TEST REPORT

Report Number: 100329070DEN-001
Project Number: G100329070

Report Issue Date: 8/28/2012

Product Designation: **Model: AL (with embedded M2e radio)**

Standards: FCC 47 CFR Part 15.247
IC RSS 210: Issue 8:2010
IC RSS-GEN Issue 3:2010

Tested by:

Intertek Testing Services NA, Inc.
1795 Dogwood Street, Suite 200
Louisville, CO 80027

Client:

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Section **Page**

1 Introduction and Conclusion

The tests indicated in section 2.0 were performed on the product constructed as described in section 3.0. The remaining test sections are the verbatim text from the actual data sheets used during the investigation. These test sections include the test name, the specified test Method, a list of the actual Test Equipment Used, documentation Photos, Results and raw Data. No additions, deviations, or exclusions have been made from the standard(s) unless specifically noted.

Based on the results of our investigation, we have concluded **the product tested complies with the requirements of the standard(s) indicated.** The results obtained in this test report pertain only to the item(s) tested.

2 Test Summary

Section	Test full name	Test date	Result
5	Radiated Emissions – Field Strength of the Fundamental & Harmonics of the Fundamental – FCC 247(b)(3)(d)/15.205/209 (Covers RSS-210 A8.4(4) & A8.5)	02/17/2011	Pass
6	Radiated Emissions – Unintentional and Spurious of the Transmitter - FCC 15.209/15.247(d)/15.205 (Covers RSS-210 A8.5, & RSS-Gen 7.2.5)	03/08/2011	Pass
7	Radiated Emissions – Unintentional and Spurious – Band Edge FCC 15.209/15.247(d)/15.205 (Covers RSS-210 A8.5, & RSS-Gen 7.2.5)	02/18/2011	Pass
8	Radiated Emissions – Unintentional – Receiver FCC 15.109 (Covers RSS-Gen Section 6)	03/08/2011	Pass
9	6dB Bandwidth – FCC 15.247(a)(2) (Covers RSS-210 A8.2(a))	02/18/2011	Pass
10	Power Spectral Density (PSD) – FCC 15.247(e) (Covers RSS-210 A8.2(b))	02/18/2011	Pass
11	Occupied Bandwidth – RSS-Gen, Section 4.6.1	02/18/2011	Pass
12	AC Conducted Emissions – FCC 15.207 (Covers RSS-Gen Section 7.2.4)	03/08/2011	Pass

Notes:

1) Product tested is an AMR Radio Module that is plugged into a host device – electricity meter.
2) The following product models are covered in this test report:

   - Model AL – Landis & Gyr FOCUS Electric Meter with M2e radio embedded
   - Model AX – Landis & Gyr FOCUS Electric Meter with M2e radio embedded

2.1 Test Facility

Intertek Denver's testing facilities are located at 1795 Dogwood St. Suite 200 Louisville, CO 80027. The testing facility is ISO17025:2005 accredited by A2LA, our lab code is 2506.02, our VCCI registration numbers are. R-1643, C-1752 and T-1558, our FCC designation no. US1121 and our IC lab no. 2042N.

Testing contained in this test report may not be covered under the laboratories scope of accreditation. A note will be placed in the specific test section for testing not coved under the laboratories scope.

General Radio Remarks:

Testing was performed in 3 different orthogonal axes to determine the worst-case emissions from the device. The worst-case axis and emissions are shown in this report.

FCC CFR Part 15.31(e): For a product with an ac voltage supply, the ac voltage was varied between 85% and 115% of the nominal rated supply voltage to determine worst-case fundamental frequency level. For products that are battery-powered, a fresh battery was used during all testing.

FCC CFR Part 15.35: Measurement Detector Functions and Bandwidths: FCC Part 15.35 was utilized when performing measurements within this report.

Whenever possible the approved test procedures specified in **ANSI C63.10 – 2009 for DTS devices** were used for testing.

When the field strength (or envelope power) is not constant or when it pulses, and an average detector/limit is specified to be used, a duty cycle correction factor may be utilized to determine the pulsed "average" of the field strength or power.

If the product tested is configured with an integral antenna, all measurements are Radiated Field Strength measurements. Note if RF Conducted Port tests cannot be performed, Radiated Field Strength measurements may be taken to demonstrate compliance with the various Conducted Port Power requirements of FCC 15.247.

When applicable, the following equation was utilized to covert measurements between RF Conducted Port Power and Radiated Field Strength for a given test distance:

$P = (E \times d)^2 / (30 \times G)$

Whereby:

P = Power in watts
E= measured maximum field strength in Volts/meter
d = test distance in meters from which the field strength was measured (typically 3-meters)
G = numeric gain of the transmitting antenna over an isotropic radiator

If the antenna gain is not known (declared by the client) at the time of testing, a maximum numeric antenna gain of 4 (6dBi) may be assumed per FCC 15.247(b)(4). This is allowable when applying the above calculation to determine a de facto EIRP limit.

Product-Specific Radio Remarks: M2e AMR Module (embedded in Landis & Gyr FOCUS electric meters)

1) The product under test is a DTS utilizing FM Digital Modulation (FSK) for its radio function.
2) The manufacturer has not declared an antenna gain – therefore, a maximum numeric gain of 4 (6dBi) was assumed for this report.
3) The product has a single integral antenna – Planar Inverted-F (PIFA).
4) The product operates within the 902MHz to 928MHz frequency band of operation. Therefore, (3) channels were configured and tested (902MHz, 920MHz and 927MHz).
5) Testing was performed in (1) axis only – the product is specified to be mounted in a single orientation – vertical mounted on a wall or flat surface.
6) Where applicable, Duty Cycle Correction Factors were utilized in this report per client request.

3 Description of Equipment Under Test

Equipment Under Test			
Description	Manufacturer	Model Number	Serial Number
900MHz AMR Module Tx	Transparent Technologies	AL (with M2e radio)	FCC1
900MHz AMR Module Rx	Transparent Technologies	AL (with M2e radio)	FCC2

Receive Date:	02/17/2011
Received Condition:	Good
Type:	Production Sample

Description of Equipment Under Test (provided by client)

The M2e Electric Meter Radio Transceiver offers utilities a high-performance, cost-effective radio read system. Embedded within the Landis & Gyr FOCUS kWh electric meter, the M2e offers superior reading performance with a clear migration path to networked AMR.
The radio operates at a nominal frequency range of 903-927MHz – ISM band.

The product utilizes two-way spread spectrum RF transmission and FM Digital Modulation (FSK) for its radio function.
The product has a single integral antenna – Planar Inverted-F (PIFA)

Intended use of the product is commercial and industrial applications in dry, damp and wet locations.

The product is marketed in the US & Canada.

Equipment Under Test Power Configuration			
Rated Voltage	Rated Power	Rated Frequency	Number of Phases
240 VAC	3 W	60 Hz	1

Operating modes of the EUT:

No.	Descriptions of EUT Exercising
1	Tx - Product set up in transmit mode at full power, CW mode (for testing only)
	Tx – Product set up in transmit mode, full power, FSK modulated
2	Rx – Product set up in “standby” receive mode

Clock Frequencies of the EUT:

No.	Descriptions of Product Clocks
1	Transmit Frequency: 903 MHz to 927 MHz
2	Lowest Frequency Utilized: 32.768 kHz

3.1 Product Photo:

Product Tested - Model AL – Landis & Gyr FOCUS Electric Meter
(with embedded M2e radio)

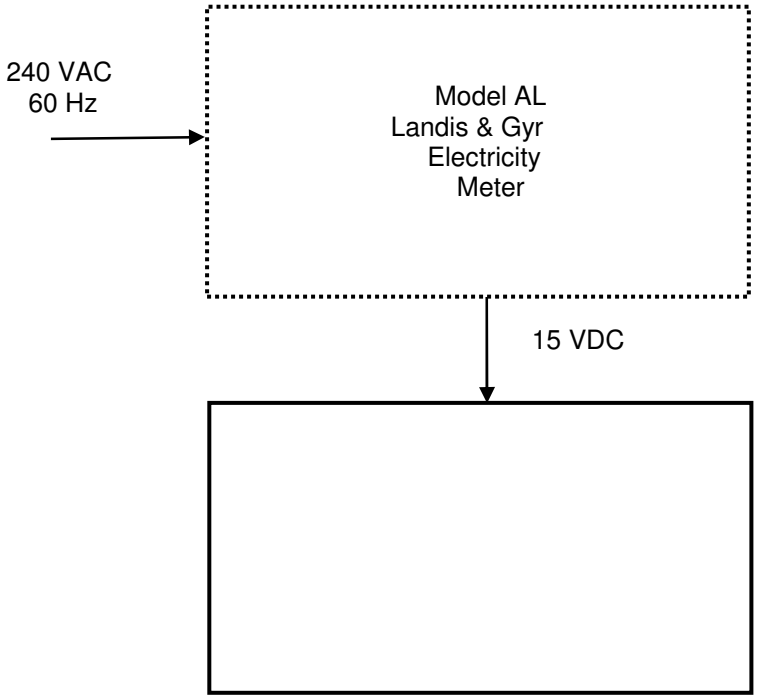
M2e installed into “Host” (Electricity Meter)

4 System setup including cable interconnection details, support equipment and simplified block diagram

4.1 Method:

Record the details of EUT cabling, document the support equipment, and show the interconnections in a block diagram.

4.2 EUT Block Diagram:



Note: The electricity meter (with embedded radio) was located inside the test volume.

4.3 Data:

ID	Cable Description	Length	Shielding	Ferrites
1	AC Cable	1 meter	no	no

Support Equipment			
Description	Manufacturer	Model Number	Serial Number
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General notes:
1. Product did not require any support equipment other than laptop/software utility to change Tx channels and operating modes.

5 Radiated Emissions – Fundamental Power & Harmonics of the Fundamental

5.1 Method

The test methods used comply with ANSI C63.10. Unless otherwise stated no deviations were made from **FCC CFR47 15.247 & IC RSS-210**.

This testing was performed at Intertek Denver, located at 1795 Dogwood St. Suite 200, Louisville, CO 80027.

5.2 Test Equipment Used:

Asset ID:	Description:	Manufacturer:	Model:	Serial:	Cal Date	Cal Due
18882	Spectrum Analyzer (dc-22 GHz)	Hewlett-Packard	8566B	2410A00154	12/06/2010	12/06/2011
18660	Spectrum Analyzer Display Section (set 1)	Hewlett-Packard	85662A	2318A04983	12/06/2010	12/06/2011
18880	Q.P Adapter	Hewlett-Packard	85650A	2811A01300	12/06/2010	12/06/2011
18913	Spectrum Analyzer	Hewlett-Packard	E7405A	My44211889	05/07/2010	05/07/2011
18912	9 kHz- 1.3GHz Pre Amp	Hewlett-Packard	8447F	3113A05545	06/04/2010	06/04/2011
18906	Pre-Amplifier (1-4 GHz)	Mini-Circuits Lab	ZHL-42	N052792-2	06/11/2010	06/11/2011
18900	RF Pre-Amplifier (4-8 GHz)	Avantek	AFT97-8434-10F	1007	06/07/2010	06/07/2011
18901	RF Pre-Amplifier (8-18 GHz)	Avantek	AWT-18037	1002	06/07/2010	06/07/2011
18897	Magnetic loop antenna 10kHz-30MHz	EMCO	6502	9205-2738	11/18/2010	11/18/2011
19936	Bilog Antenna 30 MHz - 6GHz	Sunol Sciences	JB6	A050707-1	10/11/2010	10/11/2011
18886	Ridged Guide Antenna 1-18GHz	TENSOR	4105	2020	10/08/2010	10/08/2011
SW-6	Software application for Radiated and Conducted Emissions	Intertek	OATS_CVI	V.1.0	01/01/2011	01/01/2012

5.3 Results:

The sample tested was found to Comply.

- FCC 247(b)(3) (d)/15.205/209
- RSS-210 A8.4(4) & A8.5

5.4 Setup Photographs:

Test setup – Front View

Photo:

Test setup – Rear View

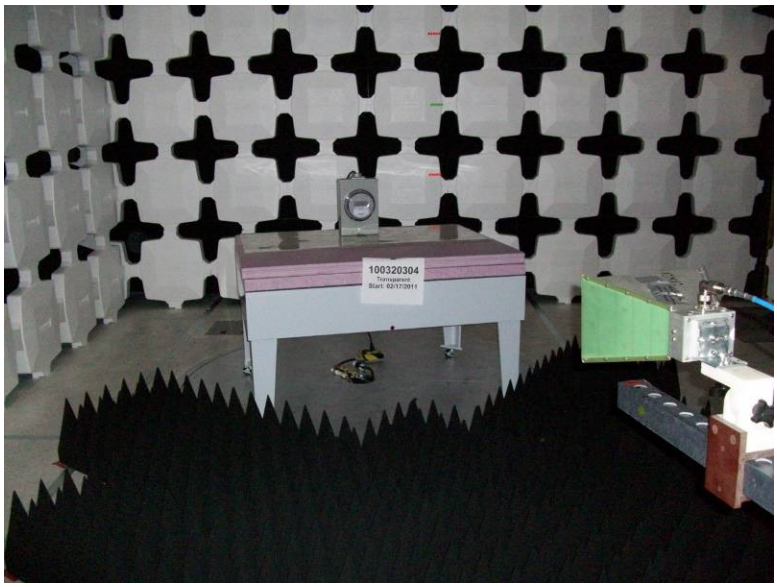
Photo:

Normal Axis (EUT Vertical – Mounted on Wall/ Building)

Photo: Antenna Setups

BiLog Antenna (30MHz to 1000MHz)

Ridged Guide Horn Antenna (1GHz to 18GHz)



5.5 Test Data: Fundamental Output Power

Fundamental Power and Spurious of the Transmitter

Test Report #:	**100320304 Run 01**	Test Area:	CC1 Radiated	Temperature:	22.8	°C
Test Method:	FCC 15.247	Test Date:	17-Feb-2011	Relative Humidity:	23.7	%
EUT Model #:	Model AL (with embedded M2E)	EUT Power:	220VAC/60Hz	Air Pressure:	80.2	kPa
EUT Serial #:	FCC1					

Manufacturer:	Transparent Technologies
EUT Description:	AMR Module used in host device – Landis & Gyr FOCUS electricity meter
Notes:	DTS - FSK 900MHz Tx
	Product configured for maximum power and 100% duty cycle (testing purposes only)
	All measurements peak detector: 1MHz RBW/ 3MHz VBW

Level Key	
Pk – Peak	Nb – Narrow Band
Qp – QuasiPeak	Bb – Broad Band
Av - Average	

FREQ	LEVEL	CABLE / ANT / PREAMP	FINAL	POL / HGT / AZ	Duty Cycle Correction	Final Corrected	Limit FCC 15.247	DELTA
(MHz)	(dBuV)	(dB) (dB\m) (dB)	(dBuV)	(m) (DEG)	(dB)	(dBuV/m)	(dBuV/m)	(dB)
The following Duty Cycle was verified by Intertek:								
3.75%								
Averaging method for pulsed signals and calculation in accordance to FCC CFR47 Part 15.35 utilized to calculate field strength emissions.								
The testing performed in accordance to FCC CFR47 Part 15.205 (restricted bands of operation) and 15.247 emissions and delta limits were calculated as follows:								
Final Corrected Peak Measurement – Duty Cycle Correction Factor* = Final Calculated Emission								
The Final Calculated Emission was then compared to the Limits in CFR47 Part 15.209 and 15.247 and the emission/limit delta was calculated.								
the DTCF is calculated as follows $20*\log_{10}$(duty cycle in 100mS).								
Part 15.247 and 15.205 Respectively								
Fundamental Measurements								
Fundamental - Low Channel								
902.84	83.3 Pk	2.1 / 22.5 / 0.0	108	V / 1.1 / 358.0	0.0	108.0	131.2	-23.2
902.84	87.5 Pk	2.1 / 22.5 / 0.0	112.2	H / 1.3 / 358.0	0.0	112.2	131.2	-19.0
Fundamental - Mid Channel								
919.84	**90.6 Pk**	**2.1 / 22.5 / 0.0**	**115.2**	**H / 1.3 / 5.0**	**0.0**	**115.2**	**131.2**	**-16.0**
919.84	83.8 Pk	2.1 / 22.5 / 0.0	108.4	V / 1.1 / 5.0	0.0	108.4	131.2	-22.8
Fundamental - High Channel								
926.84	89.7 Pk	2.1 / 22.4 / 0.0	114.2	H / 1.3 / 5.0	0.0	114.2	131.2	-17.0
926.84	81.6 Pk	2.1 / 22.4 / 0.0	106.2	V / 1.1 / 5.0	0.0	106.2	131.2	-25.0

Notes:

1) Worst-Case Fundamental Measurement – Mid Channel: 115.2 dBuV/m (16.0 dBuV below Limit)

Conversion of Radiated Field Strength to Power: Worst-case Fundamental Measurement

From FCC KDB 558074 – Alternative Test Procedures.

If antenna conducted tests cannot be performed on this device, radiated tests to show compliance with the peak output power limit specified in Section 15.247(b) and the spurious RF conducted emission limit specified in Section 15.247(c) are acceptable. As stated previously, a pre-amp, and, in the latter case, a high pass filter, are required for the following measurements.

1) Calculate the transmitter's peak power using the following equation:

$$E = \frac{\sqrt{30PG}}{d}$$

Where: E is the measured maximum fundamental field strength in V/m, utilizing a RBW ≥ the 6dB bandwidth of the emission, VBW > RBW, peak detector function. Follow the procedures in C63.10-2009 with respect to maximizing the emission.

G is the numeric gain of the transmitting antenna with reference to an isotropic radiator.
d is the distance in meters from which the field strength was measured.
P is the power in watts for which you are solving:

$$P = \frac{(E*d)^2}{30G}$$

In this case:

E = 115.2 dBuV/m (from above mid channel) = 0.57544 V/m
D = 3 meters
G = 4 (6dBi)

P = 0.02483 W

Limit from 15.247(b)(3) = 1.0 W

Therefore, Delta from Limit = 0.02483 – 1.0 = - 0.97517 W

Conversion of RF Conducted Port Power Limit to Radiated Field Strength Limit

When limits are defined as conducted port power measurements and the product has an integral antenna, radiated field strength tests to demonstrate compliance are acceptable per FCC KDB 558074.

The following equation was used to convert RF Conducted Port Power (Watts) limit into a Radiated Field Strength (dBuV/m) limit:

$$P = \frac{(E*d)^2}{30G}$$

Therefore:

$$E = \frac{\sqrt{30PG}}{d}$$

Radiated Field Strength Limit Fundamental Frequency: 131.2 dBuV/m

Where:
E = Measured Field Strength in V/m (converted to dBuV/m in test data)
P = 1 Watt Fundamental Limit
G = Numeric Gain of transmitting antenna over an ideal isotropic radiator = 4 (6dBi)
d = EUT-to-Antenna Test Distance = 3-meters

5.6 Test Data: Harmonics of the Fundamental

FREQ	LEVEL	CABLE / ANT / PREAMP	FINAL	POL / HGT / AZ	Duty Cycle Correction	Final Corrected	Limit FCC 15.247	DELTA
(MHz)	(dBuV)	(dB) (dB\m) (dB)	(dBuV)	(m) (DEG)	(dB)	(dBuV/m)	(dBuV/m)	(dB)
Harmonics of the Fundamental – FCC Restricted Bands are Highlighted in Yellow								
Harmonics - Low Channel								
1805.7	44.8 Pk	3.0 / 27.1 / 36.1	38.8	V / 1.7 / 5.0	28.5	10.3	92.2	-81.9
1805.7	40.0 Pk	3.0 / 27.1 / 36.1	34	H / 1.7 / 48.0	28.5	5.5	92.2	-86.7
2708.55	46.6 Pk	3.8 / 29.1 / 37.0	42.5	V / 1.8 / 5.0	28.5	14.0	54.0	-40.0
2708.55	51.1 Pk	3.8 / 29.1 / 37.0	47.1	H / 1.6 / 34.0	28.5	18.6	54.0	-35.4
3611.4	42.0 Pk	4.4 / 31.7 / 37.5	40.6	V / 1.6 / 44.0	28.5	12.1	54.0	-41.9
3611.4	39.8 Pk	4.4 / 31.7 / 37.5	38.4	H / 1.6 / 16.0	28.5	9.9	54.0	-44.1
4514.27	37.9 Pk	5.0 / 32.4 / 39.0	36.2	H / 1.7 / 42.0	28.5	7.7	54.0	-46.3
4514.27	39.0 Pk	5.0 / 32.4 / 39.0	37.3	V / 1.5 / 21.0	28.5	8.8	54.0	-45.2
5417.12	35.8 Pk	5.5 / 34.4 / 39.1	36.6	V / 1.3 / 22.0	28.5	8.1	54.0	-45.9
5417.13	34.4 Pk	5.5 / 34.4 / 39.1	35.2	H / 1.5 / 22.0	28.5	6.7	54.0	-47.3
6320.01	34.9 Pk	5.9 / 34.6 / 39.6	35.9	H / 1.4 / 22.0	28.5	7.4	92.2	-84.8
6320.04	33.4 Pk	5.9 / 34.6 / 39.6	34.4	V / 1.4 / 38.0	28.5	5.9	92.2	-86.3
7222.86	33.6 Pk	6.4 / 36.1 / 39.7	36.5	H / 1.4 / 56.0	28.5	8.0	92.2	-84.2
7222.87	34.5 Pk	6.4 / 36.1 / 39.7	37.4	V / 1.3 / 36.0	28.5	8.9	92.2	-83.3
8125.67	35.9 Pk	6.9 / 36.7 / 45.7	33.8	V / 1.3 / 43.0	28.5	5.3	54.0	-48.7
8125.67	38.4 Pk	6.9 / 36.7 / 45.7	36.2	H / 1.2 / 22.0	28.5	7.7	54.0	-46.3
9028.52	41.5 Pk	7.3 / 37.1 / 47.3	38.7	V / 1.2 / 28.0	28.5	10.2	54.0	-43.8
9028.52	40.6 Pk	7.3 / 37.1 / 47.3	37.8	H / 1.2 / 22.0	28.5	9.3	54.0	-44.7
Harmonics - Mid Channel								
1839.7	47.6 Pk	3.1 / 27.0 / 36.2	41.5	H / 1.3 / 10.0	28.5	13.0	95.2	-82.2
1839.69	49.5 Pk	3.1 / 27.0 / 36.2	43.3	V / 1.7 / 7.0	28.5	14.8	95.2	-80.4
2759.55	52.6 Pk	3.8 / 29.2 / 37.0	48.7	H / 2.1 / 16.0	28.5	20.2	54.0	-33.8
2759.56	50.4 Pk	3.8 / 29.2 / 37.0	46.4	V / 1.4 / 32.0	28.5	17.9	54.0	-36.1
3679.41	43.9 Pk	4.5 / 31.9 / 37.5	42.7	H / 1.5 / 52.0	28.5	14.2	54.0	-39.8
3679.41	45.0 Pk	4.5 / 31.9 / 37.5	43.8	V / 1.5 / 13.0	28.5	15.3	54.0	-38.7
4599.27	42.8 Pk	5.0 / 32.4 / 39.1	41.2	V / 1.5 / 52.0	28.5	12.7	54.0	-41.3
4599.27	42.6 Pk	5.0 / 32.4 / 39.1	41.1	H / 1.7 / 15.0	28.5	12.6	54.0	-41.4
5519.12	35.2 Pk	5.5 / 34.4 / 39.1	36.1	V / 1.3 / 16.0	28.5	7.6	95.2	-87.6
5519.21	33.0 Pk	5.5 / 34.4 / 39.1	33.9	H / 1.5 / 34.0	28.5	5.4	95.2	-89.8
6439.06	36.9 Pk	6.0 / 34.6 / 39.5	38	V / 1.4 / 22.0	28.5	9.5	95.2	-85.7
6439.06	36.5 Pk	6.0 / 34.6 / 39.5	37.6	H / 1.6 / 26.0	28.5	9.1	95.2	-86.1
7358.91	34.7 Pk	6.5 / 36.4 / 39.4	38.1	V / 1.4 / 36.0	28.5	9.6	54.0	-44.4
7358.91	35.7 Pk	6.5 / 36.4 / 39.4	39.1	H / 1.3 / 56.0	28.5	10.6	54.0	-43.4
8278.74	41.7 Pk	7.0 / 36.7 / 45.9	39.4	H / 1.2 / 15.0	28.5	10.9	54.0	-43.1
8278.74	41.8 Pk	7.0 / 36.7 / 45.9	39.5	V / 1.2 / 16.0	28.5	11.0	54.0	-43.0
9198.59	43.5 Pk	7.4 / 37.2 / 47.5	40.6	H / 1.3 / 12.0	28.5	12.1	54.0	-41.9
9198.59	43.1 Pk	7.4 / 37.2 / 47.5	40.3	V / 1.2 / 16.0	28.5	11.8	54.0	-42.2

Harmonics - High Channel								
1853.7	**54.7 Pk**	**3.1 / 27.0 / 36.2**	**48.6**	**V / 1.1 / 12.0**	**28.5**	**20.1**	**94.2**	**-74.1**
1853.69	52.7 Pk	3.1 / 27.0 / 36.2	46.6	H / 1.3 / 32.0	28.5	18.1	94.2	-76.1
2780.55	56.0 Pk	3.8 / 29.3 / 37.0	52.1	V / 1.6 / 20.0	28.5	23.6	54.0	-30.4
2780.56	53.8 Pk	3.8 / 29.3 / 37.0	49.8	H / 1.8 / 26.0	28.5	21.3	54.0	-32.7
3707.41	**49.4 Pk**	**4.5 / 32.0 / 37.5**	**48.4**	**V / 2.4 / 18.0**	**28.5**	**19.9**	**54.0**	**-34.1**
3707.41	53.2 Pk	4.5 / 32.0 / 37.5	52.2	H / 1.5 / 15.0	28.5	23.7	54.0	-30.3
4634.27	50.5 Pk	5.1 / 32.5 / 39.1	49	H / 1.6 / 18.0	28.5	20.5	54.0	-33.5
4634.28	49.2 Pk	5.1 / 32.5 / 39.1	47.7	V / 1.4 / 6.0	28.5	19.2	54.0	-34.8
5561.13	38.2 Pk	5.6 / 34.3 / 39.1	39.1	V / 1.3 / 28.0	28.5	10.6	94.2	-83.6
5561.14	39.5 Pk	5.6 / 34.3 / 39.1	40.3	H / 1.8 / 14.0	28.5	11.8	94.2	-82.4
6488.05	40.5 Pk	6.0 / 34.6 / 39.5	41.7	H / 1.5 / 65.0	28.5	13.2	94.2	-81.0
6488.06	41.1 Pk	6.0 / 34.6 / 39.5	42.3	V / 1.9 / 40.0	28.5	13.8	94.2	-80.4
7414.91	42.9 Pk	6.5 / 36.4 / 39.4	46.4	H / 1.4 / 60.0	28.5	17.9	54.0	-36.1
7414.91	40.7 Pk	6.5 / 36.4 / 39.4	44.2	V / 1.4 / 42.0	28.5	15.7	54.0	-38.3
8341.76	40.6 Pk	7.0 / 36.8 / 46.1	38.3	V / 1.2 / 16.0	28.5	9.8	54.0	-44.2
8341.76	41.4 Pk	7.0 / 36.8 / 46.1	39.1	H / 1.2 / 12.0	28.5	10.6	54.0	-43.4
9268.61	43.7 Pk	7.5 / 37.4 / 47.5	41	V / 1.2 / 12.0	28.5	12.5	94.2	-81.7
9268.61	45.1 Pk	7.5 / 37.4 / 47.5	42.4	H / 1.1 / 32.0	28.5	13.9	94.2	-80.3

Example calculation for Intentional Radiated Emissions:

Measured Level	+	Transducer, Cable Loss Pre-Amplifier	=	Corrected Reading	-	Duty Cycle Correction	=	FINAL Measurement	-	Specification Limit	=	Delta from Specification Limit
(dBµV)		(dB)		(dBµV/m)		(dBµV/m)		(dBµV/m)		(dBµV/m)		
24.0		**14.9**		**38.9**		**10.0**		**28.9**		**40.0**		**-11.1**

Notes:

1) Worst-Case Harmonic within FCC Restricted Band: High Channel – 3707.41MHz (34.1dB below limit).

