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**Report of Measurements
of Electromagnetic Compatibility Testing**

Test Report File No. : **MC2219** Date of issue: January 28, 2002
Applicant : Lutron Electronics Co. Inc.
Model / Serial No. : RB-GRX-3 /
Product Type : Light Dimmer
Power Supply : 120Vac, 60Hz
Manufacturer : Same As Applicant
License holder : Same As Applicant
Address : 7200 Suter Road
: Coopersburg, PA 18036
Test Type : **Compliance Investigation**
 Manufacturer's Specification
Test Project Number : 01ME23496
References(s) : FCC ID: JPZ0019

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1.0 G E N E R A L - Product Description

Device Function: The RB-GRX-3 is a wall mounted 3-zone dimmer. It contains a super-heterodyne receiver, a saw stabilized transmitter, and an antenna. It is used as part of an integrated lighting control system. The purpose of the RF communication is to transmit and receive command signals. Received command signals allow the RB-GRX-3 to turn zones of light ON or OFF in response to commands from the Lutron RBMC-XX master control keypads and the Lutron RB-REP. Transmitted command signals acknowledge the state of the RB-GRX-3 to the rest of the RadioRA system in response to manual button presses on a master control keypad.

RF Function: The receiver down converts a 433.92MHz carrier frequency using a 423.22MHz local oscillator producing a 10.7MHz IF signal. The signal is further processed to decode data. The transmitter uses a SAW oscillator and power amplifier, which is keyed ON/OFF to produce the modulated carrier. The RB-GRX-3 contains a micro controller running at 4MHz to ensure that all transmissions stop within 5 seconds of the button release or within 5 seconds on the beginning of the transmission. A transmission actuated automatically shall cease transmission within 5 seconds after activation. Modulation is AM, specifically ON/OFF Keyed (OOK) or sometimes called Amplitude Shift Keyed (ASK) data at 15.625kbps. The antenna cannot be modified or easily replaced by the user.

Analog Function: The RB-GRX-3 obtains power through standard household wiring. The power supply and voltage regulator produce a 5V DC output, which is used to power all analog and micro controller activities.

1.1 Device Configuration During Test

The device under test was tested in normal orientation that represents the worst case orientation. The device is normally mounted in a vertical wall.

The device was tested in two modes of operation:

Continuously transmitting an intentional radio frequency in continuous wave (CW).

Standby mode. Device waiting to receive a signal source.

The manufacturer configured the device.

The device was powered with 120VAC, 60Hz.

"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"

1.2 Deviations from ANSI C63.4

Not Applicable

As described below:

1.3 Device Modifications Necessary for Compliance

- N/A
- As described below:

To comply with the conducted emissions requirements, the device needed the following modification implemented.

In the power section of the device, a 0.1uF, 400V capacitor was added between Pin #1 of Tran1 and Pin #5 (common) on U8.

1.4 Test Summary

Test	Basic Standard	Considered	Tested	In Compliance
Conducted Voltage Emissions	FCC Part 15	✓	✓	✓
Radiated Emissions	FCC Part 15	✓	✓	✓

Environmental conditions in the lab:

	<u>Range</u>
Temperature:	20-25°C
Relative Humidity	30 - 60 %
Atmospheric pressure	680 - 1060 mbar

2.0 EMISSIONS TEST REGULATIONS

FCC Part 15, Subpart C, 15.231, 15.209, 15.205, 15.207

2.1 EUT OPERATION MODE - EMISSIONS TESTS

- Standby
- Test program (H-Pattern)
- Test program (color bar)
- Test program (customer specific)
- Practice operation
- Normal operation Mode:
- As per manufacturer's instructions: Continuous wave (CW) at 434MHz and standby mode.

2.1.1 Conducted Emissions Tests

Test Applicable Test Not Applicable

Frequency range on each side of line.

<input type="checkbox"/> 9kHz to 30MHz	<input type="checkbox"/> Voltage	<input type="checkbox"/> Current
<input type="checkbox"/> 10kHz to 30MHz	<input type="checkbox"/> Voltage	<input type="checkbox"/> Current
<input type="checkbox"/> 20kHz to 30MHz	<input type="checkbox"/> Voltage	<input type="checkbox"/> Current
<input type="checkbox"/> 150kHz to 30MHz	<input type="checkbox"/> Voltage	<input type="checkbox"/> Current
<input checked="" type="checkbox"/> 450kHz to 30 MHz	<input checked="" type="checkbox"/> Voltage	<input type="checkbox"/> Current
<input type="checkbox"/> 500kHz to 30MHz	<input type="checkbox"/> Voltage	<input type="checkbox"/> Current

Measurement Point

<input type="checkbox"/> Mains	<input type="checkbox"/> I/O Lines
<input type="checkbox"/> Mains	<input type="checkbox"/> I/O Lines
<input type="checkbox"/> Mains	<input type="checkbox"/> I/O Lines
<input type="checkbox"/> Mains	<input type="checkbox"/> I/O Lines
<input checked="" type="checkbox"/> Mains	<input type="checkbox"/> I/O Lines
<input type="checkbox"/> Mains	<input type="checkbox"/> I/O Lines

Line Description:

Line Number	Type/Designation
1	Hot side of line / receive mode
2	Neutral side of line / receive mode
3	Hot side of line / transmit mode
4	Neutral side of line / transmit mode

Test equipment used for conducted emissions:

R3261C **Advantest** **Spectrum Analyzer** **Equipment No.: ME5A-229**
Resolution BW: 100kHz
Video BW: 100kHz
QP BW: 10kHz

Range: .450 –30MHz Last Calibration Date: 22 June 01 Calibration Due Date: 22 June 02

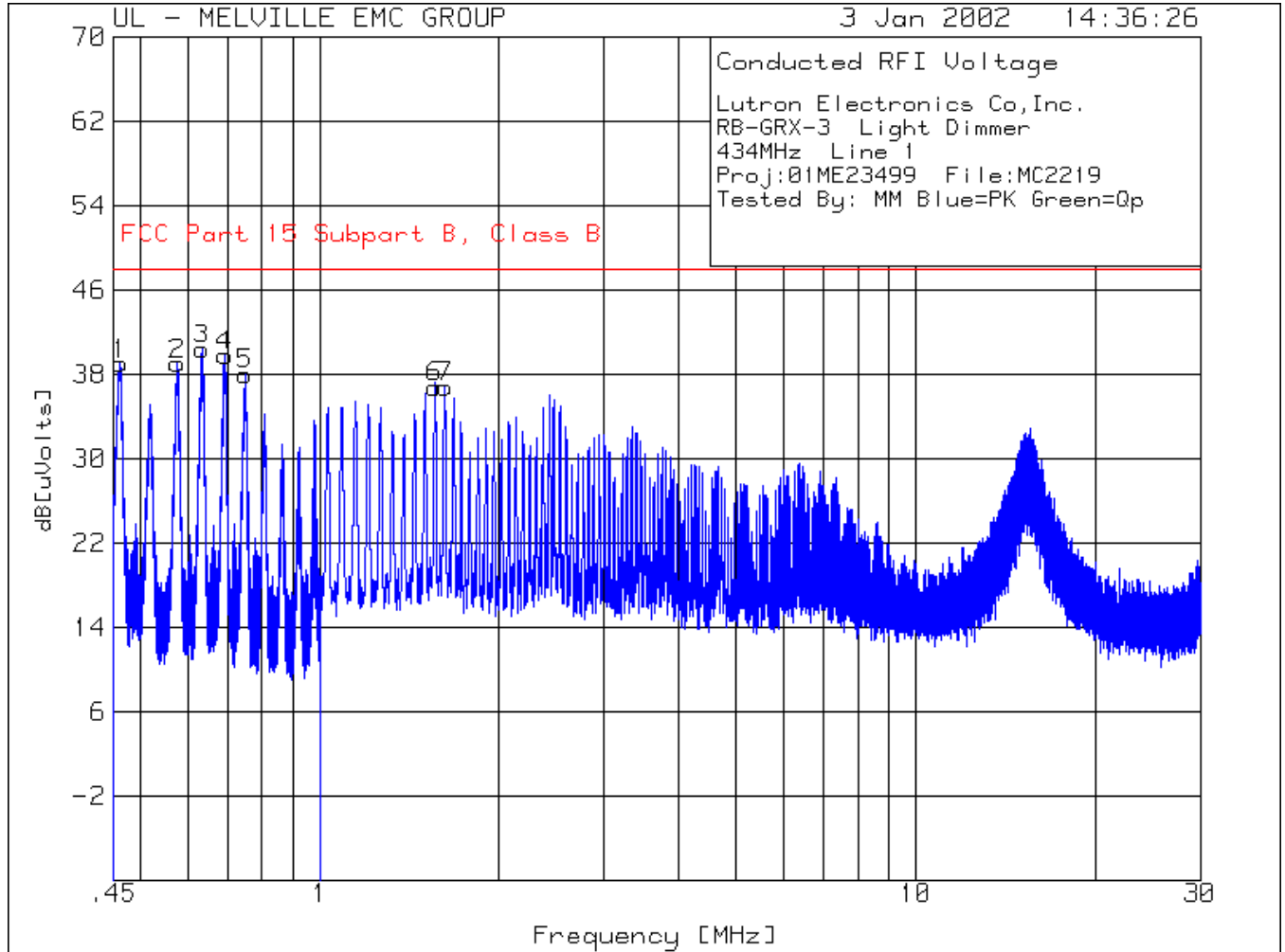
R3551 **Advantest** **Pre-Selector** **Equipment No.: ME5A-228**

Range: .450 –30MHz Last Calibration Date: 31 July 01 Calibration Due Date: 31 July 02

Test Accessories for Conducted Emissions:

11947A **Hewlett Packard** **Transient Limiter** **Equipment No.: ME5A-443**
 Last Calibration Date: 25 January 01 Calibration Due Date: 21 January 02

9252-50-R-24-BNC **Solar Electronics** **LISN** **Equipment No.: ME5A-636**
 Last Calibration Date: 14 August 01 Calibration Due Date: 14 August 02



