FCC PART 15.407

TEST REPORT

For

Cisco Systems, Inc.

125 West Tasman Drive
San Jose, CA 95134-1706
United States of America (Excluding The State of Alaska)

FCC ID: LDKIW9165DH

Report Type: Class II Permissive Change Report	**Product Type:** Outdoor Access Point
Prepared By:	Libass Thiaw RF Test Engineer
Report Number:	R2406203-407
Report Date:	2024-10-25
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ACCREDITED
CERTIFICATE #3297.02

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DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
0	R2406203-407	Class II Permissive Change Report	2024-10-25

1 General Description

1.1 Product Description for Equipment Under Test (EUT)

This test report is prepared on behalf of *Cisco Systems, Inc.*, and their product model: IW9165DH-B (for FCC), FCC ID: LDKIW9165DH, the "EUT" as referred to in this report. The EUT is designed to add wireless connectivity to moving vehicles and machines. The EUT is a BLE, 4.9 GHz, 5 GHz WI-Fi dual band, 6E Wi-Fi, and GNSS outdoor access point.

1.2 Mechanical Description of EUT

The UUT measures approximately 20cm (L) x 18cm (W) x 9cm (H) and weighs approximately 0.8 kg.

The data gathered was from a production sample provided by Cisco Systems, Inc. with S/N: FOC2638BL8P

1.3 Objective

This report is prepared on behalf of *Cisco Systems, Inc.* in accordance with FCC CFR47 §15.407. This report is prepared for the purpose of adding 6GHz capabilites.

The objective is to determine compliance with FCC Part 15.407 for Radiated Spurious Emissions.

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

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product maybe which result in lowering the immunity should be checked to ensure compliance has been maintained (i.e., printed circuit board layout changes, different line filter, different power supply, harnessing and/or I/O cable changes, etc.).

1.4 Related Submittal(s)/Grant(s)

N/A

1.5 Test Methodology

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

1.6 Measurement Uncertainty

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

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

1.7 Test Facility Registrations

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

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

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-428.

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 17025:2005 Scope of Accreditation includes all of the Test Method Standards and/or the Product Family Standards detailed in this Test Report.

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

B- ***A Product Certification Body accredited to ISO/IEC 17065:2012 by A2LA (Product Certification Body Accreditation Certificate Number 3297.03)*** to certify

- For the USA (Federal Communications Commission):
  - 1- All Unlicensed radio frequency devices within FCC Scopes A1, A2, A3, and A4;
  - 2- All Licensed radio frequency devices within FCC Scopes B1, B2, B3, and B4;
  - 3- All Telephone Terminal Equipment within FCC Scope C.
- For the Canada (Industry Canada):
  - 1 All Scope 1-Licence-Exempt Radio Frequency Devices;
  - 2 All Scope 2-Licensed Personal Mobile Radio Services;
  - 3 All Scope 3-Licensed General Mobile & Fixed Radio Services;
  - 4 All Scope 4-Licensed Maritime & Aviation Radio Services;
  - 5 All Scope 5-Licensed Fixed Microwave Radio Services
  - 6 All Broadcasting Technical Standards (BETS) in the Category I Equipment Standards List.
- For Singapore (Info-Communications Development Authority (IDA)):
  - 1 All Line Terminal Equipment: All Technical Specifications for Line Terminal Equipment – Table 1 of IDA MRA Recognition Scheme: 2011, Annex 2
  - 2. All Radio-Communication Equipment: All Technical Specifications for Radio-Communication Equipment – Table 2 of IDA MRA Recognition Scheme: 2011, Annex 2
- For the Hong Kong Special Administrative Region:
  - 1 All Radio Equipment, per KHCA 10XX-series Specifications;
  - 2 All GMDSS Marine Radio Equipment, per HKCA 12XX-series Specifications;
  - 3 All Fixed Network Equipment, per HKCA 20XX-series Specifications.
- For Japan:
  - 1 MIC Telecommunication Business Law (Terminal Equipment):
    - All Scope A1 - Terminal Equipment for the Purpose of Calls;
    - All Scope A2 - Other Terminal Equipment
  - 2 Radio Law (Radio Equipment):
    - All Scope B1 - Specified Radio Equipment specified in Article 38-2-2, paragraph 1, item 1 of the Radio Law
    - All Scope B2 - Specified Radio Equipment specified in Article 38-2-2, paragraph 1, item 2 of the Radio Law
    - All Scope B3 - Specified Radio Equipment specified in Article 38-2-2, paragraph 1, item 3 of the Radio Law

C- ***A Product Certification Body accredited to ISO/IEC 17065:2012 by A2LA (Product Certification Body Accreditation Certificate Number 3297.01)*** to certify Products to USA's Environmental Protection Agency (EPA) ENERGY STAR Product Specifications for:

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

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

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

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

5 Other
- For Water Coolers (ver. 3.0)

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

- Australia: ACMA (Australian Communication and Media Authority) – APEC Tel MRA -Phase I;
- Canada: (Innovation, Science and Economic development Canada - ISEDC) Foreign Certification Body – FCB – APEC Tel MRA -Phase I & Phase II;
- Chinese Taipei (Republic of China – Taiwan):
  - BSMI (Bureau of Standards, Metrology and Inspection) APEC Tel MRA -Phase I;
  - NCC (National Communications Commission) APEC Tel MRA -Phase I;
- European Union:
  - EMC Directive 2014/30/EU US-EU EMC & Telecom MRA CAB (NB)
  - Radio Equipment (RE) Directive 2014/53/EU US-EU EMC & Telecom MRA CAB (NB)
  - Low Voltage Directive (LVD) 2014/35/EU
- Hong Kong Special Administrative Region: (Office of the Telecommunications Authority – OFTA) APEC Tel MRA -Phase I & Phase II
- Israel – US-Israel MRA Phase I
- Republic of Korea (Ministry of Communications - Radio Research Laboratory) APEC Tel MRA -Phase I
- Singapore: (Infocomm Media Development Authority - IMDA) APEC Tel MRA -Phase I & Phase II;
- Japan: VCCI - Voluntary Control Council for Interference US-Japan Telecom Treaty VCCI Side Letter-
- USA:
  - ENERGY STAR Recognized Test Laboratory – US EPA
  - Telecommunications Certification Body (TCB) – US FCC;
  - Nationally Recognized Test Laboratory (NRTL) – US OSHA

Vietnam: APEC Tel MRA -Phase I;

2 System Test Configuration

2.1 Justification

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

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

2.2 EUT Exercise Software

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

Modulation	Frequency (MHz)	Power Setting Radio 2
802.11ax20	5955	34
	6195	34
	6415	34
	6535	34
	6695	34
	6855	34

Data rates used:
802.11ax20: m0h1

2.3 Equipment Modification

No modifications were made to the EUT during testing.

2.4 Local Support Equipment

Manufacturer	Description	Model
Dell	Laptop	Latitude E6410

2.5 Remote Support Equipment

Manufacturer	Description	Model
LiteON	Power Supply	PA-1600-1C

2.6 Interface Ports and Cabling

Cable Description	Length (m)	From	To
USB A to RJ45	< 1 m	EUT	Laptop
Power Supply	< 1 m	EUT	Power

3 Summary of Test Results

FCC Rules	Description of Test	Results
FCC §2.1053, §15.35(b), §15.205, §15.209, 15.407(b)	Radiated Spurious Emissions	Compliant

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

4 FCC §15.35(b), §15.205, §15.209, §15.407(b) –Radiated Spurious Emissions

4.1 Applicable Standard

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

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

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

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

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

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

As per FCC §15.407 (b),

6) For transmitters operating within the 5.925-7.125 GHz band: Any emissions outside of the 5.925-7.125 GHz band must not exceed an e.i.r.p. of −27 dBm/MHz.
7) For transmitters operating within the 5.925-7.125 GHz bands: Power spectral density must be suppressed by 20 dB at 1 MHz outside of channel edge, by 28 dB at one channel bandwidth from the channel center, and by 40 dB at one- and one-half times the channel bandwidth away from channel center. At frequencies between one megahertz outside an unlicensed device's channel edge and one channel bandwidth from the center of the channel, the limits must be linearly interpolated between 20 dB and 28 dB suppression, and at frequencies between one and one- and one-half times an unlicensed device's channel bandwidth, the limits must be linearly interpolated between 28 dB and 40 dB suppression. Emissions removed from the channel center by more than one- and one-half times the channel bandwidth must be suppressed by at least 40 dB
8) The emission measurements shall be performed using a minimum resolution bandwidth of 1 MHz. A lower resolution bandwidth may be employed near the band edge, when necessary, provided the measured energy is integrated to show the total power over 1 MHz.
9) Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in §15.209. Further, any U-NII devices using an AC power line are required to comply also with the conducted limits set forth in §15.207.
10) The provisions of §15.205 apply to intentional radiators operating under this section.

4.2 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 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.

4.3 Test Procedure

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

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

The spectrum analyzer or receiver is set as:

Below 1000 MHz:

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

Above 1000 MHz:

(1) Peak: RBW = 1MHz / VBW = 3MHz / Sweep = 100ms
(2) Average: RBW = 1MHz / VBW = 10Hz or 1/T / Sweep = Auto

4.4 Corrected Amplitude and Margin Calculation

For emissions below 1 GHz,

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

CA = S.A. Reading + Correction Factor

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

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

Correction Factor = AF + CL + Atten – Ga

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

Margin = Corrected Amplitude – Limit

For emission above 1 GHz,

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

CA = Ai + AF + CL + Atten – Ga

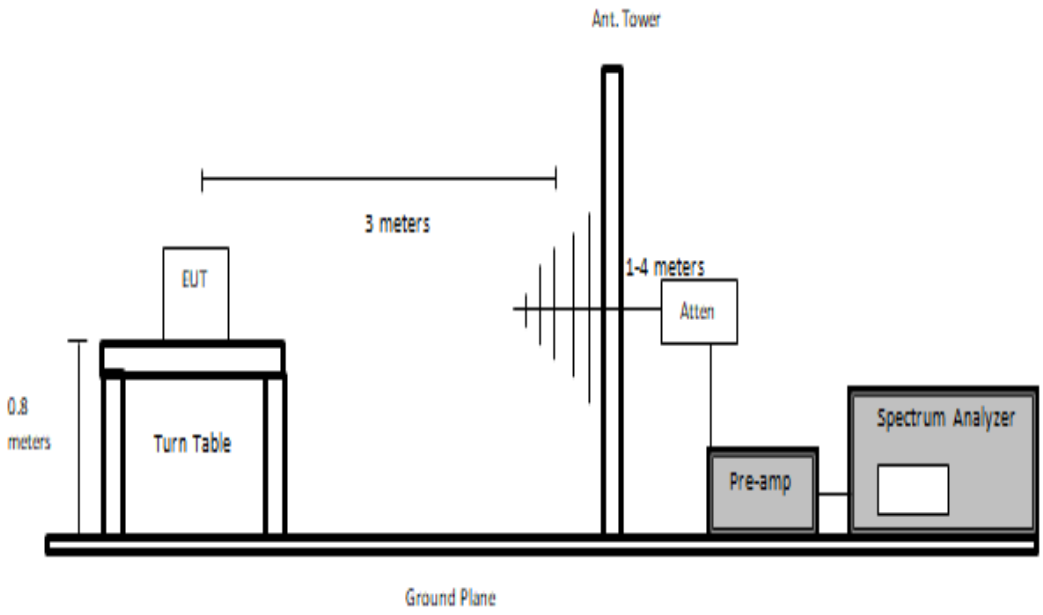
For example, a corrected amplitude of 40.3 dBuV/m = Indicated Reading (32.5 dBuV) + Antenna Factor (+23.5dB) + Cable Loss (3.7 dB) + Attenuator (10 dB) - Amplifier Gain (29.4 dB)

