FCC PART 15.407
ISEDC RSS-247, ISSUE 3, AUGUST 2023

TEST REPORT

For

ChargePoint, Inc.

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

FCC ID: W38-LB2AE
IC: 8854A-LB2AE

Report Type: Class II Permissive Change Report	**Product Type:** Smart Antenna
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Report Number:	R2405152-407
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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	R2405152-407	Class II Permissive Change Report	2024-07-25

1 General Description

1.1 Product Description for Equipment Under Test (EUT)

This test report is prepared on behalf of *ChargePoint, Inc.*, and their product model: LB2AE, FCC ID: W38-LB2AE, IC: 8854A-LB2AE, the "EUT" as referred to in this report. The EUT contains a pre-certified Cellular module FCC ID: XMR202212EG25GL, IC: 10224A-2022EG25GL. The EUT is a Smart Antenna with Bluetooth, Cellular, and 2.4 GHz/5GHz Wi-Fi capabilities.

Model Number	LB2AE
FCC ID	BT & Wi-Fi: W38-LB2AE Cellular: XMR202212EG25GL
IC	BT & Wi-Fi: 8854A-LB2AE Cellular: 10224A-2022EG25GL
Operating Frequency	5150-5875 MHz
Modulation	802.11a/n20/n40/ac80
Channel Spacing	20 MHz,40 MHz,80 MHz
Max Antenna Gain	3.94 dBi

1.2 Mechanical Description of EUT

The UUT measures approximately 54.0 cm (L) x 17.0 cm (W) x 5.0 (H) and weighs approximately 0.6 kg.

The data gathered was from a production sample provided by ChargePoint, Inc. with S/N: REW-72-002940-01

1.3 Objective

This report is prepared on behalf of *ChargePoint, Inc.* in accordance with FCC CFR47 §15.407 and ISEDC RSS-247 Issue 3, August 2023.

The objective is to determine compliance with FCC Part 15.407 and ISEDC RSS-247 for Antenna Requirement, Radiated Spurious Emissions and RF Exposure.

NOTE: this report is for the purpose of adding a new antenna. The new antenna will be comprised of two identical antennas that operate in diversity mode meaning that they will only transmit one path at a time. Through pre-testing, it was determined that measurement results were identical between paths and thus one was chosen to reflect performance of both.

In order to determine compliance, the manufacturer or a contracted laboratory makes measurements and takes the necessary steps to ensure that the equipment complies with the appropriate technical standards.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product maybe which result in lowering the immunity should be checked to ensure compliance has been maintained (i.e.,

printed circuit board layout changes, different line filter, different power supply, harnessing and/or I/O cable changes, etc.).

1.4 Related Submittal(s)/Grant(s)

FCC Part 15, Subpart C, Equipment Class: DTS with FCC ID: W38-LB2AE, IC: 8854A-LB2AE
FCC Part 15, Subpart C, Equipment Class: DSS with FCC ID: W38-LB2AE, IC: 8854A-LB2AE

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	±1.48 dB
Unwanted Emissions, conducted	±1.57 dB
All emissions, radiated	±4.0 dB
AC power line Conducted Emission	±2.0 dB
Temperature	±2ºC
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 17025:2017 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 17025:2017 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 17025:2017 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 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.

2.2 EUT Exercise Software

The exercising software used during testing was "Tera Term". The software is compliant with the standard requirements being tested against.

Modulation	Band	Channel	Frequency (MHz)	Power Setting
802.11a	UNII-1	36	5180	12
		40	5200	12
		48	5240	12
	UNII-3	149	5745	12
		157	5785	12
		165	5825	12
802.11n20	UNII-1	36	5180	12
		40	5200	12
		48	5240	12
	UNII-3	149	5745	12
		157	5785	12
		165	5825	12
802.11n40	UNII-1	38	5190	10
		46	5230	10
	UNII-3	151	5755	10
		159	5795	10
802.11ac80	UNII-1	42	5210	10
	UNII-3	155	5775	10

Data rates used:
802.11a: 6 Mbps
802.11n: MCS0
802.11ac: MCS0

2.3 Equipment Modification

No modifications were made to the EUT during testing.

2.4 Local Support Equipment

Manufacturer	Description	Model
Dell	Laptop	Latitude 5401

2.5 Remote Support Equipment

Manufacturer	Description	Serial Number
ChargePoint, Inc.	Universal Controller Board	32-A10197-06-01-22511A000044

2.6 Power Supply and Line Filters

Manufacturer	Description	Model	Serial Number
OpenPeak	5VDC 4A Wall Adapter Switching Power Supply	LFS054000D-A8S	EPS050400H
MeanWell	48V 1.25A Wall Adapter Switching Power Supply	SGA60U46	SGA60U48-P1J

2.7 Interface Ports and Cabling

Cable Description	Length (m)	From	To
USB-A to USB-Micro B	1.5	Universal Controller Board	Laptop
USB-A to USB-C	1.5	Universal Controller Board	Laptop
USB-B to USB-C	1	Universal Controller Board	EUT

3 Summary of Test Results

FCC & ISEDC Rules	Description of Test	Results
FCC §15.203 ISEDC RSS-Gen §6.8	Antenna Requirements	Compliant
FCC §2.1091, §15.407(f) ISEDC RSS-102	RF Exposure	Compliant
FCC §2.1053, §15.35(b), §15.205, §15.209, 15.407(b) ISEDC RSS-247 §6.2 ISEDC RSS-Gen §8.9, §8.10	Radiated Spurious Emissions	Compliant

BACL is responsible for all the information provided in this report, except when information is provided by the customer as identified in this report. Information provided by the customer, e.g., antenna gain, can affect the validity of results.

4 FCC §15.203 & ISEDC 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 §15.247 (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 license-exempt equipment with detachable antennas, the user manual shall also contain the following notice in a conspicuous location:

This radio transmitter 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 Description

External/Internal/ Integral	Part Number	Antenna Type	Frequency Range (MHz)	Maximum Antenna Gain (dBi)
Integral	AMAN1003030ST06	Dielectric Chip	5150-5875	3.94

5 FCC §2.1091, FCC §15.407(i) & ISEDC RSS-102 – RF Exposure

5.1 Applicable Standard

As per FCC §1.1310(d) (3), At operating frequencies above 6 GHz, the MPE limits listed in Table 1 in paragraph (e)(1) of this section shall be used in all cases to evaluate the environmental impact of human exposure to RF radiation as specified in §1.1307(b) of this part.

TABLE 1 TO §1.1310(E)(1)—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm^2)	Averaging time (minutes)
(i) Limits for Occupational/Controlled Exposure				
0.3-3.0	614	1.63	*(100)	≤6
3.0-30	1842/f	4.89/f	*($900/f^2$)	<6
30-300	61.4	0.163	1.0	<6
300-1,500			f/300	<6
1,500-100,000			5	<6
(ii) 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
300-1,500			f/1500	<30
1,500-100,000			1.0	<30

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

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 Footnote6 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 x 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.

5.2 MPE Prediction

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

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

Where: S = power density
EIRP = Effective Isotropic Radiated Power
R = distance to the center of radiation of the antenna

5.3 MPE Result for FCC

Band	Frequency (MHz)	Antenna Gain (dBi)	Maximum Power (dBm)	Maximum EIRP (dBm)	Maximum EIRP (mW)	Power Density at 20cm (mW/cm^2)	Limit (mW/cm^2)
5 GHz Wi-Fi	5180	3.94	18.5	22.44	175.39	0.035	1.0
LTE	1710	5.58	25	30.58	1142.9	0.23	1.0

Sum of Ratios:

WLAN 5Wifi + LTE: 0.035/1.0+0.23 /1.0= 0.265 < 1

For the different combination of transmitters, a separation distance of 20 cm complies with the SAR simultaneous transmission limit of ≤ 1.0.

5.4 IC Exemption

5GHz Wi-Fi

The EIRP of this device is 22.44 dBm (175.39 mW) which is less than the exemption threshold, i.e., 1.31*10^(-2) * f^(0.6834)=4.55W. Therefore, the RF exposure evaluation is exempt.

LTE

The EIRP of this device is 30.58 dBm (1142.9 mW) which is less than the exemption threshold, i.e., 1.31*10^(-2) * f^(0.6834)=2.12W. Therefore, the RF exposure evaluation is exempt.

Sum of Ratios:

WLAN 5Wifi + LTE: 0.17539/4.55+1.14/2.12= 0.576 < 1

6 FCC §15.35(b), §15.205, §15.209, §15.407(b) & ISEDC RSS-247 §6.2, RSS-Gen §8.9, §8.10 –Radiated Spurious Emissions

6.1 Applicable Standard

As per FCC §15.35(b): Unless otherwise specified, on any frequency or frequencies above 1000 MHz, the radiated emission limits are based on the use of measurement instrumentation employing an average detector function. Unless otherwise specified, measurements above 1000 MHz shall be performed using a minimum resolution bandwidth of 1 MHz.

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**	3
88 - 216	150**	3
216 - 960	200**	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 §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 solely in the 5.725–5.850 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.
8) 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.
9) 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.
10) The provisions of §15.205 apply to intentional radiators operating under this section.

According to ISEDC RSS-247 §6.2.1.2, for transmitters with operating frequencies in the band 5150-5250 MHz, all emissions outside the band 5150-5350MHz shall not exceed -27 dBm/MHz e.i.r.p. Any unwanted emissions that fall into the band 5250-5350 MHz shall be attenuated below the channel power by at least 26 dB, when measured using a resolution bandwidth between 1 and 5% of the occupied bandwidth (i.e. 99% bandwidth), above 5250 MHz. The 26 dB bandwidth may fall into the 5250-5350 MHz band; however, if the occupied bandwidth also falls within the 5250-5350 MHz band, the transmission is considered as intentional and the devices shall comply with all requirements in the band 5250-5350 MHz including implementing dynamic frequency selection (DFS) and TPC, on the portion of the emission that resides in the 5250-5350 MHz band.

According to ISEDC RSS-247 §6.2.2.2, devices shall comply with the following:

a. All emissions outside the band 5250-5350 MHz shall not exceed -27 dBm/MHz e.i.r.p.; or
b. All emissions outside the band 5150-5350 MHz shall not exceed -27 dBm/MHz e.i.r.p. and its power shall comply with the spectral power density for operation within the band 5150-5250 MHz. The device, except devices installed in vehicles, shall be labelled or include in the user manual the following text "for indoor use only."

According to ISEDC RSS-247 §6.2.3.2, Emissions outside the band 5470-5725 MHz shall not exceed -27 dBm/MHz e.i.r.p. However, devices with bandwidth overlapping the band edge of 5725 MHz can meet the emission limit of -27 dBm/MHz e.i.r.p.at 5850 MHz instead of 5725 MHz.

According to ISEDC RSS-247 §6.2.4.3, Devices operating in the band 5725-5850 MHz shall comply with the following e.i.r.p. spectral density limits:

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/MHz at 25 MHz above or below the band edges;
c. 10 dBm/MHz at 25 MHz above or below the band edges decreasing linearly to -27 dBm/MHz at 75 MHz above or below the band edges; and
d. -27 dBm/MHz at frequencies more than 75 MHz above or below the band edges.

As per ISEDC RSS-Gen §8.9,

Except where otherwise indicated in the applicable RSS, radiated emissions shall comply with the field strength limits shown in table 5 and table 6. Additionally, the level of any transmitter unwanted emission shall not exceed the level of the transmitter's fundamental emission.

Table 5 – General field strength limits at frequencies above 30 MHz

Frequency (MHz)	Field Strength (µV/m at 3 m)
30 – 88	100
88 – 216	150
216 – 960	200
Above 960	500

Table 6 – General field strength limits at frequencies below 30 MHz

Frequency	Field Strength (micro volts/meter)	Measurement Distance (meters)
9 – 490 kHz[Note 1]	6.37/F (F in kHz)	300
490 – 1705 kHz	63.7/F (F in kHz)	30
1.705 – 30 MHz	0.08	30

Note 1: The emission limits for the ranges 9-90 kHz and 110-490 kHz are based on measurements employing a linear average detector.

As per ISEDC RSS-Gen §8.10(c),

Unwanted emissions that do not fall within the restricted frequency bands listed in table 7 shall comply either with the limits specified in the applicable RSS or with those specified in table 5 and table 6.

Table 7 – Restricted frequency bands[Note 1]

MHz	MHz	GHz
0.090 – 0.110	149.9 – 150.05	9.0 – 9.2
0.495 – 0.505	156.52475 – 156.52525	9.3 – 9.5
2.1735 – 2.1905	156.7 – 156.9	10.6 – 12.7
3.020 – 3.026	162.0125 –167.17	13.25 – 13.4
4.125 – 4.128	167.72 – 173.2	14.47 – 14.5
4.17725 – 4.17775	240 – 285	15.35 – 16.2
4.20725 – 4.20775	322 – 335.4	17.7 – 21.4
5.677 – 5.683	399.9 – 410	22.01 – 23.12
6.215 – 6.218	608 – 614	23.6 – 24.0
6.26775 – 6.26825	960 – 1427	31.2 – 31.8
6.31175 – 6.31225	1435 – 1626.5	36.43 – 36.5
8.291 – 8.294	1645.5 – 1646.5	Above 38.6
8.362 – 8.366	1660 – 1710	
8.37625 – 8.38675	1718.8 – 1722.2	
8.41425 – 8.41475	2200 – 2300	
12.29 – 12.293	2310 – 2390	
12.51975 – 12.52025	2483.5 – 2500	
12.57675 – 12.57725	2655 – 2900	
13.36 – 13.41	3260 – 3267	
16.42 – 16.423	3332 – 3339	
16.69475 – 16.69525	3345.8 – 3358	
16.80425 – 16.80475	3500 – 4400	
25.5 – 25.67	4500 – 5150	
37.5 – 38.25	5350 – 5460	
73 – 74.6	7250 – 7750	
74.8 – 75.2	8025 – 8500	
108 – 138		

Note 1: Certain frequency bands listed in table 7 and in bands above 38.6 GHz are designated for licence-exempt applications. These frequency bands and the requirements that apply to related devices are set out in the 200 and 300 series of RSSs.

