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

TEST REPORT

For

Cisco Systems Inc.

125 West Tasman Drive,

San Jose, CA 95134 USA

FCC ID: LDKHDGWI1903
IC: 2461N-HDGWI1903

Report Type:	**Product type:**
Original Report	Cisco Catalyst C9117AX Series

Prepared By:	Zhao Zhao Test Engineer
Report Number:	R1811136-407
Report Date:	2019-02-14
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TABLE OF CONTENTS

DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
0	R1811136-407	Original Report	2019-02-14

1 General Description

1.1 Product Description for Equipment under Test (EUT)

This test and measurement report was prepared on behalf of *Cisco Systems Inc.,* and their product model: C9117AXI-B (US), C9117AXI-A (Canada) as referred to in this report. The product is an 802.11ax Access Point.

1.2 Mechanical Description of EUT

The C9117AXI-B (US), C9117AXI-A (Canada) measures approximately 220 mm (L) x 220 mm (W) x 60 mm (H) and weighs approximately 1300 g.

1.3 Objective

This report is prepared on behalf of *Cisco Systems Inc.,* in accordance with FCC CFR47 §15.407 and ISED RSS-247 Issue 2, February2017.

The objective is to determine compliance with FCC Part 15.407 and ISEDC RSS-247 rules for Antenna Requirements and Radiated Spurious Emissions.

1.4 Related Submittal(s)/Grant(s)

DTS EDCS-15634526, EDCS-15797453, and R1811136-247

1.5 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.

1.6 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 %

1.7 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.

1.8 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 System 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 Tera Term and test commands, provided by *Cisco Systems Inc.,* the software is compliant with the standard requirements being tested against.

2.3 Duty Cycle Correction Factor

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

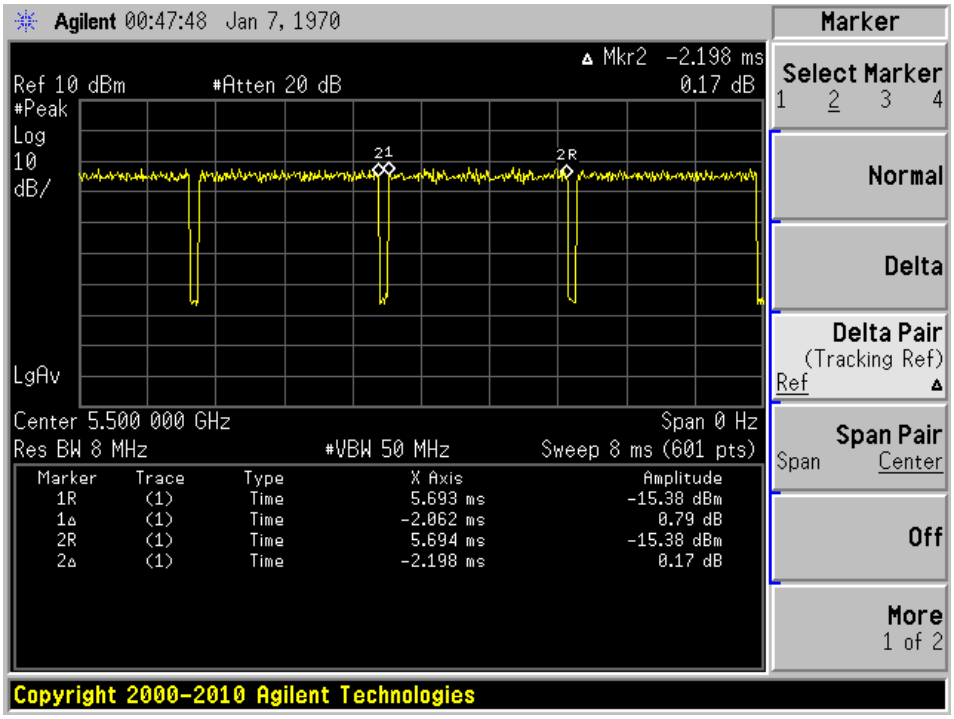
All measurements are to be performed with the EUT transmitting at 100% duty cycle at its maximum power control level; however, if 100% duty cycle cannot be achieved, measurements of duty cycle, x, and maximum-power transmission duration, T, are required for each tested mode of operation.

Radio Mode	On Time (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)
802.11a	2.062	2.198	93.18	0.2774
802.11n20/ac20	5.354	5.628	95.13	0.2168
802.11n40/ac40	5367	5667	94.71	0.2362
802.11ac80	5.4	5.667	95.29	0.2096
802.11ac160	5.458	5.708	95.62	0.1945

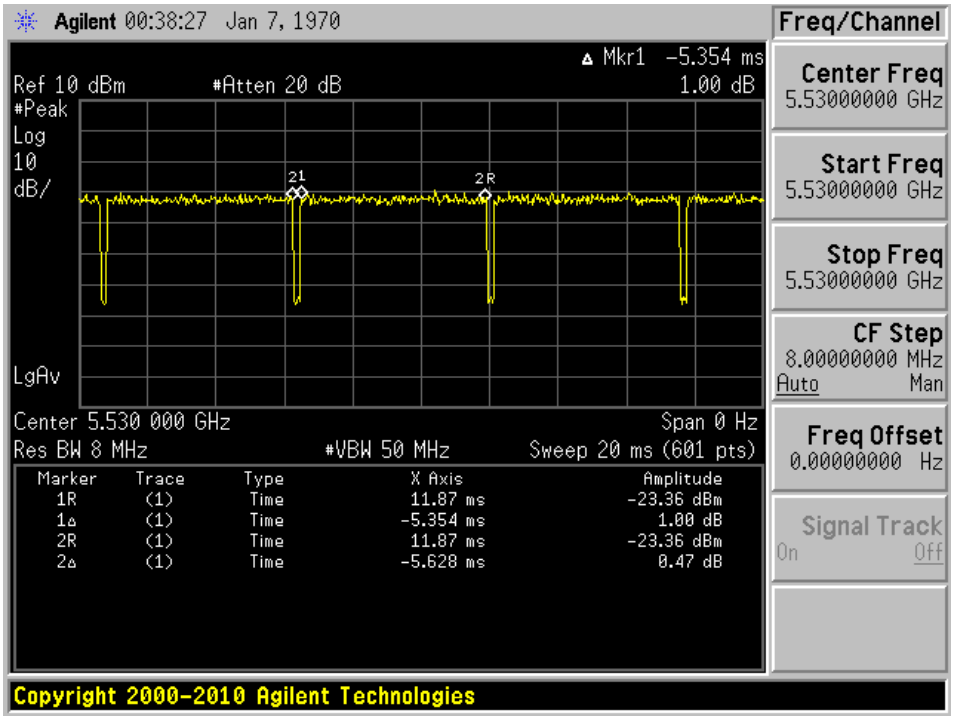
Note: Duty Cycle Correction Factor = 10*log(1/duty cycle)

Please refer to the following plots.

