



Project: 03ME16541
File: NC2219
Date: 1/13/2004
Model: RTA-TX
FCC ID: JPZ0030

Test Report

On

Electromagnetic Compatibility Testing

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Underwriters Laboratories Inc.
1285 Walt Whitman Rd.
Melville, NY 11747

Tel: (631) 271-6200 Fax: (631) 439-6095

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Test Report Details

Tests Performed By: **Underwriters Laboratories Inc.
1285 Walt Whitman Rd.
Melville, NY 11747**

Tests Performed For: **Lutron Electronics Co. Inc.
7200 Suter Road
Coopersburg, PA 18036**

Applicant Contact: **Mark Clouser**
Title: **Field Application Specialist**
Phone: **610-282-3800**
Fax: **610-282-0298**
E-mail: **mclouser@lutron.com**

Test Report Date: **1/13/2004**

Product Type: **Control Unit**

Model Number: **RTA-TX**

Sample Serial Number: **Not Provided**

Sample Tag Number: **0546132001**

Sample Receive Date: **17 December 2003**

EUT Category: **Radio Transmitter**

Testing Start Date: **17 December 2003**

Date Testing Complete: **05 January 2004**

Underwriters Laboratories Inc. reports apply only to the specific samples tested under stated test conditions. All samples tested were in good operating condition throughout the entire test program. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. Underwriters Laboratories Inc. shall have no liability for any deductions, inferences or generalizations drawn by the client or others from Underwriters Laboratories Inc. issued reports. This report shall not be used to claim, constitute or imply product certification, approval, or endorsement by NVLAP, A2LA, or any agency of the US government.

This report may contain test results that are not covered by the NVLAP or A2LA accreditation. The scope of accreditation is limited to the specific tests that are listed on the NVLAP and/or A2LA certificates provided at the end of this report.

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Report Revision History

Revision Date	Description	Revised By	Revision Reviewed By
Not Applicable	Not Applicable	Not Applicable	Not Applicable

1.0 G E N E R A L - Product Description

The RTA-TX is a master control keypad, which is tabletop, or wall mounted and contains a super-heterodyne receiver, a transmitter and an antenna. A master control keypad is the user input to an integrated lighting control system. The purpose of the RF communication is to transmit command signals. The product only receives RF commands during End-of-Line test. The command signals allow the RTA-TX to control the Lutron RTA-RX series of lighting controllers. Transmitted command signals turn on or turn off dimmers and switches in the system and are initiated by manual button pushes

1.1 Device Configuration During Test

The Transmitter is divided into three columns, Power, CW, and Send. The raise and lower buttons at the bottom of the unit have no functionality and should not be pressed. Pressing the ON button under the Power column turns on the power to the unit and Pressing the Off button under the Power column turns off power to the unit.

CW Mode: Pressing the ON button under the CW column turns on the CW mode to the unit and pressing the OFF button under the CW column turns off CW mode to the unit.

Continuous Transmit Mode: Pressing the ON button under the SEND column enables continuous transmission packets and pressing the OFF button under the SEND column enables continuous transmission packets.

The manufacturer configured the device. The antenna is an Integral part of the EUT (equipment under test) and cannot be changed or removed.

1.1.1 Equipment Used During Test:

Use*	Product Type	Manufacturer	Model	Comments
EUT	Control Unit	Lutron	RTA-TX	-----

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

1.1.2 Input/Output Ports:

Port #	Name	Type*	Cable Max. >3m	Cable Shielded	Comments
0	Enclosure	N/E	-	-	None
1	Mains	DC	None	-	The unit operates on two AAA batteries

*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

1.1.3 EUT Internal Operating Frequencies:

Frequency (MHz)	Description	Frequency (MHz)	Description
418	Operating Frequencies	-	-

1.1.4 Power Interface:

Mode #	Voltage (V)	Current (A)	Power (W)	Frequency (DC/AC-Hz)	Phases (#)	Comments
Rated	None			DC	None	-

1.2 EUT Operation Modes:

Mode #	Description
1	Transmit
2	Receive

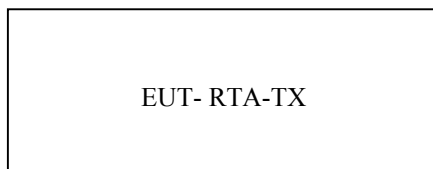
1.3 EUT Configuration Modes:

Mode #	Description
1	The EUT was tested in Continuous wave and receive modes by depressing the designated button.

"The results contained in this report reflect the results for this particular model and serial number. It is the responsibility of the manufacturer to ensure that all production models meet the intent of the requirements detailed within this report"

1.4 Block Diagram:

The diagram below illustrates the configuration of the equipment above.



1.5 Deviations from standard test methods.

Not Applicable

1.6 Device Modifications Necessary for Compliance

Not Applicable.

1.7 Test Summary

Test Name	Comply	Does Not	See
Test Requirement/Specification		Comply	Remark
		-	
Conducted Voltage Emissions (Continuous Data Transmit Mode): FCC Part 15 Subpart B, Class B. Paragraph 15.205	N/A	-	3
Radiated Emissions: FCC Part 15 Subpart C, Class B, Intentional Radiators, Paragraph 15.209, 15.231	Yes	-	1
FCC Part 15 Subpart B, Class B, Un-Intentional Radiators, Paragraph 15.109	Yes	-	1
Cease Operation < 5 seconds: FCC Part 15 Subpart C, Paragraph 15.231	Yes	-	1
Occupied Bandwidth: FCC Part 15 Subpart C, Paragraph 15.231	Yes	-	1

Remarks:

- 1) No Modifications required for compliance.
- 2) Modifications required to comply as described in Section 1.5
- 3) The EUT operates on two AAA DC batteries

2.0 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 Applicant as being applicable to the Equipment Under Test determined the test list. 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.

The equipment under test has

Met the technical requirements as defined under section(s) 5.0

Test Start Date: 17 December 2003
Test Completion Date: 6 January 2004



Joseph Danisi (Ext.23055)
Senior Engineering Associate
International EMC Services
Conformity Assessment Services-3014AMEL



Robert DeLisi (Ext.22452)
Senior Staff Engineer
International EMC Services
Conformity Assessment Services-3014AMEL

3.0 FCC Labeling Information

3.1 Identification.

Devices Subject to Verification

In 47 CFR, Part 2, § 2.954:

“Devices subject only to verification shall be uniquely identified by the person responsible for marketing or importing the equipment within the United States. However, the identification shall not be of a format, which could be confused with the FCC Identifier required on certified, notified or type accepted equipment. The importer or manufacturer shall maintain adequate identification records to facilitate positive identification for each verified device.”

Devices Subject to Declaration of Conformity

In 47 CFR, Part 2, § 2.1074:

“Devices subject only to a Declaration of Conformity shall be uniquely identified by the responsible party. This identification shall not be of a format which could be confused with the FCC Identifier required on certified, notified, type accepted or type approved equipment. The responsible party shall maintain adequate identification records to facilitate positive identification for each device.”

3.2 Compliance information

§ 2.1077 Compliance information.

(a) If a product must be tested and authorized under a Declaration of Conformity, a compliance information statement shall be supplied with the product at the time of marketing or importation, containing the following information:

- (1) Identification of the product, e.g., name and model number;
- (2) A statement, similar to that contained in § 15.19(a)(3) of this chapter, that the product complies with part 15 of this chapters; and
- (3) The identification, by name, address and telephone number, of the responsible party, as defined in §

2.909.

The responsible party for a Declaration of Conformity must be located within the United States.

(c) The compliance information statement shall be included in the user’s manual or as a separate sheet.

§ 15.19(a)(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.”

3.3 Labeling.

Labeling Certification or Verification

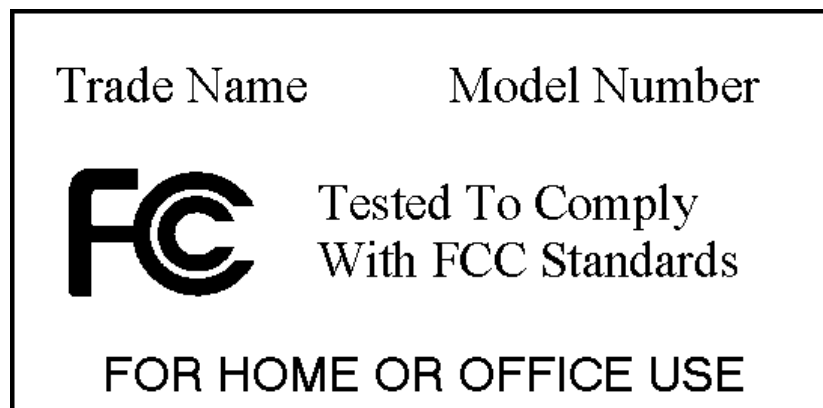
In addition to the requirements in Part 2 of this CFR 47 (See **1.6.1 Identification** above), a device subject to certification or verification shall be labeled as follows:

- (1) Receivers associated with the operation of a licensed radio service, e.g., FM broadcast under Part 73, 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.

