MET Laboratories, Inc. *Safety Certification - EMI - Telecom Environmental Simulation*
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June 27, 2011

Echelon Corporation
550 Meridian Avenue
San Jose, CA 95126

Dear James Smith,

Enclosed is the EMC Wireless test report for compliance testing of the Echelon Corporation, Edge Control Node (ECN) 70101-XXXX as tested to the requirements of Title 47 of the CFR, Ch. 1 (10-1-06 ed.), Part 15, Subpart B, ICES-003, Issue 4 February 2004 for a Class B Digital Device.

Thank you for using the services of MET Laboratories, Inc. If you have any questions regarding these results or if MET can be of further service to you, please feel free to contact me.

Sincerely yours,
MET LABORATORIES, INC.

Jennifer Warnell
Documentation Department

Reference: (\Echelon Corporation\EMCS83011-FCC Rev. 2)

Electromagnetic Compatibility Criteria
Test Report

for the

Echelon Corporation
Edge Control Node (ECN) 70101-XXXX

Tested under
the FCC Certification Rules
contained in
Title 47 of the CFR, Parts 15 Subpart B & ICES-003
for Class B Digital Devices

MET Report: EMCS83011-FCC Rev. 2

June 27, 2011

Prepared For:

Echelon Corporation
550 Meridian Avenue
San Jose, CA 95126

Prepared By:
MET Laboratories, Inc.
3162 Belick St.
Santa Clara, CA 95054

Electromagnetic Compatibility Criteria
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Lionel Gabrillo, Project Engineer
Electromagnetic Compatibility Lab

Jennifer Warnell
Documentation Department

Engineering Statement: The measurements shown in this report were made in accordance with the procedures indicated, and the emissions from this equipment were found to be within the limits applicable. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them. It is further stated that upon the basis of the measurements made, the equipment tested is capable of operation in accordance with the requirements of the FCC Rules Parts 15B and Industry Canada standards ICES-003, Issue 4 February 2004 under normal use and maintenance.

Shawn McMillen,
Wireless Manager, Electromagnetic Compatibility Lab

Report Status Sheet

Revision	Report Date	Reason for Revision
∅	June 16, 2011	Initial Issue.
1	June 24, 2011	Revised to reflect engineer corrections.

Table of Contents

List of Tables

List of Plots

List of Photographs

List of Terms and Abbreviations

AC	**A**lternating **C**urrent
ACF	**A**ntenna **C**orrection **F**actor
Cal	**Cal**ibration
d	**M**easurement **D**istance
dB	**D**eci**b**els
dBµA	**D**eci**b**els above one **micro**amp
dBµV	**D**eci**b**els above one **micro**volt
dBµA/m	**D**eci**b**els above one **micro**amp **per m**eter
dBµV/m	**D**eci**b**els above one **micro**volt **per m**eter
DC	**D**irect **C**urrent
E	**E**lectric Field
DSL	**D**igital **S**ubscriber **L**ine
ESD	**E**lectro**s**tatic **D**ischarge
EUT	**E**quipment **U**nder **T**est
f	**F**requency
FCC	**F**ederal **C**ommunications **C**ommission
GRP	**G**round **R**eference **P**lane
H	Magnetic Field
HCP	**H**orizontal **C**oupling **P**lane
Hz	**H**ert**z**
IEC	**I**nternational **E**lectrotechnical **C**ommission
kHz	**k**ilo**h**ert**z**
kPa	**k**ilo**pa**scal
kV	**k**ilo**v**olt
LISN	**L**ine **I**mpedance **S**tabilization **N**etwork
MHz	**M**ega**h**ertz
µH	**microh**enry
µ	**microf**arad
µs	**micros**econds
NEBS	**N**etwork **E**quipment-**B**uilding **S**ystem
PRF	**P**ulse **R**epetition **F**requency
RF	**R**adio **F**requency
RMS	**R**oot-**M**ean-**S**quare
TWT	**T**raveling **W**ave **T**ube
V/m	**V**olts **per m**eter
VCP	**V**ertical **C**oupling **P**lane

I. Executive Summary

A. Purpose of Test

An EMC evaluation was performed to determine compliance of the Echelon Corporation Edge Control Node (ECN) 70101-XXXX, with the requirements of Part 15B. All references are to the most current version of Title 47 of the Code of Federal Regulations in effect. In accordance with §2.1033, the following data is presented in support of the Certification of the Edge Control Node (ECN) 70101-XXXX. Echelon Corporation should retain a copy of this document which should be kept on file for at least two years after the manufacturing of the Edge Control Node (ECN) 70101-XXXX, has been **permanently** discontinued.

B. Executive Summary

The following tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15B, in accordance with Echelon Corporation, purchase order number 32432. All tests were conducted using measurement procedure ANSI C63.4-2003.

FCC Reference 47 CFR Part 15.247:2005	IC Reference RSS-210 Issue 8: 2010; RSS-GEN Issue 3: 2010	Description	Compliance
47 CFR Part 15.107 (a)	ICES-003 Issue 4 February 2004	Conducted Emission Limits for a Class B Digital Device	Compliant
47 CFR Part 15.109 (a)	ICES-003 Issue 4 February 2004	Radiated Emission Limits for a Class B Digital Device	Compliant

Table 1. Executive Summary of EMC Part 15 Subpart B ComplianceTesting

II. Equipment Configuration

A. Overview

MET Laboratories, Inc. was contracted by Echelon Corporation to perform testing on the Edge Control Node (ECN) 70101-XXXX, under Echelon Corporation's purchase order number 32432.

This document describes the test setups, test methods, required test equipment, and the test limit criteria used to perform compliance testing of the Echelon Corporation, Edge Control Node (ECN) 70101-XXXX.

The results obtained relate only to the item(s) tested.

