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FCC / Industry Canada Certification Test Report

MEI

MEI 5 IN 1 CREDIT CARD BEZEL

WLL REPORT# **12589-01 Rev 0**
July 31, 2012

Re-issued August 28, 2012

FCC ID: QP85IN1

IC ID: 1297A-MEI5IN1

Prepared for:

MEI
1301 Wilson Drive
West Chester, PA 19380

Prepared By:

Washington Laboratories, Ltd.
7560 Lindbergh Drive
Gaithersburg, Maryland 20879

ACCREDITED TESTING

Testing Certificate AT-1448

FCC / Industry Canada Certification Test Report

For the

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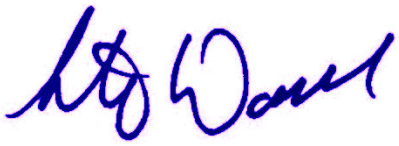

Steven Dovell
Compliance Engineer

Reviewed by:

Michael F. Violette, P.E.
President

Abstract

This report has been prepared on behalf of MEI to support the attached Application for Equipment Authorization. The test report and application are submitted for an Intentional Radiator under Part 15.225 of the FCC Rules and Regulations and Industry Canada RSS210. This Certification Test Report documents the test configuration and test results for a MEI 5 in 1 Credit Card Bezel.

Testing was performed on an Open Area Test Site (OATS) of Washington Laboratories, Ltd, 7560 Lindbergh Drive, Gaithersburg, MD 20879. Site description and site attenuation data have been placed on file with the FCC's Sampling and Measurements Branch at the FCC laboratory in Columbia, MD. Washington Laboratories, Ltd. has been accepted by the FCC and approved by ACLASS under Certificate AT-1448 as an independent FCC test laboratory.

These tests are accredited and meet the requirements of ISO/IEC 17025 as verified by the ANSI-ASQ National Accreditation Board/ACLASS. Refer to certificate and scope of accreditation AT-1448.

The MEI 5 in 1 Credit Card Bezel complies with the limits for an Intentional Radiator device under FCC Part 15.225 and Industry Canada RSS 210.

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Revision History	Reason	Date
Rev 0	Initial Release	July 31, 2012
Rev 1	Corrected limits & added maximum spurious emissions to table	August 28, 2012

Table of Contents

List of Tables

List of Figures

1.1 Compliance Statement

The MEI 5 in 1 Credit Card Bezel complies with the limits for an Intentional Radiator device under FCC Part 15.225 (10/2010) and Industry Canada RSS 210 (Issue 8).

1.2 Test Scope Summary

Tests for radiated and conducted emissions were performed. All measurements were performed in accordance with the 2003 version of ANSI C63.4. The measurement equipment conforms to ANSI C63.2 Specifications for Electromagnetic Noise and Field Strength Instrumentation.

Test Specification	Specific Description	Date Completed	Result	Modifications (Y/N)
CFR47 Part 15.207, RSS Gen section 7.2.4	Class B Conducted Emissions – AC Power Ports	7/24/12	Complied	No
CFR47 Part 15.209, RSS Gen section 7.2.5	Class B Radiated Emissions	7/24/12	Complied	No
RSS Gen section 6	Receiver Spurious Emissions	7/24/12	Complied	No
CFR47 Part 15.225, RSS 210 section A2.6	Field Strength	7/24/12	Complied	No
CFR47 Part 15.225, RSS GEN section 4.7	Frequency Stability	7/25/12	Complied	No
CFR47 Part 2.1049	Occupied Bandwidth	7/24/12	Complied	No

1.3 Contract Information

Customer:	MEI 1301 Wilson Drive West Chester, PA 19380
Purchase Order Number:	4500222815
Quotation Number:	66935

1.4 Test Dates

Testing was performed on the following date(s): 7/24/12 - 7/25/12.