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

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 = 3MHz, 100 trace average sweeps / Sweep = Auto

6.4 Corrected Amplitude and Margin Calculation

For emissions below 1 GHz,

The Corrected Amplitude (CA) is calculated by adding the Correction Factor to the S.A. Reading. The basic equation is as follows:

CA = S.A. Reading + Correction Factor

For example, a corrected amplitude of 40.3 dBuV/m = S.A. Reading (32.5 dBuV) + Correction Factor (7.8 dB/m)

The Correction Factor is calculated by adding the Antenna Factor (AF), the Cable Loss (CL), the Attenuator Factor (Atten) and subtracting the Amplifier Gain (Ga) together. This calculation is done in the measurement software, and reported in the test result section. The basic equation is as follows:

Correction Factor = AF + CL + Atten – Ga

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

For emission above 1 GHz,

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

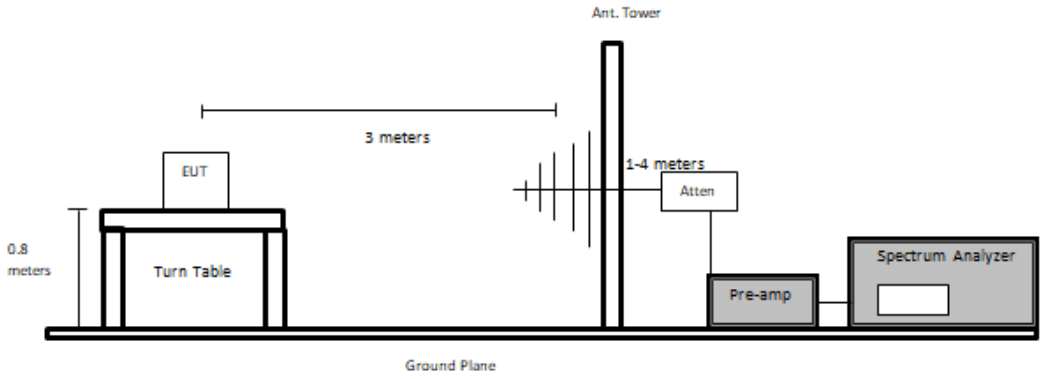
For example, a corrected amplitude of 40.3 dBuV/m = Indicated Reading (32.5 dBuV) + Antenna Factor (+23.5dB) + Cable Loss (3.7 dB) + Attenuator (10 dB) - Amplifier Gain (29.4 dB)

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. The equation for margin calculation is as follows:

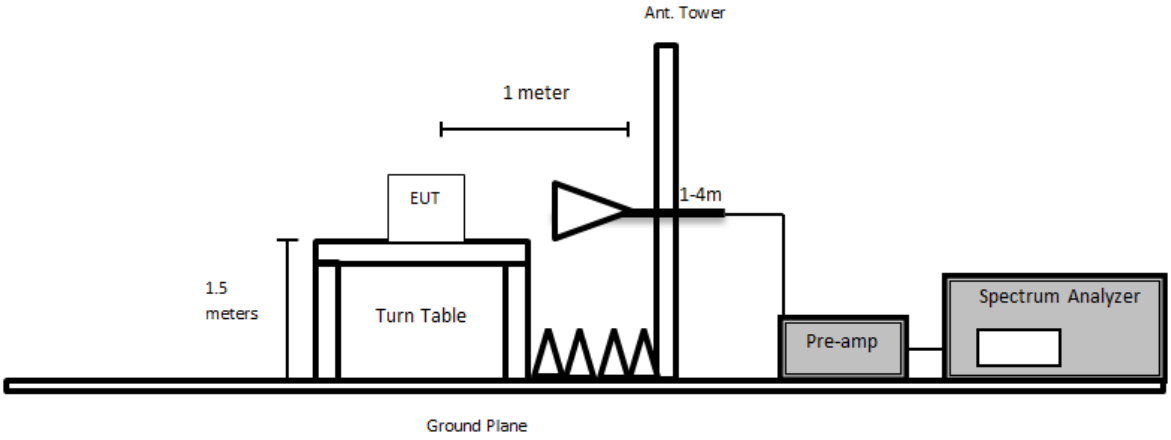
Margin = Corrected Amplitude – Limit

6.5 Test Setup Block Diagram

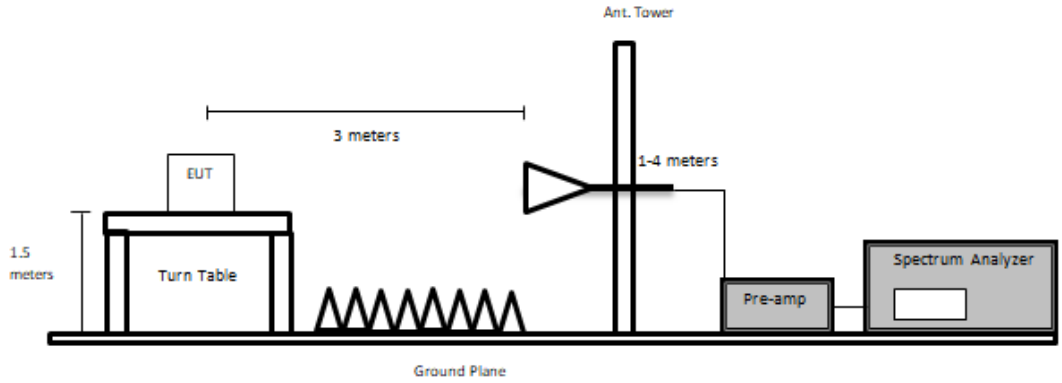
Below 1 GHz



Above 1 GHz at 1m



Above 1GHz at 3m



6.6 Test Equipment List and Details

BACL No.	Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
310	Rhode & Schwarz	EMI Test Receiver	ESCI 1166.5950.03	100338	2024-05-29	1 year
424	Agilent	Spectrum Analyzer	E4440A	US45303156	2024-03-06	1 year
624	Agilent	Spectrum Analyzer	E4446A	MY48250238	2024-06-14	1 year
614	Rhode & Schwarz	Wideband Radio Communication Tester	CMW500	1201.0002K50-120503-Um	2024-06-11	1 year
327	Sunol Science Corp	System Controller	SC110V	122303-1	N/R	N/A
1075	Sunol Sciences	Boresight Tower	TLT3	050119-7	N/R	N/A
1388	Sunol Sciences	Flush Mount Turntable	FM	112005-2	N/R	N/A
316	Sonoma Instruments	Preamplifier 10 kHz - 2.5 GHz	317	260406	2024-02-27	6 months
658	HP/Agilent	Pre-Amplifier	8449B OPT HO2	3008A01103	2024-06-18	6 months
827	AH Systems	Preamplifier	PAM 1840 VH	170	2024-05-05	6 months
321	Sunol Sciences	Biconilog Antenna	JB3	A020106-2; 1504	2023-12-18	2 years
1192	ETS Lindgren	Horn Antenna	3117	00218973	2022-09-29	2 years
91	ETS Lindgren	Horn Antenna	ARH-4223-02	10555-02	2024-03-14	2 years
230	Wisewave	Horn Antenna	ARH-2823-02	10555-02	2024-03-14	2 years
188	Sunol Sciences	Horn Antenna	DRH-118	A052704	2023-11-06	2 years
1186	Pasternack	Coaxial Cable, RG214	PE3062-1050CM	1	2024-04-09	1 year
1248	Pasternack	RG214 COAX Cable	PE3062	-	2024-04-04	1 year
1249	Time Microwave	LMR-400 Cable Dc-3 GHz	AE13684	2k80612-5 6fts	2024-04-09	1 year
1353	RFMW	2.92mm 10ft RF Cable DC to 40 GHz	P1CA-29M29M-F150-120	NA	2024-01-24	6 months
1356	Pasternack	N 28ft RF Cable	RG213	062421	2023-12-11	1 year
-	-	RF Cable (x2)	-	-	Each Time[1]	Each Time[1]
1245	-	6dB Atennuator	PE7390-6	01182018A	2022-11-22	2 year
1246	HP	RF Limiter	11867A	01734	2024-04-09	1 year
387	Micro-Tronics	5150-5350 MHz Notch Filter	BRC50703	006	2024-03-06	1 year
1175	Micro-Tronics	Notch band 5725-5875 MHz filter	BRC50705	006	2023-12-12	1 year
920	UMTS	Notch Filter 1865 - 2025 Mhz	-	938147A 60656 0944	Each Time[1]	Each Time[1]

Note[1]: cables, attenuators and notch filters included in the test set-up were 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:	21 to 22ºC
Relative Humidity:	42 to 47%
ATM Pressure:	101.7 kPa

The testing was performed by Arturo Reyes from 2024-06-20 to 2024-07-15 in 5m chamber 3.

6.8 Summary of Test Results

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

Worst Case – Mode: Transmitting			
Margin (dB)	**Frequency (MHz)**	**Polarization (Horizontal/Vertical)**	**Configuration**
-2.02	31.455	Horizontal	802.11a 5240 MHz

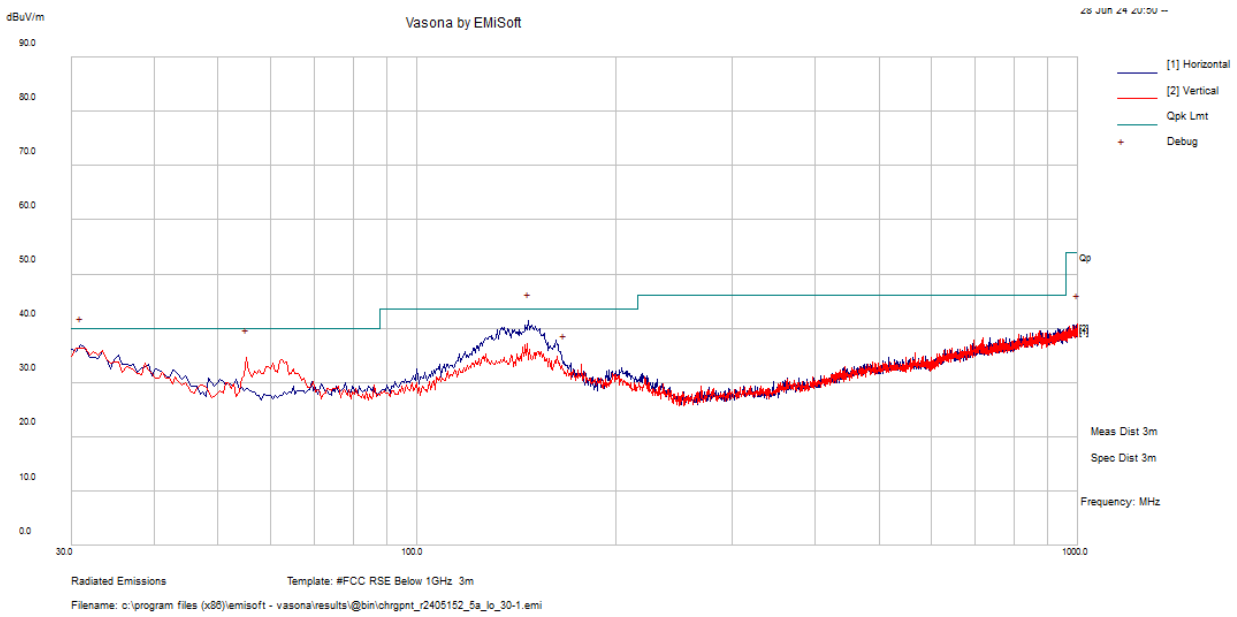
Please refer to the tables and plots in the next section for detailed test results.

6.9 Radiated Emissions Test Result Data

Note 1: For Radiated Band Edge measurements, please refer to Annex A and Annex B.
Note 2: The EUT is not transmitting at below 30 MHz, thus 9 kHz to 30 MHz was not evaluated for Spurious Emissions.
Note 3: As per ANSI C63.10 Clause 5.6.2.2, 802.11a was determined to be the worst-case mode per modulation family and was used for the following testing.
Note 4: In cases where Peak emissions were shown to comply with average/QP limits, such emissions' measurements positions (i.e. azimuth and height) are shown in nearest step size since scan was performed with a peak/maxhold trace at all positions.

