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

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Job Number:	1001145819
Project Number:	09CA39970
File Number:	MC15896
FCC ID Number:	JPZ0065
IC Number:	2851A-JPZ0065
Date:	11 Sept 09
Model:	Grafik Eye QS Wireless

Electromagnetic Compatibility Test Report

For

LUTRON ELECTRONICS INC

Test Report Details

Tests Performed By:	**Underwriters Laboratories Inc.** **1285 Walt Whitman Rd.** **Melville, NY 11747**
Tests Performed For:	**LUTRON ELECTRONICS INC** **7200 SUTTER ROAD** **COOPERBURG, PA 18036**
Applicant Contact: Title: Phone: E-mail:	**Dan Mitchell** **Senior Engineering Technician** **(610) 282-5370** **dmitchell@lutron.com**
Test Report Date:	**11 Sept 09**
Product Type:	**RF Control Module**
Product standards	**FCC Part 15, Subpart C, 15.231; RSS-GEN; RSS-210**
Model Number:	**Grafik Eye QS Wireless**
Sample Serial Number:	**Prototype**
EUT Category:	**Periodic Low Power Transmitter**
Testing Start Date:	**24 Aug 09**
Date Testing Complete:	**11 Sept 09**
Overall Results:	**Compliant**

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, NIST, 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 websites referenced at the end of this report.

Report Directory

Report Revision History

Revision Date	Description	Revised By	Revision Reviewed By
None	Original	-	-

1.0 G E N E R A L - Product Description

1.1 Equipment Description

The Grafik Eye QS Wireless is an RF module intended for construction by Lutron Electronics Co., Inc. into a wall mounted dimmer/switch. It contains a FM transceiver and an antenna, which is not accessible to the user. It is used as part of an integrated lighting control system. The purpose of the RF communication is to transmit and receive command signals. Transmitted commands allow the triggering of system events. Received commands allow for updating of control indicator status.

1.2 Equipment Marking Plate

1.3 Device Configuration During Test

1.3.1 Equipment Used During Test:

Use	Product Type	Manufacturer	Model	Comments
EUT	RF Lighting Transmitter	LUTRON ELECTRONICS INC	Grafik Eye QS Wireless	None

Note: **EUT** - Equipment Under Test, **AE** - Auxiliary/Associated Equipment, or **SIM** - Simulator (Not Subjected to Test)

1.3.2 Input/Output Ports:

Port #	Name	Type*	Cable Max. >3m (Y/N)	Cable Shielded (Y/N)	Comments
0	Enclosure	N/E	—	—	None
1	Mains	AC	N	N	None

Note:
AC = AC Power Port DC = DC Power Port N/E = Non-Electrical
I/O = Signal Input or Output Port (Not Involved in Process Control)
TP = Telecommunication Ports

1.3.3 EUT Internal Operating Frequencies:

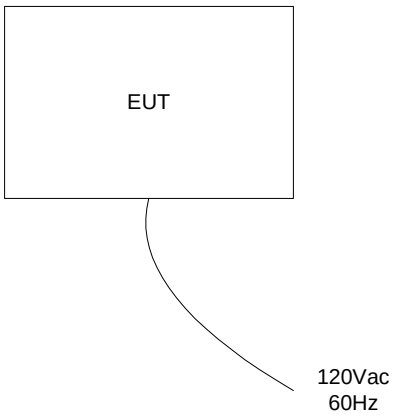
Frequency (MHz)	Description
431	Transmit Frequency – Low
433	Transmit Frequency – Mid
437	Transmit Frequency – High
0.132	Switching Power Supply
32	Microcontroller
0.3072	Receiver Section
0.031	Receiver Section

1.3.4 Power Interface:

Mode # /Rated	Voltage (V)	Current (A)	Power (W)	Frequency (DC/AC-Hz)	Phases (#)	Comments
1	120Vac	-	-	60Hz	Single Phase	None

1.4 Block Diagram:

The diagram below illustrates the configuration of the equipment above.



1.5 EUT Configurations

Mode #	Description
1	EUT powered by a 120V, 60Hz source.

1.6 EUT Operation Modes

Mode #	Description
1	Constant Transmitting (431MHz)
2	Constant Transmitting (433MHz)
3	Constant Transmitting (437MHz)
4	Normal Operation (Receive Mode)

2.0 Summary

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 determined the list of tests performed were 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.

2.1 Deviations from standard test methods

None

2.2 Device Modifications Necessary for Compliance

None

2.3 Reference Standards

Standard Number	Standard Name	Standard Date
FCC Part 15, Subpart C, 15.231	Code of Federal Regulations, Part 15, Radio Frequency Devices	2008
FCC Part 15, Subpart B	Code of Federal Regulations, Part 15, Radio Frequency Devices	2008
RSS-GEN, Issue 2	General Requirements and Information for the Certification of Radiocommunication Equipment	2007
RSS-210, Issue 7	Low-power License-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment	2007
ICES-003, Issue 4	Spectrum Management and Telecommunication Policy Interference-Causing Equipment Standard – Digital Apparatus	2006

2.4 Results Summary

This product is considered Class B

Requirement – Test	Result (Compliant / Non-Compliant)*
Cease Operation	Compliant
Conducted Emissions - Mains	Compliant
Fundamental Radiated Emissions	Compliant
General Radiated Emissions	Compliant
Occupied Bandwidth	Compliant
Pulse Train - Averaging Factor	Compliant
Pulse Train Measurement	Compliant
Radiated Emissions - Unintentional	Compliant
Spurious Radiated Emissions	Compliant

Test Engineer:

Mike Antola (Ext.23053)
Senior Project Engineer
International EMC Services
Conformity Assessment Services

Reviewer:

Bob DeLisi (Ext.22452)
Senior Staff Engineer
International EMC Services
Conformity Assessment Services

Any information and documentation involving UL Mark services are provided on behalf of Underwriters Laboratories Inc. (UL) or any authorized licensee of UL.

3.0 Calibration of Equipment Used for Measurement

All test equipment and test accessories are calibrated on a regular basis. The maximum time between calibrations is one year or the manufacturers' recommendation, 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.

4.0 EMISSIONS TEST RESULTS

The emissions tests were performed according to following regulations:

---------- North America ----------

Code of Federal Regulations Title 47	Part 15, Subparts B & C, Radio Frequency Devices
Industry Canada	RSS-GEN, RSS-210, ICES-003

Unless specified otherwise in the individual Methods, the tests shall be conducted under the following ambient conditions. Confirmation of these conditions shall be verified at the time the test is conducted.

Ambient Temperature, °C	22.5 ± 2.5	Relative Humidity, %	45 ± 15	Barometric Pressure, mBar	950 ± 150

4.1 Test Conditions and Results – Mains Terminal – Conducted Emissions

Test Description	Measurements were made on a ground plane. All power was connected to the system through Artificial Mains Network (AMN). Conducted voltage measurements on mains lines were made at the output of the AMN.		
Basic Standard		FCC Part 15, Subpart C, 15.231	
UL LPG		80-EM-S0026	
		Frequency range on each side of line	Measurement Point
Fully configured sample scanned over the following frequency range		150kHz to 30MHz	Mains
Limits - Class B			
Frequency (MHz)	Limit (dBµV)		
	Quasi-Peak	Average	
0.15-0.5	66 to 56	56 to 46	
0.5-5	56	46	
5-30	60	50	
Supplementary information: None			

Table 1 Conducted Emissions EUT Configuration Settings

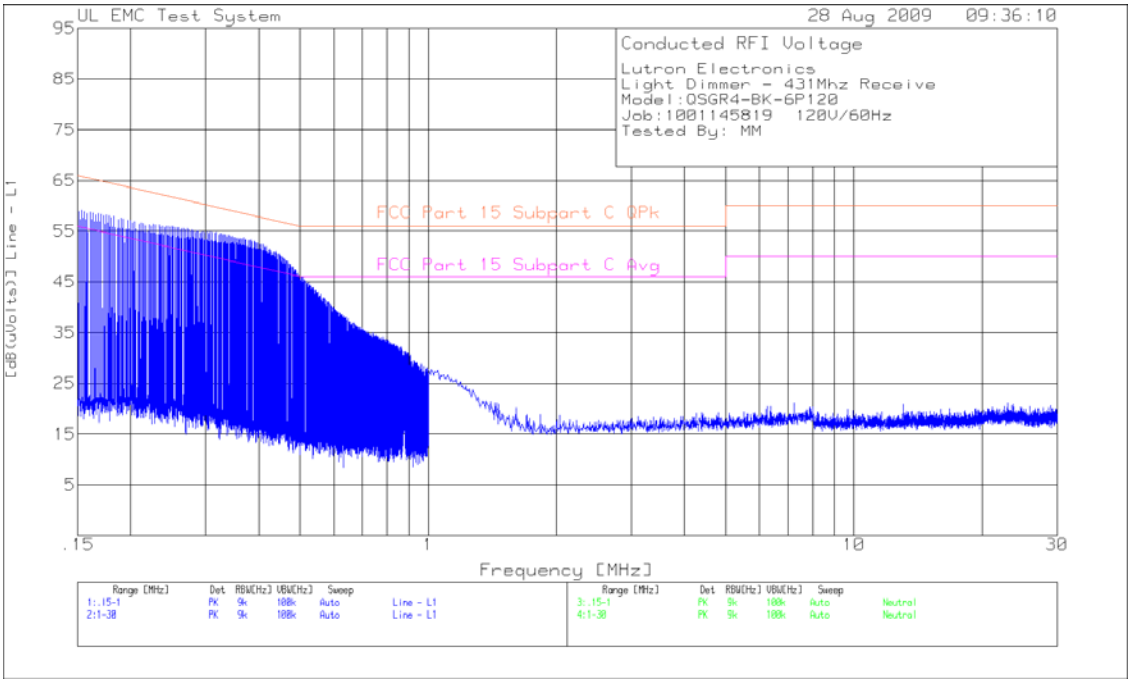
Power Interface Mode #	EUT Configurations Mode #	EUT Operation Mode #
1	1	1,4
Supplementary information: Since the transmitter does not operate in the test frequency range, only 1 channel was tested in transmit mode.		

Table 2 Conducted Emissions Test Equipment

Test Equipment Used			
Description	Manufacturer	Model	Identifier
Conducted Emissions – GP 1			
EMI Receiver	Rohde & Schwarz	ESIB26	ME5B-081
LISN	EMCO	3825/2R	ME5-790
Switch Driver	HP	11713A	44397
RF Switch Box	UL	4	44404
Measurement Software	UL	Version 9.3	44736
Temp/Humidity/Pressure Meter	Cole Parmer	99760-00	43734
Multimeter	Fluke	87V	44547

Figure 1 Test Setup for Conducted Emissions

Figure 2 Conducted Emissions Graph



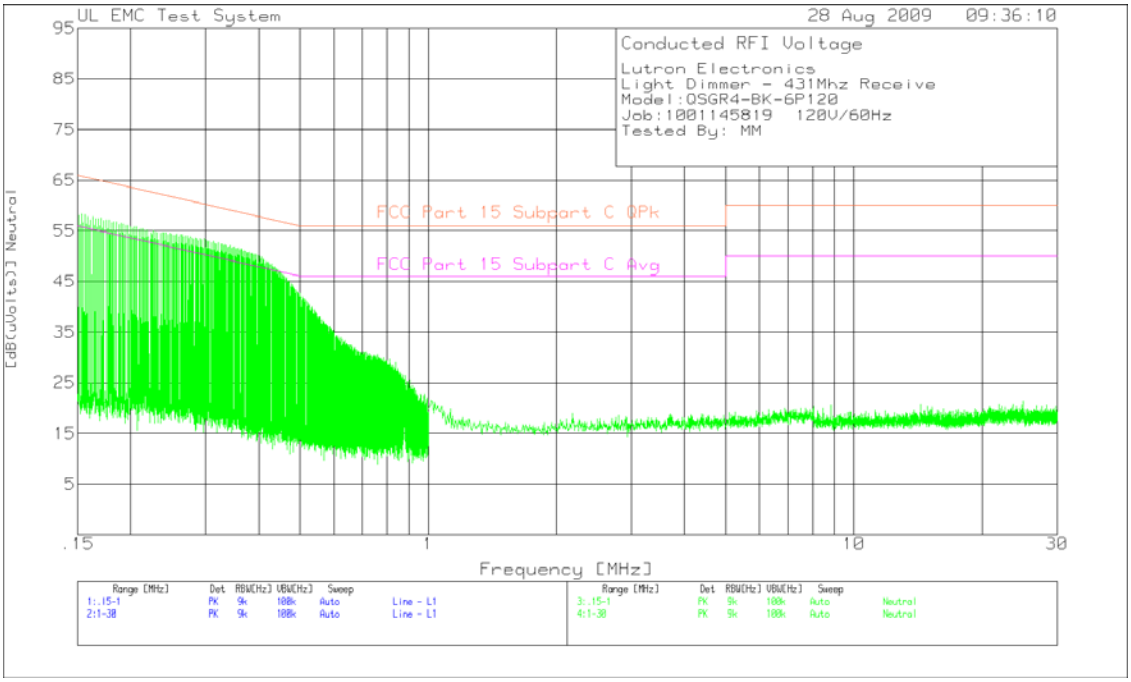


Table 3 Conducted Emissions Data Points

Lutron Electronics
Light Dimmer - 431Mhz Receive
Model:QSGR4-BK-6P120
Job:1001145819 120V/60Hz
Tested By: MM

No.	Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level [dB(uVolts)]	Limit:1	2	3	4	5	6
Line - L1 .15 - 1MHz											
1	.1534	46.99 pk	12.1	0	59.09	65.8	55.8	-	-	-	-
				Margin [dB]		-6.71	3.29	-	-	-	-
2	.18248	46.22 pk	11.7	0	57.92	64.4	54.4	-	-	-	-
				Margin [dB]		-6.48	3.52	-	-	-	-
3	.22618	45.02 pk	11.3	0	56.32	62.6	52.6	-	-	-	-
				Margin [dB]		-6.28	3.72	-	-	-	-
4	.27157	44.54 pk	11	0	55.54	61.1	51.1	-	-	-	-
				Margin [dB]		-5.56	4.44	-	-	-	-
5	.31765	43.95 pk	10.8	0	54.75	59.8	49.8	-	-	-	-
				Margin [dB]		-5.05	4.95	-	-	-	-
6	.34877	42.97 pk	10.8	0	53.77	59	49	-	-	-	-
				Margin [dB]		-5.23	4.77	-	-	-	-
7	.38278	42.65 pk	10.7	0	53.35	58.2	48.2	-	-	-	-
				Margin [dB]		-4.85	5.15	-	-	-	-
8	.41168	41.33 pk	10.7	0	52.03	57.6	47.6	-	-	-	-
				Margin [dB]		-5.57	4.43	-	-	-	-
9	.45045	39.49 pk	10.6	0	50.09	56.9	46.9	-	-	-	-
				Margin [dB]		-6.81	3.19	-	-	-	-
10	.49364	36.16 pk	10.6	0	46.76	56.1	46.1	-	-	-	-
				Margin [dB]		-9.34	.66	-	-	-	-
11	.55179	32.51 pk	10.5	0	43.01	56	46	-	-	-	-
				Margin [dB]		-12.99	-2.99	-	-	-	-
12	.6198	28.33 pk	10.5	0	38.83	56	46	-	-	-	-
				Margin [dB]		-17.17	-7.17	-	-	-	-
Neutral .15 - 1MHz											
13	.15357	46.18 pk	12.1	0	58.28	65.8	55.8	-	-	-	-
				Margin [dB]		-7.52	2.48	-	-	-	-
14	.16326	45.87 pk	12	0	57.87	65.3	55.3	-	-	-	-
				Margin [dB]		-7.43	2.57	-	-	-	-
15	.18996	44.83 pk	11.6	0	56.43	64	54	-	-	-	-
				Margin [dB]		-7.57	2.43	-	-	-	-
16	.20441	44.28 pk	11.5	0	55.78	63.4	53.4	-	-	-	-
				Margin [dB]		-7.62	2.38	-	-	-	-
17	.24233	43.44 pk	11.2	0	54.64	62	52	-	-	-	-
				Margin [dB]		-7.36	2.64	-	-	-	-
18	.26885	42.99 pk	11	0	53.99	61.2	51.2	-	-	-	-
				Margin [dB]		-7.21	2.79	-	-	-	-
19	.2981	42.55 pk	10.9	0	53.45	60.3	50.3	-	-	-	-
				Margin [dB]		-6.85	3.15	-	-	-	-
20	.32871	41.59 pk	10.8	0	52.39	59.5	49.5	-	-	-	-
				Margin [dB]		-7.11	2.89	-	-	-	-
21	.36271	40.72 pk	10.7	0	51.42	58.7	48.7	-	-	-	-
				Margin [dB]		-7.28	2.72	-	-	-	-
22	.40658	39.24 pk	10.7	0	49.94	57.7	47.7	-	-	-	-
				Margin [dB]		-7.76	2.24	-	-	-	-
23	.44059	36.85 pk	10.6	0	47.45	57.1	47.1	-	-	-	-
				Margin [dB]		-9.65	.35	-	-	-	-
24	.48429	33.04 pk	10.6	0	43.64	56.3	46.3	-	-	-	-
				Margin [dB]		-12.66	-2.66	-	-	-	-
25	.53309	29.56 pk	10.6	0	40.16	56	46	-	-	-	-
				Margin [dB]		-15.84	-5.84	-	-	-	-

```
LIMIT 1: FCC Part 15 Subpart C QPk
LIMIT 2: FCC Part 15 Subpart C Avg
LIMIT 3: NONE
LIMIT 4: NONE
LIMIT 5: NONE
LIMIT 6: NONE

pk - Peak detector
qp - Quasi-Peak detector
av - Average detector
avlg - denotes average log detection
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Lutron Electronics
Light Dimmer - 431Mhz Receive
Model:QSGR4-BK-6P120
Job:1001145819 120V/60Hz
Tested By: MM

Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level [dB(uVolts)]	Limit:1	2	3	4	5	6
Line - L1 .15 - 1MHz										
.15339	39.88 qp	12.1	0	51.98	65.8	55.8	-	-	-	-
			Margin [dB]:		-13.82	-3.82	-	-	-	-
.18203	39.08 qp	11.7	0	50.78	64.4	54.4	-	-	-	-
			Margin [dB]:		-13.62	-3.62	-	-	-	-
.22604	37.97 qp	11.3	0	49.27	62.6	52.6	-	-	-	-
			Margin [dB]:		-13.33	-3.33	-	-	-	-
.27162	37.28 qp	11	0	48.28	61.1	51.1	-	-	-	-
			Margin [dB]:		-12.82	-2.82	-	-	-	-
.31815	36.66 qp	10.8	0	47.46	59.8	49.8	-	-	-	-
			Margin [dB]:		-12.34	-2.34	-	-	-	-
.34938	36.25 qp	10.8	0	47.05	59	49	-	-	-	-
			Margin [dB]:		-11.95	-1.95	-	-	-	-
.38242	35.68 qp	10.7	0	46.38	58.2	48.2	-	-	-	-
			Margin [dB]:		-11.82	-1.82	-	-	-	-
.41187	34.76 qp	10.7	0	45.46	57.6	47.6	-	-	-	-
			Margin [dB]:		-12.14	-2.14	-	-	-	-
.45009	32.73 qp	10.6	0	43.33	56.9	46.9	-	-	-	-
			Margin [dB]:		-13.57	-3.57	-	-	-	-
.49422	29.78 qp	10.6	0	40.38	56.1	46.1	-	-	-	-
			Margin [dB]:		-15.72	-5.72	-	-	-	-
.55178	25.66 qp	10.5	0	36.16	56	46	-	-	-	-
			Margin [dB]:		-19.84	-9.84	-	-	-	-
.61959	21.78 qp	10.5	0	32.28	56	46	-	-	-	-
			Margin [dB]:		-23.72	-13.72	-	-	-	-
Neutral .15 - 1MHz										
.15324	39.57 qp	12.1	0	51.67	65.8	55.8	-	-	-	-
			Margin [dB]:		-14.13	-4.13	-	-	-	-
.16314	39.66 qp	12	0	51.66	65.3	55.3	-	-	-	-
			Margin [dB]:		-13.64	-3.64	-	-	-	-
.1899	38.29 qp	11.6	0	49.89	64	54	-	-	-	-
			Margin [dB]:		-14.11	-4.11	-	-	-	-
.20301	37.76 qp	11.5	0	49.26	63.5	53.5	-	-	-	-
			Margin [dB]:		-14.24	-4.24	-	-	-	-
.24301	36.74 qp	11.2	0	47.94	62	52	-	-	-	-
			Margin [dB]:		-14.06	-4.06	-	-	-	-
.26898	36.25 qp	11	0	47.25	61.1	51.1	-	-	-	-
			Margin [dB]:		-13.85	-3.85	-	-	-	-
.29775	35.58 qp	10.9	0	46.48	60.3	50.3	-	-	-	-
			Margin [dB]:		-13.82	-3.82	-	-	-	-
.32791	34.81 qp	10.8	0	45.61	59.5	49.5	-	-	-	-
			Margin [dB]:		-13.89	-3.89	-	-	-	-
.36245	33.82 qp	10.7	0	44.52	58.7	48.7	-	-	-	-
			Margin [dB]:		-14.18	-4.18	-	-	-	-
.40704	32.21 qp	10.7	0	42.91	57.7	47.7	-	-	-	-
			Margin [dB]:		-14.79	-4.79	-	-	-	-
.4396	30.25 qp	10.6	0	40.85	57.1	47.1	-	-	-	-
			Margin [dB]:		-16.25	-6.25	-	-	-	-
.48399	26.75 qp	10.6	0	37.35	56.3	46.3	-	-	-	-
			Margin [dB]:		-18.95	-8.95	-	-	-	-
.53284	22.73 qp	10.6	0	33.33	56	46	-	-	-	-
			Margin [dB]:		-22.67	-12.67	-	-	-	-

