TEST REPORT

Report Number: 100521432DEN-004_Pie
Project Number: G100521432

Report Issue Date: 11/30/2011

Product Designation: **SDSR Wireless Accessory Pie**

Standards: FCC 47 CFR Part 15.249
IC RSS 210: Issue 8:2010
IC RSS-GEN Issue 3:2010

Tested by:
Intertek Testing Services NA, Inc.
1795 Dogwood St. Suite 200
Louisville, CO 80027

Client:
Handi Quilter LLC
445 N 700 W
North Salt Lake, UT 84054

Report prepared by

Michael Kanda
EMC Team Leader

Report reviewed by

Michael Spataro
Engineering Team Leader

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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 15.249(a)/15.205/209 (Covers RSS-210 A8.4(4) & A8.5)	10/24/2011	Pass
6	Radiated Emissions – Unintentional and Spurious of the Transmitter - FCC 15.209/15.249(a)/15.205 (Covers RSS-210 A8.5, & RSS-GEN 7.2.2/5)	10/26/2011	Pass
7	Radiated Emissions – Unintentional and Spurious – Band Edge FCC 15.209/15.249(a)/15.205 (Covers RSS-210 A8.5, & RSS-GEN 7.2.2/5)	10/27/2011	Pass
8	Radiated Emissions – Unintentional – Receiver FCC 5.209/15.249(a)/15.205 (Covers RSS-GEN Section 6)	11/15/2011	Pass
9	Occupied Bandwidth – RSS-GEN, Section 4.6.1	11/10/2011	Pass
10	AC Conducted Emissions – FCC 15.207 (Covers RSS-GEN Section 7.2.4)	-	NA

Notes: None

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:

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.

Duty Cycle Correction Factors were not utilized in this testing and report per client request.

3 Description of Equipment Under Test (Provided by client)

Equipment Under Test			
Description	Manufacturer	Model Number	Serial Number
SDSR “Pie”	Handi Quilter Inc.	QM 29010	1

Receive Date:	10/24/2011
Received Condition:	Good
Type:	Production Sample

Description of Equipment Under Test (provided by client)
1. Optical Motion Sensor with radio – “Pie” 2. The transmitter of the base unit was set at -14dB for all tests.

Equipment Under Test Power Configuration			
Rated Voltage	Rated Current	Rated Frequency	Number of Phases
3.7V DC	150mA	N/A	0

Operating modes of the EUT: Intentional Tx Testing

No.	Descriptions of EUT Exercising
1	Low channel, 2.400250 GHz continuous
2	Mid channel, 2.440390 GHz continuous
3	High channel, 2.480936 GHz continuous
4	Low channel, normal operation
5	Mid channel, normal operation
6	High channel, normal operation

Operating modes of the EUT: Unintentional Rx Testing

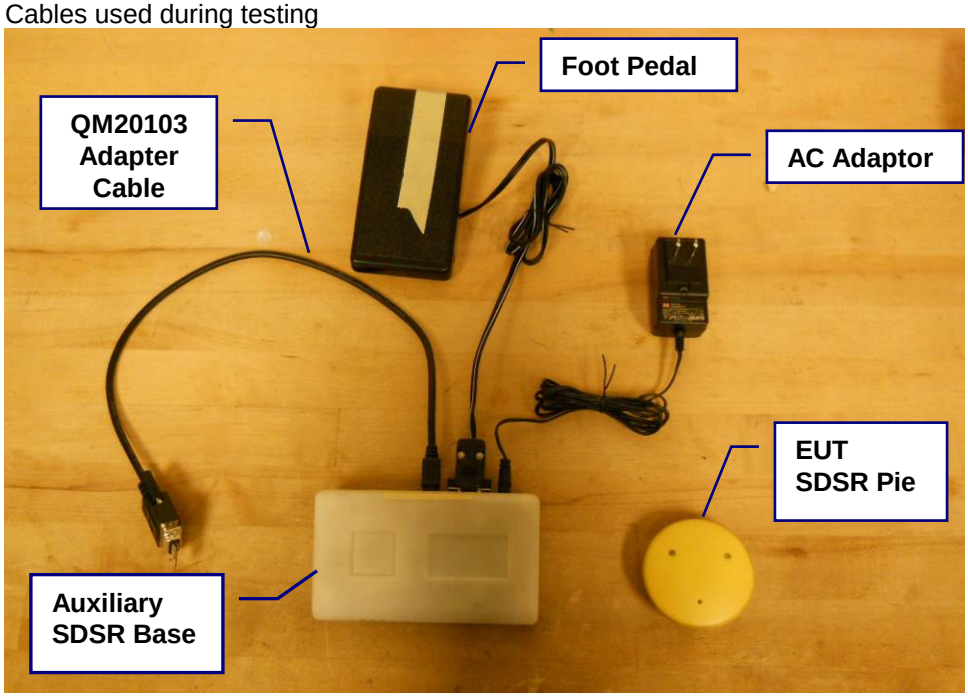
No.	Descriptions of EUT Exercising
1	Low channel, 2.400250 GHz constant receive
2	Mid channel, 2.440390 GHz constant receive
3	High channel, 2.480936 GHz constant receive

Clock Frequencies of the EUT:

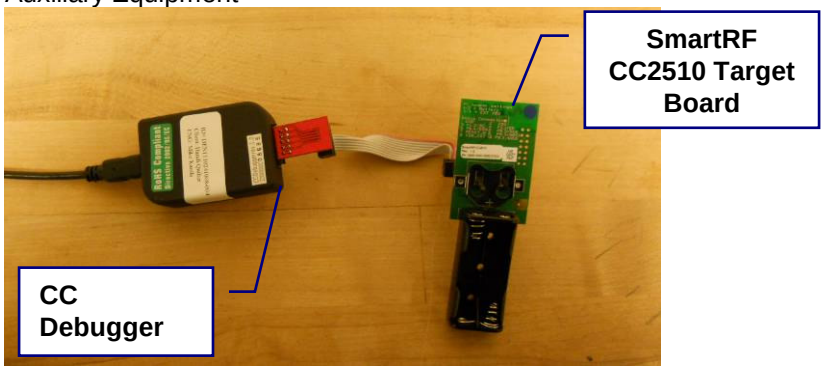
No.	Descriptions of EUT Exercising
	SDSR Pie
1	26 MHz – Micro Controller
2	47 MHz – Mouse Driver
3	1.2 MHz – Switcher
4	1.6 MHz – LED Driver

3.1 Product Photo:

Product Tested
Cables used during testing



Auxiliary Equipment



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`m.

4.2 EUT Block Diagram:

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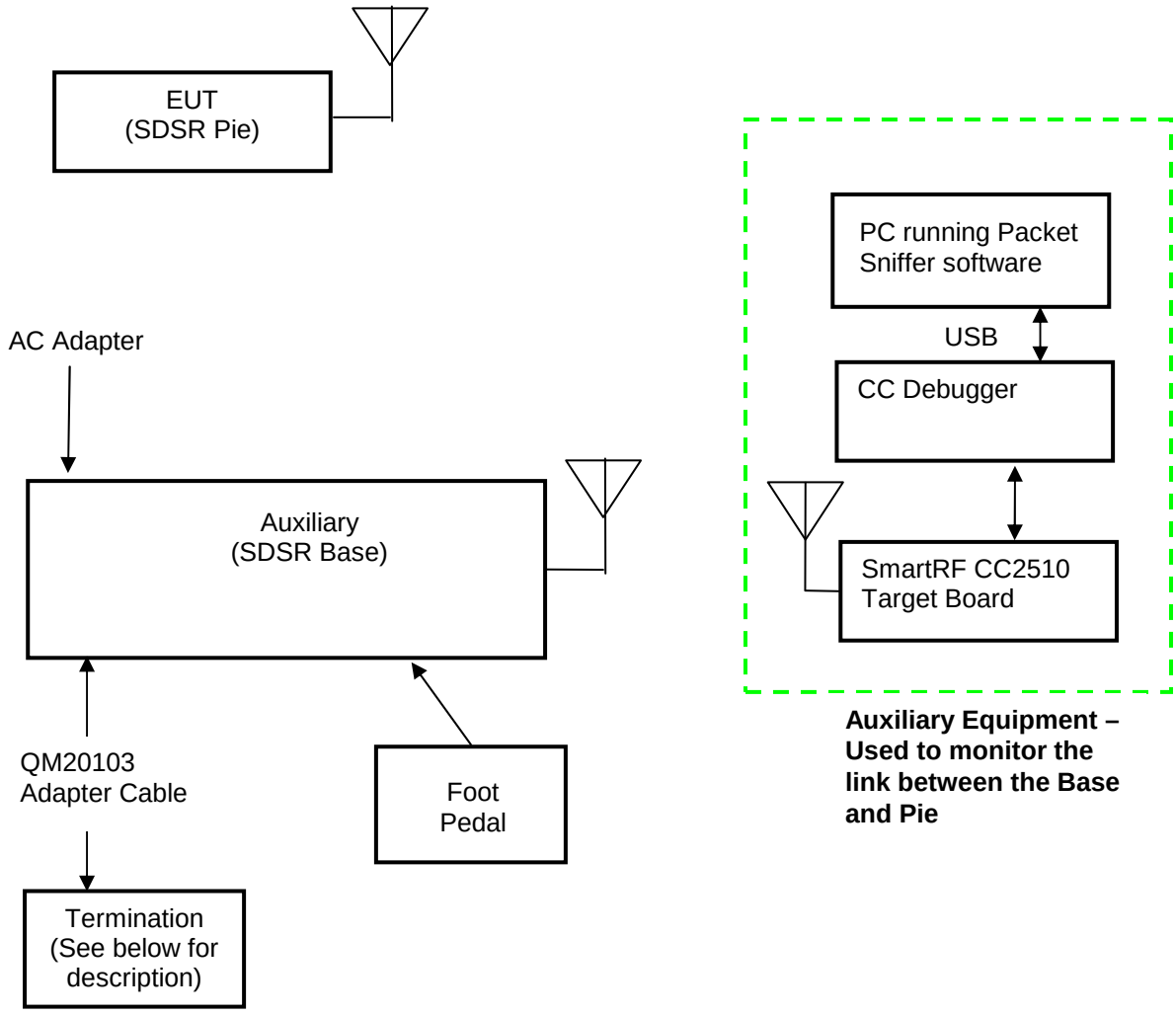


Note: Dashed lines indicate auxiliary/support equipment outside the test area

4.3 Support Data:

ID	Description/ Function	Shield Type	Length	Connector	Connection	Ferrites
	QM20103 Adapter Cable	None	12”	Mini-DIN 8	D-Sub DB-9	None

Support Equipment			
Description	Manufacturer	Model Number	Serial Number
AC Adapter	Meanwell (Franmar International)	GE12I05-P1J	N/A
Foot Pedal	Handi Quilter Inc.	QM00744	N/A
CC2500 Target Board	Texas Instruments	SmartRFCC2510	N/A
CC Debugger	Texas Instruments	CC Debugger	1234
PC	Dell	Latitude D820	CN-0GF470-48643-73H-1444

Notes: Adapter Cable Signals and Termination:

- Pin 3 - RS-232 level Transmit Output (4.7K termination to ground on connector {from part data sheet})
- Pin 2 - RS-232 level Receive Input (4.7K termination to ground on connector)
- Pin 1 - Quadrature Signal XA Output (4.7K termination to ground on connector)
- Pin 4 - Quadrature Signal XB Output (4.7K termination to ground on connector)
- Pin 5 - Ground