1.5 Test and Support Personnel

Washington Laboratories, LTD	Steven Dovell
Client Representative	Robert Carney

1.6 Abbreviations

A	**A**mpere
ac	**a**lternating **c**urrent
AM	Amplitude Modulation
Amps	**Amp**ere**s**
b/s	**b**its per **s**econd
BW	**B**and**W**idth
CE	**C**onducted **E**mission
cm	**c**enti**m**eter
CW	**C**ontinuous **W**ave
dB	**d**eci**B**el
dc	**d**irect **c**urrent
EMI	**E**lectro**m**agnetic **I**nterference
EUT	**E**quipment **U**nder **T**est
FM	**F**requency **M**odulation
G	**g**iga - prefix for 10^9 multiplier
Hz	**H**ertz
IF	**I**ntermediate **F**requency
k	**k**ilo - prefix for 10^3 multiplier
LISN	**L**ine **I**mpedance **S**tabilization **N**etwork
M	**M**ega - prefix for 10^6 multiplier
m	**m**eter
µ	**m**icro - prefix for 10^{-6} multiplier
NB	**N**arrow**b**and
QP	**Q**uasi-**P**eak
RE	**R**adiated **E**missions
RF	**R**adio **F**requency
rms	**r**oot-**m**ean-**s**quare
SN	**S**erial **N**umber
S/A	**S**pectrum **A**nalyzer
V	**V**olt

2 Equipment Under Test

2.1 EUT Identification & Description

The MEI 5 in 1 Credit Card Bezel used in the vending industry to author magnetic stripe, contact (EMV) & contactless (RFID) credit cards in support of unattended sales. Mechanically it can mount to the front of the MEI Series 2000 bill acceptor or be operated standalone. The RFID emission is based on the ISO 14443 standard with a carrier center frequency of 13.56 MHz.

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Table 1. Device Summary

ITEM	DESCRIPTION
Manufacturer:	MEI
FCC ID:	QP85IN1
IC ID:	1297A-MEI5IN1
Model:	MEI 5 in 1 Credit Card Bezel
FCC Rule Parts:	§15.225
IC Rule Part	§RSS 210 A2.6 & RSS Gen
Frequency Range:	13.56MHz
Maximum Output Power:	1804.3 uV/m at 10 meters
Modulation:	ASK
Occupied Bandwidth:	1.542 kHz
Type of Information:	Data
Number of Channels:	1
Power Output Level	Fixed
Antenna Type	Internal PCB
Frequency Tolerance:	>±0.01% (±100 ppm)
Interface Cables:	Power, I/O
Highest TX Spurious Emission	54.24MHz: 95.8 uV/m @ 3m
Highest RX Spurious Emission	384.03MHz: 118.9 uV/m @ 3m
Power Source & Voltage:	5Vdc from Host device

2.2 Test Configuration

The MEI 5 in 1 Credit Card Bezel was configured for testing as indicated in the figure below. Power from a support AC115 to 5VDC power adaptor (EUT normally receives 5VDC from host unit) was provided to EUT. In addition a RS232 (DB9) line was connected between the EUT and a support laptop. No other connections were necessary.

