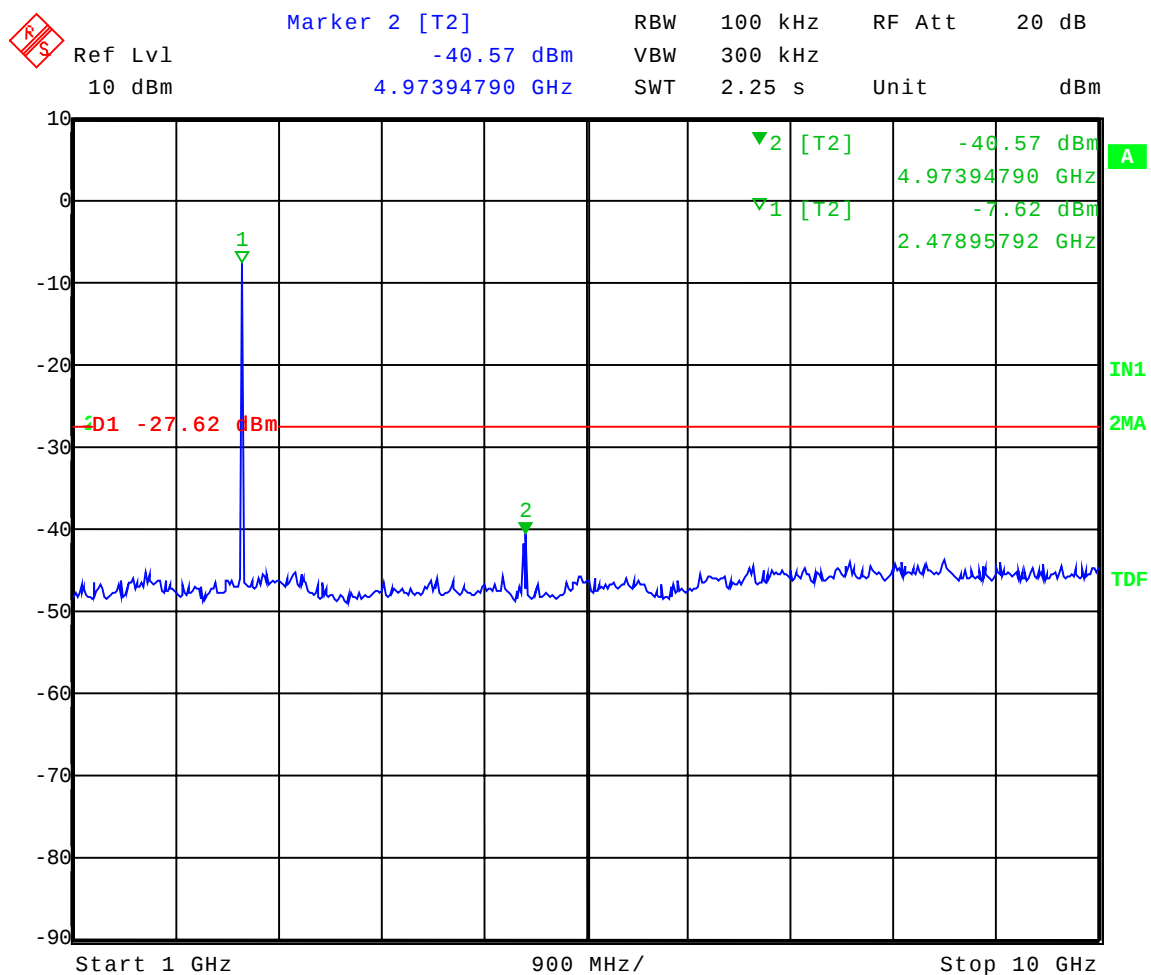


Company: RF Technologies, Inc.
Model Tested: 0800-0285
Report Number: 12318

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Test Date: 06-22-2006
Company: RF Technologies
EUT: Reset Required Universal Transmitter Model: 0800-0304
Test: Spurious Emissions - Conducted
Operator: Craig Brandt
Comment: High Channel Transmit = 2.480 GHz
Frequency Range: 1 to 10 GHz
Limit = -27.62 dBm

All Spurious Emissions at Least 20 dB below Peak Level of In Band Frequency



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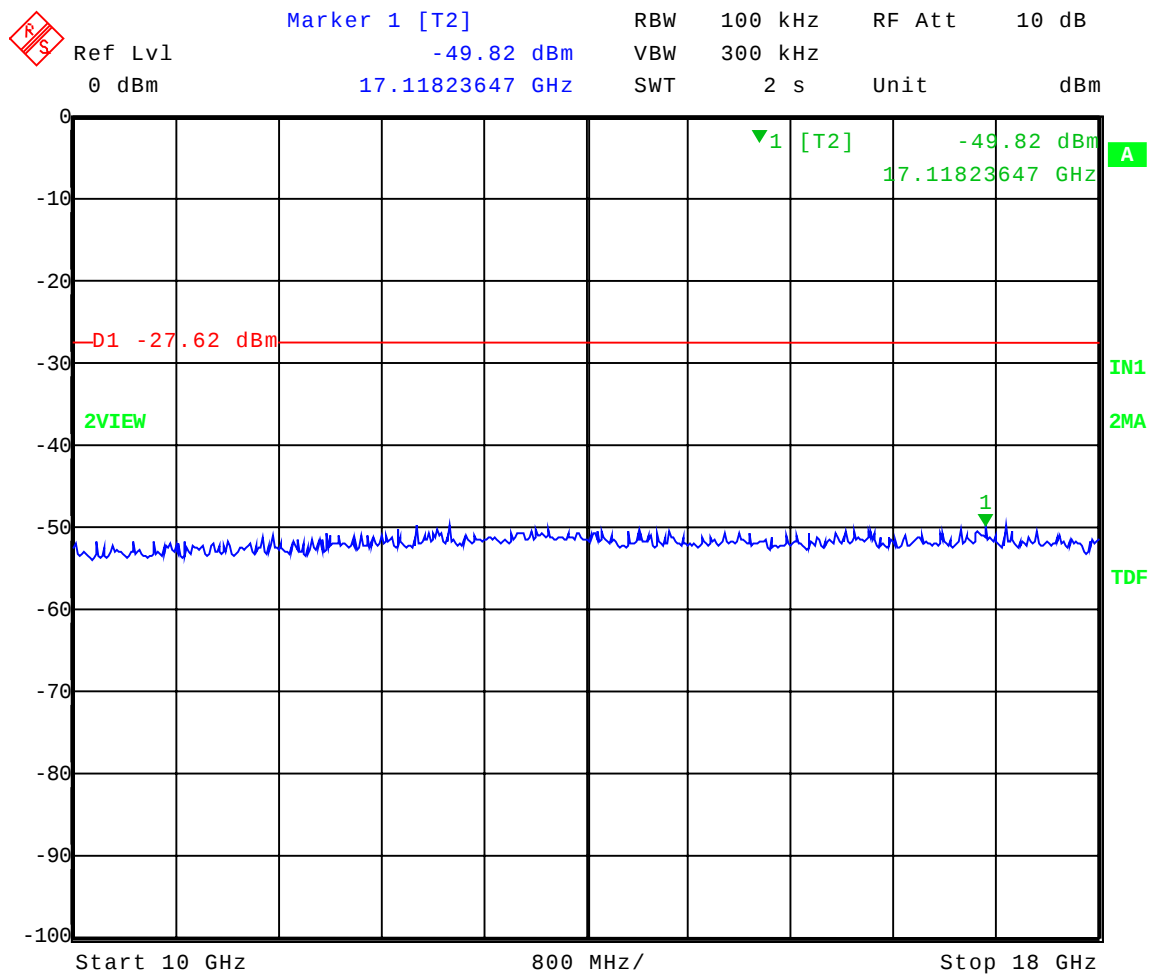


Company: RF Technologies, Inc.
Model Tested: 0800-0285
Report Number: 12318

1250 Peterson Dr., Wheeling, IL 60090

Test Date: 06-22-2006
Company: RF Technologies
EUT: Reset Required Universal Transmitter Model: 0800-0304
Test: Spurious Emissions - Conducted
Operator: Craig Brandt
Comment: High Channel Transmit = 2.480 GHz
Frequency Range: 10 to 18 GHz
Limit = -27.62 dBm

All Spurious Emissions at Least 20 dB below Peak Level of In Band Frequency



Date: 22.JUN.2006 12:31:59

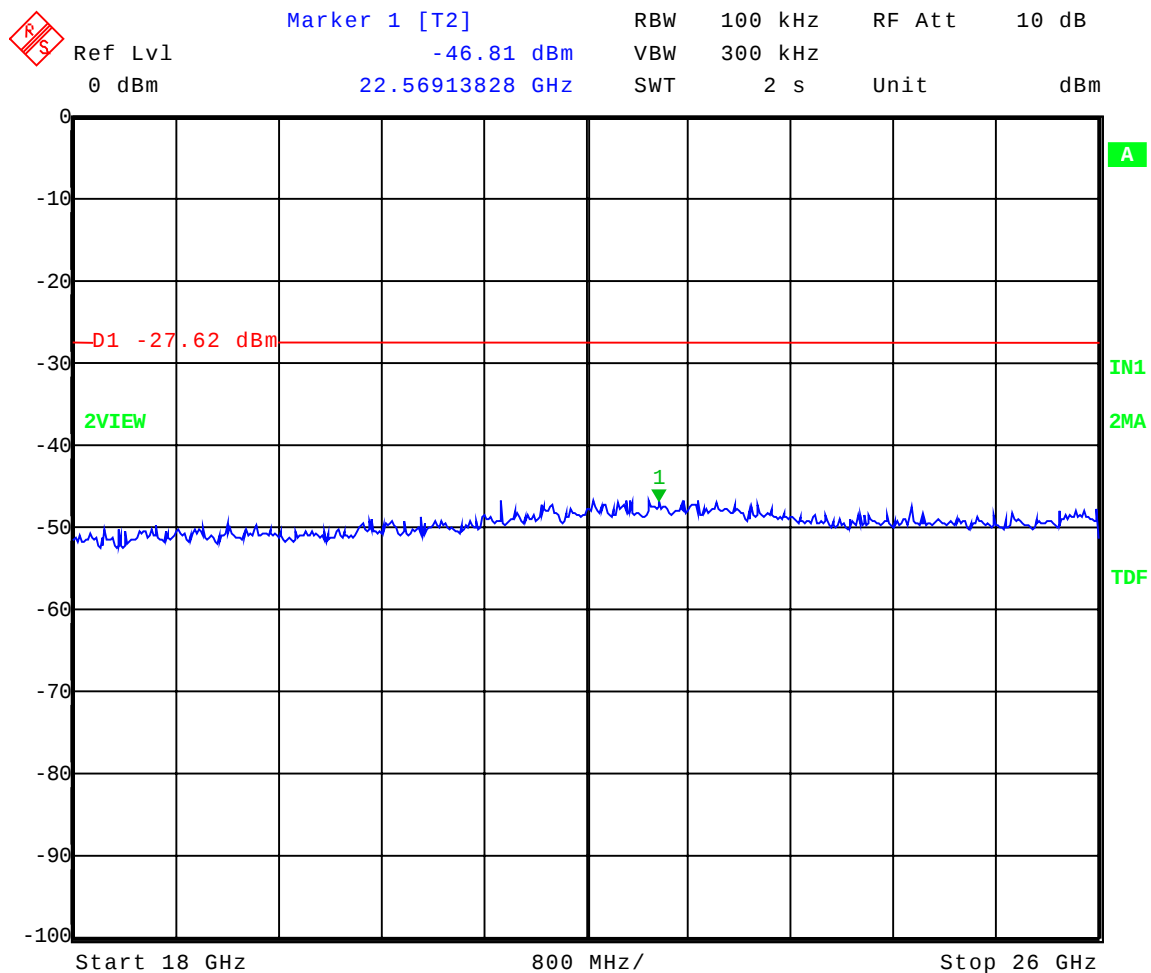


Company: RF Technologies, Inc.
Model Tested: 0800-0285
Report Number: 12318

1250 Peterson Dr., Wheeling, IL 60090

Test Date: 06-22-2006
Company: RF Technologies
EUT: Reset Required Universal Transmitter Model: 0800-0304
Test: Spurious Emissions - Conducted
Operator: Craig Brandt
Comment: High Channel Transmit = 2.480 GHz
Frequency Range: 18 to 26 GHz
Limit = -27.62 dBm