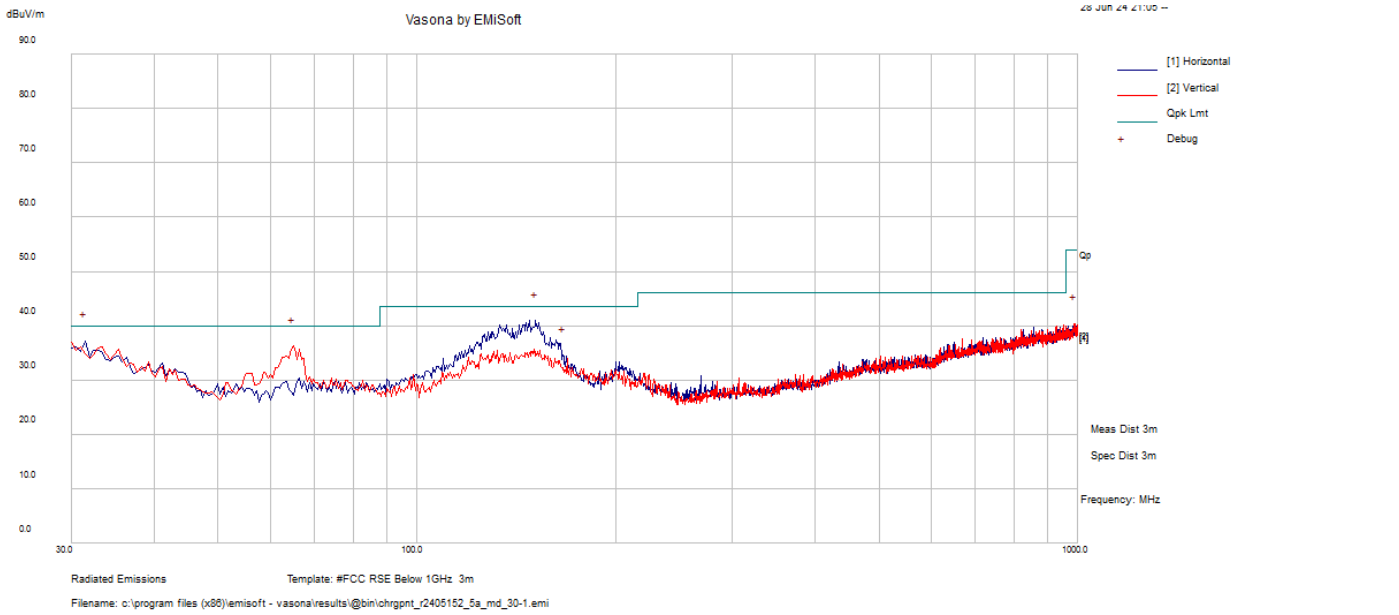
1) 30 MHz – 1 GHz, Measured at 3 meters

802.11a, 5180 MHz



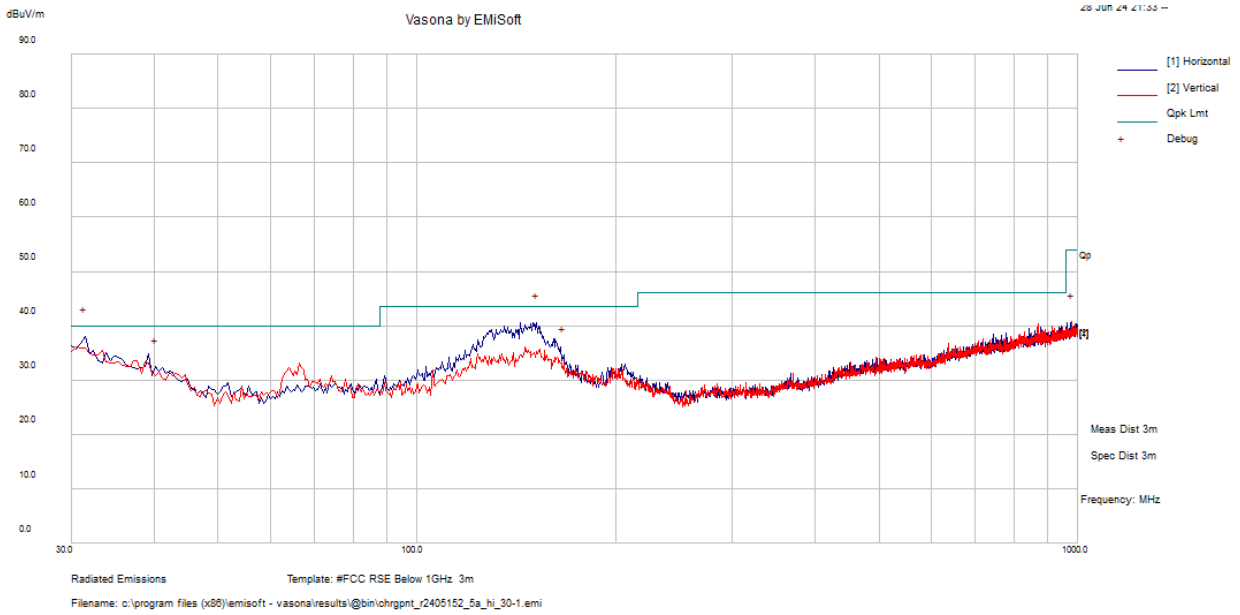
Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Detector
147.37	49.47	-8.17	41.3	300	H	360	43.5	-2.2	Peak
30.97	38.49	-1.65	36.84	300	H	360	40	-3.16	Peak
55.22	48.85	-14.21	34.64	100	V	360	40	-5.36	Peak
167.255	42.48	-8.82	33.66	300	H	360	43.5	-9.84	Peak
1000	35.28	5.71	40.99	100	V	360	54	-13.01	Peak
135.982	46.92	-7.35	39.57	100	H	7	43.5	-3.93	Peak

802.11a, 5220 MHz



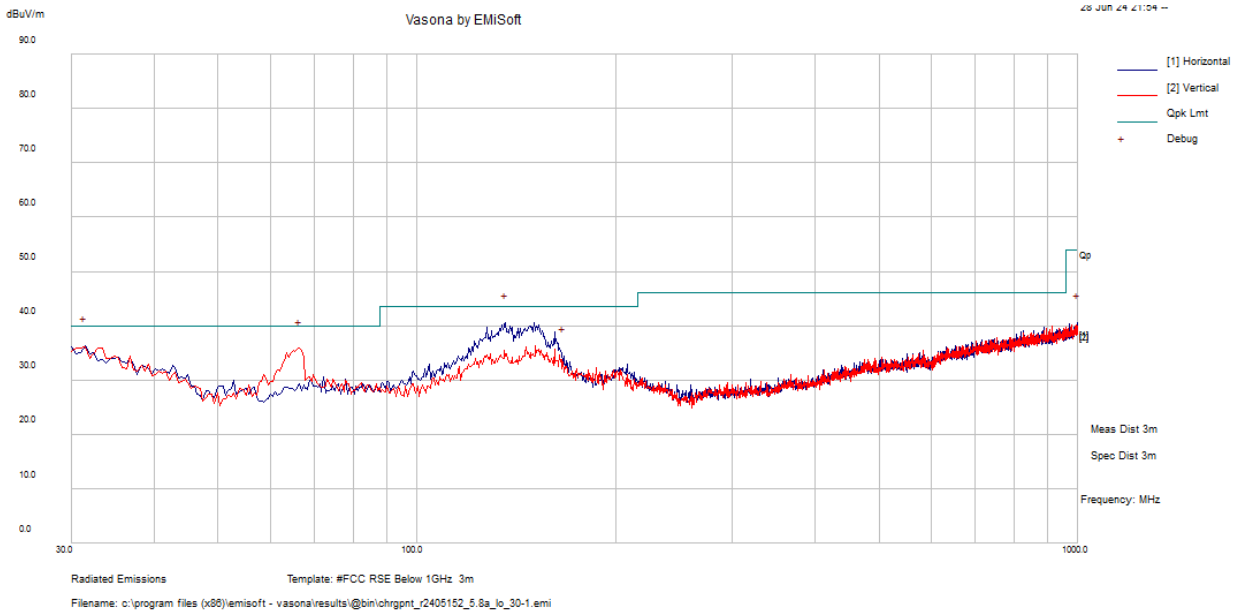
Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Detector
151.25	49.23	-8.29	40.94	300	H	360	43.5	-2.56	Peak
31.455	39.19	-2.03	37.16	300	H	360	40	-2.84	Peak
64.92	49.69	-13.43	36.26	100	V	360	40	-3.74	Peak
166.285	43.25	-8.74	34.51	300	H	360	43.5	-8.99	Peak
986.42	34.96	5.45	40.41	300	V	360	54	-13.59	Peak
135.506	46.61	-7.31	39.3	100	H	7	43.5	-4.2	Peak

802.11a, 5240 MHz



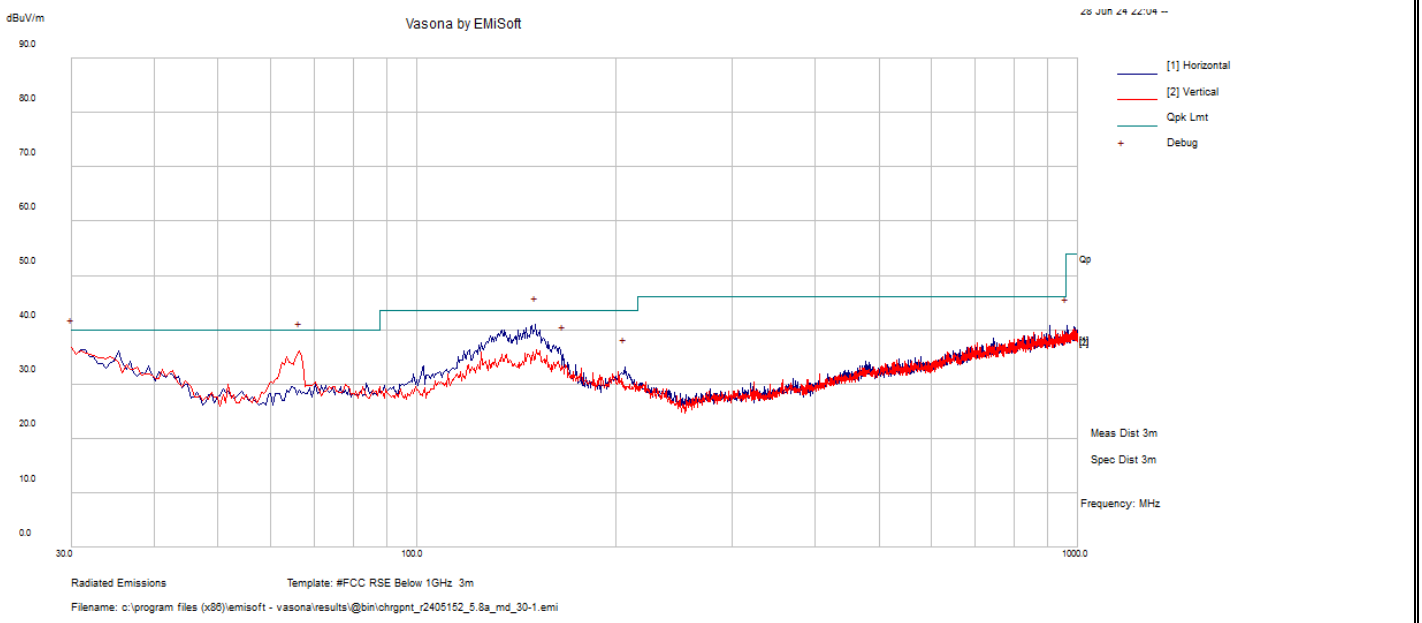
Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Detector
31.455	40.01	-2.03	37.98	300	H	360	40	-2.02	Peak
151.735	48.94	-8.31	40.63	300	H	360	43.5	-2.87	Peak
40.185	40.39	-7.95	32.44	300	H	360	40	-7.56	Peak
166.77	43.32	-8.79	34.53	300	H	360	43.5	-8.97	Peak
979.63	35.34	5.33	40.67	300	V	360	54	-13.33	Peak
66.85	45.56	-13.32	32.24	100	H	352	40	-7.76	Peak

802.11a, 5745 MHz



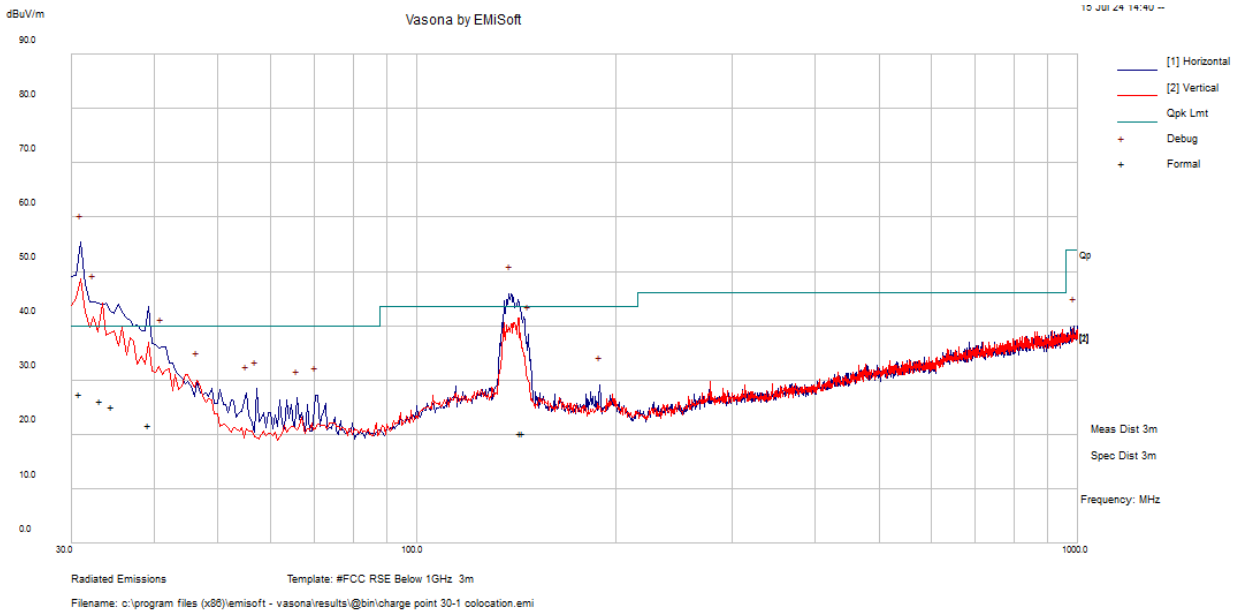
Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Detector
136.215	47.9	-7.36	40.54	300	H	0	43.5	-2.96	Peak
31.455	38.4	-2.04	36.36	300	H	0	40	-3.64	Peak
66.375	49.14	-13.35	35.79	100	V	0	40	-4.21	Peak
166.77	43.2	-8.78	34.42	300	H	0	43.5	-9.08	Peak
999.03	34.89	5.69	40.58	300	H	0	54	-13.42	Peak
206.398	41.14	-9.79	31.35	100	H	352	43.5	-12.15	Peak

802.11a, 5785 MHz



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)	Detector
151.25	49.19	-8.29	40.9	300	H	0	43.5	-2.6	Peak
30	37.68	-0.89	36.79	300	V	0	40	-3.21	Peak
66.375	49.51	-13.35	36.16	100	V	0	40	-3.84	Peak
166.285	44.3	-8.75	35.55	300	H	0	43.5	-7.95	Peak
206.055	42.97	-9.75	33.22	300	H	0	43.5	-10.28	Peak
961.685	35.69	4.99	40.68	300	H	0	54	-13.32	Peak

