



INGENIUM TESTING, LLC

ELECTROMAGNETIC INTERFERENCE (EMI)

CERTIFICATION TEST REPORT FOR THE

DICKSON COMPANY WIZARD2 MODULE

DOCUMENT NUMBER CTR-10-0110, REVISION DRAFT

APPROVAL		RESPONSIBILITY	SIGNATURE	DATE
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1.0 SCOPE

Between October 28TH, 2009 and May 19, 2010, a series of radiated RF Emissions (EMC) tests were performed on one production sample consisting of two units of the WIZARD2 MODULE, tagged as Logger and Receiver, here forth referred to as the “*Equipment Under Test*” or “*EUT*”. The emissions characteristics of the EUT were tested in transmit and receive modes and the results are covered in this report.

The radio frequency (RF) emission tests were performed in accordance with 47 CFR, issue (2008-10), Subpart C, for an *Intentional Radiator* product, qualifying under section 15.249, as well as Subpart B, for an *Un-Intentional Radiator* product, qualifying under section 15.109, using the emission standards test procedures outlined in ANSI C63.4 (2003), with test instruments adhering to CISPR 16-2 guidelines.

The tests were performed to allow verification, in part, of the product’s EMI compliance in accordance with the EMC standards in the United States of America and abroad. The tests were performed by Rick Hill, Lead EMC/EMI Technician at Ingenium Testing.

2.0 GENERAL PRODUCT DESCRIPTION

2.1 General operational description of the WiZARD2 system

Logger:

Each logger takes a reading every sample interval which can range from 10 seconds up to 1 hour. After taking five samples or after five minutes, the logger will send a thirty two byte packet upstream to its target unit. If the logger receives an acknowledgement for the packet, that is the end of it. If the logger does not receive an acknowledgement, it will store the readings and try again after another sample interval or five minutes whichever comes first. Since it is a logger, it can store up to 32,000 samples during a period of non communication to avoid data loss

Repeater:

Each repeater looks for packets addressed to its id. When it receives a packet addressed to it, it sends an acknowledgement and then transmits the packet upstream to its target unit. If it receives an acknowledgement it returns to listening downstream for more packets. If it does not receive an acknowledgement, it will retry at random intervals (to avoid collisions) until it receives an acknowledgement.

Receiver:

There is one and only one receiver per system. It is the final upstream targeted address. When it receives a packet addressed to it, it sends an acknowledgement and stores the packet in a buffer for retrieval by a program running in the base PC. The receiver is connected to the base PC at all times via USB. If the buffers in the receiver become full or the PC is disconnected, the receiver will no longer acknowledge packets.

Base PC:

WiZARD software runs on the Base PC and continuously polls the receiver via USB. The software maintains a database of readings from the loggers and allows the user to view this data in a wide variety of methods. The software can also send commands to the receiver which will be embedded in the acknowledgements that are sent when a packet is received.

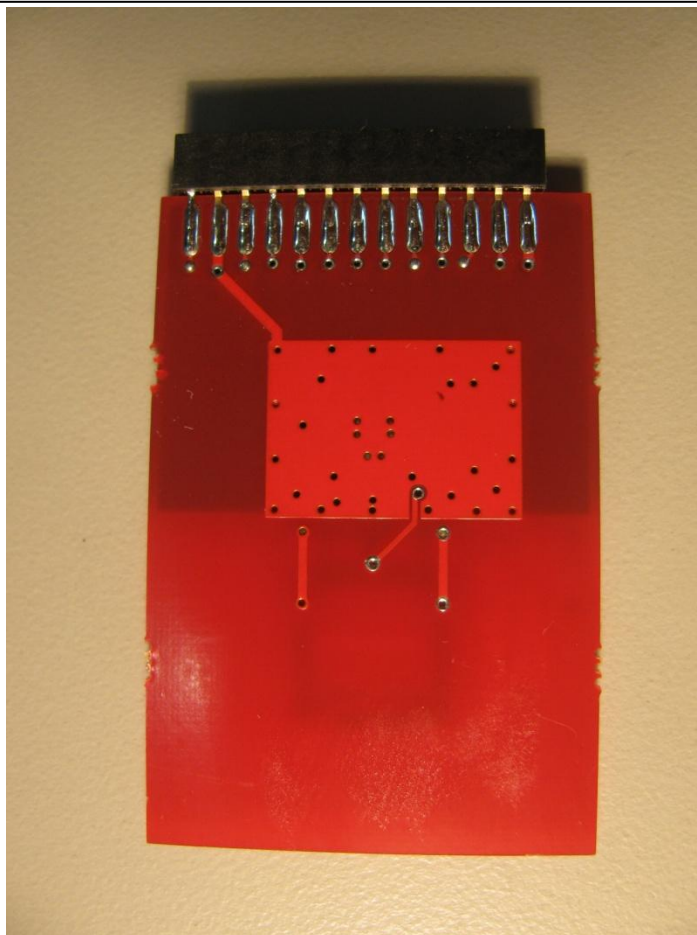


Figure 1 Dickson WiZARD2 Module

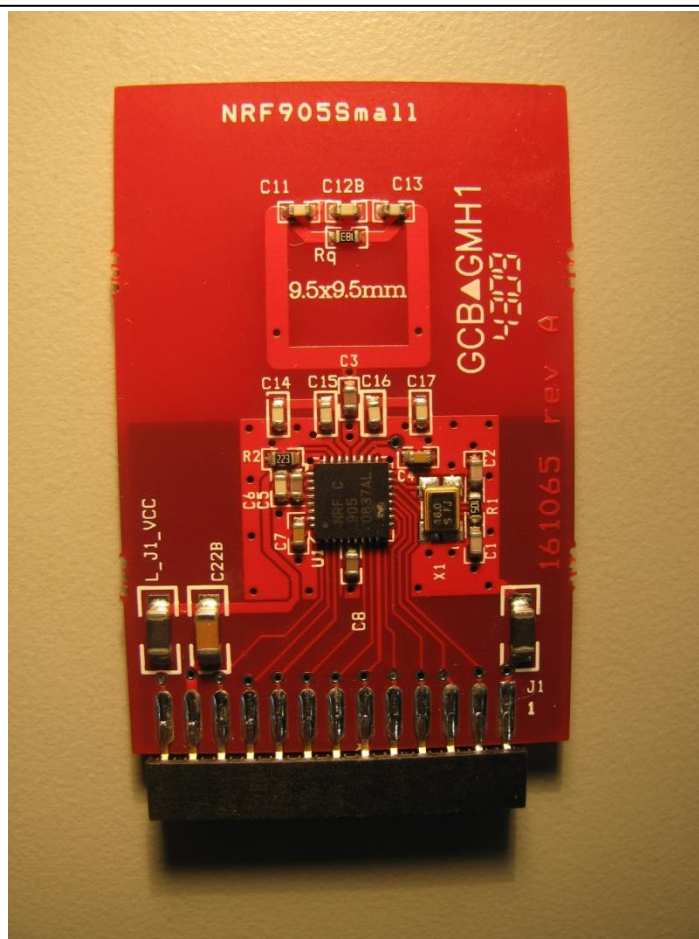


Figure 2: Dickson WiZARD2 MODULE (Component Side)

2.2 Modes of Operation

The WiZARD2 Module is comprised of two units with separate modes of operation: Logger and Receiver.

- **Logger:** Information is sent to the Receiver in a burst transmission.
- **Receiver:** The information from the Logger is received and stored to a computer via USB.

One sample consisting of both Logger and Receiver was provided for testing.

2.3 Mode of Operation during RF Emission Testing

The logger was placed in CW mode for Radiated and Conducted Emissions during the peak receiver scan. The Logger was placed in pulse mode for recording the pulse width for the Average calculation. This mode is to transmit a single pulse of data to the receiver.

For receiver test, the Receiver unit was tested in receive mode.

3.0 EQUIPMENT UNDER TEST (EUT)

The following information has been supplied by the applicant.

Product Name:	WiZARD2 MODULE
Model Number:	WiZARD2 MODULE
Serial Number:	Engineering Unit

Table 1: Equipment Under Test (EUT) Product Information

3.1 Equipment Under Test (EUT) Technical Specifications:

Frequency Range (in MHz)	919.1384 MHz
Field Strength	76.064 dBμV/m at 3m
Transmitter Spurious (worst case)	21.71389 dBμV/m at 3m
Operating Temperature Range	-10°C (14F) to +70°C (158F)
EUT will be operated under FCC Rule Part(s)	47 CFR 15.249
Modular Filing	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Design Engineer (optional)	N/A
Cabinet Size	NA
Cabinet Weight	0.2 Pounds
Power Requirements	One 3.6V 1/2AA 1200mAh Lithium Battery, ER14250H, LS14250 or equivalent
Environmental Operating conditions	Residential and Light Industrial
Communication Ports	USB

Table 2: Equipment Under Test (EUT) Technical Specifications

3.2 Associated Antenna Description

The antenna in the system is an integrated internal PC-Board trace monopole antenna.
 There are no contingencies for any other types of antennas.
 The antenna is not accessible to the end user.
 The antenna is not adjustable.

4.0 APPLICABLE NORMATIVE DOCUMENTS

Table 3: Regulatory Documents

Publication	Year	Title
47 CFR, Parts 0-15 (FCC)	Release Date 2008-07-10	United States of America Code of Federal Regulations Title 47 – Telecommunications.
RSS-210	Issue 7 (2007-06)	Industry Canada Spectrum Management and Telecommunications Radio Standard Specification. Low-power License-Exempt Radio communication Devices (All Frequency Bands): Category I Equipment.
ANSI C63.4	2003	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low- Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.
CISPR 16-1-1	Edition 2.1 (2006-11)	Specification for radio disturbance and immunity measuring apparatus and methods. Part 1-1: Measuring Apparatus.
CISPR 16-1-2	Edition 1.2 (2006-08)	Specification for radio disturbance and immunity measuring apparatus and methods. Part 1-2: Ancillary equipment – conducted disturbances.
CISPR 16-2-1	Edition 1.1 (2005-09)	Specification for radio disturbance and immunity measuring apparatus and methods. Part 2-1: Conducted disturbance measurement.
CISPR 16-2-2	Edition 1.2 (2005-09)	Specification for radio disturbance and immunity measuring apparatus and methods. Part 2-2: Measurement of disturbance power.
CISPR 16-2-3	Edition 2.0 (2006-07)	Specification for radio disturbance and immunity measuring apparatus and methods. Part 2-3: Methods of Measurement of disturbance and immunity – Radiated disturbance measurements.

Table 4: Non-Regulatory Controlled Documents from Ingenium Testing, LLC.

Document	Owner	Title
JCEAQ1063	Ingenium Testing, LLC	Statement of Work

5.0 OPERATIONAL DEFINITIONS AND PERFORMANCE CRITERION

Manufacturer and Device-Specific Operational Definitions:

The Wizard2 Receiver/Repeater/Logger is a wireless data transceiver used to receive and send data such as temperature, humidity, etc. and store it in a database on a pc. Typically the Wizard2 Receiver is connected to a computer and is powered through an external power adapter. The Wizard2 also has battery backup of four AA batteries.

5.1 Applicable Test Matrix and Test Results

The following matrix defines the scope of testing as covered by this report, and agreed to between Dickson Company (Client) and Ingenium Testing, LLC.

This series of testing is performed to verify that the electromagnetic performance of the “Wizard 2” adheres to the expected performance stated in the aforementioned standards. These tests verified that the transmitter characteristics met the specific limits dictated by 47CFR 15.249, and that the receiver characteristics met the specific limits dictated by 47CFR 15.109. The following matrix describes the test regiment.

Table 5: Test Matrix and Test Results

Port Definition	Terminal Name	Description/ Detail	Test Standard	Performance Criteria	Pass / Fail
Enclosure	N/A	Enclosure containing digital circuitry <i>Transmit Mode</i>	Radiated RF Emissions 47 CFR 15.249	30 MHz-12.0 GHz Measured RF Emission should be Below specified Limits	Pass
Power Mains	AC Power Lines	AC Power Mains <i>Transmit Mode</i>	Conducted RF Emissions 47 CFR 15.207	.150 MHz to 30 MHz Measured RF Emission should be Below specified Limits	Pass
Enclosure	N/A	Enclosure containing digital circuitry <i>Receive Mode</i>	Radiated RF Emissions 47 CFR 15.109	30 MHz-12.0 GHz Measured RF Emission should be Below specified Limits	Pass
Power Mains	AC Power Lines	AC Power Mains <i>Receive Mode</i>	Conducted RF Emissions 47 CFR 15.107	.150 MHz to 30 MHz Measured RF Emission should be Below specified Limits	Pass

Notes and Exceptions to Report

None.

6.0 DECLARATION OF CONFORMITY

The Dickson Company "Wizard2 Module" Intelligent Wireless Data Logging Solutions system, serial number "Logger and Receiver" were found to **MEET** the emission and performance requirements as described within the specifications of Title 47, Part 15, of the Code of Federal Regulations for the United States of America.

Dickson Company "Wizard2 Module" Intelligent Wireless Data Logging Solutions system meets the requirements of 47 CFR 15.249, subpart C, for an intentional radiator product in transmit mode, and meets the requirements of 47 CFR 15.109, subpart B, for an un-intentional radiator in receive mode. The conformity statement is limited in scope to the testing that was commissioned and administered and covered in this report.

If some emissions are seen to be within 3 dB of their respective limits:

As these levels are within the tolerances of the test equipment and site employed, there is a possibility that this unit, or a similar unit selected out of production may not meet the required limit specification if tested by another agency.

Ingenium Testing, LLC certifies that the data contained herein was taken under conditions that meet or exceed the requirements of the test specifications. The results in this Test Report apply only to the item(s) tested on the above-specified dates. Any modifications made to the EUT, subsequent to the indicated test date(s), will invalidate the data herein, and void this certification.

7.0 SIGNATORIES

The test matrix presented in this report was generated, in agreement, by the cognizant parties representing the client as the manufacturer of the equipment, and by the cognizant parties at Ingenium Testing. The performance of the tests and reporting of the results are accurate to the best of our collective knowledge as presented within the body of this report.

The testing of this product was approved by the cognizant parties representing the manufacturer:

Manufacturer Name:	DICKSON Dickson Company
Address:	930 S. Westwood Ave. Addison, IL 601101-4917 United States of America
Contact Person:	Mr. Steve Thompson Dickson Company 930 S. Westwood Ave. Addison, IL 601101-4917 United States of America PH: +1 630 563 4258 EM: sthompson@dicksondata.com

8.0 TEST FACILITY ACCREDITATION

Ingenium Testing, LLC is accredited by A2LA (American Association for Laboratory Accreditation) to conform to ISO/IEC 17025:2005, "General Requirements for the Competence of Calibration and Testing Laboratories."

Ingenium Testing's scope of accreditation includes all test methods listed herein, unless otherwise noted. A copy of the accreditation (testing certificate number 2674.01) may be accessed at the Ingenium Testing website (www.ingeniumtesting.com), and the accreditation status may be verified at the A2LA website (www.a2la.net).



The American Association for Laboratory Accreditation

World Class Accreditation

Accredited Laboratory

A2LA has accredited

INGENIUM TESTING, LLC

Rockford, IL

for technical competence in the field of

Electrical Testing

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005 *General Requirements for the Competence of Testing and Calibration Laboratories*. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communiqué dated 8 January 2009).

Presented this 5th day of May 2010.



Peter Mlynar

President & CEO
For the Accreditation Council
Certificate Number 2674.01
Valid to February 28, 2012

For the tests or types of tests to which this accreditation applies, please refer to the laboratory's Electrical Scope of Accreditation.



TESTING CERTIFICATE NUMBER 2674.01

8.1 Location of Test Facility

All testing was performed at Ingenium Testing, LLC, 3761 South Central Avenue, Rockford, Illinois, 61102-4292, United States of America, utilizing the facilities listed below, unless otherwise noted.

List of Facilities used at Ingenium Testing, LLC:

- 10-meter SEMC-Anechoic Chamber designated Chamber number 6.
- RF Shielded room designated Chamber 11.

9.0 ELECTROMAGNETIC EMISSION TESTS

9.1 Radiated RF Emissions Measurements

9.1.1 Test Criterion

Port Definition	Terminal Name	Description/ Detail	Test Standard	Performance Criteria	Pass / Fail
Enclosure	N/A	Alarm Enclosure containing digital circuitry <i>Transmit Mode</i>	Radiated RF Emissions 47 CFR 15.249	30 MHz-12.0 GHz Measured RF Emission should be Below specified Limits	Pass
Enclosure	N/A	Alarm Enclosure containing digital circuitry <i>Receive Mode</i>	Radiated RF Emissions 47 CFR 15.109	30 MHz-12.0 GHz Measured RF Emission should be Below specified Limits	Pass

The following tables present the limits for intentional radiated RF emissions, at the fundamental frequency, and harmonic frequencies as specified in Title 47 CFR, Part 15.249, section (a). These limits were also applied to any signals found in the restricted frequency bands as defined in 47 CFR, Part 15.205.

