Emissions
Test Report

EUT Name: Tribrid Contactless Card Reader

EUT Model: M07999

FCC Title 47, Part 15, Subpart C and ICES-003

Prepared for:

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Report/Issue Date: 24 July 2008
Report Number: 30861749.001

Statement of Compliance

Manufacturer:	Gilbarco, Inc. 7300 W. Friendly Rd, POB 22087 Greensboro, NC 27410 336-547-5000
Requester / Applicant:	Bob Sykes
Name of Equipment:	Tribrid Contactless Card Reader
Model No.	M07999
Type of Equipment:	Intentional Radiator
Class of Equipment:	Intentional Radiator
Application of Regulations:	FCC Title 47, Part 15, Subpart C and ICES-003
Test Dates:	18 July 2008 to 21 July 2008

Guidance Documents:

Emissions: FCC Part 15.225 and RSS-210 Issue 7

Test Methods:

Emissions: ANSI C63.4-2003,

The electromagnetic compatibility test and documented data described in this report has been performed and recorded by TUV Rheinland, in accordance with the standards and procedures listed herein. As the responsible authorized agent of the EMC laboratory, I hereby declare that a sample of one, of the equipment described above, has been shown to be compliant with the EMC requirements of the stated regulations and standards based on these results. If any special accessories and/or modifications were required for compliance, they are listed in the Executive Summary of this report.

This report must not be used to claim product endorsement by NVLAP or any agency of the U.S. Government. This report contains data that are not covered by NVLAP accreditation. This report shall not be reproduced except in full, without the written authorization of the laboratory.

Michael Moranha	24 July 2008		24 July 2008
Test Engineer	Date	NVLAP Signatory	Date

200094-0

90552 and 100881

Industry Canada

IC3755

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1 Executive Summary

1.1 Scope

This report is intended to document the status of conformance with the requirements of the FCC Title 47, Part 15, Subpart C and ICES-003 based on the results of testing performed on *18 July* 2008 through *21 July* 2008 on the *Tribrid Contactless Card Reader* Model No. *M07999* manufactured by Gilbarco, Inc.. This report only applies to the specific samples tested under the stated test conditions. It is the responsibility of the manufacturer to assure that additional production units of this model are manufactured with identical or EMI equivalent electrical and mechanical components. This report is further intended to document changes and modifications to the EUT throughout its life cycle. All documentation will be included as a supplement.

1.2 Purpose

Testing was performed to evaluate the EMC performance of the EUT in accordance with the applicable requirements, procedures, and criteria defined in the application of regulations and application of standards listed in this report.

1.3 Summary of Test Results

Table 1 - Summary of Test Results

Emission	Test Method(s)	Test Parameters	Result
Radiated Emissions	ANSI C63.4-2003	30 MHz to 1000 MHz, Intentional Radiator	compliant
Conducted Emissions	ANSI C63.4-2003	0.15 MHz to 30 MHz	compliant

1.4 Special Accessories

No special accessories were necessary in order to achieve compliance.

1.5 Equipment Modifications

No modifications were found to be necessary in order to achieve compliance.

2 Laboratory Information

2.1 Accreditations & Endorsements

2.1.1 US Federal Communications Commission

TUV Rheinland at the 762 Park Ave., Youngsville, N.C 27596 address is accredited by the commission for performing testing services for the general public on a fee basis. This laboratory test facilities have been fully described in reports submitted to and accepted by the FCC (Registration No 90552 and 100881). The laboratory scope of accreditation includes: Title 47 CFR Part 15, 18, and 90. The accreditation is updated every 3 years.

2.1.2 NIST / NVLAP

TUV Rheinland is accredited by the National Voluntary Laboratory Accreditation Program, which is administered under the auspices of the National Institute of Standards and Technology. The laboratory has been assessed and accredited in accordance with ISO Standard 17025:2005 (Lab code 200094-0). The scope of laboratory accreditation includes emission and immunity testing. The accreditation is updated annually.

2.1.3 Canada – Industry Canada

Registration No. IC3755

2.1.4 Japan - VCCI

The Voluntary Control Council for Interference by Information Technology Equipment (VCCI) is a group that consists of Information Technology Equipment (ITE) manufacturers and EMC test laboratories. The purpose of the Council is to take voluntary control measures against electromagnetic interference from Information Technology Equipment, and thereby contribute to the development of a socially beneficial and responsible state of affairs in the realm of Information Technology Equipment in Japan. TUV Rheinland at the 762 Park Ave. Youngsville, N.C 27596 address has been assessed and approved in accordance with the Regulations for Voluntary Control Measures. (Registration No. R-1174, R-1679, C-1790 and C-1791).

2.1.5 Acceptance By Mutual Recognition Arrangement

The United States has an established agreement with specific countries under the Asia Pacific Laboratory Accreditation Corporation (APLAC) Mutual Recognition Arrangement. Under this agreement, all TUV Rheinland at the 762 Park Ave. Youngsville, N.C 27596 address test results and test reports within the scope of the laboratory NIST / NVLAP accreditation will be accepted by each member country.

2.2 Test Facilities

All of the test facilities are located at 762 Park Ave., Youngsville, North Carolina 27596, USA.

2.2.1 Emission Test Facility

The Open Area Test Site and AC Line Conducted measurement facility used to collect the radiated and conducted data has been constructed in accordance with ANSI C63.7:1992. The site has been measured in accordance with and verified to comply with the theoretical normalized site attenuation requirements of ANSI C63.4:2003, at a test distance of 3 and 10 meters. This site has been described in reports dated May 12, 1997, submitted to the FCC, and accepted by letter dated June 25, 1997 (31040/SIT 1300F2). The site is listed with the FCC and accredited by NVLAP (code 200094-0). The 5m semi-anechoic chamber used to collect the radiated data has been verified to comply with the theoretical normalized site attenuation requirements of ANSI C63.4:2003, at a test distance of 3 meters. A report detailing this site can be obtained from TUV Rheinland.

2.2.2 Immunity Test Facility

ESD, EFT, Surge, PQF: These tests are performed in an environmentally controlled room with a 3.7m x 3.7m x 3.175mm thick aluminum floor connected to PE ground. For ESD testing, tabletop equipment is placed on a 0.5mm thick insulated mat on a 1.6m x 0.8m x 0.8m high non-conductive table with a 3.175mm aluminum top (Horizontal Coupling Plane). The HCP is connected to the main ground plane via a low impedance ground strap through two 470 kΩ resistors. The Vertical Coupling Plane consists of an aluminum plate 50cm x 50cm x 3.175mm thick. The VCP is connected to the main ground plane via a low impedance ground strap through two 470 kΩ resistors. For each of the other tests, the HCP is removed.

RF Field Immunity testing is performed in a 7.3m x 3.7m x 3.2m anechoic chamber.

RF Conducted and Magnetic Field Immunity testing is performed on a 4.9m x 3.7m x 3.175mm thick aluminum ground plane which is connected to one end of the anechoic chamber.

All test areas allow a minimum distance of 1 meter from the EUT to walls or conducting objects.

2.3 Measurement Uncertainty

Two types of measurement uncertainty are expressed in this report, per *ISO Guide To The Expression Of Uncertainty In Measurement*, 1st addition, 1995.

The Combined Standard Uncertainty is the standard uncertainty of the result of a measurement when that result is obtained from the values of a number of other quantities, equal to the positive square root of a sum of terms, the terms being the variances or co-variances of these other quantities weighted according to how the measurement result varies with changes in these quantities. The term standard uncertainty is the result of a measurement expressed as a standard deviation.

The Expanded Uncertainty defines an interval about the result of a measurement that may be expected to encompass a large fraction of the distribution of values that could reasonably be attributed to the measurand. The fraction may be viewed as the coverage probability or level of confidence of the interval.

The test system for conducted emissions is defined as the LISN, spectrum analyzer, coaxial cables, and pads. The test system for radiated emissions is defined as the antenna, spectrum analyzer, pre-amplifier, coaxial cables, and pads. The test system for radiated immunity is defined as the antenna, amplifier, cables, signal generator field probe and spectrum analyzer. The test system for conducted immunity is defined as the coupling/decoupling device, amplifier, cables, signal generator and spectrum analyzer. The test system for voltage variations and interruptions immunity is defined as the AC power source and the interruptions generator. The test system for electrical fast transient immunity is defined as the AC power output source and the fast transient generator. The test system for lightning surge immunity is defined as the AC power output source and the lightning surge generator. The test system for electrostatic discharge immunity is defined as the air and contact discharge generators. The test system for power frequency magnetic field immunity is defined as the AC voltage source. The test system for the damped oscillatory wave immunity is defined as the AC power output source and the oscillatory wave generator. The test system for harmonic current and voltage flicker test is defined as the AC power source and the detection devices. Compliance criteria are not based on measurement uncertainty.

Radiated emissions measurements is ± 3.3 dB
Conducted emissions measurements is ± 2.18 dB
Harmonic current and flicker measurements is ± 5.0 %
ESD immunity measurements is ± 8.2 %
Radiated immunity measurements is ± 4.10 dB
EFT fast transient immunity measurements is ± 5.84 %
Surge immunity measurements is ± 5.84 %
Conducted immunity measurements is ± 3.66 dB
Magnetic field immunity measurements is ± 11.6 %
Voltage variation and interruption measurements is ± 3.48 %

2.4 Calibration Traceability

All measurement instrumentation is traceable to the National Institute of Standards and Technology (NIST). Measurement method complies with ANSI/NCSL Z540-1-1994 and ISO Standard 17025:2005.

3 Product Information

3.1 Product Description

The information for all equipment used in the tested system, including: descriptions of cables, clock and microprocessor frequencies, EMI critical components, and accessory equipment has been supplied by the manufacturer.

The serial number of the product tested is Not Serialized.

3.2 Equipment Configuration

A description and justification of the equipment configuration is given in the EMC Test Plan. The EUT was tested as described in the EMC Test Plan and was configured and operated in a manner consistent with its intended use. The EUT was connected to rated power and allowed to warm up to normal operating conditions. The placement of the EUT system components was guided by the test standard and selected to represent typical installation conditions.

In the case of an EUT that can operate in more than one configuration, preliminary testing was performed to determine the configuration that produced maximum radiation.

The final configuration was selected to produce worse case radiation and place the EUT in the most susceptible state. There were no deviations from the description of the Equipment Configuration given in the EMC Test Plan.

3.3 Operation Mode

A description and justification of the operation mode is given in the EMC Test Plan.

In the case of an EUT that can operate in more than one state, preliminary testing was performed to determine the operating mode that produced maximum radiation.

The final operating mode was selected to produce worse case radiation and place the EUT in the most susceptible state. There were no deviations from the description of the Operation Mode given in the EMC Test Plan.

4 Emissions

4.1 Radiated Emissions

Testing was performed in accordance with ANSI C63.4-2003. These test methods are listed under the laboratory's NVLAP Scope of Accreditation. This test measures the levels emanating from the EUT, thus evaluating the potential for the EUT to cause radio frequency interference to other electronic devices.

4.1.1 Test Methodology

4.1.1.1 Preliminary Test

A test program that controls instrumentation and data logging was used to automate the preliminary RF emission test procedure. The frequency range of interest was divided into sub-ranges to yield a frequency resolution of approximately 300 kHz and provide a reading at each frequency for no more than 12° of turntable rotation. For each frequency sub-range the turntable was rotated 360° while peak emission data was recorded and plotted over the frequency range of interest in horizontal and vertical antenna polarization's.

Preliminary emission profile testing was performed inside the anechoic chamber. The EUT was placed on a 1.0m x 1.5m non-conductive table 80cm above the floor. The EUT was positioned as shown in the setup photographs. The receiving antenna was placed at a distance of 3m at a fixed height of 1m. Measurement equipment was located outside of the chamber. A video camera was placed inside the chamber to view the EUT.

