



1250 Peterson Dr., Wheeling, IL 60090

Company: RF Technologies, Inc.  
Model Tested: 0800-0302  
Report Number: 12906

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

AND

FCC Rules and Regulations / Intentional Radiators

General Requirements

Part 15, Subpart B, Section 15.207 & 15.209

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

Formal Name: Asset Security Transceiver, 262 kHz  
Kind of Equipment: Nurse Call and Security Device  
Test Configuration: Wireless Connection (Tested at 3 vdc)  
Model Number(s): 0800-0302  
Model(s) Tested: 0800-0302  
Serial Number(s): N/A  
Date of Tests: January 9, 10 & 26, 2007  
Test Conducted For: RF Technologies, Inc.  
3125 North 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: 0800-0302  
Report Number: 12906

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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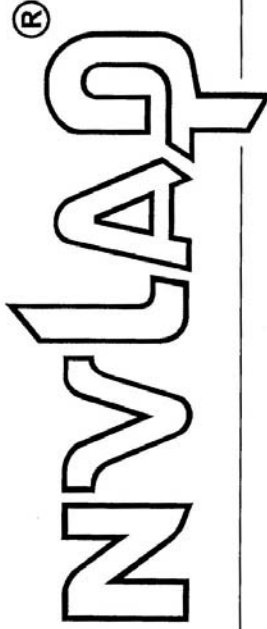
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United States Department of Commerce  
National Institute of Standards and Technology



# 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 17025:1999.  
Accreditation is granted for specific services, listed on the Scope of Accreditation, for:

**ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS**



2006-10-01 through 2007-09-30

Effective dates

*Sally S. Buce*  
For the National Institute of Standards and Technology

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



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Company: RF Technologies, Inc.  
Model Tested: 0800-0302  
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## 1.0 SUMMARY OF TEST REPORT

It was found that the Asset Security Transceiver, 262 kHz, Model Number(s) 0800-0302, "**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 Asset Security Transceiver, 262 kHz 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: 79

## 2.0 INTRODUCTION

On January 9, 10 & 26, 2007, a series of radio frequency interference measurements was performed on Asset Security Transceiver, 262 kHz, Model Number(s) 0800-0302, Serial Number: N/A. 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 than can placed upon an asset to allow facility movement regulation and tracking of that asset. The test sample can transmit at low frequency, 262 kHz to a portal receiver which can initiate doors locking, set off alarms or signal caregivers or that an asset is being removed from a controlled area. In addition the test sample within a mesh network or receivers can give relative position, presence at a location and low battery indication.

7.2 PHYSICAL DIMENSIONS OF EQUIPMENT UNDER TEST

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

7.3 LINE FILTER USED:

N/A

7.4 INTERNAL CLOCK FREQUENCIES:

Switching Power Supply Frequencies:

N/A

Clock Frequencies:

32 MHz

7.5 DESCRIPTION OF ALL CIRCUIT BOARDS:

1. ZigBee Universal Tx PCB Assm., No Wires, 262 kHz  
Coils, Chipcon

PN: 0830-0051 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 continuous transmit from 2405 MHz - 2480 MHz, with Low, Mid & High Channels and with the low frequency transmitter transmitting at 262 kHz.

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



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## 9.0 PHOTO INFORMATION AND TEST SET-UP

Item 0 Asset Security Transceiver, 262 kHz  
Model Number: 0800-0302 Serial Number: N/A



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## 10.0 RADIATED PHOTOS TAKEN DURING TESTING

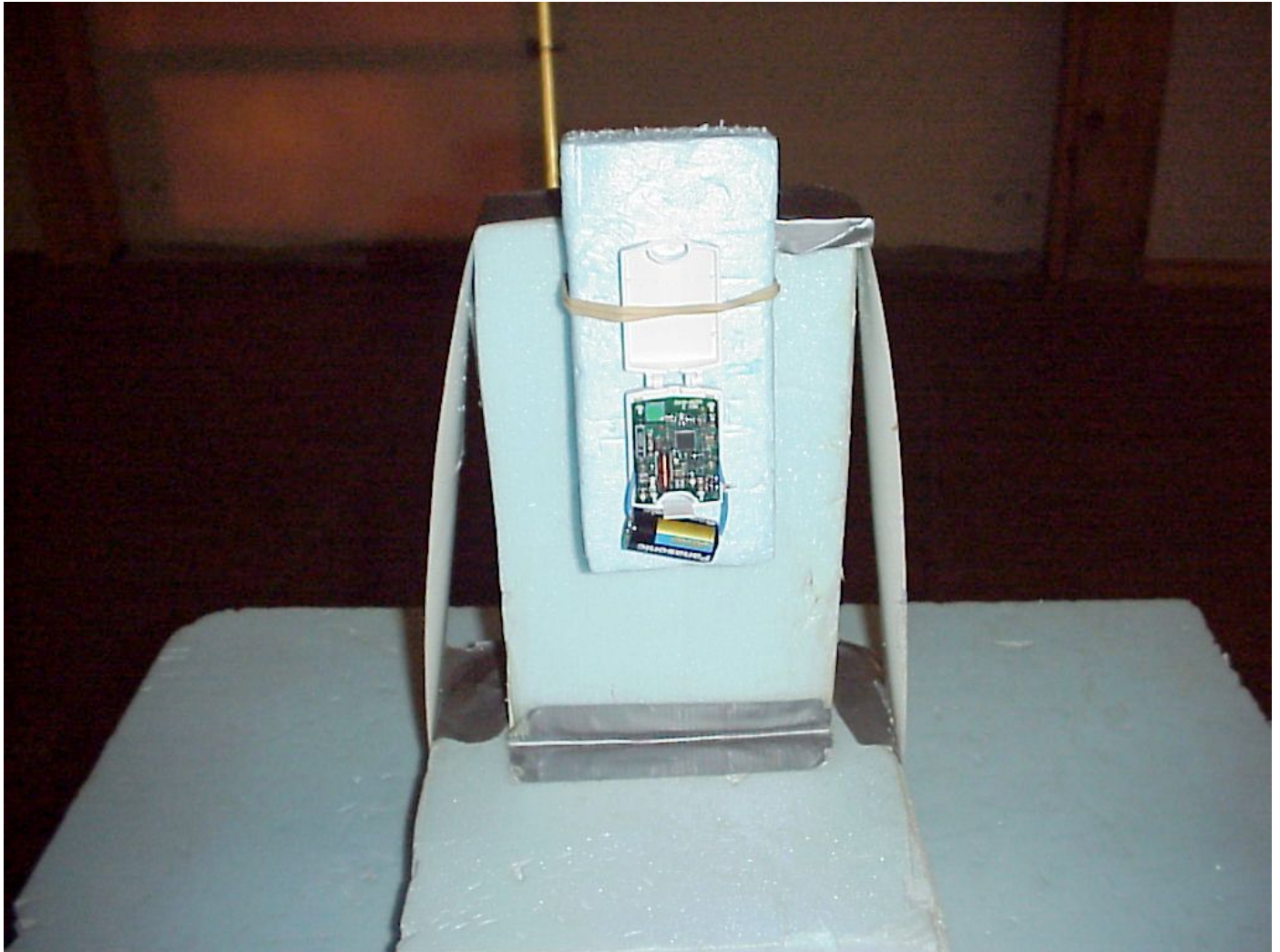




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## 10.0 RADIATED PHOTOS TAKEN DURING TESTING





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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 Asset Security Transceiver, 262 kHz, Model Number(s) 0800-0302 "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 Asset Security Transceiver, 262 kHz 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

<b>Test Equipment</b>	<b>Manufacturer</b>	<b>Model Number</b>	<b>Serial Number</b>	<b>Frequency Range</b>	<b>Cal Due Dates</b>
Receiver	Rohde & Schwarz	ESI 26	837491/010	20 Hz – 26 GHz	11/07
Receiver	Rohde & Schwarz	ESI 40	837808/006	20 Hz – 40 GHz	12/07
Receiver	Rohde & Schwarz	ESI 40	837808/005	20 Hz – 40 GHz	12/07
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	8/07
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	8/07

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



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TABLE 1 – EQUIPMENT LIST

<b>Test Equipment</b>	<b>Manufacturer</b>	<b>Model Number</b>	<b>Serial Number</b>	<b>Frequency Range</b>	<b>Cal Due Dates</b>
LISN	Solar	8012-50-R-24-BNC	8305116	10 MHz – 30 MHz	8/07
LISN	Solar	8012-50-R-24-BNC	814548	10 MHz – 30 MHz	8/07
LISN	Solar	9252-50-R-24-BNC	961019	10 MHz – 30 MHz	12/07
LISN	Solar	9252-50-R-24-BNC	971612	10 MHz – 30 MHz	10/07
LISN	Solar	9252-50-R-24-BNC	92710620	10 MHz – 30 MHz	7/07

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.

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

**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 10<sup>th</sup> harmonic of the fundamental.

The allowed emissions for transmitters operating in the 2400 MHz - 2483.5 MHz bands for Asset Security Transceiver, 262 kHz 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: See the following pages for the data ad graphs of the actual measurements made:**



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CONDUCTED EMISSION DATA AND GRAPH(S)

TAKEN FOR

SPURIOUS EMISSION MEASUREMENTS MADE

AT THE ANTENNA TERMINALS

PART 15.247(c)



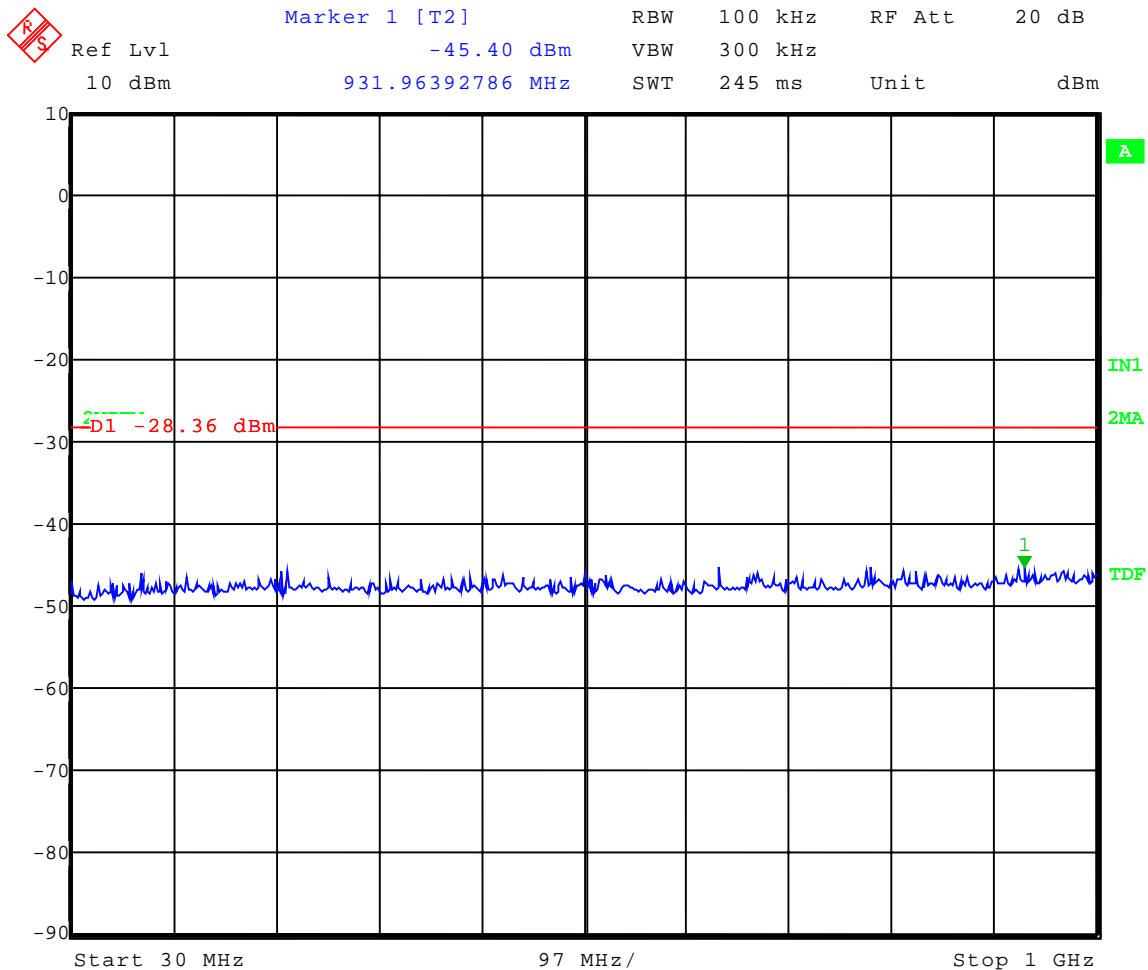
Company: RF Technologies, Inc.  
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### APPENDIX A

Test Date: 01-09-2007  
Company: RF Technologies  
EUT: ZigBee Asset Security Transceiver Model: 0800-0286 and 0800-0302  
Test: Spurious Emissions - Conducted  
Operator: Jason Lauer  
Comment: **Low Channel** Transmit = 2.405 GHz  
Frequency Range: **30 to 1000 MHz**  
Limit = -28.36 dBm

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



Date: 9.JAN.2007 12:21:56



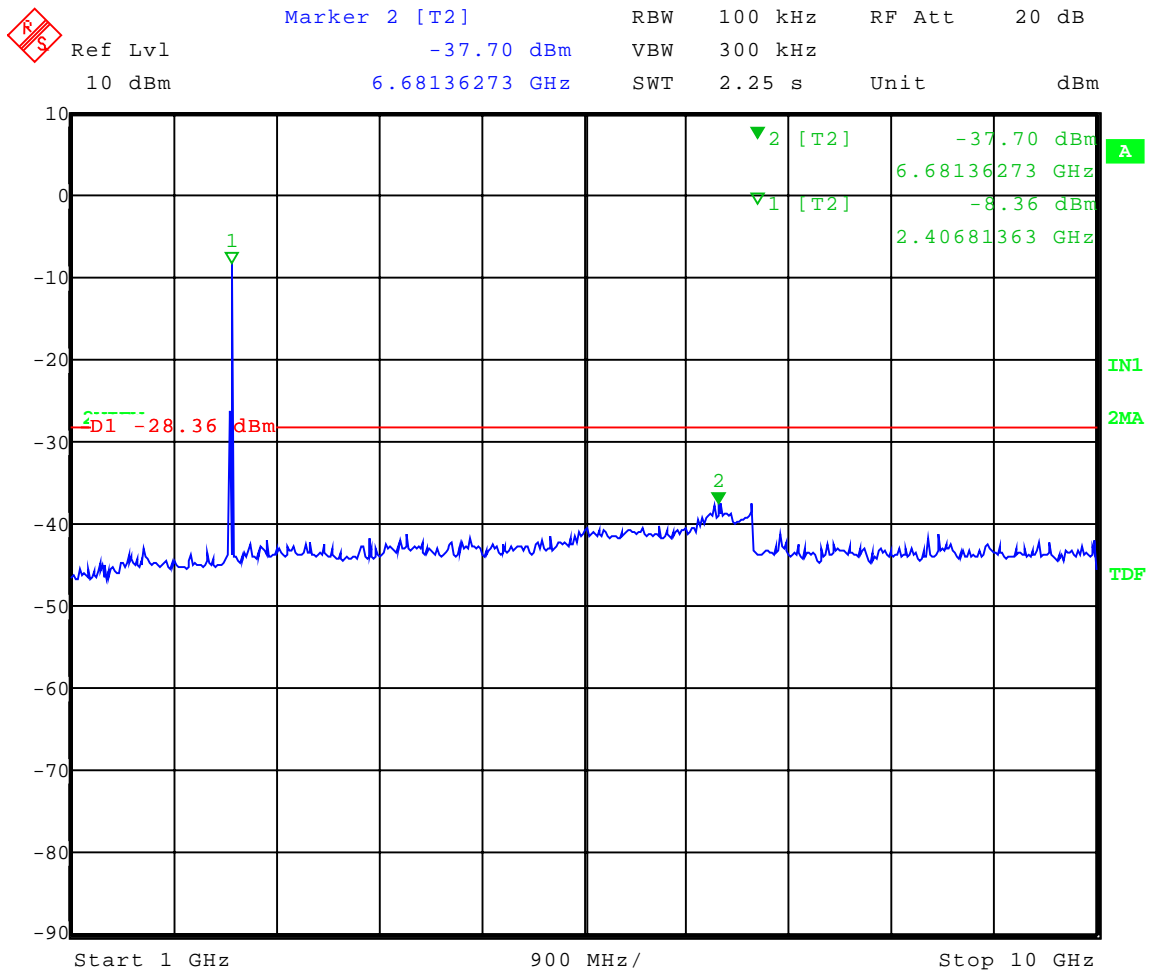
Company: RF Technologies, Inc.  
 Model Tested: 0800-0302  
 Report Number: 12906

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APPENDIX A

Test Date: 01-09-2007  
 Company: RF Technologies  
 EUT: ZigBee Asset Security Transceiver Model: 0800-0286 and 0800-0302  
 Test: Spurious Emissions - Conducted  
 Operator: Jason Lauer  
 Comment: Low Channel Transmit = 2.405 GHz  
 Frequency Range: 1 to 10 GHz  
 Limit = -28.36 dBm