2) Worst-Case Harmonic outside the FCC Restricted Band: Mid/High Channel – 1853.7MHz (74.1dB below limit).

3) All measurements are Radiated Field Strength at 3-meter test distance.

4) All measurements were taken using a peak detector – duty cycle correction factors were applied to calculations above 1GHz, where average limits are specified.

Deviations, Additions, or Exclusions: None

6 Radiated Emissions – Unintentional & Spurious of the Transmitter

6.1 Method

The test methods used comply with ANSI C63.10. Unless otherwise stated no deviations were made from **FCC 15.247 & IC RSS-210.**

This testing was performed at Intertek Denver, located at 1795 Dogwood St. Suite 200, Louisville, CO 80027.

6.2 Test Equipment Used:

Asset ID:	Description:	Manufacturer:	Model:	Serial:	Cal Date	Cal Due
18882	Spectrum Analyzer (dc-22 GHz)	Hewlett-Packard	8566B	2410A00154	12/06/2010	12/06/2011
18660	Spectrum Analyzer Display Section (set 1)	Hewlett-Packard	85662A	2318A04983	12/06/2010	12/06/2011
18880	Q.P Adapter	Hewlett-Packard	85650A	2811A01300	12/06/2010	12/06/2011
18912	9 kHz- 1.3GHz Pre Amp	Hewlett-Packard	8447F	3113A05545	06/04/2010	06/04/2011
18906	Pre-Amplifier (1-4 GHz)	Mini-Circuits Lab	ZHL-42	N052792-2	06/11/2010	06/11/2011
18900	RF Pre-Amplifier (4-8 GHz)	Avantek	AFT97-8434-10F	1007	06/07/2010	06/07/2011
18901	RF Pre-Amplifier (8-18 GHz)	Avantek	AWT-18037	1002	06/07/2010	06/07/2011
18897	Magnetic loop antenna 10kHz-30MHz	EMCO	6502	9205-2738	11/18/2010	11/18/2011
19936	Bilog Antenna 30 MHz - 6GHz	Sunol Sciences	JB6	A050707-1	10/11/2010	10/11/2011
18886	Ridged Guide Antenna 1-18GHz	TENSOR	4105	2020	10/08/2010	10/08/2011
SW-6	Software application for Radiated and Conducted Emissions	Intertek	OATS_CVI	V.1.0	01/01/2011	01/01/2012

6.3 Results:

The sample tested was found to Comply.

- FCC 15.209/ 15.247(d)/ 15.205
- Covers RSS-210 A8.5, & RSS-GEN 7.2.2 & 7.2.5

6.4 Setup Photographs:

Test setup – Front View

Photo:

Test setup – Rear View

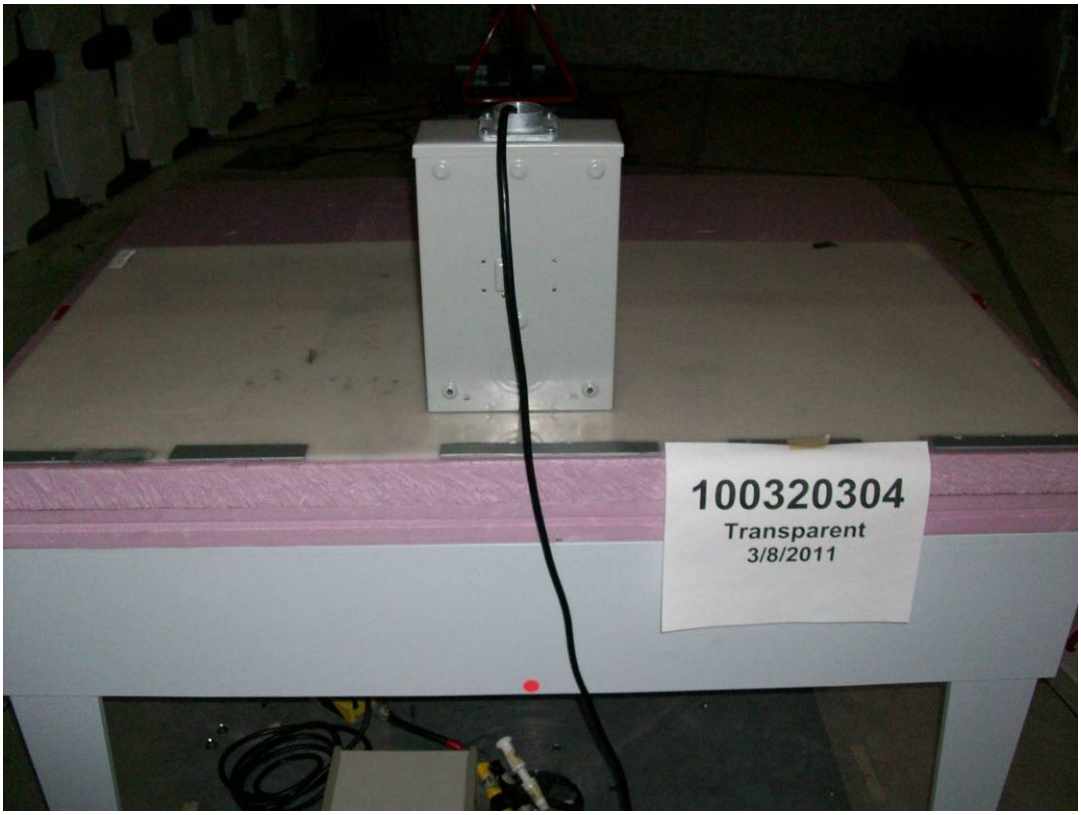


Photo: Antenna Setups

Active Magnetic Loop Antenna (10kHz to 30MHz)

BiLog Antenna (30MHz to 1000MHz)

Ridged Guide Horn Antenna (1GHz to 18GHz)

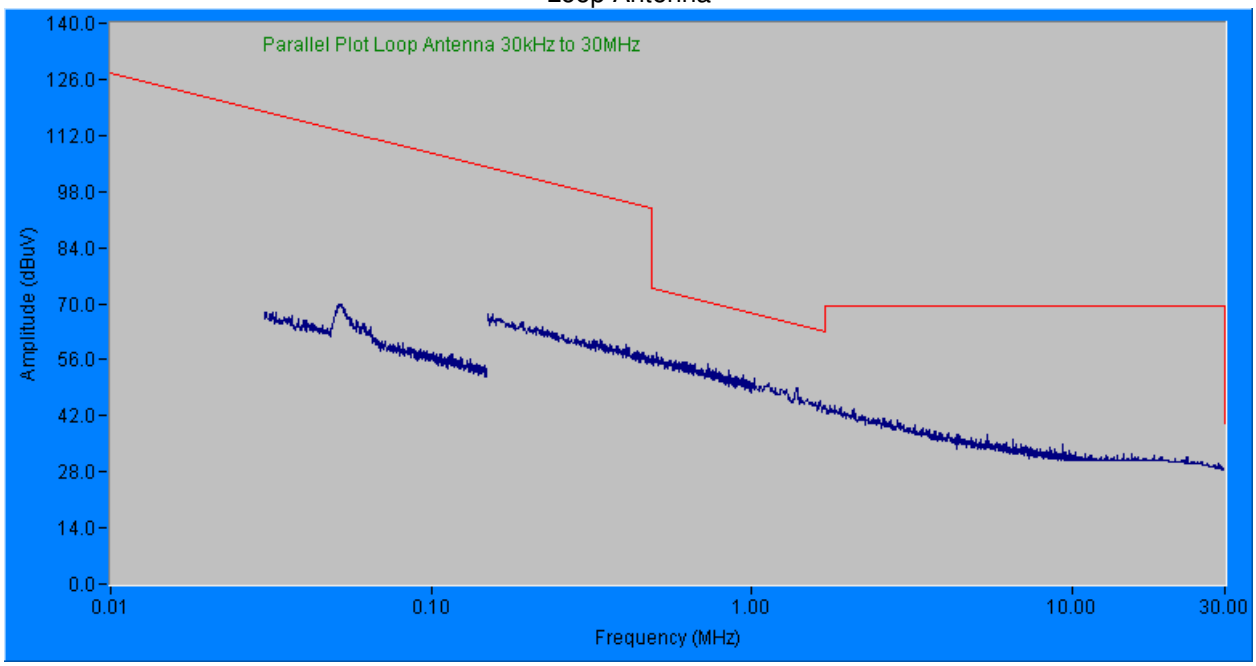
6.5 Test Data

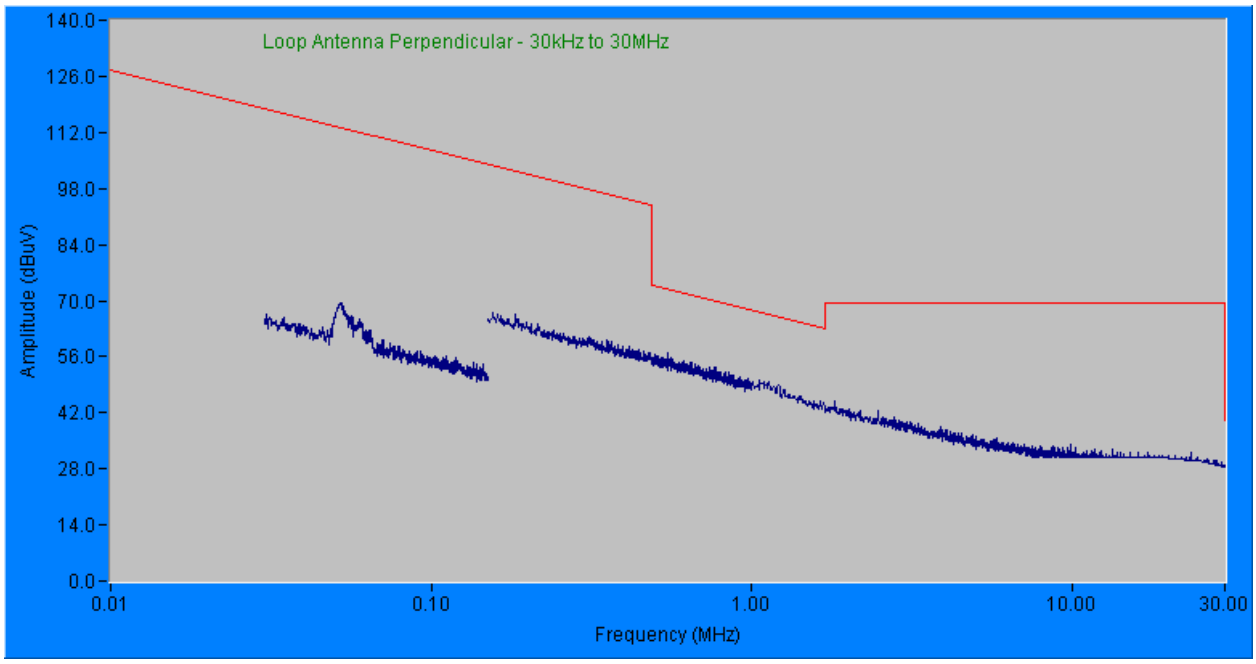
Tx Spurious Emissions – M2E AMR Module

FCC 15.209/15.247(d)/15.205 & RSS-210 A8.5/RSS-Gen 7.2.2/ 7.2.5

Tx Spurious Plots – 10kHz to 30MHz

Loop Antenna



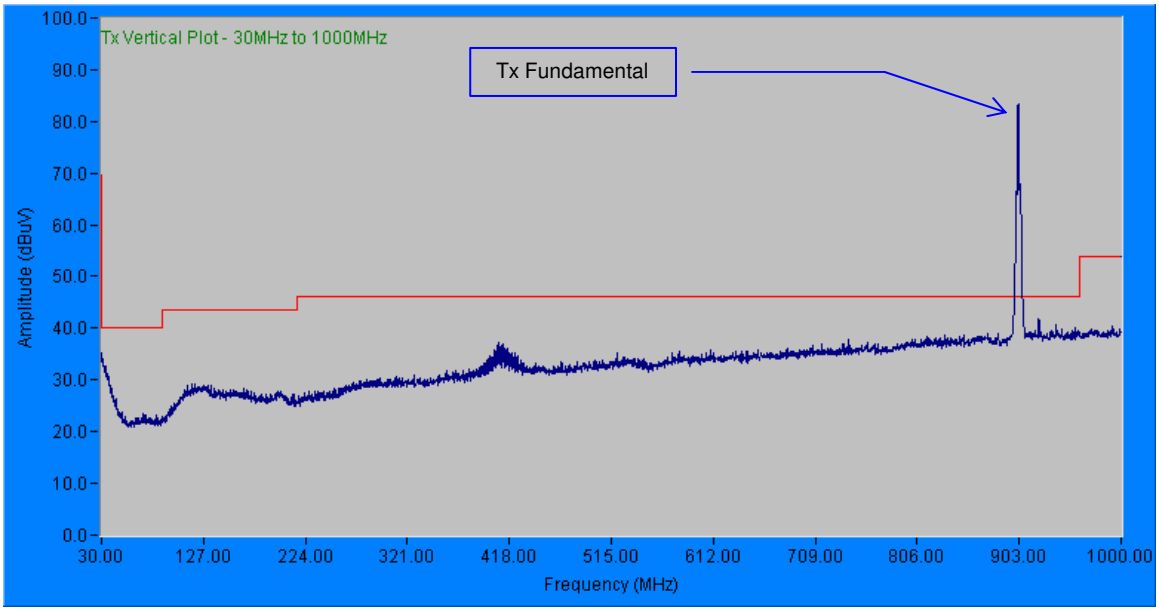


Note: Peak Detector measurements relative to FCC 15.209 quasi-peak limit

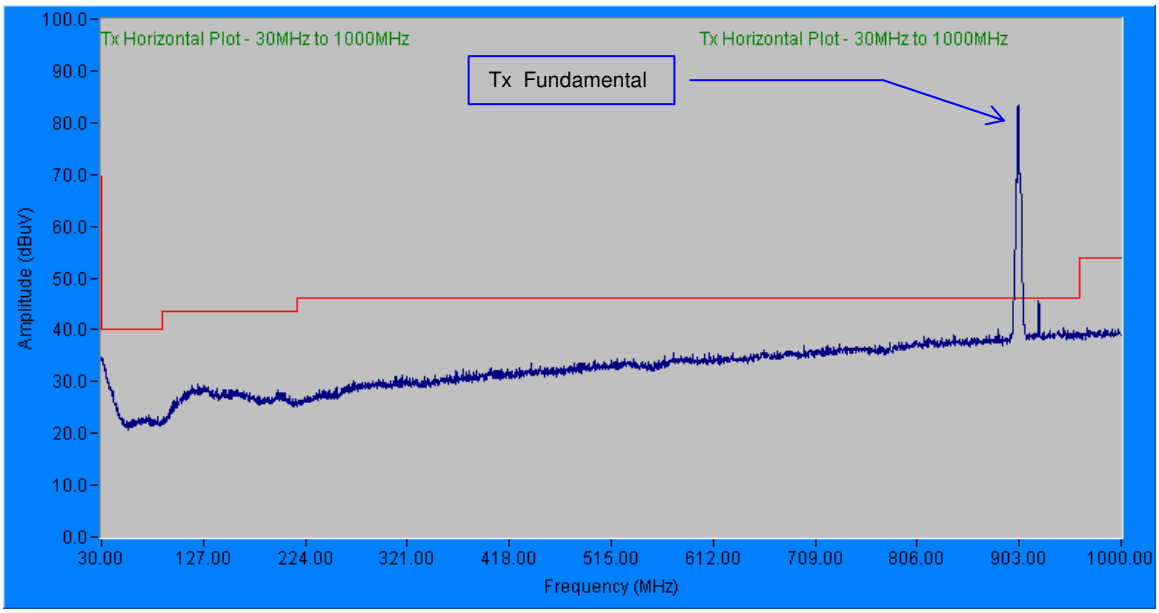
Spec: FCC 15.209 Limit & Spurious -20dBc

Tx Spurious Plots – 30MHz to 1000MHz

Vertical Antenna



Horizontal Antenna

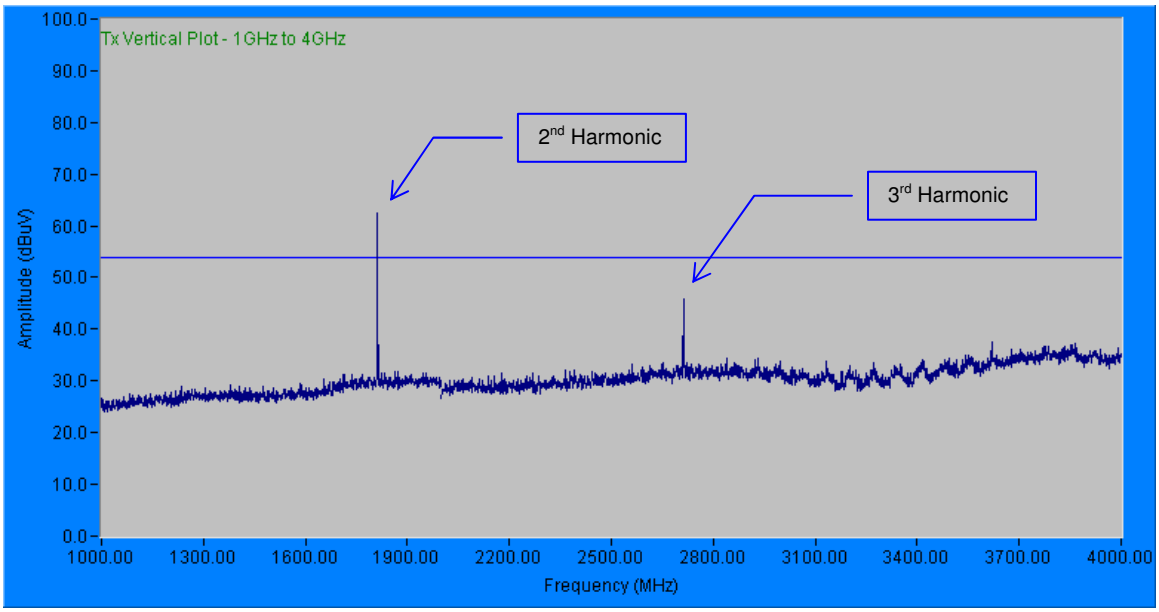


Note: Peak Detector measurements relative to FCC 15.209 quasi-peak limit

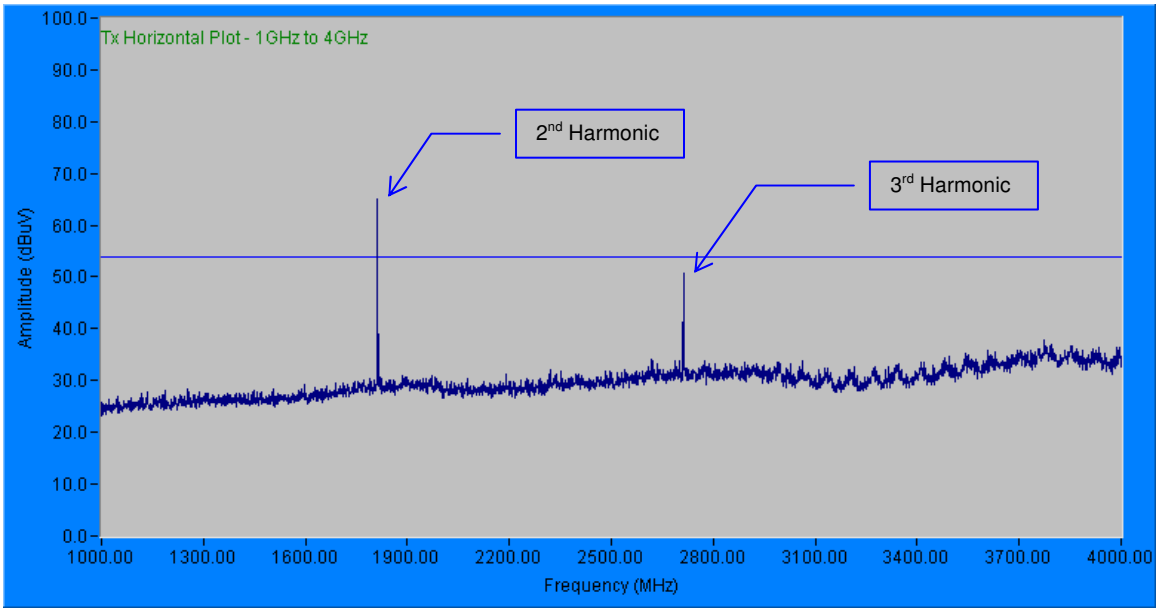
Spec: FCC 15.209 Limit & Spurious -20dBc