Emission	Field Strength Limit at 3m (mV/m)	Field Strength Limit at 3m (μV/m)	Field Strength Limit at 3m (dBμV/m)
Fundamental: 902-928 MHz	50.0	50,000.0	93.9
Harmonic: 2 nd through 10 th	-	500.0	53.9
Spurious:	-	500.0	53.9

Table 6: Field Strength Limit for Intentional Radiators under 47 CFR 15.249

The following table presents the limits for unintentional radiated RF emissions as specified in Title 47 CFR, Part 15.109, section (a), for products qualifying as Class B Digital Devices. These limits were also applied to any signals found in the restricted frequency bands as defined in 47 CFR, Part 15.205.

Frequency (MHz)	Field Strength Limit at 3m ($\mu\text{V/m}$)	Field Strength Limit at 3m ($\text{dB}\mu\text{V/m}$)
30 – 88	100.0	40.0
88 - 216	150.0	43.5
216 – 960	200.0	46.0
Above 960	500.0	54.0

Notes:

In the calculations for margin below the limit, the limits are rounded to one digit past the decimal.

9.1.2 Test Equipment

All equipment is calibrated according to governing standards, and is N.I.S.T. traceable. The equipment is used according to the operation manuals as provided by the manufacturers.

Table 7: List of Test Equipment January:

Ingenium Asset Number	Description	Manufacturer	Model	Last Cal data	Cal due date
1206	PRESECTOR, RF	AGILENT	N9039A	12-Jan-10	12-Jan-11
1207	SPECTRUM ANALYZER	AGILENT	E4440A	12-Jan-10	12-Jan-11
1753	CABLE, 56ft, TRUE BLUE .290	STORM PRODUCTS	PR90-206-670	10-Aug-09	10-Aug-10
1751	CABLE, 8 ft., TRUE BLUE .290	STORM PRODUCTS	PR90-206-118	9-May-09	9-May-10
RP-0057	PREAMPLIFIER	AGILENT	8449B	13-Oct-09	13-Apr-10
RP-0054	PREAMPLIFIER	HP	8447D	13-Oct-09	13-Apr-10
1351	ANTENNA, HORN	ETS LINDGREN	3117	10-Mar-09	10-Mar-10
1361	ANTENNA, BICONILOG	EMCO	3142C	18-Dec-09	18-Dec-10

Table 8: List of Test Equipment May:

Ingenium Asset Number	Description	Manufacturer	Model	Last Cal data	Cal due date
1360	ANTENNA, BICONILOG	EMCO	3142C	19-Nov-09	19-Nov-10
1750	CABLE, 6FT, TRUE BLUE .290	STORM PRODUCTS	PR90-195-098	4-Aug-09	4-Aug-10
1753	CABLE, 56ft, TRUE BLUE .290	STORM PRODUCTS	PR90-206-670	10-Aug-09	10-Aug-10
RP-0054	PREAMPLIFIER	HP	8447D	28-Mar-10	28-Sep-10
1206	PRESELECTOR, RF	AGILENT	N9039A	12-Jan-10	12-Jan-11
1207	SPECTRUM ANALYZER	AGILENT	E4440A	12-Jan-10	12-Jan-11
1352	ANTENNA, HORN	ETS LINDGREN	3117	18-Nov-09	18-Nov-10
0833	PREAMPLIFIER, 26dB	HP	8449B	13-Apr-10	13-Oct-10

May Testing

The data presented accounts for the antenna correction factor as well as cable loss or other corrections, and can, therefore, be entered into the database as a corrected measurement result.

9.1.3 Test Setup

The EUT was tested as a “table-top device” type product, as described in ANSI C63.4. The EUT was placed on a non-conductive table, centered on a flush-mounted 3 meter-diameter turntable in the 10 Meter FCC Listed Semi-Anechoic Chamber located at Ingenium Testing. The test setup complies with the necessary procedures as described in the ANSI standard. The EUT was exercised under standard operating conditions, and powered by four type ‘AA’ batteries or by a wall transformer. This radio was tested in three orthogonal positions to determine worse case emissions. The data found in Table 10 have been determined to be worse case emissions.

Test Setup Photos:

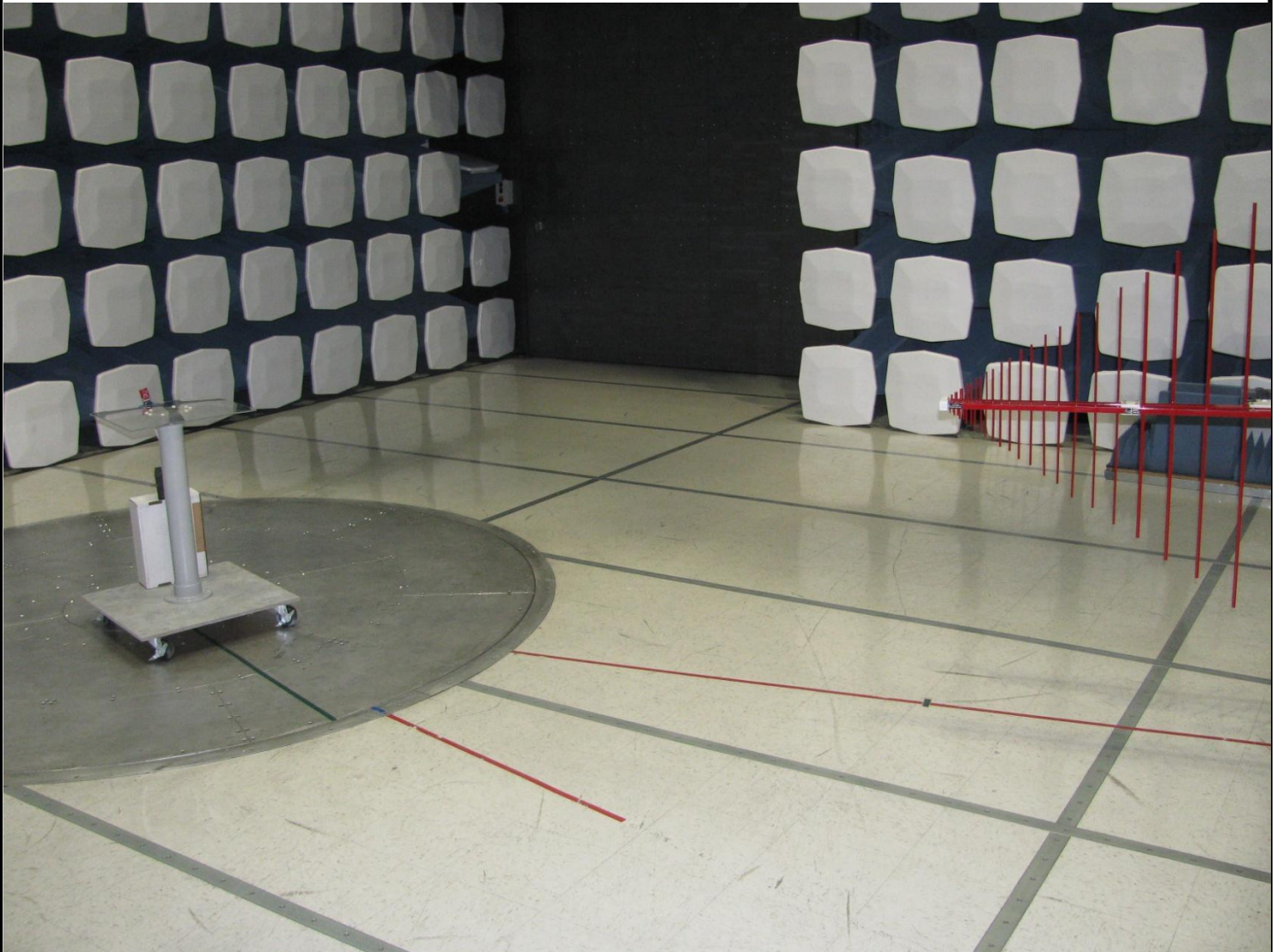


Figure 3: Setup of the Logger for Radiated Emissions 80 MHz to 1000MHz

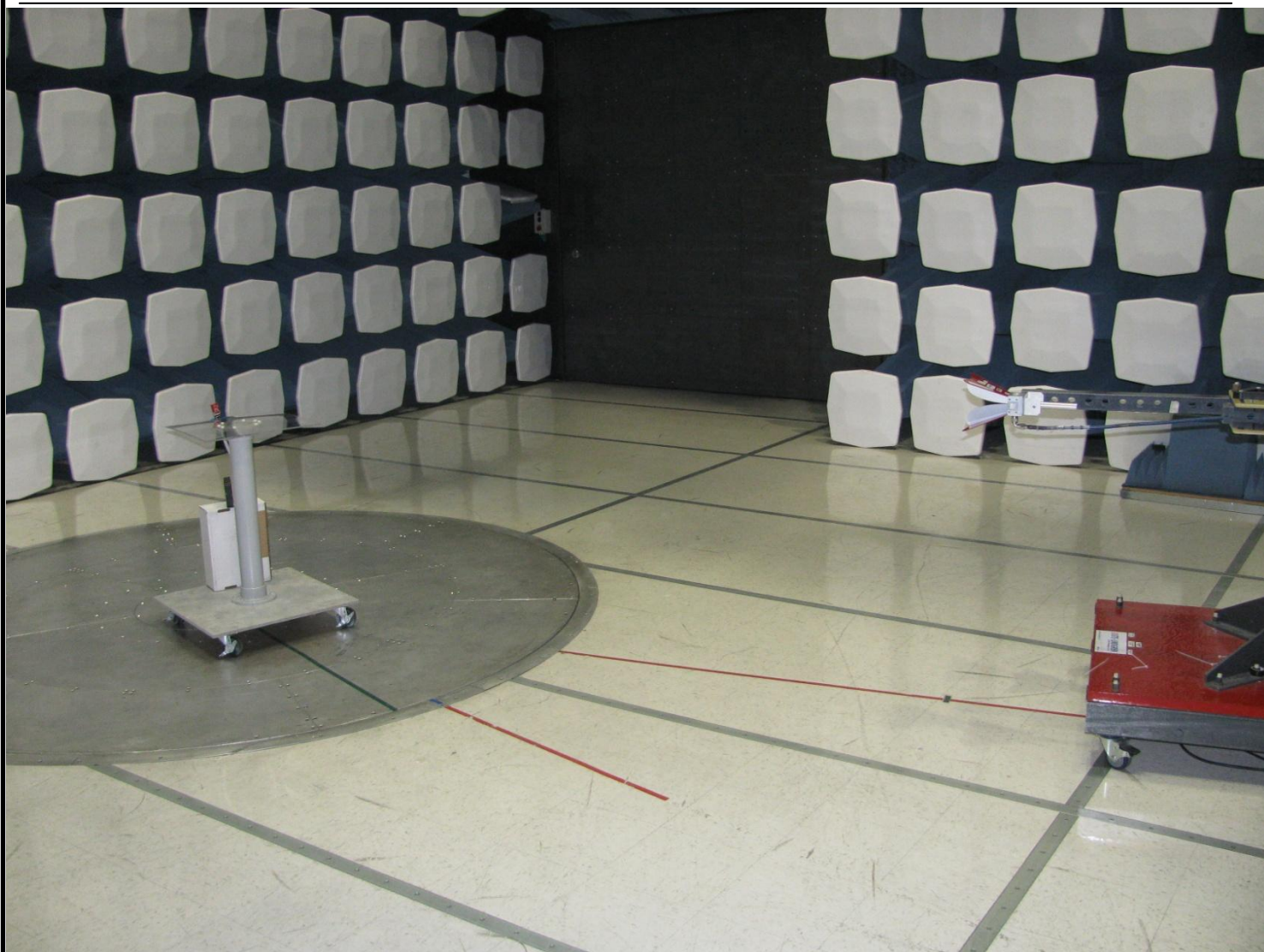


Figure 4: Setup of the Logger for Radiated Emissions 1 GHz to 12.5 GHz

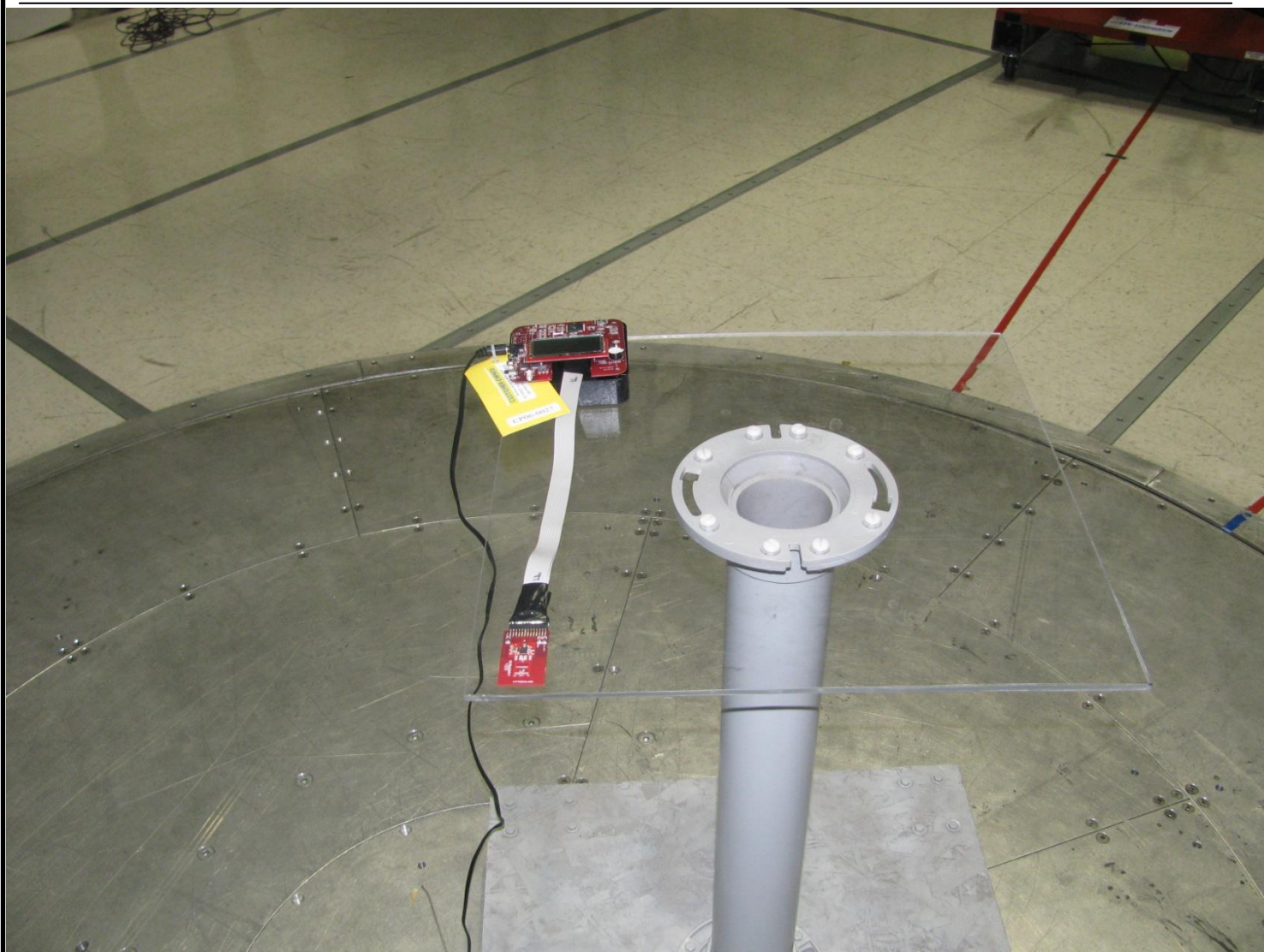


Figure 5: Setup of the Logger for Radiated Emissions Back Axis



Figure 6: Setup of the Logger for Radiated Emissions Side Axis

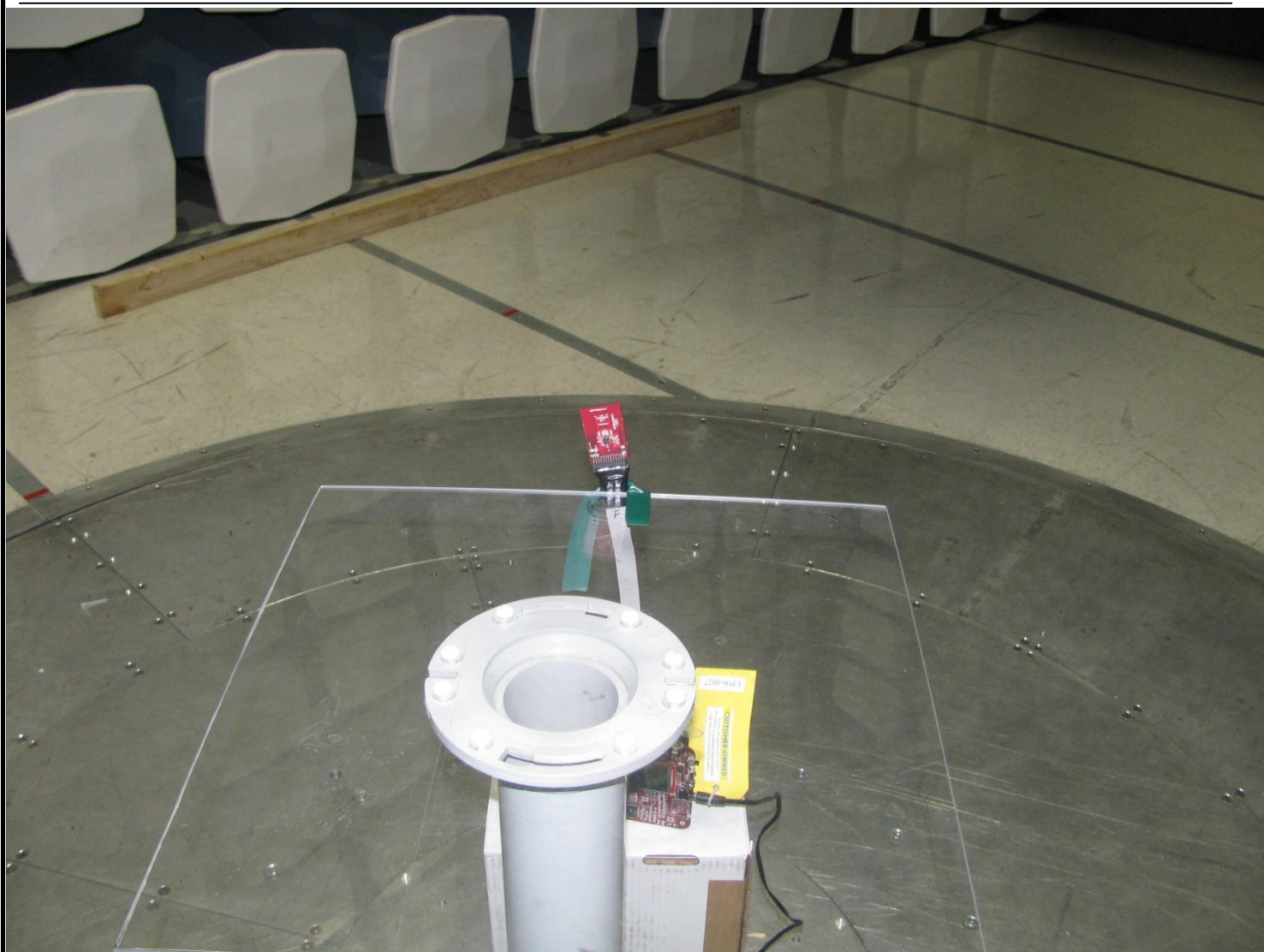


Figure 7: Setup of the Logger for Radiated Emissions Upright Axis

9.1.4 Test Procedure

The EUT was measured for Radiated RF Emissions in the 10 Meter FCC Listed Semi-Anechoic Chamber located at Ingenium Testing. The frequency range from 30 MHz to 12.5 GHz was investigated for RF emissions, and emission levels were noted along with the fixed degree settings of azimuth on the turntable and sense antenna height. The EUT was placed on a non-conductive table, centered on a turn-table with a conductive rotating surface, flush and in contact with the conductive ground plane. The antenna mast was placed such that the antenna was separated by 3 meters from the test object for testing. A Hybrid Bicon-Log Antenna was used to measure emissions from 30 MHz to 1000 MHz. A Double-Ridged Wave-Guide Horn Antenna was used to measure emissions from 1 GHz to 12.5 GHz. The maximum radiated emissions were found by raising and lowering the antenna between 1 and 4 meters in height, while utilizing the turn-table to rotate the product. The process was repeated using both horizontal and vertical antenna polarizations. The maximum emission levels were then recorded along with the attitude of the product.

The EUT was programmed in advance, by the client cognizant engineer, in the proper mode. The mode tested was in continuous-transmit CW, for the intentional radiator testing, and in stand-by for the un-intentional radiator testing. The alarm sounder was deactivated in order to conserve battery power during CW testing.

The applicable limits as noted in 47 CFR 15.249 were applied for the intentional radiator tests. As per 47 CFR 15 Section 15.31 (e), the transmitter was tested at 85% and 115% as well as nominal. The transmitter can also operate on battery power and this was checked also.

The applicable limits as noted in 47 CFR 15.109 for a Class B type product were applied for the un-intentional radiator tests. The receiver was operated with a resolution bandwidth (RBW) of 120 kHz for measurements below 1 GHz (video bandwidth of 300 kHz), and a bandwidth of 1 MHz for measurements above 1 GHz (video bandwidth of 3 MHz).

9.1.5 Test Results

The EUT was found to **MEET** the requirements as described within the specifications of the FCC, Title 47 CFR, Part 15.249 for radiated emissions from an intentional radiator.

The EUT was found to **MEET** the requirements as described within the specifications of the FCC, Title 47 CFR, Part 15.109 for radiated emissions from a Class B product, as well as the Industry Canada requirements specified within ICES-003 for a Class B digital device. Supporting evidence of significant measured RF emissions, are tabulated and presented below.

CLIMATE TEST CONDITIONS

Temperature:	73 °F (22.8 °C)
Humidity:	48 % RH

Table 9: Level of Significant Spurious Radiated RF Emissions

Mode (Tx / Rx)	Frequency (MHz)	Antenna Polarization	Height (cm)	Azimuth (0° - 360°)	Type of Measurement	Measured EFI (dBμV/m@3m)	15.109 Limit (dBμV/m@3m)	Margin (dB)
Rx	30.06	H	206.1	296.3	Peak	17.60	40	22.4
Rx	106.7998	H	399.6	314.3	Peak	9.8777	43.5	33.6223
Rx	735.82	H	100.3	360	Peak	25.94	46	20.06
Rx	30.88512	V	305	122.9	Peak	15.63	40	24.37
Rx	101.5981	V	100.3	122.9	Peak	9.289	43.5	34.211
Rx	474.1145	V	305	350	Peak	21.127	46	24.873
TXnom	48.0066	V	143.4	67.532	Peak	19.86216	40	20.13784
TXnom	199.993	V	143.4	67.5	Peak	21.44568	43.5	22.05433
TXnom	459.559	V	245.3	67.5	Peak	25.831	46	20.169
TXnom	184.0187	H	145.6	22.8	Peak	23.21565	43.5	20.28435
TXnom	200.0236	H	244.3	336.5	Peak	23.06688	43.5	20.43312
TXnom	459.559	H	255.4	157.6	Peak	25.69223	46	20.30777
TX85%nom	34.18412	V	253.6	22.1	Peak	21.26386	40	18.73614
TX85%nom	48.00661	V	146.3	248.1	Peak	21.61816	40	18.38185
TX85%nom	96.02156	V	145.9	157.8	Peak	16.37289	43.5	27.12711
TX85%nom	200	V	144.2	68	Peak	22.18486	43.5	21.31514
TX85%nom	459.559	V	246	68	Peak	27.062	46	18.938
TX85%nom	200.0236	H	154.8	336.8	Peak	23.63388	43.5	19.86612
TX85%nom	459.559	H	255.7	247	Peak	26.12423	46	19.87577
TX115%nom	42.1563	V	144.5	243.3	Peak	21.71389	40	18.28611
TX115%nom	48.00661	V	151.9	198.3	Peak	21.23616	40	18.76384
TX115%nom	183.9883	V	144.1	63.4	Peak	20.12385	43.5	23.37615
TX115%nom	200	V	144.1	63.4	Peak	21.11863	43.5	22.38137
TX115%nom	459.5893	V	244.8	243.3	Peak	25.19561	46	20.80439
TX115%nom	55.97878	H	355.7	333.4	Peak	14.41953	40	25.58047
TX115%nom	184.0187	H	150.8	161.5	Peak	21.948032	43.5	21.55197
TX115%nom	200.0236	H	154.4	333.4	Peak	24.08888	43.5	19.41112
TX115%nom	459.559	H	255.9	161.5	Peak	24.80124	46	21.19877
TXBattery	168.0044	V	244.7	68	Peak	17.01525	47	29.98475
TXBattery	184.0187	V	245.1	68	Peak	19.32659	48	28.67341
TXBattery	200.054	V	244.7	247.5	Peak	18.30456	49	30.69544
TXBattery	459.559	V	245.1	68	Peak	23.748	50	26.252
TXBattery	168.0137	H	155.8	157.8	Peak	23.6919	50	26.3081
TXBattery	184.0187	H	145	202.6	Peak	26.30966	50	23.69034
TXBattery	200.0236	H	145	202.6	Peak	24.89189	50	25.10811

Table 10: Significant Radiated RF Emissions Measured in Transmit Fundamental and Harmonic Frequencies

Frequency (MHz)	Ant./EUT Polarization	Height (cm)	Azimuth (0° - 360°)	Measured Peak (dBμV/m@3m)	Calculated Average dBμV/m (Note 1)	Average Limit (dBμV/m)	Peak Limit (dBμV/m)	Average Margin (dB)
919.1384	V	107.8	138.8	76.064			93.9	41.716
1838.277	H	100.1	299.2	64.659	40.779	53.9	73.9	13.121
2757.415	V	100.1	329.5	72.889	49.009	53.9	73.9	4.891
3676.554	V	100.1	213.6	56.737	32.857	53.9	73.9	21.043
4595.692	-			(Note 2)				
5514.83	-			(Note 2)				
6433.969	-			(Note 2)				
7353.107	-			(Note 2)				
8272.246	-			(Note 2)				
9191.384	-			(Note 2)				

Notes:

- 1) See following for justification
- 2) Measurement at receiver system noise floor, and better than 20 dB below limits.

9.1.6 Calculated Average

The Second harmonic of the fundamental is at 2.757344 GHz. The EUT sends out one pulse every minute. Since this is a pulsed signal it cannot be properly measured with an average receiver, the pulse was captured and the pulse width measured 0Hz span with a window width 100ms sweep speed with a 1dB/div settings per ANSI C63.4 H.4 j. The pulse width is 6.4ms as shown below. Convert the dutycycle to dBμV/m using $20 \cdot \text{LOG} (6.4/100)$ yields a -23.88dB average correction factor. This is added to the peak signal at the 2.757344 GHz, 72.89dBuV+ (-23.88dB) = 49.01 dBuV, well under the average limit of 54dBuV.

Agilent 14:24:15 Jan 5, 2010

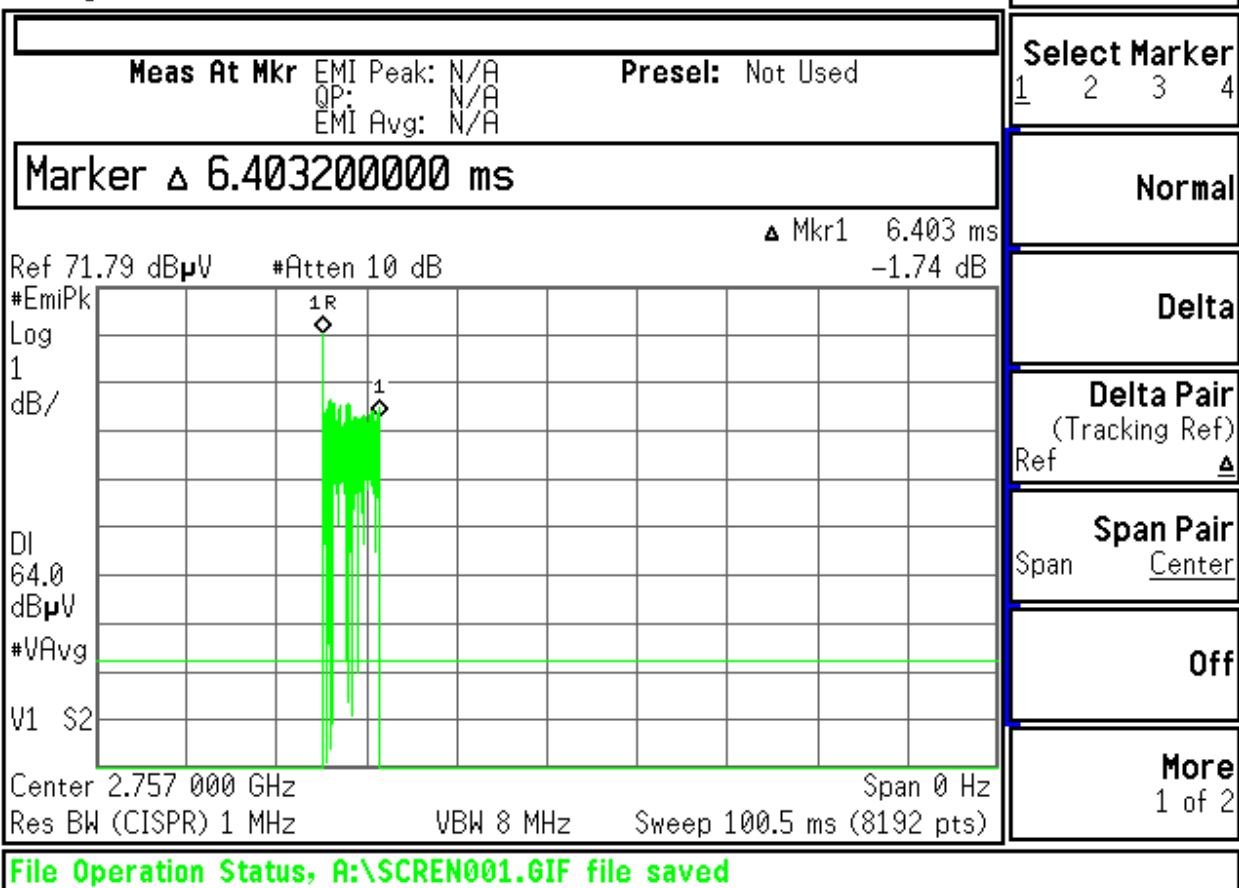


Figure 8 Pulse width of transmission

Agilent 10:27:15 Mar 18, 2010

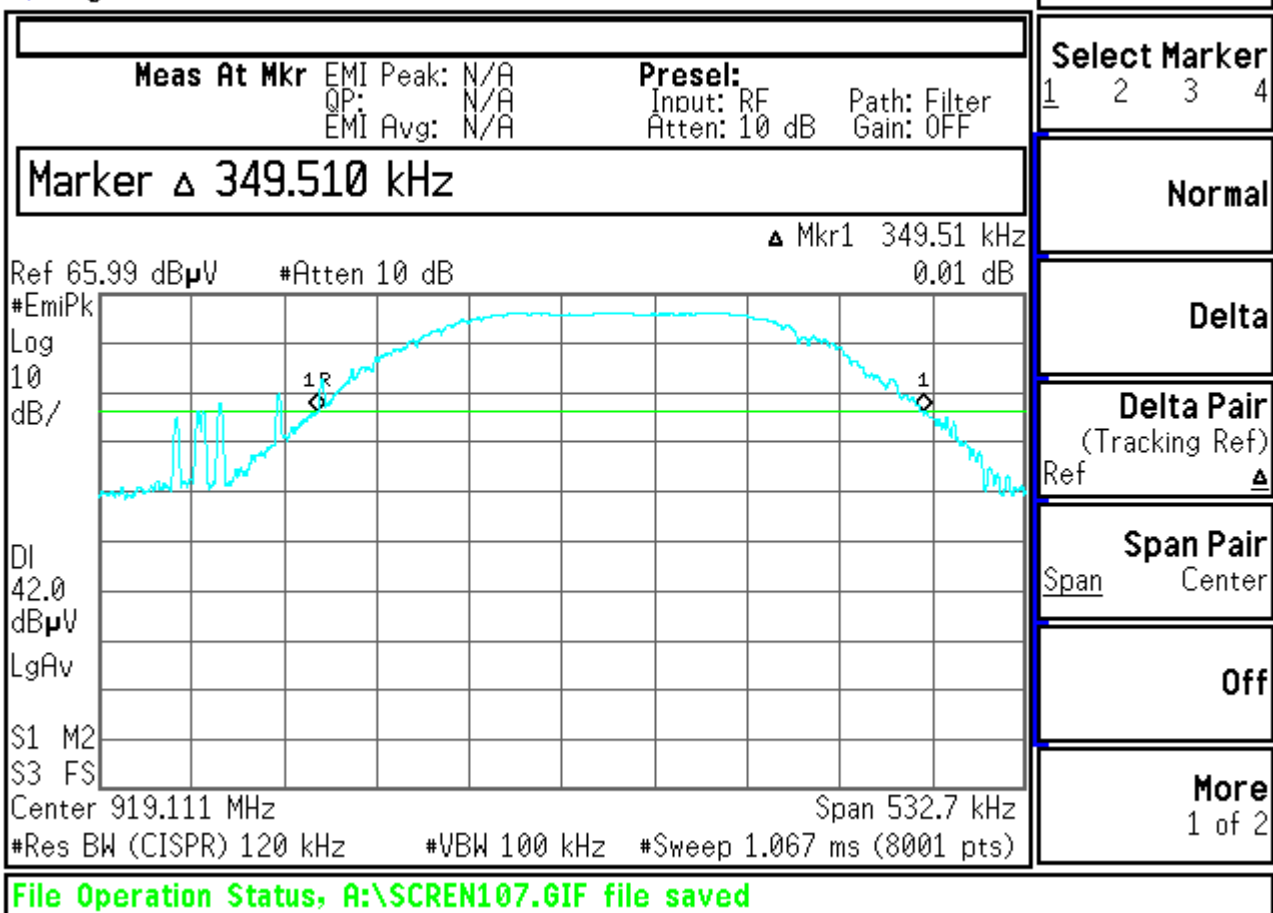


Figure 10 99% (20 dB down) of Peak

SCREEN CAPTURES – RADIATED RF EMISSIONS TESTING

These screen captures represent Peak Emissions. For radiated Emission measurements, a Quasi-Peak detector function is utilized when measuring frequencies below 1 GHz, and an Average detector function is utilized when measuring frequencies above 1 GHz.

