



**FCC CFR47 PART 15 SUBPART C
CERTIFICATION TEST REPORT
FOR
ALVH CARD READER**

MODEL NUMBER: ALVH

FCC ID: VBU-ALVH

REPORT NUMBER: 08J11616-1

ISSUE DATE: FEBRUARY 13, 2008

Prepared for

MIWA LOCK CO., LTD.

3-1-12, SHIBA, MINATO-KU

TOKYO 105-8510

JAPAN

Prepared by

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NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: MIWA LOCK., LTD.
3-1-12, SHIBA, MINATO-KU
TOKYO 105-8510, JAPAN

EUT DESCRIPTION: ALVH CARD READER

MODEL: ALVH

SERIAL NUMBER: 07K000890A FOR 14.7456 MHz SAMPLE &
07K000891A FOR 13.56MHz SAMPLE

MHz DATE TESTED: FEBRUARY 12 - 14, 2008

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart C	No Non-Compliance Note

Compliance Certification Services, Inc. tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by Compliance Certification Services and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by Compliance Certification Services will constitute fraud and shall nullify the document. No part of this report may be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any government agency.

Approved & Released For CCS By:

Tested By:



FRANK IBRAHIM
EMC SUPERVISOR
COMPLIANCE CERTIFICATION SERVICES

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EMC ENGINEER
COMPLIANCE CERTIFICATION SERVICES

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4-2003, FCC CFR 47 Part 2, and FCC CFR 47 Part 15.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 Benicia Street, Fremont, California, USA.

CCS is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at <http://www.ccsemc.com>.

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

4.2. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	UNCERTAINTY
Radiated Emission, 30 to 200 MHz	+/- 3.3 dB
Radiated Emission, 200 to 1000 MHz	+4.5 / -2.9 dB
Radiated Emission, 1000 to 2000 MHz	+4.5 / -2.9 dB
Power Line Conducted Emission	+/- 2.9 dB

Uncertainty figures are valid to a confidence level of 95%.

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

EUT is a low power transmitter for hotel card door lock and its fundamental frequencies are 13.56 MHz and 14.7456 MHz.

5.2. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an embedded antenna.

5.3. SOFTWARE AND FIRMWARE

M2AMHa-S10-104, Version 8107

5.4. WORST-CASE CONFIGURATION AND MODE OF OPERATION

EUT was powered by 3 VDC batteries and was tested as a stand-alone device.

EUT was tested in three orthogonal orientations and it was found that "Y" orientation is the worst-case orientation; therefore, all radiated testing was performed with EUT in "Y" orientation, refer to set up photos for more details.

EUT was set to transmit continuously during testing.

5.5. MODIFICATIONS

No modifications were made during testing.

5.6. DESCRIPTION OF TEST SETUP

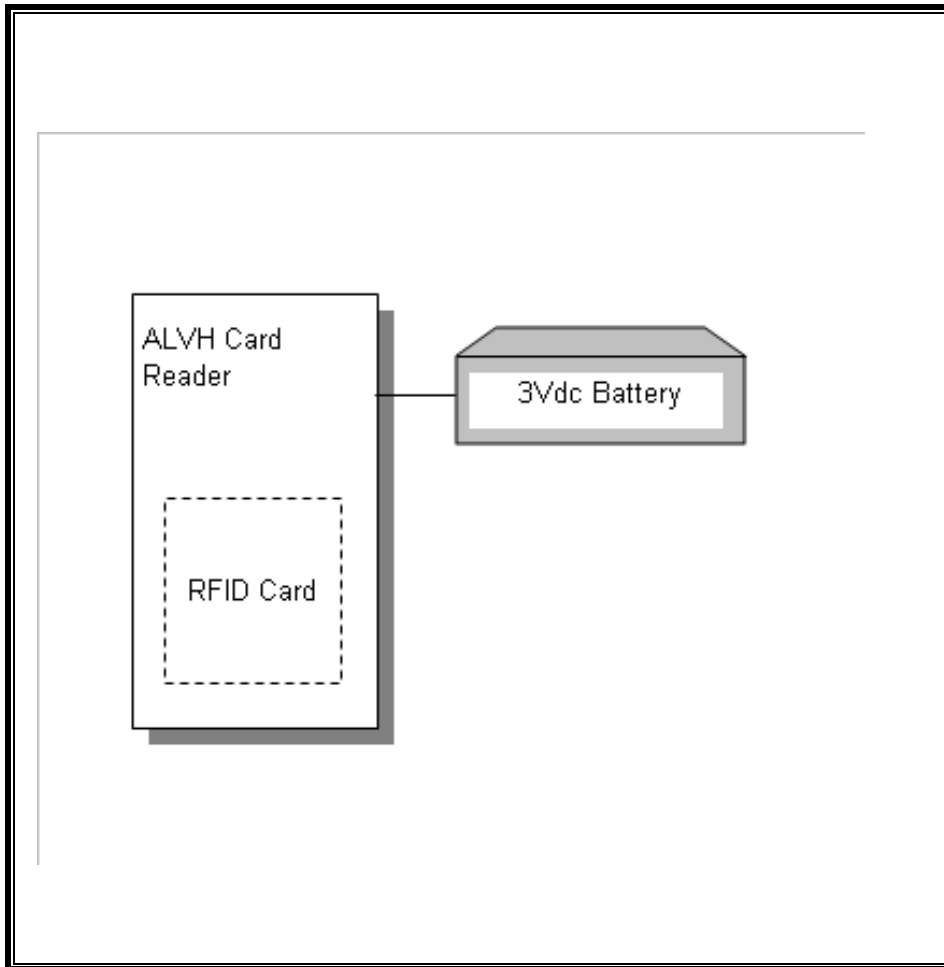
SUPPORT EQUIPMENT

None; EUT was tested as a stand-alone device.

