

Electromagnetic Compatibility

Test Report

FCC CFR47, PART 15, SUBPART C Section 15.231,15.205

& RSS 210 issue 8, Annex 1

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Testing Laboratory.....: Quality Auditing Institute

Address.....: 16 – 211 Schoolhouse Street, Coquitlam, BC, V3K 4X9, Canada

Accreditations (ISO 17025):



Standard Council of Canada: Accredited Laboratory No. 743

International Accreditation Service Inc: Accredited Laboratory: No. TL-239

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Applicant's name: Pacific Energy Fireplace Products

Address.....: 2975 Allenby Rd. Duncan, BC V9L 6V8

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Phone.....: (250)748-1184

Test Standard.....: FCC CFR47, Part 15, Subpart C Section 15.231,15.205
 & RSS 210 issue 8, Annex 1

Test item description.....: Interface Board 5003.325

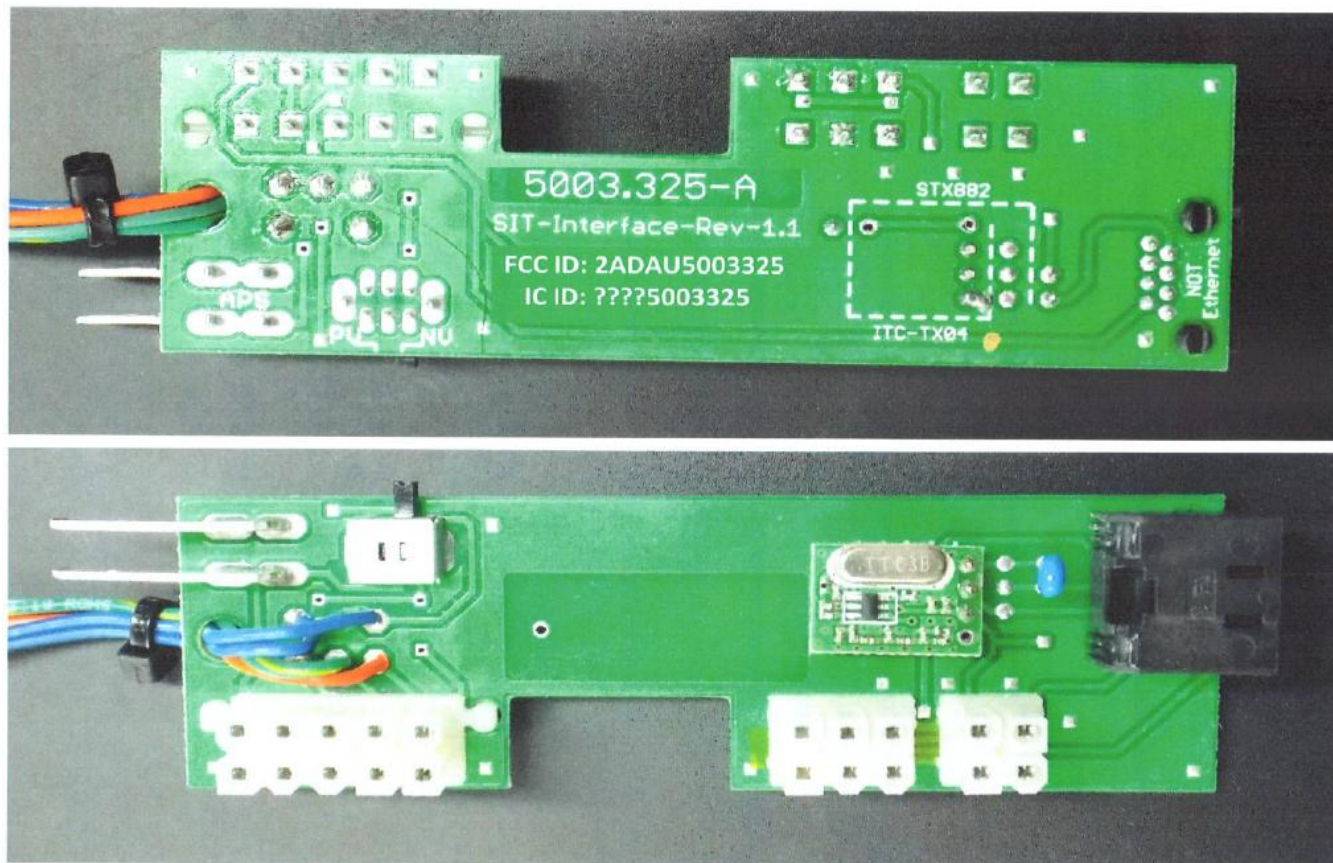


Manufacturer.....: Pacific Energy Fireplace Products

Model Number: 5003.325

FCC ID: 2ADAU5003325

IC Certification No.: 12377A-5003325



Interface Board 5003.325 (EUT)

Revision History

Date	Report Number	Rev #	Details	Authors Initials
Sep-22-2014	E10657-1401	0.0	Draft Test Report	JQ
Oct-03-2014	E10657-1401	1.0	Final Test Report	JQ
Oct-16-2014	E10657-1401	2.0	Final Test Report with all the changes as per the TCB response.	AJ
All previous versions of this Report have been superseded by the latest dated Revision as listed in the above table. Please dispose of all previous electronic and paper printed revisions accordingly.				

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Section I: GENERAL TEST INFORMATION

EMC TEST SUMMARY

The following tests demonstrate the testimony to "FCC & IC" Mark Electromagnetic compatibility testing for "Interface Board 5003.325" manufactured by Pacific Energy Fireplace Products. The testing was performed pursuant to FCC CFR47, Part 15, Subpart C Section 15.231, 15.205 & RSS 210 issue 8, Annex 1

Test Item	Applicable Standard	Description	Performance Criteria
AC Mains Conducted Emissions	FCC CFR47, Part 15, Subpart C Section 15.231,15.205 & RSS 210 issue 8, Annex 1	The conducted emissions are measured on the phase and Neutral Power lines in the 0.15 - 30.0 MHz range.	Complies
Radiated Emissions	FCC CFR47, Part 15, Subpart C Section 15.231,15.205 & RSS 210 issue 8, Annex 1	The radiated emissions are measured in the 30MHz-3.5GHz range	Complies
Spurious Radiated Emissions	FCC CFR47, Part 15, Subpart C Section 15.231,15.205 & RSS 210 issue 8, Annex 1	The radiated emissions are measured in the 30MHz-3.5GHz range	Complies
Occupied Bandwidth	FCC CFR 47 Part 15.231(C)-(20dB OBW) RSS-210 Issue 8 A1.1.3 (99%OBW)	Occupied bandwidth shall be no wider than 0.25% of the centre frequency for devices operating between 70 MHz and 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the centre frequency	Complies
Activation Less than 5 secs	FCC CFR 47 Part 15.231(a)(2) RSS-210 issue 8 A1.1.1(b)	A transmitter activated automatically shall cease transmissions within 5secs after activation.	Complies
Automatic Transmissions does not exceed 2 seconds per hour for each transmitter	FCC CFR 47 Part 15.231(a)(3) RSS-210 issue 8 A1.1.1(c)	Periodic transmissions at regular predetermined intervals are not permitted, except as provided in this Section. However, polling or supervision transmissions to determine system integrity of transmitters used in security or safety applications are allowed if the total duration of transmission does not exceed 2 seconds per hour for each transmitter.	Complies

Tests were conducted on a sample of the equipment as requested by Pacific Energy Fireplace Products for the purpose of demonstrating compliance with FCC CFR47, Part 15, Subpart C Section 15.231,15.205 & RSS 210 issue 8, Annex 1. Pacific Energy Fireplace Products is responsible for the tested product configuration, continued product compliance with these standards listed, and for the appropriate auditing of subsequent products, as required. Please note that this list of tests may only comprise a partial list of the tests that are required before a FCC or IC label can be produced by the manufacturer.

This is to certify that the following report is true and correct to the best of our knowledge.