Tx Spurious Plots – 1GHz to 4GHz

Vertical Antenna



Horizontal Antenna

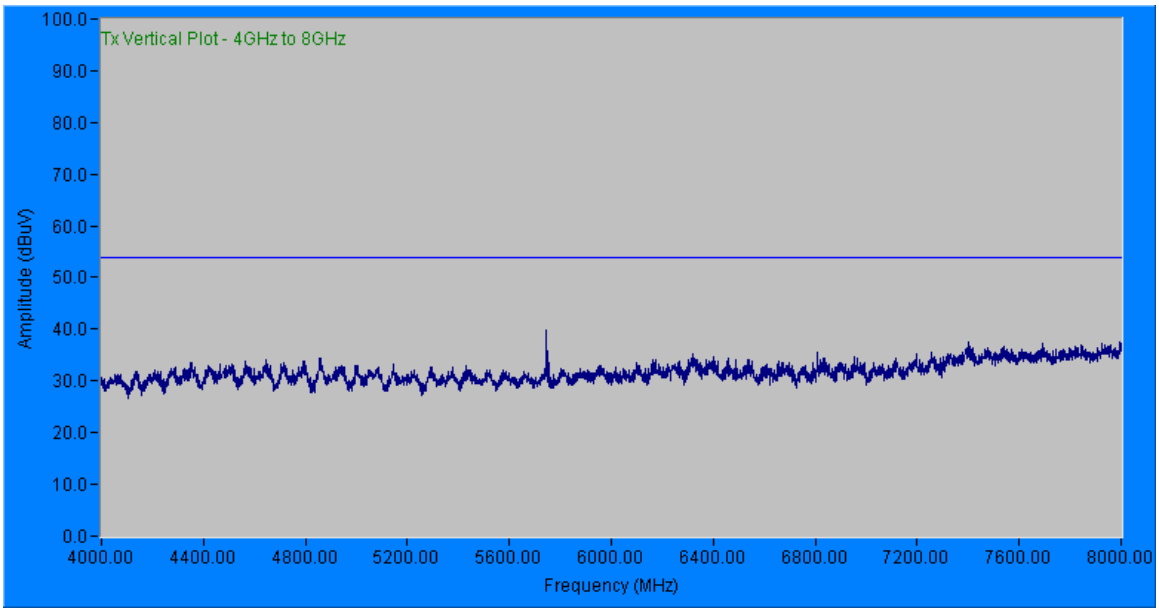


Note: Peak Detector measurements relative to FCC 15.209 average limit

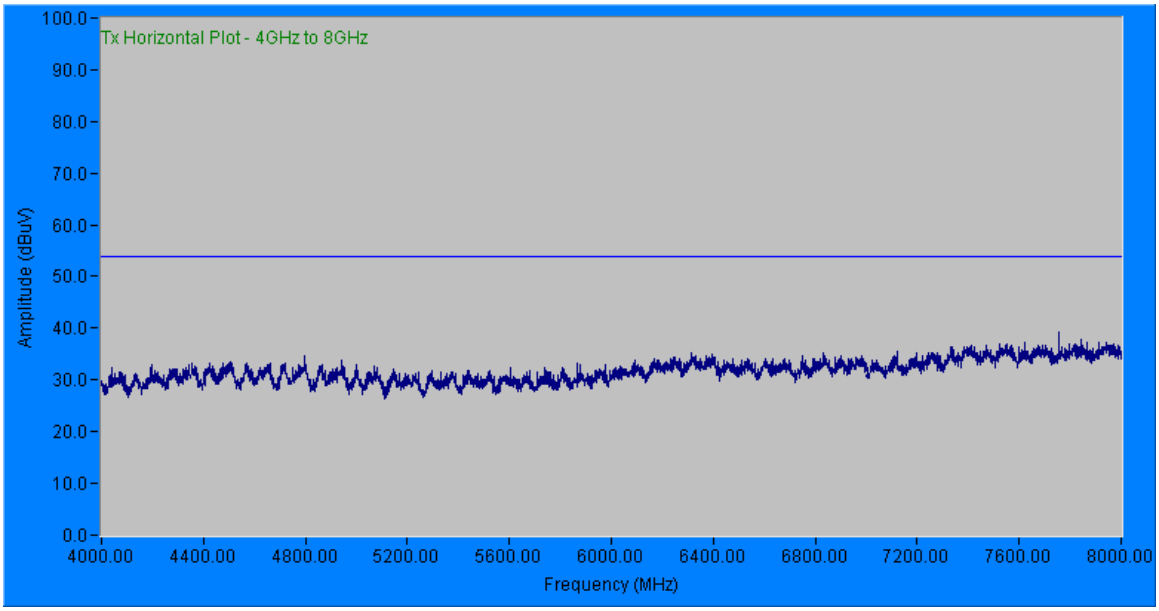
Spec: FCC 15.209 Limit & Spurious -20dBc

Tx Spurious Plots – 4GHz to 8GHz

Vertical Antenna



Horizontal Antenna

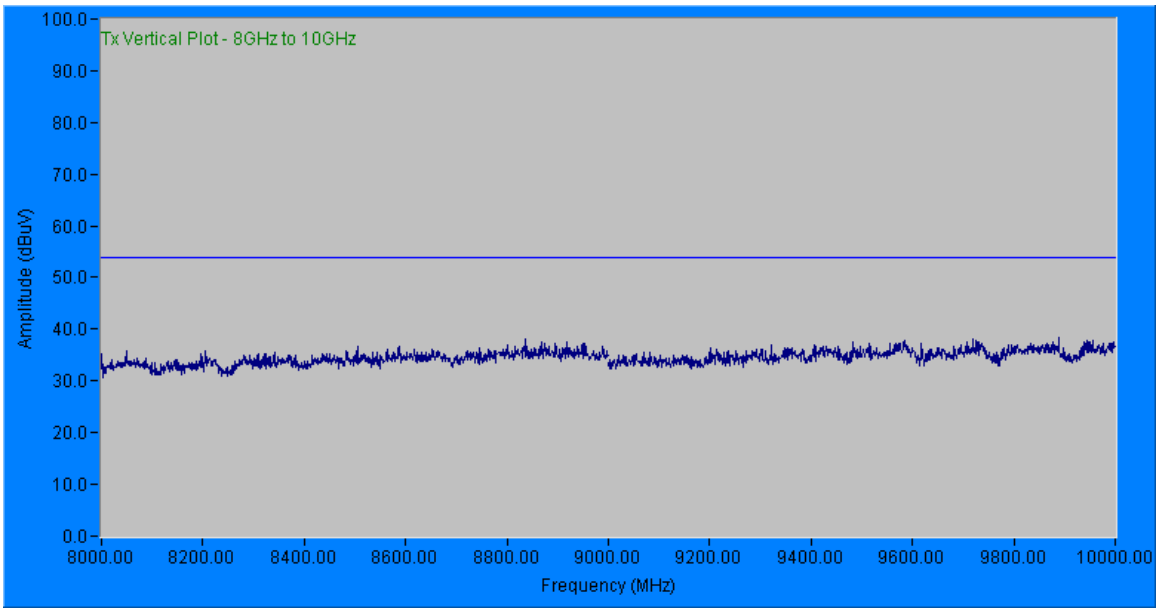


Note: Peak Detector measurements relative to FCC 15.209 average limit

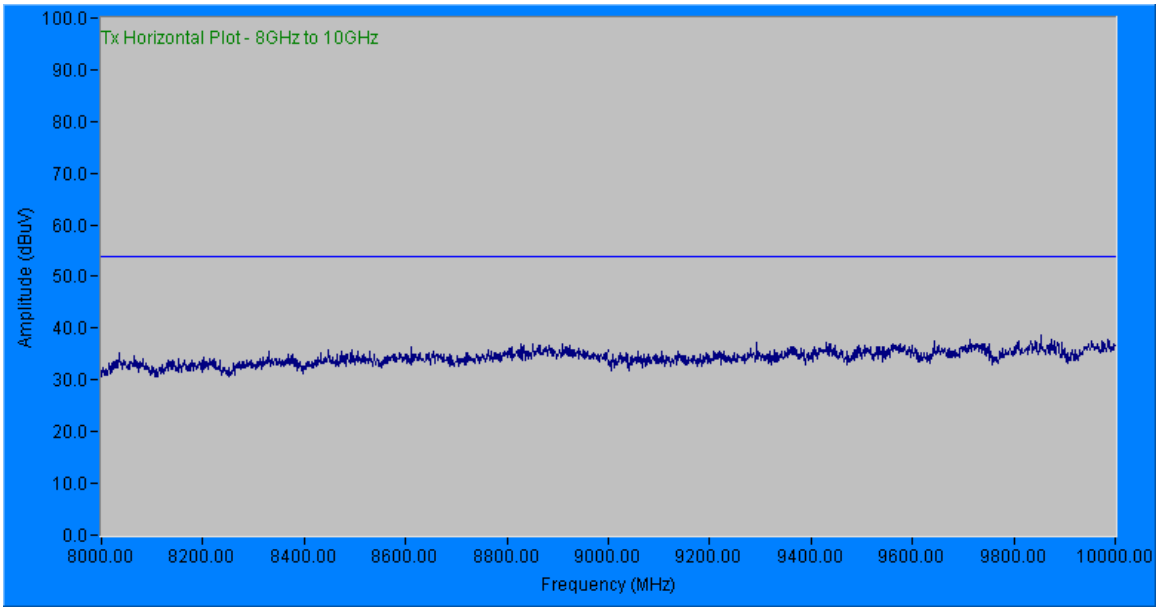
Spec: FCC 15.209 Limit & Spurious -20dBc

Tx Spurious Plots – 8GHz to 10GHz

Vertical Antenna



Horizontal Antenna



Note: Peak Detector measurements relative to FCC 15.209 average limit

Spec: FCC 15.209 Limit & Spurious -20dBc

Notes:

1) All peak Tx spurious signals fell below the FCC 15.209 quasi-peak and average limits – therefore, no discrete measurements were required. All signals were at least 20dBc under the fundamental.

Deviations, Additions, or Exclusions: None

7 Band Edge Measurements – Unintentional and Spurious of the Transmitter

7.1 Method

The test methods used comply with ANSI C63.10. Unless otherwise stated no deviations were made from **FCC 15.247 & IC RSS-210.**

This testing was performed at Intertek Denver, located at 1795 Dogwood St. Suite 200, Louisville, CO 80027.

7.2 Test Equipment Used:

Asset ID:	Description:	Manufacturer:	Model:	Serial:	Cal Date	Cal Due
18913	Spectrum Analyzer with Pre-Amp	Hewlett-Packard	E7405A	My44211889	05/11/2010	05/11/2011
19936	Bilog Antenna 30 MHz - 6GHz	Sunol Sciences	JB6	A050707-1	10/11/2010	10/11/2011

7.3 Results:

The sample tested was found to Comply.

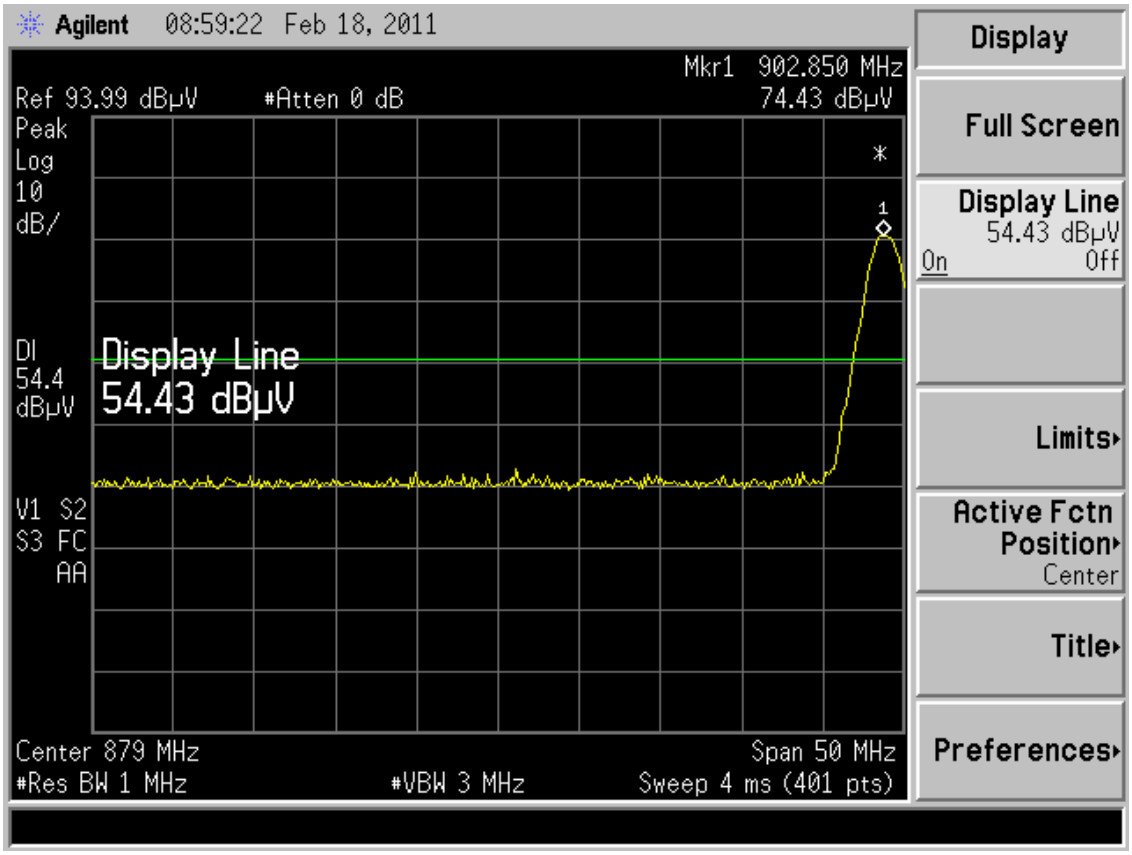
- FCC 15.209/15.247(d) / 15.205
- Covers RSS-210 A8.5, & RSS-Gen 7.2.2/ 7.2.5

7.4 Test Data: Band Edge

Band Edge – M2E AMR Module

FCC 15.209/15.247(d)/15.205 & RSS-210 A8.5/ RSS-GEN 7.2.2/ 7.2.5

Low Channel – 903 MHz

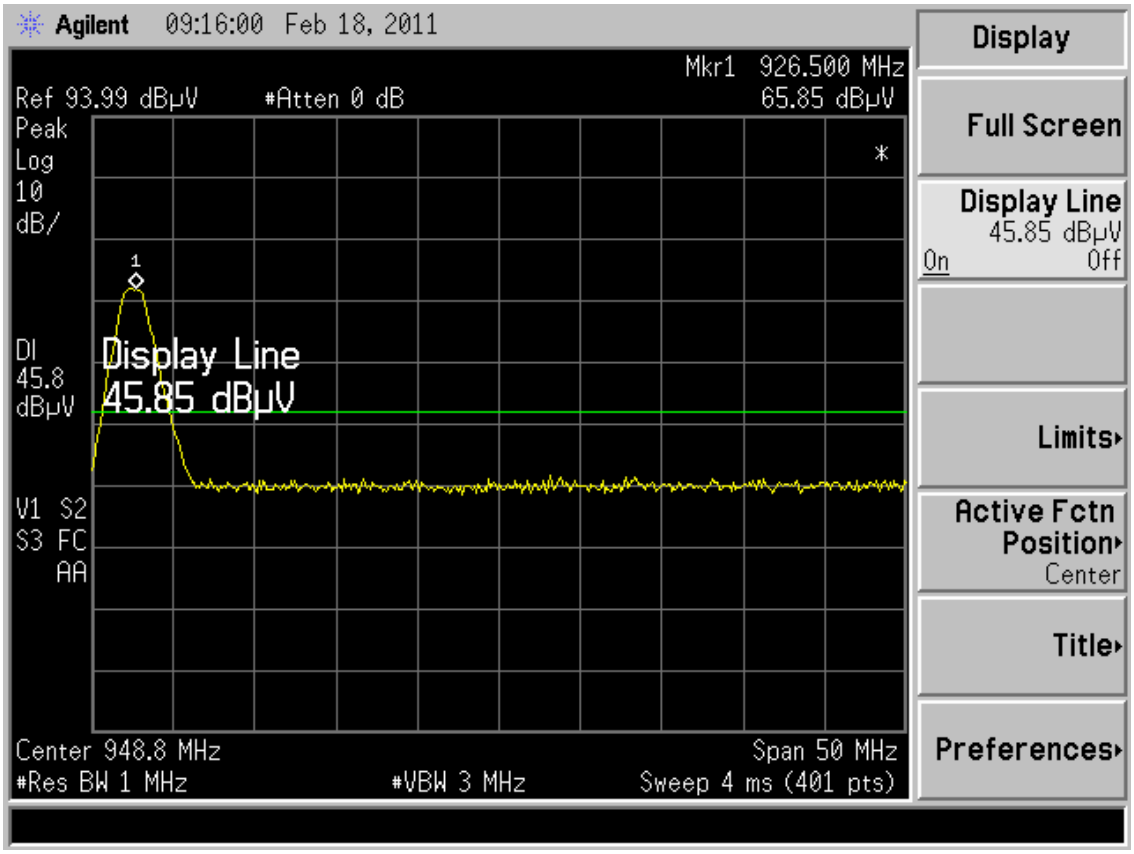


Specification: Spurious Emissions - 20dBc (Fundamental)

Band Edge

FCC 15.209/15.247(d)/15.205 & RSS-210 A8.5/ RSS-GEN 7.2.2

High Channel – 927 MHz

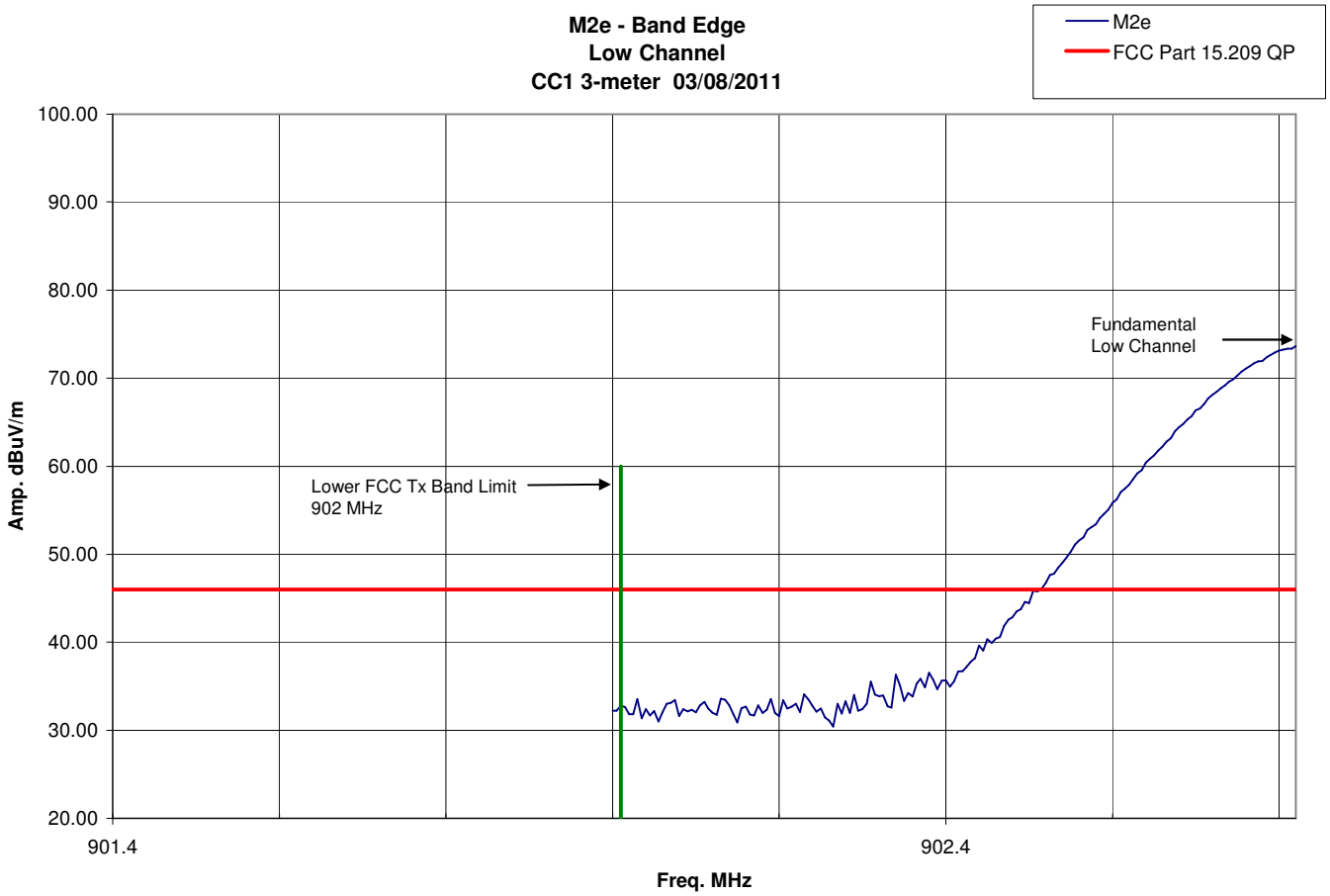


Specification: Spurious Emissions - 20dBc (Fundamental)

Band Edge

FCC 15.209/15.247(d)/15.205 & RSS-210 A8.5/ RSS-GEN 7.2.2

Low Channel – 903 MHz

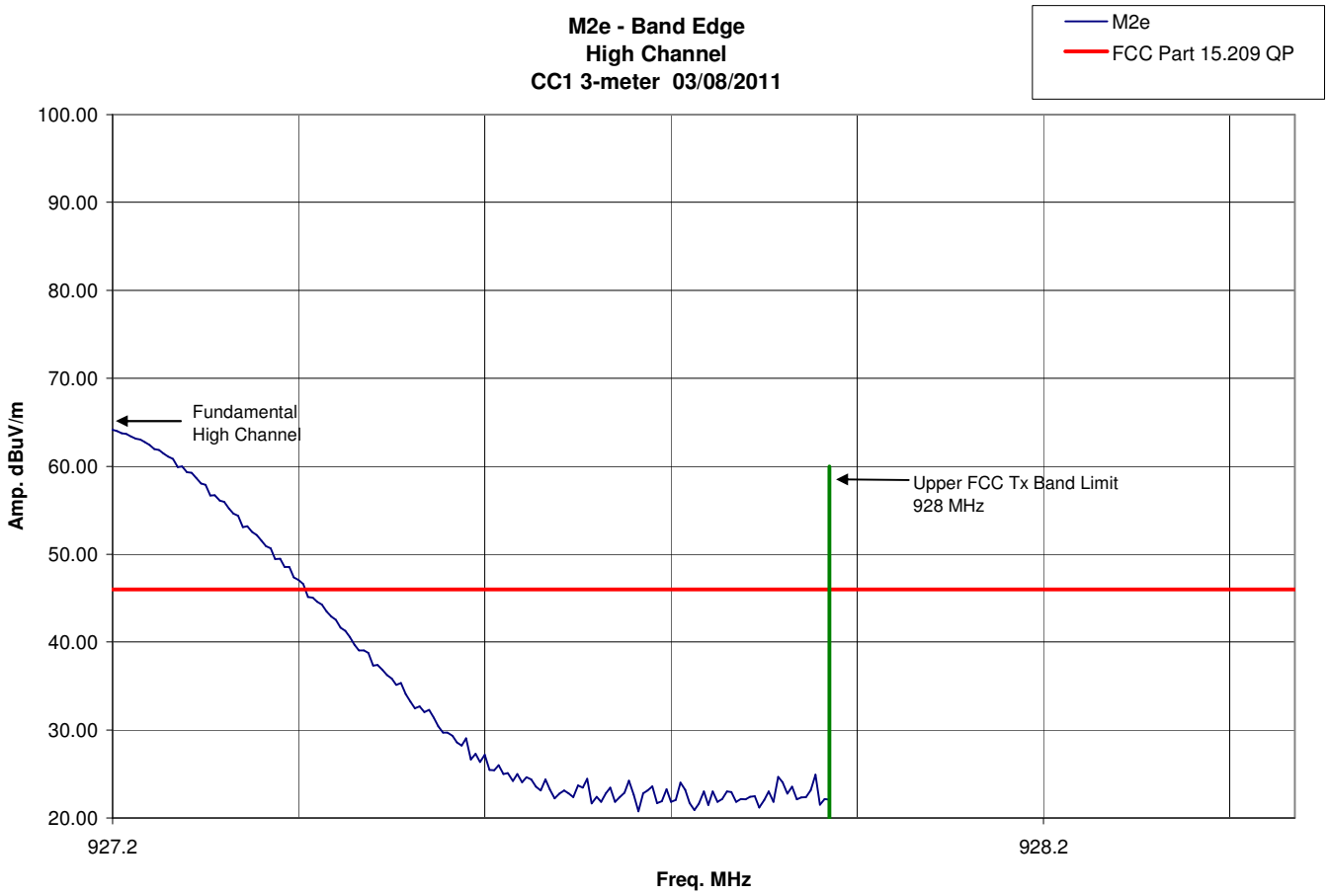


Specification: Spurious Emissions below FCC 15.209 limits outside Tx Band

Band Edge

FCC 15.209/15.247(d)/15.205 & RSS-210 A8.5/ RSS-GEN 7.2.2

High Channel – 927 MHz



Specification: Spurious Emissions below FCC 15.209 limit outside Tx Band

8 Radiated Emissions – Unintentional of the Receiver

8.1 Method

The test methods used comply with ANSI C63.10. Unless otherwise stated no deviations were made from **FCC 15.109 & IC RSS-Gen.**

This testing was performed at Intertek Denver, located at 1795 Dogwood St. Suite 200, Louisville, CO 80027.

