EXHIBIT E: REPORT OF MEASUREMENTS [2.1033(B6)]

Abbreviated Test Report for FCC ID: FBRBGEN2-EI

FCC Part 2.1031, Part 15 Subpart C(15.247)

Report #0600901BF
Issued 04/30/06

FREQUENCY HOPPING TRANSCEIVER
MODEL BGEN2EI

Prepared for:

Mr. Dave Ramon
Fleetwood Group Inc.
P.O. Box 1259
Holland, MI 49422-1259

Final Test Date: April 30, 2006

Report prepared by:

Gordon L. Helm, NCE

Report reviewed by:

Mr. Dave Ramon

Data recorded by:

Gordon L. Helm, NCE

TABLE OF CONTENTS

Statements Concerning this Report

NVLAP Accreditation: NVLAP Lab. Code 200129-0

The scope of AHD accreditation is the conducted emissions, radiated emissions test methods of:

IEC/CISPR 22: Limits and methods measurement of radio disturbance characteristics of information technology equipment.
FCC Method – 47 CFT Part 15 – Digital Devices.
AS/NZS 3548: Electromagnetic Interference – Limits and Methods of Measurement of Information Technology Equipment.
IEC61000-4-2 and Amend.1: ElectroStatic Discharge Immunity
IEC61000-4-5: Surge Immunity

Test Data:

This test report contains data included in the scope of the NVLAP accreditation.

Subcontracted Testing:

This report contains data recorded at the University of Michigan Radiation Laboratory. The University of Michigan test facility is located at 8501 Beck Road, Belleville, Michigan 48111. This test facility has been fully described and accepted by the FCC and Industry Canada. This facility was utilized to measure emissions occurring at frequencies greater than 6GHz.

Test Traceability:

The calibration of all measuring and test equipment and the measured data using this equipment are traceable to the National Institute for Standards and Technology (NIST).

Limitations on results:

The test results contained in this report relate only to the Item(s) tested. Any electrical or mechanical modification made to the test item subsequent to the test date shall invalidate the data presented in this report. Any electrical or mechanical modification made to the test item subsequent to this test date shall require an evaluation to verify continued compliance.

Limitations on copying:

This report shall not be reproduced, except in full, without the written approval of AHD.

Limitations of the report:

This report shall not be used to claim product endorsement by NVLAP, FCC, or any agency of the US Government.

Statement of Test Results Uncertainty: Following the guidelines of NAMAS publication NIS81 and NIST Technical Note 1297, the Measurement Uncertainty at a 95% confidence level is determined to be: ± 1.4 dB. This report contains data points within the Measurement Uncertainty.

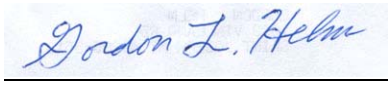
EXHIBIT 1: STATEMENTS OF ATTESTATION

Statement Attesting to the Accuracy of the Data

The measurements declared in this report were made in accordance with the procedures indicated and the energy levels emitted by this equipment were found to be within the limits applicable.

The technical test data reported herein was performed or supervised by a NARTE Certified Engineer at a NVLAP accredited facility who attests to the accuracy of the data presented and whose signature appears below.

On the basis of the measurements made, the equipment tested is capable of operation in compliance with the requirements of Part 15 of the FCC Rules under normal use and maintenance.

signed 

Gordon L. Helm, NCE
Technical Lab. Mgr., AHD

NVLAP Accreditation

United States Department of Commerce
National Institute of Standards and Technology

NVLAP®

ISO/IEC 17025:1999
ISO 9002:1994

Certificate of Accreditation

AHD (AMBER HELM DEVELOPMENT, L.C.)
DOWAGIAC, MI

is recognized by the National Voluntary Laboratory Accreditation Program for satisfactory compliance with criteria set forth in NIST Handbook 150:2001, all requirements of ISO/IEC 17025:1999, and relevant requirements of ISO 9002:1994. Accreditation is awarded for specific services, listed on the Scope of Accreditation, for:

ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS

June 30, 2006
Effective through

For the National Institute of Standards and Technology
NVLAP Lab Code: 200129-0

NVLAP-01C (06-01)

Manufacturer/Applicant [2.1033(b1)]

The manufacturer and applicant:

FLEETWOOD GROUP Inc.
P.O. Box 1259
Holland, Michigan 49422-1259

Tested Configuration /Setup: [2.1033(b8)]

Support Equipment & Cabling

Setup Diagram Legend	Description	Model	Serial No. / Part No.	EMC Consideration
A,F	[EUT] BGEN2 FHSS Base Transceiver	[Fleetwood Group] BGEN2EI	preproduction	-
B,C,D, E,	Support PC system			
1	USB cable	-	1 meter	Shielded. Routed to below ground plane to power cube or Routed to PC computer. 2 Ferrite clamps each with 2 passes. Steward 28A0640-0A2

Model: BGEN2EI

Description:

A short range Transceiver operates on 75 frequency hopping channels between 2401MHz and 2475MHz.

Base unit used in audience interaction events, by an instructor, communicates with many keypad units.

Main PCB #
2-layer printed circuit board.
Oscillator: 20MHz
Microprocessor -- PIC18LF452
Transceiver IC: Nordic nRF24EI
Receiver Local Oscillator is 300MHz above the received transmission.
Oscillator: 16MHz
Power Source – USB from PC

Remote PC: exercise unit via USB link.
Gateway 200MHz PC Tower
S/N 10378

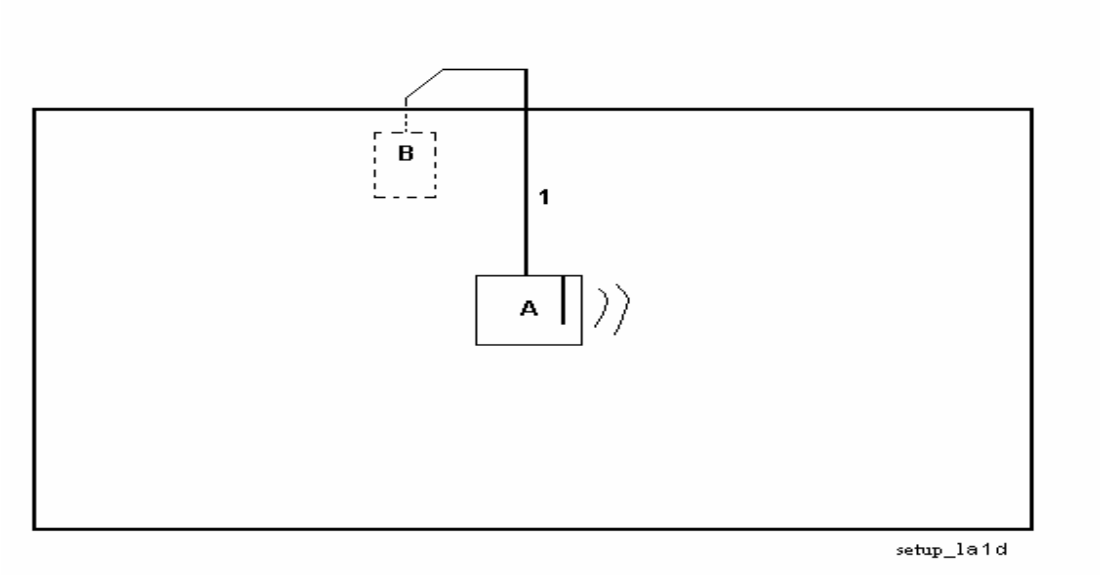
Remote Monitor: Acer model 70330 FCC ID: JVP70330A
S/N 330225935P1

Remote Keyboard: ZDS model SK-2000RE FCC ID: GYUR10SK
S/N 5BSDDC000002

Remote Mouse: MICROSOFT Intellimouse model 1.1A
S/N 01929284

Setup Diagram

Note: Setup photographs are located in Attached Electronic File, Exhibit E.



