



Project: **03RT10105**  
File: **MC1324**  
Report: **030364**  
Date: **December 01, 2003**  
(Revised February 15, 2005)  
Model(s): **W62 and W63**  
  
Part Number(s): **7801910, 7801920, 7854220,  
and 7854230**

## **Test Report**

**On**

# **Electromagnetic Compatibility Testing**

**Hunter Fan Company**

**Memphis, TN USA**

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## Test Report Details:

Tests Performed By:	<b>Underwriters Laboratories Inc. 12 Laboratory Drive Research Triangle Park, NC 27709</b>
Tests Performed For:	<b>Hunter Fan Company 2500 Frisco Avenue Memphis, TN 38114 USA</b>
Applicant Contact:	<b>Mr. Chris Williams Safety and Test Engineer (901) 248-2342 (901) 248-2382 - FAX</b>
Test Report Number:	<b>030364A</b>
Test Report Date:	<b>December 01, 2003</b> Revised 2-14-2005 to include new "Safe Exit" features
Product Type:	<b>Remote Control for Ceiling Fan/Lamp</b>
Model Number:	<b>W62 and W63</b>
Sample Serial Number:	<b>Unserialized, production sample</b>
Sample Tag Number:	<b>0535367-001</b>
EUT Category:	<b>Transmitter - Low Powered</b>
EUT Type:	<b>Hand Held</b>
Sample Receive Date:	<b>November 17, 2003</b>
Testing Start Date:	<b>November 24, 2003</b>
Date Testing Complete:	<b>November 24, 2003</b> (follow-up test performed February 2, 2005)

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## Summary of Testing:

Test #	Test Name Test Requirement/Specification	Comply	Does Not Comply	See Remark
1	Radiated Disturbance Emissions - 30 MHz to 1000 MHz 47 CFR Part 15, Subpart C / 47 CFR Part 15, Subpart C, Section 15.209 and 15.231 Canada RSS-210, Issue 5, Amendment / Canada RSS-210, Issue 5, Amendment Section 6.1.1(e)	X	-	
2	Radiated Disturbance Emissions - Above 1 GHz 47 CFR Part 15, Subpart C / 47 CFR Part 15, Subpart C, Section 15.209 and 15.231 Canada RSS-210, Issue 5, Amendment / Canada RSS-210, Issue 5, Amendment Section 6.1.1(e)	X	-	
3	Radiated Disturbance Emissions - Peak-to-Average Ratio 47 CFR Part 15, Subpart C / 47 CFR Part 15, Subpart C, Section 15.231 Canada RSS-210, Issue 5, Amendment / Canada RSS-210, Issue 5, Amendment Section 6.1.1(e)	X	-	
4	Radiated Disturbance Emissions - Occupied Bandwidth 47 CFR Part 15, Subpart C / 47 CFR Part 15, Subpart C, Section 15.231 Canada RSS-210, Issue 5, Amendment / Canada RSS-210, Issue 5, Amendment Section 6.1.1(e)	X	-	
5	Radiated Disturbance Emissions – Transmission Duration 47 CFR Part 15, Subpart C / 47 CFR Part 15, Subpart C, Section 15.231 Canada RSS-210, Issue 5, Amendment / Canada RSS-210, Issue 5, Amendment Section 6.1.1(e)	X	-	
6	Radiated Disturbance Emissions - Restricted Bands 47 CFR Part 15, Subpart C / 47 CFR Part 15, Subpart C, Section 15.205 Canada RSS-210, Issue 5, Amendment / Canada RSS-210, Issue 5, Amendment Section 6.2.2(t1)	X	-	

## Remarks:

- 1) Canada: Test performed on Industry Canada Registered Site IC-2953. Canada Emissions designator L1D14K4.
- 2) Device is exempt from routine RF exposure testing per FCC Part 2.1091.
- 3) Device contains an integrated antenna. It is not detachable or replaceable by the user.
- 4) Device contains a "Safe Exit" mode that performs a manually activated transmission and begins a countdown to an automatically activated transmission.
  - a) The initial manually activated transmission lasts for 5.00 seconds after release of button. This dims the lamp to 50%. This is equal to the maximum 5 seconds permitted by FCC Part 15.231(a)(1) and RSS-210 Section 6.1.1.
  - b) The automatically activated transmission begins 10 seconds after the manual transmission ends. This transmission is 4.9 seconds in duration and gradually dims the lamp to off. This is less than the 5 second maximum duration permitted for automatic devices in FCC Part 15.231(a)(2) and RSS-210 Section 6.1.1.
- 5) Other buttons cease transmission less than 1 second after button release. This satisfies the 5 second maximum permitted by FCC Part 15.231(a)(1) and RSS-210 Section 6.1.1.

## Conclusion:

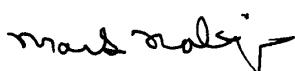
The tests listed in the Summary of Testing section of this report have been performed and the results recorded by Underwriters Laboratories Inc. in accordance with the procedures stated in each test requirement and specification. The test list was determined by the Applicant as being applicable to the Equipment Under Test. As a result, the subject product has been verified to comply or not comply as noted in the Summary of Testing with each test specification. The test results relate only to the items tested.

Prepared By:



Jim Marley  
NARTE Certified EMC Engineer  
EMC-002278-NE  
(919) 549-1408

Reviewed By:



Mark Nolting  
NARTE Certified EMC Test Lab Engineer  
ATL-0340-E  
(919) 549-1584

## **Test Facilities:**

### **Test Location A) 10-Meter Anechoic Chamber (Industry Canada - IC 2953, NVLAP - 200246-0, VCCI - R-722)**

Constructed by Lindgren RF Enclosures, this room consists of a 17.9 by 12 by 8.3 m (inside clearance) shielded room lined with TDK absorber material. The walls, floor (conducting ground plane) and ceiling are constructed of double sided galvanized sheet steel supported by 19 mm thick particle board. The interior walls and ceiling are covered with 10 by 10 cm, 4.6 mm thick ferrite tiles and partially covered with polystyrene absorber cones. Removable floor tiles and cones covering the floor between the EUT and antenna are provided when RF immunity testing is performed.

Room is provided with a 4.0 m diameter embedded turntable and a 1.2 by 2.1 m and 2.4 by 2.4 m double knife edge doors for access. Also, the room is fed electrical EUT power via permanently installed filters and is provided with a permanently mounted video surveillance camera. A remotely controllable antenna mast is located in the room for positioning the measuring antenna from 1 to 4 m above the ground plane.

### **Test Location B) Compact Anechoic Chamber**

Constructed by Lindgren RF Enclosures, this room consists of a 6 by 3 by 2.9 m (inside clearance) shielded room lined with TDK absorber material. The walls, floor, and ceiling are constructed of double sided galvanized sheet steel supported by 19 mm thick particle board. The interior walls and ceiling are covered with 10 by 10 cm, 4.6 mm thick ferrite tiles and partially covered with polystyrene absorber cones. Removable floor tiles and cones cover the floor between the EUT and antenna.

Room is provided with a 1.2 by 2.1 m double knife edge door for access. Also, the room is fed electrical EUT power via permanently installed filters and is provided with a video camera.

### **Test Location C) RF Shielded Room (VCCI - C-744, NVLAP - 200246-0)**

Constructed by Lindgren RF Enclosures, this room consists of a 7.3 by 4.3 by 2.7 m (inside clearance) shielded room. The walls, floor (conducting ground plane) and ceiling are constructed of double sided galvanized sheet steel supported by 19 mm thick particle board. Room is provided with a 1.2 by 2.1m double knife edge door for access. Also, the room is fed electrical EUT power via permanently installed filters and is provided with a portable video surveillance camera.

### **Test Location D) Ground Reference Plane # 1 (VCCI - C-742, NVLAP - 200246-0)**

Horizontal floor ground reference plane constructed of double sided galvanized sheet steel supported by 19 mm particle board and measures 3.6 by 3.0 m. It is located and bonded next to one vertical wall of the Control Room and is, therefore, provided with a 3.0 by 3.6 m vertical ground reference plane constructed of the same material. Power filters and LISNs, when required, are placed on top of and bonded to the horizontal floor ground reference plane.

### **Test Location E) Ground Reference Plane # 2 (VCCI - C-743, NVLAP - 200246-0)**

Horizontal floor ground reference plane constructed of double sided galvanized sheet steel supported by 19 mm particle board and measures 4.3 by 5.2 m. It is located and bonded next to one vertical wall of the RFD Shielded Room and is, therefore, provided with a 4.3 by 2.8 m vertical ground reference plane constructed of the same material. Power filters and LISNs, when required, are placed on top of and bonded to the horizontal floor ground reference plane.

### **Test Location F) Ground Reference Plane # 3**

Horizontal floor ground reference plane constructed of galvanized sheet steel measuring 3.0 by 3.6 m x 2.5mm thick.

### **Test Location G) Ground Reference Plane # 4 (Automotive)**

Horizontal floor ground reference plane constructed of double-sided galvanized sheet steel supported by 19 mm particle board and measures 3.6 by 3.0 m.

### **Test Location I) Harmonic Current Test Area - Located in front of Standard Source Impedance Power Supply.**

### **Test Location J) Magnetic Field Ground Reference Plane**

Horizontal floor ground reference plane constructed of 1.5 mm thick aluminum measuring 3.6 by 2.4 m.

### **Test Location P) Ground Reference Plane # 5**

Horizontal floor ground reference plane constructed of double-sided galvanized sheet steel supported by 19 mm particle board and measures 3.6 by 3.0 m.

### **Test Location R) Ground Reference Plane # 6**

Ground reference plane constructed of galvanized sheet steel measuring 3.0 m x 3.6 m x 2.5 mm thick. CDNs, when required, are placed on top of and bonded to the horizontal floor ground reference plane.

### **Test Location Q) CISPR 12 Outdoor Site**

30 meter diameter non-reflective area located behind the UL-RTP EMC Lab. Test area is used for CISPR 12 testing.

### **Test Location X) Other - As described in the Comments Section of Test Results.**

## EUT Information:

### Equipment Used During Test:

Use*	Product Type	Manufacturer	Model	Comments
EUT	Transmitter	Hunter Fan Co.	W63	Model Tested.
EUT	Transmitter	Hunter Fan Co.	W62	Model Electrically identical to W63. Model W62 or W63 is selected by jumper at time of manufacturer. Operates 1 lamp only.

\* Use = EUT - Equipment Under Test, ACC - Accessory (Not Subjected to Test), or SIM - Simulator (Not Subjected to Test)

### Part Numbers:

These devices may be sold under the following product part numbers:

W62: 1-light OEM Transmitter - 7801910

W62: 1-light Spare Part Transmitter - 7854220

W63: 2-light OEM Transmitter - 7801920

W63: 2-light Spare Part Transmitter - 7854230

### Input/Output Ports:

Port #	Name	Type*	Cable Max. >3m	Cable Shielded	Comments
0	Enclosure	N/E	No	No	

\* AC = AC Power Port      DC = DC Power Port      N/E = Non-Electrical  
I/O = Signal Input or Output Port (Not Involved in Process Control)  
PMC = Process Measurement and Control Port

#### EUT Internal Operating Frequencies:

Frequency (MHz)*	Description
303.5	Transmit Frequency

#### Power Interface:

Mode #	Voltage (V)	Current (A)	Power (W)	Frequency (DC/AC-Hz)	Phases (#)	Comments
Rated	12	-	-	DC	X	
1	12	-	-	DC	X	A fresh A23 battery was installed prior to testing.

#### EUT Operation Modes:

Mode #	Description
1	A button was continuously depressed by a rubber band.

#### EUT Configuration Modes:

Mode #	Description
1	Device was placed onto a 1.5m x 1.0m x 80cm high wooden table. Device was positioned flat on the table (see diagram below). Non-conductive polystyrene foam is used to position the device.
2	Device was placed onto a 1.5m x 1.0m x 80cm high wooden table. Device was positioned on left side. Non-conductive polystyrene foam is used to position the device.
3	Device was placed onto a 1.5m x 1.0m x 80cm high wooden table. Device was positioned pointing straight up. Non-conductive polystyrene foam is used to position the device.



Flat Orientation



Side Orientation



End Orientation

## Test 1: Radiated Disturbance Emissions - 30 MHz to 1000 MHz

**Test Requirement:** 47 CFR Part 15, Subpart C  
Canada RSS 210, Issue 5, Amendment

**Test Specification:** 47 CFR Part 15, Subpart C, Section 15.209 and 15.231  
Canada RSS 210, Issue 5, Amendment, Section 6.1.1(e) and 6.2.2(t1)

### Test Procedure:

The test was performed in accordance with the Test Requirement and Specification and configured as noted in the Test Setup. The EUT was placed inside the anechoic chamber with a fresh battery installed. A peak measurement was first made by scanning the entire test frequency range and maximizing the EUT emissions by rotating the EUT and raising the antenna height from 1 to 4 meters above the ground reference plane. Then, a measurement was taken for all peak emissions to verify each were below the Test Limits.

