MET Laboratories, Inc. *Safety Certification - EMI - Telecom Environmental Simulation*
914 WEST PATAPSCO AVENUE • BALTIMORE, MARYLAND 21230-3432 • PHONE (410) 354-3300 • FAX (410) 354-3313
33439 WESTERN AVENUE • UNION CITY, CALIFORNIA 94587 • PHONE (510) 489-6300 • FAX (510) 489-6372
3162 BELICK STREET • SANTA CLARA, CA 95054 • PHONE (408) 748-3585 • FAX (510) 489-6372
13301 MCCALLEN PASS • AUSTIN, TEXAS 78753 • PHONE (512) 287-2500 • FAX (512) 287-2513

March 20, 2014

Spirent Communications
20324 Seneca Meadows Parkway
Germantown, MD 20876

Dear Jim Wasel,

Enclosed is the EMC Wireless test report for compliance testing of the Spirent Communications, Flex NG2 Base Unit / T5100 as tested to the requirements of Title 47 of the CFR, Ch. 1 (10-1-06 ed.), Part 15, Subpart B and ICES-003, Issue 5 August 2012 for Unintentional Radiators, and Part 15.407 Subpart E and RSS-210, Issue 8, Dec. 2010 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.

Jennifer Warnell
Documentation Department

Reference: (\Spirent Communications\EMC38436A-FCC407 Rev. 1 UNII 1)

Electromagnetic Compatibility Criteria
Test Report

for the

Spirent Communications
Model Flex NG2 Base Unit / T5100

Tested under
the Certification Rules
contained in
Title 47 of the CFR, Part 15, Subpart B& ICES-003
for Unintentional Radiators
and
15.407 Subpart E & & RSS-210, Issue 8, Dec. 2010
for Intentional Radiators

MET Report: EMC38436A-FCC407 Rev. 1 UNII 1

March 20, 2014

Prepared For:

Spirent Communications
20324 Seneca Meadows Parkway
Germantown, MD 20876

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

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for Intentional Radiators

Djed Mouada, 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 Parts 15B, 15.407, of the FCC Rules under normal use and maintenance.

Asad Bajwa,
Director, Electromagnetic Compatibility Lab

Report Status Sheet

Revision	Report Date	Reason for Revision
∅	March 18, 2014	Initial Issue.
1	March 20, 2014	Revised to reflect engineer corrections.

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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**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
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 Spirent Communications Flex NG2 Base Unit / T5100, with the requirements of Part 15, §15.407. 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 Flex NG2 Base Unit / T5100. Spirent Communications should retain a copy of this document which should be kept on file for at least two years after the manufacturing of the Flex NG2 Base Unit / T5100, 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, §15.407, in accordance with Spirent Communications, purchase order number 76678. All tests were conducted using measurement procedure ANSI C63.4-2003.

FCC Reference	IC Reference RSS-210 Issue 8: 2010; RSS-GEN Issue 3: 2010	Description	Results
47 CFR Part 15.107 (a)	ICES-003 Issue 5 August 2012	Conducted Emission Limits for a Class A Digital Device	Compliant
47 CFR Part 15.109 (a)	ICES-003 Issue 5 August 2012	Radiated Emission Limits for a Class A Digital Device	Compliant
Title 47 of the CFR, Part 15 §15.203	N/A	Antenna Requirement	Compliant
Title 47 of the CFR, Part 15 §15.207(a)	RSS-GEN (7.2.4)	Conducted Emission Limits	Compliant
Title 47 of the CFR, Part 15 §15.403 (i)	RSS-Gen (4.6)	26dB Occupied Bandwidth	Compliant
		99% Occupied Bandwidth	Compliant
Title 47 of the CFR, Part 15 §15.407 (a)(2)	RSS-210 (A9.2)	Conducted Transmitter Output Power	Compliant
Title 47 of the CFR, Part 15 §15.407 (a)(2)	RSS-210 (A8.2)	Power Spectral Density	Compliant
Title 47 of the CFR, Part 15 §15.407 (a)(6)		Peak Excursion	Compliant
Title 47 of the CFR, Part 15 §15.407 (b)(2), (3), (5), (6)	RSS-210 (A9.2)	Undesirable Emissions (15.205/15.209 - General Field Strength Limits (Restricted Bands and Radiated Emission Limits)	Compliant
Title 47 of the CFR, Part 15 §15.407(f)	RSS-102 (4.1)	RF Exposure	Compliant

Table 1. Executive Summary of EMC Part 15.407 ComplianceTesting

II. Equipment Configuration

A. Overview

MET Laboratories, Inc. was contracted by Spirent Communications to perform testing on the Flex NG2 Base Unit / T5100, under Spirent Communications' purchase order number 76678.

This document describes the test setups, test methods, required test equipment, and the test limit criteria used to perform compliance testing of the Spirent Communications Flex NG2 Base Unit / T5100.

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

Model(s) Tested:	Flex NG2 Base Unit / T5100	
Model(s) Covered:	Flex NG2 Base Unit / T5100	
EUT Specifications:	Primary Power: 120 VAC, 60 Hz	
	FCC ID: WR2-TXFLEX-NG2	
	Type of Modulations:	OFDM
	Equipment Code:	NII
	Peak RF Output Power:	11.69 dBm
	EUT Frequency Ranges:	5210-5210 MHz (80 MHz channel)
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:	Djed Mouada	
Report Date(s):	March 20, 2014	

Table 2. EUT Summary

B. References

CFR 47, Part 15, Subpart B	Electromagnetic Compatibility: Criteria for Radio Frequency Devices
CFR 47, Part 15, Subpart E	Unlicensed National Information Infrastructure Devices (UNII)
RSS-210, Issue 8, Dec. 2010	Low-power Licence-exempt Radiocommunications Devices (All Frequency Bands): Category I Equipment
RSS-GEN, Issue 3, Dec. 2010	General Requirements and Information for the Certification of Radio Apparatus
ICES-003, Issue 5 August 2012	Information Technology Equipment (ITE) — Limits and methods of measurement
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
ISO/IEC 17025:2005	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.

D. Description of Test Sample

The Spirent Communications Flex NG2 Base Unit / T5100, Equipment Under Test (EUT), is a handheld tester for Ethernet (10/100/1000Mbps) and IP connectivity. The EUT has two radio modules. This test report addresses the 2nd radio module that supports 802.11ac 80 MHz mode (3x3 MIMO).

Photograph 1. Spirent Communications Flex NG2 Base Unit / T5100

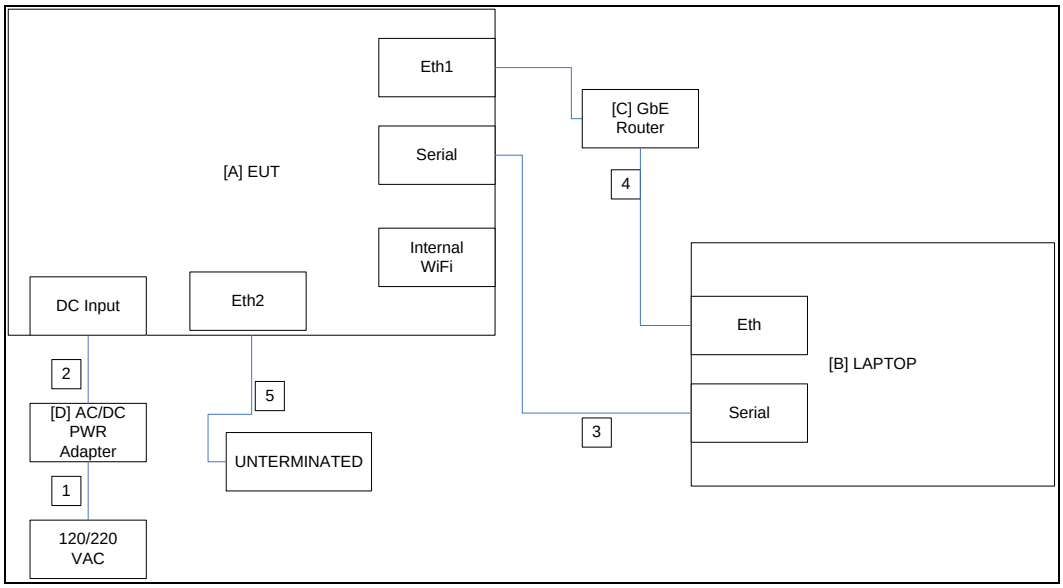


Figure 1. Block Diagram of Test Configuration

E. Equipment Configuration

All cards, racks, etc., incorporated as part of the EUT is included in the following list.

Ref. ID	Name / Description	Model Number	Part Number	Serial Number	Revision
A	Flex NG2 Base Unit	T5100	53-004638	00E18130001	A

Table 4. Equipment Configuration

F. Support Equipment

The EUT was set up as outlined in Figure 1, Block Diagram of Test Setup. All cards, racks, etc., incorporated as part of the EUT is included in the following list.

Ref. ID	Name / Description	Manufacturer	Model Number
B	LAPTOP	Dell	E6400
C	GbE Router	Netgear (or sim.)	GS605NA
D	AC/DC Wall adapter	Sinpro	SPU25A-105

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	N/A	3 conductor, 18 awg	1	2	1	N/A
2	DC Input	2 conductor, UL1185 18 awg	1	2	2	DC Input
3	Serial	--	1	2	3	Serial
4	Eth1	Cat5E	2	2	4	Eth1
5	Eth2	No connect	0	N/A	5	Eth2

Table 6. Ports and Cabling Information

H. Mode of Operation

Data test Mode: Serial connection to the Flex base unit provides the communication interface with laptop. Peer to peer Ethernet connection between laptop and Flex is established for ping test. The WiFi function is also enabled during this test to perform scans. Statistics of the ping and WiFi are gathered via the serial link (validating both Ethernet and WiFi functionality). Statistics gathering is set in a repetitive loop in which the stats are displayed every 5 seconds. Loss of Ethernet connectivity or WiFi stats will result in a "Fail" notification.