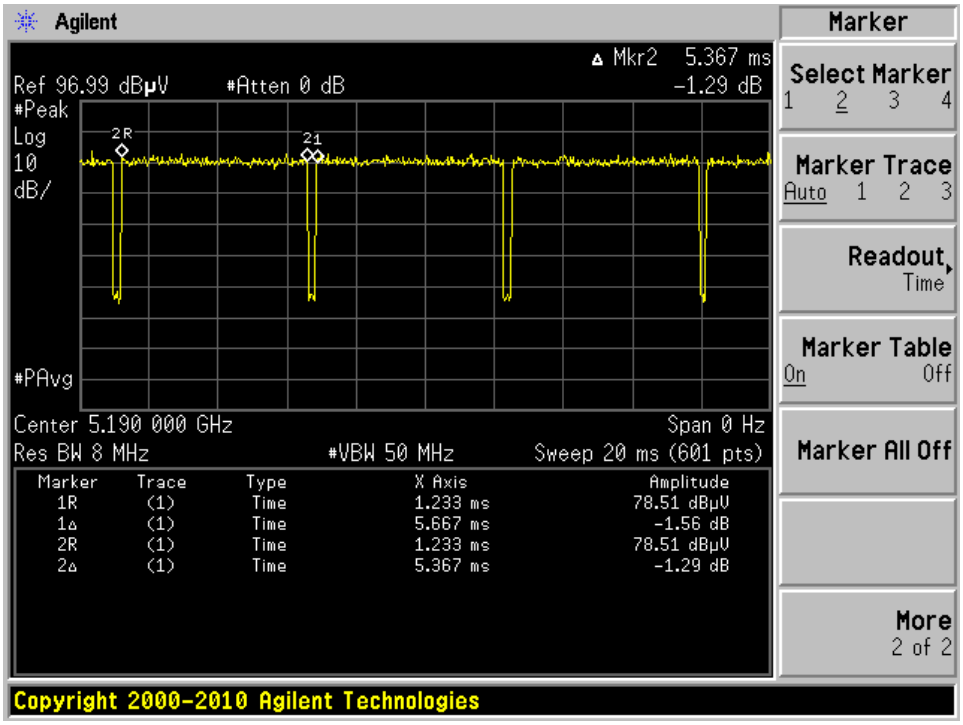
a Mode



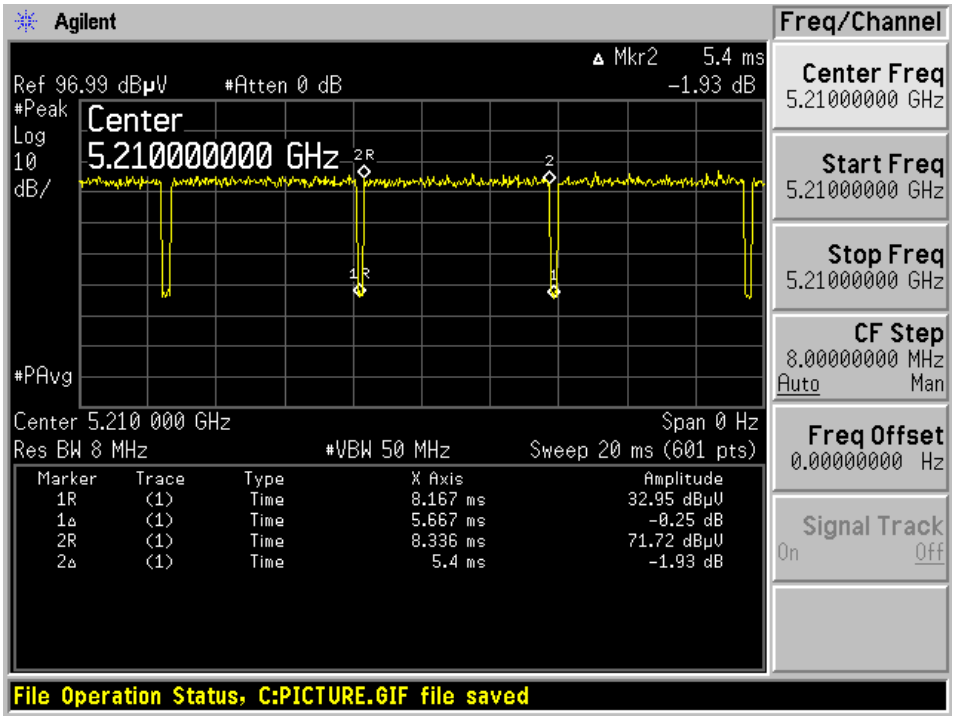
n20/ac20 Mode



n40/ac40 Mode



ac80 Mode



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
Cisco	Power supply	AIR-PWRINJ6 V01

2.7 Interface Ports and Cabling

Cable Description	Length (m)	To	From
Ethernet cable	2 m	PoE	EUT
Ethernet-serial-USB cable	2 m	EUT	Laptop

3 Summary of Test Results

FCC and ISED Rules	Description of Test	Result
FCC §15.203 ISED RSS-Gen §6.8	Antenna Requirement	Compliant
FCC §15.207 ISED RSS-Gen §8.8	AC Power Line Conducted Emissions	Compliant
FCC §2.1053, §15.205, §15.209, 15.407(b) ISED RSS-247 §6.2 ISEDC RSS-Gen §8.9 and §8.10	Spurious Radiated Emissions	Compliant

4 FCC §15.203 & ISED RSS-Gen §6.8 - Antenna Requirements

4.1 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.

4.2 Antenna List

The antennas used by the EUT are permanent attached antennas.

Antenna usage	Band of Operation (GHz)	Maximum Antenna Gain (dBi)
Wi-Fi	5000-6000	6

5 FCC §15.207 & ISED RSS-Gen §8.8 - AC Line Conducted Emissions

5.1 Applicable Standards

As per FCC §15.207 and ISEDC RSS-Gen §8.8 Conducted limits:

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

5.2 Test Setup

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

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.

5.3 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 were 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”.

