REPORT

For

Guard RFID Solutions Inc.

#140 – 766 Cliveden Place
Delta, British Columbia
V3M 6C7, Canada

Date:	January 26, 2015
Report No.:	12955-1E
Revision No.:	1
Project No.:	12955
Equipment:	RFID Tag Exciter
FCC ID:	VZKPTE
IC ID.:	9937A-PTE

ONE STOP GLOBAL CERTIFICATION SOLUTIONS

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FCC Part 15: 2015/RSS-210, Issue 8		
Report reference No.....:	12955-1E	
Report Revision History:	✓ Rev. 0: December 16, 2015 ✓ Rev. 1: January 26, 2016, revised under 30MHz testing and Occupied Bandwidth.	
Tested by (printed name and signature) .....:	Jeremy LEE	
Approved by (printed name and signature) .....:	Kavinder Dhillon, Eng.L.	
Date of issue .....:	January 26, 2016	
Note: By signing this report, both the Testing Technician and the Reviewer hereby declare to abide by the applicable LabTest policies: 1.) Statement of Independence # 3014 (LabTest Employees), 2.) Independence, Impartiality, and Integrity #1039, clause 11 (Engineering Service Subcontractors), or 3.) Independence, Impartiality, and Integrity #1019, clause 3.5 (Testing Subcontractors).		
FCC Site Registration No.:	373387	
IC Site Registration No.:	5970A-2	
Test Site Location Name .....:	LabTest Certification Inc.	
Address .....:	3133 – 20800 Westminster Hwy, Richmond, B.C. V6V-2W3	
Applicant's Name .....:	Guard RFID Solutions Inc.	
Address .....:	#140-766 Cliveden Place, Delta, BC, V3M 6C7, Canada	
Manufacture's Name .....:	Same as Applicant	
Address .....:	Same as Applicant	
Test specification		
Standards .....:	FCC15.207 & 209:2015 / RSS-210, Issue 8, December 2010	
Date Test sample received .....:	Nov. 09, 2015	
Date of Testing .....:	Dec. 02 to 08, 2015	
Test item description		
Model number .....:	Proximity Tag Exciter(PTE)	
Serial number .....:	000120	
FCC ID .....:	VZKPTE	
IC ID .....:	9937A-PTE	
Rating(s).....:	12VDC, 1A Max.	

Device Under Test Description

EUT Description	125kHz Transmitter
Application for	RFID Tag solution
Operating Frequency Range	125kHz
Number of Channels	1 Channel
Type of Antenna	Internal(Loop coil antenna)
Max. Output Power	N/A
Modulation	ASK
Nominal Voltage for	_X_ stand-alone equipment ___ combined (or host) equipment __ test jig
Supply Voltage	_____ AC ____ Amps ____Hz ___12V___ DC __1__Amps Max.
If DC Power	____ Internal Power Supply _X__ Host system is supplied the DC power ____ Battery
Size of equipment (Width X Height X Depth, mm)	
Mass of equipment (g)	500
Operating Temperature Range	-10 °C to + 50 °C
Equipment mobility	No
Mounting	Wall or Ceiling (Non-metallic surface only)
Coverage Area	2 ~ 10 ft. radius (selectable)
Test case verdicts	
Test case does not apply to the test object	N/A
Test item does meet the requirement	Pass
Test item does not meet the requirement	Fail

General Product Information:

The EUT, Proximity Tag Exciter (PTE) creates a 125 KHz radio frequency (RF) zone with a unique ID that allows instant and accurate location of Guard RFID's Active Tags equipped with 125KHz Receivers. When such an active tag enters the zone, it immediate transmits the zone's unique ID to the system. This real-time tag location information can then be used by Guard RFID's Argus network for various response activities, such as to secure portals by automatically locking doors through which the tag has no access privileges.

The field strength of the Exciter's LF field can be adjusted from 2' to 10', creating the defined detection zone. By adjusting the LF field the Exciter can tightly define a specified area such as a single exit point, up to a large area or zone such as a corridor.

When used in combination with a Tag Reader Controller, this real-time tag location information is processed to secure portals or notify the system that at tag has entered or left an area. The Tag Reader/Controller can automatically lock doors through which the tag has no access privileges or trigger other actions.

Frequencies

Module	Signal	Frequencies (MHz)
Crystal	Clock	16MHz

List of ancillary and/or support equipment provided by the applicant

Model No.	Description	Manufacturer	Approvals/Standards
ICT22012-12APB	Power Supply, 12VDC	ICT	FCC, CE

Description of Interface Cables for Testing

Connected port	Cable Type	Cable length	Ferrite
DC 12V Power Input	Unshielded, 2 wires power cable	6 ft	Yes*

*Note *) added 28A2024-0A2 by Laird with three turns on Power Cable.*

Software and Firmware

Description	Version
N/A	

Worst-case configuration and mode of operation during testing

The EUT was placed in continuous transmit mode of operation and the output was selected as “F”.

Modifications Required for Compliance

Added a ferrite, 28A2024-0A2 by Laird-Signal Integrity Products on DC Power Cable near power connector as see below photo, for reducing the Radiated Emissions.

Test Equipment Verified for function

Model #	Description	Checked Function	Results
E7405A	Spectrum Analyzer	Frequency and Amplitude	Connected 50MHz and -20 dBm Ref_siganl and checked OK.
8447D	Pre-Amplifier, 30 to 2,000MHz	Gain at 30 and 1,000MHz	Gains were normal.
JB1	Anatenna, 30 to 2000MHz	Checked structure	Normal – no damage.
AL-130	Anatenna, 9kHz to 30MHz	Checked power and structure	Normal – no damage.
8611-50-TS-10-N	LISN	Checked Insertion Losses from 150kHz to 30MHz	Losses were normal.
5001i	AC Power Source	Measured the Output power, 120VAC, 60Hz	Working normally
Onset HOBO	Humidity/ Temperature Logger	Compared room Temp. and Hum. with another data logger	Working normally

Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests:

Parameter	Uncertainty(dB)
Conducted Measurements, 0.15 to 30MHz	± 3.46 dB
Radiated Measurements, 9kHz to 1,000MHz	± 4.91 dB

Uncertainty figures are valid to a confidence level of 95%.

Markings

Blank

You should refer to the clause of FCC Part 2 Section 2.925 and FCC Part 15 Section 15.19 for information to be contained on the label as well as information about the label. Any other statements or labelling requirements may appear on a separate label at the option of the applicant/grantee.

According to FCC Section 2.925(a),
”(a)Each equipment covered in an application for equipment authorization shall bear a nameplate or label listing the following:
(1) FCC Identifier consisting of the two elements in the exact order specified in §2.926. The FCC Identifier shall be preceded by the term *FCC ID* in capital letters on a single line, and shall be a type size large enough to be legible without the aid of magnification.
Example: FCC ID XXX123. XXX-Grantee Code 123-Equipment Product Code”

According to FCC Section 15.19(a)(3), the following statement must be include on the identification label:
This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Note: Some jurisdictions in Canada require Cautions and Warnings to also be in French. It is the responsibility of the Customer to provide bilingual marking, where applicable, in accordance with the requirements of the local regulatory authorities. It is the responsibility of the Customer to determine this requirement and have bilingual wording added to the "Markings".

Test Summary

When configured and operated as specified in this report, the product was found to comply with the requirements as indicated below.

Test	Regulation	Measurement Method	Result
Antenna Requirement	15.203 & RSS-210	N/A	PASS
Conducted Emission on AC Power Line	15.207 & RSS-Gen	ANSI C63.4:2014	PASS
Field Strength of Fundamental	15.209 & RSS-210	ANSI C63.4:2014	PASS
Field Strength of Spurs			
- Harmonics	15.209 & RSS-210	ANSI C63.4:2014	PASS
- Unintentional Spurs	15.209 & RSS-210	ANSI C63.4:2014	PASS
Occupied Bandwidth, 99%	RSS-GEN	ANSI C63.10:2013	PASS

Antenna Requirement

Test Date	December 08, 2015
Sample Number	3809
Tested By	Jeremy LEE

Test Limits

FCC 15.203

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of §15.211, §15.213, §15.217, §15.219, or §15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

Test Result

The EUT has an integral loop coil antenna. Please reference Appendix B EUT Photos, Internal View.

X Pass **Fail** **N/A**

Conducted Emission on AC Power line

Temperature	23.3 °C
Relative Humidity	37.0 %
Barometric Pressure:	101.3 kPa
Test Date	December 02, 2015
Sample Number	3809
Calibrated Test Equipment (ID)	266, 272, 377, 378
Reference Equipment (ID) (Calibration not required)	059, 215
Tested Voltages	120VAC, 60Hz, Single Phase
Tested By	Jeremy LEE

Use the barometric pressure reported at: http://www.theweathernetwork.com/weather/cabc0248

Test Limits

FCC 15.207(a):

(a) Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 μH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency of emission (MHz)	Conducted limit (dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

Test Setup

The test was performed in accordance with **FCC 15.107 and ANSI C63.4, 2014.**

The EUT was placed on the table, referenced by ANSI C63.4, shown in Figure-1, and 0.4 meters from the conducting wall with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.

The EUT was set up as per the test configuration to simulate typical actual usage per the user's manual.
The AC power line of EUT was connected to LISN for maximum conducted interference.
The EUT was set on the maximum operating; the EUT was setup to continuing operating as a worst case.

Initially a scan was made with an EMC Analyzer from 150 kHz to 30 MHz on each phase with the receiver in the peak mode. The measuring bandwidth was set up 9 kHz. Measurements were then made using CISPR16-1 quasi peak and averaging detectors when the peak readings were within 20dB of the Quasi-peak limit line.

