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

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June 21, 2013

Linak U.S.A.
2200 Stanley Gault Parkway
Louisville, KY 40223

Dear Peter Brondum,

Enclosed is the EMC Wireless test report for compliance testing of the Linak U.S.A., HBBRIO as tested to the requirements of Title 47 of the CFR, Ch. 1 (10-1-06 ed.), FCC Part 15 Subpart B for a Class B Digital Device and FCC Part 15 Subpart C 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: (\Linak U.S.A.\EMC38402-FCC231 Rev. 2)

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Electromagnetic Compatibility Criteria Test Report

for the

Linak U.S.A.
HBBRIO

Tested under
the FCC Certification Rules
contained in
Title 47 of the CFR, Parts 15 Subpart B
for Class B Digital Devices
&
15.231 for Intentional Radiators

MET Report: EMC38402-FCC231 Rev. 2

June 21, 2013

Prepared For:

Linak U.S.A.
2200 Stanley Gault Parkway
Louisville, KY 40223

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

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&
15.231 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 Part 15.231, of the FCC Rules under normal use and maintenance.

Asad Bajwa,
Director, Electromagnetic Compatibility Lab

Report Status Sheet

Revision	Report Date	Reason for Revision
∅	May 10, 2013	Initial Issue.
1	June 3, 2013	Revised to add Part 15.231.
2	June 21, 2013	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
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**
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
µ**H**	**microh**enry
µ	**microf**arad
µ**s**	**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 Linak U.S.A. HBBRIO, with the requirements of Part 15, §15.231. 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 HBBRIO. Linak U.S.A. should retain a copy of this document which should be kept on file for at least two years after the manufacturing of the HBBRIO, 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, §15.231, in accordance with Linak U.S.A., purchase order number 61812. All tests were conducted using measurement procedure ANSI C63.4-2003.

FCC Reference	Description	Results
Transmitter Mode (TX)		
§15.203	Antenna Requirement	Compliant
§15.207	AC Power Line Conducted Emissions	N/A
§15.231(a)	Periodic Operation Requirements	Compliant
§15.231(b)	Field Strength of Fundamentals and Harmonics	Compliant
§15.231(c)	20dB Bandwidth	Compliant
Unintentional Digital		
15.107	AC Power Line Conducted Emissions	N/A - EUT is battery powered.
15.109	Radiated Emissions	Compliant

Table 1. Executive Summary of EMC Part 15.231 ComplianceTesting

II. Equipment Configuration

A. Overview

MET Laboratories, Inc. was contracted by Linak U.S.A. to perform testing on the HBBRIO, under Linak U.S.A.'s purchase order number 143040.

This document describes the test setups, test methods, required test equipment, and the test limit criteria used to perform compliance testing of the Linak U.S.A., HBBRIO.

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

Model(s) Tested:	HBBRIO	
Model(s) Covered:	HBBRIO	
EUT Specifications:	Primary Power: 6 VDC from 4 AAA batteries	
	FCC ID: XBE-HBBRIO	
	Max Field Strength:	77.09 dBuV/m @ 3m
	EUT Frequency Ranges:	433 .92MHz
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:	Benjamin Taylor	
Report Date(s):	June 21, 2013	

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
CFR 47, Part 15, Subpart B	Electromagnetic Compatibility: Criteria for Radio Frequency Devices
ANSI C63.4:2003	Methods and Measurements of Radio-Noise Emissions from Low-Voltage Electrical And Electronic Equipment in the Range of 9 kHz to 40 GHz
ISO/IEC 17025:2005	General Requirements for the Competence of Testing and Calibration Laboratories

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 HBBRIO, Equipment Under Test (EUT), is a RF remote control for elevation beds.

Photograph 1. Linak U.S.A. HBBRIO

E. Equipment Configuration

The EUT was set up as outlined in **Error! Reference source not found.**. All equipment incorporated as part of the EUT is included in the following list.

Ref. ID	Name / Description	Model Number	Part Number	Serial Number	Revision
--	BRIO RF handset	HBBRIO01	SMLHBBRIO01-A	--	A

Table 4. Equipment Configuration

F. Support Equipment

The EUT did not require any support equipment for operation or monitoring.

G. Ports and Cabling Information

The EUT did not require any ports and cabling information for operation or monitoring.

H. Mode of Operation

Device was powered on.

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 Linak U.S.A. upon completion of testing.

