



ELECTROMAGNETIC COMPATIBILITY (EMC) Report

EMISSIONS

GE Interlogix

**Model AL-111x Series Keypad
FCC ID : CGS-ATS111X**

May 4, 2004

Project No.: 04CA09977

Test Report No.: NC-050404

REPORT DIRECTORY

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1.0 General Information

1.1 Scope

Underwriters Laboratories Inc., authorizes the above named company to reproduce this Report, provided it is reproduced in its entirety. The data in this Report reflects only the items tested in the configurations and mode of operations described. All data recorded and photographs represents testing under the worst case conditions permitted by the requirements applied to the product. It is the manufacturer's responsibility to assure that additional production units are manufactured with identical electrical and mechanical components. Any modifications necessary for compliance made during testing must be implemented in all production units for compliance to be maintained.

Underwriters Laboratories Inc., shall have no liability for any deductions, inferences or generalizations drawn from this report. This report shall not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the United States government.

1.2 Purpose

Testing was performed to the following regulations:

Emissions Standards used: CFR 47 Part 15 Subpart B, CFR 47 Part 15 Subpart C

1.3 Test Results

☒ In Compliance

☐ Not in Compliance

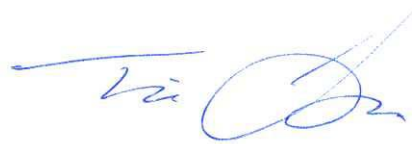
1.4 Documentation Review/Approval

Project Management:



Bill Barry
Staff Engineer
International EMC Services
Department 3014A

Technical Review By:



Tim Lee
Staff Engineer
International EMC Services
Department 3014A

2.0 General Product Description

Applicant	: GE Interlogoix
Manufactured By	: Same as Applicant
FCC ID	: CGGATS111X
Applicant Address	: 12345 S Leveton Drive Tualatin, OR 97062
Applicant Contact	: Tracey Boyle
Model/Type No.	: AL-111x Series
Date of Issue	: 4-15-2004
File No.	: NC4346
Test Report No.	: NC4346-041504
Project No.	: 04CA09977

Product Description

The equipment under test (EUT) is a keypad for use with the applicant's alarm control units. A proximity RFID transmitter operating at 125 kHz is provided within the keypad's enclosure.

Equipment Size, Mobility, and Identification

Dimensions: 6.5 by 3.5 by 0.825 in.

Mobility: ☐ Hand-held ☐ Table-top ☐ Floor-standing ☒ Wall Mount

Serial No: Not Provided

Electrical Ratings

	Voltage [Volts]	Current or Power	Frequency [Hz]	Phase
Eut	9-14 V dc	165 mA	DC	N/A

Test Voltage & Frequency

Unless indicated otherwise on the individual data sheet or test results, the test voltage and frequency was as indicated below.

<u>Voltage</u>	<u>Frequency</u>
12 V	DC

Clocks/Oscillators

125 kHz

Equipment Type

☐ Prototype ☒ Pre-Production ☐ Production

Model Differences

The series AL-111x covers 4 different models. Models AL-1110 and AL-1111 are not provided with proximity card readers. Model AL-1115 and AL-1116 contain the card reader. Model AL-1115 was tested to represent all models.

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

Device Modifications

The following modifications were necessary for compliance: None

EUT and Peripherals

Description	Manufacturer	Model/Part #	Serial Number
Keypad (EUT)	GE Interlogix	AL-1115	None Provided
Alarm Panel	GE Interlogix	AL-4017	None Provided

Cables

Cable Type	Shield	Length (meters)	Ferrite	Connector	Connection Point 1	Connection Point 2
Jacketed Solid	Yes	20	N	Hardwire	Keypad	Alarm Panel

2.1 Justification of Configuration

The unit is provided in one configuration.

2.2 EUT Operating Mode(s)

Equipment under test was operated during the measurement under the following conditions:

The system was tested in the stand-by mode. A RFID card was placed near the field of transmitter during the test.

3.0 Environmental Conditions in Test Lab

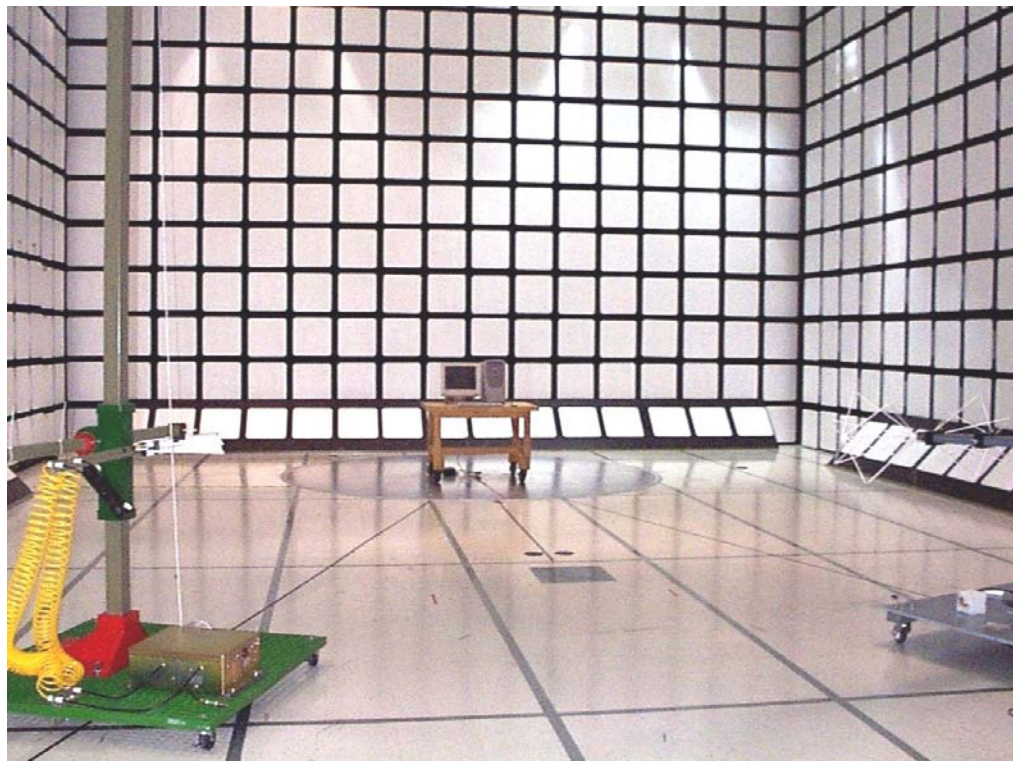
Temperature: 20-25 °C Atmospheric Pressure: 680-1060 mbar
Relative Humidity: 30-60% 20.1-31.3 in. Hga

4.0 Calibration Details of Equipment Used for Measurement

Test equipment and test accessories are calibrated on 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.