5.4 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:

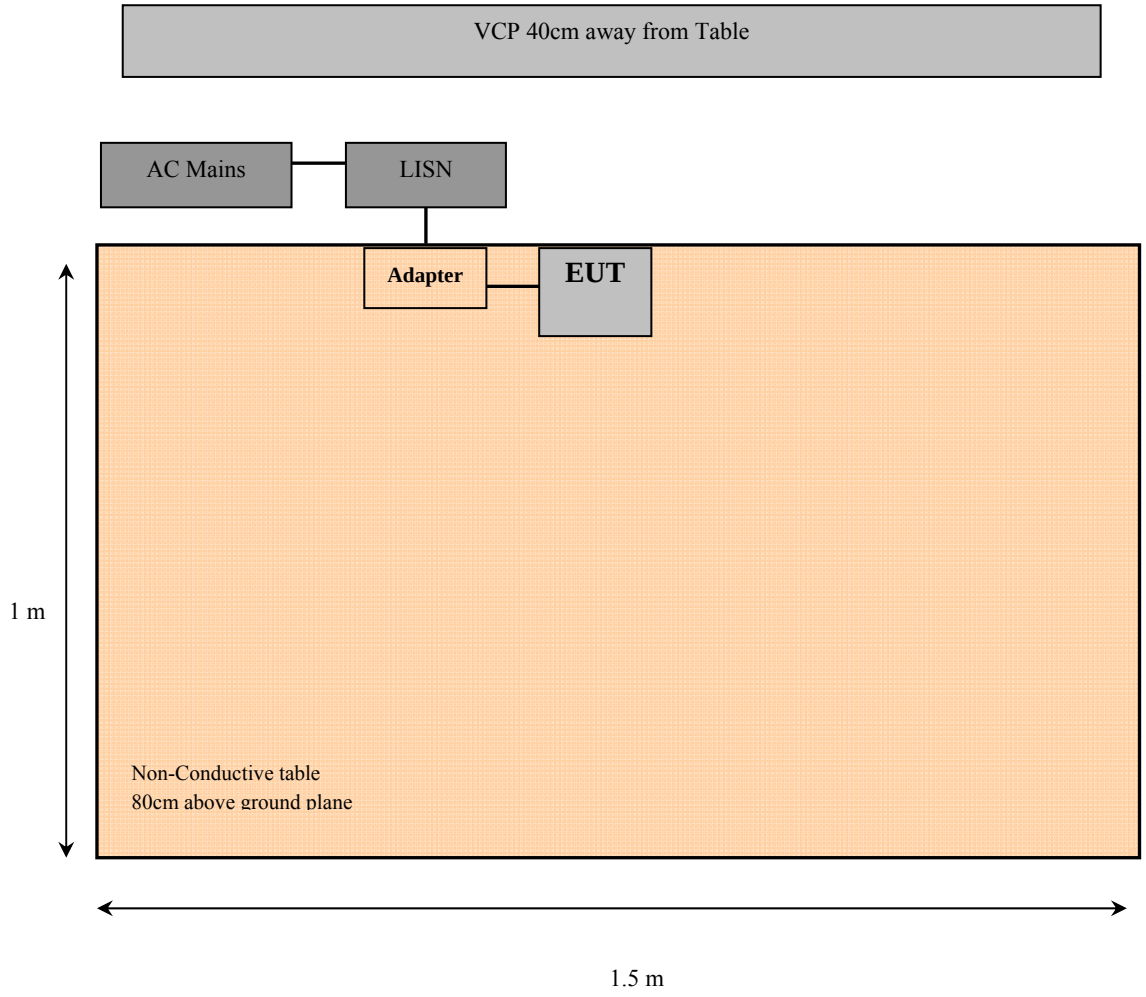
CA = Ai + CL + Atten

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

5.5 Test Setup Block Diagram



5.6 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	2018-07-27	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".*

5.7 Test Environmental Conditions

Temperature:	24º C
Relative Humidity:	30 %
ATM Pressure:	102.1 kPa

The testing was performed by Zhao Zhao on 2018-12-07 in 5 meter chamber 3.

5.8 Summary of Test Results

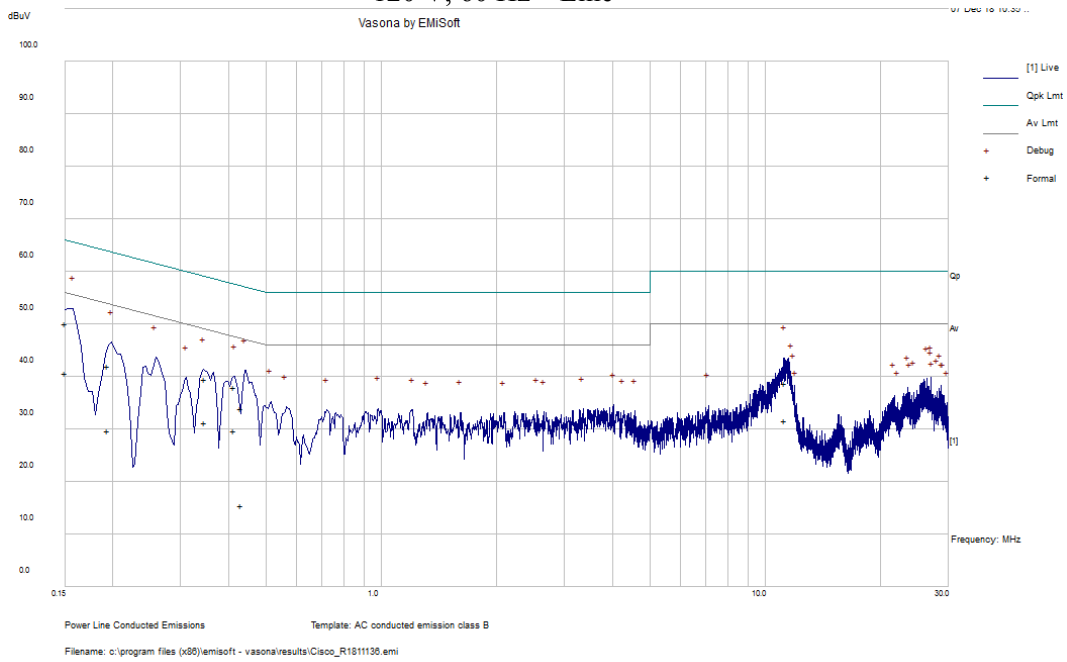
According to the recorded data in following table, the EUT complied with the FCC 15.207 and ISEDC RSS-Gen standard's conducted emissions limits, with the margin reading of:

Connection: AC/DC adapter connected to 120 V/60 Hz, AC			
Margin (dB)	**Frequency (MHz)**	**Conductor Mode (Line/Neutral)**	**Range (MHz)**
-15.17	0.150731	Neutral	0.15-30

5.9 Conducted Emissions Test Plots and Data

Worst Case Colocation, 2.4 GHz BLE, 2.4 GHz Wi-Fi CCK mode and 5 GHz Wi-Fi HT/VHT20 mode