Model(s) Tested:	Edge Control Node (ECN) 70101-XXXX	
Model(s) Covered:	Edge Control Node (ECN) 70101-XXXX	
EUT Specifications:	Primary Power: 240 VAC, 60 Hz	
	FCC ID: IZP70101-R000	
	EUT Receive Frequency:	900 MHz
Analysis:	The results obtained relate only to the item(s) tested.	
Environmental Test Conditions:	Temperature: 15-35º C	
	Relative Humidity: 30-60%	
	Barometric Pressure: 860-1060 mbar	
Evaluated by:	Lionel Gabrillo	
Report Date(s):	June 27, 2011	

Table 2. EUT Summary Table

B. References

CFR 47, Part 15, Subpart B	Electromagnetic Compatibility: Criteria for Radio Frequency Devices
ICES-003, Issue 4 February 2004	Electromagnetic Compatibility: Criteria for Radio Frequency Devices
ANSI C63.4:2003	Methods and Measurements of Radio-Noise Emissions from Low-Voltage Electrical And Electronic Equipment in the Range of 9 kHz to 40 GHz
ANSI/NCSL Z540-1-1994	Calibration Laboratories and Measuring and Test Equipment - General Requirements
ANSI/ISO/IEC 17025:2000	General Requirements for the Competence of Testing and Calibration Laboratories
ANSI C63.10-2009	American National Standard for Testing Unlicensed Wireless Devices

Table 3. References

C. Test Site

All testing was performed at MET Laboratories, Inc., 3162 Belick St., Santa Clara, CA 95054. All equipment used in making physical determinations is accurate and bears recent traceability to the National Institute of Standards and Technology.

Radiated Emissions measurements were performed in a 3 meter semi-anechoic chamber (equivalent to an Open Area Test Site). In accordance with §2.948(a)(3), a complete site description is contained at MET Laboratories.

D. Description of Test Sample

The Echelon Corporation Edge Control Node (ECN) 70101-XXXX, Equipment Under Test (EUT), is as follows:

The nBox is a telemetry device that is intended to collect data from electrical power usage data from electrical utility power meters, and gas meters. Electrical power meters can communicate over PLC band A or band C; or they can use 900 MHz ISM band.

The EUT is a 900 MHz ISM band receiver, a second PLC (Power Line Communications) card, a serial (RS-232) interface, and a local power line current monitor. The unit is a fixed stationary device, powered from the AC line, with a battery backup option. This unit is intended for mounting on a utility pole or on a pad mounted distribution transformer.

List of Interfaces
Ethernet
RS-232 2X
Power Line Communications (PLC) Band A
Power Line Communications (PLC) Band C
900 MHz ISM band receiver

The EUT is only a 900 MHz ISM band receiver.

E. Equipment Configuration

Ref. ID	Name / Description	Model Number	Serial Number
1	7xxx series Edge Control Node	770101-XXXX	0020, 0093, 0094

Table 4. Equipment Configuration

F. Support Equipment

Support equipment necessary for the operation and testing of the EUT is included in the following list.

Ref. ID	Name / Description	Manufacturer	Model Number
1	Power Transformer 120V in 240V CT out	Echelon	NA
2	Laptop PC (Echelon Asset 105331)	Lenovo	T510
3	Null Modem Adapter	Pan Pacific	D25NM3
5	Current Transformer	Dent Instruments	CT-RMV-16-1000
6	Current Transformer	Dent Instruments	CT-RMV-16-1000

Table 5. Support Equipment

G. Ports and Cabling Information

Ref. ID	Port Name on EUT	Cable Description	Qty.	Length (m)	Shielded (Y/N)	Termination Point
1	AC Power	AC Power cable	1	6’	N	1
2	Ethernet	CAT-5e Ethernet cable with clamp on ferrites on the PC end.	1	6’	N	2
3	RS-232 Serial Port 1	DE-9 –DE-9 Serial Cable	1	6’	N	3
4	RS-232 Serial Port 2	DE-9 –DE-9 Serial Cable	1	6’	N	3

Table 6. Ports and Cabling Information

H. Mode of Operation

The Ethernet port will be connected to a Lenovo laptop PC which will be used to control the UUT and provide stimulus to the Ethernet port.

A script will be run on the UUT main processor that sends data on the Serial port.

A script will be run on the UUT main processor that sends data on the PLC Band A port.

A script will be run on the UUT main processor that sends data on the PLC Band C port.

A script can be run on the UUT main processor or the laptop that reads the data from the 900 MHz ISM band receiver over the Ethernet.

I. Method of Monitoring EUT Operation

A series of ping messages can be sent from the laptop to the UUT over the Ethernet and monitored in a separate command window to verify the Ethernet port and the UUT main CPU is operating normally.

Data received on the Serial port can be forwarded to a terminal session window on the PC where it can be monitored to verify activity.

A PLC A band and C band node can be connected to the PC to monitor PLC data sent by the UUT.

Data read from the 900 MHz ISM.

J. Modifications

a) Modifications to EUT

No modifications were made to the EUT.

b) Modifications to Test Standard

No modifications were made to the test standard.

K. Disposition of EUT

The test sample including all support equipment submitted to the Electro-Magnetic Compatibility Lab for testing was returned to Echelon Corporation upon completion of testing.

III. Electromagnetic Compatibility Criteria for Unintentional Radiators

Electromagnetic Compatibility Criteria

§ 15.107 Conducted Emissions Limits

Test Requirement(s):

15.107 (a) Except for Class A digital devices, for equipment 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 Table 7. Compliance with this provision shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminals.

15.107 (b) For a Class A digital device 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 Table 7. Compliance with this provision shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminals. The lower limit applies at the band edges.

15.207(a), Except as shown in paragraphs (b) and (c) of this section*, charging, AC adapters or battery eliminators 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 Table 7, 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 frequencies ranges.

Frequency range (MHz)	Class A Conducted Limits (dBμV)		*Class B Conducted Limits (dBμV)	
	Quasi-Peak	Average	Quasi-Peak	Average
* 0.15- 0.45	79	66	66 - 56	56 - 46
0.45 - 0.5	79	66	56	46
0.5 - 30	73	60	60	50
Note 1 — The lower limit shall apply at the transition frequencies. Note 2 — The limit decreases linearly with the logarithm if the frequency in the range 0.15 MHz to 0.5 MHz. * -- Limits per Subsection 15.207(a).				

Table 7. Conducted Limits for Radio Frequency Devices calculated from FCC Part 15 Subsections 15.107(a) (b) and 15.207(a)

Test Results: The EUT was compliant with the Class B requirement(s) of this section. Measured emissions were below applicable limits.

