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**Report of Measurements
of Electromagnetic Compatibility Testing**

Test Report File No.: **NC2219** Date of issue: 11/7/02
Applicant: Lutron Electronics Co. Inc.
Model : H-RFP-1P
Product Type: RF Processor
Power Supply: 120Vac, 60Hz
Manufacturer: Same As Applicant

License holder: Same As Applicant
Address: 7200 Sutro Road
Coopersburg, PA 18036
Test Type: ☒ **Compliance Investigation**
☐ **Manufacturer's Specification**
Test Project Number: 02ME20017
References(s) FCC ID: JPZ0023

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1.0 G E N E R A L - Product Description

Device Function: The H-RFP acts as a data storage hub of an integrated lighting control system. It contains a FM transceiver and an antenna. The purpose of the RF communication is to transmit and receive command signals. Transmitted commands allow the triggering of system events and the updating of control indicator status.

RF Function: The receiver down converts a 431-437MHz-carrier frequency using a 420.3-426.3MHz voltage-controlled oscillator producing a 10.7MHz IF signal. The signal is further processed to decode data. The transmitter uses the voltage-controlled oscillator, which is frequency modulated, and power amplifier to produce the modulated carrier. The H-RFP contains a micro controller running at 52MHz to ensure that all transmissions stop within 5 seconds of a button release or within 5 seconds on the beginning of a transmission. A transmission shall automatically cease within 5 seconds after activation. The ceasing of the transmission is accomplished via the micro controller. Modulation is FM, sometimes referred to as Frequency Shift Keyed (FSK), data at 62.5kbps. The antenna is permanently attached and cannot be modified or easily replaced by the user since the fastening mechanism is located inside the sheet metal enclosure. This sheet metal enclosure is closed securely by several odd screws and by keying features in the sheet metal itself.

Analog Function: The H-RFP obtains power through a 120Vac to 24Vdc Class 2 transformer or 15Vdc Class 2 transformer. The voltage is then down converted with a switching buck converter to produce a 5Vdc 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 was tested in two modes of operation:

1. Continuously transmitting an intentional radio frequency in Continuous Wave (CW).
2. Standby mode (Receive). The device is waiting to receive a signal source.

The manufacturer configured the device.

The device was powered with 120VAC, 60Hz.

Device	Manufacturer	Model Number	Serial Number	FCC ID
RF Processor	Lutron	H-RFP	N/A	JPZ0023
AC-DC Adapter Class 2	LEI	LEI-4	N/A	-----

"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, the ANSI C63.4 test measurements procedures were employed
- ☐ As described below:

1.3 Device Modifications Necessary for Compliance

☐

N/A

☒

As described below:

1.4 Test Summary

Test	Basic Standard	Considered	Tested	In Compliance
Conducted Voltage Emissions (Continuous Data Transmit Mode)	FCC Part 15 Subpart B, Class B. Paragraph 15.205	✓	✓	✓
Radiated Emissions	FCC Part 15 Subpart C, Class B, Intentional Radiators, Paragraph 15.209	✓	✓	✓
Radiated Emissions	FCC Part 15 Subpart B, Class B, Un-Intentional Radiators, Paragraph 15.109	✓	✓	✓
Cease Operation < 5 seconds	FCC Part 15 Subpart C, Paragraph 15.231	✓	✓	✓
Occupied Bandwidth	FCC Part 15 Subpart C, Paragraph 15.231	✓	✓	✓
Pulse Train Measurements Over One Complete Pulse Train	FCC Part 15 Subpart A, Paragraph 15.35	✓	✓	✓

2.0 EMISSIONS TEST REGULATIONS

FCC Part 15, Subpart B, Paragraph 15.107 & 15.109

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

2.1 EUT OPERATION MODE - EMISSIONS TESTS

☒ Normal operation Mode: Continuous Data Transmit for Conducted Emissions, Constant (Continuous) Wave Transmit and Receive modes for all other tests

File Number: NC2219
Project Number: 02ME20017
Model Number: H-RFP-1P
FCC ID: JPZ0023

Issued: 11/5/02

2.1.1 Conducted Emissions Tests

☒ **Test Applicable** ☐ **Test Not Applicable**

Temperature: 21.1 °C
Humidity: 40 %RH
Pressure: 1035 milbar
Date test performed: 18 October 2002

Mode: "Continuous Data Transmit" @ 437 MHz was determined worst-case emissions.

Frequency range on each side of line.

Measurement Point

☒ 150kHz to 30MHz ☒ Voltage

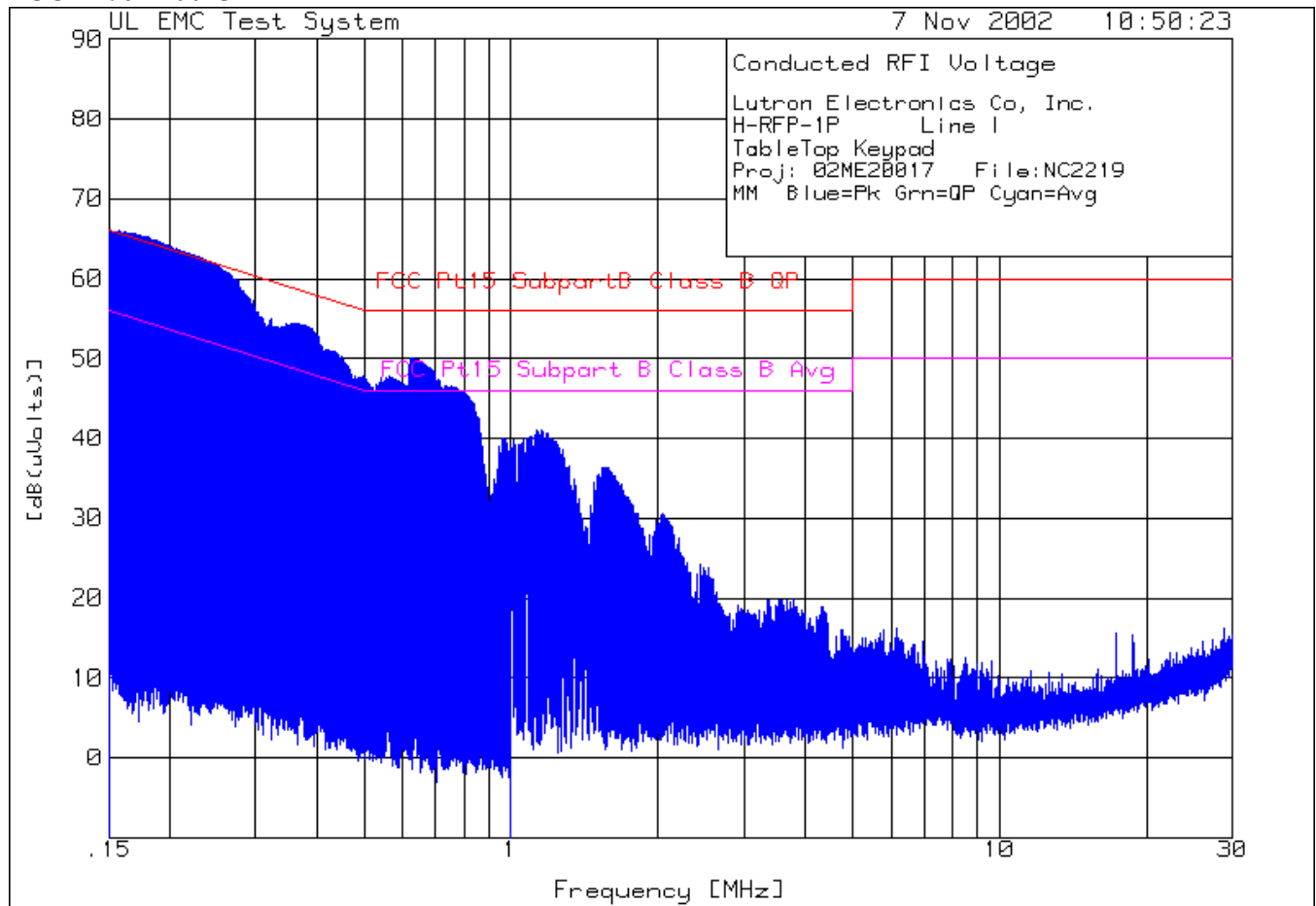
☒ Mains

Test equipment used for conducted emissions:

☒ ES126	Rhode & Schwartz	EMI Receiver	Equipment No.: ME5B-081
Range: 150k-30MHz	Last Calibration Date: 20 August 2002	Calibration Due Date: 20 August 2003	

Test Accessories for Conducted Emissions:

☒ 11947A	Hewlett Packard	Transient Limiter	Equipment No.: ME5A-443
Last Calibration Date: 16 January 2002 Calibration Due Date: 16 January 2003			
☒ 9252-50-R-24-BNC	Solar Electronics	LISN	Equipment No.: ME5A-637
Last Calibration Date: 04 April 2002 Calibration Due Date: 04 April 2002			
☒ Temp/Pressure	Oakton	Barometer	Equipment No.: ME4-263
Range: 900-1045mbar	Last Calibration Date: 02 April 2002	Calibration Due Date: 02 April 2003	
☒ 453320	Ex-Tech	Hydro-Thermometer	Equipment No.: ME4-264
Range: 0-80%	Last Calibration Date: 02 April 2002	Calibration Due Date: 02 April 2003	



Transmit at 437MHz

File Number: NC2219
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UL EMC Test System

7 Nov 2002 10:50:23

Lutron Electronics Co, Inc.
 H-RFP-1P Line 1
 TableTop Keypad
 Proj: 02ME20017 File:NC2219
 MM Blue=Pk Grn=QP Cyan=Avg

Frequency [MHz]	Reading [dB(uV)]	Factor [dB]	Factor [dB]	Factor [dB(uVolts)]
Range: 1 .15 - 1MHz				
.1506	49.05 qp	10.3	0	59.35+ 66 56
				Margin [dB]: -6.65 3.35
.16864	49.27 qp	10.3	0	59.57+ 65 55
				Margin [dB]: -5.43 4.57
.18298	48.58 qp	10.3	0	58.88+ 64.3 54.3
				Margin [dB]: -5.42 4.58
.20572	47.27 qp	10.3	0	57.57+ 63.4 53.4
				Margin [dB]: -5.83 4.17
.23097	45.34 qp	10.3	0	55.64+ 62.4 52.4
				Margin [dB]: -6.76 3.24
.25583	43.56 qp	10.3	0	53.86+ 61.6 51.6
				Margin [dB]: -7.74 2.26
.274	41.39 qp	10.3	0	51.69+ 61 51
				Margin [dB]: -9.31 .69
.28533	39.61 qp	10.3	0	49.91 60.7 50.7
				Margin [dB]: -10.79 -.79
.29576	38.61 qp	10.3	0	48.91 60.4 50.4
				Margin [dB]: -11.49 -1.49
.30627	38.03 qp	10.3	0	48.33 60.1 50.1
				Margin [dB]: -11.77 -1.77

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
 avem - denotes EMI average detection

LIMIT 1: FCC Pt15 SubpartB Class B QP

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TableTop Keypad
Proj: 02ME20017 File:NC2219
MM Blue=Pk Grn=QP Cyan=Avg

Frequency [MHz]	Reading [dB(uV)]	Factor [dB]	Factor [dB(uVolts)] [dB]
=====			
Range: 1 .15 - 1MHz			
.63144	31.81 qp	10.3 0	42.11 56 46
		Margin [dB]:	-13.89 -3.89

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LIMIT 1: FCC Pt15 SubpartB Class B QP
LIMIT 2: FCC Pt15 Subpart B Class B Avg
LIMIT 3: NONE
LIMIT 4: NONE
LIMIT 5: NONE
LIMIT 6: NONE

File Number: NC2219
Project Number: 02ME20017
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Lutron Electronics Co, Inc.
H-RFP-1P Line 1
TableTop Keypad
Proj: 02ME20017 File: NC2219
MM Blue=Pk Grn=QP Cyan=Avg

Frequency	Reading	Factor	Factor	dB(uVolts)	
[MHz]	[dB(uV)]	[dB]	[dB]		
=====					
Range: 1.15 - 1MHz					
.15061	19.65	avem	10.3 0	29.95	66 56
		Margin [dB]:		-36.05	-26.05
.16873	18.89	avem	10.3 0	29.19	65 55
		Margin [dB]:		-35.81	-25.81
.18293	18.13	avem	10.3 0	28.43	64.4 54.4
		Margin [dB]:		-35.97	-25.97
.20565	16.72	avem	10.3 0	27.02	63.4 53.4
		Margin [dB]:		-36.38	-26.38
.23093	14.89	avem	10.3 0	25.19	62.4 52.4
		Margin [dB]:		-37.21	-27.21
.2558	12.21	avem	10.3 0	22.51	61.6 51.6
		Margin [dB]:		-39.09	-29.09
.27393	10.94	avem	10.3 0	21.24	61 51
		Margin [dB]:		-39.76	-29.76
.28534	10.48	avem	10.3 0	20.78	60.7 50.7
		Margin [dB]:		-39.92	-29.92
.29581	9.97	avem	10.3 0	20.27	60.4 50.4
		Margin [dB]:		-40.13	-30.13
.30635	9.62	avem	10.3 0	19.92	60.1 50.1
		Margin [dB]:		-40.18	-30.18

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

pk - Peak detector
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avlg - denotes average log detection
avem - denotes EMI average detection

LIMIT 1: FCC Pt15 SubpartB Class B QP

File Number: NC2219
Project Number: 02ME20017
Model Number: H-RFP-1P
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Issued: 11/5/02

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Lutron Electronics Co, Inc.
H-RFP-1P Line 1
TableTop Keypad
Proj: 02ME20017 File:NC2219
MM Blue=Pk Grn=QP Cyan=Avg

Frequency [MHz]	Reading [dB(uV)]	Factor [dB]	Factor [dB]	Factor [dB(uVolts)]
Range: 1 .15 - 1MHz				
.32168	9.54	avem	10.3 0	19.84 59.7 49.7
		Margin [dB]:		-39.86 -29.86
.34508	9.05	avem	10.3 0	19.35 59.1 49.1
		Margin [dB]:		-39.75 -29.75
.36136	8.62	avem	10.3 0	18.92 58.7 48.7
		Margin [dB]:		-39.78 -29.78
.37971	8.1	avem	10.3 0	18.4 58.3 48.3
		Margin [dB]:		-39.9 -29.9
.39872	6.55	avem	10.3 0	16.85 57.9 47.9
		Margin [dB]:		-41.05 -31.05
.421	6.41	avem	10.3 0	16.71 57.4 47.4
		Margin [dB]:		-40.69 -30.69
.45051	4.78	avem	10.3 0	15.08 56.9 46.9
		Margin [dB]:		-41.82 -31.82
.49973	3.16	avem	10.3 0	13.46 56 46
		Margin [dB]:		-42.54 -32.54
.55787	3.32	avem	10.3 0	13.62 56 46
		Margin [dB]:		-42.38 -32.38
.61995	4.15	avem	10.3 0	14.45 56 46
		Margin [dB]:		-41.55 -31.55
.64	2.87	avem	10.3 0	13.17 56 46
		Margin [dB]:		-42.83 -32.83
.66253	3.16	avem	10.3 0	13.46 56 46
		Margin [dB]:		-42.54 -32.54
.69102	2.71	avem	10.3 0	13.01 56 46
		Margin [dB]:		-42.99 -32.99
.77257	1.16	avem	10.3 0	11.46 56 46
		Margin [dB]:		-44.54 -34.54
.95979	-1.28	avem	10.3 0	9.02 56 46
		Margin [dB]:		-46.98 -36.98
Range: 2 1 - 30MHz				