All Spurious Emissions at Least 20 dB below Peak Level of In Band Frequency



Date: 22.JUN.2006 13:23:43



Company: RF Technologies, Inc.
Model Tested: 0800-0285
Report Number: 12318

1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

3.0 RESTRICTED BANDS

As stated in Section 15.205a, the fundamental emission from the Reset Required Universal Transceiver shall not fall within any of the bands listed below:

Frequency in MHz	Frequency in MHz	Frequency in MHz	Frequency in GHz
.0900 to .1100	162.0125 to 167.17	2310.0 to 2390	9.30 to 9.50
.4900 to .5100	167.7200 to 173.20	2483.5 to 2500	10.60 to 12.70
2.1735 to 2.1905	240.000 to 285.00	2655.0 to 2900	13.25 to 13.40
8.362 to 8.3660	322.200 to 335.40	3260.0 to 3267	14.47 to 14.50
13.36 to 13.410	399.900 to 410.00	3332.0 to 3339	15.35 to 16.20
25.50 to 25.670	608.000 to 614.00	3345.8 to 3358	17.70 to 21.40
37.50 to 38.250	960.000 to 1240.00	3600.0 to 4400	22.01 to 23.13
73.00 to 75.500	1300.000 to 1427.00	4500.0 to 5250	23.60 to 24.00
108.00 to 121.94	1435.000 to 1626.50	5350.0 to 5450	31.20 to 31.80
123.00 to 138.00	1660.000 to 1710.00	7250.0 to 7750	36.43 to 36.50
149.90 to 150.00	1718.800 to 1722.20	8025.0 to 8500	ABOVE 38.60
156.70 to 156.90	2200.000 to 2300.00	9000.0 to 9200	

NOTE:

The noise floor within the Restricted Bands for the EMC Receiver and HP Spectrum Analyzer will typically lay 20 dB below the limit.

4.0 BAND EDGE AND RESTRICT BAND COMPLIANCE

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the attenuation below the general limits specified in 15.209 is not required.

The field strength of any **radiated emissions** which fall within the restricted bands shall not exceed the general radiated emissions limits as stated Section 15.209.

NOTE: See the following page(s) for the graph(s) made showing compliance for Band Edge and Restrict Band:



1250 Peterson Dr., Wheeling, IL 60090

Company: RF Technologies, Inc.
Model Tested: 0800-0285
Report Number: 12318

DATA AND GRAPH(S) TAKEN SHOWING

THE BAND EDGE COMPLIANCE

PART 15.247(c)

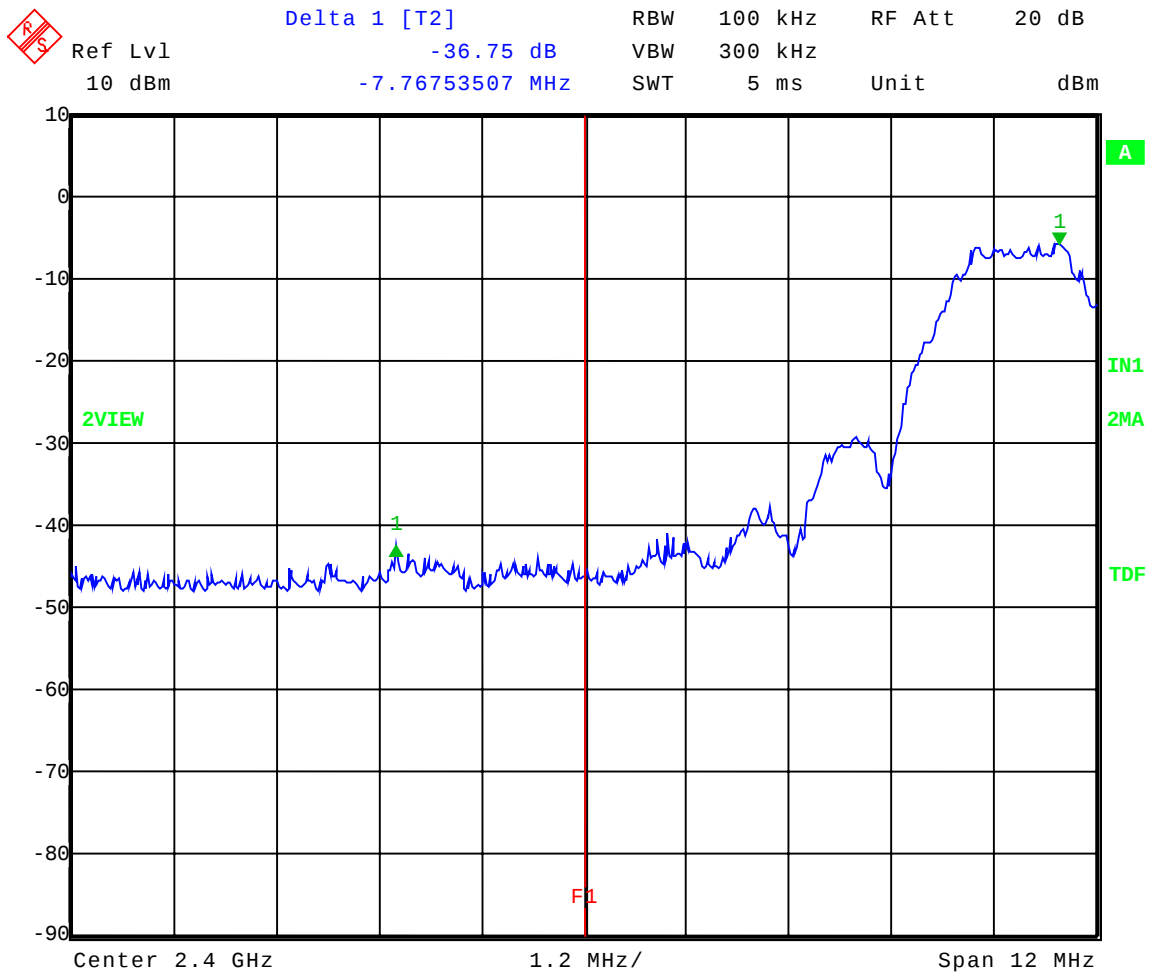


Company: RF Technologies, Inc.
Model Tested: 0800-0285
Report Number: 12318

1250 Peterson Dr., Wheeling, IL 60090

Test Date: 06-22-2006
Company: RF Technologies
EUT: Reset Required Universal Transmitter Model: 0800-0304
Test: Low Band-Edge Compliance - Conducted
Operator: Craig Brandt
Comment: Low Channel: Frequency – 2.405 GHz

Band-Edge Frequency = 2.4 GHz
Band-Edge > 20 dB Below Peak In-Band Emission



Date: 22.JUN.2006 12:01:59

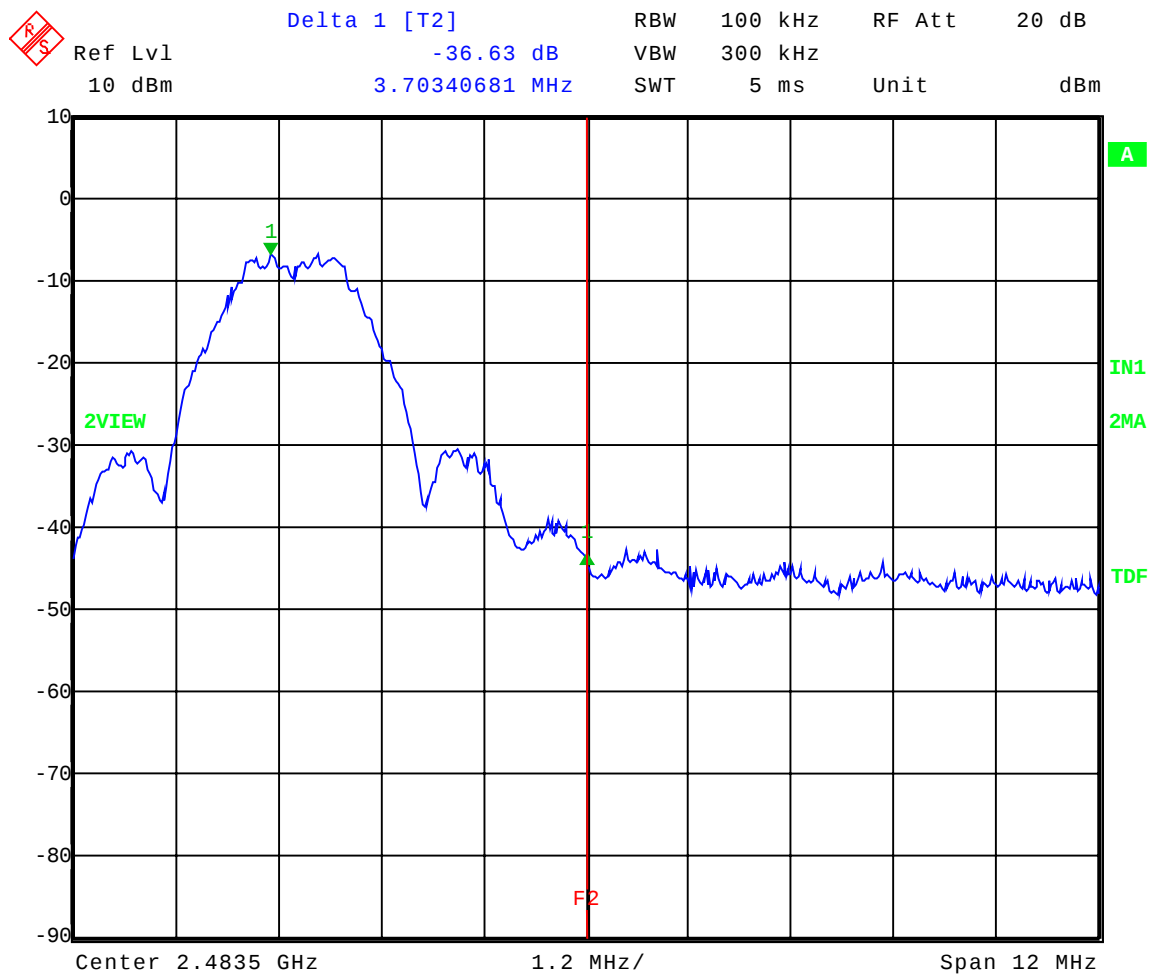


Company: RF Technologies, Inc.
Model Tested: 0800-0285
Report Number: 12318

1250 Peterson Dr., Wheeling, IL 60090

Test Date: 06-22-2006
Company: RF Technologies
EUT: Reset Required Universal Transmitter Model: 0800-0304
Test: Upper Band-Edge Compliance - Conducted
Operator: Craig Brandt
Comment: High Channel: Frequency – 2.480 GHz

Band-Edge Frequency = 2.4835 GHz
Band-Edge > 20 dB Below Peak In-Band Emission



Date: 22.JUN.2006 12:03:53



1250 Peterson Dr., Wheeling, IL 60090

Company: RF Technologies, Inc.
Model Tested: 0800-0285
Report Number: 12318

DATA AND GRAPH(S) TAKEN SHOWING

THE RESTRICT BAND COMPLIANCE

PART 15.247(c)



Company: RF Technologies, Inc.
Model Tested: 0800-0285
Report Number: 12318

1250 Peterson Dr., Wheeling, IL 60090

Radiated Spurious Emissions in Restricted Bands

Tested at a 3 Meter Distance

EUT: Reset Required Universal Transmitter Model: 0800-0304
Manufacturer: RF Technologies
Operating Condition: 72 deg F; 48% R.H.
Test Site: Site 3
Operator: Craig Brandt
Test Specification: FCC Part 15.247(d) and FCC Part 15.205
Comment: Continuous Transmit
Date: 06/19/2006

Notes: (1) Average measurements taken with RBW = 1 MHz, VBW = 10 Hz, Sweep: Auto
(2) All other restricted band emissions at least 20 dB under the limit.