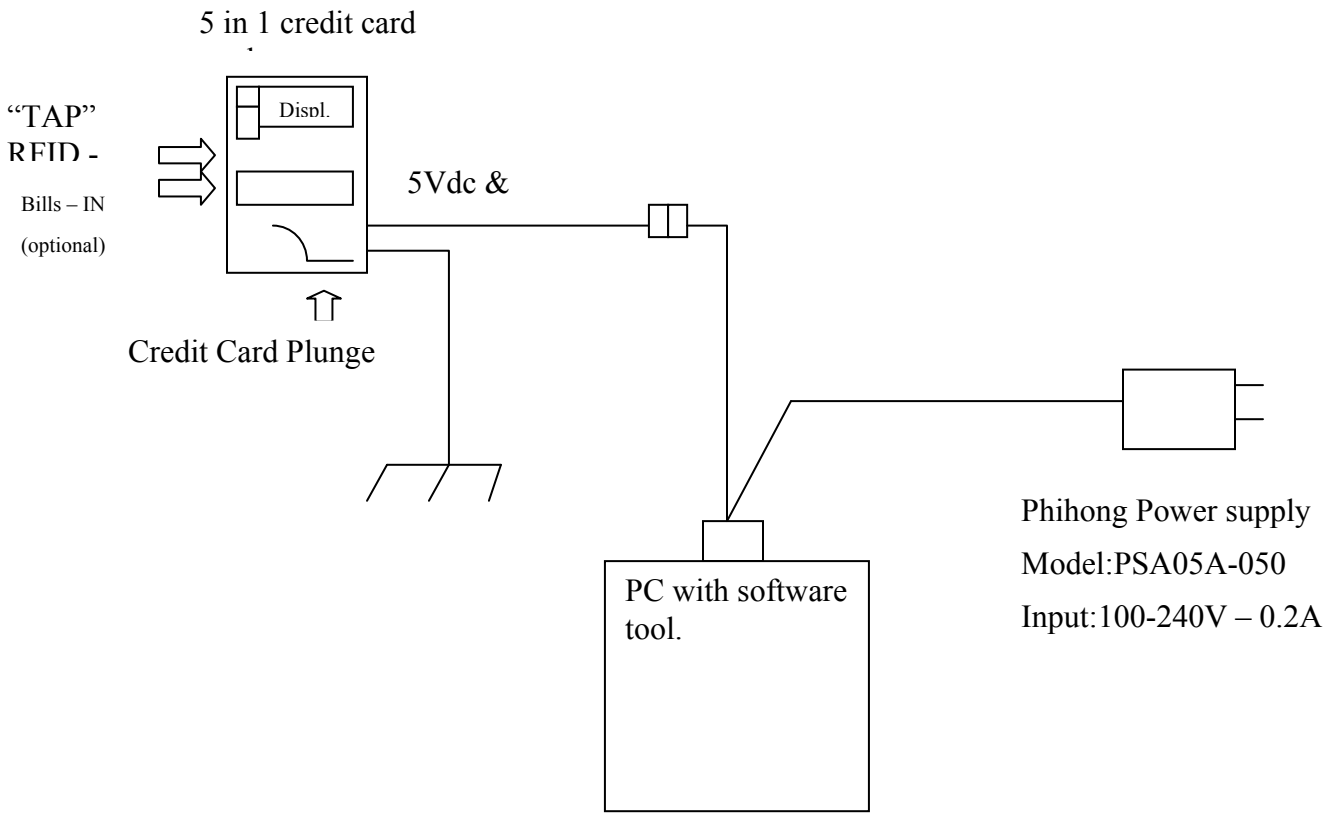

Figure 1: Test Configuration

2.3 Testing Algorithm

The Reader operates at a fixed frequency of 13.56MHz. A support laptop sent commands via RS232 to continuously transmit characters using "MEIDBX1N.exe" test utility program.

2.4 Measurements

2.4.1 References

ANSI C63.2 Specifications for Electromagnetic Noise and Field Strength Instrumentation

ANSI C63.4 American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40GHz

Land Mobile FM or PM Communications Equipment Measurement and Performance Standards (ANSI/TIA/EIA-603-93)

2.5 Test Location

All measurements herein were performed at Washington Laboratories, Ltd. test center in Gaithersburg, MD. Site description and site attenuation data have been placed on file with the FCC's Sampling and Measurements Branch at the FCC laboratory in Columbia, MD. Washington Laboratories, Ltd. has been accepted by the FCC and approved by ACLASS under Certificate AT-1448 as an independent FCC test laboratory.

2.6 Measurement Uncertainty

All results reported herein relate only to the equipment tested. The basis for uncertainty calculation uses ANSI/NCSL Z540-2-1997 with a type B evaluation of the standard uncertainty. Elements contributing to the standard uncertainty are combined using the method described in Equation 1 to arrive at the total standard uncertainty. The standard uncertainty is multiplied by the coverage factor to determine the expanded uncertainty which is generally accepted for use in commercial, industrial, and regulatory applications and when health and safety are concerned (see Equation 2). A coverage factor was selected to yield a 95% confidence in the uncertainty estimation.

Equation 1: Standard Uncertainty

$$u_c = \pm\sqrt{\frac{a^2}{div_a{}^2} + \frac{b^2}{div_b{}^2} + \frac{c^2}{div_c{}^2} + ...}$$

where u_c = standard uncertainty

$a, b, c,..$ = individual uncertainty elements

$div_{a,\ b,\ c}$ = the individual uncertainty element divisor based on the probability distribution

divisor = 1.732 for rectangular distribution

divisor = 2 for normal distribution

divisor = 1.414 for trapezoid distribution

Equation 2: Expanded Uncertainty

$$U = ku_c$$

where U = expanded uncertainty

k = coverage factor

$k \leq 2$ for 95% coverage (ANSI/NCSL Z540-2 Annex G)

u_c = standard uncertainty

The measurement uncertainty complies with the maximum allowed uncertainty from CISPR 16-4-2. Measurement uncertainty is not used to adjust the measurements to determine compliance. The expanded uncertainty values for the various scopes in the WLL accreditation are provided in Table 2 below.

