FCC PART 15, SUBPART C
ISEDC RSS-247, ISSUE 2, FEBRUARY 2017

TEST REPORT

For

ChargePoint, Inc.

253 E. Hacienda Ave, Campbell, CA 95008, USA

FCC ID: W38-60SIPT
IC: 8854A-602230C

Report Type:	**Product Type:**
Class II Permissive Change	Wi-Fi & BT Module

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ACCREDITED
CERTIFICATE #3297.02

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DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
0	R2108319-407	Original Report	2021-10-26

1 General Description

1.1 Product Description for Equipment under Test (EUT)

This test report was prepared on behalf of *ChargePoint, Inc.,* and their product model: *SU60-2230C, FCC ID: W38-60SIPT, IC: 8854A-602230C*, or the "EUT" as referred to in this report. The EUT is a Wi-Fi & BT module and is contained within a Network Module host device which also contains a Cell Modem and RFID Module.

1.2 Objective

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

The objective was to determine compliance with FCC Part 15.407 and ISEDC RSS-247 rules for Antenna Requirements, RF Exposure &Radiated Spurious Emissions.

This project was a Permissive Change II submission for the purpose of changing the Wifi/BT module antenna used by the EUT, disabling DFS band and enabling radio co-location with RFID module (FCC ID: W38-UICFG, IC: 8854A-UICFG) and cell modem (FCC ID: W38-201903EG25G, IC: 8854A-201903EG25G).

1.3 Related Submittal(s)/Grant(s)

Equipment Class: DTS/DSS, FCC ID: W38-60SIPT, IC: 8854A-602230C

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 ° 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 3297.02),*** 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 3297.03)*** 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 3297.01)*** 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.

2.2 EUT Exercise Software

The EUT was configured to transmit through Command Prompt. The software is compliant with the standard requirements being tested against.

Please refer to the following power setting table.

Modulation	Frequency (MHz)	Power Setting
802.11a	5180	17
	5220	19
	5240	19
802.11ac20	5180	17
	5220	19
	5240	19
802.11ac40	5190	15
	5230	17
802.11ac80	5210	12
802.11a	5745	19
	5785	19
	5825	20
802.11ac20	5745	19
	5785	19
	5825	20
802.11ac40	5755	18
	5795	18
802.11ac80	5775	15

*Data rates tested:
802.11a mode: 6 Mbps
802.11ac20 VHT20: MCS0
802.11ac40 VHT40: MCS0
802.11ac80 VHT80: MCS0

Note: Power settings were determined from settings used in previous test report of device (Test Report FR740701AN Rev. 02 issued by International Certification Corp. on 07/21/2017).

2.3 Duty Cycle Correction Factor

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

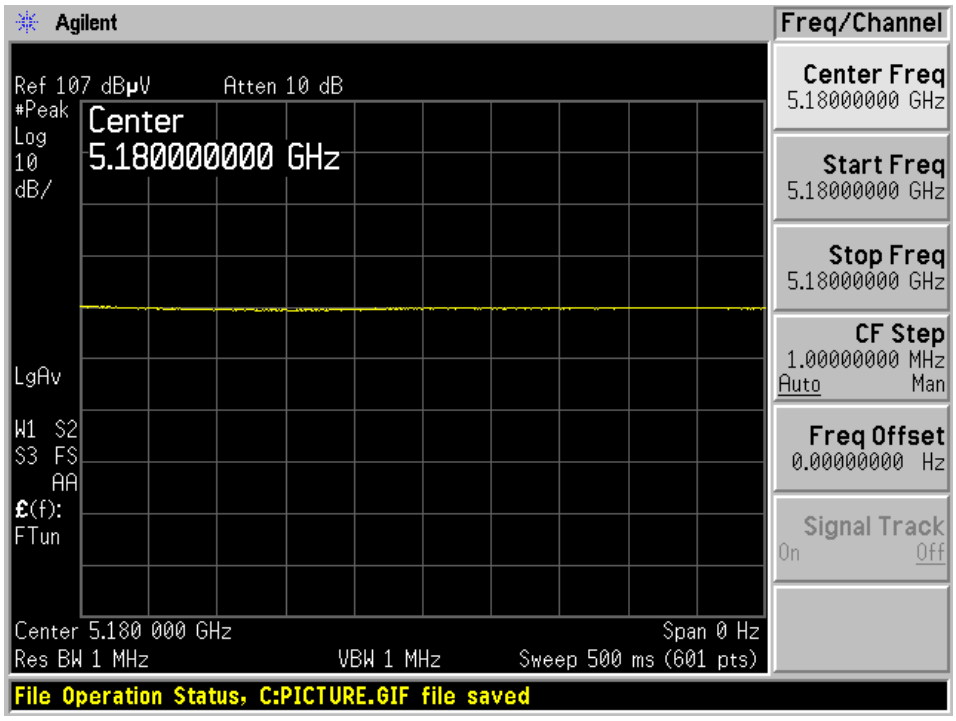
All measurements are to be performed with the EUT transmitting at 100% duty cycle at its maximum power control level; however, if 100% duty cycle cannot be achieved, measurements of duty cycle, x, and maximum-power transmission duration, T, are required for each tested mode of operation.

Radio Mode	On Time (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)
802.11a	-	-	100	0
802.11ac20	-	-	100	0
802.11ac40	-	-	100	0
802.11ac80	-	-	100	0

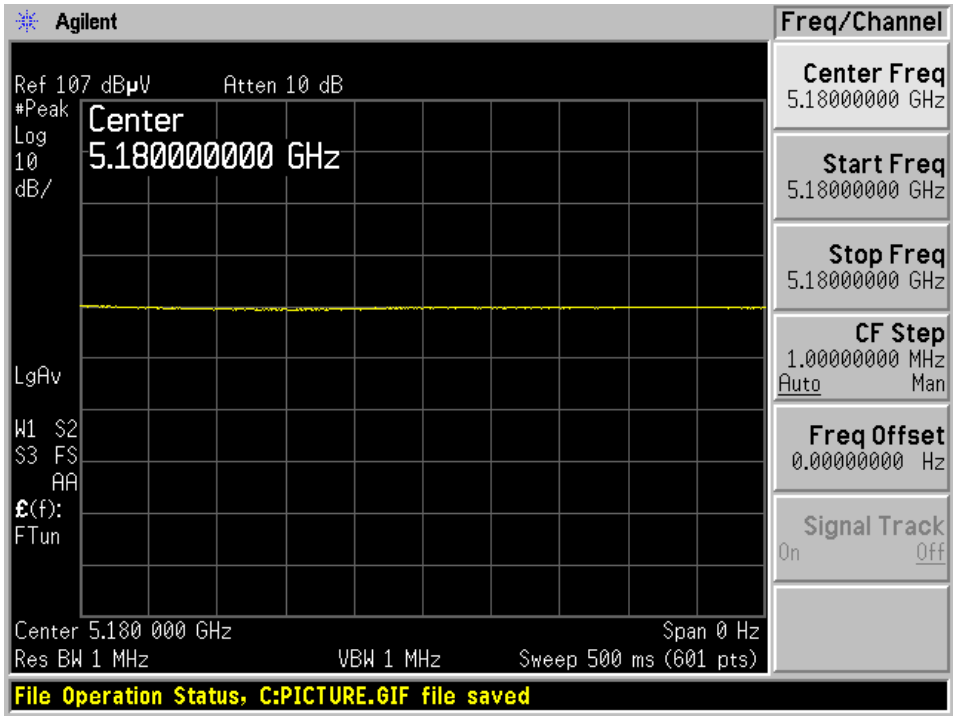
Note: Duty Cycle Correction Factor = 10*log(1/duty cycle)

Please refer to the following plots.

