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

TEST REPORT

For

Roku, Inc.

1155 Coleman Avenue, San Jose, CA 95110, USA

FCC ID: TC2-R1042
IC: 5959A-R1039

Report Type:	**Model:**
Original Report	WR002

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Report Number:	R2106181-407
Report Date:	2021-08-26
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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	R2106181-407	Original Report	2021-08-26

1 General Description

1.1 Product Description for Equipment under Test (EUT)

This test report was prepared on behalf of Roku, Inc., and their product model: *WR002*, *FCC ID: TC2-R1042, IC: 5959A-R1039*, or the "EUT" as referred to in this report. The EUT has 2.4 GHz/5 GHz Wi-Fi capabilities.

The EUT was evaluated as a complete unit, which consist of models 3820X and WR002. In order for the device to function, both sub-devices must be connected to each other (refer to the User Manual for more information) and are always packaged together for the market. The sub-devices are not intended for sale separately.

1.2 Objective

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

The objective was to determine compliance with FCC Part 15.407 and ISEDC RSS-247 rules for Output Power, Antenna Requirements, AC Line Conducted Emissions, Emission Bandwidth, Power spectral density, Conducted and Radiated Spurious Emissions.

1.3 Related Submittal(s)/Grant(s)

Equipment Class: DTS, FCC ID: TC2-R1042, IC: 5959A-R1039

1.4 Test Methodology

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

1.5 Measurement Uncertainty

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

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

1.6 Test Facility Registrations

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

BACL's test facilities that are used to perform Radiated and Conducted Emissions tests are currently registered with Industry Canada under Registration Numbers: 3062A-1, 3062A-2, and 3062A-3.

BACL is a Chinese Taipei Bureau of Standards Metrology and Inspection (BSMI) validated Conformity Assessment Body (CAB), under Appendix B, Phase I Procedures of the APEC Mutual Recognition Arrangement (MRA). BACL's BSMI Lab Code Number is: SL2-IN-E-1002R

BACL's test facilities that are used to perform AC Line Conducted Emissions, Telecommunications Line Conducted Emissions, Radiated Emissions from 30 MHz to 1 GHz, and Radiated Emissions from 1 GHz to 6 GHz are currently recognized as Accredited in accordance with the Voluntary Control Council for Interference [VCCI] Article 15 procedures under Registration Number A-0027.

1.7 Test Facility Accreditations

Bay Area Compliance Laboratories Corp. (BACL) is:

A- ***An independent, 3rd-Party, Commercial Test Laboratory accredited to ISO/IEC 17025:2005 by A2LA (Test Laboratory Accreditation Certificate Number 3297.02)*****,** in the fields of: Electromagnetic Compatibility and Telecommunications. Unless noted by an Asterisk (*) in the Compliance Matrix (See Section 3 of this Test Report), BACL's ISO/IEC 17025:2005 Scope of Accreditation includes all of the Test Method Standards and/or the Product Family Standards detailed in this Test Report..

BACL's ISO/IEC 17025:2005 Scope of Accreditation includes a comprehensive suite of EMC Emissions, EMC Immunity, Radio, RF Exposure, Safety and wireline Telecommunications test methods applicable to a wide range of product categories. These product categories include Central Office Telecommunications Equipment [including NEBS - Network Equipment Building Systems], Unlicensed and Licensed Wireless and RF devices,

Information Technology Equipment (ITE); Telecommunications Terminal Equipment (TTE); Medical Electrical Equipment; Industrial, Scientific and Medical Test Equipment; Professional Audio and Video Equipment; Industrial and Scientific Instruments and Laboratory Apparatus; Cable Distribution Systems, and Energy Efficient Lighting.

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

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

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

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

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

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

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

5 Other
- For Water Coolers (ver. 3.0)

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

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

2 EUT Test Configuration

2.1 Justification

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

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

The worst-case data rates are determined by measuring the average power, peak power and PPSD across all data rates bandwidths, and modulations.

2.2 EUT Exercise Software

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

Please refer to the following power setting table.

Standard	Modulation	Frequency (MHz)	Power Setting	
			Ant A	Ant B
FCC 15.407	802.11a	5180	92	92
		5220	94	94
		5240	94	94
	802.11n/ac20	5180	70	70
		5220	74	74
		5240	76	76
	802.11n/ac40	5190	78	78
		5230	89	89
	802.11ac80	5210	76	76
RSS-247	802.11a	5180	64	64
		5220	66	66
		5240	70	70
	802.11n/ac20	5180	40	40
		5220	44	44
		5240	44	44
	802.11n/ac40	5190	56	56
		5230	58	58
	802.11ac80	5210	62	62
FCC 15.407/ RSS-247	802.11a	5745	115	115
		5785	115	115
		5825	115	115
	802.11n/ac20	5745	115	115
		5785	115	115
		5825	115	115
	802.11n/ac40	5755	105	105
		5795	110	110
	802.11ac80	5775	83	83

*Data rates tested:
802.11a mode: 6 Mbps
802.11n/ac20 HT20/VHT20: MCS0
802.11n/ac40 HT40/VHT40: MCS0
802.11ac80 VHT80: VHT1MCS0

2.3 Duty Cycle Correction Factor

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

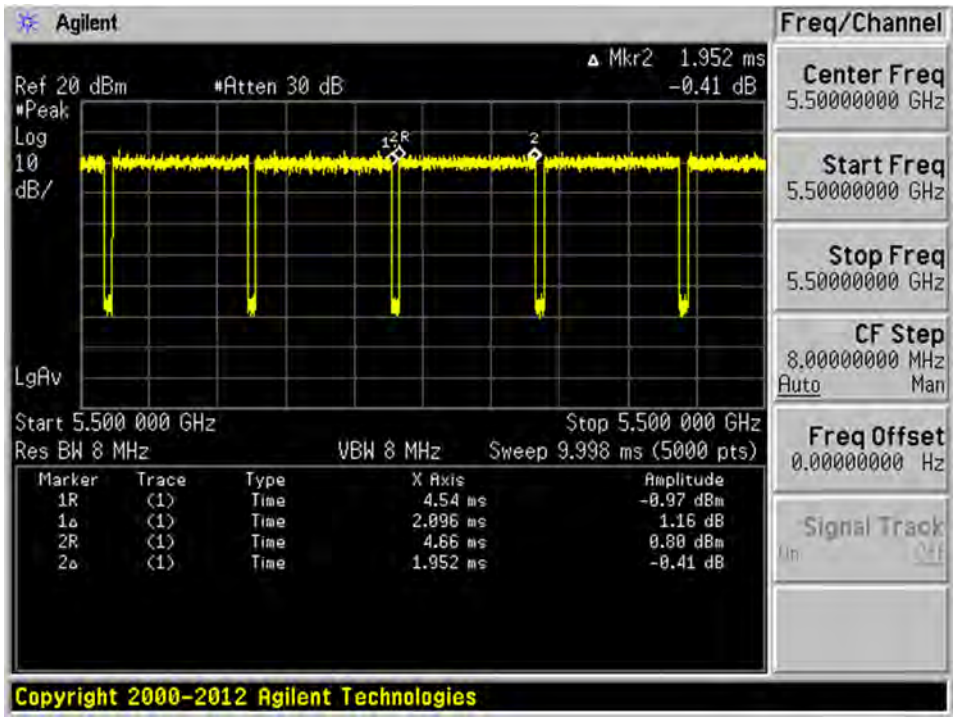
All measurements are to be performed with the EUT transmitting at 100% duty cycle at its maximum power control level; however, if 100% duty cycle cannot be achieved, measurements of duty cycle, x, and maximum-power transmission duration, T, are required for each tested mode of operation.

Radio Mode	On Time (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)
802.11a	1.952	2.096	93%	0.31
802.11n/ac20	5.364	5.669	95%	0.24
802.11n/ac40	5.386	5.634	96%	0.20
802.11ac80	10.772	12.41	87%	0.61

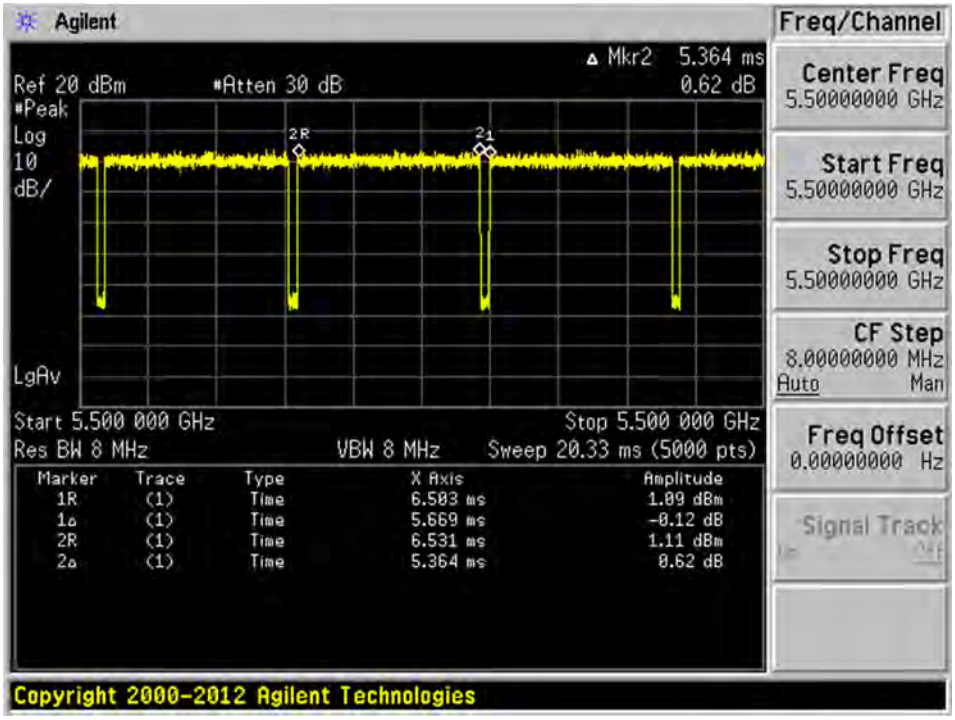
Note: Duty Cycle Correction Factor = 10*log(1/duty cycle)

Please refer to the following plots.

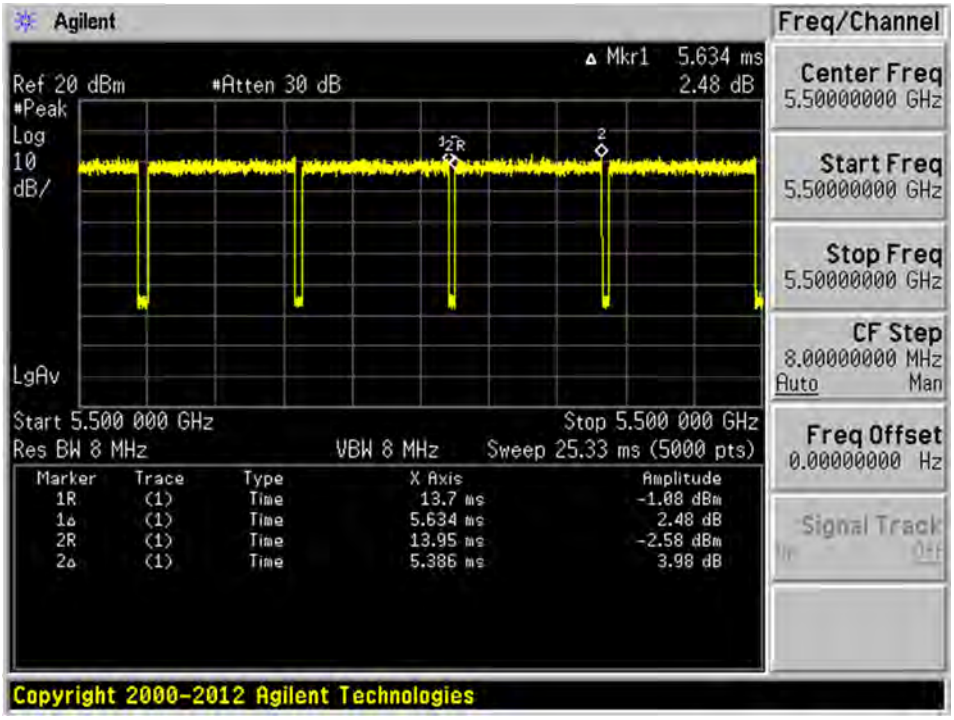
802.11a mode



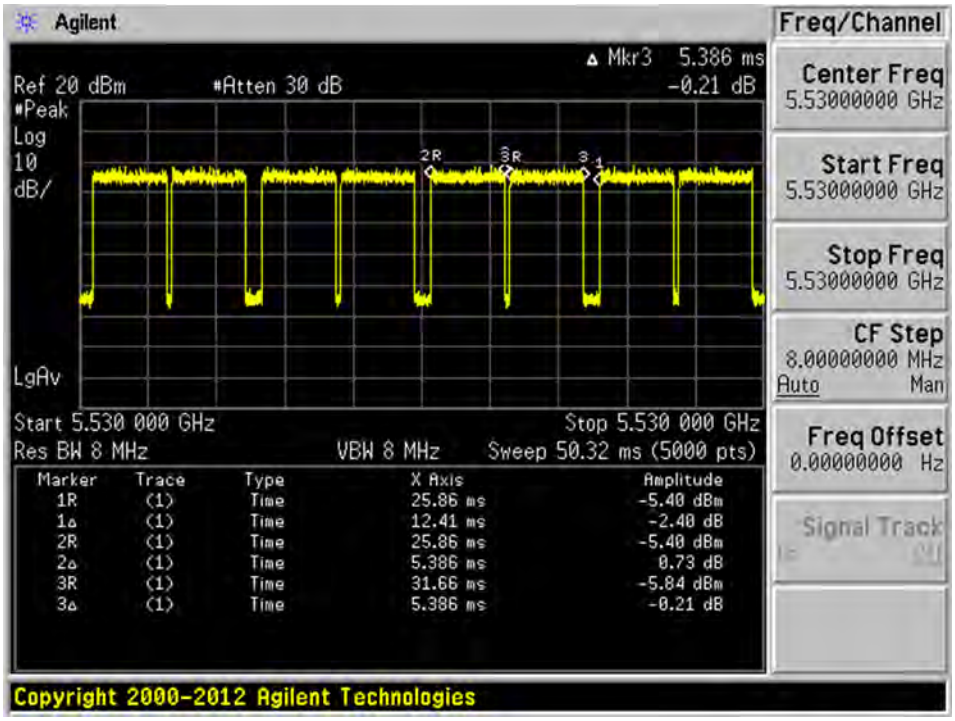
802.11ac20 mode



802.11ac40 mode



802.11ac80



2.4 Equipment Modifications

N/A

2.5 Local Support Equipment

Manufacturer	Description	Model
Dell	Laptop	Latitude E6410

2.6 Support Equipment

Manufacturer	Description	Model
Roku, Inc.	Debug Board	-

2.7 Interface Ports and Cabling

Cable Description	Length (m)	To	From
USB Cable	< 1 m	Laptop	EUT
RF Cable	< 1 m	EUT	PSA

3 Summary of Test Results

FCC/ISEDC Rules	Description of Test	Result
FCC §2.1091, §15.407(f), ISEDC RSS-102	RF Exposure	Compliant
FCC §15.203 ISEDC RSS-Gen §6.8	Antenna Requirement	Compliant
FCC §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-Gen §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

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

4.1 Applicable Standards

According to FCC §15.407(f) and §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

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

Limits for General Population/Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm^2)	Averaging Time (minutes)
Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	* (100)	30
1.34-30	824/f	2.19/f	* ($180/f^2$)	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	f/1500	30
1500-100,000	/	/	1.0	30

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

Before equipment certification is granted, the procedure of IC RSS-102 must be followed concerning the exposure of humans to RF field.

According to ISED RSS-102 Issue 5:

2.5.2 Exemption Limits for Routine Evaluation – RF Exposure Evaluation

RF exposure evaluation is required if the separation distance between the user and/or bystander and the device's radiating element is greater than 20 cm, except when the device operates as follows:

- below 20 MHz[6] and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 1 W (adjusted for tune-up tolerance);
- at or above 20 MHz and below 48 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than $4.49/f^{0.5}$ W (adjusted for tune-up tolerance), where f is in MHz;
- at or above 48 MHz and below 300 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 0.6 W (adjusted for tune-up tolerance);
- at or above 300 MHz and below 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than $1.31 \times 10^{-2} f^{0.6834}$ W (adjusted for tune-up tolerance), where f is in MHz;
- at or above 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 5 W (adjusted for tune-up tolerance).

In these cases, the information contained in the RF exposure technical brief may be limited to information that demonstrates how the e.i.r.p. was derived.

4.2 MPE Prediction

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

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

Where: S = power density
P = power input to antenna
G = power gain of the antenna in the direction of interest relative to an isotropic radiator
R = distance to the center of radiation of the antenna

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

4.3 MPE Results

Radio Standalone RF Exposure Configuration

5 GHz Wi-Fi: 802.11n/ac40 mode, 5795 MHz

Maximum output power at antenna input terminal (dBm):	24.61
Maximum output power at antenna input terminal (mW):	289.07
Prediction distance (cm):	20
Prediction frequency (MHz):	5795
Maximum Antenna Gain, typical (dBi):	7.1
Maximum Antenna Gain (numeric):	5.13
Power density of prediction frequency at 20.0 cm (mW/cm^2):	0.295
FCC MPE limit for uncontrolled exposure at prediction frequency (mW/cm^2):	1.0

The device is compliant with the requirement FCC MPE limit for uncontrolled exposure. The maximum power density at the distance of 20 cm is 0.295 mW/cm^2. Limit is 1.0 mW/cm^2.

Radio Co-location: 2.4 GHz Wi-Fi and 5 GHz Wi-Fi simultaneous transmission is not supported.

4.4 RF exposure evaluation exemption for IC

5 GHz Wi-Fi: 802.11n/ac40 mode, 5795 MHz

Maximum EIRP power = 24.61dBm + 7.1 dBi = 31.71 dBm which is less than $1.31\times10^{-2}f^{0.6834}$ = 4.86 W = 36.87 dBm

Therefore the RF exposure Evaluation is not required.

Note: Maximum Antenna Gain used is based on Combined Antenna Gain calculation for MIMO transmitting usage(i.e. Combined Antenna Gain(dBi) = Single Antenna Gain(dBi) + 10*log(Number of Antennas)). In this case the Combined Antenna Gain is 7.1 dBi = 4.1 dBi +10*log(2).

5 FCC §15.203 & ISEDC RSS-Gen §6.8 - Antenna Requirements

5.1 Applicable Standards

According to FCC §15.203:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

And according to FCC §15.247 (b) (4), if transmitting antennas of directional gain greater than 6 dBi are used the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

According to ISEDC RSS-Gen §6.8: Transmitter Antenna

The applicant for equipment certification shall provide a list of all antenna types that may be used with the transmitter, where applicable (i.e. for transmitters with detachable antenna), indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna. The test report shall demonstrate the compliance of the transmitter with the limit for maximum equivalent isotropically radiated power (e.i.r.p.) specified in the applicable RSS, when the transmitter is equipped with any antenna type, selected from this list.

For expediting the testing, measurements may be performed using only the antenna with highest gain of each combination of transmitter and antenna type, with the transmitter output power set at the maximum level. However, the transmitter shall comply with the applicable requirements under all operational conditions and when in combination with any type of antenna from the list provided in the test report (and in the notice to be included in the user manual, provided below).

When measurements at the antenna port are used to determine the RF output power, the effective gain of the device's antenna shall be stated, based on a measurement or on data from the antenna's manufacturer.

The test report shall state the RF power, output power setting and spurious emission measurements with each antenna type that is used with the transmitter being tested.

For licence-exempt equipment with detachable antennas, the user manual shall also contain the following notice in a conspicuous location:

This radio transmitter [enter the device's ISED certification number] has been approved by Innovation, Science and Economic Development Canada to operate with the antenna types listed below, with the maximum permissible gain indicated. Antenna types not included in this list that have a gain greater than the maximum gain indicated for any type listed are strictly prohibited for use with this device.

Immediately following the above notice, the manufacturer shall provide a list of all antenna types which can be used with the transmitter, indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna type.

5.2 Antenna List

Antenna usage	Frequency Range (MHz)	Maximum Antenna Gain (dBi)	Antenna Type
5 GHz Wi-Fi	5150-5250	5.2	Chip
5 GHz Wi-Fi	5725-5850	4.1	Chip

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

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

6.1 Applicable Standards

As per FCC §15.207 and ISEDC RSS GEN §8.8

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 was FCC §15.207 limits and 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.

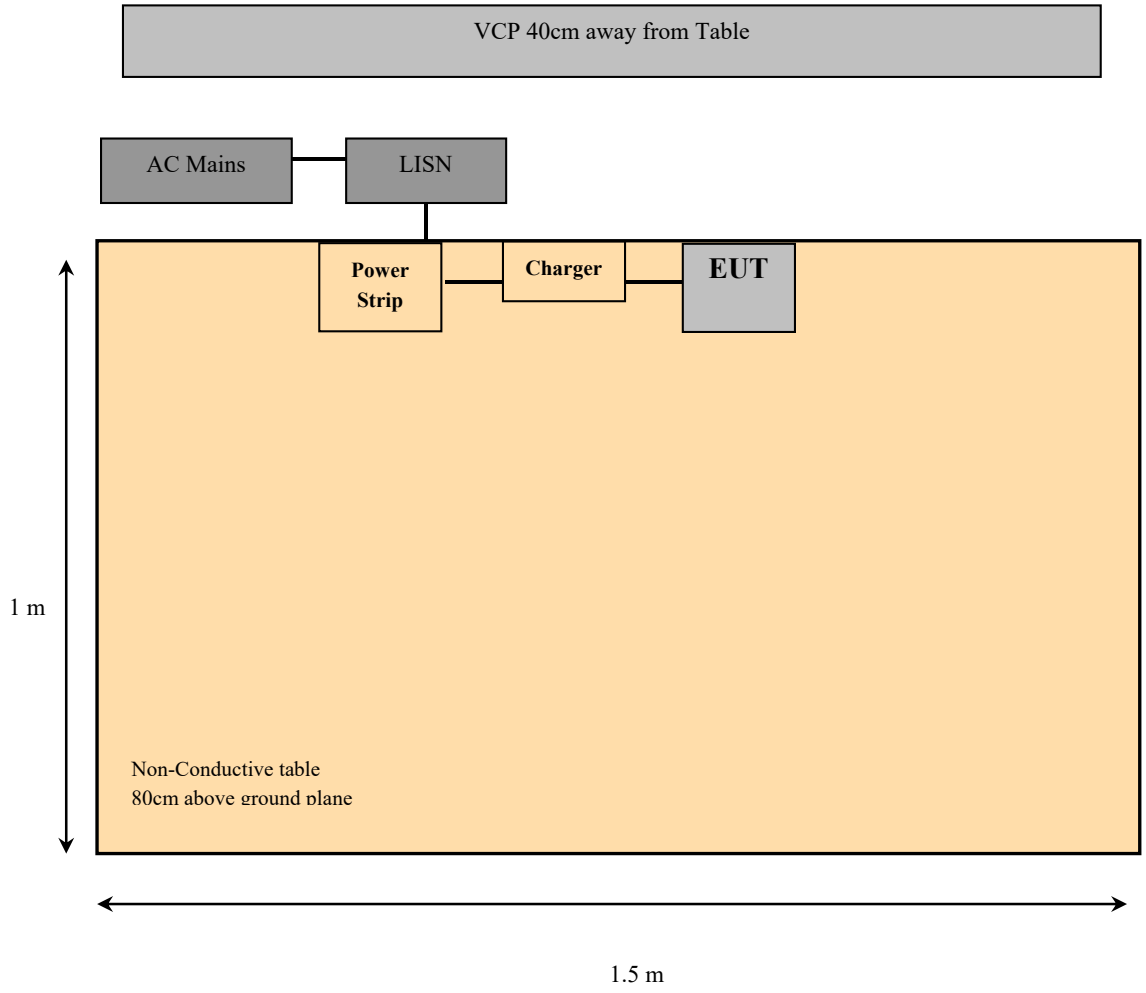
6.3 Test Procedure

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 was 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 Test Setup Block Diagram



6.5 Corrected Amplitude and Margin Calculation

The Corrected Amplitude (CA) is calculated by adding the Correction Factor (CF) to indicated Amplitude (Ai) reading. The basic equation is as follows:

CA = Ai + CF

For example, a corrected amplitude of 46.2 dBuV = Indicated Reading (32.5 dBuV) + Correction Factor (13.7 dB)

The Correction Factor is calculated by adding Cable loss (CL), LISN calibration factor, and attenuation of the impulse limiter and the high pass filter. The basic equation is as follows:

CF= CL + LISN calibration factor + Attenuation

For example, a corrected amplitude of 46.2 dBuV = Indicated Reading (32.5 dBuV) + Cable Loss (3.5 dB) + LISN calibration factor (0.2 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

6.6 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
Rohde and Schwarz	Receiver, EMI Test	ESCI 1166.5950.03	100338	2020-03-17	1.5 years
Rohde and Schwarz	Impulse Limiter	ESH3-Z2	101964	2021-07-07	1 year
Solar Electronics Company	High Pass Filter	Type 7930-100	7930150202	2021-03-02	1 year
Suirong	30 ft conductive emission cable	LMR 400	-	N/R	N/A
FCC	LISN	FCC-LISN-50-25-2-10-CISPR16	160129	2020-10-13	1 year
Vasona	Test software	V6.0 build 11	10400213	N/R	N/R

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:	20º C
Relative Humidity:	55 %
ATM Pressure:	102.1 kPa

The testing was performed by Allen Huang on 2021-08-03 in the Ground Plane test site.

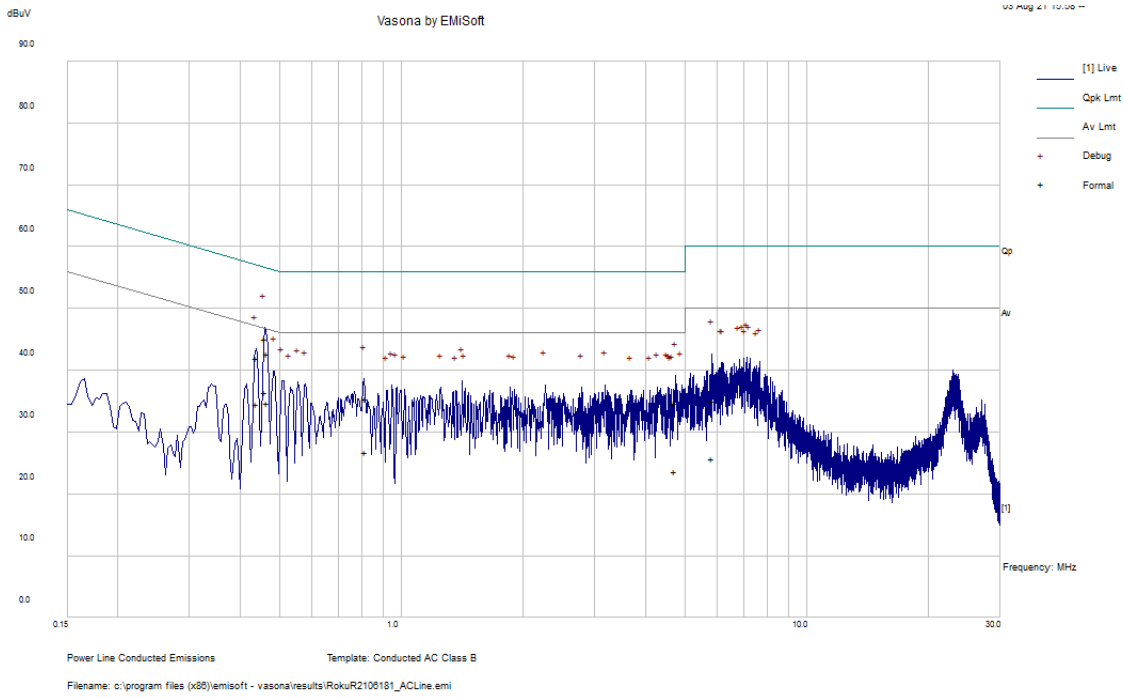
6.8 Summary of Test Results

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

Connection: AC/DC adapter connected to 120 V/60 Hz, AC			
Margin (dB)	**Frequency (MHz)**	**Conductor Mode (Line/Neutral)**	**Range (MHz)**
-8.34	0.464935	Live	0.15-30

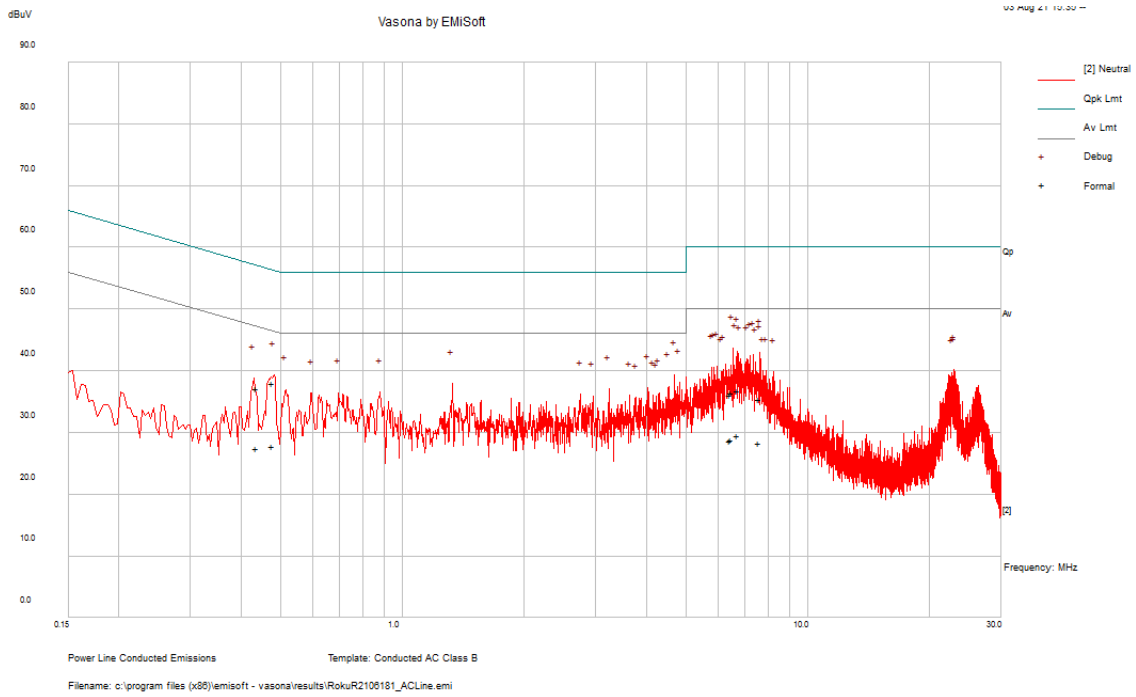
6.9 Conducted Emissions Test Plots and Data

120 V, 60 Hz – Line



Frequency (MHz)	Ai. Reading (dBuV)	Correction Factor (dB)	Corrected Amplitude (dBµV)	Limit (dBµV)	Margin (dB)	Detector
0.464935	35.47	10.35	45.82	56.6	-10.78	QP
0.45142	18.12	10.36	28.48	56.85	-28.37	QP
0.467835	33.07	10.34	43.41	56.55	-13.14	QP
4.740447	24.51	9.99	34.5	56	-21.5	QP
5.848715	24.98	10.01	34.99	60	-25.01	QP
0.803834	23.76	10.18	33.94	56	-22.06	QP
0.464935	27.92	10.35	38.27	46.6	-8.34	Ave
0.45142	5.83	10.36	16.19	46.85	-30.65	Ave
0.467835	26.27	10.35	36.62	46.55	-9.93	Ave
4.740447	13.72	10	23.72	46	-22.28	Ave
5.848715	15.44	10.01	25.45	50	-24.55	Ave
0.803834	11.21	10.18	21.39	46	-24.61	Ave

120 V, 60 Hz – Neutral



Frequency (MHz)	Ai. Reading (dBuV)	Correction Factor (dB)	Corrected Amplitude (dBµV)	Limit (dBµV)	Margin (dB)	Detector
6.526522	27.21	10.02	37.23	60	-22.77	QP
4.681456	20.33	9.99	30.32	56	-25.68	QP
6.71645	24.88	10.02	34.9	60	-25.1	QP
0.46414	27.83	10.35	38.18	56.62	-18.44	QP
7.596381	23.05	10.04	33.09	60	-26.91	QP
7.319553	23.38	10.04	33.42	60	-26.58	QP
6.526522	17.33	10.02	27.35	50	-22.65	Ave
4.681456	8.64	9.99	18.63	46	-27.37	Ave
6.71645	15.92	10.03	25.95	50	-24.05	Ave
0.46414	22.11	10.34	32.45	46.62	-14.16	Ave
7.596381	15.2	10.05	25.25	50	-24.75	Ave
7.319553	15.89	10.03	25.92	50	-24.08	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.

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

(3) For transmitters operating in the 5.47 -5.725 GHz band: All emissions outside of the 5.47-5725 GHz band shall not exceed an ei.r.p. of -27 dBm/MHz.

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

(5) The emission measurements shall be performed using a minimum resolution bandwidth of 1 MHz. A lower resolution bandwidth may be employed near the band edge, when necessary, provided the measured energy is integrated to show the total power over 1 MHz.

(6) Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in §15.209. Further, any U-NII devices using an AC power line are required to comply also with the conducted limits set forth in §15.207.

(7) The provisions of §15.205 apply to intentional radiators operating under this section.

As per ISEDC RSS-247 §6.2

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

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

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

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

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

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

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 Procedure

For the radiated emissions test, the EUT host, and all support equipment power cords were connected to the AC floor outlet.

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

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

The spectrum analyzer or receiver is set as:

Below 1000 MHz:

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

Above 1000 MHz:

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

7.4 Corrected Amplitude and Margin Calculation

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

CA = Ai + AF + CL + Atten – Ga

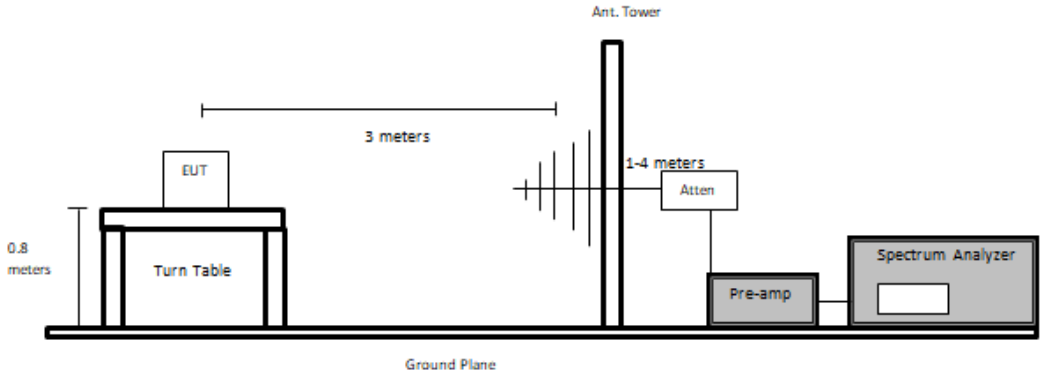
For example, a corrected amplitude of 40.3 dBuV/m = Indicated Reading (32.5 dBuV) + Antenna Factor (+23.5dB) + Cable Loss (3.7 dB) + Attenuator (10 dB) - Amplifier Gain (29.4 dB)

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

Margin = Corrected Amplitude – Limit

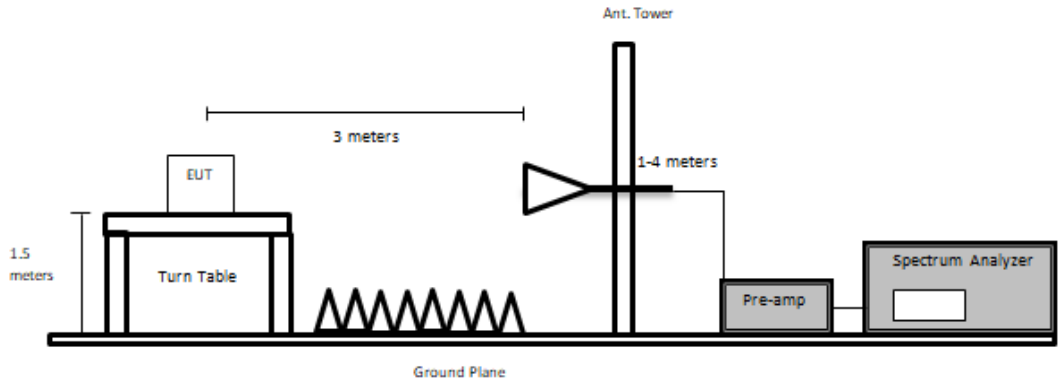
7.5 Test Setup Block Diagram

Below 1GHz:

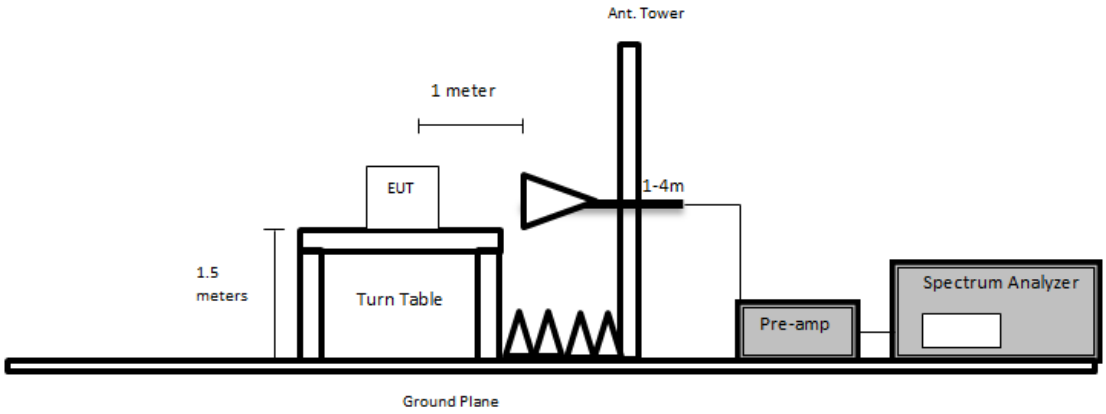


Above 1GHz:

At 3 meters:



At 1 meter:


Ant. Tower
1 meter
EUT
1-4m
1.5
meters
Turn Table
Spectrum Analyzer
Pre-amp
Ground Plane

7.6 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
Rohde & Schwarz	EMI Test Receiver	ESCI 1166.5950K03	100044	2020-10-26	2 years
Rohde & Schwarz	Signal Analyzer	FSV40	1321.3008K39-101203-UW	2021-04-26	1 year
Agilent	Spectrum Analyzer	E4446A	US44300386	2021-04-27	1 year
Sunol Science Corp	System Controller	SC110V	122303-1	N/R	N/A
HP	Pre-Amplifier	8447D	2944A07030	2020-08-17	1 year
HP	Pre-Amplifier	8449B	3147A00400	2021-05-05	1 year
Wisewave	Horn Antenna	ARH-4223-02	10555-02	2020-02-05	2 years
Wisewave	Antenna, Horn	ARH-2823-02	10555-01	2020-02-05	2 years
AH Systems	Preamplifier	PAM 1840 VH	170	2020-11-09	1 year
ETS Lindgren	Horn Antenna	3117	00218973	2020-06-20	2 years
Sunol Sciences	Biconilog Antenna	JB3	A020106-2	2019-11-20	2 years
-	RF cable	-	-	Each time[1]	N/A
-	Notch Filter	-	-	Each time[1]	N/A
Fairview Microwave	Times Microwave LMR 400 UltraFex Coaxial Cable 35'	FMC0101405-420	BACL1904161	2021-06-18	1 year
Insulted Wire Corp.	157 Series 2.92 SM (x2) Armored 33 ft. Cable	KPS-1571AN-3960-KPS	DC 1917	2021-03-03	1 year
IW Microwave	157 Series Cable Armored with 2.92mm Male Plugs on Both Sides	KPS-1571AN-2400	DC 1922	2021-07-06	1 year
BACL	5m3 Sensitivity Box	1	2	2020-10-27	1 year

Note[1]: cables and attenuators 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 ºC
Relative Humidity:	42-50 %
ATM Pressure:	102.7 kPa

The testing was performed by Allen Huang from 2021-07-14 to 2021-08-05 in 5m chamber 3.

