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

TEST REPORT

For

Roku, Inc.

1155 Coleman Ave., San Jose, CA 95110, USA

FCC ID: TC2-R1038
IC: 5959A-R1035

Report Type:	**Model:**
Original Report	9102X

Prepared By:	Matthew Riego de Dios Test Technician
Report Number:	R2005041-NII
Report Date:	2020-09-17
Reviewed By:	Simon Ma RF Supervisor

Bay Area Compliance Laboratories Corp.
1274 Anvilwood Avenue,
Sunnyvale, CA 94089, USA
Tel: (408) 732-9162, Fax: (408) 732-9164

ACCREDITED
CERTIFICATE #3297.02

TABLE OF CONTENTS

DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
0	R2005041-NII	Original Report	2020-07-20
1	R2005041-NII	Updated 17065 reviewer comments	2020-09-17

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: *9102X,* FCC ID: TC2-R1038, IC: 5959A-R1035 or the "EUT" as referred to in this report. It is a Speaker Built-in Set-up-box.

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)

FCC Part 15, Subpart C, Equipment DSS with FCC ID: TC2-R1038, IC: 5959A-R1035
FCC Part 15, Subpart C, Equipment DTS with FCC ID: TC2-R1038, IC: 5959A-R1035

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 PuTTy. The software is compliant with the standard requirements being tested against.

Please refer to the following power setting table.

FCC:

Modulation	Frequency (MHz)	Power Setting RADIO 2		Power Setting RADIO 1
		Ant A	Ant B	
802.11a	5180	74	72	43
	5220	72	71	44
	5240	68	71	44
	5745	125	111	63
	5785	105	87	63
	5825	104	96	63
802.11n20	5180	60	60	42
	5220	56	56	45
	5240	56	56	45
	5745	93	93	63
	5785	87	87	63
	5825	95	95	63
802.11ac20	5180	61	61	42
	5220	58	58	45
	5240	58	58	45
	5745	89	89	63
	5785	85	85	63
	5825	90	90	63

IC:

Modulation	Frequency (MHz)	Power Setting RADIO 2		Power Setting RADIO 1
		Ant A	Ant B	
802.11a	5180	53	53	35
	5220	49	53	33
	5240	47	53	32
	5745	125	111	63
	5785	105	87	63
	5825	104	96	63
802.11n20	5180	32	32	35
	5220	29	29	33
	5240	29	29	33
	5745	93	93	63
	5785	87	87	63
	5825	95	95	63
802.11ac20	5180	33	33	35
	5220	30	30	34
	5240	30	30	34
	5745	89	89	63
	5785	85	85	63
	5825	90	90	63

*Data rates tested:
802.11a mode: 6Mbps
802.11n HT20: MCS0
802.11ac VHT20: 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 2

Radio Mode	On Time (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)
802.11a	2.06	2.19	94.06	0.27
802.11n20	1.91	2.06	92.72	0.33
802.11ac20	1.92	2.17	88.48	0.53

Radio 1

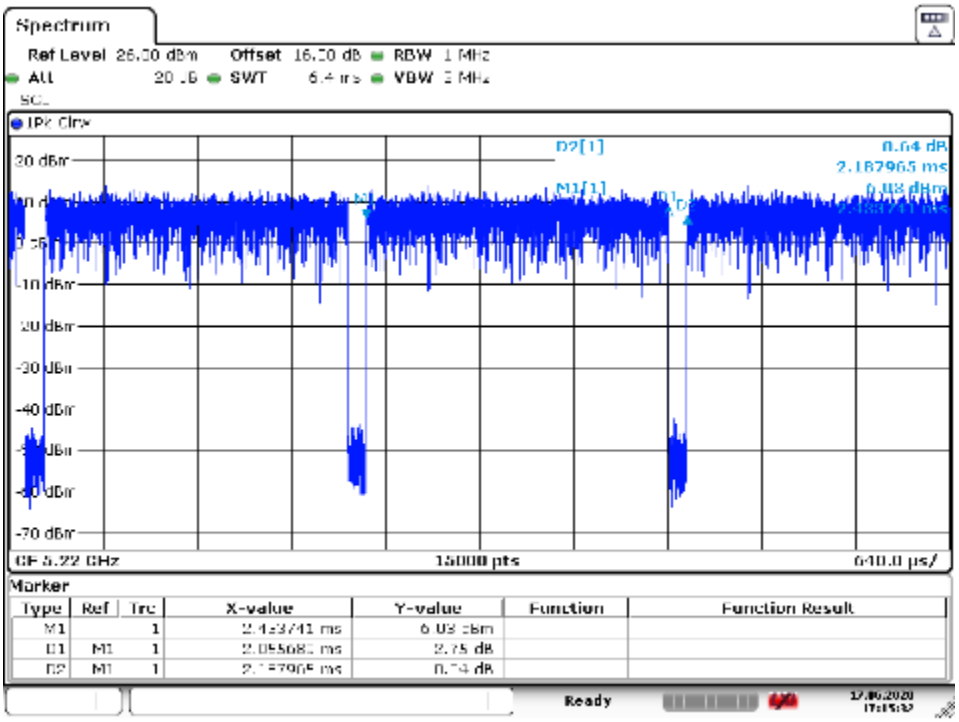
Radio Mode	On Time (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)
802.11a	2.05	2.125	96.47	0.16
802.11n20	1.905	2.006	94.97	0.22
802.11ac20	1.926	2.0	96.30	0.24

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

Please refer to the following plots.

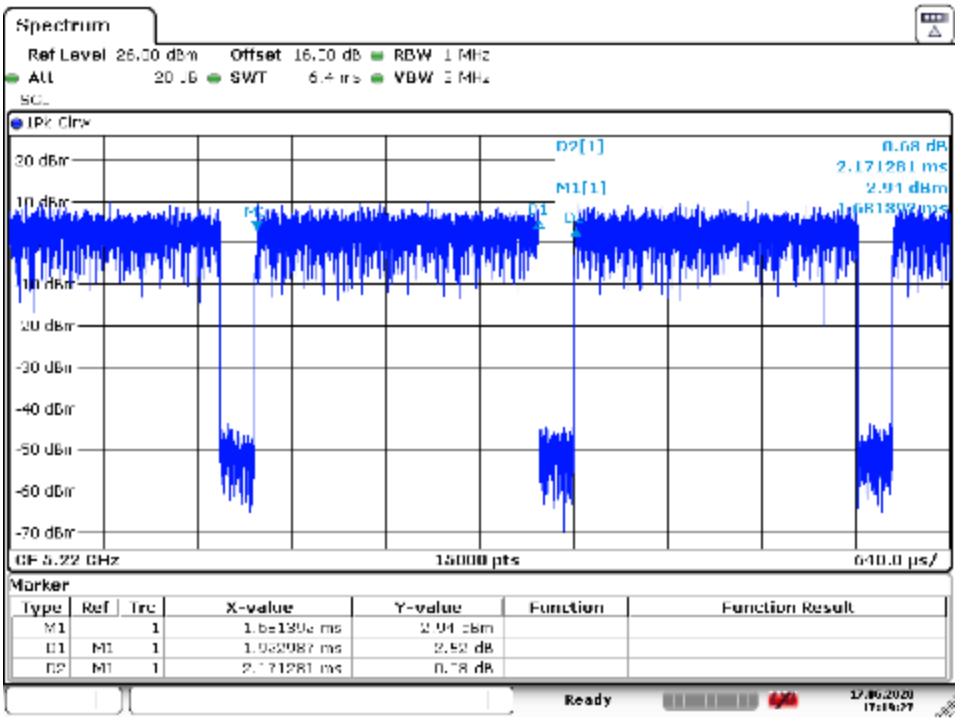
Radio 2

802.11a mode



Date: 17.JUN.2020 17:15:32

802.11ac20 mode



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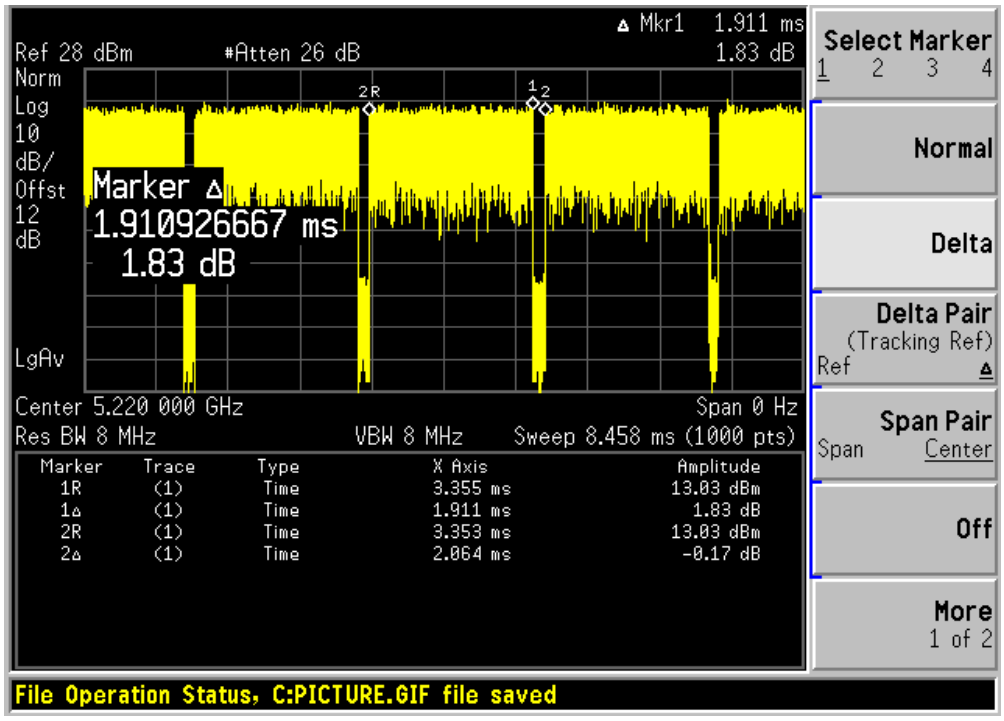
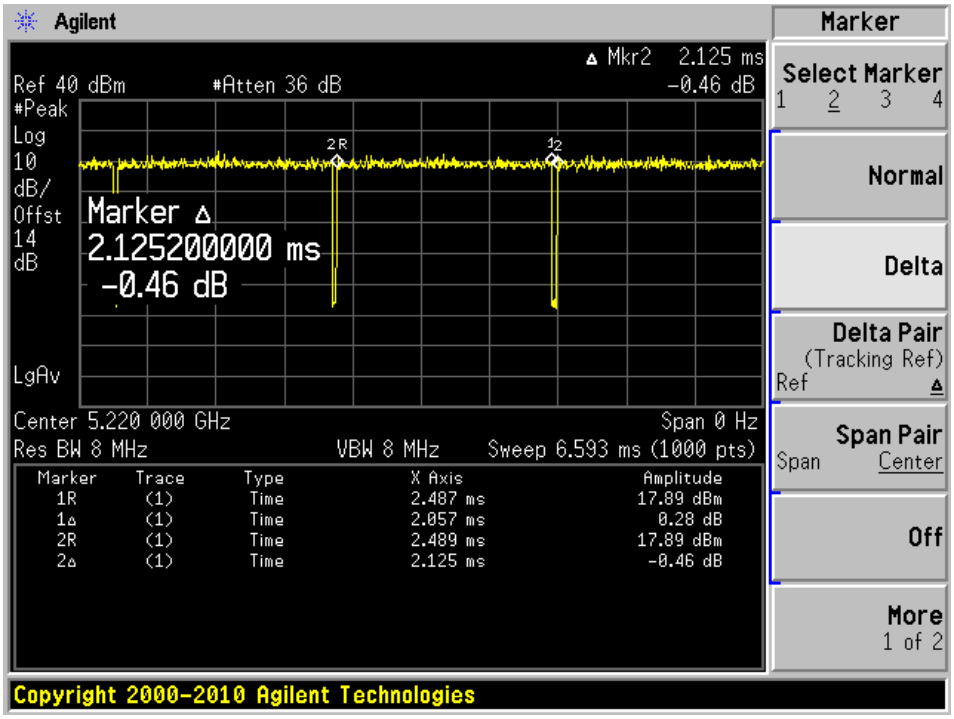
802.11n20 mode