5.0 Test Facility

Underwriters Laboratories Inc.
1655 Scott Blvd.
Santa Clara, CA 95050
Phone: (408) 876-2905 Fax: (408) 556-6071



6.0 Accreditations and Authorizations



FCC: Details of the measurement facilities used for these tests have been filed with the Federal Communications Commission's Laboratory in Columbia, Maryland and accepted in a letter dated September 24, 1997 (Ref. No. 31040/SIT 1300F2).



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 2704



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-672, (Conducted Emissions) C-689.



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



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

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

NIST/CAB: Recognized by the Infocomm Development Authority of Singapore (IDA) under the Asia Pacific Economic Cooperation Mutual Recognition Agreement (APEC MRA). Our laboratory is provisionally designated to act as a Conformity Assessment Body (CAB) under Appendix B, Phase I Procedures, of the APEC MRA. Our scope of designation includes IDA TS EMC (CISPR 22), IEC 61000-4-2, -4-3, -4-4, -4-5, and -4-6.
U.S. Identifier Number: US0114

7.0 Emissions Test Regulations

The emissions tests were performed according to following regulations:

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

CFR 47 Part 15 Subpart B : 2003 Code of Federal Regulations, Part 15, Subpart B, Radio Frequency Devices - Unintentional Radiators
☐ Class A ☒ Class B
CFR 47 Part 15 Subpart C : 2003 Code of Federal Regulations, Part 15, Subpart C, Radio Frequency Devices - Intentional Radiators

7.1 Equipment Classifications



Class A Digital Device: *A digital device that is marketed for use in a commercial, industrial or business environment, exclusive of a device which is marketed for use by the general public or is intended to be used in the home.*



Class B Digital Device: *A digital device that is marketed for use in a residential environment notwithstanding use in commercial, business and industrial environments. Examples of such devices include, but are not limited to, personal computer, calculators, and similar electronic devices that are marketed for use by the general public.*

7.2 Summary of FCC Requirements

FCC Requirement	Description	Compliance Met?	Comments
15.31(e)	Supply Voltage Variation 85-110%	Yes	Voltage to product is supplied from a regulated 12 V source from the alarm control unit. The alarm control unit receives power from a 120 V ac and a 12 V battery. Variations across the 9-14 V dc rating does not effect the output RF power.
15.31(m)	Number of Frequencies Tested	Yes	Frequency of operation is 125 kHz. It is the only operating frequency
15.203	Antenna Requirement	Yes	Unit is provided with an integral antenna that is not detachable.
15.205	Restricted Bands	Yes	The unit does not transmit within a restricted band. Spurious emissions are compliant with 15.209.
15.207	Conducted Emissions	Yes	See Section 7.6
15.209	Radiated Emissions	Yes	See Section 7.7

7.3 Field Strength Calculations

The field strength is calculated by adding the Transducer Factor (Antenna Factor) and Gain/Loss (Cable Loss, Preamp Gain) Factor to the Meter Reading. The basic equation with a sample calculation is as follows:

Field Strength = Meter Reading + Transducer Factor + Gain/Loss

Assume a receiver reading of 53.2 dBuV is obtained. The Transducer Factor of 5.1 dB and a Gain/Loss of -31 dB is added, giving a field strength of 27.3 dBuV.

$$FS = 53.2 + 5.1 + (-31) = 27.3 \text{ dBuV}$$

Use the following formula to convert dBμV to μV: $x = 10^{(y/20)}$, where x is the value in μV and y is the value in dBμV.

$$\text{Level in uV} = 10^{(27.3/20)} = 23.2 \text{ uV}$$

7.4 Measurement Uncertainty

When a measurement is made the result will be different from the true or theoretically correct value. The difference is the result of tolerances in the measurement system that cannot be completely eliminated. To the extent that technology allows us, it has been our aim to minimize this error. The following statement of measurement uncertainty is used to reflect the accuracy of the measured result as compared with its “true” value.

Uncertainty (dB)

Test Distance	Probability Distribution	Biconical Antenna		Log Periodic Antenna			
		10m +18 deg	10m -14 deg	3m	10m +18 deg	10m -14 deg	3m
Combined Standard Uncertainty $u_c(y)$	Normal	± 1.24	± 1.25	± 1.29	± 1.14	± 1.13	± 1.9
Expanded uncertainty U (level of confidence = 95%)	Normal ($k = 2$)	± 2.47	± 2.49	± 2.59	± 2.28	± 2.27	± 2.76

Conducted Voltage Emissions	Probability Distribution	
Combined Standard Uncertainty $u_c(y)$	Normal	± 1.08
Expanded uncertainty U (level of confidence = 95%)	Normal ($k = 2$)	± 2.16

$u_c(y)$ = square root of the sum of squares of the individual standard deviation uncertainties.

U = combined standard uncertainty multiplied by the coverage factor: k . This defines an interval about the measured result that will encompass the true value with a confidence level of approximately 95%. If a higher level of confidence is required then $k=3$ (CL=97%) can be used.

“ISO Guide to the Expression of Uncertainty in Measurements” and “NIS81: The Treatment of Uncertainty in EMC Measurements” were the basis for determining the uncertainty levels of our measurements. Details of those calculations are available upon request.

7.5 Measurement Bandwidths

Frequency Range (MHz)	Peak Data BW (kHz)	Quasi-Peak Data BW (kHz)	Average Data BW (kHz)
0.01 - 0.15	1	3	0.2
0.15 - 30	10	9	100
30 - 1000	100	120	120
Above 1000	1000	N/A	1000

7.6 Conducted Voltage Emissions

Test Location

Ground Plane #1 (Test Station 5)

Date Tested: 05-04-2004

Test Instruments

Instrument	Manufacturer	Model	ID#	Last	Cal
					Next
Spectrum Analyzer	Hewlett-Packard	8566B	8502	2/12/2004	2/12/2005

Test Accessories

Instrument	Manufacturer	Model	ID#	Last	Cal
					Next
6dB Res Band Display	Hewlett-Packard	85662A	8500	2/12/2004	2/12/2005
Quasi-Peak Detector	Hewlett-Packard	85650A	8501	2/12/2004	2/12/2005
LISN	Electro-Metrics	EM-7820-1	8010	6/9/2003	6/9/2004
LISN	Electro-Metrics	EM-7820-1	8011	1/21/2004	1/21/2005
Transient Limiter	Com-Power	HZ-560	8137	3/12/2003	3/12/2004

