



UL International EMC Services
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December 11, 2002

Accutec a Div. of
Innovative Control Systems, Inc.
Attn: Mr. Mark Kieckhefer
N27 W23910-A Paul Rd.
Pewaukee, WI 53072

UL Reference: File MC1670, Project 02NK45212

Subject: EMC Test and Measurement Report for
Model Receiver, Infant Security RF Receiving Module

Dear Mr. Kieckhefer:

We have provided with this letter your EMC Test Report for the above referenced model. The product was determined to comply with the requirements noted in the report.

Please review the attached report and direct any questions or comments to me. Samples will be returned to your attention.

We appreciate your interest in UL's EMC Services, and encourage you to contact us in the future should you need EMC test services. This closes Project 02NK45212.

Best regards,

Reviewed by:

A handwritten signature in black ink, appearing to read 'Mike Ehas'.

Mike Ehas (Ext 42351)
EMC Lead Engineering Associate
International EMC Services

A handwritten signature in black ink, appearing to read 'Jack Steiner'.

Jack Steiner
Engineering Group Leader
International EMC Services

EMC – TEST REPORT

Issue Date: December 11, 2002

√ EMISSIONS IMMUNITY

Test Report File No. : MC1670
 Project No. : 02NK45212

Model / Type : Receiver
 Kind of Product : Infant Security RF Receiving Module

Applicant : Accutec a Div. of
 Innovative Control Systems, Inc.

License Holder : Accutec a Div. of
 Innovative Control Systems, Inc.

Address : N27 W23910-A Paul Rd
 : Pewaukee, WI 53072

Manufacturer : Same as Applicant
 :
 :

Test Result : COMPLIANT

This report without appendices consists of 10 pages. Appendix A contains test photos, Appendix B contains original test data and Appendix C contains sample calculations.

The data contained in this report reflects only the items tested in the configurations and mode of operations described. An attempt has been made to arrange the EUT, with the equipment provided, into a test configuration which maximizes the observed emissions of the EUT while simulating, as close as practical, a typical end-use installation. The photos and data provided in this report document that configuration.

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**Underwriters Laboratories Inc. 333 Pfingsten Rd. Northbrook, IL 60062
 Fax: (847) 272-8864**

REPORT DIRECTORY

SECTION TITLE

GENERAL

- 1.0 General Product Description
- 1.1 Model Differences
- 1.2 Environmental Conditions in Test Lab
- 1.3 Calibration Details of Equipment Used for Measurement
- 1.4 EUT (Equipment Under Test) Configuration
- 1.5 EUT Operating Mode
- 1.6 Device Modifications

EMISSIONS

- 2.0 Emissions Test Regulations
 - Conducted Voltage
 - Radiated Electric Field Emissions
 - Band Edge Measurement

IMMUNITY

- 3.0 Immunity Test Regulations

CONCLUSION

- 4.0 General Remarks
- 4.1 Summary

APPENDICIES

- A Test Setups (Photos, Diagrams and Drawings)
- B Test Data
- C Sample Calculations
- D Block Diagram of the Measurement System

1.0 GENERAL PRODUCT DESCRIPTION

The Equipment Under Test (EUT) is an infant security RF Receiving module. The module is mounted in or on ceilings or walls in the rooms or hallways of healthcare facilities. The receiver detects a 418 MHz signal transmitted by the infant security module if the module is removed or if the infant is passed through an area with doorway modules active (transmitting 132 kHz signal). The received signal is routed to a central receiving module which is in turn connected to the graphical display system or Multiplexer. The Receiver also incorporates a 418 MHz transmitter to test the system only.

1.0.1 Equipment Mobility:

Floor Standing. See Appendix A for configuration photos.

1.0.2 Test Voltage and Frequency:

<u>Voltage (V)</u>	<u>Frequency (Hz)</u>
12	DC

1.1 MODEL DIFFERENCES

Any other model(s) represented by the models tested in this investigation will be documented by the manufacturer.

1.2 ENVIRONMENTAL CONDITIONS IN TEST LAB

Temperature:	20-25 °C
Relative Humidity:	30-60% RH
Atmospheric Pressure:	860-1060 mbar

1.3 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 what is recommended by the manufacturer, 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.

1.4 EUT CONFIGURATION(s)

See Appendix A for individual set-up configuration(s). In addition to the EUT, the following peripheral devices and/or cables were connected during the measurement:

Device	Manufacturer	Model	Input Rating	Output Rating
Power Supply	Ault Inc.	P48121000A300G	120V, 60 Hz, 21W	12Vdc, 1000 mA

Cable	Manufacturer	Length	Type	Shield Type	Shield Termination
N/A					

1.5 EUT OPERATING MODE(s)

The equipment under test was operated during the measurements under the following conditions:

Testing was conducted in the Receive (Rx) mode and Transmit (Tx) mode.

Testing in the Rx mode was conducted with the Multiplexer connected.

Testing in the Tx mode was conducted with a modified sample of the Receiver to transmit a continuous 418 MHz signal. Under normal operation, the Receiver will only produce a momentary (1ms) 418 MHz signal per hour minimum to poll or supervise the entire system.

1.6 DEVICE MODIFICATIONS

The following modifications were necessary for compliance:

None

2.0 EMISSIONS TEST REGULATIONS

The EUT was considered to be a Class B device.

Emissions testing was performed according to the following regulations:

47 CFR Part 15 Subpart C: 2000 + ANSI C63.4 – 1992

47 CFR Part 15.207(a)(b)(c)(d)

47 CFR Part 15.209(a)(b)(c)(d)

47 CFR Part 15.231(a) (b)(c)

CONDUCTED VOLTAGE EMISSIONS

Test Location

Ground Plane (Test Station 3)

UL Procedure

3014ANBK-LPG-001

Test Instruments

Spectrum Analyzer / Quasi-peak Adapter

Advantest Model 3261A Spectrum Analyzer No. EMC4084
Model R3551 Preselector No. EMC4088

Line Impedance Stabilization Networks (LISNs)

SOLAR Model 8602-50-TS-50-N S/N 963903 No. EMC4064
Last Cal. 01/17/02 Next Cal. 01/17/03
SOLAR Model 8602-50-TS-50-N S/N 887823 No. EMC4051
Last Cal. 01/17/02 Next Cal. 01/17/03

Transient Limiter

Electro Metrics Model EM-7600-2 No. EMC4224
Last Cal. 01/17/02 Next Cal. 01/17/03

Frequency Range on each line

450 kHz to 30MHz

Test Results

The requirements are:
MET

Remarks

See App. B for complete test results.

RADIATED ELECTRIC FIELD EMISSIONS, 30MHz to 1000MHzTest Location

10 Meter Semi-Anechoic Chamber

UL Procedure

3014ANBK-LPG-002

Test InstrumentsSpectrum Analyzer / Quasi-peak Adapter / Preamplifier / Preselector

Hewlett Packard Model 8566B Spectrum Analyzer

Last Cal. 05/08/02 Next Cal. 05/08/03

Model 85650A Quasi-peak Adapter

Last Cal. 05/08/02 Next Cal. 05/08/03

Miteq AM-3A-000110-N Preamp No. FCA4003, EMC4016, EMC4151

Last Cal. 05/08/02 Next Cal. 05/08/03

Model 85685A RF Preselector No. EMC4015

Last Cal. 05/08/02 Next Cal. 05/08/03

Antennas

Chase EMC Ltd., Biconical Antenna Model VBA6106A

S/N 1246

Last Cal. 05/25/02 Next Cal. 05/25/03

Chase EMC Ltd., Log Periodic Antenna Model UPA6108

S/N 1120

Last Cal. 05/25/02 Next Cal. 05/25/03

Frequency Range of Measurement

30MHz-1000MHz

Measurement Distance

3 meters

Test Results

The requirements are:

MET

Remarks

See App. B for complete test results.

Preliminary measurements (peak scans) were done by rotating the turntable 360° and at multiple antenna heights (1 meter and 3 meters).

If necessary, final measurements were conducted using a quasi-peak detector. These emissions were maximized by rotating the turntable 360° and positioning the receive antenna from 1 to 4 meters in height.

RADIATED ELECTRIC FIELD EMISSIONS, 1000MHz to 5000MHz

Test Location

10 Meter Semi-Anechoic Chamber

UL Procedure

3014ANBK-LPG-002

Test Instruments

Spectrum Analyzer / Preamplifier / Preselector

Hewlett Packard Model 8566B Spectrum Analyzer No. EMC4086

Last Cal. 05/08/02 Next Cal. 05/08/03

Model 8499 Preamplifier No. EMC4201

Last Cal. 05/08/02 Next Cal. 05/08/03

Model 85685A RF Preselector No. EMC4015

Last Cal. 05/08/02 Next Cal. 05/08/03

Antennas

EMCO., Double Ridge Guide Antenna Model 3115 S/N 3032

Last Cal. 05/25/02 Next Cal. 05/25/03

Frequency Range of Measurement

1000MHz-5000MHz

Measurement Distance

3 meters

Test Results

The requirements are:

MET

Remarks

See App. B for complete test results.