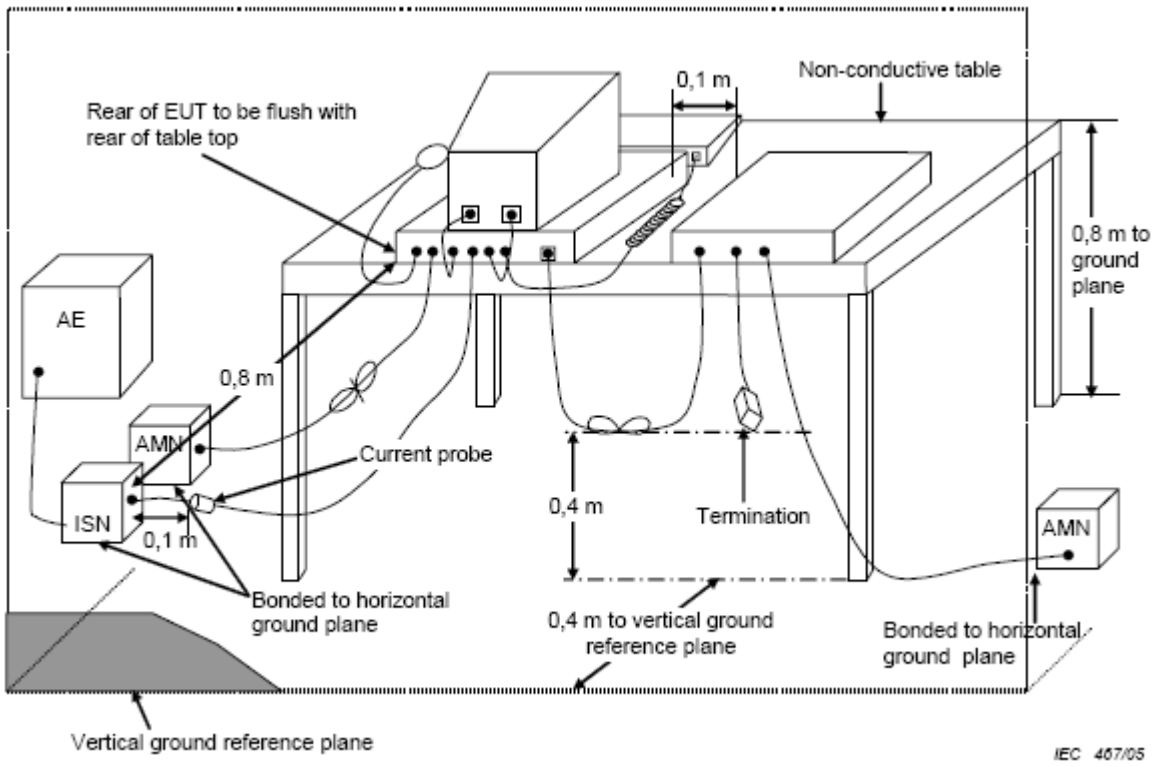
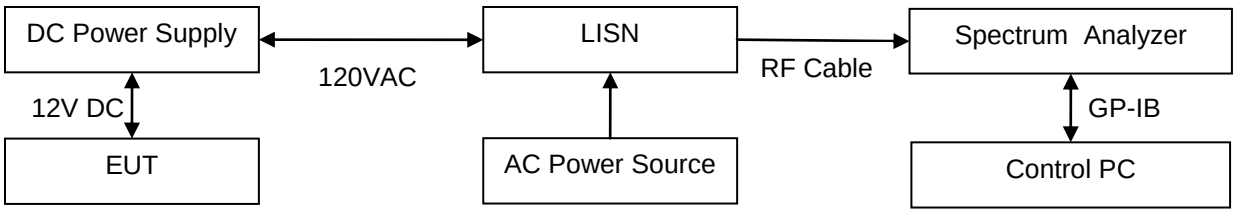


Figure – 1 Test setup for Conducted emissions

Setup Block Diagram



Test Result

Conducted Emission (dBuV) = Measured Emission (dBuV) + Cable Loss(dB)+LISN(dB)

X Pass **Fail** **N/A**

- Table of Conducted Emissions: Hot Line

LabTest Certification Inc.
Conducted Emission
FCC 15.207, AVG_Neutral_120Vac/60Hz

Operator: Jeremy LEE

05:52:53 PM, Wednesday, December 02, 2015

Frequency	Measured_AVG	PathLoss	Emission_AVG	Limit_AVG	Margin_AVG
MHz	dBuV	dB	dBuV	dBuV	dB
8.268 MHz	38.36	10.22	48.58	50.00	1.42
12.574 MHz	39.45	10.37	49.82	50.00	0.18
T: 23.3 C, H: 37.0 %, BP.:101.3 kPa					
Project # - 12955					
Model # - Proximity Tag Exciter					
Serial # - 000120					
Sample # - 3809					
keep exciting - w PSU					

- Table of Conducted Emissions: Neutral Line

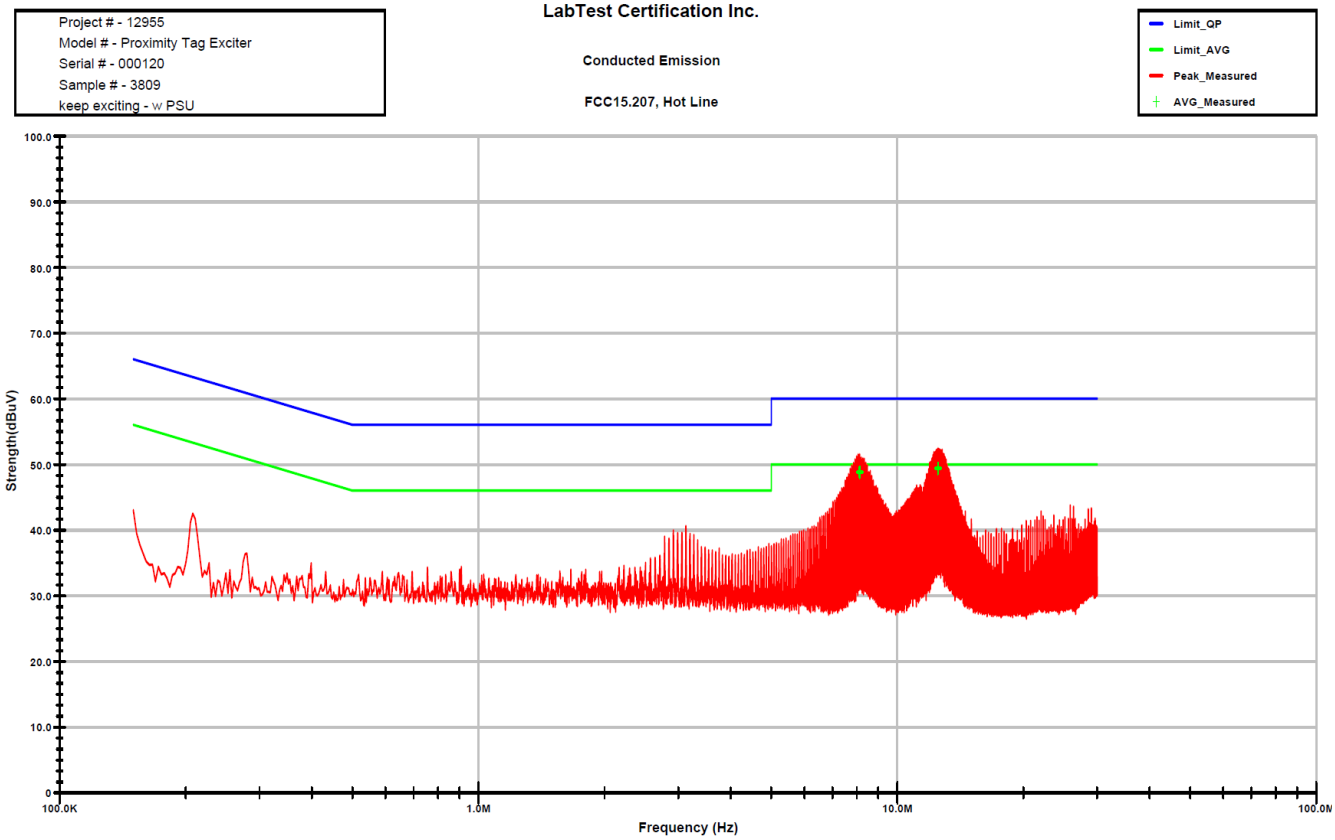
LabTest Certification Inc.
Conducted Emission
FCC 15.207, AVG_Hot_120Vac/60Hz

Operator: Jeremy LEE

05:52:53 PM, Wednesday, December 02, 2015

Frequency	Measured_AVG	PathLoss	Emission_AVG	Limit_AVG	Margin_AVG
MHz	dBuV	dB	dBuV	dBuV	dB
8.129 MHz	38.59	10.23	48.82	50.00	1.18
12.510 MHz	39.04	10.35	49.39	50.00	0.61
T: 23.3 C, H: 37.0 %, BP.:101.3 kPa					
Project # - 12955					
Model # - Proximity Tag Exciter					
Serial # - 000120					
Sample # - 3809					
keep exciting - w PSU					

- Graph of Conducted Emissions: Hot Line



T: 23.3 C, H: 37.0 %, BP.:101.3 kPa

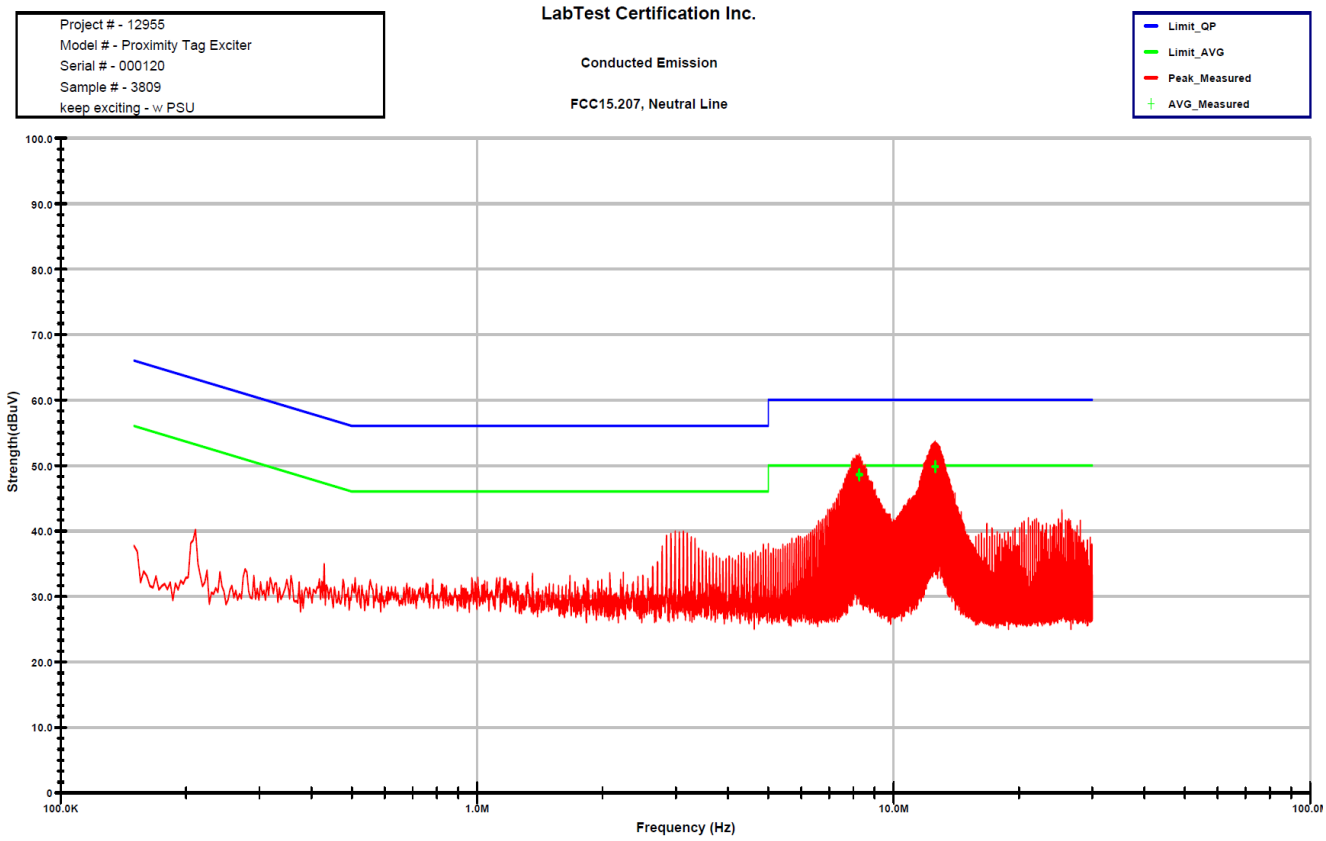
Operator: Jeremy LEE

Contact: Dalibor Pokrajac

05:32:06 PM, Wednesday, December 02, 2015

Company: Guard RFID Solutions Inc.

- Graph of Conducted Emissions: Neutral Line



T: 23.3 C, H: 37.0 %, BP.:101.3 kPa

Operator: Jeremy LEE

Contact: Dalibor Pokrajac

05:52:34 PM, Wednesday, December 02, 2015

Company: Guard RFID Solutions Inc.