4.1.1.2 Final Test

For each frequency measured, the peak emission was maximized by manipulating the receiving antenna from 1 to 4 meters above the ground plane and placing it at the position that produced the maximum signal strength reading. The turntable was then rotated through 360° while observing the peak signal and placing the EUT at the position that produced maximum radiation. The six highest emissions relative to the limit were measured unless such emissions were more than 20 dB below the limit. If less than six emissions are within 20 dB of the limit, than the noise level of the receiver is measured at frequencies where emissions are expected. Multiples of all oscillator and microprocessor frequencies were also checked.

Final testing was performed on an NSA compliant test site. The EUT was placed on a 1.0m x 1.5m non-conductive table 80cm above the ground plane. The placement of EUT and cables were the same as for preliminary testing and is shown in the setup photographs.

4.1.1.3 Deviations

There were no deviations from this test methodology.

4.1.2 Test Results

Section 4.1.2.1 lists the final measurement data under the worst case operating modes, configurations, and/or cable positions. It also reflects the results including any modifications and/or special accessories listed in Sections 1.4 and 1.5.

As originally tested, the EUT was found to be compliant to the requirements of the test standard(s).

4.1.2.1 Final Data For Fundamental Transmit Frequency

The data recorded in this section contains the final results under the worst-case conditions and with any modifications or special accessories implemented as the manufacturer intends.

SOP 1 Radiated Emissions — Tracking # 30861749.001 Page 1 of 1

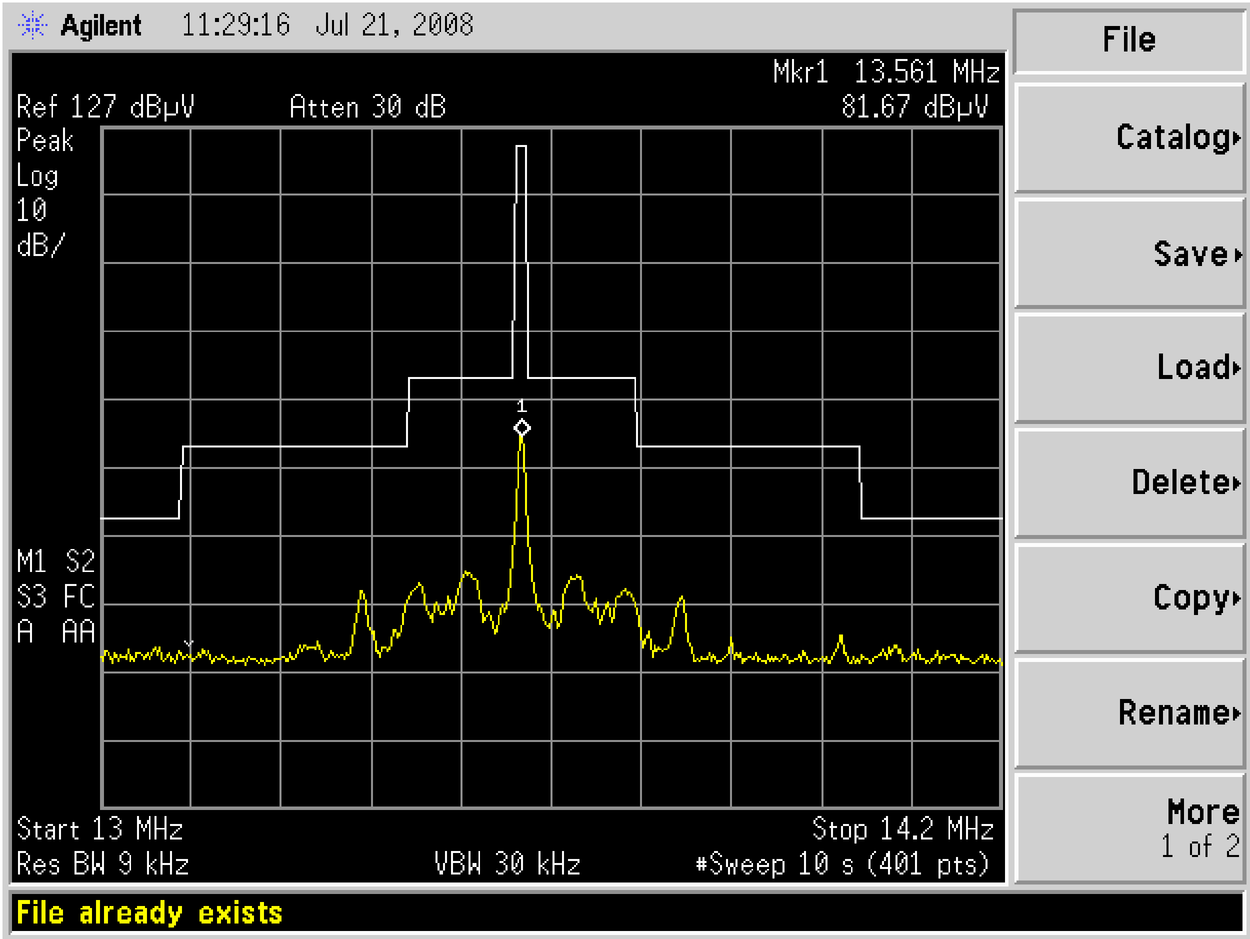
EUT Name	Tribrid Contactless Card Reader	**Date**	21 Jul 2008
EUT Model	M07999	**Temp / Hum in**	75ºF / 33%rh
EUT Serial	Not Serialized	**Temp / Hum out**	N/A
Standard	FCC Part 15.225 and RSS-210 Issue 7	**Line AC / Freq.**	N/A
Deg/sweep	12 degrees	**RBW / VBW**	9khz/ 30khz
Dist/Ant Used	3m / 6502	**Performed by**	Michael Moranha
Configuration:	Normal Configuration /		

Emission Freq (MHz)	ANT Polar (H/V)	ANT Pos (m)	Table Pos (deg)	FIM Value (dBuV)	Amp Gain (dB)	Cable Loss (dB)	ANT Factor (dB/m)	E-Field Value (dBuV/m)	Spec Limit (dBuV/m)	Spec Margin (dB)
13.56	H	1.00	204	70.78	0.00	0.39	10.5	81.67	124.00	-42.33

Spec Margin = E-Field Value - Limit, E-Field Value = FIM Value - Amp Gain + Cable Loss + ANT Factor ± Uncertainty

Combined Standard Uncertainty $u_c(y)$ = ± 1.6dB Expanded Uncertainty $U = ku_c(y)$ k = 2 for 95% confidence

Notes: Quasi Peak Measurement.
H = The loop antenna positioned parallel to the EUT (worst case).



All antenna and coax factors have been added into the above measurement.

4.1.2.2 Final Data For Emissions other Than Transmit Frequency

The data recorded in this section contains the final results under the worst-case conditions and with any modifications or special accessories implemented as the manufacturer intends.

SOP 1 Radiated Emissions Tracking # 30861749.001 Page 1 of 1

EUT Name	Tribrid Contactless Card Reader	**Date**	18 Jul 2008
EUT Model	M07999	**Temp / Hum in**	ºF / %rh
EUT Serial	Not Serialized	**Temp / Hum out**	N/A
Standard	FCC Part 15.209 and RSS-210 Issue 7	**Line AC / Freq.**	120 VAC
Deg/sweep	12 degrees	**RBW / VBW**	See Notes
Dist/Ant Used	3m /6502 / 6140	**Performed by**	Michael Moranha

Configuration: Normal Operation – Spurious emissions up to the 10th Harmonic

Emission Freq (MHz)	ANT Polar (H/V)	ANT Pos (m)	Table Pos (deg)	FIM Value (dBuV)	Amp Gain (dB)	Cable Loss (dB)	ANT Factor (dB/m)	E-Field Value (dBuV/m)	Spec Limit (dBuV/m)	Spec Margin (dB)
27.12	H	1.00	270	14.52	0.00	0.56	9.3	24.38	49.54	-25.16
40.68	H	1.05	10	20.11	0.00	0.68	9.28	30.07	40.00	-9.93
54.24	H	1.00	70	17.67	0.00	0.80	10.08	28.56	40.00	-11.44
67.80	H	1.75	87	16.47	0.00	0.90	9.35	26.73	40.00	-13.27
81.36	H	2.67	69	23.02	0.00	0.99	6.96	30.96	40.00	-9.04
94.92	H	1.00	4	17.88	0.00	1.05	7.68	26.62	43.50	-16.88
108.48	H	3.12	84	26.02	0.00	1.13	7.12	34.27	43.50	-9.23
122.04	H	2.38	104	24.17	0.00	1.20	7.40	32.77	43.50	-10.73
135.60	H	2.30	228	31.63	0.00	1.28	7.72	40.64	43.50	-2.86
95.24	H	1.00	4	17.88	0.00	1.06	7.71	26.65	43.50	-16.85
100.01	H	2.00	55	20.49	0.00	1.07	8.00	29.56	43.50	-13.94

Spec Margin = E-Field Value - Limit, E-Field Value = FIM Value - Amp Gain + Cable Loss + ANT Factor ± Uncertainty

Combined Standard Uncertainty $u_c(y)$ = ± 1.6dB Expanded Uncertainty $U = ku_c(y)$ k = 2 for 95% confidence

Notes: Quasi Peak Measurements
Measurements made below 30 MHz were made with 9kHz RBW / 30kHz VBW
Measurements made above 30 MHz were made with 120kHz RBW / 300kHz VBW

4.1.3 Sample Calculation

The field strength is calculated by subtracting the Amplifier Gain and adding the Cable Loss and Antenna Correction Factor to the measured reading. The basic equation is as follows:

Field Strength (dBµV/m) = FIM - AMP + CBL + ACF

Where: FIM = Field Intensity Meter (dBµV)
AMP = Amplifier Gain (dB)
CBL = Cable Loss (dB)
ACF = Antenna Correction Factor (dB/m)

$$\mu V/m = 10^{\frac{dB\mu V/m}{20}}$$

4.2 99 % Occupied Bandwidth

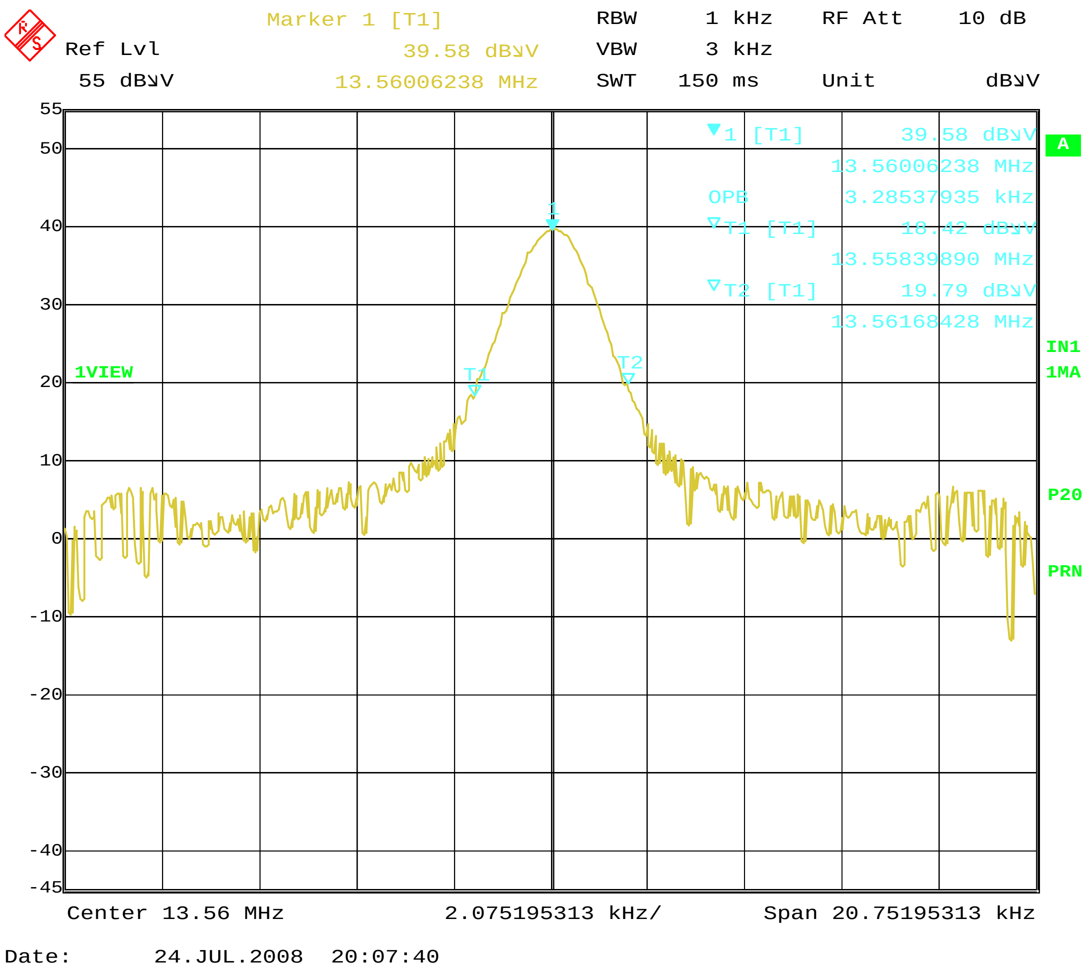


Figure 1 – 13.56 MHz

4.3 Frequency Tolerance vs. Temperature

Testing was performed in accordance with ANSI C63.4-2003. These test methods are listed under the laboratory's NVLAP Scope of Accreditation.