Preliminary measurements (peak scans) were done by rotating the turntable 360° and at multiple antenna heights (1 meter and 3 meters).

If necessary, final measurements were conducted using a quasi-peak detector. These emissions were maximized by rotating the turntable 360° and positioning the receive antenna from 1 to 4 meters in height.

RADIATED EMISSIONS / BAND EDGE MEASUREMENT

Test Location

10 Meter Semi-Anechoic Chamber

UL Procedure

3014ANBK-LPG-002

Test Instruments

Spectrum Analyzer / Quasi-peak Adapter / Preamplifier / Preselector

Hewlett Packard Model 8566B Spectrum Analyzer

Last Cal. 05/08/02 Next Cal. 05/08/03

Model 85650A Quasi-peak Adapter

Last Cal. 05/08/02 Next Cal. 05/08/03

Model 85685A RF Preselector No. EMC4015

Last Cal. 05/08/02 Next Cal. 05/08/03

Antennas

Chase EMC Ltd., Log Periodic Antenna Model UPA6108

S/N 1120

Last Cal. 05/25/02 Next Cal. 05/25/03

Frequency Range of Measurement

418 MHz

Measurement Distance

3 meters

Test Results

The requirements are:

MET

Remarks

See App. B for complete test results.

3.0 IMMUNITY TEST REGULATIONS

Immunity testing was not required nor performed.

4.0 GENERAL REMARKS

Sample Receipt Date : October 24, 2002

Test Dates

Start : October 30, 2002
End : December 11, 2002

4.1 SUMMARY

The requirements according to the technical regulations are:

MET

Underwriters Laboratories Inc.
333 Pfingsten Road
Northbrook, IL 60062 USA

FCC Site Number: 31040/SIT 1300F2

Best regards,



Mike Ehas (Ext 42351)
EMC Lead Engineering Associate
International EMC Services

Reviewed by:



Jack Steiner
Engineering Group Leader
International EMC Services

APPENDIX A

PHOTOS



**Radiated Emissions
Receiver Module Only**

Fig. 1



**Radiated Emissions
Receiver w/ Multiplexer**

Fig. 2



Conducted Emissions

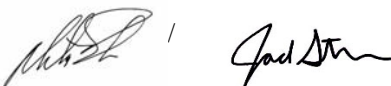
Fig. 2

APPENDIX B

TEST DATA

EMISSIONS

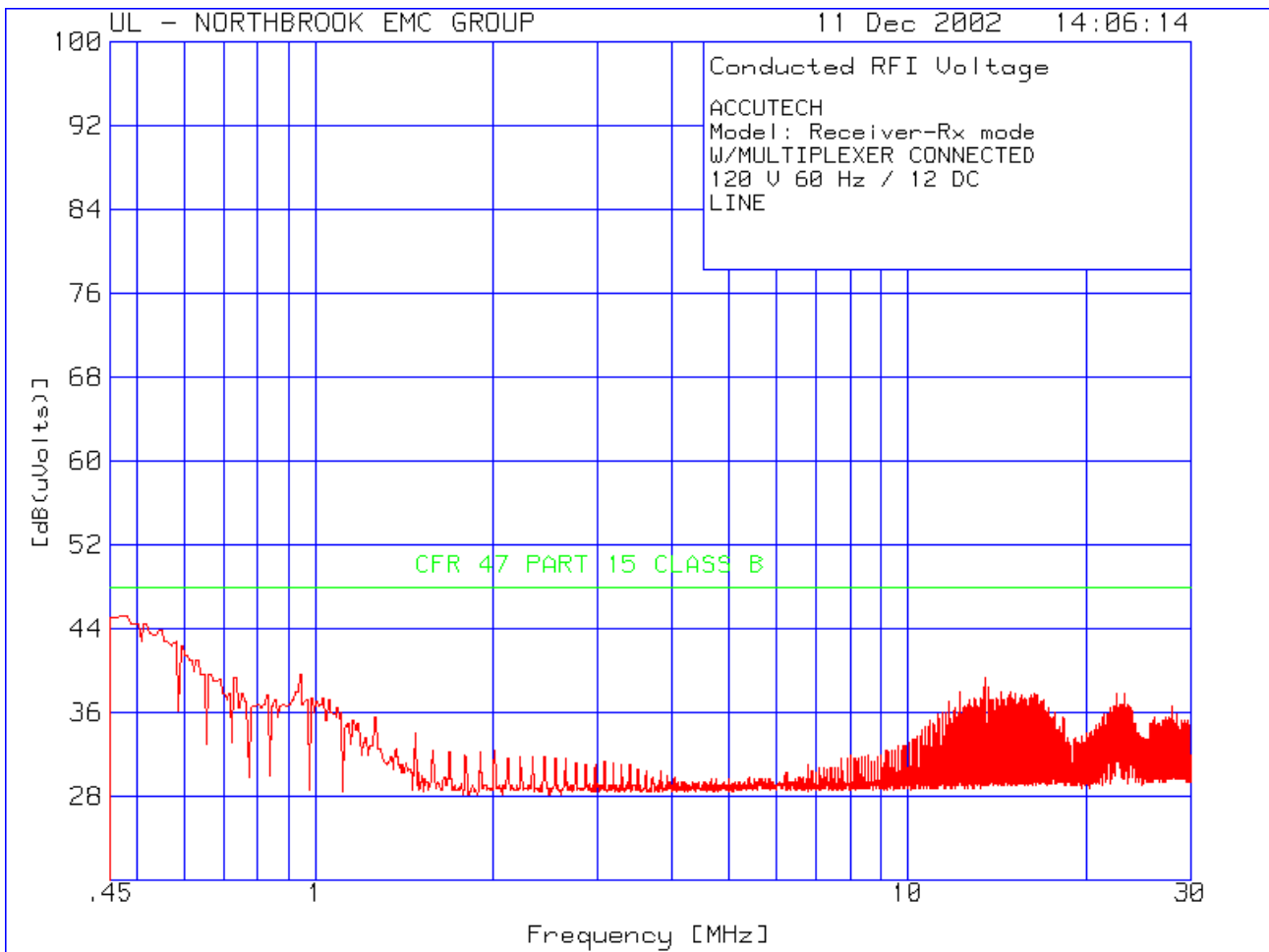
Conducted Voltage Emissions
Radiated Electric Field Emissions
Band Edge Measurement



**UNDERWRITERS LABORATORIES INC.
Conducted Emissions**

Date Tested: 11 December 2002

Manufacturer : Accutec a Div. Innovative Control Systems, Inc.
Equipment Under Test : Reciever (Rx mode) with Multiplexer
Requirement : CISPR Class B
Detection Mode : Quasi-peak (qp) or Peak (pk) or Average (ave)
Bandwidth : 200 Hz for measurements 9 kHz to 150 kHz
 9 kHz for measurements 150 kHz to 30 MHz
Line : L1

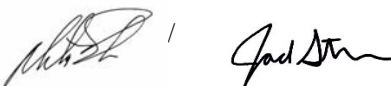


ACCUTECH
 Model: Receiver-Rx mode
 W/MULTIPLEXER CONNECTED
 120 V 60 Hz / 12 DC
 LINE

No.	Test Frequency [MHz]	Meter Reading [dB (uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level [dB (uVolts)]	Limit:1	2
=====							
Neutral .45 - 30MHz							
1	.47899	35.51 pk	9.69	0	45.2	47.96	
				Margin [dB]		-2.76	
2	.63182	31.27 pk	9.73	0	41	47.96	
				Margin [dB]		-6.96	
3	.94276	29.83 pk	9.77	0	39.6	47.96	
				Margin [dB]		-8.36	
4	13.54644	29.09 pk	10.31	0	39.4	47.96	
				Margin [dB]		-8.56	
5	16.38444	27.43 pk	10.37	0	37.8	47.96	
				Margin [dB]		-10.16	
6	23.15665	27.33 pk	10.47	0	37.8	47.96	
				Margin [dB]		-10.16	
7	27.92618	26 pk	10.6	0	36.6	47.96	
				Margin [dB]		-11.36	