Field Strength of Fundamental

Temperature	22.4 °C
Relative Humidity	44.0 %
Barometric Pressure:	100.2 kPa
Test Date	December 08, 2015
Sample Number	3809
Calibrated Test Equipment (ID)	241, 266, 272
Reference Equipment (ID) (Calibration not required)	059, 374
Tested Voltages	120VAC, 60Hz, Single Phase
Tested By	Jeremy LEE

Use the barometric pressure reported at: http://www.theweathernetwork.com/weather/cabc0284

Test Limits

FCC 15.209:

(a) Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100**	3
88-216	150**	3
216-960	200**	3
Above 960	500	3

**Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permItted under other sections of this part, e.g., §§15.231 and 15.241.

(d) The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

Test Setup

The test was performed in accordance with **FCC 15.109, FCC 15.31, FCC 15.33, FCC 15.35, and ANSI C63.4, 2014.**

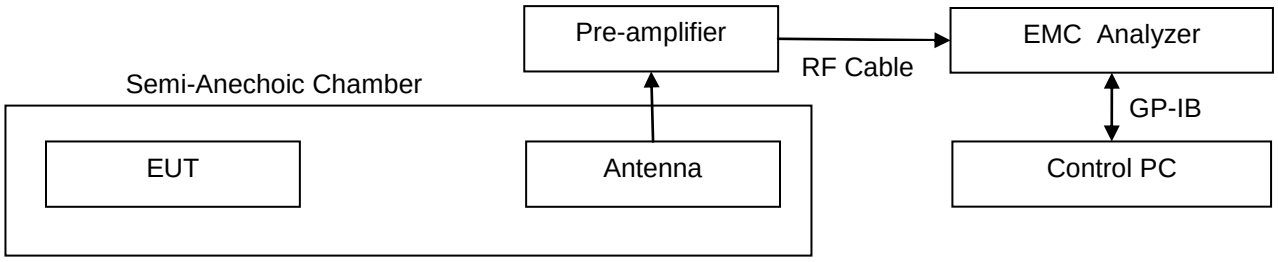
Test procedure is based on the FCC15.31(a)(3) - Other intentional and unintentional radiators are to be measured for compliance using the following procedure excluding sections 4.1.5.2, 5.7, 9 and 14: ANSI C63.4–2014: "Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz" (incorporated by reference, see § 15.38). This incorporation by reference was approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR Part 51.
NOTE to Paragraph (a)(3): Digital devices tested to show compliance with the provisions of §§ 15.107(e) and 15.109(g) must be tested following the ANSI C63.4 procedure described in paragraph (a)(3) of this section.[As stated in the adopting R&O, ANSI C63.4 is not used for measurements below 30 MHz.]

The EUT was placed on 0.8-meter high nonconductive table that was placed directly onto a flush mounted turntable. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna supporter. It is measured with a receiver – the spectrum analyzer, was software controlled. The antennas was used an Active Loop Antenna.

The EUT was positioned the emissions from the unit were maximized by manipulating the cables, and by adjusting the polarization and height of the receive antenna and rotating the EUT on the turntable.

- The EUT was set-up at Channel "F".
- The following measurements were made with
  - Span = wide enough to fully capture the emission being measured.
  - RBW = 200Hz
  - VBW = 300Hz
  - Sweep = Auto
  - Detector Method = Peak and Average
  - Trace = Single trace up to capturing the whole range of signal

Setup Block Diagram



Test Result

Emission level (dBuV/m) = Detected level (dBuV) +Path Loss (dB) + Antenna Factor (dB/m)

Frequency (kHz)	Detector	Measur ed (dBuV)	AF (dB/m)	Path Loss (dB)	Radiated Emission (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Results
123.077	Peak	95.29	10.81	0.22	106.32	125.8	19.48	PASS
123.077	Average	87.68	10.81	0.22	98.71	105.8	7.09	PASS

The limit was calculated as followed;

- Limit of FCC 15.209 at 123.077kHz; 2400/123.077 uV/m at 300meter distance
- Converting to dBuV/m: 25.8dBuV/m at 300meter distance
- Concerting at 3 meter: 105.8dBuV/m as Averaging limit
- Converting Peak Limit: 125.8dBuV

X Pass Fail N/A

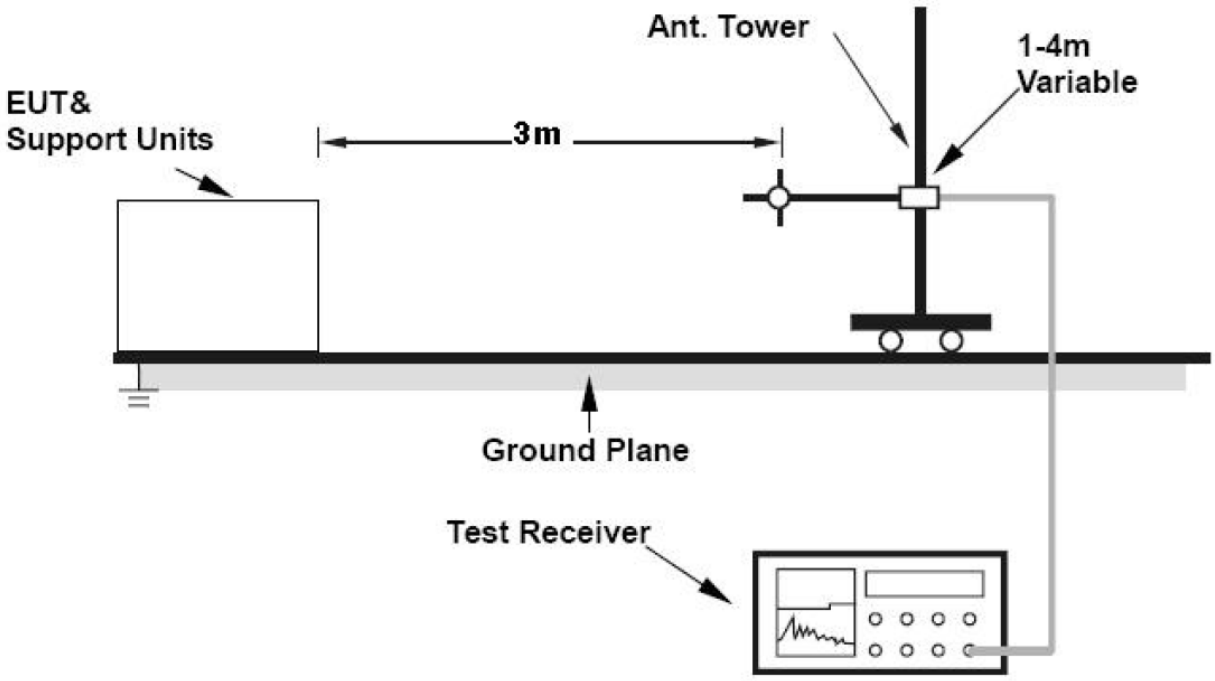


Figure – 2 Test setup for Radiated emissions

- Table of Field Strength of Fundamental, Average Detecting, Antenna was used AL-130.

LabTest Certification Inc.
Intentional Radiated Emissions
FCC15.209, 3 meters, Averaging Detector

Operator: Jeremy Lee

Contact: Dalibor Pokarajac
Company: Guard RFID Solutions Inc.

Frequency	Measured	AntFactor	PathLoss	Emission	Limit	Margin	T/T	Tower	POL
MHz	dBuV	dB/m	dB	dBuV/m	dBuV/m	dB	Degree	cm	
123.077 KHz	87.68	10.81	0.22	98.71	105.80	7.09	0.5	100.9	H
T: 22.4 C, H: 44.0 %, BP.:100.2 kPa									
Project # - 12955									
Model # - Proximity Tag Exciter									
Serial # - 000120									
Sample # - 3809									
keep exciting as Level "F" - w PSU, add a Ferritew 3 turns									

- Table of Field Strength of Fundamental, Peak Detecting, Antenna was used AL-130.

LabTest Certification Inc.
Intentional Radiated Emissions
FCC15.209, 3 meters, Peak Detector

Operator: Jeremy Lee

Contact: Dalibor Pokarajac
Company: Guard RFID Solutions Inc.

Frequency	Measured_PK	AntFactor	PathLoss	Emission_PK	Limit_PK	Margin_PK	T/T	Tower	POL
MHz	dBuV	dB/m	dB	dBuV/m	dBuV/m	dB	Degree	cm	
123.077 KHz	95.29	10.81	0.22	106.32	125.80	19.48	0.5	100.9	H
T: 22.4 C, H: 44.0 %, BP.:100.2 kPa									
Project # - 12955									
Model # - Proximity Tag Exciter									
Serial # - 000120									
Sample # - 3809									
keep exciting as Level "F" - w PSU, add a Ferritew 3 turns									

Field Strength of Spurs- Harmonics

Temperature	22.4 °C
Relative Humidity	44.0 %
Barometric Pressure:	100.3 kPa
Test Date	December 08, 2015
Sample Number	3809
Calibrated Test Equipment (ID)	241, 266, 272
Reference Equipment (ID) (Calibration not required)	059, 374
Tested Voltages	120VAC, 60Hz, Single Phase
Tested By	Jeremy LEE

Use the barometric pressure reported at: http://www.theweathernetwork.com/weather/cabc0284

Test Limits

FCC 15.209:

(c) The level of any unwanted emissions from an intentional radiator operating under these general provisions shall not exceed the level of the fundamental emission. For intentional radiators which operate under the provisions of other sections within this part and which are required to reduce their unwanted emissions to the limits specified in this table, the limits in this table are based on the frequency of the unwanted emission and not the fundamental frequency. However, the level of any unwanted emissions shall not exceed the level of the fundamental frequency.

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100**	3
88-216	150**	3
216-960	200**	3
Above 960	500	3

**Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permItted under other sections of this part, e.g., §§15.231 and 15.241.

(d) The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

Test Setup

The test was performed in accordance with **FCC 15.109, FCC 15.31, FCC 15.33, FCC 15.35, and ANSI C63.4, 2014.**

Test procedure is based on the FCC15.31(a)(3) - Other intentional and unintentional radiators are to be measured for compliance using the following procedure excluding sections 4.1.5.2, 5.7, 9 and 14: ANSI C63.4–2014: "Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz" (incorporated by reference, see § 15.38). This incorporation by reference was approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR Part 51.
NOTE to Paragraph (a)(3): Digital devices tested to show compliance with the provisions of §§ 15.107(e) and 15.109(g) must be tested following the ANSI C63.4 procedure described in paragraph (a)(3) of this section.[As stated in the adopting R&O, ANSI C63.4 is not used for measurements below 30 MHz.]

The EUT was placed on 0.8-meter high nonconductive table that was placed directly onto a flush mounted turntable. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna supporter. It is measured with a receiver – the spectrum analyzer, was software controlled. The antennas was used an Active Loop Antenna.

The EUT was positioned the emissions from the unit were maximized by manipulating the cables, and by adjusting the polarization and height of the receive antenna and rotating the EUT on the turntable.