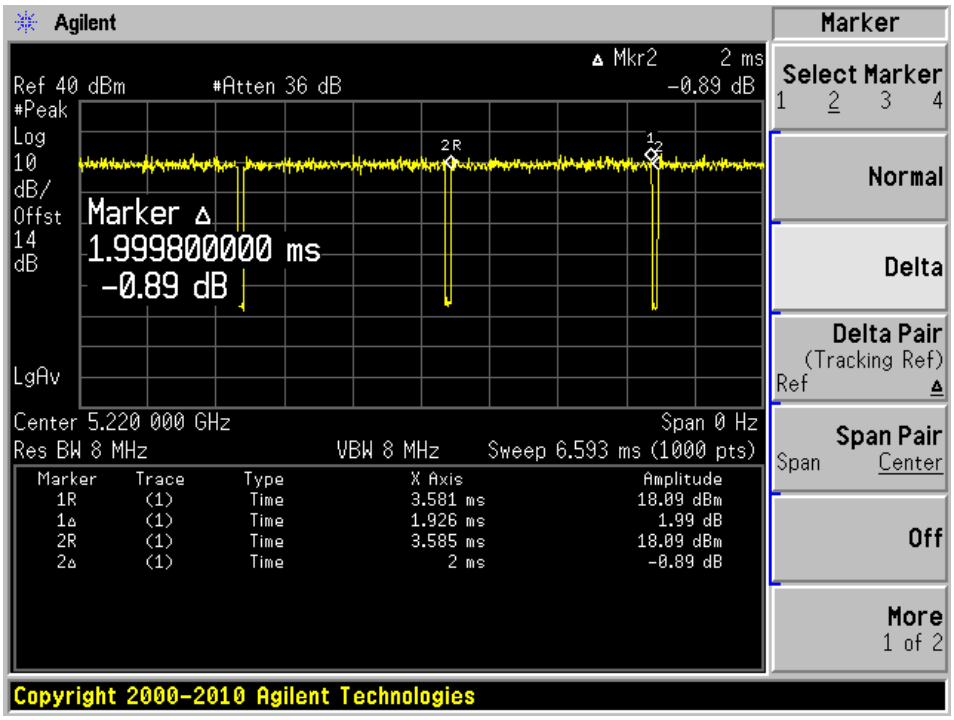


Radio 1

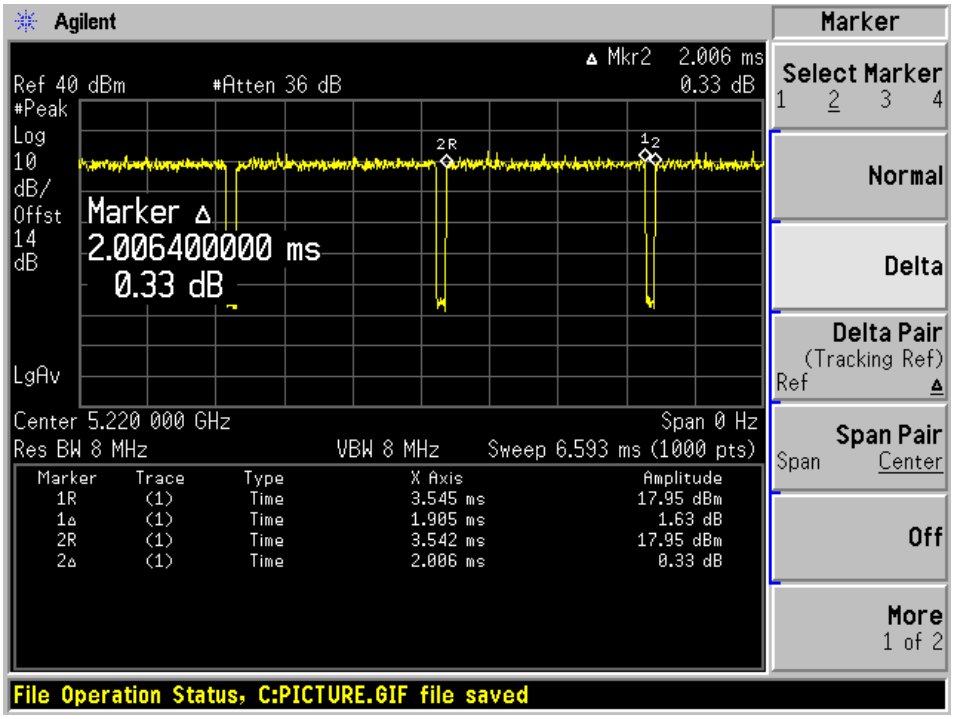
802.11a mode



802.11ac20 mode



802.11n20 mode



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 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
FCC §2.1051, §15.407(b) ISEDC RSS-247 §6.2	Spurious Emissions at Antenna Terminals	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

4.3 MPE Results

Radio 2

Worst Case: 802.11n20, High Channel 5825 MHz

Maximum peak output power at antenna input terminal (dBm):	23.02
Maximum peak output power at antenna input terminal (mW):	200.4472
Prediction distance (cm):	20
Prediction frequency (MHz):	5825
Maximum Antenna Gain, typical (dBi):	7.5
Maximum Antenna Gain (numeric):	5.6234
Power density of prediction frequency at 20.0 cm (mW/cm^2):	0.2243
FCC MPE limit for uncontrolled exposure at prediction frequency (mW/cm^2):	1.0
MPE Ratio (numeric):	0.2243

The device is compliant with the requirement MPE limit for uncontrolled exposure. The maximum power density at the distance of 20 cm is 0.2243 mW/cm^2. Limit is 1.0 mW/cm^2.

Radio 1

Worst Case: 802.11ac20, Mid Channel 5785 MHz

Maximum peak output power at antenna input terminal (dBm):	21.77
Maximum peak output power at antenna input terminal (mW):	150.3142
Prediction distance (cm):	20
Prediction frequency (MHz):	5785
Maximum Antenna Gain, typical (dBi):	4.5
Maximum Antenna Gain (numeric):	2.8184
Power density of prediction frequency at 20.0 cm (mW/cm^2):	0.0843
FCC MPE limit for uncontrolled exposure at prediction frequency (mW/cm^2):	1.0
MPE Ratio (numeric):	0.0843

The device is compliant with the requirement MPE limit for uncontrolled exposure. The maximum power density at the distance of 20 cm is 0.0843 mW/cm^2. Limit is 1.0 mW/cm^2.

Radio Co-location

The device supports the following radio co-location configurations.

	Wi-Fi Radio 2 2.4G	Wi-Fi Radio 2 UNII-1	Wi-Fi Radio 2 UNII-3
BT	X	X	X
Wi-Fi Radio 1 2.4G		X	X
Wi-Fi Radio 1 UNII-1	X		X
Wi-Fi Radio 1 UNII-3	X	X	

Worst Case Colocation 2.4 GHz Classic Bluetooth and 5.8 GHz Wi-Fi Radio 2 (MIMO):

Frequency Band	Max Conducted Power(dBm)	Evaluated Distance (cm)	Worst-Case MPE (mW/cm^2)	MPE Limit (mW/cm^2)	Worst-Case MPE Ratios	Sum of MPE Ratios	Limit
Worst Case							
2.4 GHz Classic Bluetooth	11.81	20	0.0051	1.0	0.51%	22.95%	100%
5.8 GHz Wi-Fi Radio 2	23.02	20	0.2244	1.0	22.44%		

Worst Case Colocation 2.4 GHz Wi-Fi Radio 1 (SISO) and 5.8 GHz Wi-Fi Radio 2 (MIMO):

Frequency Band	Max Conducted Power(dBm)	Evaluated Distance (cm)	Worst-Case MPE (mW/cm^2)	MPE Limit (mW/cm^2)	Worst-Case MPE Ratios	Sum of MPE Ratios	Limit
Worst Case							
2.4 GHz Wi-Fi Radio 1	23.14	20	0.10	1.0	10%	32.44%	100%
5.8 GHz Wi-Fi Radio 2	23.02	20	0.2244	1.0	22.44%		

Worst Case Colocation 5.8 GHz Wi-Fi Radio 1 (SISO) and 2.4 GHz Wi-Fi Raido 2 (MIMO):

Frequency Band	Max Conducted Power(dBm)	Evaluated Distance (cm)	Worst-Case MPE (mW/cm^2)	MPE Limit (mW/cm^2)	Worst-Case MPE Ratios	Sum of MPE Ratios	Limit
Worst Case							
5.8 GHz Wi-Fi Radio 1	21.77	20	0.0843	1.0	8.43%	50.28%	100%
2.4 GHz Wi-Fi Radio 2	26.23	20	0.4185	1.0	41.85%		

4.4 RF exposure evaluation exemption for IC

Radio 2

Worst Case: 802.11n20, High Channel 5825 MHz

Maximum EIRP power = 23.02dBm + 7.5 dBi = 30.52 dBm which is less than $1.31\times10^{-2}f^{0.6834}$ = 4.90 W = 36.90 dBm

Therefore the RF exposure Evaluation is not required.

Radio 1

Worst Case: 802.11ac20, Mid Channel 5785 MHz

Maximum EIRP power = 21.77dBm + 4.5 dBi = 26.27 dBm which is less than $1.31\times10^{-2}f^{0.6834}$ = 4.88 W = 36.88 dBm

Therefore the RF exposure Evaluation is not required.

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

The antennas used by the EUT are permanent attached antennas.

Radio	Antenna	Manufacturer/PN	Frequency Range (MHz)	Antenna Type	Maximum Antenna Gain (dBi)
Bluetooth	Single Antenna	N/A	2400-2500	PCB	2.3
Wi-Fi 2 2.4 GHz	Ant A	WC0D-15/GSD	2400-2500	PIFA	4
	Ant B	WC0D-15/GSD	2400-2500	PIFA	4
Wi-Fi 2 5 GHz	Ant A	WC0D-15/GSD	5150-5850	PIFA	4.5
	Ant B	WC0D-15/GSD	5150-5850	PIFA	4.5
Wi-Fi 1 2.4 GHz	Single Antenna	WC0D-15/GSD	2400-2500	PIFA	4
Wi-Fi 1 5 GHz	Single Antenna	WC0D-15/GSD	5150-5850	PIFA	4.5

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.

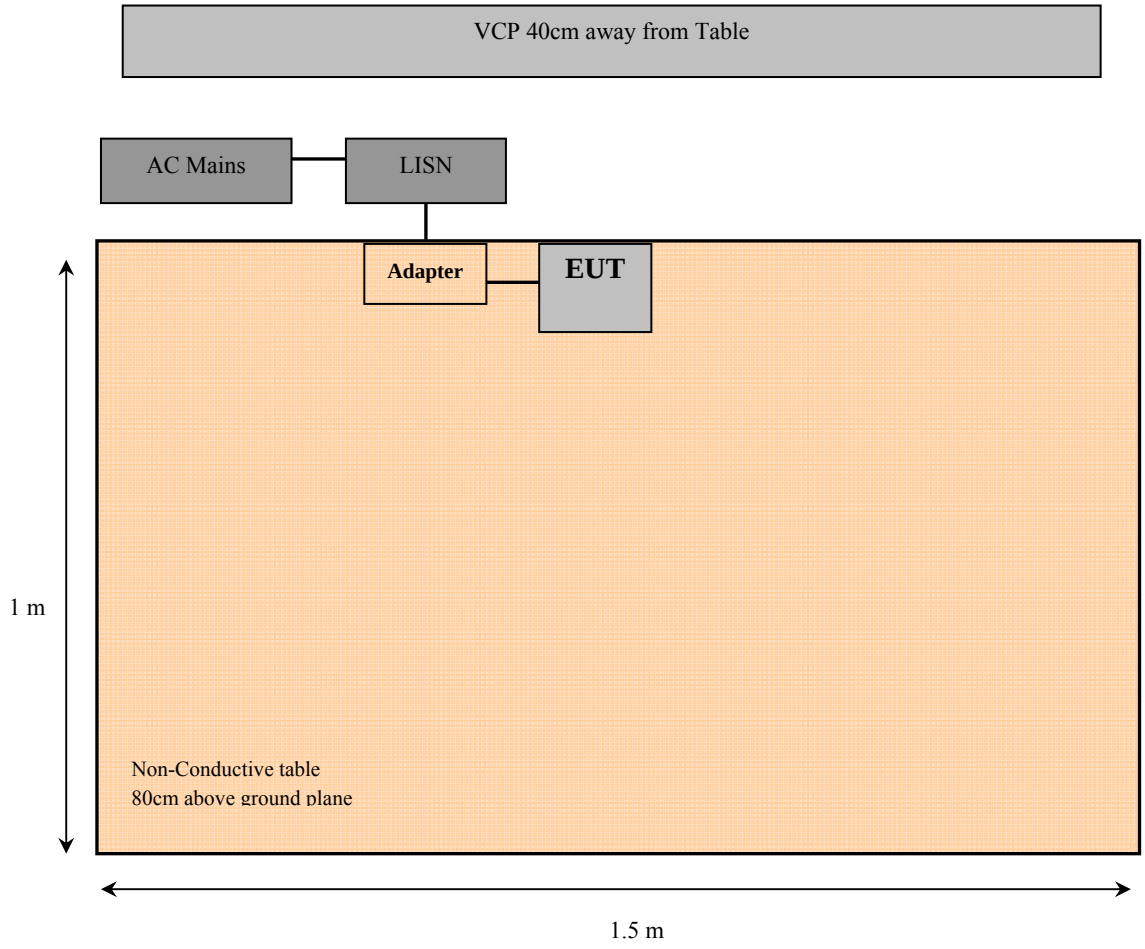
6.3 Test Procedure

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

CA = Ai + CL + Atten

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

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

Margin = Corrected Amplitude - Limit

6.6 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	2018-07-05	2 years
Rohde and Schwarz	Impulse Limiter	ESH3-Z2	101964	2019-07-31	1 year
Solar Electronics Company	High Pass Filter	Type 7930-100	7930150202	2020-02-27	1 year
Suirong	30 ft conductive emission cable	LMR 400	-	N/R	N/A
FCC	LISN	FCC-LISN-50-25-2-10-CISPR16	160129	2019-07-11	14 months
Vasona	Test software	V6.0 build 11	10400213	N/R	N/R

Statement of Traceability: BACL Corp. *attests that all calibrations have been performed per the A2LA requirements, traceable to the NIST.*

6.7 Test Environmental Conditions

Temperature:	23º C
Relative Humidity:	42 %
ATM Pressure:	101.31 kPa

The testing was performed by Matthew Riego de Dios on 2020-06-23 in the Ground Plane test site.