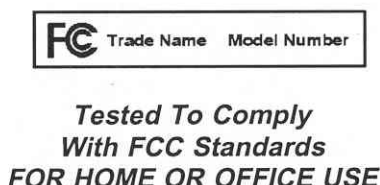
Declaration of Conformity Labeling

In addition to the requirements in Part 2 of CFR 47 (See **1.6.1 Identification** above), a device subject to authorization under a Declaration of Conformity shall be labeled as follows:

- (1) The label shall be located in a conspicuous location on the device and shall contain the unique identification described in Section 2.1074 of this chapter and the following logo:
 - (i) If the product is authorized based on testing of the product or system:



Alternate label format for small devices:



The text shown in ***bold-face italics*** may be placed in a prominent location in the instruction manual or pamphlet supplied to the user.

- (2) Label text and information should be in a size of type large enough to be readily legible, consistent with the dimensions of the equipment and the label. However, the type size for the text is not required to be larger than eight point.
- (3) When the device is so small or for such use that it is not practicable to place the statement specified under paragraph (b)(1) of this section on it, such as for a CPU board or a plug-in circuit board peripheral device, the text associated with the logo may be placed in a prominent location in the instruction manual or pamphlet supplied to the user. However, the unique identification (trade name and model number) and the logo must be displayed on the device.
- (4) The label shall not be a stick-on, paper label. The label on these products shall be permanently affixed to the product and shall be readily visible to the purchaser at the time of purchase, as described in Section 2.925(d) of this chapter. "Permanently affixed" means that the label is etched, engraved, stamped, silk-screened, indelibly printed, or otherwise permanently marked on a permanently attached part of the equipment or on a nameplate of metal, plastic, or other material fastened to the equipment by welding, riveting, or a permanent adhesive. The label must be designed to last the expected lifetime of the equipment in the environment in which the equipment may be operated and must not be readily detachable.

3.4 User information.

In 47 CFR, Part 15, § 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.”

In 47 CFR, Part 15, § 15.105 Information to the user:

Class A Devices

“(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 his own expense.”

Class B Devices

“(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 in a residential installation. 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*

“(d) For systems incorporating several digital devices, the statement shown in paragraph (a) or (b) of this section needs to be contained only in the instruction manual for the main control unit.”

4.0 Calibration of Equipment Used for Measurement

All test equipment and test accessories are calibrated on a regular basis. The maximum time between calibrations is the manufacturer recommends one year or what whichever is less.

All test equipment calibrations are traceable to the National Institute of Standards and Technology (NIST); therefore, all test data recorded in this report is traceable to NIST.

5.0 EMISSIONS TEST REGULATIONS

The emissions tests were performed according to following regulations:

----- United States -----

FCC Part 15, Subpart B, Paragraph 15.107 & 15.109 Code of Federal Regulations, Part 15,
FCC Part 15 Subpart C, Paragraph 15.205, 15.207, Subpart C, Radio Frequency Devices
15.209 & 15.231

5.1.1 Conducted Emissions Tests

Test Not Applicable: Equipment operates on Battery Power

5.1.2 Cease Operation Within 5 Seconds

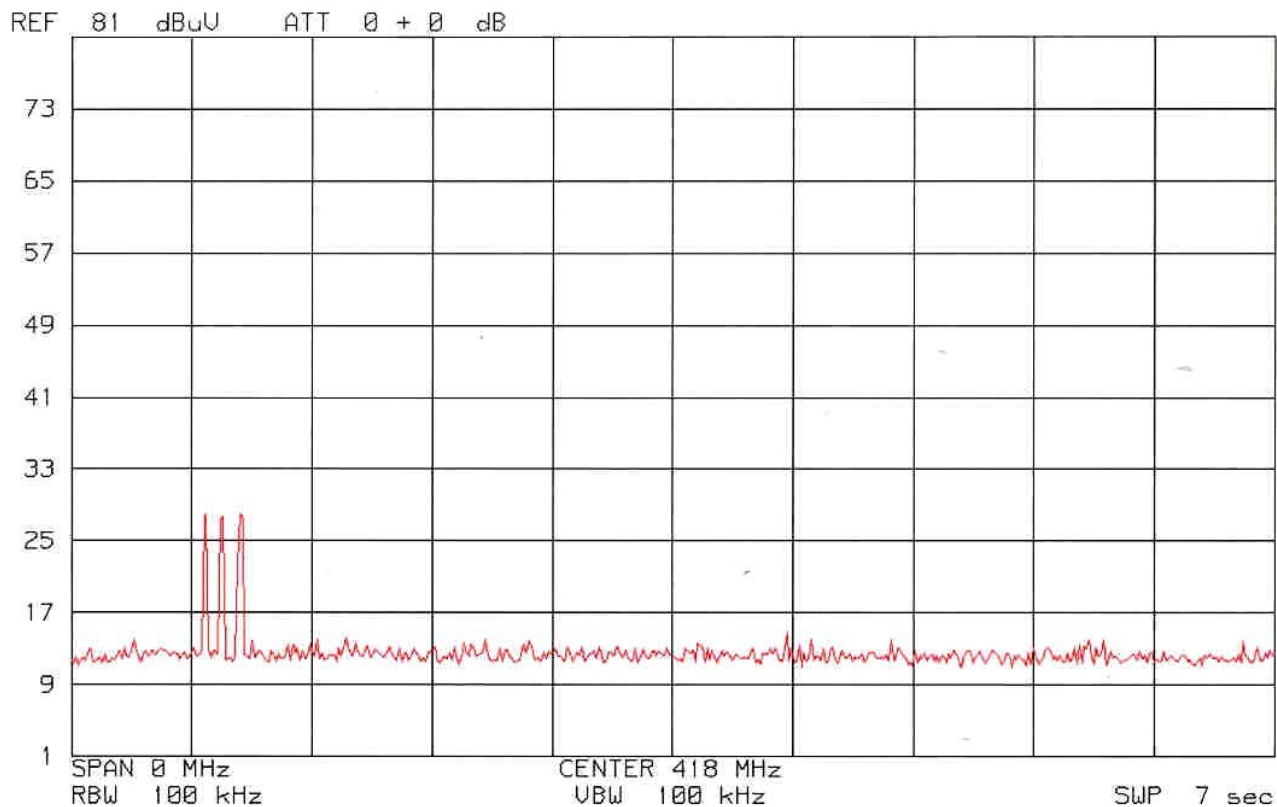
Test Applicable

Test Procedure:

This test is performed one time at any frequency band. A manual operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released

Test equipment used for Cease Operation measurements:

ESI26	Rhode & Schwartz	EMI Receiver	Equipment No.: ME5B-081
			Quasi Peak BW: 200Hz
			9kHz to 150kHz
			RBW 10 KHz
			Quasi Peak BW: 9kHz
			150kHz to 30MHz
			RBW 100 KHz
			Quasi Peak BW: 120
			30 to 1000MHz
			kHz
			RBW 1.0 MHz
Range: 30MHz-1000MHz	Last Calibration Date: 28 August 2003		Calibration Due Date: 31 August 2004
3121C-DB4	EMCO	Dipole Antenna	Equipment No.: ME-751
Last Calibration Date: 6 March 2003			Calibration Due Date: 6 March 2004
99760-00	Cole –Parmer	Hydrometer/Temp/Barometer	Equipment No.: ME4-268
Ranges: Temp:0°C-55°C			
Humidity 25% to 95 %RH			
Pressure 795 to 1050 mbar			
Last Calibration Date:	27 May 2003	Calibration Due Date: 27 May 2004	



Cease operation in < 5 seconds



Cease Operation in < 5 Seconds Test Set- Up

5.1.3 Radiated Emissions Test (10 Meter Semi-Anechoic Chamber)

Test Applicable

Measurements were made in a 3-meter semi-anechoic chamber that complies to ANSI C63.4. All frequencies were investigated in both horizontal and vertical antenna polarity, where applicable.

The EUT (equipment under test) was tested in 3 orthogonal axes and the orientation depicted in the Radiated Emission test set-up was deemed worst case.

Results

The system met the requirements for radiated emissions. Data Pages follow.