I/O CABLES

None; EUT was tested as a stand-alone device.

SETUP DIAGRAM FOR TESTS



6. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

TEST EQUIPMENT LIST					
Description	Manufacturer	Model	Asset	Cal Date	Cal Due
Temperature / Humidity Chamber	Thermotron	SE 600-10-10	C00930	04/16/07	04/16/08
RF Filter Section, 2.9 GHz	Agilent / HP	85420E	C00958	02/06/07	06/12/08
Antenna, Bilog, 2 GHz	Schaffner	CCN-1000-1	C01017	05/30/06	10/30/08
Preamplifier, 1300 MHz	Agilent / HP	8447D	C01018	05/09/07	05/09/08
Antenna, Loop, 30 MHz	EMCO	6502	C00593	10/24/06	10/24/08
Preamplifier, 1300 MHz	Agilent / HP	8447D	0	05/09/07	05/09/08
Spectrum Analyzer, 40 GHz	Agilent / HP	8564E	C00951	09/05/07	12/05/08
DC power Supply	HP	E3610A	N/A	N/A	N/A

7. APPLICABLE LIMITS AND TEST RESULTS

7.1. RADIATED EMISSION

TEST PROCEDURE

ANSI C63.4

The highest clock frequency generated or used in the EUT is 13.56 MHz; therefore the frequency range was investigated from 9 kHz to 1000 MHz.

LIMIT

§15.225:

(a) The field strength of any emissions within the band 13.553–13.567 MHz shall not exceed 15,848 microvolts/ meter at 30 meters.

(b) Within the bands 13.410–13.553 MHz and 13.567–13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters.

(c) Within the bands 13.110–13.410 MHz and 13.710–14.010 MHz the field strength of any emissions shall not exceed 106 microvolts/meter at 30 meters.

(d) The field strength of any emissions appearing outside of the 13.110– 14.010 MHz and shall not exceed the general radiated emission limits in § 15.209 as follows:

§15.209 (a) Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Limits for radiated disturbance of an intentional radiator		
Frequency range (MHz)	Limits (µV/m)	Measurement Distance (m)
0.009 – 0.490	2400 / F (kHz)	300
0.490 – 1.705	24000 / F (kHz)	30
1.705 – 30.0	30	30
30 – 88	100**	3
88 - 216	150**	3
216 – 960	200**	3
Above 960	500	3

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz,

174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g. §§ 15.231 and 15.241.

§15.209 (b) In the emission table above, the tighter limit applies at the band edges.

Formula for converting the field strength from uV/m to dBuV/m is:

Limit (dBuV/m) = 20 log limit (uV/m)

In addition:

§15.209 (d) The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emissions limits in these three bands are based on measurements employing an average detector.

§15.209 (d) The provisions in §§ 15.225, measuring emissions at distances other than the distances specified in the above table, determining the frequency range over which radiated emissions are to be measured, and limiting peak emissions apply to all devices operated under this part.

RESULTS

No non-compliance noted:

7.1.1. FUNDAMENTAL AND SPURIOUS EMISSIONS (0.15 – 30 MHz)

TRANSCEIVER SPURIOUS EMISSIONS BELOW 30 MHz

Fundamental = 13.56 MHz

FCC Part 15, Subpart B & C												10 Meter Distance Measurement At Open Field	
Company:		MIWA LOCK., LTD											
Project #:		08J11616											
Date:		02/11/08											
Test Engineer:		Tom Chen											
Configuration:		EUT Alone with 3Vdc											
Mode:		Continuous Tx Mode, 13.56 MHz											
Frequency (MHz)	PK (dBuV)	QP (dBuV)	AV (dBuV)	AF (dBm)	Distance Correction (dB)	PK Corrected Reading (dBuV/m)	AV Corrected Reading (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	PK Margin (dB)	AV Margin (dB)	Notes	
Loop Antenna Face On:													
13.56	40.89		N/A	10.56	-19.08	32.16	N/A	84.00	N/A	-51.8	N/A	Fundamental @ 10m Dist	
13.41	25.59		N/A	10.54	-19.08	17.05	N/A	50.48	N/A	-33.4	N/A	13.41-13.553MHz Spurious @ 10m	
13.553	40.85		N/A	10.56	-19.08	32.12	N/A	50.48	N/A	-18.4	N/A	13.41-13.553MHz Spurious @ 10m	
13.567	40.10		N/A	10.56	-19.08	31.57	N/A	50.48	N/A	-18.9	N/A	13.567-13.710MHz Spurious @ 10m	
13.71	24.83		N/A	10.57	-19.08	16.32	N/A	50.48	N/A	-34.2	N/A	13.567-13.710MHz Spurious @ 10m	
13.11	24.89		N/A	10.51	-19.08	16.12	N/A	40.51	N/A	-24.4	N/A	13.110-13.410MHz Spurious @ 10m	
13.41	25.59		N/A	10.54	-19.08	17.05	N/A	40.51	N/A	-23.5	N/A	13.110-13.410MHz Spurious @ 10m	
13.71	24.83		N/A	10.57	-19.08	16.32	N/A	40.51	N/A	-24.2	N/A	13.710-14.010MHz Spurious @ 10m	
14.01	24.47		N/A	10.60	-19.08	15.99	N/A	40.51	N/A	-24.5	N/A	13.710-14.010MHz Spurious @ 10m	
27.145	17.38		N/A	9.04	-19.08	7.34	N/A	29.54	N/A	-22.2	N/A	13.710-14.010MHz Spurious @ 10m	
Loop Antenna Face Off:													
13.56	32.51		N/A	10.56	-19.08	23.98	N/A	84.00	N/A	-60.0	N/A	Fundamental @ 10m Dist	
13.41	24.89		N/A	10.54	-19.08	16.35	N/A	50.48	N/A	-34.1	N/A	13.41-13.553MHz Spurious @ 10m	
13.553	30.53		N/A	10.56	-19.08	22.00	N/A	50.48	N/A	-28.5	N/A	13.41-13.553MHz Spurious @ 10m	
13.567	29.85		N/A	10.56	-19.08	21.12	N/A	50.48	N/A	-29.4	N/A	13.567-13.710MHz Spurious @ 10m	
13.71	23.08		N/A	10.57	-19.08	14.57	N/A	50.48	N/A	-35.9	N/A	13.567-13.710MHz Spurious @ 10m	
13.11	23.09		N/A	10.51	-19.08	14.52	N/A	40.51	N/A	-26.0	N/A	13.110-13.410MHz Spurious @ 10m	
13.41	24.89		N/A	10.54	-19.08	16.35	N/A	40.51	N/A	-24.2	N/A	13.110-13.410MHz Spurious @ 10m	
13.71	23.08		N/A	10.57	-19.08	14.57	N/A	40.51	N/A	-25.9	N/A	13.710-14.010MHz Spurious @ 10m	
14.01	23.98		N/A	10.60	-19.08	15.50	N/A	40.51	N/A	-25.0	N/A	13.710-14.010MHz Spurious @ 10m	
27.145	17.86		N/A	9.04	-19.08	7.62	N/A	29.54	N/A	-21.9	N/A	13.710-14.010MHz Spurious @ 10m	