The signature scans shown here are from **worst-case** emissions, as measured with the sense antenna both in vertical and horizontal polarity.

Transmit Mode

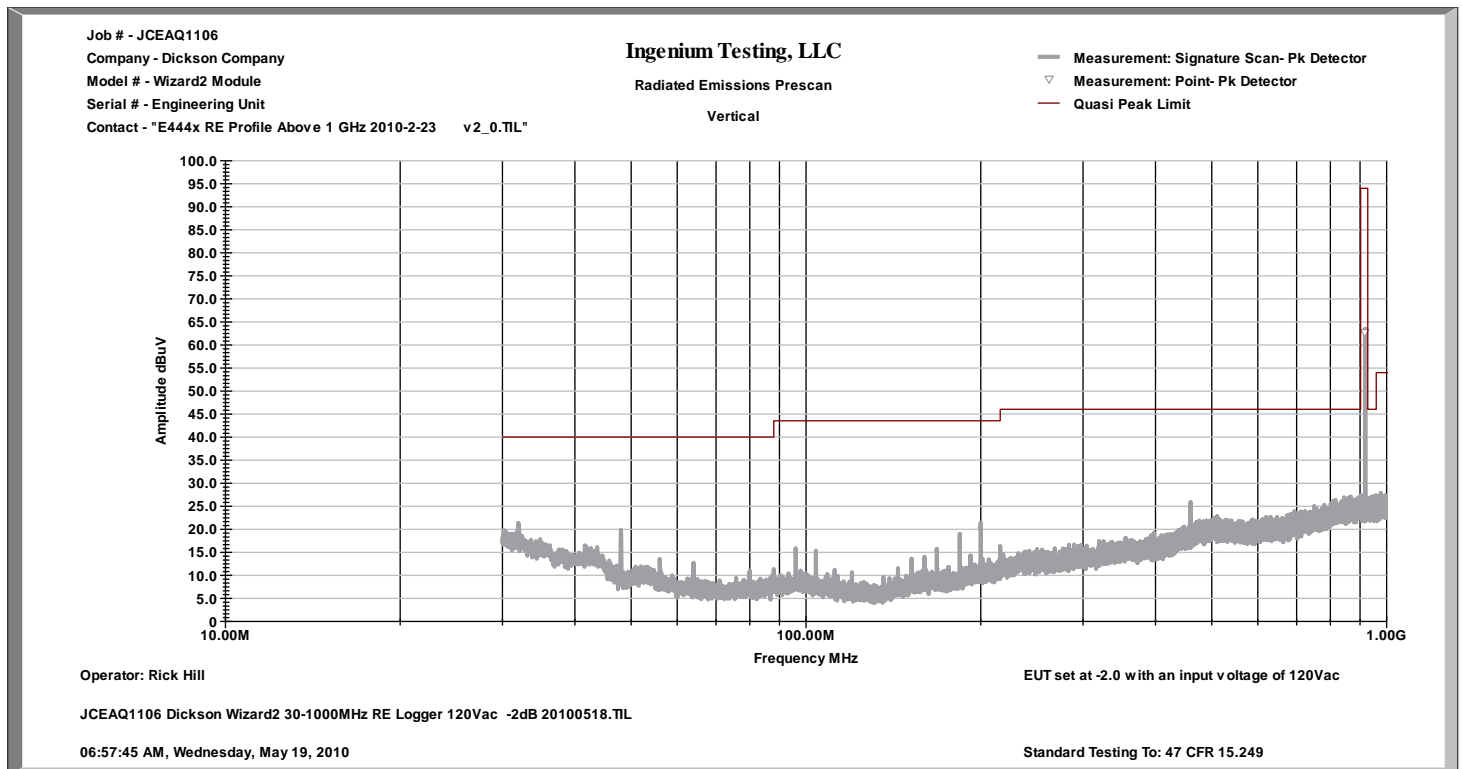
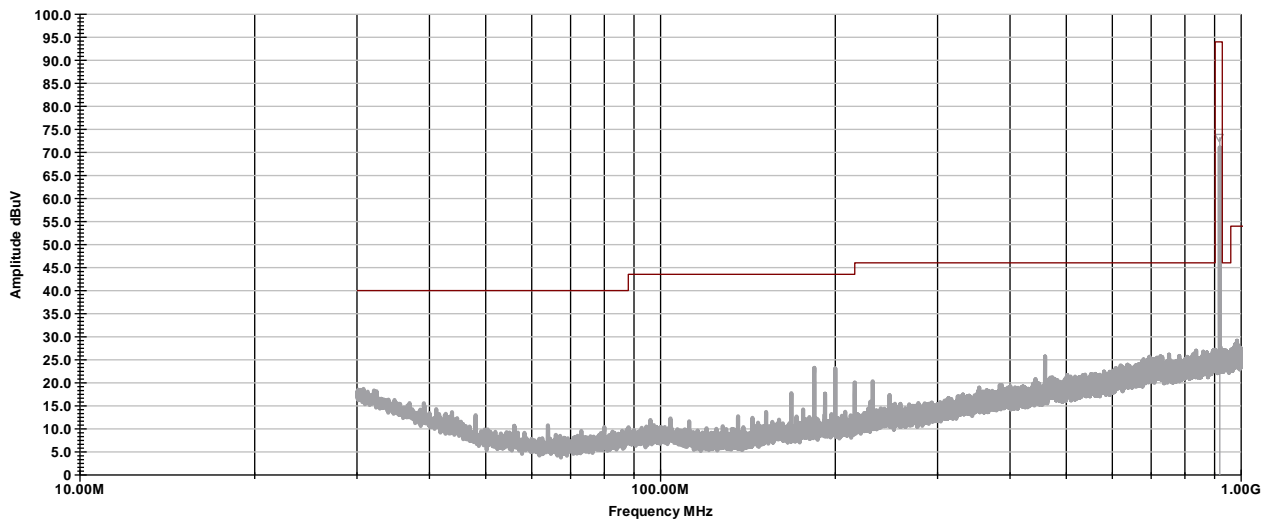


Figure 11: Logger RF Emissions, Antenna Vertically Polarized, 30-1000MHz, at 3m, and nominal Voltage

Job # - JCEAQ1106
 Company - Dickson Company
 Model # - Wizard2 Module
 Serial # - Engineering Unit
 Contact - "E444x RE Profile Above 1 GHz 2010-2-23 v2_0.TIL"

Ingenium Testing, LLC
 Radiated Emissions Prescan
 Horizontal

— Measurement: Signature Scan- Pk Detector
 ▽ Measurement: Point- Pk Detector
 — Quasi Peak Limit



Operator: Rick Hill

EUT set at -2.0 with an input voltage of 120Vac

JCEAQ1106 Dickson Wizard2 30-1000MHz RE Logger 120Vac -2dB 20100518.TIL

07:02:06 AM, Wednesday, May 19, 2010

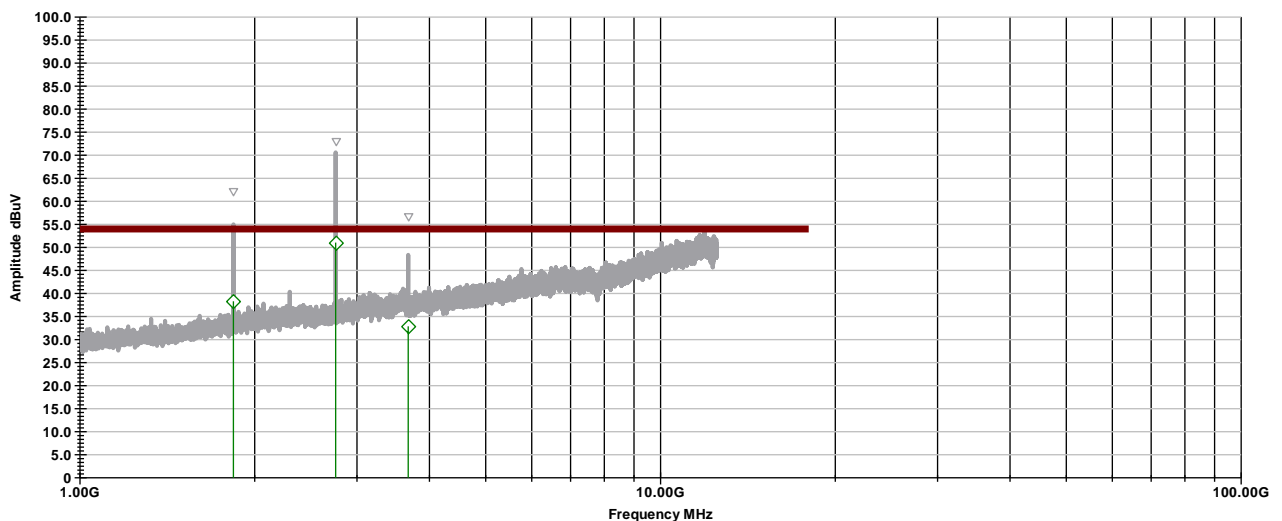
Standard Testing To: 47 CFR 15.249

Figure 12: Logger RF Emissions, Antenna Horizontally Polarized, 30-1000MHz, at 3m, and nominal Voltage

Job # - JCEAQ1106
 Company - Dickson Company
 Model # - Wizard2 Module
 Serial # - NA
 Contact - "E444x RE Profile Above 1 GHz 2010-2-23 v2_0.TIL"

Ingenium Testing, LLC
 Radiated Emissions Prescan
 Vertical

— Measurement: Signature Scan- Pk Detector
 ▽ Measurement: Point- Pk Detector
 ◇ Calculation: Point-Avg Detector
 — Average Limit



Operator: Rick Hill

EUT set at -2.0 with 120 Vac input

JCEAQ1106 Dickson Wizard2 1-12_5GHz RE Logger 120 V -2dB 20100518.TIL

11:17:35 AM, Tuesday, May 18, 2010

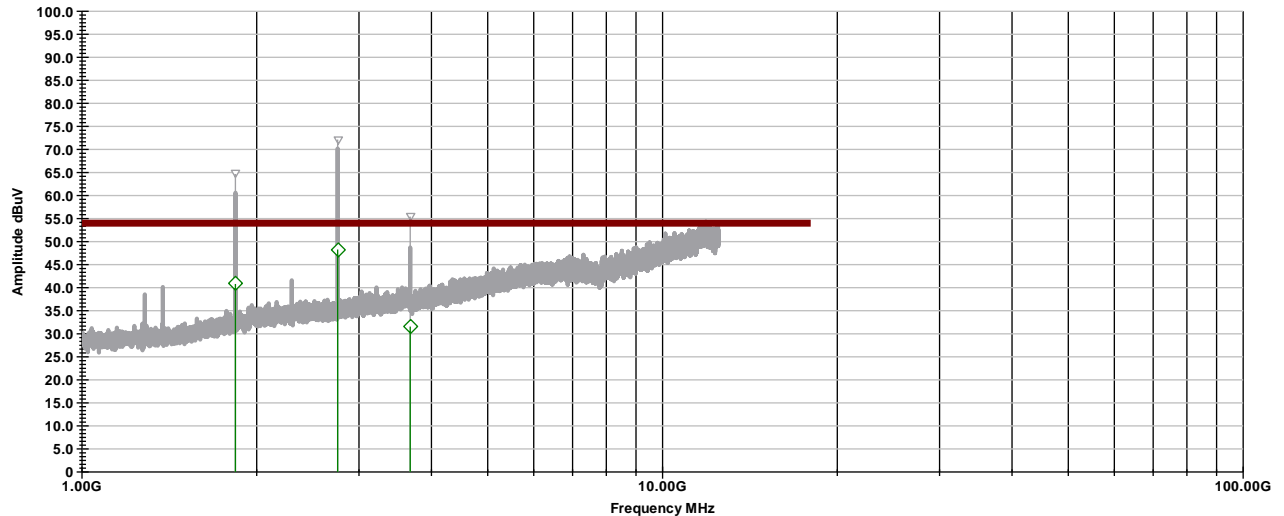
Standard Testing To: 47 CFR 15.249

Figure 13: Logger RF Emissions, Antenna Vertically Polarized, 1 – 12.5 GHz, at 3m, and nominal Voltage

Job # - JCEAQ1106
 Company - Dickson Company
 Model # - Wizard2 Module
 Serial # - NA
 Contact - "E444x RE Profile Above 1 GHz 2010-2-23 v2_0.TIL"

Ingenium Testing, LLC
 Radiated Emissions Prescan
 Horizontal

— Measurement: Signature Scan- Pk Detector
 ▽ Measurement: Point- Pk Detector
 ◇ Calculation: Point- Avg Detector
 — Average Limit



Operator: Rick Hill

EUT set at -2.0 with 120 Vac input

JCEAQ1106 Dickson Wizard2 1-12_5GHz RE Logger 120 V -2dB 20100518.TIL

11:27:23 AM, Tuesday, May 18, 2010

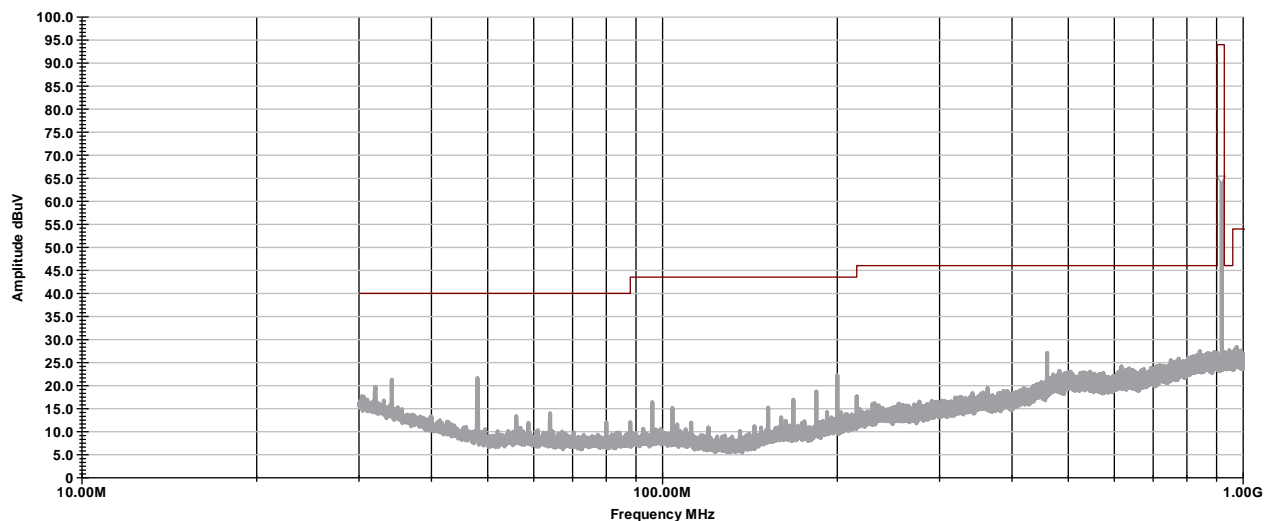
Standard Testing To: 47 CFR 15.249

Figure 14: Logger RF Emissions, Antenna Horizontally Polarized, 1 – 12.5 GHz, at 3m, and nominal Voltage

Job # - JCEAQ1106
 Company - Dickson Company
 Model # - Wizard2 Module
 Serial # - Engineering Unit
 Contact - "E444x RE Profile Above 1 GHz 2010-2-23 v2_0.TIL"

Ingenium Testing, LLC
 Radiated Emissions Prescan
 Vertical

— Measurement: Signature Scan- Pk Detector
 ▽ Measurement: Point- Pk Detector
 — Quasi Peak Limit