```
NOTE: "+"  - Indicates an emission level in excess of the
             applicable limit (s).

pk - Peak detector
qp - Quasi-Peak detector
av - Average detector
avlg - denotes average log detection
ave - denotes average detection

LIMIT 1: FCC Part 15 Subpart C QPk
LIMIT 2: FCC Part 15 Subpart C Avg
LIMIT 3: NONE
LIMIT 4: NONE
LIMIT 5: NONE
LIMIT 6: NONE
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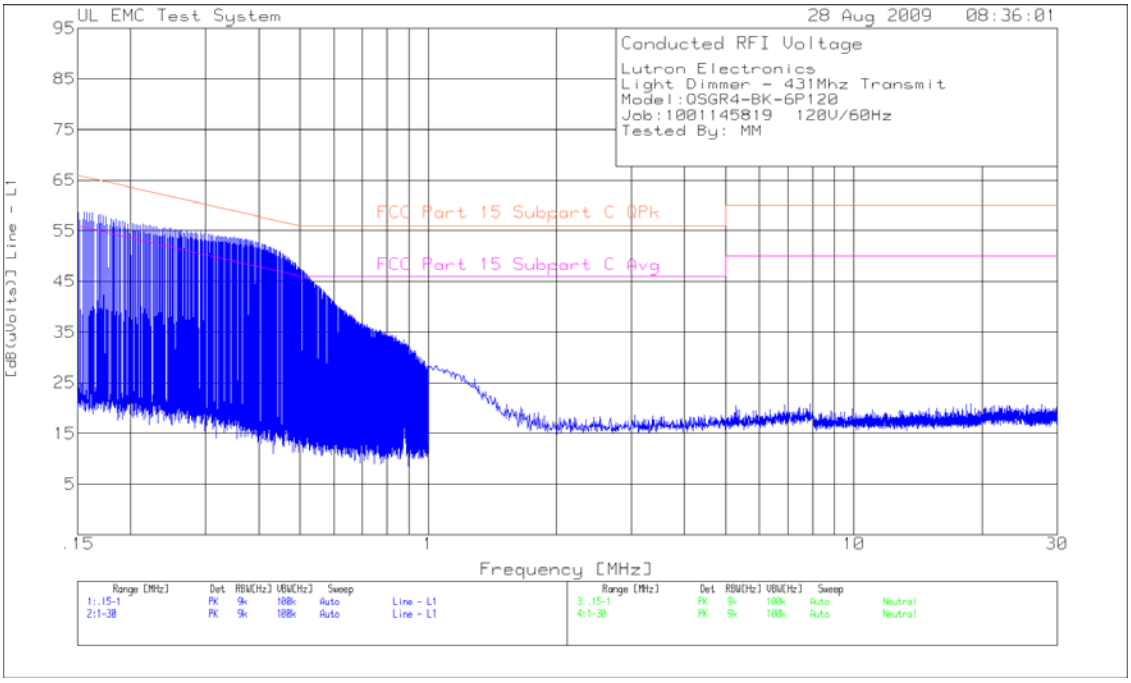
Figure 3 Conducted Emissions Graph



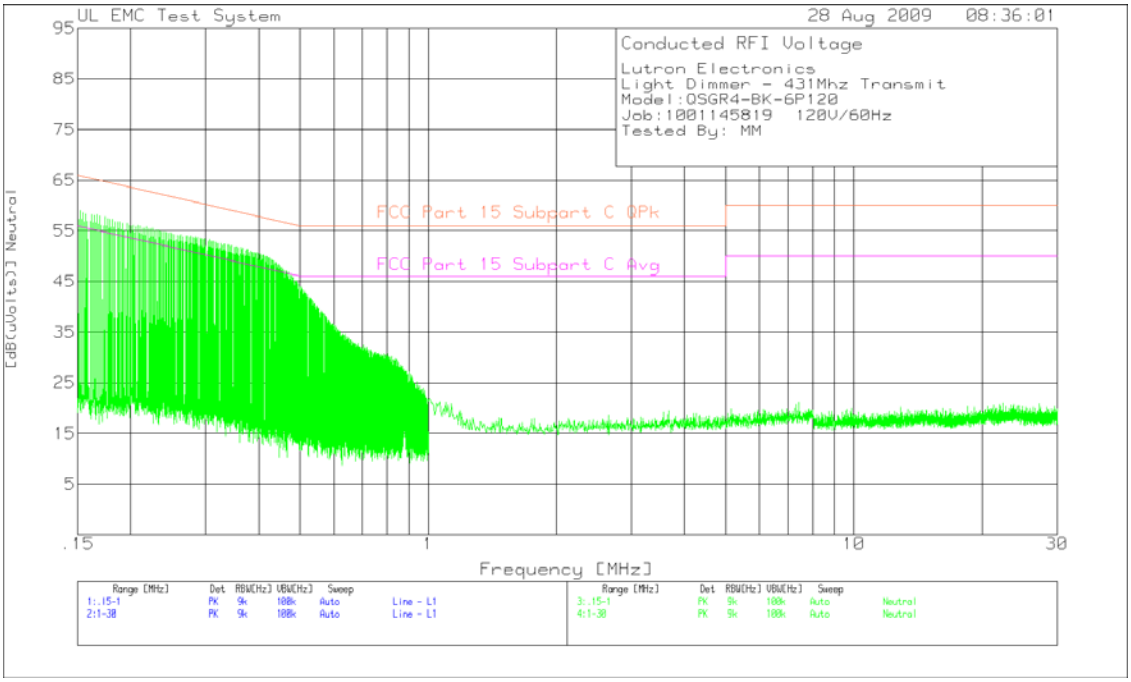


Table 4 Conducted Emissions Data Points

Lutron Electronics
Light Dimmer - 431Mhz Transmit
Model:QSGR4-BK-6P120
Job:1001145819 120V/60Hz
Tested By: MM

No.	Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level [dB(uVolts)]	Limit:1	2	3	4	5	6
Line - L1 .15 - 1MHz											
1	.16275	46.59 pk	12	0	58.59	65.3	55.3	-	-	-	-
				Margin [dB]		-6.71	3.29	-	-	-	-
2	.2209	44.79 pk	11.3	0	56.09	62.8	52.8	-	-	-	-
				Margin [dB]		-6.71	3.29	-	-	-	-
3	.28501	43.89 pk	10.9	0	54.79	60.7	50.7	-	-	-	-
				Margin [dB]		-5.91	4.09	-	-	-	-
4	.34299	42.96 pk	10.8	0	53.76	59.1	49.1	-	-	-	-
				Margin [dB]		-5.34	4.66	-	-	-	-
5	.37445	42.55 pk	10.7	0	53.25	58.4	48.4	-	-	-	-
				Margin [dB]		-5.15	4.85	-	-	-	-
6	.41168	41.56 pk	10.7	0	52.26	57.6	47.6	-	-	-	-
				Margin [dB]		-5.34	4.66	-	-	-	-
7	.45538	39.99 pk	10.6	0	50.59	56.8	46.8	-	-	-	-
				Margin [dB]		-6.21	3.79	-	-	-	-
8	.48922	37.75 pk	10.6	0	48.35	56.2	46.2	-	-	-	-
				Margin [dB]		-7.85	2.15	-	-	-	-
9	.53496	34.48 pk	10.5	0	44.98	56	46	-	-	-	-
				Margin [dB]		-11.02	-1.02	-	-	-	-
10	.60059	30.28 pk	10.5	0	40.78	56	46	-	-	-	-
				Margin [dB]		-15.22	-5.22	-	-	-	-
11	.66996	27.32 pk	10.5	0	37.82	56	46	-	-	-	-
				Margin [dB]		-18.18	-8.18	-	-	-	-
Neutral .15 - 1MHz											
12	.15221	46.84 pk	12.1	0	58.94	65.9	55.9	-	-	-	-
				Margin [dB]		-6.96	3.04	-	-	-	-
13	.18129	45.63 pk	11.7	0	57.33	64.4	54.4	-	-	-	-
				Margin [dB]		-7.07	2.93	-	-	-	-
14	.19829	44.61 pk	11.5	0	56.11	63.7	53.7	-	-	-	-
				Margin [dB]		-7.59	2.41	-	-	-	-
15	.25049	43.28 pk	11.1	0	54.38	61.7	51.7	-	-	-	-
				Margin [dB]		-7.32	2.68	-	-	-	-
16	.30626	42.42 pk	10.9	0	53.32	60.1	50.1	-	-	-	-
				Margin [dB]		-6.78	3.22	-	-	-	-
17	.37462	40.58 pk	10.7	0	51.28	58.4	48.4	-	-	-	-
				Margin [dB]		-7.12	2.88	-	-	-	-
18	.42342	39.01 pk	10.7	0	49.71	57.4	47.4	-	-	-	-
				Margin [dB]		-7.69	2.31	-	-	-	-
19	.45028	37.21 pk	10.6	0	47.81	56.9	46.9	-	-	-	-
				Margin [dB]		-9.09	.91	-	-	-	-
20	.50248	33.38 pk	10.6	0	43.98	56	46	-	-	-	-
				Margin [dB]		-12.02	-2.02	-	-	-	-
21	.54856	29.45 pk	10.5	0	39.95	56	46	-	-	-	-
				Margin [dB]		-16.05	-6.05	-	-	-	-
22	.60722	25.4 pk	10.5	0	35.9	56	46	-	-	-	-
				Margin [dB]		-20.1	-10.1	-	-	-	-

LIMIT 1: FCC Part 15 Subpart C QPk
LIMIT 2: FCC Part 15 Subpart C Avg

pk - Peak detector
qp - Quasi-Peak detector
av - Average detector
avlg - denotes average log detection

Lutron Electronics
Light Dimmer - 431Mhz Transmit
Model:QSGR4-BK-6P120
Job:1001145819 120V/60Hz
Tested By: MM

Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level [dB(uVolts)]	Limit:1	2	3	4	5	6
Line - L1 .15 - 1MHz										
.16197	40.18 qp	12	0	52.18	65.4	55.4	-	-	-	-
			Margin [dB]:		-13.22	-3.22	-	-	-	-
.22225	38.37 qp	11.3	0	49.67	62.7	52.7	-	-	-	-
			Margin [dB]:		-13.03	-3.03	-	-	-	-
.28497	37.49 qp	10.9	0	48.39	60.7	50.7	-	-	-	-
			Margin [dB]:		-12.31	-2.31	-	-	-	-
.34339	36.69 qp	10.8	0	47.49	59.1	49.1	-	-	-	-
			Margin [dB]:		-11.61	-1.61	-	-	-	-
.37406	36.21 qp	10.7	0	46.91	58.4	48.4	-	-	-	-
			Margin [dB]:		-11.49	-1.49	-	-	-	-
.41115	35.41 qp	10.7	0	46.11	57.6	47.6	-	-	-	-
			Margin [dB]:		-11.49	-1.49	-	-	-	-
.45547	33.25 qp	10.6	0	43.85	56.8	46.8	-	-	-	-
			Margin [dB]:		-12.95	-2.95	-	-	-	-
.49003	31.04 qp	10.6	0	41.64	56.2	46.2	-	-	-	-
			Margin [dB]:		-14.56	-4.56	-	-	-	-
.53469	27.9 qp	10.5	0	38.4	56	46	-	-	-	-
			Margin [dB]:		-17.6	-7.6	-	-	-	-
.6005	23.71 qp	10.5	0	34.21	56	46	-	-	-	-
			Margin [dB]:		-21.79	-11.79	-	-	-	-
.66925	20.28 qp	10.5	0	30.78	56	46	-	-	-	-
			Margin [dB]:		-25.22	-15.22	-	-	-	-
Neutral .15 - 1MHz										
.15172	39.85 qp	12.1	0	51.95	65.9	55.9	-	-	-	-
			Margin [dB]:		-13.95	-3.95	-	-	-	-
.18096	38.82 qp	11.7	0	50.52	64.4	54.4	-	-	-	-
			Margin [dB]:		-13.88	-3.88	-	-	-	-
.19935	38.13 qp	11.5	0	49.63	63.6	53.6	-	-	-	-
			Margin [dB]:		-13.97	-3.97	-	-	-	-
.25024	36.93 qp	11.1	0	48.03	61.7	51.7	-	-	-	-
			Margin [dB]:		-13.67	-3.67	-	-	-	-
.30781	35.83 qp	10.9	0	46.73	60	50	-	-	-	-
			Margin [dB]:		-13.27	-3.27	-	-	-	-
.37416	33.99 qp	10.7	0	44.69	58.4	48.4	-	-	-	-
			Margin [dB]:		-13.71	-3.71	-	-	-	-
.42343	32.13 qp	10.7	0	42.83	57.4	47.4	-	-	-	-
			Margin [dB]:		-14.57	-4.57	-	-	-	-
.45005	30.41 qp	10.6	0	41.01	56.9	46.9	-	-	-	-
			Margin [dB]:		-15.89	-5.89	-	-	-	-
.50187	26.54 qp	10.6	0	37.14	56	46	-	-	-	-
			Margin [dB]:		-18.86	-8.86	-	-	-	-
.54816	23 qp	10.5	0	33.5	56	46	-	-	-	-
			Margin [dB]:		-22.5	-12.5	-	-	-	-
.60761	18.84 qp	10.5	0	29.34	56	46	-	-	-	-
			Margin [dB]:		-26.66	-16.66	-	-	-	-

pk - Peak detector
qp - Quasi-Peak detector
av - Average detector
avlg - denotes average log detection
ave - denotes average detection

LIMIT 1: FCC Part 15 Subpart C QPk
LIMIT 2: FCC Part 15 Subpart C Avg

4.2 Test Conditions and Results – Occupied Bandwidth

Test Description	Measurements were made in the laboratory environment. A Dipole (or equivalent) antenna tuned to the transmit frequency was attached to the input of a spectrum analyzer. The device was operated and the spectrum analyzer resolution bandwidth set per the appropriate standard.
Basic Standard	CFR 47, Part 15, Subpart C, Section 15.231; RSS-GEN; RSS-210
Occupied Bandwidth Limits	
0.25% of the Fundamental Frequency	

Table 5 Occupied Bandwidth Configuration Settings

Power Interface Mode #	EUT Configurations Mode #	EUT Operation Mode #
1	1	1,2,3
Supplementary information: None		

Table 6 Occupied Bandwidth Spectrum Analyzer Settings

Resolution Bandwidth (MHz)	Occupied Bandwidth Requirements	
	dBc	%
0.01	-20	99
Supplementary information: None		

Table 7 Occupied Bandwidth Test Results

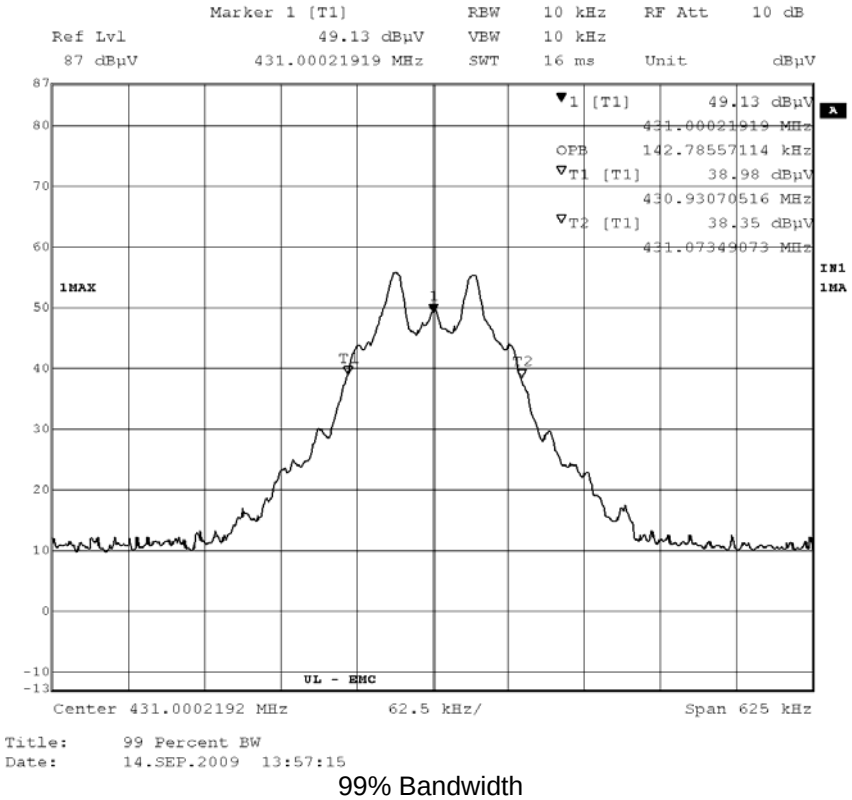
Frequency (MHz)	20dB Bandwidth (kHz)	99% Bandwidth (kHz)
431	155	142.8
433	155	142.8
437	155	145.3