Channel 11:

Frequency (GHz)	Measurement Type	Ant. Pol.	Level (dBuV)	Antenna Factor (dB/m)	System Loss (dB)	Total Level (dBuV/m)	Duty Cycle Correction (dB)	Final Corrected (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Comment
4.81	Average	Vert	51.72	33.32	-34.4	50.7	-31.2	19.5	54	34.5	Res. Band
4.81	Max Peak	Vert	61.53	33.32	-34.4	60.45	-	60.45	74	13.5	Res. Band
4.81	Average	Horz	50.23	33.32	-34.4	49.2	-31.2	18.0	54	36.0	Res. Band
4.81	Max Peak	Horz	60.03	33.32	-34.4	59.0	-	59.0	74	15.0	Res. Band



Company: RF Technologies, Inc.
Model Tested: 0800-0285
Report Number: 12318

1250 Peterson Dr., Wheeling, IL 60090

Radiated Spurious Emissions in Restricted Bands

Tested at a 3 Meter Distance

EUT: Reset Required Universal Transmitter Model: 0800-0304
Manufacturer: RF Technologies
Operating Condition: 72 deg F; 48% R.H.
Test Site: Site 3
Operator: Craig Brandt
Test Specification: FCC Part 15.247(d) and FCC Part 15.205
Comment: Continuous Transmit
Date: 06/19/2006

Notes: (1) Average measurements taken with RBW = 1 MHz, VBW = 10 Hz, Sweep: Auto
(2) All other restricted band emissions at least 20 dB under the limit.

Channel 18:

Frequency (GHz)	Measurement Type	Ant. Pol.	Level (dBuV)	Antenna Factor (dB/m)	System Loss (dB)	Total Level (dBuV/m)	Duty Cycle Correction (dB)	Final Corrected (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Comment
4.88	Average	Vert	53.99	33.46	-34.1	53.4	-31.2	22.2	54	31.8	Res. Band
4.88	Max Peak	Vert	63.95	33.46	-34.1	63.3	-	63.3	74	10.7	Res. Band
4.88	Average	Horz	56.32	33.46	-34.1	55.7	-31.2	24.5	54	29.5	Res. Band
4.88	Max Peak	Horz	66.24	33.46	-34.1	65.6	-	65.6	74	8.4	Res. Band



Company: RF Technologies, Inc.
Model Tested: 0800-0285
Report Number: 12318

1250 Peterson Dr., Wheeling, IL 60090

Radiated Spurious Emissions in Restricted Bands

Tested at a 3 Meter Distance

EUT: Reset Required Universal Transmitter Model: 0800-0304
Manufacturer: RF Technologies
Operating Condition: 72 deg F; 48% R.H.
Test Site: Site 3
Operator: Craig Brandt
Test Specification: FCC Part 15.247(d) and FCC Part 15.205
Comment: Continuous Transmit
Date: 06/19/2006

Notes: (1) Average measurements taken with RBW = 1 MHz, VBW = 10 Hz, Sweep: Auto
(2) All other restricted band emissions at least 20 dB under the limit.

Channel 26:

Frequency (GHz)	Measurement Type	Ant. Pol.	Level (dBuV)	Antenna Factor (dB/m)	System Loss (dB)	Total Level (dBuV/m)	Duty Cycle Correction (dB)	Final Corrected (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Comment
4.96	Average	Vert	57.79	33.62	-34.0	57.4	-31.2	26.2	54	27.8	Res. Band
4.96	Max Peak	Vert	67.93	33.62	-34.0	67.6	-	67.6	74	6.4	Res. Band
4.96	Average	Horz	57.41	33.62	-34.0	57.0	-31.2	25.8	54	28.2	Res. Band
4.96	Max Peak	Horz	67.38	33.62	-34.0	67.0	-	67.0	74	7.0	Res. Band
7.44	Average	Vert	37.66	36.63	-30.4	43.9	-31.2	12.7	54	41.3	Res. Band
7.44	Max Peak	Vert	47.97	36.63	-30.4	54.2	-	54.2	74	19.8	Res. Band



Company: RF Technologies, Inc.
Model Tested: 0800-0285
Report Number: 12318

1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

5.0 FIELD STRENGTH OF SPURIOUS EMISSION MEASUREMENTS

The radiated measurements made at D.L.S. Electronic Systems, Inc., for the Reset Required Universal Transceiver, Model Number: 0800-0304, are shown in tabulated and graph form. Preliminary radiation measurements were performed at a 3 meter test distance with the limits adjusted linearly when required. The frequency range from 30 MHz to over 960 MHz, depending upon the fundamental frequency as stated in Part 15.33a, was automatically scanned and plotted at various angles.

Measurements for the Reset Required Universal Transceiver were made up to 12750 MHz, in accordance with Section 15.33a for Intentional Radiators with a fundamental frequency of 2480 MHz. For intentional radiators, the frequency range to be investigated is determined by the lowest radio frequency generated by the device without going below 30 MHz, up to at least the tenth harmonic of the highest fundamental frequency or 10 GHz, whichever is lower. At those frequencies where significant signals were detected, measurements were made over the entire frequency range specified in FCC Part 15, Subpart C, Section 15.247 at the open field test site, located at Genoa City, Wisconsin, FCC file number **31040/SIT**. When required, levels were extrapolated from 10 meters to 3 meters using a linear extrapolation.

All signals in the frequency range of 30 MHz to 2000 MHz were measured with a Biconical Antenna or tuned dipoles and from 200 MHz to 1000 MHz, a Log Periodic or Tuned Dipoles were used. From 1000 MHz to 25 GHz Horn Antennas were used. During the test the equipment was rotated and the antenna was raised and lowered from 1 meter to 4 meters to find the maximum level of emissions. In order to find maximum emissions, the cables were moved through all the positions the equipment would be expected to experience in the field. The EUT, peripheral equipment and cables were configured to meet the conditions in ANSI C63.4-2003, Clauses 6 & 8. Tests were made with the receive antenna(s) in both the horizontal and vertical planes of polarization. In each case, the table was rotated to find the maximum emissions.



Company: RF Technologies, Inc.
Model Tested: 0800-0285
Report Number: 12318

1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

5.0 FIELD STRENGTH OF SPURIOUS EMISSION MEASUREMENTS (CON'T)

As stated in Section 15.247(b) the allowed maximum peak output power of the transmitter shall not exceed 1 Watt. In any 100 kHz bandwidth outside these frequency bands (the power that is produced by the modulation products of the spreading sequence), the information sequence and the carrier frequency shall be either at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power. Attenuation below the general limits specified in 15.209 is not required.

Field strength limits are at a distance of 3 meters. The emission limits shown are based on measurement instrumentation employing an average detector.

Emissions radiated outside of the specified frequency bands, except for harmonics are attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.

Preliminary radiated emission measurements were performed at a 3 meter test distance. The frequency range from 30 MHz to 1000 MHz was automatically scanned and plotted at various angles.

NOTE:

All radiated emissions measurements were made at a test room temperature of 72°F at 48% relative humidity.



1250 Peterson Dr., Wheeling, IL 60090

Company: RF Technologies, Inc.
Model Tested: 0800-0285
Report Number: 12318

RADIATED DATA AND GRAPH(S) TAKEN FOR
FIELD STRENGTH FUNDAMENTAL AND
SPURIOUS EMISSION MEASUREMENTS

PART 15.247

FCC Part 15 Class B

Electric Field Strength

EUT: Reset Rquired Universal Transmitter Model: 0800-0304
Manufacturer: RF Technologies
Operating Condition: 72 deg. F; 56% R.H.
Test Site: DLS OF Site 3
Operator: Craig Brandt
Test Specification: Continuous transmit and continuous receive modes
Comment: Low, mid, and high channels
Date: 06-23-2006

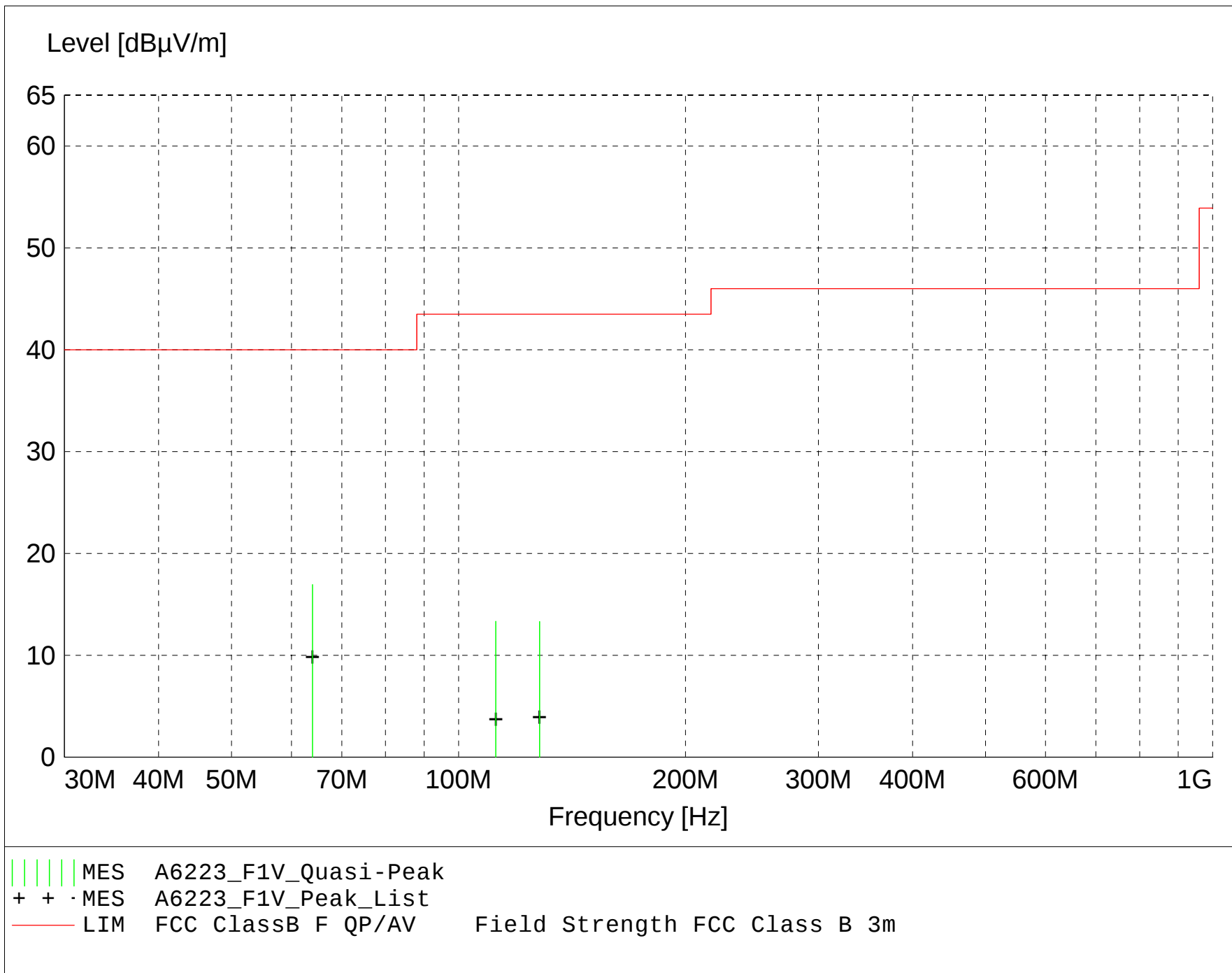
TEXT: "Site 3 MidV 3M"

Short Description: Test Set-up Vert30-1000MHz
TEST EQUIPMENT: Receiver --- Rohde&Schwarz ESI 26 SN: 837491/010

Antennas ---
Biconical -- EMC0 3104C SN: 9701-4785
Log Periodic -- EMC0 3146 SN: 9702-4895

Pre-Amp --- Rohde&Schwarz TS-PR10 SN: 032001/005

TEST SET-UP: EUT Measured at 3 Meters with VERTICAL Antenna Polarization



MEASUREMENT RESULT: "A6223_F1V_Final"