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



Date: 9.JAN.2007 12:17:59



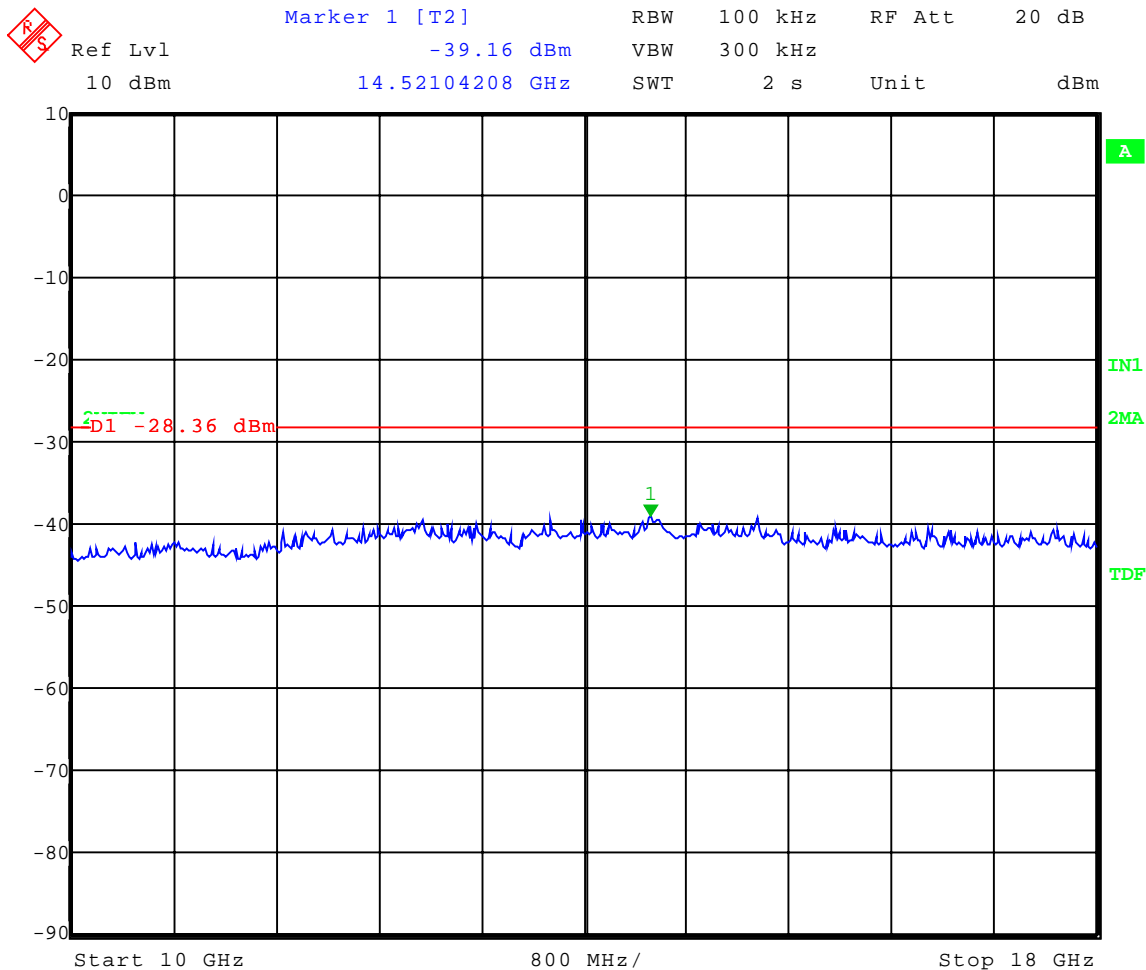
Company: RF Technologies, Inc.  
Model Tested: 0800-0302  
Report Number: 12906

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### APPENDIX A

Test Date: 01-09-2007  
Company: RF Technologies  
EUT: ZigBee Asset Security Transceiver Model: 0800-0286 and 0800-0302  
Test: Spurious Emissions - Conducted  
Operator: Jason Lauer  
Comment: **Low Channel** Transmit = 2.405 GHz  
Frequency Range: **10 to 18 GHz**  
Limit = -28.36 dBm

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



Date: 9.JAN.2007 12:19:40



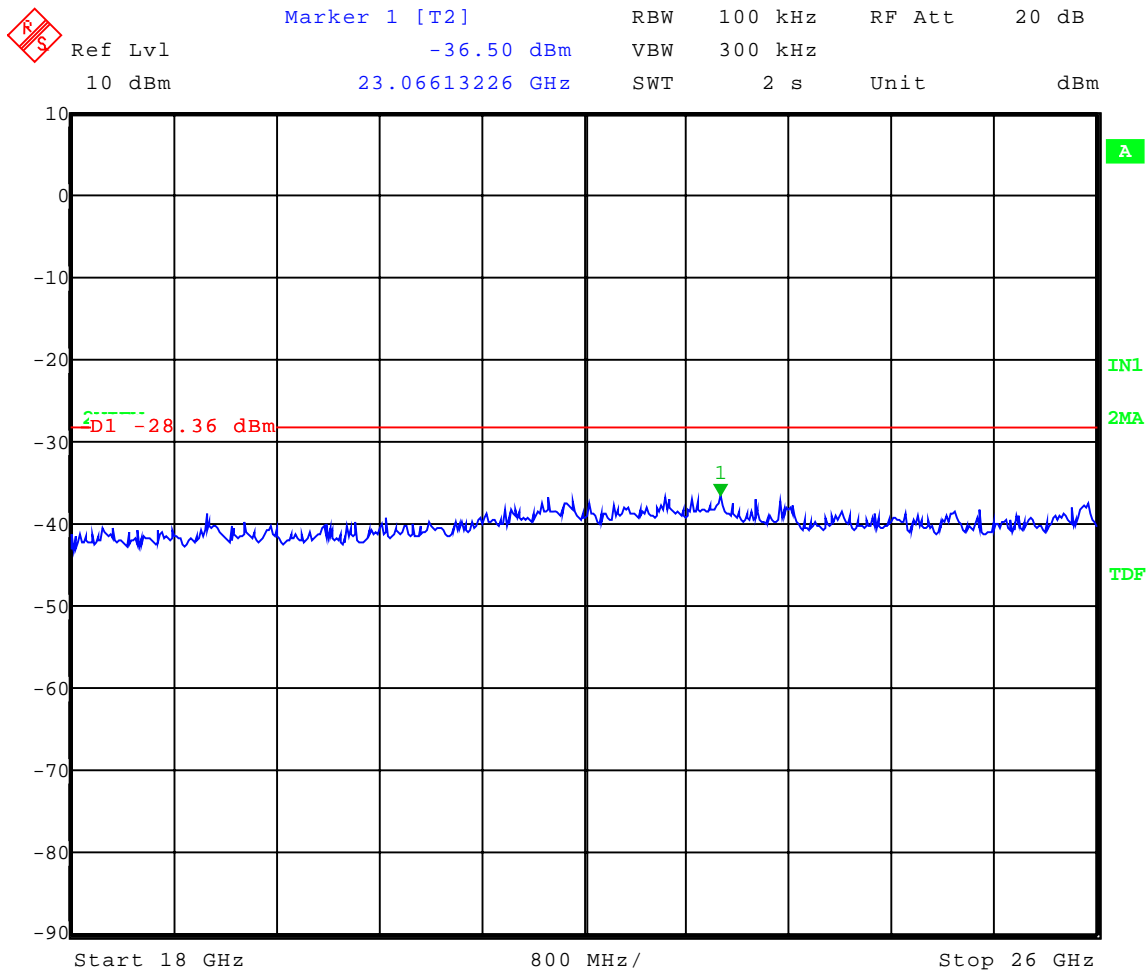
Company: RF Technologies, Inc.  
Model Tested: 0800-0302  
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### APPENDIX A

Test Date: 01-09-2007  
Company: RF Technologies  
EUT: ZigBee Asset Security Transceiver Model: 0800-0286 and 0800-0302  
Test: Spurious Emissions - Conducted  
Operator: Jason Lauer  
Comment: **Low Channel** Transmit = 2.405 GHz  
Frequency Range: **18 to 26 GHz**  
Limit = -28.36 dBm

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



Date: 9.JAN.2007 12:20:52





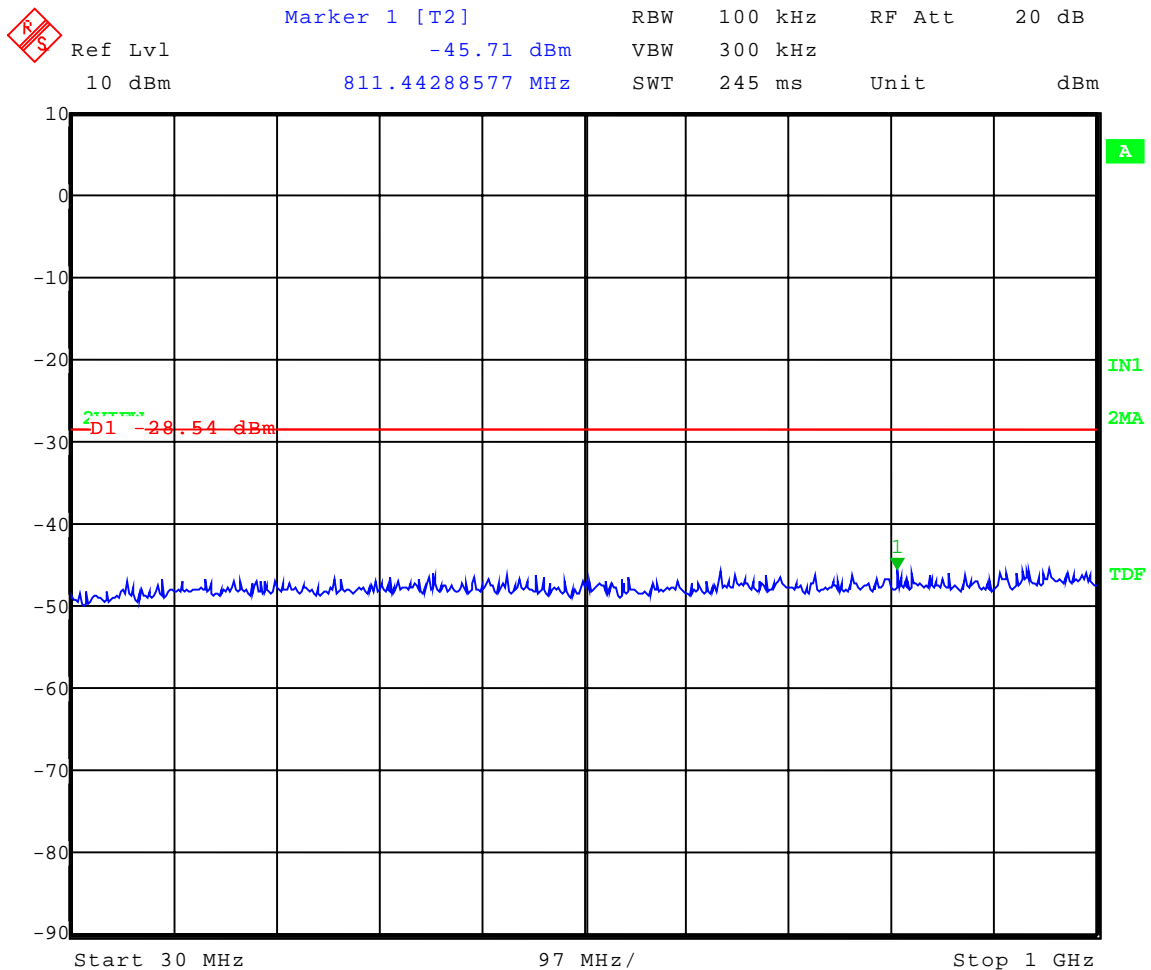
Company: RF Technologies, Inc.  
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APPENDIX A

Test Date: 01-09-2007  
 Company: RF Technologies  
 EUT: ZigBee Asset Security Transceiver Model: 0800-0286 and 0800-0302  
 Test: Spurious Emissions - Conducted  
 Operator: Jason Lauer  
 Comment: Middle Channel Transmit = 2.440 GHz  
 Frequency Range: 30 to 1000 MHz  
 Limit = -28.54 dBm

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



Date: 9.JAN.2007 12:28:29



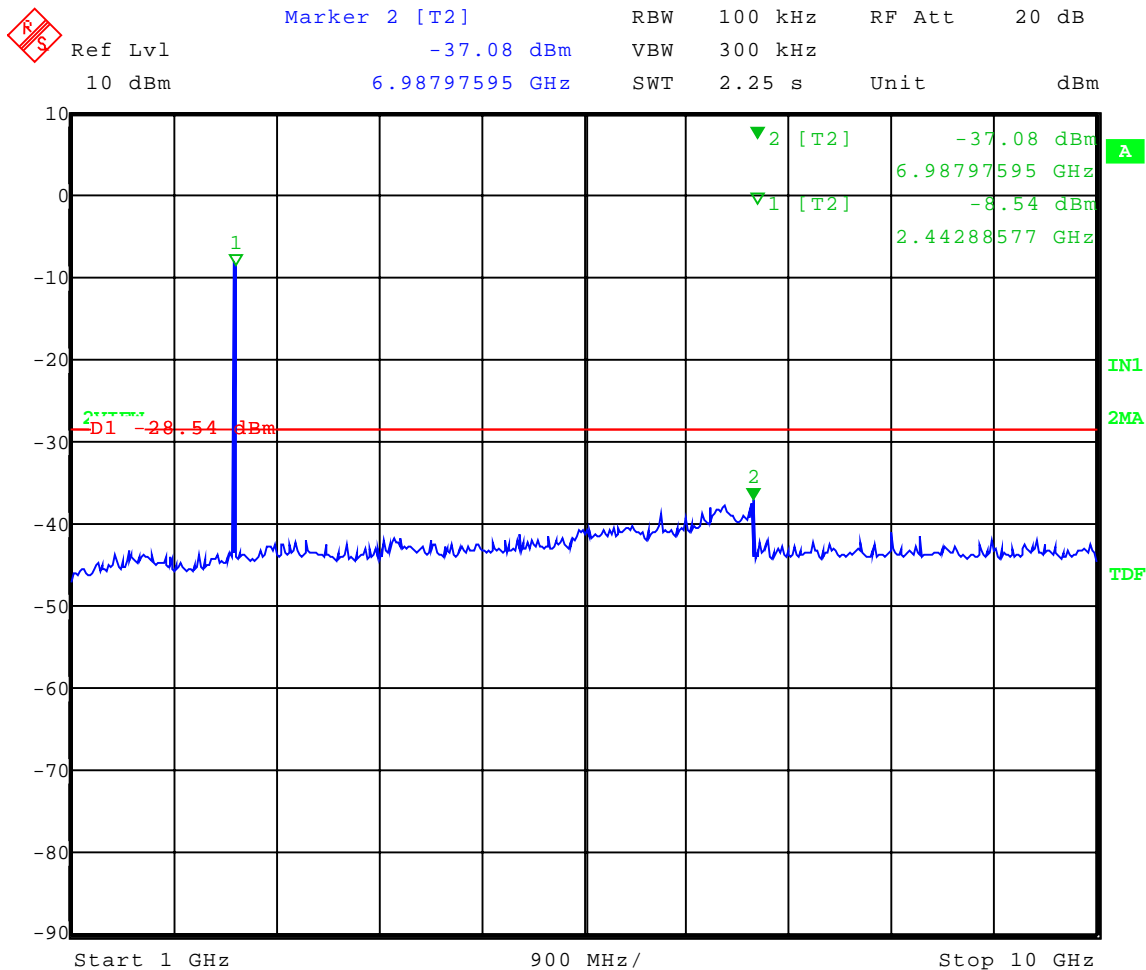
Company: RF Technologies, Inc.  
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APPENDIX A

Test Date: 01-09-2007  
 Company: RF Technologies  
 EUT: ZigBee Asset Security Transceiver Model: 0800-0286 and 0800-0302  
 Test: Spurious Emissions - Conducted  
 Operator: Jason Lauer  
 Comment: Middle Channel Transmit = 2.440 GHz  
 Frequency Range: 1 to 10 GHz  
 Limit = -28.54 dBm

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



Date: 9.JAN.2007 12:24:26



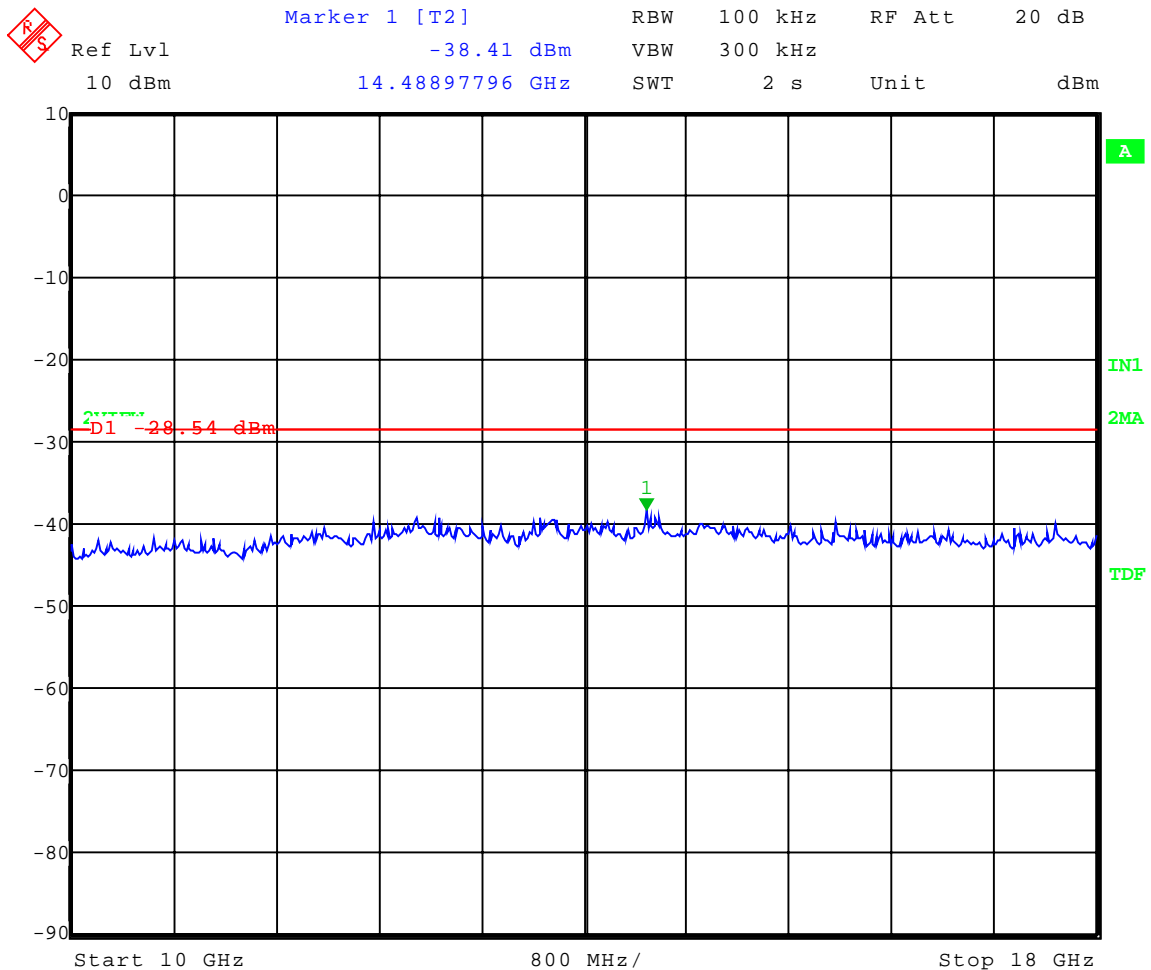
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Test Date: 01-09-2007  
 Company: RF Technologies  
 EUT: ZigBee Asset Security Transceiver Model: 0800-0286 and 0800-0302  
 Test: Spurious Emissions - Conducted  
 Operator: Jason Lauer  
 Comment: Middle Channel Transmit = 2.440 GHz  
 Frequency Range: 10 to 18 GHz  
 Limit = -28.54 dBm