Table 8 Occupied Bandwidth Test Equipment

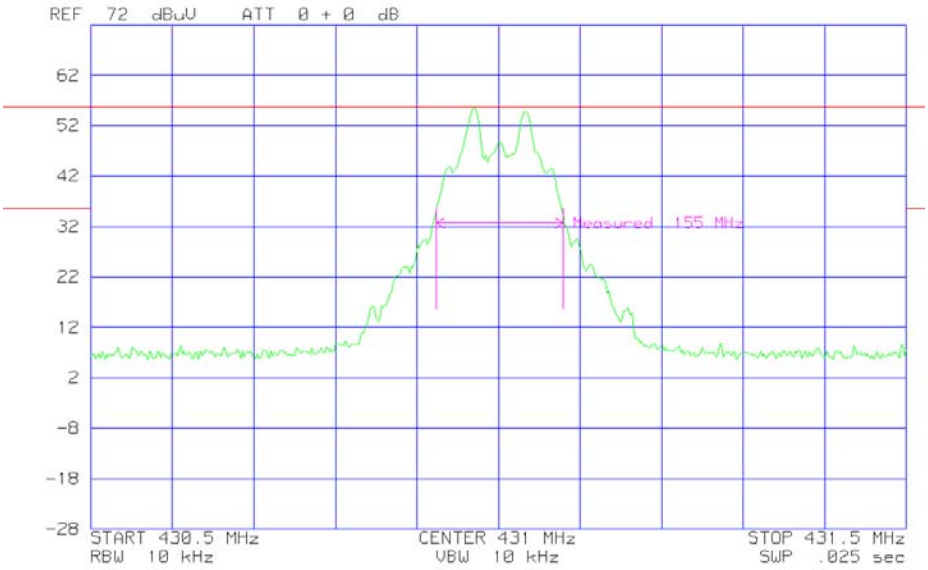
Test Equipment Used			
Description	Manufacturer	Model	Identifier
EMI Receiver	Rohde & Schwarz	ESIB26	ME5B-081
Dipole Antenna	EMCO	3121C	3359
Temp/Humidity/Pressure Meter	Cole Parmer	99760-00	4268
Measurement Software	UL	Version 9.3	44740
Multimeter	Fluke	83V	43443

Figure 4 Test Setup for Occupied Bandwidth

Figure 5 Occupied Bandwidth Graph (431MHz)

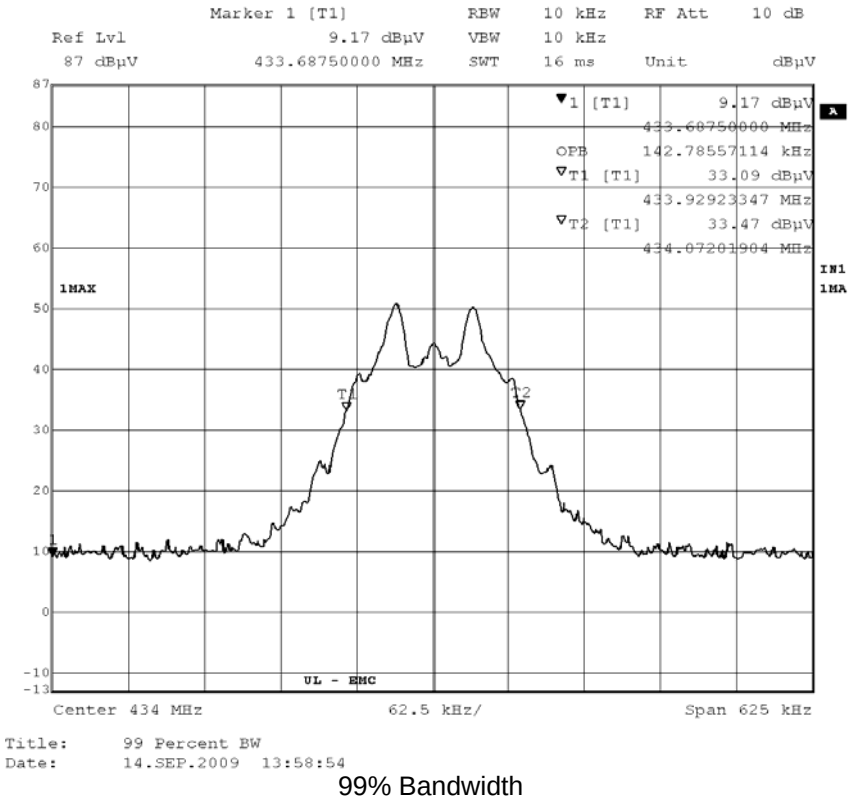


99% Bandwidth

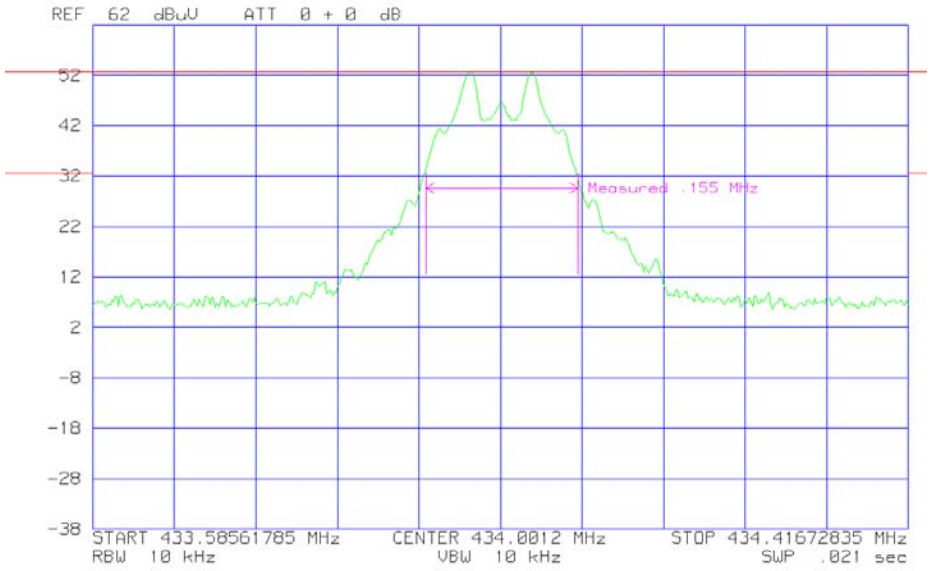


-20B Bandwidth

Figure 6 Occupied Bandwidth Graph (434MHz)

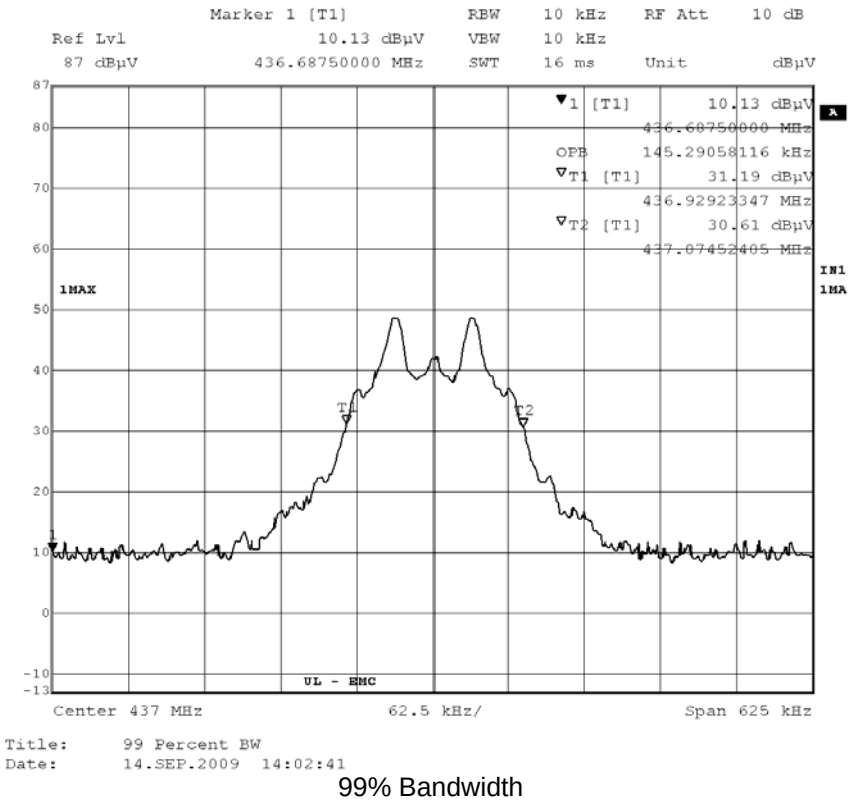


99% Bandwidth

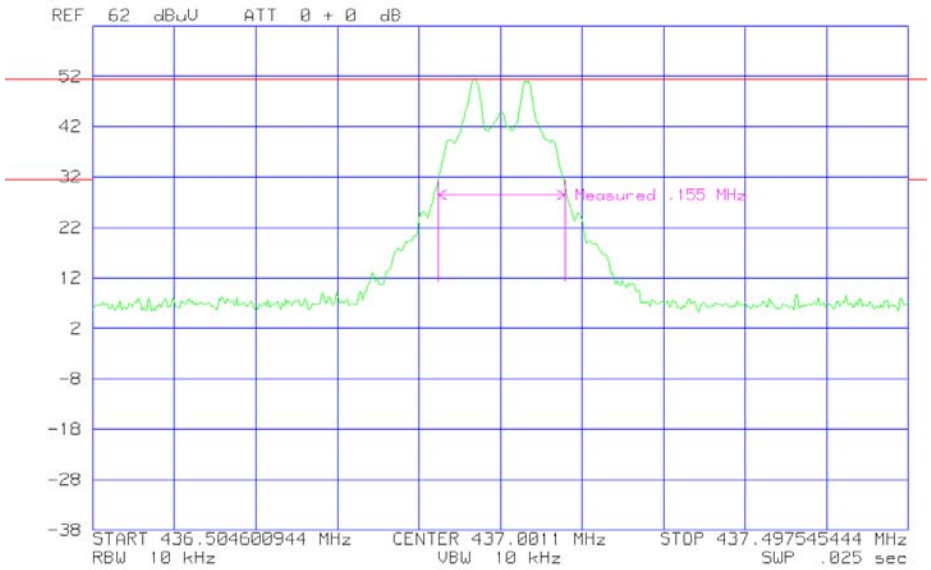


-20B Bandwidth

Figure 7 Occupied Bandwidth Graph (437MHz)



99% Bandwidth



-20B Bandwidth

4.3 Test Conditions and Results – Cease Operation

Test Description	Measurements were made in the laboratory environment. A Dipole (or equivalent) antenna tuned to the transmit frequency was attached to the input of a spectrum analyzer. The device was operated and the transmission time measured with the spectrum analyzer set to zero span at the fundamental frequency.
Basic Standard	CFR 47, Part 15, Subpart C, Section 15.231; RSS-GEN; RSS-210
Cease Operation Limits	
The transmissions shall stop within 5 seconds of either a button being released or if automatically controlled transmissions shall be stopped 5 seconds after transmissions begin.	

Table 9 Cease Operation Configuration Settings

Power Interface Mode #	EUT Configurations Mode #	EUT Operation Mode #
1	1	1
Supplementary information: None		

Table 10 Cease Operation Test Equipment

Test Equipment Used			
Description	Manufacturer	Model	Identifier
EMI Receiver	Rohde & Schwarz	ESIB26	ME5B-081
Dipole Antenna	EMCO	3121C	3359
Temp/Humidity/Pressure Meter	Cole Parmer	99760-00	4268
Measurement Software	UL	Version 9.3	44740
Multimeter	Fluke	83V	43443

Figure 8 Test Setup for Cease Operation

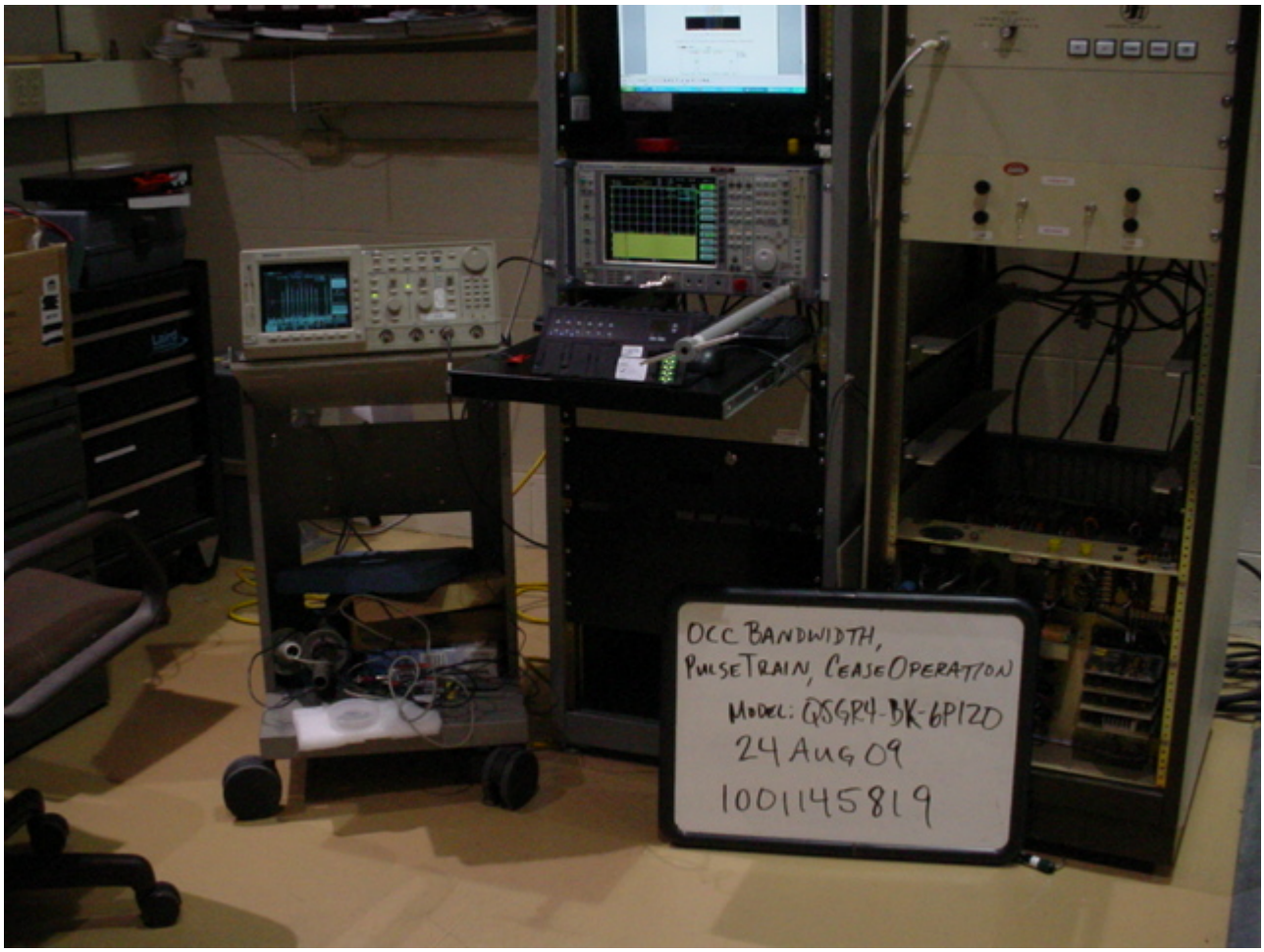
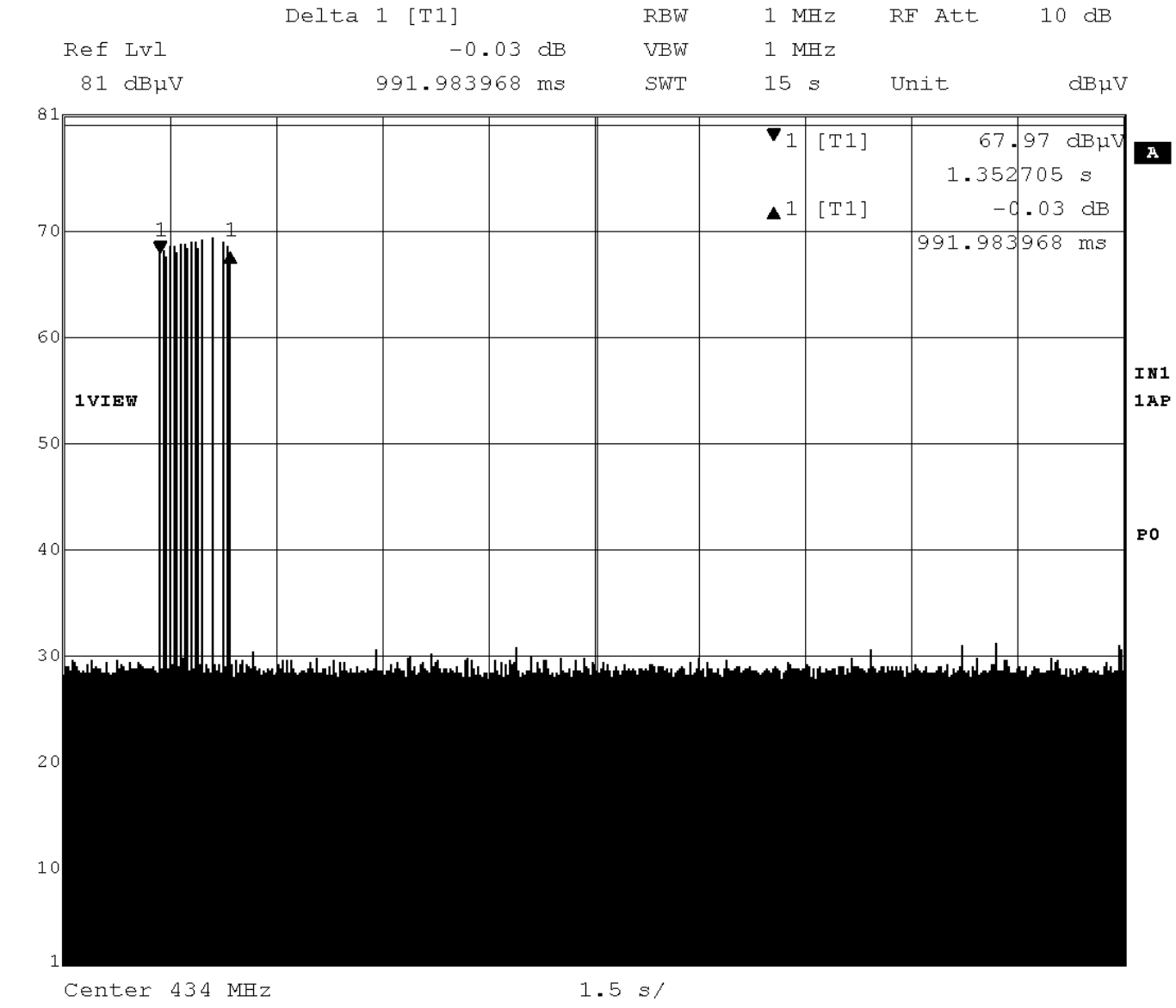


Figure 9 Cease Operation Graph



Title: Cease Operation
Comment A: QSGR4-BK-6P120
Date: 24.AUG.2009 10:28:04

4.4 Test Conditions and Results – Pulse Train

Test Description	Measurements were made in the laboratory environment. A Dipole (or equivalent) antenna tuned to the transmit frequency was attached to the input of a spectrum analyzer. The pulse train was measured with the spectrum analyzer set to zero span at the fundamental frequency.
Basic Standard	FCC Part 15 Subpart A, 15.35
Pulse Train Limits	
There are no limits for this test. This data is used to calculate the averaging correction factor that is applied to the measured peak radiated emissions results.	