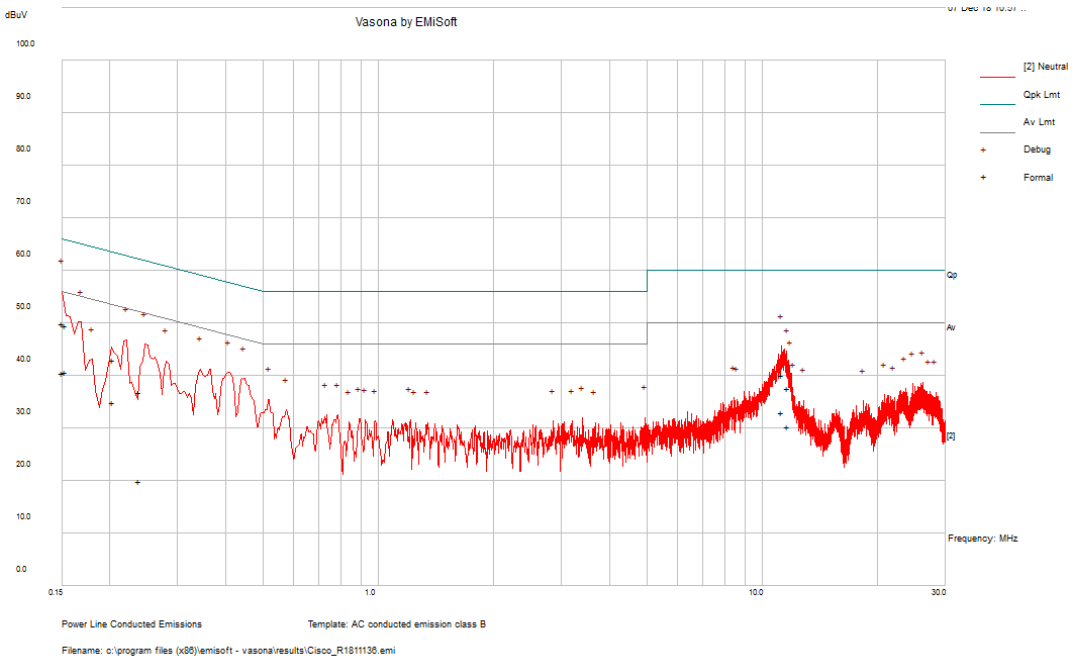
120 V, 60 Hz – Line



Frequency (MHz)	Corrected Amplitude (dBuV)	Conductor (Line/Neutral)	Limit (dBuV)	Margin (dB)	Detector (QP/Ave.)
0.150731	50.16	Line	65.96	-15.8	QP
0.430779	33.89	Line	57.24	-23.35	QP
11.21	38.73	Line	60	-21.27	QP
0.194118	42.02	Line	63.86	-21.84	QP
0.412561	38.07	Line	57.6	-19.53	QP
0.347224	39.64	Line	59.03	-19.39	QP

Frequency (MHz)	Corrected Amplitude (dBuV)	Conductor (Line/Neutral)	Limit (dBuV)	Margin (dB)	Detector (QP/Ave.)
0.150731	40.79	Line	55.96	-15.17	Ave.
0.430779	15.46	Line	47.24	-31.78	Ave.
11.21	31.73	Line	50	-18.27	Ave.
0.194118	29.7	Line	53.86	-24.16	Ave.
0.412561	29.73	Line	47.6	-17.87	Ave.
0.347224	31.21	Line	49.03	-17.82	Ave.

120 V, 60 Hz – Neutral



Frequency (MHz)	Corrected Amplitude (dBuV)	Conductor (Line/Neutral)	Limit (dBuV)	Margin (dB)	Detector (QP/Ave.)
0.150288	49.98	Neutral	65.98	-16.01	QP
11.211363	40.06	Neutral	60	-19.94	QP
0.153142	49.56	Neutral	65.83	-16.27	QP
0.238721	36.95	Neutral	62.14	-25.19	QP
0.203223	43.07	Neutral	63.48	-20.41	QP
11.666763	37.56	Neutral	60	-22.44	QP

Frequency (MHz)	Corrected Amplitude (dBuV)	Conductor (Line/Neutral)	Limit (dBuV)	Margin (dB)	Detector (QP/Ave.)
0.150288	40.44	Neutral	55.98	-15.54	Ave.
11.211363	33.08	Neutral	50	-16.92	Ave.
0.153142	40.77	Neutral	55.83	-15.06	Ave.
0.238721	19.85	Neutral	52.14	-32.29	Ave.
0.203223	34.91	Neutral	53.48	-18.57	Ave.
11.666763	30.42	Neutral	50	-19.58	Ave.

6 FCC §15.209, §15.407(b) & ISEDC RSS-247 §6.2, RSS-Gen §8.9, §8.10 - Spurious Radiated Emissions

6.1 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 ISED RSS-247 §6.2

For transmitters with operating frequencies in the band 5150-5250 MHz, all emissions outside the band 5150-5350 MHzshall 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.

For devices with both operating frequencies and channel bandwidths contained within the band 5250-5350 MHz, the device shall comply with the following:

1. All emissions outside the band 5250-5350 MHz shall not exceed -27 dBm/MHz e.i.r.p. if the equipment is intended for outdoor use; or

2. All emissions outside the band 5150-5350 MHz shall not exceed -27 dBm/MHz e.i.r.p. and any emissions within the band 5150-5250 MHz shall meet the power spectral density limits of Section 6.2.1. The device shall be labelled “for indoor use only.”

For devices with operating frequencies in the band 5250-5350 MHz but having a channel bandwidth that overlaps the band 5150-5250 MHz, the devices’ unwanted emission shall not exceed -27 dBm/MHz e.i.r.p. outside the band 5150-5350 MHz and its power shall comply with the spectral power density for operation within the band 5150-5250 MHz. The device shall be labelled “for indoor use only.”

For transmitters operating in the band 5470-5725 MHz, emissions outside the band shall not exceed -27 dBm/MHz e.i.r.p.

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 Bm/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/MHzat 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/MHzat 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.

6.2 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 ISED 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.

6.3 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 or 10 Hz / Sweep = Auto

6.4 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

6.5 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
Rohde and Schwarz	Receiver, EMI Test	ESCI 1166.5950K03	100338	2018-07-05	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	JB1	A013105-3	2018-02-26	2 years
Wisewave	Antenna, Horn	ARH-4223-02	10555-02	2018-02-14	2 years
Wisewave	Antenna, Horn	ARH-4223-02	10555-01	2018-02-14	2 years
Agilent	Amplifier, Pre	8447D	2944A10187	2018-04-02	1 year
Insulated Wire INC	2.92mm (M) X2, 1501 Armor Neoprene, 396	KPS-1501AN-3960-KPS	DC 1807	2018-03-13	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
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".*

6.6 Test Environmental Conditions

Temperature:	22-25 ºC
Relative Humidity:	29-30 %
ATM Pressure:	102.1 kPa

The testing was performed by Zhao Zhao from 2018-11-21 in 5m chamber 3.