BASIC EUT SETUP
(Legend designation is above)

Summary of Results:

1. This test series evaluated the Equipment Under Test to FCC Part 15, SubPart C.
2. The system tested is compliant to the requirement of CFR 47, FCC Part 15, SubPart C for Frequency Hopping operation in the 2400-2483.5MHz frequency band, (Part 15.247).
3. The equipment under test was received on January 15, 2006 and this test series commenced through April 30, 2006.
4. This submittal presents a complete new set of measurements as evidence of compliance. This model is electrically similar to previously tested models using FCC ID: FBRCRS940-FH. This model differs in the number of 7 segment indicator LED it will now have two digits.
5. The product is powered using the USB port of a host PC. Using a PC power supply to test the unit the line conducted emission level nearest the limit occurred at 451kHz. The signal was measured to be **3.65dB** below the Class B Quasi-Peak limit when measuring phase to ground.
6. The occupied bandwidth was greatest while observing 2475MHz. Using 30kHz RBW, the 99% bandwidth measured **510kHz**.
7. The Band Edge measurements: All spurious below the lower band edge of 2400MHz and above the upper band edge of 2483.5MHz are greater than 20dB below the level of the fundamental carrier.
8. The output level of the fundamental was measured for 2401MHz, 2438MHz, and 2475MHz. The evaluation showed the emission nearest the limit occurred at approximately 2475MHz. The EUT was positioned on the 'end' and the receive antenna oriented in the horizontal polarization. This signal was measured with a peak detection method and the calculated EIRP was determined to be **20.7dB** below the peak power limit of 1 Watt.
9. The evaluation of the field strength levels of the transmitter harmonics showed the emission nearest the limit occurred while operating at 2401MHz. This emission was measured using Peak detection and corrected for the 'hopping' duty cycle. The emission at 4802MHz was calculated to be **0.3dB** below the average limit of 54dBuV/m (500uV/m).
10. The suspects frequencies for spurious emissions and RX LO harmonics were determined in a shielded enclosure. The suspect frequency below 1GHz, nearest the limit, was 191.7MHz. This level was measured to be **1.9dB** below the quasi-peak limit of 40dBuV/m. The suspect frequency above 1GHz, nearest the limit, was 2488.2MHz. This level was measured to be **1.4dB** below the average limit of 54dBuV/m.
11. This report contains data points within the Measurement Uncertainty.

Changes made to achieve compliance

1. Two ferrite clamps each with 2 passes on each end of the USB cable. Steward 28A0640-0A2

Standards Applied to Test: [2.1033(b6)]

ANSI C63.4 - 2001
CFR47 FCC Part 2, Part 15, SubPart C, 15.247 Intentional Radiator; SubPart B, Digital Device
AHD test procedures TP0101-01, TP0102-01

Test Methodology: [2.1033(b6)]

This abbreviated test plan evaluated the spurious/digital emissions of the product and evaluated the fundamental power output as a field strength at 3 meters and with the output directly connected to the analyzer.

The system was placed at the center of the table 80cm above the ground plane pursuant to ANSI C63.4 for stand-alone equipment. The setup pictures in this report indicate the configurations of testing for this product.

This product contains a Nordic 2.4GHZ RF chip. The antenna is a foil trace on the circuit board. The antenna can not be adjusted by the user.

Most of the evaluations in transmit mode were performed with the frequency hopping function disabled. In this mode the EUT was setup up to transmit continuously with modulation. The measurements of the fundamental were recorded with Peak detection and the results peak power limit of section 15.247.

Line Conducted

The normal mode of installation is with the product connected to the USB port of a host computer for data gathering and power supply.

Line conducted emission evaluation for this device was performed with the unit transmitting.

The system was placed upon a 1 x 1.5 meter non-metallic table 80cm from the ground floor and 40cm from the vertical conducting plane in the prescribed setup per ANSI C63.4. This table is housed in a shielded enclosure to prevent the detection of unwanted ambients.

The mains power is nominally 120VAC, 60Hz.

The EUT was connected to the LISN being monitored by the EMI Receiver.

While monitoring the display of the EMI Receiver, via remote video monitor, the cables were manipulated to determine a position that maximized the emissions being observed. Once the highest amplitude relative to the limit was determined for the Phase current carrying line, the procedure was repeated for the Neutral current carrying line.

The configuration that created an emission closest to the limit was used during the course of taking final measurements. Pictures of this final configuration are recorded in this report.

The principal settings of the EMI Receiver for line conducted testing include:

Bandwidth = 9kHz
Detector Function: scanning and signal search = Peak Detection Mode
measurements = Quasi Peak Detection and Average Detection

Radiated

The system was placed upon a 1 x 1.5 meter non-metallic table 80cm above the open field site ground plane in the prescribed setup per ANSI C63.4.

The table sits upon a remote controlled turntable. The receiving antenna, located at the appropriate standards distance of 3 or 10 meters from the table center, is also remote controlled.

The principle settings of the EMI Receiver for radiated testing include:
IF Bandwidth: 120kHz for frequencies less than 1GHz.
1 MHz for frequencies greater than 1GHz.
Detector Function: Peak Mode for transmitter fundamental.
Quasi-Peak for emissions < 1000MHz
Average for emissions > 1000MHz
Occupied Bandwidth settings:
RBW: 10kHz
VBW: 30kHz

At frequencies up to 1000MHz a BiconiLog broadband antenna was used for measurements. At frequencies above 1000MHz a double-ridge Horn broadband antenna was used for measurements.

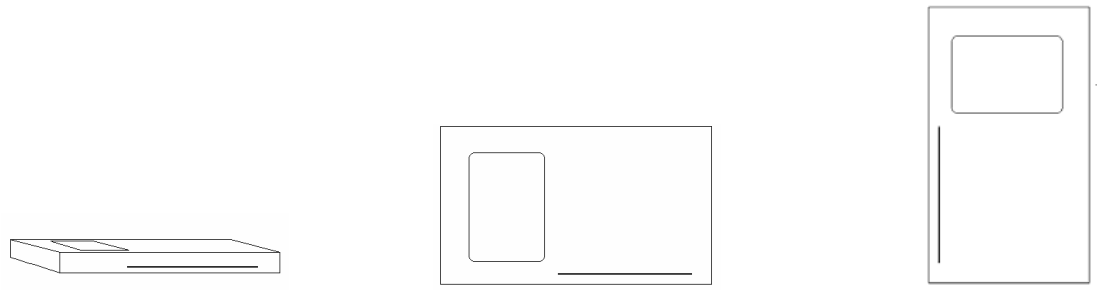
During the transmitter evaluation the EUT was transmitting continuously.

The turntable was rotated 360 degrees and the receiving antenna height varied from 1 to 4 meters to search out the highest emissions.

The final measurements were made at the lowest transmit frequency (2401MHz), a mid band frequency (2438MHz), and the highest transmit frequency (2475MHz) pursuant to the requirements of 47CFR 15.31(m). At each frequency the EUT was placed in three orthogonal positions (designated as flat, side, and end). Measurements were recorded with the receive antenna in vertical and horizontal positions.

The unit was evaluated up to the tenth harmonic of the transmit fundamental and up to 5GHz for other spurious signals.

The orthogonal positions of EUT are:
Flat Side End



FORMULAS AND SAMPLE CALCULATIONS:

THE HP8546A EMI Receiver has stored in memory the antenna and coax correction factors used in this test. The resultant Field Strength (FS) in dBuV/m presented by the HP8546A is the summation in decibels (dB) of the Received Level (RF), the Antenna Correction Factor (AF), and the Cable Loss Factor (CF).

Formula 1: Field Strength FS (dBuV/m) = RF (dBuV) + AF (dB/m) +CF (dB)

With the EUT transmitting the resultant Field Strength measurement is recorded using the peak hold detector of the HP8546A.

