FCC PART 15.407
ISEDC RSS-247, ISSUE 2, FEBRUARY 2017

TEST REPORT

For

Roku, Inc.

1155 Coleman Avenue,
San Jose, CA 95110, USA

FCC ID: TC2-R1017
IC: 5959A-R1017

Report Type:	**Model:**
Class II Permissive Change	3800X
Prepared By:	Rita Yang Test Technician
Report Number:	R2112222-407
Report Date:	2022-01-25
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ACCREDITED
CERTIFICATE #3297.02

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DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
0	R2112222-407	Class II Permissive Changec	2022-01-25

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: 3800X, FVIN: 11.0.0, FCC ID: TC2-R1017, IC: 5959A-R1017, or the "EUT" as referred to in this report. The EUT is a Streaming Stick with 2.4GHz/5GHz Wifi capabilities.

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.This is a C2PC report for the purpose of adding 40MHz and 80MHz.

This report was for a Permissive Change II submission for the purpose of enabling 40MHz and 80MHz bandwidth capabilities.

1.3 Mechanical Description of EUT

The EUT measures approximately 9.5 cm (L) x 2.0 cm (W) x 1.2 cm (H) and weighs < 1kg.
The data gathered are from a production sample provided by Roku, Inc. with BACL assigned serial number: R2112222-1

1.4 Related Submittal(s)/Grant(s)

Equipment Class: DTS, FCC ID: TC2-R1017, IC: 5959A-R1017

1.5 Test Methodology

All measurements contained in this report were conducted in accordance with ANSI C63.10-2013, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices and FCC KDB 558074 D01 DTS Meas Guidance v05r02: Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.407.

1.6 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.

1.7 Measurement Uncertainty

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

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

1.8 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.

1.9 Test Facility Accreditations

Bay Area Compliance Laboratories Corp. (BACL) is:

A- ***An independent, 3rd-Party, Commercial Test Laboratory accredited to ISO/IEC 17025:2017 by A2LA (Test Laboratory Accreditation Certificate Number 3297.02),*** in the fields of: Electromagnetic Compatibility and Telecommunications. Unless noted by an Asterisk (*) in the Compliance Matrix (See Section 3 of this Test Report), BACL's ISO/IEC 17025:2017 Scope of Accreditation includes all of the Test Method Standards and/or the Product Family Standards detailed in this Test Report..

BACL's ISO/IEC 17025:2017 Scope of Accreditation includes a comprehensive suite of EMC Emissions, EMC Immunity, Radio, RF Exposure, Safety and wireline Telecommunications test methods applicable to a wide

range of product categories. These product categories include Central Office Telecommunications Equipment [including NEBS - Network Equipment Building Systems], Unlicensed and Licensed Wireless and RF devices, Information Technology Equipment (ITE); Telecommunications Terminal Equipment (TTE); Medical Electrical Equipment; Industrial, Scientific and Medical Test Equipment; Professional Audio and Video Equipment; Industrial and Scientific Instruments and Laboratory Apparatus; Cable Distribution Systems, and Energy Efficient Lighting.

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

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

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

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

- for Computer Servers (ver. 2.0)

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

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

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

5 Other
- For Water Coolers (ver. 3.0)

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

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

2 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.

Modulation	Frequency (MHz)	Power Setting	
		Ant A	Ant B
n/ac40	5190	55	55
	5230	55	55
ac80	5210	56	56
n/ac40	5755	70	70
	5795	75	75
ac80	5775	70	70

*Data rates tested:

802.11n/ac40 HT40/VHT40: MCS0
802.11ac80 VHT80: MCS0

2.3 Duty Cycle Correction Factor

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

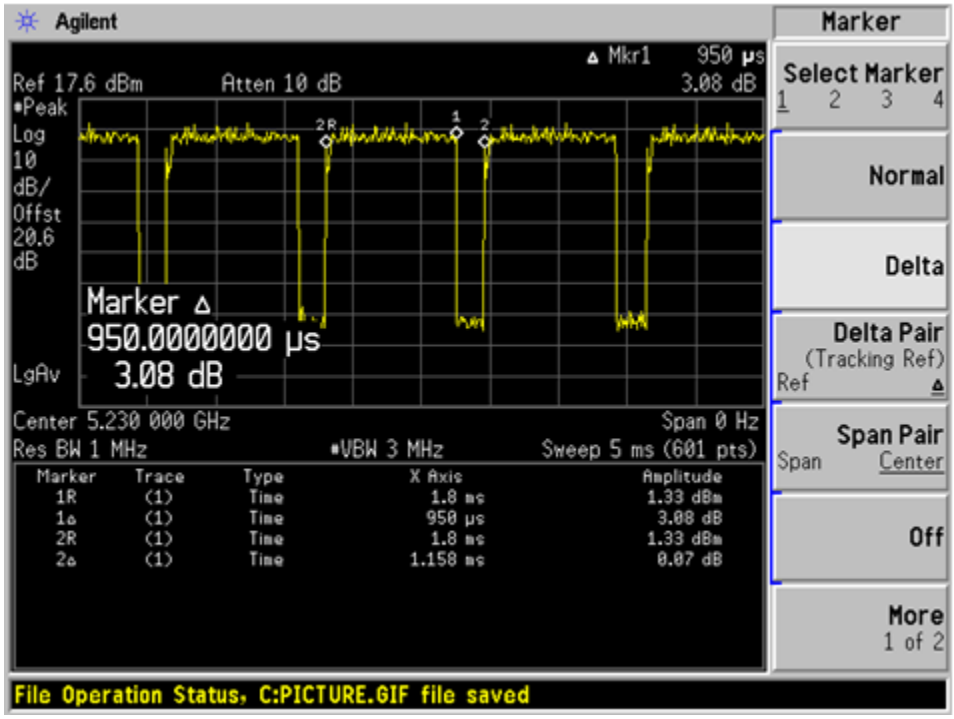
All measurements are to be performed with the EUT transmitting at 100% duty cycle at its maximum power control level; however, if 100% duty cycle cannot be achieved, measurements of duty cycle, x, and maximum-power transmission duration, T, are required for each tested mode of operation.

Radio Mode	On Time (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)
802.11n/ac40	0.95	1.15	82.6	0.83
802.11ac80	0.46	0.60	76.7	1.15

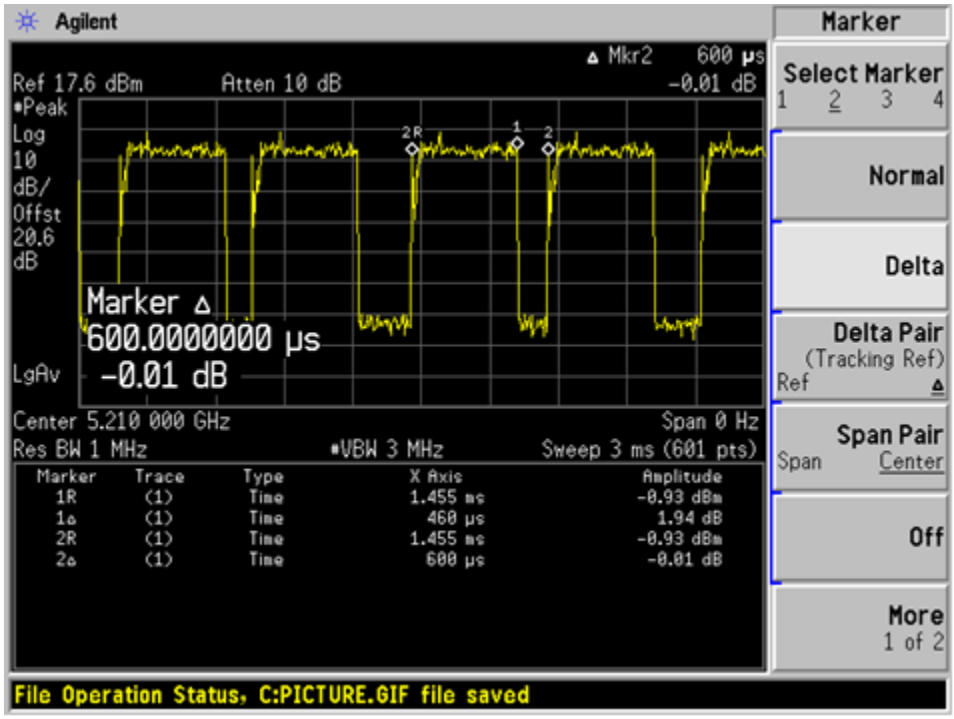
Note: Duty Cycle Correction Factor = 10*log(1/duty cycle)

Please refer to the following plots.

802.11n/ac40 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 Wireless, 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 and 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 §15.247(i) 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, 5755 MHz

Maximum output power at antenna input terminal (dBm):	12.96
Maximum output power at antenna input terminal (mW):	19.77
Prediction distance (cm):	20
Prediction frequency (MHz):	5755
Maximum Antenna Gain, typical (dBi):	7.8
Maximum Antenna Gain (numeric):	6.03
Power density of prediction frequency at 20.0 cm (mW/cm^2):	0.0237
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 0.0237 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

Worst Case: 802.11n/ac40, 5755 MHz

Maximum EIRP power = 12.96dBm + 7.8 dBi = 20.76 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 7.8 dBi = 4.8 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
5GHz Wi-Fi	5150-5250	4.8	Chip
5GHz Wi-Fi	5725-5850	4.8	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.

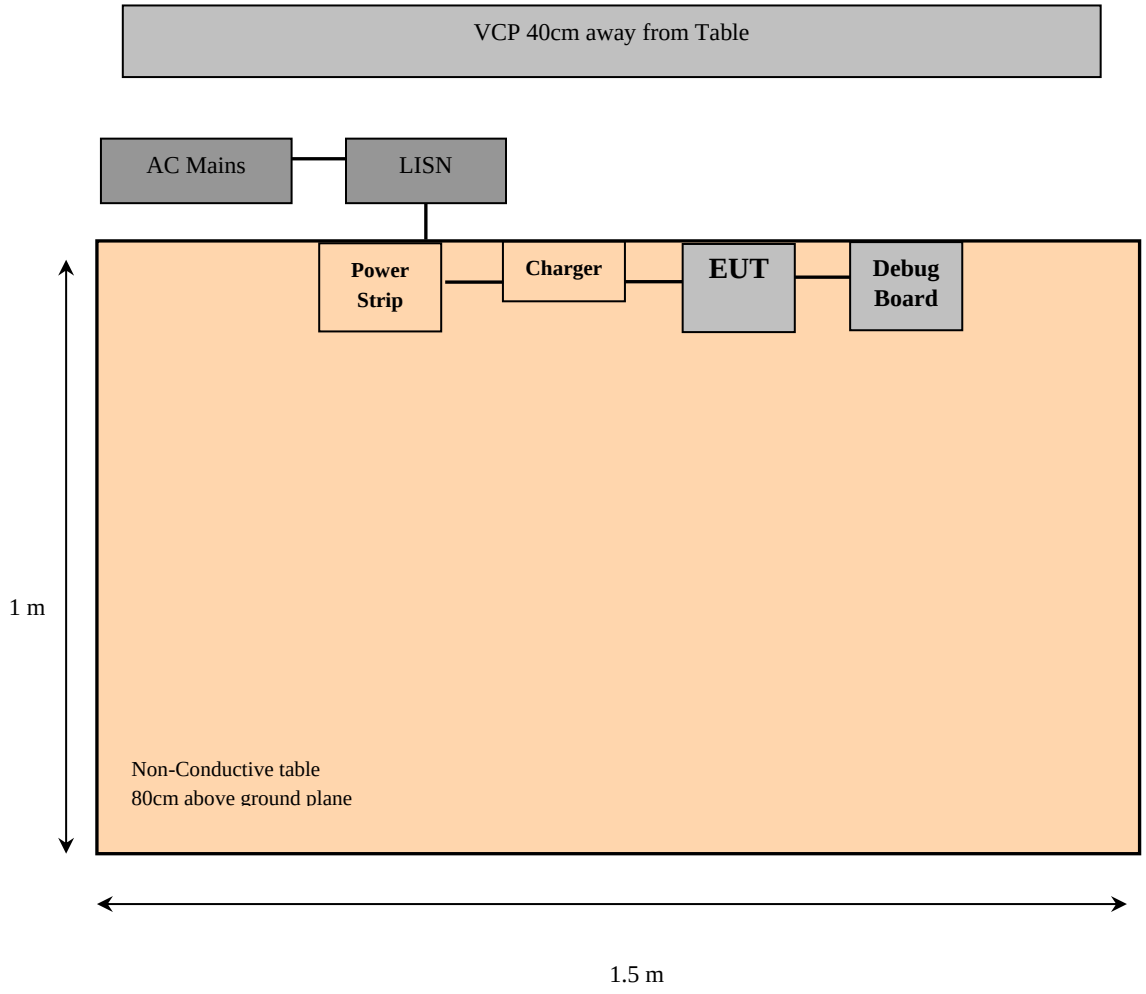
6.3 Test Procedure

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

BACL Number	Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
124	Rohde and Schwarz	Receiver, EMI Test	ESCI 1166.5950.03	100044	2021-05-14	2 years
680	Rohde and Schwarz	Impulse Limiter	ESH3-Z2	101964	2021-07-07	1 year
726	Solar Electronics Company	High Pass Filter	Type 7930-100	7930150204	2021-11-02	1 year
1226	RG58	Coax Cable	-	-	2021-09-24	1 year
732	FCC	LISN	FCC-LISN-50-25-2-10-CISPR16	160129	2021-11-24	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 Kai Chen on 2022-01-19 in the Ground Plane test site.

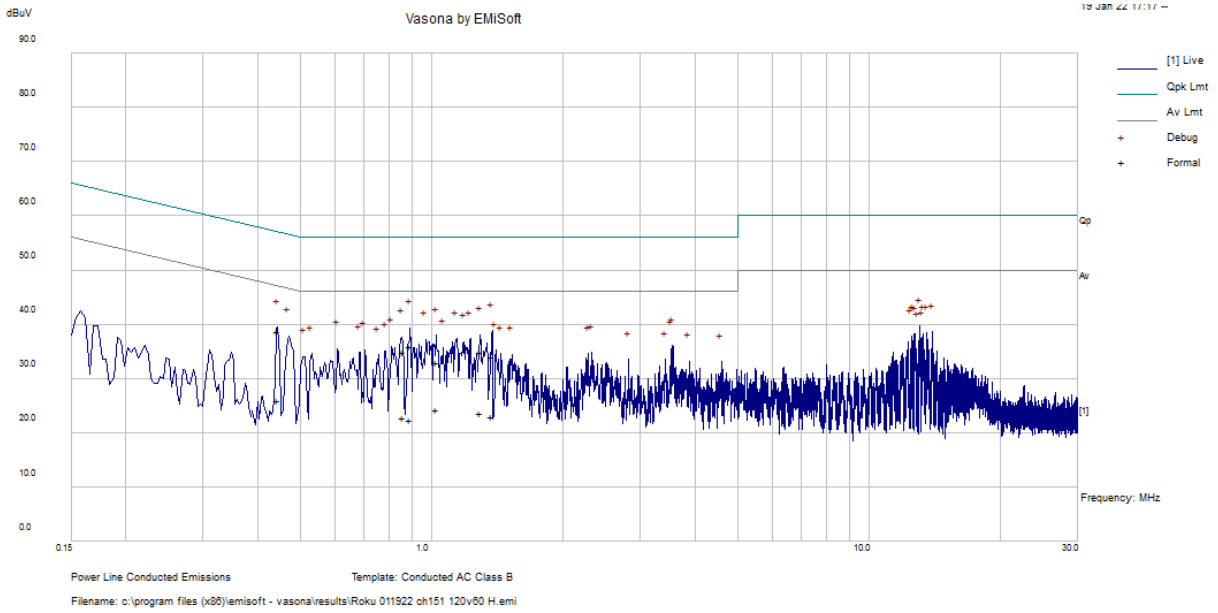
6.8 Summary of Test Results

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 (Live/Neutral)**	**Range (MHz)**
-12.53	0.471719	Neutral	0.15-30