6.7 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:

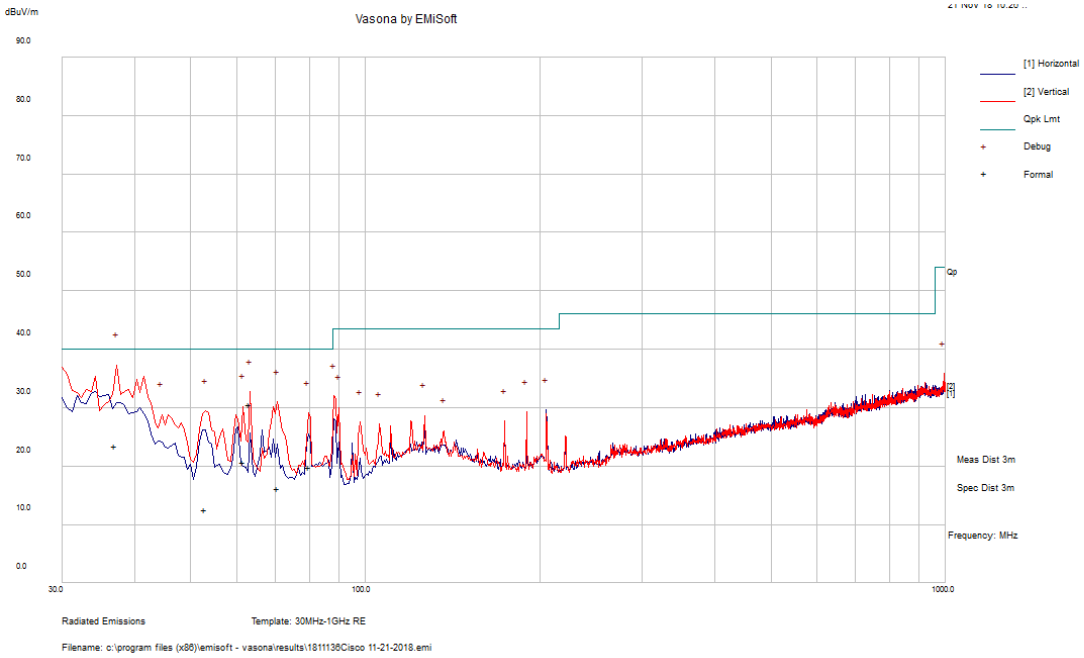
Mode: Transmitting			
Margin (dB)	**Frequency (MHz)**	**Polarization (Horizontal/Vertical)**	**Mode, Channel**
-7.21	12531	Vertical	HT/VHT20 mode, 5240 MHz

Please refer to the following table and plots for specific test result details

6.8 Radiated Emissions Test Result

1) 30 MHz – 1 GHz Worst Case, Measured at 3 meters

Worst Case Colocation, 2.4 GHz BLE, 2.4 GHz Wi-Fi CCK mode and 5 GHz Wi-Fi HT/VHT20 mode



Frequency (MHz)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Comment
37.0713	23.45	208	V	260	40	-16.55	Pass
63.1977	30.63	125	V	357	40	-9.37	Pass
70.4447	16.29	153	V	314	40	-23.71	Pass
61.5941	20.71	129	V	358	40	-19.29	Pass
52.9417	12.65	200	V	305	40	-27.35	Pass
79.9603	19.81	100	V	302	40	-20.19	Pass

2) 1 GHz–10 GHz, Measured at 3 meters

5150 - 5250 MHz

802.11 Non HT20 mode

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Low Channel 5180 MHz non HT20 mode											
1990	48.96	337	290	H	24.36	3.91	37.52	39.71	74	-34.29	PK
1987.8	41.24	337	290	H	24.36	3.91	37.52	31.99	54	-22.01	AV
1075	49.32	122	282	V	24.05	3.91	37.52	39.76	74	-34.24	PK
1074.9	41.42	122	282	V	24.05	3.91	37.52	31.86	54	-22.14	AV
2500	47.72	337	290	H	28.02	5.76	36.17	45.33	74	-28.67	PK
2497.7	39.78	337	290	H	28.02	5.76	36.17	37.39	54	-16.61	AV
2635	47.81	122	282	V	27.90	5.76	36.17	45.29	74	-28.71	PK
2632.5	40.31	122	282	V	27.90	5.76	36.17	37.79	54	-16.21	AV
Mid Channel 5220 MHz non HT20 mode											
1990	50.78	337	290	H	24.36	3.91	37.52	41.53	74	-32.47	PK
1042.9	41.92	337	290	H	24.36	3.91	37.52	32.67	54	-21.33	AV
1030	49.55	122	282	V	24.05	3.91	37.52	39.99	74	-34.01	PK
1000	42.33	122	282	V	24.05	3.91	37.52	32.77	54	-21.23	AV
2635	47.17	337	290	H	28.02	5.76	36.17	44.78	74	-29.22	PK
2632.5	40.05	337	290	H	28.02	5.76	36.17	37.66	54	-16.34	AV
2635	47.27	122	282	V	27.90	5.76	36.17	44.75	74	-29.25	PK
2632.5	39.99	122	282	V	27.90	5.76	36.17	37.47	54	-16.53	AV
High Channel 5240 MHz non HT20 mode											
1990	52.53	313	273	H	24.36	3.91	37.52	43.28	74	-30.72	PK
1986.7	43.23	313	273	H	24.36	3.91	37.52	33.98	54	-20.02	AV
1990	49.29	270	273	V	24.05	3.91	37.52	39.73	74	-34.27	PK
1987.8	41.33	270	273	V	24.05	3.91	37.52	31.77	54	-22.23	AV
2470	47.71	313	273	H	28.02	5.76	36.17	45.32	74	-28.68	PK
2516.1	40.59	313	273	H	28.02	5.76	36.17	38.20	54	-15.80	AV
2488	47.35	270	273	V	27.90	5.76	36.17	44.83	74	-29.17	PK
2486.1	39.96	270	273	V	27.90	5.76	36.17	37.44	54	-16.56	AV