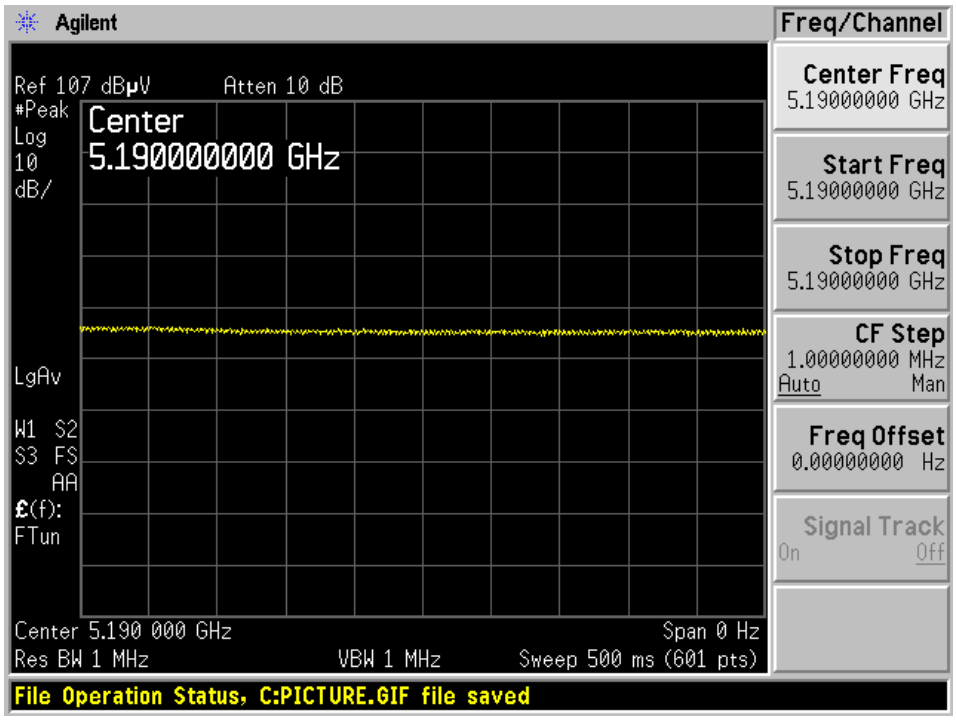
802.11a mode



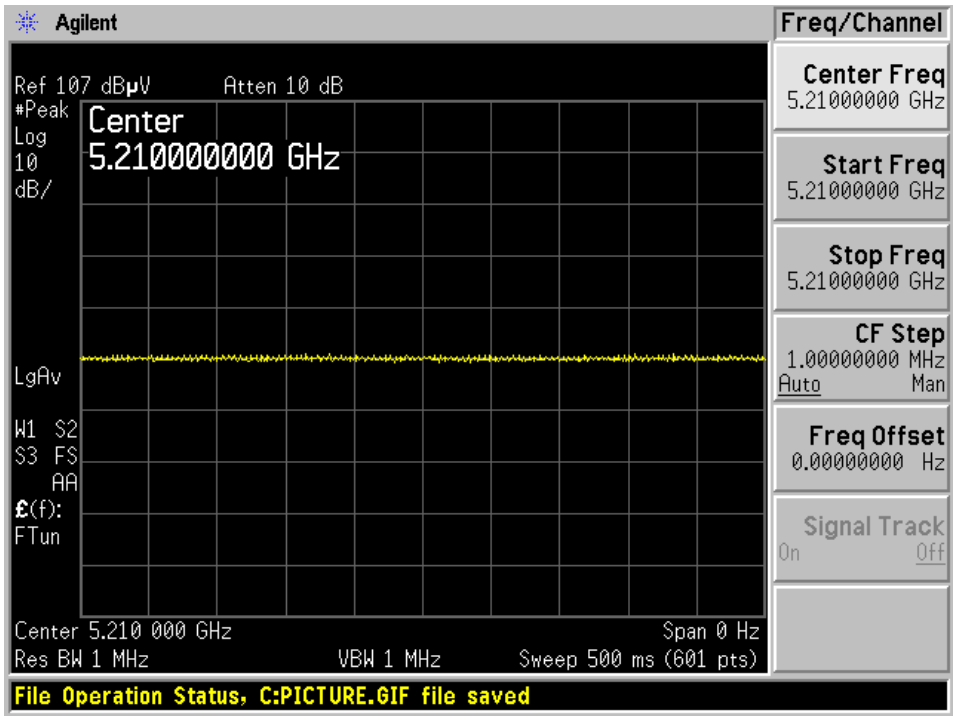
802.11ac20 mode



802.11ac40 mode



802.11ac80



2.4 Equipment Modifications

N/A

2.5 Local Support Equipment

Manufacturer	Description	Model
Dell	Laptop	Latitude E6410

2.6 Remote Support Equipment

Manufacturer	Description	Model
Mean Well Enterprises Co., LTD.	AC/DC Switching Adaptor	SGA40U48

Note: Power Adaptor was only used for test purposes. In normal operation, device will be powered by 48VDC from host

2.7 Interface Ports and Cabling

Cable Description	Length (m)	To	From
Ethernet Cable	< 1 m	EUT	Laptop

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 §2.1053, §15.205, §15.209, 15.407(b) ISEDC RSS-247 §6.2	Spurious Radiated Emissions	Compliant

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

4.1 Applicable Standards

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.

According to KDB 447 498 Section (7.2), "simultaneous transmission of MPE test exclusion applies when the sum of the MPE ratios for all simultaneous transmitting antennas incorporated in a host device, based on calculated or measured field strengths or power density, is ≤ 1.0. The MPE ratio of each antenna is determined at the minimum *test separation distance* required by the operating configurations and exposure conditions of the host device, according to the ratio of field strengths or power density to MPE limit, at the test frequency.

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

Where: 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.

4.2 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

Note: According to MIMOFCC KDB 662911 D02 MIMO with Cross Polarized Antenna v01, Where an FCC rule specifies limits in radiated terms such as EIRP or ERP, the limits apply to the maximum emission that would be observed by a linearly polarized measurement antenna. Therefore, the highest output power from single antenna power was selected to calculate in this section.

4.3 MPE Results

Radio Standalone RF Exposure Configuration

5 GHz Wi-Fi: 802.11n/ac40 mode, 5240 MHz

Maximum output power at antenna input terminal (dBm):	21.60
Maximum output power at antenna input terminal (mW):	144.54
Prediction distance (cm):	20
Prediction frequency (MHz):	5240
Maximum Antenna Gain, typical (dBi):	5.17
Maximum Antenna Gain (numeric):	3.29
Power density of prediction frequency at 20.0 cm (mW/cm^2):	0.0946
FCC MPE limit for uncontrolled exposure at prediction frequency (mW/cm^2):	1.0

The device is compliant with the requirement FCC MPE limit for uncontrolled exposure. The maximum power density at the distance of 20 cm is 0.0946 mW/cm^2. Limit is 1.0 mW/cm^2.

Radio Co-location

Simultaneous transmission among 2.4 GHz Wi-Fi, Bluetooth and 5 GHz Wi-Fi is not supported.

Radio	Max Conducted Power (dBm)	Evaluated Distance (cm)	Worst-Case Exposure Level	Limit	Worst-Case Ratios	Sum of Ratios	Limit
Worst Case							
5GHz Wifi	21.60	20	0.0946 mW/cm^2	1.0 mW/cm^2	9.46%	32.83%	100%
Cellular	25.81	20	0.1284 mW/cm^2	0.5495 mW/cm^2	23.37%		
RFID	-21.65	20	0.00000137 mW/cm^2	1 mW/cm^2	0.000137%		

Note: Cellular Module FCC ID: W38-201903EG25G, IC: 8854A-201903EG25G

Note: RFID Module FCC ID: W38-UICFG, IC: 8854A-UICFG

4.4 RF exposure evaluation exemption for IC

5 GHz Wi-Fi: 802.11n/ac40 mode, 5240 MHz

Maximum EIRP power = 21.60 dBm + 5.17 dBi = 26.77 dBm which is less than $1.31\times10^{-2}f^{0.6834}$ = 4.56 W = 36.59 dBm

Therefore the RF exposure Evaluation is not required.

Note: Maximum Antenna Gain used is based on Combined Antenna Gain calculation for MIMO transmitting usage (i.e. Combined Antenna Gain(dBi) = Single Antenna Gain(dBi) + 10*log(Number of Antennas)). In this case the Combined Antenna Gain is 5.17 dBi = 2.17 dBi +10*log(2).

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 §15.247 (b) (4), 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

Antenna usage	Frequency Range (MHz)	Maximum Antenna Gain (dBi)	Antenna Type
5 GHz Wi-Fi	5150-5850	2.17	Chip

Note: The antennas used by the EUT are permanent attached antennas.
Note: Antenna info is information provided by customer.

6 FCC §15.209, §15.407(b) & ISEDC RSS-247 §6.2 - 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 5.47-5725 GHz band shall not exceed an ei.r.p. of -27 dBm/MHz.

(4) For transmitters operating in the 5.725-5.85 GHz band: All emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an e.i.r.p. of -17 dBm/MHz; for frequencies 10 MHz or greater above or below the band edge, emissions shall noet exceed an e.i.r.p. of -27 dBm/MHz.

(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.

As per ISEDC RSS-247 §6.2

For transmitters operating in the band 5150-5250 MHz, all emissions outside the band 5150-5350 MHz shall not exceed -27 dBm/MHz e.i.r.p. However, any unwanted emissions that fall into the band 5250- 5350 MHz must be 26 dBc, when measured using a resolution bandwidth between 1 and 5% of the occupied bandwidth, above 5.25 GHz. Otherwise, the transmission is considered as intentional and the devices shall implement dynamic frequency selection (DFS) and transmitter power control (TPC) as per the requirements for the band 5250-5350 MHz

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.

For the band 5725-5850 MHz, emissions at frequencies from the band edges to 10 MHz above or below the band edges shall not exceed -17 dBm/MHz e.i.r.p. For emissions at frequencies more than 10 MHz above or below the band edges, the emissions power shall not exceed -27 dBm/MHz.

