CLASS 2 CHANGE; SUPPLEMENTAL REPORT OF MEASUREMENTS [2.1033(B6)]

Test Report for FCC ID:

FCC Part 2.1031, Part 15 Subpart C(15.247)

Report #0600960C2C2
Issued 03/2/2007

GEN2 BASE UNIT SPREAD SPECTRUM TRANSCEIVER

Judgment: Compliant

Prepared for: Fleetwood Group Inc.
P.O. Box 1259
Holland, MI 49422-1259

Test Date(s): Nov 27, 2006

Data recorded by

Gordon L. Helm, NCE

Report reviewed by

Harry Derks

This report prepared by:

Gordon L. Helm, NCE
Technical Manager/Test Engineer, AHD

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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 covered by the NVLAP accreditation..

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

Retention of Records:

1) For equipment verified to comply with FCC regulations, the manufacturer is obliged to retain this report with the product records for two years following the manufacture of the equipment that was tested.

Manufacturer/Applicant [2.1033(b1)]

The manufacturer and applicant:

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

Description of Test Item

This document represents the results of the series of radio interference measurements performed on a GEN2 Base Unit, Serial Number 1 (herein referred to as the EUT). The EUT is a frequency hopping spread spectrum transceiver. It transmits and receives in the 2400.0MHz to 2483.5MHz band. The test item can use only an internal antenna. The test item was manufactured and submitted by Fleetwood Group, Inc. located in Holland, MI.

Purpose

The test series was performed to determine if the test item meets the conducted and radiated RF emission requirements of the FCC Title 47, Part 15, Subpart B sections 15.107 and 15.109 for receivers and Subpart 15.247 for Intentional Radiators. Testing was performed in accordance with ANSI C63.4-2003.

Deviations, Additions and Exclusions

This EUT was originally tested and granted FCC certification. The results are reported in AHD report number #0600901BF . This supplemental report contains test results for these EUTs after the firmware was modified to allow a reduced hop set to avoid interference with Wi-fi systems while maintaining a minimum of 15 hop channels. This report covers the results for 5 versions each with 2 sets of hop channels. This is done to maintain firmware compatibility to the original system. The 5 versions are named: 1) Avoid 6, 2) Avoid 1&6, 3) Avoid 6&11, 4) Avoid Lower Half, and 5) Avoid Upper Half.

Keypad Transmit Frequencies											
Setting:	No Avoidance		Avoid 6		Avoid 1 and 6		Avoid 6 and 11		Avoid lower half		Avoid upper half	
	Keypads 1-50	Keypads 51-100	Keypads 1-50	Keypads 51-100	Keypads 1-50	Keypads 51-100	Keypads 1-50	Keypads 51-100	Keypads 1-50	Keypads 51-100	Keypads 1-50	Keypads 51-100
	67	13	2	1	21	1	2	1	40	38	3	1
	13	55	3	4	24	2	3	4	44	39	4	2
	55	27	6	7	25	23	5	6	50	41	10	5
	27	6	8	9	28	26	8	7	51	42	12	6
	6	12	19	10	29	27	12	9	52	43	14	7
	12	24	21	11	47	45	13	11	53	45	15	8
	24	48	23	12	50	46	19	14	57	46	17	11
	48	14	53	13	52	48	21	16	58	49	18	16
	14	28	59	16	53	51	23	17	59	54	19	24
	28	56	60	18	55	54	25	24	60	61	20	28
	56	25	61	54	59	56	26	46	63	62	21	31
	25	51	66	62	60	61	27	47	69	64	23	33
	51	49	67	64	70	62	48	51	71	66	27	35
	49	17	68	67	71	64	49	52	74	67	29	36
	17	35	71	72	75	67	50	55	75	68	32	40
	35	70										
	70	26										
	26	52										
	52	61										
	61	72										
	72	34										
	34	69										
	69	43										
	43	21										
	21	1										
	1	3										
	3	7										
	7	15										
	15	31										
	31	63										
	63	41										
	41	75										
	75	45										
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	5	47										
	47	23										
	23	11										
	11	19										
	19	16										
	16	30										
	30	59										
	58	39										
	39	60										
	60	54										
	54	57										
	57	38										
	53	67										

Frequencies listed above are added to 2.4 GHz. For example, "1" above would mean that the keypad will transmit on 2401 MHz. "75" above would mean that a keypad will transmit on 2475 MHz

The following chart explains how the WiFi channel(s) you chose to avoid in the **WiFi** menu relates to the LEDs in your Gen2 RF receiver's display panel.

WiFi Channels You Chose to Avoid in the **WiFi** Menu	LEDs
None	Top, middle, and bottom dashes light up
Channels 8 through 13	Middle and bottom dashes light up
Channel 6	Top and bottom dashes light up
Channels 1 through 4	Top and middle dashes light up
Channels 1 and 6	Top dash lights up
Channels 6 and 11	Bottom dash lights up

LEDs in your Gen2 Receiver's Display Panel

Fleetwood Confidential 1/29/2007 wb

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 Michigan Highway 152, Sister Lakes, Michigan. The mailing address is 92723 Mich Hwy-152, 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), 15.231(b)]

Equipment	Model	S/N	Last Cal Date	Calibration Interval
HP EMI Receiver system	HP 8546A			
RF Filter Section	HP-85460A	3448A00283	12-June-06	12 months
RF Receiver Section	HP-85462A	3625A00342	12-June-06	12 months
EMCO BiconiLog Antenna	3142	1077	01-Sept-06	12 months
Solar LISN	8012-50-R-24-BNC	962137	01-Sept-06	12 months
Solar LISN	8012-50-R-24-BNC	962138	01-Sept-06	12 months
(LCI) Double shielded 50ohm Coax	RG58/U	920809	18-Feb-06	12 months
(3-m) LMR-400 Ultra Flex	LMR400	9812-11	07-Nov-06	6 months
(3-m) CS-3227 RG8	CS-3227	C060914	07-Nov-06	6 months
(10-m) Amelco 50ohm Coax	RG213U	9903-10ab	07-Nov-06	6 months
Double Ridged Horn	ONO91202-2	A00329	calibration by design & physical inspection.	

Environment

The test was performed with the equipment under test, and measurement equipment inside the all-weather enclosure. Ambient temperature was 22deg.C., the relative humidity 30%.