7.8 Summary of Test Results

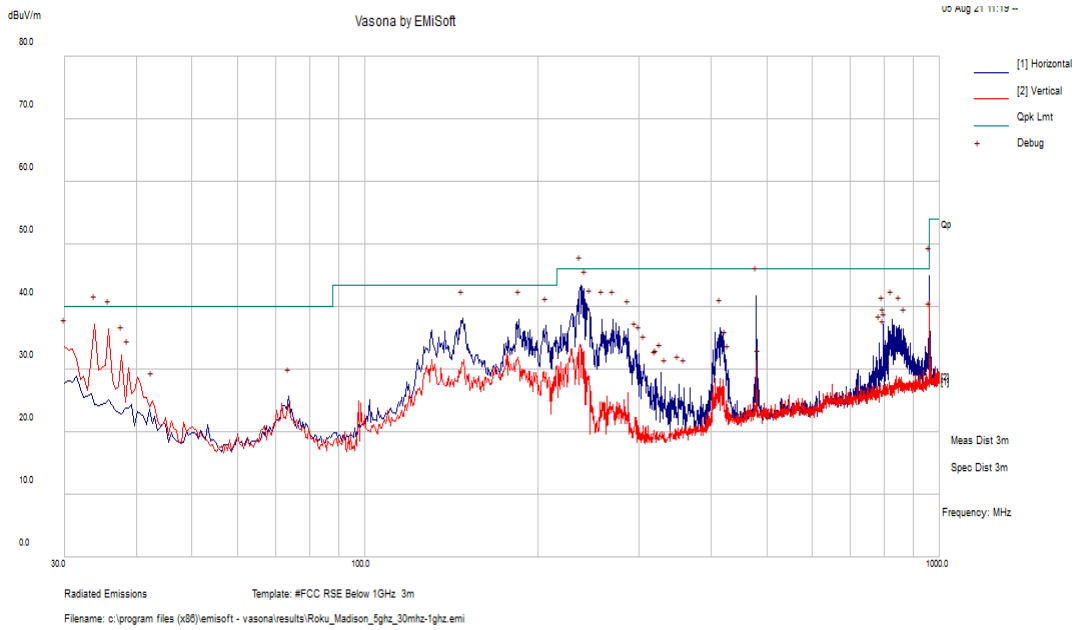
According to the data hereinafter, the EUT complied with the FCC Part 15.407 and RSS-247 standards' radiated emissions limits, and had the worst margin of:

Mode: Transmitting			
Margin (dB)	**Frequency (MHz)**	**Polarization (Horizontal/Vertical)**	**Mode, Channel**
-0.60	10360	Vertical	802.11a mode, Antenna B, 5180 MHz

7.9 Radiated Emissions Test Result Data

1) 30 MHz – 1 GHz at 3 meters

Worst Case: 802.11n/ac40, 5795 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)	Comment
237.3115	48.81	-6.51	42.3	106	H	161	46	-3.70	Pass
33.95225	21.85	-0.68	21.17	265	V	157	40	-18.83	Pass
35.545	27.99	-1.75	26.24	106	V	223	40	-13.76	Pass
480.0163	37.65	-0.15	37.49	163	H	344	46	-8.51	Pass
241.353	48.08	-6.40	41.68	134	H	132	46	-4.32	Pass
148.03	40.82	-5.73	35.09	228	H	322	43.5	-8.41	Pass

2) 1 – 18 GHz, Band Edges measured at 3 meters, Harmonics & Emission Masks measured at 1 meter

5150 - 5250 MHz

802.11a mode Antenna A

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Low Channel: 5180 MHz											
5150	55.89	340	100	H	35.5	8.336	35.278	64.45	74	-9.55	Peak
5150	59.21	105	110	V	35.5	8.336	35.278	67.77	74	-6.23	Peak
5150	42.36	340	100	H	35.5	8.336	35.278	50.92	54	-3.08	Ave
5150	42.28	105	110	V	35.5	8.336	35.278	50.84	54	-3.16	Ave
10360	53.51	15	150	H	38.1	13.353	36.459	68.50	78	-9.50	Peak
10360	59.41	340	115	V	38.1	13.353	36.459	74.40	78	-3.60	Peak
15540	45.02	90	150	H	40.5	13.379	34.034	64.87	84	-19.14	Peak
15540	45.62	80	150	V	40.5	13.379	34.034	65.47	84	-18.54	Peak
15540	34.89	90	150	H	40.5	13.379	34.034	54.73	64	-9.27	Ave
15540	34.83	80	150	V	40.5	13.379	34.034	54.67	64	-9.33	Ave
Middle Channel: 5220 MHz											
10440	55.36	340	125	H	38.1	13.353	36.459	70.35	78	-7.65	Peak
10440	61.34	335	130	V	38.1	13.353	36.459	76.33	78	-1.67	Peak
15660	44.87	0	150	H	40.5	13.379	34.034	64.72	84	-19.29	Peak
15660	44.78	105	150	V	40.5	13.379	34.034	64.63	84	-19.38	Peak
15660	34.92	0	150	H	40.5	13.379	34.034	54.76	64	-9.24	Ave
15660	35.20	105	150	V	40.5	13.379	34.034	55.04	64	-8.96	Ave
High Channel: 5240 MHz											
10480	55.58	340	105	H	38.1	13.353	36.459	70.57	78	-7.43	Peak
10480	59.56	335	135	V	38.1	13.353	36.459	74.55	78	-3.45	Peak
15720	45.53	140	150	H	40.5	13.379	34.034	65.38	84	-18.63	Peak
15720	46.08	170	150	V	40.5	13.379	34.034	65.93	84	-18.08	Peak
15720	35.65	140	150	H	40.5	13.379	34.034	55.49	64	-8.51	Ave
15720	36.03	170	150	V	40.5	13.379	34.034	55.87	64	-8.13	Ave

5150 - 5250 MHz

802.11a mode Antenna B

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Low Channel: 5180 MHz											
5150	60.04	25	110	H	35.5	8.336	35.278	68.60	74	-5.40	Peak
5150	56.96	65	150	V	35.5	8.336	35.278	65.52	74	-8.48	Peak
5150	42.48	25	110	H	35.5	8.336	35.278	51.04	54	-2.96	Ave
5150	40.63	65	150	V	35.5	8.336	35.278	49.19	54	-4.81	Ave
10360	58.37	280	130	H	38.1	13.353	36.459	73.36	78	-4.64	Peak
10360	**62.41**	**25**	**120**	**V**	**38.1**	**13.353**	**36.459**	**77.40**	**78**	**-0.60**	**Peak**
15540	46.12	80	150	H	40.5	13.379	34.034	65.97	84	-18.04	Peak
15540	44.92	185	150	V	40.5	13.379	34.034	64.77	84	-19.24	Peak
15540	35.01	80	150	H	40.5	13.379	34.034	54.85	64	-9.15	Ave
15540	34.86	185	150	V	40.5	13.379	34.034	54.70	64	-9.30	Ave
Middle Channel: 5220 MHz											
10440	58.62	280	130	H	38.1	13.353	36.459	73.61	78	-4.39	Peak
10440	62.40	30	125	V	38.1	13.353	36.459	77.39	78	-0.61	Peak
15660	45.12	205	150	H	40.5	13.379	34.034	64.97	84	-19.04	Peak
15660	45.07	205	150	V	40.5	13.379	34.034	64.92	84	-19.09	Peak
15660	34.77	205	150	H	40.5	13.379	34.034	54.61	64	-9.39	Ave
15660	34.89	205	150	V	40.5	13.379	34.034	54.73	64	-9.27	Ave
High Channel: 5240 MHz											
10480	58.05	280	125	H	38.1	13.353	36.459	73.04	78	-4.96	Peak
10480	61.34	20	125	V	38.1	13.353	36.459	76.33	78	-1.67	Peak
15720	45	180	150	H	40.5	13.379	34.034	64.85	84	-19.16	Peak
15720	45.03	180	150	V	40.5	13.379	34.034	64.88	84	-19.13	Peak
15720	35.22	180	150	H	40.5	13.379	34.034	55.06	64	-8.94	Ave
15720	34.91	180	150	V	40.5	13.379	34.034	54.75	64	-9.25	Ave

5150 - 5250 MHz

802.11ac20/n20 mode Antenna A+B

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Low Channel: 5180 MHz											
5150	57.93	25	150	H	35.5	8.336	35.278	66.49	74	-7.51	Peak
5150	57.99	80	150	V	35.5	8.336	35.278	66.55	74	-7.45	Peak
5150	42.22	25	150	H	35.5	8.336	35.278	50.78	54	-3.22	Ave
5150	39.11	80	150	V	35.5	8.336	35.278	47.67	54	-6.33	Ave
10360	48.59	110	170	H	38.1	13.353	36.459	63.58	78	-14.42	Peak
10360	51.58	35	120	V	38.1	13.353	36.459	66.57	78	-11.43	Peak
15540	45.6	105	145	H	40.5	13.379	34.034	65.45	84	-18.56	Peak
15540	45.73	10	165	V	40.5	13.379	34.034	65.58	84	-18.43	Peak
15540	34.69	105	145	H	40.5	13.379	34.034	54.53	64	-9.47	Ave
15540	34.65	10	165	V	40.5	13.379	34.034	54.49	64	-9.51	Ave
Middle Channel: 5220 MHz											
10440	50.23	110	160	H	38.1	13.353	36.459	65.22	78	-12.78	Peak
10440	53.04	35	135	H	38.1	13.353	36.459	68.03	78	-9.97	Peak
15660	45.42	230	150	H	40.5	13.379	34.034	65.27	84	-18.74	Peak
15660	45.88	170	150	V	40.5	13.379	34.034	65.73	84	-18.28	Peak
15660	34.94	230	150	H	40.5	13.379	34.034	54.78	64	-9.22	Ave
15660	35.10	170	150	V	40.5	13.379	34.034	54.94	64	-9.06	Ave
High Channel: 5240 MHz											
10480	52.01	110	165	H	38.1	13.353	36.459	67.00	78	-11.00	Peak
10480	55.13	35	125	V	38.1	13.353	36.459	70.12	78	-7.88	Peak
15720	45.7	270	150	H	40.5	13.379	34.034	65.55	84	-18.46	Peak
15720	45.34	155	150	V	40.5	13.379	34.034	65.19	84	-18.82	Peak
15720	35.00	270	150	H	40.5	13.379	34.034	54.84	64	-9.16	Ave
15720	34.94	155	150	V	40.5	13.379	34.034	54.78	64	-9.22	Ave

5150 - 5250 MHz

802.11ac40/n40 mode Antenna A+B

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Low Channel: 5190 MHz											
5150	55.46	80	150	H	35.5	8.336	35.278	64.02	74	-9.98	Peak
5150	54.62	90	150	V	35.5	8.336	35.278	63.18	74	-10.82	Peak
5150	43.93	80	150	H	35.5	8.336	35.278	52.49	54	-1.51	Ave
5150	41.29	90	150	V	35.5	8.336	35.278	49.85	54	-4.15	Ave
10380	48.37	120	150	H	38.1	13.353	36.459	63.36	78	-14.64	Peak
10380	52.01	30	150	V	38.1	13.353	36.459	67.00	78	-11.00	Peak
15570	46.26	320	150	H	40.5	13.379	34.034	66.11	84	-17.90	Peak
15570	45.52	360	155	V	40.5	13.379	34.034	65.37	84	-18.64	Peak
15570	35.56	320	150	H	40.5	13.379	34.034	55.41	64	-8.59	Ave
15570	35.51	360	155	V	40.5	13.379	34.034	55.36	64	-8.64	Ave
High Channel: 5230 MHz											
10460	50.64	25	150	H	38.1	13.353	36.459	65.63	78	-12.37	Peak
10460	53.04	40	130	V	38.1	13.353	36.459	68.03	78	-9.97	Peak
15690	47.15	250	150	H	40.5	13.379	34.034	67.00	84	-17.01	Peak
15690	45.76	310	150	V	40.5	13.379	34.034	65.61	84	-18.40	Peak
15690	36.07	250	150	H	40.5	13.379	34.034	55.92	64	-8.08	Ave
15690	35.70	310	150	V	40.5	13.379	34.034	55.55	64	-8.45	Ave

5150 - 5250 MHz

802.11ac80 mode Antenna A+B

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Low Channel: 5210 MHz											
5150	57.02	20	150	H	35.5	8.336	35.278	65.58	74	-8.42	Peak
5150	54.26	80	150	V	35.5	8.336	35.278	62.82	74	-11.18	Peak
5150	43.91	20	150	H	35.5	8.336	35.278	52.47	54	-1.53	Ave
5150	40.68	80	150	V	35.5	8.336	35.278	49.24	54	-4.76	Ave
10380	47.1	180	150	H	38.1	13.353	36.459	62.09	78	-15.91	Peak
10380	49.76	40	150	V	38.1	13.353	36.459	64.75	78	-13.25	Peak
15570	46.94	130	150	H	40.5	13.379	34.284	66.54	84	-17.47	Peak
15570	46.71	45	150	V	40.5	13.379	34.284	66.31	84	-17.70	Peak
15570	36.29	130	150	H	40.5	13.379	34.284	55.89	64	-8.11	Ave
15570	36.25	45	150	V	40.5	13.379	34.284	55.85	64	-8.15	Ave

5725 - 5850 MHz

802.11a mode Antenna A

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Low Channel: 5745 MHz											
5625-5650	64.62	95	150	V	35.30	9.47	34.85	74.54	78.20	-3.66	Peak
5650-5700	69.49	95	150	V	35.30	9.47	34.85	79.41	114.06	-34.65	Peak
5700-5720	84.27	95	150	V	35.30	9.47	34.85	94.19	120.75	-26.56	Peak
5720-5725	91.66	95	150	V	35.30	9.47	34.85	101.58	129.82	-28.24	Peak
5625-5650	63.98	320	150	H	35.30	9.47	34.85	73.90	78.20	-4.30	Peak
5650-5700	69.81	320	150	H	35.30	9.47	34.85	79.73	113.32	-33.59	Peak
5700-5720	84.53	320	150	H	35.30	9.47	34.85	94.45	120.58	-26.13	Peak
5720-5725	91.92	320	150	H	35.30	9.47	34.85	101.84	130.36	-28.52	Peak
11490	49.18	285	225	H	38.7	13.88	35.504	66.26	84	-17.74	Peak
11490	49.02	250	140	H	38.7	13.88	35.504	66.10	84	-17.90	Peak
11490	38.89	285	225	H	38.7	13.88	35.504	55.96	64	-8.04	Ave
11490	38.63	250	140	H	38.7	13.88	35.504	55.70	64	-8.30	Ave
17235	48.71	360	220	H	41.8	12.936	33.306	70.14	78	-7.86	Peak
17235	48.53	40	120	V	41.8	12.936	33.306	69.96	78	-8.04	Peak
Middle Channel: 5785 MHz											
11570	48.84	320	180	H	38.7	13.88	35.504	65.92	84	-18.08	Peak
11570	48.68	335	205	H	38.7	13.88	35.504	65.76	84	-18.24	Peak
11570	38.25	320	180	H	38.7	13.88	35.504	55.32	64	-8.68	Ave
11570	39.23	335	205	H	38.7	13.88	35.504	56.30	64	-7.70	Ave
17355	46.77	120	240	H	41.8	12.936	33.005	68.50	78	-9.50	Peak
17355	49	315	240	V	41.8	12.936	33.005	70.73	78	-7.27	Peak
High Channel: 5825 MHz											
5850-5855	81.15	90	150	V	35.60	9.47	35.05	91.17	132.02	-40.85	Peak
5855-5875	75.62	90	150	V	35.60	9.47	35.05	85.64	120.77	-35.13	Peak
5875-5925	65.33	90	150	V	35.60	9.47	35.05	75.35	113.94	-38.59	Peak
5925-5950	64.46	90	150	V	35.80	9.47	35.05	74.68	78.20	-3.52	Peak
5850-5855	81.61	320	130	H	35.60	9.47	35.05	91.63	132.08	-40.45	Peak
5855-5875	76.36	320	130	H	35.60	9.47	35.05	86.38	120.80	-34.42	Peak
5875-5925	65.38	320	130	H	35.60	9.47	35.05	75.40	114.92	-39.52	Peak
5925-5950	64.46	320	130	H	35.80	9.47	35.05	74.68	78.20	-3.52	Peak
11650	48.61	320	150	H	38.9	13.88	35.35	66.04	84	-17.96	Peak
11650	49.09	335	150	V	38.9	13.88	35.35	66.52	84	-17.48	Peak
11650	37.75	320	150	H	38.9	13.88	35.35	55.18	64	-8.82	Ave
11650	38.28	335	150	V	38.9	13.88	35.35	55.71	64	-8.29	Ave
17475	48.39	40	245	H	41.8	12.936	33.005	70.12	78	-7.88	Peak
17475	50.42	325	230	V	41.8	12.936	33.005	72.15	78	-5.85	Peak

5725 - 5850 MHz

802.11a mode Antenna B

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Low Channel: 5745 MHz											
5625-5650	61.88	65	150	V	35.30	9.47	34.85	71.80	78.20	-6.40	Peak
5650-5700	65.18	65	150	V	35.30	9.47	34.85	75.10	113.62	-38.53	Peak
5700-5720	74.66	65	150	V	35.30	9.47	34.85	84.58	120.66	-36.08	Peak
5720-5725	86.84	65	150	V	35.30	9.47	34.85	96.76	132.21	-35.45	Peak
5625-5650	63.24	35	135	H	35.30	9.47	34.85	73.16	78.20	-5.04	Peak
5650-5700	67.59	35	135	H	35.30	9.47	34.85	77.51	113.62	-36.12	Peak
5700-5720	80.80	35	135	H	35.30	9.47	34.85	90.72	120.81	-30.09	Peak
5720-5725	90.96	35	135	H	35.30	9.47	34.85	100.88	132.23	-31.35	Peak
11490	55.67	330	200	H	38.7	13.88	35.504	72.75	84	-11.25	Peak
11490	54.13	80	150	H	38.7	13.88	35.504	71.21	84	-12.79	Peak
11490	44.64	330	200	H	38.7	13.88	35.504	61.71	64	-2.29	Ave
11490	42.90	80	150	H	38.7	13.88	35.504	59.97	64	-4.03	Ave
17235	50.24	360	200	H	41.8	12.936	33.306	71.67	78	-6.33	Peak
17235	54.65	5	125	V	41.8	12.936	33.306	76.08	78	-1.92	Peak
Middle Channel: 5785 MHz											
11570	52.15	105	150	H	38.7	13.88	35.504	69.23	84	-14.77	Peak
11570	52.03	80	150	H	38.7	13.88	35.504	69.11	84	-14.89	Peak
11570	40.73	105	150	H	38.7	13.88	35.504	57.80	64	-6.20	Ave
11570	41.48	80	150	H	38.7	13.88	35.504	58.55	64	-5.45	Ave
17355	51.03	0	205	H	41.8	12.936	33.005	72.76	78	-5.24	Peak
17355	52.99	15	125	V	41.8	12.936	33.005	74.72	78	-3.28	Peak
High Channel: 5825 MHz											
5850-5855	78.42	290	150	V	35.60	9.47	35.05	88.44	127.88	-39.44	Peak
5855-5875	75.97	290	150	V	35.60	9.47	35.05	85.99	120.43	-34.44	Peak
5875-5925	64.75	290	150	V	35.60	9.47	35.05	74.77	114.25	-39.48	Peak
5925-5950	64.27	290	150	V	35.80	9.47	35.05	74.49	78.20	-3.71	Peak
5850-5855	82.22	35	150	H	35.60	9.47	35.05	92.24	127.33	-35.09	Peak
5855-5875	80.11	35	150	H	35.60	9.47	35.05	90.13	120.61	-30.49	Peak
5875-5925	66.58	35	150	H	35.60	9.47	35.05	76.60	114.12	-37.52	Peak
5925-5950	64.66	35	150	H	35.80	9.47	35.05	74.88	78.20	-3.32	Peak
11650	51.99	90	150	H	38.9	13.88	35.35	69.42	84	-14.58	Peak
11650	51.32	80	180	V	38.9	13.88	35.35	68.75	84	-15.25	Peak
11650	40.63	90	150	H	38.9	13.88	35.35	58.06	64	-5.94	Ave
11650	40.81	80	180	V	38.9	13.88	35.35	58.24	64	-5.76	Ave
17475	50.71	360	205	H	41.8	12.936	33.005	72.44	78	-5.56	Peak
17475	54.4	20	120	V	41.8	12.936	33.005	76.13	78	-1.87	Peak

5725 - 5850 MHz

802.11ac20/n20 mode Antenna A+B

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Low Channel: 5745 MHz											
5625-5650	63.59	110	155	V	35.30	9.47	34.85	73.51	78.20	-4.69	Peak
5650-5700	65.05	110	155	V	35.30	9.47	34.85	74.97	112.27	-37.30	Peak
5700-5720	76.37	110	155	V	35.30	9.47	34.85	86.29	120.68	-34.39	Peak
5720-5725	86.69	110	155	V	35.30	9.47	34.85	96.61	127.00	-30.40	Peak
5625-5650	63.27	30	130	H	35.30	9.47	34.85	73.19	78.20	-5.01	Peak
5650-5700	65.33	30	130	H	35.30	9.47	34.85	75.25	114.68	-39.43	Peak
5700-5720	76.06	30	130	H	35.30	9.47	34.85	85.98	120.79	-34.81	Peak
5720-5725	87.34	30	130	H	35.30	9.47	34.85	97.26	132.02	-34.76	Peak
11490	52.38	105	140	H	38.7	13.88	35.504	69.46	84	-14.54	Peak
11490	54.34	255	130	H	38.7	13.88	35.504	71.42	84	-12.58	Peak
11490	42.06	105	140	H	38.7	13.88	35.504	59.13	64	-4.87	Ave
11490	41.28	255	130	H	38.7	13.88	35.504	58.35	64	-5.65	Ave
17235	50.14	360	200	H	41.8	12.936	33.306	71.57	78	-6.43	Peak
17235	55.44	10	130	V	41.8	12.936	33.306	76.87	78	-1.13	Peak
Middle Channel: 5785 MHz											
11570	50.47	290	200	H	38.7	13.88	35.504	67.55	84	-16.45	Peak
11570	54.18	320	200	V	38.7	13.88	35.504	71.26	84	-12.74	Peak
11570	38.49793	290	200	H	38.7	13.88	35.504	55.57	64	-8.43	Ave
11570	42.49793	320	200	V	38.7	13.88	35.504	59.57	64	-4.43	Ave
17355	48.68	10	185	H	41.8	12.936	33.005	70.41	78	-7.59	Peak
17355	55.46	5	210	V	41.8	12.936	33.005	77.19	78	-0.81	Peak
High Channel: 5825 MHz											
5850-5855	79.22	110	135	V	35.60	9.47	35.05	89.24	131.96	-42.72	55.08
5855-5875	73.04	110	135	V	35.60	9.47	35.05	83.06	120.53	-37.47	51.96
5875-5925	63.93	110	135	V	35.60	9.47	35.05	73.95	113.14	-39.19	34.51
5925-5950	64.25	110	135	V	35.80	9.47	35.05	74.47	78.20	-3.73	29.69
5850-5855	79.43	95	135	H	35.60	9.47	35.05	89.45	132.06	-42.61	52.57
5855-5875	76.35	95	135	H	35.60	9.47	35.05	86.37	120.75	-34.38	51.01
5875-5925	65.34	95	135	H	35.60	9.47	35.05	75.36	90.20	-14.84	33.55
5925-5950	64.09	95	135	H	35.80	9.47	35.05	74.31	78.20	-3.89	29.81
11650	47.79	20	160	H	38.9	13.88	35.35	65.22	84	-18.78	47.82
11650	49.34	85	150	V	38.9	13.88	35.35	66.77	84	-17.23	49.24
11650	35.87	20	160	H	38.9	13.88	35.35	53.30	64	-10.70	38.5
11650	37.64	85	150	V	38.9	13.88	35.35	55.07	64	-8.93	39.4
17475	50.22	360	210	H	41.8	12.936	33.005	71.95	78	-6.05	51.74
17475	55.64	5	205	V	41.8	12.936	33.005	77.37	78	-0.63	51.47

5725 - 5850 MHz

802.11ac40/n40 mode Antenna A+B

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Low Channel: 5755 MHz											
5625-5650	58.32	110	145	V	35.30	9.47	34.85	68.24	78.20	-9.96	Peak
5650-5700	66.96	110	145	V	35.30	9.47	34.85	76.88	111.47	-34.59	Peak
5700-5720	52.80	110	145	V	35.30	9.47	34.85	62.72	120.77	-58.05	Peak
5720-5725	84.82	110	145	V	35.30	9.47	34.85	94.74	127.22	-32.48	Peak
5625-5650	58.57	30	125	H	35.30	9.47	34.85	68.49	78.20	-9.71	Peak
5650-5700	67.03	30	125	H	35.30	9.47	34.85	76.95	114.86	-37.91	Peak
5700-5720	83.57	30	125	H	35.30	9.47	34.85	93.49	120.79	-27.30	Peak
5720-5725	86.41	30	125	H	35.30	9.47	34.85	96.33	126.89	-30.56	Peak
11510	48.29	100	150	H	38.7	13.88	35.504	65.37	84	-18.63	Peak
11510	49.76	260	150	V	38.7	13.88	35.504	66.84	84	-17.16	Peak
11510	37.92	100	150	H	38.7	13.88	35.504	55.00	64	-9.00	Ave
11510	38.47	260	150	V	38.7	13.88	35.504	55.55	64	-8.45	Ave
17265	46.2	355	150	H	41.8	12.936	33.306	67.63	78	-10.37	Peak
17265	51.69	5	150	V	41.8	12.936	33.306	73.12	78	-4.88	Peak
High Channel: 5795 MHz											
5850-5855	71.82	110	135	V	35.60	9.47	35.05	81.84	131.17	-49.33	Peak
5855-5875	70.13	110	135	V	35.60	9.47	35.05	80.15	120.10	-39.95	Peak
5875-5925	62.33	110	135	V	35.60	9.47	35.05	72.35	113.69	-41.34	Peak
5925-5950	58.88	110	135	V	35.80	9.47	35.05	69.10	78.20	-9.10	Peak
5850-5855	72.47	325	135	H	35.60	9.47	35.05	82.49	132.23	-49.74	Peak
5855-5875	71.36	325	135	H	35.60	9.47	35.05	81.38	120.05	-38.68	Peak
5875-5925	63.64	325	135	H	35.60	9.47	35.05	73.66	113.62	-39.97	Peak
5925-5950	60.61	325	135	H	35.80	9.47	35.05	70.83	78.20	-7.37	Peak
11590	48.25	330	130	H	38.9	13.88	35.35	65.68	84	-18.32	Peak
11590	50.14	330	150	V	38.9	13.88	35.35	67.57	84	-16.43	Peak
11590	38.09	330	130	H	38.9	13.88	35.35	55.52	64	-8.48	Ave
11590	38.03	330	150	V	38.9	13.88	35.35	55.46	64	-8.54	Ave
17385	45.26	330	200	H	41.8	12.936	33.005	66.99	78	-11.01	Peak
17385	51.43	0	200	V	41.8	12.936	33.005	73.16	78	-4.84	Peak

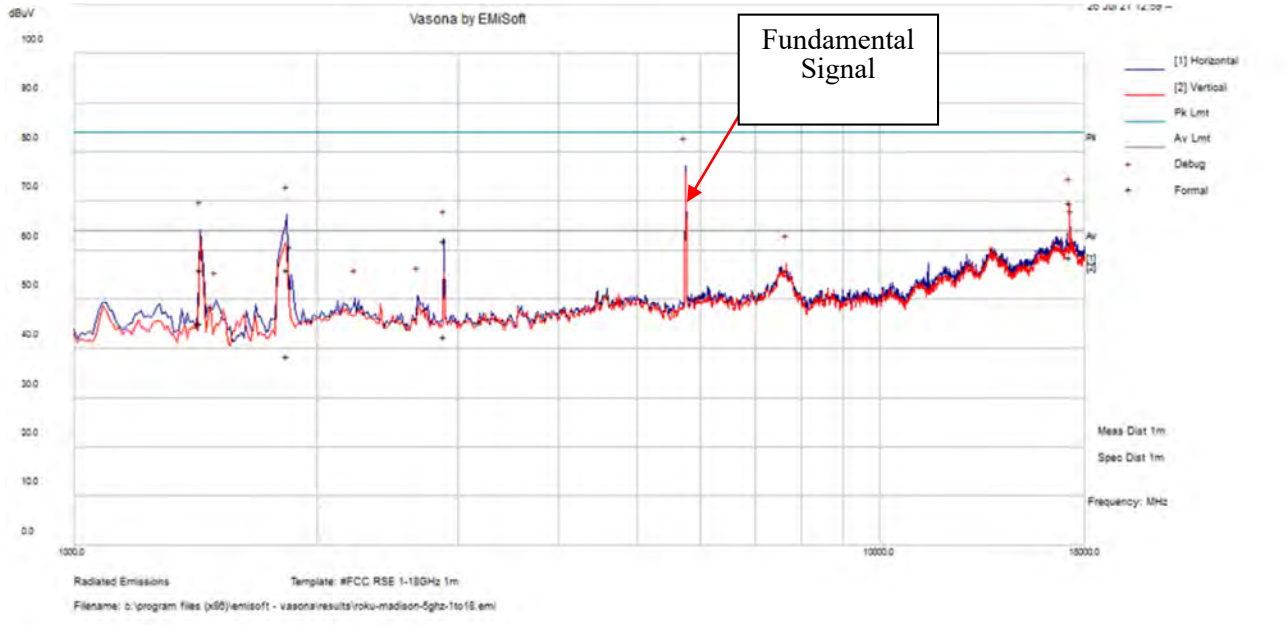
5725 - 5850 MHz

802.11ac80 mode Antenna A+B

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
High Channel: 5775 MHz											
5625-5650	58.58	115	150	V	35.30	9.47	34.85	68.50	78.20	-9.70	Peak
5650-5700	66.36	115	150	V	35.30	9.47	34.85	76.28	113.75	-37.47	Peak
5700-5720	70.78	115	150	V	35.30	9.47	34.85	80.70	120.33	-39.63	Peak
5720-5725	70.42	115	150	V	35.30	9.47	34.85	80.34	130.62	-50.28	Peak
5625-5650	58.59	30	150	H	35.30	9.47	34.85	68.51	78.20	-9.69	Peak
5650-5700	68.17	30	150	H	35.30	9.47	34.85	78.09	113.81	-35.72	Peak
5700-5720	73.86	30	150	H	35.30	9.47	34.85	83.78	120.28	-36.50	Peak
5720-5725	73.62	30	150	H	35.30	9.47	34.85	83.54	131.83	-48.29	Peak
5850-5855	67.23	105	125	V	35.60	9.47	35.05	77.25	130.67	-53.42	Peak
5855-5875	63.38	105	125	V	35.60	9.47	35.05	73.40	120.79	-47.39	Peak
5875-5925	60.11	105	125	V	35.60	9.47	35.05	70.13	113.81	-43.68	Peak
5925-5950	58.61	105	125	V	35.80	9.47	35.05	68.83	78.20	-9.37	Peak
5850-5855	69.17	330	120	H	35.60	9.47	35.05	79.19	131.24	-52.05	Peak
5855-5875	68.27	330	120	H	35.60	9.47	35.05	78.29	119.59	-41.30	Peak
5875-5925	61.89	330	120	H	35.60	9.47	35.05	71.91	110.05	-38.14	Peak
5925-5950	59.19	330	120	H	35.80	9.47	35.05	69.41	78.20	-8.79	Peak
11550	45.5	160	150	H	38.7	13.88	35.35	62.73	84	-21.27	Peak
11550	46.45	260	150	V	38.7	13.88	35.35	63.68	84	-20.32	Peak
11550	34.98	160	150	H	38.7	13.88	35.35	52.21	64	-11.79	Ave
11550	35.54	260	150	V	38.7	13.88	35.35	52.77	64	-11.23	Ave
17325	43.97	310	150	H	41.8	12.936	33.005	65.70	78	-12.30	Peak
17325	44.92	135	150	V	41.8	12.936	33.005	66.65	78	-11.35	Peak

3) to 18 GHz Vasona scan at 1 meter

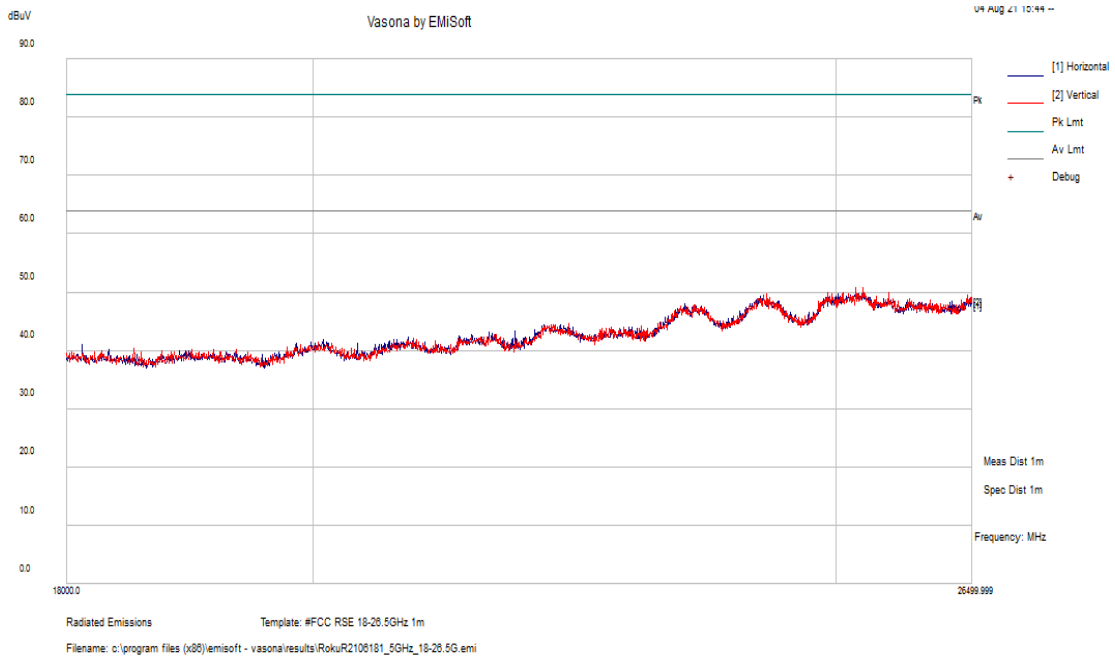
Worst Case: 802.11n/ac40, 5795 MHz



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)	Comment
17233.595	45.83	15.61	69.72	101	V	23	84	-14.28	Peak
1839.5925	55.35	-2.05	56.09	200	H	270	84	-27.91	Peak
1437.48	60	-6.18	56.1	149	H	261	84	-27.9	Peak
2879.9275	58.98	-0.55	61.98	188	H	231	84	-22.02	Peak
17233.595	34.62	15.61	58.52	101	V	23	64	-5.48	Ave
1839.5925	37.72	-2.05	38.46	200	H	270	64	-25.54	Ave
1437.48	49.02	-6.18	45.13	149	H	261	64	-18.87	Ave
2879.9275	39.6	-0.55	42.59	188	H	231	64	-21.41	Ave

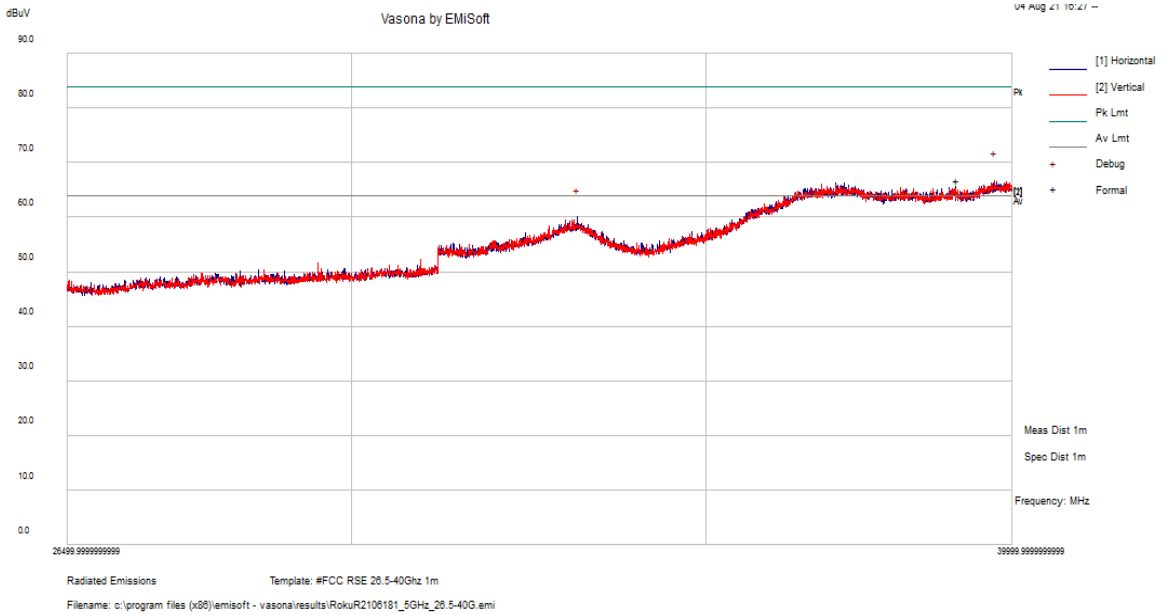
4) 18 – 26.5 GHz Worst Case Scan at 1 Meter

Worst Case: 802.11n/ac40, 5795 MHz



5) 26.5 – 40 GHz Worst Case Scan at 1 Meter

Worst Case: 802.11n/ac40, 5795 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)	Comment
39696.8	51.45	22.4	73.84	243	V	83	84	-10.16	Peak
39696.8	40.63	22.4	63.02	243	V	83	64	-0.98	Ave

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

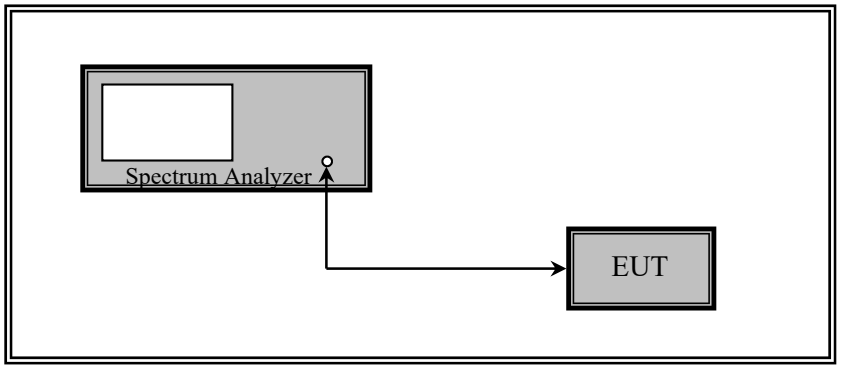
8.1 Applicable Standards

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

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
3. Measure the frequency difference of two frequencies that were attenuated 6 or 26 dB from the reference level. Record the frequency difference as the minimum emission or emission bandwidth.
4. Repeat above procedures until all frequencies measured were complete.