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 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.

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 = 100ms
(2) Average: RBW = 1MHz / VBW = 10Hz / 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

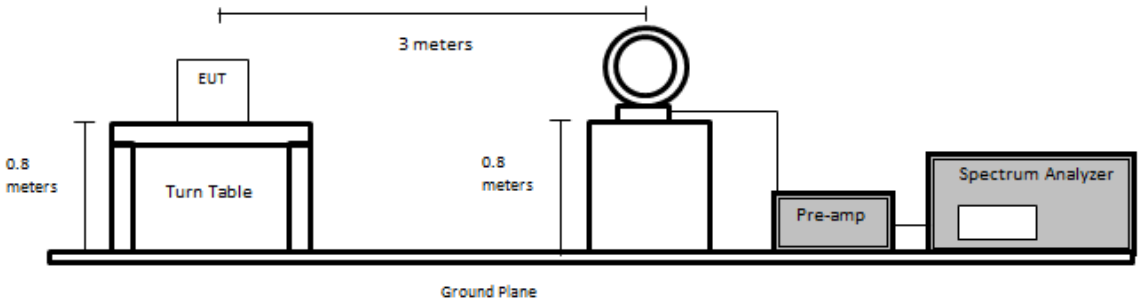
For example, a corrected amplitude of 40.3 dBuV/m = Indicated Reading (32.5 dBuV) + Antenna Factor (+23.5dB) + Cable Loss (3.7 dB) + Attenuator (10 dB) - Amplifier Gain (29.4 dB)

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:

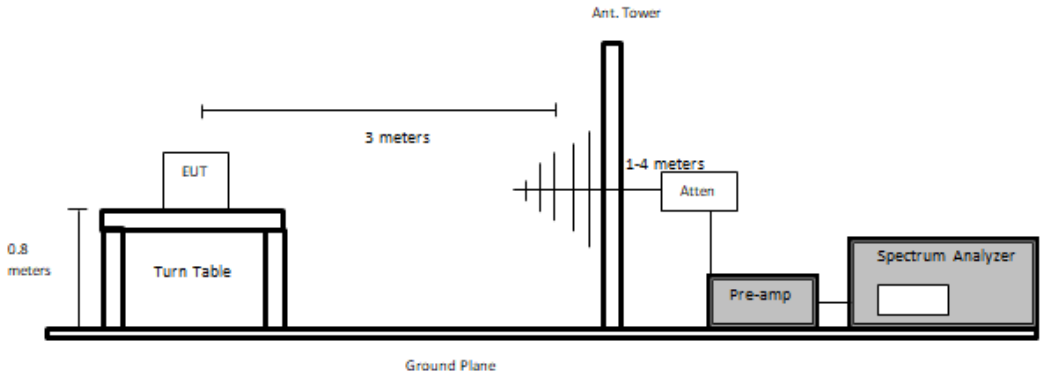
Margin = Corrected Amplitude – Limit

6.5 Test Setup Block Diagram

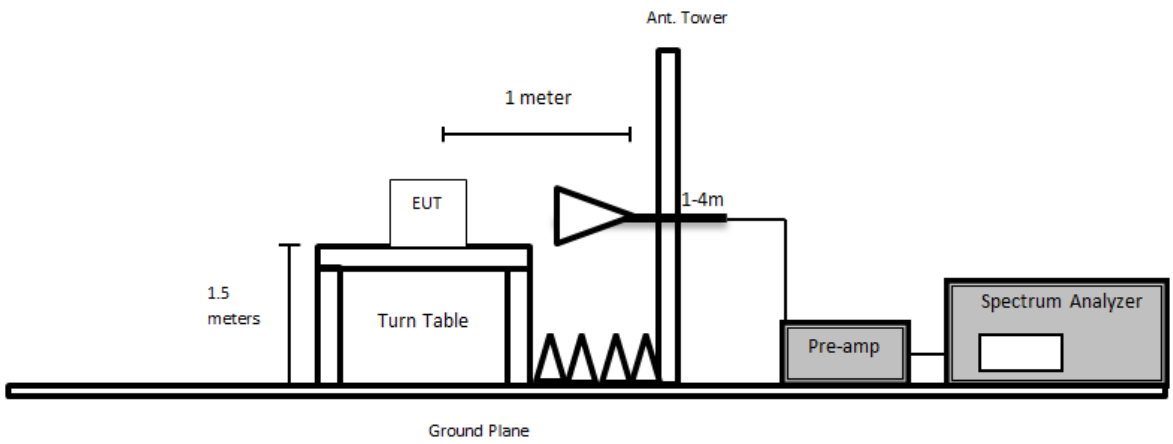
9 kHz to 30 MHz:



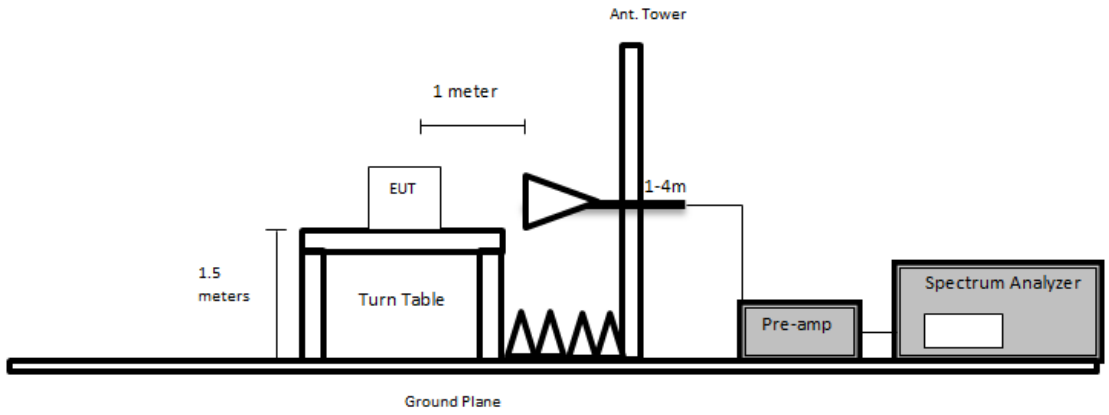
30 MHz to 1GHz:



1 GHz to 18 GHz (Asset #187 Antenna used):



18 GHz to 40 GHz (Asset #91 and #92 Antennas used):



6.6 Test Equipment List and Details

BACL No.	Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
0322	Rohde & Schwarz	EMI Test Receiver	ESCI 1166.5950K03	100337	2021-03-09	2 years
0811	Keysight Technologies	RF Limiter	11867A	MY42243052	2020-10-27	1 year
0287	Agilent	Spectrum Analyzer	E4446A	US44300386	2021-04-27	1 year
-	Sunol Science Corp	System Controller	SC110V	122303-1	N/R	N/A
0658	HP	Pre-Amplifier	8449B OPT HO2	3008A0113	2021-05-06	1 year
0827	AH Systems	Preamplifier	PAM 1840 VH	170	2021-08-03	1 year
0092	Wisewave	Horn Antenna	ARH-2823-02	10555-01	2020-02-05	2 years
0091	Wisewave	Horn Antenna	ARH-4223-02	10555-02	2020-02-05	2 years
0187	A.R.A	Antenna, Horn	DRG-118/A	1132	2020-02-25	2 years
0321	Sunol Sciences	Biconilog Antenna	JB3	A020106-2	2019-11-20	2 years
0459	HP	Pre Amplifier	8447D	2443A04374	2020-08-17	15 months
-	-	RF cable	-	-	Each time[1]	N/A
-	-	Notch Filter	-	-	Each time[1]	N/A
1077	Insulted Wire Corp.	157 Series 2.92 SM (x2) Armored 33 ft. Cable	KPS-1571AN-3960-KPS	DC 1917	2021-03-03	1 year
1081	MDP Digital	Times Microwave LMR 400 UltraFex Coaxial Cable 35\'	LMR400UF	BACL1904161	2021-06-18	1 year
1101	IW Microwave	157 Series Cable Armored with 2.92mm Male Plugs	KPS-1571AN-2400	DC 1922	2021-07-06	1 year
0445	Sonoma Instruments	Pre Amplifier	315	303125	2021-08-03	1 year
0393	Com-Power	Antenna, Loop Active	AL-130	17043	2021-05-05	2 years
1151	BACL	5m3 Sensitivity Box	1	2	2020-10-27	1 year

Note[1]: equipment 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 the latest version of A2LA policy P102 "A2LA Policy on Metrological Traceability".*

6.7 Test Environmental Conditions

Temperature:	20-22 ºC
Relative Humidity:	42-50 %
ATM Pressure:	102.7 kPa

The testing was performed by Deepak Mishra and Giriraj Gurjar from 2021-10-15 to 2021-10-25 in 5m chamber 3 and 10m chamber 1.