5GHz Wi-Fi + LTE, 5220 MHz



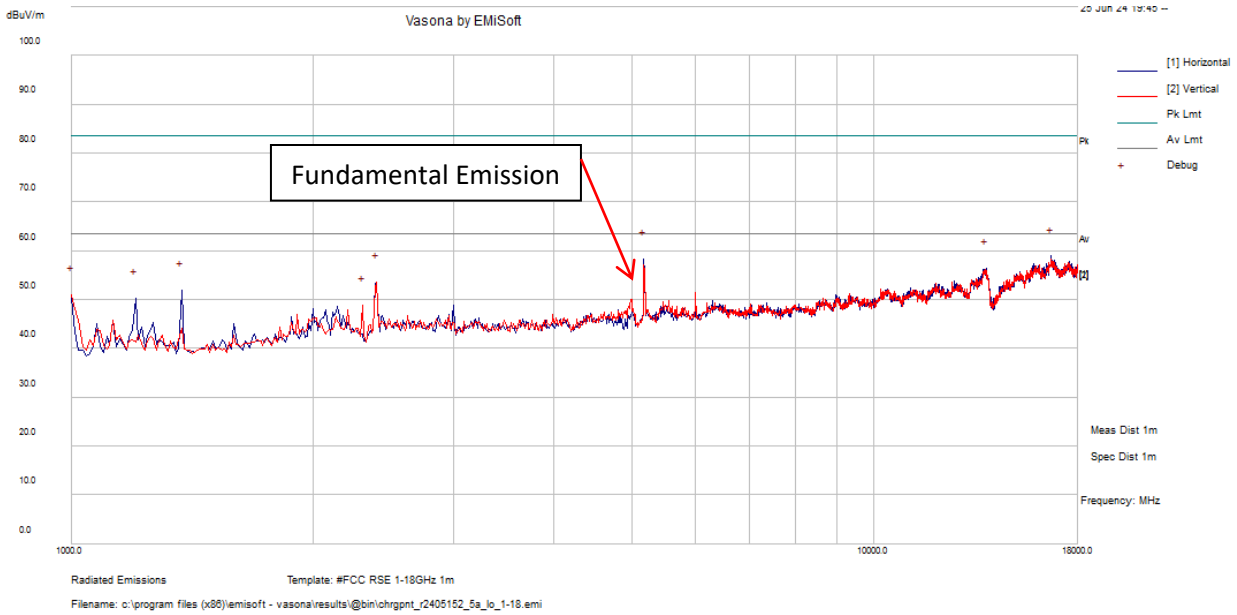
Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Detector
31.0325	35.15	-1.59	33.56	105	H	306	40	-6.44	QP
32.557	29.92	-2.74	27.18	151	H	308	40	-12.82	QP
41.1175	29.06	-8.46	20.6	248	H	307	40	-19.4	QP
46.595	36.78	-11.97	24.81	113	V	186	40	-15.19	QP
56.97725	28.82	-13.97	14.85	206	H	279	40	-25.15	QP
55.22975	28.88	-14.09	14.79	101	H	99	40	-25.21	QP

FCC/IC Limits for 1 GHz to 40 GHz				
Applicability	**(dBm)**	**(uV/m at 3meters)**	**(dBuV/m at 3meters)**	**(dBuV/m at 1meter)**
Restricted Band Average Limit	-	500	54[2]	63.54[3]
Restricted Band Peak Limit[1]	-	-	74	83.54
FCC §15.407(b)/ ISEDC RSS-247 §6.2 Defined Unwanted Emissions Limit	-27	-	68	78[4]

Note 1: Restricted Band Peak Limit is defined to be 20dB higher than Average Limit.
Note 2: Above 1GHz limit calculation:
dBuV/m = 20*log(V/m) + 120 = 20*log((500 [uV/m]/1000000)) + 120 = 54 [dBuV/m]
Note 3: Limits at 1 meter are determined by applying a Distance correction factor accounts for extrapolation from 1 meter to 3 meters. Formula used is as follows: 20*log (3 meters / 1 meter) = 9.54 (According to ANSI C63.10-2013 Section 9.4). Extrapolation calculation from 3m to 1m distance:
54 [dBuV/m at 3m] + 9.54 [dB] = 63.54 [dBuV/m at 1m]
Note 4: Where Restricted Band Peak Limit is replaced with the stricter 78 dBµV/m limit at 1 meter, compliance is being shown for unwanted emissions per FCC §15.407(b)/ISEDC RSS-247 §6.2.
Note 5: Ports terminated for radiated measurements.

2) 1 GHz – 18 GHz, Measured at 1 meter

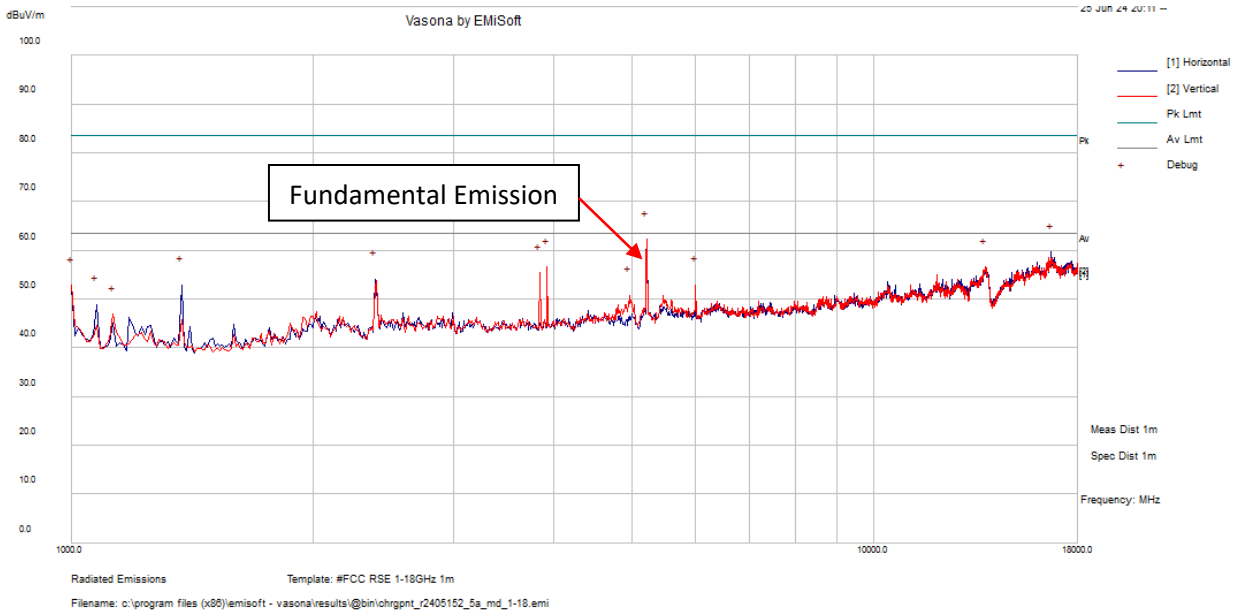
802.11a, 5180 MHz



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)	Detector
16661.25	47.19	11.71	58.9	200	H	0	63.54	-4.64	Peak
13824.38	44.59	11.83	56.42	100	H	0	63.54	-7.12	Peak

Note: The plot above shows that all peak emissions from 1 to 18 GHz passed the average limits.

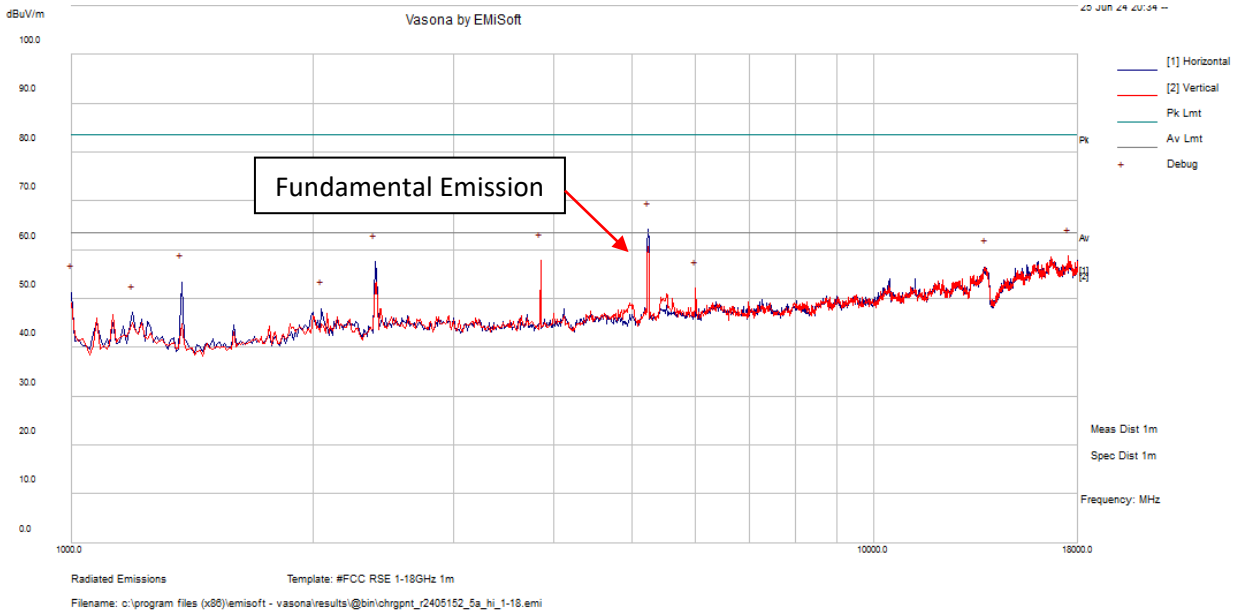
802.11a, 5220 MHz



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)	Detector
16661.25	47.91	11.71	59.62	200	H	0	63.54	-3.92	Peak
13792.5	44.58	12.01	56.59	100	V	0	63.54	-6.95	Peak

Note: The plot above shows that all peak emissions from 1 to 18 GHz passed the average limits.

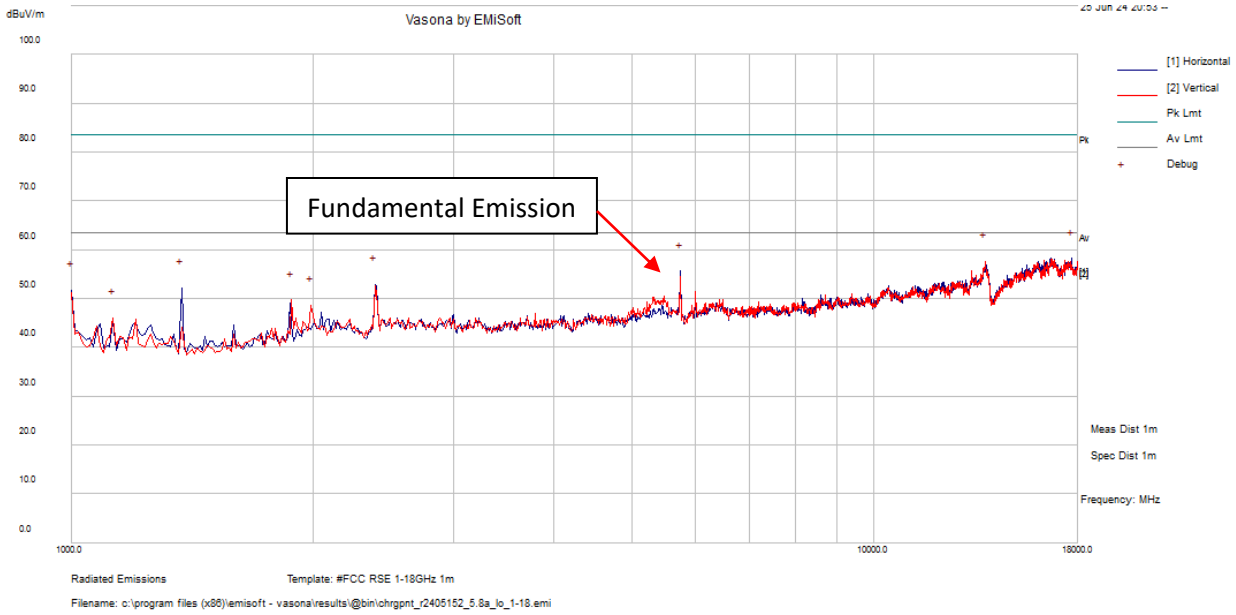
802.11a, 5240 MHz



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)	Detector
17532.5	47.39	11.28	58.67	100	V	0	63.54	-4.87	Peak
3847.5	59.32	-1.56	57.76	300	V	0	63.54	-5.78	Peak

Note: The plot above shows that all peak emissions from 1 to 18 GHz passed the average limits.

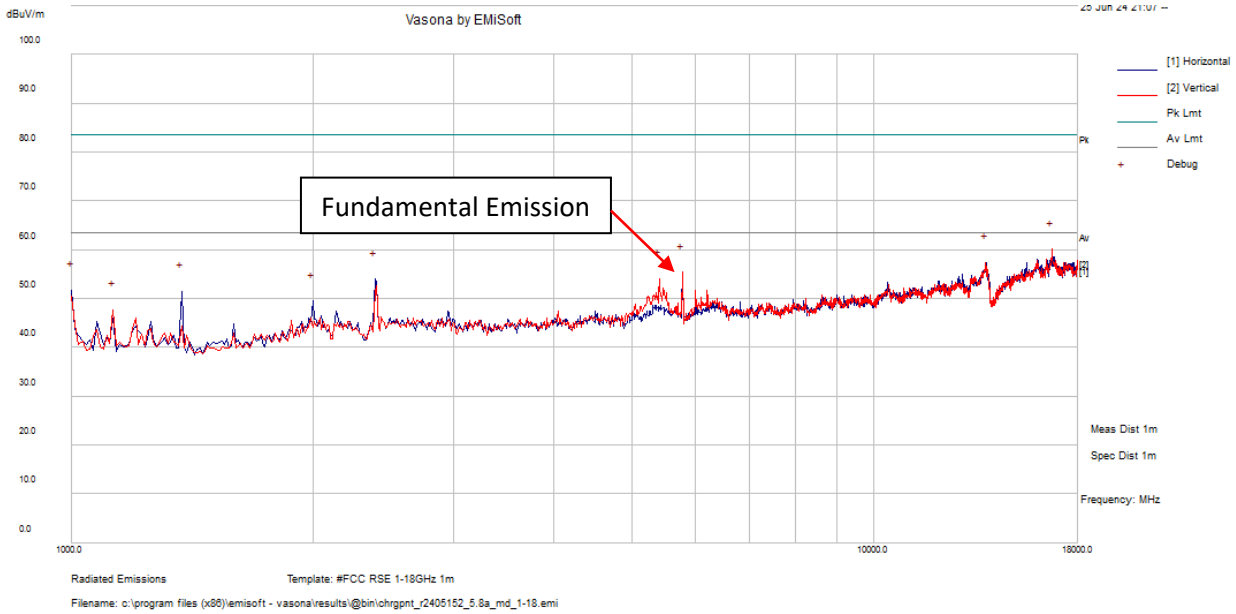
802.11a, 5745 MHz



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)	Detector
17681.25	46.83	11.38	58.21	100	H	0	63.54	-5.33	Peak
13792.5	45.66	12.01	57.67	100	V	0	63.54	-5.87	Peak

Note: The plot above shows that all peak emissions from 1 to 18 GHz passed the average limits.