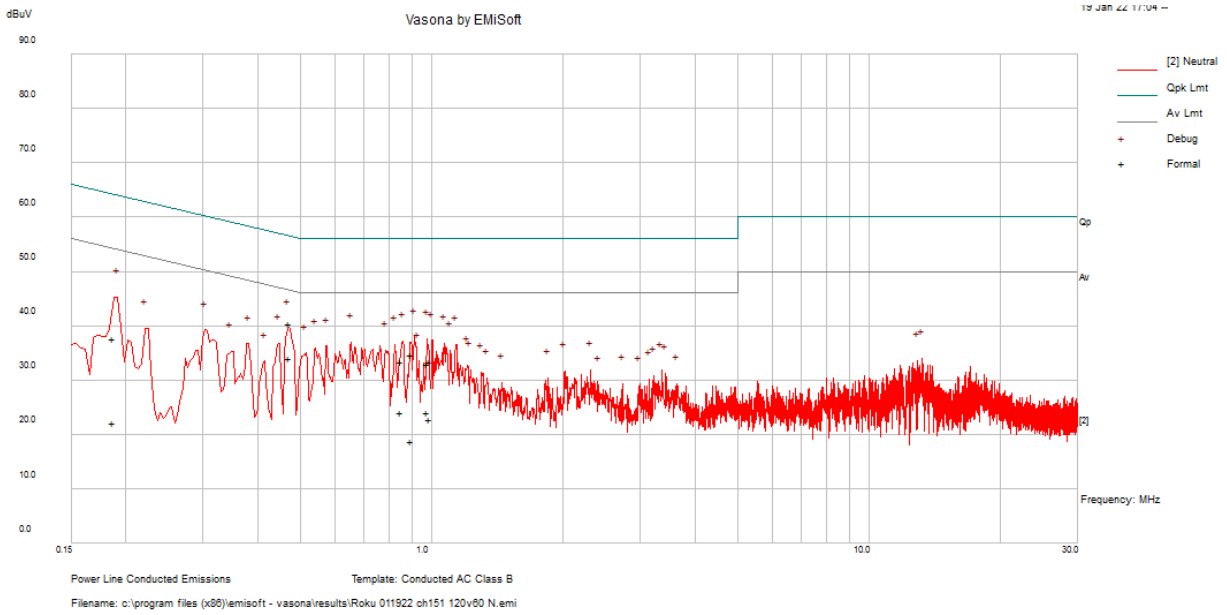
6.9 Conducted Emissions Test Plots and Data

120 V, 60 Hz – Live



Frequency (MHz)	Ai. Reading (dBuV)	Correction Factor (dB)	Corrected Amplitude (dBµV)	Limit (dBµV)	Margin (dB)	Detector
0.890157	25.6	10.27	35.87	56	-20.13	QP
1.370314	23.85	10.15	34	56	-22	QP
0.445131	28.35	10.44	38.79	56.97	-18.18	QP
1.294791	24.79	10.17	34.95	56	-21.05	QP
1.028337	22.84	10.23	33.07	56	-22.93	QP
0.858962	24.69	10.28	34.96	56	-21.04	QP
0.890157	11.99	10.27	22.26	46	-23.74	Ave
1.370314	12.8	10.15	22.94	46	-23.06	Ave
0.445131	15.54	10.44	25.98	46.97	-20.98	Ave
1.294791	13.55	10.17	23.72	46	-22.28	Ave
1.028337	14.04	10.23	24.27	46	-21.73	Ave
0.858962	12.39	10.28	22.67	46	-23.33	Ave

120 V, 60 Hz – Neutral



Frequency (MHz)	Ai. Reading (dBuV)	Correction Factor (dB)	Corrected Amplitude (dBµV)	Limit (dBµV)	Margin (dB)	Detector
0.471719	30.08	10.42	40.49	56.48	-15.99	QP
0.896994	24.37	10.27	34.64	56	-21.36	QP
0.976107	22.82	10.25	33.06	56	-22.94	QP
0.186439	26.83	10.76	37.59	64.19	-26.61	QP
0.986712	23.07	10.24	33.32	56	-22.68	QP
0.848149	23.1	10.28	33.38	56	-22.62	QP
0.471719	23.54	10.42	33.95	46.48	-12.53	Ave
0.896994	8.49	10.27	18.76	46	-27.24	Ave
0.976107	13.71	10.25	23.95	46	-22.05	Ave
0.186439	11.47	10.76	22.24	54.19	-31.96	Ave
0.986712	12.52	10.24	22.76	46	-23.24	Ave
0.848149	13.87	10.28	24.15	46	-21.85	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:

$$CA = Ai + AF + CL + Atten - Ga$$

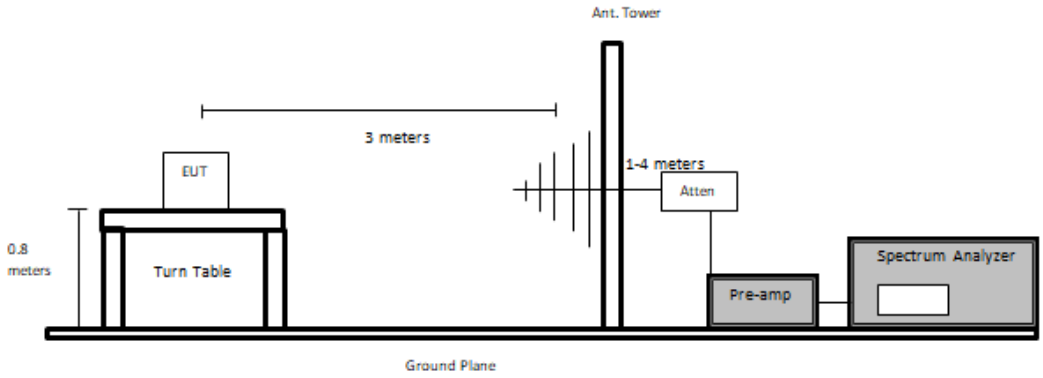
For example, a corrected amplitude of 40.3 dBuV/m = Indicated Reading (32.5 dBuV) + Antenna Factor (+23.5dB) + Cable Loss (3.7 dB) + Attenuator (10 dB) - Amplifier Gain (29.4 dB)

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

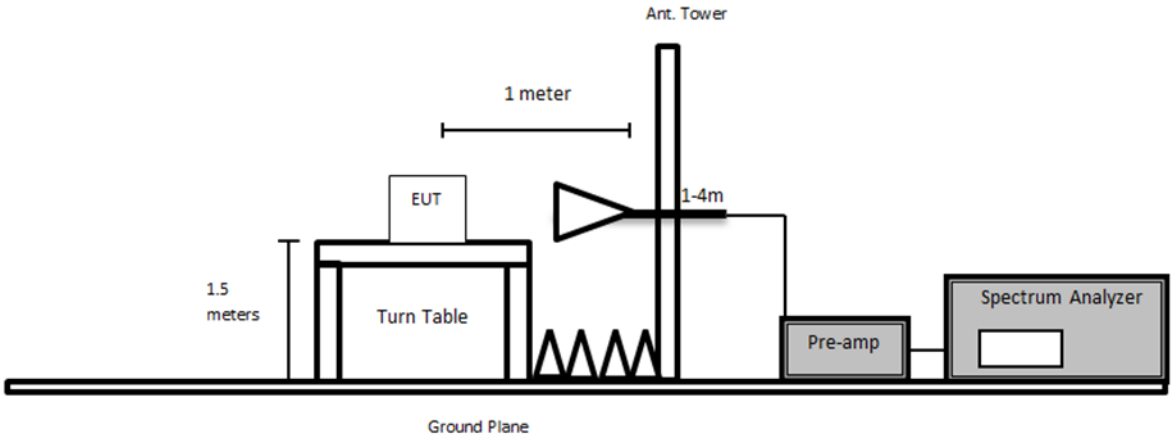
7.5 Test Setup Block Diagram

Below 1GHz:

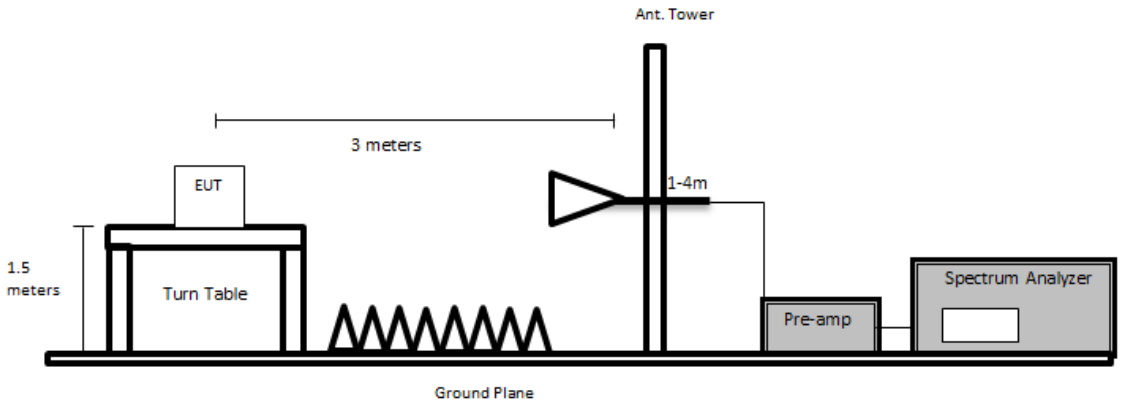


1 GHz to 18 GHz (Asset #1192 Antenna used):

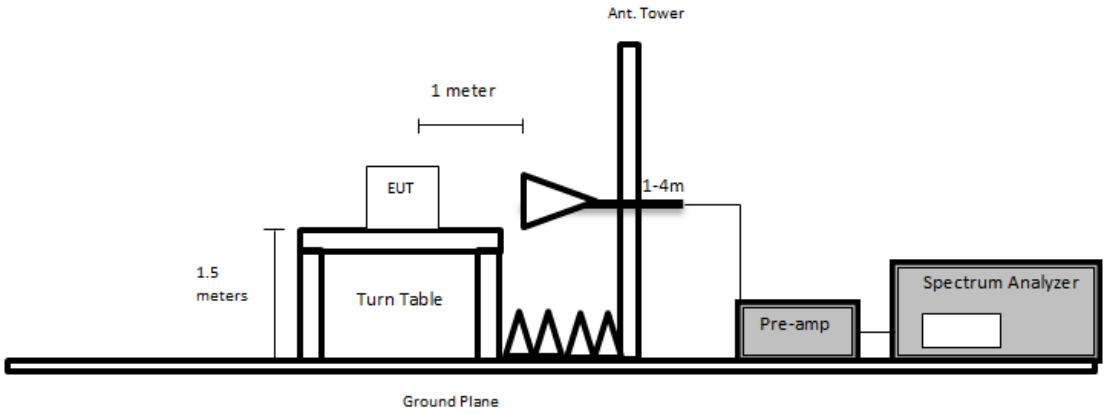
At 1 meter:



At 3 meters:



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



7.6 Test Equipment List and Details

BACL Number	Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
310	Rohde & Schwarz	EMI Test Receiver	ESCI 1166.5950K03	100044	2020-10-26	2 years
912	Rohde & Schwarz	Signal Analyzer	FSV40	101203	2021-04-26	1 year
624	Agilent	Spectrum Analyzer	E4446A	US44300386	2021-04-27	1 year
831	Rohde & Schwarz	EMI Test Receiver	ESU-40	100433	2021-09-20	1 year
-	Sunol Science Corp	System Controller	SC110V	122303-1	N/R	N/A
459	HP	Pre-Amplifier	8447D	2944A07030	2021-11-02	1 year
658	HP	Pre-Amplifier	8449B OPT HO2	3008A0113	2021-05-06	1 year
91	Wisewave	Horn Antenna	ARH-4223-02	10555-02	2020-02-05	2 years
92	Wisewave	Antenna, Horn	ARH-2823-02	10555-01	2020-02-05	2 years
827	AH Systems	Preamplifier	PAM 1840 VH	170	2021-08-03	1 year
1192	ETS Lindgren	Horn Antenna	3117	00218973	2021-09-14	2 years
321	Sunol Sciences	Biconilog Antenna	JB3	A020106-2	2021-11-22	2 years
-	-	RF cable	-	-	Each time[1]	N/A
-	-	Notch Filter	-	-	Each time[1]	N/A
1081	Fairview Microwave	Times Microwave LMR 400 UltraFex Coaxial Cable 35'	FMC0101405-420	BACL1904161	2021-06-18	1 year
1077	Insulted Wire Corp.	157 Series 2.92 SM (x2) Armored 33 ft. Cable	KPS-1571AN-3960-KPS	DC 1917	2021-03-03	1 year
1101	IW Microwave	157 Series Cable Armored with 2.92mm Male Plugs on Both Sides	KPS-1571AN-2400	DC 1922	2021-07-06	1 year
1151	BACL	5m3 Sensitivity Box	1	2	2021-11-30	1 year

Note[1]: equipment included in the test set-up will be checked each time before testing.
Statement of Traceability: BACL Corp. *attests that all of the calibrations on the equipment items listed above were traceable to NIST or to another internationally recognized National Metrology Institute (NMI), and were compliant with the latest version of A2LA policy P102 "A2LA Policy on Metrological Traceability".*

7.7 Test Environmental Conditions

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

The testing was performed by Rita Yang from 2022-01-14 to 2022-01-20 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:

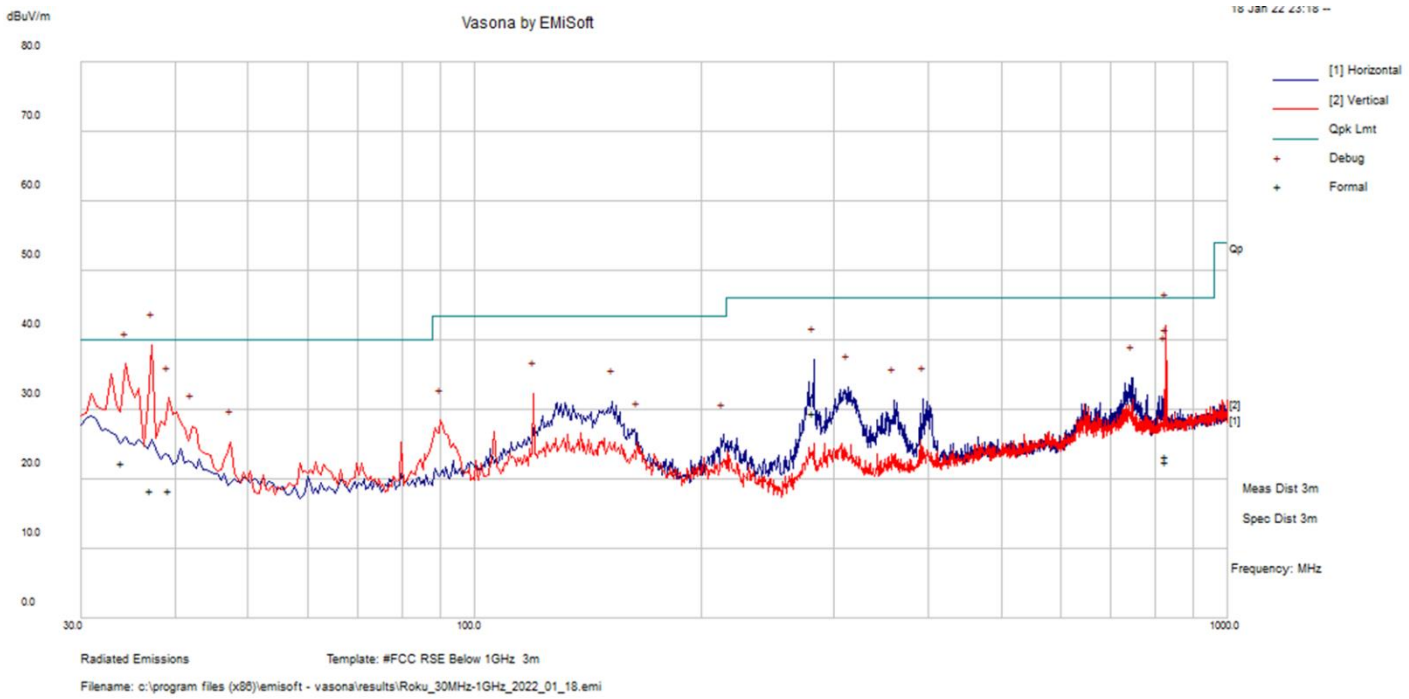
Mode: Transmitting			
Margin (dB)	**Frequency (MHz)**	**Polarization (Horizontal/Vertical)**	**Mode, Channel**
-0.32	5150	Vertical	802.11n/ac40, Antenna AB, 5190 MHz

7.9 Radiated Emissions Test Result Data

Note: Pre-scan was performed in order to determine worst-case orientation of device with respect to measurement antenna. Plots/data shown represent measurements made in worst-case orientation.

