



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

13501 MCCALLEN PASS • AUSTIN, TEXAS 78753 • PHONE (512) 287-2500 • FAX (512) 287-2513

July 7, 2016

Assistive Technology Products, Inc.
1214 Research Boulevard Suite 1000, P.O. Box 377
Hershey, PA 17033

Dear Daniel Adlon,

Enclosed is the EMC Wireless test report for compliance testing of the Assistive Technology Products, Inc., HydraData Wireless as tested to the requirements of Title 47 of the CFR, Ch. 1 (10-1-06 ed.), FCC Part 15 Subpart C, RSS-210, Issue 8, December 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: (\Assistive Technology Products, Inc.\EMC88566-FCC249 Rev. 2)

Certificates and reports shall not be reproduced except in full, without the written permission of MET Laboratories, Inc.



Electromagnetic Compatibility Criteria Test Report

for the

**Assistive Technology Products, Inc.
HydraData Wireless**

Tested under
the FCC Certification Rules
contained in
Title 47 of the CFR, Part 15.249 Subpart C
&
RSS-210, Issue 8, December 2010
for Intentional Radiators

MET Report: EMC88566-FCC249 Rev. 2

July 7, 2016

Prepared For:

**Assistive Technology Products, Inc.
1214 Research Boulevard Suite 1000, P.O. Box 377
Hershey, PA 17033**

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



Electromagnetic Compatibility Criteria Test Report

for the

Assistive Technology Products, Inc.
HydraData Wireless

Tested under
the FCC Certification Rules
contained in
Title 47 of the CFR, Part 15.249 Subpart C
&
RSS-210, Issue 8, December 2010
for Intentional Radiators

Benjamin Taylor, Project Engineer
Electromagnetic Compatibility Lab

Jennifer Warnell
Documentation Department

Engineering Statement: The measurements shown in this report were made in accordance with the procedures indicated, and the emissions from this equipment were found to be within the limits applicable. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them. It is further stated that upon the basis of the measurements made, the equipment tested is capable of operation in accordance with the requirements of the FCC Rules Part 15.249 and Industry Canada standard RSS-210, Issue 8, December 2010 under normal use and maintenance.

Asad Bajwa,
Director, Electromagnetic Compatibility Lab



Report Status Sheet

Revision	Report Date	Reason for Revision
Ø	June 20, 2016	Initial Issue.
1	June 22, 2016	Editorial corrections.
2	July 7, 2016	Updated report to reflect 15.249 and add RSS-210 references.



Table of Contents

I.	Executive Summary	1
	A. Purpose of Test	2
	B. Executive Summary	2
II.	Equipment Configuration	3
	A. Overview.....	4
	B. References.....	5
	C. Test Site	5
	D. Description of Test Sample.....	6
	E. Equipment Configuration.....	6
	F. Support Equipment	7
	G. Mode of Operation.....	7
	H. Method of Monitoring EUT Operation	7
	I. Modifications	7
	a) Modifications to EUT	7
	b) Modifications to Test Standard.....	7
	J. Disposition of EUT	7
III.	Electromagnetic Compatibility Criteria for Intentional Radiators.....	8
	§ 15.203 Antenna Requirement	9
	§ 15.207(a) Conducted Emissions Limits.....	10
	§ 15.249(b)(1) Radiated Field Strength of Fundamental	11
	RSS-102 (3.2) RF Exposure Evaluation of Devices	13
	Maximum Permissible Exposure	14
	§ 15.249 Occupied Bandwidth	15
	§ 15.247(a)(d) Harmonics and Spurious Emissions Requirements	18
IV.	Test Equipment	24
V.	Certification & User's Manual Information	26
	A. Certification Information	27
	B. Label and User's Manual Information	31

List of Tables

Table 1. Executive Summary of EMC Part 15.249 Compliance Testing	2
Table 2. EUT Summary Table.....	4
Table 3. References	5
Table 4. Equipment Configuration	6
Table 5. Support Equipment.....	7
Table 6. Conducted Limits for Intentional Radiators from FCC Part 15 § 15.207(a)	10
Table 7. 6 dB Occupied Bandwidth, Test Results	15
Table 8. 99% Occupied Bandwidth, Test Results	15
Table 9. Test Equipment List	25

List of Plots

Plot 1. Fundamental Field Strength, Low Channel.....	12
Plot 2. Fundamental Field Strength, Mid Channel	12
Plot 3. Fundamental Field Strength, High Channel	12
Plot 4. 6 dB Occupied Bandwidth, Low Channel.....	16
Plot 5. 6 dB Occupied Bandwidth, Mid Channel	16
Plot 6. 6 dB Occupied Bandwidth, High Channel	16
Plot 7. 99% Occupied Bandwidth, Low Channel	17
Plot 8. 99% Occupied Bandwidth, Mid Channel.....	17
Plot 9. 99% Occupied Bandwidth, High Channel	17
Plot 10. Radiated Spurious Emissions, Low Channel, 30 MHz – 1 GHz.....	19
Plot 11. Radiated Spurious Emissions, Low Channel, 1 GHz – 18 GHz, Average	19
Plot 12. Radiated Spurious Emissions, Low Channel, 1 GHz – 18 GHz, Peak	19
Plot 13. Radiated Spurious Emissions, Mid Channel, 30 MHz – 1 GHz	20
Plot 14. Radiated Spurious Emissions, Mid Channel, 1 GHz – 18 GHz, Average.....	20
Plot 15. Radiated Spurious Emissions, Mid Channel, 1 GHz – 18 GHz, Peak	20
Plot 16. Radiated Spurious Emissions, High Channel, 30 MHz – 1 GHz	21
Plot 17. Radiated Spurious Emissions, High Channel, 1 GHz – 18 GHz, Average	21
Plot 18. Radiated Spurious Emissions, High Channel, 1 GHz – 18 GHz, Peak	21
Plot 19. Radiated Band Edge, Low Channel, Average	22
Plot 20. Radiated Band Edge, Low Channel, Peak.....	22
Plot 21. Radiated Band Edge, High Channel, Average	23
Plot 22. Radiated Band Edge, High Channel, Peak	23