Temperature:	21.5 °C	Mode*	
Humidity:	43.0%RH	Power	Operation
Pressure:	1007mbar	1	1
Date test performed:	17 December 2003	1	2

1 fully configured sample was scanned over the following frequency range:

Electric fields:	30MHz – 1GHz	(3 meter measurement distance) Unintentional
Electric fields:	1GHz – 3GHz	(3 meter measurement distance) Unintentional
Electric fields:	30MHz - 1GHz	(3 meter measurement distance) Intentional
Electric fields:	1GHz - 5GHz	(3 meter measurement distance) Intentional

Test equipment used for radiated emissions

ESI26	Rhode & Schwartz	EMI Receiver	Equipment No.: ME5B-081
			Quasi Peak BW: 200Hz
			9kHz to 150kHz
			RBW 10 KHz
			Quasi Peak BW: 9kHz
			150kHz to 30MHz
			RBW 100 KHz
			Quasi Peak BW: 120
			30 to 1000MHz
			kHz
			RBW 1.0 MHz
			Calibration Due Date: 31 August 2004
Range: 30MHz-5GHz	Last Calibration Date: 28 August 2003		

Test Accessories for Radiated Emissions

3104C	EMCO	Biconnical Antenna	Equipment No.: ME5-810
Range: 30MHz-200MHz	Last Calibration Date: 11 March 2003		Calibration Due Date: 11 March 2004
3146	EMCO	Log Periodic Antenna	Equipment No.: ME5-811
Range: 200MHz-1000MHz	Last Calibration Date: 27 March 2003		Calibration Due Date: 27 March 2004
RGA-180	EMCO	Horn Antenna	Equipment No.: ME5-565
Range: 1-5GHz	Last Calibration Date: 24 June 2003		Calibration Due Date: 24 June 2004
99760-00	Cole –Parmer	Hygrometer/Temp/Barometer	Equipment No.: ME4-268
		Ranges	Temp: 0°C-55°C
			Humidity: 25% to 95 %RH

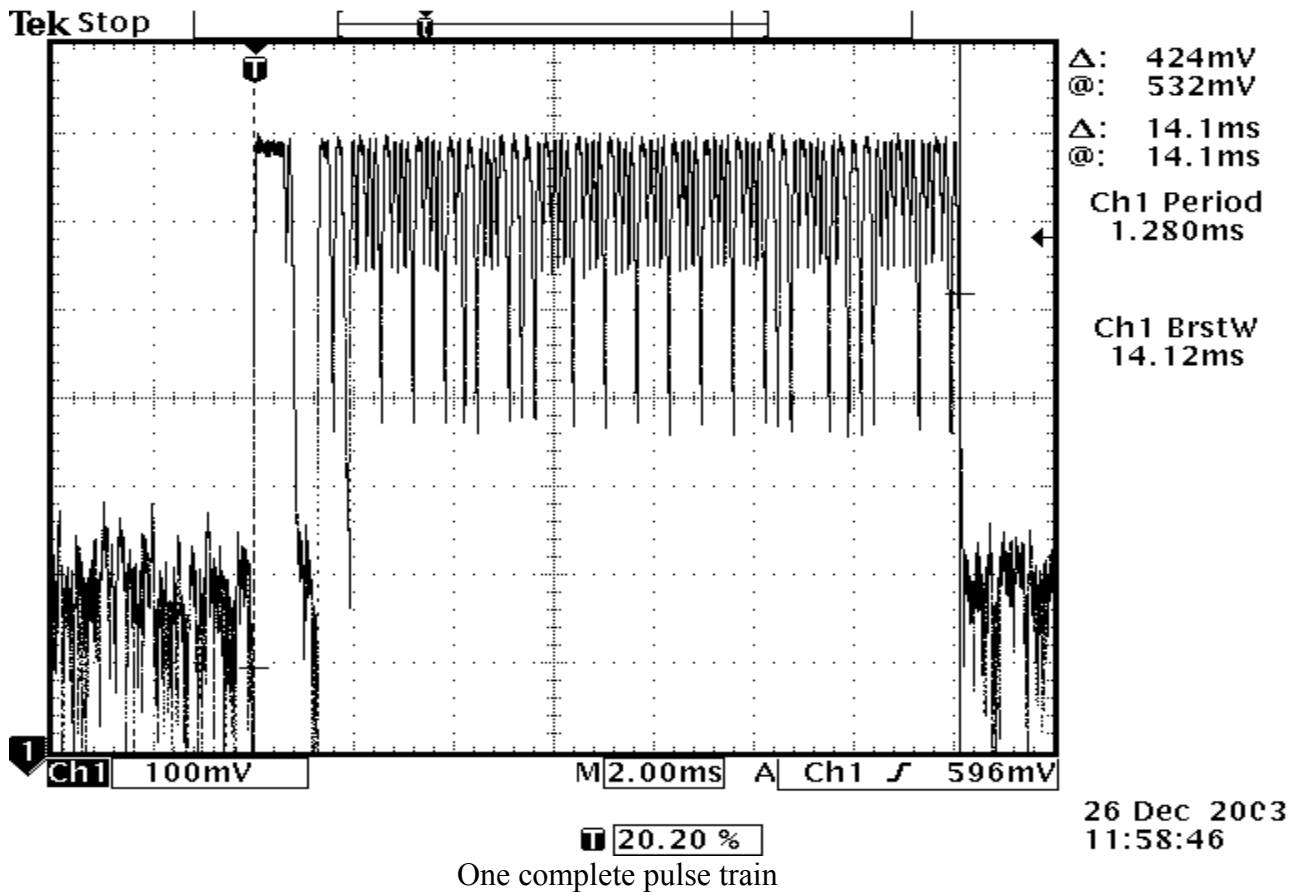
File Number: NC2219
Project Number: 03ME16541
Model Number: RTA-TX
FCC ID: JPZ0030

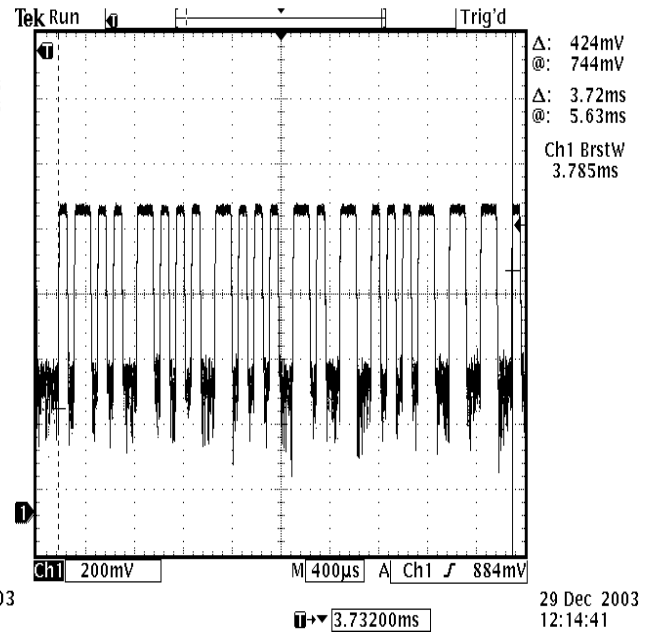
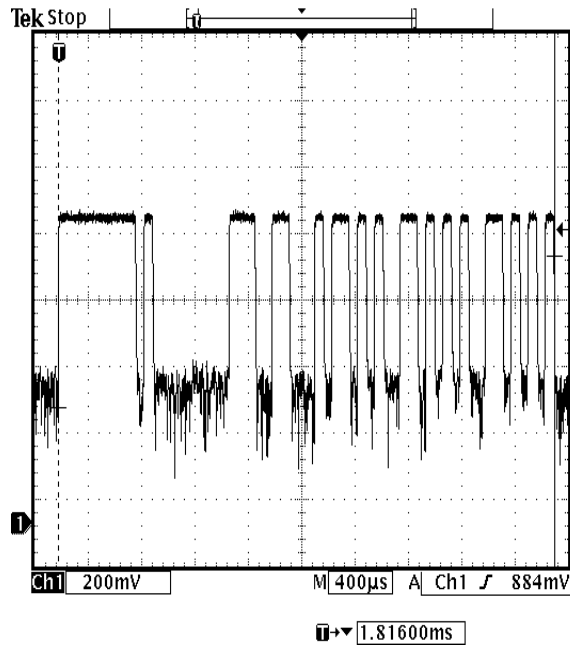
Issued: 1/13/2004

Pressure: 795 to 1050 mbar

Paragraph 15.35:

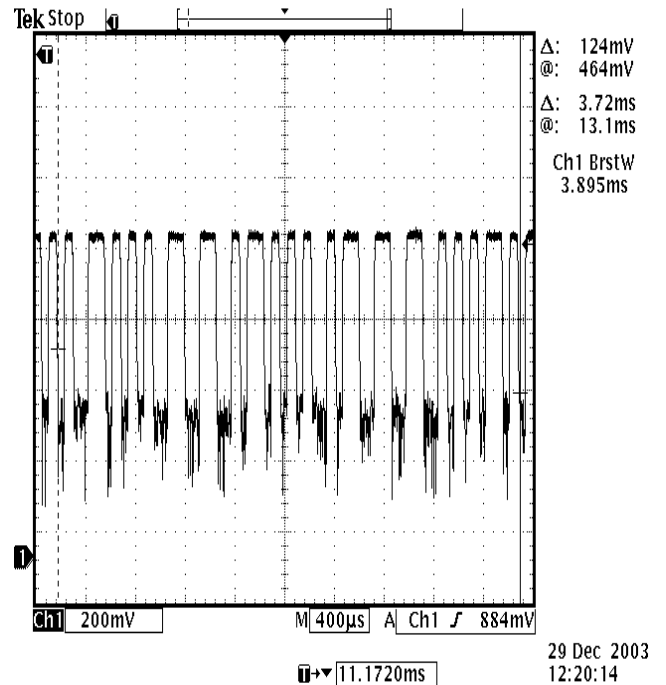
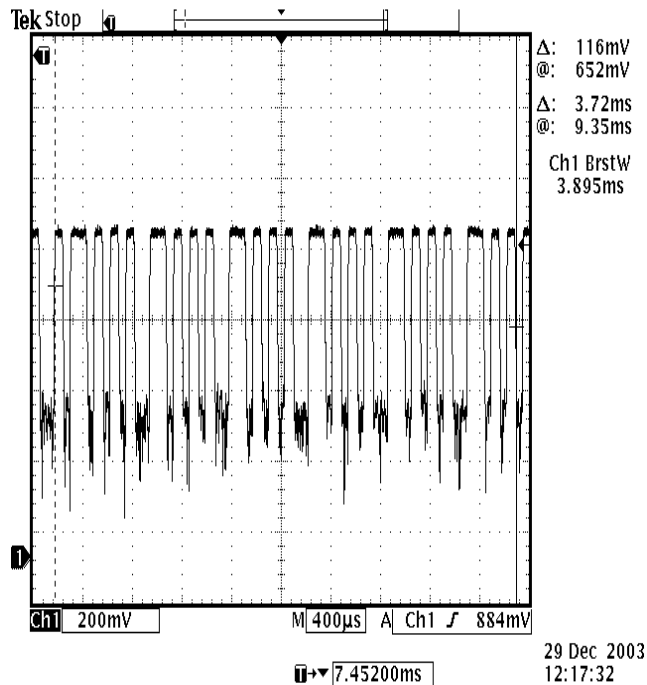
When the Radiated Limits are expressed in terms of the average value of the emissions, and pulse operation is employed, the pulse measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds (100ms) or in cases where the pulse train exceeds 0.1seconds the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value.





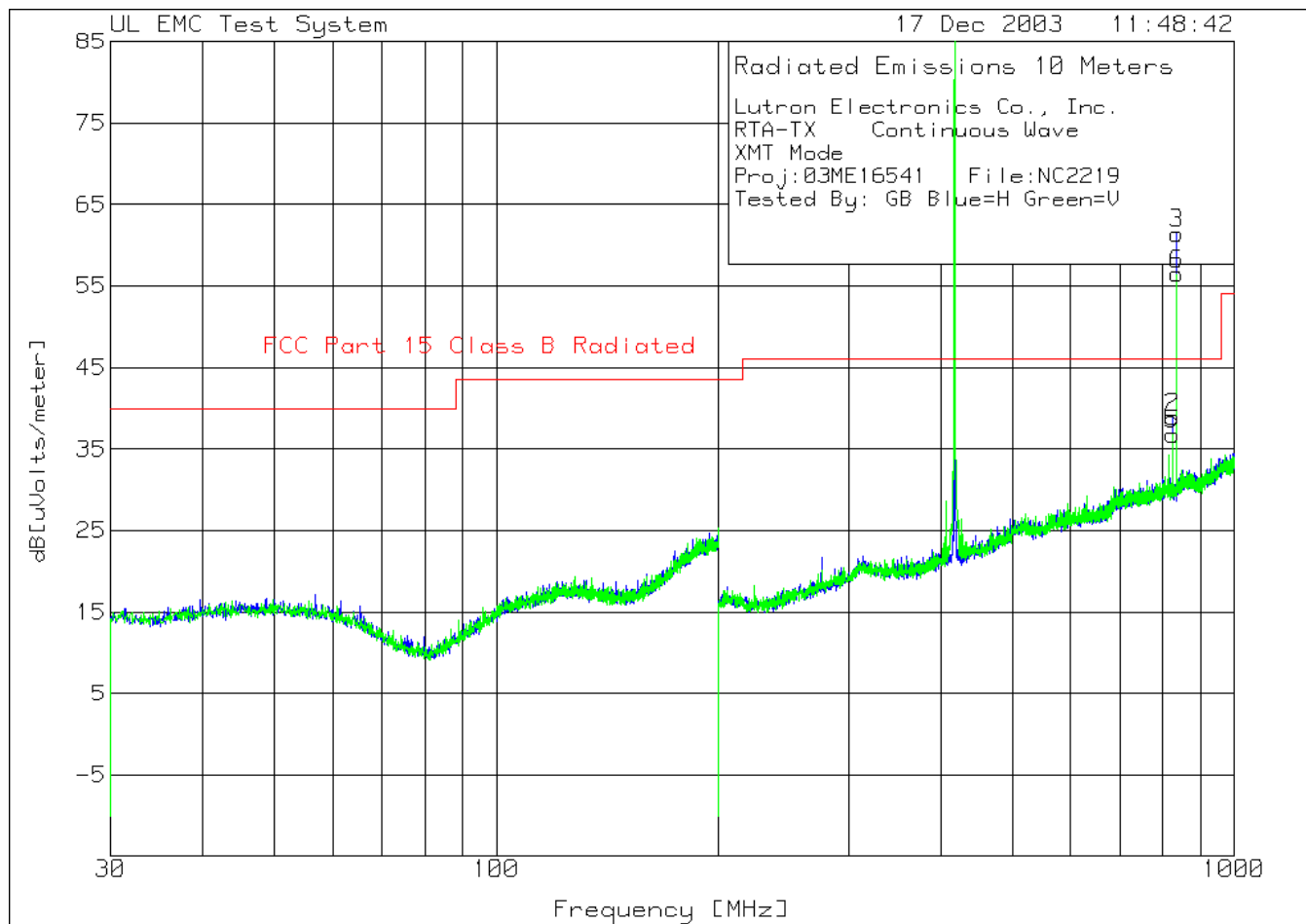
T= T₀ to T₁ = Individual Pulses

T= T₁ to T₂ = Individual Pulses



T= T₂ to T₃ = Individual Pulses

T= T₃ to T₄ = Individual Pulses



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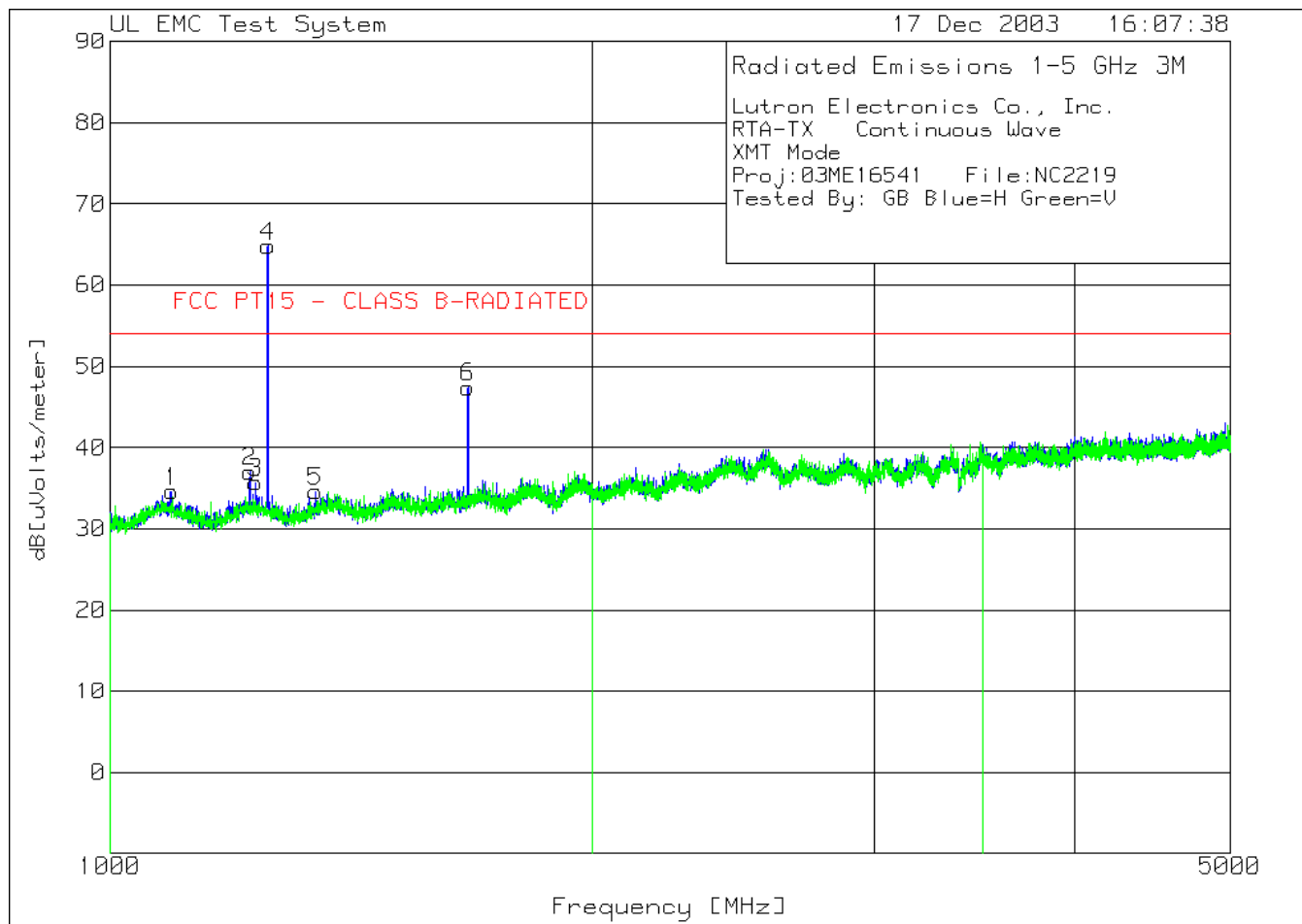
Lutron Electronics Co., Inc.
RTA-TX Continuous Wave
XMT Mode
Proj:03ME16541 File:NC2219
Tested By: GB Blue=H Green=V