Test Engineer(s): Lionel Gabrillo and Tunji Yusuf

Test Date(s): 05/09/11

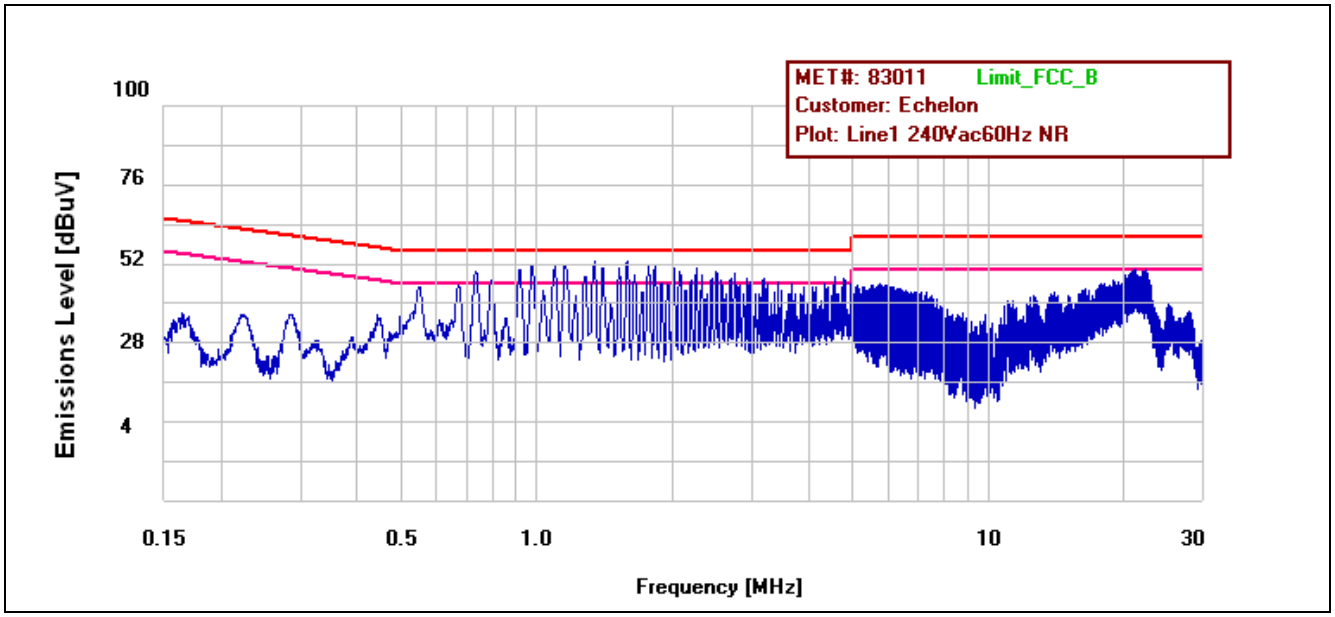
Conducted Emissions - Voltage, AC Power, Phase Line (240 VAC, 60 Hz)

Line	Freq. (MHz)	QP Amplitude	QP Limit	Delta	Pass	Average Amplitude	Average Limit	Delta	Pass
Line1 240Vac60Hz	0.162	48.3	65.363	-17.063	Pass	35.1	55.363	-20.263	Pass
Line1 240Vac60Hz	0.542	50.87	56	-5.13	Pass	39.6	46	-6.4	Pass
Line1 240Vac60Hz	0.650	49.91	56	-6.09	Pass	38.6	46	-7.4	Pass
Line1 240Vac60Hz	0.706	54.95	56	-1.05	Pass	43.56	46	-2.44	Pass
Line1 240Vac60Hz	0.762	51.42	56	-4.58	Pass	39.9	46	-6.1	Pass
Line1 240Vac60Hz	0.922	54.4	56	-1.6	Pass	42.6	46	-3.4	Pass
Line1 240Vac60Hz	0.978	48.41	56	-7.59	Pass	37.3	46	-8.7	Pass
Line1 240Vac60Hz	1.086	54.2	56	-1.8	Pass	43	46	-3	Pass
Line1 240Vac60Hz	1.142	53.5	56	-2.5	Pass	42.5	46	-3.5	Pass
Line1 240Vac60Hz	1.302	52.57	56	-3.43	Pass	41.6	46	-4.4	Pass
Line1 240Vac60Hz	1.522	53.34	56	-2.66	Pass	42.32	46	-3.68	Pass
Line1 240Vac60Hz	1.783	51.72	56	-4.28	Pass	40.6	46	-5.4	Pass
Line1 240Vac60Hz	22.006	44.15	60	-15.85	Pass	29.8	50	-20.2	Pass

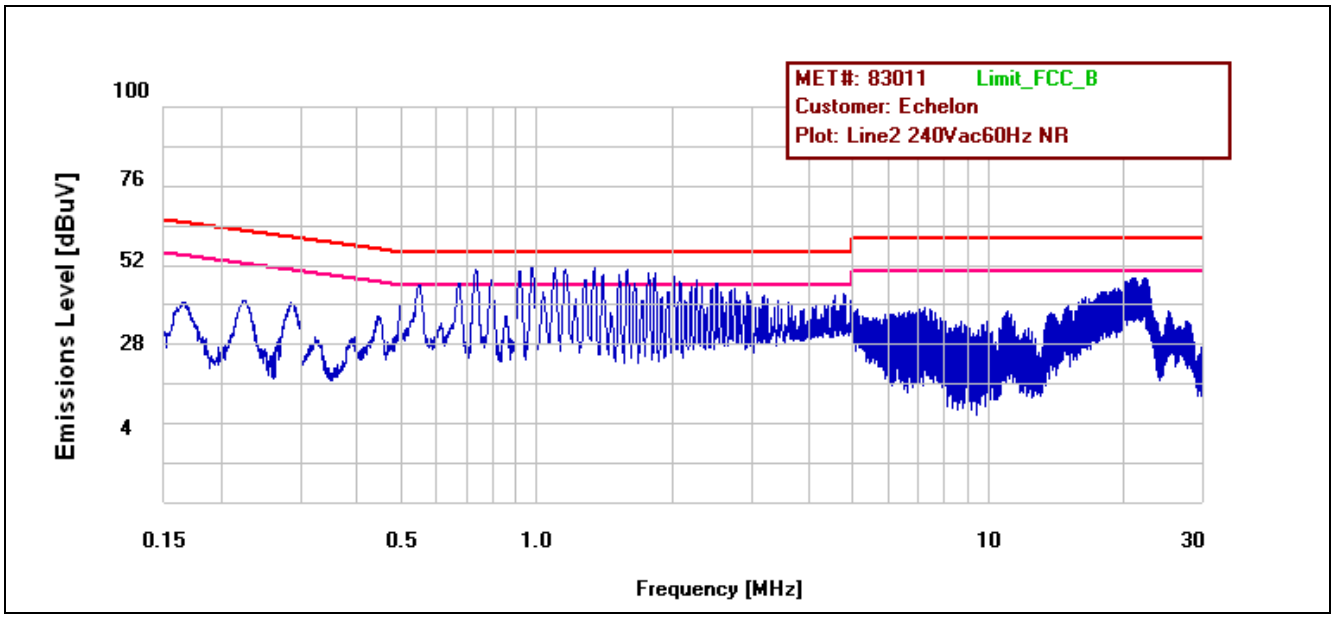
Table 8. Conducted Emissions - Voltage, AC Power, Phase Line 1 (240 VAC, 60 Hz)