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 15.249 & 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	12/10/2010	12/10/2011
18880	Q.P Adapter	Hewlett-Packard	85650A	2811A01300	12/06/2010	12/06/2011
18913	Spectrum Analyzer	Hewlett-Packard	E7405A	My44211889	06/28/2011	06/28/2012
18912	9 kHz- 1.3GHz Pre Amp	Hewlett-Packard	8447F	3113A05545	06/03/2011	06/03/2012
18906	Pre-Amplifier (1-4 GHz)	Mini-Circuits Lab	ZHL-42	N052792-2	06/03/2011	06/03/2012
18900	RF Pre-Amplifier (4-8 GHz)	Avantek	AFT97-8434-10F	1007	06/03/2011	06/03/2012
18901	RF Pre-Amplifier (8-18 GHz)	Avantek	AWT-18037	1002	06/03/2011	06/03/2012
18887	Horn Antenna 1-18GHz	EMCO	3115	9205-3886	12/09/2010	12/09/2011
18805	HF Antenna/Harmonic Mixer 18 GHz to 26.5 GHz	Hewlett-Packard	11970K	2332A01280	10/04/2010	10/04/2011
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 with the requirements of:

- FCC 249(a)(c)/15.205/15.209
- RSS-210 A2.9

5.4 Setup Photographs:

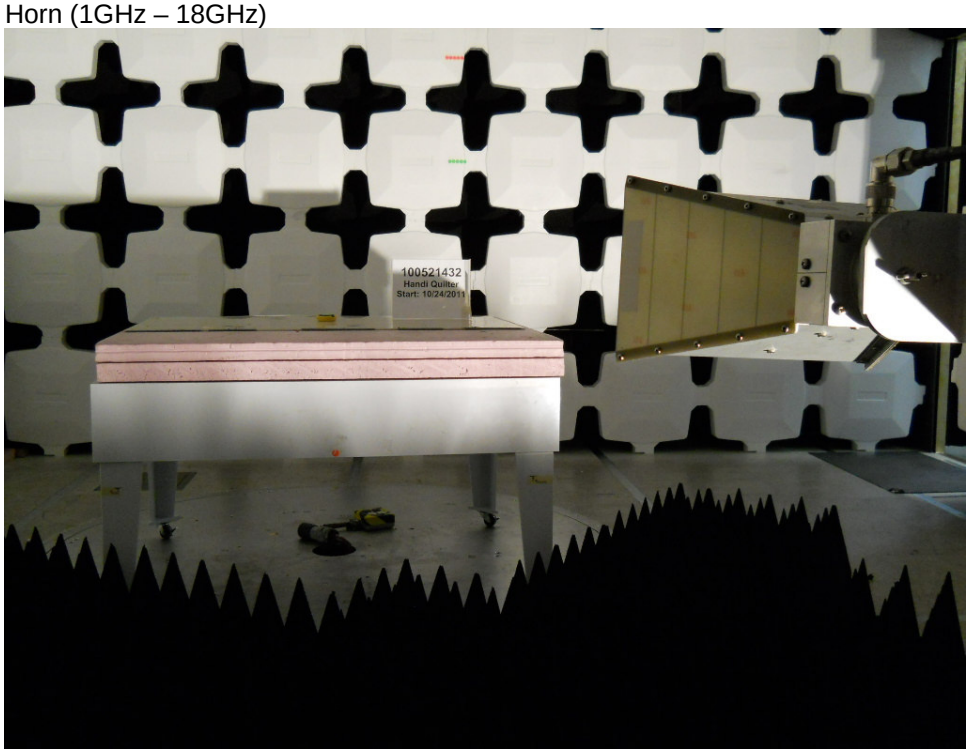
Test setup – Field Strength Measurements (Front View)

Test setup – Field Strength Measurements (Rear View)

Photo: Antenna Setups

Photo: Antenna Setups

Horn (1GHz – 18GHz)



HF Active Antenna/Harmonic Mixer (18GHz – 30GHz)

5.5 Test Data: Fundamental Power & Harmonics of the Fundamental

Test Report #:	**100521432 Run 2**	Test Area:	CC1 Radiated	Temperature:	22.1	°C
Test Method:	FCC Part 15.209	Test Date:	24-Oct-2011	Relative Humidity:	22.2	%
EUT Model #:	QM 29010	EUT Power:	Li-Ion Battery	Air Pressure:	83.55	kPa
EUT Serial #:	1					
Manufacturer:	Handi Quilter					
EUT Description:						
Notes:	Pie					

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

Pie – Fundamental

FREQ	LEVEL	CABLE / ANT / PREAMP	FINAL	POL / HGT / AZ	15.249 Limit	Delta
(MHz)	(dBuV)	(dB) (dB\m) (dB)	(dBuV)	(m) (DEG)	(dBuV)	dB
Fundamental Measurements						
Low Ch						
2400.11	58.1 Pk	3.5 / 29.4 / 0.0	91	H / 1.2 / 244.7	94	-3
2400.11	46.2 Pk	3.5 / 29.4 / 0.0	79.1	V / 1.4 / 332.1	94	-14.9
Mid Ch						
2441.5	56.3 Pk	3.5 / 29.6 / 0.0	89.4	H / 1.2 / 112.5	94	-4.6
2441.5	46.6 Pk	3.5 / 29.6 / 0.0	79.7	V / 1.4 / 358.4	94	-14.3
High Ch						
2483.23	54.4 Pk	3.6 / 29.8 / 0.0	87.7	V / 2.4 / 14.7	94	-6.3
2483.23	47.1 Pk	3.6 / 29.8 / 0.0	80.5	H / 1.2 / 252.6	94	-13.5

Pie – Harmonics of the Fundamental

FREQ	LEVEL	CABLE / ANT / PREAMP	FINAL	POL / HGT / AZ	DELTA1 (dB)
(MHz)	(dBuV)	(dB) (dB\m) (dB)	(dBuV)	(m) (DEG)	15.209 >1GHz
Harmonics					
Mid Ch					
4883.00	47.6 Pk	5.2 / 35.1 / 38.4	49.5	V / 1.6 / 18.9	-4.5
4883.00	50.0 Pk	5.2 / 35.1 / 38.4	51.9	H / 4.0 / 74.9	-2.1
7324.50	30.6 Pk	6.5 / 38.7 / 38.7	37.0	H / 1.0 / 0.0	-17.0
7324.50	29.4 Pk	6.5 / 38.7 / 38.7	35.9	V / 1.0 / 0.0	-18.1
9766.00	32.3 Pk	7.7 / 40.8 / 47.9	32.8	V / 1.0 / 0.0	-21.2
9766.00	34.1 Pk	7.7 / 40.8 / 47.9	34.7	H / 1.0 / 0.0	-19.3
12207.5	24.7 Pk	8.8 / 40.9 / 45.6	28.8	H / 1.0 / 0.0	-25.2
12207.5	27.6 Pk	8.8 / 40.9 / 45.6	31.8	V / 1.0 / 0.0	-22.2
14649.0	31.9 Pk	9.5 / 43.1 / 47.9	36.7	V / 1.0 / 0.0	-17.3
14649.0	31.1 Pk	9.5 / 43.1 / 47.9	35.8	H / 1.0 / 0.0	-18.2
17090.5	29.4 Pk	10.6 / 43.8 / 47.5	36.2	H / 1.0 / 0.0	-17.8
17090.5	30.4 Pk	10.6 / 43.8 / 47.5	37.3	V / 1.0 / 0.0	-16.7
Low Ch					
4800.30	47.7 Pk	5.2 / 34.9 / 38.5	49.2	V / 1.6 / 351.2	-4.8
4800.30	49.5 Pk	5.2 / 34.9 / 38.5	51.0	H / 2.7 / 58.3	-3.0
7200.45	30.6 Pk	6.4 / 38.5 / 39.0	36.6	H / 1.0 / 0.0	-17.4
7200.45	31.1 Pk	6.4 / 38.5 / 39.0	37.0	V / 1.0 / 0.0	-17.0
9600.60	34.8 Pk	7.6 / 41.0 / 48.6	34.8	V / 1.0 / 0.0	-19.2
9600.60	34.0 Pk	7.6 / 41.0 / 48.6	33.9	H / 1.0 / 0.0	-20.1
12000.7	26.8 Pk	8.7 / 40.7 / 45.6	30.6	H / 1.0 / 0.0	-23.4
12000.7	25.4 Pk	8.7 / 40.7 / 45.6	29.2	V / 1.0 / 0.0	-24.8
14400.9	30.0 Pk	9.4 / 42.6 / 48.0	34.0	V / 1.0 / 0.0	-20.0
14400.9	30.0 Pk	9.4 / 42.6 / 48.0	34.0	H / 1.0 / 0.0	-20.0
16801.0	29.9 Pk	10.5 / 42.8 / 48.4	34.8	H / 1.0 / 0.0	-19.2
16801.0	30.4 Pk	10.5 / 42.8 / 48.4	35.2	V / 1.0 / 0.0	-18.8
High Ch					
4960.84	48.0 Pk	5.2 / 35.3 / 38.3	50.2	V / 1.2 / 112.6	-3.8
4960.84	51.0 Pk	5.2 / 35.3 / 38.3	53.2	H / 1.7 / 259.6	-0.8
7441.24	29.3 Pk	6.5 / 38.8 / 38.8	35.9	H / 1.0 / 0.0	-18.1
7441.24	27.6 Pk	6.5 / 38.8 / 38.8	34.2	V / 1.0 / 0.0	-19.8
9933.12	33.0 Pk	7.7 / 40.8 / 48.8	32.7	V / 1.0 / 0.0	-21.3
9933.12	32.9 Pk	7.7 / 40.8 / 48.8	32.6	H / 1.0 / 0.0	-21.4
12402.0	23.7 Pk	8.9 / 41.2 / 45.7	28.1	V / 1.0 / 0.0	-25.9
12402.0	18.3 Pk	8.9 / 41.2 / 45.7	22.7	H / 1.0 / 0.0	-31.3
14882.4	30.2 Pk	9.6 / 43.4 / 47.8	35.4	H / 1.0 / 0.0	-18.6
14882.4	29.4 Pk	9.6 / 43.4 / 47.8	34.6	V / 1.0 / 0.0	-19.4
17362.8	23.1 Pk	10.7 / 44.4 / 46.3	31.9	V / 1.0 / 0.0	-22.1
17362.8	29.5 Pk	10.7 / 44.4 / 46.3	38.3	H / 1.0 / 0.0	-15.7