4.3.1 Test Methodology

The frequency tolerance of the carrier signal shall be maintained within .01% of the operating frequency over a temperature variation of -20 degrees to +50 degrees C at normal supply voltage.
a) Place the de-energized EUT in an environmental temperature test chamber. Supply the EUT with nominal ac voltage, or install a new or fully charged battery in the EUT. An antenna should be connected to the antenna output connector of the EUT if possible. Use of a dummy load could affect the output frequency of the EUT. If the EUT is equipped with or uses an adjustable-length antenna, it should be fully extended.
b) Turn the EUT on, and couple its output to a frequency counter or other frequency-measuring device of sufficient accuracy, considering the frequency tolerance with which the EUT shall comply.
NOTE—An antenna connected to the measuring instrument with a suitable length of coaxial cable may be placed near the EUT (e.g., 15 cm away) for this purpose.
Tune the EUT to one of the number of frequencies specified in 13.1.1. Adjust the location of the measurement antenna and the controls on the measuring instrument to obtain a suitable signal level (i.e., a level that will not overload the measuring instrument, but is strong enough to allow measurement of the operating or fundamental frequency of the EUT).
c) Turn the EUT off, and place it inside an environmental chamber set to the highest temperature specified
by the procuring or regulatory agency. For devices that are normally operated continuously, the EUT may be energized while inside the test chamber. For devices that have oscillator heaters, energize only the heater circuit while the EUT is inside the chamber.
d) Allow sufficient time (approximately 30 minutes) for the temperature of the chamber to stabilize. While maintaining a constant temperature inside the environmental chamber, turn the EUT on and measure the EUT operating frequency at startup, and two, five, and ten minutes after startup. Four measurements in total are made.
e) If 13.1.1 requires measurements on only one operating frequency, proceed to step f); otherwise, successively tune the EUT to each of the additional operating frequencies specified in 13.1.1 and repeat step d).
f) Repeat step d) and step e) with the temperature chamber set to the lowest temperature specified by the procuring or regulatory agency. Be sure to allow the environmental chamber temperature to stabilize before performing these measurements.
g) Prepare the final test report in accordance with Clause 10.

Test Data			
Time (min)	Voltage(VAC)	Temp. C	Frequency MHz
Allowed Tolerance=13.560000+/-0.01%(1356 Hz)			
0	120	25	13.560000
2	120	25	13.560000
5	120	25	13.560000
10	120	25	13.560000
0	120	50	13.560250
2	120	50	13.560250
5	120	50	13.560250
10	120	50	13.560250
0	120	-20	13.560000
2	120	-20	13.560000
5	120	-20	13.560000
10	120	-20	13.560000