III. Electromagnetic Compatibility Criteria for Unintentional Radiators

Electromagnetic Compatibility Emission Criteria

§ 15.107 Conducted Emission 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 5. 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 5. 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)	15.107(b), Class A Limits (dBμV)		15.107(a), Class B Limits (dBμV)	
	Quasi-Peak	Average	Quasi-Peak	Average
0.15- 0.5	79	66	66 - 56	56 - 46
0.5 – 5.0	73	60	56	46
5.0 - 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 5. Conducted Limits for Radio Frequency Devices calculated from FCC Part 15 Section 15.107(a) (b)

Test Results: The EUT was not applicable with the Class B requirement(s) of this section. EUT is battery powered.

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 6.

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 6.

Frequency (MHz)	Field Strength (dBµV/m)	
	§15.109 (b), Class A Limit (dBµV/m) @ 10m	§15.109 (a),Class B Limit (dBµV/m) @ 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 6. Radiated Emissions Limits calculated from FCC Part 15, §15.109 (a) (b)

Test Procedures: The EUT was located on a non-metallic table, 80 cm above ground plane on the turntable inside a semi-anechoic chamber. The method of testing and test conditions of ANSI C63.4:2003 were used. For emissions between 30 and 1000 MHz, a broadband 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 resolution bandwidth.

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

Test Engineer(s): Ben Taylor

Test Date(s): 05/07/13

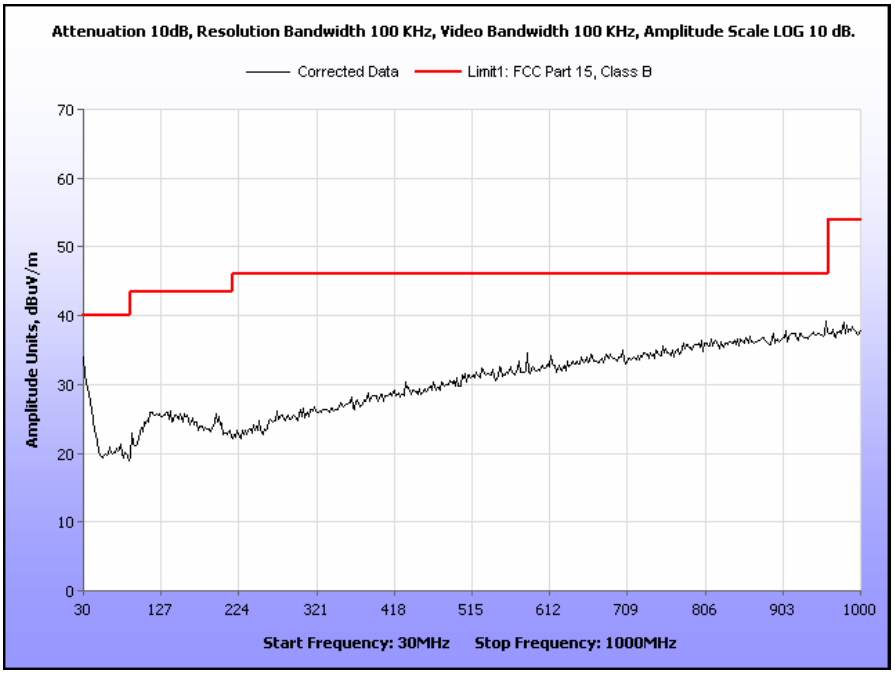
FCC Radiated Emissions Limits Test Results, Class B

Frequency (MHz)	EUT Azimuth (Degrees)	Antenna Polarity (H/V)	Antenna Height (m)	Uncorrected Amplitude (dBµV)	Antenna Correction Factor (dB) (+)	Cable Loss (dB) (+)	Distance Correction Factor (dB) (-)	Corrected Amplitude (dBµV/m)	Limit (dBµV/m)	Margin (dB)
33.907816	20	H	1.49	5.18	18.96	0.38	0.00	24.52	40.00	-15.48
33.907816	30	V	1.52	5.10	18.96	0.38	0.00	24.44	40.00	-15.56
67.222445	15	H	1.48	5.50	8.00	0.61	0.00	14.11	40.00	-25.89
67.222445	7	V	1.44	5.57	8.00	0.61	0.00	14.18	40.00	-25.82
199.86974	23	H	1.49	6.23	12.77	0.91	0.00	19.91	43.50	-23.59
199.86974	12	V	1.47	6.16	12.77	0.91	0.00	19.84	43.50	-23.66
444.80561	33	H	1.84	4.86	17.10	1.71	0.00	23.67	46.00	-22.33
444.80561	31	V	1.91	4.86	17.10	1.71	0.00	23.67	46.00	-22.33
541.80361	12	H	1.29	5.50	18.60	1.95	0.00	26.05	46.00	-19.95
541.80361	22	V	1.31	5.42	18.60	1.95	0.00	25.97	46.00	-20.03
995.51102	27	H	1.33	5.87	23.70	2.97	0.00	32.54	54.00	-21.46
995.51102	17	V	1.29	5.95	23.70	2.97	0.00	32.62	54.00	-21.38