UL Procedure

3314-LPG-004

Frequency Range of Measurement

150 kHz to 30 MHz

Test Results

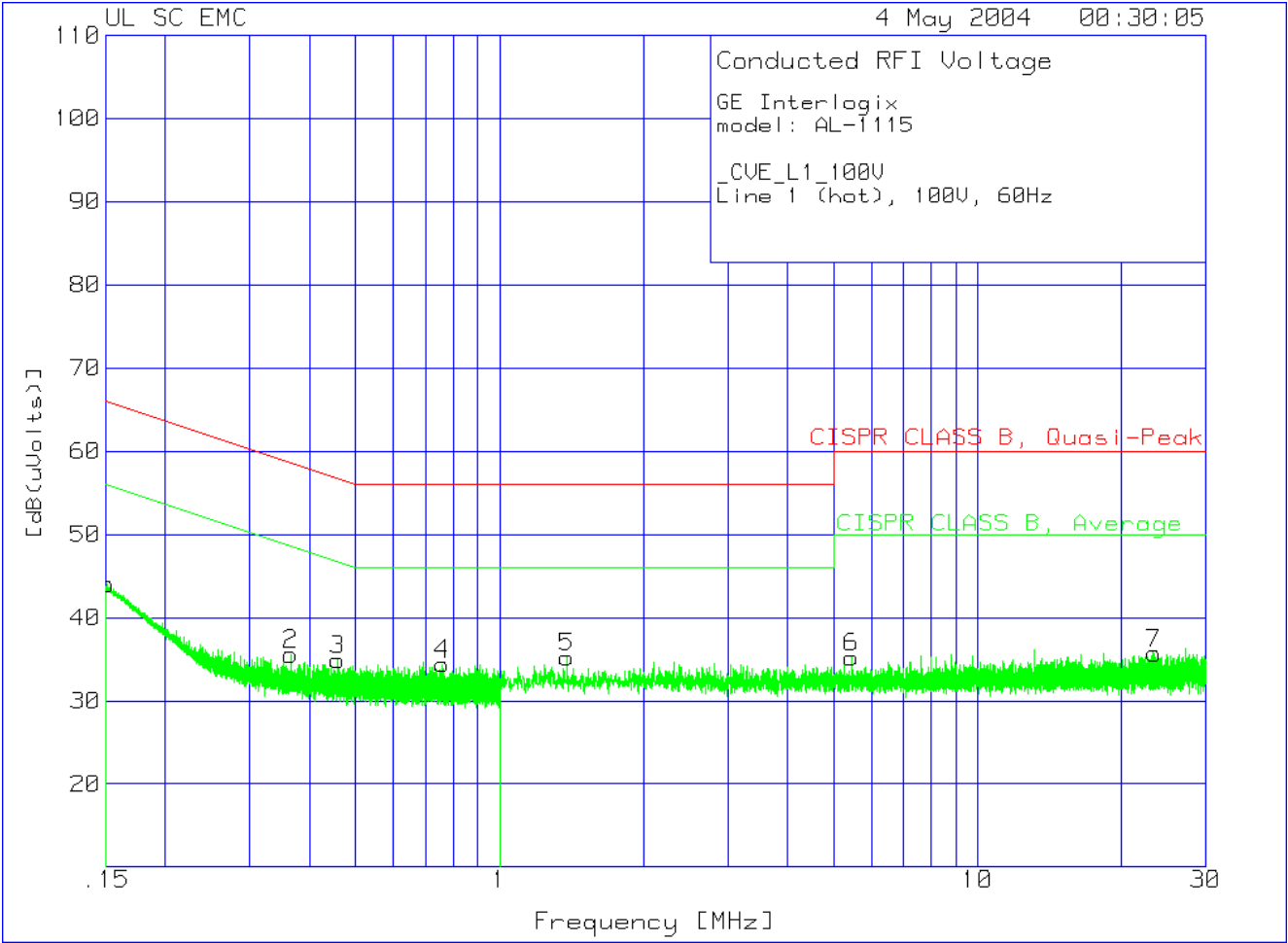
The Requirements are:

MET minimum margin is greater than 10 dB μ V at all frequencies.

Remarks

The unit was powered from a 12 V dc power supply. The power supply was operated from a 100 V ac source. The input voltage needed to be reduced from 120 V ac in order to provide a 12 V dc output to the EUT.