Operator: Rick Hill

EUT set at -2.0 with an input voltage of 108Vac

JCEAQ1106 Dickson Wizard2 30-1000MHz RE Logger 108Vac -2dB 20100518.TIL

05:50:08 PM, Tuesday, May 18, 2010

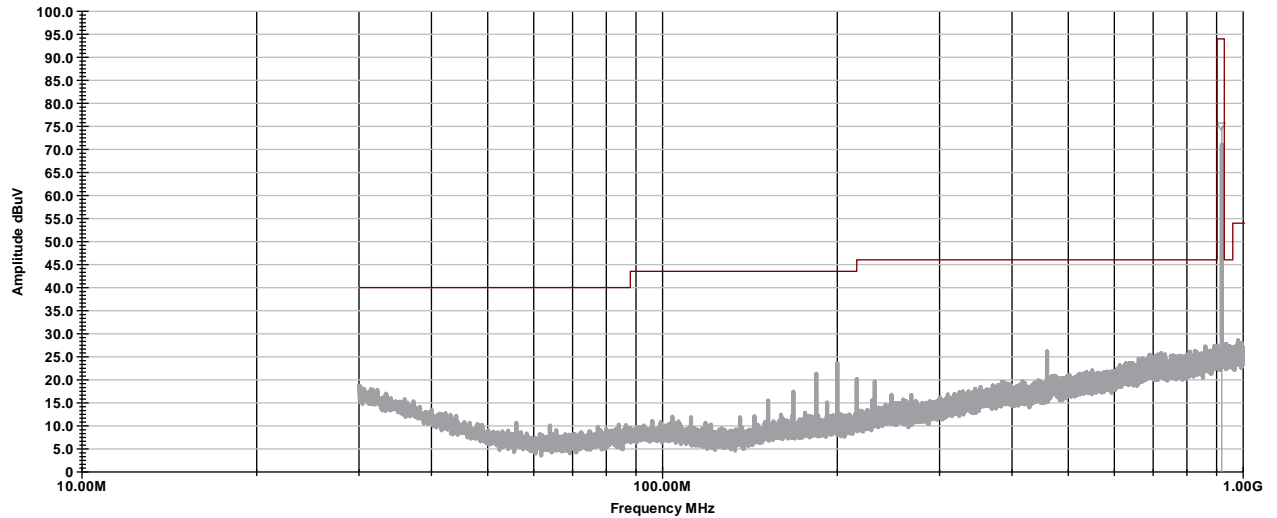
Standard Testing To: 47 CFR 15.249

Figure 15: Logger RF Emissions, Antenna Vertically Polarized, 30-1000MHz, at 3m, and 85% of nominal Voltage

Job # - JCEAQ1106
 Company - Dickson Company
 Model # - Wizard2 Module
 Serial # - Engineering Unit
 Contact - "E444x RE Profile Above 1 GHz 2010-2-23 v2_0.TIL"

Ingenium Testing, LLC
 Radiated Emissions Prescan
 Horizontal

— Measurement: Signature Scan- Pk Detector
 ▽ Measurement: Point- Pk Detector
 — Quasi Peak Limit



Operator: Rick Hill

EUT set at -2.0 with an input voltage of 108Vac

JCEAQ1106 Dickson Wizard2 30-1000MHz RE Logger 108Vac -2dB 20100518.TIL

05:52:35 PM, Tuesday, May 18, 2010

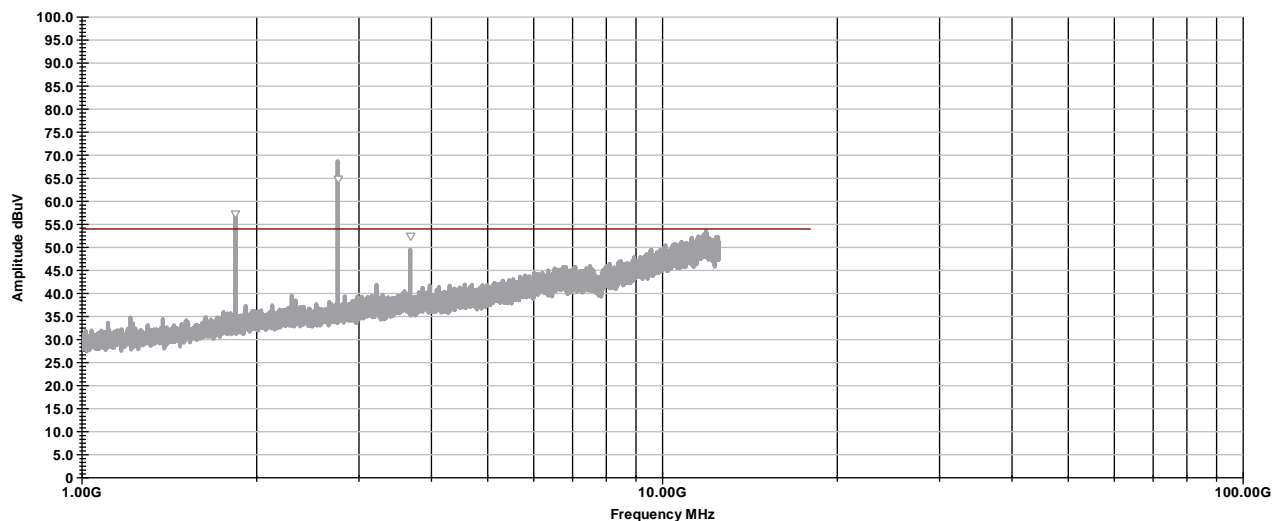
Standard Testing To: 47 CFR 15.249

Figure 16: Logger RF Emissions, Antenna Horizontally Polarized, 30-1000MHz, at 3m, and 85% of nominal Voltage

Job # - JCEAQ1106
 Company - Dickson Company
 Model # - Wizard2 Module
 Serial # - Engineering Unit
 Contact - "E444x RE Profile Above 1 GHz 2010-2-23 v2_0.TIL"

Ingenium Testing, LLC
 Radiated Emissions Prescan
 Vertical

— Measurement: Signature Scan- Pk Detector
 ▽ Measurement: Point- Pk Detector
 ◇ Calculation: Point-Avg Detector
 — Average Limit



Operator: Rick Hill

EUT set at -2.0 with an input voltage of 108Vac

JCEAQ1106 Dickson Wizard2 1-12_5GHz RE Logger 108V -2dB 20100518.TIL

01:26:38 PM, Tuesday, May 18, 2010

Standard Testing To: 47 CFR 15.249

Figure 17: Logger RF Emissions, Antenna Vertically Polarized, 1 – 12.5 GHz, at 3m, and 85% of nominal Voltage

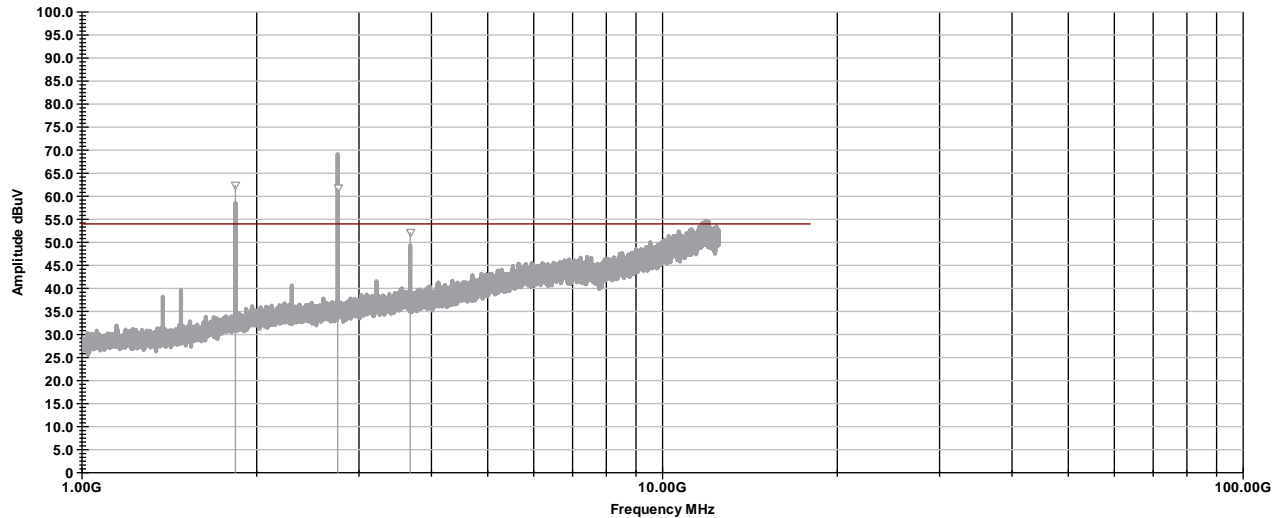
Job # - JCEAQ1106
 Company - Dickson Company
 Model # - Wizard2 Module
 Serial # - Engineering Unit
 Contact - "E444x RE Profile Above 1 GHz 2010-2-23 v2_0.TIL"

Ingenium Testing, LLC

Radiated Emissions Prescan

Horizontal

— Measurement: Signature Scan- Pk Detector
 ▽ Measurement: Point- Pk Detector
 ◇ Calculation: Point- Avg Detector
 — Average Limit



Operator: Rick Hill

EUT set at -2.0 with an input voltage of 108Vac

JCEAQ1106 Dickson Wizard2 1-12_5GHz RE Logger 108V -2dB 20100518.TIL

01:32:56 PM, Tuesday, May 18, 2010

Standard Testing To: 47 CFR 15.249

Figure 18: Logger RF Emissions, Antenna Horizontally Polarized, 1 – 12.5 GHz, at 3m, and 85% of nominal Voltage

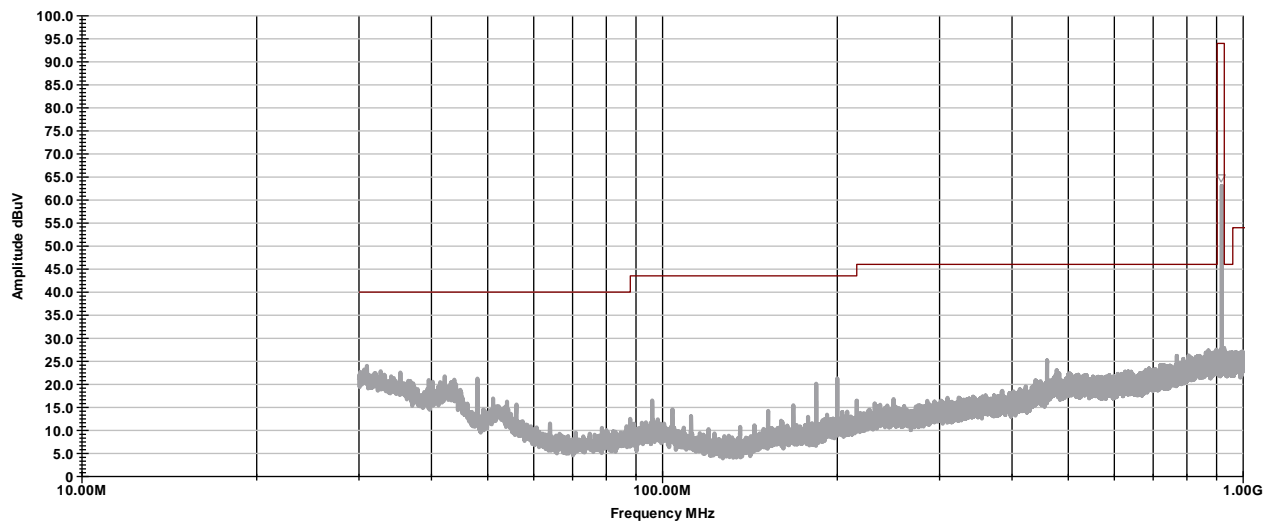
Job # - JCEAQ1106
 Company - Dickson Company
 Model # - Wizard2 Module
 Serial # - Engineering Unit
 Contact - "E444x RE Profile Above 1 GHz 2010-2-23 v2_0.TIL"

Ingenium Testing, LLC

Radiated Emissions Prescan

Vertical

— Measurement: Signature Scan- Pk Detector
 ▽ Measurement: Point- Pk Detector
 — Quasi Peak Limit



Operator: Rick Hill

EUT set at -2.0 with an input voltage of 132Vac

JCEAQ1106 Dickson Wizard2 30-1000MHz RE Logger 132Vac -2dB 20100518.TIL

07:55:08 AM, Wednesday, May 19, 2010

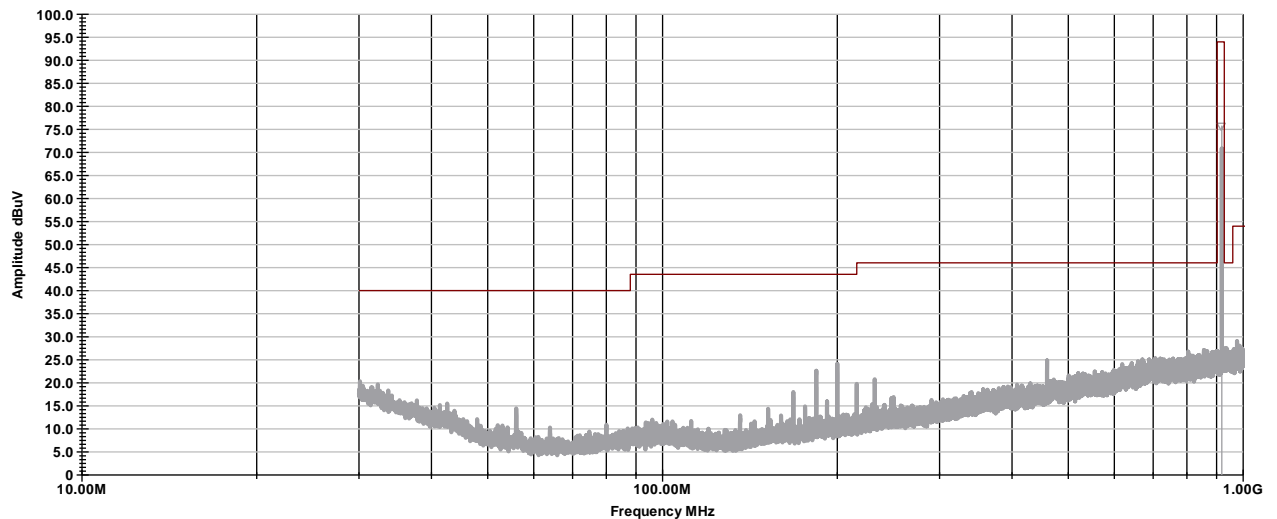
Standard Testing To: 47 CFR 15.249

Figure 19: Logger RF Emissions, Antenna Vertically Polarized, 30-1000MHz, at 3m, and 115% of nominal Voltage

Job # - JCEAQ1106
 Company - Dickson Company
 Model # - Wizard2 Module
 Serial # - Engineering Unit
 Contact - "E444x RE Profile Above 1 GHz 2010-2-23 v2_0.TIL"

Ingenium Testing, LLC
 Radiated Emissions Prescan
 Horizontal

— Measurement: Signature Scan- Pk Detector
 ▽ Measurement: Point- Pk Detector
 — Quasi Peak Limit



Operator: Rick Hill

EUT set at -2.0 with an input voltage of 132Vac

JCEAQ1106 Dickson Wizard2 30-1000MHz RE Logger 132Vac -2dB 20100518.TIL

08:11:29 AM, Wednesday, May 19, 2010

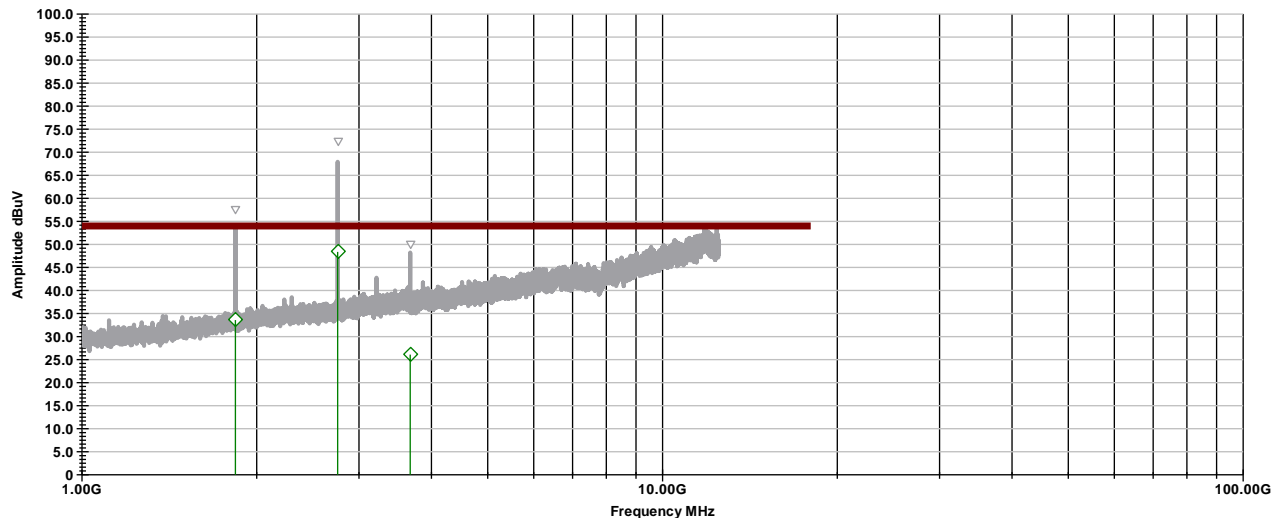
Standard Testing To: 47 CFR 15.249

Figure 20: Logger RF Emissions, Antenna Horizontally Polarized, 30-1000MHz, at 3m, and 115% of nominal Voltage

