



CERT NO: 2088/01

TEST REPORT #180909

STANDARD: FCC PART 15

**SUBPART C--INTENTIONAL RADIATORS
SECTION 15. 249 OPERATION WITHIN THE BANDS 902-928 MHZ,
2400-2483.5 MHZ, AND 5725-5875 MHZ AND 24.0 TO 24.25 GHZ**

FCC PART 15.212 MODULAR TRANSMITTERS

EQUIPMENT TESTED:

NORTH POLE ENGINEERING, INC.

WIRELESS NETWORK MODULE

FCC ID: XRH-1997

MODEL: WL10-GS AND WL10-GC

TEST DATE: 18 SEPTEMBER, 2009

1100 Falcon Avenue
Glencoe, MN 55336



Tele: 320-864-4444
Fax: 320-864-6611

CERTIFICATION SERVICES, INC.

Prepared for: North Pole Engineering, Inc.
221 North 1st Street, Suite 310
Minneapolis, MN 55401

Test agent: International Certification Services, Inc.
1100 Falcon Avenue
Glencoe, MN 55336
Tele: 320-864-4444
Fax: 320-864-6611

Test location: International Certification Services, Inc.
1100 Falcon Avenue
Glencoe, MN 55336
Tele: 320-864-4444
Fax: 320-864-6611

Prepared by: International Certification Services, Inc.
1100 Falcon Avenue
Glencoe, MN 55336

International Certification Services represents to the client that testing is done in accordance with standard procedures applicable and that reported test results are accurate within generally accepted commercial ranges of accuracy.

This report only applies to the specific samples tested under stated test conditions. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. International Certification Services shall have no liability for any deductions, inferences or generalizations drawn by the client or others from this report.

This report is the confidential property of the client. As a mutual protection to our clients, the public and ourselves, extracts from the test report shall not be reproduced except in full without our written approval.

1.0 TEST SUMMARY

TEST REPORT: #180909

COMPANY: North Pole Engineering, Inc.

AGENT: International Certification Services, Inc.

PHONE: 320-864-4444

TEST DATE: 18 September, 2009

EQUIPMENT UNDER TEST: 802.11 b/g Wireless Network Module 2.4 Ghz
Transmitter Models: WL10-GS and WL10-GC

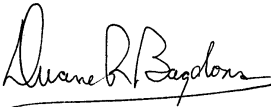
GENERAL TEST SUMMARY: The testing was performed at International Certification Services, Inc. at 1100 Falcon Ave, Glencoe, MN 55336

VERIFICATION / CERTIFICATION STATUS: The 802.11 b/g Wireless Network Module 2.4 Ghz Transmitter Models: WL10-GS and WL10GC was found to be in compliance with the FCC Part 15 Subpart C, Section 15.249 and FCC 15.212 for modular transmitters requirements.

MODIFICATIONS NECESSARY: None

TESTED BY

Duane R. Bagdons



WRITTEN BY

Duane R. Bagdons



Applicable Standards

- 47 CFR Ch.1 (07-10-2008 Edition)
 - FCC Part 15 Radio Frequency Devices (July 10, 2008)
 - Subpart C Intentional Radiators
 - Section 15.249 Operation within the bands 902-928 Mhz, 2400-2483.5 Mhz, 5725-5875 Mhz and 24.0 to 2425 Ghz.
 - Section 15.212 Modular Transmitters

2.1 Referenced Standards

ANSI C63.4-2003 Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 Khz to 40 Ghz.

2.2 Equipment Units Tested

The equipment tested was a modular 2.4 Ghz Wireless Network module. This device is a module that takes power from a HOST equipment and post regulates this voltage to the necessary voltages to operate the modular EUT. The Transmitter chip that is used in the design is a Gainspan GS1010 WiFi. There are two antennas that can be configured with this device, one is an external stick type antenna (Taoglas GW.11.A153: Model: WL10-GS) and the other antenna is an internal PC board mounted chip antenna (Antenna Factor ANT-2.45-CHP-T,B; Model: WL10-GC). The external Stick antenna has a reverse SMA connector as required by FCC 15.203. It can only be configured with one antenna at a time. It is a Digital Modulated Transmitter (DTS) that operates on up to 14 channels in the 2.4 to 2.4835 Ghz frequency band. The transmit time is controlled by the internal firmware of the chip and is compatible with the 802.11 b/g requirements. This module has an on board post regulator to control the voltage to the Intentional Radiator circuitry per the requirements of FCC 15.212 (a) (1) (iii).

2.3 Equipment and Cable Configuration

See photo of the EUT test configuration setup in Attachment A

2.4 List of Test Equipment

<u>Test Equipment</u>	<u>Model</u>	<u>S/N</u>	<u>Calibration Date</u>
Spectrum Analyzer	Hewlett-Packard 8566B	2421A00458	01/25/08
Harmonic Mixer	Hewlett Packard 11970K	3003A04385	10/10/08
RF Amplifier	Hewlett Packard 11975A	2738A01733	09/30/08
Preamp	Nextec Model: NB00391	378	06/09/08
Biconical Antenna	EMCO 93110B	105799	06/22/09
Log Periodic Antenna (200-1000 MHz)	EMCO 3146	9111-3280	01/23/08
Horn Antenna (1-18 Ghz)	EMCO 3115	2334	06/23/09
Horn Antenna (18-26 Ghz)	Alpha Industries 61932500	55	01/23/08

Measurement cable losses, and antenna correction factors are included in the data sheets. The Resolution BW was set at 1 Mhz and the Video BW was set at 1 Hz with a Span of 0 Hz to perform the correct average detected measurements over 1000 Mhz.

2.5 Units of Measurement.

All measurements were taken in dBuV/m with the antenna located at 3 meters distance from the EUT. Frequency measurements are recorded in Mhz

2.6 Location of Test Site

The open area test site (OATS) measurement facility used to collect the data was International Certification Services, Inc. at 1100 Falcon Ave in Glencoe, MN 55336. This site has been certified to be in spec of the normalized site attenuation per ANSI C63.4-2003. (FCC registration number: 640574)

2.7 Measurement Procedures

The antenna was placed at a distance of 3 meters from the EUT. The EUT was set on an insulating table in the OATS site and rotated through all orientations to determine the worst case EUT position. The antenna was then positioned vertical and horizontal to determine which antenna polarity orientation was worst case. Then certification data was recorded at all the transmitter frequencies from the fundamental to the 10th harmonic at an antenna height variation of from 1-4 meters.

2.8 Reporting Measurement Data

See data sheets and plots in Attachment B.

2.9 Radiated Emissions Data

The frequency and amplitude of the tuned frequency of the EUT along with the frequencies and amplitudes of the harmonics up to the 10th harmonic are reported in the data sheets in Attachment B. This information is plotted against the limit of section 15.249 of FCC Part 15 subpart C. Both Horizontal and Vertical antenna polarities as well as antenna heights of 1 to 4 meters were observed.

The Final Level, expressed in dBuV/m, is arrived at by taking the reading from the spectrum analyzer (Level dBuV) and adding the antenna correction factor and cable loss factor (Factor dB) and subtracting the preamp gain. This result then has the FCC limit subtracted from it to provide the margin which gives the tabular data as shown in the data sheets in Attachment B.

Example:

<u>Frequency</u>							
<u>(MHz)</u>							
100.0							
	<u>Level</u>	+	<u>Factor</u>	=	<u>Corr Data</u>	-	<u>FCC Limit</u>
	<u>(dBuV)</u>		<u>(dB)</u>		<u>(dBuV/m)</u>		<u>(dBuV/m)</u>
	20.6	+	11.0	=	31.6	-	43.5
							=
							<u>Margin</u>
							<u>(dB)</u>
							-11.9

2.10 Operating Frequency Data for Intentional Radiators

All operating frequencies and harmonic frequencies and ambient temperature at which all data was taken is recorded in the data sheets in Attachment B.

2.11 Summary of Results

The EUT passed the requirements of FCC Part 15 Subpart C, Section 15.249 with a maximum field strength of 90.165 dBuV/m at the fundamental frequency of 2412.88 Mhz for the WL10-GS (External Antenna) against a limit of 93.979 dBuV/m and a maximum field strength of 75.28 dBuV/m at the fundamental frequency of 2411.78 Mhz for the WL10-GC (Internal PC Board Chip Antenna) against a limit of 93.979 dBuV/m. No modifications were necessary to accomplish this compliance.

ATTACHMENT A

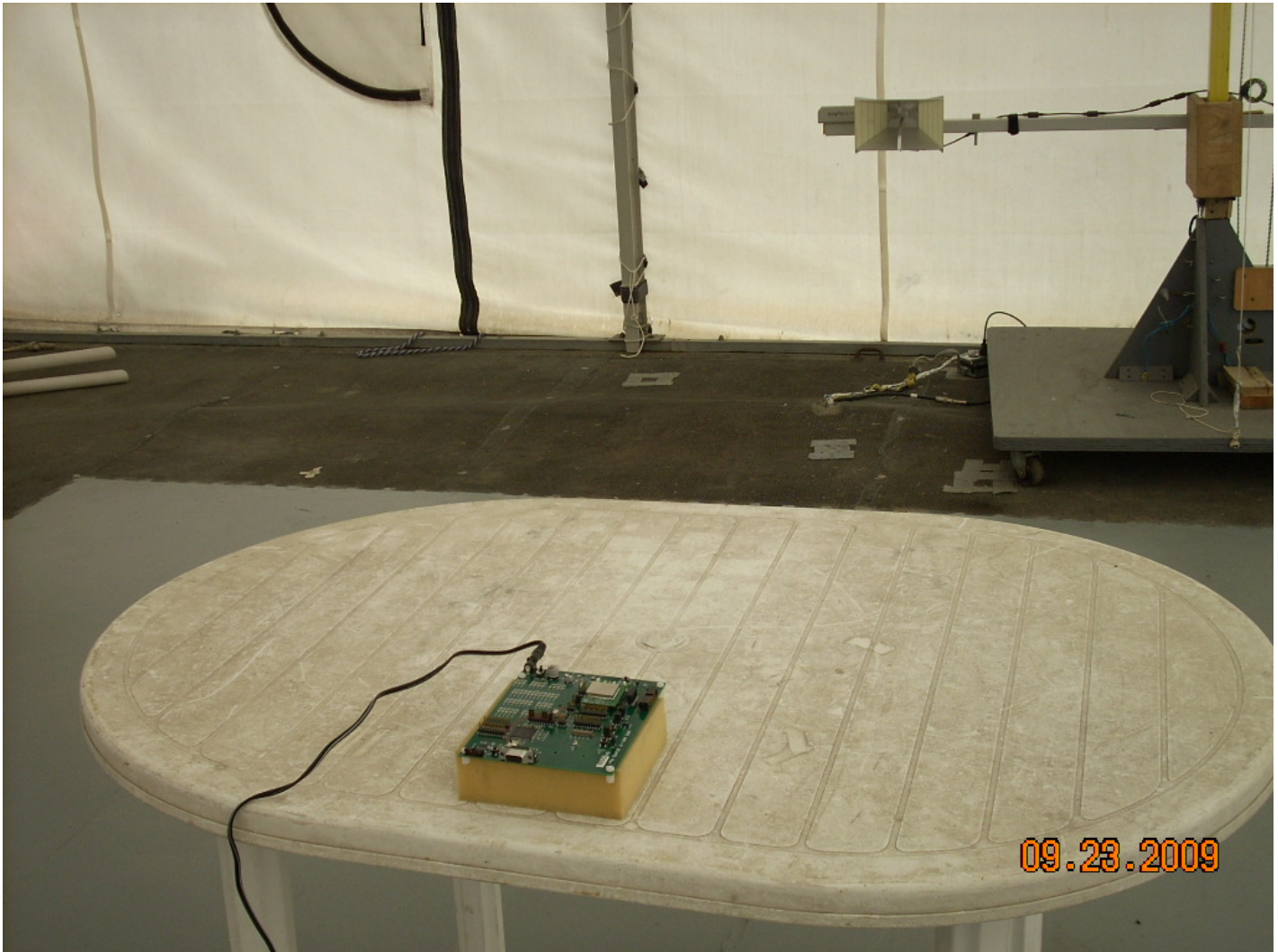
RADIATED MEASUREMENT

TEST SET UP

**North Pole Engineering, Inc.
WLAN Module with External Antenna
Model: WL10-GS
Radiated Emissions
Test Configuration**



**North Pole Engineering, Inc.
WLAN Module with PC Board Chip Antenna
Model: WL10-GC
Radiated Emissions
Test Configuration**



ATTACHMENT B

DETAILED TEST DATA SHEETS

Each radiated emissions plot indicates the receiving antenna measurement distance in meters and the emission amplitudes with respect to their applicable limits. The associated tabulation for each radiated plot lists the emission frequency, the final emission level, and the margin from the limit.

North Pole Engineering, Inc.
 WLAN Module
 Model: WL10-GS and WL10-GC
 Temperature: 22.5 Deg C.
 Humidity: 55 % R.H.