1.15315	-1.67	avem	10.3	0	8.63	56	46
Margin [dB]:					-47.37	-37.37	

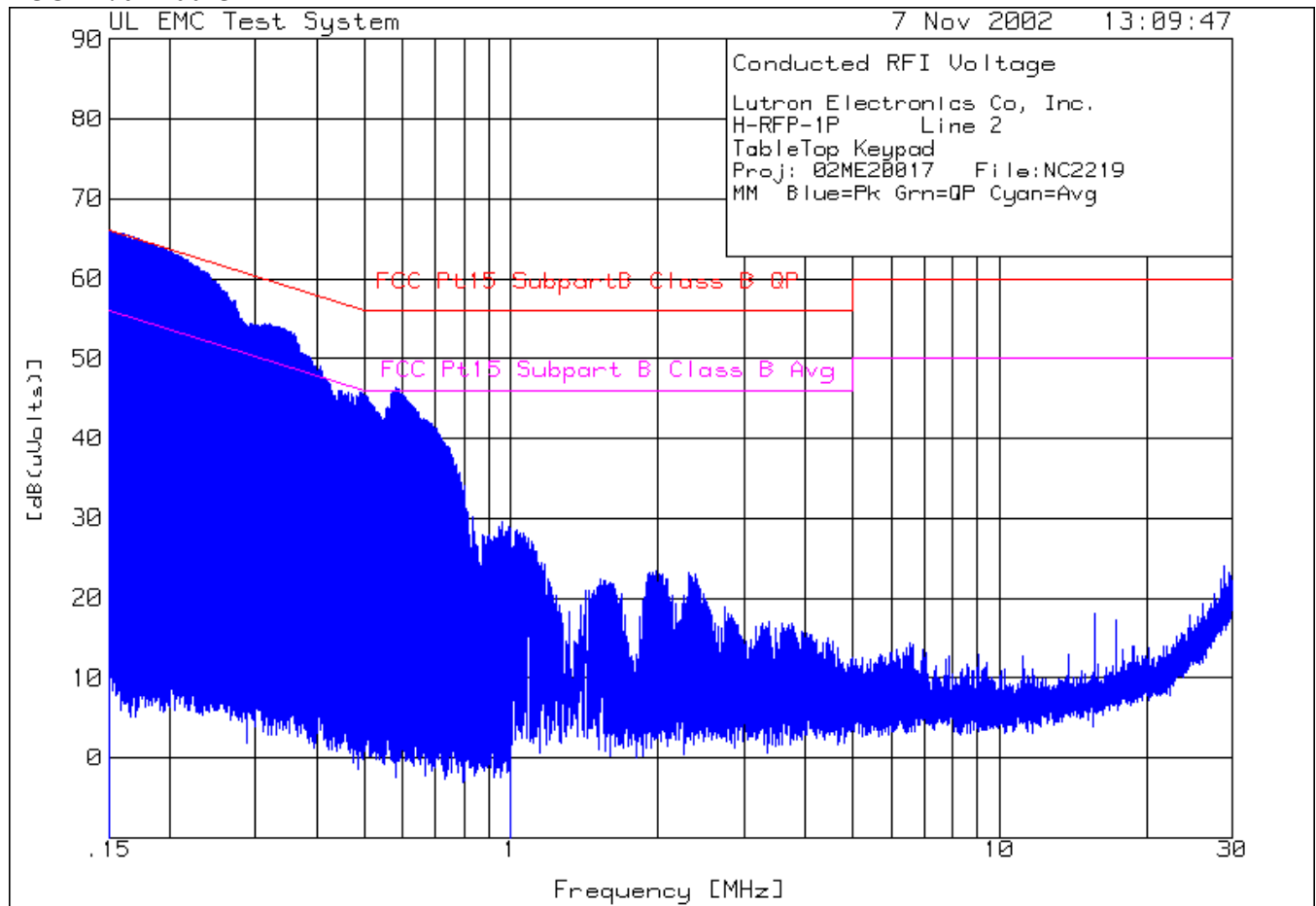
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LIMIT 1: FCC Pt15 SubpartB Class B QP
LIMIT 2: FCC Pt15 Subpart B Class B Avg
LIMIT 3: NONE
LIMIT 4: NONE
LIMIT 5: NONE
LIMIT 6: NONE

File Number: NC2219
Project Number: 02ME20017
Model Number: H-RFP-1P
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File Number: NC2219
 Project Number: 02ME20017
 Model Number: H-RFP-1P
 FCC ID: JPZ0023

Issued: 11/5/02

UL EMC Test System

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Lutron Electronics Co, Inc.
 H-RFP-1P Line 2
 TableTop Keypad
 Proj: 02ME20017 File:NC2219
 MM Blue=Pk Grn=QP Cyan=Avg

Frequency	Reading	Factor	Factor	Factor [dB(uVolts)]		
[MHz]	[dB(uV)]	[dB]	[dB]			
=====						
Range: 1 .15 - 1MHz						
.15298	49.25 qp	10.3	0	59.55+	65.8	55.8
		Margin [dB]:		-6.25	3.75	
.1616	49.19 qp	10.3	0	59.49+	65.4	55.4
		Margin [dB]:		-5.91	4.09	
.17215	48.54 qp	10.3	0	58.84+	64.9	54.9
		Margin [dB]:		-6.06	3.94	
.1907	47.41 qp	10.3	0	57.71+	64	54
		Margin [dB]:		-6.29	3.71	
.20954	46.06 qp	10.3	0	56.36+	63.2	53.2
		Margin [dB]:		-6.84	3.16	
.23631	43.46 qp	10.3	0	53.76+	62.2	52.2
		Margin [dB]:		-8.44	1.56	
.25252	42.01 qp	10.3	0	52.31+	61.7	51.7
		Margin [dB]:		-9.39	.61	
.26972	39.93 qp	10.3	0	50.23	61.1	51.1
		Margin [dB]:		-10.87	-.87	
.27154	39.59 qp	10.3	0	49.89	61.1	51.1
		Margin [dB]:		-11.21	-1.21	
.30261	36.97 qp	10.3	0	47.27	60.2	50.2
		Margin [dB]:		-12.93	-2.93	
.33074	36.3 qp	10.3	0	46.6	59.4	49.4
		Margin [dB]:		-12.8	-2.8	
.36132	35.33 qp	10.3	0	45.63	58.7	48.7
		Margin [dB]:		-13.07	-3.07	
.38022	34.08 qp	10.3	0	44.38	58.3	48.3
		Margin [dB]:		-13.92	-3.92	
.40122	31.94 qp	10.3	0	42.24	57.8	47.8
		Margin [dB]:		-15.56	-5.56	
.42679	28.99 qp	10.3	0	39.29	57.3	47.3
		Margin [dB]:		-18.01	-8.01	
.44902	28.75 qp	10.3	0	39.05	56.9	46.9

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.48094	28.01 qp	Margin [dB]:	-17.85	-7.85	
		10.3	0	38.31	56.3 46.3
.50411	26.56 qp	Margin [dB]:	-17.99	-7.99	
		10.3	0	36.86	56 46
.52412	25.49 qp	Margin [dB]:	-19.14	-9.14	
		10.3	0	35.79	56 46
.55927	27.04 qp	Margin [dB]:	-20.21	-10.21	
		10.3	0	37.34	56 46
.57881	27.3 qp	Margin [dB]:	-18.66	-8.66	
		10.3	0	37.6	56 46
.58733	27 qp	Margin [dB]:	-18.4	-8.4	
		10.3	0	37.3	56 46
.60832	27.22 qp	Margin [dB]:	-18.7	-8.7	
		10.3	0	37.52	56 46
.63425	26.32 qp	Margin [dB]:	-18.48	-8.48	
		10.3	0	36.62	56 46
.6692	24.83 qp	Margin [dB]:	-19.38	-9.38	
		10.3	0	35.13	56 46
.69872	23.41 qp	Margin [dB]:	-20.87	-10.87	
		10.3	0	33.71	56 46
.72514	21.93 qp	Margin [dB]:	-22.29	-12.29	
		10.3	0	32.23	56 46
.74905	20.8 qp	Margin [dB]:	-23.77	-13.77	
		10.3	0	31.1	56 46
.76239	19.49 qp	Margin [dB]:	-24.9	-14.9	
		10.3	0	29.79	56 46
.78531	17.72 qp	Margin [dB]:	-26.21	-16.21	
		10.3	0	28.02	56 46
		Margin [dB]:	-27.98	-17.98	

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
 avem - denotes EMI average detection

LIMIT 1: FCC Pt15 SubpartB Class B QP
 LIMIT 2: FCC Pt15 Subpart B Class B Avg
 LIMIT 3: NONE
 LIMIT 4: NONE
 LIMIT 5: NONE
 LIMIT 6: NONE

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 TableTop Keypad
 Proj: 02ME20017 File:NC2219
 MM Blue=Pk Grn=QP Cyan=Avg

Frequency [MHz]	Reading [dB(uV)]	Factor [dB]	Factor [dB(uVolts)] [dB]			
=====						
Range: 1 .15 - 1MHz						
.15297	18.59 avem	10.3	0	28.89	65.8	55.8
	Margin [dB]:			-36.91	-26.91	
.16157	18.45 avem	10.3	0	28.75	65.4	55.4
	Margin [dB]:			-36.65	-26.65	
.17208	18.15 avem	10.3	0	28.45	64.9	54.9
	Margin [dB]:			-36.45	-26.45	
.19067	17.04 avem	10.3	0	27.34	64	54
	Margin [dB]:			-36.66	-26.66	
.20951	15.83 avem	10.3	0	26.13	63.2	53.2
	Margin [dB]:			-37.07	-27.07	
.23627	13.85 avem	10.3	0	24.15	62.2	52.2
	Margin [dB]:			-38.05	-28.05	
.25253	12.28 avem	10.3	0	22.58	61.7	51.7
	Margin [dB]:			-39.12	-29.12	
.26964	10.85 avem	10.3	0	21.15	61.1	51.1
	Margin [dB]:			-39.95	-29.95	
.27152	10.61 avem	10.3	0	20.91	61.1	51.1
	Margin [dB]:			-40.19	-30.19	
.30258	9.09 avem	10.3	0	19.39	60.2	50.2
	Margin [dB]:			-40.81	-30.81	
.33078	8.56 avem	10.3	0	18.86	59.4	49.4
	Margin [dB]:			-40.54	-30.54	
.36133	7.39 avem	10.3	0	17.69	58.7	48.7
	Margin [dB]:			-41.01	-31.01	
.38022	6.03 avem	10.3	0	16.33	58.3	48.3
	Margin [dB]:			-41.97	-31.97	
.40118	4.51 avem	10.3	0	14.81	57.8	47.8
	Margin [dB]:			-42.99	-32.99	
.42676	3.81 avem	10.3	0	14.11	57.3	47.3
	Margin [dB]:			-43.19	-33.19	
.44891	3.76 avem	10.3	0	14.06	56.9	46.9

		Margin [dB]:	-42.84	-32.84	
.48095	1.28 avem	10.3 0	11.58	56.3	46.3
		Margin [dB]:	-44.72	-34.72	
.50408	1.78 avem	10.3 0	12.08	56	46
		Margin [dB]:	-43.92	-33.92	
.52411	2.01 avem	10.3 0	12.31	56	46
		Margin [dB]:	-43.69	-33.69	
.55933	1.33 avem	10.3 0	11.63	56	46
		Margin [dB]:	-44.37	-34.37	
.57881	1.62 avem	10.3 0	11.92	56	46
		Margin [dB]:	-44.08	-34.08	
.58737	1.35 avem	10.3 0	11.65	56	46
		Margin [dB]:	-44.35	-34.35	
.60832	1.1 avem	10.3 0	11.4	56	46
		Margin [dB]:	-44.6	-34.6	
.63428	.69 avem	10.3 0	10.99	56	46
		Margin [dB]:	-45.01	-35.01	
.66914	-.43 avem	10.3 0	9.87	56	46
		Margin [dB]:	-46.13	-36.13	
.69872	-.89 avem	10.3 0	9.41	56	46
		Margin [dB]:	-46.59	-36.59	
.72517	-1.48 avem	10.3 0	8.82	56	46
		Margin [dB]:	-47.18	-37.18	
.7491	-1.88 avem	10.3 0	8.42	56	46
		Margin [dB]:	-47.58	-37.58	
.76238	-2.15 avem	10.3 0	8.15	56	46
		Margin [dB]:	-47.85	-37.85	
.78528	-2.42 avem	10.3 0	7.88	56	46
		Margin [dB]:	-48.12	-38.12	

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
avem - denotes EMI average detection

LIMIT 1: FCC Pt15 SubpartB Class B QP
LIMIT 2: FCC Pt15 Subpart B Class B Avg
LIMIT 3: NONE
LIMIT 4: NONE
LIMIT 5: NONE
LIMIT 6: NONE

File Number: NC2219
Project Number: 02ME20017
Model Number: H-RFP-1P
FCC ID: JPZ0023

Issued: 11/5/02



Conducted Emission Test Set-Up 150k-30MHz

File Number: NC2219
Project Number: 02ME20017
Model Number: H-RFP-1P
FCC ID: JPZ0023

Issued: 11/5/02

2.1.2 Cease Operation Within 5 Seconds

☒ **Test Applicable** ☐ **Test Not Applicable**

Temperature: 21.2°C
Humidity: 42%RH
Pressure: 1025 milbar
Date test performed : 17 October 2002