Table 7. Radiated Emissions Limits, Test Results

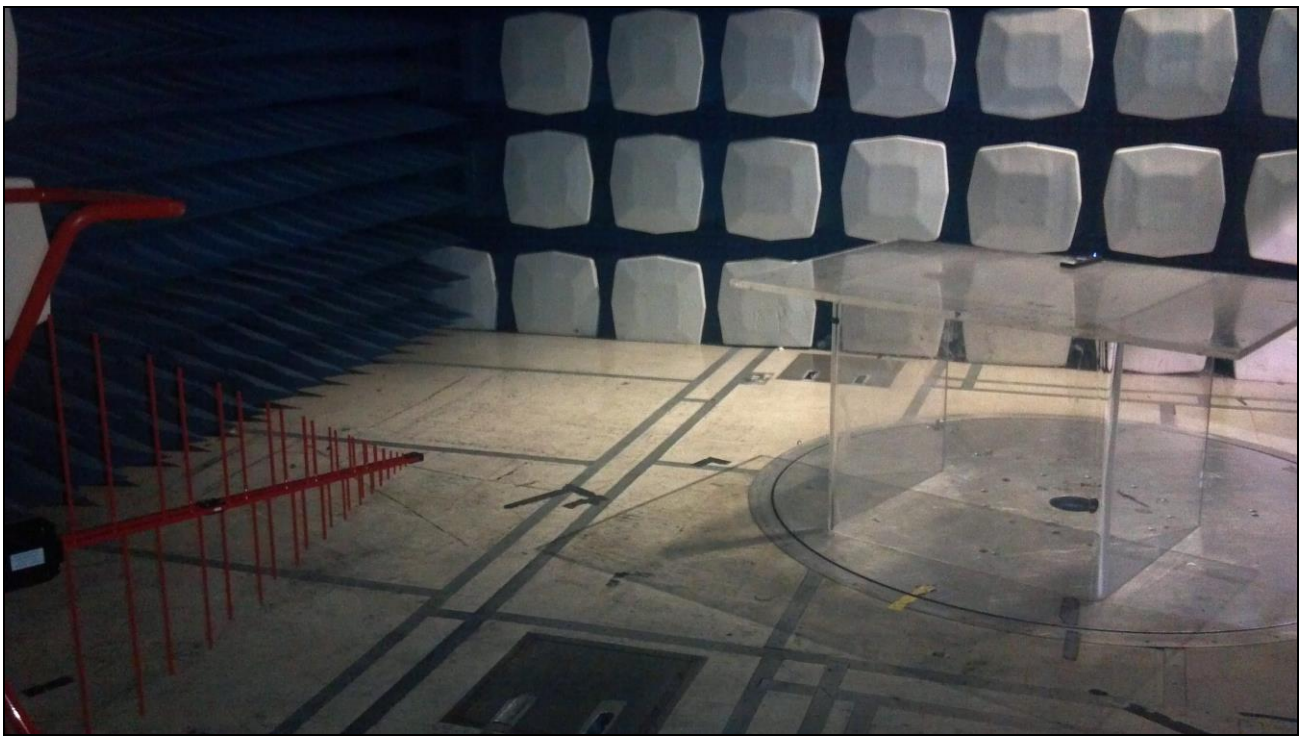
Note 1: The EUT was tested at 3 m. The data has been corrected for comparison with the 10 m limit using the formula: 20log (3 m/10 m) as expressed in the 'Distance Correction' column.

Note 2: The following sample calculation was used to correct the amplitude (Corrected Amplitude (dBuV/m)= Uncorrected Data+ACF+Cable Loss-Distance Correction Factor).



Plot 1. Radiated Emissions, Pre-Scan

Radiated Emission Limits Test Setup



Photograph 2. Radiated Emission, Test Setup

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 by virtue of having an integral antenna.