FREQ	LEVEL	CABLE / ANT / PREAMP	FINAL	POL / HGT / AZ	DELTA1 (dB)
(MHz)	(dBuV)	(dB) (dB\m) (dB)	(dBuV)	(m) (DEG)	15.209 >1GHz
********** Measurement Summary **********					
4960.84	51.0 Pk	5.2 / 35.3 / 38.3	53.2	H / 1.7 / 259.6	-0.8
4883	50.0 Pk	5.2 / 35.1 / 38.4	51.9	H / 4.0 / 74.9	-2.1
4800.3	49.5 Pk	5.2 / 34.9 / 38.5	51	H / 2.7 / 58.3	-3
17362.8	29.5 Pk	10.7 / 44.4 / 46.3	38.3	H / 1.0 / 0.0	-15.7
17090.5	30.4 Pk	10.6 / 43.8 / 47.5	37.3	V / 1.0 / 0.0	-16.7
7200.45	31.1 Pk	6.4 / 38.5 / 39.0	37	V / 1.0 / 0.0	-17
7324.5	30.6 Pk	6.5 / 38.7 / 38.7	37	H / 1.0 / 0.0	-17
14649	31.9 Pk	9.5 / 43.1 / 47.9	36.7	V / 1.0 / 0.0	-17.3
7441.24	29.3 Pk	6.5 / 38.8 / 38.8	35.9	H / 1.0 / 0.0	-18.1
14882.4	30.2 Pk	9.6 / 43.4 / 47.8	35.4	H / 1.0 / 0.0	-18.6
16801	30.4 Pk	10.5 / 42.8 / 48.4	35.2	V / 1.0 / 0.0	-18.8
9600.6	34.8 Pk	7.6 / 41.0 / 48.6	34.8	V / 1.0 / 0.0	-19.2
9766	34.1 Pk	7.7 / 40.8 / 47.9	34.7	H / 1.0 / 0.0	-19.3
14400.9	30.0 Pk	9.4 / 42.6 / 48.0	34	V / 1.0 / 0.0	-20
9933.12	33.0 Pk	7.7 / 40.8 / 48.8	32.7	V / 1.0 / 0.0	-21.3
12207.5	27.6 Pk	8.8 / 40.9 / 45.6	31.8	V / 1.0 / 0.0	-22.2
12000.7	26.8 Pk	8.7 / 40.7 / 45.6	30.6	H / 1.0 / 0.0	-23.4
12402	23.7 Pk	8.9 / 41.2 / 45.7	28.1	V / 1.0 / 0.0	-25.9

Notes:

1. Worst-Case Harmonic within FCC Restricted Band: High Channel (4.96084GHz) 53.2 dBuV/m (0.8 dBuV below FCC 15.209 Limit)
2. Measurements made with a RBW=1MHz and VBW=1MHz.
3. All measurements taken using a peak detector and found to be compliant to the average limit. No duty cycle correction is applicable to this product.
4. All measurements 10kHz to 18GHz taken at a 3-meter product-to-antenna test distance. All measurements above 18GHz are taken at a 1-meter product-to-antenna test distance then extrapolated to 3m. The FCC limits were not altered.
5. HF active horn antenna/harmonic mixer combination used for frequencies above 18GHz. Note cable loss and antenna factors are combined into a single correction factor during calibration.
6. The device is designed to be used while placed under the quilting material and determine the motion of the material as the quilting machine is being used. Therefore the device was tested as positioned on the table as shown in the setup pictures. No other configurations were tested.

Deviations, Additions, or Exclusions: None

6 Radiated Emissions – Unintentional and 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 15.249 & 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	12/10/2010	12/10/2011
18880	Q.P Adapter	Hewlett-Packard	85650A	2811A01300	12/06/2010	12/06/2011
18913	Spectrum Analyzer	Hewlett-Packard	E7405A	My44211889	06/28/2011	06/28/2012
18912	9 kHz- 1.3GHz Pre Amp	Hewlett-Packard	8447F	3113A05545	06/03/2011	06/03/2012
18906	Pre-Amplifier (1-4 GHz)	Mini-Circuits Lab	ZHL-42	N052792-2	06/03/2011	06/03/2012
18900	RF Pre-Amplifier (4-8 GHz)	Avantek	AFT97-8434-10F	1007	06/03/2011	06/03/2012
18901	RF Pre-Amplifier (8-18 GHz)	Avantek	AWT-18037	1002	06/03/2011	06/03/2012
18897	Magnetic loop antenna 10kHz-30MHz	EMCO	6502	9205-2738	11/18/2010	11/18/2011
19937	Bilog Antenna 30MHz – 6GHz	Sunol Sciences	JB6	A050707-2	1/31/2011	1/31/2012
18887	Horn Antenna 1-18GHz	EMCO	3115	9205-3886	12/09/2010	12/09/2011
18805	HF Active Antenna/Harmonic Mixer 18 GHz to 26.5 GHz	Hewlett-Packard	11970K	2332A01280	10/04/2010	10/04/2011
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 with the requirements of:

- FCC 15.209/109 15.249(d)
- Covers RSS-210 A2.9, & RSS-GEN 7.2.5

6.4 Setup Photographs:

Pie Test setup – Field Strength Measurements (Front View)

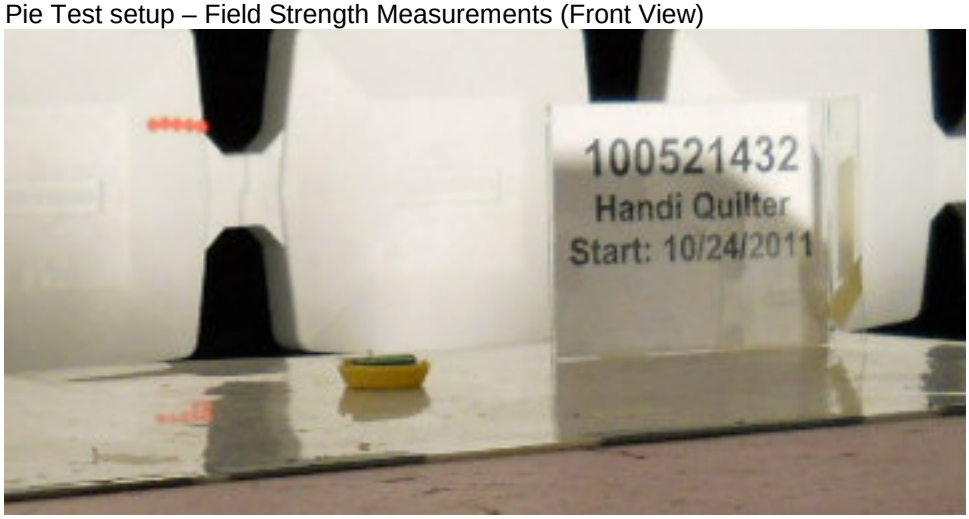
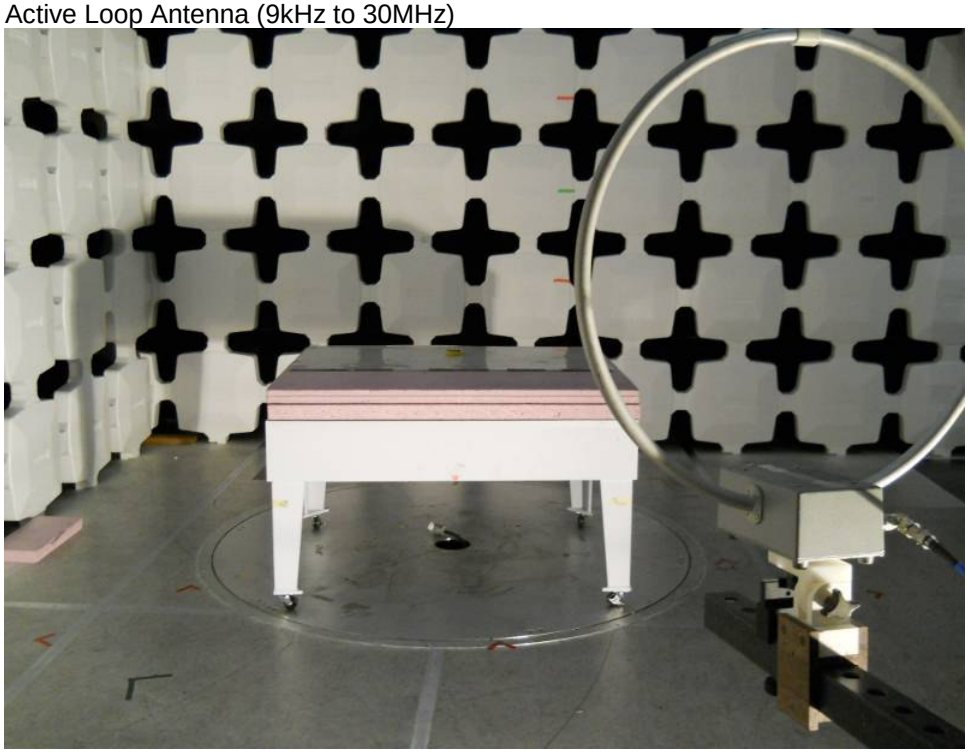


Photo: Antenna Setups

Active Loop Antenna (9kHz to 30MHz)



BiLog Antenna (30MHz to 1000MHz)

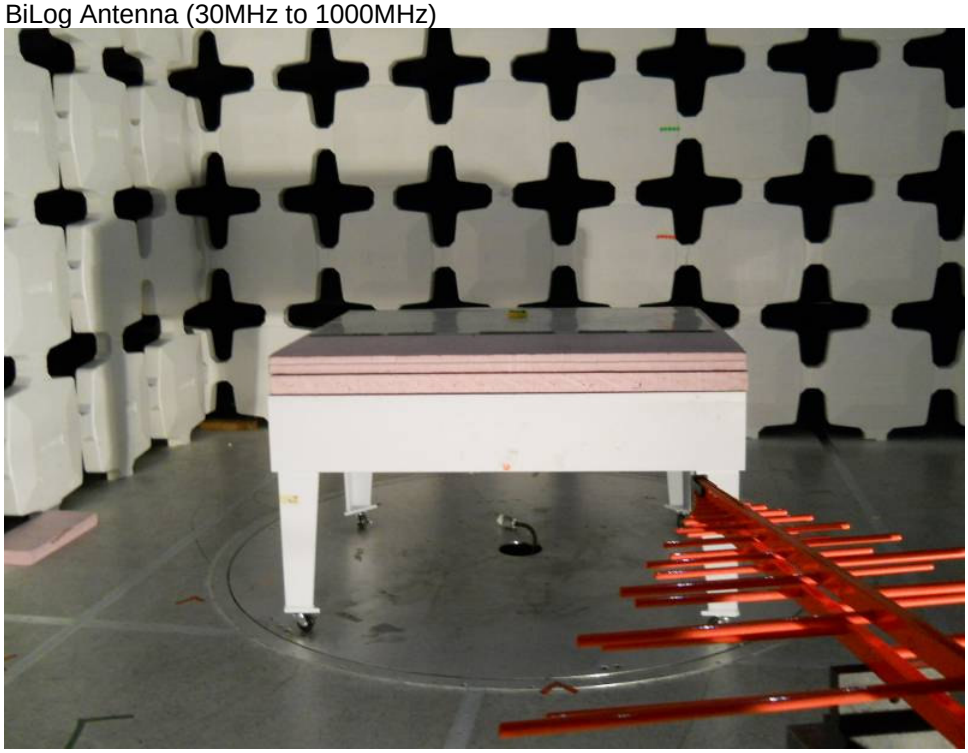
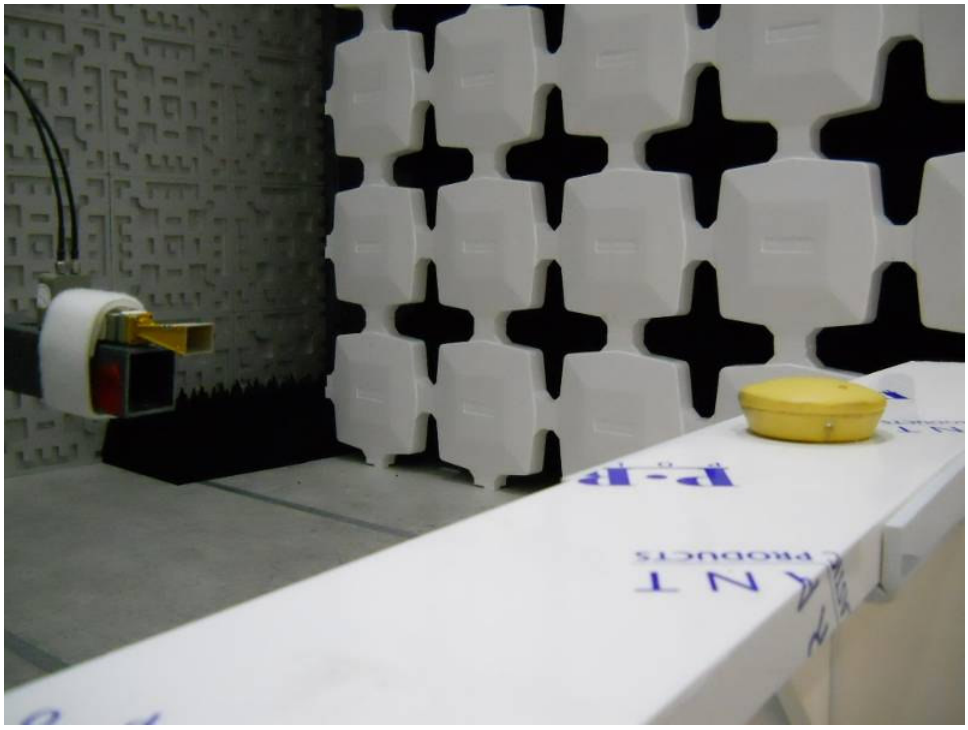