List of Figures

Figure 1. Block Diagram of Test Configuration.....	6
--	---



List of Terms and Abbreviations

AC	Alternating Current
ACF	Antenna Correction Factor
Cal	Calibration
<i>d</i>	Measurement Distance
dB	Decibels
dB μ A	Decibels above one microamp
dB μ V	Decibels above one microvolt
dB μ A/m	Decibels above one microamp per meter
dB μ V/m	Decibels above one microvolt per meter
DC	Direct Current
E	Electric Field
DSL	Digital Subscriber Line
ESD	Electrostatic Discharge
EUT	Equipment Under Test
<i>f</i>	Frequency
FCC	Federal Communications Commission
GRP	Ground Reference Plane
H	Magnetic Field
HCP	Horizontal Coupling Plane
Hz	Hertz
IEC	International Electrotechnical Commission
kHz	kilohertz
kPa	kilopascal
kV	kilovolt
LISN	Line Impedance Stabilization Network
MHz	Megahertz
μ H	microhenry
μ	microfarad
μ s	microseconds
NEBS	Network Equipment-Building System
PRF	Pulse Repetition Frequency
RF	Radio Frequency
RMS	Root-Mean-Square
TWT	Traveling Wave Tube
V/m	Volts per meter
VCP	Vertical Coupling Plane



I. Executive Summary

A. Purpose of Test

An EMC evaluation was performed to determine compliance of the Assistive Technology Products, Inc. HydraData Wireless, with the requirements of Part 15, §15.249. 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 HydraData Wireless. Assistive Technology Products, Inc. should retain a copy of this document which should be kept on file for at least two years after the manufacturing of the HydraData Wireless, 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, §15.249, in accordance with Assistive Technology Products, Inc., purchase order number 011816-1. All tests were conducted using measurement procedure ANSI C63.4-2014.

FCC Reference 47 CFR Part 15.249	Canada Reference	Description	Compliance
§ 15.203	--	Antenna Requirement	Compliant
§ 15.207	RSS GEN §8.8	Conducted Emission Limits	Not Applicable
§ 15.249 (b)(1)	RSS-210 A12	Field Strength of Fundamental	Compliant
§ 15.249(a)(d), § 15.209	RSS-Gen §7.2.5 and RSS-210 A2.0	Harmonics and Spurious Emissions	Compliant
	RSS-102	Maximum Permissible Exposure	Compliant

Table 1. Executive Summary of EMC Part 15.249 Compliance Testing



II. Equipment Configuration

A. Overview

MET Laboratories, Inc. was contracted by Assistive Technology Products, Inc. to perform testing on the HydraData Wireless, under Assistive Technology Products, Inc.'s purchase order number 011816-1.

This document describes the test setups, test methods, required test equipment, and the test limit criteria used to perform compliance testing of the Assistive Technology Products, Inc., HydraData Wireless.

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

Model(s) Tested:	HydraData Wireless	
Model(s) Covered:	HydraData Wireless	
EUT Specifications:	Primary Power: Battery Powered	
	FCC ID: 2AHIB-HYDRADATA IC: 21481-201A00	
	Equipment Code:	DXX
	Highest Fundamental Field Strength:	87.06 dBuV/m
	EUT Frequency Ranges:	2402-2480 MHz
Analysis:	The results obtained relate only to the item(s) tested.	
Environmental Test Conditions:	Temperature: 15-35° C	
	Relative Humidity: 30-60%	
	Barometric Pressure: 860-1060 mbar	
Evaluated by:	Benjamin Taylor	
Report Date(s):	July 7, 2016	

Table 2. EUT Summary Table

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
ANSI C63.4:2014	Methods and Measurements of Radio-Noise Emissions from Low-Voltage Electrical And Electronic Equipment in the Range of 9 kHz to 40 GHz
RSS-210, Issue 8, December 2010	Low-power Licence-exempt Radiocommunications Devices (All Frequency Bands): Category I Equipment
RSS-102, Issue 5, March 2015	Radio Frequency (RF) Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands)
ISO/IEC 17025:2005	General Requirements for the Competence of Testing and Calibration Laboratories
ANSI C63.10-2013	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 Assistive Technology Products, Inc. HydraData Wireless, Equipment Under Test (EUT), is a device used to monitor fluid flow consisting of an electronic module and a disposable fluid path cartridge. When the fluid cartridge is mated to the electronic module, fluid flow causes rotation of a magnet within the fluid path cartridge that alternately opens and closes switches within the electronic module. These closures are monitored and the internal processors calculate the amount of fluid that has passed through the cartridge. The electronic module will then communicate via Bluetooth LE to a separate reporting device (cell phone, tablet computer, etc.) running a custom application that will display results to the end user.

The intended use of the HydraData Wireless is to monitor an end user's fluid intake. The application will have set targets against which actual intake is monitored and will provide feedback when required levels are not being maintained.

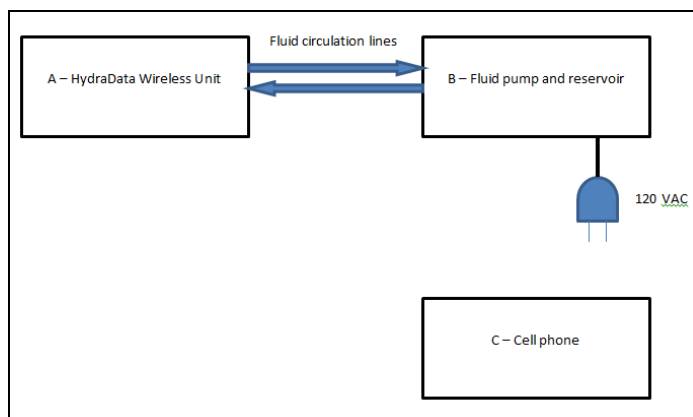


Figure 1. Block Diagram of Test Configuration

E. Equipment Configuration

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	Model Number	Part Number	Serial Number	Revision
A	HydraData Wireless	--	--	--	--

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
B	Water pump/reservoir	ATP	--
C	Cell phone	--	--

Table 5. Support Equipment

G. Mode of Operation

The HydraData Wireless has a single continuous mode of operation. During use the electronic module will continually monitoring fluid flow with the processor going into sleep mode between flow events. The electronic module, after being connected to the reporting device will upload stored data on demand to the reporting device. Once connected, the application in the reporting device sends queries to the HydraData device on regular intervals to upload any new data.

H. Method of Monitoring EUT Operation

There is no physical indication on the HydraData Wireless unit itself of performance. Performance is determined by syncing to a reporting device and seeing a connection made and data being downloaded.