Radiated Disturbance Limits for Manually Operated Transmitters  
FCC Part 15 Section 15.231 and RSS-210 Section 6.1.1(e)  
at a measurement distance of 3 meters

Frequency Range (MHz)	Field Strength of Fundamental (μV/m)	Field Strength of Fundamental (dBμV/m)	Field Strength of Fundamental (MHz)	Field Strength of Fundamental (μV/m)
40.66 to 40.70	2250	67.04	225	47.04
70 to 130	1250	61.94	125	41.94
130 to 174	1250 to 3750	61.94 to 71.48	125 to 375	41.94 to 51.48
174 to 260	3750	71.48	375	51.48
260 to 470	3750 to 12,500	71.48 to 81.93	375 to 1250	51.48 to 61.93
above 470	12,500	81.93	1250	61.93

### Test Clarifications (Specific Limits for this transmit frequency):

At fundamental frequency, 303.5 MHz, Average field strength limit = 5562 μV/m (74.9 dBμV/m).

Harmonic field strength limit = 556.2 μV/m (54.9 dBμV/m).

Per 15.35(b) peak limit is 20 dB above average limit for each frequency.

Average is calculated by applied peak-to-average ratio from Test 3 of 10.2 dB to each peak measurement.

### Test Deviations:

None

**Test Setup:** Only the following ports were tested. See EUT Information for details.

Test Item	Port #	Port Name	EUT Operation Mode	EUT Configuration	Power Interface
A	0	Enclosure	1	1 (Flat Orientation)	1
B	0	Enclosure	1	2 (Side Orientation)	1
C	0	Enclosure	1	3 (End Orientation)	1

**Test 1 - Results:** Radiated Disturbance Emissions - 30 MHz to 1000 MHz

**Test Results Summary:**

Test Item	Test Location	Humidity (%)	Temperature (°C)	Pressure (kPa)	Pass/Fail (P/F)	Date Completed	Comment #
A	A	41	23.5	100.6	P	11/21/03	
B	A	41	23.5	100.6	P	11/21/03	1
C	A	41	23.5	100.6	P	11/21/03	1

The EUT was considered to **Pass** the Requirements.

**Comments:**

Comment #	Description
1	Only the flat orientation was tested below 200 MHz. No significant emissions were observed in this range.

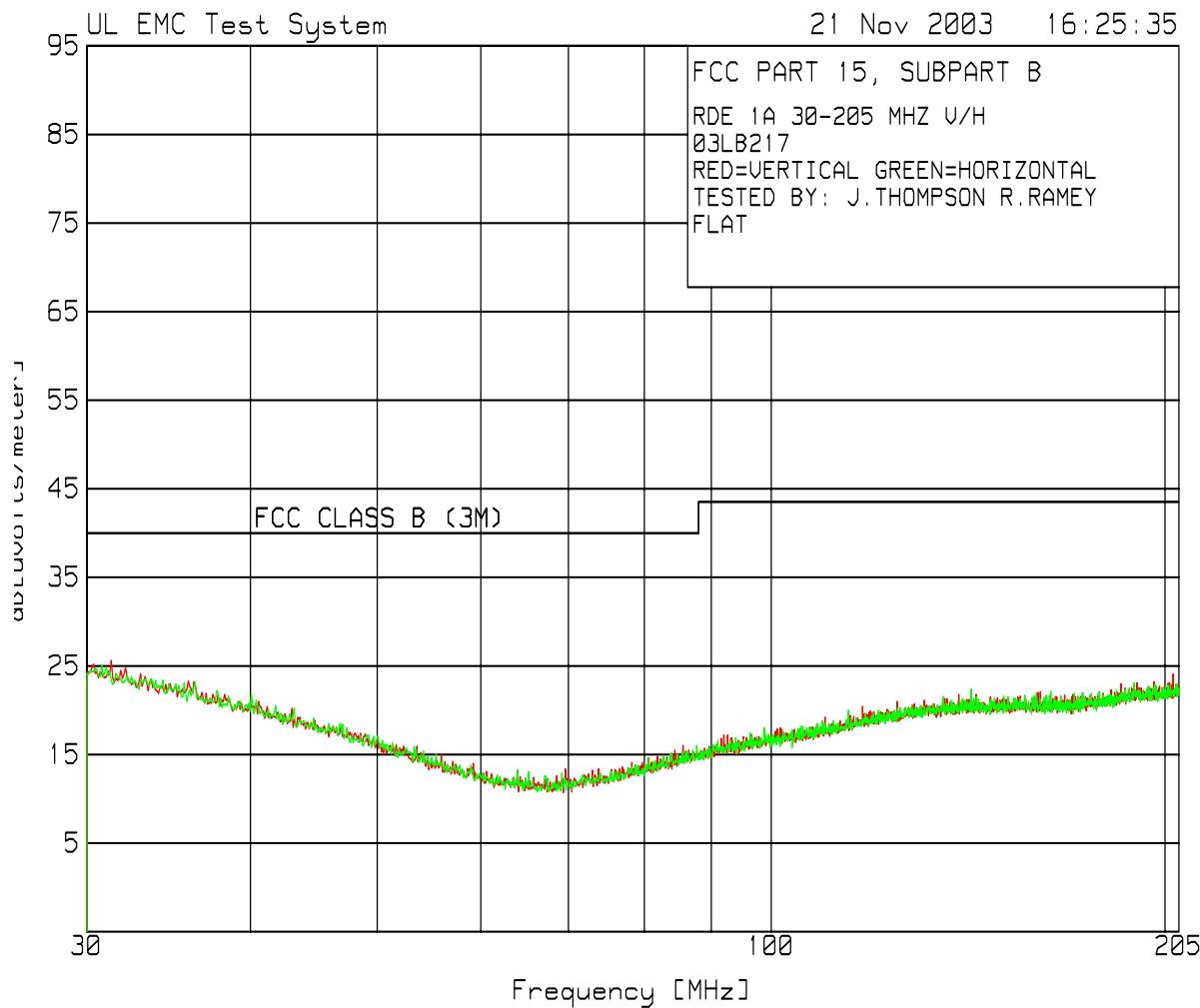
**Test 1 - Test Equipment Used:** Radiated Disturbance Emissions - 30 MHz to 1000 MHz

Equipment ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
AT0025	Biconical Antenna, 30 to 300 MHz	Schaffner, EMC	VBA6106A	4/8/03	4/30/04
AT0030	Log periodic Antenna, 200 MHz to 1000 MHz	Schaffner, EMC	3160-07	1/13/03	1/31/04
ATA084	Attenuator 6 dB, 2 GHz	Pasternack	PE7002-6	3/19/03	3/31/04
ATA085	Attenuator 6 dB, 2 GHz	Pasternack	PE7002-6	3/19/03	3/31/04
ATA096	50 ft, N male - N male	Micro-Coax	Coaxial Cable	9/30/03	3/31/04
ATA108	10 m, N male - N male	UL	RG214	3/19/03	3/31/04
ATA110	RF Amplifier, 1 to 1000 MHz	Miteq	AM-3A-000110-N	3/19/03	3/31/04
ATA124	RF Amplifier, 1 to 1000 MHz	Miteq	AM-3A-000110-N	3/20/03	3/31/04
ATA140	RG214 Ferrite Cable	EMC Eupen	N/A	3/19/03	3/31/04
ATA143	6ft., N-male to N-male	Micro-Coax	Coaxial Cable	3/19/03	3/31/04
HI0034	Environmental Indicator	Cole-Palmer	99760-00	10/17/03	10/31/04
MG1131	Tape Measure, 15 m / 50 ft.	Lufkin	EL15CME	4/9/03	4/30/06
SAR002	Spectrum Analyzer / Receiver	Hewlett-Packard	8566B	12/2/03	12/31/04

The above equipment has been calibrated and is within the manufacturer's published limit of error. Calibration is traceable to the National Institute of Standards & Technology(NIST) and conforms to ANSI/NCSL Z540-1-1994.

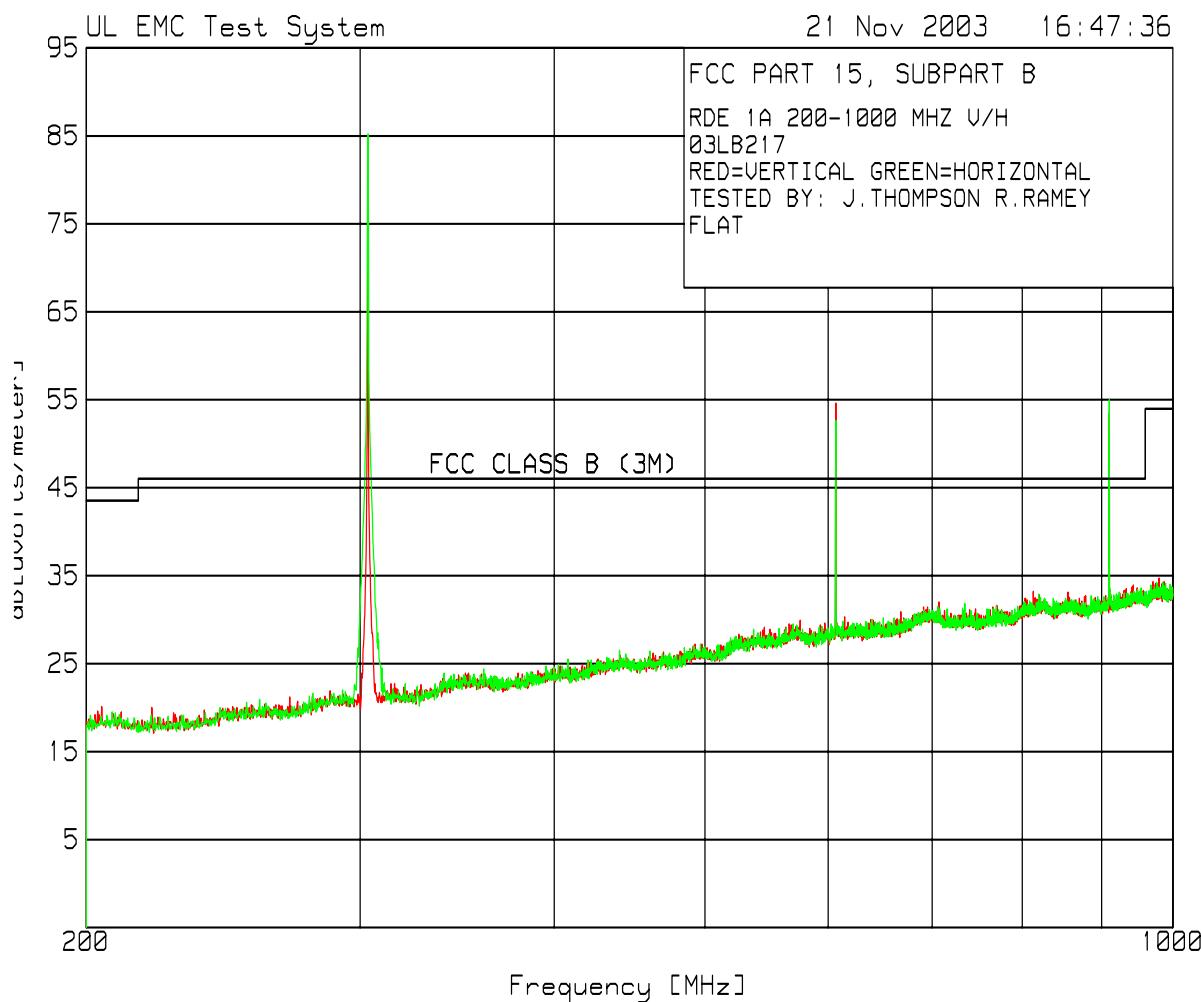
**Test 1, Item A - Peak Plot (Amplitude in dBuV/m):**