- The EUT was set-up at Channel "F".
- The following measurements were made with
  - Span = wide enough to fully capture the emission being measured.
  - RBW = 9kHz
  - VBW = 30kHz
  - Sweep = Auto
  - Detector Method = Quasi-peak or Peak and Average
  - Trace = Single trace up to capturing the whole range of signal

Test Result

Emission level (dBuV/m) = Detected level (dBuV) +Cable Loss (dB) + Antenna Factor (dB/m)

Frequency (kHz)	Detector	Measur ed (dBuV)	AF (dB/m)	Path Loss (dB)	Radiated Emission (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Results
244.475	Average	37.15	10.53	0.24	47.92	111.52	63.60	PASS
244.475	Peak	48.85	10.53	0.24	59.62	131.52	71.90	PASS
369.187	Average	37.08	10.60	0.26	47.94	102.52	54.58	PASS
369.187	Peak	51.82	10.60	0.26	62.68	122.52	59.84	PASS
486.677	QP	36.36	10.55	0.27	47.18	94.04	46.86	PASS
616.385	QP	37.43	10.69	0.26	48.38	72.67	24.29	PASS
740.512	QP	32.81	10.79	0.12	43.71	71.57	27.86	PASS
862.884	QP	33.27	10.96	0.13	44.36	70.48	26.12	PASS
985.278	QP	30.38	10.94	0.12	41.44	69.39	27.94	PASS
1107.54	QP	30.87	10.95	0.13	41.95	68.30	26.34	PASS
1226.154	QP	28.46	10.97	0.13	39.56	67.24	27.67	PASS

X Pass Fail N/A

- Table of Field Strength of Fundamental, Average or Quasi-Peak Detecting, Antenna was used AL-130.

LabTest Certification Inc.
Intentional Radiated Emissions
FCC15.209, 3 meters, Averaging and QP Detector

Operator: Jeremy Lee

08:08:47 PM, Tuesday, December 08, 2015

Contact: Dalibor Pokarajac
Company: Guard RFID Solutions Inc.

Frequency	Measured	AntFactor	PathLoss	Emission	Limit	Margin	T/T	Tower	POL
MHz	dBuV	dB/m	dB	dBuV/m	dBuV/m	dB	Degree	cm	
244.475000 KHz	37.15	10.53	0.24	47.92	111.52	63.60	32.3	230.2	H
369.187000 KHz	37.08	10.60	0.26	47.94	102.52	54.58	193.5	107.5	H
486.677000 KHz	36.36	10.55	0.27	47.18	94.04	46.86	114.8	146.3	H
616.385000 KHz	37.43	10.69	0.26	48.38	72.67	24.29	193.3	255.6	H
740.512000 KHz	32.81	10.79	0.12	43.71	71.57	27.86	141.5	329.8	H
862.884000 KHz	33.27	10.96	0.13	44.36	70.48	26.12	24.0	237.2	H
985.278000 KHz	30.38	10.94	0.12	41.44	69.39	27.94	109.0	122.5	H
1.107540 MHz	30.87	10.95	0.13	41.95	68.30	26.34	216.3	137.2	H
1.226154 MHz	28.46	10.97	0.13	39.56	67.24	27.67	247.0	296.0	H

T: 22.4 C, H: 44.0 %, BP.:100.3 kPa

Project # - 12955
Model # - Proximity Tag Exciter
Serial # - 000120
Sample # - 3809

keep exciting as Level "F" - w PSU, add a Ferrite with 3 turns

- Table of Field Strength of Fundamental, Peak Detecting, Antenna was used AL-130.

LabTest Certification Inc.
Intentional Radiated Emissions
FCC15.209, 3 meters, Peak Detector

Operator: Jeremy Lee

08:08:47 PM, Tuesday, December 08, 2015

Contact: Dalibor Pokarajac
Company: Guard RFID Solutions Inc.

Frequency	Measured_PK	AntFactor	PathLoss	Emission_PK	Limit_PK	Margin_PK	T/T	Tower	POL
MHz	dBuV	dB/m	dB	dBuV/m	dBuV/m	dB	Degree	cm	
244.475 KHz	48.85	10.53	0.24	59.62	131.52	71.90	32.3	230.2	H
369.187 KHz	51.82	10.60	0.26	62.68	122.52	59.84	193.5	107.5	H

T: 22.4 C, H: 44.0 %, BP.:100.3 kPa

Project # - 12955
Model # - Proximity Tag Exciter
Serial # - 000120
Sample # - 3809

keep exciting as Level "F" - w PSU, add a Ferrite with 3 turns

Field Strength of Spurs- Unintentional spurs

Temperature	22.1 to 23.4 °C
Relative Humidity	37.0 to 44.0 %
Barometric Pressure:	100.3 to 101.7 kPa
Test Date	December 02 & 08, 2015
Sample Number	3809
Calibrated Test Equipment (ID)	241, 266, 272, 371
Reference Equipment (ID) (Calibration not required)	059, 374, 516
Tested Voltages	120VAC, 60Hz, Single Phase
Tested By	Jeremy LEE

Use the barometric pressure reported at: http://www.theweathernetwork.com/weather/cabc0284

Test Limits

FCC 15.209:

(c) The level of any unwanted emissions from an intentional radiator operating under these general provisions shall not exceed the level of the fundamental emission. For intentional radiators which operate under the provisions of other sections within this part and which are required to reduce their unwanted emissions to the limits specified in this table, the limits in this table are based on the frequency of the unwanted emission and not the fundamental frequency. However, the level of any unwanted emissions shall not exceed the level of the fundamental frequency.

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100**	3
88-216	150**	3
216-960	200**	3
Above 960	500	3

**Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permItted under other sections of this part, e.g., §§15.231 and 15.241.

(d) The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

Test Setup

The test was performed in accordance with **FCC 15.109, FCC 15.31, FCC 15.33, FCC 15.35, and ANSI C63.4, 2014.**

Test procedure is based on the FCC15.31(a)(3) - Other intentional and unintentional radiators are to be measured for compliance using the following procedure excluding sections 4.1.5.2, 5.7, 9 and 14: ANSI C63.4–2014: "Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz" (incorporated by reference, see § 15.38). This incorporation by reference was approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR Part 51.
NOTE to Paragraph (a)(3): Digital devices tested to show compliance with the provisions of §§ 15.107(e) and 15.109(g) must be tested following the ANSI C63.4 procedure described in paragraph (a)(3) of this section.[As stated in the adopting R&O, ANSI C63.4 is not used for measurements below 30 MHz.]

The EUT was placed on 0.8-meter high nonconductive table that was placed directly onto a flush mounted turntable. The EUT was set 3 meters away from the interference-receiving antenna. It is measured with a receiver – the EMC analyzer, was software controlled.
The antennas was installed followed ANSI C63.4-2014, Clause 8.2 as followed;

- Under 30MHz
  - Active Loop Antenna, AL-130 was used as followed ANSI C63.4-2014, Clause 8.2.1.
  - The center of the loop was 1 m above the ground Plane of Chamber.
- 30 to 1,000MHzused an Active Loop Antenna.
  - Broadband Hybrid Antenna, JB-1 was used as followed ANSI C63.4-2014, Clause 8.2.3.
  - The antenna height was varied from 1 m to 4 m.

The EUT was positioned the emissions from the unit were maximized by manipulating the cables, and by adjusting the polarization and height of the receive antenna and rotating the EUT on the turntable.

- The EUT was set-up at Channel "F".
- The following measurements were made with
  - Span = wide enough to fully capture the emission being measured.
  - RBW = 9kHz(under 30MHz) and 120kHz(30 to 1,000MHz)
  - VBW = 30kHz(under 30MHz) and 300kHz(30 to 1,000MHz)
  - Sweep = Auto
  - Detector Method = Quasi-peak
  - Trace = Single trace up to capturing the whole range of signal

Test Result

Emission level (dBuV/m) = Detected level (dBuV) +Cable Loss (dB) + Antenna Factor (dB/m) – Pre-amplifier's Gain (dB)

Frequency (MHz)	Detector	Measured (dBuV)	AF (db/m)	Path Loss (dB)	Radiated Emission (dBuV/m)	Limit (dBuV/m)	Margin (dB)	POL	Results
32.6048	QP	37.06	19.06	-27.26	28.85	40.00	11.15	V	PASS
50.4601	QP	55.72	8.05	-27.07	36.70	40.00	3.30	V	PASS
94.4536	QP	52.11	9.49	-26.55	35.05	43.52	8.47	V	PASS
108.8150	QP	50.78	12.86	-26.40	37.24	43.52	6.28	V	PASS
125.8362	QP	53.08	14.98	-26.20	41.87	43.52	1.65	V	PASS
127.7380	QP	40.51	14.30	-26.17	28.64	43.52	14.88	H	PASS
136.3842	QP	50.63	13.76	-26.06	38.33	43.52	5.19	V	PASS

136.7655	QP	39.50	13.72	-26.06	27.16	43.52	16.36	H	PASS

Note) There was no checked signal with Quasi-Peak detector under 30MHz as see their plot with peak detector.

X Pass **Fail** **N/A**

- Table of Field Strength of Fundamental, QP Detecting, and Antenna was used JB-1.

LabTest Certification Inc.
Intentional Radiated Emissions
FCC15.209, 3 meters, Horizontal

Operator: Jeremy Lee

Contact: Dalibor Pokrajac
Company: Guard RFID Solutions Inc.

05:04:25 PM, Wednesday, December 02, 2015

Frequency MHz	Measured dBuV	AntFactor dB/m	PathLoss dB	Emission dBuV/m	Limit dBuV/m	Margin dB	T/T Degree	Tower cm	POL
127.7380 MHz	40.51	14.30	-26.17	28.64	43.52	14.88	76.3	143.6	H
136.7655 MHz	39.50	13.72	-26.06	27.16	43.52	16.36	295.8	175.2	H

T: 23.4 C, H: 38.0 %, BP.:101.3 kPa

Project # - 12955
Model # - Proximity Tag Exciter
Serial # - 000120
Sample # - 3809

keep exciting - w PSU

LabTest Certification Inc.
Intentional Radiated Emissions
FCC15.209, 3 meters, Vertical

Operator: Jeremy Lee

Contact: Dalibor Pokrajac
Company: Guard RFID Solutions Inc.

