# FCC PART 15.407
# ISEDC RSS-247, ISSUE 2, FEBRUARY 2017

# TEST REPORT

For

## Brava Home Inc.

312 Chestnut Street,

Redwood City, CA 94063, USA

**FCC ID: 2AOGABRAVAONE**
**IC: 24108-BRAVAONE**

| **Report Type:** | **Product Type:** |
|---|---|
| Original Report | Convection Oven |

| | |
|---|---|
| | Vincent Licata |
| **Prepared By:** | Test Engineer |
| **Report Number:** | R18062910-407 |
| **Report Date:** | 2018-08-21 |
| | Jin Yang |
| **Reviewed By:** | RF Lead |

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# DOCUMENT REVISION HISTORY

| Revision Number | Report Number | Description of Revision | Date of Revision |
|---|---|---|---|
| 0 | R18062910-407 | Original Report | 2018-08-21 |

# 1 General Description

## 1.1 Product Description for Equipment under Test (EUT)

This test and measurement report was prepared on behalf of *Brava Home Inc.,* and their product model; Brava one, FCC ID: 2AOGABRAVAONE, IC: 24108-BRAVAONE, or the "EUT" as referred to in this report. The EUT is a countertop smart convection oven with Wi-Fi for household use.

## 1.2 Objective

This report is prepared on behalf of Brava Home Inc. in accordance with FCC CFR47 §15.407 and ISEDC RSS-247 Issue 2, February2017.

The objective is to determine compliance with FCC Part 15.407 and ISEDC RSS-247 rules for Output Power, Antenna Requirements, AC Line Conducted Emissions, Emission Bandwidth, Power spectral density, and Radiated Spurious Emissions.

## 1.3 Related Submittal(s)/Grant(s)

FCC 15.247 Report: R18062910-247 DTS

## 1.4 Test Methodology

All measurements contained in this report were conducted in accordance with ANSI C63.10-2013, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz, and FCC KDB 789033 D02 General UNII Test Procedure New Rules v02r01.

## 1.5 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in the field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

| Parameter | Measurement uncertainty |
|---|---|
| Occupied Channel Bandwidth | ±5 % |
| RF output power, conducted | ±0.57 dB |
| Power Spectral Density, conducted | ±1.48dB |
| Unwanted Emissions, conducted | ±1.57dB |
| All emissions, radiated | ±4.0 dB |
| AC power line Conducted Emission | ±2.0 dB |
| Temperature | ±2 º C |
| Humidity | ±5 % |
| DC and low frequency voltages | ±1.0 % |
| Time | ±2 % |
| Duty Cycle | ±3 % |

## 1.6 Test Facility Registrations

BACLs test facilities that are used to perform Radiated and Conducted Emissions tests are currently recognized by the Federal Communications Commission as Accredited with NIST Designation Number US1129.

BACL's test facilities that are used to perform Radiated and Conducted Emissions tests are currently registered with Industry Canada under Registration Numbers: 3062A-1, 3062A-2, and 3062A-3.

BACL is a Chinese Taipei Bureau of Standards Metrology and Inspection (BSMI) validated Conformity Assessment Body (CAB), under Appendix B, Phase I Procedures of the APEC Mutual Recognition Arrangement (MRA). BACL's BSMI Lab Code Number is: SL2-IN-E-1002R

BACL's test facilities that are used to perform AC Line Conducted Emissions, Telecommunications Line Conducted Emissions, Radiated Emissions from 30 MHz to 1 GHz, and Radiated Emissions from 1 GHz to 6 GHz are currently recognized as Accredited in accordance with the Voluntary Control Council for Interference [VCCI] Article 15 procedures under Registration Number A-0027.

## 1.7 Test Facility Accreditations

Bay Area Compliance Laboratories Corp. (BACL) is:

**A-** ***An independent, 3rd-Party, Commercial Test Laboratory accredited to ISO/IEC 17025:2005 by A2LA (Test Laboratory Accreditation Certificate Number 3279.02),*** in the fields of: Electromagnetic Compatibility and Telecommunications. Unless noted by an Asterisk (*) in the Compliance Matrix (See Section 3 of this Test Report), BACL's ISO/IEC 17025:2005 Scope of Accreditation includes all of the Test Method Standards and/or the Product Family Standards detailed in this Test Report..

BACL's ISO/IEC 17025:2005 Scope of Accreditation includes a comprehensive suite of EMC Emissions, EMC Immunity, Radio, RF Exposure, Safety and wireline Telecommunications test methods applicable to a wide range of product categories. These product categories include Central Office Telecommunications Equipment [including NEBS - Network Equipment Building Systems], Unlicensed and Licensed Wireless and RF devices, Information Technology Equipment (ITE); Telecommunications Terminal Equipment (TTE); Medical Electrical Equipment; Industrial, Scientific and Medical Test Equipment; Professional Audio and Video Equipment; Industrial and Scientific Instruments and Laboratory Apparatus; Cable Distribution Systems, and Energy Efficient Lighting.

**B-** ***A Product Certification Body accredited to ISO/IEC 17065:2012 by A2LA (Product Certification Body Accreditation Certificate Number 3279.03)*** to certify

- For the USA (Federal Communications Commission):
    1- All Unlicensed radio frequency devices within FCC Scopes A1, A2, A3, and A4;
    2- All Licensed radio frequency devices within FCC Scopes B1, B2, B3, and B4;
    3- All Telephone Terminal Equipment within FCC Scope C.
- For the Canada (Industry Canada):
    1 All Scope 1-Licence-Exempt Radio Frequency Devices;
    2 All Scope 2-Licensed Personal Mobile Radio Services;
    3 All Scope 3-Licensed General Mobile & Fixed Radio Services;
    4 All Scope 4-Licensed Maritime & Aviation Radio Services;
    5 All Scope 5-Licensed Fixed Microwave Radio Services
    6 All Broadcasting Technical Standards (BETS) in the Category I Equipment Standards List.
- For Singapore (Info-Communications Development Authority (IDA)):
    1 All Line Terminal Equipment: All Technical Specifications for Line Terminal Equipment – Table 1 of IDA MRA Recognition Scheme: 2011, Annex 2
    2. All Radio-Communication Equipment: All Technical Specifications for Radio-Communication Equipment – Table 2 of IDA MRA Recognition Scheme: 2011, Annex 2

- For the Hong Kong Special Administrative Region:
  1 All Radio Equipment, per KHCA 10XX-series Specifications;
  2 All GMDSS Marine Radio Equipment, per HKCA 12XX-series Specifications;
  3 All Fixed Network Equipment, per HKCA 20XX-series Specifications.
- For Japan:
  1 MIC Telecommunication Business Law (Terminal Equipment):
  - All Scope A1 - Terminal Equipment for the Purpose of Calls;
  - All Scope A2 - Other Terminal Equipment
  2 Radio Law (Radio Equipment):
  - All Scope B1 - Specified Radio Equipment specified in Article 38-2-2, paragraph 1, item 1 of the Radio Law
  - All Scope B2 - Specified Radio Equipment specified in Article 38-2-2, paragraph 1, item 2 of the Radio Law
  - All Scope B3 - Specified Radio Equipment specified in Article 38-2-2, paragraph 1, item 3 of the Radio Law

**C-** ***A Product Certification Body accredited to ISO/IEC 17065:2012 by A2LA (Product Certification Body Accreditation Certificate Number 3279.01)*** to certify Products to USA's Environmental Protection Agency (EPA) ENERGY STAR Product Specifications for:

1 Electronics and Office Equipment:
- for Telephony (ver. 3.0)
- for Audio/Video (ver. 3.0)
- for Battery Charging Systems (ver. 1.1)
- for Set-top Boxes & Cable Boxes (ver. 4.1)
- for Televisions (ver. 6.1)
- for Computers (ver. 6.0)
- for Displays (ver. 6.0)
- for Imaging Equipment (ver. 2.0)
- for Computer Servers (ver. 2.0)

2 Commercial Food Service Equipment
- for Commercial Dishwashers (ver. 2.0)
- for Commercial Ice Machines (ver. 2.0)
- for Commercial Ovens (ver. 2.1)
- for Commercial Refrigerators and Freezers

3 Lighting Products
- For Decorative Light Strings (ver. 1.5)
- For Luminaires (including sub-components) and Lamps (ver. 1.2)
- For Compact Fluorescent Lamps (CFLs) (ver. 4.3)
- For Integral LED Lamps (ver. 1.4)

4 Heating, Ventilation, and AC Products
- for Residential Ceiling Fans (ver. 3.0)
- for Residential Ventilating Fans (ver. 3.2)

5 Other
- For Water Coolers (ver. 3.0)

**D-** ***A NIST Designated Phase-I and Phase-II Conformity Assessment Body (CAB) for the following economies and regulatory authorities under the terms of the stated MRAs/Treaties:***

- Australia: ACMA (Australian Communication and Media Authority) – APEC Tel MRA -Phase I;
- Canada: (Innovation, Science and Economic development Canada - ISEDC) Foreign Certification Body – FCB – APEC Tel MRA -Phase I & Phase II;
- Chinese Taipei (Republic of China – Taiwan):
  - BSMI (Bureau of Standards, Metrology and Inspection) APEC Tel MRA -Phase I;

  - NCC (National Communications Commission) APEC Tel MRA -Phase I;
- European Union:
  - EMC Directive 2014/30/EU US-EU EMC & Telecom MRA CAB (NB)
  - Radio Equipment (RE) Directive 2014/53/EU US-EU EMC & Telecom MRA CAB (NB)
  - Low Voltage Directive (LVD) 2014/35/EU
- Hong Kong Special Administrative Region: (Office of the Telecommunications Authority – OFTA) APEC Tel MRA -Phase I & Phase II
- Israel – US-Israel MRA Phase I
- Republic of Korea (Ministry of Communications - Radio Research Laboratory) APEC Tel MRA -Phase I
- Singapore: (Infocomm Media Development Authority - IMDA) APEC Tel MRA -Phase I & Phase II;
- Japan: VCCI - Voluntary Control Council for Interference US-Japan Telecom Treaty VCCI Side Letter-
- USA:
  - ENERGY STAR Recognized Test Laboratory – US EPA
  - Telecommunications Certification Body (TCB) – US FCC;
  - Nationally Recognized Test Laboratory (NRTL) – US OSHA
- Vietnam: APEC Tel MRA -Phase I;

# 2 EUT Test Configuration

## 2.1 Justification

The EUT was configured for testing according to ANSI C63.10-2013 and FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.

The EUT was tested in a testing mode to represent worst-case results during the final qualification test.

The worst-case data rates are determined by measuring the average power, peak power and PPSD across all data rates bandwidths, and modulations.

## 2.2 EUT Exercise Software

The test firmware used was Putty and Lab tool provided by *Brava Home Inc.,* the software is comply with the standard requirements being tested against.

Please refer to the following power setting table.

The test firmware used was Tera Term, provided by *Brava Home Inc.,* the software is compliant with the standard requirements being tested against.

| Modulation | Frequency (MHz) | Power Setting |
|---|---|---|
| 802.11a mode | 5180 | 13 |
| | 5200 | 13 |
| | 5240 | 13 |
| | 5260 | 13 |
| | 5300 | 13 |
| | 5320 | 13 |
| | 5500 | 13 |
| | 5580 | 13 |
| | 5700 | 13 |
| | 5745 | 13 |
| | 5785 | 13 |
| | 5825 | 13 |

| Modulation | Frequency (MHz) | Power Setting |
|---|---|---|
| 802.11n20 mode | 5180 | 13 |
| | 5200 | 13 |
| | 5240 | 13 |
| | 5260 | 13 |
| | 5300 | 13 |
| | 5320 | 13 |
| | 5500 | 13 |
| | 5580 | 13 |
| | 5700 | 13 |
| | 5745 | 13 |
| | 5785 | 13 |
| | 5825 | 13 |

Data Rates Tested:
802.11a mode: 6Mbps
802.11n HT20 mode: MCS0

## 2.3 Duty Cycle Correction Factor

According to KDB 789033 D02 General UNII Test Procedures New Rules v02r01 section B:

All measurements are to be performed with the EUT transmitting at 100% duty cycle at its maximum power control level; however, if 100% duty cycle cannot be achieved, measurements of duty cycle, x, and maximum-power transmission duration, T, are required for each tested mode of operation.

**5.2 GHz Results**

| Radio Mode | On Time (ms) | Period (ms) | Duty Cycle (%) | Duty Cycle Correction Factor (dB) |
|---|---|---|---|---|
| 802.11a | 1.393 | 1.493 | 93.30 | 0.301 |
| 802.11n20 | 1.308 | 1.408 | 92.90 | 0.320 |

**5.3 GHz Results**

| Radio Mode | On Time (ms) | Period (ms) | Duty Cycle (%) | Duty Cycle Correction Factor (dB) |
|---|---|---|---|---|
| 802.11a | 1.393 | 1.493 | 93.30 | 0.301 |
| 802.11n20 | 1.308 | 1.408 | 92.90 | 0.320 |

### 5.6 GHz Results

| Radio Mode | On Time (ms) | Period (ms) | Duty Cycle (%) | Duty Cycle Correction Factor (dB) |
|---|---|---|---|---|
| 802.11a | 1.393 | 1.493 | 93.30 | 0.301 |
| 802.11n20 | 1.308 | 1.408 | 92.90 | 0.320 |

### 5.8 GHz Results

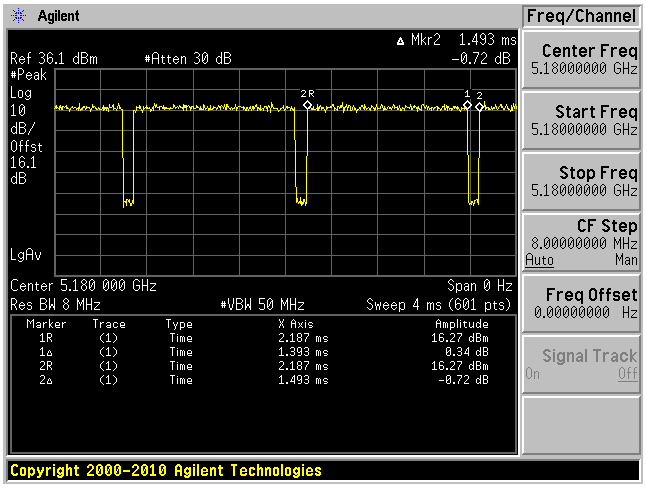
| Radio Mode | On Time (ms) | Period (ms) | Duty Cycle (%) | Duty Cycle Correction Factor (dB) |
|---|---|---|---|---|
| 802.11a | 1.393 | 1.500 | 92.87 | 0.321 |
| 802.11n20 | 1.308 | 1.408 | 92.90 | 0.320 |

Note: Duty Cycle Correction Factor = 10*log(1/duty cycle)

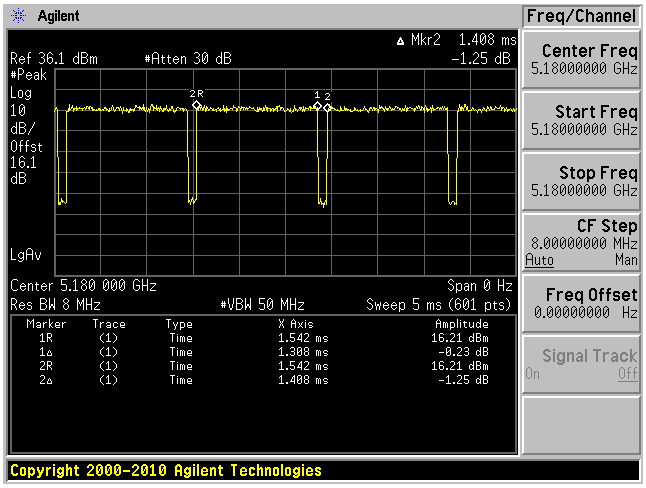
Please refer to the following plots.

