MET Laboratories, Inc. *Safety Certification - EMI - Telecom Environmental Simulation*
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February 8, 2011

Cubic Global Tracking Solutions
2570 W El Camino Real Suite 100
Mountain View, CA 94040-1309

Dear Bryan Shah,

Enclosed is the EMC Wireless test report for compliance testing of the Cubic Global Tracking Solutions, GS-5L 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 and FCC Part 15 Subpart C, RSS-210, Issue 7, June 2007 for Intentional Radiators.

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.

Roseline Onyeagwu
Documentation Department

Reference: (\Cubic Global Tracking Solutions\EMC82776B-FCC247 Rev. 1)

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Electromagnetic Compatibility Criteria
Test Report

for the

Cubic Global Tracking Solutions
GS-5L

Tested under
the FCC Certification Rules
contained in
Title 47 of the CFR, Parts 15 Subpart B & ICES-003
for Class B Digital Devices
&
15.247 Subpart C & RSS-210, Issue 7, June 2007
for Intentional Radiators

MET Report: EMC82776B-FCC247 Rev. 1

February 8, 2011

Prepared For:

Cubic Global Tracking Solutions
2570 W El Camino Real Suite 100
Mountain View, CA 94040-1309

Prepared By:
MET Laboratories, Inc.
914 W. Patapsco Ave
Baltimore, MD 21230

Electromagnetic Compatibility Criteria
Test Report

for the

Cubic Global Tracking Solutions
Minifly2 – Bluetooth, Model: AB185

Tested Under
the FCC Certification Rules
contained in
Title 47 of the CFR, Parts 15 Subpart B & ICES-003
for Class B Digital Devices
&
15.247 Subpart C & RSS-210, Issue 7, June 2007
for Intentional Radiators

Manasi Bhandiwad, Project Engineer
Electromagnetic Compatibility Lab

Roseline Onyeagwu
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, 15.247 and Industry Canada standards ICES-003, Issue 4 February 2004, RSS-210, Issue 7, June 2007 under normal use and maintenance.

Shawn McMillen,
Wireless Manager, Electromagnetic Compatibility Lab

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Report Status Sheet

Revision	Report Date	Reason for Revision
∅	January 6, 2011	Initial Issue.
1	February 8, 2011	Editorial Changes

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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**er**z**
IEC	**I**nternational **E**lectrotechnical **C**ommission
kHz	**k**ilo**h**er**z**
kPa	**k**ilo**pa**scal
kV	**k**ilovolt
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

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I. Executive Summary

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A. Purpose of Test

An EMC evaluation was performed to determine compliance of the Cubic Global Tracking Solutions GS-5L, with the requirements of Part 15, §15.247. 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 GS-5L. Cubic Global Tracking Solutions should retain a copy of this document which should be kept on file for at least two years after the manufacturing of the GS-5L, 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 15, §15.247, in accordance with Cubic Global Tracking Solutions, purchase order number 20101015.02. All tests were conducted using measurement procedure ANSI C63.4-2003.

FCC Reference 47 CFR Part 15.247:2005	IC Reference RSS-210 Issue 7: 2007	Description	Compliance
47 CFR Part 15.107 (a)	ICES-003 Issue 4 February 2004	Conducted Emission Limits for a Class B Digital Device	Not Applicable
47 CFR Part 15.109 (a)	ICES-003 Issue 4 February 2004	Radiated Emission Limits for a Class B Digital Device	Compliant
Title 47 of the CFR, Part 15 §15.203	N/A	Antenna Requirement	Compliant
Title 47 of the CFR, Part 15 §15.205	RSS-210(A8.5)	Emissions at Restricted Band	Compliant
Title 47 of the CFR, Part 15 §15.207(a)	RSS-210(7.2.2)	Conducted Emission Voltage	Not Applicable
Title 47 of the CFR, Part 15 §15.247(a)(1)	RSS-210(A8.1)	Channel Separation Occupied Bandwidth Number of Hopping Channels Time of Occupancy	Compliant
Title 47 of the CFR, Part 15 §15.247(b)	RSS-210(A8.4)	RF Output Power	Compliant
Title 47 of the CFR, Part 15 §15.209, §15.247(d)	RSS-210(A8.5)	Radiated and Conducted Spurious Emissions	Compliant
Title 47 of the CFR, Part15 15.247(g)	RSS-210(A8.1)	Hopping Capability	Compliant
Title 47 of the CFR, Part 15 §15.247(h)	RSS-210(A8.1)	Hopping Coordination Requirement	Compliant
Title 47 of the CFR, Part 15 §15.247(i)	RSS-Gen(5.5)	Maximum Permissible Exposure	Compliant
N/A	RSS-Gen(4.8)	Receiver Spurious Emissions	Compliant

Table 1. Executive Summary of EMC Part 15.247 ComplianceTesting

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II. Equipment Configuration

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A. Overview

MET Laboratories, Inc. was contracted by Cubic Global Tracking Solutions to perform testing on the GS-5L, under Cubic Global Tracking Solutions' purchase order number 20101015.02.

This document describes the test setups, test methods, required test equipment, and the test limit criteria used to perform compliance testing of the Cubic Global Tracking Solutions, GS-5L.

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

Model(s) Tested:	GS-5L	
Model(s) Covered:	GS-5L	
EUT Specifications:	Primary Power: 4x 3.6V Li-SOCl2 cells	
	FCC ID: YVDGS5L IC: 9336A-GS5L	
	Type of Modulations:	FHSS
	Equipment Code:	DSS
	Peak RF Output Power:	-1.39 dBm
	EUT Frequency Ranges:	2402 – 2480 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:	Manasi Bhandiwad	
Report Date(s):	February 8, 2011	

Table 2. EUT Summary Table

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B. References

CFR 47, Part 15, Subpart C	Federal Communication Commission, Code of Federal Regulations, Title 47, Part 15: General Rules and Regulations, Allocation, Assignment, and Use of Radio Frequencies
RSS-210, Issue 7, June 2007	Low-power License-exempt Radiocommunications Devices (All Frequency Bands): Category I Equipment
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., 914 W. Patapsco Ave., Baltimore, MD 21230. 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.

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D. Description of Test Sample

The Cubic Global Tracking Solutions GS-5L, Equipment Under Test (EUT), is described as follows:

This device is used to remotely track shipping containers. It has a GPS receiver, a quad-band GSM radio, a satellite radio and a 802.15 radio. It runs primarily on battery power with a very low duty-cycle.

It can run off of external power. This external power usually comes from the alternator of an automobile but there are cases where it will run (indirectly) from the public utility power. The most common case is when the GS-5L is connected to a refrigerated shipping container (reefer), and the container is waiting at a port. In this scenario, the reefer runs two legs of the three-phase 460VAC bus into a single-phase step-down transformer, yielding 24VAC. This 24V bus is used to power a number of subsystems within the reefer, including the GS-5L

The GSM radio and the satellite radio are modules that already have FCC IDs. The 802.15 radio is not a pre-certified module. It typically transmits at +4.5dBm. The signal then runs into a 3dB splitter to two different paths, one towards a printed antenna and the other to an RP-SMA jack. There is approximately 10dB of path loss from the output of the splitter to the RP-SMA connector. The path-loss to the printed antenna has not been determined yet, its gain is 2-3dBi.

The 802.15 radio is used to talk to Remote Sensor Units (RSU). The GS-5L sends out periodic beacon pulse, typically 100ms long, once every 10 seconds. The RSU will bring up its receiver at a set interval or during an emergency and send a report to the GS-5L as soon as it sees a beacon.

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Photograph 1. Cubic Global Tracking Solutions, GS-5L

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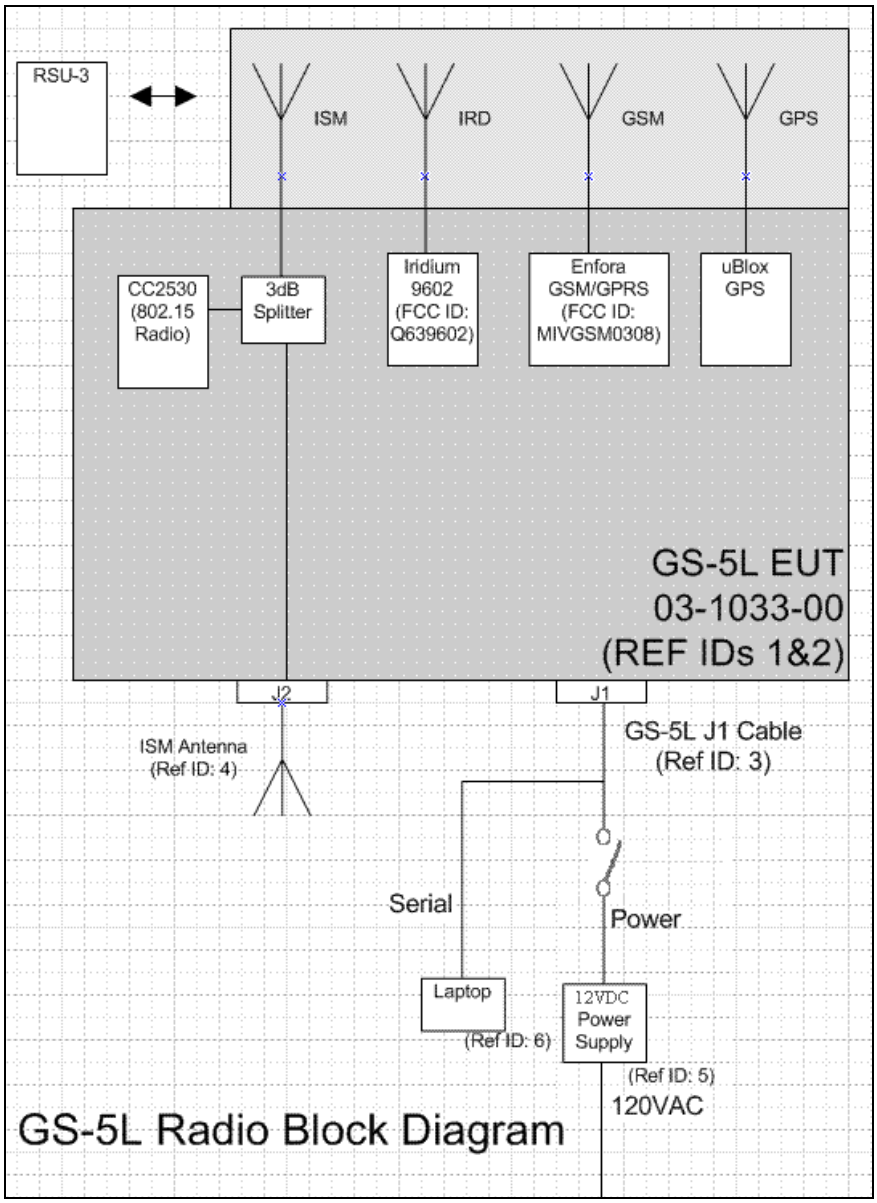

Figure 1. Block Diagram of Test Configuration

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E. Equipment Configuration

The EUT was set up as outlined in Figure 1, Block Diagram of Test Setup.

Ref. ID	Name / Description	Model Number	Serial Number
1	GS-5L	03-1033-00	211000137
2	GS-5L	03-1033-00	211000138

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
3	GS-5L J1 Cable	CGTS	
4	ISM 1/2-wave antenna	Linx Technologies	ANT-2.4-CW-RCT-RP-ND
6	Laptop	Dell	Latitude D830
7	RSU	CGTS	

Table 5. Support Equipment

G. Ports and Cabling

Port name on EUT	Cable Description or reason for no cable	Qty.	Length (m)	Shielded? (Y/N)
J1	GS-5L J1 Cable	1	2	N
J2	Will have an antenna plugged directly on	1	N/A	N/A

Table 6. Ports and Cabling

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H. Mode of Operation

For that test, we will either put the radio into constant-waveform transmission mode or rapid-reporting mode. CW transmit mode simply means that the radio will transmit an un-modulated signal at the center frequency of one channel. Rapid reporting mode more closely approximates normal operating conditions. In this mode, the GS-5L will be mated to a Remote Sensor Unit and forced to communicate at a higher than normal duty cycle. To expedite testing, something on the order of once a second. For reference, a typical reporting interval is once every 20-30 minutes.

