



Testing Tomorrow's Technology

Application

For

Part 2, Subpart J, Paragraph 2.907 Equipment Authorization of Certification for an Intentional Radiator per Part 15, Subpart C, paragraphs 15.207, 15.209 and 15.249

And

IC Radio Standards Specification: RSS-210 Issue 8, Annex A 2.9

For the

Aglogica Holdings, Inc.

Model: AGL2

FCC ID: 2AIYR-AGL2

IC: 21677-AGL2

UST Project: 16-0105

Issue Date: July 11, 2016

Total Pages in This Report: 38

3505 Francis Circle Alpharetta, GA 30004

PH: 770-740-0717 Fax: 770-740-1508

www.ustech-lab.com



Testing Tomorrow's Technology

I certify that I am authorized to sign for the Test Agency and that all of the statements in this report and in the Exhibits attached hereto are true and correct to the best of my knowledge and belief:

US TECH (Agent Responsible For Test):

By: Alan Ghasiani

Name: *Alan Ghasiani*

Title: Compliance Engineer – President

Date July 13, 2016



NVLAP LAB CODE 200162-0

This report shall not be reproduced except in full. This report may be copied in part only with the prior written approval of US Tech. The results contained in this report are subject to the adequacy and representative character of the sample provided. This report must not be used to claim product certification, approval, or endorsement by NVLAP, NIST or any agency of the Federal Government.

**3505 Francis Circle Alpharetta, GA 30004
PH: 770-740-0717 Fax: 770-740-1508
www.ustech-lab.com**

US Tech Test Report:
FCC ID:
IC:
Test Report Number:
Issue Date:
Customer:
Model:

FCC Part 15 Certification/ RSS 210
2AIYR-AGL2
21677-AGL2
16-0105
July 13, 2016
Aglogica Holdings, Inc.
AGL2

MEASUREMENT TECHNICAL REPORT

COMPANYS NAME: Aglogica Holdings, Inc

MODEL: AGL2

FCC ID: 2AIYR-AGL2

IC: 21677-AGL2

DATE: July 13, 2016

This report concerns (check one): Original grant ☒
Class II change

Equipment type: 2.4 GHz Bluetooth Transmitter Module

Deferred grant requested per 47 CFR 0.457(d)(1)(ii)? yes_____ No X

If yes, defer until: N/A
date

agrees to notify the Commission by N/A
date

of the intended date of announcement of the product so that the grant can be issued on that date.

Report prepared by:

US Tech
3505 Francis Circle
Alpharetta, GA 30004

Phone Number: (770) 740-0717
Fax Number: (770) 740-1508

US Tech Test Report:
FCC ID:
IC:
Test Report Number:
Issue Date:
Customer:
Model:

FCC Part 15 Certification/ RSS 210
2AIYR-AGL2
21677-AGL2
16-0105
July 13, 2016
Aglogica Holdings, Inc.
AGL2

Table of Contents

<u>Paragraph</u>	<u>Title</u>	<u>Page</u>
1	General Information.....	7
1.1	Purpose of this Report.....	7
1.2	Characterization of Test Sample	7
1.3	Product Description	7
1.4	Configuration of Tested System	8
1.5	Test Facility	8
1.6	Related Submittals	8
2	Tests and Measurements	9
2.1	Test Equipment	9
2.2	Modifications to EUT Hardware	10
2.3	Number of Measurements for Intentional Radiators (15.31(m))	10
2.4	Frequency Range of Radiated Measurements (Part 15.33)	11
2.4.1	Intentional Radiator.....	11
2.4.2	Unintentional Radiator	11
2.5	Measurement Detector Function and Bandwidth (CFR 15.35)	11
2.6	EUT Antenna Requirements (CFR 15.203)	13
2.7	Restricted Bands of Operation (Part 15.205).....	14
2.8	Transmitter Duty Cycle (CFR 35 (c))	14
2.9	Intentional Radiator, Power Line Conducted Emissions (CFR 15.207)	16
2.10	Intentional Radiator, Radiated Emissions (CFR 15.209, 15.247(d)) (IC RSS 247, 5.4)	18
2.11	Band Edge Measurements – (CFR 15.247 (d)).....	22
2.12	99% Occupied Bandwidth (IC RSS 247, 5.1 & 5.2).....	29
2.13	Unintentional Radiator, Powerline Emissions (CFR 15.107)	33
2.14	Unintentional Radiator, Radiated Emissions (CFR 15.109).....	35
2.15	Measurement Uncertainty	38
3	Test Outcome	38

US Tech Test Report:
FCC ID:
IC:
Test Report Number:
Issue Date:
Customer:
Model:

FCC Part 15 Certification/ RSS 210
2AIYR-AGL2
21677-AGL2
16-0105
July 13, 2016
Aglogica Holdings, Inc.
AGL2

List of Figures

<u>Figures</u>	<u>Title</u>	<u>Page</u>
Figure 1.	Block Diagram of Test Configuration	13
Figure 2.	Transmitter Pulse Width.....	14
Figure 3.	Band Edge Compliance, Low Channel Delta - Peak.....	23
Figure 4.	Radiated Restricted Band Measurements PK, 2.31 GHz to 2.39 GHz	24
Figure 5.	Radiated Restricted Band Measurements AVG, 2.31 GHz to 2.39 GHz...	25
Figure 6.	Band Edge Compliance, High Channel Delta – Peak	26
Figure 7.	Radiated Restricted Band Measurements PK, 2.4835 GHz to 2.5 GHz ...	27
Figure 8.	Radiated Restricted Measurements AVG, 2.4835 GHz to 2.5 GHz	28
Figure 9.	Twenty dB Bandwidth - IC RSS 247, A8.1– Low Channel	30
Figure 10.	Twenty dB Bandwidth -IC RSS 247, A8.1 – Mid Channel.....	31
Figure 11.	Twenty dB Bandwidth -IC RSS 247, A8.1 – High Channel	32

US Tech Test Report:
FCC ID:
IC:
Test Report Number:
Issue Date:
Customer:
Model:

FCC Part 15 Certification/ RSS 210
2AIYR-AGL2
21677-AGL2
16-0105
July 13, 2016
Aglogica Holdings, Inc.
AGL2

List of Tables

<u>Table</u>	<u>Title</u>	<u>Page</u>
Table 1.	EUT and Peripherals.....	8
Table 2.	Test Instruments	9
Table 3.	Number of Test Frequencies for Intentional Radiators.....	10
Table 4.	Allowed Antenna(s).....	13
Table 5.	Transmitter Power Line Conducted Emissions Test Data, Part 15.207	17
Table 6.	Intentional Radiator, Spurious Radiated Emissions (CFR 15.209),.....	19
Table 7.	Peak Radiated Fundamental & Harmonic Emissions.....	20
Table 8.	Average Radiated Fundamental & Harmonic Emissions	21
Table 9.	Radiated Restricted Band Measurements PK, 2.31 GHz to 2.39 GHz.....	24
Table 10.	Radiated Restricted Band Measurements AVG, 2.31 GHz to 2.39 GHz ..	25
Table 11.	Radiated Restricted Band Measurements PK, 2.4835 GHz to 2.5 GHz...	27
Table 12.	Radiated Restricted Measurements AVG, 2.4835 GHz to 2.5 GHz	28
Table 13.	20 dB Bandwidth and 99% Occupied Bandwidth	29
Table 14.	Transmitter Power Line Conducted Emissions Test Data, Part 15.107 ...	34
Table 15.	Unintentional Radiator, Peak Radiated Emissions (CFR 15.109),	36
Table 16.	Unintentional Radiator, Peak Radiated Emissions (CFR 15.109),	37

List of Attachments

Agency Agreement
Application Forms
Letter of Confidentiality
Equipment Label(s)
Block Diagram(s)
Schematic(s)
Test Configuration Photographs
Internal Photographs
External Photographs
Antenna Photographs
Theory of Operation
User's Manual

US Tech Test Report:
FCC ID:
IC:
Test Report Number:
Issue Date:
Customer:
Model:

FCC Part 15 Certification/ RSS 210
2AIYR-AGL2
21677-AGL2
16-0105
July 13, 2016
Aglogica Holdings, Inc.
AGL2

1 General Information

1.1 Purpose of this Report

This report is prepared as a means of conveying test results and information concerning the suitability of this exact product for public distribution according to the FCC Rules and Regulations Part 15, Section 247 and IC RSS 247 Issue 1.

1.2 Characterization of Test Sample

The samples used for testing were received by US Tech on May 31, June 24, and July 11, 2016 in good operating condition.

1.3 Product Description

The Equipment Under Test (EUT) is the Aglogica Holdings, Inc. AGL Vetrax AGL Sensor, Model AGL2. The AGL2 sensor is a component of the AGL Vetrax™ medical analytics solution. The AGL2 wearable animal sensor collects multi-dimensional sensor, 9 axis, data. The AGL Vetrax analytics system derives animal behaviors from the sensor data – quantifying behaviors such as running, walking, resting, scratching, shaking, etc. AGL Vetrax Veterinarians are able to better track the effectiveness of their medical care programs. Conditions such as geriatric care, obesity, surgical rehabilitation and dermatology issues can all be observed through tracking and monitoring animal behavior.

The EUT incorporates both a Bluetooth LE technology and WiFi technology on the same host board. This test report covers the Bluetooth LE radio only.

The Bluetooth radio features the following:

Antenna Peak Gain: 0.5 dBi (Chip)
Modulation: GFSK
Data Rates: DH1, DH3 and DH5
Maximum Output Power: +7 dBm

US Tech Test Report:
FCC ID:
IC:
Test Report Number:
Issue Date:
Customer:
Model:

FCC Part 15 Certification/ RSS 210
2AIYR-AGL2
21677-AGL2
16-0105
July 13, 2016
Aglogica Holdings, Inc.
AGL2

1.4 Configuration of Tested System

The EUT was tested per *ANSI C63.4:2009/2014, Methods of Measurement of Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz (2009/2014)* for FCC subpart A Digital equipment Verification requirements and per FCC Public Notice DA 00-705 released March 30, 2000 Under section 15.247. Also, FCC, KDB Publication No. DA 00-705 was used as a test procedure guide.