Formula 2: Equivalent Isotropic Radiated Power $PG = \frac{(E*d)^2}{30}$

E = 10^ (FS (dBuV/m) / 20) / 1000000
d = 3 meter

Where applicable, the recorded level is further corrected, by calculation, using a duty cycle correction factor. The duty cycle factor is determined by:

Formula 3: Duty Cycle factor DC factor (dB) = 20*LOG (dwell time / 100mSec).

When the dwell time is determined to be less than 10mSec, the duty cycle factor to apply is determined to be 20dB. [duty cycle factor (dB) = 20*Log (0.1) = -20.0 dB]

Where it was necessary to move the EUT to 1 meter distance to take measurements a 'dB' factor which adjusts for this distance variance is used before comparing the emission level to the FCC limits. This factor is determined by the following formula.

Formula 4: Distance factor (dB) = 20*Log (3meter/1meter) = 20*Log (3) = 9.54dB.

Emission Designation [TRC-43]

The emission designation applicable to this product is 510KF1D.

The "510K" is the highest measured occupied bandwidth of the device.
"F" designates the frequency modulation.
"1" designates the modulation as single channel digital information.
"D" designates the modulation as data transmission.

Test Data [2.1033(b6)]

Antenna Characteristics [15.203, 15.204]

The radiating element 'antenna' is a foil trace on the printed circuit board. The user can not adjust nor replace the trace antenna.

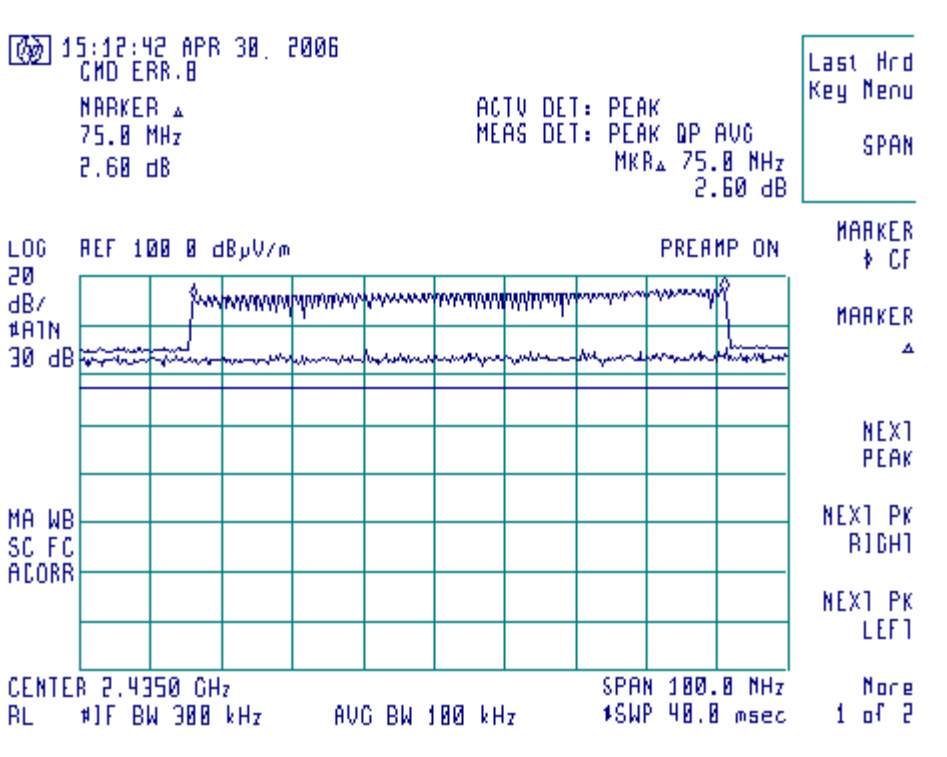
Modulation Characteristics

The transmitter is FSK modulated.
Modulation. F1 represents the bit "1", F2 represents the bit "0". F1 and F2 are separated by approximately 300kHz. Data rate is 256KB/sec

Frequency Hopping Characteristics

Number of Hopping Frequencies [15.247a1i; 6.2.2o]

Seventy Five (75) frequencies from 2401MHz through 2475MHz are available for the keypad transceiver to utilize. The base initiates the communications to the associated keypad units. Refer to 'file GEN2_TechDesc.pdf' for a detailed operational description.



Plot scan of the FHSS profile. Seventy five transmitted frequencies can be discerned.

Occupied bandwidth [15.247a1i; 6.2.2o]

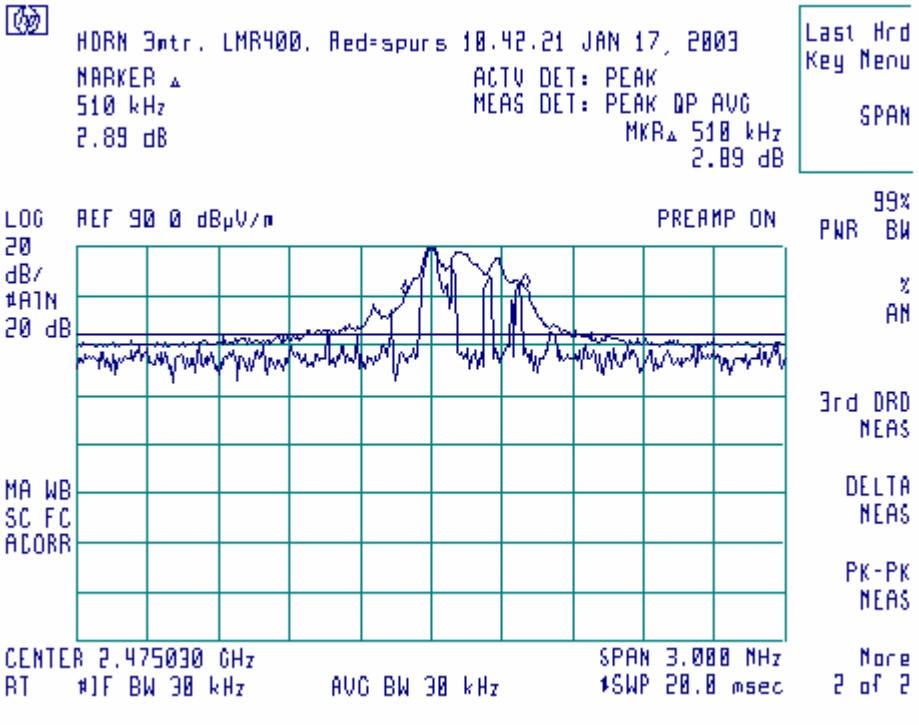
The occupied bandwidth was measured with the unit hopping function disabled. The transmitter is FSK modulated.

Two methods were used to determine occupied bandwidth; 20dB method and 99% method. The 99% method is reported here. The measurement procedure of both methods are described in the paper "A Discussion on the Measurement of Occupied Bandwidth" authored by Brian Kasper.

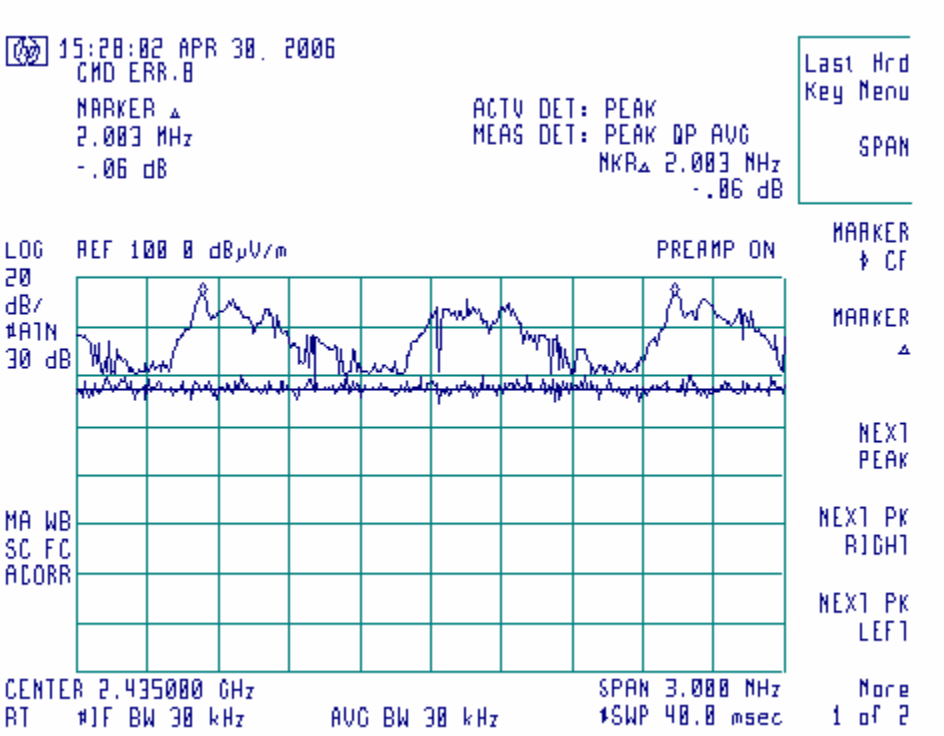
The 99% method utilized a routine which had been programmed into the HP8546A EMI Receiver by the manufacturer.