No.	Test Frequency [MHz]	Meter Reading [dB (uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit:1	Limit 2
=====							
Horizontal 200 - 1000MHz -----							
1	417.9397	*50.89 pk	2.9	16.4	*70.19	46	80.3
	Azimuth:358	Height:99	Horz	Margin [dB]		47.19	-9.4
2	825.2761	12.83 pk	4.2	21.9	38.93	46	60.3
	Azimuth:65	Height:99	Horz	Margin [dB]		-7.07	-21.37
3	836.2131	*11.94 pk	4.2	22.3	*38.44	46	60.3
	Azimuth:65	Height:99	Horz	Margin [dB]		15.44	-21.86
Vertical 200 - 1000MHz -----							
4	417.9397	*56.66 pk	2.9	16.4	*75.96	46	80.3
	Azimuth:225	Height:198	Vert	Margin [dB]		52.96	-4.34
5	825.5428	10.67 pk	4.2	21.9	36.77	46	60.3
	Azimuth:359	Height:100	Vert	Margin [dB]		-9.23	-23.53
6	836.2131	*6.98 pk	4.2	22.3	*33.48	46	60.3
	Azimuth:321	Height:100	Vert	Margin [dB]		10.48	-26.82

LIMIT 1: FCC Part 15 Subpart B ClB (3M)
LIMIT 2: FCC Part 15 Subpart C-Section 15.231

pk - Peak detector
qp - Quasi-Peak detector
av - Average detector
avlg - denotes average log detection
avem - denotes EMI average detection
tm - Trace Math Result

***Duty Cycle correction factor of -23.0 dB added to Average level.**



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Lutron Electronics Co., Inc.
RTA-TX Continuous Wave
XMT Mode
Proj:03ME16541 File:NC2219
Tested By: GB Blue=H Green=V

No.	Test Frequency [MHz]	Meter Reading [dB (uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit:1	Limit 2
=====							
Horizontal 1000 - 2000MHz -----							
1	1092.697	41.19 pk	-31.8	25.2	34.59	54	60.3
	Azimuth:262	Height:100	Horz	Margin [dB]		-19.41	
2	1222.074	42.76 pk	-31.4	25.7	37.06	54	60.3
	Azimuth:258	Height:100	Horz	Margin [dB]		-16.94	
3	1232.41	41.42 pk	-31.4	25.7	35.72	54	60.3
	Azimuth:10	Height:100	Horz	Margin [dB]		-18.28	
4	1254.084	*47.32 pk	-31.3	25.8	*41.82	54	60.3
	Azimuth:18	Height:100	Horz	Margin [dB]		10.82	-18.48
5	1343.447	39.61 pk	-31.1	26.1	34.61	54	60.3
	Azimuth:1	Height:100	Horz	Margin [dB]		-19.39	
6	1672.223	50.03 pk	-30.1	27.5	47.43	54	60.3
	Azimuth:343	Height:100	Horz	Margin [dB]		-6.57	

LIMIT 1: FCC Part 15 Subpart B ClB (3M)
LIMIT 2: FCC Part 15 Subpart C-Section 15.231

pk - Peak detector
qp - Quasi-Peak detector
av - Average detector
avlg - denotes average log detection
avem - denotes EMI average detection
tm - Trace Math Result

***Duty Cycle correction factor of -23.0 dB added to Average level.**

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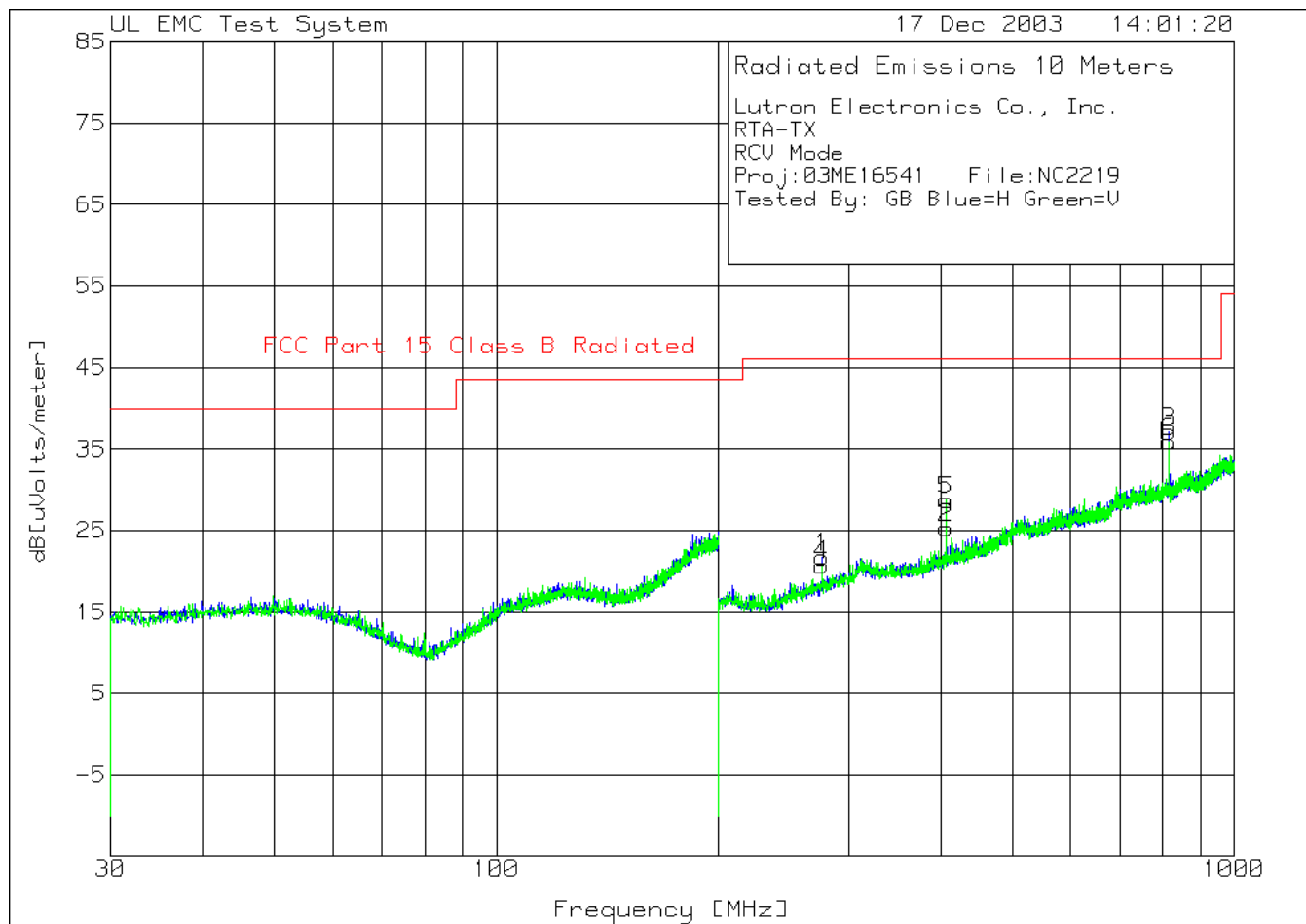
Issued: 1/13/2004