1) 30 MHz – 1 GHz Worst Case Scan at 3 Meters

802.11n/ac40, 5795 MHz, Antenna AB



Frequency (MHz)	S.A. Reading (dBµV)	Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Comment
37.20975	21.33	-3.26	18.28	220	H	173	40	-21.72	QP
34.011	23.05	-0.92	22.32	159	V	281	40	-17.68	QP
826.5545	18.91	2.6	23.25	105	H	188	46	-22.75	QP
39.239	23.03	-4.88	18.37	281	V	309	40	-21.63	QP
282.011	34.08	-5.57	29.44	148	H	19	46	-16.56	QP
829.1883	18.19	2.6	22.53	103	V	18	46	-23.47	QP

2) 1 – 18 GHz, 5.2 Band Edges measured at 3 meters, Harmonics & Emission Masks measured at 1 meter

5150 - 5250 MHz

802.11n/ac40 mode, Antenna AB

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	57.76	260	135	H	35.5	8.336	35.278	66.32	68	-1.68	Peak
5150	57.67	110	140	V	35.5	8.336	35.278	66.23	68	-1.77	Peak
5150	44.55	260	135	H	35.5	8.336	35.278	53.11	54	-0.89	Ave
5150	45.12	110	140	V	35.5	8.336	35.278	53.68	54	-0.32	Ave
10380	47.57	260	135	H	38.1	13.353	36.459	62.56	78	-15.44	Peak
10380	48.65	110	140	V	38.1	13.353	36.459	63.64	78	-14.36	Peak
15570	48.26	260	135	H	40.5	13.379	34.034	68.11	84	-15.90	Peak
15570	49.11	110	140	V	40.5	13.379	34.034	68.96	84	-15.05	Peak
15570	39.56	260	135	H	40.5	13.379	34.034	59.41	64	-4.59	Ave
15570	38.98	110	140	V	40.5	13.379	34.034	58.83	64	-5.18	Ave
High Channel (5230 MHz)											
10460	43.93	0	150	H	38.1	13.353	36.459	58.92	78	-19.08	Peak
10460	45.36	0	150	V	38.1	13.353	36.459	60.35	78	-17.65	Peak
15690	41.61	0	150	H	40.5	13.379	34.034	61.46	84	-22.55	Peak
15690	41.00	0	150	V	40.5	13.379	34.034	60.85	84	-23.16	Peak
15690	31.17	0	150	H	40.5	13.379	34.034	51.02	64	-12.99	Ave
15690	32.39	0	150	V	40.5	13.379	34.034	52.24	64	-11.77	Ave

5150 - 5250 MHz

802.11ac80 mode, Antenna AB

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)	
5210MHz											
5150	56.89	265	140	H	35.5	8.336	35.278	65.45	68	-2.55	Peak
5150	59.09	120	140	V	35.5	8.336	35.278	67.65	68	-0.35	Peak
5150	42.68	265	140	H	35.5	8.336	35.278	51.24	54	-2.76	Ave
5150	45.01	120	140	V	35.5	8.336	35.278	53.57	54	-0.43	Ave
10420	47.16	265	140	H	38.1	13.353	36.459	62.15	78	-15.85	Peak
10420	47.08	120	140	V	38.1	13.353	36.459	62.07	78	-15.93	Peak
15630	48.38	265	140	H	40.5	13.379	34.284	67.98	84	-16.03	Peak
15630	47.51	120	140	V	40.5	13.379	34.284	67.11	84	-16.90	Peak
15630	37.91	265	140	H	40.5	13.379	34.284	57.51	64	-6.50	Ave
15630	38.65	120	140	V	40.5	13.379	34.284	58.25	64	-5.75	Ave

5725 - 5850 MHz

802.11n/ac40 mode, Antenna AB

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	28.12	250	140	V	35.30	9.47	0.00	72.89	78.20	-5.31	Peak
5650-5700	35.29	250	140	V	35.30	9.47	0.00	80.06	111.47	-31.41	Peak
5700-5720	43.11	250	140	V	35.30	9.47	0.00	87.88	120.77	-32.89	Peak
5720-5725	46.11	250	140	V	35.30	9.47	0.00	90.88	127.22	-36.34	Peak
5625-5650	27.90	270	140	H	35.30	9.47	0.00	72.67	78.20	-5.53	Peak
5650-5700	33.59	270	140	H	35.30	9.47	0.00	78.36	114.86	-36.50	Peak
5700-5720	40.77	270	140	H	35.30	9.47	0.00	85.54	120.79	-35.25	Peak
5720-5725	44.57	270	140	H	35.30	9.47	0.00	89.34	126.89	-37.55	Peak
11510	48.43	270	140	H	38.7	13.88	35.504	65.51	84	-18.49	Peak
11510	46.87	250	140	V	38.7	13.88	35.504	63.95	84	-20.05	Peak
11510	39.03	270	140	H	38.7	13.88	35.504	56.11	64	-7.89	Ave
11510	36.63	250	140	V	38.7	13.88	35.504	53.71	64	-10.29	Ave
17265	47.93	270	140	H	41.8	12.936	33.306	69.36	78	-8.64	Peak
17265	48.16	250	140	V	41.8	12.936	33.306	69.59	78	-8.41	Peak
High Channel: 5795 MHz											
5850-5855	34.30	260	140	V	35.60	9.47	0.00	79.37	131.17	-51.80	Peak
5855-5875	32.67	260	140	V	35.60	9.47	0.00	77.74	120.10	-42.36	Peak
5875-5925	28.97	260	140	V	35.60	9.47	0.00	74.04	113.69	-39.65	Peak
5925-5950	28.14	260	140	V	35.80	9.47	0.00	73.41	78.20	-4.79	Peak
5850-5855	34.57	100	120	H	35.60	9.47	0.00	79.64	132.23	-52.59	Peak
5855-5875	32.51	100	120	H	35.60	9.47	0.00	77.58	120.05	-42.48	Peak
5875-5925	29.51	100	120	H	35.60	9.47	0.00	74.58	113.62	-39.05	Peak
5925-5950	28.75	100	120	H	35.80	9.47	0.00	74.02	78.20	-4.18	Peak
11590	48.28	100	120	H	38.9	13.88	35.35	65.71	84	-12.29	Peak
11590	46.62	260	140	V	38.9	13.88	35.35	64.05	84	-13.95	Peak
11590	38.14	100	120	H	38.9	13.88	35.35	55.57	64	-8.43	Ave
11590	36.44	260	140	V	38.9	13.88	35.35	53.87	64	-10.13	Ave
17385	48.26	100	120	H	41.8	12.936	33.005	69.99	78	-8.01	Peak
17385	48.43	260	140	V	41.8	12.936	33.005	70.16	78	-7.84	Peak

5725 - 5850 MHz

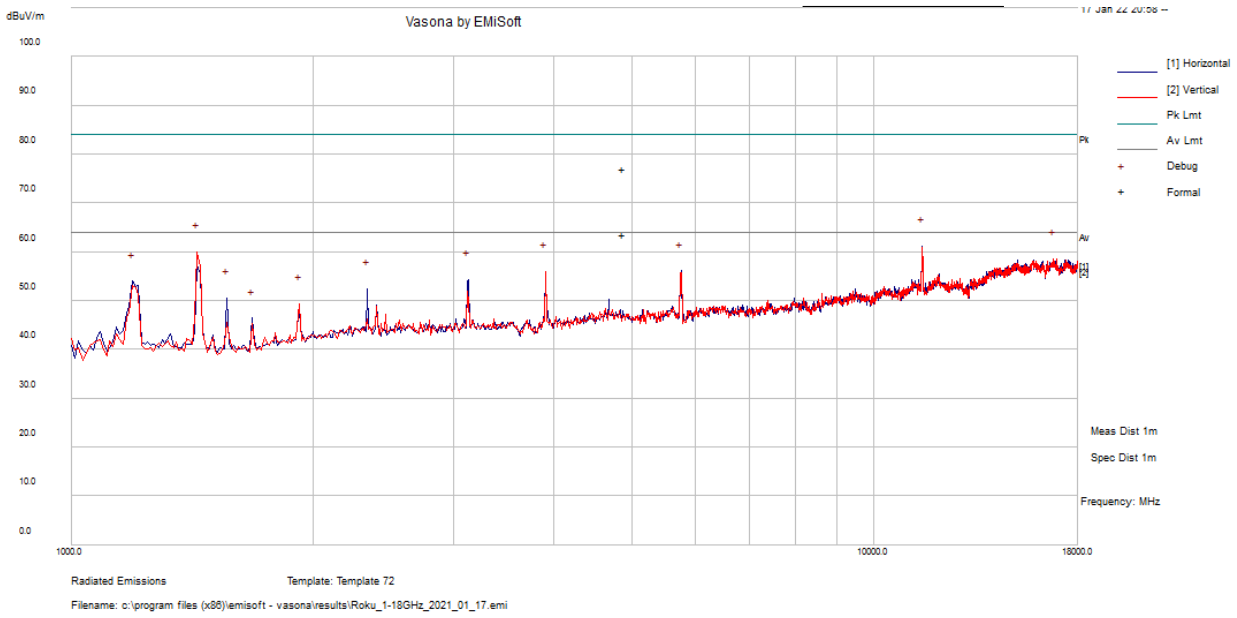
802.11ac80 mode, Antenna AB

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)	
5775 MHz											
5625-5650	29.71	170	120	V	35.30	9.47	0.00	74.48	78.20	-3.72	Peak
5650-5700	39.62	170	120	V	35.30	9.47	0.00	84.39	113.75	-29.36	Peak
5700-5720	43.80	170	120	V	35.30	9.47	0.00	88.57	120.33	-31.76	Peak
5720-5725	44.38	170	120	V	35.30	9.47	0.00	89.15	130.62	-41.47	Peak
5625-5650	28.85	280	130	H	35.30	9.47	0.00	73.62	78.20	-4.58	Peak
5650-5700	37.17	280	130	H	35.30	9.47	0.00	81.94	113.81	-31.87	Peak
5700-5720	42.45	280	130	H	35.30	9.47	0.00	87.22	120.28	-33.06	Peak
5720-5725	44.60	280	130	H	35.30	9.47	0.00	89.37	131.83	-42.46	Peak
5850-5855	44.26	170	120	V	35.60	9.47	0.00	89.33	130.67	-41.34	Peak
5855-5875	40.55	170	120	V	35.60	9.47	0.00	85.62	120.79	-35.17	Peak
5875-5925	45.86	170	120	V	35.60	9.47	0.00	90.93	113.81	-22.88	Peak
5925-5950	29.31	170	120	V	35.80	9.47	0.00	74.58	78.20	-3.62	Peak
5850-5855	41.72	280	150	H	35.60	9.47	0.00	86.79	131.24	-44.45	Peak
5855-5875	38.05	280	150	H	35.60	9.47	0.00	83.12	119.59	-36.47	Peak
5875-5925	34.28	280	150	H	35.60	9.47	0.00	79.35	110.05	-30.70	Peak
5925-5950	30.22	280	150	H	35.80	9.47	0.00	75.49	78.20	-2.71	Peak
11550	45.92	280	150	H	38.7	13.88	35.35	63.15	84	-20.85	Peak
11550	44.84	170	120	V	38.7	13.88	35.35	62.07	84	-21.93	Peak
11550	36.12	280	150	H	38.7	13.88	35.35	53.35	64	-10.65	Ave
11550	36.38	170	120	V	38.7	13.88	35.35	53.61	64	-10.39	Ave
17325	48.24	280	150	H	41.8	12.936	33.005	69.97	78	-8.03	Peak
17325	48.2	170	120	V	41.8	12.936	33.005	69.93	78	-8.07	Peak

Note: For harmonics outside of restricted bands, only 15.407(b) spurious emission limit was applied (i.e. -27 dBm [78dBµV/m at 1meter and 68dBµV/m at 3meters]).
Note: For 5.2 GHz band edge, stricter 15.407(b) spurious emission limit (i.e. -27 dBm [68dBµV/m at 3meters]) was used for peak measurement to show compliance.

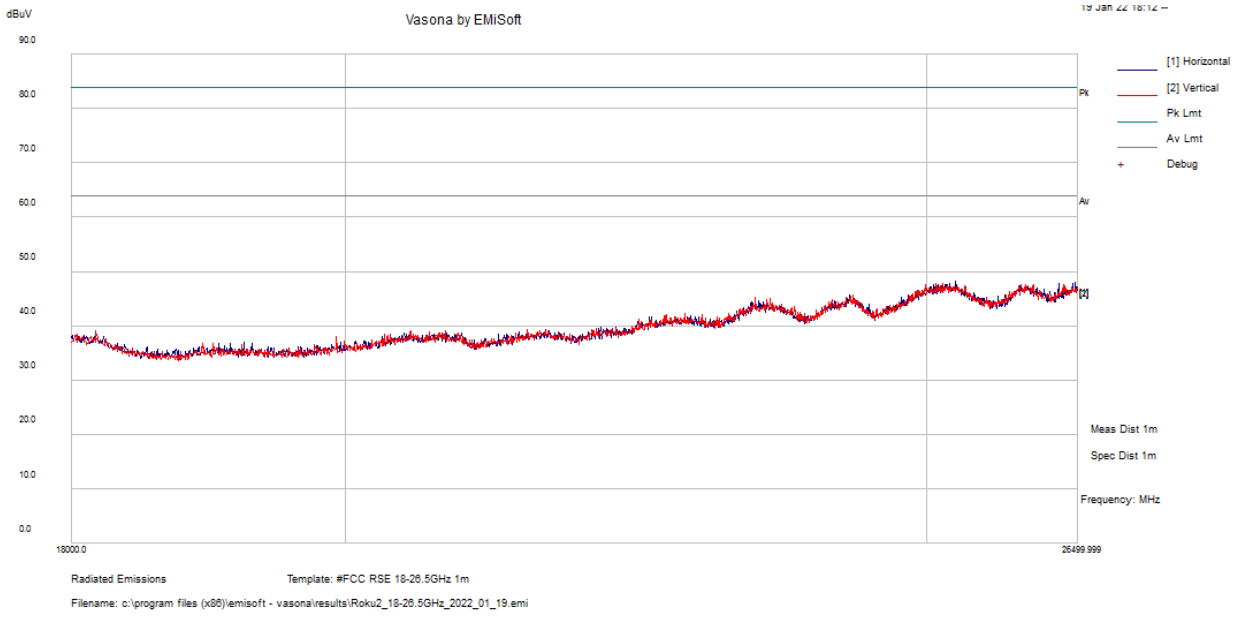
3) 1GHz to 18 GHz Worst Case Scan at 1 Meter

Worst Case: 802.11n/ac40, 5795 MHz, Antenna AB



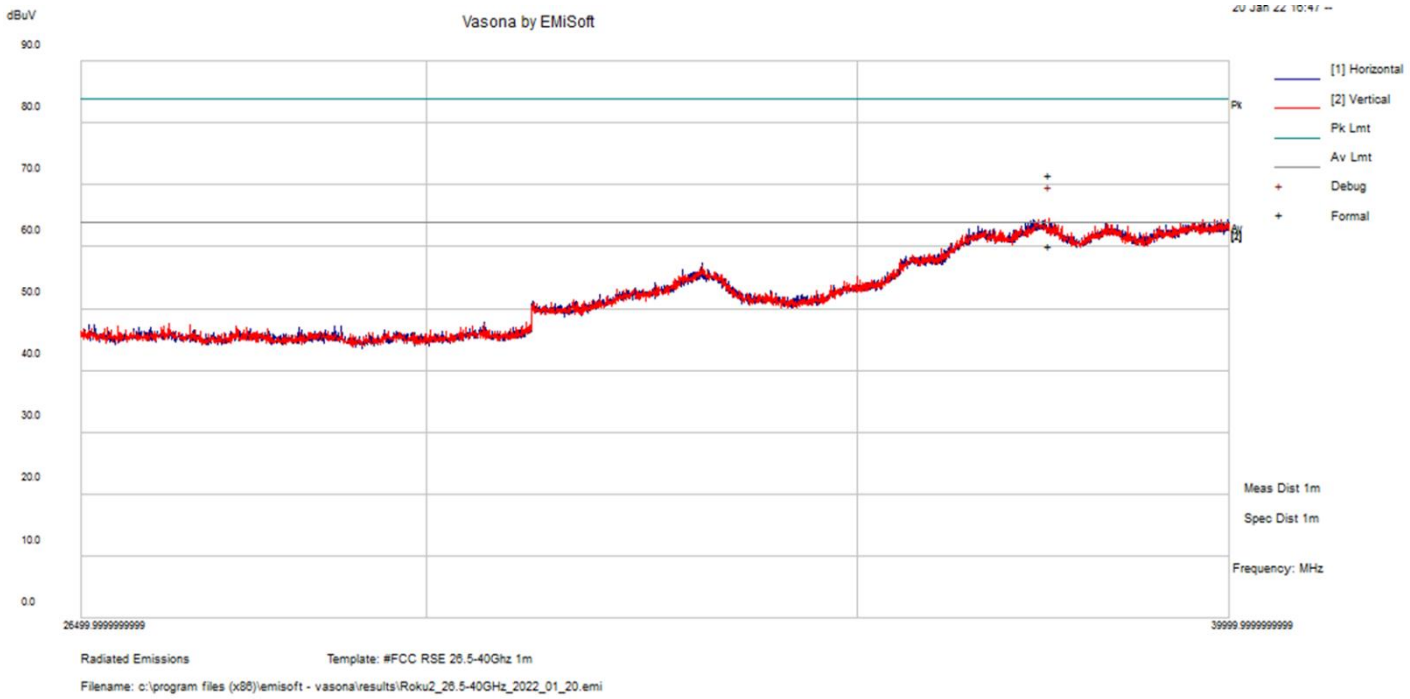
4) 18 – 26.5 GHz Worst Case Scan at 1 Meter