8.2 Test Equipment Used:

Asset ID:	Description:	Manufacturer:	Model:	Serial:	Cal Date	Cal Due
18882	Spectrum Analyzer (dc-22 GHz)	Hewlett-Packard	8566B	2410A00154	12/06/2010	12/06/2011
18660	Spectrum Analyzer Display Section (set 1)	Hewlett-Packard	85662A	2318A04983	12/06/2010	12/06/2011
18880	Q.P Adapter	Hewlett-Packard	85650A	2811A01300	12/06/2010	12/06/2011
18912	9 kHz- 1.3GHz Pre Amp	Hewlett-Packard	8447F	3113A05545	06/04/2010	06/04/2011
18906	Pre-Amplifier (1-4 GHz)	Mini-Circuits Lab	ZHL-42	N052792-2	06/11/2010	06/11/2011
18900	RF Pre-Amplifier (4-8 GHz)	Avantek	AFT97-8434-10F	1007	06/07/2010	06/07/2011
18901	RF Pre-Amplifier (8-18 GHz)	Avantek	AWT-18037	1002	06/07/2010	06/07/2011
18897	Magnetic loop antenna 10kHz-30MHz	EMCO	6502	9205-2738	11/18/2010	11/18/2011
19936	Bilog Antenna 30 MHz - 6GHz	Sunol Sciences	JB6	A050707-1	10/11/2010	10/11/2011
18886	Ridged Guide Antenna 1-18GHz	TENSOR	4105	2020	10/08/2010	10/08/2011
SW-6	Software application for Radiated and Conducted Emissions	Intertek	OATS_CVI	V.1.0	01/01/2011	01/01/2012

8.3 Results:

The sample tested was found to Comply.

- FCC 15.109/209
- Covers RSS-GEN Section 6

8.4 Setup Photographs:

Test setup – Front View

Photo:

Test setup – Rear View

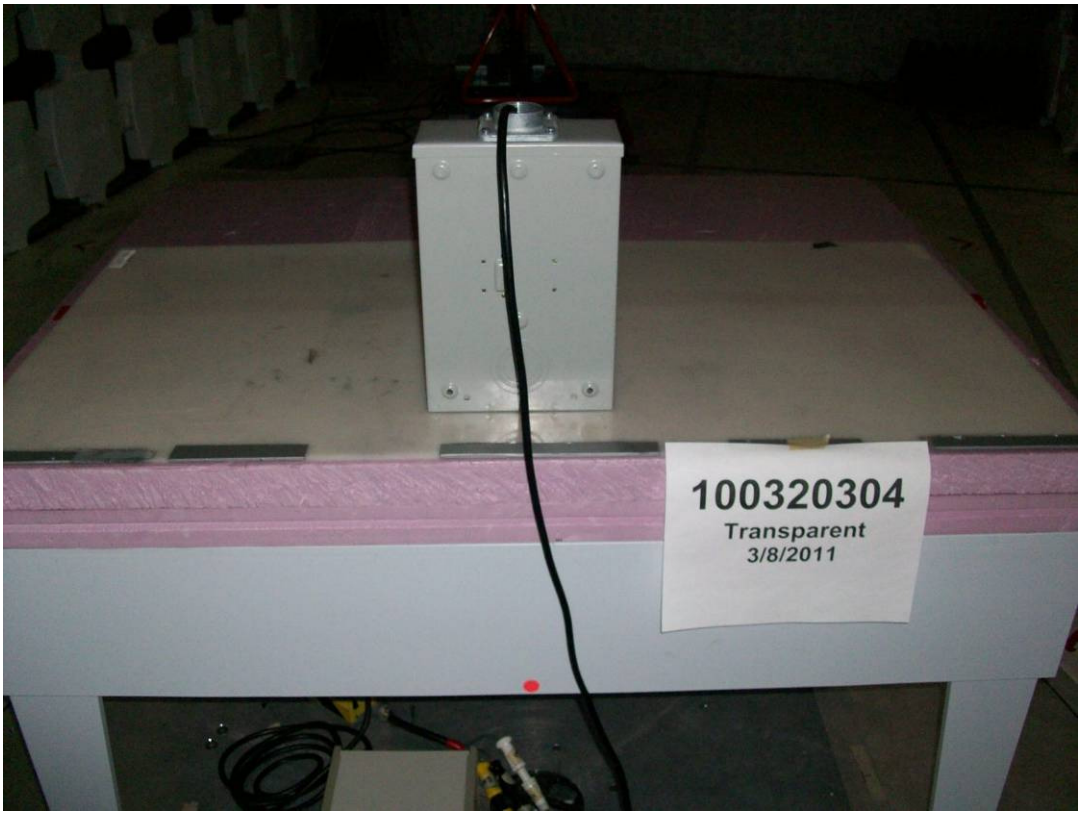


Photo: Antenna Setups

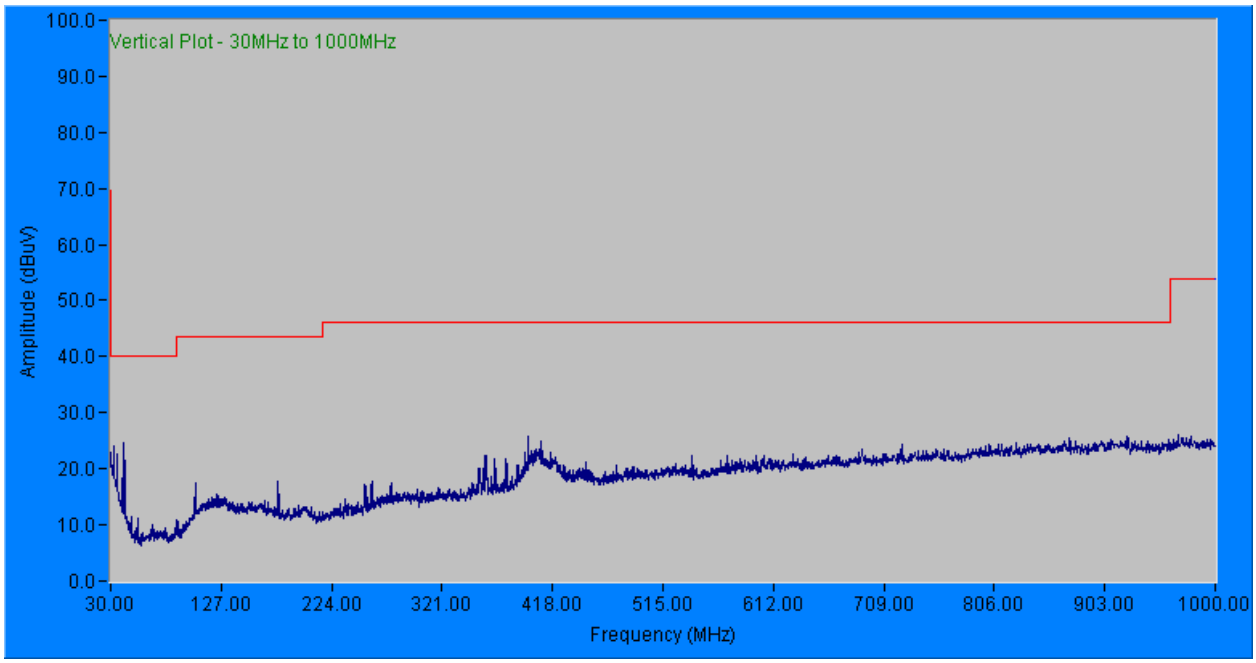
Active Magnetic Loop Antenna (10kHz to 30MHz)

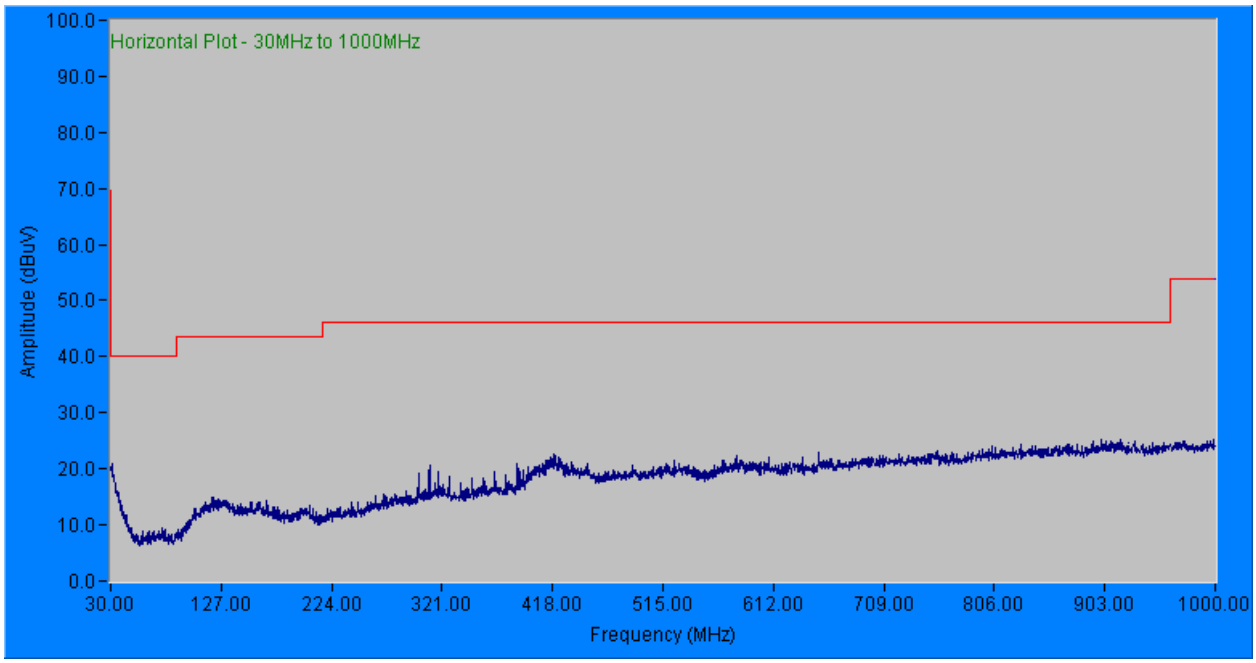
BiLog Antenna (30MHz to 1000MHz)

Ridged Guide Horn Antenna (1GHz to 18GHz)

8.5 Plots: Pre-Scan Peak Measurements – Not Final (Reference Only)

Radiated Emissions – FCC 15.109 (30MHz to 1000MHz)

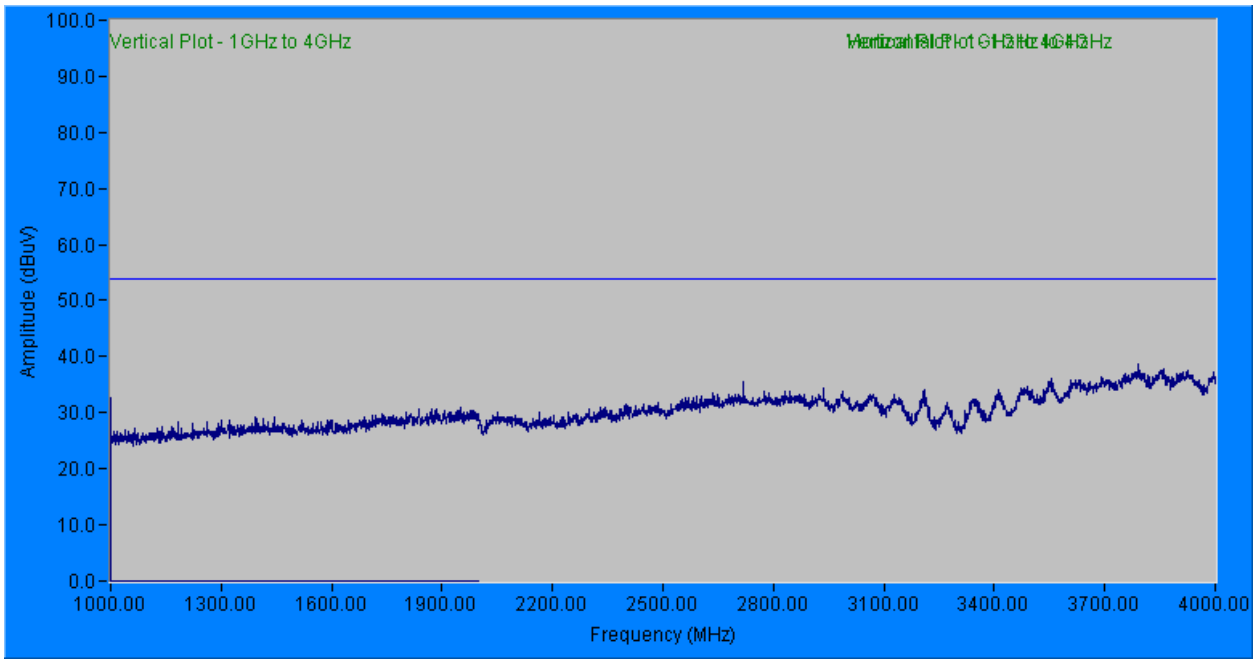


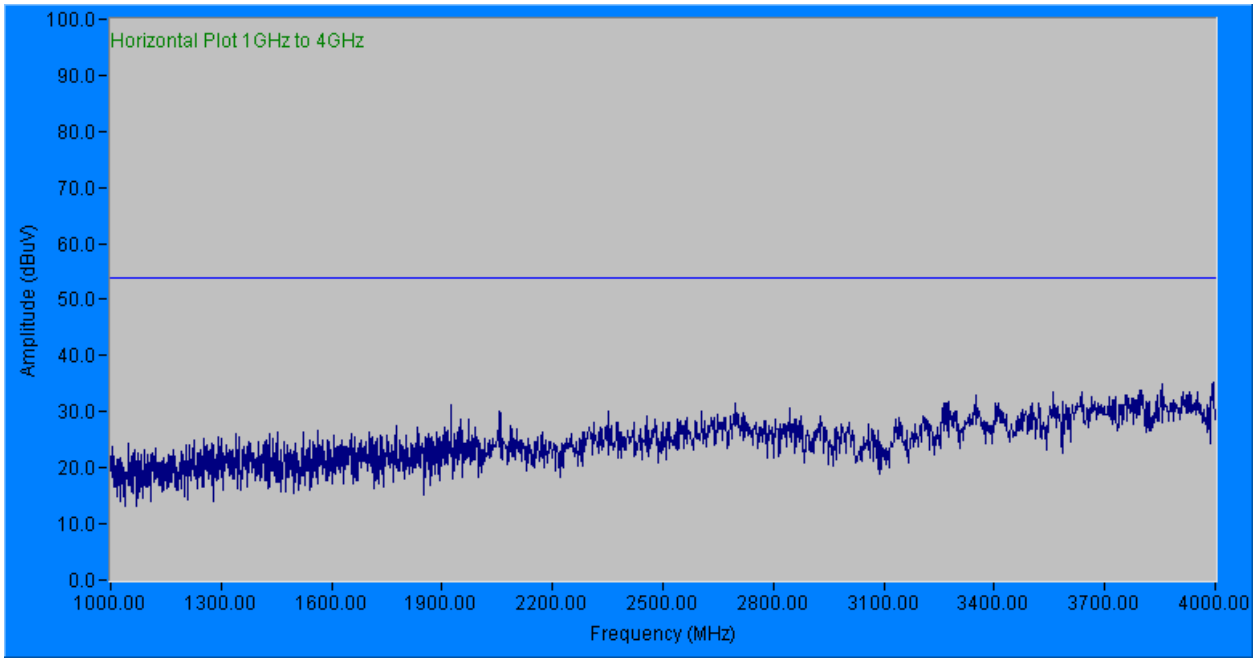


Note: Peak measurements plotted against FCC 15.109 Quasi-Peak Limit

Plots: Pre-Scan Peak Measurements – Not Final (Reference Only)

Radiated Emissions – FCC 15.109 (1GHz to 4GHz)

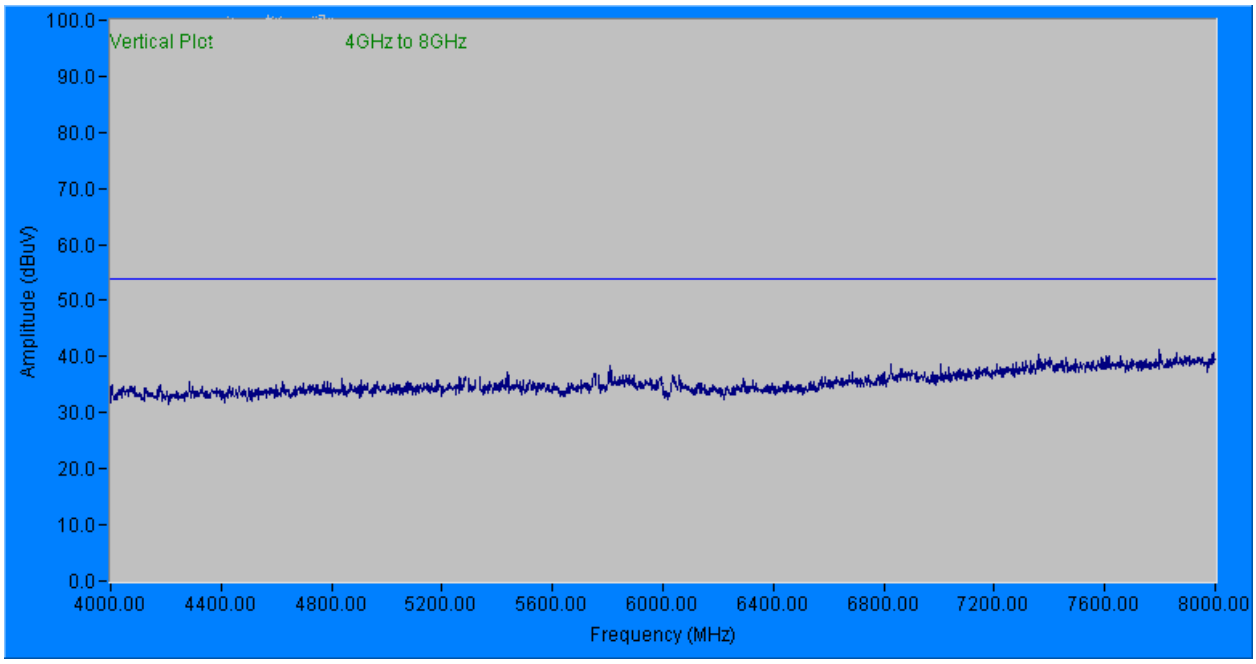


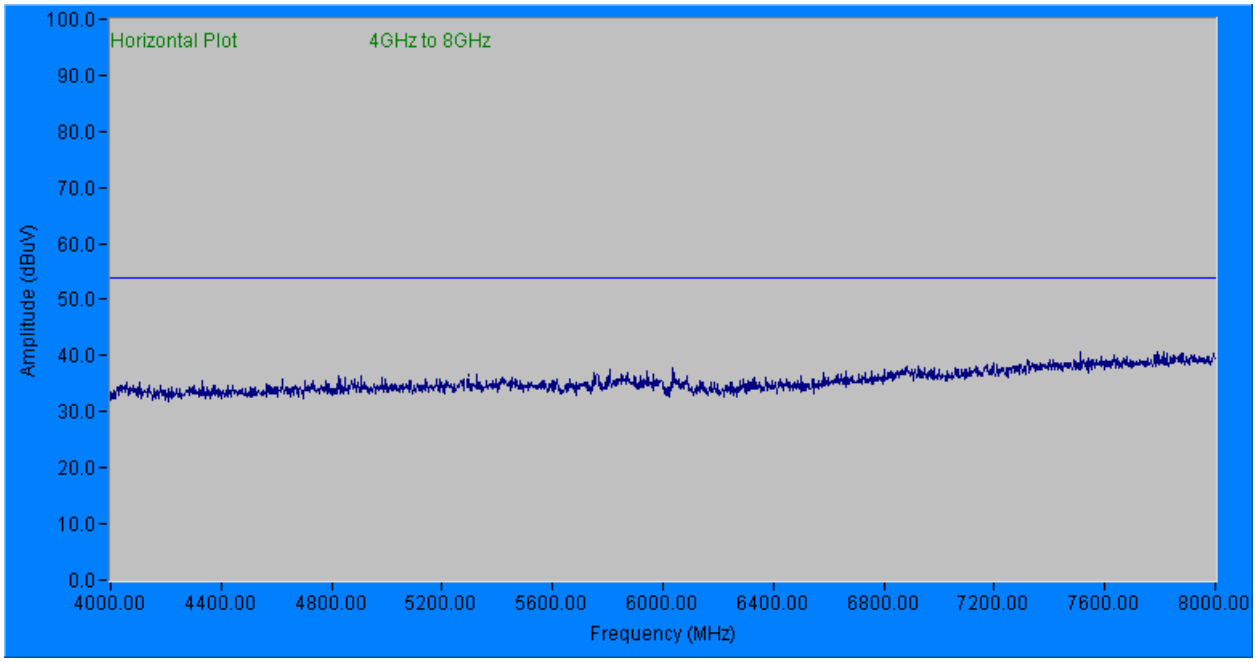


Note: Peak measurements plotted against FCC 15.109 Average Limit

Plots: Pre-Scan Peak Measurements – Not Final (Reference Only)

Radiated Emissions – FCC 15.109 (4GHz to 8GHz)

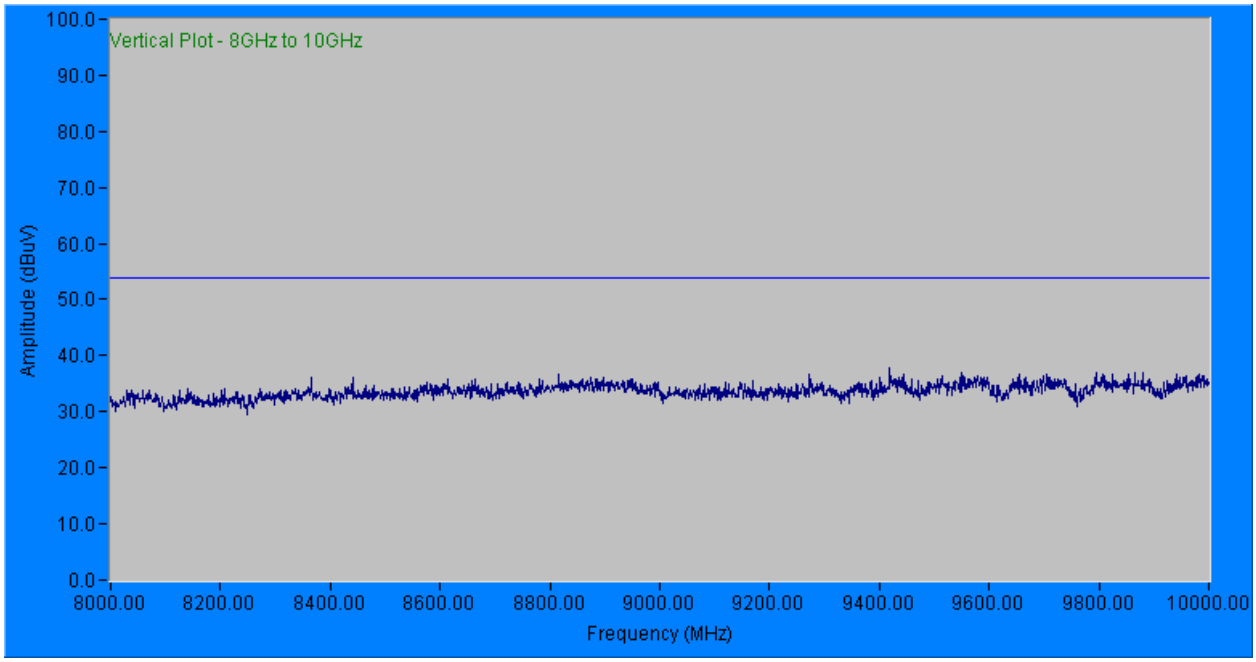


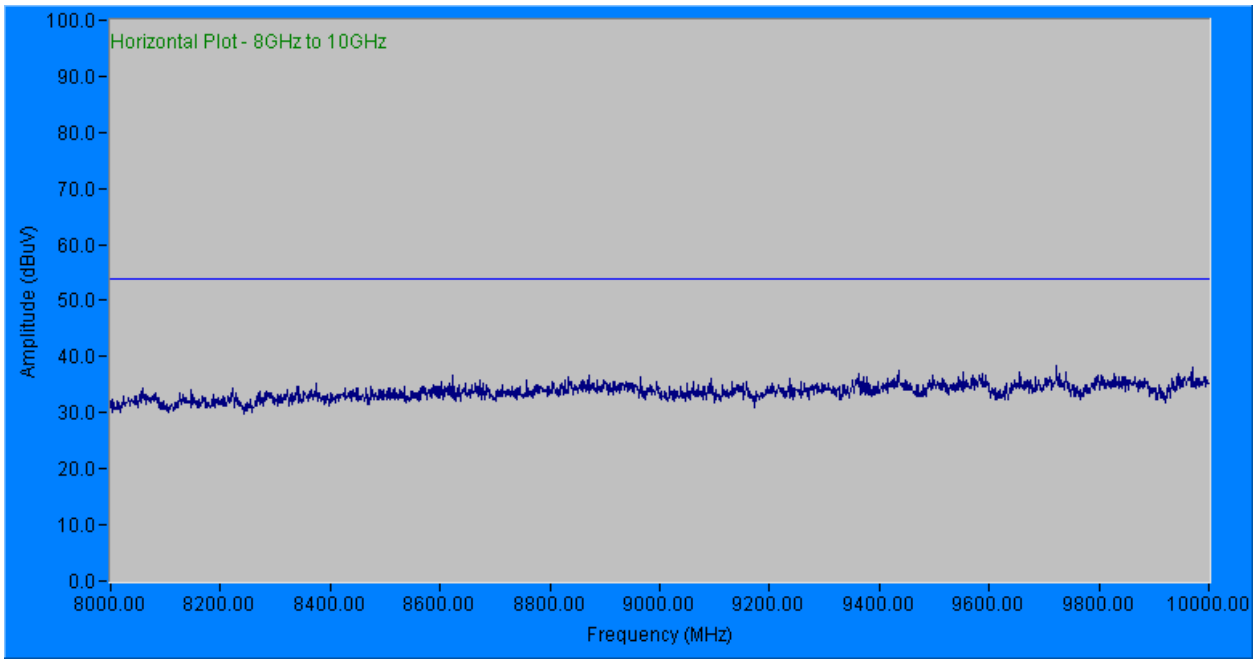


Note: Peak measurements plotted against FCC 15.109 Average Limit

Plots: Pre-Scan Peak Measurements – Not Final (Reference Only)