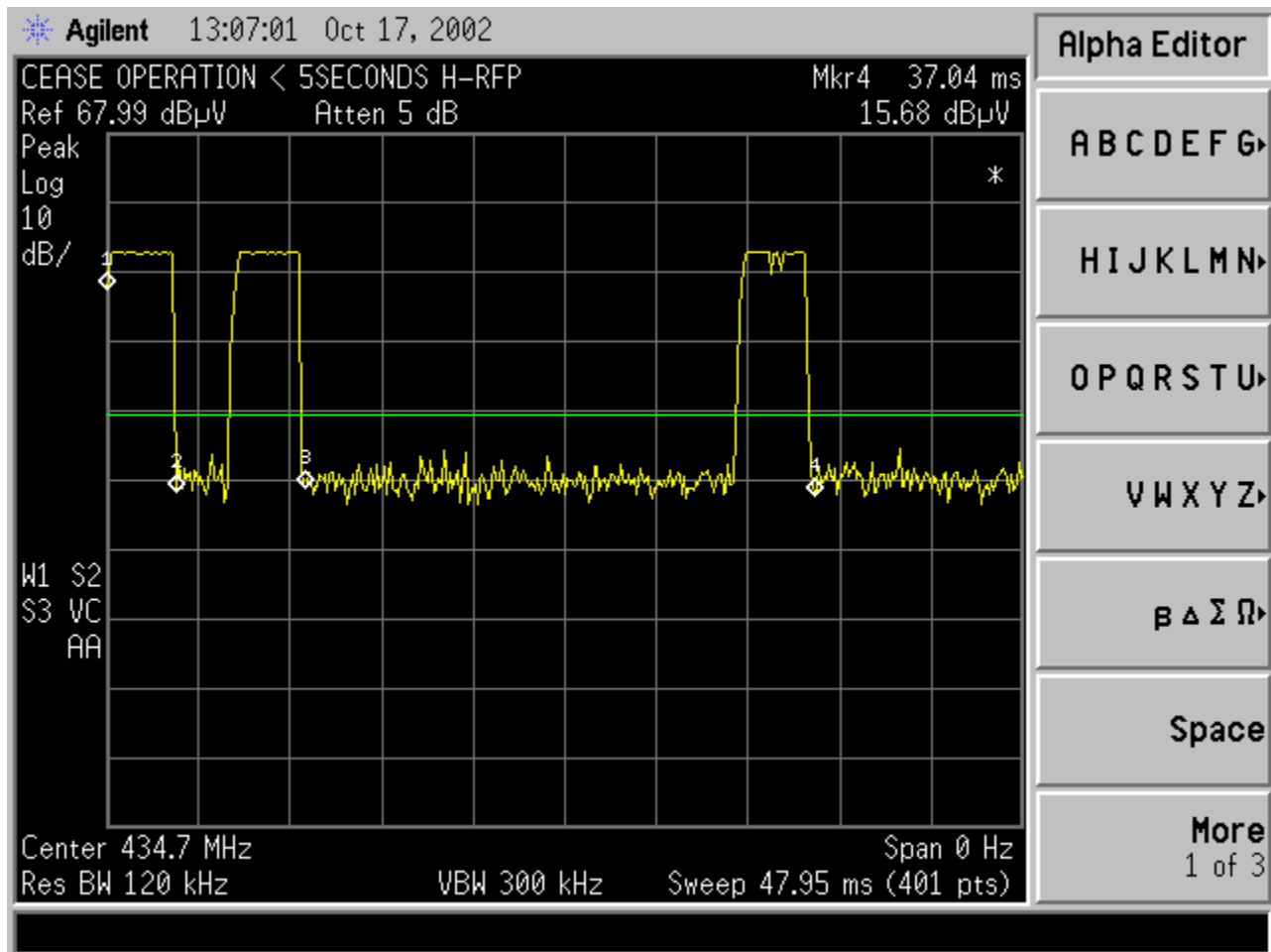
Test Procedure:

☒ 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.

☐ A transmitter activated automatically shall cease transmission within 5 seconds after activation.

Test equipment used for conducted Click measurements:

☒ E7402A	Agilent	EMC Analyzer	Equipment No.: 5B-123
Last Calibration Date: 17 Sept. 2002		Calibration Due Date: 17 September 2003	
☒ Temp/Pressure	Oakton	Barometer	Equipment No.: ME4-263
Range:950-1045	Last Calibration Date: 2 April 02	Calibration Due Date:2 April 03	
☒ 453320	Ex-Tech	Hydro-Thermometer	Equipment No.: ME4-264
Range:0-80%	Last Calibration Date:2 April 02	Calibration Due Date:2 April 03	



H-RFP-1P < 5 Seconds the plot depicts Multiple transmit turn on
 (Model number in title block H-RFP = H-RFP-1P)

File Number: NC2219
Project Number: 02ME20017
Model Number: H-RFP-1P
FCC ID: JPZ0023

Issued: 11/5/02



Test Set-Up Cease Operation < 5 seconds

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

☒ Test Applicable ☐ Test Not Applicable

Temperature: 22.1°C
Humidity: 44%RH
Pressure: 1030milbar
Date test performed: 16 Oct. 2002

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.

Mode: "Constant Wave Transmit"

Measurement distance: ☒ 3 intentional Radiator ☐ 10 meters un-intentional radiator

Frequency Range:

☒ 30MHz - 5000MHz	☒ Electric Intentional @ low band 431MHz & High band 437MHz
☒ 30MHz - 2000MHz	☒ Electric Unintentional @ low band 431MHz & High band 437MHz

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.

Note: The model number H-RFP depicted in some graphs and photo's is the same as H-RFP-1P

File Number: NC2219
Project Number: 02ME20017
Model Number: H-RFP-1P
FCC ID: JPZ0023

Issued: 11/5/02

Test equipment used for final radiated emissions tests:

☒ HP 8574A	Hewlett-Packard	EMI Receiver,	Equipment No.: ME5A-461
Range:30-1000MHz	Last Calibration Date:25 Jan 02	Calibration Due Date: 25 Jan 03	

Consisting of:

HP - 8566B	Hewlett-Packard	Spectrum Analyzer,
	Resolution BW:	100kHz
		9kHz to 30 MHz
		1MHz
		30MHz to 1000 MHz
	Video BW:	100kHz
		9kHz to 30 MHz
		1MHz
		30MHz TO 1000MHz
HP - 85662A	Hewlett-Packard	Analyzer Display
HP - 85650A	Hewlett-Packard	Quasi-Peak Adapter,
	Quasi Peak BW:	200Hz
		9kHz to 150kHz
		9kHz
		150kHz to 30MHz
		120kHz
		30 to 1000 MHz
HP - 85685A	Hewlett-Packard	Preselector

For Measurements above 1GHz:

☒ HP - 8566B	Hewlett-Packard	Spectrum Analyzer,	Equipment No.: ME5A-461
	Resolution BW: 1MHz		
	Video BW: 1MHz		

Range: 1- 2 GHz	Last Calibration Date:30 April 02	Calibration Due Date: 30 April 03
-----------------	-----------------------------------	-----------------------------------

☒ HP - 85662A	Hewlett-Packard	Analyzer Display	Equipment No. ME5A-461
Last Calibration Date:30 April 02	Calibration Due Date: 30 April 03		

Test Accessories for Radiated Emissions:

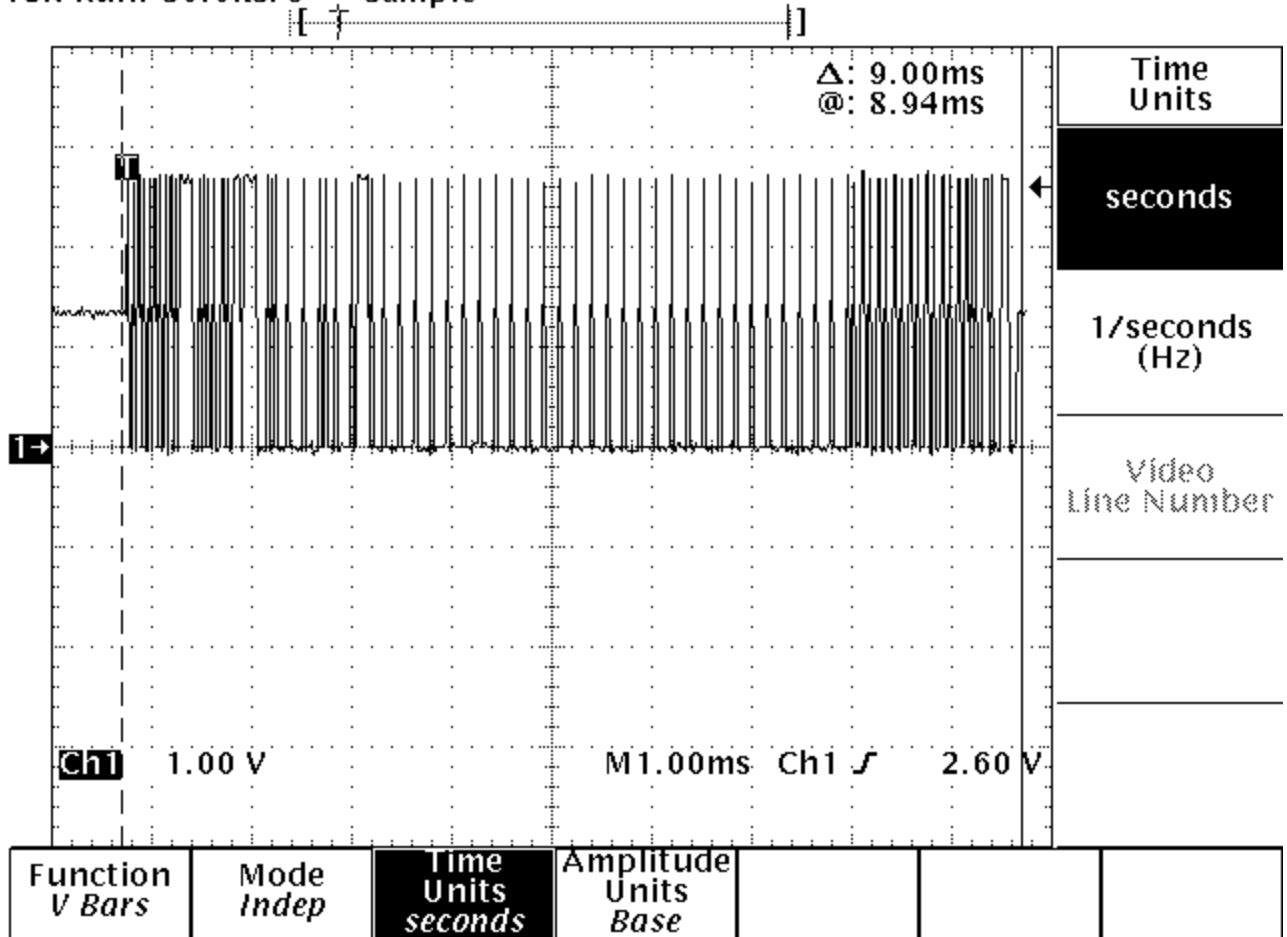
☒ 94455-1	Ailtech	Biconnical Antenna	Equipment No.: ME5-439
Last Calibration Date:16 Oct 02		Calibration Due Date: 16 Oct 03	

☒ 3146	EMCO	Log Periodic Antenna	Equipment No.: ME5-451
Last Calibration Date:15 Oct 02		Calibration Due Date: 15 Oct 03	

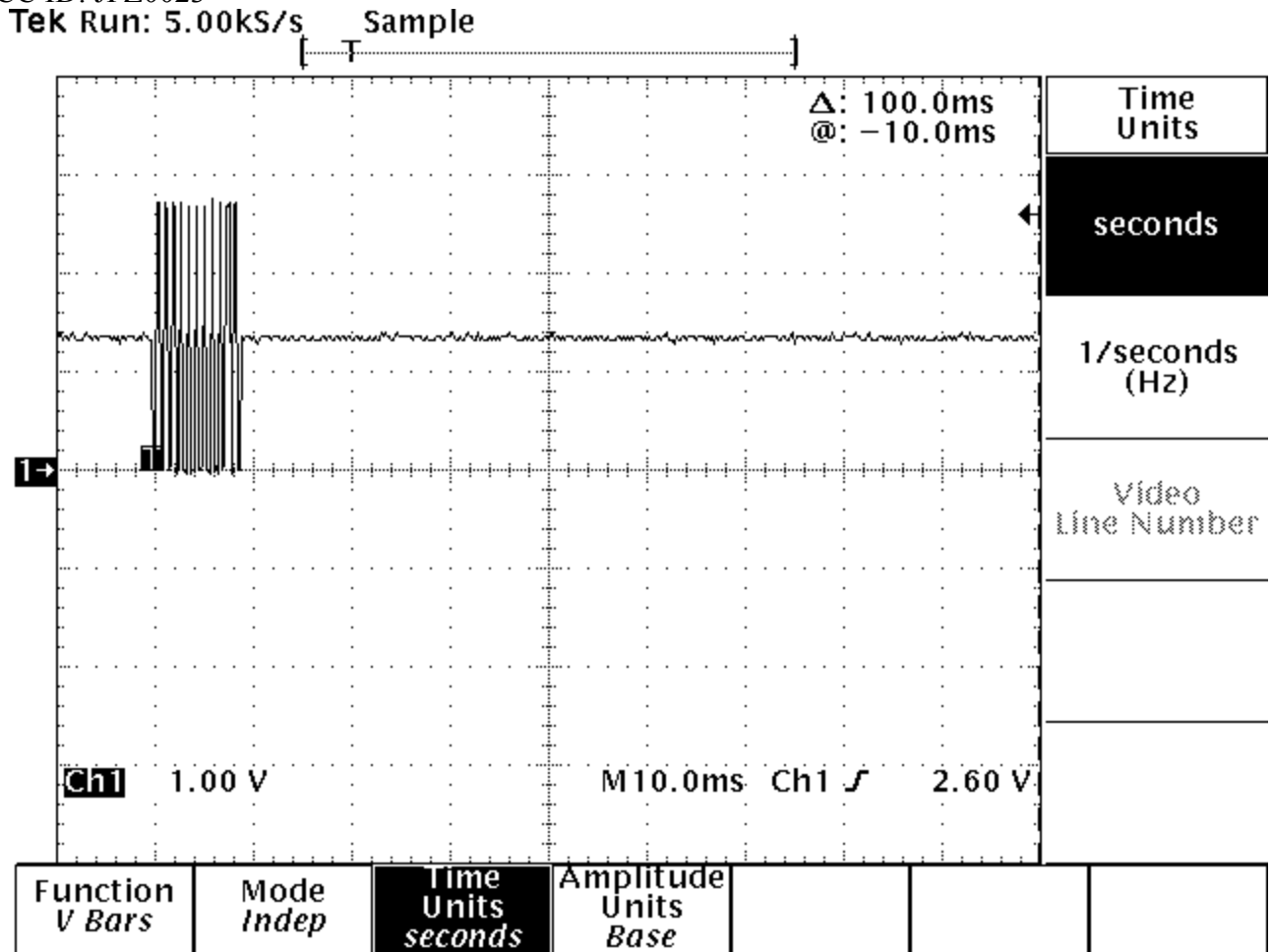
☒ Temp/Pressure	Oakton	Barometer	Equipment No.: ME4-263
Range:950-1045	Last Calibration Date: 2 April 02	Calibration Due Date:2 April 03	

☒ 453320	Ex-Tech	Hydro-Thermometer	Equipment No.: ME4-264
Range:0-80%	Last Calibration Date:2 April 02	Calibration Due Date:2 April 03	