I. Method of Monitoring EUT Operation

There will be a clear "PASS" or "FAIL" indication on the laptop running the repetitive measurements and stats gathering. Pass or Fail indication, along with all the stats, are updated every 5 seconds.

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 Spirent Communications 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.

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.				

Table 7. Conducted Limits for Radio Frequency Devices calculated from FCC Part 15 Subsections 15.107(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, test conditions, and test procedures of ANSI C63.4 were used. The EUT was powered through a 50Ω/50µH LISN. An EMI receiver, connected to the measurement port of the LISN, scanned the frequency range from 150 kHz to 30 MHz in order to find the peak conducted emissions. All peak emissions within 6 dB of the limit were re-measured using a quasi-peak and/or average detector as appropriate.

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

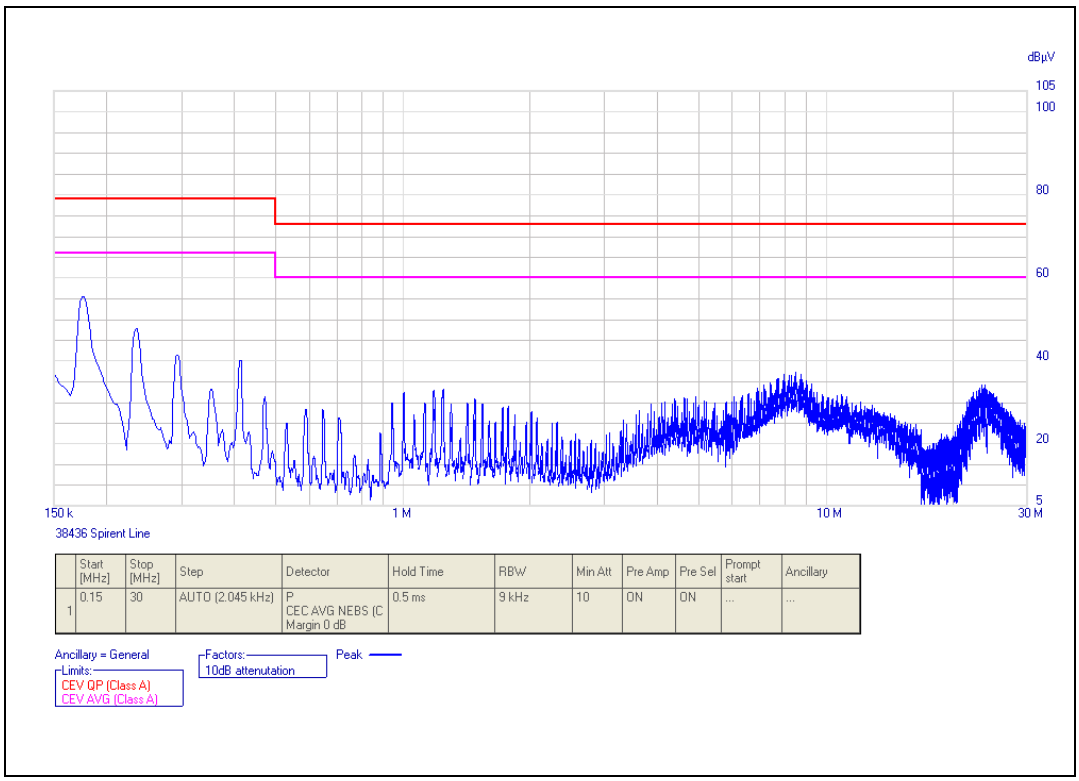
Test Engineer(s): Arden Huang

Test Date(s): 08/23/13

Conducted Emissions - Voltage, AC Power, Phase Line (120 VAC, 60 Hz)

Line	Freq. (MHz)	QP Amplitude	QP Limit	Delta	Pass	Average Amplitude	Average Limit	Delta	Pass
Line	0.17454	53.31	79	-25.69	Pass	43.63	66	-22.37	Pass
Line	0.15	33.85	79	-45.15	Pass	13.69	66	-52.31	Pass
Line	0.2338	45.67	79	-33.33	Pass	37.34	66	-28.66	Pass
Line	0.29315	39.31	79	-39.69	Pass	34.7	66	-31.3	Pass
Line	0.41176	38.57	79	-40.43	Pass	36.11	66	-29.89	Pass
Line	8.45745	32	73	-41	Pass	27.68	60	-32.32	Pass

Table 8. Conducted Emissions - Voltage, AC Power, Phase Line (120 VAC, 60 Hz)

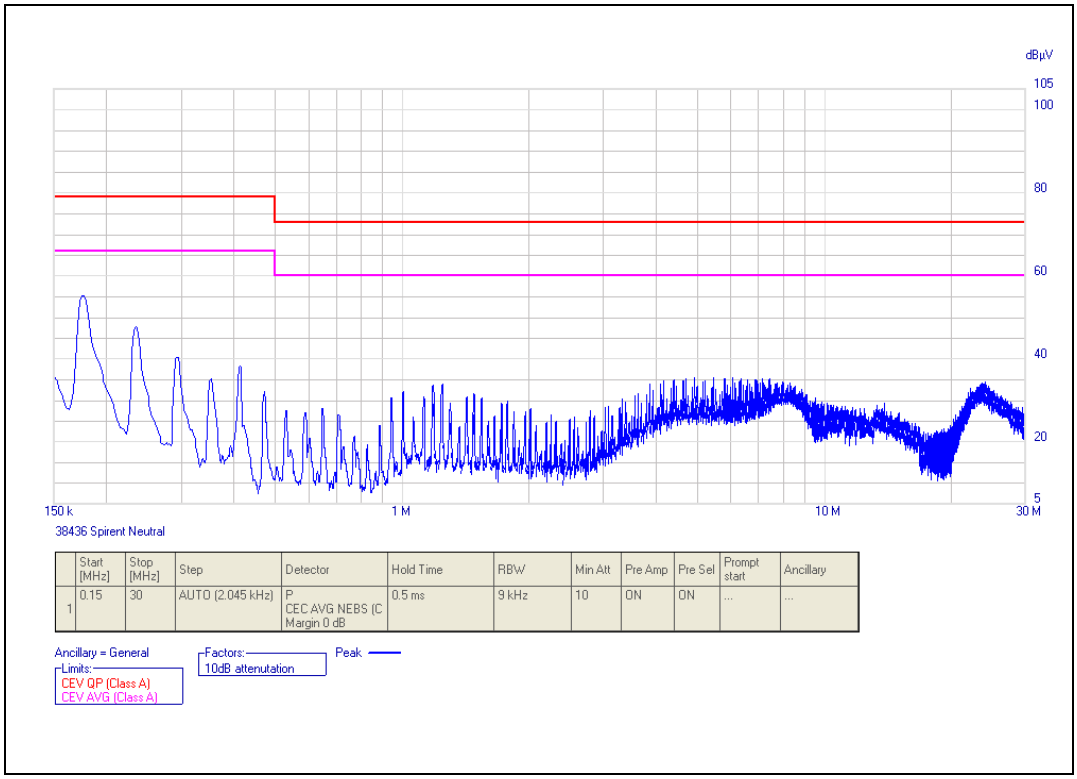


Plot 1. Conducted Emission, Phase Line Plot

Conducted Emissions - Voltage, AC Power, Neutral Line (120 VAC, 60 Hz)

Line	Freq. (MHz)	QP Amplitude	QP Limit	Delta	Pass	Average Amplitude	Average Limit	Delta	Pass
Neutral	0.15	33	79	-46	Pass	13.81	66	-52.19	Pass
Neutral	0.17454	53	79	-26	Pass	43.37	66	-22.63	Pass
Neutral	0.233845	45.43	79	-33.57	Pass	37.18	66	-28.82	Pass
Neutral	0.29315	38.44	79	-40.56	Pass	31.86	66	-34.14	Pass
Neutral	0.41176	36	79	-43	Pass	33.08	66	-32.92	Pass
Neutral	6.03142	33.54	73	-39.46	Pass	30.37	60	-29.63	Pass

Table 9. Conducted Emissions - Voltage, AC Power, Neutral Line (120 VAC, 60 Hz)



Plot 2. Conducted Emission, Neutral Line Plot

Conducted Emission Limits Test Setup

Photograph 2. 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 10.

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 10.

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 10. 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 A requirement(s) of this section. Measured emissions were below applicable limits.