Table 2: Expanded Uncertainty List

Scope	Standard(s)	Expanded Uncertainty
Conducted Emissions	CISPR11, CISPR22, CISPR14, FCC Part 15	2.63 dB
Radiated Emissions	CISPR11, CISPR22, CISPR14, FCC Part 15	4.55 dB

3 Test Equipment

Table 3 shows a list of the test equipment used for measurements along with the calibration information.

Table 3: Test Equipment

Asset #	Manufacturer/Model	Description	Cal. Due
68	HP - 85650A	ADAPTER QP	7/1/2013
70	HP - 85685A	PRESELECTOR RF W/OPT 8ZE	7/1/2013
72	HP - 8568B	ANALYZER SPECTRUM	7/1/2013
31	EMCO - 6502	ANTENNA ACTIVE LOOP	2/23/2014
382	SUNOL SCIENCES CORPORATION - JB1	ANTENNA BICONLOG	12/27/2012
773	FLUKE - 115	TRUE RMS MULTIMETER	1/5/2013
528	AGILENT - E4446A	ANALYZER SPECTRUM	8/30/2012
641	HQ POWER - NONE	0-50V 5AMP DC SUPPLY	CNR
125	SOLAR - 8028-50-TS-24-BNC	LISN	6/28/2013
126	SOLAR - 8028-50-TS-24-BNC	LISN	6/28/2013
53	HP - 11947A	LIMITER TRANSIENT	3/28/2013

4 Test Results

4.1 Occupied Bandwidth

Occupied bandwidth measurement was performed by coupling the output of the EUT to the input of a spectrum analyzer using a near field probe.

The occupied bandwidth was measured as shown:

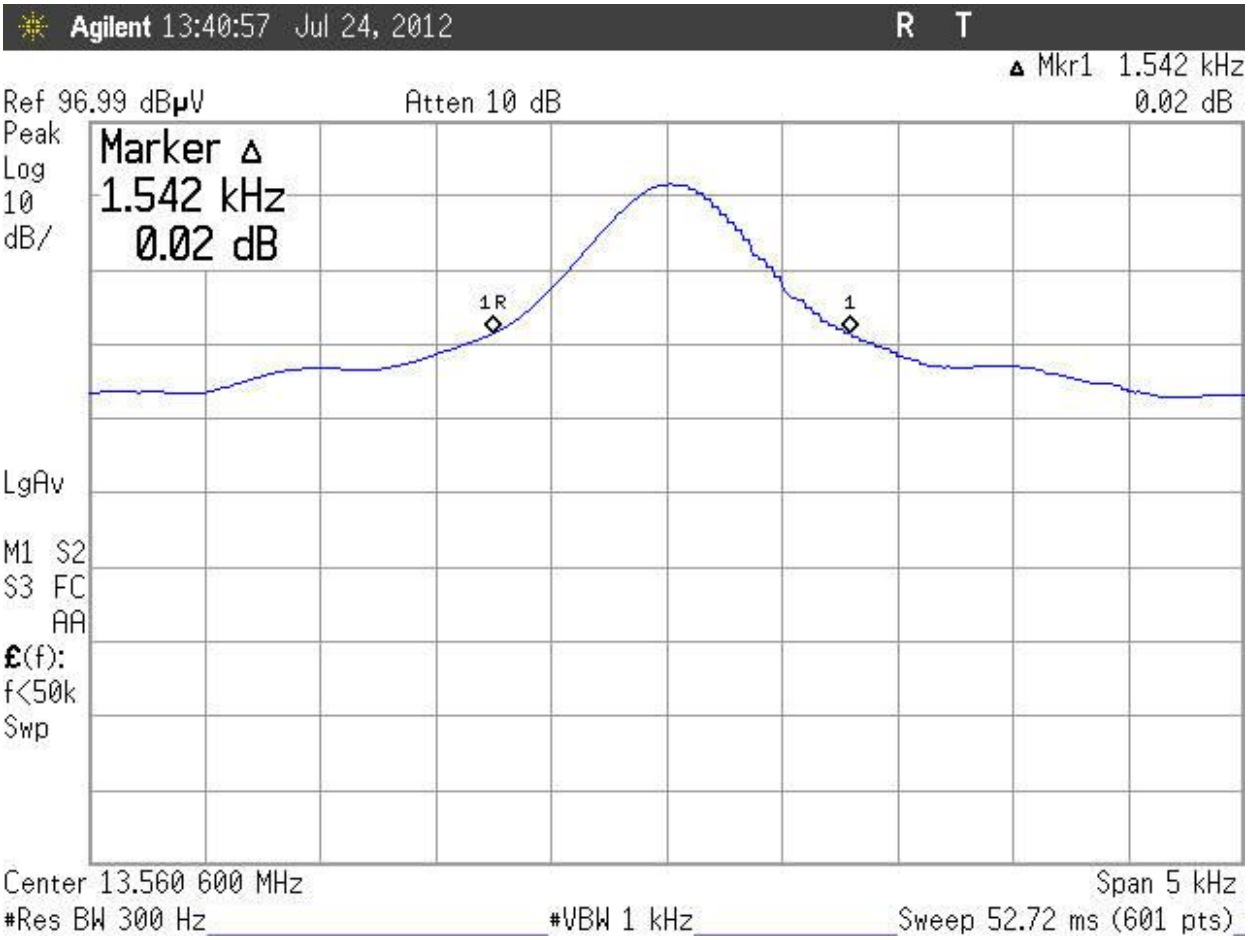

Figure 2: Occupied Bandwidth

Table 3 provides a summary of the Occupied Bandwidth Results.

Table 4: Occupied Bandwidth Results

Frequency	Bandwidth	Limit	Pass/Fail
13.560MHz	1.542 kHz	N/A	Pass

4.2 Radiated Spurious Emissions: FCC §15.225, §15.209, RSS 210 §A2.6, RSS GEN §7.2.5

Radiated emissions from the EUT must comply with the field strength limits as specified in FCC Part 15.225 and 15.209 and IC RSS 210 and RSS GEN . The limits for the radiated emissions are as shown in the following table.

Table 5: Radiated Spurious Emissions Limits

Frequency (MHz)	Limit (µV/m)	Rule Part Reference
13.553 - 13.567	15,848 (@ 30m)	§15.225(a), §RSS 210 A2.6(a)
13.410 – 13.553	334 (@ 30m)	§15.225(b), §RSS 210 A2.6(b)
13.567 – 13.710	334 (@ 30m)	§15.225(b), §RSS 210 A2.6(b)
13.110 – 13.410	106 (@ 30m)	§15.225(c), §RSS 210 A2.6(c)
13.710 – 14.010	106 (@ 30m)	§15.225(c), §RSS 210 A2.6(c)
1.705 – 13.110 14.010 – 30.0	30 (@ 30m)	§15.225(d), §RSS 210 A2.6(c) §15.209, RSS GEN 7.2.5
30.00 – 88.00	100 (@ 3m)	§15.225(d), §RSS 210 A2.6(d) §15.209, RSS GEN 7.2.5
88.00 – 216.00	150 (@ 3m)	§15.225(d), §RSS 210 A2.6(d) §15.209, RSS GEN 7.2.5
216.00 – 960.00	200 (@ 3m)	§15.225(d), §RSS 210 A2.6(d) §15.209, RSS GEN 7.2.5
Above 960	500 (@ 3m)	§15.225(d), §RSS 210 A2.6(d) §15.209, RSS GEN 7.2.5

4.1.1 Test Procedure

The EUT was placed on motorized turntable for radiated testing on an Open Area Test Site. The emissions from the EUT were measured continuously at every azimuth by rotating the turntable. For frequencies below 30MHz, the loop antenna was mounted on a tripod at a height of 1 meter and a distance of 10m from the EUT. Above 30MHz, Biconical and log periodic broadband receiving antennas were mounted on an antenna mast to determine the height of maximum emissions. The height of the antenna was varied between 1 and 4 meters at a distance of 3 meters from the EUT. The peripherals were placed on the table in accordance with ANSI C63.4-2003. Cables were varied in position to produce maximum emissions. Both the horizontal and vertical field components were measured

Below 150kHz, bandwidths used were 300Hz RBW and 10kHz VBW. Between 150 kHz and 30MHz, bandwidths used were 10kHz RBW and 30kHz VBW. Limits were interpolated from the 30 meter limit to the equivalent at 10 meters using the 40dB/decade roll-off. Three orientations of the loop antenna were tested. Above 30MHz, bandwidths used were 100kHz RBW and 30kHz VBW.