I. 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.

J. Disposition of EUT

The test sample including all support equipment submitted to the Electro-Magnetic Compatibility Lab for testing was returned to Assistive Technology Products, Inc. upon completion of testing.



III. 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. EUT has an internal antenna.

Test Engineer(s): Benjamin Taylor

Test Date(s): 04/08/16

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.207(a) 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 μ H/50 Σ 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 (dB μ V)	
	Quasi-Peak	Average
* 0.15- 0.45	66 - 56	56 - 46
0.45 - 0.5	56	46
0.5 - 30	60	50

Table 6. Conducted Limits for Intentional Radiators from FCC Part 15 § 15.207(a)

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



Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.249(b)(1) Radiated Field Strength of Fundamental

Test Requirements: § 15.249(b)(1): Fixed, point-to-point operation as referred to in this paragraph shall be limited to systems employing a fixed transmitter transmitting to a fixed remote location. Point-to-multipoint systems, omnidirectional applications, and multiple co-located intentional radiators transmitting the same information are not allowed. Fixed, point-to-point operation is permitted in the 24.05–24.25 GHz band subject to the following conditions:

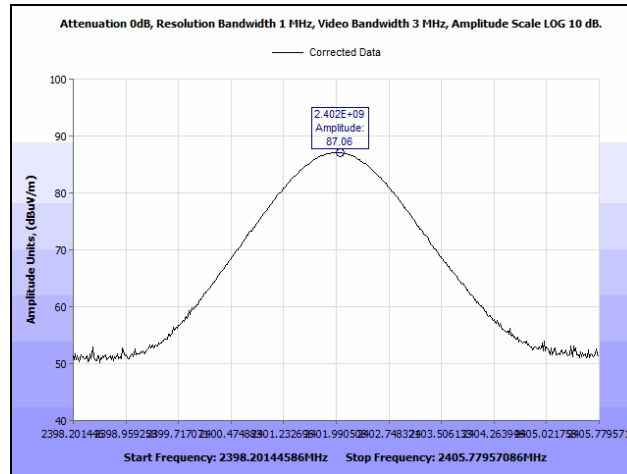
The field strength of emissions in this band shall not exceed 2500 millivolts/meter.

Test Procedure: 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. The antenna was placed 3m away from the EUT. The EUT was rotated about all three orthogonal axis. Therefore the field strength limit is based on a 3m distance.

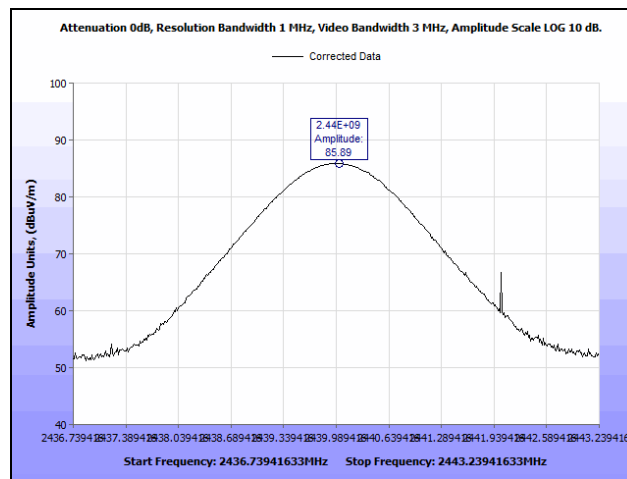
Test Results: The EUT is compliant with the requirements of §15.249(b)(1).

Test Engineer(s): Benjamin Taylor

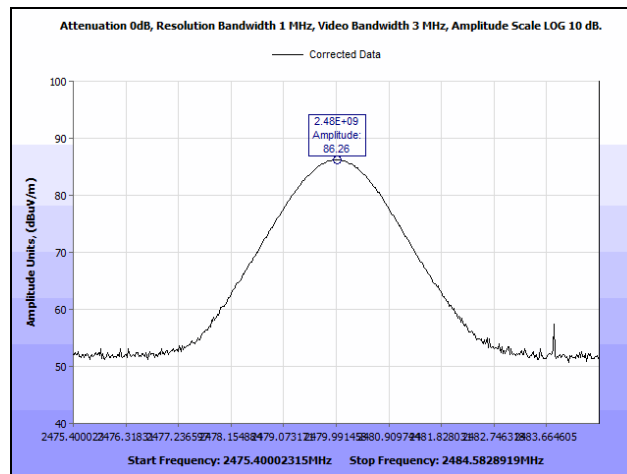
Test Date(s): 04/12/16



Plot 1. Fundamental Field Strength, Low Channel



Plot 2. Fundamental Field Strength, Mid Channel



Plot 3. Fundamental Field Strength, High Channel

RSS-102(3.2)

RF Exposure Evaluation of Devices

RF Exposure Requirements:

RSS-102(3.2): A device requiring an RF exposure evaluation shall be made in accordance with the latest version of IEEE C95.3.

If the device is designed such that more than one antenna can functionally transmit at the same time, the RF exposure evaluation shall be conducted while all antennas are transmitting. The individual exposure level ratios shall be totaled and used for compliance purposes.

If the device has more than one antenna, but is not designed to have more than one antenna functionally transmit at the same time, the RF exposure evaluation of the device shall be performed for each of the individually transmitting antennas. The maximum RF field strength value shall be recorded and used for compliance purposes.

If the device combines groups of simultaneous and non-simultaneous transmitting antennas, the worst-case of the above scenarios applies.

Exposure Limit:

For a device operating between 300 – 6000 MHz the power density limit for RF Evaluation can be determined from the equation $0.02619 \times f^{0.6834} \text{ W/m}^2$, where f is the frequency in MHz.

The Time-Averaged Maximum e.i.r.p. RF Evaluation Exemption limit for devices operating between 300 – 6000 MHz can be found from the equation $0.0131 \times f^{0.6834} \text{ W}$, where f is the frequency in MHz.