**5.2 GHz**

802.11a

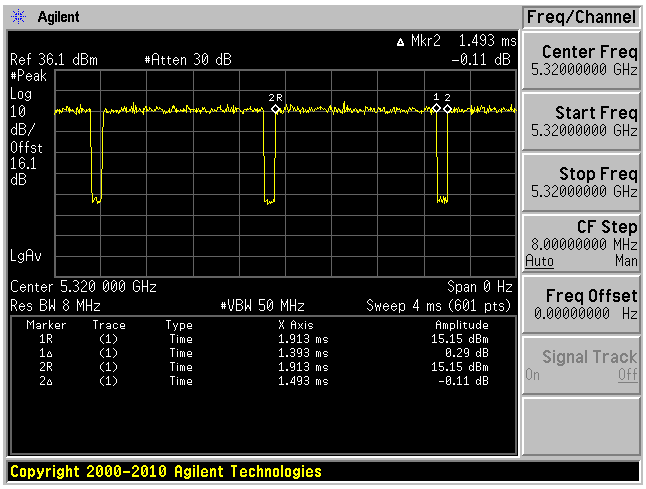



802.11n20

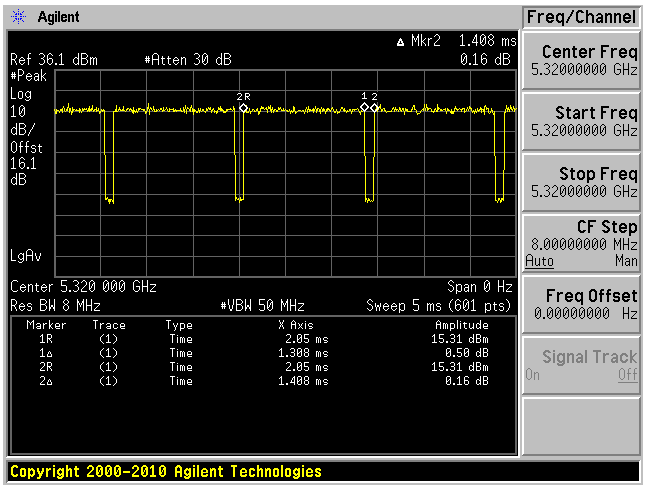


## 5.3 GHz

802.11a

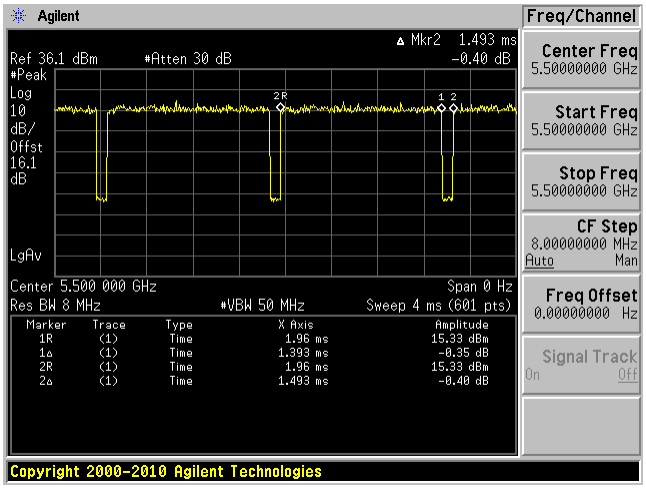



802.11n20

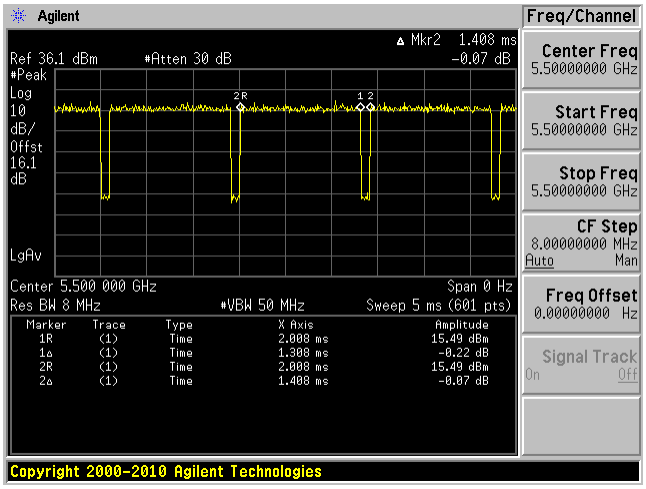



## 5.6 GHz

802.11a

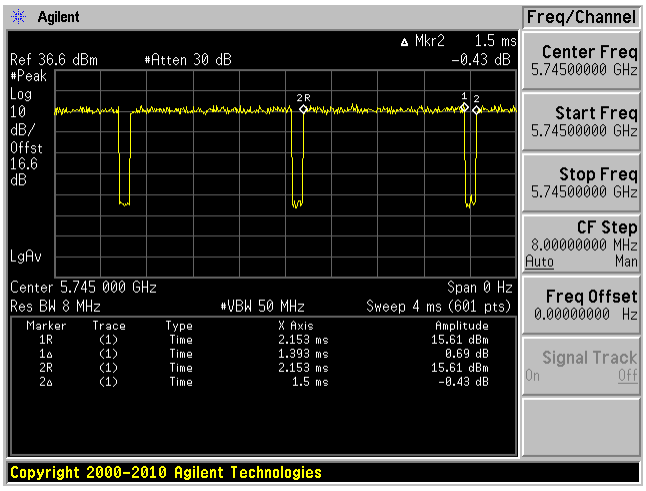



802.11n20

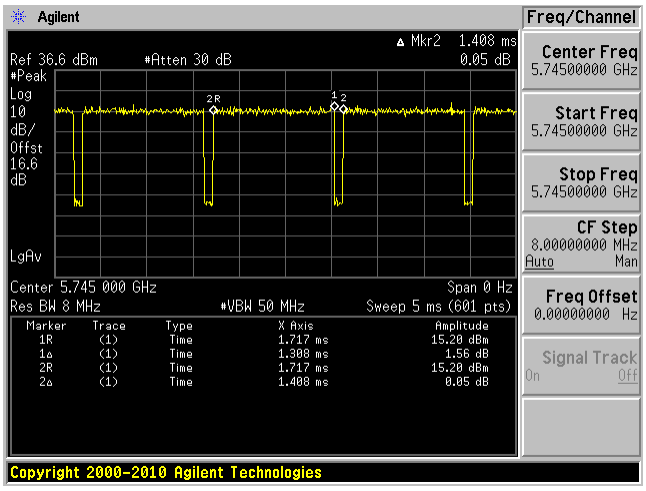


**5.8 GHz**

802.11a




802.11n20




## 2.4 Equipment Modifications

N/A

## 2.5 Local Support Equipment

| Manufacturer | Description | Model | Serial Number |
|---|---|---|---|
| Dell | Laptop | Latitude E6410 | 3CKRAQ1 |

## 2.6 Support Equipment

| Manufacturer | Description | Model |
|---|---|---|
| FTDI Ltd. | Debug Board | FT4232H Mini Module |

## 2.7 Power Supply/Adapter

N/A

## 2.8 Interface Ports and Cabling

| Description | Length (m) | To | From |
|---|---|---|---|
| RF Cable | < 1 m | PSA | EUT |
| Serial Cables | < 1 m | Debug Board | EUT |
| USB A-Male to Mini-B | < 1 m | Laptop | Debug Board |

# 3 Summary of Test Results

| FCC & ISEDC Rules | Description of Test | Result |
|---|---|---|
| FCC §2.1091, §15.407(f), ISEDC RSS-102 | RF Exposure | Compliant |
| FCC §15.203 ISEDC RSS-Gen §6.8 | Antenna Requirement | Compliant |
| FCC §15.207 ISEDC RSS-Gen §8.8 | AC Power Line Conducted Emissions | Compliant |
| FCC §2.1053, §15.205, §15.209, 15.407(b) ISEDC RSS-247 §6.2 | Spurious Radiated Emissions | Compliant |
| FCC §15.407(e) ISEDC RSS-Gen §6.2 | Emission Bandwidth | Compliant |
| FCC §407(a) ISEDC RSS-247 §6.2 | Output Power | Compliant |
| FCC §2.1051, §15.407(b) ISEDC RSS-247 §6.2 | Band Edges | Compliant |
| FCC §15.407(a) ISEDC RSS-247 §6.2 | Power Spectral Density | Compliant |
| FCC §2.1051, §15.407(b) ISEDC RSS-247 §6.2 | Spurious Emissions at Antenna Terminals | Compliant |

# 4 FCC §2.1091, §15.407(f) & ISEDC RSS-102 - RF Exposure

According to FCC §15.407(f) and §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

Limits for General Population/Uncontrolled Exposure

| Frequency Range (MHz) | Electric Field Strength (V/m) | Magnetic Field Strength (A/m) | Power Density ($mW/cm^2$) | Averaging Time (minutes) |
|---|---|---|---|---|
| Limits for General Population/Uncontrolled Exposure | | | | |
| 0.3-1.34 | 614 | 1.63 | * (100) | 30 |
| 1.34-30 | 824/f | 2.19/f | * ($180/f^2$) | 30 |
| 30-300 | 27.5 | 0.073 | 0.2 | 30 |
| 300-1500 | / | / | f/1500 | 30 |
| 1500-100,000 | / | / | 1.0 | 30 |

f = frequency in MHz
* = Plane-wave equivalent power density

Before equipment certification is granted, the procedure of IC RSS-102 must be followed concerning the exposure of humans to RF field

According to ISED RSS-102 Issue 5:

### 2.5.2 Exemption Limits for Routine Evaluation – RF Exposure Evaluation

RF exposure evaluation is required if the separation distance between the user and/or bystander and the device's radiating element is greater than 20 cm, except when the device operates as follows:

- below 20 MHz[6] and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 1 W (adjusted for tune-up tolerance);
- at or above 20 MHz and below 48 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than $4.49/f^{0.5}$ W (adjusted for tune-up tolerance), where $f$ is in MHz;
- at or above 48 MHz and below 300 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 0.6 W (adjusted for tune-up tolerance);
- at or above 300 MHz and below 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than $1.31 \times 10^{-2} f^{0.6834}$ W (adjusted for tune-up tolerance), where $f$ is in MHz;
- at or above 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 5 W (adjusted for tune-up tolerance).

In these cases, the information contained in the RF exposure technical brief may be limited to information that demonstrates how the e.i.r.p. was derived.

## 4.1 MPE Prediction

Predication of MPE limit at a given distance, Equation from OET Bulletin 65, Edition 97-01

$$S = PG/4\pi R^2$$

Where: S = power density
P = power input to antenna
G = power gain of the antenna in the direction of interest relative to an isotropic radiator
R = distance to the center of radiation of the antenna

## 4.2 MPE Results

### 5 GHz Wi-Fi

| | |
|---|---|
| Maximum output power at antenna input terminal (dBm): | 13.43 |
| Maximum output power at antenna input terminal (mW): | 22.029 |
| Prediction distance (cm): | 20 |
| Prediction frequency (MHz): | 5200 |
| Maximum Antenna Gain, typical (dBi): | 5.5 |
| Maximum Antenna Gain (numeric): | 3.548 |
| Power density of prediction frequency at 20.0 cm ($mW/cm^2$): | 0.01555 |
| FCC MPE limit for uncontrolled exposure at prediction frequency ($mW/cm^2$): | 1.0 |

The device is compliant with the requirement MPE limit for uncontrolled exposure. The maximum power density at the distance of 20 cm is 0.01555 $mW/cm^2$. Limit is 1.0 $mW/cm^2$.
Note: Wi-Fi radio is non-simultaneous dual-band operation.

## 4.3 RF exposure evaluation exemption for IC

### 5 GHz Wi-Fi

13.43 + 5.5 dBi = 18.93 dBm < $1.31\times10^{-2}f^{0.6834}$ = 4.5372 W = 36.57 dBm

Therefore the RF exposure is not required.

# 5 FCC §15.203 & ISEDC RSS-Gen §6.8 - Antenna Requirements

## 5.1 Applicable Standards

According to FCC §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. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

And according to FCC §15.407 (a) (ii), if transmitting antennas of directional gain greater than 6 dBi are used the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

According to ISEDC RSS-Gen §6.8: Transmitter Antenna

The applicant for equipment certification shall provide a list of all antenna types that may be used with the transmitter, where applicable (i.e. for transmitters with detachable antenna), indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna. The test report shall demonstrate the compliance of the transmitter with the limit for maximum equivalent isotropically radiated power (e.i.r.p.) specified in the applicable RSS, when the transmitter is equipped with any antenna type, selected from this list.

For expediting the testing, measurements may be performed using only the antenna with highest gain of each combination of transmitter and antenna type, with the transmitter output power set at the maximum level. However, the transmitter shall comply with the applicable requirements under all operational conditions and when in combination with any type of antenna from the list provided in the test report (and in the notice to be included in the user manual, provided below).

When measurements at the antenna port are used to determine the RF output power, the effective gain of the device's antenna shall be stated, based on a measurement or on data from the antenna's manufacturer.

The test report shall state the RF power, output power setting and spurious emission measurements with each antenna type that is used with the transmitter being tested.

For licence-exempt equipment with detachable antennas, the user manual shall also contain the following notice in a conspicuous location:

This radio transmitter [enter the device's ISED certification number] has been approved by Innovation, Science and Economic Development Canada to operate with the antenna types listed below, with the maximum permissible gain indicated. Antenna types not included in this list that have a gain greater than the maximum gain indicated for any type listed are strictly prohibited for use with this device.