Test Technician: Duane R. Bagdons

Model: WL10-GS: External SMA antenna

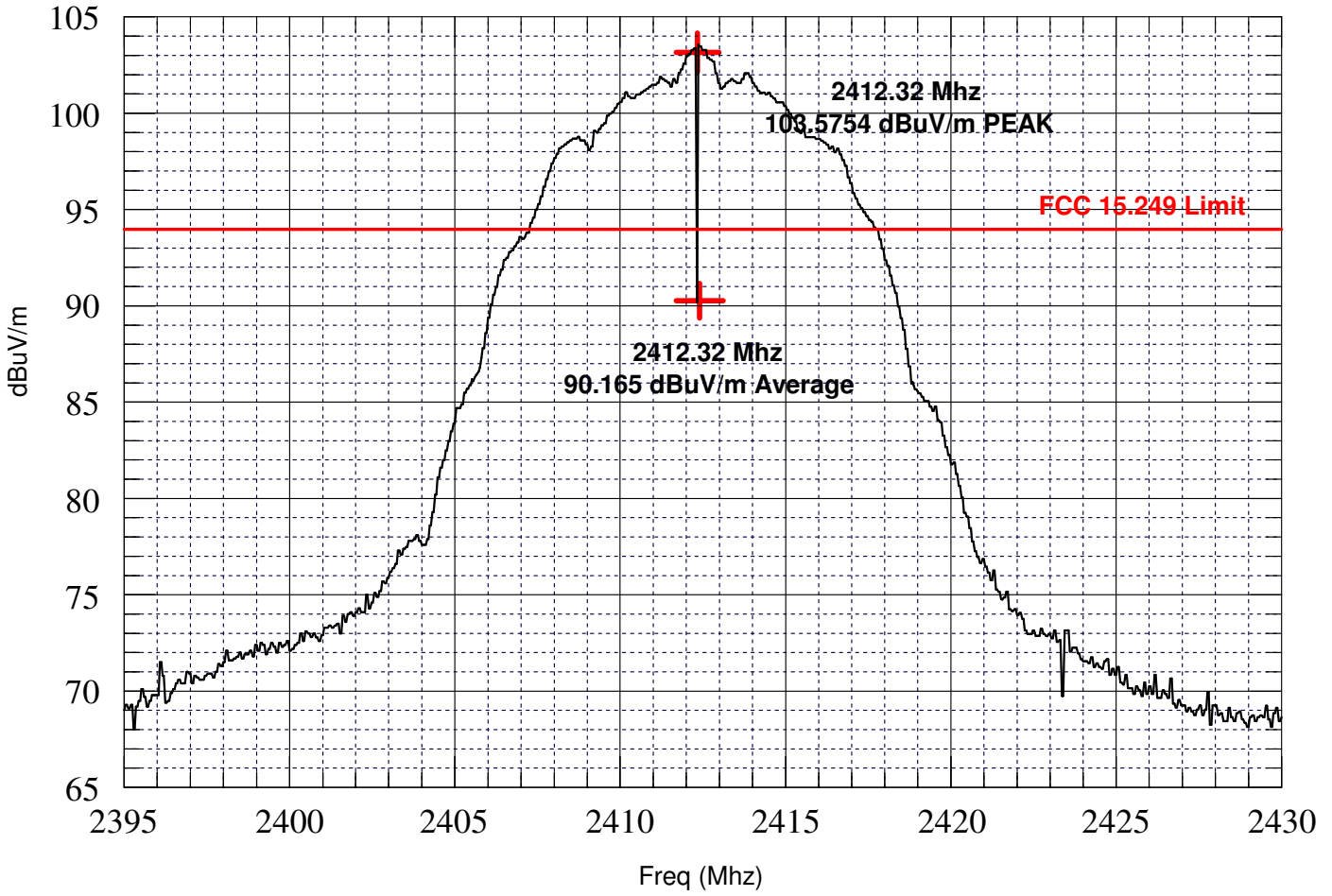
Center Frequency: 2412.32 Mhz (low channel)
 2437.115 Mhz (mid channel)
 2461.92 Mhz (high channel)

Preliminary testing was done to determine what antenna polarity and antenna height generated the highest signal levels. Tests were performed at this test configuration and then each frequency was maximized to 0-360 degrees orientation and antenna height of 1-4 meters.

FCC 15.249 (a) Field Strength of Fundamental

Channel	Frequency (Mhz)	Amplitude (dBuV/m) Peak Detected	Amplitude (dBuV/m) Average Detected	FCC 15.249 Limit (uV/m)	FCC 15.249 Limit (AVG) (dBuV/m)
Low Channel	2412.32	103.5754	90.165	50	93.979
Mid Channel	2437.115	100.7258	86.908	50	93.979
High Channel	2461.92	100.3762	81.336	50	93.979

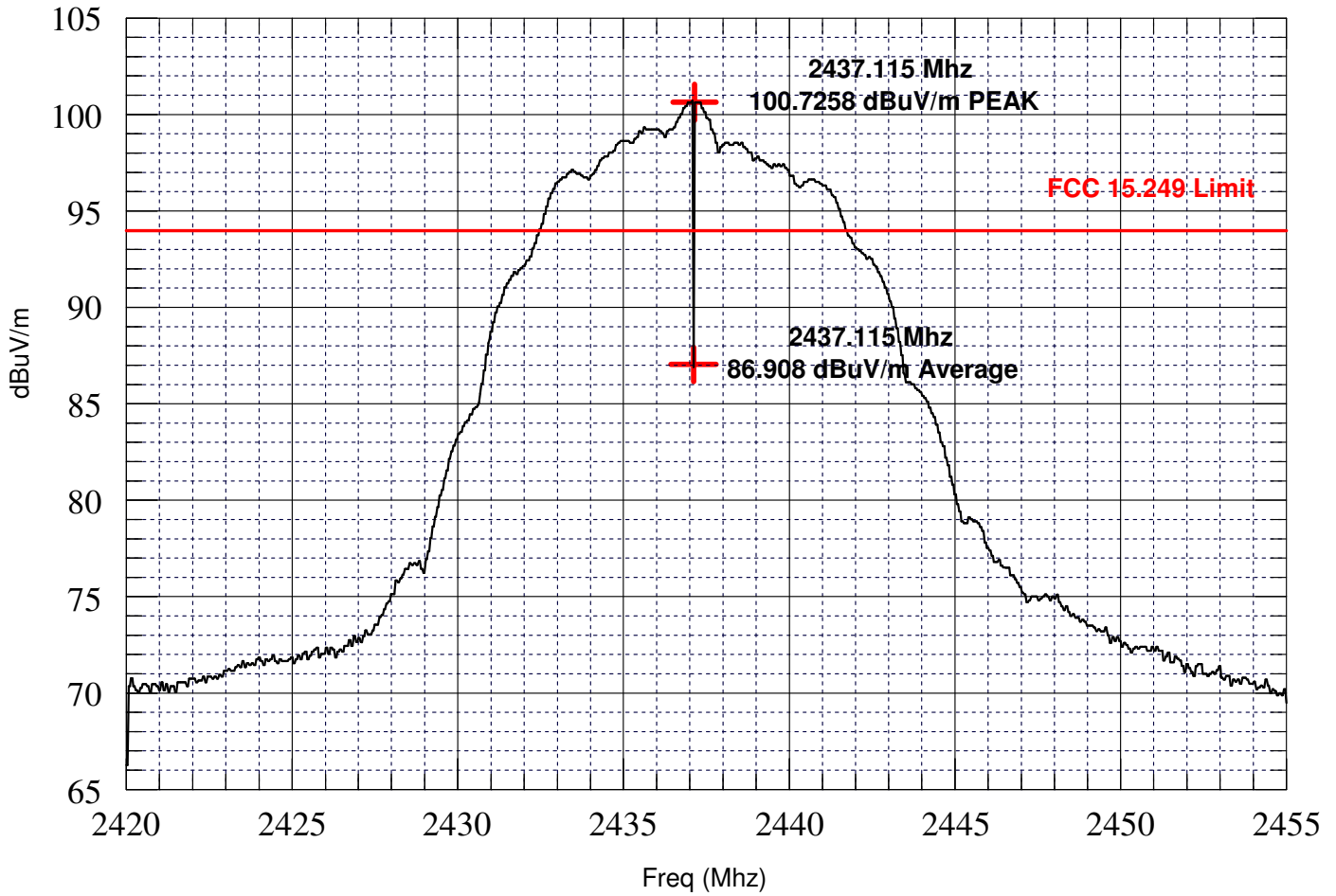
North Pole Engineering, Inc.
Model: WL10-GS with external Antenna
FCC 15.249 Channel #1 Amplitude
Radiated Emissions



International Certification Services, Inc.

15-Sept-2009

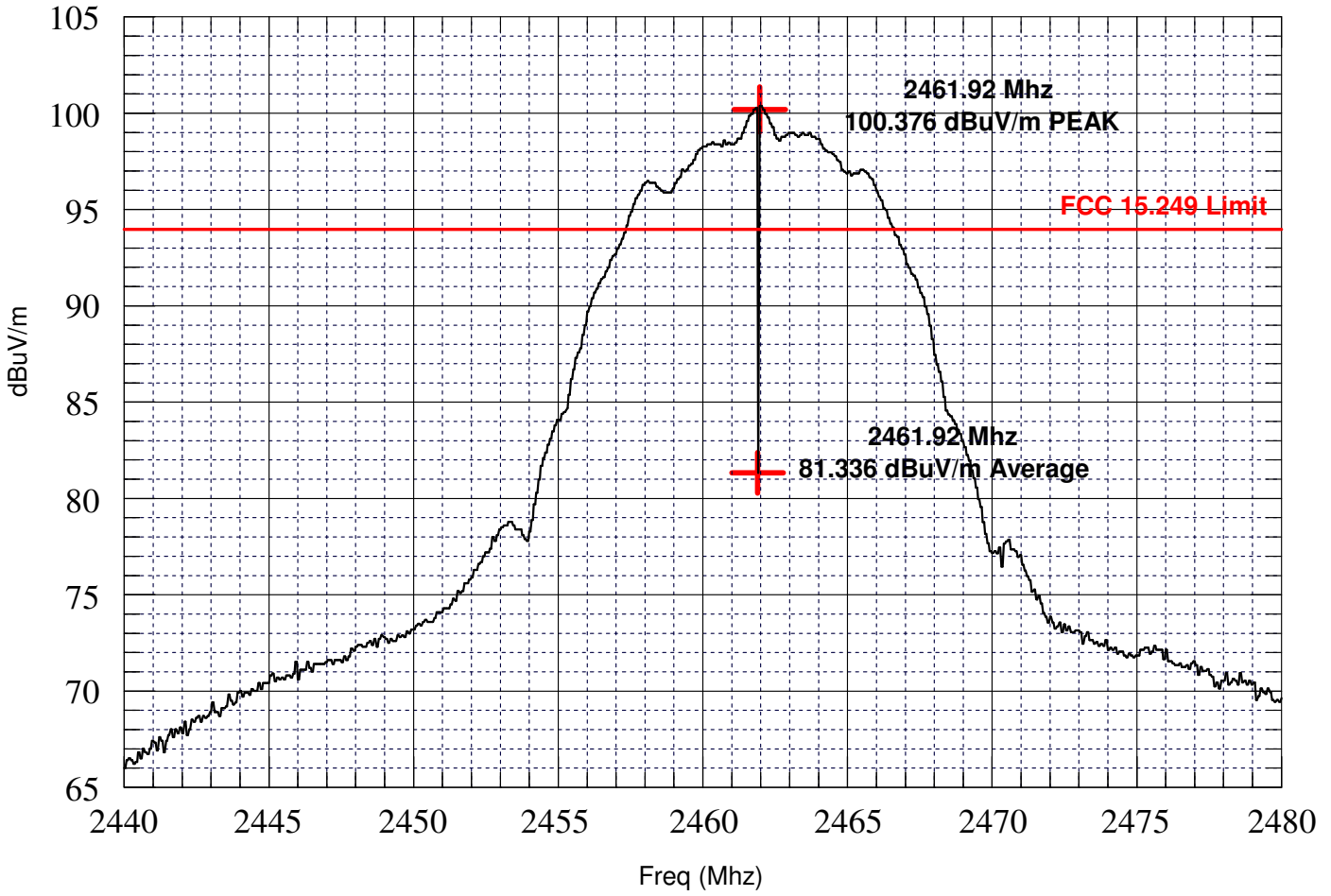
North Pole Engineering, Inc.
Model: WL10-GS with external Antenna
FCC 15.249 Channel #6 Amplitude
Radiated Emissions



International Certification Services, Inc.

15-Sept-2009

North Pole Engineering, Inc.
Model: WL10-GS with external Antenna
FCC 15.249 Channel #11 Amplitude
Radiated Emissions



International Certification Services, Inc.