6.8 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)**	**Configuration**
-5.31	17606.828	Vertical	5 GHz Wifi (ac20 mode, 5240 MHz) + Cellular Modem(WCDMA Band II) + RFID

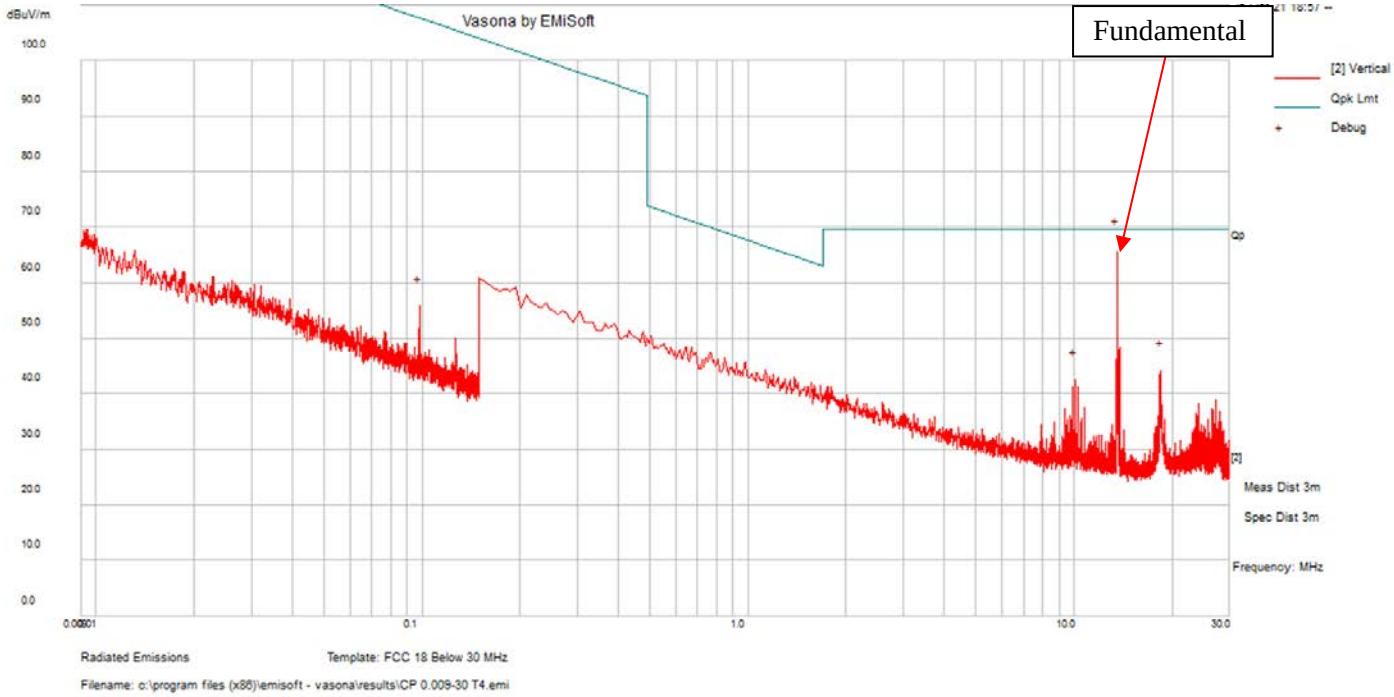
Please refer to the following table and plots for specific test result details

6.9 Radiated Emissions Test Result Data

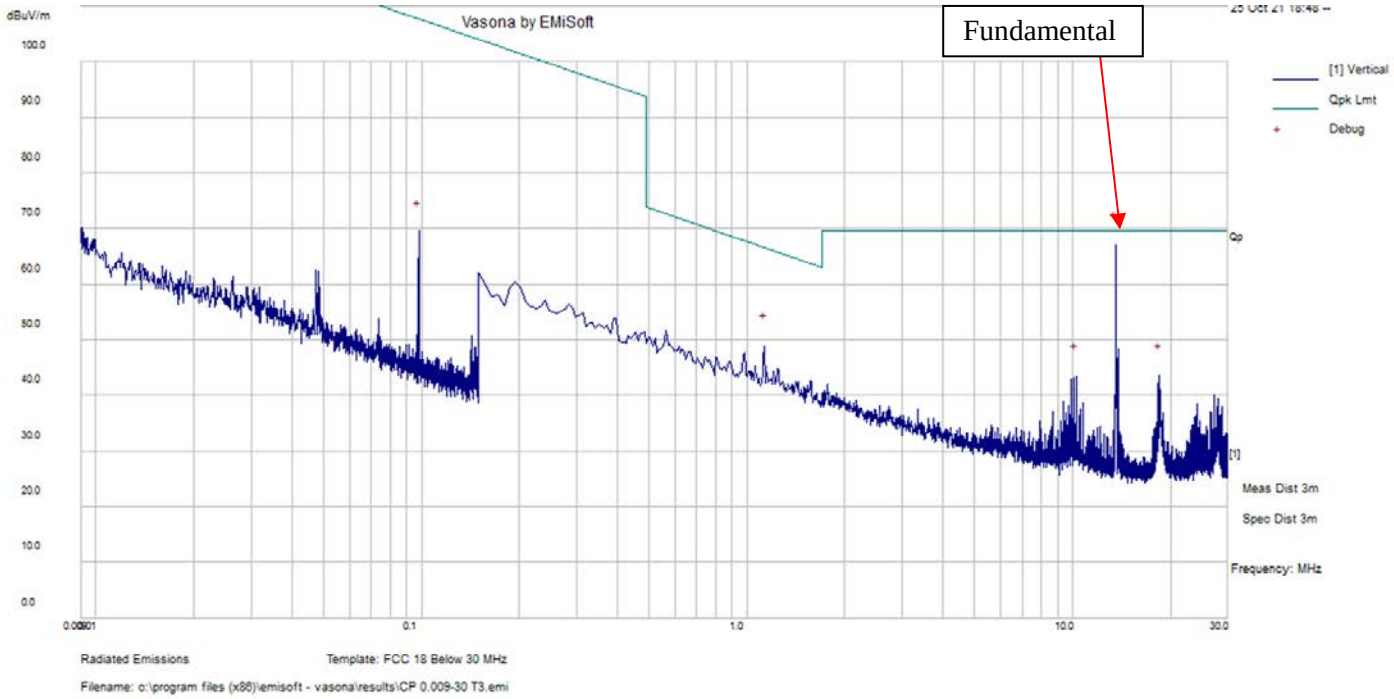
1) Below 30 MHz Radiated Field Strength at 3 meters

Worst Case: 5 GHz Wifi (ac20 mode, 5240 MHz) + Cellular Modem (WCDMA Band II) + RFID

Perpendicular

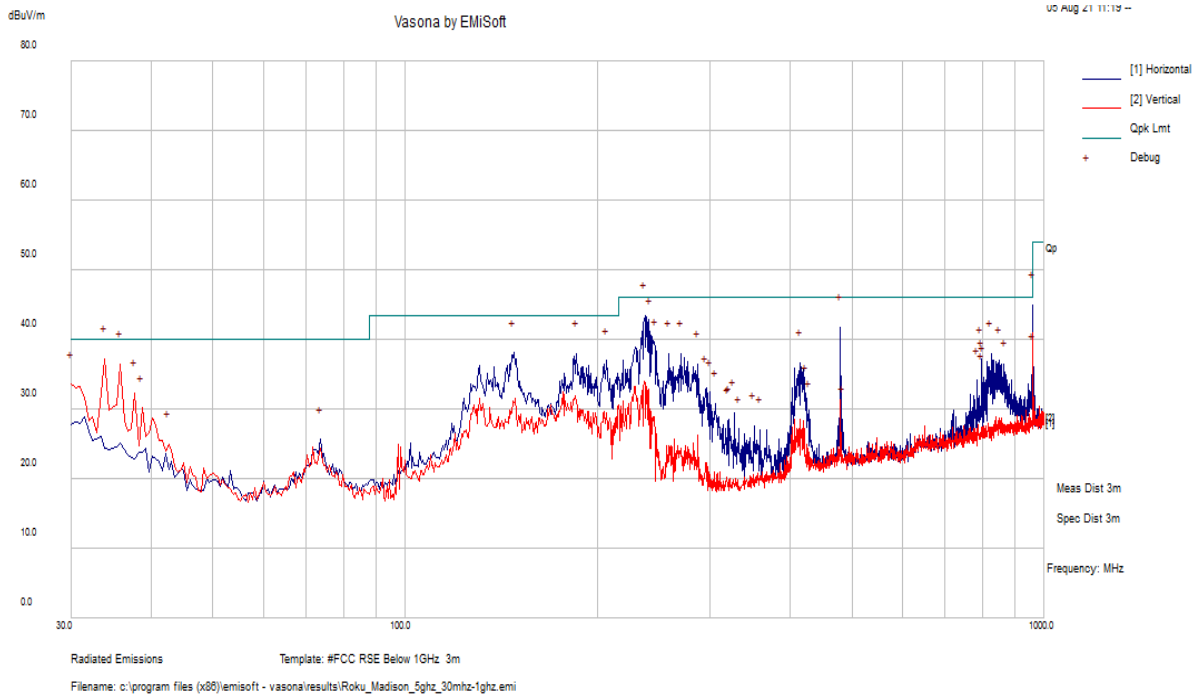


Parallel:


Vasona by EMiSoft
Fundamental
dBuV/m
100.0
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
0.1
1.0
10.0
30.0
[1] Vertical
Qpk Lmt
Debug
Qp
[1]
Meas Dist 3m
Spec Dist 3m
Frequency: MHz
Radiated Emissions
Template: FCC 18 Below 30 MHz
Filename: c:\program files (x86)\emisoft - vasona\results\CP 0.009-30 T3.emi

2) 30 MHz – 1 GHz at 3 meters

Worst Case: 5 GHz Wifi (ac20 mode, 5240 MHz) + Cellular Modem (WCDMA Band II) + RFID



Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Comment
35.2545	43.43	-13.36	30.07	164	H	361	40	-9.93	Pass
31.42275	37.75	-10.38	27.37	173	H	361	40	-12.63	Pass
43.765	47.49	-19.74	27.75	119	H	247	40	-12.25	Pass
33.14125	39.47	-11.68	27.79	111	H	206	40	-12.21	Pass
32.5025	38.6	-11.18	27.42	169	H	64	40	-12.58	Pass
44.6985	48.08	-20.22	27.86	128	H	274	40	-12.14	Pass

3) 1 – 18 GHz, measured at 1 meter

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/IC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Low Channel: 5180 MHz											
5150	63.36	93	249	V	35.53	8.64	38.39	69.14	78	-8.86	Peak
5150	50.05	93	249	V	35.53	8.34	38.39	55.53	64	-8.47	Ave
5150	64.78	193	224	H	35.53	8.34	38.39	70.26	78	-7.74	Peak
5150	50.25	193	224	H	35.53	8.34	38.39	55.73	64	-8.27	Ave
10360	49.12	0	150	V	38.12	14.15	38.65	62.74	78	-15.26	Peak
10360	49.67	0	150	H	38.12	14.15	38.65	63.29	78	-14.71	Peak
Middle Channel: 5220 MHz											
10440	49.25	0	130	V	38.12	14.15	38.65	62.87	78	-15.13	Peak
10440	48.74	303	150	H	38.12	14.15	38.65	62.36	78	-15.64	Peak
High Channel: 5240 MHz											
10480	47.40	24	150	V	38.12	14.15	38.65	61.02	78	-16.98	Peak
10480	50.42	56	150	H	38.12	14.15	38.65	64.04	78	-13.96	Peak

5150 - 5250 MHz

802.11ac20 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											
5150	59.67	103	256	V	35.53	8.34	38.39	65.15	78	-12.85	Peak
5150	49.70	103	256	V	35.53	8.34	38.39	55.19	64	-8.82	Ave
5150	61.41	78	206	H	35.53	8.34	38.39	66.89	78	-11.11	Peak
5150	49.70	78	206	H	35.53	8.34	38.39	55.19	64	-8.82	Ave
10360	47.64	0	150	V	38.12	14.15	38.65	61.26	78	-16.74	Peak
10360	47.30	82	150	H	38.12	14.15	38.65	60.92	78	-17.08	Peak
Middle Channel: 5220 MHz											
10440	46.64	264	150	V	38.12	14.15	38.65	60.26	78	-17.74	Peak
10440	49.05	56	151	H	38.12	14.15	38.65	62.67	78	-15.33	Peak
High Channel: 5240 MHz											
10480	47.39	14	117	V	38.12	14.15	38.65	61.01	78	-16.99	Peak
10480	47.97	47	107	H	38.12	14.15	38.65	61.59	78	-16.41	Peak

5150 - 5250 MHz

802.11ac40 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											
5150	64.13	94	256	V	35.53	8.34	38.39	69.61	78	-8.39	Peak
5150	52.29	94	256	V	35.53	8.34	38.39	57.77	64	-6.23	Ave
5150	64.44	83	192	H	35.53	8.34	38.39	69.92	78	-8.08	Peak
5150	52.49	83	192	H	35.53	8.34	38.39	57.97	64	-6.03	Ave
10380	46.44	0	150	V	38.12	14.15	38.65	60.06	78	-17.94	Peak
10380	46.74	0	150	H	38.12	14.15	38.65	60.36	78	-17.64	Peak
High Channel: 5230 MHz											
10460	47.46	0	150	V	38.12	14.15	38.65	61.08	78	-16.92	Peak
10460	47.50	184	150	H	38.12	14.15	38.65	61.12	78	-16.88	Peak

5150 - 5250 MHz

802.11ac80 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: 5210 MHz											
5150	61.30	82	244	V	35.53	8.34	38.39	66.78	78	-11.22	Peak
5150	51.75	82	244	V	35.53	8.34	38.39	57.23	64	-6.77	Ave
5150	62.96	74	182	H	35.53	8.34	38.39	68.44	78	-9.56	Peak
5150	51.53	74	182	H	35.53	8.34	38.39	57.01	64	-6.99	Ave
10380	46.73	289	240	V	38.12	14.15	38.65	60.35	78	-17.65	Peak
10380	47.23	0	198	H	38.12	14.15	38.65	60.85	78	-17.15	Peak

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/IC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Low Channel: 5745 MHz											
11490	46.68	65	249	V	38.76	14.88	37.82	62.50	84	-21.50	Peak
11490	36.66	65	249	V	38.76	14.88	37.82	52.48	64	-11.52	Ave
11490	48.11	90	273	H	38.76	14.88	37.82	63.93	84	-20.07	Peak
11490	37.83	90	273	H	38.76	14.88	37.82	53.65	64	-10.35	Ave
Middle Channel: 5785 MHz											
11570	46.80	66	150	V	38.76	14.88	37.82	62.62	84	-21.38	Peak
11570	35.74	66	150	V	38.76	14.88	37.82	51.56	64	-12.44	Ave
11570	46.27	178	150	H	38.76	14.88	37.82	62.09	84	-21.91	Peak
11570	35.21	178	150	H	38.76	14.88	37.82	51.03	64	-12.97	Ave
High Channel: 5825 MHz											
11650	46.66	0	278	V	38.76	14.88	37.82	62.48	84	-21.52	Peak
11650	37.17	0	278	V	38.76	14.88	37.82	53.00	64	-11.01	Ave
11650	47.37	319	150	H	38.76	14.88	37.82	63.19	84	-20.81	Peak
11650	35.27	319	150	H	38.76	14.88	37.82	51.09	64	-12.91	Ave

5725 - 5850 MHz

802.11ac20 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: 5745 MHz											
11490	46.15	57	150	V	38.76	14.88	37.82	61.97	84	-22.03	Peak
11490	35.97	57	150	V	38.76	14.88	37.82	51.79	64	-12.21	Ave
11490	46.30	49	150	H	38.76	14.88	37.82	62.12	84	-21.88	Peak
11490	34.83	49	150	H	38.76	14.88	37.82	50.65	64	-13.35	Ave
Middle Channel: 5785 MHz											
11570	46.61	321	150	V	38.76	14.88	37.82	62.43	84	-21.57	Peak
11570	35.33	321	150	V	38.76	14.88	37.82	51.15	64	-12.85	Ave
11570	46.39	238	150	H	38.76	14.88	37.82	62.21	84	-21.79	Peak
11570	35.12	238	150	H	38.76	14.88	37.82	50.94	64	-13.06	Ave
High Channel: 5825 MHz											
11650	46.52	0	150	V	38.76	14.88	37.82	62.34	84	-21.66	Peak
11650	35.36	0	150	V	38.76	14.88	37.82	51.18	64	-12.82	Ave
11650	47.15	129	150	H	38.76	14.88	37.82	62.97	84	-21.03	Peak
11650	35.42	129	150	H	38.76	14.88	37.82	51.24	64	-12.76	Ave

5725 - 5850 MHz

802.11ac40 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: 5755 MHz											
11510	46.50	139	171	V	38.76	14.88	37.82	62.32	84	-21.68	Peak
11510	35.11	139	171	V	38.76	14.88	37.82	50.93	64	-13.07	Ave
11510	46.17	168	150	H	38.76	14.88	37.82	61.99	84	-22.01	Peak
11510	35.08	168	150	H	38.76	14.88	37.82	50.91	64	-13.09	Ave
High Channel: 5795 MHz											
11590	45.92	160	195	V	38.76	14.88	37.82	61.74	84	-22.26	Peak
11590	35.55	160	195	V	38.76	14.88	37.82	51.37	64	-12.63	Ave
11590	46.61	0	150	H	38.76	14.88	37.82	62.43	84	-21.57	Peak
11590	35.32	0	150	H	38.76	14.88	37.82	51.14	64	-12.86	Ave