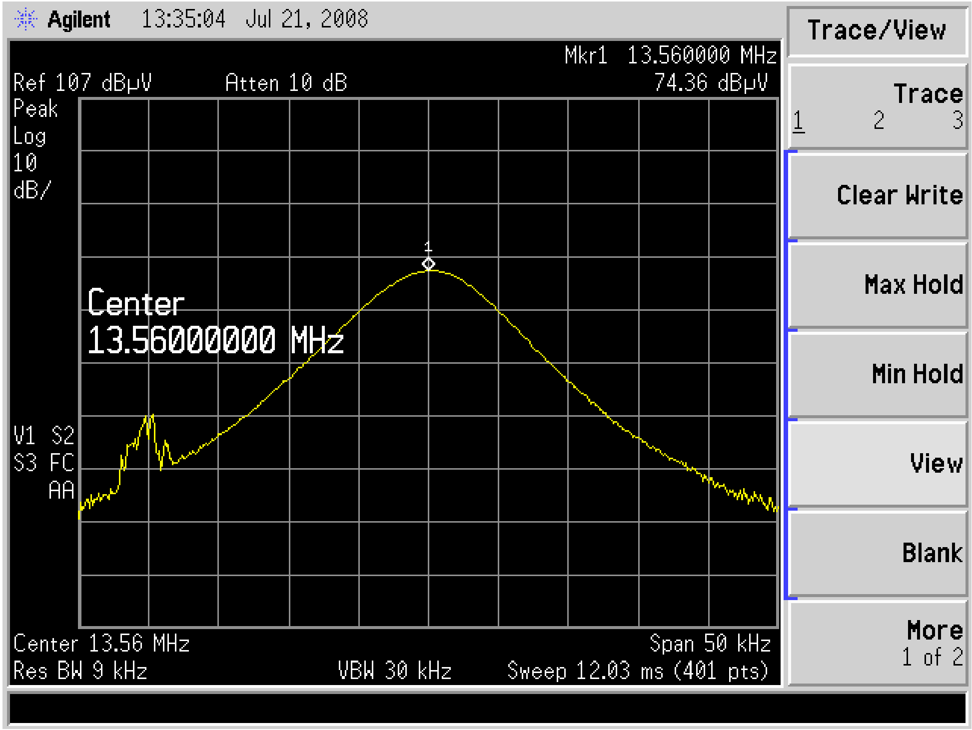


Figure 2 – Frequency screen capture

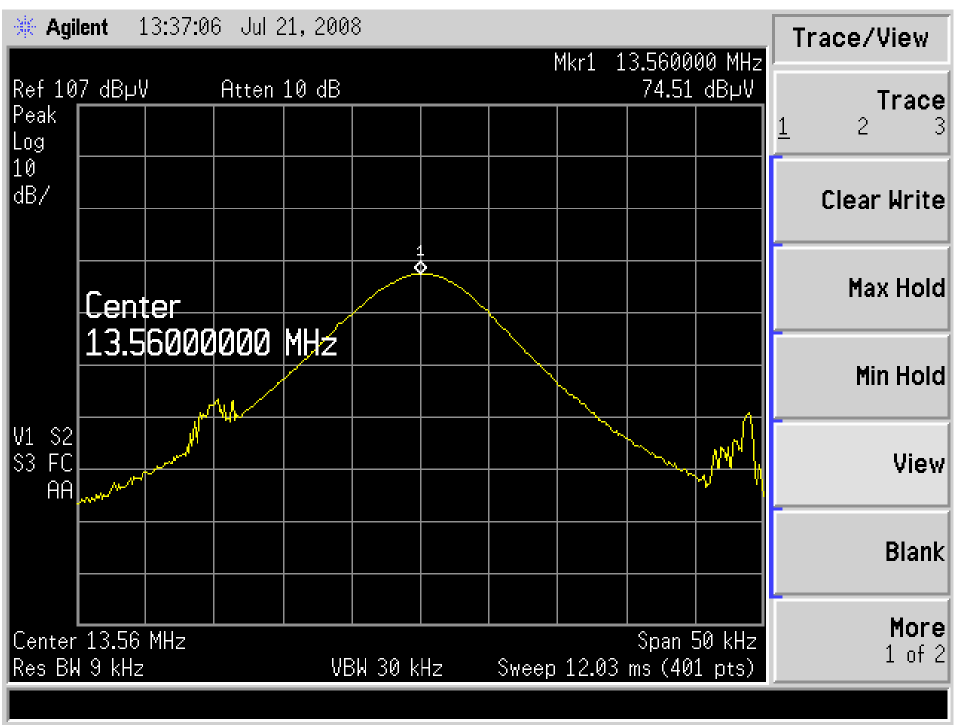


Figure 3 – Frequency screen capture

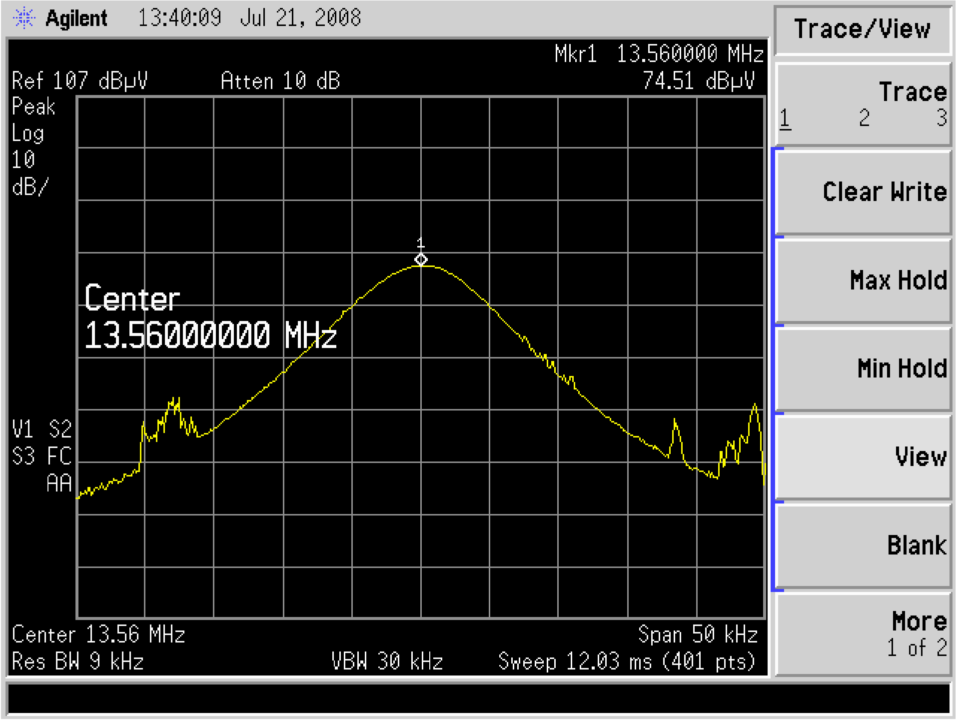


Figure 4 – Frequency screen capture

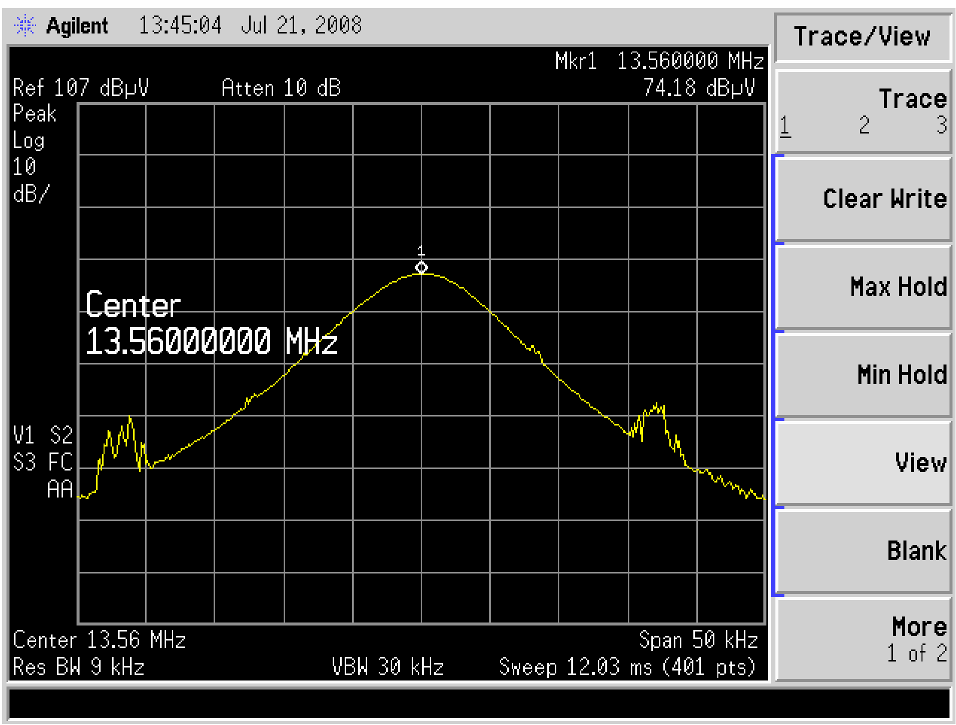


Figure 5 – Frequency screen capture

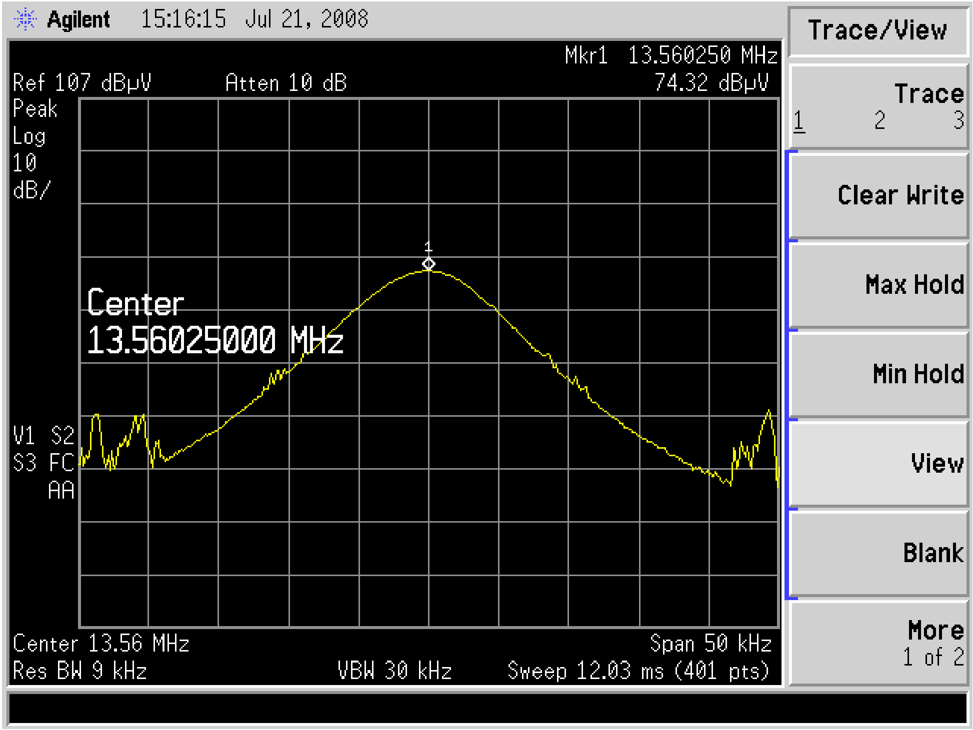


Figure 6 – Frequency screen capture

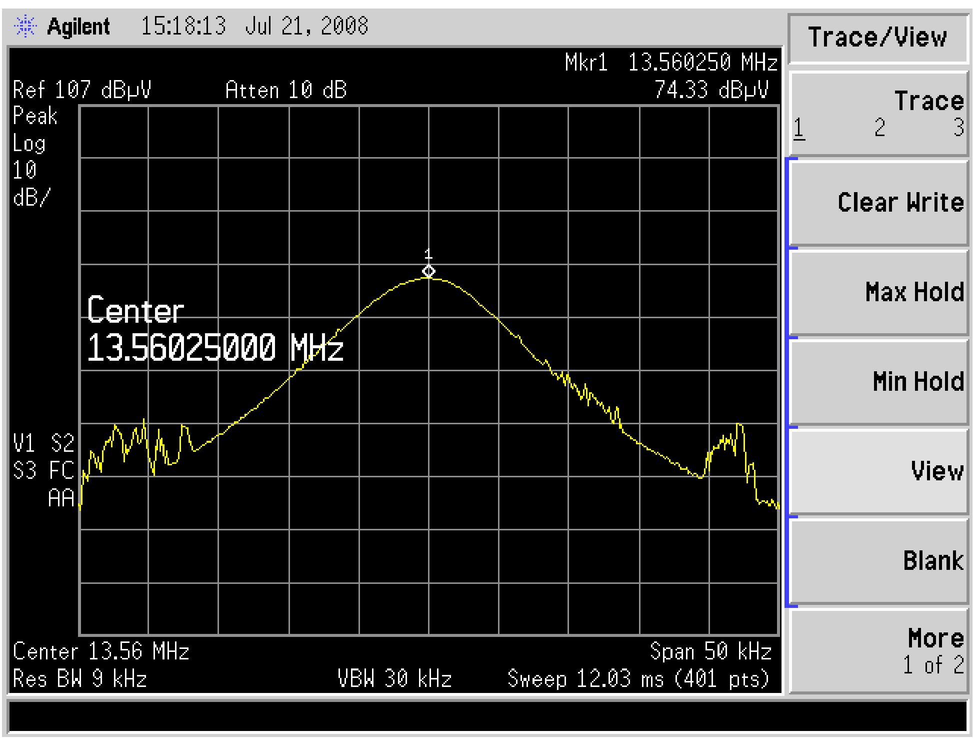


Figure 7 – Frequency screen capture

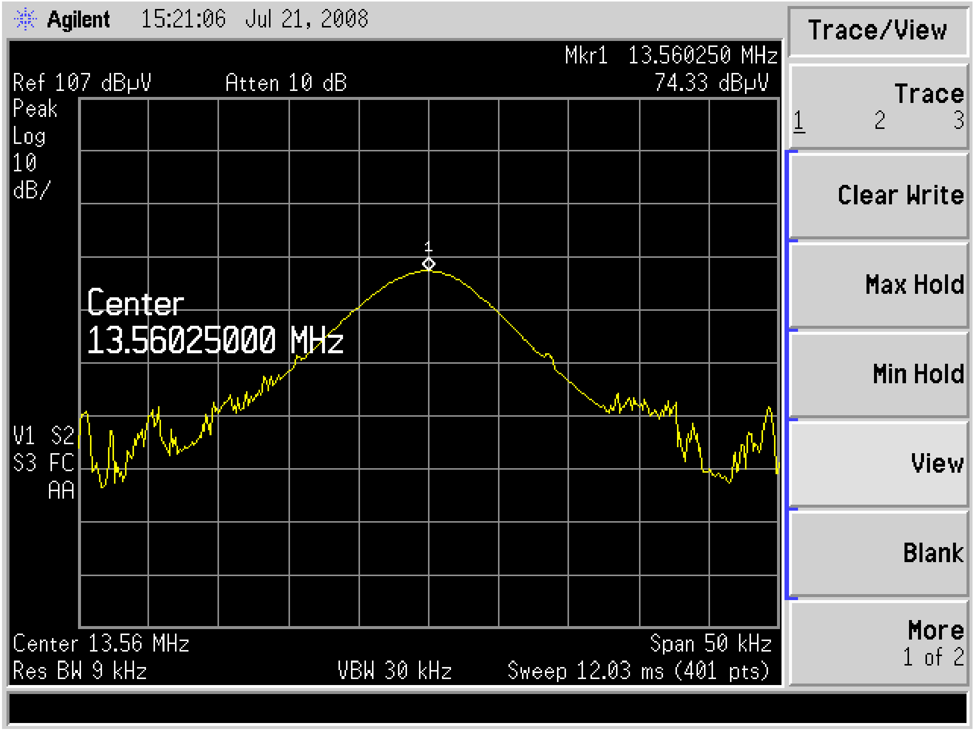


Figure 8 – Frequency screen capture

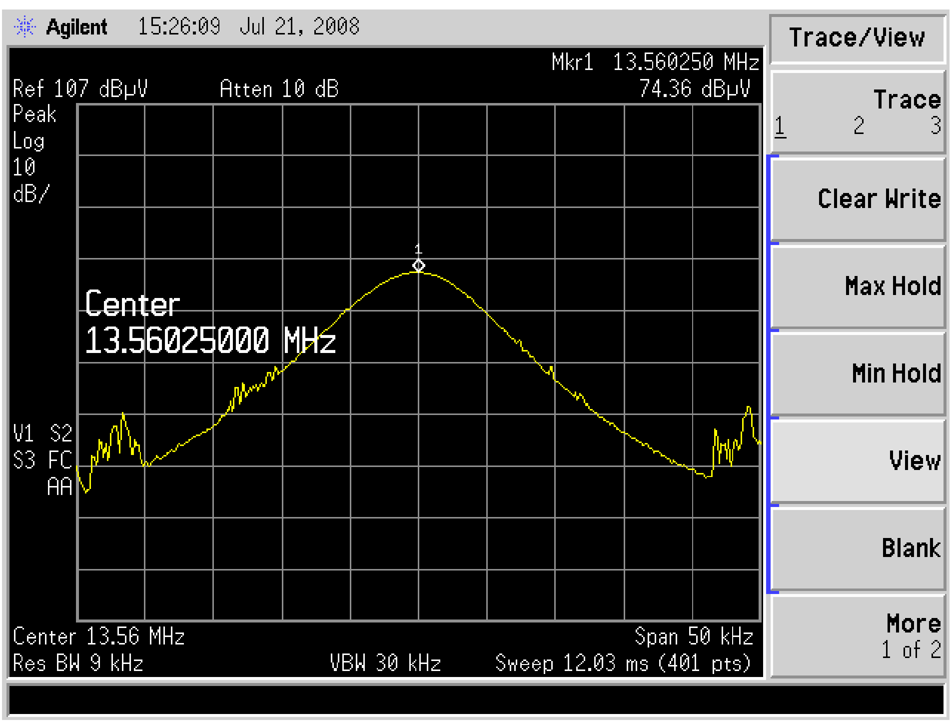


Figure 9 – Frequency screen capture

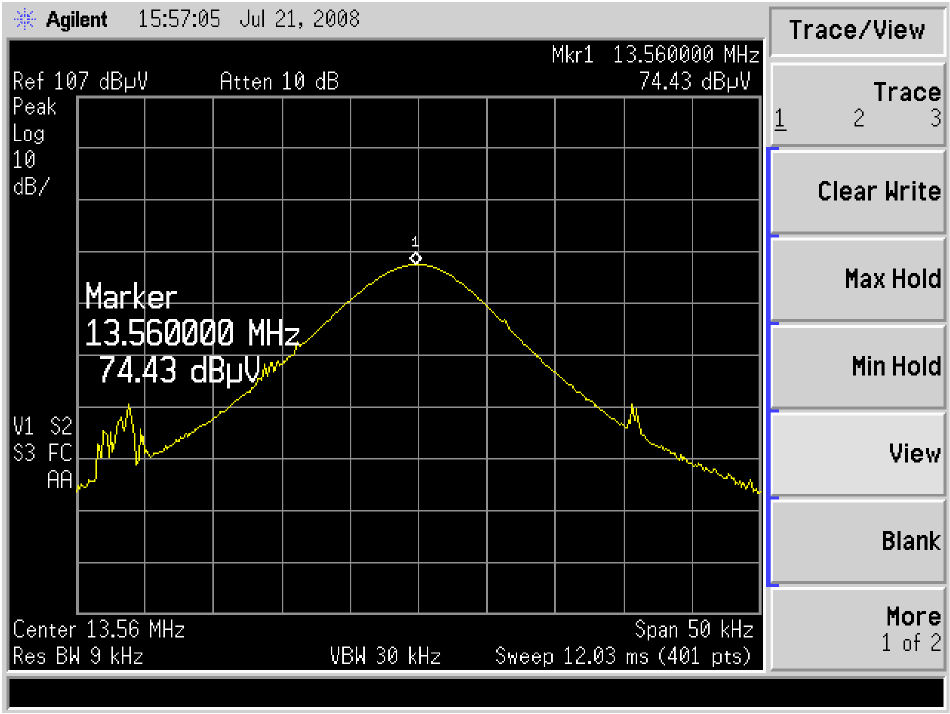


Figure 10 – Frequency screen capture

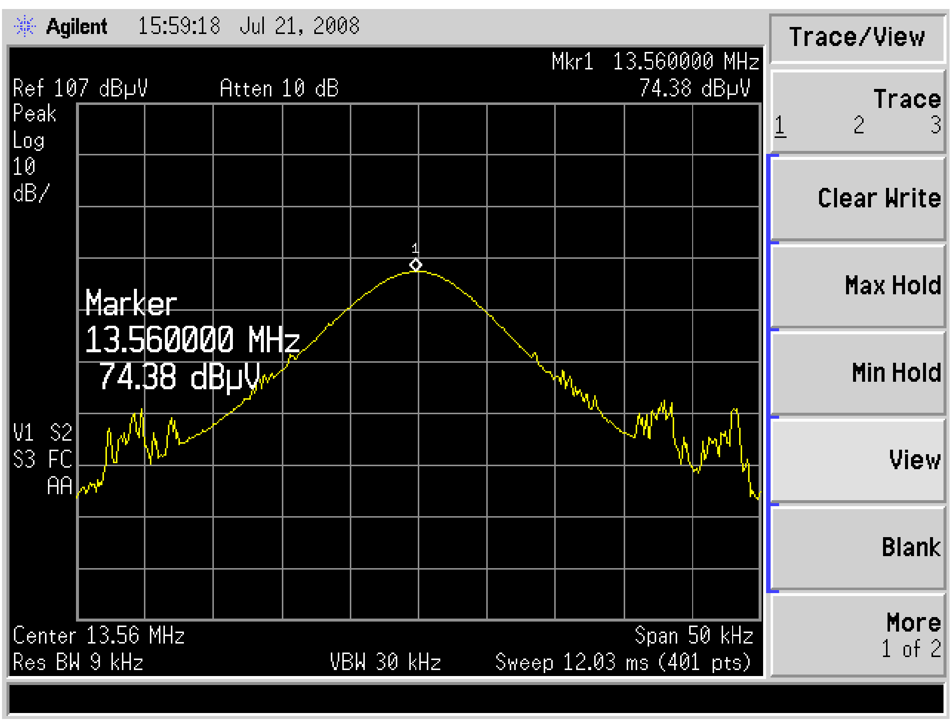