* No more emissions were found up to 30MHz

Note: The emission limits are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9–90 kHz, 110–480 kHz and above 10000Mhz. Radiated emission limits in these three bands are based on measurements employing an average detector.

P.K. = Peak
 Q.P. = Quasi Peak Readings
 A.F. = Antenna factor

Fundamental = 14.7456 MHz

FCC Part 15, Subpart B & C 10 Meter Distance Measurement At Open Field												
Company:		MIWA LOCK., LTD										
Project #:		08J11616										
Date:		02/11/08										
Test Engineer:		Tom Chen										
Configuration:		EUT Alone with 3Vdc										
Mode:		Continuous Tx Mode, 14.7456 MHz										
Frequency (MHz)	PK (dBuV)	QP (dBuV)	AV (dBuV)	AF (dB/m)	Distance Correction (dB)	PK Corrected Reading (dBuV/m)	AV Corrected Reading (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	PK Margin (dB)	AV Margin (dB)	Notes
Loop Antenna Face On:												
14.7456	30.60		N/A	10.67	-19.08	22.19	N/A	29.54	N/A	-7.4	N/A	Fundamental @ 10m Dist
29.4912	16.42		N/A	8.76	-19.08	6.10	N/A	29.54	N/A	-23.4	N/A	Spurious @ 10m
Loop Antenna Face Off:												
14.7456	26.08		N/A	10.67	-19.08	17.67	N/A	29.54	N/A	-11.9	N/A	Fundamental @ 10m Dist
29.4912	15.21		N/A	8.76	-19.08	4.69	N/A	29.54	N/A	-24.7	N/A	Spurious @ 10m

* No more emissions were found up to 30MHz

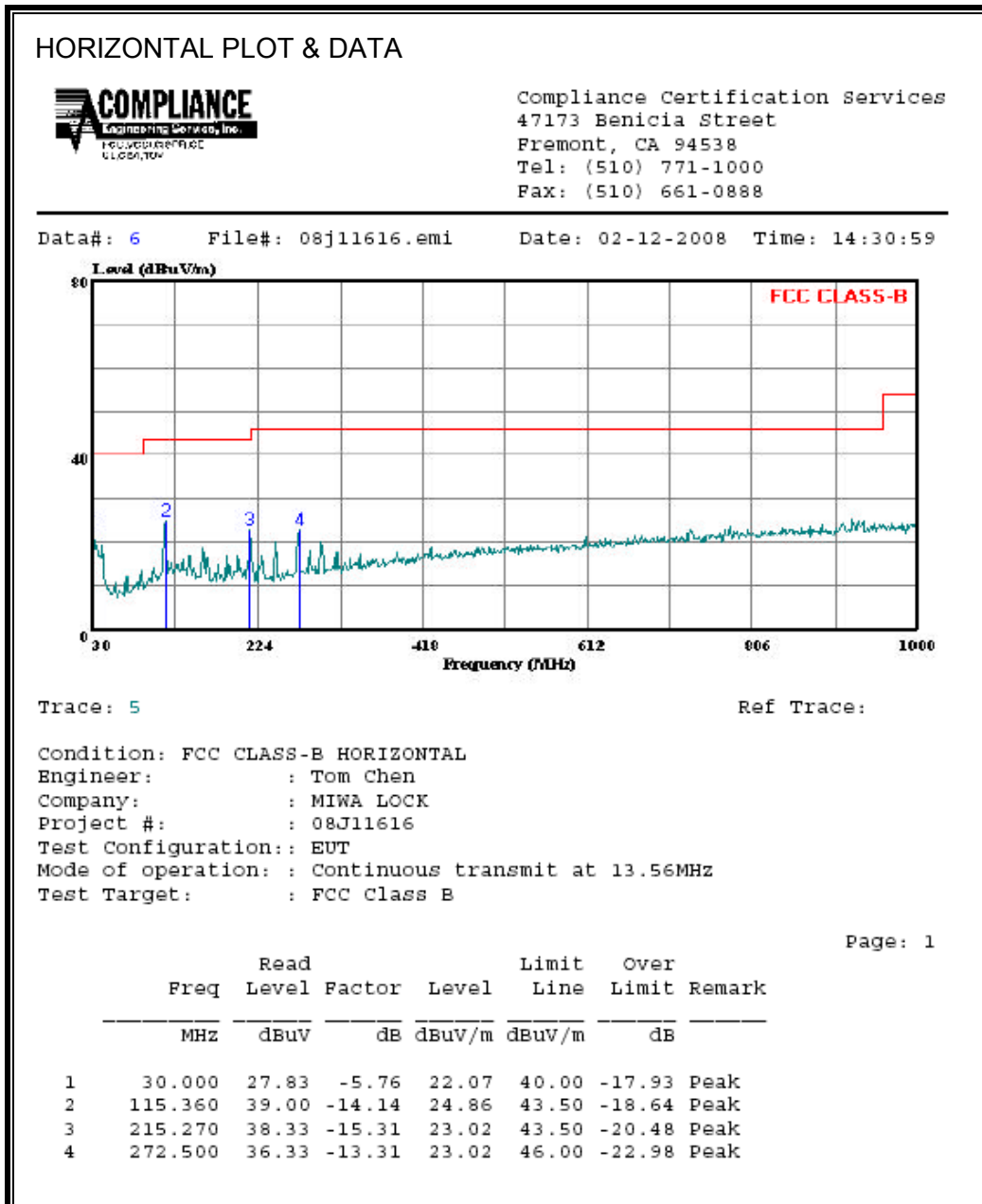
Note: The emission limits are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 10000Mhz. Radiated emission limits in these three bands are based on measurements employing an average detector.