Immediately following the above notice, the manufacturer shall provide a list of all antenna types which can be used with the transmitter, indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna type.

## 5.2 Antenna List

The antennas used by the EUT have nonstandard U.FL Connectors.

| Antenna usage | Band of Operation (GHz) | Maximum Antenna Gain (dBi) |
|---|---|---|
| Wi-Fi | 2400-2500 | 3.0 |
| Wi-Fi | 4900-6000 | 5.5 |

# 6 FCC §15.207 & ISEDC RSS-Gen §8.8 - AC Power Line Conducted Emissions

## 6.1 Applicable Standards

As per FCC §15.207 and ISEDC RSS GEN §8.8

For an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 μH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequencies ranges.

| Frequency of Emission (MHz) | Conducted Limit (dBuV) | |
|---|---|---|
| | Quasi-Peak | Average |
| 0.15-0.5 | 66 to 56 Note1 | 56 to 46 Note2 |
| 0.5-5 | 56 | 46 |
| 5-30 | 60 | 50 |

*Note1: Decreases with the logarithm of the frequency.*
*Note2: A linear average detector is required*

## 6.2 Test Setup

The measurement was performed at shield room, using the setup per ANSI C63.10-2013 measurement procedure. The specification used was FCC §15.207 limits and and ISEDC RSS GEN §8.8.

External I/O cables were draped along the edge of the test table and bundle when necessary.
The AC/DC power adapter of the EUT was connected with LISN-1 which provided 120 V / 60 Hz AC power.

## 6.3 Test Procedure

During the conducted emissions test, the power cord of the EUT host system was connected to the mains outlet of the LISN-1 and the power cords of support equipment were connected to LISN-2.

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All data was recorded in the peak, quasi-peak, and average detection mode. Quasi-Peak readings are distinguished with a “QP.” Average readings are distinguished with an “Ave”.

## 6.4 Corrected Amplitude and Margin Calculation

The Corrected Amplitude (CA) is calculated by adding the Cable Loss (CL), the Attenuator Factor (Atten) to indicated Amplitude (Ai) reading. The basic equation is as follows:

CA = Ai + CL + Atten

For example, a corrected amplitude of 46.2 dBuV = Indicated Reading (32.5 dBuV) + Cable Loss (3.7 dB) + Attenuator (10 dB)

The "**Margin**" column of the following data tables indicates the degree of compliance within the applicable limit. For example, a margin of -7 dB means the emission is 7 dB below the maximum limit. The equation for margin calculation is as follows:

Margin = Corrected Amplitude - Limit

## 6.5 Test Equipment List and Details

| Manufacturer | Description | Model No. | Serial No. | Calibration Date | Calibration Interval |
|---|---|---|---|---|---|
| Rohde & Schwarz | Receiver, EMI Test | ESCI 1166.5950.03 | 100338 | 2018-07-05 | 2 years |
| Rohde & Schwarz | Impulse Limiter | ESH3-Z2 | 101964 | 2017-07-24 | 1 year |
| Solar Electronics Company | High Pass Filter | Type 7930-100 | 7930150203 | 2018-02-28 | 1 year |
| Suirong | 30 ft conductive emission cable | LMR 400 | - | N/R | N/A |
| FCC | LISN | FCC-LISN-50-25-2-10-CISPR16 | 160129 | 2018-04-04 | 1 year |
| Vasona | Test software | V6.0 build 11 | 10400213 | N/R | N/R |
| Rohde & Schwarz | Receiver, EMI Test | ESCI 1166.5950.03 | 100338 | 2018-07-05 | 2 years |

***Statement of Traceability: BACL Corp.*** *attests that all of the calibrations on the equipment items listed above were traceable to NIST or to another internationally recognized National Metrology Institute (NMI), and were compliant with A2LA Policy P102 (dated 09 June 2016) "A2LA Policy on Metrological Traceability".*

## 6.6 Test Environmental Conditions

| | |
|---|---|
| **Temperature:** | 23º C |
| **Relative Humidity:** | 42 % |
| **ATM Pressure:** | 101.31 kPa |

*The testing was performed by Vincent Licata on 2018-07-16 at Conducted Test Site.*

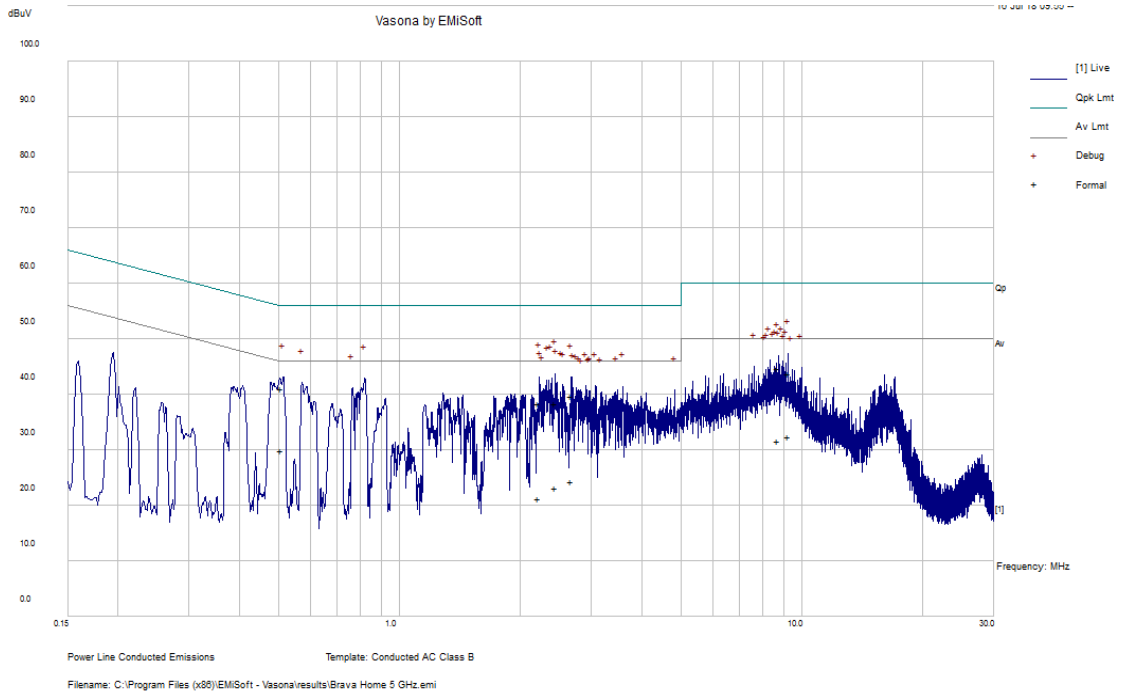
## 6.7 Summary of Test Results

According to the recorded data in following table, the EUT complied with the FCC Part 15 and RSS-Gen standards' conducted emissions limits, with the margin reading of:

| **Connection: AC/DC adapter connected to 120 V/60 Hz, AC** | | | |
|---|---|---|---|
| **Margin (dB)** | **Frequency (MHz)** | **Conductor Mode (Line/Neutral)** | **Range (MHz)** |
| -13.48 | 8.735629 | Neutral | 0.15-30 |

## 6.8 Conducted Emissions Test Plots and Data

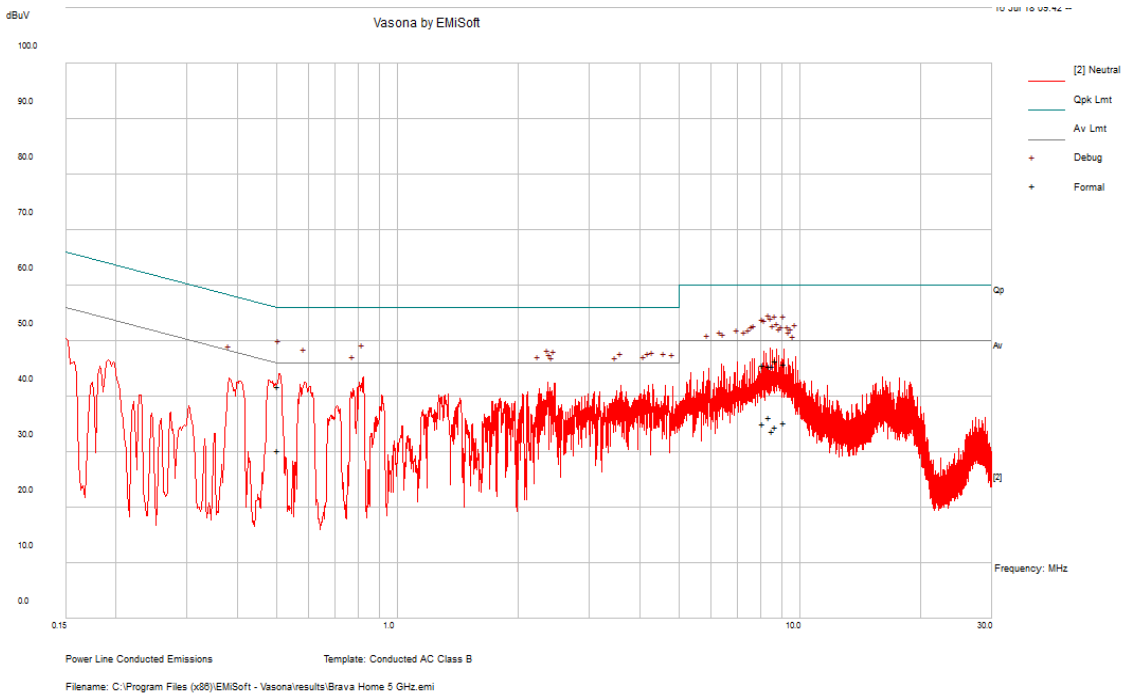
**120 V, 60 Hz – Line**




| Frequency (MHz) | Corrected Amplitude (dBuV) | Conductor (Line/Neutral) | Limit (dBuV) | Margin (dB) | Detector (QP/Ave.) |
|---|---|---|---|---|---|
| 2.441934 | 38.35 | Line | 56 | -17.65 | QP |
| 9.248492 | 43.78 | Line | 60 | -16.22 | QP |
| 2.211056 | 38.3 | Line | 56 | -17.7 | QP |
| 2.67179 | 39.65 | Line | 56 | -16.35 | QP |
| 0.507725 | 41.09 | Line | 56 | -14.91 | QP |
| 8.73368 | 44.82 | Line | 60 | -15.18 | QP |

| Frequency (MHz) | Corrected Amplitude (dBuV) | Conductor (Line/Neutral) | Limit (dBuV) | Margin (dB) | Detector (QP/Ave.) |
|---|---|---|---|---|---|
| 2.441934 | 23.24 | Line | 46 | -22.76 | Ave. |
| 9.248492 | 32.42 | Line | 50 | -17.58 | Ave. |
| 2.211056 | 21.38 | Line | 46 | -24.62 | Ave. |
| 2.67179 | 24.31 | Line | 46 | -21.69 | Ave. |
| 0.507725 | 30 | Line | 46 | -16 | Ave. |
| 8.73368 | 31.7 | Line | 50 | -18.3 | Ave. |

## 120 V, 60 Hz – Neutral




| Frequency (MHz) | Corrected Amplitude (dBuV) | Conductor (Line/Neutral) | Limit (dBuV) | Margin (dB) | Detector (QP/Ave.) |
|---|---|---|---|---|---|
| 8.42697 | 45.51 | Neutral | 60 | -14.49 | QP |
| 9.146459 | 45.92 | Neutral | 60 | -14.08 | QP |
| **8.735629** | **46.52** | **Neutral** | **60** | **-13.48** | **QP** |
| 8.53117 | 45.51 | Neutral | 60 | -14.49 | QP |
| 8.116019 | 45.65 | Neutral | 60 | -14.35 | QP |
| 0.50355 | 41.82 | Neutral | 56 | -14.18 | QP |

| Frequency (MHz) | Corrected Amplitude (dBuV) | Conductor (Line/Neutral) | Limit (dBuV) | Margin (dB) | Detector (QP/Ave.) |
|---|---|---|---|---|---|
| 8.42697 | 36.34 | Neutral | 50 | -13.66 | Ave. |
| 9.146459 | 35.32 | Neutral | 50 | -14.68 | Ave. |
| 8.735629 | 34.51 | Neutral | 50 | -15.49 | Ave. |
| 8.53117 | 33.84 | Neutral | 50 | -16.16 | Ave. |
| 8.116019 | 35.09 | Neutral | 50 | -14.91 | Ave. |
| 0.50355 | 30.34 | Neutral | 46 | -15.66 | Ave. |

Note: testing was performed at worst case 5200MHz 802.11n20.

# 7 FCC §15.209, §15.407(b) & ISEDC RSS-247 §6.2 - Spurious Radiated Emissions

## 7.1 Applicable Standard

As Per FCC §15.205(a) except as show in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

| MHz | MHz | MHz | GHz |
|---|---|---|---|
| 0.090 – 0.110 | 16.42 – 16.423 | 960 – 1240 | 4. 5 – 5. 15 |
| 0.495 – 0.505 | 16.69475 – 16.69525 | 1300 – 1427 | 5. 35 – 5. 46 |
| 2.1735 – 2.1905 | 25.5 – 25.67 | 1435 – 1626.5 | 7.25 – 7.75 |
| 4.125 – 4.128 | 37.5 – 38.25 | 1645.5 – 1646.5 | 8.025 – 8.5 |
| 4.17725 – 4.17775 | 73 – 74.6 | 1660 – 1710 | 9.0 – 9.2 |
| 4.20725 – 4.20775 | 74.8 – 75.2 | 1718.8 – 1722.2 | 9.3 – 9.5 |
| 6.215 – 6.218 | 108 – 121.94 | 2200 – 2300 | 10.6 – 12.7 |
| 6.26775 – 6.26825 | 123 – 138 | 2310 – 2390 | 13.25 – 13.4 |
| 6.31175 – 6.31225 | 149.9 – 150.05 | 2483.5 – 2500 | 14.47 – 14.5 |
| 8.291 – 8.294 | 156.52475 – 156.52525 | 2690 – 2900 | 15.35 – 16.2 |
| 8.362 – 8.366 | 156.7 – 156.9 | 3260 – 3267 | 17.7 – 21.4 |
| 8.37625 – 8.38675 | 162.0125 –167.17 | 3.332 – 3.339 | 22.01 – 23.12 |
| 8.41425 – 8.41475 | 167.72 – 173.2 | 3 3458 – 3 358 | 23.6 – 24.0 |
| 12.29 – 12.293 | 240 – 285 | 3.600 – 4.400 | 31.2 – 31.8 |
| 12.51975 – 12.52025 | 322 – 335.4 | | 36.43 – 36.5 |
| 12.57675 – 12.57725 | 399.9 – 410 | | Above 38.6 |
| 13.36 – 13.41 | 608 – 614 | | |

As per FCC §15.209: The emissions from an intentional radiator shall not exceed the field strength levels specified in the following table

| Frequency (MHz) | Field Strength (micro volts/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 Note 1 | 3 |
| 88 - 216 | 150 Note 1 | 3 |
| 216 - 960 | 200 Note 1 | 3 |
| Above 960 | 500 | 3 |

Note 1: 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.