Figure 11 – Frequency screen capture

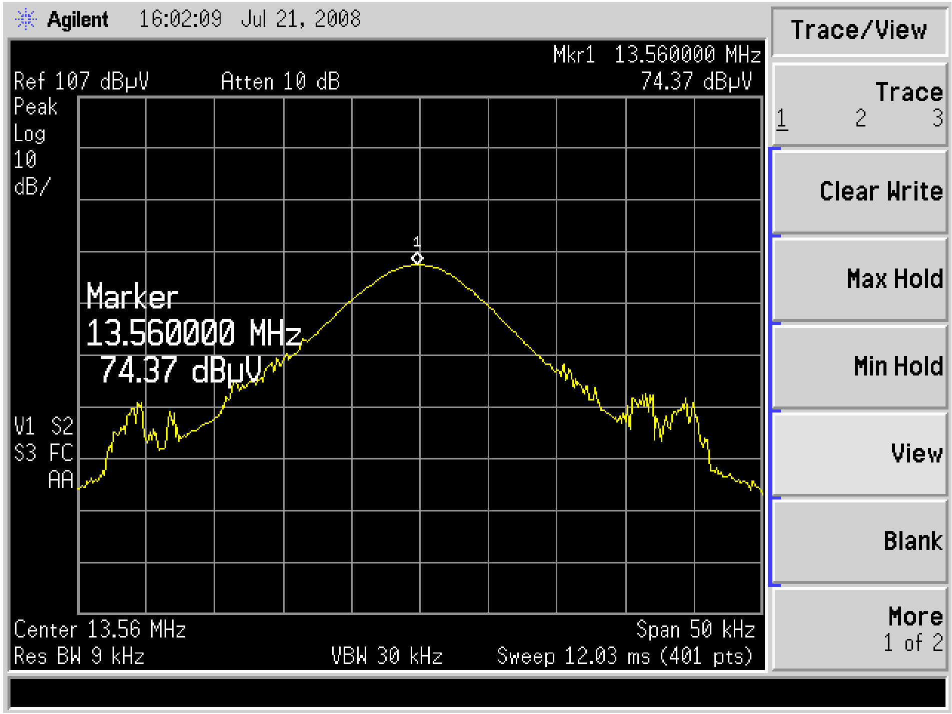


Figure 12 – Frequency screen capture

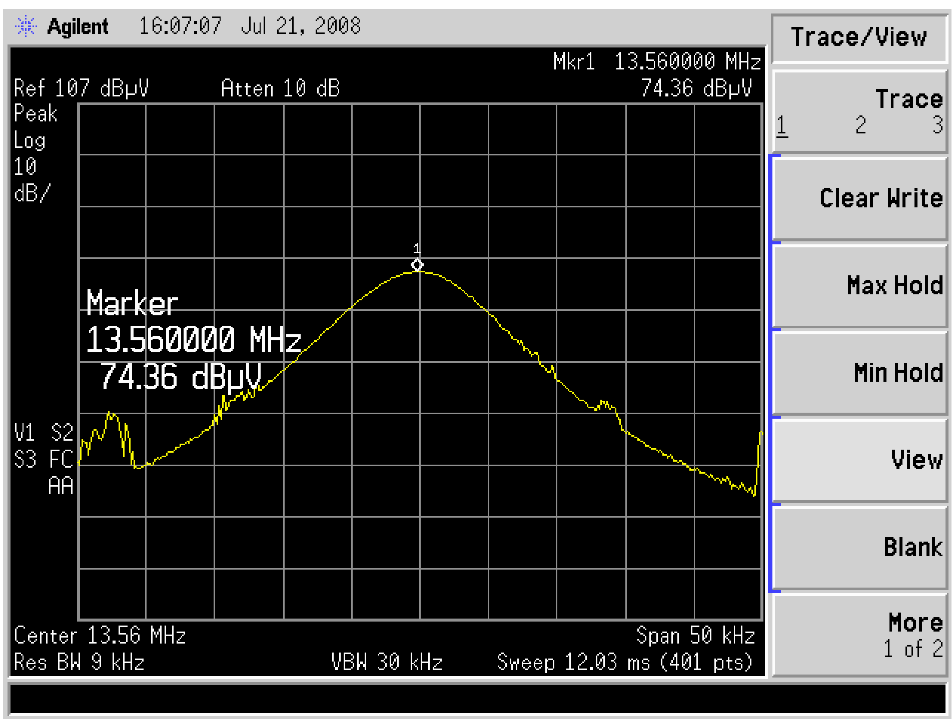


Figure 13 – Frequency screen capture

4.4 Frequency Tolerance vs. Voltage Variations

The frequency tolerance of the carrier signal shall be maintained within .01% of the operating frequency 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 Data			
Time (min)	Voltage(VAC)	Temp. C	Frequency MHz
Allowed Tolerance=13.560000+/-0.01%(1356 Hz)			
0	120	25	13.560000
2	120	25	13.560000
5	120	25	13.560000
10	120	25	13.560000
0	102	25	13.560000
2	102	25	13.560000
5	102	25	13.560000
10	102	25	13.560000
0	138	25	13.560250
2	138	25	13.560250
5	138	25	13.560250
10	138	25	13.560250