FCC required statements: [Class B Digital Device or Peripheral]

1. A statement required to be placed in the User's Manual shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

2. The User's Manual shall include this or similar statement:

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- *Reorient or relocate the receiving antenna.*
- *Increase the separation between the equipment and receiver.*
- *Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.*
- *Consult the dealer or an experienced radio/TV technician for help.*

Summary of Results:

1. Powerline Conducted Emissions

Requirement

All radio frequency voltages on the power lines of an intentional radiator shall be below the values shown below when using a quasi-peak detector:

Conducted Limits for Intentional Radiators

Frequency	RFI Voltage (QP)	RFI Voltage (Average)
MHz	dBuV	dBuV
0.15-0.5	66 decreasing with logarithm of frequency to 56	56 decreasing with logarithm of frequency to 46
0.5-5	56	46
5-30	60	50

Note1: The lower limit shall apply at the transition frequencies.

Results:

The Powerline Conducted Emissions testing was omitted as original EUT tested did not have any emissions issues.

2. 20dB Bandwidth

Requirement

Per section 15.247(a)(1), for frequency hopping systems operating in the 2400-2483.5MHz band, the 20dB bandwidth shall be measured for determination of the carrier frequency separation limits. The 20dB bandwidth measurement was omitted as original EUT tested was not anticipated to change.

3. Carrier Frequency Separation

Requirement

Per section 15.247(a)(1), for frequency hopping systems operating in the 2400-2483.5MHz band, all frequency hopping systems will have channel carrier frequencies separated by a minimum of 25KHz or the 20dB bandwidth of the hopping channel, whichever is greater.

Results

The Carrier Frequency Separation measurement was omitted as original EUT tested was not anticipated to change.

4. Number of Hopping Frequencies

Requirement

Per section 15.247(a)(l)(iii), for frequency hopping systems operating in the 2400-2483.5MHz band, the frequency hopping systems shall use at least 15 non overlapping channels.

Results

The measurement of number of hopping frequencies is shown in the test data and all contained 15 non overlapping channels.

5. Time of Occupancy

Requirement

Per section 15.247(a)(l)(iii), for frequency hopping systems operating in the 2400-2483.5MHz band, the average time of occupancy shall not be greater than 0.4 seconds within a 0.4 second period multiplied by the number of hopping channels employed.

Results

The measurement of Time of Occupancy was omitted as original EUT measurements were not anticipated to change.

6. Peak Output Power – Internal Antenna

Requirement

Per section 15.247(b)(l), for frequency hopping systems operating in the 2400-2483.5MHz band and employing at least 75 hopping channels, the peak output power shall not be greater than 1 watt. The peak output power measurement was omitted as original EUT tested was not anticipated to change.

7. Peak Output Power – Conducted Measurement

Requirement

Per section 15.247(b)(l), for frequency hopping systems operating in the 2400-2483.5MHz band and employing at least 75 hopping channels, the peak output power shall not be greater than 1 watt. The peak output power conducted measurement was omitted as original EUT tested was not anticipated to change.

8. Band edge Compliance

Requirement

Per section 15.247(d), the emissions at the band-edges must be at least 20dB below the highest level measured within the band but attenuation below the general limits listed in 15.209(a) is not required. In addition, the radiated emissions which fall in the restricted band beginning at 2483.5 MHz, must meet the general limits of 15.209(a). The band edge measurements were omitted as original EUT tested was not anticipated to change.

9. Spurious RF Conducted Emissions

Requirement

Per section 15.247(c), in any 100 kHz bandwidth outside the frequency band in which the test item is operating, the spurious RF conducted emissions shall be at least 20dB down from the highest level of power but attenuation below the general limits listed in 15.209(a) is not required. The spurious RF conducted emission measurements was omitted as original EUT tested was not anticipated to change.

10. Radiated Spurious Emissions

Requirement

Per section 15.247(c), in any 100 kHz bandwidth outside the frequency band in which the test item is operating, the spurious emissions shall be at least 20dB down from the highest level of power but attenuation below the general limits listed in 15.209(a) is not required. In addition, the radiated emissions which fall in the restricted bands must meet the general limits of 15.209(a). The radiated spurious emission measurements was omitted as original EUT tested was not anticipated to change.

11. Receiver

Requirement

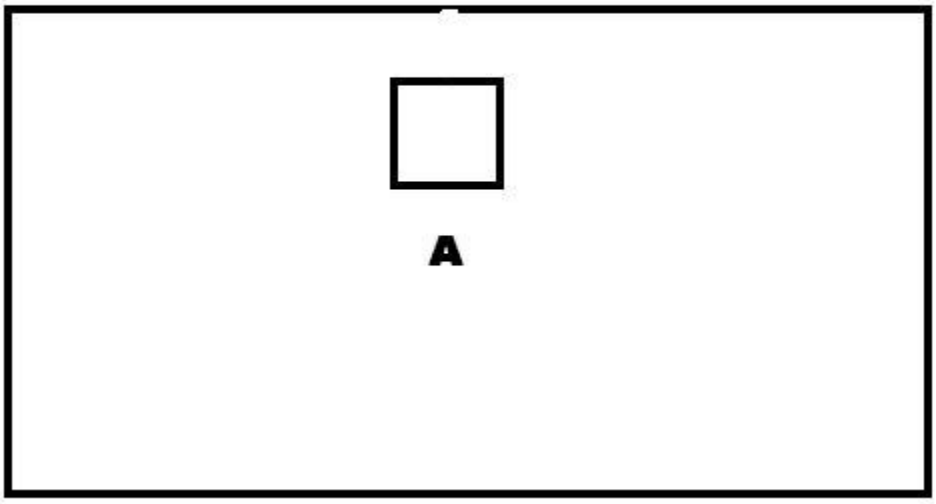
Per section 15.101(b), receivers operating above 960MHz or below 30MHz are exempt from complying with the technical provisions of CFR Title 47, Part 15, Subpart B. Therefore no testing was performed on the receiver portion of the test item.

EUT Set-up and Operation :