15-Sept-2009

Model: WL10-GC: On Board CHIP antenna

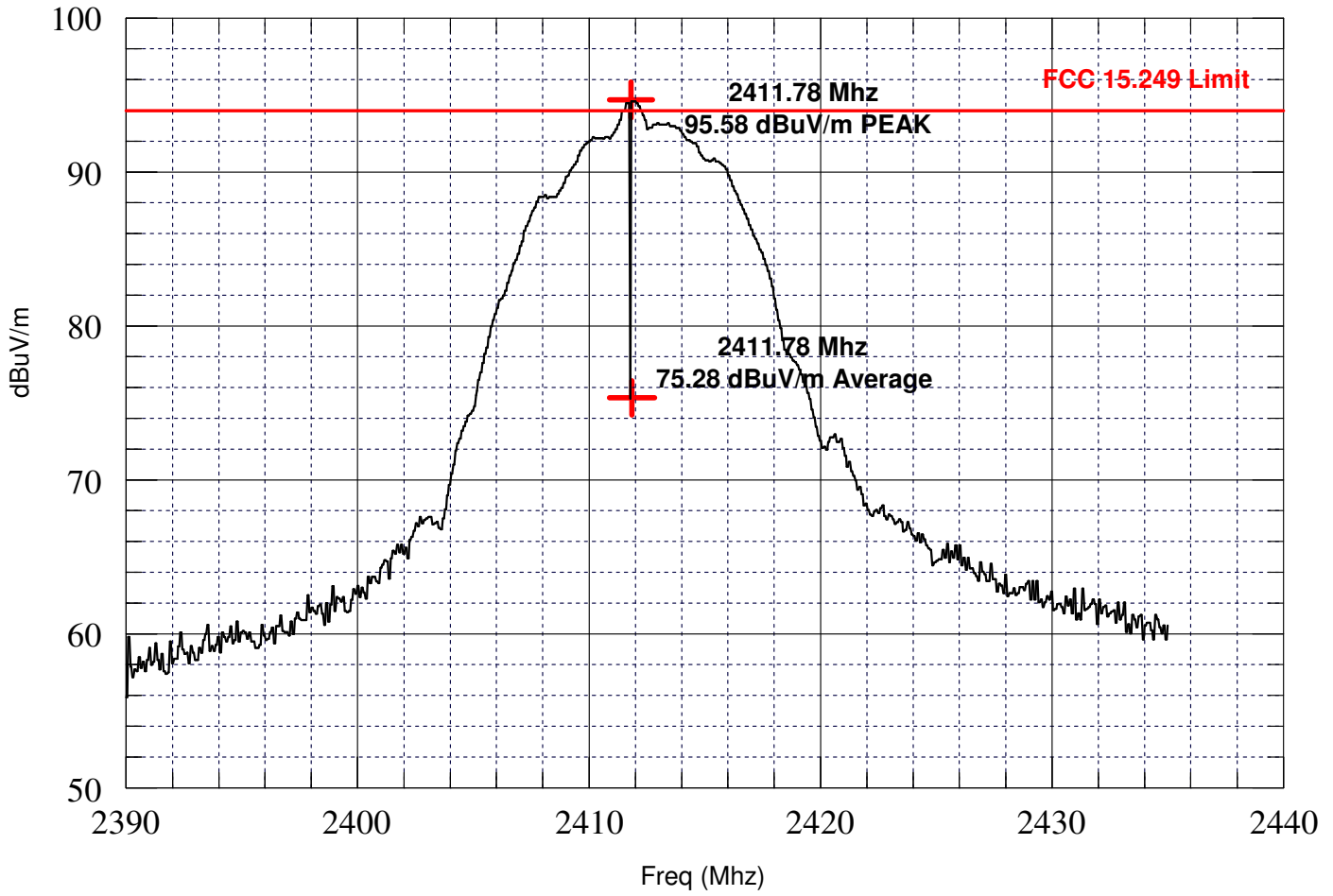
Center Frequency: 2411.78 Mhz (low channel)
2437.08 Mhz (mid channel)
2461.84 Mhz (high channel)

Preliminary testing was done to determine what antenna polarity and antenna height generated the highest signal levels. Tests were performed at this test configuration and then each frequency was maximized to 0-360 degrees orientation and antenna height of 1-4 meters.

FCC 15.249 (a) Field Strength of Fundamental

Channel	Frequency (Mhz)	Amplitude (dBuV/m) Peak Detected	Amplitude (dBuV/m) Average Detected	FCC 15.249 Limit (uV/m)	FCC 15.249 Limit (AVG) (dBuV/m)
Low Channel	2411.78	95.57644	75.28	50	93.979
Mid Channel	2437.08	94.22577	63.93	50	93.979
High Channel	2461.84	95.476	63.71	50	93.979

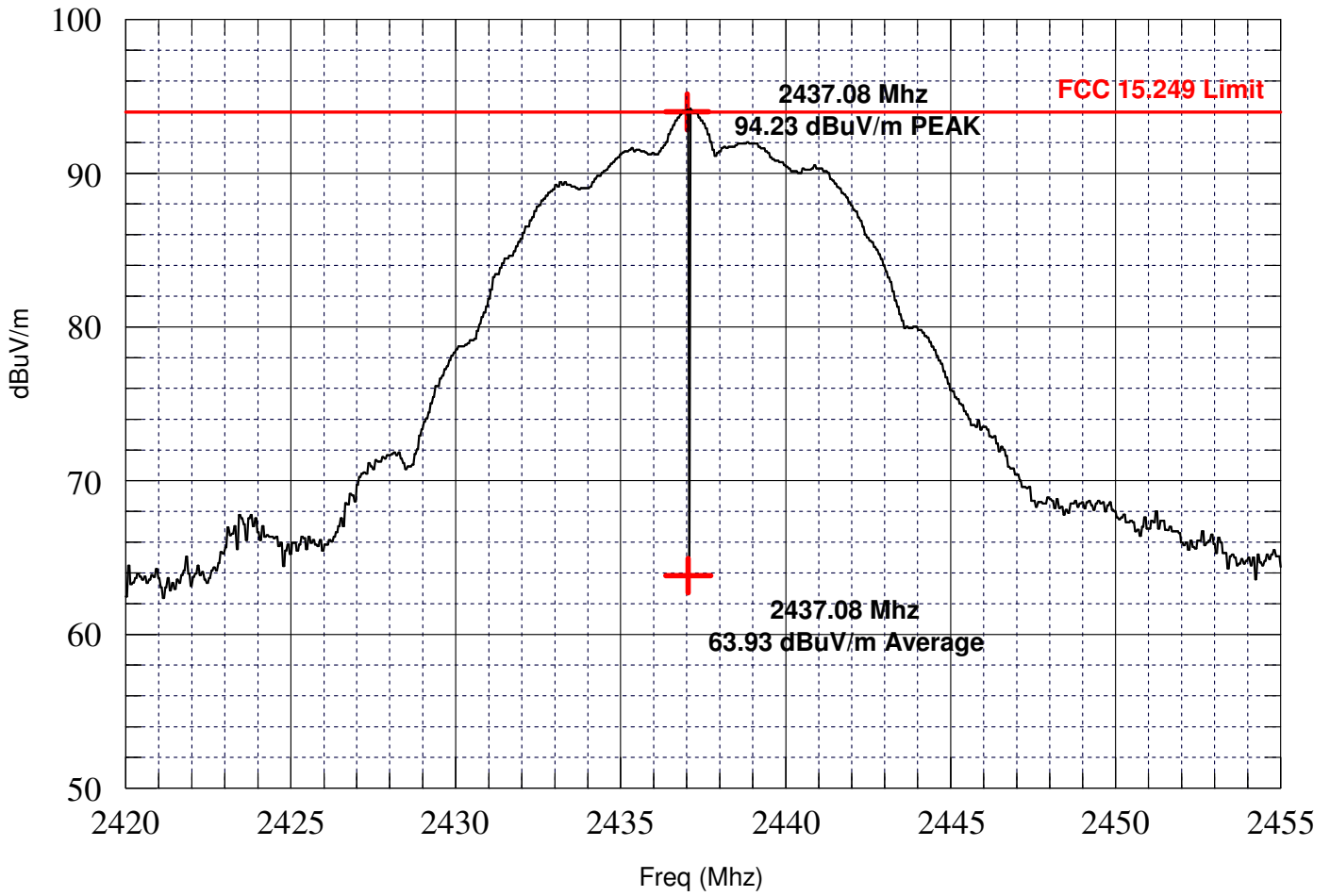
North Pole Engineering, Inc.
Model: WL10-GC with Chip Antenna
FCC 15.249 Channel #1 Amplitude
Radiated Emissions



International Certification Services, Inc.

21-Sept-2009

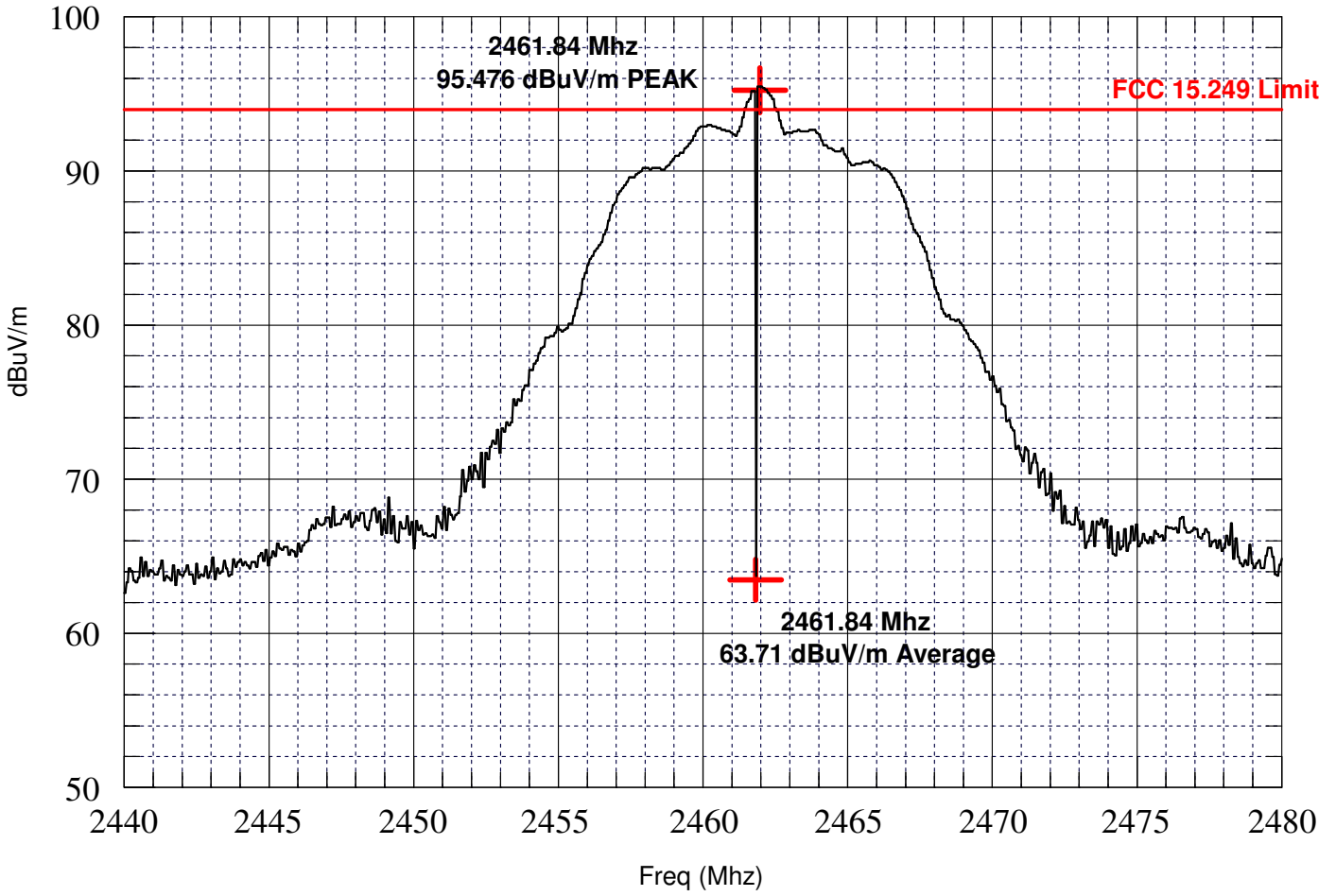
North Pole Engineering, Inc.
Model: WL10-GC with Chip Antenna
FCC 15.249 Channel #6 Amplitude
Radiated Emissions



International Certification Services, Inc.

21-Sept-2009

North Pole Engineering, Inc.
Model: WL10-GC with Chip Antenna
FCC 15.249 Channel #11 Amplitude
Radiated Emissions



International Certification Services, Inc.

15-Sept-2009

FCC 15.249 (a) Field Strength of Harmonics

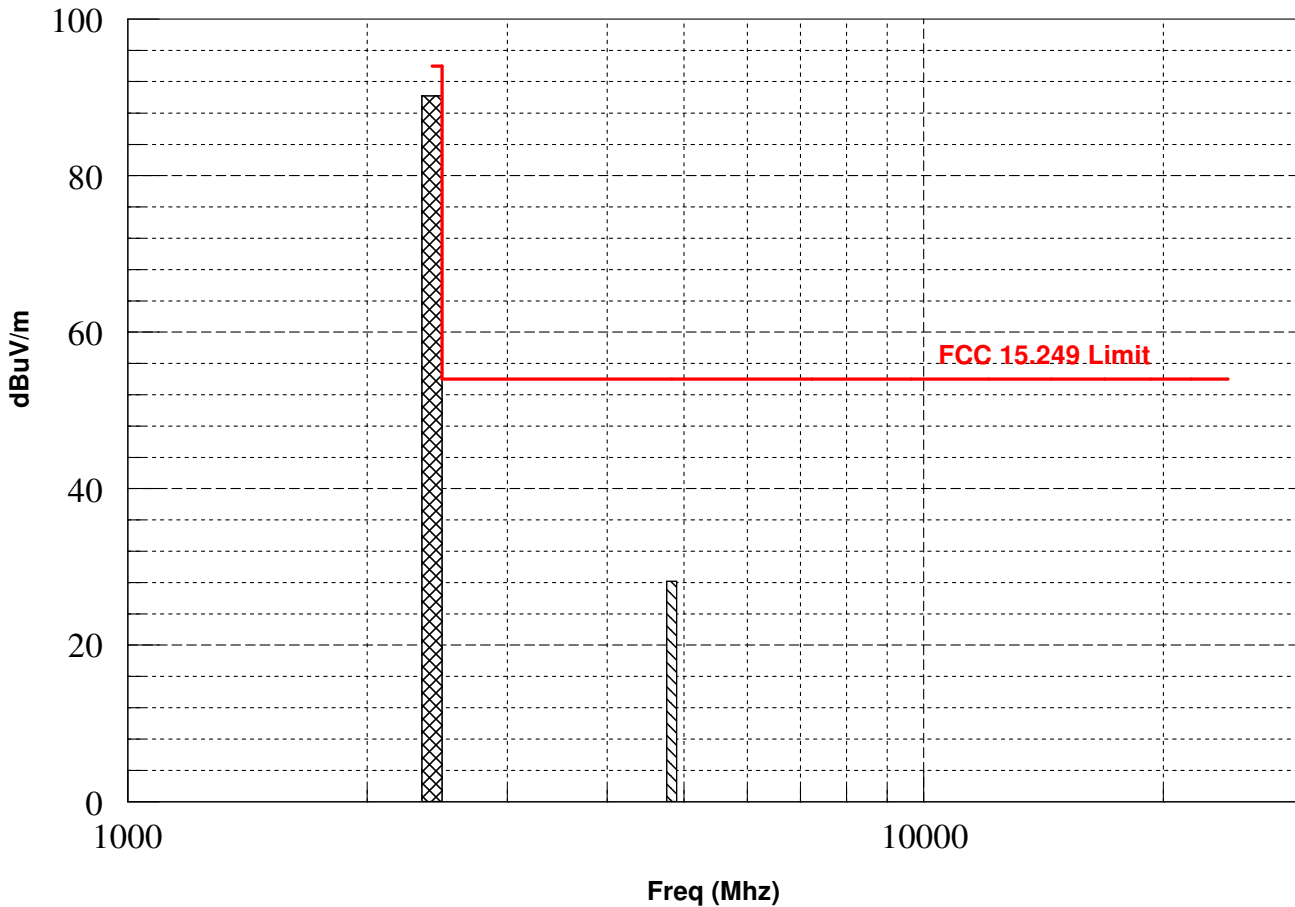
Model: WL10-GS: External SMA antenna

Low Frequency Channel Harmonics:

Freq. (MHz)	Peak (dBuV/m)	AVG uV/m	AVG (dBuV/m)		Corr Peak (dBuV/m)	Corr AVG (dBuV/m)	FCC 15.249 LIMIT (dBuV/m)	Margin
2412	Fundamental		77.29		103.5754	90.1654	93.979	
4824	33.4	3.75	11.48		35.9776	28.15823	53.979	-25.82

No signals were observed within 20 dB of the limit above 4824 Mhz.