03:56:36 PM, Wednesday, December 02, 2015

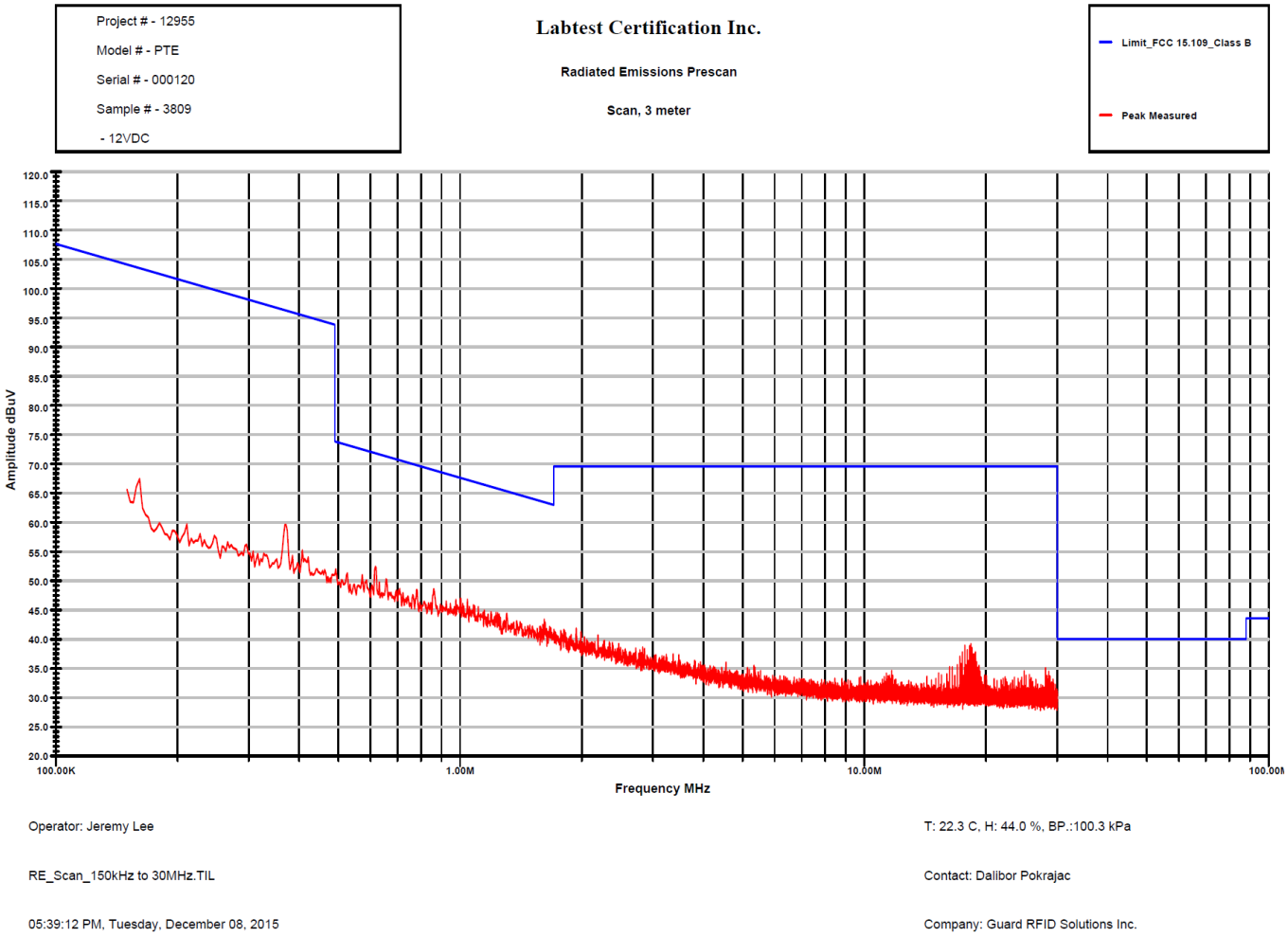
Frequency MHz	Measured dBuV	AntFactor dB/m	PathLoss dB	Emission dBuV/m	Limit dBuV/m	Margin dB	T/T Degree	Tower cm	POL
32.6048 MHz	37.06	19.06	-27.26	28.85	40.00	11.15	103.3	115.0	V
50.4601 MHz	55.72	8.05	-27.07	36.70	40.00	3.30	191.0	102.1	V
94.4536 MHz	52.11	9.49	-26.55	35.05	43.52	8.47	324.0	140.2	V
108.8150 MHz	50.78	12.86	-26.40	37.24	43.52	6.28	360.0	100.4	V
125.8342 MHz	53.08	14.98	-26.20	41.87	43.52	1.65	335.3	155.0	V
136.3842 MHz	50.63	13.76	-26.06	38.33	43.52	5.19	10.5	181.3	V

T: 23.4 C, H: 38.0 %, BP.:101.3 kPa

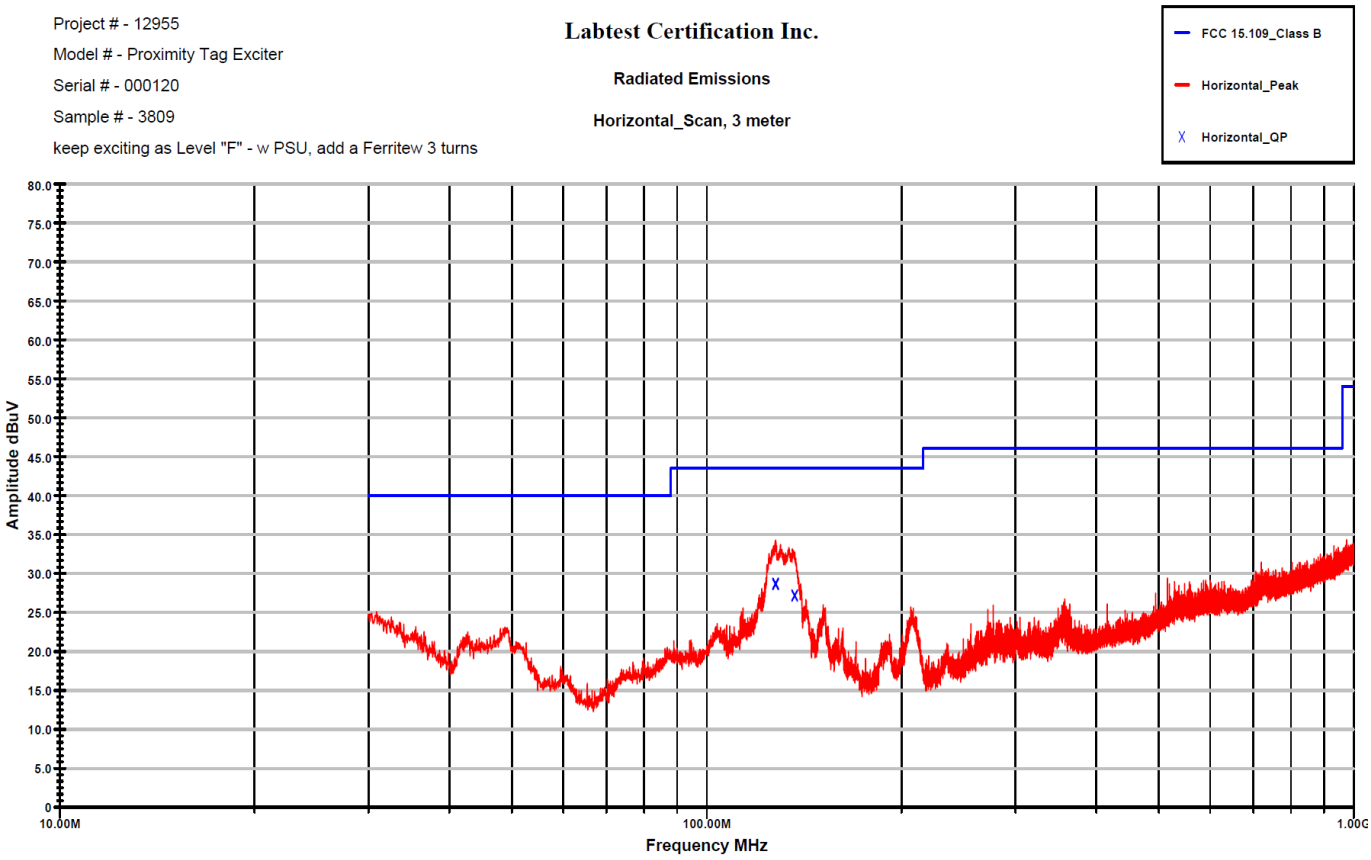
Project # - 12955
Model # - Proximity Tag Exciter
Serial # - 000120
Sample # - 3809

keep exciting - w PSU

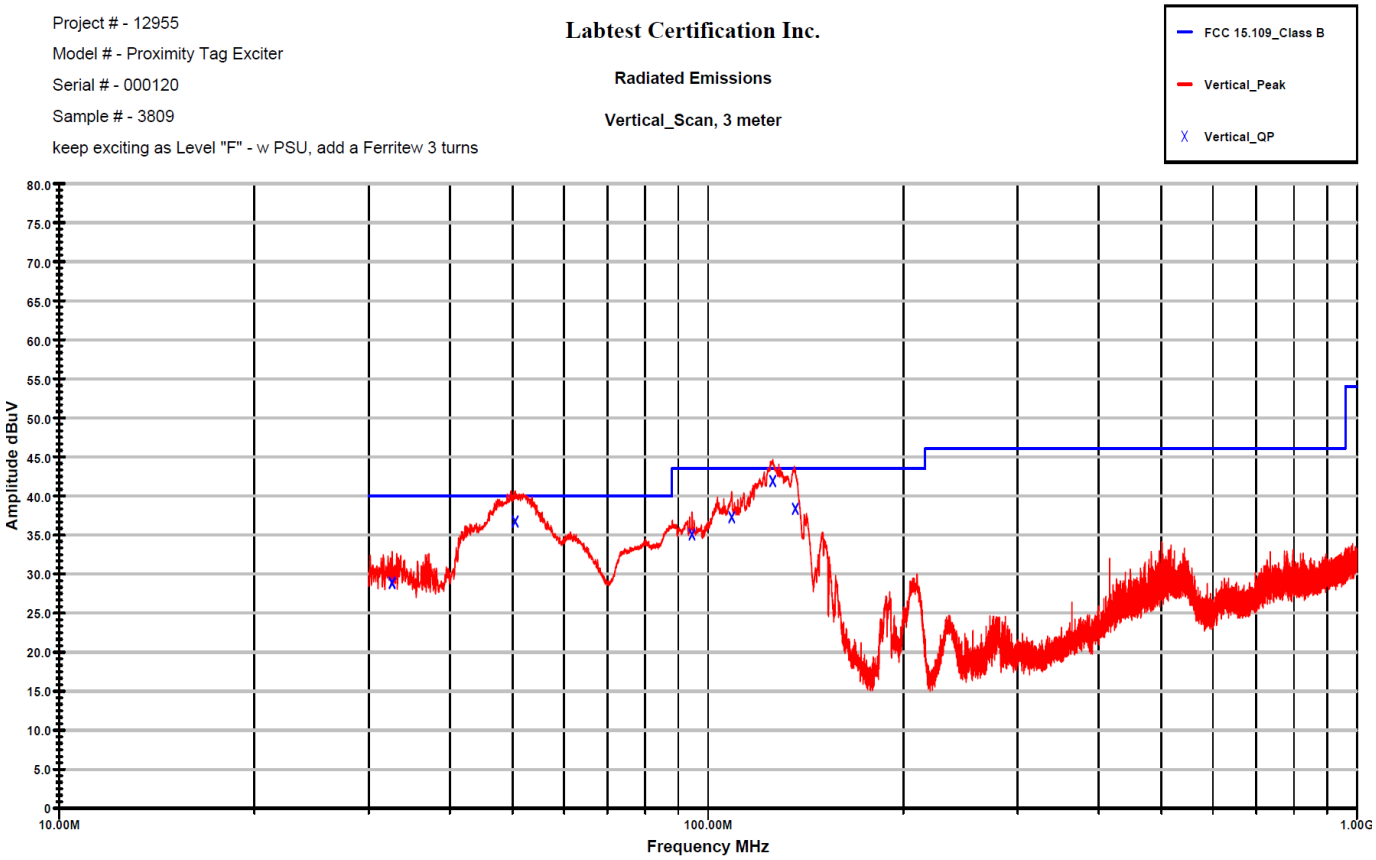
- Graph of Radiated Emissions: 150kHz to 30MHz, Peak detecting, and Antenna was used AL-130.



- Graph of Radiated Emissions: 30 to 1,000MHz, Peak detecting, the polarization of Antenna, JB-1 was Horizontal.



- Graph of Radiated Emissions: 30 to 1,000MHz, Peak detecting, the polarization of Antenna, JB-1 was Vertical.