P.K. = Peak
 Q.P. = Quasi Peak Readings
 A.F. = Antenna factor

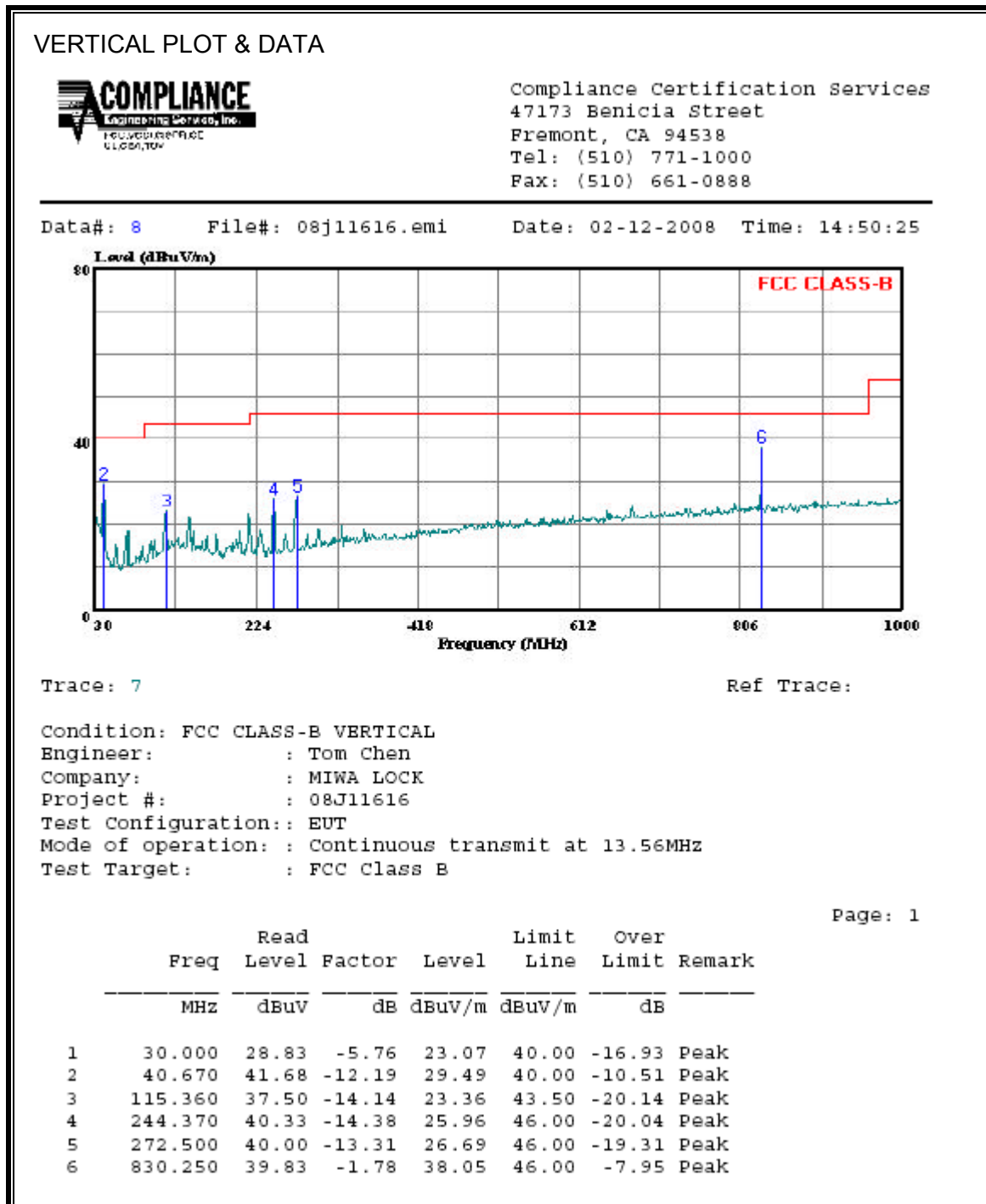
7.1.2. SPURIOUS EMISSIONS (30 - 1000 MHz)