File Number: MC2219
 Project Number: 01ME23496
 Model Number: RB-GRX-3

Issued: January 28, 2002

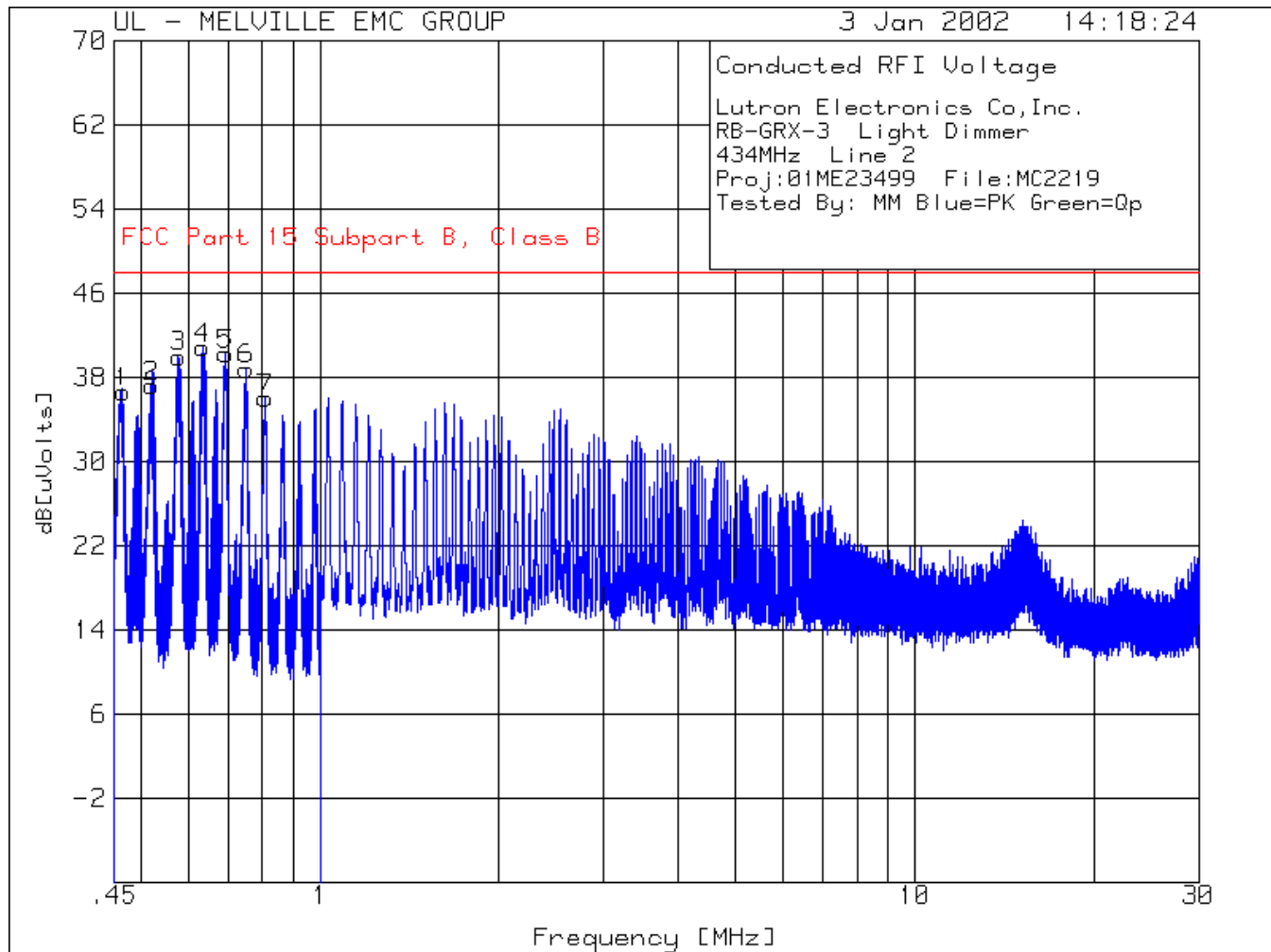
FCC ID: JPZ0019

Lutron Electronics Co, Inc.
 RB-GRX-3 Light Dimmer
 434MHz Line 1
 Proj:01ME23499 File:MC2219
 Tested By: MM Blue=PK Green=Qp

No.	Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level Limit:1 [dB]	2	3	4
1	.46229	28.9 pk	10.1	0	39	47.9	N/A	N/A
	Azimuth: N/A	Height: N/A		Margin [dB]	-8.9		N/A	N/A
2	.57688	28.9 pk	10.1	0	39	47.9	N/A	N/A
	Azimuth: N/A	Height: N/A		Margin [dB]	-8.9		N/A	N/A
3	.63472	30.3 pk	10.1	0	40.4	47.9	N/A	N/A
	Azimuth: N/A	Height: N/A		Margin [dB]	-7.5		N/A	N/A
4	.69314	29.7 pk	10.1	0	39.8	47.9	N/A	N/A
	Azimuth: N/A	Height: N/A		Margin [dB]	-8.1		N/A	N/A
5	.75008	27.9 pk	10.1	0	38	47.9	N/A	N/A
	Azimuth: N/A	Height: N/A		Margin [dB]	-9.9		N/A	N/A
6	1.55954	26.7 pk	10.1	0	36.8	47.9	N/A	N/A
	Azimuth: N/A	Height: N/A		Margin [dB]	-11.1		N/A	N/A
7	1.62005	26.7 pk	10.1	0	36.8	47.9	N/A	N/A
	Azimuth: N/A	Height: N/A		Margin [dB]	-11.1		N/A	N/A

LIMIT 1: FCC Part 15 Subpart B, Class B
 LIMIT 2: NONE
 LIMIT 3: NONE
 LIMIT 4: NONE

pk - Peak detector
 qp - Quasi-Peak detector
 av - Average detector
 tm - Trace Math Result



File Number: MC2219
 Project Number: 01ME23496
 Model Number: RB-GRX-3

Issued: January 28, 2002

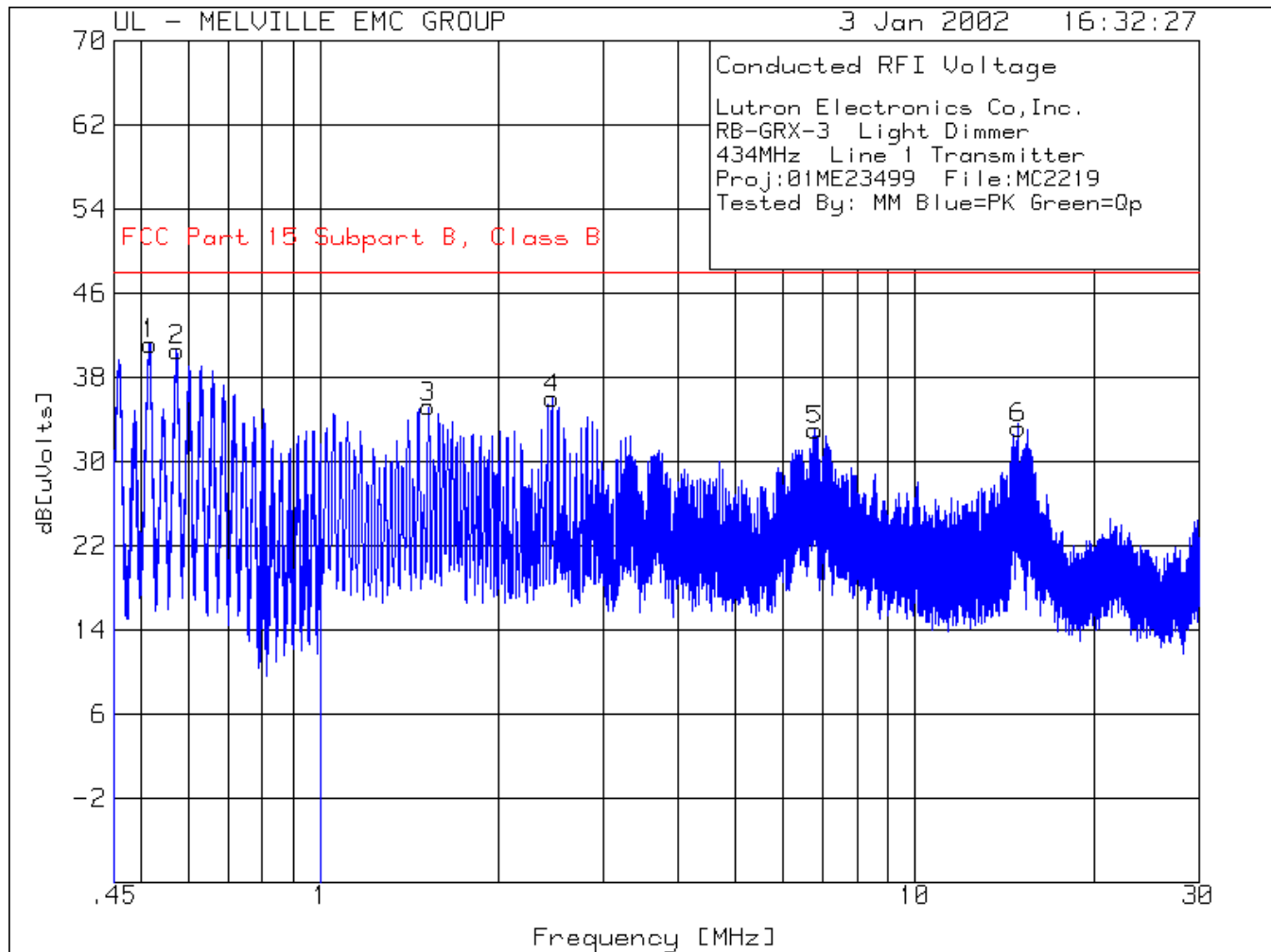
FCC ID: JPZ0019

Lutron Electronics Co, Inc.
 RB-GRX-3 Light Dimmer
 434MHz Line 2
 Proj:01ME23499 File:MC2219
 Tested By: MM Blue=PK Green=Qp

No.	Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Level Factor [dB]	Limit 1 dB[uVolts]	Limit 2	Limit 3	Limit 4
1	.46554	26.5 pk	10.1	0	36.6	47.9	N/A	N/A
	Azimuth: N/A	Height: N/A		Margin [dB]	-11.3		N/A	N/A
2	.52018	27.1 pk	10.1	0	37.2	47.9	N/A	N/A
	Azimuth: N/A	Height: N/A		Margin [dB]	-10.7		N/A	N/A
3	.57707	29.9 pk	10.1	0	40	47.9	N/A	N/A
	Azimuth: N/A	Height: N/A		Margin [dB]	-7.9		N/A	N/A
4	.63473	30.7 pk	10.1	0	40.8	47.9	N/A	N/A
	Azimuth: N/A	Height: N/A		Margin [dB]	-7.1		N/A	N/A
5	.69314	30.1 pk	10.1	0	40.2	47.9	N/A	N/A
	Azimuth: N/A	Height: N/A		Margin [dB]	-7.7		N/A	N/A
6	.75126	28.7 pk	10.1	0	38.8	47.9	N/A	N/A
	Azimuth: N/A	Height: N/A		Margin [dB]	-9.1		N/A	N/A
7	.8085	25.9 pk	10.1	0	36	47.9	N/A	N/A
	Azimuth: N/A	Height: N/A		Margin [dB]	-11.9		N/A	N/A

