Certification Test Report

FCC ID: VEYXMODR1W1

FCC Rule Part: 15.247

ACS Report Number: 13-2019.W04.1A

Manufacturer: xG Technology, Inc.
Model: xMaxW

Test Begin Date: **February 28, 2013**
Test End Date: **April 13, 2013**

Report Issue Date: May 9, 2013

FOR THE SCOPE OF ACCREDITATION UNDER CERTIFICATE NUMBER AT-1533

This report must not be used by the client to claim product certification, approval, or endorsement by ACLASS, ANSI, or any agency of the Federal Government.

Project Manager:

Thierry Jean-Charles
EMC Engineer
Advanced Compliance Solutions, Inc.

Reviewed by:

Kirby Munroe
Director, Wireless Certifications
Advanced Compliance Solutions, Inc.

This report contains 13 pages

TABLE OF CONTENTS

1 GENERAL

1.1 Purpose

The purpose of this report is to demonstrate compliance with Part 15 Subpart C of the FCC's Code of Federal Regulations for a Class II Permissive Change for the specific test requirements described in this document.

The purpose of the Class II Permissive change is to add a new antenna/host to the xG Technology Model xMaxW.

1.2 Manufacturer Information

xG Technology, Inc
7771 West Oakland Park Blvd, Suite 231
Sunrise, FL 33351

1.3 Product Description

The xG Technology Model xMaxW is a complete IEEE 802.11b/g radio solution. The EUT includes all radio components, clocking and regulation for a complete WLAN radio subsystem. The unit is integrated inside of xG technology host device model xMod (FCC ID: VEYXMODR1) which includes an ISM 900 MHz xMax radio transceiver.

Technical Details

Mode of Operation:	WLAN 802.11 b/g
Frequency Range:	2412 MHz – 2462 MHz
Number of Channels:	11
Channel Separation:	5 MHz
Transmit Data Rates:	802.11b: 1, 2, 5.5, and 11Mb/s 802.11g: 6, 9, 12, 18, 24, 36, 48, and 54 Mb/s
Modulations:	802.11b DSSS/CCK, 802.11g OFDM
Antenna Type/Gain:	Flex Dipole Antenna, 3.4 dBi

Model Number: xMaxW

Test Sample Serial Number(s): N/A

Test Sample Condition: The samples were in good conditions with no observable physical damages.

1.4 Test Methodology and Considerations

The model xMaxW was evaluated for radiated emissions with the Molex, Inc. 479502011 2.4/5 GHz flex antenna while integrated inside of host device xMod. The evaluation was performed using the data rates listed as the worst case in the original certification. The radio configurations during the evaluation are reported below:

Mode of Operations	Frequency (MHz)	Channel	Data Rate (Mbps)
802.11b	2412	1	11
	2437	6	
	2462	11	
802.11g	2412	1	54
	2437	6	
	2462	11	

The unit was also evaluated for inter-modulation product emissions generated by simultaneous transmission with the co-located xMax 900 MHz radio. All intermods were found to be compliant to the limits of FCC 15.209.

2 TEST FACILITIES

2.1 Location

The radiated and conducted emissions test sites are located at the following address:

Advanced Compliance Solutions, Inc.
3998 FAU Blvd, Suite 310
Boca Raton, Florida 33431
Phone: (561) 961-5585
Fax: (561) 961-5587
www.acstestlab.com

FCC Test Firm Registration #: 587595
Industry Canada Lab Code: 4175C

2.2 Laboratory Accreditations/Recognitions/Certifications

ACS is accredited to ISO/IEC 17025 by ANSI-ASQ National Accreditation Board under their ACLASS program and has been issued certificate number AT-1533 in recognition of this accreditation. Unless otherwise specified, all test methods described within this report are covered under the ISO/IEC 17025 scope of accreditation.