Worst Case: 802.11n/ac40, 5795 MHz, Antenna AB



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

Worst Case: 802.11n/ac40, 5795 MHz, Antenna AB



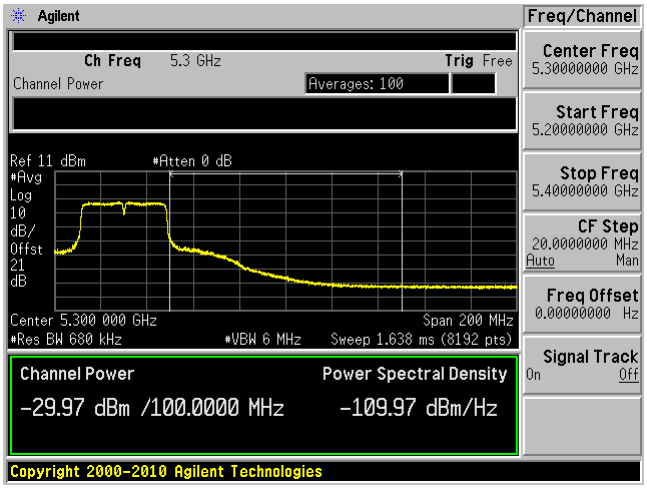
Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Comment
37497.36	54.77	2.7	71.58	108	V	189	84	-12.42	Peak
37497.36	43.33	2.7	60.13	108	V	189	64	-3.87	Ave

ISEDC Emission falling into 5250 – 5350 MHz

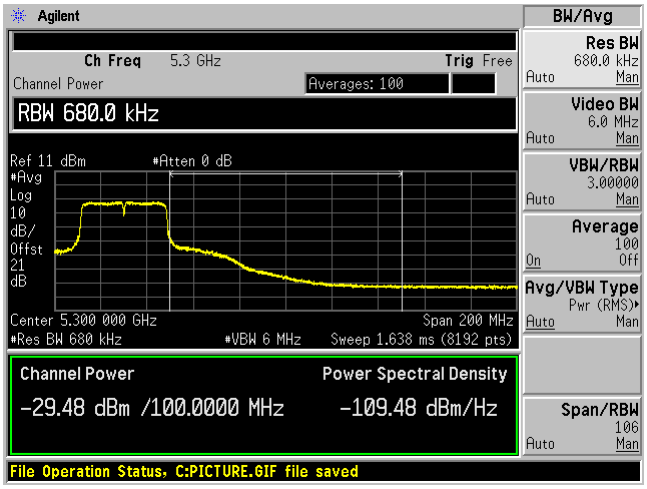
Channel	Frequency (MHz)	Conducted Output Power (dBm)		Conducted Emission Power (dBm)		Delta (dB)		Limit (dB)
		ANT A	ANT A	ANT A	ANT B	ANT A	ANT B	
802.11n/ac40								
46	5230	8.12	9.2	-29.97	-29.48	38.09	38.68	>26
802.11ac80								
42	5210	8.67	9.42	-27.26	-26.91	35.93	36.33	>26

Note: please refer to section 9.6 for the output power result.

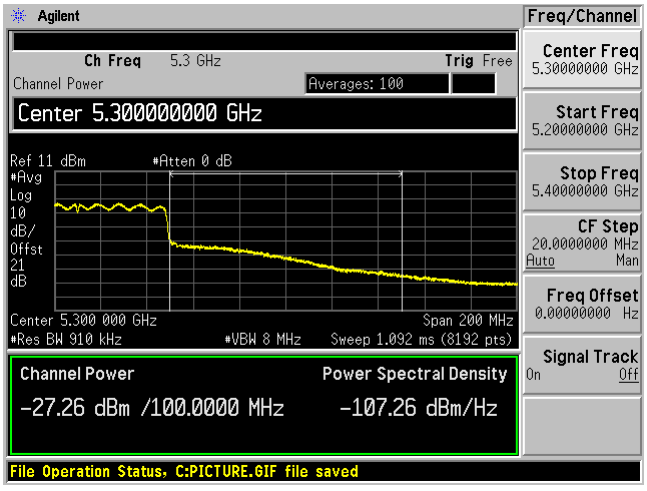
5230MHz Antenna A



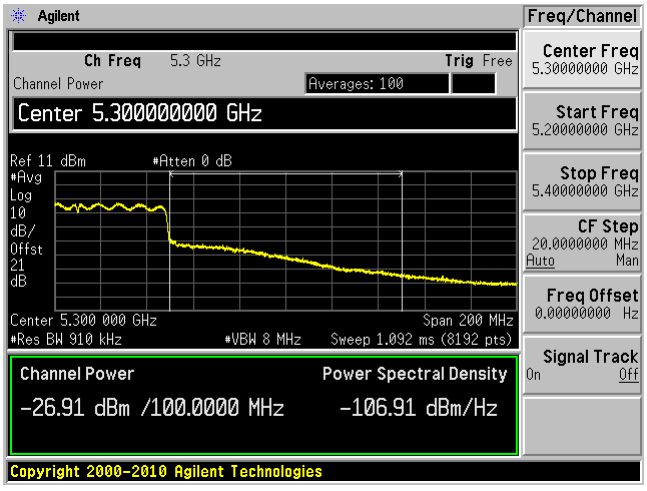
5230MHz Antenna B



5210MHz Antenna A



5210MHz Antenna B



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

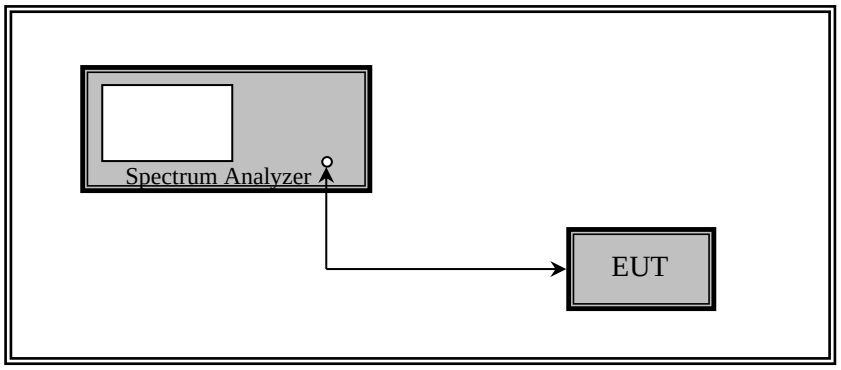
8.1 Applicable Standards

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

BACL Number	Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
624	Agilent	Spectrum Analyzer	E4446A	US44300386	2021-04-27	1 year
-	-	RF cable	-	-	Each time[1]	N/A
-	-	20 dB attenuator	-	-	Each time[1]	N/A
-	-	30 dB attenuator	-	-	Each time[1]	N/A

Note[1]: cable 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".*

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 2022-01-12 to 2021-01-15 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)
802.11n/ac40 mode			
38	5190	36.4797	49.081
46	5230	36.4238	53.626
802.11ac80 mode			
42	5210	75.6624	90.956

Ant B

Channel	Frequency (MHz)	99% OBW (MHz)	26 dB OBW (MHz)
802.11n/ac40 mode			
38	5190	36.4696	49.058
46	5230	36.8815	56.107
802.11ac80 mode			
42	5210	75.7101	89.964

5725 - 5850MHz

Ant A

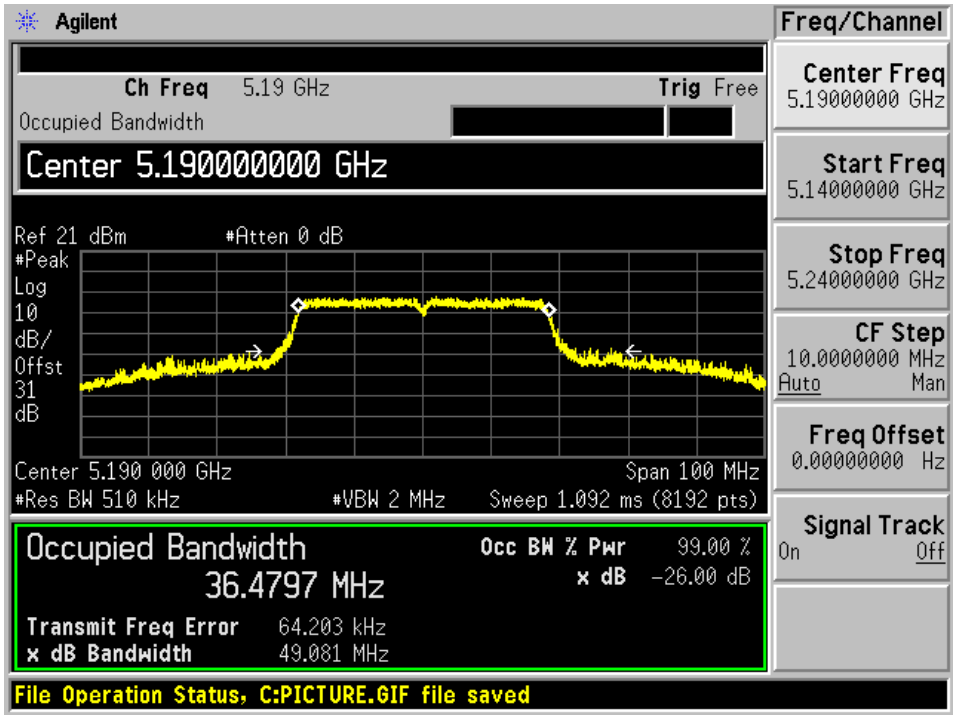
Channel	Frequency (MHz)	99% OBW (MHz)	6 dB OBW (MHz)	Limit (≥500kHz)
802.11n/ac40 mode				
151	5755	38.5726	35.182	Pass
159	5795	37.0754	35.812	Pass
802.11ac80 mode				
155	5775	76.1587	73.972	Pass

Ant B

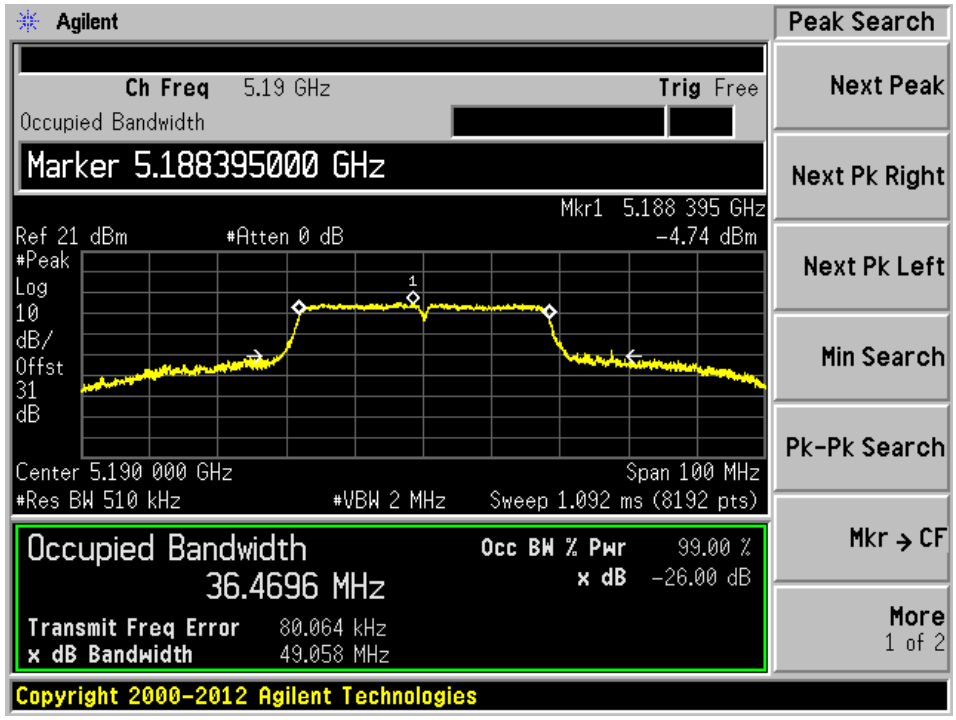
Channel	Frequency (MHz)	99% OBW (MHz)	6 dB OBW (MHz)	Limit (≥500kHz)
802.11n/ac40 mode				
151	5755	37.2669	35.794	Pass
159	5795	37.2730	35.477	Pass
802.11ac80 mode				
155	5775	76.1335	75.169	Pass