LIMIT 1: FCC Part 15 Subpart B, Class B
 LIMIT 2: NONE
 LIMIT 3: NONE
 LIMIT 4: NONE

pk - Peak detector
 qp - Quasi-Peak detector
 av - Average detector
 tm - Trace Math Result



File Number: MC2219
 Project Number: 01ME23496
 Model Number: RB-GRX-3

Issued: January 28, 2002

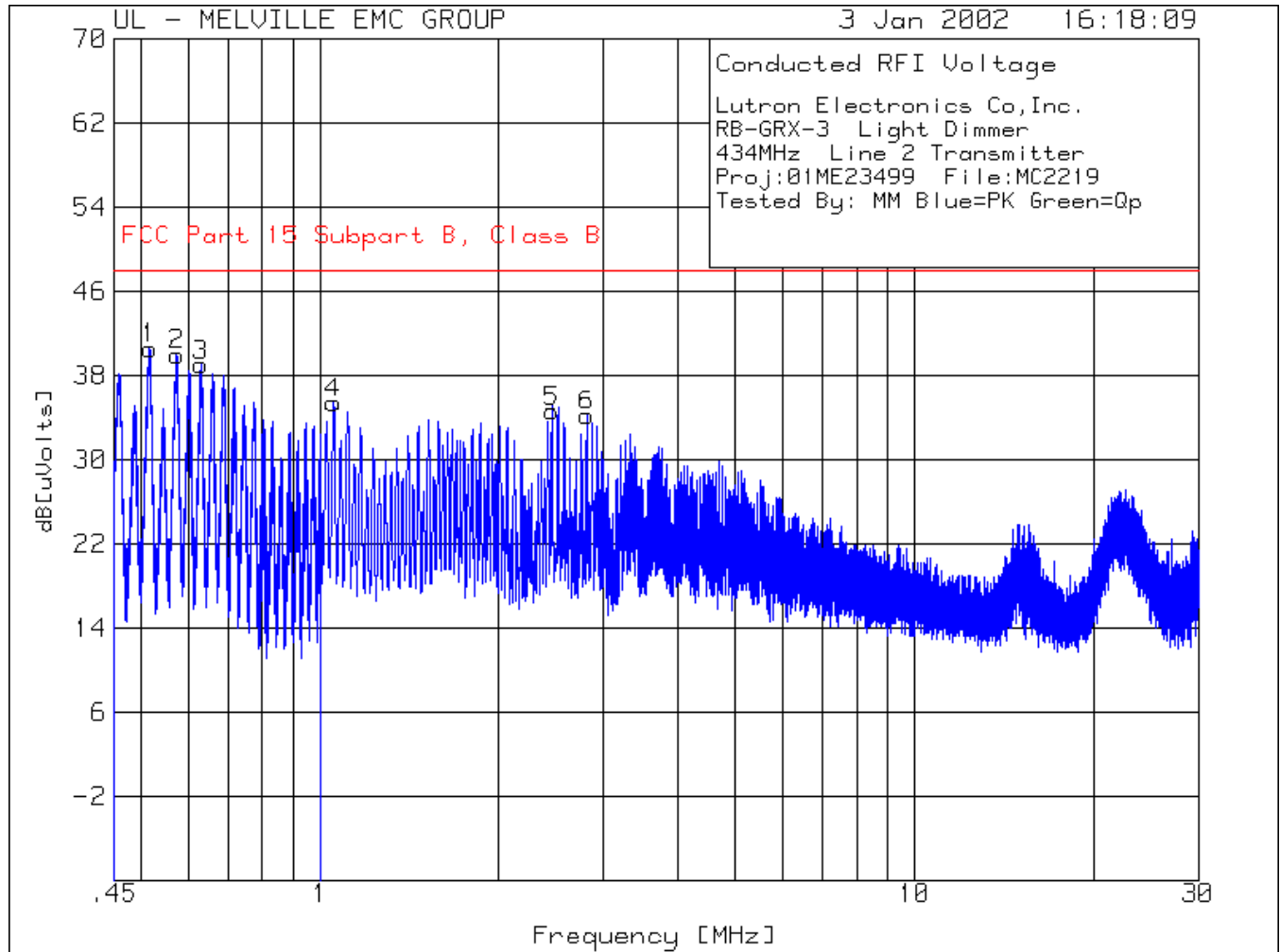
FCC ID: JPZ0019

Lutron Electronics Co, Inc.
 RB-GRX-3 Light Dimmer
 434MHz Line 1 Transmitter
 Proj:01ME23499 File:MC2219
 Tested By: MM Blue=PK Green=Qp

Test No.	Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level Limit:1 [dB]	2	3	4
1	.51727	31.1 pk	10.1	0	41.2	47.9	N/A	N/A
Azimuth: N/A		Height: N/A		Margin [dB]	-6.7	N/A	N/A	N/A
2	.57364	30.5 pk	10.1	0	40.6	47.9	N/A	N/A
Azimuth: N/A		Height: N/A		Margin [dB]	-7.3	N/A	N/A	N/A
3	1.52231	25.1 pk	10.1	0	35.2	47.9	N/A	N/A
Azimuth: N/A		Height: N/A		Margin [dB]	-12.7	N/A	N/A	N/A
4	2.45522	25.8 pk	10.2	0	36	47.9	N/A	N/A
Azimuth: N/A		Height: N/A		Margin [dB]	-11.9	N/A	N/A	N/A
5	6.79452	22.7 pk	10.3	0	33	47.9	N/A	N/A
Azimuth: N/A		Height: N/A		Margin [dB]	-14.9	N/A	N/A	N/A
6	14.93322	22.9 pk	10.3	0	33.2	47.9	N/A	N/A
Azimuth: N/A		Height: N/A		Margin [dB]	-14.7	N/A	N/A	N/A

LIMIT 1: FCC Part 15 Subpart B, Class B
 LIMIT 2: NONE
 LIMIT 3: NONE
 LIMIT 4: NONE

pk - Peak detector
 qp - Quasi-Peak detector
 av - Average detector
 tm - Trace Math Result



File Number: MC2219
 Project Number: 01ME23496
 Model Number: RB-GRX-3

Issued: January 28, 2002

FCC ID: JPZ0019

Lutron Electronics Co, Inc.
 RB-GRX-3 Light Dimmer
 434MHz Line 2 Transmitter
 Proj:01ME23499 File:MC2219
 Tested By: MM Blue=PK Green=Qp

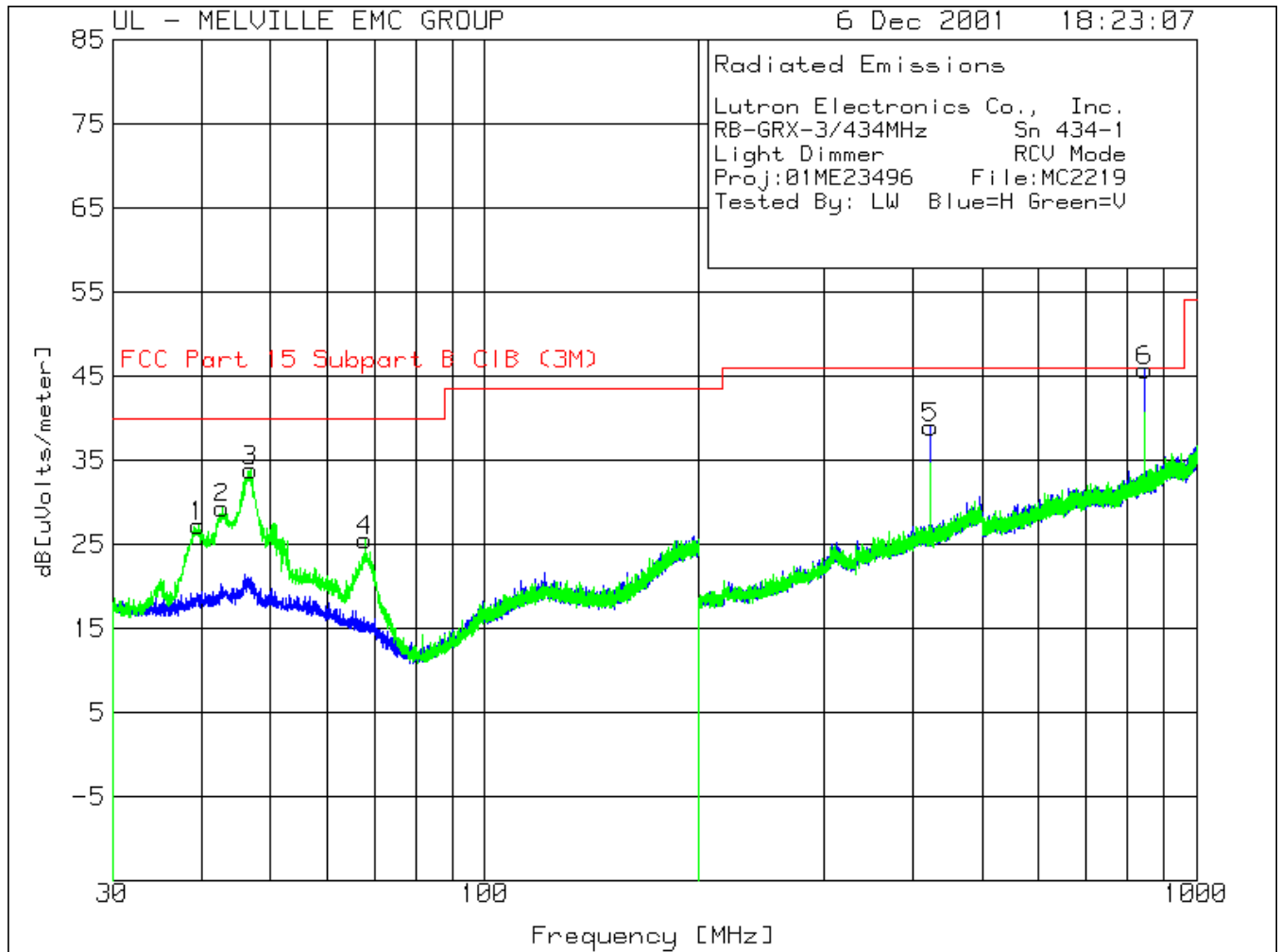
Test No.	Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level Limit:1 [dB]	2	3	4
1	.5166	30.5 pk	10.1	0	40.6	47.9	N/A	N/A
Azimuth: N/A		Height: N/A		Margin [dB]	-7.3	N/A	N/A	N/A
2	.57409	29.9 pk	10.1	0	40	47.9	N/A	N/A
Azimuth: N/A		Height: N/A		Margin [dB]	-7.9	N/A	N/A	N/A
3	.63176	28.9 pk	10.1	0	39	47.9	N/A	N/A
Azimuth: N/A		Height: N/A		Margin [dB]	-8.9	N/A	N/A	N/A
4	1.05378	25.3 pk	10.1	0	35.4	47.9	N/A	N/A
Azimuth: N/A		Height: N/A		Margin [dB]	-12.5	N/A	N/A	N/A
5	2.45419	24.4 pk	10.2	0	34.6	47.9	N/A	N/A
Azimuth: N/A		Height: N/A		Margin [dB]	-13.3	N/A	N/A	N/A
6	2.80791	24 pk	10.2	0	34.2	47.9	N/A	N/A
Azimuth: N/A		Height: N/A		Margin [dB]	-13.7	N/A	N/A	N/A