6/23/2006 9:35AM

Frequency	Level	Antenna Factor	System Loss	Total Level	Limit	Margin	Height Ant. m	EuT Angle deg	Final Detector	Comment
MHz	dBμV	dBμV/m	dB	dBμV/m	dBμV/m	dB				
64.000000	32.13	8.77	-24.0	16.9	40.0	23.1	1.00	0	QUASI-PEAK	None
112.005000	24.55	12.05	-23.3	13.3	43.5	30.2	1.00	0	QUASI-PEAK	None
127.990000	23.80	12.67	-23.1	13.3	43.5	30.2	1.00	0	QUASI-PEAK	None

FCC Part 15 Class B

Electric Field Strength

EUT: Reset Rquired Universal Transmitter Model: 0800-0304
Manufacturer: RF Technologies
Operating Condition: 72 deg. F; 56% R.H.
Test Site: DLS OF Site 3
Operator: Craig Brandt
Test Specification: Continuous transmit and continuous receive modes
Comment: Low, mid, and high channels
Date: 06-23-2006

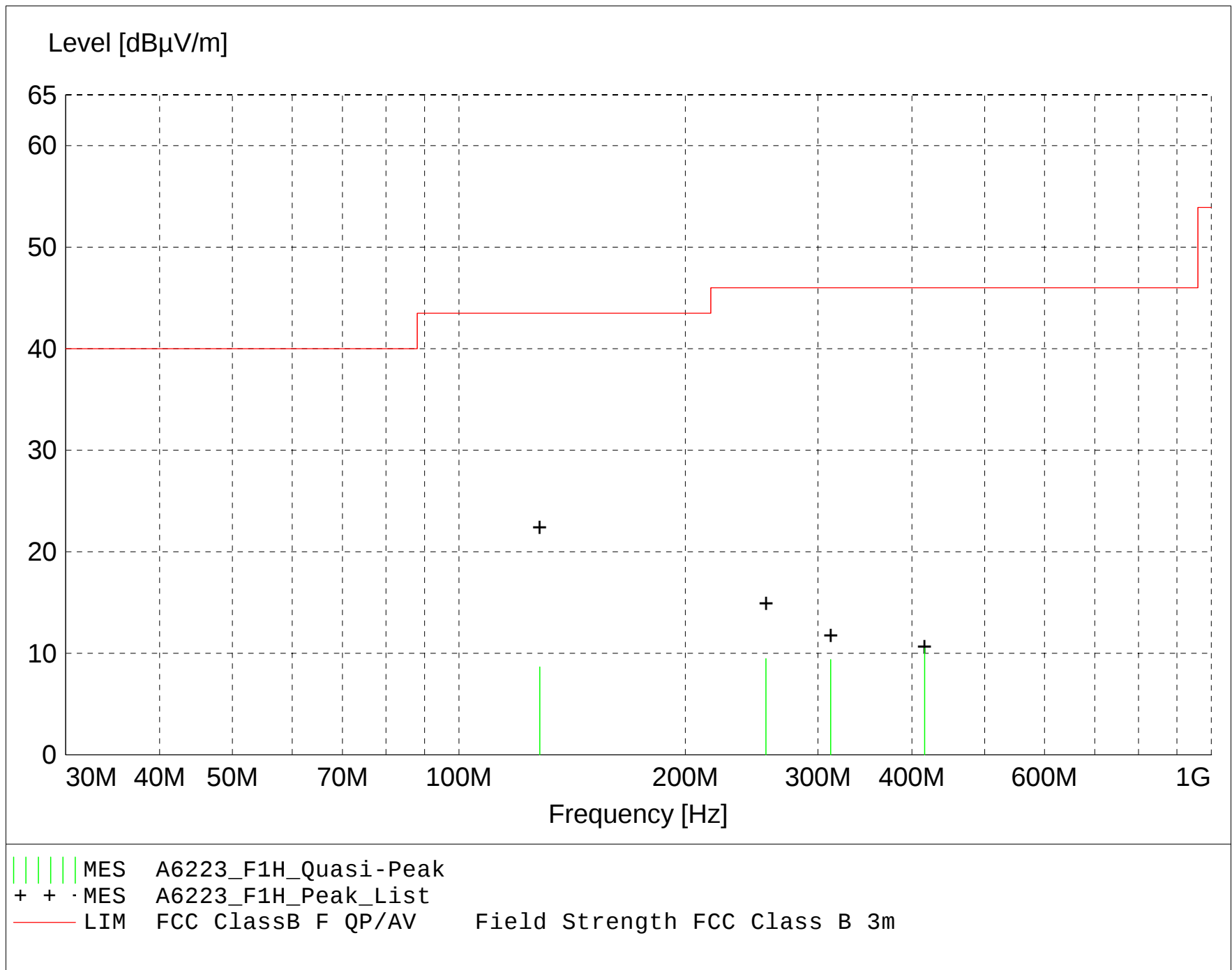
TEXT: "Site 3 MidH 3M"

Short Description: Test Set-up Horz30-1000MHz
TEST EQUIPMENT: Receiver --- Rohde&Schwarz ESI 40 SN: 837808/006

Antennas ---
Biconical -- EMC0 3104C SN: 9701-4785
Log Periodic -- EMC0 3146 SN: 9702-4895

Pre-Amp --- Rohde&Schwarz TS-PR10 SN: 032001/005

TEST SET-UP: EUT Measured at 3 Meters with HORIZONTAL Antenna Polarization



MEASUREMENT RESULT: "A6223_F1H_Final"

6/23/2006 9:15AM

Frequency	Level	Antenna Factor	System Loss	Total Level	Limit	Margin	Height Ant. m	EuT Angle deg	Final Detector	Comment
MHz	dBμV	dBμV/m	dB	dBμV/m	dBμV/m	dB				
128.000000	19.15	12.67	-23.1	8.7	43.5	34.8	2.50	270	QUASI-PEAK	None
416.010000	15.92	15.77	-21.2	10.5	46.0	35.5	2.50	180	QUASI-PEAK	None
256.000000	19.52	12.12	-22.2	9.5	46.0	36.5	2.50	0	QUASI-PEAK	None
312.010000	16.14	15.18	-21.9	9.4	46.0	36.6	2.50	180	QUASI-PEAK	None



Company: RF Technologies, Inc.
Model Tested: 0800-0285
Report Number: 12318

1250 Peterson Dr., Wheeling, IL 60090

DLS Electronic Systems, Inc.

Company:
Operator: Craig Brandt
Date of test: 06-19-2006
Temperature: 72 deg. F
Humidity: 48% R.H.

EIRP - Substitution Method

Model: Reset Required Universal Transmitter Model: 0800-0304								
Channel: 11								
Frequency and Polarization (MHz)	Max. Field Strength of EUT @ 3 meters (dBuV/m)	Output of Signal Generator when field strength equals that of EUT (dBm)	Correction factor for cable between Signal Gen. and subst. antenna (dB)	Gain of subst. antenna (dBi)	Strength of emission [EIRP] (dBm)	Limit (dBm)	Margin (dB)	Strength of emission [EIRP] (mW)
2405 vertical	90.12	-13.90	2.78	9.59	-7.09	30.00	37.09	0.20
2405 horizontal	92.41	-13.70	2.78	9.59	-6.89	30.00	36.89	0.20

EIRP = Signal generator output - cable loss + antenna gain

$ERP_{(ref. \text{ to } \frac{1}{2}\lambda \text{ dipole})} = \text{Signal generator output} - \text{cable loss} + \text{antenna gain} - 2.15$

(Ref. ITU-R SM.329-8 Annex 1[1])



Company: RF Technologies, Inc.
 Model Tested: 0800-0285
 Report Number: 12318

1250 Peterson Dr., Wheeling, IL 60090

DLS Electronic Systems, Inc.

Company: RF Technologies
 Operator: Craig Brandt
 Date of test: 06-19-2006
 Temperature: 72 deg. F
 Humidity: 48% R.H.

EIRP - Substitution Method

Model: Reset Required Universal Transmitter Model: 0800-0304								
Channel: 18								
Frequency and Polarization (MHz)	Max. Field Strength of EUT @ 3 meters (dBuV/m)	Output of Signal Generator when field strength equals that of EUT (dBm)	Correction factor for cable between Signal Gen. and subst. antenna (dB)	Gain of subst. antenna (dBi)	Strength of emission [EIRP] (dBm)	Limit (dBm)	Margin (dB)	Strength of emission [EIRP] (mW)
2440 vertical	90.58	-13.60	2.79	9.63	-6.76	30.00	36.76	0.21
2440 horizontal	92.02	-14.00	2.79	9.63	-7.16	30.00	37.16	0.19

EIRP = Signal generator output - cable loss + antenna gain

$ERP_{(ref. to \frac{1}{2}\lambda \text{ dipole})} = \text{Signal generator output} - \text{cable loss} + \text{antenna gain} - 2.15$

(Ref. ITU-R SM.329-8 Annex 1[1])



1250 Peterson Dr., Wheeling, IL 60090

Company: RF Technologies, Inc.
Model Tested: 0800-0285
Report Number: 12318

DLS Electronic Systems, Inc.

Company: RF Technologies
Operator: Craig Brandt
Date of test: 06-19-2006
Temperature: 72 deg. F
Humidity: 48% R.H.

EIRP - Substitution Method

Model: Reset Required Universal Transmitter Model: 0800-0304								
Channel: 26								
Frequency and Polarization (MHz)	Max. Field Strength of EUT @ 3 meters (dBuV/m)	Output of Signal Generator when field strength equals that of EUT (dBm)	Correction factor for cable between Signal Gen. and subst. antenna (dB)	Gain of subst. antenna (dBi)	Strength of emission [EIRP] (dBm)	Limit (dBm)	Margin (dB)	Strength of emission [EIRP] (mW)
2480 vertical	86.64	-17.20	2.80	9.68	-10.32	30.00	40.32	0.09
2480 horizontal	90.86	-14.40	2.80	9.68	-7.52	30.00	37.52	0.18

EIRP = Signal generator output - cable loss + antenna gain

$ERP_{(ref. to \frac{1}{2}\lambda \text{ dipole})} = \text{Signal generator output} - \text{cable loss} + \text{antenna gain} - 2.15$

(Ref. ITU-R SM.329-8 Annex 1[1])