Radiated Emissions – FCC 15.109 (8GHz to 10GHz)

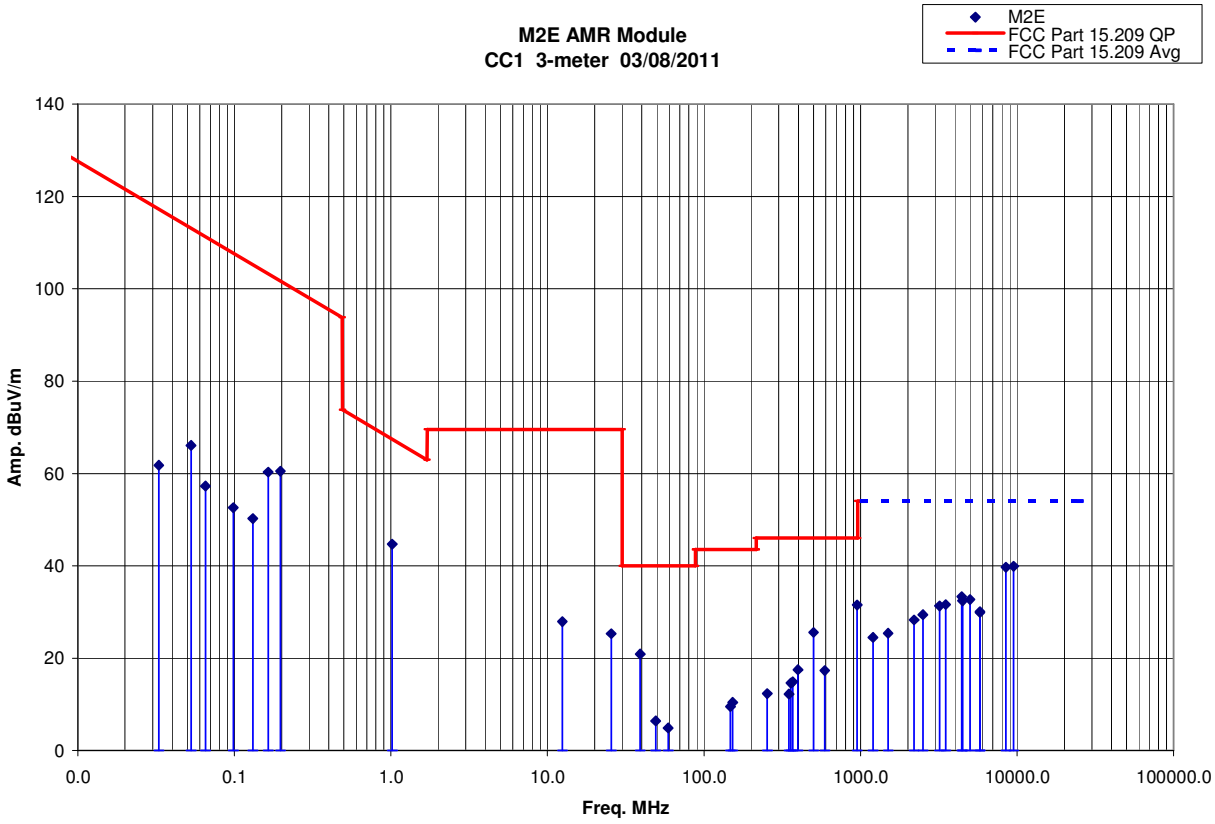




Note: Peak measurements plotted against FCC 15.109 Average Limit

8.6 Plots: Final Measurements

Radiated Emissions – FCC 15.109/209 (10kHz to 10GHz)



8.7 Test Data: Rx Radiated Unintentional Emissions

Radiated Electromagnetic Emissions - Unintentional

Test Report #:	**1003320304 Unintentional Run 1**	Test Area:	CC1 Radiated	Temperature:	22.1	°C
Test Method:	FCC Part 15.209	Test Date:	18-Feb-2011	Relative Humidity:	23.7	%
EUT Model #:	Model AL (with embedded M2e)	EUT Power:	230VAC/60Hz	Air Pressure:	81.2	kPa
EUT Serial #:	FCC2					
Manufacturer:	Transparent Technologies					
EUT Description:	AMR module used in host device – Landis & Gyr FOCUS electricity meter					
Notes:	Product in Receive/Standby mode					

Level Key	
Pk – Peak	Nb – Narrow Band
Qp – QuasiPeak	Bb – Broad Band
Av - Average	

30kHz to 30MHz Active Loop Antenna Measurements

FREQ	LEVEL	CABLE / ANT / PREAMP	FINAL	POL / HGT / AZ	DELTA1 (dB)	DELTA2 (dB)
(MHz)	(dBuV)	(dB) (dB\m) (dB)	(dBuV)	(m) (DEG)	15.209 <1GHz	15.209 >1GHz
********** **Measurement Summary** **********						
1.02	34.2 Qp	0.1 / 10.4 / 0.0	44.7	V / 1.1 / 43.0	-22.7	N/A
0.197	50.1 Qp	0.0 / 10.4 / 0.0	60.5	V / 1.1 / 43.0	-41.2	N/A
12.44	16.9 Qp	0.3 / 10.7 / 0.0	27.9	V / 1.1 / 43.0	-41.6	N/A
0.164	49.9 Qp	0.0 / 10.4 / 0.0	60.3	V / 1.1 / 56.0	-43.0	N/A
25.53	15.5 Qp	0.4 / 9.4 / 0.0	25.3	V / 1.1 / 112.0	-44.2	N/A
0.0528	55.2 Qp	0.0 / 10.8 / 0.0	66.1	V / 1.1 / 98.0	-47.0	N/A
0.0653	46.5 Qp	0.0 / 10.7 / 0.0	57.3	V / 1.1 / 112.0	-54.0	N/A
0.131	39.8 Qp	0.0 / 10.5 / 0.0	50.2	V / 1.1 / 56.0	-55.0	N/A
0.0983	42.0 Qp	0.0 / 10.5 / 0.0	52.6	V / 1.1 / 56.0	-55.1	N/A
0.0329	49.2 Qp	0.0 / 12.5 / 0.0	61.8	V / 1.1 / 112.0	-55.4	N/A

Radiated Electromagnetic Emissions - Unintentional

Test Report #:	**100320304 Unintentional Run 01**	Test Area:	CC1 Radiated	Temperature:	23.1	°C
Test Method:	FCC Part 15.109	Test Date:	08-Mar-2011	Relative Humidity:	41.8	%
EUT Model #:	Model AL (with embedded M2e)	EUT Power:	230VAC/60Hz	Air Pressure:	80.4	kPa
EUT Serial #:	FCC2					

Manufacturer: Transparent Technologies

EUT Description: AMR module used in host device – Landis & Gyr FOCUS electricity meter

Notes: Product in Receive/Standby Mode

Level Key	
Pk – Peak	Nb – Narrow Band
Qp – QuasiPeak	Bb – Broad Band
Av - Average	

30MHz to 1000MHz BiLog Antenna Measurements

FREQ	LEVEL	CABLE / ANT / PREAMP	FINAL	POL / HGT / AZ	DELTA1 (dB)	DELTA2 (dB)
(MHz)	(dBuV)	(dB) (dB\m) (dB)	(dBuV)	(m) (DEG)	15.109 <1GHz	15.109 >1GHz
********** **Measurement Summary** **********						
950.00	34.4 Qp	2.2 / 22.3 / 27.4	31.5	H / 1.0 / 188.0	-14.5	N/A
39.00	34.4 Qp	0.4 / 14.2 / 28.1	20.9	H / 1.0 / 188.0	-19.1	N/A
500.00	34.4 Qp	1.5 / 17.8 / 28.1	25.6	H / 1.0 / 188.0	-20.4	N/A
397.89	27.9 Qp	1.4 / 15.9 / 27.6	17.5	V / 1.0 / 36.0	-28.5	N/A
590.29	24.8 Qp	1.7 / 19.0 / 28.2	17.3	V / 1.0 / 124.0	-28.7	N/A
368.36	25.9 Qp	1.3 / 15.1 / 27.4	14.9	V / 1.0 / 12.0	-31.1	N/A
358.55	25.8 Qp	1.3 / 14.9 / 27.4	14.6	V / 1.0 / 12.0	-31.4	N/A
152.28	24.5 Qp	0.8 / 12.5 / 27.5	10.4	V / 1.0 / 94.0	-33.1	N/A
49.13	25.3 Qp	0.8 / 8.4 / 28.0	6.4	V / 1.0 / 264.0	-33.6	N/A
253.78	26.4 Qp	1.1 / 11.9 / 27.1	12.3	V / 1.0 / 12.0	-33.7	N/A
348.79	23.7 Qp	1.3 / 14.5 / 27.3	12.2	V / 1.0 / 12.0	-33.8	N/A
147.36	23.7 Qp	0.8 / 12.5 / 27.5	9.5	V / 1.0 / 94.0	-34.0	N/A
58.94	24.7 Qp	0.8 / 7.4 / 28.0	4.9	V / 1.0 / 216.0	-35.1	N/A

Radiated Electromagnetic Emissions - Unintentional

Test Report #:	**100320304 Unintentional Run 01**	Test Area:	CC1 Radiated	Temperature:	23.1	°C
Test Method:	FCC Part 15.109	Test Date:	08-Mar-2011	Relative Humidity:	41.8	%
EUT Model #:	Model AL (with embedded M2e)	EUT Power:	230VAC/ 60Hz	Air Pressure:	80.4	kPa
EUT Serial #:	FCC2					

Manufacturer: Transparent Technologies

EUT Description: AMR module used in host device – Landis & Gyr FOCUS electricity meter

Notes: Product in Receive/Standby mode

Level Key	
Pk – Peak	Nb – Narrow Band
Qp – QuasiPeak	Bb – Broad Band
Av - Average	

1GHz to 10GHz Ridge Guide Horn Antenna Measurements

FREQ	LEVEL	CABLE / ANT / PREAMP	FINAL	POL / HGT / AZ	DELTA1 (dB)	DELTA2 (dB)
(MHz)	(dBuV)	(dB) (dB\m) (dB)	(dBuV)	(m) (DEG)	15.109 <1GHz	15.109 >1GHz
********** **Measurement Summary** **********						
9500.00	42.4 Av	7.6 / 37.8 / 47.7	39.9	V / 1.0 / 0.0	N/A	-14.1
8500.00	42.0 Av	7.1 / 36.9 / 46.4	39.7	H / 1.0 / 0.0	N/A	-14.3
4423.96	35.0 Av	4.9 / 32.4 / 39.0	33.3	V / 1.0 / 12.0	N/A	-20.7
4999.25	33.0 Av	5.3 / 33.6 / 39.1	32.7	V / 1.2 / 47.0	N/A	-21.3
4486.07	34.0 Av	5.0 / 32.4 / 39.0	32.4	H / 1.1 / 32.0	N/A	-21.6
3500.00	33.2 Av	4.3 / 31.5 / 37.5	31.6	V / 1.0 / 0.0	N/A	-22.4
3200.00	33.4 Av	4.2 / 31.2 / 37.4	31.3	H / 1.0 / 0.0	N/A	-22.7
5786.51	29.3 Av	5.7 / 34.2 / 39.0	30.1	V / 1.2 / 22.0	N/A	-23.9
5785.51	29.1 Av	5.7 / 34.2 / 39.0	29.9	H / 1.1 / 23.0	N/A	-24.1
2500.00	35.1 Av	3.6 / 28.4 / 37.7	29.4	V / 1.0 / 0.0	N/A	-24.6
2200.00	34.6 Av	3.4 / 27.8 / 37.4	28.3	H / 1.0 / 0.0	N/A	-25.7
1500.00	34.3 Av	2.7 / 25.2 / 36.7	25.4	V / 1.0 / 0.0	N/A	-28.6
1200.00	34.6 Av	2.4 / 24.7 / 37.3	24.5	H / 1.0 / 0.0	N/A	-29.5

Example Unintentional Radiated Emissions Calculation:

Measured Level	+	**Transducer, Cable Loss & Amplifier corrections**	=	**Corrected Reading**	**Specification Limit**	-	**Corrected Reading**	=	**Delta Specification**
(dBµV)		(dB)		(dBµV/m)	(dBµV/m)		(dBµV/m)		
14.0		**14.9**		**28.9**	**40.0**		**28.9**		**-11.1**

Notes:

1) The primary product tested was the M2e AMR Module – however, the host electricity meter was indirectly tested since it was inside the test volume.

2) All measurements were taken at a 3-meter test distance.

3) Measurements up to and including 1GHz are quasi-peak detector. Measurements above 1GHz are average detector.

Deviations, Additions, or Exclusions: None

9 6dB Bandwidth

9.1 Method

The test methods used comply with ANSI C63.10. Unless otherwise stated no deviations were made from **FCC 15.247 & IC RSS-210.**

This testing was performed at Intertek Denver, located at 1795 Dogwood St. Suite 200, Louisville, CO 80027.

9.2 Test Equipment Used:

Asset ID:	Description:	Manufacturer:	Model:	Serial:	Cal Date	Cal Due
18913	Spectrum Analyzer with Pre-Amp	Hewlett-Packard	E7405A	My44211889	05/11/2010	05/11/2011
19936	Bilog Antenna 30 MHz - 6GHz	Sunol Sciences	JB6	A050707-1	10/11/2010	10/11/2011

9.3 Results:

The sample tested was found to Comply.

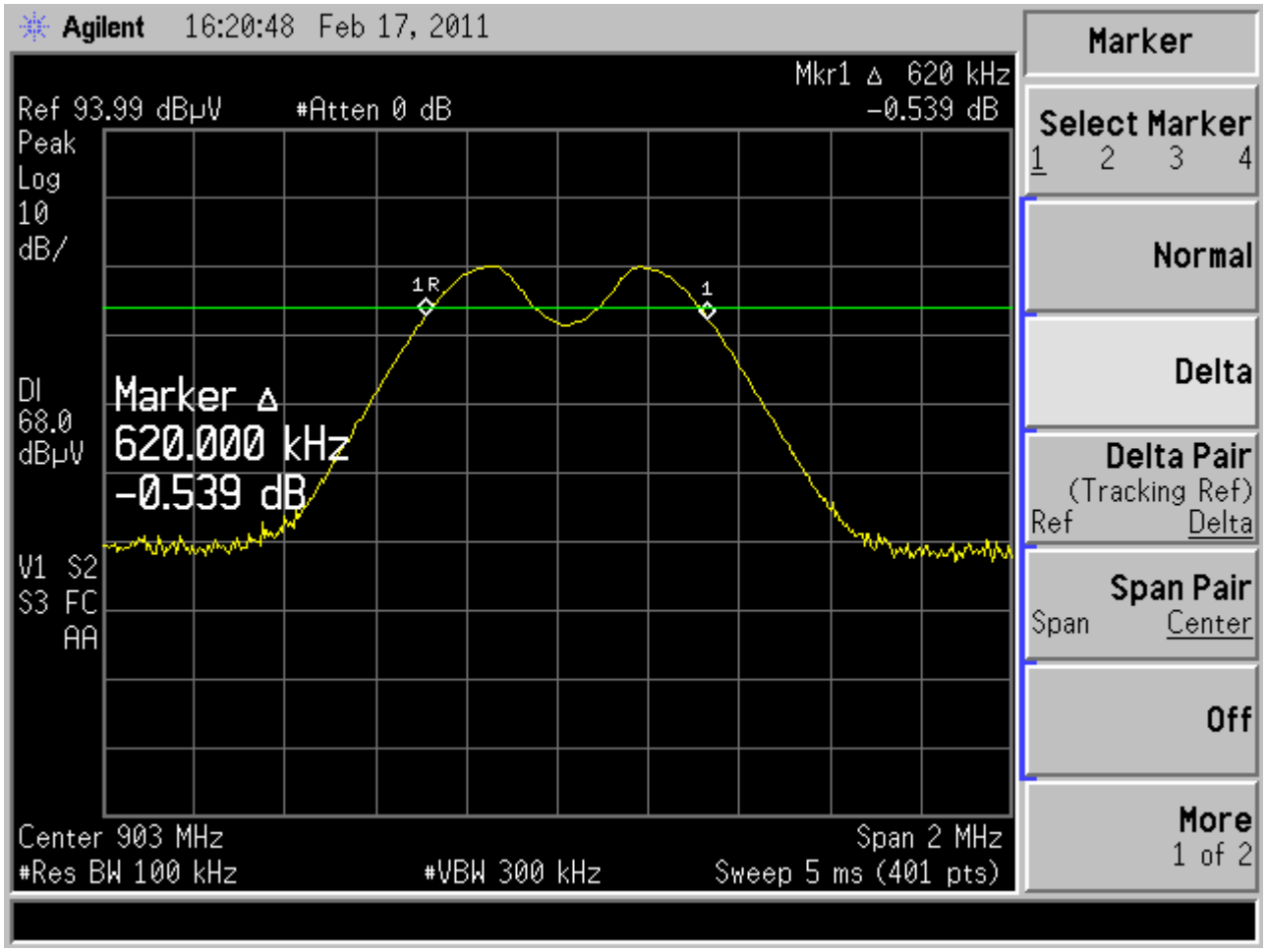
- FCC 15.247 (a)(2)
- IC RSS-210 A8.2(a)

9.4 Test Data:

6 dB Bandwidth – M2E AMR Module

FCC 15.247(a)(2) / RSS-210 A8.2(a)

Low Channel – 903 MHz

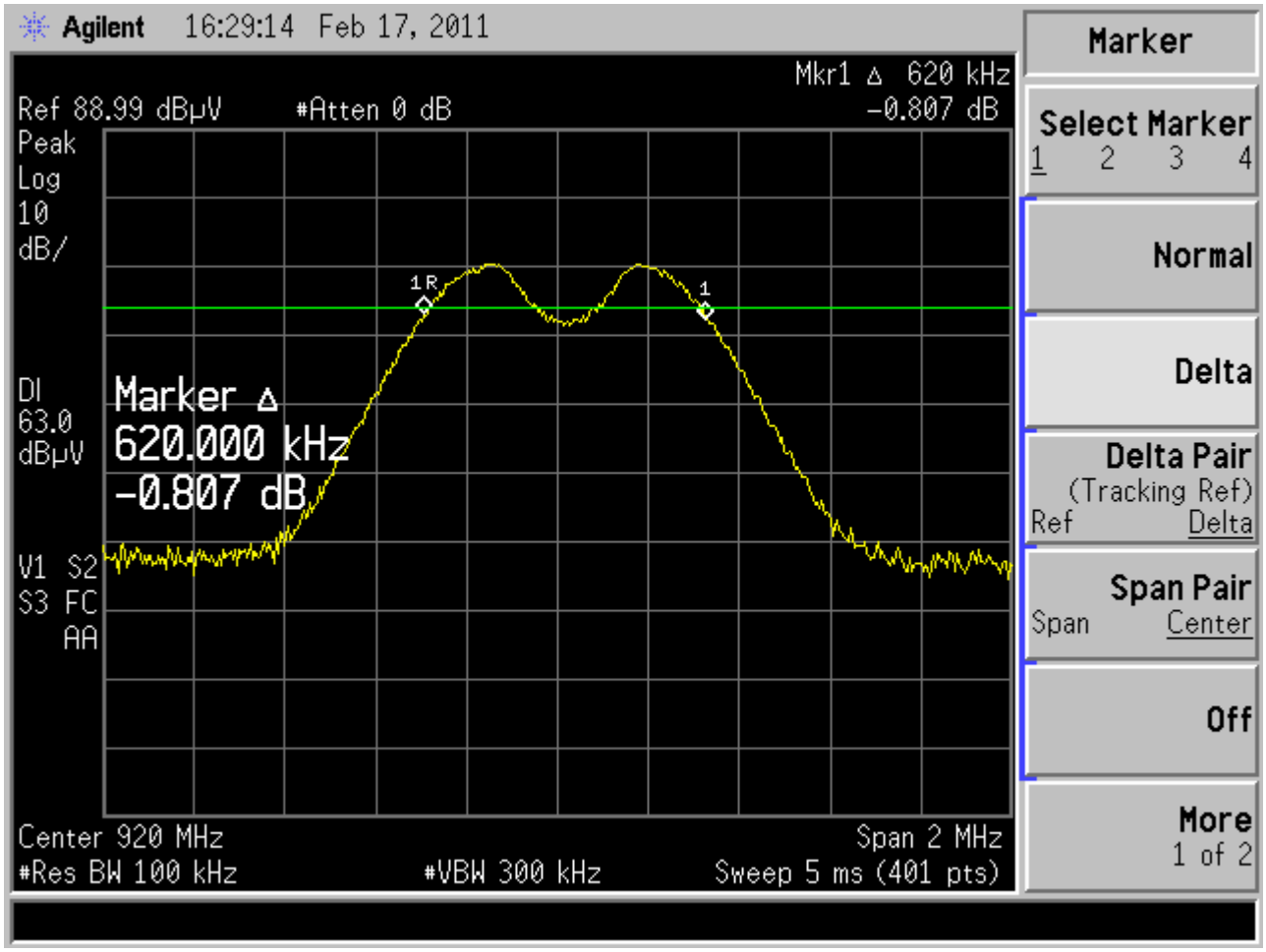


Specification: 6dB Bandwidth > 500 kHz

6 dB Bandwidth

FCC 15.247(a)(2) / RSS-210 A8.2(a)

Mid Channel – 920 MHz

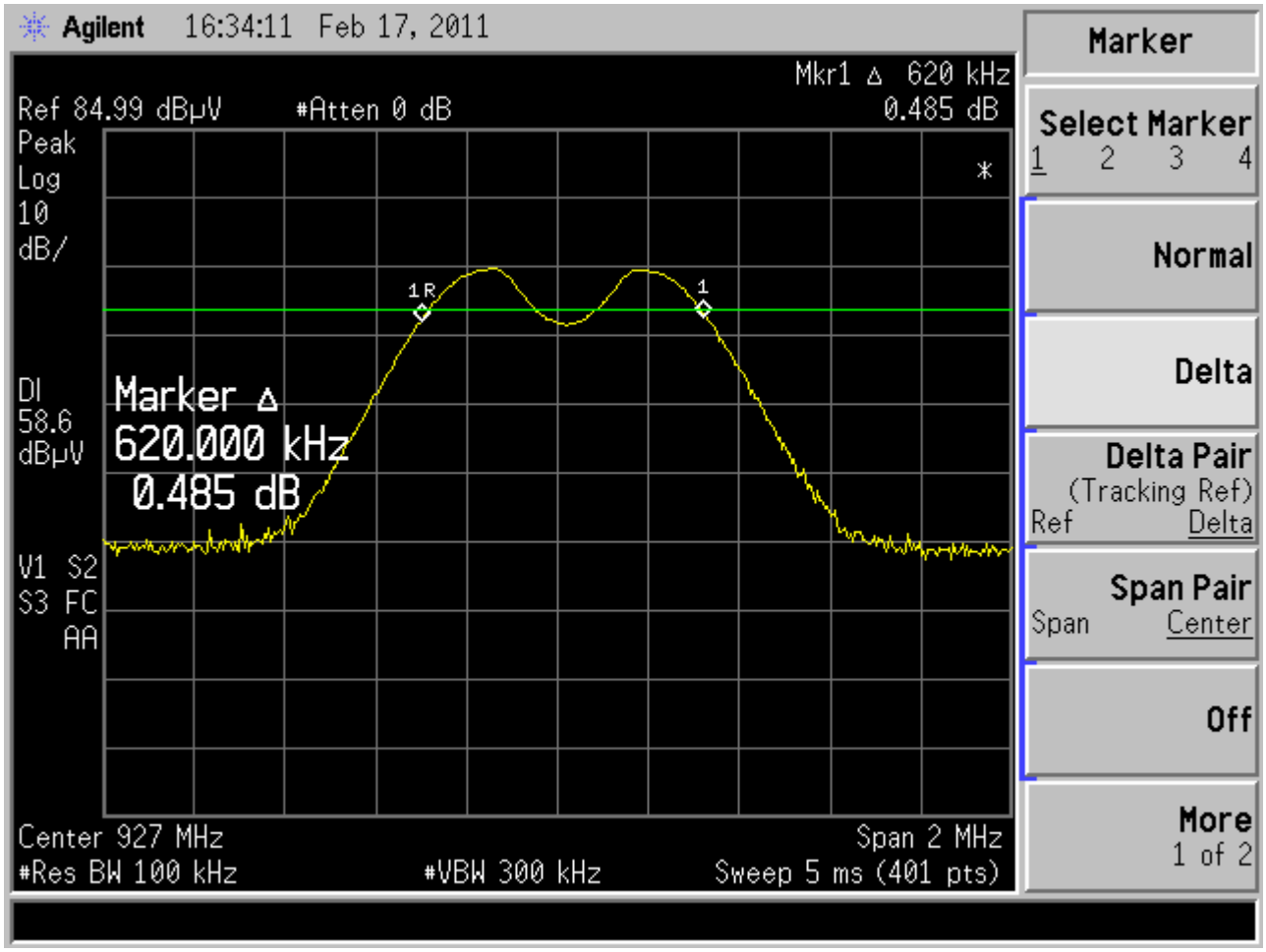


Specification: 6dB Bandwidth > 500 kHz

6 dB Bandwidth

FCC 15.247(a)(2) / RSS-210 A8.2(a)

High Channel – 927 MHz



Specification: 6dB Bandwidth > 500 kHz

Notes:

1) Worst-case 6dB Bandwidth: Low, Mid & High Channels – 620 kHz

2) All measurements are Radiated Field Strength.