Photo: Antenna Setups

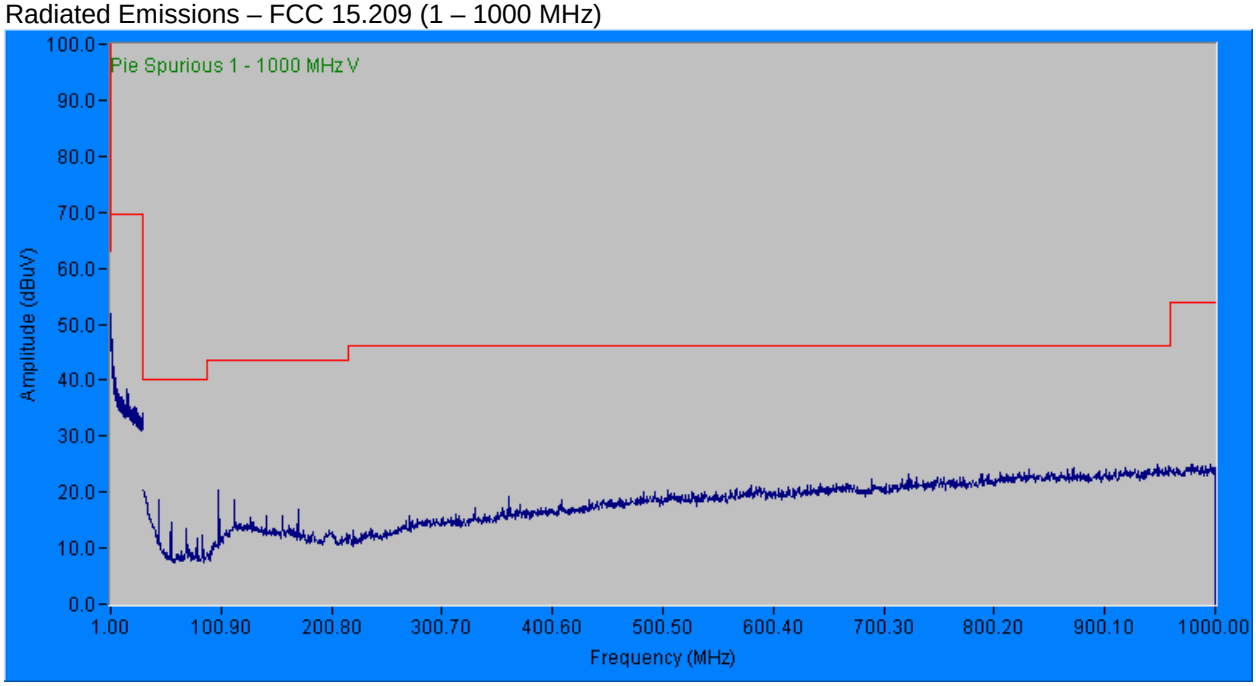
Horn (1GHz – 18GHz)

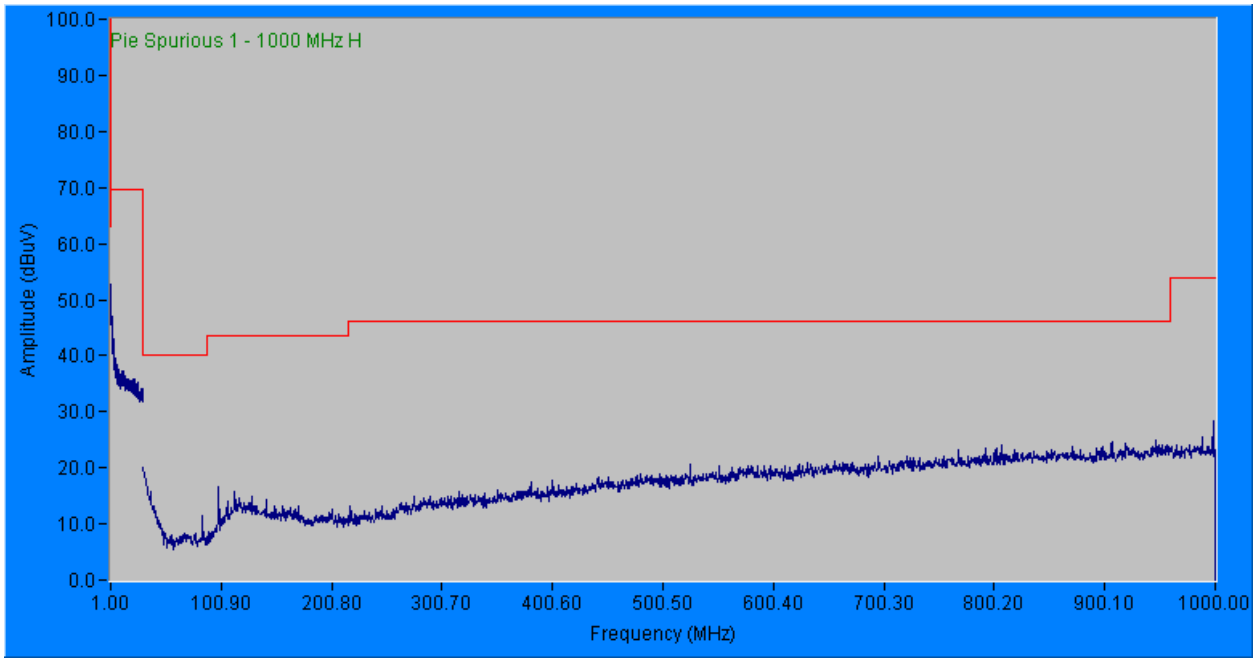
HF Active Antenna/Harmonic Mixer (18GHz – 26.5GHz)



6.5 Plots: Pre-Scan Peak Measurements – Not Final Data

Radiated Emissions – FCC 15.209 (1 – 1000 MHz)

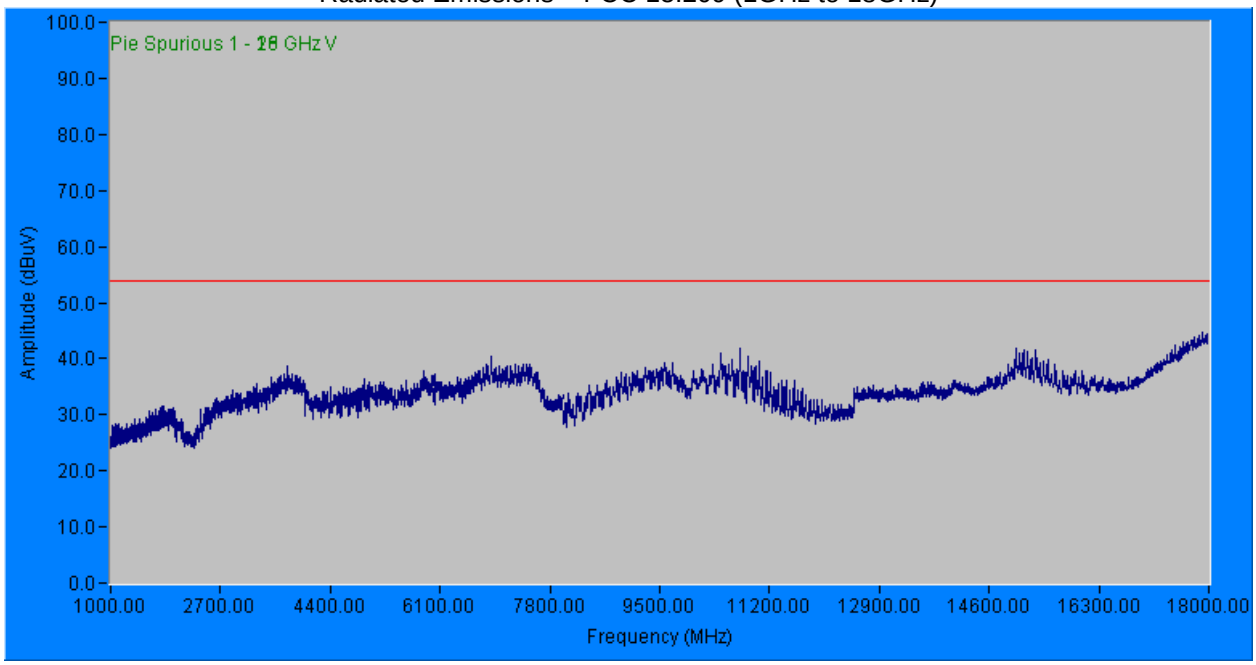


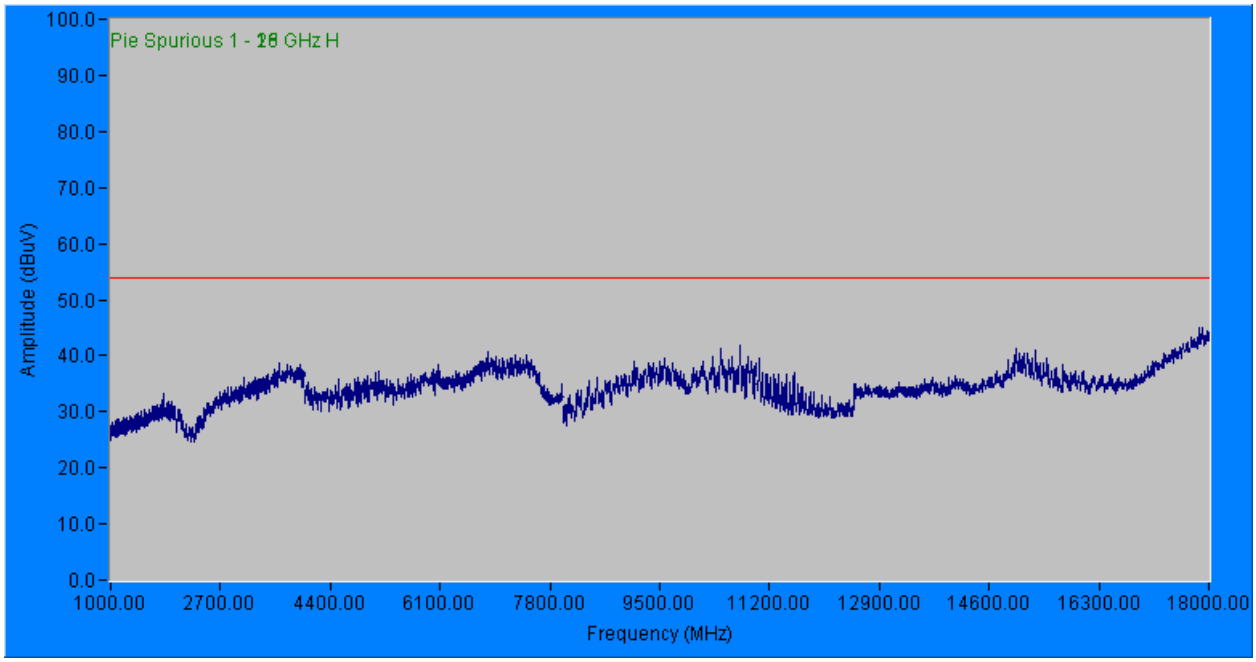


Note: Peak measurements plotted against FCC 15.209 Quasi-Peak Limit

Plots: Pre-Scan Peak Measurements - Not Final Data

Radiated Emissions – FCC 15.209 (1GHz to 18GHz)