1250 Peterson Dr., Wheeling, IL 60090

Company: RF Technologies, Inc.
Model Tested: 0800-0285
Report Number: 12318

6 dB BANDWIDTH GRAPHS

PART 15.247

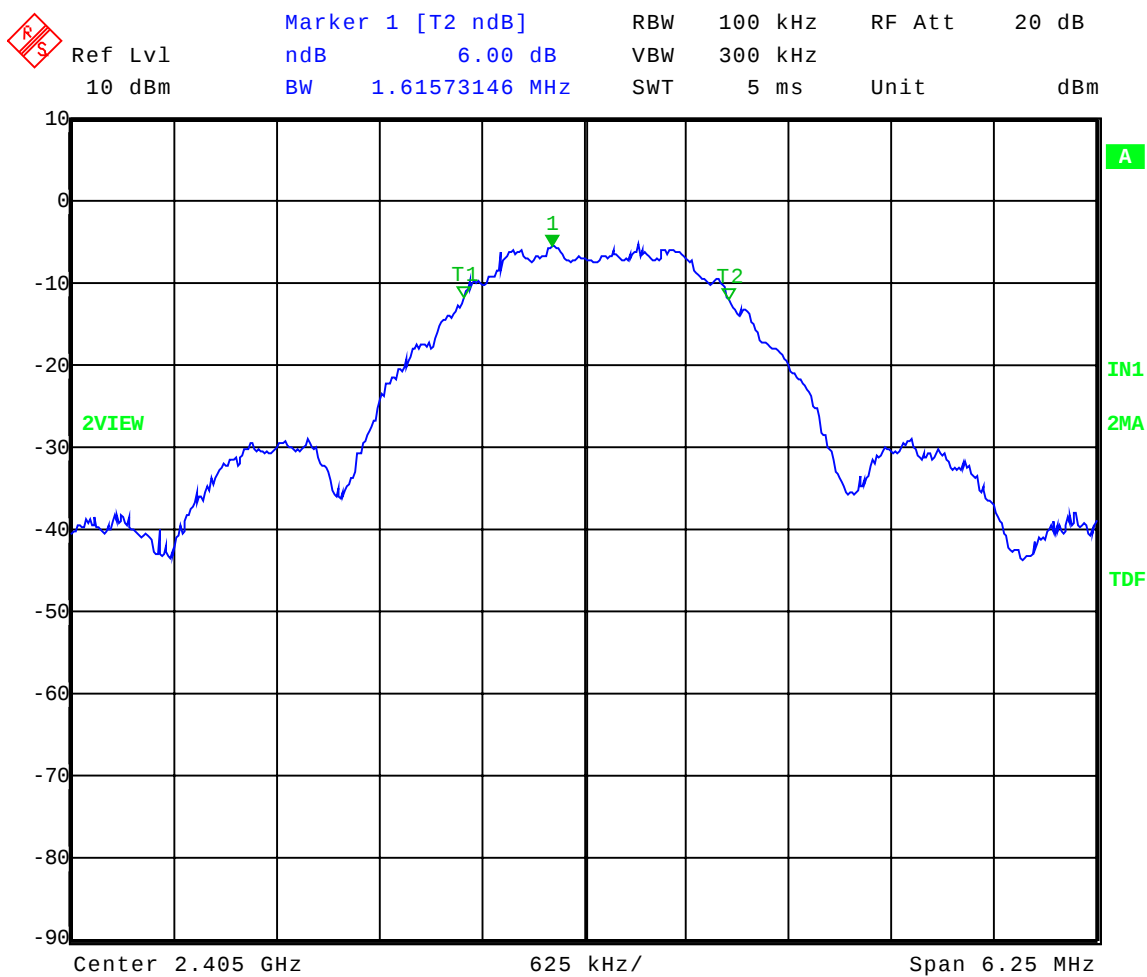


Company: RF Technologies, Inc.
Model Tested: 0800-0285
Report Number: 12318

1250 Peterson Dr., Wheeling, IL 60090

Test Date: 06-22-2006
Company: RF Technologies
EUT: Reset Required Universal Transmitter Model: 0800-0304
Test: 6 dB Bandwidth - Conducted
Operator: Craig Brandt
Comment: Low Channel: Frequency – 2.405 GHz

6 dB Bandwidth = 1.62 MHz



Date: 22.JUN.2006 10:34:45

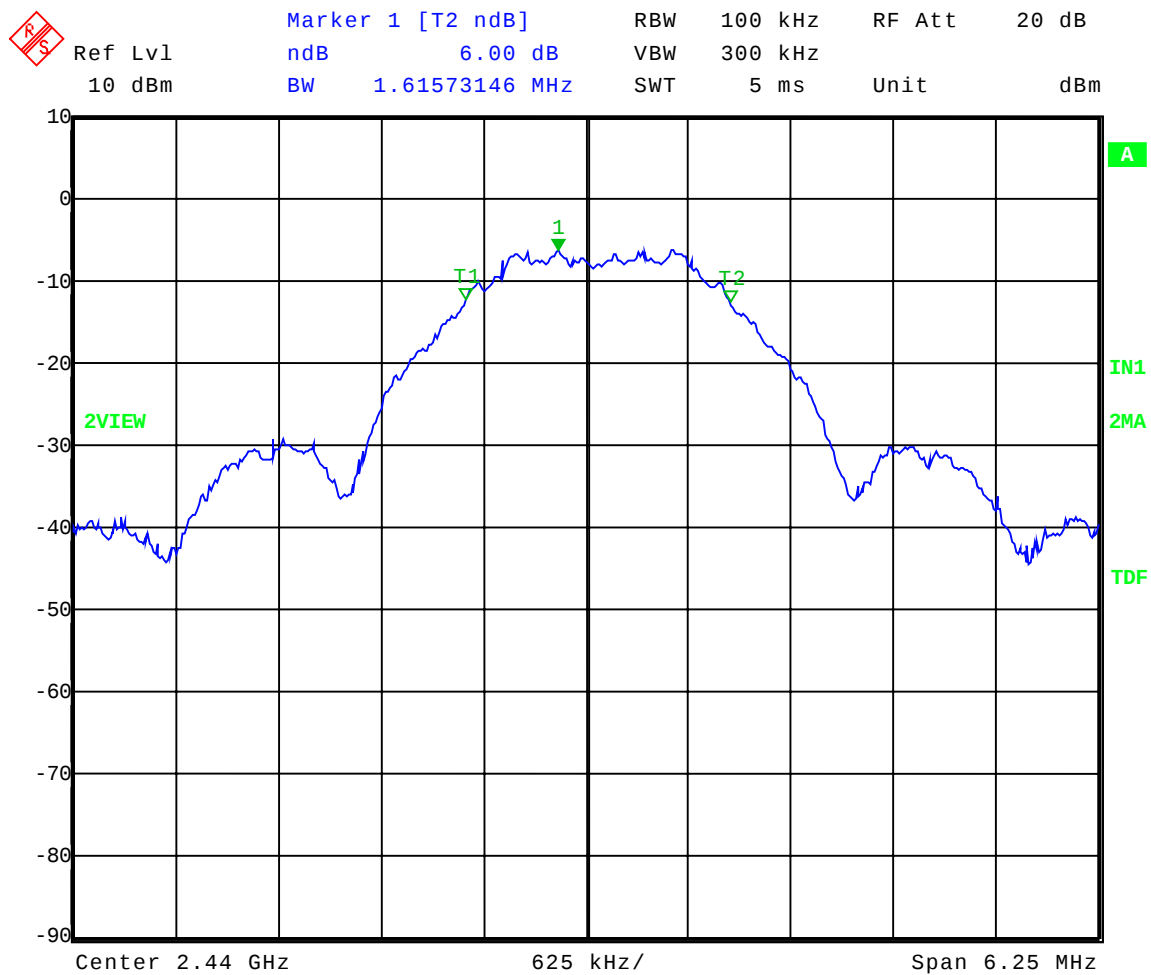


Company: RF Technologies, Inc.
Model Tested: 0800-0285
Report Number: 12318

1250 Peterson Dr., Wheeling, IL 60090

Test Date: 06-22-2006
Company: RF Technologies
EUT: Reset Required Universal Transmitter Model: 0800-0304
Test: 6 dB Bandwidth - Conducted
Operator: Craig Brandt
Comment: Middle Channel: Frequency – 2.440 GHz

6 dB Bandwidth = 1.62 MHz



Date: 22.JUN.2006 10:38:30

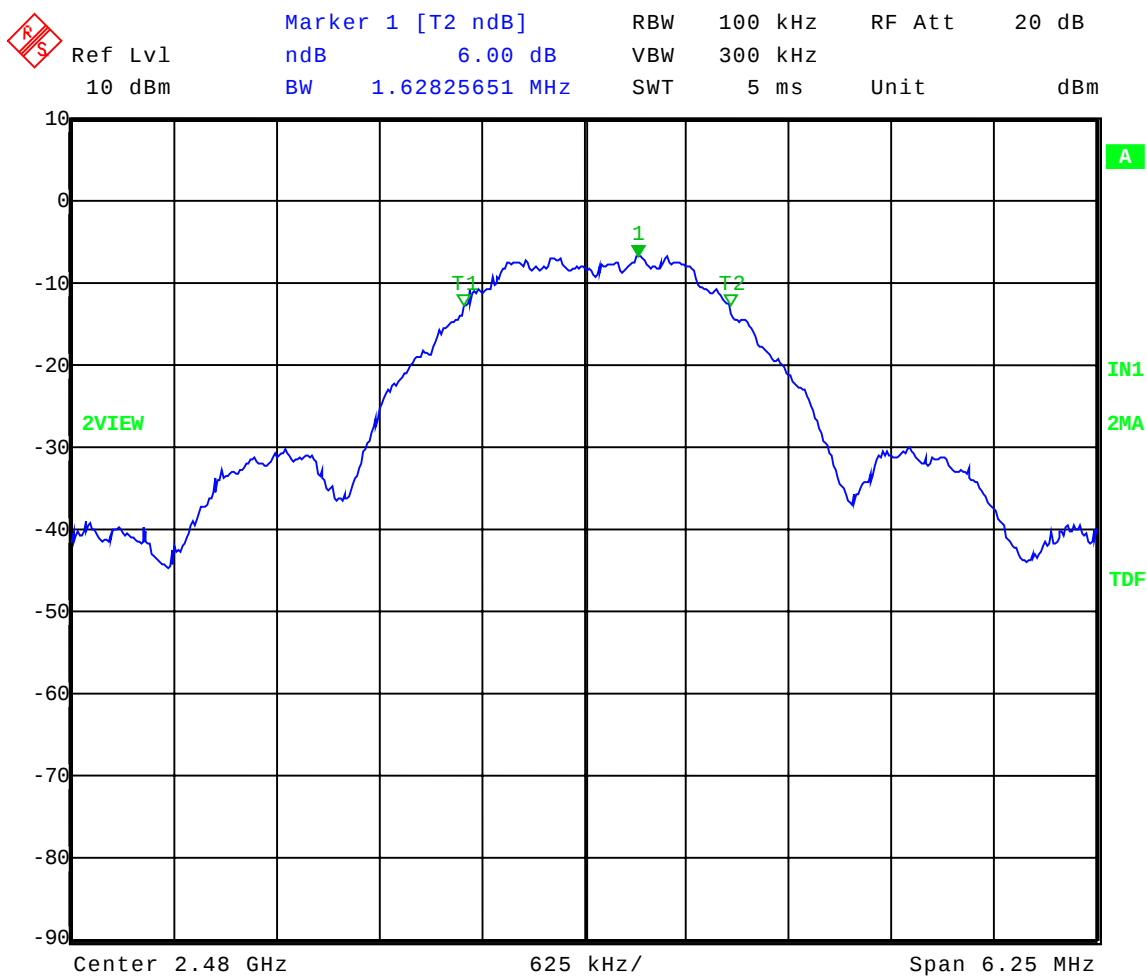


Company: RF Technologies, Inc.
Model Tested: 0800-0285
Report Number: 12318

1250 Peterson Dr., Wheeling, IL 60090

Test Date: 06-22-2006
Company: RF Technologies
EUT: Reset Required Universal Transmitter Model: 0800-0304
Test: 6 dB Bandwidth - Conducted
Operator: Craig Brandt
Comment: High Channel: Frequency – 2.480 GHz

6 dB Bandwidth = 1.63 MHz



Date: 22.JUN.2006 10:41:35



1250 Peterson Dr., Wheeling, IL 60090

Company: RF Technologies, Inc.
Model Tested: 0800-0285
Report Number: 12318

PEAK POWER SPECTRAL DENSITY GRAPH(S)