Test Result:

Frequency (MHz)	Con. Pwr. (dBm)	Con. Pwr. (mW)	Ant. Gain (dBi)	Ant. Gain numeric	Pwr. Density (W/m ²)	MPE Limit (W/m ²)	Margin	Distance (cm)	e.i.r.p. (W)	e.i.r.p. Exempt Limit (W)	Result
2402	-12.67	0.054	4.5	2.818	N/A	N/A	N/A	20	0.00015	2.6764	Exempt

Maximum Permissible 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: EUT's operating frequencies @ 2400-2483.5 MHz; **Limit for Uncontrolled exposure: 1 mW/cm² or 10 W/m²**

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 (mW/cm²)
P = Power Input to antenna (mW)
G = Antenna Gain (numeric value)
R = Distance (cm)

Test Results:

Frequency (MHz)	Con. Pwr. (dBm)	Con. Pwr. (mW)	Ant. Gain (dBi)	Ant. Gain numeric	Pwr. Density (mW/cm ²)	Limit (mW/cm ²)	Margin	Distance (cm)	Result
2437	-12.67	0.054	4.5	2.818	0.00003	1	0.99997	20	Pass

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.249 Occupied Bandwidth

Test Requirements: § 15.249

Test Procedure: The EUT was placed inside the anechoic chamber and both -20dB and 99% occupied bandwidth were measured for all channels.

Test Results The EUT was compliant with § 15.249.

Test Engineer(s): Benjamin Taylor

Test Date(s): 04/12/16

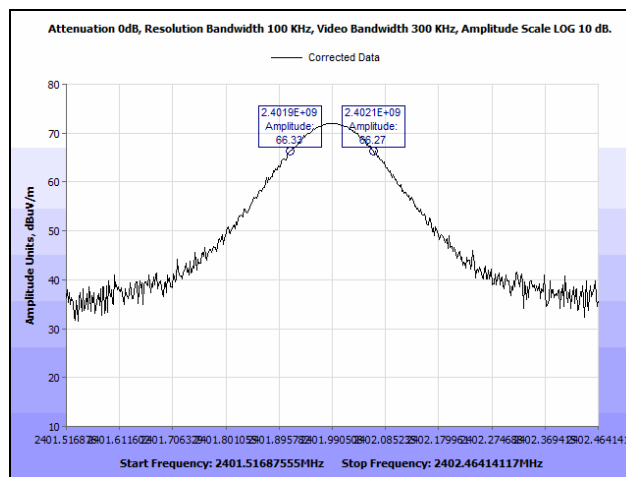
Occupied Bandwidth		
Carrier Channel	Frequency (MHz)	Measured 6 dB Bandwidth (kHz)
Low	2402	200
Mid	2440	200
High	2480	200

Table 7. 6 dB Occupied Bandwidth, Test Results

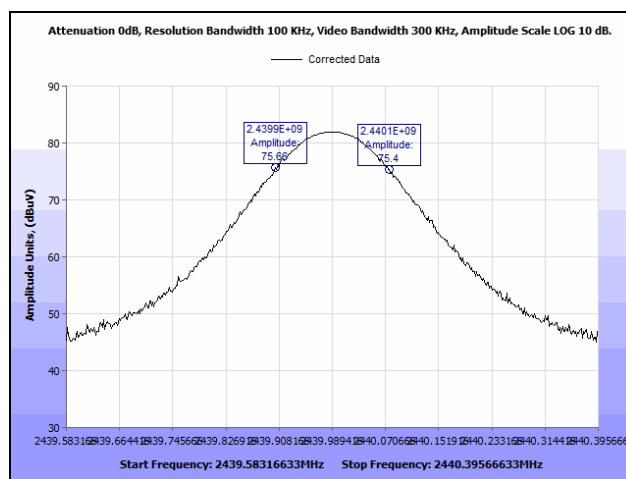
Occupied Bandwidth		
Carrier Channel	Frequency (MHz)	Measured 99% Bandwidth (kHz)
Low	2402	200
Mid	2440	200
High	2480	200