Radiated Disturbance Emissions - 30 MHz to 1000 MHz



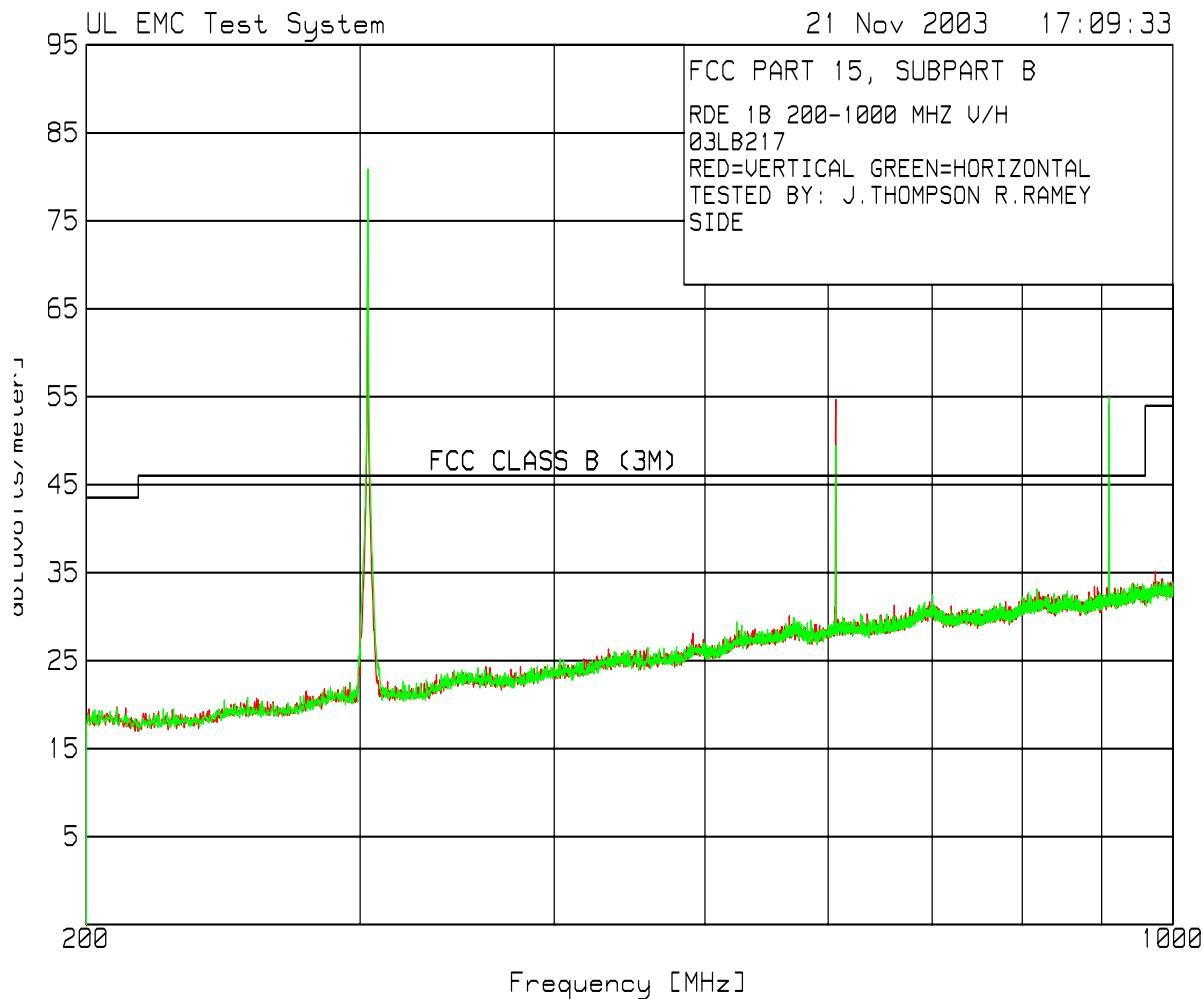
**Test 1, Item A (Flat Orientation) - Peak Plot (Amplitude in dBuV/m):**

Radiated Disturbance Emissions - 30 MHz to 1000 MHz



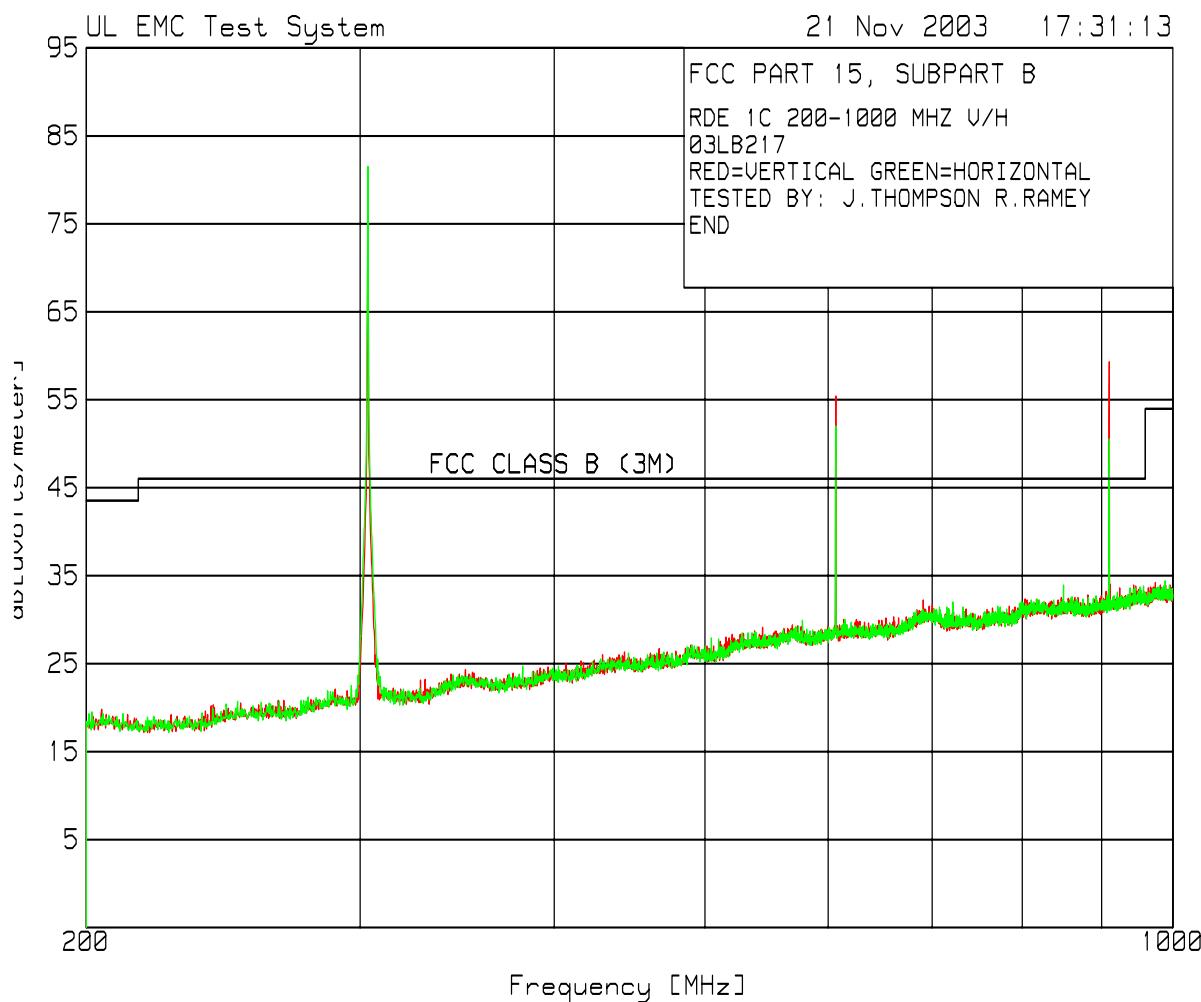
**Test 1, Item B (Side Orientation) - Peak Plot (Amplitude in dBuV/m):**

Radiated Disturbance Emissions - 30 MHz to 1000 MHz



**Test 1, Item C (End Orientation) - Peak Plot (Amplitude in dBuV/m):**

Radiated Disturbance Emissions - 30 MHz to 1000 MHz



**Test 1, All Items - Discrete Data:** Radiated Disturbance Emissions - 30 MHz to 1000 MHz

Test Item (A-Z)	Detector Type* (P/Q/A)	Antenna Polarity (H/V)	Antenna Distance (m)	Measured Frequency (MHz)	Measured Value (dB $\mu$ V)	Measured Value (dB $\mu$ V)	Equip Correction (dB/m)	Corrected Value (dB $\mu$ V/m)	Specified Limit** (dB $\mu$ V/m)	Spec Margin (dB)	See Comment (#)***
<b>Flat Orientation</b>											
A	P	H	3	303.500	98.6	-13.7	84.9	94.9	-10.0		
A	A	H	3	303.500	-	-	74.7	74.9	-0.2	2	
A	P	V	3	607.000	60.4	-5.8	54.6	74.9	-20.3		
A	A	V	3	607.000	-	-	44.4	54.9	-10.5		
A	P	H	3	910.500	57.5	-2.5	55.0	74.9	-19.9		
A	A	H	3	910.500	-	-	44.8	54.9	-10.1		
<b>Side Orientation</b>											
B	P	H	3	303.500	94.6	-13.7	80.9	94.9	-14.0		
B	A	H	3	303.500	-	-	70.7	74.9	-4.2		
B	P	V	3	607.000	60.5	-5.8	54.7	74.9	-20.2		
B	A	V	3	607.000	-	-	44.5	54.9	-10.4		
B	P	H	3	910.500	57.4	-2.5	54.9	74.9	-20.0		
B	A	H	3	910.500	-	-	44.7	54.9	-10.2		
<b>End Orientation</b>											
C	P	H	3	303.500	95.2	-13.7	81.5	94.9	-13.4		
C	A	H	3	303.500	-	-	71.3	74.9	-3.6		
C	P	V	3	607.000	61.2	-5.8	55.4	74.9	-19.5		
C	A	V	3	607.000	-	-	45.2	54.9	-9.7		
C	P	V	3	910.500	61/8	-2.5	59.3	74.9	-15.6		
C	A	V	3	910.500	-	-	49.1	54.9	-5.8	3	

\* P = Peak, Q = Quasi-Peak, A = Average.

\*\* The Specified Limit is for the type measurement indicated. When Peak data is indicated, the tightest limit applicable is indicated.

\*\*\* # = See Comment Number Under This Test's Comments Section.

Sample Calculation: Corrected Value = Measured Value + Equip Correction

Sample Calculation: Equip Correction = Antenna Factor (dB/m) + Cable Loss (dB) - Amplifier Gain (dB, if used)

**Comments:**

Comment #	Description
2	Highest Transmit Frequency was found in flat orientation. Measured field strength was 74.7 dB $\mu$ V/m (or 5432 uV/m in linear units).
3	Highest Spurious Emissions was found at 910.5 MHz in "side" orientation. Measured field strength was 49.1 dB $\mu$ V/m (or 285 uV/m in linear units).

**Test 1, All Items - Test Set-Up Photo:**

Radiated Disturbance Emissions - 30 MHz to 1000 MHz



## Test 2: Radiated Disturbance Emissions - Above 1 GHz

**Test Requirement:** 47 CFR Part 15, Subpart C  
Canada RSS 210, Issue 5, Amendment

**Test Specification:** 47 CFR Part 15, Subpart C, Section 15.209 and 15.231  
Canada RSS 210, Issue 5, Amendment, Section 6.1.1(e) and 6.2.2(t1)

### Test Procedure:

The test was performed in accordance with the Test Requirement and Specification and configured as noted in the Test Setup. The EUT was placed inside the anechoic chamber with a fresh battery installed. A peak measurement was first made by scanning the entire test frequency range and maximizing the EUT emissions by rotating the EUT and raising the antenna height from 1 to 4 meters above the ground reference plane. Then, a measurement was taken for all peak emissions to verify each were below the Test Limits.

Radiated Disturbance Limits for Manually Operated Transmitters  
FCC Part 15 Section 15.231 and RSS-210 Section 6.1.1(e)  
at a measurement distance of 3 meters

Frequency Range (MHz)	Field Strength of Fundamental ( $\mu$ V/m)			
40.66 to 40.70	2250	67.04	225	47.04
70 to 130	1250	61.94	125	41.94
130 to 174	1250 to 3750	61.94 to 71.48	125 to 375	41.94 to 51.48
174 to 260	3750	71.48	375	51.48
260 to 470	3750 to 12,500	71.48 to 81.93	375 to 1250	51.48 to 61.93
above 470	12,500	81.93	1250	61.93

### Test Clarifications (Specific Limits for this Transmit Frequency):

At fundamental frequency, 303.5 MHz, Average field strength limit = 5562  $\mu$ V/m (74.9 dB $\mu$ V/m).

Harmonic field strength limit = 556.2  $\mu$ V/m (54.9 dB $\mu$ V/m).

Per 15.35(b) peak limit is 20 dB above average limit for each frequency.

Average is calculated by applied peak-to-average ratio from Test 3 of 10.2 dB to each peak measurement.

### Test Deviations:

None

**Test Setup:** Only the following ports were tested. See EUT Information for details.

Test Item	Port #	Port Name	EUT Operation Mode	EUT Configuration	Power Interface
A	0	Enclosure	1	1 (Flat Orientation)	1
B	0	Enclosure	1	2 (Side Orientation)	1
C	0	Enclosure	1	3 (End Orientation)	1

**Test 2 - Results:** Radiated Disturbance Emissions - Above 1 GHz

**Test Results Summary:**

Test Item	Test Location	Humidity (%)	Temperature (°C)	Pressure (kPa)	Pass/Fail (P/F)	Date Completed	Comment #
A	A	41	24	100.4	P	11/21/03	
B	A	41	24	100.4	P	11/21/03	
C	A	41	24	100.4	P	11/21/03	

The EUT was considered to **Pass** the Requirements.

**Comments:**

Comment #	Description
1	See Test 1 for Setup Photo.