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



Date: 9.JAN.2007 12:26:04



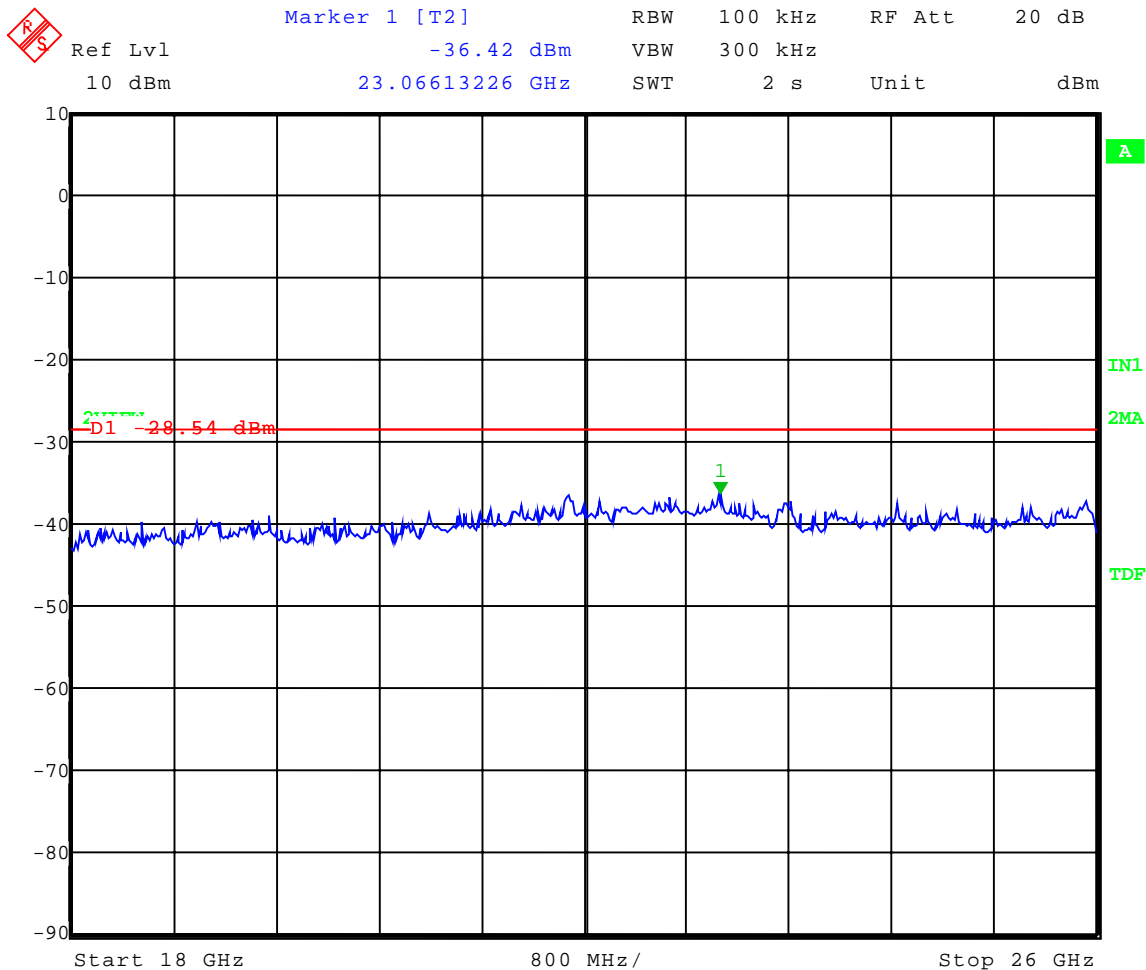
Company: RF Technologies, Inc.  
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### APPENDIX A

Test Date: 01-09-2007  
Company: RF Technologies  
EUT: ZigBee Asset Security Transceiver Model: 0800-0286 and 0800-0302  
Test: Spurious Emissions - Conducted  
Operator: Jason Lauer  
Comment: Middle Channel Transmit = 2.440 GHz  
Frequency Range: 18 to 26 GHz  
Limit = -28.54 dBm

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



Date: 9.JAN.2007 12:27:27



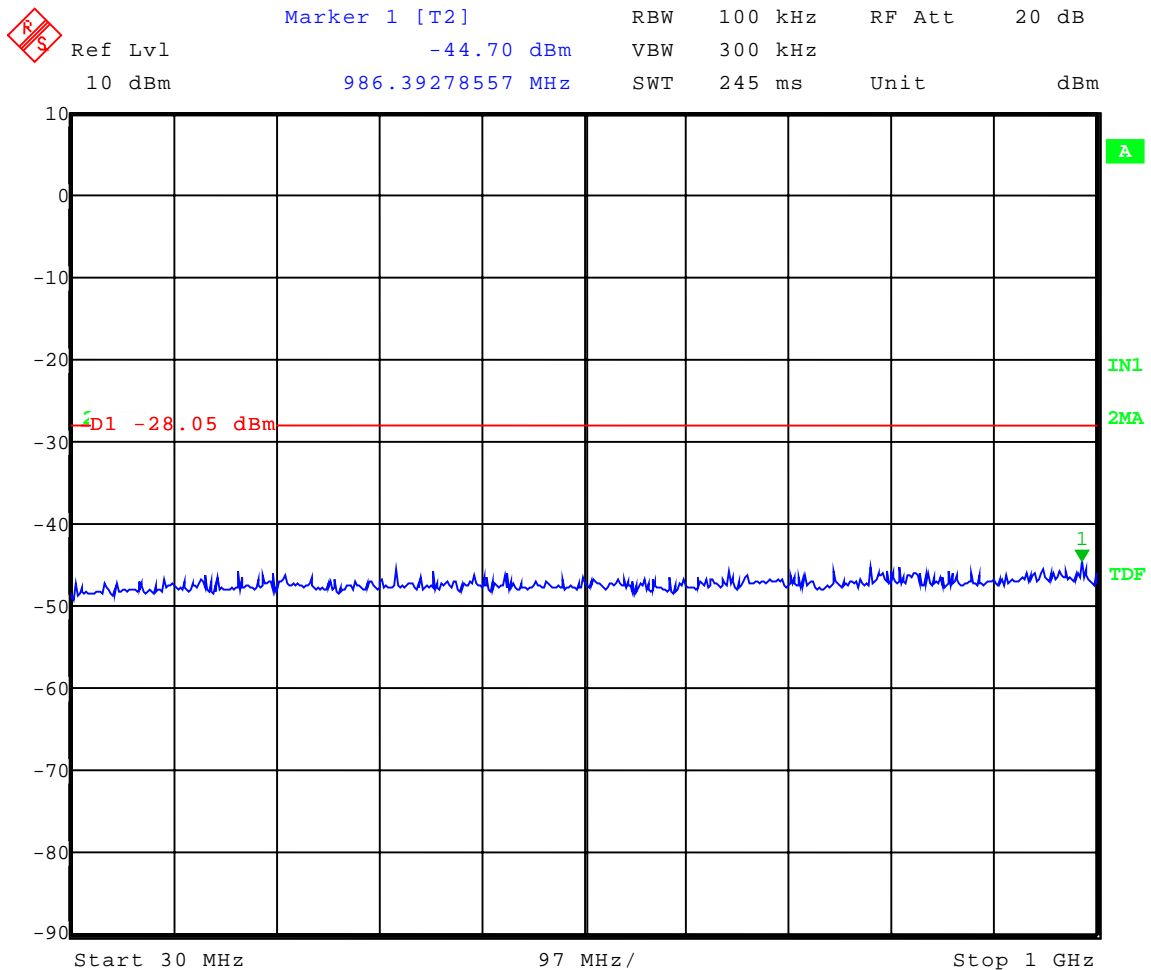
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### APPENDIX A

Test Date: 01-09-2007  
Company: RF Technologies  
EUT: ZigBee Asset Security Transceiver Model: 0800-0286 and 0800-0302  
Test: Spurious Emissions - Conducted  
Operator: Jason Lauer  
Comment: **High Channel** Transmit = 2.480 GHz  
Frequency Range: **30 to 1000 MHz**  
Limit = -28.05 dBm

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



Date: 9.JAN.2007 12:34:45



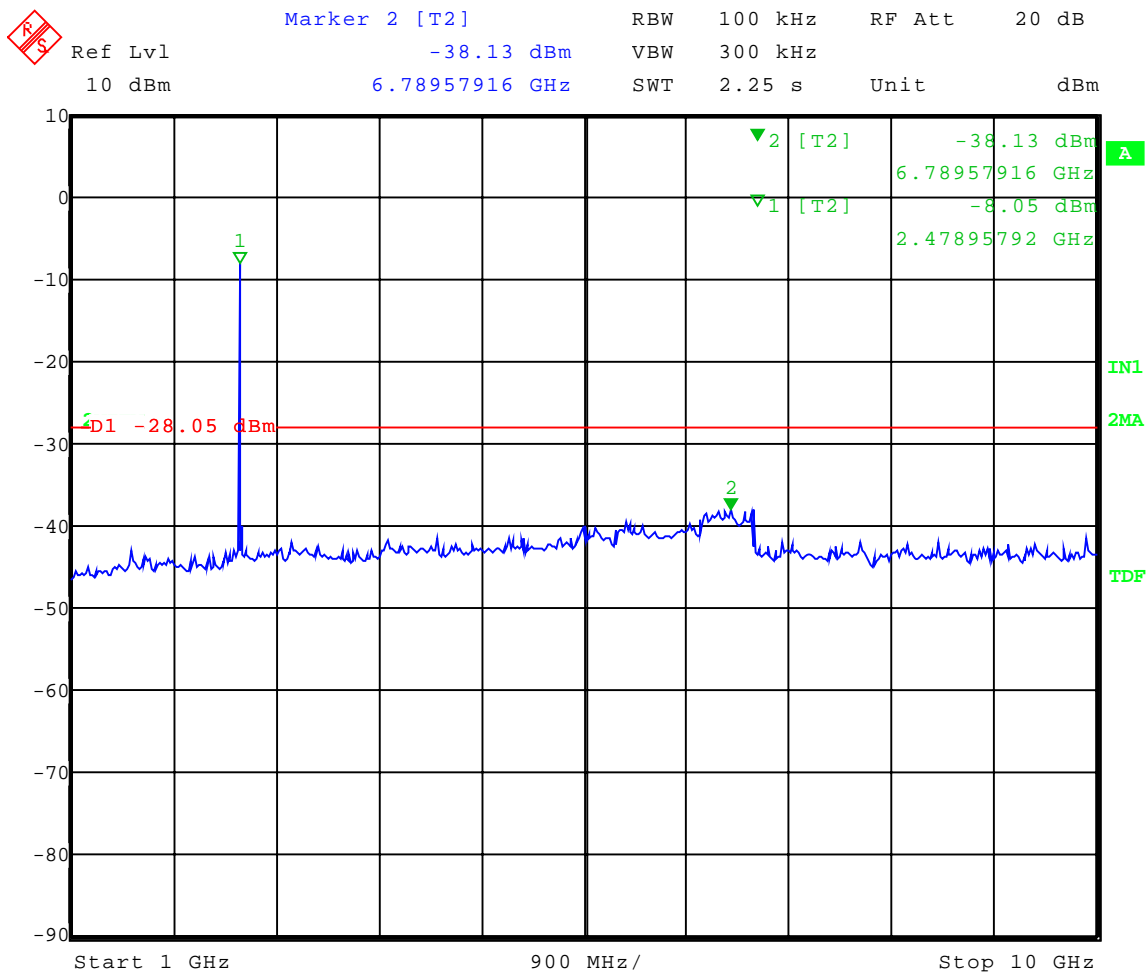
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APPENDIX A

Test Date: 01-09-2007  
 Company: RF Technologies  
 EUT: ZigBee Asset Security Transceiver Model: 0800-0286 and 0800-0302  
 Test: Spurious Emissions - Conducted  
 Operator: Jason Lauer  
 Comment: High Channel Transmit = 2.480 GHz  
 Frequency Range: 1 to 10 GHz  
 Limit = -28.05 dBm

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



Date: 9.JAN.2007 12:30:40



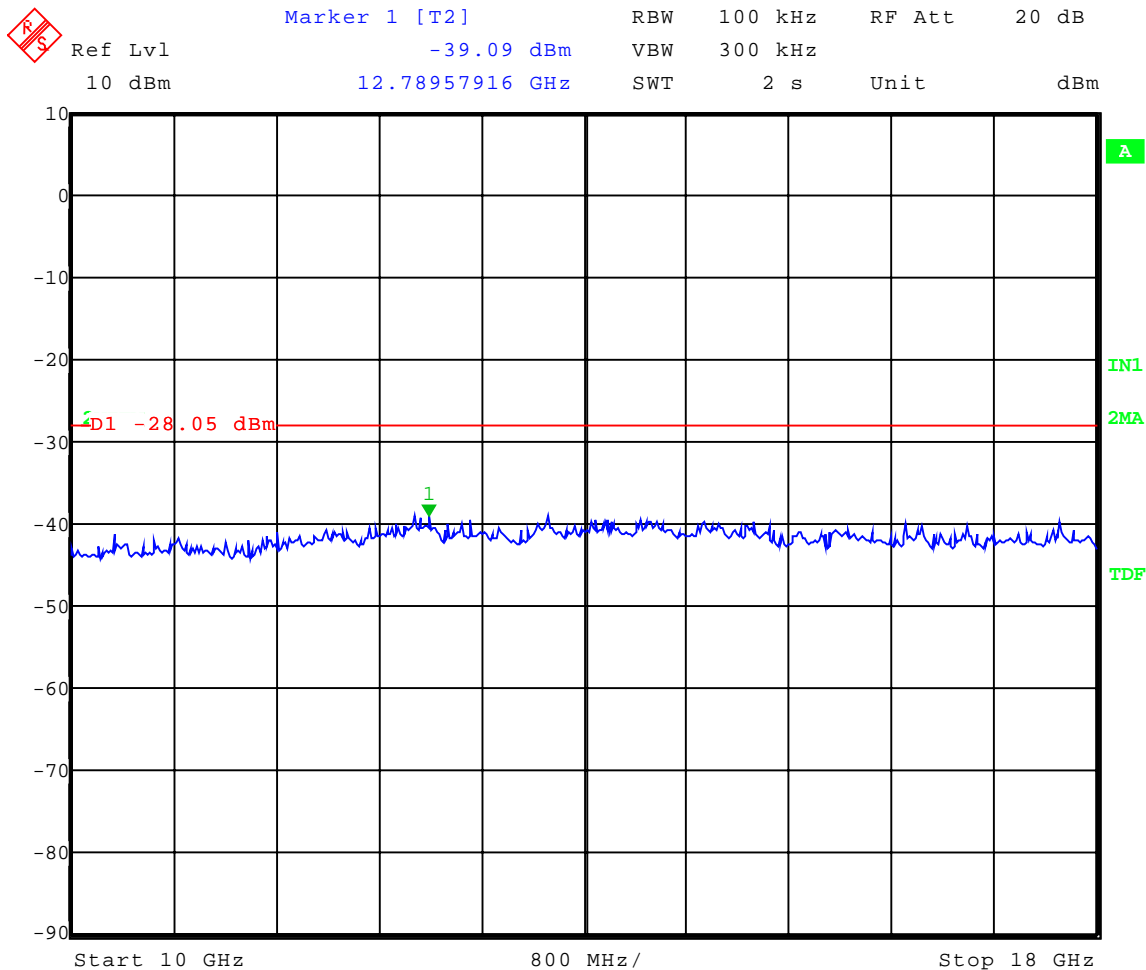
Company: RF Technologies, Inc.  
Model Tested: 0800-0302  
Report Number: 12906

1250 Peterson Dr., Wheeling, IL 60090

### APPENDIX A

Test Date: 01-09-2007  
Company: RF Technologies  
EUT: ZigBee Asset Security Transceiver Model: 0800-0286 and 0800-0302  
Test: Spurious Emissions - Conducted  
Operator: Jason Lauer  
Comment: **High Channel** Transmit = 2.480 GHz  
Frequency Range: **10 to 18 GHz**  
Limit = -28.05 dBm

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



Date: 9.JAN.2007 12:32:06



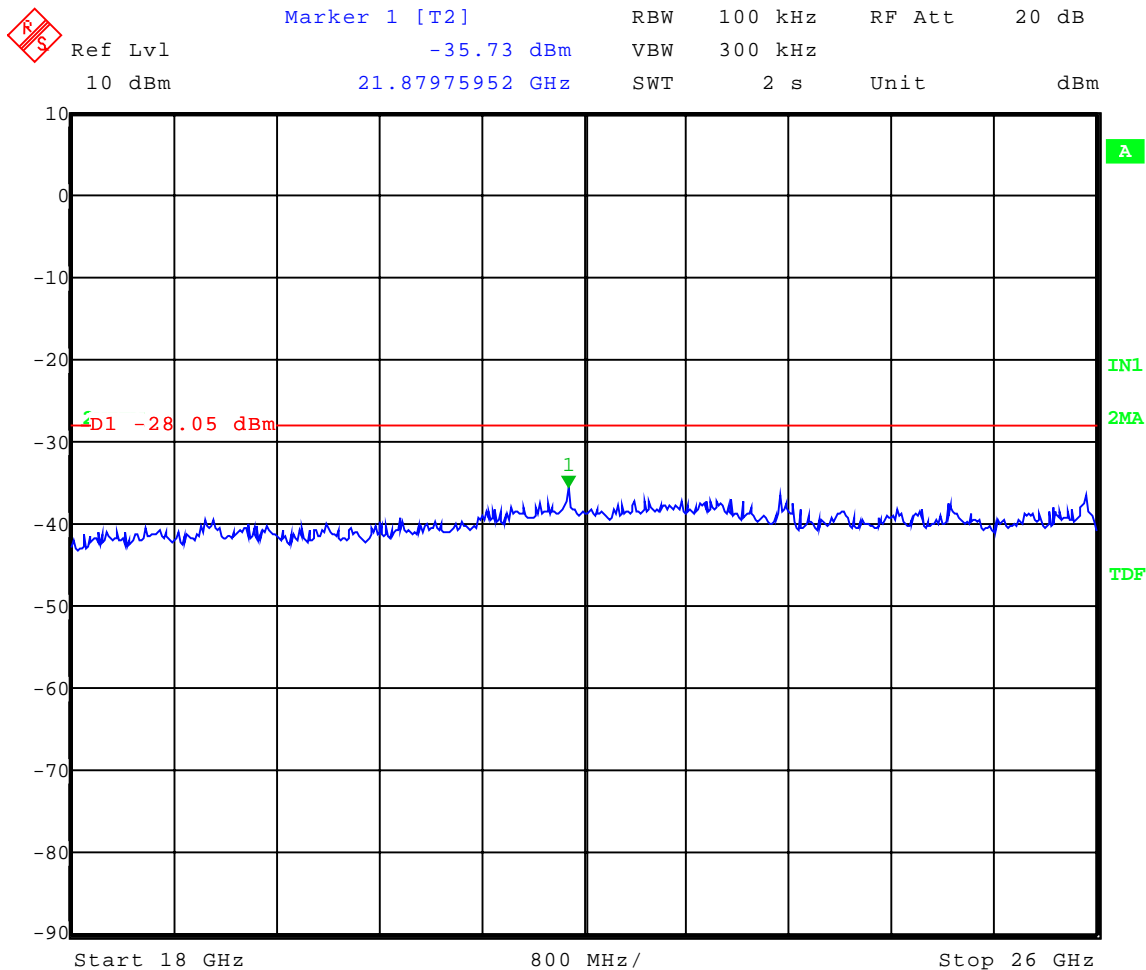
Company: RF Technologies, Inc.  
Model Tested: 0800-0302  
Report Number: 12906