8.3 Test Setup Block Diagram



8.4 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
Rhode & Schwarz	Signal Analyzer	FSV40	101203	2021-04-26	12 months
-	RF cable	-	-	Each time[1]	N/A
-	20 dB attenuator	-	-	Each time[1]	N/A
-	10 dB attenuator			Each time[1]	N/A

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:	22-24 ºC
Relative Humidity:	40-41 %
ATM Pressure:	103.1-104.1 kPa

The testing was performed by Rita Yang from 2021-06-29 to 2021-08-12 in 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 mode			
36	5180	16.7149	22.880
44	5220	17.887	20.014
48	5240	16.889	20.492
802.11n/ac20 mode			
36	5180	17.800	20.101
44	5220	17.757	20.058
48	5240	17.800	20.101
802.11n/ac40 mode			
38	5190	36.643	42.547
46	5230	36.816	43.242
802.11ac80 mode			
42	5210	75.557	82.550

Ant B

Channel	Frequency (MHz)	99% OBW (MHz)	26 dB OBW (MHz)
802.11a mode			
36	5180	16.368	18.973
44	5220	16.368	19.103
48	5240	16.368	19.580
802.11n/ac20 mode			
36	5180	17.713	20.101
44	5220	17.540	20.101
48	5240	17.496	20.145
802.11n/ac40 mode			
38	5190	36.816	42.721
46	5230	36.643	43.502
802.11ac80 mode			
42	5210	75.109	81.710

5725 – 5850 MHz

Ant A

Channel	Frequency (MHz)	99% OBW (MHz)	6 dB OBW (MHz)	Limit (≥500kHz)
802.11a mode				
149	5745	20.926	15.847	Pass
157	5785	20.405	15.456	Pass
165	5825	20.492	15.803	Pass
802.11n/ac20 mode				
149	5745	21.317	15.846	Pass
157	5785	20.579	16.975	Pass
165	5825	20.188	15.803	Pass
802.11n/ac40 mode				
151	5755	38.726	33.864	Pass
159	5795	38.379	33.286	Pass
802.11ac80 mode				
155	5775	75.326	73.34	Pass

Ant B

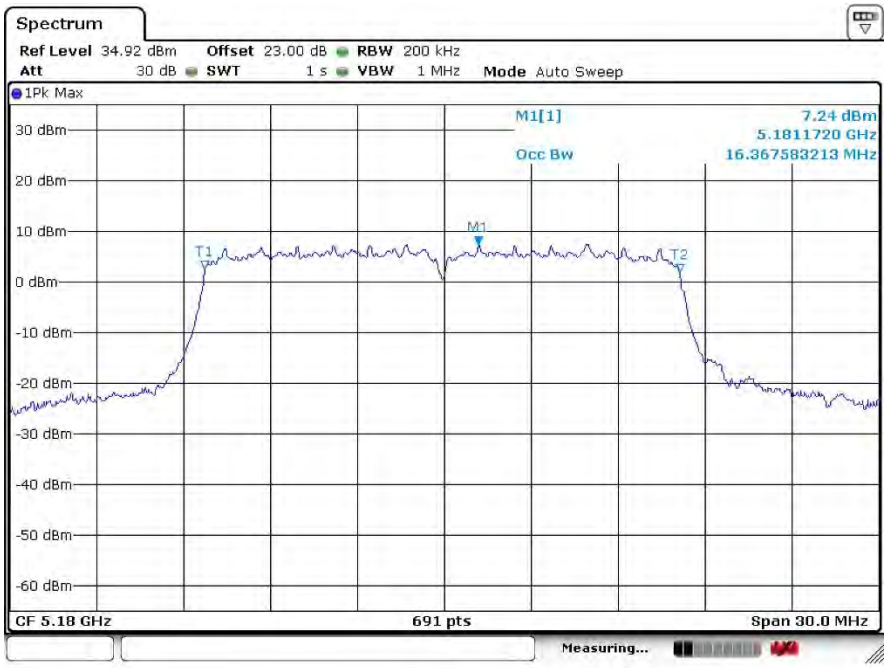
Channel	Frequency (MHz)	99% OBW (MHz)	6 dB OBW (MHz)	Limit (≥500kHz)
802.11a mode				
149	5745	16.368	16.020	Pass
157	5785	16.324	15.673	Pass
165	5825	16.368	16.02	Pass
802.11n/ac20 mode				
149	5745	17.540	16.324	Pass
157	5785	17.540	16.498	Pass
165	5825	17.540	16.671	Pass
802.11n/ac40 mode				
151	5755	36.903	34.153	Pass
159	5795	37.424	33.256	Pass
802.11ac80 mode				
155	5775	75.109	75.06	Pass

5150 - 5250 MHz 802.11a Mode 99% OBW

Low Channel Ant A

Date: 6.JUL.2021 09:06:24

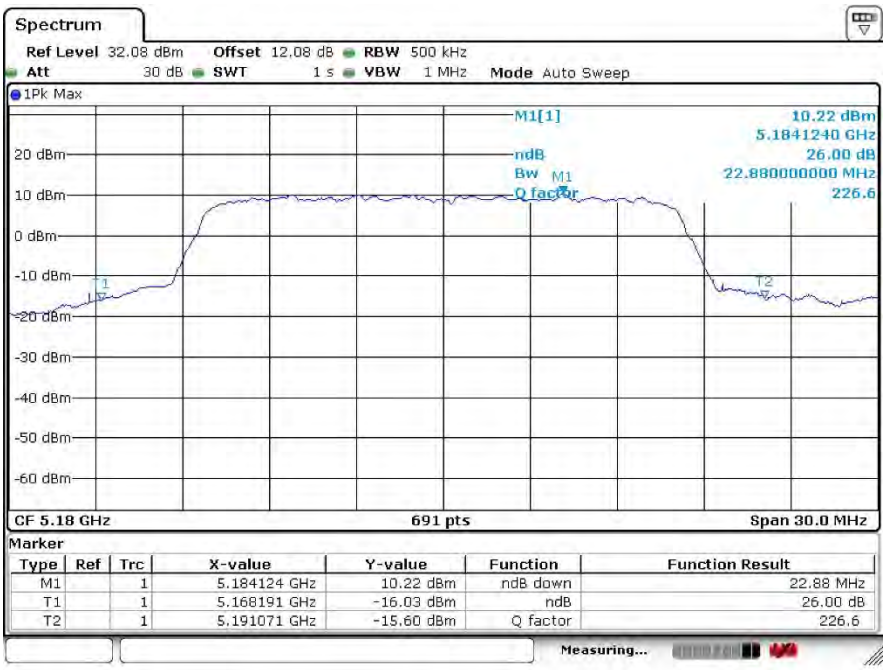
Low Channel Ant B



Date: 29.JUN.2021 11:45:38

5150 - 5250 MHz 802.11a Mode 26 dB OBW

Low Channel Ant A



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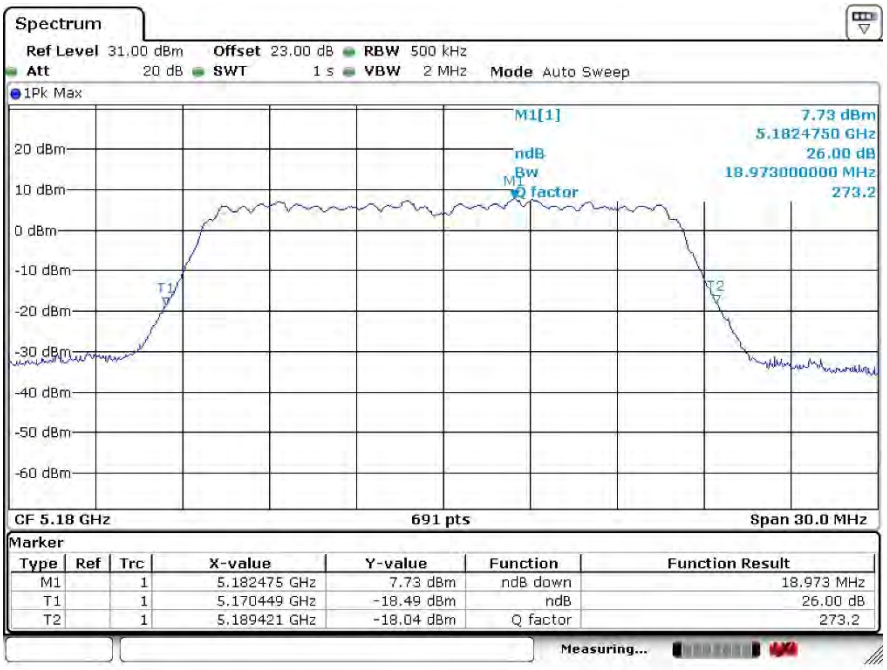
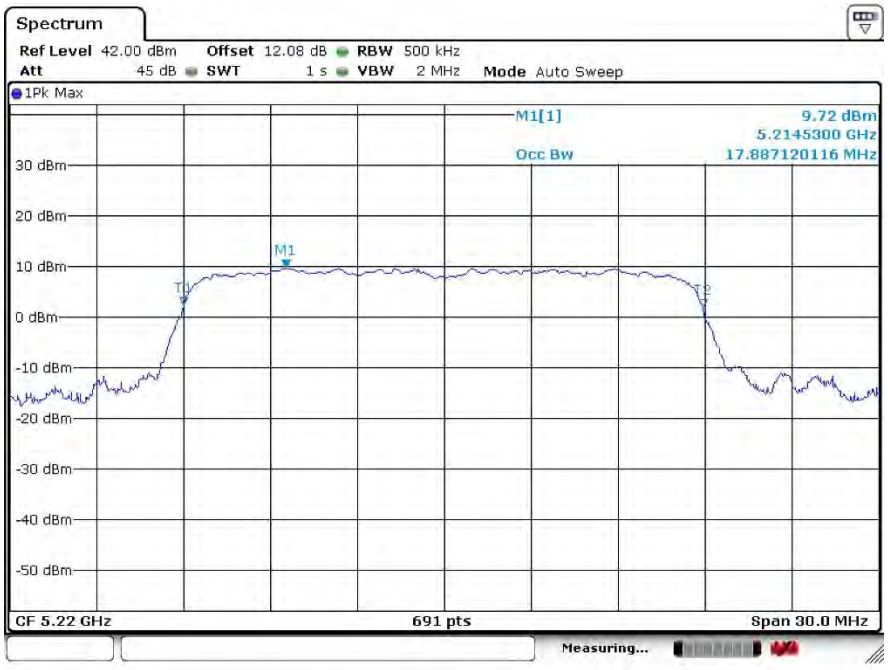
Low Channel Ant B



Date: 30.JUN.2021 13:27:05

5150 - 5250 MHz 802.11a Mode 99% OBW

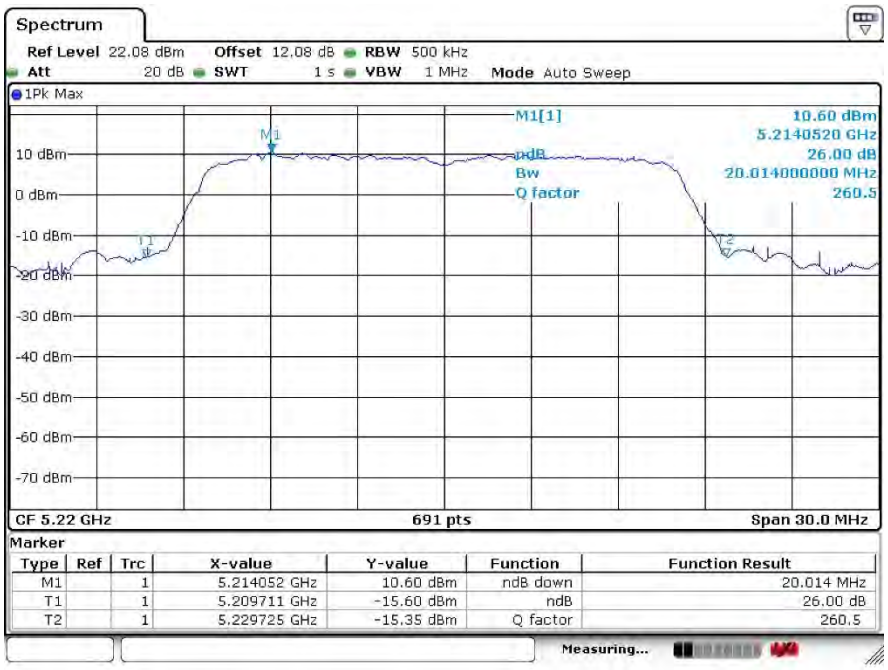
Middle Channel Ant A



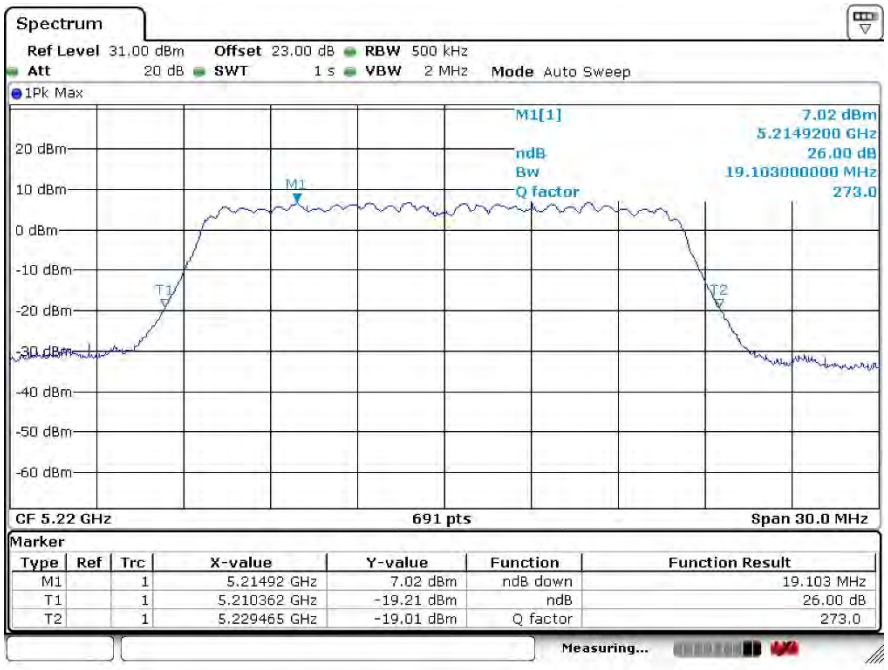
Middle Channel Ant B

5150 - 5250 MHz 802.11a Mode 26 dB OBW

Middle Channel Ant A



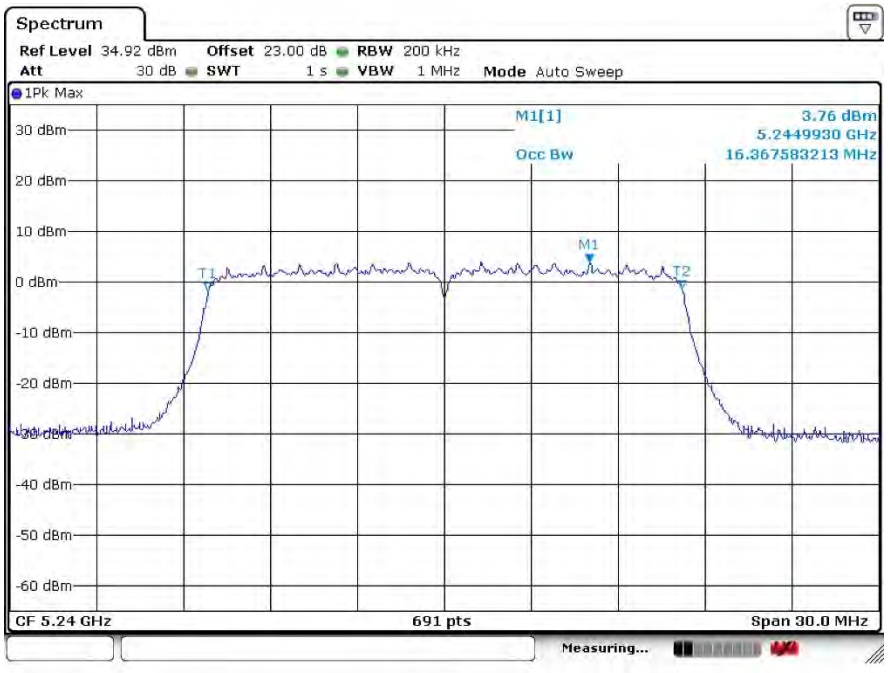
Middle Channel Ant B



5150 - 5250 MHz 802.11a Mode 99% OBW

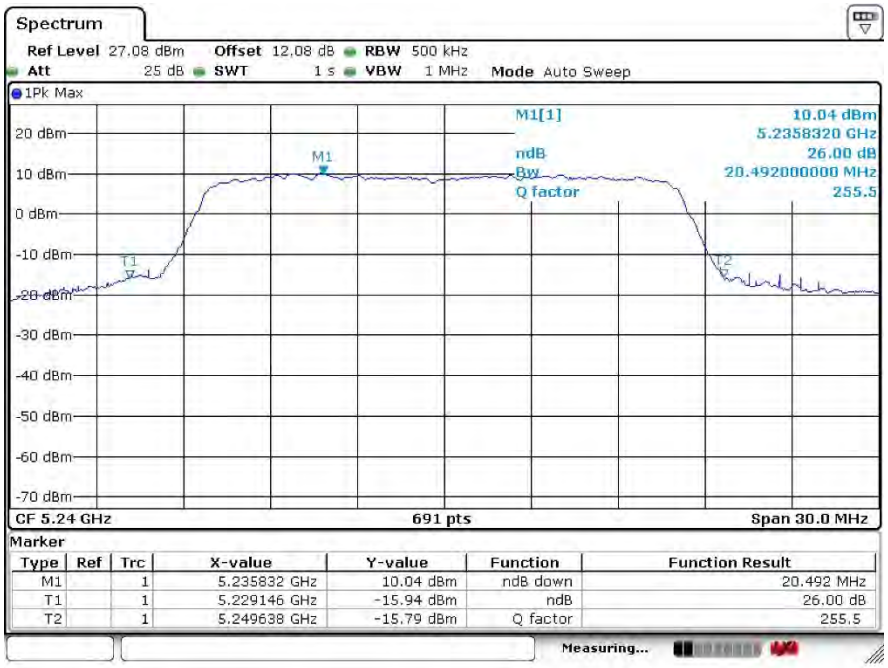
High Channel Ant A

High Channel Ant B

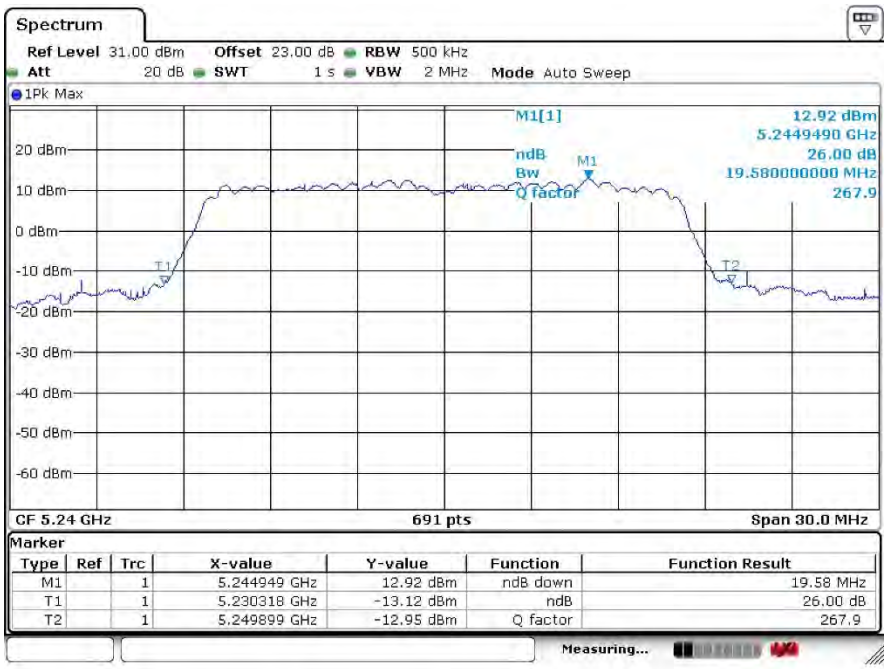


5150 - 5250 MHz 802.11a Mode 26 dB OBW

High Channel Ant A

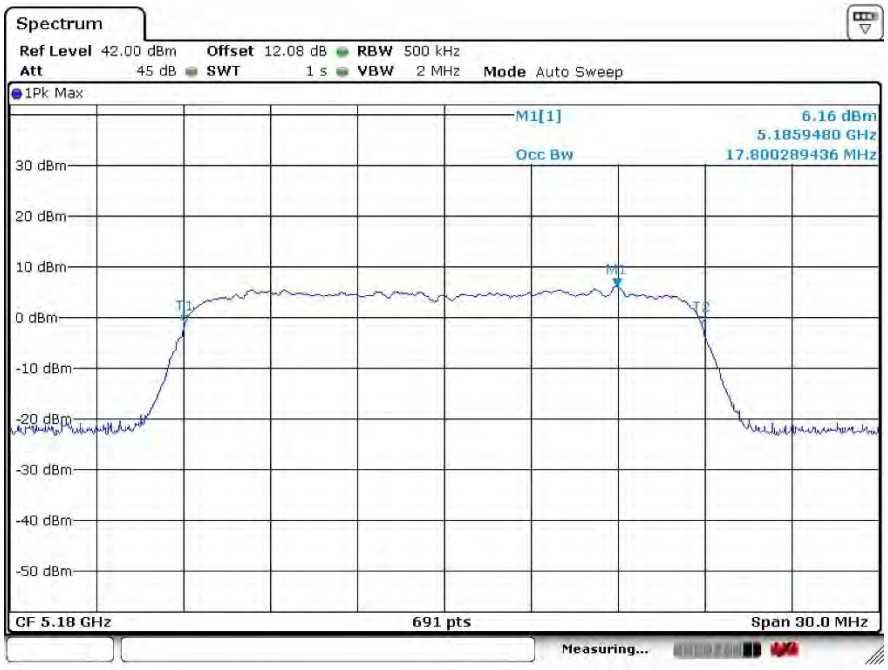


High Channel Ant B



5150 - 5250 MHz 802.11n/ac20 Mode 99% OBW

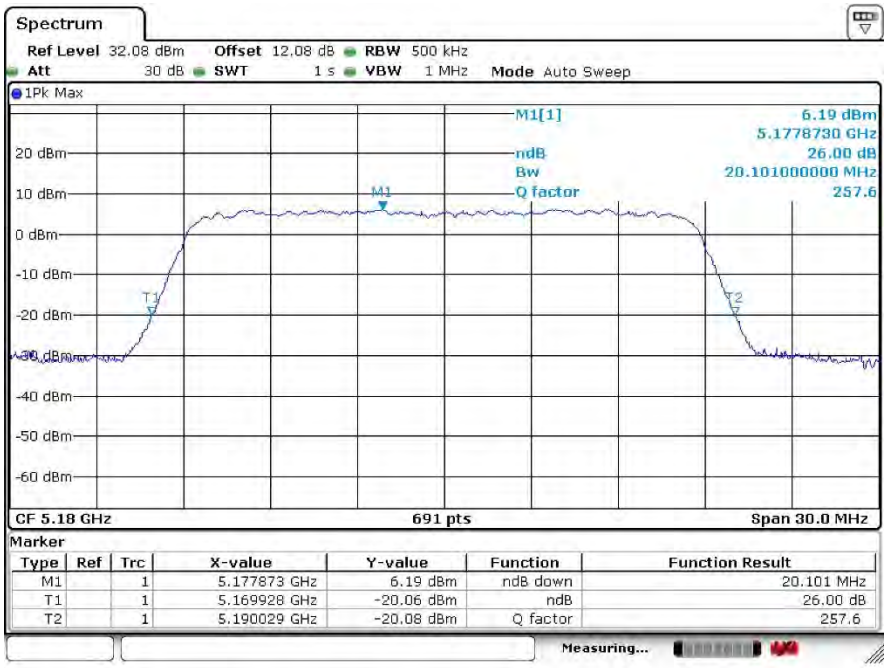
Low Channel Ant A



Low Channel Ant B

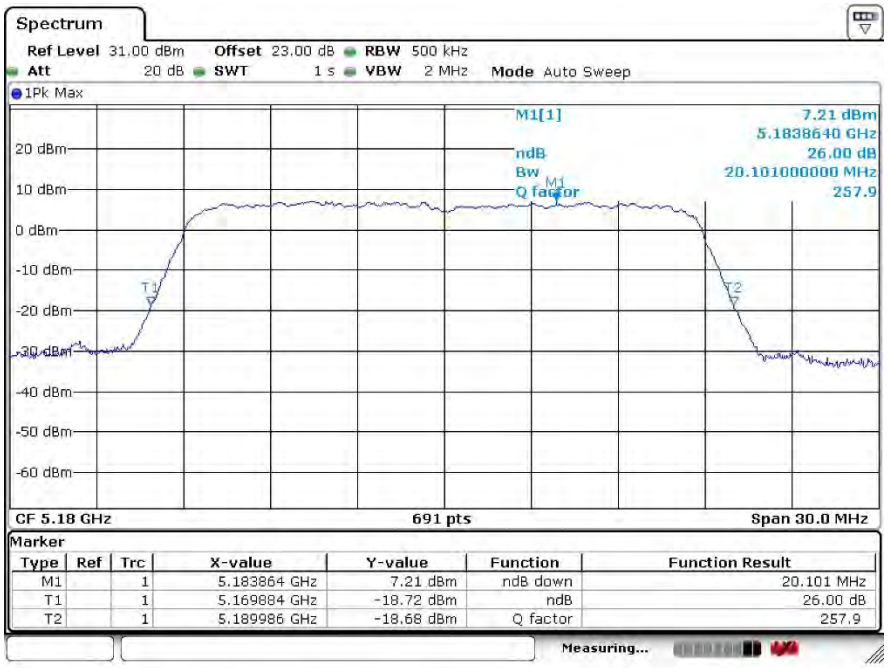
5150 - 5250 MHz 802.11n/ac20 Mode 26 dB OBW

Low Channel Ant A



Date: 6.JUL.2021 09:52:25

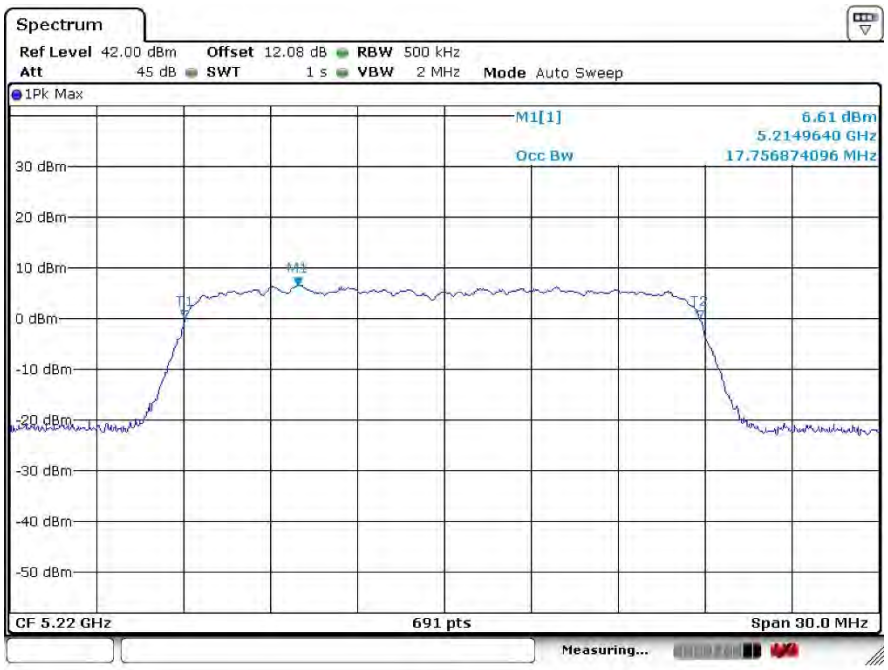
Low Channel Ant B



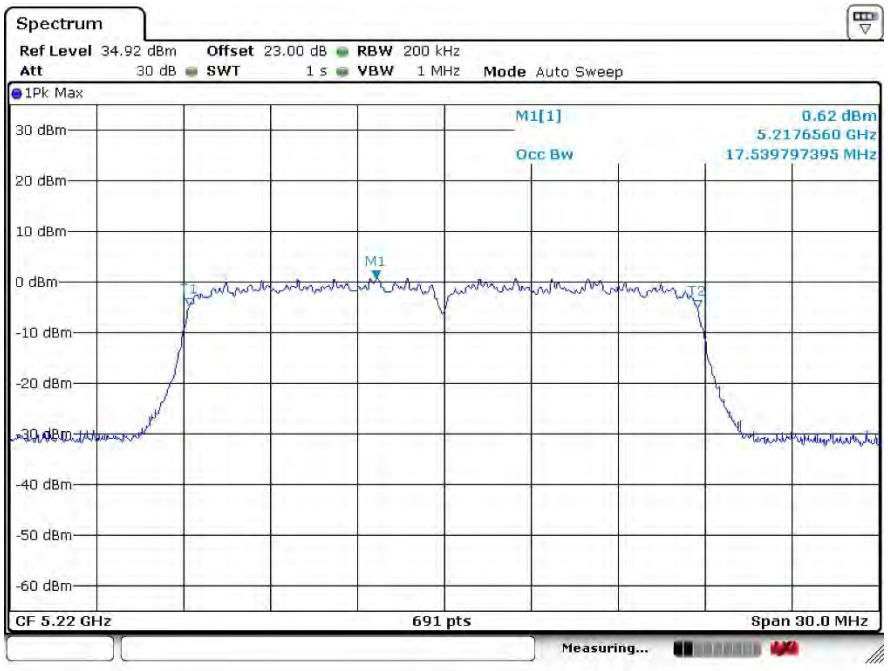
Date: 30.JUN.2021 13:33:39

5150 - 5250 MHz 802.11n/ac20 Mode 99% OBW

Middle Channel Ant A

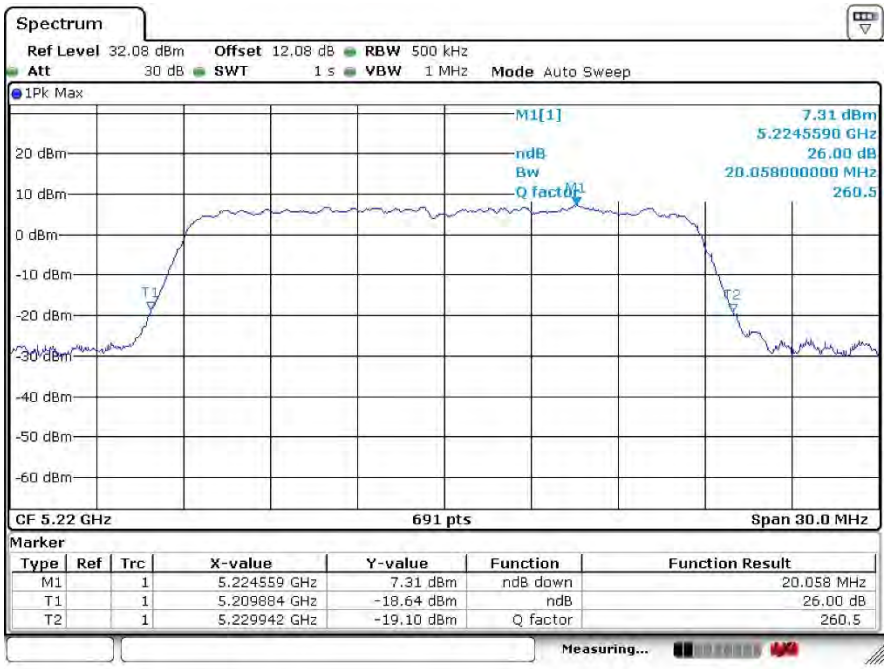


Middle Channel Ant B



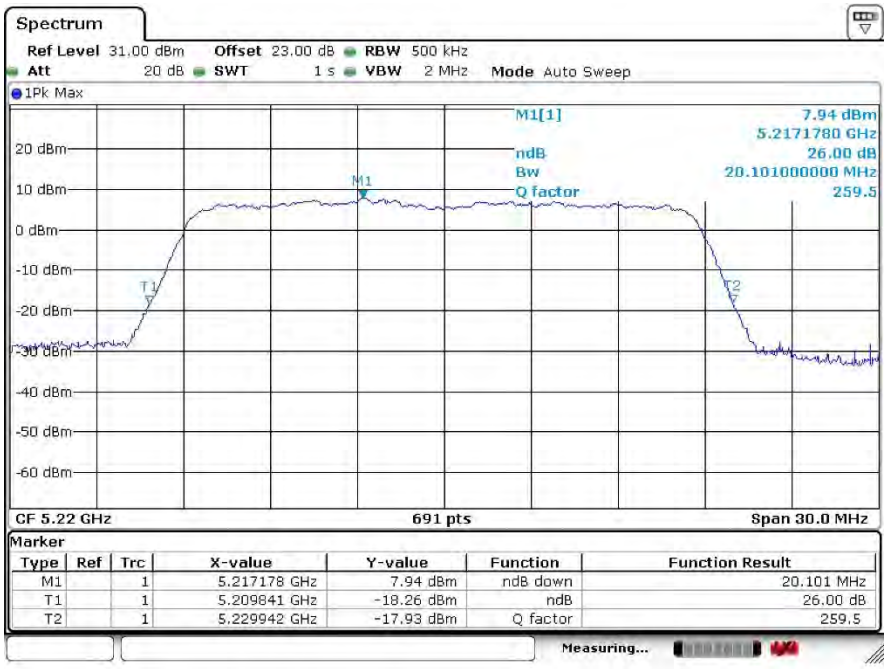
5150 - 5250 MHz 802.11n/ac20 Mode 26 dB OBW

Middle Channel Ant A



Date: 6.JUL.2021 09:50:51

Middle Channel Ant B

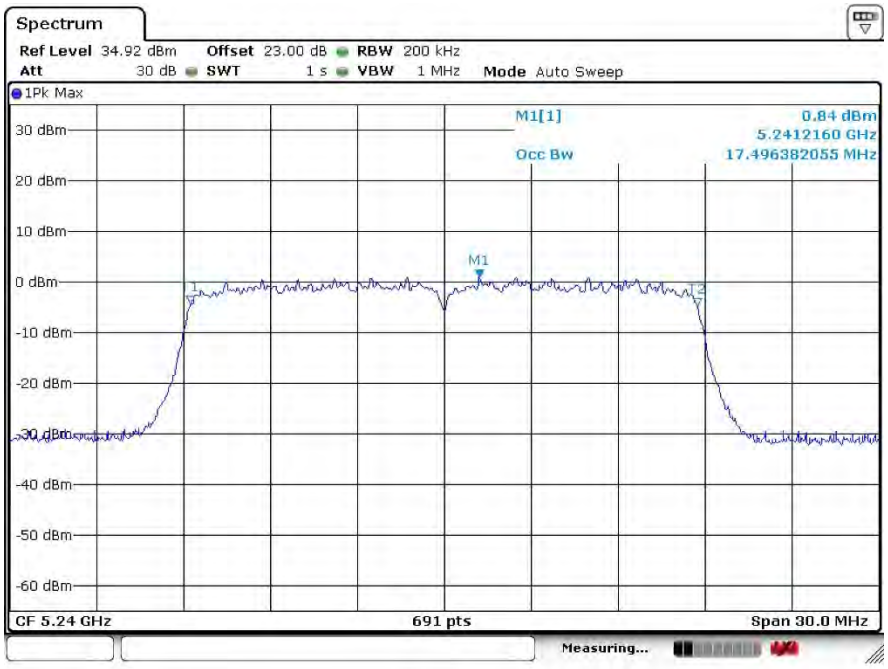


Date: 30.JUN.2021 13:35:21

5150 - 5250 MHz 802.11n/ac20 Mode 99% OBW

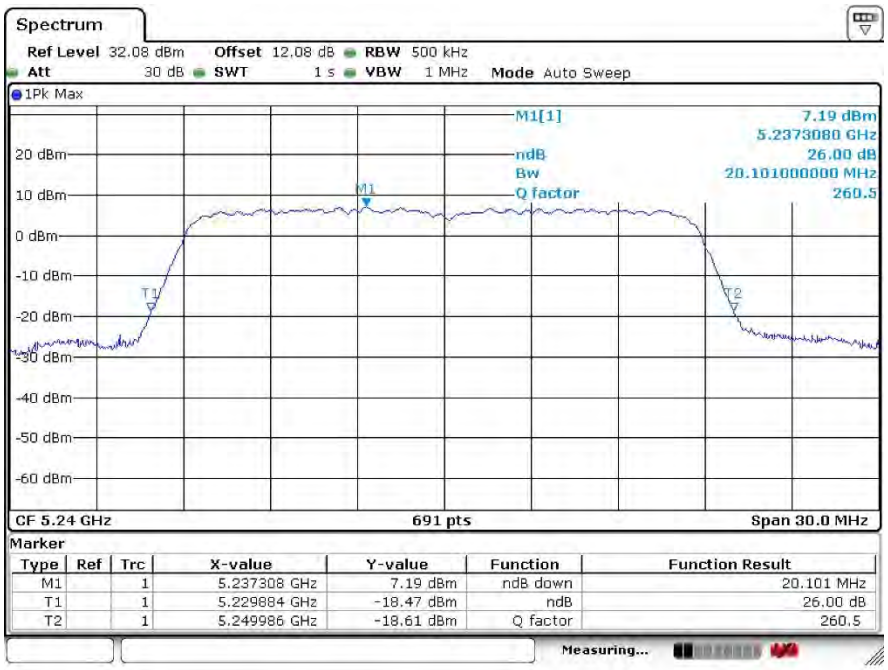
High Channel Ant A

High Channel Ant B



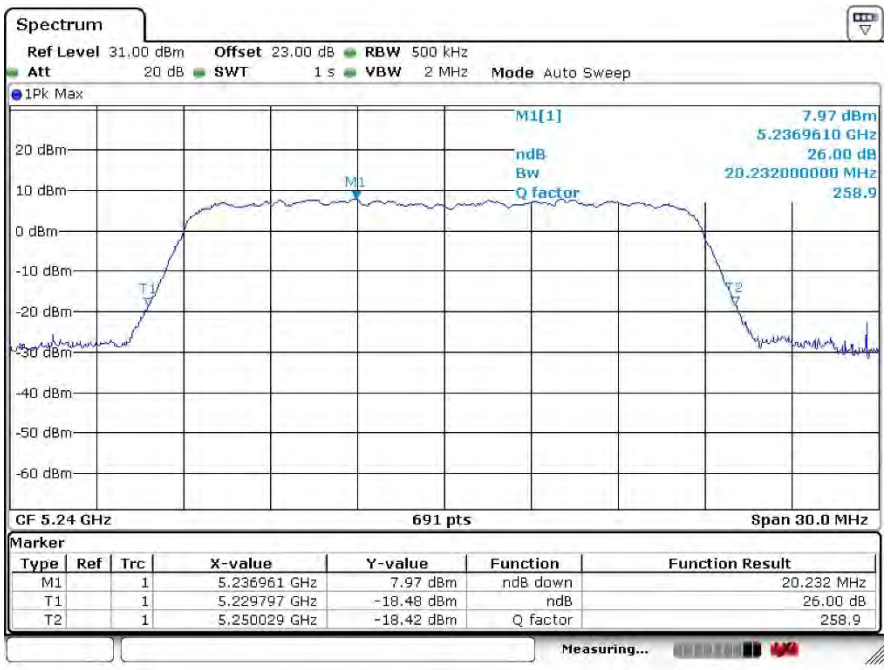
5150 - 5250 MHz 802.11n/ac20 Mode 26 dB OBW