Line	Freq. (MHz)	QP Amplitude	QP Limit	Delta	Pass	Average Amplitude	Average Limit	Delta	Pass
Line2 240Vac60Hz	0.162	55.65	65.363	-9.713	Pass	43.34	55.363	-12.023	Pass
Line2 240Vac60Hz	0.546	50.85	56	-5.15	Pass	39.8	46	-6.2	Pass
Line2 240Vac60Hz	0.654	51.07	56	-4.93	Pass	39.6	46	-6.4	Pass
Line2 240Vac60Hz	0.706	55.69	56	-0.31	Pass	44.3	46	-1.7	Pass
Line2 240Vac60Hz	0.762	51.98	56	-4.02	Pass	40.73	46	-5.27	Pass
Line2 240Vac60Hz	0.870	53.82	56	-2.18	Pass	42.71	46	-3.29	Pass
Line2 240Vac60Hz	0.926	53.77	56	-2.23	Pass	42.5	46	-3.5	Pass
Line2 240Vac60Hz	1.086	53.39	56	-2.61	Pass	42.02	46	-3.98	Pass
Line2 240Vac60Hz	1.142	53.14	56	-2.86	Pass	41.91	46	-4.09	Pass
Line2 240Vac60Hz	1.306	52.43	56	-3.57	Pass	41.21	46	-4.79	Pass
Line2 240Vac60Hz	1.522	51.84	56	-4.16	Pass	40.6	46	-5.4	Pass
Line2 240Vac60Hz	1.738	49.69	56	-6.31	Pass	38.2	46	-7.8	Pass
Line2 240Vac60Hz	22.014	44.32	60	-15.68	Pass	30.8	50	-19.2	Pass

Table 9. Conducted Emissions - Voltage, AC Power, Phase Line 2 (240 VAC, 60 Hz)



Plot 1. Conducted Emission, Phase Line 1 Plot

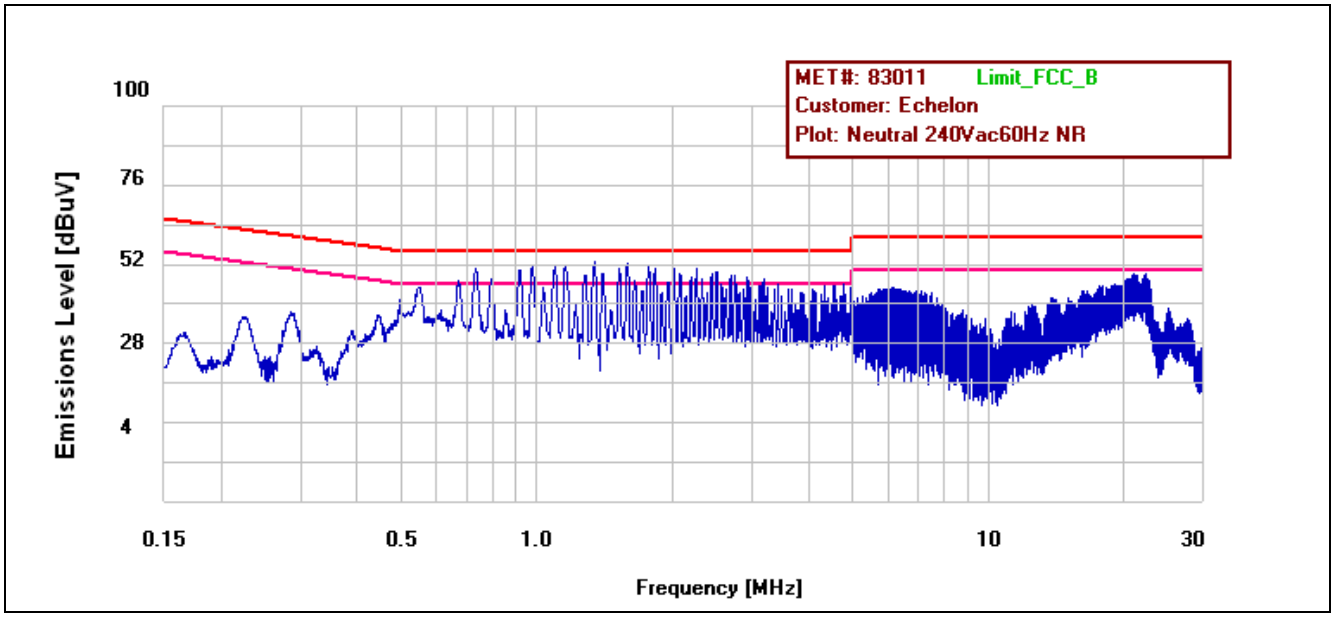


Plot 2. Conducted Emission, Phase Line 2 Plot

Conducted Emissions - Voltage, AC Power, Neutral Line (240 VAC, 60 Hz)

Line	Freq. (MHz)	QP Amplitude	QP Limit	Delta	Pass	Average Amplitude	Average Limit	Delta	Pass
Neutral 240Vac60Hz	0.162	45.78	65.363	-19.583	Pass	33.6	55.363	-21.763	Pass
Neutral 240Vac60Hz	0.546	49.92	56	-6.08	Pass	38.9	46	-7.1	Pass
Neutral 240Vac60Hz	0.654	50.58	56	-5.42	Pass	39.4	46	-6.6	Pass
Neutral 240Vac60Hz	0.706	54.76	56	-1.24	Pass	43.75	46	-2.25	Pass
Neutral 240Vac60Hz	0.762	51.15	56	-4.85	Pass	39.92	46	-6.08	Pass
Neutral 240Vac60Hz	0.870	53.7	56	-2.3	Pass	42.3	46	-3.7	Pass
Neutral 240Vac60Hz	0.926	53.94	56	-2.06	Pass	42.67	46	-3.33	Pass
Neutral 240Vac60Hz	1.086	53.87	56	-2.13	Pass	42.6	46	-3.4	Pass

Table 10. Conducted Emissions - Voltage, AC Power, Neutral Line (240 VAC, 60 Hz)



Plot 3. Conducted Emission, Neutral Line Plot

Conducted Emission Limits Test Setup

Photograph 1. Conducted Emissions, Test Setup

Radiated Emission Limits

§ 15.109 Radiated Emissions Limits

Test Requirement(s): **15.109 (a)** Except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the Class B limits expressed in Table 11.