PART 15.247

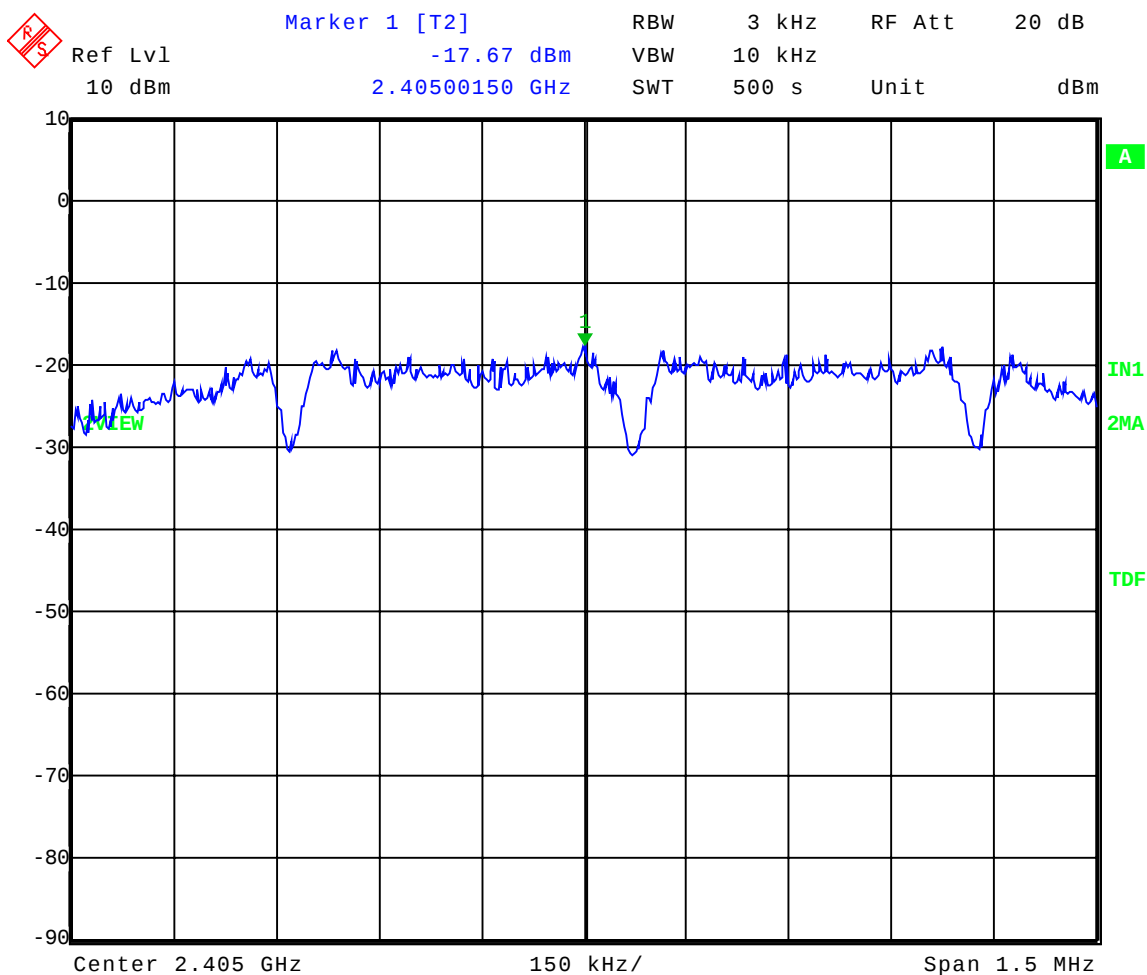


Company: RF Technologies, Inc.
Model Tested: 0800-0285
Report Number: 12318

1250 Peterson Dr., Wheeling, IL 60090

Test Date: 06-22-2006
Company: RF Technologies
EUT: Reset Required Universal Transmitter Model: 0800-0304
Test: Peak Power Spectral Density - Conducted
Operator: Craig Brandt
Comment: Low Channel: Frequency – 2.405 GHz

3 kHz Bandwidth = -17.67 dBm



Date: 22.JUN.2006 11:34:15

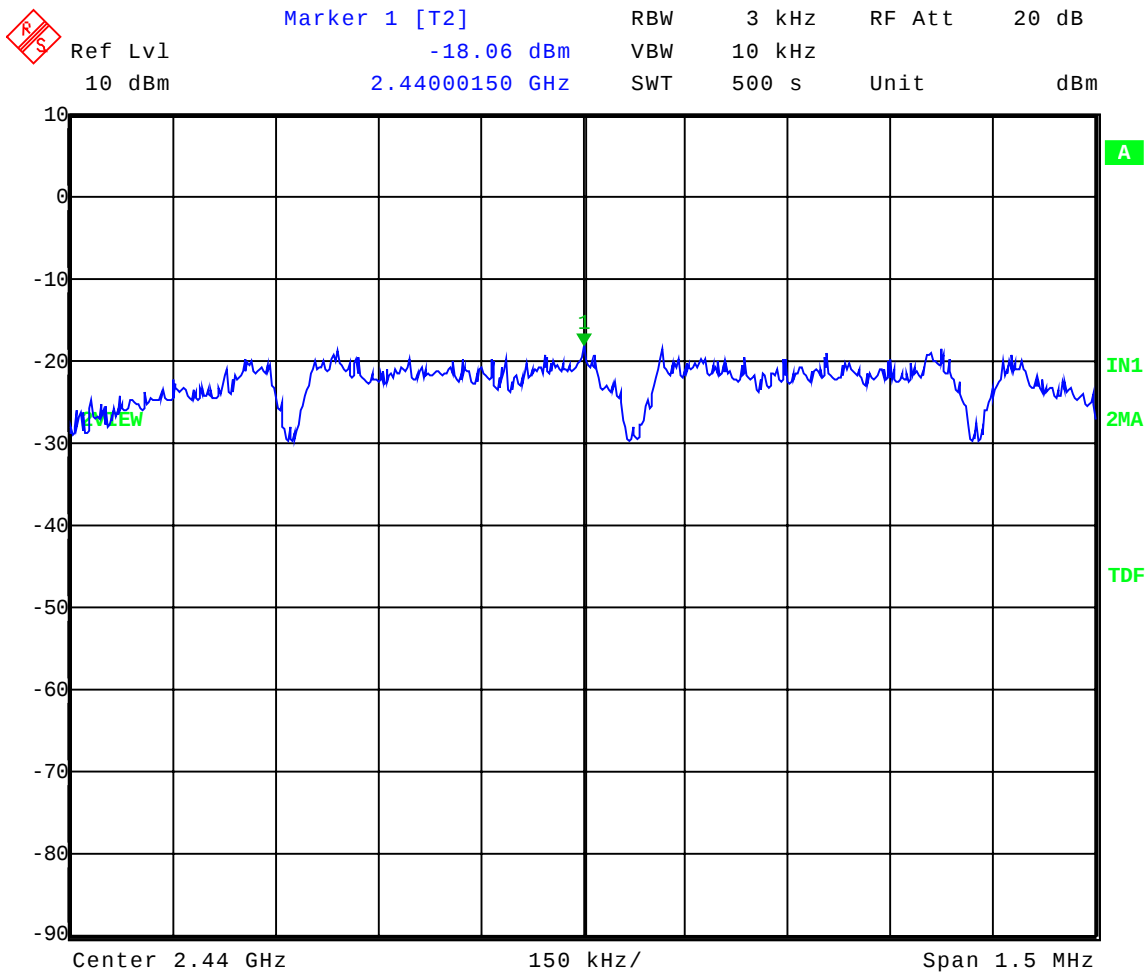


Company: RF Technologies, Inc.
Model Tested: 0800-0285
Report Number: 12318

1250 Peterson Dr., Wheeling, IL 60090

Test Date: 06-22-2006
Company: RF Technologies
EUT: Reset Required Universal Transmitter Model: 0800-0304
Test: Peak Power Spectral Density - Conducted
Operator: Craig Brandt
Comment: Middle Channel: Frequency – 2.440 GHz

3 kHz Bandwidth = -18.06 dBm



Date: 22.JUN.2006 11:13:51

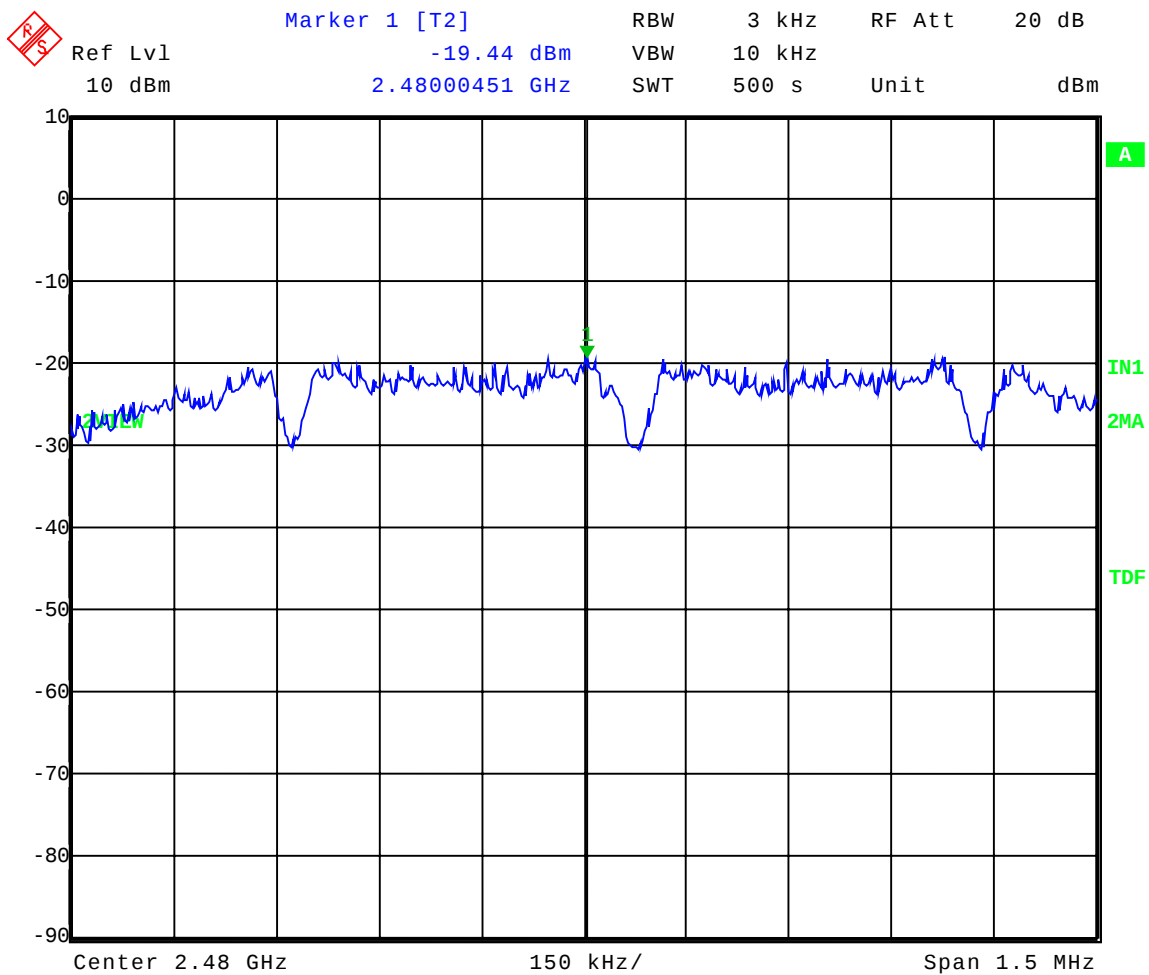


Company: RF Technologies, Inc.
Model Tested: 0800-0285
Report Number: 12318

1250 Peterson Dr., Wheeling, IL 60090

Test Date: 06-22-2006
Company: RF Technologies
EUT: Reset Required Universal Transmitter Model: 0800-0304
Test: Peak Power Spectral Density - Conducted
Operator: Craig Brandt
Comment: High Channel: Frequency – 2.480 GHz

3 kHz Bandwidth = -19.44 dBm



Date: 22.JUN.2006 11:24:08



1250 Peterson Dr., Wheeling, IL 60090

Company: RF Technologies, Inc.
Model Tested: 0800-0285
Report Number: 12318

NUMBER OF IEEE 802.15.4 ZIGBEE FREQUENCIES

PART 15.247



Company: RF Technologies, Inc.
Model Tested: 0800-0285
Report Number: 12318

1250 Peterson Dr., Wheeling, IL 60090

***RFT*TECHNOLOGIES™**

3125 N. 126th St. Brookfield, WI 53005
1-800-669-9946 Ph: 262-790-1771
Fx: 262-790-1784
info@rft.com
www.rft.com

Product Name:	Reset Required Universal Transmitter
Owner:	RF Technologies, Inc.
Owner Model Number:	0800-0304
FCC ID Number:	KXU-UNVFSZ24
Canadian ID Number:	2719A-UNVFSZ24

List of 16 frequencies (channels) used by the RF Technologies Universal Transmitter.