High Channel Ant A



Date: 6.JUL.2021 09:49:13

High Channel Ant B



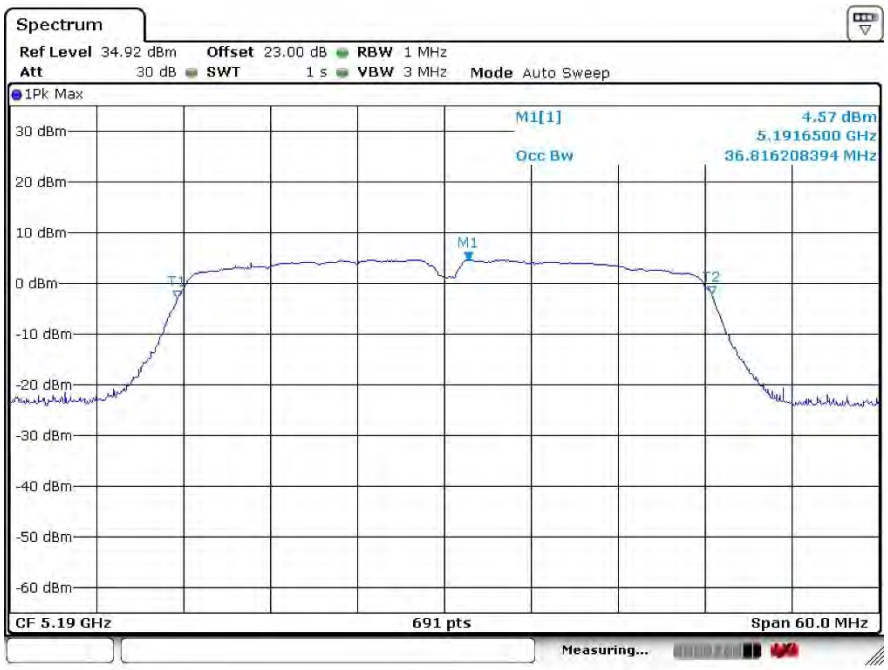
Date: 30.JUN.2021 13:37:03

5150 - 5250 MHz 802.11n/ac40 Mode 99% OBW

Low Channel Ant A

Date: 6.JUL.2021 09:25:53

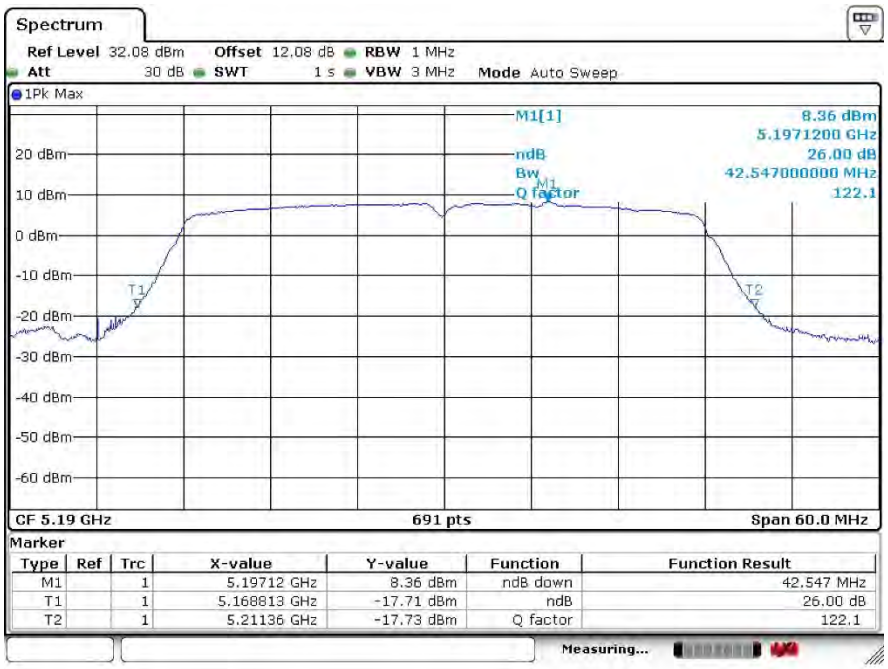
Low Channel Ant B



Date: 29.JUN.2021 13:38:18

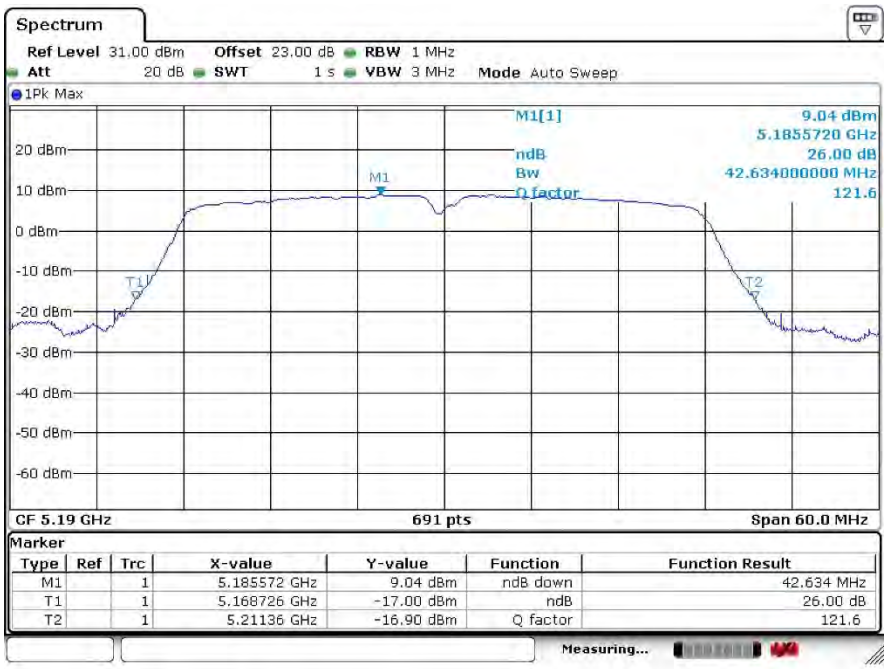
5150 - 5250 MHz 802.11n/ac40 Mode 26 dB OBW

Low Channel Ant A



Date: 6.JUL.2021 09:47:14

Low Channel Ant B



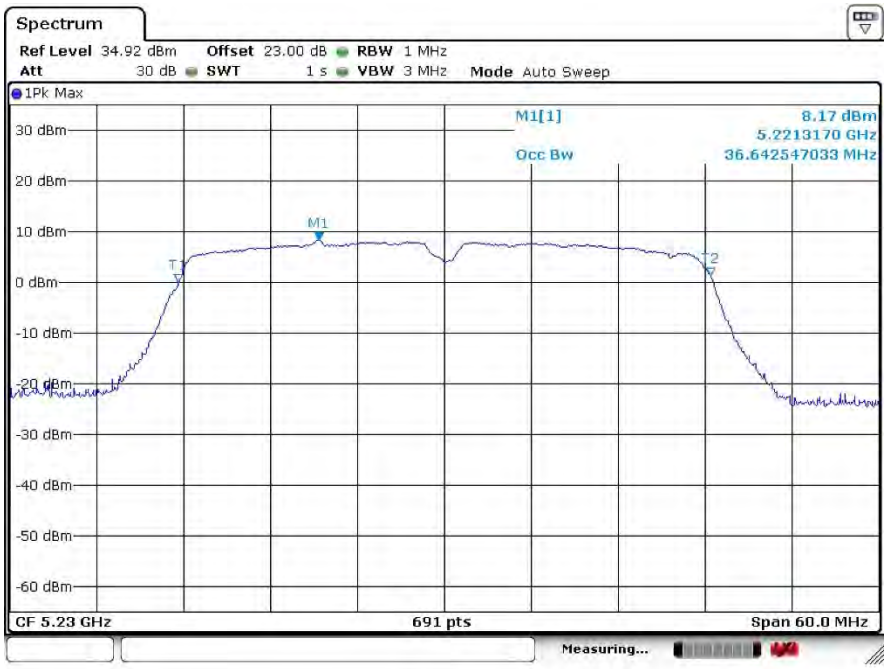
Date: 30.JUN.2021 13:38:57

5150 - 5250 MHz 802.11n/ac40 Mode 99% OBW

High Channel Ant A

Date: 6.JUL.2021 09:28:28

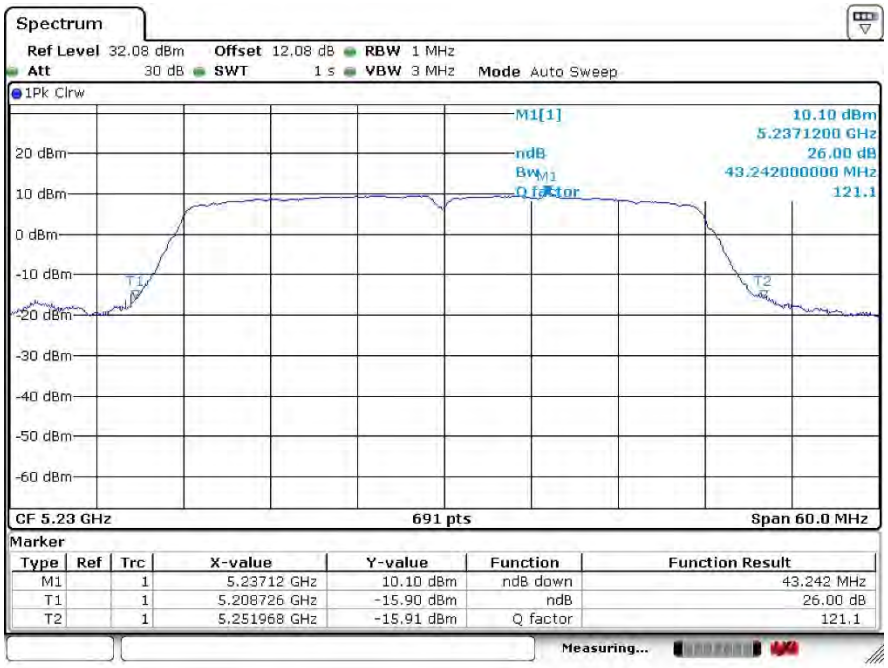
High Channel Ant B



Date: 29.JUN.2021 13:40:31

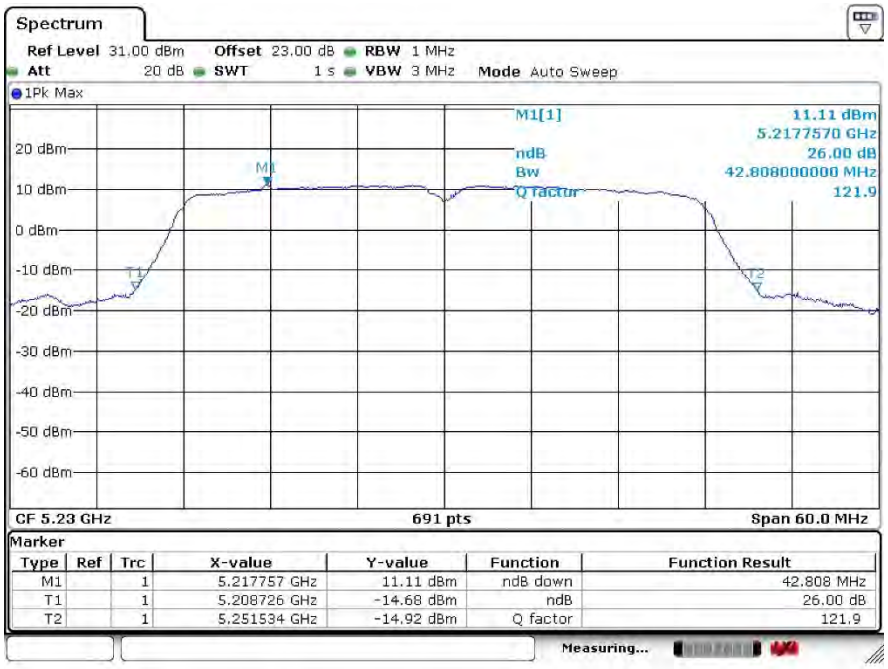
5150 - 5250 MHz 802.11n/ac40 Mode 26dB OBW

High Channel Ant A



Date: 6.JUL.2021 09:45:12

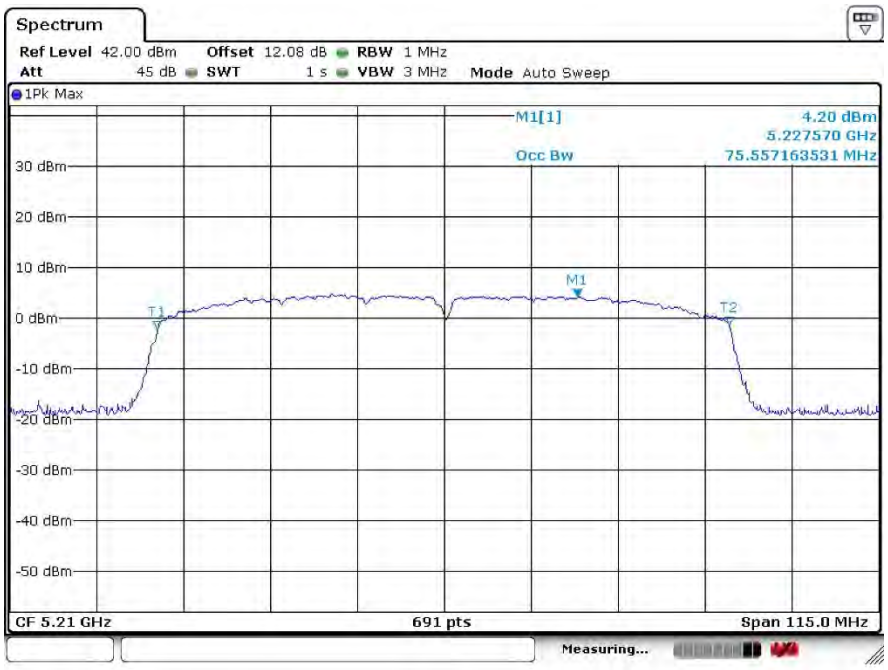
High Channel Ant B



Date: 30.JUN.2021 13:40:38

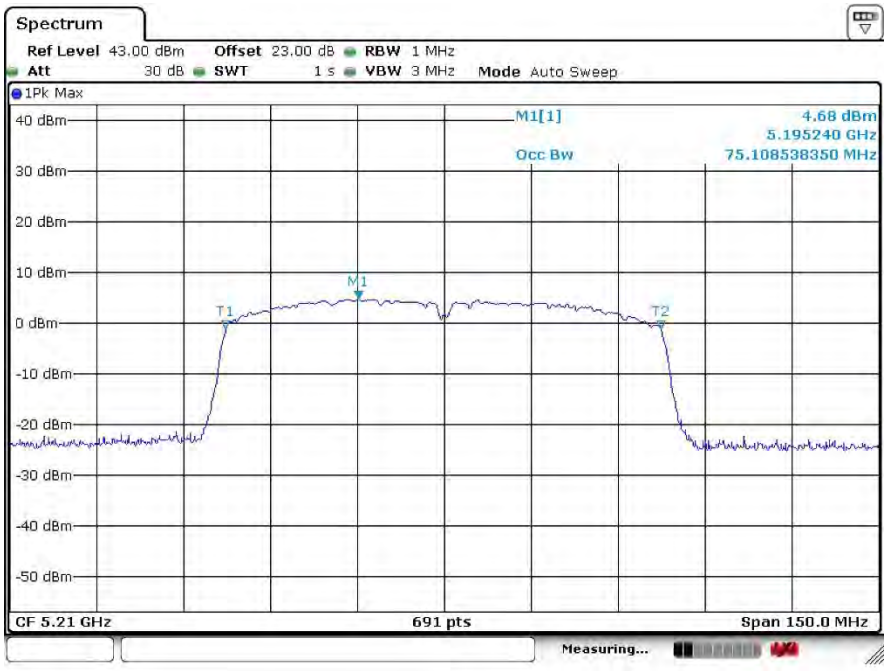
5150 - 5250 MHz 802.11 ac80 Mode 99% OBW

Ant A



Date: 6.JUL.2021 09:36:04

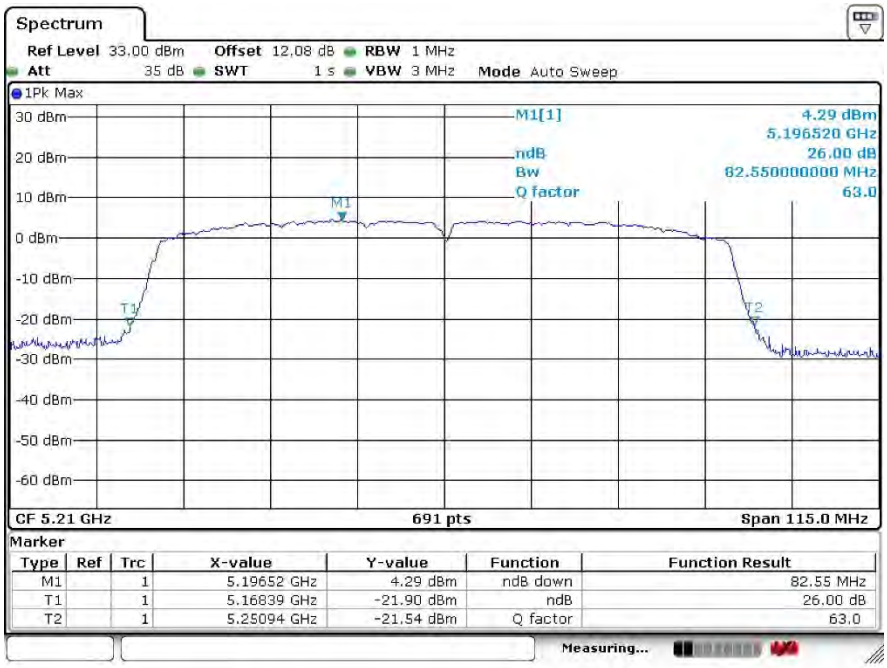
Ant B



Date: 1.JUL.2021 11:27:01

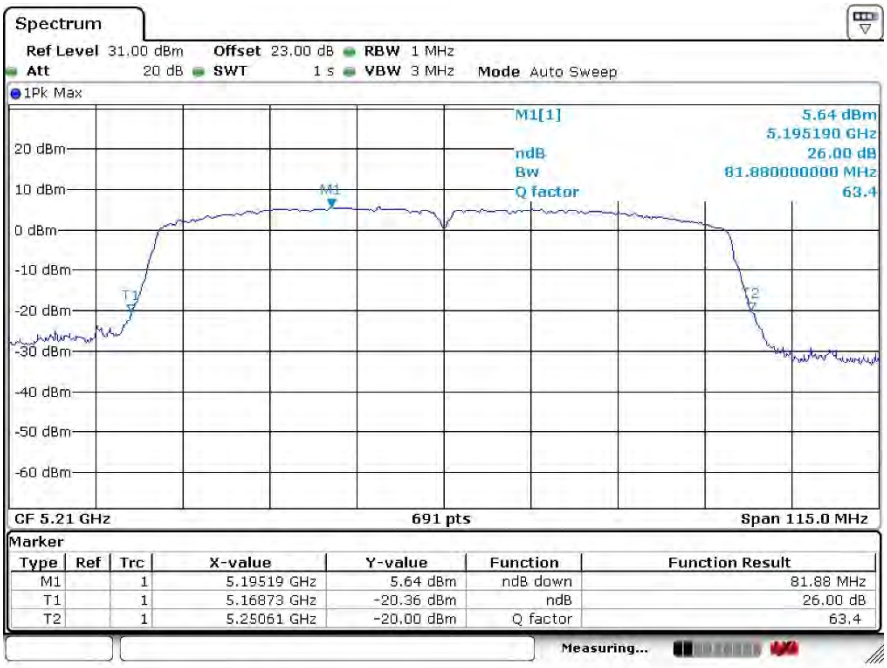
5150 - 5250 MHz 802.11 ac80 Mode 26 dB OBW

Ant A



Date: 6.JUL.2021 09:39:23

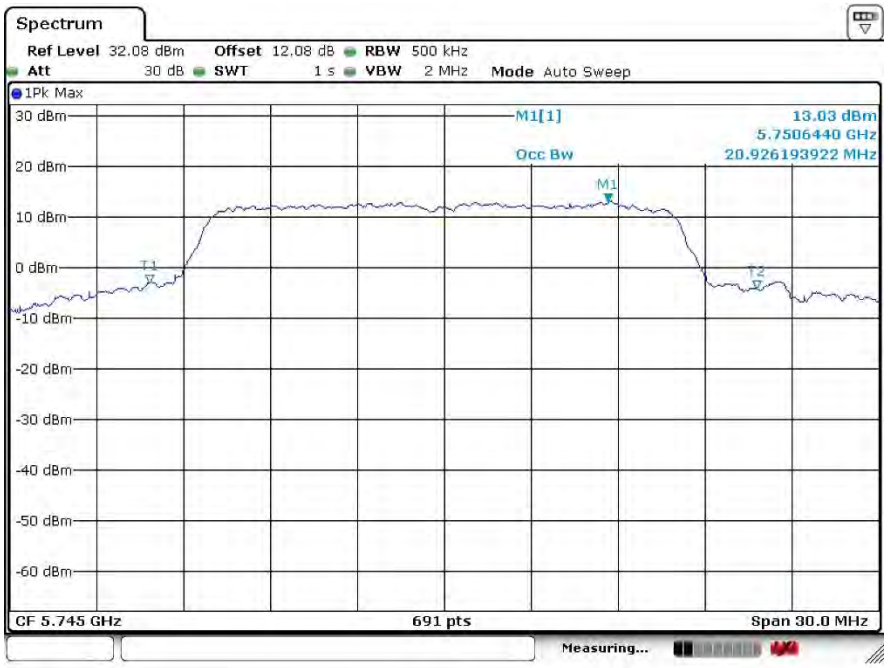
Ant B



Date: 30.JUN.2021 13:42:20

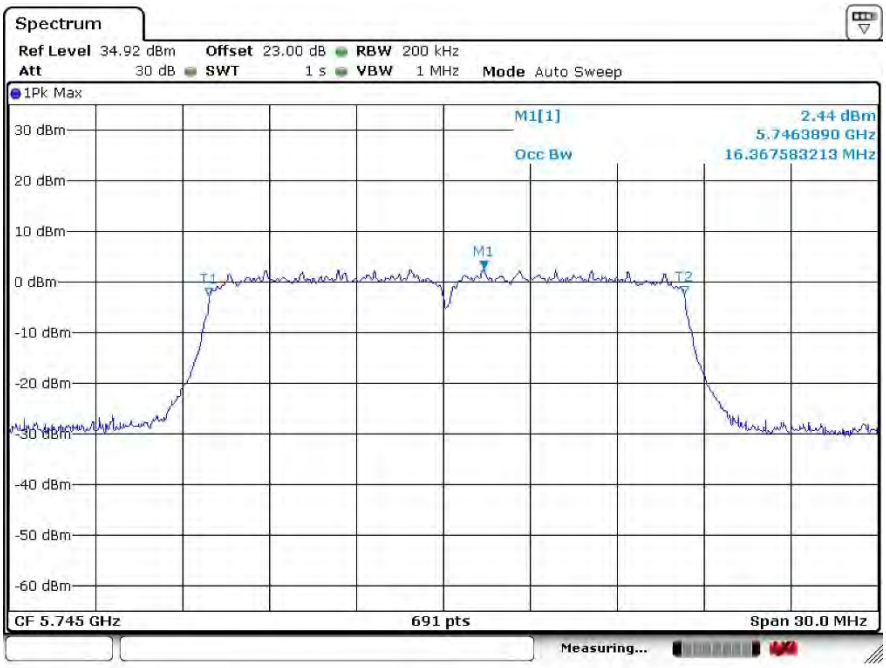
5725 - 5850 MHz 802.11 a Mode 99% OBW

Low Channel Ant A



Date: 6.JUL.2021 10:44:46

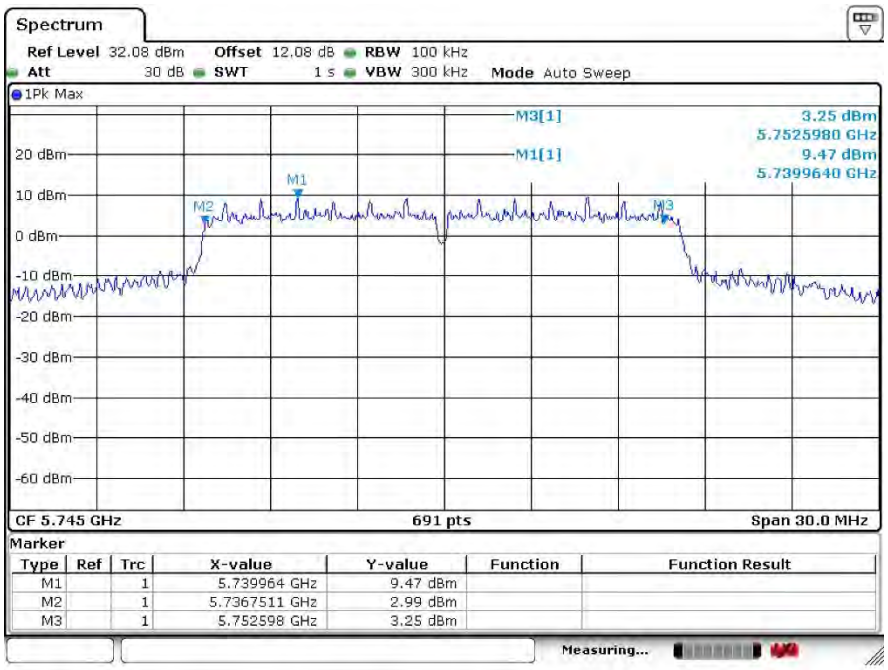
Low Channel Ant B



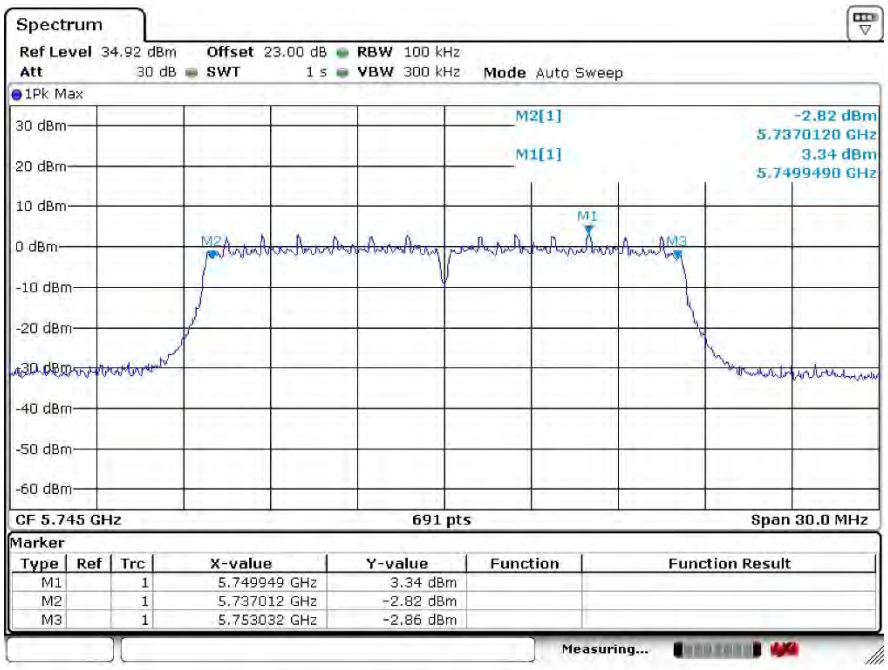
Date: 29.JUN.2021 15:25:12

5725 - 5850 MHz 802.11 a Mode 6 dB OBW

Low Channel Ant A

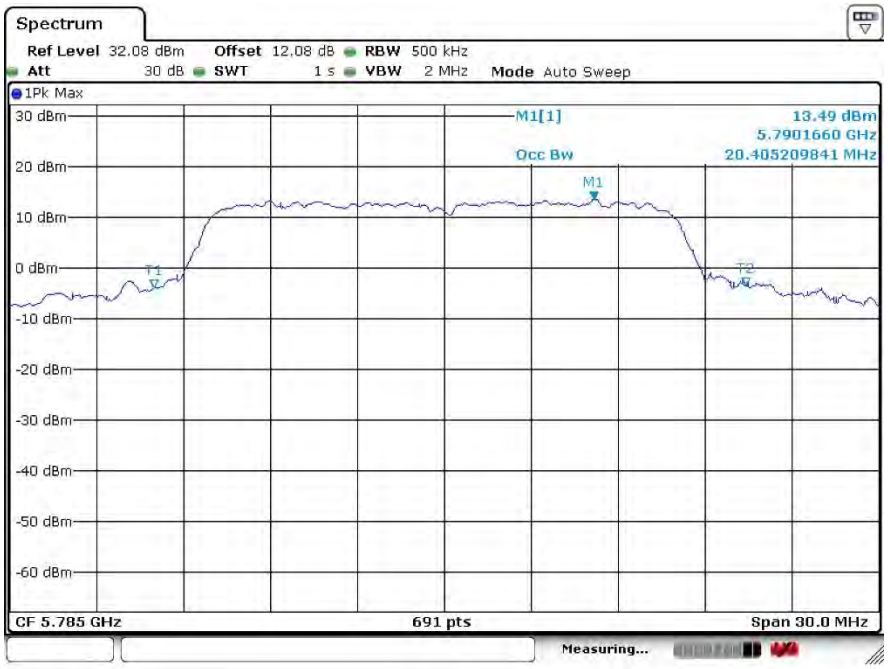


Low Channel Ant B



5725 - 5850 MHz 802.11 a Mode 99% OBW

Middle Channel Ant A



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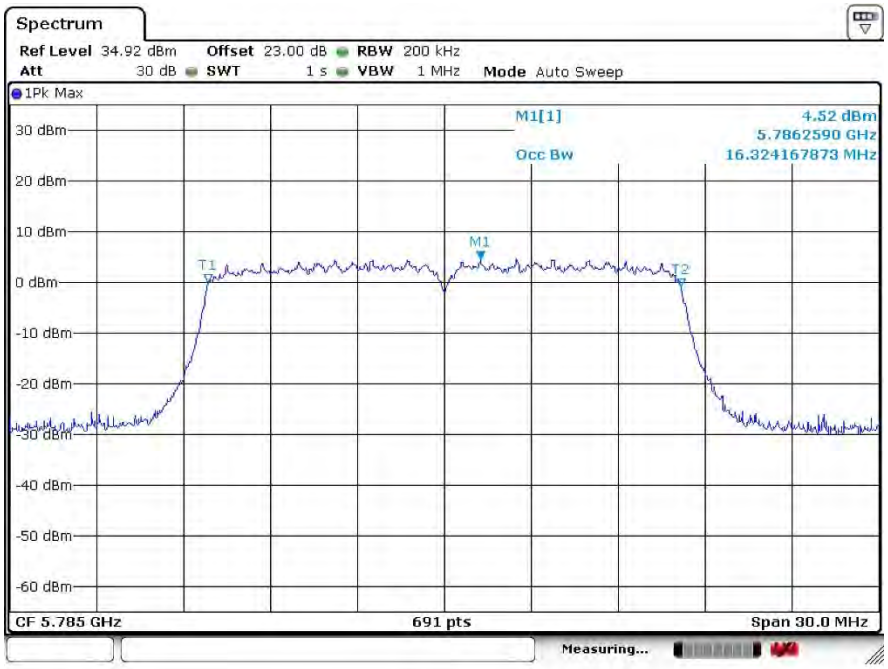
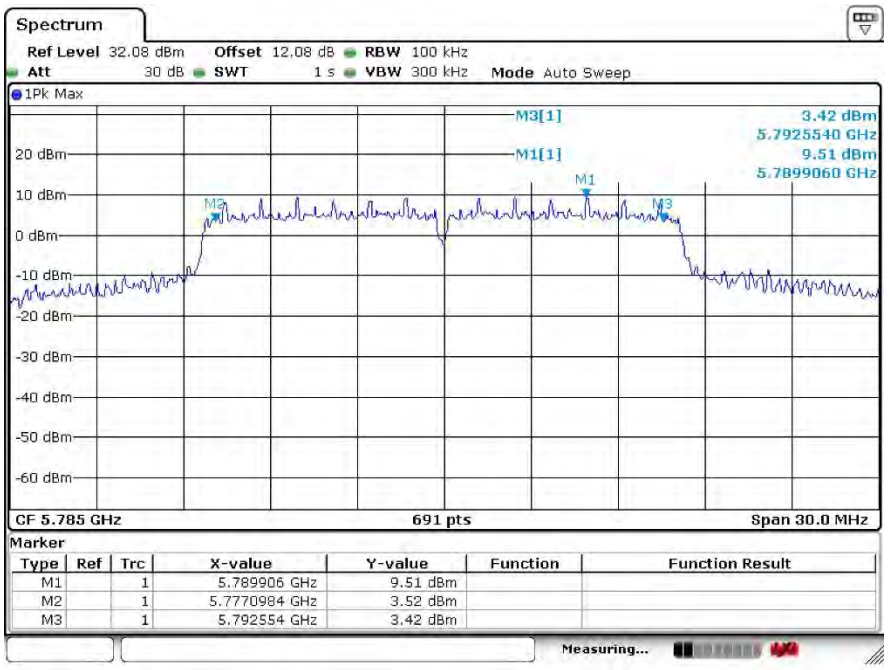
Middle Channel Ant B