North Pole Engineering, Inc.
 Model: WL10-GS with external Antenna
 FCC 15.249 Channel # 1
 Radiated Harmonic Emissions



International Certification Services, Inc.

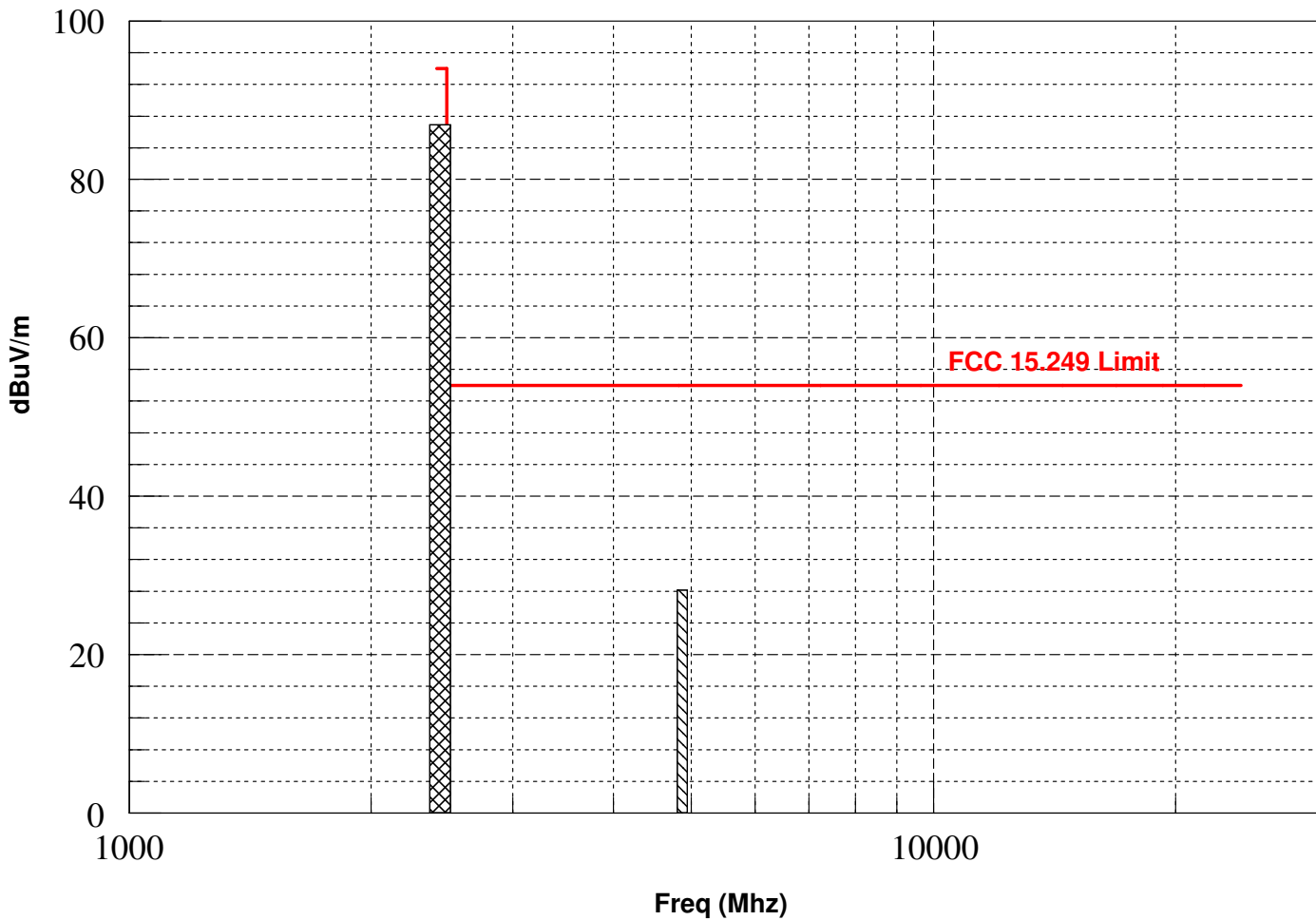
September 18, 2009

Middle Frequency Channel Harmonics:

Freq. (MHz)	Peak (dBuV/m)	AVG uV/m	AVG (dBuV/m)		Corr Peak (dBuV/m)	Corr AVG (dBuV/m)	FCC 15.249 LIMIT (dBuV/m)	Margin
2437	Fundamental		74.083		100.7258	86.9088	93.979	
4874	33.1	3.87	11.75		36.356	28.11022	53.979	-25.87

No signals were observed within 20 dB of the limit above 4874 Mhz.

North Pole Engineering, Inc.
Model: WL10-GS with external Antenna
FCC 15.249 Channel # 6
Radiated Harmonic Emissions



International Certification Services, Inc.

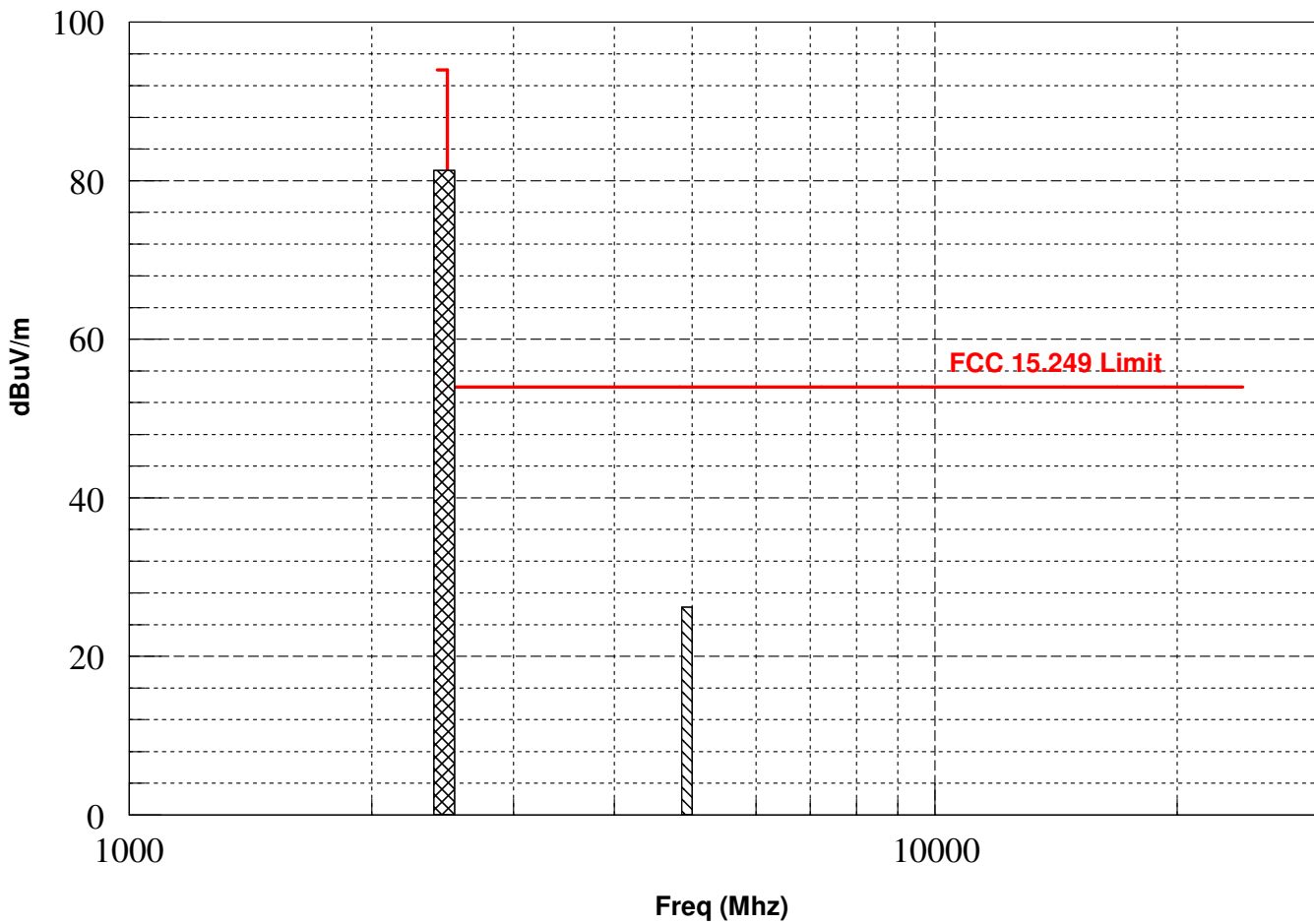
September 18, 2009

High Frequency Channel Harmonics:

Freq. (MHz)	Peak (dBuV/m)	AVG uV/m	AVG (dBuV/m)		Corr Peak (dBuV/m)	Corr AVG (dBuV/m)	FCC 15.249 LIMIT (dBuV/m)	Margin
2462	Fundamental		68.56		100.3762	81.3362	93.979	
4924	24.5	3.24	10.21		28.713	26.2245	53.979	-27.75

No signals were observed within 20 dB of the limit above 4924 Mhz.

North Pole Engineering, Inc.
 Model: WL10-GS with external Antenna
 FCC 15.249 Channel # 11
 Radiated Harmonic Emissions



International Certification Services, Inc.

September 18, 2009

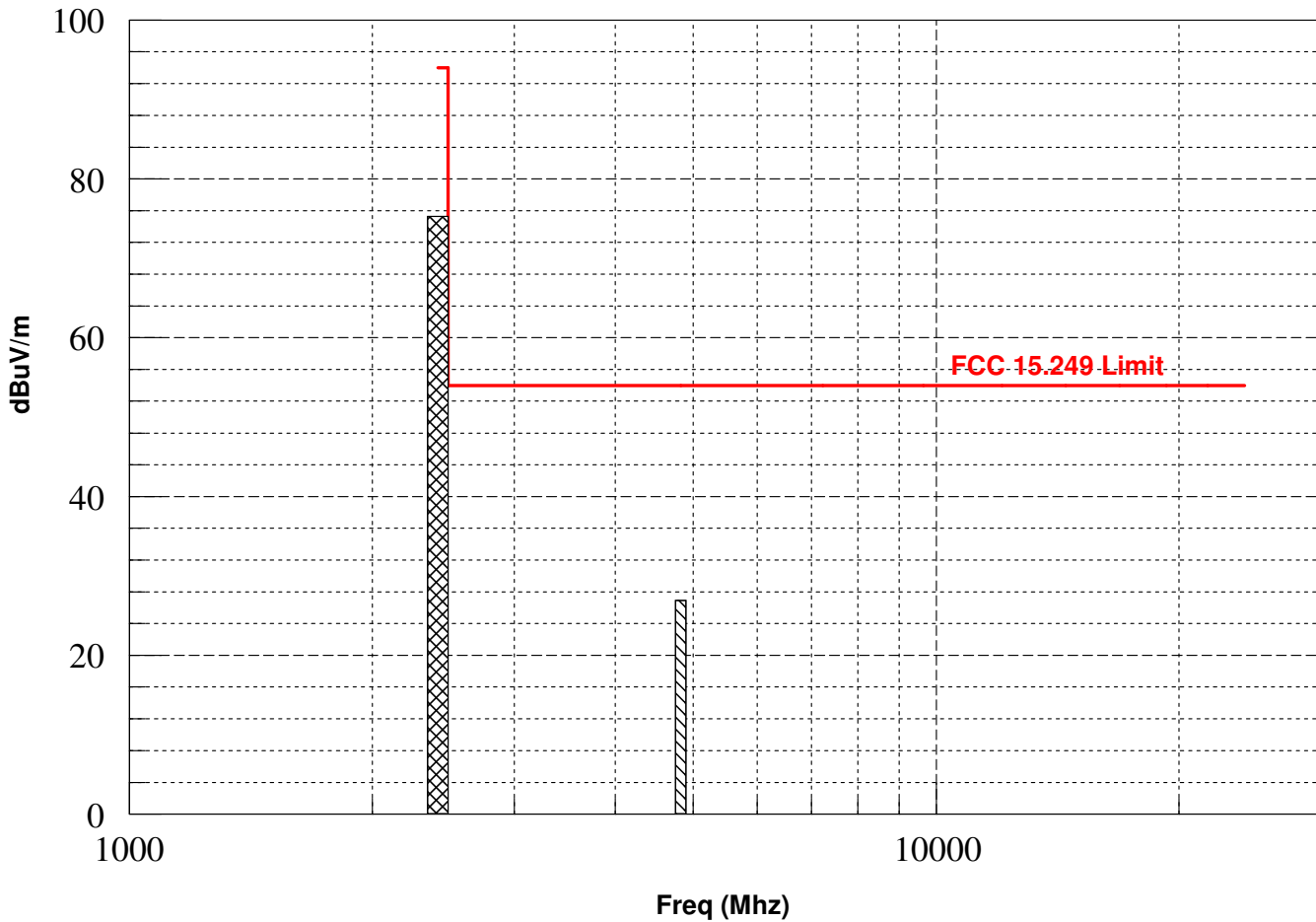
Model: WL10-GC: On Board CHIP antenna

Low Frequency Channel Harmonics:

Freq. (MHz)	Peak (dBuV/m)	AVG uV/m	AVG (dBuV/m)		Corr Peak (dBuV/m)	Corr AVG (dBuV/m)	FCC 15.249 LIMIT (dBuV/m)	Margin
2412	Fundamental		62.41		95.57644	75.2864	93.979	
4824	19.3	3.25	10.23767		35.9776	26.9143	53.979	-27.06

No signals were observed within 20 dB of the limit above 4824 Mhz.