All Zigbee radios use IEEE 802.15.4, which specifies the 16 channels to use. They start at 2405 MHz and are separated by 5 MHz. Therefore the channels are as follows:

2405
2410
2415
2420
2425
2430
2435
2440
2445
2450
2455
2460
2465
2470
2475
2480



1250 Peterson Dr., Wheeling, IL 60090

Company: RF Technologies, Inc.
Model Tested: 0800-0285
Report Number: 12318

TIME OF OCCUPANCY GRAPHS

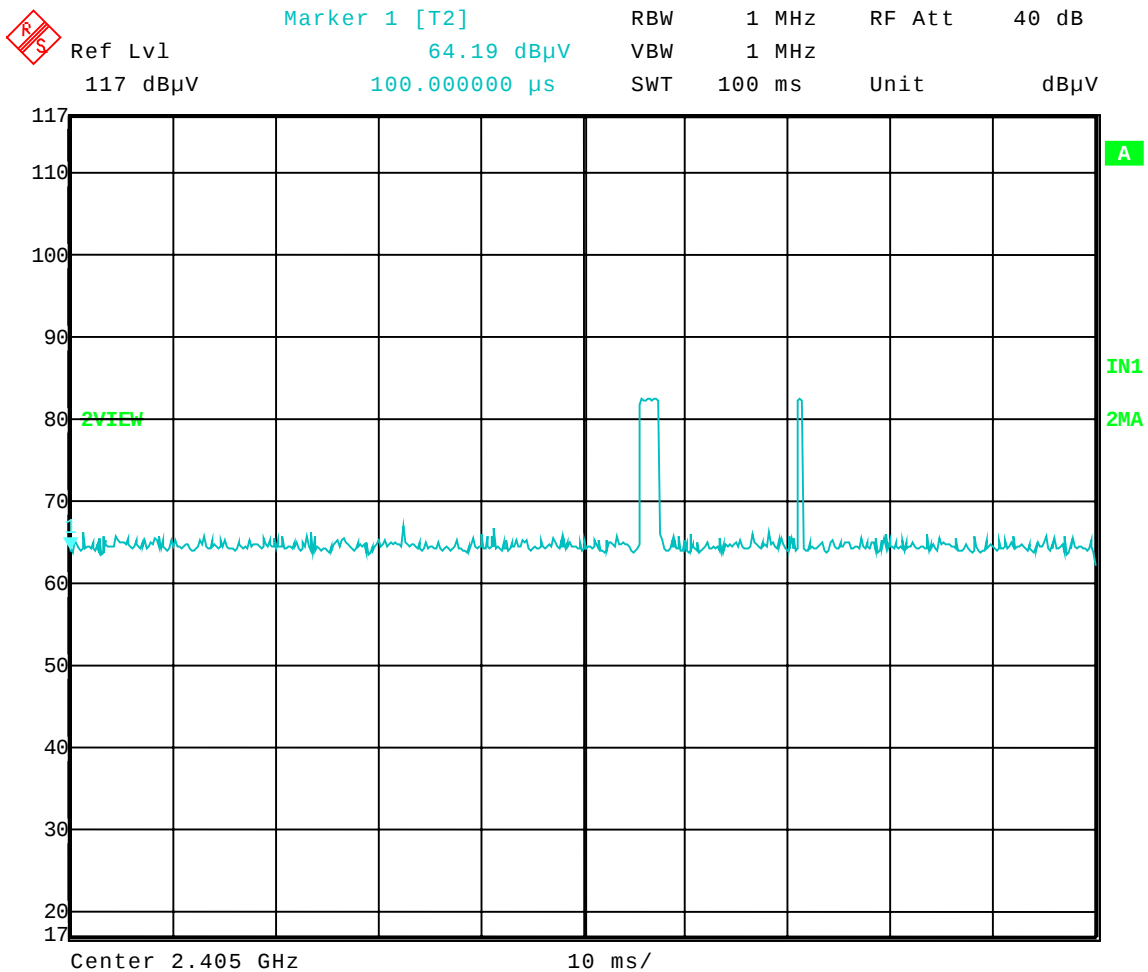
PART 15.247



Company: RF Technologies, Inc.
Model Tested: 0800-0285
Report Number: 12318

1250 Peterson Dr., Wheeling, IL 60090

Test Date: 06-19-2006
Company: RF Technologies
EUT: Reset Required Universal Transmitter Model: 0800-0304
Test: Duty Cycle
Operator: Craig Brandt
Comment: Small Pulse – 1 x 681.363 μ s = 0.681363 ms
Large Pulse – 1 x 2.044088 ms = 2.044088 ms
Total on Time = 2.73 ms during 100 ms Sweep
20 log (2.73/100) = -31.2
Duty Cycle Correction Factor = 31.2 dB



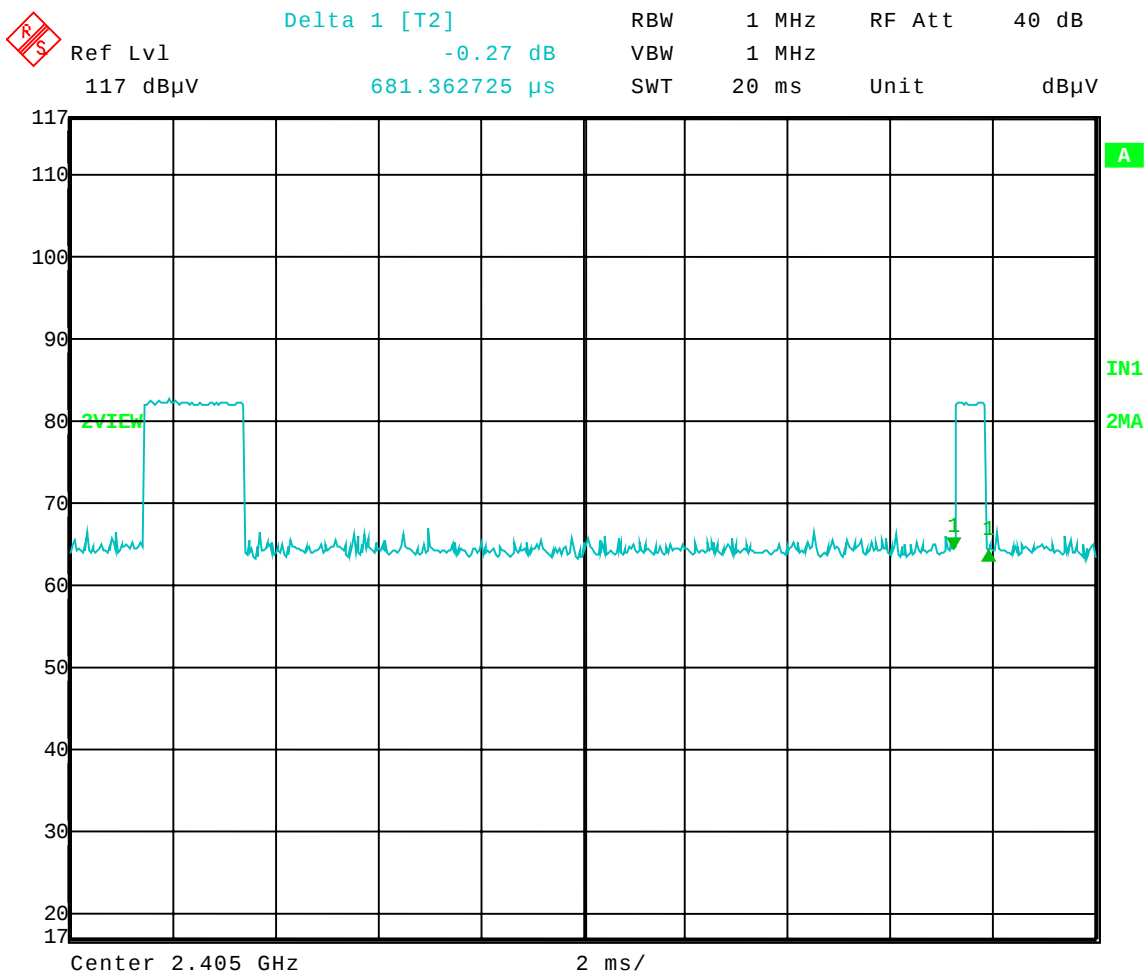
Date: 19.JUN.2006 15:22:37



Company: RF Technologies, Inc.
Model Tested: 0800-0285
Report Number: 12318

1250 Peterson Dr., Wheeling, IL 60090

Test Date: 06-19-2006
Company: RF Technologies
EUT: Reset Required Universal Transmitter Model: 0800-0304
Test: Duty Cycle
Operator: Craig Brandt
Comment: Small Pulse On Time



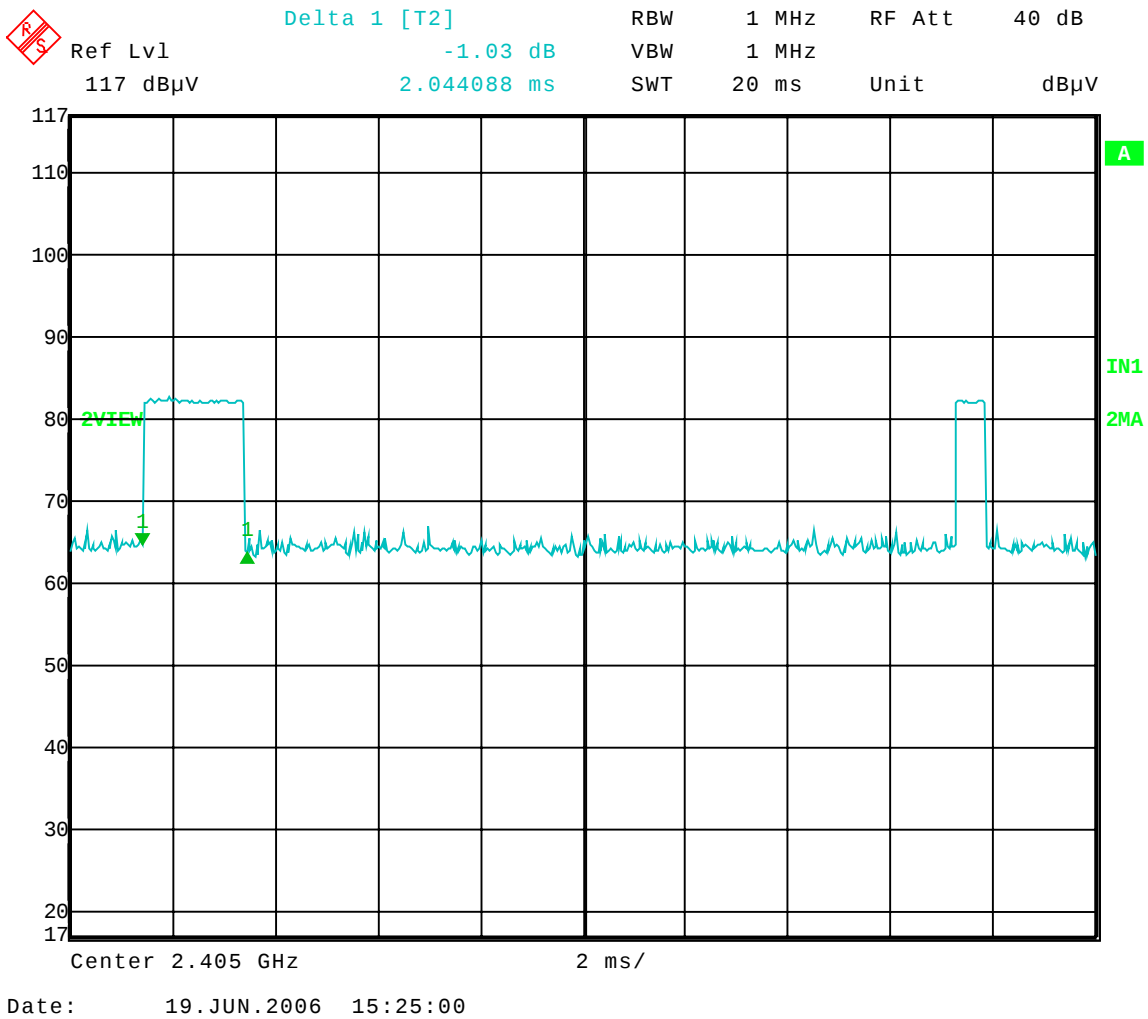
Date: 19.JUN.2006 15:25:46



Company: RF Technologies, Inc.
Model Tested: 0800-0285
Report Number: 12318

1250 Peterson Dr., Wheeling, IL 60090

Test Date: 06-19-2006
Company: RF Technologies
EUT: Reset Required Universal Transmitter Model: 0800-0304
Test: Duty Cycle
Operator: Craig Brandt
Comment: Large Pulse On Time