Fundamental (MHz)	Measured 99% Bandwidth 30kHzRBW	LIMIT RSS-210(a3)
2401	490 kHz	1000 kHz
2437	493 kHz	1000 kHz
2475	510 kHz	1000 kHz

This chart shows greatest measured bandwidth signal.

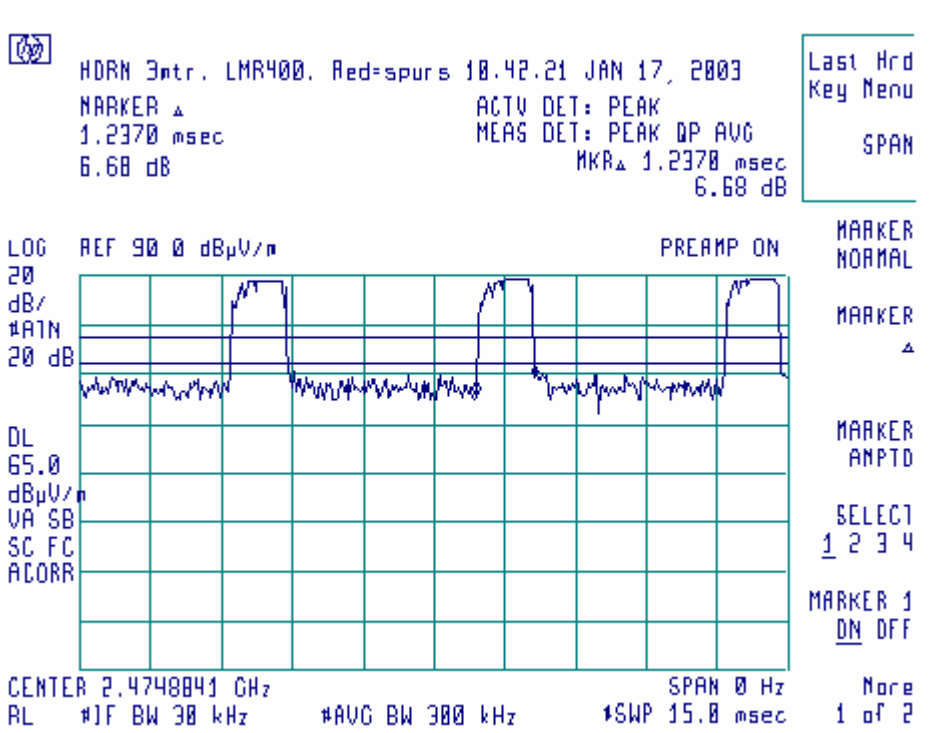


Carrier Frequency Separation [15.247a1; 6.2.2o]



Each Hopping channel is separated by 1000kHz. This is greater than the minimum requirement of 25kHz or 20dB bandwidth.

Carrier Frequency Dwell Time [15.247a1i]



The Dwell Time of each hopping frequency is 1.237mSec. Refer to Exhibit B 'operational description' for a table showing dwell times of the system operations.

Relative Emission Level vs. Supply Voltage [15.31(e)]

The relative emission level as the supply voltage varied is presented in the table below.
The voltage is varied to at least 67% to 140% of nominal supply voltage.
The unit is powered by the host PC's USB port. A variable DC power supply was used with the EUT for this test, keeping other variable constant.

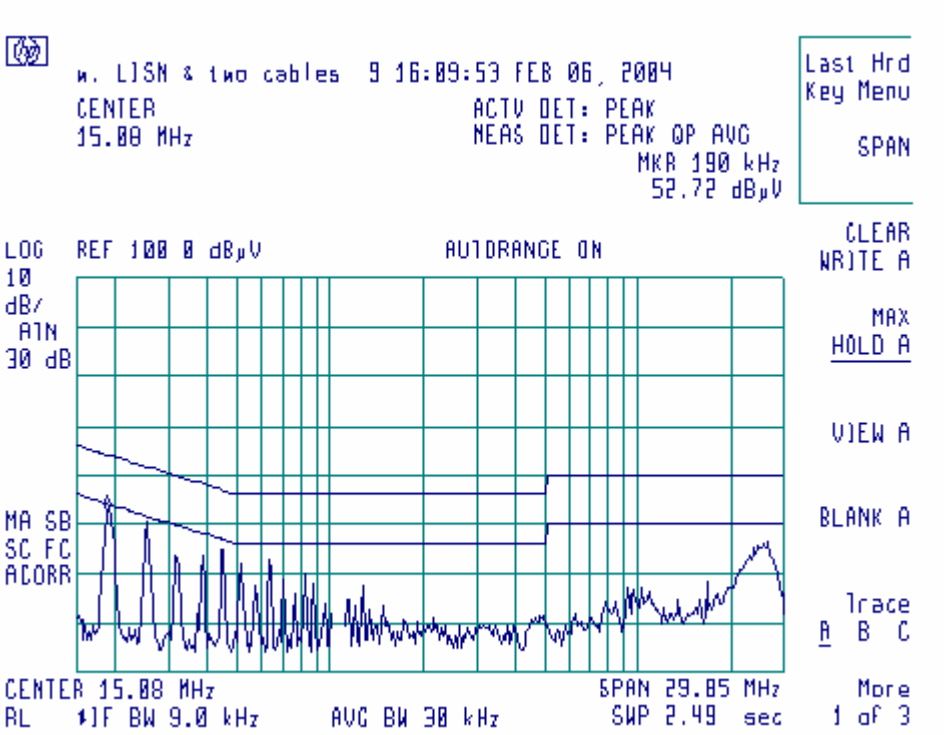
TX OUTPUT vs. Voltage LEVEL 2475MHz modulated	
Volt In	TX Output Pk dBuV/m
3.4	93.2
4.0	93.2
6.8	93.2

Line Conducted Measurements: [FCC 15.207(a); RSS-210 (6.6,7.4)]

Line Conducted 120VAC / 60Hz.

The unit was evaluated for line conducted emissions with normal mode of installation; the product is connected to the USB port of a host computer for the data gathering and power supply.