X

Tested By Rajinder Atwal,
RF/EMC Test Engineer

X

Reviewed By Aman Jathaul,
EMC Project Manager

PRODUCT DESCRIPTION

Applicant: Pacific Energy Fireplace Products
 Equipment Under Test: Interface Board 5003.325
 Trade Name: Interface Board 5003.325
 Model Number: 5003.325
 Date of Test: Aug 13 2014, Aug 28 2014

EUT DESCRIPTION

EUT	Interface Board 5003.325
Operational Description	The device in question is an interface board intended to convert both digital and analog signals from a separate controller into RF signals which will be broadcast over a short range(less than 12 inches) to a separate fireplace control module. This device is located inside of the control enclosure of the fireplace and is not visible or serviceable by the end consumer. It may however, be replaced by an authorized service technician in the event of its failure.
FRN	0023966112
FCC ID	2ADAU5003325
Manufacturer	Pacific Energy Fireplace Products
Model/Type	5003.325
Transmitter Type	Short range device
Transmitter Frequency	315 MHz
Transmit Power	45.2 dBμV/m @ 3m
Number of Channels	N/A
Antenna	No Antenna – short range device
EUT Power	3Vdc
Received Date	Aug 26 2014
Received By	Aman
Sample Log	QAI Product Control Log (QM 1305 - Sample Inventory)

FACILITIES AND ACCREDITATION

Main Laboratory Headquarters: Quality Auditing Institute
Headquarters Location/Address: 16 – 211 Schoolhouse Street, Coquitlam, BC, 3K 4X9, Canada
Associated Laboratory: Quality Auditing Institute (Remote Location)
EMC Test Laboratory Location/Address: 19473 Fraser Way, Pitt Meadows, BC, V3Y 2V4, Canada
FCC Test Site Registration Number: (3 m /10 m Open Area Test Site [OATS] and
3 m Semi-Anechoic Chamber [SAC]): 226383
FCC Designation Number: CA9543
Industry Canada Test Site Registration Number (3m SAC) :9543B-1
Industry Canada Test Site Registration Number (OTAS) :9543C-1
Standard Council of Canada: ISO/IEC 17025:2005 Accredited Laboratory No. 743
International Accreditation Service Inc.: ISO/IEC 17025:2005 Accredited Laboratory: No. TL-239

ENVIROMENTAL CONDITIONS:

INDOORS, Temperature: 22-28°C, R.H.: 39.7 - 54.4%

TESTING METHODOLOGY

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with FCC CFR47, Part 15, Subpart C Section 15.231,15.205 & RSS 210 issue 8, Annex 1. Radiated tests were conducted in accordance with ANSI C63.4-2003. AC Mains test were conducted emissions tests were performed in accordance with ANSI C63.4-2003. The measurements were made using a test receiver with 9 kHz bandwidth, using appropriate CISPR Quasi-Peak and Average detector.

EUT TESTING CONFIGURATION

EUT was powered up by 120Vac and set up to transmit continuously in modulated modes of operation.

WORST TEST CASE

Worst-case orientation was determined by rotating the EUT on three axis, during the pre-compliance test and final radiated emissions tests were performed in that orientation.

GENERAL TEST PROCEDURES

AC Mains Conducted Emissions

The EUT was connected to the conducted emissions LISN apparatus and powered by 120Vac/60Hz. The measurements were made using a test receiver with 9 kHz bandwidth, CISPR Quasi-Peak and Average detector.

Radiated Emissions

The EUT is placed on the turntable 0.8m above a ground plane 3m away from a receiving antenna. Height of receiving antenna varied from 1m to 4m, its polarity changes from vertical to horizontal. Turntable rotates 360 degrees. Motion of turntable and receiving antenna allows determining position of maximum emission level. Quasi-peak detector applies for measurements of emissions with frequency range of 30 to 1000MHz. and average/peak detector otherwise.

MEASUREMENT UNCERTAINTY

Radio Frequency	$\pm 1,5 \times 10^{-5}$
Total RF power, conducted.....	± 1 dB
RF power density, conducted.....	± 2.75 dB
Spurious emissions, conducted.....	± 3 dB
All emissions, radiated.....	± 3.5 dB
Temperature.....	$\pm 1^{\circ}\text{C}$
Humidity.....	± 5 %
DC and low frequency voltages.....	± 3 %

TEST EQUIPMENT LIST

Emmission Testing Equipment

Manufacturer	Model	Description	Serial No.	Last Cal	Cal Due Date
Sunol Sciences	SM46C	Turntable	051204-2	N/A	N/A
Sunol Sciences	TWR95	Mast	TREML0001	N/A	N/A
Sunol Sciences	JB3	Biconilog Antenna 30MHz – 3GHz	A042004	31-Oct-2012	31-Oct-2015
ETS Lindgren	2165	Turntable	00043677	N/A	N/A
ETS Lindgren	2125	Mast	00077487	N/A	N/A
Sunol Sciences	JB3	Biconilog Antenna 30MHz-3GHz (Prescan use only)	A042004	31-Oct-2012	31-Oct-2015
Rohde & Schwarz	ESU40	EMI Receiver	100011	26-June-2012	26-Jun-2015
FCC	FCC-LISN- 50-25-2	LISN (150kHz-30MHz)	9927	30-Nov-2012	30-Nov-2015
Sunol Sciences	JB3	Biconilog Antenna 30MHz-3GHz (Prescan use only)	A042004	31-Oct-2012	31-Oct-2015
ETS Lindgren	S201	5 meter Semi-Anechoic Chamber	1030	N/A	N/A
COM-POWER	AHA-118	Dual Ridge Horn Antenna	711040	14-Jun-2013	14-Jun-2016
AH Systems	PAM118	Amplifier 10KHz-18GHz	189	Conditional Use	Conditional Use
Electro- Mechanics	6502	Loop Antenna	2178	8/21/2014	8/21/2017

Measurement Software List

Manufacturer	Model	Version	Description
Rhode & Schwarz	EMC 32	6.20.0	Emissions Pre-scan Test Software

Section II: Requirements for the US(FCC) & Canada(IC) Market

General

Tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with FCC CFR47, Part 15, Subpart C Section 15.231, 15.205 & RSS 210 issue 8, Annex 1 - Intentional Radiators. Both Radiated and Power Line Conducted Emission were performed using measurement procedure outlined in the above standards.

Summary for FCC CFR47, Subpart C

Testing was performed pursuant to FCC CFR47, Part 15, Subpart C Section 15.231, 15.205 & RSS 210 issue 8, Annex 1

	Test	Standard	Description	Performance Criteria
Part 1	AC Mains Conducted Emissions	FCC CFR47, Part 15, Subpart C Section 15.231, 15.205 & RSS 210 issue 8, Annex 1	The conducted emissions are measured on the phase and Neutral Power lines in the 0.15 - 30.0 MHz range.	Complies
Part 2	Radiated Emissions	FCC CFR47, Part 15, Subpart C Section 15.231, 15.205 & RSS 210 issue 8, Annex 1	The radiated emissions are measured in the 30MHz-3.5GHz range	Complies
Part 3	Spurious Radiated Emissions	FCC CFR47, Part 15, Subpart C Section 15.231, 15.205 & RSS 210 issue 8, Annex 1	The radiated emissions are measured in the 30MHz-3.5GHz range	Complies
Part 4	Occupied Bandwidth	FCC CFR 47 Part 15.231(C)-(20dB OBW) RSS-210 Issue 8 A1.1.3 (99%OBW)	Occupied bandwidth shall be no wider than 0.25% of the centre frequency for devices operating between 70 MHz and 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the centre frequency	Complies
Part 5	Activation Less than 5 secs	FCC CFR 47 Part 15.231(a)(2) RSS-210 issue 8 A1.1.1(b)	A transmitter activated automatically shall cease transmissions within 5secs after activation.	Complies
Part 6	Automatic Transmissions does not exceed 2 seconds per hour for each transmitter	FCC CFR 47 Part 15.231(a)(3) RSS-210 issue 8 A1.1.1(c)	Periodic transmissions at regular predetermined intervals are not permitted, except as provided in Section A.1.1.5. However, polling or supervision transmissions to determine system integrity of transmitters used in security or safety applications are allowed if the total duration of transmission does not exceed 2 seconds per hour for each transmitter.	Complies

Part 1 - AC Mains Conducted Emissions

DATE: Aug-13-2014

TEST STANDARD: FCC CFR47, Part 15, Subpart C Section 15.231, 15.205 & RSS 210 issue 8, Annex 1

TEST VOLTAGE: 120Vac/60Hz

MINIMUM STANDARD: Limit:

Frequency (MHz)	Conducted Limit (dB μ V)	
	Quasi-Peak	Average
0.15 - 0.50	66 to 56	56 to 46
0.50 - 5	56	46
5-30	60	50
Note 1 The lower limit shall apply at the transition frequencies.		
Note 2 The limit decreases linearly with the logarithm of the frequency in the 0.15 to 0.50 MHz		

TEST SETUP: The EUT was connected to the conducted emissions LISN apparatus.