Support Equipment & Cabling

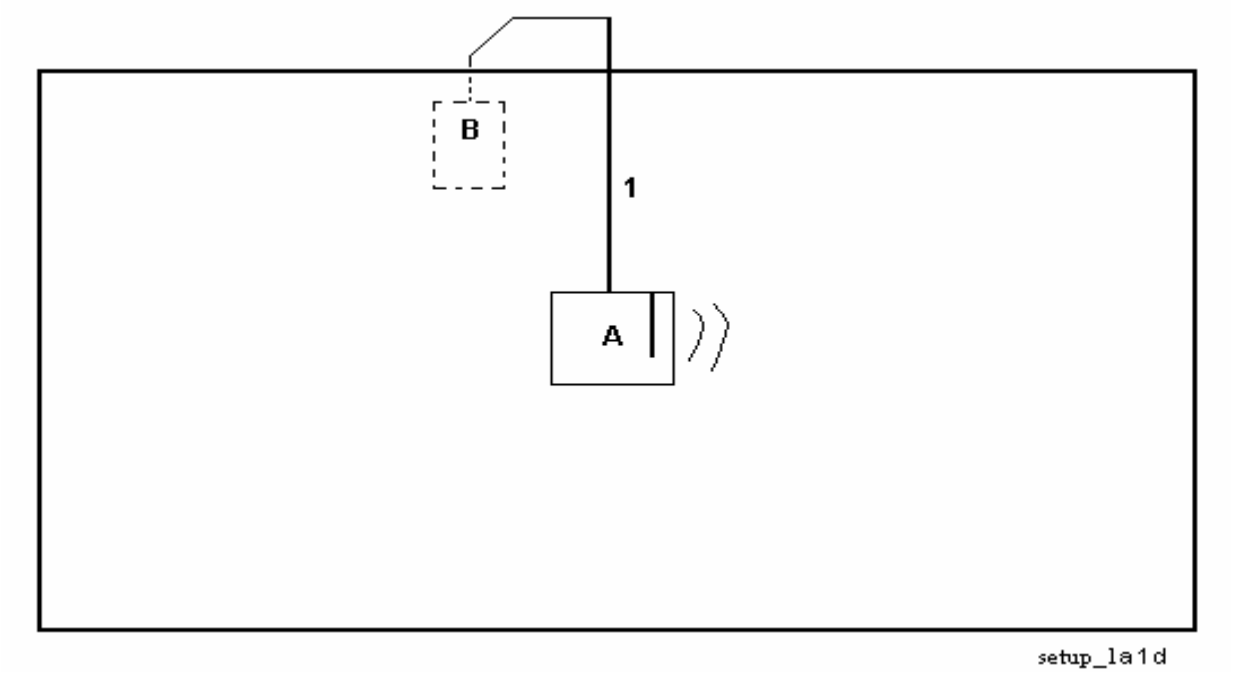
Setup Diagram Legend	Description	Model	Serial No. / Part No.	EMC Consideration
A	[EUT] GEN2 Keypad 2.4GHz transceiver	KGEN2EI	60 :1 & 60 : 51	FBRGEN2EI (Two keypads)

Setup Diagram



Remote Equipment & Cabling

Setup Diagram Legend	Description	Model	Serial No. / Part No.	EMC Consideration
A	[EUT] GEN2 Base 2.4GHz transceiver	BGEN2EI	Avoid X	
B	Power Supply			
1	USB cable			2 Ferrite USB cable ; 2m



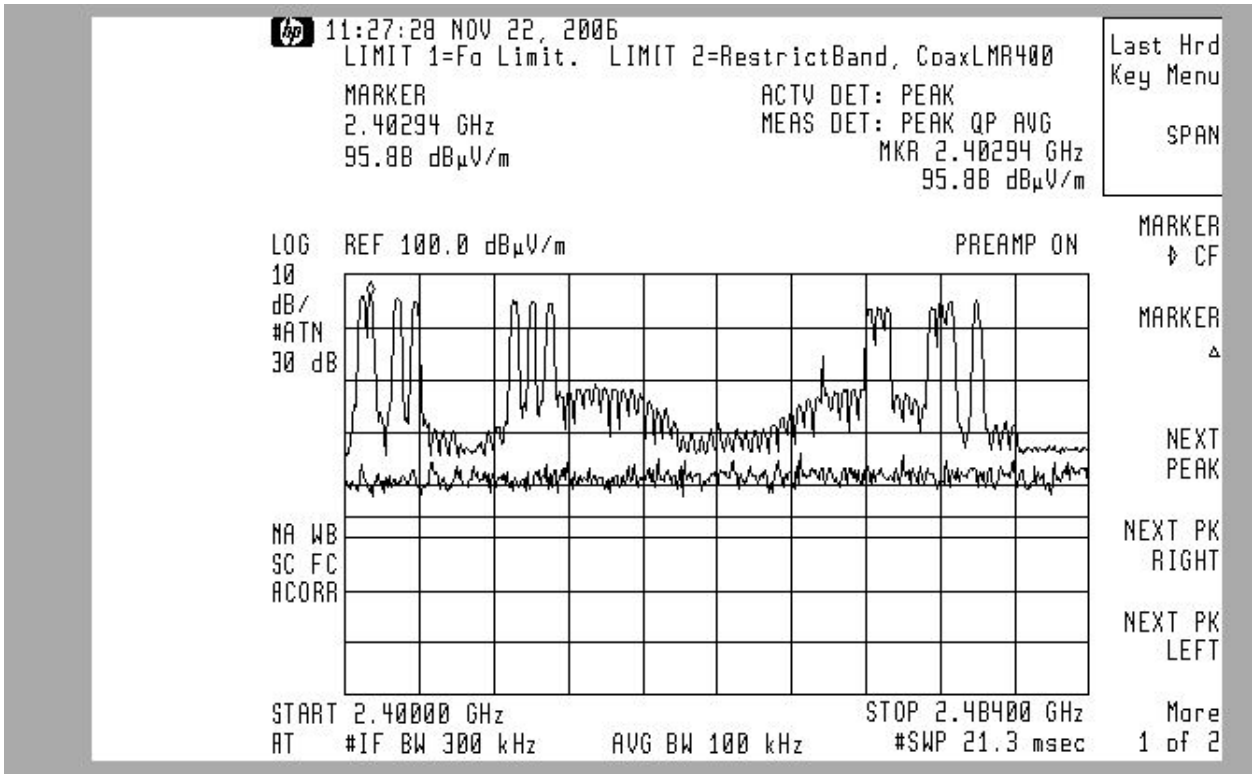
Remote Setup Picture:

Standards Applied to Test:

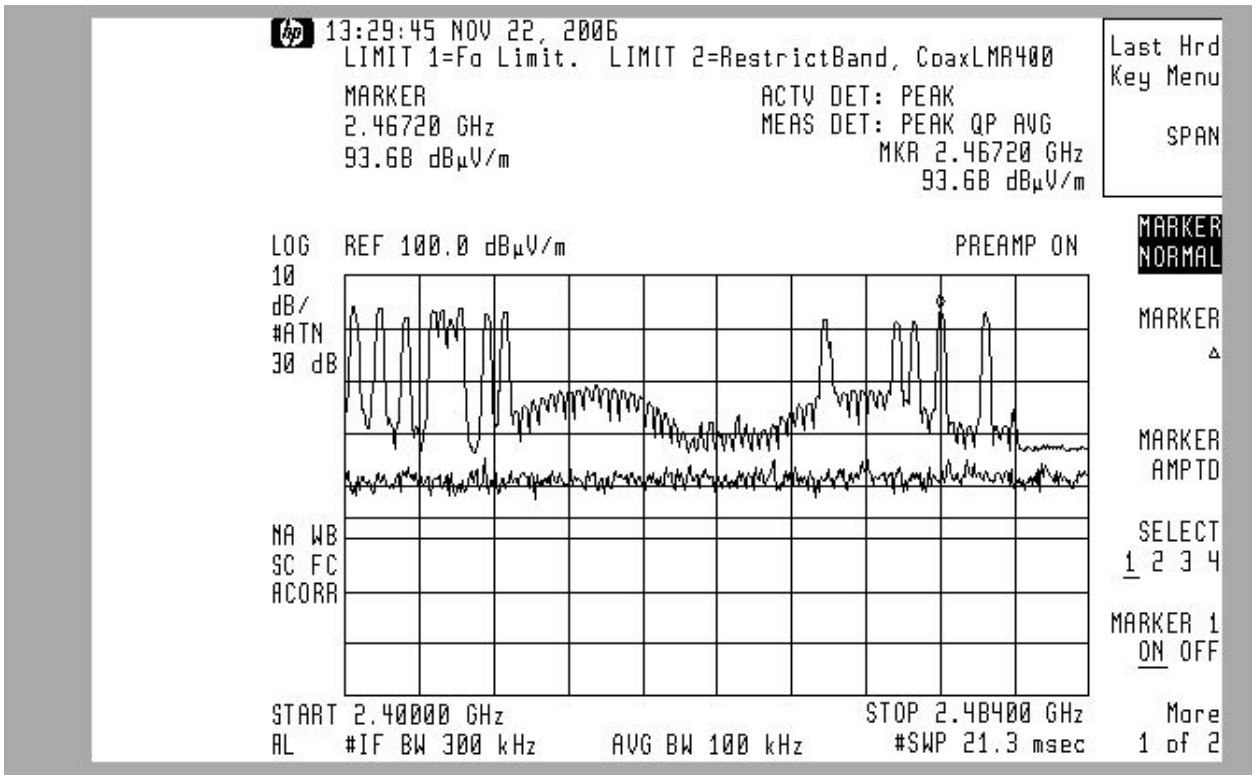
Federal Communications Commission Code of Federal Regulations, Title 47, Part 15, Subpart C, dated October 2005
FCC Public Notice, DA 00-705, Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems, Released March 30, 2000
ANSI C63.4 – 2003, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-voltage Electrical and Electronic Equipment in the Range of 9KHz to 40GHz
AHD test procedures TP0101-01, TP0102-01