15.109 (b) The field strength of radiated emissions from a Class A digital device, as determined at a distance of 10 meters, shall not exceed the Class A limits expressed in Table 11.

Frequency (MHz)	Field Strength (dBµV/m)	
	§15.109 (b), Class A Limit (dBµV) @ 10m	§15.109 (a),Class B Limit (dBµV) @ 3m
30 - 88	39.00	40.00
88 - 216	43.50	43.50
216 - 960	46.40	46.00
Above 960	49.50	54.00

Table 11. Radiated Emissions Limits calculated from FCC Part 15, §15.109 (a) (b)

Test Procedures: The EUT was placed on a non-metallic table, 80 cm above the ground plane inside a semi-anechoic chamber. The method of testing and test conditions of ANSI C63.4 were used. An antenna was located 3 m from the EUT on an adjustable mast. A pre-scan was first performed in order to find prominent radiated emissions. For final emissions measurements at each frequency of interest, the EUT was rotated and the antenna height was varied between 1 m and 4 m in order to maximize the emission. Measurements in both horizontal and vertical polarities were made and the data was recorded. Unless otherwise specified, measurements were made using a quasi-peak detector with a 120 kHz bandwidth (30MHz - 1GHz) and 1 MHz (1 – 10GHz).

Test Results: The EUT was compliant with the Class B requirement(s) of this section. Measured emissions were below applicable limits.

Test Engineer(s): Joe Vang

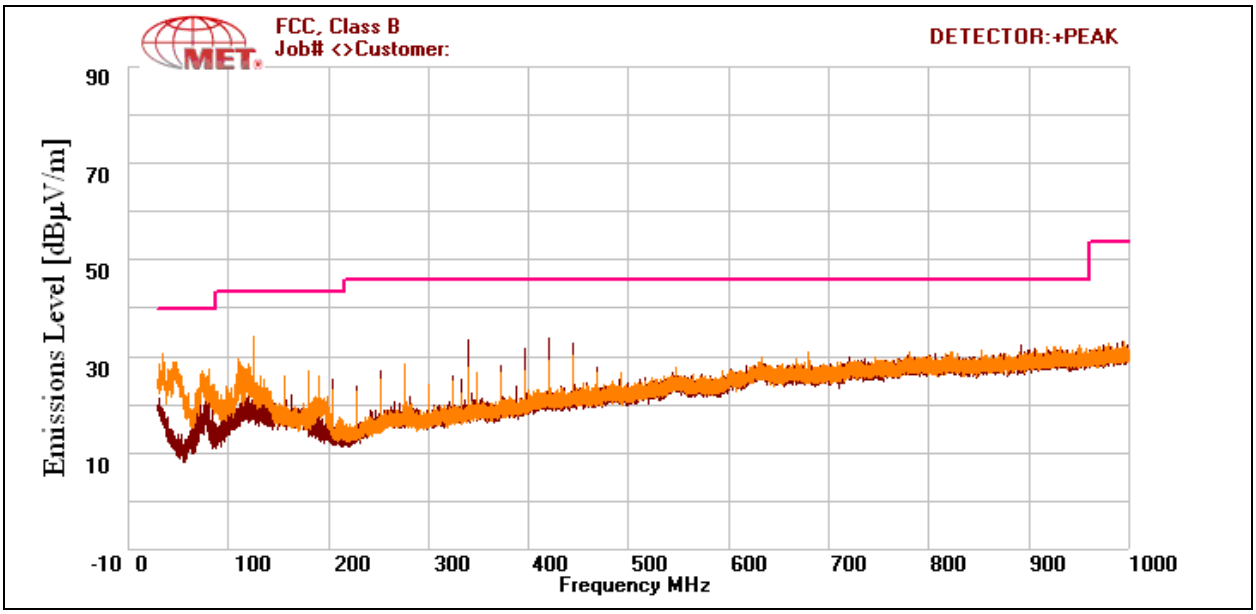
Test Date(s): 05/12/11

Radiated Emissions Limits Test Results, Class B

Frequency (MHz)	Antenna Polarity	EUT Azimuth (Degrees)	Antenna Height (cm)	Uncorrected Amplitude (dBuV)	ACF (dB/m)	Pre Amp Gain (dB)	CBL (dB)	DCF (dB)	Corrected Amplitude (dBuV)	Limit (dBuV)	Margin (dB)
45.24	V	86	100	15.24	10.156	0	1.684	0	27.08	40	-12.92
125	V	151	110.4	20.49	12.2	0	3.115	0	35.805	43.5	-7.695
276	V	324	100	8.03	13.18	0	3.652	0	24.862	46	-21.138
340	H	116	100	12.54	14.1	0	3.802	0	30.442	46	-15.558
420	H	239	100	11.67	16.3	0	4.264	0	32.234	46	-13.766
444	H	227	100	11.62	16.48	0	4.401	0	32.501	46	-13.499

Table 12. Radiated Emissions Limits, Test Results, 30 MHz – 1 GHz, FCC Limits

Note: The EUT was tested at 3 m.



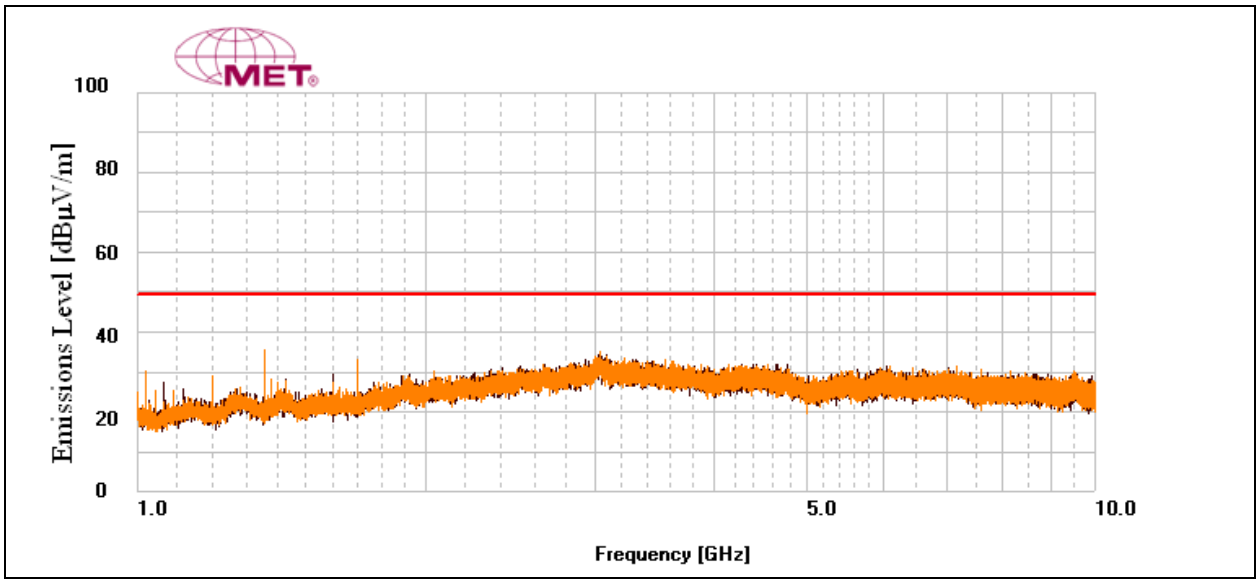
Plot 4. Radiated Emissions, 30 MHz - 1 GHz, FCC Limits