Tek Run: 50.0kS/s Sample



H-RFP-1P One Complete Pulse Train 8.94ms expanded view profile



H-RFP-1P One Complete Pulse Train > 100ms wide profile

File Number: NC2219
Project Number: 02ME20017
Model Number: H-RFP-1P
FCC ID: JPZ0023

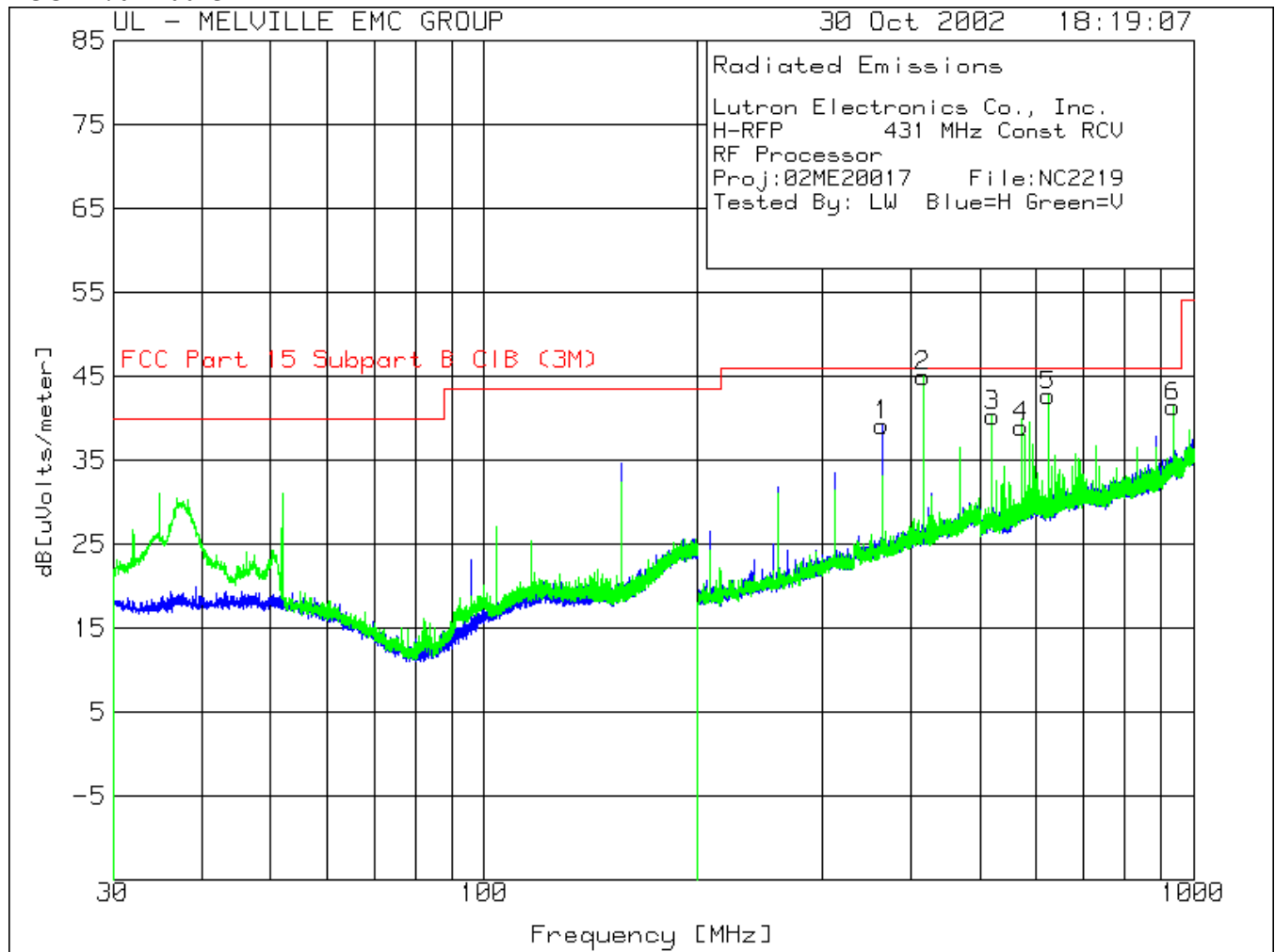
Issued: 11/5/02



Pulse Train Test Set-Up

File Number: NC2219
Project Number: 02ME20017
Model Number: H-RFP-1P
FCC ID: JPZ0023

Issued: 11/5/02



431MHz Receive Mode (Model number in title block H-RFP = H-RFP-1P)

File Number: NC2219
Project Number: 02ME20017
Model Number: H-RFP-1P
FCC ID: JPZ0023

Issued: 11/5/02

Lutron Electronics Co., Inc.
H-RFP 431 MHz Const RCV
RF Processor
Proj:02ME20017 File:NC2219
Tested By: LW 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
=====						
Range: 3 200 - 1000MHz -----						
1	363.8634	21 pk	2.71	15.49	39.2	46
	Azimuth:221	Height:100	Horz	Margin [dB]		-6.8

Range: 4 200 - 1000MHz -----						
2	415.9534	25.64 pk	3.06	16.3	45	46
	Azimuth:340	Height:199	Vert	Margin [dB]		-1
3	520	17.84 pk	3.56	18.9	40.3	46
	Azimuth:166	Height:100	Vert	Margin [dB]		-5.7
4	572.0899	16.04 pk	3.66	19.3	39	46
	Azimuth:358	Height:100	Vert	Margin [dB]		-7
5	624.0466	19.52 pk	3.68	19.5	42.7	46
	Azimuth:168	Height:100	Vert	Margin [dB]		-3.3
6	935.6536	12.78 pk	4.54	24.08	41.4	46
	Azimuth:206	Height:100	Vert	Margin [dB]		-4.6

LIMIT 1: FCC Part 15 Subpart B ClB (3M)
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
tm - Trace Math Result

File Number: NC2219
Project Number: 02ME20017
Model Number: H-RFP-1P
FCC ID: JPZ0023

Issued: 11/5/02

Lutron Electronics Co., Inc.
H-RFP-1P 431 MHz Const RCV
RF Processor
Proj:02ME20017 File:NC2219
Tested By: LW Blue=H Green=V

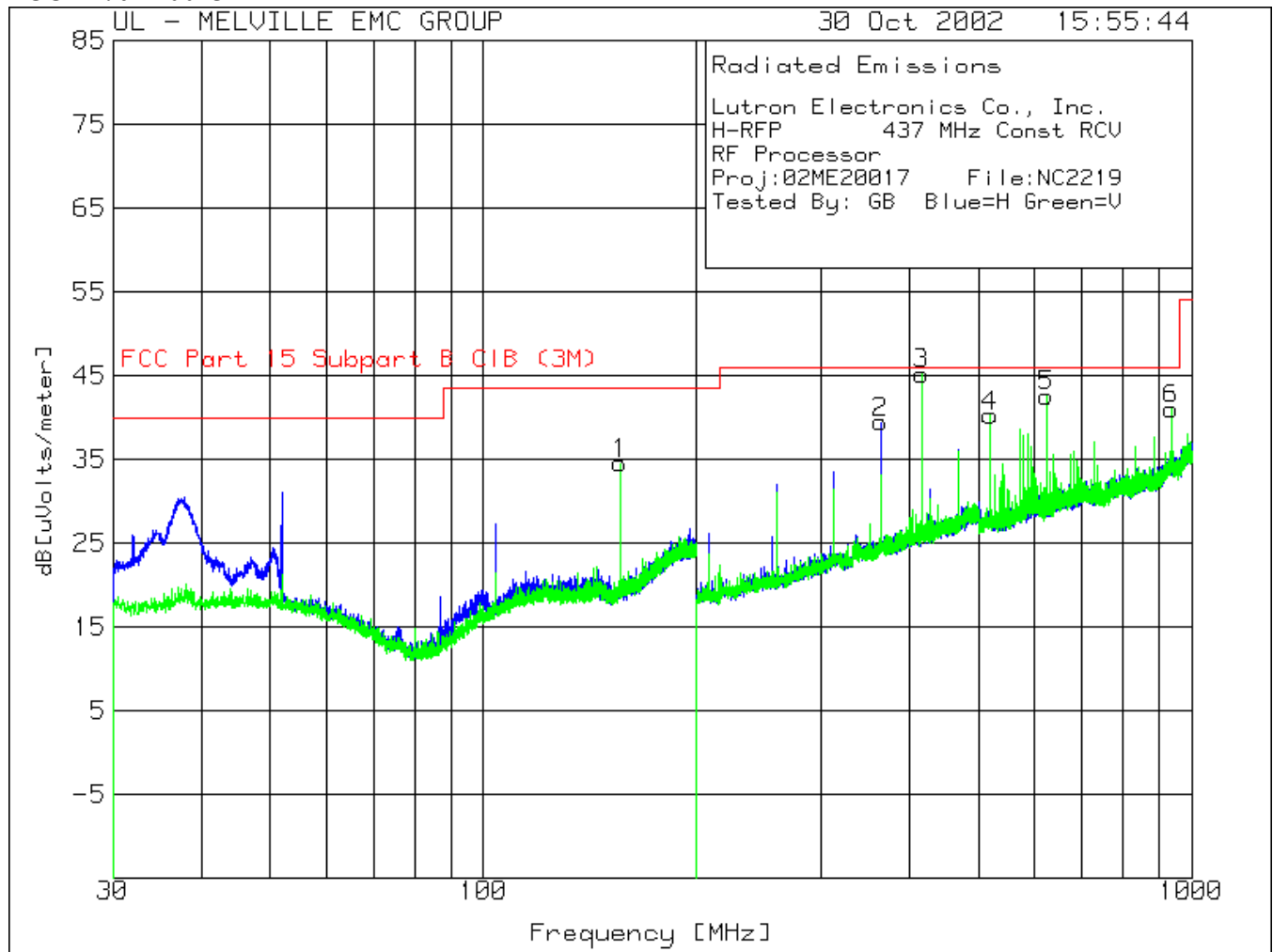
Test Frequency [MHz]	Meter Reading [dB (uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit:1
=====					
Range: 3 200 - 1000MHz					
363.9941	17.2 qp	2.71	15.5	35.41	46
Azimuth: 22		Height:103	Horz	Margin [dB]:	-10.59
Range: 4 200 - 1000MHz					
416.058	23.66 qp	3.06	16.3	43.02	46
Azimuth: 360		Height:145	Vert	Margin [dB]:	-2.98
520	13.58 qp	3.56	18.9	36.04	46
Azimuth: 341		Height:121	Vert	Margin [dB]:	-9.96
572.02	11.67 qp	3.66	19.3	34.63	46
Azimuth: 0		Height:113	Vert	Margin [dB]:	-11.37
624.0359	14.16 qp	3.68	19.5	37.34	46
Azimuth: 8		Height:110	Vert	Margin [dB]:	-8.66
936.0995	5.68 qp	4.54	24.1	34.32	46
Azimuth: 197		Height:104	Vert	Margin [dB]:	-11.68

LIMIT 1: FCC Part 15 Subpart B ClB (3M)
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

File Number: NC2219
Project Number: 02ME20017
Model Number: H-RFP-1P
FCC ID: JPZ0023

Issued: 11/5/02



437MHz Receive Mode (Model number in title block H-RFP = H-RFP-1P)

File Number: NC2219
Project Number: 02ME20017
Model Number: H-RFP-1P
FCC ID: JPZ0023

Issued: 11/5/02

Lutron Electronics Co., Inc.
H-RFP-1P 437 MHz Const RCV
RF Processor
Proj:02ME20017 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
=====						
Range: 2 30 - 200MHz -----						
1	155.9605	20.23 pk	1.78	12.49	34.5	43.5
	Azimuth:207	Height:199	Vert	Margin [dB]		-9

Range: 3 200 - 1000MHz -----						
2	363.8634	21.2 pk	2.71	15.49	39.4	46
	Azimuth:77	Height:101	Horz	Margin [dB]		-6.6

Range: 4 200 - 1000MHz -----						
3	415.8202	25.84 pk	3.06	16.3	45.2	46
	Azimuth:350	Height:200	Vert	Margin [dB]		-.8
4	519.8668	17.74 pk	3.56	18.9	40.2	46
	Azimuth:163	Height:101	Vert	Margin [dB]		-5.8
5	624.0466	19.42 pk	3.68	19.5	42.6	46
	Azimuth:340	Height:101	Vert	Margin [dB]		-3.4
6	935.9201	12.36 pk	4.54	24.1	41	46
	Azimuth:213	Height:101	Vert	Margin [dB]		-5

LIMIT 1: FCC Part 15 Subpart B ClB (3M)
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
tm - Trace Math Result

File Number: NC2219
Project Number: 02ME20017
Model Number: H-RFP-1P
FCC ID: JPZ0023

Issued: 11/5/02

Lutron Electronics Co., Inc.
H-RFP-1P 437 MHz Const RCV
RF Processor
Proj:02ME20017 File:NC2219
Tested By: GB Blue=H Green=V