LIMIT 1: FCC Part 15 Subpart B, Class B
 LIMIT 2: NONE
 LIMIT 3: NONE
 LIMIT 4: NONE

pk - Peak detector
 qp - Quasi-Peak detector
 av - Average detector
 tm - Trace Math Result



Conducted Emissions test set-up



EUT in Receive (standby) mode

File Number: MC2219
 Project Number: 01ME23496
 Model Number: RB-GRX-3

Issued: January 28, 2002

FCC ID: JPZ0019

Lutron Electronics Co., Inc.
 RB-GRX-3/434MHz Sn 434-1
 Light Dimmer RCV Mode
 Proj:01ME23496 File:MC2219
 Tested By: LW Blue=H Green=V

Test No.	Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level [dB]	Limit:1	2	3	4
1	39.5129	13.7 pk	.9	12.6	27.2	40	N/A	N/A	N/A
Azimuth: 106		Height:99	Vert	Margin	[dB]	-12.8	N/A	N/A	N/A
2	42.7829	15.5 pk	1	12.8	29.3	40	N/A	N/A	N/A
Azimuth: 274		Height:99	Vert	Margin	[dB]	-10.7	N/A	N/A	N/A
3	46.8174	19.9 pk	1	12.9	33.8	40	N/A	N/A	N/A
Azimuth: 295		Height:99	Vert	Margin	[dB]	-6.2	N/A	N/A	N/A
4	67.8816	15.1 pk	1.2	9.2	25.5	40	N/A	N/A	N/A
Azimuth: 316		Height:99	Vert	Margin	[dB]	-14.5	N/A	N/A	N/A
5	423.0142	19.5 pk	3.1	16.3	38.9	46	N/A	N/A	N/A
Azimuth: 0		Height:400	Horz	Margin	[dB]	-7.1	N/A	N/A	N/A
6	845.995	18.8 pk	4.3	22.6	45.7	46	N/A	N/A	N/A
Azimuth: 65		Height:202	Horz	Margin	[dB]	-.3	N/A	N/A	N/A

LIMIT 1: FCC Part 15 Subpart B ClB (3M)
 LIMIT 2: NONE
 LIMIT 3: NONE
 LIMIT 4: NONE

pk - Peak detector
 qp - Quasi-Peak detector
 av - Average detector
 tm - Trace Math Result

File Number: MC2219
Project Number: 01ME23496
Model Number: RB-GRX-3

Issued: January 28, 2002

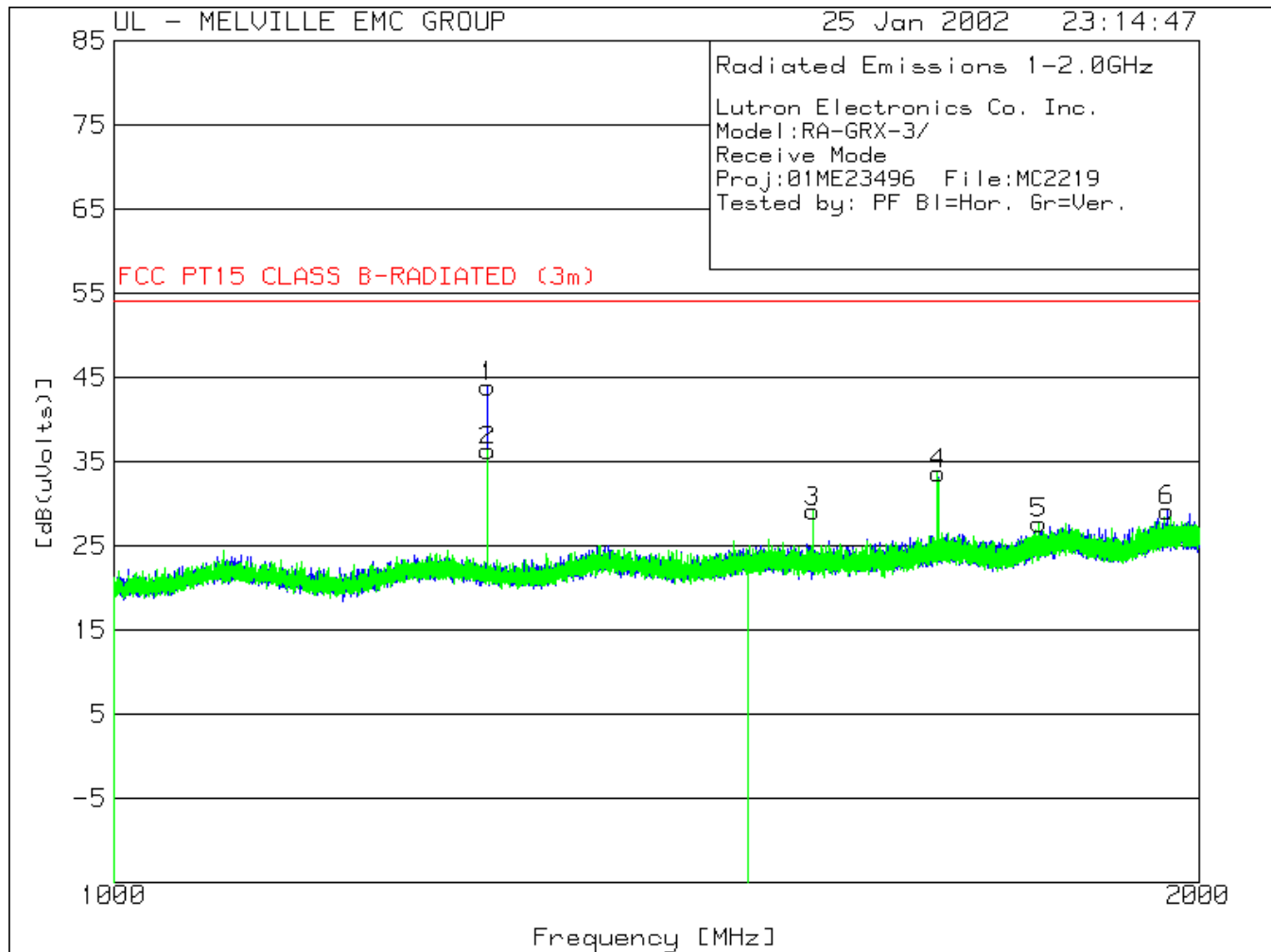
FCC ID: JPZ0019

Lutron Electronics Co., Inc.
RB-GRX-3/434MHz Sn 434-1
Light Dimmer RCV Mode
Proj:01ME23496 File:MC2219
Tested By: LW Blue=H Green=V

Test	Meter	Gain/Loss	Transducer	Level	Limit:1	2	3	4	
Frequency	Reading	Factor	Factor	dB[uVolts/meter]					
[MHz]	[dB(uV)]	[dB]	[dB]						
846.499	18.81	qp	4.3	22.6	45.71	46	N/A	N/A	N/A
Azimuth: 40	Height:196	Horz	Margin	[dB]	-.29		N/A	N/A	N/A

LIMIT 1: FCC Part 15 Subpart B ClB (3M)
LIMIT 2: NONE
LIMIT 3: NONE
LIMIT 4: NONE

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



EUT in Receive (standby) mode
Model in Title block above should read RB-GRX-3

File Number: MC2219
 Project Number: 01ME23496
 Model Number: RB-GRX-3

Issued: January 28, 2002

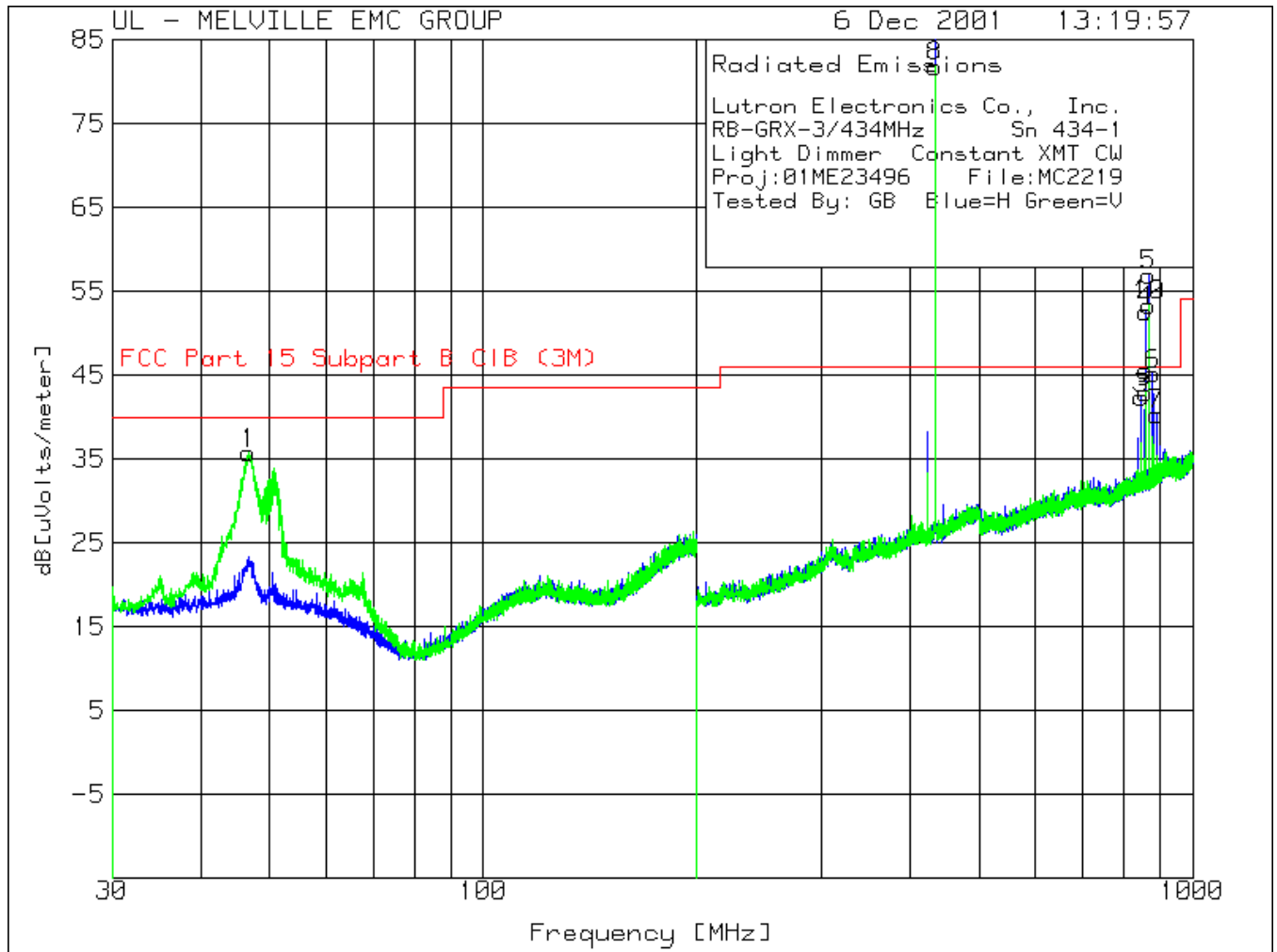
FCC ID: JPZ0019

Lutron Electronics Co. Inc.
 Model:RB-GRX-3/434MHz
 Receive Mode
 Proj:01ME23496 File:MC2219
 Tested by: PF Bl=Hor. Gr=Ver.