5150 - 5250 MHz, 802.11 n/ac40 Mode, 99% & 26dB OBW

5190MHz, Ant A

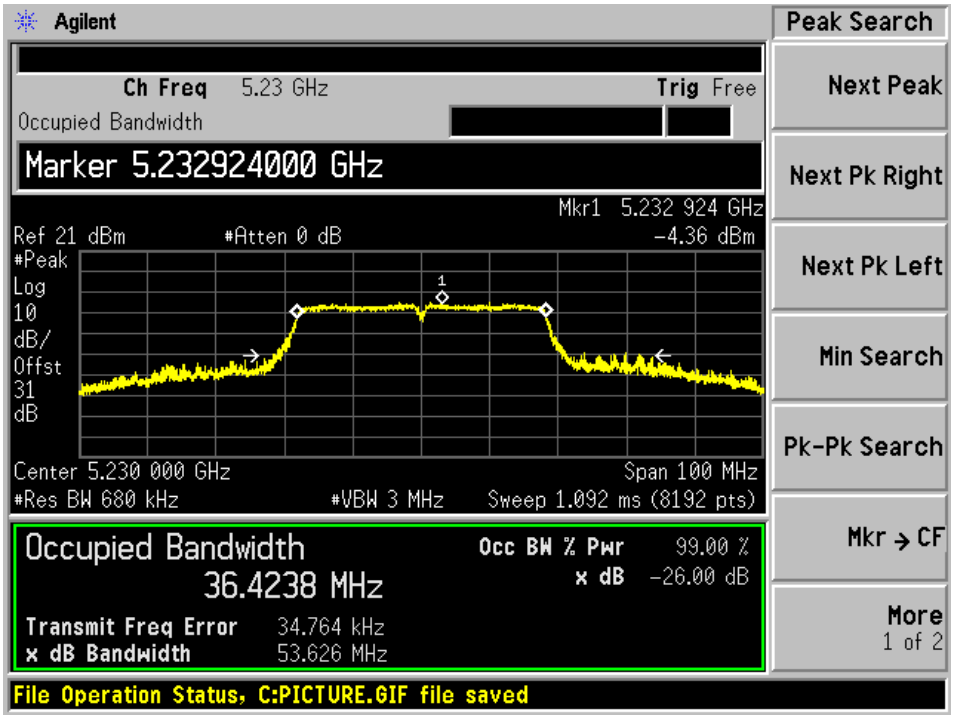


5190MHz, Ant B

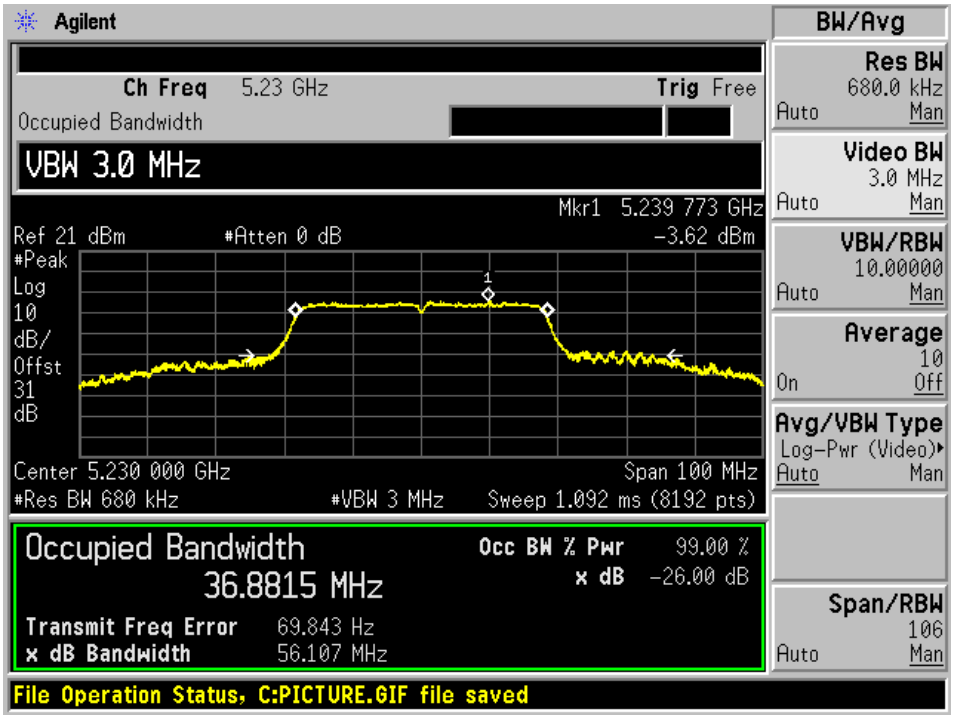


5150 - 5250 MHz, 802.11 n/ac40 Mode, 99% & 26dB OBW

5230MHz, Ant A

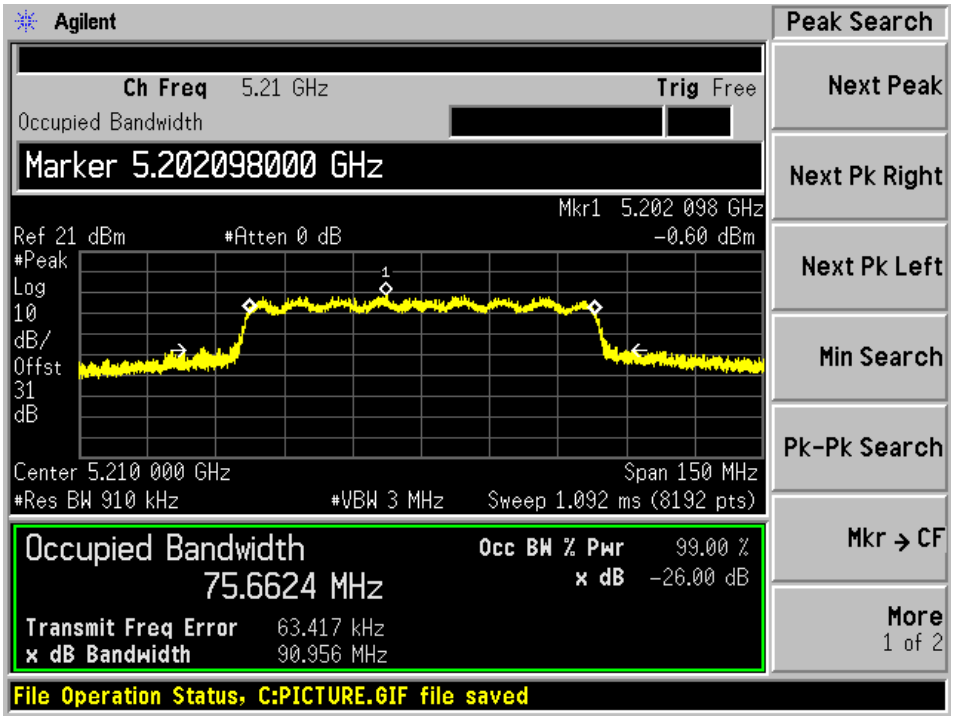


5230MHz, Ant B

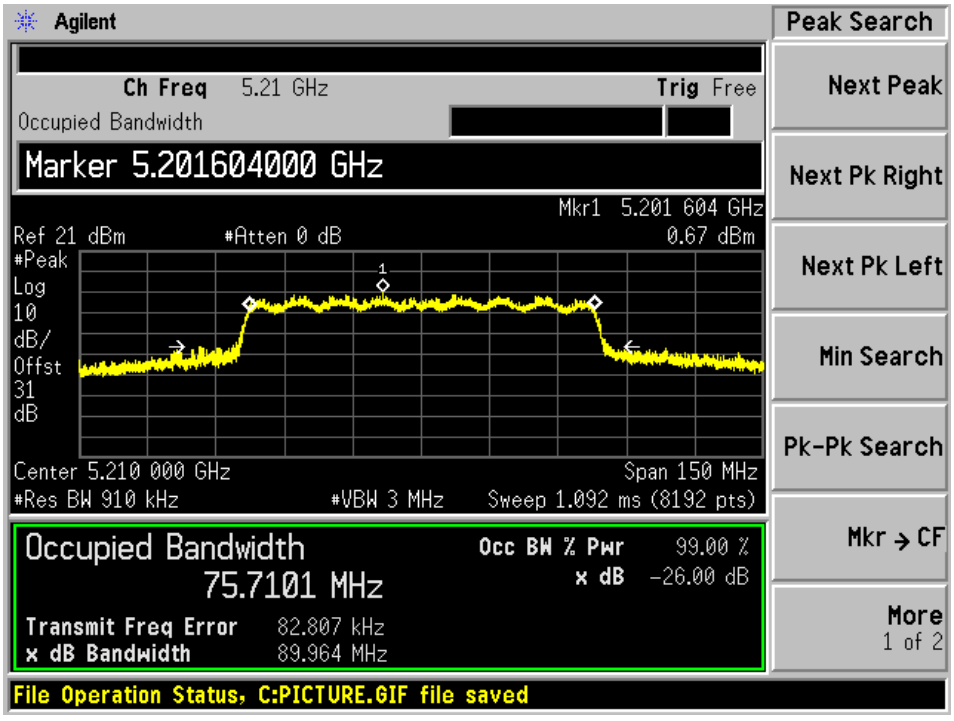


5150 - 5250 MHz, 802.11 ac80 Mode, 99% & 26dB OBW

5210MHz, Ant A

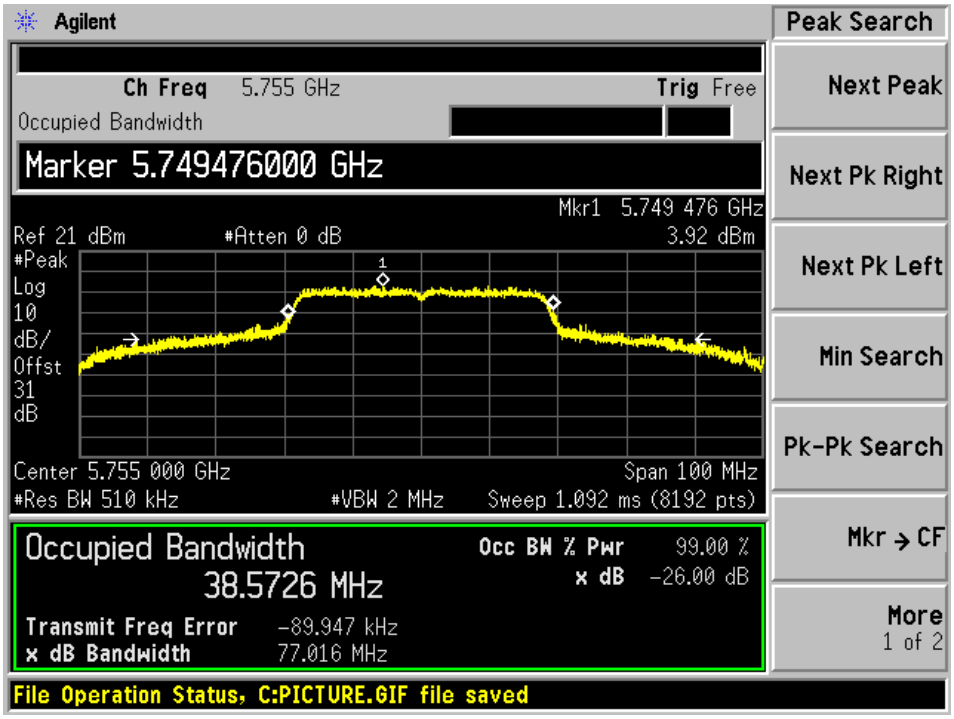


5210MHz, Ant B

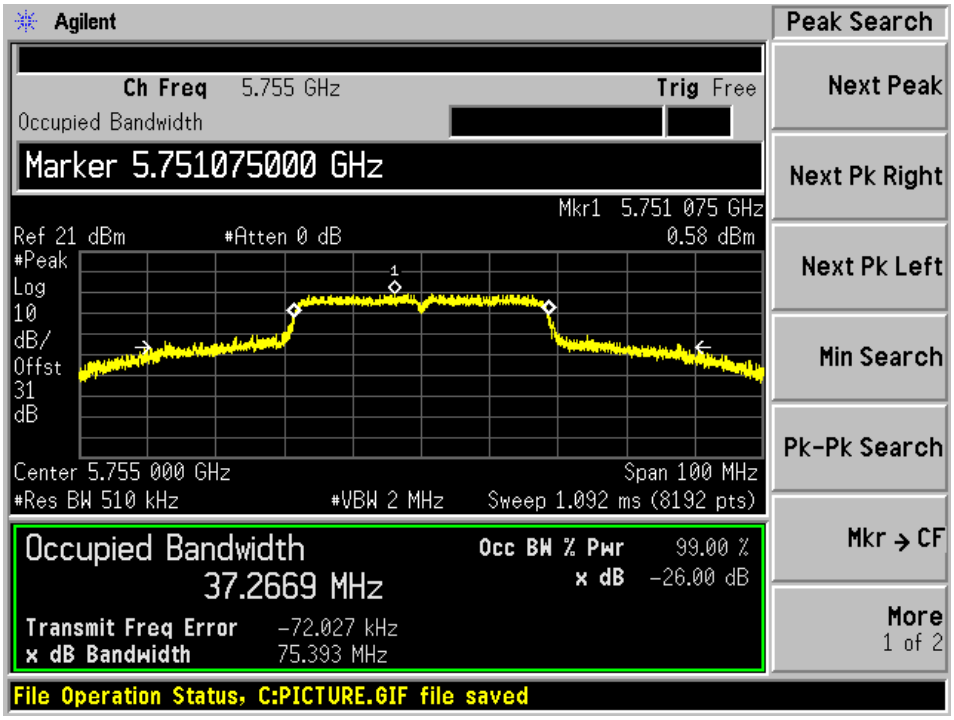


5725 - 5850 MHz, 802.11 n/ac40, 99% OBW

5755MHz, Ant A

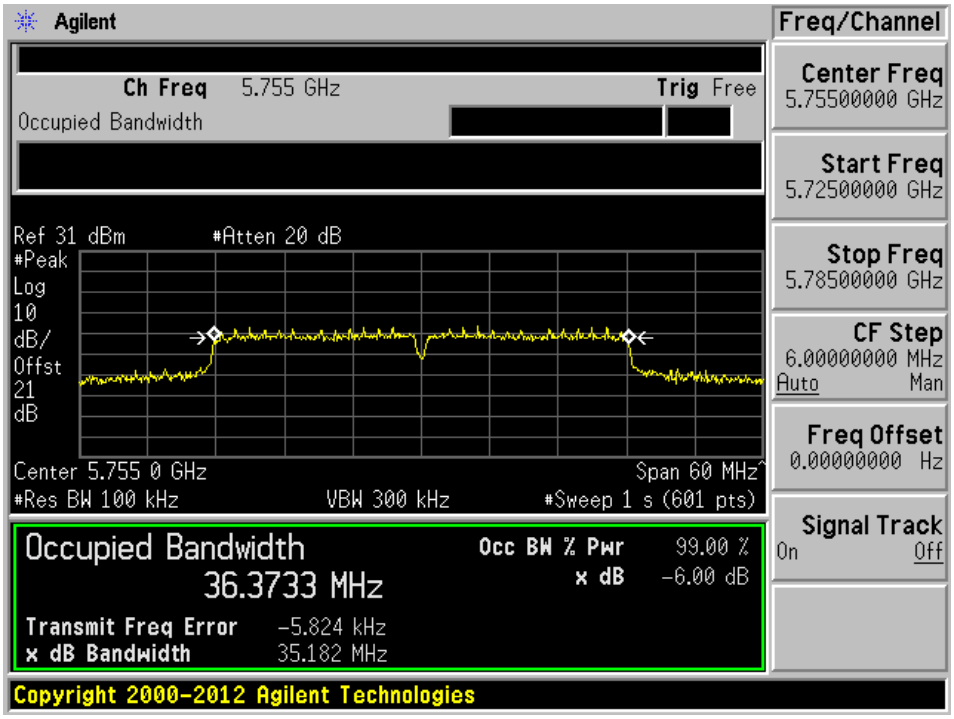


5755MHz, Ant B

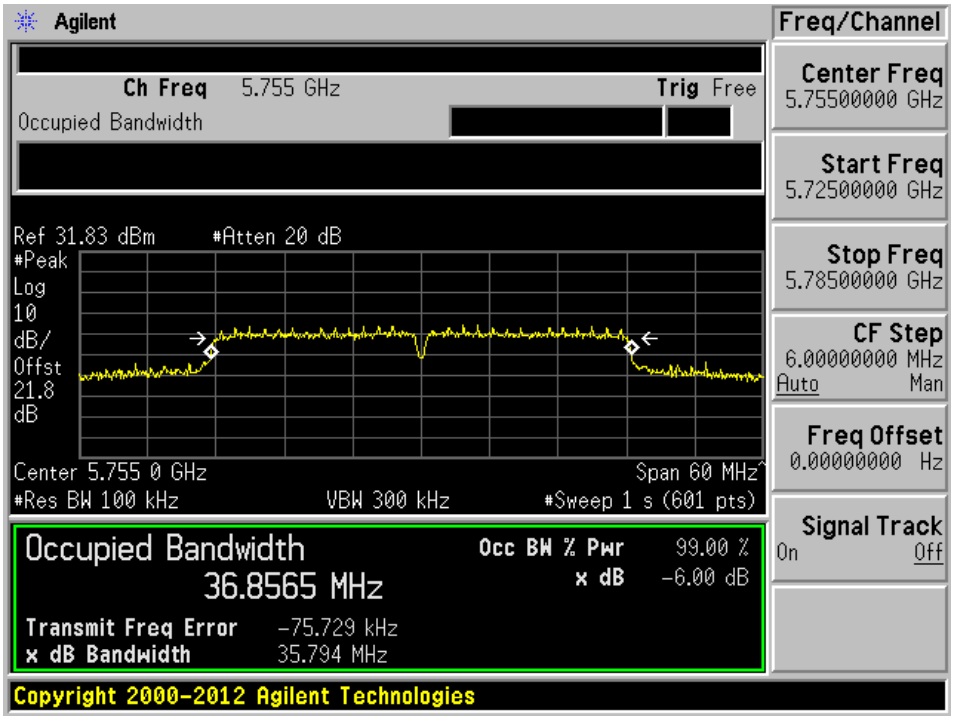


5725 - 5850 MHz, 802.11 n/ac40, 6dB OBW

5755MHz, Ant A

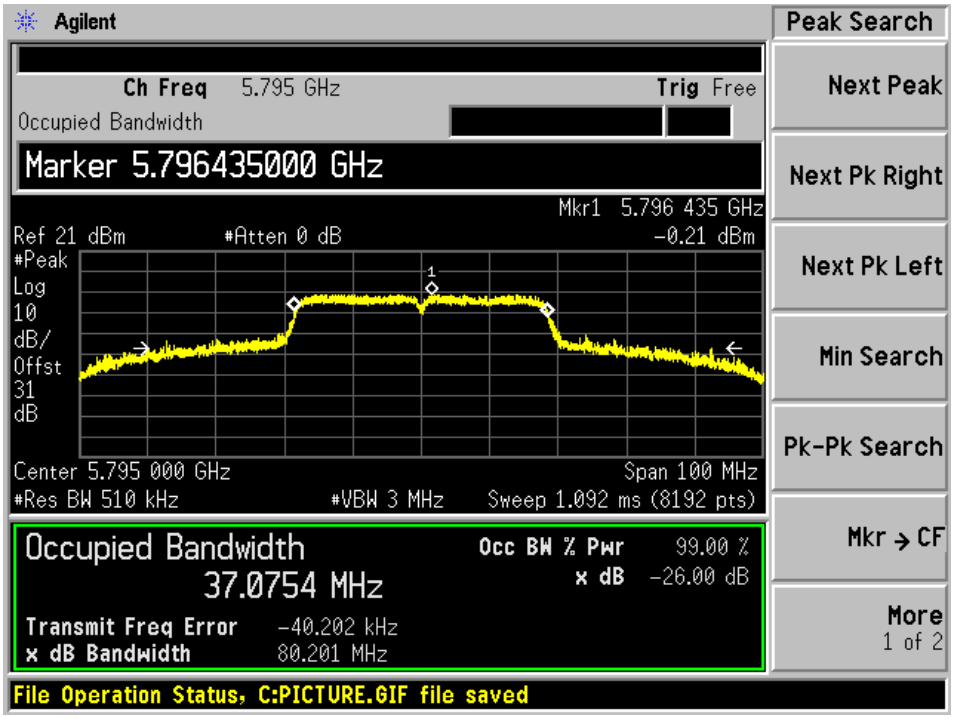


5755MHz, Ant B

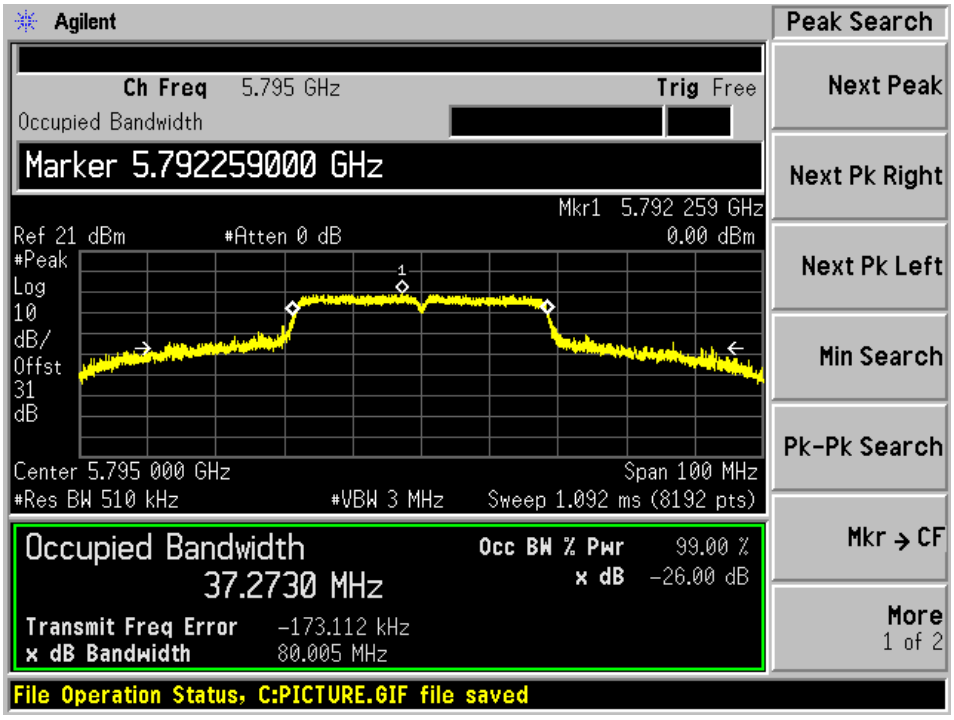


5725 - 5850 MHz, 802.11 n/ac40 Mode, 99% OBW

5795MHz, Ant A

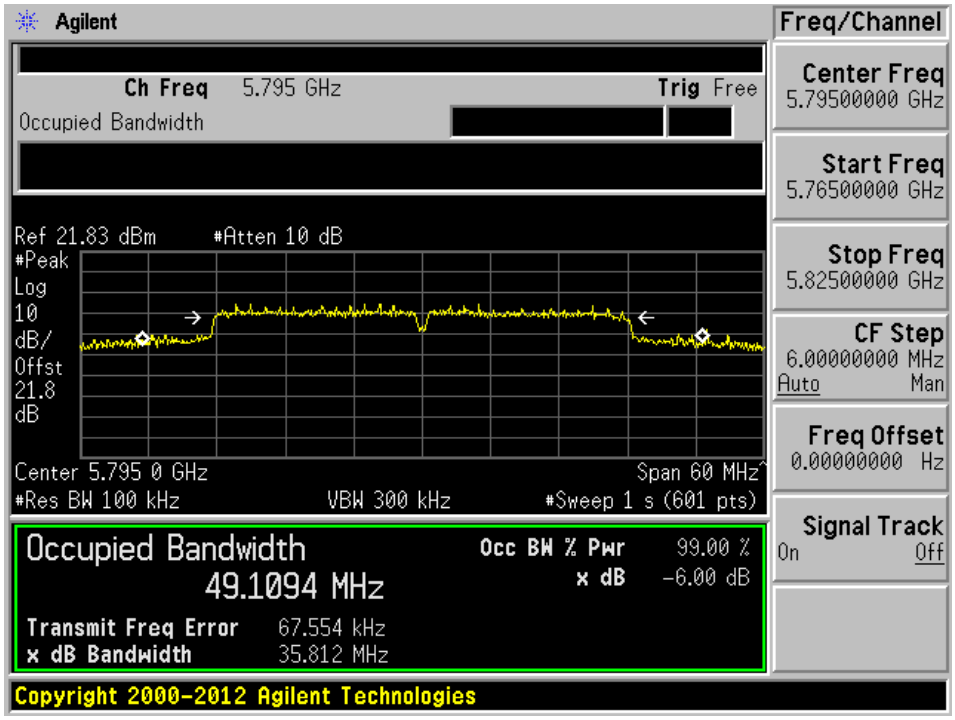


5795MHz, Ant B

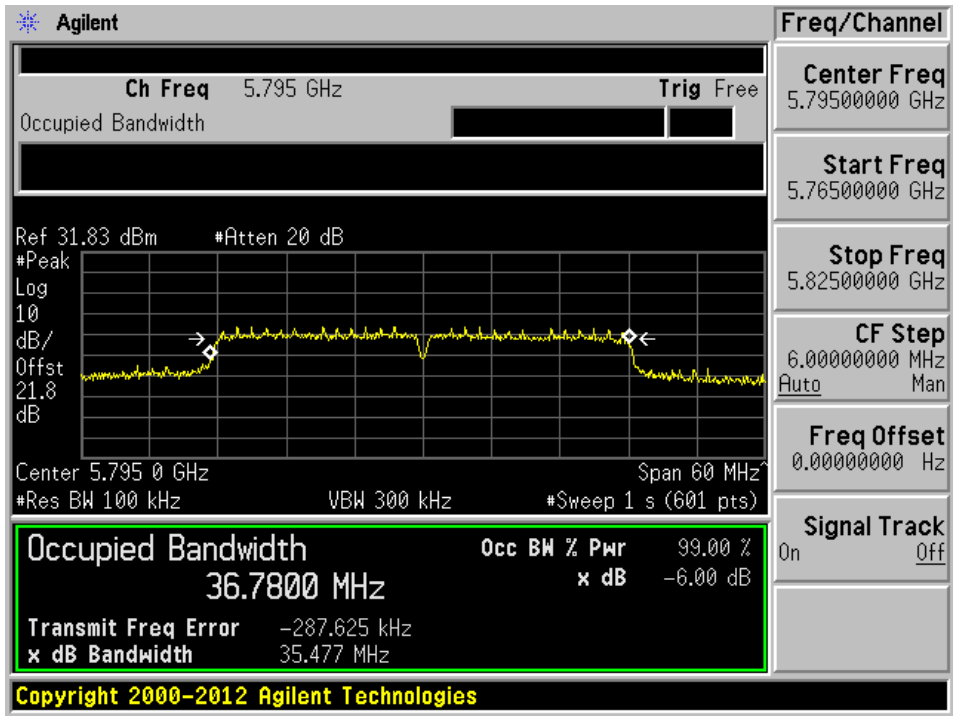


5725 - 5850 MHz, 802.11 n/ac40, Mode 6dB OBW

5795MHz, Ant A

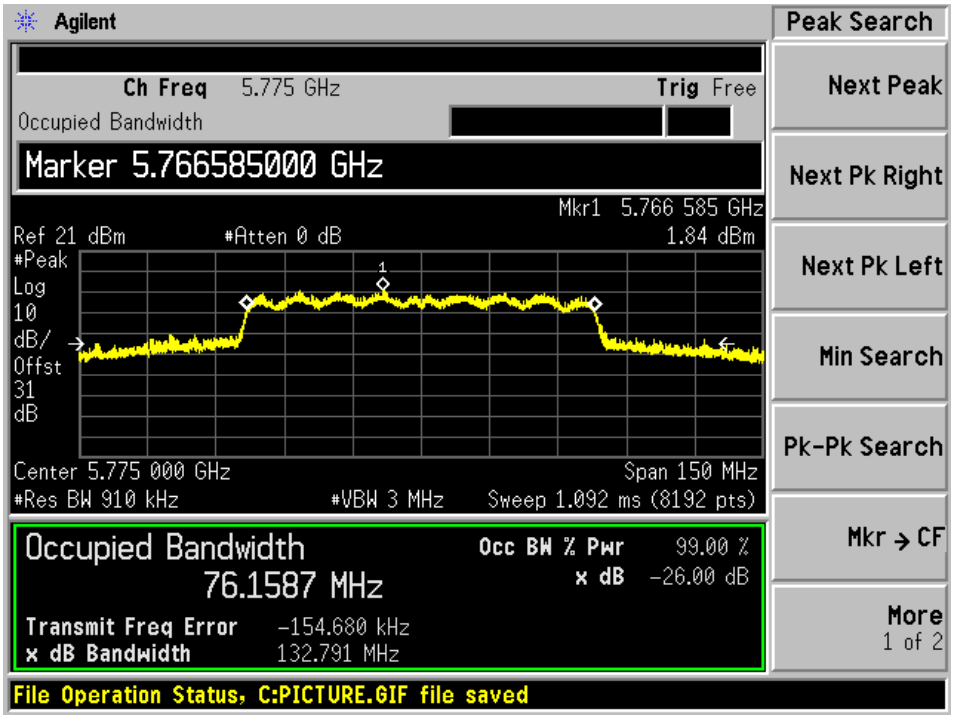


5795MHz, Ant B

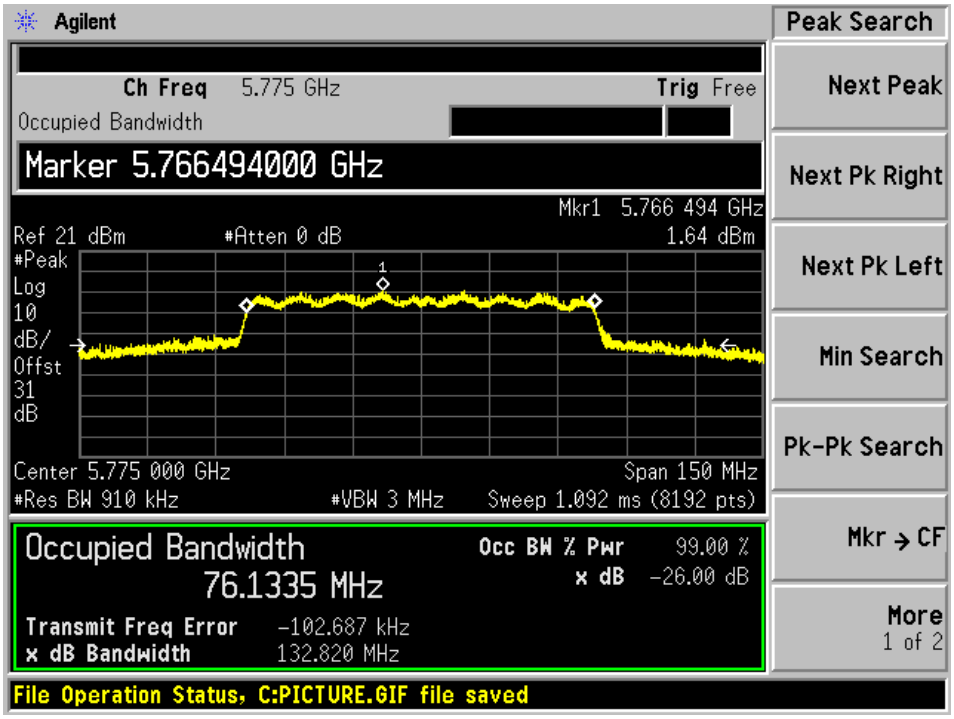


5725 - 5850 MHz, 802.11 ac80, Mode 99% OBW

5775MHz, Ant A

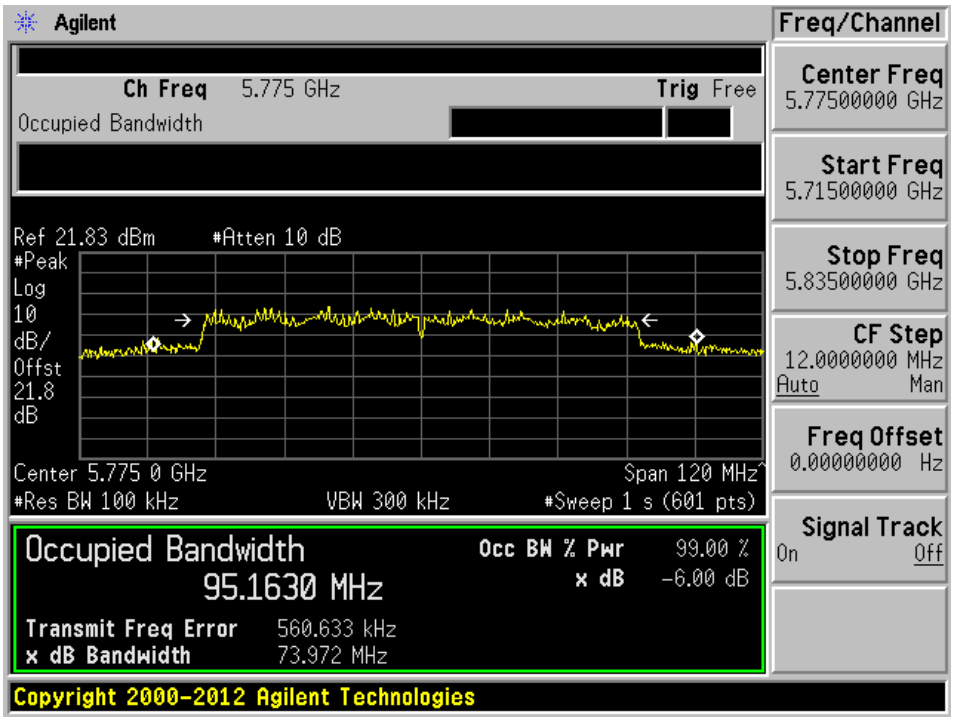


5775MHz, Ant B

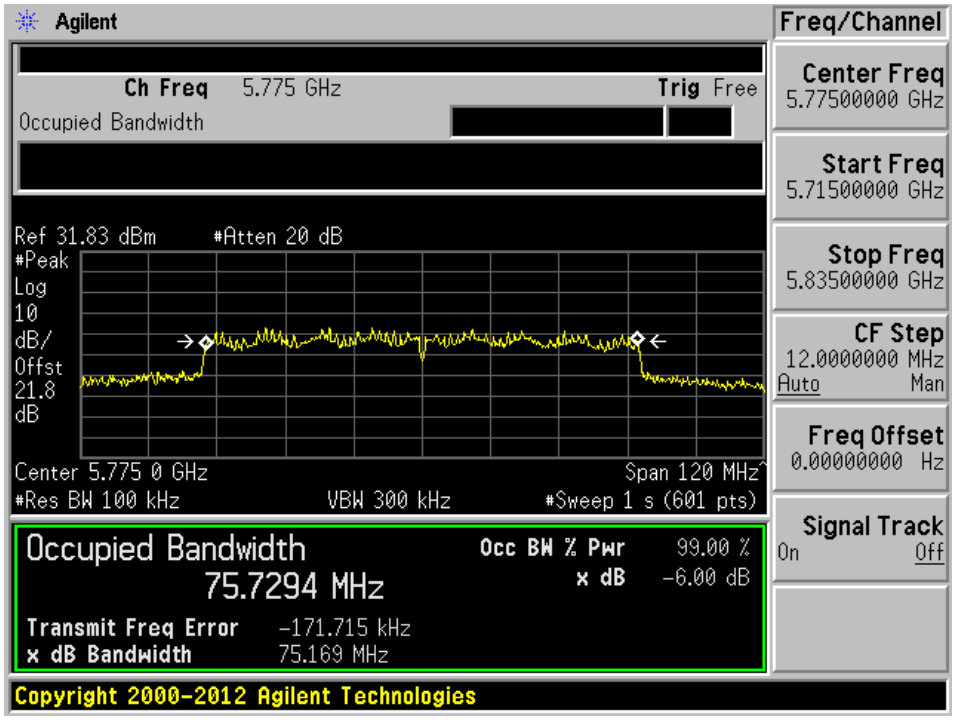


5725 - 5850 MHz, 802.11 ac80 Mode, 6dB OBW

5775MHz, Ant A



5775MHz, Ant B



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.

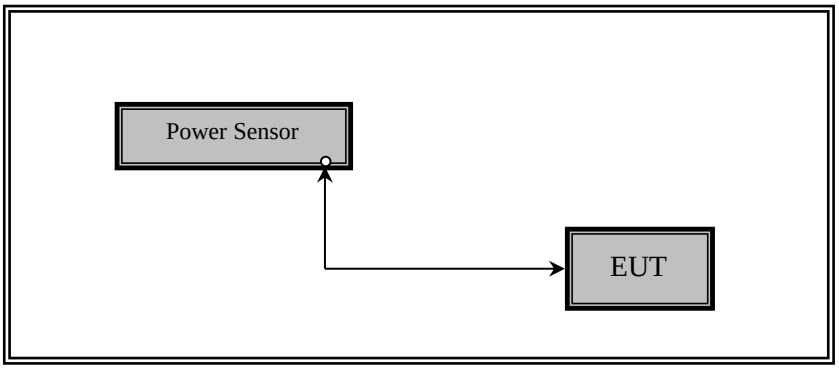
According to ISEDC RSS-247 §6.2.4 for frequency band 5725-5850 MHz:

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

BACL Number	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
697	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		
802.11n/ac40 mode					
38	5190	8.98	9.12	12.06	< 22.2
46	5230	8.12	9.2	11.70	< 22.2
802.11ac80 mode					
42	5210	8.67	9.42	12.07	< 22.2

*Note: Total power (dBm) =10*Log(10^(Ant A [dBm]/10)+ 10^(Ant B [dBm]/10))*
*Note: Directional Gain=4.8+10*Log(Nant)=7.8dBi > 6dBi*
Note: Limit=24dBm-(Directional Gain-6dBi) =22.2dBm;

IC Results

Channel	Frequency (MHz)	Conducted Output Power (dBm)		Total EIRP (dBm)	IC Limit (dBm)
		ANT A	ANT B		
802.11n/ac40 mode					
38	5190	8.98	9.12	19.86	< 23
46	5230	8.12	9.2	19.50	< 23
802.11ac80 mode					
42	5210	8.67	9.42	19.87	< 23

*Note: Total EIRP (dBm) =10*Log(10^(Ant A dBm/10)+ 10^(Ant B dBm/10)) + Directional Gain (dBi)*
*Note: Directional Gain=4.8+10*Log(Nant)=7.8dBi*

5725MHz-5850MHz

FCC/IC Results

Channel	Frequency (MHz)	Conducted Output Power (dBm)		Total Power (dBm)	FCC/IC Limit (dBm)
		ANT A	ANT B		
802.11n/ac40 mode					
151	5755	10.06	9.84	12.96	< 28.2
159	5795	10.1	9.61	12.87	< 28.2
802.11ac80 mode					
155	5775	9.83	9.55	12.70	< 28.2

*Note: Total power (dBm) =10*Log(10^(Ant A [dBm]/10)+ 10^(Ant B [dBm]/10))*
*Note: Directional Gain=4.8+10*Log(Nant)=7.8dBi > 6dBi*
Note: Limit=30dBm-(Directional Gain-6dBi) = 28.2 dBm

Note: Duty cycle correction factor has already been added to the measurements
Note: Antenna gain 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.