I. Method of Monitoring

The GS-5L has an LED heartbeat that pulses every 30 seconds when it is working properly, but in an idle state. When it is reporting, the LED beats once a second.
In addition, the unit can be monitored by running a cable between the GS-5L J1 connector and a PC's serial port. Then a user can monitor the device over this serial connection.

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J. Modifications

a) Modifications to EUT

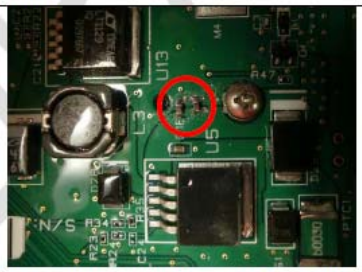
ECO PROCEDURE

Date: December 12, 2010
Project: Global Sentinel 5
Subject: BHT modification for CE Compliance
Document: 4510211v1

CUBIC GLOBAL TRACKING SOLUTIONS

This technical memo provides the procedure for modifying the BHT within a GS-5L to be CE Compliant. This ECO only applies to BHTv4 and earlier revisions.

Assembly Item: **GS-5L**

Procedure Action	Completed
1. Pull the 07-1009-00-1.0UF box from the stock room.	
2. Open the GS-5L from the rear and pull out the BHT.	
3. Identify the rectified external power input trace next to U5. U5 is at the southern part of the BHT. Scrap off the conformal coat and solder mask from that trace near the edge and the ground plane nearby that trace. Ensure the exposed areas are large enough to solder the pads of two 0805 capacitors and spaced far enough apart to prevent shorting.	
	
4. Solder two 07-1009-00-1.0uF capacitors to the exposed pads.	
5. Check for a short-circuit between the rectified external power input trace and ground.	
6. Re-assemble the GS-5L and apply an "ECO 153" label to the enclosure, below the product option label.	

Impeva Labs Company Confidential — Page 1 of 1
ECO_153_BHT_CE_Compliance_Procedure_4510211v1 — December 12, 2010

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 Cubic Global Tracking Solutions upon completion of testing.

III. Electromagnetic Compatibility Criteria for Unintentional Radiators

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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 7.

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 7.

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 7. 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.

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

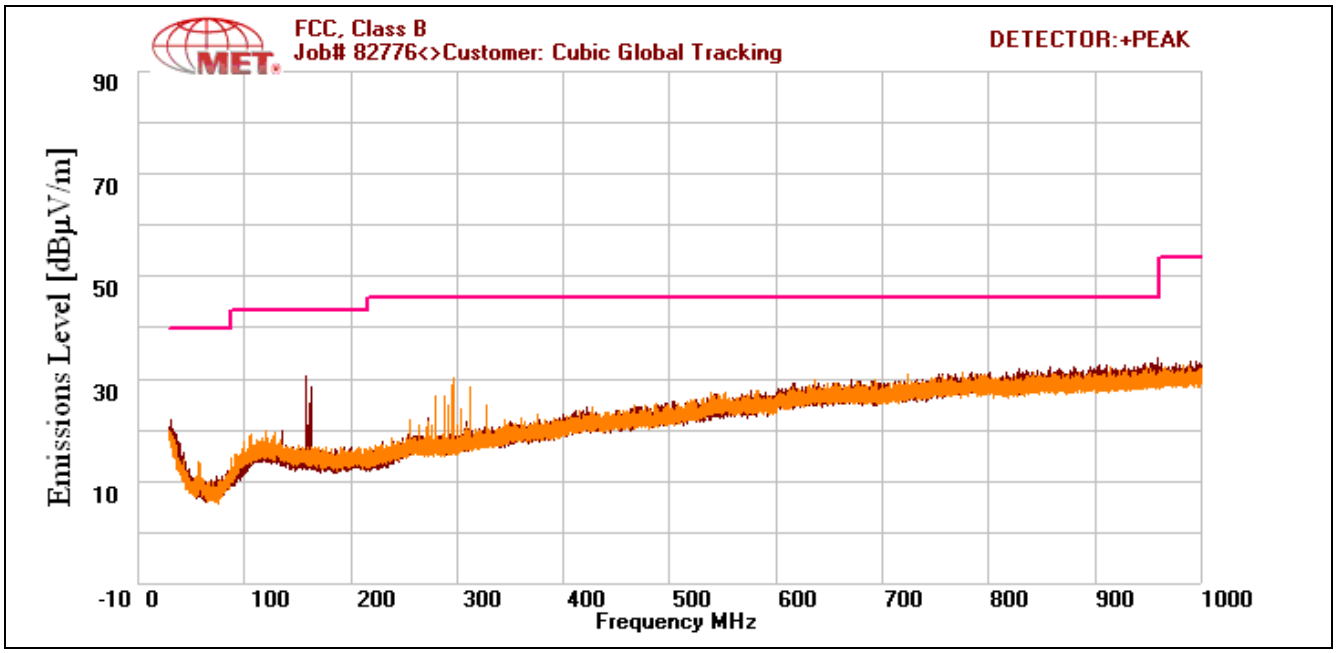
Test Engineer(s): Minh Ly

Test Date(s): 11/02/10

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)
168	H	0	100	2.23	10.38	0	3.571	0	16.181	43.5	-27.319
288	V	159	170	5.08	13.2	0	3.611	0	21.891	46	-24.109
288	H	234	121	7.9	13.56	0	3.611	0	25.071	46	-20.929
296	V	157	150	5.72	13.24	0	3.584	0	22.544	46	-23.456
296	H	101	126	9.55	13.74	0	3.584	0	26.874	46	-19.126
312	V	151	150	2.86	13.84	0	3.64	0	20.34	46	-25.66

Table 8. Radiated Emissions Limits, Test Results, FCC Limits



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

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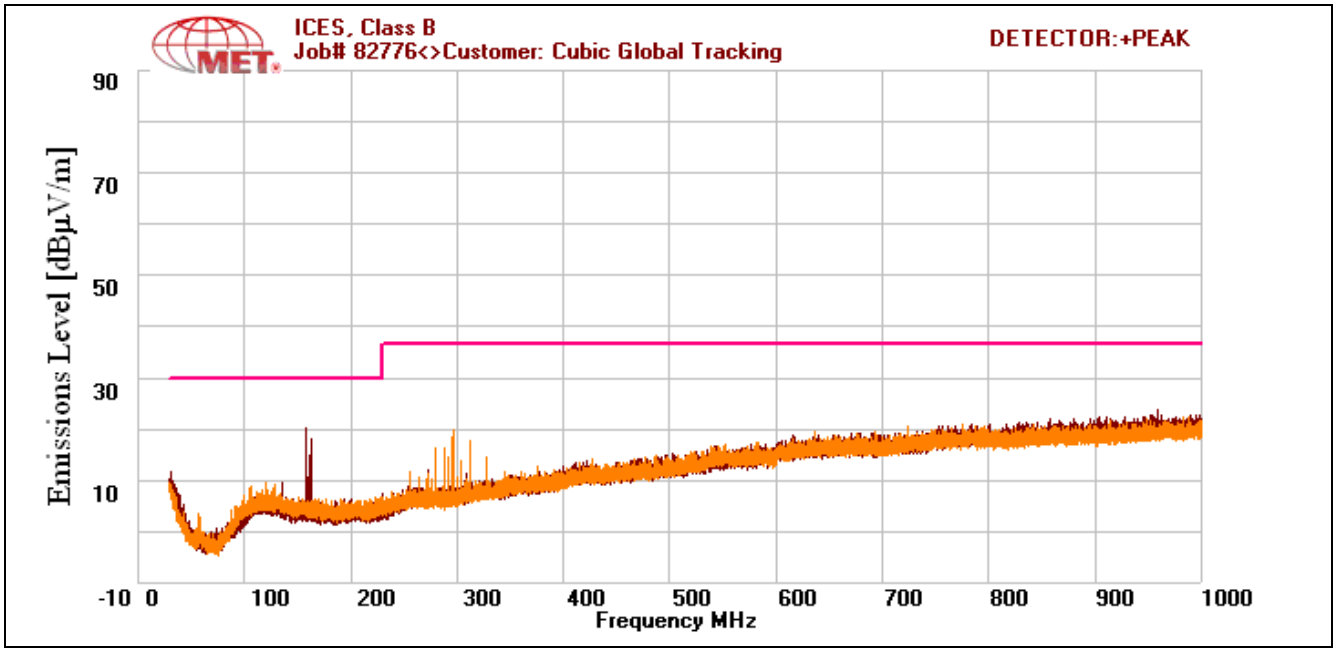
Radiated Emissions Limits Test Results, Class B

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)
168	H	0	100	2.23	10.38	0	3.571	0	16.181	30	-13.819
288	V	159	170	5.08	13.2	0	3.611	0	21.891	37	-15.109
288	H	234	121	7.9	13.56	0	3.611	0	25.071	37	-11.929
296	V	157	150	5.72	13.24	0	3.584	0	22.544	37	-14.456
296	H	101	126	9.55	13.74	0	3.584	0	26.874	37	-10.126
312	V	151	150	2.86	13.84	0	3.64	0	20.34	37	-16.66

Table 9. Radiated Emissions Limits, Test Results, ICES-003 Limits



Plot 2. Radiated Emissions, ICES-003 Limits

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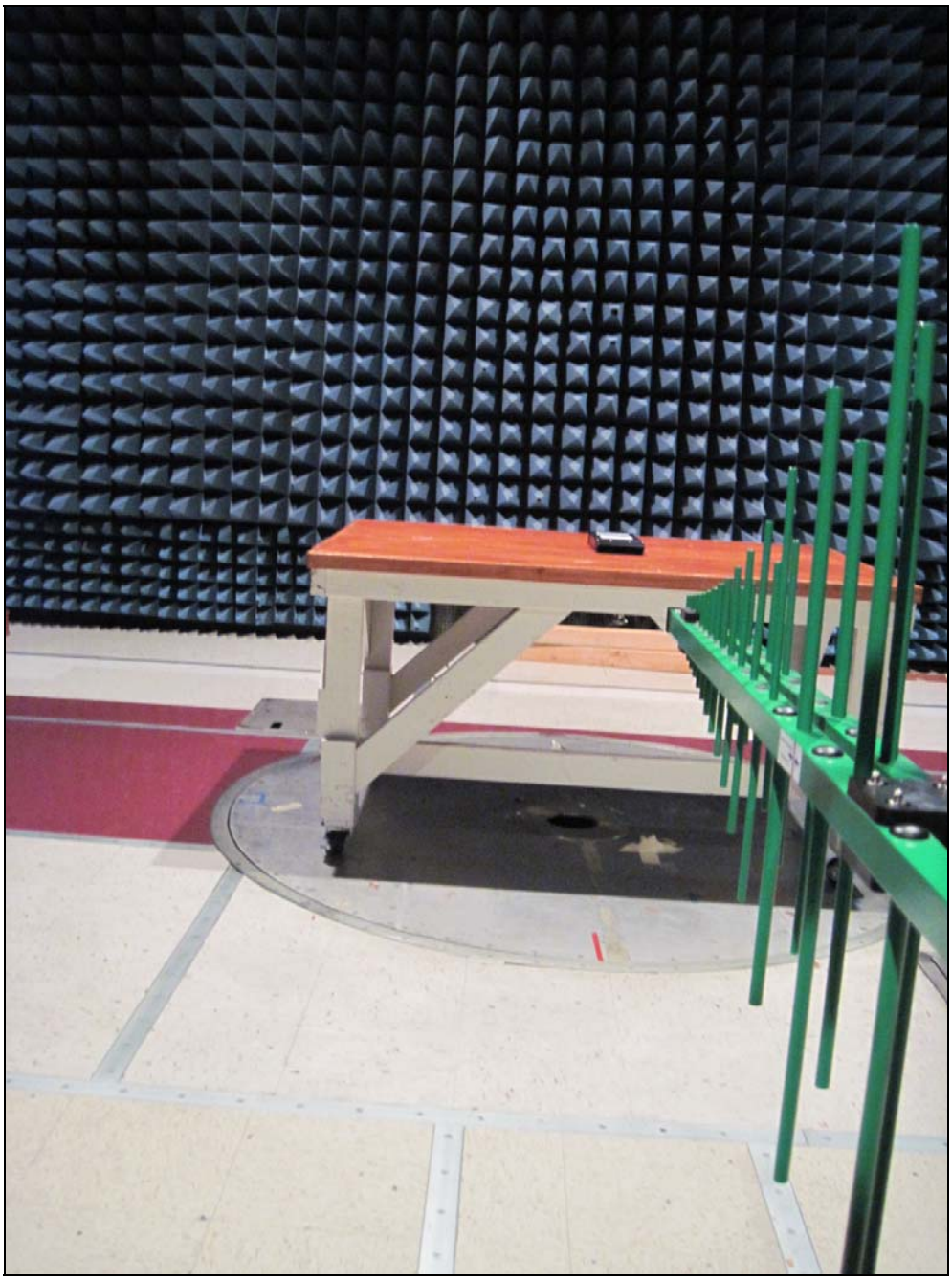
Radiated Emission Limits Test Setup



Photograph 2. Radiated Emission, Test Setup

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IV. Electromagnetic Compatibility Criteria for Intentional Radiators

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Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.203 Antenna Requirement

Test Requirement: **§ 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.