Table 11 Pulse Train Configuration Settings

Power Interface Mode #	EUT Configurations Mode #	EUT Operation Mode #
1	1	1
Supplementary information: None		

Table 12 Pulse Train Calculation

Pulse Width (ms)	Total Transmission time or 100ms which ever is lesser	Average Correction Factor (dB) $20\log\left(\frac{PulseWidth}{TotalTransmissionTime}\right)$
20.6	100	-13.72

Table 13 Pulse Train Test Equipment

Test Equipment Used			
Description	Manufacturer	Model	Identifier
EMI Receiver	Rohde & Schwarz	ESIB26	ME5B-081
Dipole Antenna	EMCO	3121C	3359
Oscilloscope	Tektronix		
Temp/Humidity/Pressure Meter	Cole Parmer	99760-00	4268
Measurement Software	UL	Version 9.3	44740
Multimeter	Fluke	83V	43443

Figure 10 Test Setup for Pulse Train

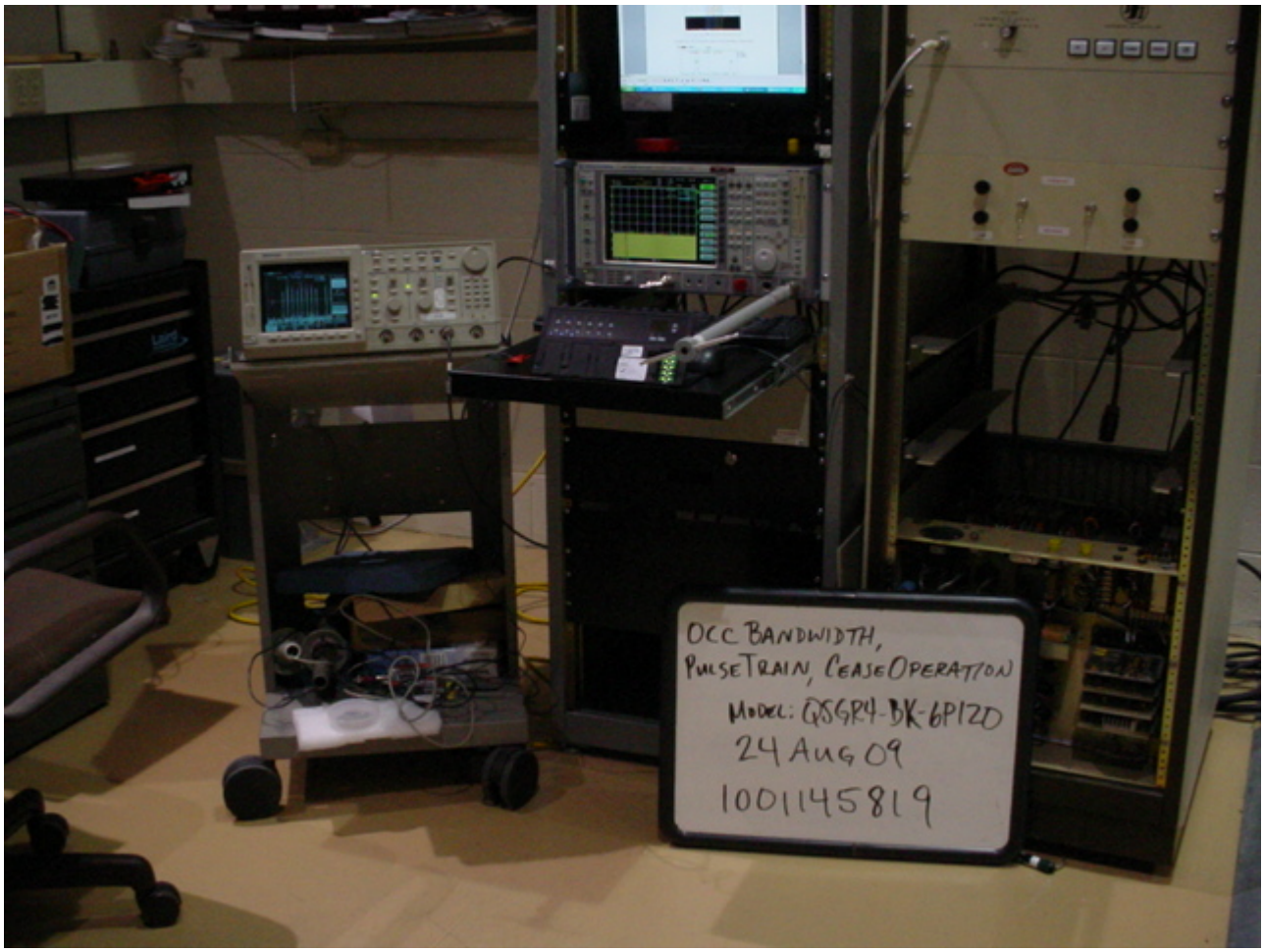
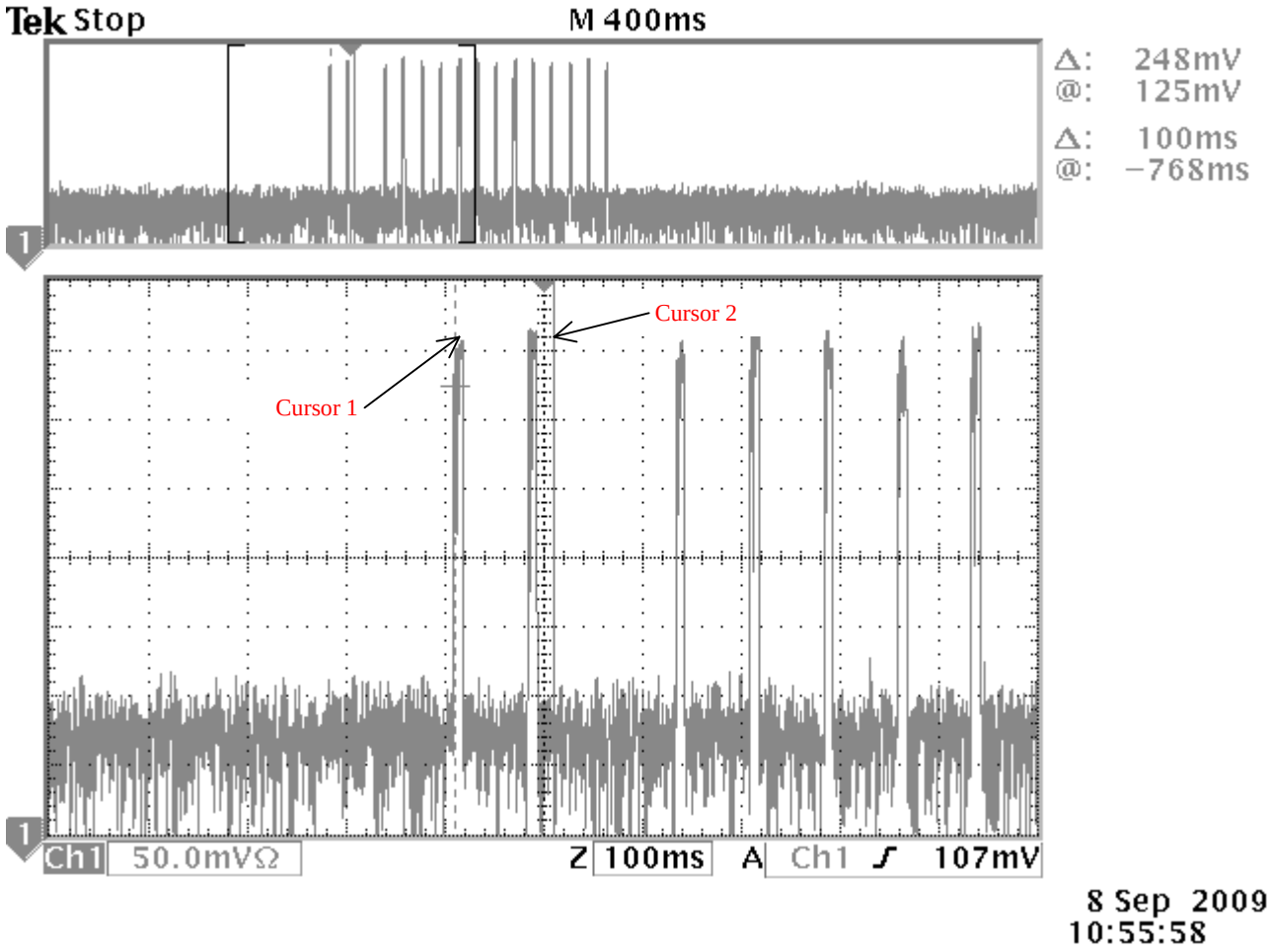
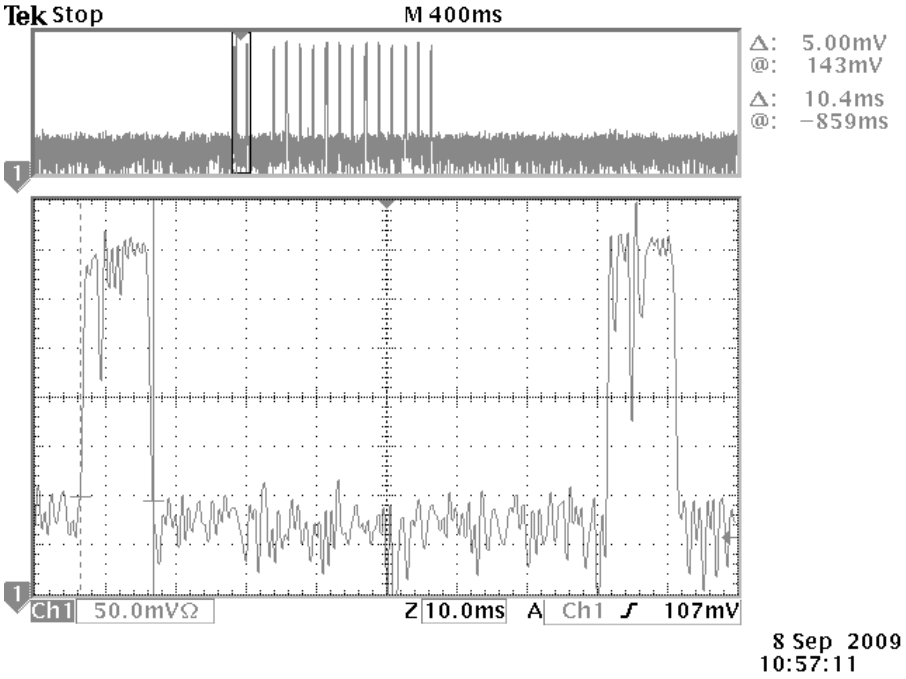


Figure 11 Pulse Train Graph

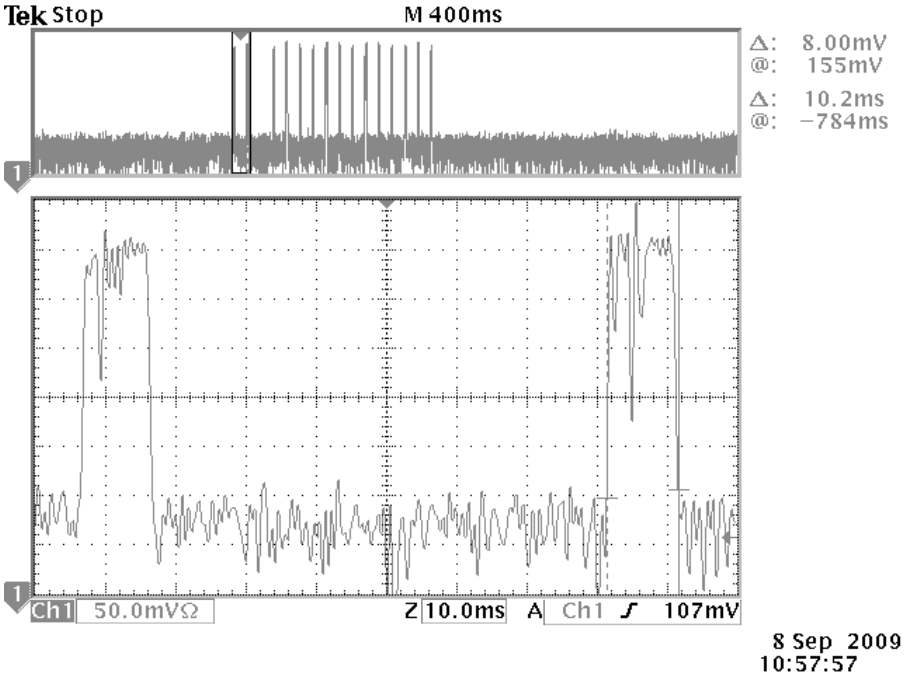


Start of one transmission, showing only 2 pulses contained in a 100 ms window

Figure 12 Pulse Train Graph



Duration of Pulse 1



Duration of Pulse 2

4.5 Test Conditions and Results – Radiated Emissions (Transmit Mode)

Test Description	Measurements were made in a 10-meter semi-anechoic chamber that complies to CISPR 16/ANSI C63.4. Preliminary (peak) measurements were performed at an antenna to EUT separation distance of 3-meter. The EUT was rotated 360° about its azimuth with the receive antenna located at various heights in both horizontal and vertical polarities. Final measurements (quasi-peak or average as noted) were then performed by rotating the EUT 360° and adjusting the receive antenna height from 1 to 4-meters. All frequencies were investigated in both horizontal and vertical antenna polarity, where applicable.		
Basic Standard	CFR 47, Part 15, Subpart C, Section 15.231; RSS-GEN; RSS-210		
UL LPG	80-EM-S0029		
	Frequency range	Measurement Point	
Fully configured sample scanned over the following frequency range	9kHz – 5GHz	(3 meter measurement distance)	

Limits

Frequency (MHz)	Limit (dBµV/m)		
	Quasi-Peak	Average	
	General Emissions	Fundamental	Spurious
0.009 – 0.490	128.5 – 93.8	-	-
0.490 – 1.705	73.8 – 63	-	-
1.705 – 30	69.5	-	-
30 – 88	40	-	-
88 – 216	43.5	-	-
216-960	46	-	
1000-5000	54	-	-
431	-	80.73	-
434	-	80.79	-
437	-	80.92	-
All 431 Harmonics	-	-	60.73
All 434 Harmonics	-	-	60.79
All 437 Harmonics	-	-	60.92

Supplementary information: Spurious limits are only applied against products of the transmitter. All other emissions must meet the general limits. Testing below 30MHz performed at only one operating frequency since the fundamental does not operate in this range.

Table 14 Radiated Emissions EUT Configuration Settings

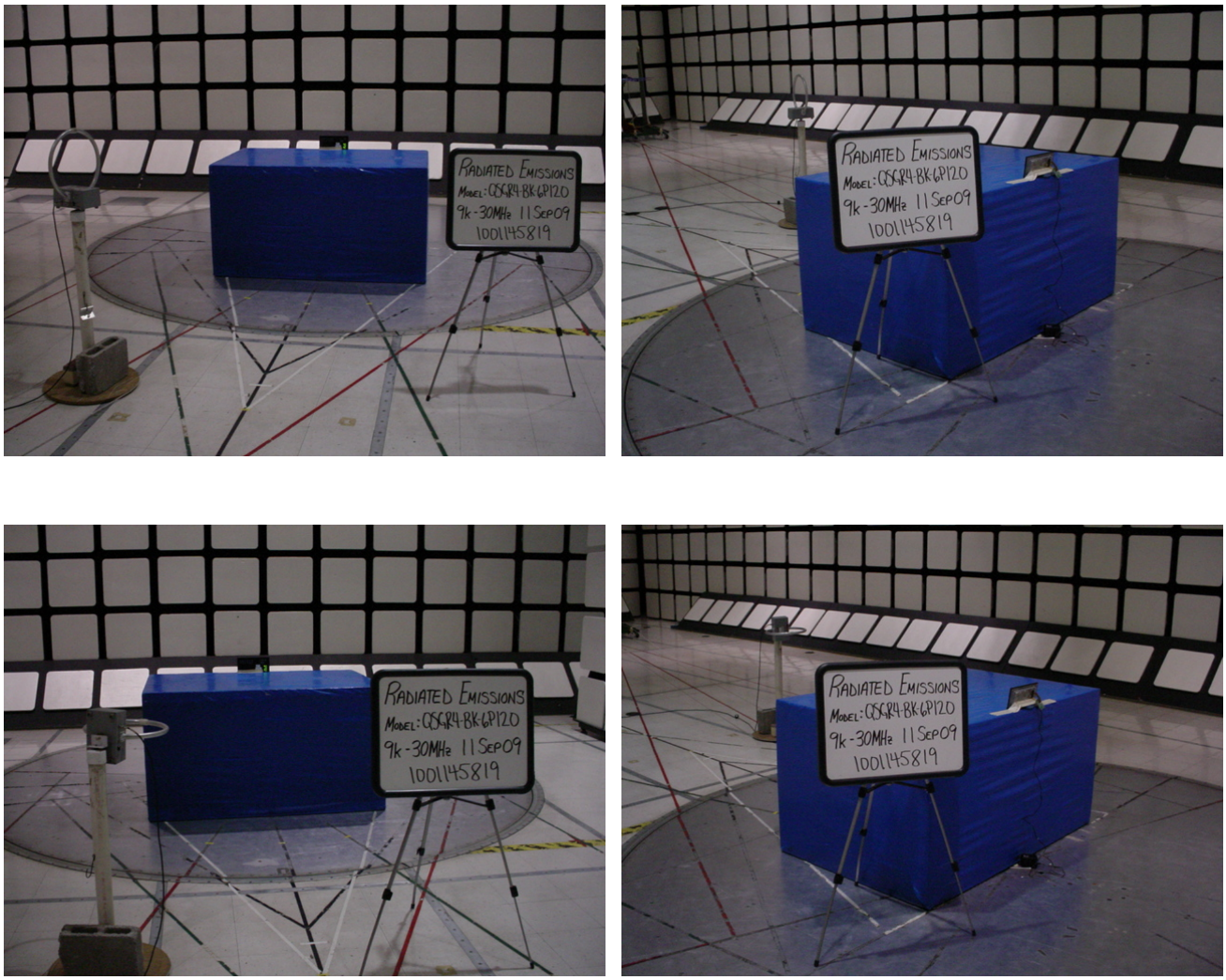
Power Interface Mode #	EUT Configurations Mode #	EUT Operation Mode #
1	1	1,2,3
Supplementary information: None		