Table 8. 99% Occupied Bandwidth, Test Results

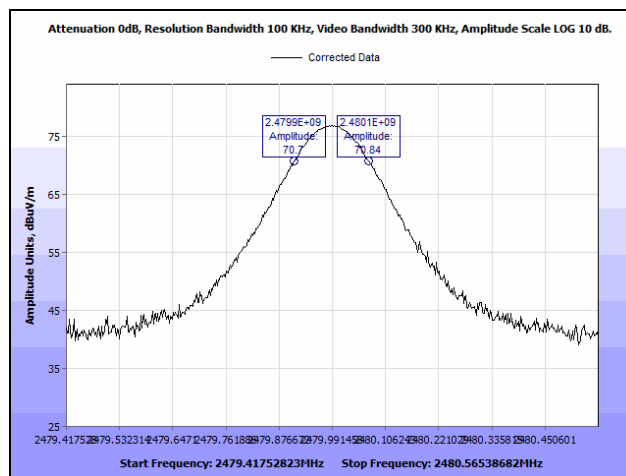
6 dB Occupied Bandwidth Test Results



Plot 4. 6 dB Occupied Bandwidth, Low Channel

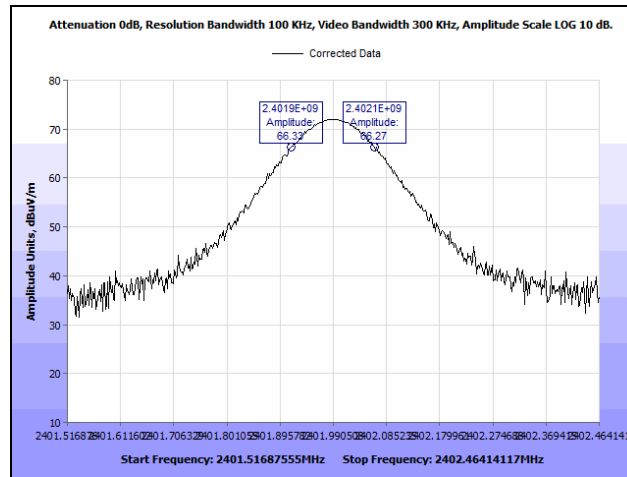


Plot 5. 6 dB Occupied Bandwidth, Mid Channel

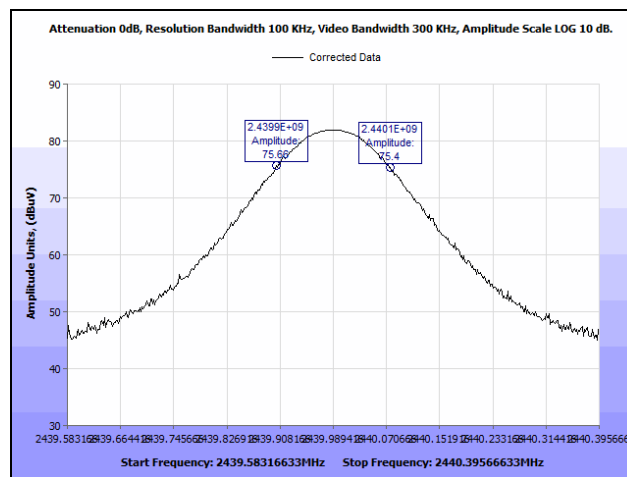


Plot 6. 6 dB Occupied Bandwidth, High Channel

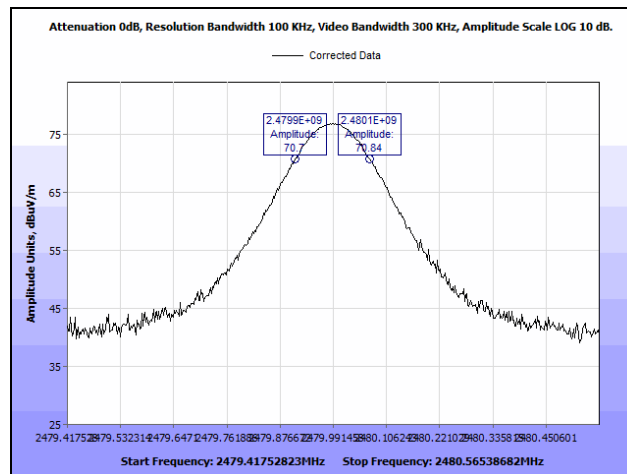
99% Occupied Bandwidth Test Results



Plot 7. 99% Occupied Bandwidth, Low Channel



Plot 8. 99% Occupied Bandwidth, Mid Channel



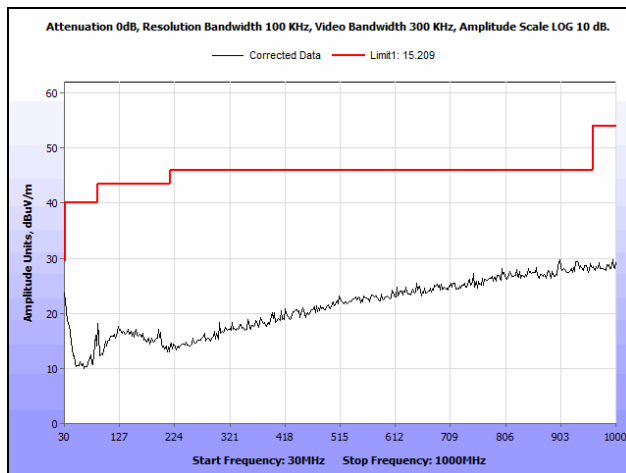
Plot 9. 99% Occupied Bandwidth, High Channel



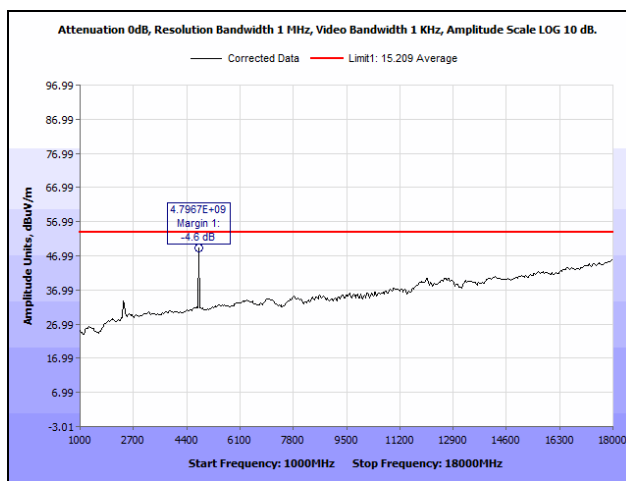
Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.249(a)(d) Harmonics and Spurious Emissions Requirements

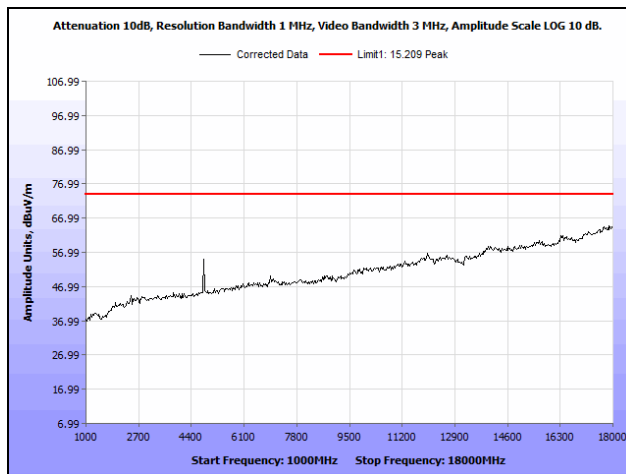
Test Requirements:	Harmonics originating from devices that operate in the 24.0-24.25 GHz band shall meet the 2500 microvolts/meter limit (i.e. 68 dB μ V/m) with an average detector. In addition, emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.
Test Procedure:	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. Emissions below 1 GHz were performed with the antenna placed 3m away from EUT. For above 1 GHz, the measuring antenna was placed 1m away. Measurements were performed from 30MHz to 26GHz. Only noise floor was observed above 18GHz.
Test Results:	The EUT is compliant with the harmonics and Spurious Emissions Requirements of §15.249(a)(d). For spurious emissions the lesser attenuation was the 15.209 limits.
Test Engineer(s):	Benjamin Taylor
Test Date(s):	04/12/16



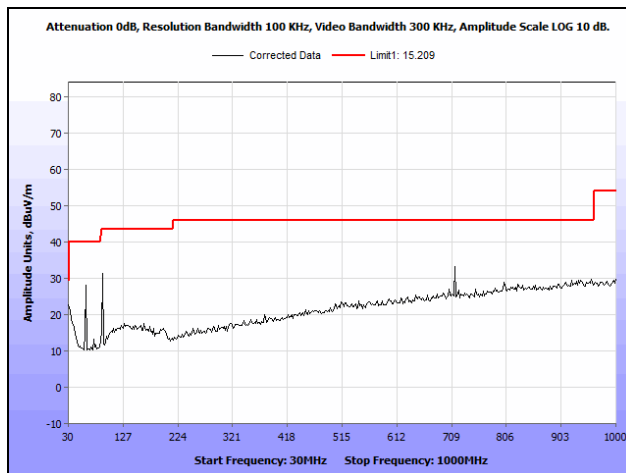
Plot 10. Radiated Spurious Emissions, Low Channel, 30 MHz – 1 GHz



