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

TEST REPORT

For

Brilliant Home Technology Inc.

155 Bovet Road Suite 500
San Mateo CA 94402, USA

FCC ID: 2APQV-BCPUSMG
IC: 23875-BCPCAMG

Report Type:	**Product Type:**
Original Report	Control Panel

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Report Number:	R2310194-NII	
Report Date:	2024-03-20	
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ACCREDITED
CERTIFICATE #3297.02

TABLE OF CONTENTS

DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
0	R2310194-NII	Original Report	2024-03-20

1 General Description

1.1 Product Description for Equipment Under Test (EUT)

This test report was prepared on behalf of *Brilliant Home Technology Inc.*, and their product: 4-Switch BHA120US-WH4 F4.2, FCC ID: 2APQV-BCPUSMG, IC: 23875-BCPCAMG, the "EUT" as referred to in this report. The EUT has 2.4 GHz/ 5 GHz Wi-Fi and 2.4 GHz BLE capabilities.

Model Number	4-Switch BHA120US-WH4 F4.2
FCC ID	2APQV-BCPUSMG
IC	23875-BCPCAMG
Device Description	Control Panel
Operating Frequency	5180 MHz – 5825 MHz
Modes supported	802.11a/n20/n40/ac80
Omnidirectional Antenna Gain	Wi-Fi Ant 1: 1.5 dBi, Wifi Ant 2: 2.0 dBi

1.2 Objective

This report was prepared on behalf of *Brilliant Home Technology 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, RF Exposure, Radiated Spurious Emissions, Occupied Bandwidth, Output Power, and Power Spectrum Density testing, AC Line Conducted Emission testing and to verify the Output Power.

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.).

1.3 Mechanical Description of EUT

Dimensions: 21 cm (Length) 13.2 cm (Width) 0.8 cm (Height).
Weight: 0.25 kg
Serial Number: FA4AMS20F2
EUT Photos: See Attachments Appendix B and Appendix C.

1.4 Related Submittal(s)/Grant(s)

FCC Part 15, Subpart E, Equipment Class: DTS with FCC ID: 2APQV-BCPUSMG, IC: 23875-BCPCAMG

1.5 Test Methodology

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

1.6 Measurement Uncertainty

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

Parameter	Measurement uncertainty
Occupied Channel Bandwidth	±5%
RF output power, conducted	±0.57 dB
Power Spectral Density, conducted	±1.48dB
Unwanted Emissions, conducted	±1.57dB
All emissions, radiated	±4.0 dB
AC power line Conducted Emission	±2.0 dB
Temperature	±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.

2.2 EUT Exercise Software

The test utility used was "Tera Term", the software is compliant with the standard requirements being tested against.

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

Note: The weather band (5600-5650 MHz) is not supported for ISEDC.

5150 MHz-5250 MHz

Radio	Frequency (MHz)	Mode	Power Setting
5 GHz Wi-Fi	5180	802.11a	18
	5200		18
	5240		18
	5180	802.11n20	17
	5200		17
	5240		17
	5190	802.11n40	15
	5230		15
	5210	802.11ac80	13

5250 MHz-5350 MHz

Radio	Frequency (MHz)	Mode	Power Setting
5 GHz Wi-Fi	5260	802.11a	19
	5280		19
	5320		19
	5260	802.11n20	18
	5280		18
	5320		18
	5270	802.11n40	15
	5310		15
	5290	802.11ac80	15

5470 MHz-5725 MHz

Radio	Frequency (MHz)	Mode	Power Setting
5 GHz Wi-Fi	5500	802.11a	17
	5600		17
	5700		17
	5720		17
	5500	802.11n20	17
	5600		17
	5700		16
	5720		17
	5510	802.11n40	15
	5590		15
	5670		15
	5710		15
	5530	802.11ac80	14
	5610		14
	5690		14

5725 MHz-5850 MHz

Radio	Frequency (MHz)	Mode	Power Setting
5 GHz Wi-Fi	5745	802.11a	23
	5785		23
	5825		23
	5745	802.11n20	23
	5785		23
	5825		23
	5755	802.11n40	21
	5795		21
	5775	802.11ac80	17

Wi-Fi Data Rates Tested:
802.11a mode: 6Mbps
802.11n HT20 mode: MCS0
802.11n HT40 mode: MCS0
802.11ac VHT80 mode: MCS0

Note: For IC, channels with emissions in the 5600 MHz – 5650 MHz band are disabled due to weather band.

2.3 Duty Cycle for 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.

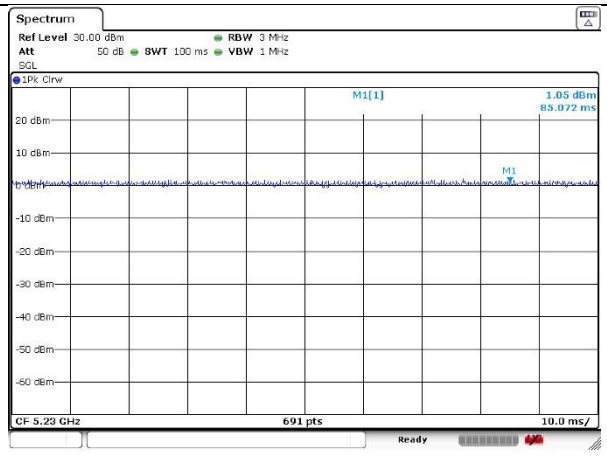
Radio Mode	On Time (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)
802.11a	-	-	100%	0
802.11n20	-	-	100%	0
802.11n40	-	-	100%	0
802.11ac80	-	-	100%	0

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

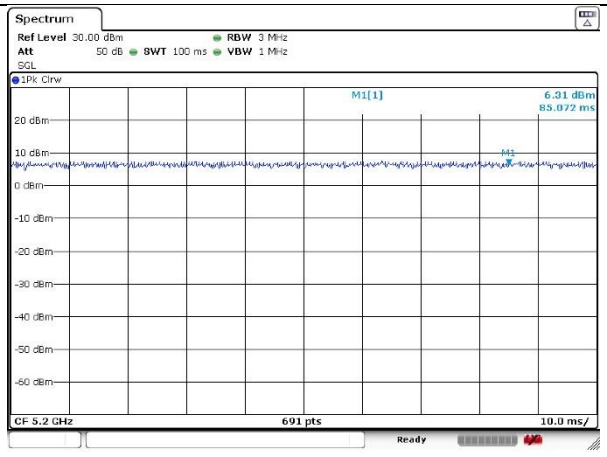
Please refer to the following plots for duty cycle.

Naming Convention:

Frequency (MHz)_Mode



5230_802.11n40



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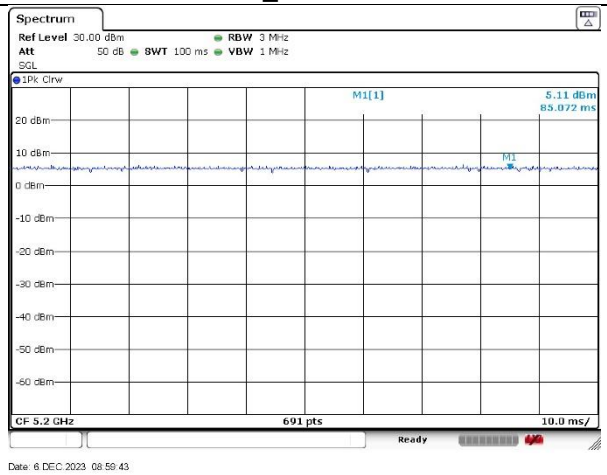

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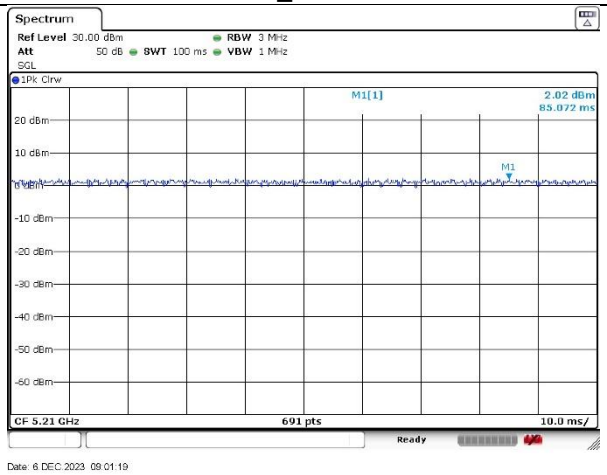


5210_802.11ac80

2.4 Equipment Modification

None.

2.5 Local Support Equipment

Manufacturer	Description	Model
Dell	Laptop	Latitude 5410

2.6 Remote Support Equipment

Manufacturer	Description	Model
-	USB/Serial Breakout	213-00068 Rev 1

2.7 Interface Ports and Cabling

Cable Descriptions	Length (m)	From	To
USB to TTL UART Serial Cable	1.5	UUT	Laptop

3 Summary of Test Results

Results reported relate only to the product tested.

FCC & ISEDC Rules	Description of Test	Results
FCC §2.1091, §15.407(f) ISEDC RSS-102	RF Exposure	Compliant
FCC §15.203 ISEDC RSS-Gen §6.8	Antenna Requirement	Compliant
FCC §15.207 ISEDC RSS-Gen §8.8	AC Power Line Conducted Emissions	Compliant
FCC §2.1053, §15.205, §15.209, 15.407(b) ISEDC RSS-247 §6.2	Spurious Radiated Emissions	Compliant
FCC §15.407(e) ISEDC RSS-247 §6.2	Emission Bandwidth	Compliant
FCC §407(a) ISEDC RSS-247 §6.2	Output Power	Compliant
FCC §2.1051, §15.407(b) ISEDC RSS-247 §6.2	Band Edges	Compliant
FCC §15.407(a) ISEDC RSS-247 §6.2	Power Spectral Density	Compliant
FCC §2.1051, §15.407(b) ISEDC RSS-247 §6.2	Spurious Emissions at Antenna Terminals	Compliant
FCC §15.407(h) ISEDC RSS-247 §6.3	Dynamic Frequency Selection	Compliant[1]

[1]*Note: Please refer to Report Number R2310194-DFS and issued by Bar Area Complliance Labs for results*

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

Antenna	External/Internal/ Integral	Antenna Type	Frequency Range (MHz)	Maximum Antenna Gain (dBi)
Wi-Fi Ant 1	Internal	PCB	5150-5850	1.5
Wi-Fi Ant 2	Internal	PCB	5150-5850	2.0

Note: Antenna gain information was provided by *Brilliant Home Technology Inc.*
Note: For MIMO configs (i.e. 802.11n/ac), gain is 4.77dBi

5 FCC §15.407(f) §2.1091 & ISED RSS-102 - RF Exposure

5.1 Applicable Standards

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/f0.5 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 f0.6834 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 Results 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)
2.4 GHz Wi-Fi	2462	1.1	20.73	21.83	152.41	0.03	1.0
5 GHz Wi-Fi	5825	4.77	17.78	22.55	179.89	0.04	1.0
BLE	2402	1.8	12.56	14.36	27.29	0.01	1.0

5.4 RF exposure evaluation exemption for IC

2.4 GHz Wi-Fi

The EIRP of this device is 21.83 dBm (152.41 mW) which is less than the exemption threshold, i.e., 1.31*10^(-2) * f^(0.6834)=2.72W. Therefore, the RF exposure evaluation is exempt.

5 GHz Wi-Fi

The EIRP of this device is 22.55 dBm (179.89 mW) which is less than the exemption threshold, i.e., 1.31*10^(-2) * f^(0.6834)=4.9W. Therefore, the RF exposure evaluation is exempt.

BLE

The EIRP of this device is 14.36 dBm (27.29mW) which is less than the exemption threshold, i.e., 1.31*10^(-2) * f^(0.6834)=2.68W. Therefore, the RF exposure evaluation is exempt.

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

6.1 Applicable Standards

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

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

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

Note1: Decreases with the logarithm of the frequency.

Note2: A linear average detector is required

6.2 Test Setup

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

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

The AC/DC power adapter of the EUT was connected with LISN-1 which provided 120 V/60 Hz AC power.

6.3 Test Procedure

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

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

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

6.4 Corrected Amplitude and Margin Calculation

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

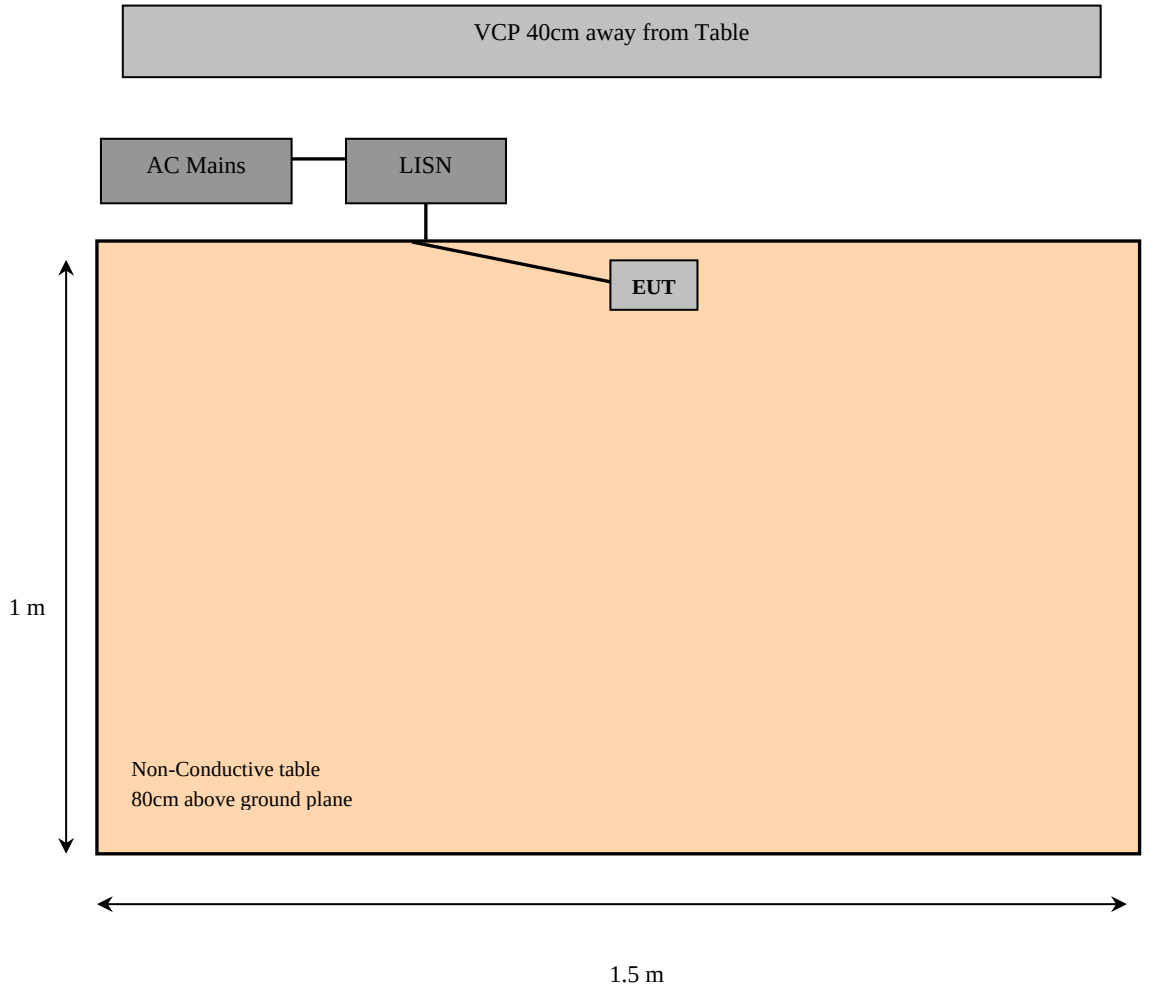
CA = Ai + CL + Atten

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

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

Margin = Corrected Amplitude – Limit

6.5 Test Setup Block Diagram



6.6 Test Equipment List and Details

BACL No.	Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
124	Rohde & Schwarz	EMI Test Receiver	ESCI 1166.5950K03	100044	2023-06-16	1 year
681	Rohde & Schwarz	Impulse Limiter	ESH3-Z2	101962	2024-01-04	6 months
726	Solar Electronics Company	High Pass Filter	Type 7930-100	7930150204	2024-01-08	6 months
732	FCC	LISN	FCC-LISN-50-25-2-10-CISPR16	160129	2023-09-12	1 year
1241	Pasternack	RG223 Coaxial cable 1500cm	PE3447-1500cm	N/A	2024-01-02	6 months

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:	22ºC
Relative Humidity:	49%
ATM Pressure:	102.6 kPa

The testing was performed by Steven Lianto on 2024-02-04 in 5m chamber 3

6.8 Summary of Test Results

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

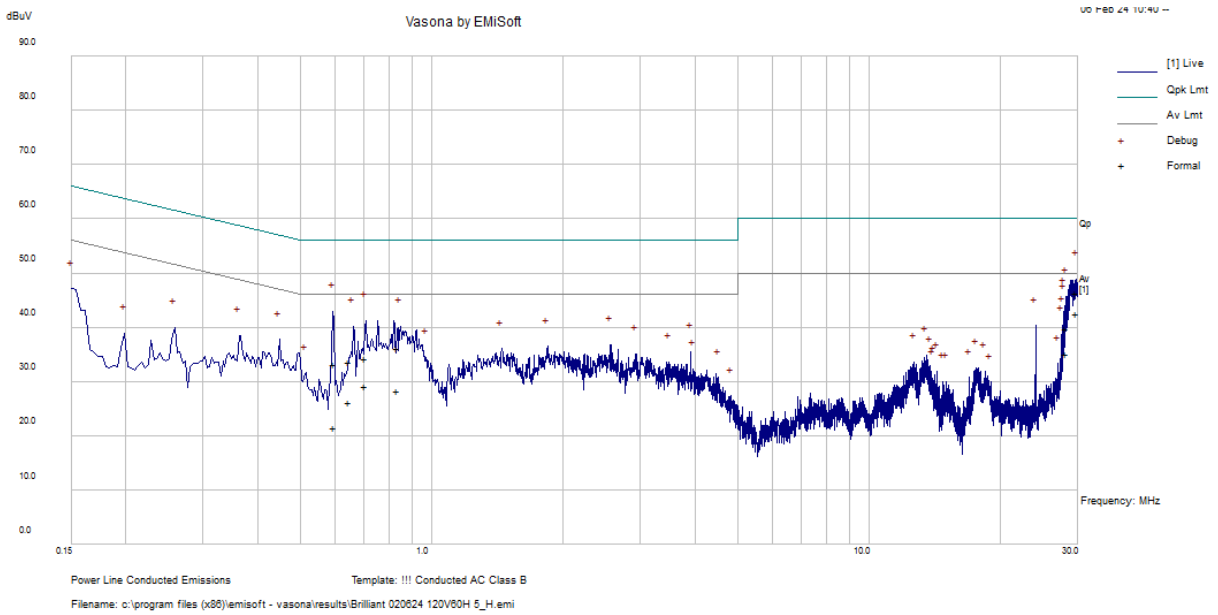
5 GHz Wi-Fi

Connection: AC/DC adapter connected to 120 V/60 Hz, AC			
Margin (dB)	**Frequency (MHz)**	**Conductor Mode (Live/Neutral)**	**Range (MHz)**
-1.09	0.154344	Neutral	0.15-30

6.9 Conducted Emissions Test Plots and Data

5 GHz Wi-Fi

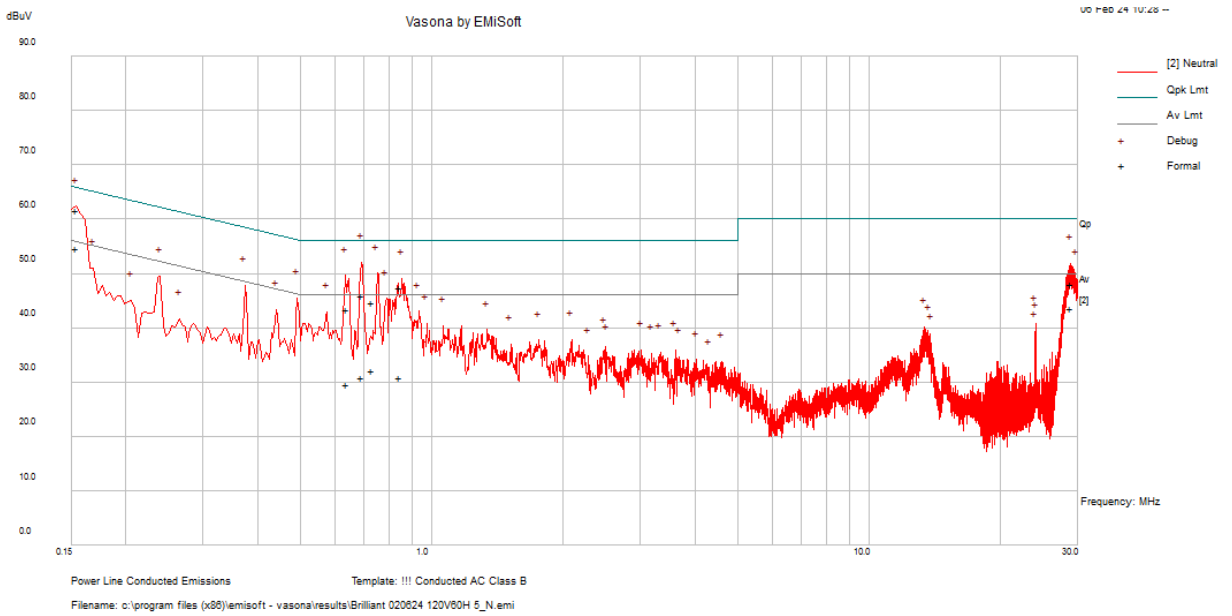
120 V, 60 Hz – Live



Frequency (MHz)	Corrected Amplitude (dBuV)	Conductor (Live/Neutral)	Limit (dBuV)	Margin (dB)	Detector (QP/Ave.)
29.75803	46.27	Live	60	-13.73	QP
0.599395	33.19	Live	56	-22.81	QP
28.14591	39.86	Live	60	-20.14	QP
0.703978	34.31	Live	56	-21.69	QP
0.835803	36.2	Live	56	-19.8	QP
0.64579	33.69	Live	56	-22.31	QP

Frequency (MHz)	Corrected Amplitude (dBuV)	Conductor (Live/Neutral)	Limit (dBuV)	Margin (dB)	Detector (QP/Ave.)
29.75803	42.61	Live	50	-7.39	Ave.
0.599395	21.54	Live	46	-24.46	Ave.
28.14591	35.09	Live	50	-14.91	Ave.
0.703978	29.05	Live	46	-16.95	Ave.
0.835803	28.3	Live	46	-17.7	Ave.
0.64579	26.12	Live	46	-19.88	Ave.

120 V, 60 Hz – Neutral



Frequency (MHz)	Corrected Amplitude (dBuV)	Conductor (Live/Neutral)	Limit (dBuV)	Margin (dB)	Detector (QP/Ave.)
0.154344	61.59	Neutral	65.76	-4.17	QP
0.693948	45.91	Neutral	56	-10.09	QP
0.732916	44.71	Neutral	56	-11.29	QP
0.639541	43.4	Neutral	56	-12.6	QP
0.846272	47.51	Neutral	56	-8.49	QP
28.90746	47.98	Neutral	60	-12.02	QP

Frequency (MHz)	Corrected Amplitude (dBuV)	Conductor (Live/Neutral)	Limit (dBuV)	Margin (dB)	Detector (QP/Ave.)
0.154344	54.67	Neutral	55.76	-1.09	Ave.
0.693948	30.94	Neutral	46	-15.06	Ave.
0.732916	32.14	Neutral	46	-13.86	Ave.
0.639541	29.51	Neutral	46	-16.49	Ave.
0.846272	30.78	Neutral	46	-15.22	Ave.
28.90746	43.7	Neutral	50	-6.3	Ave.

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

7.1 Applicable Standard

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

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

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

Frequency (MHz)	Field Strength (micro volts/meter)	Measurement Distance (meters)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 - 30.0	30	30
30 - 88	100 Note 1	3
88 - 216	150 Note 1	3
216 - 960	200 Note 1	3
Above 960	500	3

Note 1: Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

As per FCC Part 15.407 (b)

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

(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.

7.2 Test Setup

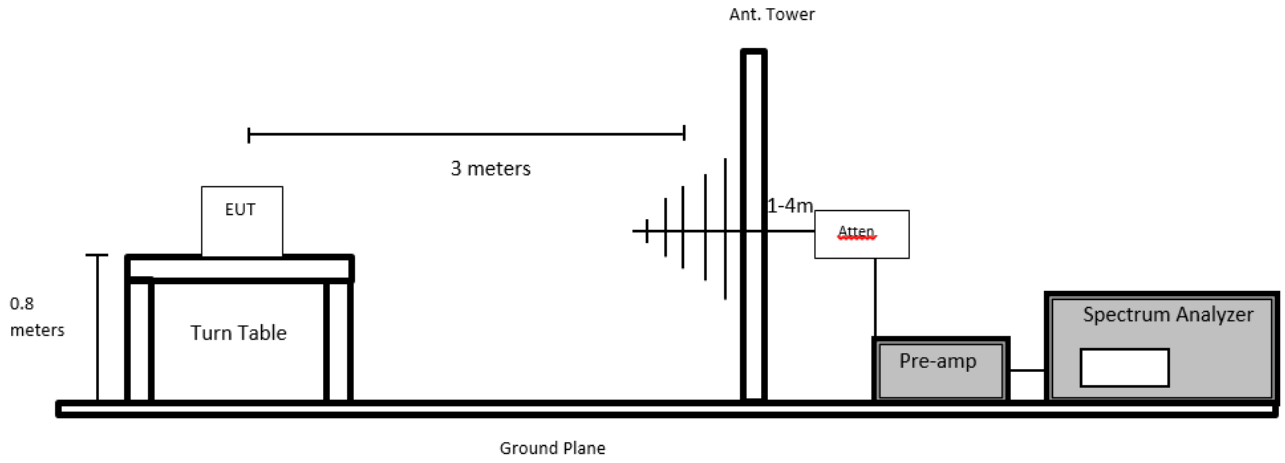
The radiated emissions tests were performed in the 5-meter Chamber, using the setup in accordance with ANSI C63.10-2013. The specification used was the FCC 15.407 and ISEDC RSS-247 limits.

The spacing between the peripherals was 10 centimeters.

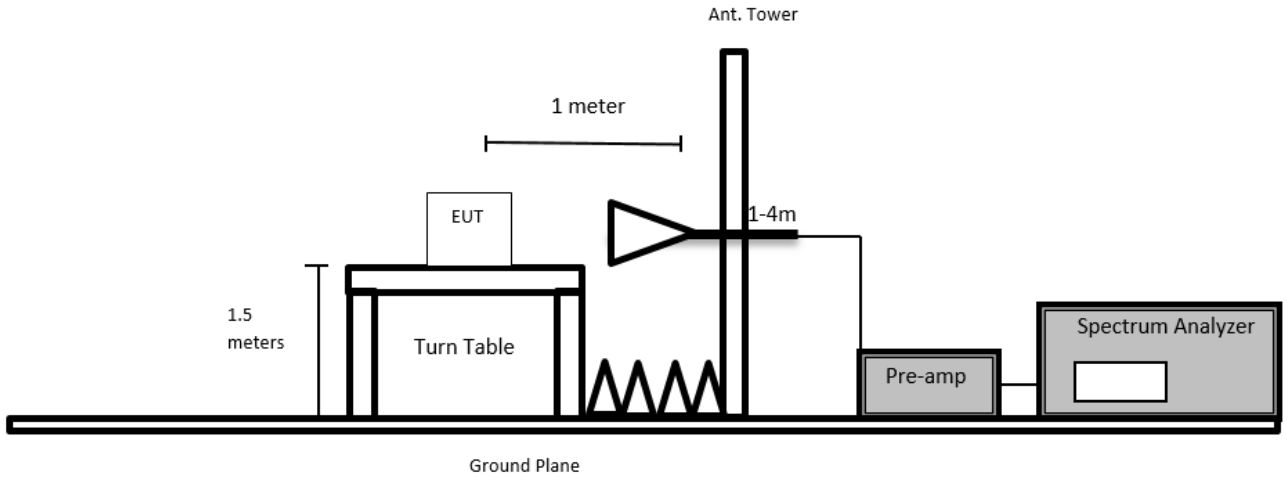
External I/O cables were draped along the edge of the test table and bundle when necessary.