Table 15 Radiated Emissions Test Equipment

Test Equipment Used			
Description	Manufacturer	Model	Identifier
9kHz-30MHz			
EMI Receiver	Rohde & Schwarz	ESIB40	34968
Active Loop Antenna	EMCO	6507	ME5A-288
Switch Driver	HP	11713A	ME7A-627
System Controller	Sunol Sciences	SC99V	44396
Camera Controller	Panasonic	WV-CU254	44395
RF Switch Box	UL	1	44398
Measurement Software	UL	Version 9.3	44740
Temp/Humidity/Pressure Meter	Cole Parmer	99760-00	4268
Multimeter	Fluke	83V	43443
30-1000MHz			
EMI Receiver	Rohde & Schwarz	ESIB40	34968
Bicon Antenna	Schaffner	VBA6106A	54
Log-P Antenna	Schaffner	UPA6109	44067
Switch Driver	HP	11713A	ME7A-627
System Controller	Sunol Sciences	SC99V	44396
Camera Controller	Panasonic	WV-CU254	44395
RF Switch Box	UL	1	44398
Measurement Software	UL	Version 9.3	44740
Temp/Humidity/Pressure Meter	Cole Parmer	99760-00	4268
Multimeter	Fluke	83V	43443
Above 1GHz (Band Optimized System)			
Spectrum Analyzer	Agilent	E7405A	19695
Horn Antenna (1-2 GHz)	ETS	3161-01	51442
Horn Antenna (2-4 GHz)	ETS	3161-02	48107
Horn Antenna (4-8 GHz)	ETS	3161-03	48106
Signal Path Controller	HP	11713A	50250
Gain Controller	HP	11713A	50251
RF Switch / Preamp Fixture	UL	BOMS1	50249
System Controller	UL	BOMS2	50252
Measurement Software	UL	Version 9.3	44740

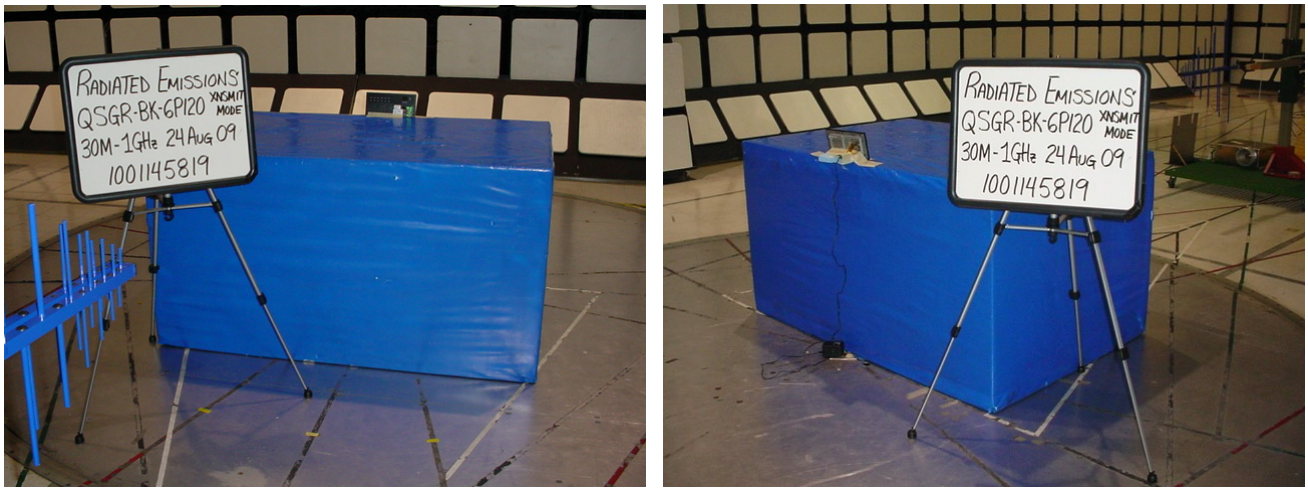
Test Equipment Used			
Description	Manufacturer	Model	Identifier
Temp/Humidity/Pressure Meter	Cole Parmer	99760-00	4268
Multimeter	Fluke	83V	43443

Figure 13 Test setup for Radiated Emissions

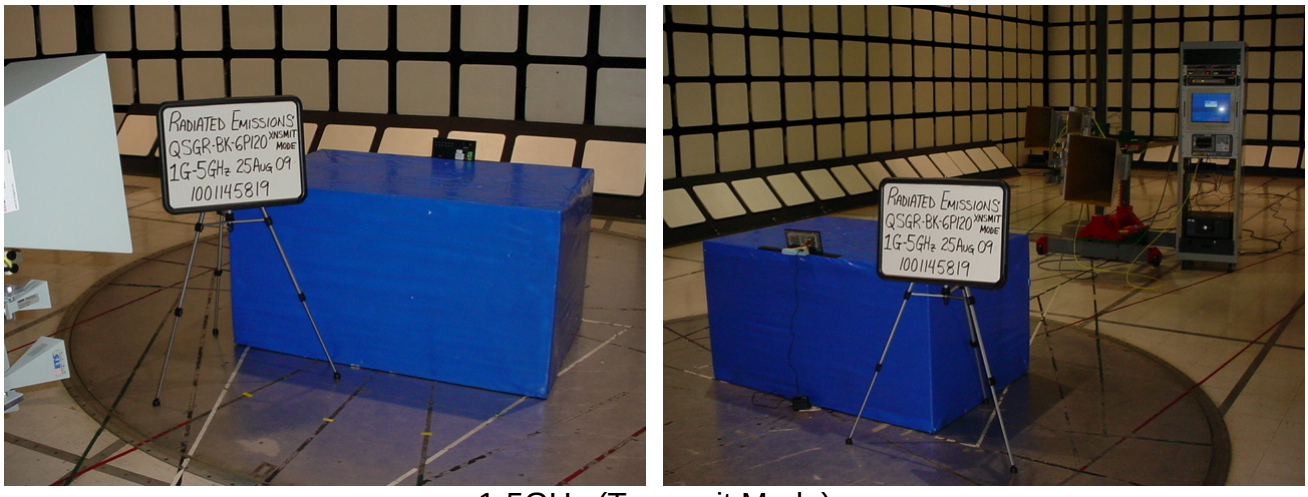


9kHz-30MHz (Transmit Mode)

Figure 14 Test setup for Radiated Emissions



30-1000MHz (Transmit Mode)



1-5GHz (Transmit Mode)

Figure 16 Radiated Emissions Graph

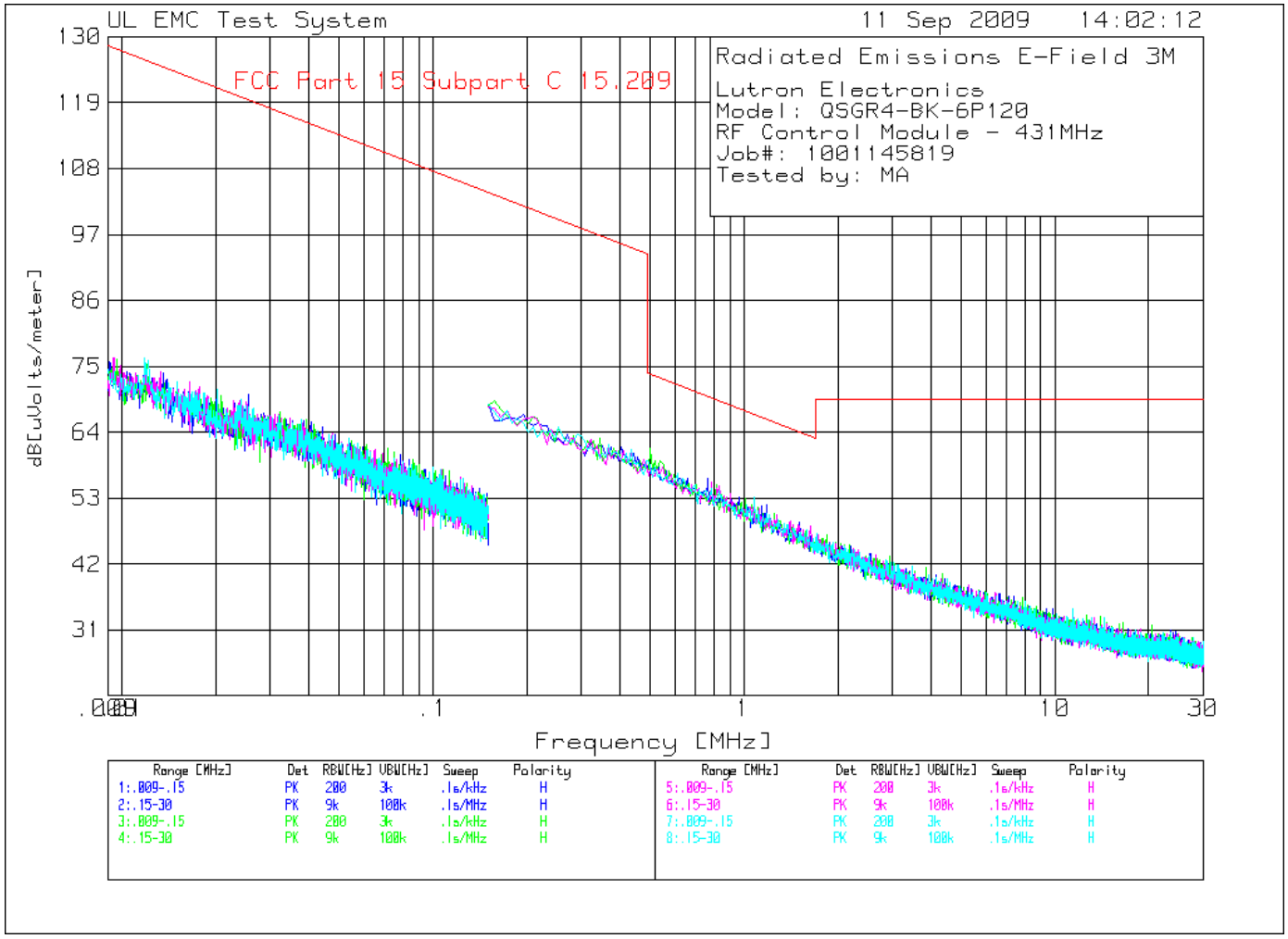


Table 17 Radiated Emissions Data Points

Lutron Electronics
Model: QSGR4-BK-6P120
RF Control Module - 431MHz
Job#: 1001145819
Tested by: MA

No.	Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit:1	2	3	4	5	6
0° .009 - .15MHz											
1	.01363	44.81 pk	0	29.1	73.91	124.9	-	-	-	-	-
	Azimuth:209	Height:100 Horz		Margin [dB]		-50.99	-	-	-	-	-
2	.02548	45.51 pk	0	24.8	70.31	119.5	-	-	-	-	-
	Azimuth:134	Height:100 Horz		Margin [dB]		-49.19	-	-	-	-	-
0° .15 - 30MHz											
3	23.91654	12.41 pk	.3	17.8	30.51	69.5	-	-	-	-	-
	Azimuth:337	Height:100 Horz		Margin [dB]		-38.99	-	-	-	-	-
45° .009 - .15MHz											
4	.0121	45.28 pk	.1	30	75.38	125.9	-	-	-	-	-
	Azimuth:2	Height:120 Horz		Margin [dB]		-50.52	-	-	-	-	-
45° .15 - 30MHz											
5	11.2943	14.94 pk	.2	17.5	32.64	69.5	-	-	-	-	-
	Azimuth:225	Height:120 Horz		Margin [dB]		-36.86	-	-	-	-	-
90° .009 - .15MHz											
6	.04032	42.22 pk	0	22.3	64.52	115.5	-	-	-	-	-
	Azimuth:301	Height:140 Horz		Margin [dB]		-50.98	-	-	-	-	-
90° .15 - 30MHz											
7	7.062	18.51 pk	.2	17.3	36.01	69.5	-	-	-	-	-
	Azimuth:52	Height:140 Horz		Margin [dB]		-33.49	-	-	-	-	-
135° .009 - .15MHz											
8	.00906	41.76 pk	.8	32	74.56	128.4	-	-	-	-	-
	Azimuth:353	Height:159 Horz		Margin [dB]		-53.84	-	-	-	-	-
135° .15 - 30MHz											
9	7.99505	18.4 pk	.2	17.3	35.9	69.5	-	-	-	-	-
	Azimuth:325	Height:159 Horz		Margin [dB]		-33.6	-	-	-	-	-

LIMIT 1: FCC Part 15 Subpart C 15.209
LIMIT 2: NONE
LIMIT 3: NONE
LIMIT 4: NONE
LIMIT 5: NONE
LIMIT 6: NONE

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

Figure 17 Radiated Emissions Graph

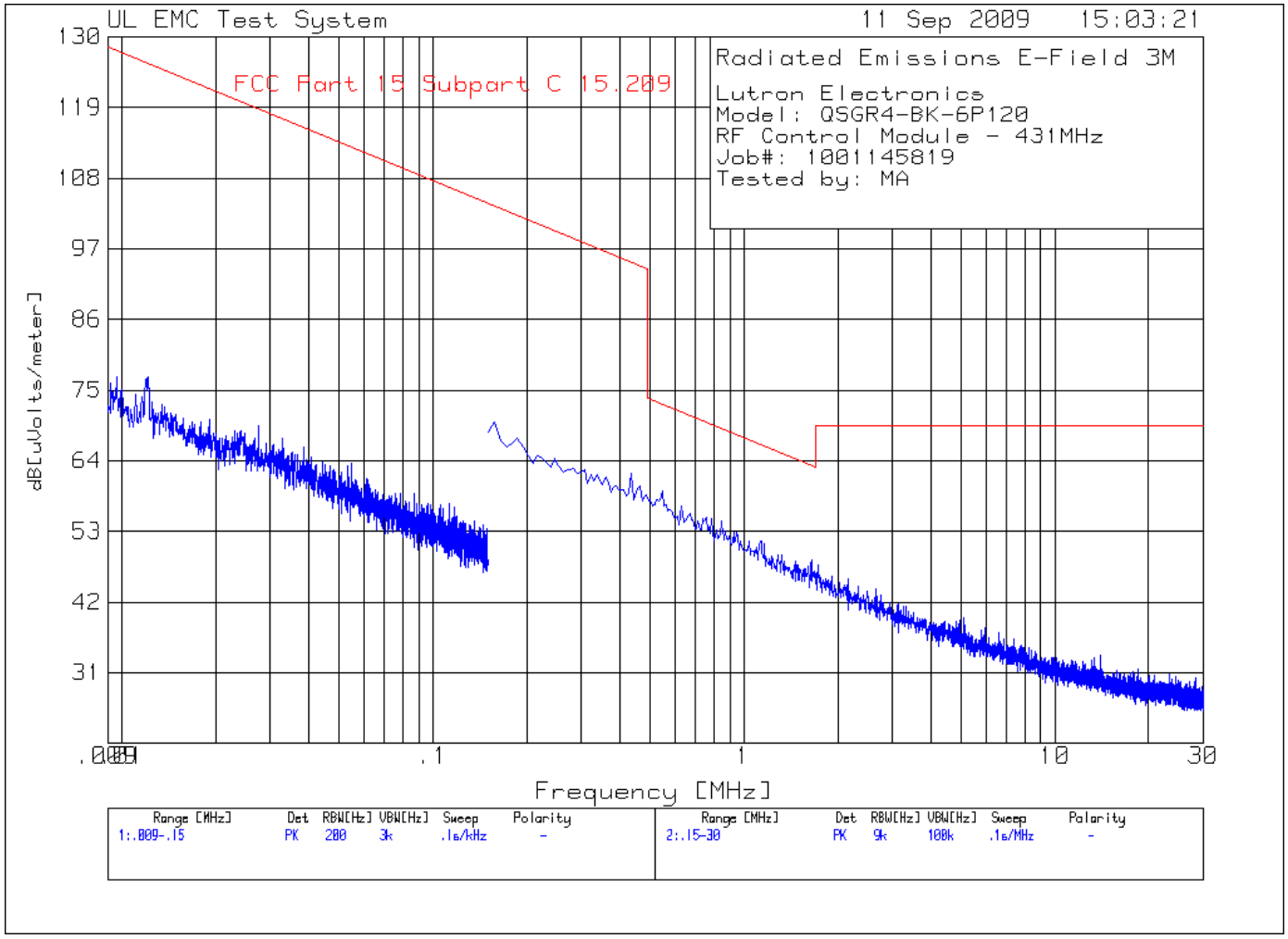


Table 18 Radiated Emissions Data Points

Lutron Electronics
Model: QSGR4-BK-6P120
RF Control Module - 431MHz
Job#: 1001145819
Tested by: MA

No.	Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit:1	2	3	4	5	6
Range 1 .009 - .15MHz ----------											
1	.01216	46.99 pk	.1	29.9	76.99	125.9	-	-	-	-	-
	Azimuth:151			Margin [dB]		-48.91	-	-	-	-	-
2	.02745	45.01 pk	0	24.4	69.41	118.8	-	-	-	-	-
	Azimuth:354			Margin [dB]		-49.39	-	-	-	-	-
3	.05493	43.38 pk	0	20.3	63.68	112.8	-	-	-	-	-
	Azimuth:284			Margin [dB]		-49.12	-	-	-	-	-
Range 2 .15 - 30MHz ----------											
4	.30675	45.57 pk	0	17	62.57	97.9	-	-	-	-	-
	Azimuth:276			Margin [dB]		-35.33	-	-	-	-	-
5	.43365	44.77 pk	0	17.2	61.97	94.9	-	-	-	-	-
	Azimuth:337			Margin [dB]		-32.93	-	-	-	-	-
6	14.00386	15.91 pk	.2	17.6	33.71	69.5	-	-	-	-	-
	Azimuth:257			Margin [dB]		-35.79	-	-	-	-	-

LIMIT 1: FCC Part 15 Subpart C 15.209
LIMIT 2: NONE
LIMIT 3: NONE
LIMIT 4: NONE
LIMIT 5: NONE
LIMIT 6: NONE

pk - Peak detector
qp - Quasi-Peak detector
av - Average detector
avlg - denotes average log detection