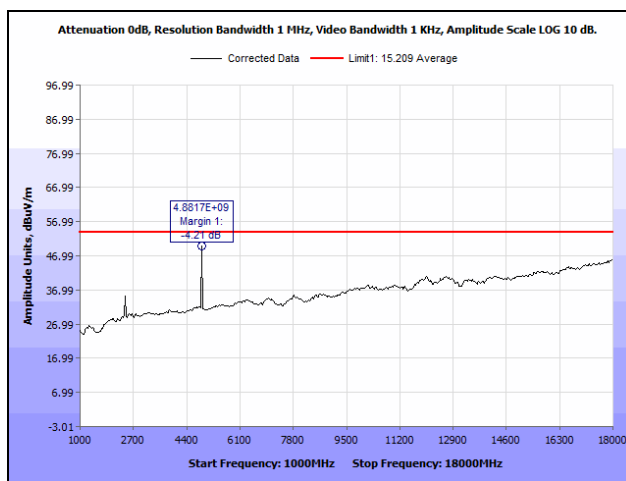
Plot 11. Radiated Spurious Emissions, Low Channel, 1 GHz – 18 GHz, Average



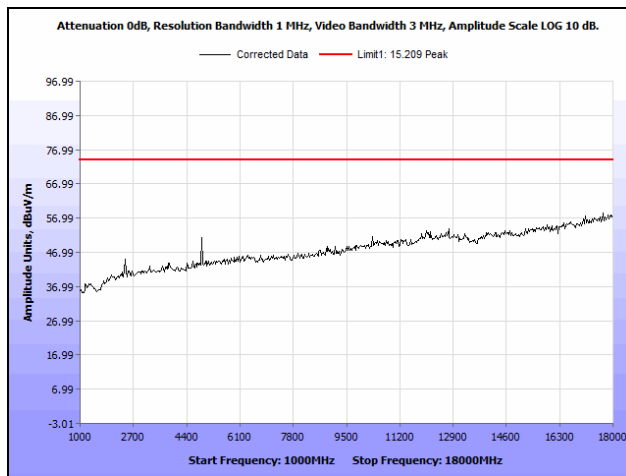
Plot 12. Radiated Spurious Emissions, Low Channel, 1 GHz – 18 GHz, Peak



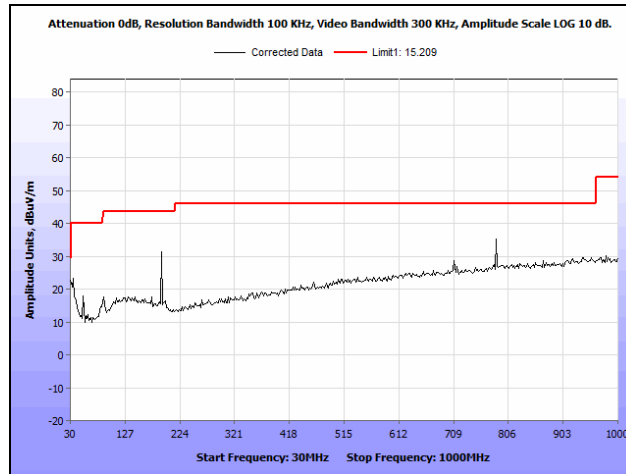
Plot 13. Radiated Spurious Emissions, Mid Channel, 30 MHz – 1 GHz



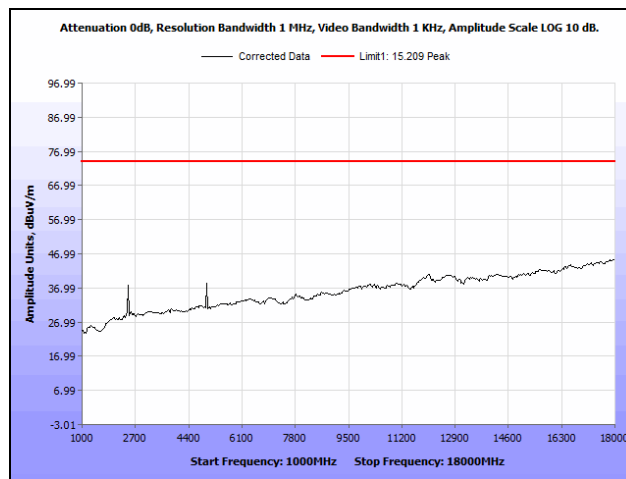
Plot 14. Radiated Spurious Emissions, Mid Channel, 1 GHz – 18 GHz, Average



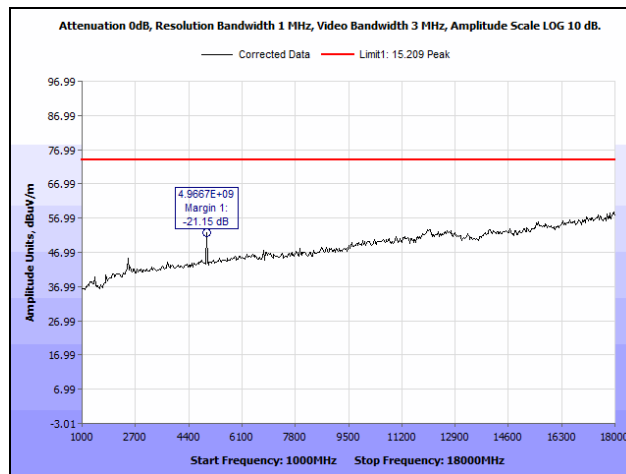
Plot 15. Radiated Spurious Emissions, Mid Channel, 1 GHz – 18 GHz, Peak



