

FCC PART 74

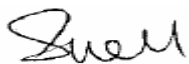
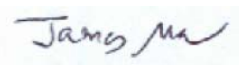
EMI MEASUREMENT AND TEST REPORT

For

Prince Electronics

200-7, Maesan-Ri, Mohyon-Myon
Yongin-City, Kyonggi-Do, Korea 449-853

FCC ID: NPXM70H-P070H071H

This Report Concerns: ☒ Original Report	Product Name: Wireless Microphone System
Test Engineer: Snell Leong / 	
Report No.: R0603152 M70H	
Report Date: 2006-03-22	
Reviewed By: James Ma / 	
Prepared By: Bay Area Compliance Laboratory Corporation 230 Commercial Street Sunnyvale, CA 94085 Tel: (408) 732-9162 Fax: (408) 732 9164	

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GENERAL INFORMATION

Product Description for Equipment Under Test (EUT)

The *Prince Electronics* product, FCC ID: *NPXM70H-P070H071H*, Model Number: *M-70H* for transmitter and *R-72D* for receiver, the “EUT” as referred to this report is a Wireless Microphone system, which measures approximately 265mmL x 50mmW x 50mmH for transmitter, M-70H, and 420mmL x 180mmW x 45mmH for receiver, R-72D.

* The test data gathered are from typical production sample, serial number: 70H500403 for transmitter and 8806284 107235 for receiver, revision: 1.0, provided by the manufacturer.

EUT Photo

Transmitter :



M-70H

Receiver :



R-72D

Objective

This report is prepared on behalf of *Prince Electronics* in accordance with Part 74 Subpart H of the Federal Communication Commissions rules.

The objective of the manufacturer is to determine compliance with FCC rules for peak output power, modulation characteristics, occupied bandwidth of emission, spurious emission, field strength of spurious radiation, frequency stability and line conduction.

Related Submittal(s)/Grant(s)

No Related Submittals

Test Methodology

Measurements contained in this report were also conducted with TIA/EIA Standard 603C, Telecommunications Industry Association Land Mobile FM or PM Communications Equipment Measurement and Performance Standards.

Test Facility

The Test site used by BACL Corp. to collect radiated and conducted emission measurement data is located at 230 Commercial Street, Sunnyvale, California 94085, USA.

Test site at BACL Corp. has been fully described in reports submitted to the Federal Communication Commission (FCC) and Voluntary Control Council for Interference (VCCI). The details of these reports has been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on February 11 and December 10, 1997 and Article 8 of the VCCI regulations on December 25, 1997. The facility also complies with the test methods and procedures set forth in ANSI C63.4-2001& TIA/EIA-603.

The Federal Communications Commission and Voluntary Control Council for Interference has the reports on file and is listed under FCC registration number: 90464 and VCCI Registration No.: C-1298 and R-1234. The test site has been approved by the FCC and VCCI for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, BACL is a National Institute of Standards and Technology (NIST) accredited laboratory, under the National Voluntary Laboratory Accredited Program (Lab Code 200167-0). The scope of the accreditation covers the FCC Method - 47 CFR Part 15 - Digital Devices, CISPR 22:2002, Electromagnetic Interference - Limits and Methods of Measurement of Information Technology Equipment test methods.

SYSTEM TEST CONFIGURATION

Justification

The EUT was configured for testing according to TIA/EIA-603C.

The final qualification test was performed with the EUT operating at normal mode.

Equipment Modifications

No modifications were made to the EUT.

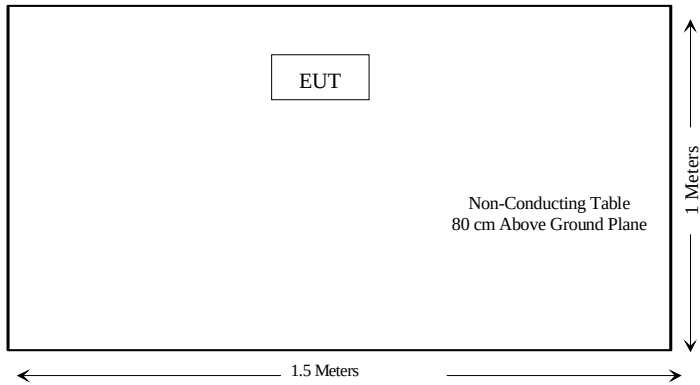
Power Supply and Line Filters

Manufacturer	Description	Model	Serial Number
Yurida electronic	ADC Power Supply	SM-1210C	N/A

Test Setup Block Diagram

LISN 1

LISN 2



SUMMARY OF TEST RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT
§2.1093, §1.1307(b)(1)	RF Exposure Requirement	Compliant
§74.861(e)(1)(ii)	Output Power Measurement	Compliant
§74.861(e)(3)	Modulation Characteristics	Compliant
§74.861(e)(5)	Occupied Bandwidth Emission	Compliant
§74.861(e)(6)	Field Strength of Emission	Compliant
§74.861(e)(6)(f)	Spurious Emission at Antenna Port	Compliant
§74.86(e)(4)	Frequency Stability	Compliant
§15.207	AC Line Conducted Emission	Compliant
§15.209	Unintentional Radiated Emission	Compliant

§15.207(a) - AC LINE CONDUCTED EMISSIONS

Measurement Uncertainty

All measurements involve certain levels of uncertainties. The factors contributing to uncertainties are spectrum analyzer, cable loss, and LISN.

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any conducted emissions measurement at BACL is ± 2.4 dB.

EUT Setup

The measurement was performed in the shield room, using the same setup per ANSI C63.4-2003 measurement procedure. The specification used was FCC 15 Subpart B limits.

The spacing between the peripherals was 10 centimeters.

External I/O cables were draped along the edge of the test table and bundled when necessary.

The notebook PC was connected with 120Vac/60Hz power source.

Environmental Conditions

Temperature:	17° C
Relative Humidity:	62%
ATM Pressure:	1022 mbar

The testing was performed by Snell Leong on 2005-03-21.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Date
R&S	Receiver, EMI Test	ESCS30	100176	2006-3-13
R&S	LISN, Artificial Mains	ESH2-Z5	871884/039	2005-11-14

*** Statement of Traceability: BACL Corp.** attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

Test Procedure

During the conducted emission test, the power cord of the host system was connected to the auxiliary outlet of the first LISN.

Maximizing procedure was performed on the six (6) highest provided emissions of each modes tested to ensure EUT is compliant with all installation combination.

All data was recorded in the peak detection mode. Quasi-peak readings were only performed when an emission was found to be marginal (within -4 dB of specification limits). Quasi-peak readings are distinguished with a "Qp".

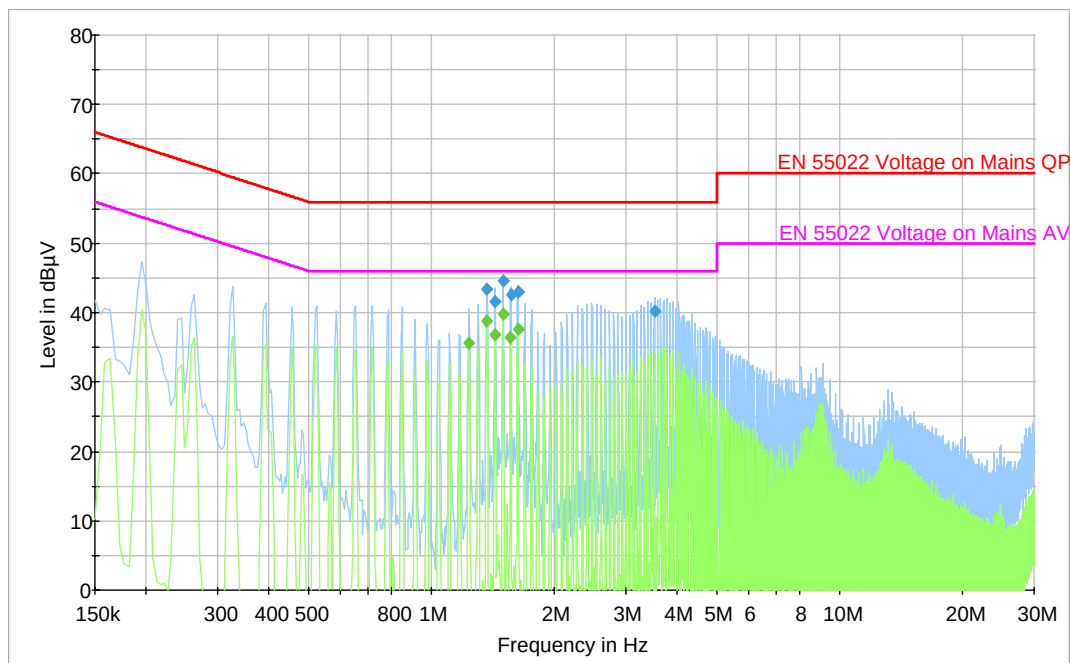
Summary of Test Results

According to the data in following table, the EUT complies with the FCC Conducted margin for a Class B device, with the *worst* margin reading of:

6.2 dB at 1.5 MHz in the **Neutral** conductor mode

Conducted Emissions Test Data

Neutral:



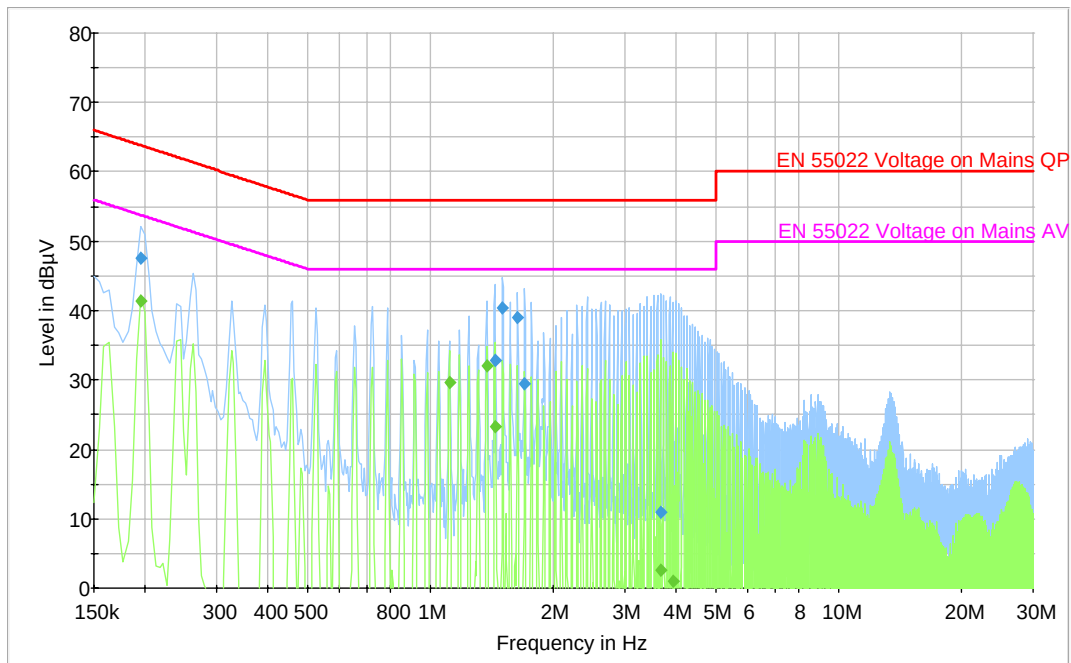
Final Measurement Detector 1

Frequency (MHz)	QuasiPeak (dBµV)	Line	Margin (dB)	Limit (dBµV)
1.500000	44.6	N	11.4	56.0
1.369500	43.4	N	12.6	56.0
1.630500	43.1	N	12.9	56.0
1.567500	42.5	N	13.5	56.0
1.432500	41.6	N	14.4	56.0
3.520500	40.3	N	15.7	56.0

Final Measurement Detector 2

Frequency (MHz)	Average (dBµV)	Line	Margin (dB)	Limit (dBµV)
1.500000	39.8	N	6.2	46.0
1.369500	38.9	N	7.1	46.0
1.630500	37.7	N	8.3	46.0
1.432500	36.8	N	9.2	46.0
1.563000	36.4	N	9.6	46.0
1.239000	35.7	N	10.3	46.0

Line:

**Final Measurement Detector 2**

Frequency (MHz)	Average (dBμV)	Line	Margin (dB)	Limit (dBμV)
0.195000	41.5	L1	12.4	53.8
1.374000	32.1	L1	14.0	46.0
1.113000	29.7	L1	16.3	46.0
1.441500	23.4	L1	22.6	46.0
3.664500	2.6	L1	43.4	46.0
3.925500	1.0	L1	45.0	46.0

Final Measurement Detector 1

Frequency (MHz)	QuasiPeak (dBμV)	Line	Margin (dB)	Limit (dBμV)
1.504500	40.4	L1	15.6	56.0
0.195000	47.6	L1	16.2	63.8
1.635000	38.9	L1	17.1	56.0
1.441500	32.9	L1	23.1	56.0
1.702500	29.5	L1	26.5	56.0
3.664500	10.9	L1	45.1	56.0

§74.861(e)(1)(ii) – OUTPUT POWER MEASUREMENT

Standard Applicable

According to §74.861(e)(1)(ii), for low power auxiliary station operating in the 614-806MHz band, the power of the measured unmodulated carrier power and the output of the transmitter power amplifier (antenna input power) may not exceed 250mW.

Test Procedure

The maximum peak output power was measured with a spectrum analyzer connected to the antenna terminal (conducted measurement) while EUT was operating in normal situation. Set RBW of spectrum analyzer to 100 kHz and VBW to 100 kHz.

Environmental Conditions

Temperature:	17° C
Relative Humidity:	62%
ATM Pressure:	1022 mbar

The testing was performed by Snell Leong on 2005-03-21.

Test equipment

Manufacturer	Description	Model No.	Serial No.	Calibration Date
HP	Analyzer, Spectrum	8565EC	3946A00131	2006-01-16

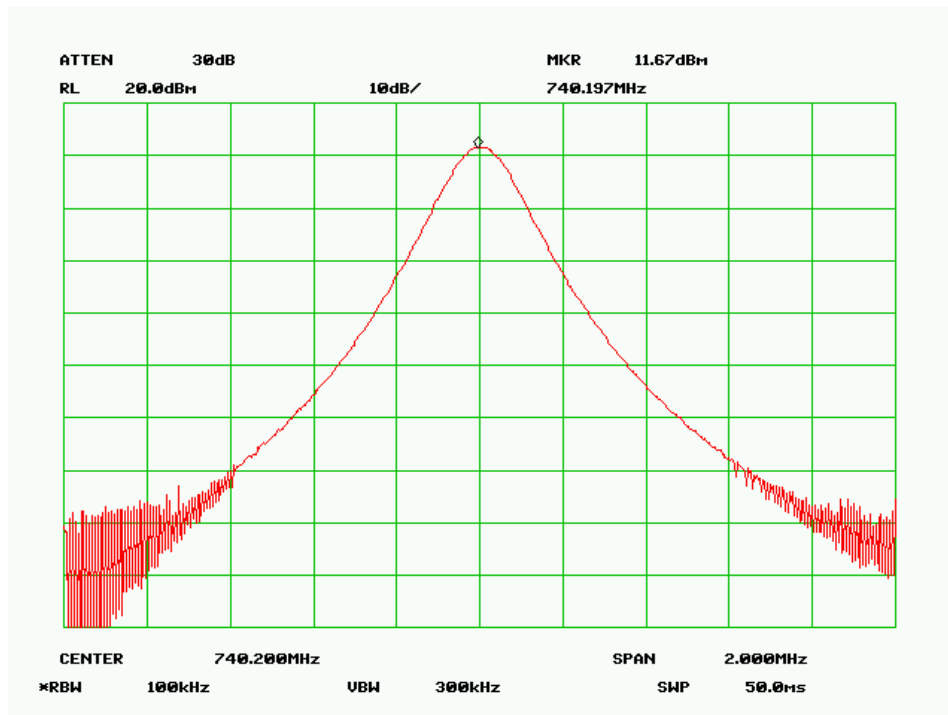
* **Statement of Traceability: BACL Corp.** attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

Test Results

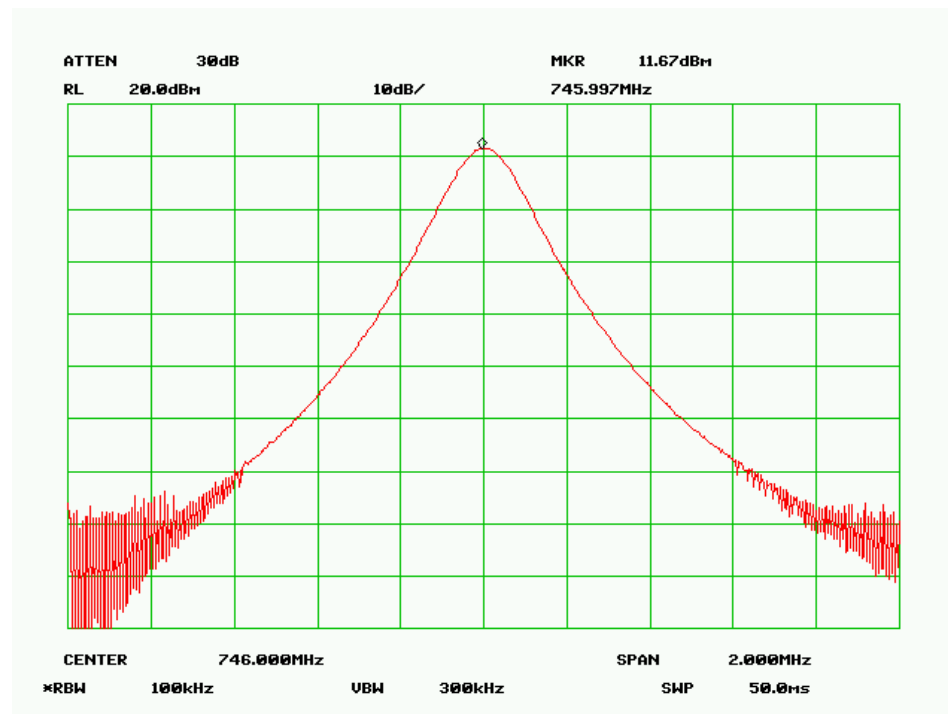
Channel	Spec Freq (MHz)	Peak Output Power (dBm)	Limit(dBm)	Result
Low	741.2	11.67	24	pass
Mid	746.0	11.67	24	pass
High	751.8	11.50	24	pass

The plot (s) of Maximum Output Peak Power was presented hereinafter as reference.