Figure 18 Radiated Emissions Graph

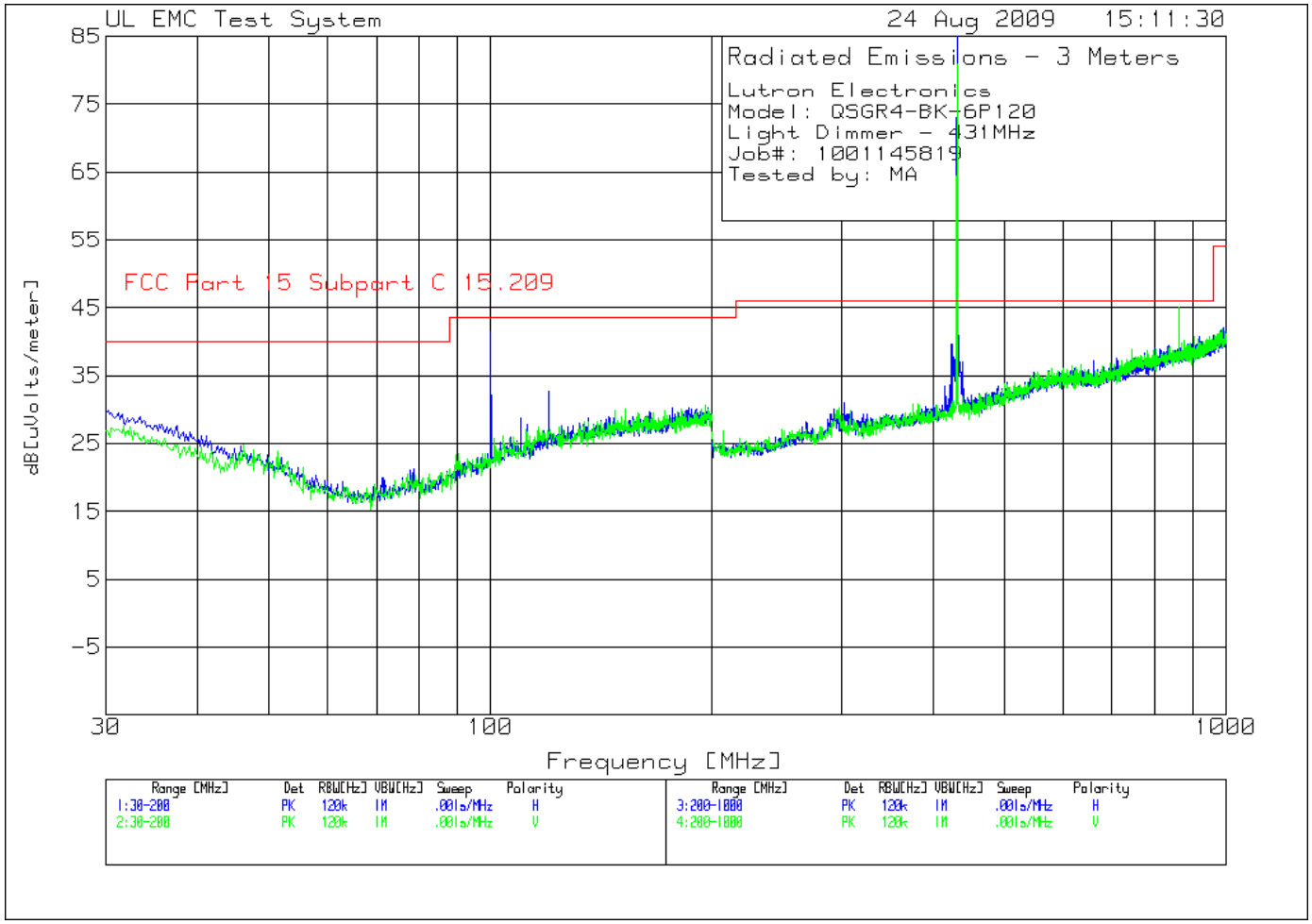


Table 19 Radiated Emissions Data Points

Lutron Electronics
Model: QSGR4-BK-6P120
Light Dimmer - 431MHz
Job#: 1001145819
Tested by: MA

No.	Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit:1	2	3	4	5	6
Horizontal 30 - 200MHz											
1	99.9399	30.47 pk	.6	10.5	41.57	43.5	-	-	-	-	-
	Azimuth:251	Height:200 Horz		Margin [dB]		-1.93	-	-	-	-	-
2	120.02	18.95 pk	.7	13	32.65	43.5	-	-	-	-	-
	Azimuth:287	Height:300 Horz		Margin [dB]		-10.85	-	-	-	-	-
Horizontal 200 - 1000MHz											
3	430.9155	75.65 pk	1.3	16.7	93.65	46	-	-	-	-	-
	Azimuth:343	Height:200 Horz		Margin [dB]		47.65	-	-	-	-	-
4	861.931	16.99 pk	1.7	23.1	41.79	46	-	-	-	-	-
	Azimuth:319	Height:100 Horz		Margin [dB]		-4.21	-	-	-	-	-
Vertical 200 - 1000MHz											
5	430.9155	63.14 pk	1.3	16.4	80.84	46	-	-	-	-	-
	Azimuth:67	Height:300 Vert		Margin [dB]		34.84	-	-	-	-	-
6	862.3312	20.39 pk	1.7	23	45.09	46	-	-	-	-	-
	Azimuth:358	Height:200 Vert		Margin [dB]		-.91	-	-	-	-	-

LIMIT 1: FCC Part 15 Subpart C 15.209
LIMIT 2: NONE
LIMIT 3: NONE
LIMIT 4: NONE
LIMIT 5: NONE
LIMIT 6: NONE

pk - Peak detector
qp - Quasi-Peak detector

Lutron Electronics
Model: QSGR4-BK-6P120
Light Dimmer - 431MHz
Job#: 1001145819
Tested by: MA

Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit:1	2	3	4	5	6
Horizontal 30 - 200MHz										
99.9711	8.07 qp	.6	10.5	19.17	43.5	-	-	-	-	-
Azimuth: 351	Height:336 Horz		Margin [dB]:		-24.33	-	-	-	-	-
Horizontal 200 - 1000MHz										
430.9901	74.99 pk	1.3	16.7	79.27*	46	80.73	-	-	-	-
Azimuth: 7	Height:207 Horz		Margin [dB]:		33.27	-1.46	-	-	-	-
861.9961	20.57 pk	1.7	23.1	45.37	46	-	60.73	-	-	-
Azimuth: 330	Height:146 Horz		Margin [dB]:		-.63	-	-15.36	-	-	-
Vertical 200 - 1000MHz										
430.986	64.79 pk	1.3	16.4	68.77*	46	80.73	-	-	-	-
Azimuth: 267	Height:253 Vert		Margin [dB]:		22.77	-11.96	-	-	-	-
861.9828	22.35 pk	1.7	23	47.05	46	-	60.73	-	-	-
Azimuth: 325	Height:132 Vert		Margin [dB]:		1.05	-	-13.68	-	-	-

LIMIT 1: FCC Part 15 Subpart C 15.209
LIMIT 2: FCC Part 15 Subpart C 15.231 (Fundamental)
LIMIT 3: FCC Part 15 Subpart C 15.231 (Harmonics)
LIMIT 4: NONE
LIMIT 5: NONE
LIMIT 6: NONE

pk - Peak detector (Maximized)
qp - Quasi-Peak detector
av - Average detector
avlg - Average log detector
ave - Average detector

* - Correction factor, as determined in Section 4.4 of this report, has been applied.

Figure 19 Radiated Emissions Graph

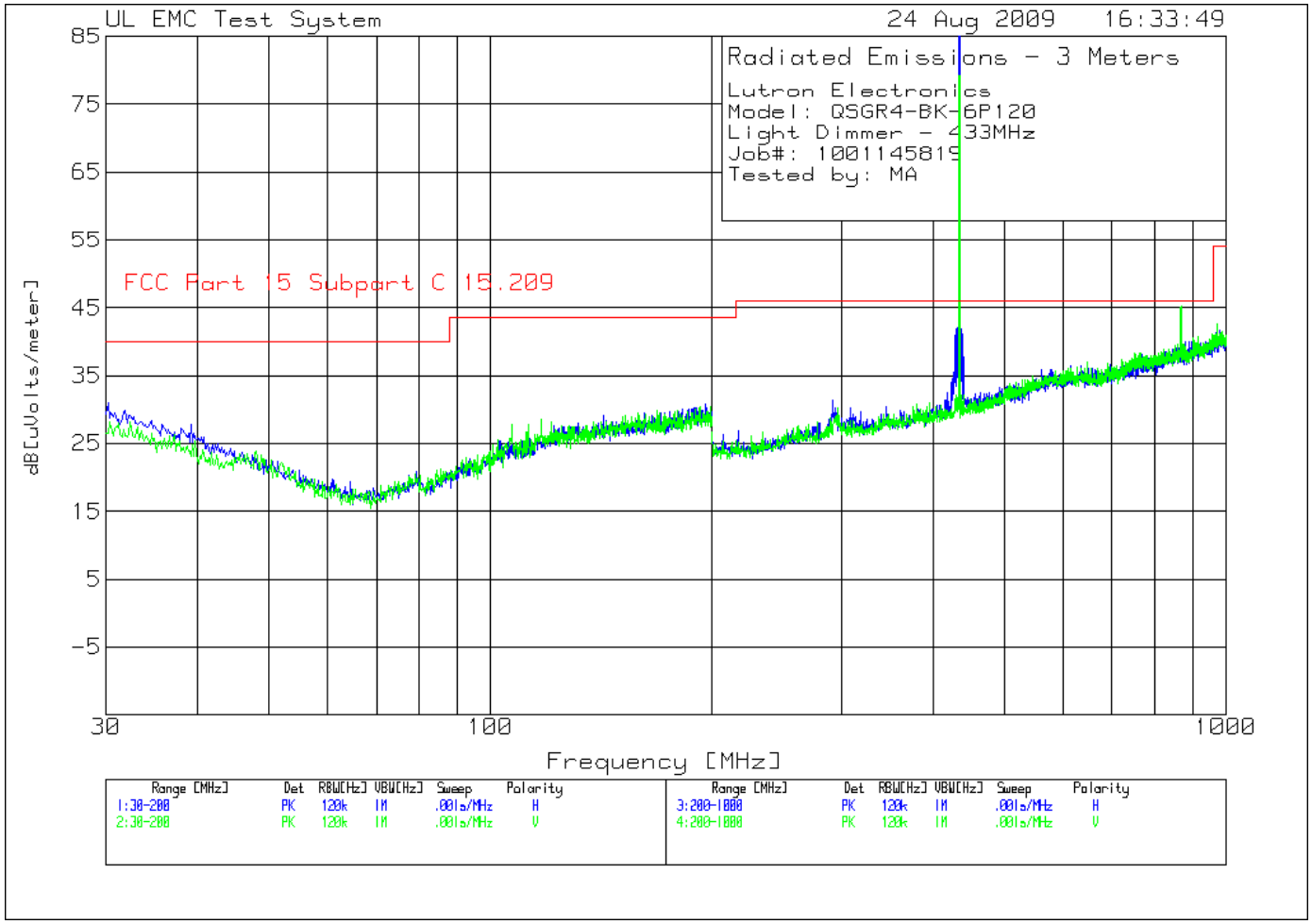


Table 20 Radiated Emissions Data Points

Lutron Electronics
Model: QSGR4-BK-6P120
Light Dimmer - 433MHz
Job#: 1001145819
Tested by: MA

No.	Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit:1	2	3	4	5	6
Horizontal 30 - 200MHz											
1	39.1892	12.87 pk	.4	14.6	27.87	40	-	-	-	-	-
	Azimuth:179	Height:200 Horz	Margin [dB]			-12.13	-	-	-	-	-
2	142.3123	14.11 pk	.8	14.3	29.21	43.5	-	-	-	-	-
	Azimuth:179	Height:400 Horz	Margin [dB]			-14.29	-	-	-	-	-
Vertical 30 - 200MHz											
3	117.1271	14.44 pk	.7	13.4	28.54	43.5	-	-	-	-	-
	Azimuth:110	Height:100 Vert	Margin [dB]			-14.96	-	-	-	-	-
Horizontal 200 - 1000MHz											
4	292.046	16.65 pk	1.1	13.7	31.45	46	-	-	-	-	-
	Azimuth:161	Height:100 Horz	Margin [dB]			-14.55	-	-	-	-	-
5	433.7169	74.26 pk	1.3	16.8	92.36	46	-	-	-	-	-
	Azimuth:343	Height:200 Horz	Margin [dB]			46.36	-	-	-	-	-
6	868.3342	16.81 pk	1.7	22.9	41.41	46	-	-	-	-	-
	Azimuth:269	Height:400 Horz	Margin [dB]			-4.59	-	-	-	-	-
Vertical 200 - 1000MHz											
7	434.1171	61.45 pk	1.3	16.5	79.25	46	-	-	-	-	-
	Azimuth:43	Height:300 Vert	Margin [dB]			33.25	-	-	-	-	-
8	868.3342	20.39 pk	1.7	23.1	45.19	46	-	-	-	-	-
	Azimuth:1	Height:200 Vert	Margin [dB]			-.81	-	-	-	-	-

LIMIT 1: FCC Part 15 Subpart C 15.209
LIMIT 2: NONE
LIMIT 3: NONE
LIMIT 4: NONE
LIMIT 5: NONE
LIMIT 6: NONE

Lutron Electronics
Model: QSGR4-BK-6P120
Light Dimmer - 433MHz
Job#: 1001145819
Tested by: MA

Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit:1	2	3	4	5	6
Horizontal 200 - 1000MHz										
433.992	73.63 pk	1.3	16.9	78.11*	46	80.79	-	-	-	-
Azimuth: 10	Height:210 Horz		Margin [dB]:		32.11	-2.68	-	-	-	-
867.9924	18.83 pk	1.7	22.9	43.43	46	-	60.79	-	-	-
Azimuth: 315	Height:149 Horz		Margin [dB]:		-2.57	-	-17.36	-	-	-
Vertical 200 - 1000MHz										
433.99	63.28 pk	1.3	16.5	67.36*	46	80.79	-	-	-	-
Azimuth: 270	Height:253 Vert		Margin [dB]:		21.36	-13.43	-	-	-	-
867.9926	21.3 pk	1.7	23.1	46.1	46	-	60.79	-	-	-
Azimuth: 347	Height:127 Vert		Margin [dB]:		.1	-	-14.69	-	-	-

LIMIT 1: FCC Part 15 Subpart C 15.209
LIMIT 2: FCC Part 15 Subpart C 15.231 (Fundamental)
LIMIT 3: FCC Part 15 Subpart C 15.231 (Harmonics)
LIMIT 4: NONE
LIMIT 5: NONE
LIMIT 6: NONE

pk - Peak detector (Maximized)
qp - Quasi-Peak detector
av - Average detector
avlg - Average log detector
ave - Average detector

* - Correction factor, as determined in Section 4.4 of this report, has been applied.

Figure 20 Radiated Emissions Graph

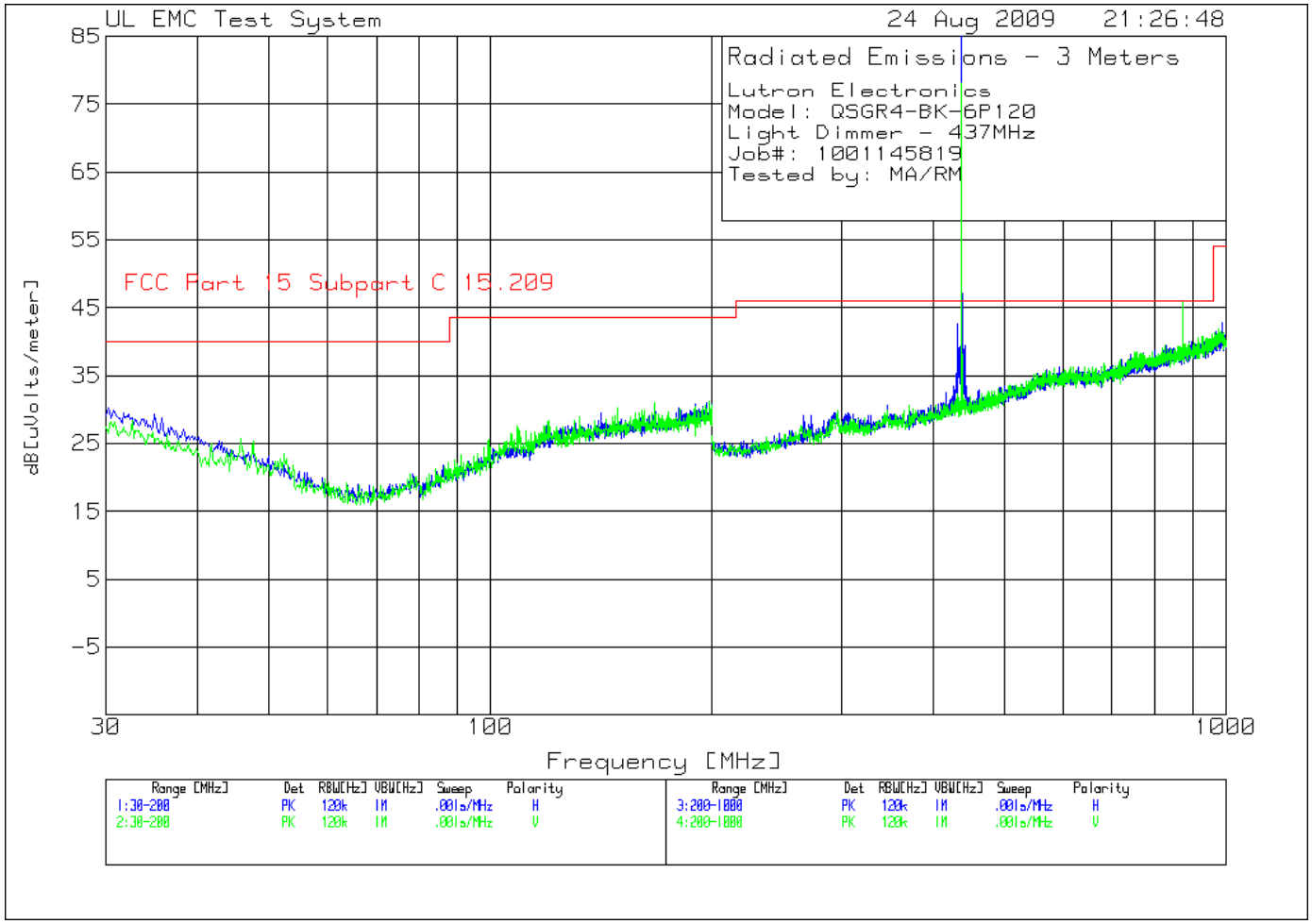


Table 21 Radiated Emissions Data Points

Lutron Electronics
Model: QSGR4-BK-6P120
Light Dimmer - 437MHz
Job#: 1001145819
Tested by: MA/RM

No.	Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit:1	2	3	4	5	6
Horizontal 30 - 200MHz											
1	34.9349	12.51 pk	.4	16.4	29.31	40	-	-	-	-	-
	Azimuth:183	Height:200 Horz	Margin [dB]			-10.69	-	-	-	-	-
2	141.2913	14.33 pk	.8	14.3	29.43	43.5	-	-	-	-	-
	Azimuth:219	Height:400 Horz	Margin [dB]			-14.07	-	-	-	-	-
Vertical 30 - 200MHz											
3	167.3273	14.39 pk	.8	15.8	30.99	43.5	-	-	-	-	-
	Azimuth:257	Height:100 Vert	Margin [dB]			-12.51	-	-	-	-	-
Horizontal 200 - 1000MHz											
4	436.9185	72.8 pk	1.3	17	91.1	46	-	-	-	-	-
	Azimuth:337	Height:200 Horz	Margin [dB]			45.1	-	-	-	-	-
5	431.7159	24.62 pk	1.3	16.8	42.72	46	-	-	-	-	-
	Azimuth:337	Height:200 Horz	Margin [dB]			-3.28	-	-	-	-	-
6	873.937	15.88 pk	1.7	23	40.58	46	-	-	-	-	-
	Azimuth:253	Height:100 Horz	Margin [dB]			-5.42	-	-	-	-	-
Vertical 200 - 1000MHz											
7	436.9185	60.37 pk	1.3	16.5	78.17	46	-	-	-	-	-
	Azimuth:85	Height:200 Vert	Margin [dB]			32.17	-	-	-	-	-
8	873.937	20.89 pk	1.7	23.2	45.79	46	-	-	-	-	-
	Azimuth:297	Height:200 Vert	Margin [dB]			-.21	-	-	-	-	-

LIMIT 1: FCC Part 15 Subpart C 15.209
LIMIT 2: NONE
LIMIT 3: NONE
LIMIT 4: NONE
LIMIT 5: NONE
LIMIT 6: NONE

Lutron Electronics
Model: QSGR4-BK-6P120
Light Dimmer - 437MHz
Job#: 1001145819
Tested by: MA/RM

Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit:1	2	3	4	5	6
Horizontal 200 - 1000MHz										
436.991	72.6 pk	1.3	17	77.18*	46	80.92	-	-	-	-
Azimuth: 5	Height:205	Horz	Margin [dB]:		31.18	-3.74	-	-	-	-
873.9907	18.81 pk	1.7	23	43.51	46	-	60.92	-	-	-
Azimuth: 335	Height:146	Horz	Margin [dB]:		-2.49	-	-17.41	-	-	-
Vertical 200 - 1000MHz										
436.9915	61.75 pk	1.3	16.5	79.55	46	80.92	-	-	-	-
Azimuth: 265	Height:240	Vert	Margin [dB]:		33.55	-1.37	-	-	-	-
873.9919	24.09 pk	1.7	23.2	48.99	46	-	60.92	-	-	-
Azimuth: 346	Height:127	Vert	Margin [dB]:		2.99	-	-11.93	-	-	-

LIMIT 1: FCC Part 15 Subpart C 15.209
LIMIT 2: FCC Part 15 Subpart C 15.231 (Fundamental)
LIMIT 3: FCC Part 15 Subpart C 15.231 (Harmonics)
LIMIT 4: NONE
LIMIT 5: NONE
LIMIT 6: NONE

pk - Peak detector (Maximized)
qp - Quasi-Peak detector
av - Average detector
avlg - Average log detector
ave - Average detector

* - Correction factor, as determined in Section 4.4 of this report, has been applied.