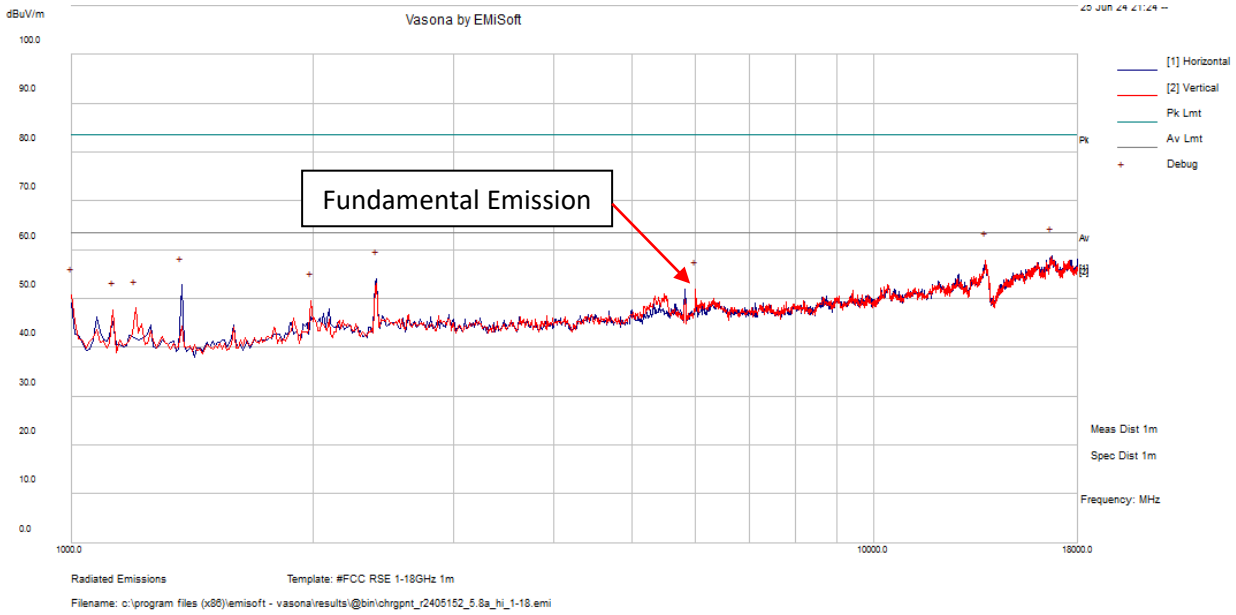
802.11a, 5785 MHz



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)	Detector
16703.75	48.02	12.06	60.08	100	V	0	63.54	-3.46	Peak
13824.38	45.63	11.82	57.45	100	H	0	63.54	-6.09	Peak

Note: The plot above shows that all peak emissions from 1 to 18 GHz passed the average limits.

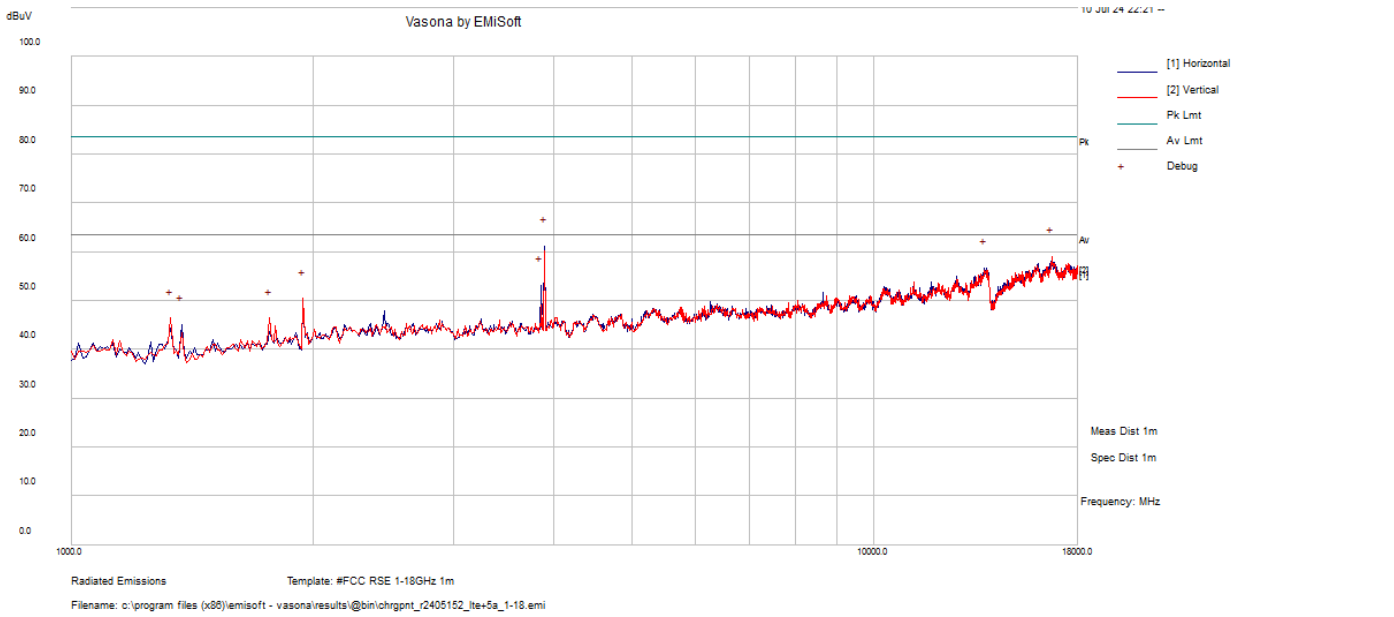
802.11a, 5825 MHz



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)	Detector
16693.13	46.83	12	58.83	300	H	0	63.54	-4.71	Peak
13813.75	45.89	11.94	57.83	200	V	0	63.54	-5.71	Peak

Note: The plot above shows that all peak emissions from 1 to 18 GHz passed the average limits.

5GHz Wi-Fi + LTE, 5220 MHz

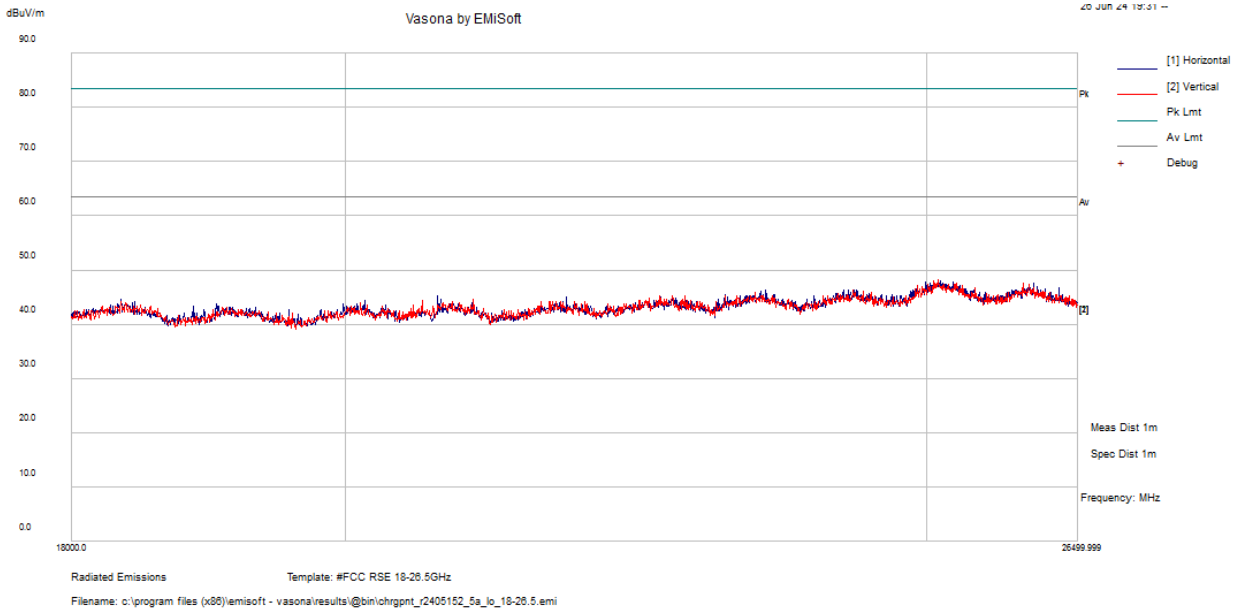


Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Detector
3890	62.97	-1.77	61.2	200	H	200	0	63.54	Peak
16703.75	47	12.05	59.05	300	V	300	0	63.54	Peak

Note: The plot above shows that there were no emissions above the noise floor level at 18-26.5 GHz frequency range.

3) 18 GHz – 26.5 GHz, Measured at 1 meter

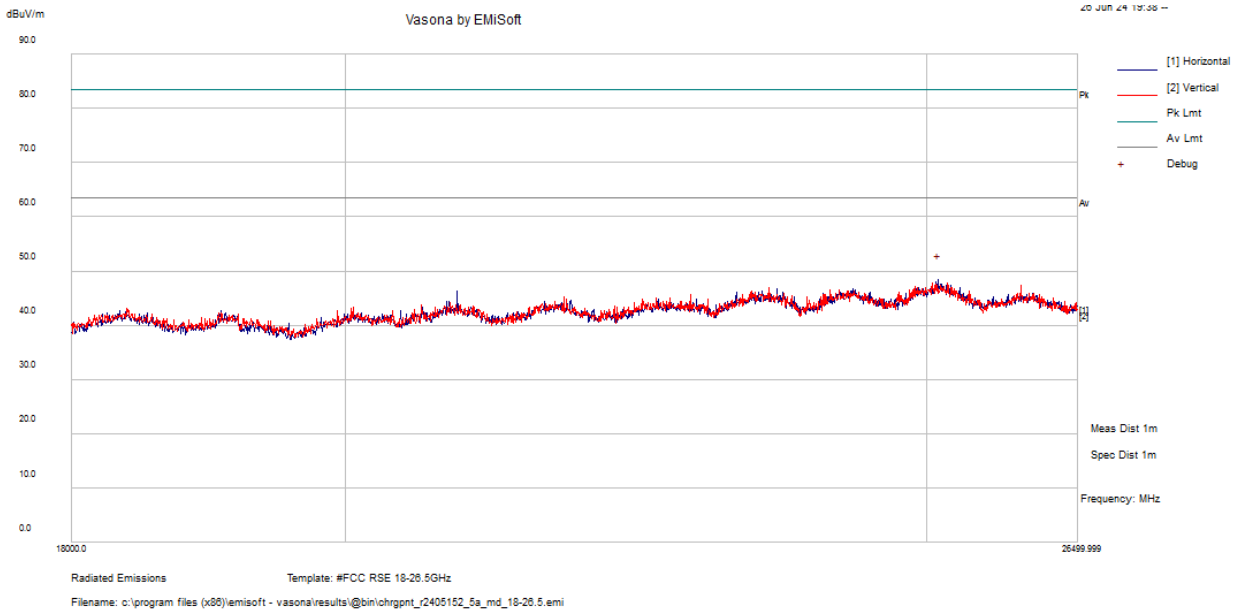
802.11a, 5180 MHz



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)	Detector
25115.47	40.76	6.98	47.74	200	V	7	63.54	-15.8	Peak

Note: The plot above shows that there were no emissions above the noise floor level at 18-26.5 GHz frequency range

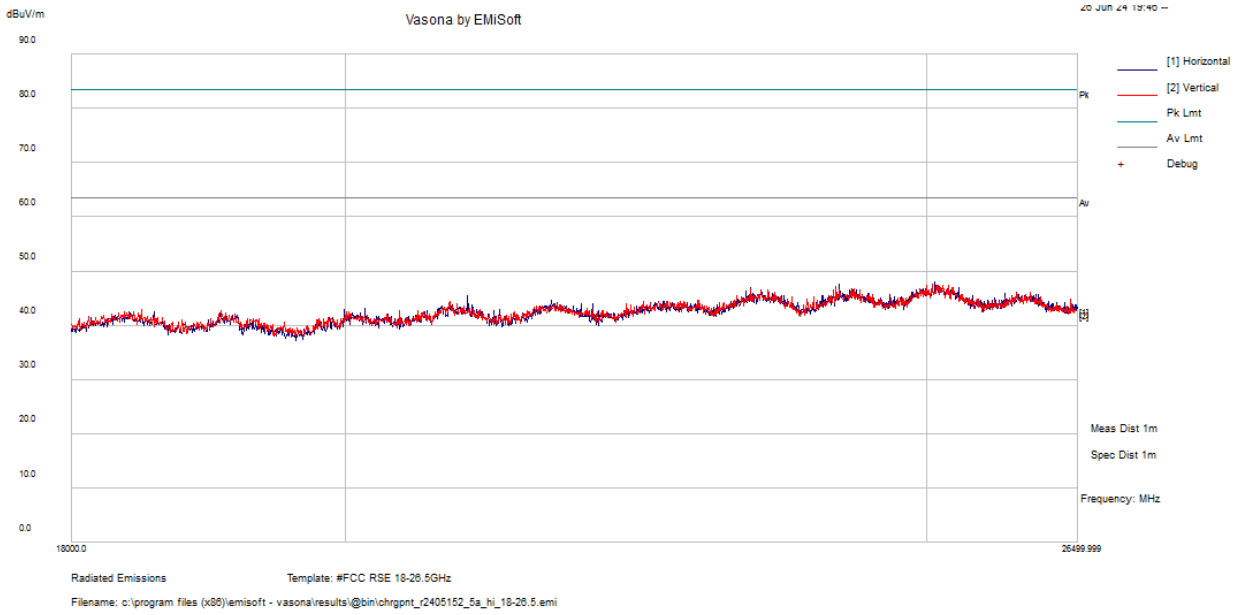
802.11a, 5220 MHz



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)	Detector
25114.8	40.96	6.98	47.94	200	V	7	63.54	-15.6	Peak