LIMIT 1: NONE
 LIMIT 2: CFR 47 PART 15 CLASS B

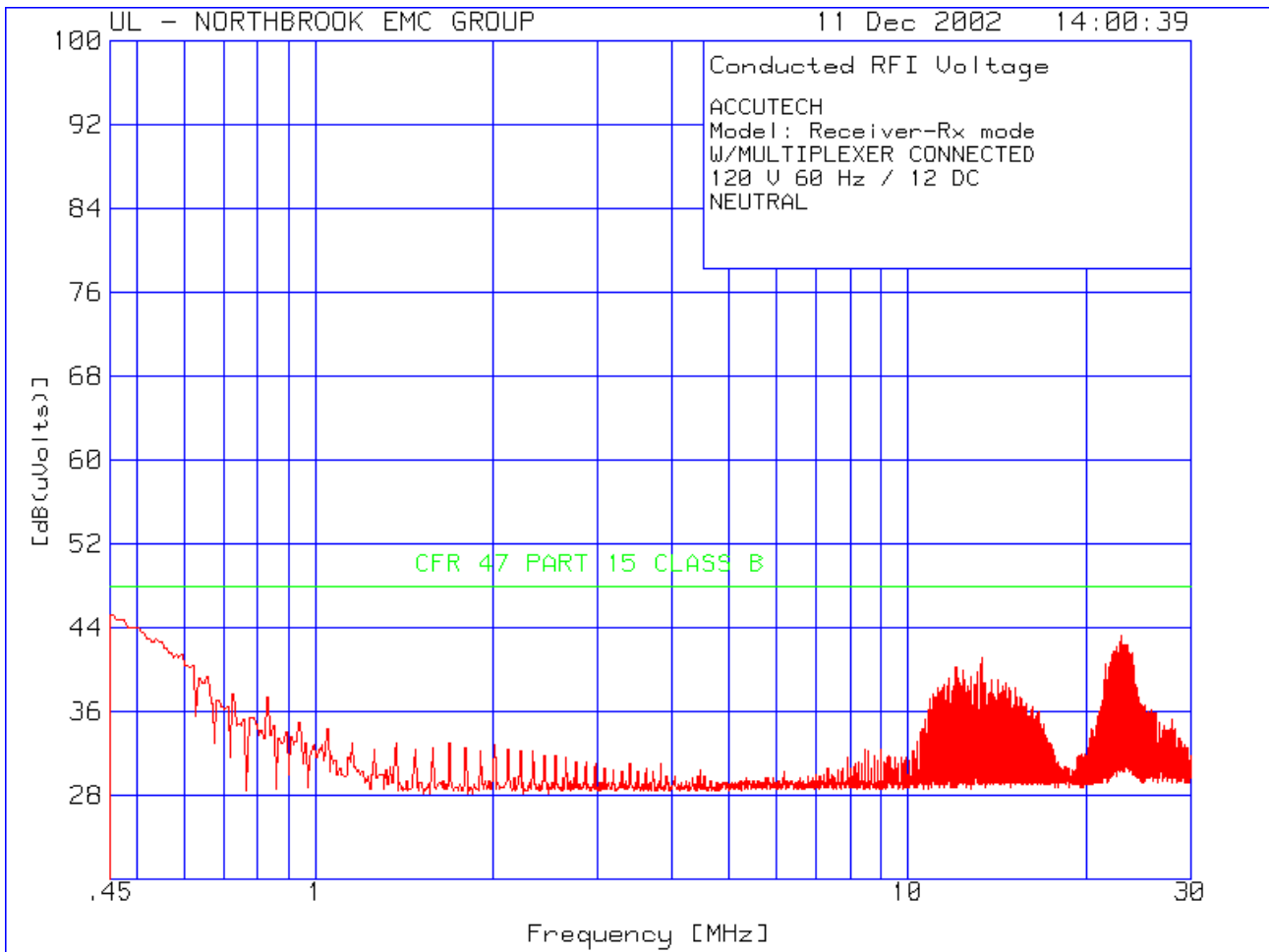
pk - Peak detector



UNDERWRITERS LABORATORIES INC.
Conducted Emissions

Date Tested: 11 December 2002

Manufacturer : Accutec a Div. Innovative Control Systems, Inc.
Equipment Under Test : Reciever (Rx mode) with Multiplexer
Requirement : CISPR Class B
Detection Mode : Quasi-peak (qp) or Peak (pk) or Average (ave)
Bandwidth : 200 Hz for measurements 9 kHz to 150 kHz
 9 kHz for measurements 150 kHz to 30 MHz
Line : L2



ACCUTECH
 Model: Receiver-Rx mode
 W/MULTIPLEXER CONNECTED
 120 V 60 Hz / 12 DC
 NEUTRAL

No.	Test Frequency [MHz]	Meter Reading [dB (uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level [dB (uVolts)]	Limit:1	2
=====							
Neutral .45 - 30MHz							
1	.45527	35.51 pk	9.69	0	45.2	47.96	
				Margin [dB]		-2.76	
2	.62128	30.67 pk	9.73	0	40.4	47.96	
				Margin [dB]		-7.56	
3	.83209	27.65 pk	9.75	0	37.4	47.96	
				Margin [dB]		-10.56	
4	12.05761	29.9 pk	10.3	0	40.2	47.96	
				Margin [dB]		-7.76	
5	13.34354	30.89 pk	10.31	0	41.2	47.96	
				Margin [dB]		-6.76	
6	22.96165	32.7 pk	10.5	0	43.2	47.96	
				Margin [dB]		-4.76	

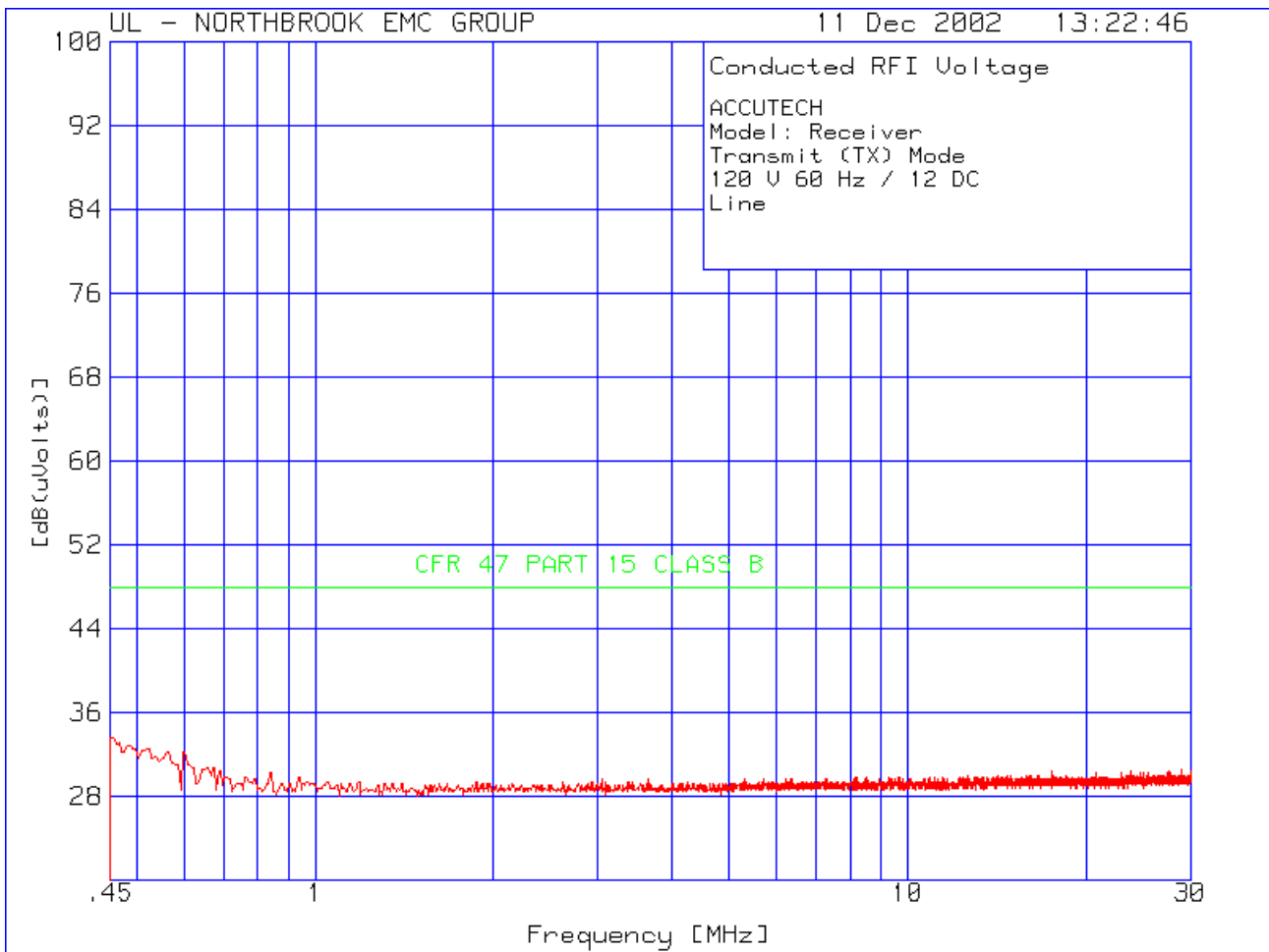
LIMIT 1: NONE
 LIMIT 2: CFR 47 PART 15 CLASS B