1250 Peterson Dr., Wheeling, IL 60090

### APPENDIX A

Test Date: 01-09-2007  
Company: RF Technologies  
EUT: ZigBee Asset Security Transceiver Model: 0800-0286 and 0800-0302  
Test: Spurious Emissions - Conducted  
Operator: Jason Lauer  
Comment: **High Channel** Transmit = 2.480 GHz  
Frequency Range: **18 to 26 GHz**  
Limit = -28.05 dBm

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



Date: 9.JAN.2007 12:33:12



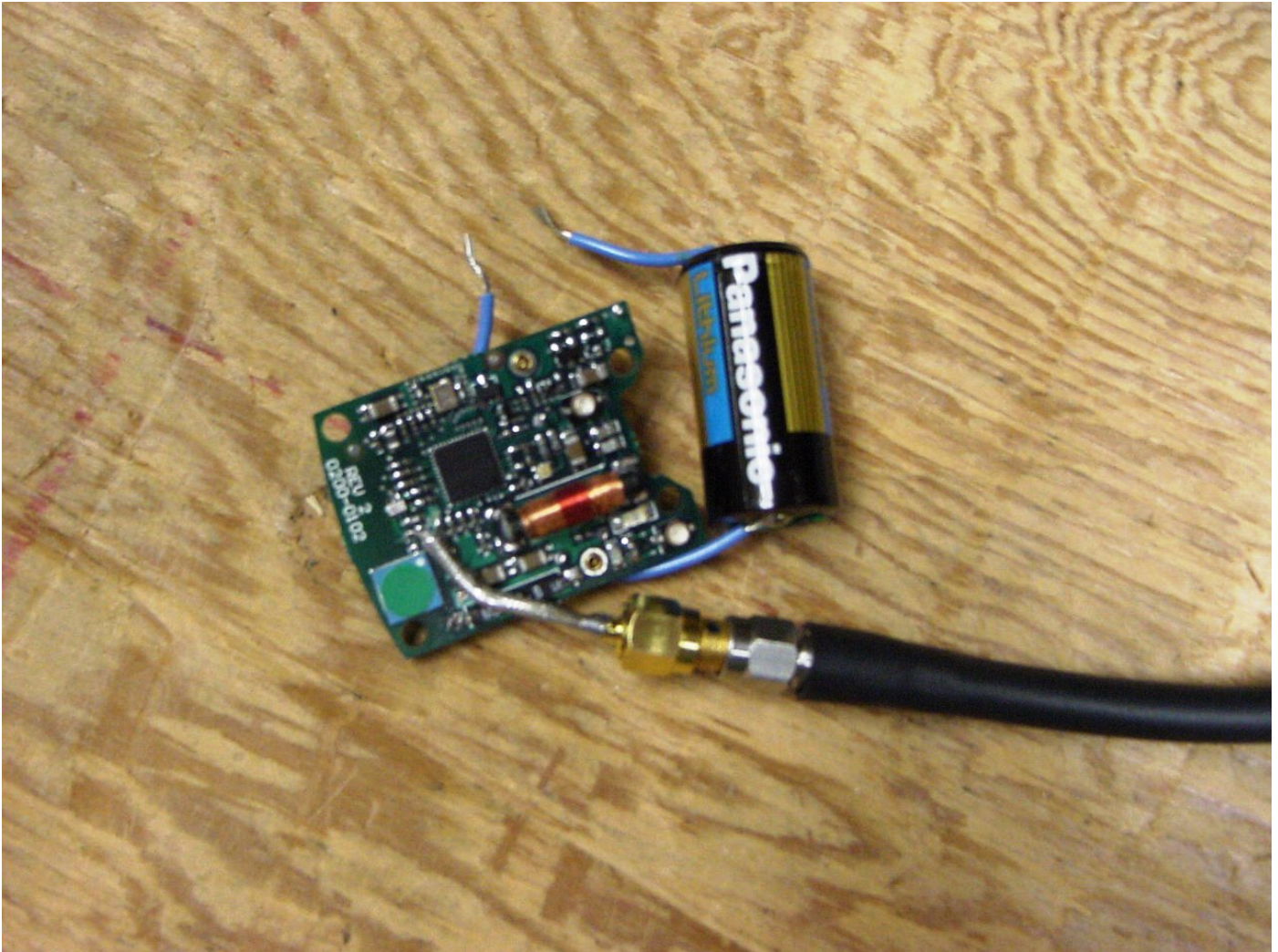


Company: RF Technologies, Inc.  
Model Tested: 0800-0302  
Report Number: 12906

1250 Peterson Dr., Wheeling, IL 60090

## APPENDIX A

### 3.0 CONDUCTED EMISSIONS (ANTENNA TERMINAL) PHOTOS TAKEN DURING TESTING





Company: RF Technologies, Inc.  
 Model Tested: 0800-0302  
 Report Number: 12906

1250 Peterson Dr., Wheeling, IL 60090

## APPENDIX A

### 4.0 RESTRICTED BANDS

As stated in Section 15.205a, the fundamental emission from the Asset Security Transceiver, 262 kHz 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.

### 5.0 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:



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Company: RF Technologies, Inc.  
Model Tested: 0800-0302  
Report Number: 12906

APPENDIX A

DATA AND GRAPH(S) TAKEN SHOWING

THE BAND EDGE AND

RESTRICT BAND COMPLIANCE

PART 15.247(c)



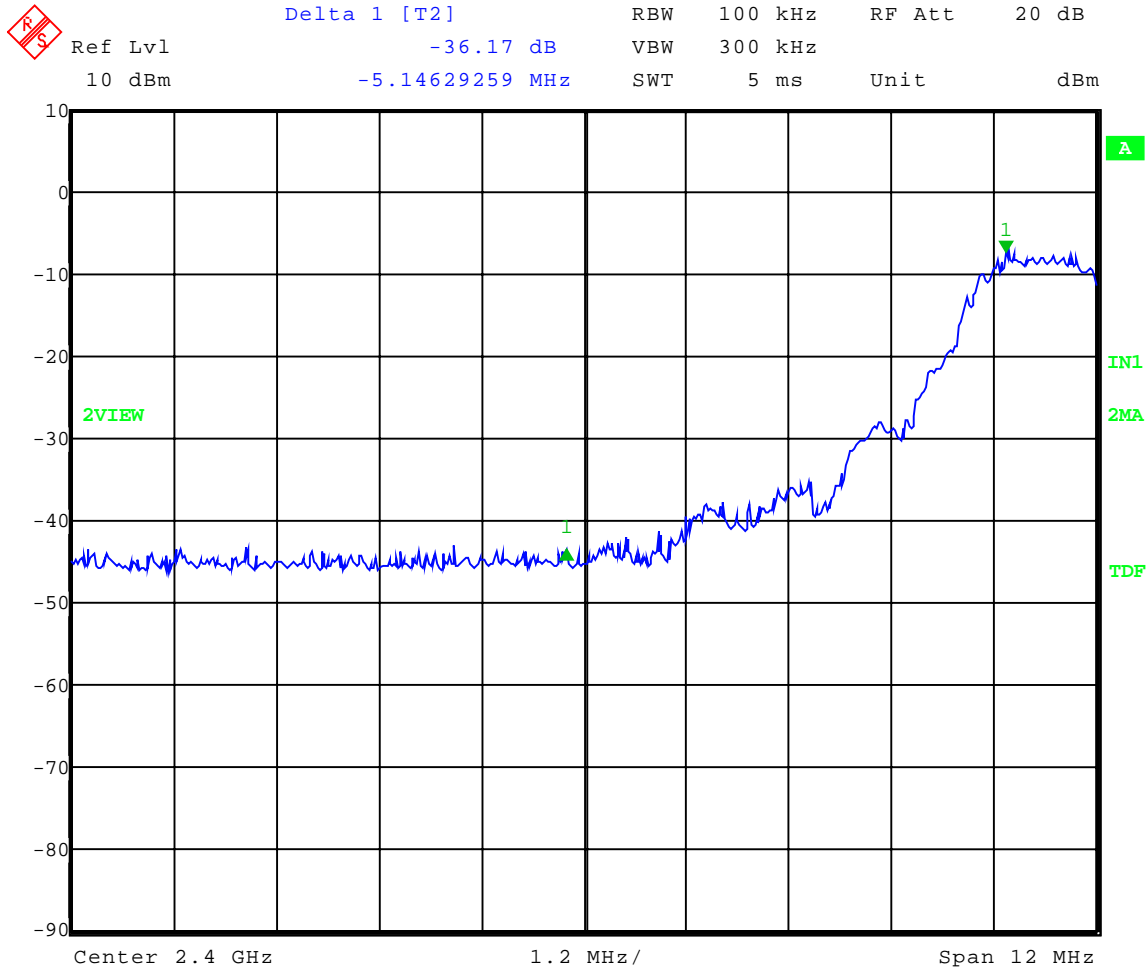
Company: RF Technologies, Inc.  
Model Tested: 0800-0302  
Report Number: 12906

1250 Peterson Dr., Wheeling, IL 60090

### APPENDIX A

Test Date: 01-09-2007  
Company: RF Technologies  
EUT: ZigBee Asset Security Transceiver Model: 0800-0286 and 0800-0302  
Test: Low Band-Edge Compliance - Conducted  
Operator: Jason Lauer  
Comment: Low Channel: Frequency – 2.405 GHz

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



Date: 9.JAN.2007 12:14:26



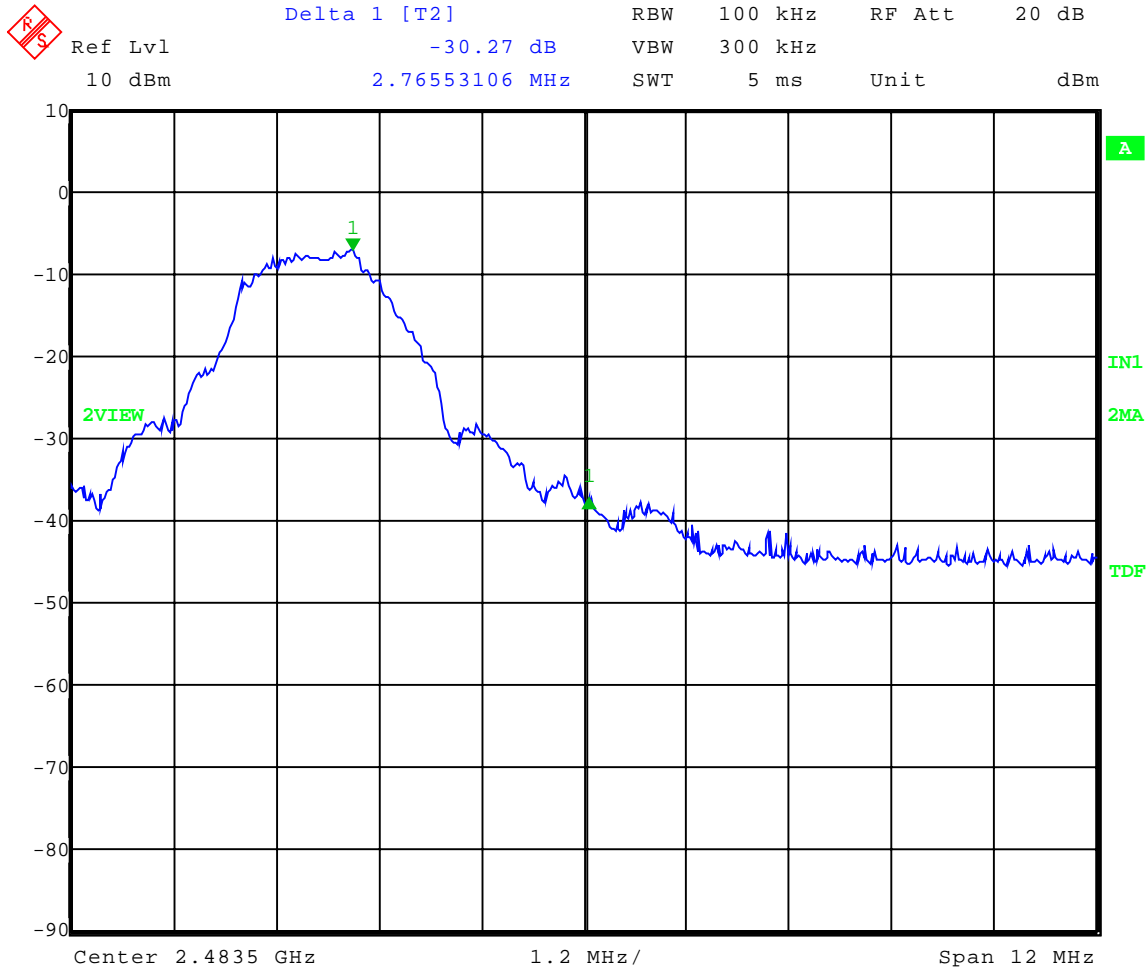
Company: RF Technologies, Inc.  
Model Tested: 0800-0302  
Report Number: 12906

1250 Peterson Dr., Wheeling, IL 60090

### APPENDIX A

Test Date: 01-09-2007  
Company: RF Technologies  
EUT: ZigBee Asset Security Transceiver Model: 0800-0286 and 0800-0302  
Test: Upper Band-Edge Compliance - Conducted  
Operator: Jason Lauer  
Comment: High Channel: Frequency – 2.480 GHz

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



Date: 9.JAN.2007 11:05:31



Company: RF Technologies, Inc.  
 Model Tested: 0800-0302  
 Report Number: 12906

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APPENDIX A

**Radiated Spurious Emissions in Restricted Bands  
 1 GHz – 25 GHz / Tested at a 3 Meter Distance**

**EUT:** ZigBee Asset Security Transceiver Model: 0800-0286 and 0800-0302  
**Manufacturer:** RF Technologies  
**Operating Condition:** 72 deg F°; 31% R.H.  
**Test Site:** Site 3  
**Operator:** Jason L  
**Test Specification:** FCC Part 15.247(d) and FCC Part 15.205  
**Comment:** Transmit  
**Date:** 09/07/2007

- Notes:** (1) Since unit was not able to transmit continuously, compliance is shown by comparing Peak data against the Average limits.  
 (2) ALL measurements were taken with RBW = 1 MHz, VBW = 1 MHz (Peak Detector Data)  
 (3) 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	51.65	32.91	-32.6	51.96	28.2	23.76	54	30.24	Res. Band
4.81	Max Peak	Vert	51.65	32.91	-32.6	51.96	-	51.96	74	22.04	Res. Band
4.81	Average	Horz	52.82	32.91	-32.6	53.13	28.2	24.93	54	29.07	Res. Band
4.81	Max Peak	Horz	52.82	32.91	-32.6	53.13	-	53.13	74	20.87	Res. Band

Notice that (under Measurement Type on the charts) the Average and Max Peak measurements are the same. This is because Peak data was used for both types of measurements.

The duty cycle correction factor of 28.2 dB (as shown in the Duty Cycle Correction column in the table) has been applied.

The Average (Peak minus the duty cycle correction factor) and the Peak levels are shown in the Final Corrected column in the table.

These levels are then compared to the corresponding Peak/Average limits.



Company: RF Technologies, Inc.  
 Model Tested: 0800-0302  
 Report Number: 12906

1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

**Radiated Spurious Emissions in Restricted Bands  
 1 GHz – 25 GHz / Tested at a 3 Meter Distance**

**EUT:** ZigBee Asset Security Transceiver Model: 0800-0286 and 0800-0302  
**Manufacturer:** RF Technologies  
**Operating Condition:** 72 deg F°; 31% R.H.  
**Test Site:** Site 3  
**Operator:** Jason L  
**Test Specification:** FCC Part 15.247(d) and FCC Part 15.205  
**Comment:** Transmit  
**Date:** 09/07/2007

- Notes:** (1) Since unit was not able to transmit continuously, compliance is shown by comparing Peak data against the Average limits.  
 (2) ALL measurements were taken with RBW = 1 MHz, VBW = 1 MHz (Peak Detector Data)  
 (3) 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	54.06	33.09	-32.7	54.45	28.2	26.25	54	27.75	Res. Band
4.88	Max Peak	Vert	54.06	33.09	-32.7	54.45	-	54.45	74	19.55	Res. Band
4.88	Average	Horz	54.54	33.09	-32.7	54.93	28.2	26.73	54	27.27	Res. Band
4.88	Max Peak	Horz	54.54	33.09	-32.7	54.93	-	54.93	74	19.07	Res. Band

Notice that (under Measurement Type on the charts) the Average and Max Peak measurements are the same. This is because Peak data was used for both types of measurements.

The duty cycle correction factor of 28.2 dB (as shown in the Duty Cycle Correction column in the table) has been applied.

The Average (Peak minus the duty cycle correction factor) and the Peak levels are shown in the Final Corrected column in the table.

These levels are then compared to the corresponding Peak/Average limits.



Company: RF Technologies, Inc.  
 Model Tested: 0800-0302  
 Report Number: 12906

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APPENDIX A

**Radiated Spurious Emissions in Restricted Bands  
 1 GHz – 25 GHz / Tested at a 3 Meter Distance**

**EUT:** ZigBee Asset Security Transceiver Model: 0800-0286 and 0800-0302  
**Manufacturer:** RF Technologies  
**Operating Condition:** 72 deg F°; 31% R.H.  
**Test Site:** Site 3  
**Operator:** Jason L  
**Test Specification:** FCC Part 15.247(d) and FCC Part 15.205  
**Comment:** Transmit  
**Date:** 09/07/2007

**Notes:** (1) Since unit was not able to transmit continuously, compliance is shown by comparing Peak data against the Average limits.  
 (2) ALL measurements were taken with RBW = 1 MHz, VBW = 1 MHz (Peak Detector Data)  
 (3) 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	54.58	33.3	-32.7	55.18	28.2	26.98	54	27.02	Res. Band
4.96	Max Peak	Vert	54.58	33.3	-32.7	55.18	-	55.18	74	18.82	Res. Band
4.96	Average	Horz	55.29	33.3	-32.7	55.89	28.2	27.69	54	26.31	Res. Band
4.96	Max Peak	Horz	55.29	33.3	-32.7	55.89	-	55.89	74	18.11	Res. Band

Notice that (under Measurement Type on the charts) the Average and Max Peak measurements are the same. This is because Peak data was used for both types of measurements.