Emissions were scanned from 9 kHz to 1GHz. Emissions from were measured using a Quasi-peak detector. Worst case emissions are reported in the data table.

The following is a sample calculation used in the data tables for calculating the final field strength of spurious emissions and comparing these levels to the specified limits.

Sample Calculation:

Spectrum Analyzer Voltage (SA Level):	VdBµV
Antenna Factor (Ant Corr):	AFdB/m
Cable Loss Correction (Cable Corr):	CCdB
Amplifier Gain:	GdB (if applicable)
Electric Field (Corr Level):	EdBµV/m = VdBµV + AFdB/m + CCdB - GdB
To convert to linear units:	EµV/m = antilog (EdBµV/m/20)

4.1.2 Test Results

The EUT complies with the radiated emission requirements of §15.225. The following tables provide the test data.

Table 6: Radiated Emissions below 30MHz

Frequency (MHz)	Polarity H/V	Azimuth (Degree)	Ant. Height (m)	SA Level (dBuV)	Corr Factors (dB)	Corr. Level (uV/m)	Limit (uV/m)	Margin (dB)	Comments
13.56	X	180.00	1.00	49.30	11.9	1151.6	158480.0	-42.8	
13.56	Y	270.00	1.00	53.20	11.9	1804.3	158480.0	-38.9	
13.56	Z	300.00	1.00	40.20	11.9	403.9	158480.0	-51.9	
27.121	X	185.00	1.00	29.30	10.4	96.6	300.0	-9.8	
27.121	Y	180.00	1.00	33.22	10.4	151.6	300.0	-5.9	QP
27.121	Z	270.00	1.00	23.00	10.4	46.8	300.0	-16.1	
13.553	X	180.00	1.00	20.60	11.9	42.3	3340.0	-37.9	Band edge
13.553	Y	80.00	1.00	24.20	11.9	64.0	3340.0	-34.3	Band edge
13.553	Z	0.00	1.00	16.90	11.9	27.6	3340.0	-41.6	Band edge
13.567	X	185.00	1.00	20.20	11.9	40.4	3340.0	-38.3	Band edge
13.567	Y	95.00	1.00	24.30	11.9	64.8	3340.0	-34.2	Band edge
13.567	Z	125.00	1.00	16.00	11.9	24.9	3340.0	-42.5	Band edge
13.35	X	190.00	1.00	26.20	11.9	80.5	1060.0	-22.4	
13.35	Y	270.00	1.00	31.20	11.9	143.1	1060.0	-17.4	
13.35	Z	160.00	1.00	20.10	11.9	39.9	1060.0	-28.5	
13.43	X	190.00	1.00	26.30	11.9	81.4	3340.0	-32.3	
13.43	Y	270.00	1.00	29.10	11.9	112.4	3340.0	-29.5	
13.43	Z	120.00	1.00	20.30	11.9	40.8	3340.0	-38.3	
13.49	X	185.00	1.00	26.50	11.9	83.4	3340.0	-32.1	
13.49	Y	270.00	1.00	31.40	11.9	146.6	3340.0	-27.2	
13.49	Z	180.00	1.00	21.30	11.9	45.8	3340.0	-37.3	
13.64	X	180.00	1.00	24.20	11.9	64.1	3340.0	-34.3	
13.64	Y	270.00	1.00	28.30	11.9	102.7	3340.0	-30.2	
13.64	Z	125.00	1.00	22.30	11.9	51.5	3340.0	-36.2	
13.71	X	185.00	1.00	23.40	11.9	58.4	1060.0	-25.2	
13.71	Y	270.00	1.00	25.85	11.9	77.5	1060.0	-22.7	
13.71	Z	125.00	1.00	18.60	11.9	33.6	1060.0	-30.0	