As per FCC Part 15.407 (b):

(1) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.

(2) For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.

(3) For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.

(4) For transmitters operating in the 5.725-5.85 GHz band:

(i) All emissions shall be limited to a level of −27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

(ii) Devices certified before March 2, 2017 with antenna gain greater than 10 dBi may demonstrate compliance with the emission limits in §15.247(d), but manufacturing, marketing and importing of devices certified under this alternative must cease by March 2, 2018. Devices certified before March 2, 2018 with antenna gain of 10 dBi or less may demonstrate compliance with the emission limits in §15.247(d), but manufacturing, marketing and importing of devices certified under this alternative must cease before March 2, 2020.

(5) The emission measurements shall be performed using a minimum resolution bandwidth of 1 MHz. A lower resolution bandwidth may be employed near the band edge, when necessary, provided the measured energy is integrated to show the total power over 1 MHz.

(6) Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in §15.209. Further, any U-NII devices using an AC power line are required to comply also with the conducted limits set forth in §15.207.

(7) The provisions of §15.205 apply to intentional radiators operating under this section.

(8) When measuring the emission limits, the nominal carrier frequency shall be adjusted as close to the upper and lower frequency band edges as the design of the equipment permits.

As per ISEDC RSS-247 §6.2

For transmitters with operating frequencies in the band 5150-5250 MHz, all emissions outside the band 5150-5350 MHz shall not exceed -27 dBm/MHz e.i.r.p. Any unwanted emissions that fall into the band 5250-5350 MHz shall be attenuated below the channel power by at least 26 dB, when measured using a resolution bandwidth between 1 and 5% of the occupied bandwidth (i.e. 99% bandwidth), above 5250 MHz. The 26 dB bandwidth may fall into the 5250-5350 MHz band; however, if the occupied bandwidth also falls within the 5250-5350 MHz band, the transmission is considered as intentional and the devices shall comply with all requirements in the band 5250-5350 MHz including implementing dynamic frequency selection (DFS) and TPC, on the portion of the emission that resides in the 5250-5350 MHz band.

Devices shall comply with the following:

a) All emissions outside the band 5250-5350 MHz shall not exceed -27 dBm/MHz e.i.r.p.; or

b) All emissions outside the band 5150-5350 MHz shall not exceed -27 dBm/MHz e.i.r.p. and its power shall comply with the spectral power density for operation within the band 5150-5250 MHz. The device,

except devices installed in vehicles, shall be labelled or include in the user manual the following text "for indoor use only."

Emissions outside the band 5470-5725 MHz shall not exceed -27 dBm/MHz e.i.r.p. However, devices with bandwidth overlapping the band edge of 5725 MHz can meet the emission limit of -27 dBm/MHz e.i.r.p. at 5850 MHz instead of 5725 MHz.

Devices operating in the band 5725-5850 MHz with antenna gain greater than 10 dBi can have unwanted emissions that comply with either the limits in this section or in section 5.5 until six (6) months after the publication date of this standard for certification. Certified devices that do not comply with emission limits in this section shall not be manufactured, imported, distributed, leased, offered for sale or sold after April 1, 2018.

Devices operating in the band 5725-5850 MHz with antenna gain of 10 dBi or less can have unwanted emissions that comply with either the limits in this section or in section 5.5 until April 1, 2018 for certification. Certified devices that do not comply with emission limits in this section shall not be manufactured, imported, distributed, leased, offered for sale or sold after April 1, 2020.

Devices operating in the band 5725-5850 MHz shall have e.i.r.p. of unwanted emissions comply with the following:

a) 27 dBm/MHz at frequencies from the band edges decreasing linearly to 15.6 dBm/MHz at 5 MHz above or below the band edges;

b) 15.6 dBm/MHz at 5 MHz above or below the band edges decreasing linearly to 10 dBm/MHz at 25 MHz above or below the band edges;

c) 10 dBm/MHz at 25 MHz above or below the band edges decreasing linearly to -27 dBm/MHz at 75 MHz above or below the band edges; and

d) -27 dBm/MHz at frequencies more than 75 MHz above or below the band edges.

## 7.2 Test Setup

The radiated emissions tests were performed in the 5-meter Chamber, using the setup in accordance with ANSI C63.10-2013. The specification used was the FCC 15.407 and ISEDC RSS-247 limits.

The spacing between the peripherals was 10 centimeters.

External I/O cables were draped along the edge of the test table and bundle when necessary.

## 7.3 Test Procedure

For the radiated emissions test, the EUT host, and all support equipment power cords were connected to the AC floor outlet.

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

The EUT is set 3 meter away from the testing antenna, which is varied from 1-4 meter, and the EUT is placed on a turntable, which is 0.8 meter or 1.5 meter above ground plane, the table shall be rotated for 360 degrees to find out the highest emission. The receiving antenna should be changed the polarization both of horizontal and vertical.

The spectrum analyzer or receiver is set as:

Below 1000 MHz:

RBW = 100 kHz / VBW = 300 kHz / Sweep = Auto

Above 1000 MHz:

(1) Peak: RBW = 1MHz / VBW = 3MHz / Sweep = 100 ms
(2) Average: RBW = 1MHz / VBW = 1 / T / Sweep = Auto

## 7.4 Corrected Amplitude and Margin Calculation

The Corrected Amplitude (CA) is calculated by adding the Antenna Factor (AF), the Cable Loss (CL), the Attenuator Factor (Atten) and subtracting the Amplifier Gain (Ga) to indicated Amplitude (Ai) reading. The basic equation is as follows:

CA = Ai + AF + CL + Atten – Ga

For example, a corrected amplitude of 40.3 dBuV/m = Indicated Reading (32.5 dBuV) + Antenna Factor (+23.5dB) + Cable Loss (3.7 dB) + Attenuator (10 dB) - Amplifier Gain (29.4 dB)

The "**Margin**" column of the following data tables indicates the degree of compliance within the applicable limit. For example, a margin of -7 dB means the emission is 7 dB below the maximum limit for Class A. The equation for margin calculation is as follows:

Margin = Corrected Amplitude – Limit

## 7.5 Test Equipment List and Details

| Manufacturer | Description | Model No. | Serial No. | Calibration Date | Calibration Interval |
|---|---|---|---|---|---|
| Rohde and Schwarz | Receiver, EMI Test | ESCI 1166.5950K03 | 100337 | 2017-07-15 | 2 years |
| Agilent | Analyzer, Spectrum | E4446A | MY48250238 | 2018-05-08 | 1 year |
| Sunol Sciences | System Controller | SC99V | 011003-1 | N/R | N/A |
| Sunol Sciences | Antenna, Biconi-Log | JB3 | A020106-3 | 2017-11-02 | 2 years |
| Wisewave | Antenna, Horn | ARH-4223-02 | 10555-01 | 2018-02-14 | 2 years |
| Wisewave | Antenna, Horn | ARH-2823-02 | 10555-02 | 2017-12-15 | 2 years |
| IW | AOBOR Hi frequency Co AX Cable | DC 1531 | KPS-1501A3960K PS | 2017-08-05 | 1 year |
| - | SMA cable | - | C00011 | Each time[1] | N/A |
| - | N-Type Cable | - | C00012 | Each time[1] | N/A |
| - | N-Type Cable | - | C00014 | Each time[1] | N/A |
| HP | Pre-Amplifier | 8449B | 3147A00400 | 2018-02-02 | 1 year |
| SONOMA INSTRUMENT | Pre-Amplifier | 315 | 303125 | 2017-08-01 | 1 year |
| Sunol Sciences | Antenna, Horn | DRH-118 | A052704 | 2017-03-27 | 2 years |
| Vasona | Test software | V6.0 build 11 | 10400213 | N/R | N/R |

Note[1]: cables included in the test set-up will be checked each time before testing.
***Statement of Traceability: BACL Corp.*** *attests that all of the calibrations on the equipment items listed above were traceable to NIST or to another internationally recognized National Metrology Institute (NMI), and were compliant with A2LA Policy P102 (dated 09 June 2016) "A2LA Policy on Metrological Traceability".*

## 7.6 Test Environmental Conditions

| | |
|---|---|
| **Temperature:** | 22-24 ºC |
| **Relative Humidity:** | 40-41 % |
| **ATM Pressure:** | 103.1-104.1 kPa |

*The testing was performed by Vincent Licata and Chin Ming Lui from 2018-07-03 to 2018-07-20 in 5m chamber 3 and 10m chamber 1.*

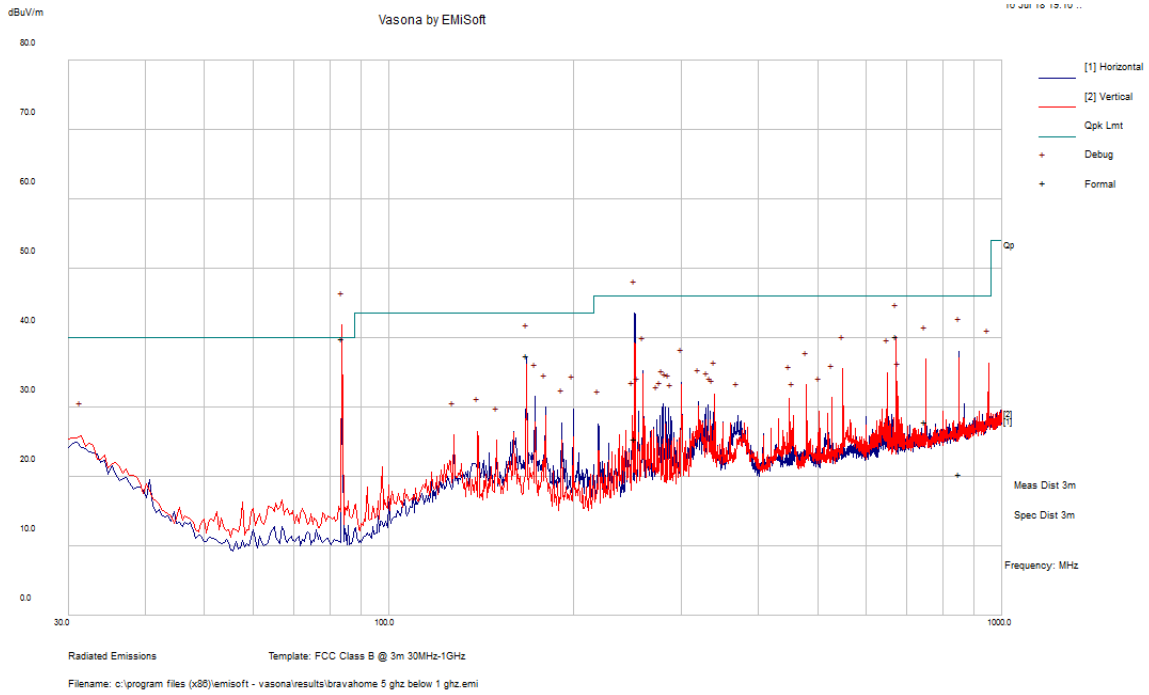
## 7.7 Summary of Test Results

According to the data hereinafter, the EUT complied with the FCC Part 15.407 and RSS-247 standards' radiated emissions limits, and had the worst margin of:

| **Mode: Transmitting** | | | |
|---|---|---|---|
| **Margin (dB)** | **Frequency (MHz)** | **Polarization (Horizontal/Vertical)** | **Mode, Channel** |
| -0.07 | 83.9935 | Vertical | n20 mode, 5200 MHz |

## 7.8 Radiated Emissions Test Result Data

### 1) 30 MHz – 1 GHz




| Frequency (MHz) | Corrected Amplitude (dBµV/m) | Antenna Height (cm) | Antenna Polarity (H/V) | Turntable Azimuth (degrees) | Limit (dBµV/m) | Margin (dB) | Comment |
|---|---|---|---|---|---|---|---|
| **83.9935** | **39.93** | **127** | **V** | **214** | **40** | **-0.07** | **QP** |
| 251.8928 | 25.46 | 134 | H | 276 | 46 | -20.54 | QP |
| 672.023 | 40.23 | 109 | V | 0 | 46 | -5.77 | QP |
| 167.9855 | 37.5 | 169 | H | 280 | 43.5 | -6 | QP |
| 850.3543 | 20.37 | 120 | H | 243 | 46 | -25.63 | QP |
| 750.0105 | 27.92 | 155 | V | 193 | 46 | -18.08 | QP |

Note: testing was performed at worst case 5200 MHz 802.11n20.