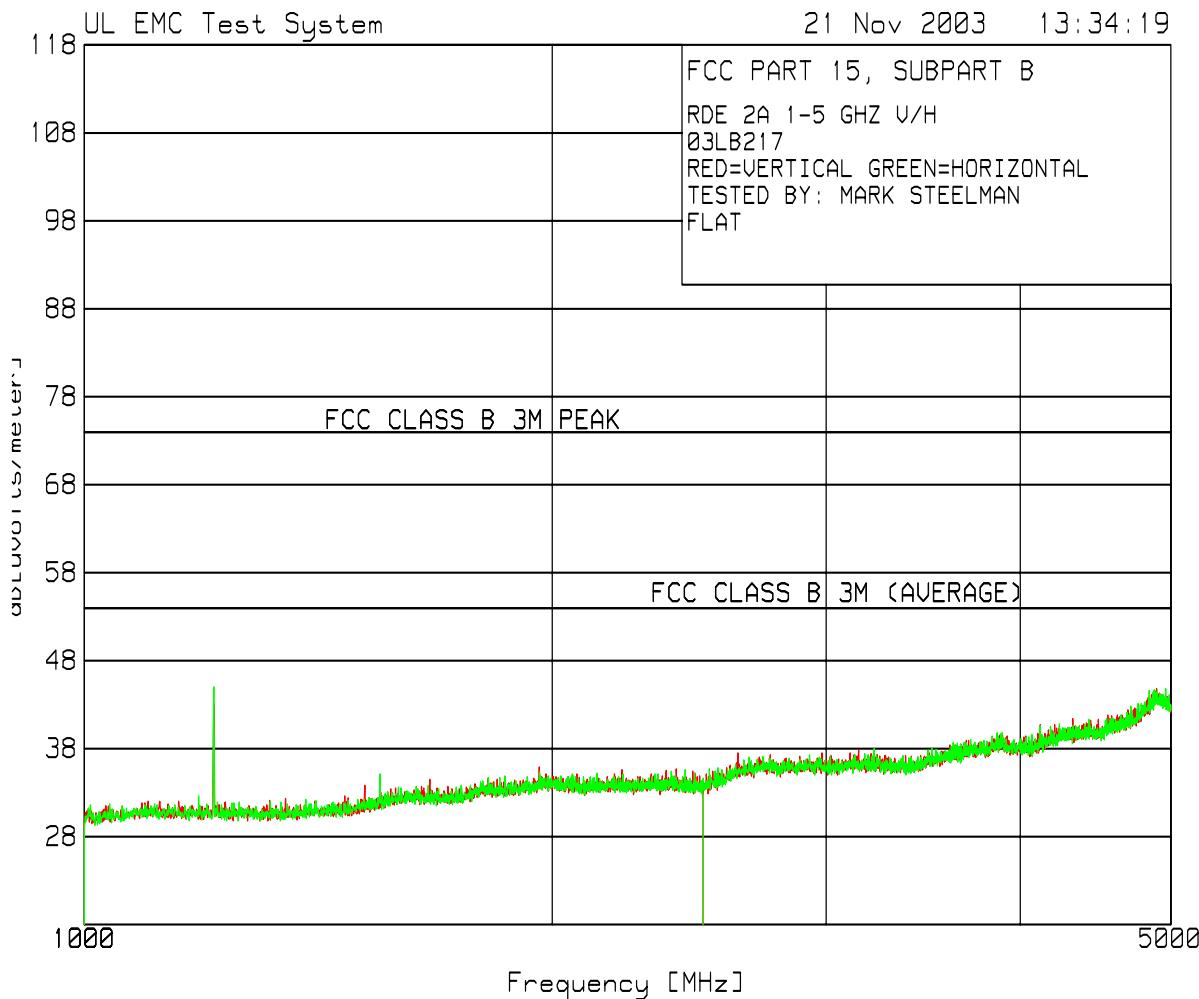
**Test Equipment Used:**

Equipment ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
AT0026	Horn Antenna, 1 to 18 GHz	EMC Test Systems	3115	5/8/03	5/31/04
ATA096	50 ft, N male - N male	Micro-Coax	Coaxial Cable	9/30/03	3/31/04
ATA143	6ft., N-male to N-male	Micro-Coax	Coaxial Cable	3/19/03	3/31/04
ATA144	Amplifier, 0.1 to 18 GHz	Miteq	AFS42-00101800-2	3/20/03	3/31/04
ATA152	27 ft. N male - N male low loss cable	Micro-Coax	UFB293C-0-3149-50504	8/21/03	2/29/04
HI0034	Environmental Indicator	Cole-Palmer	99760-00	10/17/03	10/31/04
SAR002	Spectrum Analyzer / Receiver	Hewlett-Packard	8566B	12/2/03	12/31/04

The above equipment has been calibrated and is within the manufacturer's published limit of error. Calibration is traceable to the National Institute of Standards & Technology(NIST) and conforms to ANSI/NCSL Z540-1-1994.

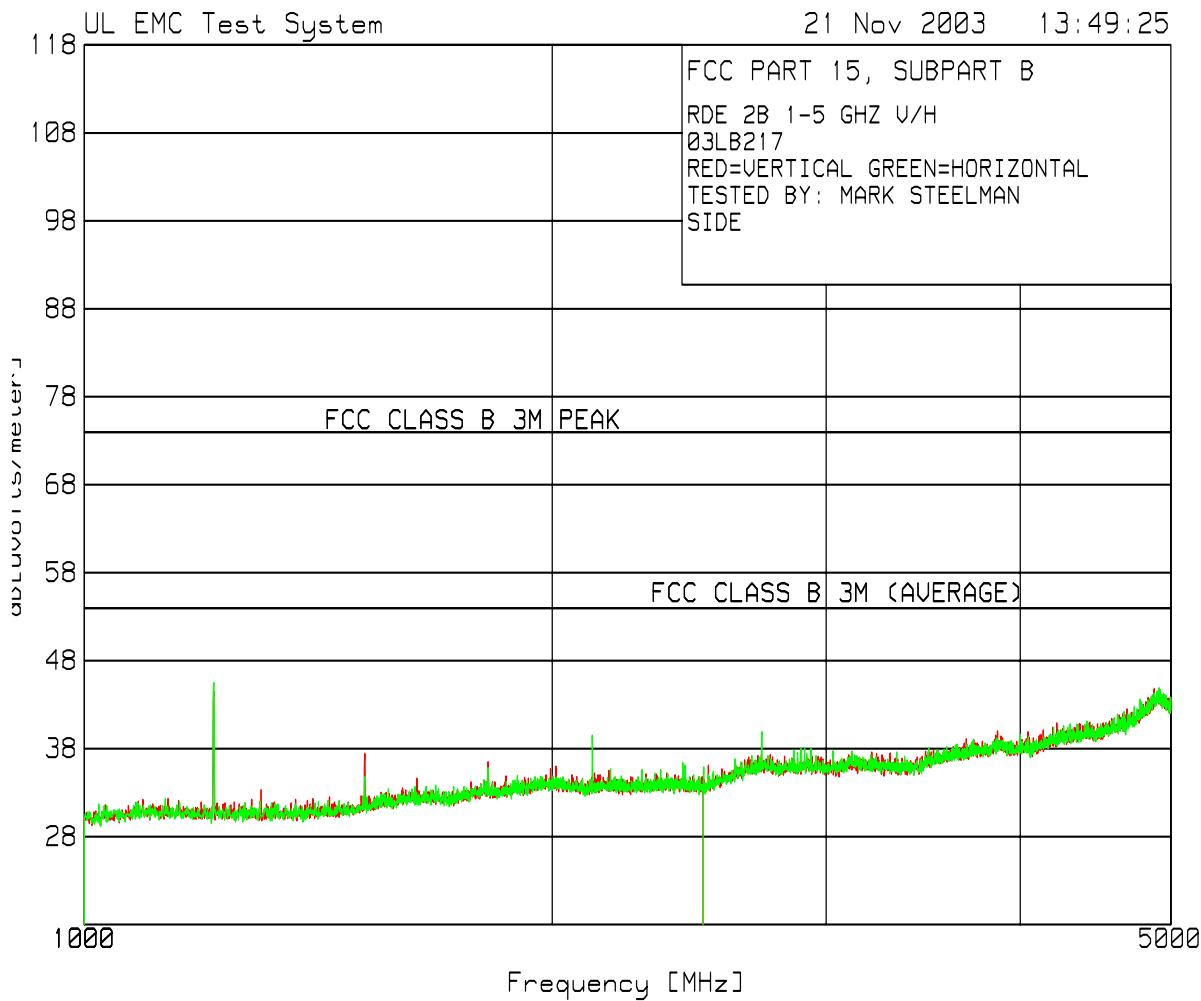
**Test 2, Item A (Flat Orientation) - Peak Plot (Amplitude in dBuV/m):**

Radiated Disturbance Emissions - Above 1 GHz



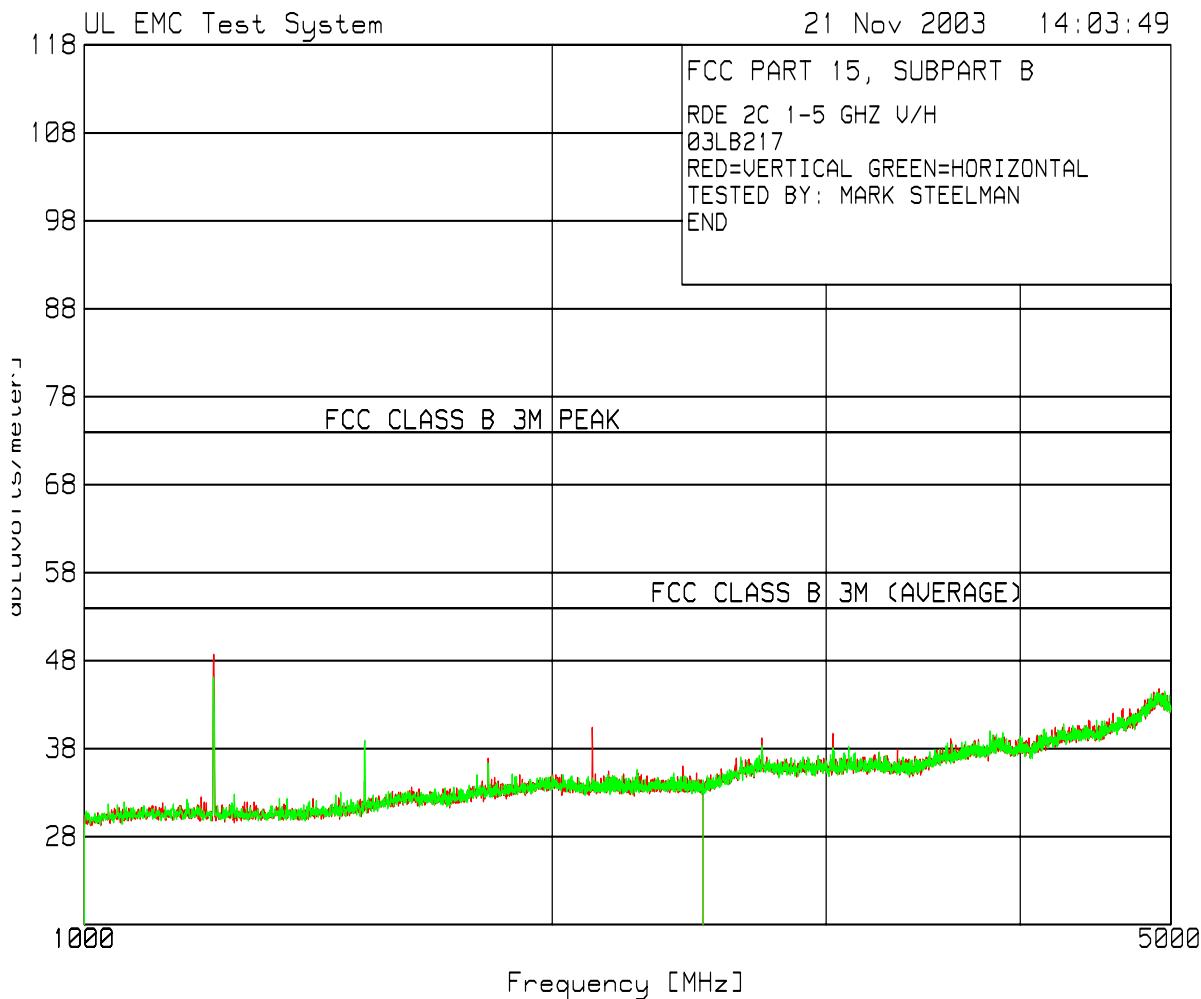
**Test 2, Item B (Side Orientation) - Peak Plot (Amplitude in dBuV/m):**