The structure and application of the EUT were analyzed to determine compliance with Section 15.203 of the Rules. Section 15.203 states that the subject device must meet at least one of the following criteria:

a.) Antenna must be permanently attached to the unit.

b.) Antenna must use a unique type of connector to attach to the EUT.

c.) Unit must be professionally installed. Installer shall be responsible for verifying that the correct antenna is employed with the unit.

Results: The EUT as tested is compliant the criteria of §15.203. EUT has a unique connector and an integral antenna.

Test Engineer(s): Manasi Bhandiwad

Test Date(s): 11/12/10 to 11/15/10

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Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.207 Conducted Emissions Limits

Test Requirement(s): **§ 15.207 (a):** 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 30MHz, shall not exceed the limits in the following table, as measured using a 50 μH/50 Ω 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 range (MHz)	§ 15.207(a), Conducted Limit (dBμV)	
	Quasi-Peak	Average
* 0.15- 0.45	66 - 56	56 - 46
0.45 - 0.5	56	46
0.5 - 30	60	50

Table 10. Conducted Limits for Intentional Radiators from FCC Part 15 § 15.207(a)

Test Results: The EUT was not applicable with this requirement. The EUT is battery operated.

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Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.247(a) Bandwidth & Channelization Requirements

Test Requirements: **§ 15.247(a):** Operation under the provisions of this section is limited to frequency hopping and digitally modulated intentional radiators that comply with the following provisions:

For systems using digital modulation techniques, the EUT may operate in the 902-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz bands. For DTS, the minimum 6 dB bandwidth shall be at least 500 kHz. For frequency hopping systems, the EUT shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

Test Procedure: The bandwidth of the fundamental frequency was measured with the spectrum analyzer using a RBW approximately equal to 1% of the total emission bandwidth. The 20 dB bandwidth was measured and recorded.

The bandwidth of the fundamental frequency was measured with the spectrum analyzer using a RBW approximately equal to 1% of the span. A Sample detector was used.

Test Results The EUT was compliant with § 15.247 (a).

Test Engineer(s): Manasi Bhandiwad

Test Date(s): 11/15/10

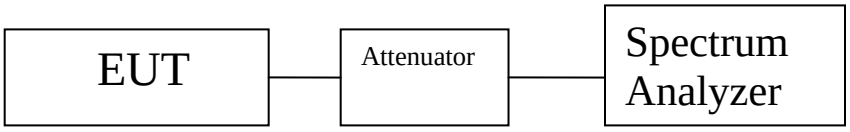

Figure 2. Block Diagram, Occupied Bandwidth Test Setup

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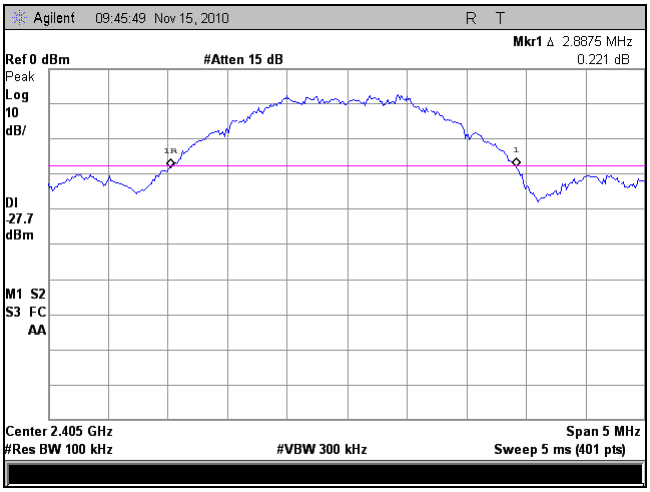
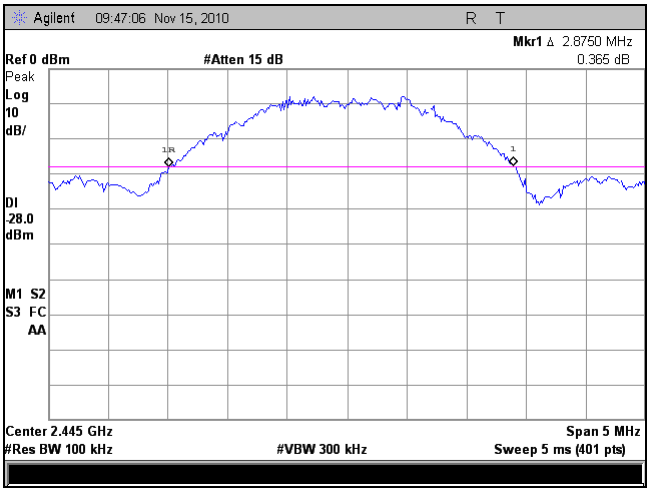
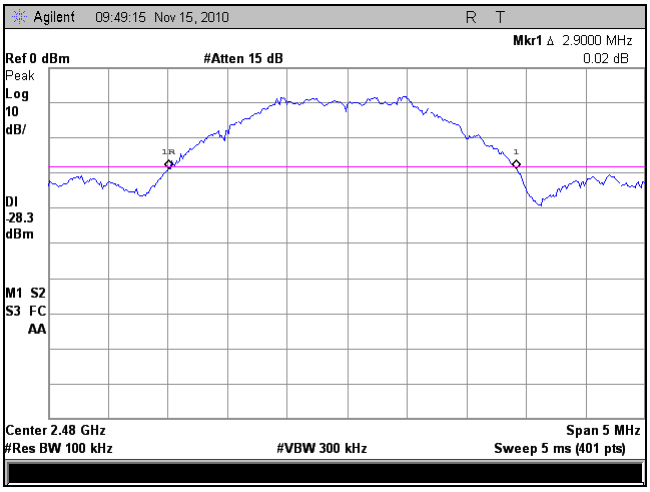
Occupied Bandwidth Test Results



Plot 3. 20 dB Occupied Bandwidth, Channel 0



Plot 4. 20 dB Occupied Bandwidth, Channel 8



Plot 5. 20 dB Occupied Bandwidth, Channel 15

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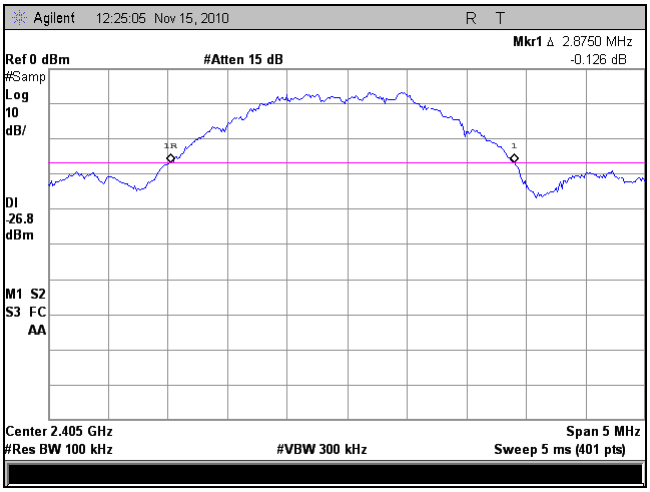
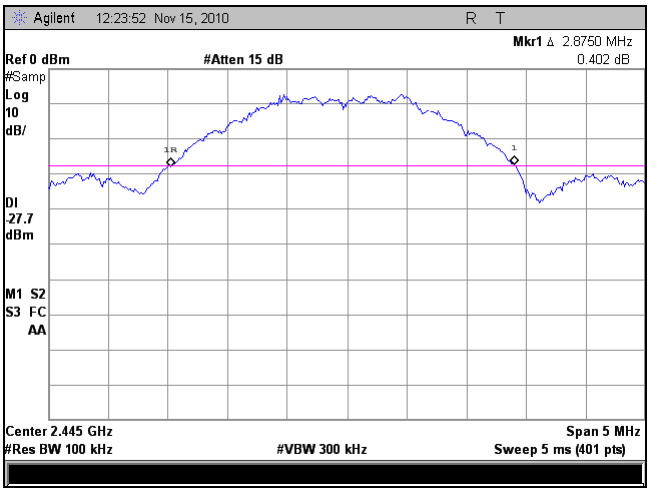
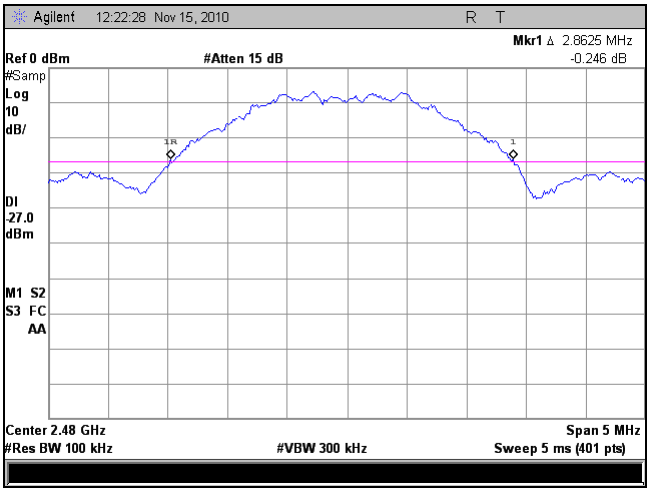