7.3 Test Setup Diagrams

Below 1 GHz



Above 1 GHz



7.4 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 or 1/T / Sweep = Auto

7.5 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

7.6 Test Equipment List and Details

BACL No.	Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
310	Rohde & Schwarz	EMI Test Receiver 9 KHZ to 3 GHZ	ESCI 1166.5950.03	100338	2023-05-11	1 year
424	Agilent	Spectrum Analyzer	E4440A	US45303156	2022-12-19	15 months
624	Agilent	Spectrum Analyzer	E4446A	MY48250238	2023-05-12	1 year
327	Sunol Sciences	System Controller	SC110V	122303-1	N/R	N/R
1075	Sunol Sciences	Boresight Tower	TLT3	050119-7	N/R	N/R
1388	Sunol Sciences	Flush Mount Turntable	FM	112005-2	N/R	N/R
316	Sonoma Instruments	Preamplifier	317	260406	2023-09-26	6 months
321	Sunol Sciences	Biconilog Antenna	JB3	A020106-2; 1504	2023-12-18	2 years
1186	Pasternack	Coaxial Cable, RG214	PE3062-1050CM	N/A	2023-10-03	6 months
1245	-	6 dB Attenuator	PE7390-6	01182018A	2023-12-18	2 years
1246	Hewlet Packard	RF Limiter	11867A	01734	2023-04-13	1 year
1248	Pasternack	RG214 COAX Cable	PE3062	N/A	2023-10-04	6 months
1249	Time Microwave	LMR-400 Cable Dc-3 GHz	AE13684	2k80612-5 6fts	2023-10-09	6 months
658	HP/ Agilant	Pre Amplifier	8449B OPT HO2	3008A01103	2023-12-01	6 months
1192	ETS Lindgren	Horn Antenna	3117	00218973	2022-09-29	2 years
1247	Uti flex	Micro - Coax	N/A	N/A	2023-12-01	6 months
1354	RFMW	2.92 mm 10ft RF Cable DC to 40 GHz	P1CA-29M29M-F150-120	N/A	2023-07-24	1 year
387	Micro-Tronics	5150-5350 MHz Notch Filter	BRC50703	006	2023-03-02	1 year
389	Micro-Tronics	5.6 GHz Notch Filter	BRC 50704	003	2023-05-04	1 year
1175	Micro-Tronics	Notch band 5725-5875 MHz filter	BRC50705	006	2023-12-12	1 year
1331	Micro-Tronics	Notch band 5150-5880 MHz Filter	BRM50716	G262	2023-12-11	1 year
91	Wisewave	Horn Antenna	ARH-4223-02	10555-02	2022-03-08	2 years
230	Wisewave	Horn Antenna	ARH-2823-02	10555-02	2022-03-08	2 years
827	AH Systems	Preamplifier	PAM 1840 VH	170	2023-11-08	6 months
1329	Pasternack	2.92 mm short coaxial cable	PE360-12	N/A	2023-11-28	6 months

Note[1]: cable and notch filters 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".*

7.7 Test Environmental Conditions

Temperature:	20°–22.5°C
Relative Humidity:	55%
ATM Pressure:	101.85 kPa

The testing was performed by Arturo Reyes from 2024-01-18 to 2024-02-16 in 5m chamber 3.

7.8 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:

Mode: Transmitting			
Margin (dB)	**Frequency (MHz)**	**Polarization (Horizontal/Vertical)**	**Mode, Channel**
-0.75	11648.23	Vertical	802.11a, 5825 MHz

7.9 Radiated Emissions Test Result Data

Note: Below test data are the radiated cabinet emissions, for conducted in-lieu of radiated measurements performed at the antenna port please refer to ANNEX D, ANNEX E, ANNEX F, and ANNEX G.

Note: the device does not produce emissions below 30 MHz thus testing was not performed below 30 MHz

U-NII-2A Leakage

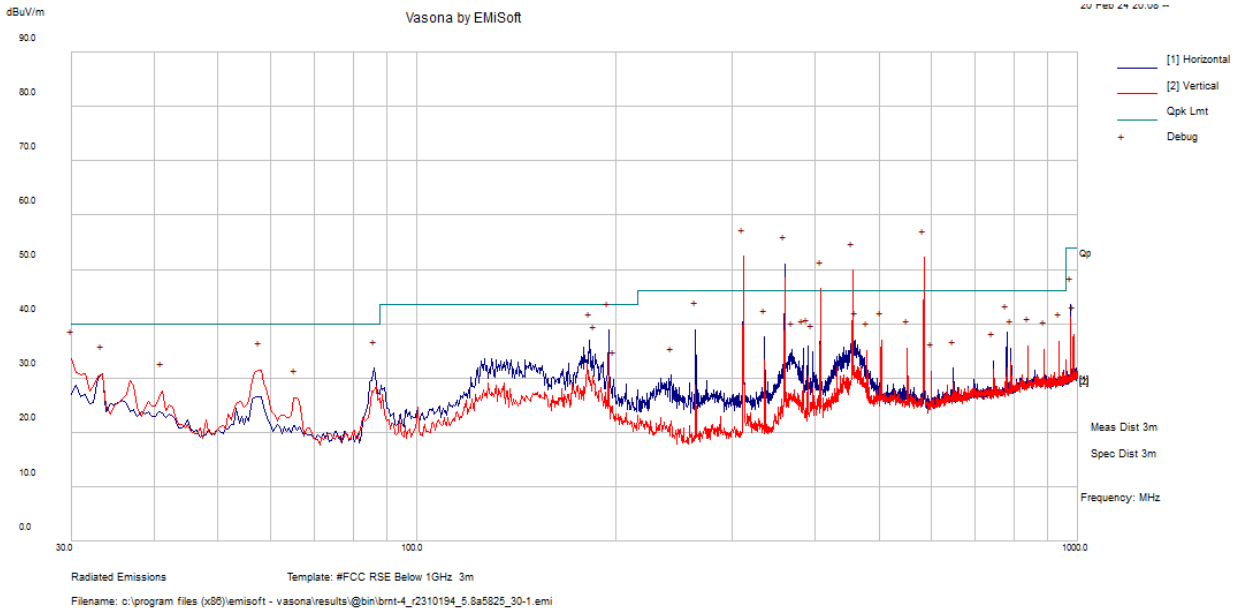
Output Power (dBm)		Leakage Power (dBm)		Delta (dB)		Threshold (dB)
Ant A	**Ant B**	**Ant A**	**Ant B**	**Ant A**	**Ant B**	
802.11a Configuration						
15.42	9.38	-13.80	-18.15	29.22	27.53	26
802.11n20 Configuration						
13.49	7.43	-21.01	-20.37	34.50	27.80	26
802.11n40 Configuration						
11.82	5.91	-24.89	-28.34	36.71	34.25	26
802.11ac80 Configuration						
9.6	4.04	-34.55	-37.84	44.15	48.19	26

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

Note[1]: *All peaks exceeding the limit line in the graph fall out of restricted bands and thus -27dBm limit (FCC 15.407(b)/RSS-247 6.2.1.2) was instead applied. Conversion of limit from [dBm] to [dBµV/m @ 3m]: -27dBm + 95.2 = 68.3 dBµV/m @ 3m.*

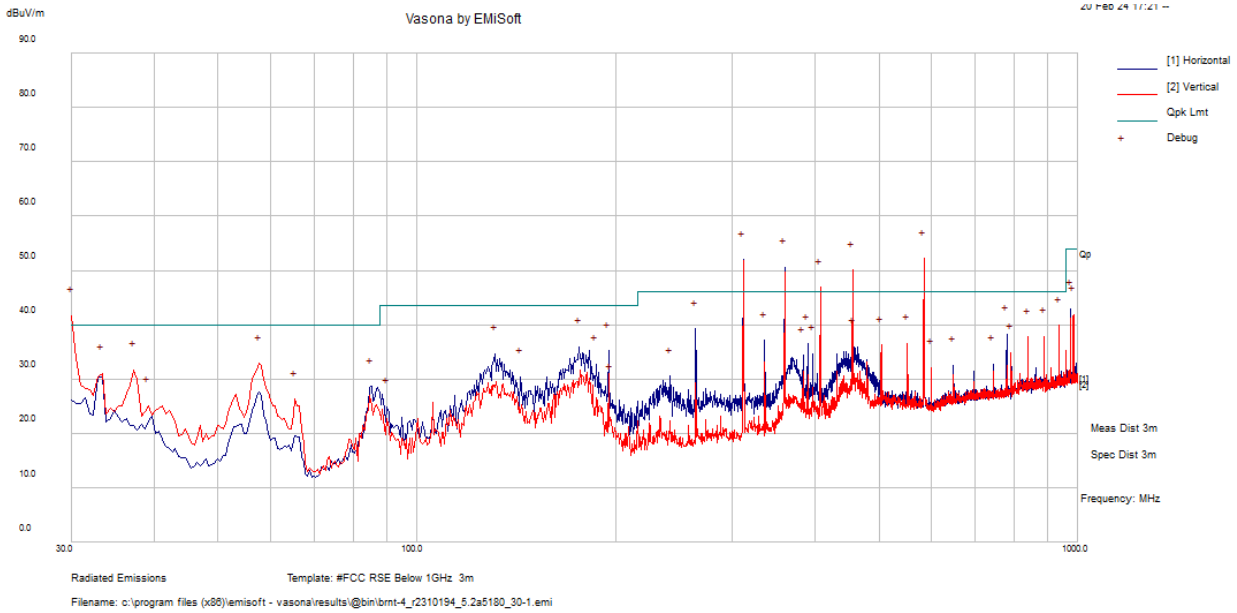
Note: Prescans were performed on all shown configs in order to determine worst-case results. Following this, a formal scan was performed on the worst-case detailed below

Worst Case: U-NII-3, 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)	Comments (PK/QP/Ave.)
311.98825	67.68	-14.93	52.75	168	V	318	68.3	-15.55	QP
585.075	46.79	-8.99	37.8	104	V	41	46	-8.2	QP
359.99275	63.7	-13.51	50.19	100	H	241	68.3	-18.11	QP
455.99025	60.87	-10.91	49.96	101	V	335	68.3	-18.34	QP
408.0515	52.6	-12.63	39.97	112	V	300	46	-6.03	QP
194.982	55.88	-17.14	38.74	103	H	225	43.5	-4.76	QP

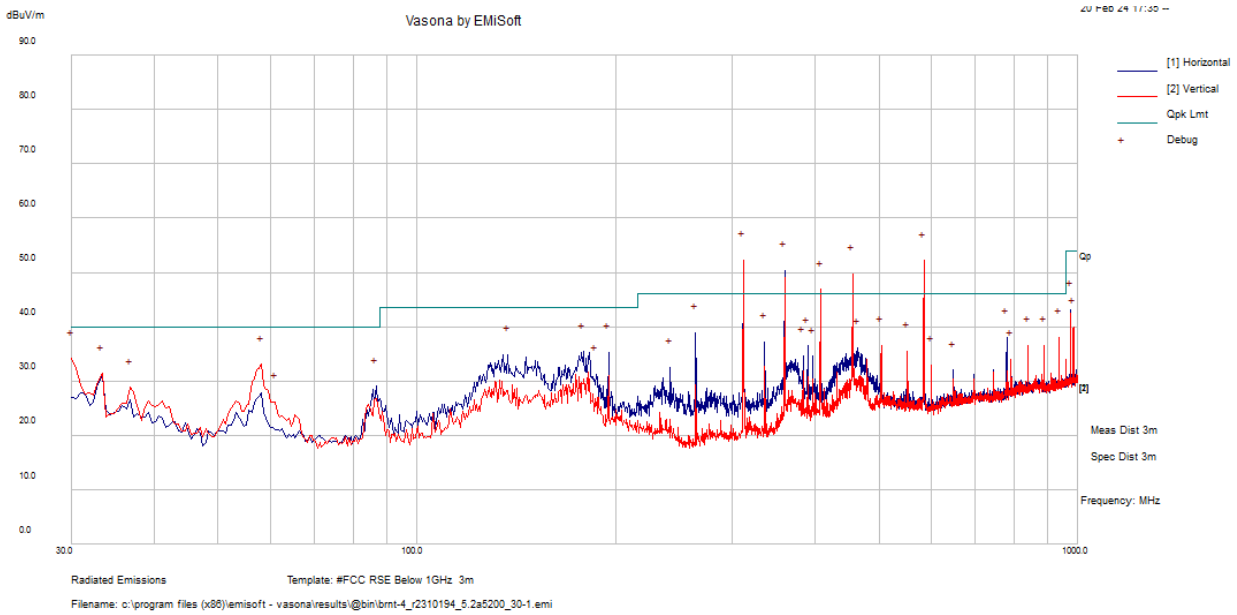
U-NII-1, 802.11a, 5180 MHz



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)	Comments (PK/QP/Ave.)
585.325	61.14	-9	52.14	100	V	360	68.3	-16.16	Peak
311.785	66.89	-14.94	51.95	100	H	360	68.3	-16.35	Peak
359.8	64.14	-13.52	50.62	100	H	360	68.3	-17.68	Peak
455.83	61	-10.92	50.08	100	V	360	68.3	-18.22	Peak
30	51.09	-9.5	41.59	100	V	360	68.3	-26.71	Peak
407.815	59.48	-12.64	46.84	100	V	360	68.3	-21.46	Peak

Note: Peak measurement is compared to the quasi-peak limit.

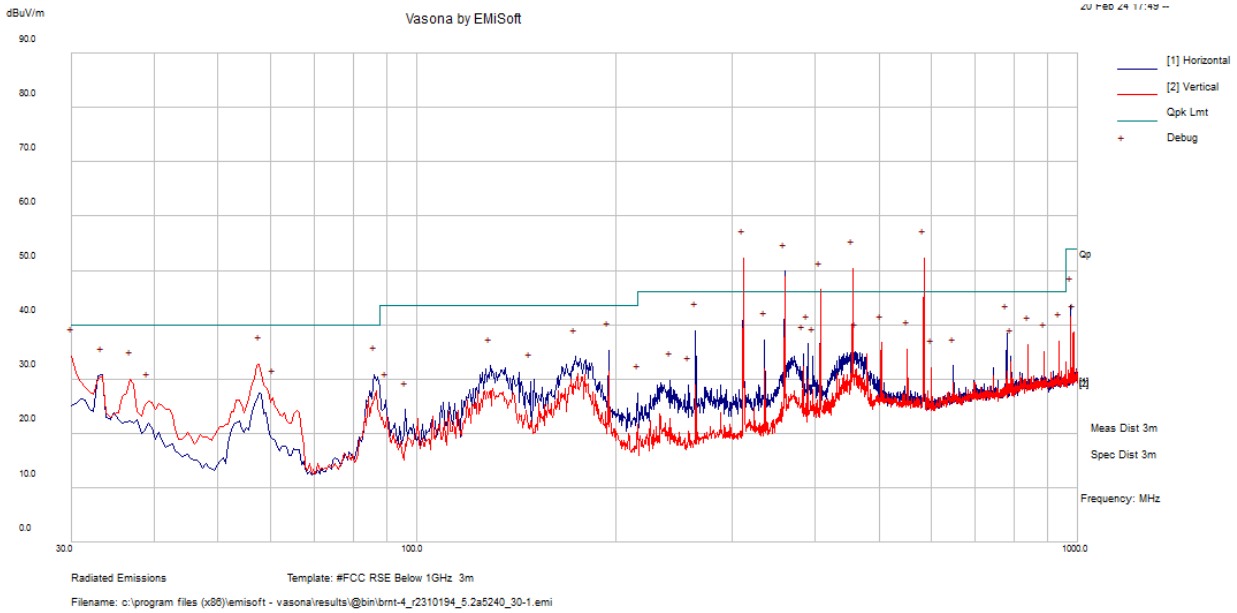
U-NII-1, 802.11a, 5200 MHz



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)	Comments (PK/QP/Ave.)
311.785	67.16	-14.94	52.22	200	V	360	68.3	-16.08	Peak
585.325	61.2	-9	52.2	100	V	360	68.3	-16.1	Peak
359.8	63.87	-13.52	50.35	100	H	360	68.3	-17.95	Peak
455.83	60.71	-10.92	49.79	100	V	360	68.3	-18.51	Peak
408.3	59.49	-12.61	46.88	100	V	360	68.3	-21.42	Peak
30	43.64	-9.5	34.14	100	V	360	40	-5.86	Peak

Note: Peak measurement is compared to the quasi-peak limit.

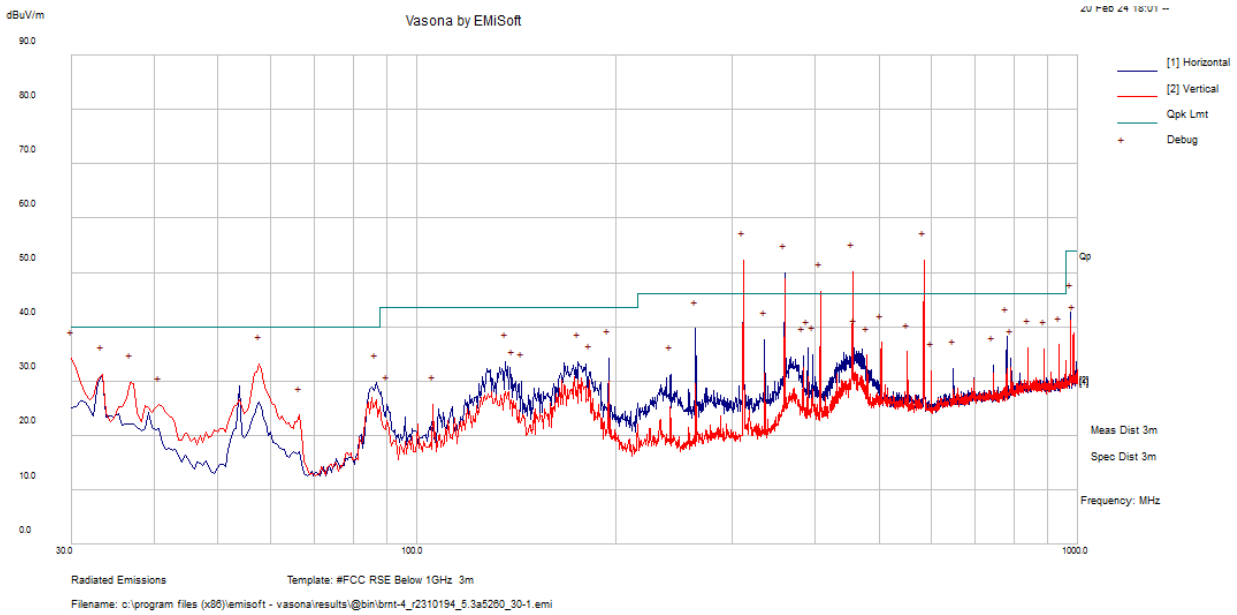
U-NII-1, 802.11a, 5240 MHz



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)	Comments (PK/QP/Ave.)
311.785	67.19	-14.94	52.25	200	V	360	68.3	-16.05	Peak
585.325	61.21	-9	52.21	100	V	360	68.3	-16.09	Peak
455.83	61.33	-10.92	50.41	100	V	360	68.3	-17.89	Peak
359.8	63.35	-13.52	49.83	100	H	360	68.3	-18.47	Peak
407.815	59.05	-12.64	46.41	100	V	360	68.3	-21.89	Peak
30	43.76	-9.5	34.26	100	V	360	40	-5.74	Peak

Note: Peak measurement is compared to the quasi-peak limit.

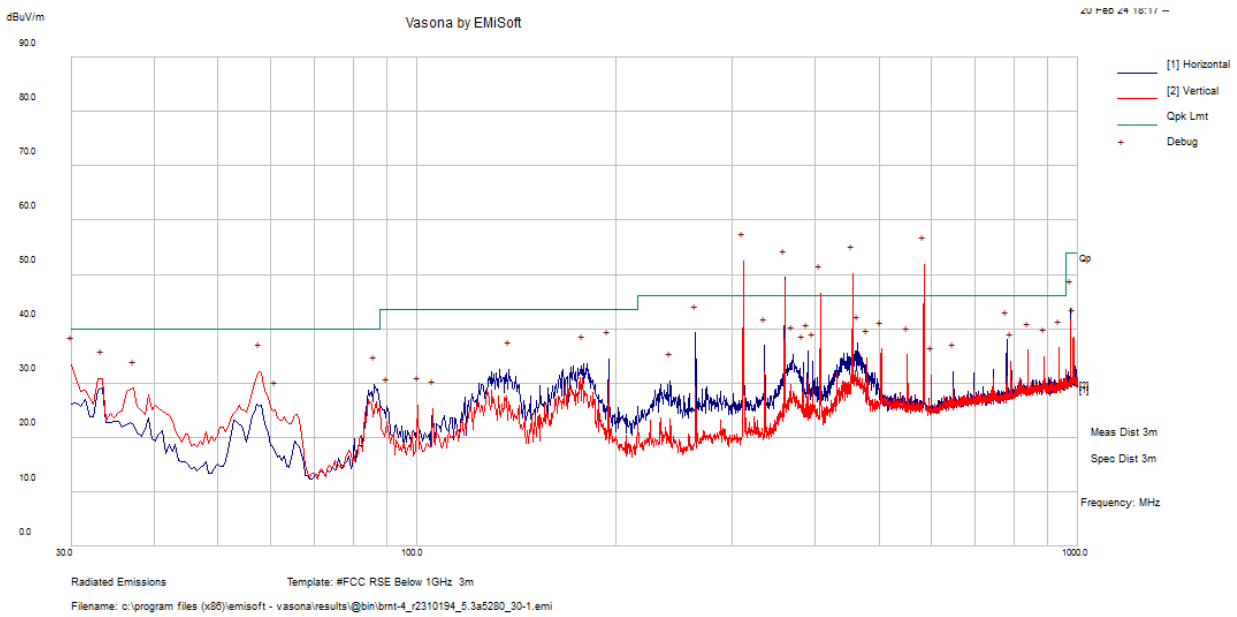
U-NII-2A, 802.11a, 5260 MHz



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)	Comments (PK/QP/Ave.)
585.325	61.3	-9	52.3	100	V	360	68.3	-16	Peak
311.785	67.24	-14.94	52.3	200	V	360	68.3	-16	Peak
455.83	61.12	-10.92	50.2	100	V	360	68.3	-18.1	Peak
359.8	63.51	-13.52	49.99	100	H	360	68.3	-18.31	Peak
407.815	59.13	-12.64	46.49	100	V	360	68.3	-21.81	Peak
30	43.59	-9.5	34.09	100	V	360	40	-5.91	Peak

Note: Peak measurement is compared to the quasi-peak limit.

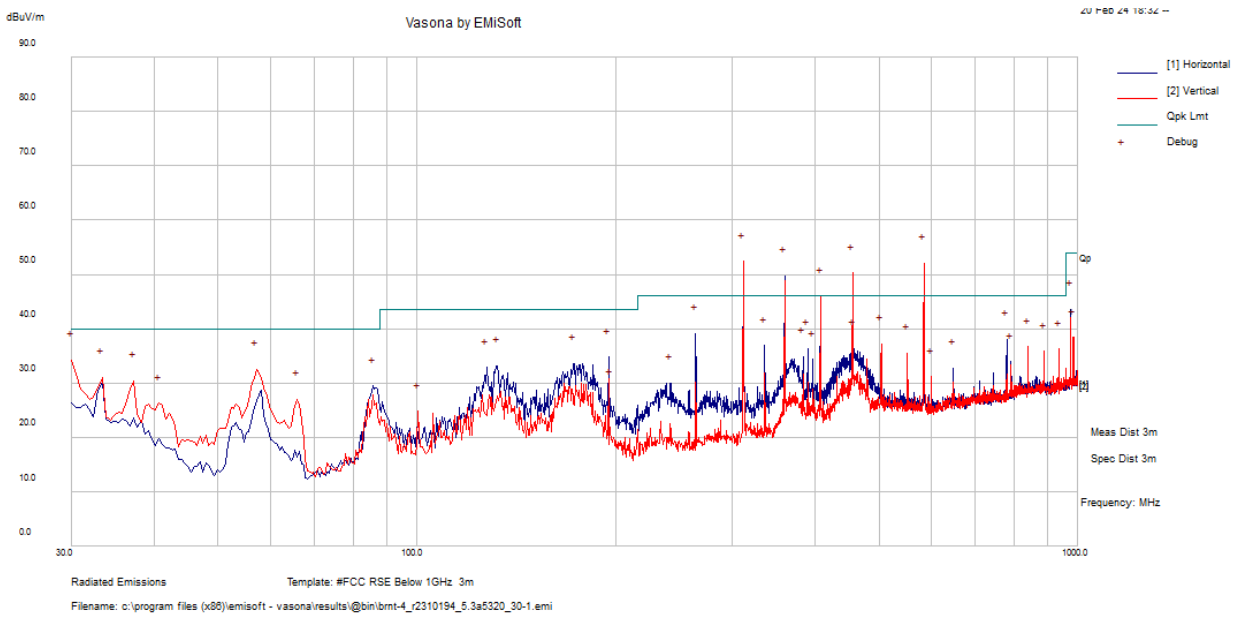
U-NII-2A, 802.11a, 5280 MHz



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)	Comments (PK/QP/Ave.)
311.785	67.45	-14.94	52.51	200	V	360	68.3	-15.79	Peak
585.325	60.88	-9	51.88	100	V	360	68.3	-16.42	Peak
455.83	61.12	-10.92	50.2	100	V	360	68.3	-18.1	Peak
359.8	62.93	-13.52	49.41	100	H	360	68.3	-18.89	Peak
407.815	59.13	-12.64	46.49	100	V	360	68.3	-21.81	Peak
30	42.8	-9.5	33.3	100	V	360	40	-6.7	Peak

Note: Peak measurement is compared to the quasi-peak limit.

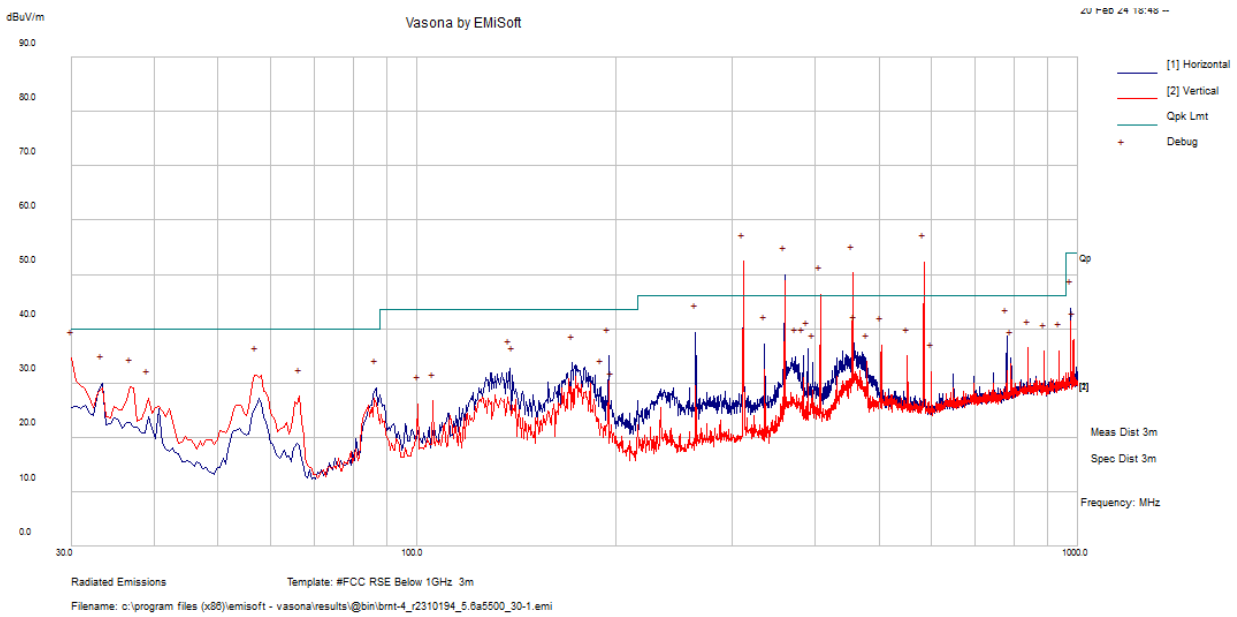
U-NII-2A, 802.11a, 5320 MHz



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)	Comments (PK/QP/Ave.)
311.785	67.29	-14.94	52.35	200	V	360	68.3	-15.95	Peak
585.325	61.12	-9	52.12	100	V	360	68.3	-16.18	Peak
455.83	61.17	-10.92	50.25	100	V	360	68.3	-18.05	Peak
359.8	63.21	-13.52	49.69	100	H	360	68.3	-18.61	Peak
408.3	58.64	-12.61	46.03	100	V	360	68.3	-22.27	Peak
30	43.75	-9.5	34.25	100	V	360	40	-5.75	Peak

Note: Peak measurement is compared to the quasi-peak limit.