2.3 Radiated & Conducted Emissions Test Site Description

2.3.1 Semi-Anechoic Chamber Test Site

The EMC radiated test facility consists of an RF-shielded enclosure. The interior dimensions of the indoor semi-anechoic chamber are approximately 48 feet (14.6 m) long by 36 feet (10.8 m) wide by 24 feet (7.3 m) high and consist of rigid, 1/8 inch (0.32 cm) steel-clad, wood core modular panels with steel framing. In the shielded enclosure, the faces of the panels are galvanized and the chamber is self-supporting. 8-foot RF absorbing cones are installed on 4 walls and the ceiling. The steel-clad ground plane is covered with vinyl floor.

The turntable is driven by pneumatic motor, which is capable of supporting a 2000 lb. load. The turntable is flushed with the chamber floor which it is connected to, around its circumference, with a continuous metallic loaded spring. An EMCO Model 1050 Multi-device Controller controls the turntable position.

A pneumatic motor is used to control antenna polarizations and height relative to the ground. The height information is displayed on the control unit EMCO Model 1050.

The control room is an RF shielded enclosure attached to the semi-anechoic chamber with two bulkhead panels for connecting RF, and control cables. The dimension of the room is 7.3 m x 4.9 m x 3 m high and the entrance doors of both control and conducted rooms are 3 feet (0.91 m) by 7 feet (2.13 m).

A diagram of the Semi-Anechoic Chamber Test Site is shown in Figure 2.3.1-1 below:

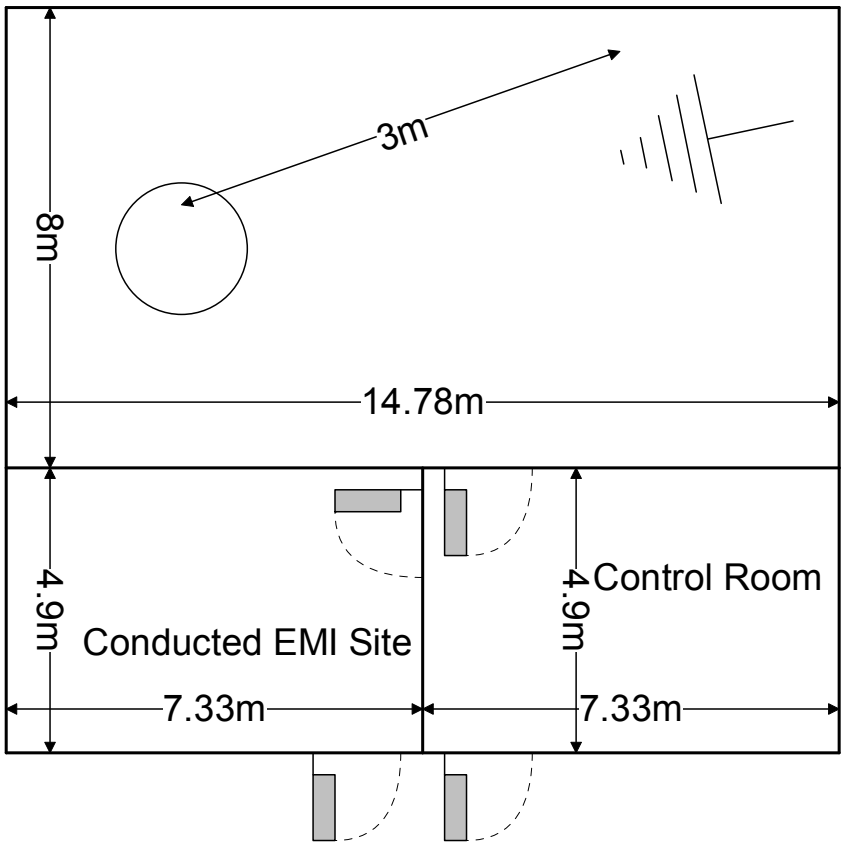


Figure 2.3.1-1: Semi-Anechoic Chamber Test Site

2.3.2 Conducted Emissions Test Site Description

The dimensions of the shielded conducted room are 7.3 x 4.9 x 3 m^3. As per ANSI C63.4 2003 requirements, the data were taken using two LISNs; a Solar Model 8028-50 50 Ω/50 µH and an EMCO Model 3825, which are installed as shown in Photograph 3. For 220 V, 50 Hz, a Polarad LISN (S/N 879341/048) is used in conjunction with a 1 kVA, 50 Hz/220 V EDGAR variable frequency generator, Model 1001B, to filter conducted noise from the generator.

A diagram of the room is shown below in figure 2.3.2-1:

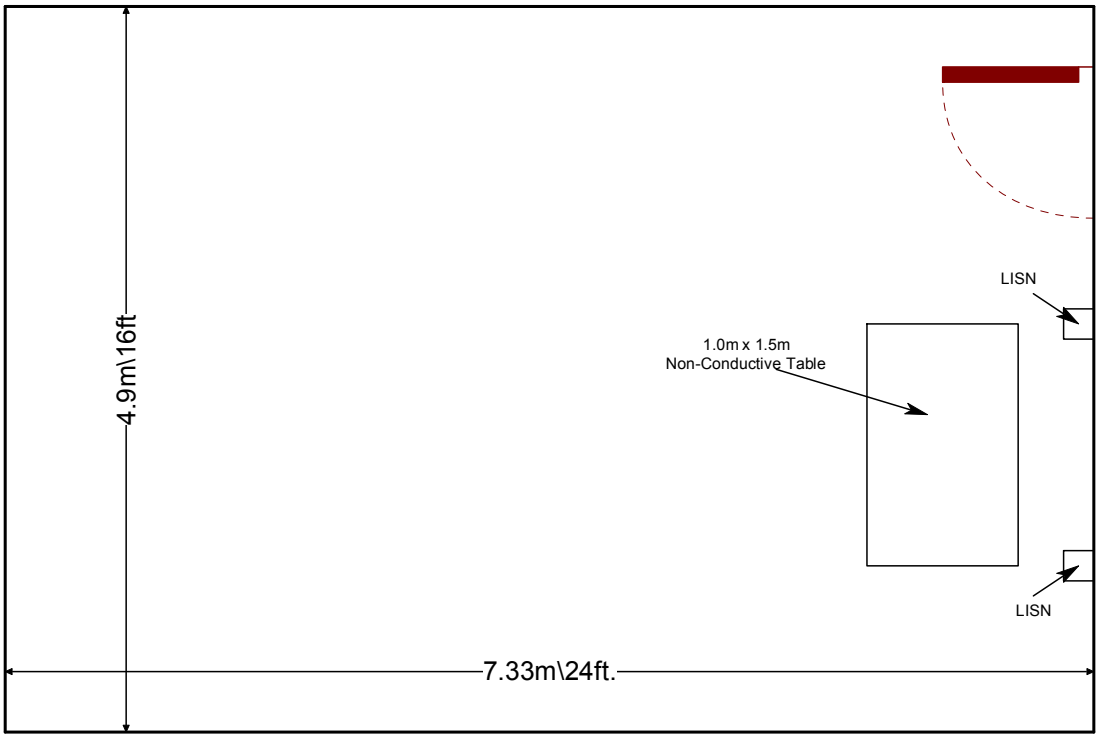


Figure 2.3.2-1: AC Mains Conducted EMI Site

3 APPLICABLE STANDARD REFERENCES

The following standards were used:

- ANSI C63.4-2003: Method of Measurements of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the 9 kHz to 40 GHz.
- ANSI C63.10-2009: American National Standard for Testing Unlicensed Wireless Devices.
- US Code of Federal Regulations (CFR): Title 47, Part 2, Subpart J: Equipment Authorization Procedures, 2013.
- US Code of Federal Regulations (CFR): Title 47, Part 15, Subpart C: Radio Frequency Devices, Intentional Radiators, 2013
- KDB Publication No. 558074 D01 DTS Meas Guidance v03r01 – Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under 15.247, April 9, 2013.