A list of EUT and Peripherals is found in Table 1 below. A block diagram of the tested system is shown in Figure 1. Test configuration photographs are provided in separate Appendices.

1.5 Test Facility

Testing was performed at US Tech's measurement facility at 3505 Francis Circle, Alpharetta, GA 30004. This site has been fully described and registered with the FCC. Its designation number is 186022. Additionally this site has also been fully described and submitted to Industry Canada (IC), and has been approved under file number 9900A-1.

1.6 Related Submittals

The EUT is subject to the following FCC authorizations:

- a) Certification under section 15.247 as a transmitter.
- b) Verification under 15.101 as a digital device and receiver.
- c) Certification under section 15.249 as a transmitter.

Table 1. EUT and Peripherals

PERIPHERAL MANUFACTURER.	MODEL NUMBER	SERIAL NUMBER	FCC ID:	CABLES P/D
Aglogica Holdings, Inc	AGL2	Engineering Sample	FCC ID: 2AIYR-AGL2 (pending) IC: 21677-AGL2 (pending)	N/A
Antenna See antenna details	--	--	--	--

U= Unshielded S= Shielded P= Power D= Data

US Tech Test Report:
 FCC ID:
 IC:
 Test Report Number:
 Issue Date:
 Customer:
 Model:

FCC Part 15 Certification/ RSS 210
 2AIYR-AGL2
 21677-AGL2
 16-0105
 July 13, 2016
 Aglogica Holdings, Inc.
 AGL2

2 Tests and Measurements

2.1 Test Equipment

The table below lists test equipment used to evaluate this product. Model numbers, serial numbers and their calibration status are indicated.

Table 2. Test Instruments

TEST INSTRUMENT	MODEL NUMBER	MANUFACTURER	SERIAL NUMBER	DATE OF LAST CALIBRATION
SPECTRUM ANALYZER	8566B	HEWLETT-PACKARD	2747A05665	5/07/2015 Extended 90 days
SPECTRUM ANALYZER	E4407B	AGILENT	US41442935	2/11/2016
LOOP ANTENNA	SAS-200/562	A.H. Systems	142	9/28/2015 2 yr.
BICONICAL ANTENNA	3110B	EMCO	9306-1708	11/24/2014 2 yr.
LOG PERIODIC ANTENNA	3146	EMCO	9305-3600	7/01/2014 2 yr.
HORN ANTENNA	3115	EMCO	9107-3723	7/08/2014 2 yr.
HORN ANTENNA	3116	EMO	9505-2255	1/27/2015 2 yr.
PRE-AMPLIFIER	8449B	HEWLETT-PACKARD	3008A00480	12/01/2015
PRE-AMPLIFIER	8447E	HEWLETT-PACKARD	1145A00307	12/03/2015
PRE-AMPLIFIER	8447D	HEWLETT-PACKARD	1937A02980	12/02/2015
LISN x 2	8028-50-TS24-BNC	SOLAR ELECTRONICS	910495 and 910494	11/20/2015

Note: The calibration interval of the above test instruments are 12 months unless stated otherwise and all calibrations are traceable to NIST/USA.

US Tech Test Report:
FCC ID:
IC:
Test Report Number:
Issue Date:
Customer:
Model:

FCC Part 15 Certification/ RSS 210
2AIYR-AGL2
21677-AGL2
16-0105
July 13, 2016
Aglogica Holdings, Inc.
AGL2

2.2 Modifications to EUT Hardware

No physical modifications were made by US Tech in order to bring the EUT into compliance with FCC Part 15, Subpart C Intentional Radiator Limits for the transmitter portion of the EUT or the Subpart B Unintentional Radiator Limits (Receiver and Digital Device) Requirements.

2.3 Number of Measurements for Intentional Radiators (15.31(m))

Measurements of intentional radiators or receivers shall be performed and reported for each band in which the device can be operated with the device operating at the number of frequencies in each band specified in Table 3 below.

Table 3. Number of Test Frequencies for Intentional Radiators

Frequency Range over which the device operates	Number of Frequencies	Location in the Range of operation
1 MHz or less	1	Middle
1 to 10 MHz	2	1 near the top 1 near the bottom
Greater than 10 MHz	3	1 near top 1 near middle 1 near bottom

Because the EUT operates from 2400 MHz to 2483.5 MHz, 3 test frequencies were used.

US Tech Test Report:
FCC ID:
IC:
Test Report Number:
Issue Date:
Customer:
Model:

FCC Part 15 Certification/ RSS 210
2AIYR-AGL2
21677-AGL2
16-0105
July 13, 2016
Aglogica Holdings, Inc.
AGL2

2.4 Frequency Range of Radiated Measurements (Part 15.33)

2.4.1 Intentional Radiator

The spectrum shall be investigated for the intentional radiator from the lowest RF signal generated in the EUT, without going below 9 kHz to the 10th harmonic of the highest fundamental frequency generated or 40 GHz, whichever is the lowest.

2.4.2 Unintentional Radiator

For the digital device, an unintentional radiator, the frequency range shall be 30 MHz to 1000 MHz, or up to 5 times the highest internal clock frequency.

2.5 Measurement Detector Function and Bandwidth (CFR 15.35)

The radiated and conducted emissions limits shown herein are based on the following:

Detector Function and Associated Bandwidth:

On frequencies below 1000 MHz, the limits herein are based upon measurement equipment employing a CISPR Quasi-peak detector function and related measurement bandwidths (i.e. 9 kHz from 150 kHz to 30 MHz and 120 kHz from 30 MHz to 1000 MHz). Alternatively, measurements may be made with equipment employing a peak detector function as long as the same bandwidths specified for the Quasi-peak device are used.

Corresponding Peak and Average Requirements:

Above 1000 MHz, radiated limits are based on measuring instrumentation employing an average detector function. When average radiated emissions are specified there is also a corresponding Peak requirement, as measured using a peak detector, of 20 dB greater than the average limit. For all measurements above 1000 MHz the Resolution Bandwidth shall be at least 1 MHz.

US Tech Test Report:
FCC ID:
IC:
Test Report Number:
Issue Date:
Customer:
Model:

FCC Part 15 Certification/ RSS 210
2AIYR-AGL2
21677-AGL2
16-0105
July 13, 2016
Aglogica Holdings, Inc.
AGL2

Pulsed Transmitter Averaging:

When the radiated emissions limit is expressed as an average value, and the transmitter is pulsed, the measured field strength shall be determined by applying a Duty Cycle Correction Factor based upon dividing the total ON time during the first 100 ms period by 100 ms (or by the period if less than 100 ms). The duty cycle may be expressed logarithmically in dB.

NOTE: If the transmitter was programmed to transmit at >98% duty cycle, then, wherever applicable (where the detection mode was AVG) the duty cycle factor calculated will be applied.

2.6 EUT Antenna Requirements (CFR 15.203)

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. Only the antenna(s) listed in Table 4 will be used with this module.

Table 4. Allowed Antenna(s)

REPORT REFERENCE	MANUFACTURER	TYPE OF ANTENNA	MODEL	GAIN dBi	TYPE OF CONNECTOR
Antenna	Johanson Technology	Chip	2450AT18A 100	+0.5	soldered

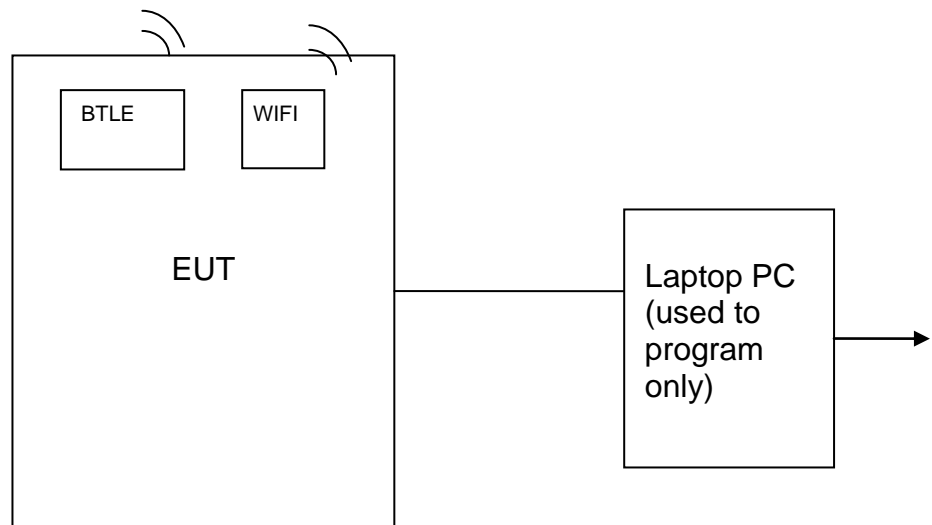


Figure 1. Block Diagram of Test Configuration

2.7 Restricted Bands of Operation (Part 15.205)

Only spurious emissions can fall in the frequency bands of CFR 15.205. The field strength of these spurious emissions cannot exceed the limits of 15.209. Radiated harmonics and other spurious emissions are examined for this requirement see paragraph 2.13.