North Pole Engineering, Inc.
Model: WL10-GC with PC Board Chip Antenna
FCC 15.249 Channel # 1
Radiated Harmonic Emissions



International Certification Services, Inc.

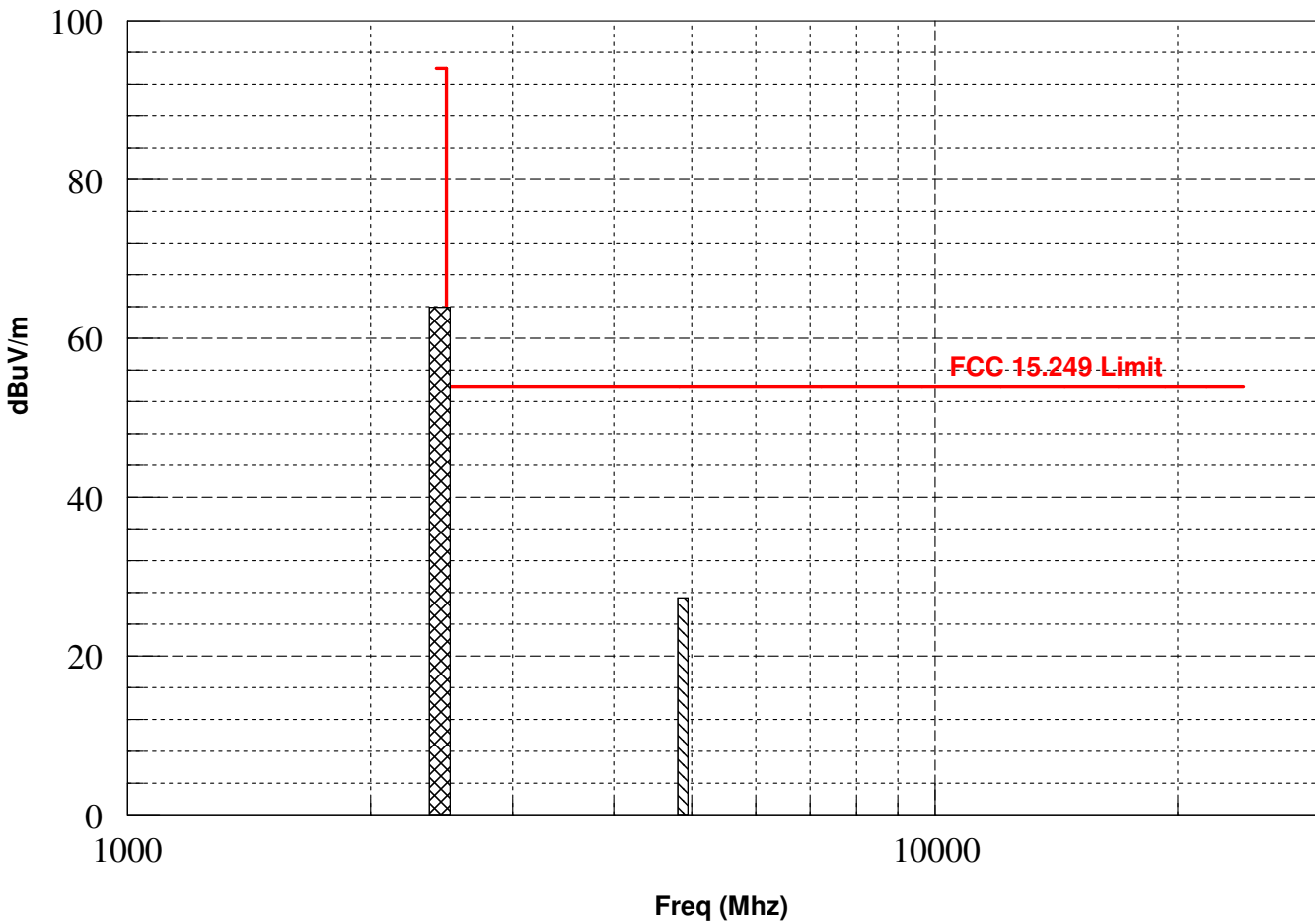
September 18, 2009

Middle Frequency Channel Harmonics:

Freq. (MHz)	Peak (dBuV/m)	AVG uV/m	AVG (dBuV/m)	Corr Peak (dBuV/m)	Corr AVG (dBuV/m)	FCC 15.249 LIMIT (dBuV/m)	Margin
2437	Fundamental		51.1019	94.22577	63.9277	93.979	
4874	20	3.54	10.98007	36.356	27.33607	53.979	-26.64

No signals were observed within 20 dB of the limit above 4874 Mhz.

North Pole Engineering, Inc.
 Model: WL10-GC with PC Board Chip Antenna
 FCC 15.249 Channel # 6
 Radiated Harmonic Emissions



International Certification Services, Inc.

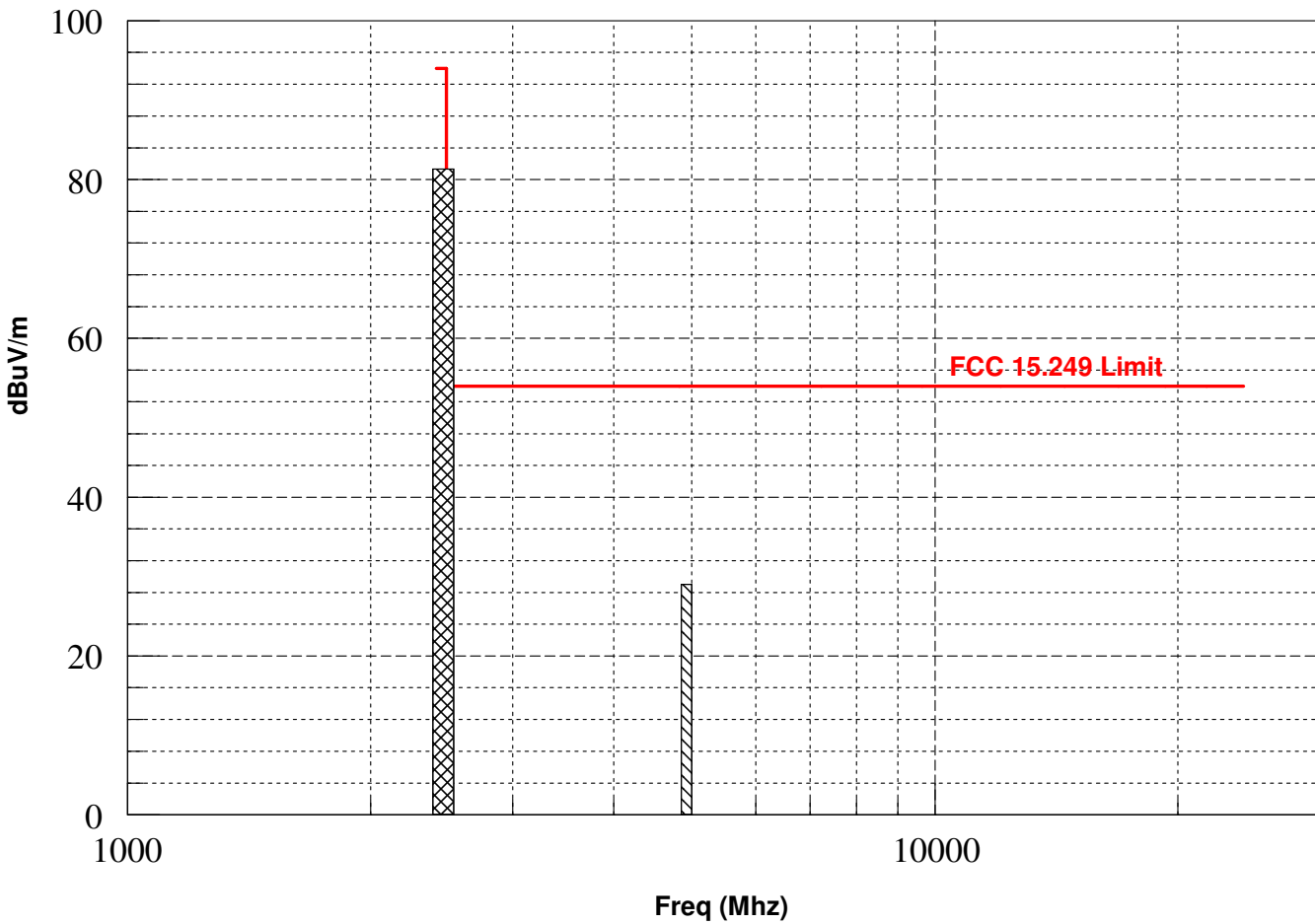
September 18, 2009

High Frequency Channel Harmonics:

Freq. (MHz)	Peak (dBuV/m)	AVG uV/m	AVG (dBuV/m)		Corr Peak (dBuV/m)	Corr AVG (dBuV/m)	FCC 15.249 LIMIT (dBuV/m)	Margin
2462	Fundamental		68.56		95.476	81.3362	93.979	
4924	12.7	4.47	13.00615		28.713	29.01975	53.979	-24.96

No signals were observed within 20 dB of the limit above 4924 Mhz.

North Pole Engineering, Inc.
 Model: WL10-GC with PC Board Chip Antenna
 FCC 15.249 Channel # 11
 Radiated Harmonic Emissions



International Certification Services, Inc.

September 18, 2009

FCC 15.249 (b): N/A

FCC 15.249 (c) All radiated Emissions tests were performed at an antenna distance of 3 meters.

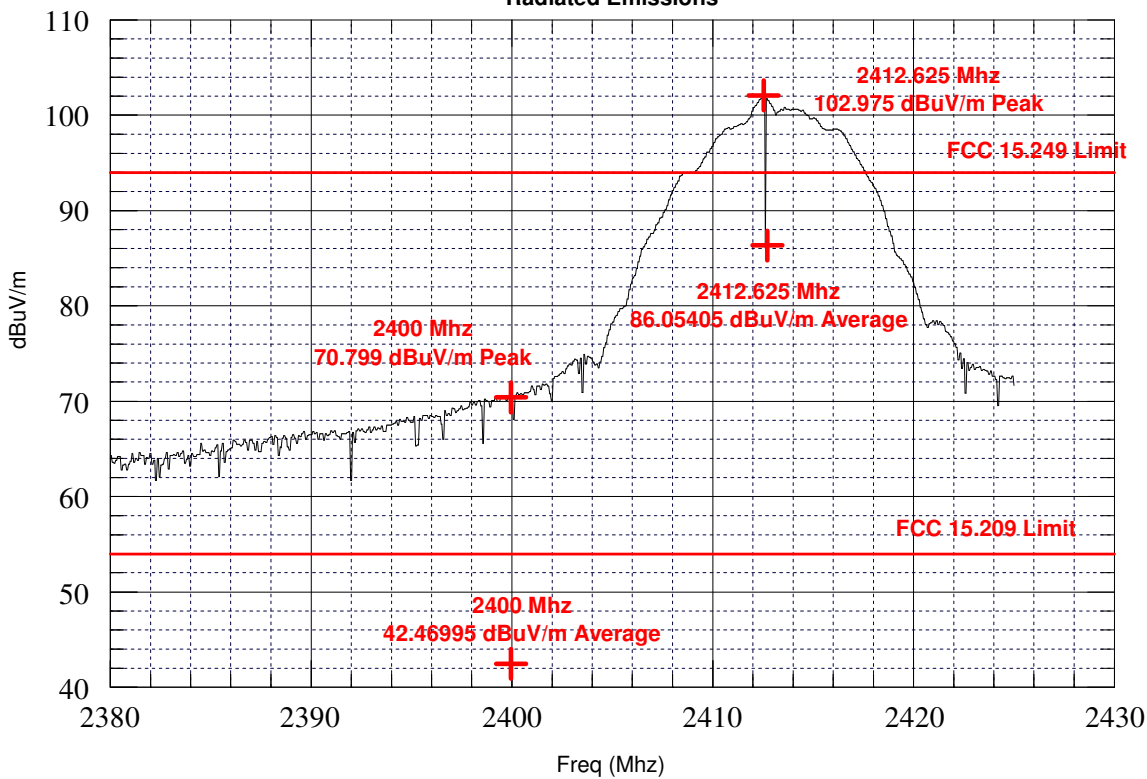
FCC 15.249 (d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.