4 LIST OF TEST EQUIPMENT

The calibration interval of test equipment is annually or the manufacturer's recommendations. Where the calibration interval deviates from the annual cycle based on the instrument manufacturer's recommendations, it shall be stated below.

Table 4-1: Test Equipment

AssetID	Manufacturer	Model #	Equipment Type	Serial #	Last Calibration Date	Calibration Due Date
523	Agilent	E7405	Spectrum Analyzers	MY45103293	1/8/2013	1/8/2015
524	Chase	CBL6111	Antennas	1138	1/7/2013	1/7/2015
2007	EMCO	3115	Antennas	2419	1/18/2012	1/18/2014
2008	COM-Power	AH-826	Antennas	81009	NCR	NCR
2011	Hewlett-Packard	HP 8447D	Amplifiers	2443A03952	12/31/2012	12/31/2013
2037	ACS Boca	Chamber EMI Cable Set	Cable Set	2037	1/1/2013	1/1/2014
2044	QMI	N/A	Cables	2044	12/31/2012	12/31/2013
2070	Mini Circuits	VHF-8400+	Filter	2070	12/31/2012	12/31/2013
2072	Mini Circuits	VHF-3100+	Filter	30737	12/31/2012	12/31/2013
2076	Hewlett Packard	HP5061-5458	Cables	2076	12/29/2012	12/29/2013
2086	Merrimac	FAN-6-10K	Attenuators	23148-83-1	12/29/2012	12/29/2013
2089	Agilent Technologies, Inc.	83017A	Amplifiers	3123A00214	12/20/2012	12/20/2013
2091	Agilent Technologies, Inc.	8573A	Spectrum Analyzers	2407A03233	12/12/2011	12/12/2013
2095	ETS Lindgren	TILE4! - Version 4.2.A	Software	85242	NCR	NCR