2.8 Transmitter Duty Cycle (CFR 35 (c))

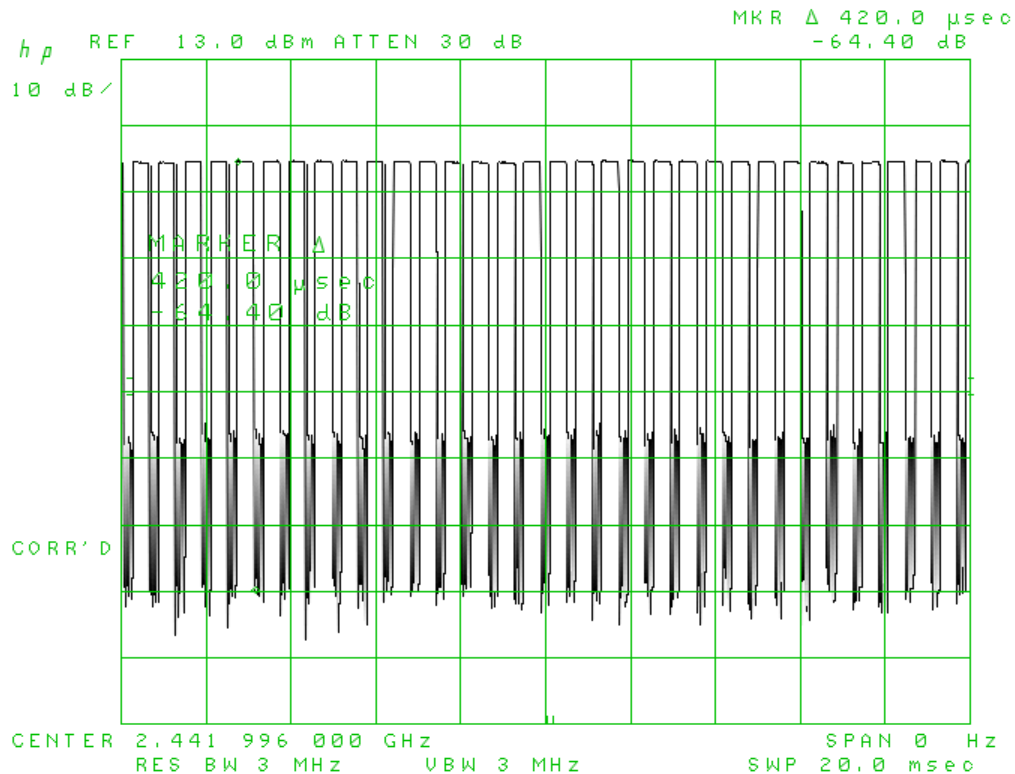


Figure 2. Transmitter Pulse Width

US Tech Test Report:
FCC ID:
IC:
Test Report Number:
Issue Date:
Customer:
Model:

FCC Part 15 Certification/ RSS 210
2AIYR-AGL2
21677-AGL2
16-0105
July 13, 2016
Aglogica Holdings, Inc.
AGL2

Total Time On from Figure 2 = 0.42 ms * 32 = 13.4 ms (Transmitter Pulse Width)

((13.4 ms * 5) Total Time On= 67.2 ms)/(100 ms Total Pulse Train) = 0.672
Numeric Duty Cycle

Duty Cycle = 20 Log (0.672) = -3.45 dB

NOTE: The transmitter was programmed to transmit at >98% duty cycle, therefore wherever applicable (where the detection mode was AVG), the duty cycle factor calculated above will be applied.

US Tech Test Report:
FCC ID:
IC:
Test Report Number:
Issue Date:
Customer:
Model:

FCC Part 15 Certification/ RSS 210
2AIYR-AGL2
21677-AGL2
16-0105
July 13, 2016
Aglogica Holdings, Inc.
AGL2

2.9 Intentional Radiator, Power Line Conducted Emissions (CFR 15.207)

The EUT is powered by 3.3 VDC through a host device, since the host device was connected to the AC mains, power line conducted emissions testing was performed. Power line conducted emissions testing was performed to ensure that with the EUT in operation (exercising all transmitter functions), the complete system continues to meet the applicable requirements for CFR 15.207. These measurements were completed and are displayed below.

US Tech Test Report:
 FCC ID:
 IC:
 Test Report Number:
 Issue Date:
 Customer:
 Model:

FCC Part 15 Certification/ RSS 210
 2AIYR-AGL2
 21677-AGL2
 16-0105
 July 13, 2016
 Aglogica Holdings, Inc.
 AGL2

Table 5. Transmitter Power Line Conducted Emissions Test Data, Part 15.207

150KHz to 30 MHz						
Test: Power Line Conducted Emissions				Client: Aglogica Holdings, Inc.		
Project: 16-0105				Model: AGL2		
Frequency (MHz)	Test Data (dBuV)	LISN+CL-PA (dB)	Results (dBuV)	AVG Limits (dBuV)	Margin (dB)	Detector PK, QP, or AVG
120 VAC, 60 Hz Phase						
0.2450	52.50	0.28	52.78	61.9*	9.1	QP
0.2550	32.00	0.25	32.25	51.6	19.3	AVG
0.7520	50.00	0.18	50.18	56.0*	5.8	PK
0.7510	22.10	0.18	22.28	46.0	23.7	AVG
1.7640	46.50	0.24	46.74	56.0*	9.3	PK
1.7540	19.30	0.23	19.53	46.0	26.5	AVG
5.0000	40.10	0.33	40.43	46.0	5.6	PK
11.8200	35.30	0.42	35.72	50.0	14.3	PK
21.5800	30.40	0.64	31.04	50.0	19.0	PK
120VAC, 60 Hz Neutral						
0.2460	60.00	0.37	60.37	61.9*	1.5	PK
0.2560	29.20	0.37	29.57	51.6	22.0	AVG
0.5250	49.00	0.32	49.32	56.0*	6.7	PK
0.5250	20.60	0.32	20.92	46.0	25.1	AVG
1.6640	45.00	0.30	45.30	46.0	0.7	PK
5.0050	40.90	0.40	41.30	50.0	8.7	PK
12.0400	34.00	0.56	34.56	50.0	15.4	PK
21.7200	30.00	0.78	30.78	50.0	19.2	PK

Note: * denotes QP Limits

SAMPLE CALCULATION at 0.2450 MHz:

Magnitude of Measured Frequency	52.50	dBuV
+ Cable Loss+ LISN Loss	0.28	dB
=Corrected Result	52.78	dBuV
Limit	61.90	dBuV
-Corrected Result	52.78	dBuV
Margin	9.10	dB

Test Date: June 15, 2016

Tested By

Signature: Hossein Rahnama

Name: Hossein Rahnama

US Tech Test Report:
FCC ID:
IC:
Test Report Number:
Issue Date:
Customer:
Model:

FCC Part 15 Certification/ RSS 210
2AIYR-AGL2
21677-AGL2
16-0105
July 13, 2016
Aglogica Holdings, Inc.
AGL2

2.10 Intentional Radiator, Radiated Emissions (CFR 15.209, 15.247(d)) (IC RSS 247, 5.4)

Radiated Spurious measurements: The EUT was placed into a continuous transmit mode of operation (>98% duty cycle) and tested per FCC Public Notice DA 00-705 and ANSI C63.10:2013. A preliminary scan was performed on the EUT to find signal frequencies that were caused by the transmitter part of the device. A preliminary scan was performed on the EUT to find the worse case results the EUT was tested in X, Y and Z axes or in the orientation of normal operation if the device is designed to operate in a fixed position.

Radiated measurements were then conducted between the frequency range of 9 kHz (or lowest frequency used/generated by the device) up to the tenth harmonic of the device (no greater than 40 GHz). In the band below 30 MHz a resolution bandwidth (RBW) of 9 kHz was used, emissions below 1 GHz were tested with a RBW of 120 kHz and emissions above 1 GHz were tested with a RBW of 1 MHz. All video bandwidth settings were at least three times the RBW value.

The EUT was investigated per CFR 15.209, General requirements for unwanted spurious emissions. The conducted spurious method as described below was used to investigate all other emissions emanating from the antenna port.

US Tech Test Report:
FCC ID:
IC:
Test Report Number:
Issue Date:
Customer:
Model:

FCC Part 15 Certification/ RSS 210
2AIYR-AGL2
21677-AGL2
16-0105
July 13, 2016
Aglogica Holdings, Inc.
AGL2

**Table 6. Intentional Radiator, Spurious Radiated Emissions (CFR 15.209),
9 kHz to 30 MHz**

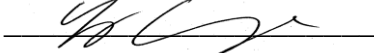
9 kHz to 30 MHz							
Test: Radiated Emissions				Client: Aglogica Holdings, Inc.			
Project: 16-0105				Model: AGL2			
Frequency (MHz)	Test Data (dBuv)	AF+CA-AMP (dB/m)	Results (dBuV/m)	QP Limits (dBuV/m)	Antenna Distance/ Polarization	Margin (dB)	Detector PK, or QP
All emissions seen were 20 dB or more from the limit.							

Tested from 9 kHz to 30 MHz

SAMPLE CALCULATION: N/A

Test Date: June 1, 2016

Tested By

Signature: 

Name: George Yang

US Tech Test Report:
 FCC ID:
 IC:
 Test Report Number:
 Issue Date:
 Customer:
 Model:

FCC Part 15 Certification/ RSS 210
 2AIYR-AGL2
 21677-AGL2
 16-0105
 July 13, 2016
 Aglogica Holdings, Inc.
 AGL2

Table 7. Peak Radiated Fundamental & Harmonic Emissions

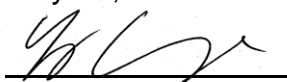
Test: FCC Part 15, Para 15.209, 15.249(a)					Client: Aglogica Holdings, Inc.			
Project: 16-0105					Model: AGL2			
Frequency (MHz)	Test Data (dBuV)	Factor (dB)	AF+CA -AMP (dB/m)	Results (dBuV/m)	Limits (dBuV/m)	Antenna Distance/ Polarization	Margin (dB)	Detector Mode
Low Channel								
2402.00	65.23	--	30.08	95.31	114.0	3.0m./HORZ	18.7	PK
All emissions were 20 dB or greater from the applicable limit								
Mid Channel								
2442.23	63.79	--	30.16	93.95	114.0	3.0m./HORZ	20.1	PK
All emissions were 20 dB or greater from the applicable limit								
High Channel								
2480.00	62.83	--	30.16	92.99	114.0	3.0m./HORZ	21.0	PK
All emissions were 20 dB or greater from the applicable limit								

- (*) Falls within the restricted bands of CFR 15.205. Limits based on CFR15.209 & 20 dB relaxation for peak measurements of CFR 15.35.
- No other signals detected within 20 dB of specification limit. Harmonics investigated up to the 10th harmonic
- The EUT was placed in three orthogonal positions and the transmitter was in constant broadcast mode, with a duty cycle of greater than 98%. The emissions were measured with the receive antenna in vertical and horizontal polarizations. The data listed in the above table was worst case.