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

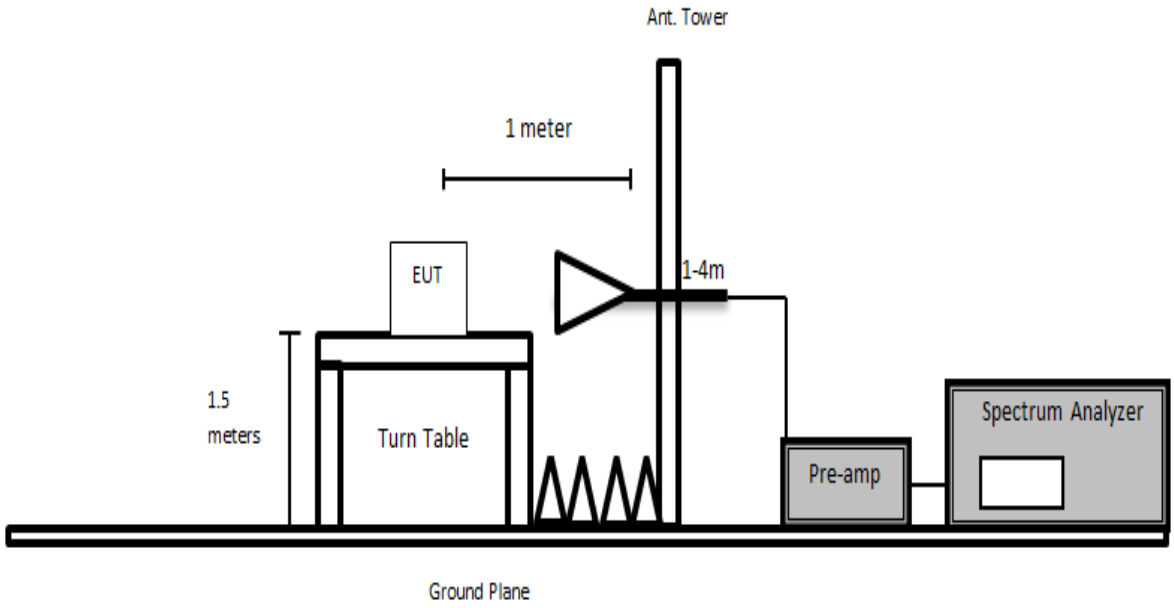
Margin = Corrected Amplitude – Limit

4.5 Test Setup Block Diagram

Below 1 GHz



Above 1 GHz



4.6 Test Equipment List and Details

For testing on 2024-07-01 to 2024-07-08

BACL No.	Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
310	Rhode & Schwarz	EMI Test Receiver	ESCI 1166.5950.03	100338	2024-05-29	1 year
424	Agilent	Spectrum Analyzer	E4440A	US45303156	2024-03-06	1 year
624	Agilent	Spectrum Analyzer	E4446A	MY48250238	2024-06-14	1 year
327	Sunol Science Corp	System Controller	SC110V	122303-1	N/R	N/A
316	Sonoma Instruments	Preamplifier 10 kHz - 2.5 GHz	317	260406	2024-02-27	6 months
658	HP/Agilent	Pre-Amplifier	8449B OPT HO2	3008A01103	2024-06-18	6 months
827	AH Systems	Preamplifier	PAM 1840 VH	170	2024-05-05	6 months
321	Sunol Sciences	Biconilog Antenna	JB3	A020106-2; 1504	2023-12-18	2 years
1192	ETS Lindgren	Horn Antenna	3117	00218973	2022-09-29	2 years
91	ETS Lindgren	Horn Antenna	ARH-4223-02	10555-02	2024-03-14	2 years
92	ETS Lindgren	Horn Antenna	ARH-2823-02	10555-01	2024-06-26	2 years
1186	Pasternack	Coaxial Cable, RG214	PE3062-1050CM	1	2023-10-03	1 year
1248	Pasternack	RG214 COAX Cable	PE3062	-	2023-10-04	1 year
1249	Time Microwave	LMR-400 Cable Dc-3 Ghz	AE13684	2k80612-5 6fts	2023-09-26	1 year
1353	RFMW	2.92mm 10ft RF Cable DC to 40 GHz	P1CA-29M29M-F150-120	NA	2024-01-24	6 months
1329	Pasternack	2.92mm short coaxial cable	PE360-12	NA	2024-05-06	6 months
1346	RFMW	2.92mm 10ft RF cable	KMSE-160SAW-240.0-KSME	NA	2024-05-03	6 Months
1362	Marvelous Microwave Inc	SMA Notch Filter, 5925MHz - 7125MHz	5925.7125.S1	D30002N	2024-04-14	1 year
1245	-	6dB Atennuator	PE7390-6	01182018A	2022-11-22	2 year
1246	HP	RF Limiter	11867A	01734	2024-04-09	1 year

For testing on 2024-12-27

BACL No.	Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Interval
310	Rhode & Schwarz	EMI Test Receiver	ESCI 1166.5950.03	100338	2024-05-29	1 year
316	Sonoma Instruments	Preamplifier 10 kHz - 2.5 GHz	317	260406	2024-08-30	6 months
321	Sunol Sciences	Biconilog Antenna	JB3	A020106-2; 1504	2023-12-18	2 years
1245	-	Attenuator	PE7390-6	01182018A	2023-12-18	2 years
1248	Pasternack	RG214 COAX Cable	PE3062	NA	2024-10-01	6 months
1249	Time Microwave	LMR-400 Cable Dc-3 GHz	AE13684	2k80612-5 6fts	2024-04-09	1 year
1359	Pasternack	N 600in RF Cable	PE3496LF-600	NA	2024-07-26	6 months
1246	HEWLET PACKARD	RF Limiter	11867A	01734	2024-04-09	1 year

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".*

4.7 Test Environmental Conditions

Temperature:	22-23° C
Relative Humidity:	46-48 %
ATM Pressure:	101.1-101.9 kPa

The testing was performed by Libass Thiaw from 2024-07-01 to 2024-07-08, and Kevin Chau on 2024-12-27 in 5m chamber 3.

4.8 Summary of Test Results

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

Worst Case – Mode: Transmitting			
Margin (dB)	**Frequency (MHz)**	**Polarization (Horizontal/Vertical)**	**Configuration**
-1.03	381.3113	Horizontal	802.11ax20, 5955MHz

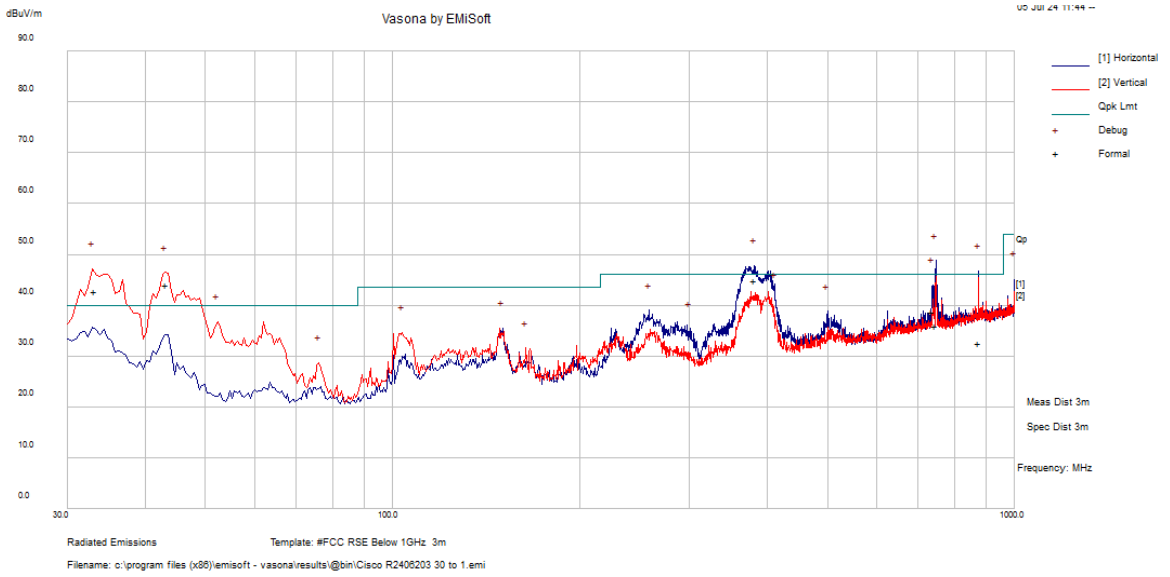
Please refer to the tables and plots in the next section for detailed test results.

4.9 Radiated Emissions Test Result Data

Note: The EUT is not transmitting at below 30 MHz, thus 9 kHz to 30 MHz was not evaluated for Spurious Emissions.
Note: peak detector was used in comparison to QP limit in some cases to show worst-case compliance. In such cases, it is clearly shown that no emissions appear above the noise floor, thus positon is independent of any max readings noticed.
Note: Note: 802.1ax20 was measured and evaluated to be the worst case configuration per its modulation family.
Note: Testing was performed with output ports terminated into a load and both radios transmited at max power through both paths respectively
Note: As per FCC Part 15.407, emissions outside the restricted bands shall not exceed -27dBm/MHz. Per ANSI 63.10-2013 Section 12.7.2: E[dBµV/m] = EIRP [dBM] + 95.2, for d = 3meters. Thus Limit [dBµV/m @ 3m]=-27[dBm/MHz] + 95.3=68.3[dBµV/m @ 3m]