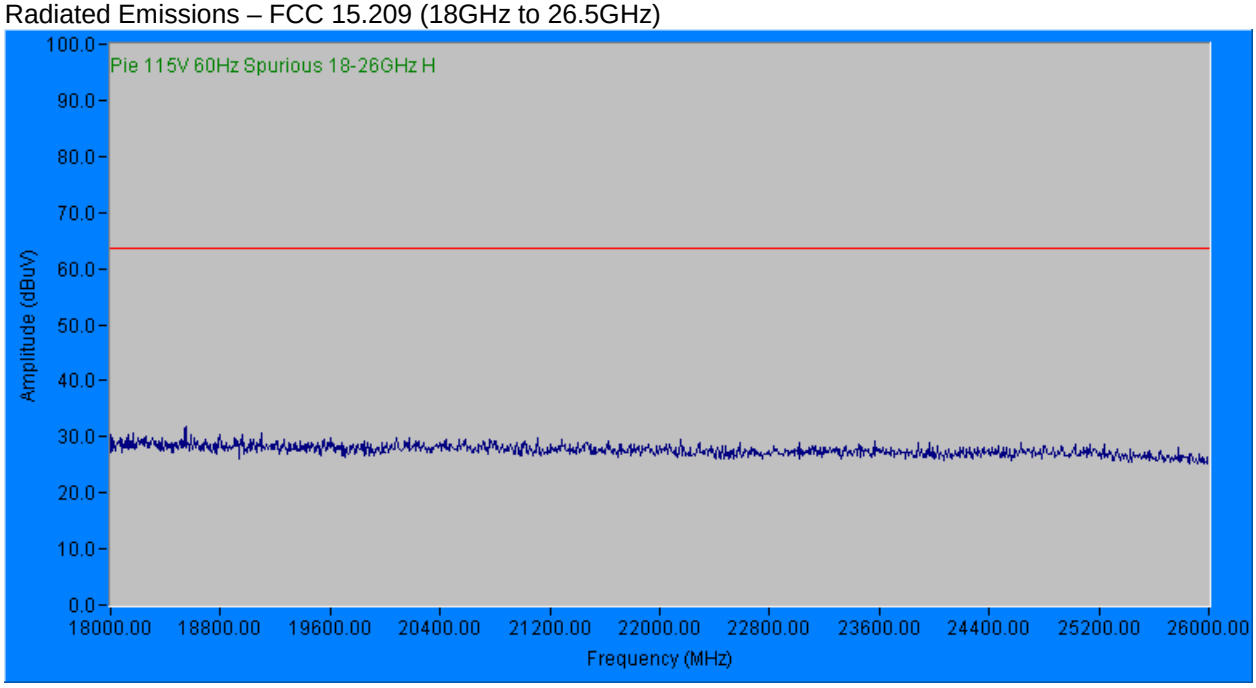


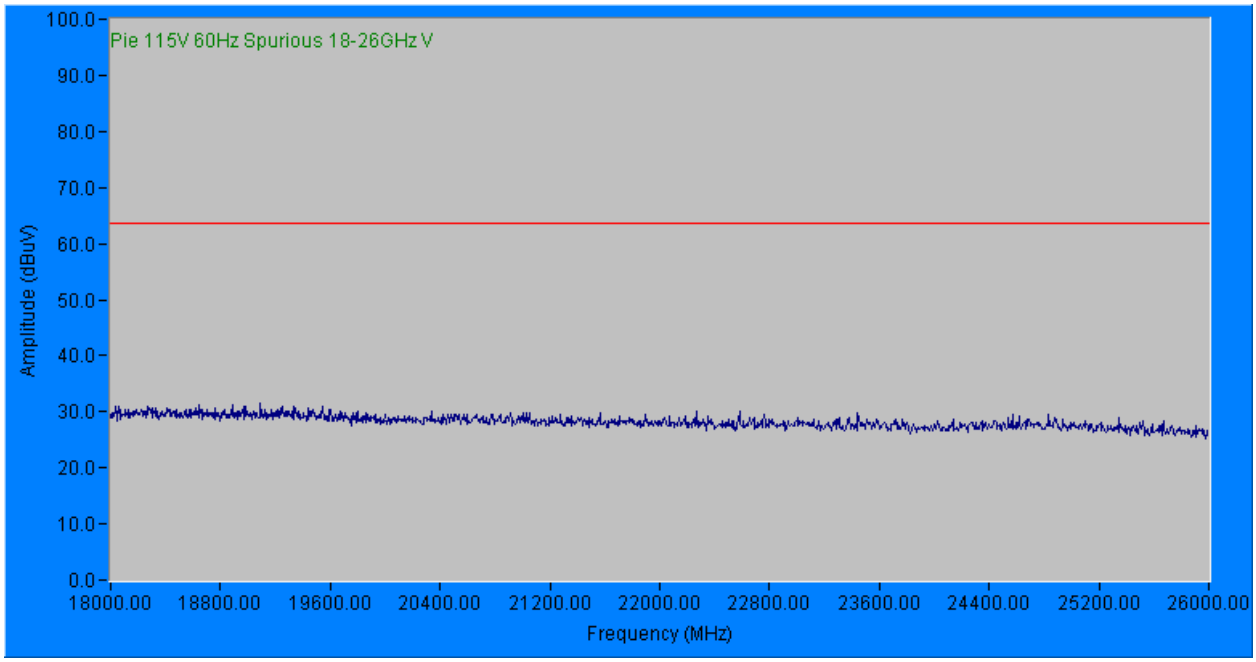


Note: Peak measurements plotted against FCC 15.209 Average Limit

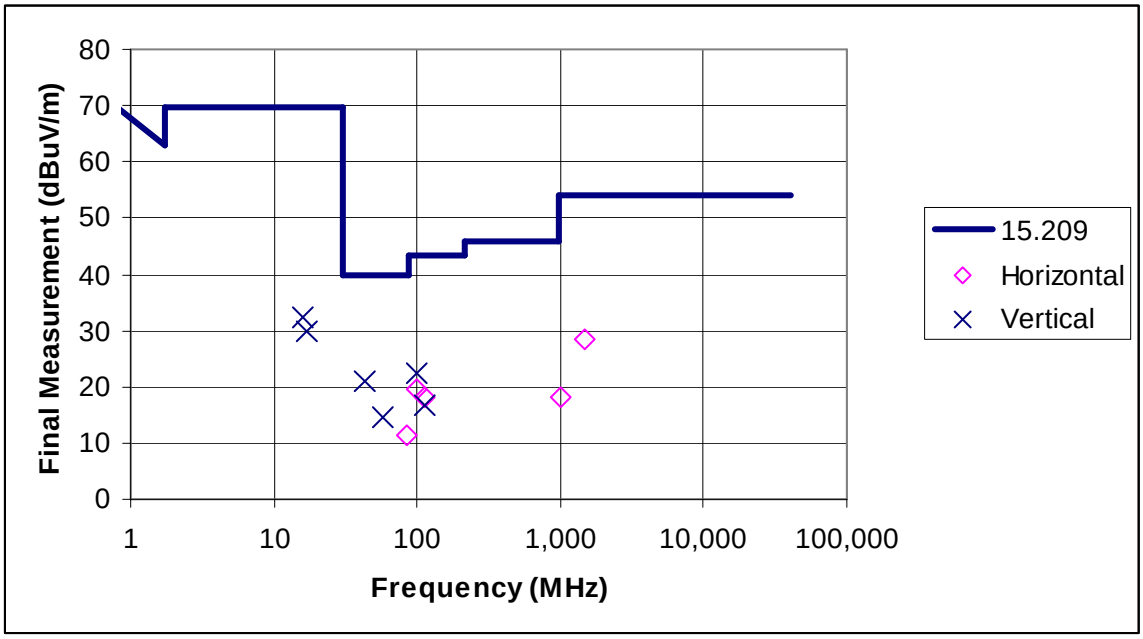
Plots: Pre-Scan Peak Measurements - Not Final Data

Radiated Emissions – FCC 15.209 (18GHz to 26.5GHz)





6.6 Plots: Final Peak Measurements



Test Data:

Radiated Electromagnetic Emissions

Test Report #:	**100521432 Run 3**	Test Area:	CC1 Radiated	Temperature:	22.1	°C
Test Method:	FCC Part 15.209	Test Date:	25-Oct-2011	Relative Humidity:	22.2	%
EUT Model #:	QM 20100	EUT Power:	Li-Ion	Air Pressure:	83.55	kPa
EUT Serial #:	1					
Manufacturer:	Handi Quilter					
EUT Description:						
Notes:	Pie					

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

FREQ	LEVEL	CABLE / ANT / PREAMP	FINAL	POL / HGT / AZ	DELTA1 (dB)
(MHz)	(dBuV)	(dB) (dB\m) (dB)	(dBuV)	(m) (DEG)	15.209 <1GHz
85.88	30.9 Qp	0.8 / 7.7 / 28.0	11.4	H / 1.9 / 0.0	-28.6
100.22	36.1 Qp	0.8 / 10.5 / 28.0	19.5	H / 1.8 / 112.5	-24
114.54	31.9 Qp	0.8 / 13.4 / 27.9	18.1	H / 1.6 / 21.5	-25.4
998.06	20.9 Qp	2.2 / 22.2 / 27.3	18	H / 1.0 / 0.0	-36
1500	35.8 Pk	2.7 / 26.6 / 36.6	28.5	H / 1.0 / 0.0	-25.5
15.87	21.4 Qp	0.3 / 10.6 / 0.0	32.3	Perp / 1.0 / 0.0	-37.2
17.09	19.0 Qp	0.3 / 10.5 / 0.0	29.8	Perp / 1.0 / 0.0	-39.7
42.95	36.5 Qp	0.8 / 11.8 / 28.2	21	V / 1.0 / 236.8	-19
57.26	34.5 Qp	0.8 / 7.6 / 28.2	14.7	V / 1.0 / 0.0	-25.3
100.19	39.1 Qp	0.8 / 10.5 / 28.0	22.4	V / 1.0 / 0.0	-21.1
114.5	30.4 Qp	0.8 / 13.4 / 27.9	16.7	V / 1.0 / 0.0	-26.8