6.8 Summary of Test Results

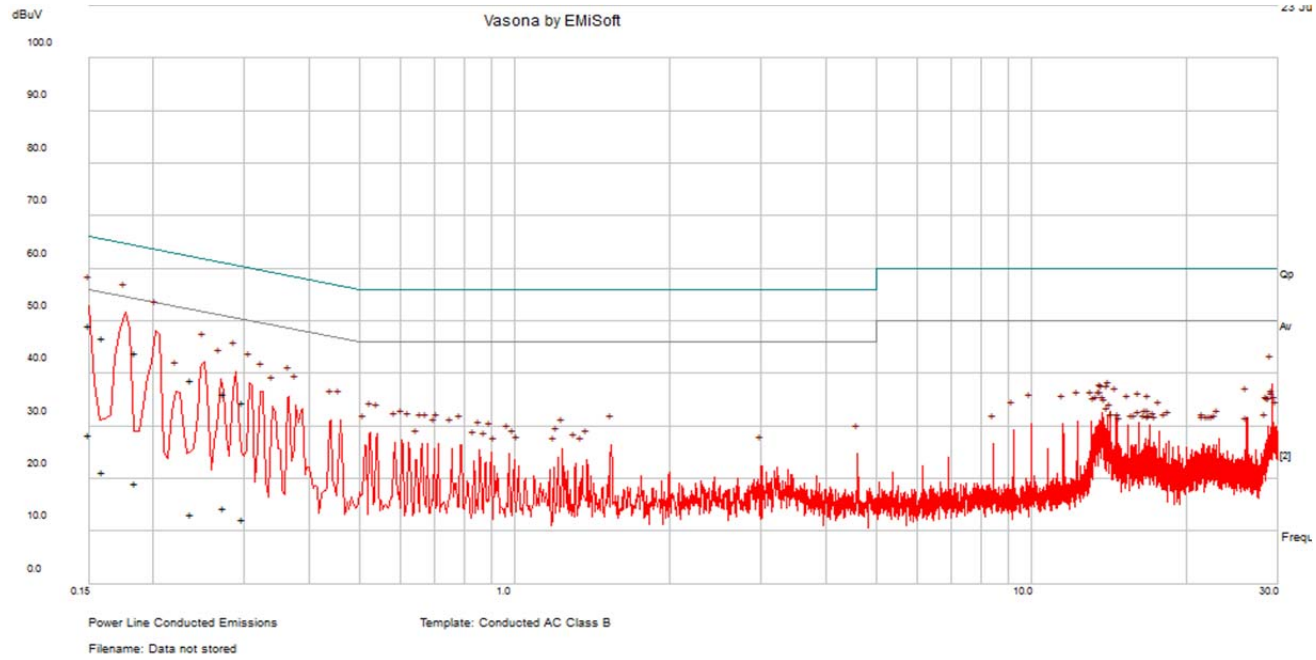
According to the recorded data in following table, the EUT complied with the FCC Part 15 and RSS-Gen standards' conducted emissions limits, with the margin reading of:

Connection: AC/DC adapter connected to 120 V/60 Hz, AC			
Margin (dB)	**Frequency (MHz)**	**Conductor Mode (Live/Neutral)**	**Range (MHz)**
-16.36	0.150296	Neutral	0.15-30

6.9 Conducted Emissions Test Plots and Data

Worst Case: Radio 2 802.11n20 mode – Low Channel

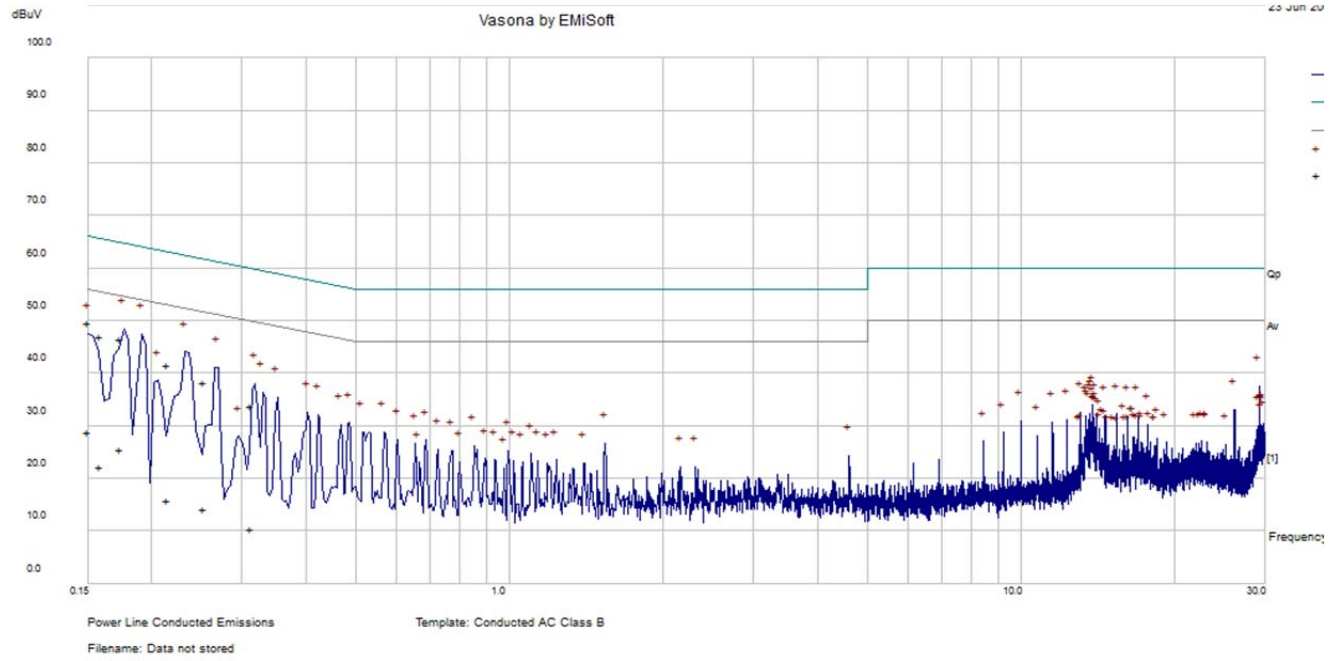
120 V, 60 Hz – Line



Frequency (MHz)	Corrected Amplitude (dBµV)	Conductor (Line/Neutral)	Limit (dBµV)	Margin (dB)	Detector (QP/Ave.)
0.150302	49.13	Line	65.98	-16.85	QP
0.159651	46.89	Line	65.48	-18.59	QP
0.184241	43.93	Line	64.29	-20.36	QP
0.236801	38.66	Line	62.21	-23.55	QP
0.273234	36.08	Line	61.02	-24.93	QP
0.298659	34.42	Line	60.28	-25.86	QP

Frequency (MHz)	Corrected Amplitude (dBµV)	Conductor (Line/Neutral)	Limit (dBµV)	Margin (dB)	Detector (QP/Ave.)
0.150302	28.29	Line	55.98	-27.7	Ave.
0.159651	21.29	Line	55.48	-34.19	Ave.
0.184241	19.25	Line	54.29	-35.04	Ave.
0.236801	13.34	Line	52.21	-38.87	Ave.
0.273234	14.5	Line	51.02	-36.52	Ave.
0.298659	12.25	Line	50.28	-38.03	Ave.

120 V, 60 Hz – Neutral



Frequency (MHz)	Corrected Amplitude (dBµV)	Conductor (Line/Neutral)	Limit (dBµV)	Margin (dB)	Detector (QP/Ave.)
0.158625	47.13	Neutral	65.54	-18.4	QP
0.173605	46.5	Neutral	64.79	-18.29	QP
0.215551	41.54	Neutral	62.99	-21.45	QP
0.150296	49.63	Neutral	65.98	-16.36	QP
0.252884	38.21	Neutral	61.66	-23.45	QP
0.312104	33.75	Neutral	59.91	-26.16	QP

Frequency (MHz)	Corrected Amplitude (dBµV)	Conductor (Line/Neutral)	Limit (dBµV)	Margin (dB)	Detector (QP/Ave.)
0.158625	22.28	Neutral	55.54	-33.26	Ave.
0.173605	25.63	Neutral	54.79	-29.15	Ave.
0.215551	15.88	Neutral	52.99	-37.11	Ave.
0.150296	28.96	Neutral	55.98	-27.03	Ave.
0.252884	14.24	Neutral	51.66	-37.42	Ave.
0.312104	10.33	Neutral	49.91	-39.58	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 Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
Agilent	Spectrum Analyzer	E4446A	MY48250238	2019-07-26	1 year
Rhode & Schwarz	EMI Test Receiver	ESCI 1166.5950K03	100044	2018-10-26	2 years
BACL	5m3 Sensitivity Box	1	2	2019-10-02	1 year
Sunol Sciences	System Controller	SC99V	011003-1	N/R	N/A
Sunol Sciences	Biconilog Antenna	JB3	A020106-2	2019-11-20	2 years
ETS Lindgren	Horn Antenna	3117	00218973	2019-02-13	2 years
Wisewave	Antenna, Horn	ARH-4223-02	10555-02	2020-02-05	2 years
Wisewave	Antenna, Horn	ARH-2823-02	10555-01	2020-02-05	2 years
-	SMA cable	-	-	Each time[1]	N/A
IW Microwave	150 Series 2.92mm Cable	KPS1501AN-3780-KPS	DC 1925	2019-09-11	1 year
IW Microwave	157 Series Cable Armored with 2.92mm Male Plugs on Both Sides	KPS-1571AN-2400	DC 1922	2019-07-07	1 year
MDP Digital	Times Microwave LMR 400 UltraFex Coaxial Cable 35\'	LMR400UF	BACL1904161	2020-05-20	1 year
AH Systems	Preamplifier	PAM 1840 VH	170	2019-09-24	1 year
Agilent	Preamplifier	8449B	3147A00400	2020-02-27	1 year
HP	Pre Amplifier	8447D	2443A04374	2019-08-13	1 year
Vasona	Test software	V6.0 build 11	10400213	N/R	N/R

Note[1]: cables and attenuators included in the test set-up will be checked each time before testing.
Statement of Traceability: BACL *attests that all calibrations have been performed per the A2LA requirements, traceable to NIST.*

7.6 Test Environmental Conditions

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

The testing was performed by Matthew Riego de Dios from 2020-06-08 to 2020-07-01 in 5m chamber 3.