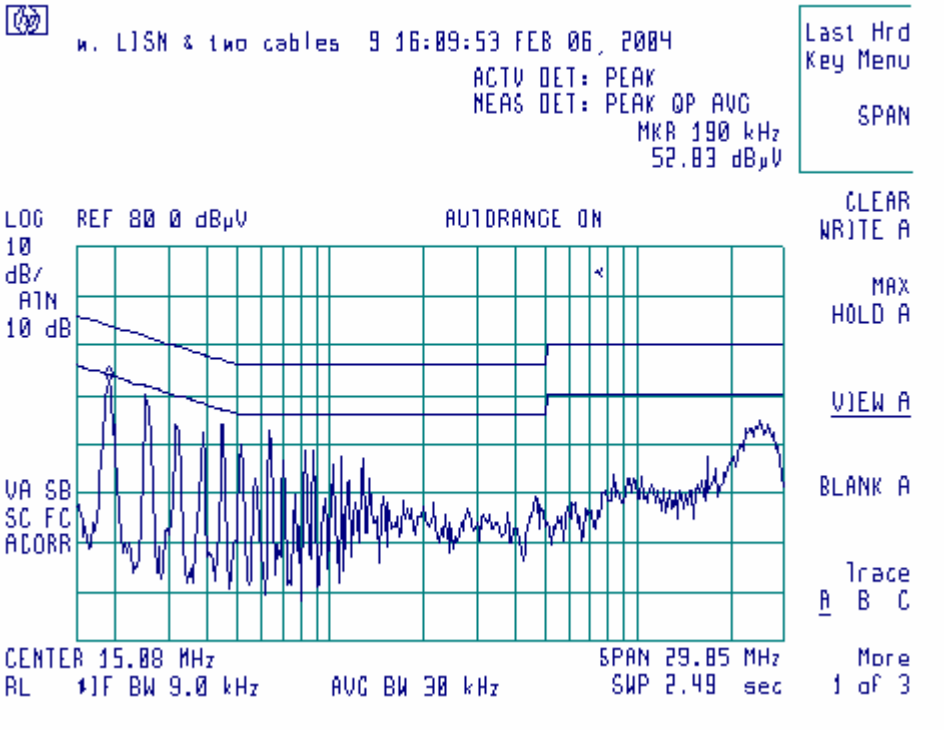
NEUTRAL to Ground Measurement.
Class B
Plot of Peak Values



Tabulated Quasi-Peak/Average Measurements.

Frequency	dBuV Reading		FCC / EN55022 dBuV Class B Limit		dB Margin	
MHz	QP	Avg	QP	Avg	QP	Avg
0.193	52.67	48.15	63.9	53.9	11.23	5.75
0.257	50.34	44.62	61.52	51.52	11.18	6.90
0.322	43.26	40.84	59.65	49.65	16.39	8.81
0.45	44.61	42.97	56.87	46.87	12.26	3.90
0.644	42.69	40.84	60.00	50.00	17.31	9.16
24.7	42.15	32.51	60.00	50.00	17.85	17.49

PHASE to Ground Measurement.
Class B
Plot of Peak Values



Tabulated Quasi-Peak/Average Measurements.

Frequency	dBuV Reading		FCC / EN55022 dBuV Class B Limit		dB Margin	
MHz	QP	Avg	QP	Avg	QP	Avg
0.193	52.74	48.21	63.9	53.9	11.16	5.69
0.257	50.5	44.62	61.52	51.52	11.02	6.90
0.321	43.25	40.76	59.68	49.68	16.43	8.92
0.451	44.78	43.2	56.85	46.85	12.07	3.65
0.644	42.77	40.95	60.00	50.00	17.23	9.05
25.1	42.09	33.15	60.00	50.00	17.91	16.85

Restricted Bands: [15.205]

The following frequency bands are restricted. Only spurious emissions are permitted at levels limited by 15.209:

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.25
0.490-0.510	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2655-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	Above 38.6
13.36-13.41			

LIMIT @ 3meter: [15.209(a)]

30-88MHz	100uV/m	40dBuV/m
88-216MHz	150uV/m	43.5dBuV/m
216-960MHz	200uV/m	46dBuV/m
above 960MHz	500uV/m	54dBuV/m

The spurious emissions observed in the restricted bands did not exceed the allowed limits for the restricted bands.

Radiated Field Strength / Output Power Measurements: [15.209, 15.247(b,c)]

Field Strength Measurements : [15.247, 15.209, RSS-210.6.1.1, 6.5, 6.2.2]]

MEASUREMENT PROCEDURE:
Direct Connect Measurements at antenna output.

Transmit Mode. Fundamental

Frequency MHz	Module #2 Direct Connect PEAK Measurement dBm	FCC Limit 15.247b =1 Watt	**Margin dB**
2401	-1.7	30dBm	**31.7**
2437	-0.8	30dBm	**30.8**
2475	-0.7	30dBm	**30.7**

Field Strength Measurements of Fundamental & harmonics [15.247(a), 15.209]

MEASUREMENT PROCEDURE:
1. The EUT was measured at three test frequencies.
2. The receiving antenna and EUT were placed in the orientation determined in earlier testing

Transmit Mode. Fundamental

Frequency MHz	Corrected PEAK Measurement dBuV/m	Included Cable+Antenna Factors dB+dB/m	Turntable Azimuth deg	Antenna Height Mtr	Calculated EIRP dB	FCC Limit 15.247b mWatt	**Margin dB**	EUT position	Ant Pol.
2401	99.3	35.39	150	1.4	123	1000	**23.7**	end	H
2438	102.3	35.61	0	1.3	123	1000	**20.7**	end	H
2475	101.3	35.83	340	1.3	123	1000	**21.7**	end	H

The measurements of the 2nd through 10th transmitter harmonics were taken at the UM Radiation Lab facility.
Transmit Mode. Fundamental harmonics

Table 5.1 Highest Emissions Measured

Radiated Emissions										Base, FCC/IC
#	Freq. MHz	Ant. Used	Ant. Pol.	Pr. (Pk) dBm	Ka dB/m	Kg dB	E3 dBµV/m	E3lim(Pk) dBµV/m	Pass dB	Comments
1	2401.0									Low channel
2	2438.0									Mid channel
3	2475.0									High channel
4										
5	2390.0	Horn S	H/V		21.5	- 0.6	-	74.0		Low
6	2390.0	Horn S	H/V		21.5	- 0.6	-	74.0		Mid
7	2390.0	Horn S	H/V		21.5	- 0.6	-	74.0		High
8	2483.5	Horn S	H/V		21.5	- 0.6	-	74.0		Low
9	2483.5	Horn S	H/V		21.5	- 0.6	-	74.0		Mid
10	2483.5	Horn S	H/V		21.5	- 0.6	-	74.0		High
11	4802.0	Horn C	H/V	-28.6	25.5	37.0	66.9	74.0	**7.1**	Low
12	4876.0	Horn C	H/V	-29.2	25.5	37.0	66.3	74.0	7.7	Mid
13	4950.0	Horn C	H/V	-31.5	25.5	37.0	64.0	74.0	10.0	High
14	7203.0	Horn XN	H/V	-36.4	25.5	36.0	60.1	N/A	-	Low
15	7314.0	Horn XN	H/V	-32.1	25.5	36.0	64.4	74.0	9.6	Mid
16	7425.0	Horn XN	H/V	-30.7	25.5	36.0	65.8	74.0	8.2	High
17	9604.0	Horn X	H/V	-44.1	25.5	34.0	54.4	N/A	-	Low
18	9752.0	Horn X	H/V	-42.9	25.5	34.0	55.6	N/A	-	Mid
19	9900.0	Horn X	H/V	-40.6	25.5	34.0	57.9	N/A	-	High
20	12005.0	Horn X	H/V	-51.4	25.5	34.0	47.1	74.0	26.9	Low, noise
21	12190.0	Horn X	H/V	-51.2	25.5	34.0	47.3	74.0	26.7	Mid, noise
22	12375.0	Horn X	H/V	-52.3	25.5	34.0	46.2	74.0	27.8	High, noise
23	14406.0	Horn Ku	H/V	-55.2	25.5	17.3	60.0	N/A	-	Low, noise
24	14628.0	Horn Ku	H/V	-55.6	25.5	17.3	59.6	N/A	-	Mid, noise
25	14850.0	Horn Ku	H/V	-54.9	25.5	17.3	60.3	N/A	-	High, noise
26	16807.0	Horn Ku	H/V	-56.3	32.3	34.0	49.1	N/A	-	Low, noise
27	17066.0	Horn Ku	H/V	-53.8	32.3	34.0	51.5	N/A	-	Mid, noise
28	17325.0	Horn Ku	H/V	-55.4	32.3	34.0	49.9	N/A	-	High, noise
29	19208.0	Horn K	H/V	-56.1	32.3	32.0	51.2	74.0	22.8	Low, noise
30	19504.0	Horn K	H/V	-51.4	32.3	32.0	55.9	74.0	18.1	Mid, noise
31	19800.0	Horn K	H/V	-50.8	32.3	32.0	56.5	74.0	17.5	High, noise
32	21609.0	Horn K	H/V	-51.1	32.3	32.0	56.2	N/A	-	Low, noise
33	21942.0	Horn K	H/V	-49.2	32.3	32.0	58.1	N/A	-	Mid, noise
34	22275.0	Horn K	H/V	-48.7	32.3	32.0	58.6	74.0	15.4	High, noise
35	24010.0	Horn Ka	H/V	-48.7	32.3	32.0	58.6	N/A	-	Low, noise
36	24380.0	Horn Ka	H/V	-48.0	32.3	32.0	59.3	N/A	-	Mid, noise
37	24750.0	Horn Ka	H/V	-47.9	32.3	32.0	59.4	N/A	-	High, noise
38										
39	* Pk: measured with 1 MHz RBW and 3 MHz VBW									
40										
41										
42										