The duty cycle correction factor of 28.2 dB (as shown in the Duty Cycle Correction column in the table) has been applied.

The Average (Peak minus the duty cycle correction factor) and the Peak levels are shown in the Final Corrected column in the table.

These levels are then compared to the corresponding Peak/Average limits.





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Company: RF Technologies, Inc.  
Model Tested: 0800-0302  
Report Number: 12906

APPENDIX A

DATA AND GRAPH(S) TAKEN SHOWING

THE UPPER BAND RESTRICT EDGE

PART 15.247(c)



Company: RF Technologies, Inc.  
Model Tested: 0800-0302  
Report Number: 12906

1250 Peterson Dr., Wheeling, IL 60090

## APPENDIX A

### Test Methodology

The EUT was investigated at the low and high channels of operation to determine band-edge compliance. Because the upper band-edge coincides with a restricted band, bandedge compliance for the upper band-edge was determined using the radiated mark-delta method as outlined in FCC DA 00-705. The radiated field strength of the fundamental emission was first determined and then the mark-delta method was used to determine the field strength of the band-edge emissions. The lower band-edge compliance was determined using the marker-delta method in which the radio frequency power that is produced by the EUT is at least 20 dB below the radio frequency power in the 100 kHz bandwidth within the band that contains the highest level of desired power.

#### Upper Band-Edge Marker Delta Method

Frequency (MHz)	Antenna Polarity (H/V)	Fundamental Field Strength (dB $\mu$ V/m)	Duty Cycle Correction (dB)	Delta-Marker (dB)	Band-Edge Field Strength (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)
2480 (Peak)	H	96.31	N/A	30.47	55.27	74	18.73
2480 (Avg)	H	96.31	28.2	30.47	37.64	54	16.36



Company: RF Technologies, Inc.  
Model Tested: 0800-0302  
Report Number: 12906

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### APPENDIX A

Test Date: 01-09-2007  
Company: RF Technologies  
EUT: ZigBee Asset Security Transceiver Model: 0800-0286 and 0800-0302  
Test: Upper Band-Edge Radiated – Marker Delta Method  
Operator: Jason Lauer  
Comment: High Channel: Frequency – 2.480 GHz



Date: 9.JAN.2007 14:13:01



Company: RF Technologies, Inc.  
Model Tested: 0800-0302  
Report Number: 12906

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## APPENDIX A

### 6.0 FIELD STRENGTH OF SPURIOUS EMISSION MEASUREMENTS

The radiated measurements made at D.L.S. Electronic Systems, Inc., for the Asset Security Transceiver, 262 kHz, Model Number: 0800-0302, 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 Asset Security Transceiver, 262 kHz were made up to 13000 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: 0800-0302  
Report Number: 12906

1250 Peterson Dr., Wheeling, IL 60090

## APPENDIX A

### 6.0 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 **27%** relative humidity.



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Company: RF Technologies, Inc.  
Model Tested: 0800-0302  
Report Number: 12906

APPENDIX A

RADIATED DATA AND GRAPH(S) TAKEN FOR

FIELD STRENGTH

SPURIOUS EMISSION MEASUREMENTS

PART 15.247



Company: RF Technologies, Inc.  
 Model Tested: 0800-0302  
 Report Number: 12906

1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

DLS Electronic Systems, Inc.

Company: RF Technologies  
 Operator: Jason Lauer  
 Date of test: 01-09-2007  
 Temperature: 73 deg. F  
 Humidity: 27% R.H.

EIRP - Substitution Method

Model: <b>ZigBee Asset Security Transceiver</b> Model: <b>0800-0286 and 0800-0302</b>								
Channel: <b>11</b>								
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	93.42	-10.82	1.72	9.59	-2.95	30.00	32.95	0.51
2405 horizontal	96.65	-10.10	1.72	9.59	-2.23	30.00	32.23	0.60

EIRP = Signal generator output - cable loss + antenna gain

ERP<sub>(ref. to 1/2λ dipole)</sub> = Signal generator output - cable loss + antenna gain - 2.15

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



Company: RF Technologies, Inc.  
 Model Tested: 0800-0302  
 Report Number: 12906

1250 Peterson Dr., Wheeling, IL 60090

## APPENDIX A

DLS Electronic Systems, Inc.

Company: RF Technologies  
 Operator: Jason Lauer  
 Date of test: 01-09-2007  
 Temperature: 73 deg. F  
 Humidity: 27% R.H.

### EIRP - Substitution Method

Model: <b>ZigBee Asset Security Transceiver</b> Model: <b>0800-0286 and 0800-0302</b>								
Channel: <b>18</b>								
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	93.48	-10.97	1.74	9.63	-3.08	30.00	33.08	0.49
2440 horizontal	96.64	-9.92	1.74	9.63	-2.03	30.00	32.03	0.63

EIRP = Signal generator output - cable loss + antenna gain

ERP<sub>(ref. to 1/2λ dipole)</sub> = Signal generator output - cable loss + antenna gain - 2.15

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





Company: RF Technologies, Inc.  
 Model Tested: 0800-0302  
 Report Number: 12906

1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

DLS Electronic Systems, Inc.

Company: RF Technologies  
 Operator: Jason Lauer  
 Date of test: 01-09-2007  
 Temperature: 73 deg. F  
 Humidity: 27% R.H.

EIRP - Substitution Method

Model: <b>ZigBee Asset Security Transceiver</b> Model: <b>0800-0286 and 0800-0302</b>								
Channel: <b>26</b>								
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	91.74	-12.89	1.76	9.68	-4.97	30.00	34.97	0.32
2480 horizontal	96.31	-8.65	1.76	9.68	-0.73	30.00	30.73	0.85

EIRP = Signal generator output - cable loss + antenna gain

ERP<sub>(ref. to 1/2λ dipole)</sub> = Signal generator output - cable loss + antenna gain - 2.15

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

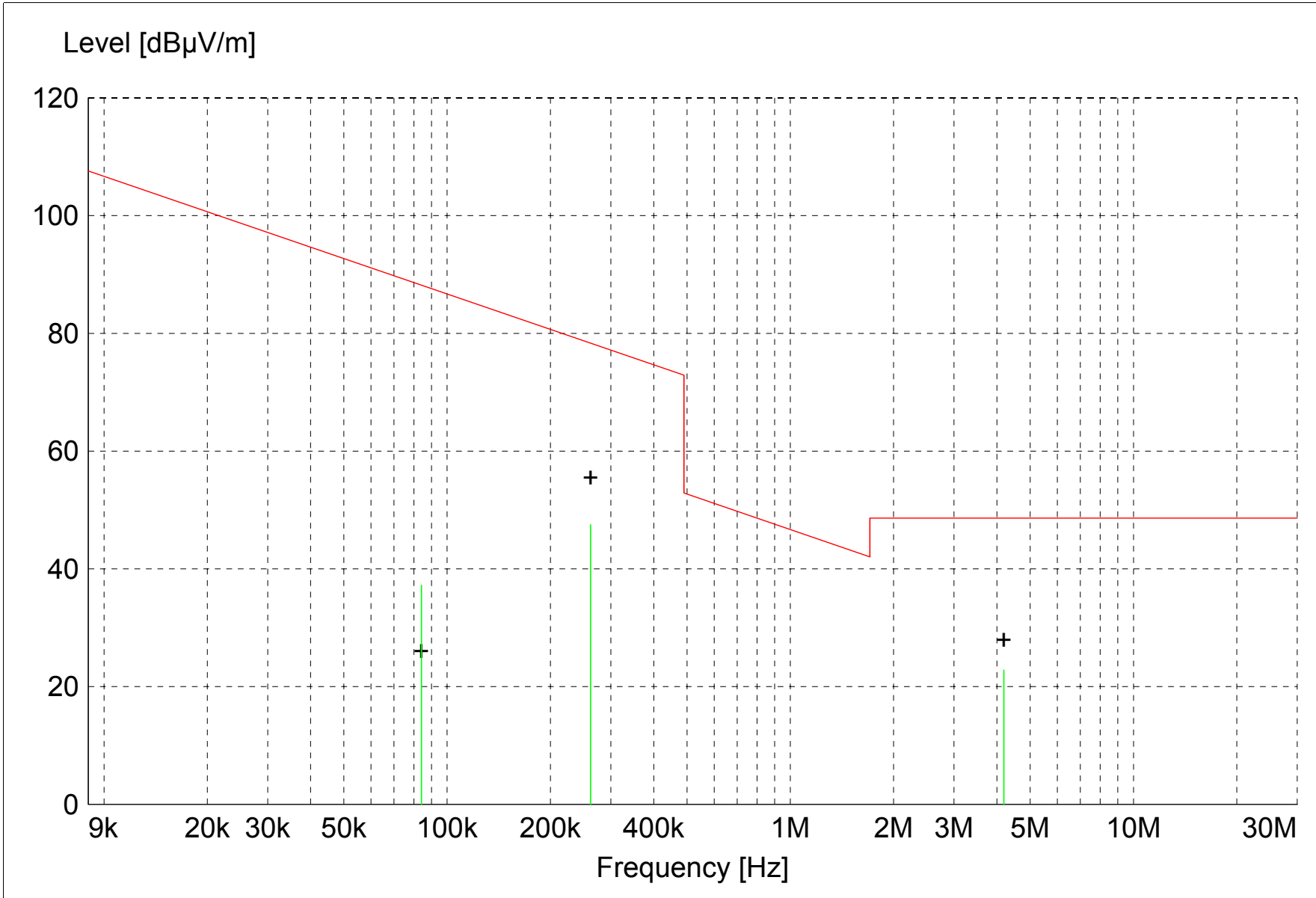
**FCC Part 15.209**

**Radiated Field Strength**

EUT: ZigBee Asset Security Model: 0800-0302  
Manufacturer: RF Technologies  
Operating Condition: 72 deg F; 27% R.H.  
Test Site: DLS O.F. Site 3  
Operator: Craig Brandt  
Test Specification: Battery Operated  
Comment: 262 kHz Transmit  
DATE: 01-10-2007

**TEXT: "Site 3 LowH 10M Act"**

Short Description: Test Set-up 9kHz to 30MHz H  
TEST EQUIPMENT: Receiver --- Rohde&Schwarz ESI40 SN: 837808/005  
Antennas --- EMCO Active Loop Model: 6502 SN: 2038  
  
TEST SET-UP: EuT Measured at 10 Meters with H-FIELD Antenna



||||| MES A3021\_FE\_Quasi-Peak  
 + + MES A3021\_FE\_Peak\_List  
 — LIM Part 15-209 10m FCC15.209 Field Strength Limit

**MEASUREMENT RESULT: "A3021\_FE\_Final"**

1/10/2007 1:51PM

Frequency	Level	Antenna	System	Total	Limit	Margin	Height	EuT	Final	Comment
MHz	dB $\mu$ V	Factor	Loss	Level			Ant.	Angle	Detector	
		dB $\mu$ V/m	dB	dB $\mu$ V/m	dB $\mu$ V/m	dB	m	deg		
4.190000	12.01	10.20	0.6	22.8	48.6	25.8	1.00	0	QUASI-PEAK	Noise Floor
0.262000	37.06	10.29	0.2	47.5	78.3	30.8	1.00	0	QUASI-PEAK	Noise Floor
0.084200	26.58	10.54	0.1	37.2	88.2	51.0	1.00	0	QUASI-PEAK	Noise Floor

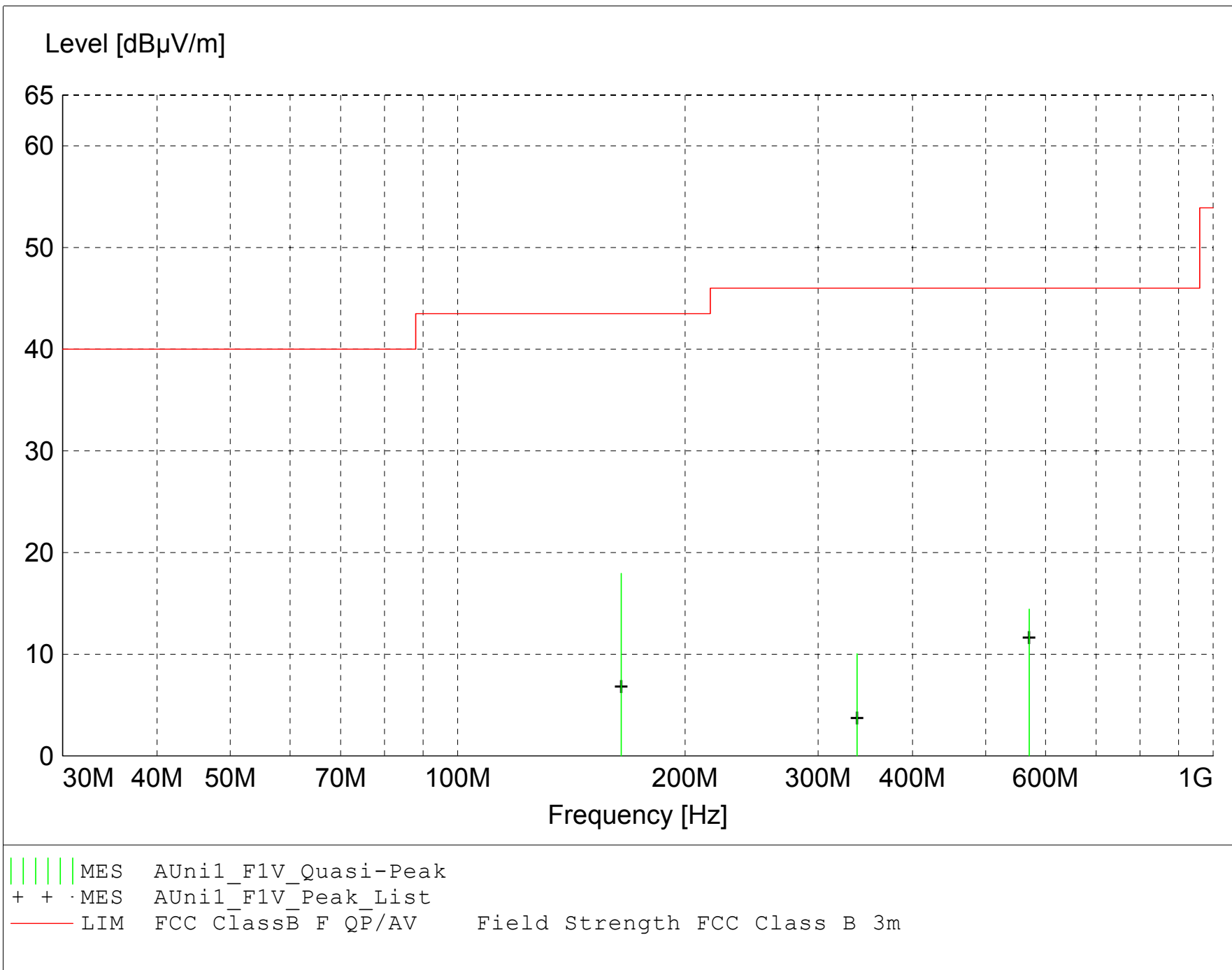
**FCC Part 15 Class B**

**Electric Field Strength**

EUT: ZigBee Asset Security Model: 0800-0286 and 0800-0302  
Manufacturer: RF Technologies  
Operating Condition: 72 deg. F; 27% R.H.  
Test Site: DLS O.F. Site 3  
Operator: Craig Brandt  
Test Specification: Battery Operated  
Comment: Transmit and Receive Mode - Low, Mid and High Channels  
Date: 01-10-2007

**TEXT: "Site 3 MidV 3M"**

Short Description: Test Set-up Vert30-1000MHz  
TEST EQUIPMENT: Receiver --- Rohde&Schwarz ESI 40 SN: 837808/005  
  
Antennas ---  
Biconical -- EMCO 3104C SN: 9701-4785  
Log Periodic -- EMCO 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: "AUnil\_F1V\_Final"**

1/10/2007 11:34AM

Frequency	Level	Antenna	System	Total	Limit	Margin	Height	EuT	Final	Comment
MHz	dB $\mu$ V	Factor	Loss	Level	dB $\mu$ V/m	dB	Ant.	Angle	Detector	
		dB $\mu$ V/m	dB	dB $\mu$ V/m	dB $\mu$ V/m		m	deg		
164.635000	26.69	14.02	-22.7	18.0	43.5	25.5	1.00	0	QUASI-PEAK	Noise Floor
570.850000	16.48	18.38	-20.4	14.4	46.0	31.6	1.00	0	QUASI-PEAK	Noise Floor
337.820000	17.20	14.33	-21.5	10.0	46.0	36.0	1.00	0	QUASI-PEAK	Noise Floor