Sample Calculation at 2402.00 MHz:

Magnitude of Measured Frequency	65.23	dBuV
+Antenna Factor + Cable Loss+ Amplifier Gain	30.08	dB/m
Corrected Result	95.31	dBuV/m

Test Date: May 31, 2016 & June 27, 2016

Tested By
 Signature:  Name: George Yang

US Tech Test Report:
 FCC ID:
 IC:
 Test Report Number:
 Issue Date:
 Customer:
 Model:

FCC Part 15 Certification/ RSS 210
 2AIYR-AGL2
 21677-AGL2
 16-0105
 July 13, 2016
 Aglogica Holdings, Inc.
 AGL2

Table 8. Average Radiated Fundamental & Harmonic Emissions

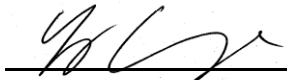
Test: FCC Part 15, Para 15.209, 15.249(a)					Client: Aglogica Holdings, Inc			
Project: 16-0105					Model: AGL2			
Frequency (MHz)	Test Data (dBuV)	Factor (dB)	AF+CA -AMP (dB/m)	Results (dBuV/m)	Limits (dBuV/m)	Antenna Distance/ Polarization	Margin (dB)	Detector Mode
Low Channel								
2402.00	48.51	--	30.08	78.59	94.0	3.0m./HORZ	15.4	AVG
All emissions were 20 dB or greater from the applicable limit								
Mid Channel								
2442.23	47.29	--	30.16	77.45	94.0	3.0m./HORZ	16.6	AVG
All emissions were 20 dB or greater from the applicable limit								
High Channel								
2480.00	46.49	--	30.16	76.65	94.0	3.0m./HORZ	17.4	AVG
All emissions were 20 dB or greater from the applicable limit								

- (*) Falls within the restricted bands of CFR 15.205. Limits based on CFR15.209 & 20 dB relaxation for peak measurements of CFR 15.35.
- No other signals detected within 20 dB of specification limit. Harmonics investigated up to the 10th harmonic
- The EUT was placed in three orthogonal positions and the transmitter was in constant broadcast mode, with a duty cycle of greater than 98%. The emissions were measured with the receive antenna in vertical and horizontal polarizations. The data listed in the above table was worst case

Sample Calculation at 2402.00 MHz:

Magnitude of Measured Frequency	48.51	dBuV
+Antenna Factor + Cable Loss+ Amplifier Gain – Duty Cycle	30.08	dB/m
Corrected Result	78.59	dBuV/m

Test Date: May 31, 2016 & June 27, 2016

Tested By
 Signature:  Name: George Yang

US Tech Test Report:
FCC ID:
IC:
Test Report Number:
Issue Date:
Customer:
Model:

FCC Part 15 Certification/ RSS 210
2AIYR-AGL2
21677-AGL2
16-0105
July 13, 2016
Aglogica Holdings, Inc.
AGL2

2.11 Band Edge Measurements – (CFR 15.247 (d))

Band Edge measurements are made following the guidelines in FCC KDB Publication No. DA 00-705 with the EUT initially operating on the Lowest Channel and then operating on the Highest Channel within its band of operation. Antenna port conducted measurements are performed to demonstrate compliance with the requirement of 15.247(d) that all emissions outside of the band edges be attenuated by at least 50 dB when compared to its highest in-band value (contained in a 100 kHz band).

US Tech Test Report:
 FCC ID:
 IC:
 Test Report Number:
 Issue Date:
 Customer:
 Model:

FCC Part 15 Certification/ RSS 210
 2AIYR-AGL2
 21677-AGL2
 16-0105
 July 13, 2016
 Aglogica Holdings, Inc.
 AGL2

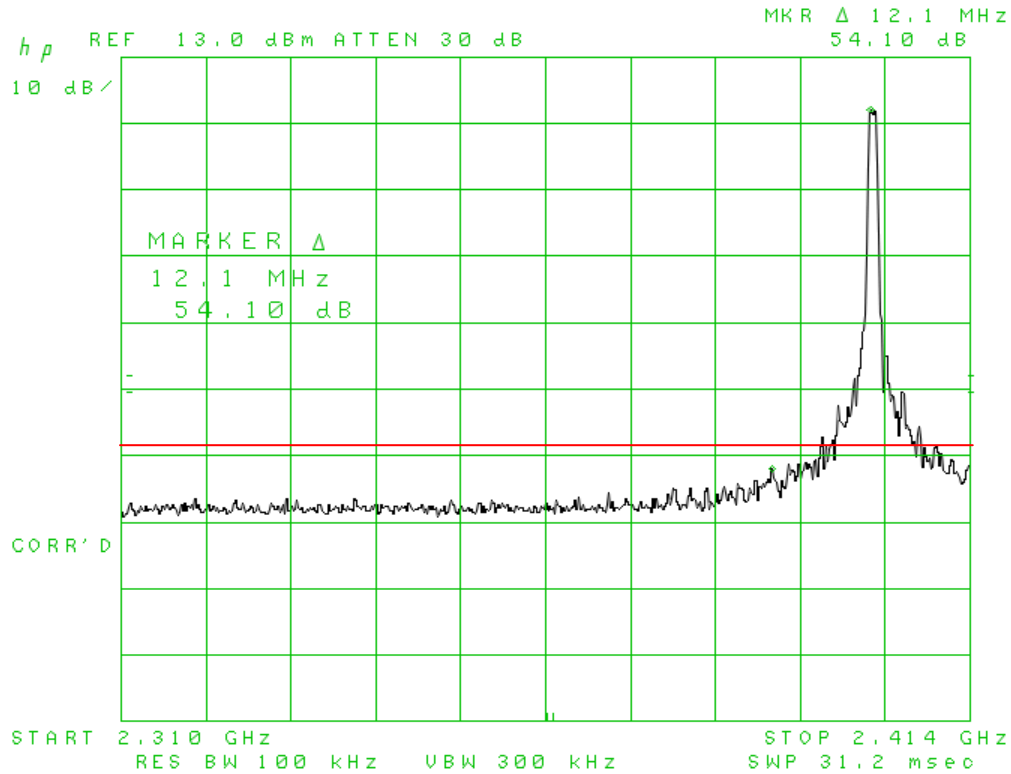


Figure 3. Band Edge Compliance, Low Channel Delta - Peak

Calculation of worst case lower band edge measurement:

Delta (from Figure above)	54.10	dB
Limit	50.00	dB
Band Edge Margin	4.10	dB

US Tech Test Report:
 FCC ID:
 IC:
 Test Report Number:
 Issue Date:
 Customer:
 Model:

FCC Part 15 Certification/ RSS 210
 2AIYR-AGL2
 21677-AGL2
 16-0105
 July 13, 2016
 Aglogica Holdings, Inc.
 AGL2