********** Measurement Summary **********					
FREQ	LEVEL	CABLE / ANT / PREAMP	FINAL	POL / HGT / AZ	DELTA1 (dB)
(MHz)	(dBuV)	(dB) (dB\m) (dB)	(dBuV)	(m) (DEG)	15.209
42.95	36.5 Qp	0.8 / 11.8 / 28.2	21	V / 1.0 / 236.8	-19
100.19	39.1 Qp	0.8 / 10.5 / 28.0	22.4	V / 1.0 / 0.0	-21.1
100.22	36.1 Qp	0.8 / 10.5 / 28.0	19.5	H / 1.8 / 112.5	-24
57.26	34.5 Qp	0.8 / 7.6 / 28.2	14.7	V / 1.0 / 0.0	-25.3
114.54	31.9 Qp	0.8 / 13.4 / 27.9	18.1	H / 1.6 / 21.5	-25.4
1500	35.8 Pk	2.7 / 26.6 / 36.6	28.5	H / 1.0 / 0.0	-25.5
114.5	30.4 Qp	0.8 / 13.4 / 27.9	16.7	V / 1.0 / 0.0	-26.8
85.88	30.9 Qp	0.8 / 7.7 / 28.0	11.4	H / 1.9 / 0.0	-28.6
998.06	20.9 Qp	2.2 / 22.2 / 27.3	18	H / 1.0 / 0.0	-36
15.87	21.4 Qp	0.3 / 10.6 / 0.0	32.3	Perp / 1.0 / 0.0	-37.2
17.09	19.0 Qp	0.3 / 10.5 / 0.0	29.8	Perp / 1.0 / 0.0	-39.7

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. Measurements made with a RBW=1MHz and VBW=1MHz.
2. Measurements at frequencies > 1000 MHz were taken using a peak detector and were found to be compliant to the average limit. No duty cycle correction is applicable to this product.
3. Measurements made >18GHz were made at a test distance of 1m and the measurement data was extrapolated to 3m. The FCC limits were not changed.
4. The device is designed to be used while placed under the quilting material and determine the motion of the material as the quilting machine is being used. Therefore the device was tested as positioned on the table as shown in the setup pictures. No other configurations were tested.

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 15.249 & 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
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	12/10/2010	12/10/2011
18880	Q.P Adapter	Hewlett-Packard	85650A	2811A01300	12/06/2010	12/06/2011
18887	Horn Antenna 1-18GHz	EMCO	3115	9205-3886	12/09/2010	12/09/2011
18906	Pre-Amplifier (1-4 GHz)	Mini-Circuits Lab	ZHL-42	N052792-2	06/03/2011	06/03/2012
SW-6	Software application for Radiated and Conducted Emissions	Intertek	OATS_CVI	V.1.0	01/01/2011	01/01/2012

7.3 Results:

The sample tested was found to comply with the requirements of:

- FCC 15.209/ 15.249(d)
- Covers RSS-210 A2.9, & RSS-GEN 7.2.2

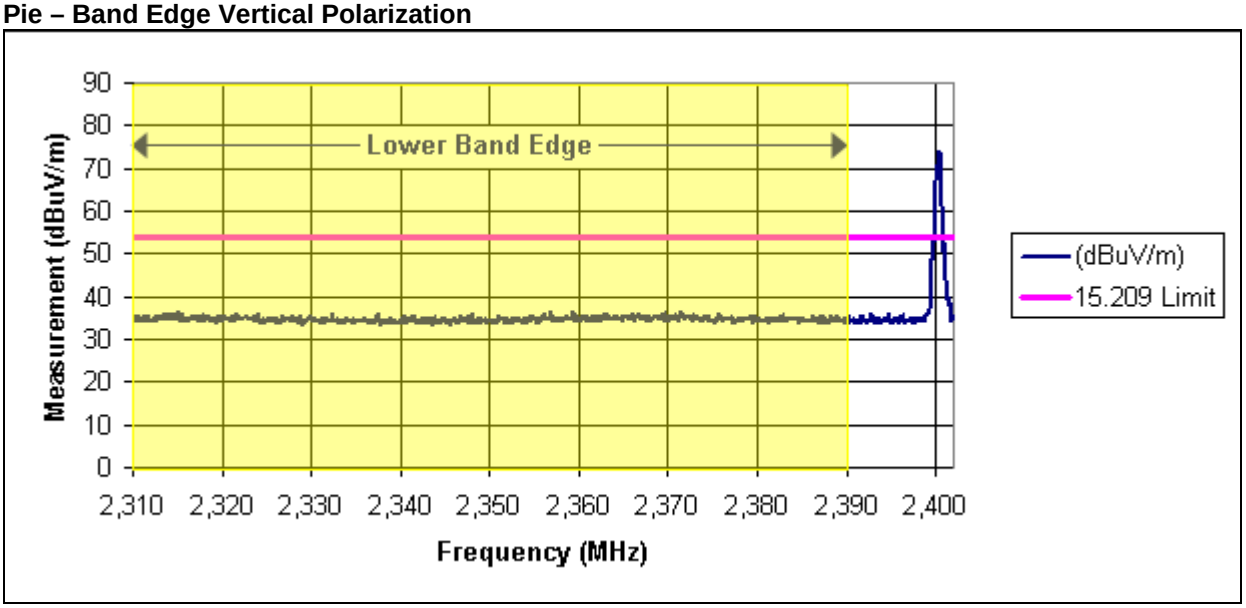
7.4 Setup Photographs:

Test setup – Field Strength Measurements (Front View)