Test Engineer(s): Arden Huang

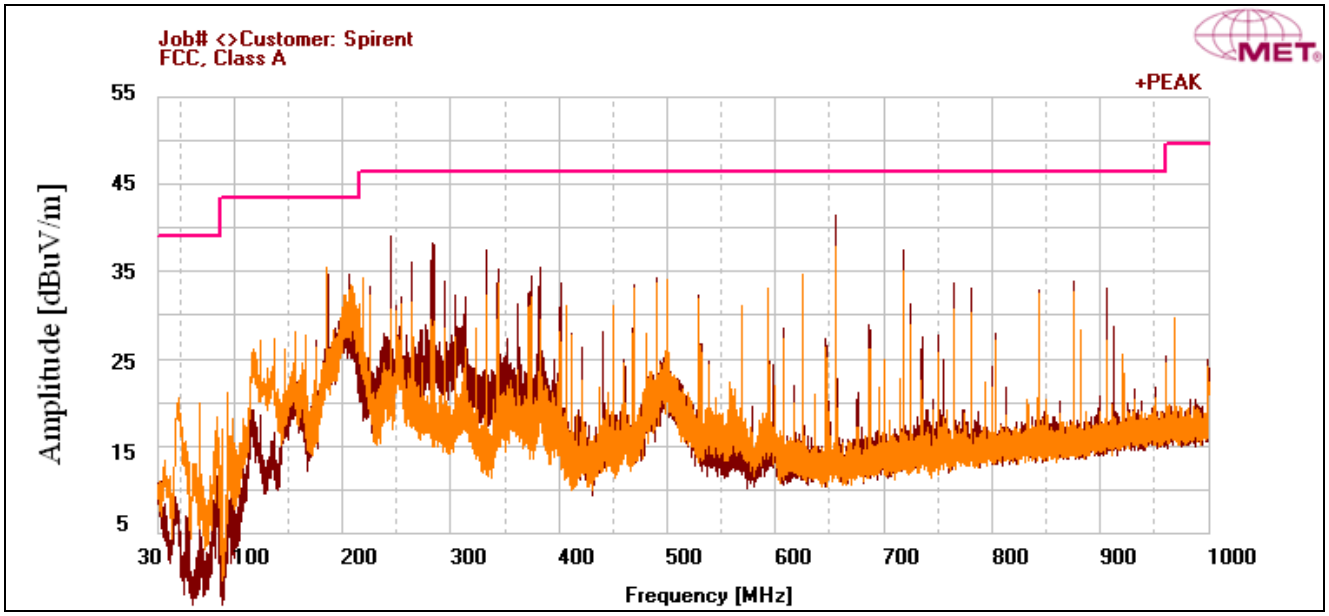
Test Date(s): 08/29/13

Radiated Emissions Limits Test Results, Class A

Frequency (MHz)	Antenna Polarity	EUT Azimuth (Degrees)	Antenna Height (cm)	Uncorrected Amplitude (dBµV)	ACF (dB/m)	Pre Amp Gain (dB)	CBL (dB)	DCF (dB)	Corrected Amplitude (dBµV/m)	Limit (dBµV/m)	Margin (dB)
656.257	H	121	121.82	24.51	20.2	0	3.884	-10.46	38.134	46.4	-8.266
244.4	H	109	119.29	19.2	12.2	0	2.362	-10.46	23.302	46.4	-23.098
284.21	H	167	100	23.05	13.716	0	2.547	-10.46	28.853	46.4	-17.547
333.2	H	115	100	30.3	14.636	0	2.746	-10.46	37.222	46.4	-9.178
718.75	H	64	108.52	23.29	20.85	0	4.095	-10.46	37.775	46.4	-8.625
186.19	V	241	100	26.5	11.5	0	1.997	-10.46	29.537	43.5	-13.963

Table 11. Radiated Emissions Limits, Test Results, 30 MHz – 1 GHz

Note: The EUT was tested at 3 m.



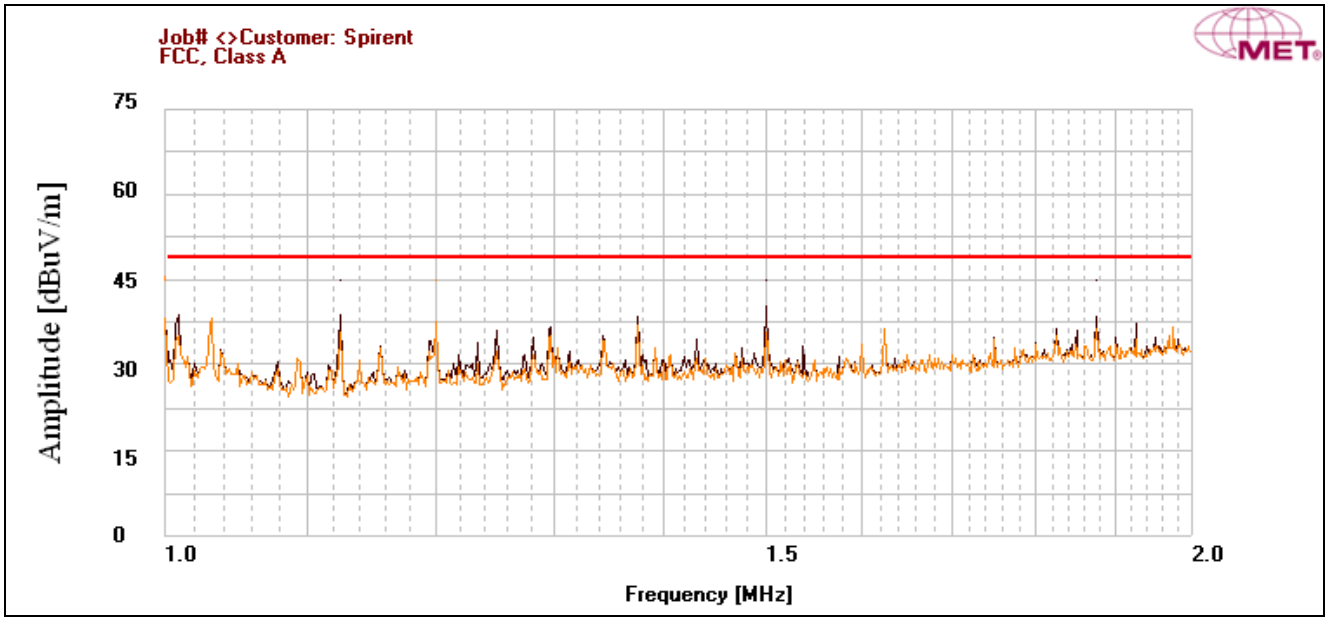
Plot 3. Radiated Emissions, 30 MHz - 1 GHz

Radiated Emissions Limits Test Results, Class A

Frequency (MHz)	Antenna Polarity	EUT Azimuth (Degrees)	Antenna Height (cm)	Uncorrected Amplitude (dBµV)	ACF (dB/m)	Pre Amp Gain (dB)	CBL (dB)	DCF (dB)	Corrected Amplitude (dBµV/m)	Limit (dBµV/m)	Margin (dB)
1499	H	156	123,23	55.26	28.978	34.103	0	-10.46	39.675	49.5	-9.825
1125	H	219	100	52.96	27.616	35.3	0	-10.46	34.816	49.5	-14.684

Table 12. Radiated Emissions Limits, Test Results, Above 1 GHz

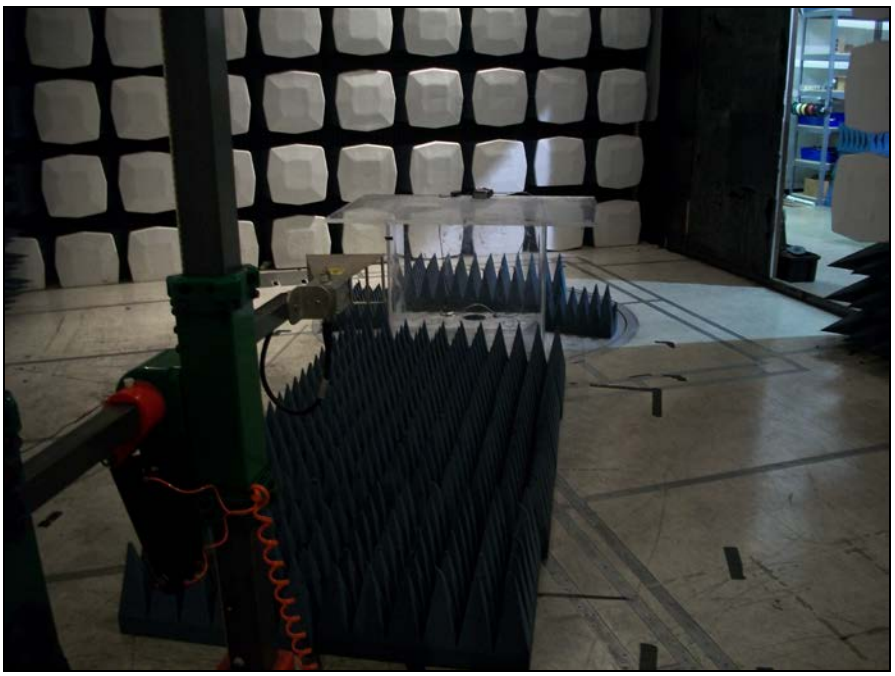
Note: The EUT was tested at 3 m.



Plot 4. Radiated Emissions, Above 1 GHz

Radiated Emissions Limits Test Setup

Photograph 3. Radiated Emissions, Test Setup, 30 MHz – 1 GHz



Photograph 4. Radiated Emissions, Test Setup, Above 1 GHz

IV. Electromagnetic Compatibility Criteria for Intentional Radiators

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. The EUT has an integral antenna; 3x3 MIMO.
Array gain = 3.7+ 10log (3) = 8.47 dBi

Test Engineer(s): Djed Mouada

Test Date(s): 11/25/13

Gain	Type	Model	Manufacturer
3.7 dBi	5 GHz Band	47950-1001	Molex

Table 13. Antenna List

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

Test Procedure: The EUT was placed on a 0.8 m-high wooden table inside a screen room. The EUT was situated such that the back of the EUT was 0.4 m from one wall of the vertical ground plane, and the remaining sides of the EUT were no closer than 0.8 m from any other conductive surface. The EUT was powered from a 50 Ω/50 μH Line Impedance Stabilization Network (LISN). The EMC receiver scanned the frequency range from 150 kHz to 30 MHz. Conducted Emissions measurements were made in accordance with *ANSI C63.4-2003 "Methods and Measurements of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9kHz to 40 GHz"*. The measurements were performed over the frequency range of 0.15 MHz to 30 MHz using a 50 Ω/50 μH LISN as the input transducer to an EMC/field intensity meter. For the purpose of this testing, the transmitter was turned on. Scans were performed with the transmitter on.

Test Results: The EUT was compliant with this requirement. Measured emissions were below applicable limits.