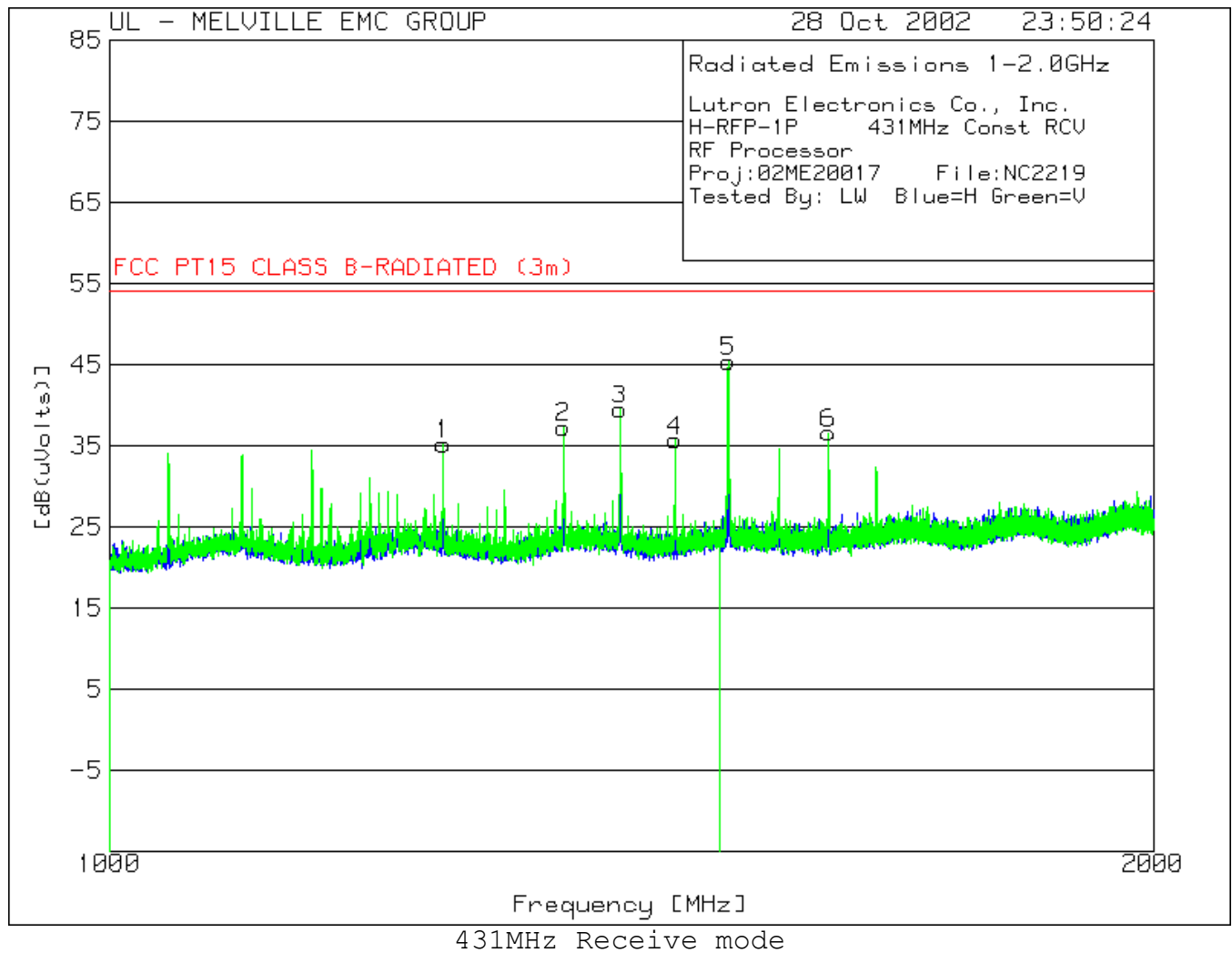
Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit:1
=====					
Range: 2 30 - 200MHz					
156.0055	16.14 qp	1.78	12.5	30.42	43.5
Azimuth: 240		Height:101 Vert	Margin [dB]: -13.08		
Range: 3 200 - 1000MHz					
364.0079	18.36 qp	2.71	15.5	36.57	46
Azimuth: 30		Height:102 Horz	Margin [dB]: -9.43		
Range: 4 200 - 1000MHz					
416.04	24.77 qp	3.06	16.3	44.13	46
Azimuth: 337		Height:151 Vert	Margin [dB]: -1.87		
519.98	13.14 qp	3.56	18.9	35.6	46
Azimuth: 323		Height:109 Vert	Margin [dB]: -10.4		
623.982	13.43 qp	3.68	19.5	36.61	46
Azimuth: 11		Height:102 Vert	Margin [dB]: -9.39		
936	5.8 qp	4.54	24.1	34.44	46
Azimuth: 199		Height:100 Vert	Margin [dB]: -11.56		

LIMIT 1: FCC Part 15 Subpart B ClB (3M)
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

File Number: NC2219
Project Number: 02ME20017
Model Number: H-RFP-1P
FCC ID: JPZ0023

Issued: 11/5/02



File Number: NC2219
Project Number: 02ME20017
Model Number: H-RFP-1P
FCC ID: JPZ0023

Issued: 11/5/02

Lutron Electronics Co., Inc.
H-RFP-1P 431MHz Const RCV
RF Processor
Proj:02ME20017 File:NC2219
Tested By: LW Blue=H Green=V

No.	Test Frequency [MHz]	Meter Reading [dB (uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level [dB (uVolts)]	Limit:1
=====						
Range: 3 1000 - 1500MHz -----						
1	1248.043	42.44 pk	-33.03	25.79	35.2	54
	Azimuth:168	Height:101	Vert	Margin [dB]		-18.8
2	1352.04	43.88 pk	-32.75	26.17	37.3	54
	Azimuth:326	Height:101	Vert	Margin [dB]		-16.7
3	1403.913	45.76 pk	-32.61	26.35	39.5	54
	Azimuth:342	Height:101	Vert	Margin [dB]		-14.5
4	1455.787	41.63 pk	-32.47	26.54	35.7	54
	Azimuth:212	Height:101	Vert	Margin [dB]		-18.3

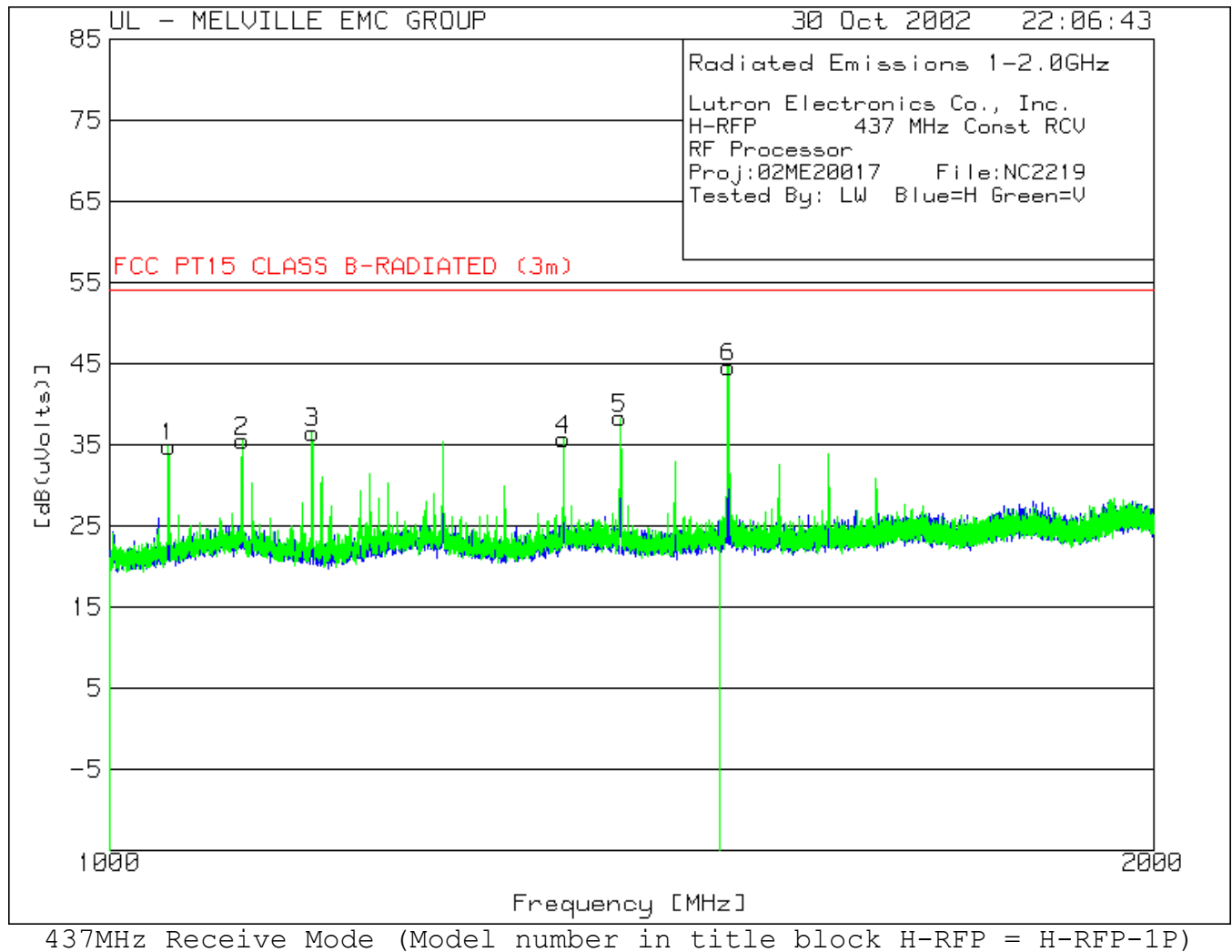
Range: 4 1500 - 2000MHz -----						
5	1508.118	50.98 pk	-32.32	26.74	45.4	54
	Azimuth:105	Height:101	Vert	Margin [dB]		-8.6
6	1611.965	41.4 pk	-31.99	27.19	36.6	54
	Azimuth:38	Height:101	Vert	Margin [dB]		-17.4

LIMIT 1: FCC PT15 CLASS B-RADIATED (3m)
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
tm - Trace Math Result

File Number: NC2219
Project Number: 02ME20017
Model Number: H-RFP-1P
FCC ID: JPZ0023

Issued: 11/5/02



File Number: NC2219
 Project Number: 02ME20017
 Model Number: H-RFP-1P
 FCC ID: JPZ0023

Issued: 11/5/02

Lutron Electronics Co., Inc.
 H-RFP-1P 437 MHz Const RCV
 RF Processor
 Proj:02ME20017 File:NC2219
 Tested By: LW Blue=H Green=V

No.	Test Frequency [MHz]	Meter Reading [dB (uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level [dB (uVolts)]	Limit:1
=====						
Range: 3 1000 - 1500MHz -----						
1	1039.883	43.35 pk	-33.59	25.04	34.8	54
	Azimuth:228	Height:198 Vert		Margin [dB]		-19.2
2	1092.09	43.72 pk	-33.45	25.23	35.5	54
	Azimuth:273	Height:100 Vert		Margin [dB]		-18.5
3	1143.88	44.39 pk	-33.31	25.42	36.5	54
	Azimuth:65	Height:100 Vert		Margin [dB]		-17.5
4	1352.04	42.28 pk	-32.75	26.17	35.7	54
	Azimuth:325	Height:100 Vert		Margin [dB]		-18.3
5	1403.58	44.56 pk	-32.61	26.35	38.3	54
	Azimuth:325	Height:100 Vert		Margin [dB]		-15.7

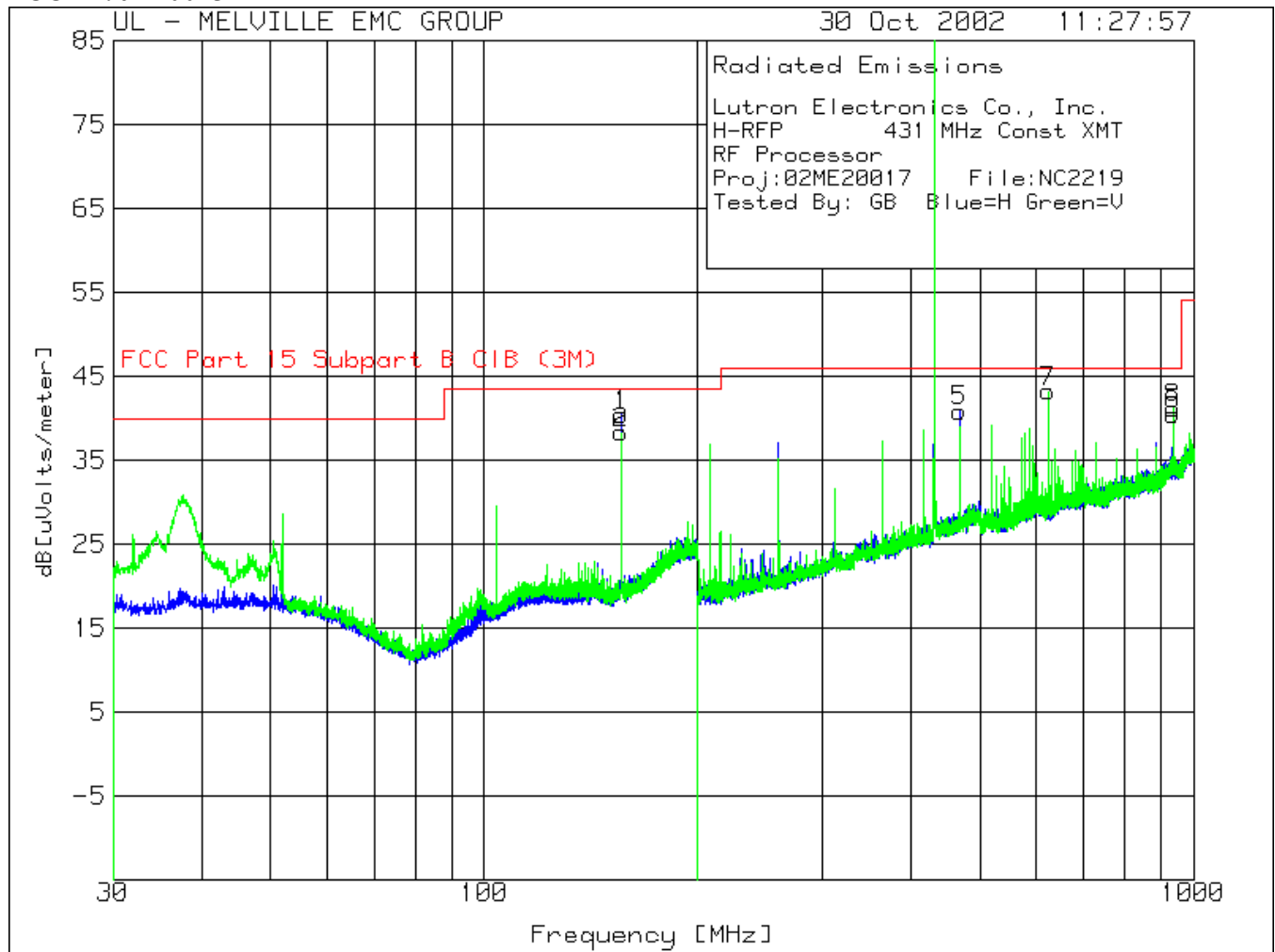
Range: 4 1500 - 2000MHz -----						
6	1508.118	50.18 pk	-32.32	26.74	44.6	54
	Azimuth:133	Height:101 Vert		Margin [dB]		-9.4

LIMIT 1: FCC PT15 CLASS B-RADIATED (3m)
 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
 tm - Trace Math Result

File Number: NC2219
Project Number: 02ME20017
Model Number: H-RFP-1P
FCC ID: JPZ0023

Issued: 11/5/02



431MHz Transmit (Model number in title block H-RFP = H-RFP-1P)

File Number: NC2219
 Project Number: 02ME20017
 Model Number: H-RFP-1P
 FCC ID: JPZ0023