Deviations, Additions, or Exclusions: None

10 Power Spectral Density (PSD)

10.1 Method

The test methods used comply with ANSI C63.10. Unless otherwise stated no deviations were made from **FCC 15.247 & IC RSS-210.**

This testing was performed at Intertek Denver, located at 1795 Dogwood St. Suite 200, Louisville, CO 80027.

10.2 Test Equipment Used:

Asset ID:	Description:	Manufacturer:	Model:	Serial:	Cal Date	Cal Due
18913	Spectrum Analyzer with Pre-Amp	Hewlett-Packard	E7405A	My44211889	05/11/2010	05/11/2011
19936	Bilog Antenna 30 MHz - 6GHz	Sunol Sciences	JB6	A050707-1	10/11/2010	10/11/2011

10.3 Results:

The sample tested was found to Comply.

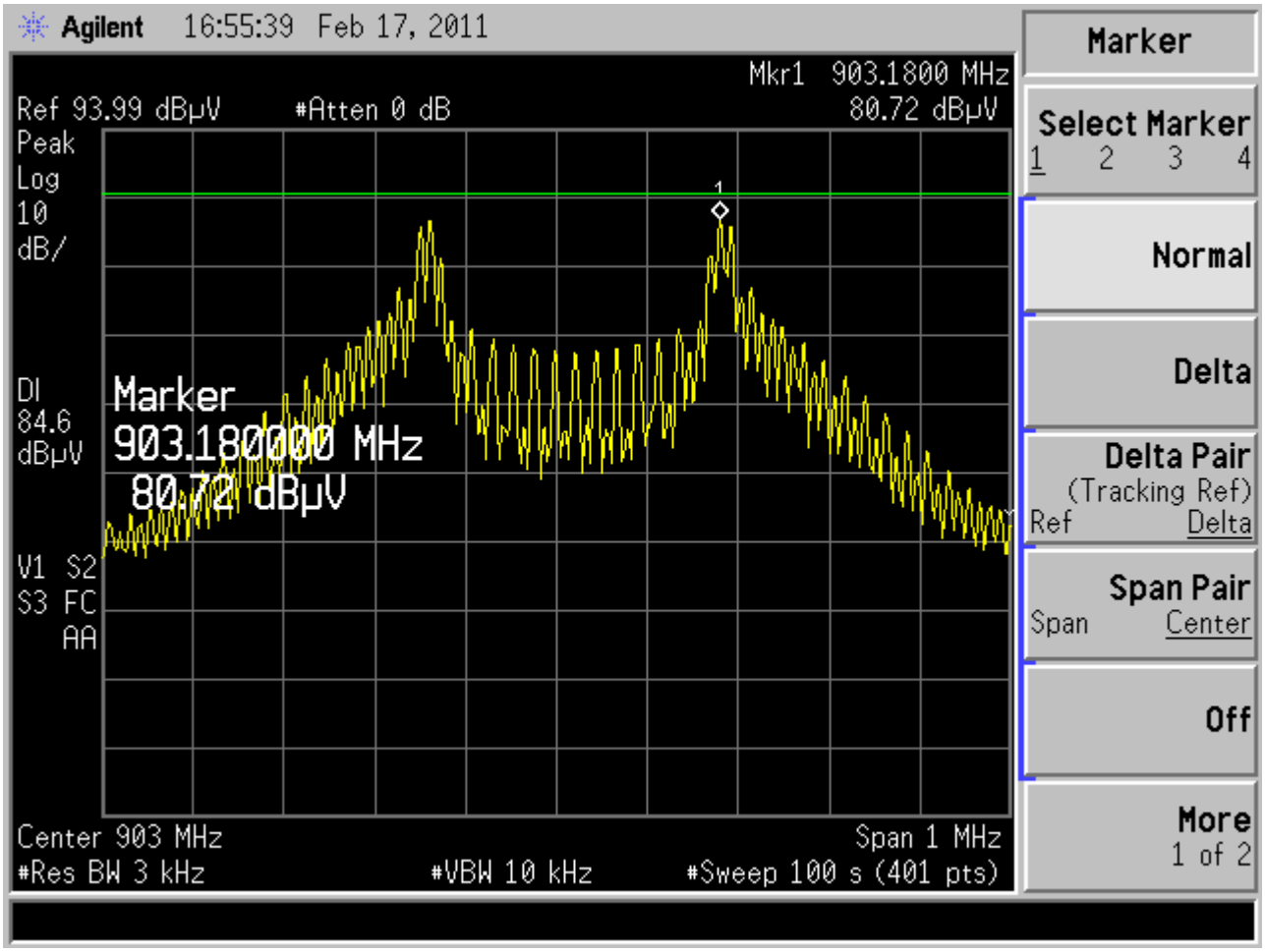
- FCC 15.247(e)
- IC RSS-210 A8.2(b)

10.4 Test Data:

Power Spectral Density (PSD) – M2E AMR Module

FCC 15.247(e) / RSS-210 A8.2(b)

Low Channel – 903 MHz



Measured field strength + antenna factor + cable loss = Final corrected field strength (dBuV/m)
80.72 + 22.5 + 2.1 = 105.32 dBuV/m

Conversion from Radiated Field Strength to RF Conducted Power for comparison to the limit:

Therefore, E = 0.1845 V/m

P = 0.0026 W = 4.1497 dBm

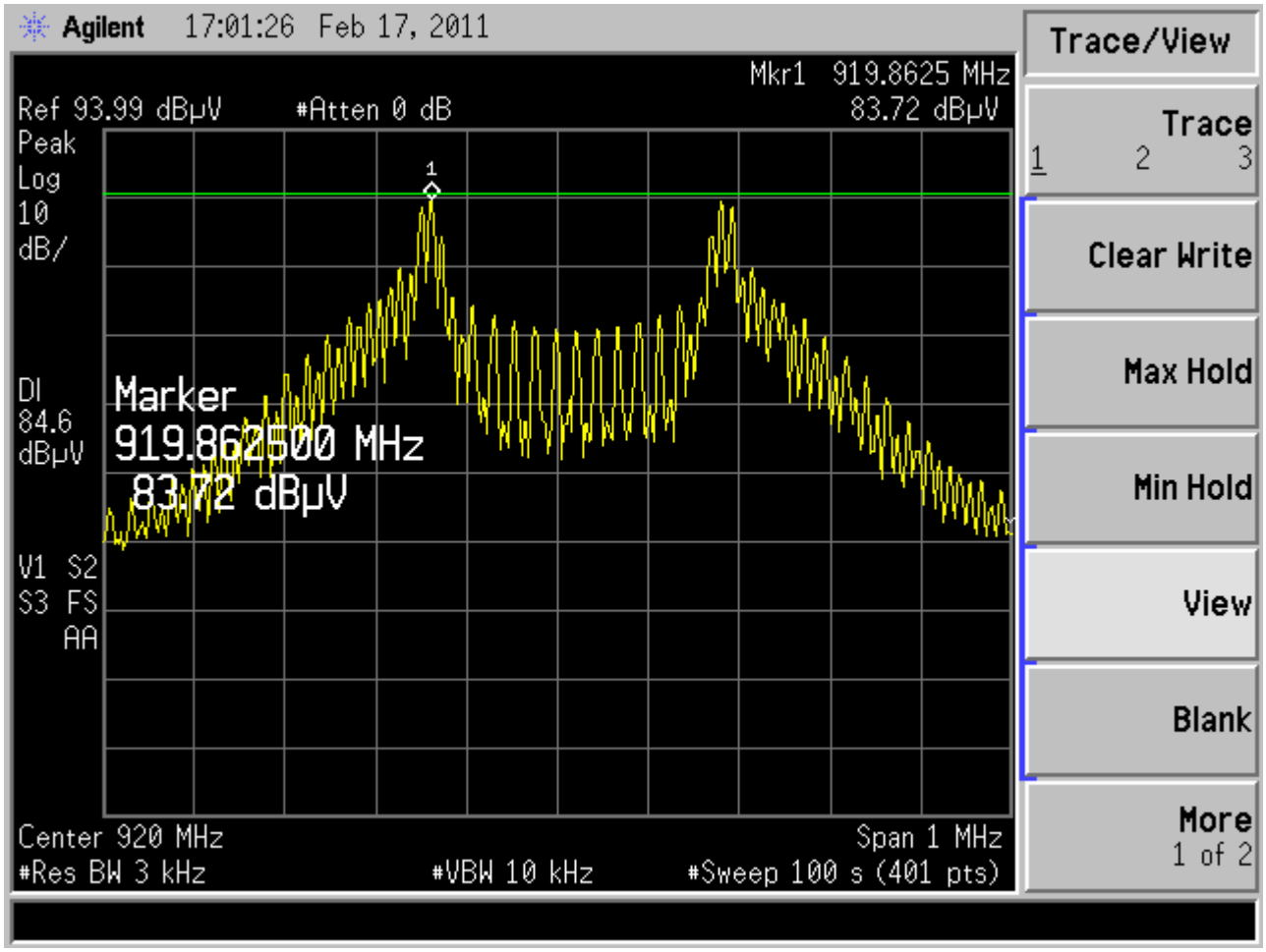
Specification: PSD < +8 dBm

Delta Limit = 4.1497 dBm – 8 dBm = -3.85 dBm

Power Spectral Density (PSD)

FCC 15.247(e) / RSS-210 A8.2(b)

Mid Channel – 920 MHz



Measured field strength + antenna factor + cable loss = Final corrected field strength (dBuV/m)
83.72 + 22.5 + 2.1 = 108.32 dBuV/m

Conversion from Radiated Field Strength to RF Conducted Power for comparison to the limit:

Therefore, E = 0.2606 V/m

P = 0.0051 W = 7.0757 dBm

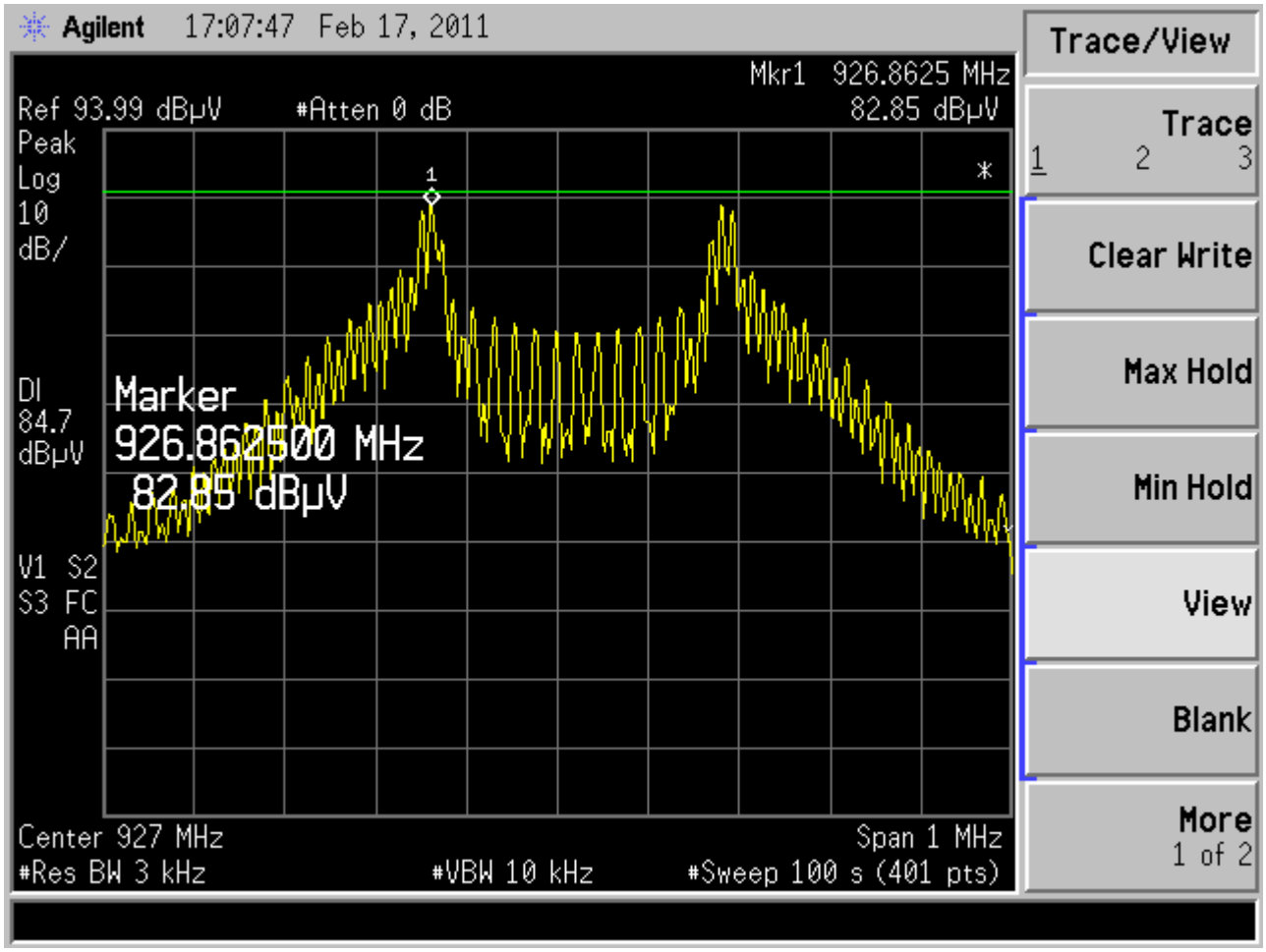
Specification: PSD < +8 dBm

Delta Limit = 7.0757 dBm – 8 dBm = -0.9243 dBm

Power Spectral Density (PSD)

FCC 15.247(e / RSS-210 A8.2(b)

High Channel – 927 MHz



Measured field strength + antenna factor + cable loss = Final corrected field strength (dBuV/m)
82.85 + 22.5 + 2.1 = 107.45 dBuV/m

Conversion from Radiated Field Strength to RF Conducted Power for comparison to the limit:

Therefore, E = 0.2358 V/m

P = W = 6.2325 dBm

Specification: PSD < +8 dBm

Delta Limit = 6.2325 dBm – 8 dBm = -1.77 dBm

Notes:

1) The following equation was utilized for the conversion of radiated field strength to power:

   $P = (E \times d)^2 / (30 \times G)$

   Whereby:

   P = Power in watts
   E= measured maximum field strength in V/m
   d = test distance in meters from which the field strength was measured
   G = numeric gain of the transmitting antenna over an isotropic radiator

2) Worst-case PSD: Mid Channel, 7.08dBm (0.92 dB below limit)

3) All measurements are Radiated Field Strength – worst-case maximized signal

4) Antenna gain was not known (declared by client) at time of testing. Therefore, a maximum numeric antenna gain of 4 (6dBi) was assumed in the above equation per FCC 15.247(b)(4).

Deviations, Additions, or Exclusions: None

11 Occupied Bandwidth (OBW)

11.1 Method

The test methods used comply with ANSI C63.0. Unless otherwise stated no deviations were made from **IC RSS-GEN.**

This testing was performed at Intertek Denver, located at 1795 Dogwood St. Suite 200, Louisville, CO 80027.

11.2 Test Equipment Used:

Asset ID:	Description:	Manufacturer:	Model:	Serial:	Cal Date	Cal Due
18913	Spectrum Analyzer with Pre-Amp	Hewlett-Packard	E7405A	My44211889	05/11/2010	05/11/2011
19936	Bilog Antenna 30 MHz - 6GHz	Sunol Sciences	JB6	A050707-1	10/11/2010	10/11/2011

11.3 Results:

The sample tested was found to Comply.

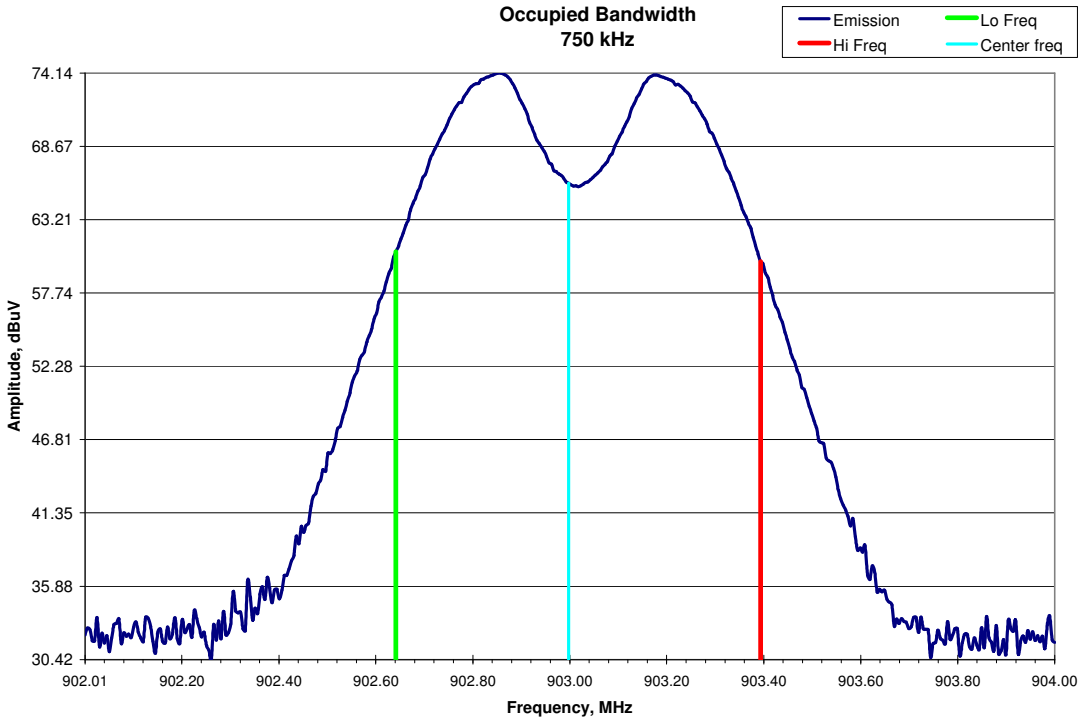
- RSS-GEN, Section 4.6.1

11.4 Test Data: Occupied Band Width (OBW)

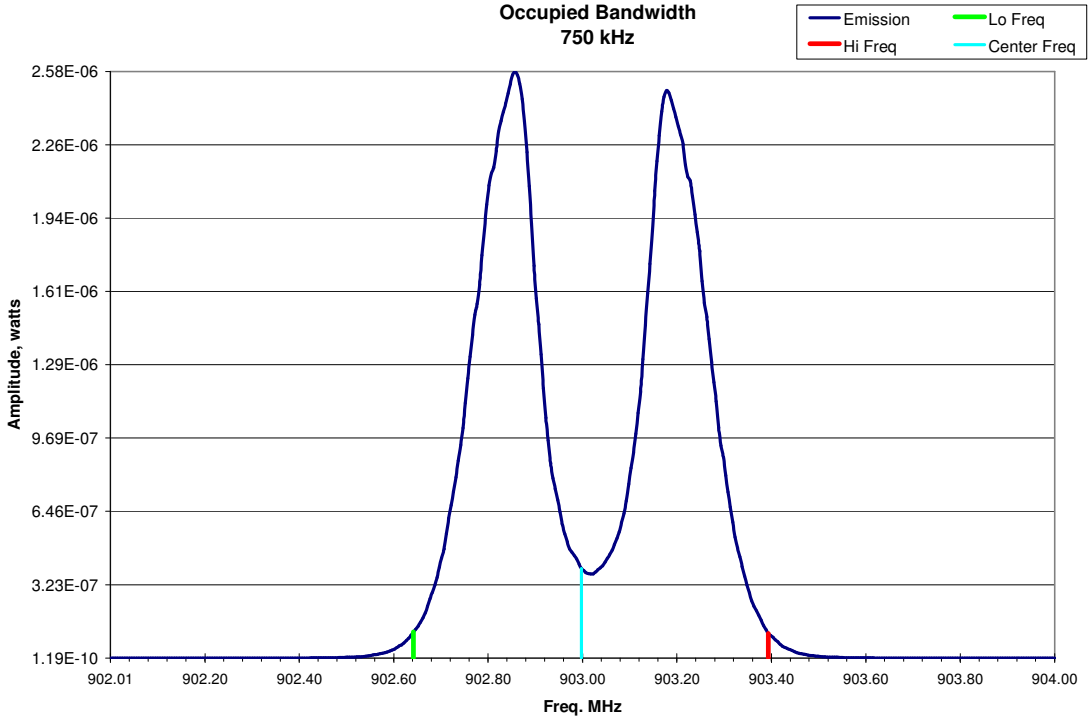
Occupied Bandwidth - (RSS-GEN, Section 4.6.1) – M2E AMR Module