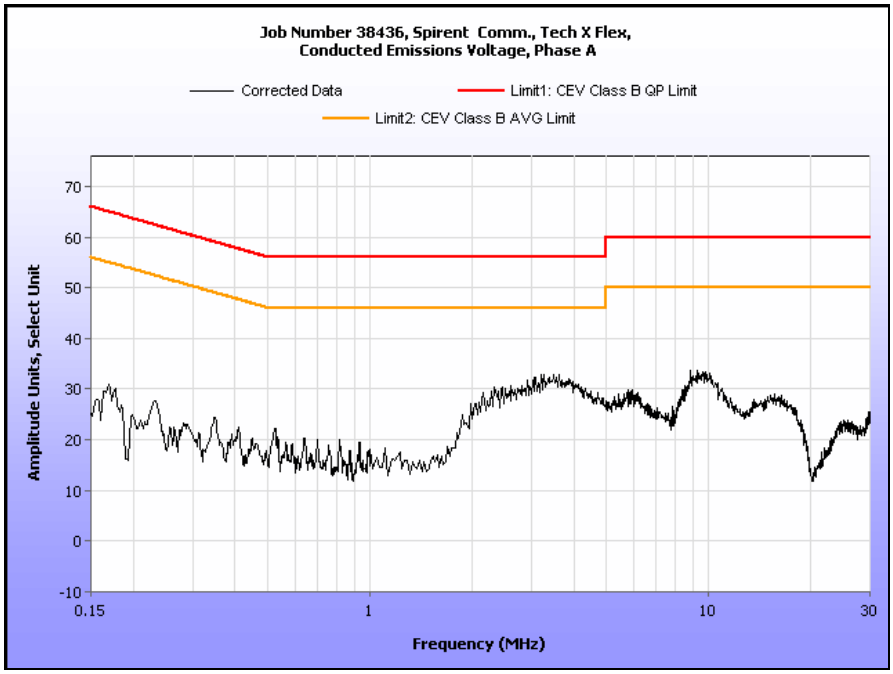
Test Engineer(s): Djed Mouada

Test Date(s): 12/09/13

15.207(a) Conducted Emissions Test Results

Frequency (MHz)	Uncorrected Meter Reading (dBµV) QP	Cable Loss (dB)	Corrected Measurement (dBµV) QP	Limit (dBµV) QP	Margin (dB) QP	Uncorrected Meter Reading (dBµV) Avg.	Cable Loss (dB)	Corrected Measurement (dBµV) AVG	Limit (dBµV) AVG	Margin (dB) AVG
0.1684	21.76	0	21.76	65.04	-43.28	14.23	0	14.23	55.04	-40.81
0.3507	19.23	0	19.23	58.95	-39.72	11.52	0	11.52	48.95	-37.43
0.5229	17.49	0	17.49	56	-38.51	9.373	0	9.373	46	-36.627
3.341	27.46	0	27.46	56	-28.54	18.34	0	18.34	46	-27.66
10.24	26.22	0.17	26.39	60	-33.61	19.09	0.17	19.26	50	-30.74
29.71	18.92	0.31	19.23	60	-40.77	12.09	0.31	12.4	50	-37.6

Table 15. Conducted Emissions, 15.207(a), Phase Line, Test Results

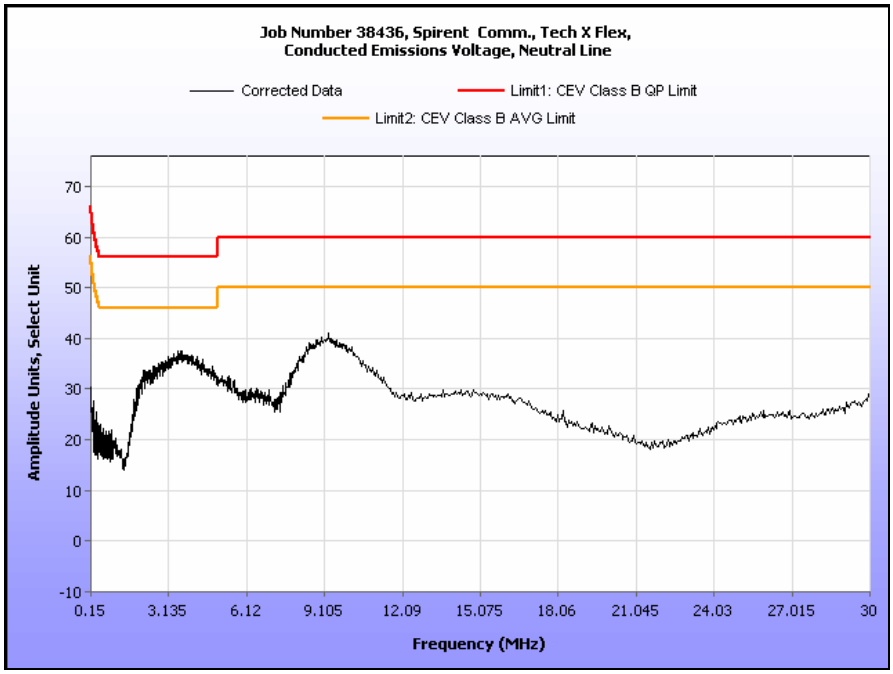


Plot 5. Conducted Emissions, 15.207(a), Phase Line

15.207(a) Conducted Emissions Test Results

Frequency (MHz)	Uncorrected Meter Reading (dBµV) QP	Cable Loss (dB)	Corrected Measurement (dBµV) QP	Limit (dBµV) QP	Margin (dB) QP	Uncorrected Meter Reading (dBµV) Avg.	Cable Loss (dB)	Corrected Measurement (dBµV) AVG	Limit (dBµV) AVG	Margin (dB) AVG
0.1516	18.48	0	18.48	65.91	-47.43	6.81	0	6.81	55.91	-49.1
0.3491	21.42	0	21.42	58.98	-37.56	16.69	0	16.69	48.98	-32.29
0.8175	17.4	0	17.4	56	-38.6	11.16	0	11.16	46	-34.84
9.438	35.76	0.33	36.09	60	-23.91	30.45	0.33	30.78	50	-19.22
10.38	32.08	0.17	32.25	60	-27.75	25.96	0.17	26.13	50	-23.87
29.96	23.44	0.33	23.77	60	-36.23	16.66	0.33	16.99	50	-33.01

Table 16. Conducted Emissions, 15.207(a), Neutral Line, Test Results



Plot 6. Conducted Emissions, 15.207(a), Neutral Line

15.207(a) Conducted Emissions Test Setup Photo

Photograph 5. Conducted Emissions, 15.207(a), Test Setup

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15. 403(c) 26dB Bandwidth

Test Requirements: **§ 15.403 (i):** For purposes of this subpart the emission bandwidth shall be determined by measuring the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, that are 26 dB down relative to the maximum level of the modulated carrier. Determination of the emissions bandwidth is based on the use of measurement instrumentation employing a peak detector function with an instrument resolution bandwidth approximately equal to 1.0 percent of the emission bandwidth of the device under measurement.

Test Procedure: The transmitter was set to both operating frequencies at the highest output power and connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured with the spectrum analyzer using a RBW approximately equal to 1% of the total emission bandwidth, VBW > RBW. The 26 dB Bandwidth was measured and recorded.

Test Results The 26 dB Bandwidth was compliant with the requirements of this section and was determined from the plots on the following pages.

Test Engineer(s): Djed Mouada and Benjamin Taylor

Test Date(s): 12/04/13 – 12/06/13

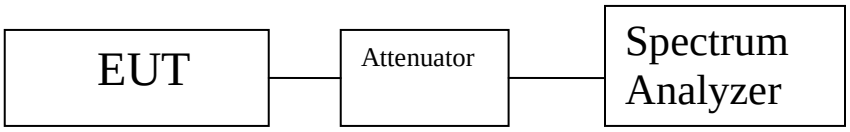


Figure 2. Occupied Bandwidth, Test Setup

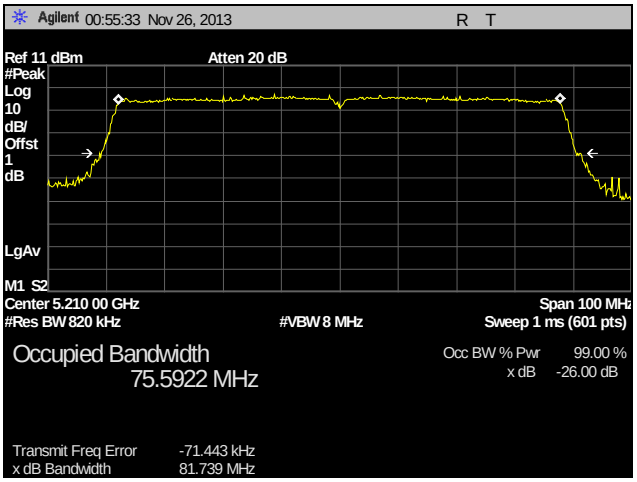
	Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Chain 0	36	5210	81.739
Chain 1	36	5210	81.515
Chain 2	36	5210	81.536

Table 17. 26 dB Occupied Bandwidth, Test Results

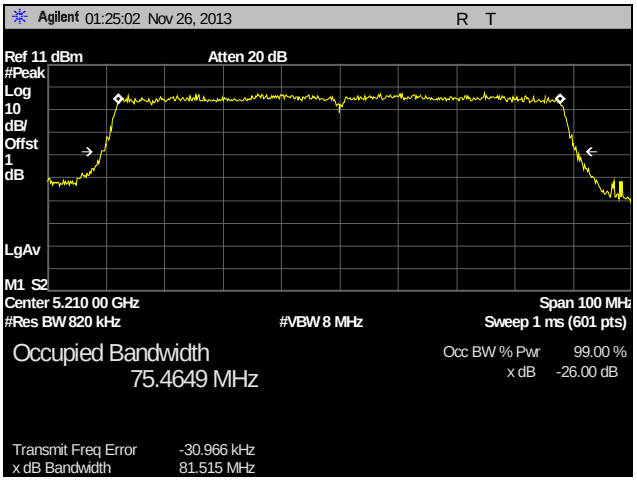
	Channel	Frequency (MHz)	99% Bandwidth (MHz)
Chain 0	36	5210	75.4944
Chain 1	36	5210	75.5003
Chain 2	36	5210	75.4766