Fundamental = 13.56 MHz

SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, HORIZONTAL)

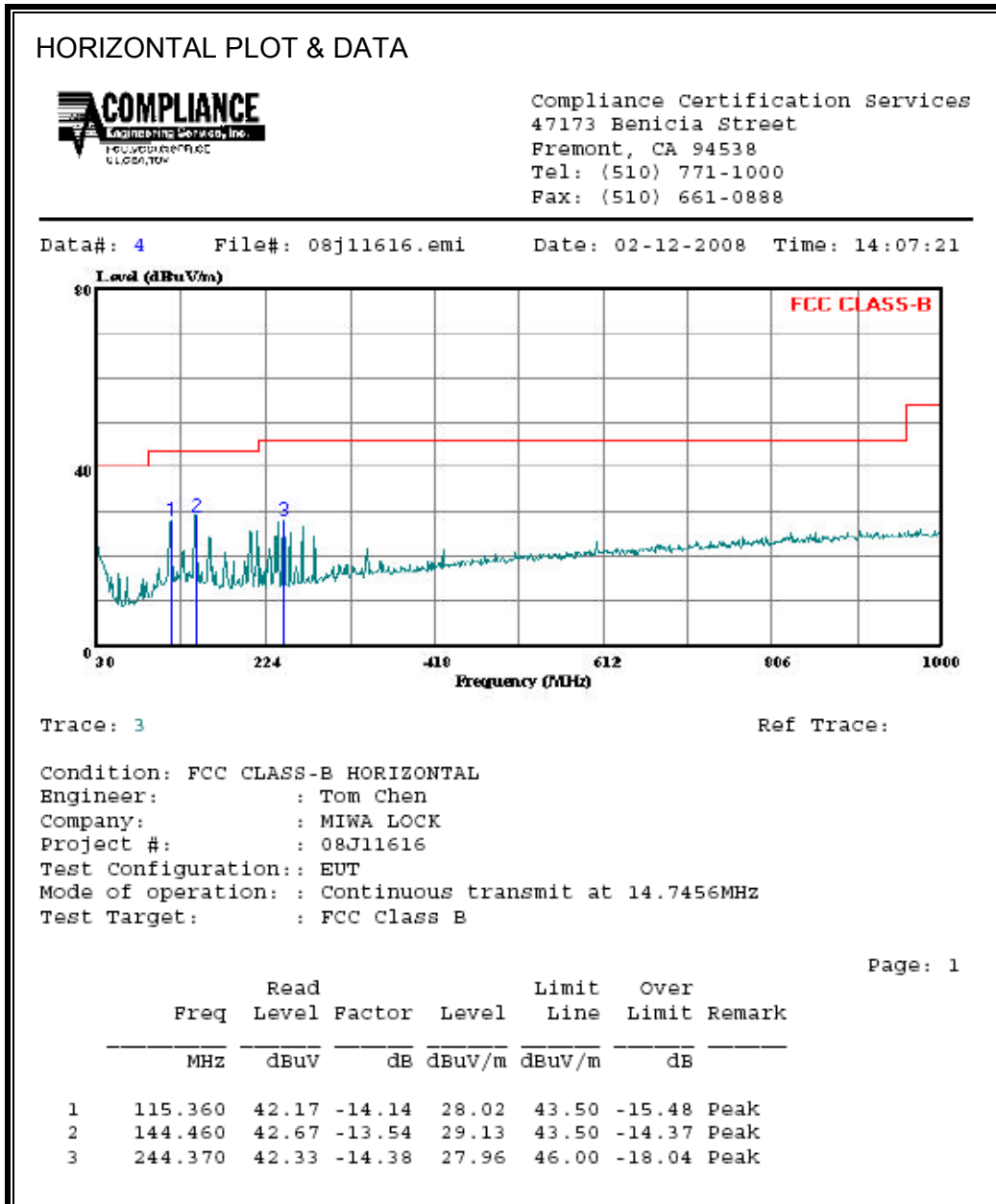


SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, VERTICAL)