Note: The plot above shows that there were no emissions above the noise floor level at 18-26.5 GHz frequency range

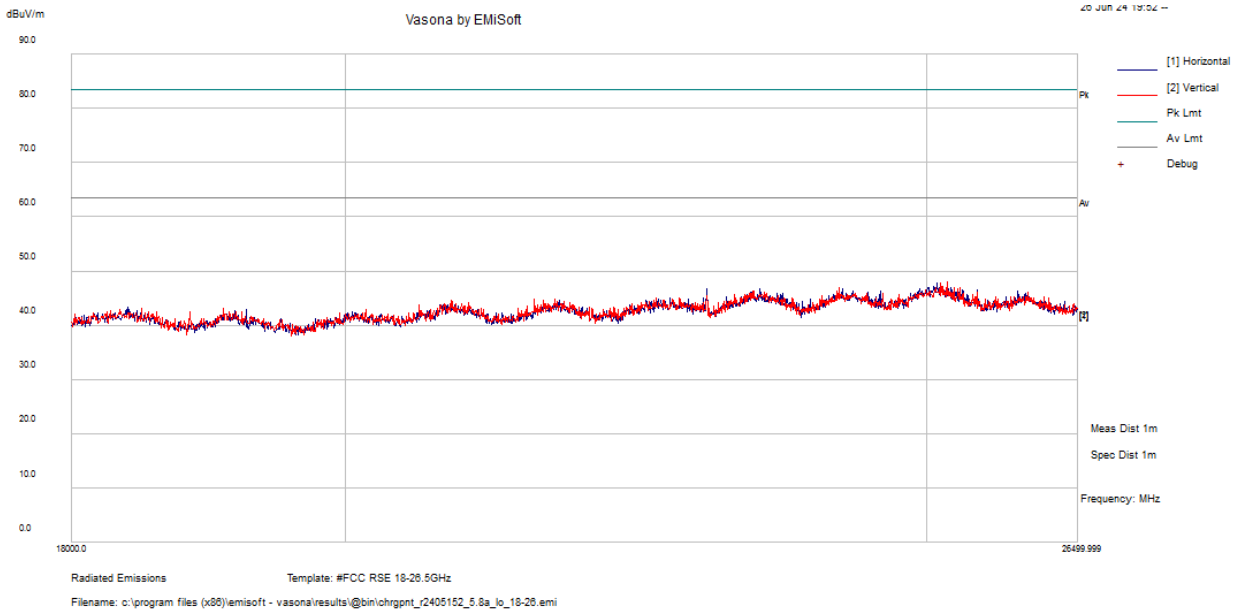
802.11a, 5240 MHz



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)	Detector
25080.69	40.35	7.28	47.63	200	V	7	63.54	-15.91	Peak

Note: The plot above shows that there were no emissions above the noise floor level at 18-26.5 GHz frequency range

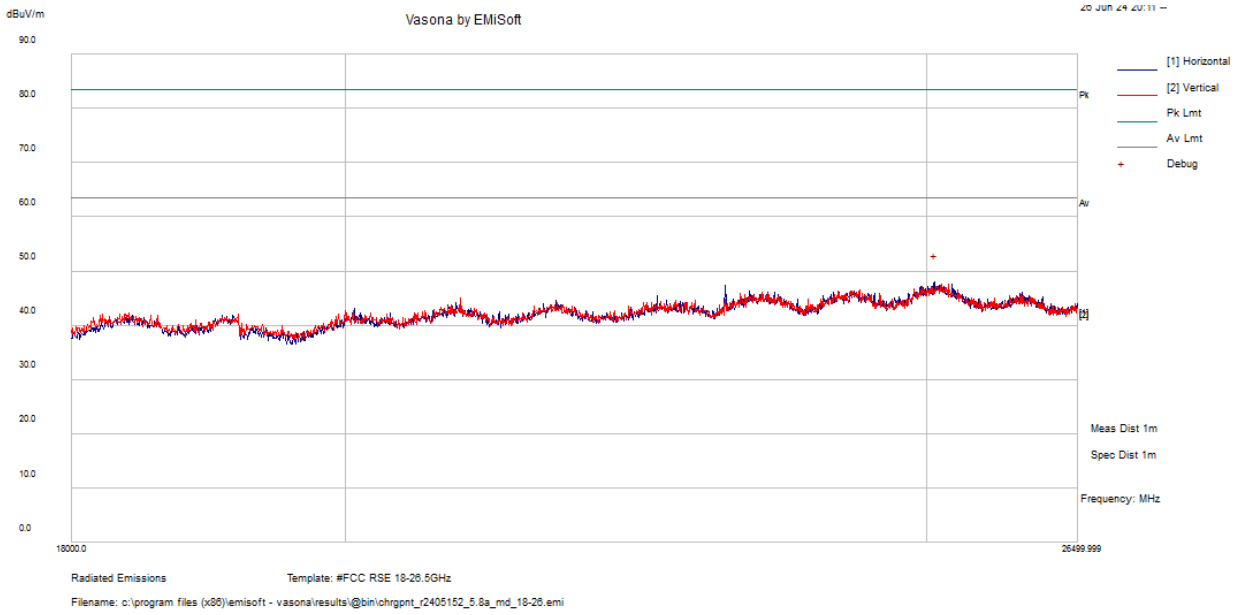
802.11a, 5745 MHz



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)	Detector
25104.42	40.04	6.96	47	200	V	8	63.54	-16.54	Peak

Note: The plot above shows that there were no emissions above the noise floor level at 18-26.5 GHz frequency range

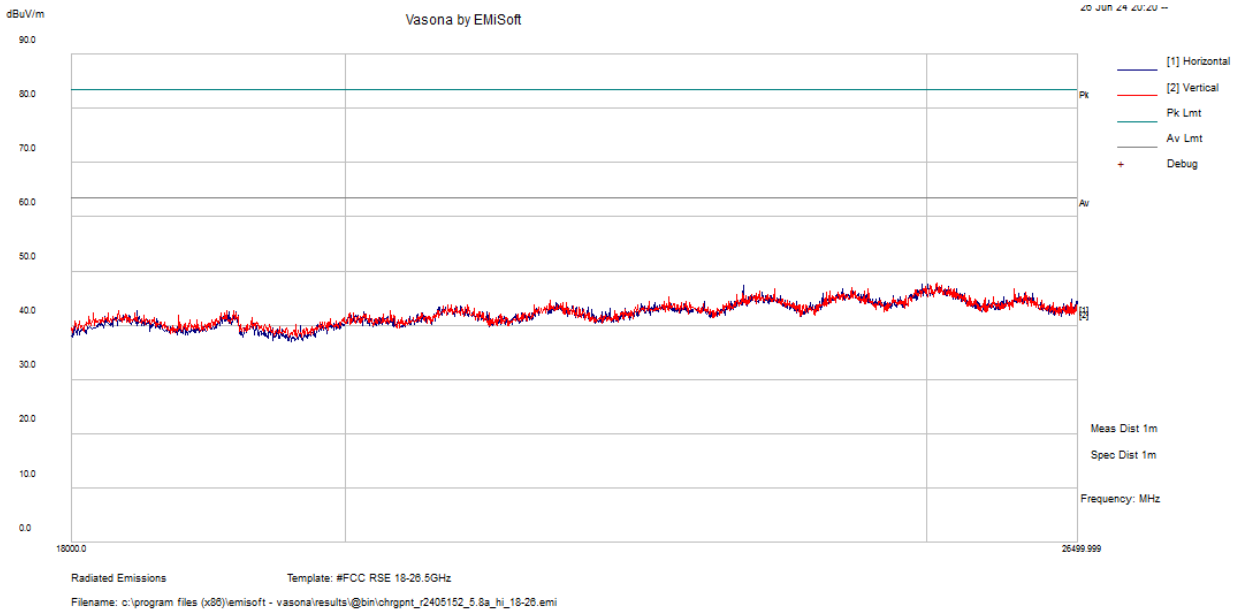
802.11a, 5785 MHz



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)	Detector
25081.01	40.55	7.28	47.83	200	V	8	63.54	-15.71	Peak

Note: The plot above shows that there were no emissions above the noise floor level at 18-26.5 GHz frequency range

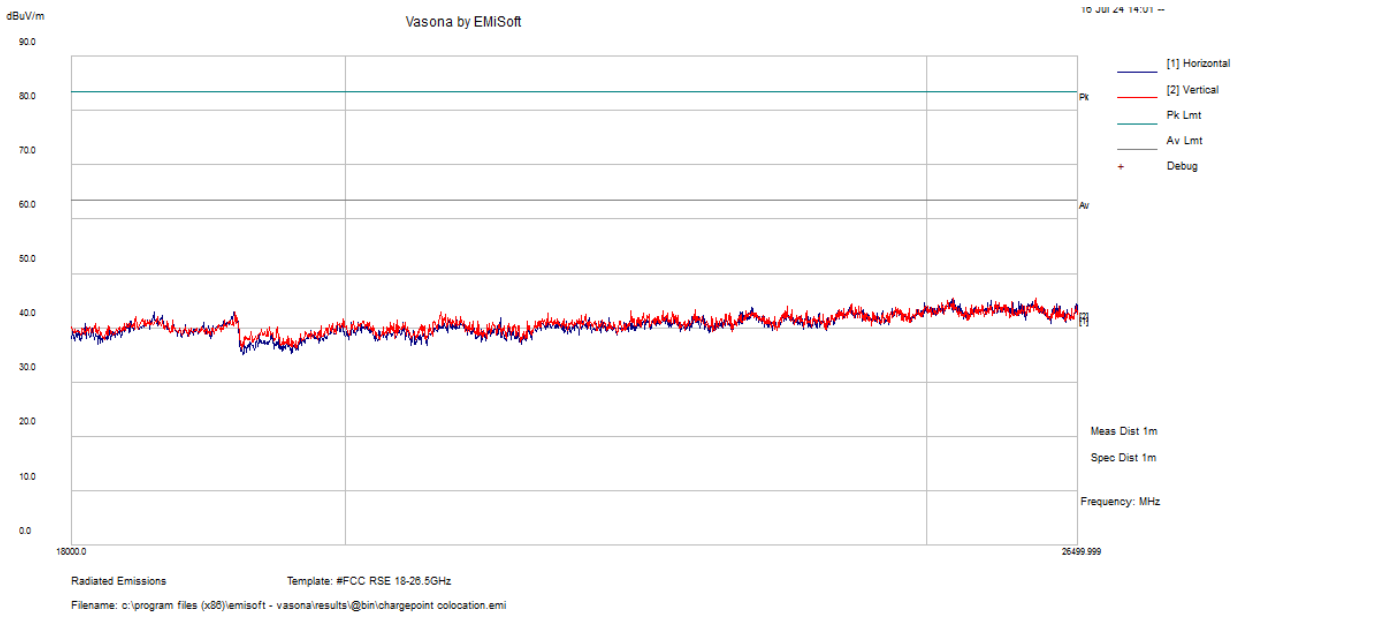
802.11a, 5825 MHz



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)	Detector
25014.47	40.62	6.8	47.42	200	V	7	63.54	-16.12	Peak

Note: The plot above shows that there were no emissions above the noise floor level at 18-26.5 GHz frequency range.

5GHz Wi-Fi + LTE, 5220 MHz

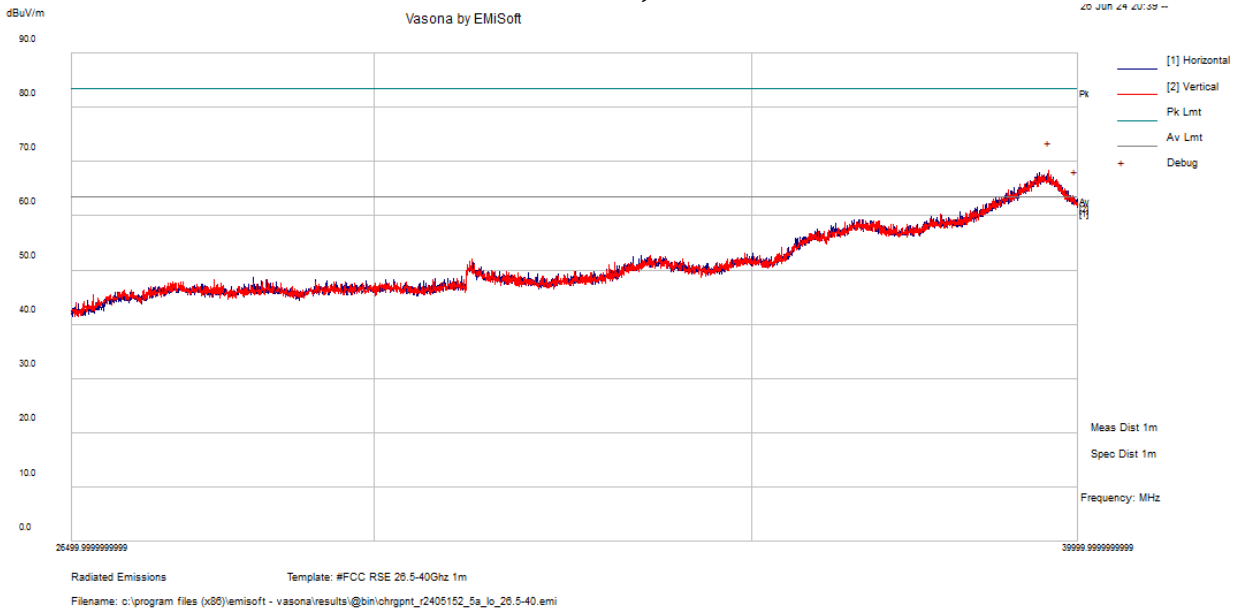


Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Detector
26082.36	36.3	7.59	43.89	200	V	7	63.54	-19.65	Peak

Note: The plot above shows that there were no emissions above the noise floor level at 18-26.5 GHz frequency range.