pk - Peak detector

UNDERWRITERS LABORATORIES INC.
Conducted Emissions

Date Tested: 11 December 2002

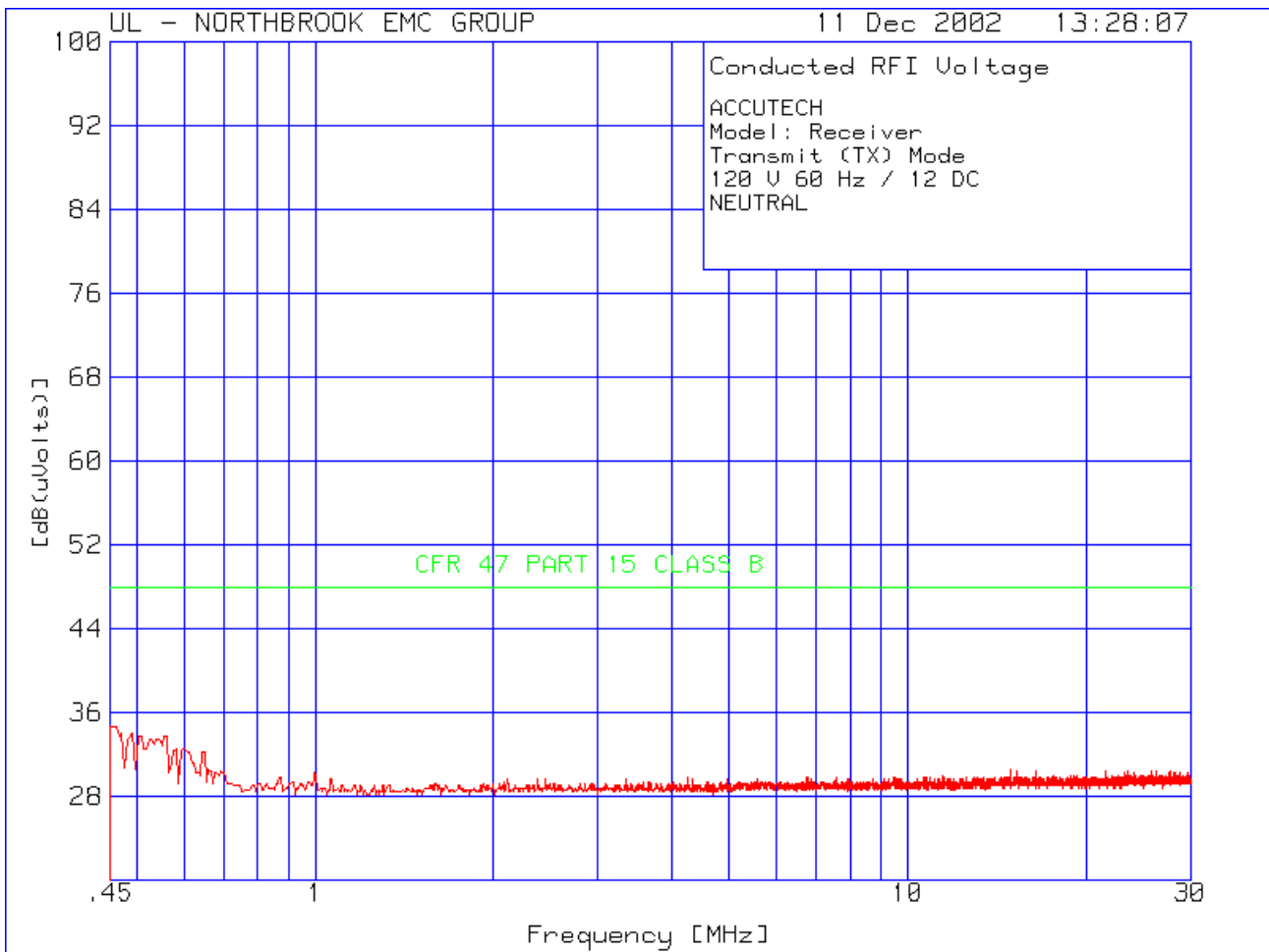
Manufacturer : Accutec a Div. Innovative Control Systems, Inc.
Equipment Under Test : Reciever (Tx mode) Receiver Module Only
Requirement : CISPR Class B
Detection Mode : Quasi-peak (qp) or Peak (pk) or Average (ave)
Bandwidth : 200 Hz for measurements 9 kHz to 150 kHz
9 kHz for measurements 150 kHz to 30 MHz
Line : L1



UNDERWRITERS LABORATORIES INC.
Conducted Emissions

Date Tested: 11 December 2002

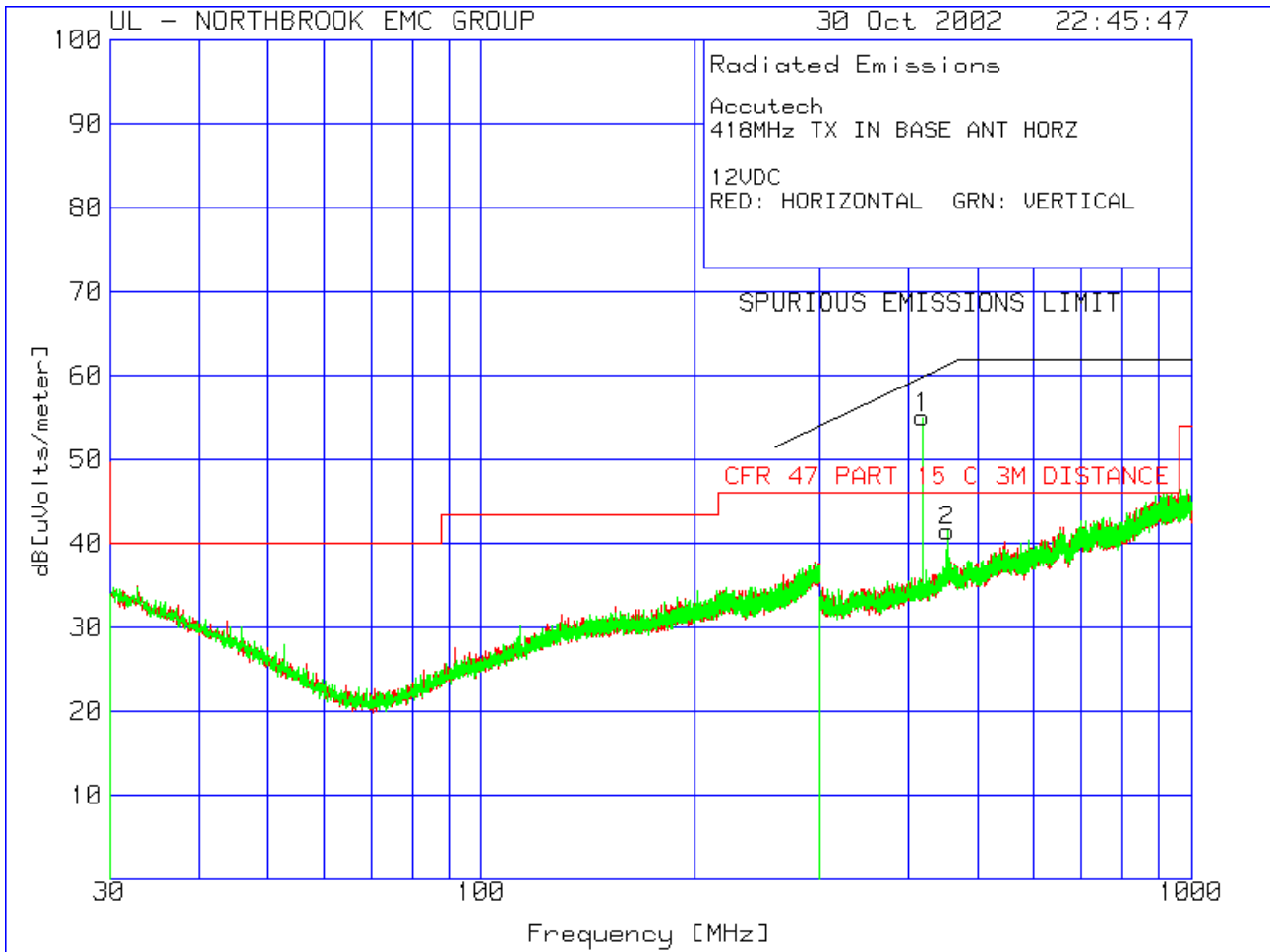
Manufacturer : Accutec a Div. Innovative Control Systems, Inc.
Equipment Under Test : Reciever (Tx mode) Receiver Module Only
Requirement : CISPR Class B
Detection Mode : Quasi-peak (qp) or Peak (pk) or Average (ave)
Bandwidth : 200 Hz for measurements 9 kHz to 150 kHz
9 kHz for measurements 150 kHz to 30 MHz
Line : L2