Plot 6. 20 dB Occupied Bandwidth, Channel 0, IC Limits



Plot 7. 20 dB Occupied Bandwidth, Channel 8, IC Limits



Plot 8. 20 dB Occupied Bandwidth, Channel 15, IC Limits

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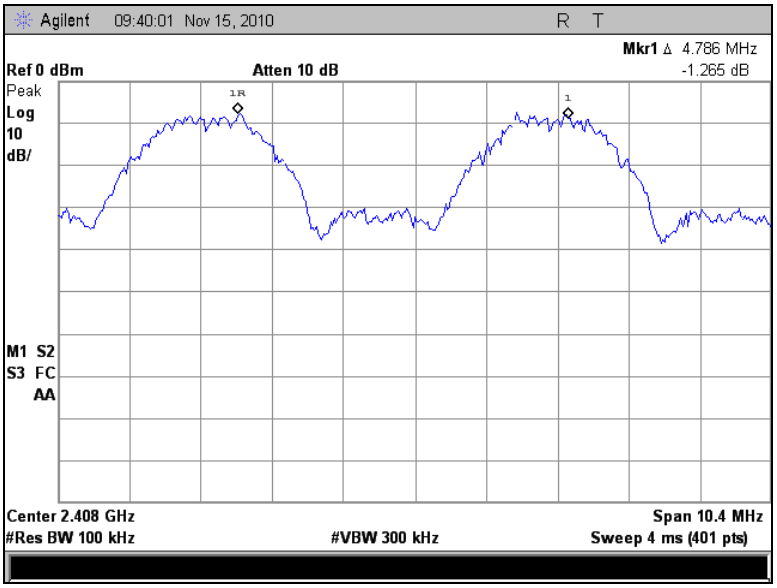
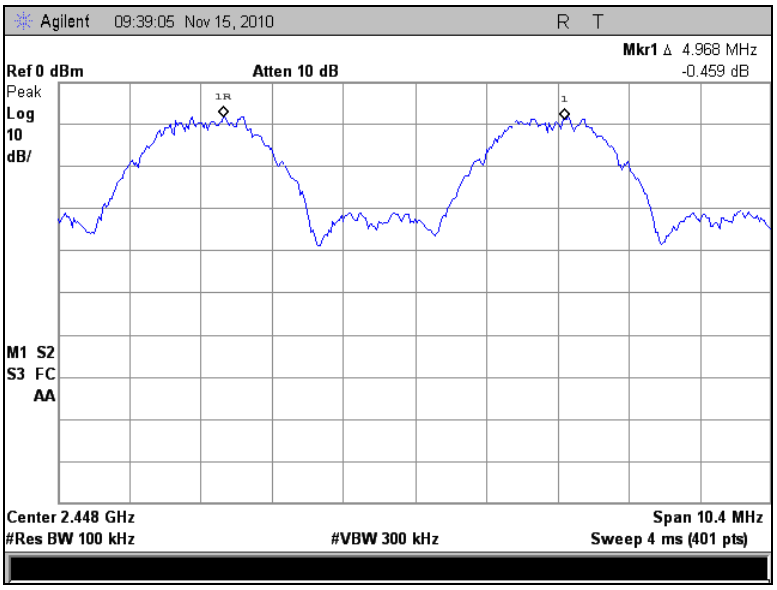
Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.247 Carrier Frequency Separation

Remarks: Total hopping channels = 16. The EUT meets the specifications of Section 15.247(a) (1) (iii) for Number of Hopping Channels.



Plot 9. Separation between Channels 1 & 2



Plot 10. Separation between Channels 8 & 9

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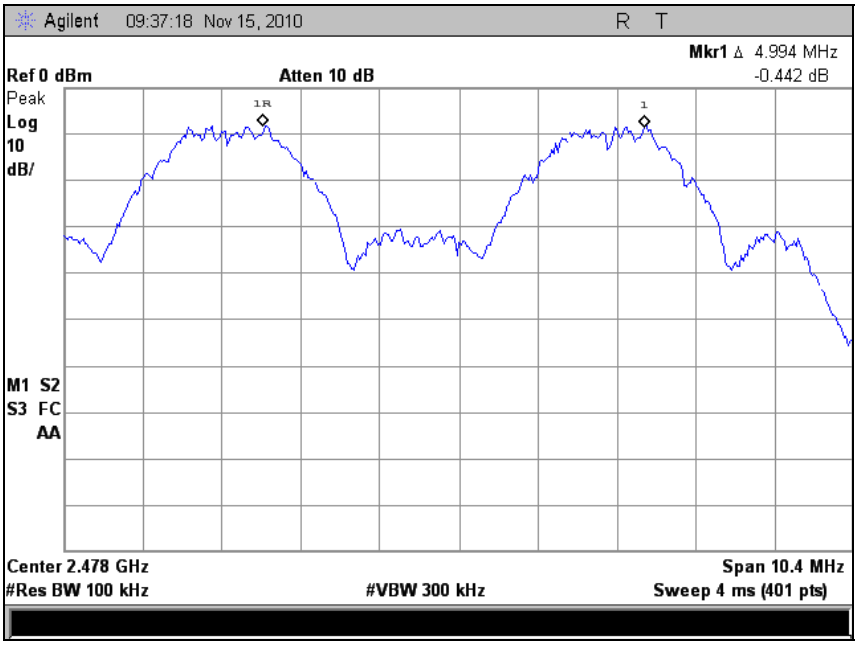

Plot 11. Separation between Channels 14 & 15

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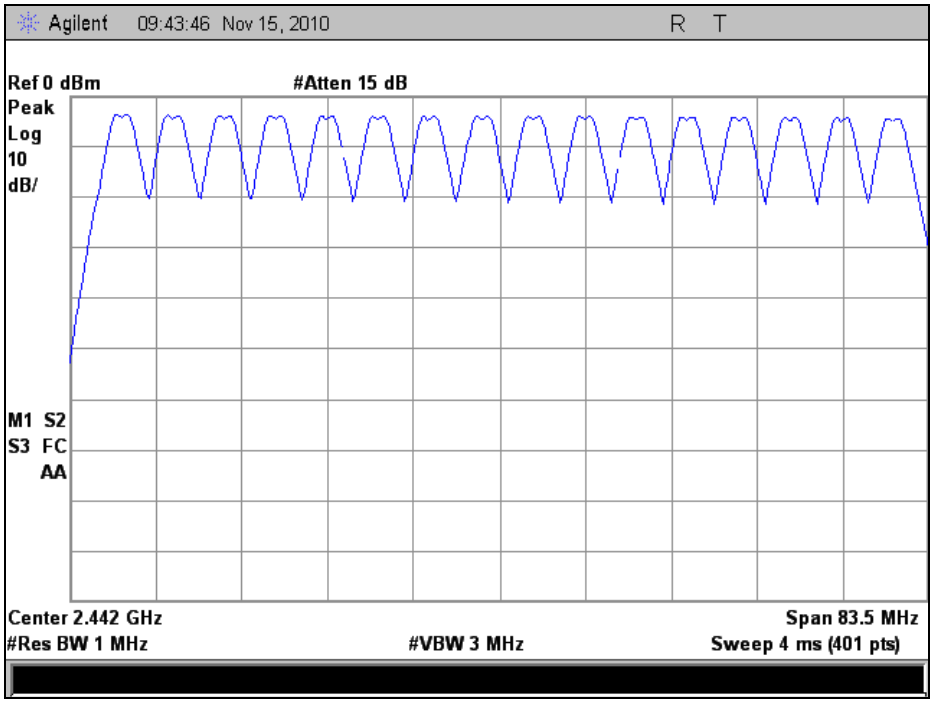
Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.247 Number of Hopping Channels



Plot 12. No. of Hopping Frequencies

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Electromagnetic Compatibility Criteria for Intentional Radiators

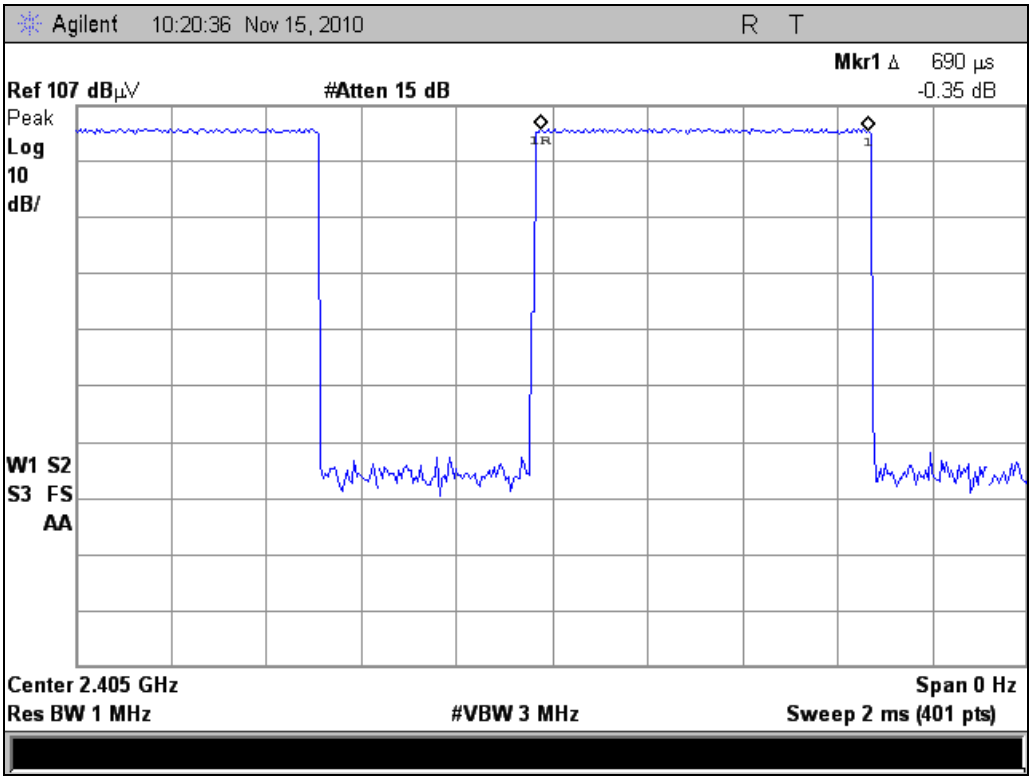
§ 15.247 Time of Occupancy

Remarks: The average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 6.4 second period.

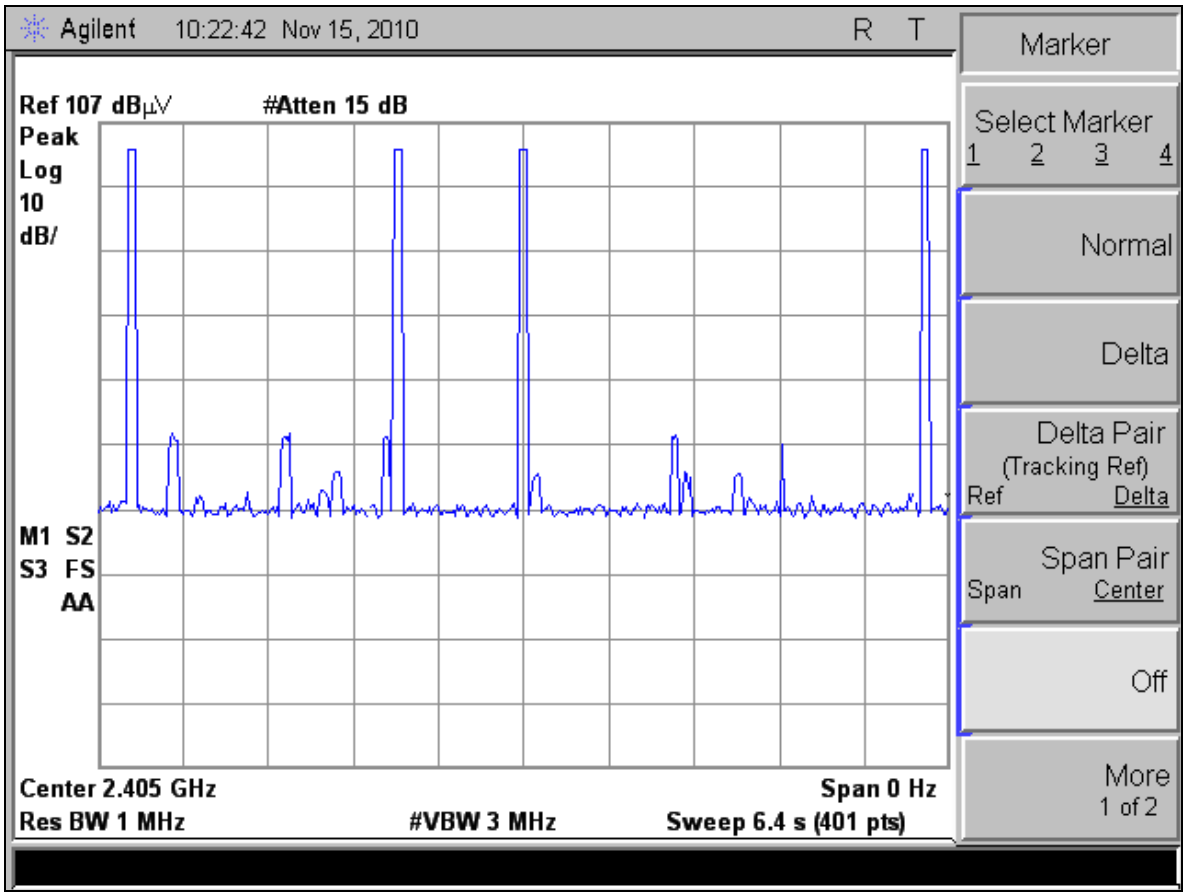
1 event was captured in 6.4 seconds.