**FCC Part 15 Class B**

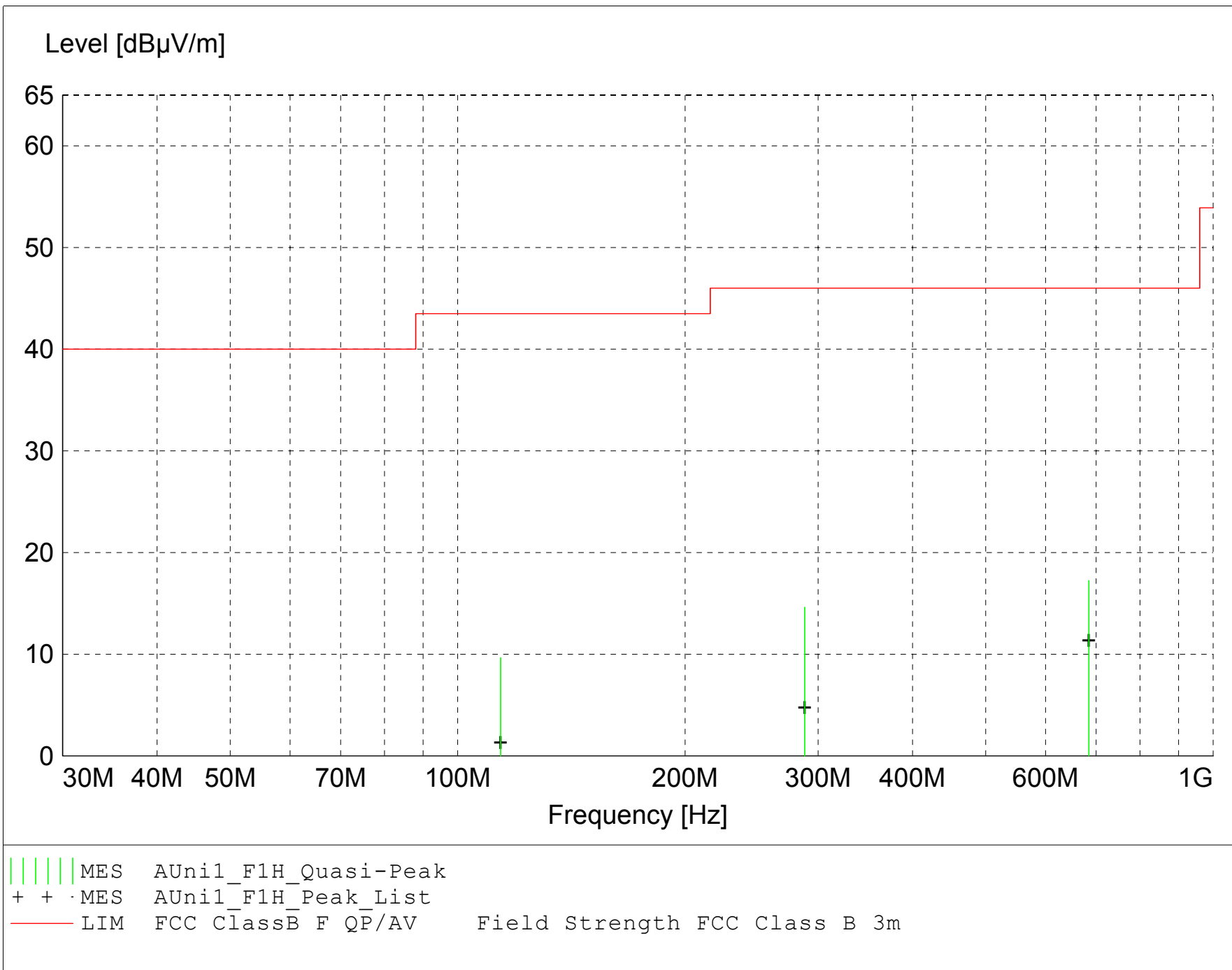
**Electric Field Strength**

EUT: ZigBee Asset Security Model: 0800-0286 and 0800-0302  
Manufacturer: RF Technologies  
Operating Condition: 72 deg. F; 27% R.H.  
Test Site: DLS O.F. Site 3  
Operator: Craig Brandt  
Test Specification: Battery Operated  
Comment: Transmit and Receive Mode - Low, Mid and High Channels  
Date: 01-10-2007

**TEXT: "Site 3 MidH 3M"**

Short Description: Test Set-up Horz30-1000MHz  
TEST EQUIPMENT: Receiver --- Rohde&Schwarz ESI 40 SN: 837808/005  
  
Antennas ---  
Biconical -- EMCO 3104C SN: 9701-4785  
Log Periodic -- EMCO 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: "AUnil\_F1H\_Final"**

1/10/2007 11:29AM

Frequency	Level	Antenna	System	Total	Limit	Margin	Height	EuT	Final	Comment
MHz	dB $\mu$ V	Factor	Loss	Level	dB $\mu$ V/m	dB	Ant.	Angle	Detector	
		dB $\mu$ V/m	dB	dB $\mu$ V/m			m	deg		
684.460000	16.10	20.61	-19.5	17.2	46.0	28.8	1.50	0	QUASI-PEAK	Noise Floor
288.030000	23.28	13.20	-21.9	14.6	46.0	31.4	1.00	135	QUASI-PEAK	None
114.020000	20.85	12.07	-23.3	9.7	43.5	33.8	2.20	0	QUASI-PEAK	Noise Floor



Company: RF Technologies, Inc.  
Model Tested: 0800-0302  
Report Number: 12906

1250 Peterson Dr., Wheeling, IL 60090

## APPENDIX A

# 6 dB BANDWIDTH GRAPHS

## PART 15.247



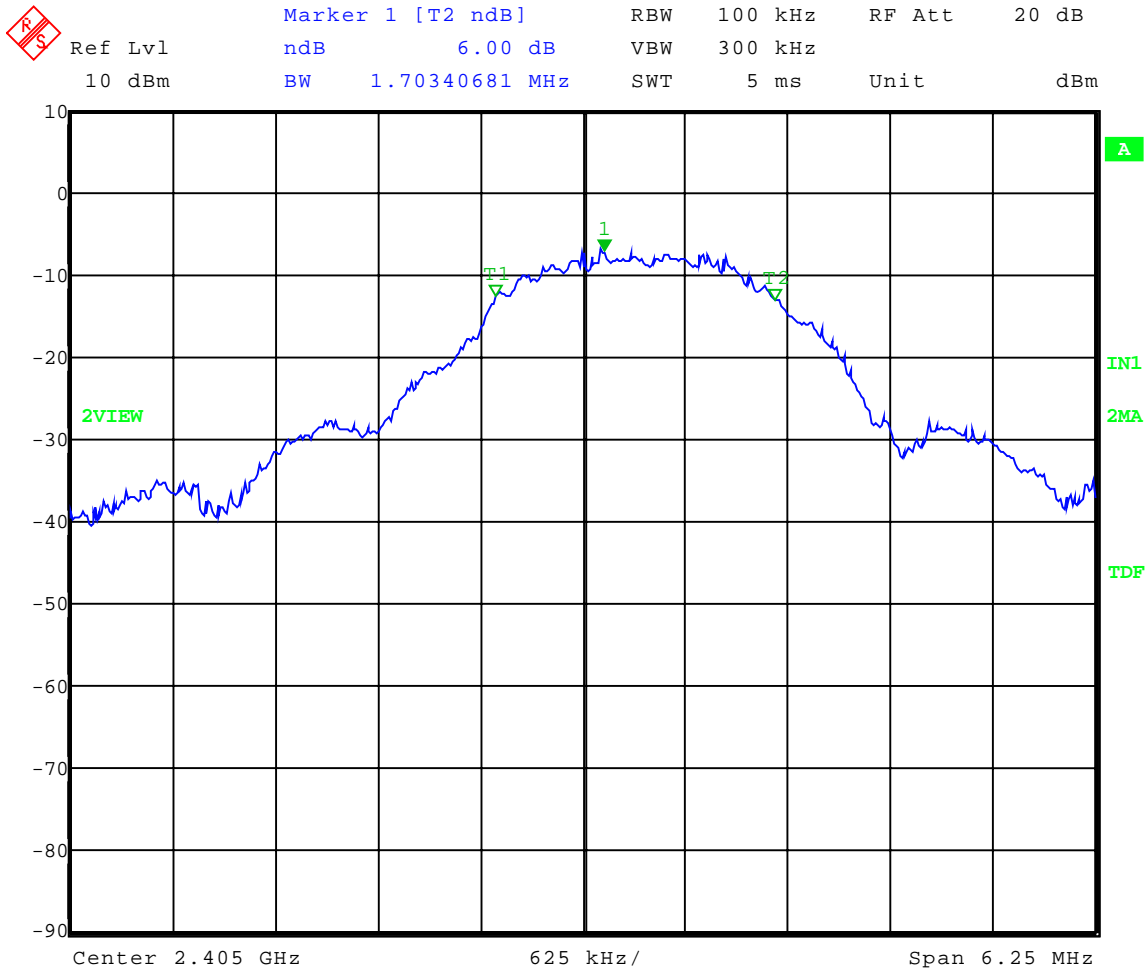
Company: RF Technologies, Inc.  
Model Tested: 0800-0302  
Report Number: 12906

1250 Peterson Dr., Wheeling, IL 60090

### APPENDIX A

Test Date: 01-09-2007  
Company: RF Technologies  
EUT: ZigBee Asset Security Transceiver Model: 0800-0286 and 0800-0302  
Test: 6 dB Bandwidth - Conducted  
Operator: Jason Lauer  
Comment: Low Channel: Frequency – 2.405 GHz

6 dB Bandwidth = 1.703 MHz



Date: 9.JAN.2007 11:52:08



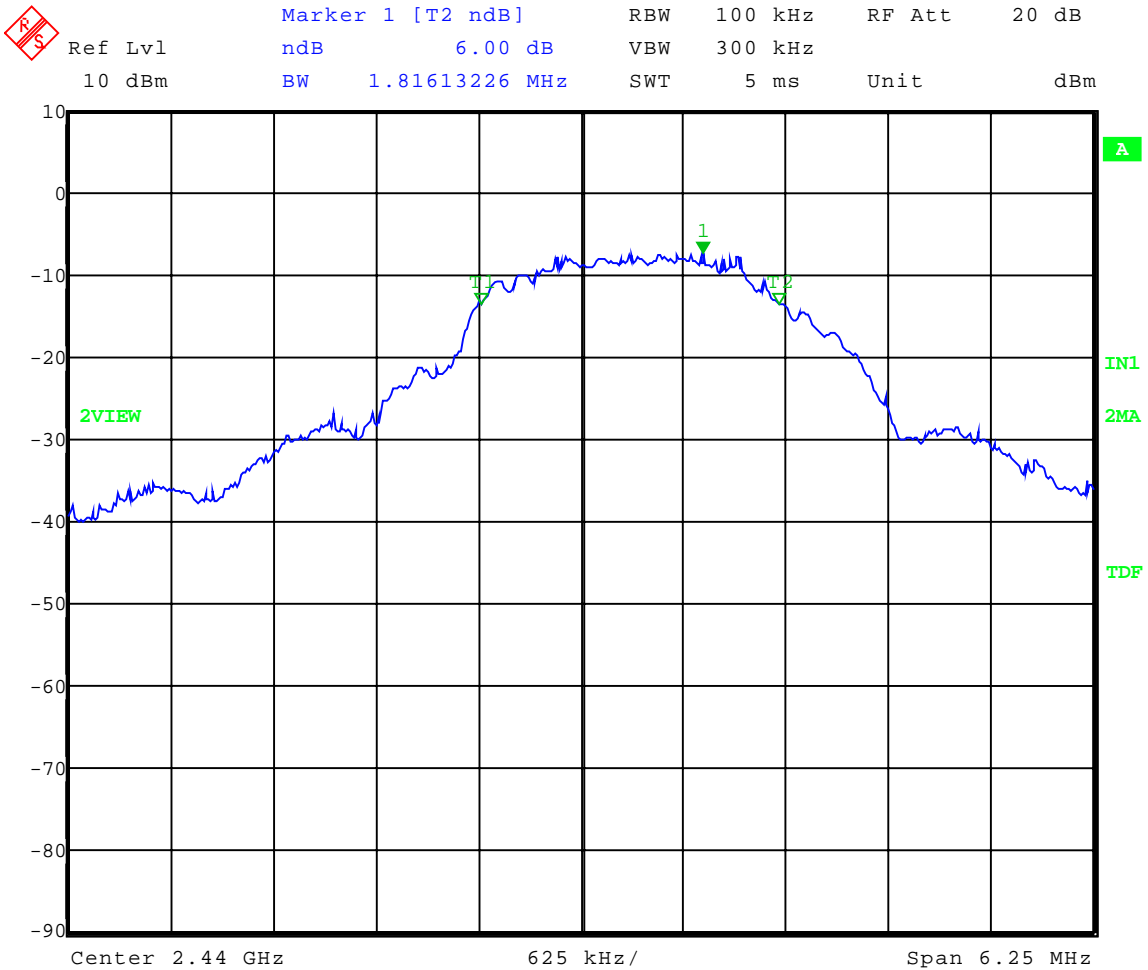
Company: RF Technologies, Inc.  
 Model Tested: 0800-0302  
 Report Number: 12906

1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

Test Date: 01-09-2007  
 Company: RF Technologies  
 EUT: ZigBee Asset Security Transceiver Model: 0800-0286 and 0800-0302  
 Test: 6 dB Bandwidth - Conducted  
 Operator: Jason Lauer  
 Comment: Middle Channel: Frequency - 2.440 GHz

6 dB Bandwidth = 1.816 MHz



Date: 9.JAN.2007 11:49:58



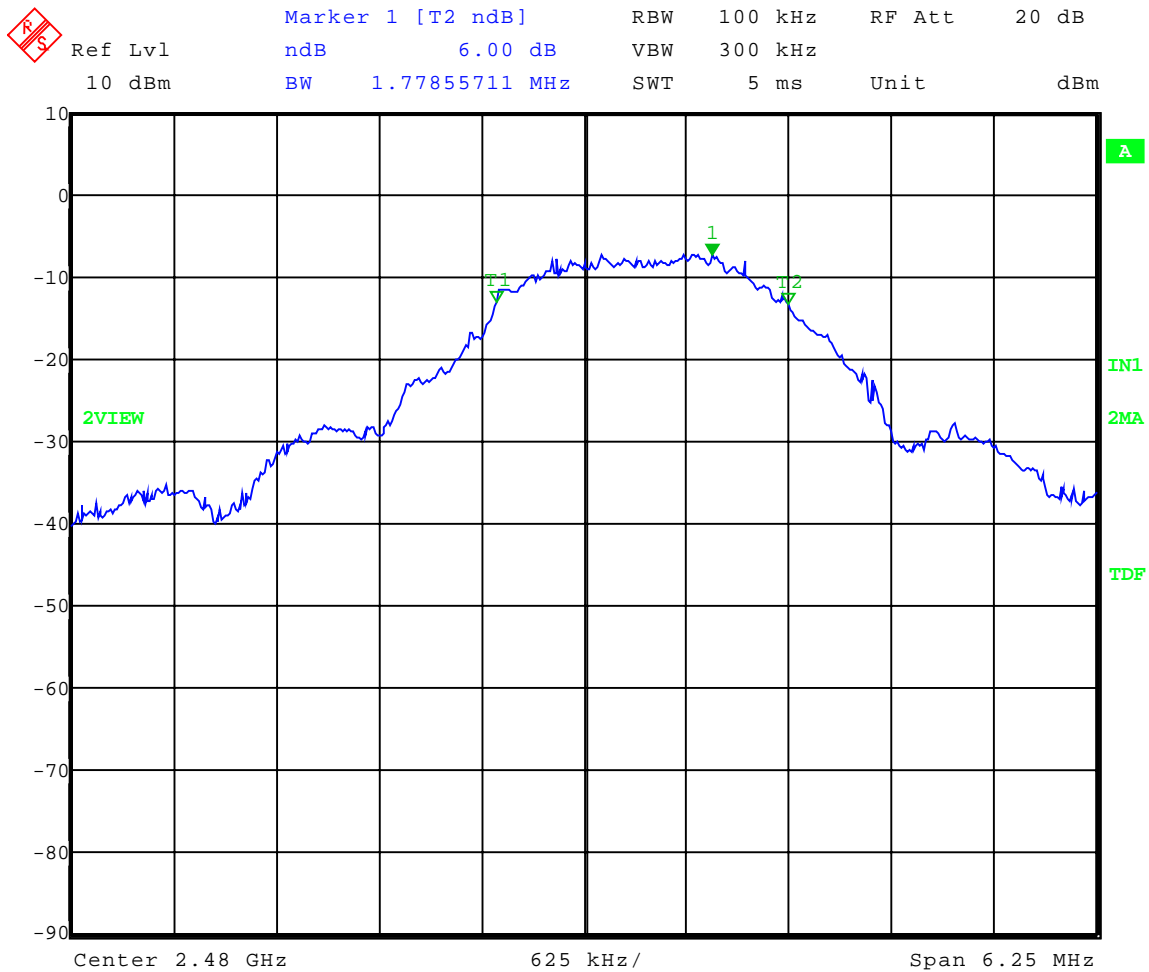
Company: RF Technologies, Inc.  
Model Tested: 0800-0302  
Report Number: 12906

1250 Peterson Dr., Wheeling, IL 60090

### APPENDIX A

Test Date: 01-09-2007  
Company: RF Technologies  
EUT: ZigBee Asset Security Transceiver Model: 0800-0286 and 0800-0302  
Test: 6 dB Bandwidth - Conducted  
Operator: Jason Lauer  
Comment: High Channel: Frequency – 2.480 GHz

6 dB Bandwidth = 1.779 MHz



Date: 9.JAN.2007 11:02:15



Company: RF Technologies, Inc.  
Model Tested: 0800-0302  
Report Number: 12906

1250 Peterson Dr., Wheeling, IL 60090

## APPENDIX A

# 20 dB BANDWIDTH GRAPHS

## PART 15.247



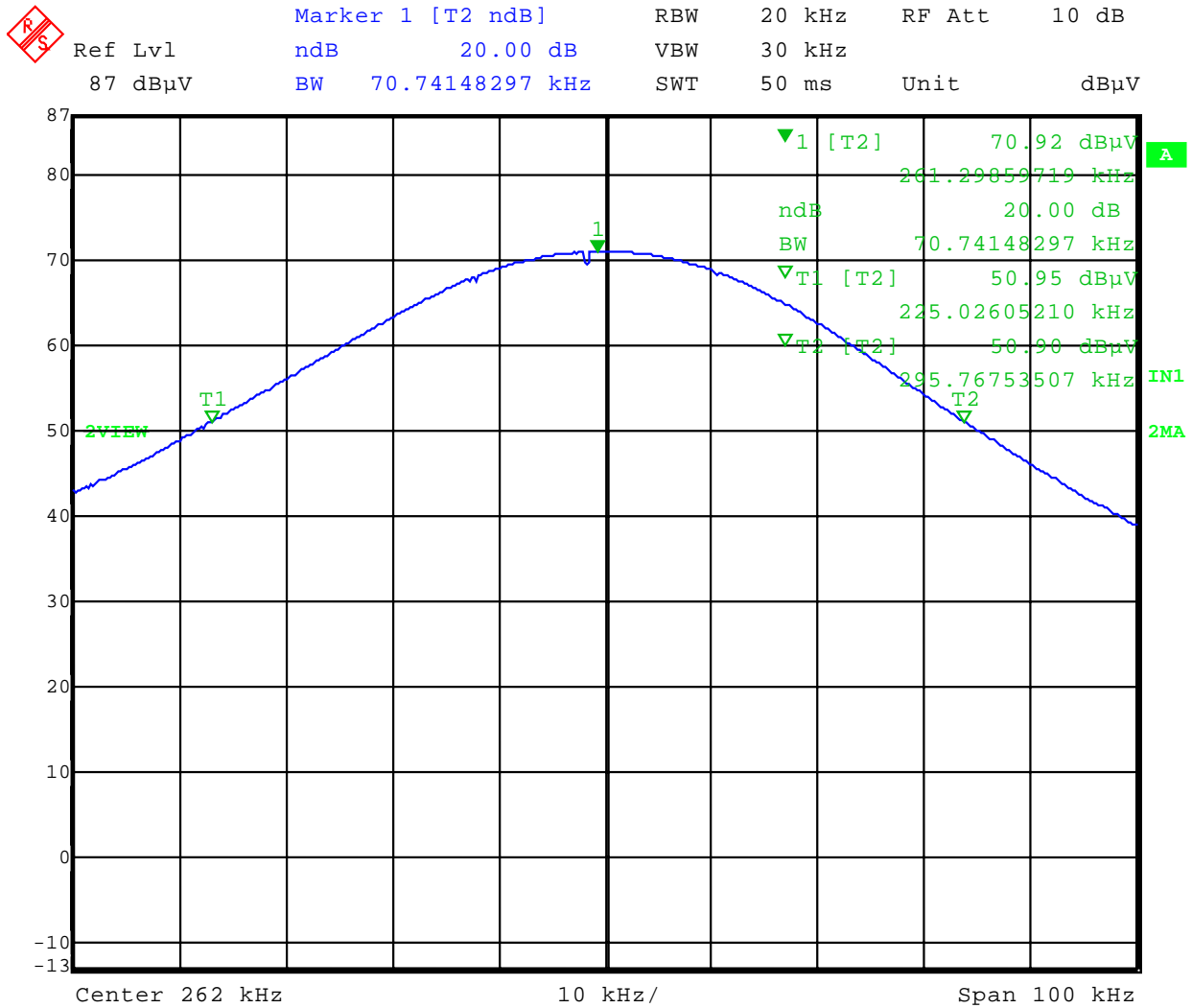
Company: RF Technologies, Inc.  
 Model Tested: 0800-0302  
 Report Number: 12906