**UNDERWRITERS LABORATORIES INC.
Radiated Emissions**

Date Tested: 24 October 2002

Manufacturer : Accutech
Equipment Under Test : Reciever (Antenna Horizontal) (TX Mode)
Requirement : CFR 47, Part 15
Detection Mode : Quasi-peak (qp) and Average (Av)
Bandwidth : 120 kHz
Measurement Distance : 10 meter
Antenna Type : 30 - 300 MHz, Biconical
 300 - 1000 MHz, Log-Periodic



Accutech
 418MHz TX IN BASE ANT HORZ
 12VDC
 RED: HORIZONTAL GRN: VERTICAL

No.	Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit:1	2
1	418.0365	36 pk	2.1	16.9	55	46	59.86
	Azimuth:148	Height:101	Vert	Margin [dB]		9	-4.86
2	454.4092	20.64 pk	2.24	18.62	41.5	46	61.33
	Azimuth:0	Height:101	Vert	Margin [dB]		-4.5	-19.83

LIMIT 1: CFR 47 PART 15 C 3M DISTANCE
 LIMIT 2: SPURIOUS EMISSIONS LIMIT

pk - Peak detector

Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit:1	2
417.9731	31.19 qp	2.1	16.9	50.19	46	59.9
Azimuth: 26	Height:222	Horz	Margin [dB]:		4.19	-9.71
417.9748	29.38 qp	2.1	16.9	48.38	46	59.9
Azimuth: 81	Height:143	Vert	Margin [dB]:		2.38	-11.52

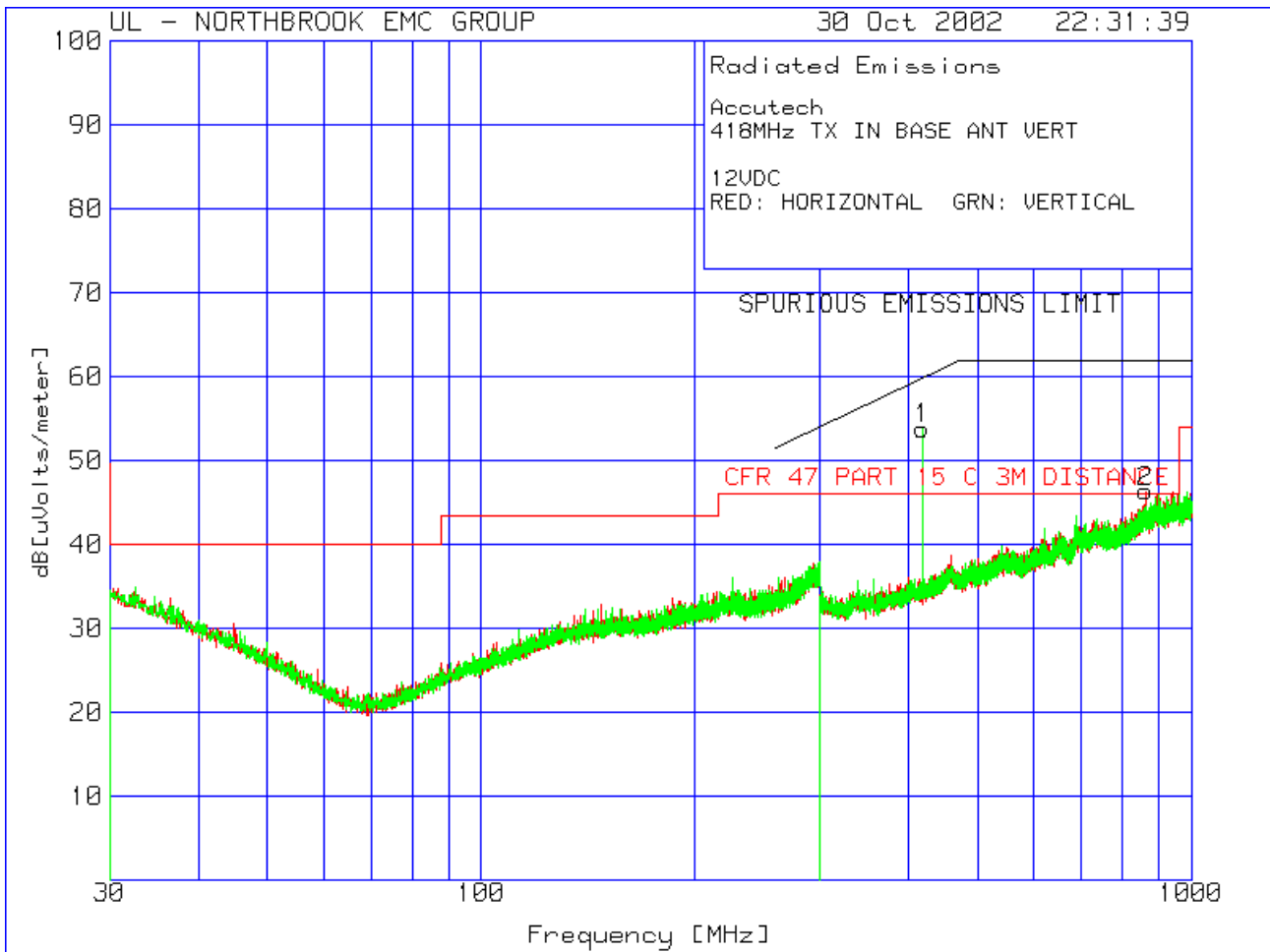
LIMIT 1: CFR 47 PART 15 C 3M DISTANCE
 LIMIT 2: SPURIOUS EMISSIONS LIMIT

qp - Quasi-Peak detector

**UNDERWRITERS LABORATORIES INC.
Radiated Emissions**

Date Tested: 30 October 2002

Manufacturer : Accutech
Equipment Under Test : Reciever (Antenna Vertical) (TX Mode)
Requirement : CFR 47, Part 15, Class B
Detection Mode : Quasi-peak (qp) and Average (Av)
Bandwidth : 120 kHz
Measurement Distance : 3 meters
Antenna Type : 30 - 300 MHz, Biconical
 300 - 1000 MHz, Log-Periodic



Accutech
 418MHz TX IN BASE ANT VERT
 12VDC
 RED: HORIZONTAL GRN: VERTICAL

No.	Test Frequency [MHz]	Meter Reading [dB (uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit:1	2
2	862.728	18.4 pk	3.4	24.5	46.3	46	61.93
	Azimuth:245	Height:101	Horz	Margin [dB]		.3	-15.63
1	418.0365	34.8 pk	2.1	16.9	53.8	46	59.86
	Azimuth:102	Height:101	Vert	Margin [dB]		7.8	-6.06

LIMIT 1: CFR 47 PART 15 C 3M DISTANCE
 LIMIT 2: SPURIOUS EMISSIONS LIMIT

pk - Peak detector

4	Test Frequency [MHz]	5 Meter Reading [dB (uV)]	6	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit:1	2	3
	417.9728	34.86 qp	2.1	16.9	53.86	46	59.9		
	Azimuth: 268	Height:129	Vert	Margin [dB]:		7.86	-6.04		
	417.9735	32.2 qp	2.1	16.9	51.2	46	59.9		
	Azimuth: 256	Height:100	Horz	Margin [dB]:		5.2	-8.7		