Burst Duration in one hop (µs)	Test Results		
	Dwell Time (ms)	Limit (ms)	Result
690	2.76	400	Pass

Table 11. Time Occupancy, Test Results



Plot 13. Channel On Time - Channel 0



Plot 14. No of Occurrences of Channel 0 in 6.4s

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Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.247(b) Peak Power Output and RF Exposure

Test Requirements: **§15.247(b):** The maximum peak output power of the intentional radiator shall not exceed the following:

Digital Transmission Systems (MHz)	Output Limit (Watts)
902-928	1.000
2400–2483.5	1.000
5725– 5850	1.000

Table 12. Output Power Requirements from §15.247

§15.247(c): if transmitting antennas of directional gain greater than 6 dBi are used the peak output power from the intentional radiator shall be reduced below the stated values in the Table 12, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Systems operating in the 2400 – 2483.5 MHz band and using a point to point application may employ transmitting antennas with directional gain greater than 6 dBi provided the maximum peak output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

Systems operating in the 5725 – 5850 MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter peak output power.

Fixed, point-to-point operation excludes the use of point-to-multipoint systems, omni-directional applications, and multiple co-located intentional radiators transmitting the same information. The operator of the spread spectrum intentional radiator or, if the equipment is professionally installed, the installer is responsible for ensuring that the system is used exclusively for fixed, point-to-point operations. The instruction manual furnished with the intentional radiator shall contain language in the installation instructions informing the operator and the installer of this responsibility.

Test Procedure: The transmitter was connected to a calibrated spectrum analyzer. The EUT was measured at the low, mid and high channels of each band at the maximum power level.

Test Results: The EUT was compliant with the Peak Power Output limits of **§15.247(b)**.

Test Engineer(s): Manasi Bhandiwad

Test Date(s): 11/15/10

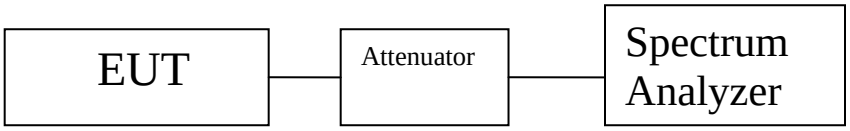

Figure 3. Peak Power Output Test Setup

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RF Power Output Test Results

Peak Conducted Output Power				
Carrier Channel	Frequency (MHz)	Measured Peak Output Power dBm		
		Port 1	Port 2	Total Power
Low	2405	-1.39	-7.71	-0.487
Mid	2445	-2.18	-7.41	-1.05
High	2480	-2.65	-7.13	-1.33

Table 13. RF Output Power Test Results

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Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.247(b) RF Exposure

RF Exposure Requirements: **§1.1307(b)(1) and §1.1307(b)(2):** Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess of the Commission's guidelines.

RF Radiation Exposure Limit: **§1.1310:** As specified in this section, the Maximum Permissible Exposure (MPE) Limit shall be used to evaluate the environmental impact of human exposure to radiofrequency (RF) radiation as specified in Sec. 1.1307(b), except in the case of portable devices which shall be evaluated according to the provisions of Sec. 2.1093 of this chapter.

Test Results: MPE= 0.00024mW/cm2

Test Engineer(s): Manasi Bhandiwad

Test Date(s): 12/22/10

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Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.247(d) Harmonic Emissions – Radiated

Test Requirements: **§15.247(d); §15.205:** Emissions outside the frequency band.

§15.247(d): In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in § 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a).

§15.205(a): Except as shown in paragraph (d) of this section, 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] 0.495–0.505----------	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	2655–2900	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])

Table 14. Restricted Bands of Operation

[1] Until February 1, 1999, this restricted band shall be 0.490 – 0.510 MHz.
[2] Above 38.6

Test Requirement(s): **§ 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 Table 15.

Frequency (MHz)	§ 15.209(a),Radiated Emission Limits (dBµV) @ 3m
30 - 88	40.00
88 - 216	43.50
216 - 960	46.00
Above 960	54.00

Table 15. Radiated Emissions Limits Calculated from FCC Part 15, § 15.209 (a)

Test Procedure: The transmitter was set to the mid channel at the highest output power and placed on a 0.8 m high wooden table inside in a semi-anechoic chamber. Measurements were performed with the EUT rotated 360 degrees and varying the adjustable antenna mast with 1 m to 4 m height to determine worst case orientation for maximum emissions. Measurement were repeated the measurement at the low and highest channels.

For frequencies from 30 MHz to 1 GHz, measurements were made using a quasi-peak detector with a 120 kHz bandwidth.

For intentional radiators with a digital device portion which operates below 10 GHz, the spectrum was investigated as per §15.33(a)(1) and §15.33(a)(4); i.e., the lowest RF signal generated or used in the device up to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.

In accordance with §15.35(b) the limit on the radio frequency emissions as measured using instrumentation with a peak detector function shall be 20 dB above the maximum permitted average limit for the frequency being investigated unless a different peak emission limit is otherwise specified in the rules.

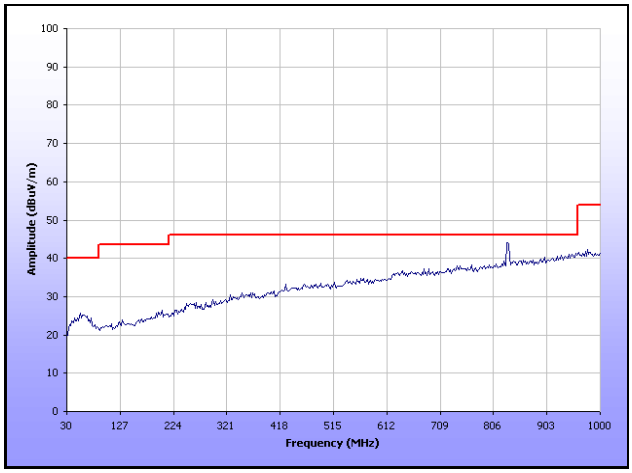
EUT Field Strength Final Amplitude = Raw Amplitude – Preamp gain + Antenna Factor + Cable Loss – Distance Correction Factor

Test Results: The EUT was compliant with the Radiated Spurious Emission limits of **§ 15.247(d)**.
This test was done only up to 18Ghz, as all emissions were measured at the noise floor and conducted spurious emissions testing was done up to 24GHz.

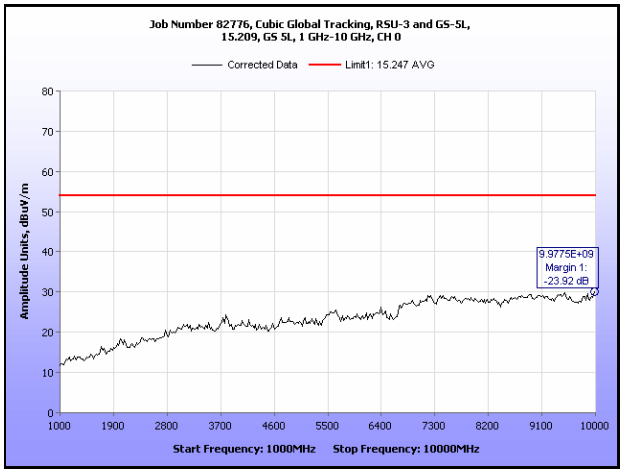
Test Engineer(s): Manasi Bhandiwad

Test Date(s): 11/11/10 to 11/15/10

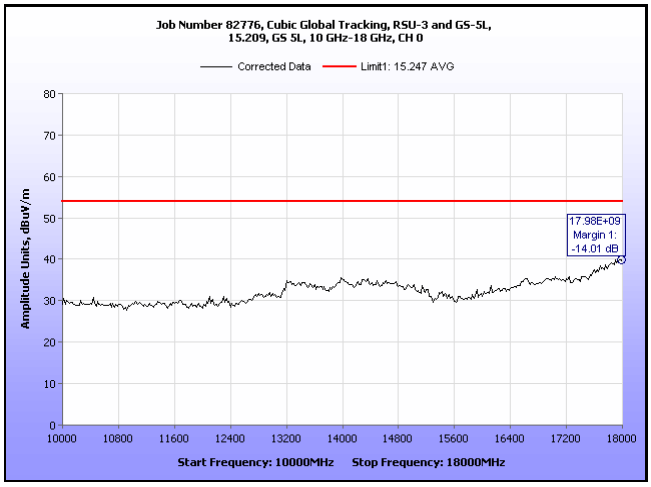
Radiated Spurious Emissions Test Results



Plot 15. Radiated Spurious Emissions, Channel 0, 30 MHz – 1 GHz



Plot 16. Radiated Spurious Emissions, Channel 0, 1 GHz – 10 GHz



Plot 17. Radiated Spurious Emissions, Channel 0, 10 GHz – 18 GHz

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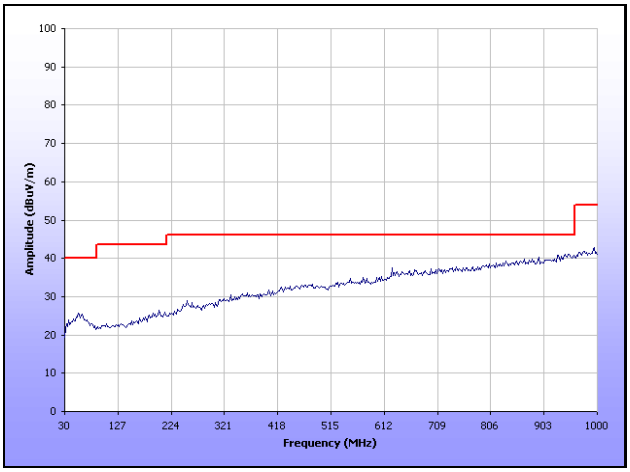
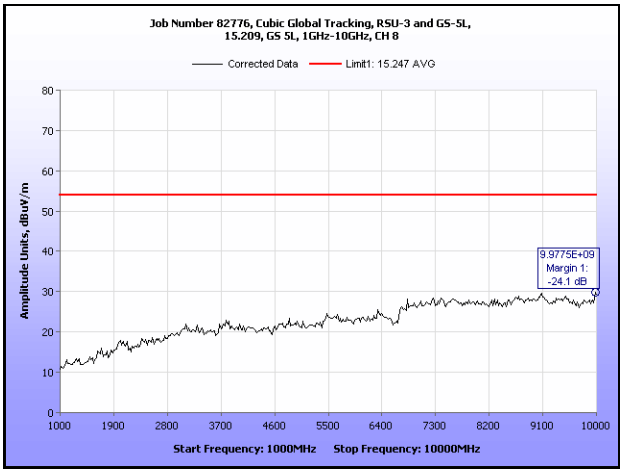
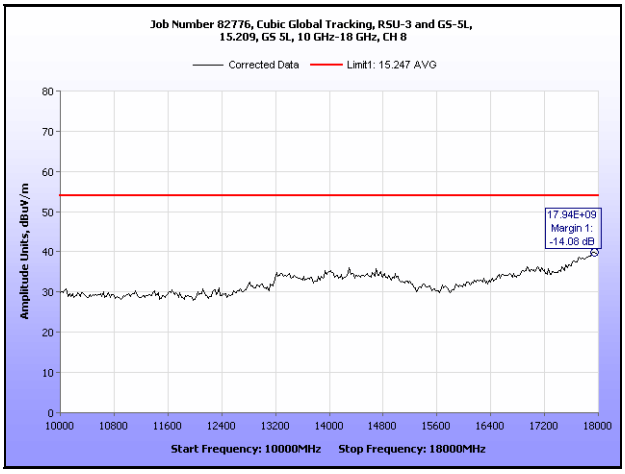