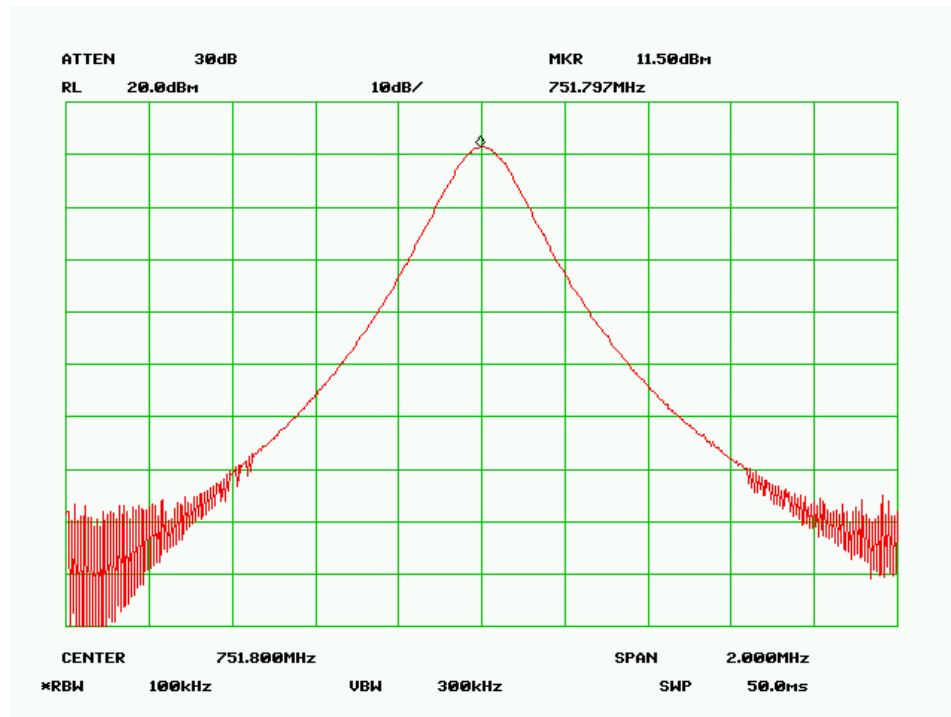
Low Channel



Middle Channel



High Channel



§74.861(e)(3) – MODULATION CHARACTERISTICS

Standard Applicable

According to FCC 2.1047 (a), for Voice Modulated Communication Equipment, the frequency response of the audio modulating circuit over a range of 100Hz to 5000Hz shall be measured. For equipment required to have an audio low-pass filter, the frequency response of the filter, or of all circuitry installed between the modulation limiter and the modulated stage shall be measured.

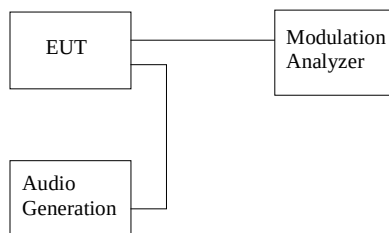
According to §74.861(e)(3), any form of modulation may be used. A maximum deviation of ± 75 kHz is permitted when frequency modulation is employed.

Test Procedure

Frequency response of audio circuits

- 1) Position the EUT as shown in figure 1

Figure 1
Modulation Characteristic
Measurement Configuration



- 2) Adjust the audio input frequency from 300Hz to 20KHz in sequence and keep the input level constant according to TIA/EIA Standard 603-C

Modulation Limit

- 1) Position the EUT as shown in figure 1, adjust the audio input frequency to 100 Hz and the input level from 0V to maximum permitted input voltage with recording each carrier frequency deviation responding to respective input level.
- 2) Repeat step 1 with changing the input frequency for 300, 1000, 2500 and 3000 Hz in sequence.

Environmental Conditions

Temperature:	17° C
Relative Humidity:	62%
ATM Pressure:	1022 mbar

The testing was performed by Snell Leong on 2005-03-21.

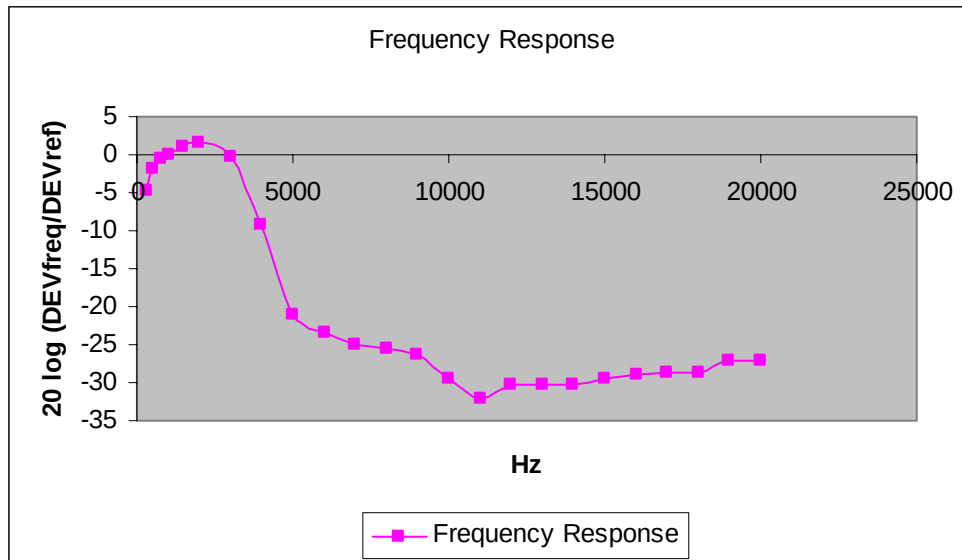
Test Equipment

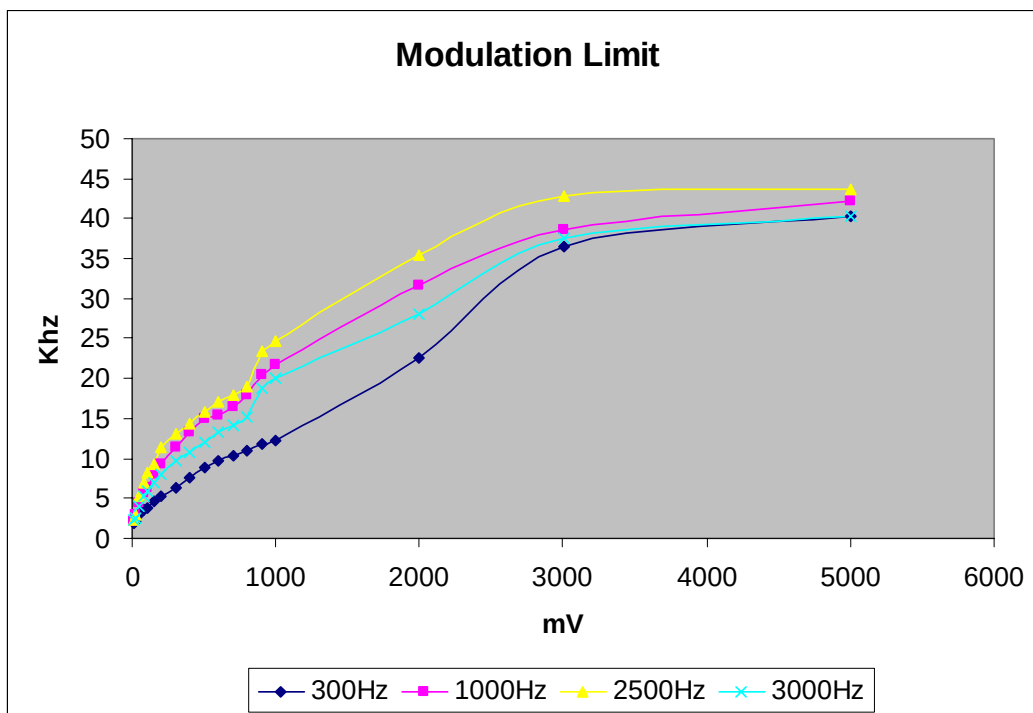
Manufacturer	Description	Model No.	Serial No.	Calibration Date
HP	Analyzer, Modulation	8901A	2026A00847	1/17/2006
Agilent	Generator, Function	33220A	MY43004878	5/18/2005

* **Statement of Traceability:** BACL Corp. attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

Test Results

The plot(s) of modulation characteristic is presented hereinafter as reference.