802.11 HT/VHT20 mode

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Low Channel 5180 MHz HT/VHT20 mode											
1780	47.65	337	290	H	24.36	3.91	37.52	38.40	74	-35.60	PK
1296.7	40.74	337	290	H	24.36	3.91	37.52	31.49	54	-22.51	AV
1990	47.90	122	282	V	24.05	3.91	37.52	38.34	74	-35.66	PK
1410.9	40.35	122	282	V	24.05	3.91	37.52	30.79	54	-23.21	AV
2463	46.14	337	290	H	28.02	5.76	36.17	43.75	74	-30.25	PK
2506.1	39.54	337	290	H	28.02	5.76	36.17	37.15	54	-16.85	AV
2496	46.77	122	282	V	27.90	5.76	36.17	44.25	74	-29.75	PK
2506.1	39.75	122	282	V	27.90	5.76	36.17	37.23	54	-16.77	AV
Mid Channel 5220 MHz HT/VHT20 mode											
2125	47.89	337	290	H	24.36	3.91	37.52	38.64	74	-35.36	PK
1297.8	40.53	337	290	H	24.36	3.91	37.52	31.28	54	-22.72	AV
2125	47.94	122	282	V	24.05	3.91	37.52	38.38	74	-35.62	PK
1306.6	40.78	122	282	V	24.05	3.91	37.52	31.22	54	-22.78	AV
2381	46.30	337	290	H	28.02	5.76	36.17	43.91	74	-30.09	PK
2484.2	39.88	337	290	H	28.02	5.76	36.17	37.49	54	-16.51	AV
2481	46.84	122	282	V	27.90	5.76	36.17	44.32	74	-29.68	PK
2494.1	39.56	122	282	V	27.90	5.76	36.17	37.04	54	-16.96	AV
High Channel 5240 MHz HT/VHT20 mode											
1990	48.61	142	270	H	24.36	3.91	37.52	39.36	74	-34.64	PK
1990	39.94	142	270	H	24.36	3.91	37.52	30.69	54	-23.31	AV
1990	48.72	202	270	V	24.05	3.91	37.52	39.16	74	-34.84	PK
1987.8	44.26	202	270	V	24.05	3.91	37.52	34.70	54	-19.30	AV
2470	46.43	142	270	H	28.02	5.76	36.17	44.04	74	-29.96	PK
2474.3	39.37	142	270	H	28.02	5.76	36.17	36.98	54	-17.02	AV
2492	46.84	202	270	V	27.90	5.76	36.17	44.32	74	-29.68	PK
2489.3	41.47	202	270	V	27.90	5.76	36.17	38.95	54	-15.05	AV

802.11 HT/VHT40 MODE

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Low Channel 5190 MHz HT/VHT40 mode											
1990	48.93	140	300	H	24.36	3.91	37.52	39.68	74	-34.32	PK
1988.9	39.81	140	300	H	24.36	3.91	37.52	30.56	54	-23.44	AV
2125	46.99	135	253	V	24.05	3.91	37.52	37.43	74	-36.57	PK
1987.8	40.98	135	253	V	24.05	3.91	37.52	31.42	54	-22.58	AV
2492	45.56	140	300	H	28.02	5.76	36.17	43.17	74	-30.83	PK
2505	39.08	140	300	H	28.02	5.76	36.17	36.69	54	-17.31	AV
2515	45.95	135	253	V	27.90	5.76	36.17	43.43	74	-30.57	PK
2508.3	39.14	135	253	V	27.90	5.76	36.17	36.62	54	-17.38	AV
High Channel 5230 MHz HT/VHT40 mode											
1990	48.97	313	282	H	24.36	3.91	37.52	39.72	74	-34.28	PK
1987.8	41.92	313	282	H	24.36	3.91	37.52	32.67	54	-21.33	AV
1990	50.13	227	273	V	24.05	3.91	37.52	40.57	74	-33.43	PK
1987.8	42.33	227	273	V	24.05	3.91	37.52	32.77	54	-21.23	AV
2471	46.81	313	282	H	28.02	5.76	36.17	44.42	74	-29.58	PK
2483.4	39.91	313	282	H	28.02	5.76	36.17	37.52	54	-16.48	AV
2492	46.46	227	273	V	27.90	5.76	36.17	43.94	74	-30.06	PK
2485.6	39.99	227	273	V	27.90	5.76	36.17	37.47	54	-16.53	AV

802.11 VHT80 mode

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Channel 5210 MHz VHT80 mode											
1990	48.10	263	265	H	24.36	3.91	37.52	38.85	74	-35.15	PK
2001	39.66	263	265	H	24.36	3.91	37.52	30.41	54	-23.59	AV
1990	49.39	177	277	V	24.05	3.91	37.52	39.83	74	-34.17	PK
1987.8	40.05	177	277	V	24.05	3.91	37.52	30.49	54	-23.51	AV
2483.5	39.70	263	265	H	28.02	5.76	36.17	37.31	54	-16.69	AV
2486	46.53	177	277	V	27.90	5.76	36.17	44.01	74	-29.99	PK
2483.5	39.55	177	277	V	27.90	5.76	36.17	37.03	54	-16.97	AV

3) 10GHz–18GHz, Measured at 1 meter

5150 - 5250 MHz

802.11 Non HT20 mode

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Low Channel 5180 MHz non HT20 mode											
10093	43.24	149	221	H	38.60	14.18	35.36	60.66	84	-23.34	PK
10101.6	38.45	149	221	H	38.60	14.18	35.36	55.87	64	-8.13	AV
10080	43.45	248	200	V	38.56	14.18	35.36	60.83	84	-23.17	PK
10092.8	38.24	248	200	V	38.56	14.18	35.36	55.62	64	-8.38	AV
10892	43.04	149	221	H	38.80	14.94	34.65	62.13	84	-21.87	PK
11085.9	37.10	149	221	H	38.80	14.94	34.65	56.19	64	-7.81	AV
10892	42.23	248	200	V	38.79	14.94	34.65	61.31	84	-22.69	PK
11103.5	36.53	248	200	V	38.79	14.94	34.65	55.61	64	-8.39	AV
Mid Channel 5220 MHz non HT20 mode											
10080	43.87	163	199	H	38.60	14.18	35.36	61.29	84	-22.71	PK
10184.6	38.56	163	199	H	38.60	14.18	35.36	55.98	64	-8.02	AV
10107	45.04	163	210	V	38.56	14.18	35.36	62.42	84	-21.58	PK
10119.2	39.16	163	210	V	38.56	14.18	35.36	56.54	64	-7.46	AV
11867	42.75	163	199	H	38.80	14.94	34.65	61.84	84	-22.16	PK
11866.7	37.24	163	199	H	38.80	14.94	34.65	56.33	64	-7.67	AV
11867	42.48	163	210	V	38.79	14.94	34.65	61.56	84	-22.44	PK
11862.8	37.16	163	210	V	38.79	14.94	34.65	56.24	64	-7.76	AV
High Channel 5240 MHz non HT20 mode											
10147	44.00	138	226	H	38.60	14.18	35.36	61.42	84	-22.58	PK
10096.7	39.09	138	226	H	38.60	14.18	35.36	56.51	64	-7.49	AV
10120	44.33	220	215	V	38.56	14.18	35.36	61.71	84	-22.29	PK
10132.8	38.62	220	215	V	38.56	14.18	35.36	56.00	64	-8.00	AV
11859	42.35	138	226	H	38.80	14.94	34.65	61.44	84	-22.56	PK
11863.9	37.47	138	226	H	38.80	14.94	34.65	56.56	64	-7.44	AV
11840	42.67	220	215	V	38.79	14.94	34.65	61.75	84	-22.25	PK
11858.1	37.14	220	215	V	38.79	14.94	34.65	56.22	64	-7.78	AV