Plot 18. Radiated Spurious Emissions, Channel 8, 30 MHz – 1 GHz



Plot 19. Radiated Spurious Emissions, Channel 8, 1 GHz – 10 GHz



Plot 20. Radiated Spurious Emissions, Channel 8, 10 GHz – 18 GHz

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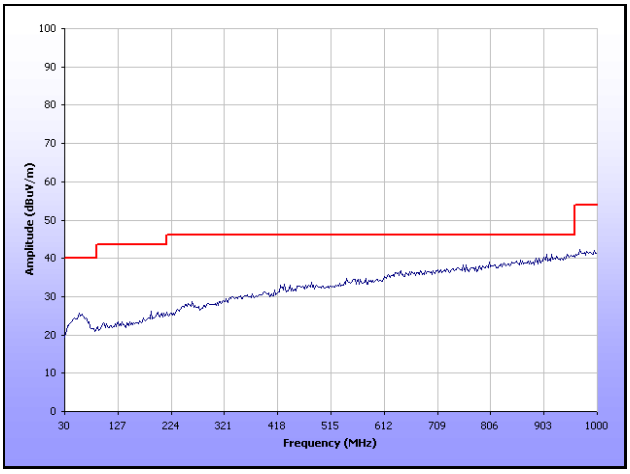
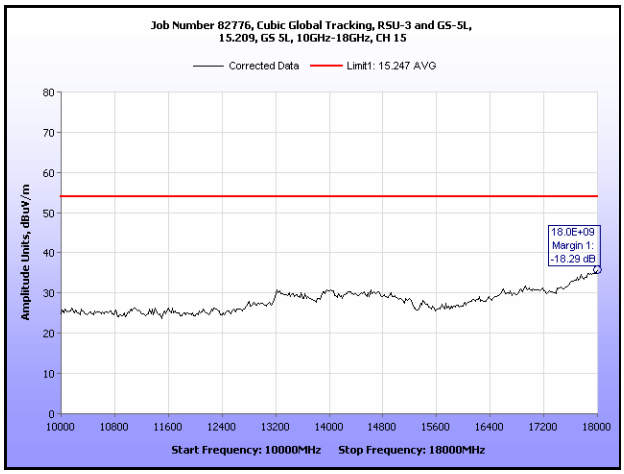


Plot 21. Radiated Spurious Emissions, Channel 15, 30 MHz – 1 GHz

Plot 22. Radiated Spurious Emissions, Channel 15, 1 GHz – 10 GHz



Plot 23. Radiated Spurious Emissions, Channel 15, 10 GHz – 18 GHz

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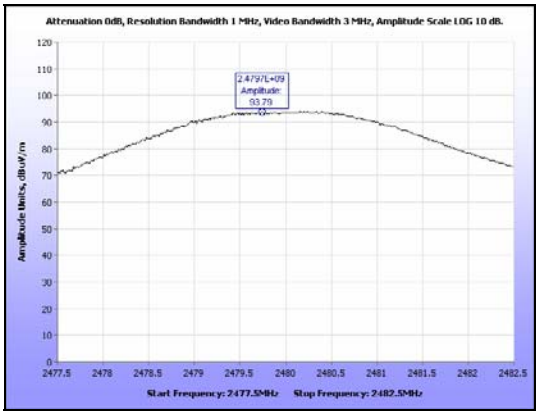
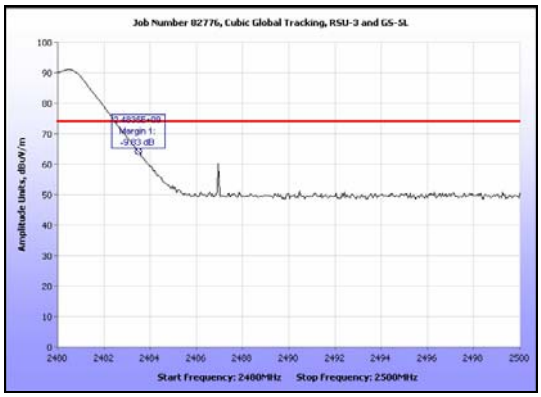
Radiated Band Edge Measurements

Test Procedures: The transmitter was turned. Measurements were performed of the low, mid and high Channels. The EUT was rotated orthogonally through all three axes. Plots shown are corrected for both antenna correction factor and distance and compared to a 3 m limit line.

Plot 24. Restricted Band Edge, Low Band Edge; Peak Detector



Plot 25. Restricted Band Edge, Field Strength Average



Plot 26. Restricted Band Edge, High Band Edge Peak Detector

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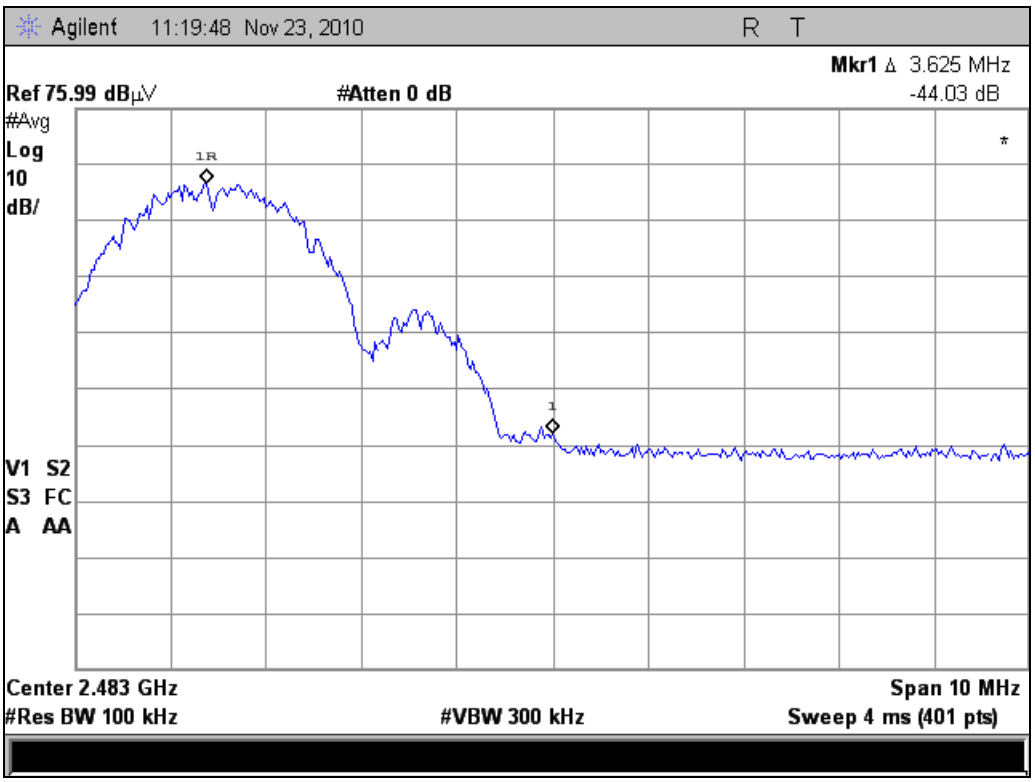

Plot 27. Restricted Band Edge, Delta Marker

Test Procedures for Radiated Band Edge for High Channel 2480MHz:

1. The field strength of the fundamental emission was measured using a 1MHz RBW and a 10Hz VBW for the average value.
2. The spectrum analyzer was spanned to encompass both the peak of the fundamental emission and the band edge emission under investigation. The RBW was set to 1% of the span and the VBW to 3x the RBW. The delta between the peak levels of the fundamental emission at the relevant band edge emission was measured and recorded.
3. The resulting delta value was used to determine compliance.

Emission	Corrected Amplitude (dBuV)	Delta Method (dBuV)	Band Edge Measurement (dBuV) = Corrected Field Strength- Delta Measured	Limit (dBuV)	Margin (dBuV)
Avg.	97.83	43.99	53.84	54	0.16

Table 16. Radiated Band Edge, Test Results

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Radiated Spurious Emissions Test Setup

Photograph 3. Radiated Spurious Emissions, Test Setup – 1

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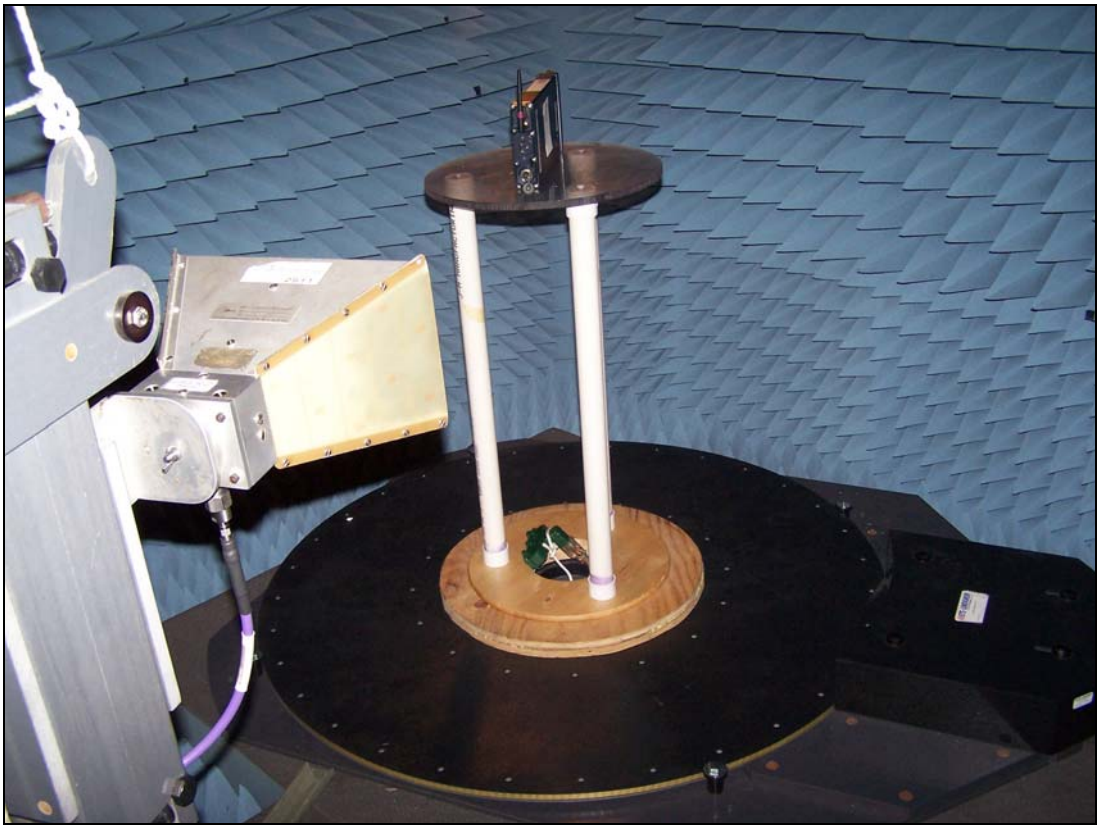

Photograph 4. Radiated Spurious Emissions, Test Setup – 2

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Electromagnetic Compatibility Criteria for Intentional Radiators

RSS-GEN Receiver Spurious Emissions Requirements

Test Requirements: The following receiver spurious emission limits shall be complied with:

(a) If a radiated measurement is made, all spurious emissions shall comply with the limits of Table 17.

Spurious Frequency (MHz)	Field Strength (microvolt/m at 3 metres)
30 – 88	100
88 – 216	150
216 – 960	200
Above 960	500

Table 17. Spurious Emission Limits for Receivers

(b) If a conducted measurement is made, no spurious output signals appearing at the antenna terminals shall exceed 2 nanowatts per any 4 kHz spurious frequency in the band 30-1000 MHz, or 5 nanowatts above 1 GHz.

Test Procedures: The EUT was programmed for receive mode only. Conducted measurements were taken at the antenna port of the EUT. 100 kHz resolution bandwidth was used from 30 MHz - 1 GHz and 300 kHz resolution was used for measurements done above 1 GHz. All plots are corrected for cable loss.

Test Results: Equipment is compliant with the Receiver Spurious Emissions Requirements of RSS-GEN.