Figure 21 Radiated Emissions Graph

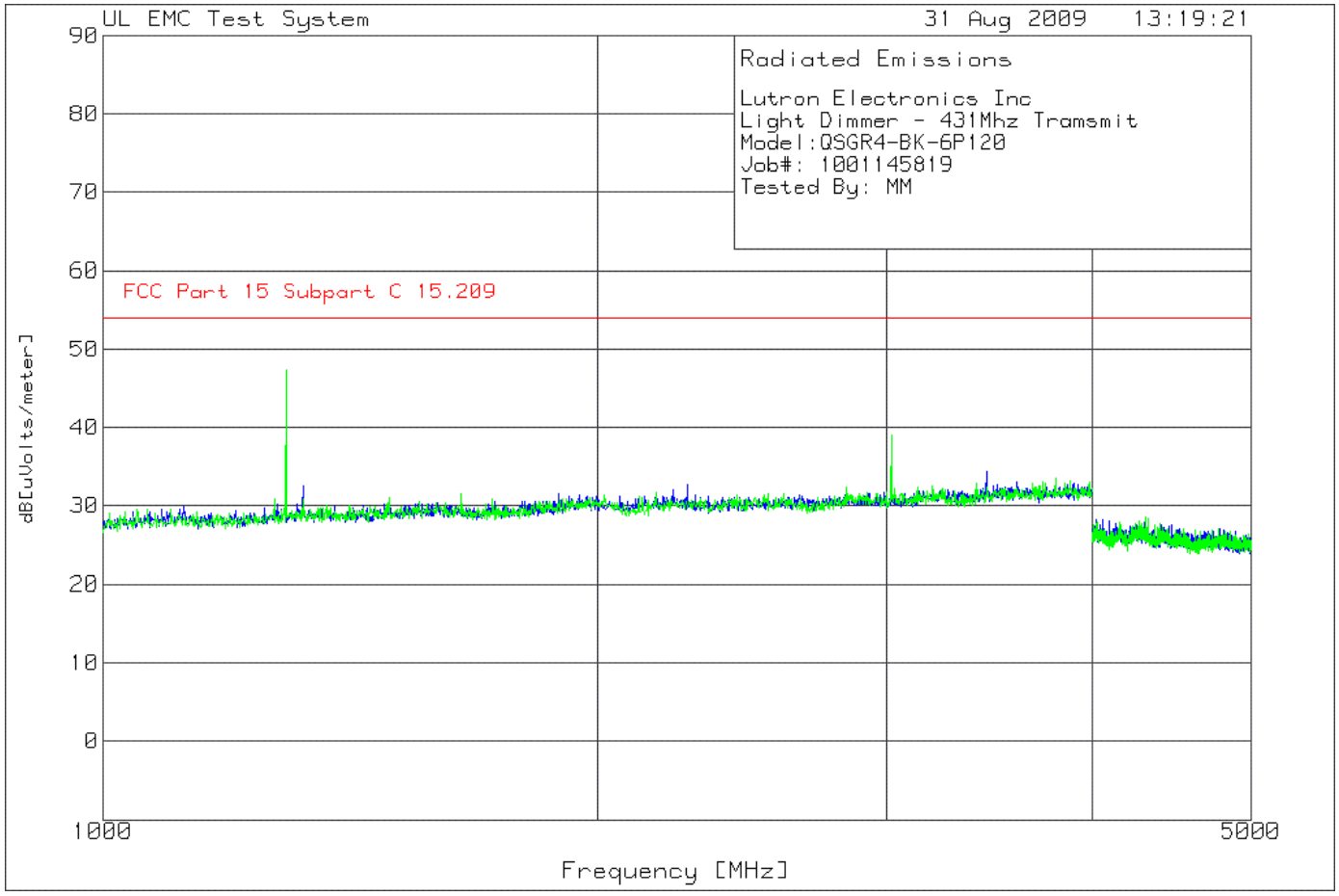


Table 22 Radiated Emissions Data Points

Lutron Electronics Inc
Light Dimmer - 431Mhz Tramsmit
Model:QSGR4-BK-6P120
Job#: 1001145819
Tested By: MM

No.	Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit:1	2	3	4	5	6
Horizontal 1000 - 2000MHz											
1	1293.383	65.71 pk	-45.59	20.5	40.62	54	-	-	-	-	-
		Height:149 Horz		Margin [dB]		-13.38	-	-	-	-	-
Horizontal 2000 - 4000MHz											
2	3018.727	57.42 pk	-42.88	21.5	36.04	54	-	-	-	-	-
		Height:150 Horz		Margin [dB]		-17.96	-	-	-	-	-
3	3450.687	54.93 pk	-42.81	22.2	34.32	54	-	-	-	-	-
		Height:150 Horz		Margin [dB]		-19.68	-	-	-	-	-
Vertical 1000 - 2000MHz											
4	1293.383	72.49 pk	-45.59	20.5	47.4	54	-	-	-	-	-
		Height:100 Vert		Margin [dB]		-6.6	-	-	-	-	-
Vertical 2000 - 4000MHz											
5	3018.727	60.25 pk	-42.88	21.7	39.07	54	-	-	-	-	-
		Height:200 Vert		Margin [dB]		-14.93	-	-	-	-	-
6	3800.25	54.06 pk	-43.04	22.5	33.52	54	-	-	-	-	-
		Height:150 Vert		Margin [dB]		-20.48	-	-	-	-	-

LIMIT 1: FCC Part 15 Subpart C 15.209
LIMIT 2: NONE
LIMIT 3: NONE
LIMIT 4: NONE
LIMIT 5: NONE
LIMIT 6: NONE

Figure 22 Radiated Emissions Graph

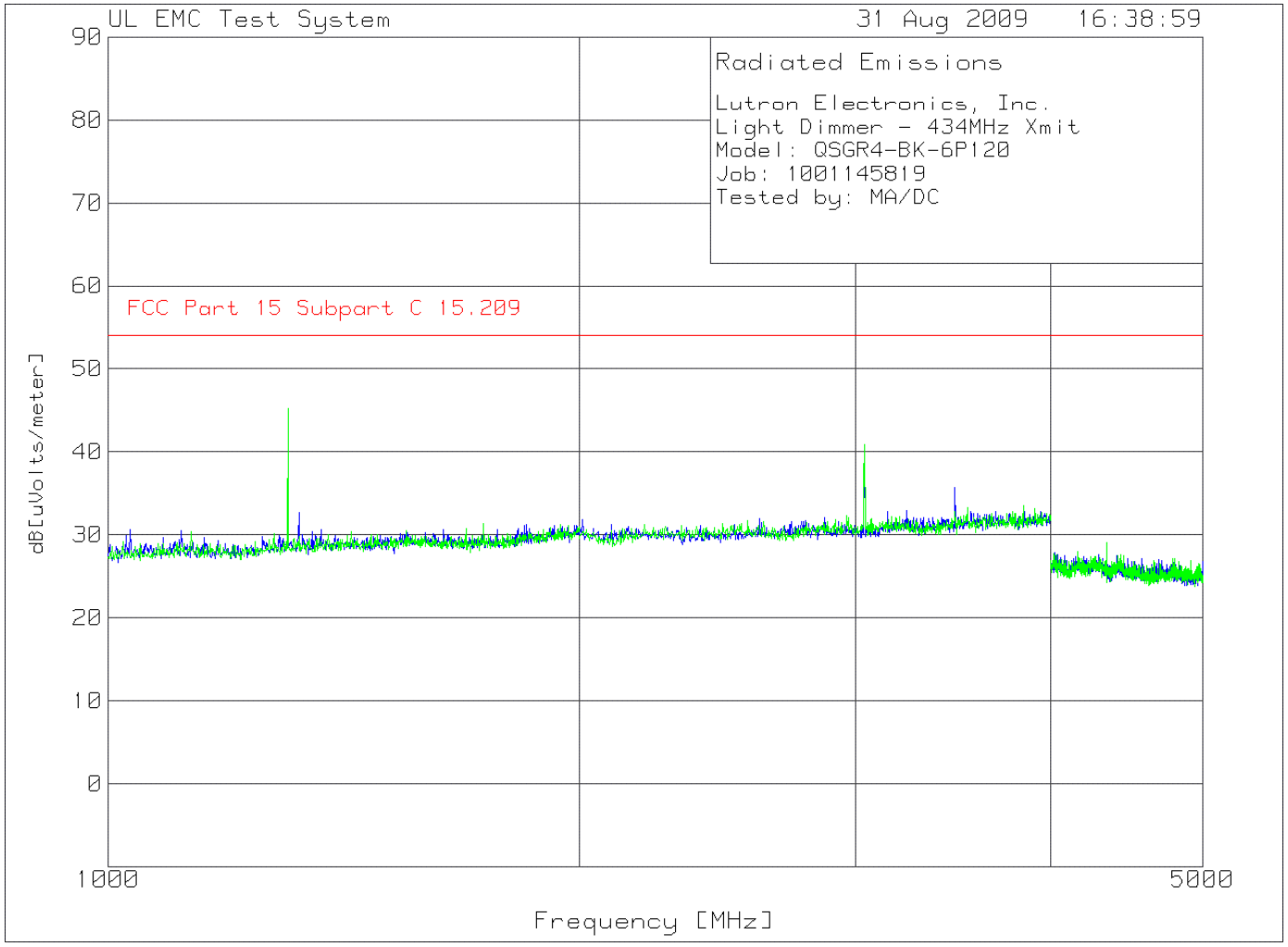


Table 23 Radiated Emissions Data Points

Lutron Electronics, Inc.
Light Dimmer - 434MHz Xmit
Model: QSGR4-BK-6P120
Job: 1001145819
Tested by: MA/DC

Test No.	Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit:1	2	3	4	5	6
Horizontal 1000 - 2000MHz											
1	1302.122	65.61 pk	-45.69	20.5	40.42	54	-	-	-	-	-
		Height:150 Horz		Margin [dB]		-13.58	-	-	-	-	-
Horizontal 2000 - 4000MHz											
2	3041.199	60.54 pk	-42.94	21.6	39.2	54	-	-	-	-	-
		Height:149 Horz		Margin [dB]		-14.8	-	-	-	-	-
3	3473.159	56.37 pk	-42.87	22.2	35.7	54	-	-	-	-	-
		Height:200 Horz		Margin [dB]		-18.3	-	-	-	-	-
Vertical 1000 - 2000MHz											
4	1302.122	70.43 pk	-45.69	20.5	45.24	54	-	-	-	-	-
		Height:199 Vert		Margin [dB]		-8.76	-	-	-	-	-
Vertical 2000 - 4000MHz											
5	3041.199	62.14 pk	-42.94	21.7	40.9	54	-	-	-	-	-
		Height:199 Vert		Margin [dB]		-13.1	-	-	-	-	-
6	3473.159	53.42 pk	-42.87	22.3	32.85	54	-	-	-	-	-
		Height:199 Vert		Margin [dB]		-21.15	-	-	-	-	-

LIMIT 1: FCC Part 15 Subpart C 15.209
LIMIT 2: NONE
LIMIT 3: NONE
LIMIT 4: NONE
LIMIT 5: NONE
LIMIT 6: NONE

Figure 23 Radiated Emissions Graph

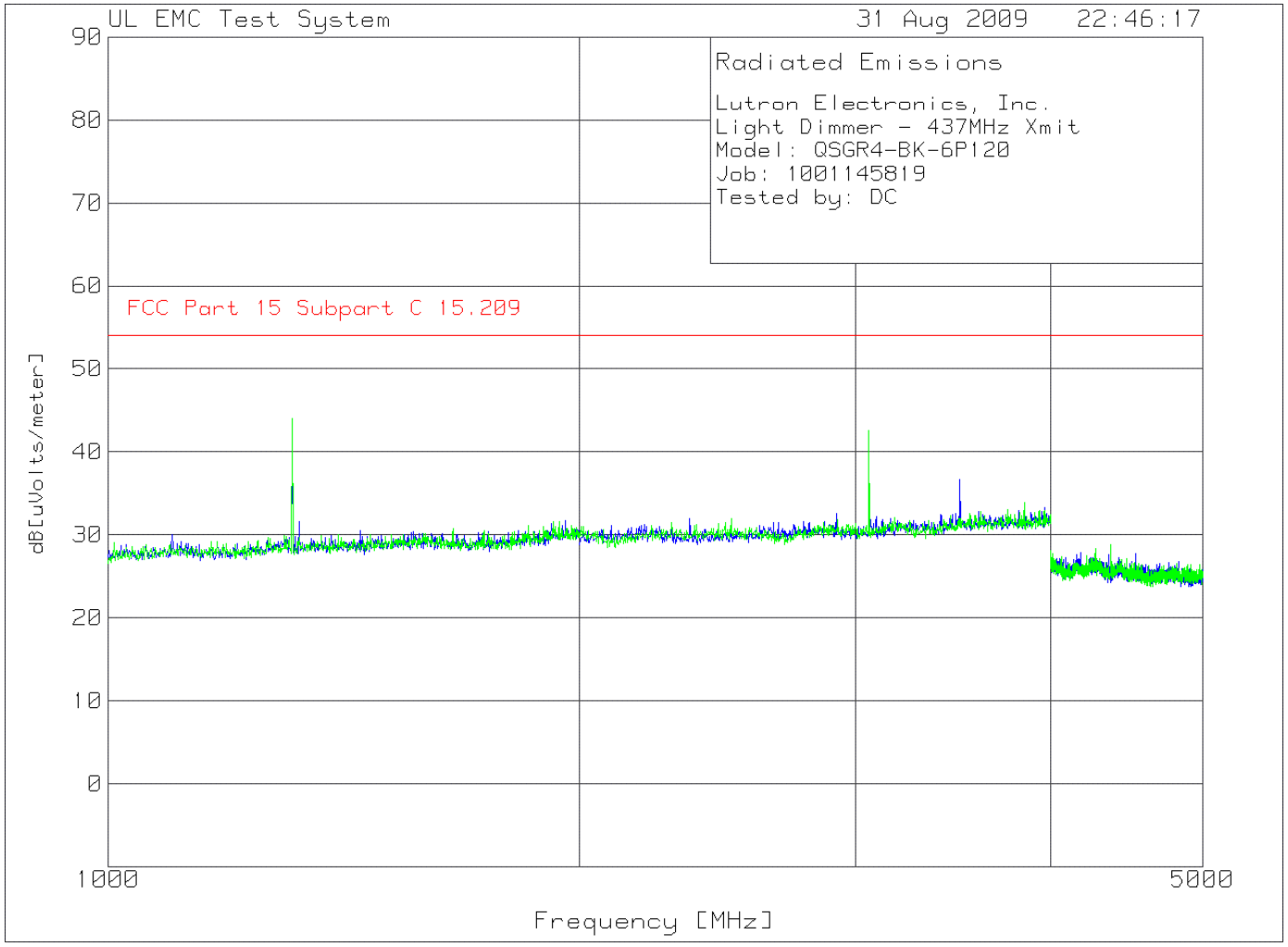


Table 24 Radiated Emissions Data Points

Lutron Electronics, Inc.
Light Dimmer - 437MHz Xmit
Model: QSGR4-BK-6P120
Job: 1001145819
Tested by: DC

No.	Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit:1	2	3	4	5	6
Horizontal 1000 - 2000MHz											
1	1310.861	64.76 pk	-45.73	20.5	39.53	54	-	-	-	-	-
		Height:149 Horz		Margin [dB]		-14.47	-	-	-	-	-
Horizontal 2000 - 4000MHz											
2	3061.174	61.14 pk	-42.93	21.6	39.81	54	-	-	-	-	-
		Height:149 Horz		Margin [dB]		-14.19	-	-	-	-	-
3	3498.127	57.29 pk	-42.85	22.2	36.64	54	-	-	-	-	-
		Height:199 Horz		Margin [dB]		-17.36	-	-	-	-	-
Vertical 1000 - 2000MHz											
4	1310.861	69.32 pk	-45.73	20.5	44.09	54	-	-	-	-	-
		Height:199 Vert		Margin [dB]		-9.91	-	-	-	-	-
Vertical 2000 - 4000MHz											
5	3061.174	63.7 pk	-42.93	21.8	42.57	54	-	-	-	-	-
		Height:200 Vert		Margin [dB]		-11.43	-	-	-	-	-
6	3932.584	52.97 pk	-42.76	22.7	32.91	54	-	-	-	-	-
		Height:100 Vert		Margin [dB]		-21.09	-	-	-	-	-

LIMIT 1: FCC Part 15 Subpart C 15.209
LIMIT 2: NONE
LIMIT 3: NONE
LIMIT 4: NONE
LIMIT 5: NONE
LIMIT 6: NONE

4.6 Test Conditions and Results – Radiated Emissions (Receive Mode)

Test Description	Measurements were made in a 10-meter semi-anechoic chamber that complies to CISPR 16/ANSI C63.4. Preliminary (peak) measurements were performed at an antenna to EUT separation distance of 3-meter. The EUT was rotated 360° about its azimuth with the receive antenna located at various heights in both horizontal and vertical polarities. Final measurements (quasi-peak or average as noted) were then performed by rotating the EUT 360° and adjusting the receive antenna height from 1 to 4-meters. All frequencies were investigated in both horizontal and vertical antenna polarity, where applicable.