1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

Test Date: 01-26-2007  
 Company: RF Technologies  
 EUT: ZigBee Asset Security Model: 0800-0302  
 Test: 20 dB Bandwidth - Radiated  
 Operator: Craig Brandt  
 Comment: Transmit Frequency – 262 kHz

20 dB Bandwidth = 70.74 kHz



Date: 26.JAN.2007 12:09:20





Company: RF Technologies, Inc.  
Model Tested: 0800-0302  
Report Number: 12906

1250 Peterson Dr., Wheeling, IL 60090

## APPENDIX A

# PEAK POWER SPECTRAL DENSITY GRAPH(S)

PART 15.247



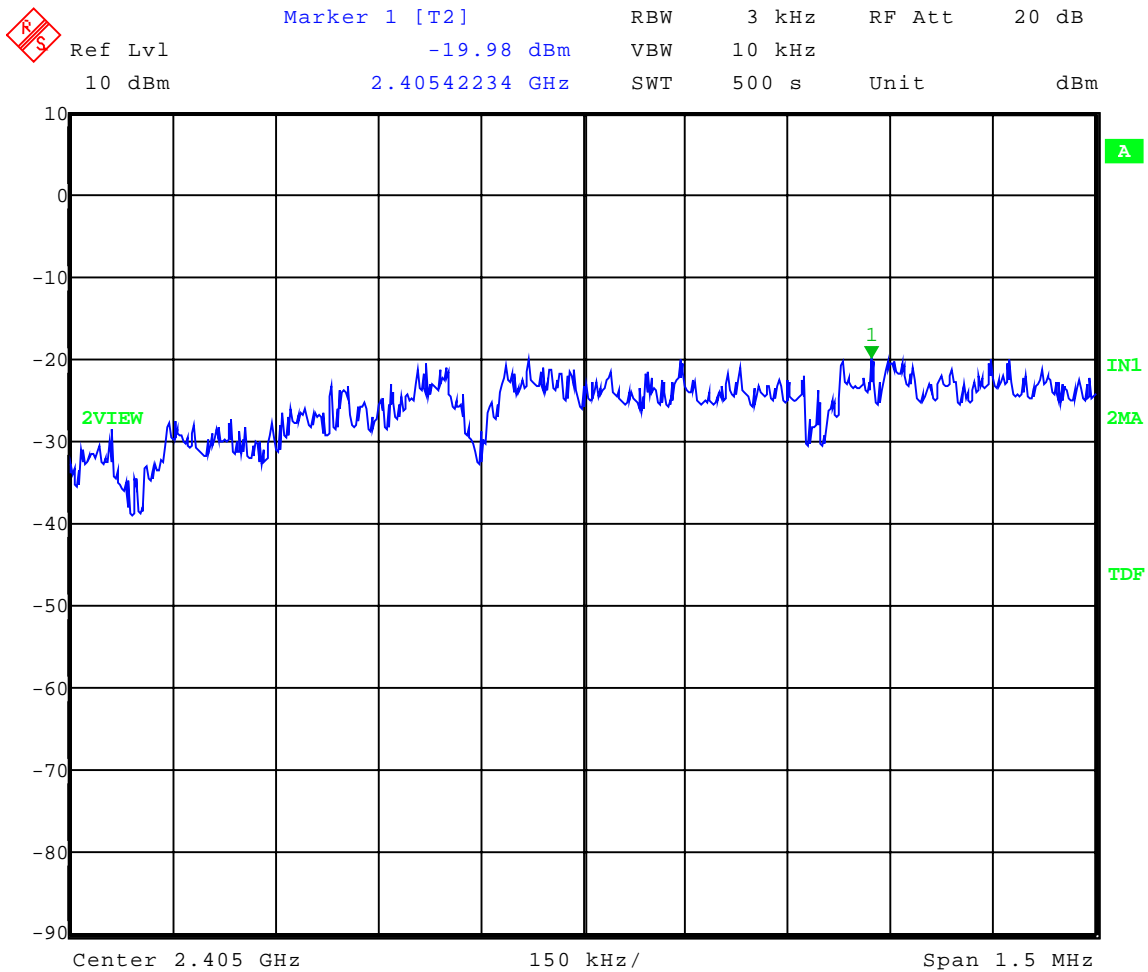
Company: RF Technologies, Inc.  
Model Tested: 0800-0302  
Report Number: 12906

1250 Peterson Dr., Wheeling, IL 60090

### APPENDIX A

Test Date: 01-09-2007  
Company: RF Technologies  
EUT: ZigBee Asset Security Transceiver Model: 0800-0286 and 0800-0302  
Test: Peak Power Spectral Density - Conducted  
Operator: Jason Lauer  
Comment: Low Channel: Frequency – 2.405 GHz

3 kHz Bandwidth = -19.98 dBm



Date: 9.JAN.2007 12:12:02



Company: RF Technologies, Inc.  
Model Tested: 0800-0302  
Report Number: 12906

1250 Peterson Dr., Wheeling, IL 60090

### APPENDIX A

Test Date: 01-09-2007  
Company: RF Technologies  
EUT: ZigBee Asset Security Transceiver Model: 0800-0286 and 0800-0302  
Test: Peak Power Spectral Density - Conducted  
Operator: Jason Lauer  
Comment: Middle Channel: Frequency – 2.440 GHz

3 kHz Bandwidth = -20.06 dBm



Date: 9.JAN.2007 11:47:00



Company: RF Technologies, Inc.  
Model Tested: 0800-0302  
Report Number: 12906

1250 Peterson Dr., Wheeling, IL 60090

## APPENDIX A

Test Date: 01-09-2007  
Company: RF Technologies  
EUT: ZigBee Asset Security Transceiver Model: 0800-0286 and 0800-0302  
Test: Peak Power Spectral Density - Conducted  
Operator: Jason Lauer  
Comment: High Channel: Frequency – 2.480 GHz

3 kHz Bandwidth = -19.29 dBm



1250 Peterson Dr., Wheeling, IL 60090

Company: RF Technologies, Inc.  
Model Tested: 0800-0302  
Report Number: 12906

## APPENDIX A

# NUMBER OF IEEE 802.15.4 ZIGBEE FREQUENCIES

## PART 15.247



Company: RF Technologies, Inc.  
Model Tested: 0800-0302  
Report Number: 12906

1250 Peterson Dr., Wheeling, IL 60090

## APPENDIX A

### **RFTECHNOLOGIES™**

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3125 N. 126<sup>th</sup> St. Brookfield, WI 53005  
1-800-669-9946 Ph: 262-790-1771  
Fx: 262-790-1784  
[info@rft.com](mailto:info@rft.com)  
[www.rft.com](http://www.rft.com)

---

Product Name: Asset Security Transceivers, 66 kHz & 262 kHz  
Owner: RF Technologies, Inc.  
Owner Model Number: 0800-0286 & 0800-0302  
FCC ID Number: KXU-ATZ2466 & KXU-ATZ24262  
Canadian ID Number: 2719A-ATZ2466 & 2719A-ATZ24262

List of 16 frequencies (channels) used by the RF Technologies Asset Security Transceivers.

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: 0800-0302  
Report Number: 12906

## APPENDIX A

# TIME OF OCCUPANCY GRAPHS

## PART 15.247

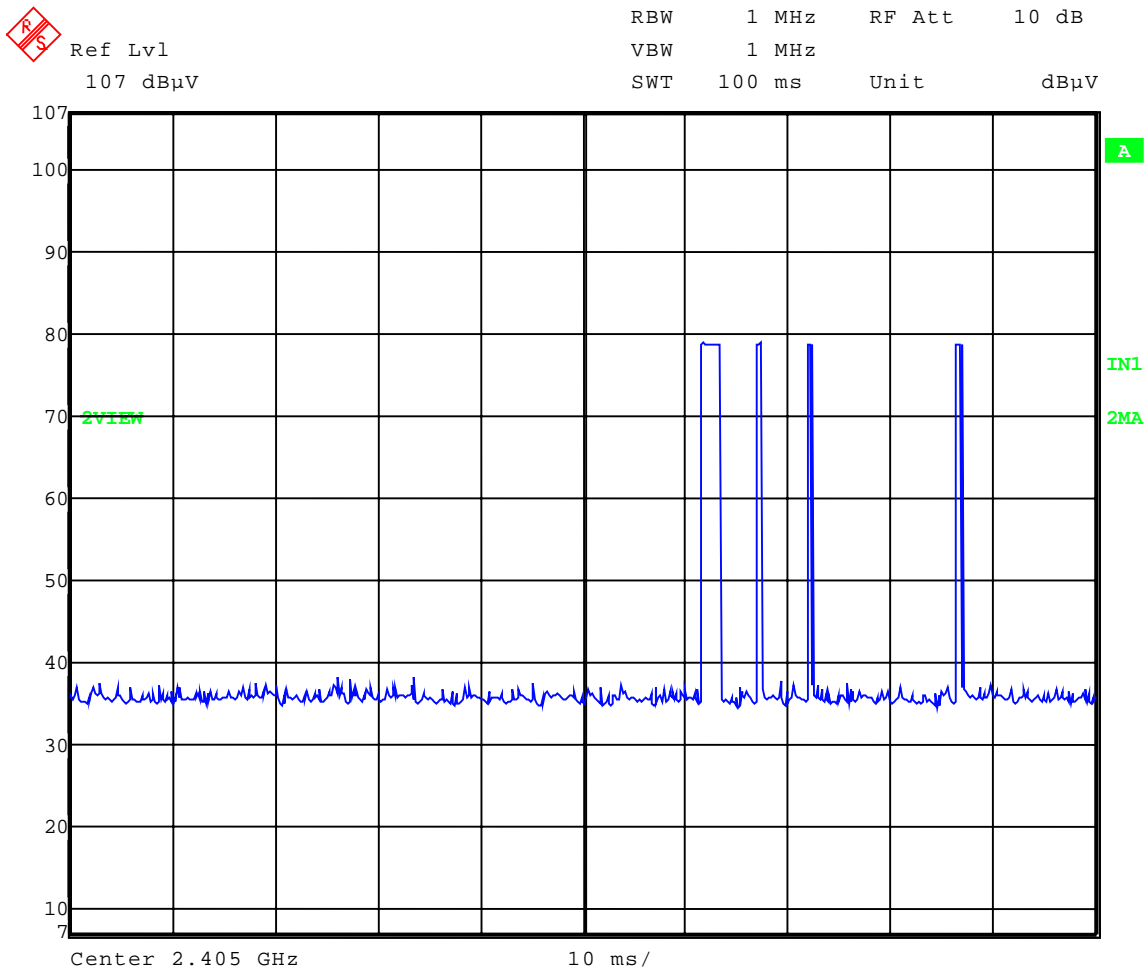


Company: RF Technologies, Inc.  
Model Tested: 0800-0302  
Report Number: 12906

1250 Peterson Dr., Wheeling, IL 60090

### APPENDIX A

Test Date: 01-09-2007  
Company: RF Technologies  
EUT: ZigBee Asset Security Transceiver Model: 0800-0286 and 0800-0302  
Test: Duty Cycle – maximum duty cycle during normal operation  
Operator: Jason Lauer  
Comment: Small Pulse – 1 x 440.882  $\mu$ s = 0.440882 ms  
Medium Pulse – 2 x 681.363  $\mu$ s = 1.362726 ms  
Large Pulse – 1 x 2.084168 ms = 2.084168 ms  
Total on Time = 3.89 ms during 100 ms Sweep  
 $20 \log (3.89/100) = 28.2$   
**Duty Cycle Correction Factor = 28.2 dB**



Date: 08.JAN.2007 14:50:38



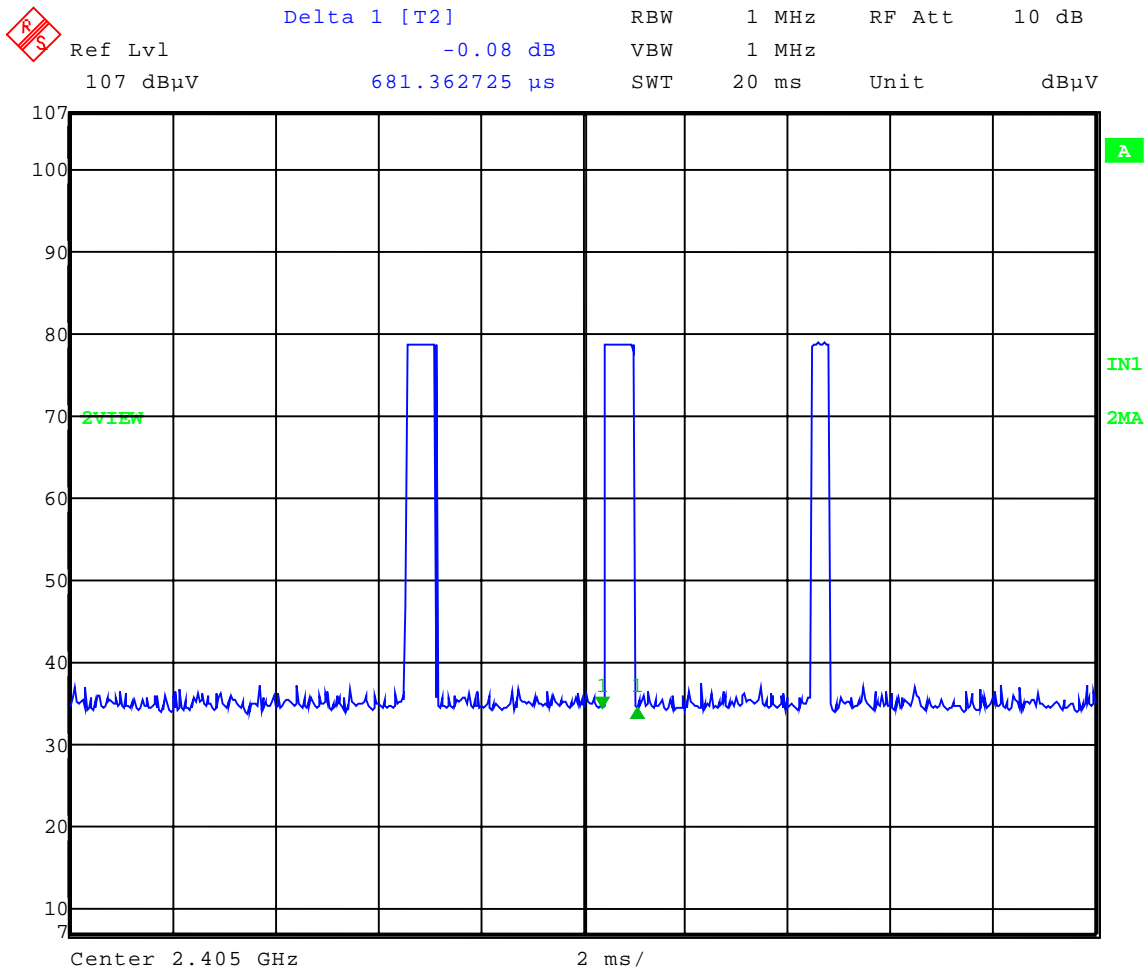


Company: RF Technologies, Inc.  
Model Tested: 0800-0302  
Report Number: 12906

1250 Peterson Dr., Wheeling, IL 60090

### APPENDIX A

Test Date: 01-09-2007  
Company: RF Technologies  
EUT: ZigBee Asset Security Transceiver Model: 0800-0286 and 0800-0302  
Test: Duty Cycle – maximum duty cycle during normal operation  
Operator: Jason Lauer  
Comment: Medium Pulse On Time