Table 7: Radiated Emissions above 30MHz

Frequency (MHz)	Polarity H/V	Azimuth (Degree)	Ant. Height (m)	SA Level (dBuV)	Corr Factors (dB)	Corr. Level (uV/m)	Limit (uV/m)	Margin (dB)	Comments
40.69	V	200.00	1.00	18.39	13.3	38.4	100.0	-8.3	QP
49.22	V	100.00	1.00	16.30	9.0	18.5	100.0	-14.7	
54.24	V	90.00	1.00	31.15	8.5	95.8	100.0	-0.4	QP
67.80	V	275.00	1.00	7.40	9.6	7.1	100.0	-23.0	
81.36	V	180.00	1.00	4.30	9.5	4.9	100.0	-26.2	
69.53	V	190.00	1.00	11.40	9.4	11.0	100.0	-19.2	
108.26	V	270.00	1.00	12.60	14.6	23.0	150.0	-16.3	
148.89	V	270.00	1.00	5.50	14.3	9.8	150.0	-23.7	
172.55	V	275.00	1.00	5.00	13.9	8.9	150.0	-24.6	
244.03	V	185.00	2.00	11.50	14.5	20.0	200.0	-20.0	
252.02	V	250.00	2.00	13.90	14.6	26.7	200.0	-17.5	
384.03	V	0.00	1.96	21.90	19.6	118.9	200.0	-4.5	QP
40.69	H	270.00	4.00	8.20	13.3	11.9	100.0	-18.5	
54.24	H	90.00	1.00	14.80	8.5	14.6	100.0	-16.7	
108.49	H	45.00	3.14	8.60	14.7	14.6	150.0	-20.2	
172.54	H	190.00	2.50	2.50	13.9	6.6	150.0	-27.1	
244.03	H	15.00	1.55	11.00	14.5	18.9	200.0	-20.5	
268.02	H	80.00	1.00	21.40	16.5	78.2	200.0	-8.2	
270.06	H	85.00	1.00	8.10	16.7	17.4	200.0	-21.2	
276.02	H	90.00	1.00	18.70	17.0	61.2	200.0	-10.3	
384.03	H	185.00	1.00	18.50	19.6	80.4	200.0	-7.9	
400.00	H	190.00	2.77	10.70	20.3	35.6	200.0	-15.0	

Table 8: Radiated Emissions Receive Only

Frequency (MHz)	Polarity H/V	Azimuth (Degree)	Ant. Height (m)	SA Level (dBuV)	Corr Factors (dB)	Corr. Level (uV/m)	Limit (uV/m)	Margin (dB)	Comments
49.22	V	100.00	1.00	16.30	9.0	18.5	100.0	-14.7	
67.80	V	275.00	1.00	7.40	9.6	7.1	100.0	-23.0	
81.36	V	180.00	1.00	4.30	9.5	4.9	100.0	-26.2	
69.53	V	190.00	1.00	11.40	9.4	11.0	100.0	-19.2	
172.55	V	275.00	1.00	5.00	13.9	8.9	150.0	-24.6	
252.02	V	250.00	2.00	13.90	14.6	26.7	200.0	-17.5	
384.03	V	0.00	1.96	21.90	19.6	118.9	200.0	-4.5	QP
172.54	H	190.00	2.50	2.50	13.9	6.6	150.0	-27.1	
268.02	H	80.00	1.00	21.40	16.5	78.2	200.0	-8.2	
270.06	H	85.00	1.00	8.10	16.7	17.4	200.0	-21.2	
276.02	H	90.00	1.00	18.70	17.0	61.2	200.0	-10.3	
384.03	H	185.00	1.00	18.50	19.6	80.4	200.0	-7.9	
400.00	H	190.00	2.77	10.70	20.3	35.6	200.0	-15.0	

4.2 Conducted Emissions (AC Power Line) FCC §15.207, RSS GEN §7.2.4

The EUT was placed on an 80 cm high 1 x 1.5 m non-conductive table above a ground plane. Power to the EUT was provided through a Solar Corporation 50 Ω/50 µH Line Impedance Stabilization Network bonded to a 3 x 2 meter ground plane. The LISN has its AC input supplied from a filtered AC power source. Power and data cables were moved about to obtain maximum emissions.

The 50 Ω output of the LISN was connected to the input of the spectrum analyzer and the emissions in the frequency range of 150 kHz to 30 MHz were measured. The detector function was set to quasi-peak or peak, as appropriate, and the resolution bandwidth during testing was at least 9 kHz, with all post-detector filtering no less than 10 times the resolution bandwidth.

All emissions were measured with the EUT intact with the exception of the fundamental transmit frequency of 13.56MHz. To measure 13.56MHz, the internal antenna was replaced with a 50 ohm resistive load.

AC Power Line conducted emissions test data are included in Table 9.