U. of Mich; Meas. 3/3/2006

Table 5.1 Highest Emissions Measured

Radiated Emissions										Base, FCC/IC
#	Freq. MHz	Ant. Used	Ant. Pol.	Pr. (avg) dBm	Ka dB/m	Kg dB	E3 dBµV/m	E3lim dBµV/m	Pass dB	Comments
1	2401.0									Low channel
2	2438.0									Mid channel
3	2475.0									High channel
4										
5	2390.0	Horn S	H/V		21.5	- 0.6	-	54.0		Low
6	2390.0	Horn S	H/V		21.5	- 0.6	-	54.0		Mid
7	2390.0	Horn S	H/V		21.5	- 0.6	-	54.0		High
8	2483.5	Horn S	H/V		21.5	- 0.6	-	54.0		Low
9	2483.5	Horn S	H/V		21.5	- 0.6	-	54.0		Mid
10	2483.5	Horn S	H/V		21.5	- 0.6	-	54.0		High
11	4802.0	Horn C	H/V	-41.8	25.5	37.0	53.7	54.0	**0.3**	Low
12	4876.0	Horn C	H/V	-41.8	25.5	37.0	53.7	54.0	0.3	Mid
13	4950.0	Horn C	H/V	-44.6	25.5	37.0	50.9	54.0	3.1	High
14	7203.0	Horn XN	H/V	-46.8	25.5	36.0	49.7	N/A	-	Low
15	7314.0	Horn XN	H/V	-46.2	25.5	36.0	50.3	54.0	3.7	Mid
16	7425.0	Horn XN	H/V	-43.0	25.5	36.0	53.5	54.0	0.5	High
17	9604.0	Horn X	H/V	-55.2	25.5	34.0	43.3	N/A	-	Low
18	9752.0	Horn X	H/V	-53.5	25.5	34.0	45.0	N/A	-	Mid
19	9900.0	Horn X	H/V	-51.8	25.5	34.0	46.7	N/A	-	High
20	12005.0	Horn X	H/V	-62.0	25.5	34.0	36.5	54.0	17.5	Low, noise
21	12190.0	Horn X	H/V	-61.9	25.5	34.0	36.6	54.0	17.4	Mid, noise
22	12375.0	Horn X	H/V	-62.1	25.5	34.0	36.4	54.0	17.6	High, noise
23	14406.0	Horn Ku	H/V	-65.9	25.5	17.3	49.3	N/A	-	Low, noise
24	14628.0	Horn Ku	H/V	-65.7	25.5	17.3	49.5	N/A	-	Mid, noise
25	14850.0	Horn Ku	H/V	-65.4	25.5	17.3	49.8	N/A	-	High, noise
26	16807.0	Horn Ku	H/V	-65.9	32.3	34.0	39.4	N/A	-	Low, noise
27	17066.0	Horn Ku	H/V	-65.9	32.3	34.0	39.4	N/A	-	Mid, noise
28	17325.0	Horn Ku	H/V	-66.0	32.3	34.0	39.3	N/A	-	High, noise
29	19208.0	Horn K	H/V	-64.4	32.3	32.0	42.9	54.0	11.1	Low, noise
30	19504.0	Horn K	H/V	-62.1	32.3	32.0	45.2	54.0	8.8	Mid, noise
31	19800.0	Horn K	H/V	-60.8	32.3	32.0	46.5	54.0	7.5	High, noise
32	21609.0	Horn K	H/V	-59.7	32.3	32.0	47.6	N/A	-	Low, noise
33	21942.0	Horn K	H/V	-58.6	32.3	32.0	48.7	N/A	-	Mid, noise
34	22275.0	Horn K	H/V	-59.7	32.3	32.0	47.6	54.0	6.4	High, noise
35	24010.0	Horn Ka	H/V	-56.1	32.3	32.0	51.2	N/A	-	Low, noise
36	24380.0	Horn Ka	H/V	-57.3	32.3	32.0	50.0	N/A	-	Mid, noise
37	24750.0	Horn Ka	H/V	-55.8	32.3	32.0	51.5	N/A	-	High, noise
38										
39	* Ave: measured with 1 MHz RBW and 100 Hz VBW									
40										
41										
42										

U. of Mich; Meas. 3/3/2006

Radiated Field Strength Measurement Setup Site 2:

Field Strength Measurements of Local Oscillator & Harmonics:

Receive Mode. Local Oscillator

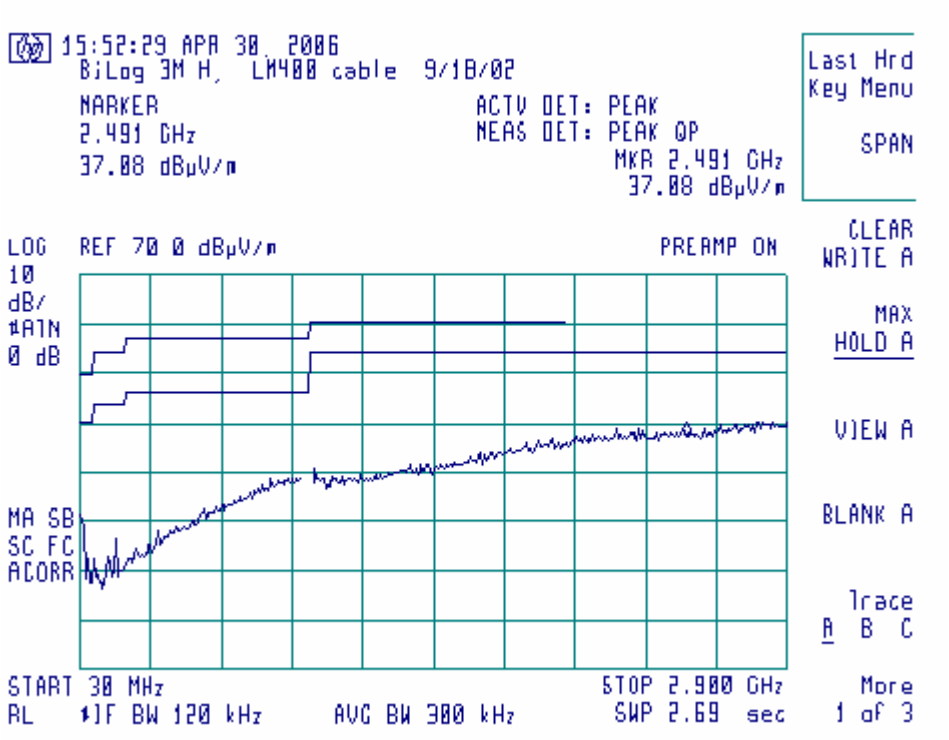
The injected LO for super heterodyne operation is 300MHz above the operating frequency.