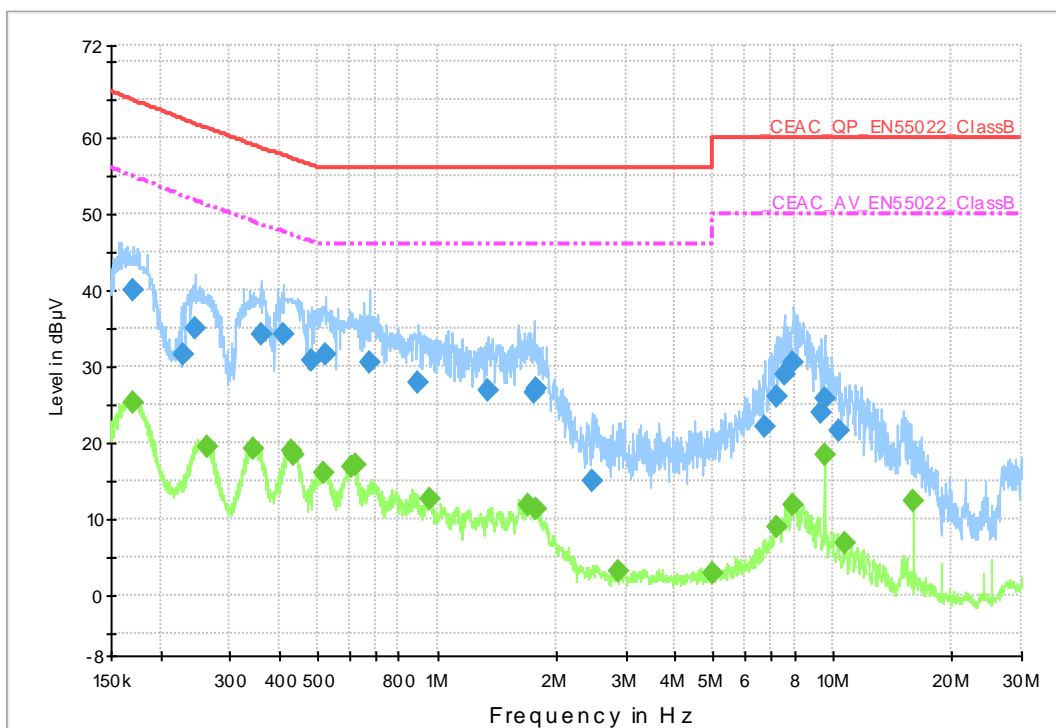
METHOD OF MEASUREMENT: Measurements were made using a test receiver with 9 kHz bandwidth, CISPR Quasi-Peak and Average detector. Measurements were performed in transmit or standby mode.

DEVICE DESCRIPTIONS: As described in the Equipment under Test Section, above.

MODIFICATIONS: No modification is required to comply for this test.

PERFORMANCE: Complies with standard.

MEASUREMENT DATA:



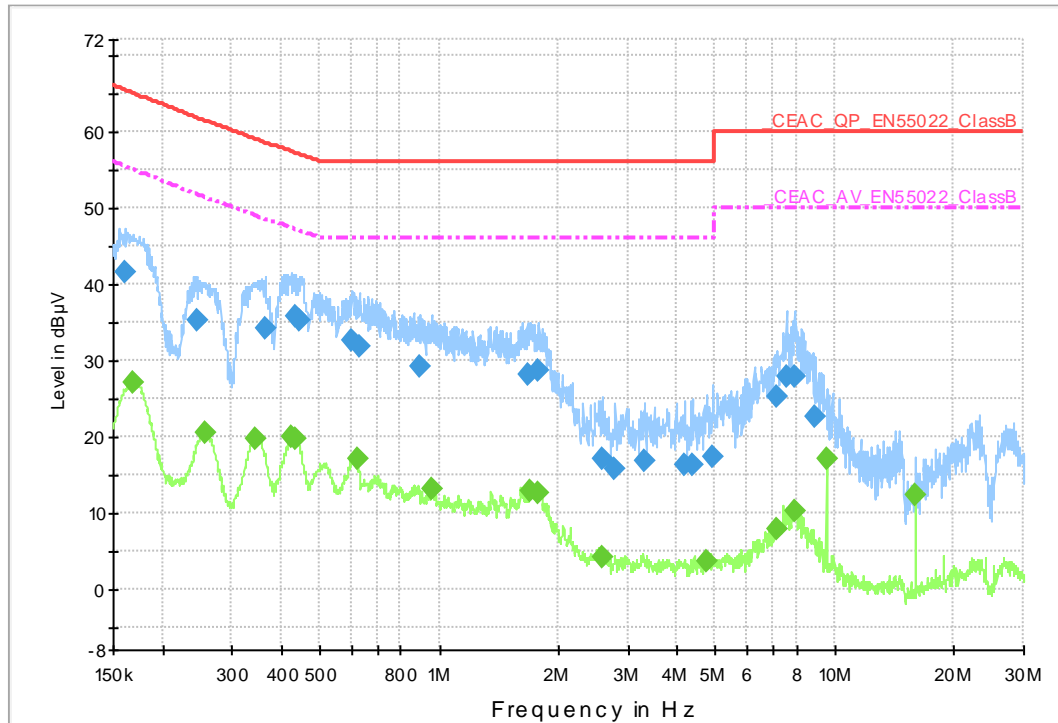
Plot 1: AC Mains Conducted Emissions FCC/ICES Class B Line 1 120Vac/60Hz - No TX

Table 1: Quasi-Peak data AC Mains Conducted Emissions FCC/ICES Class B Line 1 120Vac/60Hz- No TX

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.171144	40.0	1000.000	9.000	On	0.5	24.8	64.8
0.229570	31.5	1000.000	9.000	On	0.5	30.8	62.3
0.244728	34.8	1000.000	9.000	On	0.5	26.9	61.7
0.358441	34.0	1000.000	9.000	On	0.4	24.6	58.6
0.409784	34.1	1000.000	9.000	On	0.4	23.4	57.5
0.479850	30.8	1000.000	9.000	On	0.4	25.5	56.3
0.522898	31.5	1000.000	9.000	On	0.4	24.5	56.0
0.677986	30.4	1000.000	9.000	On	0.5	25.6	56.0
0.898607	27.8	1000.000	9.000	On	0.5	28.2	56.0
1.348085	26.8	1000.000	9.000	On	0.5	29.2	56.0
1.761943	26.5	1000.000	9.000	On	0.5	29.5	56.0
1.786759	27.1	1000.000	9.000	On	0.5	28.9	56.0
2.454899	15.0	1000.000	9.000	On	0.5	41.0	56.0
6.760339	22.1	1000.000	9.000	On	0.6	37.9	60.0
7.192301	26.0	1000.000	9.000	On	0.6	34.0	60.0
7.530529	28.9	1000.000	9.000	On	0.6	31.1	60.0
7.963824	30.4	1000.000	9.000	On	0.6	29.6	60.0
9.306876	23.9	1000.000	9.000	On	0.6	36.1	60.0
9.513687	25.7	1000.000	9.000	On	0.6	34.3	60.0
10.429514	21.5	1000.000	9.000	On	0.6	38.5	60.0

Table 2: Average data AC Mains Conducted Emissions FCC/ICES Class B Line 1 120Vac/60Hz - No TX

Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.171144	25.1	1000.000	9.000	On	0.5	29.7	54.8
0.262454	19.3	1000.000	9.000	On	0.4	31.8	51.1
0.343713	19.1	1000.000	9.000	On	0.4	29.8	48.9
0.430773	18.7	1000.000	9.000	On	0.4	28.4	47.1
0.435968	18.4	1000.000	9.000	On	0.4	28.6	47.0
0.516667	16.0	1000.000	9.000	On	0.4	30.0	46.0
0.609862	16.8	1000.000	9.000	On	0.4	29.2	46.0
0.619689	16.9	1000.000	9.000	On	0.4	29.1	46.0
0.959853	12.6	1000.000	9.000	On	0.5	33.4	46.0
1.696310	11.7	1000.000	9.000	On	0.5	34.3	46.0
1.790332	11.2	1000.000	9.000	On	0.5	34.8	46.0
2.874641	3.1	1000.000	9.000	On	0.6	42.9	46.0
4.969805	2.7	1000.000	9.000	On	0.6	43.3	46.0
7.221099	8.8	1000.000	9.000	On	0.6	41.2	50.0
7.963824	11.6	1000.000	9.000	On	0.6	38.4	50.0
9.513687	18.3	1000.000	9.000	On	0.6	31.7	50.0
10.703959	6.7	1000.000	9.000	On	0.6	43.3	50.0
15.993977	12.3	1000.000	9.000	On	0.7	37.7	50.0