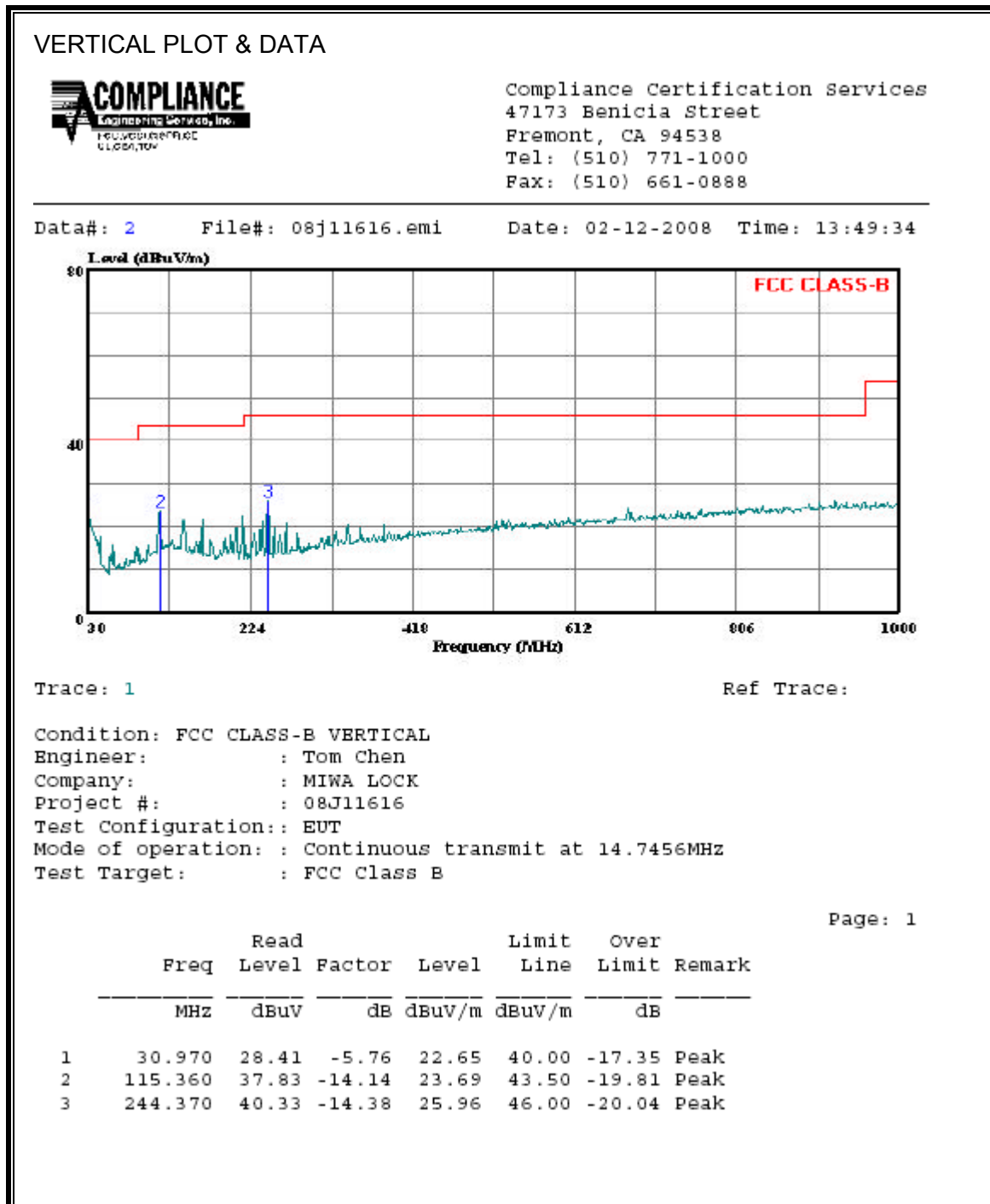


Fundamental = 14.7456 MHz

SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, HORIZONTAL)



SPURIOUS EMISSIONS 30 TO 230 MHz (WORST-CASE CONFIGURATION, VERTICAL)



7.2. FREQUENCY STABILITY

LIMIT

§15.225 (e) The frequency tolerance of the carrier signal shall be maintained within $\pm 0.01\%$ of the operating frequency, over a temperature variation of -20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

TEST PROCEDURE

ANSI / TIA / EIA 603 Clauses 2.3.1 and 2.3.2

RESULTS

No non-compliance noted.

Fundamental = 13.56 MHz

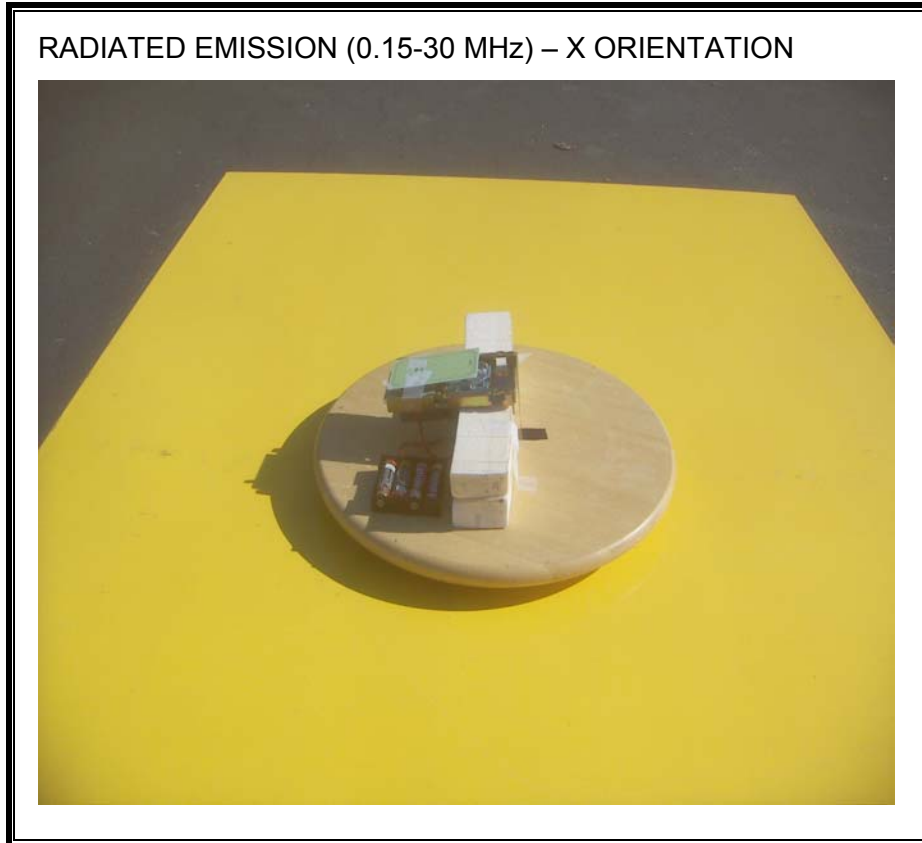
Reference Frequency: EUT Channel 13.56 MHz @ 20°C				
Limit: ± 100 ppm = 135.598 kHz				
Power Supply (Vac)	Environment Temperature (°C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.00	50	13.5598266	-0.013	± 100
3.00	40	13.5598116	-0.002	± 100
3.00	30	13.5598083	0.000	± 100
3.00	20	13.5598087	0.000	± 100
3.00	10	13.5598191	-0.008	± 100
3.00	0	13.5598163	-0.006	± 100
3.00	-10	13.559804	0.003	± 100
3.00	-20	13.55977012	0.028	± 100
2.55	20	13.5598088	0.000	± 100
3.45	20	13.5598088	0.000	± 100