1250 Peterson Dr., Wheeling, IL 60090

Company: RF Technologies, Inc.
Model Tested: 0800-0285
Report Number: 12318

CONDUCTED PEAK OUTPUT POWER GRAPHS

PART 15.247

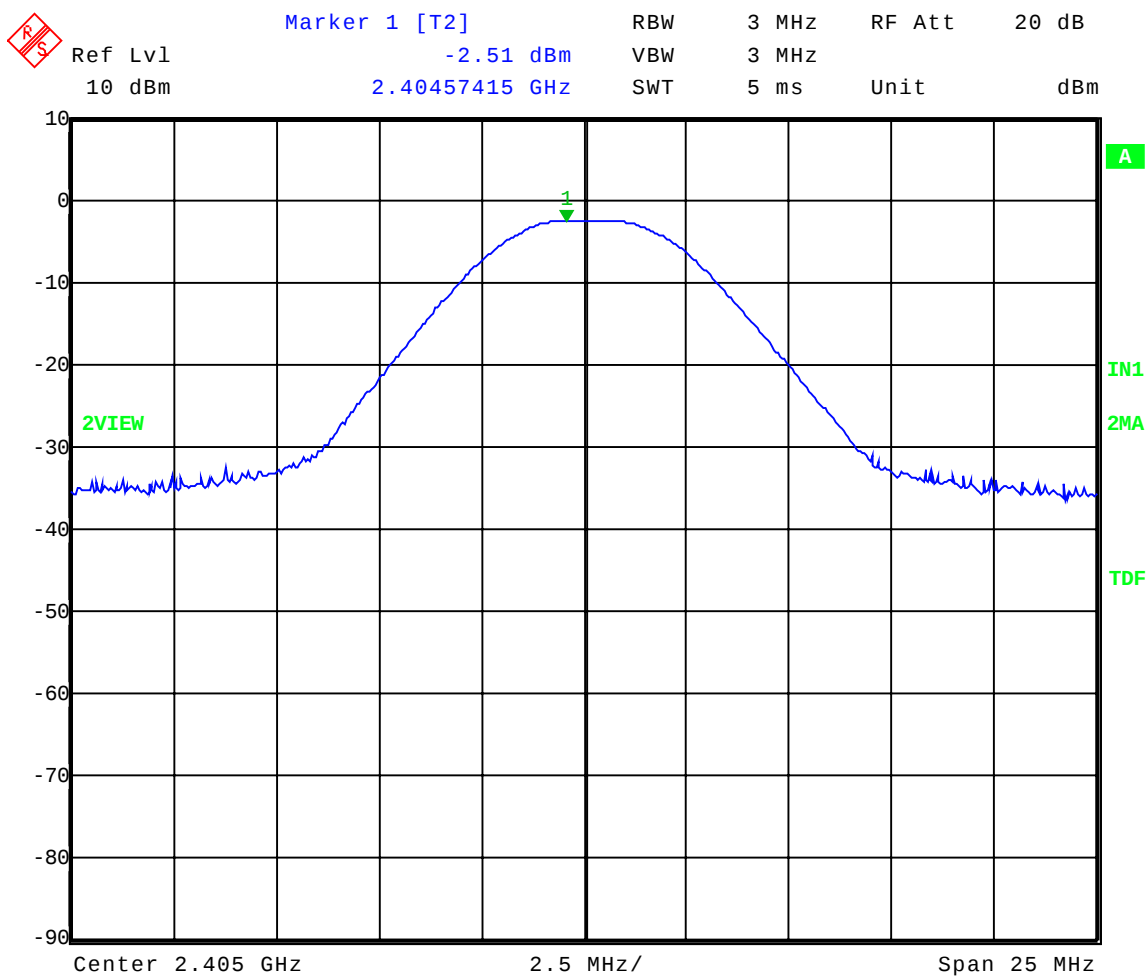


Company: RF Technologies, Inc.
Model Tested: 0800-0285
Report Number: 12318

1250 Peterson Dr., Wheeling, IL 60090

Test Date: 06-22-2006
Company: RF Technologies
EUT: Reset Required Universal Transmitter Model: 0800-0304
Test: Peak Power Output - Conducted
Operator: Craig Brandt
Comment: Low Channel: Frequency – 2.405 GHz

Peak Output Power = -2.51 dBm = 0.56 mW



Date: 22.JUN.2006 10:54:48

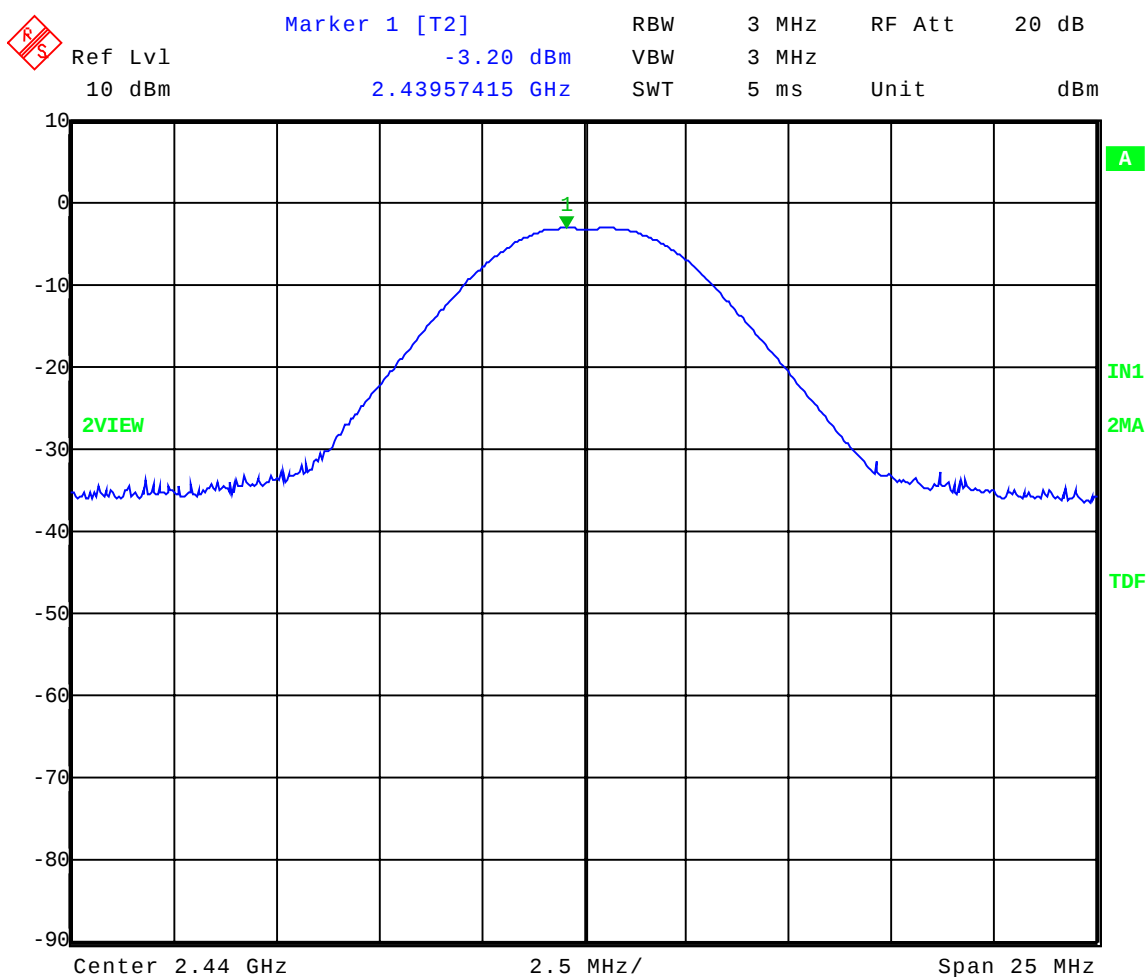


Company: RF Technologies, Inc.
Model Tested: 0800-0285
Report Number: 12318

1250 Peterson Dr., Wheeling, IL 60090

Test Date: 06-22-2006
Company: RF Technologies
EUT: Reset Required Universal Transmitter Model: 0800-0304
Test: Peak Power Output - Conducted
Operator: Craig Brandt
Comment: Middle Channel: Frequency – 2.440 GHz

Peak Output Power = -3.20 dBm = 0.48 mW



Date: 22.JUN.2006 10:59:50

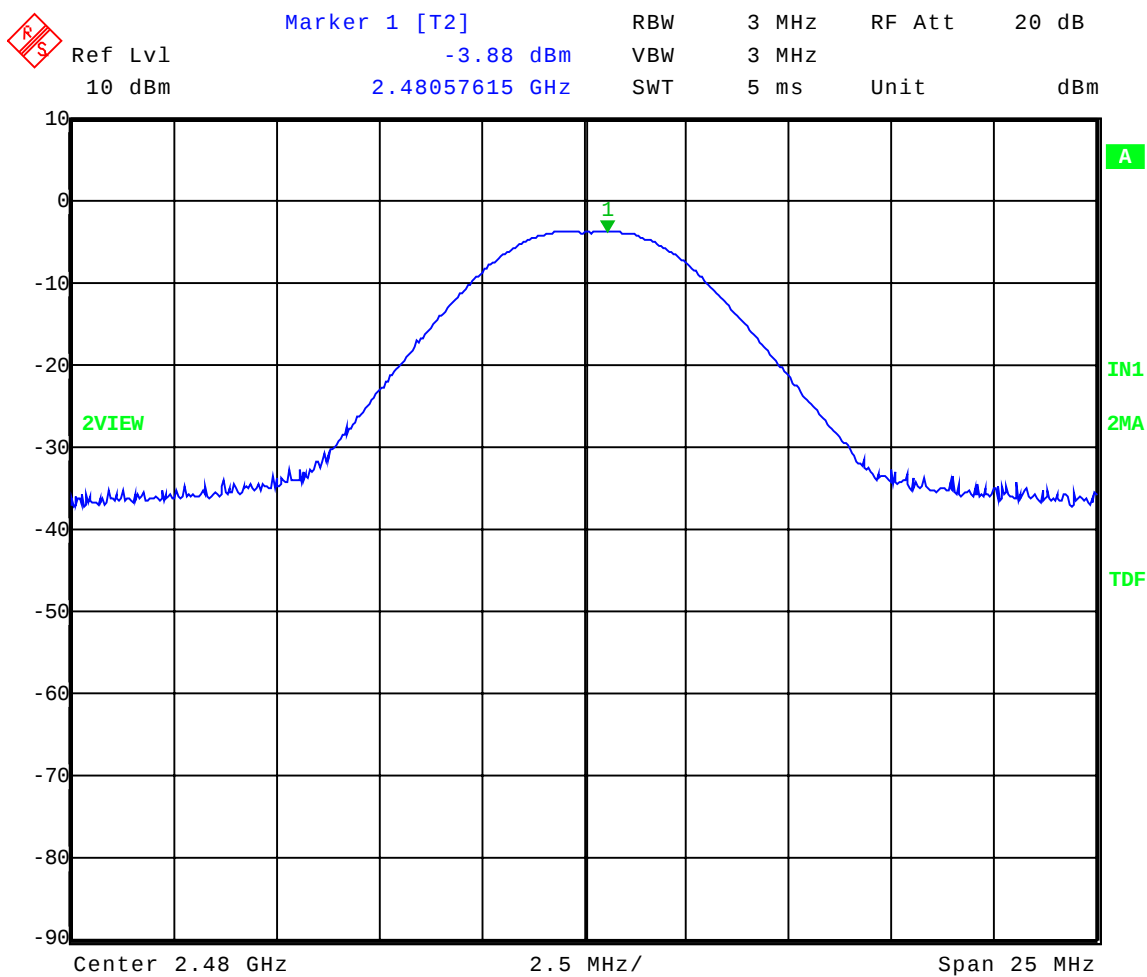


Company: RF Technologies, Inc.
Model Tested: 0800-0285
Report Number: 12318

1250 Peterson Dr., Wheeling, IL 60090

Test Date: 06-22-2006
Company: RF Technologies
EUT: Reset Required Universal Transmitter Model: 0800-0304
Test: Peak Power Output - Conducted
Operator: Craig Brandt
Comment: High Channel: Frequency – 2.480 GHz

Peak Output Power = -3.88 dBm = 0.41 mW



Date: 22.JUN.2006 10:45:59