Date: 08.JAN.2007 14:52:47

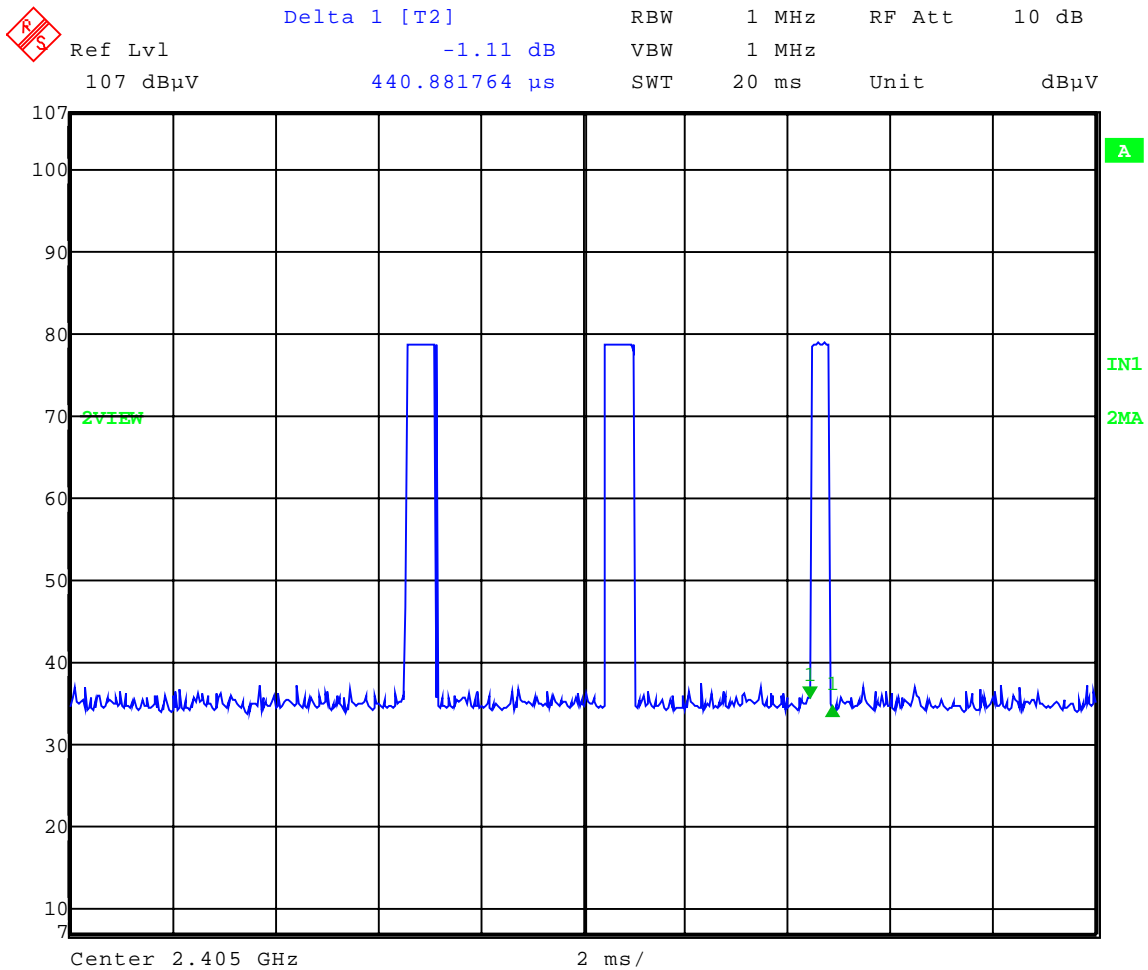


Company: RF Technologies, Inc.  
Model Tested: 0800-0302  
Report Number: 12906

1250 Peterson Dr., Wheeling, IL 60090

### APPENDIX A

Test Date: 01-09-2007  
Company: RF Technologies  
EUT: ZigBee Asset Security Transceiver Model: 0800-0286 and 0800-0302  
Test: Duty Cycle – maximum duty cycle during normal operation  
Operator: Jason Lauer  
Comment: Small Pulse On Time



Date: 08.JAN.2007 14:53:33

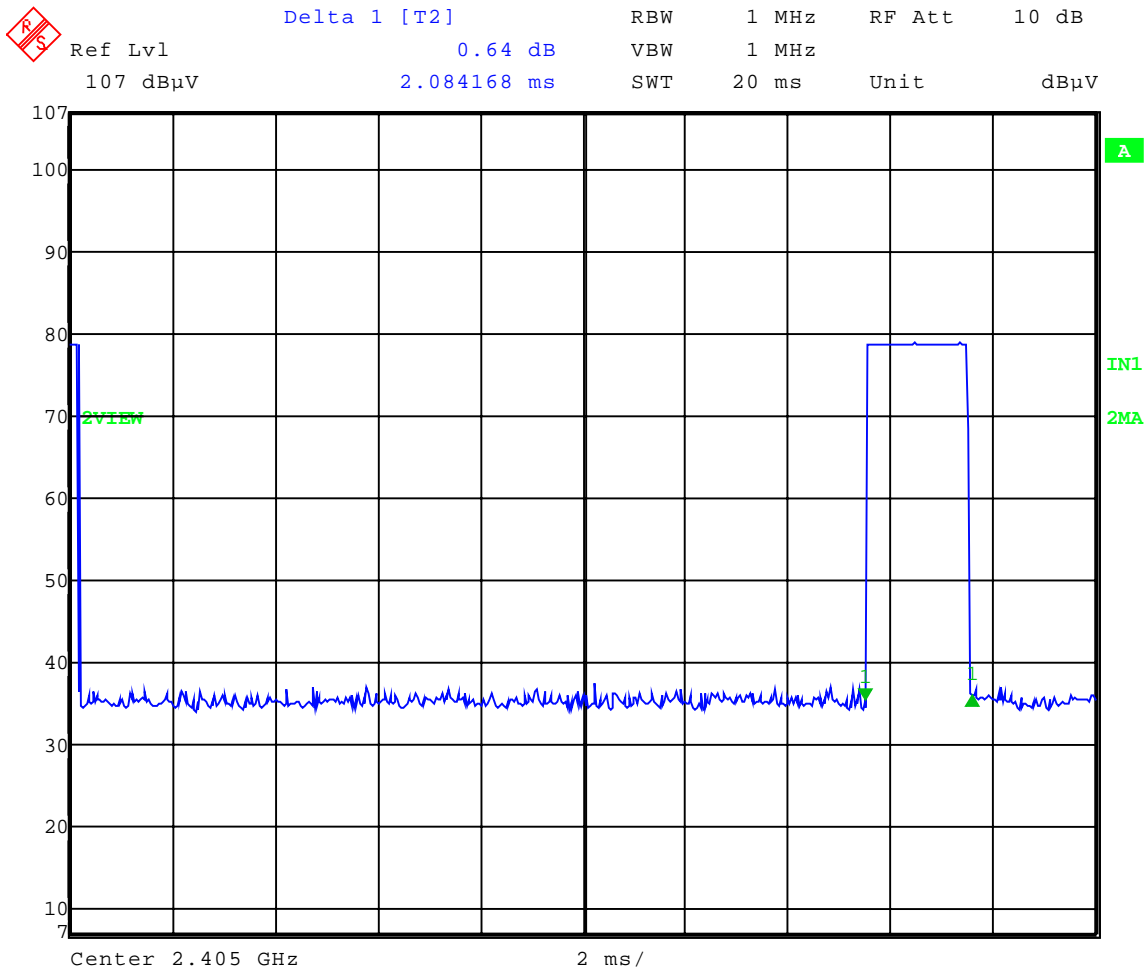


Company: RF Technologies, Inc.  
Model Tested: 0800-0302  
Report Number: 12906

1250 Peterson Dr., Wheeling, IL 60090

### APPENDIX A

Test Date: 01-09-2007  
Company: RF Technologies  
EUT: ZigBee Asset Security Transceiver Model: 0800-0286 and 0800-0302  
Test: Duty Cycle – maximum duty cycle during normal operation  
Operator: Jason Lauer  
Comment: Large Pulse On Time



Date: 08.JAN.2007 14:54:28



1250 Peterson Dr., Wheeling, IL 60090

Company: RF Technologies, Inc.  
Model Tested: 0800-0302  
Report Number: 12906

## APPENDIX A

# CONDUCTED PEAK OUTPUT POWER GRAPHS

## PART 15.247



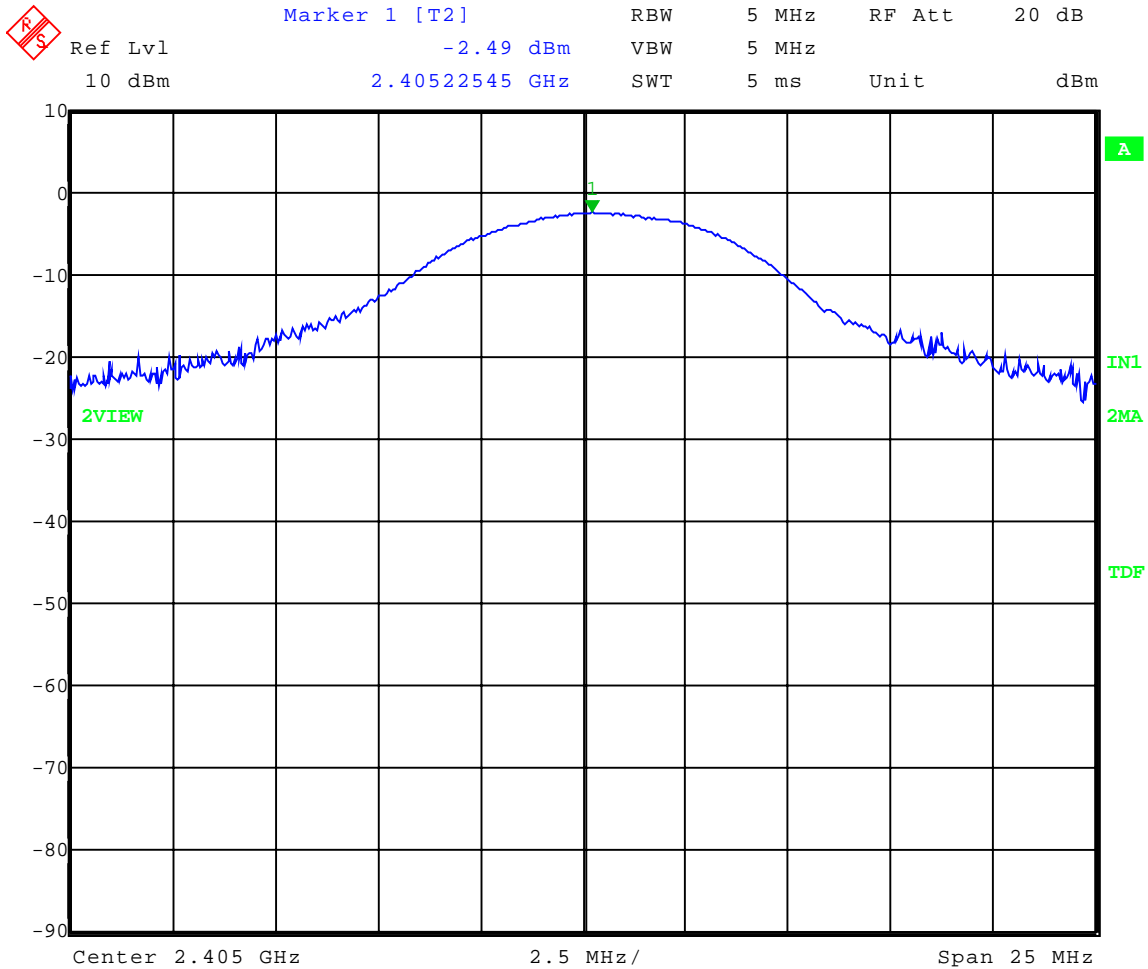
Company: RF Technologies, Inc.  
Model Tested: 0800-0302  
Report Number: 12906

1250 Peterson Dr., Wheeling, IL 60090

### APPENDIX A

Test Date: 01-09-2007  
Company: RF Technologies  
EUT: ZigBee Asset Security Transceiver Model: 0800-0286 and 0800-0302  
Test: Peak Power Output - Conducted  
Operator: Jason Lauer  
Comment: Low Channel: Frequency - 2.405 GHz

Peak Output Power = -2.49 dBm = 0.56 mW



Date: 9.JAN.2007 10:35:11



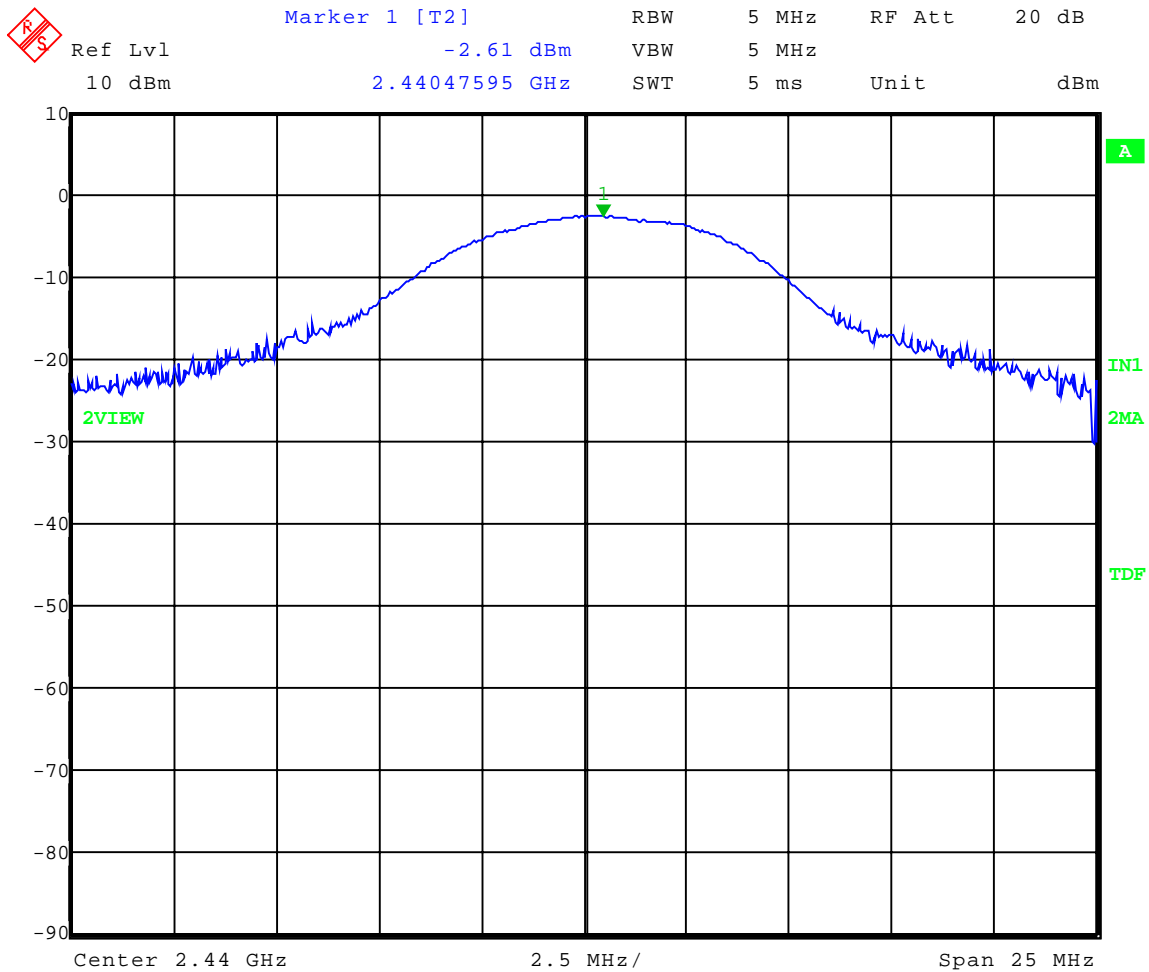
Company: RF Technologies, Inc.  
Model Tested: 0800-0302  
Report Number: 12906

1250 Peterson Dr., Wheeling, IL 60090

### APPENDIX A

Test Date: 01-09-2007  
Company: RF Technologies  
EUT: ZigBee Asset Security Transceiver Model: 0800-0286 and 0800-0302  
Test: Peak Power Output - Conducted  
Operator: Jason Lauer  
Comment: Middle Channel: Frequency - 2.440 GHz

Peak Output Power = -2.61 dBm = 0.55 mW



Date: 9.JAN.2007 10:39:02



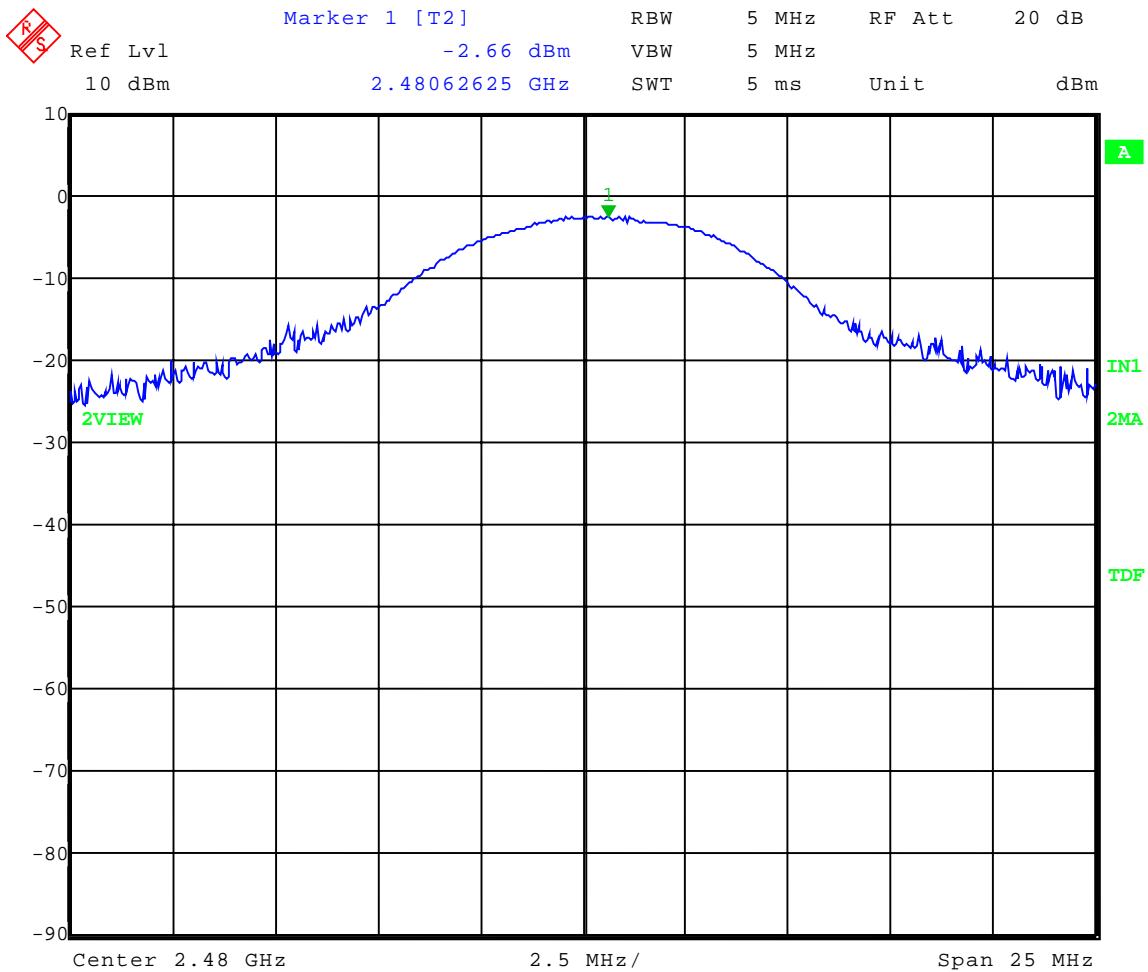
Company: RF Technologies, Inc.  
Model Tested: 0800-0302  
Report Number: 12906

1250 Peterson Dr., Wheeling, IL 60090

### APPENDIX A

Test Date: 01-09-2007  
Company: RF Technologies  
EUT: ZigBee Asset Security Transceiver Model: 0800-0286 and 0800-0302  
Test: Peak Power Output - Conducted  
Operator: Jason Lauer  
Comment: High Channel: Frequency – 2.480 GHz

Peak Output Power = -2.66 dBm = 0.54 mW



Date: 9.JAN.2007 10:57:59