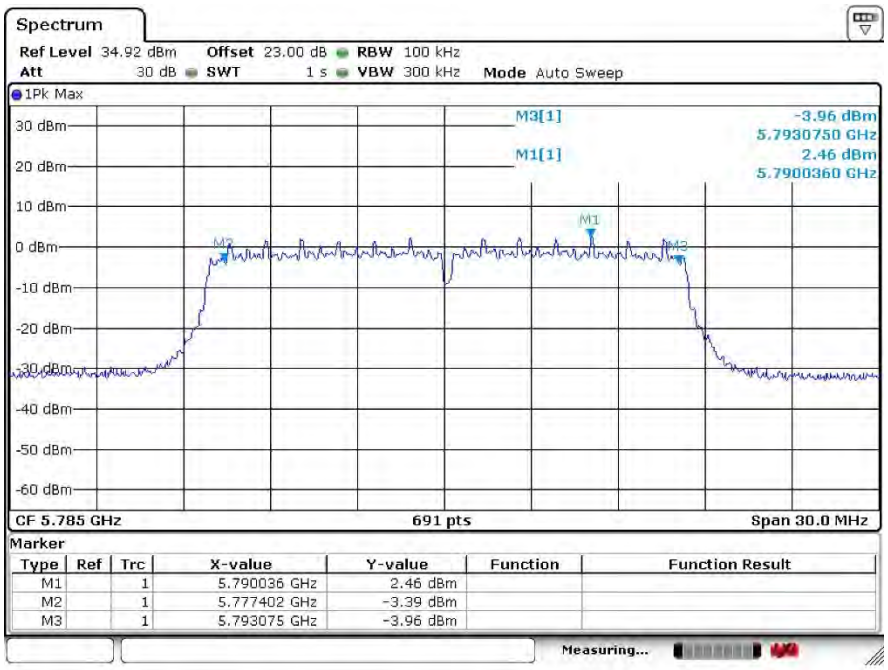
Date: 29.JUN.2021 15:27:01

5725 - 5850 MHz 802.11 a Mode 6 dB OBW

Middle Channel Ant A

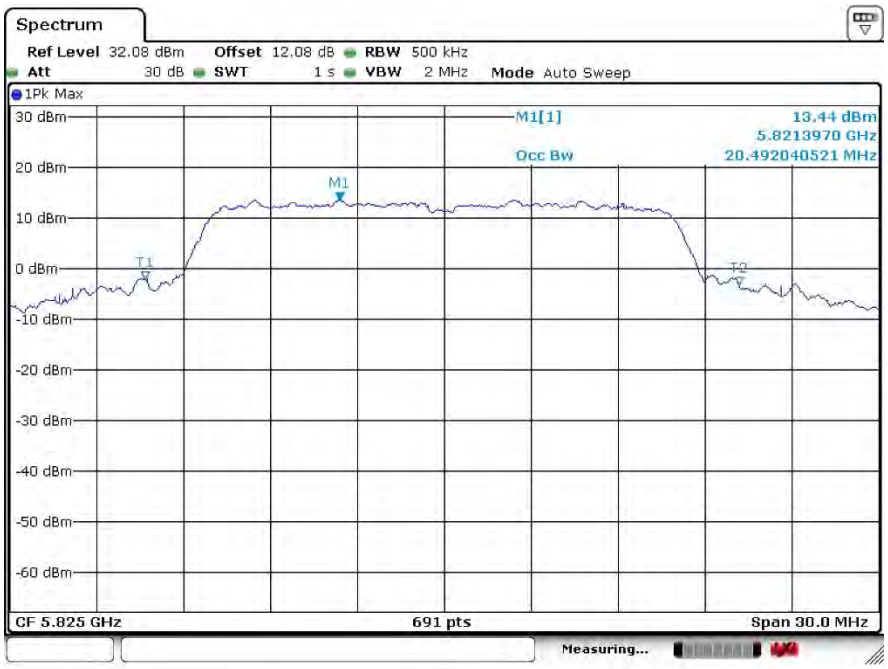


Middle Channel Ant B



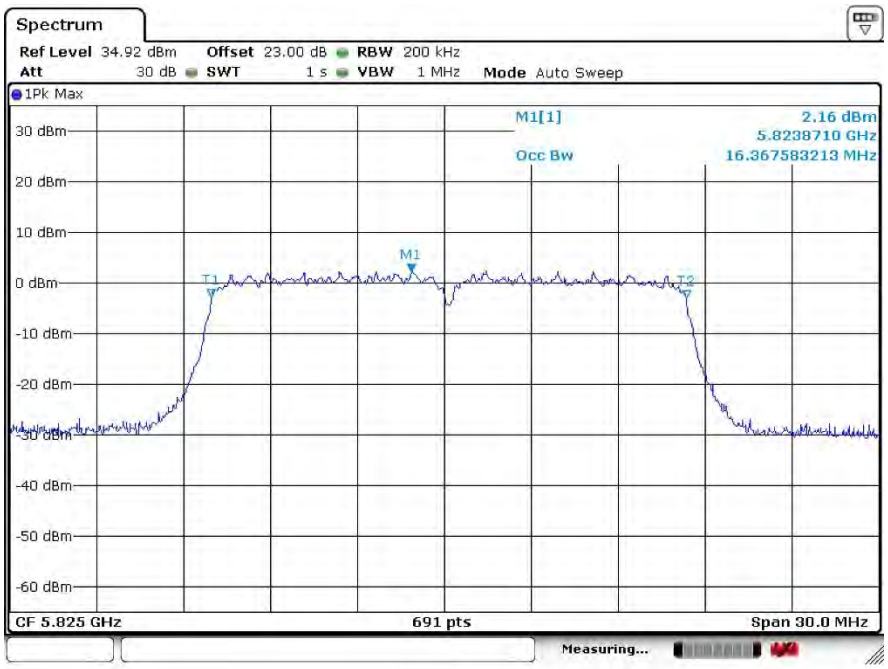
5725 - 5850 MHz 802.11 a Mode 99% OBW

High Channel Ant A



Date: 6.JUL.2021 10:53:47

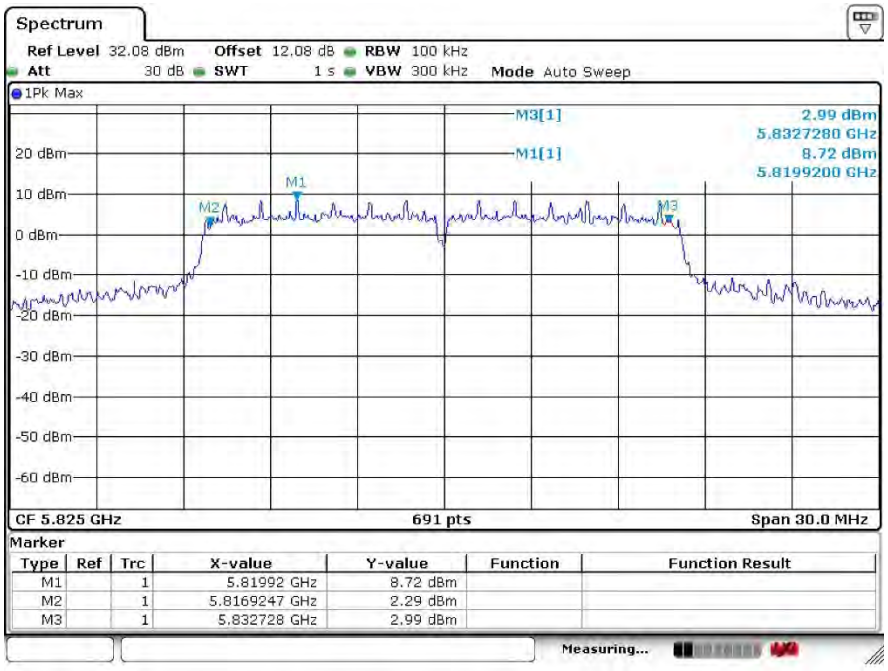
High Channel Ant B



Date: 29.JUN.2021 15:31:24

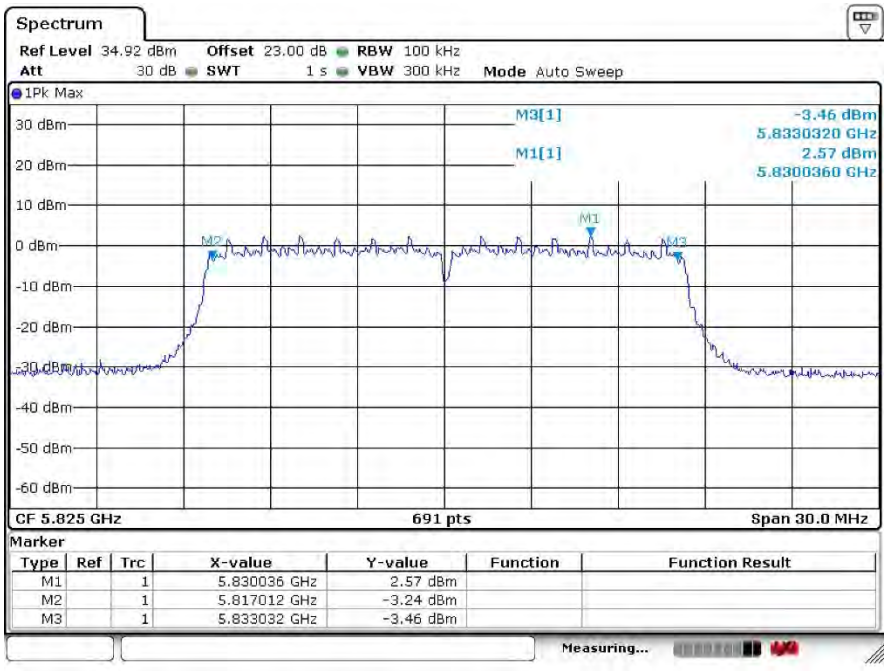
5725 - 5850 MHz 802.11 a Mode 6 dB OBW

High Channel Ant A



Date: 6.JUL.2021 10:55:03

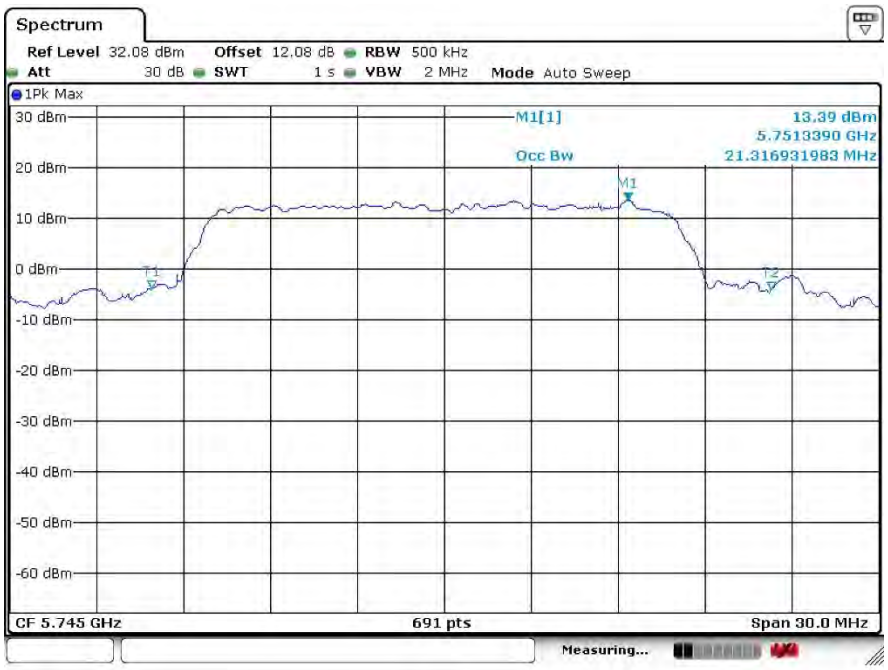
High Channel Ant B



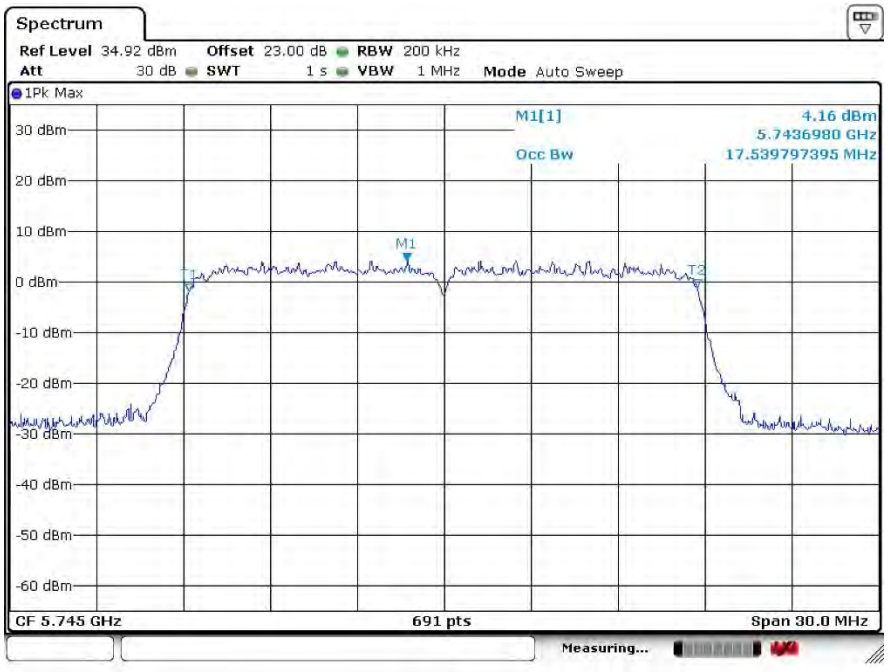
Date: 29.JUN.2021 15:30:43

5725 - 5850 MHz 802.11 n/ac20 Mode 99% OBW

Low Channel Ant A

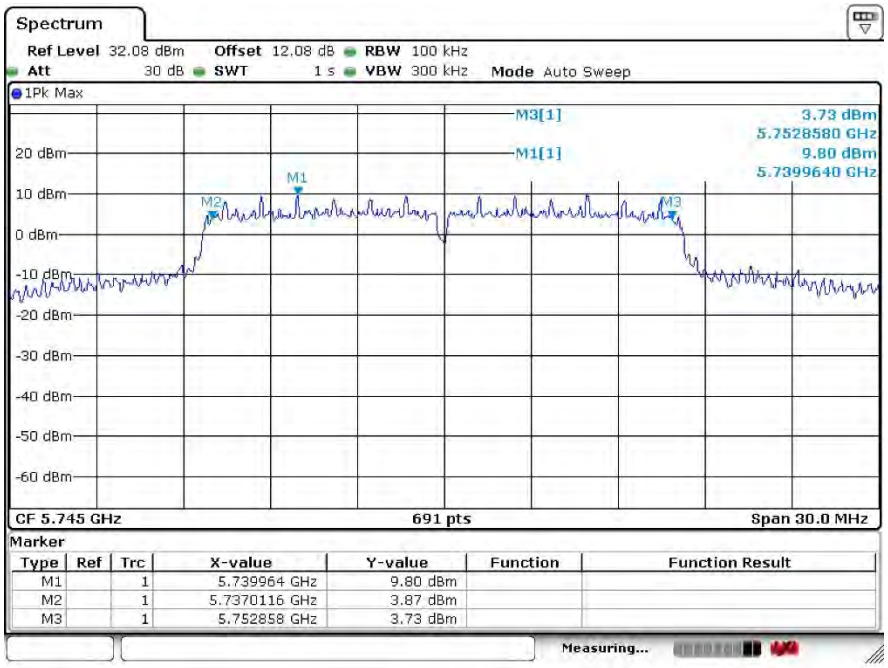


Low Channel Ant B

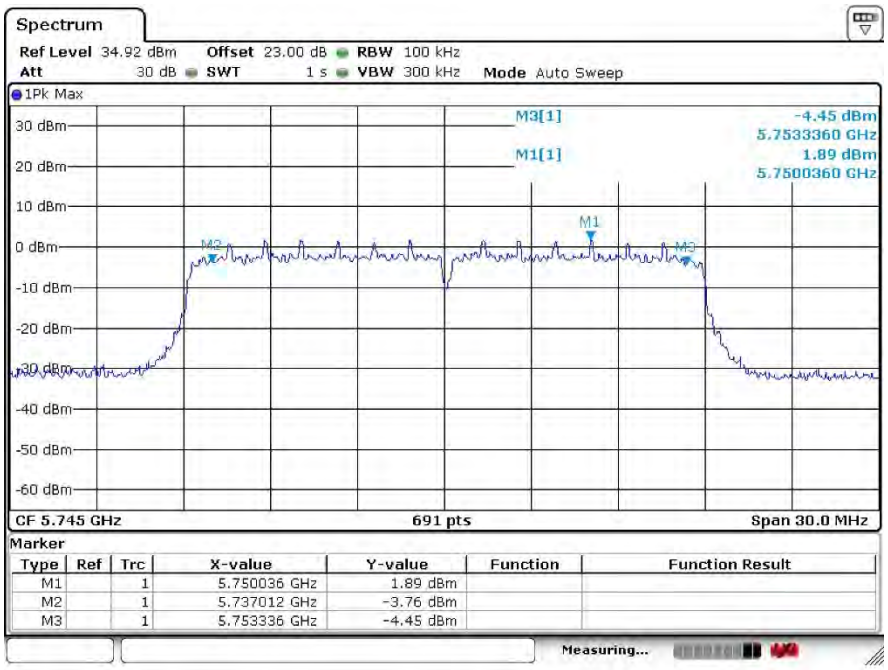


5725 - 5850 MHz 802.11 n/ac20 Mode 6 dB OBW

Low Channel Ant A

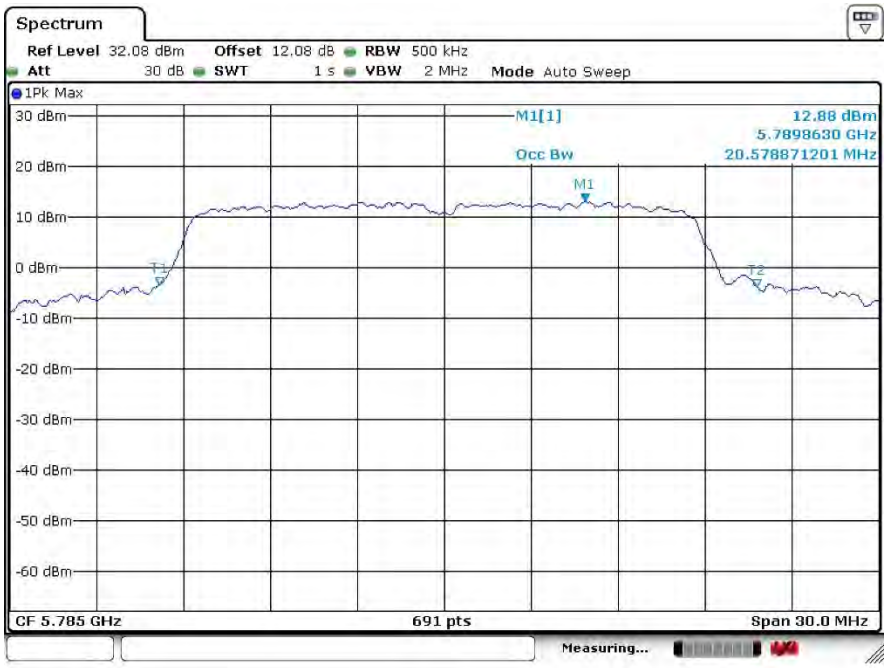


Low Channel Ant B

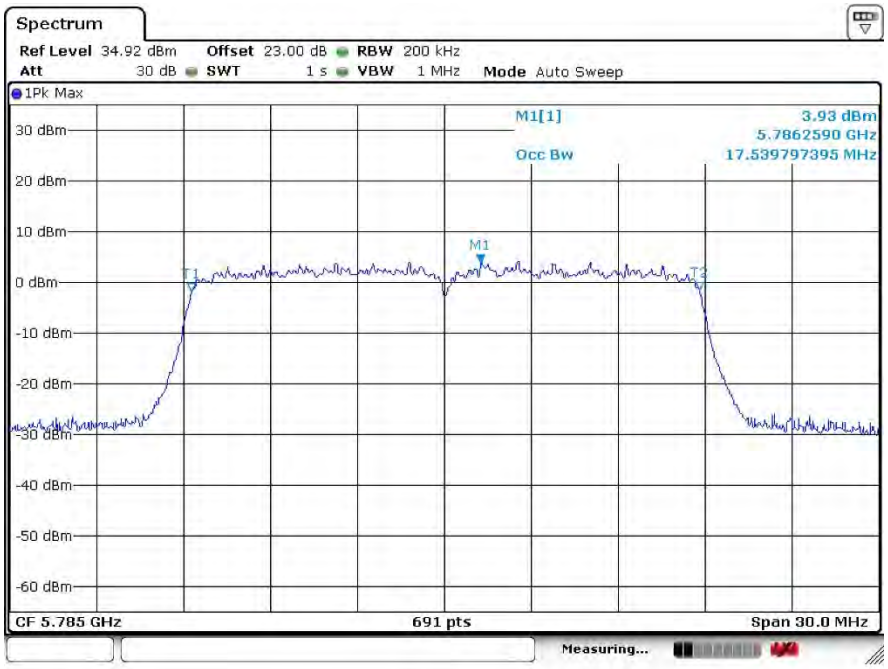


5725 - 5850 MHz 802.11 n/ac20 Mode 99% OBW

Middle Channel Ant A

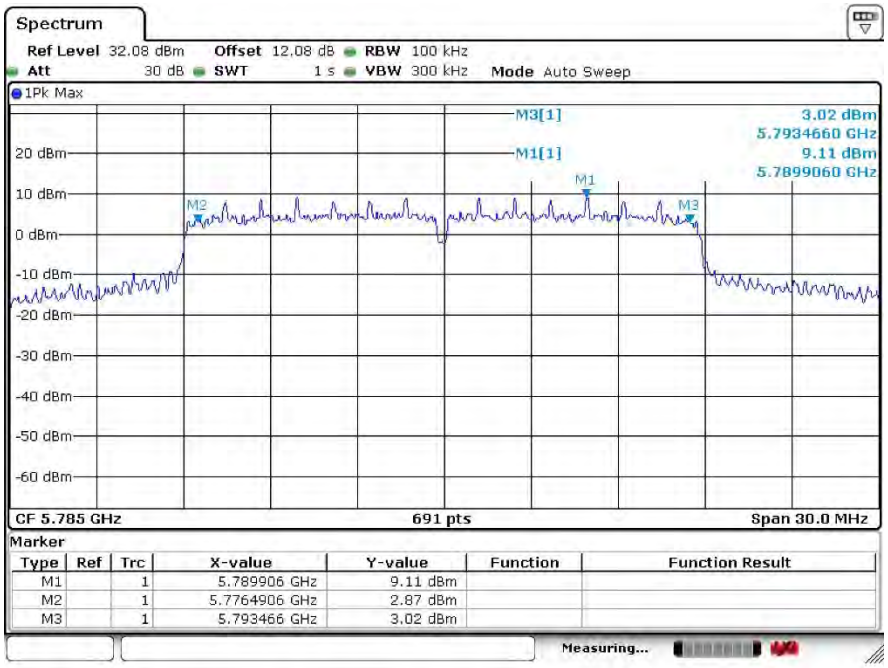


Middle Channel Ant B



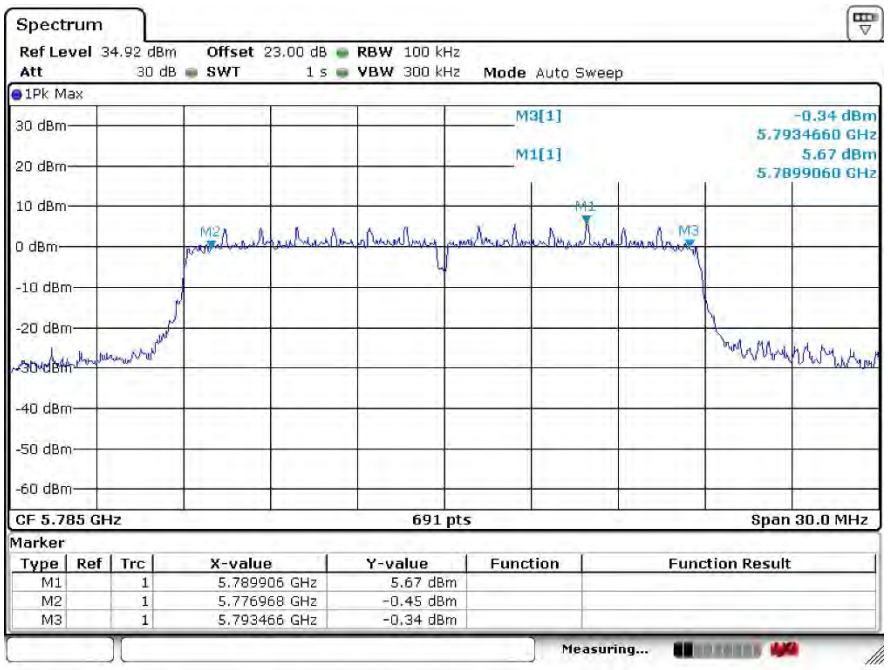
5725 - 5850 MHz 802.11 n/ac20 Mode 6 dB OBW

Middle Channel Ant A



Date: 6.JUL.2021 11:01:51

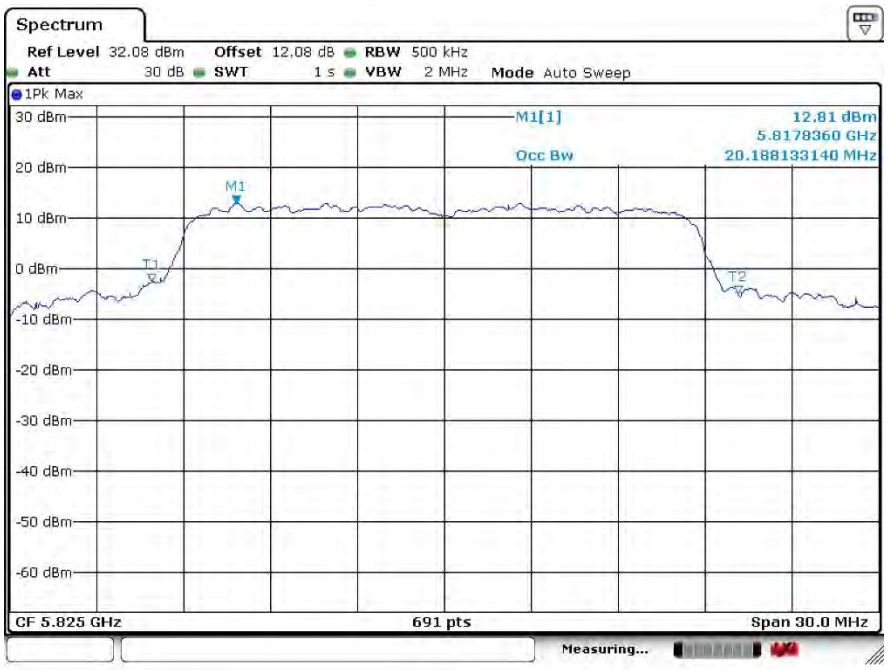
Middle Channel Ant B



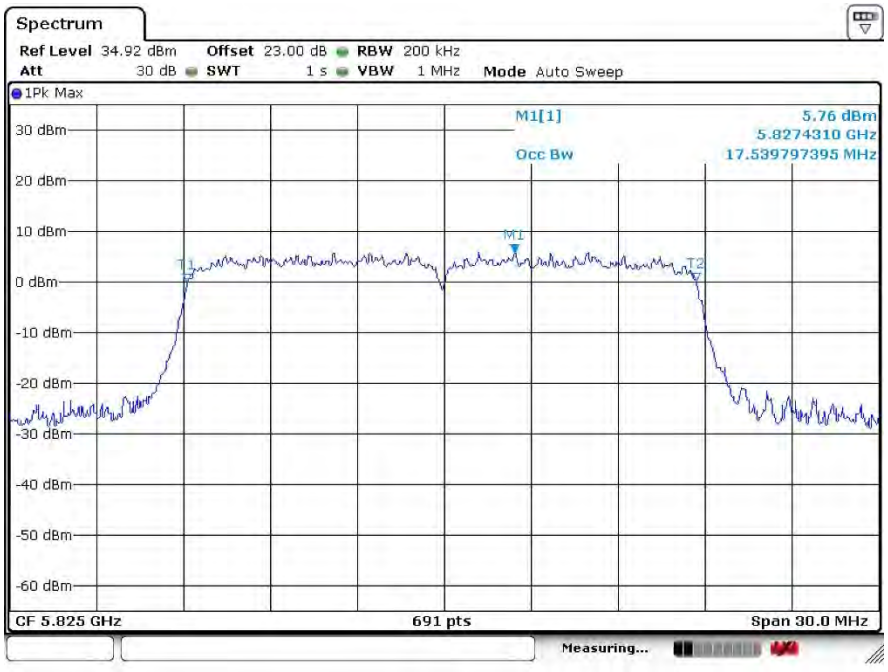
Date: 29.JUN.2021 15:17:19

5725 - 5850 MHz 802.11 n/ac20 Mode 99% OBW

High Channel Ant A

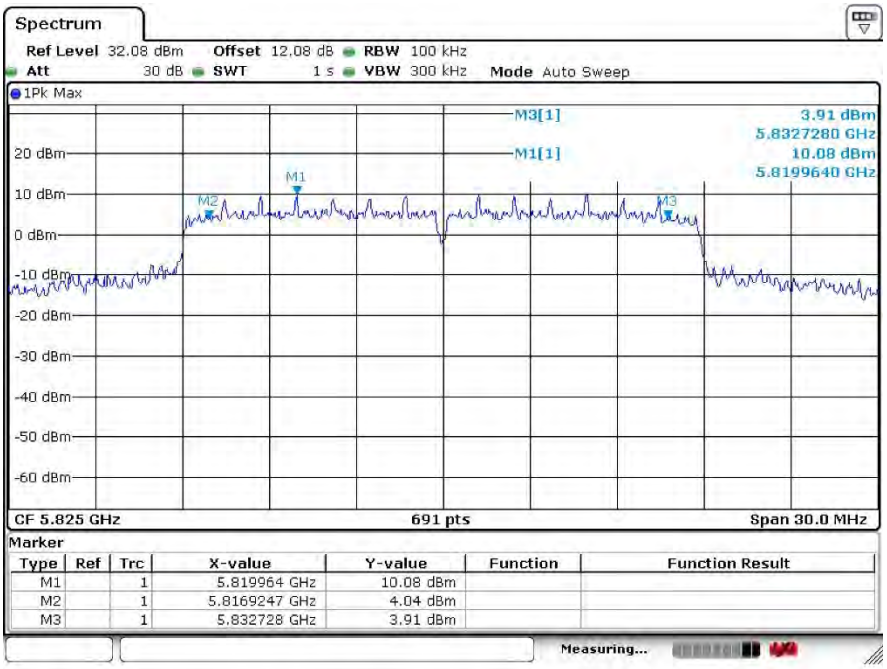


High Channel Ant B



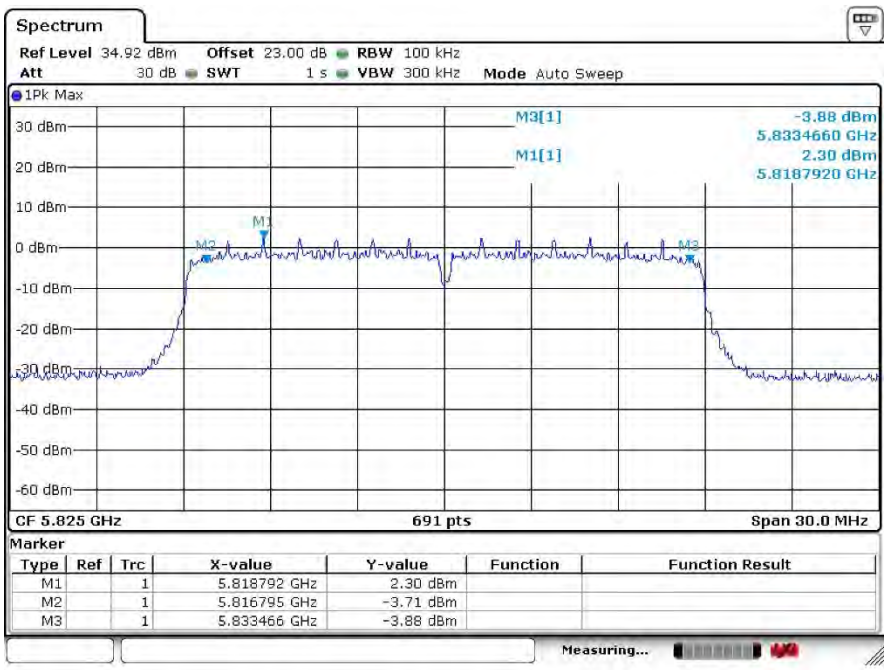
5725 - 5850 MHz 802.11 n/ac20 Mode 6 dB OBW

High Channel Ant A



Date: 6.JUL.2021 10:56:46

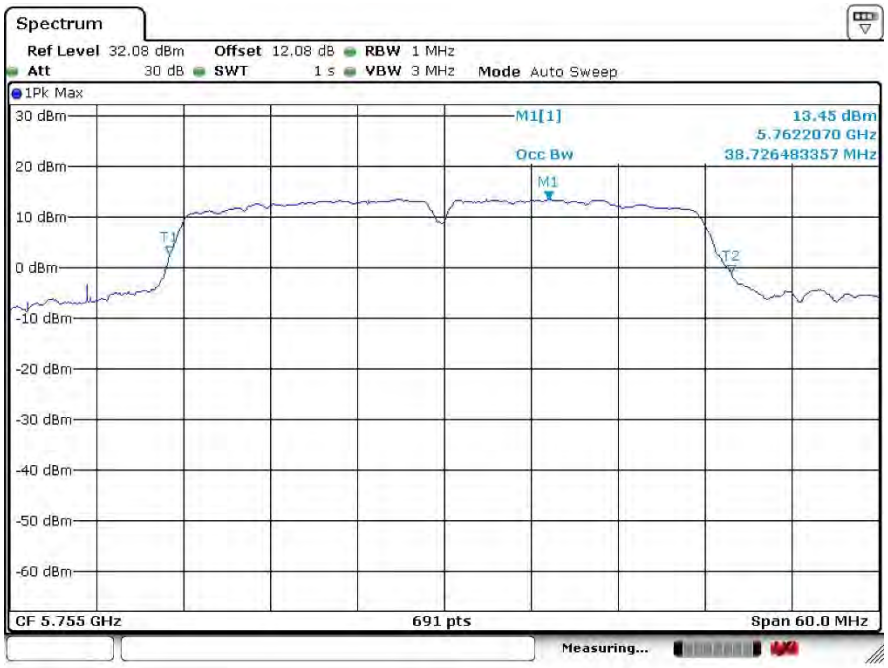
High Channel Ant B



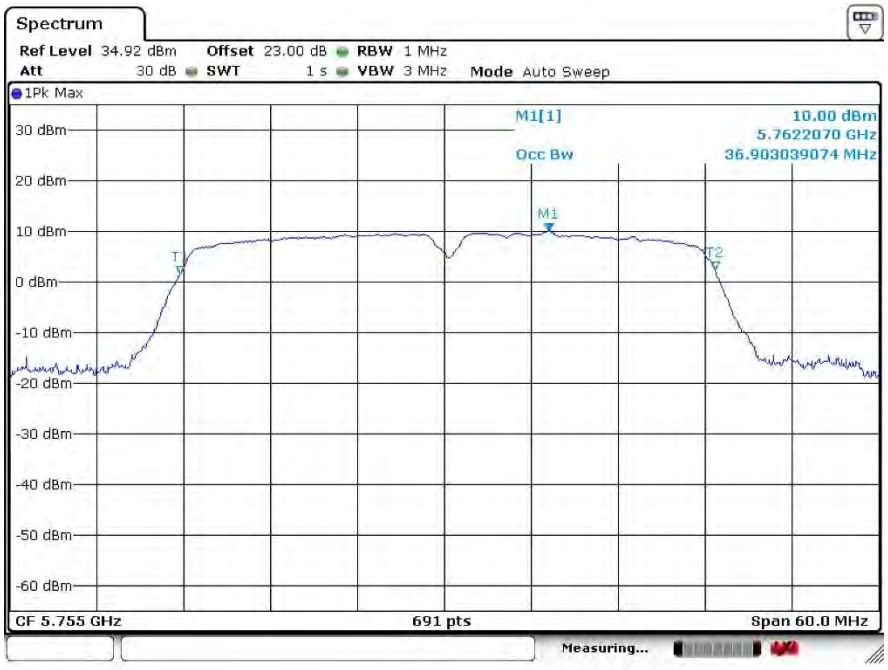
Date: 29.JUN.2021 15:00:18

5725 - 5850 MHz 802.11 n/ac40 Mode 99% OBW

Low Channel Ant A

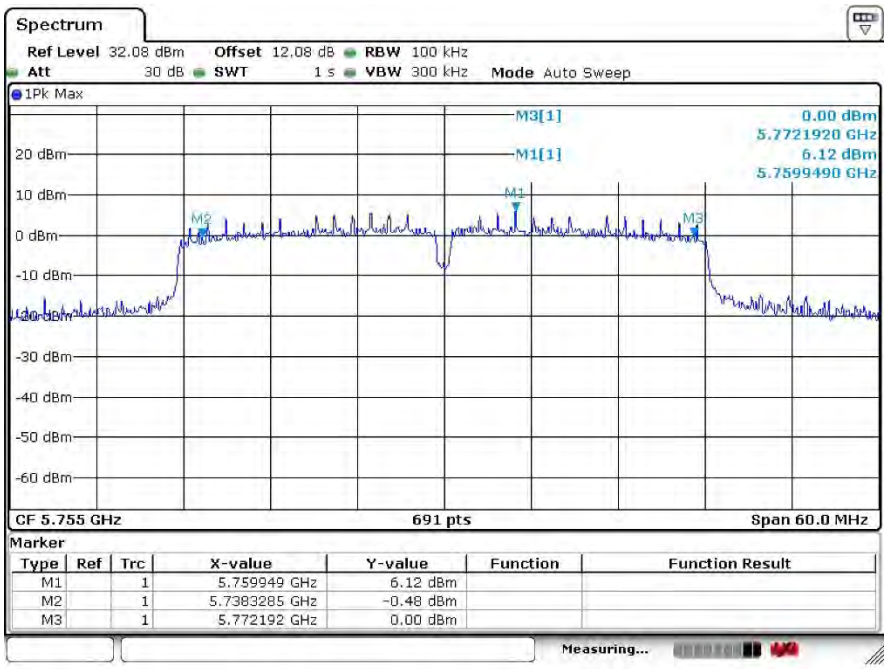


Low Channel Ant B

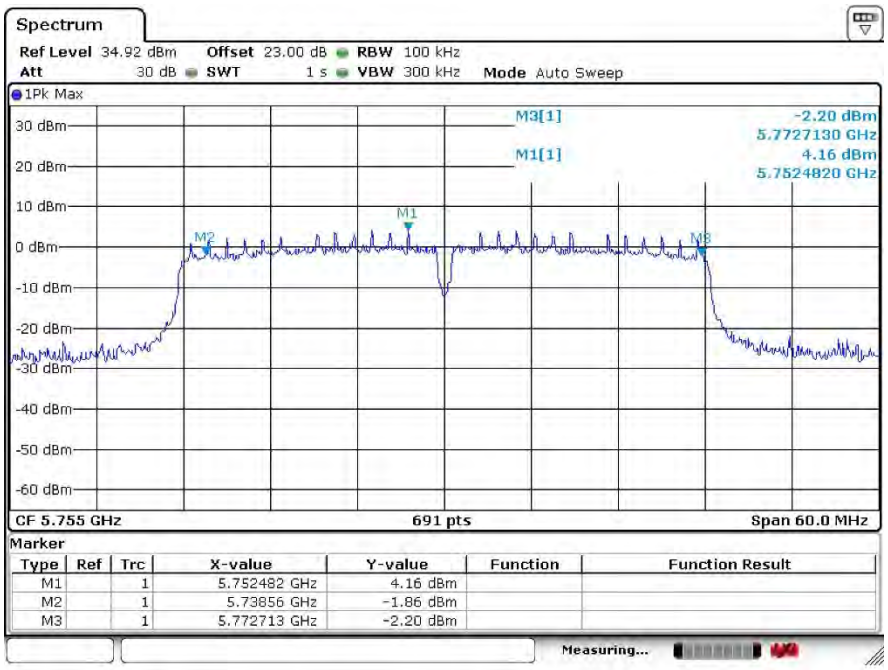


5725 - 5850 MHz 802.11 n/ac40 Mode 6 dB OBW

Low Channel Ant A

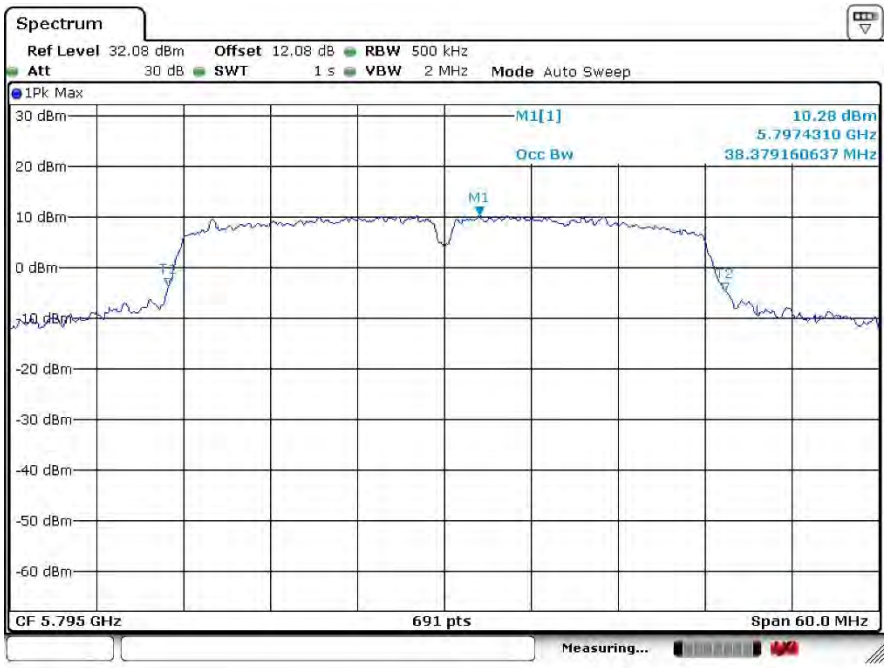


Low Channel Ant B



5725 - 5850 MHz 802.11 n/ac40 Mode 99% OBW

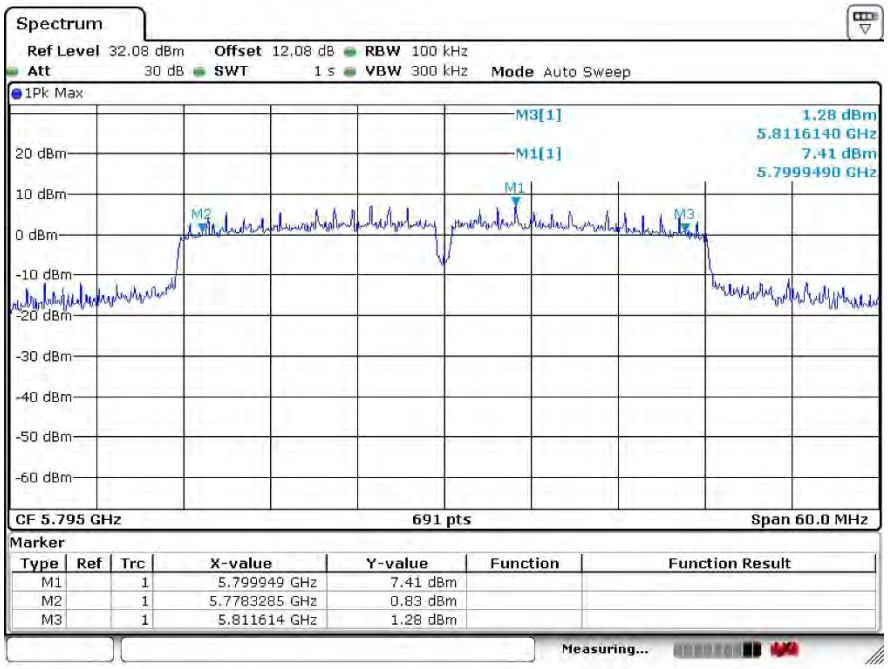
High Channel Ant A



High Channel Ant B

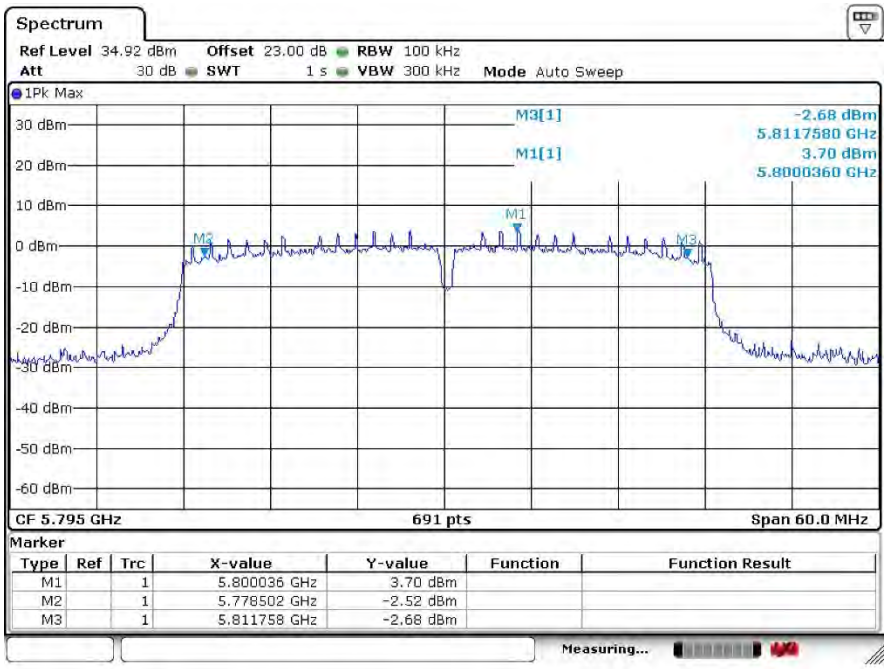
5725 - 5850 MHz 802.11 n/ac40 Mode 6 dB OBW