Table 18. 99% Occupied Bandwidth, Test Results

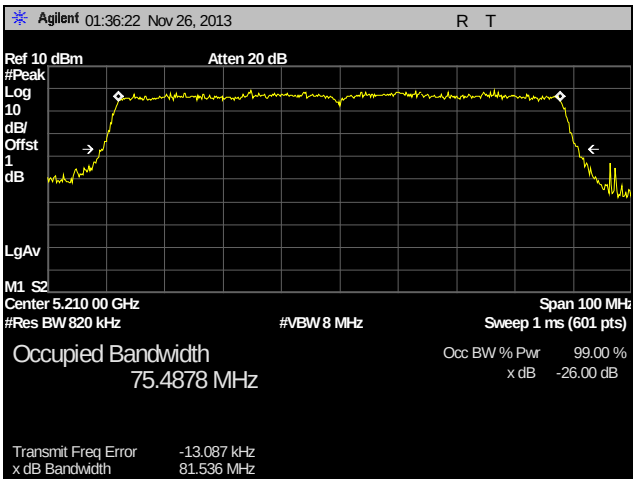
Electromagnetic Compatibility Criteria for Intentional Radiators



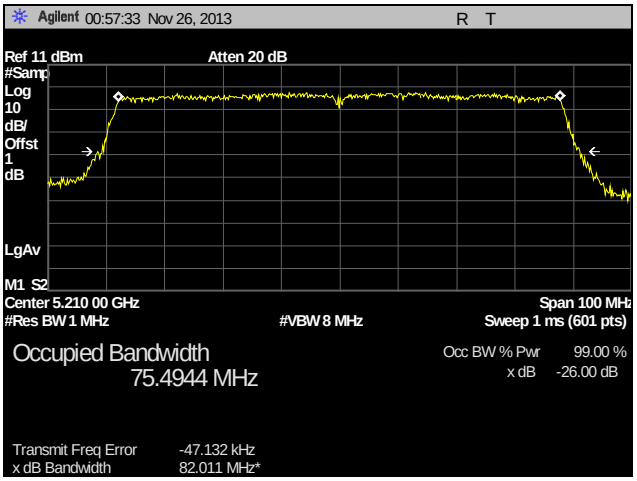
Plot 7. 26 dB Occupied Bandwidth, Channel 36, Chain 0



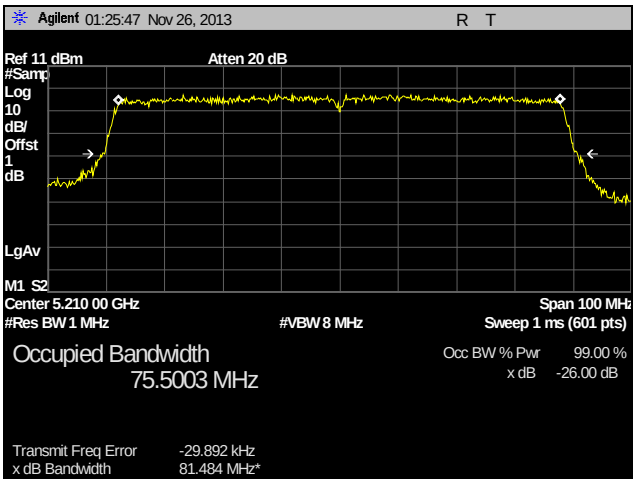
Plot 8. 26 dB Occupied Bandwidth, Channel 36, Chain 1



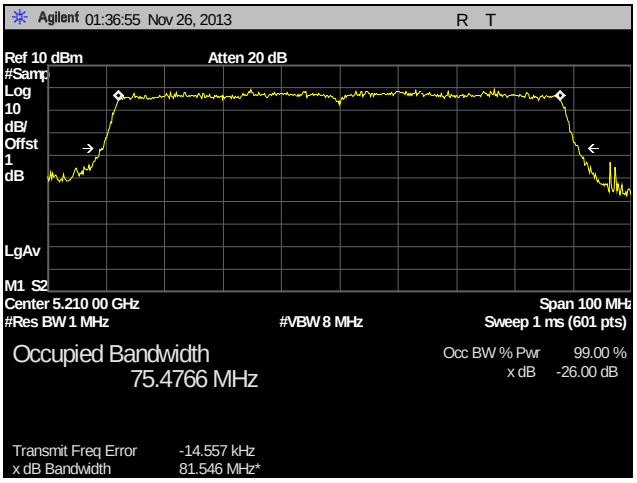
Plot 9. 26 dB Occupied Bandwidth, Channel 36, Chain 2



Plot 10. 99% Occupied Bandwidth, Channel 36, Chain 0



Plot 11. 99% Occupied Bandwidth, Channel 36, Chain 1



Plot 12. 99% Occupied Bandwidth, Channel 36, Chain 2

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15. 407(a)(1) RF Power Output

Test Requirements: **§15.407(a)(1):** For the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 50 mW or 4 dBm + 10 log B, where B is the 26-dB emission bandwidth in MHz.

Test Procedure: The EUT was connected to a spectrum analyzer through an RF cable and an attenuator. The EUT was set to transmit on low, mid, and high channels and the power was measured according to method SA-1 from FCC Publication Number 789033. Power across the antenna ports was summed.

Test Results: Equipment was compliant with the Peak Power Output limits of **§ 15.401(a)(1)**.

Test Engineer(s): Djed Mouada

Test Date(s): 12/04/13 – 12/06/13

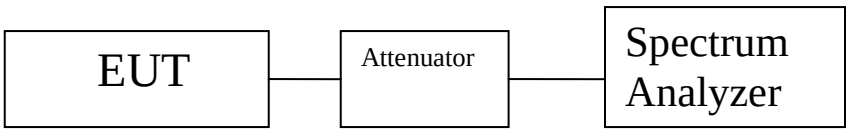
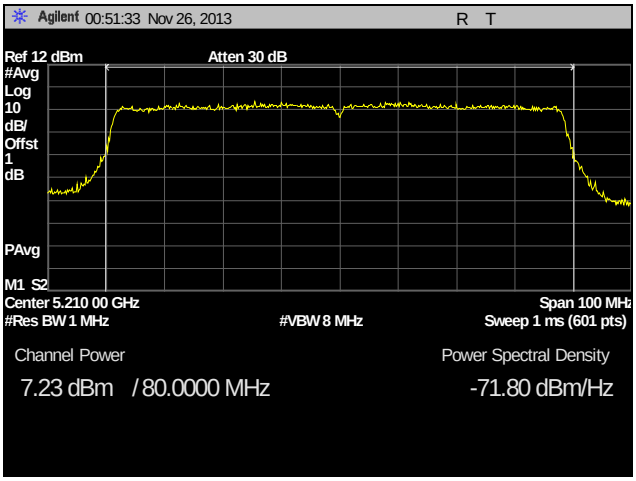


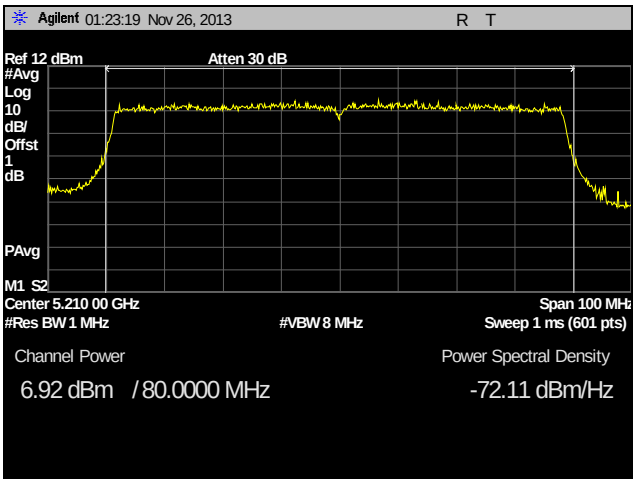
Figure 3. Power Output Test Setup

Channel	Port 0 Power dBm	Port 1 Power dBm	Port 2 Power dBm	Sum Power dBm	Limit Power dBm	Margin dBm
36	7.23	6.92	6.59	11.69	14.5	-2.81

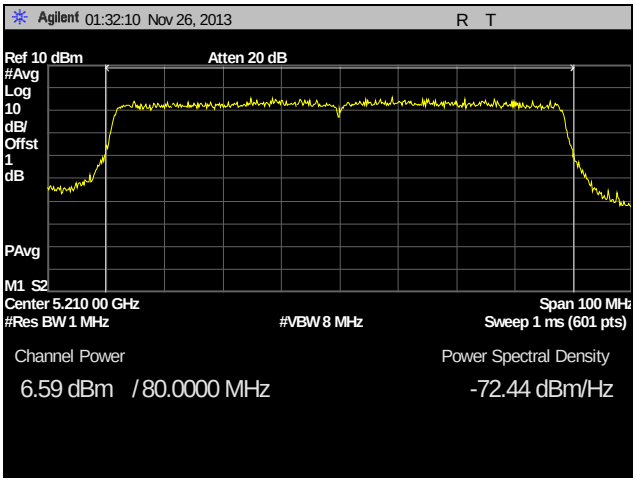
Table 19. RF Power Output, Test Results



Plot 13. RF Power Output, Channel 36, Chain 0



Plot 14. RF Power Output, Channel 36, Chain 1



Plot 15. RF Power Output, Channel 36, Chain 2

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.407(a)(1) Peak Power Spectral Density

Test Requirements: **§ 15.407(a)(1):** In addition, the peak power spectral density shall not exceed 4 dBm in any 1-MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi

Test Procedure: The transmitter was connected directly to a Spectrum Analyzer through an attenuator. The power level was set to the maximum level on the EUT. The RBW was set to 1MHz and the VBW was set to 3MHz. The method of measurement #2 from the FCC Public Notice DA 02-2138 was used.

Test Results: Equipment was compliant with the peak power spectral density limits of **§ 15.407 (a)(1).** The peak power spectral density was determined from plots on the following page(s).