Test Data



GE Interlogix
model: AL-1115
_CVE_L1_100V

Line 1 (hot), 100V, 60Hz

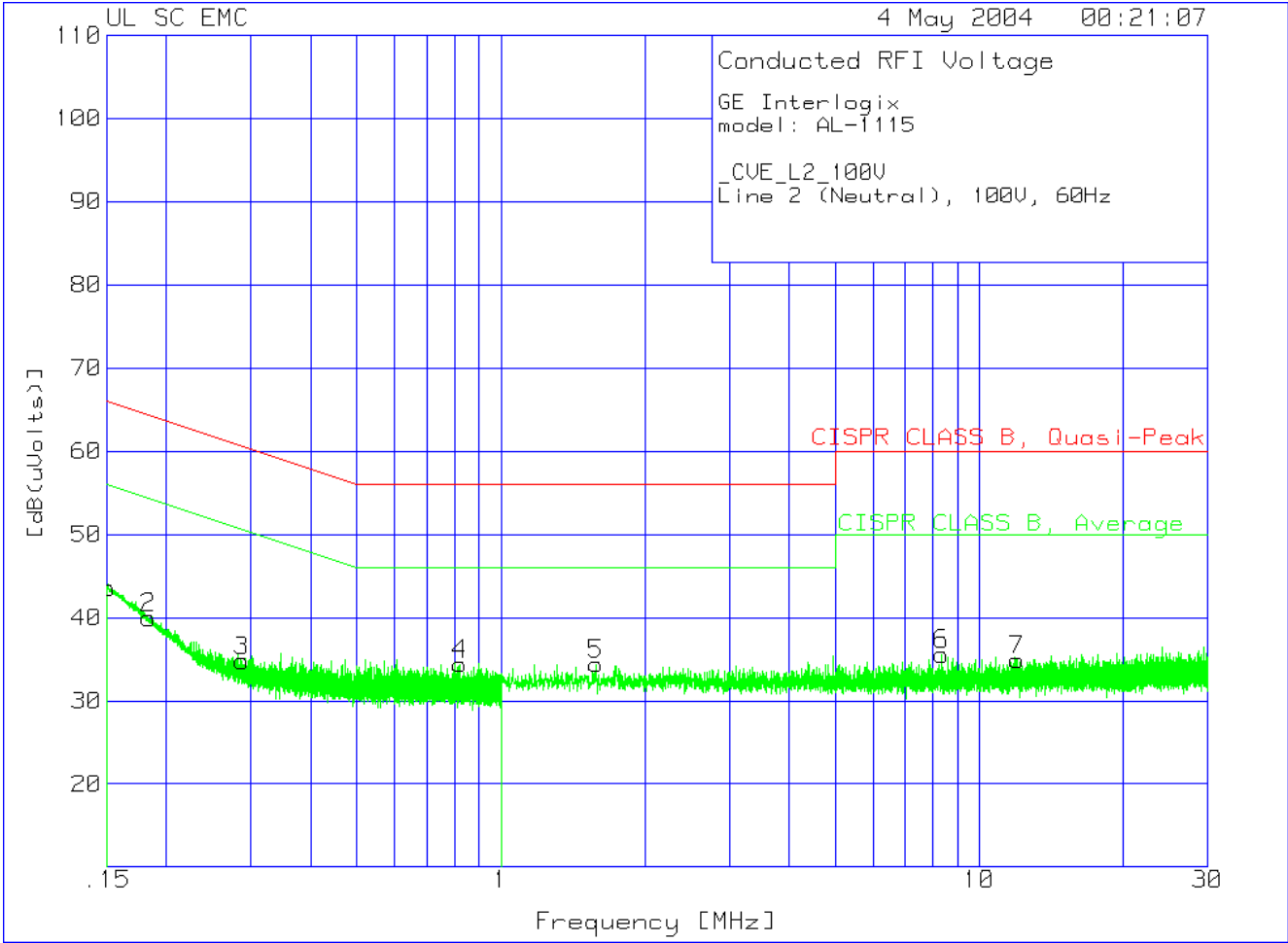
Test		Meter	Gain/Loss	Transducer	Level	Limit:1	2
No.	Frequency	Reading	Factor	Factor	[dB (uVolts)]		
	[MHz]	[dB (uV)]	[dB]	[dB]			
=====							
Range: 1 .15 - 1MHz -----							
1	.15119	33.5 pk	.1	10.5	44.1	65.9	55.9
				Margin [dB]		-21.8	-11.8
2	.36548	25.2 pk	.1	10.3	35.6	58.6	48.6
				Margin [dB]		-23	-13
3	.4594	24.4 pk	.2	10.3	34.9	56.7	46.7
				Margin [dB]		-21.8	-11.8
4	.76013	24 pk	.2	10.2	34.4	56	46
				Margin [dB]		-21.6	-11.6

Range: 2 1 - 30MHz -----							
5	1.3824	24.7 pk	.3	10.2	35.2	56	46
				Margin [dB]		-20.8	-10.8
6	5.4382	24.3 pk	.6	10.3	35.2	60	50
				Margin [dB]		-24.8	-14.8
7	23.39671	23.5 pk	1.3	10.9	35.7	60	50
				Margin [dB]		-24.3	-14.3

LIMIT 1: CISPR CLASS B, Quasi-Peak

LIMIT 2: CISPR CLASS B, Average

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



GE Interlogix
model: AL-1115
_CVE_L2_100V
Line 2 (Neutral), 100V, 60Hz

No.	Test Frequency [MHz]	Meter Reading [dB (uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level [dB (uVolts)]	Limit:1	2
=====							
Range: 1 .15 - 1MHz -----							
1	.15132	33 pk	.1	10.5	43.6	65.9	55.9
				Margin [dB]		-22.3	-12.3
2	.18332	29.4 pk	.1	10.5	40	64.3	54.3
				Margin [dB]		-24.3	-14.3
3	.28736	24.4 pk	.1	10.3	34.8	60.6	50.6
				Margin [dB]		-25.8	-15.8
4	.82252	24 pk	.2	10.2	34.4	56	46
				Margin [dB]		-21.6	-11.6
Range: 2 1 - 30MHz -----							
5	1.5823	23.9 pk	.3	10.2	34.4	56	46
				Margin [dB]		-21.6	-11.6
6	8.33231	24.4 pk	.8	10.4	35.6	60	50
				Margin [dB]		-24.4	-14.4
7	11.99991	23.4 pk	.9	10.6	34.9	60	50
				Margin [dB]		-25.1	-15.1

LIMIT 1: CISPR CLASS B, Quasi-Peak
LIMIT 2: CISPR CLASS B, Average

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

Photograph



7.7 Radiated Electric Field Emissions

Test Location

10 Meter Semi-Anechoic Chamber (Test Station 2) (Last NSA: 1/8/2004; Next NSA 1/8/2005)

Date Tested: 2-25-2004

Test Instruments

Instrument	Manufacturer	Model	ID#	Last	Cal
					Next
Spectrum Analyzer	Hewlett-Packard	8566B	8034	5/6/2003	5/6/2004

Test Accessories

Instrument	Manufacturer	Model	ID#	Last	Cal
					Next
Log Periodic Antenna	Electro-Metrics	EM-6950	8017	12/16/2003	12/16/2004
Biconical Antenna	Electro-Metrics	EM-6912A	8082	7/8/2003	7/8/2004
6dB Res Band Display	Hewlett-Packard	85662A	8031	5/6/2003	5/6/2004
Quasi-Peak Detector	Hewlett-Packard	85650A	8030	5/6/2003	5/6/2004
Switch Driver	Hewlett-Packard	11713A	8036	5/6/2003	5/6/2004
Preselector	Hewlett-Packard	85685A	8037	5/6/2003	5/6/2004
Pre-amplifier	Sonoma Instruments	310N	8085	12/17/2003	12/17/2004

UL Procedure

3314-LPG-013

Frequency Range of Measurement

0.009 MHz to 1 GHz

Measurement Distance

10 meters (30MHz to 1 GHz) & 3 meters (below 30 MHz)

Test Results

The requirements are:

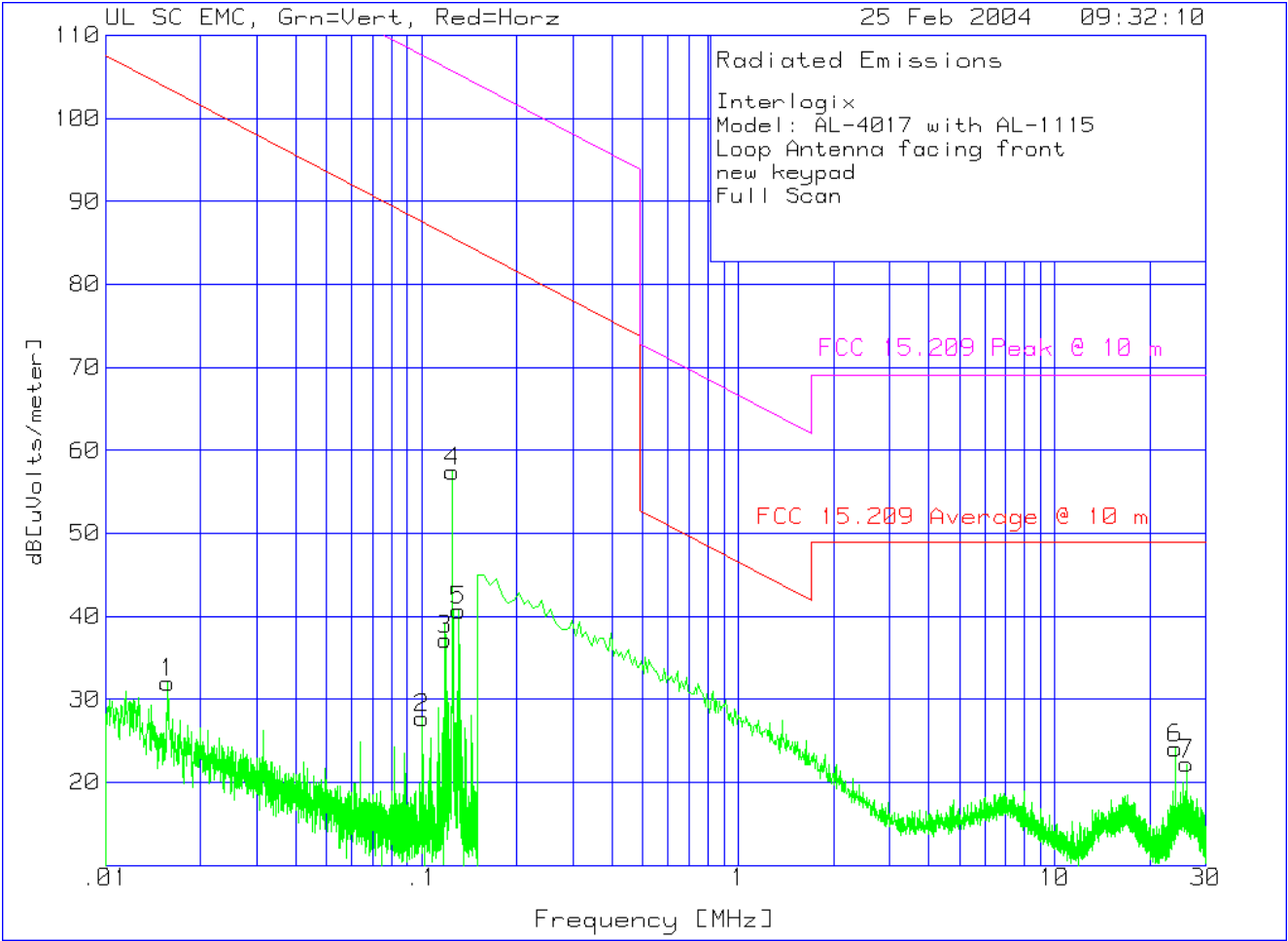
MET minimum margin is 2.26 dB ($\mu\text{V/m}$) to the quasi-peak limit for spurious emissions at 108.0 MHz.

minimum margin is 24.1 dB ($\mu\text{V/m}$) to the average limit for the fundamental at 125 kHz (peak measurement made at 10 m and extrapolated to 300 m using 40 dB/decade extrapolation factor).

Remarks

None.