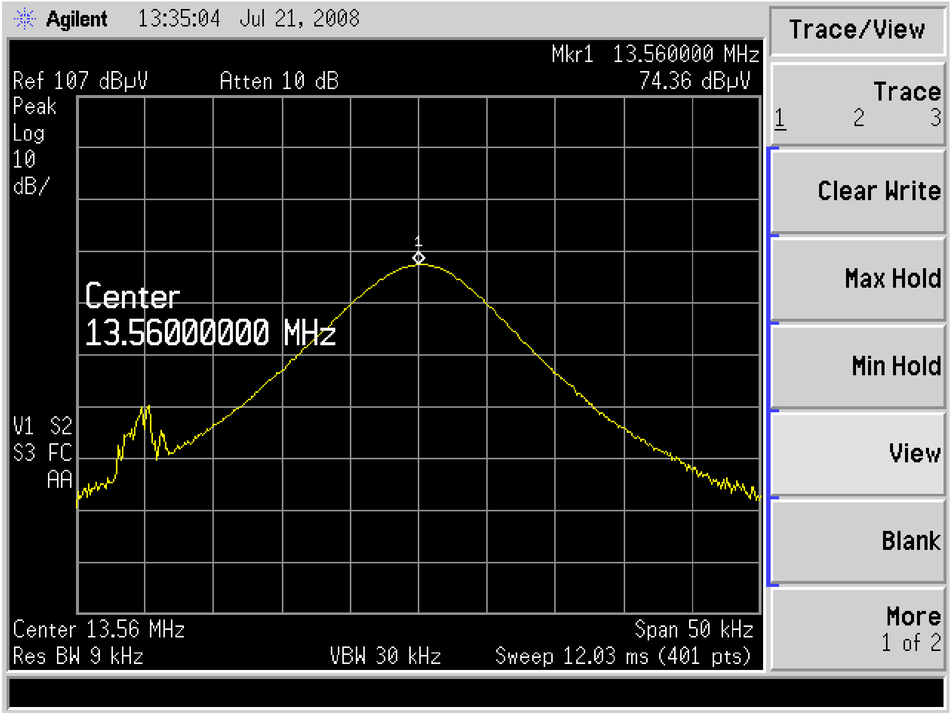


Figure 14 – Frequency screen capture

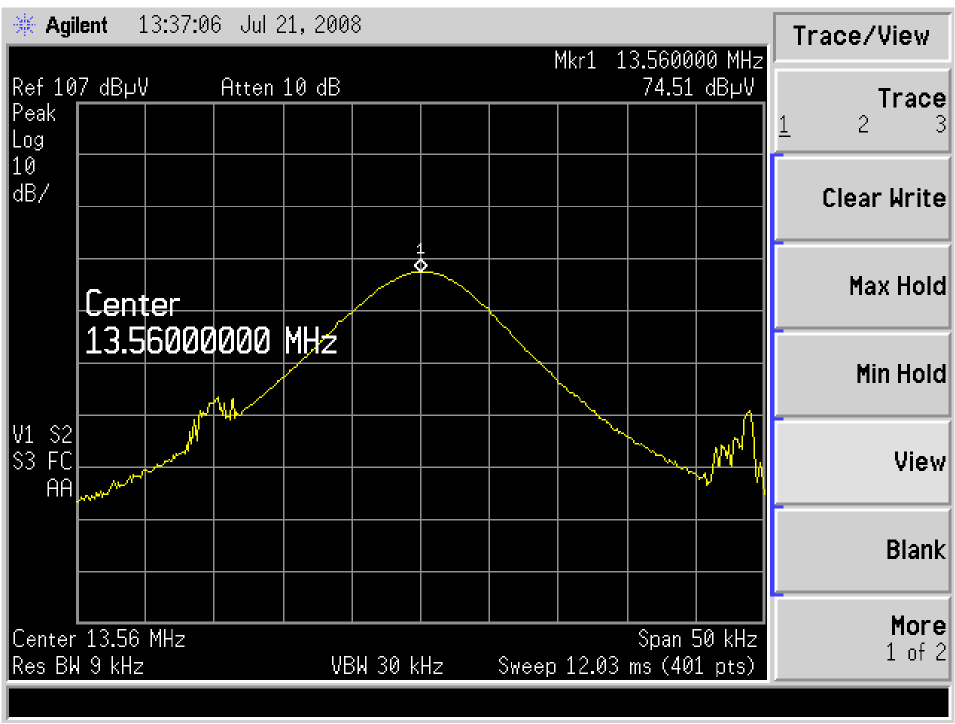


Figure 15 – Frequency screen capture

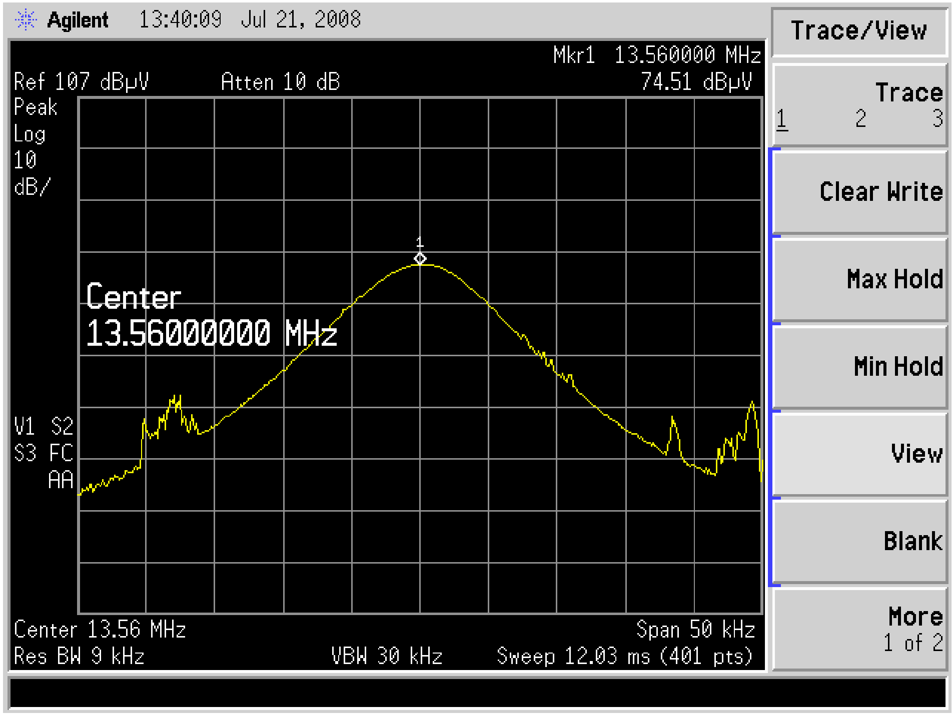


Figure 16 – Frequency screen capture

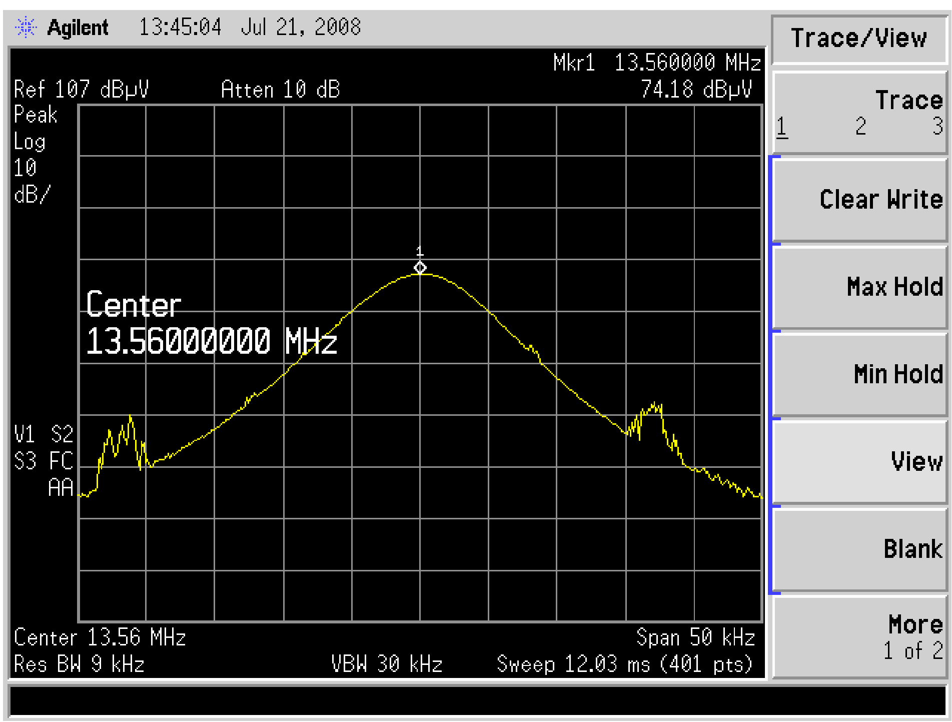


Figure 17 – Frequency screen capture

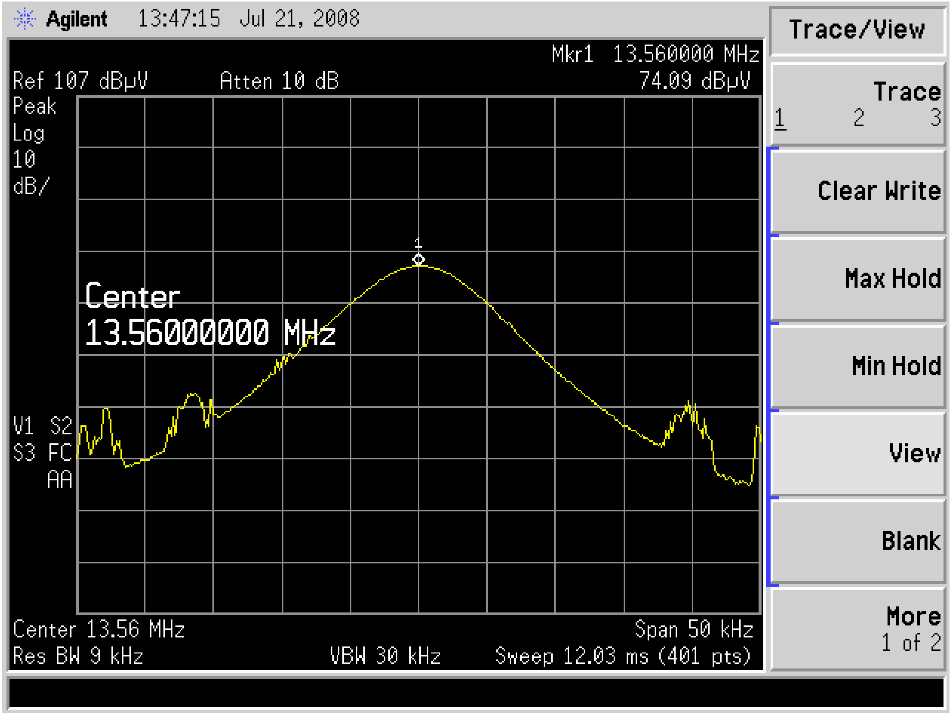


Figure 18 – Frequency screen capture

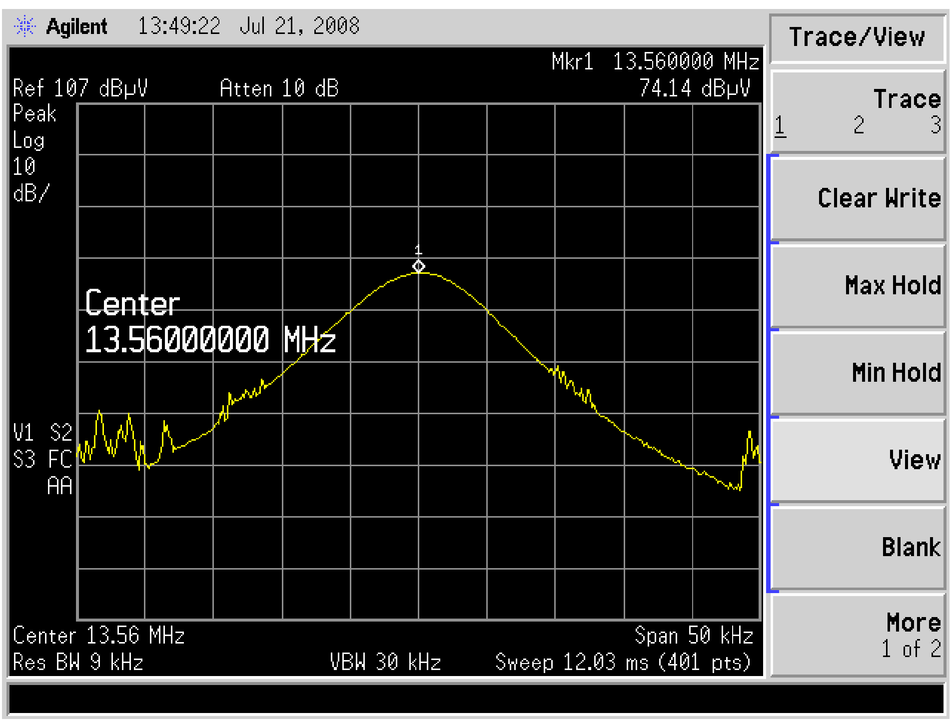


Figure 19 – Frequency screen capture

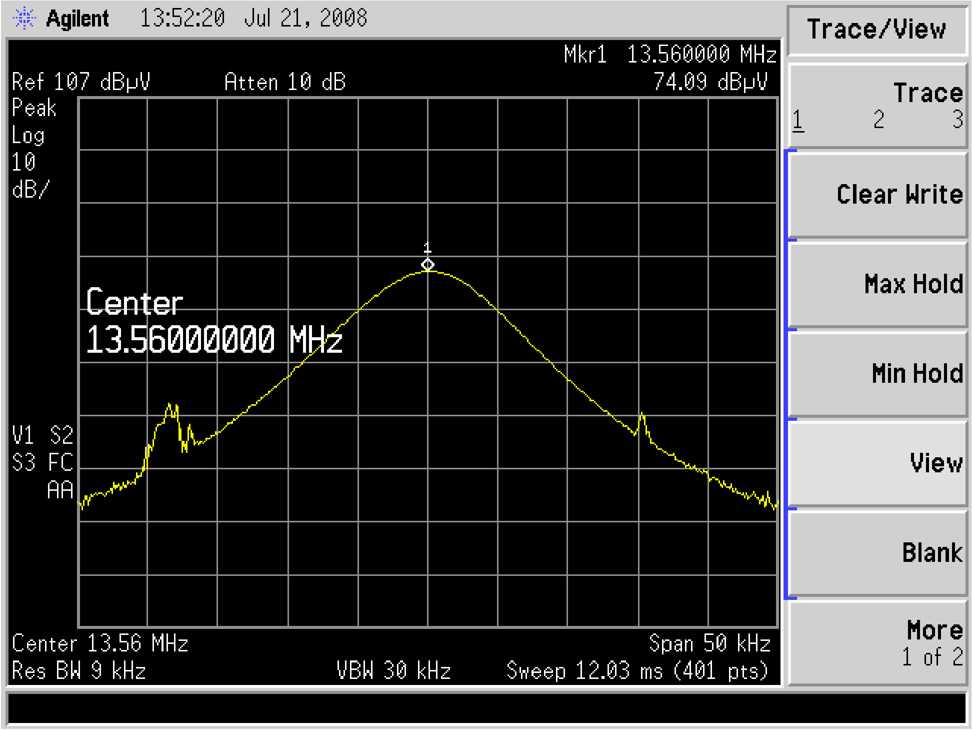


Figure 20 – Frequency screen capture

