FCC 47 CFR PART 15 SUBPART C

RF Test Report

Applicant	:	AzureWave Technologies, Inc.
Applicant Address	:	8F, No. 94, Baozhong Rd., Xindian,231 Taiwan
Product Type	:	IEEE 802.11 a/b/g/n Wireless LAN and Bluetooth Combo LGA Module
Trade Name	:	AzureWave
Model Number	:	AW-AM691NF
Applicable Standard	:	FCC 47 CFR PART 15 SUBPART C ANSI C63.10:2013
Receive Date	:	Oct. 12, 2015
Test Period	:	Nov. 09, 2015
Issue Date	:	Nov. 11, 2015

Issue by

A Test Lab Techno Corp.
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Taiwan Accreditation Foundation accreditation number: 1330

Revision History

Rev.	Issue Date	Revisions	Revised By
00	Nov. 11, 2015	Initial Issue	

Verification of Compliance

Issued Date: 11/11/2015

Applicant	:	AzureWave Technologies, Inc.
Address Applicant	:	8F, No. 94, Baozhong Rd., Xindian,231 Taiwan
Product Type	:	IEEE 802.11 a/b/g/n Wireless LAN and Bluetooth Combo LGA Module
Trade Name	:	AzureWave
Model Number	:	AW-AM691NF
FCC ID	:	TLZ-AM691NF
EUT Rated Voltage	:	DC 3.3V
Test Voltage	:	120 Vac / 60 Hz
Applicable Standard	:	FCC 47 CFR PART 15 SUBPART C ANSI C63.10:2013
Test Result	:	Complied
Performing Lab.	:	A Test Lab Techno Corp. No. 140-1, Changan Street, Bade District, Taoyuan City 33465, Taiwan (R.O.C) Tel：+886-3-2710188 / Fax：+886-3-2710190 Taiwan Accreditation Foundation accreditation number: 1330 http://www.atl-lab.com.tw/e-index.htm

A Test Lab Techno Corp. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by A Test Lab Techno Corp. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Approved By	: Fly Lu	Reviewed By	: Eric Ou Yang	
(Manager)	(Fly Lu)	(Testing Engineer)	(Eric Ou Yang)	

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1 General Information

1.1 Summary of Test Result

Standard	Item	Result	Remark
15.247			
15.207	AC Power Conducted Emission	N/A	-----
Standard	Item	Result	Remark
15.247			
15.247(d)	Transmitter Radiated Emissions	PASS	-----
15.247(b)(3)	Max. Output Power	N/A	-----
15.247(a)(2)	6dB RF Bandwidth	N/A	-----
15.247(e)	Power Spectral Density	N/A	-----
15.247(d)	Out of Band Conducted Spurious Emission	N/A	-----
15.203	Antenna Requirement	N/A	-----

The test results of this report relate only to the tested sample(s) identified in this report. Manufacturer or whom it may concern should recognize the pass or fail of the test result.

1.2 Measurement Uncertainty

Test Item	Frequency Range	Uncertainty (dB)
Conducted Emission	9kHz ~ 150KHz	2.7
	150kHz ~ 30MHz	2.8
Radiated Emission	30MHz ~ 1000MHz	6.300
	1000MHz ~ 18000MHz	5.474
	18000MHz ~ 26500MHz	5.630
	26500MHz ~ 40000MHz	5.054

2 EUT Description

Applicant	AzureWave Technologies, Inc.		
Applicant Address	8F, No. 94, Baozhong Rd., Xindian,231 Taiwan		
Manufacturer	AzureWave Technologies, Inc.		
Manufacturer Address	8F, No. 94, Baozhong Rd., Xindian,231 Taiwan		
Product Type	IEEE 802.11 a/b/g/n Wireless LAN and Bluetooth Combo LGA Module		
Trade Name	AzureWave		
Model Number	AW-AM691NF		
FCC ID	TLZ-AM691NF		
Class II Permissive Change	Add Platform.		
Operate Freq. Band	Frequency Range (MHz)	Modulation	Channel Bandwidth
IEEE 802.11b	2412 ~ 2462	DSSS	20MHz
IEEE 802.11g	2412 ~ 2462	DSSS+OFDM	20MHz
IEEE 802.11n 2.4GHz 20MHz	2412 ~ 2462	OFDM	20MHz
IEEE 802.11n 2.4GHz 40MHz	2422 ~ 2452	OFDM	40MHz
Antenna Type	PIFA PCB Antenna		
Antenna Gain	2.77 dBi		
Host Information	Product Type: Personal Computer Trade Name: ECS ELITEGROUP Model Name: EF20RA		