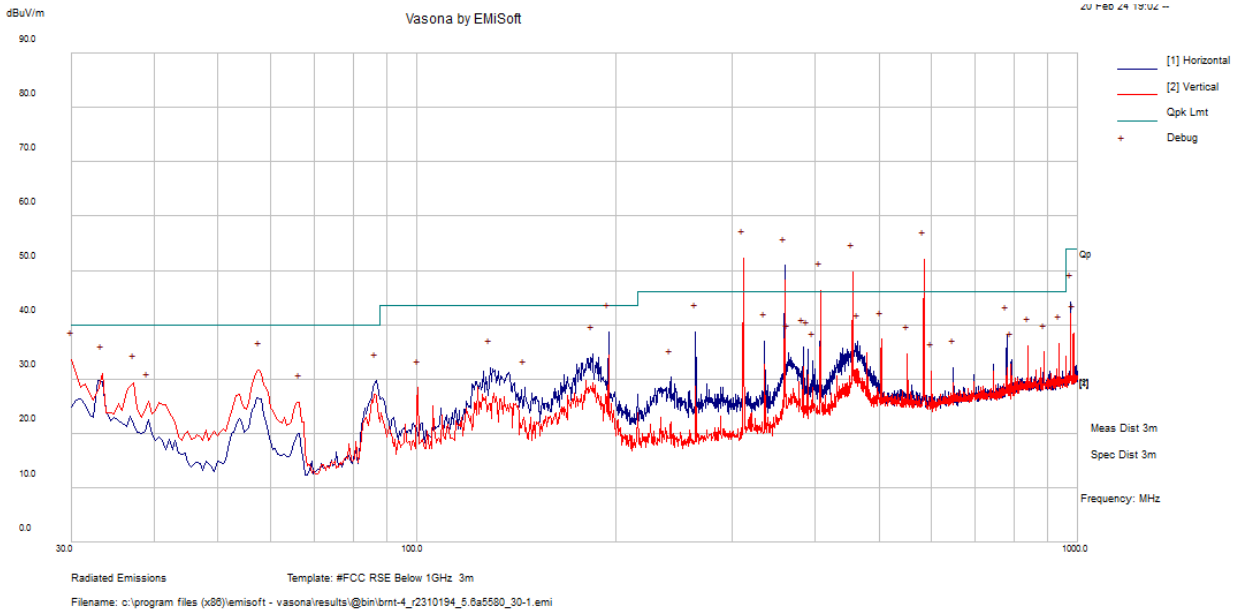
U-NII-2C, 802.11a, 5500 MHz



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)	Comments (PK/QP/Ave.)
311.785	67.33	-14.94	52.39	200	V	360	68.3	-15.91	Peak
585.325	61.34	-9	52.34	100	V	360	68.3	-15.96	Peak
455.83	61.16	-10.92	50.24	100	V	360	68.3	-18.06	Peak
359.8	63.52	-13.52	50	100	H	360	68.3	-18.3	Peak
407.815	58.9	-12.64	46.26	100	V	360	68.3	-22.04	Peak
30	44.01	-9.5	34.51	100	V	360	40	-5.49	Peak

Note: Peak measurement is compared to the quasi-peak limit.

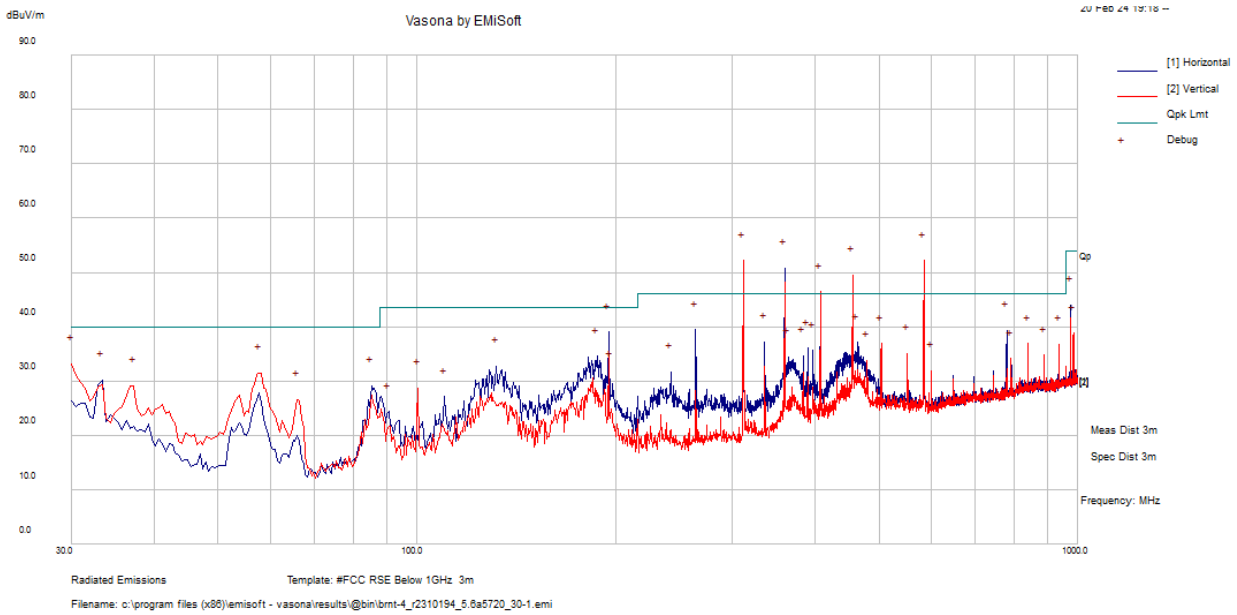
U-NII-2C, 802.11a, 5580 MHz



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)	Comments (PK/QP/Ave.)
311.785	67.23	-14.94	52.29	200	V	360	68.3	-16.01	Peak
585.325	61.12	-9	52.12	100	V	360	68.3	-16.18	Peak
359.8	64.4	-13.52	50.88	100	H	360	68.3	-17.42	Peak
455.83	60.68	-10.92	49.76	100	V	360	68.3	-18.54	Peak
407.815	59.01	-12.64	46.37	100	V	360	68.3	-21.93	Peak
194.9	55.78	-17.16	38.62	100	H	360	43.5	-4.88	Peak

Note: Peak measurement is compared to the quasi-peak limit.

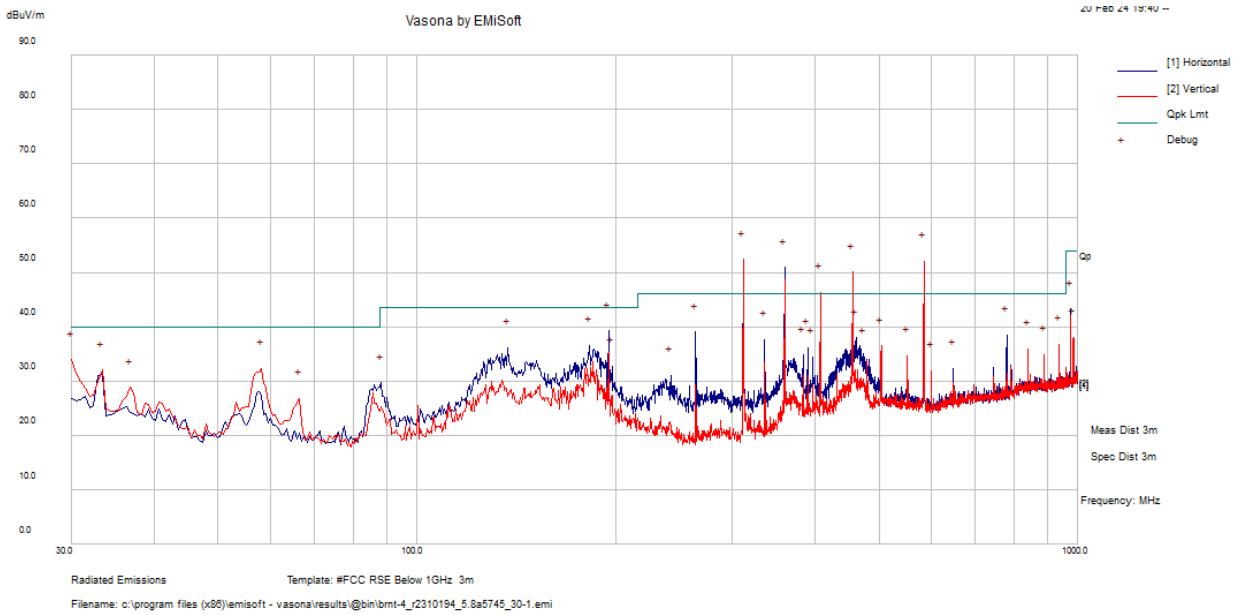
U-NII-2C, 802.11a, 5720 MHz



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)	Comments (PK/QP/Ave.)
311.785	67.14	-14.94	52.2	200	V	360	68.3	-16.1	Peak
585.325	61.15	-9	52.15	100	V	360	68.3	-16.15	Peak
359.8	64.28	-13.52	50.76	100	H	360	68.3	-17.54	Peak
455.83	60.42	-10.92	49.5	100	V	360	68.3	-18.8	Peak
407.815	59.09	-12.64	46.45	100	V	360	68.3	-21.85	Peak
194.9	56.18	-17.16	39.02	100	H	360	43.5	-4.48	Peak

Note: Peak measurement is compared to the quasi-peak limit.

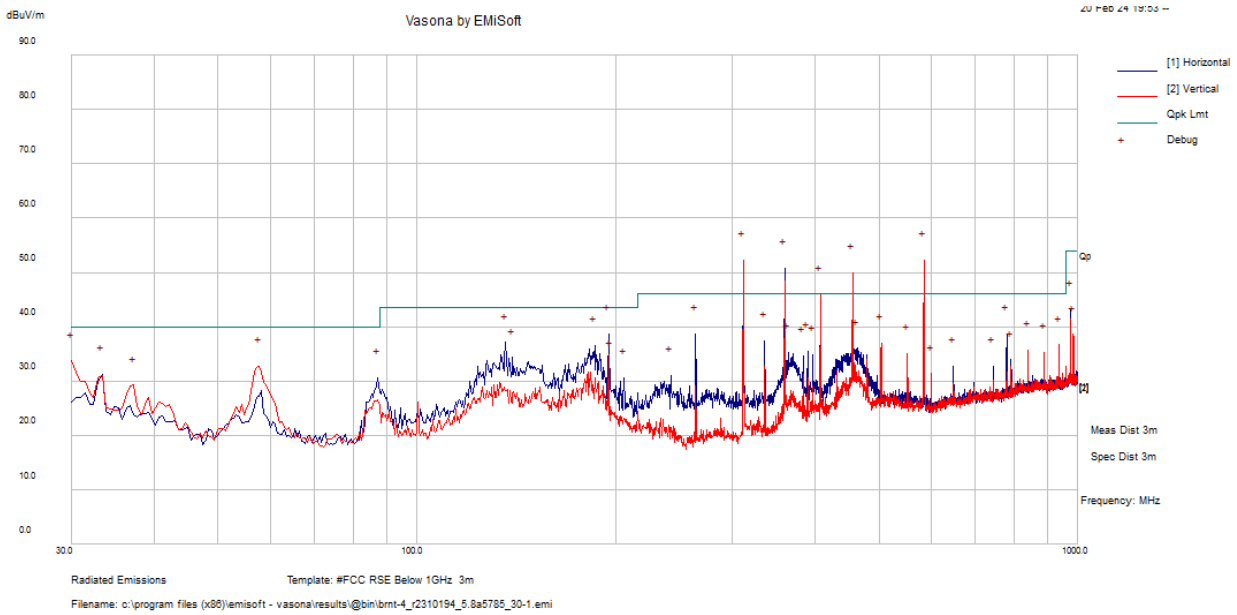
U-NII-3, 802.11a, 5745 MHz



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)	Comments (PK/QP/Ave.)
311.785	67.29	-14.94	52.35	200	V	360	68.3	-15.95	Peak
585.325	61.09	-9	52.09	100	V	360	68.3	-16.21	Peak
359.8	64.39	-13.52	50.87	100	H	360	68.3	-17.43	Peak
455.83	60.99	-10.92	50.07	100	V	360	68.3	-18.23	Peak
407.815	58.93	-12.64	46.29	100	V	360	68.3	-22.01	Peak
194.9	56.39	-17.16	39.23	100	H	360	43.5	-4.27	Peak

Note: Peak measurement is compared to the quasi-peak limit.

U-NII-3, 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)	Comments (PK/QP/Ave.)
311.785	67.28	-14.94	52.34	200	V	360	68.3	-15.96	Peak
585.325	61.22	-9	52.22	100	V	360	68.3	-16.08	Peak
359.8	64.36	-13.52	50.84	100	H	360	68.3	-17.46	Peak
455.83	60.83	-10.92	49.91	100	V	360	68.3	-18.39	Peak
407.815	58.64	-12.64	46	100	V	360	68.3	-22.3	Peak
194.9	55.86	-17.16	38.7	100	H	360	43.5	-4.8	Peak

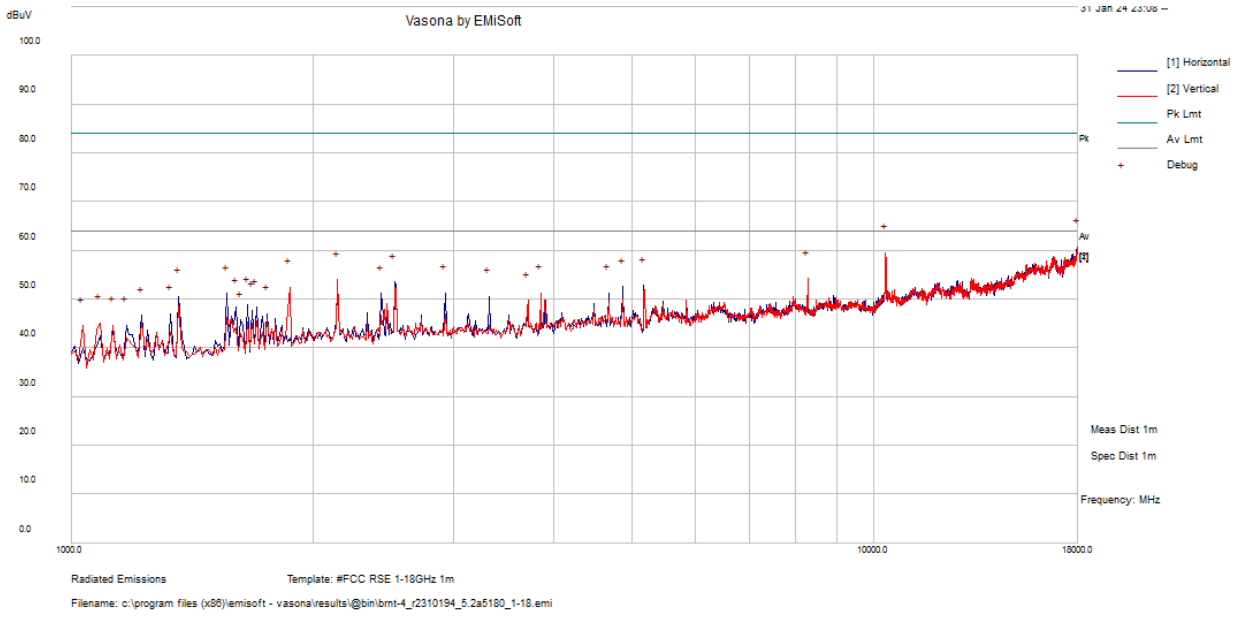
Note: Peak measurement is compared to the quasi-peak limit.

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

FCC/IC Limits for 1 GHz to 40 GHz				
Applicablity	**(dBm)**	**(uV/m at 3meters)**	**(dBuV/m at 3meters)**	**(dBuV/m at 1meter)[2]**
Restricted Band Average Limit	-	500	54	63.54
Restricted Band Peak Limit[1]	-	-	74	83.54
FCC §15.407(b) & ISEDC RSS-247 §6.2 Defined Unwanted Emissions Limit	-27	-	68.2	77.74

Note[1]: Restricted Band Peak Limit is defined to be 20dB higher than Average Limit.
Note[2]: Limits at 1 meter are determined by applying a Distance correction factor accounts for extrapolation from 1 meters to 3 meters. Formula used is as follows: 20*log(3meters/1meter) = 9.54 (According to ANSI C63.10-2013 Section 9.4). i.e. 54[dBuV/m at 3m] + 9.54dB = 63.54[dBuV/m at 1m]
Note[3]: Where Restricted Band Peak Limit is replaced with stricter 78 dBµV/m at 1 meter, compliance is being shown for unwmated emissions per FCC §15.407(b) & ISEDC RSS-247 §6.2
Note: dBuV/m = 20*log(V/m) + 120. Thus 20*log((500[uV/m]/1000000))+120=54[dBuV/m]
Note: Per ANSI C63.10-2013 Section 12.7.2: E[dBuV/m] = EIRP[dBm] + 95.2, for d = 3meters. Thus -27dBm + 95.2dB = 68.2dBuV/m at 3meters.

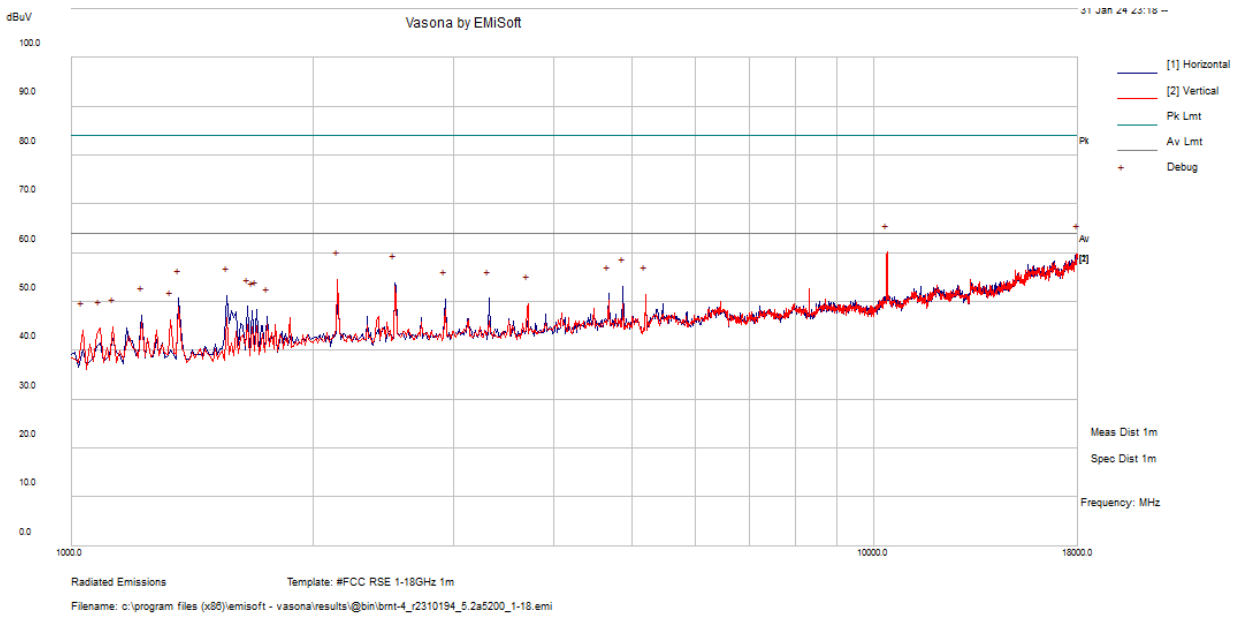
U-NII-1, 802.11a, 5180 MHz



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)	Comments (PK/QP/Ave.)
17978.75	45.45	15.2	60.65	V	200	360	63.54	-2.89	Peak

Note: Peak measurement is compared to the average limit.

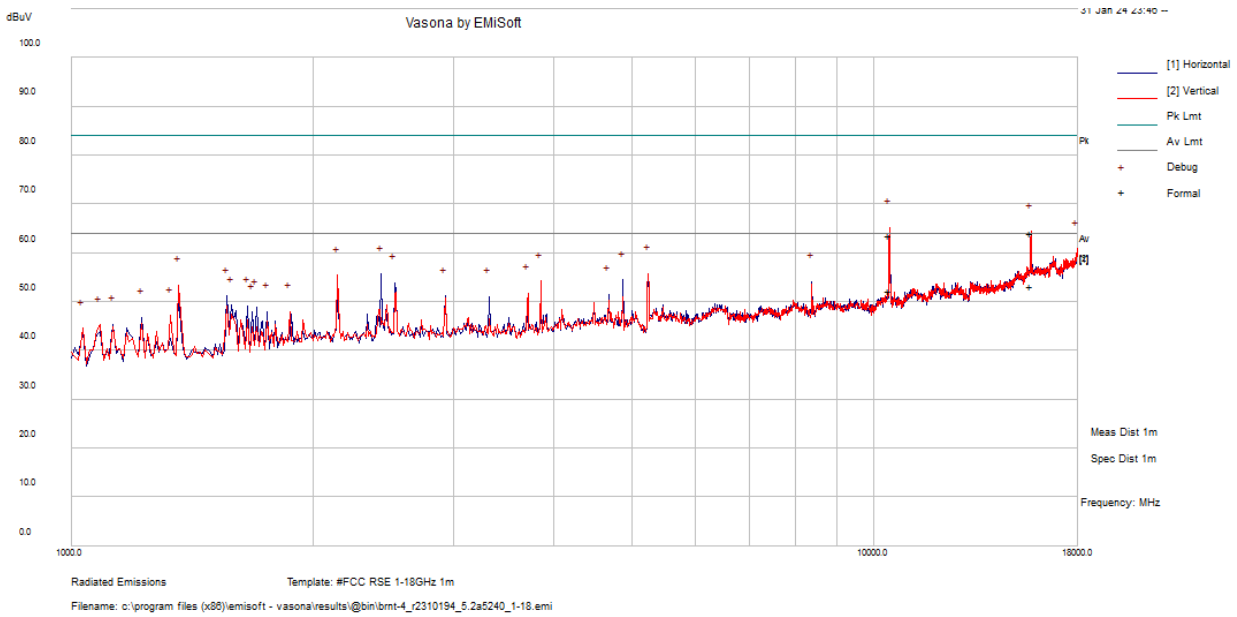
U-NII-1, 802.11a, 5200 MHz



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)	Comments (PK/QP/Ave.)
10403.125	55.57	4.48	60.05	V	200	360	63.54	-3.49	Peak

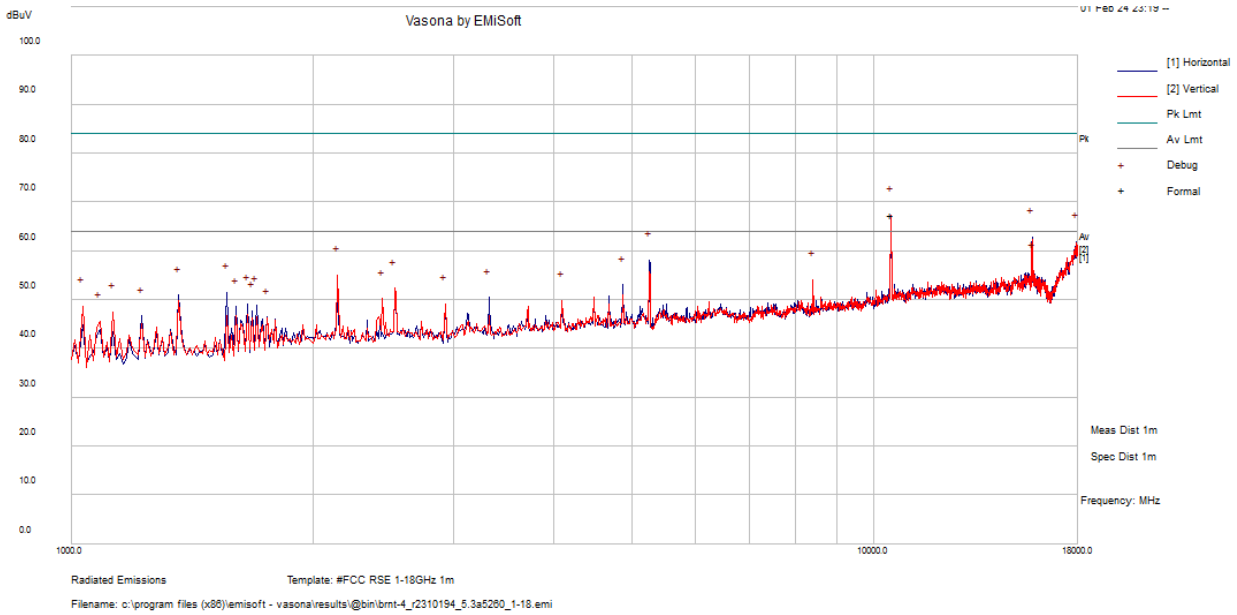
Note: Peak measurement is compared to the average limit.