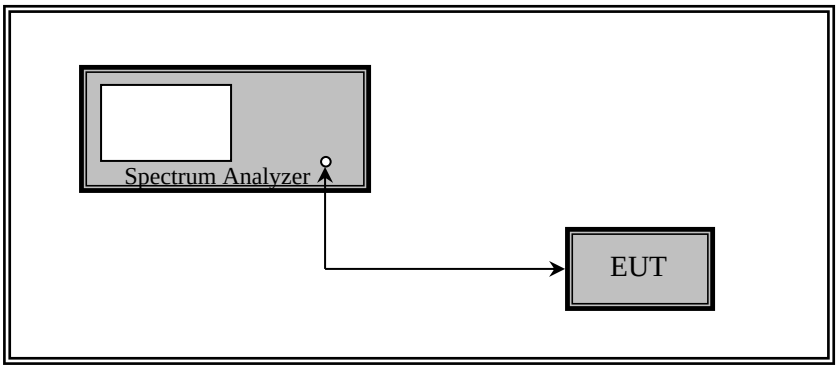
According to ISEDC RSS-247 §6.2.4 for frequency band 5725-5850 MHz:

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) Use peak search function on instrucment to find the peak of the spectrum
(x) Add Duty Cycle Correction Factor to the peak of the spectrum

10.3 Test Setup Block Diagram



10.4 Test Equipment List and Details

BACL Number	Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
624	Agilent	Spectrum Analyzer	E4446A	MY48250238	2021-06-23	1 year
-	-	RF cable	-	-	Each time[1]	N/A
-	-	30 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 2022-01-14 to 2022-01-20 in RF site.

10.6 Test Results

5150 - 5250 MHz

FCC result:

Channel	Frequency (MHz)	PSD (dBm/MHz)		DCCF (dB)	Total Corrected PSD (dBm/MHz)	FCC Limit (dBm/MHz)
		ANT A	ANT B			
802.11n/ac40 mode						
38	5190	-9.759	-10.571	0.83	-6.31	< 15.2
46	5230	-9.542	-10.386	0.83	-6.10	< 15.2
802.11ac80 mode						
42	5210	-12.866	-11.614	1.15	-8.03	< 15.2

*Note: Total Corrected PSD (dBm/MHz) =10*Log(10^(Ant A[dBm/MHz]/10)+ 10^(Ant B [dBm/MHz]/10))+ DCCF (dB)*
*Note: Directional Gain=4.8+10*Log(Nant)=7.8dBi>6dBi*
Note: Limit=17dBm/MHz-(Directional Gain-6dBi) =15.2dBm/MHz

IC result:

Channel	Frequency (MHz)	PSD (dBm/MHz)		DCCF (dB)	Total Corrected EIRP PSD (dBm/MHz)	IC Limit (dBm/MHz)
		ANT A	ANT B			
802.11n/ac40 mode						
38	5190	-9.759	-10.571	0.83	1.49	< 10
46	5230	-9.542	-10.386	0.83	1.70	< 10
802.11ac80 mode						
42	5210	-12.866	-11.614	1.15	-0.23	< 10

*Note: Total Corrected EIRP PSD (dBm/MHz) =10*Log(10^(Ant A[dBm/MHz]/10)+ 10^(Ant B [dBm/MHz]/10)) + Directional Gain (dBi) + DCCF (dB)*
*Note: Directional Gain=4.8+10*Log(Nant)=7.8dBi*

5725MHz – 5850MHz

FCC/IC result:

Channel	Frequency (MHz)	PSD (dBm/100kHz)		DCCF (dB)	Total PSD (dBm/100kHz)	Total Corrected PSD (dBm/500kHz)	FCC/IC Limit (dBm/500kHz)
		ANT A	ANT B				
802.11n/ac40 mode							
151	5755	-16.184	-16.956	0.83	-12.71	-5.72	< 28.2
159	5795	-18.156	-17.107	0.83	-13.76	-6.77	< 28.2
802.11ac80 mode							
155	5775	-19.037	-18.919	1.15	-14.82	-7.83	< 28.2

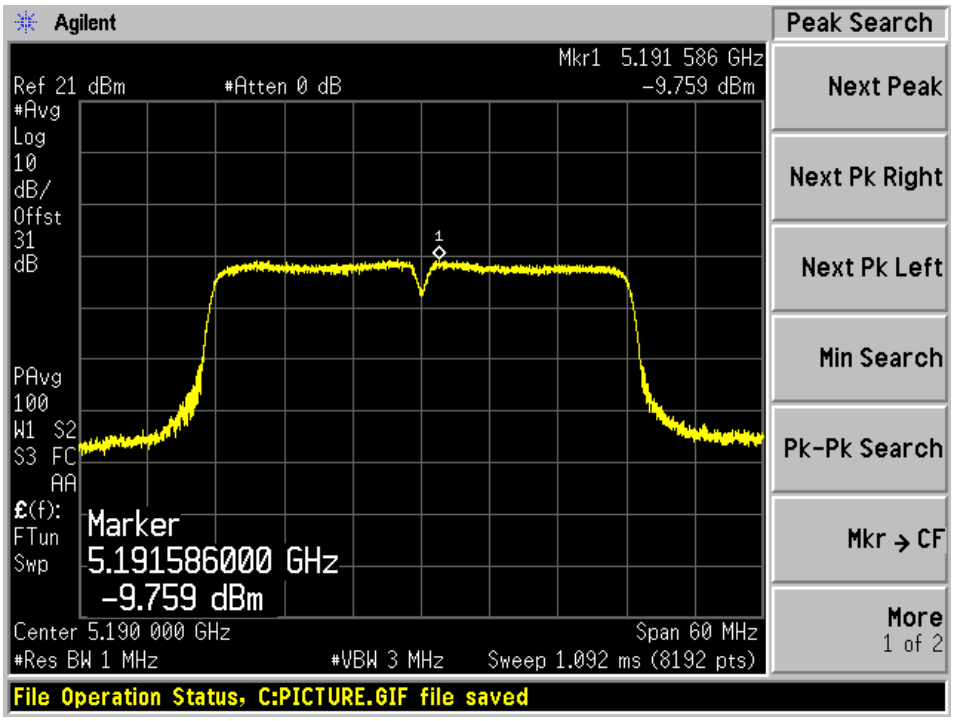
*Note: Total PSD (dBm/100kHz) = 10*Log(10^(Ant A[dBm/100kHz]/10)+10^(Ant B[dBm/100kHz]/10)) + DCCF (dB)*
*Note: Total Corrected PSD (dBm/500kHz) = Total PSD (dBm/100kHz) +10*Log(500kHz/100kHz) (dB)*
*Note: Directional Gain=4.8+10*Log(Nant)=7.8dBi>6dBi*
Note: Limit=30dBm/500kHz-(Directional Gain-6dBi) =28.2dBm/500kHz

Please refer to the following plots.