Operator: Jeremy Lee

RE_Scan_over 30MHz.TIL

03:57:44 PM, Wednesday, December 02, 2015

T: 22.1 C, H: 37.0 %, BP.:101.7 kPa

Contact: Dalibor Pokrajac

Company: Guard RFID Solutions Inc.

Occupied Bandwidth, 99.00%

Temperature	22.1 to 23.4 °C
Relative Humidity	37.0 to 44.0 %
Barometric Pressure:	100.3 to 101.7 kPa
Test Date	December 02 & 08, 2015
Sample Number	3809
Calibrated Test Equipment (ID)	241, 266, 272, 371
Reference Equipment (ID) (Calibration not required)	059, 374, 516
Tested Voltages	120VAC, 60Hz, Single Phase
Tested By	Jeremy LEE

Use the barometric pressure reported at: http://www.theweathernetwork.com/weather/cabc0284

Test Limits

RSS-GEN, Clause 6.6:

When the occupied bandwidth limit is not stated in the applicable RSS or reference measurement method, the transmitted signal bandwidth shall be reported as the 99% emission bandwidth, as calculated or measured.

Test Setup

The test was performed in accordance with **ANSI C63.10:2013.**

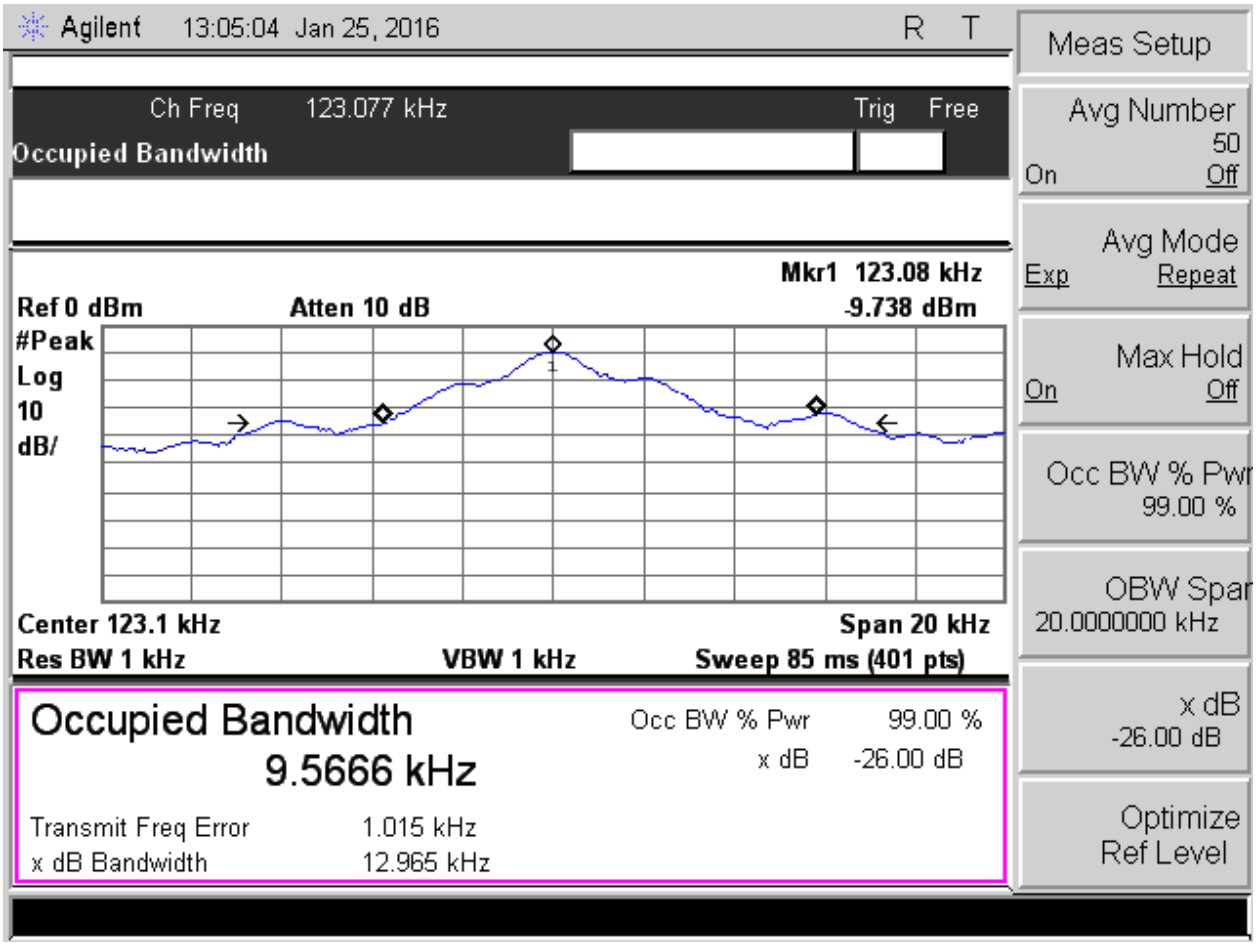
- Center frequency: 123.077kHz
- Frequency span: 20kHz.
- RBW: 1kHz
- VBW: 1kHz
- Set the 99% power bandwidth function of the Spectrum Analyzer, Agilent E4404B.
- Used Max Hold function for proper sampling.

Test Result:

Carrier Frequency (kHz)	Occupied Bandwidth, 99.00%(kHz)	Limits(kHz)	Results
123.077	9.567	N/A	PASS

X Pass **Fail** **N/A**

- Bandwidth, 99% Method.



APPENDIX A: Test equipments used for tests

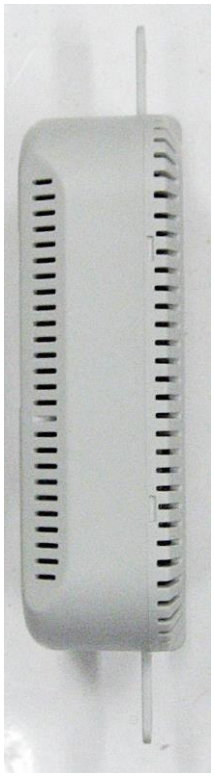
ID No.	Description	Manufacturer	Model	Serial No.	Calibration Date	Calibration Due Date	Calibration Certificate No:	Calibration Laboratory
059	AC Power Source	California Instrument	5000i	HK51870	N/A	N/A	N/A	N/A
215	Transient Limiter	Com-Power	LIT-930	531518	N/A	N/A	N/A	N/A
241	Active Loop Antenna	AL-130	Com-Power	17075	28-Oct-2015	28-Oct-2017	151020-114249-d3931f	Liberty Labs
266	Humidity/ Temperature Logger	Onset HOBO	U14-001	2436907	23-Jan-2014	23-Jan-2016	890824060	Techmaster
272	EMC Analyzer	Agilent	E7405A	US41110263	09-Jun-2015	09-Jun-2016	1-6977926962-1	Keysight
371	EMC Broadband Antenna	Sunol	JB1	A022012	17-Mar-2014	17-Mar-2016	1403130381	Liberty Labs
374	EMC Shielded Enclosure	USC	USC-26	111811	N/A	N/A	N/A	N/A
377	LISN	Solar	8611-50-TS-10-N	118553	06-Jan-2015	06-Jan-2016	150106-090623-71a854	Liberty Labs
378	LISN	Solar	8611-50-TS-10-N	118554	06-Jan-2015	06-Jan-2016	150106-091321-c72eae	Liberty Labs
406	Spectrum Analyzer	Agilent	E4404B	MY45115702	20-Nov-2015	20-Nov-2016	37880	Tradeport
516	Pre-Amplifier	Agilent	AT8447D	2944A10969	N/A	N/A	N/A	N/A