Test Engineer(s): Djed Mouada

Test Date(s): 12/04/13 – 12/06/13

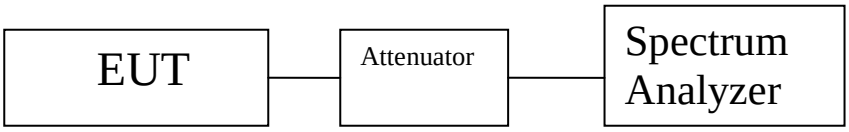
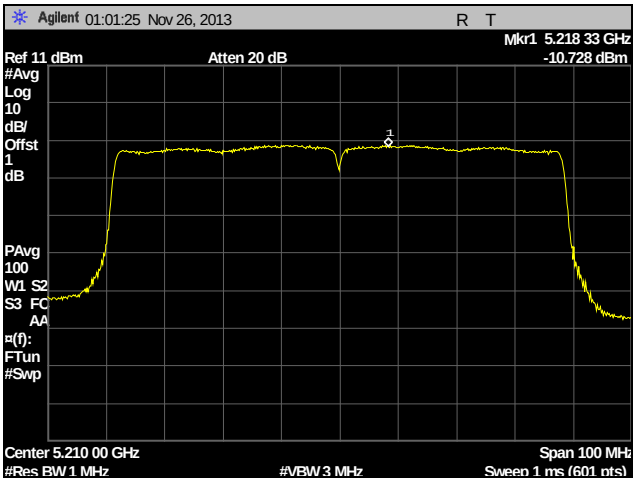


Figure 4. Power Spectral Density Test Setup

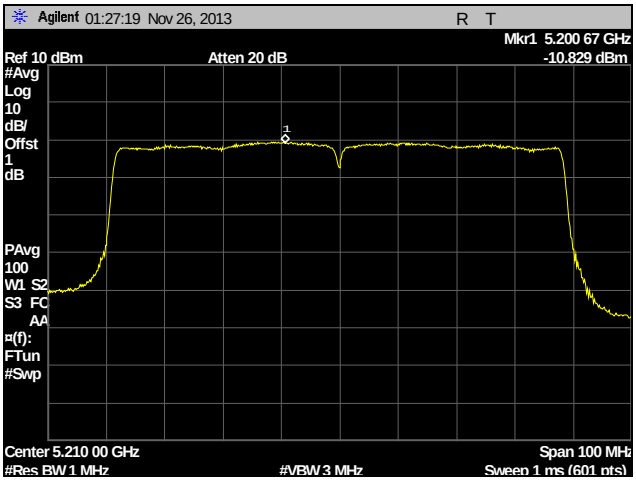
Channel	Port 0 PSD dBm	Port 1 PSD dBm	Port 2 PSD dBm	Sum PSD dBm	Limit PSD dBm	Margin dBm
36	-10.72	-10.83	-11.14	-6.12	1.53	-7.65

Table 20. Power Spectral Density, Test Results

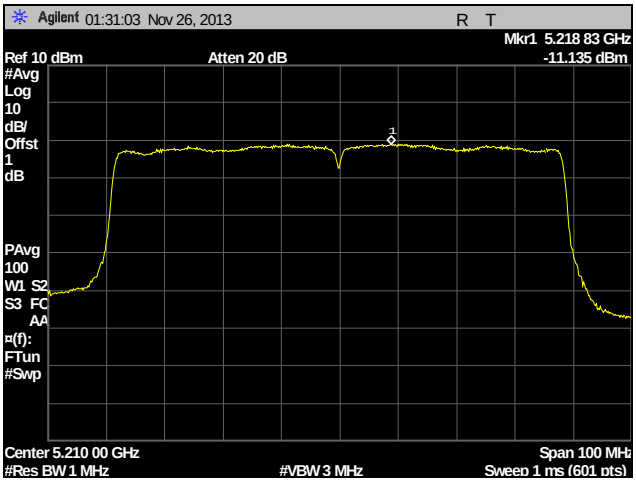
Electromagnetic Compatibility Criteria for Intentional Radiators



Plot 16. Power Spectral Density, Channel 36, Chain 0



Plot 17. Power Spectral Density, Channel 36, Chain 1



Plot 18. Power Spectral Density, Channel 36, Chain 2

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.407(a)(6) Peak Excursion Ratio

Test Requirements: **§ 15.407(a)(6):** The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the maximum conducted output power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

Test Procedure: The EUT was connected directly to the spectrum analyzer through cabling and attenuation. Measurements were made according to FCC Public Notice DA 02-2138 for making measurements.

Test Results: Equipment was compliant with the peak excursion ratio limits of **§ 15.407(a)(6).** The peak excursion ratio was determined from plots on the following page(s) and the PSD values in previous section.

Channel	Peak Emission	PSD (dBm)	Ratio (dB)	Limit (dB)	Margin (dB)
36	-0.84	-10.73	9.9	13	-3.1

Test Engineer(s): Djed Mouada

Test Date(s): 12/04/13 – 02/05/14

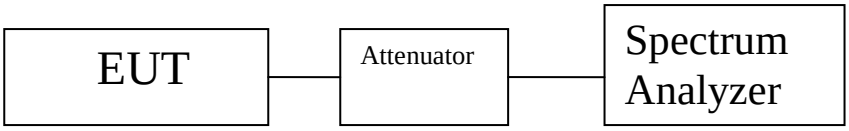
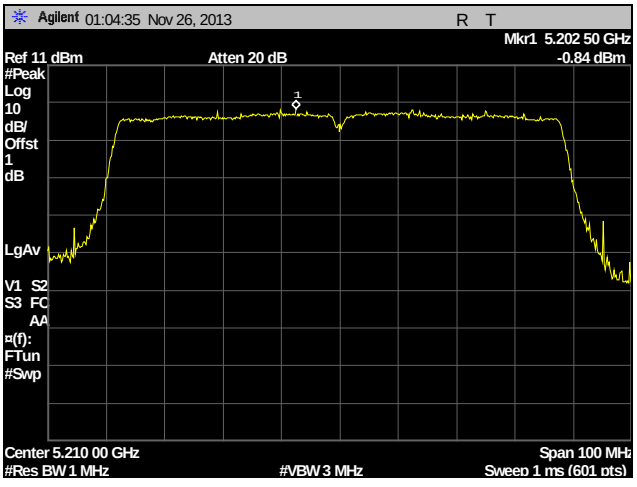


Figure 5. Peak Excursion Ration Test Setup



Plot 19. Peak Excursion Ratio, Channel 36, Chain 0

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.407(b)(1), (6), (7) Undesirable Emissions

Test Requirements: **§ 15.407(b)(1), (6), (7)**; **§15.205:** Emissions outside the frequency band.

§ 15.407(b)(1): For transmitters operating in the 5.15-5.25 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27 dBm/MHz.

§ 15.407(b)(6): Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in Section 15.209. Further, any U-NII devices using an AC power line are required to comply also with the conducted limits set forth in Section 15.207.

§ 15.407(b)(7): The provisions of Section 15.205 of this part apply to intentional radiators operating under this section.

Test Procedure: The EUT was placed on a non-conducting 0.8m high stand on a turntable in a semi-anechoic chamber. The EUT was set to transmit on low, mid, and high channels, while the turntable was rotated 360 degrees through three orthogonal axes and the receiving antenna height was varied to maximize emissions.

For frequencies from 30MHz to 1GHz, measurements were first made using a peak detector with a 100kHz resolution bandwidth. Emissions which exceeded the limits were re-measured using a quasi-peak detector with a 120kHz resolution bandwidth.

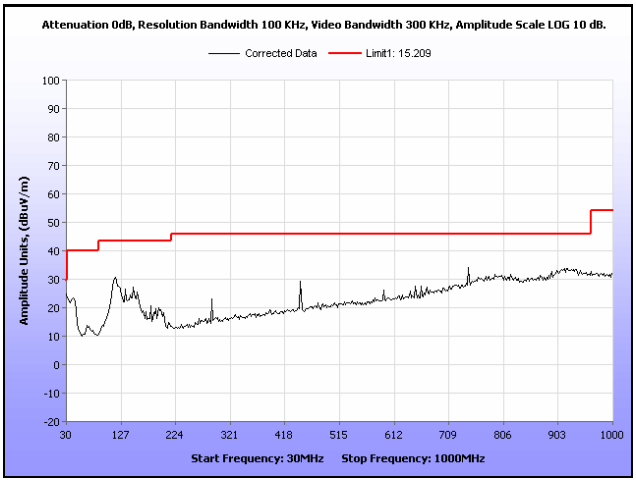
For measurements above 1 GHz, measurements were made with a Peak detector with 1 MHz resolution bandwidth. Where the spurious emissions fell into a restricted band, measurements were also made with an average detector to make sure they complied with 15.209 limits. Emissions were explored up to 40 GHz.
The equation, **EIRP= E + 20 log D – 104.8** was used to convert an EIRP limit to a field strength limit.
E = field strength (dBUv/m)
D = Reference measurement distance

Test Results: The EUT was compliant with the Radiated Emission limits for Intentional Radiators. See following pages for detailed test results. Emissions above 18 GHz were in the noise floor of the spectrum analyzer.