U-NII-1, 802.11a, 5240 MHz



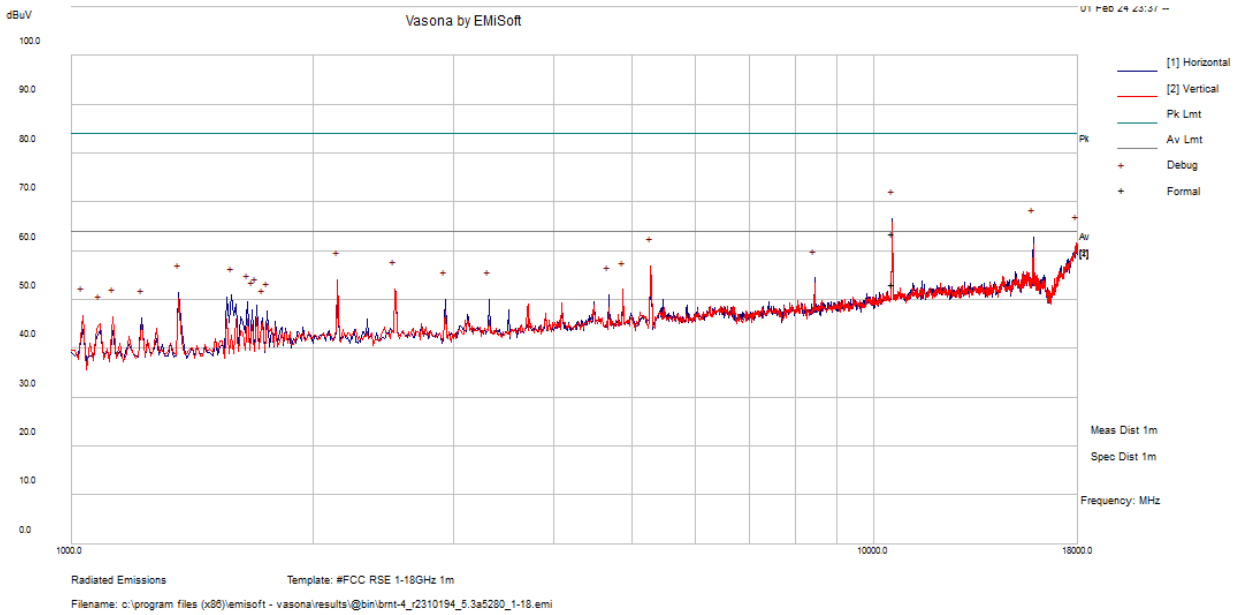
Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Ant. Polarity (H/V)	Ant. Height (cm)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Detector (Peak /Ave.)
10478.51	58.64	4.81	63.45	V	130	298	83.54	-20.09	Peak
10478.51	47.39	4.81	52.2	V	130	298	63.54	-11.34	Ave
15724.673	53.57	10.49	64.06	V	137	332	83.54	-19.48	Peak
15724.673	42.57	10.49	53.06	V	137	332	63.54	-10.48	Ave

U-NII-2A, 802.11a, 5260 MHz



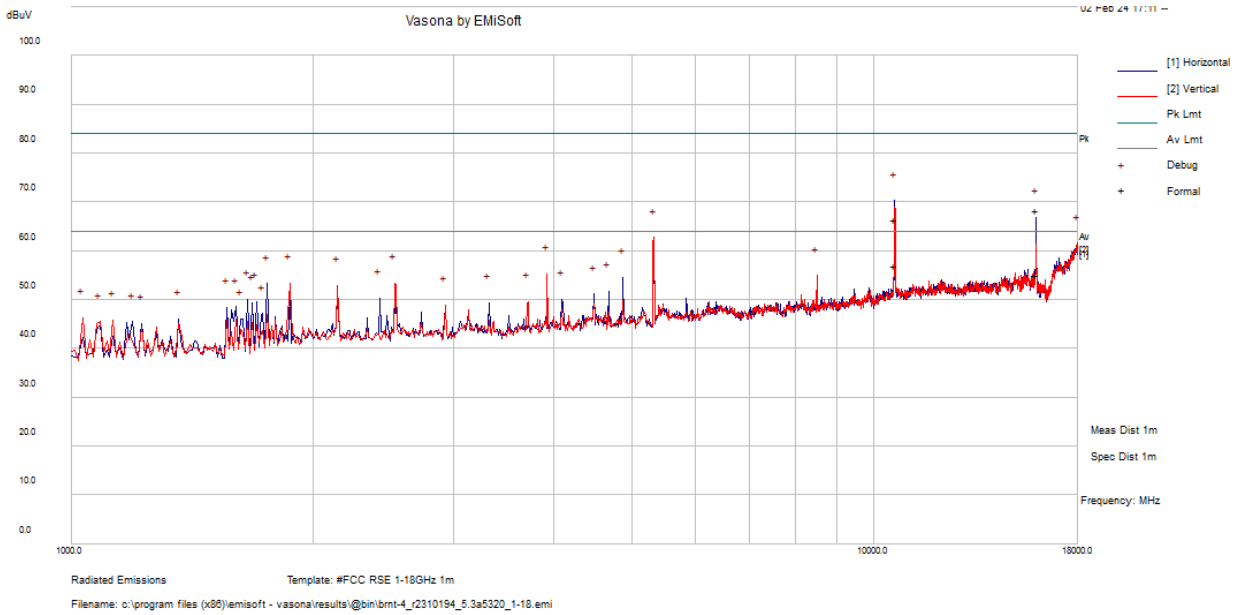
Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Ant. Polarity (H/V)	Ant. Height (cm)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Detector (Peak /Ave.)
10522	59.47	4.95	64.42	V	140	39	83.54	-19.12	Peak
10522	48.9	4.95	53.85	V	140	39	63.54	-9.69	Ave

U-NII-2A, 802.11a, 5280 MHz



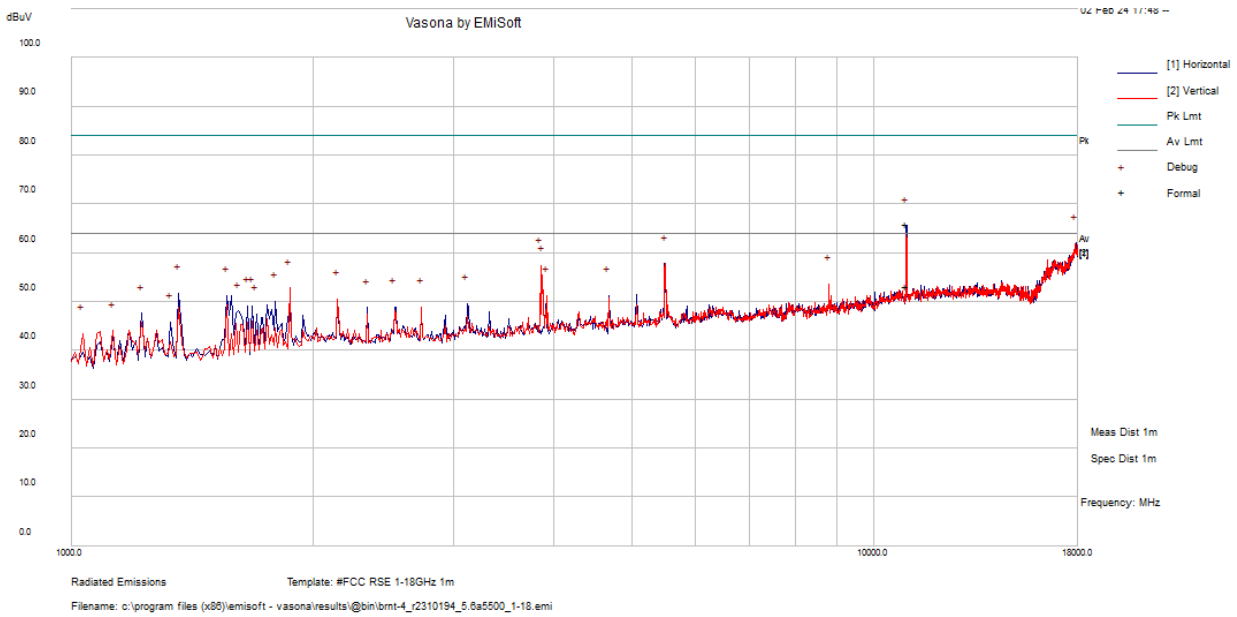
Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Ant. Polarity (H/V)	Ant. Height (cm)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Detector (Peak /Ave.)
10562.133	58.38	5.07	63.45	H	173	331	83.54	-20.09	Peak
10562.133	48.12	5.07	53.19	H	173	331	63.54	-10.35	Ave

U-NII-2A, 802.11a, 5320 MHz



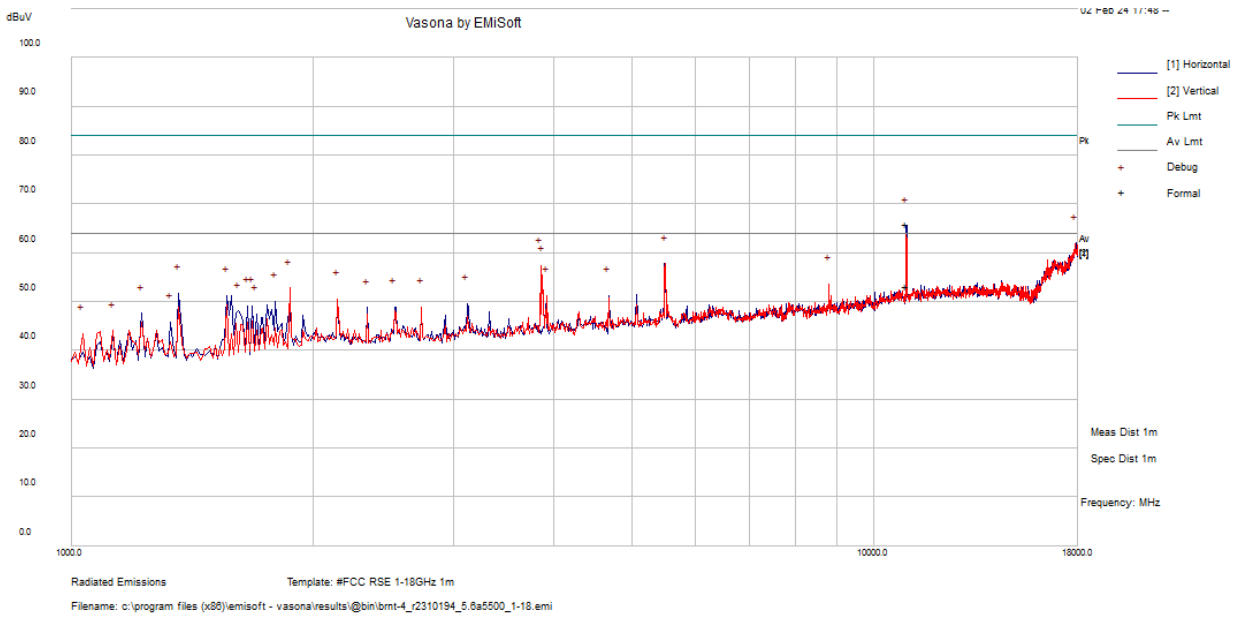
Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Ant. Polarity (H/V)	Ant. Height (cm)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Detector (Peak /Ave.)
10638.778	61.2	5.19	66.39	H	181	7	83.54	-17.15	Peak
10638.778	51.8	5.19	56.99	H	181	7	63.54	-6.55	Ave
15970.788	57.67	10.59	68.26	H	201	352	83.54	-15.28	Peak
15970.788	44.49	10.59	55.08	H	201	352	63.54	-8.46	Ave

U-NII-2C, 802.11a, 5500 MHz



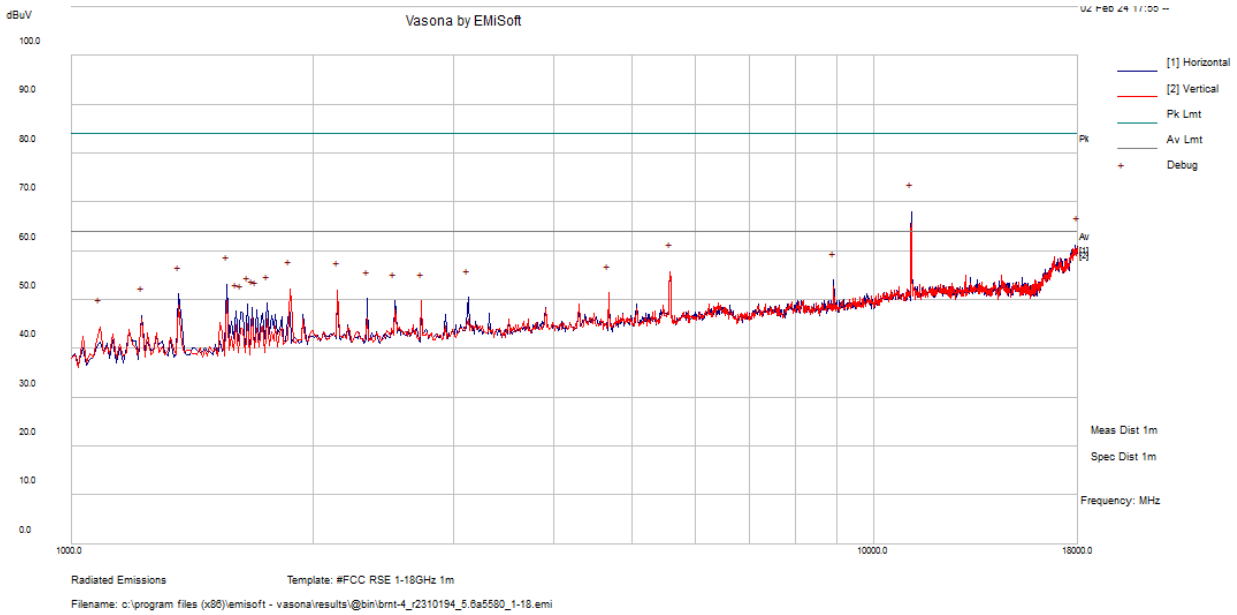
Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Ant. Polarity (H/V)	Ant. Height (cm)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Detector (Peak /Ave.)
10996.398	60.7	5.23	65.93	H	104	338	83.54	-17.61	Peak
10996.398	48.02	5.23	53.25	H	104	338	63.54	-10.29	Ave

U-NII-2C, 802.11a, 5500 MHz



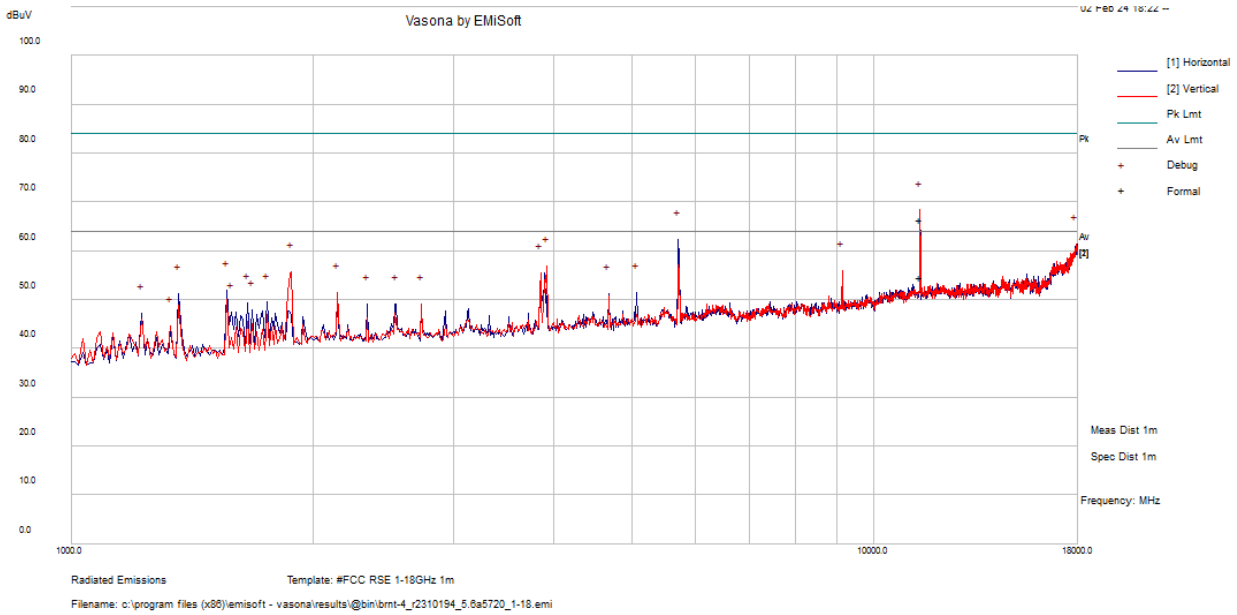
Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Ant. Polarity (H/V)	Ant. Height (cm)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Detector (Peak /Ave.)
10996.398	60.7	5.23	65.93	H	104	338	83.54	-17.61	Peak
10996.398	48.02	5.23	53.25	H	104	338	63.54	-10.29	Ave

U-NII-2C, 802.11a, 5580 MHz



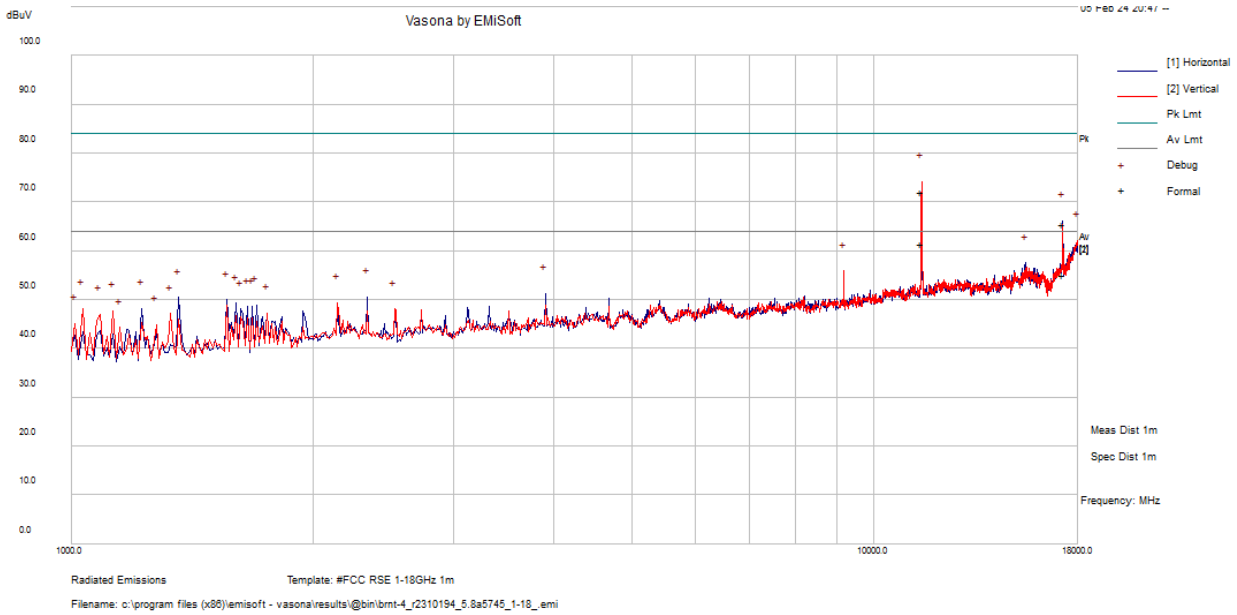
Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Ant. Polarity (H/V)	Ant. Height (cm)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Detector (Peak /Ave.)
11156.34	58.97	5.69	64.66	H	177	317	83.54	-18.88	Peak
11156.34	46.21	5.69	51.9	H	177	317	63.54	-11.64	Ave

U-NII-2C, 802.11a, 5720 MHz



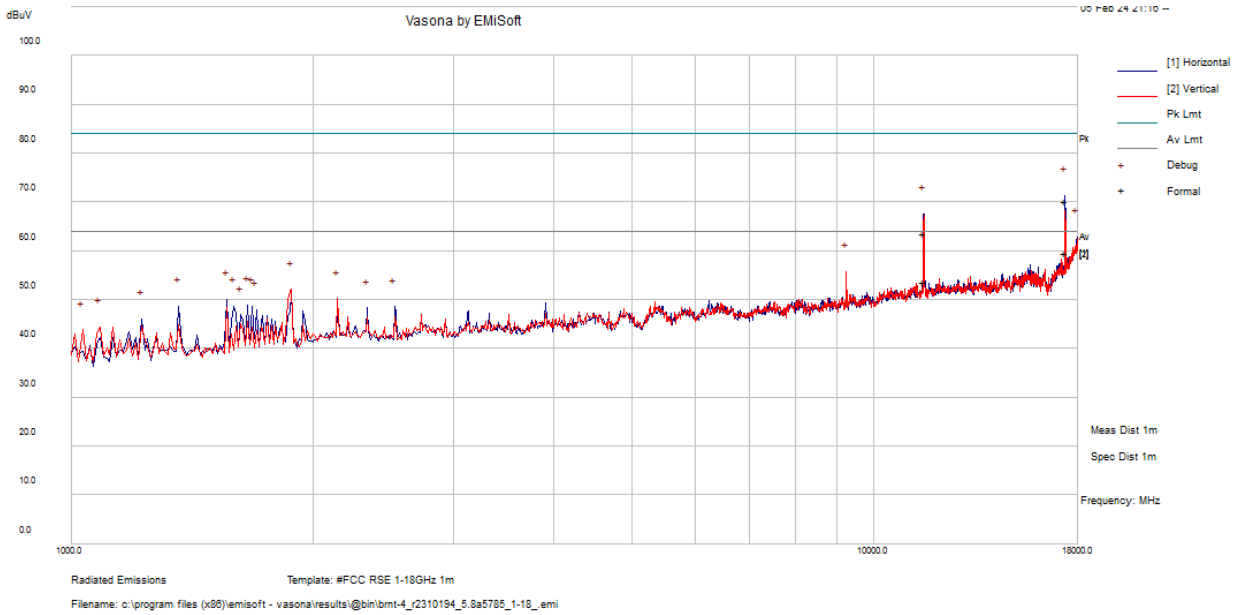
Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Ant. Polarity (H/V)	Ant. Height (cm)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Detector (Peak /Ave.)
11435.723	60.35	6.03	66.38	V	104	328	83.54	-17.16	Peak
11435.723	48.66	6.03	54.69	V	104	328	63.54	-8.85	Ave

U-NII-3, 802.11a, 5745 MHz



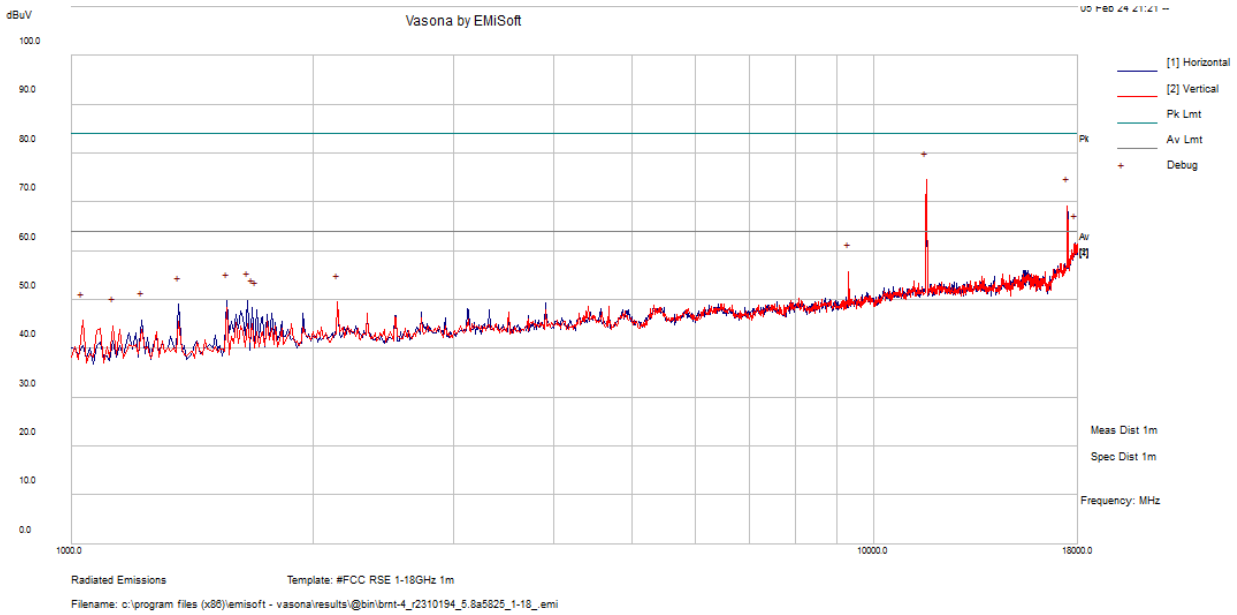
Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Ant. Polarity (H/V)	Ant. Height (cm)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Detector (Peak /Ave.)
11496.218	66.02	6.07	72.09	V	181	337	83.54	-11.45	Peak
11496.218	55.46	6.07	61.53	V	181	337	63.54	-2.01	Ave.
17234.618	53.5	11.91	65.41	H	248	28	83.54	-18.13	Peak
17234.618	43.24	11.91	55.15	H	248	28	63.54	-8.39	Ave.

U-NII-3, 802.11a, 5785 MHz



Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Ant. Polarity (H/V)	Ant. Height (cm)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Detector (Peak /Ave.)
17352.955	58.55	11.67	70.22	H	211	352	83.54	-13.32	Peak
17352.955	47.79	11.67	59.46	H	211	352	63.54	-4.08	Ave.
11569.968	57.49	6.05	63.54	H	205	271	83.54	-20	Peak
11569.968	47.58	6.05	53.63	H	205	271	63.54	-9.91	Ave.

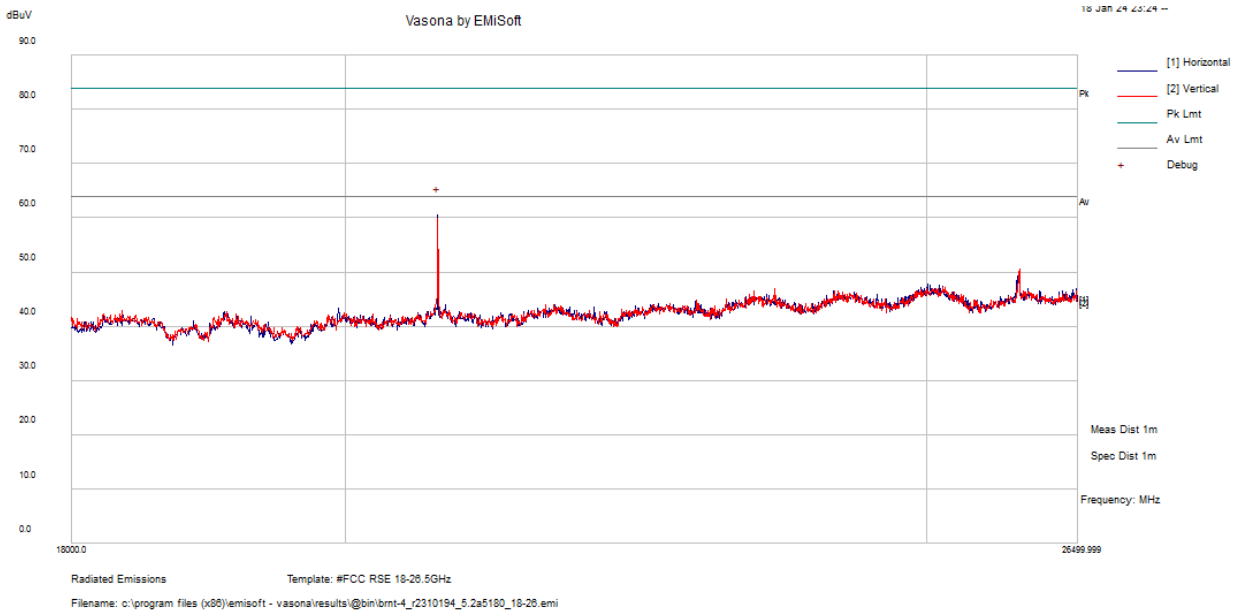
U-NII-3, 802.11a, 5825 MHz



Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Ant. Polarity (H/V)	Ant. Height (cm)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Detector (Peak /Ave.)
11648.23	68.22	6.1	74.32	V	190	335	83.54	-9.22	Peak
11648.23	56.69	6.1	62.79	V	190	335	63.54	-0.75	Ave.
17467.698	53.49	12	65.49	V	190	343	83.54	-18.05	Peak
17467.698	41.03	12	53.03	V	190	343	63.54	-10.51	Ave.

3) 18-26.5 GHz Worst Case, Measured at 1 meter

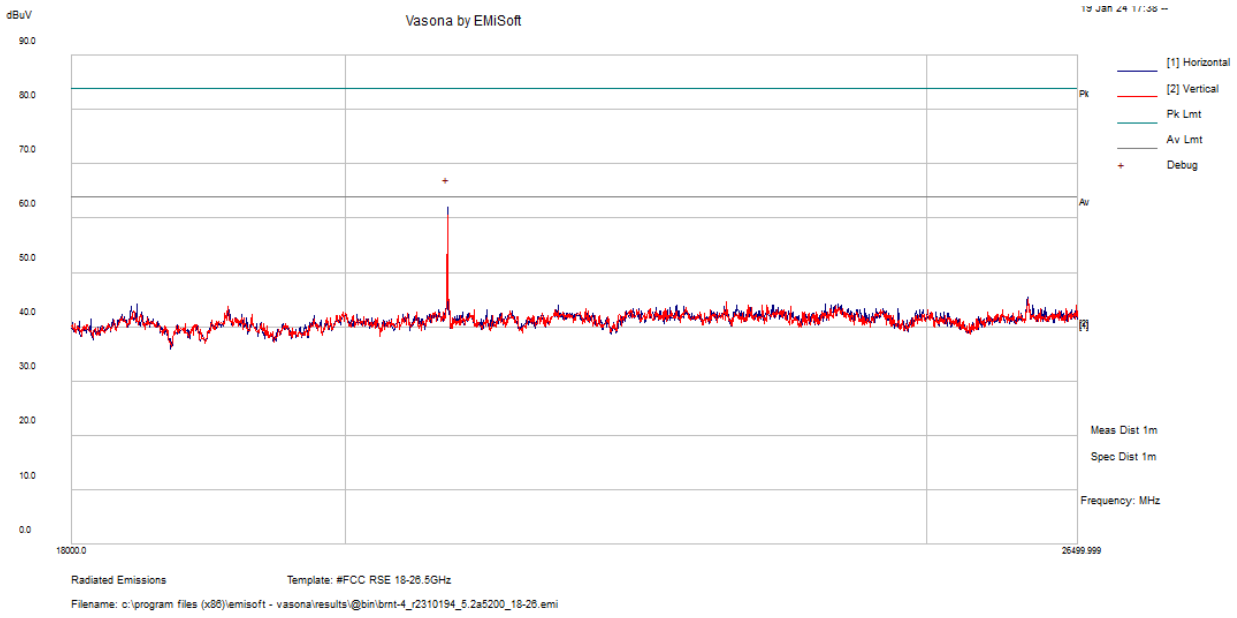
U-NII-1, 802.11a, 5180 MHz



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)	Comments (PK/QP/Ave.)
20720	57.56	2.91	60.47	H	200	360	63.54	-3.07	Peak

Note: Peak measurement is compared to the average limit.