Test Data

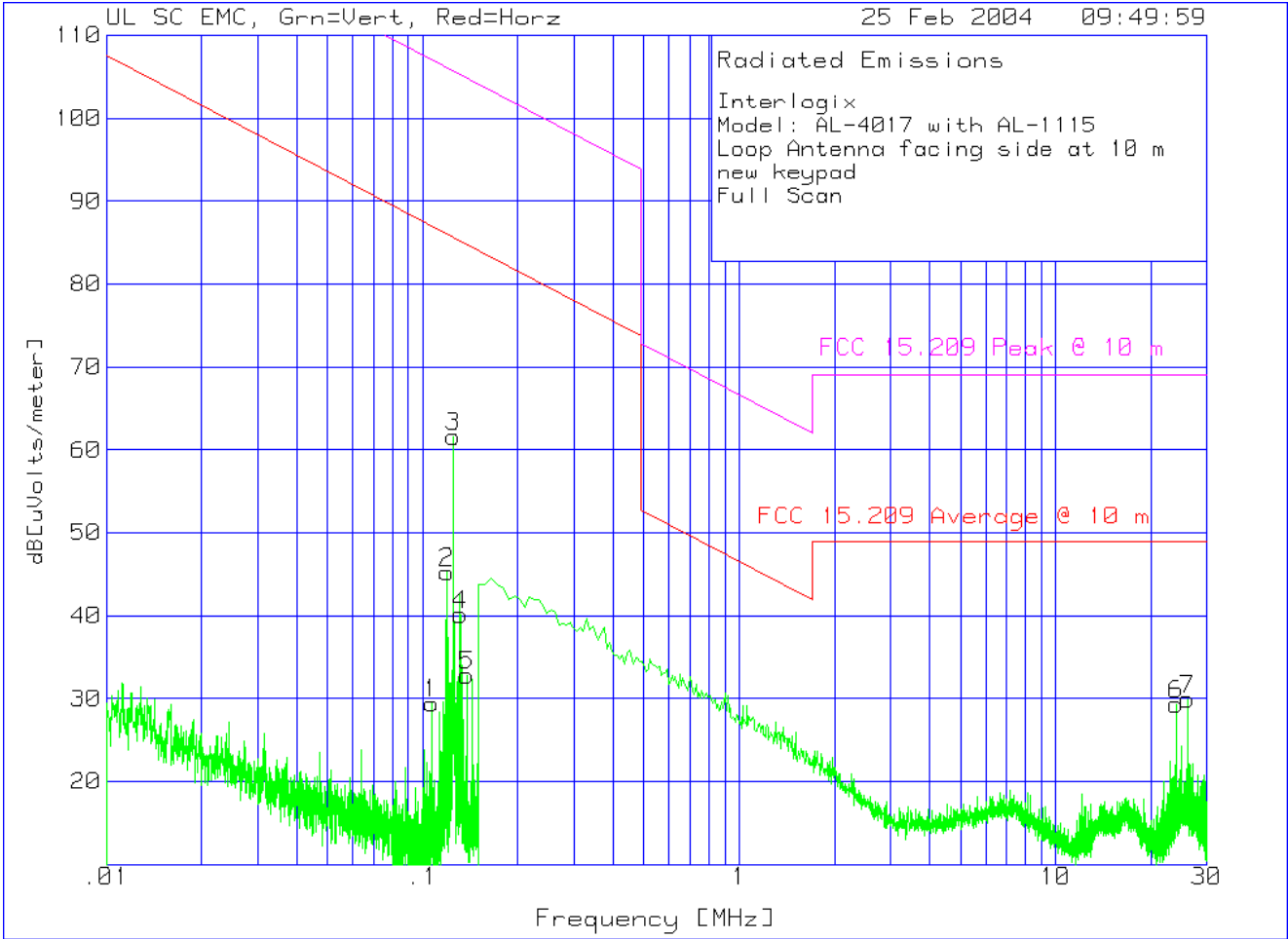


Interlogix
Model: AL-4017 with AL-1115
Loop Antenna facing front
new keypad
Full Scan

No.	Test Frequency [MHz]	Meter Reading [dB (uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit:1	2
=====							
Range 1 .01 - .15MHz -----							
1	.01574	3.9 pk	-31.4	59.5	32	103.7	123.7
	Azimuth:24			Margin [dB]		-71.7	-91.7
2	.10027	4.3 pk	-32.2	55.6	27.7	87.6	107.6
	Azimuth:101			Margin [dB]		-59.9	-79.9
3	.11863	13.5 pk	-32.1	55.8	37.2	86.1	106.1
	Azimuth:182			Margin [dB]		-48.9	-68.9
4	.12503	33.7 pk	-32.1	55.8	57.4	85.7	105.7
	Azimuth:341			Margin [dB]		-28.3	-48.3
5	.13094	17 pk	-32.1	55.8	40.7	85.3	105.3
	Azimuth:341			Margin [dB]		-44.6	-64.6
Range 2 .15 - 30MHz -----							
6	24.00465	20.6 pk	-31.1	34.6	24.1	49	69
	Azimuth:341			Margin [dB]		-24.9	-44.9
7	26.00683	19 pk	-31.2	34.4	22.2	49	69
	Azimuth:1			Margin [dB]		-26.8	-46.8

LIMIT 1: FCC 15.209 Average @ 10 m
LIMIT 2: FCC 15.209 Peak @ 10 m

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

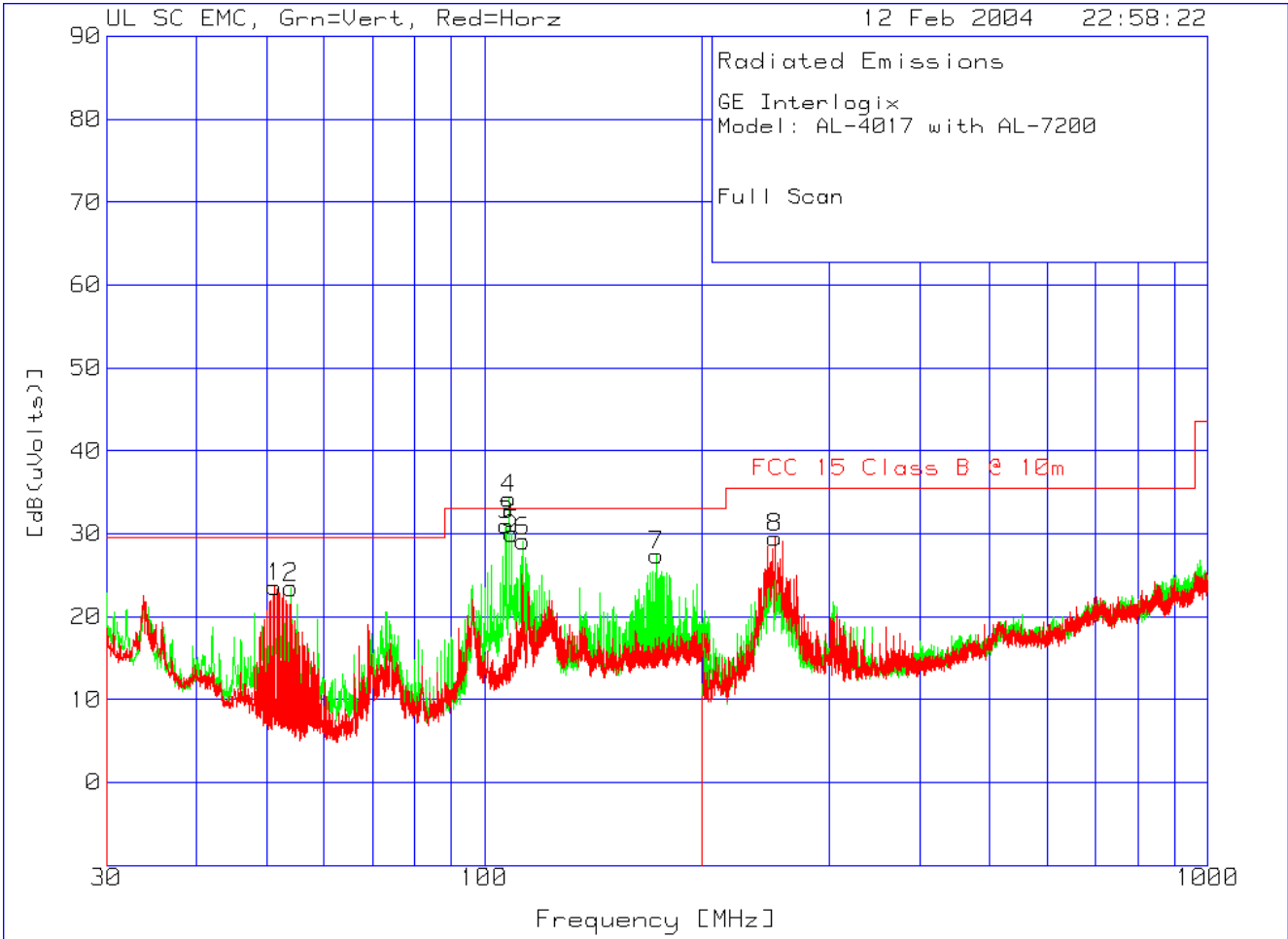


Interlogix
Model: AL-4017 with AL-1115
Loop Antenna facing side at 10 m
new keypad
Full Scan