Issued: 11/5/02

Lutron Electronics Co., Inc.
 H-RFP-1P 431 MHz Const XMT
 RF Processor
 Proj:02ME20017 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	Limit:1 dB[uVolts/meter]	Limit2
Range: 1 30 - 200MHz -----							
1	156.003	26.12 pk	1.78	12.5	40.4	N/A	43.5
	Azimuth:237	Height:199	Horz	Margin [dB]			-3.1
Range: 2 30 - 200MHz -----							
2	156.0455	24.02 pk	1.78	12.5	38.3	N/A	43.5
	Azimuth:341	Height:100	Vert	Margin [dB]			-5.2
Range: 3 200 - 1000MHz -----							
3	430.8743	74.69 pk	3.17	16.54	94.4	80.7	
	Azimuth:347	Height:199	Horz	Margin [dB]		13.7	
5	467.9101	20.25 pk	3.35	17.3	40.9	60.7	
	Azimuth:86	Height:100	Horz	Margin [dB]		-19.8	
6	935.9201	11.86 pk	4.54	24.1	40.5	60.7	
	Azimuth:227	Height:100	Horz	Margin [dB]		-20.2	
Range: 4 200 - 1000MHz -----							
4	430.8743	71.99 pk	3.17	16.54	91.7	80.7	
	Azimuth:341	Height:100	Vert	Margin [dB]		11.0	
7	623.9134	20.02 pk	3.68	19.5	43.2	60.7	
	Azimuth:144	Height:100	Vert	Margin [dB]		-17.5	
8	935.7868	12.57 pk	4.54	24.09	41.2	60.7	
	Azimuth:103	Height:100	Vert	Margin [dB]		-19.5	

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

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

File Number: NC2219
 Project Number: 02ME20017
 Model Number: H-RFP-1P
 FCC ID: JPZ0023

Issued: 11/5/02

Lutron Electronics Co., Inc.
 H-RFP-1P 431 MHz Const XMT
 RF Processor
 Proj:02ME20017 File:NC2219
 Tested By: GB Blue=H Green=V

Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level	Limit:1 dB[uVolts/meter]	Limit2
=====						
Range: 1 30 - 200MHz						
155.998	23.11 qp	1.78	12.5	37.39	N/A	43.5
Azimuth: 216	Height:202	Horz	Margin [dB]:			-6.11
Range: 2 30 - 200MHz						
156.009	17.45 qp	1.78	12.5	31.73	N/A	43.5
Azimuth: 293	Height:105	Vert	Margin [dB]:			-11.77
Range: 3 200 - 1000MHz						
431.0478	*52.67 av	3.17	16.55	*72.39	80.7	
Azimuth: 258	Height:101	Horz	Margin [dB]:		-8.31	
468.012	15.55 av	3.35	17.3	36.2	60.7	
Azimuth: 253	Height:101	Horz	Margin [dB]:		-24.5	
935.94	3.28 av	4.54	24.1	31.92	60.7	
Azimuth: 265	Height:117	Horz	Margin [dB]:		-28.78	
Range: 4 200 - 1000MHz						
430.9884	*51.88 av	3.17	16.55	*71.6	80.7	
Azimuth: 192	Height:118	Vert	Margin [dB]:		-9.1	
623.98	13.5 av	3.68	19.5	36.68	60.7	
Azimuth: 12	Height:109	Vert	Margin [dB]:		-24.02	
935.9895	5.5 av	4.54	24.1	34.14	60.7	
Azimuth: 196	Height:105	Vert	Margin [dB]:		-26.56	

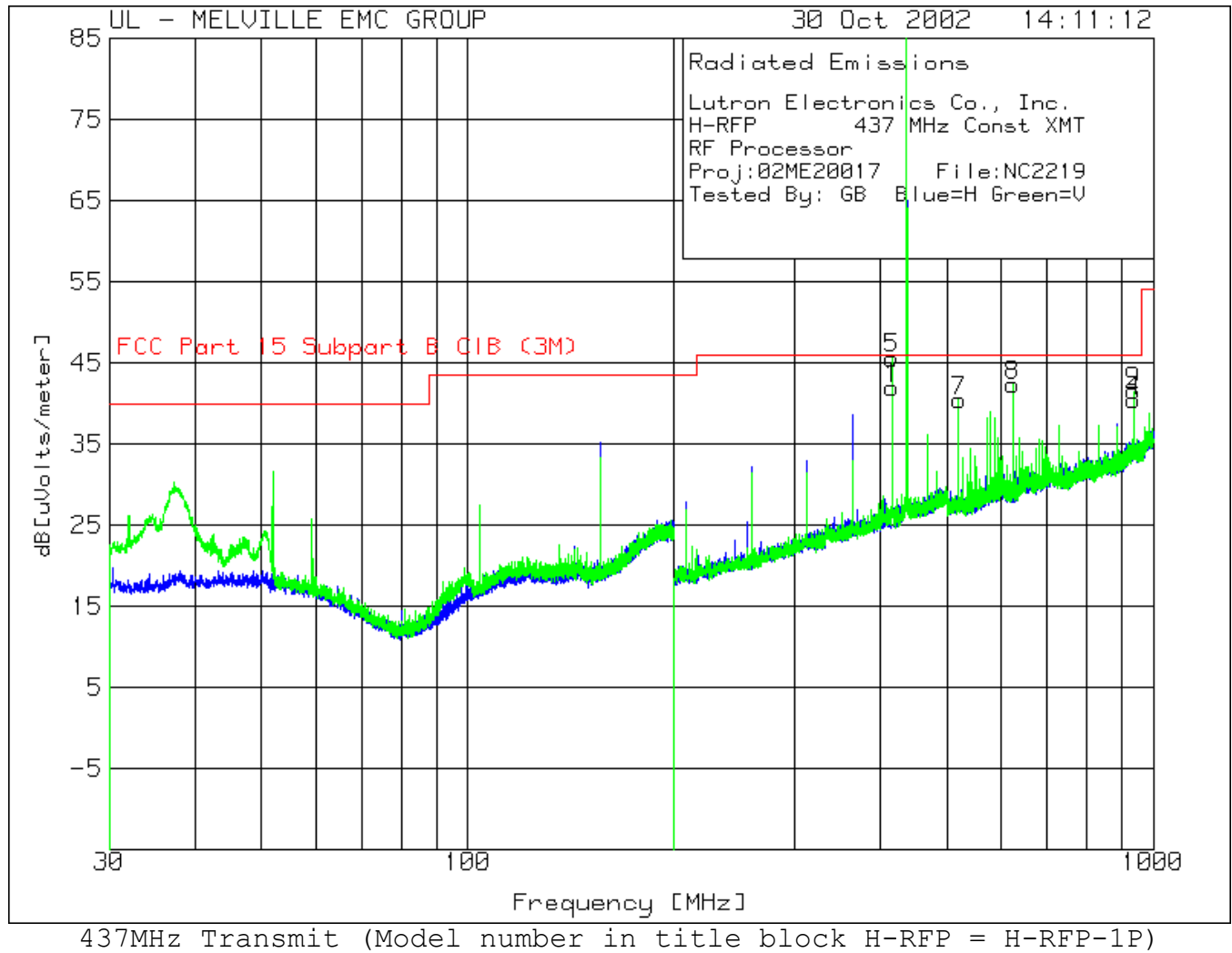
LIMIT 1: FCC Part 15 Subpart C-Section 15.231
 LIMIT 2: FCC Part 15 Subpart B ClB (3M)
 LIMIT 3: NONE
 LIMIT 4: NONE
 LIMIT 5: NONE
 LIMIT 6: NONE

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

***Duty Cycle correction factor of -20.9dB added to Average level.**

File Number: NC2219
Project Number: 02ME20017
Model Number: H-RFP-1P
FCC ID: JPZ0023

Issued: 11/5/02



File Number: NC2219
 Project Number: 02ME20017
 Model Number: H-RFP-1P
 FCC ID: JPZ0023

Issued: 11/5/02

Lutron Electronics Co., Inc.
 H-RFP-1P 437 MHz Const XMT
 RF Processor
 Proj:02ME20017 File:NC2219
 Tested By: GB Blue=H Green=V

Test No.	Frequency [MHz]	Meter Reading [dB (uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level	Limit:1 dB[uVolts/meter]	Limit2
=====							
Range: 3 200 - 1000MHz -----							
1	415.8202	22.54 pk	3.06	16.3	41.9	N/A	46
	Azimuth:107	Height:400	Horz	Margin [dB]			-4.1
2	436.8693	75.36 pk	3.2	16.94	95.5	80.9	
	Azimuth:358	Height:200	Horz	Margin [dB]		14.6	
4	935.7868	11.77 pk	4.54	24.09	40.4	60.9	
	Azimuth:216	Height:100	Horz	Margin [dB]		-20.5	
Range: 4 200 - 1000MHz -----							
5	415.8202	26.24 pk	3.06	16.3	45.6	N/A	46
	Azimuth:170	Height:200	Vert	Margin [dB]			-.4
6	436.8693	72.16 pk	3.2	16.94	92.3	80.9	
	Azimuth:14	Height:100	Vert	Margin [dB]		11.4	
7	520	17.94 pk	3.56	18.9	40.4	60.9	
	Azimuth:188	Height:100	Vert	Margin [dB]		-20.5	
8	624.0466	19.12 pk	3.68	19.5	42.3	60.9	
	Azimuth:334	Height:100	Vert	Margin [dB]		-18.6	
9	935.7868	12.87 pk	4.54	24.09	41.5	60.9	
	Azimuth:214	Height:100	Vert	Margin [dB]		-19.4	

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

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

File Number: NC2219
 Project Number: 02ME20017
 Model Number: H-RFP-1P
 FCC ID: JPZ0023

Issued: 11/5/02

Lutron Electronics Co., Inc.
 H-RFP-1P 437 MHz Const XMT
 RF Processor
 Proj:02ME20017 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	Limit2
=====						
Range: 3	200 - 1000MHz					
415.9879	18.45 qp	3.06	16.3	37.81	N/A	46
Azimuth: 92	Height:378	Horz	Margin [dB]:			-8.19
437	*52.48 av	3.2	16.95	*72.63	80.9	
Azimuth: 7	Height:99	Horz	Margin [dB]:		-8.27	
936.052	4.49 av	4.54	24.1	33.13	60.9	
Azimuth: 261	Height:105	Horz	Margin [dB]:		-27.77	
Range: 4	200 - 1000MHz					
416	24.32 av	3.06	16.3	43.68	60.9	
Azimuth: 0	Height:144	Vert	Margin [dB]:		-17.22	
436.9948	*51.45 av	3.2	16.95	*71.6	80.9	
Azimuth: 236	Height:143	Vert	Margin [dB]:		-9.3	
520.0139	13.61 av	3.56	18.9	36.07	60.9	
Azimuth: 341	Height:122	Vert	Margin [dB]:		-24.83	
623.99	12.35 av	3.68	19.5	35.53	60.9	
Azimuth: 0	Height:105	Vert	Margin [dB]:		-25.37	
936.0498	5.66 av	4.54	24.1	34.3	60.9	
Azimuth: 183	Height:108	Vert	Margin [dB]:		-26.6	

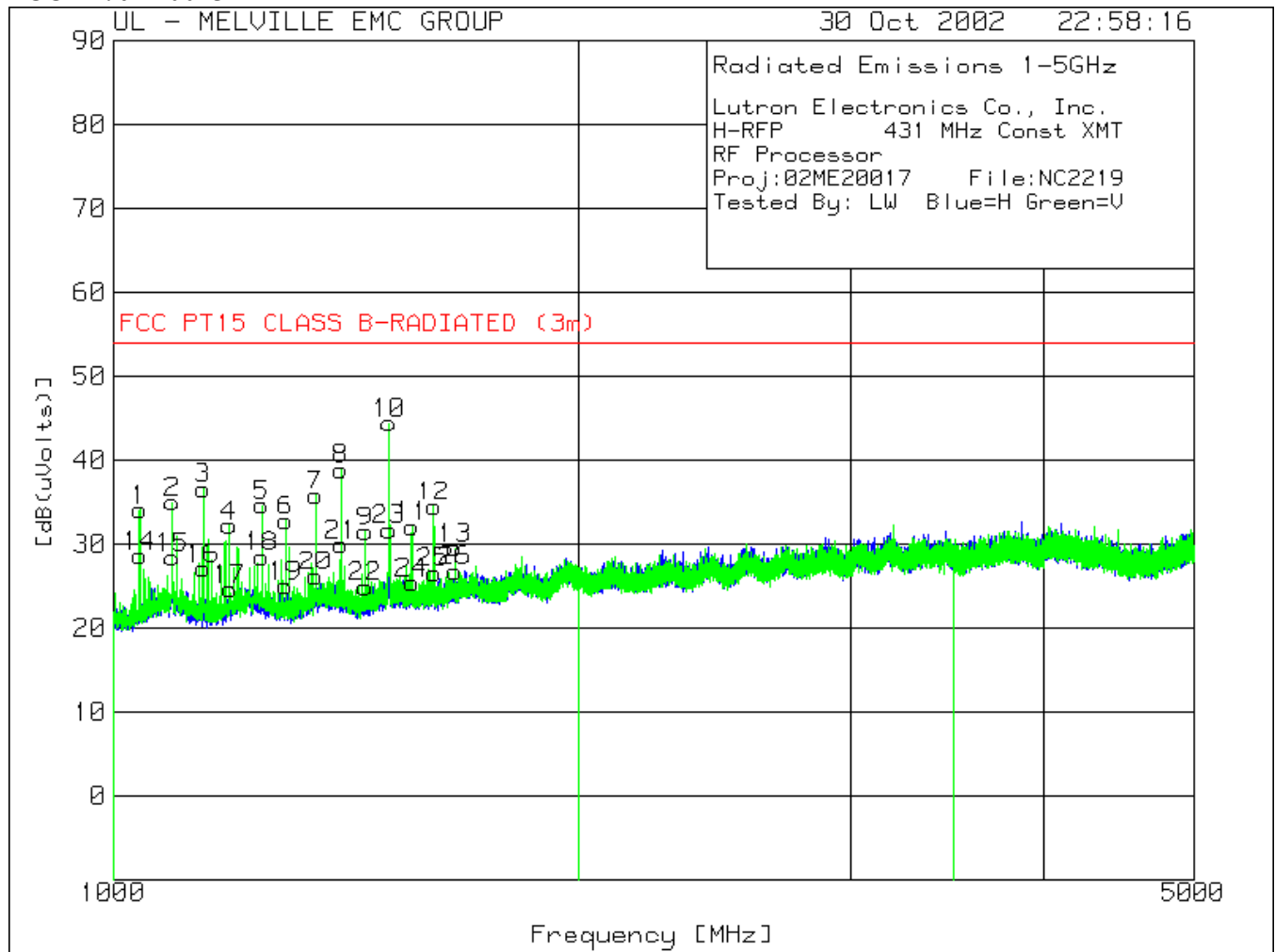
LIMIT 1: FCC Part 15 Subpart C-Section 15.231
 LIMIT 2: FCC Part 15 Subpart B ClB (3M)

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

*** Duty Cycle correction factor of -20.9dB added to Average level.**

File Number: NC2219
 Project Number: 02ME20017
 Model Number: H-RFP-1P
 FCC ID: JPZ0023

Issued: 11/5/02



431MHz Transmit (Model number in title block H-RFP = H-RFP-1P)

File Number: NC2219
 Project Number: 02ME20017
 Model Number: H-RFP-1P
 FCC ID: JPZ0023