High Channel Ant A



Date: 6.JUL.2021 11:12:43

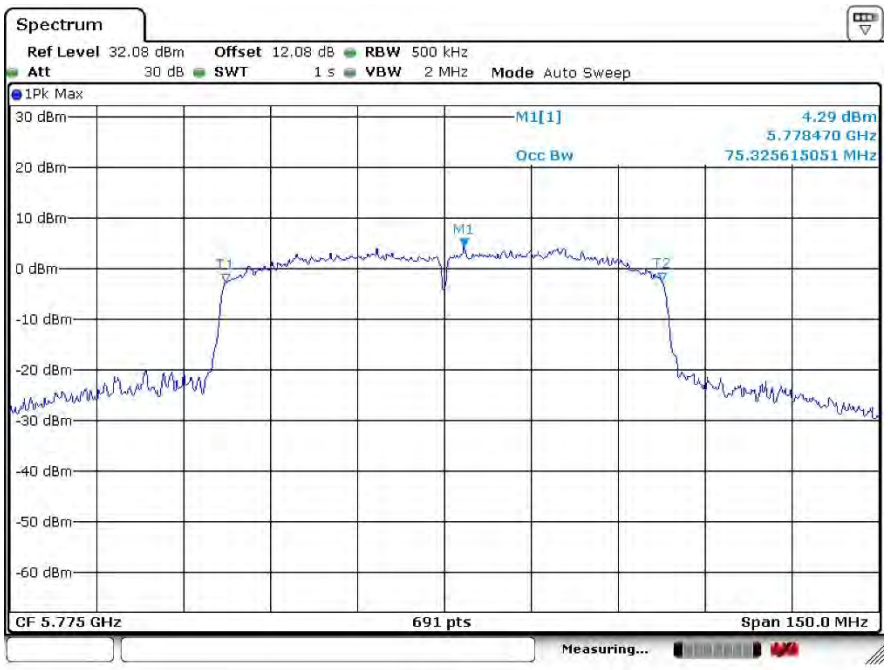
High Channel Ant B



Date: 29.JUN.2021 14:46:27

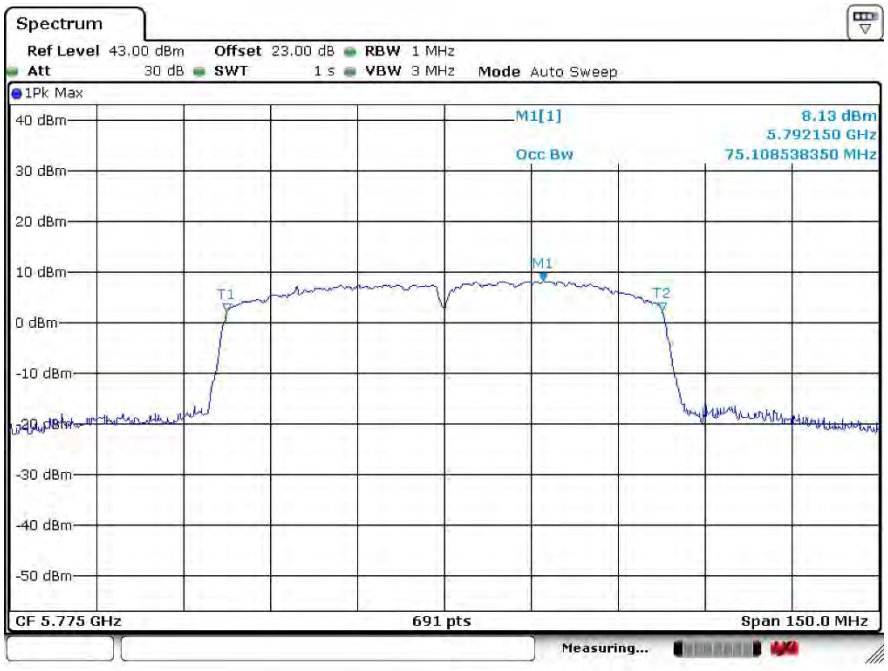
5725 - 5850 MHz 802.11 ac80 Mode 99% OBW

Ant A



Date: 6.JUL.2021 11:16:16

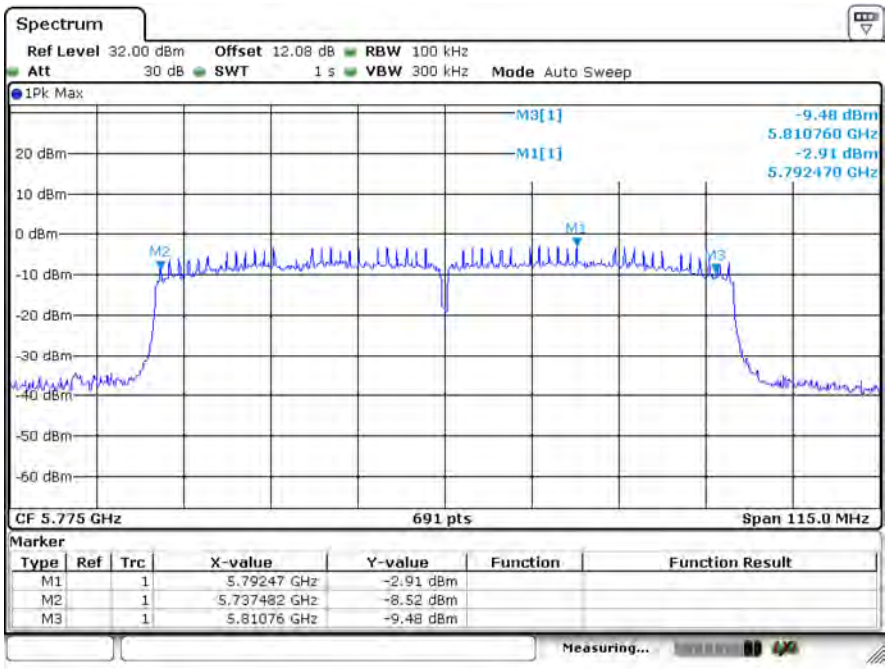
Ant B



Date: 1.JUL.2021 11:30:58

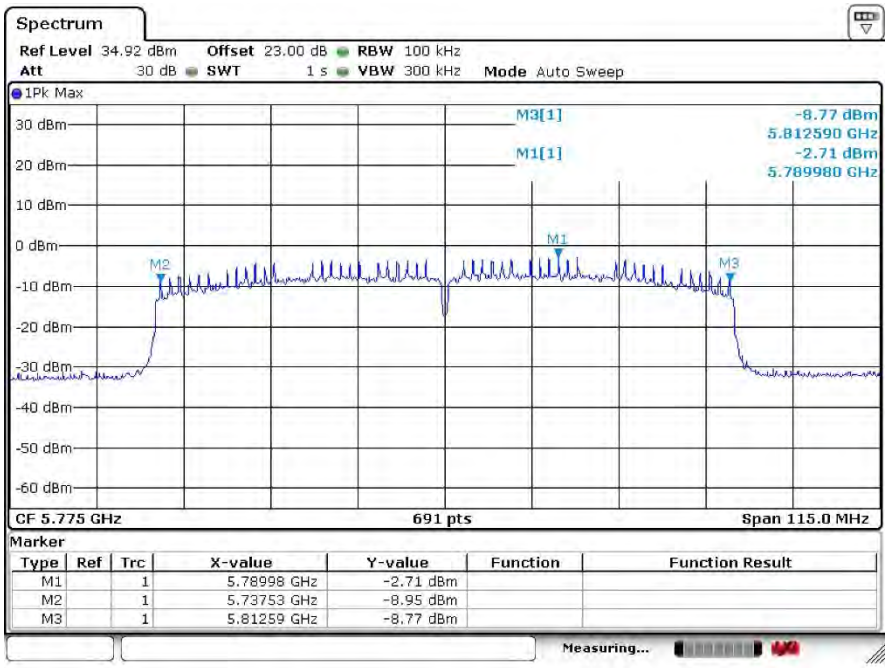
5725 - 5850 MHz 802.11 ac80 Mode 6 dB OBW

Ant A



Date: 12.AUG.2021 13:53:34

Ant B



Date: 29.JUN.2021 14:40:07

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 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.

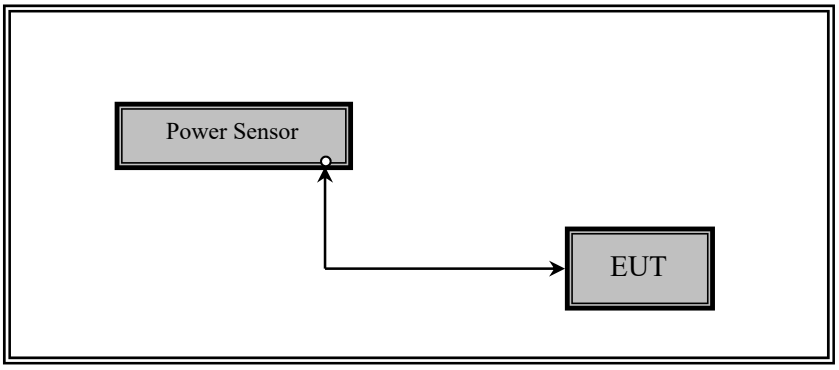
According to ISEDC RSS-247 §6.2.4 for frequency band 5725-5850 MHz:

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

1. Place the EUT on a bench and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to a power meter.

9.3 Test Setup Block Diagram



9.4 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
-	RF cable	-	-	Each time[1]	N/A
-	20 dB attenuator	-	-	Each time[1]	N/A
ETS- Lingerin	Power Sensor	7002-006	160097	2021-02-12	2 years

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".*

9.5 Test Environmental Conditions

Temperature:	23º C
Relative Humidity:	55 %
ATM Pressure:	102.2 KPa

The testing was performed by Rita Yang on 2021-07-20 in RF site.

9.6 Test Results

5150 - 5250 MHz

FCC Results

Channel	Frequency (MHz)	Conducted Output Power (dBm)		Total Power (dBm)	FCC Limit (dBm)
		ANT A	ANT B		
802.11a mode					
36	5180	20.45	19.56	-	24
44	5220	20.48	18.93	-	24
48	5240	21.37	19.3	-	24
802.11n/ac20 mode					
36	5180	14.91	14.04	17.51	21.8
44	5220	15.01	13.32	17.26	21.8
48	5240	16.05	14.26	18.26	21.8
802.11n/ac40 mode					
38	5190	17.82	16.98	20.43	21.8
46	5230	18.00	17.39	20.72	21.8
802.11ac80 mode					
42	5210	16.32	15.2	18.81	21.8

Note: Total power (dBm) =10*Log(Ant A(mw)+Ant B(mw))
Note: Duty cycle correction factor has already been added to the measurements
Note: Where applicable, limits are reduced (in dB) by amount that antenna gain exceeds 6dBi. Individual antenna gain = 5.2 dBi @ 5.2 GHz. Directional antenna gain (dBi) = 5.2 dBi + 10*log(2) = 8.2 dBi. Individual antenna gain was provided by customer.

IC results

Channel	Frequency (MHz)	Conducted Power (dBm)			EIRP (dBm)			IC Limit (dBm)
		ANT A	ANT B	Total	ANT A	ANT B	Total	
802.11a mode								
36	5180	14.25	13.36	-	19.45	18.56	-	22.53
44	5220	13.98	12.43	-	19.18	17.63	-	22.53
48	5240	13.92	11.65	-	19.12	16.85	-	22.53
802.11n/ac20 mode								
36	5180	7.36	6.49	9.96	-	-	18.16	22.50
44	5220	9.02	7.33	11.27	-	-	19.47	22.50
48	5240	8.34	6.55	10.55	-	-	18.75	22.50
802.11n/ac40 mode								
38	5190	11.23	10.39	13.84	-	-	22.04	23.00
46	5230	11.2	10.59	13.92	-	-	22.12	23.00
802.11ac80 mode								
42	5210	12.26	11.14	14.75	-	-	22.95	23.00

Note: Total EIRP power (dBm) =10*Log(Ant A(mw)+Ant B(mw))
Note: Duty cycle correction factor has already been added to the measurements
Note: For 5.2 GHz IC Limit, the maximum e.i.r.p. shall not exceed 200 mW or 10 + 10 $\log_{10}$B, dBm, where B is 99% OBW. [Limit is the lower value of the two]
Note: Individual antenna gain = 5.2 dBi @ 5.2 GHz. Directional antenna gain (dBi) = 5.2 dBi + 10*log(2) = 8.2 dBi. Individual antenna gain was provided by customer.

5725-5850 MHz

FCC/IC results

Channel	Frequency (MHz)	Conducted Output Power (dBm)		Total Power (dBm)	FCC/IC Limit (dBm)
		ANT A	ANT B		
802.11a mode					
149	5745	22.11	21.02	-	30
157	5785	21.2	19.65	-	30
165	5825	22.1	19.83	-	30
802.11n/ac20 mode					
149	5745	22.21	21.34	24.81	28.9
157	5785	21.96	20.27	24.21	28.9
165	5825	21.45	19.66	23.66	28.9
802.11n/ac40 mode					
151	5755	20.19	19.35	22.801	28.9
159	5795	21.89	21.28	24.61	28.9
802.11ac80 mode					
155	5775	17.41	16.29	19.90	28.9

Note: Total power (dBm) =10*Log(Ant A(mW)+Ant B(mW))
Note: Duty cycle correction factor has already been added to the measurements
Note: Where applicable, limits are reduced (in dB) by amount that antenna gain exceeds 6dBi. Individual antenna gain = 4.1 dBi @ 5.8 GHz. Directional antenna gain (dBi) = 4.1 dBi + 10*log(2) = 7.1 dBi. Individual antenna gain was provided by customer.

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

10.1 Applicable Standards

According to FCC §15.407(a):

For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 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.

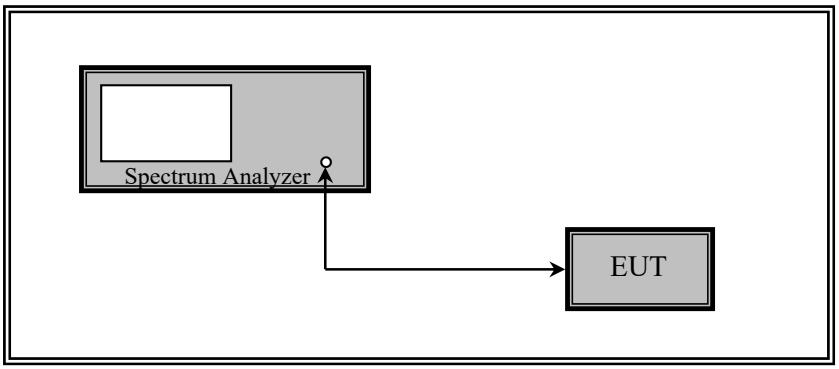
According to ISEDC RSS-247 §6.2.4 for frequency band 5725-5850 MHz:

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.
(ix) Compute power by integrating the spectrum across the 26 dB EBW of the signal using the spectrum analyzer's band power measurement function with band limits set equal to the EBW band edges. If the spectrum analyzer does not have a band power function, sum the spectrum levels (in power units) at 1 MHz intervals extending across the 26 dB EBW of the spectrum.

10.3 Test Setup Block Diagram



10.4 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
Rohde & Schwarz	Signal Analyzer	FSV40	1321.3008K39-101203-UW	2021-04-26	12 months
-	RF cable	-	-	Each time[1]	N/A
-	10 dB attenuator	-	-	Each time[1]	N/A
-	20 dB attenuator	-	-	Each time[1]	N/A

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:	22-24 ºC
Relative Humidity:	50-55 %
ATM Pressure:	102.1-102.7 kPa

The testing was performed by Rita Yang from 2021-07-14 to 2021-07-20 in RF site.

10.6 Test Results

5150 - 5250 MHz

FCC:

Channel	Frequency (MHz)	PSD (dBm/MHz)		DCCF (dB)	Corrected PSD (dBm/MHz)		FCC Limit (dBm/MHz)
		ANT A	ANT B		ANT A	ANT B	
802.11a mode							
36	5180	4.34	4.54	0.31	4.65	4.85	11
44	5220	5.12	5.91	0.31	5.43	6.22	11
48	5240	6.42	6.12	0.31	6.73	6.43	11
802.11n/ac20 mode							
36	5180	1.62	0.10	0.24	4.18		8.8
44	5220	1.45	1.69	0.24	4.82		8.8
48	5240	2.11	2.06	0.24	5.34		8.8
802.11n/ac40 mode							
38	5190	-1.15	-0.73	0.2	2.28		8.8
46	5230	1.86	1.88	0.2	5.08		8.8
802.11ac80 mode							
42	5210	-5.10	-4.83	0.61	-1.34		8.8

IC:

Channel	Frequency (MHz)	PSD (dBm/MHz)		DCCF (dB)	E.I.R.P Corrected PSD (dBm/MHz)		IC Limit (dBm/MHz)
		ANT A	ANT B		ANT A	ANT B	
802.11a mode							
36	5180	-0.54	-0.37	0.31	4.97	5.14	10
44	5220	0.21	0.11	0.31	5.72	5.62	10
48	5240	1.31	1.06	0.31	6.82	6.57	10
802.11n/ac20 mode							
36	5180	-7.33	-6.51	0.24	4.85		10
44	5220	-4.93	-5.05	0.24	6.76		10
48	5240	-4.89	-5.27	0.24	6.67		10
802.11n/ac40 mode							
38	5190	-6.09	-5.80	0.2	5.77		10
46	5230	-4.92	-5.33	0.2	6.59		10
802.11ac80 mode							
42	5210	-8.11	-7.85	0.61	4.14		10

Note: for 802.11a mode, E.I.R.P corrected PSD = Conducted PSD (dBm/MHz) + DCCF (dB) + Antenna Gain(dBi). for 802.11n/ac mode, Total E.I.R.P corrected PSD = Total Conducted PSD (dBm/MHz) + DCCF (dB) + Directional Gain(dBi)
Note: Individual antenna gain = 5.2 dBi @ 5.2 GHz. Directional antenna gain (dBi) = 5.2 dBi + 10*log(2) = 8.2 dBi. Individual antenna gain was provided by customer.

5725– 5850 MHz

FCC/IC:

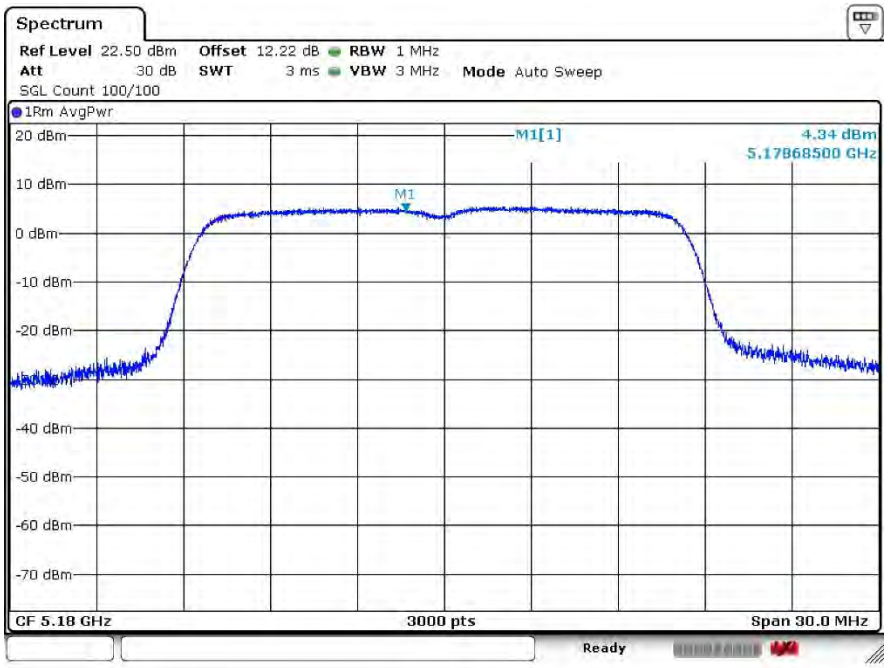
Channel	Frequency (MHz)	Conducted PSD (dBm/500kHz)		DCCF (dB)	Corrected PSD (dBm/500kHz)		FCC/IC Limit (dBm/500KHz)
		ANT A	ANT B		ANT A	ANT B	
802.11a mode							
149	5745	7.83	6.80	0.31	8.14	7.11	30
157	5785	8.54	7.49	0.31	8.85	7.8	30
165	5825	8.85	7.73	0.31	9.16	8.04	30
802.11n/ac20 mode							
149	5745	10.29	6.55	0.24	12.06		28.9
157	5785	7.92	7.38	0.24	10.91		28.9
165	5825	8.40	7.47	0.24	11.21		28.9
802.11n/ac40 mode							
151	5755	1.58	1.23	0.2	4.62		28.9
159	5795	3.59	2.25	0.2	6.18		28.9
802.11ac80 mode							
155	5775	-5.59	-5.81	0.61	-2.08		28.9

Note: Corrected PSD EIRP = PSD (dBm/MHz) + DCCF (dB)
Note: Where applicable, limits are reduced (in dB) by amount that antenna gain exceeds 6dBi.
Note: Individual antenna gain = 4.1 dBi @ 5.8 GHz. Directional antenna gain (dBi) = 4.1 dBi + 10*log(2) = 7.1 dBi. Individual antenna gain was provided by customer.

Please refer to the following plots.

FCC 5150 - 5250 MHz

802.11a Mode
Ant A Low Channel



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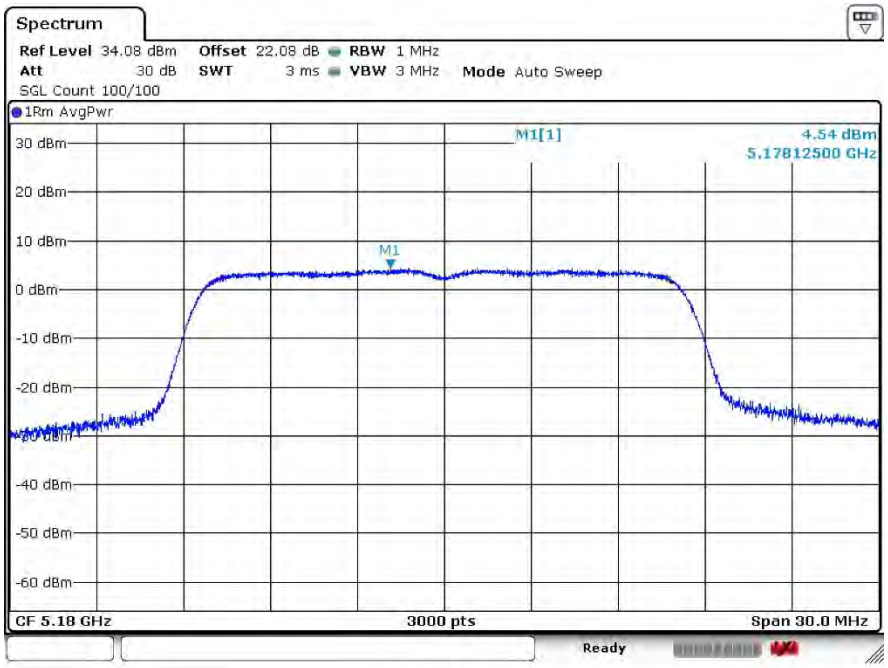
Ant B Low Channel



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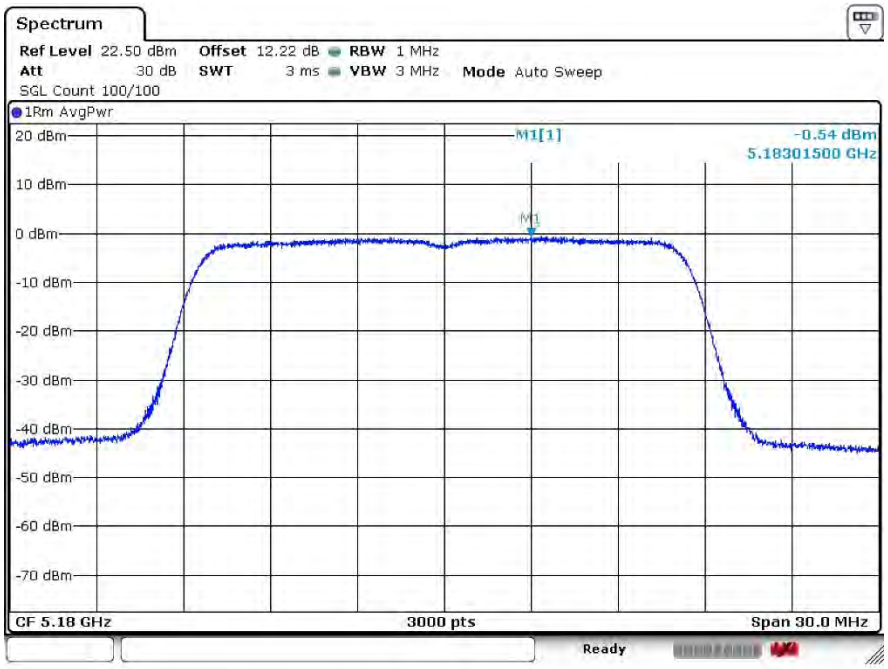
IC 5150 - 5250 MHz

802.11a Mode
ANT A Low Channel



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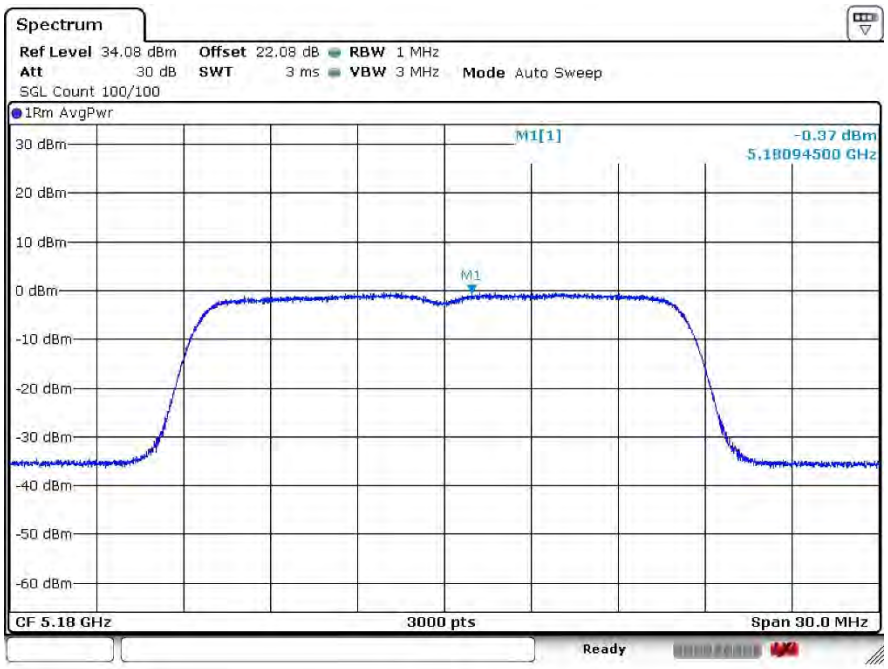
Ant B Low Channel



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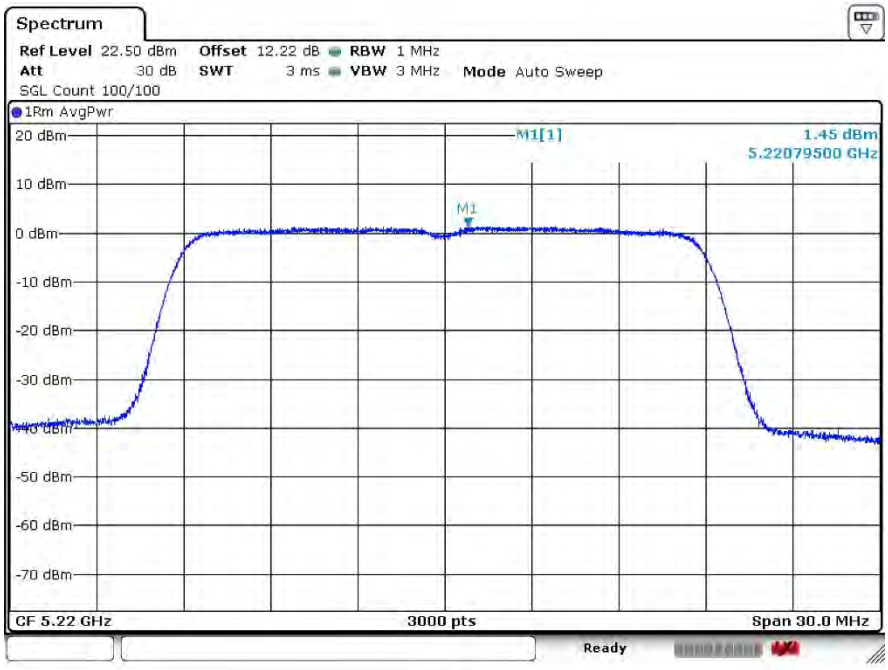
FCC 5150 - 5250 MHz

802.11a Mode
Ant A Middle Channel



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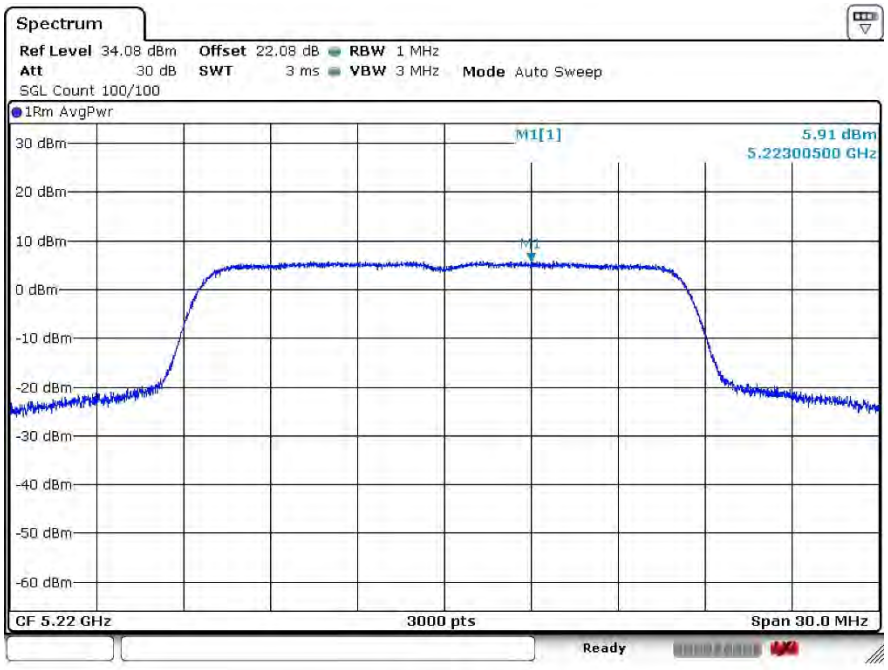
Ant B Middle Channel



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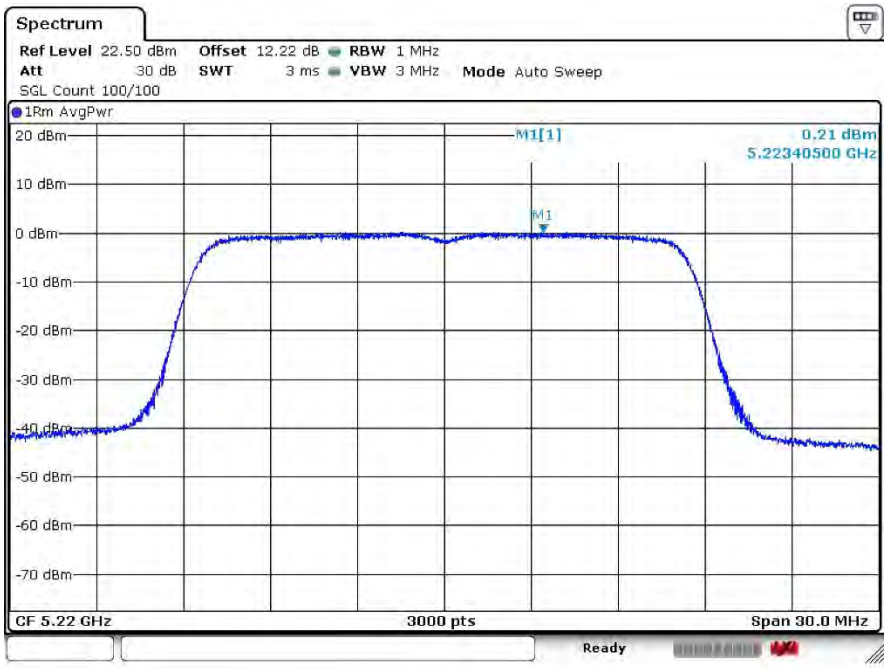
IC 5150 - 5250 MHz

802.11a Mode
ANT A Middle Channel



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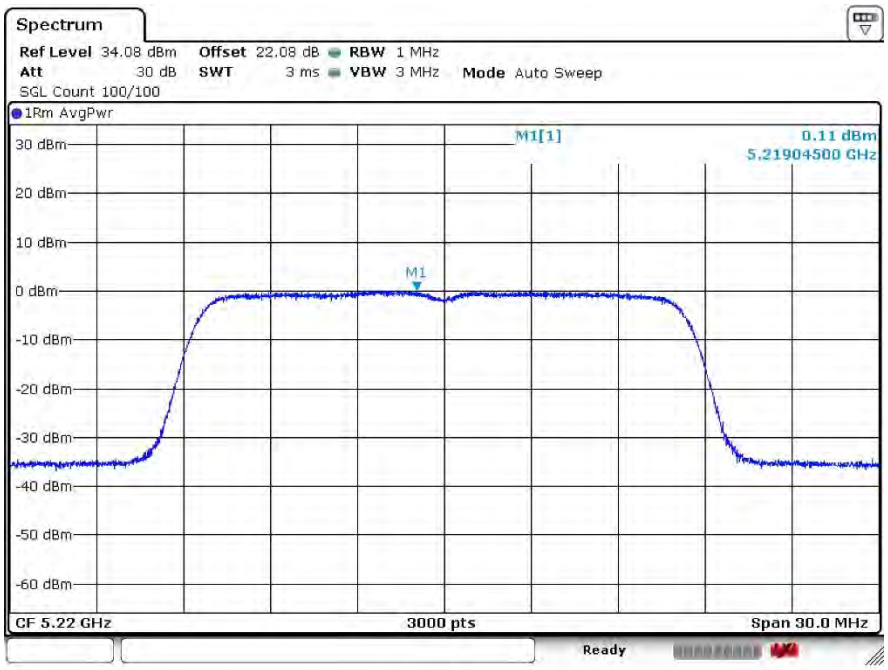
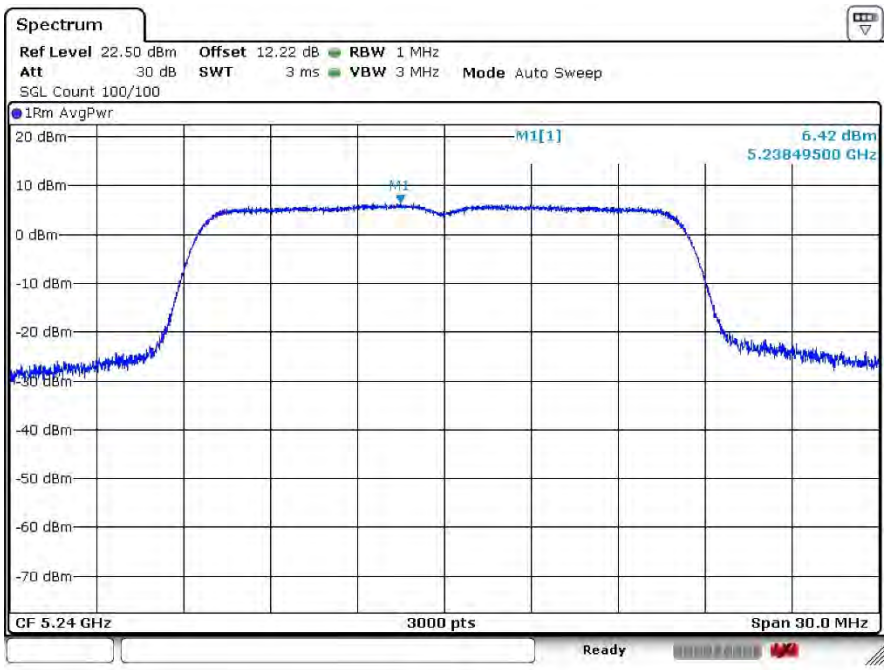
ANT B Middle Channel