5725 - 5850 MHz

802.11ac80 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)	
High Channel: 5775 MHz											
11550	47.15	89	150	V	38.76	14.88	37.82	62.97	84	-21.03	Peak
11550	35.11	89	150	V	38.76	14.88	37.82	50.93	64	-13.07	Ave
11550	46.16	96	150	H	38.76	14.88	37.82	61.98	84	-22.02	Peak
11550	35.18	96	150	H	38.76	14.88	37.82	51.00	64	-13.00	Ave

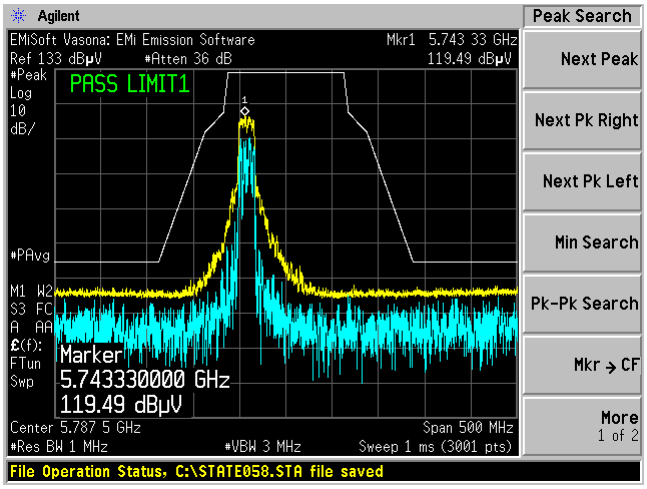
Note: For harmonics outside of restricted bands, only 15.407(b) spurious emission limit was applied (i.e. -27 dBm [78dBµV/m at 1meter]).
Note: For 5.2 GHz band edge, stricter 15.407(b) spurious emission limit (i.e. -27 dBm [78dBµV/m at 1meter]) was used for peak measurement to show compliance.