**2) 1–40 GHz**

**5150 - 5250 MHz**

802.11a mode

| Frequency (MHz) | S.A. Reading (dBµV) | Turntable Azimuth (degrees) | Test Antenna | | | Cable Loss (dB) | Pre-Amp. (dB) | Cord. Reading (dBµV/m) | FCC/ISEDC | | Comments (PK/Ave.) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Height (cm) | Polarity (H/V) | Factor (dB/m) | | | | Limit (dBµV/m) | Margin (dB) | |
| Low Channel 5180 MHz | | | | | | | | | | | |
| 5180 | 59.96 | 71 | 300 | H | 33.59 | 8.53 | 0.00 | 102.08 | - | - | PK |
| 5180 | 50.24 | 71 | 300 | H | 33.59 | 8.53 | 0.00 | 92.36 | - | - | AV |
| 5180 | 65.91 | 158 | 285 | V | 33.59 | 8.53 | 0.00 | 108.03 | - | - | PK |
| 5180 | 56.72 | 158 | 285 | V | 33.59 | 8.53 | 0.00 | 98.84 | - | - | AV |
| 5150 | 54.09 | 71 | 300 | H | 33.53 | 9.71 | 33.15 | 64.17 | 74.00 | -9.83 | PK |
| 5150 | 37.99 | 71 | 300 | H | 33.53 | 9.71 | 33.15 | 48.07 | 54.00 | -5.93 | AV |
| 5150 | 58.39 | 158 | 285 | V | 33.53 | 9.71 | 33.15 | 68.47 | 74.00 | -5.53 | PK |
| 5150 | 42.40 | 158 | 285 | V | 33.53 | 9.71 | 33.15 | 52.48 | 54.00 | -1.52 | AV |
| 10360 | 45.20 | 0 | 100 | V | 38.15 | 14.55 | 32.88 | 65.02 | 74.00 | -8.98 | PK |
| 10360 | 33.69 | 0 | 100 | V | 38.15 | 14.55 | 32.88 | 53.51 | 54.00 | -0.49 | AV |
| Middle Channel 5200 MHz | | | | | | | | | | | |
| 5200 | 63.55 | 43 | 300 | H | 33.59 | 8.53 | 0.00 | 105.67 | - | - | PK |
| 5200 | 54.32 | 43 | 300 | H | 33.59 | 8.53 | 0.00 | 96.44 | - | - | AV |
| 5200 | 65.50 | 153 | 292 | V | 33.59 | 8.53 | 0.00 | 107.62 | - | - | PK |
| 5200 | 56.17 | 153 | 292 | V | 33.59 | 8.53 | 0.00 | 98.29 | - | - | AV |
| 10400 | 45.16 | 0 | 100 | V | 38.20 | 14.55 | 32.88 | 65.03 | 74.00 | -8.97 | PK |
| 10400 | 33.53 | 0 | 100 | V | 38.20 | 14.55 | 32.88 | 53.40 | 54.00 | -0.60 | AV |
| High Channel 5240 MHz | | | | | | | | | | | |
| 5240 | 63.23 | 46 | 300 | H | 33.62 | 8.53 | 0.00 | 105.38 | - | - | PK |
| 5240 | 54.19 | 46 | 300 | H | 33.62 | 8.53 | 0.00 | 96.34 | - | - | AV |
| 5240 | 65.77 | 155 | 290 | V | 33.62 | 8.53 | 0.00 | 107.92 | - | - | PK |
| 5240 | 56.54 | 155 | 290 | V | 33.62 | 8.53 | 0.00 | 98.69 | - | - | AV |
| 10480 | 45.09 | 0 | 100 | V | 38.26 | 14.59 | 32.88 | 65.06 | 74.00 | -8.94 | PK |
| 10480 | 33.47 | 0 | 100 | V | 38.26 | 14.59 | 32.88 | 53.44 | 54.00 | -0.56 | AV |

802.11n20 mode

| Frequency (MHz) | S.A. Reading (dBµV) | Turntable Azimuth (degrees) | Test Antenna | | | Cable Loss (dB) | Pre-Amp. (dB) | Cord. Reading (dBµV/m) | FCC/ISEDC | | Comments (PK/Ave.) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Height (cm) | Polarity (H/V) | Factor (dB/m) | | | | Limit (dBµV/m) | Margin (dB) | |
| Low Channel 5180 MHz | | | | | | | | | | | |
| 5180 | 62.02 | 47 | 300 | H | 33.59 | 8.53 | 0.00 | 104.14 | - | - | PK |
| 5180 | 53.51 | 47 | 300 | H | 33.59 | 8.53 | 0.00 | 95.63 | - | - | AV |
| 5180 | 64.77 | 215 | 276 | V | 33.59 | 8.53 | 0.00 | 106.89 | - | - | PK |
| 5180 | 55.87 | 215 | 276 | V | 33.59 | 8.53 | 0.00 | 97.99 | - | - | AV |
| 5150 | 59.31 | 47 | 300 | H | 33.53 | 9.71 | 33.15 | 69.39 | 74.00 | -4.61 | PK |
| 5150 | 40.03 | 47 | 300 | H | 33.53 | 9.71 | 33.15 | 50.11 | 54.00 | -3.89 | AV |
| 5150 | 62.41 | 215 | 276 | V | 33.53 | 9.71 | 33.15 | 72.49 | 74.00 | -1.51 | PK |
| 5150 | 42.87 | 215 | 276 | V | 33.53 | 9.71 | 33.15 | 52.95 | 54.00 | -1.05 | AV |
| 10360 | 44.22 | 0 | 100 | V | 38.15 | 14.55 | 32.88 | 64.04 | 74.00 | -9.96 | PK |
| 10360 | 33.07 | 0 | 100 | V | 38.15 | 14.55 | 32.88 | 52.89 | 54.00 | -1.11 | AV |
| Middle Channel 5200 MHz | | | | | | | | | | | |
| 5200 | 63.72 | 47 | 300 | H | 33.59 | 8.53 | 0.00 | 105.84 | - | - | PK |
| 5200 | 54.83 | 47 | 300 | H | 33.59 | 8.53 | 0.00 | 96.95 | - | - | AV |
| 5200 | 65.81 | 226 | 288 | V | 33.59 | 8.53 | 0.00 | 107.93 | - | - | PK |
| 5200 | 56.53 | 226 | 288 | V | 33.59 | 8.53 | 0.00 | 98.65 | - | - | AV |
| 10400 | 44.63 | 0 | 100 | V | 38.20 | 14.55 | 32.88 | 64.50 | 74.00 | -9.50 | PK |
| 10400 | 33.51 | 0 | 100 | V | 38.20 | 14.55 | 32.88 | 53.38 | 54.00 | -0.62 | AV |
| High Channel 5240 MHz | | | | | | | | | | | |
| 5240 | 62.50 | 47 | 300 | H | 33.62 | 8.53 | 0.00 | 104.65 | - | - | PK |
| 5240 | 54.11 | 47 | 300 | H | 33.62 | 8.53 | 0.00 | 96.26 | - | - | AV |
| 5240 | 65.36 | 222 | 280 | V | 33.62 | 8.53 | 0.00 | 107.51 | - | - | PK |
| 5240 | 56.29 | 222 | 280 | V | 33.62 | 8.53 | 0.00 | 98.44 | - | - | AV |
| 10480 | 44.71 | 0 | 100 | V | 38.26 | 14.59 | 32.88 | 64.68 | 74.00 | -9.32 | PK |
| 10480 | 33.76 | 0 | 100 | V | 38.26 | 14.59 | 32.88 | 53.73 | 54.00 | -0.27 | AV |

**5250 - 5350 MHz**

802.11a mode

| Frequency (MHz) | S.A. Reading (dBµV) | Turntable Azimuth (degrees) | Test Antenna | | | Cable Loss (dB) | Pre-Amp. (dB) | Cord. Reading (dBµV/m) | FCC/ISEDC | | Comments (PK/Ave.) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Height (cm) | Polarity (H/V) | Factor (dB/m) | | | | Limit (dBµV/m) | Margin (dB) | |
| Low Channel 5260 MHz | | | | | | | | | | | |
| 5260 | 61.89 | 48 | 300 | H | 33.62 | 8.61 | 0.00 | 104.12 | - | - | PK |
| 5260 | 52.81 | 48 | 300 | H | 33.62 | 8.61 | 0.00 | 95.04 | - | - | AV |
| 5260 | 63.41 | 174 | 292 | V | 33.62 | 8.61 | 0.00 | 105.64 | - | - | PK |
| 5260 | 54.07 | 174 | 292 | V | 33.62 | 8.61 | 0.00 | 96.30 | - | - | AV |
| 10520 | 44.09 | 0 | 100 | V | 38.26 | 14.59 | 32.88 | 64.06 | 74.00 | -9.94 | PK |
| 10520 | 32.56 | 0 | 100 | V | 38.26 | 14.59 | 32.88 | 52.53 | 54.00 | -1.47 | AV |
| Middle Channel 5300 MHz | | | | | | | | | | | |
| 5300 | 58.73 | 234 | 290 | H | 33.78 | 8.61 | 0.00 | 101.12 | - | - | PK |
| 5300 | 49.39 | 234 | 290 | H | 33.78 | 8.61 | 0.00 | 91.78 | - | - | AV |
| 5300 | 62.93 | 161 | 280 | V | 33.78 | 8.61 | 0.00 | 105.32 | - | - | PK |
| 5300 | 53.59 | 161 | 280 | V | 33.78 | 8.61 | 0.00 | 95.98 | - | - | AV |
| 10600 | 44.11 | 0 | 100 | V | 38.29 | 14.64 | 32.88 | 64.16 | 74.00 | -9.84 | PK |
| 10600 | 32.62 | 0 | 100 | V | 38.29 | 14.64 | 32.88 | 52.67 | 54.00 | -1.33 | AV |
| High Channel 5320 MHz | | | | | | | | | | | |
| 5320 | 59.39 | 335 | 300 | H | 33.78 | 8.61 | 0.00 | 101.78 | - | - | PK |
| 5320 | 49.53 | 335 | 300 | H | 33.78 | 8.61 | 0.00 | 91.92 | - | - | AV |
| 5320 | 63.90 | 129 | 277 | V | 33.78 | 8.61 | 0.00 | 106.29 | - | - | PK |
| 5320 | 54.43 | 129 | 277 | V | 33.78 | 8.61 | 0.00 | 96.82 | - | - | AV |
| 5350 | 51.12 | 335 | 300 | H | 33.76 | 9.81 | 33.22 | 61.46 | 74.00 | -12.5 | PK |
| 5350 | 36.85 | 335 | 300 | H | 33.76 | 9.81 | 33.22 | 47.19 | 54.00 | -6.81 | AV |
| 5350 | 55.01 | 129 | 277 | V | 33.76 | 9.81 | 33.22 | 65.35 | 74.00 | -8.65 | PK |
| 5350 | 39.14 | 129 | 277 | V | 33.76 | 9.81 | 33.22 | 49.48 | 54.00 | -4.52 | AV |
| 10640 | 44.18 | 0 | 100 | V | 38.28 | 14.64 | 32.88 | 64.22 | 74.00 | -9.78 | PK |
| 10640 | 32.69 | 0 | 100 | V | 38.28 | 14.64 | 32.88 | 52.73 | 54.00 | -1.27 | AV |

802.11n20 mode

| Frequency (MHz) | S.A. Reading (dBµV) | Turntable Azimuth (degrees) | Test Antenna | | | Cable Loss (dB) | Pre-Amp. (dB) | Cord. Reading (dBµV/m) | FCC/ISEDC | | Comments (PK/Ave.) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Height (cm) | Polarity (H/V) | Factor (dB/m) | | | | Limit (dBµV/m) | Margin (dB) | |
| Low Channel 5260 MHz | | | | | | | | | | | |
| 5260 | 56.10 | 224 | 300 | H | 33.62 | 8.61 | 0.00 | 98.33 | - | - | PK |
| 5260 | 47.74 | 224 | 300 | H | 33.62 | 8.61 | 0.00 | 89.97 | - | - | AV |
| 5260 | 62.55 | 113 | 286 | V | 33.62 | 8.61 | 0.00 | 104.78 | - | - | PK |
| 5260 | 53.73 | 113 | 286 | V | 33.62 | 8.61 | 0.00 | 95.96 | - | - | AV |
| 10520 | 43.66 | 0 | 100 | V | 38.26 | 14.59 | 32.88 | 63.63 | 74.00 | -10.4 | PK |
| 10520 | 33.04 | 0 | 100 | V | 38.26 | 14.59 | 32.88 | 53.01 | 54.00 | -0.99 | AV |
| Middle Channel 5300 MHz | | | | | | | | | | | |
| 5300 | 55.78 | 235 | 289 | H | 33.78 | 8.61 | 0.00 | 98.17 | - | - | PK |
| 5300 | 47.28 | 235 | 289 | H | 33.78 | 8.61 | 0.00 | 89.67 | - | - | AV |
| 5300 | 62.82 | 126 | 284 | V | 33.78 | 8.61 | 0.00 | 105.21 | - | - | PK |
| 5300 | 53.91 | 126 | 284 | V | 33.78 | 8.61 | 0.00 | 96.30 | - | - | AV |
| 10600 | 44.27 | 0 | 100 | V | 38.29 | 14.64 | 32.88 | 64.32 | 74.00 | -9.68 | PK |
| 10600 | 32.79 | 0 | 100 | V | 38.29 | 14.64 | 32.88 | 52.84 | 54.00 | -1.16 | AV |
| High Channel 5320 MHz | | | | | | | | | | | |
| 5320 | 54.94 | 234 | 300 | H | 33.78 | 8.61 | 0.00 | 97.33 | - | - | PK |
| 5320 | 46.38 | 234 | 300 | H | 33.78 | 8.61 | 0.00 | 88.77 | - | - | AV |
| 5320 | 62.49 | 125 | 280 | V | 33.78 | 8.61 | 0.00 | 104.88 | - | - | PK |
| 5320 | 53.64 | 125 | 280 | V | 33.78 | 8.61 | 0.00 | 96.03 | - | - | AV |
| 5350 | 46.05 | 234 | 300 | H | 33.76 | 9.81 | 33.22 | 56.39 | 74.00 | -17.6 | PK |
| 5350 | 35.03 | 234 | 300 | H | 33.76 | 9.81 | 33.22 | 45.37 | 54.00 | -8.63 | AV |
| 5350 | 54.70 | 125 | 280 | V | 33.76 | 9.81 | 33.22 | 65.04 | 74.00 | -8.96 | PK |
| 5350 | 39.64 | 125 | 280 | V | 33.76 | 9.81 | 33.22 | 49.98 | 54.00 | -4.02 | AV |
| 10640 | 44.34 | 0 | 100 | V | 38.28 | 14.64 | 32.88 | 64.38 | 74.00 | -9.62 | PK |
| 10640 | 32.73 | 0 | 100 | V | 38.28 | 14.64 | 32.88 | 52.77 | 54.00 | -1.23 | AV |