§74.861(e)(5)/(e)(6) - OCCUPIED BANDWIDTH OF EMISSION / EMISSION MASK

Standard Applicable

According to FCC 2.1049 (c) (1), for radiotelephone transmitter, other than single sideband or independent sideband transmitter, when modulated by a 2.5 kHz tone at an input level 16 dB greater than that necessary to produce 50 percent modulation.

According to §74.861(e)(5) & §74.861(e)(6),
(1) the operating bandwidth shall not exceed 200 kHz

(2)(i) On any frequency removed from the operating frequency by more than 50 percent up to and including 100 percent of the authorized bandwidth: at least 25 dB;

(ii) On any frequency removed from the operating frequency by more than 100 percent up to and including 250 percent of the authorized bandwidth: at least 35 dB;

(iii) On any frequency removed from the operating frequency by more than 250 percent of the authorized bandwidth: at least $43+10\log_{10}$ (mean output power in watts) dB.

Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Install new batteries in the EUT. Turn on the EUT and set it to any one convenient frequency within its operating range.

Environmental Conditions

Temperature:	17° C
Relative Humidity:	62%
ATM Pressure:	1022 mbar

The testing was performed by Snell Leong on 2005-03-21.

Test Equipment

Manufacturer	Description	Model No.	Serial No.	Calibration Date
HP	Analyzer, Spectrum	8565EC	3946A00131	1-11-2006

* **Statement of Traceability:** BACL Corp. attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

Test Results

Channel	Frequency MHz	99% Bandwidth KHz	Limit KHz	Result
Low	741.2	75.0	200	pass
Mid	746.0	75.7	200	pass
High	751.8	76.3	200	pass

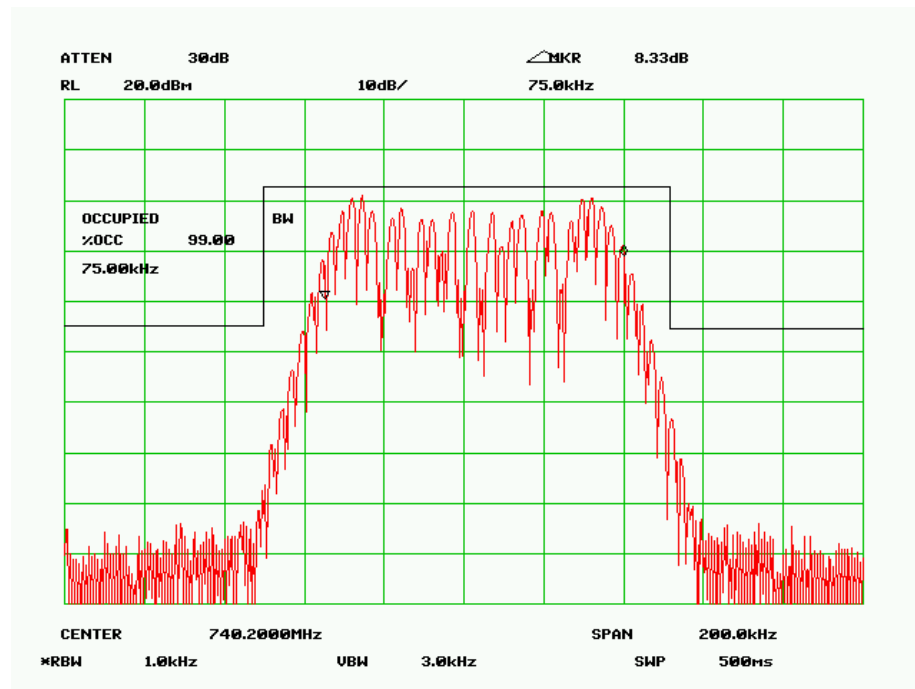
Please refer the following plot.

Emission Designator

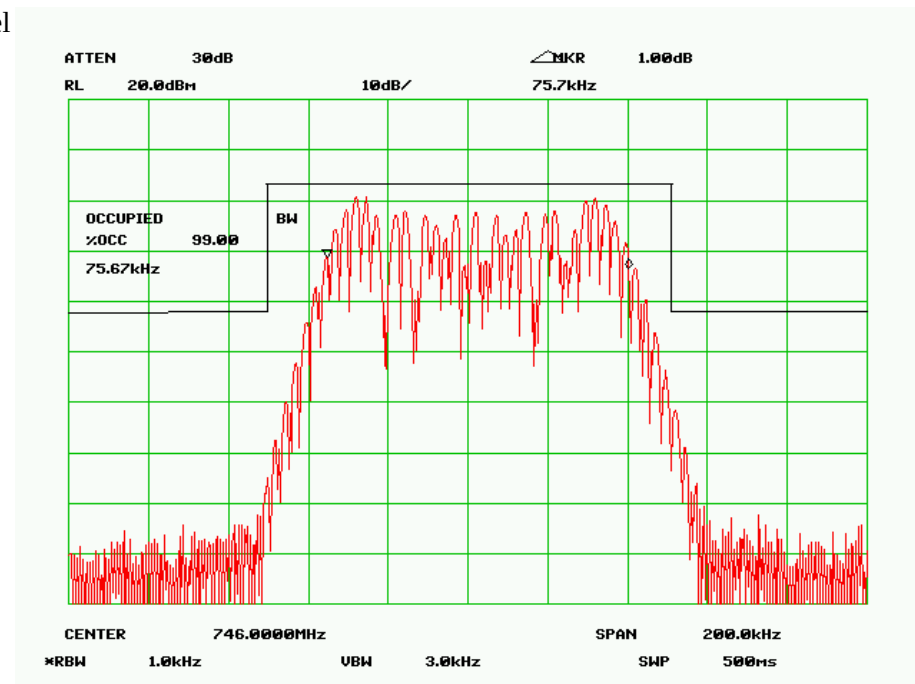
$$2M + 2D = (2 \times 15\text{kHz}) + (2 \times 45\text{kHz}) = 120\text{KF3E}$$

Please refer to the plots hereinafter.

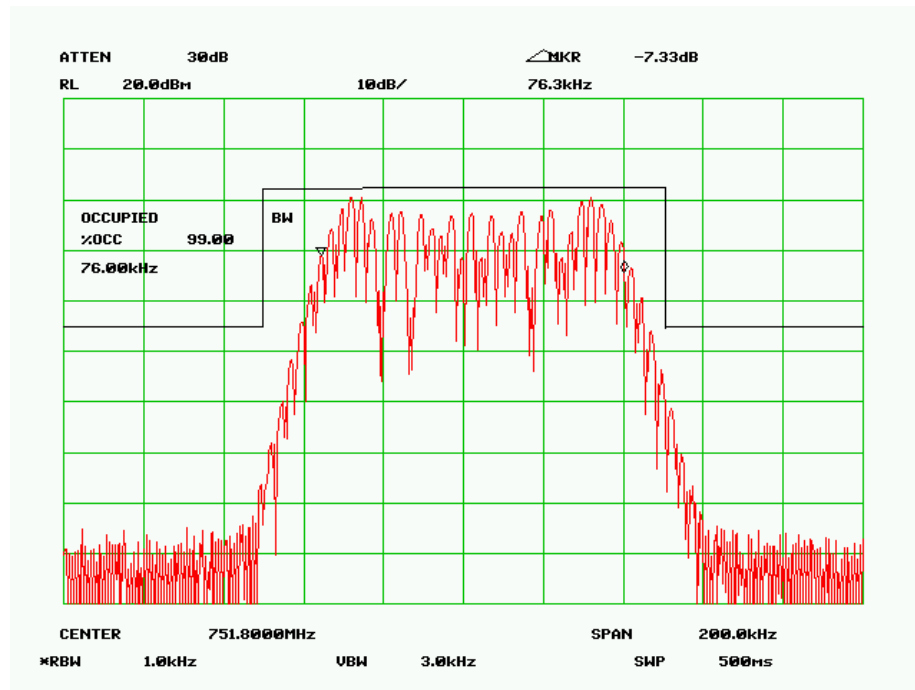
Low Channel



Middle Channel



High Channel



§74.861 (e)(6) / 15.209 – RADIATED SPURIOUS EMISSION

Standard Applicable

According to FCC2.1053, measurements shall be made to detect spurious emission that may be radiated directly from the cabinet, control circuits, power leads, or intermediated circuit elements under normal condition of installation and operation. Information submitted shall include the relative radiated power of spurious emission with reference to the rated power output of the transmitter, assuming all emissions are radiated from a half wave dipole antenna.