8. SETUP PHOTOS

RADIATED EMISSION (0.15-30 MHz)



RADIATED EMISSION (0.15-30 MHz) – X ORIENTATION



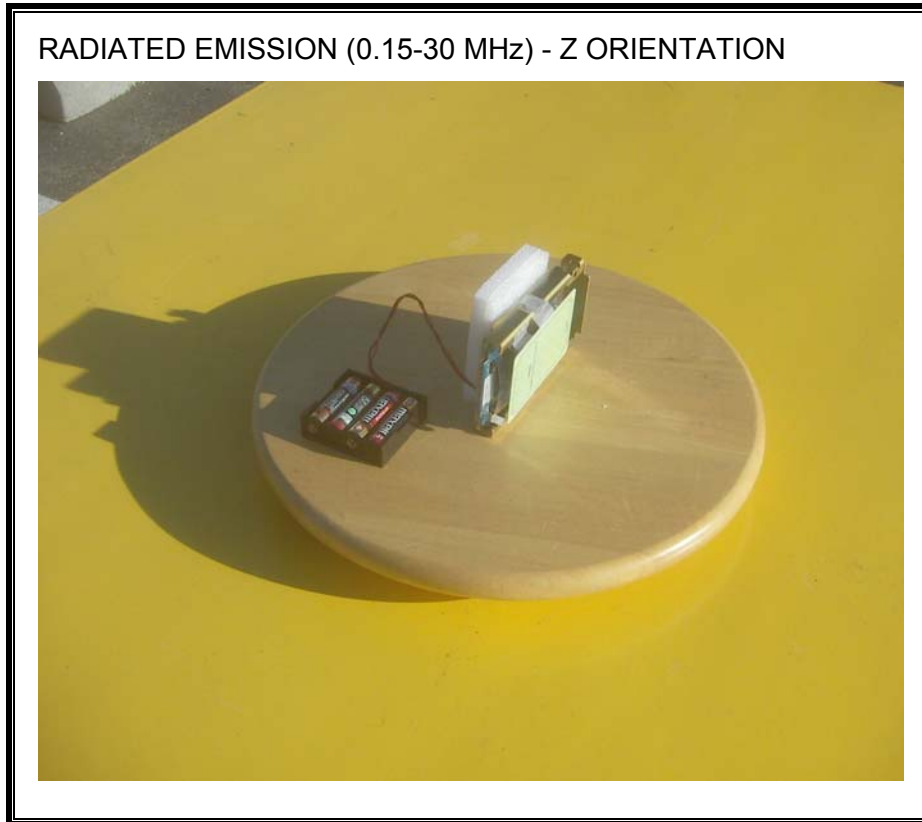
RADIATED EMISSION (0.15-30 MHz) – Y ORIENTATION



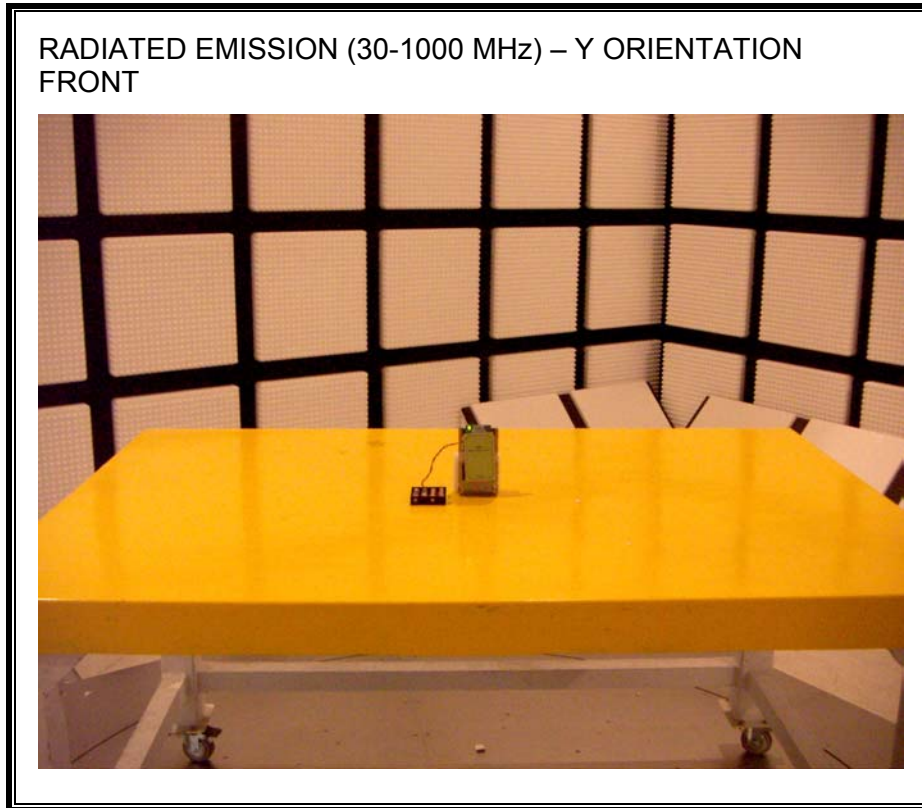
RADIATED EMISSION (0.15-30 MHz) - Y ORIENTATION
BACK