3 Test Methodology

3.1. Mode of Operation

Decision of Test ATL has verified the construction and function in typical operation. All the test modes were carried out with the EUT in normal operation, which was shown in this test report and defined as:

Test Mode
Mode 1: Normal operation mode

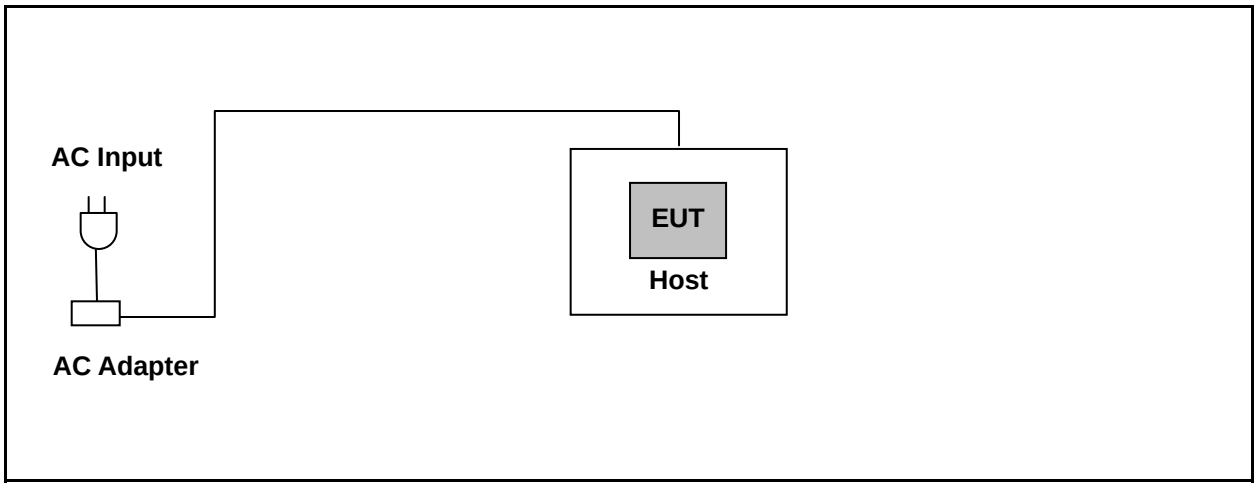
Software used to control the EUT for staying in continuous transmitting mode was programmed.

After verification, all tests were carried out with the worst case test modes as shown below except radiated spurious emission below 1GHz and power line conducted emissions below 30MHz, which worst case was in normal link mode only.

3.2. EUT Exercise Software

1. Setup the EUT shown on 3.3.
2. Turn on the power of all equipment.
3. Turn on Wi-Fi function.
4. EUT run test program.

3.3. Configuration of Test System Details



3.4. Test Site Environment

Items	Required (IEC 60068-1)	Actual
Temperature (°C)	15-35	26
Humidity (%RH)	25-75	60
Barometric pressure (mbar)	860-1060	950

4 Radiated Emission Measurement

4.1. Limit

According to §15.209(a), except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (μV/m at meter)	Measurement Distance (meters)
0.009 – 0.490	2400 / F (kHz)	300
0.490 – 1.705	24000 / F (kHz)	30
1.705 – 30.0	30	30
30 - 88	100**	3
88-216	150**	3
216-960	200**	3
Above 960	500	3