Job # - JCEAQ1106
 Company - Dickson Company
 Model # - Wizard2 Module
 Serial # - NA
 Contact - "E444x RE Profile Above 1 GHz 2010-2-23 v2_0.TIL"

Ingenium Testing, LLC
 Radiated Emissions Prescan
 Vertical

— Measurement: Signature Scan- Pk Detector
 ▽ Measurement: Point- Pk Detector
 ◇ Calculation: Point-Avg Detector
 — Average Limit



Operator: Rick Hill

EUT set at -2.0 with an input voltage of 132Vac

JCEAQ1106 Dickson Wizard2 1-12_5GHz RE Logger 132V -2dB 20100518.TIL

12:53:16 PM, Tuesday, May 18, 2010

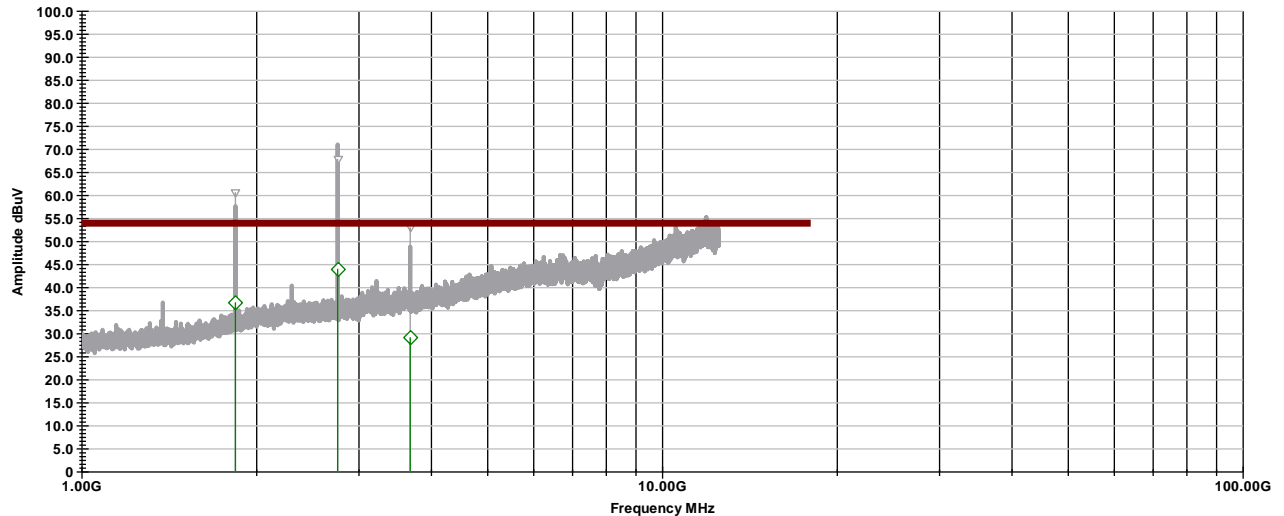
Standard Testing To: 47 CFR 15.249

Figure 21: Logger RF Emissions, Antenna Vertically Polarized, 1 – 12.5 GHz, at 3m, and 115% of nominal Voltage

Job # - JCEAQ1106
 Company - Dickson Company
 Model # - Wizard2 Module
 Serial # - NA
 Contact - "E444x RE Profile Above 1 GHz 2010-2-23 v2_0.TIL"

Ingenium Testing, LLC
 Radiated Emissions Prescan
 Horizontal

— Measurement: Signature Scan- Pk Detector
 ▽ Measurement: Point- Pk Detector
 ◇ Calculation: Point- Avg Detector
 — Average Limit



Operator: Rick Hill

EUT set at -2.0 with an input voltage of 132Vac

JCEAQ1106 Dickson Wizard2 1-12_5GHz RE Logger 132V -2dB 20100518.TIL

12:51:33 PM, Tuesday, May 18, 2010

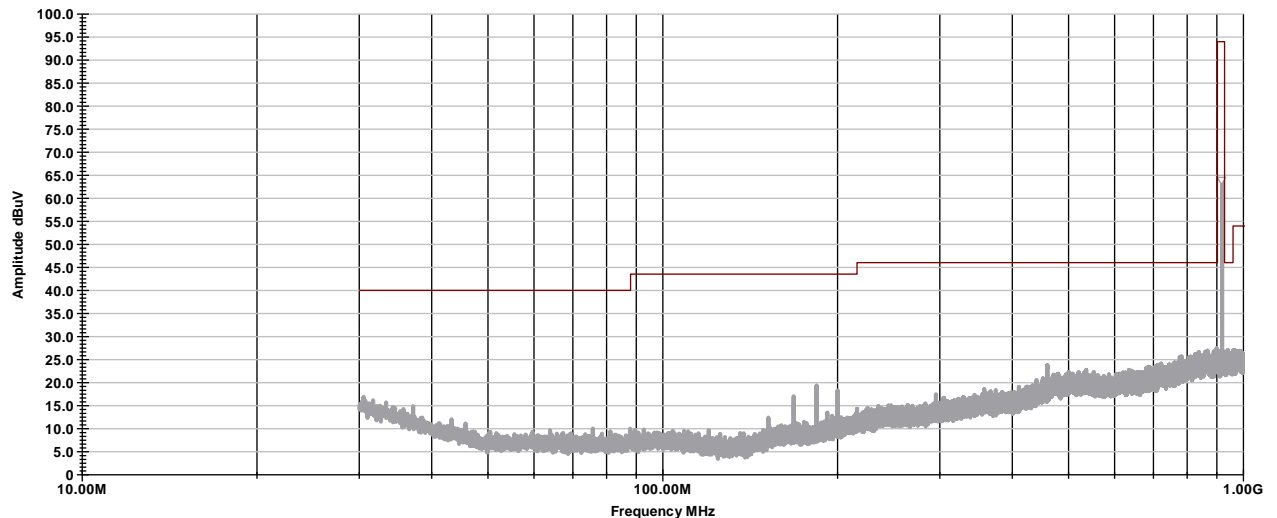
Standard Testing To: 47 CFR 15.249

Figure 22: Logger RF Emissions, Antenna Horizontally Polarized, 1 – 12.5 GHz, at 3m, and 115% of nominal Voltage

Job # - JCEAQ1106
 Company - Dickson Company
 Model # - Wizard2 Module
 Serial # - Engineering Unit
 Contact - "E444x RE Profile Above 1 GHz 2010-2-23 v2_0.TIL"

Ingenium Testing, LLC
 Radiated Emissions Prescan
 Vertical

— Measurement: Signature Scan- Pk Detector
 ▽ Measurement: Point- Pk Detector
 — Quasi Peak Limit



Operator: Rick Hill

EUT set at -2.0 with an input voltage of Battery Power

JCEAQ1106 Dickson Wizard2 30-1000MHz RE Logger Batt -2dB 20100518.TIL

05:07:01 PM, Tuesday, May 18, 2010

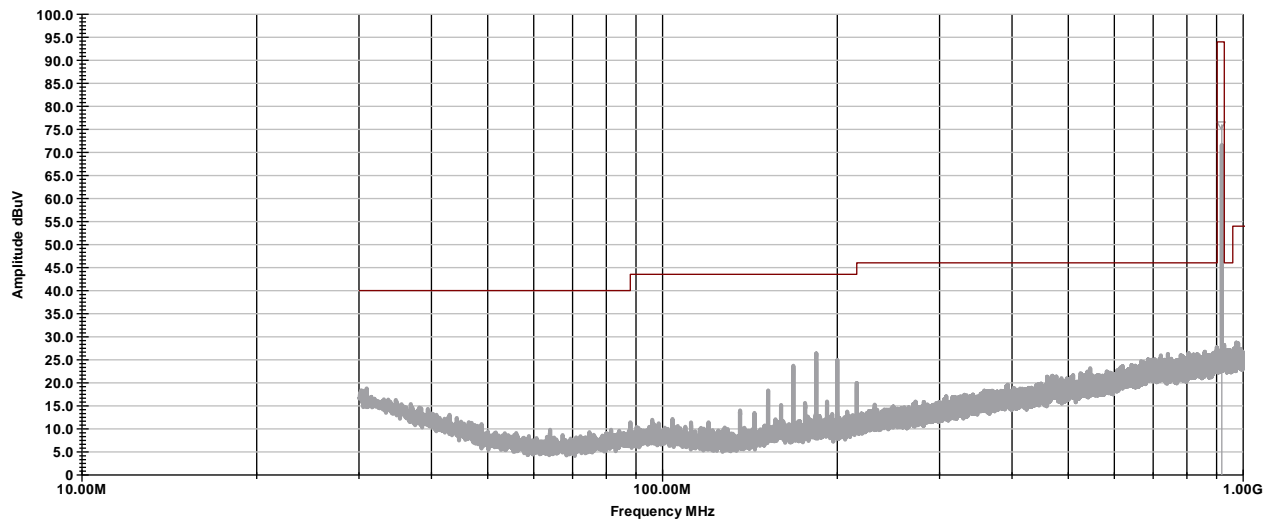
Standard Testing To: 47 CFR 15.249

Figure 23: Logger RF Emissions, Antenna Vertically Polarized, 30-1000MHz, at 3m, Battery powered

Job # - JCEAQ1106
 Company - Dickson Company
 Model # - Wizard2 Module
 Serial # - Engineering Unit
 Contact - "E444x RE Profile Above 1 GHz 2010-2-23 v2_0.TIL"

Ingenium Testing, LLC
 Radiated Emissions Prescan
 Horizontal

— Measurement: Signature Scan- Pk Detector
 ▽ Measurement: Point- Pk Detector
 — Quasi Peak Limit



Operator: Rick Hill

EUT set at -2.0 with an input voltage of Battery Power

JCEAQ1106 Dickson Wizard2 30-1000MHz RE Logger Batt -2dB 20100518.TIL

05:10:24 PM, Tuesday, May 18, 2010

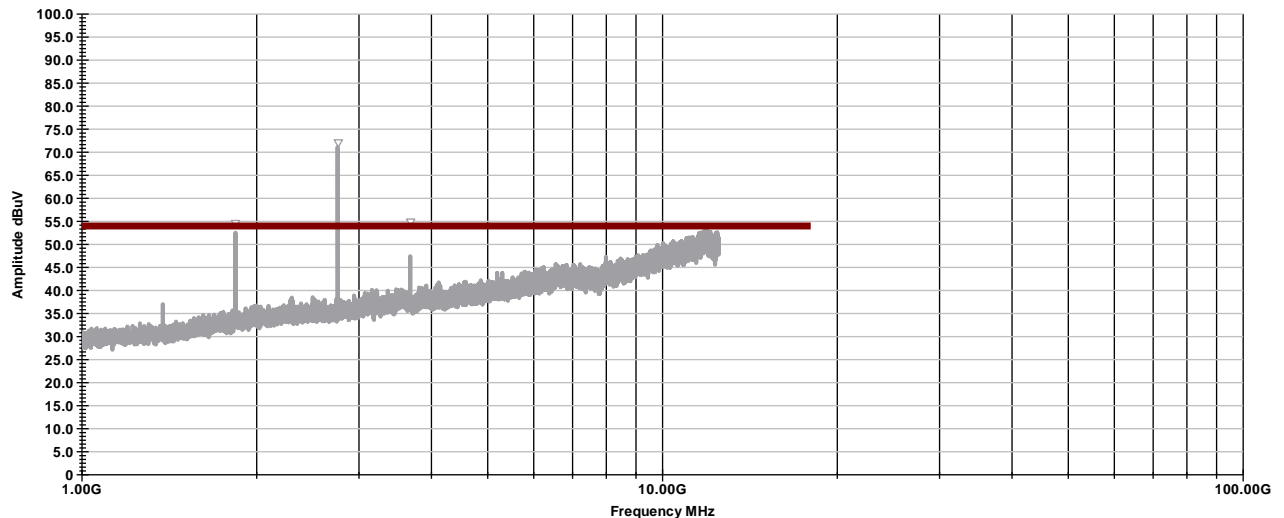
Standard Testing To: 47 CFR 15.249

Figure 24: Logger RF Emissions, Antenna Horizontally Polarized, 30-1000MHz, at 3m, Battery powered

Job # - JCEAQ1106
 Company - Dickson Company
 Model # - Wizard2 Module
 Serial # - NA
 Contact - "E444x RE Profile Above 1 GHz 2010-2-23 v2_0.TIL"

Ingenium Testing, LLC
 Radiated Emissions Prescan
 Vertical

— Measurement: Signature Scan- Pk Detector
 ▽ Measurement: Point- Pk Detector
 ◇ Calculation: Point-Avg Detector
 — Average Limit



Operator: Rick Hill

EUT set at -2.0 with an input voltage of Battery Power

JCEAQ1106 Dickson Wizard2 1-12_5GHz RE Logger Batt -2dB 20100518B.TIL

03:02:24 PM, Tuesday, May 18, 2010

Standard Testing To: 47 CFR 15.249

Figure 25: Logger RF Emissions, Antenna Vertically Polarized, 1 – 12.5 GHz, at 3m, Battery powered

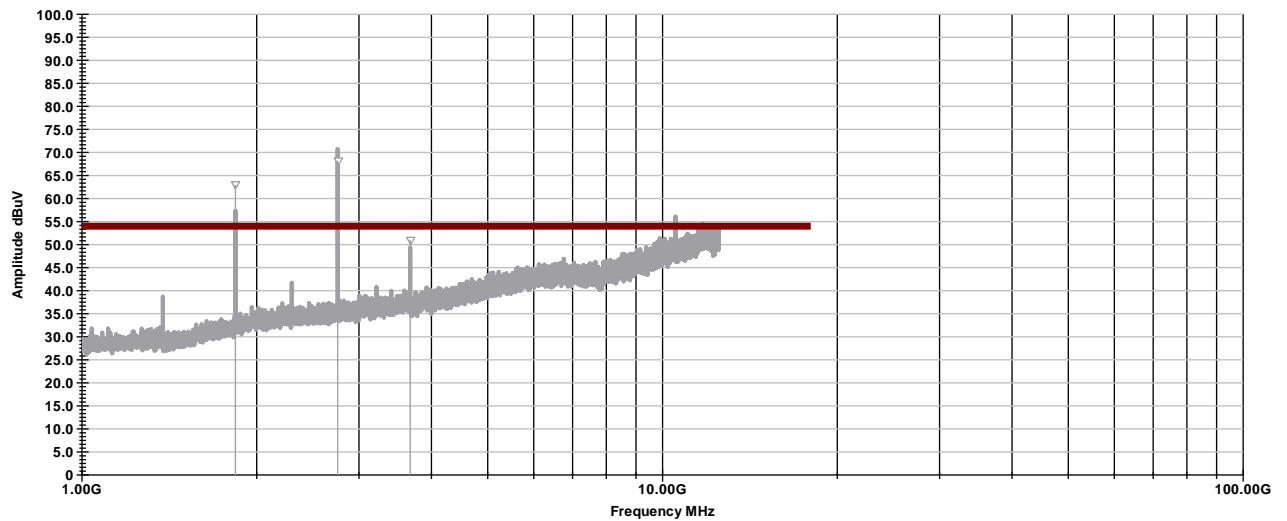
Job # - JCEAQ1106
 Company - Dickson Company
 Model # - Wizard2 Module
 Serial # - NA
 Contact - "E444x RE Profile Above 1 GHz 2010-2-23 v2_0.TIL"

Ingenium Testing, LLC

Radiated Emissions Prescan

Horizontal

— Measurement: Signature Scan- Pk Detector
 ▽ Measurement: Point- Pk Detector
 ◇ Calculation: Point- Avg Detector
 — Average Limit



Operator: Rick Hill

EUT set at -2.0 with an input voltage of Battery Power

JCEAQ1106 Dickson Wizard2 1-12_5GHz RE Logger Batt -2dB 20100518B.TIL

03:08:22 PM, Tuesday, May 18, 2010

Standard Testing To: 47 CFR 15.249

Figure 26: Logger RF Emissions, Antenna Horizontally Polarized, 1 – 12.5 GHz, at 3m, Battery powered