Test Engineer(s): Manasi Bhandiwad

Test Date(s): 11/23/10

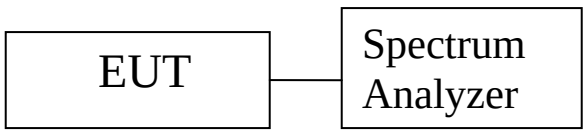

Figure 4. Block Diagram, Conducted Receiver Spurious Emissions Test Setup

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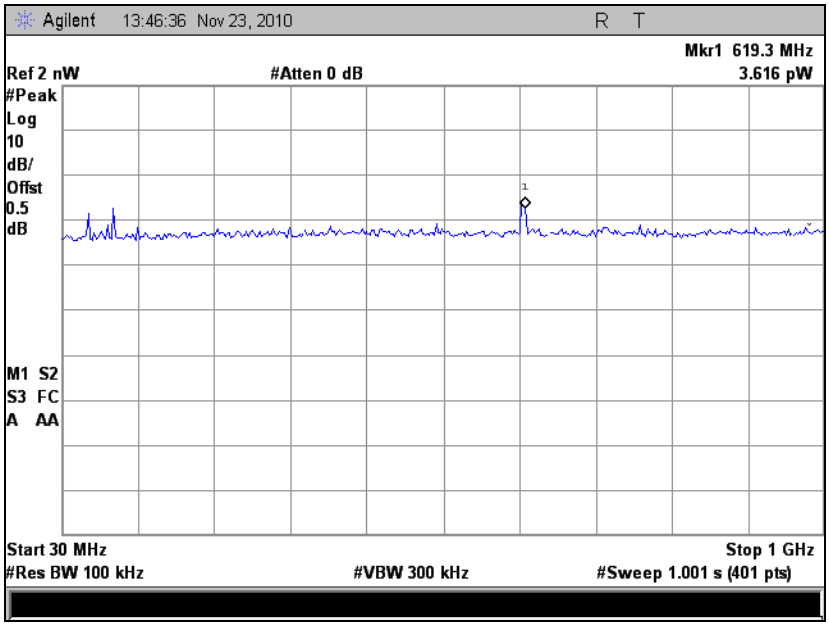
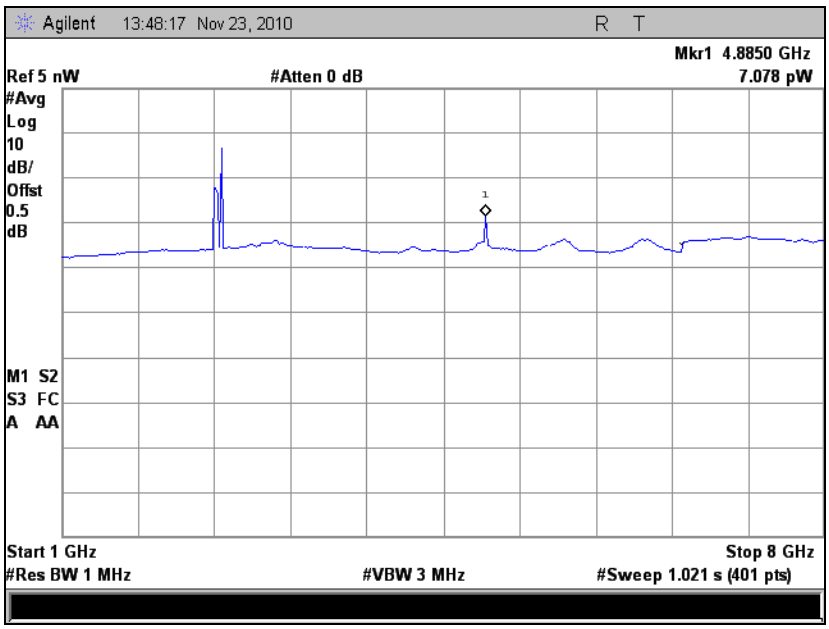
Conducted Receiver Spurious Emissions



Plot 28. Receiver Spurious Emission, 30 MHz – 1 GHz



Plot 29. Receiver Spurious Emission, 1 GHz – 8 GHz

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Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.247(d) RF Conducted Spurious Emissions Requirements and Band Edge

Test Requirement: **15.247(d)** In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

Test Procedure: For intentional radiators with a digital device portion which operates below 10 GHz, the spectrum was investigated as per §15.33(a)(1) and §15.33(a)(4); i.e., the lowest RF signal generated or used in the device up to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.

A conducted version of the EUT was provided with a connector at the antenna port. The spectrum analyzer was set to a 100 kHz resolution bandwidth and 300 kHz video bandwidth. Measurements were taken at antenna port. Plots are corrected for external attenuation and cable loss.
This test was done on the u.fl port since the power measured on this port was higher than the one measured on the SMA-RP Port.

See following pages for detailed test results with RF Conducted Spurious Emissions.

Test Results: The EUT was compliant with the Conducted Spurious Emission limits of **§15.247(d)**.

Test Engineer(s): Manasi Bhandiwad

Test Date(s): 11/12/10

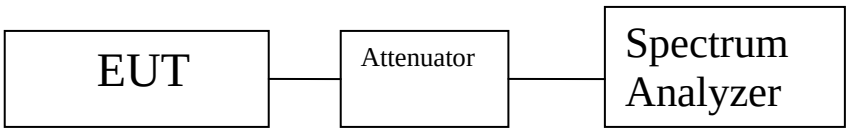

Figure 5. Block Diagram, Conducted Spurious Emissions Test Setup

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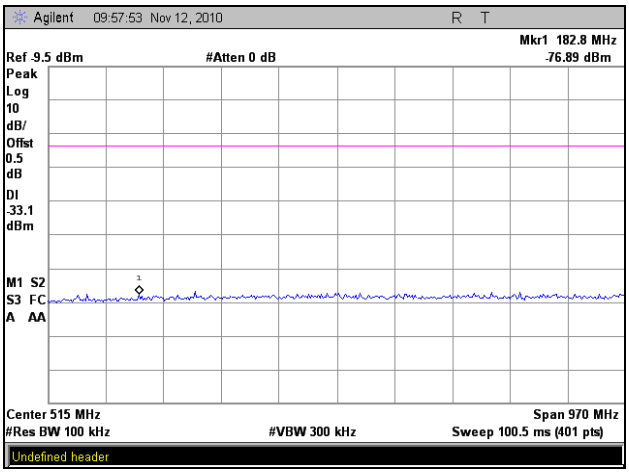
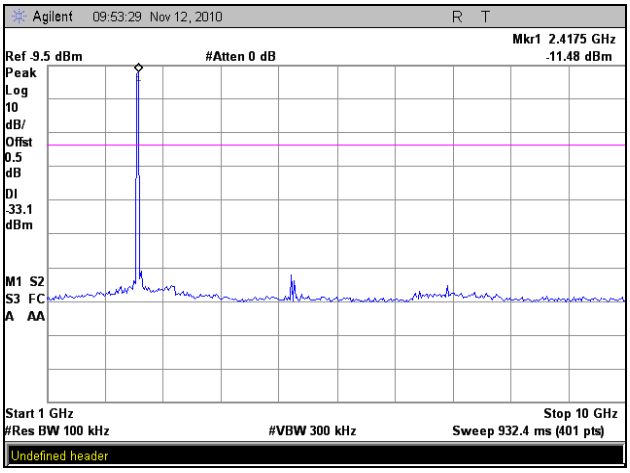
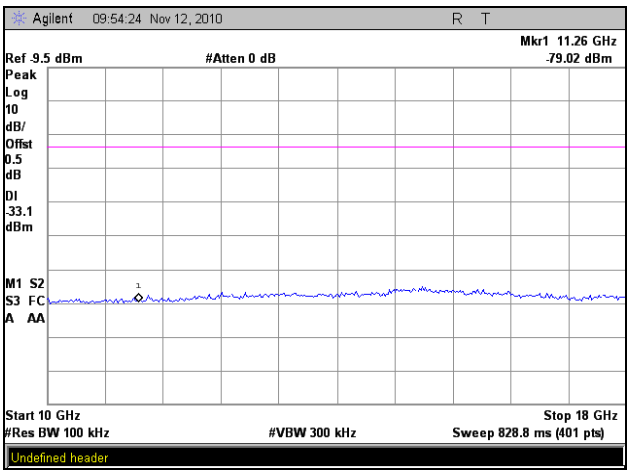


Plot 30. Conducted Spurious Emission, Channel 0, 30MHz - 1GHz



Plot 31. Conducted Spurious Emission, Channel 0, 1GHz - 10GHz



Plot 32. Conducted Spurious Emission, Channel 0, 10GHz - 18GHz

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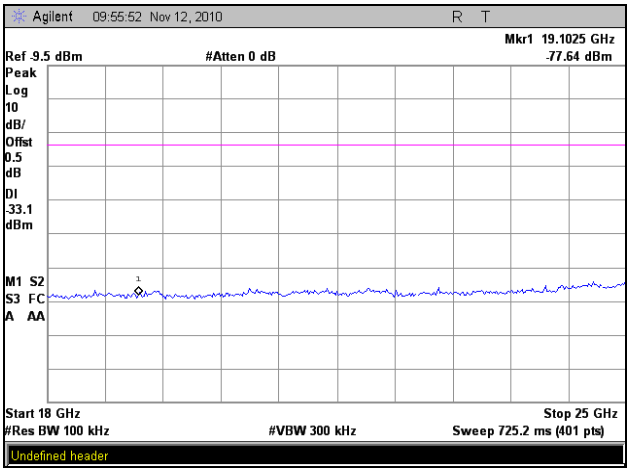
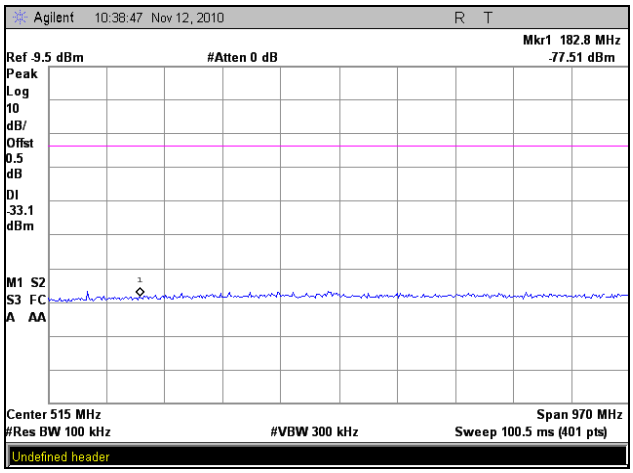
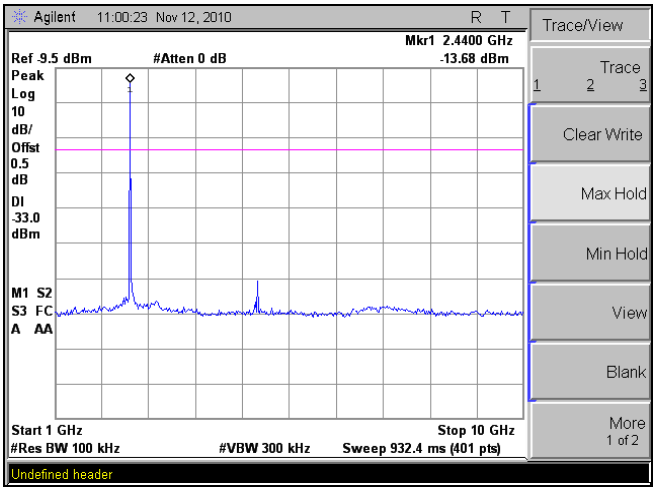