NCR=No Calibration Required

5 SUPPORT EQUIPMENT

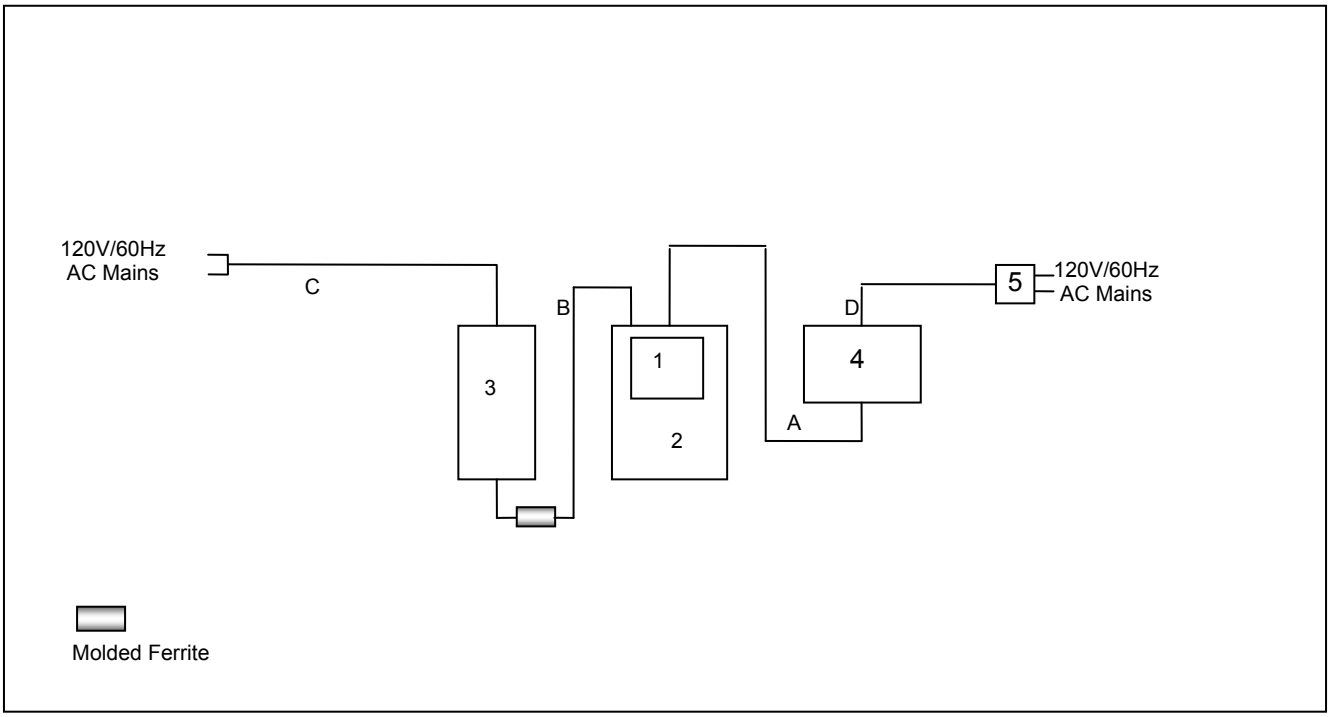
Table 5-1: EUT and Support Equipment

Item #	Type Device	Manufacturer	Model/Part #	Serial #
1	EUT	XG Technology	xMaxW	N/A
2	Host	XG Technology	xMod	ACS#23
3	EUT Power Supply	V-Infinity	ETSA190342UD	N/A
4	Ethernet Switch	NetGear	FS105	FS15A09005405
5	Ethernet Switch Power Supply	NetGear	YP-040	N/A

Table 5-2: Cable Description

Cable #	Cable Type	Length	Shield	Termination
A	Ethernet Cable	1.5m	No	EUT Ethernet Switch
B	Power supply cable	1.83m	No	EUT to Power Supply
C	Power Cable	1.8m	No	Power Supply to AC Mains
D	Power Supply Cable	1.87m	No	Ethernet Switch to Power Supply

6 EQUIPMENT UNDER TEST SETUP BLOCK DIAGRAM



7 SUMMARY OF TESTS

Along with the tabular data shown below, plots were taken of all signals deemed important enough to document.

7.1 Antenna Requirement – FCC: Section 15.203

The xMaxW WLAN module uses a u. FL. connector provided by the DPM Board of the host device. The antenna is stuck to the plastic enclosure of the host device, thus meeting the requirements of FCC 15.203.

7.2 Radiated Spurious Emissions - FCC Section 15.205

7.2.1.1 Measurement Procedure

Radiated emissions tests were made over the frequency range of 30 MHz to 26 GHz, 10 times the highest fundamental frequency.

The EUT was rotated through 360° and the receive antenna height was varied from 1m to 4m so that the maximum radiated emissions level would be detected. For frequencies below 1000MHz, quasi-peak measurements were made using a resolution bandwidth RBW of 120 kHz and a video bandwidth VBW of 300 kHz. For frequencies above 1000 MHz, peak measurements are made with RBW of 1 MHz and VBW of 3 MHz. Average measurements are performed in the linear scale using VBW of 30 Hz over a 5 second sweep.

7.2.1.2 Measurement Results

Radiated band-edge and spurious emissions found in the band of 30MHz to 26 GHz are reported in the tables below.