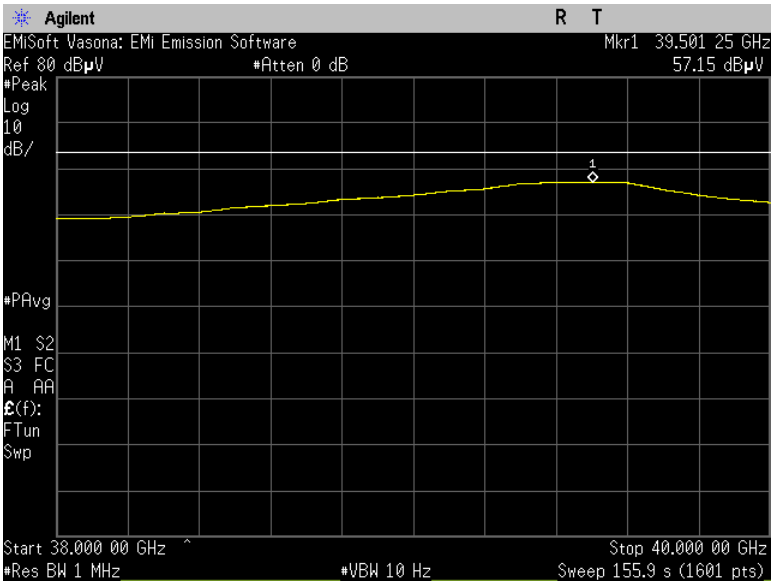
4) 26.5 GHz – 40 GHz, Measured at 1 meter

802.11a, 5180 MHz



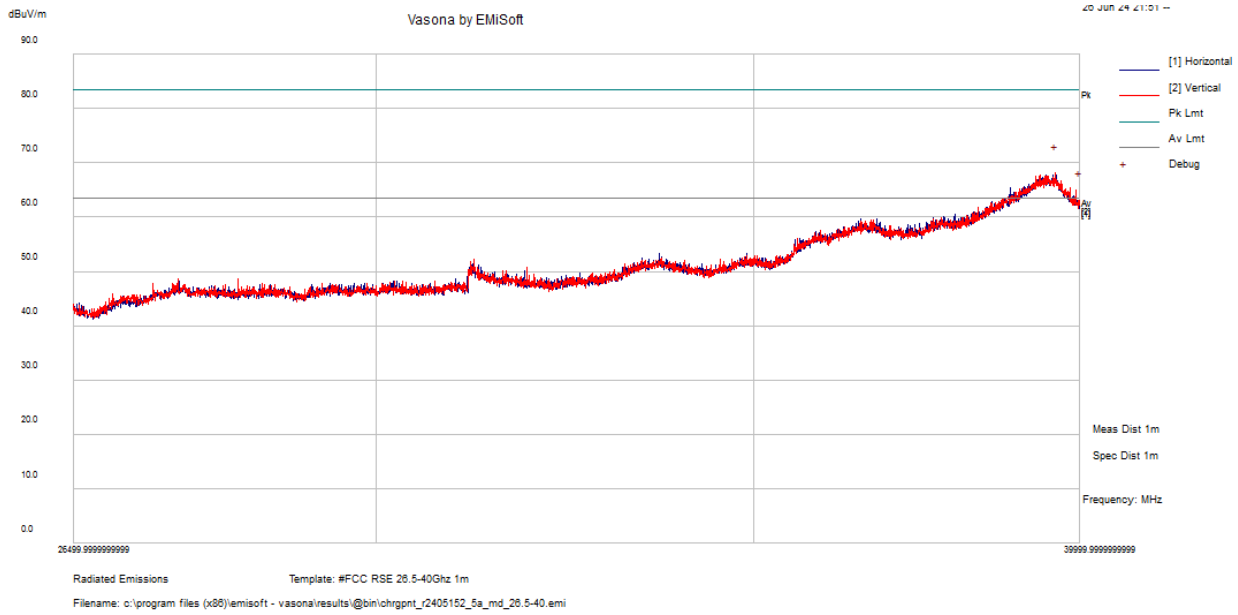
Note: Above plot shows complicance for 26.5-38 GHz

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)	Detector
39501.25	41.55	15.6	57.15	200	H	0	63.54	-6.39	Average

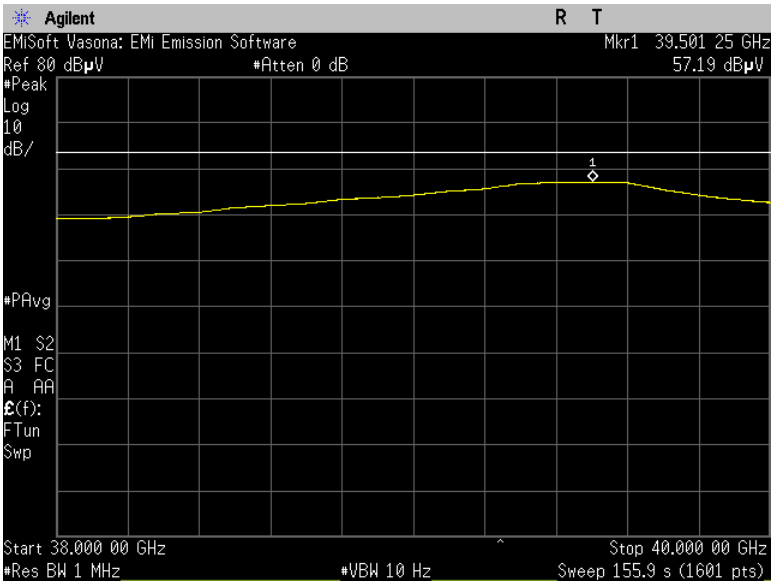


Note: The plot above shows reduced VBW for average measurements compared to average limit, thus the EUT complies with 38-40 GHz frequency range average limit requirement.

802.11a, 5220 MHz



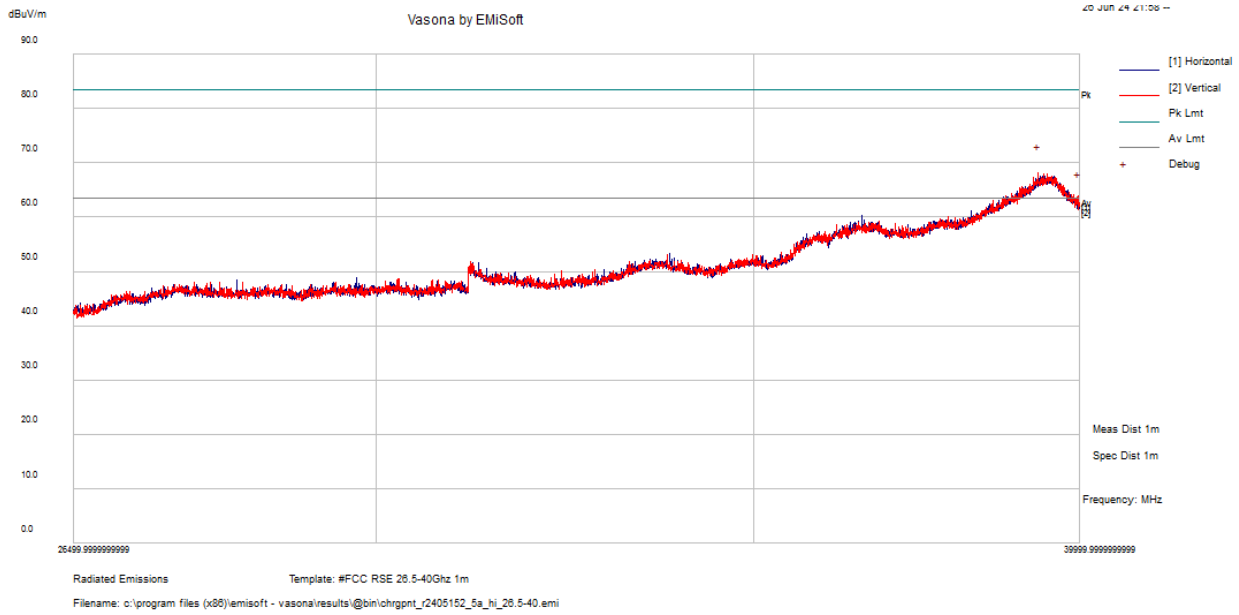
Note: Above plot shows complicance for 26.5-38 GHz



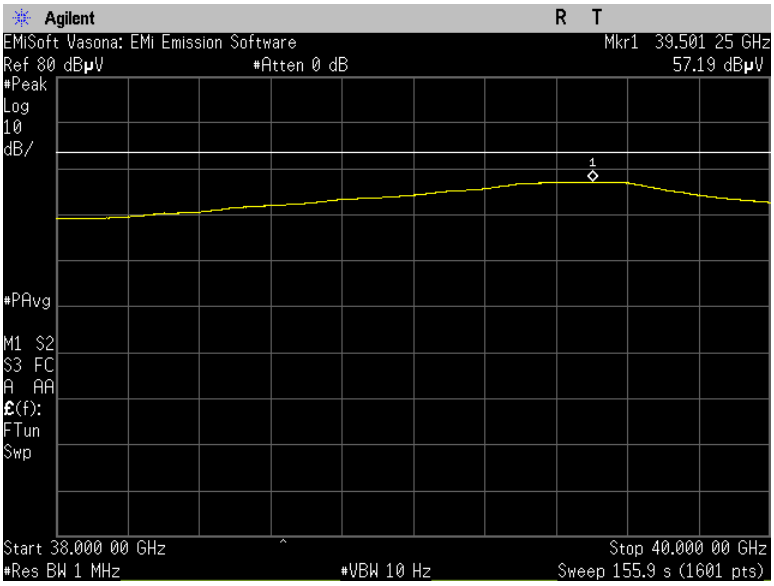
Note: The plot above shows reduced VBW for average measurements compared to average limit, thus the EUT complies with 38-40 GHz frequency range average limit requirement.

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)	Detector
39501.25	38.65	18.54	57.19	200	V	0	63.54	-6.35	Average

802.11a, 5240 MHz



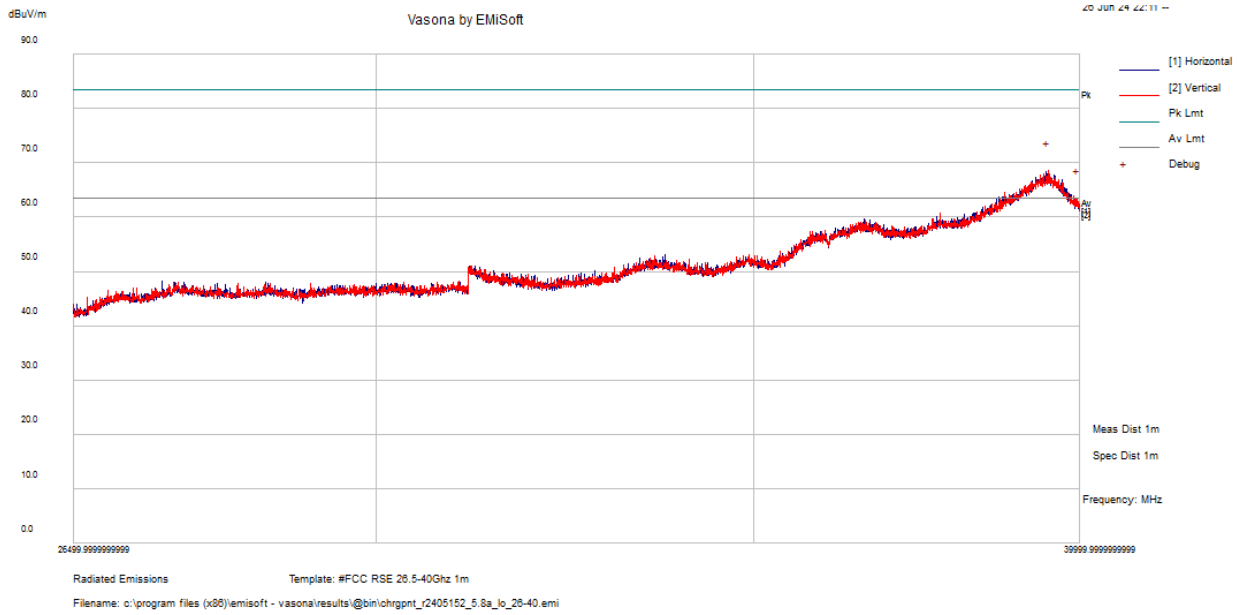
Note: Above plot shows complicance for 26.5-38 GHz



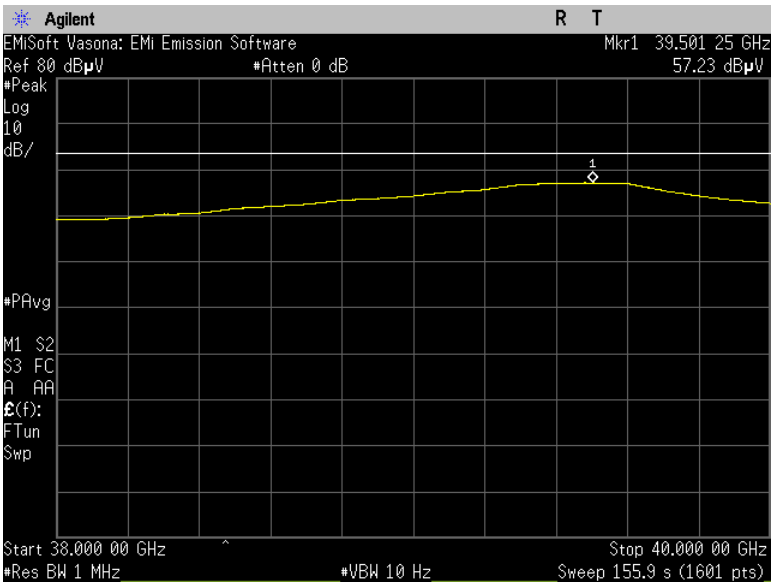
Note: The plot above shows reduced VBW for average measurements compared to average limit, thus the EUT complies with 38-40 GHz frequency range average limit requirement.