Test Engineer(s): Len Knight

Test Date(s): 09/25/09

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.205 Radiated Spurious Emissions

Test Requirement(s): **§15.205(a):** Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090–0.110----------	16.42–16.423	399.9–410	4.5–5.15
[1] 0.495–0.505----------	16.69475–16.69525	608–614	5.35–5.46
2.1735–2.1905----------	16.80425–16.80475	960–1240	7.25–7.75
4.125–4.128----------	25.5–25.67	1300–1427	8.025–8.5
4.17725–4.17775----------	37.5–38.25	1435–1626.5	9.0–9.2
4.20725–4.20775----------	73–74.6	1645.5–1646.5	9.3–9.5
6.215–6.218----------	74.8–75.2	1660–1710	10.6–12.7
6.26775–6.26825----------	108–121.94	1718.8–1722.2	13.25–13.4
6.31175–6.31225----------	123–138	2200–2300	14.47–14.5
8.291–8.294----------	149.9–150.05	2310–2390	15.35–16.2
8.362–8.366----------	156.52475–156.52525	2483.5–2500	17.7–21.4
8.37625–8.38675----------	156.7–156.9	2655–2900	22.01–23.12
8.41425–8.41475----------	162.0125–167.17	3260–3267	23.6–24.0
12.29–12.293----------	167.72–173.2	3332–3339	31.2–31.8
12.51975–12.52025----------	240–285	3345.8–3358 36.	43–36.5
12.57675–12.57725----------	322–335.4	3600–4400	([2])

Table 8. Restricted Bands of Operation

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

Test Procedures: The EUT was placed on a non-conducting table in a semi-anechoic chamber. The transmitter was turned on and the EUT was rotated orthogonally through all three axes while the height of an antenna 1m away was adjusted to maximize the field strength of the emissions. Emissions in restricted bands of operation were observed and measured up to the frequency of the tenth harmonic of the fundamental. Data in Table 9 has been corrected for antenna factor, cable loss, preamp gain, and distance.

Test Results: The EUT was compliant with the Radiated Spurious Emission limits of **§ 15.209**.

Test Engineer(s): Benjamin Taylor

Test Date(s): 06/20/13

Frequency (MHz)	Uncorrected EMI Meter Reading (dBµV)	Antenna Correction Factor (dB/m) (+)	Cable Loss (dB) (+)	Pre-Amp (dB) (-)	Distance Correction Factor (dB) (-)	Duty Cycle Correction Factor (dB) (-)	Detector	Corrected Amplitude (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pass/Fail
1300.6	64.96	25.3	N/A	29.8	9.54	N/A	Average	50.92	54	3.08	Pass
3905.8	52.53	33.19	N/A	27.94	9.54	N/A	Average	48.24	54	5.76	Pass
4338.7	53.77	32.64	N/A	27.55	9.54	N/A	Average	49.32	54	4.68	Pass

Table 9. Radiated Spurious Emissions, Test Results

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.231 (a) Periodic Operation Requirements

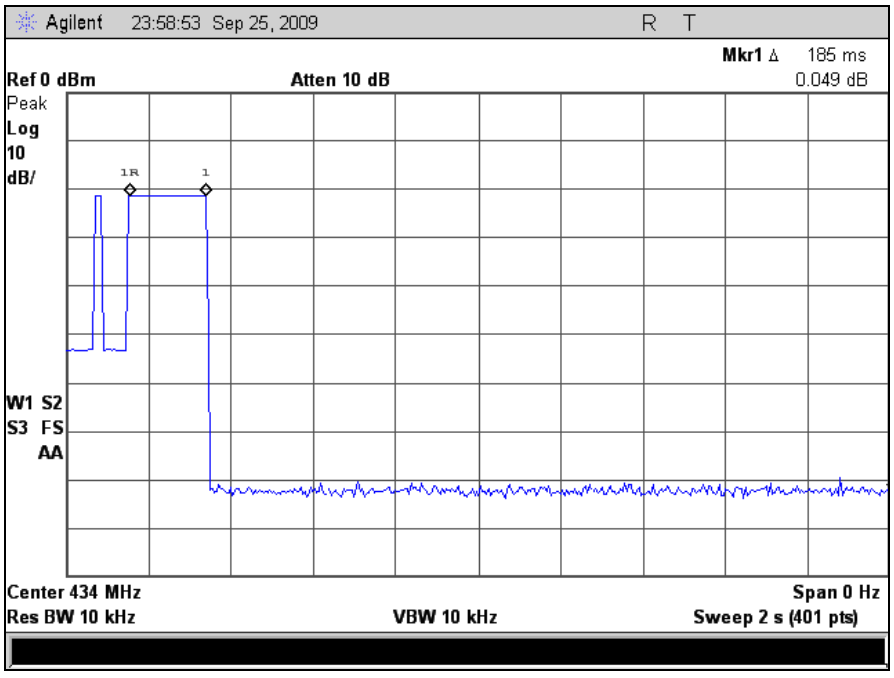
Test Requirement(s): **§ 15.231 (a):** (a) The provisions of this section are restricted to periodic operation within the band 40.66–40.70 MHz and above 70 MHz. Except as shown in paragraph (e) of this section, the intentional radiator is restricted to the transmission of a control signal such as those used with alarm systems, door openers, remote switches, etc. Continuous trans-missions, voice, video and the radio control of toys are not permitted. Data is permitted to be sent with a control signal. The following conditions shall be met to comply with the provisions for this periodic operation: (1) A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released. (2) A transmitter activated automatically shall cease transmission within 5 seconds after activation.