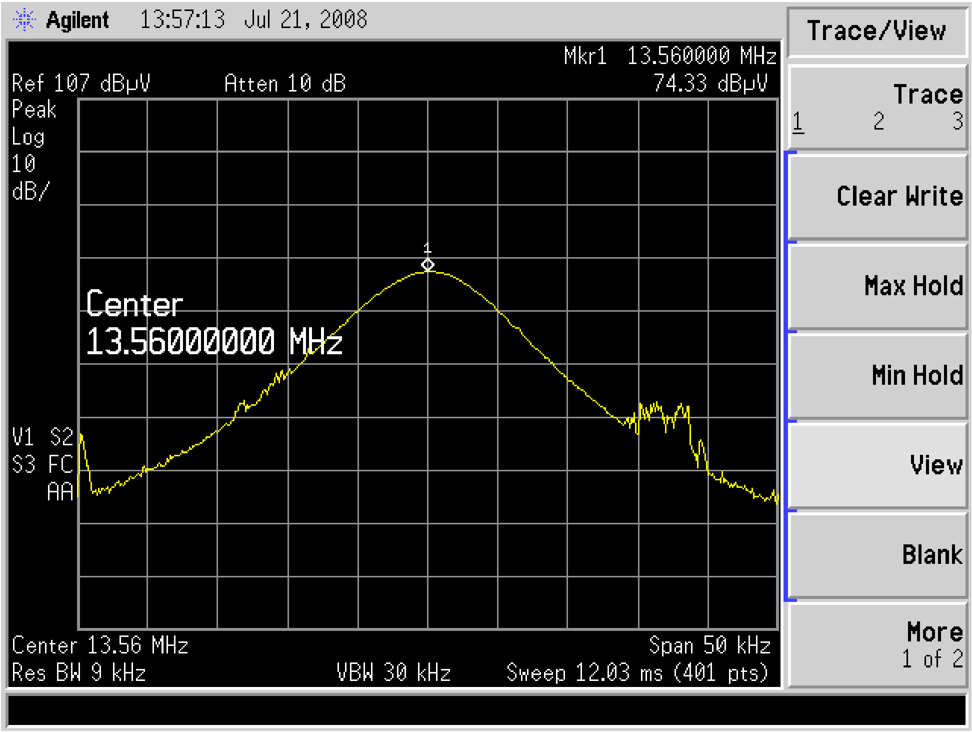


Figure 21 – Frequency screen capture

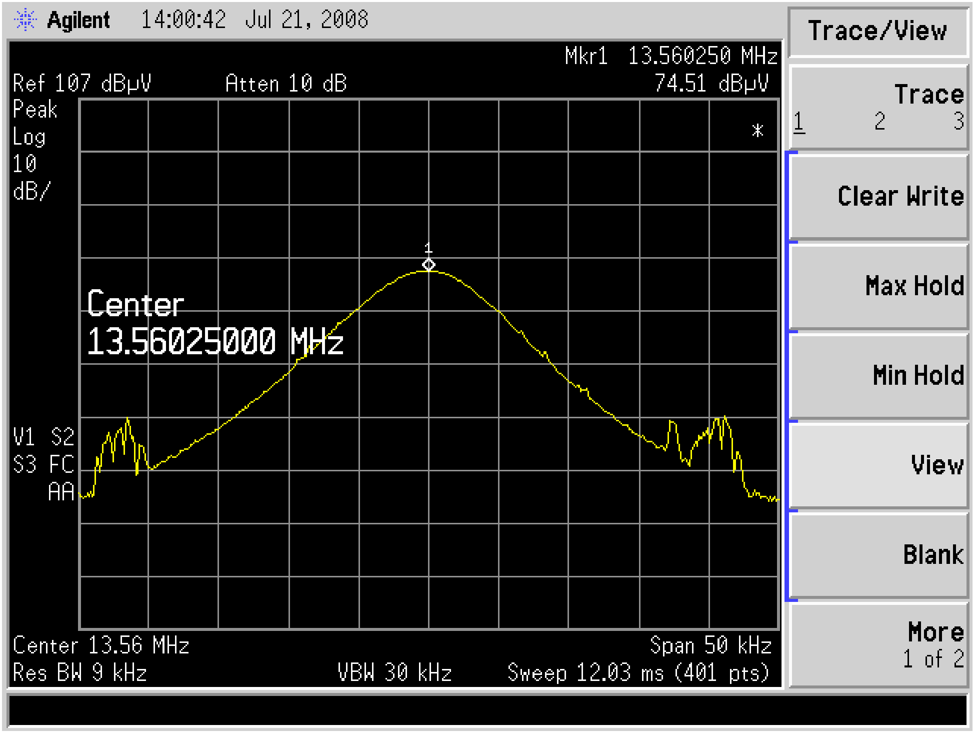


Figure 22 – Frequency screen capture

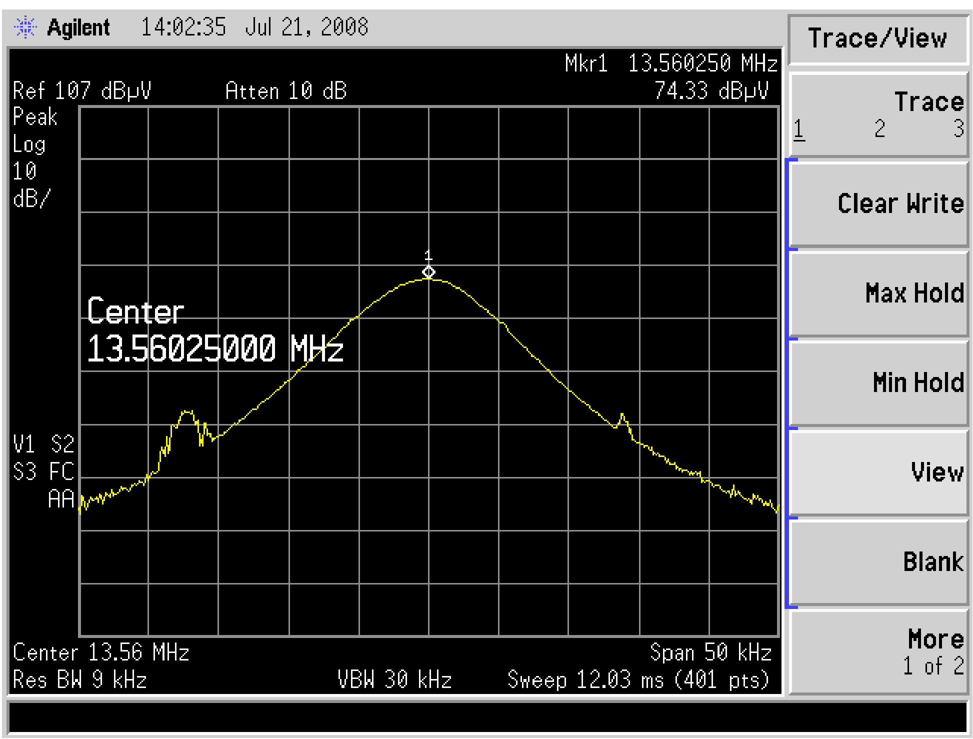


Figure 23 – Frequency screen capture

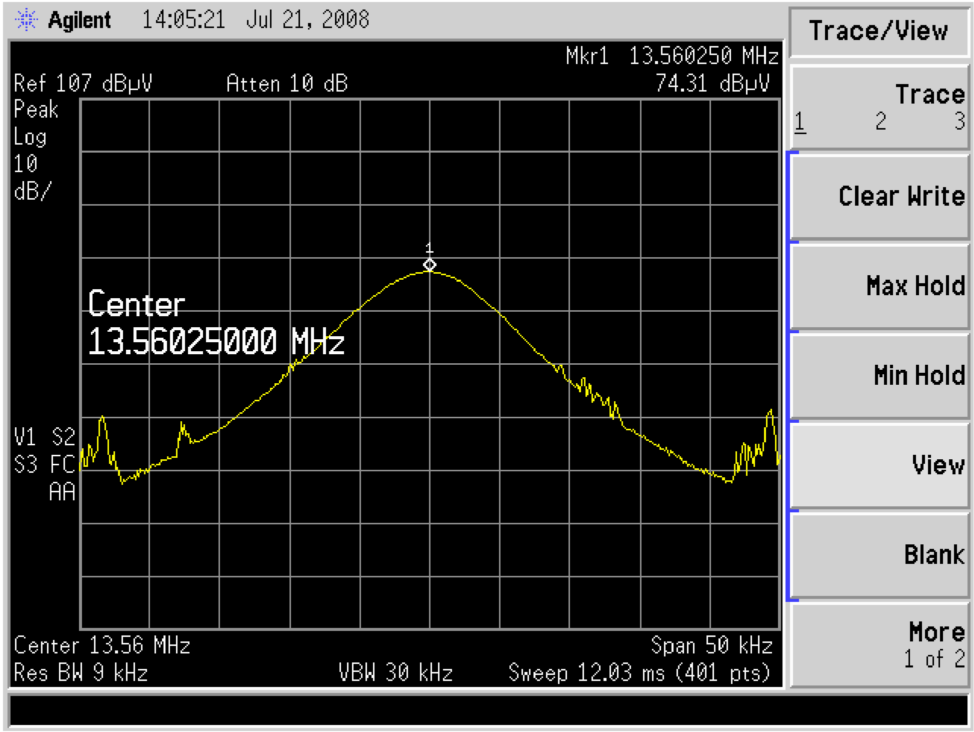


Figure 24 – Frequency screen capture

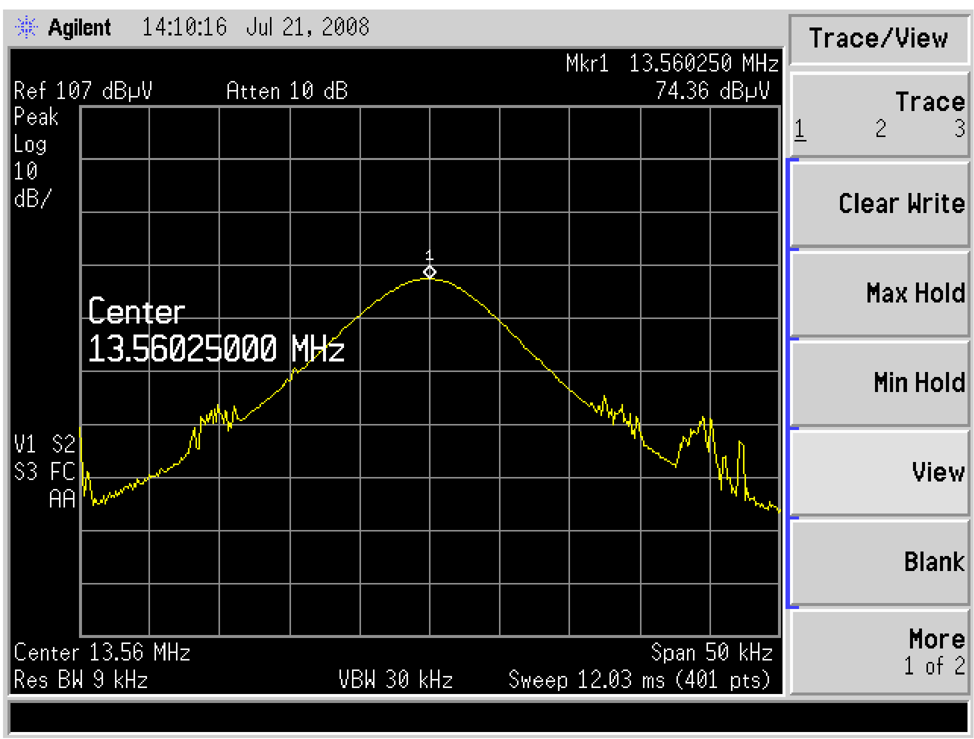


Figure 25 – Frequency screen capture

4.5 Conducted Emissions

Testing was performed in accordance with ANSI C63.4-2003. These test methods are listed under the laboratory's NVLAP Scope of Accreditation.