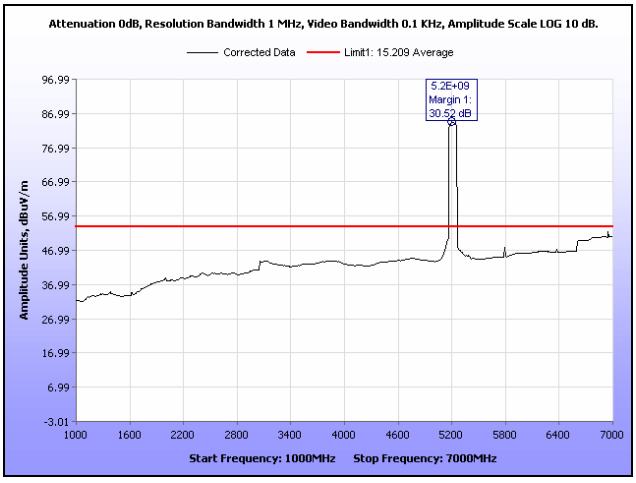
Test Engineer(s): Djed Mouada

Test Date(s): 12/06/13 – 12/09/13

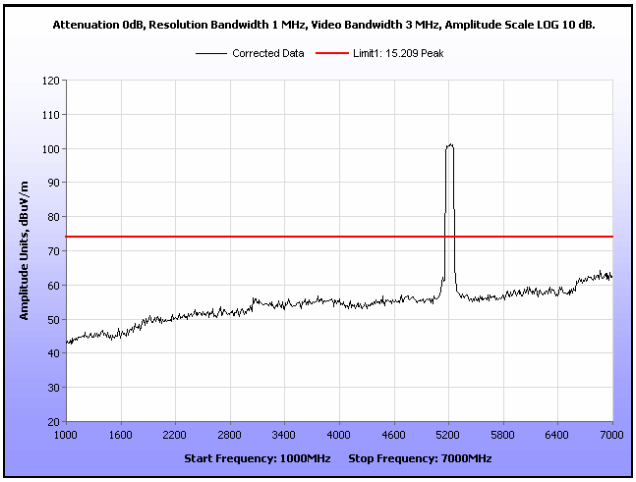
§ 15.209 Radiated Emissions Limits



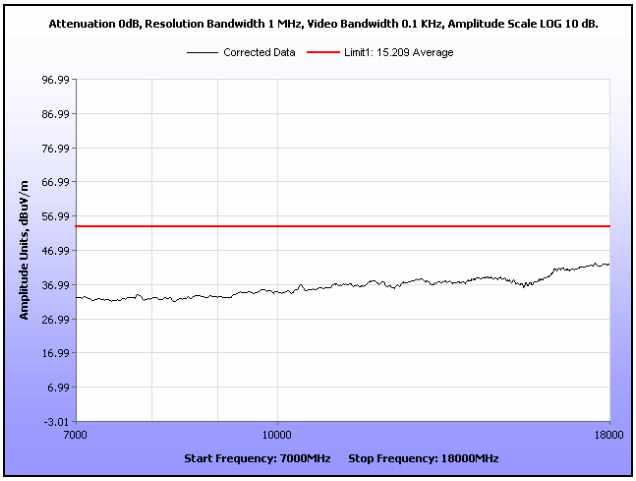
Plot 20. Radiated Spurious Emissions, Channel 36, 30 MHz – 1 GHz



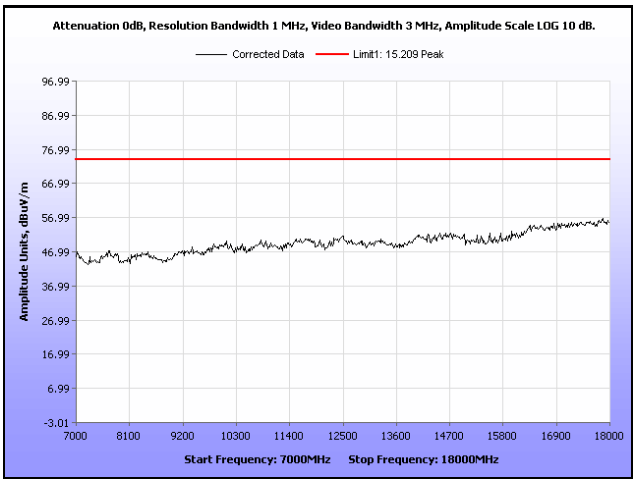
Plot 21. Radiated Spurious Emissions, Channel 36, 1 GHz – 7 GHz, Average



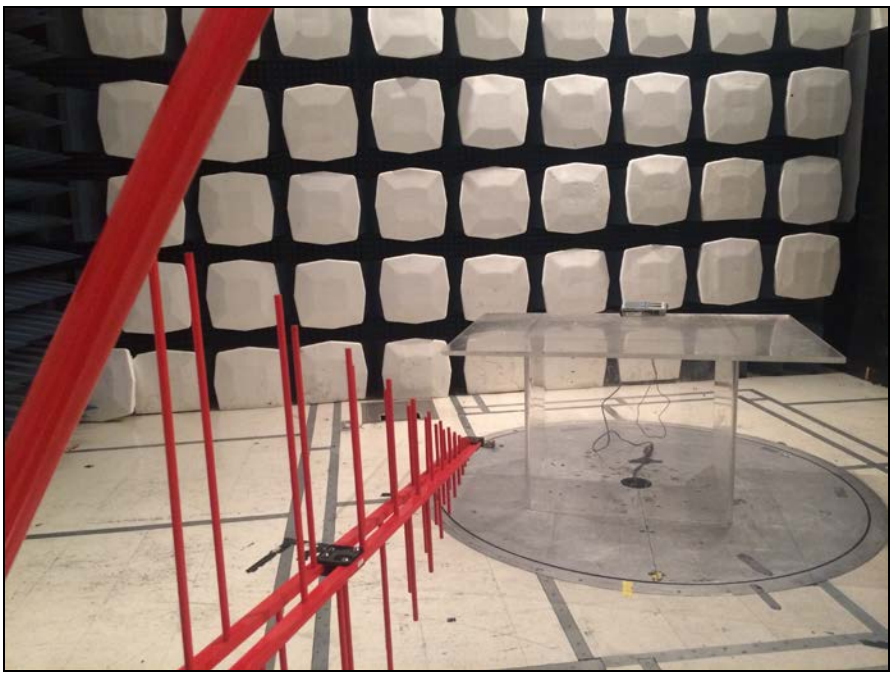
Plot 22. Radiated Spurious Emissions, Channel 36, 1 GHz – 7 GHz, Peak



Plot 23. Radiated Spurious Emissions, Channel 36, 7 GHz – 18 GHz, Average



Plot 24. Radiated Spurious Emissions, Channel 36, 7 GHz – 18 GHz, Peak



Photograph 6. Radiated Spurious Emissions, Test Setup Below 1 GHz

Photograph 7. Radiated Spurious Emissions, Test Setup Above 1 GHz

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.407(f) 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.

MPE Limit Calculation: EUT's operating frequencies @ 5.15-5.25, 5.25-5.35 GHz and 5.47-5.725 ; highest conducted power = *19.667 dBm* (peak) therefore, **Limit for Uncontrolled exposure: 1 mW/cm^2 or 10 W/m^2**

EUT maximum antenna gain = *3.7+(10*LOG(3)) dBi.*
= 8.47 dBi
Equation from page 18 of OET 65, Edition 97-01

$$S = PG / 4\pi R^2 \quad \text{or} \quad R = \sqrt{PG / 4\pi S}$$

where, S = Power Density
P = Power Input to antenna (92.61mW)
G = Antenna Gain (7.03 numeric)
R = 20 cm

$S = (92.61*7.03/ 4\pi*20^2) = 0.129$ mW/cm^2

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.407(g) Frequency Stability

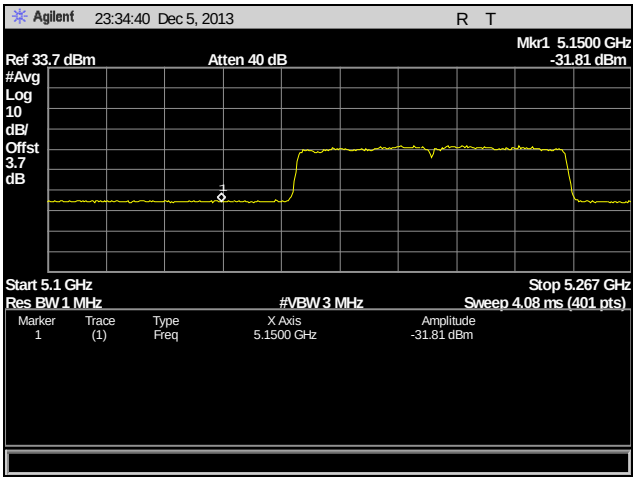
Test Requirements: **§ 15.407(g):** Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

Test Procedure: The EUT was connected directly to a spectrum analyzer through an attenuator and set to transmit at normal operating power. The resolution band width of the spectrum analyzer was set to 1 MHz the Center frequency was set to the band edge (i.e. 5150 MHz). At normal operating temperature, the voltage was varied to (+/-85%), and Then the temperature was changed to extreme conditions while maintaining nominal voltage. The signal was observed for drifts beyond the band edge (Center frequency).

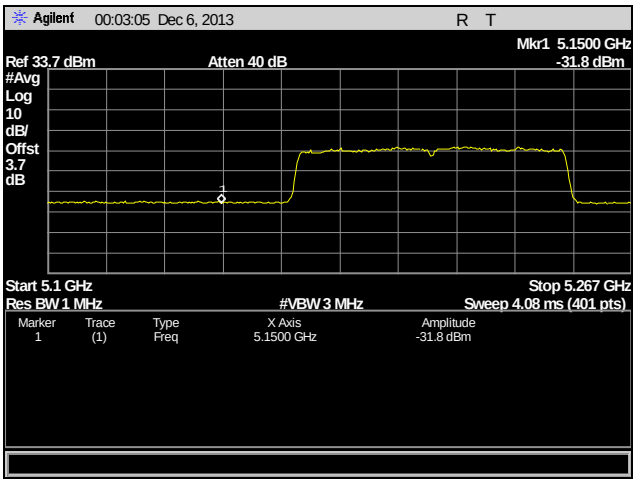
Test Results: The EUT was compliant with the requirements of **§15.407(g)**.