RADIATED EMISSION (0.15-30 MHz) – Z ORIENTATION

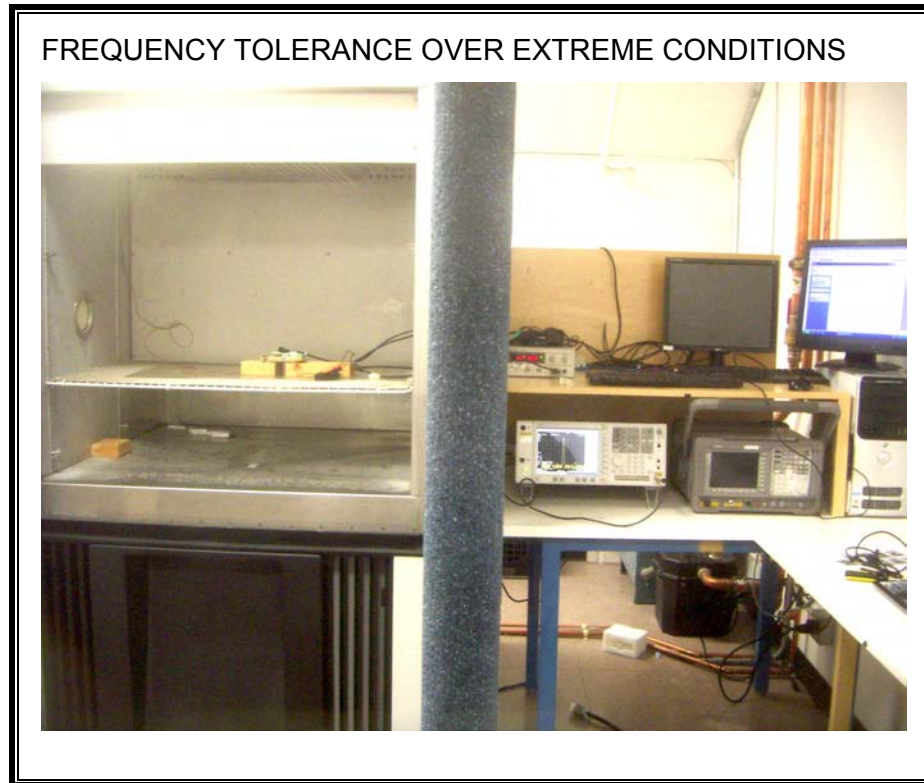


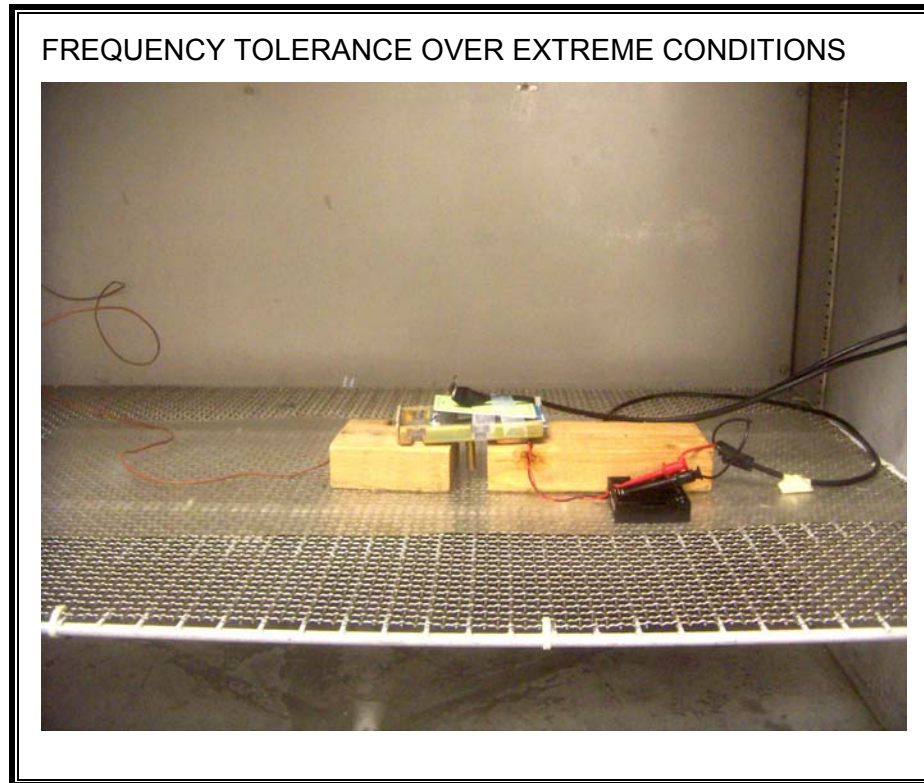
RADIATED EMISSION (30-1000 MHz) – Y ORIENTATION



RADIATED EMISSION (30-1000 MHz) – Y ORIENTATION
BACK







END OF REPORT