Basic Standard	FCC Part 15, Subpart B	
UL LPG	80-EM-S0029	
	Frequency range	Measurement Point
Fully configured sample scanned over the following frequency range	30MHz – 3GHz	(3 meter measurement distance)

Limits - Class B

Frequency (MHz)	Limit (dBµV/m)	
	Quasi-Peak	Average
30-88	40	NA
88-216	43.5	NA
216-960	46	NA
960-1000	54	NA
1000-3000	NA	54

Supplementary information: None

Table 25 Radiated Emissions EUT Configuration Settings

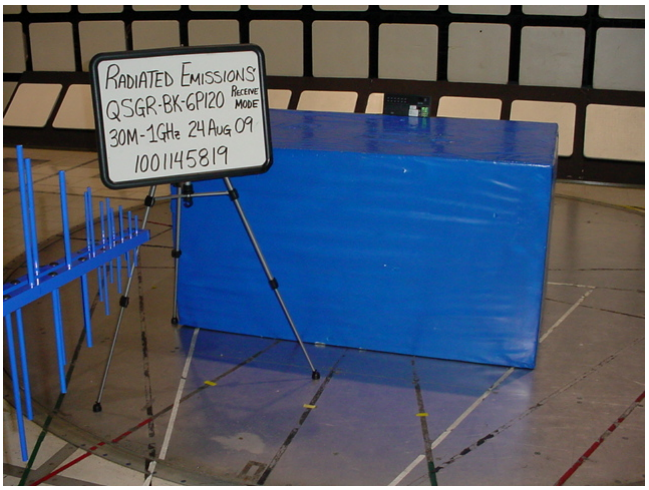
Power Interface Mode #	EUT Configurations Mode #	EUT Operation Mode #
1	1	4
Supplementary information: None		

Table 26 Radiated Emissions Test Equipment

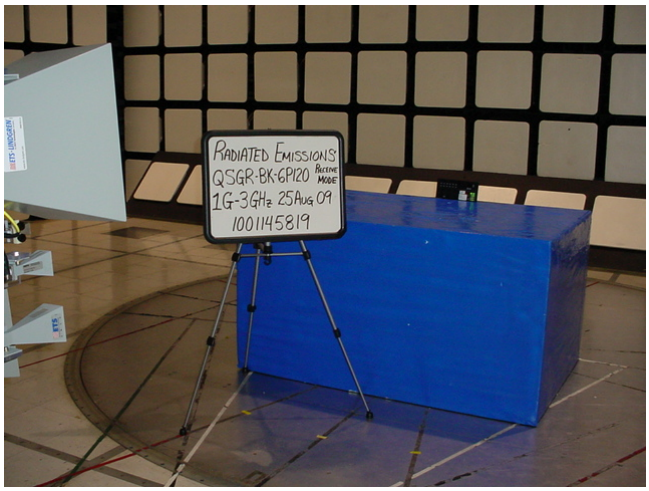
Test Equipment Used			
Description	Manufacturer	Model	Identifier
30-1000MHz			
EMI Receiver	Rohde & Schwarz	ESIB40	34968
Log-P Antenna	Schaffner	UPA6109	44068
Bicon Antenna	Schaffner	VBA6106A	54

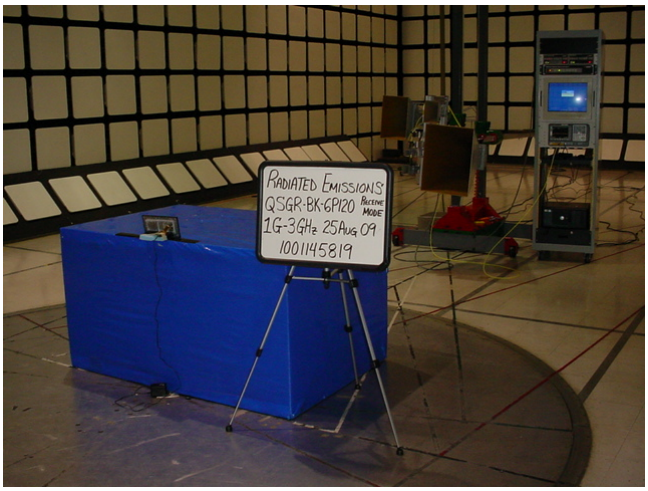
Test Equipment Used			
Description	Manufacturer	Model	Identifier
Switch Driver	HP	11713A	ME7A-627
System Controller	Sunol Sciences	SC99V	44396
Camera Controller	Panasonic	WV-CU254	44395
RF Switch Box	UL	1	44398
Measurement Software	UL	Version 9.3	44740
Temp/Humidity/Pressure Meter	Cole Parmer	99760-00	4268
Multimeter	Fluke	87V	44547
Above 1GHz (Band Optimized System)			
Spectrum Analyzer	Agilent	E7405A	19695
Horn Antenna (1-2 GHz)	ETS	3161-01	51442
Horn Antenna (2-4 GHz)	ETS	3161-02	48107
Signal Path Controller	HP	11713A	50250
Gain Controller	HP	11713A	50251
RF Switch / Preamp Fixture	UL	BOMS1	50249
System Controller	UL	BOMS2	50252
Measurement Software	UL	Version 9.3	44740
Temp/Humidity/Pressure Meter	Cole Parmer	99760-00	4268
Multimeter	Fluke	87V	44547

Figure 24 Test setup for Radiated Emissions



30-1000MHz (Receive Mode)





1-3GHz (Receive Mode)

Figure 25 Radiated Emissions Graph

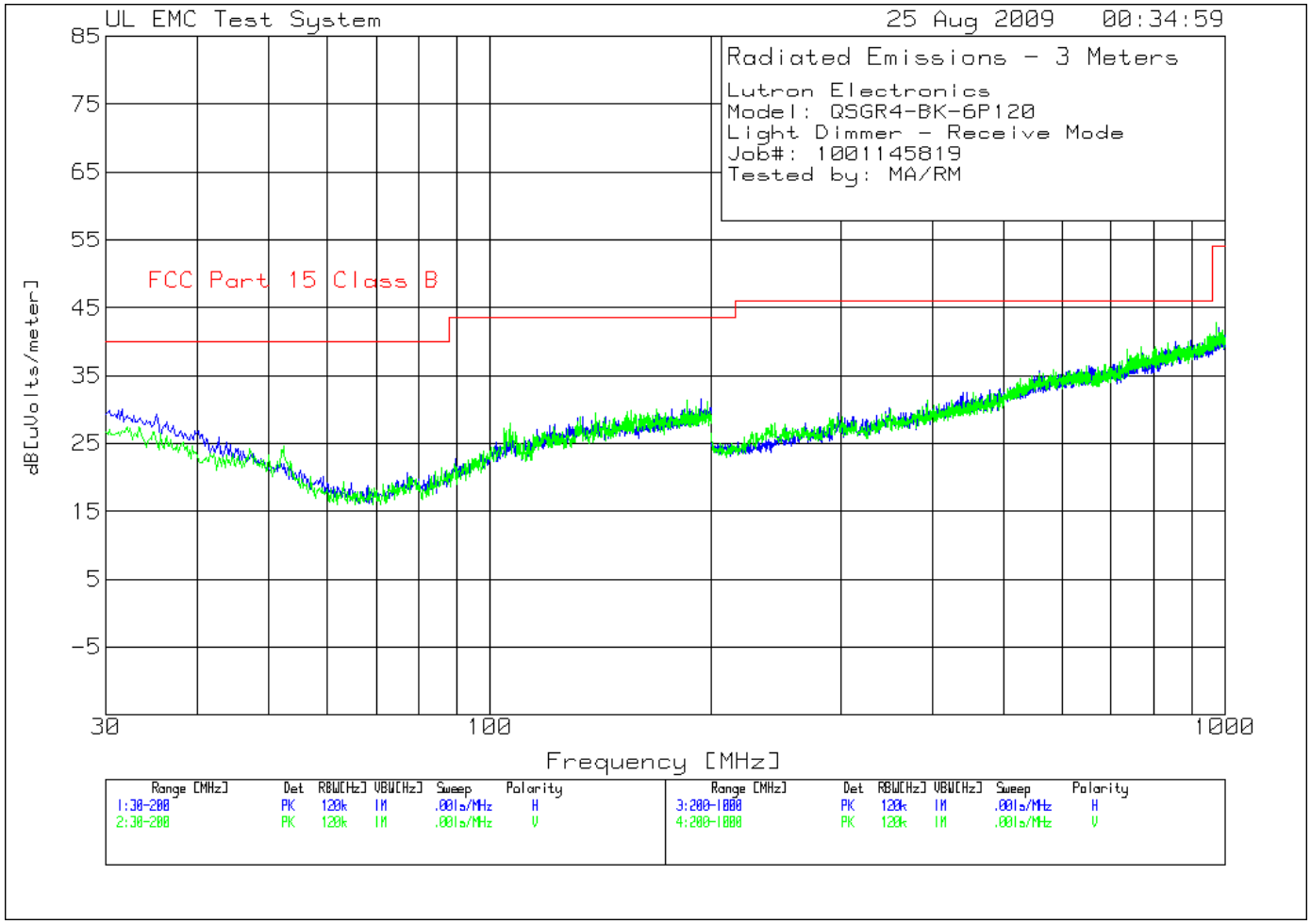


Table 27 Radiated Emissions Data Points

Lutron Electronics
Model: QSGR4-BK-6P120
Light Dimmer - Receive Mode
Job#: 1001145819
Tested by: MA/RM

No.	Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit:1	2	3	4	5	6
Horizontal 30 - 200MHz											
1	35.1051	12.55 pk	.4	16.3	29.25	40	-	-	-	-	-
	Azimuth:68	Height:300 Horz		Margin [dB]		-10.75	-	-	-	-	-
2	193.5335	14.98 pk	.9	15.7	31.58	43.5	-	-	-	-	-
	Azimuth:213	Height:400 Horz		Margin [dB]		-11.92	-	-	-	-	-
Vertical 30 - 200MHz											
3	52.2923	15.25 pk	.5	8.8	24.55	40	-	-	-	-	-
	Azimuth:355	Height:100 Vert		Margin [dB]		-15.45	-	-	-	-	-
4	106.4064	15.08 pk	.7	12.2	27.98	43.5	-	-	-	-	-
	Azimuth:358	Height:100 Vert		Margin [dB]		-15.52	-	-	-	-	-
Horizontal 200 - 1000MHz											
5	446.1231	14.05 pk	1.3	17.2	32.55	46	-	-	-	-	-
	Azimuth:17	Height:300 Horz		Margin [dB]		-13.45	-	-	-	-	-
6	855.1276	15.05 pk	1.8	23.1	39.95	46	-	-	-	-	-
	Azimuth:97	Height:300 Horz		Margin [dB]		-6.05	-	-	-	-	-
Vertical 200 - 1000MHz											
7	736.6683	15.77 pk	1.6	21.6	38.97	46	-	-	-	-	-
	Azimuth:45	Height:200 Vert		Margin [dB]		-7.03	-	-	-	-	-
8	767.8839	15.62 pk	1.6	22.1	39.32	46	-	-	-	-	-
	Azimuth:2	Height:400 Vert		Margin [dB]		-6.68	-	-	-	-	-
9	890.3452	15.19 pk	1.8	23	39.99	46	-	-	-	-	-
	Azimuth:227	Height:300 Vert		Margin [dB]		-6.01	-	-	-	-	-
10	973.987	16.07 pk	1.8	24.9	42.77	54	-	-	-	-	-
	Azimuth:17	Height:100 Vert		Margin [dB]		-11.23	-	-	-	-	-

LIMIT 1: FCC Part 15 Class B
LIMIT 2: NONE
LIMIT 3: NONE
LIMIT 4: NONE
LIMIT 5: NONE
LIMIT 6: NONE

Figure 26 Radiated Emissions Graph

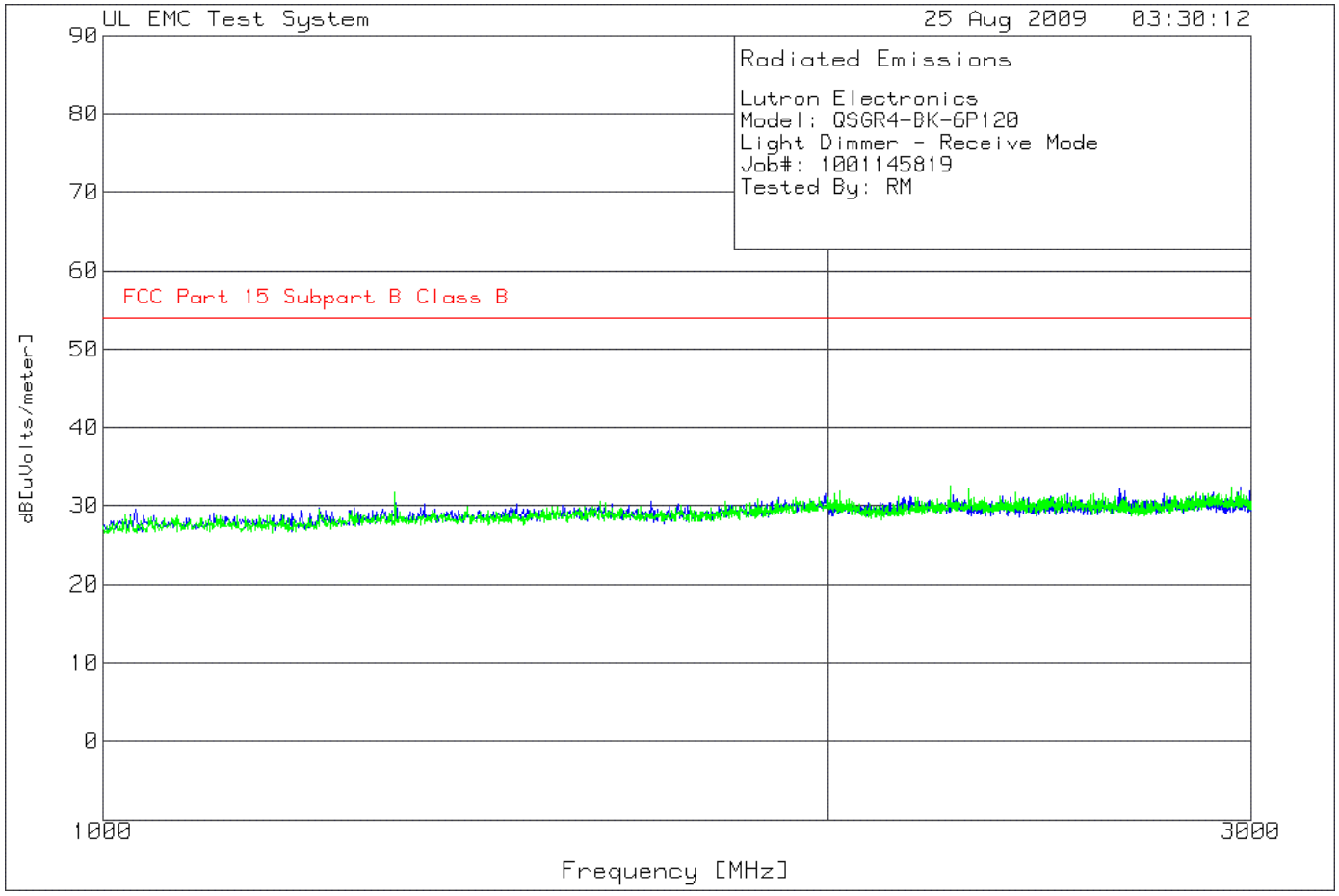


Table 28 Radiated Emissions Data Points

Lutron Electronics
Model: QSGR4-BK-6P120
Light Dimmer - Receive Mode
Job#: 1001145819
Tested By: RM

No.	Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit:1	2	3	4	5	6
Horizontal 1000 - 2000MHz											
1	1031.211	55.82 pk	-45.78	19.5	29.54	54	-	-	-	-	-
		Height:100 Horz	Margin [dB]		-24.46		-	-	-	-	-
2	1689.139	55.01 pk	-45.2	20.8	30.61	54	-	-	-	-	-
		Height:100 Horz	Margin [dB]		-23.39		-	-	-	-	-
Horizontal 2000 - 3000MHz											
3	2644.759	54.22 pk	-43.33	21.4	32.29	54	-	-	-	-	-
		Height:149 Horz	Margin [dB]		-21.71		-	-	-	-	-
Vertical 1000 - 2000MHz											
4	1321.963	56.91 pk	-45.64	20.5	31.77	54	-	-	-	-	-
		Height:100 Vert	Margin [dB]		-22.23		-	-	-	-	-
Vertical 2000 - 3000MHz											
5	2024.329	54.69 pk	-44.16	21.3	31.83	54	-	-	-	-	-
		Height:149 Vert	Margin [dB]		-22.17		-	-	-	-	-
6	2248.908	55.1 pk	-43.84	21.3	32.56	54	-	-	-	-	-
		Height:149 Vert	Margin [dB]		-21.44		-	-	-	-	-

LIMIT 1: FCC Part 15 Subpart B Class B
LIMIT 2: NONE
LIMIT 3: NONE
LIMIT 4: NONE
LIMIT 5: NONE
LIMIT 6: NONE

5.0 IMMUNITY TEST RESULTS

Not Required

Appendix A

Accreditations and Authorizations

NVLAP Lab code: 100255-0

NVLAP: The National Institute of Standards and Technology (NIST) administers the National Voluntary Laboratory Accreditation Program (NVLAP). NVLAP is comprised of laboratory accreditation programs (LAPs) which are established on the basis of requests and demonstrated need. Each LAP includes specific calibration and/or test standards and related methods and protocols assembled to satisfy the unique needs for accreditation in a field of testing or calibration. NVLAP accredits public and private laboratories based on evaluation of their technical qualifications and competence to carry out specific calibrations or tests. Accreditation criteria are established in accordance with the U.S. Code of Federal Regulations (CFR, Title 15, Part 285), NVLAP Procedures and General Requirements, and encompass the requirements of ISO/IEC 17025. For a full scope listing see http://ts.nist.gov/ts/htdocs/210/214/scopes/1002550.htm

FCC: Details of the measurement facilities used for these tests have been filed with the Federal Communications Commission's Laboratory in Columbia, Maryland (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, 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-83400, and C-81879 and (Conducted Emissions - Telecommunications Ports) T-1582 and T-1583.

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