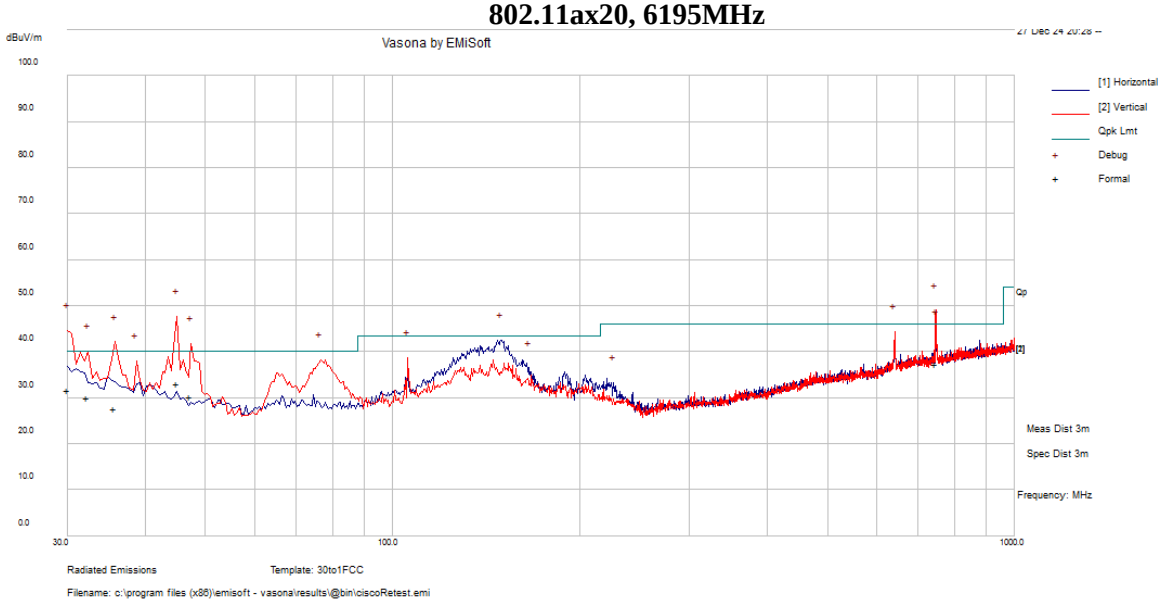
1) 30 MHz – 1 GHz, Measured at 3 meters

802.11ax20, 5955MHz



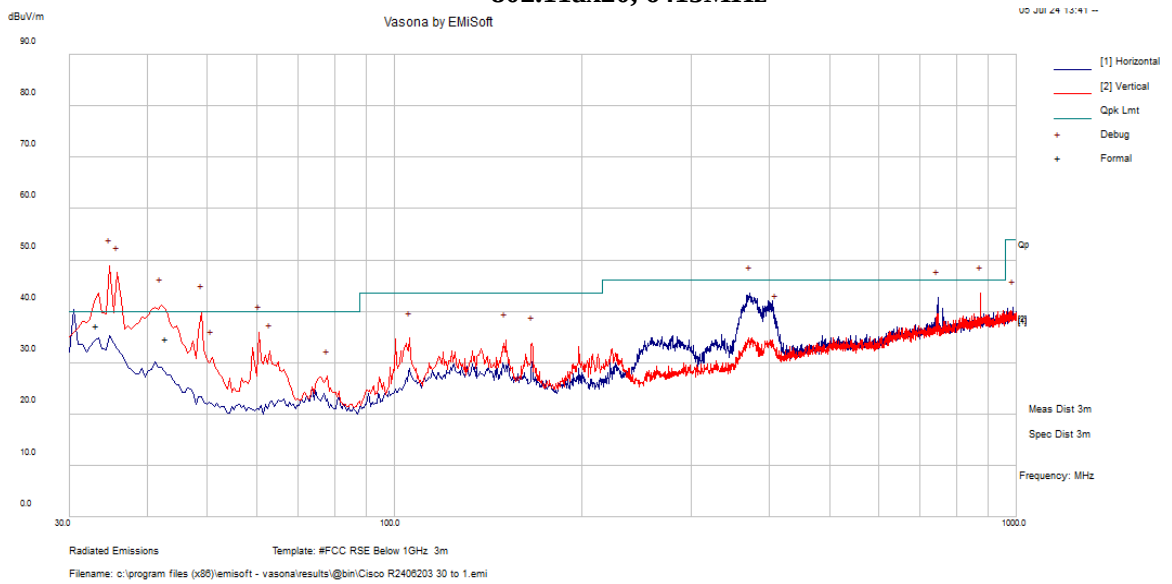
Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Detector
43.00925	44.45	-9.88	34.57	131	V	205	40	-5.43	Q-Peak
33.22175	40.56	-3.3	37.26	134	V	30	40	-2.74	Q-Peak
747.0693	33.65	2.24	35.9	126	H	260	46	-10.1	Q-Peak
381.3113	**49.7**	**-4.73**	**44.97**	**101**	**H**	**258**	**46**	**-1.03**	**Q-Peak**
875.241	28.53	4.01	32.54	264	H	6	46	-13.46	Q-Peak
737.7758	36.56	2.16	38.72	210	H	149	46	-7.28	Q-Peak

802.11ax20, 6195MHz



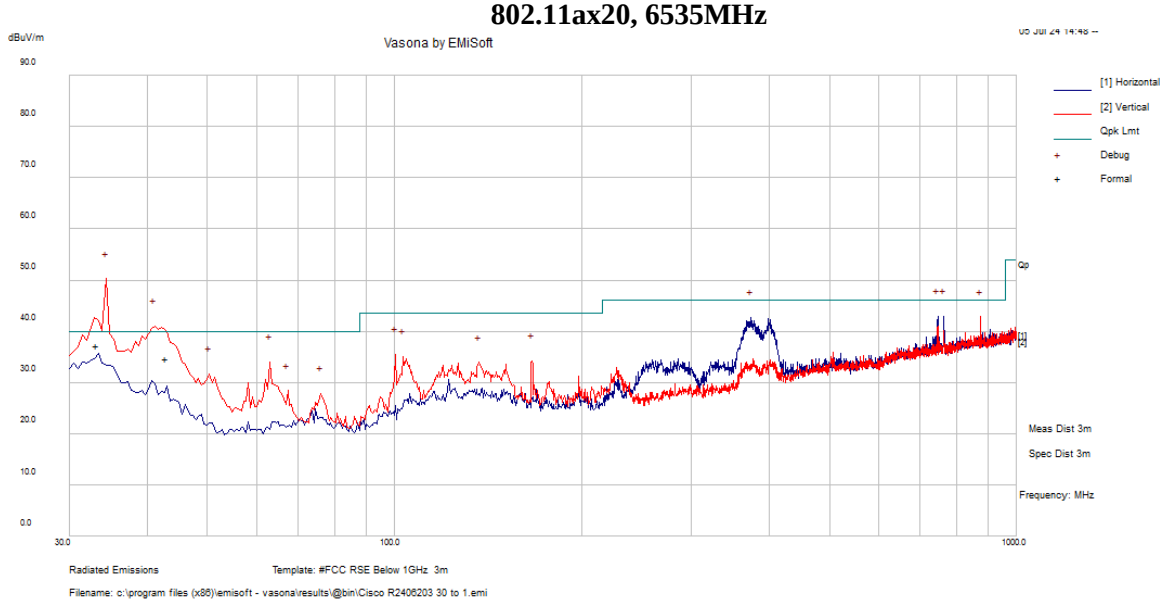
Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Detector
44.9595	44.03	-10.89	33.15	107	V	344	40	-6.85	Q-Peak
30.00187	32.24	-0.61	31.64	109	V	348	40	-8.36	Q-Peak
747.0368	32.87	4.46	37.33	157	V	210	46	-8.67	Q-Peak
35.67825	32.21	-4.46	27.75	134	V	7	40	-12.25	Q-Peak
47.27275	42.32	-12.06	30.26	127	V	45	40	-9.74	Q-Peak
32.3085	32.37	-2.38	29.99	109	V	353	40	-10.01	Q-Peak

802.11ax20, 6415MHz



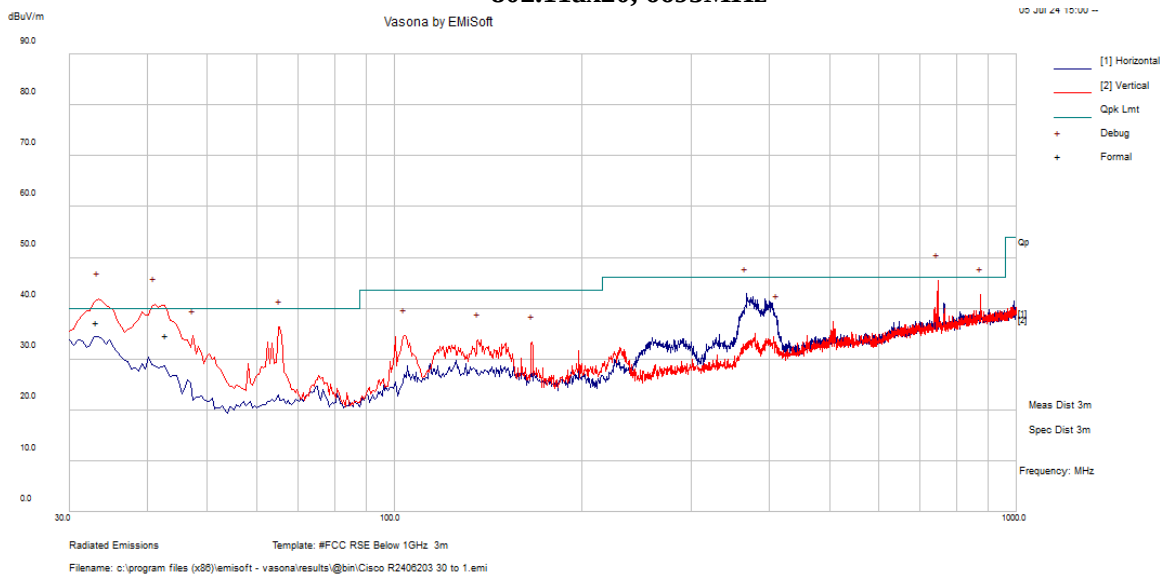
Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Detector
35.8915	34.49	-4.94	29.56	106	V	274	40	-10.44	Q-Peak
42.30375	42.43	-9.37	33.06	110	V	315	40	-6.94	Q-Peak
48.67075	33.43	-13.1	20.34	142	V	288	40	-19.66	Q-Peak
372.6718	38.7	-4.71	33.99	105	H	261	46	-12.01	Q-Peak
875.3968	27.89	4.01	31.89	155	H	172	46	-14.11	Q-Peak
34.619	34.98	-4.13	30.86	100	V	332	40	-9.14	Q-Peak

802.11ax20, 6535MHz



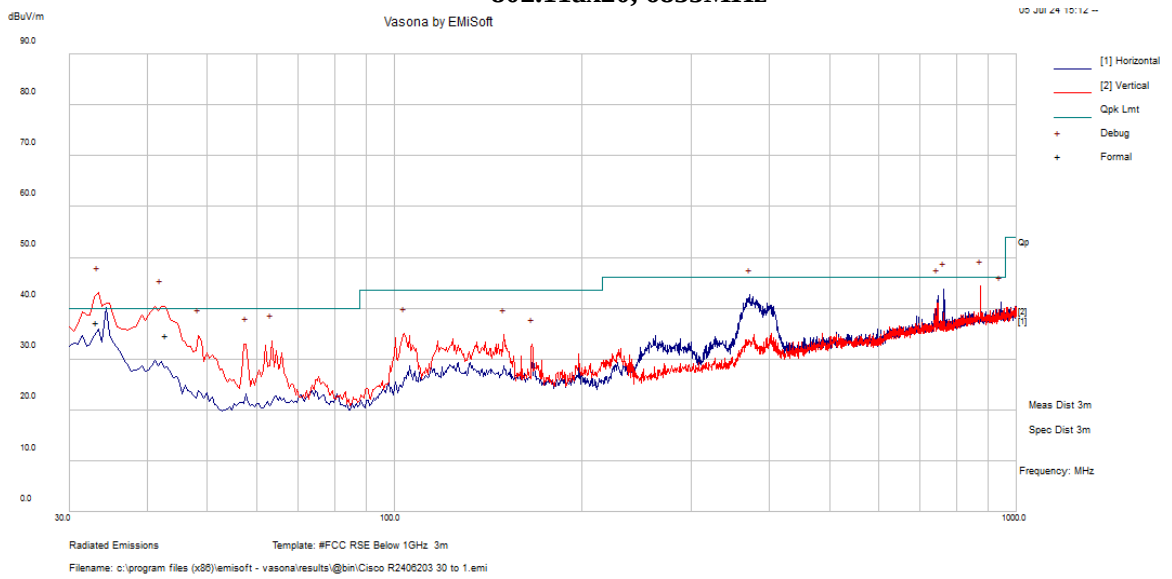
Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Detector
34.14275	35.52	-3.84	31.67	161	V	126	40	-8.33	Q-Peak
41.20025	36.29	-8.62	27.67	140	V	68	40	-12.33	Q-Peak
763.391	27.89	2.32	30.22	239	H	117	46	-15.78	Q-Peak
746.7873	28.05	2.24	30.29	189	H	189	46	-15.71	Q-Peak
875.3968	27.85	4.01	31.85	247	V	221	46	-14.15	Q-Peak
374.3533	37.52	-4.73	32.79	109	H	96	46	-13.21	Q-Peak

802.11ax20, 6695MHz



Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Detector
33.29075	41.23	-3.34	37.89	114	V	204	40	-2.11	Q-Peak
65.3095	36.47	-13.38	23.09	236	V	229	40	-16.91	Q-Peak
41.35825	39.09	-8.73	30.36	101	V	7	40	-9.64	Q-Peak
746.8578	27.86	2.24	30.1	293	V	141	46	-15.9	Q-Peak
367.73	34.77	-4.67	30.1	290	H	267	46	-15.9	Q-Peak
875.2395	27.84	4.01	31.84	144	H	111	46	-14.16	Q-Peak