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

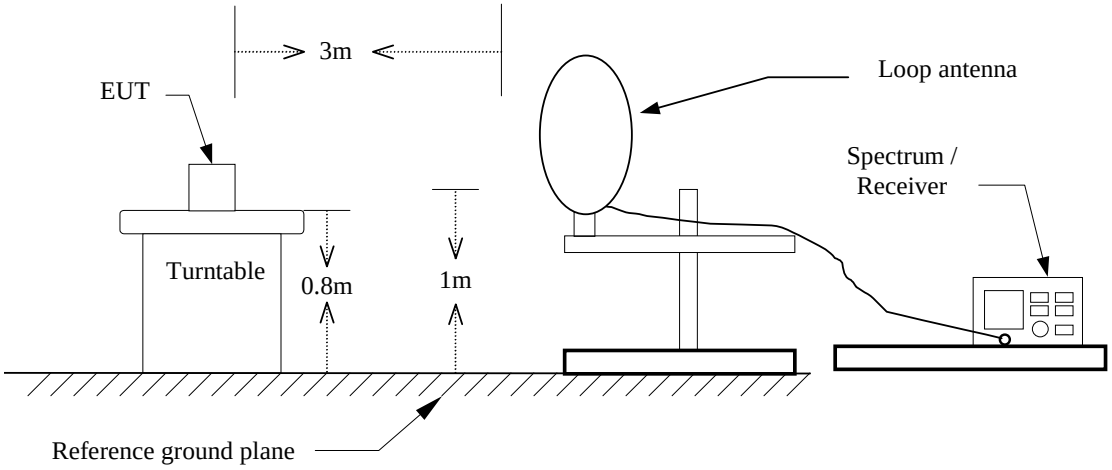
4.2. Test Instruments

3 Meter Chamber					
Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Remark
RF Pre-selector	Agilent	N9039A	MY46520256	01/06/2015	(1)
Spectrum Analyzer	Agilent	E4446A	MY46180578	01/06/2015	(1)
Pre Amplifier	Agilent	8449B	3008A02237	02/24/2015	(1)
Pre Amplifier	Agilent	8447D	2944A10961	02/24/2015	(1)
Broadband Antenna (30MHz~1GHz)	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	9163-270	08/11/2015	(1)
Horn Antenna (1~18GHz)	SCHWARZBECK MESS-ELEKTRONIK	BBHA9120D	9120D-550	06/12/2015	(1)
Horn Antenna (18~40GHz)	SCHWARZBECK MESS-ELEKTRONIK	BBHA9170	9170-320	07/06/2015	(1)
Loop Antenna	COM-POWER CORPORATION	AL-130	121014	02/02/2015	(1)
Microwave Cable	EMCI	EMC-104-SM-SM-14000	140202	02/24/2015	(1)
Microwave Cable	EMCI	EMC104-SM-SM-600	140301	02/24/2015	(1)
Test Site	ATL	TE01	888001	08/27/2015	(1)

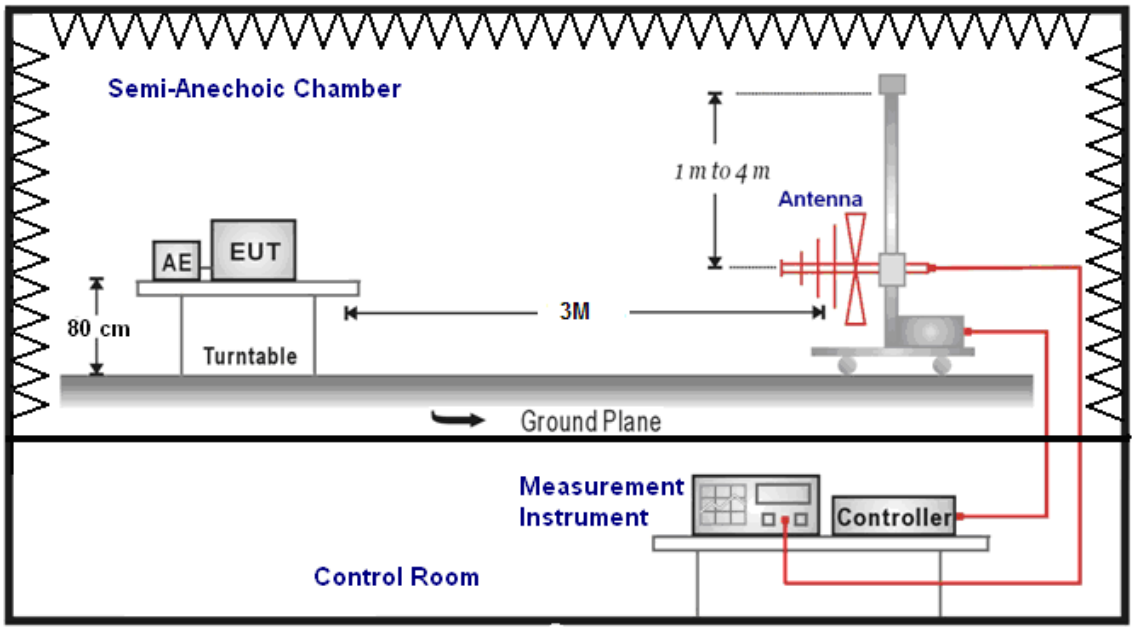
Remark: (1) Calibration period 1 year. (2) Calibration period 2 years. (3) Calibration period 3 years.
Note: N.C.R. = No Calibration Request.