Plot 16. Radiated Spurious Emissions, High Channel, 30 MHz – 1 GHz



Plot 17. Radiated Spurious Emissions, High Channel, 1 GHz – 18 GHz, Average

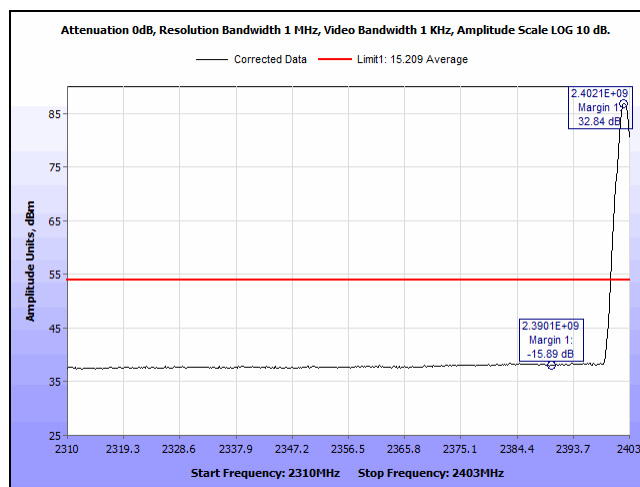


Plot 18. Radiated Spurious Emissions, High Channel, 1 GHz – 18 GHz, Peak

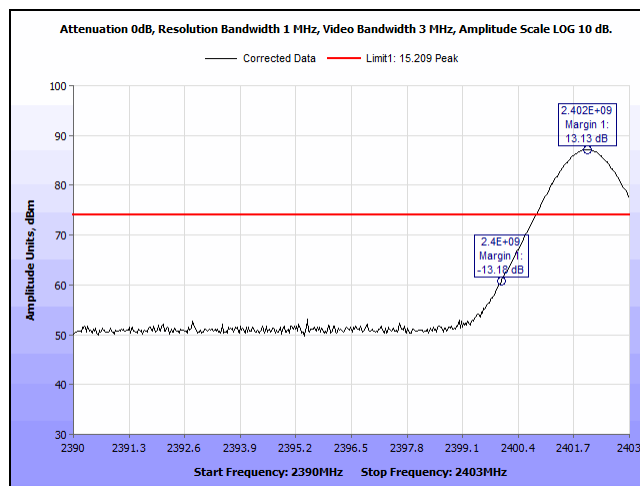
Radiated Band Edge Measurements

Test Procedures:

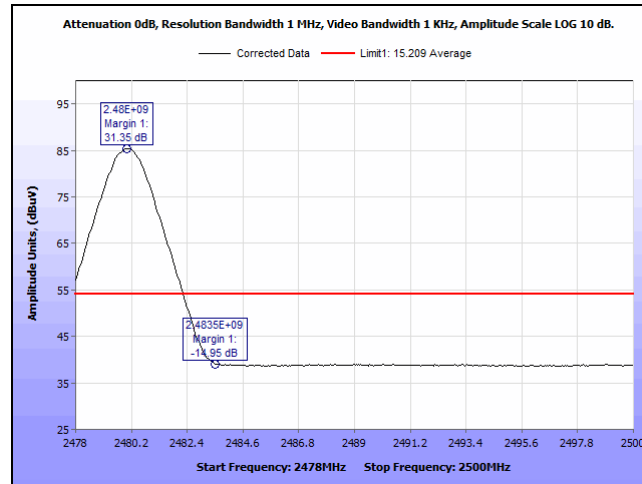
The transmitter was turned on. Measurements were performed of the low, mid and high Channels. The EUT was rotated orthogonally through all three axes. Plots shown are corrected for both antenna correction factor and distance and compared to a 3 m limit line.



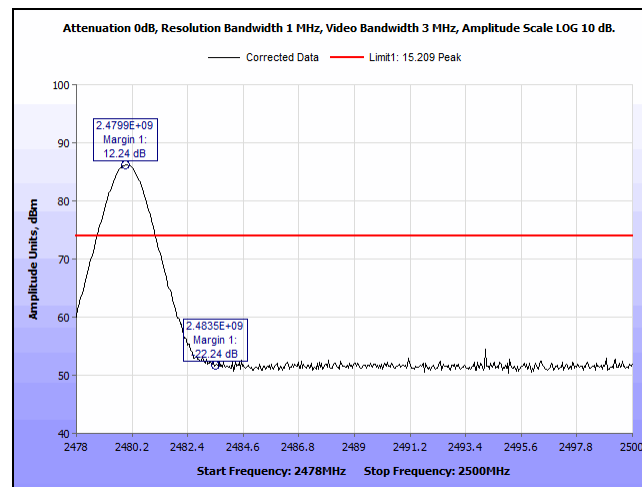
Plot 19. Radiated Band Edge, Low Channel, Average



Plot 20. Radiated Band Edge, Low Channel, Peak



Plot 21. Radiated Band Edge, High Channel, Average



Plot 22. Radiated Band Edge, High Channel, Peak



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
1T4409	EMI RECEIVER	ROHDE & SCHWARZ	ESIB7	10/29/2014	10/29/2016
1T4300A	SEMI-ANECHOIC CHAMBER # 1 (FCC)	EMC TEST SYSTEMS	NONE	01/31/2014	01/31/2017
1T4751	ANTENNA - BILOG	SUNOL SCIENCES	JB6	02/26/2016	08/26/2017
1T4149	HIGH-FREQUENCY ANECHOIC CHAMBER	RAY PROOF	81	NOT REQUIRED	
1T4483	ANTENNA; HORN	ETS-LINDGREN	3117	10/08/2015	04/08/2017
1T4771	PSA SPECTRUM ANALYZER	AGILENT TECHNOLOGIES	E4446A	12/25/2014	06/25/2016
1T4442	PRE-AMPLIFIER, MICROWAVE	MITEQ	AFS42-01001800-30-10P	SEE NOTE	
1T4859	DIGITAL BAROMETER, HYGROMETER, THERMOMETER	CONTROL COMPANY	15-078-198, FB70423, 245CD	02/10/2016	02/10/2018
1T4409	EMI RECEIVER	ROHDE & SCHWARZ	ESIB7	10/29/2014	10/29/2016
1T4300A	SEMI-ANECHOIC CHAMBER # 1 (FCC)	EMC TEST SYSTEMS	NONE	01/31/2014	01/31/2017
1T4751	ANTENNA - BILOG	SUNOL SCIENCES	JB6	02/26/2016	08/26/2017
1T4149	HIGH-FREQUENCY ANECHOIC CHAMBER	RAY PROOF	81	NOT REQUIRED	
1T4483	ANTENNA; HORN	ETS-LINDGREN	3117	10/08/2015	04/08/2017

Table 9. Test Equipment List

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



V. Certification & User's Manual Information



Certification & User's Manual Information

A. Certification Information

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

§ 2.801 Radio-frequency device defined.