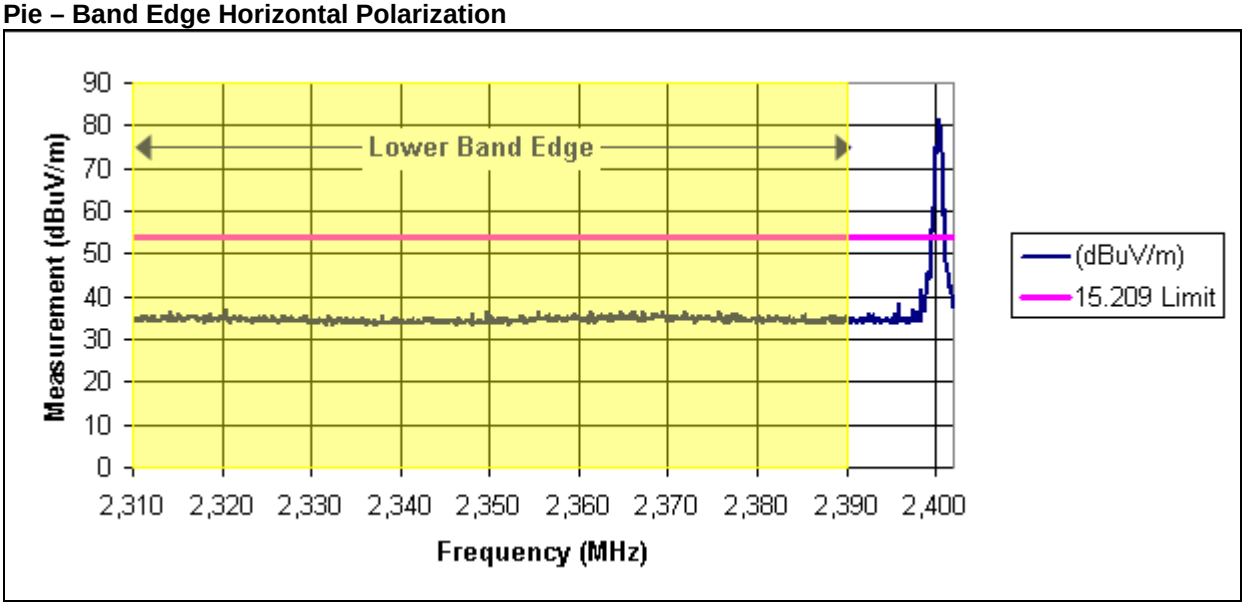
7.5 Band Edge Plot – Low Channel

FCC 15.247(d) / 15.205/209/ RSS-210 A8.5

Pie – Band Edge Vertical Polarization



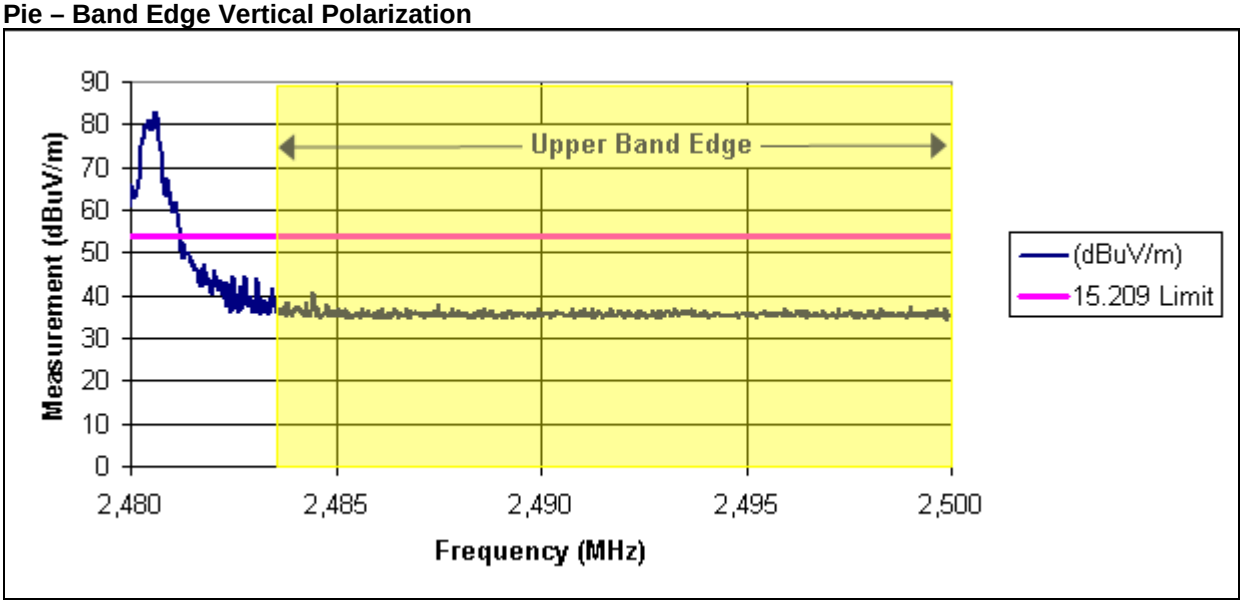
Pie – Band Edge Horizontal Polarization



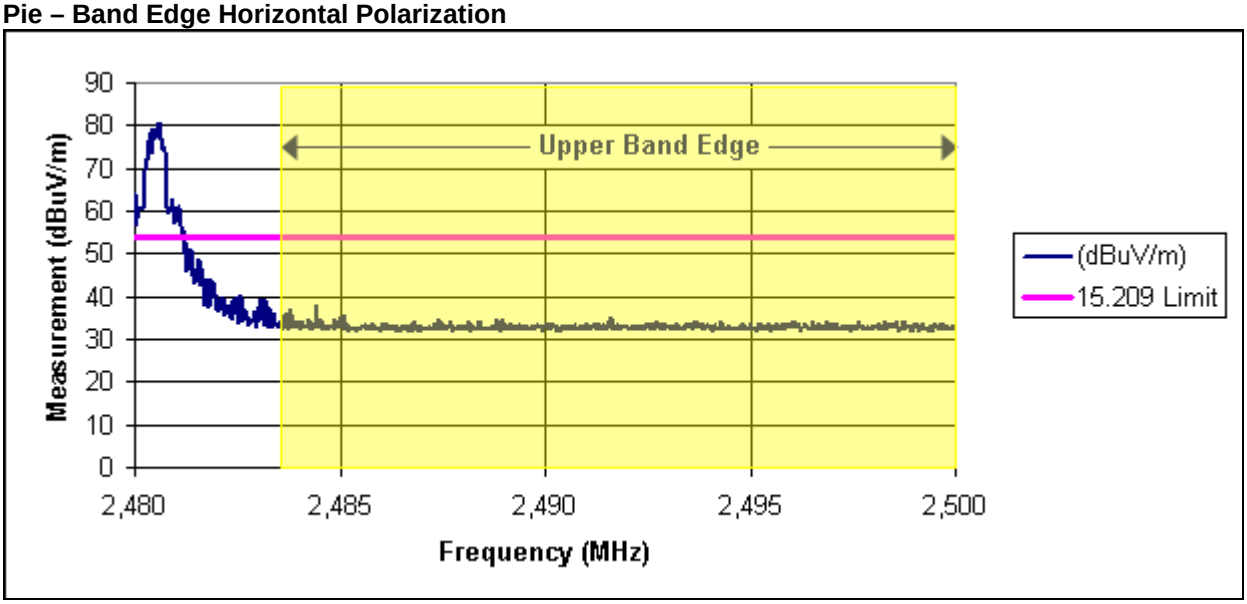
7.6 Band Edge Plot – High Channel

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

Pie – Band Edge Vertical Polarization



Pie – Band Edge Horizontal Polarization



7.7 Test Data: Band Edge

Radiated Electromagnetic Emissions

Test Report #:	**100521432 Run 09**	Test Area:	CC1 Radiated	Temperature:	22.7	°C
Test Method:	FCC Part 15.209	Test Date:	27-Oct-2011	Relative Humidity:	20.5	%
EUT Model #:	QM 20100	EUT Power:	Li-Ion	Air Pressure:	83.74	kPa
EUT Serial #:	1					
Manufacturer:	Handi Quilter					
EUT Description:	Band Edge Measurements					
Notes:	Pie					

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

FREQ	LEVEL	CABLE / ANT / PREAMP	FINAL	POL / HGT / AZ	DELTA1 (dB)
(MHz)	(dBuV)	(dB) (dB\m) (dB)	(dBuV)	(m) (DEG)	15.209 >1GHz
Lower Band Edge					
Pie – Band Edge Measurement					
2390.00	38.5 Pk	3.5 / 29.4 / 37.4	34.0	V / 1.0 / 0.0	-20.0
2390.00	37.2 Pk	3.5 / 29.4 / 37.4	32.7	H / 1.0 / 0.0	-21.3
Upper Band Edge					
Pie – Band Edge Measurement					
2483.50	37.4 Pk	3.6 / 29.8 / 37.5	33.3	V / 1.0 / 0.0	-20.7
2483.50	37.0 Pk	3.6 / 29.8 / 37.5	32.9	H / 1.0 / 0.0	-21.1
2483.10	38.0 Pk	3.6 / 29.8 / 37.5	33.9	H / 1.0 / 0.0	-20.1
2483.44	39.3 Pk	3.6 / 29.8 / 37.5	35.2	H / 1.0 / 0.0	-18.8

FREQ	LEVEL	CABLE / ANT / PREAMP	FINAL	POL / HGT / AZ	DELTA1 (dB)
(MHz)	(dBuV)	(dB) (dB\m) (dB)	(dBuV)	(m) (DEG)	15.209 >1GHz
********** **Measurement Summary** **********					
2483.44	39.3 Pk	3.6 / 29.8 / 37.5	35.2	H / 1.0 / 0.0	-18.8
2390.00	38.5 Pk	3.5 / 29.4 / 37.4	34.0	V / 1.0 / 0.0	-20.0
2483.10	38.0 Pk	3.6 / 29.8 / 37.5	33.9	H / 1.0 / 0.0	-20.1
2483.50	39.4 Pk	3.6 / 29.8 / 37.5	35.3	V / 1.0 / 0.0	-20.7

Notes:

1) All measurements are Radiated Field Strength peak measurements taken at 3-meter product-to-antenna.
2) Measurements at frequencies > 1000 MHz were taken using a peak detector and were found to be compliant to the average limit. No duty cycle correction is applicable to this product.
3) RBW = 100 kHz, VBW = 3*RBW = 300 kHz.

Deviations, Additions, or Exclusions: None

8 Unintentional Radiated Emissions - Receiver

8.1 Method

The test methods used comply with ANSI C63.4 and CISPR 16. Unless otherwise stated no deviations were made from **FCC CFR47 15.249(d)/15.209/15.109/RSS-GEN Section 6.**

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	12/10/2010	12/10/2011
18880	Q.P Adapter	Hewlett-Packard	85650A	2811A01300	12/06/2010	12/06/2011
18913	Spectrum Analyzer	Hewlett-Packard	E7405A	My44211889	06/28/2011	06/28/2012
18906	RF Pre-Amplifier (1-4 GHz)	Mini-Circuits Lab	ZHL-42	N052792-2	06/03/2011	06/03/2012
18900	RF Pre-Amplifier (4-8 GHz)	Avantek	AFT97-8434-10F	1007	06/03/2011	06/03/2012
18887	Horn Antenna 1-18GHz	EMCO	3115	9205-3886	12/09/2010	12/09/2011
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 with the requirements of:

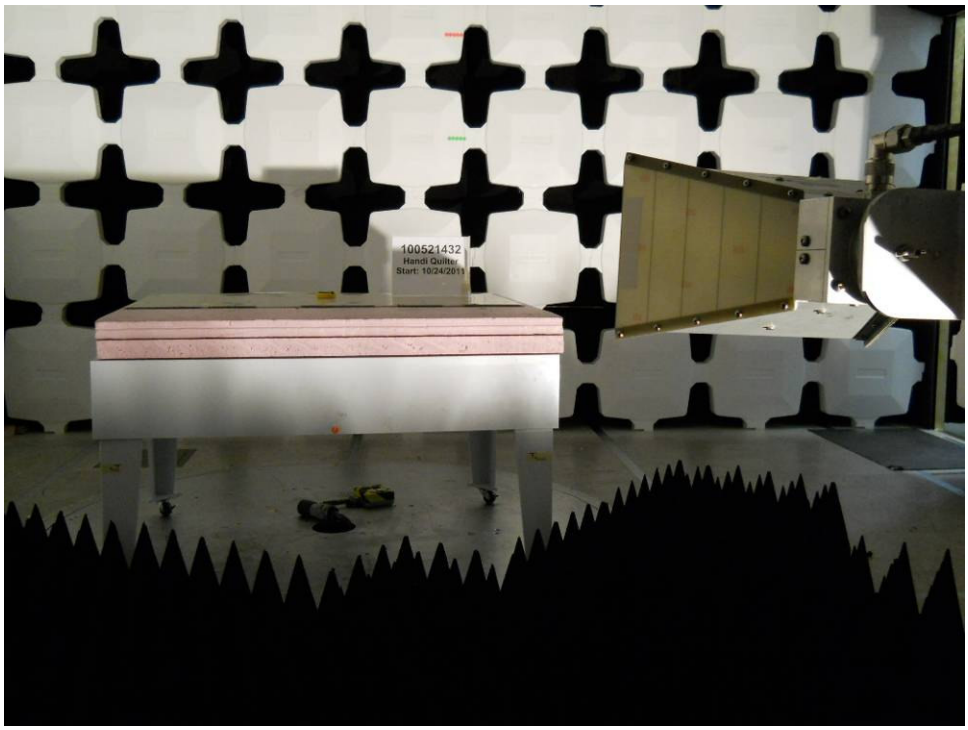
- **FCC 15.209/15.109**
- **RSS-GEN Section 6**

8.4 Setup Photographs:

Test setup – Field Strength Measurements (Front View)

Photo: Antenna Setup

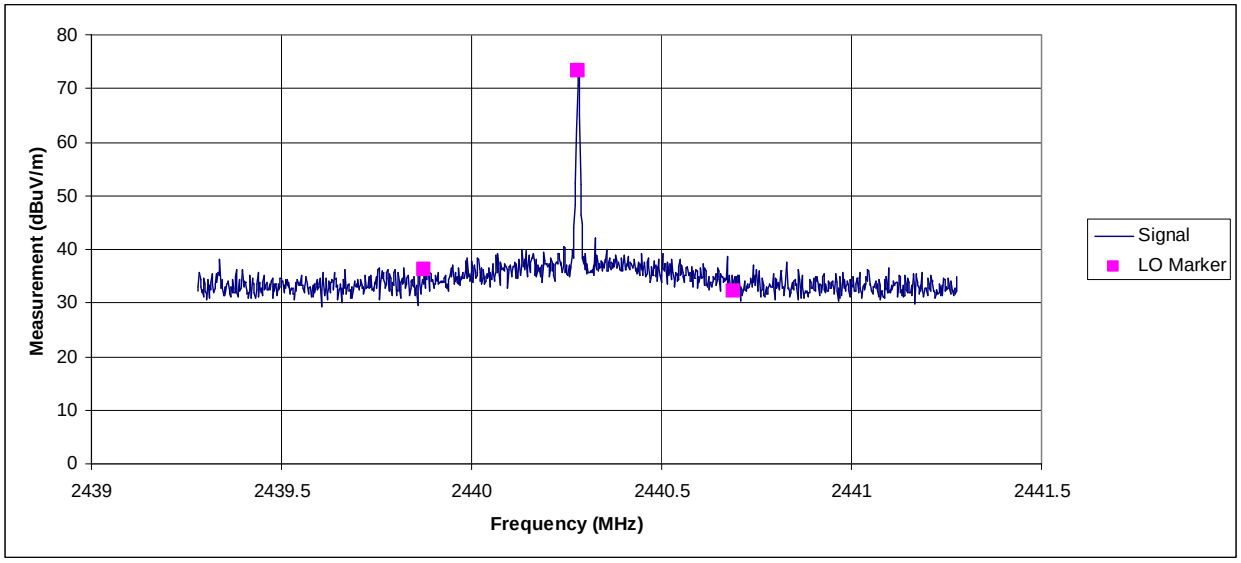
Horn (1GHz – 18GHz)