Radiated Emissions Limits Test Results, Class B

Frequency (MHz)	Antenna Polarity	EUT Azimuth (Degrees)	Antenna Height (cm)	Uncorrected Amplitude (dBuV)	ACF (dB/m)	Pre Amp Gain (dB)	CBL (dB)	DCF (dB)	Corrected Amplitude (dBuV)	Limit (dBuV)	Margin (dB)
1360	V	277.0	100.0	75.38	29.005	76.258	8.602	0	36.729	54	-17.271
1700	V	329.0	100.0	74.81	28.495	75.636	9.59	0	37.259	54	-16.741
1700	H	116.0	134.35	68.66	28.495	75.636	9.59	0	31.109	54	-22.891

Table 13. Radiated Emissions Limits, Test Results, Above 1 GHz, FCC Limits

Note: The EUT was tested at 3 m.



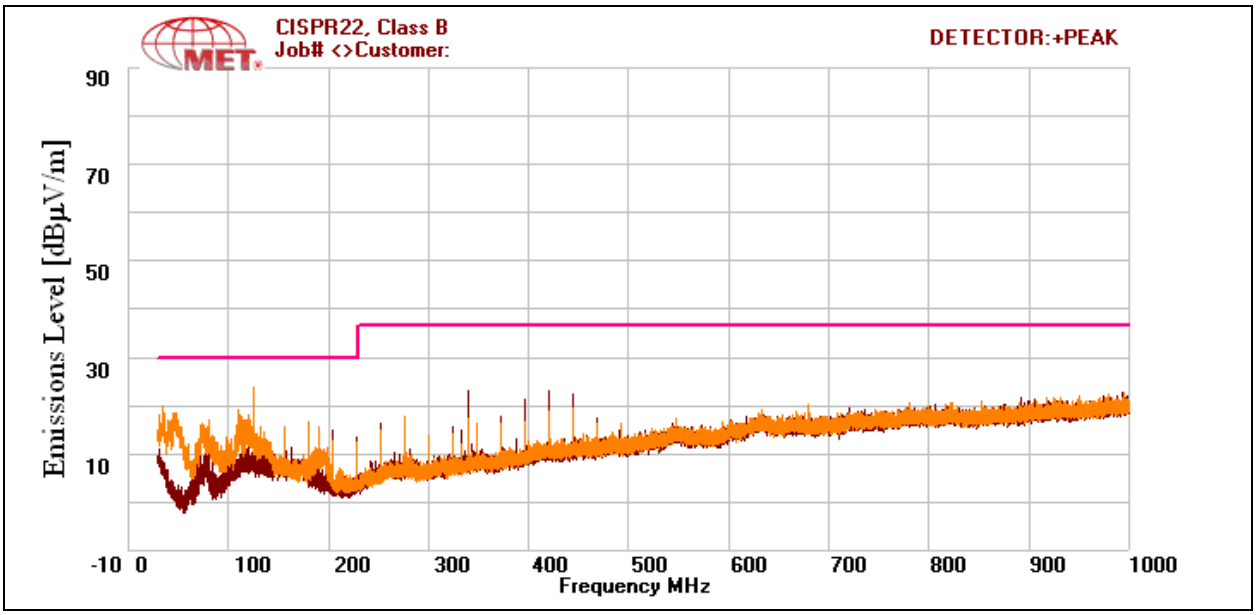
Plot 5. Radiated Emissions, Above 1 GHz, FCC Limits

Radiated Emissions Limits Test Results, Class B

Frequency (MHz)	Antenna Polarity	EUT Azimuth (Degrees)	Antenna Height (cm)	Uncorrected Amplitude (dBuV)	ACF (dB/m)	Pre Amp Gain (dB)	CBL (dB)	DCF (dB)	Corrected Amplitude (dBuV)	Limit (dBuV)	Margin (dB)
45.24	V	86	100	15.24	10.156	0	1.684	-10.46	16.62	30	-13.38
125	V	151	110.4	20.49	12.2	0	3.115	-10.46	25.345	30	-4.655
276	V	324	100	8.03	13.18	0	3.652	-10.46	14.402	37	-22.598
340	H	116	100	12.54	14.1	0	3.802	-10.46	19.982	37	-17.018
420	H	239	100	11.67	16.3	0	4.264	-10.46	21.774	37	-15.226
444	H	227	100	11.62	16.48	0	4.401	-10.46	22.041	37	-14.959

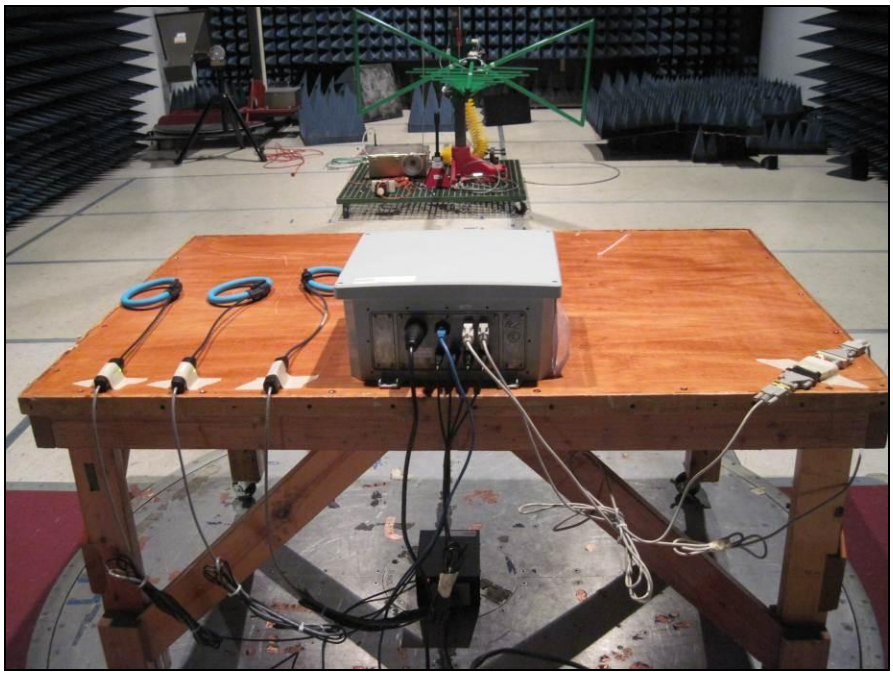
Table 14. Radiated Emissions Limits, Test Results, ICES-003 Limits

Note: The EUT was tested at 3 m.