Date: 16.JUL.2021 08:58:38

FCC 5150 - 5250 MHz

802.11a Mode
Ant A High Channel



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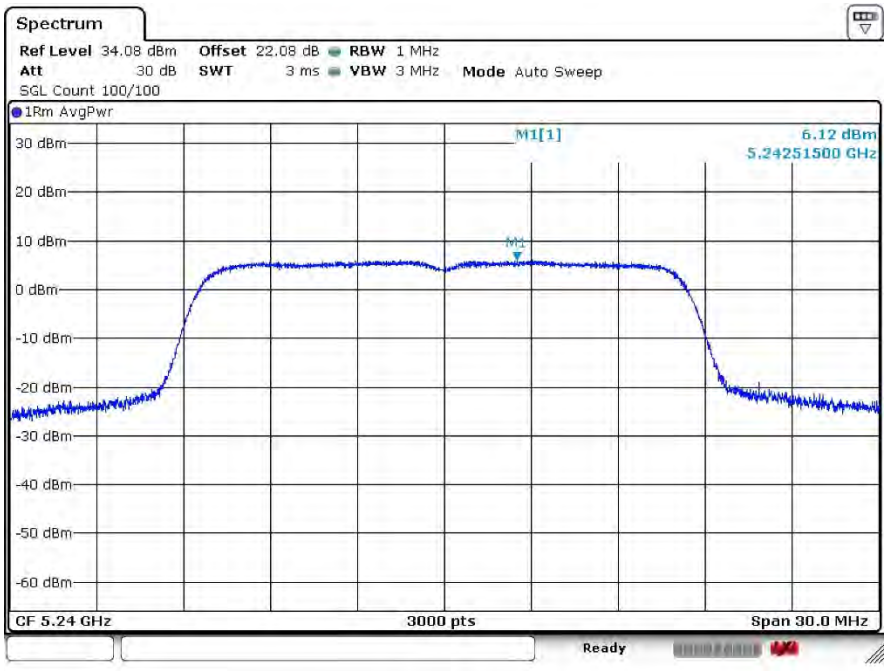
Ant B High Channel



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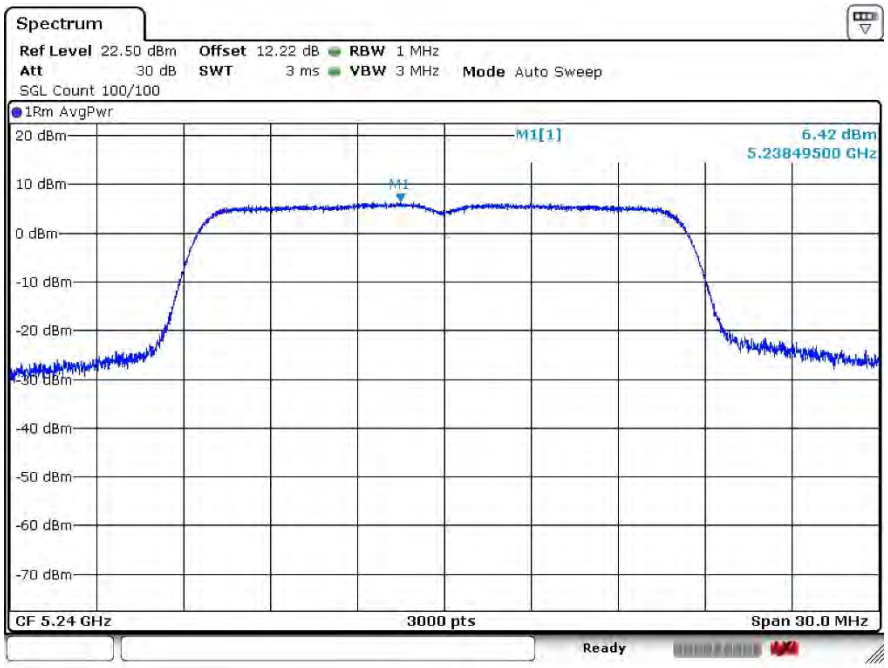
IC 5150 - 5250 MHz

802.11a Mode
ANT A High Channel



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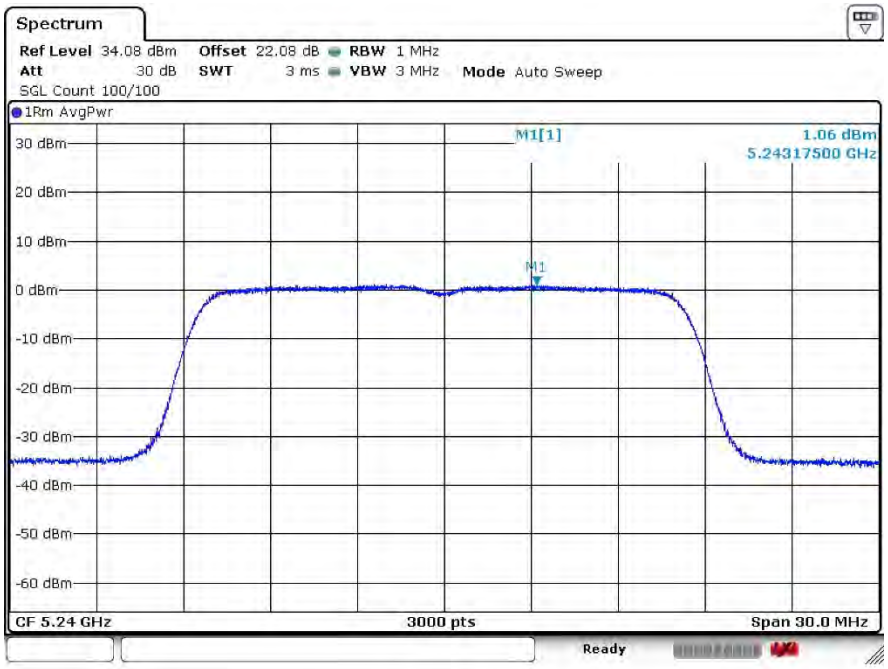
ANT B High Channel



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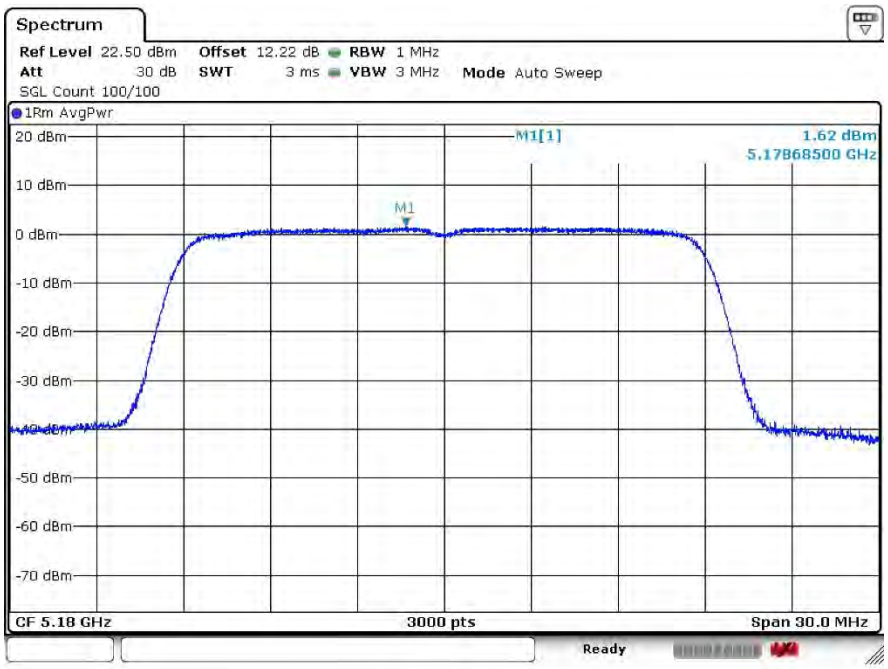
FCC 5150 - 5250 MHz

802.11n/ac20 Mode
Ant A Low Channel



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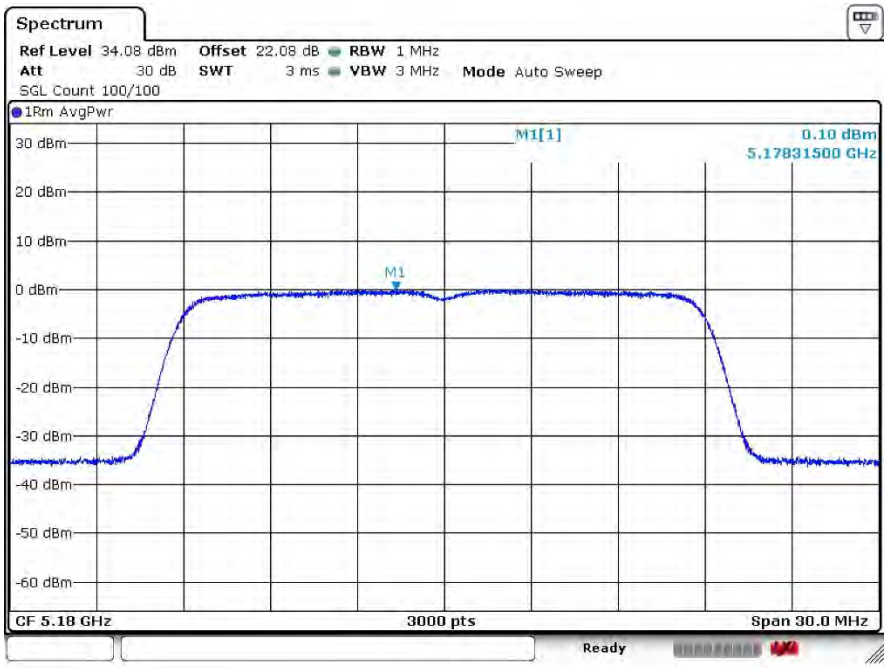
ANT B Low Channel



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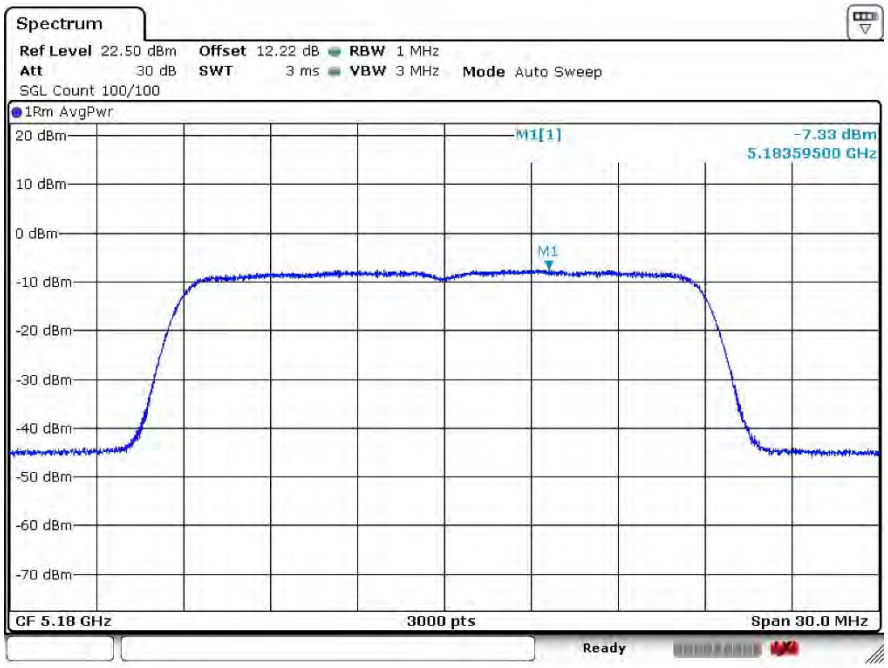
IC 5150 - 5250 MHz

802.11n/ac20 Mode
ANT A Low Channel



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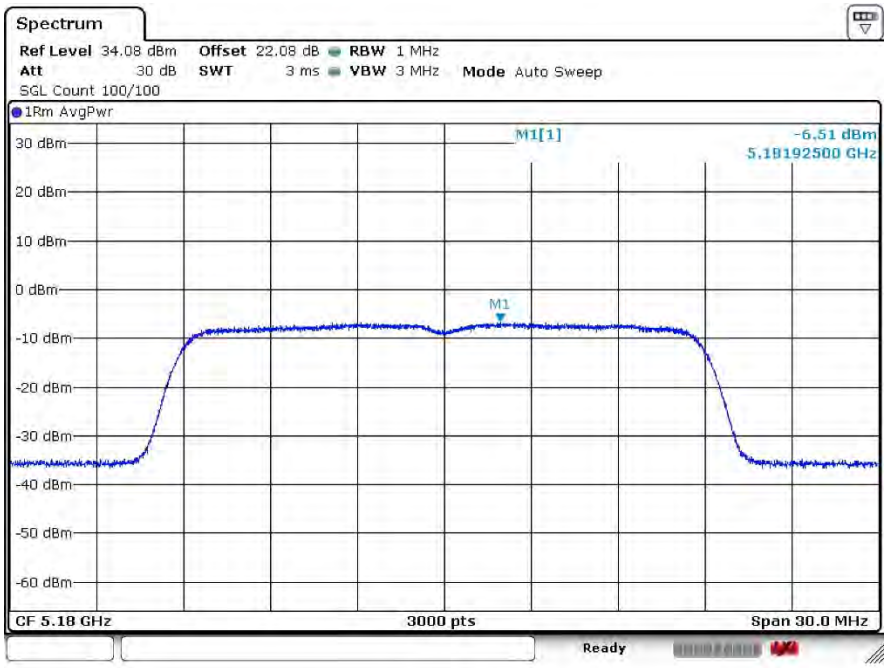
Ant B Low Channel



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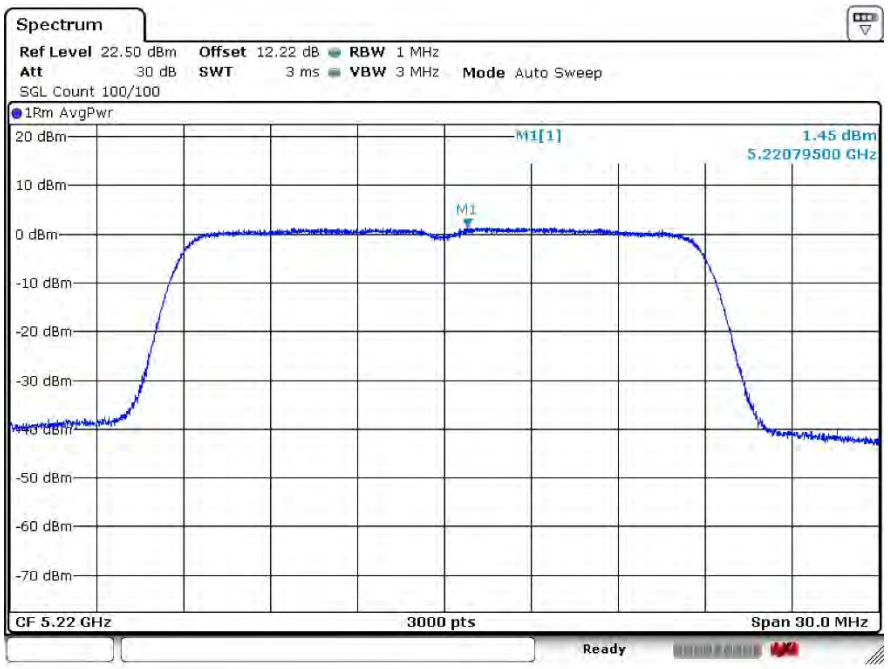
FCC 5150 - 5250 MHz

802.11n/ac20 Mode
Ant A Middle Channel



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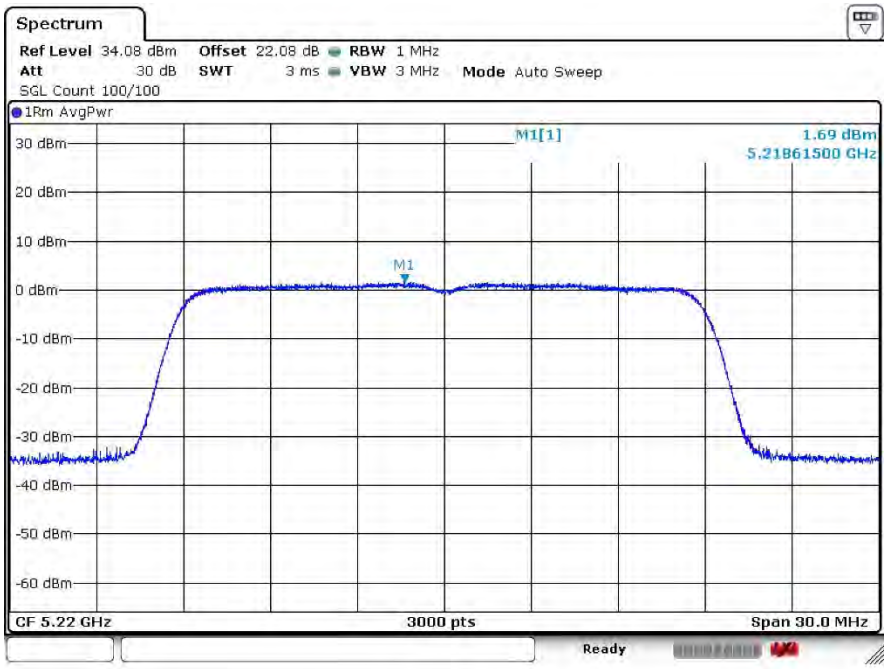

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IC 5150 - 5250 MHz

802.11n/ac20 Mode
Ant A Middle Channel

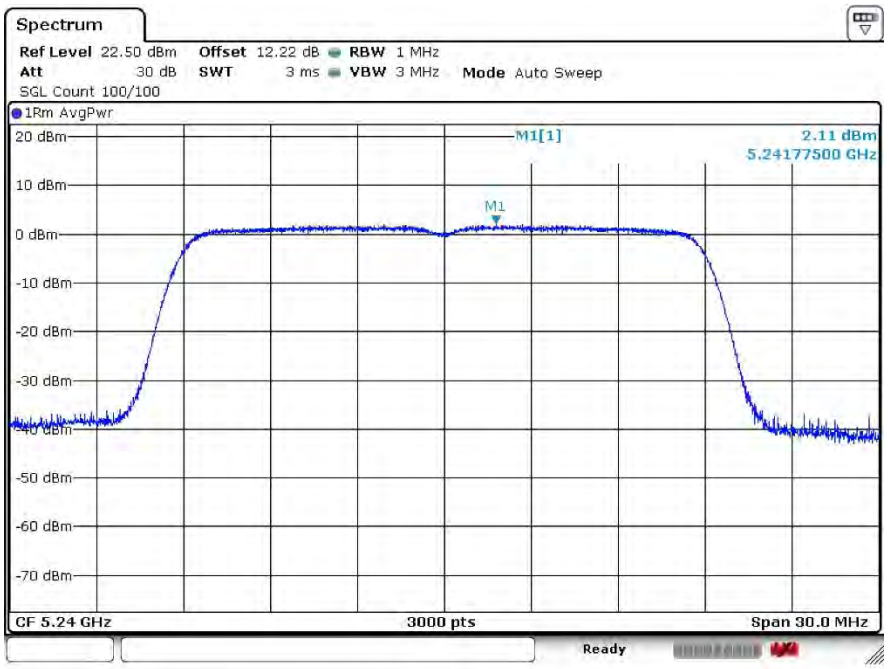
Date: 15.JUL.2021 10:58:04

Ant B Middle Channel

Date: 16.JUL.2021 09:05:03

FCC 5150 - 5250 MHz

802.11n/ac20 Mode
Ant A High Channel



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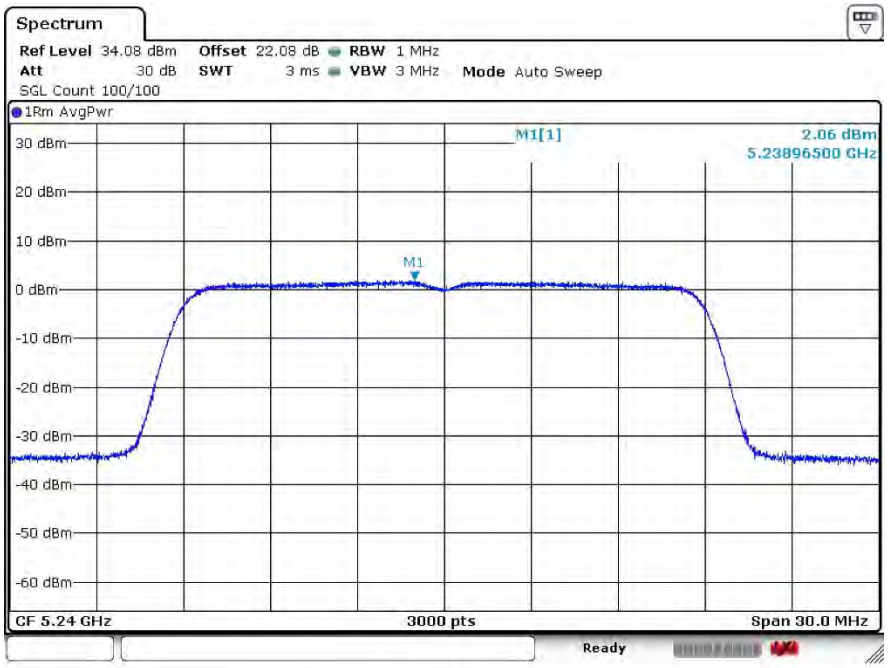
Ant B High Channel



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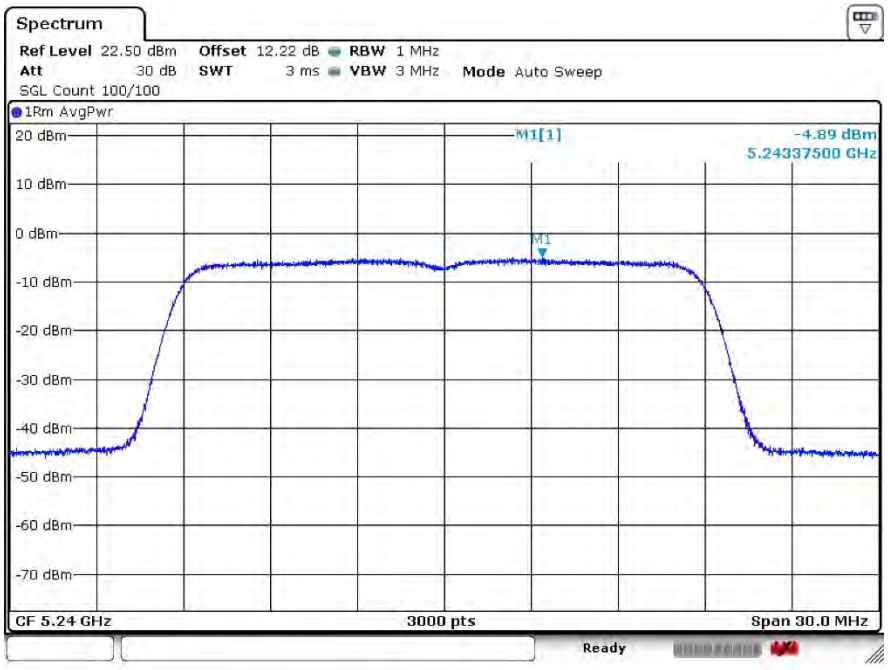
IC 5150 - 5250 MHz

802.11n/ac20 Mode
Ant A High Channel



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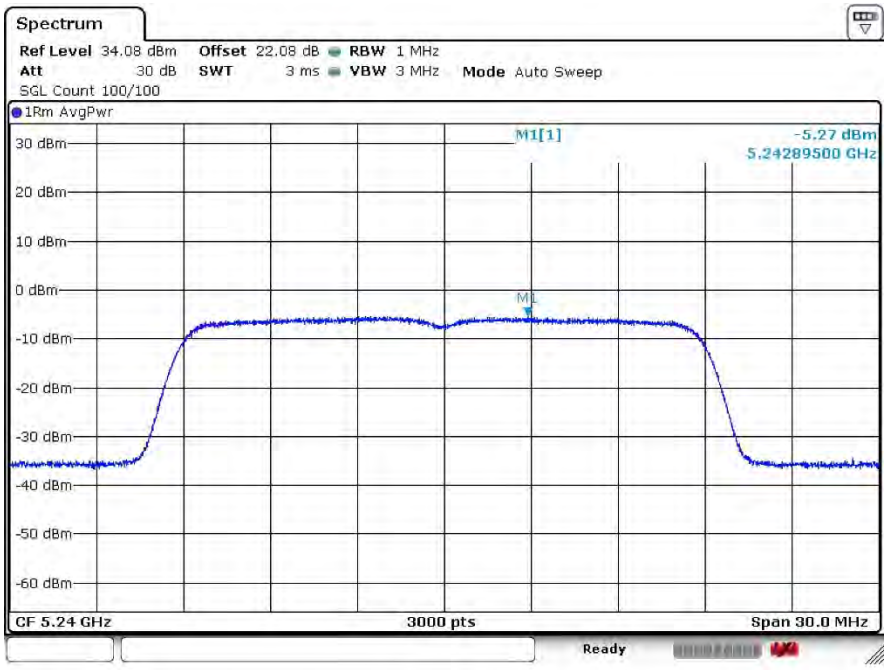
Ant B High Channel



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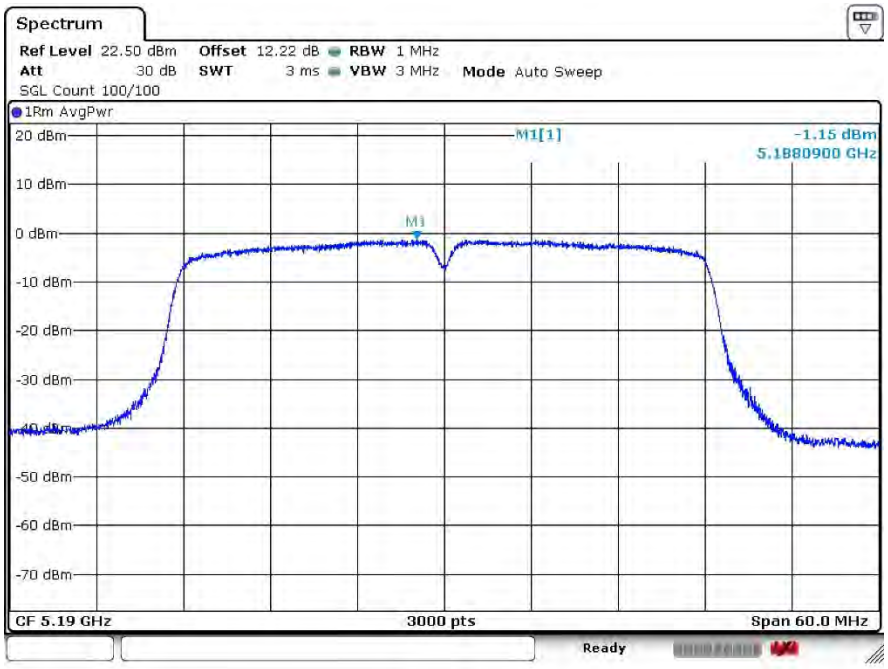
FCC 5150 - 5250 MHz

802.11n/ac40 Mode
Ant A Low Channel



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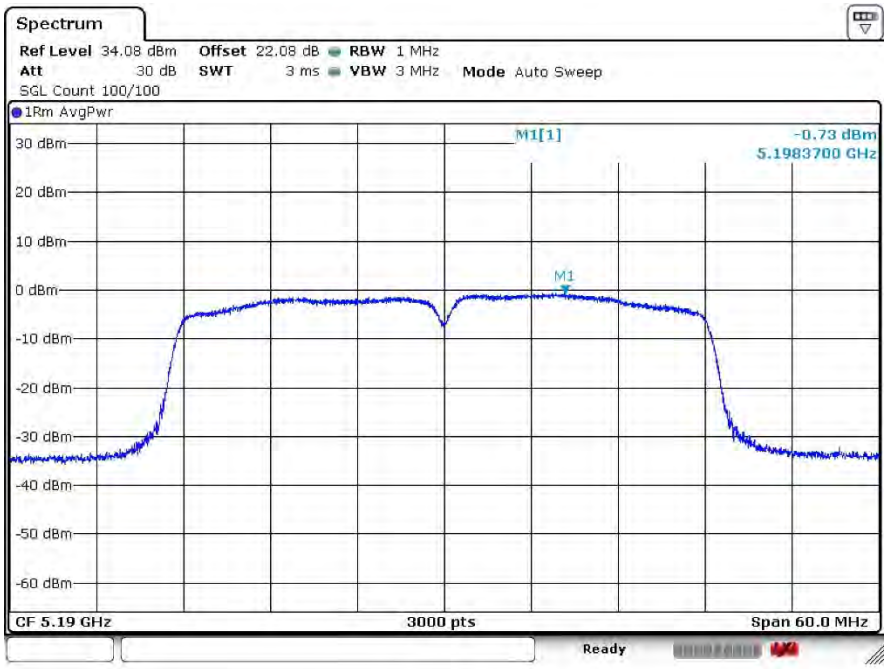

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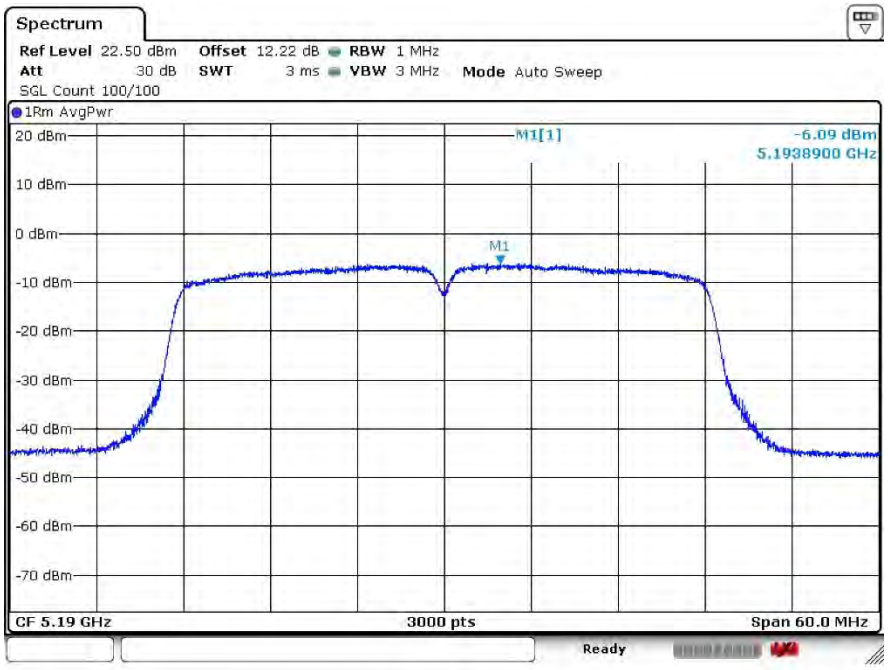
IC 5150 - 5250 MHz

802.11n/ac40 Mode
Ant A Low Channel



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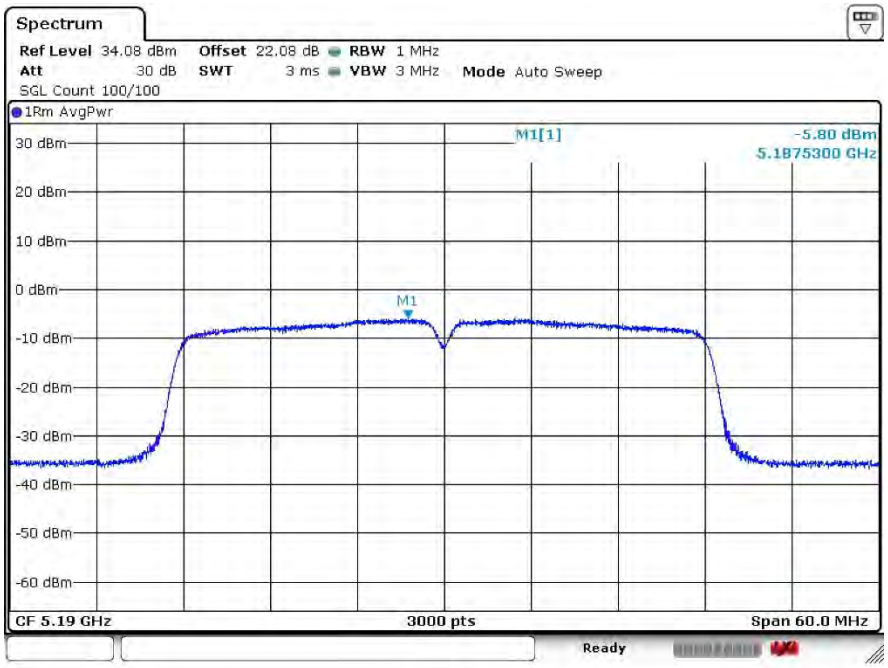
Ant B Low Channel



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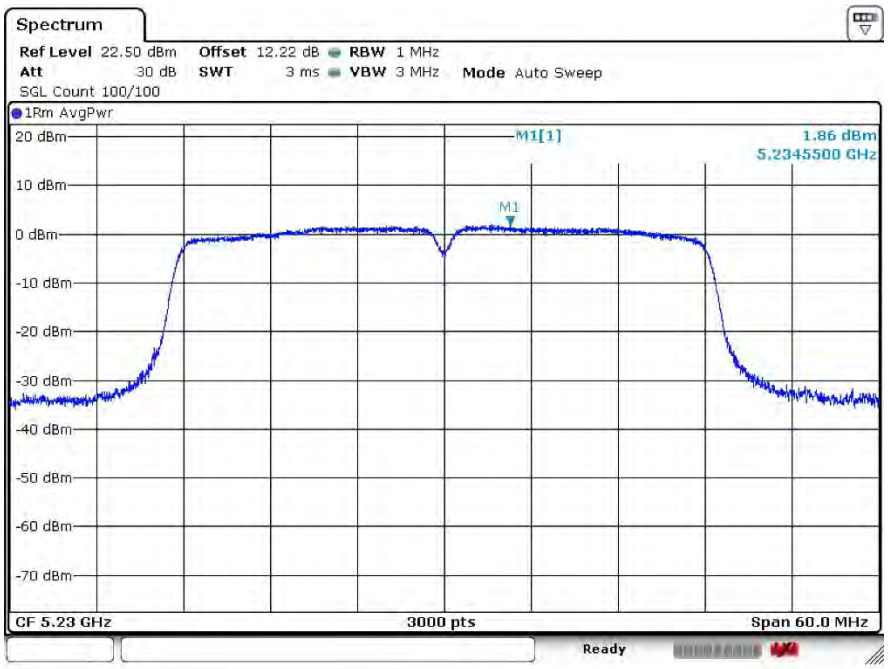
FCC 5150 - 5250 MHz

802.11n/ac40 Mode
Ant A High Channel



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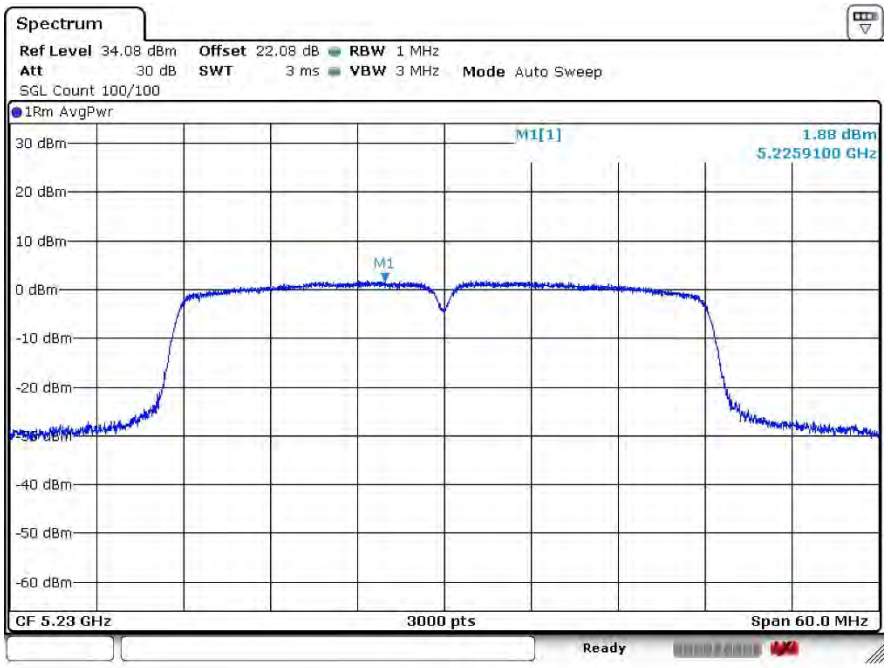
Ant B High Channel



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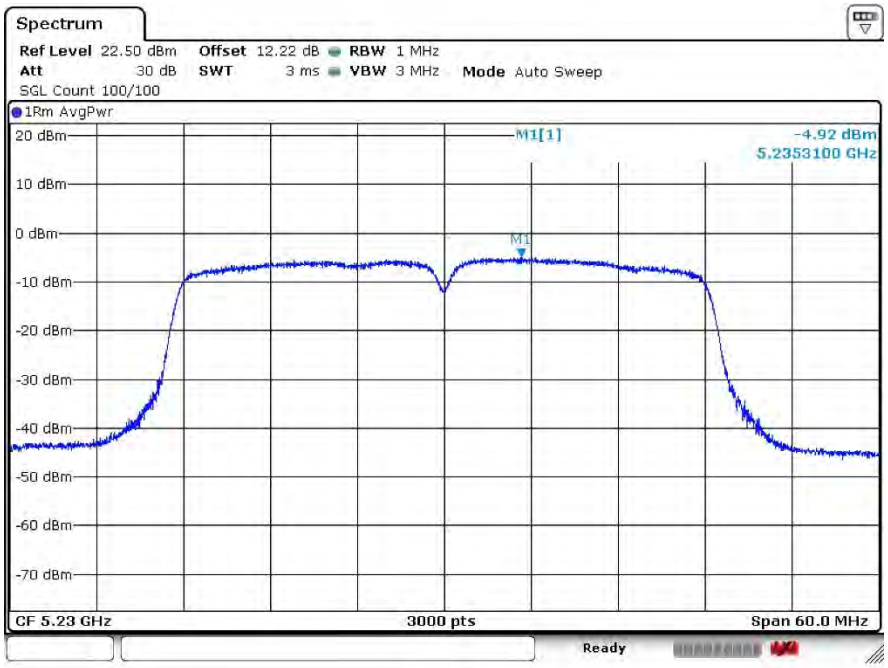
IC 5150 - 5250 MHz