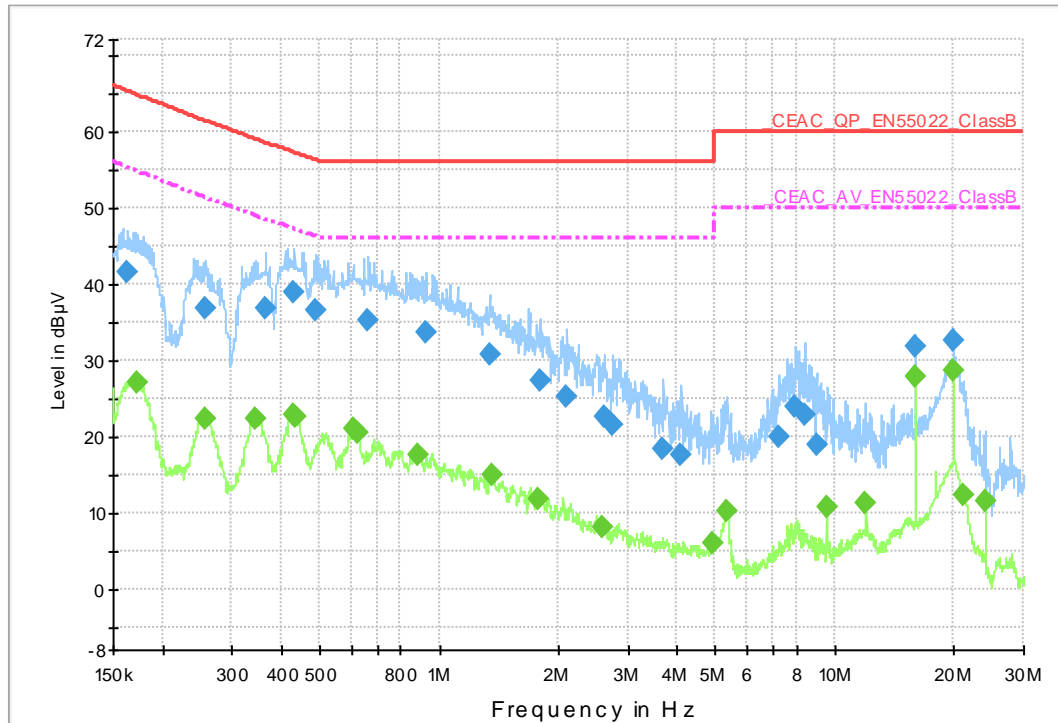
Plot 2: AC Mains Conducted Emissions FCC/ICES Class B Line 2 120Vac/60Hz No TX

Table 3: Quasi-Peak data AC Mains Conducted Emissions FCC/ICES Class B Line 2 120Vac/60Hz- No TX

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.161187	41.4	1000.000	9.000	On	0.6	24.0	65.4
0.243752	35.1	1000.000	9.000	On	0.5	26.7	61.8
0.364217	34.1	1000.000	9.000	On	0.4	24.4	58.5
0.432498	35.6	1000.000	9.000	On	0.4	21.5	57.1
0.442992	35.1	1000.000	9.000	On	0.4	21.8	56.9
0.603800	32.5	1000.000	9.000	On	0.4	23.5	56.0
0.627162	31.8	1000.000	9.000	On	0.4	24.2	56.0
0.893237	29.2	1000.000	9.000	On	0.5	26.8	56.0
1.672750	28.1	1000.000	9.000	On	0.5	27.9	56.0
1.783193	28.5	1000.000	9.000	On	0.5	27.5	56.0
2.580636	17.0	1000.000	9.000	On	0.5	39.0	56.0
2.789767	15.8	1000.000	9.000	On	0.6	40.2	56.0
3.299563	16.6	1000.000	9.000	On	0.6	39.4	56.0
4.185191	16.3	1000.000	9.000	On	0.6	39.7	56.0
4.364530	16.1	1000.000	9.000	On	0.6	39.9	56.0
4.900781	17.4	1000.000	9.000	On	0.6	38.6	56.0
7.149319	25.0	1000.000	9.000	On	0.6	35.0	60.0
7.530529	27.7	1000.000	9.000	On	0.6	32.3	60.0
7.900431	27.7	1000.000	9.000	On	0.6	32.3	60.0
8.906643	22.4	1000.000	9.000	On	0.6	37.6	60.0

Table 4: Average data AC Mains Conducted Emissions FCC/ICES Class B Line 2 120Vac/60Hz - No TX

Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.168767	26.9	1000.000	9.000	On	0.5	28.0	54.9
0.255725	20.5	1000.000	9.000	On	0.4	30.8	51.3
0.345089	19.7	1000.000	9.000	On	0.4	29.2	48.9
0.425639	19.8	1000.000	9.000	On	0.4	27.4	47.2
0.434229	19.5	1000.000	9.000	On	0.4	27.6	47.1
0.620928	16.9	1000.000	9.000	On	0.4	29.1	46.0
0.959853	13.1	1000.000	9.000	On	0.5	32.9	46.0
1.699703	12.8	1000.000	9.000	On	0.5	33.2	46.0
1.790332	12.5	1000.000	9.000	On	0.5	33.5	46.0
2.580636	4.2	1000.000	9.000	On	0.5	41.8	46.0
4.756084	3.6	1000.000	9.000	On	0.6	42.4	46.0
7.106595	7.8	1000.000	9.000	On	0.6	42.2	50.0
7.916232	10.1	1000.000	9.000	On	0.6	39.9	50.0
9.513687	17.0	1000.000	9.000	On	0.6	33.0	50.0
15.993977	12.2	1000.000	9.000	On	0.7	37.8	50.0



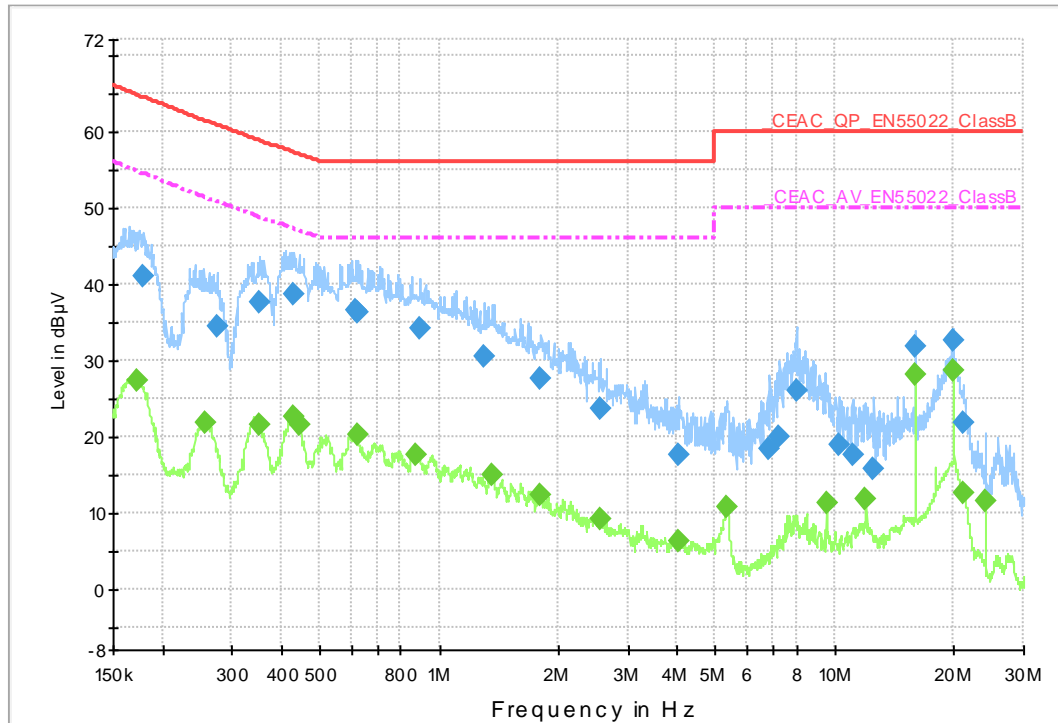
Plot 3: AC Mains Conducted Emissions FCC/ICES Class B Line 1 120Vac/60Hz - TX

Table 5: Quasi-Peak data AC Mains Conducted Emissions FCC/ICES Class B Line 1 120Vac/60Hz - TX

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.163457	41.4	1000.000	9.000	On	0.5	23.8	65.2
0.255725	36.7	1000.000	9.000	On	0.4	24.7	61.4
0.363490	36.6	1000.000	9.000	On	0.4	21.9	58.5
0.430773	38.9	1000.000	9.000	On	0.4	18.3	57.2
0.489533	36.5	1000.000	9.000	On	0.4	19.7	56.2
0.661924	35.2	1000.000	9.000	On	0.4	20.8	56.0
0.927798	33.5	1000.000	9.000	On	0.5	22.5	56.0
1.340029	30.6	1000.000	9.000	On	0.5	25.4	56.0
1.793913	27.2	1000.000	9.000	On	0.5	28.8	56.0
2.104840	25.1	1000.000	9.000	On	0.5	30.9	56.0
2.622216	22.5	1000.000	9.000	On	0.5	33.5	56.0
2.756522	21.5	1000.000	9.000	On	0.5	34.5	56.0
3.690191	18.3	1000.000	9.000	On	0.6	37.7	56.0
4.094213	17.4	1000.000	9.000	On	0.6	38.6	56.0
7.235541	19.9	1000.000	9.000	On	0.6	40.1	60.0
7.963824	23.8	1000.000	9.000	On	0.6	36.2	60.0
8.388464	22.9	1000.000	9.000	On	0.6	37.1	60.0
8.978111	18.9	1000.000	9.000	On	0.6	41.1	60.0
15.993977	31.6	1000.000	9.000	On	0.7	28.4	60.0
20.005126	32.6	1000.000	9.000	On	0.8	27.4	60.0