Radiated Disturbance Emissions - Above 1 GHz



**Test 2, Item C (End Orientation) - Peak Plot (Amplitude in dBuV/m):**

Radiated Disturbance Emissions - Above 1 GHz



**Test 2, All Items - Frequency Table:** Radiated Disturbance Emissions - Above 1 GHz

Test Item (A-Z)	Detector Type* (P/Q/A)	Antenna Polarity (H/V)	Antenna Distance (m)	Measured Frequency (MHz)	Measured Value (dB $\mu$ V)	Equip Correction (dB/m)	Corrected Value (dB $\mu$ V/m)	Specified Limit** (dB $\mu$ V/m)	Spec Margin (dB)	See Comment (#)***
<b>Flat Orientation</b>										
A	P	H	3	1214.000	52.7	-7.7	45.0	74.0	-29.0	Restr. Band
A	A	H	3	1214.000	-	-	34.8	54.0	-19.2	Restr. Band
A	P	V	3	1517.500	40.8	-6.0	34.8	74.0	-39.2	Restr. Band
A	A	V	3	1517.500	-	-	24.6	54.0	-29.4	Restr. Band
A	P	H	3	1821.000	39.1	-4.4	34.7	74.9	-40.2	
A	A	H	3	1821.000	-	-	24.5	54.9	-30.4	
A	P	V	3	2124.500	38.3	-3.9	34.4	74.9	-40.5	
A	A	V	3	2124.500	-	-	24.2	54.9	-30.7	
A	P	V	3	2428.000	38.0	-3.2	34.8	74.9	-40.1	
A	A	V	3	2428.000	-	-	24.6	54.9	-30.3	
A	P	V	3	2731.500	39.6	-2.3	37.3	74.0	-36.7	Restr. Band
A	A	V	3	2731.500	-	-	27.1	54.0	-26.9	Restr. Band
A	P	V	3	3035.000	39.3	-1.9	37.4	74.9	-37.5	
A	A	V	3	3035.000	-	-	27.2	54.9	-27.7	
<b>Side Orientation</b>										
B	P	V	3	1214.000	53.2	-7.7	45.5	74.0	-28.5	Restr. Band
B	A	V	3	1214.000	-	-	35.3	54.0	-18.7	Restr. Band
B	P	V	3	1517.500	43.4	-6.0	37.4	74.0	-36.6	Restr. Band
B	A	V	3	1517.500	-	-	27.2	54.0	-26.8	Restr. Band
B	P	V	3	1821.000	40.9	-4.4	36.5	74.9	-38.4	
B	A	V	3	1821.000	-	-	26.3	54.9	-28.6	
B	P	H	3	2124.500	43.4	-3.9	39.5	74.9	-35.4	
B	A	H	3	2124.500	-	-	29.3	54.9	-25.6	
B	P	H	3	2428.000	39.6	-3.2	36.4	74.9	-38.5	
B	A	H	3	2428.000	-	-	26.2	54.9	-28.7	
B	P	H	3	2731.500	42.2	-2.3	39.9	74.0	-34.1	Restr. Band
B	A	H	3	2731.500	-	-	29.7	54.0	-24.3	Restr. Band
B	P	H	3	3035.000	39.6	-1.9	37.7	74.9	-37.2	
B	A	H	3	3035.000	-	-	27.5	54.9	-27.4	

\* P = Peak, Q = Quasi-Peak, A = Average.

\*\* The Specified Limit is for the type measurement indicated. When Peak data is indicated, the tightest limit applicable is indicated.

\*\*\* # = See Comment Number Under This Test's Comments Section.

Sample Calculation: Corrected Value = Measured Value + Equip Correction

Sample Calculation: Equip Correction = Antenna Factor (dB/m) + Cable Loss (dB) - Amplifier Gain (dB, if used)

**Comments:**

Comment #	Description
Restr. Band	Spurious Emission lies in Restricted Band, therefore General Limits applied.

**Test 2, All Items - Frequency Table (Cont): Radiated Disturbance Emissions - Above 1 GHz**

Test Item (A-Z)	Detector Type* (P/Q/A)	Antenna Polarity (H/V)	Antenna Distance (m)	Measured Frequency (MHz)	Measured Value (dB $\mu$ V)	Equip Correction (dB/m)	Corrected Value (dB $\mu$ V/m)	Specified Limit** (dB $\mu$ V/m)	Spec Margin (dB)	See Comment (#)***
<b>End Orientation</b>										
C	P	V	3	1214.000	56.4	-7.7	48.7	74.0	-25.3	Restr. Band
C	A	V	3	1214.000	-	-	38.5	54.0	-15.5	Restr. Band
C	P	H	3	1517.500	44.9	-6.0	38.9	74.0	-35.1	Restr. Band
C	A	H	3	1517.500	-	-	28.7	54.0	-25.3	Restr. Band
C	P	V	3	1821.000	41.3	-4.4	36.9	74.9	-38.0	
C	A	V	3	1821.000	-	-	26.7	54.9	-28.2	
C	P	V	3	2124.500	44.3	-3.9	40.4	74.9	-34.5	
C	A	V	3	2124.500	-	-	30.2	54.9	-24.7	
C	P	V	3	2428.000	39.2	-3.2	36.0	74.9	-38.9	
C	A	V	3	2428.000	-	-	25.8	54.9	-29.1	
C	P	V	3	2731.500	41.5	-2.3	39.2	74.0	-34.8	Restr. Band
C	A	V	3	2731.500	-	-	29.0	54.0	-25.0	Restr. Band
C	P	V	3	3035.000	41.6	-1.9	39.7	74.9	-35.2	
C	A	V	3	3035.000	-	-	29.5	54.9	-25.4	

\* P = Peak, Q = Quasi-Peak, A = Average.

\*\* The Specified Limit is for the type measurement indicated. When Peak data is indicated, the tightest limit applicable is indicated.

\*\*\* # = See Comment Number Under This Test's Comments Section.

Sample Calculation: Corrected Value = Measured Value + Equip Correction

Sample Calculation: Equip Correction = Antenna Factor (dB/m) + Cable Loss (dB) - Amplifier Gain (dB, if used)

**Comments:**

Comment #	Description
Restr. Band	Spurious Emission lies in Restricted Band, therefore General Limits applied.

### Test 3: Radiated Disturbance Emissions - Peak-to-Average Ratio

**Test Requirement:** 47 CFR Part 15, Subpart C  
Canada RSS 210, Issue 5, Amendment

**Test Specification:** 47 CFR Part 15, Subpart C, Section 15.231  
Canada RSS 210, Issue 5, Amendment, Section 6.1.1(e)

#### **Test Procedure:**

The test was performed in accordance with the Test Requirement and Specification and configured as noted in the Test Setup. The EUT was placed inside the anechoic chamber on connected to the proper power supply source. A peak measurement was first made by scanning the entire test frequency range and maximizing the EUT emissions by rotating the EUT and raising the antenna height from 1 to 4 meters above the ground reference plane.

The measurement spectrum analyzer is centered on the EUT's transmit frequency and span is reduced to 0 Hz to obtain a time domain measurement. The period of one complete transmit cycle is recorded. Next each button on the transmitter is depressed in sequence to determine which button produces the largest duty cycle. The duration of each pulse in the cycle is recorded and the percentage of time the EUT is transmitting is calculated.

No limit is expressed in Section 15.231 for this test, however the result of this test is used to calculate average values for the remaining measurements.

#### **Test Deviations:**

None

**Test Setup:** Only the following ports were tested. See EUT Information for details.

Test Item	Port #	Port Name	EUT Operation Mode	EUT Configuration	Power Interface
A	0	Enclosure	1	1	1

**Test 3 - Results:** Radiated Disturbance Emissions - Peak-to-Average Ratio

**Test Results Summary:**

Test Item	Test Location	Humidity (%)	Temperature (°C)	Pressure (kPa)	Pass/Fail (P/F)	Date Completed	Comment #
A	A	39	23.5	100.1	P	11/24/03	

The EUT was considered to **Pass** the Requirements.

**Comments:**

Comment #	Description

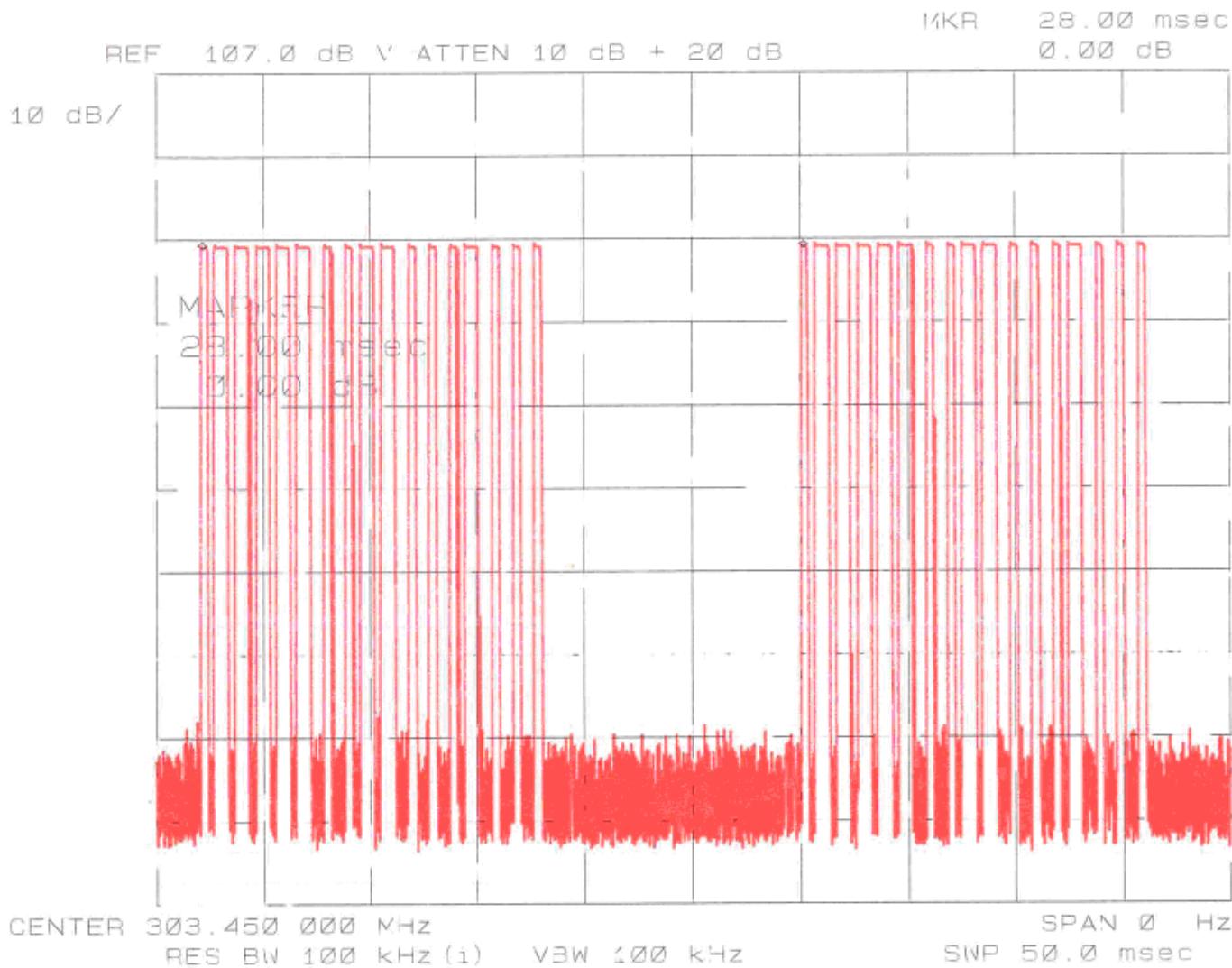
**Test Equipment Used:**

Equipment ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
SAR002	Spectrum Analyzer / Receiver	Hewlett-Packard	8566B	12/2/03	12/31/04
HI0034	Environmental Indicator	Cole-Palmer	99760-00	10/17/03	10/31/04

The above equipment has been calibrated and is within the manufacturer's published limit of error. Calibration is traceable to the National Institute of Standards & Technology(NIST) and conforms to ANSI/NCSL Z540-1-1994.