Test Procedure: The EUT employs a manual switch. The spectrum analyzer single sweep was triggered while a command on the EUT was activated.

Test Results: The spectrum analyzer plot below shows that the transmitter was deactivated well before 5 seconds.

Test Engineer(s): Len Knight

Test Date(s): 09/25/09



Plot 2. Deactivation Time, Test Results

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.231(b) Field Strength of Fundamental and Harmonics

Test Requirements: **§15.231(b):** In addition to the provisions of §15.205, the field strength of emissions from intentional radiators operated under this section shall not exceed the following:

Fundamental frequency (MHz)	Field strength of fundamental (microvolts/ meter)	Field strength of spurious emissions (microvolts/meter)
40.66– 40.70	2,250	225
70–130	1,250	125
130–174	1,250* to 3,750	125* to 375
174–260	3,750	375
260–470	3,750* to 12,500	375* to 1,250
Above 470	12,500	1,250
Note: * Linear Interpolations		

(1) The above field strength limits are specified at a distance of 3 meters. The tighter limits apply at the band edges. (2) Intentional radiators operating under the provisions of this section shall demonstrate compliance with the limits on the field strength of emissions, as shown in the above table, based on the average value of the measured emissions. As an alternative, compliance with the limits in the above table may be based on the use of measurement instrumentation with a CISPR quasi-peak detector. The specific method of measurement employed shall be specified in the application for equipment authorization. If average emission measurements are employed, the provisions in §15.35 for averaging pulsed emissions and for limiting peak emissions apply. Further, compliance with the provisions of §15.205 shall be demonstrated using the measurement instrumentation specified in that section. (3) The limits on the field strength of the spurious emissions in the above table are based on the fundamental frequency of the intentional radiator. Spurious emissions shall be attenuated to the average (or, alternatively, CISPR quasi-peak) limits shown in this table or to the general limits shown in §15.209, whichever limit permits a higher field strength.

Test Procedure: The EUT was placed in a 3m semi anechoic chamber. A log periodic antenna was placed 3m from the EUT and used to measure the field strength of the fundamental. The EUT was rotated about all three orthogonal axis. The peak field strength was measured and then the average was calculated from the peak value by correcting for duty cycle as follows. See plots 3 and 4.

For harmonics measurements above 1 GHz, a horn antenna was used 1m from the EUT. A preamp was used to measure the harmonics. Fresh batteries were used at the time of testing.

Test Results: Equipment complies with § 15.231 (b).

Test Engineer: Len Knight

Test Date: 09/25/09

Electromagnetic Compatibility Criteria for Intentional Radiators

Frequency (MHz)	Uncorrected EMI Meter Reading (dBuV)	Antenna Correction Factor (dB/m) (+)	Cable Loss (dB) (+)	Pre-Amp (dB) (-)	Distance Correction Factor (dB) (-)	Duty Cycle Correction Factor (dB) (-)	Detector	Corrected Amplitude (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Pass/Fail
433.968	72.45	16.3	3.11	N/A	0	14.77	Peak	77.09	80.82	-3.73	Pass
867.956	31.74	22.18	4.74	N/A	0	N/A	Quasi-Peak	58.66	60.83	-2.17	Pass
1300.6	64.96	25.3	N/A	29.8	9.54	N/A	Average	50.92	60.83	-9.91	Pass
1737.5	62.38	26.86	N/A	27.45	9.54	N/A	Average	52.25	60.83	-8.58	Pass
2170.3	62.83	28.23	N/A	27.35	9.54	N/A	Average	54.17	60.83	-6.66	Pass
2603.2	60.04	29.5	N/A	24.45	9.54	N/A	Average	55.55	60.83	-5.28	Pass
3036.1	45.93	30.75	N/A	26.61	9.54	N/A	Average	40.53	60.83	-20.3	Pass
3468.9	50.37	31.94	N/A	27.04	9.54	N/A	Average	45.73	60.83	-15.1	Pass
3905.8	52.53	33.19	N/A	27.94	9.54	N/A	Average	48.24	60.83	-12.59	Pass
4338.7	53.77	32.64	N/A	27.55	9.54	N/A	Average	49.32	60.83	-11.51	Pass
4775.6	37.23	33.43	N/A	27.15	9.54	N/A	Average	33.97	60.83	-26.86	Pass