NOTE: No signals were observed below the fundamental frequency. Also no signals were observed in the restricted bands above 2310 Mhz.

Model: WL10-GS: External SMA antenna

Lower Band Edge:

North Pole Engineering, Inc.
Model: WL10-GS with external Antenna
FCC 15.249 Channel #1 Band Edge
Radiated Emissions



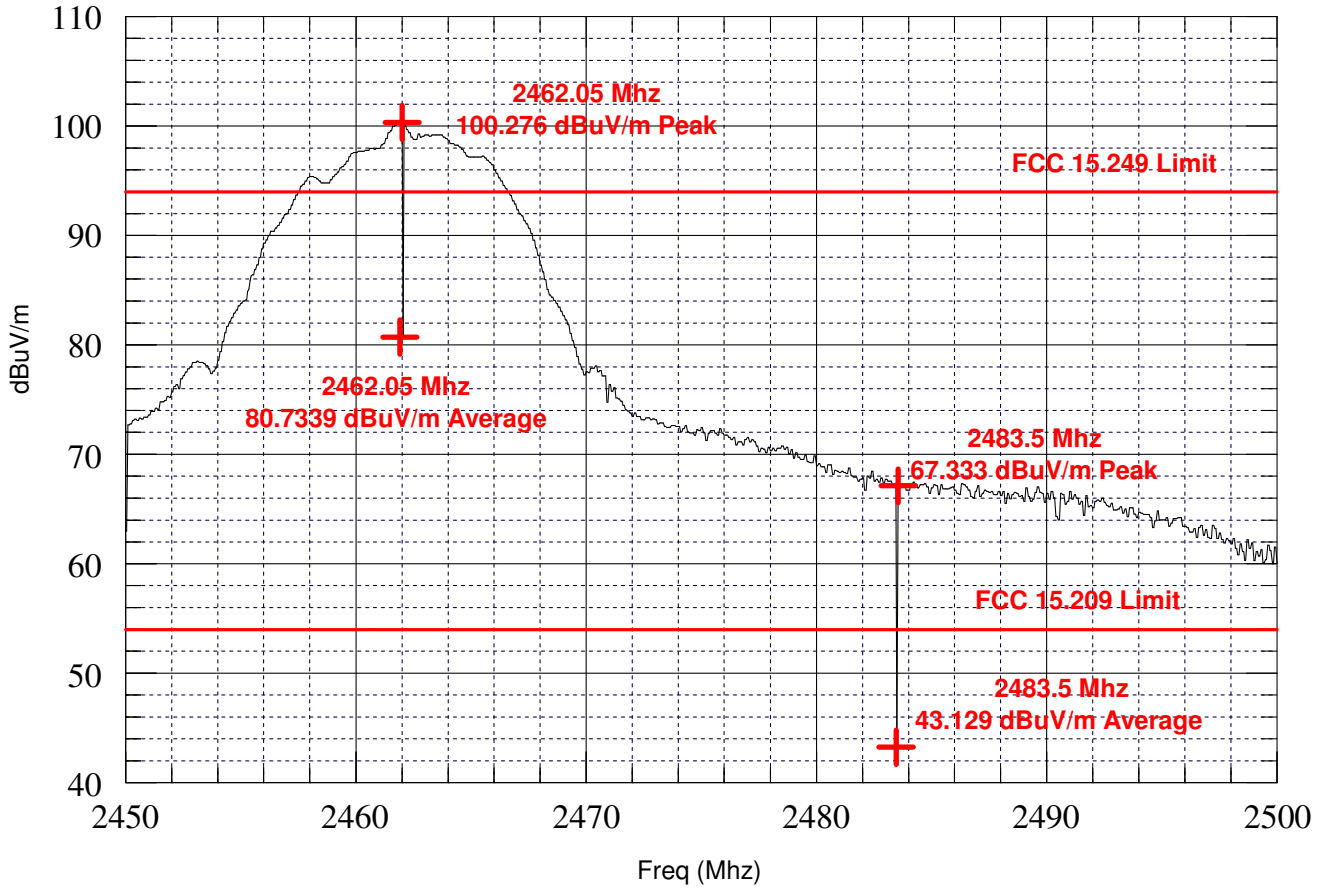
International Certification Services, Inc.

September 15, 2009

FCC 15.249 (d) (Continued)

Upper Band Edge:

North Pole Engineering, Inc.
Model: WL10-GS with external Antenna
FCC 15.249 Channel #11 Band Edge
Radiated Emissions



International Certification Services, Inc.

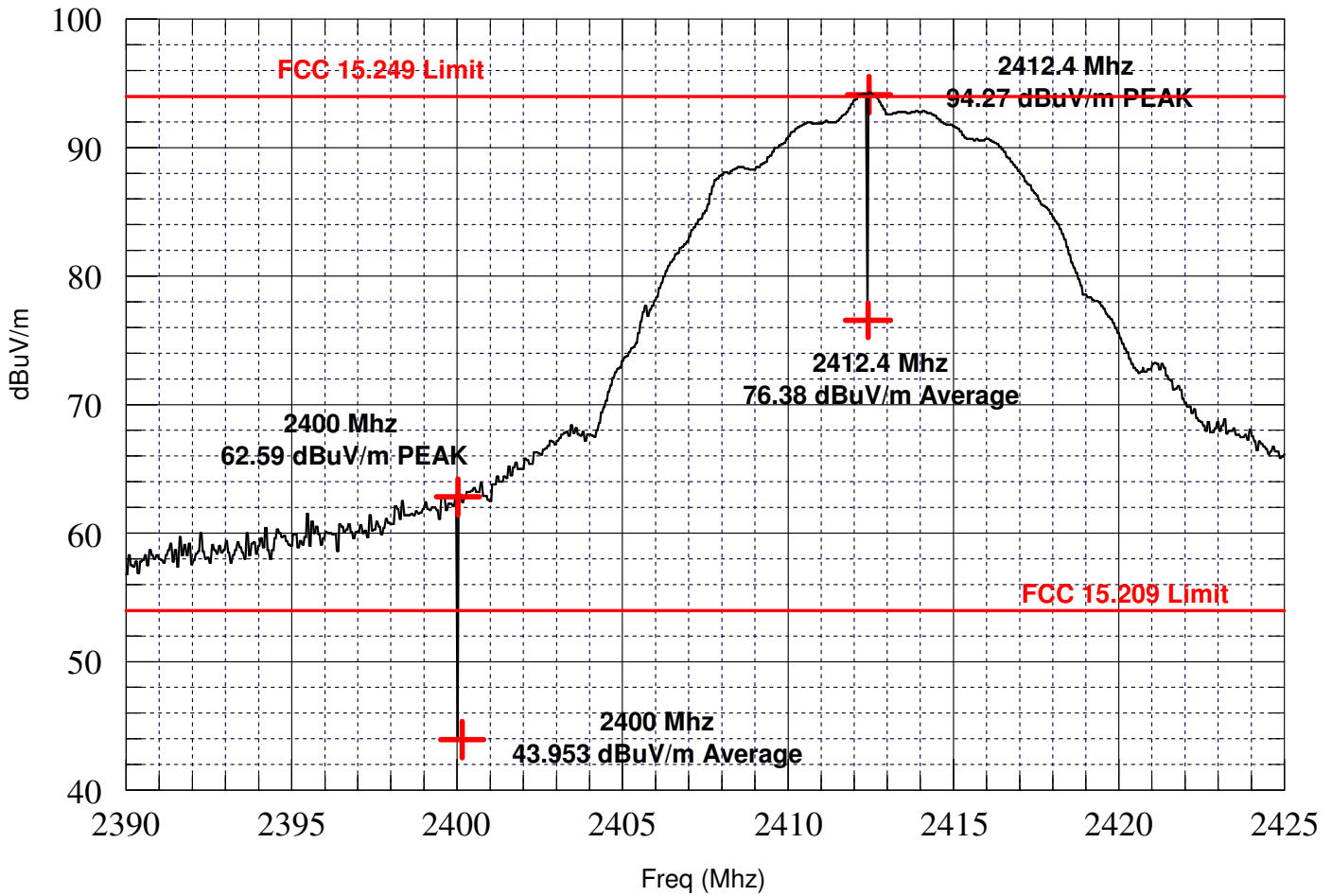
September 15, 2009

FCC 15.249 (d) (Continued)

Model: WL10-GC: On Board CHIP antenna

Lower Band Edge:

North Pole Engineering, Inc.
Model: WL10-GC with Chip Antenna
FCC 15.249 Channel #1 Band Edge
Radiated Emissions



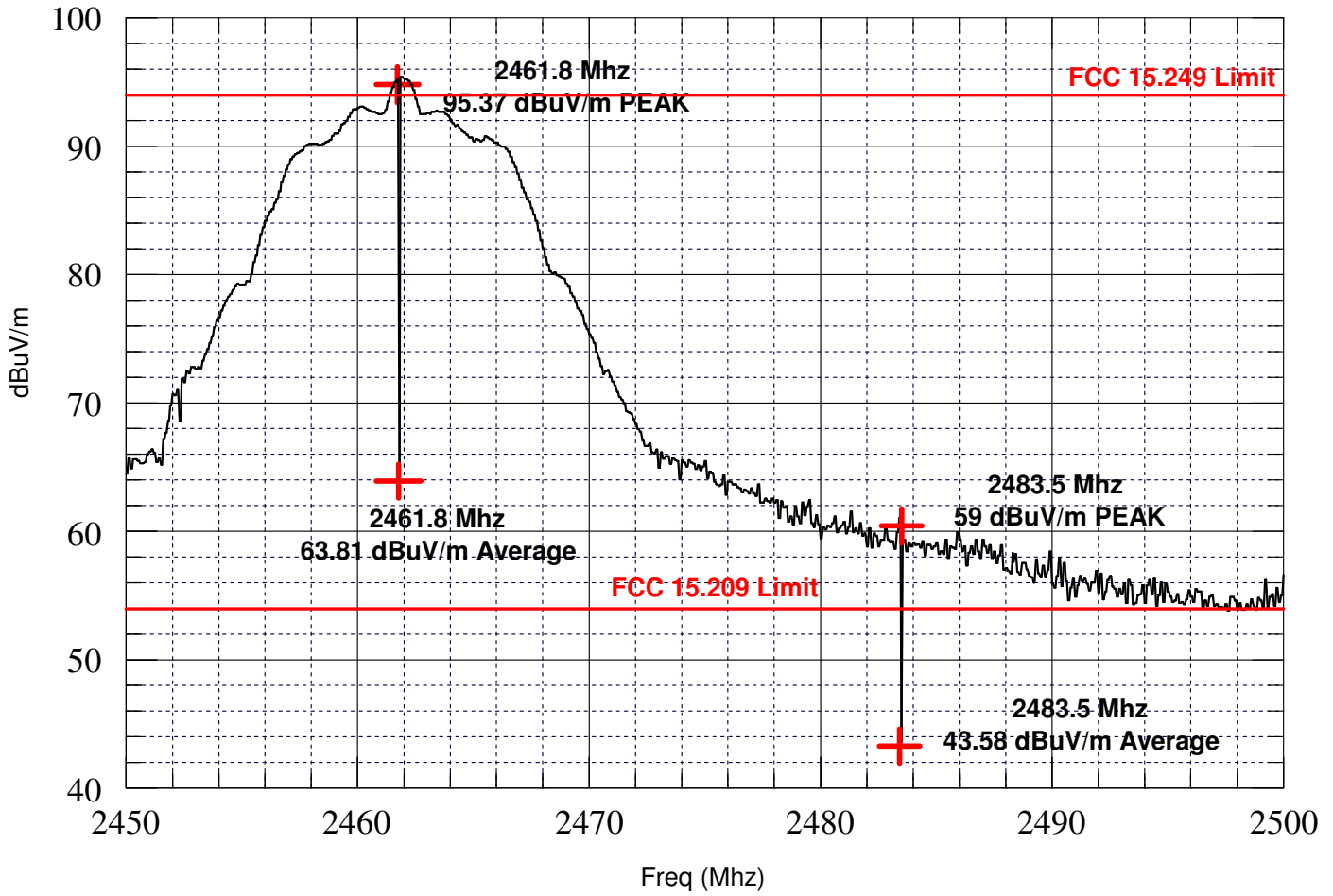
International Certification Services, Inc.

21-Sept-2009

FCC 15.249 (d) (Continued)

Upper Band Edge:

North Pole Engineering, Inc.
Model: WL10-GC with Chip Antenna
FCC 15.249 Channel #11 Band Edge
Radiated Emissions



International Certification Services, Inc.