5725 - 5850 MHz Emission Mask measured at 1 meter

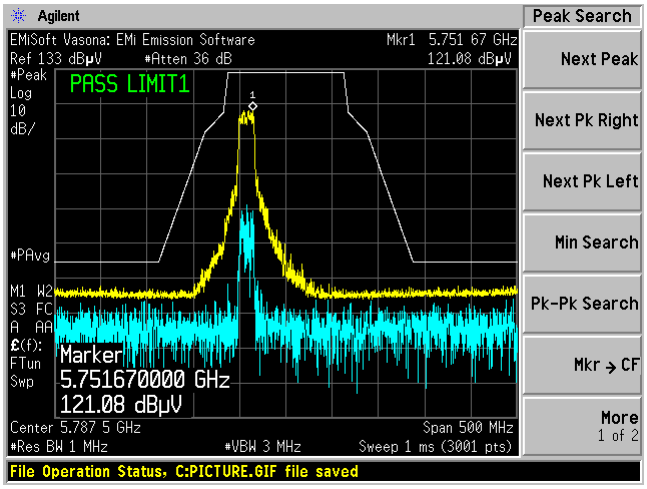
802.11a mode

Low Channel

Horizontal Antenna Polarization

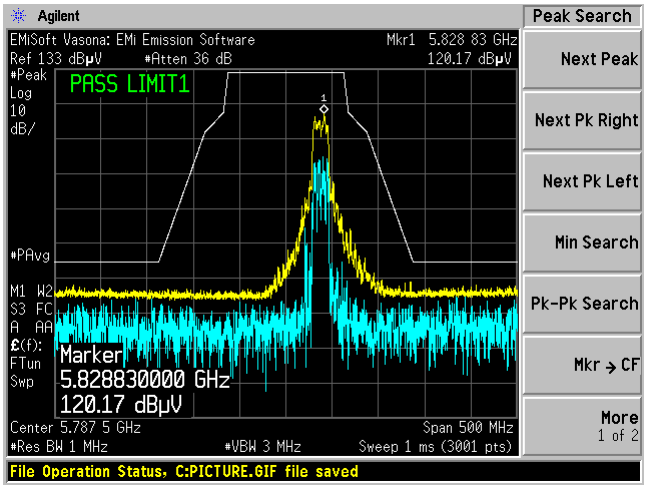


Vertical Antenna Polarization

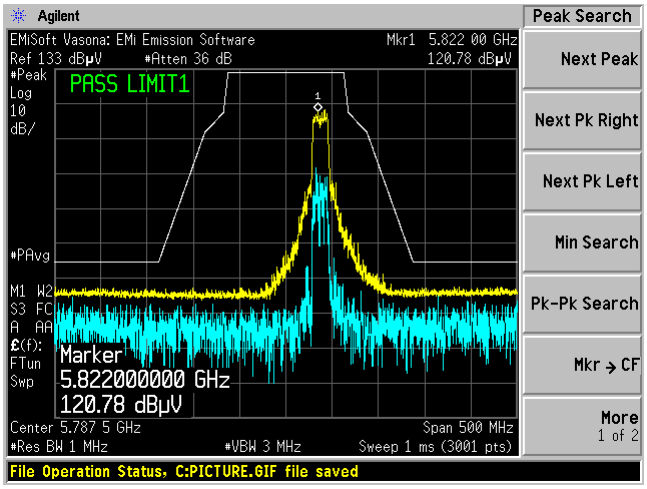


High Channel

Horizontal Antenna Polarization



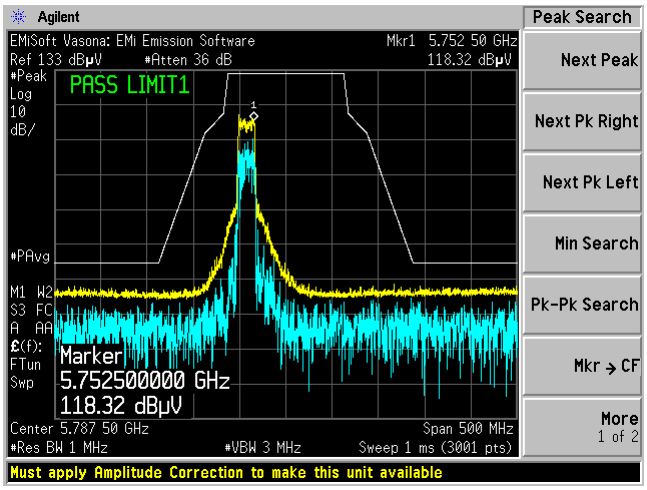
Vertical Antenna Polarization



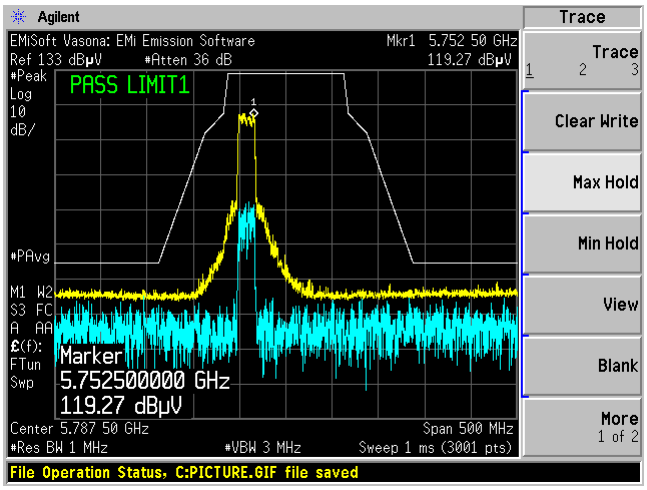
802.11ac20 mode

Low Channel

Horizontal Antenna Polarization

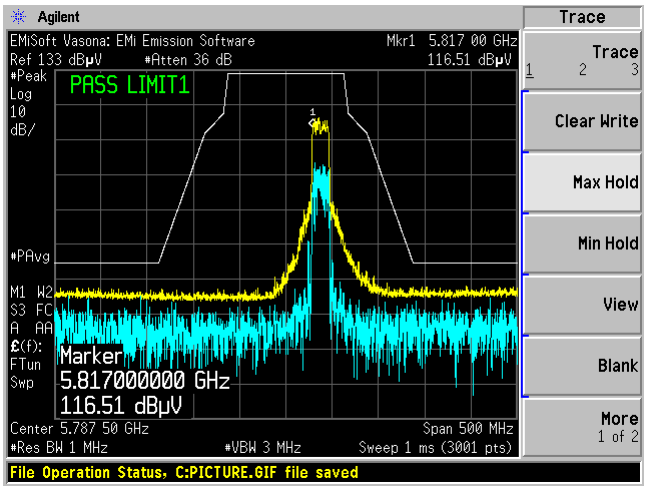


Vertical Antenna Polarization

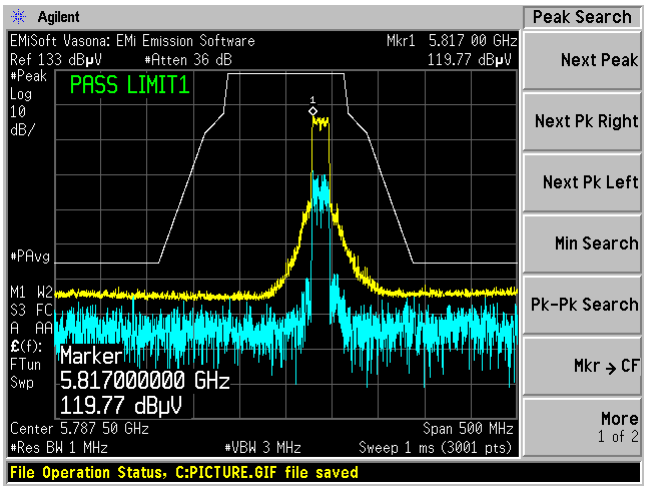


High Channel

Horizontal Antenna Polarization



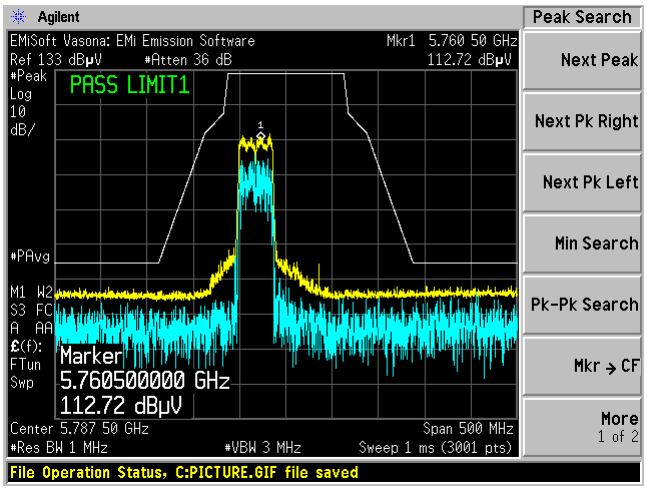
Vertical Antenna Polarization



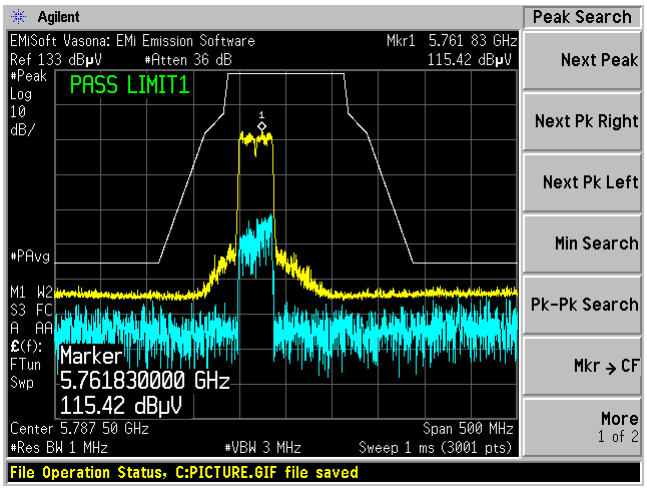
802.11ac40 mode

Low Channel

Horizontal Antenna Polarization

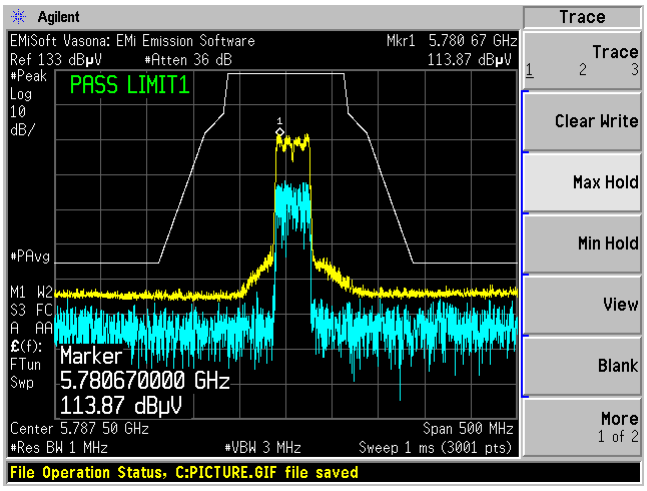


Vertical Antenna Polarization

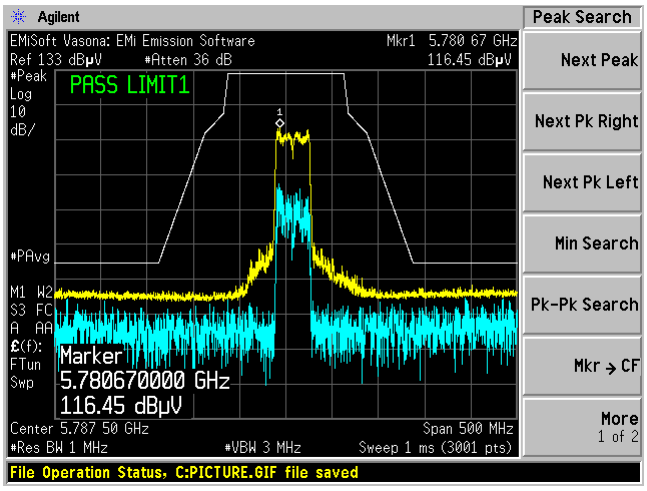


High Channel

Horizontal Antenna Polarization

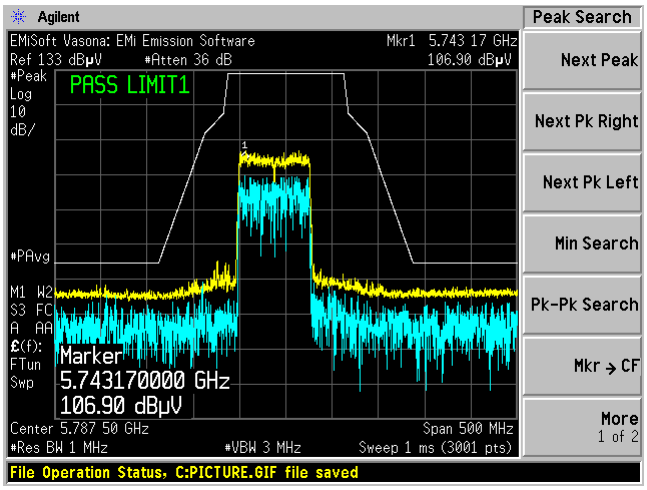


Vertical Antenna Polarization

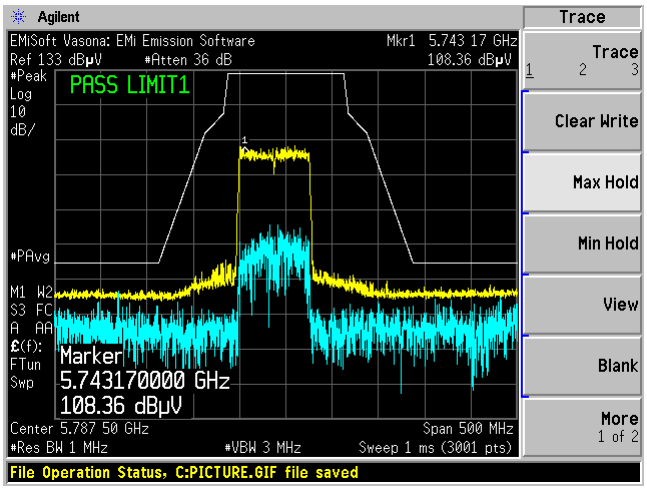


802.11ac80 mode

Horizontal Antenna Polarization



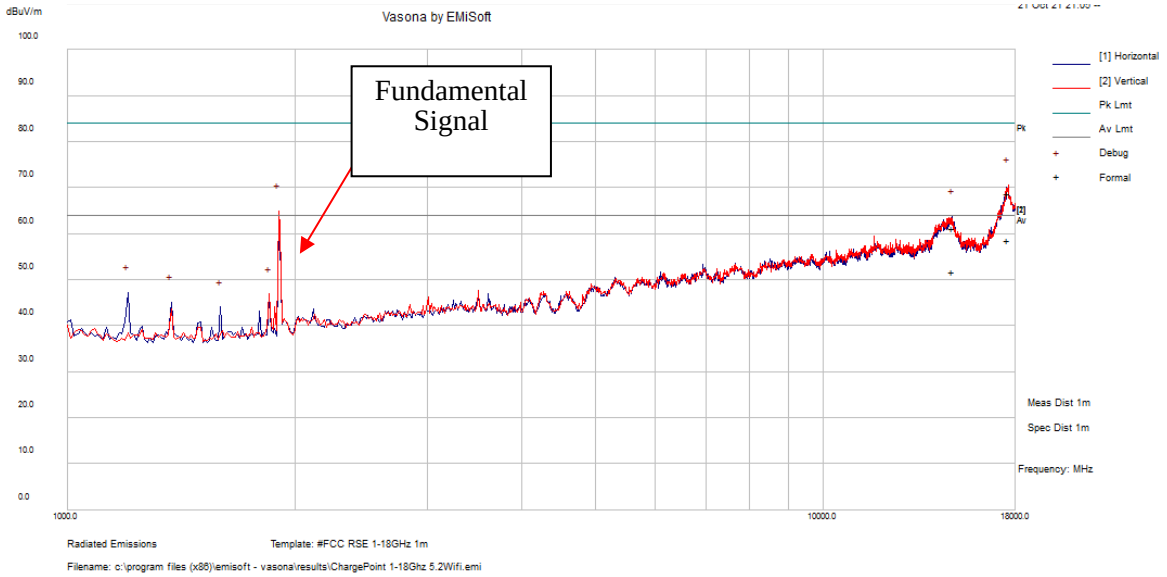
Vertical Antenna Polarization



Note: For 5.8 GHz Band Emission Mask measurements, equipment factors were considered into offset on PSA.