According to FCC74.861 (e)(6), the mean power of emissions shall be attenuated below the mean output power of the transmitter in accordance with the following schedule:

1. on any frequency removed from the operating frequency by more than 50 percent up to and including 100 percent of the authorized bandwidth: at least 25 dB.
2. on any frequency removed from the operating frequency by more than 100 percent up to and including 250 percent of the authorized bandwidth: at least 35 dB.
3. on any frequency removed from the operating frequency by more than 250 percent up to and the authorized bandwidth shall be attenuated below the un-modulated carrier by at least 43 plus 10 Log (output power in watts)dB.

Test Procedure

The transmitter was placed on a wooden turntable, and it was transmitting into a non-radiating load which was also placed on the turntable.

The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.

The frequency range up to tenth harmonic of the fundamental frequency was investigated.

Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

Spurious emissions in dB = $10 \lg (\text{TXpwr in Watts}/0.001)$ – the absolute level

Spurious attenuation limit in dB = $43 + 10 \text{ Log}_{10} (\text{power out in Watts})$

Environmental Conditions

Temperature:	17° C
Relative Humidity:	62%
ATM Pressure:	1022 mbar

The testing was performed by Snell Leong on 2005-03-21.

Test Equipment

Manufacturer	Description	Model No.	Serial No.	Calibration Date
Agilent	Analyzer, Spectrum	E4446A	US44300386	2006-3-6
HP	Amplifier, Pre	8447D	2944A10187	2005-08-25
ETS	30Mhz ~ 3 GHz Antenna	JB3	A020106-3 / S006628	2/14/2006
HP	Generator, Signal	8648C	3426A01345	2005-09-01
Com-Power	Antenna, Dipole	AD-100	2219	2005-09-26
A.R.A	Antenna, Horn	DRG-18/A	1132	2005-08-17

*** Statement of Traceability: BACL Corp.** attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

Test Results

Worst case reading:

-23.8dB at 2964.8MHz for Low Channel
 -27.1dB at 2974.4MHz for Middle Channel
 -27.0dB at 3727.2MHz for High Channel
 3.5dB at 79.99375MHz for Receiver, model: R72D

Low Channel

Indicated		Table	Test Antenna		Substituted		Antenna	Cable	Absolute		Limit	Margin
Frequency	Ampl.	Angle	Height	Polar	Frequency	Level	Gain	Loss	Level			
MHz	dBuV/m	Degree	Meter	H/V	MHz	dBm	Correction	dB	dBm	nW	dBm	dB
2964.8	59.6	330	1.2	h	2964.8	-44.7	9.9	2.03	-36.8	207.4914	-13	-23.8
2964.8	59.9	180	1.4	v	2964.8	-45.0	9.9	2.03	-37.1	193.6422	-13	-24.1
1482.4	64.3	180	1.4	v	1482.4	-50.0	6.3	1.44	-45.1	30.6196	-13	-32.1
4447.2	48.9	180	1.4	v	4447.2	-54.0	10.8	4.84	-48.0	15.7036	-13	-35.0
5188.4	45.3	90	1.2	v	5188.4	-57.0	10.7	4.37	-50.7	8.5704	-13	-37.7
4447.2	45.3	330	1.2	h	4447.2	-57.6	10.8	4.84	-51.6	6.8549	-13	-38.6
3706.0	46.5	90	1.2	v	3706.0	-59.0	10.3	3.83	-52.5	5.5847	-13	-39.5
2223.6	49.2	90	1.2	v	2223.6	-60.0	8.3	1.76	-53.5	4.5082	-13	-40.5
3706.0	45.3	0	1.4	h	3706.0	-60.5	10.3	3.83	-54.0	3.9537	-13	-41.0
2223.6	48.4	0	1.4	h	2223.6	-61.2	8.3	1.76	-54.7	3.4198	-13	-41.7
1482.4	53.9	330	1.2	h	1482.4	-60.1	6.3	1.44	-55.2	2.9923	-13	-42.2
5188.4	41.0	0	1.4	h	5188.4	-61.5	10.7	4.37	-55.2	3.0409	-13	-42.2

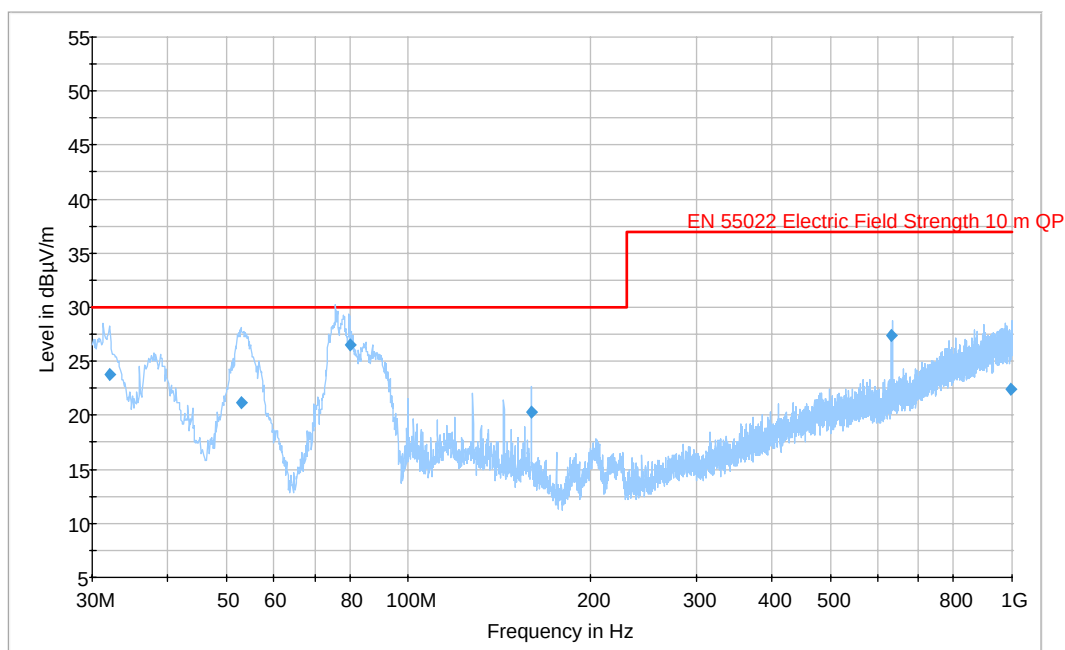
Middle Channel

Indicated		Table	Test Antenna		Substituted		Antenna	Cable	Absolute		Limit	Margin
Frequency	Ampl.	Angle	Height	Polar	Frequency	Level	Gain	Loss	Level			
MHz	dBuV/m	Degree	Meter	H/V	MHz	dBm	Correction	dB	dBm	nW	dBm	dB
2974.4	57.9	0	1.4	h	2974.4	-48.0	9.9	2.03	-40.1	97.051	-13	-27.1
2974.4	57.1	90	1.2	v	2974.4	-48.6	9.9	2.03	-40.7	84.528	-13	-27.7
1492.0	59.7	180	1.4	v	1492.0	-55.2	6.3	1.44	-50.3	9.247	-13	-37.3
4456.8	44.2	90	1.2	v	4456.8	-58.8	10.8	4.84	-52.8	5.200	-13	-39.8
3715.6	45.5	180	1.4	v	3715.6	-60.1	10.3	3.83	-53.6	4.335	-13	-40.6
4456.8	43.6	0	1.4	h	4456.8	-59.7	10.8	4.84	-53.7	4.227	-13	-40.7
2233.2	48.5	180	1.4	v	2233.2	-60.5	8.3	1.76	-54.0	4.018	-13	-41.0
1492.0	54.1	330	1.2	h	1492.0	-59.3	6.3	1.44	-54.4	3.597	-13	-41.4
3715.6	44.7	330	1.2	h	3715.6	-61.6	10.3	3.83	-55.1	3.069	-13	-42.1
2233.2	44.2	330	1.2	h	2233.2	-64.7	8.3	1.76	-58.2	1.528	-13	-45.2