Table 9: AC Power Conducted Emissions Test Data

NEUTRAL

Frequency (MHz)	Level QP (dBµV)	Level AVG (dBµV)	Cable Loss (dB)	LISN Corr (dB)	Level QP Corr (dBµV)	Level Corr Avg (dBµV)	Limit QP (dBµV)	Limit AVG (dBµV)	Margin QP (dB)	Margin AVG (dB)
0.174	31.7	28.2	10.2	0.9	42.8	39.3	64.8	54.8	-22.0	-15.5
4.942	32.8	29.8	10.7	1.2	44.7	41.7	56.0	46.0	-11.3	-4.3
6.330	40.5	34.1	10.9	1.3	52.7	46.3	60.0	50.0	-7.3	-3.7
8.060	36.5	31.2	11.0	1.3	48.8	43.5	60.0	50.0	-11.2	-6.5
13.560	30.5	28.4	11.3	1.0	42.8	40.7	60.0	50.0	-17.2	-9.3
14.240	37.1	18.3	11.3	1.0	49.4	30.6	60.0	50.0	-10.6	-19.4
16.000	35.9	16.5	11.4	0.9	48.2	28.8	60.0	50.0	-11.8	-21.2
27.220	38.2	35.1	11.8	2.6	52.6	49.5	60.0	50.0	-7.4	-0.5

Phase

Frequency (MHz)	Level QP (dBµV)	Level AVG (dBµV)	Cable Loss (dB)	LISN Corr (dB)	Level QP Corr (dBµV)	Level Corr Avg (dBµV)	Limit QP (dBµV)	Limit AVG (dBµV)	Margin QP (dB)	Margin AVG (dB)
0.179	32.3	25.5	10.2	0.5	43.0	36.2	64.5	54.5	-21.5	-18.3
4.932	34.6	31.3	10.7	0.8	46.1	42.8	56.0	46.0	-9.9	-3.2
6.540	43.2	34.7	10.9	0.8	54.9	46.4	60.0	50.0	-5.1	-3.6
9.160	37.6	30.5	11.1	0.9	49.6	42.5	60.0	50.0	-10.4	-7.5
13.560	30.4	27.9	11.3	0.9	42.6	40.1	60.0	50.0	-17.4	-9.9
26.510	33.9	10.5	11.8	2.3	48.0	24.6	60.0	50.0	-12.0	-25.4
27.220	37.4	33.9	11.8	2.5	51.7	48.2	60.0	50.0	-8.3	-1.8

4.3 Frequency Stability: FCC Part §2.1055, §15.225, RSS GEN §4.7, RSS 210 §A2.6

Frequency as a function of temperature and voltage variation shall be maintained within the FCC-prescribed tolerances. Per §15.225(e) and RSS 210 A2.6, the frequency tolerance shall be maintained within ±0.01% of the reference frequency.

4.3.1 Test Procedure

The temperature stability was measured with the unit in an environmental chamber used to vary the temperature of the sample. The sample was held at each temperature step to allow the temperature of the sample to stabilize.

The frequency stability of the transmitter was examined at the voltage extremes and for the temperature range of -30°C to +50°C. The carrier frequency was measured while the EUT was in the temperature chamber. The reference frequency of the EUT was measured at the ambient room temperature with the frequency counter.

The frequency stabilities can be maintained to a lesser temperature range provided that the transmitter is automatically inhibited from operating outside the lesser temperature range.

The RF carrier frequency shall not depart from the reference frequency (reference frequency is the frequency at 20ºC and rated supply voltage) in excess of +/-1356 Hz.

The EUT is powered by 5Vdc voltage supplied via an external adjustable AC/DC power supply.

4.3.2 Test Results

The EUT complies with the temperature stability requirements of the specified standards. Test results are given in Table 10.

Table 10: Frequency Stability Test Data

Temp (C)	Freq (MHz)	Difference (Hz)	Deviation (%)
Ambient	13.560625	0	0
-30	13.560441		
-20	13.560553	-72	-0.00053
-10	13.560591	-34	-0.00025
0	13.560625	0	0.00000
10	13.560625	0	0.00000
20	13.560625	0	0.00000
25	13.560625	0	0.00000
30	13.560600	-25	-0.00018
40	13.560604	-21	-0.00015
50	13.560608	-17	-0.00013

Voltage (Volts)	Freq (MHz)	Difference (Hz)	Deviation (%)	Voltage (Volts)
At rated	13.560625	0	0	5.01
At 85%	13.560625	0	0.0000	4.25
At 115%	13.560625	0	0.0000	5.75