No.	Test Frequency [MHz]	Meter Reading [dB (uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit:1	2
=====							
Range 1 .01 - .15MHz -----							
1	.10674	5.9 pk	-32.2	55.7	29.4	87	107
	Azimuth:264			Margin [dB]		-57.6	-77.6
2	.11933	21.5 pk	-32.1	55.8	45.2	86.1	106.1
	Azimuth:95			Margin [dB]		-40.9	-60.9
3	.12505	37.9 pk	-32.1	55.8	61.6	85.7	105.7
	Azimuth:309			Margin [dB]		-24.1	-44.1
4	.13171	16.4 pk	-32.1	55.8	40.1	85.2	105.2
	Azimuth:309			Margin [dB]		-45.1	-65.1
5	.13751	9 pk	-32.1	55.9	32.8	84.8	104.8
	Azimuth:149			Margin [dB]		-52	-72
Range 2 .15 - 30MHz -----							
6	23.99719	25.8 pk	-31.1	34.6	29.3	49	69
	Azimuth:128			Margin [dB]		-19.7	-39.7
7	25.99564	26.7 pk	-31.2	34.4	29.9	49	69
	Azimuth:264			Margin [dB]		-19.1	-39.1

LIMIT 1: FCC 15.209 Average @ 10 m
LIMIT 2: FCC 15.209 Peak @ 10 m

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



GE Interlogix					
Model: AL-4017 with AL-7200 (AL-1115 Included)					
Full Scan					
No.	Test Frequency [MHz]	Meter Reading [dB (uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level Limit:1 [dB (uVolts)]
=====					
Range: 1 30 - 205MHz -----					
2	54.0007	42.7 pk	-27.4	8.2	23.5 29.5
	Azimuth:47	Height:101	Vert	Margin [dB]	-6
3	107.0734	44.7 pk	-26.8	13.1	31 33
	Azimuth:157	Height:101	Vert	Margin [dB]	-2
4	108.0789	47.5 pk	-26.6	13.3	34.2 33
	Azimuth:208	Height:101	Vert	Margin [dB]	1.2
5	109.0844	43.5 pk	-26.8	13.3	30 33
	Azimuth:234	Height:101	Vert	Margin [dB]	-3
6	113.0627	42.6 pk	-26.7	13.2	29.1 33
	Azimuth:234	Height:200	Vert	Margin [dB]	-3.9
7	173.0427	37.2 pk	-26	16.2	27.4 33
	Azimuth:358	Height:101	Vert	Margin [dB]	-5.6
Range: 2 30 - 205MHz -----					
1	51.2466	42.2 pk	-27.5	8.9	23.6 29.5
	Azimuth:46	Height:99	Horz	Margin [dB]	-5.9
Range: 4 200 - 1000MHz -----					
8	251.7612	44.8 pk	-27.1	11.8	29.5 35.5
	Azimuth:140	Height:199	Horz	Margin [dB]	-6

LIMIT 1: FCC 15 Class B @ 10m

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

GE Interlogix

Model: AL-4017 with AL-7200

Full Scan

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

Range: 1 30 - 205MHz

54	38.3 qp	-27.4	8.2	19.1	29.5
Azimuth: 69	Height:264	Vert	Margin	[dB]:	-10.4

107.0008	42.79 qp	-26.8	13.1	29.09	33
Azimuth: 198	Height:111	Vert	Margin	[dB]:	-3.91

108.0115	44.04 qp	-26.6	13.3	30.74	33
Azimuth: 181	Height:121	Vert	Margin	[dB]:	-2.26

109.0064	40.53 qp	-26.8	13.3	27.03	33
Azimuth: 186	Height:128	Vert	Margin	[dB]:	-5.97

112.9985	41 qp	-26.7	13.2	27.5	33
Azimuth: 232	Height:104	Vert	Margin	[dB]:	-5.5

173	27.44 qp	-26.1	16.2	17.54	33
Azimuth: 94	Height:100	Vert	Margin	[dB]:	-15.46

Range: 2 30 - 205MHz

51.24	21.89 qp	-27.5	8.9	3.29	29.5
Azimuth: 337	Height:397	Horz	Margin	[dB]:	-26.21

Range: 4 200 - 1000MHz

251.9154	45.66 qp	-27.1	11.8	30.36	35.5
Azimuth: 126	Height:178	Horz	Margin	[dB]:	-5.14