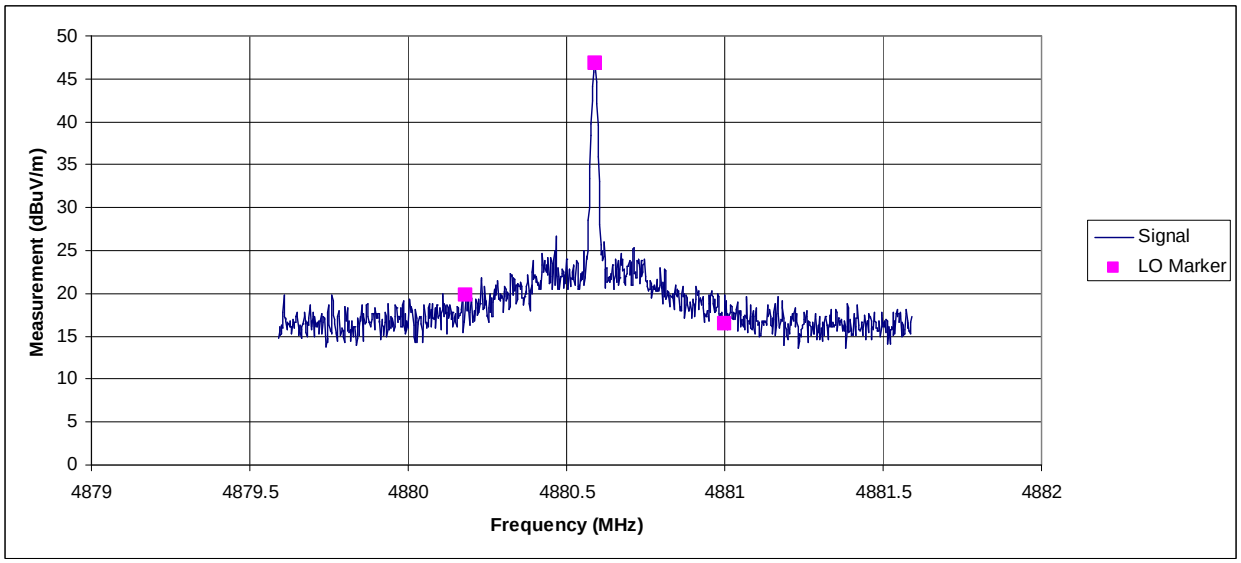
8.5 Test Data: 30MHz to 18GHz

The Local Oscillator frequency is 406.25 kHz.
RBW 10 kHz, VBW = 30 kHz
A radiated LO signal could not be measured.

Pie Fundamental



Pie 2nd Harmonic



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) All measurements taken a 3-meter test distance.

(2) The LO (above 1GHz) measurement was taken with a peak detector but was too low to be measured

(3) Measurements made with a RBW=1MHz and VBW=1MHz.

(4) The device is designed to be used while placed under the quilting material and determine the motion of the material as the quilting machine is being used. Therefore the device was tested as positioned on the table as shown in the setup pictures. No other configurations were tested.

Deviations, Additions, or Exclusions: None

9 Occupied Bandwidth (OBW)

9.1 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.
.

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	06/28/2011	06/28/2012
18887	Horn Antenna 1-18GHz	EMCO	3115	9205-3886	12/09/2010	12/09/2011

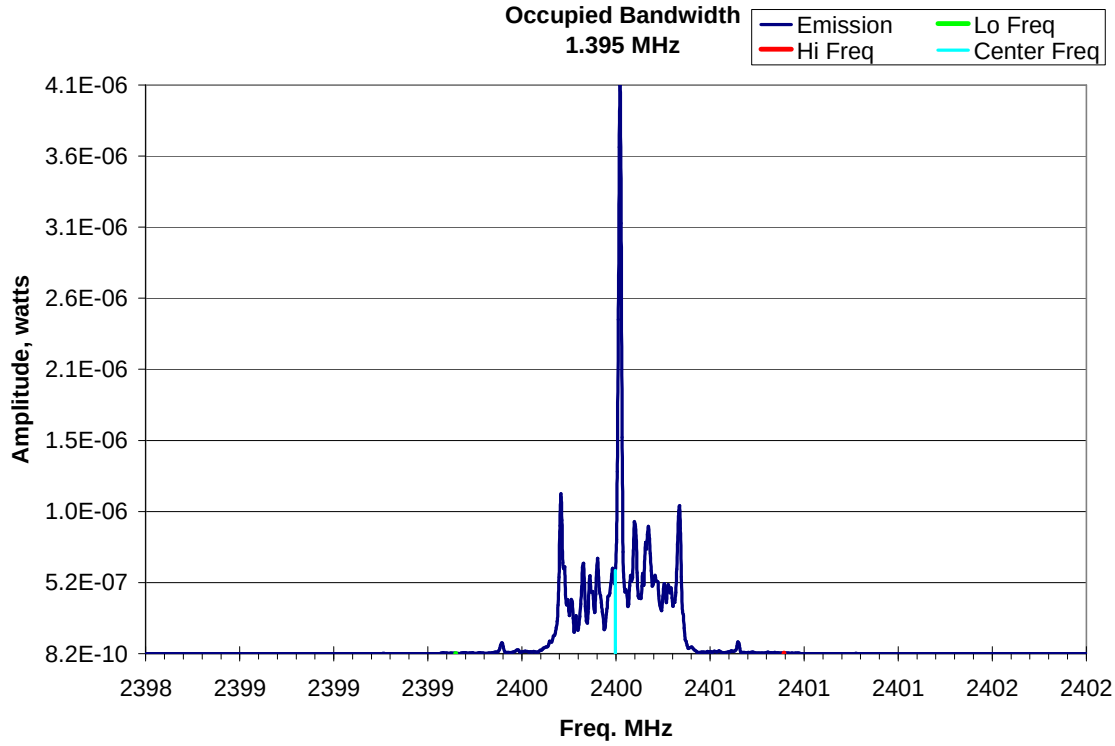
9.3 Results:

The sample tested was found to comply with the requirements of:

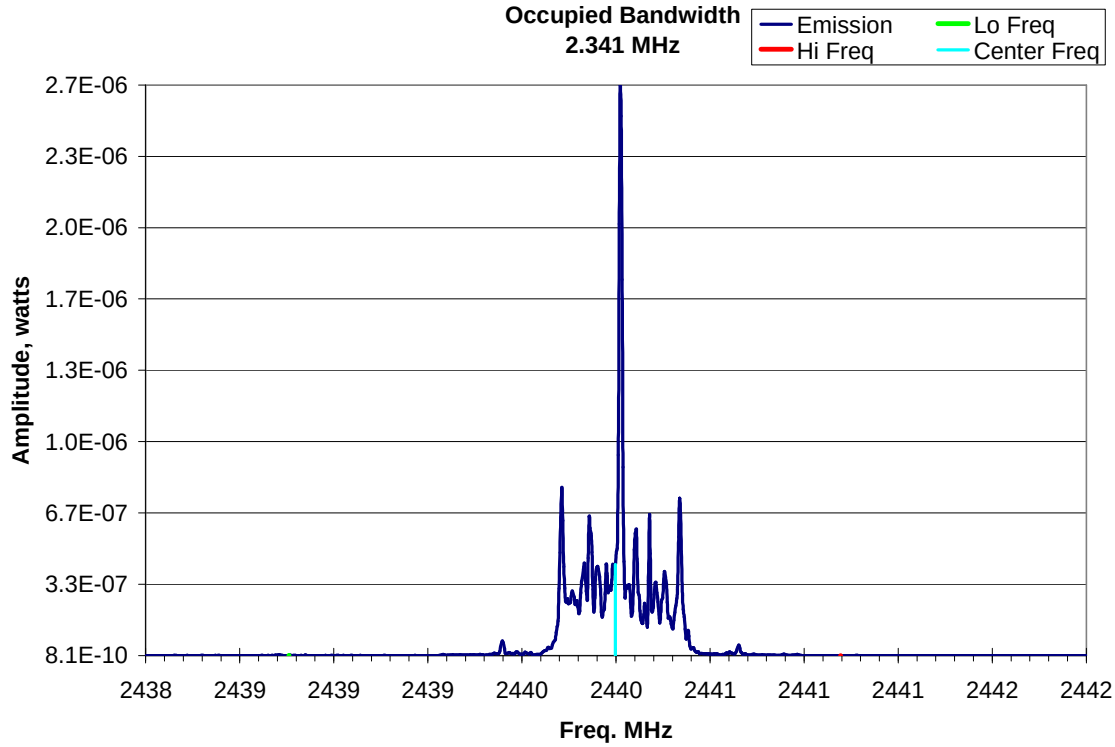
- RSS-GEN, Section 4.6.1

9.4 Test Data:

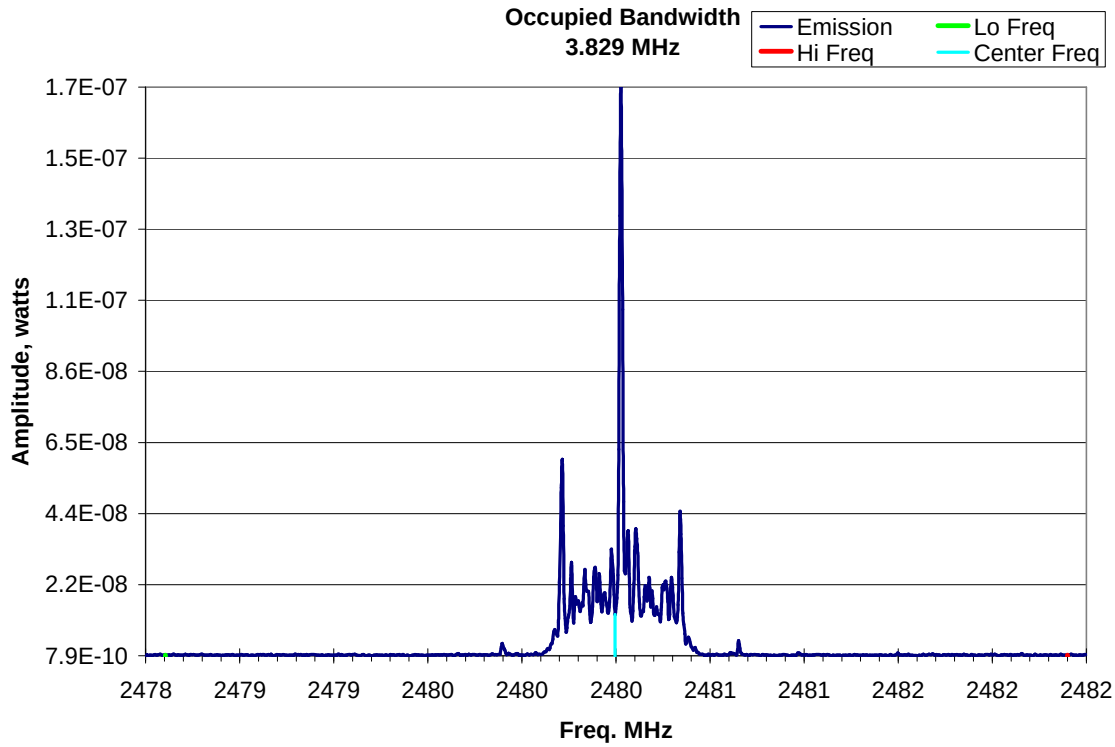
Low Channel



Mid Channel



High Channel



Notes:

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

(2) Worst-case Occupied Bandwidth (OBW): High Channel – 3.829 MHz

(3) RBW = 100 kHz, VBW = 3*RBW = 300 kHz.

Deviations, Additions, or Exclusions: None

10 AC Mains Conducted Emissions – Not necessary, battery operated.

11 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, 9kHz to 30 MHz	3.14 dB	

12 Duty Cycle Correction Factor

No duty cycle correction factor was applied during this testing – therefore, no product Duty Cycle verification was applicable.

Appendix A: Modifications required - None

13 Revision History

Revision Level	Date	Report Number	Notes
0	11/30/2011	100521432DEN-004 Pie	Original Issue