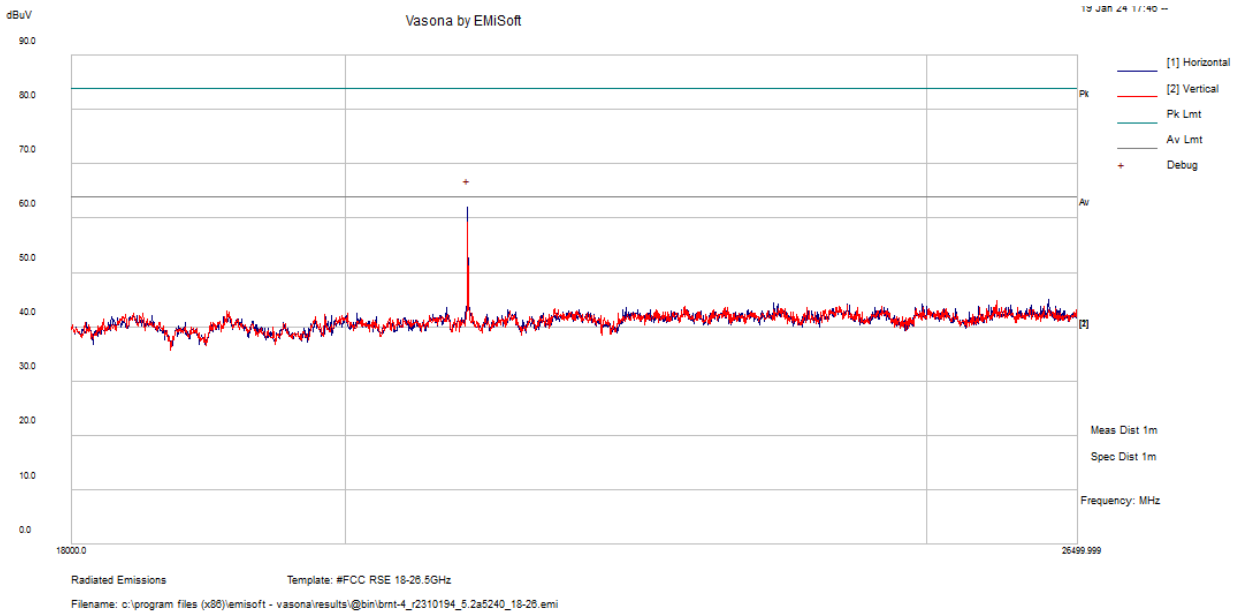
U-NII-1, 802.11a, 5200 MHz



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)	Comments (PK/QP/Ave.)
20799.687	59.20	2.90	62.1	H	200	360	63.54	-1.44	Peak

Note: Peak measurement is compared to the average limit.

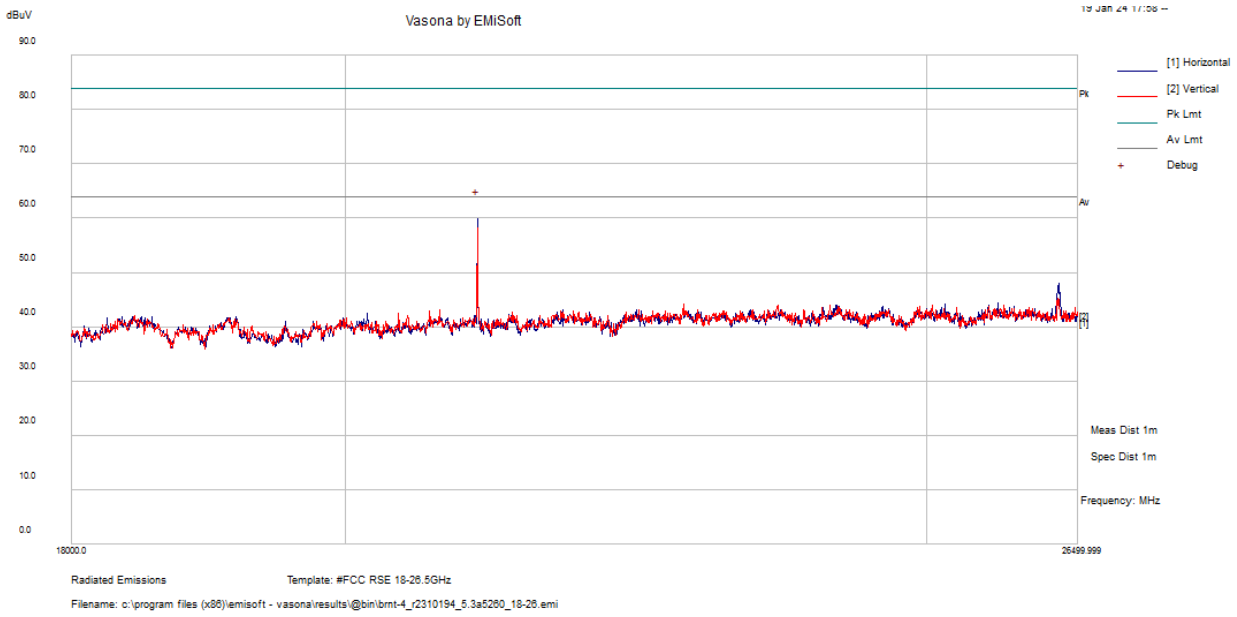
U-NII-1, 802.11a, 5240 MHz



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)	Comments (PK/QP/Ave.)
20959.062	59.23	2.73	61.96	H	200	360	63.54	-1.58	Peak

Note: Peak measurement is compared to the average limit.

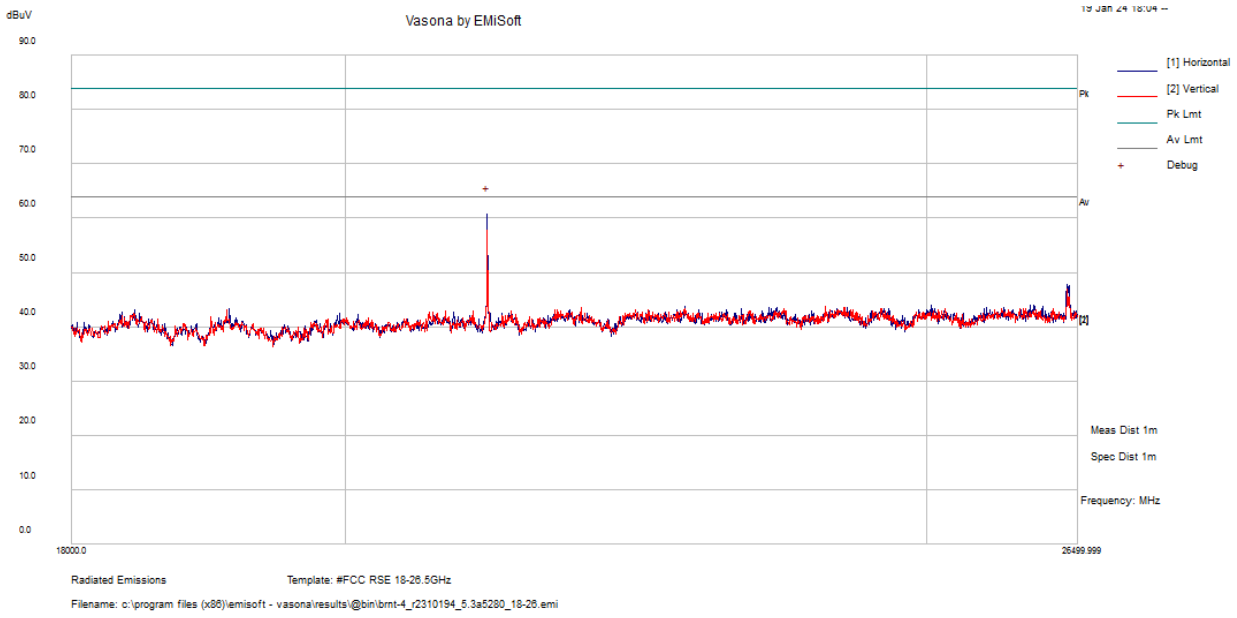
U-NII-2A, 802.11a, 5260 MHz



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)	Comments (PK/QP/Ave.)
21038.75	57.23	2.64	59.87	H	200	360	63.54	-3.67	Peak

Note: Peak measurement is compared to the average limit.

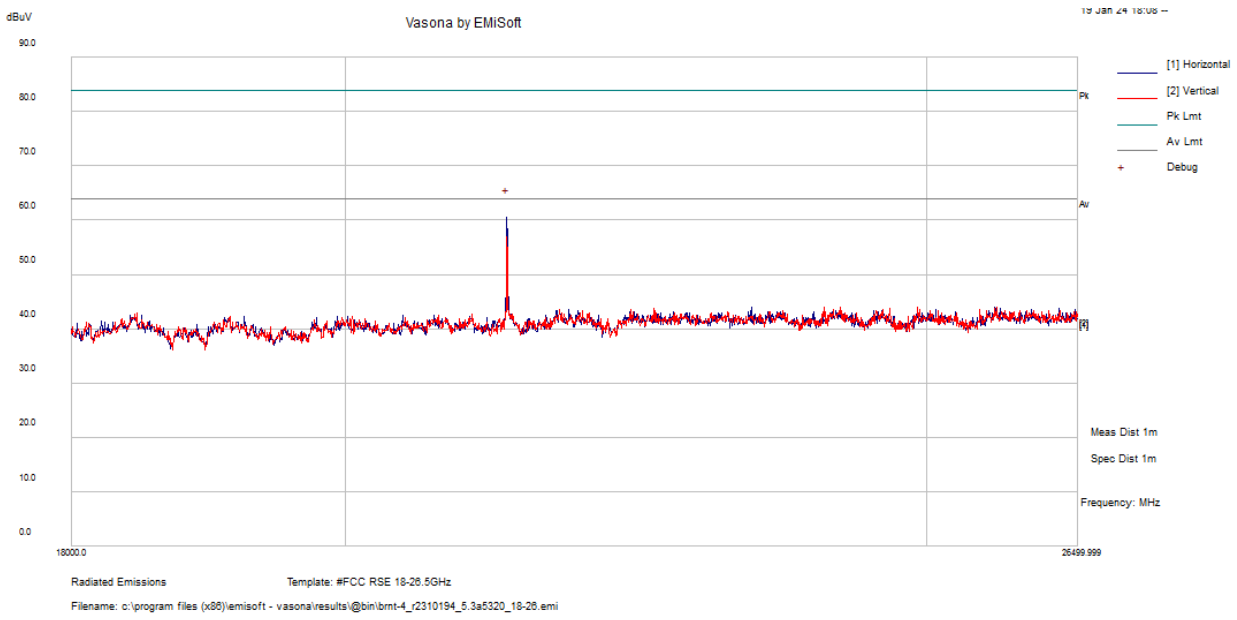
U-NII-2A, 802.11a, 5280 MHz



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)	Comments (PK/QP/Ave.)
21118.437	58.00	2.65	60.65	H	200	360	63.54	-2.89	Peak

Note: Peak measurement is compared to the average limit.

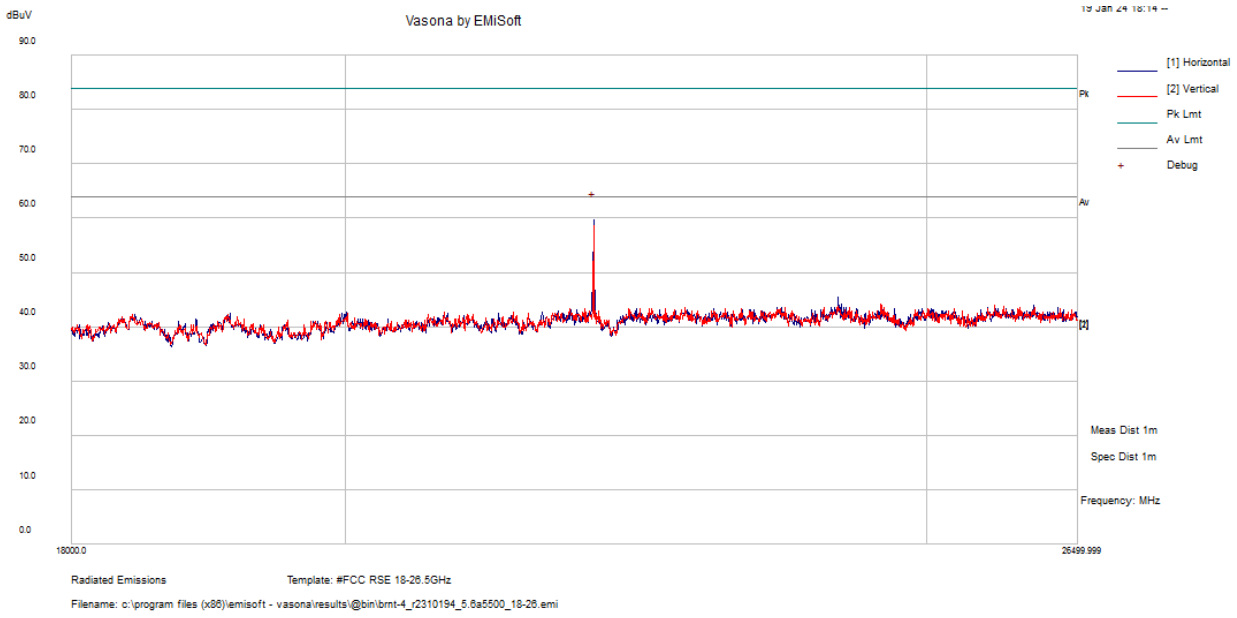
U-NII-2A, 802.11a, 5320 MHz



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)	Comments (PK/QP/Ave.)
21277.812	57.48	3.03	60.51	H	200	360	63.54	-3.03	Peak

Note: Peak measurement is compared to the average limit.

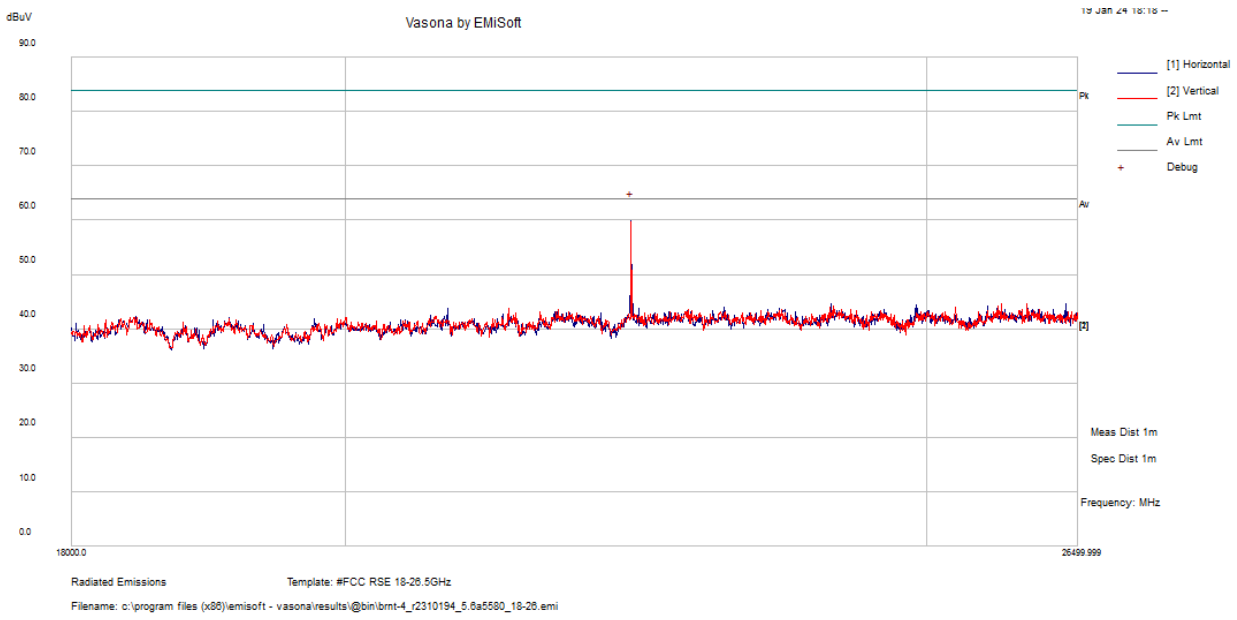
U-NII-2C, 802.11a, 5500 MHz



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)	Comments (PK/QP/Ave.)
22000.312	55.81	3.81	59.62	H	200	360	63.54	-3.92	Peak

Note: Peak measurement is compared to the average limit.

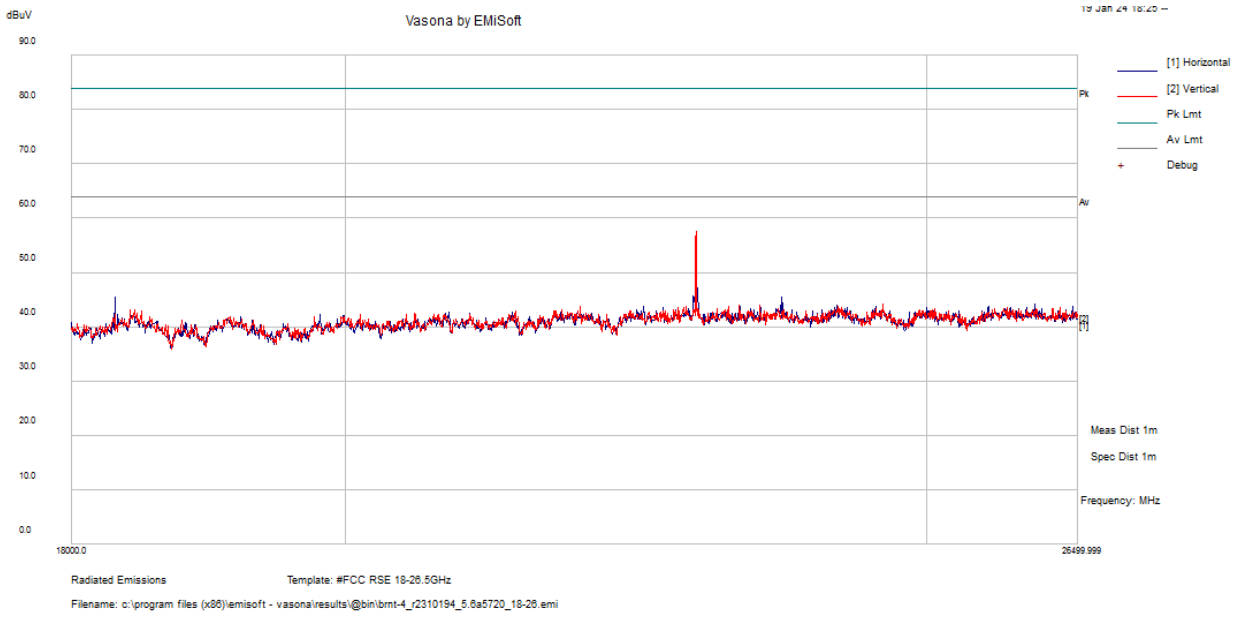
U-NII-2C, 802.11a, 5580 MHz



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)	Comments (PK/QP/Ave.)
22319.062	55.39	4.51	59.9	H	200	360	63.54	-3.64	Peak

Note: Peak measurement is compared to the average limit.

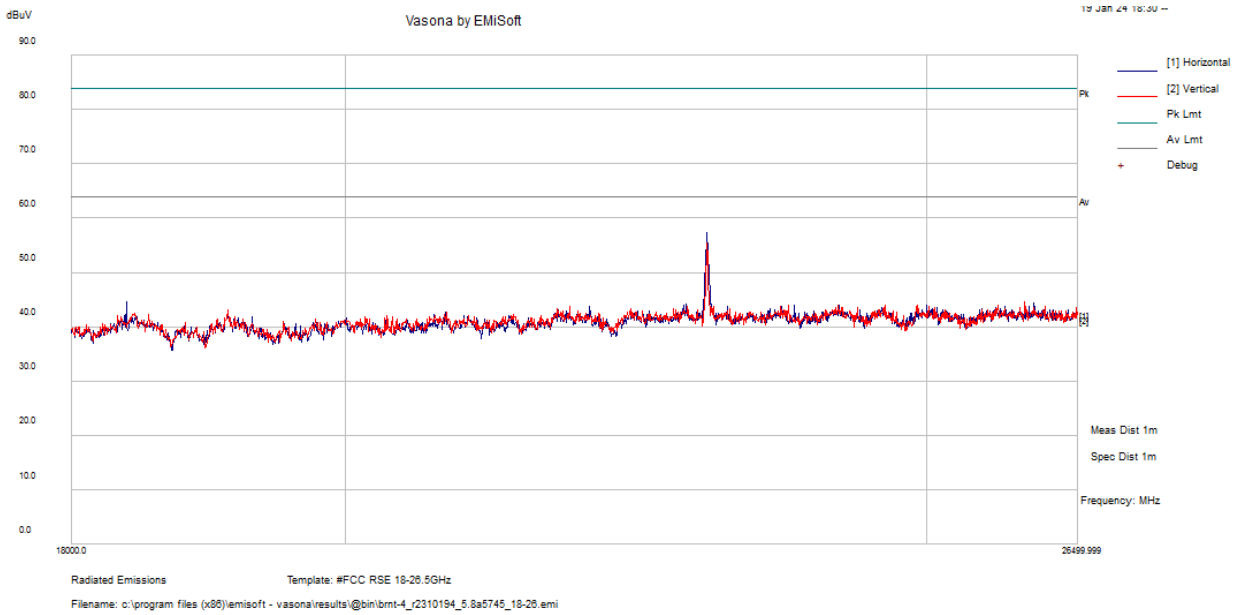
U-NII-2C, 802.11a, 5720 MHz



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)	Comments (PK/QP/Ave.)
22882.309	52.00	5.24	57.24	H	200	360	63.54	-6.3	Peak

Note: Peak measurement is compared to the average limit.

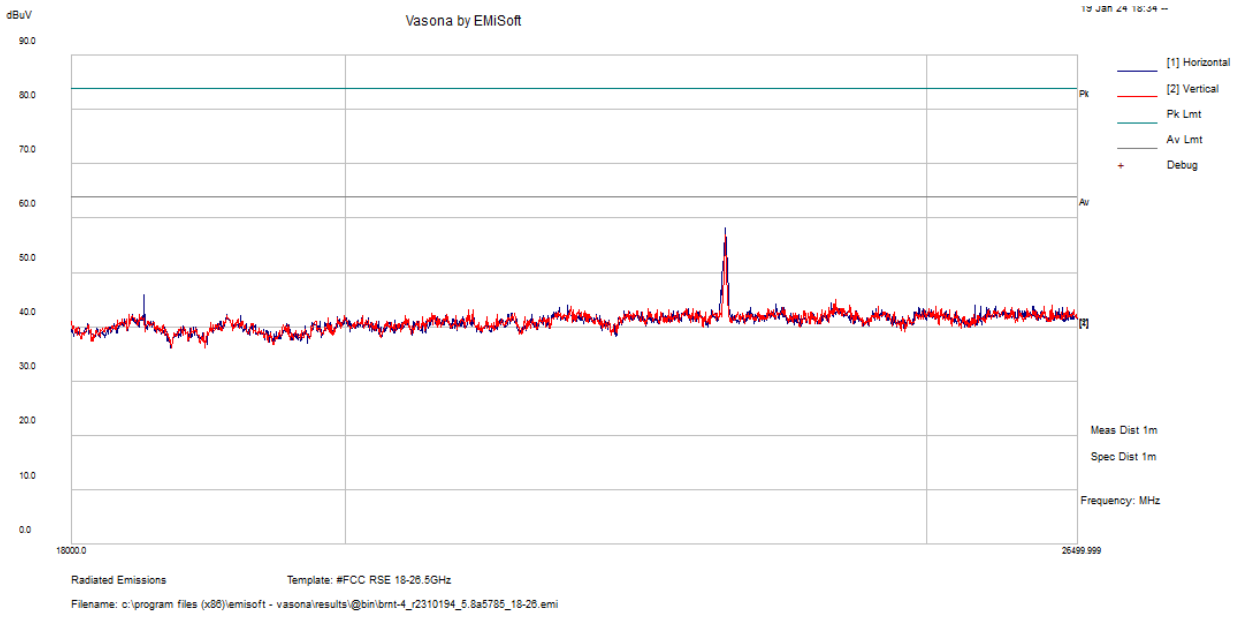
U-NII-3, 802.11a, 5745 MHz



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)	Comments (PK/QP/Ave.)
22978.53	51.56	5.34	56.9	H	200	360	63.54	-6.64	Peak

Note: Peak measurement is compared to the average limit.

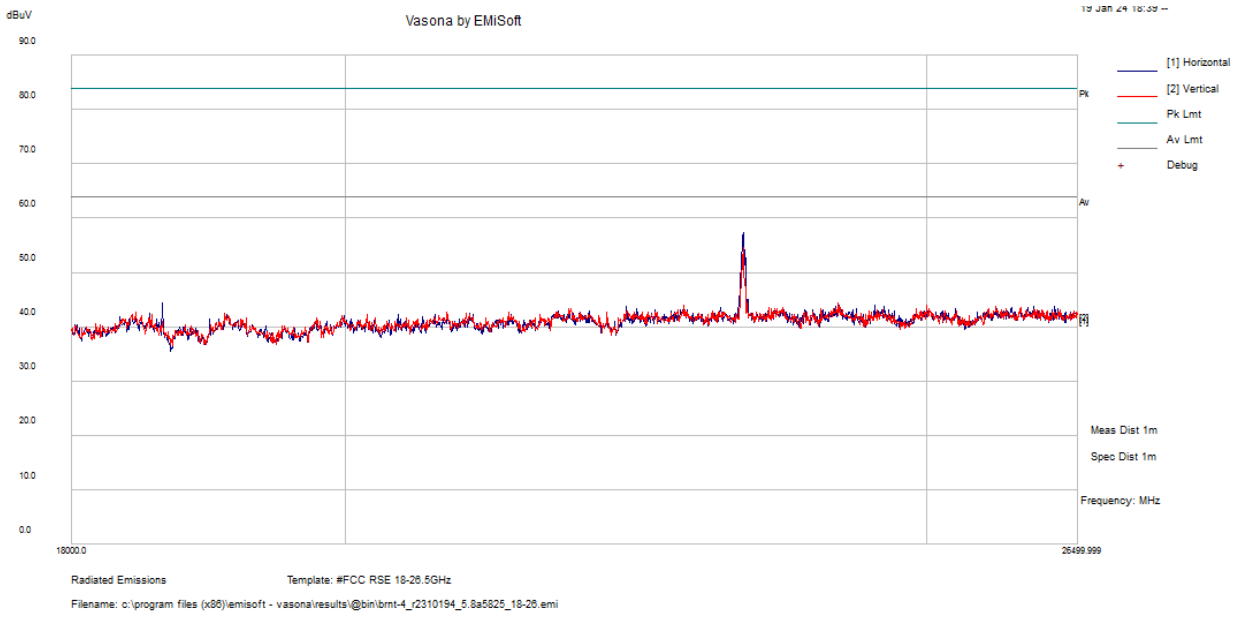
U-NII-3, 802.11a, 5785 MHz



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)	Comments (PK/QP/Ave.)
23142.539	52.70	5.51	58.21	H	200	360	63.54	-5.33	Peak

Note: Peak measurement is compared to the average limit.