Test No.	Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level [dB(uVolts)]	Limit:1	2	3	4
1	1269.775	51.1 pk	-33	25.8	43.9	54	N/A	N/A	N/A
Azimuth: 0		Height:199	Horz	Margin [dB]	-10.1	N/A	N/A	N/A	N/A
2	1269.734	43.5 pk	-33	25.8	36.3	54	N/A	N/A	N/A
Azimuth: 170		Height:100	Vert	Margin [dB]	-17.7	N/A	N/A	N/A	N/A
3	1563.444	34.3 pk	-32.1	26.9	29.1	54	N/A	N/A	N/A
Azimuth: 8		Height:100	Vert	Margin [dB]	-24.9	N/A	N/A	N/A	N/A
4	1692.956	37.8 pk	-31.7	27.5	33.6	54	N/A	N/A	N/A
Azimuth: 0		Height:198	Vert	Margin [dB]	-20.4	N/A	N/A	N/A	N/A
5	1805.92	31.1 pk	-31.4	28	27.7	54	N/A	N/A	N/A
Azimuth: 0		Height:198	Vert	Margin [dB]	-26.3	N/A	N/A	N/A	N/A
6	1960.41	31.4 pk	-30.9	28.7	29.2	54	N/A	N/A	N/A
Azimuth: 296		Height:100	Horz	Margin [dB]	-24.8	N/A	N/A	N/A	N/A

LIMIT 1: FCC PT15 CLASS B-RADIATED (3m)
 LIMIT 2: NONE
 LIMIT 3: NONE
 LIMIT 4: NONE

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



EUT in CW transmit mode

File Number: MC2219
 Project Number: 01ME23496
 Model Number: RB-GRX-3

Issued: January 28, 2002

FCC ID: JPZ0019

Lutron Electronics Co., Inc.
 RB-GRX-3/434MHz Sn 434-1
 Light Dimmer Constant XMT CW
 Proj:01ME23496 File:MC2219
 Tested By: GB Blue=H Green=V

No.	Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level Limit:1 [dB]	2	3	4
1	46.69	21.8 pk	1	12.9	35.7	N/A	40	N/A
	Azimuth: 21	Height:99	Vert	Margin	[dB]	N/A	-4.3	N/A
2	433.8052	66.8 pk	3.2	16.7	86.7	80.8	N/A	N/A
	Azimuth: 350	Height:202	Horz	Margin	[dB]	5.9	N/A	N/A
3	845.995	15.4 pk	4.3	22.6	42.3	60.8	N/A	N/A
	Azimuth: 237	Height:202	Horz	Margin	[dB]	-18.5	N/A	N/A
4	856.6528	25.6 pk	4.4	22.6	52.6	60.8	N/A	N/A
	Azimuth: 151	Height:202	Horz	Margin	[dB]	-8.2	N/A	N/A
5	867.9767	29.6 pk	4.4	22.9	56.9	60.8	N/A	N/A
	Azimuth: 262	Height:202	Horz	Margin	[dB]	-3.9	N/A	N/A
6	878.6345	17.4 pk	4.5	23.2	45.1	60.8	N/A	N/A
	Azimuth: 55	Height:202	Horz	Margin	[dB]	-15.7	N/A	N/A
7	889.2923	12.4 pk	4.5	23.4	40.3	60.8	N/A	N/A
	Azimuth: 55	Height:202	Horz	Margin	[dB]	-20.5	N/A	N/A
8	433.8052	61.9 pk	3.2	16.7	81.8	60.8	N/A	N/A
	Azimuth: 280	Height:98	Vert	Margin	[dB]	21	N/A	N/A
9	856.6528	15.9 pk	4.4	22.6	42.9	60.8	N/A	N/A
	Azimuth: 220	Height:201	Vert	Margin	[dB]	-17.9	N/A	N/A
10	867.9767	26 pk	4.4	22.9	53.3	60.8	N/A	N/A
	Azimuth: 342	Height:98	Vert	Margin	[dB]	-7.5	N/A	N/A

LIMIT 1: FCC Part 15 Subpart C-Section 15.231
 LIMIT 2: FCC Part 15 Subpart B (3M)
 LIMIT 3: NONE
 LIMIT 4: NONE

pk - Peak detector
 qp - Quasi-Peak detector
 av - Average detector
 tm - Trace Math Result

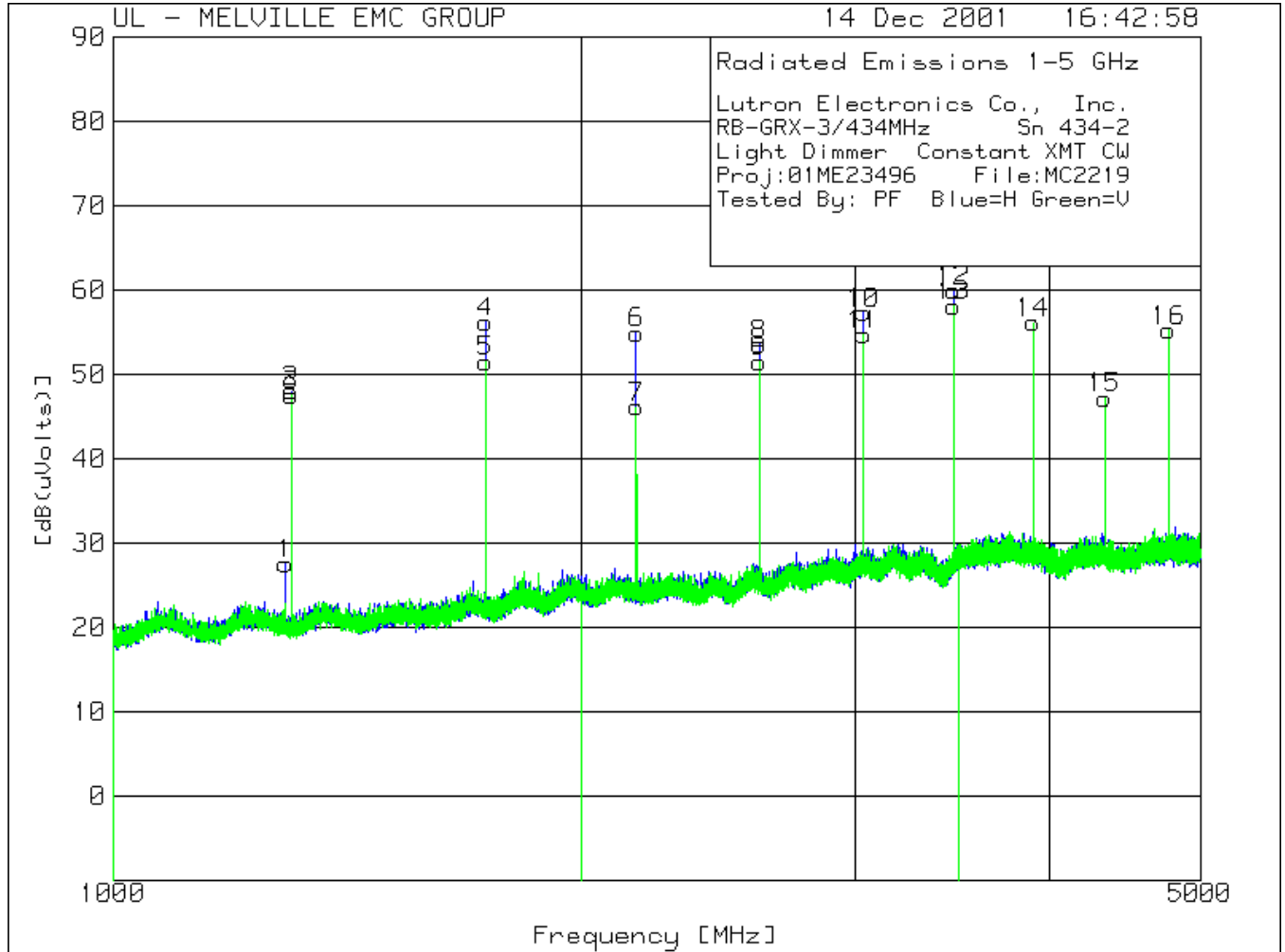
Lutron Electronics Co., Inc.
 RB-GRX-3/434MHz Sn 434-1
 Light Dimmer Constant XMT CW
 Proj:01ME23496 File:MC2219
 Tested By: GB Blue=H Green=V

Test	Meter	Gain/Loss	Transducer	Level	Limit:1	2	3	4
Frequency	Reading	Factor	Factor	dB[uVolts/meter]				
[MHz]	[dB(uV)]	[dB]	[dB]					
46.7585	10.64 av	1	12.9	24.54	N/A	40	N/A	N/A
Azimuth: 264	Height:100	Vert	Margin	[dB]	N/A	-15.46	N/A	N/A
433.8201	35.49 av	3.2	16.7	55.39	80.8	N/A	N/A	N/A
Azimuth: 298	Height:180	Vert	Margin	[dB]	-25.41	N/A	N/A	N/A
433.922	70.84 av	3.2	16.7	*68.44	80.8	N/A	N/A	N/A
Azimuth: 0	Height:151	Horz	Margin	[dB]	-12.36	N/A	N/A	N/A
433.9233	62.9 av	3.2	16.7	*60.5	80.8	N/A	N/A	N/A
Azimuth: 301	Height:176	Vert	Margin	[dB]	-20.3	N/A	N/A	N/A
846.4741	13.33 av	4.3	22.6	40.23	60.8	N/A	N/A	N/A
Azimuth: 336	Height:196	Horz	Margin	[dB]	-20.57	N/A	N/A	N/A
857.16	24.62 av	4.4	22.7	51.72	60.8	N/A	N/A	N/A
Azimuth: 33	Height:195	Horz	Margin	[dB]	-9.0	N/A	N/A	N/A
857.178	16.49 av	4.4	22.7	43.59	60.8	N/A	N/A	N/A
Azimuth: 16	Height:178	Vert	Margin	[dB]	-17.21	N/A	N/A	N/A
867.8865	29.96 av	4.4	22.9	57.26	60.8	N/A	N/A	N/A
Azimuth: 316	Height:191	Horz	Margin	[dB]	-3.54	N/A	N/A	N/A
867.89	28.04 av	4.4	22.9	55.34	60.8	N/A	N/A	N/A
Azimuth: 4	Height:109	Vert	Margin	[dB]	-5.46	N/A	N/A	N/A
878.6155	17.36 av	4.5	23.2	45.06	60.8	N/A	N/A	N/A
Azimuth: 26	Height:190	Horz	Margin	[dB]	-15.74	N/A	N/A	N/A
889.3364	12.05 av	4.5	23.4	39.95	60.8	N/A	N/A	N/A
Azimuth: 39	Height:185	Horz	Margin	[dB]	-20.85	N/A	N/A	N/A

LIMIT 1: FCC Part 15 Subpart C-Section 15.231
 LIMIT 2: FCC Part 15 Subpart B (3M)
 LIMIT 3: NONE

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

* Duty Cycle correction factor of -22.3dB added to Average level.