802.11 HT/VHT20 mode

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Low Channel 5180 MHz HT/VHT20 mode											
10173	43.51	149	221	H	38.60	14.18	35.36	60.93	84	-23.07	PK
10103.5	38.08	149	221	H	38.60	14.18	35.36	55.50	64	-8.50	AV
10293	44.19	248	200	V	38.56	14.18	35.36	61.57	84	-22.43	PK
10107.4	38.10	248	200	V	38.56	14.18	35.36	55.48	64	-8.52	AV
10573	42.53	149	221	H	38.80	14.94	34.65	61.62	84	-22.38	PK
10909.1	36.66	149	221	H	38.80	14.94	34.65	55.75	64	-8.25	AV
11121	42.75	248	200	V	38.79	14.94	34.65	61.83	84	-22.17	PK
10639.5	37.24	248	200	V	38.79	14.94	34.65	56.32	64	-7.68	AV
Mid Channel 5220 MHz HT/VHT20 mode											
10200	44.10	163	199	H	38.60	14.18	35.36	61.52	84	-22.48	PK
10184.6	38.79	163	199	H	38.60	14.18	35.36	56.21	64	-7.79	AV
10147	43.64	163	210	V	38.56	14.18	35.36	61.02	84	-22.98	PK
10119.2	38.92	163	210	V	38.56	14.18	35.36	56.30	64	-7.70	AV
12480	42.92	163	199	H	38.80	14.94	34.65	62.01	84	-21.99	PK
12666.6	37.65	163	199	H	38.80	14.94	34.65	56.74	64	-7.26	AV
12814	41.63	163	210	V	38.79	14.94	34.65	60.71	84	-23.29	PK
12529.9	37.52	163	210	V	38.79	14.94	34.65	56.60	64	-7.40	AV
High Channel 5240 MHz HT/VHT20 mode											
10013	44.28	138	226	H	38.60	14.18	35.36	61.70	84	-22.30	PK
10178.7	38.79	138	226	H	38.60	14.18	35.36	56.21	64	-7.79	AV
10133	43.47	220	215	V	38.56	14.18	35.36	60.85	84	-23.15	PK
10132.8	38.82	220	215	V	38.56	14.18	35.36	56.20	64	-7.80	AV
12793	41.24	138	226	H	38.80	14.94	34.65	60.33	84	-23.67	PK
12628.7	37.04	138	226	H	38.80	14.94	34.65	56.13	64	-7.87	AV
12600	42.28	220	215	V	38.79	14.94	34.65	61.36	84	-22.64	PK
12531	37.71	220	215	V	38.79	14.94	34.65	56.79	64	-7.21	AV

802.11 HT/VHT40 mode

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Low Channel 5190 MHz HT/VHT40 mode											
10120	44.60	162	214	H	38.60	14.18	35.36	62.02	84	-21.98	PK
10118.2	39.21	162	214	H	38.60	14.18	35.36	56.63	64	-7.37	AV
10147	44.13	285	221	V	38.56	14.18	35.36	61.51	84	-22.49	PK
10105.5	39.06	285	221	V	38.56	14.18	35.36	56.44	64	-7.56	AV
12653	42.53	162	214	H	38.80	14.94	34.65	61.62	84	-22.38	PK
12538.1	37.10	162	214	H	38.80	14.94	34.65	56.19	64	-7.81	AV
11840	42.45	285	221	V	38.79	14.94	34.65	61.53	84	-22.47	PK
12552.1	37.15	285	221	V	38.79	14.94	34.65	56.23	64	-7.77	AV
High Channel 5230 MHz HT/VHT40 mode											
10133	44.12	314	230	H	38.60	14.18	35.36	61.54	84	-22.46	PK
10118.2	39.20	314	230	H	38.60	14.18	35.36	56.62	64	-7.38	AV
10093	43.31	189	205	V	38.56	14.18	35.36	60.69	84	-23.31	PK
10109.4	39.18	189	205	V	38.56	14.18	35.36	56.56	64	-7.44	AV
12667	42.52	314	230	H	38.80	14.94	34.65	61.61	84	-22.39	PK
12669.4	37.36	314	230	H	38.80	14.94	34.65	56.45	64	-7.55	AV
12554	42.26	189	205	V	38.79	14.94	34.65	61.34	84	-22.66	PK
12669.4	37.25	189	205	V	38.79	14.94	34.65	56.33	64	-7.67	AV