Table 6: Average data AC Mains Conducted Emissions FCC/ICES Class B Line 1 120Vac/60Hz - TX

Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.172173	27.1	1000.000	9.000	On	0.5	27.7	54.8
0.255725	22.2	1000.000	9.000	On	0.4	29.1	51.3
0.342342	22.3	1000.000	9.000	On	0.4	26.6	48.9
0.428198	22.7	1000.000	9.000	On	0.4	24.5	47.2
0.433363	22.4	1000.000	9.000	On	0.4	24.7	47.1
0.607430	20.9	1000.000	9.000	On	0.4	25.1	46.0
0.622170	20.5	1000.000	9.000	On	0.4	25.5	46.0
0.880831	17.7	1000.000	9.000	On	0.5	28.3	46.0
1.358902	14.9	1000.000	9.000	On	0.5	31.1	46.0
1.790332	11.8	1000.000	9.000	On	0.5	34.2	46.0
2.575485	8.1	1000.000	9.000	On	0.5	37.9	46.0
4.910583	5.8	1000.000	9.000	On	0.6	40.2	46.0
5.340444	10.3	1000.000	9.000	On	0.6	39.7	50.0
9.513687	10.6	1000.000	9.000	On	0.6	39.4	50.0
11.995119	11.1	1000.000	9.000	On	0.6	38.9	50.0
15.993977	27.9	1000.000	9.000	On	0.7	22.1	50.0
20.005126	28.5	1000.000	9.000	On	0.8	21.5	50.0
21.198504	12.4	1000.000	9.000	On	0.8	37.6	50.0
23.994071	11.6	1000.000	9.000	On	0.9	38.4	50.0



Plot 4: AC Mains Conducted Emissions FCC/ICES Class B Line 2 120Vac/60Hz - TX

Table 7: Quasi-Peak data AC Mains Conducted Emissions FCC/ICES Class B Line 2 120Vac/60Hz - TX

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.179550	40.9	1000.000	9.000	On	0.5	23.5	64.4
0.274248	34.4	1000.000	9.000	On	0.4	26.4	60.8
0.351351	37.6	1000.000	9.000	On	0.4	21.2	58.8
0.430773	38.7	1000.000	9.000	On	0.4	18.5	57.2
0.615985	36.4	1000.000	9.000	On	0.4	19.6	56.0
0.624661	36.1	1000.000	9.000	On	0.4	19.9	56.0
0.895023	34.2	1000.000	9.000	On	0.5	21.8	56.0
1.300464	30.4	1000.000	9.000	On	0.5	25.6	56.0
1.811924	27.4	1000.000	9.000	On	0.5	28.6	56.0
2.554984	23.5	1000.000	9.000	On	0.5	32.5	56.0
4.045424	17.6	1000.000	9.000	On	0.6	38.4	56.0
6.841870	18.4	1000.000	9.000	On	0.6	41.6	60.0
7.250012	19.8	1000.000	9.000	On	0.6	40.2	60.0
7.979752	25.8	1000.000	9.000	On	0.6	34.2	60.0
10.284662	18.8	1000.000	9.000	On	0.6	41.2	60.0
11.073776	17.5	1000.000	9.000	On	0.6	42.5	60.0
12.559206	15.7	1000.000	9.000	On	0.6	44.3	60.0
15.993977	31.8	1000.000	9.000	On	0.7	28.2	60.0
20.005126	32.6	1000.000	9.000	On	0.8	27.4	60.0
21.156192	21.8	1000.000	9.000	On	0.8	38.2	60.0

Table 8: Average data AC Mains Conducted Emissions FCC/ICES Class B Line 2 120Vac/60Hz - TX

Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.172862	27.2	1000.000	9.000	On	0.5	27.5	54.7
0.257262	21.8	1000.000	9.000	On	0.4	29.5	51.3
0.351351	21.5	1000.000	9.000	On	0.4	27.2	48.7
0.429055	22.6	1000.000	9.000	On	0.4	24.6	47.2
0.442992	21.5	1000.000	9.000	On	0.4	25.4	46.9
0.619689	20.3	1000.000	9.000	On	0.4	25.7	46.0
0.877318	17.6	1000.000	9.000	On	0.5	28.4	46.0
1.358902	14.9	1000.000	9.000	On	0.5	31.1	46.0
1.797501	12.4	1000.000	9.000	On	0.5	33.6	46.0
2.549884	9.2	1000.000	9.000	On	0.5	36.8	46.0
4.053515	6.2	1000.000	9.000	On	0.6	39.8	46.0
5.329784	10.7	1000.000	9.000	On	0.6	39.3	50.0
9.513687	11.3	1000.000	9.000	On	0.6	38.7	50.0
11.995119	11.7	1000.000	9.000	On	0.6	38.3	50.0
15.993977	28.0	1000.000	9.000	On	0.7	22.0	50.0
20.005126	28.5	1000.000	9.000	On	0.8	21.5	50.0
21.198504	12.5	1000.000	9.000	On	0.8	37.5	50.0
23.994071	11.4	1000.000	9.000	On	0.9	38.6	50.0

Part 2 - Radiated Emissions Testing

DATE: Aug-28-2014

TEST STANDARD: FCC CFR47, Part 15, Subpart C Section 15.231, 15.205 & RSS 210 issue 8, Annex 1

TEST VOLTAGE: 120Vac/60Hz

MINIMUM STANDARD: Except as provided elsewhere in FCC CFR47, Part 15, Subpart C & RSS 210 issue 8, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table

Frequency (MHz)	Field Strength (dB μ V/m) at 3m
30 – 88	40
88 – 216	43.5
216 - 960	46
960 – above	54

Note: In the above emission table, the tighter limit applies at the band edges.

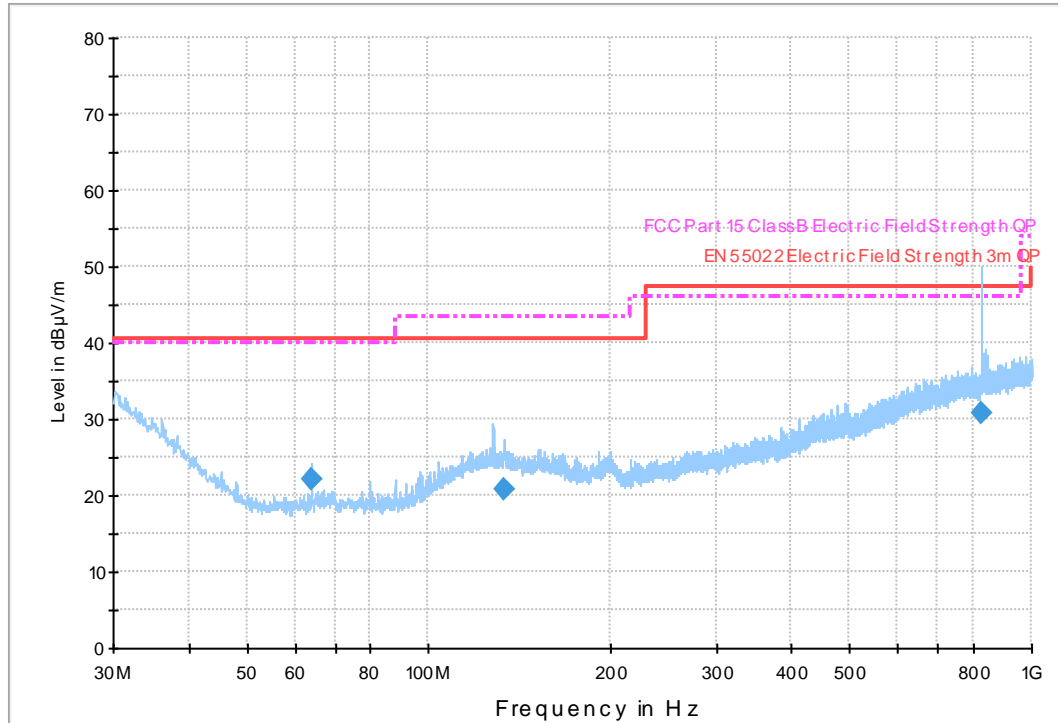
TEST SETUP: The EUT was placed on a turntable, which is 0.8 m above ground plane. Emissions in both horizontal and vertical polarizations were measured while rotating the EUT on a turntable and moving the receiving antenna from 1m to 4 m high to maximize the emissions signal strength. The equipment was set up in a 3-meter Semi Anechoic Chamber for preliminary measurements and finals were completed in 3m/10m Open Air Test Site at 3 meters.