802.11ax20, 6855MHz



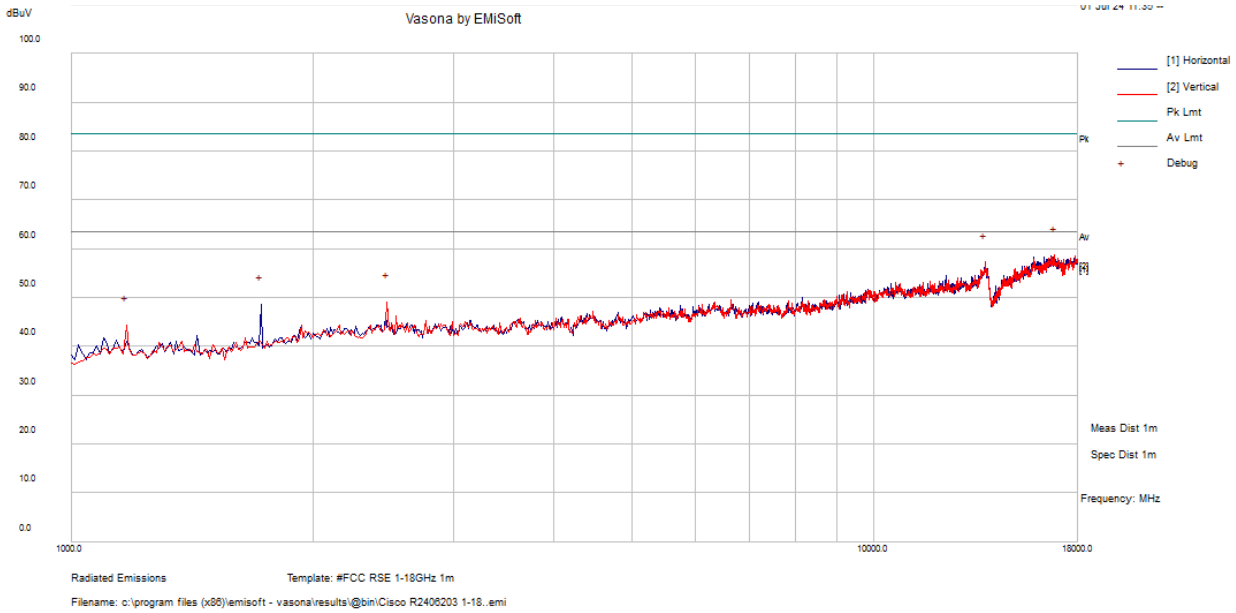
Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Detector
33.294	41.79	-3.35	38.45	101	V	290	40	-1.55	Q-Peak
42.335	39.43	-9.4	30.03	135	V	352	40	-9.97	Q-Peak
875.4783	27.88	4.01	31.88	164	V	289	46	-14.12	Q-Peak
764.3018	28.45	2.34	30.78	152	H	257	46	-15.22	Q-Peak
372.465	37.85	-4.71	33.13	102	H	257	46	-12.87	Q-Peak
746.82	29.57	2.24	31.81	148	H	107	46	-14.19	Q-Peak

FCC Limits for 1 GHz to 40 GHz				
Applicability	**(dBm)**	**(uV/m at 3meters)**	**(dBuV/m at 3meters)**	**(dBuV/m at 1meter)**
Restricted Band Average Limit	-	500	54[2]	63.54[3]
Restricted Band Peak Limit[1]	-	-	74	83.54
FCC §15.407(b) Defined Unwanted Emissions Limit	-27	-	68	77.74[4]

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

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

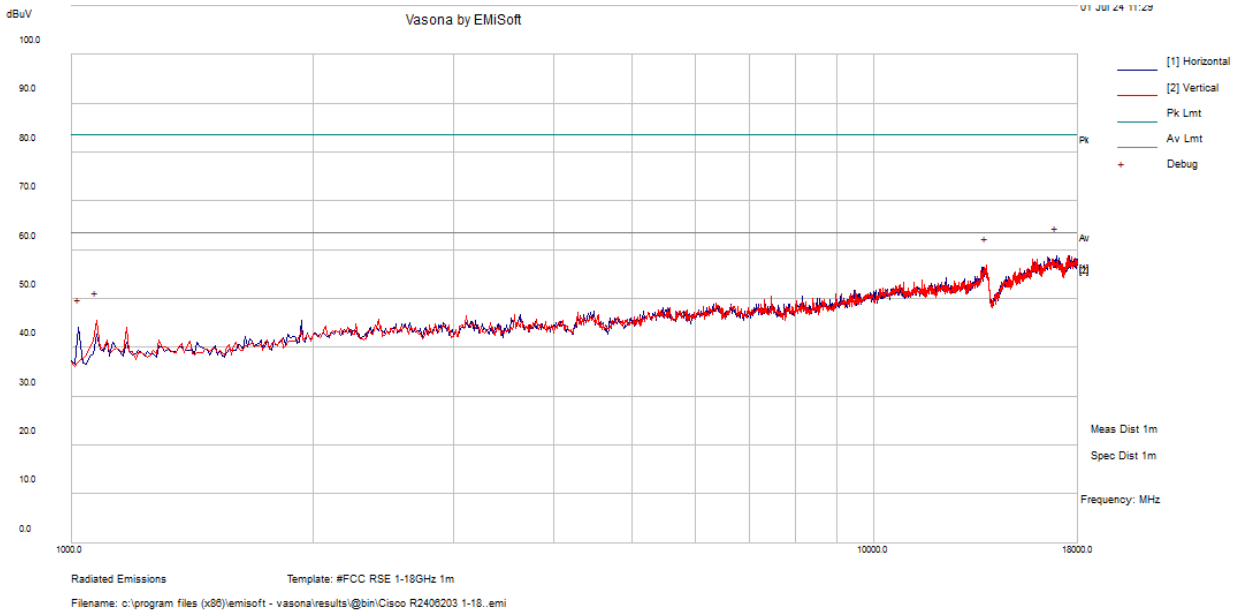
802.11ax20, 5955 MHz



Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Detector
16820.63	46.84	11.82	58.66	100	V	0	63.54	-4.88	Peak
13792.5	45.24	12.01	57.25	100	V	0	63.54	-6.29	Peak
2476.875	52.26	-3.16	49.1	100	V	0	63.54	-14.44	Peak
1722.5	55.75	-7.15	48.6	100	H	0	63.54	-14.94	Peak
1170	54.83	-10.44	44.39	100	V	0	63.54	-19.15	Peak

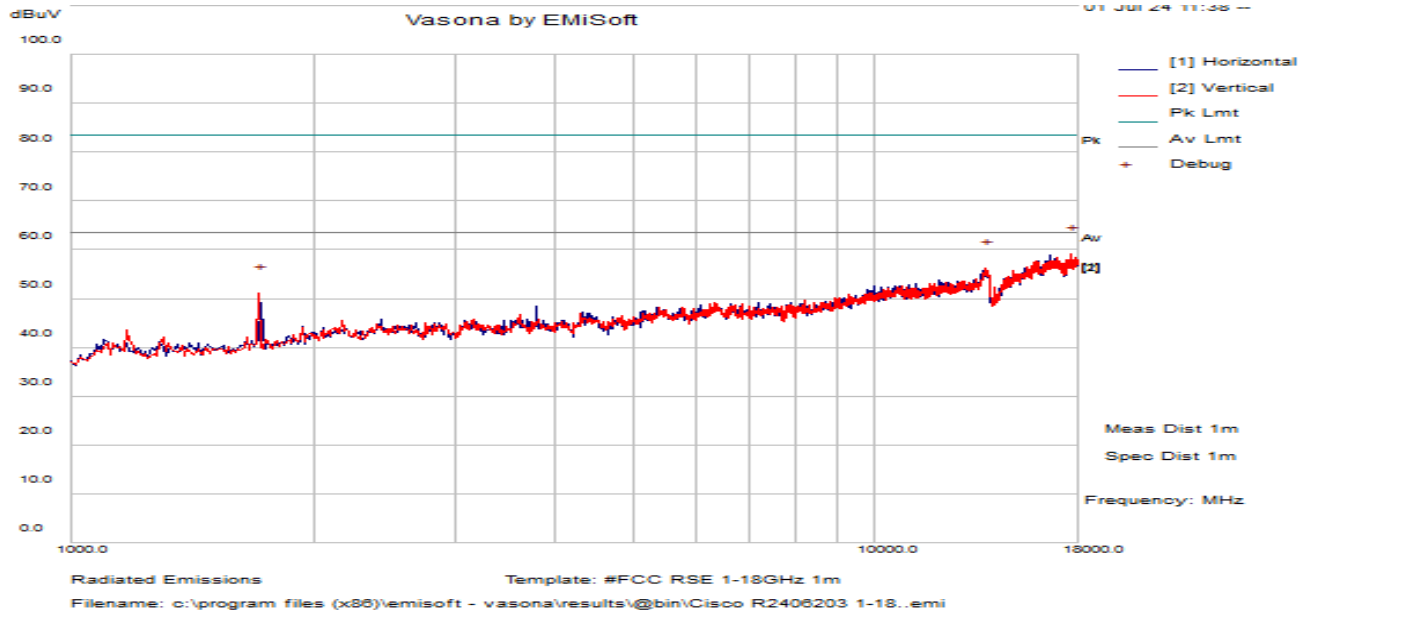
Note: The plot above shows that all peak emissions below 18GHz passed the average limits.

802.11ax20, 6195 MHz



Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Detector
16926.88	47.06	11.71	58.77	100	H	0	63.54	-4.77	Peak
13835	45.05	11.7	56.75	100	V	0	63.54	-6.79	Peak
1074.375	56.34	-10.76	45.58	100	V	0	63.54	-17.96	Peak
1021.25	56.13	-12.02	44.11	100	H	0	63.54	-19.43	Peak

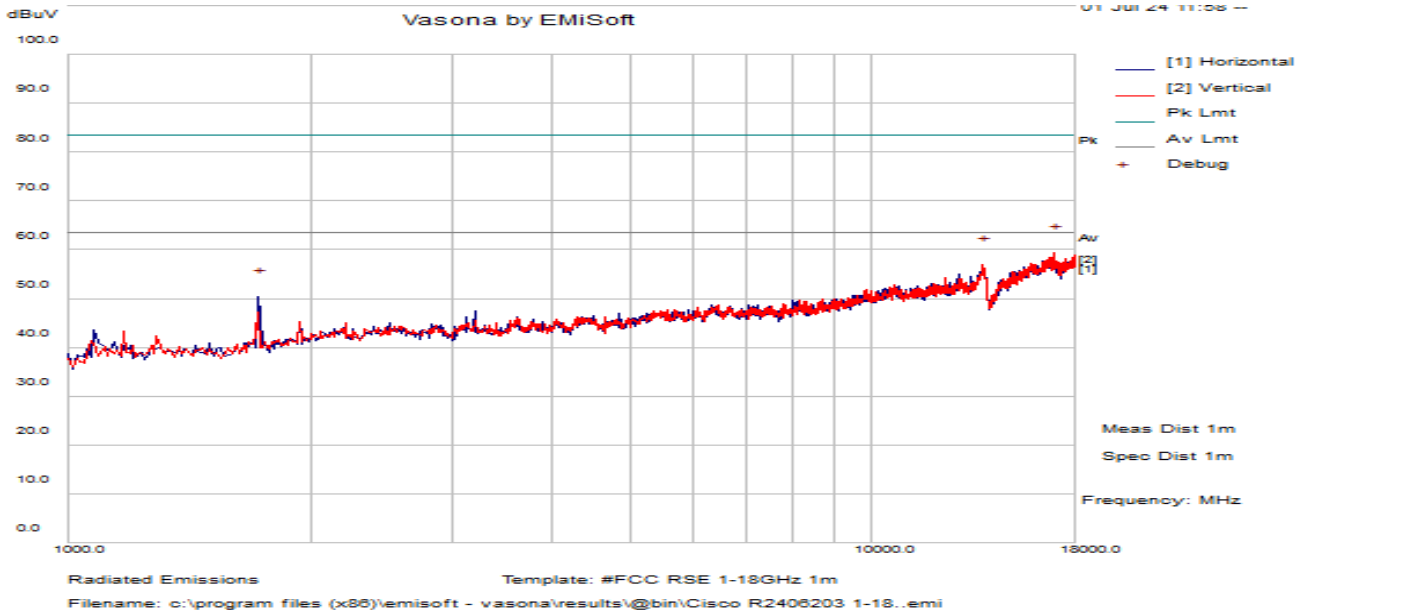
802.11ax20, 6415 MHz



Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Detector
17638.75	47.78	11.44	59.22	100	V	0	63.54	-4.32	Peak
13750	44.75	11.57	56.32	100	V	0	63.54	-7.22	Peak
1711.875	58.31	-7.23	51.08	100	V	0	63.54	-12.46	Peak