Lutron Electronics Co., Inc.
RTA-TX Continuous Wave
XMT Mode
Proj:03ME16541 File:NC2219
Tested By: GB Blue=H Green=V

Test Frequency [MHz]	Meter Reading [dB (uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit:1
=====					
Horizontal 1000 - 2000MHz					
1256.513	27.82	avem	-31.3	25.8	22.32 54
Azimuth: 215 Height:100 Horz			Margin [dB]: -31.68		
1672.2952	27.36	avem	-30.1	27.5	24.76 54
Azimuth: 26 Height:100 Horz			Margin [dB]: -29.24		
1092.7652	29.08	avem	-31.8	25.2	22.48 54
Azimuth: 72 Height:100 Horz			Margin [dB]: -31.52		
1222.1452	28.17	avem	-31.4	25.7	22.47 54
Azimuth: 143 Height:100 Horz			Margin [dB]: -31.53		
1232.4852	28.18	avem	-31.4	25.7	22.48 54
Azimuth: 157 Height:101 Horz			Margin [dB]: -31.52		
1343.5152	27.59	avem	-31.1	26.1	22.59 54
Azimuth: 122 Height:102 Horz			Margin [dB]: -31.41		

LIMIT 1: FCC Part 15 Subpart B ClB (3M)
LIMIT 2: FCC Part 15 Subpart C-Section 15.231

pk - Peak detector
qp - Quasi-Peak detector
av - Average detector
avlg - Average log detector
avem - EMI Average detector



File Number: NC2219
Project Number: 03ME16541
Model Number: RTA-TX
FCC ID: JPZ0030

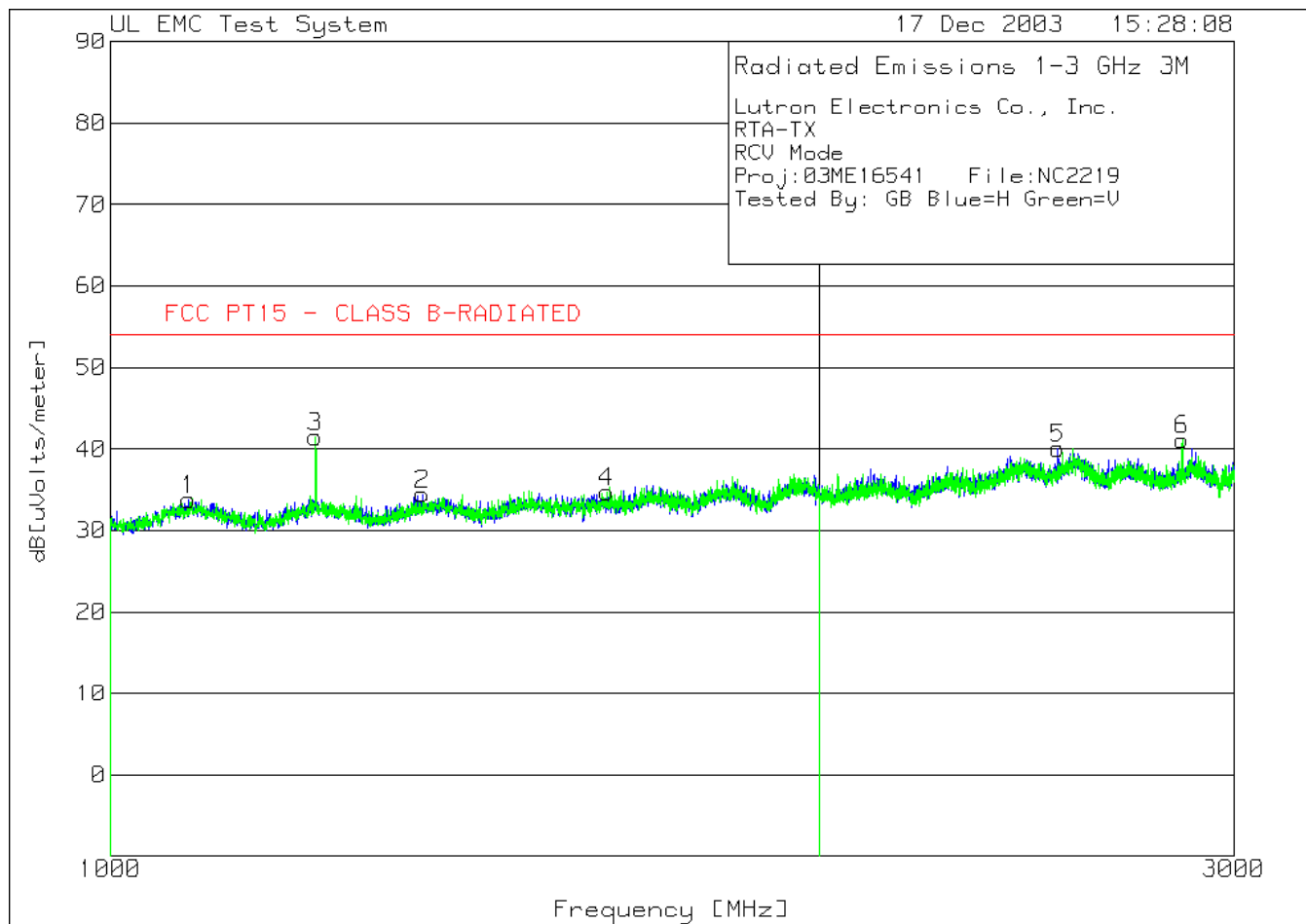
Issued: 1/13/2004

Lutron Electronics Co., Inc.
RTA-TX
RCV Mode
Proj:03ME16541 File:NC2219
Tested By: GB Blue=H Green=V

No.	Test Frequency [MHz]	Meter Reading [dB (uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit:1
=====						
Horizontal 200 - 1000MHz -----						
1	276.2922	5.81 pk	2.4	13.5	21.71	46
	Azimuth:358	Height:99	Horz	Margin [dB]		-24.29
2	407.2694	6.21 pk	2.9	16.2	25.31	46
	Azimuth:224	Height:99	Horz	Margin [dB]		-20.69
3	814.6058	10.83 pk	4.2	22.1	37.13	46
	Azimuth:258	Height:99	Horz	Margin [dB]		-8.87
Vertical 200 - 1000MHz -----						
4	276.0255	4.83 pk	2.4	13.5	20.73	46
	Azimuth:358	Height:198	Vert	Margin [dB]		-25.27
5	407.2694	9.63 pk	2.9	16.2	28.73	46
	Azimuth:22	Height:198	Vert	Margin [dB]		-17.27
6	814.6058	9.59 pk	4.2	22.1	35.89	46
	Azimuth:2	Height:101	Vert	Margin [dB]		-10.11

LIMIT 1: FCC Part 15 Class B Radiated

pk - Peak detector
qp - Quasi-Peak detector
av - Average detector
avlg - denotes average log detection
avem - denotes EMI average detection
tm - Trace Math Result



File Number: NC2219
Project Number: 03ME16541
Model Number: RTA-TX
FCC ID: JPZ0030

Issued: 1/13/2004

Lutron Electronics Co., Inc.
RTA-TX
RCV Mode
Proj:03ME16541 File:NC2219
Tested By: GB Blue=H Green=V