7.7 Summary of Test Results

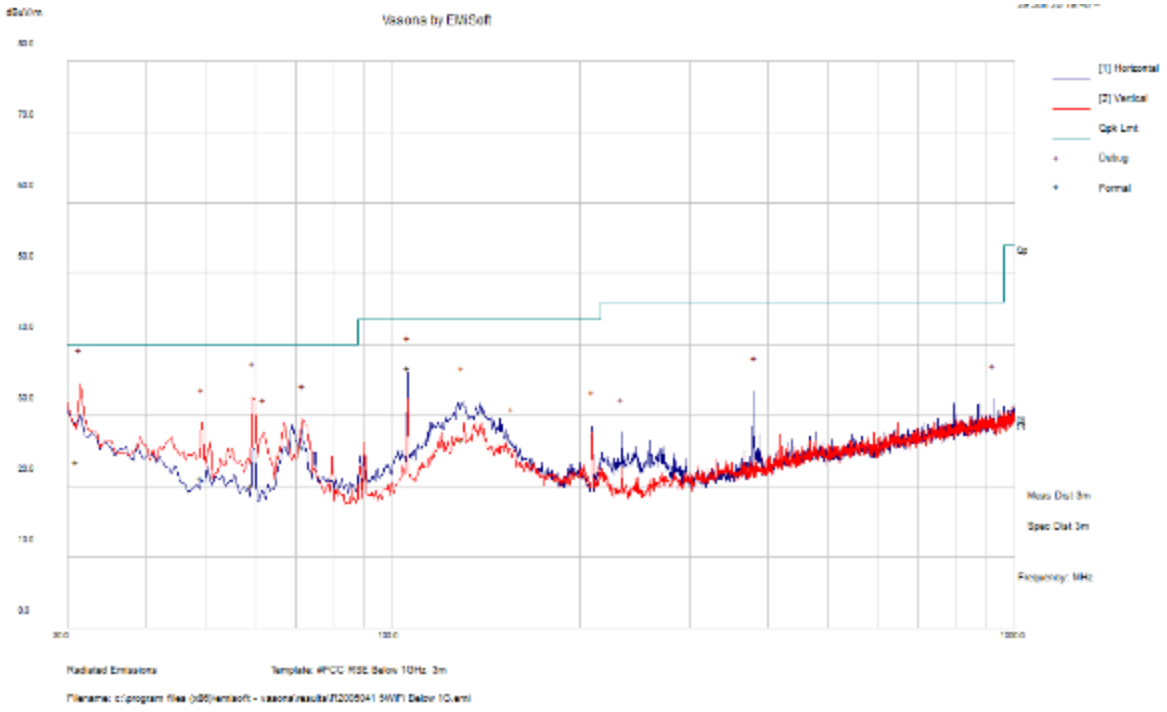
According to the data hereinafter, the EUT complied with the FCC Part 15.407 and RSS-247 standards' radiated emissions limits, and had the worst margin of:

Mode: Transmitting			
Margin (dB)	**Frequency (MHz)**	**Polarization (Horizontal/Vertical)**	**Mode, Channel**
-0.06	17235	Horizontal	802.11n20 mode, 5745 MHz

7.8 Radiated Emissions Test Result Data

1) 30 MHz – 1 GHz at 3 meters

Worst Case: RADIO 2, n20 mode, 5.8 Low Channel Freq. 5745 MHz



Frequency (MHz)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Comments (PK/QP/Ave.)
31.027	23.47	283	H	193	40	-16.53	QP
105.73425	36.9	110	H	273	43.5	-6.6	QP
59.38375	20.19	138	V	106	40	-19.81	QP
71.6065	25.61	105	V	125	40	-14.39	QP
49.17575	21.18	109	V	24	40	-18.82	QP
129.4885	26.53	214	H	353	43.5	-16.97	QP

2) 1-40 GHz Band Edges measured at 3 meters, Harmonics measured at 1 meter

5150 - 5250 MHz

RADIO 2

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/ISEDC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Low Channel 5180 MHz											
5150	58.04	175	167	V	35.5	9.77	35.2	68.11	74	-5.90	Peak
5150	58.01	10	157	H	35.5	9.77	35.2	68.08	74	-5.93	Peak
5150	42.94	175	167	V	35.5	9.77	35.2	53.01	54	-0.99	Ave
5150	**43.12**	**10**	**157**	**H**	**35.5**	**9.77**	**35.2**	**53.18**	**54**	**-0.82**	**Ave**
10360	46.07	0	100	V	38.1	13.40	35.74	61.83	78	-16.17	Peak
10360	46.11	0	100	H	38.1	13.40	35.74	61.87	78	-16.13	Peak
15540	46.29	0	100	V	40.5	18.91	33.7	72.00	84	-12.00	Peak
15540	45.89	0	100	H	40.5	18.91	33.7	71.60	84	-12.40	Peak
15540	34.31	0	100	V	40.5	18.91	33.7	60.02	64	-3.98	Ave
15540	34.32	0	100	H	40.5	18.91	33.7	60.03	64	-3.97	Ave
Middle Channel 5220 MHz											
10440	45.78	0	100	V	38.1	13.25	35.49	61.64	78	-16.36	Peak
10440	45.56	0	100	H	38.1	13.25	35.49	61.42	78	-16.58	Peak
15660	45.43	0	100	V	40.7	19.05	33.87	71.31	84	-12.69	Peak
15660	45.07	0	100	H	40.7	19.05	33.87	70.95	84	-13.05	Peak
15660	33.81	0	100	V	40.7	19.05	33.87	59.69	64	-4.31	Ave
15660	33.75	0	100	H	40.7	19.05	33.87	59.63	64	-4.37	Ave
High Channel 5240 MHz											
10480	46.02	0	100	V	38.2	13.25	35.49	61.98	78	-16.02	Peak
10480	45.25	0	100	H	38.2	13.25	35.49	61.21	78	-16.79	Peak
15720	45.3	0	100	V	40.7	19.09	33.87	71.22	84	-12.78	Peak
15720	45.36	0	100	H	40.7	19.09	33.87	71.28	84	-12.72	Peak
15720	33.73	0	100	V	40.7	19.09	33.87	59.65	64	-4.35	Ave
15720	33.86	0	100	H	40.7	19.09	33.87	59.78	64	-4.22	Ave

5150 - 5250 MHz

RADIO 2

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/ISEDC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Low Channel 5180 MHz											
5150	53.28	360	215	V	35.50	9.77	35.20	63.35	74	-10.66	Peak
5150	57.56	130	215	H	35.50	9.77	35.20	67.63	74	-6.38	Peak
5150	40.69	360	215	V	35.50	9.77	35.20	50.76	54	-3.24	Ave
5150	**42.80**	**130**	**215**	**H**	**35.50**	**9.77**	**35.20**	**52.86**	**54**	**-1.14**	**Ave**
10360	49.59	248	100	V	38.10	13.40	35.74	65.35	78	-12.65	Peak
10360	48.40	119	100	H	38.10	13.40	35.74	64.16	78	-13.84	Peak
15540	46.14	0	100	V	40.50	18.91	33.70	71.85	84	-12.15	Peak
15540	45.44	0	100	H	40.50	18.91	33.70	71.15	84	-12.85	Peak
15540	34.08	0	100	V	40.50	18.91	33.70	59.79	64	-4.21	Ave
15540	34.13	0	100	H	40.50	18.91	33.70	59.84	64	-4.16	Ave
Middle Channel 5220 MHz											
10440	48.64	250	103	V	38.1	13.25	35.49	64.5	78	-13.5	Peak
10440	47.64	171	140	H	38.1	13.25	35.49	63.5	78	-14.5	Peak
15660	45.1	0	100	V	40.70	19.05	33.87	70.98	84	-13.02	Peak
15660	44.99	0	100	H	40.70	19.05	33.87	70.87	84	-13.13	Peak
15660	33.85	0	100	V	40.70	19.05	33.87	59.73	64	-4.267	Ave
15660	33.78	0	100	H	40.70	19.05	33.87	59.66	64	-4.337	Ave
High Channel 5240 MHz											
10480	48.75	248	100	V	38.20	13.25	35.49	64.71	78	-13.29	Peak
10480	47.04	129	100	H	38.20	13.25	35.49	63.00	78	-15.00	Peak
15720	45.58	0	100	V	40.70	19.09	33.87	71.50	84	-12.50	Peak
15720	45.45	0	100	H	40.70	19.09	33.87	71.37	84	-12.63	Peak
15720	33.93	0	100	V	40.70	19.09	33.87	59.85	64	-4.15	Ave
15720	34.03	0	100	H	40.70	19.09	33.87	59.95	64	-4.05	Ave

5150 - 5250 MHz

RADIO 2

802.11n20 mode

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/ISEDC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Low Channel 5180 MHz											
5150	56.72	306	100	V	35.50	9.77	35.20	66.79	74	-7.22	Peak
5150	54.66	66	100	H	35.50	9.77	35.20	64.73	74	-9.28	Peak
5150	**43.25**	**306**	**100**	**V**	**35.50**	**9.77**	**35.20**	**53.32**	**54**	**-0.69**	**Ave**
5150	41.62	66	100	H	35.50	9.77	35.20	51.69	54	-2.32	Ave
10360	46.75	0	100	V	38.10	13.40	35.74	62.51	78	-15.49	Peak
10360	46.43	0	100	H	38.10	13.40	35.74	62.19	78	-15.81	Peak
15540	45.6	0	100	V	40.50	18.91	33.70	71.31	84	-12.69	Peak
15540	44.94	0	100	H	40.50	18.91	33.70	70.65	84	-13.35	Peak
15540	33.69	0	100	V	40.50	18.91	33.70	59.40	64	-4.60	Ave
15540	33.62	0	100	H	40.50	18.91	33.70	59.33	64	-4.67	Ave
Middle Channel 5220 MHz											
10440	45.21	0	100	V	38.1	13.25	35.49	61.07	78	-16.93	Peak
10440	45.41	0	100	H	38.1	13.25	35.49	61.27	78	-16.73	Peak
15660	44.86	0	100	V	40.70	19.05	33.87	70.74	84	-13.26	Peak
15660	45.36	0	100	H	40.70	19.05	33.87	71.24	84	-12.76	Peak
15660	33.6	0	100	V	40.70	19.05	33.87	59.48	64	-4.52	Ave
15660	33.51	0	100	H	40.70	19.05	33.87	59.39	64	-4.61	Ave
High Channel 5240 MHz											
10480	45.15	0	100	V	38.20	13.25	35.49	61.11	78	-16.89	Peak
10480	44.91	0	100	H	38.20	13.25	35.49	60.87	78	-17.13	Peak
15720	45.47	0	100	V	40.70	19.09	33.87	71.39	84	-12.61	Peak
15720	44.95	0	100	H	40.70	19.09	33.87	70.87	84	-13.13	Peak
15720	33.78	0	100	V	40.70	19.09	33.87	59.70	64	-4.30	Ave
15720	33.79	0	100	H	40.70	19.09	33.87	59.71	64	-4.29	Ave

5150 - 5250 MHz

RADIO 2

802.11ac20 mode

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/ISEDC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Low Channel 5180 MHz											
5150	57.35	360	100	V	35.50	9.77	35.20	67.42	74	-6.59	Peak
5150	59.55	130	215	H	35.50	9.77	35.20	69.62	74	-4.39	Peak
5150	41.16	360	100	V	35.50	9.77	35.20	51.23	54	-2.77	Ave
5150	**43.07**	**130**	**215**	**H**	**35.50**	**9.77**	**35.20**	**53.14**	**54**	**-0.86**	**Ave**
10360	45.67	0	100	V	38.10	13.40	35.74	61.43	78	-16.57	Peak
10360	45.77	0	100	H	38.10	13.40	35.74	61.53	78	-16.47	Peak
15540	45.22	0	100	V	40.50	18.91	33.70	70.93	84	-13.07	Peak
15540	45.04	0	100	H	40.50	18.91	33.70	70.75	84	-13.25	Peak
15540	33.35	0	100	V	40.50	18.91	33.70	59.06	64	-4.94	Ave
15540	33.4	0	100	H	40.50	18.91	33.70	59.11	64	-4.89	Ave
Middle Channel 5220 MHz											
10440	45.43	0	100	V	38.10	13.25	35.49	61.29	78	-16.71	Peak
10440	45.09	0	100	H	38.10	13.25	35.49	60.95	78	-17.05	Peak
15660	44.94	0	100	V	40.70	19.05	33.87	70.82	84	-13.18	Peak
15660	45.71	0	100	H	40.70	19.05	33.87	71.59	84	-12.41	Peak
15660	33.49	0	100	V	40.70	19.05	33.87	59.37	64	-4.63	Ave
15660	33.33	0	100	H	40.70	19.05	33.87	59.21	64	-4.79	Ave
High Channel 5240 MHz											
10480	45.2	0	100	V	38.20	13.25	35.49	61.16	78	-16.84	Peak
10480	45.09	0	100	H	38.20	13.25	35.49	61.05	78	-16.95	Peak
15720	45.66	0	100	V	40.70	19.09	33.87	71.58	84	-12.42	Peak
15720	44.94	0	100	H	40.70	19.09	33.87	70.86	84	-13.14	Peak
15720	33.6	0	100	V	40.70	19.09	33.87	59.52	64	-4.48	Ave
15720	33.69	0	100	H	40.70	19.09	33.87	59.61	64	-4.39	Ave