EUT in CW transmit mode

File Number: MC2219
 Project Number: 01ME23496
 Model Number: RB-GRX-3

Issued: January 28, 2002

FCC ID: JPZ0019

Lutron Electronics Co., Inc.
 RB-GRX-3/434MHz Sn 434-2
 Light Dimmer Constant XMT CW
 Proj:01ME23496 File:MC2219
 Tested By: PF Blue=H Green=V

Test No.	Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level [dB]	Limit:1 [dB]	2	3	4
1	1290.924	36.5 pk	-32.9	23.9	27.5	60.8	N/A	N/A	N/A
	Azimuth: 0	Height:200	Horz	Margin	[dB]	-33.3	N/A	N/A	N/A
2	1301.582	57 pk	-32.9	23.9	48	N/A	53.97	N/A	N/A
	Azimuth: 0	Height:200	Horz	Margin	[dB]	N/A	-5.97	N/A	N/A
3	1301.582	56.5 pk	-32.9	23.9	47.5	N/A	53.97	N/A	N/A
	Azimuth: 336	Height:99	Vert	Margin	[dB]	N/A	-6.47	N/A	N/A
4	1735.887	62.1 pk	-31.6	25.7	56.2	60.8	N/A	N/A	N/A
	Azimuth: 9	Height:100	Horz	Margin	[dB]	-4.6	N/A	N/A	N/A
5	1735.887	57.4 pk	-31.6	25.7	51.5	60.8	N/A	N/A	N/A
	Azimuth: 341	Height:99	Vert	Margin	[dB]	-9.3	N/A	N/A	N/A
6	2169.352	58.2 pk	-30.6	27.3	54.9	60.8	N/A	N/A	N/A
	Azimuth: 0	Height:199	Horz	Margin	[dB]	-5.9	N/A	N/A	N/A
7	2169.352	49.4 pk	-30.6	27.3	46.1	60.8	N/A	N/A	N/A
	Azimuth: 355	Height:99	Vert	Margin	[dB]	-14.7	N/A	N/A	N/A
8	2603.597	55.3 pk	-30.2	28.4	53.5	60.8	N/A	N/A	N/A
	Azimuth: 304	Height:98	Horz	Margin	[dB]	-7.3	N/A	N/A	N/A
9	2603.597	53.3 pk	-30.2	28.4	51.5	60.8	N/A	N/A	N/A
	Azimuth: 0	Height:199	Vert	Margin	[dB]	-9.3	N/A	N/A	N/A
10	3037.467	56.1 pk	-29	30.2	57.3	60.8	N/A	N/A	N/A
	Azimuth: 314	Height:98	Horz	Margin	[dB]	-3.5	N/A	N/A	N/A
11	3037.467	53.5 pk	-29	30.2	54.7	60.8	N/A	N/A	N/A
	Azimuth: 127	Height:99	Vert	Margin	[dB]	-6.1	N/A	N/A	N/A
12	3471.338	55.8 pk	-27.2	31.3	59.9	60.8	N/A	N/A	N/A
	Azimuth: 53	Height:98	Horz	Margin	[dB]	-0.9	N/A	N/A	N/A
13	3471.338	54 pk	-27.2	31.3	58.1	60.8	N/A	N/A	N/A
	Azimuth: 14	Height:99	Vert	Margin	[dB]	-2.7	N/A	N/A	N/A
14	3905.583	50.9 pk	-27.3	32.5	56.1	N/A	53.97	N/A	N/A
	Azimuth: 25	Height:98	Vert	Margin	[dB]	N/A	2.13	N/A	N/A
15	4339.266	42.3 pk	-27.3	32.2	47.2	N/A	53.97	N/A	N/A
	Azimuth: 344	Height:98	Vert	Margin	[dB]	N/A	-6.77	N/A	N/A

File Number: MC2219
Project Number: 01ME23496
Model Number: RB-GRX-3

Issued: January 28, 2002

FCC ID: JPZ0019

No.	Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level [dB(uVolts)]	Limit:1	2	3	4	
16	4773.323	49.6	pk	-27.1	32.7	55.2	60.8	N/A	N/A	N/A
Azimuth: 7		Height:98		Vert	Margin [dB]	-5.6	N/A	N/A	N/A	

LIMIT 1: FCC Part 15 Subpart C-Section 15.231
LIMIT 2: FCC Part 15 Subpart C-Section 15.209, 15.205
LIMIT 3: NONE
LIMIT 4: NONE

pk - Peak detector
qp - Quasi-Peak detector
av - Average detector
tm - Trace Math Result

File Number: MC2219
 Project Number: 01ME23496
 Model Number: RB-GRX-3

Issued: January 28, 2002

FCC ID: JPZ0019

Lutron Electronics Co., Inc.
 RB-GRX-3/434MHz Sn 434-2
 Light Dimmer Constant XMT CW
 Proj:01ME23496 File:MC2219
 Tested By: PF Blue=H Green=V

Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level [dB]	Limit:1 [dB(uVolts)]	2	3	4
1291.1658	38.95 av	-32.9	23.9	29.95	60.8	N/A	N/A	N/A
Azimuth: 353		Height:172	Horz	Margin [dB]	-30.85	N/A	N/A	N/A
1301.866	59.95 av	-32.9	23.9	50.95	N/A	53.97	N/A	N/A
Azimuth: 342		Height:172	Vert	Margin [dB]	N/A	-3.02	N/A	N/A
1301.8682	58.06 av	-32.9	23.9	49.06	N/A	53.97	N/A	N/A
Azimuth: 14		Height:119	Horz	Margin [dB]	N/A	-4.91	N/A	N/A
1735.8234	65.6 av	-31.6	25.7	59.7	60.8	N/A	N/A	N/A
Azimuth: 323		Height:129	Horz	Margin [dB]	-1.1	N/A	N/A	N/A
1735.826	55.5 av	-31.6	25.7	49.6	60.8	N/A	N/A	N/A
Azimuth: 123		Height:105	Vert	Margin [dB]	-11.2	N/A	N/A	N/A
2169.7757	60.91 av	-30.6	27.3	57.61	60.8	N/A	N/A	N/A
Azimuth: 45		Height:117	Horz	Margin [dB]	-3.19	N/A	N/A	N/A
2169.7769	45.57 av	-30.6	27.3	42.27	60.8	N/A	N/A	N/A
Azimuth: 151		Height:112	Vert	Margin [dB]	-18.53	N/A	N/A	N/A
2603.7349	56.31 av	-30.2	28.4	54.51	60.8	N/A	N/A	N/A
Azimuth: 40		Height:115	Horz	Margin [dB]	-6.29	N/A	N/A	N/A
2603.7356	53.9 av	-30.2	28.4	52.1	60.8	N/A	N/A	N/A
Azimuth: 336		Height:154	Vert	Margin [dB]	-8.7	N/A	N/A	N/A
3037.6887	55.51 av	-29	30.2	56.71	60.8	N/A	N/A	N/A
Azimuth: 359		Height:101	Horz	Margin [dB]	-4.09	N/A	N/A	N/A
3037.6935	52.56 av	-29	30.2	53.76	60.8	N/A	N/A	N/A
Azimuth: 333		Height:111	Vert	Margin [dB]	-7.04	N/A	N/A	N/A
3471.6454	55.13 av	-27.2	31.3	59.23	60.8	N/A	N/A	N/A
Azimuth: 48		Height:161	Horz	Margin [dB]	-1.57	N/A	N/A	N/A
3471.648	55.24 av	-27.2	31.3	59.34	60.8	N/A	N/A	N/A
Azimuth: 351		Height:182	Vert	Margin [dB]	-1.46	N/A	N/A	N/A
3905.593	50.55 av	-27.3	32.5	*33.45	N/A	53.97	N/A	N/A
Azimuth: 33		Height:114	Vert	Margin [dB]	N/A	-20.52	N/A	N/A
4339.5588	43.45 av	-27.3	32.2	48.35	N/A	53.97	N/A	N/A
Azimuth: 17		Height:107	Vert	Margin [dB]	N/A	-5.62	N/A	N/A