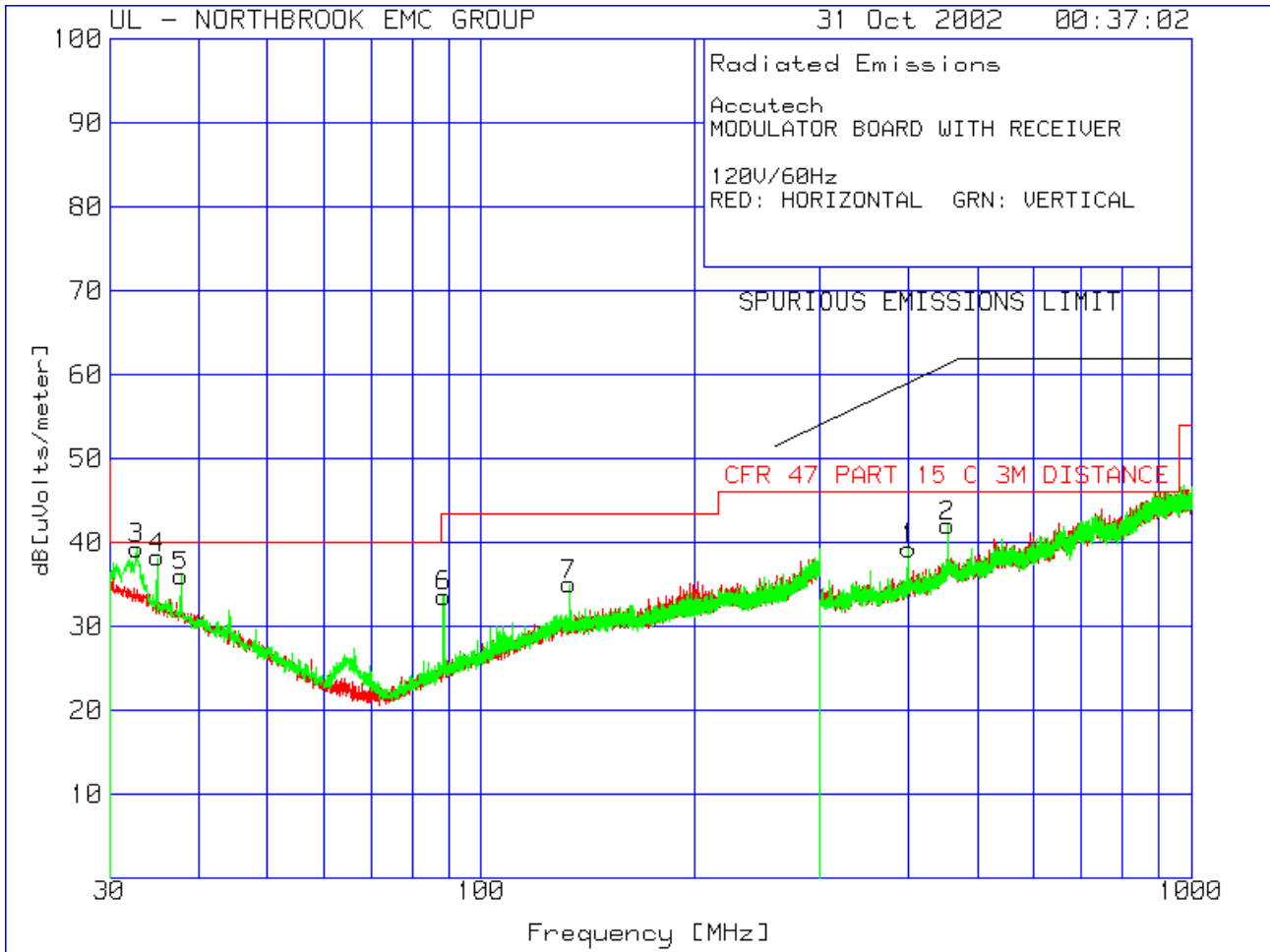
LIMIT 1: CFR 47 PART 15 C 3M DISTANCE
 LIMIT 2: SPURIOUS EMISSIONS LIMIT

qp - Quasi-Peak detector

**UNDERWRITERS LABORATORIES INC.
Radiated Emissions**

Date Tested: 31 October 2002

Manufacturer : Accutech
Equipment Under Test : Reciever w/ Multiplexer (Receive Mode)
Requirement : CFR 47, Part 15, Class B
Detection Mode : Quasi-peak (qp) and Average (Av)
Bandwidth : 120 kHz
Measurement Distance : 3 meters
Antenna Type : 30 - 300 MHz, Biconical
 300 - 1000 MHz, Log-Periodic



Accutech
 MODULATOR BOARD WITH RECEIVER
 120V/60Hz
 RED: HORIZONTAL GRN: VERTICAL

No.	Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit:1	2
3	32.698	20.89 pk	.54	17.87	39.3	40	
	Azimuth:125	Height:99 Vert		Margin [dB]		-.7	
4	34.9913	20.9 pk	.5	16.8	38.2	40	
	Azimuth:308	Height:99 Vert		Margin [dB]		-1.8	
5	37.7567	19.71 pk	.6	15.69	36	40	
	Azimuth:224	Height:200 Vert		Margin [dB]		-4	
6	88.4786	24.05 pk	.85	8.7	33.6	43.46	
	Azimuth:274	Height:99 Vert		Margin [dB]		-9.86	
7	132.9278	19.81 pk	1.09	14.1	35	43.46	
	Azimuth:299	Height:99 Vert		Margin [dB]		-8.46	
1	400.025	20.3 pk	2	17	39.3	46	59.08
	Azimuth:101	Height:100 Vert		Margin [dB]		-6.7	-19.78
AMBIENT							
2	454.4092	21.14 pk	2.24	18.62	42	46	61.33
	Azimuth:52	Height:200 Vert		Margin [dB]		-4	-19.33

LIMIT 1: CFR 47 PART 15 C 3M DISTANCE
 LIMIT 2: SPURIOUS EMISSIONS LIMIT

pk - Peak detector

Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit:1	2
32.6285	16.91 qp	.5	17.9	35.31	40	
	Azimuth: 204	Height:101 Vert		Margin [dB]:		-4.69
35.1208	9.35 qp	.5	16.8	26.65	40	
	Azimuth: 225	Height:108 Vert		Margin [dB]:		-13.35
37.7818	9.25 qp	.6	15.7	25.55	40	
	Azimuth: 39	Height:169 Vert		Margin [dB]:		-14.45
88.4528	22.65 qp	.9	8.7	32.25	43.5	
	Azimuth: 265	Height:108 Vert		Margin [dB]:		-11.25
132.6885	16.29 qp	1.1	14.1	31.49	43.5	
	Azimuth: 239	Height:100 Vert		Margin [dB]:		-12.01
399.9889	17.83 qp	2	17	36.83	46	59.1
	Azimuth: 145	Height:102 Vert		Margin [dB]:		-9.17 -22.27