4.3. Setup

9kHz ~ 30MHz



Below 1GHz



4.4. Test Procedure

Final radiation measurements were made on a three-meter, Semi Anechoic Chamber. The EUT system was placed on a nonconductive turntable which is 0.8 or 1.5 meters height(below 1GHz use 0.8m turntabl, top surface 1.0 x 1.5 meter. The spectrum was examined from 250 MHz to 2.5 GHz in order to cover the whole spectrum below 10th harmonic which could generate from the EUT. During the test, EUT was set to transmit continuously & Measurements spectrum range from 9 kHz to 26.5 GHz is investigated.

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

SCHWARZBECK MESS-ELEKTRONIK Biconilog Antenna (mode VULB9163) at 3 Meter and the SCHWARZBECK Double Ridged Guide Antenna (model BBHA9120D&9170) was used in frequencies 1 –26.5 GHz at a distance of 3 meter. The antenna at an angle toward the source of the emission. All test results were extrapolated to equivalent signal at 3 meters utilizing an inverse linear distance extrapolation Factor (20dB/decade).

The spectrum analyzer's 6 dB bandwidth was set to 1 MHz, and the analyzer was operated in the peak detection mode, for frequencies both below and up 1 GHz. The average levels were obtained by subtracting the duty cycle correction factor from the peak readings.

The following procedures were used to convert the emission levels measured in decibels referenced to 1 microvolt (dBuV) into field intensity in micro volts pre meter (uV/m).

The actual field intensity in decibels referenced to 1 microvolt in to field intensity in micro colts per meter (dBuV/m).

The actual field is intensity in referenced to 1 microvolt per meter (dBuV/m) is determined by algebraically adding the measured reading in dBuV, the antenna factor (dB), and cable loss (dB) and Subtracting the gain of preamplifier (dB) is auto calculate in spectrum analyzer.

(1) Amplitude (dBuV/m) = FI (dBuV) +AF (dBuV) +CL (dBuV)-Gain (dB)
FI= Reading of the field intensity.
AF= Antenna factor.
CL= Cable loss.
P.S Amplitude is auto calculate in spectrum analyzer.

(2) Actual Amplitude (dBuV/m) = Amplitude (dBuV)-Dis(dB)
The FCC specified emission limits were calculated according the EUT operating frequency and by following linear interpolation equations:
(a) For fundamental frequency : Transmitter Output < +30dBm
(b) For spurious frequency : Spurious emission limits = fundamental emission limit /10

Data of measurement within this frequency range without mark in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

4.5. Test Result

Below 1GHz

Standard:	FCC Part 15C	Test Distance:	3m
Test item:	Radiated Emission	Power:	AC 120V/60Hz
Model Number:	AW-AM691NF	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	Mode 1	Date:	11/10/2015
		Test By:	Eric Ou Yang

Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Polar. H / V
276.0000	28.59	-9.99	18.60	46.00	-27.40	QP	H
459.0000	32.04	-6.30	25.74	46.00	-20.26	QP	H
596.5000	27.03	-3.84	23.19	46.00	-22.81	QP	H
713.5000	28.03	-2.05	25.98	46.00	-20.02	QP	H
815.0000	25.98	-0.27	25.71	46.00	-20.29	QP	H
898.5000	25.68	1.54	27.22	46.00	-18.78	QP	H
167.0000	37.50	-14.90	22.60	43.50	-20.90	QP	V
359.0000	31.01	-7.37	23.64	46.00	-22.36	QP	V
458.0000	34.99	-6.33	28.66	46.00	-17.34	QP	V
611.0000	31.82	-3.55	28.27	46.00	-17.73	QP	V
711.5000	27.26	-2.11	25.15	46.00	-20.85	QP	V
853.5000	26.04	0.50	26.54	46.00	-19.46	QP	V

Note: No emission found between lowest internal used/generated frequency to 30MHz (9kHz~30MHz).