APPENDIX B: Photos

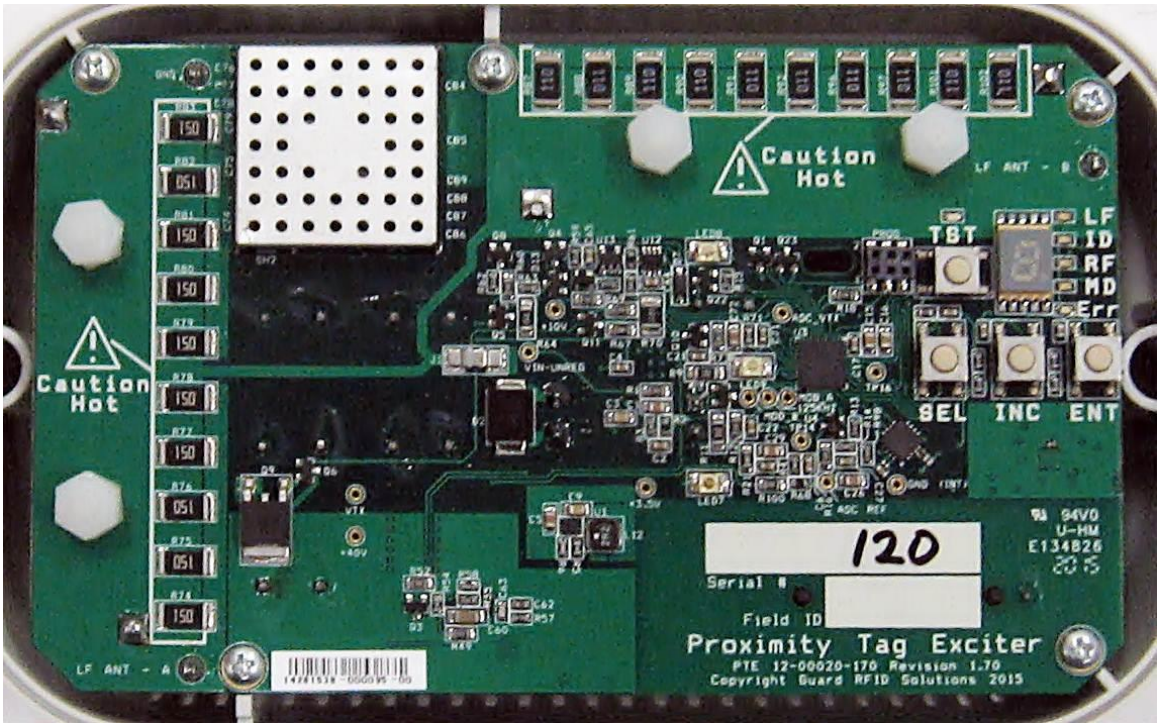
- EUT: Top View

Bottom View

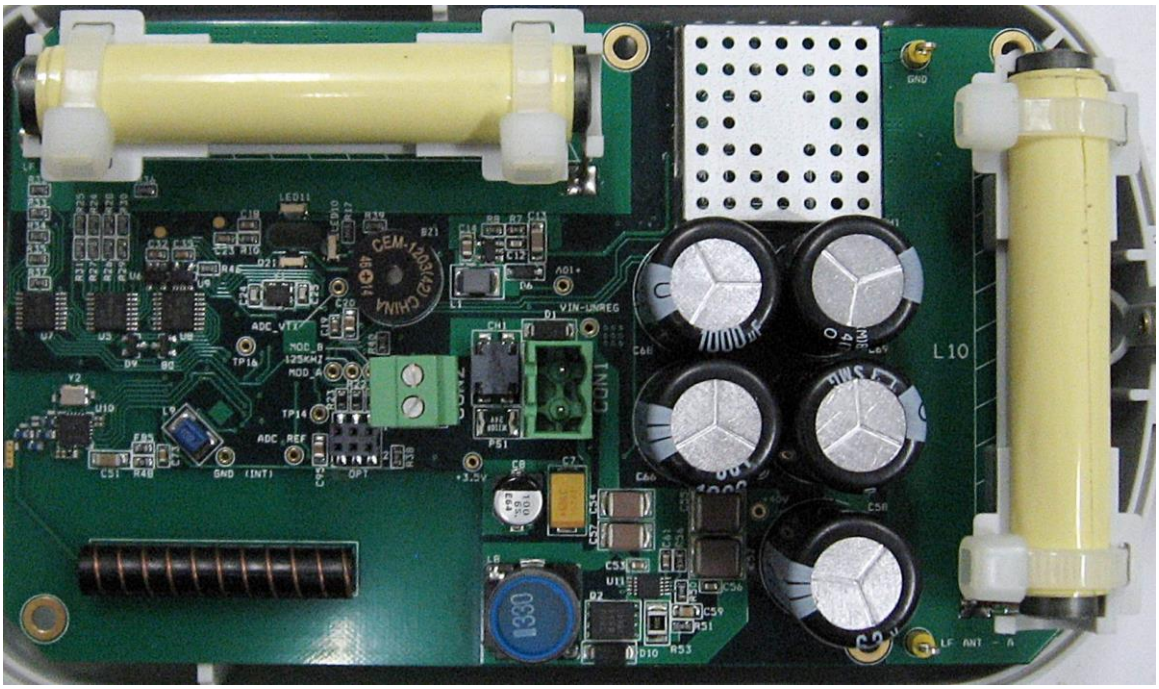
Side View



- EUT: Internal View_Top

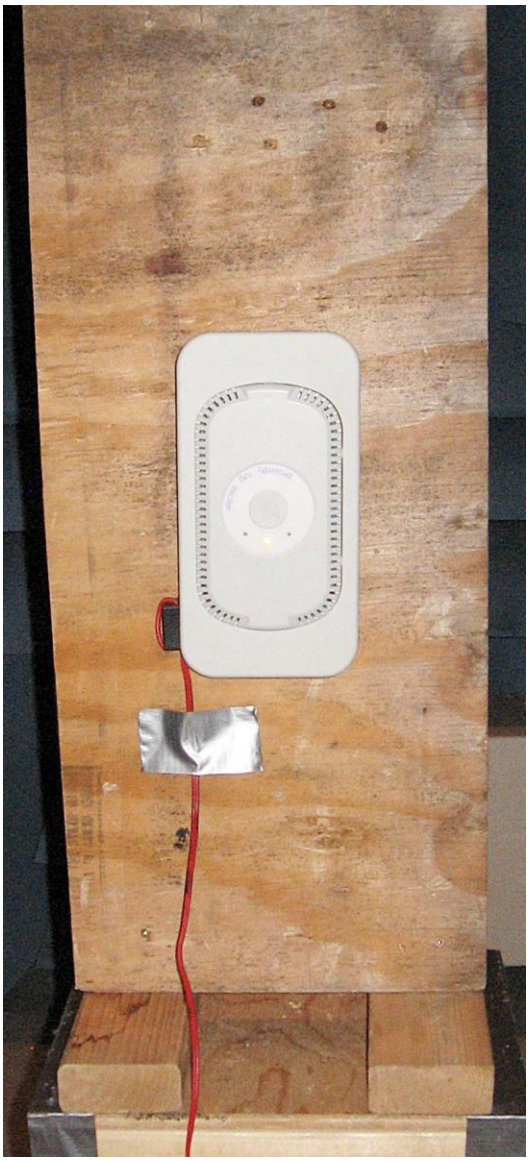


- EUT: Internal View_Bottom

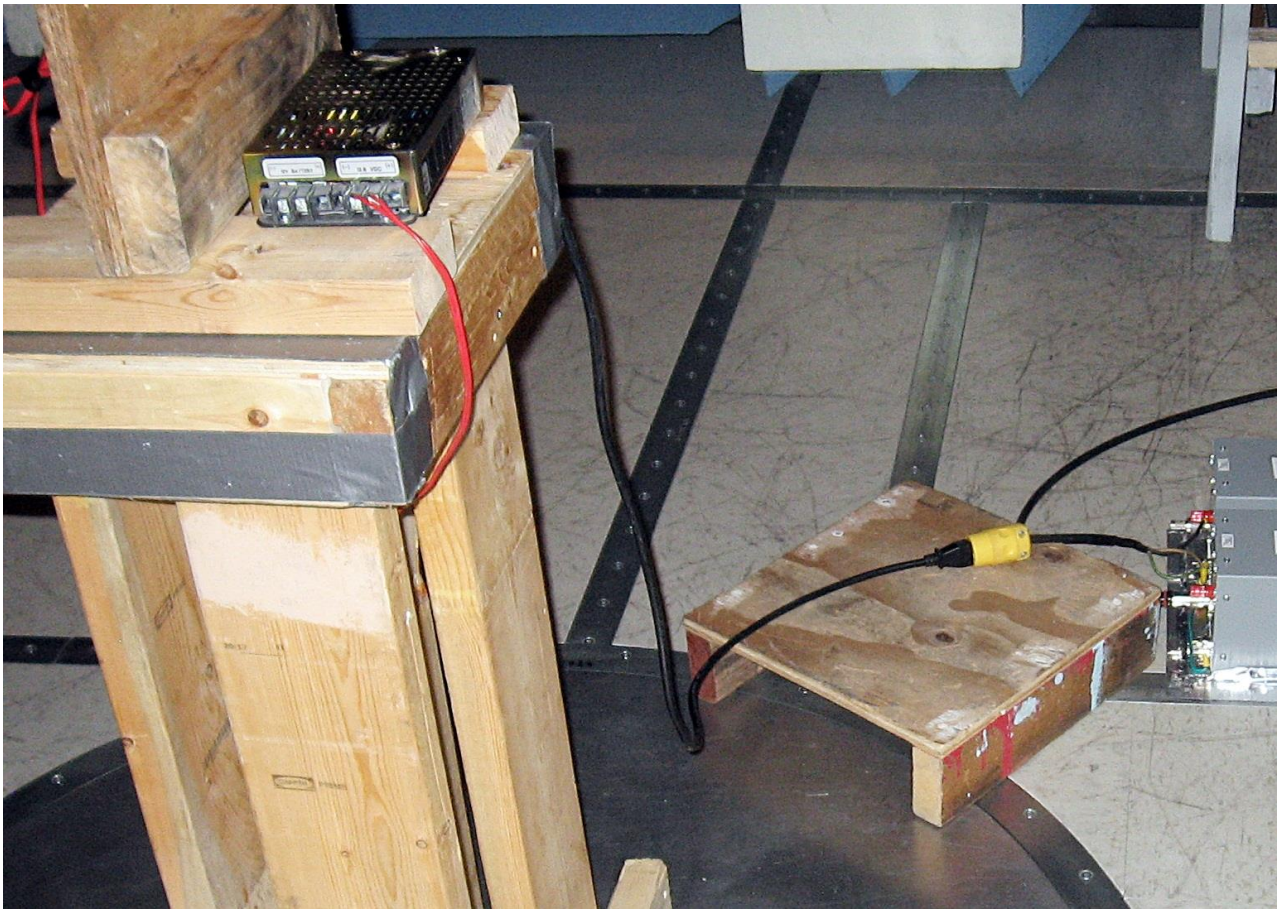


APPENDIX C: Test setup photos

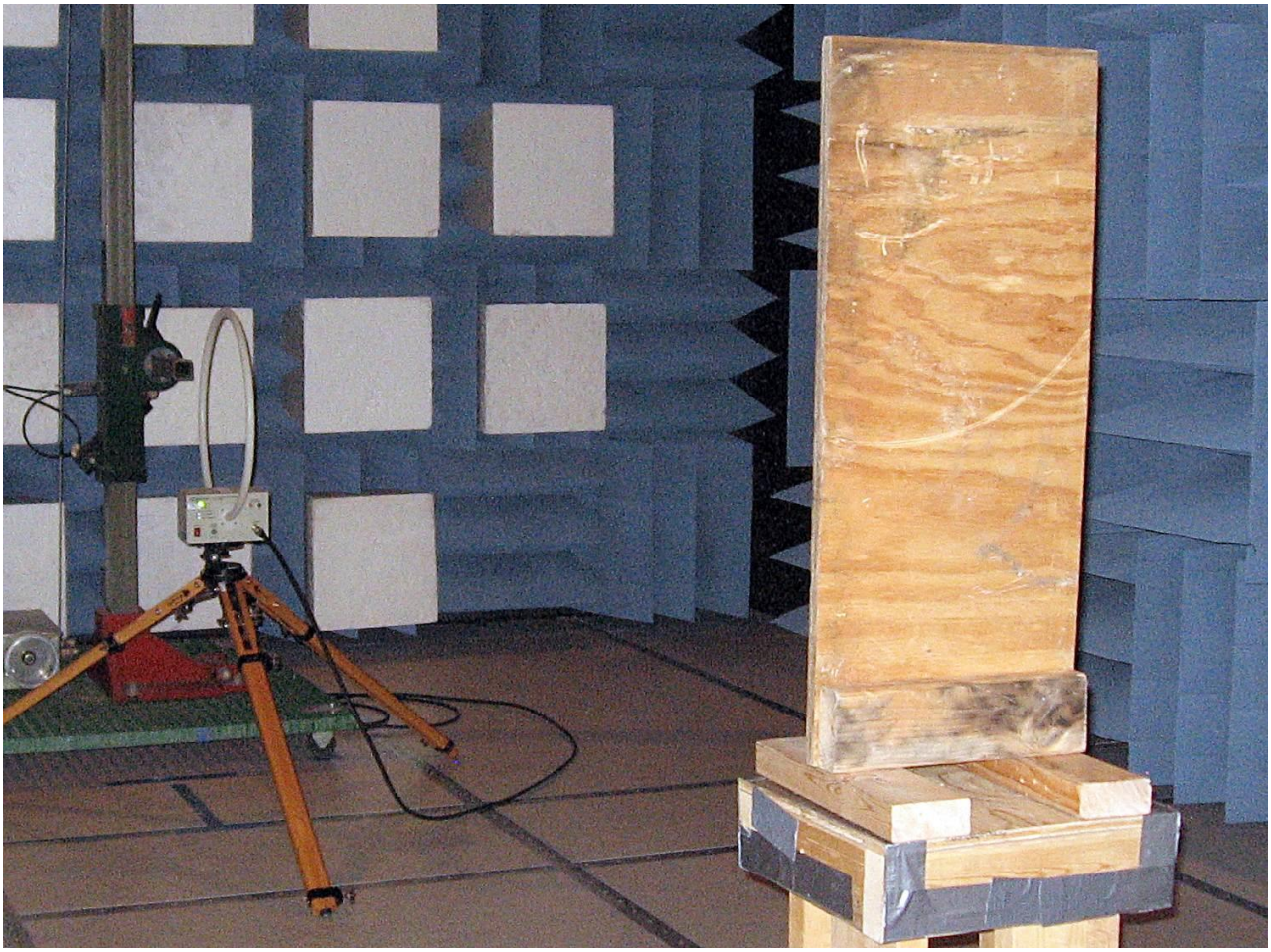
- Test setup as Wall Ceiling



- Test configuration for Conducted Emissions



- Test configuration for Radiated Measurement_under 30MHz



- Test configuration for Radiated Measurement_30 to 1,000MHz

APPENDIX D: ISO 17025:2005 Accreditation Certificate

International Accreditation Service

CERTIFICATE OF ACCREDITATION

This is to signify that

LABTEST CERTIFICATION, INC.
3133-20800 WESTMINSTER HIGHWAY
RICHMOND, BRITISH COLUMBIA V6V 2W3
CANADA

Testing Laboratory TL-367
(Revised March 21, 2013)

has met the requirements of the IAS Accreditation Criteria for Testing Laboratories (AC89), has demonstrated compliance with ISO/IEC Standard 17025:2005, *General requirements for the competence of testing and calibration laboratories*, and has been accredited, commencing May 5, 2011, for the test methods listed in the approved scope of accreditation.