Low Channel – 903 MHz

Field Strength Graph



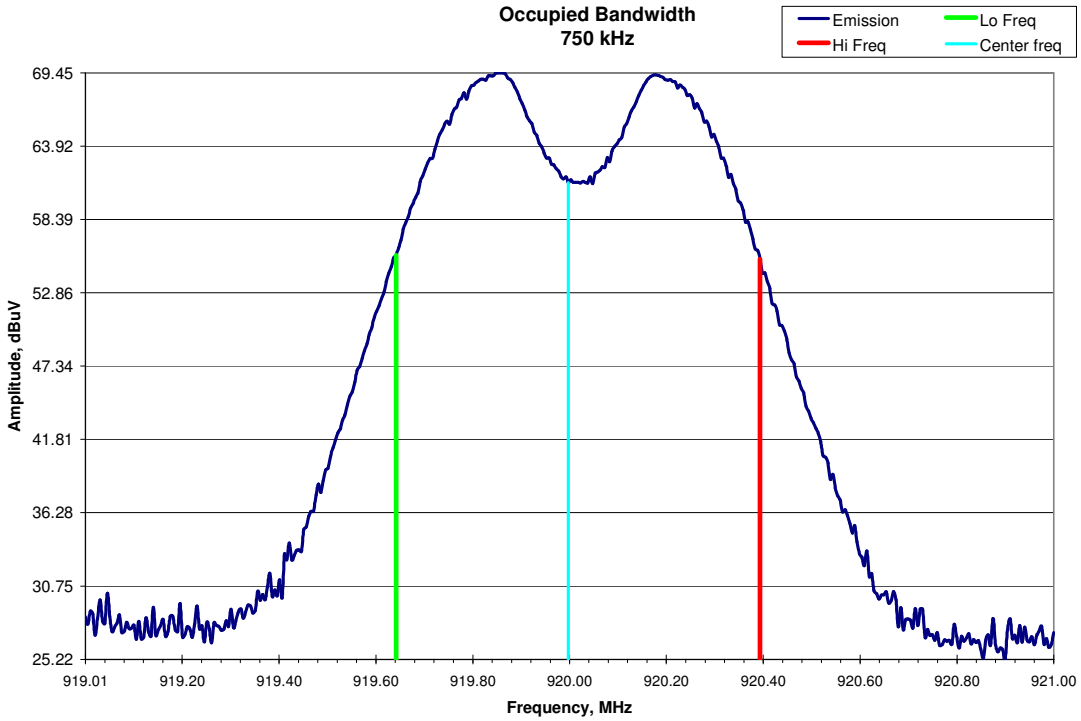
Power Graph



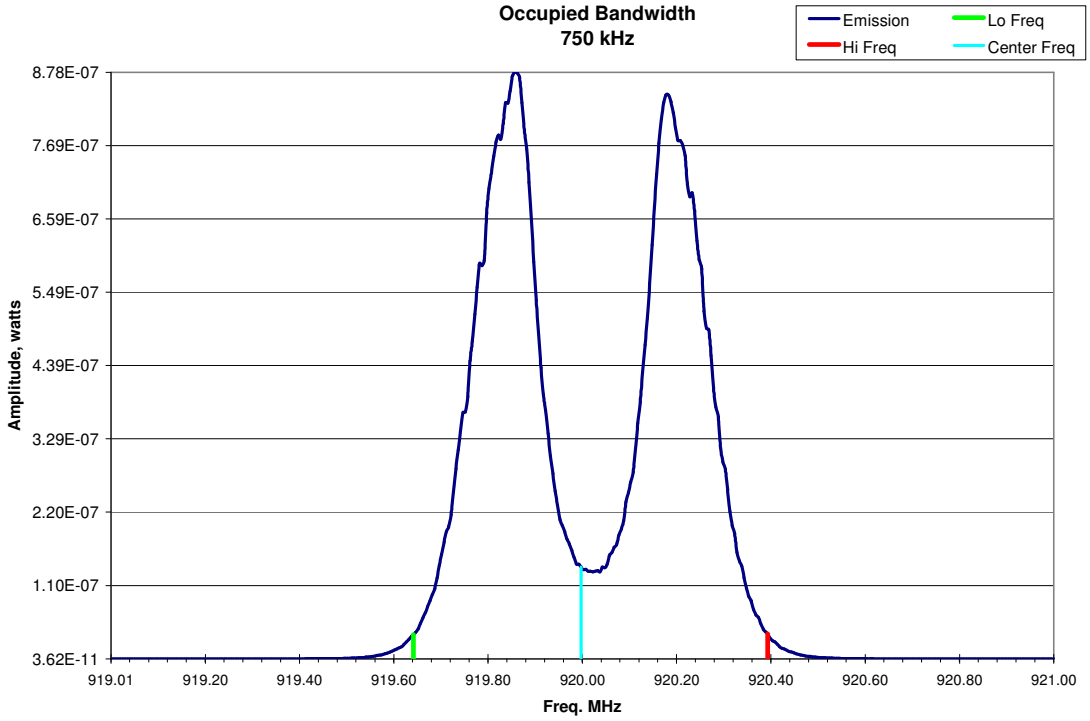
Occupied Bandwidth - (RSS-GEN, Section 4.6.1)

Mid Channel – 920 MHz

Field Strength Graph



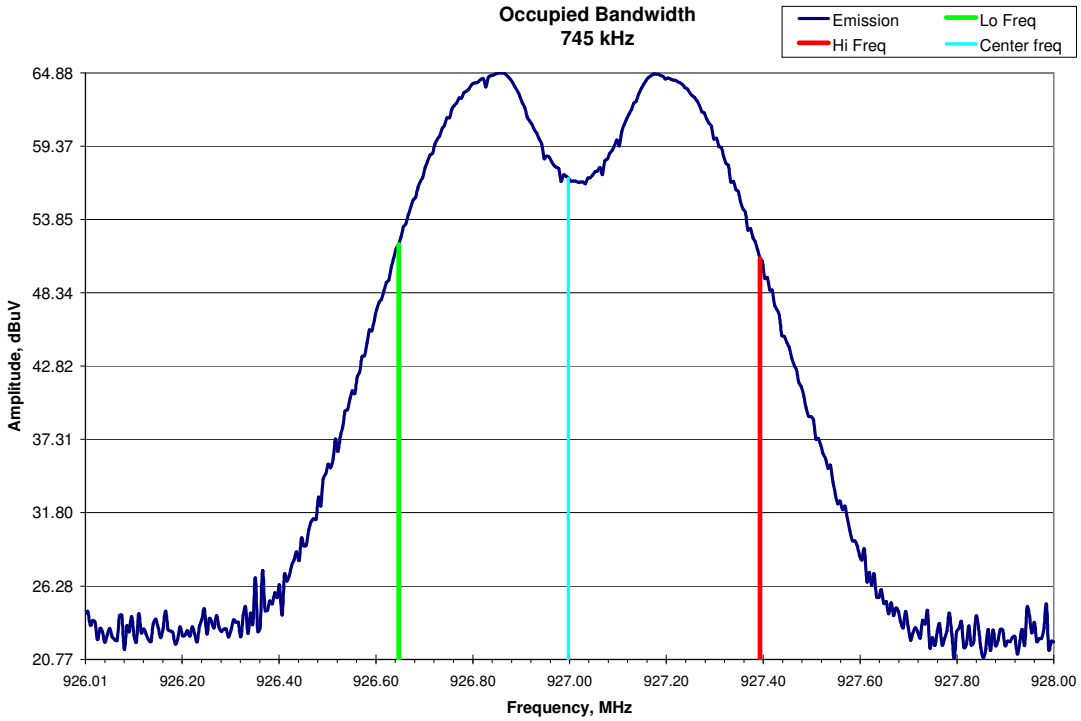
Power Graph



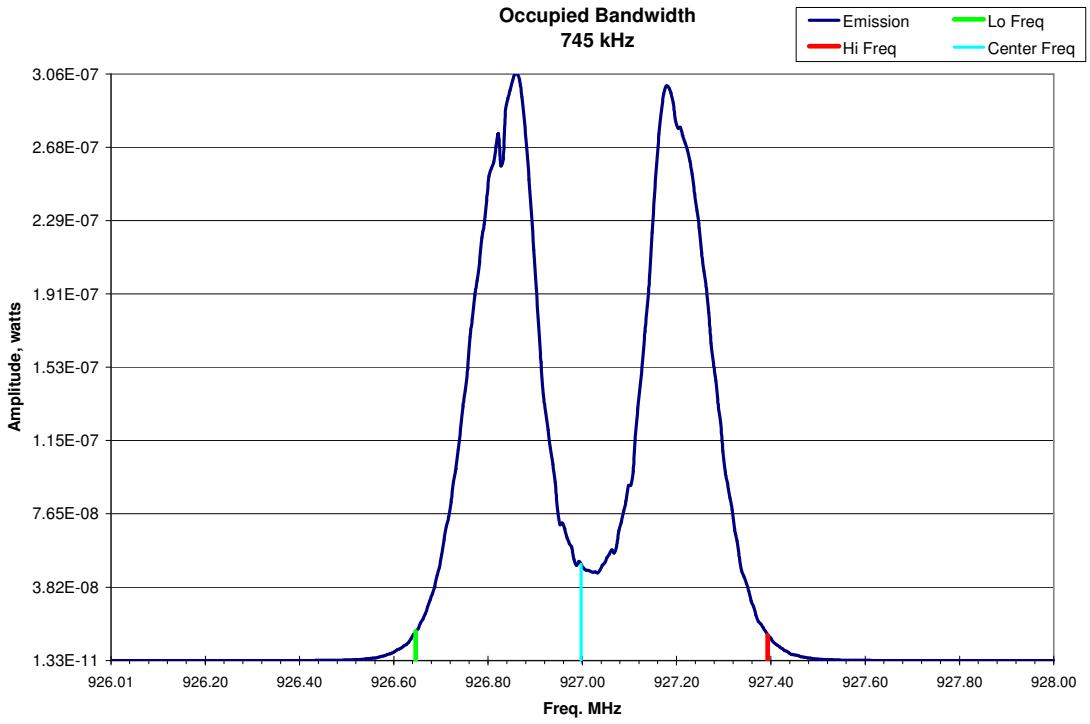
Occupied Bandwidth - (RSS-GEN, Section 4.6.1)

High Channel – 927 MHz

Field Strength Graph



Power Graph



Notes:

1) All measurements are Radiated Field Strength at 3-meters.

2) Worst-case Occupied Bandwidth (OBW): Low & Mid Channels – 750kHz.

Deviations, Additions, or Exclusions: None

12 AC Mains Conducted Emissions

12.1 Method

The test methods used comply with ANSI C63.4 and CISPR 16. Unless otherwise stated no deviations were made from **FCC 15.207 & RSS-GEN.**

This testing was performed at Intertek Denver, located at 1795 Dogwood St. Suite 200, Louisville, CO 80027.

12.2 Test Equipment Used:

Asset ID:	Description:	Manufacturer:	Model:	Serial:	Cal Date	Cal Due
18909	EMI Test Receiver	RHODE & SCHWARZ	ESHS 30	842806/001	06/15/2010	06/15/2011
18882	Spectrum Analyzer (dc-22 GHz)	Hewlett-Packard	8566B	2410A00154	12/06/2010	12/06/2011
18765	LISN	EMCO	3825/2	9202-1945	01/31/2011	01/31/2012
18885	Transient Limiter	Hewlett-Packard	11947A	3107A00700	04/27/2010	04/27/2011
SW-6	Software application for Radiated and Conducted Emissions	Intertek	OATS_CVI	V.1.0	01/01/2011	01/01/2012

12.3 Results:

The sample tested was found to comply.

- FCC 15.207
- RSS-GEN, Section 7.2.4

12.4 Setup Photographs:

Test Setup – Conducted Emissions (Front View)

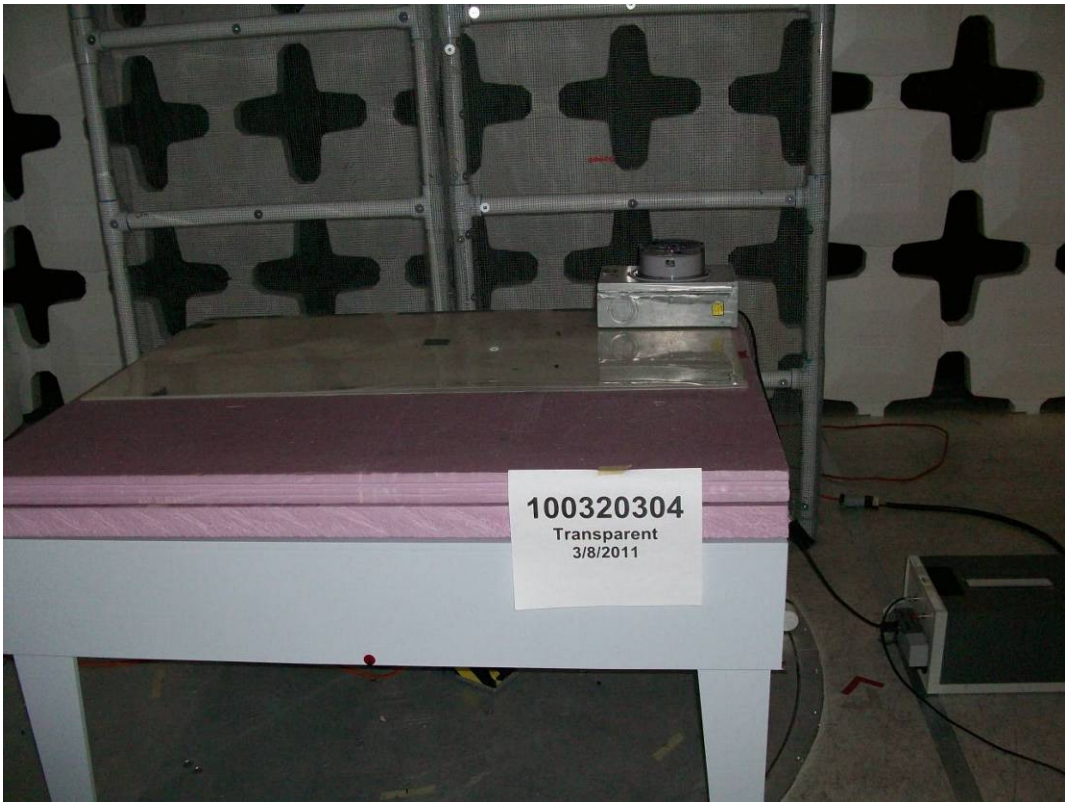
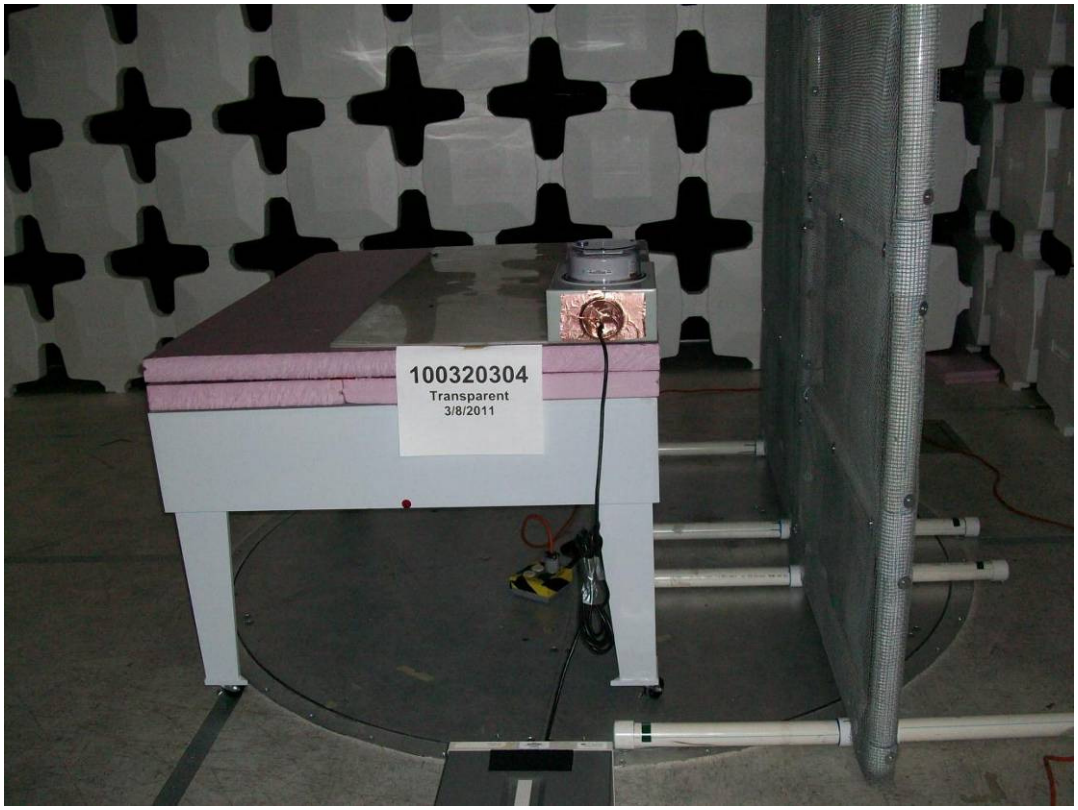


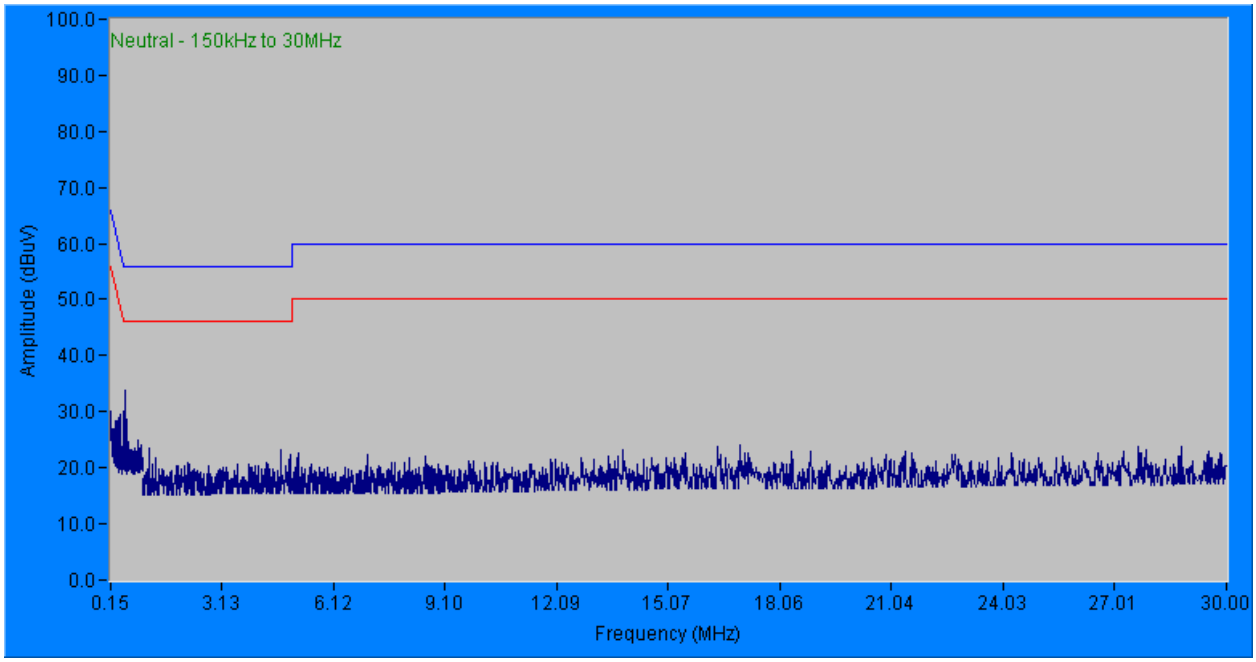
Photo:

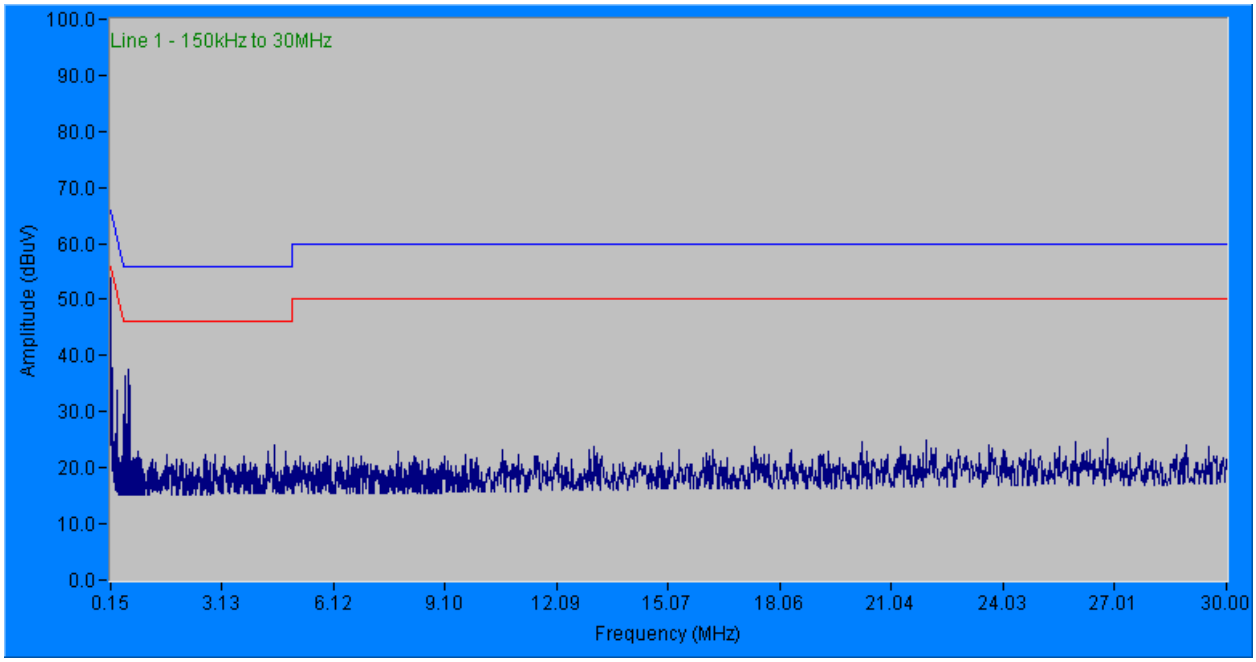
Test Setup – Conducted Emissions (Side View)



12.5 Plots: Pre-Scan Peak Measurements – Not Final (Reference Only)

Conducted Emissions – FCC 15.207 (150kHz to 30MHz)