LIMIT 1: FCC 15 Class B @ 10m

pk - Peak detector

qp - Quasi-Peak detector

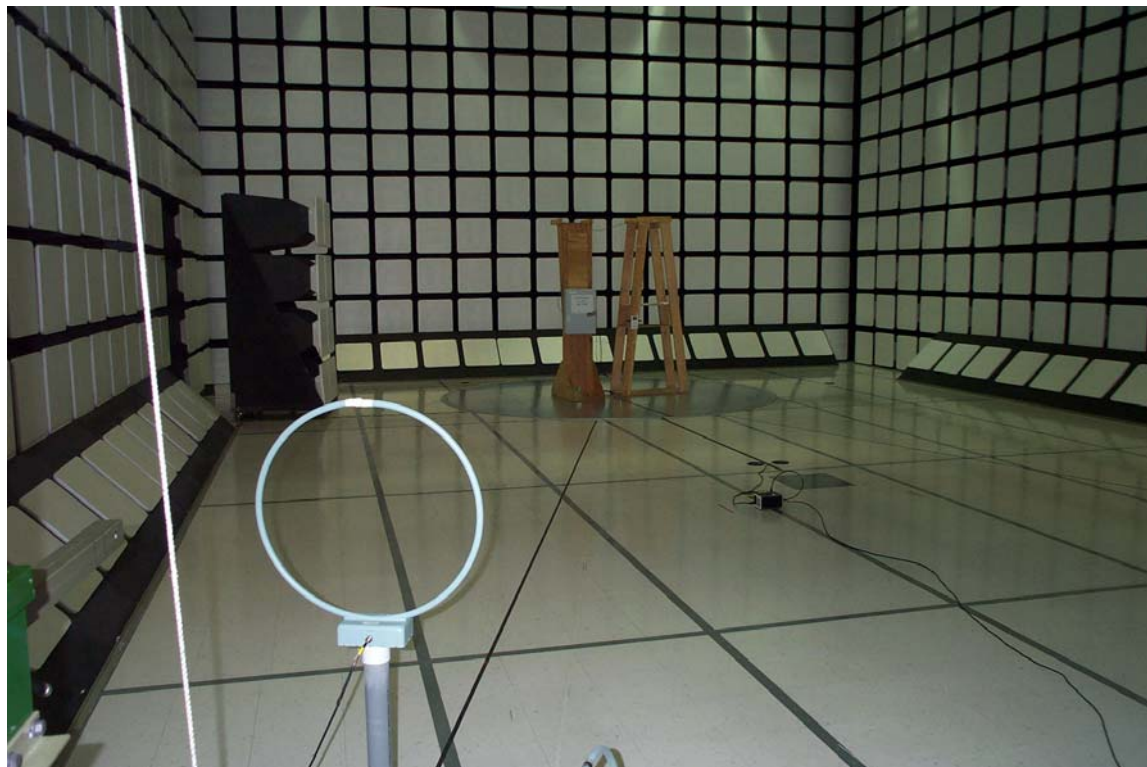
av - Average detector

avlg - Average log detector

avem - EMI Average detector

Photographs





7.8 Radiated Electric Field Fundamental Measurements

Test Location

Date Tested: 2-24-2004

10 Meter Semi-Anechoic Chamber (Test Station 2) (Last NSA: 3/19/02; Next NSA 3/19/03)

Test Instruments

Instrument	Manufacturer	Model	ID#	Last	Cal
					Next
Spectrum Analyzer	Hewlett-Packard	8566B	8034	5/6/2003	5/6/2004

Test Accessories

Instrument	Manufacturer	Model	ID#	Last	Cal
					Next
Log Periodic Antenna	Electro-Metrics	EM-6950	8017	12/16/2003	12/16/2004
Biconical Antenna	Electro-Metrics	EM-6912A	8082	7/8/2003	7/8/2004
6dB Res Band Display	Hewlett-Packard	85662A	8031	5/6/2003	5/6/2004
Quasi-Peak Detector	Hewlett-Packard	85650A	8030	5/6/2003	5/6/2004
Switch Driver	Hewlett-Packard	11713A	8036	5/6/2003	5/6/2004
Preselector	Hewlett-Packard	85685A	8037	5/6/2003	5/6/2004
Pre-amplifier	Sonoma Instruments	310N	8085	12/17/2003	12/17/2004

UL Procedure

The following measurements of the transmitter fundamental frequency were made:

It was verified if the fundamental field strength changed with the input voltage.

The EUT was examined to determine the type antenna connection.

The fundamental frequency (including 20 dB bandwidth) was measured.

FCC Part 15 Requirements

15.203, 15.205, 15.209, 15.31(e), 15.31(m),

Frequency Range of Measurement

125 kHz

Test Results

15.31(e) Voltage Variation at 125 kHz: The measured value did not change as the voltage to the power supply was varied from 85-115 %.

15.31(m) Number of Channels: The EUT operates on one channel

15.203 Antenna Requirements: The EUT is provided with a integral non-detachable antenna.

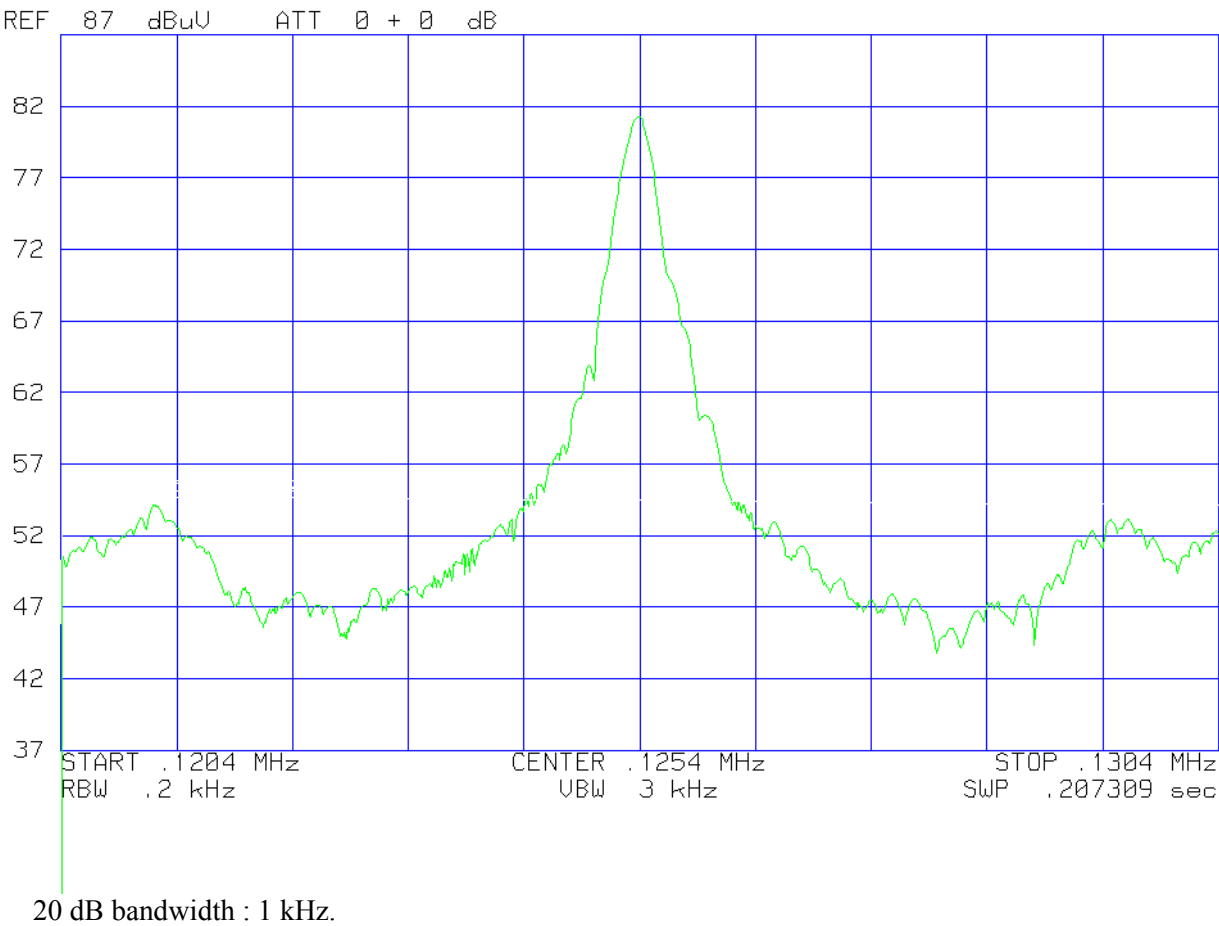
15.205 Restricted Bands of Operation: The 125 kHz fundamental frequency does not fall within a restricted band (20 dB bandwidth is less than 1 kHz)

Remarks:

None.

Test Data

Bandwidth Measurement (amplitude is not corrected)



Photograph