High Channel

Indicated		Table	Test Antenna		Substituted		Antenna	Cable	Absolute		Limit	Margin
Frequency	Ampl.	Angle	Height	Polar	Frequency	Level	Gain	Loss	Level			
MHz	dBuV/m	Degree	Meter	H/V	MHz	dBm	Correction	dB	dBm	nW	dBm	dB
3727.2	58.8	90	1.2	v	3727.2	-46.5	10.3	3.83	-40.0	99.312	-13	-27.0
2986.0	57.7	330	1.2	h	2986.0	-48.5	9.9	2.03	-40.6	86.497	-13	-27.6
2244.8	60.4	90	1.2	v	2244.8	-49.7	8.3	1.76	-43.2	48.306	-13	-30.2
1503.6	60.3	180	1.4	v	1503.6	-54.3	8.8	1.44	-46.9	20.230	-13	-33.9
2986.0	50.2	180	1.4	v	2986.0	-55.0	9.9	2.03	-47.1	19.364	-13	-34.1
4468.4	46.2	330	1.2	h	4468.4	-53.9	10.8	4.84	-47.9	16.069	-13	-34.9
4468.4	45.8	180	1.4	v	4468.4	-54.6	10.8	4.84	-48.6	13.677	-13	-35.6
5209.6	47.0	180	1.4	v	5209.6	-55.2	10.7	5.07	-49.6	11.041	-13	-36.6
5950.8	46.3	0	1.4	h	5950.8	-55.3	10.6	5.27	-50.0	10.069	-13	-37.0
5950.8	46.2	90	1.2	v	5950.8	-55.4	10.6	5.27	-50.1	9.840	-13	-37.1
5209.6	45.9	330	1.2	h	5209.6	-56.7	10.7	5.07	-51.1	7.816	-13	-38.1
1503.6	54.5	330	1.2	h	1503.6	-59.8	8.8	1.44	-52.4	5.702	-13	-39.4
3727.2	46.3	0	1.4	h	3727.2	-59.0	10.3	3.83	-52.5	5.585	-13	-39.5
2244.8	50.3	0	1.4	h	2244.8	-59.6	8.3	1.76	-53.1	4.943	-13	-40.1

Receiver, Model: R72D

**Final Measurement Detector 1**

Frequency (MHz)	QuasiPeak (dBµV/m)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
79.993750	26.5	186.0	V	88.0	-24.9	3.5	30.0
32.000000	23.8	174.0	V	0.0	-14.0	6.2	30.0
52.916250	21.2	343.0	V	201.0	-25.1	8.8	30.0
630.507500	27.4	288.0	V	340.0	-11.3	9.6	37.0
160.020000	20.3	99.0	V	78.0	-20.8	9.7	30.0
995.395000	22.4	100.0	V	269.0	-5.9	14.6	37.0

§2.1051 / 74.861(e)(6)- SPURIOUS EMISSION AT ANTENNA TERMINAL

Standard Applicable

According to §2.1051, the radio frequency voltage or powers generated within the equipment and appearing on a spurious frequency shall be checked at the equipment output terminals when properly loaded with a suitable artificial antenna. Curves or equivalent data shall show the magnitude of each harmonic and other spurious emission that can be detected when the equipment is operated under the conditions specified in §2.1049 as appropriate. The magnitude of spurious emissions which are attenuated more than 20 dB below the permissible value need not be specified.

Measurement Procedure

1. Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
2. Position the EUT as shown in figure 4 without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set the SA on Max-Hold Mode, and then keep the EUT in transmitting mode. Record all the signals from each channel until each one has been recorded.
4. Set the SA on View mode and then plot the result on SA screen.
5. Repeat above procedures until all frequencies measured were complete.

Environmental Conditions

Temperature:	17° C
Relative Humidity:	62%
ATM Pressure:	1022 mbar

The testing was performed by Snell Leong on 2005-03-21.

Test Equipment

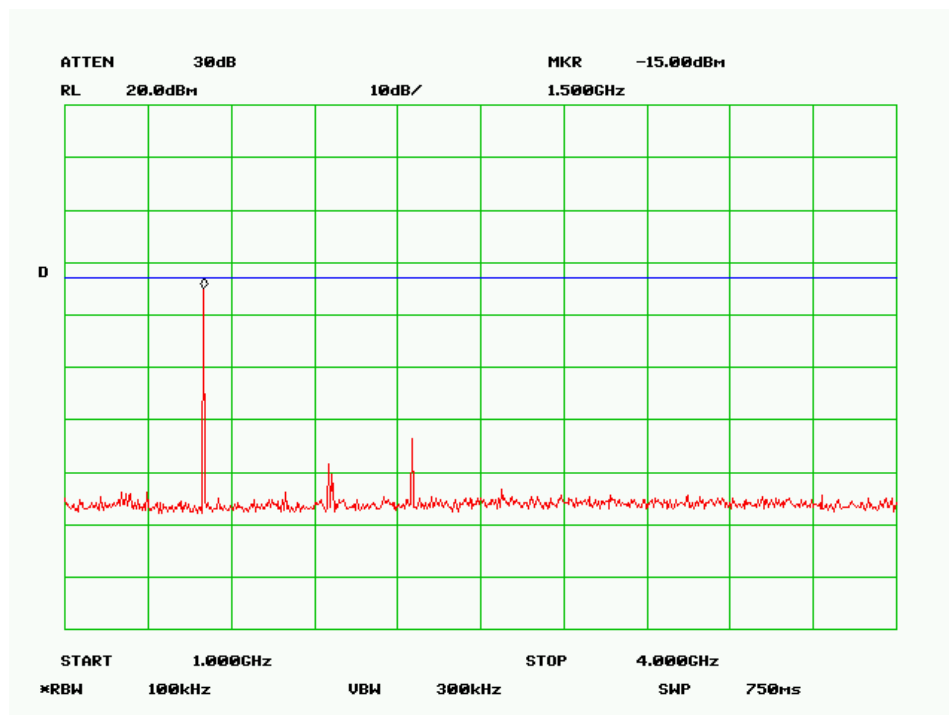
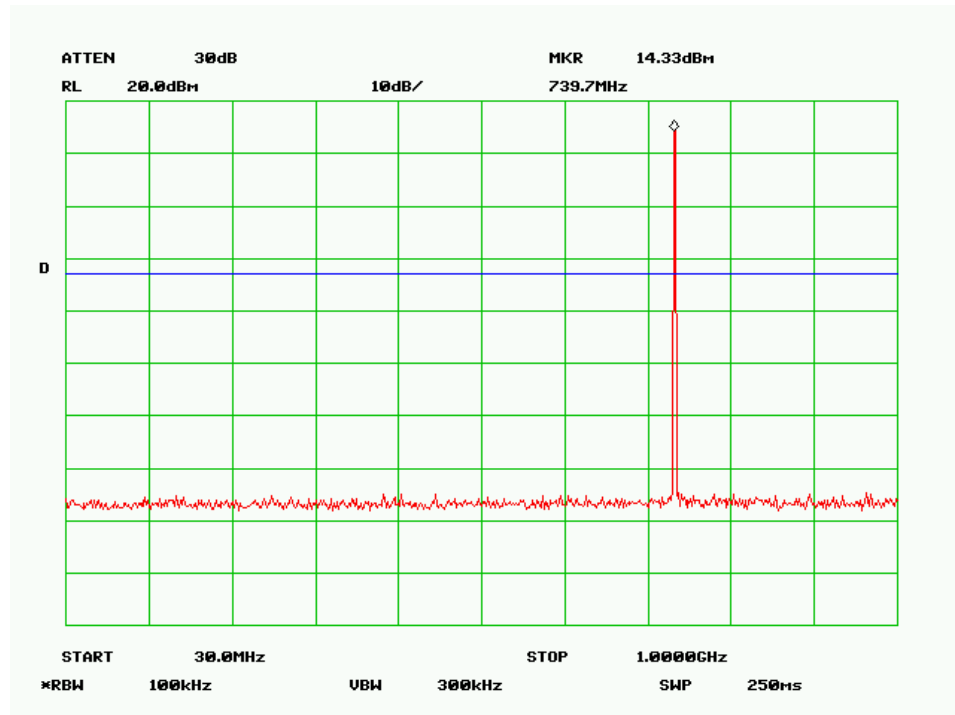
Manufacturer	Description	Model No.	Serial No.	Calibration Date
HP	Analyzer, Spectrum	8565EC	3946A00131	2006-01-11