802.11n/ac40 Mode
Ant A High Channel



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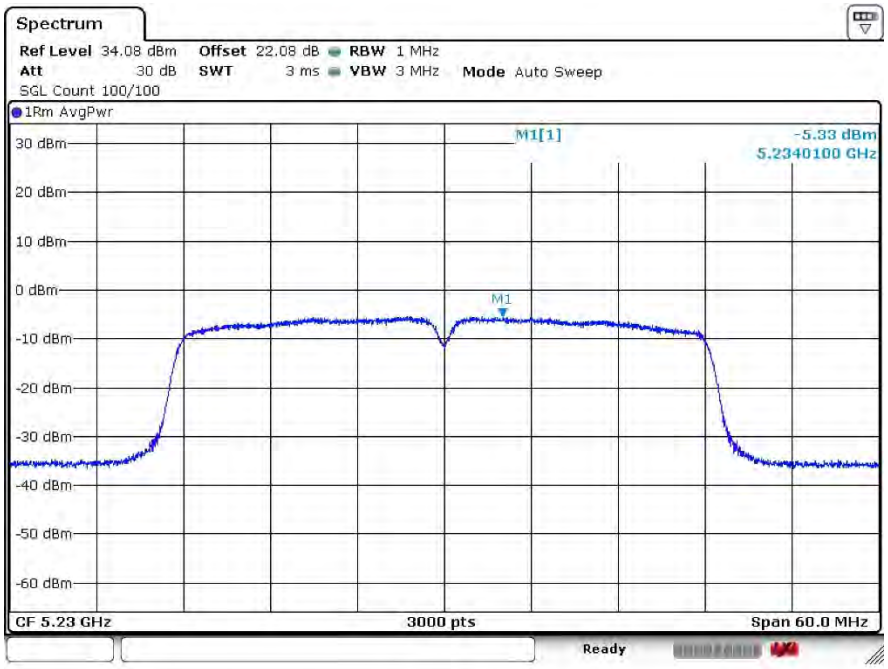
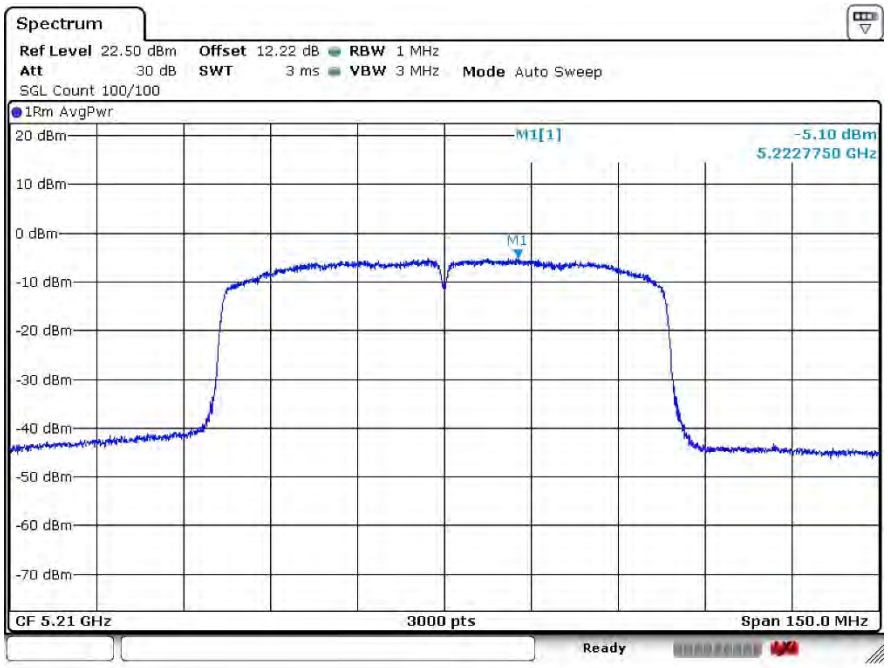
Ant B High Channel



Date: 16.JUL.2021 09:11:35

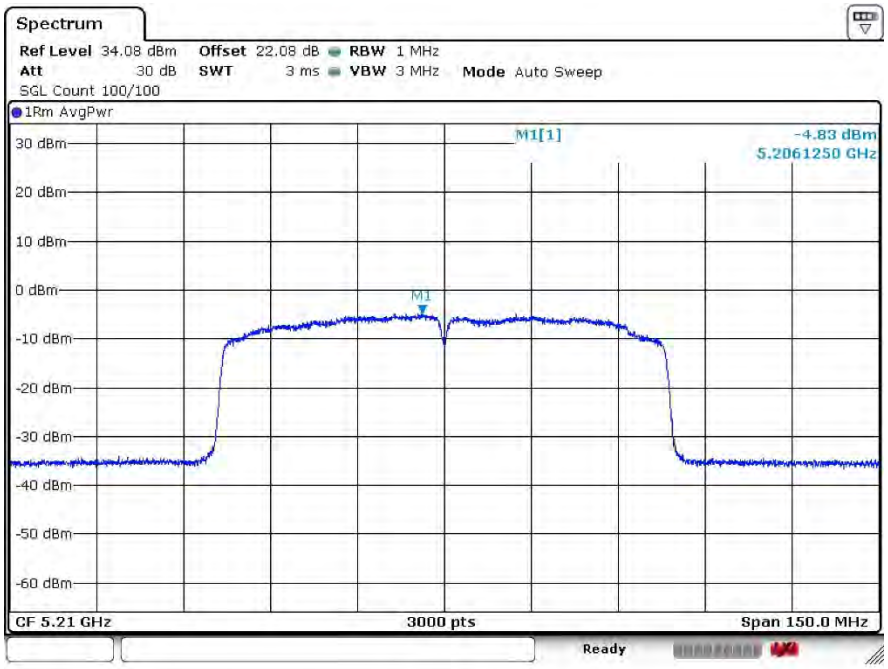
FCC 5150 - 5250 MHz

802.11 ac80 Mode
Ant A



Date: 15.JUL.2021 10:48:40

Ant B



Date: 16.JUL.2021 08:54:05

IC 5150 - 5250 MHz

802.11 ac80 Mode
Ant A

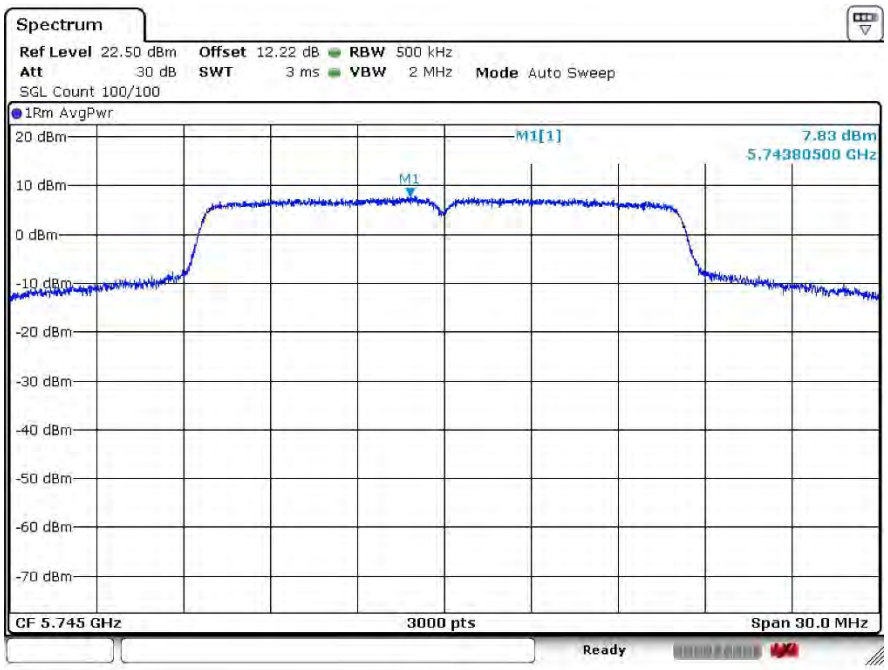
Date: 15.JUL.2021 11:04:46

Ant B

Date: 16.JUL.2021 09:13:41

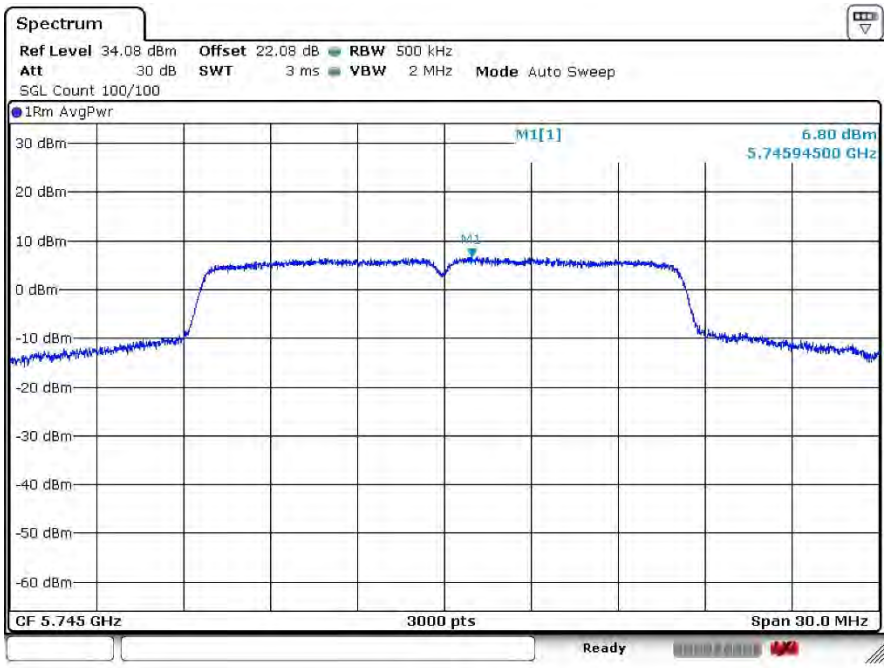
FCC/IC 5725- 5850 MHz

802.11 a Mode
Ant A Low Channel



Date: 15.JUL.2021 11:34:05

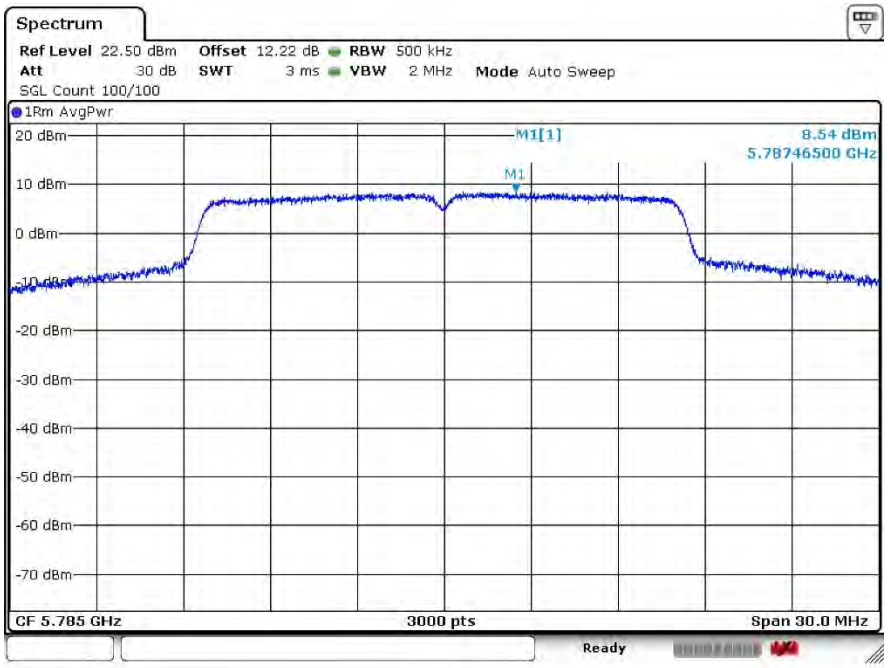
Ant B Low Channel



Date: 16.JUL.2021 09:19:58

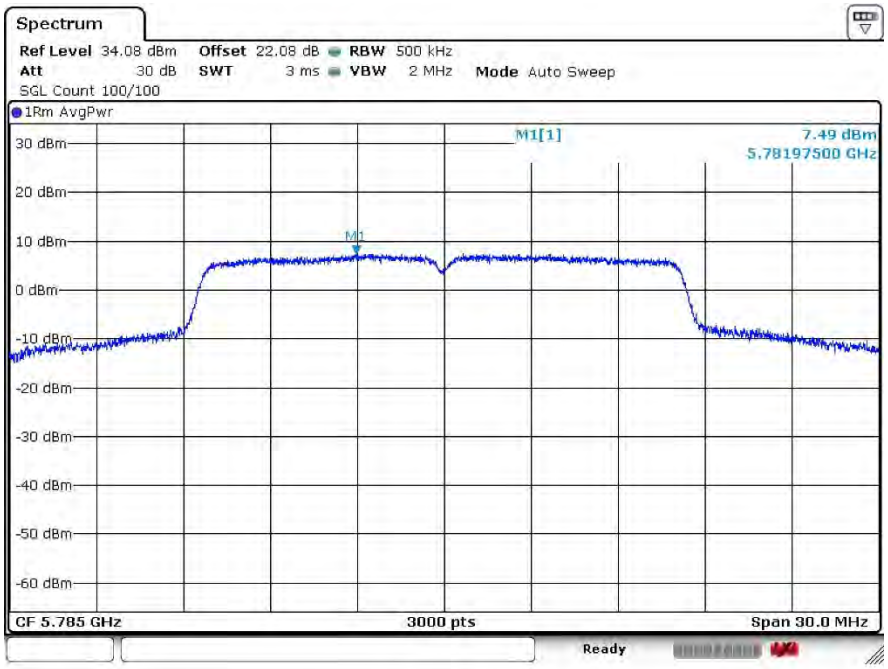
FCC/IC 5725- 5850 MHz

802.11 a Mode
Ant A Middle Channel



Date: 15.JUL.2021 11:37:59

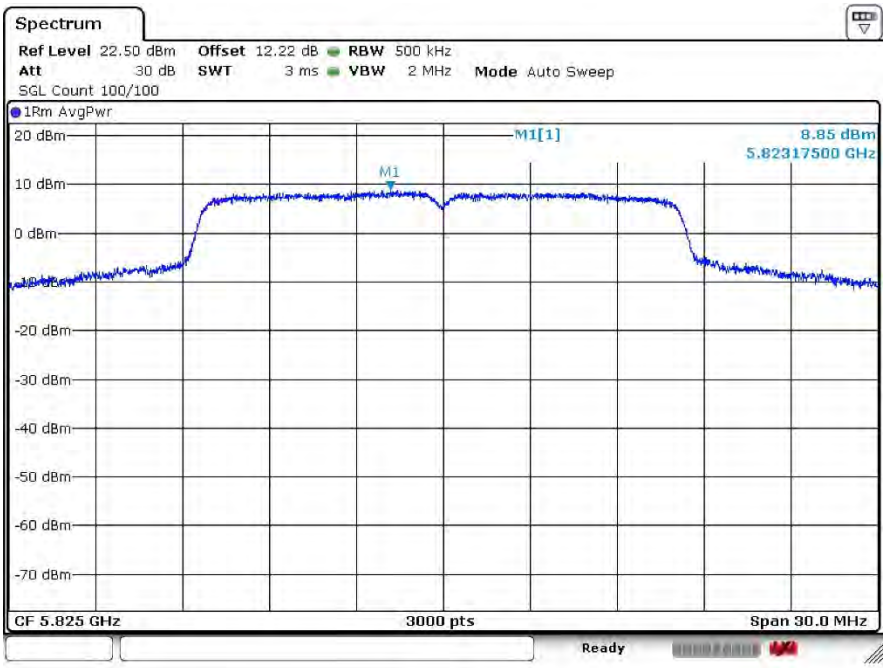
Ant B Middle Channel



Date: 16.JUL.2021 09:22:00

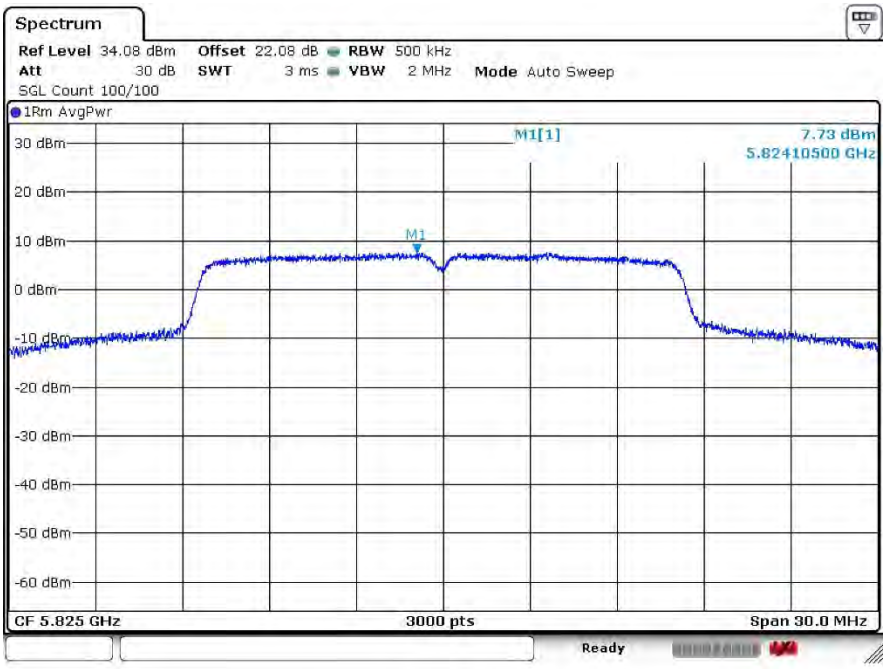
FCC/IC 5725- 5850 MHz

802.11 a Mode
Ant A High Channel



Date: 15.JUL.2021 11:39:14

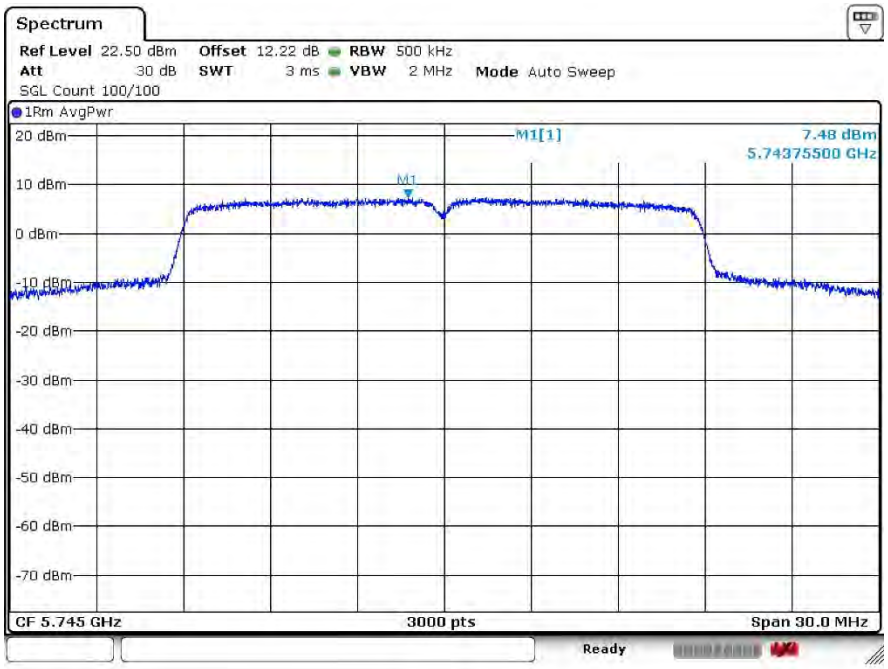
Ant B High Channel



Date: 16.JUL.2021 09:23:25

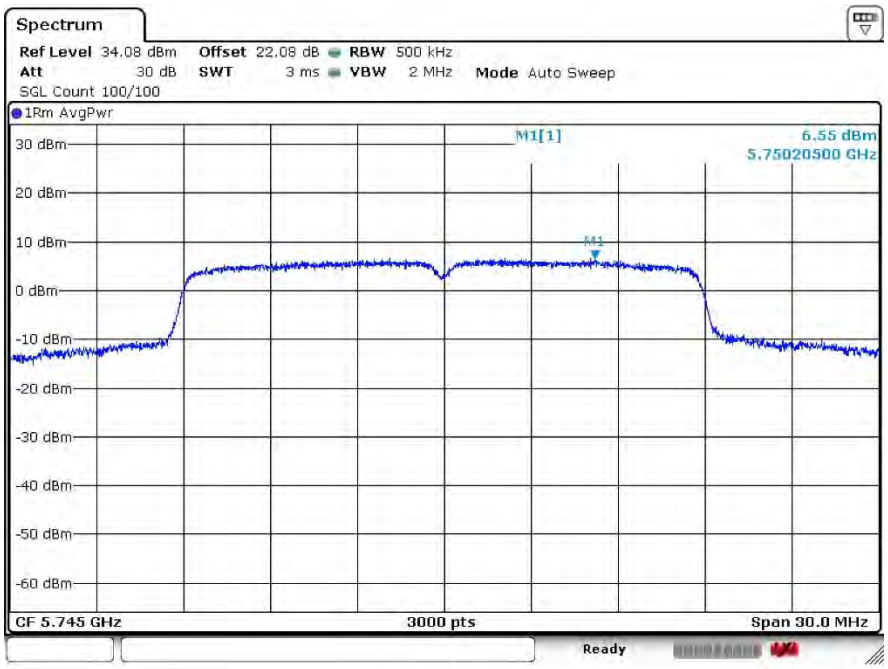
FCC/IC 5725- 5850 MHz

802.11 n/ac20 Mode
Ant A Low Channel



Date: 15.JUL.2021 11:40:34

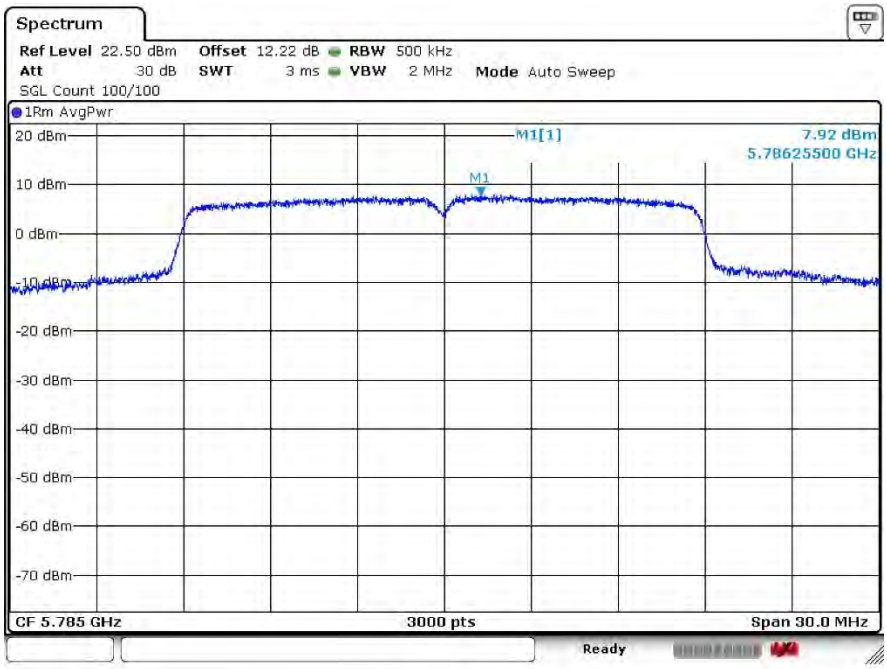
Ant B Low Channel



Date: 16.JUL.2021 09:24:51

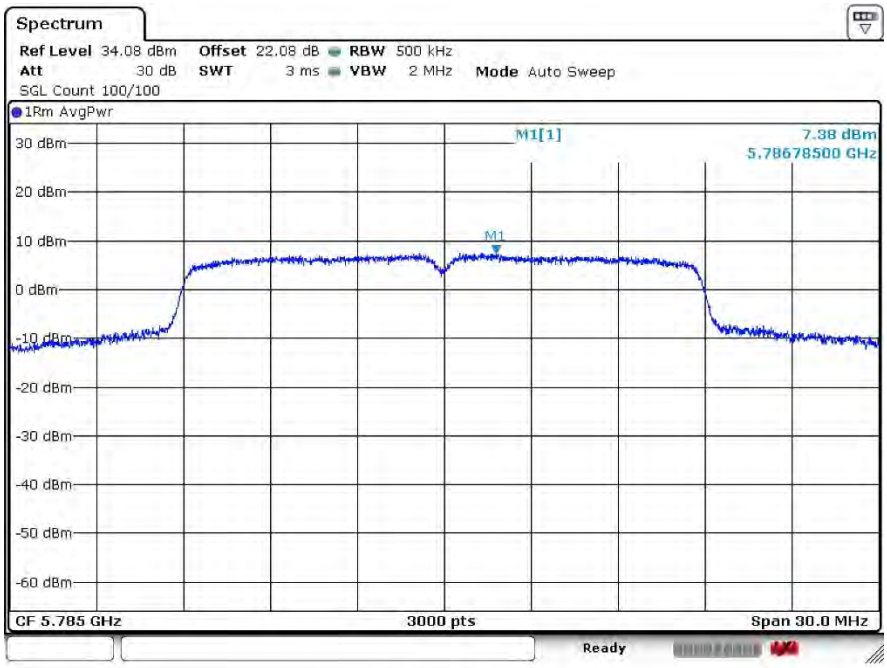
FCC/IC 5725- 5850 MHz

802.11 n/ac20 Mode
Ant A Middle Channel



Date: 15.JUL.2021 11:41:52

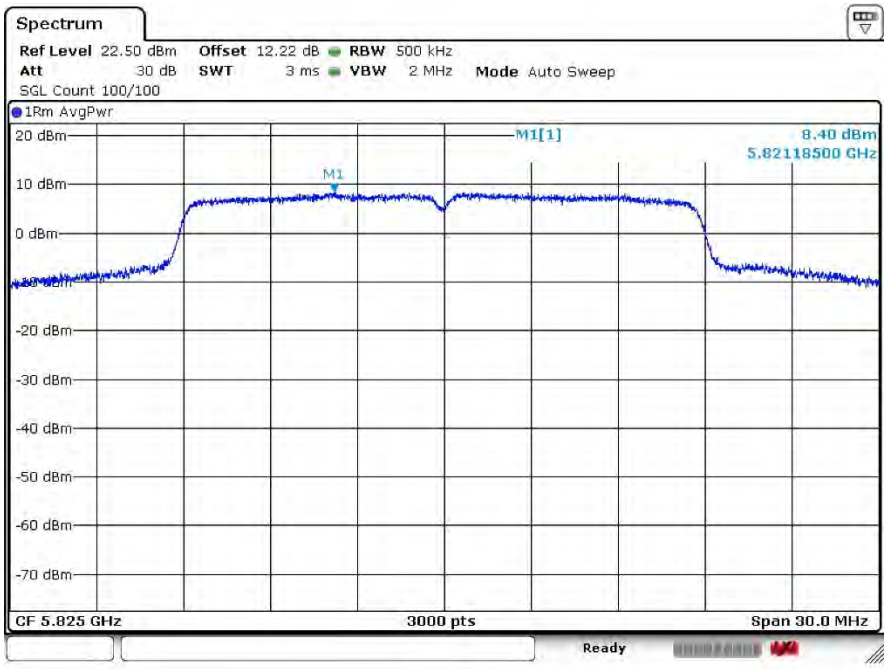
Ant B Middle Channel



Date: 16.JUL.2021 09:26:25

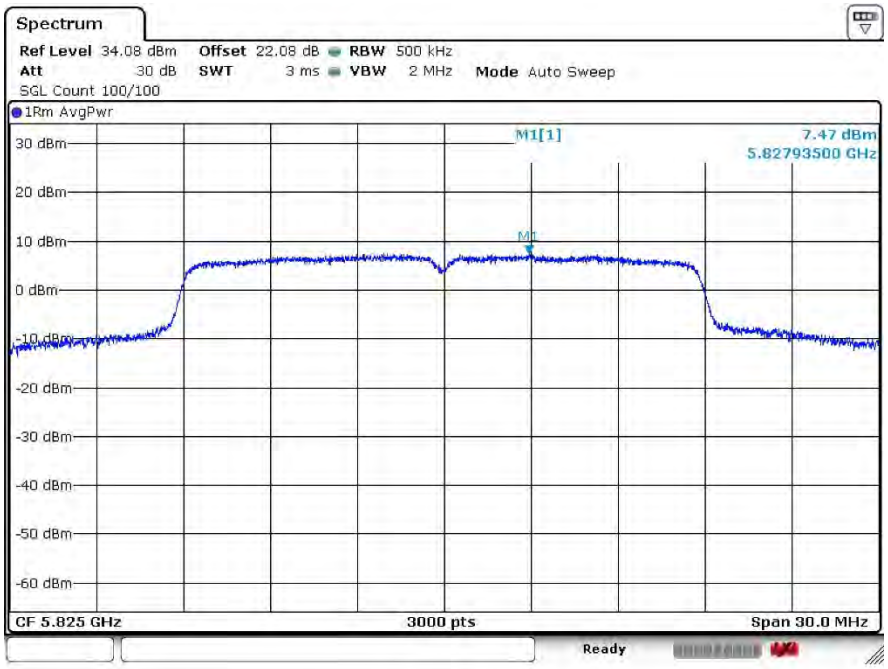
FCC/IC 5725- 5850 MHz

802.11 n/ac20 Mode
Ant A High Channel



Date: 15.JUL.2021 11:42:55

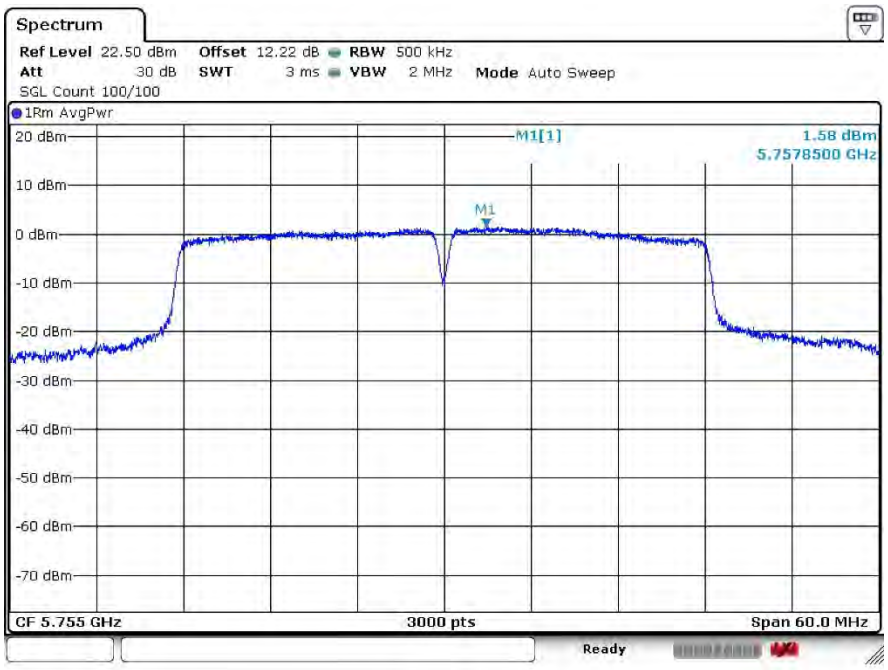
Ant B High Channel



Date: 16.JUL.2021 09:27:44

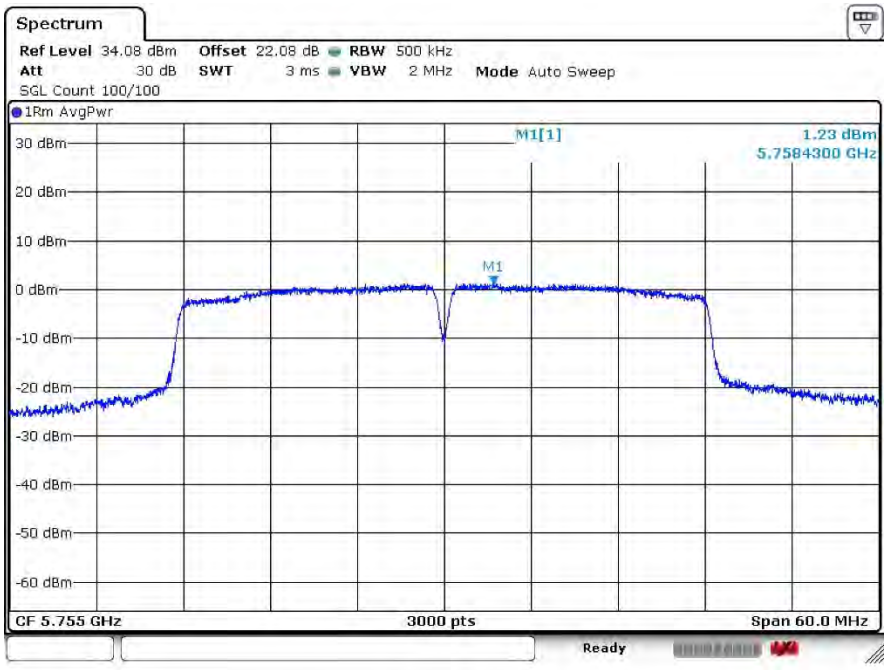
FCC/IC 5725- 5850 MHz

802.11 n/ac40 Mode
Ant A Low Channel



Date: 15.JUL.2021 11:45:13

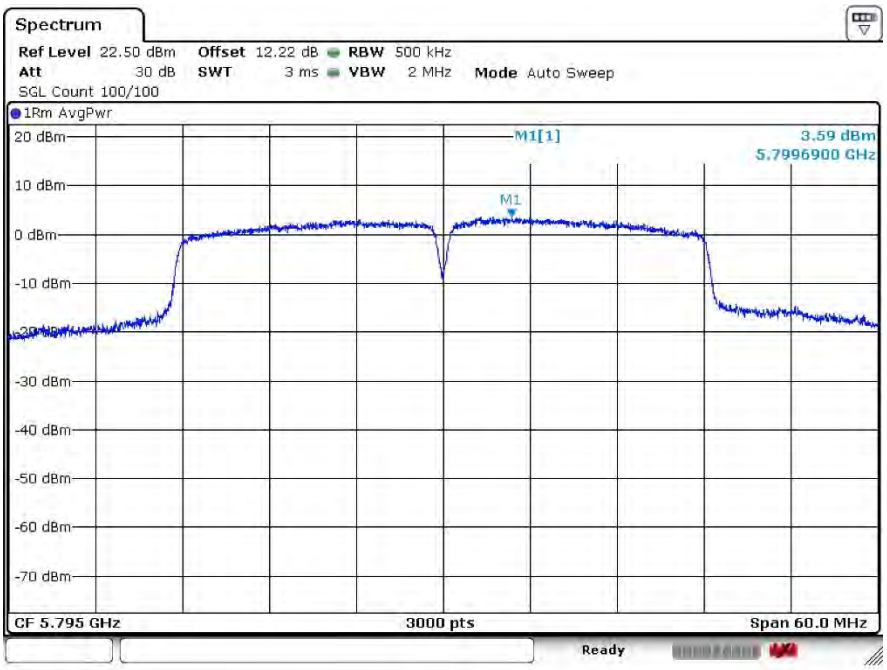
Ant B Low Channel



Date: 16.JUL.2021 09:31:16

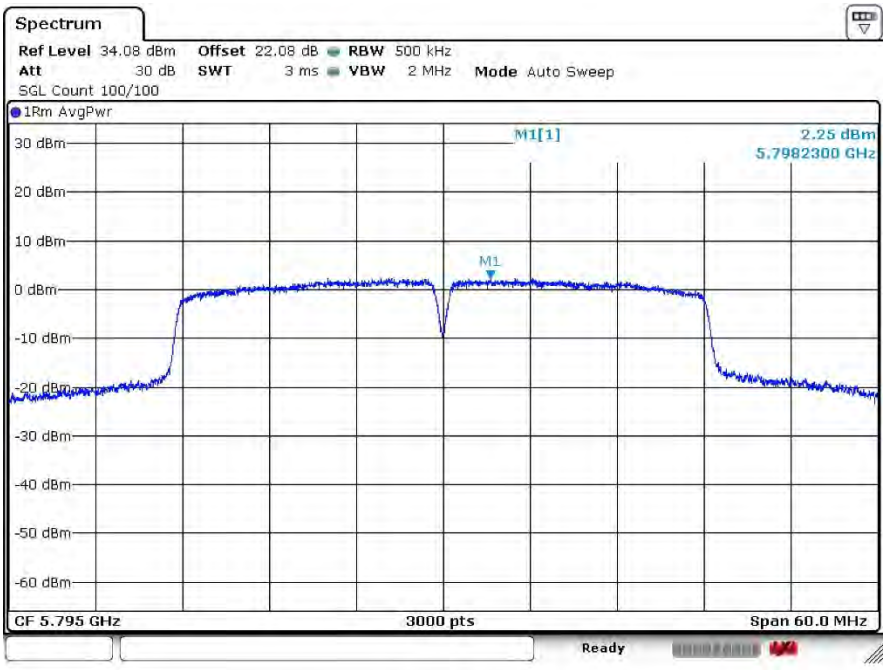
FCC/IC 5725- 5850 MHz

802.11 n/ac40 Mode
Ant A High Channel



Date: 15.JUL.2021 11:46:37

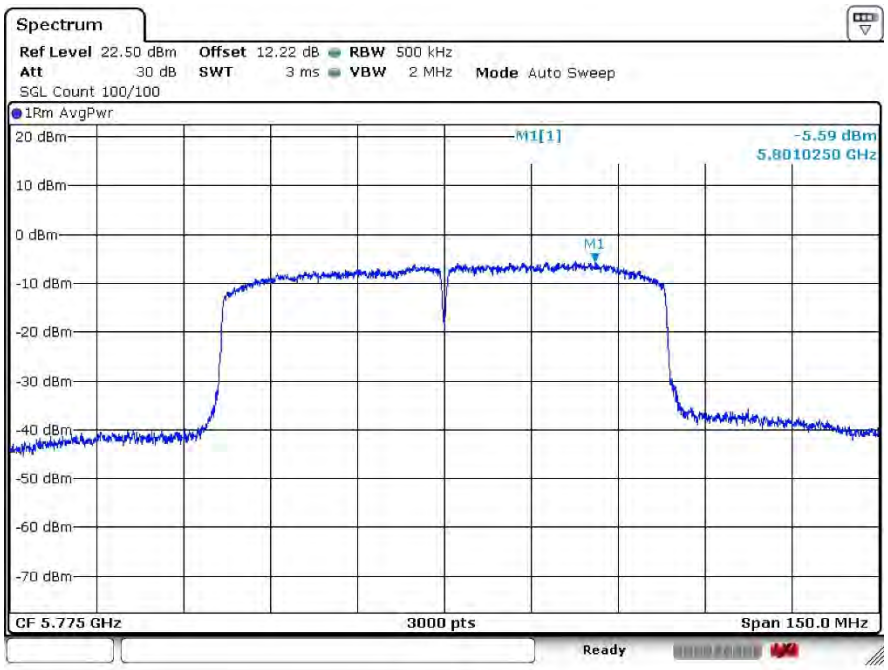
Ant B High Channel



Date: 16.JUL.2021 09:32:52

FCC/IC 5725- 5850 MHz

802.11ac80 Mode
Ant A



Date: 15.JUL.2021 11:48:39

Ant B

Date: 16.JUL.2021 09:34:39

11 Annex A (Normative) – EUT Test Setup Photographs

Please refer to the attachment.

12 Annex B (Normative) – EUT External Photographs

Please refer to the attachment.

13 Annex C (Normative) – EUT Internal Photographs

Please refer to the attachment.

14 Annex 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 10th day of March 2021.

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

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

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

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

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