Table 7.2.1-1: Radiated Spurious Emissions Tabulated Data – 802.11b

Frequency (MHz)	Level (dBuV)		Antenna Polarity	Correction Factors	Corrected Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
	pk	Qpk/Avg	(H/V)	(dB)	pk	Qpk/Avg	pk	Qpk/Avg	pk	Qpk/Avg
Low Channel = 2412 MHz										
2390	63.12	47.15	H	-9.27	53.85	37.88	74.0	54.0	20.2	16.1
2390	61.11	47.17	V	-9.27	51.84	37.90	74.0	54.0	22.2	16.1
Middle Channel = 2437 MHz										
4874	46.01	34.79	H	-2.17	43.84	32.62	74.0	54.0	30.2	21.4
4874	46.09	34.35	V	-2.17	43.92	32.18	74.0	54.0	30.1	21.8
19496	42.26	29.93	H	9.42	51.68	39.35	83.5	63.5	31.8	24.1
High Channel = 2462 MHz										
2483.5	61.34	46.55	H	-8.93	52.41	37.62	74.0	54.0	21.6	16.4
2483.5	61.65	46.49	V	-8.93	52.72	37.56	74.0	54.0	21.3	16.4
4924	47.01	33.57	V	-2.12	44.89	31.45	74.0	54.0	29.1	22.6
19696	42.52	29.67	H	10.28	52.80	39.95	83.5	63.5	30.7	23.5

NOTES:

1. Emissions above 10 GHz were measured at a distance of 1m. The limits are corrected accordingly using a distance factor of 20*log(3/1) dB ≈ 9.5 dB.
2. All emissions above 19.7 GHz were attenuated below the limits and the noise floor of the measurement equipment.

Table 7.2.1-2: Radiated Spurious Emissions Tabulated Data – 802.11g

Frequency (MHz)	Level (dBuV)		Antenna Polarity	Correction Factors	Corrected Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
	pk	Qpk/Avg	(H/V)	(dB)	pk	Qpk/Avg	pk	Qpk/Avg	pk	Qpk/Avg
Low Channel = 2412 MHz										
2390	60.25	46.96	H	-9.27	50.98	37.69	74.0	54.0	23.0	16.3
2390	66.97	46.83	V	-9.27	57.70	37.56	74.0	54.0	16.3	16.4
19296	43.11	30.11	H	9.29	52.40	39.40	83.5	63.5	31.1	24.1
Middle Channel = 2437 MHz										
19496	43.36	30.02	H	9.42	52.78	39.44	83.5	63.5	30.7	24.1
High Channel = 2462 MHz										
2483.5	60.61	46.68	H	-8.93	51.68	37.75	74.0	54.0	22.3	16.3
2483.5	62.23	47.64	V	-8.93	53.30	38.71	74.0	54.0	20.7	15.3
19696	42.44	29.47	H	10.28	52.72	39.75	83.5	63.5	30.8	23.7

NOTES:

1. Emissions above 10 GHz were measured at a distance of 1m. The limits are corrected accordingly using a distance factor of 20*log(3/1) dB ≈ 9.5 dB.
2. All emissions above 19.7 GHz were attenuated below the limits and the noise floor of the measurement equipment.

7.2.1.3 Sample Calculation:

$R_C = R_U + CF_T$

Where:

CF_T	=	Total Correction Factor (AF+CA+AG)-DC (Average Measurements Only)
R_U	=	Uncorrected Reading
R_C	=	Corrected Level
AF	=	Antenna Factor
CA	=	Cable Attenuation
AG	=	Amplifier Gain
DC	=	Duty Cycle Correction Factor

Example Calculation: Peak
Corrected Level: 60.25 + (-9.27) = 50.98dBµV/m
Margin: 74 dBµV/m – 50.98 dBµV/m = 23.0 dB

Example Calculation: Average
Corrected Level: 46.96 + (-9.27) = 37.69dBµV/m
Margin: 54 dBµV/m – 37.69 dBµV/m = 16.3 dB

8 CONCLUSION

In the opinion of ACS, Inc., the xMaxW manufactured by xG Technology, Inc. meets the requirements of FCC Part 15 subpart C for the test procedures documented in the test report.

END REPORT