5150 - 5250 MHz

RADIO 1

802.11a mode

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/ISEDC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Low Channel 5180 MHz											
5150	52.39	50	140	V	35.50	9.77	35.20	62.46	74	-11.55	Peak
5150	56.48	215	150	H	35.50	9.77	35.20	66.55	74	-7.46	Peak
5150	39.88	50	217	V	35.50	9.77	35.20	49.95	54	-4.06	Ave
5150	**42.23**	**215**	**140**	**H**	**35.50**	**9.77**	**35.20**	**52.30**	**54**	**-1.70**	**Ave**
10360	50.24	28	118	V	38.10	13.40	35.74	66.00	78	-12.00	Peak
10360	46.68	0	286	H	38.10	13.40	35.74	62.44	78	-15.56	Peak
15540	45.59	0	100	V	40.50	18.91	33.70	71.30	84	-12.70	Peak
15540	45.40	0	100	H	40.50	18.91	33.70	71.11	84	-12.89	Peak
15540	34.16	0	100	V	40.50	18.91	33.70	59.87	64	-4.13	Ave
15540	33.97	0	100	H	40.50	18.91	33.70	59.68	64	-4.32	Ave
Middle Channel 5220 MHz											
10440	46.71	0	174	V	38.10	13.25	35.49	62.57	78	-15.43	Peak
10440	46.7	14	268	H	38.10	13.25	35.49	62.56	78	-15.44	Peak
15660	45.54	0	100	V	40.70	19.05	33.87	71.42	84	-12.58	Peak
15660	44.7	0	100	H	40.70	19.05	33.87	70.58	84	-13.42	Peak
15660	32.88	0	100	V	40.70	19.05	33.87	58.76	64	-5.24	Ave
15660	33.04	0	100	H	40.70	19.05	33.87	58.92	64	-5.08	Ave
High Channel 5240 MHz											
10480	46.33	0	171	V	38.20	13.25	35.49	62.29	78	-15.71	Peak
10480	46.21	12	269	H	38.20	13.25	35.49	62.17	78	-15.83	Peak
15720	45.57	0	100	V	40.70	19.09	33.87	71.49	84	-12.51	Peak
15720	45.36	0	100	H	40.70	19.09	33.87	71.28	84	-12.72	Peak
15720	33.67	0	100	V	40.70	19.09	33.87	59.59	64	-4.41	Ave
15720	33.64	0	100	H	40.70	19.09	33.87	59.56	64	-4.44	Ave

5150 - 5250 MHz

RADIO 1

802.11n20 mode

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/ISEDC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Low Channel 5180 MHz											
5150	54.20	45	150	V	35.50	9.77	35.20	64.27	74	-9.74	Peak
5150	56.39	90	150	H	35.50	9.77	35.20	66.46	74	-7.55	Peak
5150	40.03	45	150	V	35.50	9.77	35.20	50.10	54	-3.90	Ave
5150	**41.58**	**95**	**150**	**H**	**35.50**	**9.77**	**35.20**	**51.64**	**54**	**-2.36**	**Ave**
10360	46.25	5	182	V	38.10	13.40	35.74	62.01	78	-15.99	Peak
10360	45.97	0	265	H	38.10	13.40	35.74	61.73	78	-16.27	Peak
15540	44.92	0	100	V	40.50	18.91	33.70	70.63	84	-13.37	Peak
15540	44.75	0	100	H	40.50	18.91	33.70	70.46	84	-13.54	Peak
15540	33.57	0	100	V	40.50	18.91	33.70	59.28	64	-4.72	Ave
15540	33.47	0	100	H	40.50	18.91	33.70	59.18	64	-4.82	Ave
Middle Channel 5220 MHz											
10440	45.66	337	208	V	38.10	13.25	35.49	61.52	78	-16.48	Peak
10440	45.92	141	260	H	38.10	13.25	35.49	61.78	78	-16.22	Peak
15660	44.61	0	100	V	40.70	19.05	33.87	70.49	84	-13.51	Peak
15660	43.65	0	100	H	40.70	19.05	33.87	69.53	84	-14.47	Peak
15660	33.15	0	100	V	40.70	19.05	33.87	59.03	64	-4.97	Ave
15660	33.34	0	100	H	40.70	19.05	33.87	59.22	64	-4.78	Ave
High Channel 5240 MHz											
10480	47.01	150	104	V	38.20	13.25	35.49	62.97	78	-15.03	Peak
10480	45.18	0	100	H	38.20	13.25	35.49	61.14	78	-16.86	Peak
15720	45.51	0	100	V	40.70	19.09	33.87	71.43	84	-12.57	Peak
15720	44.62	0	100	H	40.70	19.09	33.87	70.54	84	-13.46	Peak
15720	33.34	0	100	V	40.70	19.09	33.87	59.26	64	-4.74	Ave
15720	32.82	0	100	H	40.70	19.09	33.87	58.74	64	-5.26	Ave

5150 - 5250 MHz

RADIO 1

802.11ac20 mode

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/ISEDC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Low Channel 5180 MHz											
5150	52.81	230	140	V	35.50	9.77	35.20	62.88	74	-11.13	Peak
5150	56.82	213	150	H	35.50	9.77	35.20	66.89	74	-7.12	Peak
5150	39.56	230	140	V	35.50	9.77	35.20	49.62	54	-4.38	Ave
5150	**42.17**	**213**	**150**	**H**	**35.50**	**9.77**	**35.20**	**52.23**	**54**	**-1.77**	**Ave**
10360	48.16	0	171	V	38.10	13.40	35.74	63.92	78	-14.08	Peak
10360	47.57	6	287	H	38.10	13.40	35.74	63.33	78	-14.67	Peak
15540	45.63	0	100	V	40.50	18.91	33.70	71.34	84	-12.66	Peak
15540	45.11	0	100	H	40.50	18.91	33.70	70.82	84	-13.18	Peak
15540	33.90	0	100	V	40.50	18.91	33.70	59.61	64	-4.39	Ave
15540	33.75	0	100	H	40.50	18.91	33.70	59.46	64	-4.54	Ave
Middle Channel 5220 MHz											
10440	48.71	150	100	V	38.10	13.25	35.49	64.57	78	-13.43	Peak
10440	48.77	168	144	H	38.10	13.25	35.49	64.63	78	-13.37	Peak
15660	45.83	0	100	V	40.70	19.05	33.87	71.71	84	-12.29	Peak
15660	46.03	0	100	H	40.70	19.05	33.87	71.91	84	-12.09	Peak
15660	34.03	0	100	V	40.70	19.05	33.87	59.91	64	-4.09	Ave
15660	33.25	0	100	H	40.70	19.05	33.87	59.13	64	-4.87	Ave
High Channel 5240 MHz											
10480	47.62	137	100	V	38.2	13.25	35.49	63.58	78	-14.42	Peak
10480	46.38	0	100	H	38.2	13.25	35.49	62.34	78	-15.66	Peak
15720	45.83	0	100	V	40.7	19.09	33.87	71.75	84	-12.25	Peak
15720	45.89	0	100	H	40.7	19.09	33.87	71.81	84	-12.19	Peak
15720	34.08	0	100	V	40.7	19.09	33.87	60.00	64	-4.00	Ave
15720	33.97	0	100	H	40.7	19.09	33.87	59.89	64	-4.11	Ave

5745 - 5825 MHz

RADIO 2

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/ISEDC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Low Channel 5745 MHz											
5625-5650	30.51	314	120	V	35.40	9.14	0.00	75.05	78.20	-3.15	Peak
5650-5700	47.7	314	120	V	35.40	9.14	0.00	92.24	115.23	-22.99	Peak
5700-5720	63.33	314	120	V	35.40	9.14	0.00	107.87	120.53	-12.66	Peak
5720-5725	67.38	314	120	V	35.40	9.14	0.00	111.92	130.92	-19.00	Peak
5625-5650	31.84	248	145	H	35.40	9.14	0.00	76.38	78.20	-1.82	Peak
5650-5700	48.49	248	145	H	35.40	9.14	0.00	93.03	114.36	-21.33	Peak
5700-5720	64.53	248	145	H	35.40	9.14	0.00	109.07	120.54	-11.47	Peak
5720-5725	68.06	248	145	H	35.40	9.14	0.00	112.60	131.53	-18.93	Peak
11490	52.55	235	100	V	38.70	13.68	34.47	70.46	84.00	-13.54	Peak
11490	48.38	314	100	H	38.70	13.68	34.47	66.29	84.00	-17.71	Peak
11490	40.34	235	100	V	38.70	13.68	34.47	58.25	64.00	-5.75	Ave
11490	36.27	314	110	H	38.70	13.68	34.47	54.18	64.00	-9.82	Ave
17235	52.2	11	103	V	41.80	16.35	32.84	77.51	78.00	-0.49	Peak
17235	51.32	302	100	H	41.80	16.35	32.84	76.63	78.00	-1.37	Peak
Middle Channel 5785 MHz											
11570	53.62	61	100	V	38.90	13.77	34.47	71.82	84.00	-12.18	Peak
11570	48.97	338	122	H	38.90	13.77	34.47	67.17	84.00	-16.83	Peak
11570	41.42	61	100	V	38.90	13.77	34.47	59.62	64.00	-4.38	Ave
11570	36.45	338	122	H	38.90	13.77	34.47	54.65	64.00	-9.35	Ave
17355	**50.98**	**192**	**104**	**V**	**41.90**	**17.83**	**32.84**	**77.87**	**78.00**	**-0.13**	**Peak**
17355	50.41	91	233	H	41.90	17.83	32.84	77.30	78.00	-0.70	Peak
High Channel 5825 MHz											
5850-5855	52.47	312	122	V	35.60	9.14	0.00	97.21	131.96	-34.75	Peak
5855-5875	49.29	312	122	V	35.60	9.14	0.00	94.03	120.81	-26.78	Peak
5875-5925	33.21	312	122	V	35.60	9.14	0.00	77.95	115.17	-37.22	Peak
5925-5950	29.95	312	122	V	35.60	9.14	0.00	74.69	78.20	-3.51	Peak
5850-5855	55.56	245	150	H	35.60	9.14	0.00	100.30	129.13	-28.83	Peak
5855-5875	51.57	245	150	H	35.60	9.14	0.00	96.31	120.83	-24.52	Peak
5875-5925	38.62	245	150	H	35.60	9.14	0.00	83.36	114.25	-30.88	Peak
5925-5950	29.88	245	150	V	35.60	9.14	0.00	74.62	78.20	-3.58	Peak
11650	49.23	235	100	V	39.00	13.69	34.49	67.43	84.00	-16.57	Peak
11650	45.66	312	227	H	39.00	13.69	34.49	63.86	84.00	-20.14	Peak
11650	36.04	235	100	V	39.00	13.69	34.49	54.24	64.00	-9.76	Ave
11650	33.42	312	227	H	39.00	13.69	34.49	51.62	64.00	-12.38	Ave
17475	52.03	10	100	V	41.80	16.70	32.73	77.80	78.00	-0.20	Peak
17475	48.91	25	100	H	41.80	16.70	32.73	74.68	78.00	-3.32	Peak