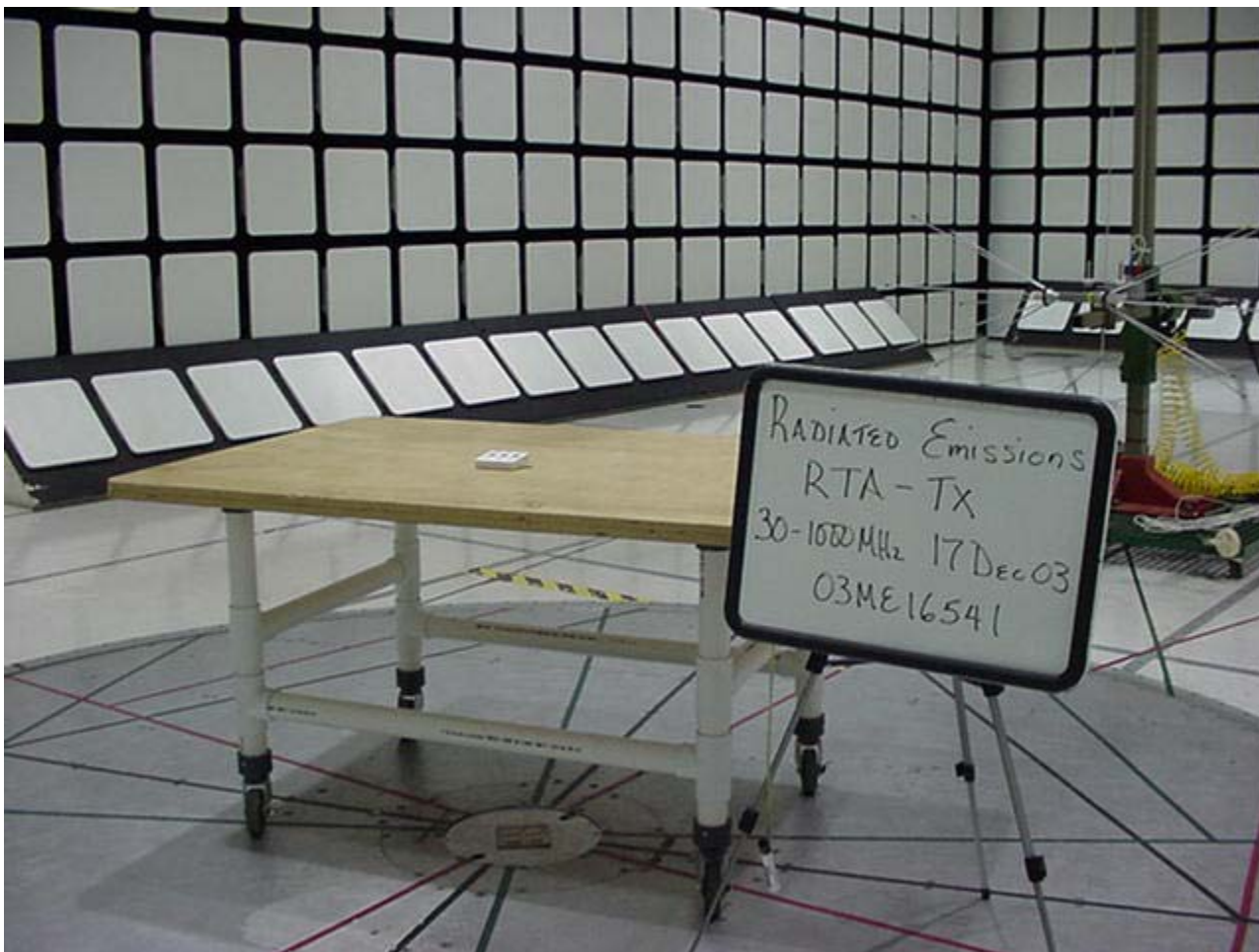
No.	Test Frequency [MHz]	Meter Reading [dB (uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit:1
=====						
Horizontal 1000 - 2000MHz -----						
1	1079.36	40.39 pk	-31.8	25.2	33.79	54
	Azimuth:166	Height:198	Horz	Margin [dB]		-20.21
2	1356.452	39.26 pk	-31	26.2	34.46	54
	Azimuth:356	Height:99	Horz	Margin [dB]		-19.54
4	1624.541	37.72 pk	-30.2	27.2	34.72	54
	Azimuth:65	Height:99	Horz	Margin [dB]		-19.28
Horizontal 2000 - 3000MHz -----						
5	2525.508	36.18 pk	-26.7	30.6	40.08	54
	Azimuth:84	Height:100	Horz	Margin [dB]		-13.92
Vertical 1000 - 2000MHz -----						
3	1221.74	47.19 pk	-31.4	25.7	41.49	54
	Azimuth:212	Height:100	Vert	Margin [dB]		-12.51
Vertical 2000 - 3000MHz -----						
6	2851.616	37.43 pk	-27.5	31.2	41.13	54
	Azimuth:357	Height:100	Vert	Margin [dB]		-12.87

LIMIT 1: FCC PT15 - CLASS B-RADIATED

pk - Peak detector
qp - Quasi-Peak detector
av - Average detector
avlg - denotes average log detection
avem - denotes EMI average detection
tm - Trace Math Result



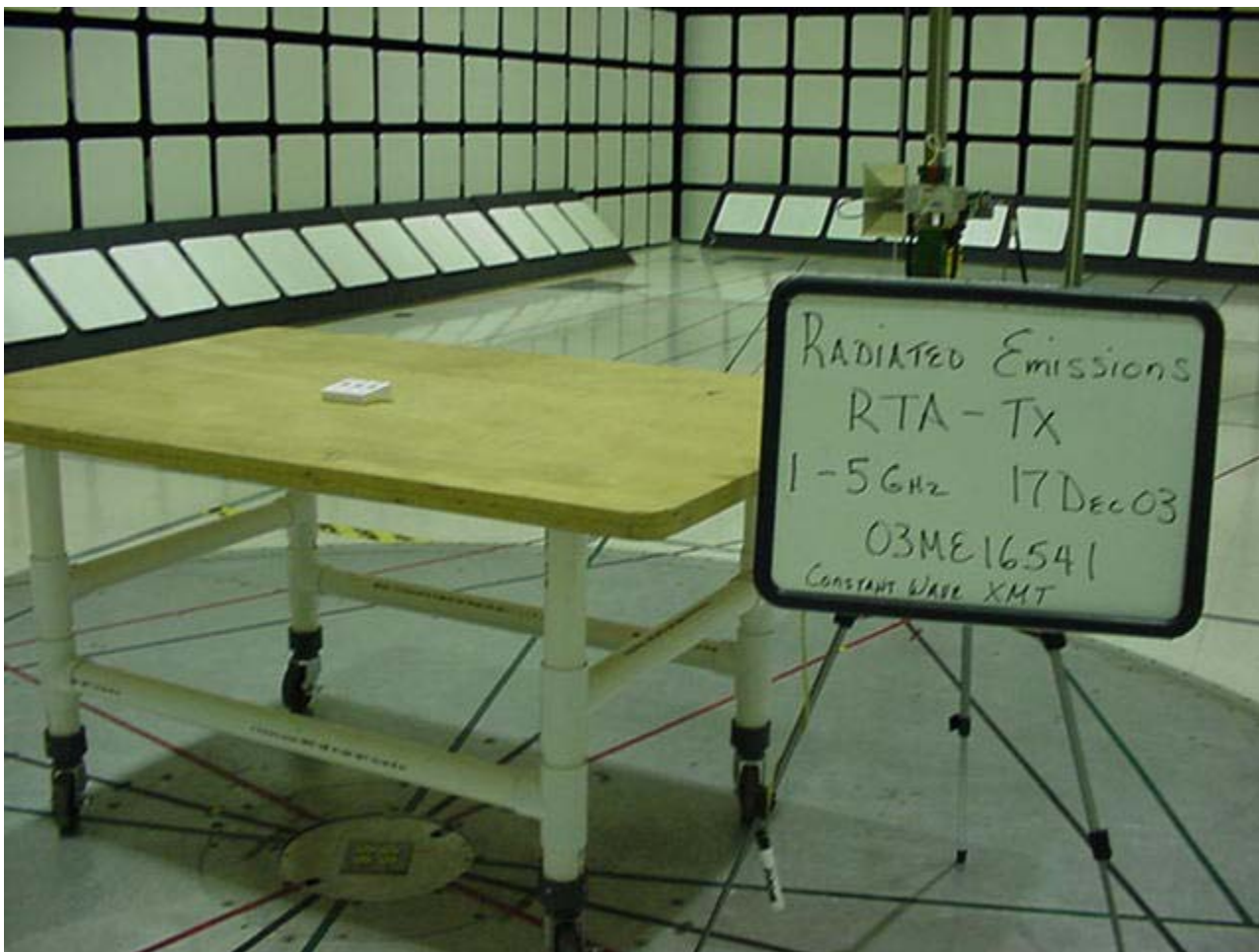
Radiated Emission Test Setup 30MHz to 1000MHz Front View



Radiated Emission Test Setup 30MHz to 1000MHz Rear View



Radiated Emission Test Setup 1GHz to 5GHz Front View



Radiated Emission Test Setup 1GHz to 5GHz Rear View

5.1.2 Occupied Bandwidth

Test Applicable

The bandwidth of the emissions shall be no wider than 0.25% of the center frequency for the devices operating above 70 MHz and below 900 MHz. Bandwidth is determined at the points 20 dB down from the modulated carrier.

418MHz

Bandwidth = 0.25% of 418MHz = 1.045MHz

Results

The system met the requirements for Occupied Bandwidth. Data Pages follow.