Receive Mode

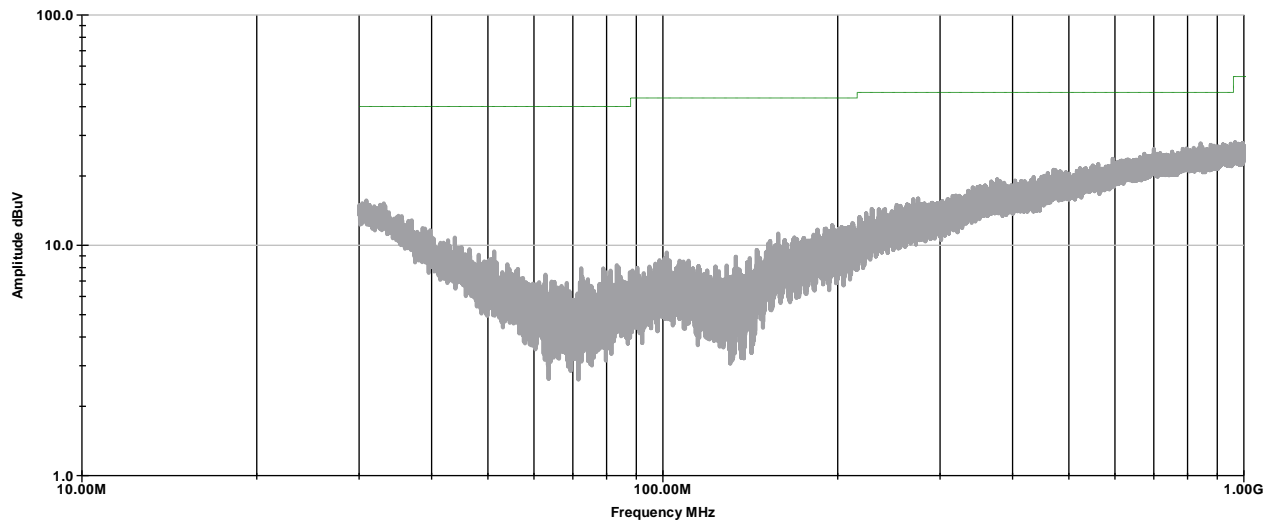
Job # - JCEAQ1106
 Company - Dickson Company
 Model # - Wizard2 Module
 Serial # - Receiver
 Contact - Profile "E444x RE Profile 2009-05-22 v0_1.TIL"

Ingenium Testing, LLC

Radiated Emissions

Vertical

— Measurement: Signature Scan- Pk Detector
 — Limit 15.109



Operator: Rick Hill

Receiver, with USB to a Laptop under the turntable

JCEAQ1106 Dickson Wizard2 30M-1GHz RE Receiver 20100125.til

07:00:03 PM, Monday, January 25, 2010

Job #: JCEAQ1106

Figure 27: Receiver RF Emissions, Antenna Vertically Polarized, 30-1000MHz, at 3m

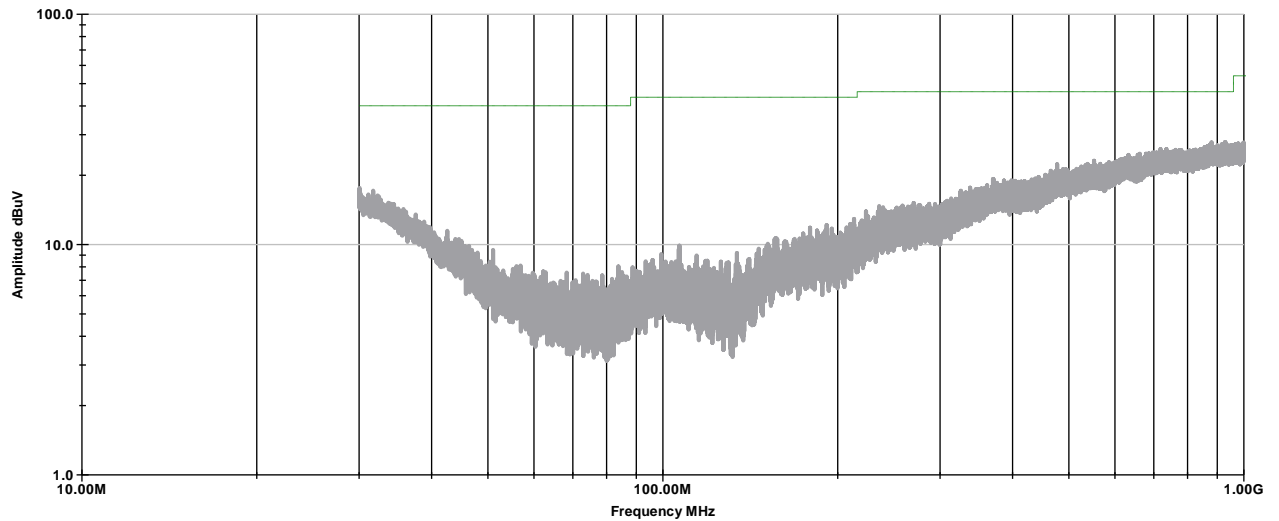
Job # - JCEAQ1106
 Company - Dickson Company
 Model # - Wizard2 Module
 Serial # - Receiver
 Contact - Profile "E444x RE Profile 2009-05-22 v0_1.TIL"

Ingenium Testing, LLC

Radiated Emissions

Horizontal

— Measurement: Signature Scan- Pk Detector
 — Limit 15.109



Operator: Rick Hill

Receiver, with USB to a Laptop under the turntable

JCEAQ1106 Dickson Wizard2 30M-1GHz RE Receiver 20100125.til

07:00:01 PM, Monday, January 25, 2010

Job #: JCEAQ1106

Figure 28: Receiver RF Emissions, Antenna Horizontally Polarized, 30 – 1000MHz, at 3m

Job # - JCEAQ1106
 Company - Dickson Company
 Model # - Wizard2 Module
 Serial # - Receiver
 Contact - Profile "E444x RE Profile 2009-05-22 v0_1.TIL"

Ingenium Testing, LLC

Radiated Emissions
 Vertical

— Measurement: Signature Scan- Pk Detector
 — Limit 15.109

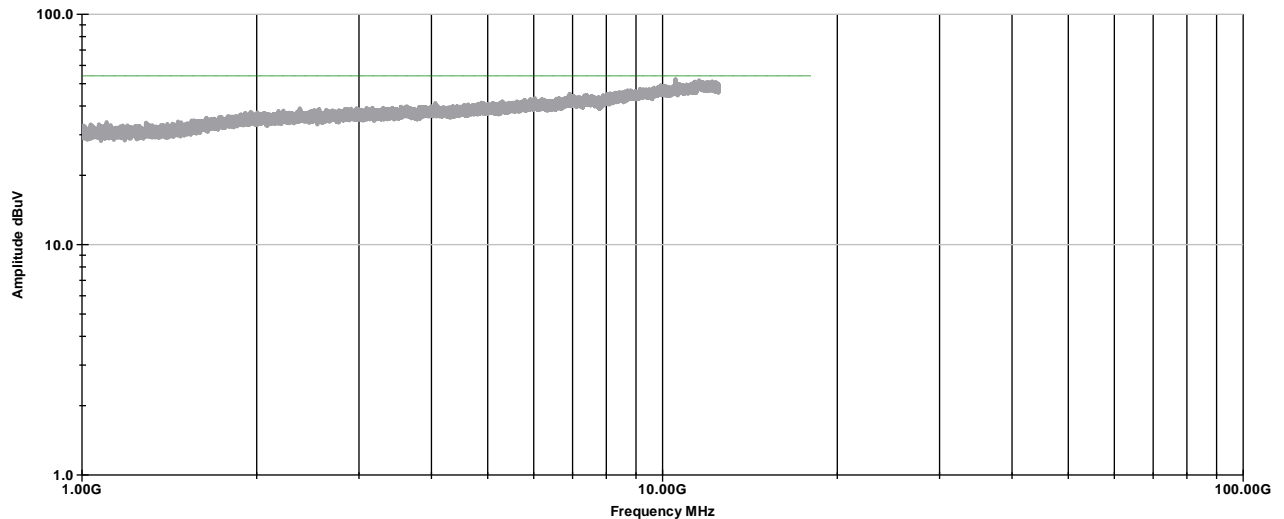


Figure 29: Receiver RF Emissions, Antenna Vertically Polarized, 1 – 12.5 GHz, at 3m

Job # - JCEAQ1106
 Company - Dickson Company
 Model # - Wizard2 Module
 Serial # - Receiver
 Contact - Profile "E444x RE Profile 2009-05-22 v0_1.TIL"

Ingenium Testing, LLC

Radiated Emissions
 Horizontal

— Measurement: Signature Scan- Pk Detector
 — Limit 15.109

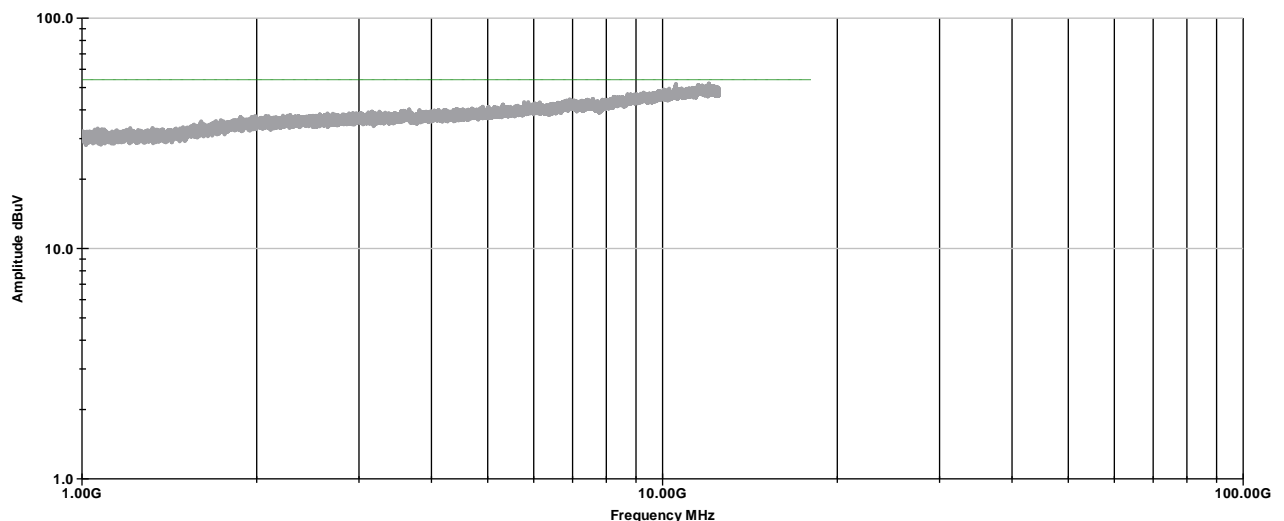


Figure 30: Receiver RF Emissions, Antenna Horizontally Polarized, 1 – 12.5 GHz, at 3m

9.2 Conducted RF Emission onto AC Mains Measurements

This EUT is powered by either batteries or by a transformer plugged into the AC Mains.
 Conducted RF Emission measurements were performed on the AC Mains supply.

9.2.1 Test Criterion

Port Definition	Terminal Name	Description/ Detail	Test Standard	Performance Criteria	Pass / Fail
Enclosure	N/A	Alarm Enclosure containing digital circuitry <i>Transmit Mode</i>	Conducted RF Emissions 47 CFR 15.207	.150 MHz to 30 MHz Measured RF Emission should be Below specified Limits	Pass
Enclosure	N/A	Alarm Enclosure containing digital circuitry <i>Receive Mode</i>	Conducted RF Emissions 47 CFR 15.107	.150 MHz to 30 MHz Measured RF Emission should be Below specified Limits	Pass

The following tables present the limits for intentional radiator connected to the AC Mains.

Frequency (MHz)	Conducted RF Voltage Quasi-peak Limit (dB μ V)	Conducted RF Voltage Average Limit (dB μ V)
0.15 – 0.50	66.0 Decreasing linearly with logarithm of frequency to 56.0	56.0 Decreasing linearly with logarithm of frequency to 46.0
0.50 – 5.0	56.0	46.0
5.0 – 30.0	60.0	50.0

Notes: In the calculations for margin below the limit, the limits are rounded to one digit past the decimal.

Table 11: Conducted Limit for Intentional Radiators under 47CFR 15.107 and 15.207

9.2.2 Test Equipment

All equipment is calibrated according to governing standards, and is N.I.S.T. traceable. The equipment is used according to the operation manuals as provided by the manufacturers.

Table 12: List of Equipment Used:

Manufacturer	Model	Ingenium Asset Number	Description	Last Cal data	Cal due date
HP	85462A	1130	RECEIVER, EMI TEST	12/18/2008	12/18/2009
AGILENT	11947A	1313	TRANSIENT LIMITER	12/18/2008	12/18/2009
TIMES MICROWAVE	098-2320-003	1769	CABLE, 10FT, "N" TO "N"	10/1/2009	10/1/2010
INTERCOMP	RG214/U	2227	CABLE, 17FT	10/1/2009	10/1/2010
ROHDE & SCHWARZ	EZ-25	2007	HIGH PASS FILTER	11/27/2008	11/27/2009
TIMES MICROWAVE	098-2320-007	2283	CABLE, 2 FT	10/1/2009	10/1/2010
EMCO	3816/2NM	1363	LISN, 50/250 μ H, 16A, COMMERCIAL	3/6/2008	3/6/2010
AGILENT	N5182A	1187	GENERATOR, MXG VECTOR SIGNAL	1/9/2009	1/9/2010
UNIFLEX	UFB311P	0874	CABLE, 44ft	8/11/2009	8/11/2010
INGENIUM TESTING	NONE	2284	ADAPTER, SIGNAL INJECTION	NCR	NCR

The data presented accounts for the antenna correction factor as well as cable loss or other corrections, and can, therefore, be entered into the database as a corrected measurement result.

9.2.3 Test Setup

The EUT was tested as a “table-top device” type product, as described in ANSI C63.4. The EUT was placed on a non-conductive table, 80 cm in height and 40 cm from the vertical ground plane in a shielded enclosure located at Ingenium Testing. The test setup complies with the necessary procedures as described in the ANSI standard. The EUT was exercised under standard operating conditions, and powered by a wall transformer.

Test Setup Photos

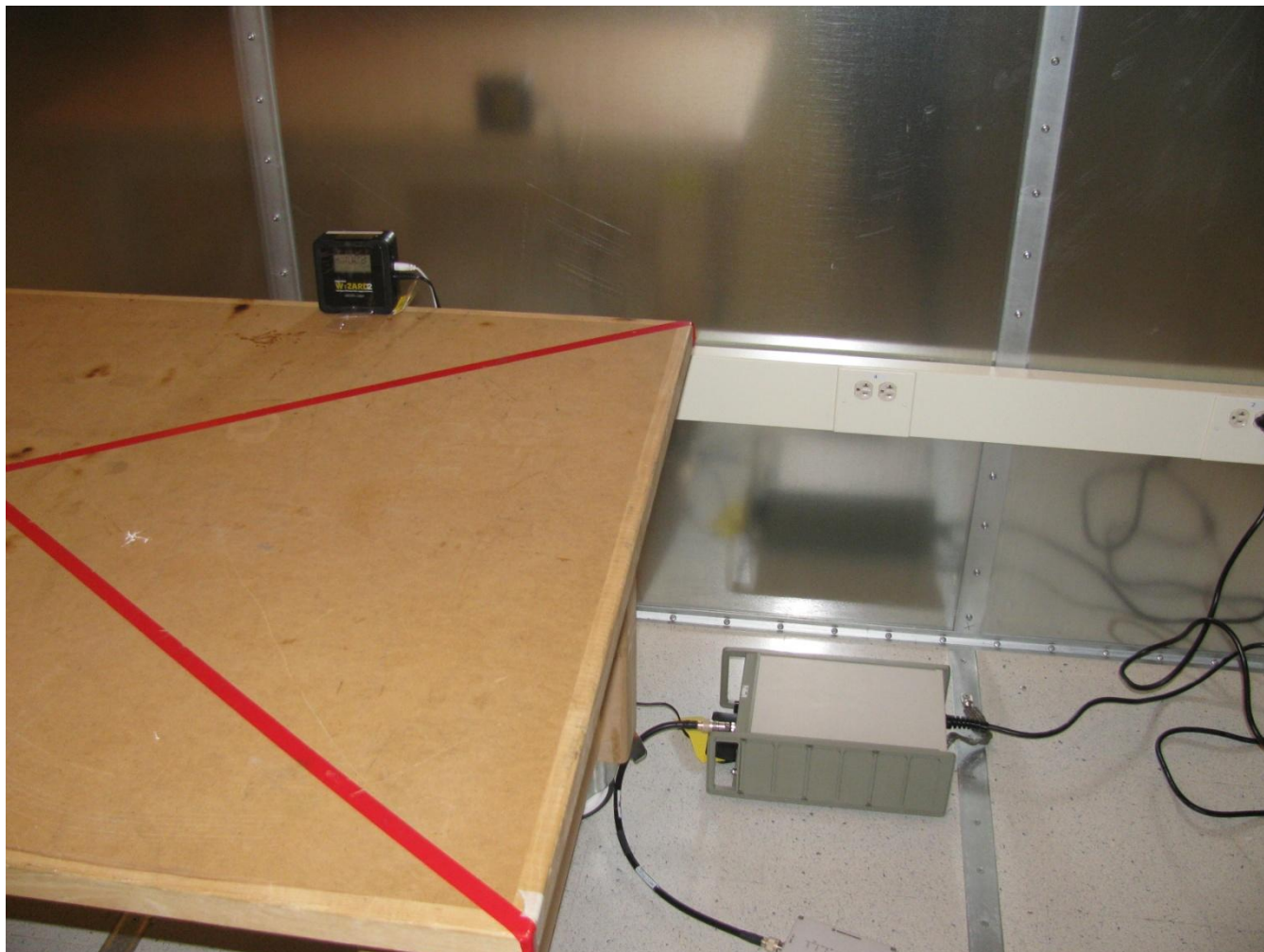


Figure 31 Conducted Emissions Logger front view



Figure 32 Conducted Emissions Logger side view

9.2.4 Test Procedure

The EUT was measured for Conducted RF Emissions in the shielded enclosure labeled Chamber 12, located at Ingenium Testing. The EUT Power lines were scanned from .150 MHz to 30 MHz for RF emissions.