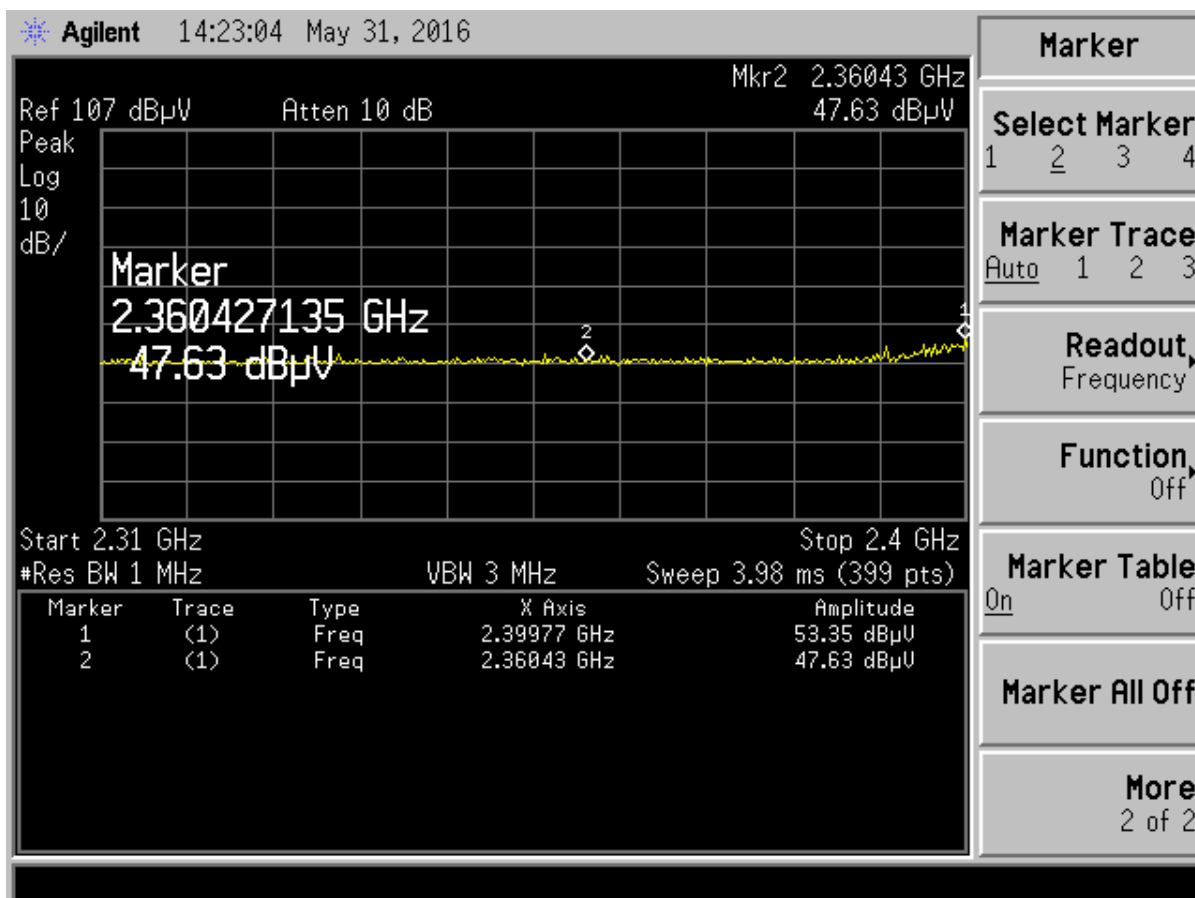


Figure 4. Radiated Restricted Band Measurements PK, 2.31 GHz to 2.39 GHz

Table 9. Radiated Restricted Band Measurements PK, 2.31 GHz to 2.39 GHz

Test: FCC Part 15, Restricted Bands				Client: Aglogica Holdings, Inc.			
Project: 16-0105				Model: AGL2			
Frequency (MHz)	Test Data (dBuV)	AF+CA-AMP (dB/m)	Results (dBuV/m)	PK Limits (dBuV/m)	Antenna Distance/ Polarization	Margin (dB)	Detector Mode
2399.77	53.35	-6.42	46.93	74.0	3.0m./HORZ	27.0	PK
2360.43	47.63	-6.69	40.94	74.0	3.0m./HORZ	33.0	PK

Test Date: May 31, 2016

Tested By

Signature:

Name: George Yang

US Tech Test Report:
 FCC ID:
 IC:
 Test Report Number:
 Issue Date:
 Customer:
 Model:

FCC Part 15 Certification/ RSS 210
 2AIYR-AGL2
 21677-AGL2
 16-0105
 July 13, 2016
 Aglogica Holdings, Inc.
 AGL2

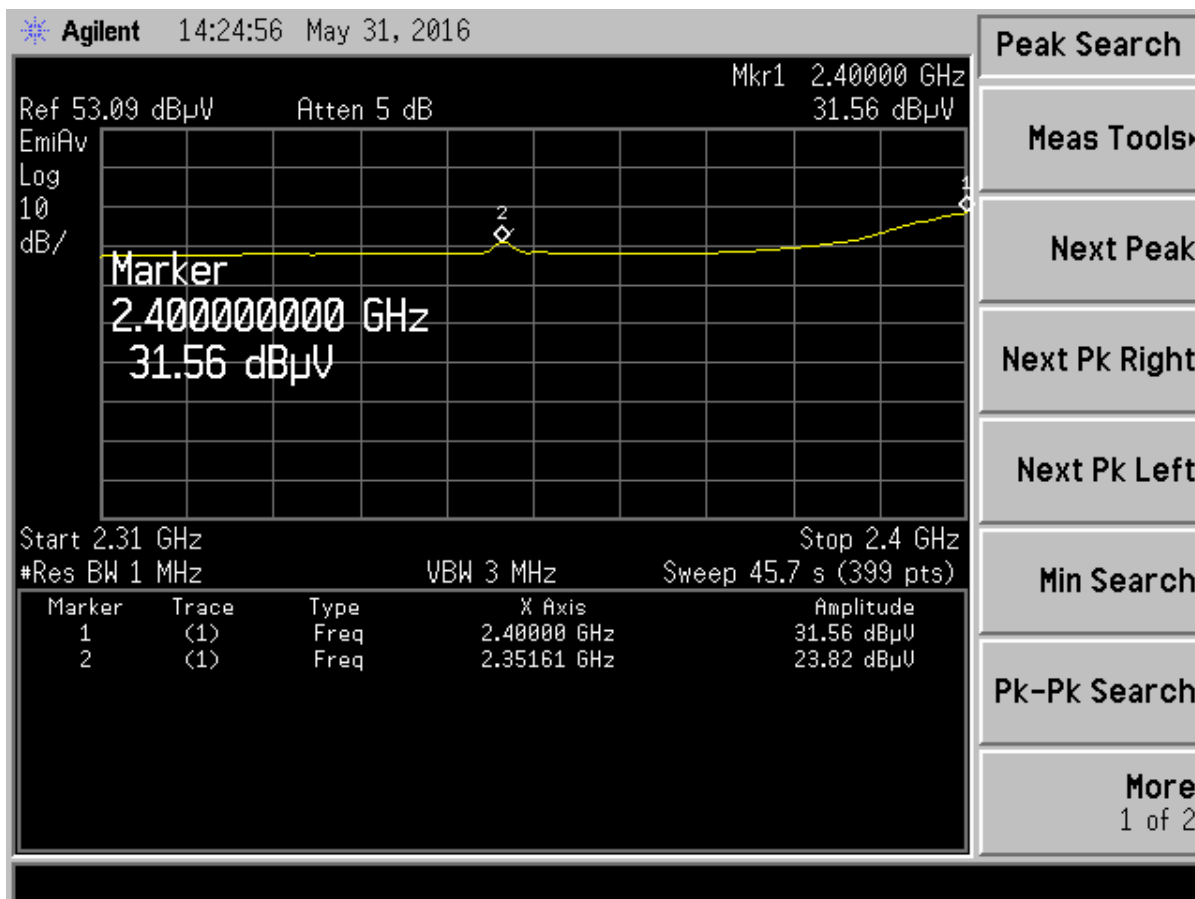


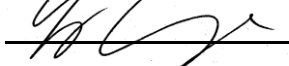
Figure 5. Radiated Restricted Band Measurements AVG, 2.31 GHz to 2.39 GHz

Table 10. Radiated Restricted Band Measurements AVG, 2.31 GHz to 2.39 GHz

Test: FCC Part 15, Restricted Bands				Client: Aglogica Holdings, Inc.			
Project: 16-0105				Model: AGL2			
Frequency (MHz)	Test Data (dBuV)	AF+CA-AMP (dB/m)	Results (dBuV/m)	Limits (dBuV/m)	Antenna Distance/ Polarization	Margin (dB)	Detector Mode
2400.00	31.56	-6.02	25.54	54.0	3.0m./HORZ	28.4	AVG
2351.61	23.82	-6.54	17.28	54.0	3.0m./HORZ	36.7	AVG

Test Date: May 31, 2016

Tested By

Signature: 

Name: George Yang

US Tech Test Report:
 FCC ID:
 IC:
 Test Report Number:
 Issue Date:
 Customer:
 Model:

FCC Part 15 Certification/ RSS 210
 2AIYR-AGL2
 21677-AGL2
 16-0105
 July 13, 2016
 Aglogica Holdings, Inc.
 AGL2

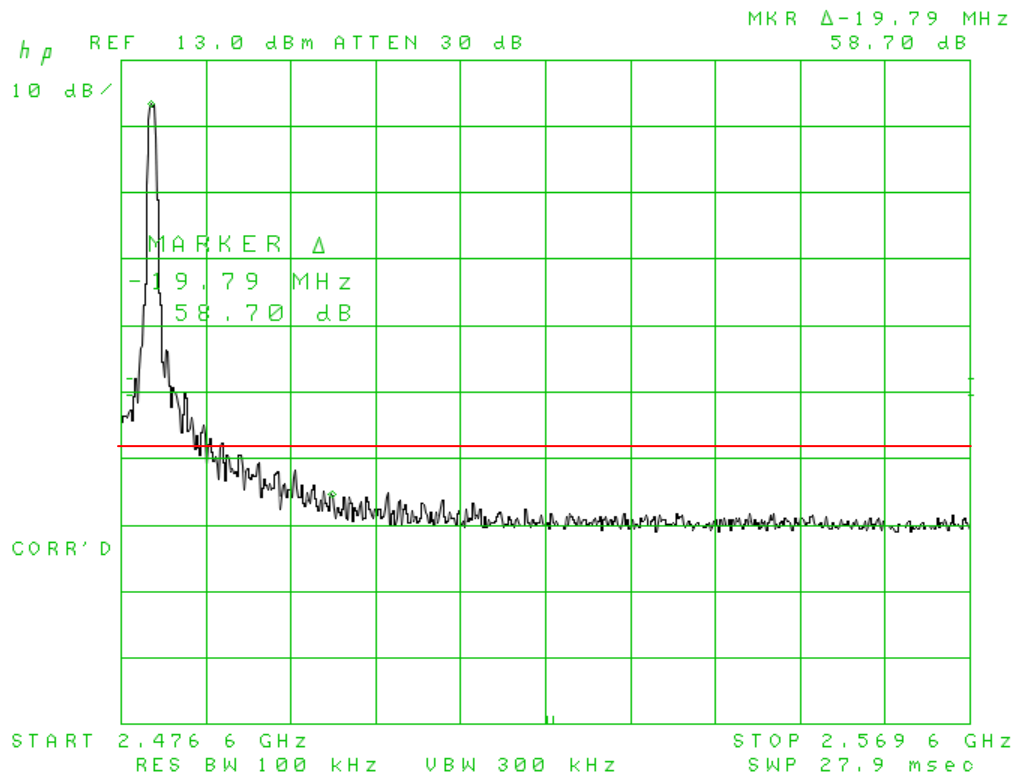


Figure 6. Band Edge Compliance, High Channel Delta – Peak

Calculation of worst case lower band edge measurement:

Delta (from Figure 6)	58.70	dB
Limit	50.00	dB
Band Edge Margin	8.70	dB

US Tech Test Report:
 FCC ID:
 IC:
 Test Report Number:
 Issue Date:
 Customer:
 Model:

FCC Part 15 Certification/ RSS 210
 2AIYR-AGL2
 21677-AGL2
 16-0105
 July 13, 2016
 Aglogica Holdings, Inc.
 AGL2

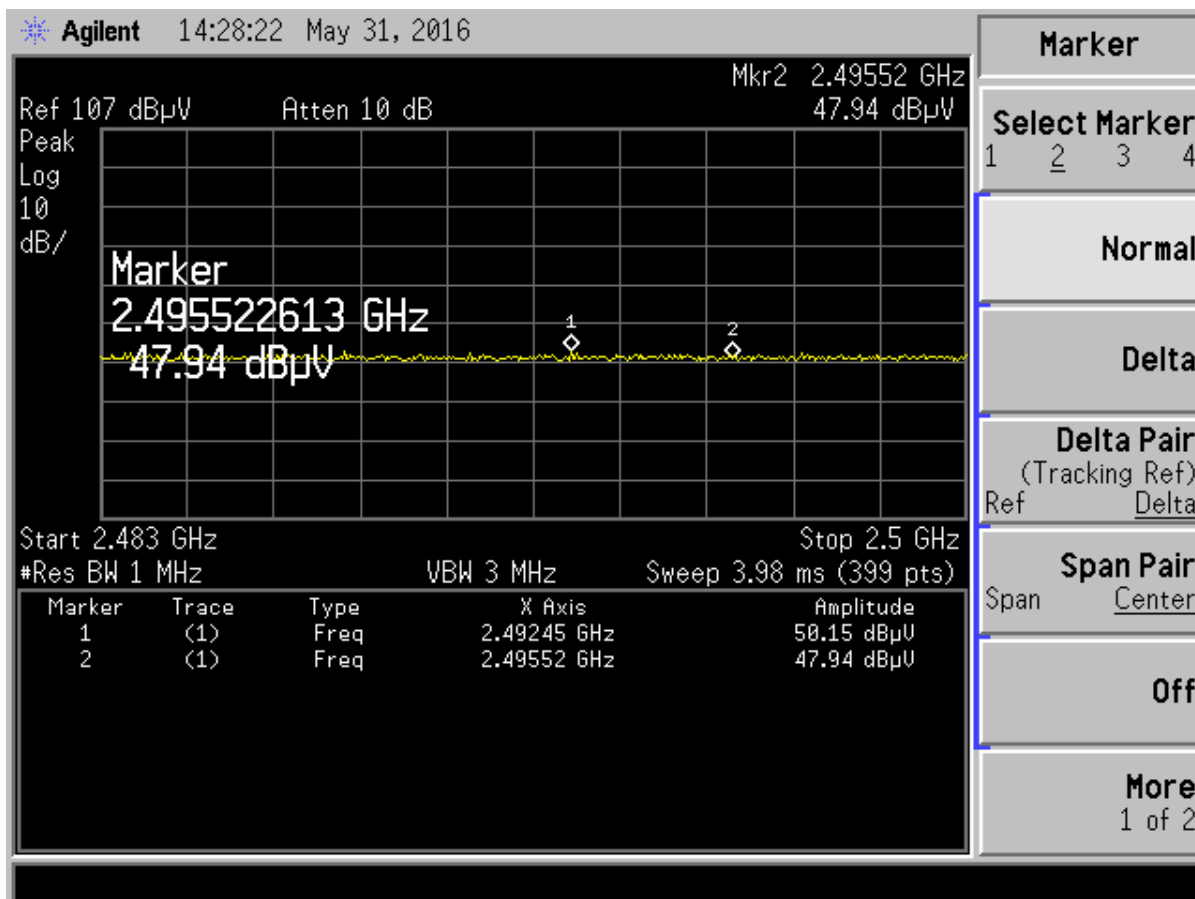


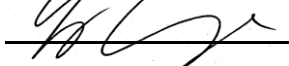
Figure 7. Radiated Restricted Band Measurements PK, 2.4835 GHz to 2.5 GHz

Table 11. Radiated Restricted Band Measurements PK, 2.4835 GHz to 2.5 GHz

Test: FCC Part 15, Restricted Bands				Client: Aglogica Holdings, Inc.			
Project: 16-0105				Model: AGL2			
Frequency (MHz)	Test Data (dBuV)	AF+CA-AMP (dB/m)	Results (dBuV/m)	Limits (dBuV/m)	Antenna Distance/ Polarization	Margin (dB)	Detector Mode
2492.45	50.15	-5.26	44.89	74.0	3.0m./HORZ	29.1	PK
2495.52	47.94	-5.26	42.68	74.0	3.0m./HORZ	31.3	PK

Test Date: May 31, 2016

Tested By

Signature: 

Name: George Yang

US Tech Test Report:
 FCC ID:
 IC:
 Test Report Number:
 Issue Date:
 Customer:
 Model:

FCC Part 15 Certification/ RSS 210
 2AIYR-AGL2
 21677-AGL2
 16-0105
 July 13, 2016
 Aglogica Holdings, Inc.
 AGL2

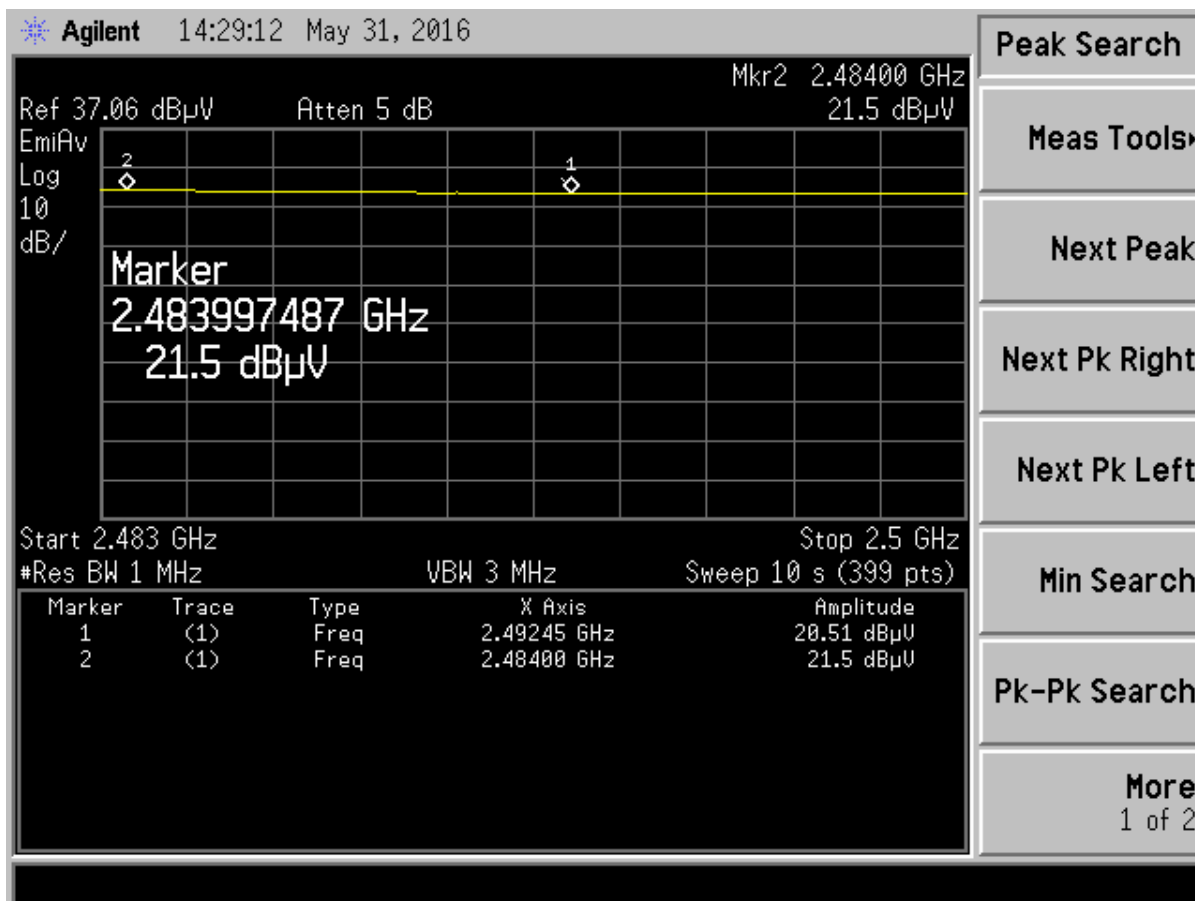
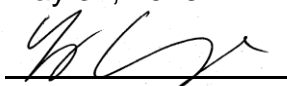


Figure 8. Radiated Restricted Measurements AVG, 2.4835 GHz to 2.5 GHz

Table 12. Radiated Restricted Measurements AVG, 2.4835 GHz to 2.5 GHz

Test: FCC Part 15, Restricted Bands				Client: Aglogica Holdings, Inc.			
Project: 16-0105				Model: AGL2			
Frequency (MHz)	Test Data (dBuV)	AF+CA-AMP (dB/m)	Results (dBuV/m)	Limits (dBuV/m)	Antenna Distance/ Polarization	Margin (dB)	Detector Mode
2492.45	20.51	-5.26	15.25	54.0	3.0m./HORZ	38.7	AVG
2484.00	21.50	-5.33	16.17	54.0	3.0m./HORZ	37.8	AVG

Test Date: May 31, 2016

Tested By
 Signature: 

Name: George Yang

US Tech Test Report:
FCC ID:
IC:
Test Report Number:
Issue Date:
Customer:
Model:

FCC Part 15 Certification/ RSS 210
2AIYR-AGL2
21677-AGL2
16-0105
July 13, 2016
Aglogica Holdings, Inc.
AGL2

2.12 99% Occupied Bandwidth (IC RSS 247, 5.1 & 5.2)

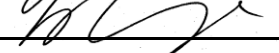
These measurements were performed while the EUT was in a constant transmit mode. A method similar to the marker delta method was used to capture the points. The RBW was set to approximately 1/100 of the manufacturers claimed RBW and with the VBW \geq RBW. The results of this test are given in Table 12 and Figures 21-23.