4) 1 to 18 GHz Vasona scan at 1 meter

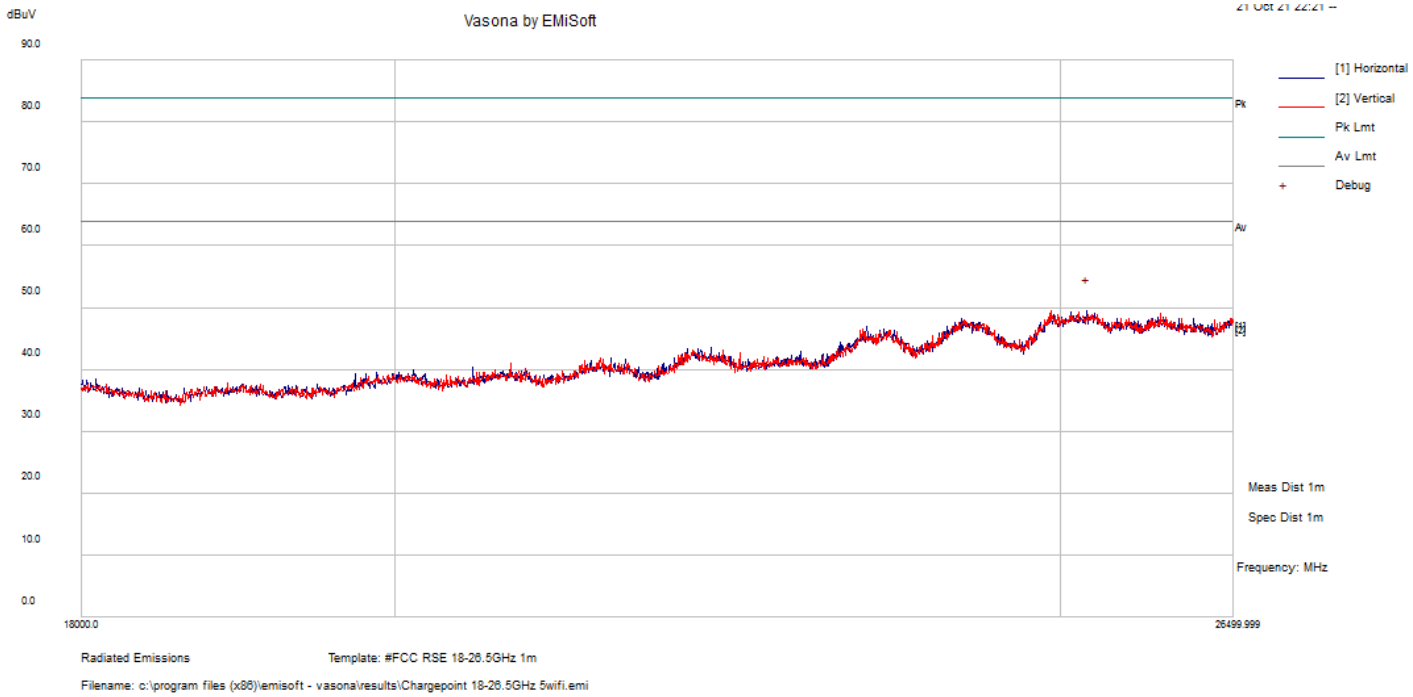
Worst Case: 5 GHz Wifi (ac20 mode, 5240 MHz) + Cellular Modem (WCDMA Band II) + RFID



Frequency (MHz)	S.A. Reading (dBµV)	Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Comment
17606.828	43.45	25.38	68.83	126	V	317	84	-15.17	Peak
17606.828	33.3	25.39	58.69	126	V	317	64	-5.31	Average

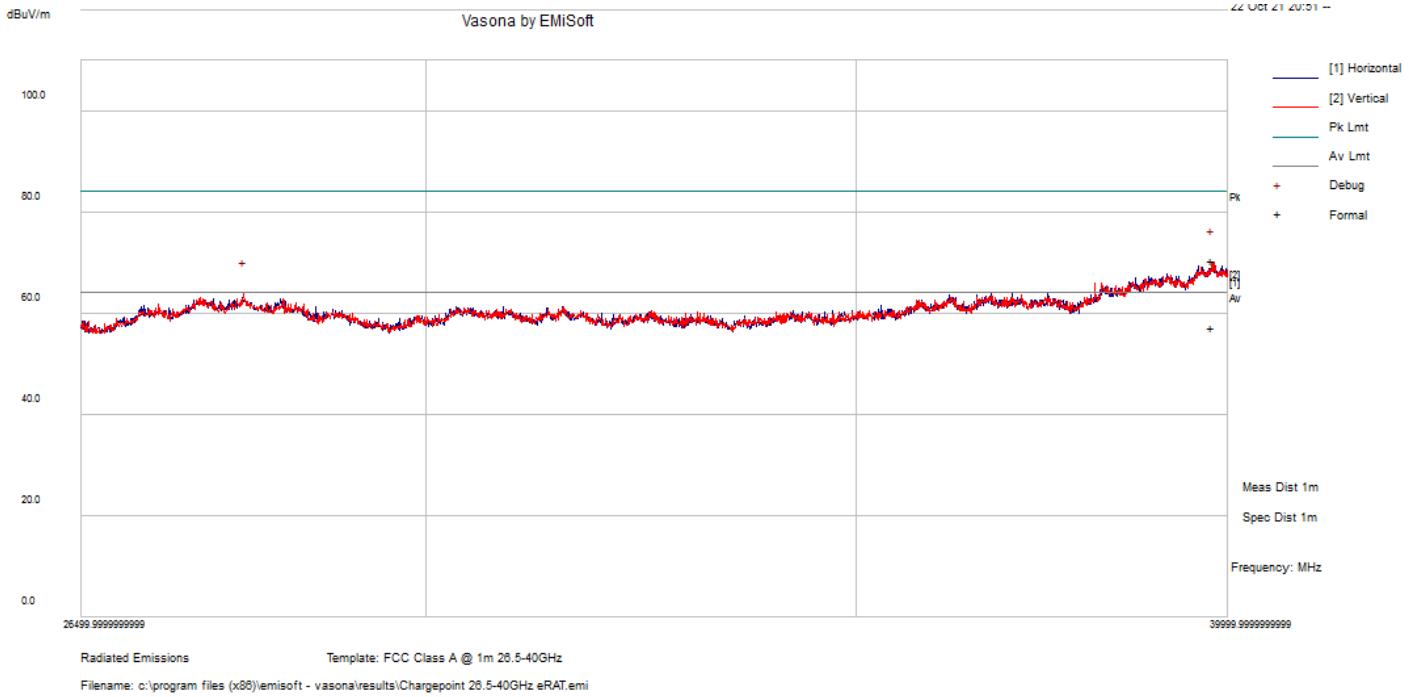
5) 18 – 26.5 GHz Worst Case Scan at 1 Meter

Worst Case: 5 GHz Wifi (ac20 mode, 5240 MHz) + Cellular Modem (WCDMA Band II) + RFID



6) 26.5 – 40 GHz Worst Case Scan at 1 Meter

Worst Case: 5 GHz Wifi (ac20 mode, 5240 MHz) + Cellular Modem (WCDMA Band II) + RFID



Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Comment
39776.32	42.81	27.6	70.41	181	V	164	84	-13.59	Peak
39776.32	29.69	27.6	57.29	181	V	164	64	-6.71	Ave

7 Annex A (Normative) – EUT Test Setup Photographs

Please refer to the attachment.

8 Annex B (Normative) – EUT Photographs

Please refer to the attachment.

9 Annex C (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 17025:2017 *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 10th day of March 2021.

Trace McInturff, Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 3297.02
Valid to September 30, 2022

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 ---