Table 10. Field Strength of Fundamental and Harmonics, Test Results

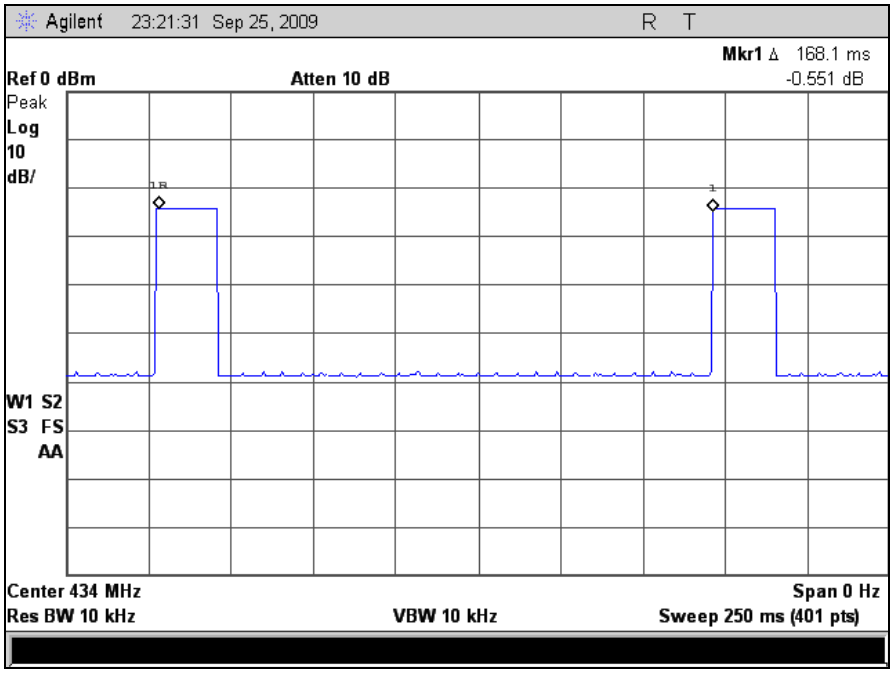
Duty Cycle Correction Factor

The modulation used is ASK.
Packets are transmitted every 160 mS.
Packet width measured is 18.25 mS
Duty Cycle = Actual RF Transmission Time On / 100 mS

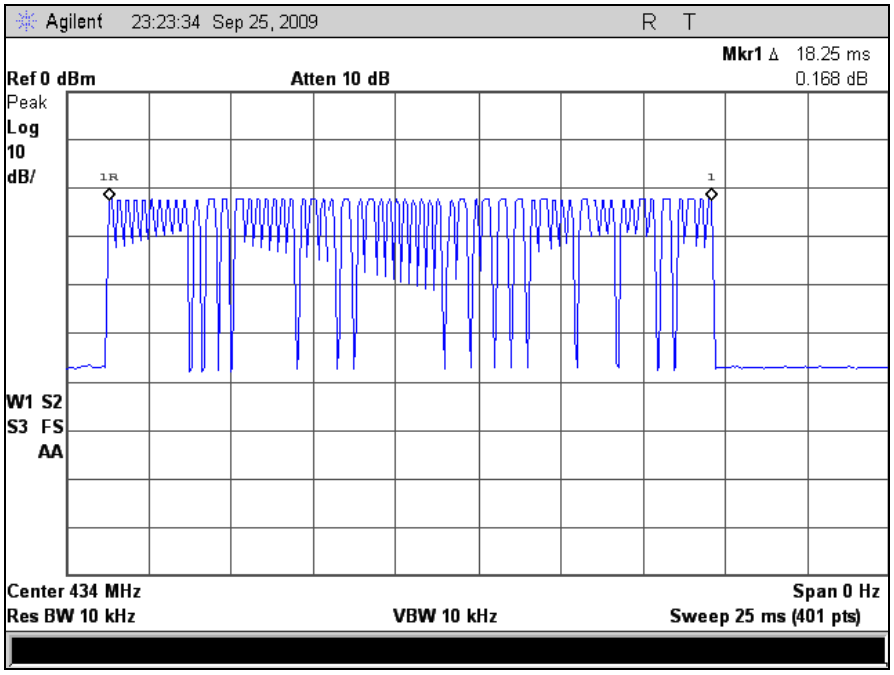
A conservative calculation for Duty Cycle Correction Factor would be:

20Log(18.25/100)