This test measures the levels emanating from the EUT, thus evaluating the potential for the EUT to cause radio frequency interference to other electronic devices.

Test Methodology

A test program that controls instrumentation and data logging was used to automate the AC Power Line Conducted emission test procedure. The frequency range of interest was divided into sub-ranges such as to yield a frequency resolution of 9 kHz. For each frequency sub-range, each phase and neutral of the AC power line were measured with respect to ground. Measurements were performed using a set of 50μH / 50Ω LISNs.

Testing is either performed in the anechoic chamber or on PLC Site 2. The setup photographs clearly identify which site was used. The vertical ground plane used in the anechoic chamber is a 2m x 2m wooden frame that is covered with ¼ inch hardware cloth and is bonded to the horizontal ground plane.

In the case of tabletop equipment, the EUT is placed on a 1.0m x 1.5m non-conductive table 80cm above the ground plane and 40cm from a vertical ground reference plane. The rear of the EUT was positioned flush with the backside of the table and directly over the LISNs. The power and I/O cables were routed over the edge of the table and bundled approximately 40cm from the ground plane. Support equipment was powered from a separate LISN. Floor-standing equipment is placed directly on the ground plane.

Deviations

There were no deviations from this test methodology.

Test Results

As originally tested, the EUT was found to be compliant to the requirements of the test standard(s).

Plots of the EUT's AC Line Conducted emissions are contained in the following sections. The plots show peak and/or average emissions and the corresponding peak and/or average limits. If the peak emissions are below the average limit, then the EUT is considered to pass and no average measurements are made. If the peak emissions are below the quasi-peak limit and the average emissions are below the average limit, then the EUT is considered to pass and no further measurements are made. Otherwise, individual frequencies are measured and compared to the corresponding limit for the detector used (quasi-peak or average).

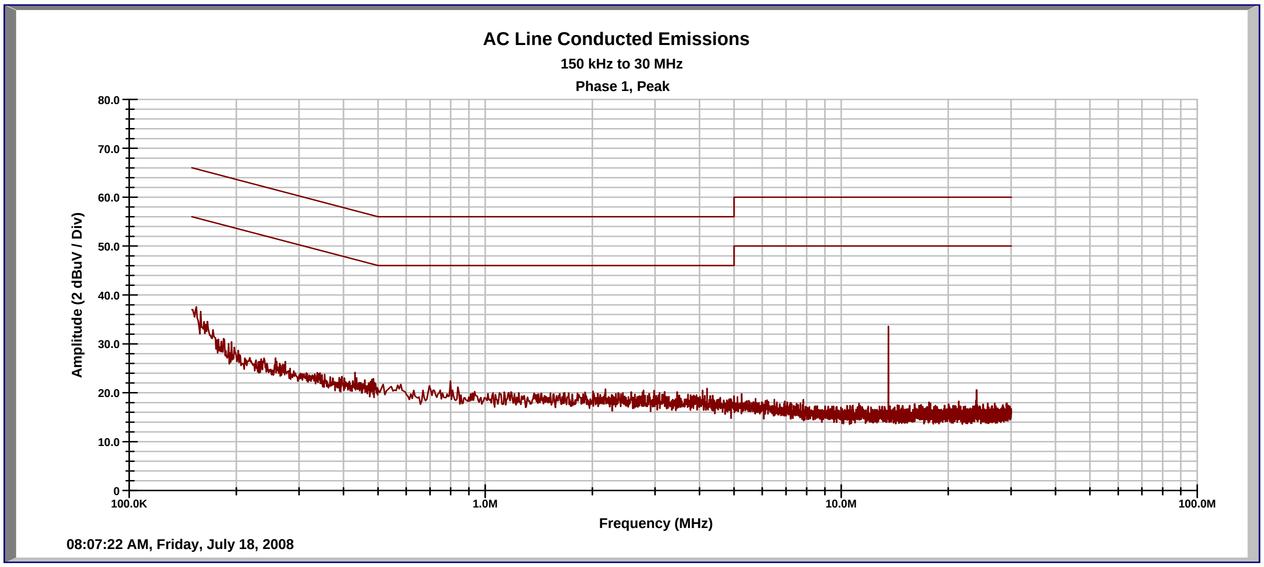
Final Data

The data recorded in this section contains the final results under the worst-case conditions and with any modifications or special accessories implemented as the manufacturer intends.

SOP 2 Conducted Emissions

Tracking # 30861749.001 Page 1 of 2

EUT Name	Tribrid Contactless Card Reader	**Date**	18-Jul-2008
EUT Model	M07999	**Temperature**	75 degrees F
EUT Serial	Not Serialized	**Humidity**	42% rH
Standard	FCC Part 15.207 and RSS-210 Issue 7	**Line AC /Freq**	120VAC / 60 Hz
LISNs Used	17	**Performed by**	Michael Moranha
Configuration	EUT to 50 ohm load		



Emission Freq (MHz)	Line ID (1,2,3,N)	FIM Quasi (dBuV)	FIM Ave (dBuV)	Cable Loss (dB)	LISN + T Limiter (dB)	Quasi Limit (dBuV)	Ave Limit (dBuV)	Quasi Spec Margin (dB)	Ave Spec Margin (dB)
0.16	1	23.60	10.50	0.03	10.03	65.57	55.57	-31.90	-35.00
13.56	1	23.00	22.50	0.13	10.76	60.00	50.00	-26.11	-16.61
23.99	1	12.90	9.40	0.21	11.15	60.00	50.00	-35.74	-29.24

Quasi Spec Margin = Quasi FIM + Cable Loss + LISN CF - Quasi Limit ± Uncertainty
Ave Spec Margin = Ave FIM + Cable Loss + LISN CF - Ave Limit ± Uncertainty

Combined Standard Uncertainty $u_c(y) = \pm 1.2$dB Expanded Uncertainty $U = ku_c(y)$ $k = 2$ for 95% confidence

Notes:

SOP 2 Conducted Emissions

Tracking # 30861749.001 Page 2 of 2

EUT Name	Tribrid Contactless Card Reader	**Date**	18-Jul-2008
EUT Model	M07999	**Temperature**	75 degrees F
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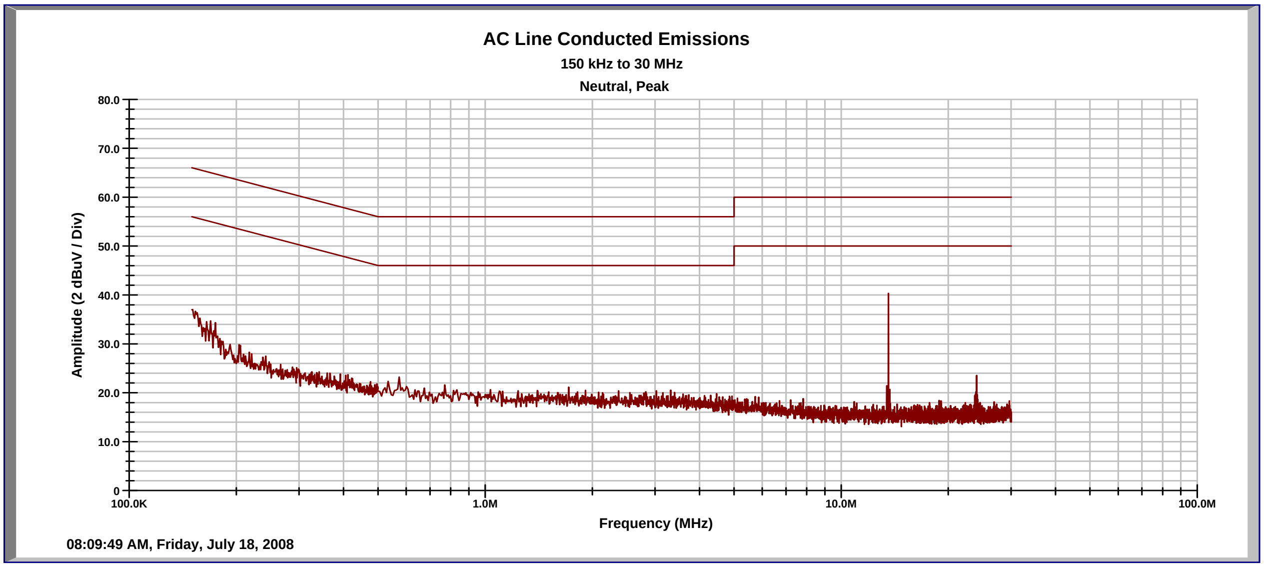
LISNs Used	18	**Performed by**	Michael Moranha
Configuration	EUT to 50 ohm load		



Emission Freq (MHz)	Line ID (1,2,3,N)	FIM Quasi (dBuV)	FIM Ave (dBuV)	Cable Loss (dB)	LISN + T Limiter (dB)	Quasi Limit (dBuV)	Ave Limit (dBuV)	Quasi Spec Margin (dB)	Ave Spec Margin (dB)
0.15	N	19.50	9.70	0.03	10.04	65.78	55.78	-36.21	-36.01
13.56	N	30.20	29.90	0.13	10.29	60.00	50.00	-19.38	-9.68
23.99	N	8.70	3.30	0.21	10.68	60.00	50.00	-40.40	-35.80

Quasi Spec Margin = Quasi FIM + Cable Loss + LISN CF - Quasi Limit ± Uncertainty
Ave Spec Margin = Ave FIM + Cable Loss + LISN CF - Ave Limit ± Uncertainty

Combined Standard Uncertainty $u_c(y) = \pm 1.2$dB Expanded Uncertainty $U = ku_c(y)$ $k = 2$ for 95% confidence

Notes:

5 Test Equipment Use List

5.1 Test Equipment use list

Equipment	Manufacturer	Model #	Serial/Inst #	Last Cal dd/mm/yy	Next Cal dd/mm/yy
SOP 1 - Radiated Emissions (5 Meter Chamber)					
Ant. BiconiLog	Chase	CBL6140A	1108	13-Jun-2008	13-Jun-2010
Antenna Loop	EMCO	6502	3336	17-Jun-2008	17-Jun-2010
Receiver, EMI	Rohde & Schwarz	ESIB40	100043	9-Jun-2008	9-Jun-2009
Cable, Coax	Andrew	FSJ1-50A	030	30-Jan-2008	30-Jan-2009
Cable, Coax	Andrew	FSJ1-50A	045	30-Jan-2008	30-Jan-2009
SOP 2 - Conducted Emissions (AC/DC and Signal I/O)					
LISN 15-18 (NSLK 8126)	Schwarzbeck Mess-Electronik	NSLK 8126	003885	11-Jan-2008	11-Jan-2009
Spectrum Analyzer	Agilent Tec.	E7405A	US39440157	4-Dec-2007	4-Dec-2008
Cable, Coax	Belden	RG-213	004	25-Jan-2008	25-Jan-2009
General Laboratory Equipment					
Meter, Temp/Humid/Barom	Fisher	02-400	01	3-Dec-07	3-Dec-08
True RMS Multimetert	Fluke	179	17-1001001	3-Dec-07	3-Dec-08
Temerature Chamber	ESPEC			CNR	CNR

* Calibration of equipment past due for re-calibration will be performed expeditiously. If any equipment is found to be out of tolerance at that time, affected customers will be notified accordingly.