21-Sept-2009

FCC 15.249 (d) (Continued)

Model: WL10-GS: External SMA antenna

FCC 15.205 Restricted Band Emissions: Channel # 1, 6, 11

The RF spectrum in the bands of 4500 to 5150 Mhz, 7250 to 7750 Mhz, 10600 to 12700 Mhz, 14470 to 14500 Mhz, 17700 to 21400 Mhz and 22010 to 23120 Mhz were observed and no signals were detected within 20 dB of the allowed limit of FCC 15.209 (53.979 dBuV/m at 3 meters)

Channel #1:

EUT Frequency (Mhz)	Restricted Band (Mhz)
2412	
4824	4500-5150
7236	
9648	
12060	10600-12700
14472	14470-14500
16884	
19296	17700-21400
21708	
24120	

Channel #6:

EUT Frequency (Mhz)	Restricted Band (Mhz)
2437	
4874	4500-5150
7311	7250-7750
9748	
12185	10600-12700
14622	
17059	
19496	17700-21400
21933	
24370	

Channel #11:

EUT Frequency (Mhz)	Restricted Band (Mhz)
2462	
4924	4500-5150
7386	7250-7750
9848	
12310	10600-12700
14772	
17234	
19696	17700-21400
22158	22010-23120
24620	

Model: WL10-GC: On Board CHIP antenna

FCC 15.205 Restricted Band Emissions: Channel # 1, 6, 11

The RF spectrum in the bands of 4500 to 5150 Mhz, 7250 to 7750 Mhz, 10600 to 12700 Mhz, 14470 to 14500 Mhz, 17700 to 21400 Mhz and 22010 to 23120 Mhz were observed and no signals were detected within 20 dB of the allowed limit of FCC 15.209 (53.979 dBuV/m at 3 meters)

Channel #1:

EUT Frequency (Mhz)	Restricted Band (Mhz)
2412	
4824	4500-5150
7236	
9648	
12060	10600-12700
14472	14470-14500
16884	
19296	17700-21400
21708	
24120	

Channel #6:

EUT Frequency (Mhz)	Restricted Band (Mhz)
2437	
4874	4500-5150
7311	7250-7750
9748	
12185	10600-12700
14622	
17059	
19496	17700-21400
21933	
24370	

Channel #11:

EUT Frequency (Mhz)	Restricted Band (Mhz)
2462	
4924	4500-5150
7386	7250-7750
9848	
12310	10600-12700
14772	
17234	
19696	17700-21400
22158	22010-23120
24620	

FCC 15.249 (e):

Model: WL10-GS: External SMA antenna

Channel	Frequency (Mhz)	Amplitude (dBuV/m) Peak Detected	FCC 15.35 (b) Max Peak Limit (Avg + 20 dB) (dBuV/m)
Low Channel	2412.88	103.5754	113.98
Mid Channel	2437.115	100.7258	113.98
High Channel	2461.92	100.3762	113.98

Model: WL10-GC: On Board CHIP antenna

Channel	Frequency (Mhz)	Amplitude (dBuV/m) Peak Detected	FCC 15.35 (b) Max Peak Limit (Avg + 20 dB) (dBuV/m)
Low Channel	2411.78	95.57644	113.98
Mid Channel	2437.08	94.22577	113.98
High Channel	2461.84	95.476	113.98

FCC 15.212 Modular Transmitters:

15.212 (a)

This EUT is a Single Modular Transmitter. It is self contained and is installed in a Host device that provides power and interface signals to it.

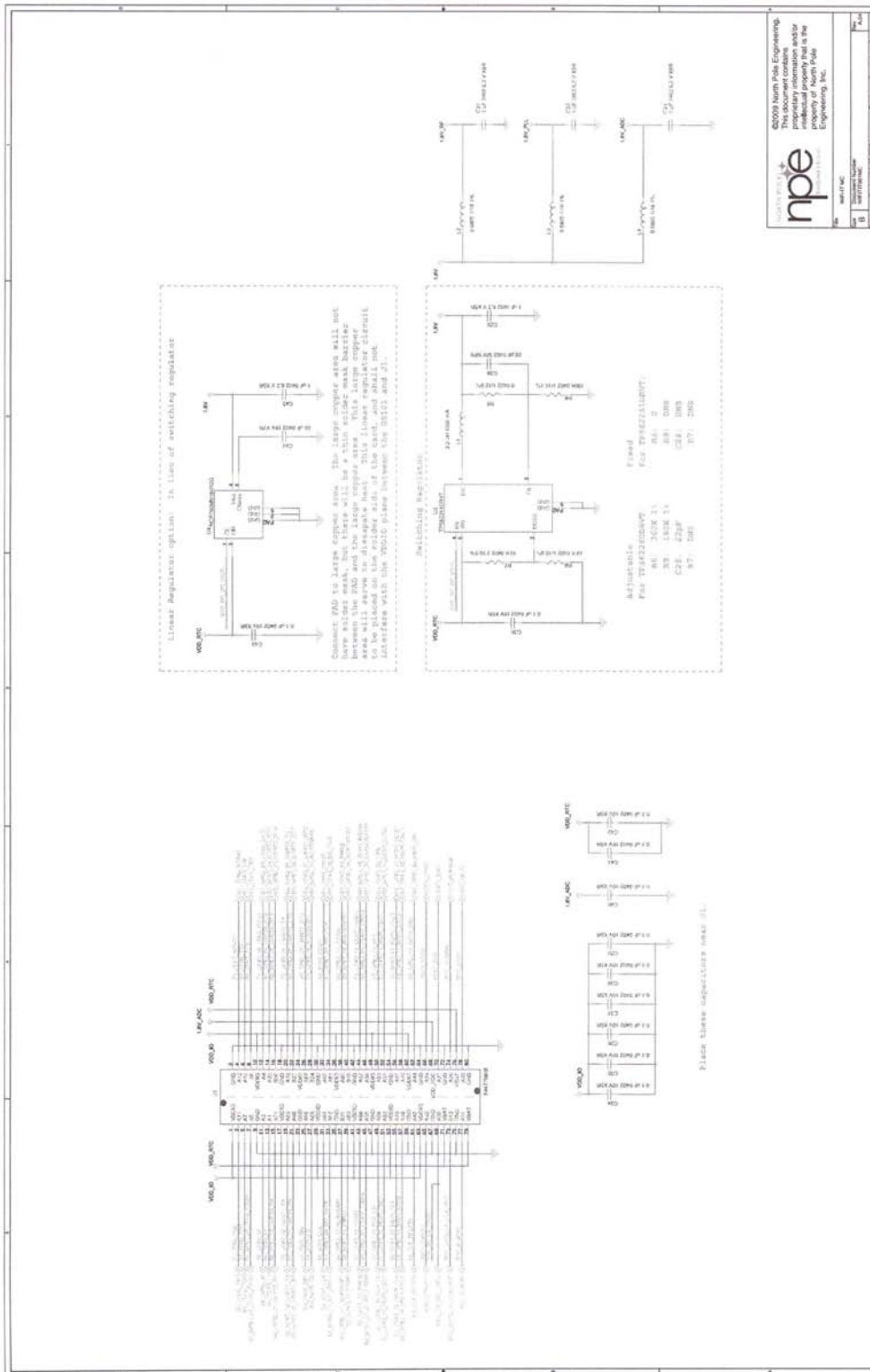
15.212 (a) (1) Requirements for Single Modular Transmitters:

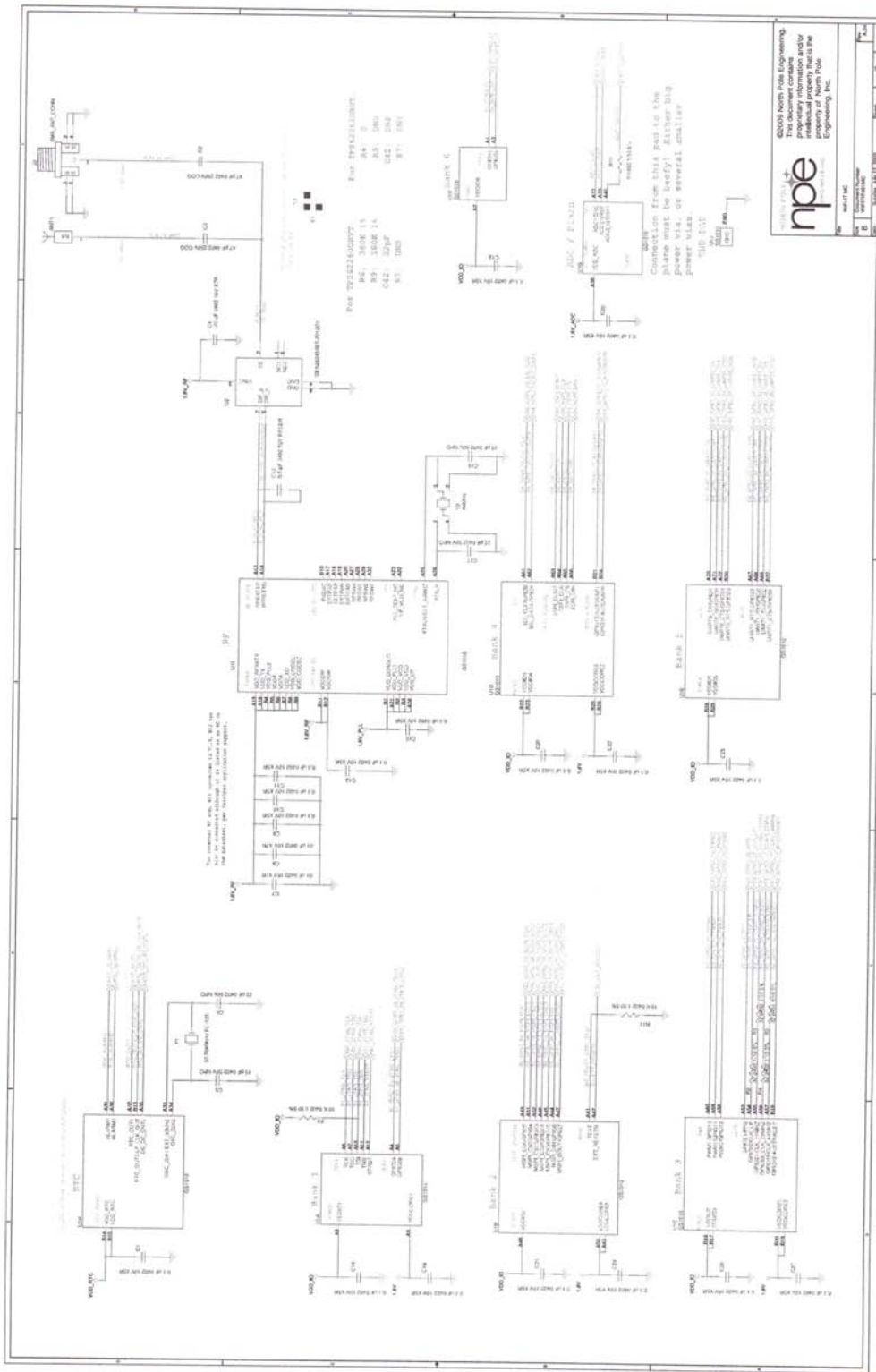
(i) The radio elements of the modular transmitter are covered by a metal shield that is grounded on the board.



(ii) The modular transmitter has buffered modulation/data inputs and the data rates and modulation are controlled by internal firmware of the Gainspan GS1010 transmitting chip.

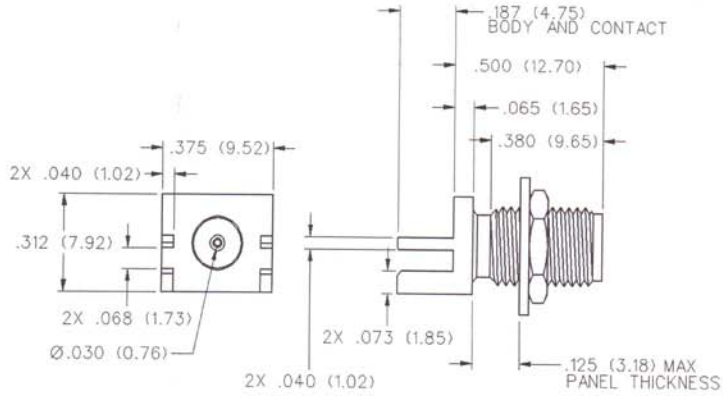
(iii) The modular transmitter has its own power supply regulation. See drawings below.





(iv) The EUT has a unique reverse polarity SMA antenna connector. See attached drawing of the component.

SMA 50 Ohm Reverse Polarity End Launch Bulkhead Jack Receptacle



GOLD PLATED	NICKEL PLATED	BOARD THICKNESS
142-4701-801	142-4701-806	.062 (1.57)

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SMA Reverse Polarity - 50 Ohm

Specifications



ELECTRICAL RATINGS

Impedance: 50 ohms

Frequency Range:

Flexible cable connectors 0-12.4 GHz

Uncabled receptacles 0-18.0 GHz

VSWR: (f = GHz)

	Straight Cabled Connectors	Right Angle Cabled Connectors
RG-316, LMR-100 cable	1.15 + .02f	1.15 + .03f
RG-58, LMR-195 cable	1.17 + .025f	1.17 + .06f
RG-142 cable	1.17 + .02f	1.15 + .03f
LMR-200, LMR-240 cable	1.10 + .03f	1.10 + .06f
Uncabled receptacles	N/A	

Working Voltage: (Vrms maximum)†

Connectors for Cable Type	Sea Level	70K Feet
RG-316; LMR-100, 195, 200	250	65
RG-58, RG-142, LMR-240, uncabled receptacles	335	85

Dielectric Withstanding Voltage: (VRMS minimum at sea level)†

Connectors for RG-316; LMR-100, 195, 200 750

Connectors for RG-58, RG-142, LMR-240, uncabled receptacles 1000

Corona Level: (Volts minimum at 70,000 feet)*

Connectors for RG-316, LMR-100, 195, 200 190

Connectors for RG-58, RG-142, LMR-240, uncabled receptacles ... 250

Insertion Loss: (dB maximum)

Straight flexible cable connectors	$0.06 \sqrt{f}$ (GHz), tested at 6 GHz
Right angle flexible cable connectors	$0.15 \sqrt{f}$ (GHz), tested at 6 GHz
Low loss flexible straight cable connectors	$0.06 \sqrt{f}$ (GHz), tested at 1 GHz
Low loss flexible right angle cable connectors	$0.15 \sqrt{f}$ (GHz), tested at 1 GHz
Uncabled receptacles, field replaceable	N/A

Insulation Resistance: 5000 megohms minimum

Contact Resistance: (milliohms maximum)

	Initial	After Environmental
Center contact (straight cabled connectors and uncabled receptacles)	3.0*	4.0*
Center contact (right angle cabled connectors)	4.0	6.0
Outer contact (all connectors)	2.0	N/A
Braid to body (gold plated connectors)	0.5	N/A
Braid to body (nickel plated connectors)	5.0	N/A

RF Leakage: (dB minimum, tested at 2.5 GHz)

Flexible cable connectors -60 dB

Uncabled receptacles and adapters N/A

RF High Potential Withstanding Voltage: (Vrms minimum, tested at 4 and 7 MHz)†

Connectors for RG-316; LMR-100, 195, 200 500

Connectors for RG-58, RG-142, LMR-240, uncabled receptacles ... 670

MECHANICAL RATINGS

Engagement Design: MIL-C-39012, Series SMA

Engagement/Disengagement Force: 2 inch-pounds maximum

Mating Torque: 7 to 10 inch-pounds

Bulkhead Mounting Nut Torque: 15 inch-pounds

Coupling Proof Torque: 15 inch-pounds minimum

Coupling Nut Retention: 60 pounds minimum

Contact Retention:

6 lbs. minimum axial force (captivated contacts)

4 inch-ounce minimum torque (uncabled receptacles)

Cable Retention: Axial Force* Torque

(pounds) (in-oz)

Connectors for RG-316, LMR-100 20 N/A

Connectors for LMR195, 200 30 N/A

Connectors for RG-58, LMR-240 40 N/A

Connectors for RG-142 45 N/A

*Or cable breaking strength whichever is less.