**Test 3, Duration - One Cycle:**

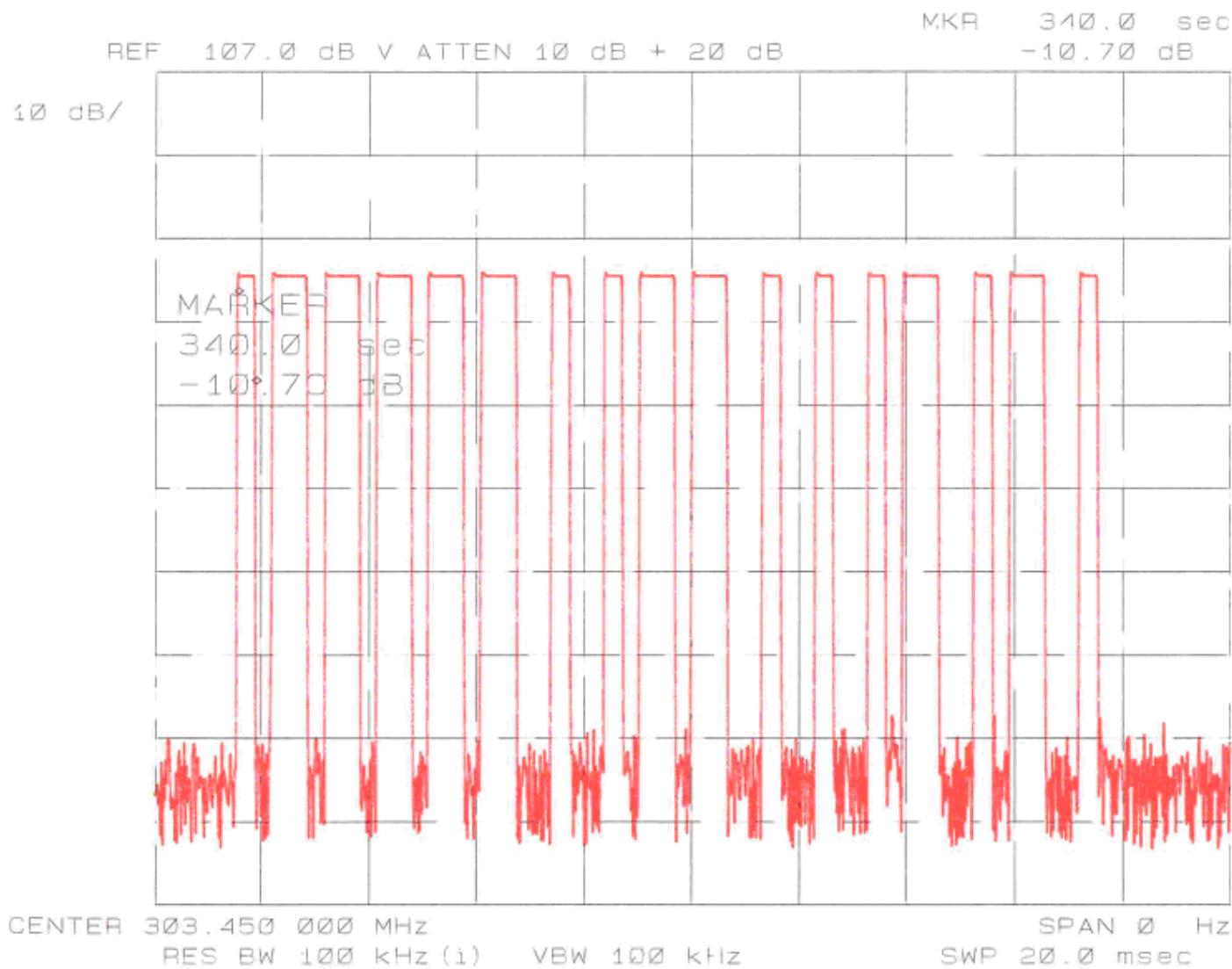
Radiated Disturbance Emissions – Peak-to-Average Ratio



One complete cycle is 28.00 ms.

**Test 3, Duration - Short Pulse:**

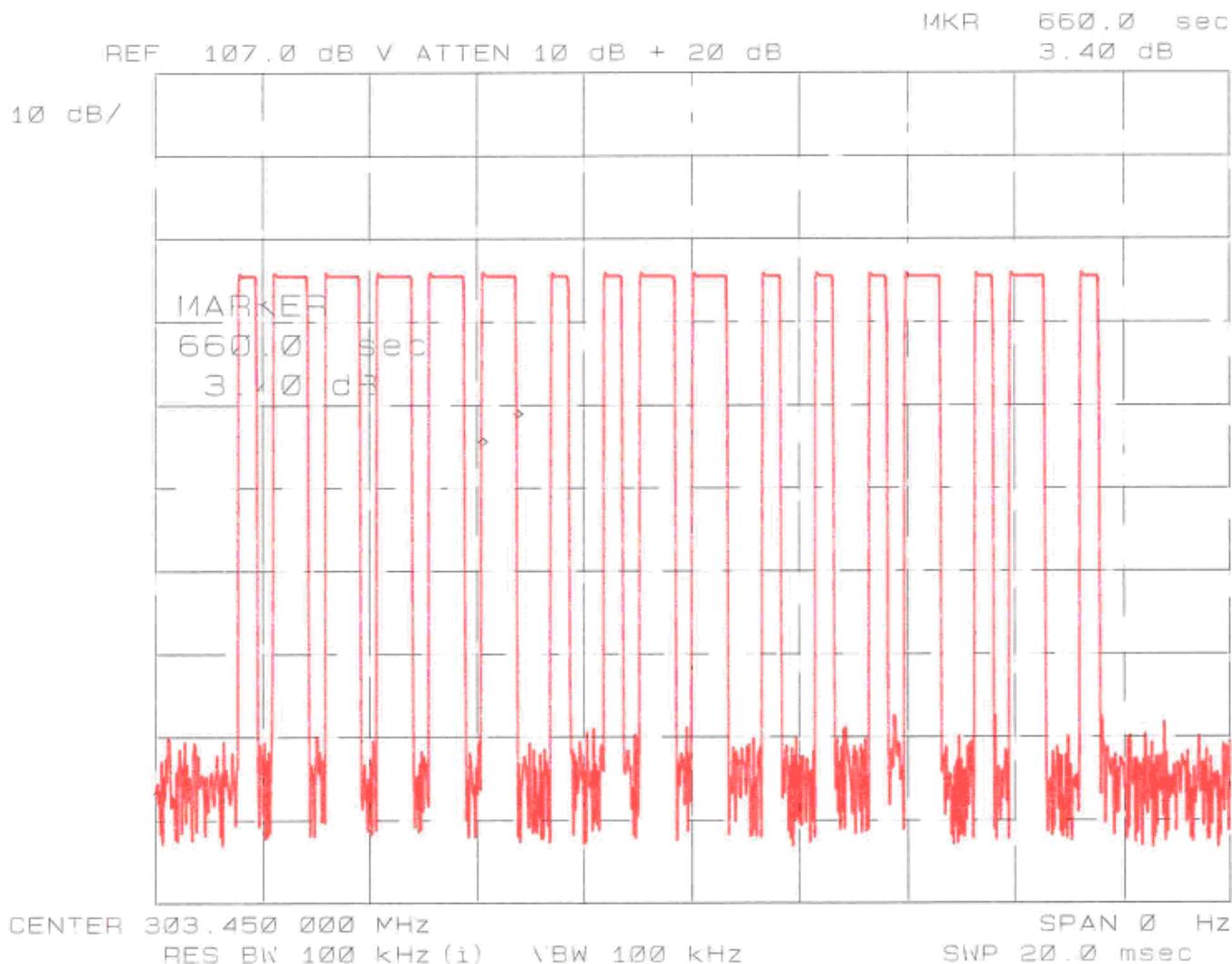
Radiated Disturbance Emissions – Peak-to-Average Ratio



One short transmission is 340  $\mu$ s. Note: Plotter does not print symbol 'μ'.

**Test 3, Duration - Long Pulse:**

Radiated Disturbance Emissions – Peak-to-Average Ratio



One long transmission is 660  $\mu$ s. Note: Plotter does not print symbol ' $\mu$ '.

**Test 3, All Items - Discrete Data:** Radiated Disturbance Emissions - Peak-to-Average Ratio

Test Item (A-Z)	Name of Pulse (short, long, header, etc)	Number of Pulses (#)	Duration of Each Pulse (ms)	Total ON Time for Pulse Type (Number x duration)	See Comment (#)***
A	Short	8	0.34	2.72	
A	Long	9	0.66	5.94	
			Total ON Time per period (ms)	8.66	
			Total Cycle Time (ms)	28.0	
			Duty Cycle (fraction)	0.309	
			Duty Cycle (dB)	-10.2	

\* Or 100 milliseconds, whichever is less

\*\* Peak-to-Average Ratio =  $20 * \log_{10}(\text{Duty Cycle})$

\*\*\* # = See Comment Number Under The Preceeding Test Comments Section.

## Test 4: Radiated Disturbance Emissions - Occupied Bandwidth

**Test Requirement:** 47 CFR Part 15, Subpart C  
Canada RSS 210, Issue 5, Amendment

**Test Specification:** 47 CFR Part 15, Subpart C, Section 15.231  
Canada RSS 210, Issue 5, Amendment, Section 6.1.1(e)

### **Test Procedure:**

This testing was performed as a benchtop measurement. A calibrated spectrum analyzer was equipment with a rod or handheld loop antenna to capture the signal. A conducted measurement cannot be performed because the antenna is not detachable.

#### FCC

The spectrum analyzer Resolution Bandwidth is set to 3% to 5% of the required bandwidth. The spectrum analyzer video bandwidth is set to approximately 10 times the resolution bandwidth. A plot of the spectrum analyzer display screen is produced with marker points displaying the center frequency and the left and right side points that are 20 dB below the field strength at the center frequency.

#### Canada

The spectrum analyzer Resolution Bandwidth is then set to 1% to 3% of the actual bandwidth. The spectrum analyzer video bandwidth is set to approximately 10 times the resolution bandwidth. A plot of the spectrum analyzer display screen is produced with marker points displaying the center frequency and the left and right side points that are 20 dB below the original peak power center frequency.

Occupied Bandwidth Limit - Manually Operated Transmitter FCC Section 15.231  
and Canada RSS-210 Section 6.1.1(e)

Transmit Frequency (MHz)	Bandwidth Limit (% of fundamental)
70 to 900	.25%
Above 900	.50%

### **Test Deviations:**

None

**Test Setup:** Only the following ports were tested. See EUT Information for details.

Test Item	Port #	Port Name	EUT Operation Mode	EUT Configuration	Power Interface
A	0	Enclosure	1	1	1

**Test 4 - Results:** Radiated Disturbance Emissions - Occupied Bandwidth

**Test Results Summary:**

Test Item	Test Location	Humidity (%)	Temperature (°C)	Pressure (kPa)	Pass/Fail (P/F)	Date Completed	Comment #
A	A	39	23.5	100.1	P	11/24/03	

The EUT was considered to **Pass** the Requirements.

**Comments:**

Comment #	Description

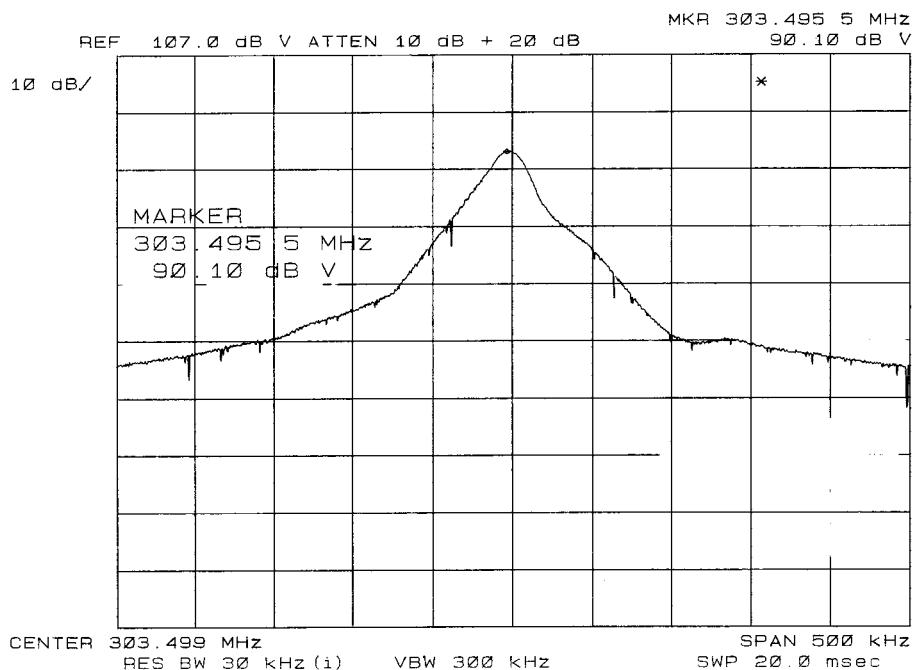
**Test Equipment Used:**

Equipment ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
SAR002	Spectrum Analyzer / Receiver	Hewlett-Packard	8566B	12/2/03	12/31/04
HI0034	Environmental Indicator	Cole-Palmer	99760-00	10/17/03	10/31/04

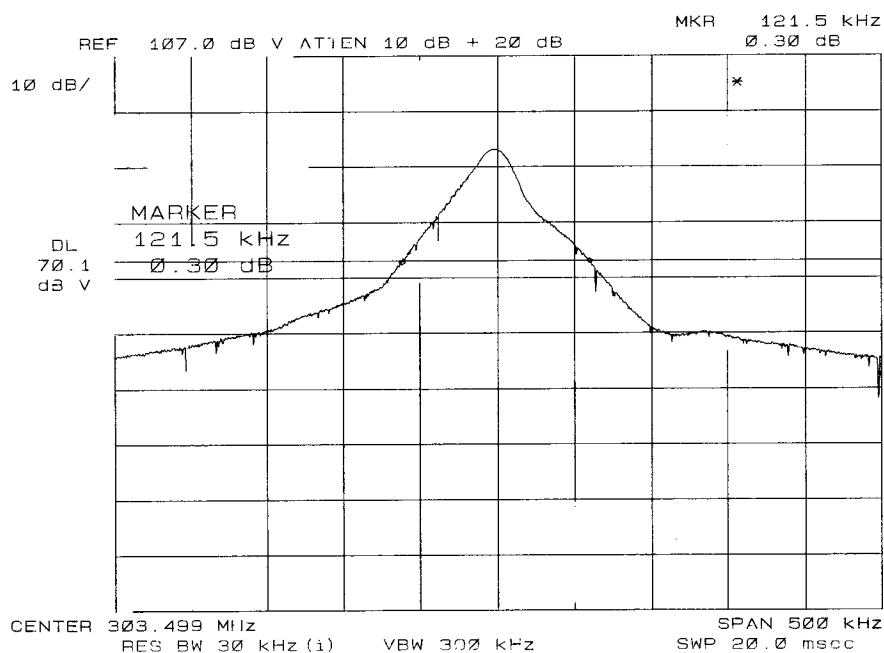
The above equipment has been calibrated and is within the manufacturer's published limit of error. Calibration is traceable to the National Institute of Standards & Technology(NIST) and conforms to ANSI/NCSL Z540-1-1994.