Plot 33. Conducted Spurious Emission, Channel 0, 18GHz - 26GHz



Plot 34. Conducted Spurious Emission, Channel 8, 30MHz - 1GHz



Plot 35. Conducted Spurious Emission, Channel 8, 1GHz - 10GHz

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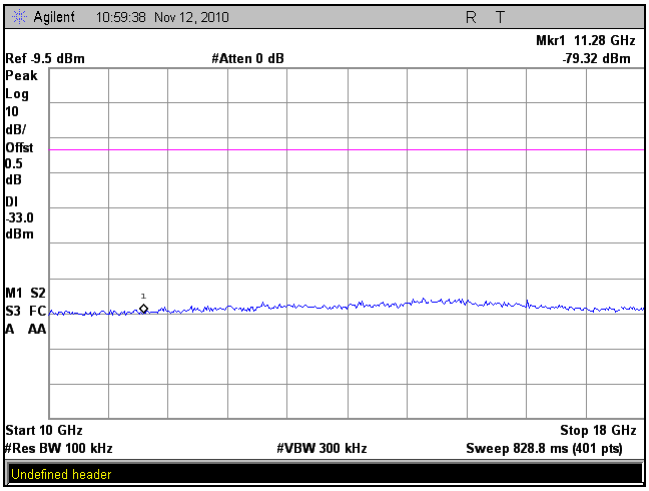
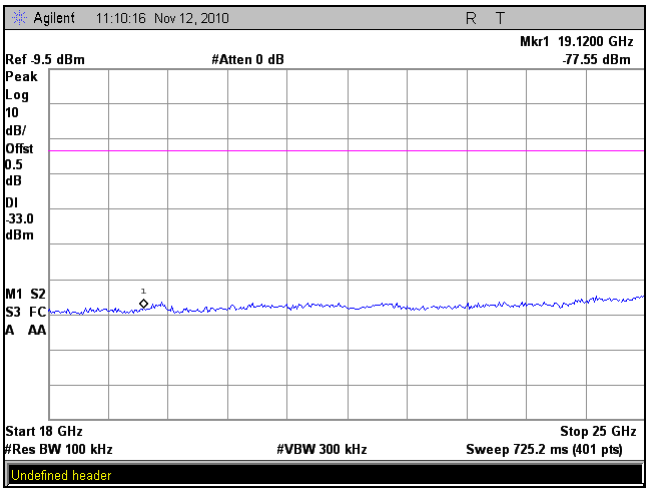
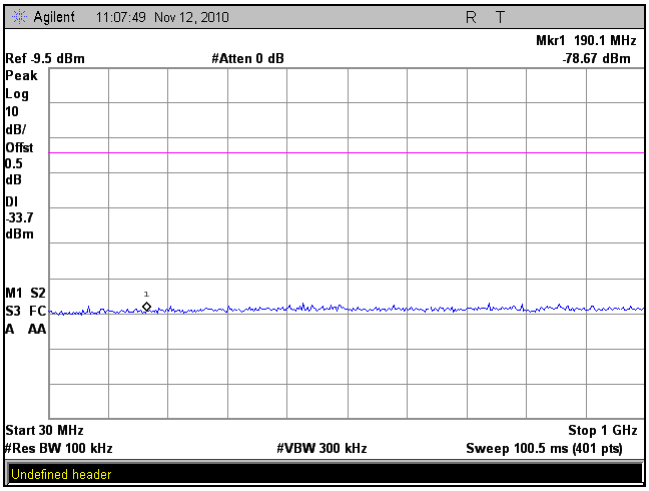


Plot 36. Conducted Spurious Emission, Channel 8, 10GHz - 18GHz



Plot 37. Conducted Spurious Emission, Channel 8, 18GHz - 26GHz



Plot 38. Conducted Spurious Emission, Channel 15, 30MHz - 1GHz

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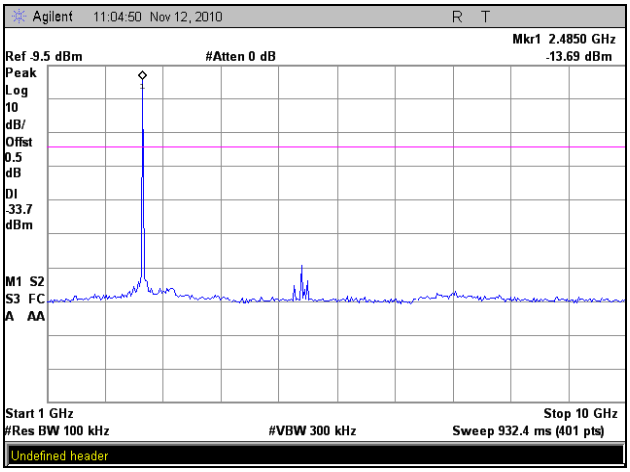
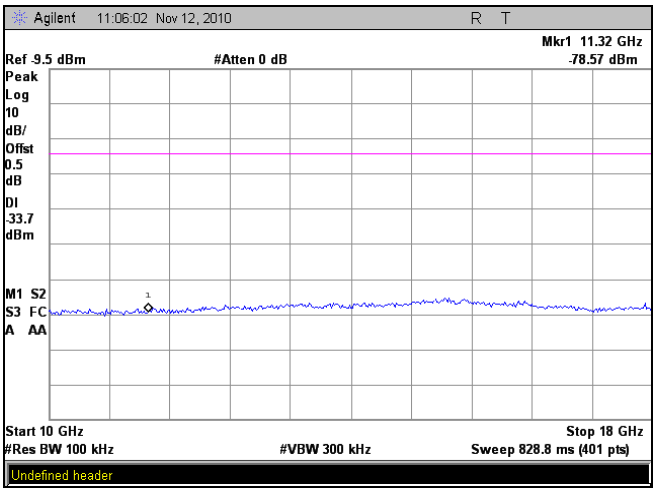
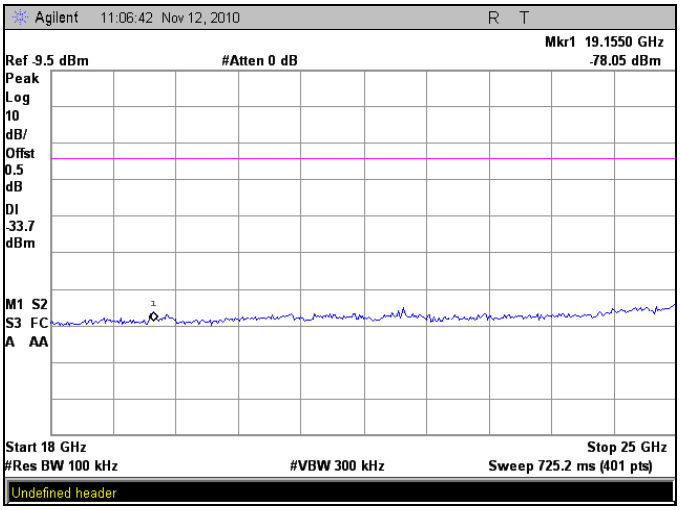


Plot 39. Conducted Spurious Emission, Channel 15, 1GHz - 10GHz



Plot 40. Conducted Spurious Emission, Channel 15, 10GHz - 18GHz



Plot 41. Conducted Spurious Emission, Channel 15, 18GHz - 26GHz

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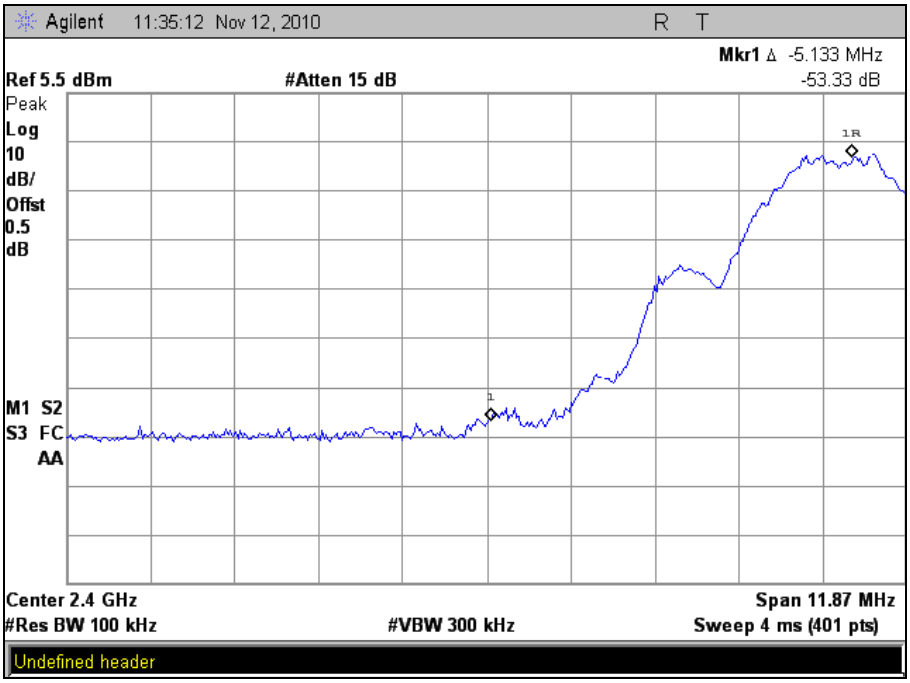
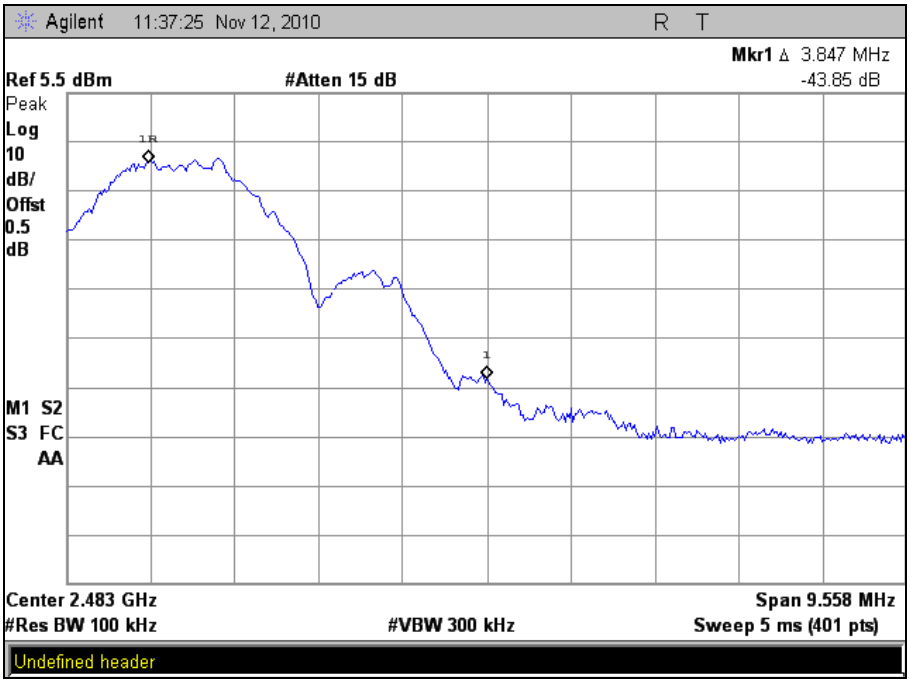


Plot 42. Conducted Spurious Emission, Channel 0, 20dBc Band Edge



Plot 43. Conducted Spurious Emission, Channel 15, 20dBc Band Edge

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IV. Test Equipment

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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
1T4409	EMI RECEIVER	ROHDE & SCHWARZ	ESIB7	05/25/2010	05/25/2011
1S2485	BILOG ANTENNA	TESEQ	CBL 6112D	05/07/2010	05/07/2011
1T2511	ANTENNA; HORN	EMCO	3115	08/31/2010	08/31/2011
1T4414	MICROWAVE PRE-AMPLIFIER	A.H. SYSTEMS	PAM-0118	SEE NOTE	
1T4612	ESA-E SERIES SPECTRUM ANALYZER	AGILENT	E4407B	09/27/2010	09/27/2011
1T4300	SEMI-ANECHOIC CHAMBER # 1	EMC TEST SYSTEMS	NONE	8/23/2010	8/23/2013

Table 18. Test Equipment List

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

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V. Certification & User's Manual Information

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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.

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(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.

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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.

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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.

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Certification & User's Manual Information

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 users 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.

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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.

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End of Report

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