U-NII-3, 802.11a, 5825 MHz

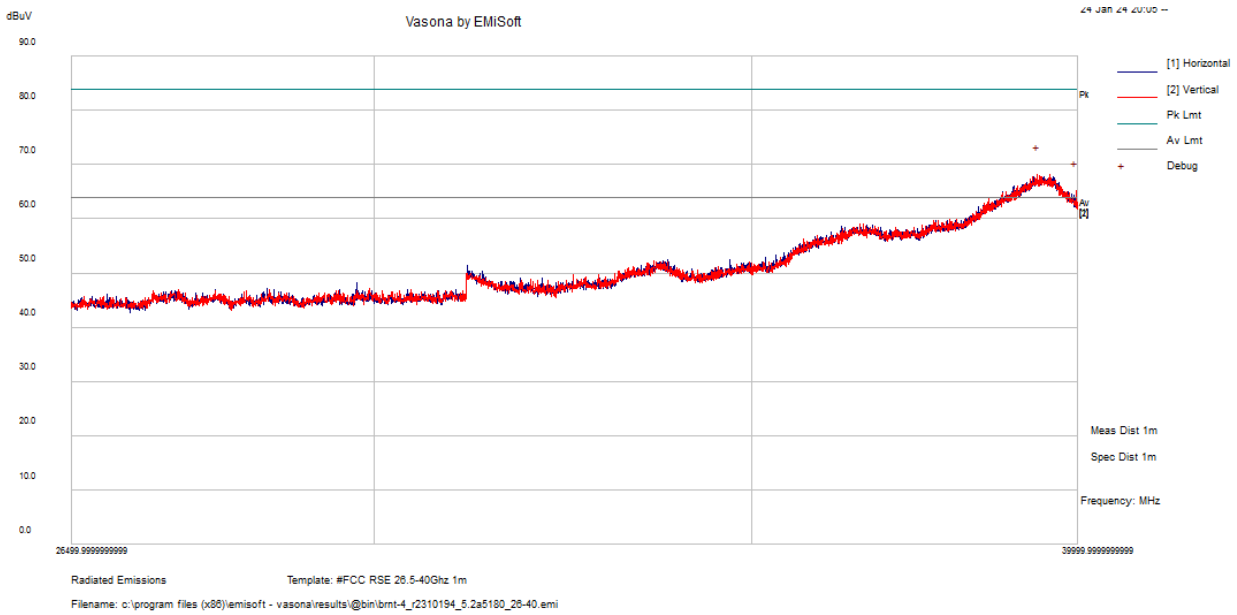


Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Comments (PK/QP/Ave.)
23302.749	50.75	6.05	56.8	H	200	360	63.54	-6.74	Peak

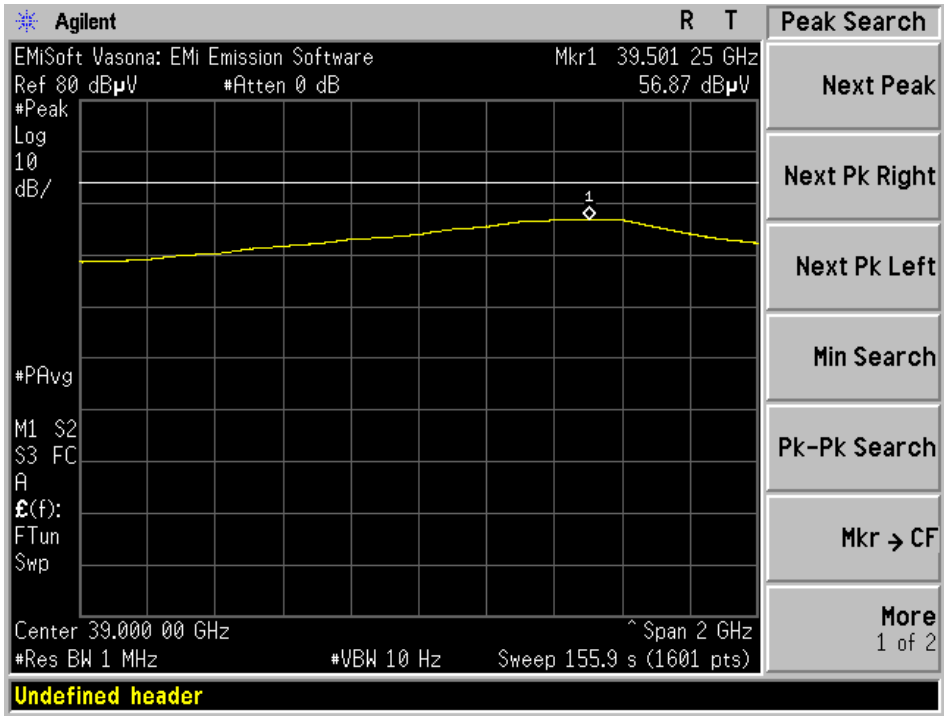
Note: Peak measurement is compared to the average limit.

4) 26.5-40 GHz Worst Case, Measured at 1 meter

U-NII-1, 802.11a, 5180 MHz



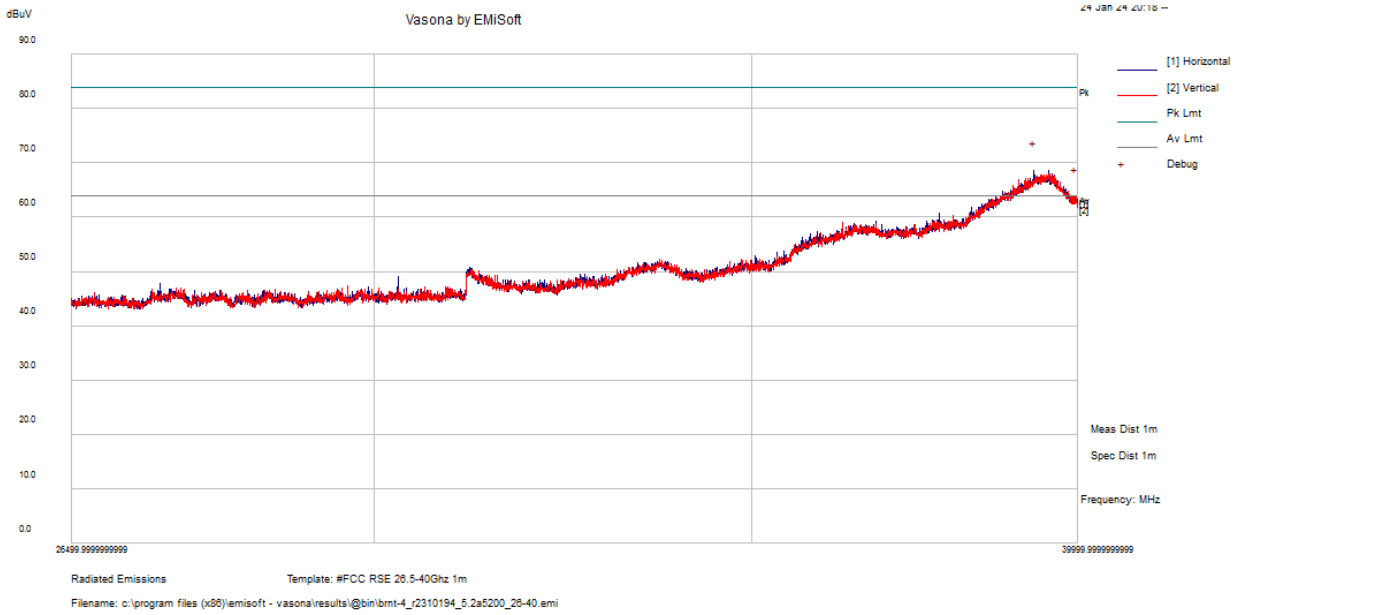
38 – 40 GHz Average Plot



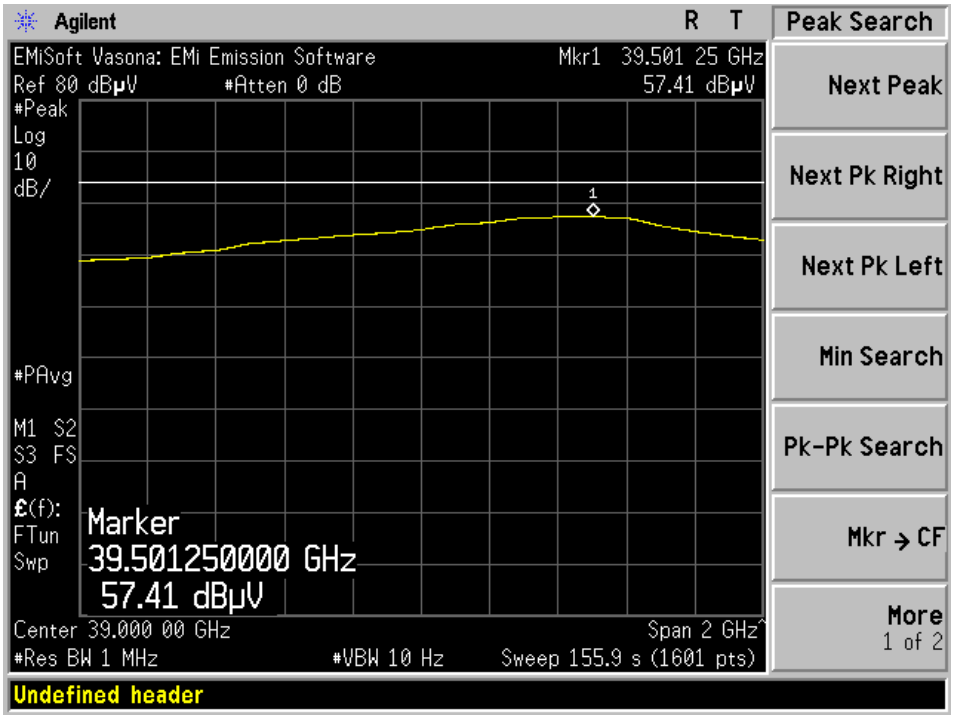
Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Comments (PK/QP/Ave.)
39.50125	38.38	18.49	56.87	200	V	360	63.54	-6.67	Peak

Note: Peak measurement is compared to the average limit.

U-NII-1, 802.11a, 5200 MHz



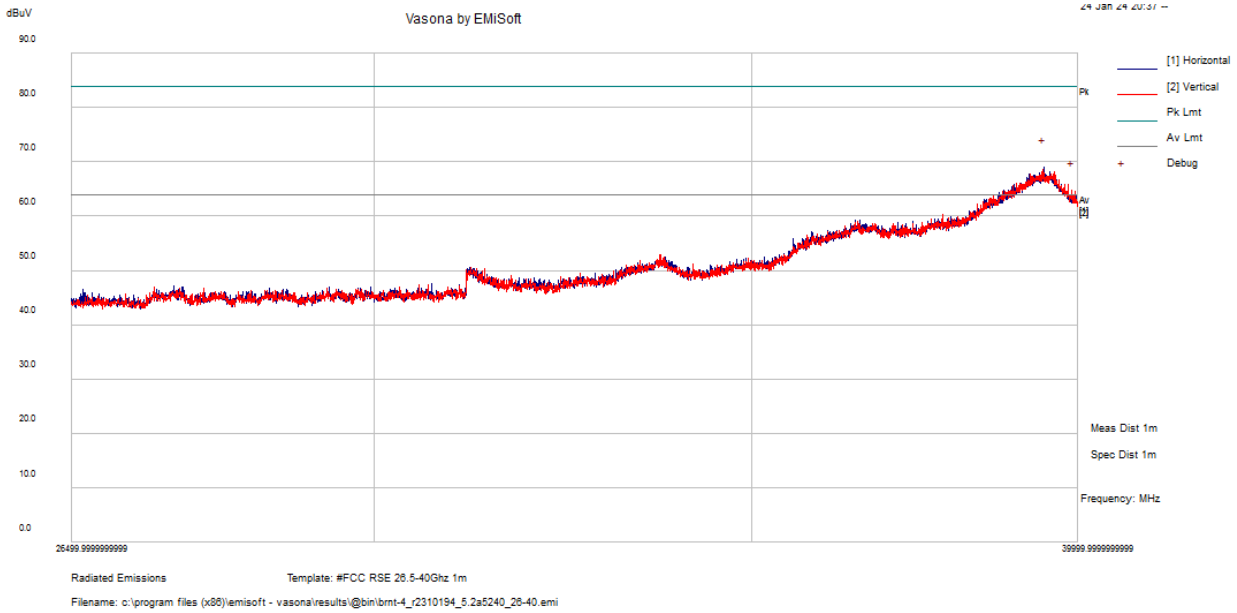
38 – 40 GHz Average Plot



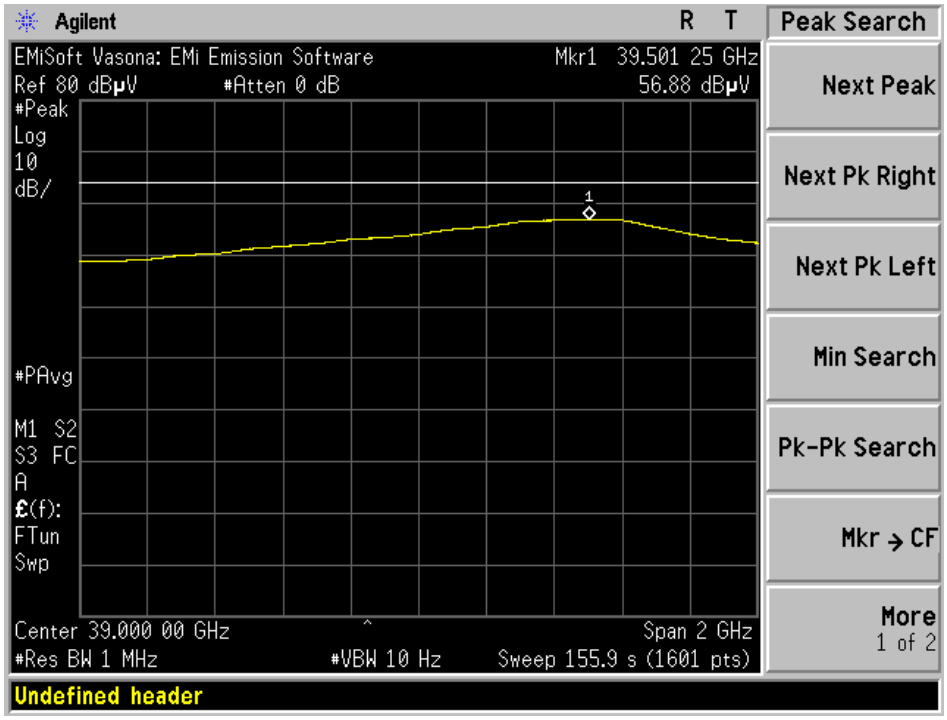
Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Comments (PK/QP/Ave.)
39.50125	38.92	18.49	57.41	200	V	360	63.54	-6.13	Peak

Note: Peak measurement is compared to the average limit.

U-NII-1, 802.11a, 5240 MHz



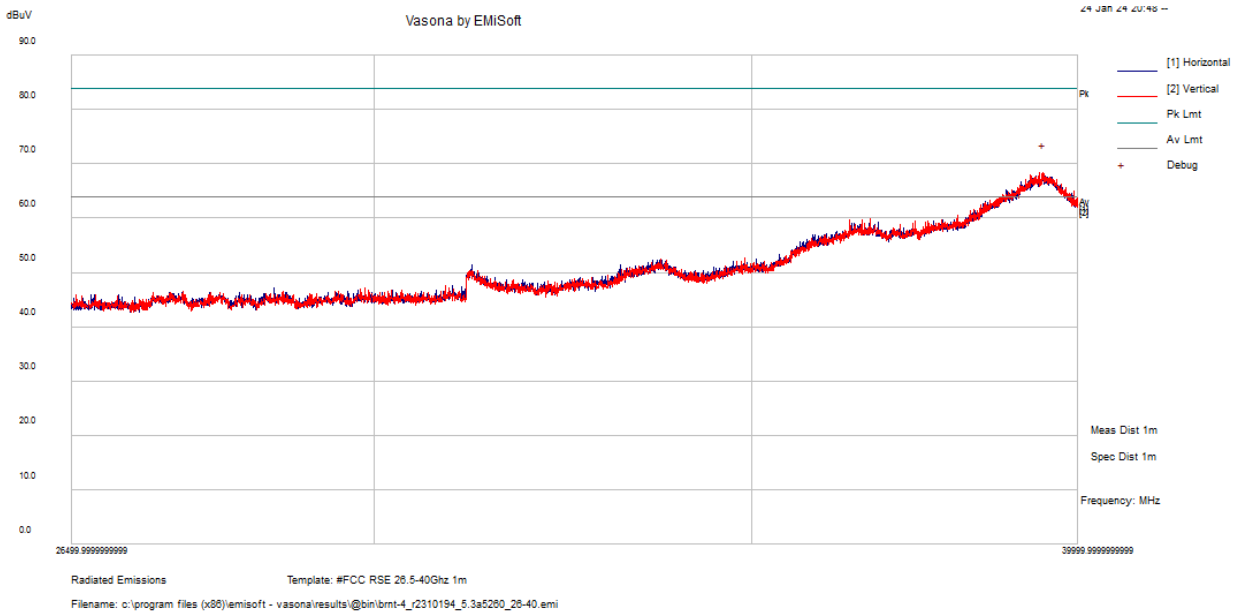
38 – 40 GHz Average Plot



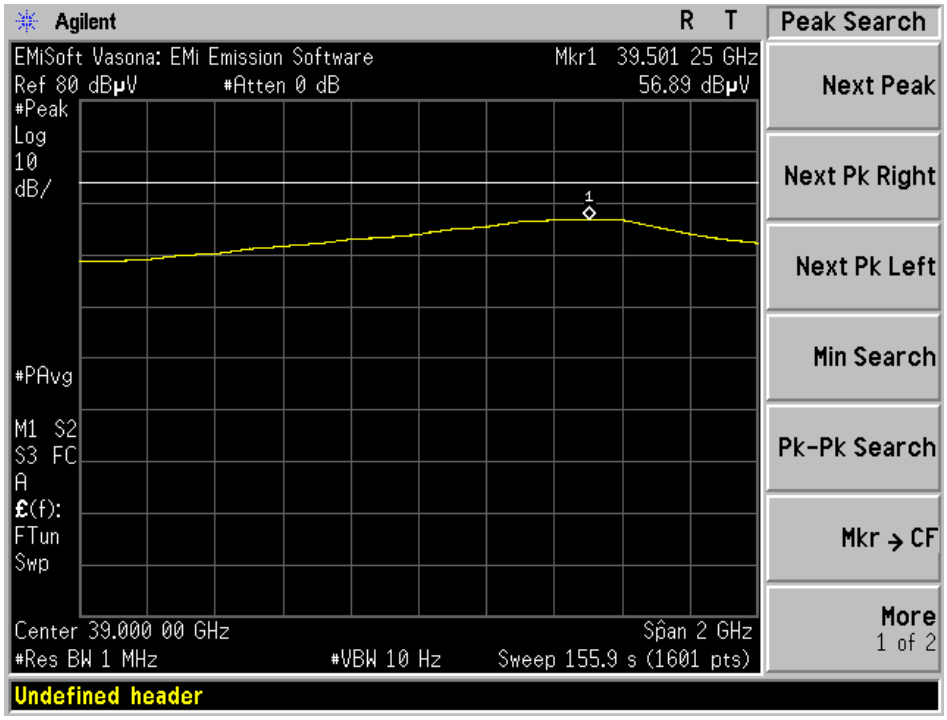
Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Comments (PK/QP/Ave.)
39.50125	38.39	18.49	56.88	200	V	360	63.54	-6.66	Peak

Note: Peak measurement is compared to the average limit.

U-NII-2A, 802.11a, 5260 MHz



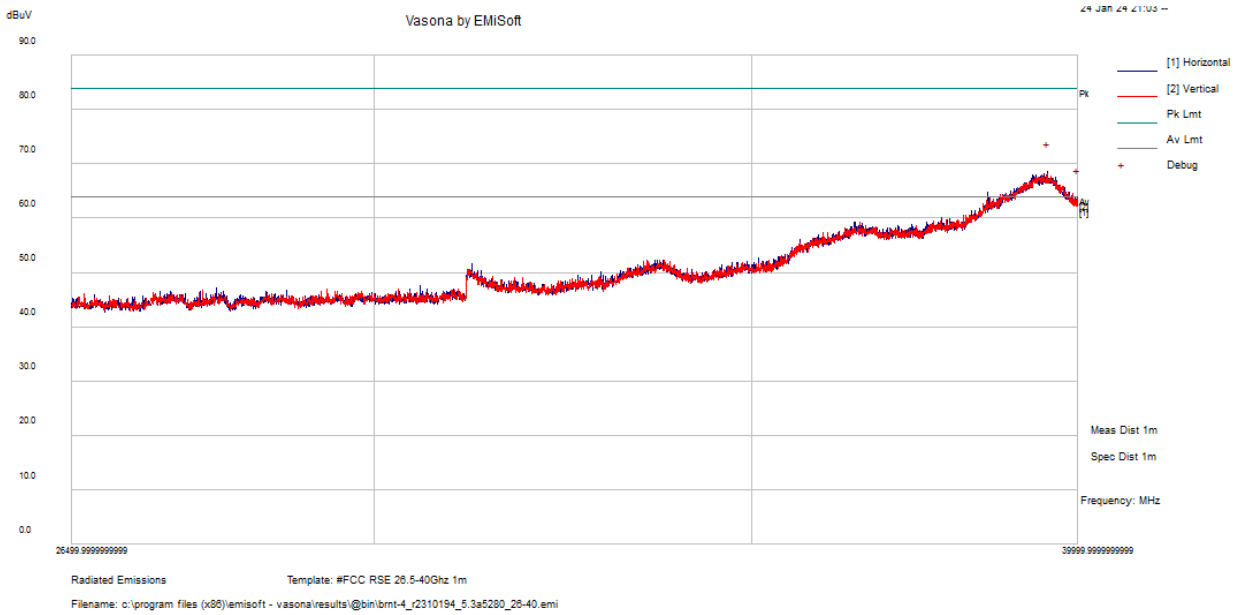
38 – 40 GHz Average Plot



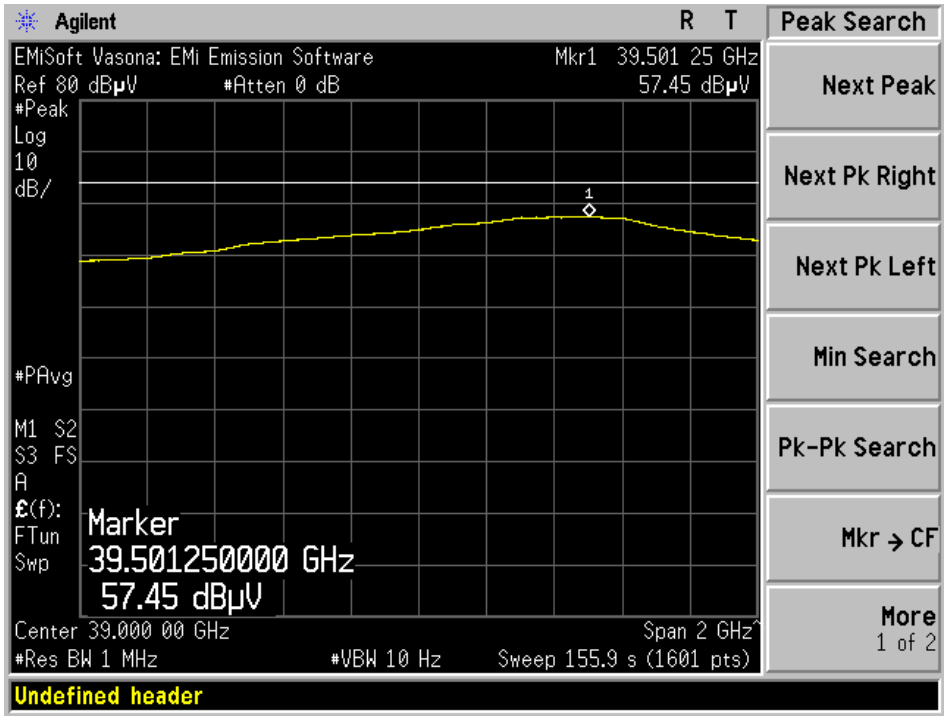
Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Comments (PK/QP/Ave.)
39.50125	38.4	18.49	56.89	200	V	360	63.54	-6.65	Peak

Note: Peak measurement is compared to the average limit.

U-NII-2A, 802.11a, 5280 MHz



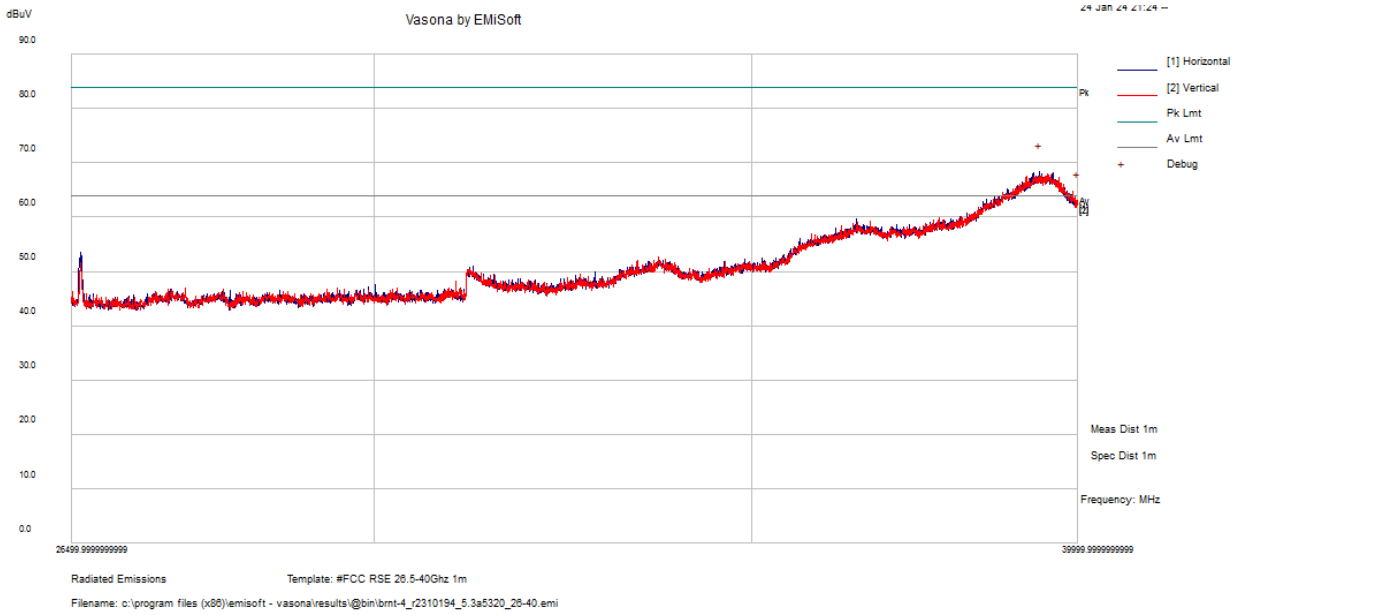
38 – 40 GHz Average Plot



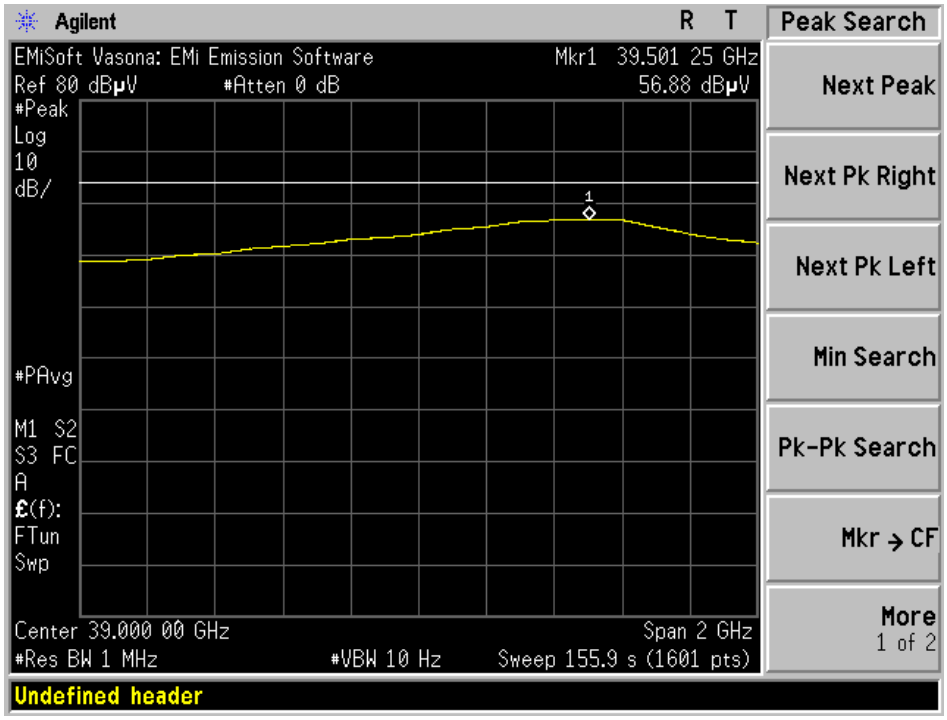
Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Comments (PK/QP/Ave.)
39.50125	38.96	18.49	57.45	200	V	360	63.54	-6.09	Peak

Note: Peak measurement is compared to the average limit.