The levels of the RF emissions of the local oscillator and harmonics were below the background noise floor of the measurement system. No emissions were detected at a distance of 1 meter from the EUT. No emissions were detected when the unit was directly connected to a spectrum analyzer.

MEASUREMENT PROCEDURE:

1. The EUT output was directly connected to the spectrum analyzer.
2. The spectrum analyzer bandwidth settings are 100kHz RBW, 300kHz VBW.
3. The spectrum is observed for emissions.

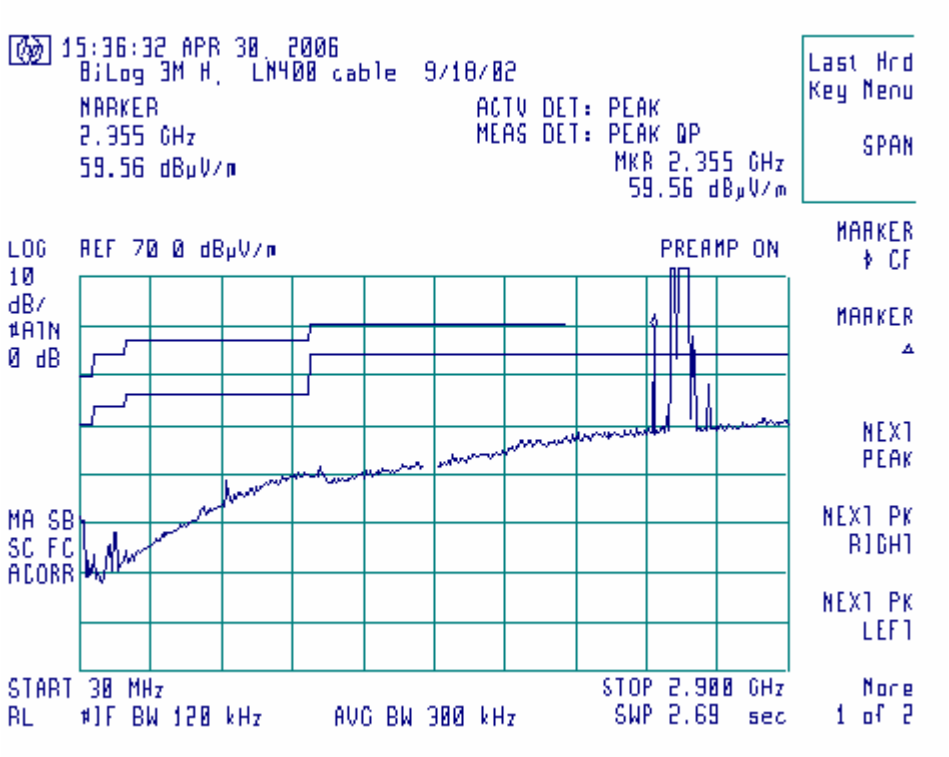
At 2437MHz, the L.O. frequency is approximately 2737MHz.



Direct connect scan. Markers 1 and 2 are one division in from the left and right respectively. Marker 1 is at the LO frequency of 2737MHz. Marker 2 is at the first harmonics frequency of 5475MHz.

Spurious Emissions: [15.247c]

A scan of the BGEN2EI was made in a shielded room to study the emission profile of the EUT. These scans indicate spurious emissions from the unit other than the fundamental and its associated harmonics. These suspect signals were measured at the 3-meter open area test site.



Band Edges [15.247(c); 6.2.2o]

The emissions outside the 2400-2483.5MHz band are to be either 20dB below the level of the fundamental or the limits of section 15.209.

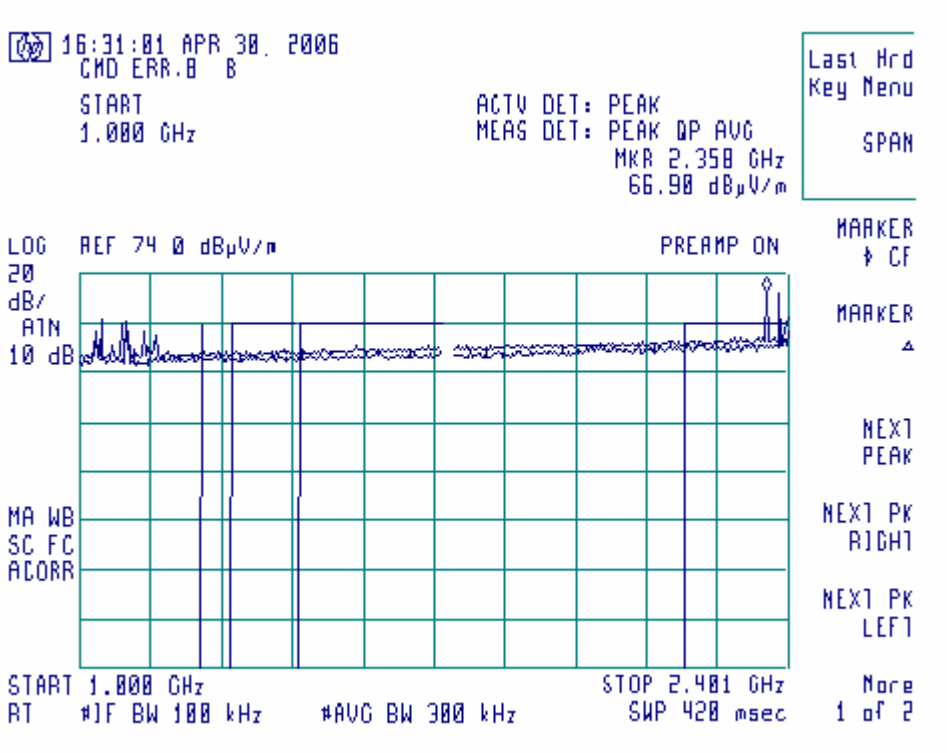
MEASUREMENT PROCEDURE:

1. The EUT output optimized for measurement by the EMI receiver.
2. The spectrum analyzer bandwidth settings are >100kHz RBW.
3. The peak of the fundamental is determined.
4. A display line is set on the spectrum analyzer 20dB below the fundamental level.
5. The remainder of the spectrum is observed for any emissions that are greater than the 20dBc display line.

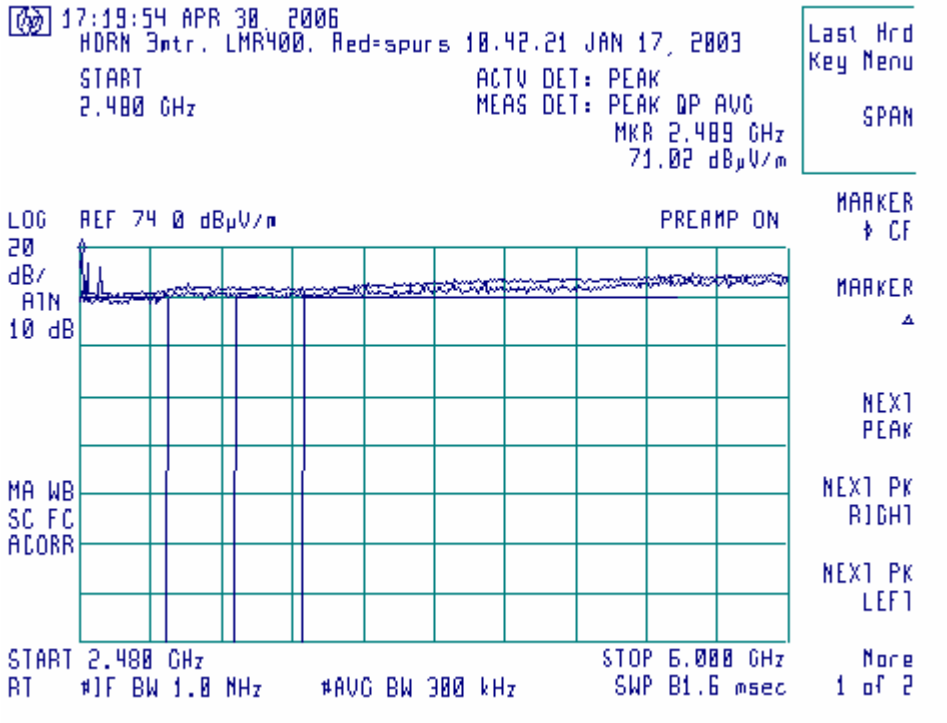
Using >100kHz resolution bandwidth, the spurious emissions outside the 2400-2483.5MHz band that is produced by the intentional radiator are greater than 20dB below the level of the fundamental frequency.