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

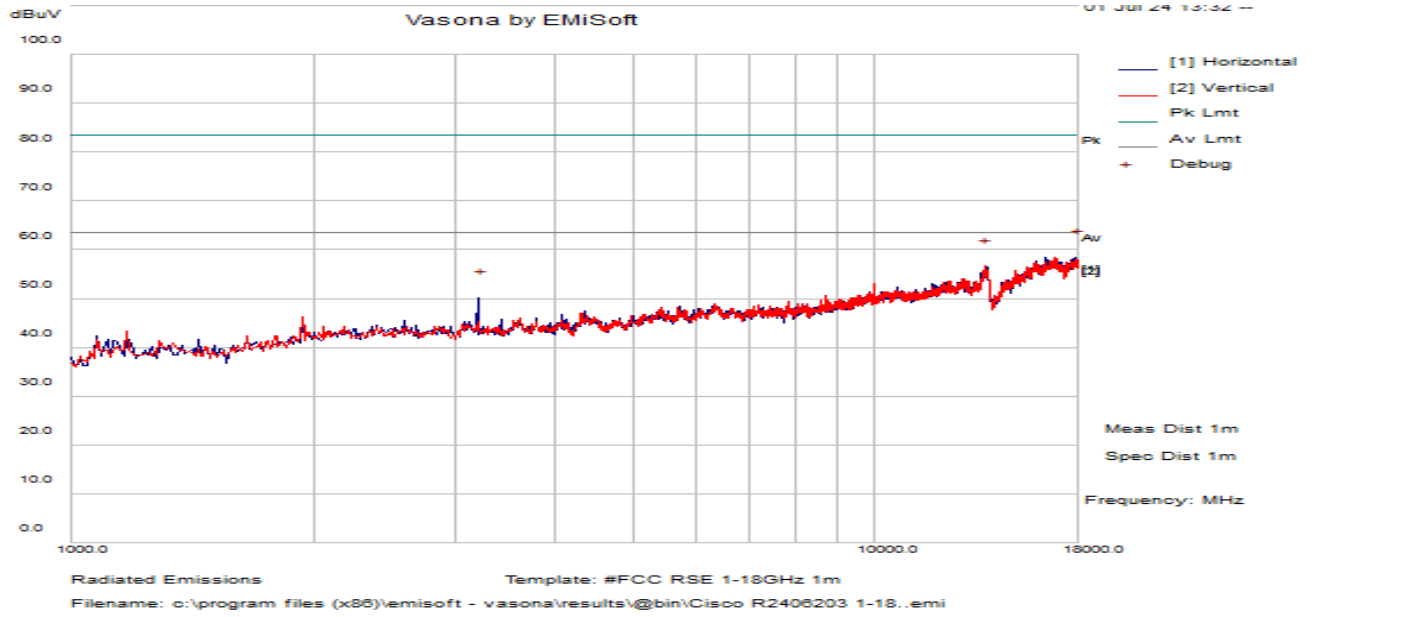
802.11ax20, 6535 MHz



Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Detector
16926.88	47.64	11.71	59.35	100	V	0	63.54	-4.19	Peak
13813.75	45.04	11.94	56.98	100	V	0	63.54	-6.57	Peak
1722.5	57.47	-7.15	50.32	100	H	0	63.54	-13.22	Peak

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

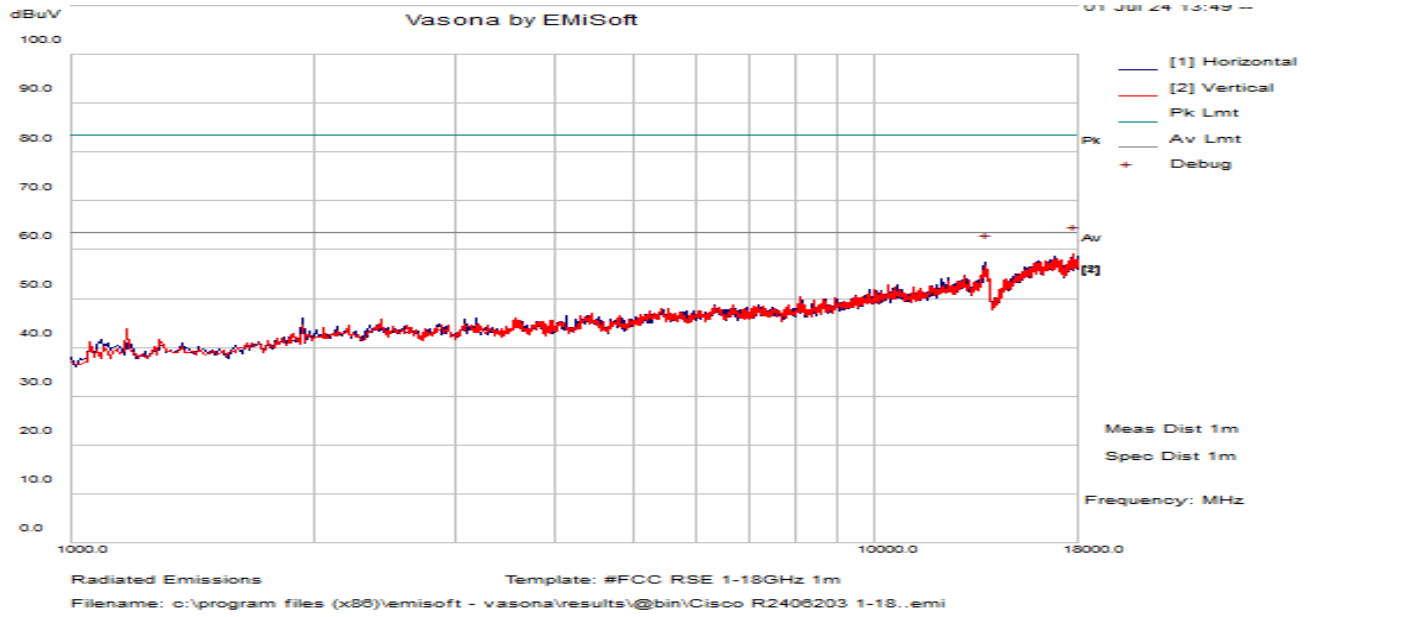
802.11ax20, 6695 MHz



Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Detector
17861.88	47.1	11.35	58.45	100	H	0	63.54	-5.09	Peak
13728.75	45.39	11.23	56.62	100	V	0	63.54	-6.92	Peak
3210	53.02	-2.88	50.14	100	H	0	63.54	-13.4	Peak

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

802.11ax20, 6855 MHz

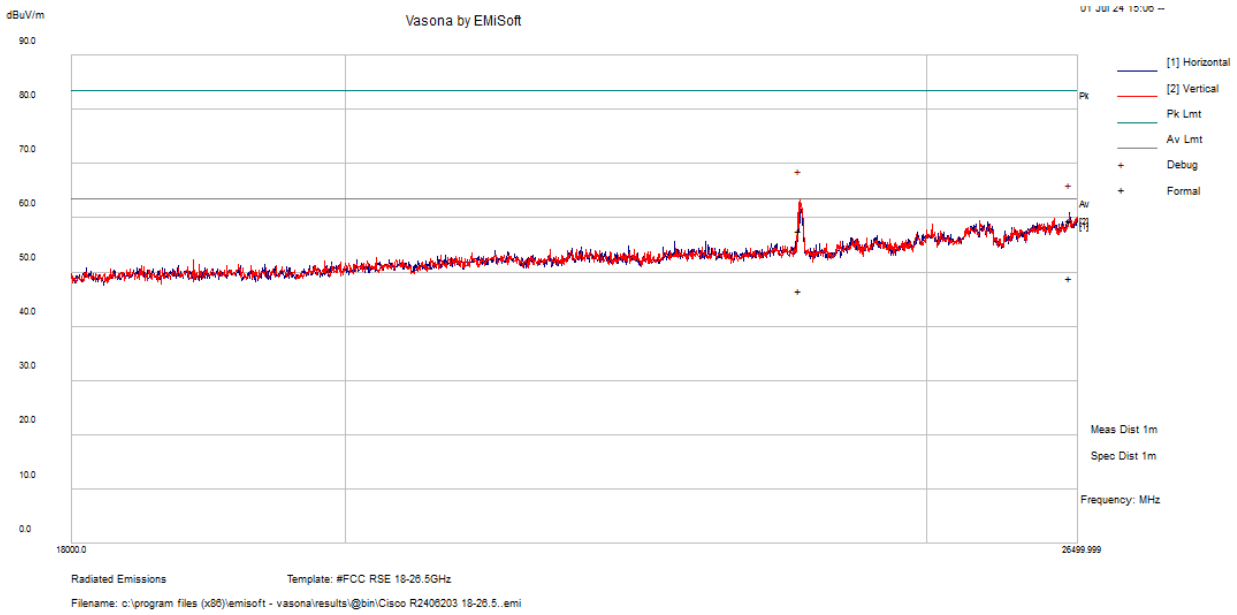


Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Detector
17691.88	47.89	11.34	59.23	100	V	0	63.54	-4.31	Peak
13728.75	46.24	11.22	57.46	100	H	0	63.54	-6.08	Peak

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

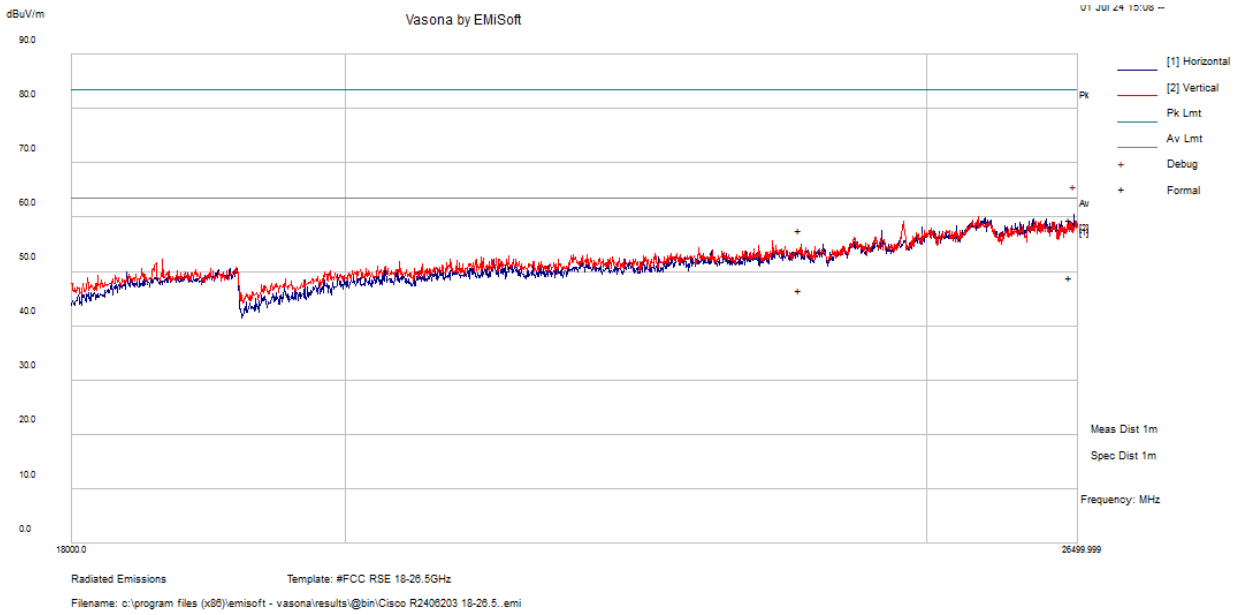
3) 18 GHz – 26.5 GHz, Measured at 1 meter

802.11ax20, 5955MHz



Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Detector
23810.05	49.46	8.06	57.52	226	V	209	83.54	-26.02	Peak
26416.77	45.57	13.93	59.5	214	H	150	83.54	-24.04	Peak
23810.05	38.44	8.06	46.5	226	V	209	63.54	-17.04	Average
26416.77	35.09	13.93	49.02	214	H	150	63.54	-14.52	Average