**5470 - 5725 MHz**

802.11a mode

| Frequency (MHz) | S.A. Reading (dBµV) | Turntable Azimuth (degrees) | Test Antenna | | | Cable Loss (dB) | Pre-Amp. (dB) | Cord. Reading (dBµV/m) | FCC/ISEDC | | Comments (PK/Ave.) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Height (cm) | Polarity (H/V) | Factor (dB/m) | | | | Limit (dBµV/m) | Margin (dB) | |
| Low Channel 5500 MHz | | | | | | | | | | | |
| 5500 | 50.96 | 226 | 300 | H | 34.06 | 8.80 | 0.00 | 93.82 | - | - | PK |
| 5500 | 41.18 | 226 | 300 | H | 34.06 | 8.80 | 0.00 | 84.04 | - | - | AV |
| 5500 | 59.14 | 121 | 281 | V | 34.06 | 8.80 | 0.00 | 102.00 | - | - | PK |
| 5500 | 50.03 | 121 | 281 | V | 34.06 | 8.80 | 0.00 | 92.89 | - | - | AV |
| 5470 | 46.09 | 226 | 300 | H | 33.78 | 9.99 | 33.22 | 56.64 | 74.00 | -17.4 | PK |
| 5470 | 34.40 | 226 | 300 | H | 33.78 | 9.99 | 33.22 | 44.95 | 54.00 | -9.05 | AV |
| 5470 | 52.70 | 121 | 281 | V | 33.78 | 9.99 | 33.22 | 63.25 | 74.00 | -10.8 | PK |
| 5470 | 36.68 | 121 | 281 | V | 33.78 | 9.99 | 33.22 | 47.23 | 54.00 | -6.77 | AV |
| 11000 | 43.54 | 0 | 100 | V | 38.45 | 15.24 | 32.79 | 64.44 | 74.00 | -9.56 | PK |
| 11000 | 31.89 | 0 | 100 | V | 38.45 | 15.24 | 32.79 | 52.79 | 54.00 | -1.21 | AV |
| Middle Channel 5580 MHz | | | | | | | | | | | |
| 5580 | 55.31 | 328 | 300 | H | 34.08 | 8.91 | 0.00 | 98.30 | - | - | PK |
| 5580 | 45.36 | 328 | 300 | H | 34.08 | 8.91 | 0.00 | 88.35 | - | - | AV |
| 5580 | 56.93 | 92 | 256 | V | 34.08 | 8.91 | 0.00 | 99.92 | - | - | PK |
| 5580 | 47.72 | 92 | 256 | V | 34.08 | 8.91 | 0.00 | 90.71 | - | - | AV |
| 11160 | 43.39 | 0 | 100 | V | 38.49 | 15.64 | 32.79 | 64.73 | 74.00 | -9.27 | PK |
| 11160 | 31.76 | 0 | 100 | V | 38.49 | 15.64 | 32.79 | 53.10 | 54.00 | -0.90 | AV |
| High Channel 5700 MHz | | | | | | | | | | | |
| 5700 | 55.38 | 280 | 300 | H | 34.02 | 9.00 | 0.00 | 98.40 | - | - | PK |
| 5700 | 46.01 | 280 | 300 | H | 34.02 | 9.00 | 0.00 | 89.03 | - | - | AV |
| 5700 | 57.01 | 267 | 296 | V | 34.02 | 9.00 | 0.00 | 100.03 | - | - | PK |
| 5700 | 47.87 | 267 | 296 | V | 34.02 | 9.00 | 0.00 | 90.89 | - | - | AV |
| 5725 | 48.95 | 280 | 300 | H | 34.07 | 10.22 | 33.22 | 60.02 | 68.26 | -8.24 | PK |
| 5725 | 50.68 | 267 | 296 | V | 34.07 | 10.22 | 33.22 | 61.75 | 68.26 | -6.51 | PK |
| 11400 | 43.59 | 0 | 100 | V | 38.41 | 15.79 | 32.75 | 65.04 | 74.00 | -8.96 | PK |
| 11400 | 31.73 | 0 | 100 | V | 38.41 | 15.79 | 32.75 | 53.18 | 54.00 | -0.82 | AV |

802.11n20 mode

| Frequency (MHz) | S.A. Reading (dBµV) | Turntable Azimuth (degrees) | Test Antenna | | | Cable Loss (dB) | Pre-Amp. (dB) | Cord. Reading (dBµV/m) | FCC/ISEDC | | Comments (PK/Ave.) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Height (cm) | Polarity (H/V) | Factor (dB/m) | | | | Limit (dBµV/m) | Margin (dB) | |
| Low Channel 5500 MHz | | | | | | | | | | | |
| 5500 | 55.14 | 335 | 276 | H | 34.06 | 8.80 | 0.00 | 98.00 | - | - | PK |
| 5500 | 46.45 | 335 | 276 | H | 34.06 | 8.80 | 0.00 | 89.31 | - | - | AV |
| 5500 | 59.19 | 118 | 280 | V | 34.06 | 8.80 | 0.00 | 102.05 | - | - | PK |
| 5500 | 50.20 | 118 | 280 | V | 34.06 | 8.80 | 0.00 | 93.06 | - | - | AV |
| 5470 | 46.06 | 335 | 276 | H | 33.78 | 9.99 | 33.22 | 56.61 | 74.00 | -17.4 | PK |
| 5470 | 34.47 | 335 | 276 | H | 33.78 | 9.99 | 33.22 | 45.02 | 54.00 | -8.98 | AV |
| 5470 | 46.07 | 118 | 280 | V | 33.78 | 9.99 | 33.22 | 56.62 | 74.00 | -17.4 | PK |
| 5470 | 35.24 | 118 | 280 | V | 33.78 | 9.99 | 33.22 | 45.79 | 54.00 | -8.21 | AV |
| 11000 | 43.58 | 0 | 100 | V | 38.45 | 15.24 | 32.79 | 64.48 | 74.00 | -9.52 | PK |
| 11000 | 31.87 | 0 | 100 | V | 38.45 | 15.24 | 32.79 | 52.77 | 54.00 | -1.23 | AV |
| Middle Channel 5580 MHz | | | | | | | | | | | |
| 5580 | 55.07 | 327 | 277 | H | 34.08 | 8.91 | 0.00 | 98.06 | - | - | PK |
| 5580 | 46.05 | 327 | 277 | H | 34.08 | 8.91 | 0.00 | 89.04 | - | - | AV |
| 5580 | 58.88 | 119 | 280 | V | 34.08 | 8.91 | 0.00 | 101.87 | - | - | PK |
| 5580 | 50.01 | 119 | 280 | V | 34.08 | 8.91 | 0.00 | 93.00 | - | - | AV |
| 11160 | 43.47 | 0 | 100 | V | 38.49 | 15.64 | 32.79 | 64.81 | 74.00 | -9.19 | PK |
| 11160 | 31.61 | 0 | 100 | V | 38.49 | 15.64 | 32.79 | 52.95 | 54.00 | -1.05 | AV |
| High Channel 5700 MHz | | | | | | | | | | | |
| 5700 | 55.16 | 309 | 300 | H | 34.02 | 9.00 | 0.00 | 98.18 | - | - | PK |
| 5700 | 46.43 | 309 | 300 | H | 34.02 | 9.00 | 0.00 | 89.45 | - | - | AV |
| 5700 | 59.18 | 120 | 283 | V | 34.02 | 9.00 | 0.00 | 102.20 | - | - | PK |
| 5700 | 50.64 | 120 | 283 | V | 34.02 | 9.00 | 0.00 | 93.66 | - | - | AV |
| 5725 | 49.50 | 309 | 300 | H | 34.07 | 10.22 | 33.22 | 60.57 | 68.26 | -7.69 | PK |
| 5725 | 52.59 | 120 | 283 | V | 34.07 | 10.22 | 33.22 | 63.66 | 68.26 | -4.60 | PK |
| 11400 | 43.25 | 0 | 100 | V | 38.41 | 15.79 | 32.75 | 64.70 | 74.00 | -9.30 | PK |
| 11400 | 31.92 | 0 | 100 | V | 38.41 | 15.79 | 32.75 | 53.37 | 54.00 | -0.63 | AV |

**5725 - 5850 MHz**

802.11a mode

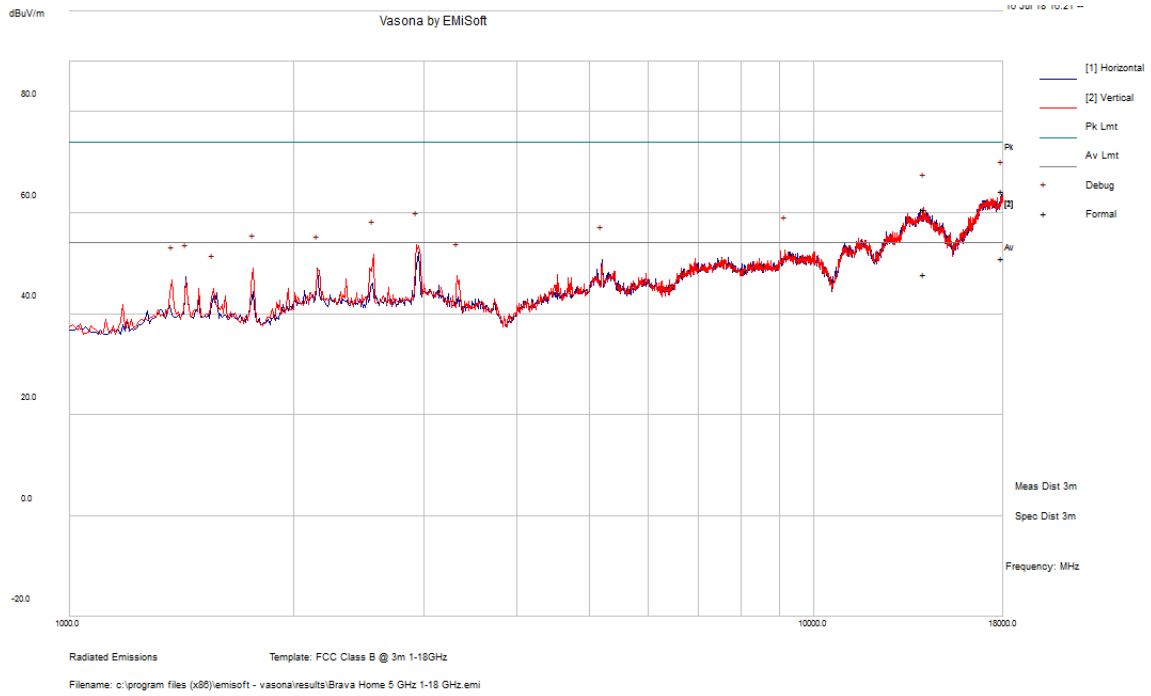
| Frequency (MHz) | S.A. Reading (dBµV) | Turntable Azimuth (degrees) | Test Antenna | | | Cable Loss (dB) | Pre-Amp. (dB) | Cord. Reading (dBµV/m) | FCC/ISEDC | | Comments (PK/Ave.) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Height (cm) | Polarity (H/V) | Factor (dB/m) | | | | Limit (dBµV/m) | Margin (dB) | |
| Low Channel 5745 MHz | | | | | | | | | | | |
| 5745 | 58.95 | 337 | 300 | H | 34.07 | 9.00 | 0.00 | 102.02 | - | - | PK |
| 5745 | 49.38 | 337 | 300 | H | 34.07 | 9.00 | 0.00 | 92.45 | - | - | AV |
| 5745 | 60.07 | 116 | 300 | V | 34.07 | 9.00 | 0.00 | 103.14 | - | - | PK |
| 5745 | 50.57 | 116 | 300 | V | 34.07 | 9.00 | 0.00 | 93.64 | - | - | AV |
| 11490 | 43.73 | 0 | 100 | V | 38.45 | 15.68 | 32.75 | 65.11 | 74.00 | -8.90 | PK |
| 11490 | 32.05 | 0 | 100 | V | 38.45 | 15.68 | 32.75 | 53.43 | 54.00 | -0.58 | AV |
| Middle Channel 5785 MHz | | | | | | | | | | | |
| 5785 | 61.06 | 331 | 300 | H | 34.17 | 9.10 | 0.00 | 104.33 | - | - | PK |
| 5785 | 51.92 | 331 | 300 | H | 34.17 | 9.10 | 0.00 | 95.19 | - | - | AV |
| 5785 | 62.26 | 111 | 300 | V | 34.17 | 9.10 | 0.00 | 105.53 | - | - | PK |
| 5785 | 53.27 | 111 | 300 | V | 34.17 | 9.10 | 0.00 | 96.54 | - | - | AV |
| 11570 | 42.68 | 0 | 100 | V | 38.46 | 15.69 | 32.75 | 64.08 | 74.00 | -9.92 | PK |
| 11570 | 31.62 | 0 | 100 | V | 38.46 | 15.69 | 32.75 | 53.02 | 54.00 | -0.98 | AV |
| High Channel 5825 MHz | | | | | | | | | | | |
| 5825 | 63.17 | 266 | 300 | H | 34.24 | 9.10 | 0.00 | 106.51 | - | - | PK |
| 5825 | 54.19 | 266 | 300 | H | 34.24 | 9.10 | 0.00 | 97.53 | - | - | AV |
| 5825 | 57.76 | 246 | 277 | V | 34.24 | 9.10 | 0.00 | 101.10 | - | - | PK |
| 5825 | 48.68 | 246 | 277 | V | 34.24 | 9.10 | 0.00 | 92.02 | - | - | AV |
| 11650 | 43.18 | 0 | 100 | H | 38.60 | 15.69 | 32.75 | 64.72 | 74.00 | -9.28 | PK |
| 11650 | 31.61 | 0 | 100 | H | 38.60 | 15.69 | 32.75 | 53.15 | 54.00 | -0.85 | AV |