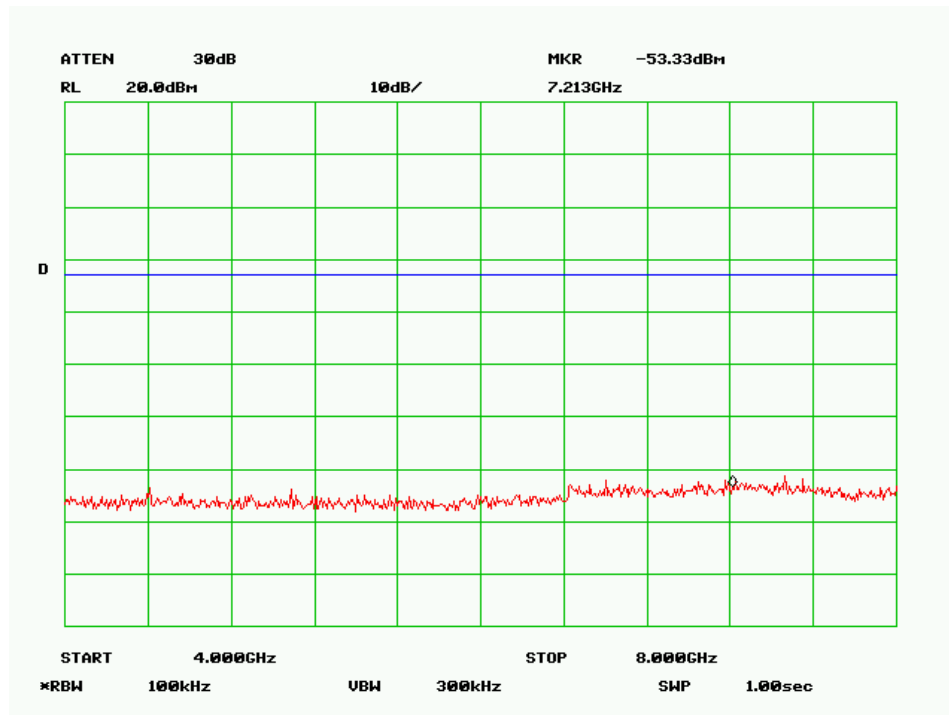
*** Statement of Traceability:** BACL Corp. attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

Measurement Data

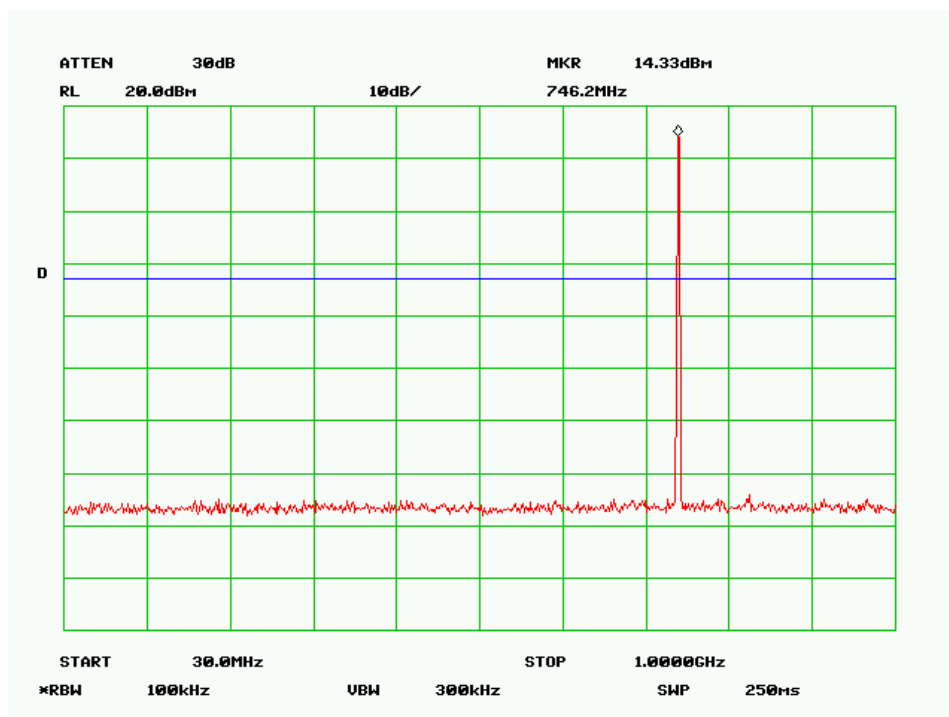
Please refer to the following plots.

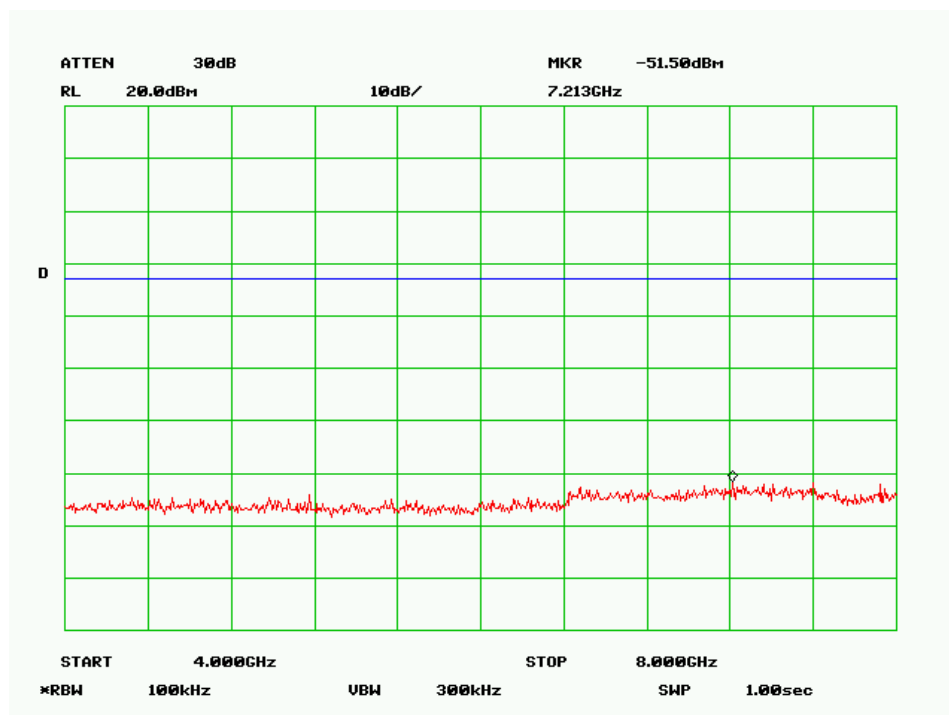
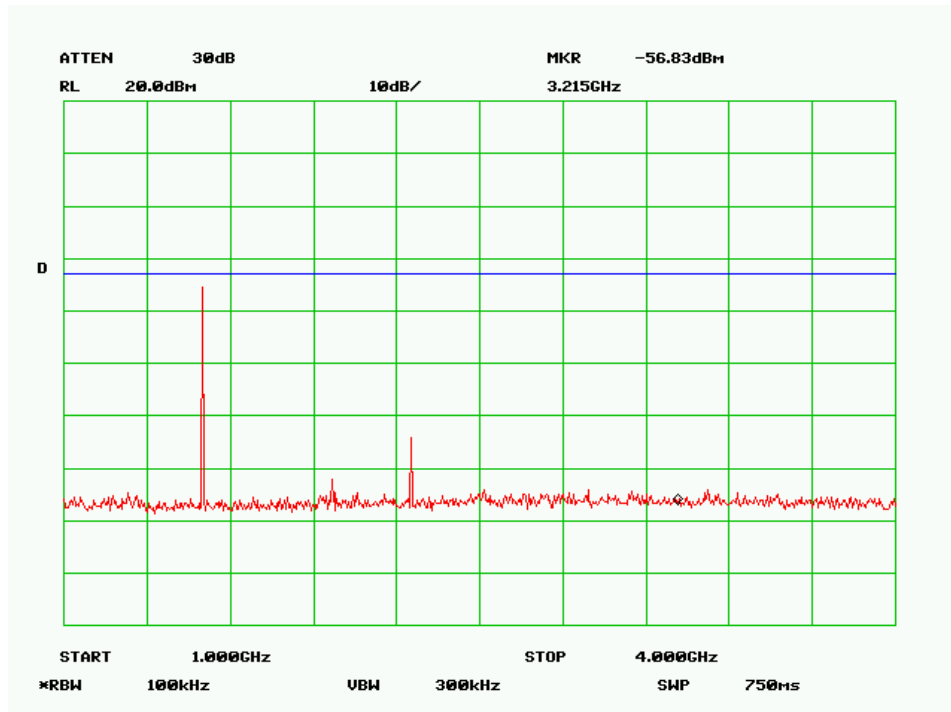
Low Channel