U-NII-2A, 802.11a, 5320 MHz



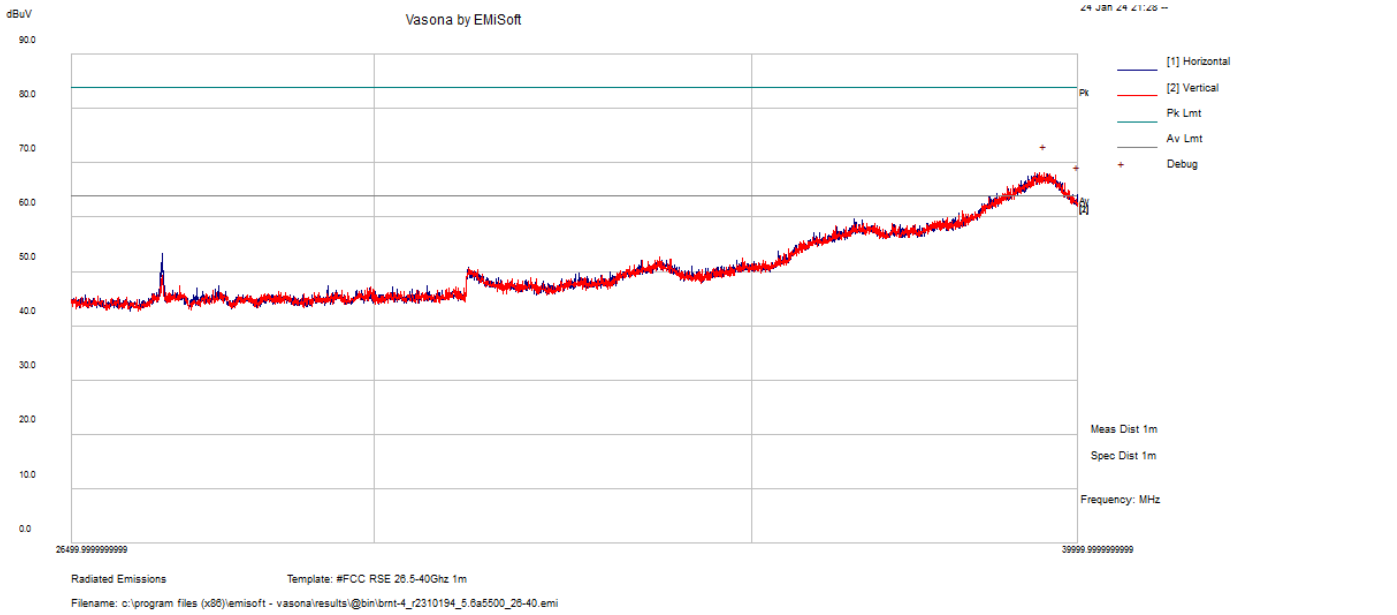
38 – 40 GHz Average Plot



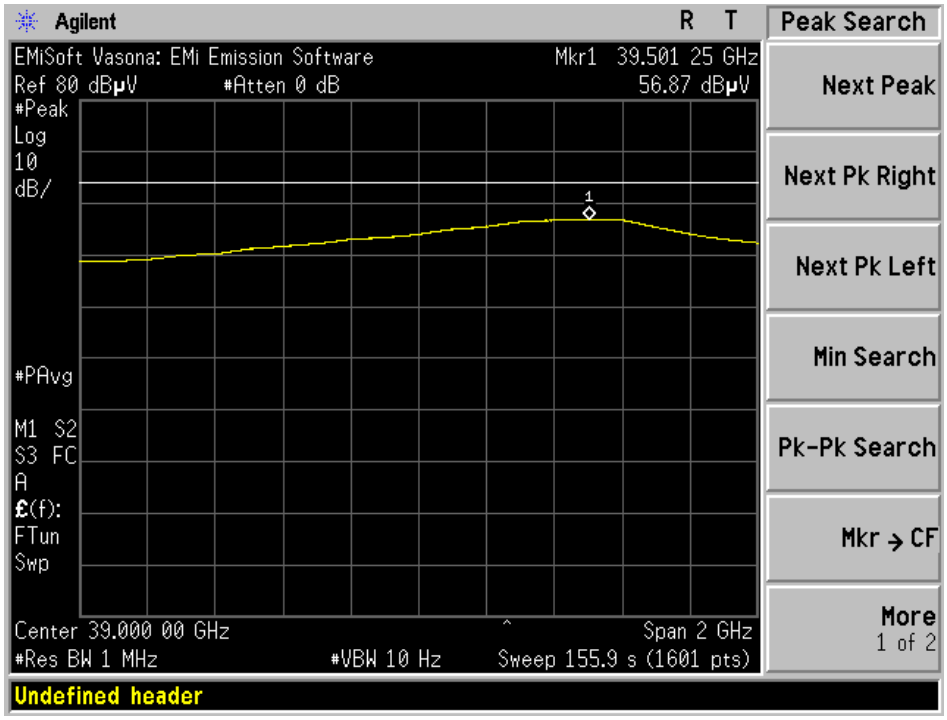
Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Comments (PK/QP/Ave.)
39.50125	38.39	18.49	56.88	200	V	360	63.54	-6.66	Peak

Note: Peak measurement is compared to the average limit.

U-NII-2C, 802.11a, 5500 MHz



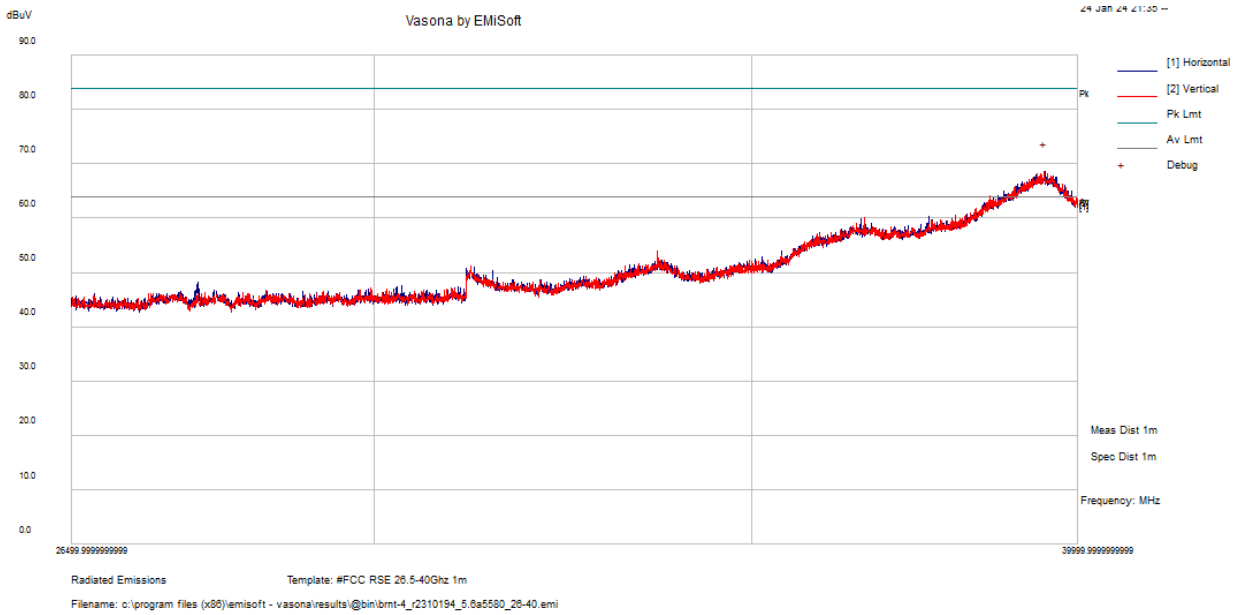
38 – 40 GHz Average Plot



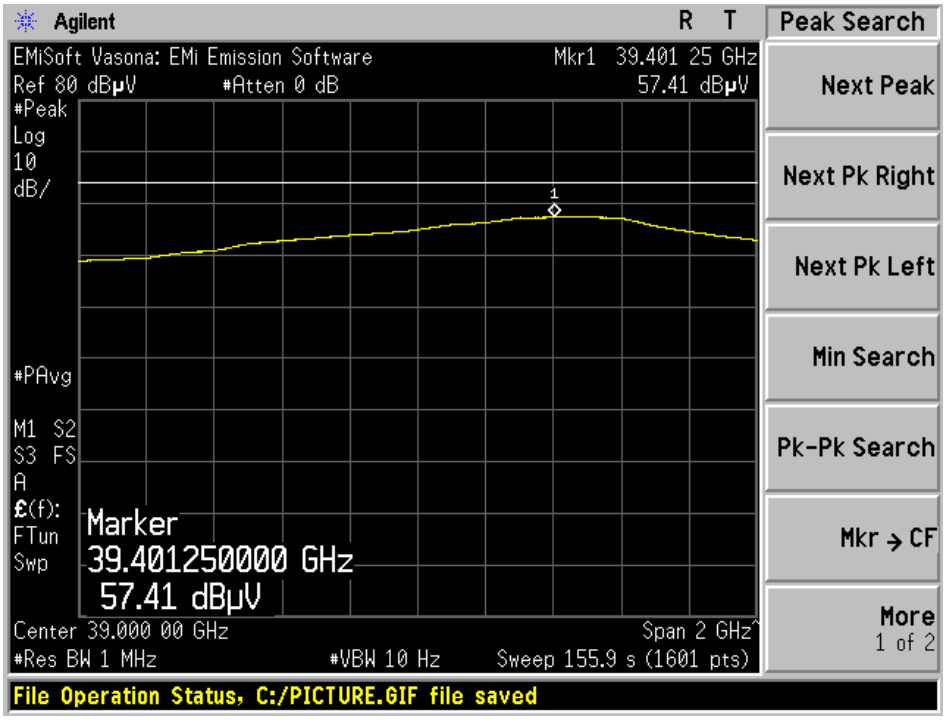
Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Comments (PK/QP/Ave.)
39.50125	38.38	18.49	56.87	200	V	360	63.54	-6.67	Peak

Note: Peak measurement is compared to the average limit.

U-NII-2C, 802.11a, 5580 MHz



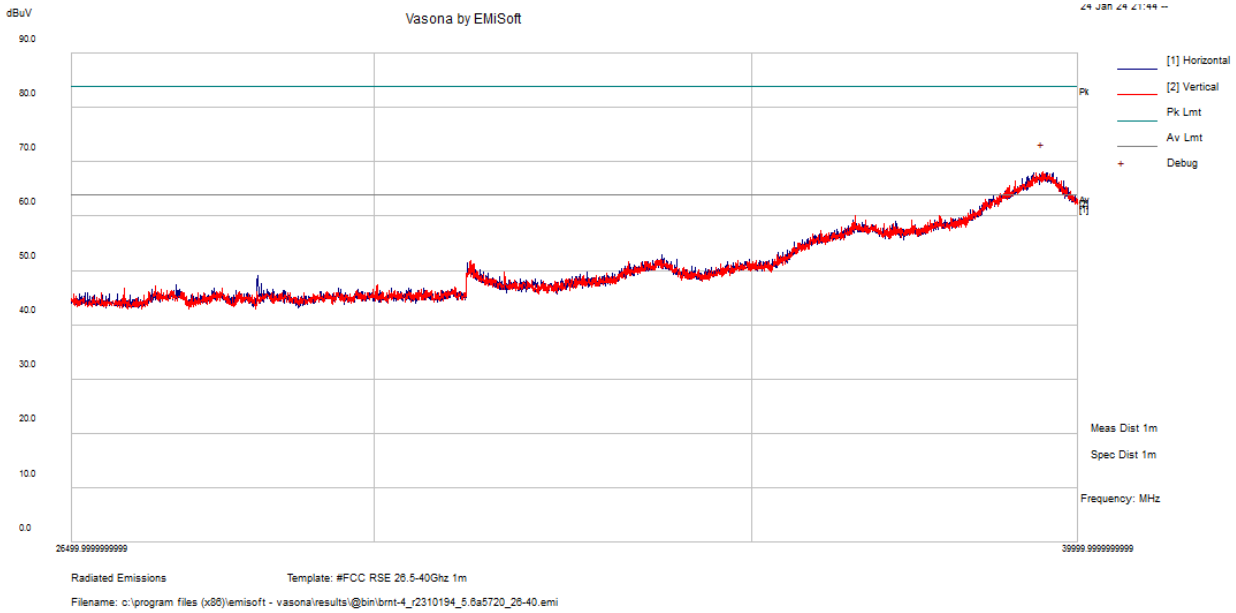
38 – 40 GHz Average Plot



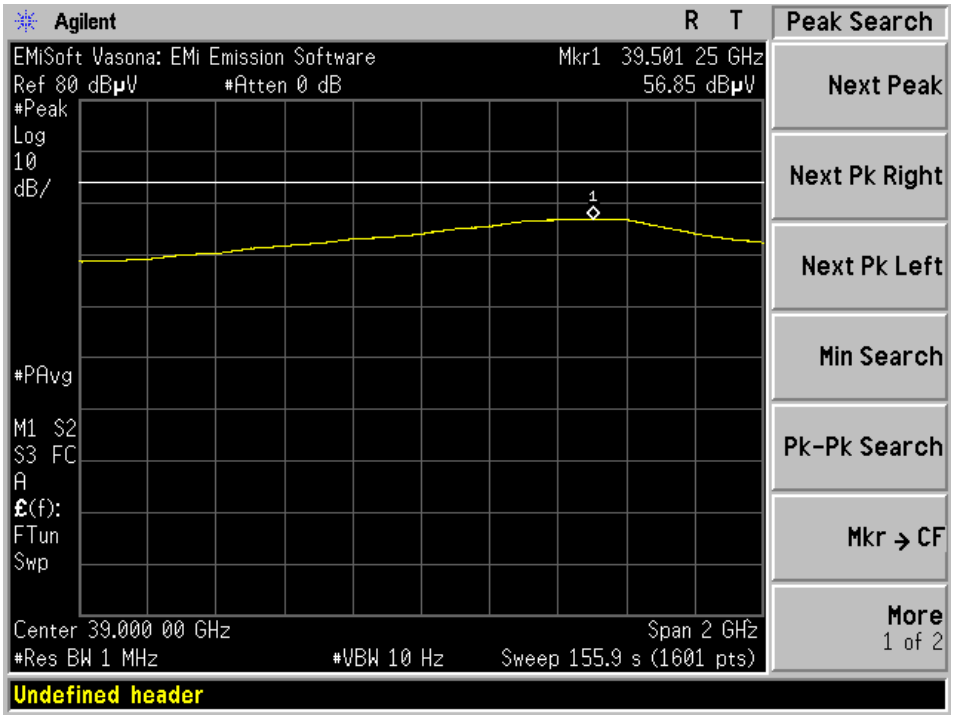
Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Comments (PK/QP/Ave.)
39.50125	38.92	18.49	57.41	200	V	360	63.54	-6.13	Peak

Note: Peak measurement is compared to the average limit.

U-NII-2C, 802.11a, 5720 MHz



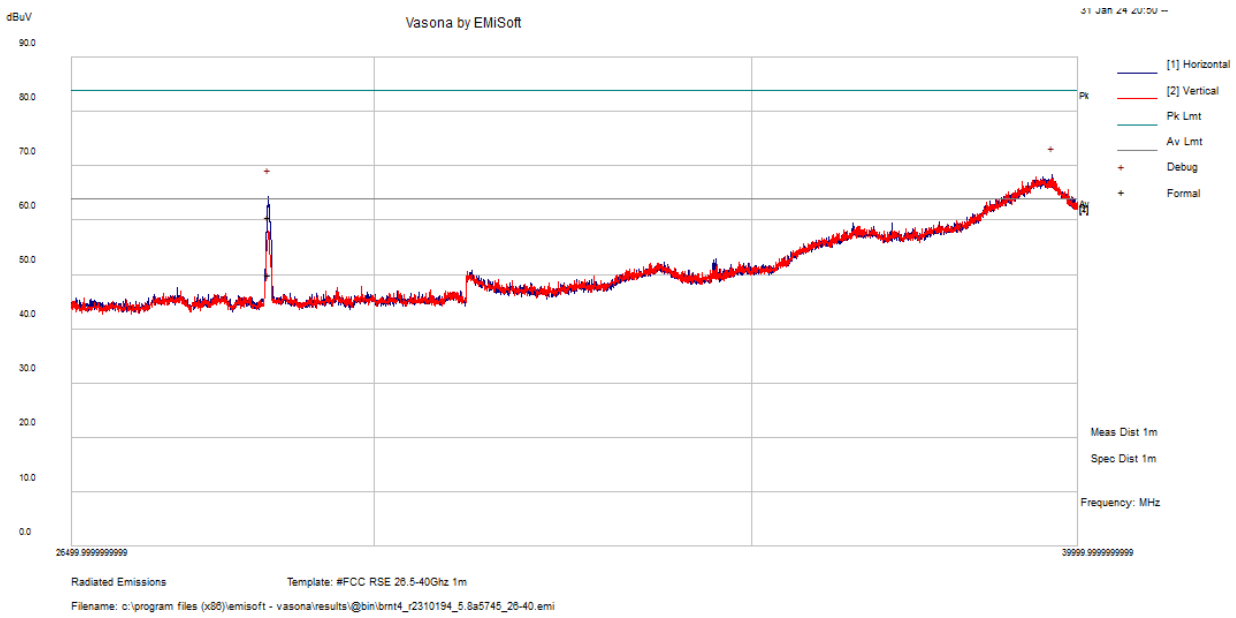
38 – 40 GHz Average Plot



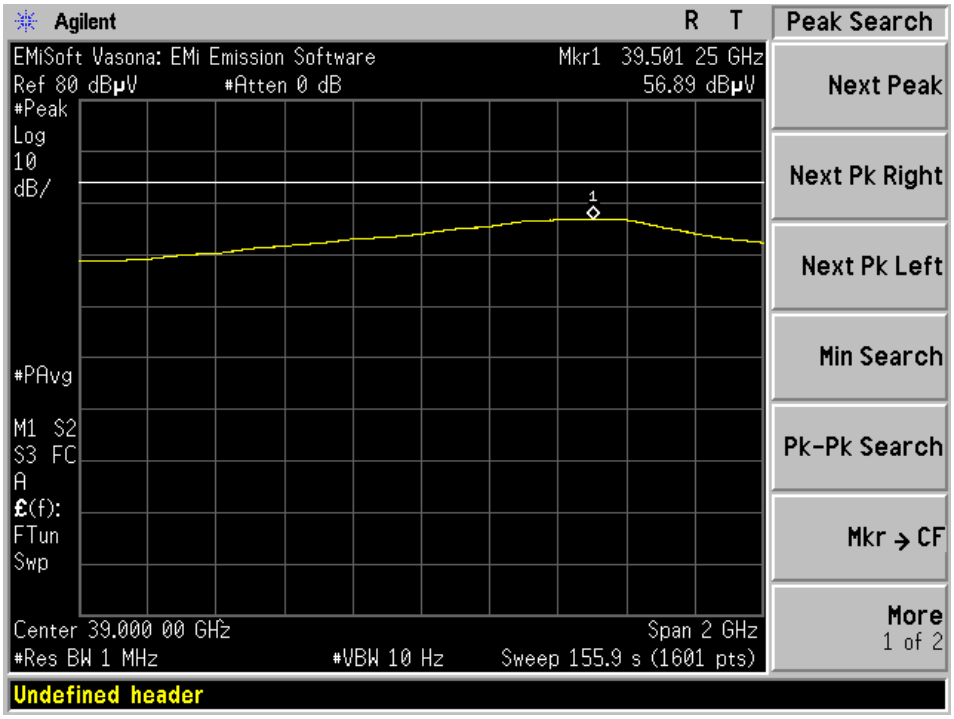
Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Comments (PK/QP/Ave.)
39.50125	38.36	18.49	56.85	200	V	360	63.54	-6.69	Peak

Note: Peak measurement is compared to the average limit.

U-NII-3, 802.11a, 5745 MHz

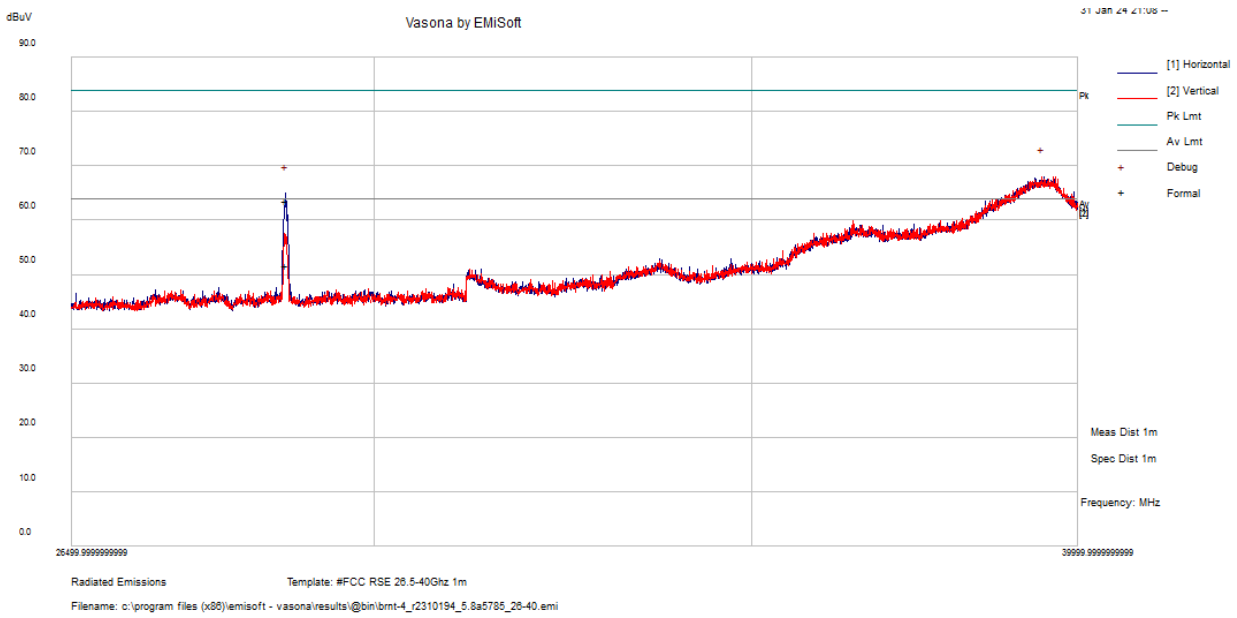


38 – 40 GHz Average Plot

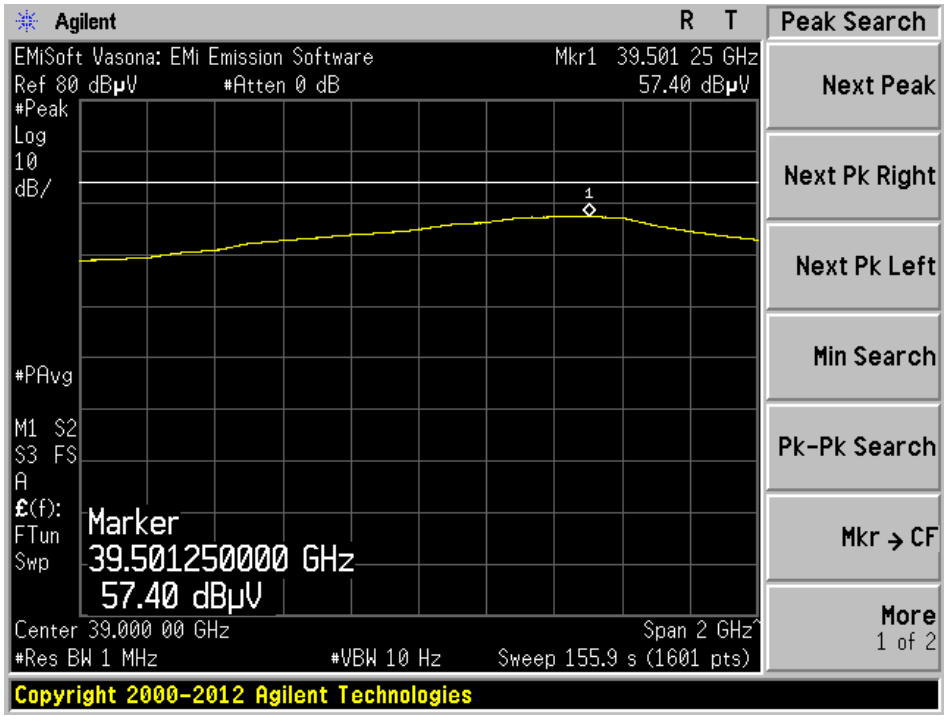


Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Ant. Polarity (H/V)	Ant. Height (cm)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Detector (Peak /Ave.)
28726.595	51.23	9.42	60.65	H	248	80	83.54	-23.35	Peak
28726.595	40.47	9.42	49.89	H	248	80	64	-14.11	Ave.

U-NII-3, 802.11a, 5785 MHz

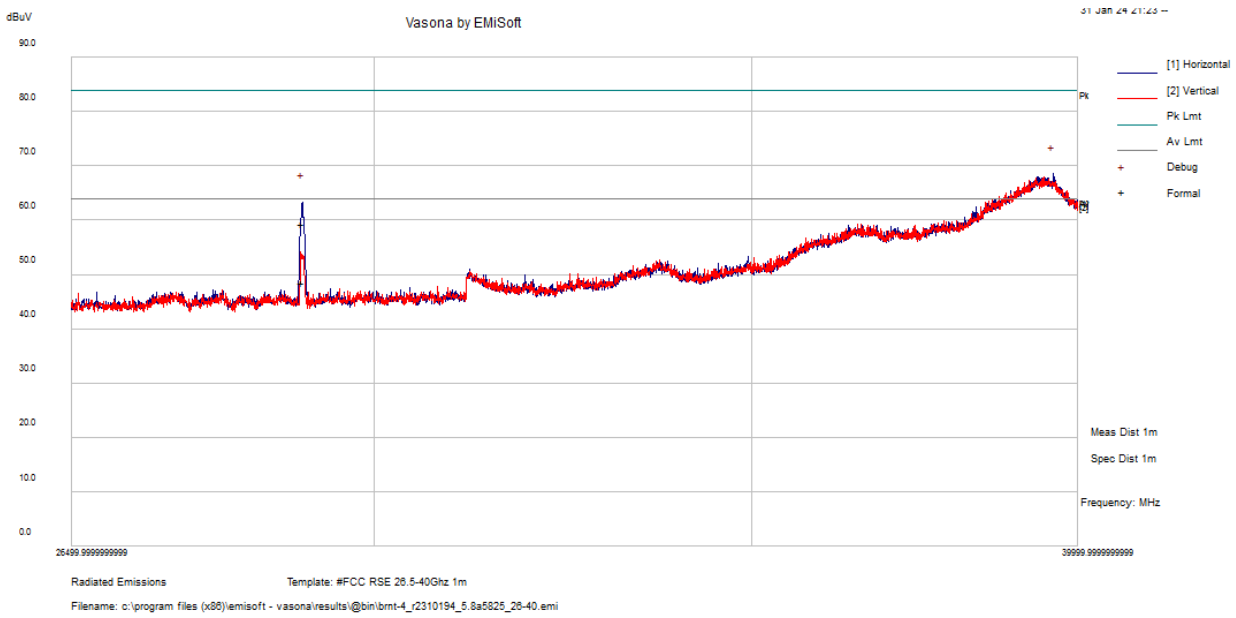


38 – 40 GHz Average Plot

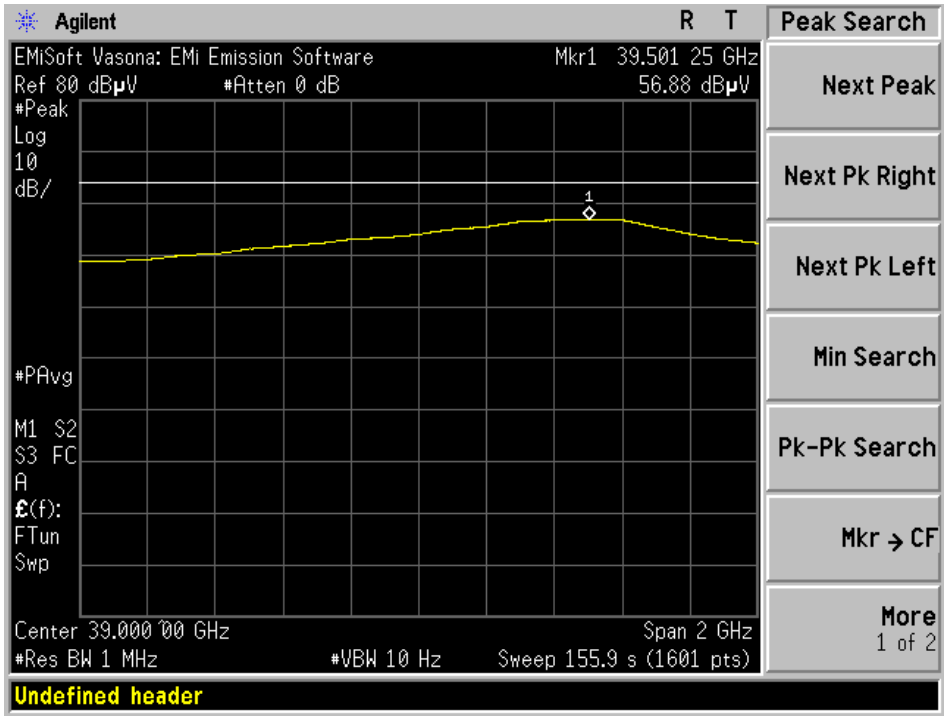


Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Ant. Polarity (H/V)	Ant. Height (cm)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Detector (Peak /Ave.)
28930.715	54.7	8.78	63.48	H	219	18	83.54	-20.52	Peak
28930.715	42.95	8.78	51.73	H	219	18	64	-12.27	Ave.