5745 - 5825 MHz

RADIO 2

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/ISEDC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Low Channel 5745 MHz											
5625-5650	30.09	35	100	V	35.40	9.14	0.00	74.63	78.20	-3.57	Peak
5650-5700	39.51	35	100	V	35.40	9.14	0.00	84.05	112.40	-28.34	Peak
5700-5720	56.22	35	100	V	35.40	9.14	0.00	100.76	120.82	-20.06	Peak
5720-5725	64	35	100	V	35.40	9.14	0.00	108.54	132.18	-23.64	Peak
5625-5650	28.93	314	134	H	35.40	9.14	0.00	73.47	78.20	-4.73	Peak
5650-5700	40.24	314	134	H	35.40	9.14	0.00	84.78	115.23	-30.45	Peak
5700-5720	57.94	314	134	H	35.40	9.14	0.00	102.48	120.83	-18.35	Peak
5720-5725	65.64	314	134	H	35.40	9.14	0.00	110.18	132.16	-21.98	Peak
11490	46.39	186	106	V	38.70	13.68	34.47	64.30	84.00	-19.70	Peak
11490	45.47	132	163	H	38.70	13.68	34.47	63.38	84.00	-20.62	Peak
11490	34.29	186	106	V	38.70	13.68	34.47	52.20	64.00	-11.80	Ave
11490	32.75	132	163	H	38.70	13.68	34.47	50.66	64.00	-13.34	Ave
17235	52.51	9	100	V	41.80	16.35	32.84	77.82	78.00	-0.18	Peak
17235	50.82	322	100	H	41.80	16.35	32.84	76.13	78.00	-1.87	Peak
Middle Channel 5785 MHz											
11570	49.98	156	100	V	38.90	13.77	34.47	68.18	84.00	-15.82	Peak
11570	48.71	21	100	H	38.90	13.77	34.47	66.91	84.00	-17.09	Peak
11570	37.86	156	100	V	38.90	13.77	34.47	56.06	64.00	-7.94	Ave
11570	36.14	21	100	H	38.90	13.77	34.47	54.34	64.00	-9.66	Ave
17355	50.09	358	100	V	41.90	17.83	32.84	76.98	78.00	-1.02	Peak
17355	50.84	320	100	H	41.90	17.83	32.84	77.73	78.00	-0.27	Peak
High Channel 5825 MHz											
5850-5855	51.15	46	100	V	35.60	9.14	0.00	95.89	132.16	-36.27	Peak
5855-5875	46.08	46	100	V	35.60	9.14	0.00	90.82	120.52	-29.70	Peak
5875-5925	33.69	46	100	V	35.60	9.14	0.00	78.43	114.99	-36.55	Peak
5925-5950	30.15	46	100	V	35.60	9.14	0.00	74.89	78.20	-3.31	Peak
5850-5855	56.18	315	129	H	35.60	9.14	0.00	100.92	130.52	-29.60	Peak
5855-5875	50.79	315	129	H	35.60	9.14	0.00	95.53	120.54	-25.01	Peak
5875-5925	38.32	315	129	H	35.60	9.14	0.00	83.06	115.17	-32.11	Peak
5925-5950	30.46	315	129	H	35.60	9.14	0.00	75.20	78.20	-3.00	Peak
11650	50.71	98	100	V	39.00	13.69	34.49	68.91	84.00	-15.09	Peak
11650	47.43	324	227	H	39.00	13.69	34.49	65.63	84.00	-18.37	Peak
11650	39.71	98	100	V	39.00	13.69	34.49	57.91	64.00	-6.09	Ave
11650	37.08	324	227	H	39.00	13.69	34.49	55.28	64.00	-8.72	Ave
17475	**52.15**	**350**	**100**	**V**	**41.80**	**16.70**	**32.73**	**77.92**	**78.00**	**-0.08**	**Peak**
17475	51.3	33	100	H	41.80	16.70	32.73	77.07	78.00	-0.93	Peak

5745 - 5825 MHz

RADIO 2

802.11n20 mode

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/ISEDC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Low Channel 5745 MHz											
5625-5650	28.67	315	100	V	35.40	9.14	0.00	73.21	78.20	-4.99	Peak
5650-5700	36.97	315	100	V	35.40	9.14	0.00	81.51	113.07	-31.56	Peak
5700-5720	47.91	315	100	V	35.40	9.14	0.00	92.45	120.75	-28.29	Peak
5720-5725	59.77	315	100	V	35.40	9.14	0.00	104.31	132.21	-27.90	Peak
5625-5650	28.83	247	134	H	35.40	9.14	0.00	73.37	78.20	-4.83	Peak
5650-5700	40.92	247	134	H	35.40	9.14	0.00	85.46	113.14	-27.67	Peak
5700-5720	51.12	247	134	H	35.40	9.14	0.00	95.66	120.49	-24.83	Peak
5720-5725	61.72	247	134	H	35.40	9.14	0.00	106.26	132.21	-25.95	Peak
11490	51.17	49	126	V	38.70	13.68	34.47	69.08	84.00	-14.92	Peak
11490	47.64	309	267	H	38.70	13.68	34.47	65.55	84.00	-18.45	Peak
11490	35.68	49	126	V	38.70	13.68	34.47	53.59	64.00	-10.41	Ave
11490	37.56	309	267	H	38.70	13.68	34.47	55.47	64.00	-8.53	Ave
17235	52.26	5	100	V	41.80	16.35	32.84	77.57	78.00	-0.43	Peak
17235	**52.63**	**323**	**108**	**H**	**41.80**	**16.35**	**32.84**	**77.94**	**78.00**	**-0.06**	**Peak**
Middle Channel 5785 MHz											
11570	49.08	99	100	V	38.90	13.77	34.47	67.28	84.00	-16.72	Peak
11570	50.64	303	198	H	38.90	13.77	34.47	68.84	84.00	-15.16	Peak
11570	39.47	99	100	V	38.90	13.77	34.47	57.67	64.00	-6.33	Ave
11570	41.4	303	198	H	38.90	13.77	34.47	59.60	64.00	-4.40	Ave
17355	49.73	2	100	V	41.90	17.83	32.84	76.62	78.00	-1.38	Peak
17355	51.03	321	100	H	41.90	17.83	32.84	77.92	78.00	-0.08	Peak
High Channel 5825 MHz											
5850-5855	55.08	317	100	V	35.60	9.14	0.00	99.82	131.59	-31.77	55.08
5855-5875	51.96	317	100	V	35.60	9.14	0.00	96.70	120.75	-24.04	51.96
5875-5925	34.51	317	100	V	35.60	9.14	0.00	79.25	115.23	-35.98	34.51
5925-5950	29.69	317	100	V	35.60	9.14	0.00	74.43	78.20	-3.77	29.69
5850-5855	52.57	243	130	H	35.60	9.14	0.00	97.31	131.96	-34.65	52.57
5855-5875	51.01	243	130	H	35.60	9.14	0.00	95.75	120.81	-25.06	51.01
5875-5925	33.55	243	130	H	35.60	9.14	0.00	78.29	115.05	-36.75	33.55
5925-5950	29.81	243	130	H	35.60	9.14	0.00	74.55	78.20	-3.65	29.81
11650	47.82	194	130	V	39.00	13.69	34.49	66.02	84.00	-17.98	47.82
11650	49.24	306	203	H	39.00	13.69	34.49	67.44	84.00	-16.56	49.24
11650	38.5	194	100	V	39.00	13.69	34.49	56.70	64.00	-7.30	38.5
11650	39.4	306	203	H	39.00	13.69	34.49	57.60	64.00	-6.40	39.4
17475	51.74	16	100	V	41.80	16.70	32.73	77.51	78.00	-0.49	51.74
17475	51.47	356	100	H	41.80	16.70	32.73	77.24	78.00	-0.76	51.47

5745 - 5825 MHz

RADIO 2

802.11ac20 mode

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/ISEDC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Low Channel 5745 MHz											
5625-5650	29.44	312	118	V	35.40	9.14	0.00	73.98	78.20	-4.22	Peak
5650-5700	37.86	312	118	V	35.40	9.14	0.00	82.40	112.33	-29.93	Peak
5700-5720	49.34	312	118	V	35.40	9.14	0.00	93.88	120.78	-26.90	Peak
5720-5725	60.48	312	118	V	35.40	9.14	0.00	105.02	132.18	-27.16	Peak
5625-5650	29.02	253	122	H	35.40	9.14	0.00	73.56	78.20	-4.64	Peak
5650-5700	34.61	253	122	H	35.40	9.14	0.00	79.15	113.20	-34.04	Peak
5700-5720	49.11	253	122	H	35.40	9.14	0.00	93.65	120.82	-27.17	Peak
5720-5725	60.41	253	122	H	35.40	9.14	0.00	104.95	132.23	-27.28	Peak
11490	49.32	251	100	V	38.70	13.68	34.47	67.23	84.00	-16.77	Peak
11490	47.51	308	268	H	38.70	13.68	34.47	65.42	84.00	-18.58	Peak
11490	37.91	251	100	V	38.70	13.68	34.47	55.82	64.00	-8.18	Ave
11490	36.16	308	268	H	38.70	13.68	34.47	54.07	64.00	-9.93	Ave
17235	51.49	358	100	V	41.80	16.35	32.84	76.80	78.00	-1.20	Peak
17235	52.39	320	100	H	41.80	16.35	32.84	77.70	78.00	-0.30	Peak
Middle Channel 5785 MHz											
11570	51.3	100	100	V	38.90	13.77	34.47	69.50	84.00	-14.50	Peak
11570	50.6	302	197	H	38.90	13.77	34.47	68.80	84.00	-15.20	Peak
11570	38.78	100	100	V	38.90	13.77	34.47	56.98	64.00	-7.02	Ave
11570	38.75	302	197	H	38.90	13.77	34.47	56.95	64.00	-7.05	Ave
17355	50.93	17	104	V	41.90	17.83	32.84	77.82	78.00	-0.18	Peak
17355	50.04	318	100	H	41.90	17.83	32.84	76.93	78.00	-1.07	Peak
High Channel 5825 MHz											
5850-5855	52.25	313	120	V	35.60	9.14	0.00	96.99	132.18	-35.19	Peak
5855-5875	47.43	313	120	V	35.60	9.14	0.00	92.17	120.79	-28.62	Peak
5875-5925	33.76	313	120	V	35.60	9.14	0.00	78.50	114.99	-36.48	Peak
5925-5950	30.15	313	120	V	35.60	9.14	0.00	74.89	78.20	-3.31	Peak
5850-5855	51.37	246	126	H	35.60	9.14	0.00	96.11	132.07	-35.96	Peak
5855-5875	46.2	246	126	H	35.60	9.14	0.00	90.94	120.83	-29.89	Peak
5875-5925	31	246	126	H	35.60	9.14	0.00	75.74	115.23	-39.49	Peak
5925-5950	30.06	246	126	H	35.60	9.14	0.00	74.80	78.20	-3.40	Peak
11650	49.44	341	100	V	39.00	13.69	34.49	67.64	84.00	-16.36	Peak
11650	47.19	23	134	H	39.00	13.69	34.49	65.39	84.00	-18.61	Peak
11650	37	341	100	V	39.00	13.69	34.49	55.20	64.00	-8.80	Ave
11650	36.4	23	134	H	39.00	13.69	34.49	54.60	64.00	-9.40	Ave
17475	**52.1**	**16**	**100**	**V**	**41.80**	**16.70**	**32.73**	**77.87**	**78.00**	**-0.13**	**Peak**
17475	51.98	355	100	H	41.80	16.70	32.73	77.75	78.00	-0.25	Peak

5745 - 5825 MHz

RADIO 1

802.11a mode

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/ISEDC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Low Channel 5745 MHz											
5625-5650	29.15	205	133	V	35.40	9.14	0.00	73.69	78.20	-4.51	Peak
5650-5700	36.38	205	133	V	35.40	9.14	0.00	80.92	114.49	-33.57	Peak
5700-5720	49.79	205	133	V	35.40	9.14	0.00	94.33	120.63	-26.30	Peak
5720-5725	57.42	205	133	V	35.40	9.14	0.00	101.96	132.23	-30.27	Peak
5625-5650	29.21	330	100	H	35.40	9.14	0.00	73.75	78.20	-4.45	Peak
5650-5700	34.14	330	100	H	35.40	9.14	0.00	78.68	113.01	-34.33	Peak
5700-5720	46.9	330	100	H	35.40	9.14	0.00	91.44	120.81	-29.37	Peak
5720-5725	56.13	330	100	H	35.40	9.14	0.00	100.67	132.23	-31.56	Peak
11490	44.27	0	100	V	38.70	13.68	34.47	62.18	84.00	-21.82	Peak
11490	44.33	0	100	H	38.70	13.68	34.47	62.24	84.00	-21.76	Peak
11490	32.42	0	100	V	38.70	13.68	34.47	50.33	64.00	-13.67	Ave
11490	33.09	0	100	H	38.70	13.68	34.47	51.00	64.00	-13.00	Ave
17235	44.26	0	100	V	41.80	16.35	32.84	69.57	78.00	-8.43	Peak
17235	44.12	0	100	H	41.80	16.35	32.84	69.43	78.00	-8.57	Peak
Middle Channel 5785 MHz											
11570	43.3	0	100	V	38.90	13.77	34.47	61.50	84.00	-22.50	Peak
11570	43.83	0	100	H	38.90	13.77	34.47	62.03	84.00	-21.97	Peak
11570	31.92	0	100	V	38.90	13.77	34.47	50.12	64.00	-13.88	Ave
11570	31.82	0	100	H	38.90	13.77	34.47	50.02	64.00	-13.98	Ave
17355	45.01	0	100	V	41.90	17.83	32.84	71.90	78.00	-6.10	Peak
17355	44.2	0	100	H	41.90	17.83	32.84	71.09	78.00	-6.91	Peak
High Channel 5825 MHz											
5850-5855	53.76	207	128	V	35.60	9.14	0.00	98.50	128.90	-30.40	Peak
5855-5875	55.53	207	128	V	35.60	9.14	0.00	100.27	120.18	-19.91	Peak
5875-5925	40.26	207	128	V	35.60	9.14	0.00	85.00	109.07	-24.06	Peak
5925-5950	30.24	207	128	V	35.60	9.14	0.00	74.98	78.20	-3.22	Peak
5850-5855	54.48	327	100	H	35.60	9.14	0.00	99.22	131.80	-32.58	Peak
5855-5875	53.67	327	100	H	35.60	9.14	0.00	98.41	120.19	-21.78	Peak
5875-5925	39.23	327	100	H	35.60	9.14	0.00	83.97	109.00	-25.03	Peak
5925-5950	**30.59**	**327**	**100**	**H**	**35.60**	**9.14**	**0.00**	**75.33**	**78.20**	**-2.87**	**Peak**
11650	43.77	0	100	V	39.00	13.69	34.49	61.97	84.00	-22.03	Peak
11650	43.57	0	100	H	39.00	13.69	34.49	61.77	84.00	-22.23	Peak
11650	32.12	0	100	V	39.00	13.69	34.49	50.32	64.00	-13.68	Ave
11650	32.22	0	100	H	39.00	13.69	34.49	50.42	64.00	-13.58	Ave
17475	43.36	0	100	V	41.80	16.70	32.73	69.13	78.00	-8.87	Peak
17475	43.58	0	100	H	41.80	16.70	32.73	69.35	78.00	-8.65	Peak