LIMIT 1: CFR 47 PART 15 C 3M DISTANCE
 LIMIT 2: SPURIOUS EMISSIONS LIMIT

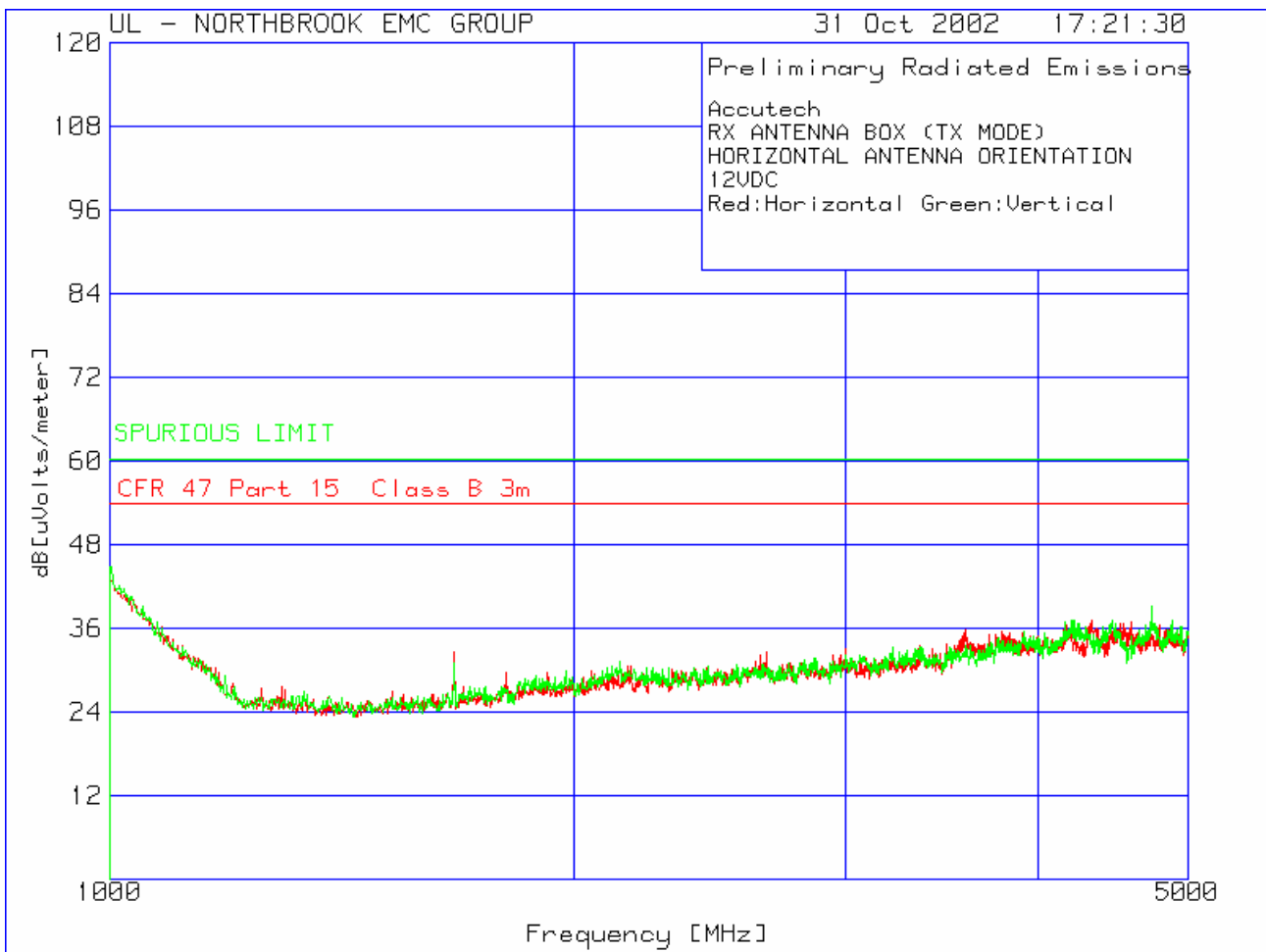
qp - Quasi-Peak detector

File MC3486 Project 02NK45212

**UNDERWRITERS LABORATORIES INC.
Radiated Emissions**

Date Tested: 31 October 2002

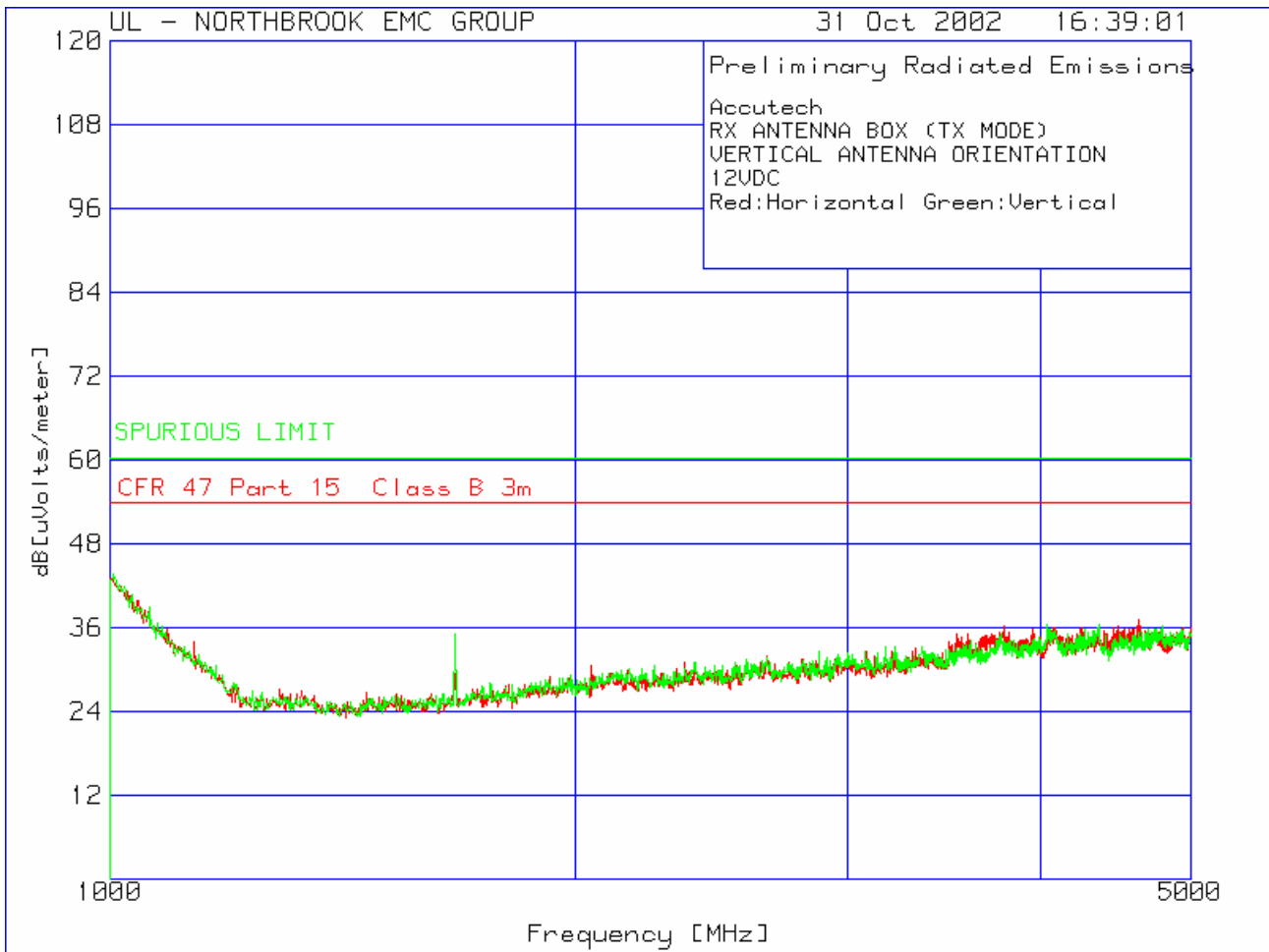
Manufacturer : Accutech
Equipment Under Test : Reciever (Antenna Horizontal) (TX Mode)
Requirement : CFR 47, Part 15, Class B
Detection Mode : Average (Av)
Bandwidth : 1 MHz
Measurement Distance : 3 meters
Antenna Type : 1000 - 5000 MHz, Horn



UNDERWRITERS LABORATORIES INC.
Radiated Emissions

Date Tested: 31 October 2002

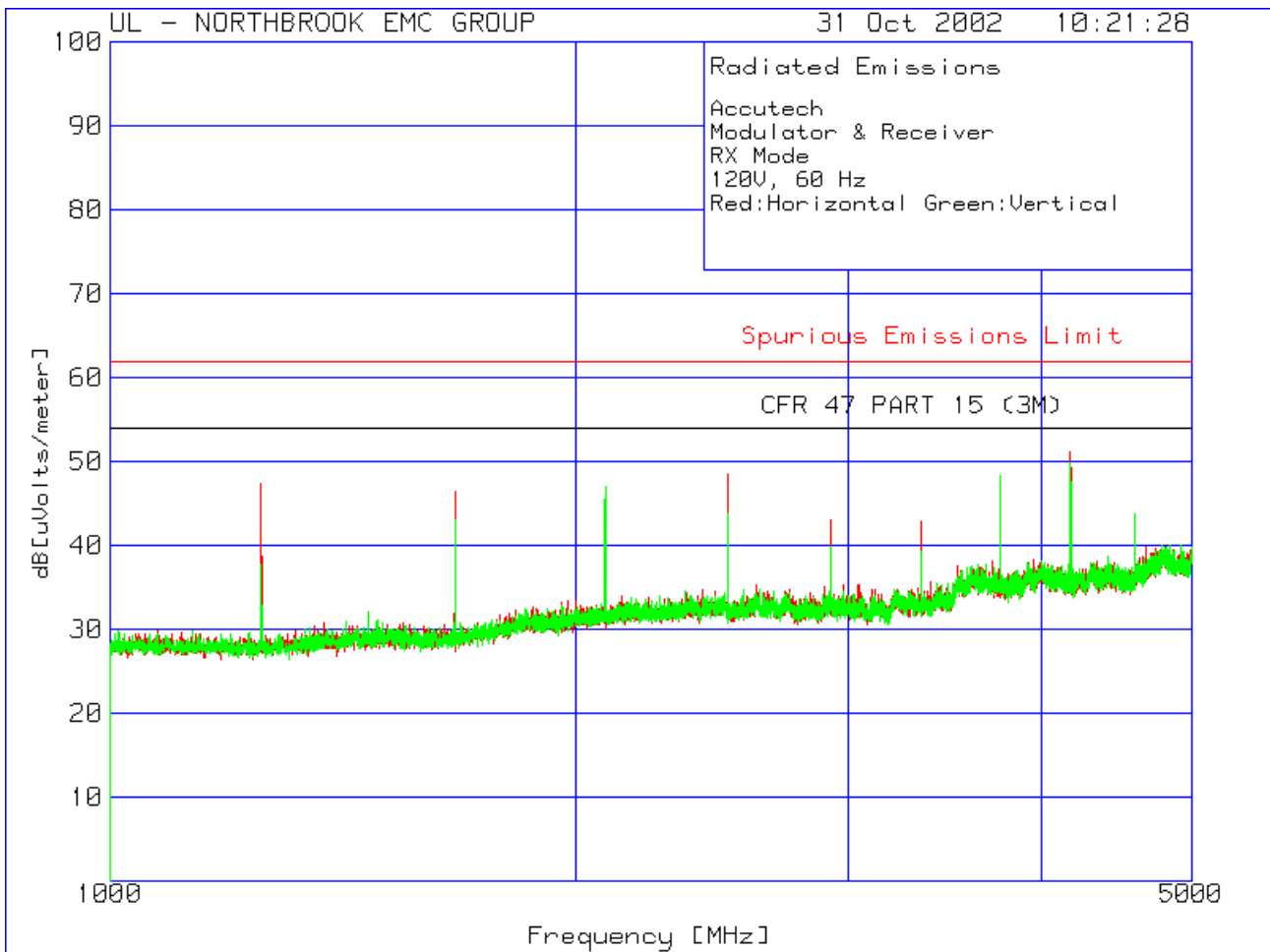
Manufacturer : Accutech
Equipment Under Test : Reciever (Antenna Vertical) (TX Mode)
Requirement : CFR 47, Part 15, Class B
Detection Mode : Average (Av)
Bandwidth : 1 MHz
Measurement Distance : 3 meters
Antenna Type : 1000 - 5000 MHz, Horn