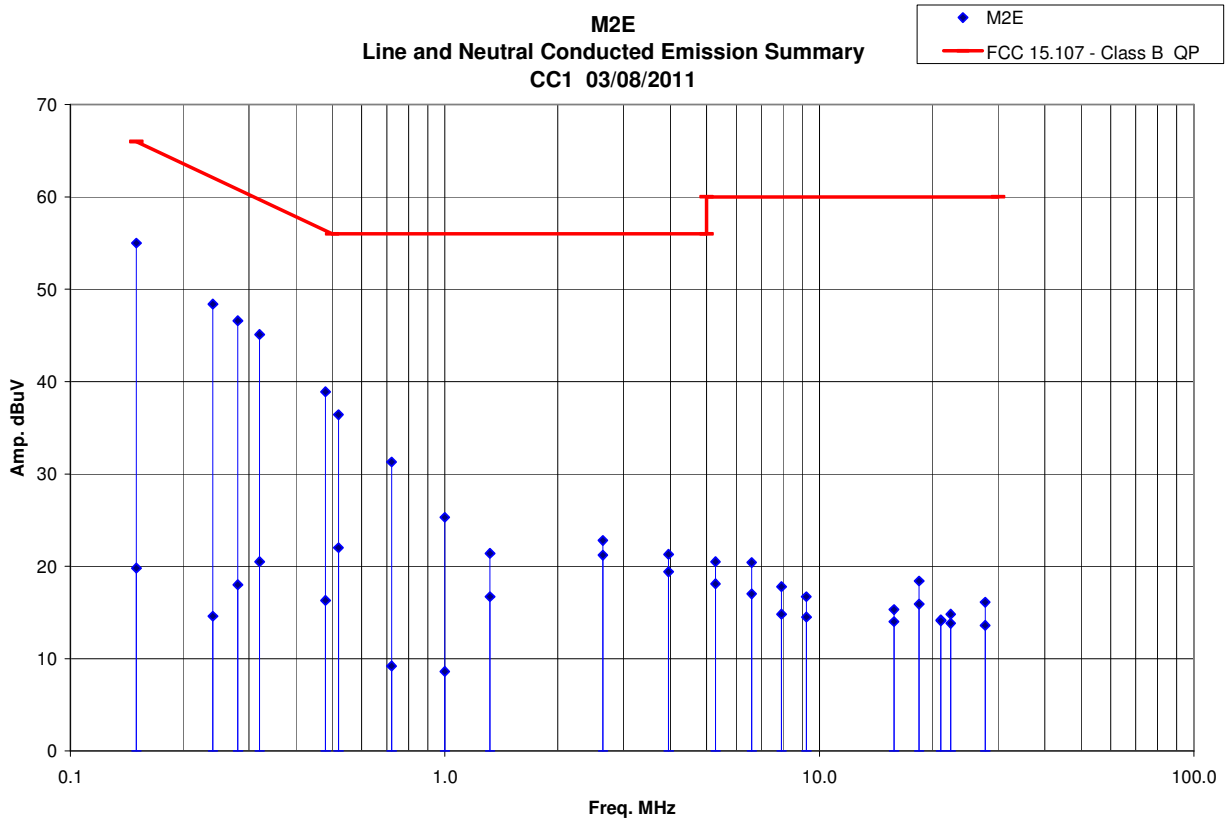


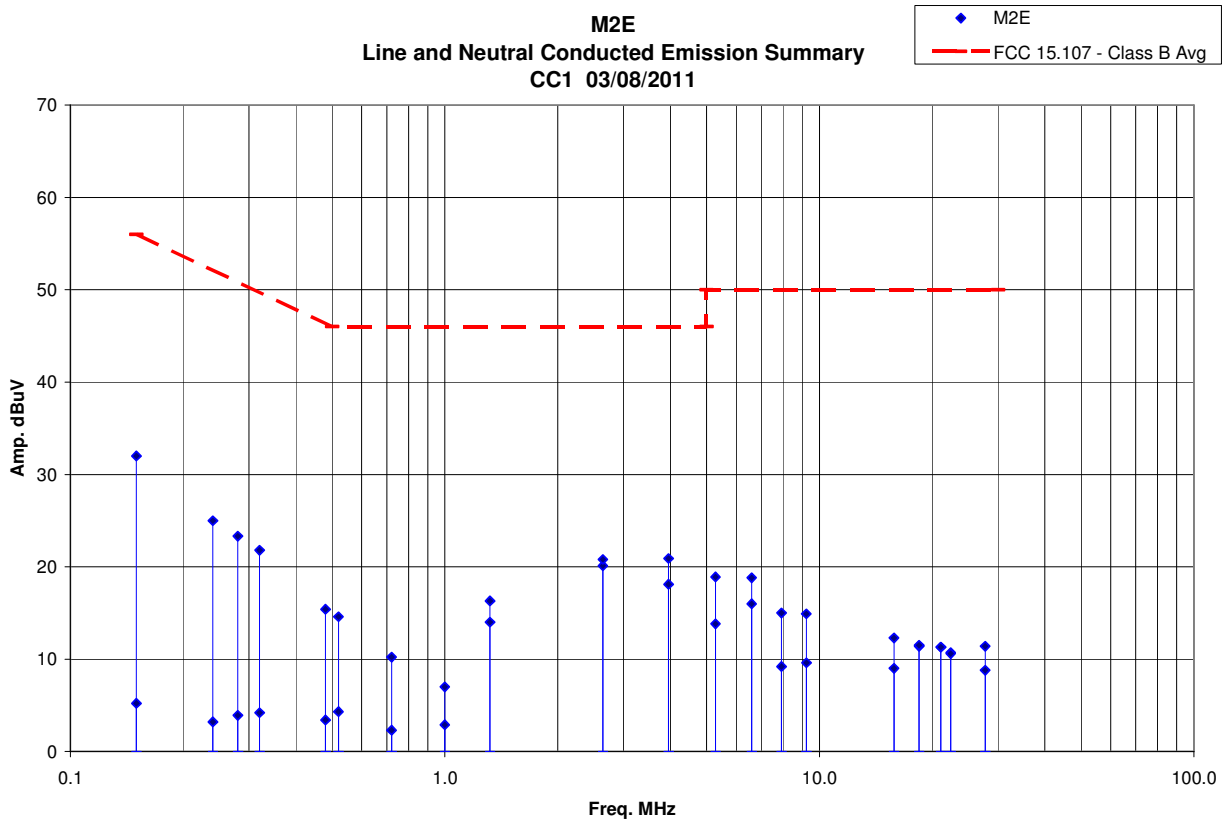


Note: Peak measurements plotted against FCC 15.207 Quasi-Peak & Average Limits

12.6 Final Plots: Quasi-Peak and Average Measurements

Conducted Emissions – FCC 15.207, Class B (150 kHz to 30 MHz)





12.7 Test Data: AC Conducted Emissions

AC Conducted Electromagnetic Emissions

Test Report #:	**100320304 Run 01**	Test Area:	CC1 Conducted	Temperature:	23.1	°C
Test Method:	FCC Part 15.207	Test Date:	08-Mar-2011	Relative Humidity:	24.8	%
EUT Model #:	Model AL (with embedded M2e)	EUT Power:	230VAC/60Hz	Air Pressure:	81.2	kPa
EUT Serial #:	FCC2					
Manufacturer:	Transparent Technologies					
EUT Description:	AMR module used in host device – Landis & Gyr FOCUS electricity meter					
Notes:	Product configured for normal operation – standby/receive mode.					

Level Key	
Pk – Peak	Nb – Narrow Band
Qp – QuasiPeak	Bb – Broad Band
Av - Average	

FREQ	LEVEL	CABLE / LISN / ATTEN	FINAL	TEST POINT	DELTA1 (dB)	DELTA2 (dB)
(MHz)	(dBuV)	(dB)	(dBuV)		FCC 15.207	FCC 15.207
Neutral						
0.150	-5.0 Av	0.1 / 0.2 / -9.9	5.2	Neutral	-50.8	N/A
0.150	9.6 Qp	0.1 / 0.2 / -9.9	19.8	Neutral	N/A	-46.2
0.240	-7.0 Av	0.1 / 0.1 / -10.0	3.2	Neutral	-48.9	N/A
0.240	4.4 Qp	0.1 / 0.1 / -10.0	14.6	Neutral	N/A	-47.5
0.280	-6.3 Av	0.1 / 0.1 / -10.0	3.9	Neutral	-46.9	N/A
0.280	7.8 Qp	0.1 / 0.1 / -10.0	18.0	Neutral	N/A	-42.8
0.320	-6.0 Av	0.1 / 0.1 / -10.0	4.2	Neutral	-45.5	N/A
0.320	10.3 Qp	0.1 / 0.1 / -10.0	20.5	Neutral	N/A	-39.2
0.480	-6.8 Av	0.1 / 0.1 / -10.0	3.4	Neutral	-42.9	N/A
0.480	6.1 Qp	0.1 / 0.1 / -10.0	16.3	Neutral	N/A	-40.0
0.520	-5.9 Av	0.1 / 0.1 / -10.0	4.3	Neutral	-41.7	N/A
0.520	11.8 Qp	0.1 / 0.1 / -10.0	22.0	Neutral	N/A	-34.0
0.720	-7.9 Av	0.1 / 0.1 / -10.0	2.3	Neutral	-43.7	N/A
0.720	-1.0 Qp	0.1 / 0.1 / -10.0	9.2	Neutral	N/A	-46.8
1.00	-7.4 Av	0.2 / 0.1 / -10.0	2.9	Neutral	-43.1	N/A
1.00	-1.7 Qp	0.2 / 0.1 / -10.0	8.6	Neutral	N/A	-47.4
1.32	3.7 Av	0.2 / 0.1 / -10.0	14.0	Neutral	-32.0	N/A
1.32	6.4 Qp	0.2 / 0.1 / -10.0	16.7	Neutral	N/A	-39.3
2.64	9.8 Av	0.2 / 0.1 / -10.0	20.1	Neutral	-25.9	N/A
2.64	10.9 Qp	0.2 / 0.1 / -10.0	21.2	Neutral	N/A	-34.8
3.96	7.8 Av	0.3 / 0.1 / -10.0	18.1	Neutral	-27.9	N/A
3.96	9.0 Qp	0.3 / 0.1 / -10.0	19.4	Neutral	N/A	-36.6
5.28	3.3 Av	0.4 / 0.1 / -10.0	13.8	Neutral	-36.2	N/A
5.28	7.7 Qp	0.4 / 0.1 / -10.0	18.1	Neutral	N/A	-41.9
6.60	5.5 Av	0.4 / 0.1 / -10.0	16.0	Neutral	-34.0	N/A
6.60	6.5 Qp	0.4 / 0.1 / -10.0	17.0	Neutral	N/A	-43.0
7.92	-1.4 Av	0.5 / 0.1 / -10.0	9.2	Neutral	-40.8	N/A
7.92	4.2 Qp	0.5 / 0.1 / -10.0	14.8	Neutral	N/A	-45.2
9.24	-1.1 Av	0.6 / 0.1 / -10.0	9.6	Neutral	-40.4	N/A

FREQ	LEVEL	CABLE / LISN / ATTEN	FINAL	TEST POINT	DELTA1 (dB)	DELTA2 (dB)
(MHz)	(dBuV)	(dB)	(dBuV)		FCC 15.207	FCC 15.207
9.24	3.9 Qp	0.6 / 0.1 / -10.0	14.5	Neutral	N/A	-45.5
15.83	-2.2 Av	1.0 / 0.2 / -10.0	9.0	Neutral	-41.0	N/A
15.83	2.7 Qp	1.0 / 0.2 / -10.0	14.0	Neutral	N/A	-46.0
18.48	0.1 Av	1.1 / 0.2 / -10.0	11.4	Neutral	-38.6	N/A
18.48	4.6 Qp	1.1 / 0.2 / -10.0	15.9	Neutral	N/A	-44.1
21.11	-0.3 Av	1.1 / 0.5 / -10.0	11.3	Neutral	-38.7	N/A
21.11	2.6 Qp	1.1 / 0.5 / -10.0	14.2	Neutral	N/A	-45.8
22.43	-1.0 Av	1.1 / 0.6 / -10.0	10.7	Neutral	-39.3	N/A
22.43	3.1 Qp	1.1 / 0.6 / -10.0	14.8	Neutral	N/A	-45.2
27.71	-3.2 Av	1.3 / 0.7 / -10.0	8.8	Neutral	-41.2	N/A
27.71	1.6 Qp	1.3 / 0.7 / -10.0	13.6	Neutral	N/A	-46.4
0.150	21.8 Av	0.1 / 0.2 / -9.9	32.0	Line 1	-24.0	N/A
0.150	44.8 Qp	0.1 / 0.2 / -9.9	55.0	Line 1	N/A	-11.0
0.240	14.8 Av	0.1 / 0.1 / -10.0	25.0	Line 1	-27.1	N/A
0.240	38.2 Qp	0.1 / 0.1 / -10.0	48.4	Line 1	N/A	-13.7
0.280	13.1 Av	0.1 / 0.1 / -10.0	23.3	Line 1	-27.5	N/A
0.280	36.4 Qp	0.1 / 0.1 / -10.0	46.6	Line 1	N/A	-14.2
0.320	11.6 Av	0.1 / 0.1 / -10.0	21.8	Line 1	-27.9	N/A
0.320	34.9 Qp	0.1 / 0.1 / -10.0	45.1	Line 1	N/A	-14.6
0.480	5.2 Av	0.1 / 0.1 / -10.0	15.4	Line 1	-30.9	N/A
0.480	28.7 Qp	0.1 / 0.1 / -10.0	38.9	Line 1	N/A	-17.4
0.520	4.4 Av	0.1 / 0.1 / -10.0	14.6	Line 1	-31.4	N/A
0.520	26.2 Qp	0.1 / 0.1 / -10.0	36.4	Line 1	N/A	-19.6
0.720	0.0 Av	0.1 / 0.1 / -10.0	10.2	Line 1	-35.8	N/A
0.720	21.1 Qp	0.1 / 0.1 / -10.0	31.3	Line 1	N/A	-24.7
1.00	-3.3 Av	0.2 / 0.1 / -10.0	7.0	Line 1	-39.0	N/A
1.00	15.0 Qp	0.2 / 0.1 / -10.0	25.3	Line 1	N/A	-30.7
1.32	6.0 Av	0.2 / 0.1 / -10.0	16.3	Line 1	-29.7	N/A
1.32	11.1 Qp	0.2 / 0.1 / -10.0	21.4	Line 1	N/A	-34.6
2.64	10.5 Av	0.2 / 0.1 / -10.0	20.8	Line 1	-25.2	N/A
2.64	12.5 Qp	0.2 / 0.1 / -10.0	22.8	Line 1	N/A	-33.2
3.96	10.5 Av	0.3 / 0.1 / -10.0	20.9	Line 1	-25.1	N/A
3.96	10.9 Qp	0.3 / 0.1 / -10.0	21.3	Line 1	N/A	-34.7
5.28	8.4 Av	0.4 / 0.1 / -10.0	18.9	Line 1	-31.1	N/A
5.28	10.0 Qp	0.4 / 0.1 / -10.0	20.5	Line 1	N/A	-39.5
6.60	8.2 Av	0.4 / 0.1 / -10.0	18.8	Line 1	-31.2	N/A
6.60	9.9 Qp	0.4 / 0.1 / -10.0	20.4	Line 1	N/A	-39.6
7.92	4.4 Av	0.5 / 0.1 / -10.0	15.0	Line 1	-35.0	N/A
7.92	7.2 Qp	0.5 / 0.1 / -10.0	17.8	Line 1	N/A	-42.2
9.23	4.2 Av	0.6 / 0.1 / -10.0	14.9	Line 1	-35.1	N/A
9.23	6.0 Qp	0.6 / 0.1 / -10.0	16.7	Line 1	N/A	-43.3
15.83	1.1 Av	1.0 / 0.2 / -10.0	12.3	Line 1	-37.7	N/A
15.83	4.1 Qp	1.0 / 0.2 / -10.0	15.3	Line 1	N/A	-44.7
18.47	0.2 Av	1.1 / 0.2 / -10.0	11.5	Line 1	-38.5	N/A

FREQ	LEVEL	CABLE / LISN / ATTEN	FINAL	TEST POINT	DELTA1 (dB)	DELTA2 (dB)
(MHz)	(dBuV)	(dB)	(dBuV)		FCC 15.207	FCC 15.207
18.47	7.1 Qp	1.1 / 0.2 / -10.0	18.4	Line 1	N/A	-41.6
21.11	-0.3 Av	1.1 / 0.5 / -10.0	11.3	Line 1	-38.7	N/A
21.11	2.5 Qp	1.1 / 0.5 / -10.0	14.1	Line 1	N/A	-45.9
22.43	-1.1 Av	1.1 / 0.6 / -10.0	10.6	Line 1	-39.4	N/A
22.43	2.1 Qp	1.1 / 0.6 / -10.0	13.8	Line 1	N/A	-46.2
27.70	-0.6 Av	1.3 / 0.7 / -10.0	11.4	Line 1	-38.6	N/A
27.70	4.1 Qp	1.3 / 0.7 / -10.0	16.1	Line 1	N/A	-43.9

FREQ	LEVEL	CABLE / LISN / ATTEN	FINAL	TEST POINT	DELTA1 (dB)	DELTA2 (dB)
(MHz)	(dBuV)	(dB)	(dBuV)		FCC 15.107	FCC 15.107
********** **Measurement Summary** **********						
0.150	44.8 Qp	0.1 / 0.2 / -9.9	55.0	Line 1	N/A	-11.0
0.240	38.2 Qp	0.1 / 0.1 / -10.0	48.4	Line 1	N/A	-13.7
0.280	36.4 Qp	0.1 / 0.1 / -10.0	46.6	Line 1	N/A	-14.2
0.320	34.9 Qp	0.1 / 0.1 / -10.0	45.1	Line 1	N/A	-14.6
0.480	28.7 Qp	0.1 / 0.1 / -10.0	38.9	Line 1	N/A	-17.4
0.520	26.2 Qp	0.1 / 0.1 / -10.0	36.4	Line 1	N/A	-19.6
0.720	21.1 Qp	0.1 / 0.1 / -10.0	31.3	Line 1	N/A	-24.7
3.96	10.5 Av	0.3 / 0.1 / -10.0	20.9	Line 1	-25.1	N/A
2.64	10.5 Av	0.2 / 0.1 / -10.0	20.8	Line 1	-25.2	N/A
1.32	6.0 Av	0.2 / 0.1 / -10.0	16.3	Line 1	-29.7	N/A
1.00	15.0 Qp	0.2 / 0.1 / -10.0	25.3	Line 1	N/A	-30.7
5.28	8.4 Av	0.4 / 0.1 / -10.0	18.9	Line 1	-31.1	N/A
6.60	8.2 Av	0.4 / 0.1 / -10.0	18.8	Line 1	-31.2	N/A
7.92	4.4 Av	0.5 / 0.1 / -10.0	15.0	Line 1	-35.0	N/A
9.23	4.2 Av	0.6 / 0.1 / -10.0	14.9	Line 1	-35.1	N/A
15.83	1.1 Av	1.0 / 0.2 / -10.0	12.3	Line 1	-37.7	N/A
18.47	0.2 Av	1.1 / 0.2 / -10.0	11.5	Line 1	-38.5	N/A
18.48	0.1 Av	1.1 / 0.2 / -10.0	11.4	Neutral	-38.6	N/A
27.70	-0.6 Av	1.3 / 0.7 / -10.0	11.4	Line 1	-38.6	N/A
21.11	-0.3 Av	1.1 / 0.5 / -10.0	11.3	Line 1	-38.7	N/A
22.43	-1.0 Av	1.1 / 0.6 / -10.0	10.7	Neutral	-39.3	N/A
9.24	-1.1 Av	0.6 / 0.1 / -10.0	9.6	Neutral	-40.4	N/A
27.71	-3.2 Av	1.3 / 0.7 / -10.0	8.8	Neutral	-41.2	N/A

13 Duty Cycle Correction Factor – FCC 15.35/ RSS-GEN, Section 4.5

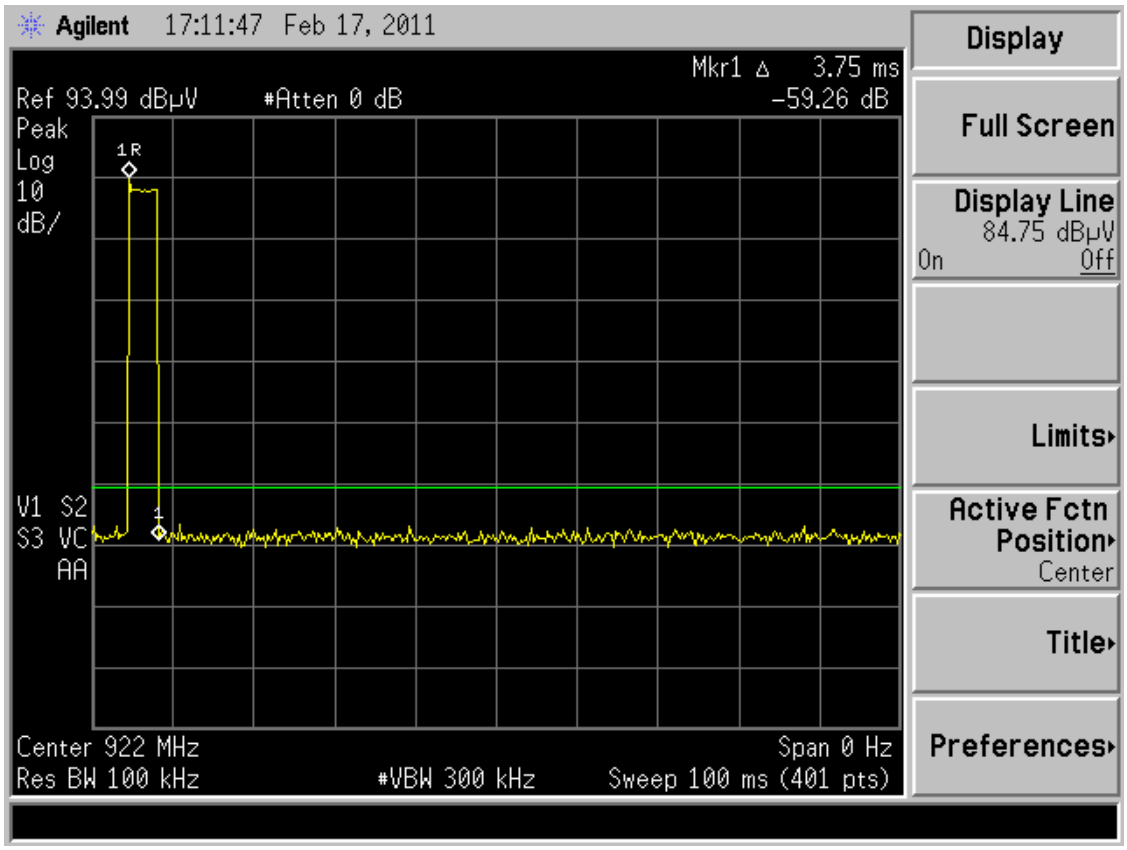
The following duty cycle was verified by Intertek and utilized where applicable in this test report:

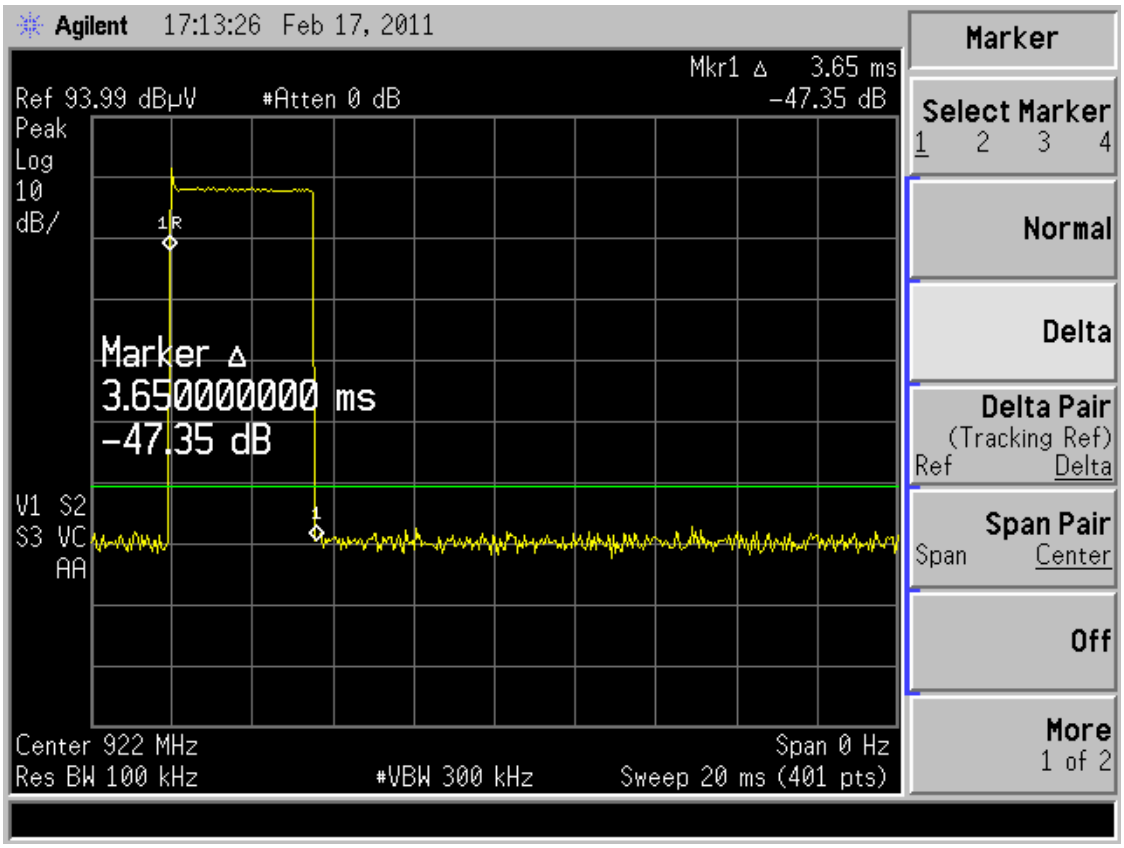
- 3.75% duty cycle

Duty Cycle – M2E AMR Module

FCC 15.35 / RSS-GEN, Section 4.5

Mid Channel

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Peak
Log
10
dB/
1R
Marker Δ
3.650000000 ms
-47.35 dB
V1 S2
S3 VC
AA
Center 922 MHz
Res BW 100 kHz
#VBW 300 kHz
Span 0 Hz
Sweep 20 ms (401 pts)
Marker
Select Marker
1 2 3 4
Normal
Delta
Delta Pair
(Tracking Ref)
Ref Delta
Span Pair
Span Center
Off
More
1 of 2

14 Measurement Uncertainty

The measured value related to the corresponding limit will be used to decide whether the equipment meets the requirements.

The measurement uncertainty figures were calculated and correspond to a coverage factor of k = 2, providing a confidence level of respectively 95.45 % in the case where the distributions characterizing the actual measurement uncertainties are normal (Gaussian).

Measurement uncertainty Table

Parameter	Uncertainty ±	Notes
Radiated emissions, 10kHz to 1000 MHz	4.4 dB	
Radiated emissions, 1 to 18 GHz	4.7 dB	
AC mains Conducted emissions, 150kHz to 30 MHz	3.14 dB	

15 Revision History

Revision Level	Date	Report Number	Notes
0	08/28/2012	100329070DEN-001	Original Issue