File Number: MC2219
Project Number: 01ME23496
Model Number: RB-GRX-3

Issued: January 28, 2002

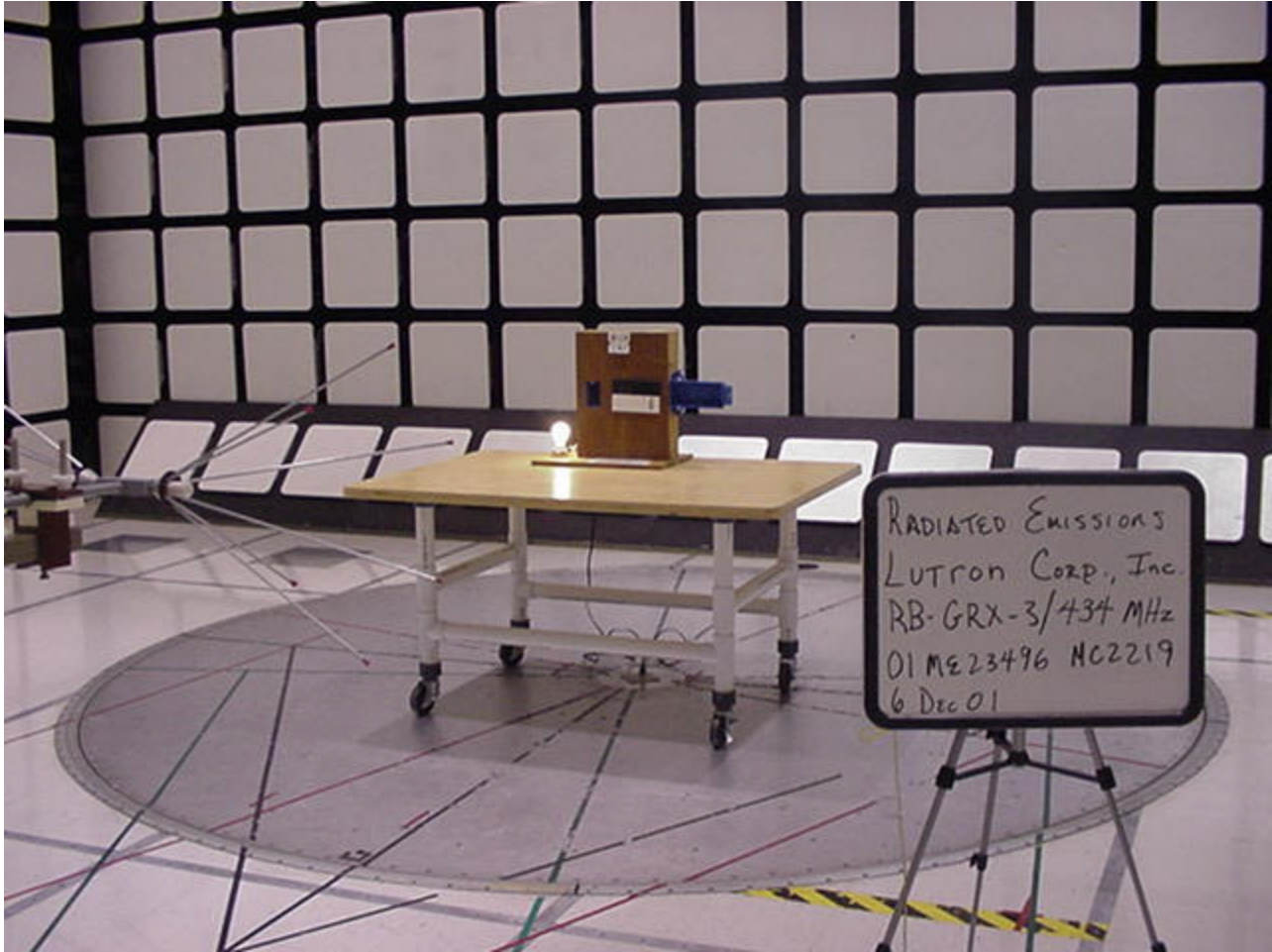
FCC ID: JPZ0019

Test	Meter	Gain/Loss	Transducer	Level	Limit:1	2	3	4	
Frequency	Reading	Factor	Factor	[dB(uVolts)]					
[MHz]	[dB(uV)]	[dB]	[dB]						
4773.51	51.78	av	-27.1	32.7	57.38	60.8	N/A	N/A	N/A
Azimuth: 19	Height:107	Vert	Margin [dB]	-3.42			N/A	N/A	N/A

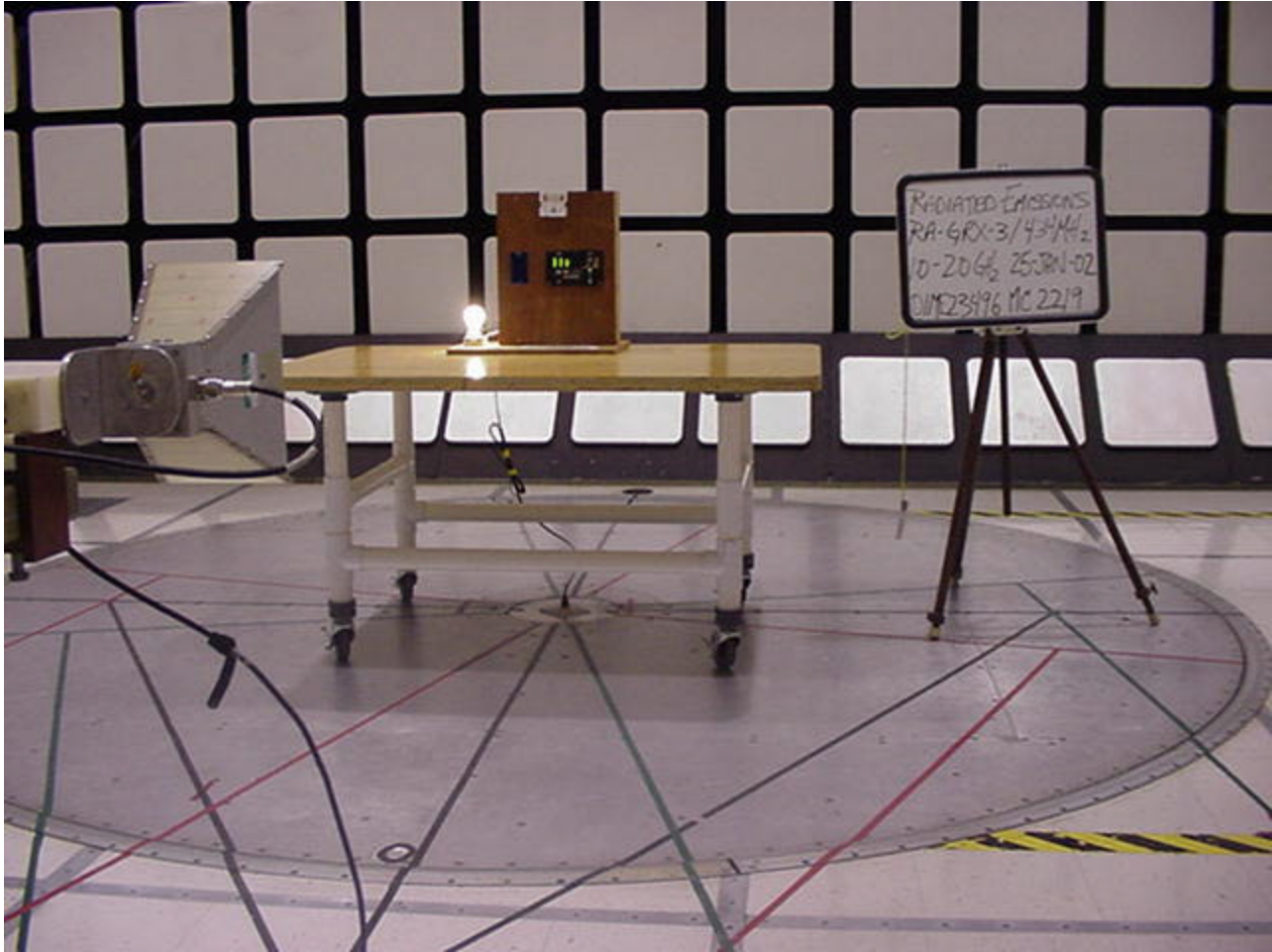
LIMIT 1: FCC Part 15 Subpart C-Section 15.231
LIMIT 2: FCC Part 15 Subpart C-Section 15.209, 15.205
LIMIT 3: NONE
LIMIT 4: NONE

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

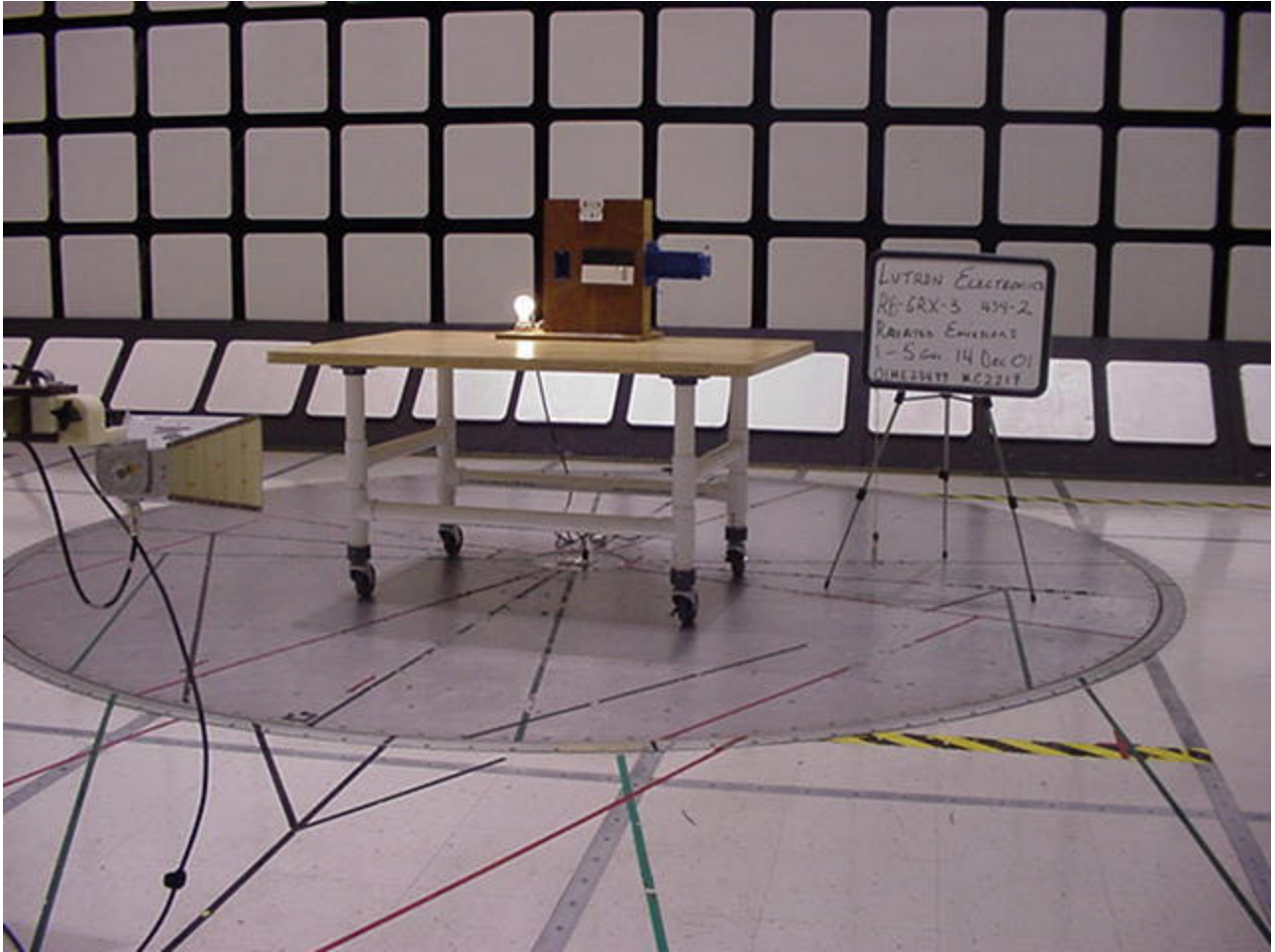
* Duty Cycle correction factor of -22.3dB added to Average level.