802.11n20 mode

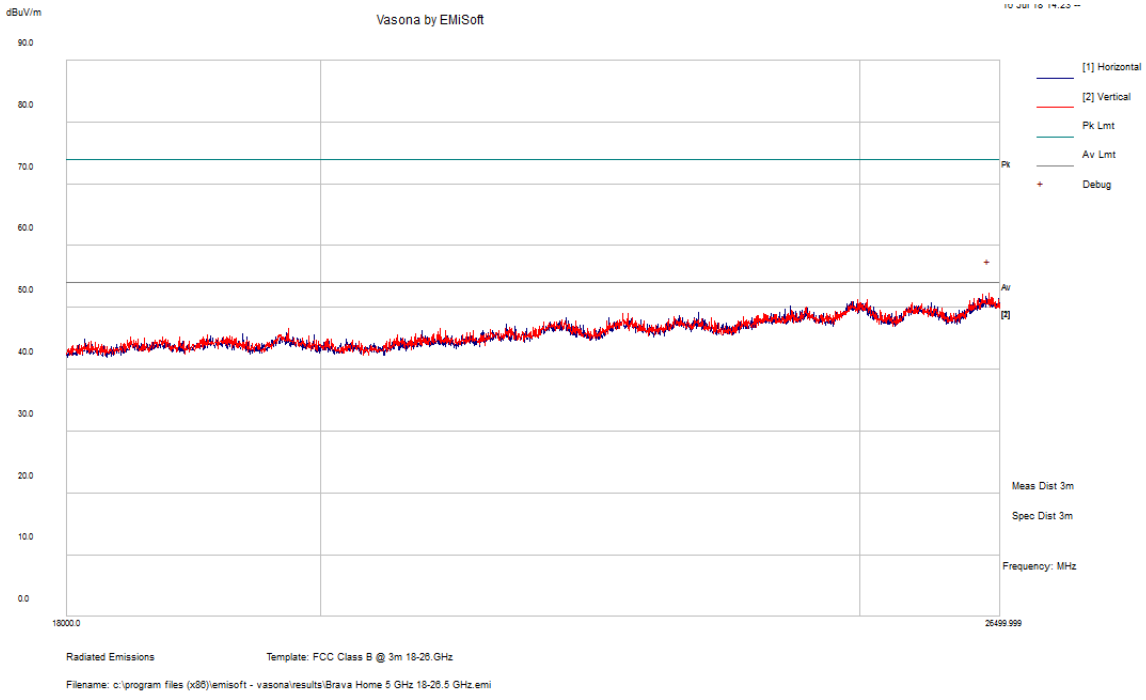
| Frequency (MHz) | S.A. Reading (dBµV) | Turntable Azimuth (degrees) | Test Antenna | | | Cable Loss (dB) | Pre-Amp. (dB) | Cord. Reading (dBµV/m) | FCC/ISEDC | | Comments (PK/Ave.) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Height (cm) | Polarity (H/V) | Factor (dB/m) | | | | Limit (dBµV/m) | Margin (dB) | |
| Low Channel 5745 MHz | | | | | | | | | | | |
| 5745 | 59.44 | 330 | 300 | H | 34.07 | 9.00 | 0.00 | 102.51 | - | - | PK |
| 5745 | 50.96 | 330 | 300 | H | 34.07 | 9.00 | 0.00 | 94.03 | - | - | AV |
| 5745 | 59.23 | 113 | 289 | V | 34.07 | 9.00 | 0.00 | 102.30 | - | - | PK |
| 5745 | 50.50 | 113 | 289 | V | 34.07 | 9.00 | 0.00 | 93.57 | - | - | AV |
| 11490 | 44.22 | 0 | 100 | V | 38.45 | 15.68 | 32.75 | 65.60 | 74.00 | -8.41 | PK |
| 11490 | 31.95 | 0 | 100 | V | 38.45 | 15.68 | 32.75 | 53.33 | 54.00 | -0.67 | AV |
| Middle Channel 5785 MHz | | | | | | | | | | | |
| 5785 | 61.36 | 331 | 300 | H | 34.17 | 9.10 | 0.00 | 104.63 | - | - | PK |
| 5785 | 52.70 | 331 | 300 | H | 34.17 | 9.10 | 0.00 | 95.97 | - | - | AV |
| 5785 | 60.38 | 112 | 300 | V | 34.17 | 9.10 | 0.00 | 103.65 | - | - | PK |
| 5785 | 51.63 | 112 | 300 | V | 34.17 | 9.10 | 0.00 | 94.90 | - | - | AV |
| 11570 | 43.17 | 0 | 100 | V | 38.46 | 15.69 | 32.75 | 64.57 | 74.00 | -9.43 | PK |
| 11570 | 31.83 | 0 | 100 | V | 38.46 | 15.69 | 32.75 | 53.23 | 54.00 | -0.77 | AV |
| High Channel 5825 MHz | | | | | | | | | | | |
| 5825 | 62.22 | 321 | 300 | H | 34.24 | 9.10 | 0.00 | 105.56 | - | - | PK |
| 5825 | 53.73 | 321 | 300 | H | 34.24 | 9.10 | 0.00 | 97.07 | - | - | AV |
| 5825 | 62.44 | 117 | 300 | V | 34.24 | 9.10 | 0.00 | 105.78 | - | - | PK |
| 5825 | 53.87 | 117 | 300 | V | 34.24 | 9.10 | 0.00 | 97.21 | - | - | AV |
| 11650 | 42.60 | 0 | 100 | H | 38.60 | 15.69 | 32.75 | 64.14 | 74.00 | -9.86 | PK |
| 11650 | 31.39 | 0 | 100 | H | 38.60 | 15.69 | 32.75 | 52.93 | 54.00 | -1.07 | AV |

Note 1: Any emissions above 12 GHz are emissions from the noise floor.

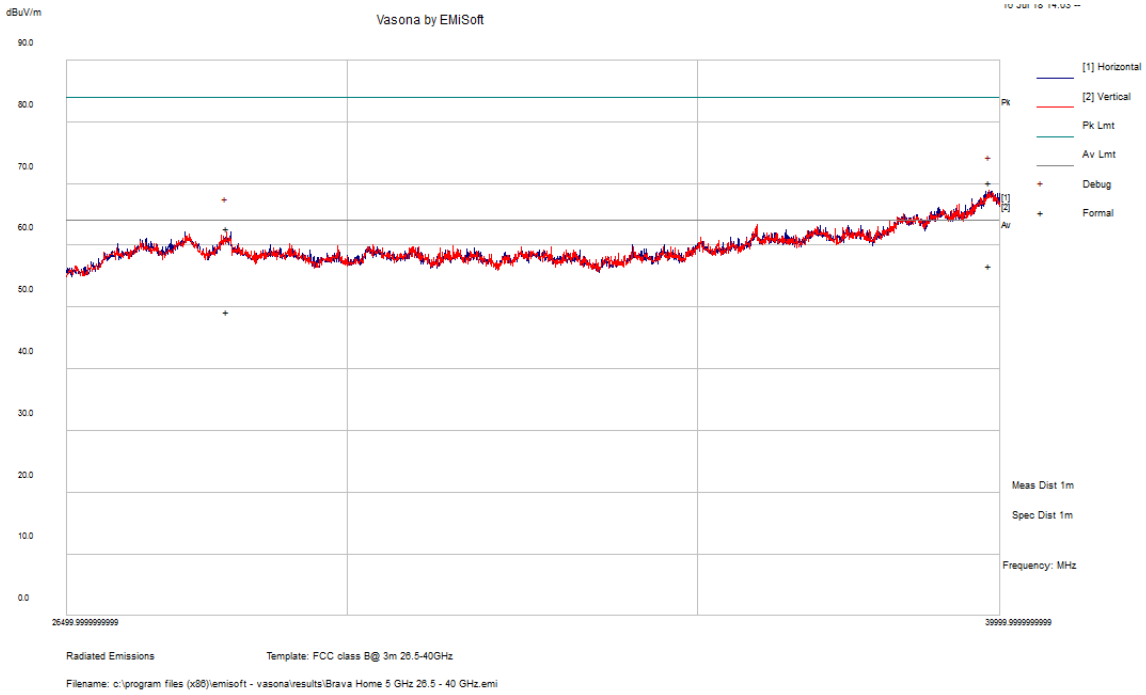
## 1-18 GHz




## 18-26.5 GHz



## 26.5-40 GHz




Note: testing was performed at worst case 5200MHz 802.11n20.

# 8 FCC §15.407 & ISEDC RSS-247 §6.2 - 6 dB, 26 dB, and 99% Occupied Bandwidth

## 8.1 Applicable Standards

As per FCC §15.407(a) and ISEDC RSS-247 6.2: For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

As per FCC §15.407(e) and ISEDC RSS-247 6.2.4(1): for equipment operating in the band 5725 – 5850 MHz, the minimum 6 dB bandwidth of U-NII devices shall be 500 kHz.

## 8.2 Measurement Procedure

The measurements are based on FCC KDB 789033 D02 General U-NII Test Procedures New Rules v02r01: C. Bandwidth Measurement.

## 8.3 Test Equipment List and Details

| Manufacturer | Description | Model No. | Serial No. | Calibration Date | Calibration Interval |
|---|---|---|---|---|---|
| Agilent | Analyzer, Spectrum | E4446A | MY48250238 | 2018-05-08 | 1 year |
| - | RF cable | - | - | Each time[1] | N/A |
| - | 10dB attenuator | - | - | Each time[1] | N/A |

Note[1]: cable and attenuator included in the test set-up will be checked each time before testing.
***Statement of Traceability: BACL Corp.*** *attests that all of the calibrations on the equipment items listed above were traceable to NIST or to another internationally recognized National Metrology Institute (NMI), and were compliant with A2LA Policy P102 (dated 09 June 2016) "A2LA Policy on Metrological Traceability".*

## 8.4 Test Environmental Conditions

| | |
|---|---|
| **Temperature:** | 22-24 ºC |
| **Relative Humidity:** | 40-41 % |
| **ATM Pressure:** | 103.1-104.1 kPa |

*The testing was performed by Vincent Licata on 2018-07-06 to 2018-07-11 in RF site.*

## 8.5 Test Results

Please refer to the following tables and plots.

**5150 - 5250 MHz**

| Channel | Frequency (MHz) | 99% OBW (MHz) | 26 dB OBW (MHz) |
|---|---|---|---|
| 802.11 a mode | | | |
| 36 | 5180 | 16.54 | 25.22 |
| 40 | 5200 | 16.56 | 26.00 |
| 48 | 5240 | 16.48 | 25.97 |
| 802.11n20 mode | | | |
| 36 | 5180 | 17.52 | 25.06 |
| 40 | 5200 | 17.53 | 25.86 |
| 48 | 5240 | 17.51 | 25.11 |

**5250 - 5350 MHz**

| Channel | Frequency (MHz) | 99% OBW (MHz) | 26 dB OBW (MHz) |
|---|---|---|---|
| 802.11 a mode | | | |
| 52 | 5260 | 16.50 | 24.82 |
| 60 | 5300 | 16.47 | 22.13 |
| 64 | 5320 | 16.46 | 20.81 |
| 802.11n20 mode | | | |
| 52 | 5260 | 17.50 | 25.23 |
| 60 | 5300 | 17.48 | 23.97 |
| 64 | 5320 | 17.49 | 22.68 |

**5500 - 5700 MHz**

| Channel | Frequency (MHz) | 99% OBW (MHz) | 26 dB OBW (MHz) |
|---|---|---|---|
| 802.11 a mode | | | |
| 100 | 5500 | 16.40 | 20.63 |
| 116 | 5580 | 16.39 | 19.74 |
| 140 | 5700 | 16.39 | 20.66 |
| 802.11n20 mode | | | |
| 100 | 5500 | 17.44 | 20.52 |
| 116 | 5580 | 17.43 | 20.29 |
| 140 | 5700 | 17.44 | 19.23 |

**5725 - 5850 MHz**

| Channel | Frequency (MHz) | 99% OBW (MHz) | 6 dB OBW (MHz) |
|---|---|---|---|
| 802.11 a mode | | | |
| 149 | 5745 | 16.43 | 15.14 |
| 157 | 5785 | 16.46 | 15.15 |
| 165 | 5825 | 16.46 | 15.16 |
| 802.11n20 mode | | | |
| 149 | 5745 | 17.48 | 15.12 |
| 157 | 5785 | 17.48 | 15.15 |
| 165 | 5825 | 17.49 | 15.14 |

**Please refer to Annex E for plots.**

# 9 FCC §407(a) & ISEDC RSS-247 §6.2 - Output Power

## 9.1 Applicable Standards

According to FCC §15.407(a):

For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

According to ISEDC RSS-247 §6.2.1 for frequency band 5150-5250 MHz:

The maximum e.i.r.p. shall not exceed 200 mW or $10 + 10 \log_{10}$ B, dBm, whichever power is less. B is the 99% emission bandwidth in megahertz. The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.

According to ISEDC RSS-247 §6.2.2 for frequency band 5250-5350 MHz:

The maximum conducted output power shall not exceed 250 mW or $11 + 10 \log_{10}$ B, dBm, whichever is less. The power spectral density shall not exceed 11 dBm in any 1.0 MHz band.

The maximum e.i.r.p. shall not exceed 1.0 W or $17 + 10 \log_{10}$ B, dBm, whichever is less. B is the 99% emission bandwidth in megahertz. Note that devices with a maximum e.i.r.p. greater than 500 mW shall implement TPC in order to have the capability to operate at least 6 dB below the maximum permitted e.i.r.p. of 1 W.

According to ISEDC RSS-247 §6.2.3 for frequency band 5470-5600 MHz and 5650-5725 MHz:

The maximum conducted output power shall not exceed 250 mW or $11 + 10 \log_{10}$ B, dBm, whichever is less. The power spectral density shall not exceed 11 dBm in any 1.0 MHz band.

The maximum e.i.r.p. shall not exceed 1.0 W or 17 + 10 $\log_{10}$ B, dBm, whichever is less. B is the 99% emission bandwidth in megahertz. Note that devices with a maximum e.i.r.p. greater than 500 mW shall implement TPC in order to have the capability to operate at least 6 dB below the maximum permitted e.i.r.p. of 1 W.

According to ISEDC RSS-247 §6.2.4 for frequency band 5725-5850 MHz:

The maximum conducted output power shall not exceed 1 W. The power spectral density shall not exceed 30 dBm in any 500 kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications and multiple collocated transmitters transmitting the same information.

## 9.2 Measurement Procedure

The measurements are based on FCC KDB 789033 D02 General U-NII Test Procedures New Rules v02r01: E. Maximum Conducted Output Power.

## 9.3 Test Equipment List and Details

| Manufacturer | Description | Model No. | Serial No. | Calibration Date | Calibration Interval |
|---|---|---|---|---|---|
| ETS- Lindgren | Power Sensor | 7002-006 | 160097 | 2016-12-05 | 2 years |
| - | RF cable | - | - | Each time[1] | N/A |
| - | 10dB attenuator | - | - | Each time[1] | N/A |

Note[1]: cable and attenuator included in the test set-up will be checked each time before testing.
***Statement of Traceability: BACL Corp.*** *attests that all of the calibrations on the equipment items listed above were traceable to NIST or to another internationally recognized National Metrology Institute (NMI), and were compliant with A2LA Policy P102 (dated 09 June 2016) "A2LA Policy on Metrological Traceability".*

## 9.4 Test Environmental Conditions

| | |
|---|---|
| **Temperature:** | 23º C |
| **Relative Humidity:** | 42 % |
| **ATM Pressure:** | 102.7 KPa |

*The testing was performed by Vincent Licata on 2018-07-06 to 2018-07-11 in RF site.*

## 9.5 Test Results

**FCC: 5150 - 5250 MHz**

| Frequency (MHz) | Mode | Conducted Average Power (dBm) | Limit (dBm) |
|---|---|---|---|
| 5180 | 802.11a | 13.12 | 24.00 |
| | 802.11n20 | 13.25 | 24.00 |
| 5200 | 802.11a | 12.75 | 24.00 |
| | 802.11n20 | 13.43 | 24.00 |
| 5240 | 802.11a | 12.72 | 24.00 |
| | 802.11n20 | 13.15 | 24.00 |

**IC: 5150 - 5250 MHz**

| Frequency (MHz) | Mode | Conducted Average Power (dBm) | Antenna Gain (dBi) | Total EIRP (dBm) | Limit (dBm) |
|---|---|---|---|---|---|
| 5180 | 802.11a | 13.12 | 5.5 | 18.62 | 22.17 |
| | 802.11n20 | 13.25 | 5.5 | 18.75 | 22.41 |
| 5200 | 802.11a | 12.75 | 5.5 | 18.25 | 22.17 |
| | 802.11n20 | 13.43 | 5.5 | 18.93 | 22.41 |
| 5240 | 802.11a | 12.72 | 5.5 | 18.22 | 22.17 |
| | 802.11n20 | 13.15 | 5.5 | 18.65 | 22.41 |

**FCC/IC: 5250 - 5350 MHz**

| Frequency (MHz) | Mode | Conducted Average Power (dBm) | Limit (dBm) |
|---|---|---|---|
| 5260 | 802.11a | 12.41 | 24.00 |
| | 802.11n20 | 12.84 | 24.00 |
| 5300 | 802.11a | 12.22 | 24.00 |
| | 802.11n20 | 12.75 | 24.00 |
| 5320 | 802.11a | 12.16 | 24.00 |
| | 802.11n20 | 12.69 | 24.00 |

**FCC/IC: 5500 - 5700 MHz**

| Frequency (MHz) | Mode | Conducted Average Power (dBm) | Limit (dBm) |
|---|---|---|---|
| 5500 | 802.11a | 12.27 | 24.00 |
| | 802.11n20 | 12.68 | 24.00 |
| 5580 | 802.11a | 12.45 | 24.00 |
| | 802.11n20 | 12.81 | 24.00 |
| 5700 | 802.11a | 12.38 | 24.00 |
| | 802.11n20 | 12.76 | 24.00 |

**FCC/IC: 5725 - 5825 MHz**

| Frequency (MHz) | Mode | Conducted Average Power (dBm) | Limit (dBm) |
|---|---|---|---|
| 5745 | 802.11a | 13.08 | 30.00 |
| | 802.11n20 | 13.36 | 30.00 |
| 5785 | 802.11a | 12.90 | 30.00 |
| | 802.11n20 | 13.33 | 30.00 |
| 5825 | 802.11a | 12.97 | 30.00 |
| | 802.11n20 | 13.40 | 30.00 |

Note: Duty Cycle correction factor already accounted for.