Temperature:	21.5°C
Humidity:	37%RH
Pressure:	1015Mbar
Date test performed:	26 December 2003

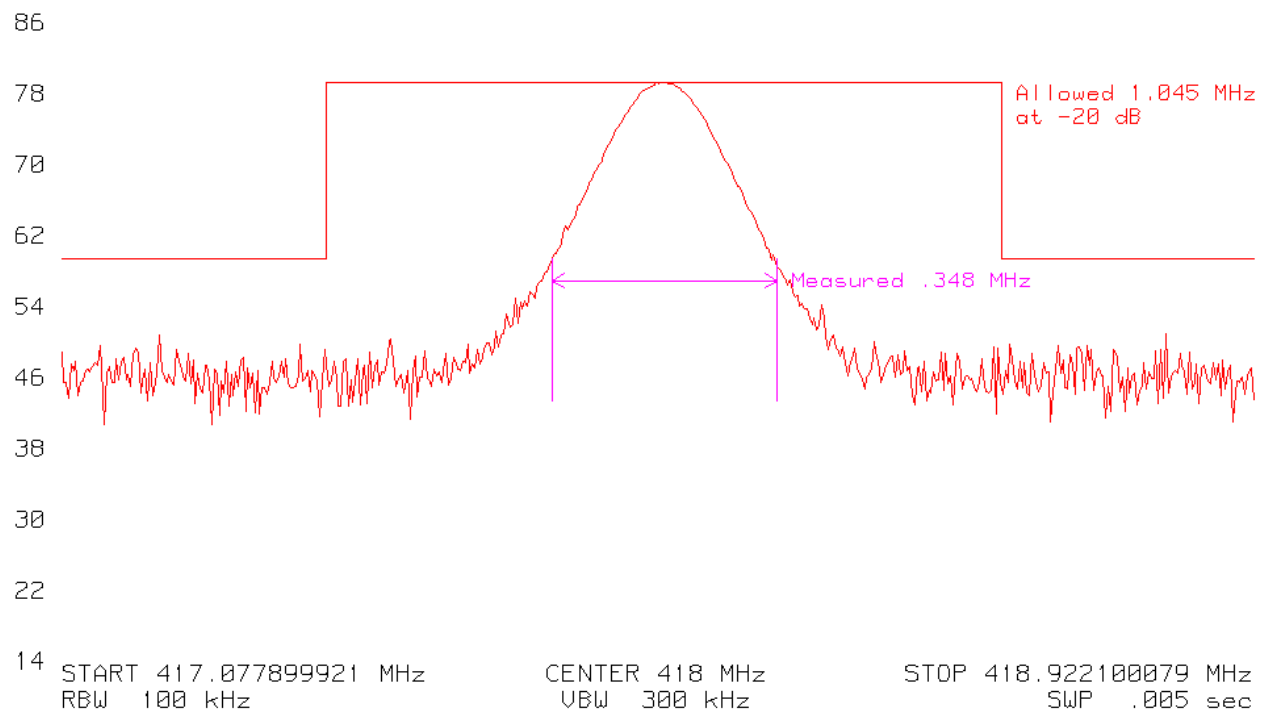
Test equipment used for Occupied Bandwidth Measurements:

ESI26	Rhode & Schwartz	EMI Receiver	Equipment No.: ME5B-081
		Quasi Peak BW:	200Hz
		RBW	10 KHz
		Quasi Peak BW:	9kHz
		RBW	100 KHz
		Quasi Peak BW:	120 kHz
		RBW	1.0 MHz
Range: 30MHz – 5GHz	Last Calibration Date: 28 August 2003		Calibration Due Date: 31 August 2004

Test Accessories for Radiated Emissions:

3121C-DB4	EMCO	Dipole Antenna	Equipment No.: ME-751
Last Calibration Date:	6 March 2003		Calibration Due Date: 6 March 2004
99760-00	Cole –Parmer	Hydrometer/Temp/Barometer	Equipment No.: ME4-268
Ranges: Temp:0°C-55°C			
Humidity 25% to 95 %RH			
Pressure 795 to 1050 mbar			
Last Calibration Date: 27 May 03			Calibration Due Date: 27 May 04

REF 94 dBuV ATT 0 + 0 dB





Occupied Bandwidth Test Set-Up

5.1.3 Fundamental Frequency and Spurious Emissions Measurement Limit Calculations

Limit Calculation

Fundamental Frequency is 418MHz

From table in section 15.231

Limit = $41.6667(418) - 7083.3333$

Limit = 10333.348uV

Limit = $\text{Log } 10333.348 (20)$

Limit = 80.3dBuV

Limit for Spurious Emissions = 20dB lower then fundamental = 60.3dBuV/m

Radiated Emissions Limit conversion from $\mu\text{V/m}$ to dB $\mu\text{V/m}$ (accordance with paragraph 15.109)

Radiated Emissions Limit (dB $\mu\text{V/m}$) = $20 \cdot \log (\mu\text{V/m})$

Radiated Emissions Limit (dB $\mu\text{V/m}$) = $20 \cdot \log (90)$

Radiated Emissions Limit (dB $\mu\text{V/m}$) = 39.1

Radiated Emissions test data obtained during measurements.

Field Strength (dB $\mu\text{V/m}$) = Measured field strength (dB $\mu\text{V/m}$) + Antenna Factor (dB) + Cable Factor (dB)

Field Strength (dB $\mu\text{V/m}$) = 19.7dB $\mu\text{V/m}$ + 12.5dB + 0.3dB

Field Strength (dB $\mu\text{V/m}$) = 32.5

Duty Cycle Correction factor calculation.

Total number of pulses counted in 100ms

Total time on = 7.05ms

Duty cycle correction factor = $20 \log (7.05 / 100\text{ms})$

= $20 \log (0.0705)$

= - 23dB

The correction factor is added to the measured field strength in dBuV/m

Appendix A

Accreditations and Authorizations



NVLAP: Recognized under the National Voluntary Laboratory Accreditation Program (NVLAP) for satisfactory compliance with criteria established in Title 15, Part 285 Code of Federal Regulations. These criteria encompass the requirements of ISO/IEC EN17025 and the relevant requirements of ISO 9002 (ANSI/ASQC Q92-1987) as suppliers of calibration or test results. The specific scope includes IEC/CISPR 22:1997, Amendment 1:1995, Amendment 2:1997, EN 55022:1998, AS/NZS 1044, CNS 13438:1997, ANSI C63.4, FCC Method - 47 CFR Part 15, FCC Method - 47 CFR Part 68, AS/NZS 3548, IEC 61000-3-2, EN 61000-3-2, CISPR 14-1, EN 55014-1, AS/NZS 1044, CNS 13783-1, CISPR 22, IEC 61000-4-2, IEC 61000-4-3, IEC 61000-4-4, IEC 61000-4-5, IEC 61000-4-6, IEC 61000-4-8, and IEC 61000-4-11 testing. NVLAP Lab code: 100255-0.



FCC: Details of the measurement facilities used for these tests have been filed with the Federal Communications Commission's Laboratory in Columbia, Maryland and accepted in a letter dated September 24, 1997 (Ref. No. 91040).



Industry Canada Industrie Canada

Industry of Canada: Accredited by Industry Canada for performance of radiated measurements. Our test site complies with RSP 100, Issue 7, and Section 3.3. File #: IC 2181



VCCI: Accepted as an Associate Member to the VCCI. The measurement facilities detailed in this test report have been registered in accordance with Regulations for Voluntary Control Measures, Article 8. Registration Nos.: (Radiated Emissions) R-797, (Conducted Emissions) C-832, C-833, C-834 and (Conducted Emissions - Telecommunications Ports) T-160.



ICASA: ICASA (Independent Communications Authority of South Africa) has appointed UL as a Designated Test Laboratory to test Telecommunications equipment for type approval in compliance with CISPR 22 to assist in fulfilling its mandate under section 54(1) of the Telecommunications Act, 1996 (Act 103 of 1996).



NIST/CAB: Validated by the European Commission as a U.S. Conformity Assessment Body (CAB) of the U.S.-EU Mutual Recognition Agreement (MRA) for the Electromagnetic Compatibility - Council Directive 89/336/EEC, Article 10 (2). Also validated for the Telecommunication Equipment-Council Directive 99/5/EC, Annex III and IV, Identification Number: 0983.

NIST/CAB: Provisioned to act as a U.S. Conformity Assessment Body (CAB) under Appendix B, Phase I Procedures, of the Asia Pacific Economic Cooperation (APEC) MRA between the American Institute in Taiwan (AIT) and the United States. Our laboratory is considered qualified to test equipment subject to the applicable EMC regulations of the Chinese Taipei Bureau of Standards, Metrology and Inspection (BSMI) which require testing to CNS 13438 (CISPR 22).

NIST/CAB: Recognized by the Infocomm Development Authority of Singapore (IDA) under the Asia Pacific Economic Cooperation Mutual Recognition Agreement (APEC MRA). Our laboratory is provisionally designated to act as a Conformity Assessment Body (CAB) under Appendix B, Phase I Procedures, of the APEC MRA. Our scope of designation includes IDA TS EMC (CISPR 22), IEC 61000-4-2, -4-3, -4-4, -4-5, and -4-6. U.S. Identifier Number: US0113