Radiated Emissions test 30 - 1000MHz set-up



Radiated Emissions test 1 - 2GHz set-up
Model in Title block above should read RB-GRX-3



Radiated Emissions test 1 - 5GHz set-up

2.1.3 Fundamental Frequency and Spurious Emissions Measurement Limit Calculations

Limit Calculation

Fundamental Frequency is 434MHz

From table in section 15.231

Limit = $41.6667(434) - 7083.3333$

Limit = 10333.3473uV

Limit = $\text{Log } 10333.3473(20)$

Limit = 80.8dBuV

Limit for Spurious Emissions = 20dB lower then fundamental = 60.8dBuV/m

Radiated Emissions Limit conversion from mV/m to dBmV/m (accordance with paragraph 15.109)

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

Radiated Emissions Limit (dBuV/m) = $20 * \log (90)$

Radiated Emissions Limit (dBuV/m) = 39.1

Radiated Emissions test data obtained during measurements.

Field Strength (dBuV/m) = Measured field strength(dBuV/m) + Antenna Factor(dB) + Cable Factor(dB)

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

Field Strength (dBuV/m) = 32.5

Duty Cycle factor calculation.

Total number of pulses counted in 100ms.

$576\mu\text{s} * 2 = 1.152\text{ms}$

$64\mu\text{s} * 65 = 4.16\text{ms}$

$132\mu\text{s} * 18 = 2.376\text{ms}$

Total time on = $1.152\text{ms} + 4.16\text{ms} + 2.376\text{ms} = 7.688\text{ms}$

Duty cycle correction factor = $20 \log (7.688\text{ms} / 100\text{ms})$

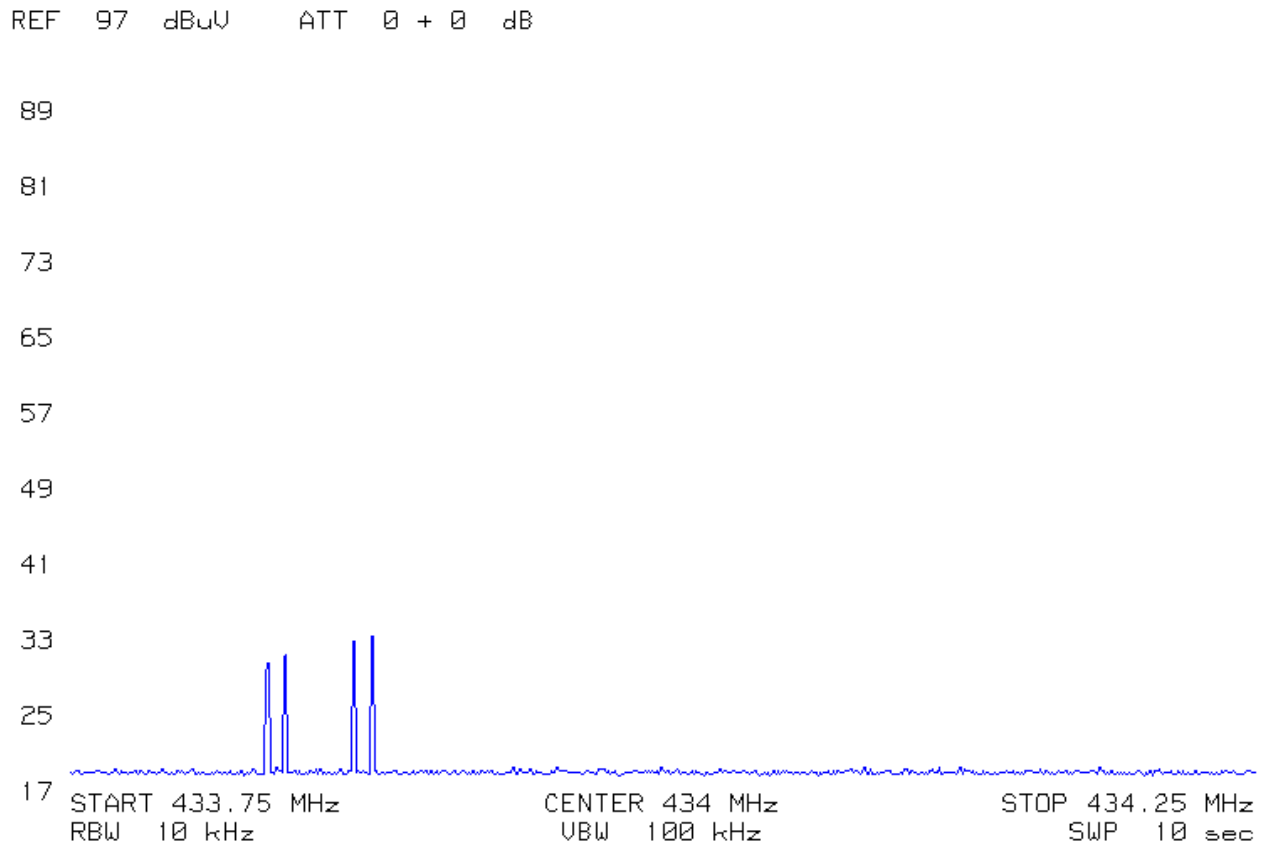
= $20 \log (76.88\text{ms})$

= - 22.3dB

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

2.1.4 Automatic Cease Operation

1. Set analyzer sweep time for 10 seconds
 2. Key transmitter and release button
 3. Ensure transmission stops before signal passes 5 second (5 divisions)
- Complies (Y/N) YES

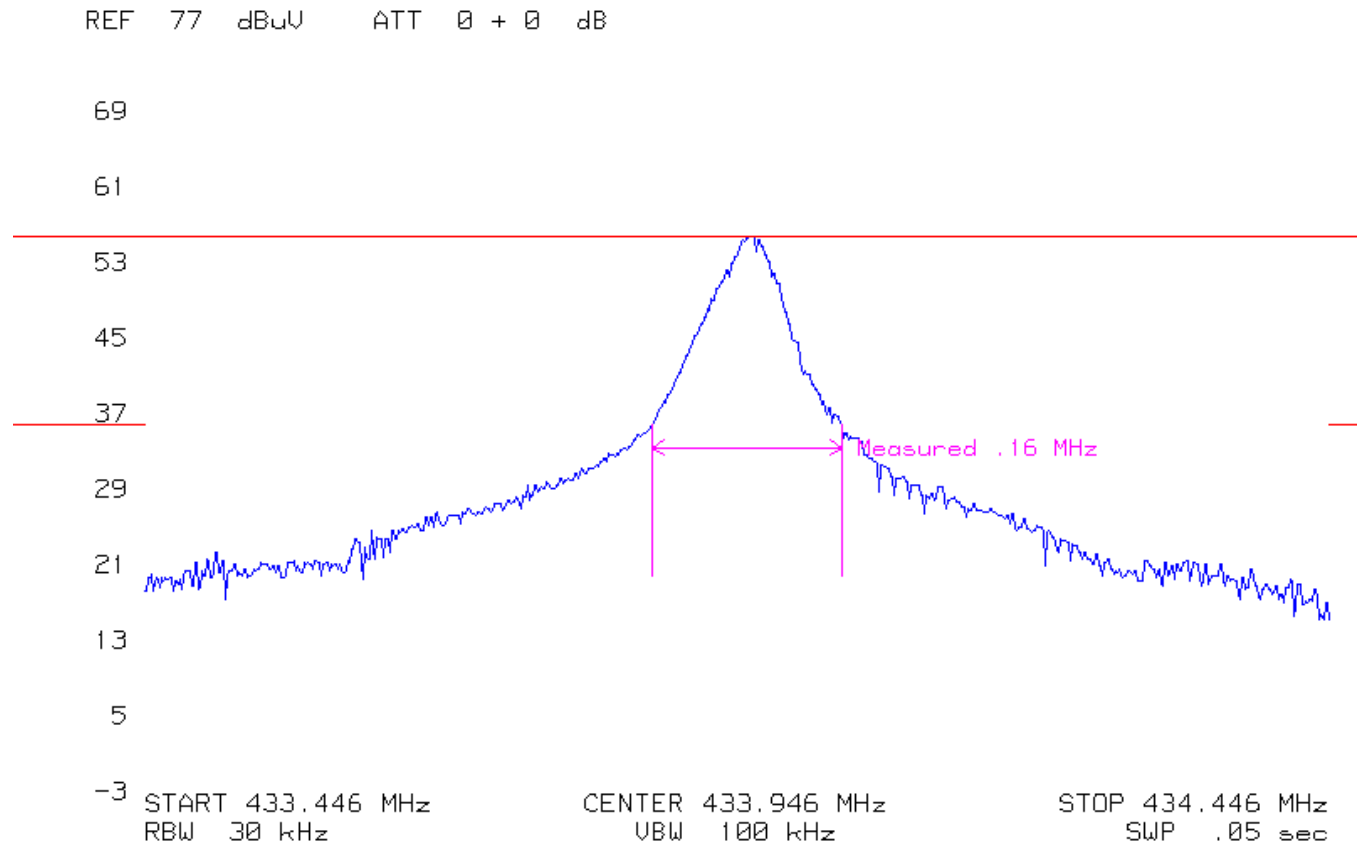


The data shown above illustrates the amount of time the device transmits by depressing the data transmit button and releasing it. The amount of total time transmitting is approximately 100ms.

2.1.5 Bandwidth Determination

Max bandwidth (0.25% of Fundamental Frequency) = 434MHz * .0025 = 1.085MHz

Complies (Y/N) YES



The data shown above illustrates the occupied bandwidth determination. The maximum bandwidth for a transmitter at 434MHz is 1.085MHz. The occupied bandwidth for the device under test is 16KHz.

The bandwidth was determined by setting the left and right markers -20dB from the peak reading.

File Number: MC2219
Project Number: 01ME23496
Model Number: RB-GRX-3

Issued: January 28, 2002

FCC ID: JPZ0019

3.0 SUMMARY:

The equipment under test has

met the technical requirements as defined under section(s) 2.0 and 3.0

not met the technical requirements as defined under section(s) 2.0 and 3.0

Test Start Date: 12/6/2001

Test Completion Date: 01/25/2002

- UNDERWRITERS LABORATORIES, INC. -

Project Engineer

Reviewer



Donald Lerner (Ext.22765)
Project Engineer
International EMC Services
Conformity Assessment Services-3014AMEL

Robert DeLisi (Ext.22452)
Engineering Group Leader
International EMC Services
Conformity Assessment Services -3014AMEL