# 10 FCC §15.407(a) & ISEDC RSS-247 §6.2 - Power Spectral Density

## 10.1 Applicable Standards

According to FCC §15.407(a):

For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

According to ISEDC RSS-247 §6.2.1 for frequency band 5150-5250 MHz:

The maximum e.i.r.p. shall not exceed 200 mW or 10 + 10 log10B, dBm, whichever power is less. B is the 99% emission bandwidth in megahertz. The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.

According to ISEDC RSS-247 §6.2.2 for frequency band 5250-5350 MHz:

The maximum conducted output power shall not exceed 250 mW or 11 + 10 $\log_{10}$B, dBm, whichever is less. The power spectral density shall not exceed 11 dBm in any 1.0 MHz band.

The maximum e.i.r.p. shall not exceed 1.0 W or 17 + 10 $\log_{10}$B, dBm, whichever is less. B is the 99% emission bandwidth in megahertz. Note that devices with a maximum e.i.r.p. greater than 500 mW shall implement TPC in order to have the capability to operate at least 6 dB below the maximum permitted e.i.r.p. of 1 W.

According to ISEDC RSS-247 §6.2.3 for frequency band 5470-5600 MHz and 5650-5725 MHz:

The maximum conducted output power shall not exceed 250 mW or 11 + 10 $\log_{10}$B, dBm, whichever is less. The power spectral density shall not exceed 11 dBm in any 1.0 MHz band.

The maximum e.i.r.p. shall not exceed 1.0 W or 17 + 10 $\log_{10}$B, dBm, whichever is less. B is the 99% emission bandwidth in megahertz. Note that devices with a maximum e.i.r.p. greater than 500 mW shall implement TPC in order to have the capability to operate at least 6 dB below the maximum permitted e.i.r.p. of 1 W.

According to ISEDC RSS-247 §6.2.4 for frequency band 5725-5850 MHz:

The maximum conducted output power shall not exceed 1 W. The power spectral density shall not exceed 30 dBm in any 500 kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications and multiple collocated transmitters transmitting the same information.

## 10.2 Measurement Procedure

The measurements are based on FCC KDB 789033 D02 General U-NII Test Procedures New Rules v02r01: F. Maximum Power Spectral Density (PSD).

## 10.3 Test Equipment List and Details

| Manufacturer | Description | Model No. | Serial No. | Calibration Date | Calibration Interval |
|---|---|---|---|---|---|
| Agilent | Analyzer, Spectrum | E4446A | MY48250238 | 2018-05-08 | 1 year |
| - | RF cable | - | - | Each time[1] | N/A |
| - | 10dB attenuator | - | - | Each time[1] | N/A |

Note[1]: cables and attenuators included in the test set-up will be checked each time before testing.
***Statement of Traceability: BACL Corp.*** *attests that all of the calibrations on the equipment items listed above were traceable to NIST or to another internationally recognized National Metrology Institute (NMI), and were compliant with A2LA Policy P102 (dated 09 June 2016) "A2LA Policy on Metrological Traceability".*

## 10.4 Test Environmental Conditions

| | |
|---|---|
| **Temperature:** | 22-24 ºC |
| **Relative Humidity:** | 40-41 % |
| **ATM Pressure:** | 103.1-104.1 kPa |

*The testing was performed by Vincent Licata on 2018-07-06 to 2018-07-11 in RF site.*

## 10.5 Test Results

**FCC: 5150 - 5250 MHz**

| Frequency (MHz) | Mode | Conducted PSD (dBm/MHz) | Limit (dBm/MHz) |
|---|---|---|---|
| 5180 | 802.11a | 3.35 | 11.00 |
| | 802.11n20 | 2.79 | 11.00 |
| 5200 | 802.11a | 2.97 | 11.00 |
| | 802.11n20 | 2.97 | 11.00 |
| 5240 | 802.11a | 3.25 | 11.00 |
| | 802.11n20 | 3.23 | 11.00 |

**IC: 5150 - 5250 MHz**

| Frequency (MHz) | Mode | EIRP (dBm/MHz) | Limit (dBm/MHz) |
|---|---|---|---|
| 5180 | 802.11a | 8.85 | 10.00 |
| | 802.11n20 | 8.29 | 10.00 |
| 5200 | 802.11a | 8.47 | 10.00 |
| | 802.11n20 | 8.47 | 10.00 |
| 5240 | 802.11a | 8.75 | 10.00 |
| | 802.11n20 | 8.73 | 10.00 |

**FCC/IC: 5250 - 5350 MHz**

| Frequency (MHz) | Mode | Conducted PSD (dBm/MHz) | Limit (dBm/MHz) |
|---|---|---|---|
| 5260 | 802.11a | 2.86 | 11.00 |
| | 802.11n20 | 2.77 | 11.00 |
| 5300 | 802.11a | 2.31 | 11.00 |
| | 802.11n20 | 2.07 | 11.00 |
| 5320 | 802.11a | 2.31 | 11.00 |
| | 802.11n20 | 2.39 | 11.00 |

**FCC/IC: 5500 - 5700 MHz**

| Frequency (MHz) | Mode | Conducted PSD (dBm/MHz) | Limit (dBm/MHz) |
|---|---|---|---|
| 5500 | 802.11a | 2.32 | 11.00 |
| | 802.11n20 | 2.16 | 11.00 |
| 5580 | 802.11a | 2.28 | 11.00 |
| | 802.11n20 | 2.28 | 11.00 |
| 5700 | 802.11a | 1.11 | 11.00 |
| | 802.11n20 | 1.18 | 11.00 |

**FCC/IC: 5725 - 5825 MHz**

| Frequency (MHz) | Mode | Conducted PSD (dBm/100 kHz) | Corrected (dBm/500kHz) | Limit (dBm/500kHz) |
|---|---|---|---|---|
| 5745 | 802.11a | -5.42 | 1.57 | 30.00 |
| | 802.11n20 | -6.09 | 0.9 | 30.00 |
| 5785 | 802.11a | -6.48 | 0.51 | 30.00 |
| | 802.11n20 | -6.77 | 0.22 | 30.00 |
| 5825 | 802.11a | -6.46 | 0.53 | 30.00 |
| | 802.11n20 | -6.77 | 0.22 | 30.00 |

Note: For the 5725-5850 MHz band, the Corrected PSD (dBm/500 kHz) is equal to:
Correct PSD (dBm/500 kHz) = PSD (dBm/100 kHz) + Duty Cycle Correction (dB) + 10*log(500 kHz/100 kHz)

Note: Duty Cycle correction factor already accounted for.

**Please refer to Annex G for plots.**

# 11 FCCC 15.407(b) - Out of Band Emissions

## 11.1 Applicable Standards

According to FCC §15.407(b):

For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.

For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.

For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.

For transmitters operating in the 5.725-5.85 GHz band: All emissions shall be limited to a level of −27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in §15.209. Further, any U-NII devices using an AC power line are required to comply also with the conducted limits set forth in §15.207.

The provisions of §15.205 apply to intentional radiators operating under this section.

## 11.2 Measurement Procedure

Add a correction factor (antenna gain+ Attenuator loss+cable loss) to the offset of the spectrum analyzer.
Integration Method

1. For peak emissions measurements, follow the procedures described in section H)5), “Procedures for Peak Unwanted Emissions Measurements above 1000 MHz”, except for the following changes:

- Set RBW = 100 kHz
- Set VBW = 3RBW
- Perform a band-power integration across the 1 MHz bandwidth in which the band-edge emission level is to be measured. CAUTION: You must ensure that the spectrum analyzer or EMI receiver is set for peak-detection and max-hold for this measurement.

2. For average emissions measurements, follow the procedures described in section H)6), “Procedures for Average Unwanted Emissions Measurements above 1000 MHz”, except for the following changes:

- Set RBW = 100 kHz
- Set VBW = 3RBW
- Perform a band-power integration across the 1 MHz bandwidth in which the band-edge emission level is to be measured.

## 11.3 Test Equipment List and Details

| Manufacturer | Description | Model No. | Serial No. | Calibration Date | Calibration Interval |
|---|---|---|---|---|---|
| Agilent | Analyzer, Spectrum | E4446A | MY48250238 | 2018-05-08 | 1 year |
| - | RF cable | - | - | Each time[1] | N/A |
| - | 10dB attenuator | - | - | Each time[1] | N/A |

Note[1]: cable and attenuator included in the test set-up will be checked each time before testing.
***Statement of Traceability: BACL Corp.*** *attests that all of the calibrations on the equipment items listed above were traceable to NIST or to another internationally recognized National Metrology Institute (NMI), and were compliant with A2LA Policy P102 (dated 09 June 2016) "A2LA Policy on Metrological Traceability".*

## 11.4 Test Environmental Conditions

| | |
|---|---|
| **Temperature:** | 22-24 ºC |
| **Relative Humidity:** | 40-41 % |
| **ATM Pressure:** | 103.1-104.1 kPa |

*The testing was performed by Vincent Licata on 2018-07-06 to 2018-07-11 in RF site.*

## 11.5 Test Results

Compliant

**Please refer to Annex H and F for plots.**

# 12 Exhibit A - FCC & ISED Equipment Labeling Requirements

## 12.1 FCC ID Label Requirements

**As per FCC §2.925,**

(a) Each equipment covered in an application for equipment authorization shall bear a nameplate or label listing the following:

(1) FCC Identifier consisting of the two elements in the exact order specified in §2.926. The FCC Identifier shall be preceded by the term FCC ID in capital letters on a single line, and shall be of a type size large enough to be legible without the aid of magnification.

Example: FCC ID: XXX123

Where: XXX—Grantee Code, 123—Equipment Product Code

**As per FCC §15.19**,

(a) In addition to the requirements in part 2 of this chapter, a device subject to certification, or verification shall be labeled as follows:

(3) All other devices shall bear the following statement in a conspicuous location on the device:
This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

(4) Where a device is constructed in two or more sections connected by wires and marketed together, the statement specified above is required to be affixed only to the main control unit. If the EUT is integrated within another device then a label affixed to the host shall also state, "Contains FCC ID: XXXXXX"

(5) When the device is so small or for such use that it is not practicable to place the statement specified under paragraph (a) of this section on it, the information required by this paragraph shall be placed in a prominent location in the instruction manual or pamphlet supplied to the user or, alternatively, shall be placed on the container in which the device is marketed. However, the FCC identifier or the unique identifier, as appropriate, must be displayed on the device.

## 12.2 IC Label Requirements

As per IC RSP-100 Section 3.1, the certification number shall appear as follows:

IC: XXXXXX-YYYYYYYY

Where:

- The letters "IC:" indicate that this is an Innovation, Science and Economic Development Canada's certification number, but they are not part of the certification number. XXXXXXYYYYYYYYYY is the ISED certification number.
- XXXXXX is the CN assigned by Innovation, Science and Economic Development Canada. Newly assigned CNs will be made up of five numeric characters (e.g. "20001") whereas existing CNs may consist of up to five numeric characters followed by an alphabetic character (e.g. "21A" or "15589J").
- YYYYYYYYYY is the Unique Product Number (UPN) assigned by the applicant, made up of a maximum of 11 alphanumeric characters.

- The CN and UPN are limited to capital alphabetic characters (A-Z) and numerals (0-9) only. The use of punctuation marks or other symbols, including "wildcard" characters, is not permitted.
- The HVIN may contain punctuation marks or symbols but they shall not represent any indeterminate ("wildcard") characters.

As per RSS-Gen §4.2 Equipment Labeling:

The application for equipment certification shall be submitted in accordance with Industry Canada's Radio Standards Procedure RSP-100, Radio Equipment Certification Procedure which sets out the requirements for certification and labelling of radio apparatus. RSP-100 shall be used in conjunction with RSS-Gen and other Radio Standards Specifications (RSSs) specifically applicable to the type of radio apparatus for which certification is sought.

### 12.3 Recommended Label Contents and Location

brava Model: BRAVA ONE

120 VAC | 1800 W | 60Hz

The device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference, and

(2) this device must accept any interference received, including interference that may cause undesired operation.

HOUSEHOLD USE ONLY

FCC ID: 2AOGABRAVAONE
IC: 24108-BRAVAONE

Designed in California
Assembled in China

# 13 Appendix

Please see attachments:

Annex B – EUT Test Setup Photographs
Annex C – EUT External Photographs
Annex D – EUT Internal Photographs
Annex E – Occupied Bandwidth
Annex F – Spurious Emissions at Antenna Port
Annex G – Power Spectral Density
Annex H – Band Edge

# 14 Annex A (Informative) - A2LA Electrical Testing Certificate

Accredited Laboratory

A2LA has accredited

BAY AREA COMPLIANCE LABORATORIES CORP.

Sunnyvale, CA

for technical competence in the field of

Electrical Testing

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005 *General requirements for the competence of testing and calibration laboratories*. This laboratory also meets the requirements of any additional program requirements in the Electrical field. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (*refer to joint ISO-ILAC-IAF Communiqué dated 8 January 2009*).

Presented this 30th day of August 2016.

President and CEO
For the Accreditation Council
Certificate Number 3297.02
Valid to September 30, 2018
Revised November 14, 2016

*For the tests to which this accreditation applies, please refer to the laboratory's Electrical Scope of Accreditation.*

**--- END OF REPORT ---**