DEVICE DESCRIPTIONS: Refer to the Equipment Under Test Section.

MODIFICATIONS: No modification is required to comply for this test.

PERFORMANCE: Complies with standard.

MEASUREMENT DATA:



Plot 5: Radiated Emissions 30MHz-1GHz CE at 3m - No TX

Table 9: Radiated Emissions 30MHz-1GHz CE at 3m - No TX

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
64.004240	22.0	1000.000	120.000	100.0	V	0.0	14.3	18.5	40
133.250240	20.7	1000.000	120.000	134.0	H	0.0	20.8	19.8	43.5

Part 3 - Transmitter Radiated Spurious Emissions

DATE: Aug-28-2014

TEST STANDARD: FCC CFR47, Part 15, Subpart C Section 15.231, 15.205 & RSS 210 issue 8, Annex 1

TEST VOLTAGE: 120Vac/60Hz

MINIMUM STANDARD: The radiated emissions of fundamental and spurious frequency from the DUT shall meet the limits below:

Fundamental Frequency (MHz)	Field Strength of Fundamental (µV/m)	Field Strength of Spurious Emission (µV/m)
40.66 - 40.70	2250	225
70 - 130	1250	125
130 - 174	1250 - 3750**	125-375**
174 - 260	3750	375
260 - 470	3750 - 12500**	375-1250**
Above 470	12500	1250

Note: 1) In the above emission table, the tighter limit applies at the band edges.
2) ** Linear interpolations.

Except as otherwise described in the standards, only spurious emissions are permitted in any of the Frequency bands listed below:

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
1.0495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	(2)
13.36-13.41			

¹ Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

² Above 38.6

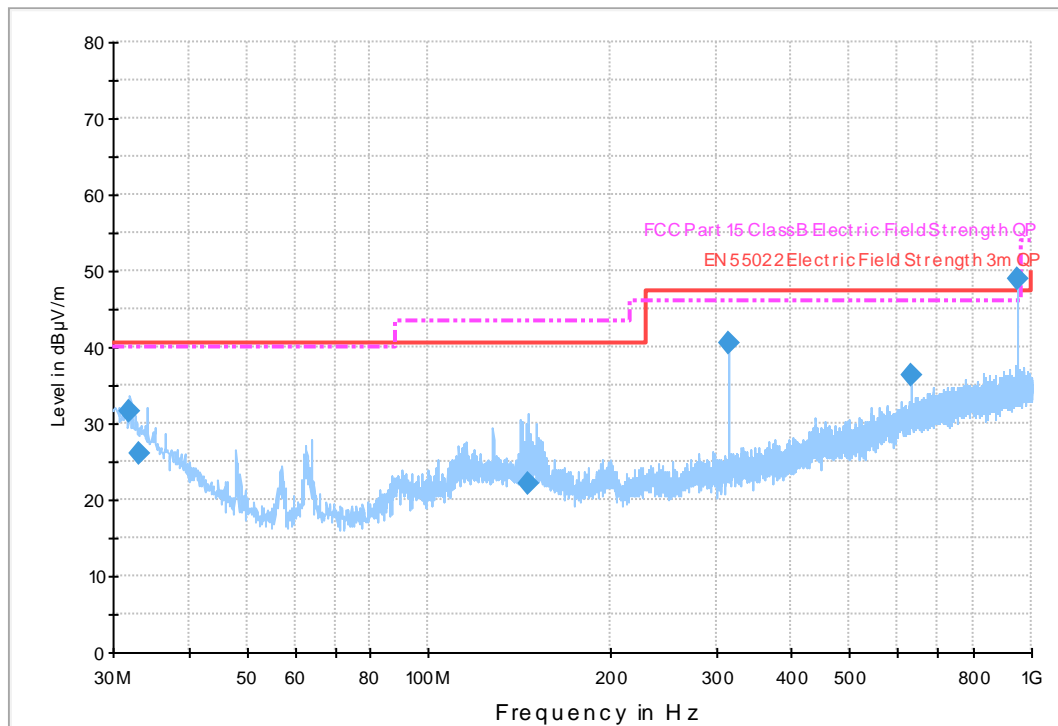
If there is field strength of spurious emissions appearing within these restricted bands, it shall not exceed the limits shown in the below table

Frequency (MHz)	Field Strength (dBµV/m) at 3m
30 - 88	40
88 - 216	43.5
216 - 960	46
960 - above	54

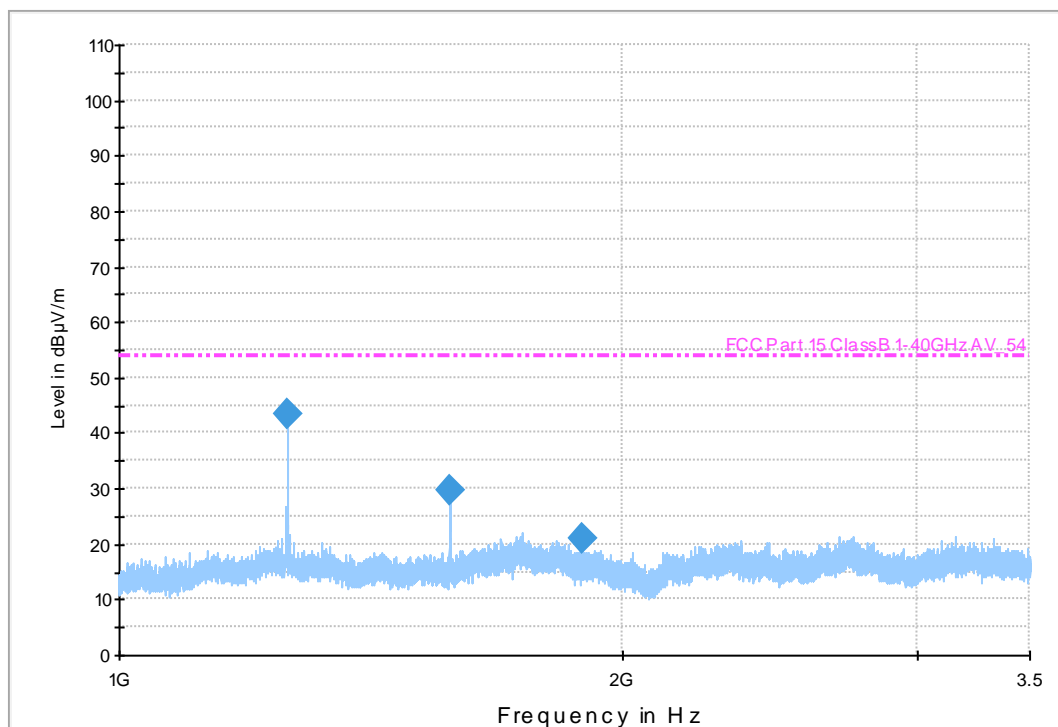
Note: In the above emission table, the tighter limit applies at the band edges.

TEST SETUP:	The EUT was placed on a turntable, which is 0.8 m above ground plane. Emissions in both horizontal and vertical polarizations were measured while rotating the EUT on a turntable and moving the receiving antenna from 1m to 4 m high to maximize the emissions signal strength. The equipment was set up in a 3-meter Semi Anechoic Chamber for preliminary measurements and finals were completed in 3m/10m Open Air Test Site at 3 meters. Measurements were also performed from 9 kHz to 30 MHz with active loop antenna, but no emissions were found in that range.
DEVICE DESCRIPTIONS:	Refer to the Equipment Under Test Section.
MODIFICATIONS:	No modification is required to comply for this test.
PERFORMANCE:	Complies with standard.