Plot 6. Radiated Emissions, ICES-003 Limits

Radiated Emission Limits Test Setup



Photograph 2. Radiated Emission, Test Setup, 30 MHz – 1 GHz

Photograph 3. Radiated Emission, Test Setup, 1 GHz – 10 GHz

IV. Test Equipment

Test Equipment

Calibrated test equipment utilized during testing was maintained in a current state of calibration per the requirements of ANSI/NCSL Z540-1-1994 and ANSI/ISO/IEC 17025:2000.

MET Asset #	Equipment	Manufacturer	Model	Last Cal Date	Cal Due Date
1S2607	SPECTRUM ANALYZER	AGILENT	E4407B	7/30/10	7/30/11
1S2270	LISN	SCHWARZBECK	NNLK8121	2/15/2011	2/15/2012
1S2399	TURNTABLE CONTROLLER	SUNOL SCIENCE	SC99V	NO CALIBRATION REQUIRED	
1S2481	10M CHAMBER	ETS-LINDGREN	DKE 8X8 DBL	11/6/2010	11/6/2011
1S2482	5 METER CHAMBER	PANASHIELD	641431	11/13/2010	11/13/2011
1S2600	BILOG ANTENNA	TESEQ	CBL6112D	4/14/2010	4/14/2013
1S2499	MULTI DEVICE CONTROLLER	ETS	2090	NO CALIBRATION REQUIRED	
1S2421	EMI TEST RECEIVER	ROHDE & SCHWARZ	ESIB7	7/6/2010	7/6/2011
1S2198	HORN ANTENNA	EMCO	3115	9/22/2010	9/22/2011
1S2521	THERMO-HYGROMETER	FISHER SCIENTIFIC	11-661-7D	12/2/2009	12/2/2011

Table 15. Test Equipment List

Note: Functionally tested equipment is verified using calibrated instrumentation at the time of testing.

V. Certification & User's Manual Information

Certification & User's Manual Information

A. Certification Information

The following is extracted from Title 47 of the Code of Federal Regulations, Part 2, Subpart I — Marketing of Radio frequency devices:

§ 2.801 Radio-frequency device defined.

As used in this part, a radio-frequency device is any device which in its operation is capable of Emitting radio-frequency energy by radiation, conduction, or other means. Radio- frequency devices include, but are not limited to:

(a) The various types of radio communication transmitting devices described throughout this chapter.

(b) The incidental, unintentional and intentional radiators defined in Part 15 of this chapter.

(c) The industrial, scientific, and medical equipment described in Part 18 of this chapter.

(d) Any part or component thereof which in use emits radio-frequency energy by radiation, conduction, or other means.

§ 2.803 Marketing of radio frequency devices prior to equipment authorization.

(a) Except as provided elsewhere in this chapter, no person shall sell or lease, or offer for sale or lease (including advertising for sale or lease), or import, ship or distribute for the purpose of selling or leasing or offering for sale or lease, any radio frequency device unless:

(1) In the case of a device subject to certification, such device has been authorized by the Commission in accordance with the rules in this chapter and is properly identified and labeled as required by §2.925 and other relevant sections in this chapter; or

(2) In the case of a device that is not required to have a grant of equipment authorization issued by the Commission, but which must comply with the specified technical standards prior to use, such device also complies with all applicable administrative (including verification of the equipment or authorization under a Declaration of Conformity, where required), technical, labeling and identification requirements specified in this chapter.

(d) Notwithstanding the provisions of paragraph (a) of this section, the offer for sale solely to business, commercial, industrial, scientific or medical users (but not an offer for sale to other parties or to end users located in a residential environment) of a radio frequency device that is in the conceptual, developmental, design or pre-production stage is permitted prior to equipment authorization or, for devices not subject to the equipment authorization requirements, prior to a determination of compliance with the applicable technical requirements *provided* that the prospective buyer is advised in writing at the time of the offer for sale that the equipment is subject to the FCC rules and that the equipment will comply with the appropriate rules before delivery to the buyer or to centers of distribution.

(e)(1) Notwithstanding the provisions of paragraph (a) of this section, prior to equipment authorization or determination of compliance with the applicable technical requirements any radio frequency device may be operated, but not marketed, for the following purposes and under the following conditions:

(i) Compliance testing;

(ii) Demonstrations at a trade show provided the notice contained in paragraph (c) of this section is displayed in a conspicuous location on, or immediately adjacent to, the device;

(iii) Demonstrations at an exhibition conducted at a business, commercial, industrial, scientific or medical location, but excluding locations in a residential environment, provided the notice contained in paragraphs (c) or (d) of this section, as appropriate, is displayed in a conspicuous location on, or immediately adjacent to, the device;

(iv) Evaluation of product performance and determination of customer acceptability, provided such operation takes place at the manufacturer's facilities during developmental, design or pre-production states; or

(v) Evaluation of product performance and determination of customer acceptability where customer acceptability of a radio frequency device cannot be determined at the manufacturer's facilities because of size or unique capability of the device, provided the device is operated at a business, commercial, industrial, scientific or medical user's site, but not at a residential site, during the development, design or pre-production stages.

(e)(2) For the purpose of paragraphs (e)(1)(iv) and (e)(1)(v) of this section, the term *manufacturer's facilities* includes the facilities of the party responsible for compliance with the regulations and the manufacturer's premises, as well as the facilities of other entities working under the authorization of the responsible party in connection with the development and manufacture, but not the marketing, of the equipment.

(f) For radio frequency devices subject to verification and sold solely to business, commercial, industrial, scientific and medical users (excluding products sold to other parties or for operation in a residential environment), parties responsible for verification of the devices shall have the option of ensuring compliance with the applicable technical specifications of this chapter at each end user's location after installation, provided that the purchase or lease agreement includes a proviso that such a determination of compliance be made and is the responsibility of the party responsible for verification of the equipment.