**Test 4, Occupied Bandwidth - FCC:**

Center Frequency



Occupied Bandwidth

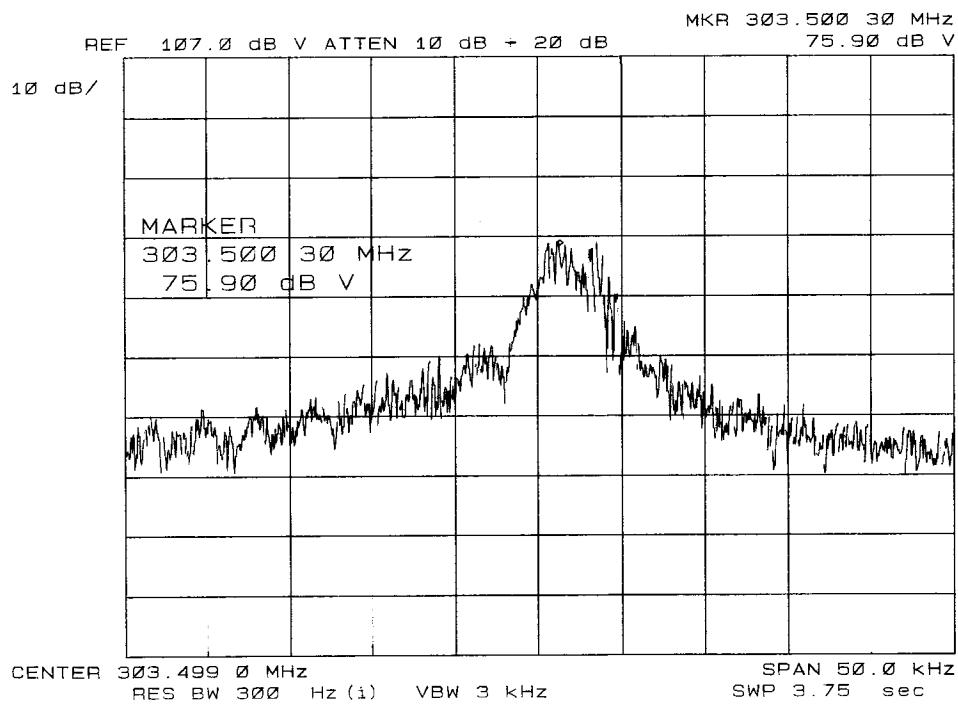


Test Item (A-Z)	Center Frequency (MHz)	Occupied Bandwidth (MHz)	Bandwidth (% of Center Frequency)	Maximum Permitted Bandwidth (% of Center Frequency)	Pass/Fail (P/F)	See Comment (#)*
A	303.4955	0.1215	0.04%	0.25%	P	

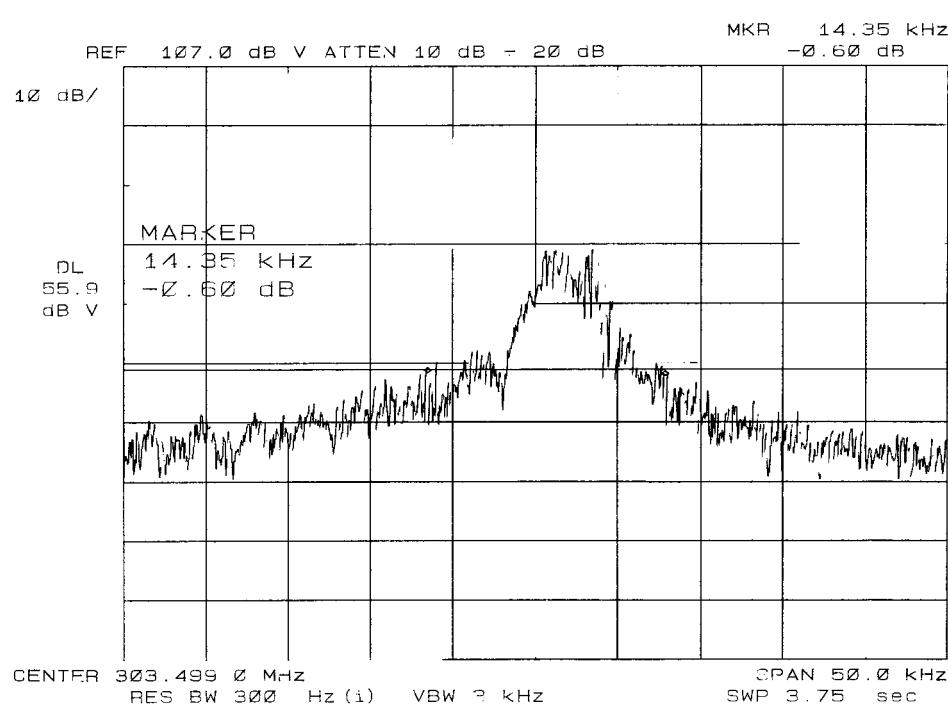
\* # = See Comment Number Under This Test's Comments Section.

**Test 4, Occupied Bandwidth - Canada:**

Center Frequency



Occupied Bandwidth



Test Item (A-Z)	Center Frequency (MHz)	Occupied Bandwidth (MHz)	Bandwidth (% of Center Frequency)	Maximum Permitted Bandwidth (% of Center Frequency)	Pass/Fail (P/F)	See Comment (#)*
A	303.499	0.01435	0.0047%	0.25%	P	

\* # = See Comment Number Under This Test's Comments Section.

## Test 5: Radiated Disturbance Emissions – Holdover Time

**Test Requirement:** 47 CFR Part 15, Subpart C  
Canada RSS 210, Issue 5, Amendment

**Test Specification:** 47 CFR Part 15, Subpart C, Section 15.231  
Canada RSS 210, Issue 5, Amendment, Section 6.1.1(e)

### **Test Procedure:**

This testing was performed as a benchtop measurement. A calibrated spectrum analyzer was equipment with a rod or handheld loop antenna to capture the signal. A conducted measurement cannot be performed because the antenna is not detachable.

The spectrum analyzer Frequency Span is set to zero. The spectrum analyzer Resolution and Video bandwidths are set to easily view the on/off transitions. The sweep time is set appropriate for the durations recorded.

Occupied Bandwidth Limit - Manually Operated Transmitter FCC Section 15.231  
and Canada RSS-210 Section 6.1.1(e)

Transmission Type (Description)	Maximum Transmission Time (seconds)
Manually activated Transmission	5 (after releasing button)
Automatically activated Transmission	5

### **Test Deviations:**

None

**Test Setup:** Only the following ports were tested. See EUT Information for details.

Test Item	Port #	Port Name	EUT Operation Mode	EUT Configuration	Power Interface
A	0	Enclosure	1	1	1

**Test 5 - Results:** Radiated Disturbance Emissions – Holdover Time

**Test Results Summary:**

Test Item	Test Location	Humidity (%)	Temperature (°C)	Pressure (kPa)	Pass/Fail (P/F)	Date Completed	Comment #
A	A	34	23	100	P	2/2/05	1 - 3

The EUT was considered to **Pass** the Requirements.

**Comments:**

Comment #	Description
1	Holdover time of manually activated transmission of "Safe Exit" mode is 5.000 second. This complies with the limit of 5 seconds in 15.231(a)(1) and RSS-210 Section 6.1.1.
2	Transmission time of automatically activated transmission of "Safe Exit" mode is 4.900 seconds. This complies with the limit of 5 seconds in 15.231(a)(2) and RSS-210 Section 6.1.1.
3	All other buttons cease transmission at 880 ms or less after depressing button. Worst-case transmission time plot is presented

**Test Equipment Used:**

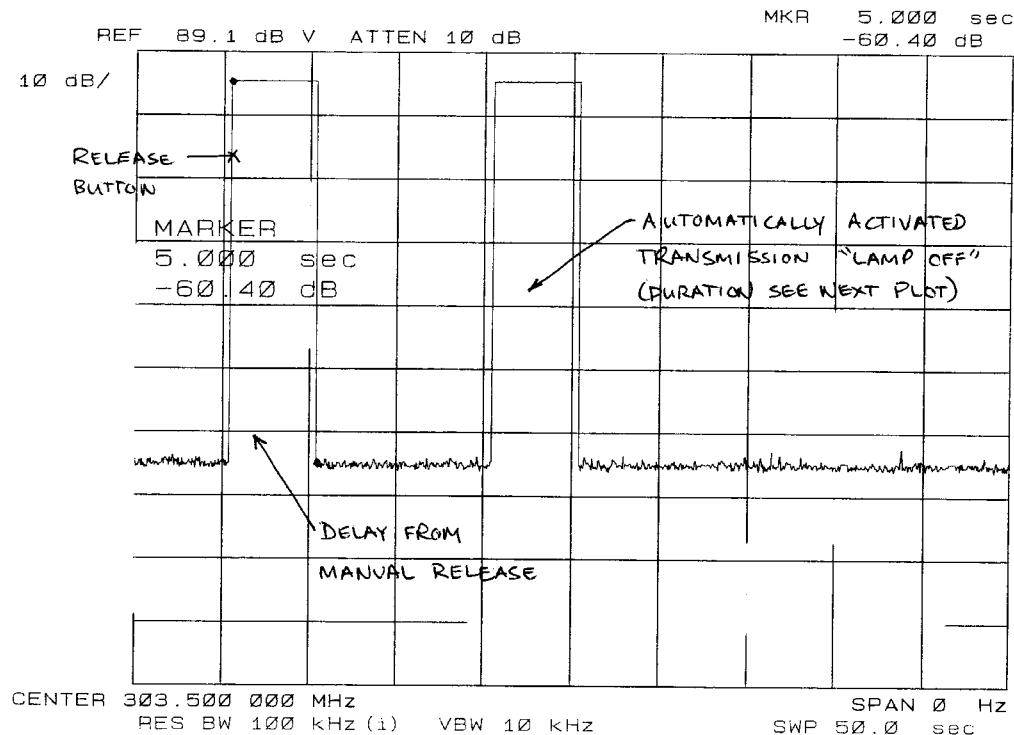
Equipment ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
HI0034	Environmental Indicator	Cole-Palmer	99760-00	10/14/04	10/31/05
SAR001	Spectrum Analyzer / Receiver	Hewlett-Packard	8572A	2/2/04	2/28/05

The above equipment has been calibrated and is within the manufacturer's published limit of error. Calibration is traceable to the National Institute of Standards & Technology(NIST) and conforms to ANSI/NCSL Z540-1-1994.