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)	Detector
39501.25	38.65	18.54	57.19	200	V	0	63.54	-6.35	Average

802.11a, 5745 MHz



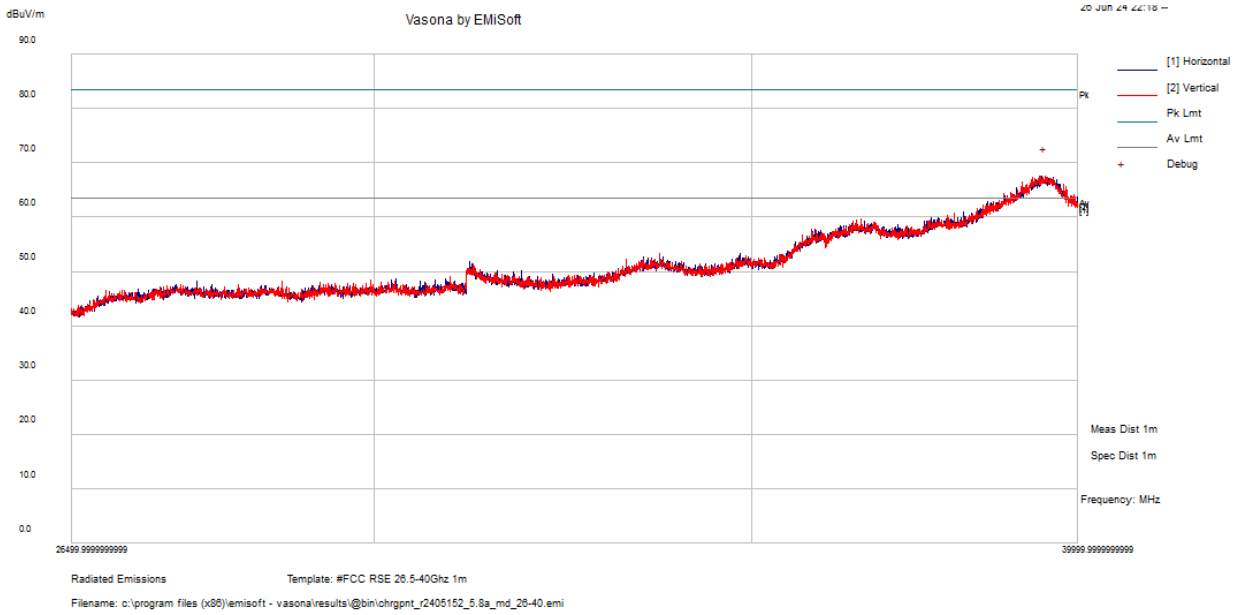
Note: Above plot shows complicance for 26.5-38 GHz



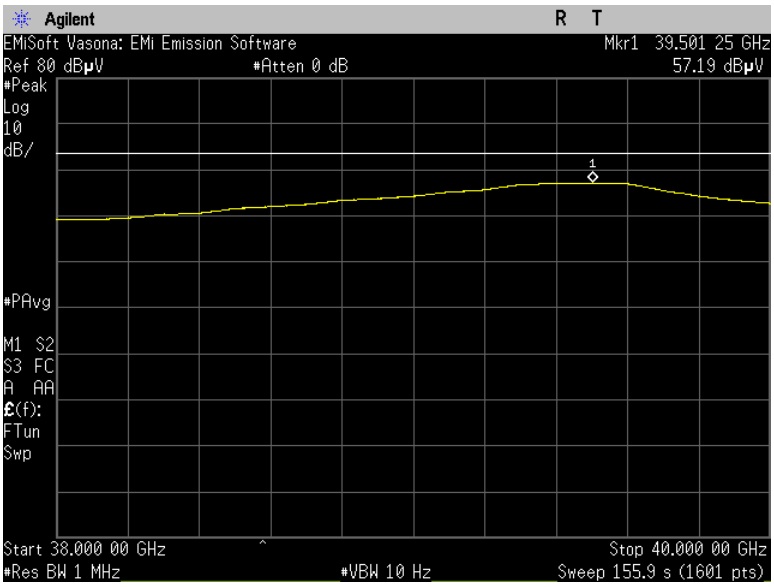
Note: The plot above shows reduced VBW for average measurements compared to average limit, thus the EUT complies with 38-40 GHz frequency range average limit requirement.

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)	Detector
39501.25	38.61	18.62	57.23	200	V	0	63.54	-6.31	Average

802.11a, 5785 MHz



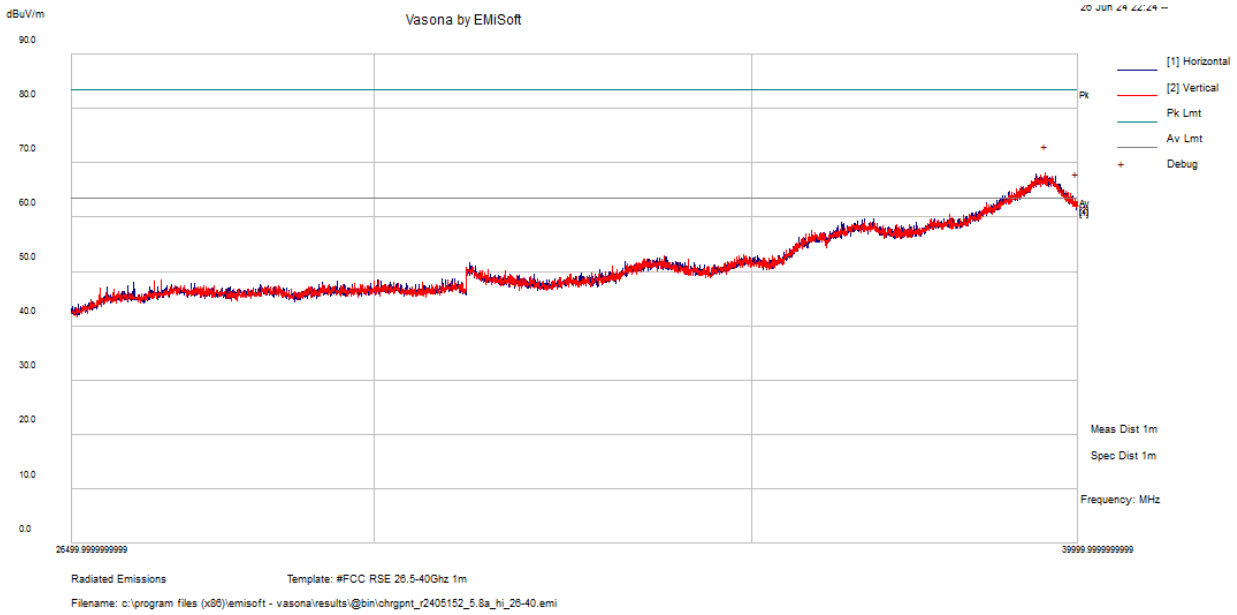
Note: Above plot shows complicance for 26.5-38 GHz



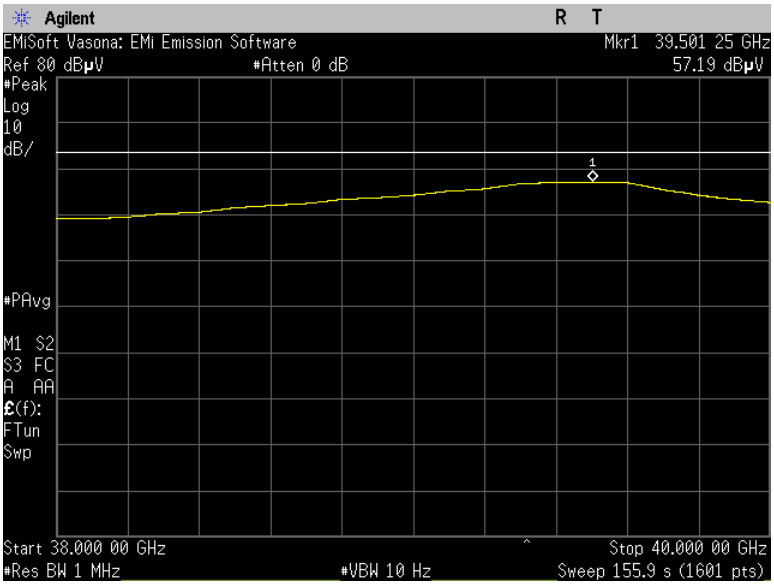
Note: The plot above shows reduced VBW for average measurements compared to average limit, thus the EUT complies with 38-40 GHz frequency range average limit requirement.

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)	Detector
39501.25	38.53	18.66	57.19	200	V	0	63.54	-6.35	Average

802.11a, 5825 MHz



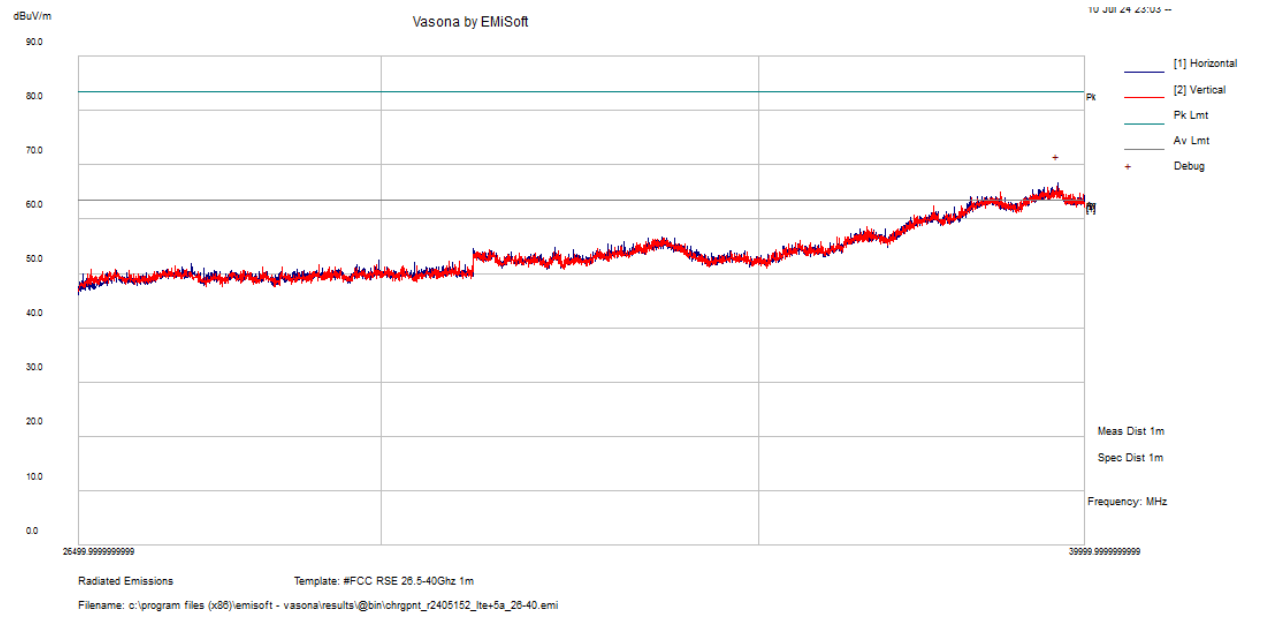
Note: Above plot shows complicance for 26.5-38 GHz



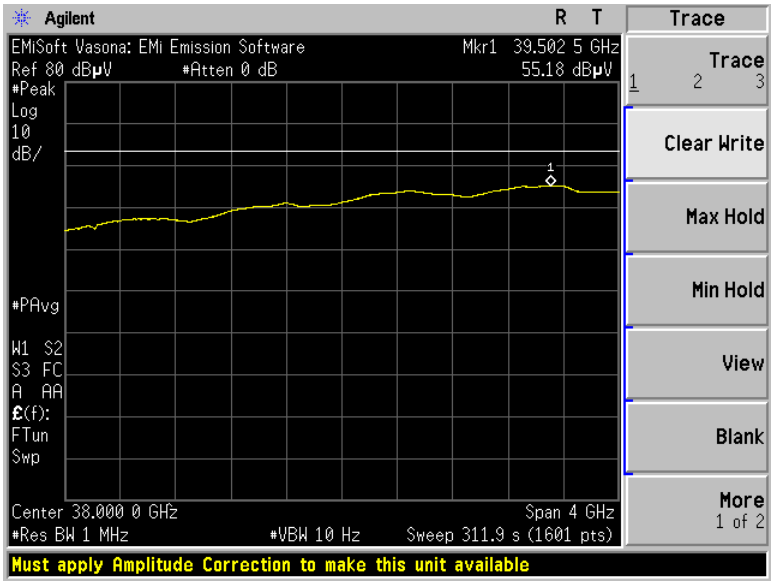
Note: The plot above shows reduced VBW for average measurements compared to average limit, thus the EUT complies with 38-40 GHz frequency range average limit requirement.

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)	Detector
39501.25	38.56	18.63	57.19	200	V	0	63.54	-6.35	Average

5 GHz Wi-Fi + LTE, 5220 MHz



Note: Above plot shows complicance for 26.5-36 GHz



Note: The plot above shows reduced VBW for average measurements compared to average limit, thus the EUT complies with 36-40 GHz frequency range average limit requirement.

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)	Detector
39502.5	38.58	16.6	55.18	200	H	0	63.54	-8.36	Average

7 Annex A – 5.2 Band Edge

Please refer to the attachment.

8 Annex B – 5.8 Emission Mask

Please refer to the attachment.

9 Appendix A (Normative) – EUT Test Setup Photographs

Please refer to the attachment.

10 Appendix B (Normative) – EUT External Photographs

Please refer to the attachment.

11 Appendix C (Normative) – EUT Internal Photographs

Please refer to the attachment.

12 Appendix D (Normative) – A2LA Electrical Testing Certificate

Accredited Laboratory

A2LA has accredited

BAY AREA COMPLIACE 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 21st day of December 2022.

Mr. Trace McInturff, Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 3297.02
Valid to September 30, 2024

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 ---