The EUT was programmed in advance, by the client cognizant engineer, in the proper mode. The mode tested for the logger was in continuous-transmit CW and the receiver was placed in receive mode.

The applicable limits as noted in 47 CFR 15.207 were applied for the intentional radiator tests. The applicable limits as noted in 47 CFR 15.107 for a Class B type product were applied for the Receiver tests.

9.2.5 Test Results

The EUTs were found to **MEET** the requirements as described within the specifications of the FCC, Title 47 CFR, Part 15.207 for radiated emissions from an intentional radiator.

The EUT was found to **MEET** the requirements as described within the specifications of the FCC, Title 47 CFR, Part 15.107 for radiated emissions from a Class B product. Supporting evidence of significant measured RF emissions, are tabulated and presented below.

CLIMATE TEST CONDITIONS

Temperature:	73 °F (22.8 °C)
Humidity:	48 % RH

Frequency (MHz)	Line/ Test Mode	Measured-QP (dBμV)	Measured-Average (dBμV)	QP Limit (dBmV)	Average Limit (dBmV)	QP Margin (dBmV)	Average Margin (dB)
162336	1	39.34	13.41	65.34	55.34	26.00	41.93
236683	1	36.37	11.97	62.21	52.21	25.84	40.24
719913	1	40.04	33.91	56.00	46.00	15.96	12.09
1299340	1	38.41	32.53	56.00	46.00	17.59	13.47
1964080	1	38.19	31.84	56.00	46.00	17.82	14.16
2520980	1	38.24	32.21	56.00	46.00	17.77	13.79
2848880	1	38.36	32.40	56.00	46.00	17.64	13.60
3017520	1	38.33	32.38	56.00	46.00	17.67	13.62
4185010	1	39.78	33.67	56.00	46.00	16.22	12.33
4510550	1	40.30	34.15	56.00	46.00	15.70	11.85
6537950	1	42.77	36.20	60.00	50.00	17.23	13.81
7492660	1	44.44	38.00	60.00	50.00	15.56	12.00
8077330	1	45.06	38.03	60.00	50.00	14.94	11.97
9811010	1	35.94	28.96	60.00	50.00	24.06	21.04
20017100	1	21.75	15.22	60.00	50.00	38.26	34.78
24072200	1	18.12	10.69	60.00	50.00	41.88	39.31
199681	2	38.10	11.11	63.62	53.62	25.53	42.51
297051	2	35.04	11.05	60.33	50.33	25.28	39.28
680468	2	36.11	30.13	56.00	46.00	19.89	15.87
1307600	2	34.69	28.69	56.00	46.00	21.32	17.32
3289720	2	35.74	29.60	56.00	46.00	20.26	16.40
3980880	2	36.43	30.40	56.00	46.00	19.57	15.60
7849270	2	41.54	35.23	60.00	50.00	18.46	14.77
20947100	2	19.91	13.25	60.00	50.00	40.09	36.75
162336	1	39.34	13.41	65.34	55.34	26.00	41.93
236683	1	36.37	11.97	62.21	52.21	25.84	40.24
719913	1	40.04	33.91	56.00	46.00	15.96	12.09
1299340	1	38.41	32.53	56.00	46.00	17.59	13.47
1964080	1	38.19	31.84	56.00	46.00	17.82	14.16
2520980	1	38.24	32.21	56.00	46.00	17.77	13.79
2848880	1	38.36	32.40	56.00	46.00	17.64	13.60
3017520	1	38.33	32.38	56.00	46.00	17.67	13.62
4185010	1	39.78	33.67	56.00	46.00	16.22	12.33
4510550	1	40.30	34.15	56.00	46.00	15.70	11.85
6537950	1	42.77	36.20	60.00	50.00	17.23	13.81
7492660	1	44.44	38.00	60.00	50.00	15.56	12.00
8077330	1	45.06	38.03	60.00	50.00	14.94	11.97
9811010	1	35.94	28.96	60.00	50.00	24.06	21.04
20017100	1	21.75	15.22	60.00	50.00	38.26	34.78
24072200	1	18.12	10.69	60.00	50.00	41.88	39.31
199681	2	38.10	11.11	63.62	53.62	25.53	42.51

297051	2	35.04	11.05	60.33	50.33	25.28	39.28
680468	2	36.11	30.13	56.00	46.00	19.89	15.87
1307600	2	34.69	28.69	56.00	46.00	21.32	17.32
3289720	2	35.74	29.60	56.00	46.00	20.26	16.40
3980880	2	36.43	30.40	56.00	46.00	19.57	15.60
7849270	2	41.54	35.23	60.00	50.00	18.46	14.77
20947100	2	19.91	13.25	60.00	50.00	40.09	36.75

1) All emissions were greater than 20 dB below the limits.

Table 13: Results table – RF emissions conducted onto AC Mains (120VAC, 60Hz).

Job # - JCEAQ1106
 Company - Dickson Company
 Model Number - Wizard2 Module
 Serial Number - Logger
 Test Mode - Profile "E444x RE Profile 2009-05-22 v0_1.TIL"

Conducted RF Emissions
 Onto AC Mains, measured via LISN
 Corrected Measurement Values 150kHz-30MHz

— Measured Peak Envelope
 — Part 15.207 QP Limit
 — Part 15.207 Average Limit

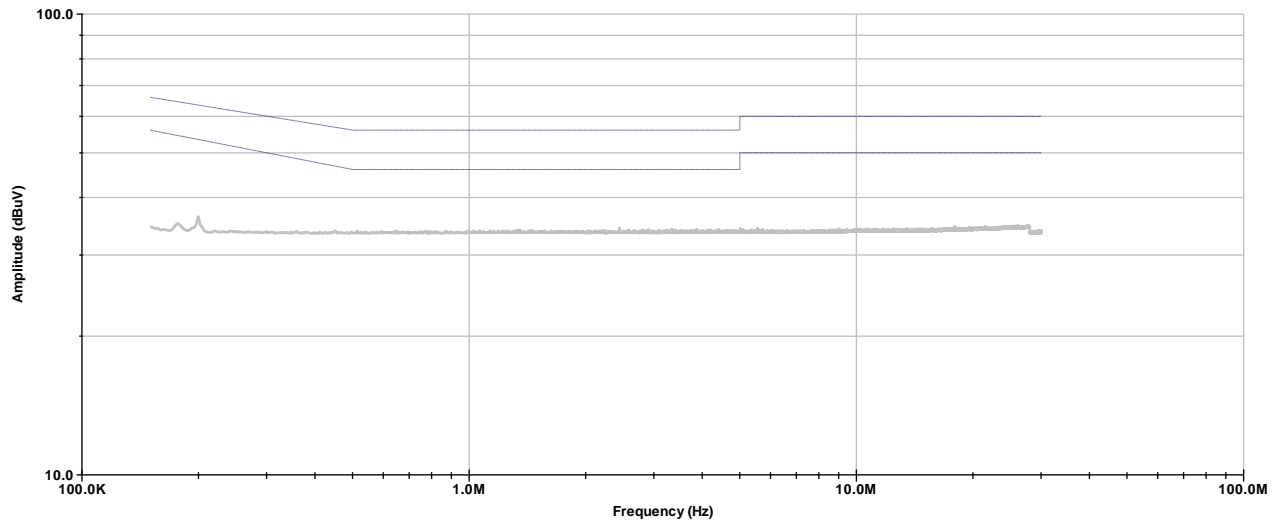


Figure 33: Transmit RF Conducted Signature, Line 1 (Supply), 150kHz-30MHz, nominal Voltage

Job # - JCEAQ1106
 Company - Dickson Company
 Model Number - Wizard2 Module
 Serial Number - Logger
 Test Mode - Profile "E444x RE Profile 2009-05-22 v0_1.TIL"

Conducted RF Emissions
 Onto AC Mains, measured via LISN
 Corrected Measurement Values 150kHz-30MHz

— Measured Peak Envelope
 — Part 15.207 QP Limit
 — Part 15.207 Average Limit

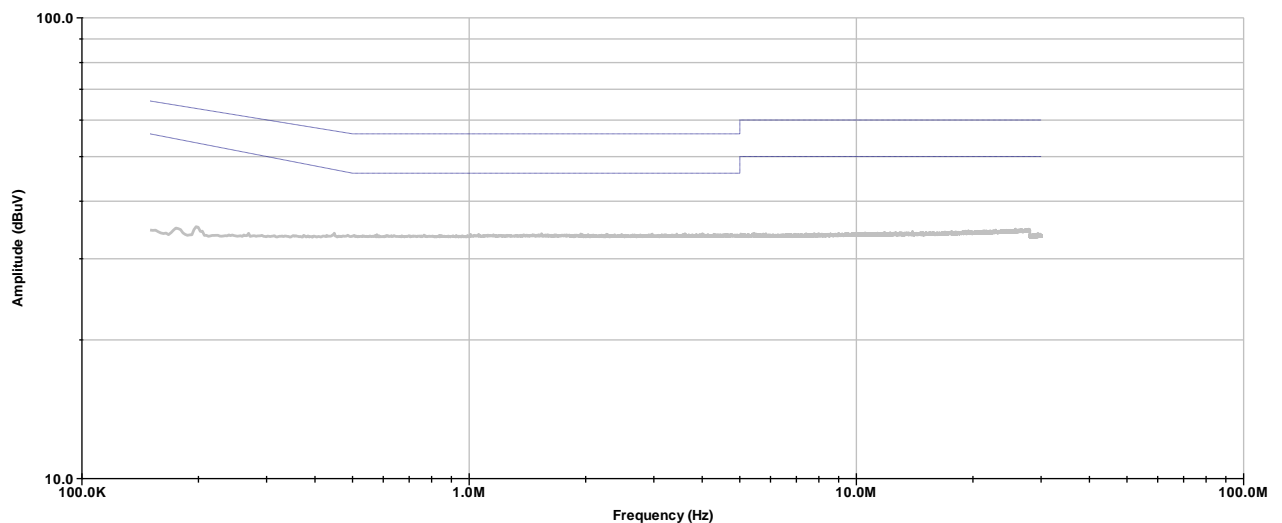


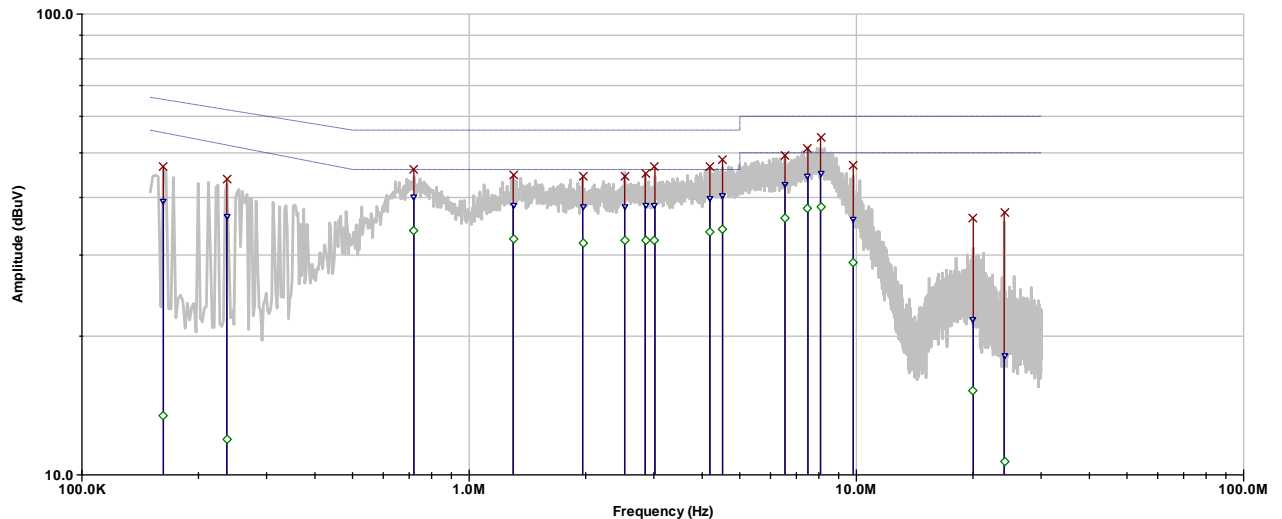
Figure 34: Transmit RF Conducted Signature, Line 2 (Neutral), 150kHz-30MHz, nominal Voltage

Job # - JCEAQ1106
 Company - Dickson Company
 Model Number - Wizard2 Module
 Serial Number - Receiver
 Test Mode - Profile "E444x RE Profile 2009-05-22 v0_1.TIL"

Conducted RF Emissions

Onto AC Mains, measured via LISN
 Corrected Measurement Values 150kHz-30MHz

— Measured Peak Envelope
 — CISPR 11 QP Limit
 — CISPR 11 Average Limit
 × Peaks
 ▽ QP Level
 ◇ Ave Reading



Operator: Rick Hill

Receiver - 120 V 60 Hz Supply Side

JCEAQ1106 Dickson Wizard2 CE line 1 Receiver 20100127.TIL

09:16:29 AM, Wednesday, January 27, 2010

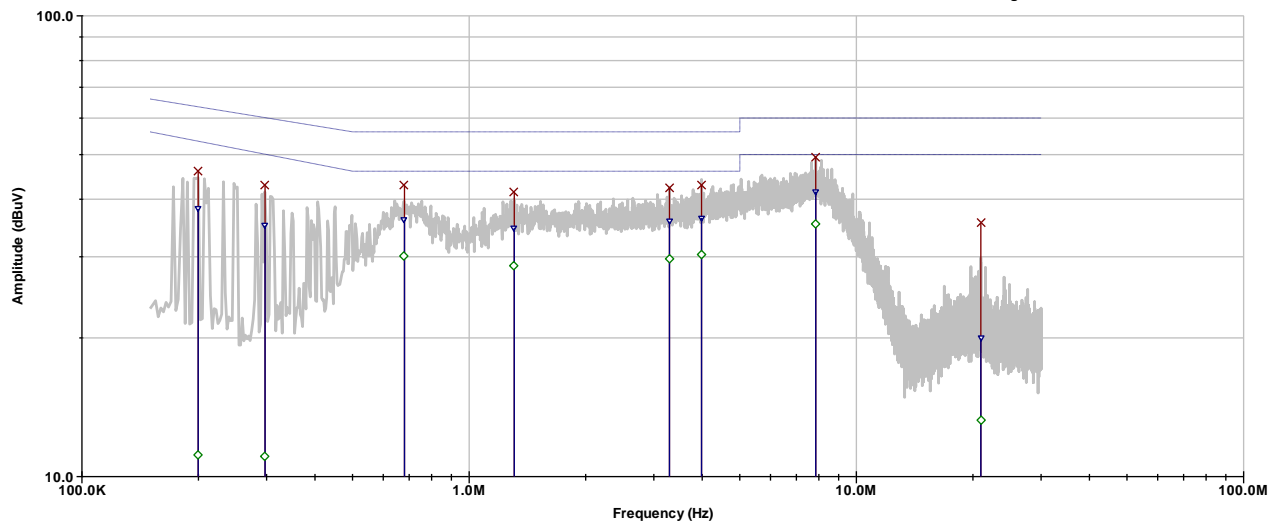
Figure 35: Receive RF Conducted Signature, Line 1 (Supply), 150kHz-30MHz, nominal Voltage

Job # - JCEAQ1106
 Company - Dickson Company
 Model Number - Wizard2 Module
 Serial Number - Receiver
 Test Mode - Profile "E444x RE Profile 2009-05-22 v0_1.TIL"

Conducted RF Emissions

Onto AC Mains, measured via LISN
 Corrected Measurement Values 150kHz-30MHz

— Measured Peak Envelope
 — CISPR 11 QP Limit
 — CISPR 11 Average Limit
 × Peaks
 ▽ QP Level
 ◇ Ave Reading



Operator: Rick Hill

Receiver - 120 V 60 Hz Return Side

JCEAQ1106 Dickson Wizard2 CE line 2 Receiver 20100127.TIL

10:03:55 AM, Wednesday, January 27, 2010

Figure 36: Receive RF Conducted Signature, Line 2 (Neutral), 150kHz-30MHz, nominal Voltage

END OF REPORT