Table 13. 20 dB Bandwidth and 99% Occupied Bandwidth

Frequency (MHz)	20 dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
2402	1.280	1.280
2442	1.280	1.280
2480	1.280	1.280

Test Date: July 6, 2016

Tested By

Signature: 

Name: George Yang

US Tech Test Report:
FCC ID:
IC:
Test Report Number:
Issue Date:
Customer:
Model:

FCC Part 15 Certification/ RSS 210
2AIYR-AGL2
21677-AGL2
16-0105
July 13, 2016
Aglogica Holdings, Inc.
AGL2

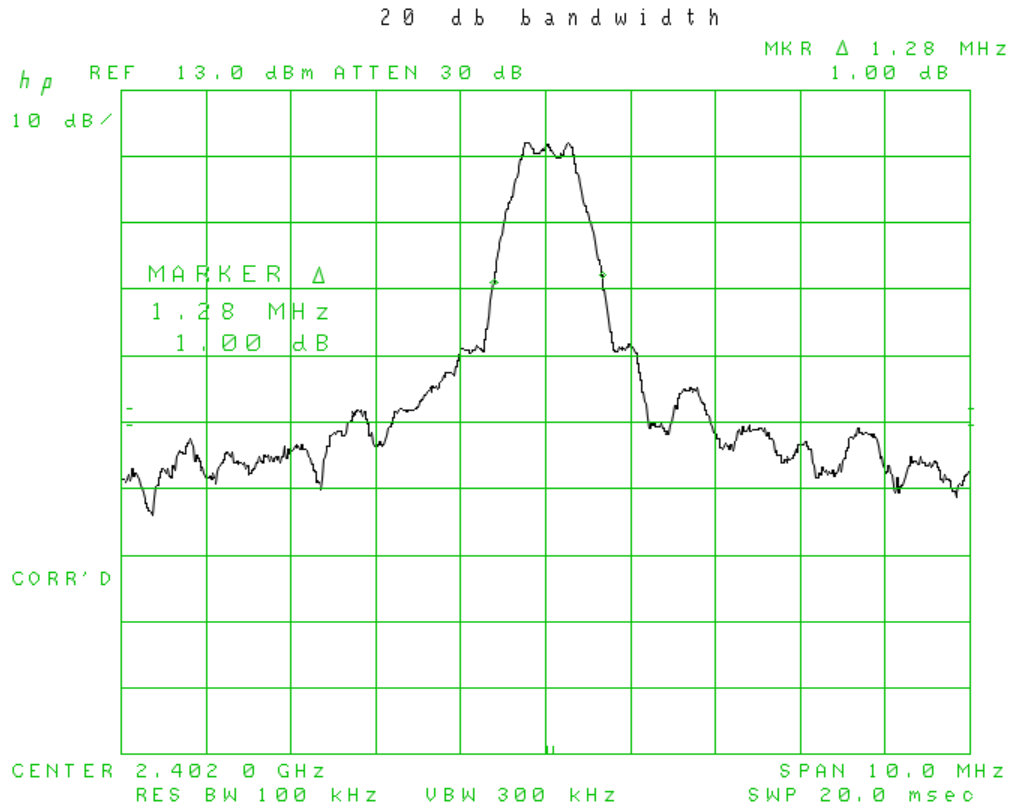


Figure 9. Twenty dB Bandwidth - IC RSS 247, A8.1– Low Channel

US Tech Test Report:
FCC ID:
IC:
Test Report Number:
Issue Date:
Customer:
Model:

FCC Part 15 Certification/ RSS 210
2AIYR-AGL2
21677-AGL2
16-0105
July 13, 2016
Aglogica Holdings, Inc.
AGL2

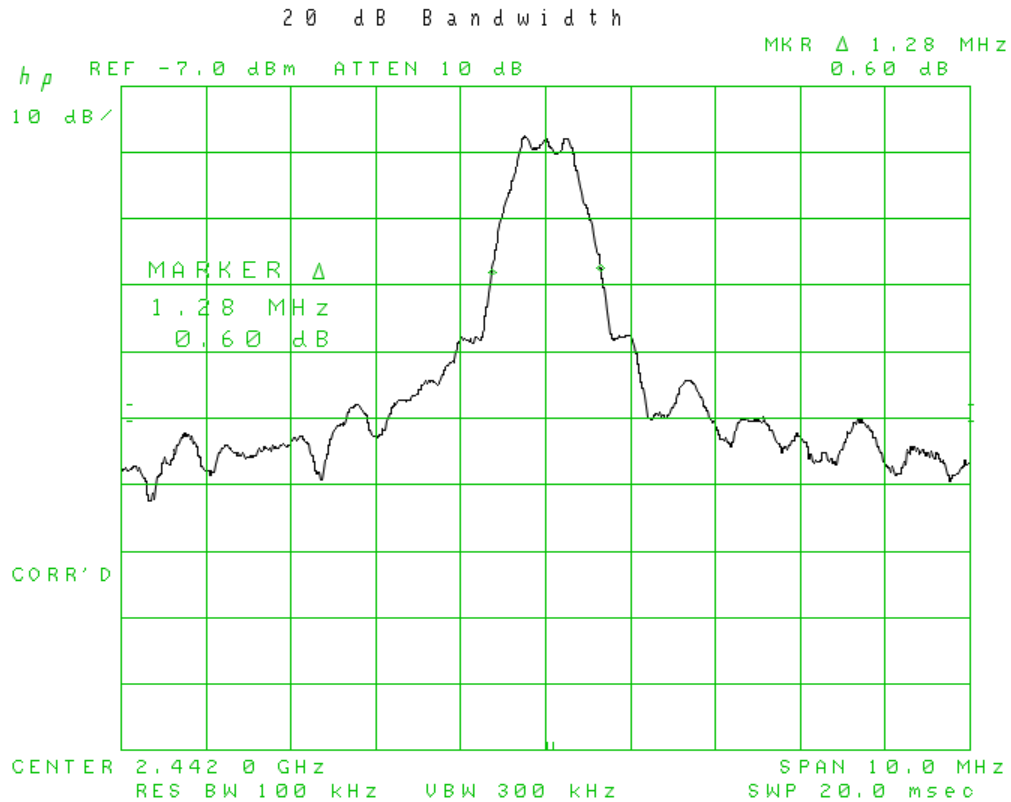


Figure 10. Twenty dB Bandwidth -IC RSS 247, A8.1 – Mid Channel

US Tech Test Report:
FCC ID:
IC:
Test Report Number:
Issue Date:
Customer:
Model:

FCC Part 15 Certification/ RSS 210
2AIYR-AGL2
21677-AGL2
16-0105
July 13, 2016
Aglogica Holdings, Inc.
AGL2

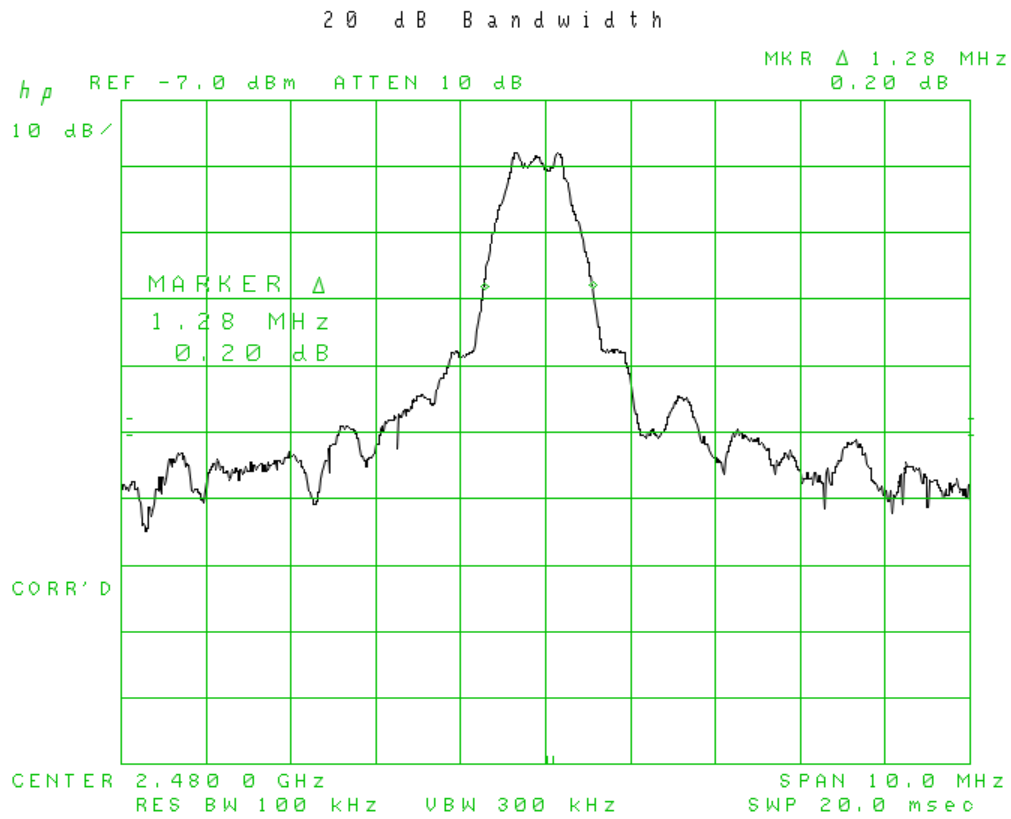


Figure 11. Twenty dB Bandwidth -IC RSS 247, A8.1 – High Channel

US Tech Test Report:
FCC ID:
IC:
Test Report Number:
Issue Date:
Customer:
Model:

FCC Part 15 Certification/ RSS 210
2AIYR-AGL2
21677-AGL2
16-0105
July 13, 2016
Aglogica Holdings, Inc.
AGL2

2.13 Unintentional Radiator, Powerline Emissions (CFR 15.107)

The power line conducted voltage emission measurements have been carried out in accordance with CFR 15.107, per ANSI C63.4:2009, Paragraph 7, with a spectrum analyzer connected to a LISN and the EUT placed into a continuous mode of transmission.