U-NII-3, 802.11a, 5825 MHz



38 – 40 GHz Average Plot



Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Ant. Polarity (H/V)	Ant. Height (cm)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Detector (Peak /Ave.)
29123.121	51.33	7.92	59.25	H	206	82	83.54	-24.75	Peak
29123.121	40.48	7.92	48.4	H	206	82	64	-15.6	Ave

8 FCC §15.407(e) & ISEDC RSS-247 §6.2 - 6 dB, 26 dB, & 99% - Occupied Bandwidth

8.1 Applicable Standards

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

8.2 Measurement Procedure

As per the ANSI 63.10 Clause 12.4.1: Emission Bandwidth

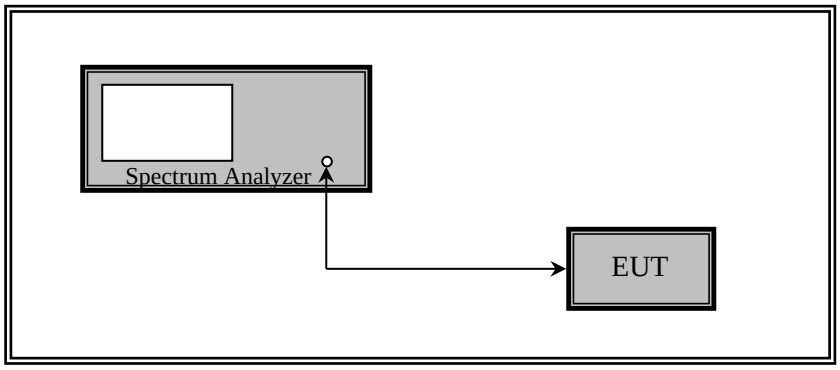
a. Set RBW = approximately 1% of the emission bandwidth
b. Set the VBW > RBW.
c. Detector = peak.
d. Trace mode = max hold.
e. Measure the maximum width of the emission that is 6 or 26 dB down from the peak of the emission. Compare this with the RBW setting of the instrument. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

As per the ANSI 63.10 Clause 6.9.3: Occupied Bandwidth – Power Bandwidth (99%)

The occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers are each equal to 0.5% of the total mean power of the given emission. The following procedure shall be used for measuring 99% power bandwidth:

f. The instrument center frequency is set to the nominal EUT channel center frequency. The frequency span for the spectrum analyzer shall be between 1.5 times and 5.0 times the OBW.
g. The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1% to 5% of the OBW, and VBW shall be approximately three times the RBW, unless otherwise specified by the applicable requirement.
h. Set the reference level of the instrument as required, keeping the signal from exceeding the maximum input mixer level for linear operation. In general, the peak of the spectral envelope shall be more than [10 log (OBW/RBW)] below the reference level. Specific guidance is given in 4.1.5.2.
i. Step a) through step c) might require iteration to adjust within the specified range.
j. Video averaging is not permitted. Where practical, a sample detection and single sweep mode shall be used. Otherwise, peak detection and max hold mode (until the trace stabilizes) shall be used.
k. Use the 99% power bandwidth function of the instrument (if available) and report the measured bandwidth.
l. If the instrument does not have a 99% power bandwidth function, then the trace data points are recovered and directly summed in linear power terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5% of the total is reached; that frequency is recorded as the lower frequency. The process is repeated until 99.5% of the total is reached; that frequency is recorded as the upper frequency. The 99% power bandwidth is the difference between these two frequencies.
m. The occupied bandwidth shall be reported by providing plot(s) of the measuring instrument display; the plot axes and the scale units per division shall be clearly labeled. Tabular data may be reported in addition to the plot(s).

8.3 Test Setup Block Diagram



8.4 Test Equipment List and Details

BACL No.	Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
00424	Agilent	Spectrum Analyzer	E4440A	US45303156	2022-12-19	12 Months
00624	Agilent	Spectrum Analyzer	E4446A	MY48250238	2023-05-12	12 Months

Note[1]: cable and attenuator included in the test set-up will be checked each time before testing.

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

8.5 Test Environmental Conditions

Temperature:	20.8°C
Relative Humidity:	34%
ATM Pressure:	102.9 kPa

The testing was performed by Michael Papa from 2023-10-31 to 2023-11-28 at RF site.

8.6 Test Results

Please refer to the following tables and plots.

5150-5250 MHz

Ant A

Channel	Frequency (MHz)	99% OBW (MHz)	26 dB OBW (MHz)
802.11a			
36	5180	17.44	27.86
40	5200	17.35	27.83
48	5240	17.35	27.72
802.11n20			
36	5180	18.17	22.57
40	5200	18.10	21.06
48	5240	18.00	22.53
802.11n40			
38	5190	36.16	41.20
46	5230	36.36	41.30
802.11ac80			
42	5210	75.84	82.30

Ant B

Channel	Frequency (MHz)	99% OBW (MHz)	26 dB OBW (MHz)
802.11a			
36	5180	18.193	35.120
40	5200	17.957	33.205
48	5240	17.795	30.984
802.11n20			
36	5180	18.344	31.464
40	5200	18.330	34.615
48	5240	18.025	29.684
802.11n40			
38	5190	36.359	41.131
46	5230	36.534	41.463
802.11ac80			
42	5210	75.352	81.119

5250-5350 MHz

Ant A

Channel	Frequency (MHz)	99% OBW (MHz)	26 dB OBW (MHz)
802.11a			
52	5260	18.16	33.73
60	5300	18.45	35.16
64	5320	18.69	34.48
802.11n20			
52	5260	18.11	26.48
60	5300	18.27	28.73
64	5320	18.35	26.31
802.11n40			
54	5270	36.31	41.44
62	5310	36.31	41.26
802.11ac80			
58	5290	75.94	82.61

Ant B

Channel	Frequency (MHz)	99% OBW (MHz)	26 dB OBW (MHz)
802.11a			
52	5260	18.16	32.95
60	5300	18.15	34.25
64	5320	18.22	33.37
802.11n20			
52	5260	18.28	36.31
60	5300	18.10	25.12
64	5320	18.10	32.22
802.11n40			
54	5270	36.68	41.26
62	5310	36.40	40.86
802.11ac80			
58	5290	75.57	81.17

5470-5725 MHz

Ant A

Channel	Frequency (MHz)	99% OBW (MHz)	26 dB OBW (MHz)
802.11a			
100	5500	17.68	23.83
120	5600	17.60	22.66
140	5700	17.53	26.91
144	5720	19.39	34.77
802.11n20			
100	5500	18.32	23.79
120	5600	18.17	24.59
140	5700	18.07	22.54
144	5720	19.04	34.34
802.11n40			
102	5510	36.32	44.71
118	5590	36.51	44.98
134	5670	36.81	45.22
142	5710	36.94	47.65
802.11ac80			
106	5530	76.05	89.46
122	5610	75.72	90.17
138	5690	76.30	89.49

Ant B

Channel	Frequency (MHz)	99% OBW (MHz)	26 dB OBW (MHz)
802.11a			
100	5500	17.45	30.17
120	5600	17.48	30.08
140	5700	17.05	24.65
144	5720	17.09	22.80
802.11n20			
100	5500	18.41	25.65
120	5600	18.46	31.10
140	5700	17.86	22.25
144	5720	17.97	24.13
802.11n40			
102	5510	36.33	44.75
118	5590	36.59	44.80
134	5670	36.61	44.67
142	5710	36.74	45.08
802.11ac80			
106	5530	75.64	88.94
122	5610	75.67	90.17
138	5690	75.78	89.32

5725-5850 MHz

Ant A

Channel	Frequency (MHz)	99% OBW (MHz)	6 dB OBW (MHz)
802.11a			
149	5745	33.71	15.63
157	5785	34.22	13.64
165	5825	35.30	15.05
802.11n20			
149	5745	32.70	29.83
157	5785	32.67	16.60
165	5825	33.94	15.78
802.11n40			
151	5755	58.90	31.19
159	5795	58.45	57.18
802.11ac80			
155	5775	86.77	89.70

Ant B

Channel	Frequency (MHz)	99% OBW (MHz)	6 dB OBW (MHz)
802.11a			
149	5745	33.15	15.98
157	5785	33.31	15.80
165	5825	33.57	16.05
802.11n20			
149	5745	36.45	31.46
157	5785	35.66	17.25
165	5825	35.63	16.47
802.11n40			
151	5755	56.85	43.95
159	5795	55.58	55.18
802.11ac80			
155	5775	76.02	84.41

Note: See Annex A for 6dB OBW, 26dB OBW, and 99OBW test results

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

9.1 Applicable Standards

According to FCC §15.407(a):

For client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

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

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

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

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

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

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

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

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

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

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

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

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

9.2 Measurement Procedure

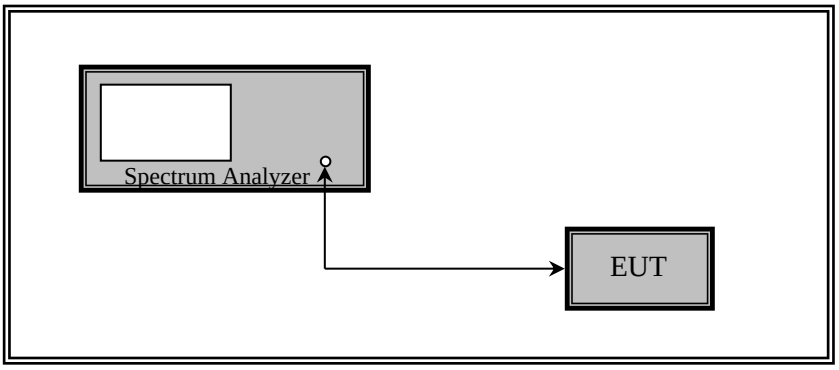
The measurements are based on ANSI C63.10-2013, Section 12.3.2.6

12.3.2.6Method SA-3

Method AVGSA-1 uses trace averaging with the EUT transmitting at full power throughout each sweep. The procedure for this method is as follows:

a. Set span to encompass the entire 26 dB EBW or 99% OBW of the signal.
b. Set sweep trigger to “free run.”
c. Set RBW = 1 MHz.
d. Set VBW ≥ 3 MHz
e. Number of points in sweep ≥ [2 × span / RBW]. (This gives bin-to-bin spacing ≤ RBW / 2, so that narrowband signals are not lost between frequency bins.)
f. Sweep time ≤ [(number of points in sweep) × T], where T is defined in 12.2. If this gives a sweep time less than the auto sweep time of the instrument, then method SA-3A shall not be used. (The purpose of this step is so that averaging time in each bin is less than or equal to the minimum time of a transmission.)
g. Detector = RMS (power averaging).
h. Trace mode = max hold.
i. Allow max hold to run for at least 60 s or longer as needed to allow the trace to stabilize.
j. Compute power by integrating the spectrum across the 26 dB EBW or 99% OBW of the signal using the instrument’s band power measurement function with band limits set equal to the EBW or OBW band edges. If the instrument does not have a band power function, then sum the spectrum levels (in power units) at 1 MHz intervals extending across the 26 dB EBW of the spectrum.

9.3 Test Setup Block Diagram



9.4 Test Equipment List and Details

BACL No	Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
00424	Agilent	Spectrum Analyzer	E4440A	US45303156	2022-12-19	12 Months
00624	Agilent	Spectrum Analyzer	E4446A	MY48250238	2023-05-12	12 Months
00912	Rhode & Schwarz	Signal Analyzer	FSV40	1321.3008k39-101203-UW	2023-06-02	12 Months

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".*

9.5 Test Environmental Conditions

Temperature:	20.8°C
Relative Humidity:	34%
ATM Pressure:	102.9 kPa

The testing was performed by Michael Papa from 2023-10-31 to 2023-11-28 at RF site.

9.6 Test Results

5150-5250 MHz

Channel	Frequency (MHz)	Highest Applicable Antenna Gain (dBi)	Conducted Output Power (dBm)		Total Power (dBm)	FCC Conducted Limit (dBm)	EIRP (dBm)	IC EIRP Limit (dBm)
			ANT A	ANT B				
802.11a								
36	5180	2	16.47	10.73	-	<24	18.47	<22.39
40	5200	2	16.24	10.22	-	<24	18.24	<22.39
48	5240	2	15.42	9.38	-	<24	17.42	<22.39
802.11n20								
36	5180	4.77	14.45	8.70	15.48	<24	20.25	<22.55
40	5200	4.77	14.12	8.68	15.22	<24	19.99	<22.55
48	5240	4.77	13.49	7.43	14.45	<24	19.22	<22.55
802.11n40								
38	5190	4.77	12.48	6.61	13.48	<24	18.25	<23
46	5230	4.77	11.82	5.91	12.81	<24	17.58	<23
802.11ac80								
42	5210	4.77	9.60	4.04	10.66	<24	15.43	<23

Note: The narrowest 99% OBW, 17.35 MHz, was used to calculate the worst limit for 802.11a20 mode.
Note: The narrowest 99% OBW, 18.00 MHz, was used to calculate the worst limit for 802.11n20 mode.
Note: EIRP(dBm) = Total Power (dBm) + Antenna Gain(dBi)
*Note: Total power (dBm) =10*Log(Ant a(mw)+Ant B(mw))*

5250-5350 MHz

Channel	Frequency (MHz)	Highest Applicable Antenna Gain (dBi)	Conducted Output Power (dBm)		Total Power (dBm)	FCC Conducted Limit (dBm)	IC Conducted Limit (dBm)	EIRP (dBm)	IC EIRP Limit (dBm)
			ANT A	ANT B					
802.11a									
52	5260	2	15.53	9.92	-	<24	<23.85	17.53	<23
60	5300	2	15.60	9.88	-	<24	<23.85	17.60	<23
64	5320	2	15.67	10.28	-	<24	<23.85	17.67	<23
802.11n20									
52	5260	4.77	13.71	8.19	14.78	<24	<23.83	19.55	<23
60	5300	4.77	13.81	8.22	14.87	<24	<23.83	19.64	<23
64	5320	4.77	13.74	8.82	14.95	<24	<23.83	19.72	<23
802.11n40									
54	5270	4.77	10.91	5.21	11.95	<24	<24	16.72	<23
62	5310	4.77	10.85	5.85	12.04	<24	<24	16.81	<23
802.11ac80									
58	5290	4.77	10.38	4.95	11.47	<24	<24	16.24	<23

Note: The narrowest 99% OBW, 18.15 MHz, was used to calculate the worst limit for 802.11a20 mode.
Note: The narrowest 99% OBW, 18.10 MHz, was used to calculate the worst limit for 802.11n20 mode.
Note: EIRP(dBm) = Total Power (dBm) + Antenna Gain(dBi)
*Note: Total power (dBm) =10*Log(Ant a(mw)+Ant B(mw))*

5470-5725 MHz

Channel	Frequency (MHz)	Highest Applicable Antenna Gain (dBi)	Conducted Output Power (dBm)		Total Power (dBm)	FCC Conducted Limit (dBm)	IC Conducted Limit (dBm)	EIRP (dBm)	IC EIRP Limit (dBm)
			ANT A	ANT B					
802.11a									
100	5500	2	15.73	11.29	-	<24	<23.55	17.73	<29.55
120	5600	2	14.67	9.73	-	<24	N/A	16.67	N/A
140	5700	2	13.50	9.98	-	<24	<23.55	15.50	<29.55
144	5720	2	12.21	7.46	-	<24	<23.55	14.21	<29.55
144	5710-5725	2	9.26	4.93	-	<24	<23.55	11.26	<29.55
144	5725-5730	2	1.85	-2.56	-	<30	<30	3.85	N/A
802.11n20									
100	5500	4.77	14.75	10.35	16.10	<24	<23.77	20.87	<29.77
120	5600	4.77	13.80	9.06	15.06	<24	N/A	19.83	N/A
140	5700	4.77	11.91	8.10	13.42	<24	<23.77	18.19	<29.77
144	5720	4.77	11.32	7.40	12.80	<24	<23.77	17.57	<29.77
144	5710-5725	4.77	8.09	4.01	9.523	<24	<23.77	14.293	<29.77
144	5725-5730	4.77	1.32	-3.45	2.570	<30	<30	7.34	N/A
802.11n40									
102	5510	4.77	12.93	8.44	14.25	<24	<24	19.02	<24
118	5590	4.77	12.16	7.19	13.36	<24	N/A	18.13	N/A
134	5670	4.77	11.69	6.97	12.95	<24	<24	17.72	<24
142	5710	4.77	9.88	5.00	11.10	<24	<24	15.87	<24
142	5690-5725	4.77	7.47	3.29	8.875	<24	<24	13.645	<24
142	5725-5730	4.77	-5.21	-9.73	-3.896	<30	<30	0.874	N/A
802.11ac80									
106	5530	4.77	11.41	6.88	12.72	<24	<24	17.49	<24
122	5610	4.77	10.09	5.20	11.31	<24	N/A	16.08	N/A
138	5690	4.77	8.28	3.45	9.51	<24	<24	14.28	<24
138	5650-5725	4.77	6.73	2.14	8.025	<24	<24	12.795	<24
138	5725-5730	4.77	-9.36	-14.03	-8.085	<30	<30	-3.315	N/A

Note: The narrowest 99% OBW, 17.05 MHz, was used to calculate the worst limit for 802.11a20 mode.
Note: The narrowest 99% OBW, 17.86 MHz, was used to calculate the worst limit for 802.11an0 mode.
Note: EIRP(dBm) = Total Power (dBm) + Antenna Gain(dBi)
*Note: Total power (dBm) =10*Log(Ant a(mw)+Ant B(mw))*

5725-5850 MHz

Channel	Frequency (MHz)	Conducted Output Power (dBm)		Total Power (dBm)	FCC/IC Conducted Limit (dBm)
		ANT A	ANT B		
802.11a					
149	5745	16.33	12.29	-	<30
157	5785	16.52	12.76	-	<30
165	5825	16.37	13.12	-	<30
802.11n20					
149	5745	15.68	11.79	17.16	<30
157	5785	15.96	12.80	17.67	<30
165	5825	15.92	13.20	17.78	<30
802.11n40					
151	5755	14.89	11.14	16.42	<30
159	5795	15.14	11.88	16.82	<30
802.11ac80					
155	5775	11.08	7.04	12.52	<30

Note: EIRP(dBm) = Total Power (dBm) + Antenna Gain(dBi)
*Note: Total power (dBm) =10*Log(Ant a(mw)+Ant B(mw))*

Note: See Annex B for Power Output test results

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

10.1 Applicable Standards

According to FCC §15.407(a):

For client devices in the 5.15–5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

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

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

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

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

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

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

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

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

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

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

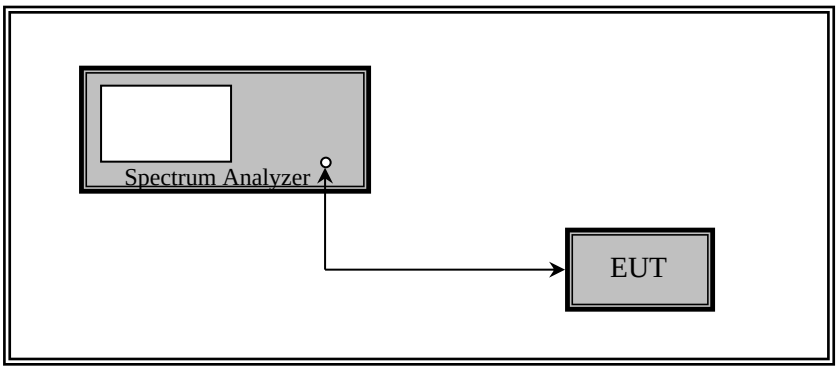
According to ISEDC RSS-247 §6.2.4 for frequency band 5725-5850 MHz:

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

10.2 Measurement Procedure

(i) Set span to encompass the entire emission bandwidth (EBW) of the signal.
(ii) Set RBW = 1 MHz.
(iii) Set VBW ≥ 3 MHz.
(iv) Number of points in sweep ≥ 2 Span / RBW. (This ensures that bin-to-bin spacing is ≤ RBW/2, so that narrowband signals are not lost between frequency bins.)
(v) Sweep time = auto.
(vi) Detector = RMS (i.e., power averaging), if available. Otherwise, use sample detector mode.
(vii) If transmit duty cycle < 98 percent, use a video trigger with the trigger level set to enable triggering only on full power pulses. Transmitter must operate at maximum power control level for the entire duration of every sweep. If the EUT transmits continuously (i.e., with no off intervals) or at duty cycle ≥ 98 percent, and if each transmission is entirely at the maximum power control level, then the trigger shall be set to "free run".
(viii) Trace average at least 100 traces in power averaging (i.e., RMS) mode.

10.3 Test Setup Block Diagram



10.4 Test Equipment List and Details

BACL No.	Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
00424	Agilent	Spectrum Analyzer	E4440A	US45303156	2022-12-19	12 Months
00624	Agilent	Spectrum Analyzer	E4446A	MY48250238	2023-05-12	12 Months

Note[1]: cable and attenuator included in the test set-up will be checked each time before testing.

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

10.5 Test Environmental Conditions

Temperature:	20.8°C
Relative Humidity:	34%
ATM Pressure:	102.9 kPa

The testing was performed by Michael Papa from 2023-10-31 to 2023-11-28 at RF site.

10.6 Test Results

5150-5250 MHz

Channel	Frequency (MHz)	Highest Antenna Gain (dBi)	PSD (dBm/MHz)		Total PSD (dBm/ MHz)	Limit (dBm/ MHz)	EIRP (dBm/ MHz)	EIRP Limit (dBm/ MHz)
			ANT A	ANT B				
802.11a								
36	5180	2	6.11	0.56	-	<11	8.11	<10
40	5200	2	5.98	0.41	-		7.98	<10
48	5240	2	5.23	-0.74	-		7.23	<10
802.11n20								
36	5180	4.77	4.03	-1.33	5.140	<11	9.91	<10
40	5200	4.77	3.93	-1.83	4.952		9.72	<10
48	5240	4.77	2.97	-2.57	4.040		8.81	<10
802.11n40								
38	5190	4.77	-0.78	-6.67	0.216	<11	4.986	<10
46	5230	4.77	-1.75	-7.52	-0.730		4.04	<10
802.11ac80								
42	5210	4.77	-6.40	-12.15	-5.375	<11	-0.605	<10

Note: EIRP PSD(dBm/MHz) = PSD (dBm/MHz) + Antenna Gain(dBi)
*Note: Total PSD (dBm/MHz) =10*Log (Ant A(mw)+Ant B(mw))*

5250-5350 MHz

Channel	Frequency (MHz)	PSD (dBm/MHz)		Total PSD (dBm/ MHz)	Limit (dBm/MHz)
		ANT A	ANT B		
802.11a					
52	5260	5.60	-0.04	-	<11
60	5300	5.21	0.05	-	
64	5320	5.58	-0.12	-	
802.11n20					
52	5260	3.50	-2.22	4.531	<11
60	5300	3.08	-1.70	4.327	
64	5320	3.23	-1.73	4.433	
802.11n40					
54	5270	-2.55	-8.24	-1.513	<11
62	5310	-2.55	-7.88	-1.434	
802.11ac80					
58	5290	-5.93	-11.63	-4.895	<11

*Note: Total PSD (dBm/MHz) =10*Log (Ant A(mw)+Ant B(mw))*

5470-5725 MHz

Channel	Frequency (MHz)	PSD (dBm/MHz)		Total PSD (dBm/ MHz)	Limit (dBm/MHz)
		ANT A	ANT B		
802.11a					
100	5500	5.66	1.18	-	<11
120	5600	4.78	-0.32	-	
140	5700	3.487	-0.080	-	
144	5720	1.93	-2.56	-	
144	5710-5725	-0.22	-5.25	-	
144*	5725-5730	-5.85	-9.47	-	<30 dBm/500kHz
802.11n20					
100	5500	4.28	-0.18	5.609	<11
120	5600	3.55	-1.00	4.856	
140	5700	1.413	-2.228	2.97	
144	5720	1.03	-3.58	2.320	
144	5710-5725	-1.69	-6.38	-0.420	
144*	5725-5730	-7.75	-10.49	-5.897	<30 dBm/500kHz
802.11n40					
102	5510	-0.69	-5.13	0.645	<11
118	5590	-1.09	-5.84	0.165	
134	5670	-1.996	-6.477	-0.67	
142	5710	-3.89	-8.68	-2.645	
142	5690-5725	-6.95	-10.93	-5.489	
142*	5725-5730	-13.15	-16.76	-11.580	<30 dBm/500kHz
802.11ac80					
106	5530	-5.07	-9.45	-3.719	<11
122	5610	-5.84	-11.10	-4.708	
138	5690	-8.28	-13.00	-7.018	
138	5650-5725	-9.65	-14.98	-8.534	
138*	5725-5730	-17.09	-20.52	-15.465	<30 dBm/500kHz

*Note: Total PSD (dBm/MHz) =10*Log (Ant A(mw)+Ant B(mw))*
Note: Due to channel being in U-NII-3 band, PSD and Limit is dBm/500kHz.*

5725-5850 MHz

Channel	Frequency (MHz)	PSD (dBm/510kHz)		Total PSD (dBm/ 510kHz)	Limit (dBm/500kHz)
		ANT A	ANT B		
802.11a					
149	5745	4.16	0.30	-	<30
157	5785	4.17	-0.19	-	
165	5825	3.83	0.75	-	
802.11n20					
149	5745	2.80	-1.26	4.238	<30
157	5785	3.12	-0.19	4.783	
165	5825	3.18	-0.03	4.875	
802.11n40					
151	5755	-1.16	-5.04	0.330	<30
159	5795	-1.09	-4.06	0.684	
802.11ac80					
155	5775	-8.19	-12.00	-6.680	<30

*Note: Total PSD (dBm/510kHz) =10*Log (Ant A(mw)+Ant B(mw))*
Note: 510 kHz was used for measurements to demonstrate worst-case compliance

Note: See Annex Power Spectrum Density test results.

11 Appendix A – EUT Test Setup Photographs

Please refer to the attachment.

12 Appendix B –EUT External Photographs

Please refer to the attachment.

13 Appendix C – EUT Internal Photographs

Please refer to the attachment.

14 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 ---