Durability: 500 cycles minimum

ENVIRONMENTAL RATINGS (Meets or exceed the applicable paragraph of MIL-C-39012)

Temperature Range: - 65°C to + 165°C

Thermal Shock: MIL-STD-202, Method 107, Condition B

Corrosion: MIL-STD-202, Method 101, Condition B

Shock: MIL-STD-202, Method 213, Condition I

Vibration: MIL-STD-202, Method 204, Condition D

Moisture Resistance: MIL-STD-202, Method 106

MATERIAL SPECIFICATIONS

Bodies: Brass per QQ-B-626, gold plated* per MIL-G-45204 .00001* min. or nickel plated per QQ-N-290

Contacts: Male - brass per QQ-B-626, gold plated per MIL-G-45204 .00003* min.

Female - beryllium copper per QQ-C-530, gold plated per MIL-G-45204 .00003* min.

Nut Retention Spring: Beryllium copper per QQ-C-533. Unplated

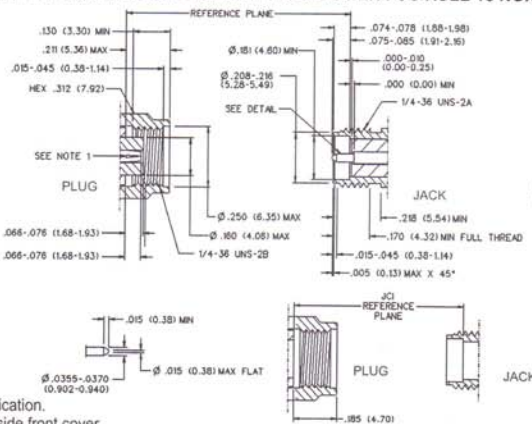
Insulators: PTFE fluorocarbon per ASTM D 1710 and ASTM D 1457 or Tefzel per ASTM D 3159

Expansion Caps: Brass per QQ-B-613, gold plated per MIL-G-45204 .00001* min. or nickel plated per QQ-N-290

Crimp Sleeves: Copper per WW-T-799 or brass per QQ-B-613, gold plated per MIL-G-45204 .00001* min. or nickel plated per QQ-N-290

Mounting Hardware: Brass per QQ-B-626 or QQ-B-613, gold plated per MIL-G-45204 .00001* min. or nickel plated per QQ-N-290

MATING ENGAGEMENT FOR SMA REVERSE POLARITY SERIES PER FCC RULE 15 NON-STANDARD INTERFACE

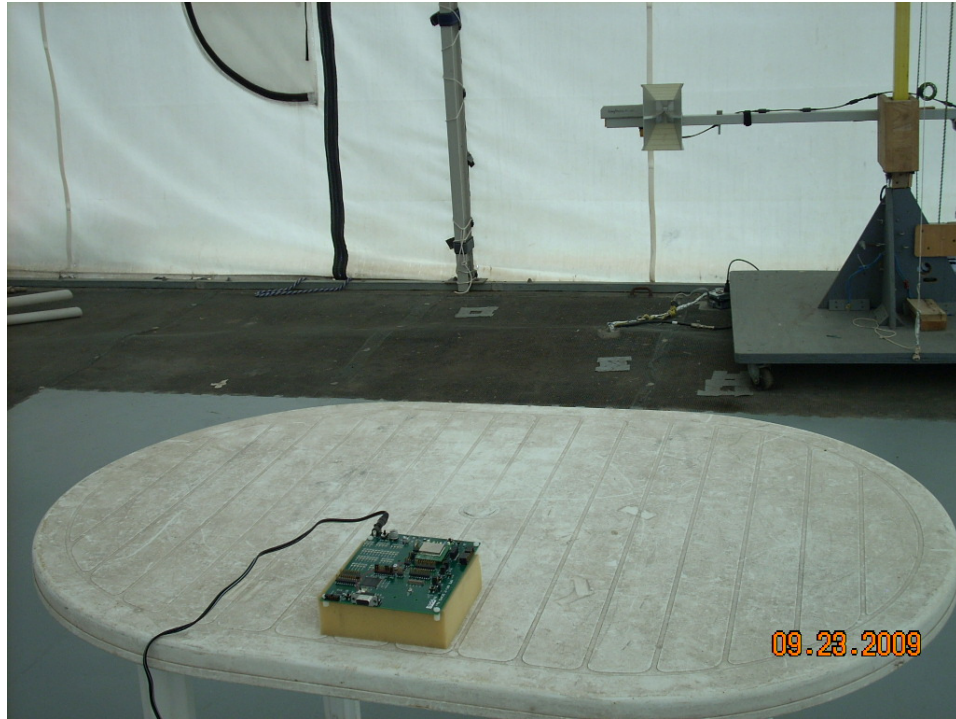


NOTES
1. ID OF CONTACT TO MEET VSWR, CONTACT RESISTANCE AND INSERTION WITHDRAWAL FORCES WHEN MATED WITH DIA .0355-.0370 MALE PIN.

†Avoid user injury due to misapplication. See safety advisory definitions inside front cover.

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(v) The modular transmitter was tested in a standalone configuration. See photo below.



(vi) The modular transmitter is labeled with a permanently affixed label. See photo.



(vi)(A) The EUT is labeled with a permanently affixed label and since after this module is installed typically this label will not be visible, the manufacturer provides instructions to the user for affixing a proper label to the outside of the host device. See photo.



WiFi-IT MODULE PLACEMENT

The WiFi-IT module is available in two antenna configurations; internal chip antenna (WL10-GC) and SMA antenna (WL10-GS) configuration. When using the WL10-GC care must be taken to minimize signal loss. The chip antenna should be clear of any metallic components, copper traces, internal layers and any ground or voltage planes. There should be at least a 5 mm clearance in all directions.

The WL10-GC module should not be enclosed in a metal enclosure.

FCC LABELING INSTRUCTIONS

When installing the WiFi-IT! module into equipment, the module FCC ID number must be visible. If it is not visible then labeling that is clearly visible must be attached to the product stating;

WL10-GS "Contains FCC ID: XRH-1997"
 WL10-GC "Contains FCC ID: XRH-1997"

WiFi-IT MODULE CERTIFICATION

The WiFi-IT! module has been certified by the FCC as a module that may be used in OEM equipment without requiring re-certification as an FCC Class C device. To maintain this certification the WiFi-IT! module must use only one of the two following antennas.

MANUFACTURER	ANTENNA GAIN	PART NUMBER	DESCRIPTION
Taoglas	1.8 DbI	GW.11.A153	84 mm Hinged SMA Reverse Male Straight Connector
Antenna Factor	0.5 DbI	ANT-2.45-CHP-x	2.45GHz Chip Antenna

(vi)(B) Not Applicable

(vii) The manufacturer provides adequate instructions in the operating manual for operating this device. The full manual is an attachment that was submitted to the FCC for this filing for equipment authorization.

(viii) This module is not applied next to the human body therefore no RF exposure requirements are necessary. Not Applicable.

15.212 (a)(2) This EUT is not a Split Modular Transmitter therefore this section is Not Applicable.

15.212 (b) This EUT is fully compliant with the Modular Requirements therefore Limited Modular Approval is Not Applicable.

ATTACHMENT C

**PRODUCT DATA SHEET OR PRODUCT INFORMATION FORM AS SUPPLIED
BY THE CUSTOMER**

COMPANY NAME: North Pole Engineering, Inc

CUSTOMER REPRESENTATIVE: International Certification Services, Inc.

EQUIPMENT DESCRIPTION: Wireless Network Module

MODEL NUMBER: WL10-GS and WL10-GC

SERIAL NUMBER: M16, M19

TYPE OF TEST:

- Development
- Initial Design Verification
- Design Change (as described below)
- Production Sample (Audit Test)

OSCILLATOR FREQUENCIES: 32.768 Khz, 44 Mhz

POWERLINE INTERFACE:

Frequency: DC
Voltage: 3 VDC

POWER SUPPLY: Host Computer

CABINET SHIELDING PROVISION:

None.

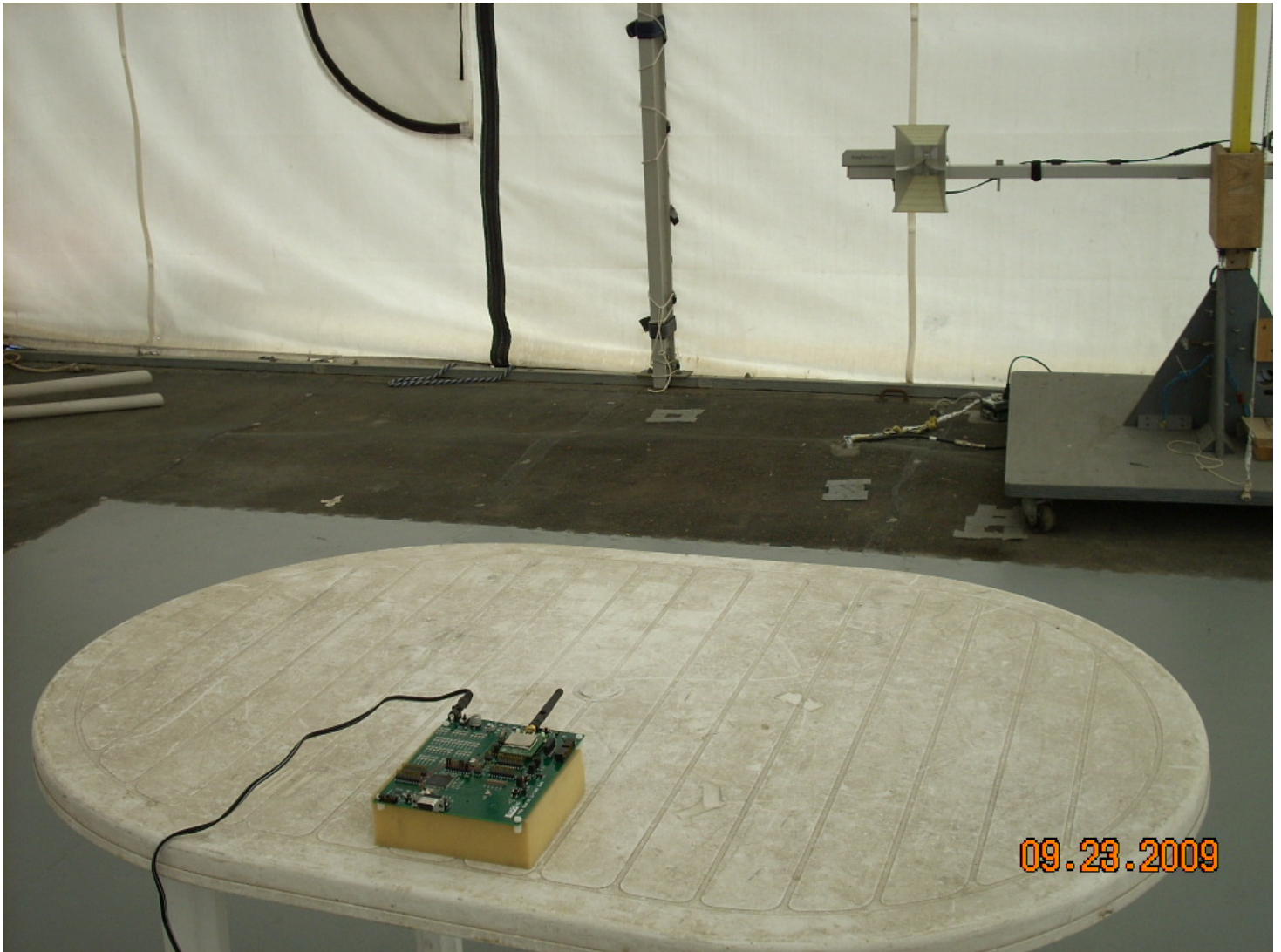
SOFTWARE AND / OR OPERATING MODES:

Microcode Firmware Version 1.0.0

INTERFACING EQUIPMENT OR SIMULATORS: None

I/O CABLES:None

**North Pole Engineering, Inc.
Wireless Network Module Model: WL10-GS
External Antenna
Test Configuration**



**North Pole Engineering, Inc.
Wireless Network Module Model: WL10-GC
PC Board Chip Antenna
Test Configuration**