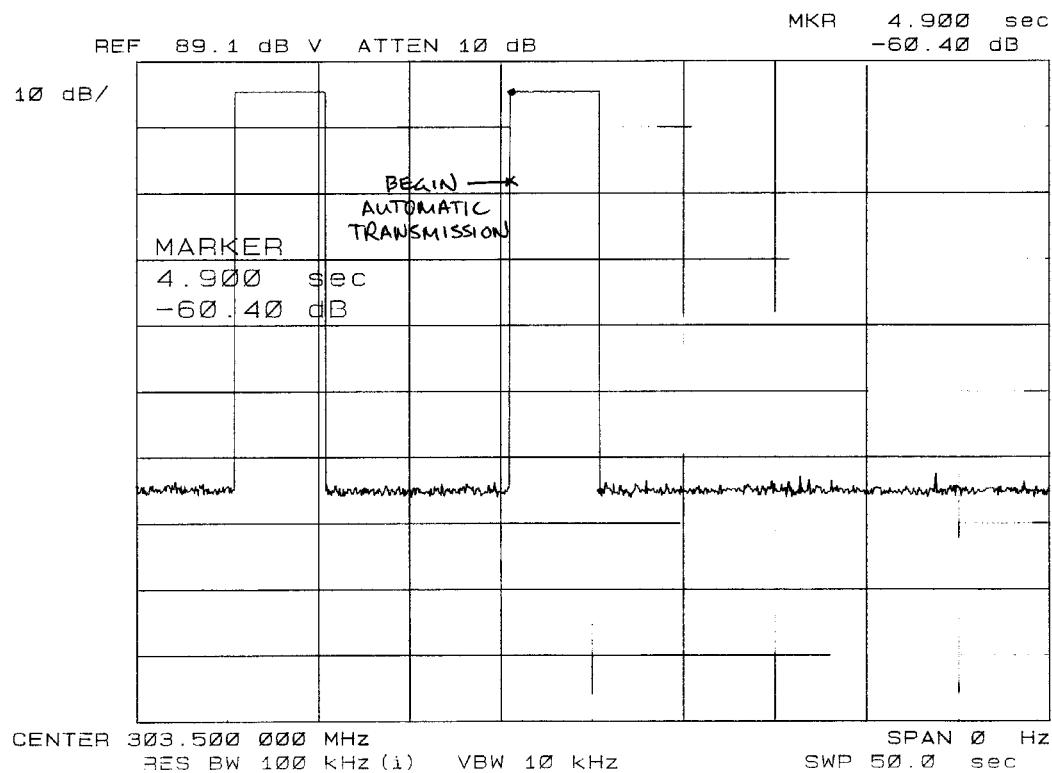
**Test 5, Holdover Time:**

Holdover Time – Safe Exit Mode

Manually Activated Transmission per 15.231(a)(1):



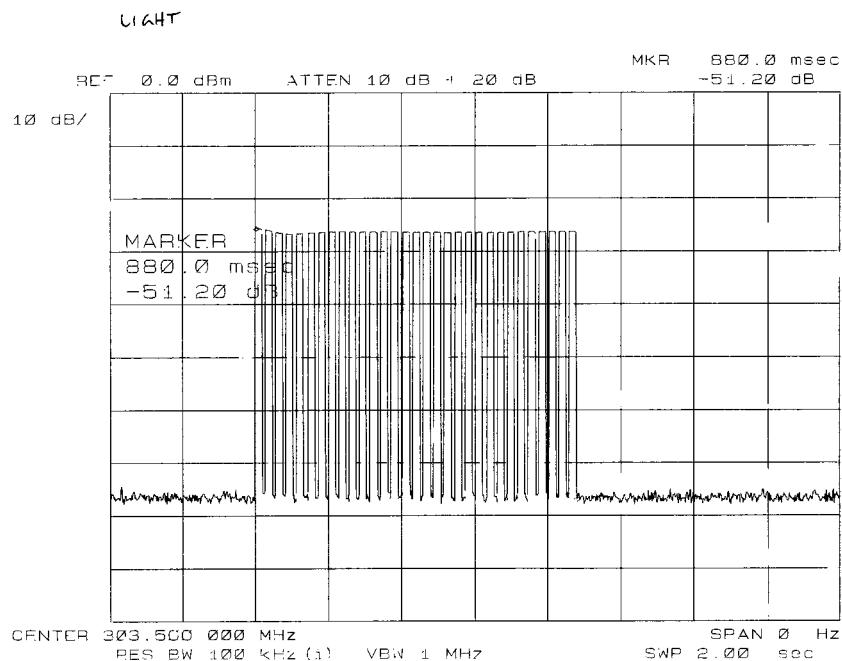
Automatically Activated Transmission per 15.231(a)(2):



**Test 5, Holdover Time (Other Buttons):**

Note for all button transmissions other than "Safe Exit" mode. Begin of transmission coincides with button press (left marker on plot). Transmission time is independent of the duration of time that the button is held down. All buttons were examined. Longest transmission holdover time measured is presented below.

Light Button = 880 ms.



## Test 6: Radiated Disturbance Emissions - Restricted Bands

**Test Requirement:** 47 CFR Part 15, Subpart C  
Canada RSS 210, Issue 5, Amendment

**Test Specification:** 47 CFR Part 15, Subpart C, Section 15.205  
Canada RSS 210, Issue 5, Amendment, Section 6.2.2(t1)

### Test Procedure:

The EUT is verified to produce only spurious emissions in the bands listed below. Where spurious emissions exist they must comply with the general limits from 47 CFR Part 15, Section 15.209.

Results from measurements are examined to ensure that no spurious emission in a restricted band (below) exceeds the general limits in Section 15.209. The restricted bands from Section 15.205 are:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	608 - 614	4.5 - 5.15
0.495 - 0.505	16.69475 - 16.69525	960 - 1240	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	1300 - 1427	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1435 - 1626.5	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1645.5 - 1646.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1660 - 1710	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1718.8 - 1722.2	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	2200 - 2300	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2310 - 2390	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2483.5 - 2500	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2655 - 2900	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	3260 - 3267	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3332 - 3339	23.6 - 24.0
12.29 - 12.293	127.72 - 167.17	3345.8 - 3358	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3600 - 4400	36.43 - 36.5
12.57675 - 12.57725	332-335.4		Above 38.6
13.36 - 13.41	399.9 - 410		

All spurious emissions, including harmonics falling within restricted bands were observed to meet the general limits of 15.209.

### Test Results Summary:

From Test 1 and Test 2 results, this device meets the general limits for all spurious emissions within restricted bands. The transmit frequency, 303.5 MHz, does not fall within a restricted band.

Accreditation Certificates:

**NVLAP**  
National Institute of Standards and Technology  
**Scope of Accreditation**

ISO/IEC 17025:1999  
ISO 9002:1994

Revised Scope 12/10/2004  
**ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS**

Page: 1 of 4  
NVLAP LAB CODE 200246-0

UNDERWRITERS LABORATORIES, INC.  
12 Laboratory Drive  
Research Triangle Park, NC 27709  
Mr. Rick A. Titus  
Phone: 847-272-8800 x43281 Fax: 847-509-6321  
E-Mail: Rick.A.Titus@us.ul.com  
URL: <http://www.ul.com>

**NVLAP Code Designation / Description**

12/CIS14 CISPR 14-1 (March 30, 2000): Limits and Methods of Measurement of Radio interference Characteristics of Household Electrical Appliances, Portable Tools and Similar Electrical Apparatus - Part 1: Emissions

12/CIS14a EN 55014-1 (1993) with Amendments A1 (1997) & A2 (1999)

12/CIS14b AS/NZS 1044 (1995)

12/CIS14c CNS 13783-1

12/CIS22 IEC/CISPR 22 (1997) and EN 55022 (1998): Limits and methods of measurement of radio disturbance characteristics of information technology equipment

12/CIS22a IEC/CISPR 22 (1993): Limits and methods of measurement of radio disturbance characteristics of information technology equipment, Amendment 1 (1995) and Amendment 2 (1996)

June 30, 2005   
Effective through   
For the National Institute of Standards and Technology

**NVLAP**  
National Institute of Standards and Technology  
**Scope of Accreditation**

ISO/IEC 17025:1999  
ISO 9002:1994

Revised Scope 12/10/2004  
**ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS**

Page: 2 of 4  
NVLAP LAB CODE 200246-0

UNDERWRITERS LABORATORIES, INC.

**NVLAP Code Designation / Description**

12/CIS22b CNS 13438 (1997): Limits and Methods of Measurement of Radio Interference Characteristics of Information Technology Equipment

12/EM02a IEC 61000-3-2, Edition 2.1 (2001-10), EN 61000-3-2 (2000), and AS/NZS 2279.1 (2000): Electromagnetic compatibility (EMC) Part 3-2: Limits - Limits for harmonic current emissions (equipment input current <= 16 A)

12/EM03b IEC 61000-3-3, Edition 1.1(2002-03) & EN 61000-3-3, A1(2001): EMC - Part 3-3: Limits - Limitations of voltage changes, voltage fluctuations and flicker, in public low-voltage supply-systems, for equipment with rated current <=16 A per phase and not subject to conditional connections

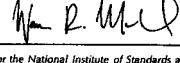
12/FCC15b ANSI C63.4 (2001) with FCC Method - 47 CFR Part 15, Subpart B: Unintentional Radiators

12/T51 AS/NZS CISPR 22 (2002) and AS/NZS 3548 (1997): Electromagnetic Interference - Limits and Methods of Measurement of Information Technology Equipment

**Immunity Test Methods:**

12/I01 IEC 61000-4-2, Edition 2.1 (2001) including Amds. 1 & 2 and EN 61000-4-2: Electrostatic Discharge Immunity Test

12/I02 IEC 61000-4-3, Edition 2.0 (2002-03) and EN 61000-4-3: Radiated Radio-Frequency Electromagnetic Field Immunity Test

June 30, 2005   
Effective through   
For the National Institute of Standards and Technology

**NVLAP**  
National Institute of Standards and Technology  
**Scope of Accreditation**

ISO/IEC 17025:1999  
ISO 9002:1994

Revised Scope 12/10/2004  
**ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS**

Page: 3 of 4  
NVLAP LAB CODE 200246-0

UNDERWRITERS LABORATORIES, INC.

**NVLAP Code Designation / Description**

12/I03 IEC 61000-4-4 (1995) + Amd. 1 (2000) & Amd. 2 (2001) and EN 61000-4-4: Electrical Fast Transient/Burst Immunity Test

12/I04 IEC 61000-4-5, Edition 1.1 (2001-04) and EN 61000-4-5: Surge Immunity Test

12/I05 IEC 61000-4-6, Edition 2.0 (2003-05) and EN 61000-4-6: Immunity to Conducted Disturbances, Induced by Radio-Frequency Fields

12/I06 IEC 61000-4-8, Edition 1.1 (2001) and EN 61000-4-8: Power Frequency Magnetic Field Immunity Test

12/I07 IEC 61000-4-11, Edition 1.1 (2001-03) and EN 61000-4-11: Voltage Dips, Short Interruptions and Voltage Variations Immunity Tests

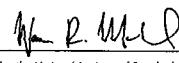
**Safety Test Methods:**

12/T41a AS/NZS 60950 (2000): Safety of Information Technology Equipment (including Amdt1)

12/T50 AS/NZS 3260 (1993) + Supplement 1 (1996): Safety of Information Technology Equipment Including Electrical Business Equipment

**Telecommunications Test Methods:**

12/1089d GR-1089-CORE, Issue 3 (April 2002): EMC and Electrical Safety - Generic Criteria for Network Telecommunications Equipment (sections: 2.1.2.1, 2.1.2.2, 2.1.4, 2.2, 3.2, 3.3, 4.6.2, 4.6.5, 4.6.7 - 4.6.17, 4.7, 5.2, 5.3.1, 5.4, 6, 7.2 - 7.7, 8, and 9.2 - 9.12)

June 30, 2005   
Effective through   
For the National Institute of Standards and Technology

**NVLAP**  
National Institute of Standards and Technology  
**Scope of Accreditation**

ISO/IEC 17025:1999  
ISO 9002:1994

Revised Scope 12/10/2004  
**ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS**

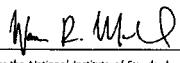
Page: 4 of 4  
NVLAP LAB CODE 200246-0

UNDERWRITERS LABORATORIES, INC.

**NVLAP Code Designation / Description**

12/76200a SBC-TP-76200, Issue 4 (May 2003): Network Equipment Power, Grounding, Environmental, and Physical Design Requirements (sections: 6.1B, 7.1, 7.2, 7.3, 7.4, and 10.1 - 10.4B)

12/GR63a GR-63-CORE, Issue 2 (April 2002): NEBS (TM) Requirements: Physical Protection (sections: 2, 3, 4.1, 4.2.3, 4.3, 4.4.1, 4.4.3, 4.4.4, 4.5, 4.6, and 4.7)

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### Measurement Uncertainty Statement

Test	Expanded Estimate of Uncertainty ( $k = 2$ , for 95% of a normal distribution)	Units
Radiated Disturbance Emissions:		
• 3 and 10 meter measurement distances	+/- 3.8 dB	Volts/meter
• 1 meter measurement distance	+/- 2.3 dB	Volts/meter
Conducted Disturbance Emissions (9 kHz – 30 MHz):	+/- 3.4 dB	Volts
Electrostatic Discharge	+/- 2.2 %	Volts
Radiated RF Immunity (Chamber):	+/- 2.7 dB	Volts/meter
Electrical Fast Transients/Bursts Immunity	+/- 4.6 %	Volts
Surge Immunity	+/- 4.6 %	Volts
Conducted RF Immunity	+/- 2.8 dB	Volts
Power Frequency Magnetic Field Immunity	+/-13.6 %	Amps/meter
Voltage Dips and Short Interrupts	+/-4.2 %	Volts
Radiated RF Immunity (Tri-plate)	+/-3.2 %	Volts/meter
Disturbance Power (30 – 300 MHz)	+/-3.5%	Volts

### **CISPR 16-4:2000 Statement**

The UL-RTP estimate of expanded measurement uncertainty listed above for Conducted Disturbance (+/- 3.4 dB), Disturbance Power (+/- 3.5 dB), and Radiated Disturbance (+/-3.8 dB) are less than the Values of  $U_{cisp}$  as listed in Table 1 of CISPR 16-4. Therefore:

- Compliance is deemed to occur if no measured disturbance reported exceeds the disturbance limits.
- Non-compliance is deemed to occur if any measured disturbance reported exceeds the disturbance limits.