5745 - 5825 MHz

RADIO 1

802.11n20 mode

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/ISEDC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Low Channel 5745 MHz											
5625-5650	28.93	207	131	V	35.40	9.14	0.00	73.47	78.20	-4.73	Peak
5650-5700	33.98	207	131	V	35.40	9.14	0.00	78.52	114.06	-35.54	Peak
5700-5720	48.38	207	131	V	35.40	9.14	0.00	92.92	120.73	-27.81	Peak
5720-5725	57.32	207	131	V	35.40	9.14	0.00	101.86	126.76	-24.90	Peak
5625-5650	29.19	332	100	H	35.40	9.14	0.00	73.73	78.20	-4.47	Peak
5650-5700	33.34	332	100	H	35.40	9.14	0.00	77.88	114.49	-36.61	Peak
5700-5720	47.13	332	100	H	35.40	9.14	0.00	91.67	120.73	-29.06	Peak
5720-5725	56.11	332	100	H	35.40	9.14	0.00	100.65	126.46	-25.81	Peak
11490	42.57	0	100	V	38.70	13.68	34.47	60.48	84.00	-23.52	Peak
11490	42.46	0	100	H	38.70	13.68	34.47	60.37	84.00	-23.63	Peak
11490	31.43	0	100	V	38.70	13.68	34.47	49.34	64.00	-14.66	Ave
11490	31.26	0	100	H	38.70	13.68	34.47	49.17	64.00	-14.83	Ave
17235	43.14	0	100	V	41.80	16.35	32.84	68.45	78.00	-9.55	Peak
17235	43.96	0	100	H	41.80	16.35	32.84	69.27	78.00	-8.73	Peak
Middle Channel 5785 MHz											
11570	43.33	0	100	V	38.90	13.77	34.47	61.53	84.00	-22.47	Peak
11570	42.98	0	100	H	38.90	13.77	34.47	61.18	84.00	-22.82	Peak
11570	32.03	0	100	V	38.90	13.77	34.47	50.23	64.00	-13.77	Ave
11570	32.02	0	100	H	38.90	13.77	34.47	50.22	64.00	-13.78	Ave
17355	43.47	0	100	V	41.90	17.83	32.84	70.36	78.00	-7.64	Peak
17355	44.42	0	100	H	41.90	17.83	32.84	71.31	78.00	-6.69	Peak
High Channel 5825 MHz											
5850-5855	55.14	207	133	V	35.60	9.14	0.00	99.88	126.12	-26.24	Peak
5855-5875	53.93	207	133	V	35.60	9.14	0.00	98.67	120.83	-22.16	Peak
5875-5925	41.06	207	133	V	35.60	9.14	0.00	85.80	112.77	-26.96	Peak
5925-5950	29.75	207	133	V	35.60	9.14	0.00	74.49	78.20	-3.71	Peak
5850-5855	53.47	328	100	H	35.60	9.14	0.00	98.21	126.01	-27.79	Peak
5855-5875	52.01	328	100	H	35.60	9.14	0.00	96.75	120.83	-24.08	Peak
5875-5925	39.42	328	100	H	35.60	9.14	0.00	84.16	113.01	-28.85	Peak
5925-5950	**30.09**	**328**	**100**	**H**	**35.60**	**9.14**	**0.00**	**74.83**	**78.20**	**-3.37**	**Peak**
11650	43.67	0	100	V	39.00	13.69	34.49	61.87	84.00	-22.13	Peak
11650	43.52	0	100	H	39.00	13.69	34.49	61.72	84.00	-22.28	Peak
11650	32.13	0	100	V	39.00	13.69	34.49	50.33	64.00	-13.67	Ave
11650	32.03	0	100	H	39.00	13.69	34.49	50.23	64.00	-13.77	Ave
17475	43.34	0	100	V	41.80	16.70	32.73	69.11	78.00	-8.89	Peak
17475	43.79	0	100	H	41.80	16.70	32.73	69.56	78.00	-8.44	Peak

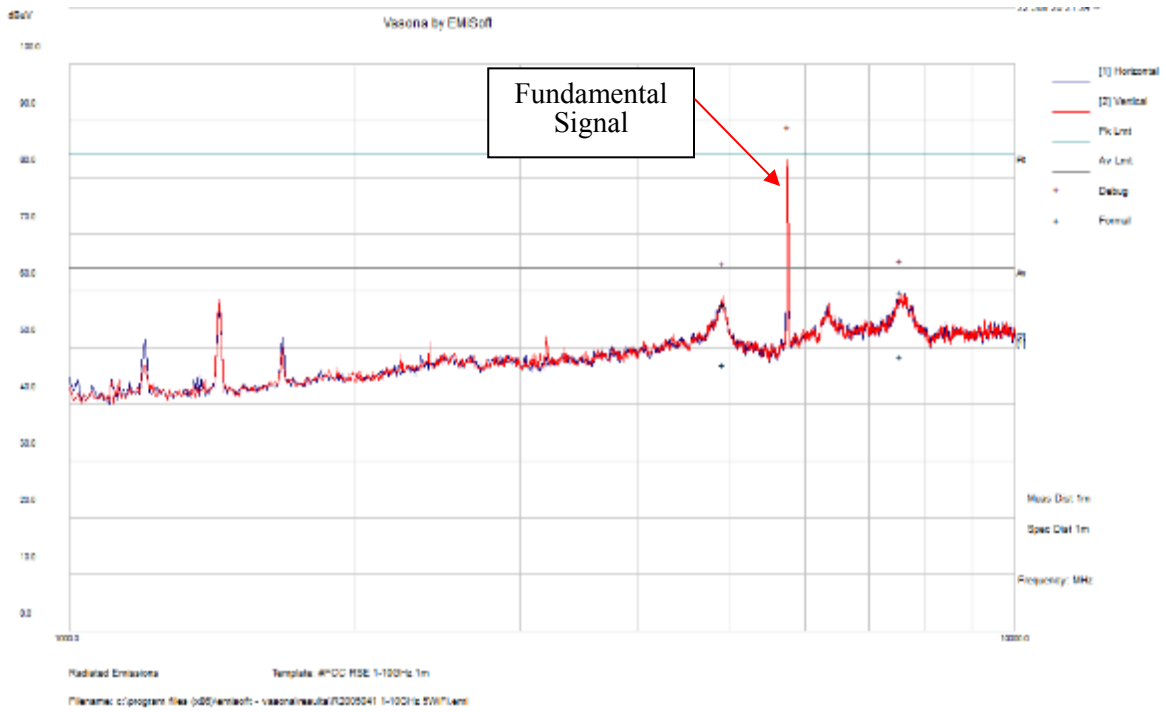
5745 - 5825 MHz

RADIO 1

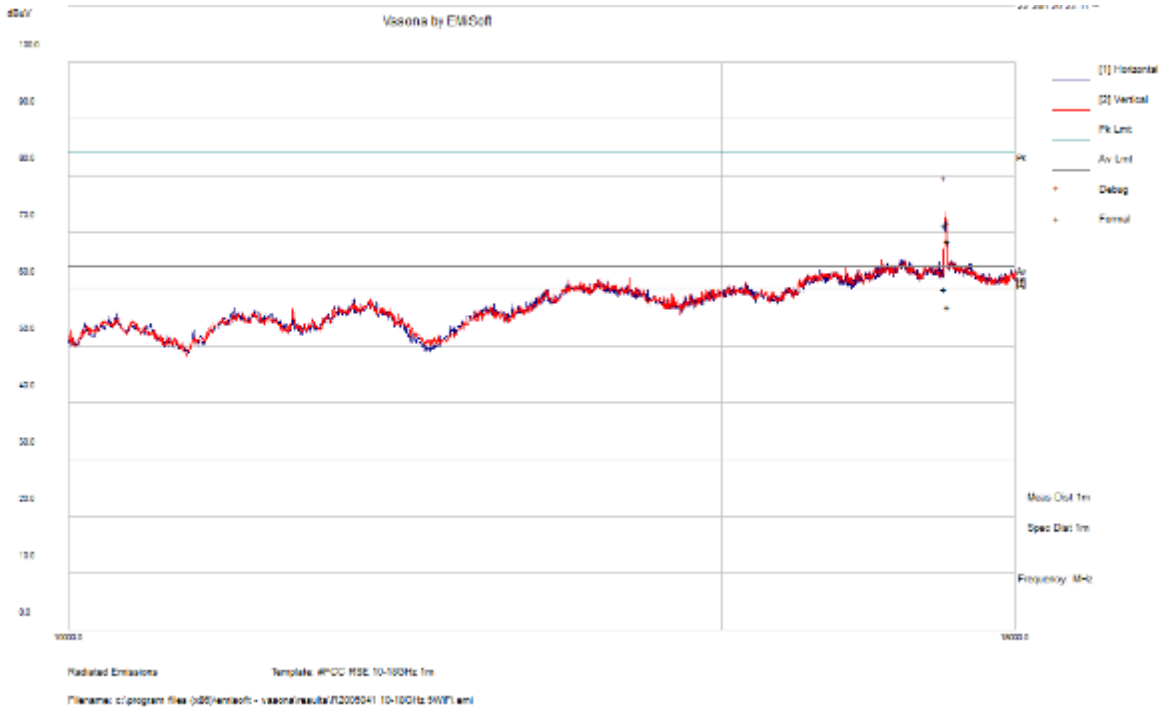
802.11ac20 mode

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/ISEDC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Low Channel 5745 MHz											
5625-5650	28.64	207	133	V	35.40	9.14	0.00	73.18	78.20	-5.02	Peak
5650-5700	31.1	207	133	V	35.40	9.14	0.00	75.64	88.81	-13.17	Peak
5700-5720	51.01	207	133	V	35.40	9.14	0.00	95.55	120.21	-24.66	Peak
5720-5725	58.37	207	133	V	35.40	9.14	0.00	102.91	130.12	-27.21	Peak
5625-5650	28.72	329	100	H	35.40	9.14	0.00	73.26	78.20	-4.94	Peak
5650-5700	34	329	100	H	35.40	9.14	0.00	78.54	109.50	-30.95	Peak
5700-5720	49.96	329	100	H	35.40	9.14	0.00	94.50	120.23	-25.73	Peak
5720-5725	57.42	329	100	H	35.40	9.14	0.00	101.96	132.21	-30.25	Peak
11490	42.68	0	100	V	38.70	13.68	34.47	60.59	84.00	-23.41	Peak
11490	43.38	0	100	H	38.70	13.68	34.47	61.29	84.00	-22.71	Peak
11490	31.62	0	100	V	38.70	13.68	34.47	49.53	64.00	-14.47	Ave
11490	31.51	0	100	H	38.70	13.68	34.47	49.42	64.00	-14.58	Ave
17235	42.95	0	100	V	41.80	16.35	32.84	68.26	78.00	-9.74	Peak
17235	43.95	0	100	H	41.80	16.35	32.84	69.26	78.00	-8.74	Peak
Middle Channel 5785 MHz											
11570	43.13	0	100	V	38.90	13.77	34.47	61.33	84.00	-22.67	Peak
11570	42.52	0	100	H	38.90	13.77	34.47	60.72	84.00	-23.28	Peak
11570	31.98	0	100	V	38.90	13.77	34.47	50.18	64.00	-13.82	Ave
11570	31.98	0	100	H	38.90	13.77	34.47	50.18	64.00	-13.82	Ave
17355	43.24	0	100	V	41.90	17.83	32.84	70.13	78.00	-7.87	Peak
17355	43.81	0	100	H	41.90	17.83	32.84	70.70	78.00	-7.30	Peak
High Channel 5825 MHz											
5850-5855	56.77	207	129	V	35.60	9.14	0.00	101.51	132.16	-30.65	Peak
5855-5875	53.12	207	129	V	35.60	9.14	0.00	97.86	120.81	-22.95	Peak
5875-5925	41.17	207	129	V	35.60	9.14	0.00	85.91	114.73	-28.82	Peak
5925-5950	**30.59**	**207**	**129**	**V**	**35.60**	**9.14**	**0.00**	**75.33**	**78.20**	**-2.87**	**Peak**
5850-5855	55.38	328	100	H	35.60	9.14	0.00	100.12	132.12	-31.99	Peak
5855-5875	51.61	328	100	H	35.60	9.14	0.00	96.35	120.83	-24.48	Peak
5875-5925	36.94	328	100	H	35.60	9.14	0.00	81.68	109.37	-27.69	Peak
5925-5950	29.81	328	100	H	35.60	9.14	0.00	74.55	78.20	-3.65	Peak
11650	43.81	0	100	V	39.00	13.69	34.49	62.01	84.00	-21.99	Peak
11650	43.62	0	100	H	39.00	13.69	34.49	61.82	84.00	-22.18	Peak
11650	32.16	0	100	V	39.00	13.69	34.49	50.36	64.00	-13.64	Ave
11650	32.15	0	100	H	39.00	13.69	34.49	50.35	64.00	-13.65	Ave
17475	43.67	0	100	V	41.80	16.70	32.73	69.44	78.00	-8.56	Peak
17475	42.73	0	100	H	41.80	16.70	32.73	68.50	78.00	-9.50	Peak