Issued: 11/5/02

Lutron Electronics Co., Inc.
 H-RFP-1P 431 MHz Const XMT
 RF Processor
 Proj:02ME20017 File:NC2219
 Tested By: LW Blue=H Green=V

No.	Test Frequency [MHz]	Meter Reading [dB (uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level [dB (uVolts)]	Limit:1
=====						
Range: 1 1000 - 2000MHz -----						
14	1039.8	37.15 pk	-33.59	25.04	28.6	60.7
	Azimuth:252	Height:100	Horz	Margin [dB]		-32.1
15	1091.757	36.62 pk	-33.45	25.23	28.4	60.7
	Azimuth:305	Height:199	Horz	Margin [dB]		-32.3
16	1143.714	34.99 pk	-33.31	25.42	27.1	60.7
	Azimuth:40	Height:100	Horz	Margin [dB]		-33.6
17	1189.342	32.21 pk	-33.19	25.58	24.6	60.7
	Azimuth:76	Height:199	Horz	Margin [dB]		-36.1
18	1247.794	35.74 pk	-33.03	25.79	28.5	60.7
	Azimuth:56	Height:199	Horz	Margin [dB]		-32.2
19	1292.756	31.96 pk	-32.91	25.95	25	60.7
	Azimuth:76	Height:199	Horz	Margin [dB]		-35.7
20	1351.873	32.78 pk	-32.75	26.17	26.2	60.7
	Azimuth:294	Height:199	Horz	Margin [dB]		-34.5
21	1403.997	36.16 pk	-32.61	26.35	29.9	60.7
	Azimuth:43	Height:100	Horz	Margin [dB]		-30.8
22	1455.62	30.83 pk	-32.47	26.54	24.9	60.7
	Azimuth:332	Height:100	Horz	Margin [dB]		-35.8
23	1507.91	37.29 pk	-32.32	26.73	31.7	60.7
	Azimuth:230	Height:199	Horz	Margin [dB]		-29
24	1559.867	30.6 pk	-32.16	26.96	25.4	60.7
	Azimuth:304	Height:199	Horz	Margin [dB]		-35.3
25	1611.823	31.4 pk	-31.99	27.19	26.6	60.7
	Azimuth:323	Height:100	Horz	Margin [dB]		-34.1
26	1663.78	31.21 pk	-31.83	27.42	26.8	60.7
	Azimuth:80	Height:199	Horz	Margin [dB]		-33.9
Range: 5 1000 - 2000MHz -----						
1	1039.967	42.65 pk	-33.59	25.04	34.1	60.7
	Azimuth:95	Height:100	Vert	Margin [dB]		-26.6
2	1091.757	43.22 pk	-33.45	25.23	35	60.7
	Azimuth:201	Height:100	Vert	Margin [dB]		-25.7
3	1143.547	44.49 pk	-33.31	25.42	36.6	60.7
	Azimuth:24	Height:100	Vert	Margin [dB]		-24.1
4	1188.51	39.81 pk	-33.19	25.58	32.2	60.7
	Azimuth:21	Height:100	Vert	Margin [dB]		-28.5
5	1247.96	41.84 pk	-33.03	25.79	34.6	60.7
	Azimuth:175	Height:100	Vert	Margin [dB]		-26.1
6	1292.756	39.76 pk	-32.91	25.95	32.8	60.7
	Azimuth:216	Height:198	Vert	Margin [dB]		-27.9
7	1351.873	42.38 pk	-32.75	26.17	35.8	60.7
	Azimuth:324	Height:100	Vert	Margin [dB]		-24.9
8	1403.83	45.16 pk	-32.61	26.35	38.9	60.7
	Azimuth:324	Height:100	Vert	Margin [dB]		-21.8
9	1455.62	37.43 pk	-32.47	26.54	31.5	60.7
	Azimuth:171	Height:100	Vert	Margin [dB]		-29.2
10	1508.077	49.98 pk	-32.32	26.74	44.4	60.7

File Number: NC2219
Project Number: 02ME20017
Model Number: H-RFP-1P
FCC ID: JPZ0023

Issued: 11/5/02

	Azimuth:21	Height:100	Vert	Margin [dB]		-16.3
11	1559.867	37.3 pk	-32.16	26.96	32.1	60.7
	Azimuth:21	Height:100	Vert	Margin [dB]		-28.6
12	1611.823	39.3 pk	-31.99	27.19	34.5	60.7
	Azimuth:21	Height:100	Vert	Margin [dB]		-26.2
13	1663.947	33.91 pk	-31.83	27.42	29.5	60.7
	Azimuth:40	Height:100	Vert	Margin [dB]		-31.2

LIMIT 1: FCC Part 15 Subpart C-Section 15.231
LIMIT 2: NONE

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

File Number: NC2219
 Project Number: 02ME20017
 Model Number: H-RFP-1P
 FCC ID: JPZ0023

Issued: 11/5/02

Lutron Electronics Co., Inc.
 H-RFP-1P 431 MHz Const XMT
 RF Processor
 Proj:02ME20017 File:NC2219
 Tested By: LW Blue=H Green=V

Test Frequency [MHz]	Meter Reading [dB (uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level [dB (uVolts)]	Limit:1
----------------------------	-------------------------------	-----------------------------	------------------------------	------------------------	---------

=====

Range: 1 1000 - 2000MHz

1039.992	36.79 av	-33.59	25.04	28.24	60.7
Azimuth: 53	Height:117	Horz	Margin	[dB]:	-32.46

1091.978	36.99 av	-33.45	25.23	28.77	60.7
Azimuth: 253	Height:132	Horz	Margin	[dB]:	-31.93

1143.978	34.43 av	-33.31	25.42	26.54	60.7
Azimuth: 144	Height:106	Horz	Margin	[dB]:	-34.16

1188.68	31.71 av	-33.19	25.58	24.1	60.7
Azimuth: 359	Height:109	Horz	Margin	[dB]:	-36.6

1247.7	33.55 av	-33.03	25.79	26.31	60.7
Azimuth: 226	Height:108	Horz	Margin	[dB]:	-34.39

1292.97	35.9 av	-32.91	25.95	28.94	60.7
Azimuth: 128	Height:107	Horz	Margin	[dB]:	-31.76

1351	30.95 av	-32.75	26.16	24.36	60.7
Azimuth: 320	Height:144	Horz	Margin	[dB]:	-36.34

Range: 5 1000 - 2000MHz

1039.955	44.25 av	-33.59	25.04	35.7	60.7
Azimuth: 13	Height:131	Vert	Margin	[dB]:	-25

1091.975	42.71 av	-33.45	25.23	34.49	60.7
Azimuth: 358	Height:123	Vert	Margin	[dB]:	-26.21

1143.99	46.8 av	-33.31	25.42	38.91	60.7
Azimuth: 73	Height:117	Vert	Margin	[dB]:	-21.79

1188.828	39.37 av	-33.19	25.58	31.76	60.7
Azimuth: 88	Height:104	Vert	Margin	[dB]:	-28.94

1247.952	43.63 av	-33.03	25.79	36.39	60.7
Azimuth: 0	Height:99	Vert	Margin	[dB]:	-24.31

1292.976	43.56 av	-32.91	25.95	36.6	60.7
Azimuth: 319	Height:110	Vert	Margin	[dB]:	-24.1

1351.98	43.62 av	-32.75	26.17	37.04	60.7
Azimuth: 329	Height:109	Vert	Margin	[dB]:	-23.66

LIMIT 1: FCC Part 15 Subpart C-Section 15.231
 pk - Peak detector

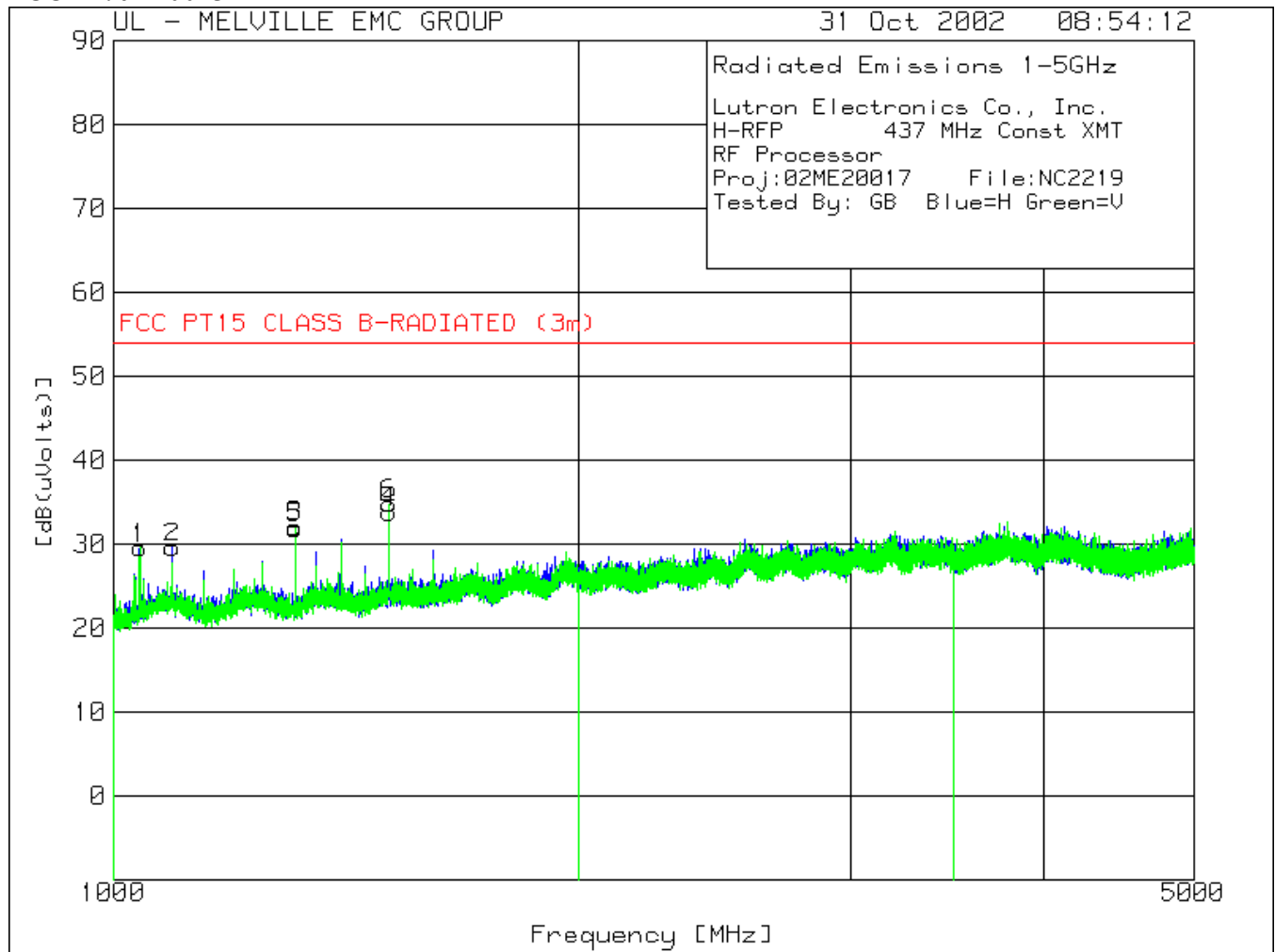
File Number: NC2219
Project Number: 02ME20017
Model Number: H-RFP-1P
FCC ID: JPZ0023

Issued: 11/5/02

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

File Number: NC2219
Project Number: 02ME20017
Model Number: H-RFP-1P
FCC ID: JPZ0023

Issued: 11/5/02



437MHz Transmit (Model number in title block H-RFP = H-RFP-1P)

File Number: NC2219
Project Number: 02ME20017
Model Number: H-RFP-1P
FCC ID: JPZ0023

Issued: 11/5/02

Lutron Electronics Co., Inc.
H-RFP-1P 437 MHz Const XMT
RF Processor
Proj:02ME20017 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)]	Limit:1
=====						
Range: 1 1000 - 2000MHz -----						
1	1039.883	38.05 pk	-33.59	25.04	29.5	60.9
	Azimuth:317	Height:100	Horz	Margin [dB]		-31.4
2	1091.757	37.82 pk	-33.45	25.23	29.6	60.9
	Azimuth:299	Height:100	Horz	Margin [dB]		-31.3
3	1310.741	38.94 pk	-32.86	26.02	32.1	60.9
	Azimuth:243	Height:199	Horz	Margin [dB]		-28.8
4	1508.41	39.38 pk	-32.32	26.74	33.8	60.9
	Azimuth:61	Height:199	Horz	Margin [dB]		-27.1

Range: 5 1000 - 2000MHz -----						
5	1310.741	38.74 pk	-32.86	26.02	31.9	60.9
	Azimuth:257	Height:199	Vert	Margin [dB]		-29
6	1508.077	40.38 pk	-32.32	26.74	34.8	60.9
	Azimuth:278	Height:199	Vert	Margin [dB]		-26.1

LIMIT 1: FCC Part 15 Subpart C-Section 15.231
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
tm - Trace Math Result

File Number: NC2219
Project Number: 02ME20017
Model Number: H-RFP-1P
FCC ID: JPZ0023

Issued: 11/5/02

Lutron Electronics Co., Inc.
H-RFP-1P 437 MHz Const XMT
RF Processor
Proj:02ME20017 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)]	Limit:1
=====					
Range: 1 1000 - 2000MHz					
1040.12	24.66 av	-33.59	25.04	16.11	60.9
Azimuth: 18	Height:176	Horz	Margin [dB]:		-44.79
1092	29.34 av	-33.45	25.23	21.12	60.9
Azimuth: 244	Height:174	Horz	Margin [dB]:		-39.78
1310.98	38.58 av	-32.86	26.02	31.74	60.9
Azimuth: 263	Height:194	Horz	Margin [dB]:		-29.16
1507.99	32.55 av	-32.32	26.74	26.97	60.9
Azimuth: 286	Height:190	Horz	Margin [dB]:		-33.93
Range: 5 1000 - 2000MHz					
1310.96	38.42 av	-32.86	26.02	31.58	60.9
Azimuth: 262	Height:194	Vert	Margin [dB]:		-29.32
1508.02	32.52 av	-32.32	26.74	26.94	60.9
Azimuth: 286	Height:198	Vert	Margin [dB]:		-33.96

LIMIT 1: FCC Part 15 Subpart C-Section 15.231
LIMIT 2: NONE

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

File Number: NC2219
Project Number: 02ME20017
Model Number: H-RFP-1P
FCC ID: JPZ0023