Test Data

1) Avoid 6

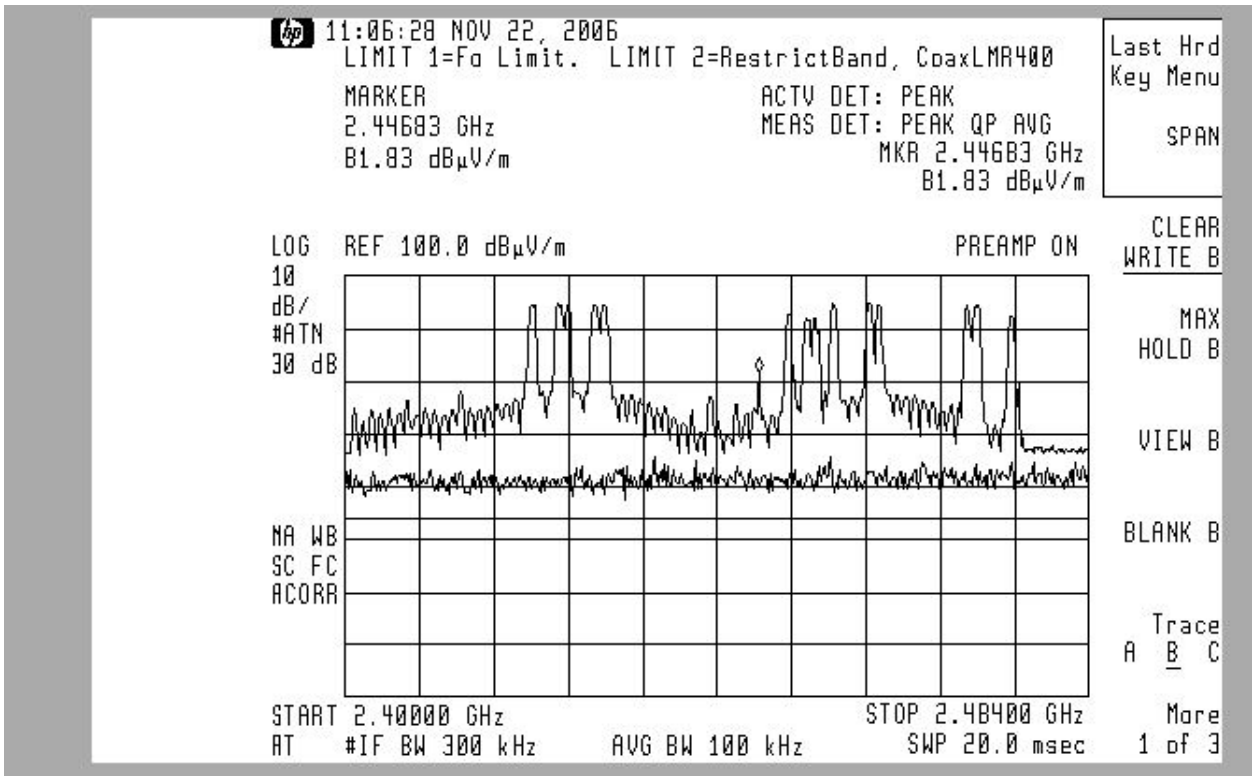


Keypad 1-50

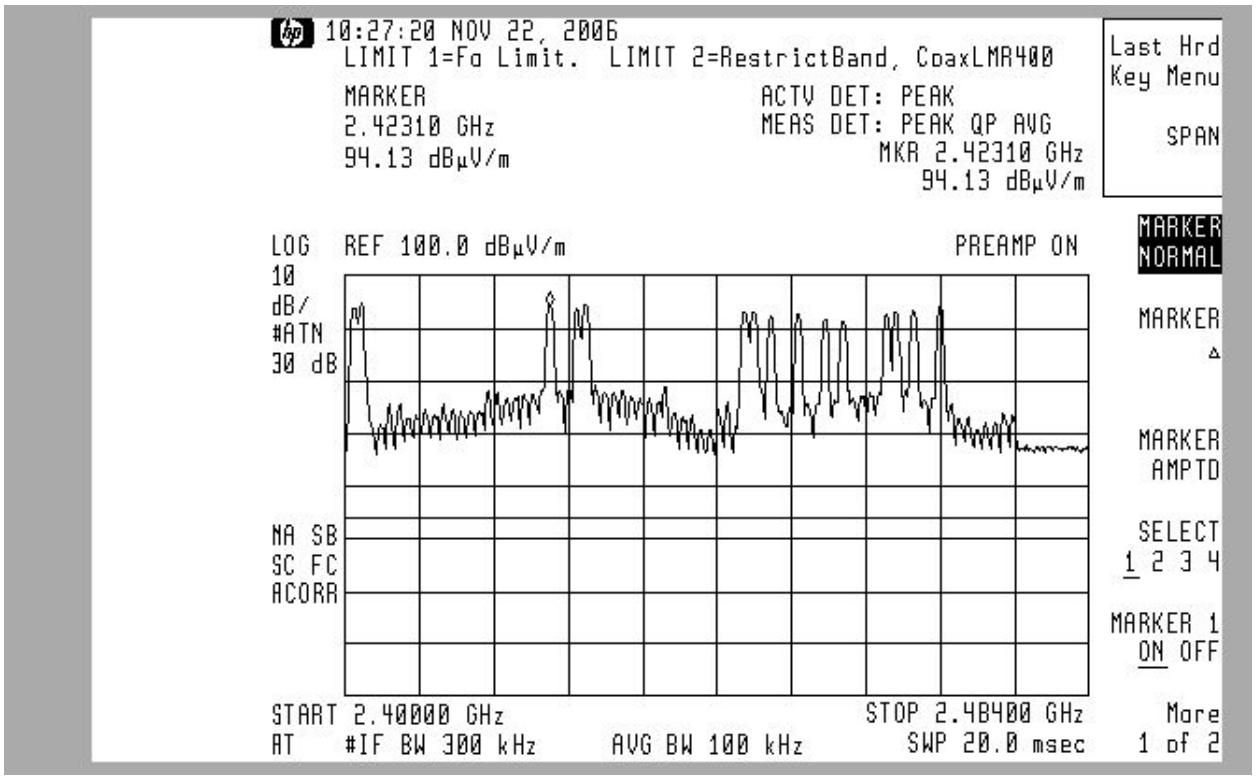


Keypad 51-100

2) Avoid 1&6

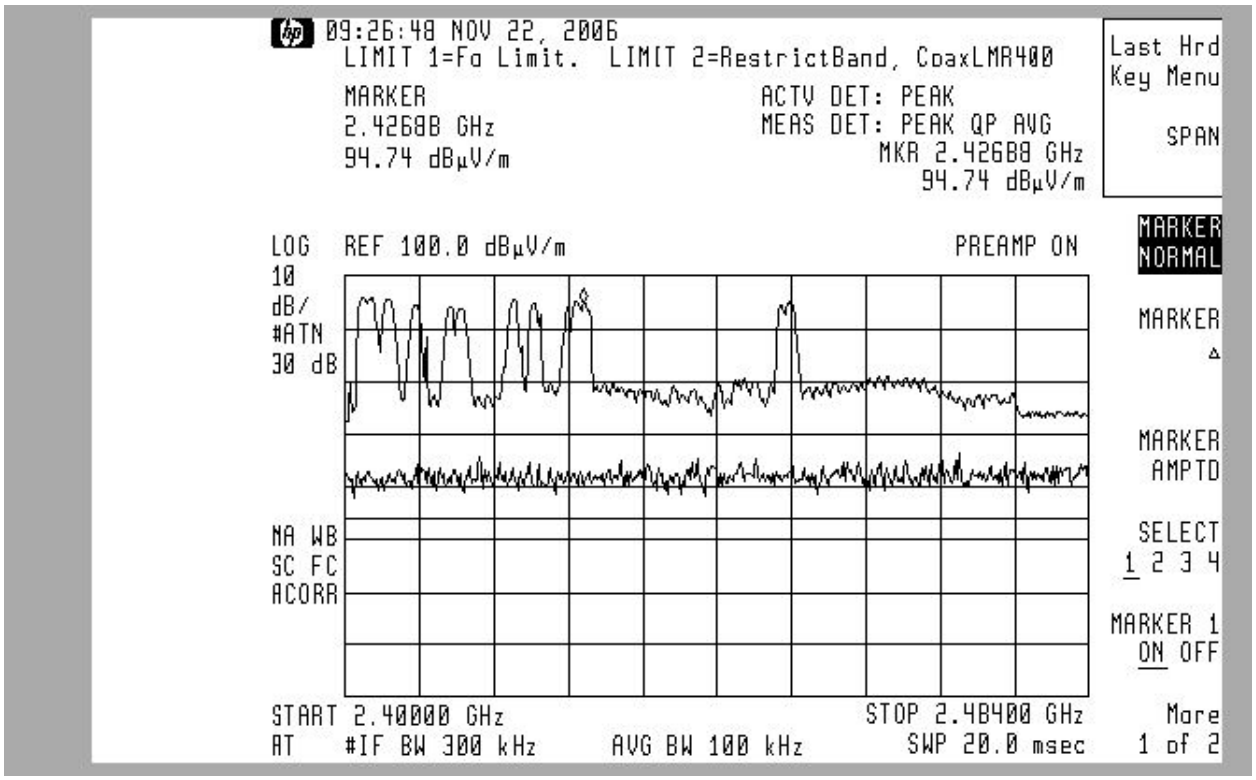


Keypad 1-50

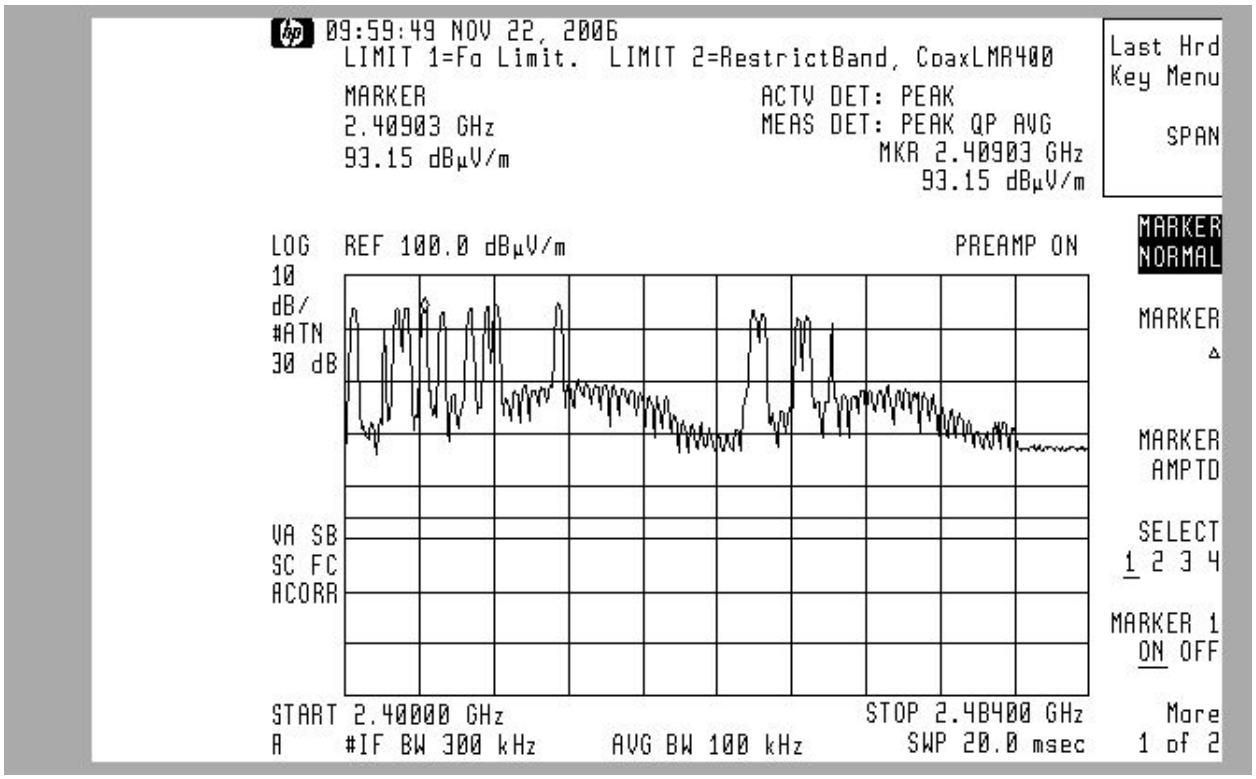


Keypad 51-100

3) Avoid 6&11

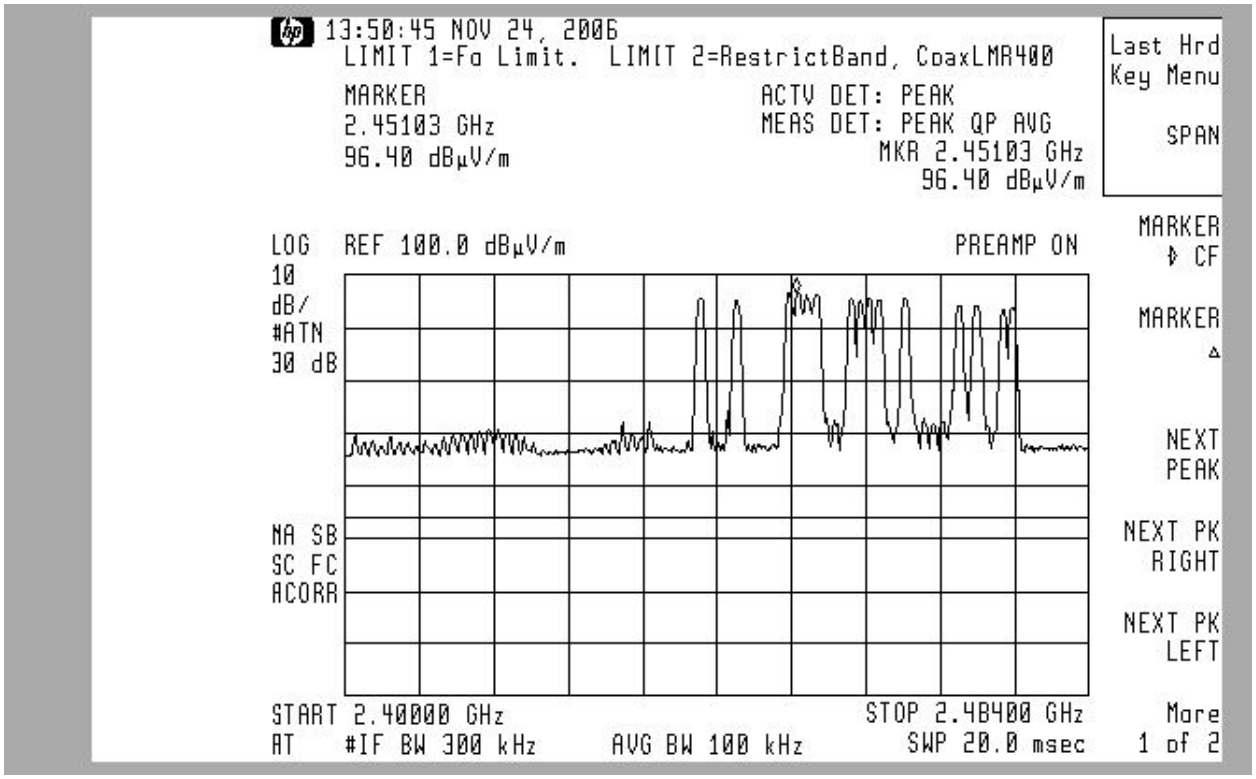


Keypad 1-50

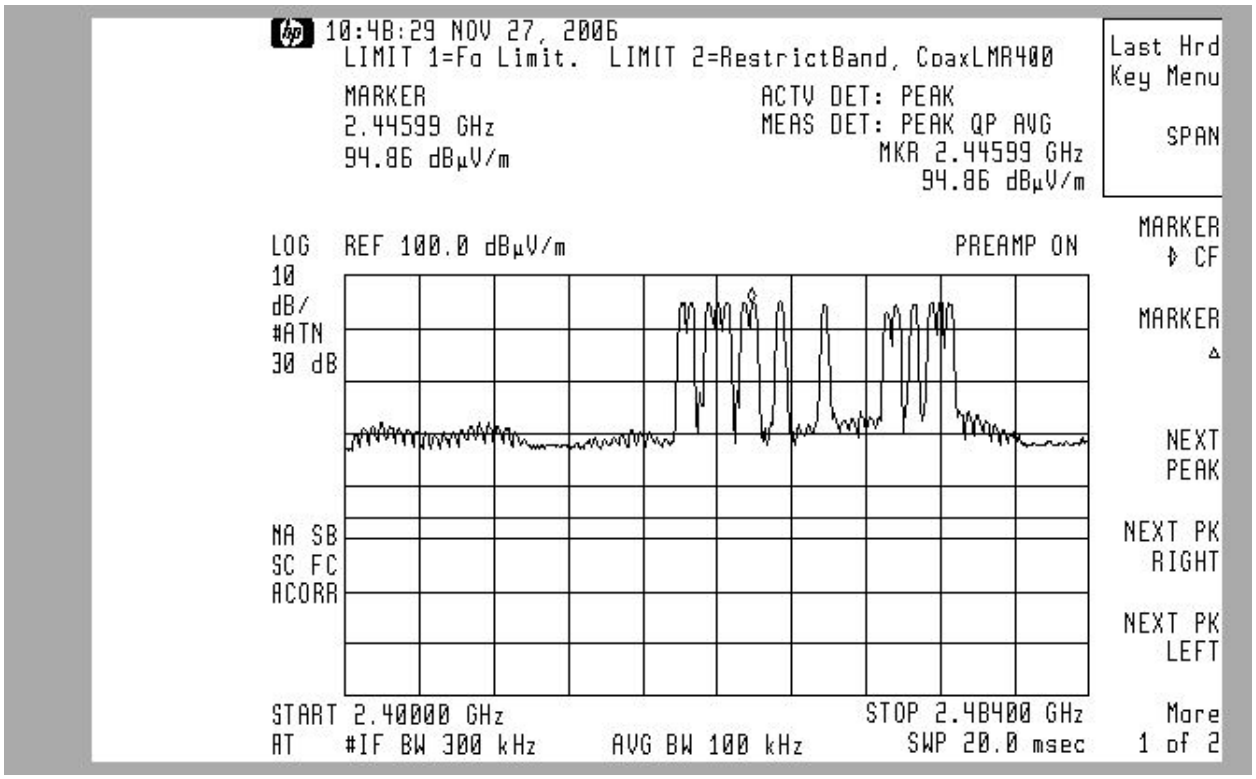


Keypad 51-100

4) Avoid Lower Half

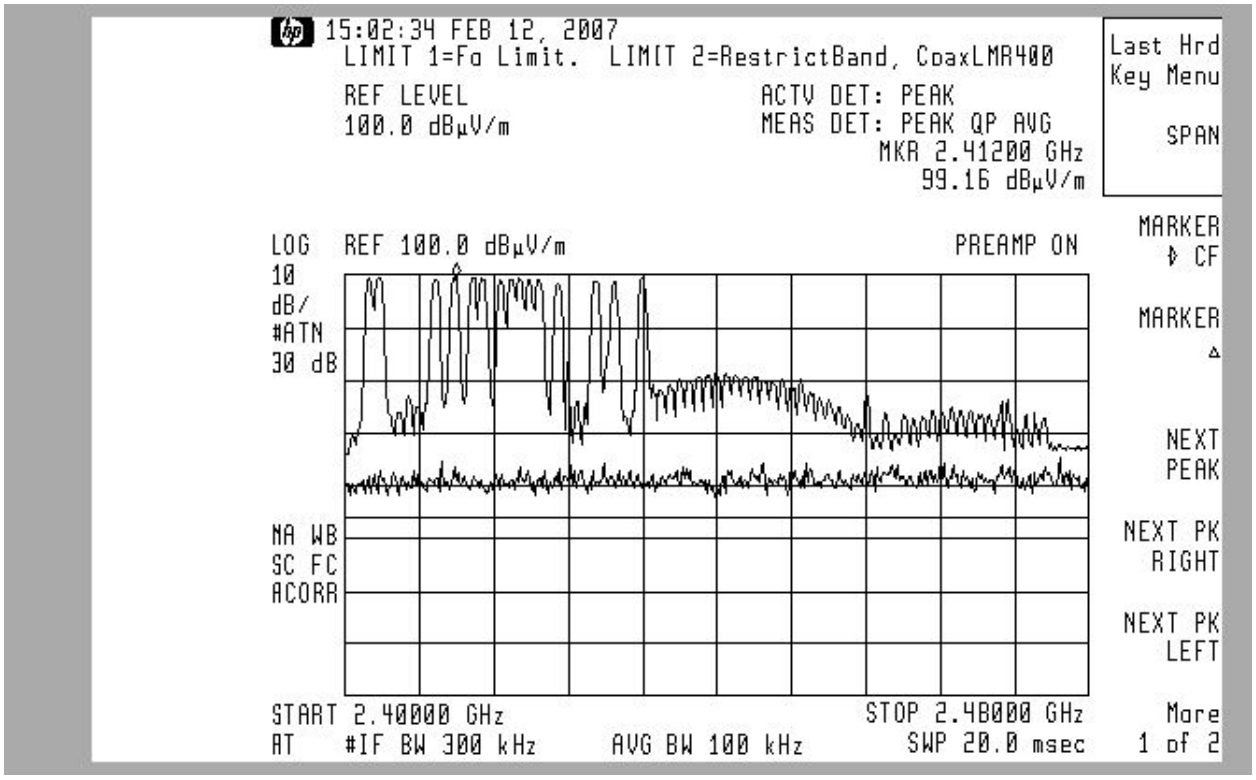


Keypad 1-50

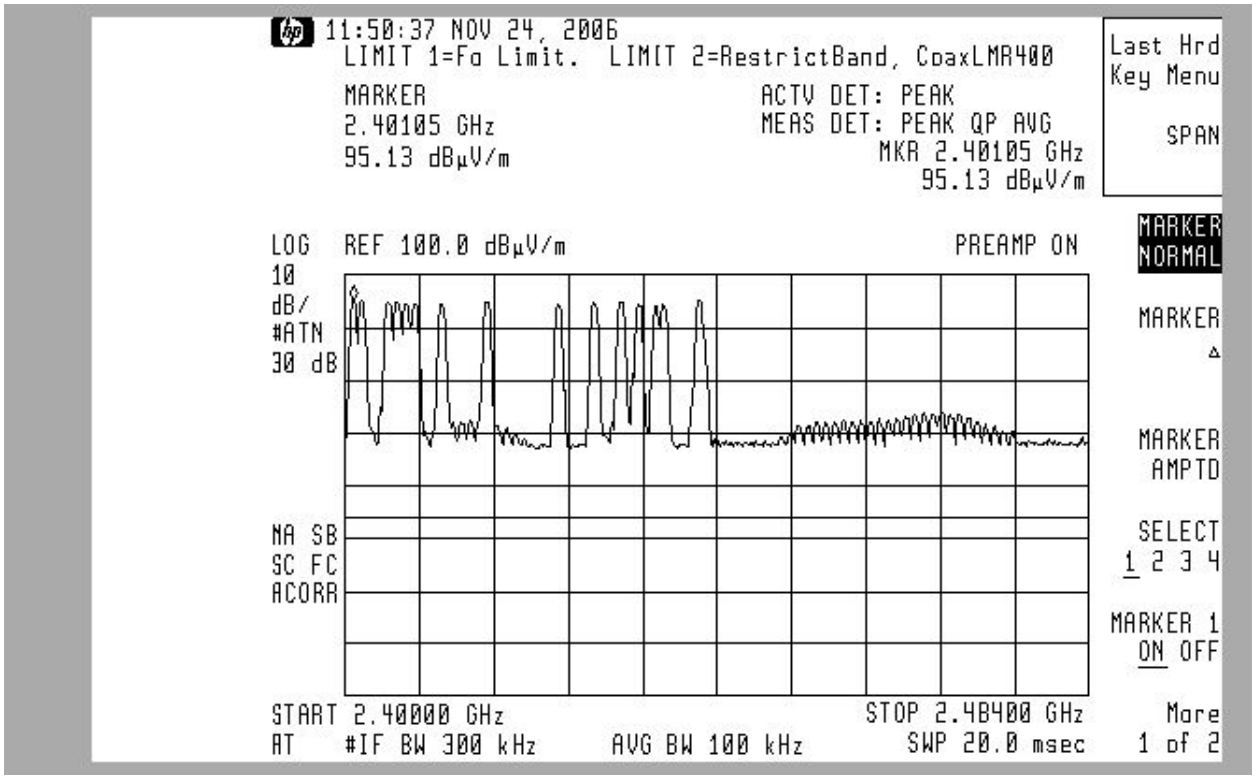


Keypad 51-100

5) Avoid Upper Half



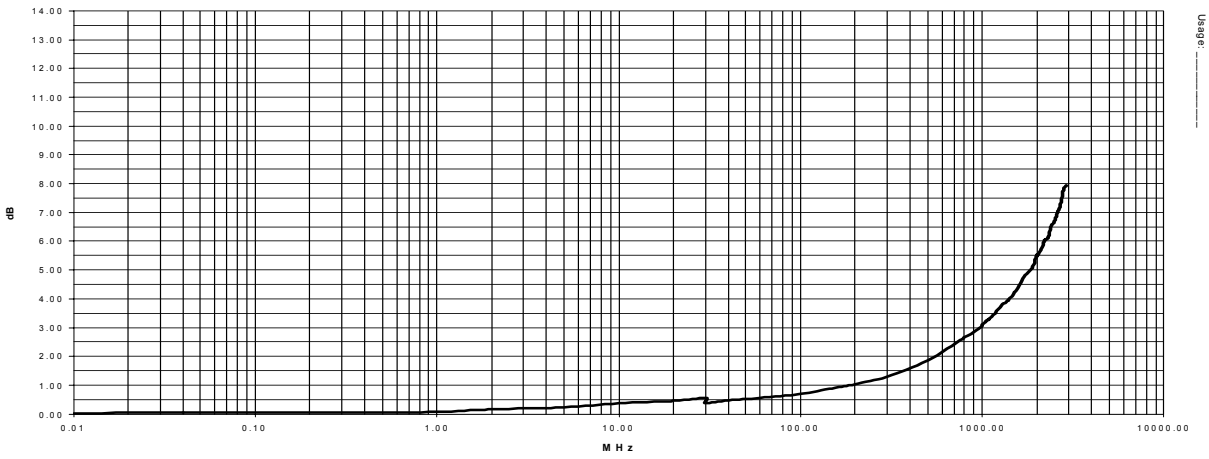
Keypad 1-50



Keypad 51-100

Cable Loss

Radiated at 3 meters; 30MHz through 3000MHz, Coax #9812_11
Last Calibration date: Nov 7, 2006



AHD Accreditation

United States Department of Commerce
National Institute of Standards and Technology

NVLAP®

Certificate of Accreditation to ISO/IEC 17025:1999

NVLAP LAB CODE: 200129-0

AHD (Amber Helm Development, L.C.)
Dowagiac, MI

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

ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS

2006-07-01 through 2007-06-30
Effective dates

For the National Institute of Standards and Technology

NVLAP-01C (REV. 2005-05-19)

NVLAP® National Voluntary Laboratory Accreditation Program

DEPARTMENT OF COMMERCE * UNITED STATES OF AMERICA *

SCOPE OF ACCREDITATION TO ISO/IEC 17025:1999

AHD (Amber Helm Development, L.C.)
92723 Michigan Highway 152
Dowagiac, MI 49047-8824
Mr. Gordon Helm
Phone: 269-429-8352 Fax: 269-429-9016
E-Mail: ghelm@ahde.com
URL: http://www.ahde.com

ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS **NVLAP LAB CODE 200129-0**

NVLAP Code	*Designation / Description*
Emissions Test Methods:	
12/CIS22	IEC/CISPR 22 (1997) & EN 55022 (1998) + A1(2000): Limits and methods of measurement of radio disturbance characteristics of information technology equipment
12/CIS22a	IEC/CISPR 22 (1993) and EN 55022 (1994): Limits and methods of measurement of radio disturbance characteristics of information technology equipment, Amendment 1 (1995) and Amendment 2 (1996)
12/FCC15b	ANSI C63.4 (2003) with FCC Method 47 CFR Part 15, Subpart B: Unintentional Radiators (Limited to 1 GHZ)
12/T51	AS/NZS CISPR 22 (2002) and AS/NZS 3548 (1997): Electromagnetic Interference - Limits and Methods of Measurement of Information Technology Equipment
Immunity Test Methods:	
12/I01	IEC 61000-4-2, Ed. 1.2 (2001) + A1, A2; EN 61000-4-2: Electrostatic Discharge Immunity Test
12/I04	IEC 61000-4-5, Ed. 1.1 (2001-04); EN 61000-4-5: Electromagnetic compatibility (EMC) - Part 4-5: Testing and measurement techniques - Surge immunity test

2006-07-01 through 2007-06-30
Effective dates

Sally S. Bruce
For the National Institute of Standards and Technology

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NVLAP-01S (REV. 2005-05-19)

FEDERAL COMMUNICATIONS COMMISSION
Laboratory Division
7435 Oakland Mills Road
Columbia, MD 21046

May 17, 2005

Registration Number: 90413

AHD EMC Laboratory
92723 M-152
Dowagiac, MI 49047

Attention: Gordon Helm

Re. Measurement facility located at Sister Lakes
3 & 10 meter site
Date of Renewal: May 17, 2005

Dear Sir or Madam:

Your request for renewal of the registration of the subject measurement facility has been received. The information submitted has been placed in your file and the registration has been renewed. The name of your organization will remain on the list of facilities whose measurement data will be accepted in conjunction with applications for Certification under Parts 15 or 18 of the Commission's Rules. Please note that the file must be updated for any changes made to the facility and the registration must be renewed at least every three years.

Measurement facilities that have indicated that they are available to the public to perform measurement services on a fee basis may be found on the FCC website www.fcc.gov under E-Filing, OET Equipment Authorization Electronic Filing, Test Firms.

Sincerely,

Phyllis Parrish
Information Technician

NARTE Seal