MEASUREMENT DATA:



Plot 6: Radiated Emissions 30MHz-1GHz at 3m - TX mode



Plot 7: Radiated Emissions 1GHz-3.5GHz at 3m - TX mode

Table 10: Radiated Emissions 30MHz-1GHz at 3m - TX mode

Frequency (MHz)	QuasiPeak (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
31.998560	31.6	1000.000	120.000	124.0	V	233.0	25.7	8.4	40
33.261160	26.2	1000.000	120.000	238.0	H	253.0	26.3	13.8	40
146.186320	22.0	1000.000	120.000	156.0	V	162.0	20.0	21.5	43.5

Table 11: Radiated Fundamental & Spurious Emissions at 3m

Frequency (MHz)	MaxPeak-MaxHold (dBμV/m)	Average (dBμV/m)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. Gain (dB)	Antenna Factor (dB)	Corrected Peak (dBμV/m)	Corrected Average (dBμV/m)	Margin (dBμV/m)	Limit Average (dBμV/m)
315.001736	18.8	13.7	100	V	349	0	21	39.8	34.7	40.92	75.62
	24.2	19.9	100	H	147.5	0	21	45.2	40.9	34.72	75.62
630.003472	11.7	1.7	100	V	344.1	0	26.5	38.2	28.2	27.42	55.62
	13.4	5	126.9	H	340.1	0	26.5	39.9	31.5	24.12	55.62
945.005174	18.8	11.5	100	V	120.8	0	30	48.8	41.5	14.12	55.62
	21.2	14.3	100	H	163	0	30	51.2	44.3	11.32	55.62
1260.007944	58.9	53.7	100	V	57.3	-30.4	24.2	52.71	47.51	8.11	55.62
	56.4	50.9	100	H	281.9	-30.4	24.2	50.21	44.71	10.91	55.62
1575.0087 (Restricted band)	46.1	38.5	100	V	210.2	-29.3	25.2	41.96	34.36	19.64	54
	47.4	40.1	100	H	149	-29.3	25.2	43.26	35.96	18.04	54
1890.010436	41.5	30.1	100	V	87.8	-29.3	26.11	38.27	26.87	28.75	55.62
	41.2	29.2	100	H	99.2	-29.3	26.11	37.97	25.97	29.65	55.62
2205.0121 (Restricted band)	41.8	30.3	100	V	176.7	-28.9	26.1	39.02	27.52	26.48	54
	38.9	27.3	100	H	88	-28.9	26.1	36.12	24.52	29.48	54
2520.0139	39.5	26.5	100	V	204.1	-27.3	25.6	37.77	24.77	30.85	55.62
	37.6	26.1	100	H	360	-27.3	25.6	35.87	24.37	31.25	55.62
2835.015644 (Restricted band)	39.6	28.1	100	V	360	-26.9	25.11	37.8	26.3	27.7	54
	39.4	27.2	100	H	360	-26.9	25.11	37.6	25.4	28.6	54
3150.01738	40.3	27.2	100	V	360	-26.9	25.15	38.59	25.49	30.13	55.62
	39.9	27.2	100	H	360	-26.9	25.15	38.19	25.49	30.13	55.62

Part 4 - Occupied Bandwidth

DATE: Aug-28-2014

TEST STANDARD: FCC CFR47, Part 15, Subpart C Section 15.231(C) & RSS 210 issue 8, A1.1.3

TEST VOLTAGE: 120Vac/60Hz

MINIMUM STANDARD: **FCC Part15 section 15.231**

The bandwidth of the emissions shall be no wider than 0.25% of the centre frequency for devices operating between 70MHz and 900MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the centre frequency.

RSS-210 Issue 8 A.1.1.3

The 99% bandwidth shall be no wider than 0.25% of the centre frequency for devices operating between 70MHz and 900MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the centre frequency.

TEST SETUP: The EUT was placed on a turntable, which is 0.8 m above ground plane. Emissions in both horizontal and vertical polarizations were measured while rotating the EUT on a turntable and moving the receiving antenna from 1m to 4 m high to maximize the emissions signal strength. Following spectrum analyzer settings were used to measure occupied bandwidth as per ANSI C63.10:2013:

Span= between two times and five times the OBW.

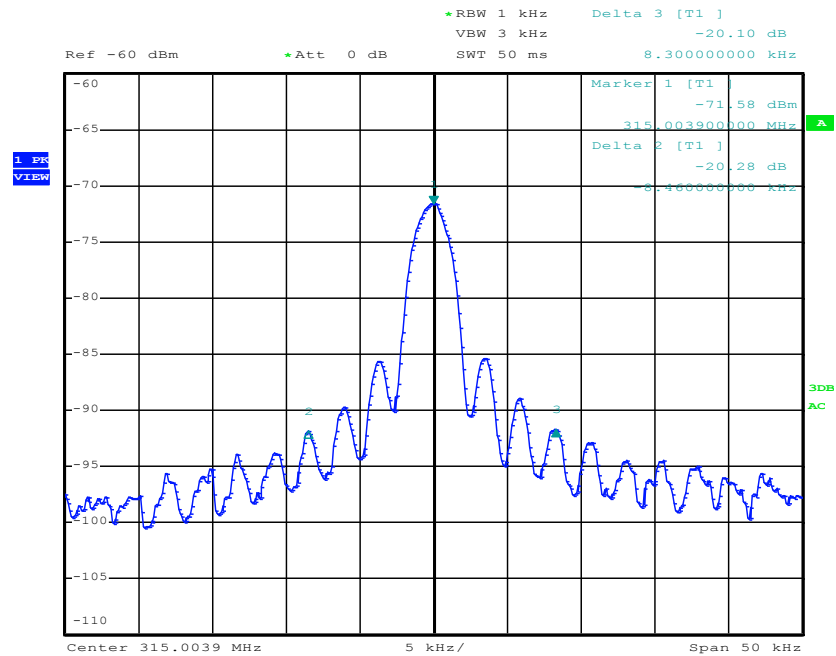
RBW= in the range of 1% to 5% of the OBW.

VBW= approximately three times RBW.

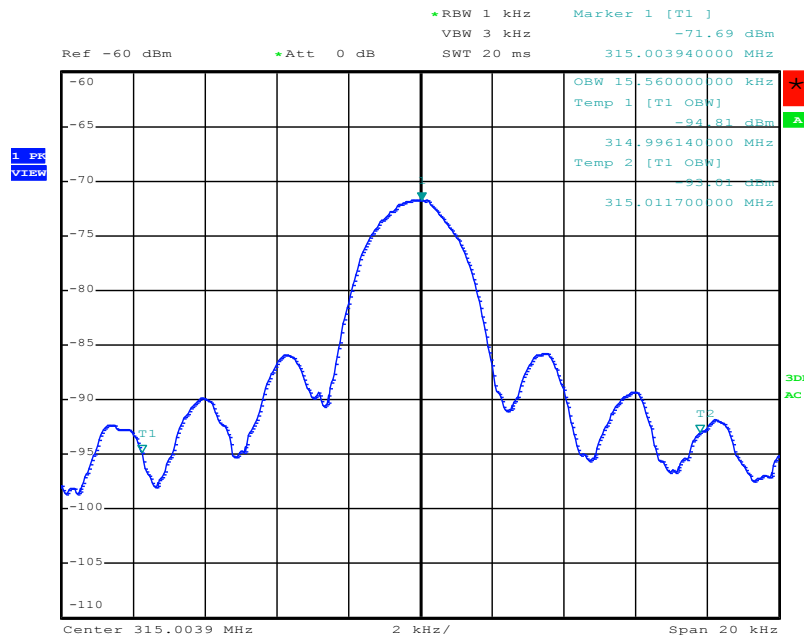
Detector =Peak

MEASUREMENT DATA:

Frequency (MHz)	20dB OBW (KHz)	99% OBW (KHz)
315	16.76	15.56



20dB Occupied Bandwidth



99% Occupied Bandwidth

RESULTS:

Pass: Complies with standard.

Part 5 - Transmitter Deactivates with in 5 seconds

DATE: Oct-16-2014

TEST STANDARD: FCC CFR47, Part 15, Subpart C Section 15.231(a)(2) & RSS 210 iss.8, A1.1.1(b)

TEST VOLTAGE: 120Vac/60Hz

MINIMUM STANDARD: A transmitter activated automatically shall cease transmission within 5 seconds after activation (i.e. maximum 5 seconds of operation).

TEST SETUP: The EUT was placed on a turntable, which is 0.8 m above ground plane. Emissions in both horizontal and vertical polarizations were measured while rotating the EUT on a turntable and moving the receiving antenna from 1m to 4 m high to maximize the emissions signal strength.