The worst-case results for conducted emissions were determined to be produced when the EUT was operating under continuous transmission. The worst case measurement occurred on the Neutral line at 1.6640 MHz. The emission level was 0.7 dB from the applicable limit. All other emissions were at least 1.5 dB from the limit. Those results are given in the table following.

NOTE: The test data provided in this section is to support the Verification and co-location requirement for the digital apparatus and the radios within.

US Tech Test Report:
 FCC ID:
 IC:
 Test Report Number:
 Issue Date:
 Customer:
 Model:

FCC Part 15 Certification/ RSS 210
 2AIYR-AGL2
 21677-AGL2
 16-0105
 July 13, 2016
 Aglogica Holdings, Inc.
 AGL2

Table 14. Transmitter Power Line Conducted Emissions Test Data, Part 15.107

150KHz to 30 MHz						
Test: Power Line Conducted Emissions				Client: Aglogica Holdings, Inc.		
Project: 16-0105				Model: AGL2		
Frequency (MHz)	Test Data (dBuV)	LISN+CL-PA (dB)	Results (dBuV)	AVG Limits (dBuV)	Margin (dB)	Detector PK, QP, or AVG
120 VAC, 60 Hz Phase						
0.2450	52.50	0.28	52.78	61.9*	9.1	QP
0.2550	32.00	0.25	32.25	51.6	19.3	AVG
0.7520	50.00	0.18	50.18	56.0*	5.8	PK
0.7510	22.10	0.18	22.28	46.0	23.7	AVG
1.7640	46.50	0.24	46.74	56.0*	9.3	PK
1.7540	19.30	0.23	19.53	46.0	26.5	AVG
5.0000	40.10	0.33	40.43	46.0	5.6	PK
11.8200	35.30	0.42	35.72	50.0	14.3	PK
21.5800	30.40	0.64	31.04	50.0	19.0	PK
120VAC, 60 Hz Neutral						
0.2460	60.00	0.37	60.37	61.9*	1.5	PK
0.2560	29.20	0.37	29.57	51.6	22.0	AVG
0.5250	49.00	0.32	49.32	56.0*	6.7	PK
0.5250	20.60	0.32	20.92	46.0	25.1	AVG
1.6640	45.00	0.30	45.30	46.0	0.7	PK
5.0050	40.90	0.40	41.30	50.0	8.7	PK
12.0400	34.00	0.56	34.56	50.0	15.4	PK
21.7200	30.00	0.78	30.78	50.0	19.2	PK

Note: * denotes QP Limits

SAMPLE CALCULATION at 0.245 MHz:

Magnitude of Measured Frequency	52.50	dBuV
+ Cable Loss+ LISN Loss	0.28	dB
=Corrected Result	52.78	dBuV
Limit	61.90	dBuV
-Corrected Result	52.78	dBuV
Margin	9.10	dB

Test Date: June 15, 2016

Tested By

Signature: Hossein Rahnama Name: Hossein Rahnama

US Tech Test Report:
FCC ID:
IC:
Test Report Number:
Issue Date:
Customer:
Model:

FCC Part 15 Certification/ RSS 210
2AIYR-AGL2
21677-AGL2
16-0105
July 13, 2016
Aglogica Holdings, Inc.
AGL2

2.14 Unintentional Radiator, Radiated Emissions (CFR 15.109)

Radiated emissions disturbance Measurements were performed with an instrument having both peak and quasi-peak detectors over the frequency range of 30 MHz to 5 times the highest frequency used or generated by the test unit. Measurements of the radiated emissions were made with the receiver antenna at a distance of 3 m from the boundary of the test unit.

The test antenna was varied from 1 m to 4 m in height while watching the analyzers' display for the maximum magnitude of the signal at the test frequency. The antenna polarization (horizontal or vertical) and test sample azimuth were varied during the measurements to find the maximum field strength readings to record.

The worst-case radiated emission in the range of 30 MHz to 1 GHz was 13.3 dB below the limit at 529.80 MHz. This signal is found in Table 46. All other radiated emissions in this range were 13.8 dB or more below the limit.

The worst-case radiated emissions in the range of 1 GHz to 13 GHz was greater than 20 dB below the limit at all frequencies.

NOTE: The test data provided in this section is to support the Verification and co-location requirement for the digital apparatus and the radios within. During this testing the radio were placed into normal operation mode.

US Tech Test Report:
 FCC ID:
 IC:
 Test Report Number:
 Issue Date:
 Customer:
 Model:

FCC Part 15 Certification/ RSS 210
 2AIYR-AGL2
 21677-AGL2
 16-0105
 July 13, 2016
 Aglogica Holdings, Inc.
 AGL2

**Table 15. Unintentional Radiator, Peak Radiated Emissions (CFR 15.109),
 30 MHz to 1000 MHz**

30 MHz to 1000 MHz with Class B Limits							
Test: Radiated Emissions				Client: Aglogica Holdings Inc.			
Project: 16-0105				Model: AGL2			
Frequency (MHz)	Test Data (dBuV)	AF+CA-AMP (dB/m)	Results (dBuV/m)	QP Limits (dBuV/m)	Antenna Distance/ Polarization	Margin (dB)	Detector PK, or QP
167.63	34.50	-4.80	29.70	43.5	3m./VERT	13.8	PK
110.95	32.60	-8.46	24.14	43.5	3m./HORZ	19.4	PK
147.97	32.30	-6.52	25.78	43.5	3m./HORZ	17.7	PK
437.96	31.80	-1.37	30.43	46.0	3m./HORZ	15.6	PK
380.41	33.40	-3.21	30.19	46.0	3m./VERT	15.8	PK
529.80	32.40	0.34	32.74	46.0	3m./VERT	13.3	PK

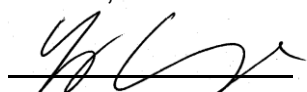
SAMPLE CALCULATION at 167.63 MHz:

Magnitude of Measured Frequency	34.50	dBuV
+ Cable Loss+ LISN Loss	-4.80	dB
=Corrected Result	29.70	dBuV
Limit	43.50	dBuV
-Corrected Result	29.70	dBuV
Margin	13.80	dB

Test Date: June 1, 2016

Tested By

Signature:



Name: George Yang

US Tech Test Report:
FCC ID:
IC:
Test Report Number:
Issue Date:
Customer:
Model:

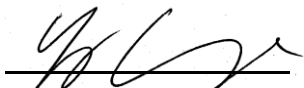
FCC Part 15 Certification/ RSS 210
2AIYR-AGL2
21677-AGL2
16-0105
July 13, 2016
Aglogica Holdings, Inc.
AGL2

Table 16. Unintentional Radiator, Peak Radiated Emissions (CFR 15.109), Above 1 GHz

1 GHz to 13 GHz with Class B Limits							
Test: Radiated Emissions				Client: Aglogica Holdings Inc.			
Project: 16-0105				Model: AGL2			
Frequency (MHz)	Test Data (dBuV)	AF+CA-AMP (dB/m)	Results (dBuV/m)	AVG Limits (dBuV/m)	Antenna Distance/ Polarization	Margin (dB)	Detector PK, or AVG
All emissions found are more than 20 dB below the applicable limit.							

SAMPLE CALCULATION: N/A

Test Date: June 1, 2016

Signature:  Name: George Yang

2.15 Measurement Uncertainty

The measurement uncertainties given were calculated using the method detailed in CISPR 16-4. A coverage factor of $k=2$ was used to give a level of confidence of approximately 95%.

2.15.1 Conducted Emissions Measurement Uncertainty

Measurement uncertainty (within a 95% confidence level) for this test is ± 2.78 dB.

The data listed in this test report does not have sufficient margin to negate the effects of uncertainty. The EUT conditionally passes this requirement.

2.15.2 Radiated Emissions Measurement Uncertainty

For a measurement distance of 3 m the measurement uncertainty (with a 95% confidence level) for this test using a Biconical Antenna (30 MHz to 200 MHz) is ± 5.39 dB. This value includes all elements of measurement.

The measurement uncertainty (with a 95% confidence level) for this test using a Log Periodic Antenna (200 MHz to 1000 MHz) is ± 5.18 dB.

The measurement uncertainty (with a 95% confidence level) for this test using a Horn Antenna is ± 5.08 dB (3 m distance).

The data listed in this test report does have sufficient margin to negate the effects of uncertainty. The EUT unconditionally passes this requirement.

3 Test Outcome

In our opinion, when tested as described in this test report, the EUT meets the requirements for FCC Part 2, Subpart J, Paragraph 2.907 and FCC Part 15, Subpart C, Paragraphs 15.207, 15.209, and 15.249. Additionally, the EUT meets the requirements for IC RSS-210, Issue 8, Annex A 2.9.