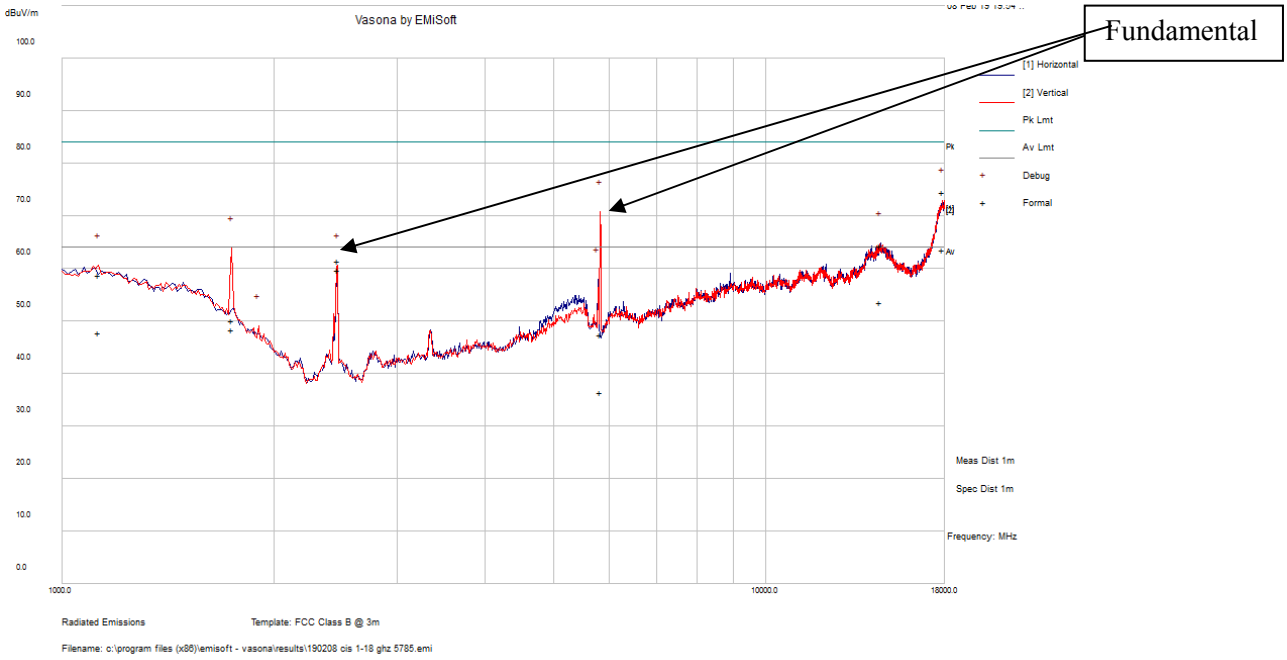
802.11 VHT80 mode

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Channel 5210 MHz VHT80 mode											
10133	44.52	153	209	H	38.60	14.18	35.36	61.94	84	-22.06	PK
10171.9	38.92	153	209	H	38.60	14.18	35.36	56.34	64	-7.66	AV
10173	42.95	256	215	V	38.56	14.18	35.36	60.33	84	-23.67	PK
10126	39.04	256	215	V	38.56	14.18	35.36	56.42	64	-7.58	AV
12676	42.11	153	209	H	38.80	14.94	34.65	61.20	84	-22.80	PK
12685	36.75	153	209	H	38.80	14.94	34.65	55.84	64	-8.16	AV
12560	41.45	256	215	V	38.79	14.94	34.65	60.53	84	-23.47	PK
12662.5	17.12	256	215	V	38.79	14.94	34.65	36.20	64	-27.80	AV

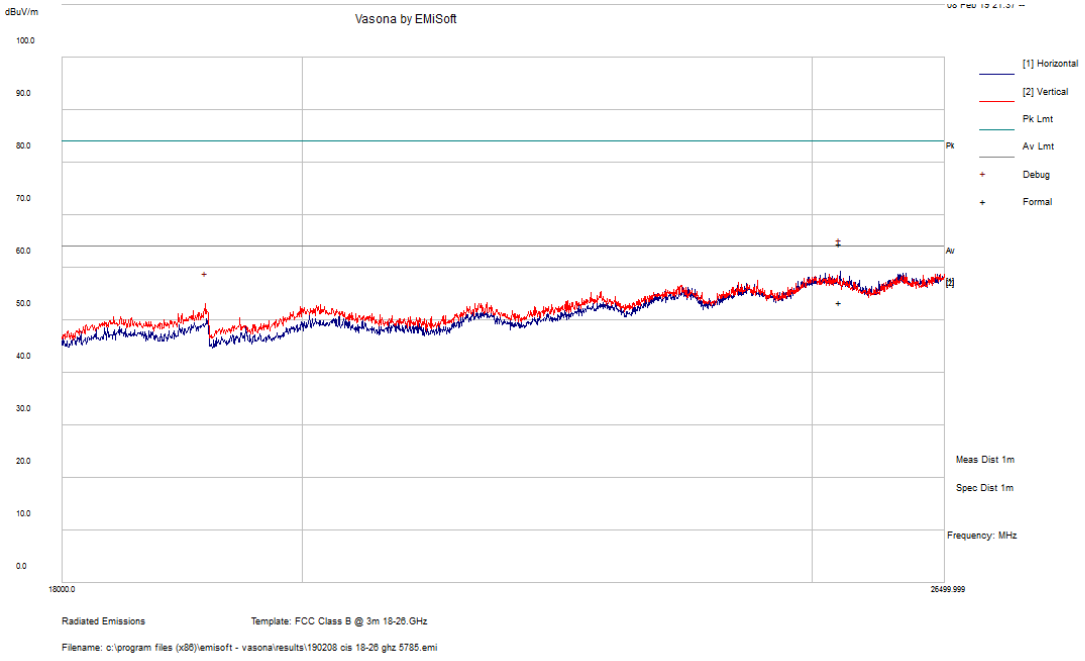
4) 1-18GHz & 18GHz -26.5GHz & 26.5GHz – 40GHz, Measured at 1 meter.

Worst Case Colocation, 2.4 GHz BLE, 2.4 GHz Wi-Fi CCK mode and 5 GHz Wi-Fi HT/VHT20 mode

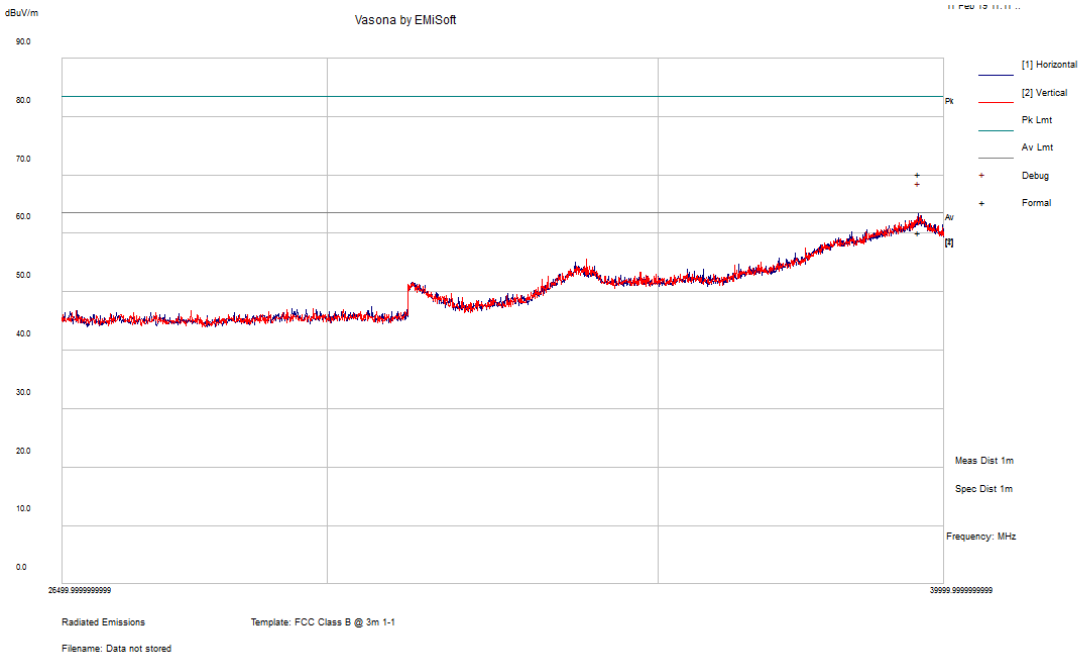
1 GHz – 18 GHz



18 GHz-26.5 GHz



26.5 GHz-40 GHz



No emission seen above 18GHz, the plot above represents worst case for all modes tested.

7 Appendix (Normative) EUT Photographs

Please see the attachments

8 Appendix D (Normative) - 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 A2LA *R222 - Specific Requirements EPA ENERGY STAR Accreditation Program*. 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 April 2017)*.

Presented this 2nd day of October 2018.

President and CEO
For the Accreditation Council
Certificate Number 3297.02
Valid to September 30, 2020

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

Please follow the web link below for a full ISO 17025 scope

https://www.a2la.org/scopepdf/3297-02.pdf

--- END OF REPORT ---