Test Engineer(s): Djed Mouada

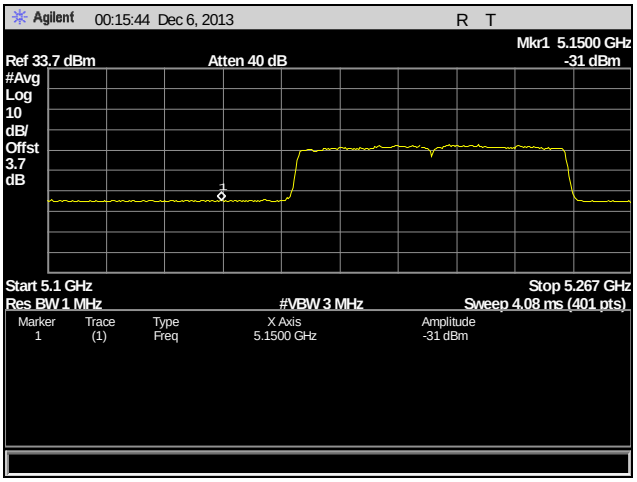
Test Date(s): 12/05/13 – 12/06/13



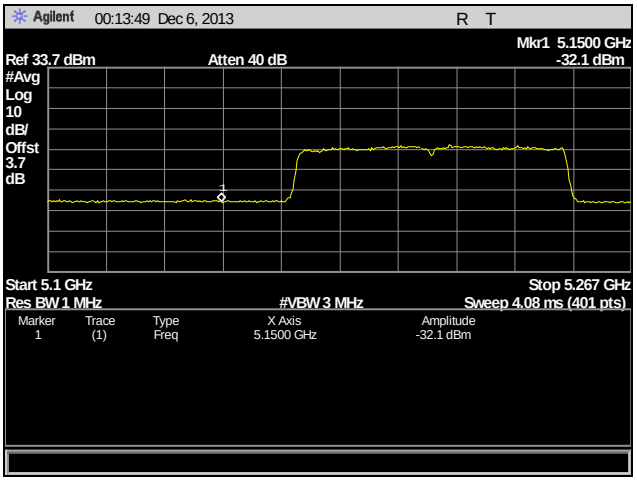
Plot 25. Frequency Stability, Channel 36, 5150 MHz, +5°C, 120V



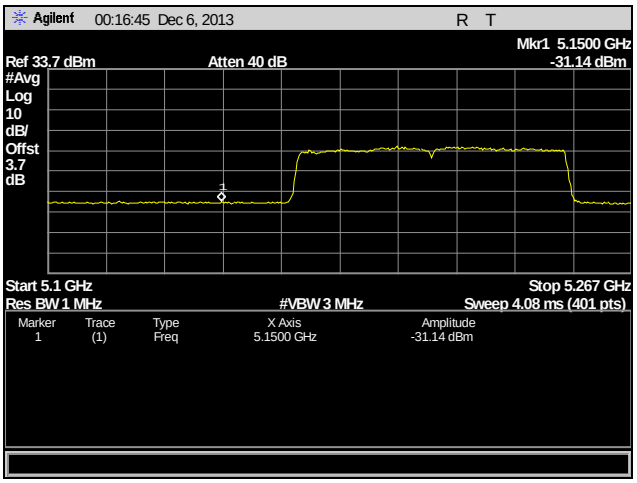
Plot 26. Frequency Stability, Channel 36, 5150 MHz, +15°C, 120V



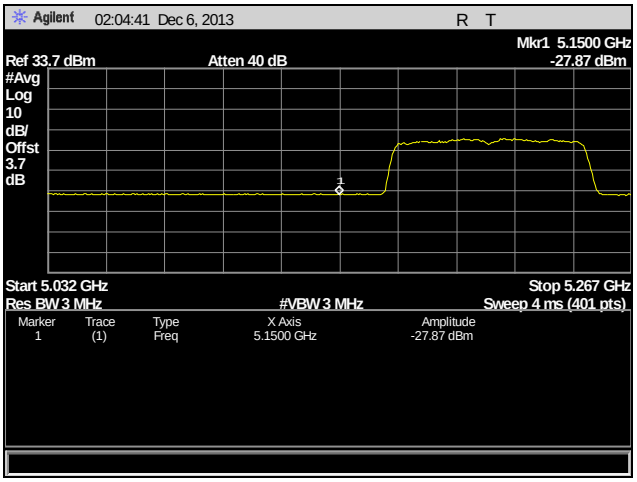
Plot 27. Frequency Stability, Channel 36, 5150 MHz, +20°C, 102V



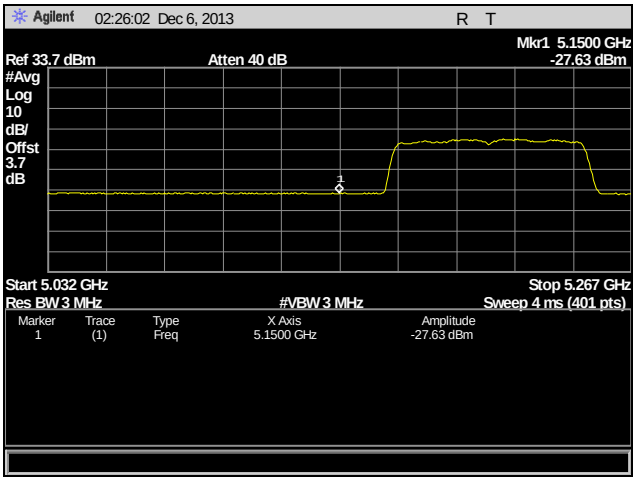
Plot 28. Frequency Stability, Channel 36, 5150 MHz, +20°C, 120V



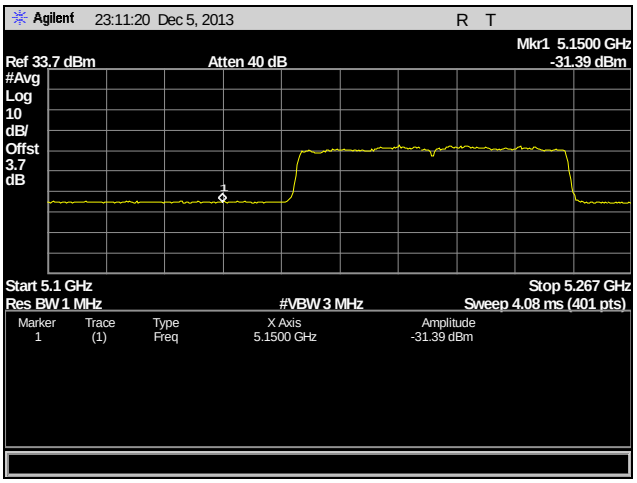
Plot 29. Frequency Stability, Channel 36, 5150 MHz, +20°C, 138V



Plot 30. Frequency Stability, Channel 36, 5150 MHz, +30°C, 120V



Plot 31. Frequency Stability, Channel 36, 5150 MHz, +40°C, 120V



Plot 32. Frequency Stability, Channel 36, 5150 MHz, -5°C, 120V

IV. Test Equipment

Test Equipment

Calibrated test equipment utilized during testing was maintained in a current state of calibration per the requirements of ISO/IEC 17025:2005.

MET ASSET #	EQUIPMENT	MANUFACTURER	MODEL	LAST CAL DATE	CAL DUE DATE
1T4149	HIGH-FREQUENCY ANECHOIC CHAMBER	RAY-PROOF	81	SEE NOTE	
1T4300	SEMI-ANECHOIC CHAMBER #1 (FCC)	EMC TEST SYSTEMS	NONE	7/24/2012	7/24/2015
1T4612	SPECTRUM ANALYZER	AGILENT TECHNOLOGIES	E4407B	5/23/2012	11/23/2013
1T4409	EMI RECEIVER	ROHDE & SCHWARZ	ESIB7	7/16/2012	7/16/2013
1T4753	ANTENNA - BILOG	SUNOL SCIENCES	JB6	1/5/2012	7/5/2013
1T4505	TEMPERATURE CHAMBER	TEST EQUITY	115	12/2/2012	12/2/2013
1T4483	ANTENNA; HORN	ETS-LINDGREN	3117	8/6/2012	2/6/2014
1T2511	ANTENNA; HORN	EMCO	3115	9/22/2011	3/22/2013
1T4502	COMB GENERATOR	COM-POWER	CGC-255	8/21/2012	2/21/2014
1T4568	RADIATING NOISE SOURCE	MET LABORATORIES	N/A	SEE NOTE	
1T4791	THERM./CLOCK/HUMIDITY	CONTROL COMPANY	06-662-4	3/8/2012	3/8/2014
1T4563	LISN (10 AMP)	SOLAR ELECTRONICS	9322-50-R-10-BNC	11/27/2012	5/27/2014
1T2948	LISN	SOLAR ELECTRONICS	8028-50-TS-24-BNC	1/30/2012	7/30/2013
1T4503	SHIELDED ROOM	UNIVERSAL SHIELDING CORP	N/A	SEE NOTE	
1T4504	SHIELDED ROOM	UNIVERSAL SHIELDING CORP	N/A	SEE NOTE	
1T4814	COMB GENERATOR	COM-POWER	CGO-5100	SEE NOTE	
1T4479	POWER SUPPLY PROGRAMMABLE	CALIFORNIA INSTRUMENTS	1501TC	SEE NOTE	

Table 21. 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

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.

ICES-003 Procedural & Labeling Requirements

The manufacturer, importer or supplier shall meet the labelling requirements set out in this section for every ITE unit[Footnote 3].

- (i) Prior to marketing in Canada, for ITE manufactured in Canada, and;
- (ii) Prior to importation into Canada, for imported ITE.

The presence of the label on the ITE represents the manufacturer's or importer's Self-Declaration of Compliance (SDoC) to Industry Canada ICES-003. Each unit of an ITE model shall bear a label indicating the model's compliance with ICES-003.

The label shall be permanently affixed to the ITE or displayed electronically and its text must be clearly legible. When the dimension of the device is too small or it is otherwise not practical to place the label on the ITE, the label shall be placed in a prominent location in the user manual supplied with the ITE. The user manual may be in an electronic format and must be readily available.

Labeling Requirements:

Industry Canada ICES-003 Compliance Label:

CAN ICES-3 (*)/NMB-3(*)

* Insert either "A" or "B" but not both to identify the applicable Class of ITE

End of Report