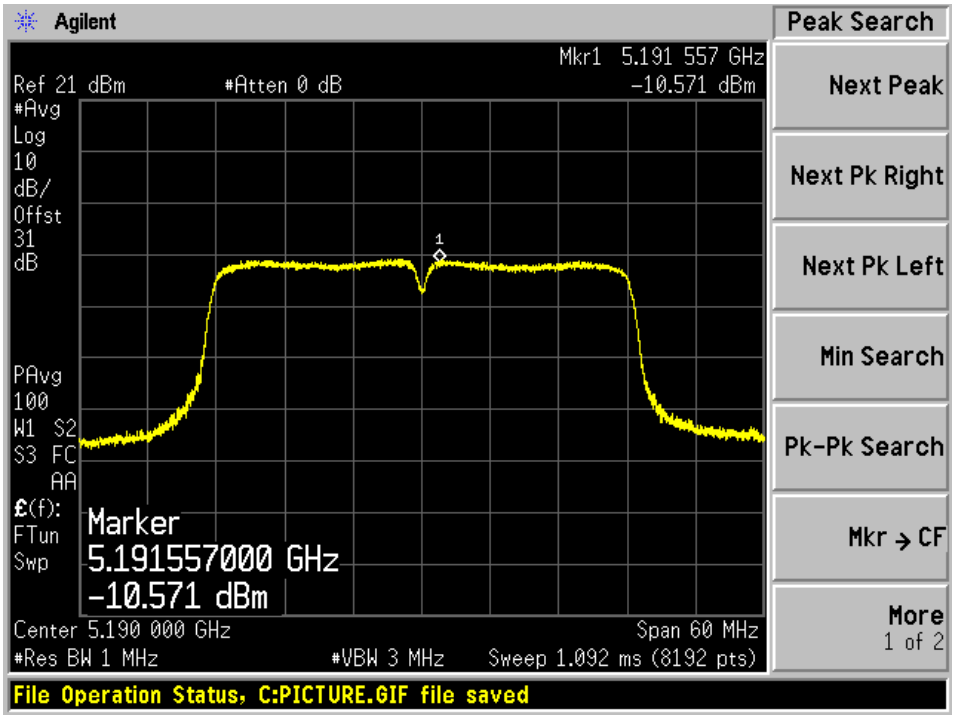
5150 - 5250 MHz

802.11n/ac40 Mode

5190MHz, Ant A



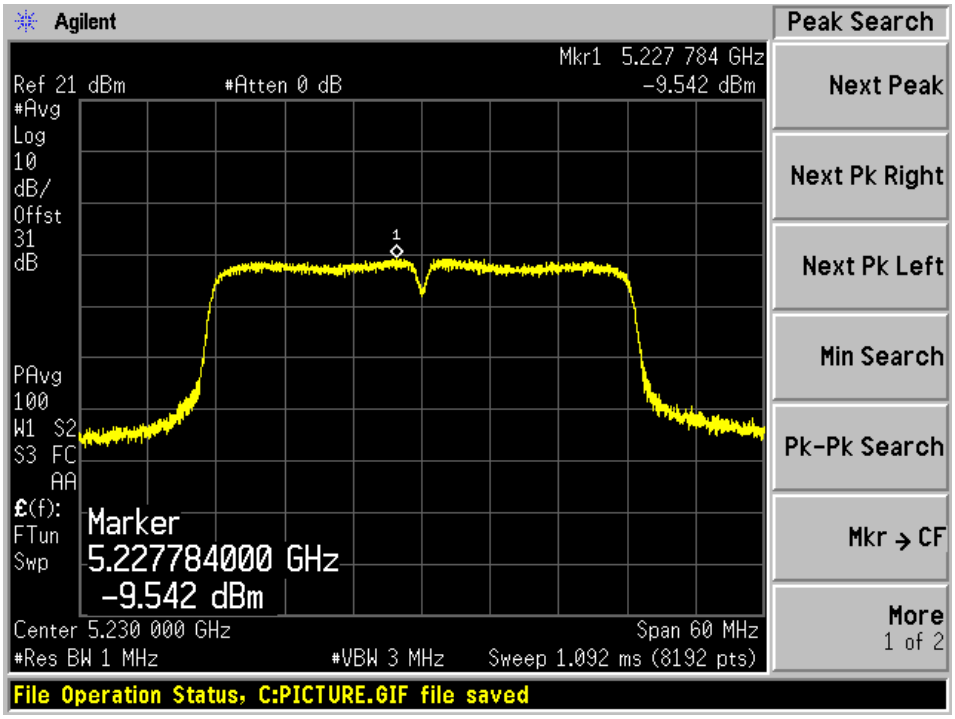
5190MHz, Ant B



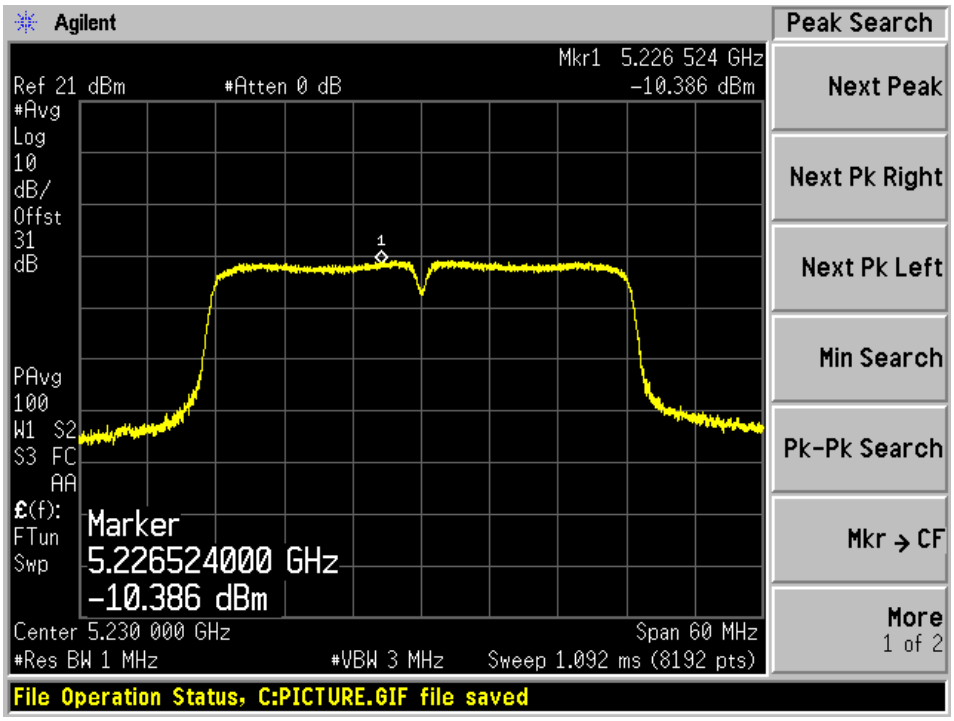
5150 - 5250 MHz

802.11n/ac40 Mode

5230MHz, Ant A



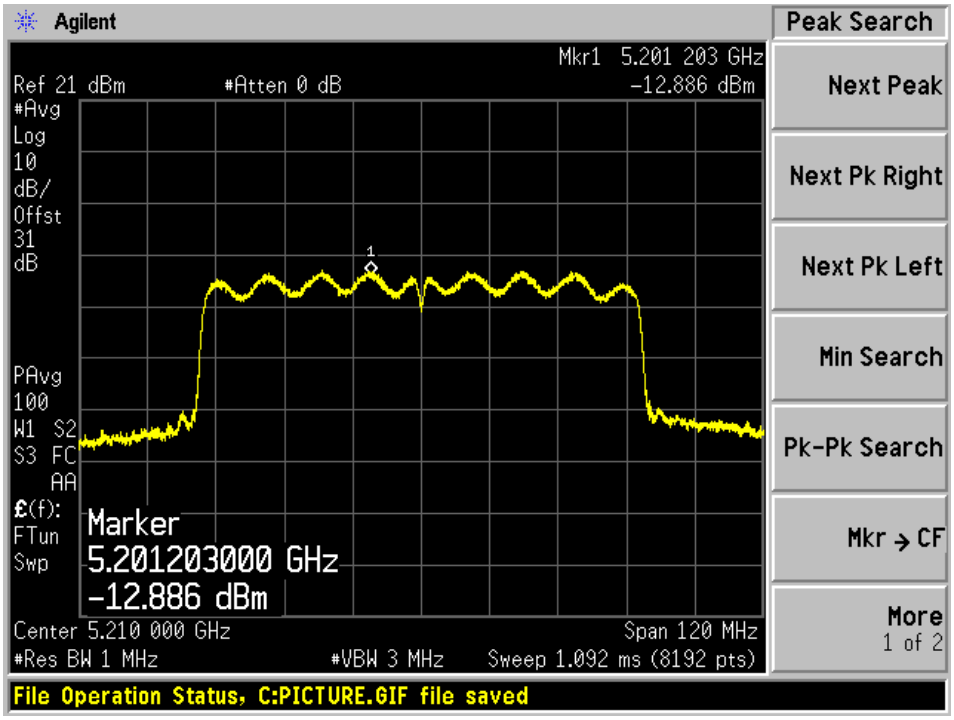
5230MHz, Ant B



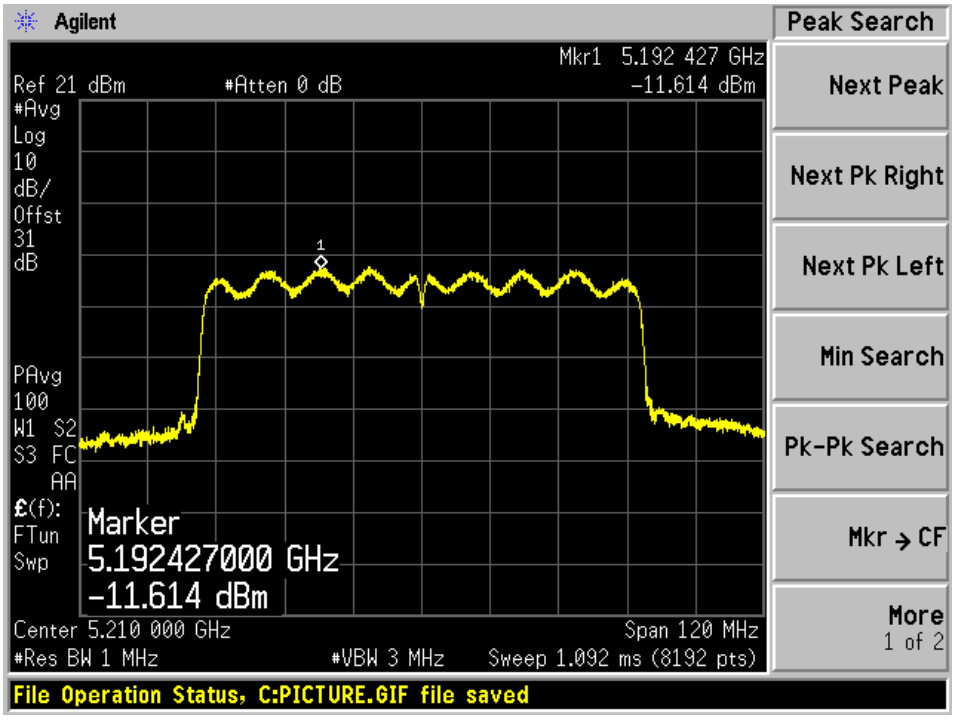
5150 - 5250 MHz

802.11ac80 Mode

5210MHz, Ant A



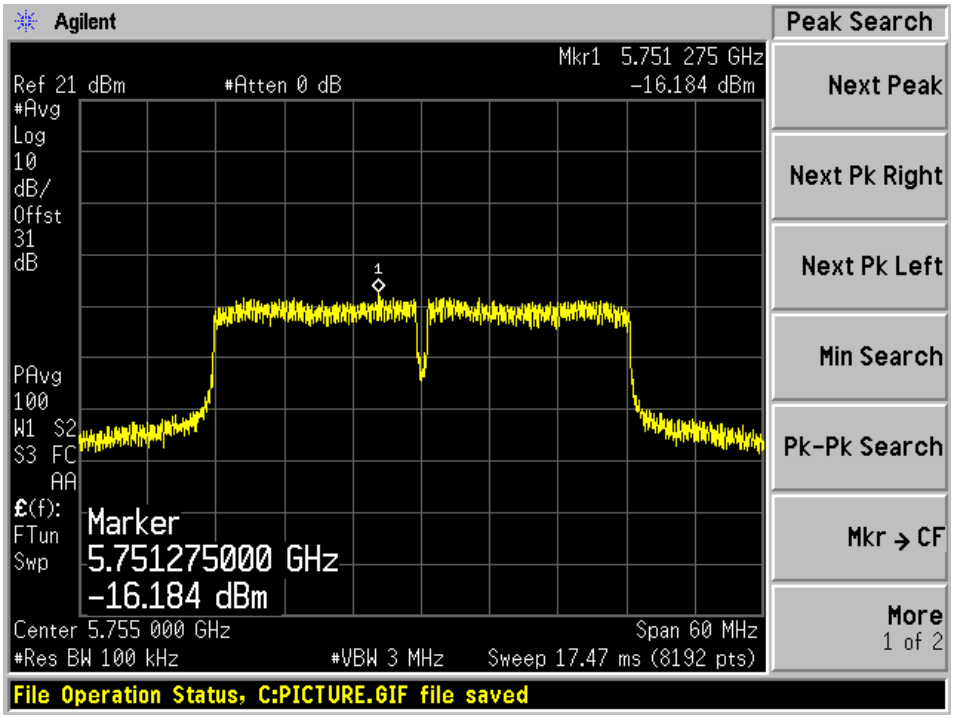
5210MHz, Ant B



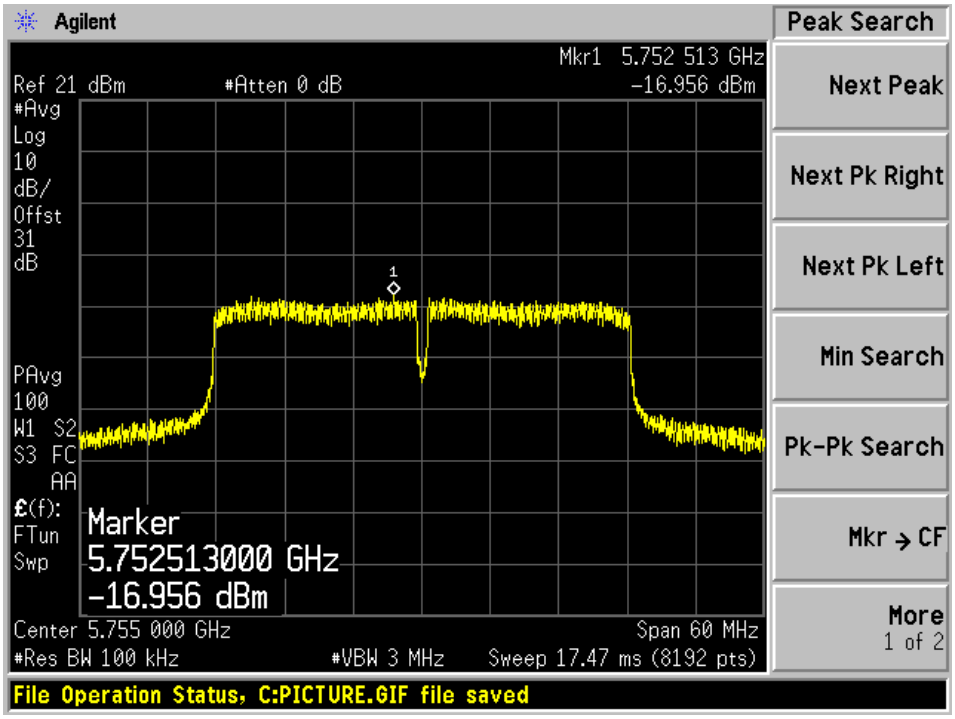
5725- 5850 MHz

802.11n/ac40 Mode

5755MHz, Ant A



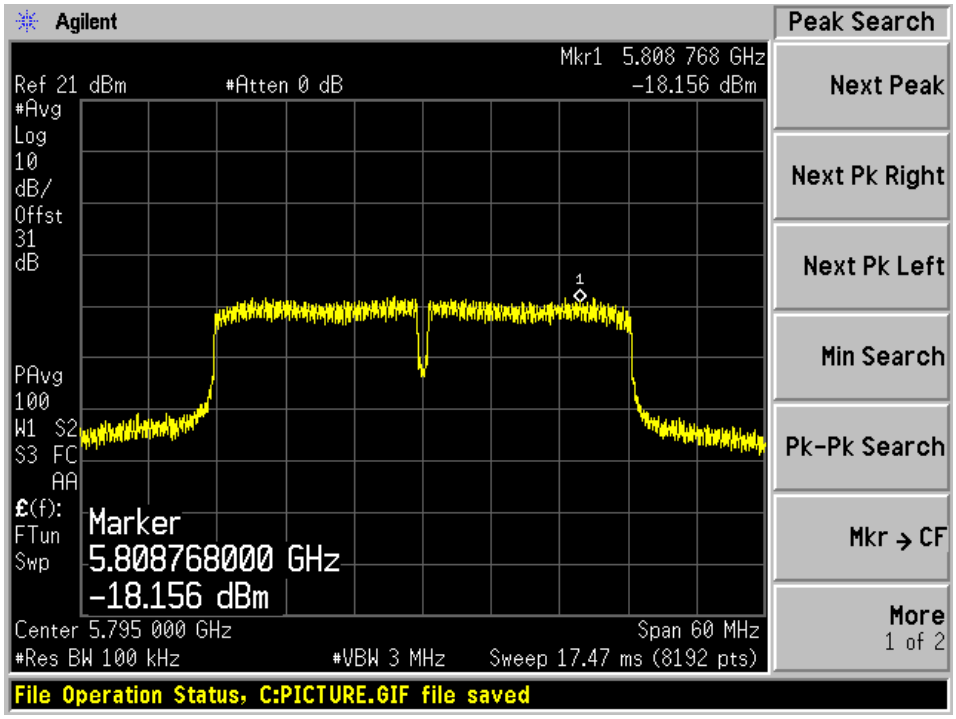
5755MHz, Ant B



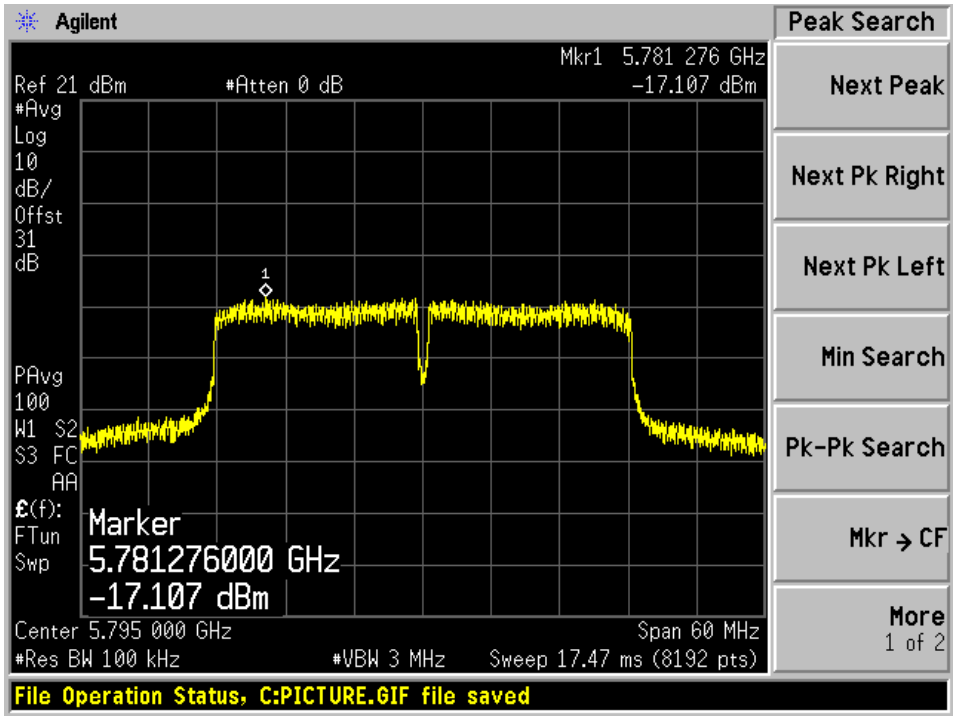
5725- 5850 MHz

802.11n/ac40 Mode

5795MHz, Ant A



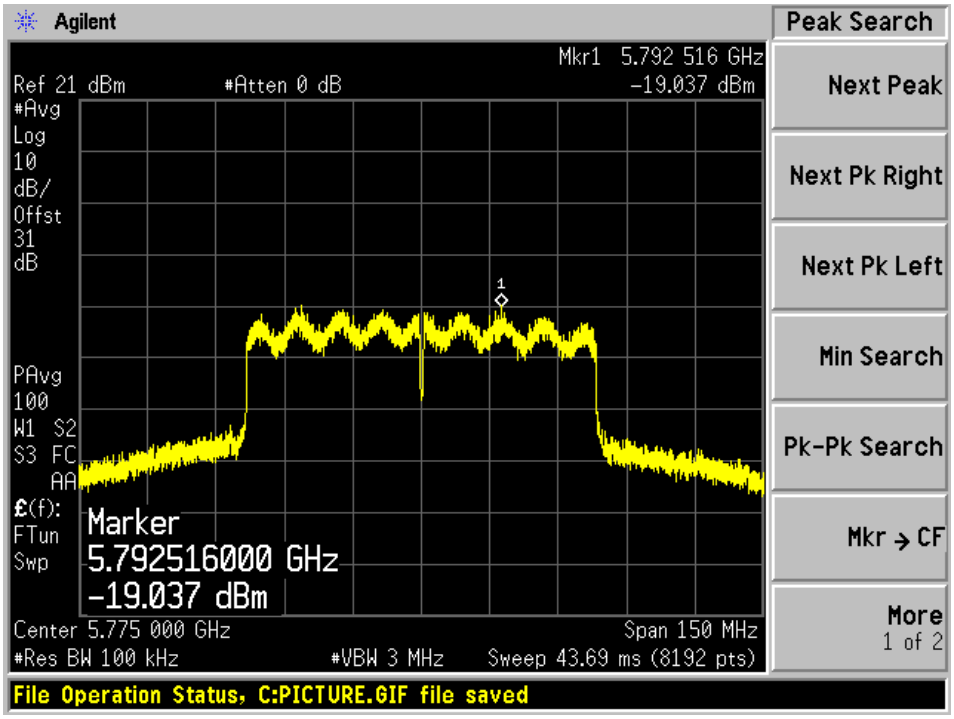
5795MHz, Ant B



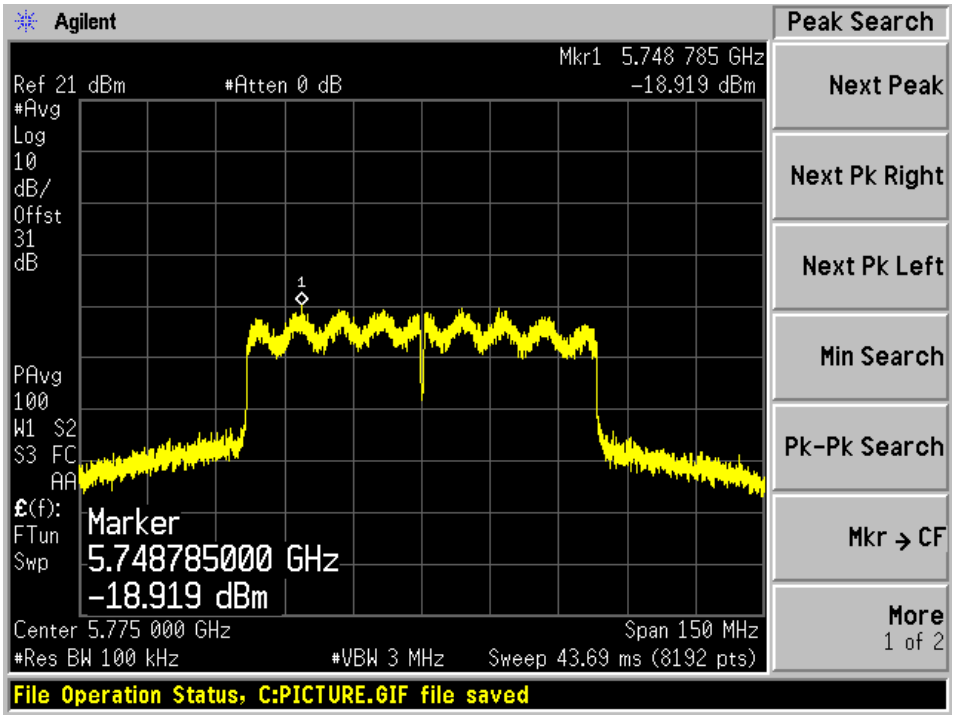
5725- 5850 MHz

802.11ac80 Mode

5775MHz, Ant A



5775MHz, Ant B



11 Annex A (Normative) – EUT Test Setup Photographs

Please refer to the attachment.

12 Annex B (Normative) - A2LA Electrical Testing Certificate

Accredited Laboratory

A2LA has accredited

BAY AREA COMPLIANCE LABORATORIES CORP.

Sunnyvale, CA

for technical competence in the field of

Electrical Testing

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 *General requirements for the competence of testing and calibration laboratories*. This laboratory also meets A2LA *R222 - Specific Requirements EPA ENERGY STAR Accreditation Program*. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (*refer to joint ISO-ILAC-IAF Communiqué dated April 2017*).

Presented this 10th day of March 2021.

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

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

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

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

--- END OF REPORT ---