= 14.77 dB

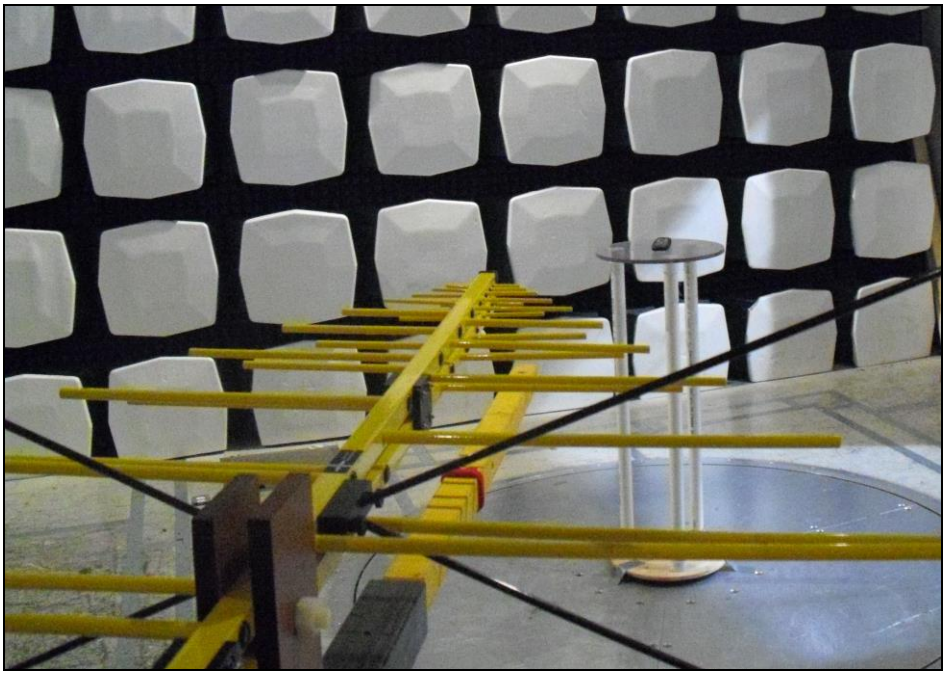


Plot 3. Duty Cycle

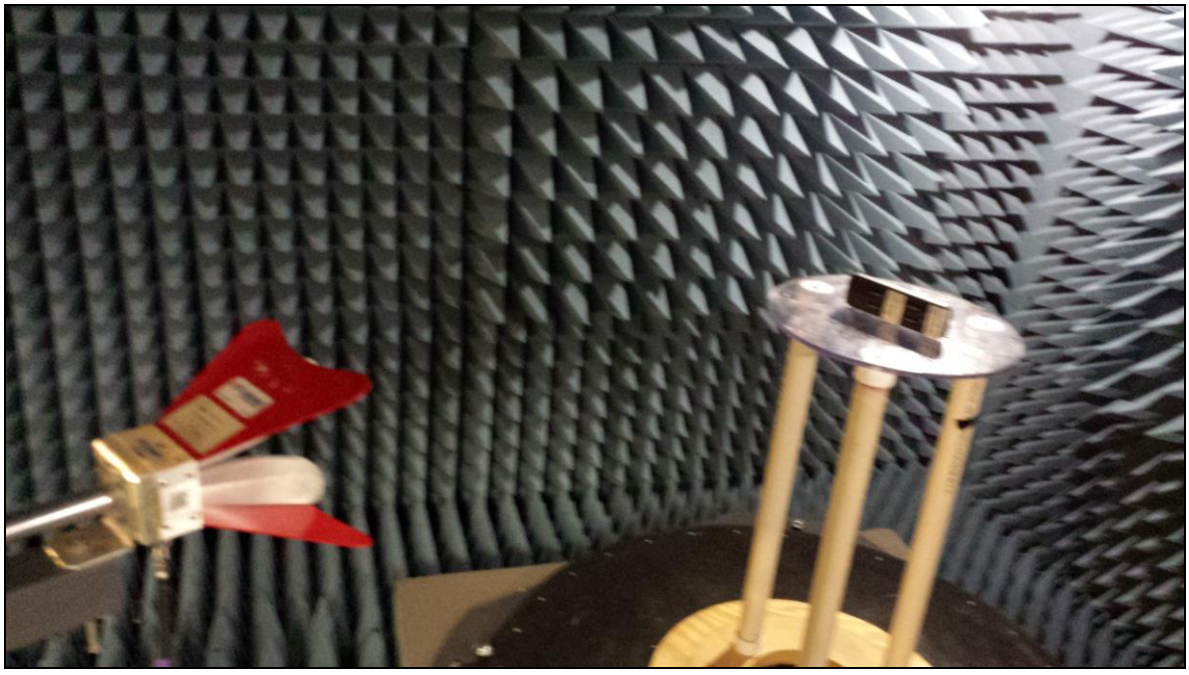


Plot 4. Packet Width

Electromagnetic Compatibility Criteria for Intentional Radiators



Photograph 3. Field Strength of Fundamental and Harmonics, Test Setup



Photograph 4. Field Strength of Fundamental and Harmonics, Test Setup, Above 1 GHz