Certification & User's Manual Information

The following is extracted from Title 47 of the Code of Federal Regulations, Part 2, Subpart J — Equipment Authorization Procedures:

§ 2.901 Basis and Purpose

(a) In order to carry out its responsibilities under the Communications Act and the various treaties and international regulations, and in order to promote efficient use of the radio spectrum, the Commission has developed technical standards for radio frequency equipment and parts or components thereof. The technical standards applicable to individual types of equipment are found in that part of the rules governing the service wherein the equipment is to be operated.[1] *In addition to the technical standards provided, the rules governing the service may require that such equipment be verified by the manufacturer or importer*, be authorized under a Declaration of Conformity, or receive an equipment authorization from the Commission by one of the following procedures: certification or registration.

(b) The following sections describe the verification procedure, the procedure for a Declaration of Conformity, and the procedures to be followed in obtaining certification from the Commission and the conditions attendant to such a grant.

§ 2.907 Certification.

(a) Certification is an equipment authorization issued by the Commission, based on representation and test data submitted by the applicant.

(b) Certification attaches to all units subsequently marketed by the grantee which are identical (see Section 2.908) to the sample tested except for permissive changes or other variations authorized by the Commission pursuant to Section 2.1043.

[1] In this case, the equipment is subject to the rules of Part 15. More specifically, the equipment falls under Subpart B (of Part 15), which deals with unintentional radiators.

Certification & User's Manual Information

§ 2.948 Description of measurement facilities.

(a) Each party making measurements of equipment that is subject to an equipment authorization under Part 15 or Part 18 of this chapter, regardless of whether the measurements are filed with the Commission or kept on file by the party responsible for compliance of equipment marketed within the U.S. or its possessions, shall compile a description of the measurement facilities employed.

(1) If the measured equipment is subject to the verification procedure, the description of the measurement facilities shall be retained by the party responsible for verification of the equipment.

(i) If the equipment is verified through measurements performed by an independent laboratory, it is acceptable for the party responsible for verification of the equipment to rely upon the description of the measurement facilities retained by or placed on file with the Commission by that laboratory. In this situation, the party responsible for the verification of the equipment is not required to retain a duplicate copy of the description of the measurement facilities.

(ii) If the equipment is verified based on measurements performed at the installation site of the equipment, no specific site calibration data is required. It is acceptable to retain the description of the measurement facilities at the site at which the measurements were performed.

(2) If the equipment is to be authorized by the Commission under the certification procedure, the description of the measurement facilities shall be filed with the Commission's Laboratory in Columbia, Maryland. The data describing the measurement facilities need only be filed once but must be updated as changes are made to the measurement facilities or as otherwise described in this section. At least every three years, the organization responsible for filing the data with the Commission shall certify that the data on file is current.

Certification & User's Manual Information

1. Label and User's Manual Information

The following is extracted from Title 47 of the Code of Federal Regulations, Part 15, Subpart A — General:

§ 15.19 Labeling requirements.

(a) In addition to the requirements in Part 2 of this chapter, a device subject to certification or verification shall be labeled as follows:

(1) Receivers associated with the operation of a licensed radio service, e.g., FM broadcast under Part 73 of this chapter, land mobile operation under Part 90, etc., shall bear the following statement in a conspicuous location on the device:

This device complies with Part 15 of the FCC Rules. Operation is subject to the condition that this device does not cause harmful interference.

(2) A stand-alone cable input selector switch, shall bear the following statement in a conspicuous location on the device:

This device is verified to comply with Part 15 of the FCC Rules for use with cable television service.

(3) All other devices shall bear the following statement in a conspicuous location on the device:

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.

(4) Where a device is constructed in two or more sections connected by wires and marketed together, the statement specified under paragraph (a) of this section is required to be affixed only to the main control unit.

(5) When the device is so small or for such use that it is not practicable to place the statement specified under paragraph (a) of this section on it, the information required by this paragraph shall be placed in a prominent location in the instruction manual or pamphlet supplied to the user or, alternatively, shall be placed on the container in which the device is marketed. However, the FCC identifier or the unique identifier, as appropriate, must be displayed on the device.

§ 15.21 Information to user.

The user's manual or instruction manual for an intentional or unintentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Verification & User's Manual Information

The following is extracted from Title 47 of the Code of Federal Regulations, Part 15, Subpart B — Unintentional Radiators:

§ 15.105 Information to the user.

(a) For a Class A digital device or peripheral, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of the manual:

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at own expense.

(b) For a Class B digital device or peripheral, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of the manual:

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a residential environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

– Reorient or relocate the receiving antenna.

– Increase the separation between the equipment and receiver.

– Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

– Consult the dealer or an experienced radio/TV technician for help.

ICES-003 Procedural & Labeling Requirements

From the Industry Canada Electromagnetic Compatibility Advisory Bulletin entitled, "Implementation and Interpretation of the Interference-Causing Equipment Standard for Digital Apparatus, ICES-003" (EMCAB-3, Issue 2, July 1995):

> "At present, CISPR 22: 2002 and ICES technical requirements are essentially equivalent. Therefore, if you have CISPR 22: 2002 approval by meeting CISPR Publication 22, the only additional requirements are: to attach a note to the report of the test results for compliance, indicating that these results are deemed satisfactory evidence of compliance with ICES-003 of the Canadian Interference-Causing Equipment Regulations; to maintain these records on file for the requisite five year period; and to provide the device with a notice of compliance in accordance with ICES-003."

Procedural Requirements:

According to Industry Canada's Interference Causing Equipment Standard for Digital Apparatus ICES-003 Issue 4, February 2004:

Section 6.1: A record of the measurements and results, showing the date that the measurements were completed, shall be retained by the manufacturer or importer for a period of at least five years from the date shown in the record and made available for examination on the request of the Minister.

Section 6.2: A written notice indicating compliance must accompany each unit of digital apparatus to the end user. The notice shall be in the form of a label that is affixed to the apparatus. Where because of insufficient space or other constraints it is not feasible to affix a label to the apparatus, the notice may be in the form of a statement in the user's manual.

Labeling Requirements:

The suggested text for the notice, in English and in French, is provided below, from the Annex of ICES-003:

> This Class [2] digital apparatus complies with Canadian ICES-003.
>
> Cet appareil numérique de la classe [1] est conforme à la norme NMB-003 du Canada.

[2] Insert either A or B but not both as appropriate for the equipment requirements.

End of Report