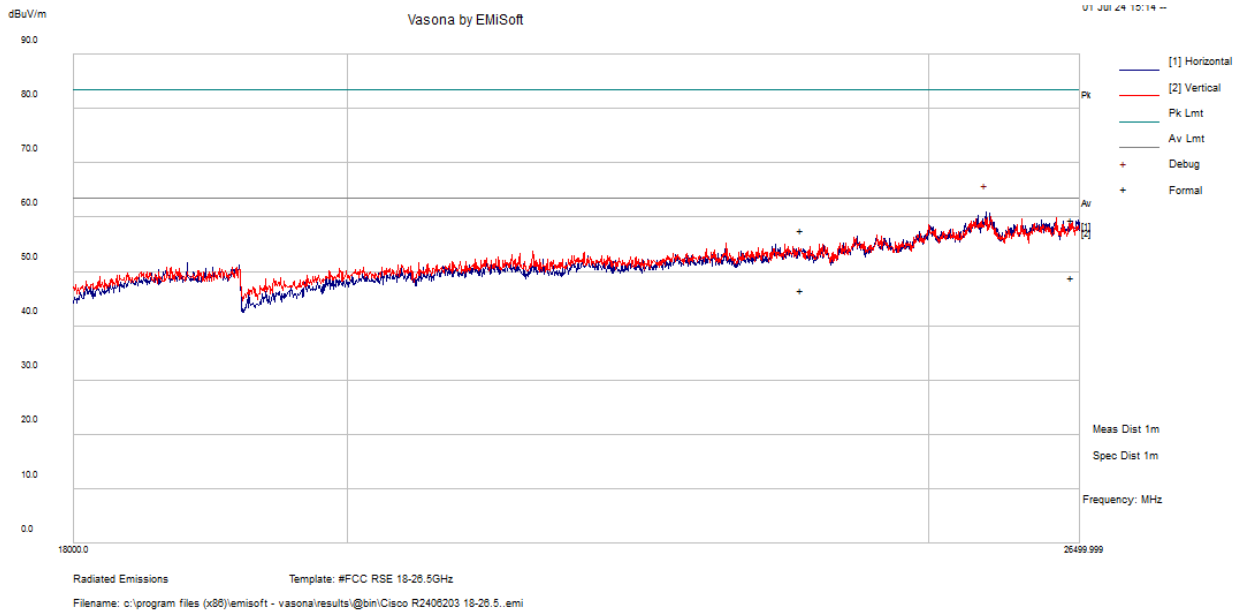
802.11ax20, 6195MHz



Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Detector
26462.81	46.19	14.38	60.57	200	H	0	63.54	-2.97	Peak

Note: *Above table and plot show all peak emissions pass under stricter average limit and thus show compliance in range of 18-26.5GHz*

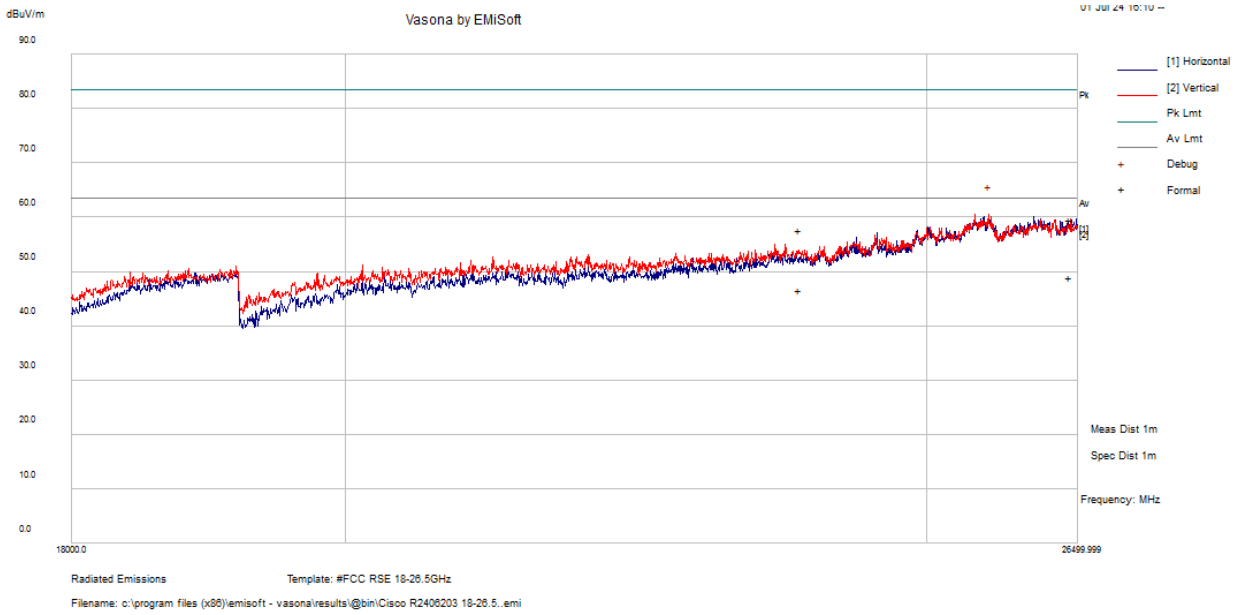
802.11ax20, 6415MHz



Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Detector
25559.69	49.51	11.35	60.86	200	H	0	63.54	-2.68	Peak

Note: *Above table and plot show all peak emissions pass under stricter average limit and thus show compliance in range of 18-26.5GHz*

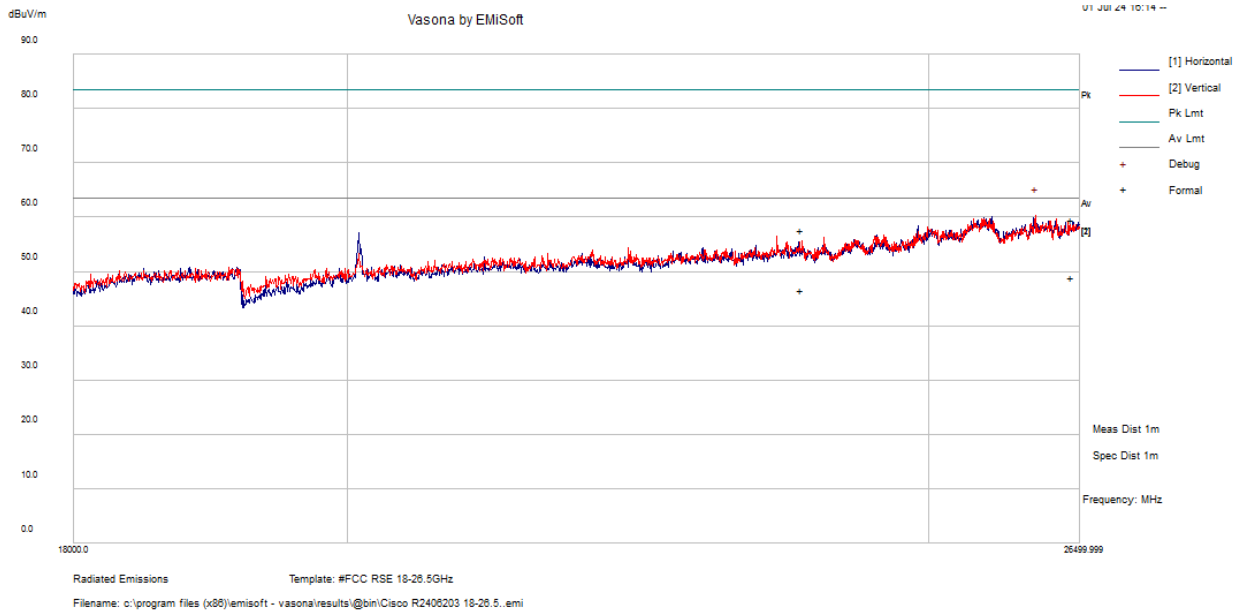
802.11ax20, 6535MHz



Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Detector
25607.5	48.98	11.58	60.56	200	V	0	63.54	-2.98	Peak

Note: *Above table and plot show all peak emissions pass under stricter average limit and thus show compliance in range of 18-26.5GHz*

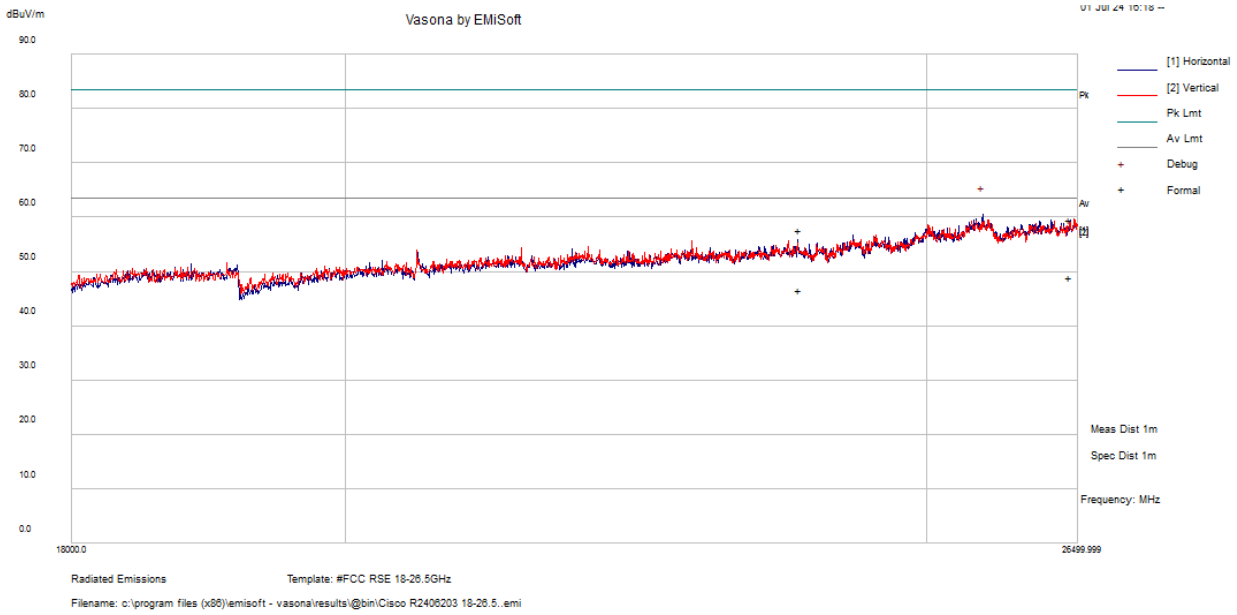
802.11ax20, 6695MHz



Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Detector
26059.06	46.87	13.39	60.26	200	V	0	63.54	-3.28	Peak

Note: *Above table and plot show all peak emissions pass under stricter average limit and thus show compliance in range of 18-26.5GHz*

802.11ax20, 6855MHz

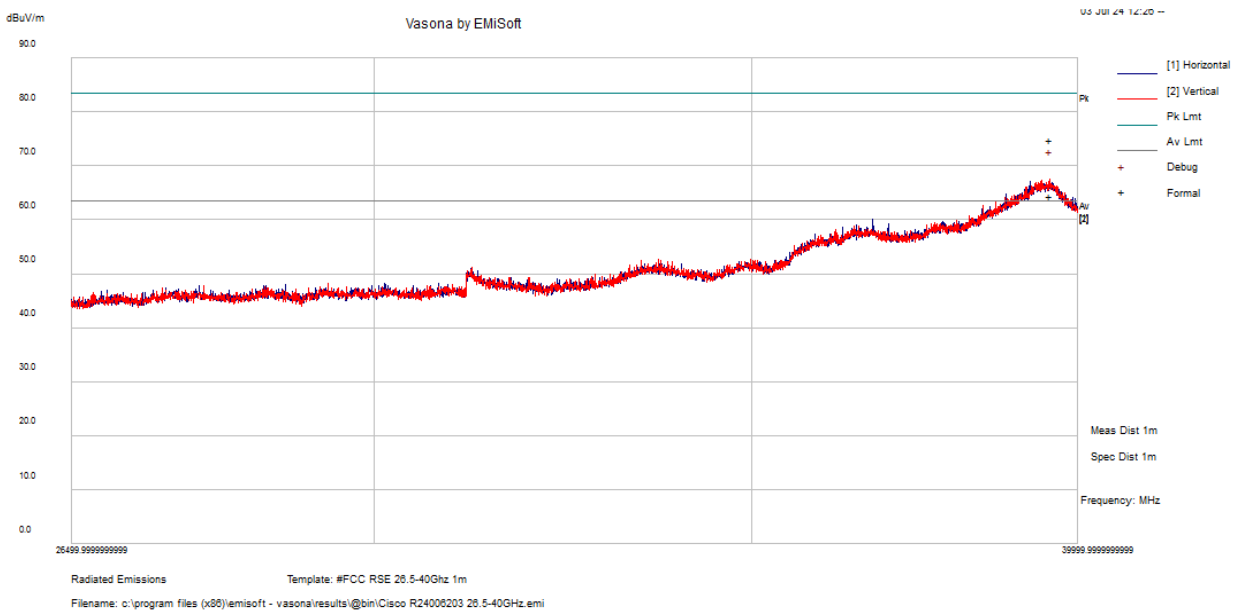


Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Detector
25549.06	49.24	11.25	60.49	200	H	0	63.54	-3.05	Peak