**UNDERWRITERS LABORATORIES INC.
Radiated Emissions**

Date Tested: 31 October 2002

Manufacturer : Accutech
Equipment Under Test : Reciever w/ Multiplexer (Receive Mode)
Requirement : CFR 47, Part 15, Class B
Detection Mode : Quasi-peak (qp) and Average (Av)
Bandwidth : 1 MHz
Measurement Distance : 3 meters
Antenna Type : 1000 - 5000 MHz, Horn



Accutech
 Modulator & Receiver
 RX Mode
 120V, 60 Hz
 Red:Horizontal Green:Vertical

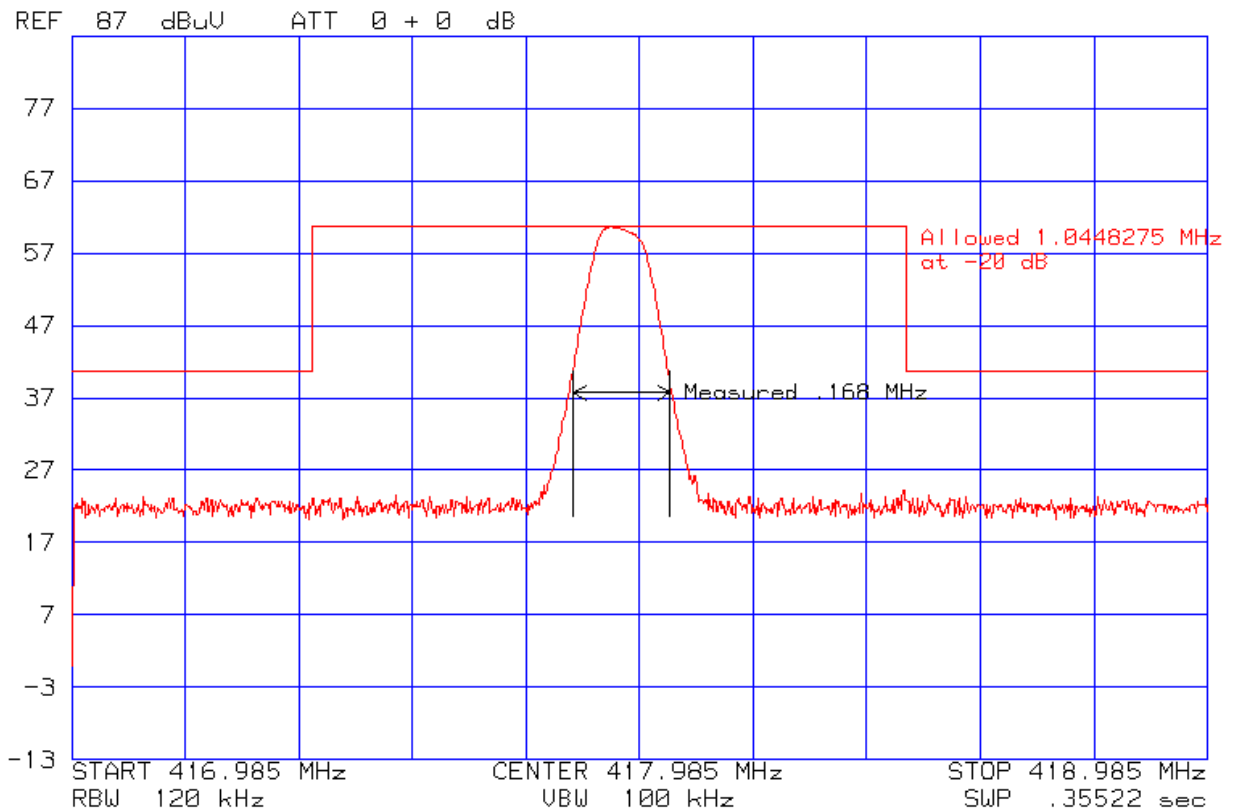
No.	Test Frequency [MHz]	Meter Reading [dB (uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit:1	2
1	1252.779	50.89 pk	-29.4	25.81	47.3	61.93	53.98
	Azimuth:198	Height:100	Horz	Margin [dB]		-14.63	-6.68
2	1670.913	49.08 pk	-30.2	27.52	46.4	61.93	53.98
	Azimuth:332	Height:100	Horz	Margin [dB]		-15.53	-7.58
4	2507.181	47.56 pk	-29.77	30.71	48.5	61.93	53.98
	Azimuth:272	Height:100	Horz	Margin [dB]		-13.43	-5.48
5	2923.317	41.08 pk	-29.63	31.55	43	61.93	53.98
	Azimuth:272	Height:133	Horz	Margin [dB]		-18.93	-10.98
6	3342.45	40.3 pk	-29.95	32.45	42.8	61.93	53.98
	Azimuth:281	Height:133	Horz	Margin [dB]		-19.13	-11.18
8	4178.219	46.19 pk	-29.3	34.21	51.1	61.93	53.98
	Azimuth:160	Height:100	Horz	Margin [dB]		-10.83	-2.88
9	4597.352	38.14 pk	-28.31	33.97	43.8	61.93	53.98
	Azimuth:234	Height:166	Horz	Margin [dB]		-18.13	-10.18
3	2089.547	47.29 pk	-29.68	29.39	47	61.93	53.98
	Azimuth:291	Height:132	Vert	Margin [dB]		-14.93	-6.98
7	3761.584	43.27 pk	-28.66	33.69	48.3	61.93	53.98
	Azimuth:19	Height:132	Vert	Margin [dB]		-13.63	-5.68

LIMIT 1: Spurious Emissions Limit
 LIMIT 2: CFR 47 PART 15 (3M)

UNDERWRITERS LABORATORIES INC.
Band Edge Measurement

Date Tested: 31 October 2002

Manufacturer : Accutec
Equipment Under Test : Reciever (TX Mode)
Requirement : CFR 47, Part 15, Class B
Detection Mode : Quasi-peak (qp) and Average (Av)
Bandwidth : 120 kHz
Measurement Distance : 3 meter
Antenna Type : 300 - 1000 MHz Log-Periodic



APPENDIX C

Sample Calculations of Field Strengths

Basic Equation:

The field strength is calculated by adding the Meter Reading, Cable Set Gain/Loss and Transducer (Antenna or LISN) Factor. The basic equation is as follows:

$$FS = MR + GL + TF$$

Where:

FS = Calculated Field Strength in dB(uV)/meter

MR = Meter Reading of receiver amplitude in dB(uV)

GL = Gain/Loss factor of cable set in dB

A negative Gain/Loss indicates signal amplification (gain)

A positive Gain/Loss indicates signal attenuation (loss)

TF = Transducer Factor of antenna or LISN in dB

Sample Calculation:

The measured receiver amplitude is 52.7 dB(uV).

The gain/loss factor is -30.2 dB (indicating a preamplifier is included in the cable set).

The transducer factor (antenna factor) is 6.6 dB.

These factors are added ($52.7 + (-30.2) + 6.6$) resulting in a calculated field strength of 29.1 dB(uV)/meter.

Sample Calculations of Limit

Basic Equation:

The limit is calculated by using the information in table 15.209 for frequency (MHz), field strength (uV/m) and measurement distance (meters).

The basic equation for converting uV/m to dBuV/m is as follows:

$$20 \text{ Log (uV/m) = dBuV/m}$$

Where:

uV/m = micro volts per meter

dBuV/m = decibel micro volts per meter

Sample Calculation:

The field strength per section 15.209 at 30 MHz (3 m measurement distance) is 100 uV/m.

$$20 \text{ Log (100 uV/m) = 40 dBuV/m}$$