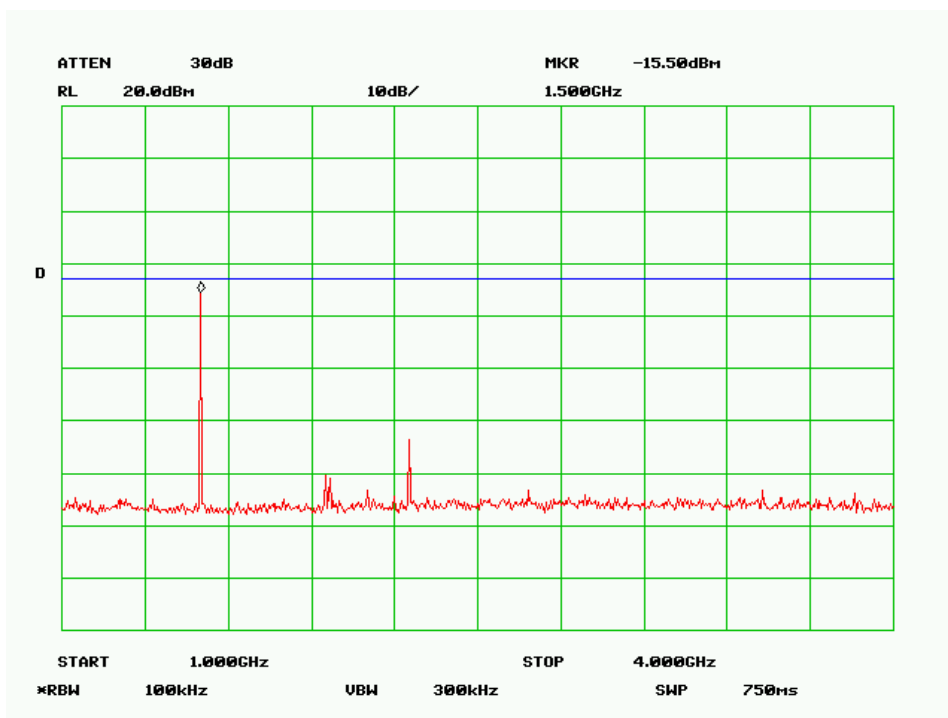
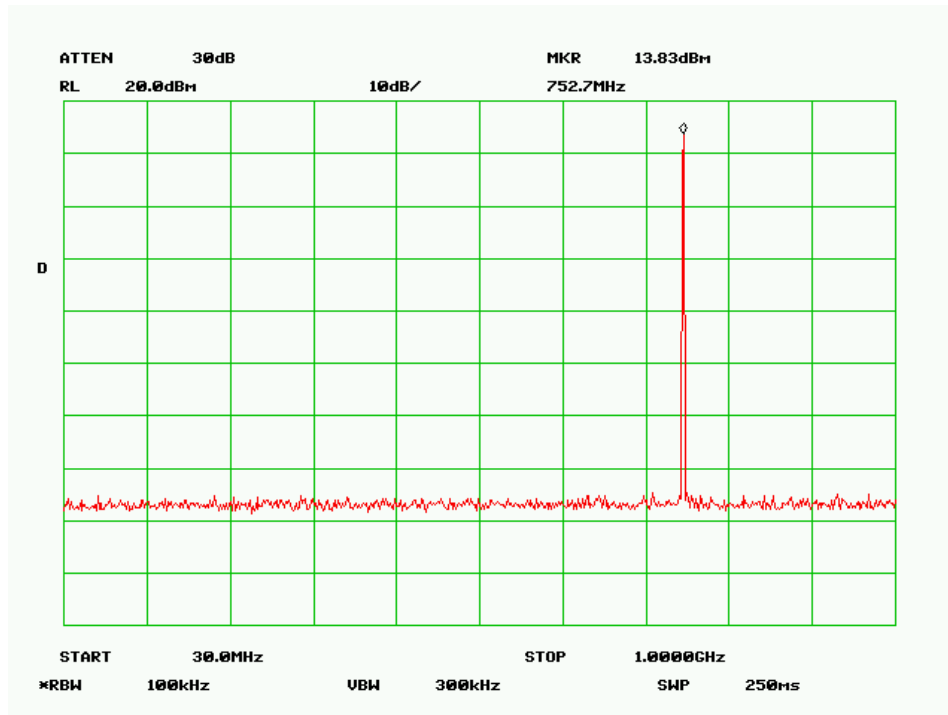


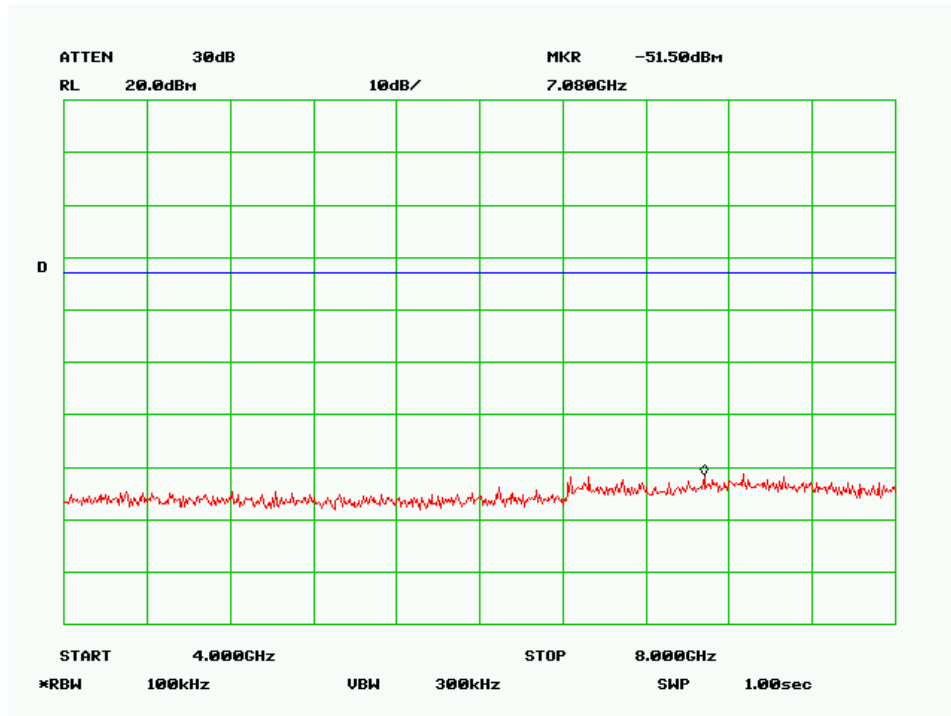
Middle Channel





High





§74.86(e)(4) - FREQUENCY STABILITY MEASUREMENT

Standard Applicable

According to FCC 2.1055(a)(1), the frequency stability shall be measure with variation of ambient temperature from -30°C to $+50^{\circ}\text{C}$, and according to FCC 2.1055(d)(2), the frequency stability shall be measured with reducing primary supply voltage to the battery operating end point which is specified by the manufacturer.

According to FCC 74.861, the frequency tolerance of the transmitter shall be 0.005 percent.

Test Procedure

A) Frequency stability versus environmental temperature

1. Setup the configuration per figure 7 for frequencies measured at ambient temperature if it is with 15°C to 25°C . otherwise, an environmental chamber set for a temperature of 20°C shall be used. Install new batteries in the EUT.
2. Turn on EUT and set frequency counter center frequency to the right frequency needs to be measured.
3. Set the temperature of chamber to 50°C . Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize. While maintaining a constant temperature inside the chamber, turn the EUT on and measure the EUT operating frequency.
4. Repeat step 2 with a 10°C decreased per stage until the lowest temperature -30°C is measured, record all measurement frequencies.

B) Frequency stability versus input voltage

1. Setup the configuration per figure 7 for frequencies measured at ambient temperature if it is within 15°C to 25°C . otherwise, an environmental chamber set for a temperature of 20°C shall be used. Install new batteries in the EUT.
2. Set frequency counter center frequency to the right frequency needs to be measured.
3. For battery operated only device, supply the EUT primary voltage at the battery operating end point which is specified by the manufactured and record the frequency.

Environmental Conditions

Temperature:	17°C
Relative Humidity:	62%
ATM Pressure:	1022 mbar

The testing was performed by Snell Leong on 2005-03-21.

Test Equipment

Manufacturer	Description	Model No.	Serial No.	Calibration Date
Tenney	Oven, Temperature	VersaTenn	12.222-193	2005-06-27
HP	Counter, Microwave Frequency	5342A	2232A06380	2005-12-12

*** Statement of Traceability: BACL Corp.** attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

Test Results

Reference Frequency: 751.8MHz, Limit: 0.005%			
Environment	Power	Measured	Error
Temperature(C)	Supply (V)	Freq (MHz)	%
50	3	751.799720	-0.00004
40	3	751.799750	-0.00003
30	3	751.799800	-0.00003
20	3	751.799950	-0.00001
10	3	751.799500	-0.00007
0	3	751.799180	-0.00011
-10	3	751.799880	-0.00002
-20	3	751.800550	0.00007
-30	3	751.800960	0.00013

Frequency Stability Vs Extreme Voltage

Reference Frequency: 751.8MHz, Limit: 0.005%			
Environment	Temperature	Measured	Error
Power Supply	C	Freq (MHz)	%
3.45	20	751.799920	-0.00001
3.00	20	751.799950	-0.00001
2.55	20	751.799925	-0.00001