Note: *Above table and plot show all peak emissions pass under stricter average limit and thus show compliance in range of 18-26.5GHz*

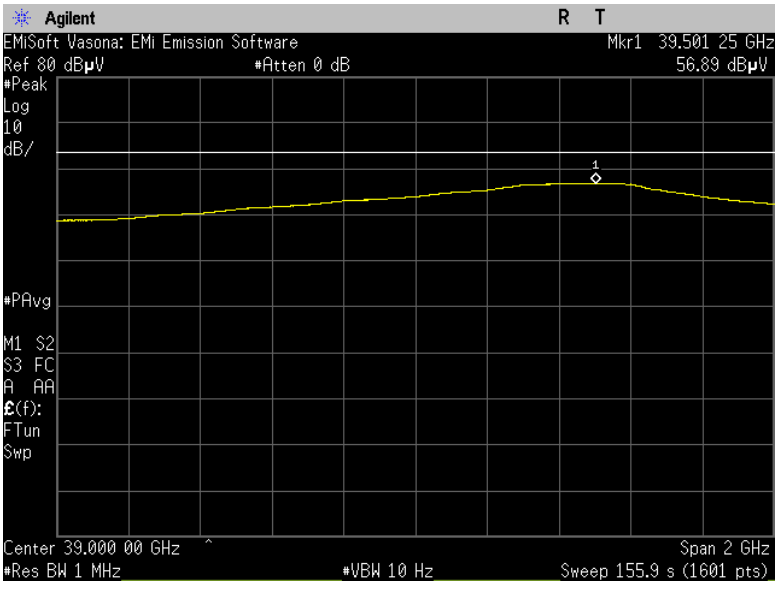
4) 26.5 GHz – 40 GHz, Measured at 1 meter

802.11ax20, 5955MHz



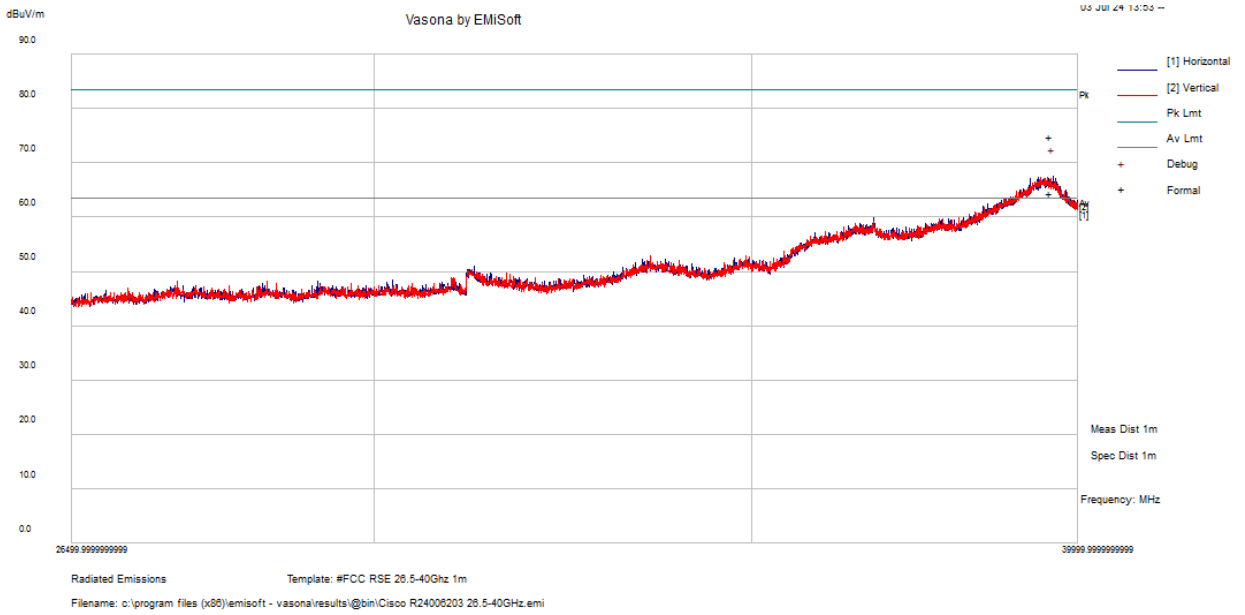
Note: Above plot shows complicance for 26.5-38GHz.

Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Detector
39548.27	56.51	18.42	74.93	156	V	94	83.54	-8.61	Peak
39501.25	38.47	18.42	56.89	156	V	94	63.54	-6.65	Average



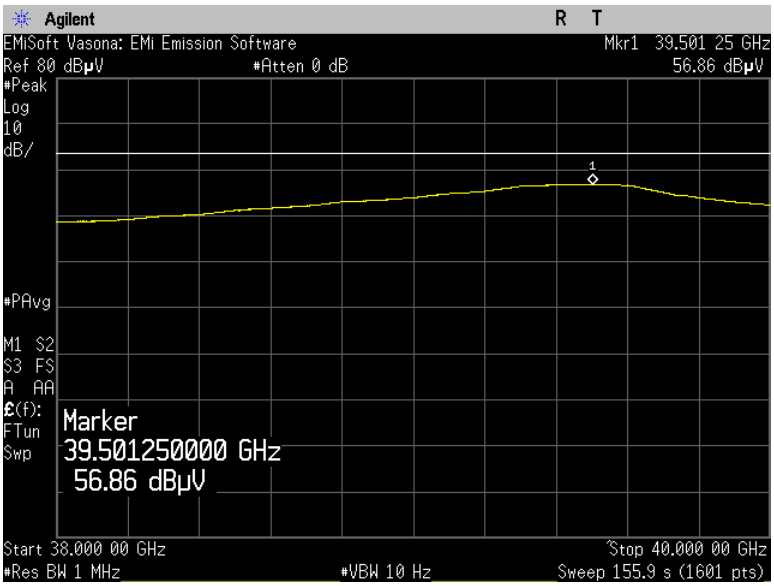
Note: The plot above shows reduced VBW for average measurements compared to average limit, thus the EUT complies with 38-40GHz frequency range average limit requirement.

802.11ax20, 6195MHz



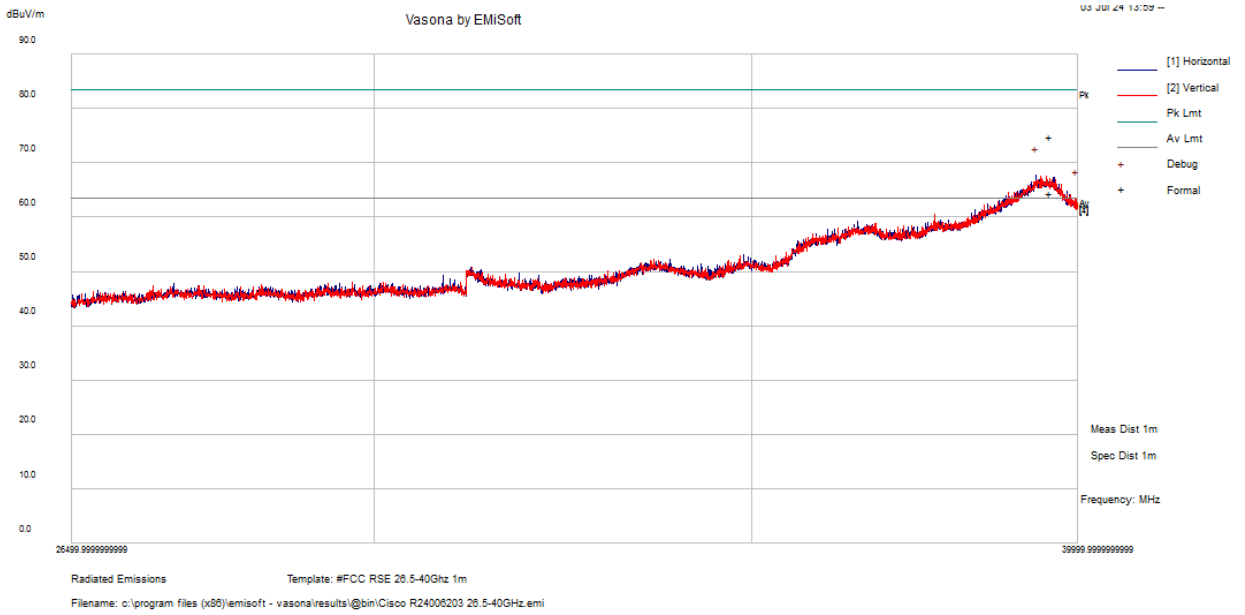
Note: Above plot shows complicance for 26.5-38GHz.

Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Detector
39590.78	49.21	18.29	67.5	200	H	0	83.54	-16.04	Peak
39501.25	38.57	18.29	56.86	200	H	0	63.54	-6.68	Average



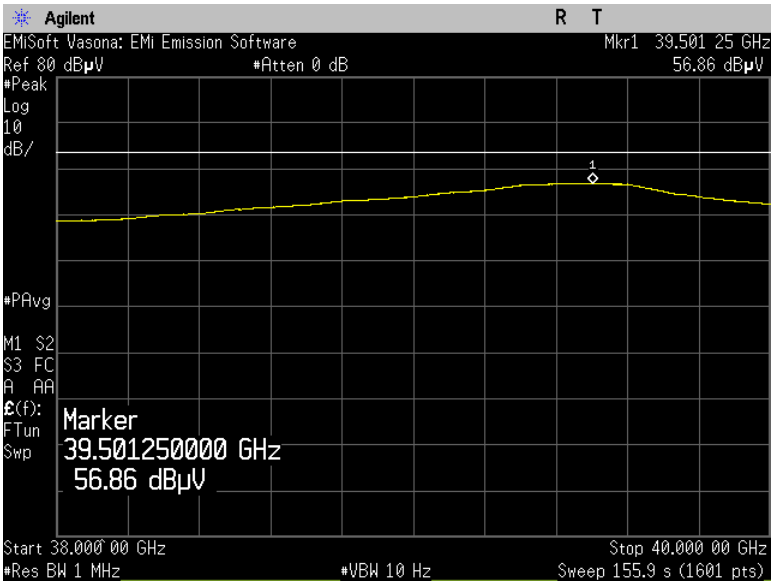
Note: The plot above shows reduced VBW for average measurements compared to average limit, thus the EUT complies with 38-40GHz frequency range average limit requirement.

802.11ax20, 6415MHz



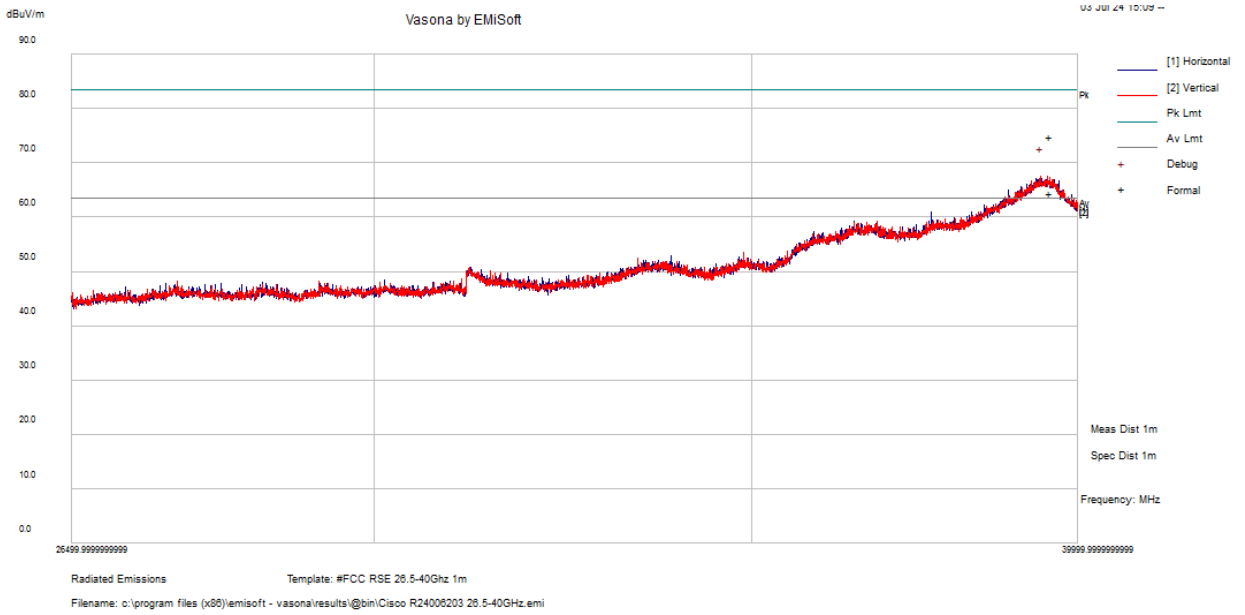
Note: Above plot shows complicance for 26.5-38GHz.

Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Detector
39325	49.12	18.55	67.67	200	H	0	83.54	-15.87	Peak
39501.25	38.31	18.55	56.86	200	H	0	63.54	-6.68	Average



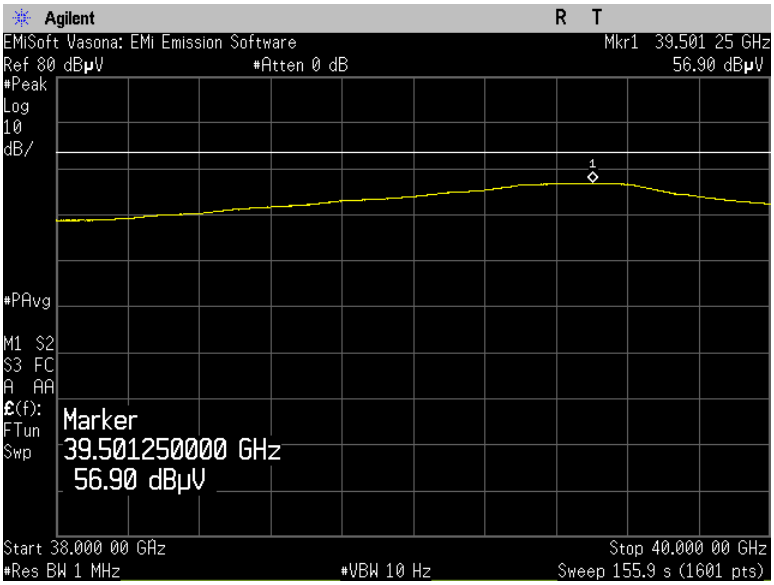
Note: The plot above shows reduced VBW for average measurements compared to average limit, thus the EUT complies with 38-40GHz frequency range average limit requirement.

802.11ax20, 6535MHz



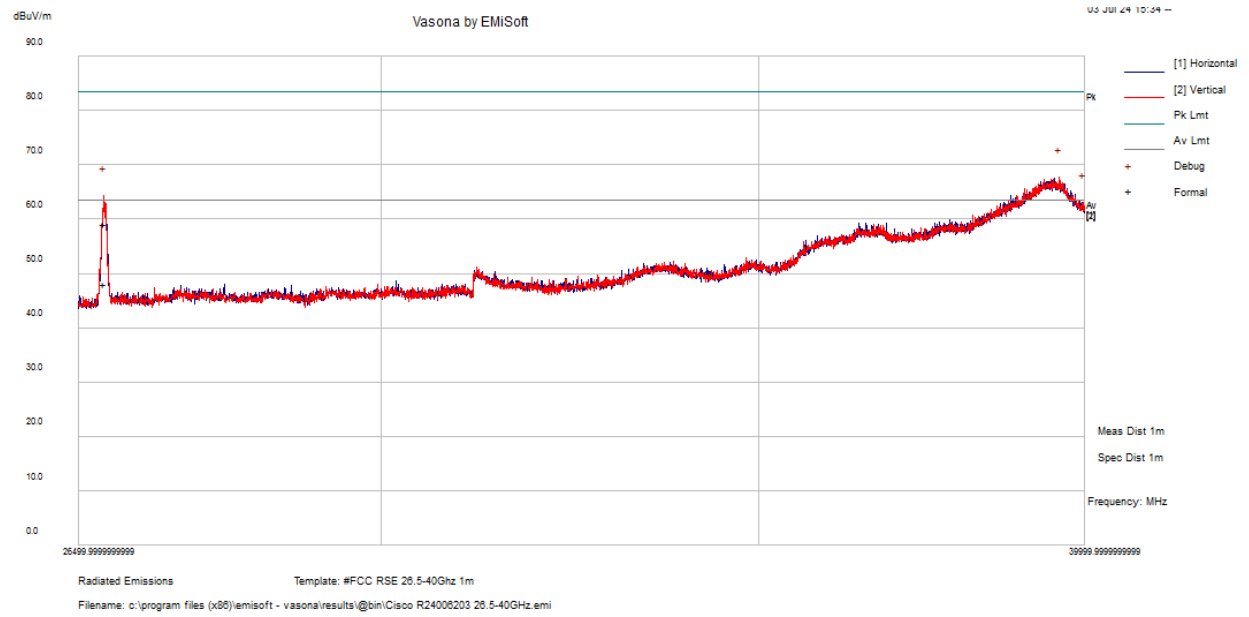
Note: Above plot shows complicance for 26.5-38GHz.

Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Detector
39396.72	48.77	18.82	67.59	200	V	0	83.54	-15.95	Peak
39501.25	38.08	18.82	56.90	200	V	0	63.54	-6.64	Average



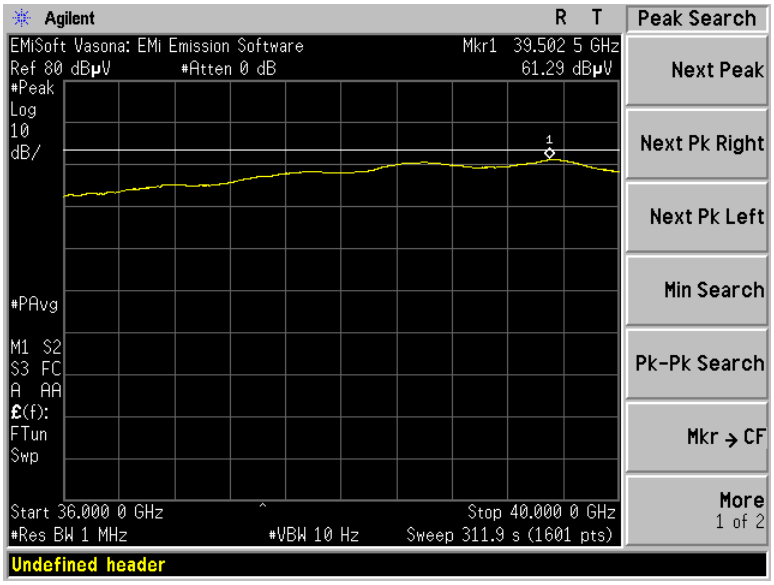
Note: The plot above shows reduced VBW for average measurements compared to average limit, thus the EUT complies with 38-40GHz frequency range average limit requirement.

802.11ax20, 6695MHz



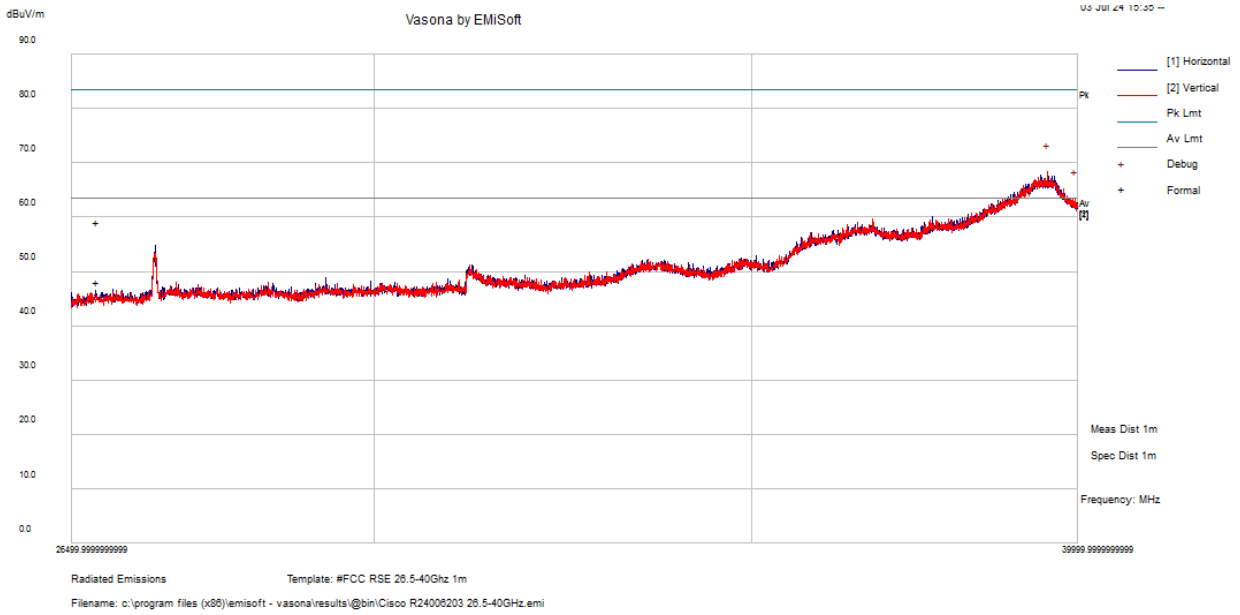
Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Detector
26776.97	50.72	8.45	59.17	272	V	68	83.54	-24.37	Peak
26776.97	39.71	8.44	48.15	272	V	68	63.54	-15.39	Average

Note: Above plot and table show complicance for 26.5-38GHz.



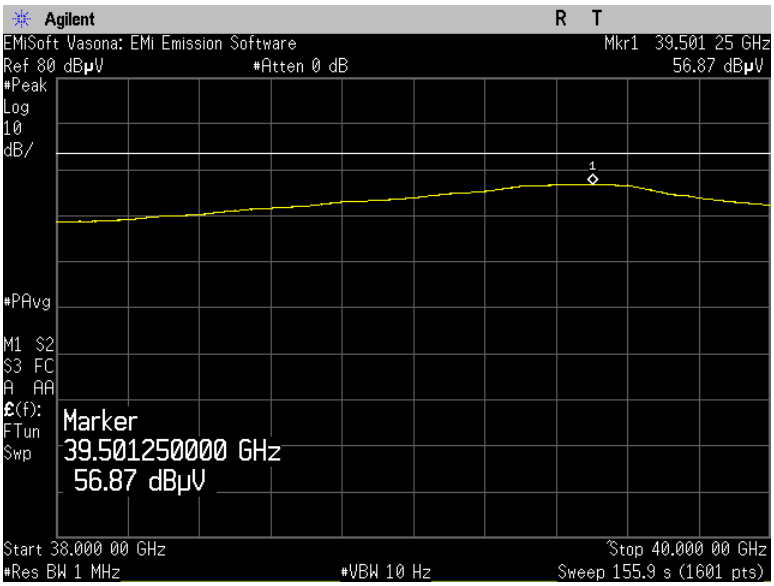
Note: The plot above shows reduced VBW for average measurements compared to average limit, thus the EUT complies with 38-40GHz frequency range average limit requirement.

802.11ax20, 6855MHz



Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Detector
39510.63	49.77	18.54	68.31	200	V	0	83.54	-15.23	Peak
39501.25	38.33	18.54	56.87	200	V	0	63.54	-6.67	Average

Note: Above plot and table show complicance for 26.5-38GHz.



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

5 Appendix A (Normative) – EUT Test Setup Photographs

Please refer to the attachment.

6 Appendix B (Normative) – EUT External Photographs

Please refer to the attachment.

7 Appendix C (Normative) – EUT Internal Photographs

8 Appendix D (Normative) – A2LA Electrical Testing Certificate

Accredited Laboratory

A2LA has accredited

BAY AREA COMPLIANCE LABORATORIES CORP.

Sunnyvale, CA

for technical competence in the field of

Electrical Testing

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 *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 13th day of September 2024.

Mr. Trace McInturff, Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 3297.02
Valid to September 30, 2026

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

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