Patrick V. McCullen
Vice President

C. P. Ramani, P.E.
President

ilac-MRA

IAS

ACCREDITED

(see attached scope of accreditation for fields of testing and accredited test methods)

Page 1 of 5

Print Date: 04/25/2013

This accreditation certificate supersedes any IAS accreditation certificate bearing an earlier date. The certificate becomes invalid upon suspension, cancellation or revocation of accreditation.
See the IAS Accreditation Listings on the web at www.iasonline.org for current accreditation information, or contact IAS directly at (562) 364-8201.

11-04577

International Accreditation Service

SCOPE OF ACCREDITATION

LabTest Certification, Inc. TL-367
(Revised March 21, 2013

LabTest Certification, Inc.
3133-20800 Westminster Hwy.
Richmond, British Columbia V6V 2W3
Canada

Kavinder Dhillon
QMS Manager
(604) 247-0444

FIELDS OF TESTING	ACCREDITED TEST METHODS
Gas and Plumbing	ANSI Standards Z21.1, Z21.8, Z21.10.1, Z21.13/CSA 4.9, Z21.15, Z21.17/CSA 2.7, Z21.19/1.6, Z21.20/C22.2 NO. 199, Z21.42, Z21 50, Z21.57, Z21.58,Z21.63/CSA 11.3, Z21.72/CSA 11.2, Z21.76, Z21.86/CSA 2.32, Z21.91, Z21.97 and Z21.89/CGA1.18, Z83.7/CSA 2.14, Z83.11/CSA 1.8, Z83.26/CSA 2.37; CAN1-1.1, CAN1-2.15, CAN1-2.21, CSA Standards B45 Series, B125, B140.0, B140.1, B140.2.1, B140.2.2, B140.3, B140.4, B140.7-05, B140.8, B140.9.3, B140.9.4-10, B140.12-03, B212-00, B366.1-11, B415.1-10; CGA 1.3,CGA 1.16, CGA 2.17; CSA/CGA-3.4; AS 4551/Ag101, AS 4553/AG 103, AS 4563 and AS 2658; EN Standards 30-1-1, 30-1-2, 30-1-3, 30-1-4, 30-2-1 and 30-2-2, ASME A112 Series; UL Standards 296, 372, and 795
Electrical, EMC and Electro-mechanical	AS 4268.1, 4268.2; AS/NZS 1044, 1053, 2064, 3548, 3652, 4051, 4251.1, 4251.2, 62040.2; 60335.1; AS/NZS 60598.1, AS/NZS 60950.1, AS/NZS 60745.1, AS/NZS 60730.1; CISPR 11 / EN55011; CISPR 14 / EN55014, CISPR 15 / EN55015, CISPR 22 / EN55022, CISPR 24 / EN55024, EN 12895, 301 489, 300 386, 50083-2, 50090-2-2, 50091-2, 50121-1, 50121-2,

ACCREDITED

May 5, 2011
Commencement Date

C. P. Ramani, P.E.
President

Print Date: 04/25/2013

Page 2 of 5

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11-04680

International Accreditation Service

SCOPE OF ACCREDITATION

LabTest Certification, Inc. TL-367
(Revised March 21, 2013

FIELDS OF TESTING	ACCREDITED TEST METHODS
Electrical, EMC and Electro-mechanical (continued)	50121-3-1, 50121-3-2, 50121-4, 50121-5, 50130-4, 50263, 50270, 50293, 50295, 50370-1, 50370-2, 50428, 50470-1, 55012, 55013, 55103-1, 55103-1, 55103-2, 55103-2, 60204-31, 60439-1, 60669-2-1, 60669-2-1, 60669-2-2, 60669-2-3, 60730-1, 60730-2-11, 60730-2-13, 60730-2-14, 60730-2-18, 60730-2-5, 60730-2-6, 60730-2-7, 60730-2-8, 60730-2-9, 60870-2-1, 60945, 61204-3, 61326, 61347-1 Part 1, 61543, 61547, 61547, 617:2001, 618, 619, 620 and 62040-2; FCC Part 15, 18; GB 13837 (CISPR 13); GB 4943, 9254, 7000.1, 7000.10, 7000.11, 7000.12, 2313, 8898, 15143, 14045, 17743, 13836 and 13837; GB/T 9383; GB/T 17618; GB 17625.1, 2; GB/T 17626.2 and 17626.4 and 17626.5; GB/T 176262.6, 176262.8, 176262.11; GB 4343.1 (CISPR 14.1), 4343.2 (CISPR 14.2), GB 4824; HKTA 1001, 1005, 1007 and 1022; ICES-001, 003; JIS T 0601-1-2; IEC/EN/AS/KN: 60601-1-2; IEC/EN/AS/KN/JIS C: 61000-3-2, 61000-3-3, 61000-4-2, 61000-4-3, 61000-4-4, 61000-4-5, 61000-4-6, 61000-4-8, 61000-4-9, 61000-4-11, 61000-4-12, 61000-4-13, 61000-6-1, 61000-6-2, 61000-6-3 and 61000-6-4; IEC/EN/AS/KN: 61326; RSS-130, 136, 138, 182, 187, 210, 213, 215, 243 and 310; MIL-STD-461E; MIL-STD-462D; KN60601-1-2; KN301 489; KN22, 24; YD 1032; YD/T 965, 968, 993, 1103; CSA Standards C22.2 No. 0, .1, .17, .4, 6, 8, 9, 10, 12, 14, 15, 18, 24, 29, 33, 36, 37, 40, 43, 53, 61, 66-1-06, 63, 64, 66.1, 66.2, 66.3, 68, 71.1, 71.2, 72, 73, 81, 85, 88, 89, 94, 99, 100, 101, 103, 104, 105, 107.1, 107.2, 107.3, 108, 109, 110, 112, 113, 114, 115, 117, 122, 125,

ACCREDITED

May 5, 2011
Commencement Date

C. P. Ramani, P.E.
President

Print Date: 04/25/2013

Page 3 of 5

This accreditation certificate supersedes any IAS accreditation certificate bearing an earlier date. The certificate becomes invalid upon suspension, cancellation or revocation of accreditation.
See the IAS Accreditation Listings on the web at www.iasonline.org for current accreditation information, or contact IAS directly at (562) 364-8201.

11-04680

International Accreditation Service

SCOPE OF ACCREDITATION

LabTest Certification, Inc. TL-367
(Revised March 21, 2013

FIELDS OF TESTING	ACCREDITED TEST METHODS
Electrical, EMC and Electro-mechanical (continued)	139, 141, 147, 148, 149, 150, 156, 157, 158, 164, 165, 166, 167, 168, 169, 173, 177, 183.1, 183.2, 184, 187, 191, 195, 205, 207, 213, 217, 218.1, 218.2, 223, 224, 225, 231, 234, 236, 243, 247, 250, 60065, 60947-1; 60947-4-1, 60950-22, 60950-23, 62368-1, E60335-1, -2, E60730-1, -2, E60745-1, -2, E61010-1, -2, E742, Z240 RV Series 08; IEC/EN Standards 60335-1, -2, 60730-1, -2, 60745-1, -2; 61010-1, -2, 60601-1, -2, 60065, 60079-0, -6, -11, -15 and 60950-1, -2; IEC/EN 60529; 60945, 60598-1, -2, 61347-1; UL Standards 48, 50, 73, 197, 499, 507, 508, 508A, 676, 745-1, 751, 763, 778, 858, 867, 875, 924, 935, 982, 987, 998, 1004, 1012, 1026, 1261, 1310, 1431, 1472, 5085-2_1; 5085-3; 1563, 1564, 1585, 1598, 1647, 1795, 1993, 1995, UL/CSA 5085-16500, 8750, 2388; 60335-1, 60335-2, 60601-1, 60601-2, 60730-1, 60730-2, 60745-1, 60745-2, 60950-1, 61010-1 and 61010-2; ISO EN Standards 60601-1-2 Part 1-2, 61000-3-2 (Equipment input current less than or equal to 16 Amps/Phase) and 61000-4-3; ANSI Standards C63.4 and C63.7 (only to 26.5GHz); UL Standards 1778, 60947-1, 60947-4-1, 60950-22, 60950-23, and 62368-1
Environmental and Energy	IEC/EN Standards 60068-2-1, 2-2, 2-6, 2-30, 2-27, 2-14, 2-64, 60092-101, 60695-2-2; MIL-STD-810: Method 500.4, 501.4, 502.4, 503.4, 506.4, 507.4, 510.4, 512.4 and 514.5; RTCA-DO-160E: Section 4, 5, 6, 7.2, 8, 10, 12, 16, 17 and 25; CSA Standard P4; CAN/CSA Standards C-300 and C-814;; ISO Standards 9806-1, 9806-2 and 9806-3; SRCC 100-08, SRCC TM-1, SRCC-150; CSA Standards F378 and F379, EN Standards 12975-1 and 12975-2

May 5, 2011
Commencement Date

ACCREDITED

C. P. Ramani, P.E.
President

Print Date: 04/25/2013

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11-04680

International Accreditation Service

SCOPE OF ACCREDITATION

LabTest Certification, Inc. TL-367
(Revised March 21, 2013

FIELDS OF TESTING	ACCREDITED TEST METHODS
ENERGY STAR Program Requirements	Product Specification for Water Coolers Eligibility Criteria
Maritime	ABYC Standards A-3, A-7, A-26, A-27, A-28, A-30, A-31, E-2, E-11, H-2, P-14, P-17, P-18, P-21, P-22, P-24 and P-27; EN Standards 28846, 28848, 28849, 29775, 60092-507; EN ISO 10133, 12216, 13297, 13929, 14895, 15083, 7840, 8847, 8849, 10239, 10240, 10592: 1995/A1, 11105, 11192 and 9097:1994/A1; IACS E1 – E21; 21005; DNV 2.4, BV: Rules for Classification of Steel Ships – Part C, Chapter 3, Section 6.2 Type Approval; ABS Part 4, Chapter 9, Section 7, Lloyds Type Approval Systems – Test Specification Number 1; GL VI-Part 7 Section 3 – Section – B Test Requirements, Chapter 2
Lighting	CAN/CSA C22.2 NO. 1993/UL 1993/NMX-J-578/1-ANCE), C22.2 NO. 206, C22.2 NO. 250.7, C22.2 NO. 256/UL 1786), C22.2 NO. 250.13,E61347-1, E61347-2-3
Hazardous Locations	CAN/CSA C22.2 NO. 25, 30, 137, 157, 213; CAN/CSA C22.2, EN, IEC and UL 60079-0, 60079-1, 60079-2, 60079-6, 60079-11, 60079-15, 60079-18, 60079-31; IEC/EN 13463-1, 13463-3, 13463-5, 13463-8; ISA 12.12.01; UL 913

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END OF REPORT