Issued: 11/5/02



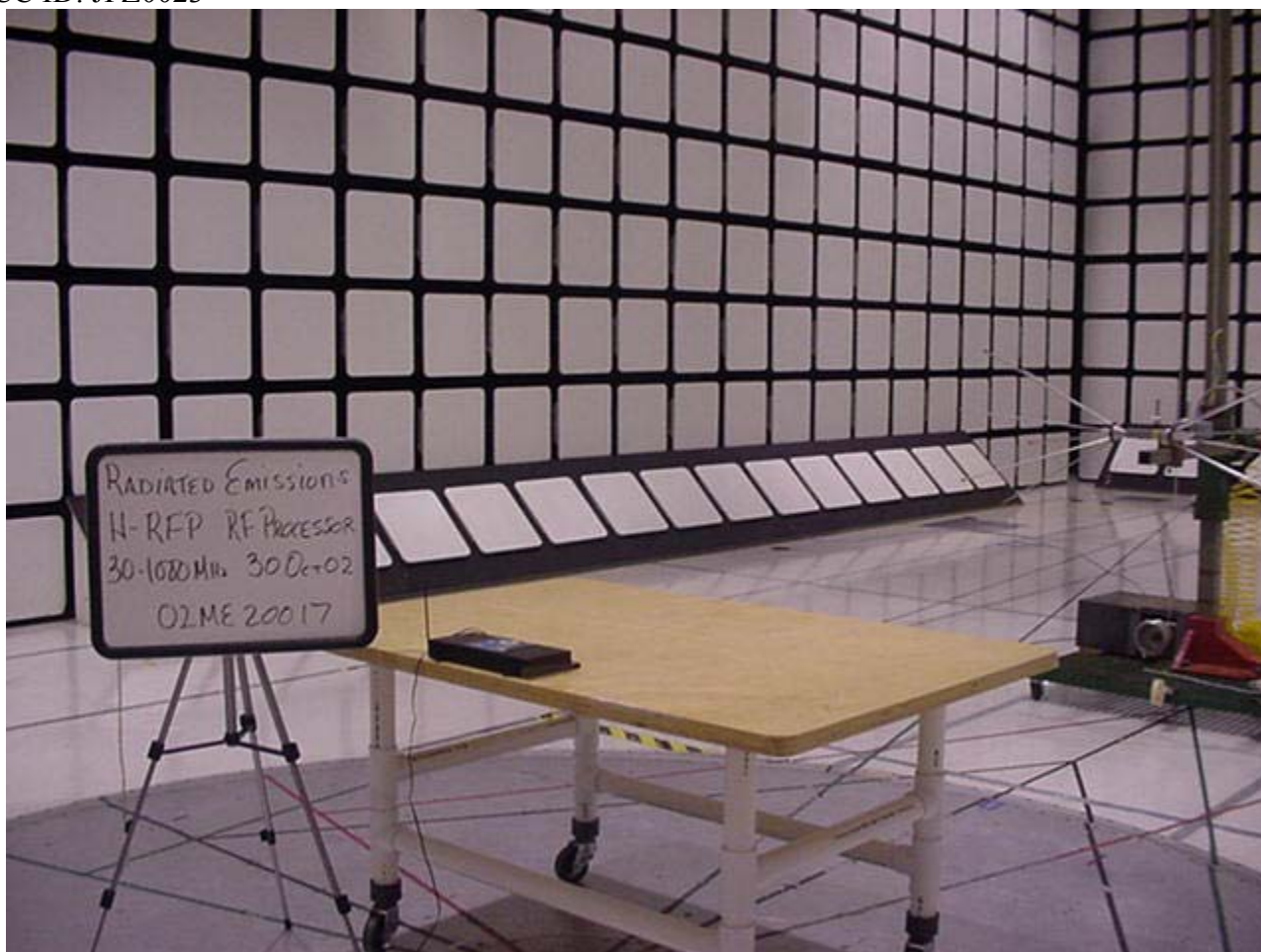
Radiated Emissions Test Set-Up 30-1000MHz
(Model number in title block H-RFP = H-RFP-1P)

File Number: NC2219
Project Number: 02ME20017
Model Number: H-RFP-1P
FCC ID: JPZ0023

Issued: 11/5/02



Radiated Emissions Test Set-Up 30-1000MHz Front View
(Model number in title block H-RFP = H-RFP-1P)



Radiated Emissions Test Set-Up 30-1000MHz Rear View
(Model number in title block H-RFP = H-RFP-1P)



Radiated Emissions Test Set-Up 1-5GHz Front View
(Model number in title block H-RFP = H-RFP-1P)

File Number: NC2219
Project Number: 02ME20017
Model Number: H-RFP-1P
FCC ID: JPZ0023

Issued: 11/5/02

2.1.4 Occupied Bandwidth

☒ Test Applicable ☐ Test Not Applicable

Temperature: 20.8 °C
Humidity: 69%RH
Pressure: 1040mbar
Date test performed: 24 Oct 2002

☒ 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.

☒ 431MHz and 437MHz

Bandwidth = 0.25% of 431MHz = 1.0775MHz

Bandwidth = 0.25% of 437MHz = 1.0925MHz

Test equipment used for Occupied Bandwidth Measurements:

☒ ESI	Rhode & Swarz	EMI Test Receiver,	Equipment No.: 5B-081
Range: 20Hz -26.5GHz	Last Calibration Date: 20 August 02	Calibration Due Date: 20 August 03	

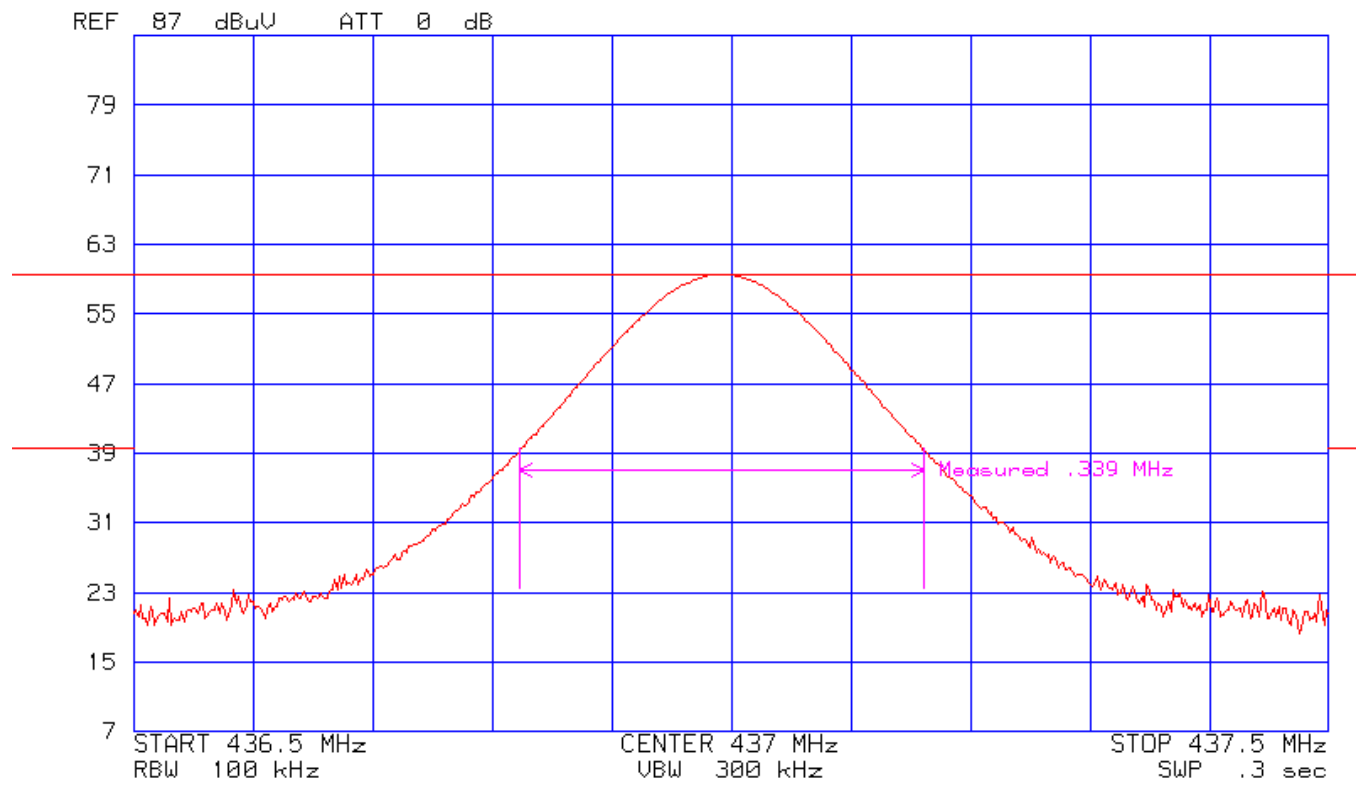
Consisting of:

HP - 8566B	Hewlett-Packard	Spectrum Analyzer,
	Resolution BW: 1MHz	
	Video BW: 1MHz	
HP - 85662A	Hewlett-Packard	Analyzer Display
HP - 85650A	Hewlett-Packard	Quasi-Peak Adapter,
	BW: 120kHz	
HP - 85685A	Hewlett-Packard	Preselector

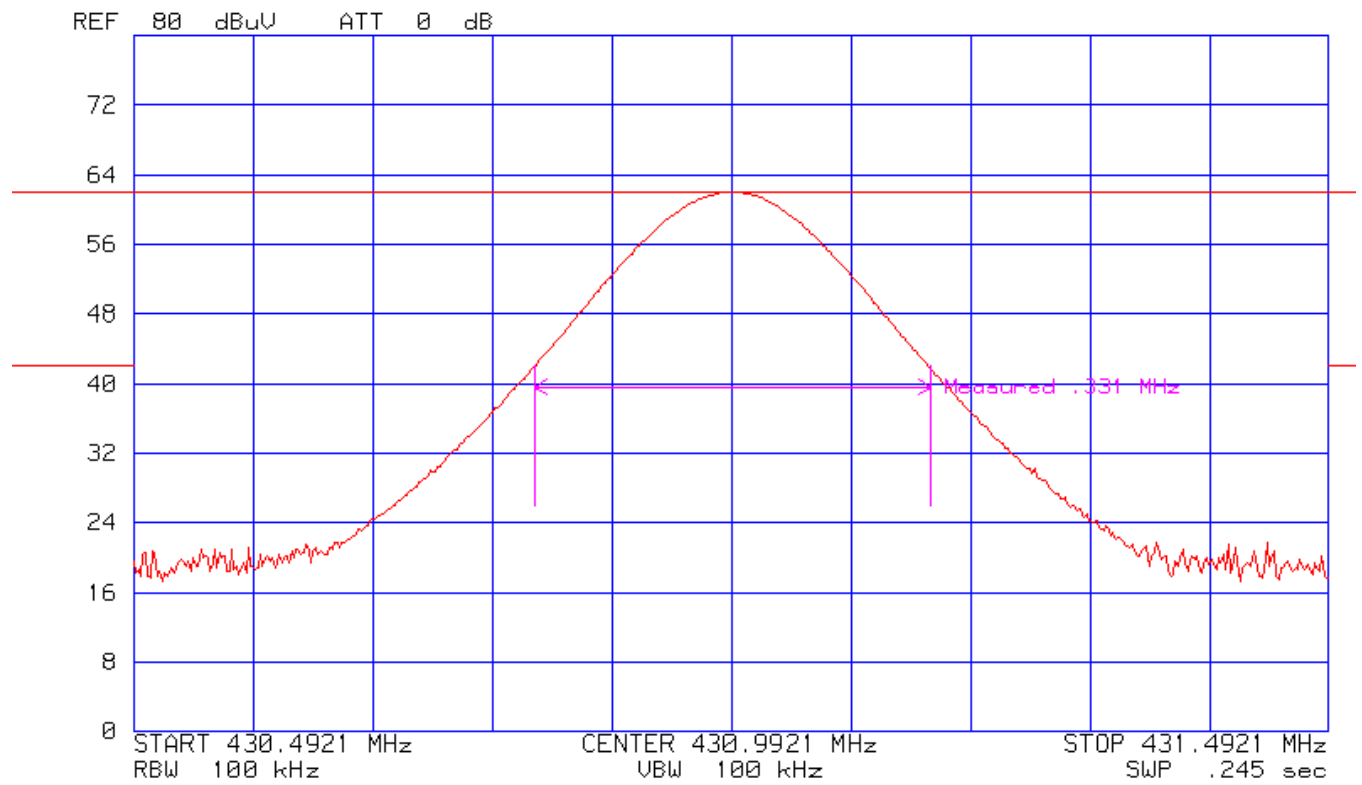
☒ 3121C	The Electro Mechanics	Dipole ANTenna	Equipment No.:
Last Calibration Date: 10 Dec. 01 Calibration Due Date: 10 DEC 02			

☒ Temp/Pressure	Oakton	Barometer	Equipment No.: ME4-263
Range: 950-1045	Last Calibration Date: 2 April 02	Calibration Due Date: 2 April 03	

☒ 453320	Ex-Tech	Hydro-Thermometer	Equipment No.: ME4-264
Range: 0-80%	Last Calibration Date: 2 April 02	Calibration Due Date: 2 April 03	



437MHz Occupied Bandwidth @ 20 db = 0.339MHz



431MHz Occupied Bandwidth @ 20 db = 0.331MHz

File Number: NC2219
Project Number: 02ME20017
Model Number: H-RFP-1P
FCC ID: JPZ0023

Issued: 11/5/02



Occupied Bandwidth Test Set-up H-RFP-1P

2.1.5 Fundamental Frequency and Spurious Emissions Measurement Limit Calculations

Limit Calculation

Fundamental Frequency is 431MHz

From table in section 15.231

Limit = $41.6667(431) - 7083.3333$

Limit = 10846.3uV

Limit = $\text{Log } 10846.3(20)$

Limit = 80.7dBuV

Limit for Spurious Emissions = 20dB lower then fundamental = 60.7dBuV/m

Fundamental Frequency is 437MHz

From table in section 15.231

Limit = $41.6667(437) - 7083.3333$

Limit = 11125.018uV

Limit = $\text{Log } 11125.018 (20)$

Limit = 80.9dBuV

Limit for Spurious Emissions = 20dB lower then fundamental = 60.9dBuV/m

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

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

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

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

Radiated Emissions test data obtained during measurements.

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

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

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

Duty Cycle factor calculation.

Total number of pulses counted in 100ms.

Total time on = 8.94ms

Duty cycle correction factor = $20 \log (8.94\text{ms} / 100\text{ms})$
= $20 \log (0.0894)$
= - 20.9dB

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

File Number: NC2219
Project Number: 02ME20017
Model Number: H-RFP-1P
FCC ID: JPZ0023

Issued: 11/5/02

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

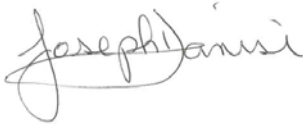
Test Start Date: 16 October 2002

Test Completion Date: 28 October 2002

- UNDERWRITERS LABORATORIES, INC. -

Project Engineer

Reviewer



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

Corey Hyatt (Ext.22452)
Associate Manager
International EMC Services
Conformity Assessment Services -3014AMEL