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.231(c) 20dB Bandwidth

Test Requirements: **§15.231(c):** The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70MHz and below 900MHz. For devices operating above 900MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20dB down from the modulated carrier.

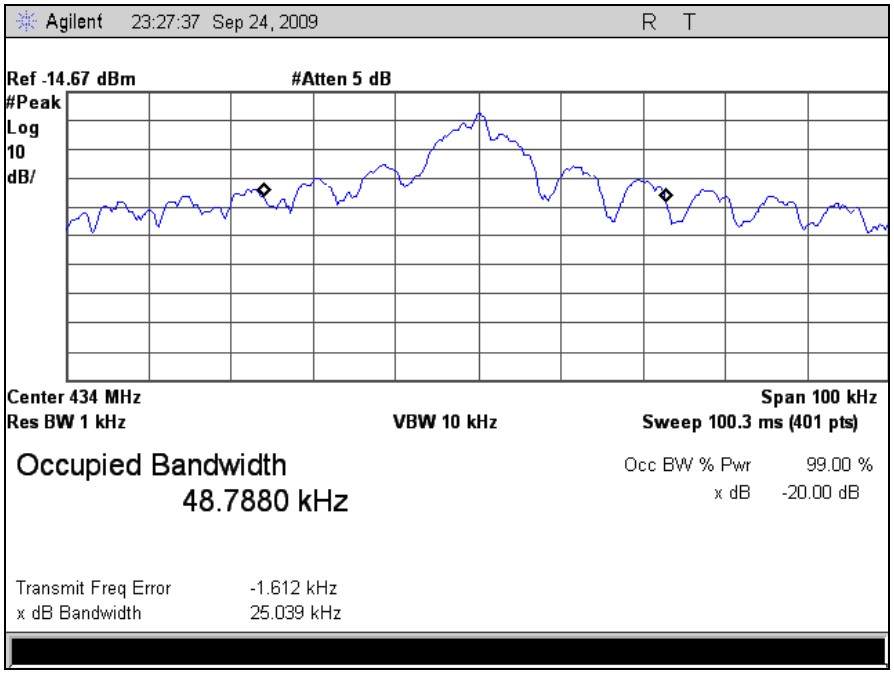
Test Results: Equipment complies with § 15.231 ©.

Carrier Frequency(Fc) (MHz)	Measured 20 dB Bandwidth (kHz)	Limit (MHz) (0.25% of Fc)
433.8	25.039	1.0848

Table 11. 20dB Bandwidth Test Results

Test Engineer: Len Knight

Test Date: 09/24/09



Plot 5. 20 dB Bandwidth Plot

Photograph 5. Bandwidth, Test Setup

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 #	Equipment	Manufacturer	Model#	Cal Date	Cal Due
1T4300	SEMI-ANECHOIC CHAMBER # 1 (NSA)	EMC TEST SYSTEMS	NONE	07/24/2012	01/24/2014
1T4751	ANTENNA - BILOG	SUNOL SCIENCES	JB6	1/8/2013	7/8/2014
1T4409	EMI RECEIVER	ROHDE & SCHWARZ	ESIB7	07/16/2012	07/16/2013
1T2342	LPA ANTENNA	EMCO	3146	08/07/2012	02/07/2014
1T2658	ANTENNA; BICON	EMCO	3109	04/03/2013	10/03/2014
1T4787	HYGROMETER / THERMOMETER / BAROMETER / DEW POINT PEN	CONTROL COMPANY	15-078-198, FB70423, 245CD	02/15/2012	02/15/2014
1T4612	SPECTRUM ANALYZER	AGILENT TECHNOLOGIES	E4407B	5/23/2012	11/23/2013
1T4576	ACTIVE HORN ANTENNA	COM-POWER	AHA-118	02/02/2012	08/02/2013
1T4442	PRE-AMPLIFIER	MICROWAVE	MITEQ	SEE NOTE	
1T4818	COMB GENERATOR	COM-POWER	CGO-520	SEE NOTE	

Table 12. 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.

End of Report