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

- (a) The various types of radio communication transmitting devices described throughout this chapter.
- (b) *The incidental, unintentional and intentional radiators defined in Part 15 of this chapter.*
- (c) The industrial, scientific, and medical equipment described in Part 18 of this chapter.
- (d) Any part or component thereof which in use emits radio-frequency energy by radiation, conduction, or other means.

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

- (a) Except as provided elsewhere in this chapter, no person shall sell or lease, or offer for sale or lease (including advertising for sale or lease), or import, ship or distribute for the purpose of selling or leasing or offering for sale or lease, any radio frequency device unless:
 - (1) In the case of a device subject to certification, such device has been authorized by the Commission in accordance with the rules in this chapter and is properly identified and labeled as required by §2.925 and other relevant sections in this chapter; or
 - (2) In the case of a device that is not required to have a grant of equipment authorization issued by the Commission, but which must comply with the specified technical standards prior to use, such device also complies with all applicable administrative (including verification of the equipment or authorization under a Declaration of Conformity, where required), technical, labeling and identification requirements specified in this chapter.
- (d) Notwithstanding the provisions of paragraph (a) of this section, the offer for sale solely to business, commercial, industrial, scientific or medical users (but not an offer for sale to other parties or to end users located in a residential environment) of a radio frequency device that is in the conceptual, developmental, design or pre-production stage is permitted prior to equipment authorization or, for devices not subject to the equipment authorization requirements, prior to a determination of compliance with the applicable technical requirements *provided* that the prospective buyer is advised in writing at the time of the offer for sale that the equipment is subject to the FCC rules and that the equipment will comply with the appropriate rules before delivery to the buyer or to centers of distribution.



- (e)(1) Notwithstanding the provisions of paragraph (a) of this section, prior to equipment authorization or determination of compliance with the applicable technical requirements any radio frequency device may be operated, but not marketed, for the following purposes and under the following conditions:
- (i) *Compliance testing*;
 - (ii) Demonstrations at a trade show provided the notice contained in paragraph (c) of this section is displayed in a conspicuous location on, or immediately adjacent to, the device;
 - (iii) Demonstrations at an exhibition conducted at a business, commercial, industrial, scientific or medical location, but excluding locations in a residential environment, provided the notice contained in paragraphs (c) or (d) of this section, as appropriate, is displayed in a conspicuous location on, or immediately adjacent to, the device;
 - (iv) Evaluation of product performance and determination of customer acceptability, provided such operation takes place at the manufacturer's facilities during developmental, design or pre-production states; or
 - (v) Evaluation of product performance and determination of customer acceptability where customer acceptability of a radio frequency device cannot be determined at the manufacturer's facilities because of size or unique capability of the device, provided the device is operated at a business, commercial, industrial, scientific or medical user's site, but not at a residential site, during the development, design or pre-production stages.
- (e)(2) For the purpose of paragraphs (e)(1)(iv) and (e)(1)(v) of this section, the term *manufacturer's facilities* includes the facilities of the party responsible for compliance with the regulations and the manufacturer's premises, as well as the facilities of other entities working under the authorization of the responsible party in connection with the development and manufacture, but not the marketing, of the equipment.
- (f) For radio frequency devices subject to verification and sold solely to business, commercial, industrial, scientific and medical users (excluding products sold to other parties or for operation in a residential environment), parties responsible for verification of the devices shall have the option of ensuring compliance with the applicable technical specifications of this chapter at each end user's location after installation, provided that the purchase or lease agreement includes a proviso that such a determination of compliance be made and is the responsibility of the party responsible for verification of the equipment.



Certification & User's Manual Information

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

§ 2.901 Basis and Purpose

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

§ 2.907 Certification.

- (a) Certification is an equipment authorization issued by the Commission, based on representation and test data submitted by the applicant.
- (b) Certification attaches to all units subsequently marketed by the grantee which are identical (see Section 2.908) to the sample tested except for permissive changes or other variations authorized by the Commission pursuant to Section 2.1043.

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



Certification & User's Manual Information

§ 2.948 Description of measurement facilities.

- (a) Each party making measurements of equipment that is subject to an equipment authorization under Part 15 or Part 18 of this chapter, regardless of whether the measurements are filed with the Commission or kept on file by the party responsible for compliance of equipment marketed within the U.S. or its possessions, shall compile a description of the measurement facilities employed.
 - (1) If the measured equipment is subject to the verification procedure, the description of the measurement facilities shall be retained by the party responsible for verification of the equipment.
 - (i) *If the equipment is verified through measurements performed by an independent laboratory, it is acceptable for the party responsible for verification of the equipment to rely upon the description of the measurement facilities retained by or placed on file with the Commission by that laboratory. In this situation, the party responsible for the verification of the equipment is not required to retain a duplicate copy of the description of the measurement facilities.*
 - (ii) If the equipment is verified based on measurements performed at the installation site of the equipment, no specific site calibration data is required. It is acceptable to retain the description of the measurement facilities at the site at which the measurements were performed.
 - (2) If the equipment is to be authorized by the Commission under the certification procedure, the description of the measurement facilities shall be filed with the Commission's Laboratory in Columbia, Maryland. The data describing the measurement facilities need only be filed once but must be updated as changes are made to the measurement facilities or as otherwise described in this section. At least every three years, the organization responsible for filing the data with the Commission shall certify that the data on file is current.



Certification & User's Manual Information

1. Label and User's Manual Information

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

§ 15.19 Labeling requirements.

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

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

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

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

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

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

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

- (4) Where a device is constructed in two or more sections connected by wires and marketed together, the statement specified under paragraph (a) of this section is required to be affixed only to the main control unit.
- (5) When the device is so small or for such use that it is not practicable to place the statement specified under paragraph (a) of this section on it, the information required by this paragraph shall be placed in a prominent location in the instruction manual or pamphlet supplied to the user or, alternatively, shall be placed on the container in which the device is marketed. However, the FCC identifier or the unique identifier, as appropriate, must be displayed on the device.

§ 15.21 Information to user.

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



Verification & User's Manual Information

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

§ 15.105 Information to the user.

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

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

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

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

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.



End of Report