MEASUREMENT DATA:

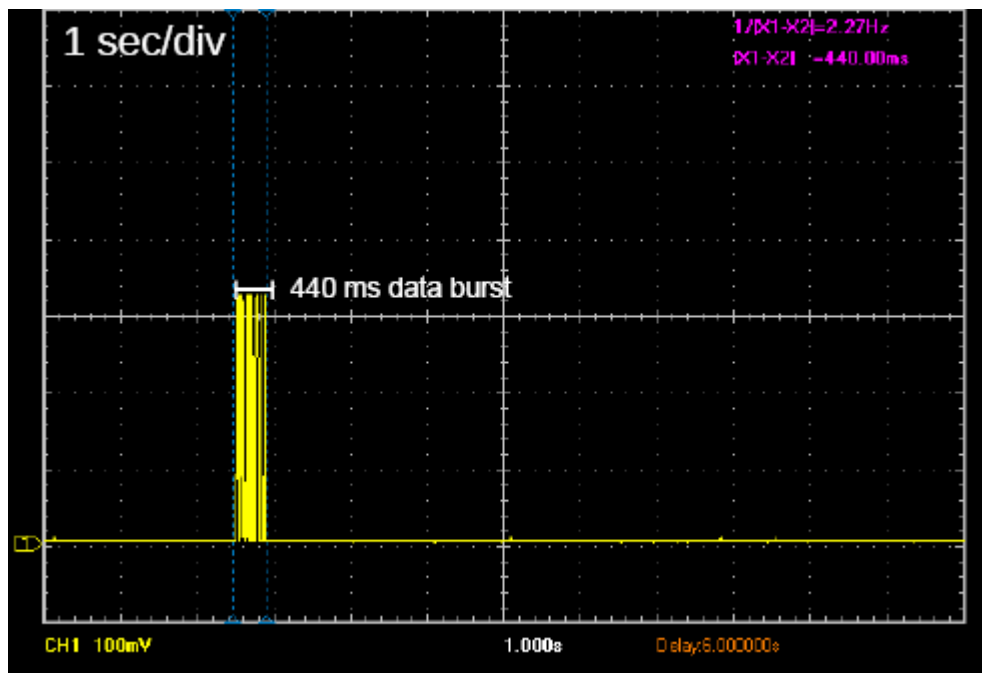


Image 1. Scale Y:100mV/div X:1.000 sec/div

As per above plot transmitter deactivated its transmission within 5seconds.

RESULTS: Pass: Complies with standard.

Part 6 - Automatic Transmissions Not exceeding 2 secs/hour for transmitter

DATE: Oct-16-2014

TEST STANDARD: FCC Part 15, Subpart C Section 15.231(a)(3) & RSS 210 iss.8, A1.1.1(C)

TEST VOLTAGE: 120Vac/60Hz

MINIMUM STANDARD: Periodic transmissions at regular predetermined intervals are not permitted, However, polling or supervision transmissions to determine system integrity of transmitters used in security or safety applications are allowed if the total duration of transmission does not exceed 2 seconds per hour for each transmitter.

TEST SETUP: The EUT was placed on a turntable, which is 0.8 m above ground plane. Emissions in both horizontal and vertical polarizations were measured while rotating the EUT on a turntable and moving the receiving antenna from 1m to 4 m high to maximize the emissions signal strength.

MEASUREMENT DATA: This transmitter is an interface board intended to convert both digital and analog signals from a separate controller in to RF signal which will be broadcast over a short range(less than 12 inches) to separate fireplace control module. This transmitter activation is only controlled by end user using the remote. This transmitter does not have periodic transmission; however it sends a maintenance packet of 440msec every 2 hours.

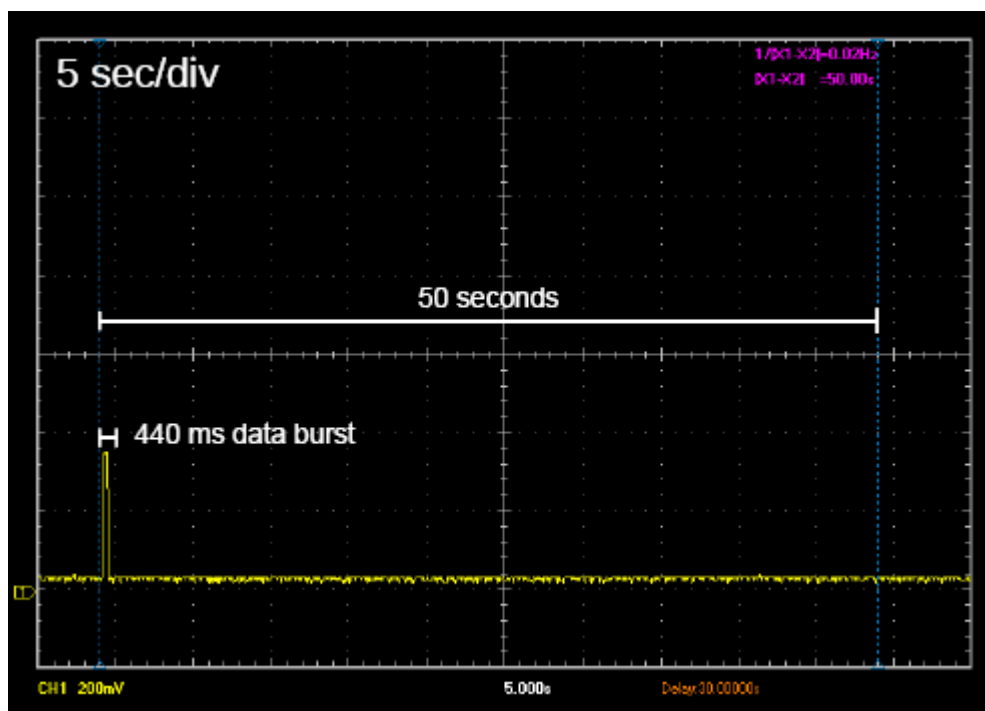
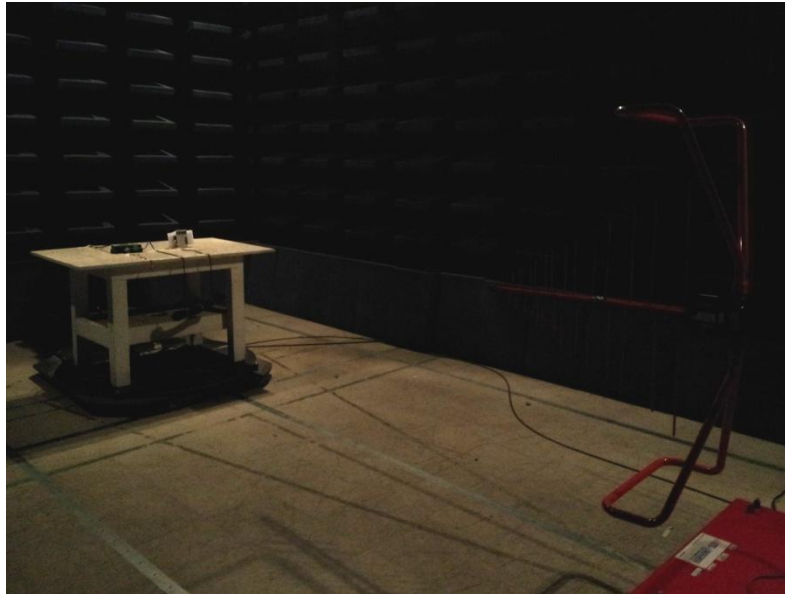


Image 2. Scale Y:200mV/div X:5.000 sec/div

RESULTS: Pass: Complies with standard.

Appendix A: Test Setup Pictures



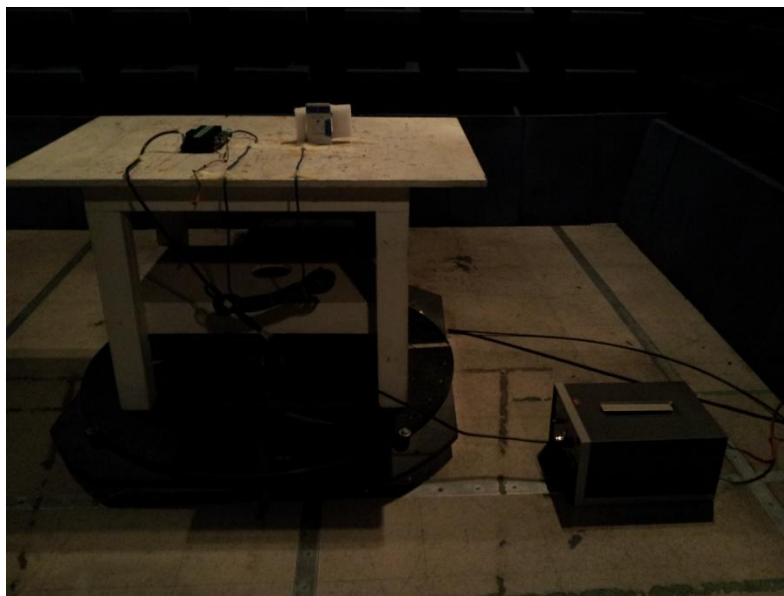
Radiated Emission test setup in Semi Anechoic Chamber



Radiated Emission test setup in Semi Anechoic Chamber



Radiated Emission test setup in Semi Anechoic Chamber



Conducted Emission test setup in Semi Anechoic Chamber