The plots on the following pages show the spectrum pattern of the EUT emissions.

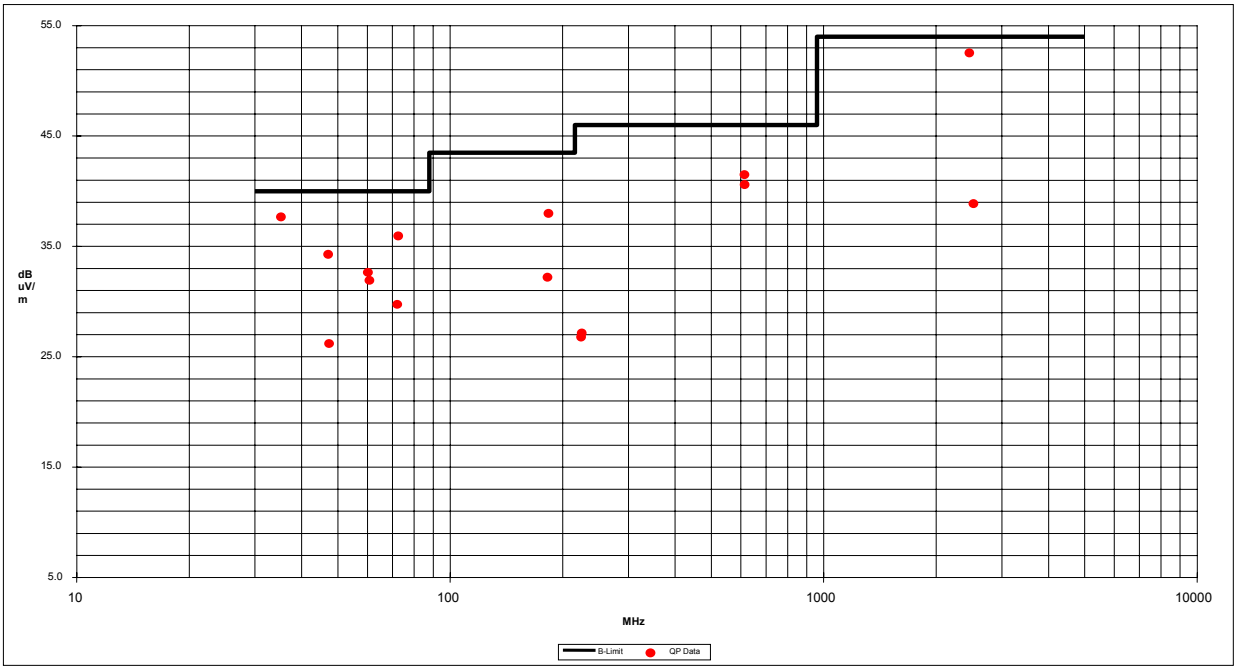
Transmitting Lower Band Edge:



Transmitting Upper Band Edge:



Other Spurious emissions



Tabulated Quasi-Peak Measurements.

Frequency MHz	Corrected Measurement dBuV/m	Duty Cycle factor dB	Included Cable+Antenna Factors dB+dB/m	Turntable Azimuth deg	Antenna Height Mtr	Polarity	FCC Limit dBuV/m	**Margin** **dB**
35.9	37.6QP	--	15.81	160	1.0	V	40.00	**2.4**
48.00	34.5 QP	--	10.50	180	1.0	V	40.00	**5.5**
60.02	32.9QP	--	8.58	170	1.0	V	40.00	**7.1**
72.02	36.0QP	--	7.42	190	1.0	V	40.00	**4.0**
191.7	38.1QP	--	10.81	160	1.0	V	40.00	**1.9**
216.0	27.1QP	--	12.07	180	1.2	V	40.00	**12.9**
624.1	41.5QP	--	22.91	170	1.0	V	40.00	**5.5**
48.00	26.6QP	--	10.50	160	1.0	H	40.00	**13.4**
60.02	32.4QP	--	8.58	180	1.1	H	40.00	**7.6**
72.02	29.6 QP	--	7.42	180	1.6	H	40.00	**10.4**
191.7	32.5 QP	--	10.81	190	1.4	H	43.50	**11.0**
216.0	27.1QP	--	12.07	180	1.5	H	43.50	**16.4**
624.1	40.8 QP	--	22.91	190	1.3	H	46.00	**5.2**
2358.0	66.9PK	20	35.88	180	2.0	V-flat	54.00	**7.1**
2488.2	72.6PK	20	35.91	10	1.4	H-end	54.00	**1.4**

The frequencies for measurements were determined by the suspect list generated from the prescan of 30MHz through 2.9GHz.

#These emissions have a pulse width of 0.15mSec and a repetition rate of 20.5mSec, the 20dB factor applies.

EXHIBIT 3: MEASUREMENT FACILITIES & EQUIPMENT

Test Site:

Measurement/Test Site Facility & Equipment

Test Site [2.948, 2.1033(b6)]

SITE 1.

The AHD test facility is centered on 9 acres of rural property near Sister Lakes, Michigan. The mailing address is 92723 Mich Hwy152, Sister Lakes, Michigan 49047. This test facility is NVLAP accredited (LabCode 200129-0). It has been fully described in a report filed with the FCC (No.90413) and Industry Canada (file:IC3161).

Measurement Equipment Used [2.947(d), 15.31(b)]

SITE 1.

Equipment	Model	S/N	Last Cal Date	Calibration Interval
HP EMI Receiver system	HP 8546A			
RF Filter Section	HP-85460A	3448A00283	18-Aug-05	12 months
RF Receiver Section	HP-85462A	3625A00342	18-Aug-05	12 months
EMCO BiconiLog Antenna	3142	1077	12-Aug-05	12 months
Solar LISN	8012-50-R-24-BNC	962137	25-Aug-05	12 months
Solar LISN	8012-50-R-24-BNC	962138	25-Aug-05	12 months
(LCI) Double shielded 50ohm Coax	RG58/U	C010609	18-Feb-06	12 months
(3-M) LMR-400 Ultra Flex	LMR400	9812-11	05-Nov-05	6 months
Double Ridged Horn	ONO91202-2	A00329	calibration by design & physical inspection.	

SITE 2.

The University of Michigan test facility is located at 8501 Beck Road, Belleville, Michigan 48111. This test facility has been fully described and accepted by the FCC and Industry Canada. This facility was utilized to measure emissions occurring at frequencies greater than 2.9 GHz.

SITE 2.

Equipment	Model	S/N	Last Cal Date	Calibration Interval
C-Band Std. Gain Horn	UM NRL design		calibration by design & physical inspection.	
XN-Band Std. Gain Horn	UM NRL design		calibration by design & physical inspection.	
X-Band Std. Gain Horn	SA 12-8.2	730	calibration by design & physical inspection.	
K-band horn (18-26.5 GHz) FXR, Inc.	K638KF		calibration by design & physical inspection.	
Avantek RF amplifier	AFT-12665		Jul-05	12 months
3ft Low Loss coax	RG142	-	with Avantek amp	
Spectrum Analyzer 26GHz	HP 8593E	3412A01131	Jul-05	12 months

Measurement Environment

The tests were performed with the equipment under test, and measurement equipment inside the all-weather enclosure. Ambient temperature was 22deg.C., the relative humidity 35%.