1 GHz – 10 GHz Worst Case Scan at 1 Meter

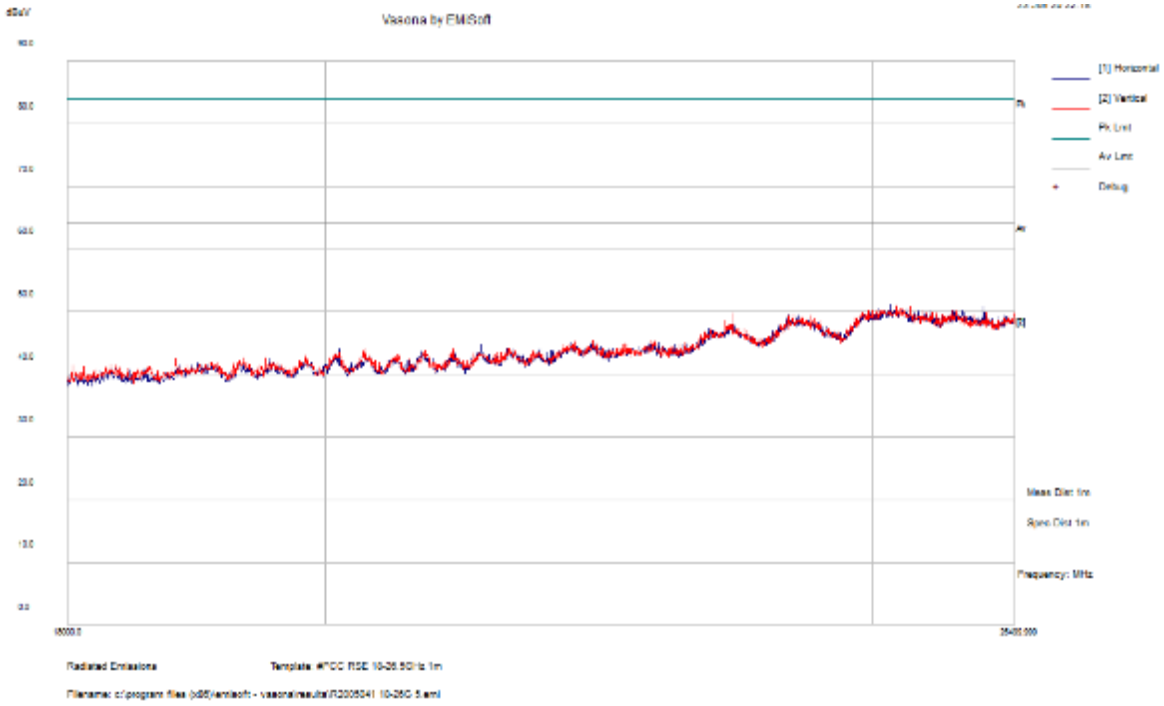


10 GHz – 18 GHz Worst Case Scan at 1 Meter

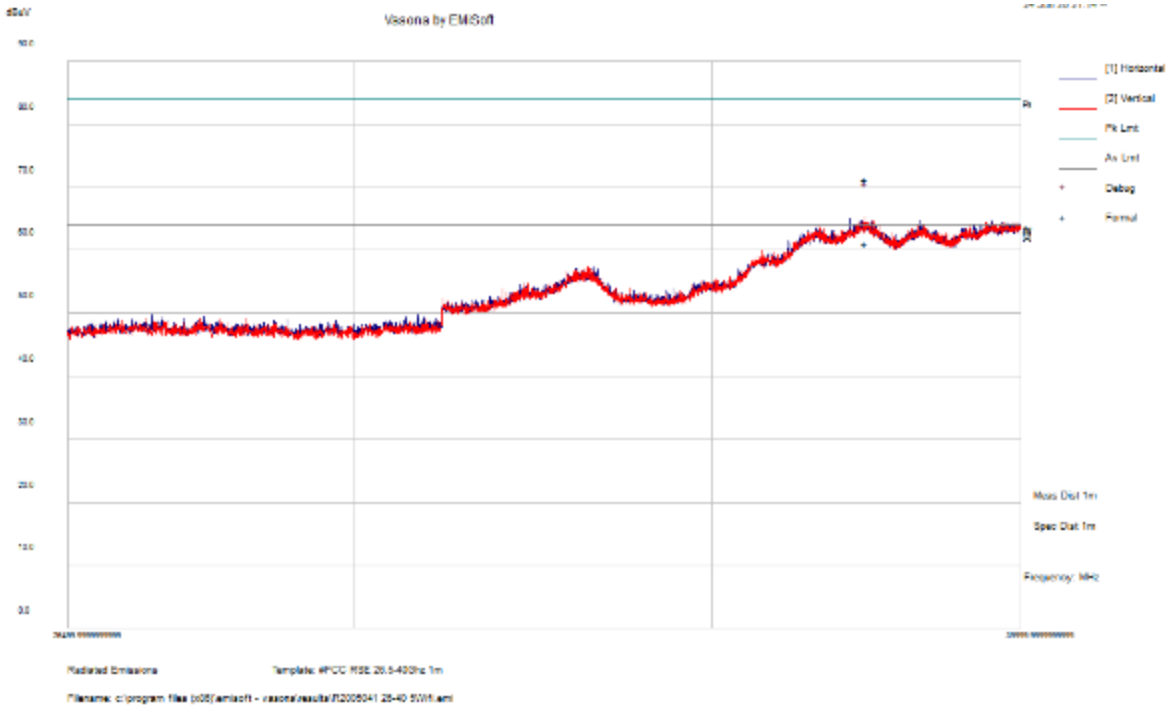


Frequency (MHz)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Comments (PK/QP/Ave.)
17232.273	71.2	204	H	252	84	-12.8	Peak
17266.455	68.5	157	V	94	84	-15.5	Peak
17232.273	60.16	204	H	252	64	-3.84	Ave
17266.455	57.08	275	H	135	64	-6.92	Ave

18 GHz – 26.5 GHz Worst Case Scan at 1 Meter



26.5 GHz – 40 GHz Worst Case Scan at 1 Meter



Frequency (MHz)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Comments (PK/QP/Ave.)
37394.803	71.3	241	H	44	84	-12.7	Peak
37394.803	61.07	108	V	14	64	-2.93	Ave

8 FCC §15.407(e) & ISEDC RSS-247 §6.2 - 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 Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
Agilent	Spectrum Analyzer	E4446A	MY48250238	2019-06-26	1 year
-	RF cable	-	-	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 calibrations have been performed per the A2LA requirements, traceable to the NIST.*

8.4 Test Environmental Conditions

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

The testing was performed by Tri Pham & Christian McCaig from 2020-05-13 to 2020-05-22 in RF site.

8.5 Test Results

Please refer to the following tables and plots.

FCC:

5150 - 5250 MHz

RADIO 2 Ant A

Channel	Frequency (MHz)	99% OBW (MHz)	26 dB OBW (MHz)
802.11a mode			
36	5180	16.41	19.26
44	5220	16.42	21.75
48	5240	16.39	18.93
802.11n20 mode			
36	5180	17.54	19.54
44	5220	17.54	19.67
48	5240	17.55	19.67
802.11ac20 mode			
36	5180	17.53	19.67
44	5220	17.53	19.56
48	5240	17.54	19.78

RADIO 2 Ant B

Channel	Frequency (MHz)	99% OBW (MHz)	26 dB OBW (MHz)
802.11a mode			
36	5180	16.35	18.51
44	5220	16.36	18.49
48	5240	16.36	18.52
802.11n20 mode			
36	5180	17.56	19.56
44	5220	17.53	19.61
48	5240	17.53	19.61
802.11ac20 mode			
36	5180	17.53	19.64
44	5220	17.52	19.62
48	5240	17.53	19.73

RADIO 1 Ant A

Channel	Frequency (MHz)	99% OBW (MHz)	26 dB OBW (MHz)
802.11a mode			
36	5180	16.37	18.79
44	5220	16.35	18.57
48	5240	16.38	18.71
802.11n20 mode			
36	5180	17.53	19.58
44	5220	17.54	19.68
48	5240	17.53	19.50
802.11ac20 mode			
36	5180	17.52	19.63
44	5220	17.62	19.53
48	5240	17.53	19.50

5725 - 5850 MHz

RADIO 2 Ant A

Channel	Frequency (MHz)	99% OBW (MHz)	6 dB OBW (MHz)	6 dB OBW limit (kHz)
802.11a mode				
149	5745	24.49	16.33	≥500
157	5785	23.36	16.34	≥500
165	5825	23.44	16.31	≥500
802.11n20 mode				
149	5745	24.28	17.55	≥500
157	5785	24.33	17.55	≥500
165	5825	23.09	17.57	≥500
802.11ac20 mode				
149	5745	24.26	17.20	≥500
157	5785	23.66	17.55	≥500
165	5825	23.18	17.57	≥500

RADIO 2 Ant B

Channel	Frequency (MHz)	99% OBW (MHz)	6 dB OBW (MHz)	6 dB OBW limit (kHz)
802.11a mode				
149	5745	26.20	16.35	≥500
157	5785	25.76	16.33	≥500
165	5825	25.63	16.36	≥500
802.11n20 mode				
149	5745	26.77	17.59	≥500
157	5785	26.36	17.20	≥500
165	5825	25.98	17.57	≥500
802.11ac20 mode				
149	5745	26.51	17.56	≥500
157	5785	26.05	17.54	≥500
165	5825	25.89	17.56	≥500

RADIO 1 Ant A

Channel	Frequency (MHz)	99% OBW (MHz)	6 dB OBW (MHz)	6 dB OBW limit (kHz)
802.11a mode				
149	5745	16.37	16.35	≥500
157	5785	16.38	16.34	≥500
165	5825	16.39	16.34	≥500
802.11n20 mode				
149	5745	17.54	17.55	≥500
157	5785	17.56	17.27	≥500
165	5825	17.54	17.56	≥500
802.11ac20 mode				
149	5745	17.56	17.32	≥500
157	5785	17.54	17.51	≥500
165	5825	17.57	17.54	≥500

IC:

5150 - 5250 MHz

RADIO 2 Ant A

Channel	Frequency (MHz)	99% OBW (MHz)	26 dB OBW (MHz)
802.11a mode			
36	5180	16.37	18.83
44	5220	16.36	18.61
48	5240	16.36	18.73
802.11n20 mode			
36	5180	17.54	19.59
44	5220	17.53	19.64
48	5240	17.53	19.61
802.11ac20 mode			
36	5180	17.55	19.66
44	5220	17.55	19.70
48	5240	17.55	19.70

RADIO 2 Ant B

Channel	Frequency (MHz)	99% OBW (MHz)	26 dB OBW (MHz)
802.11a mode			
36	5180	16.38	18.64
44	5220	16.38	18.42
48	5240	16.37	18.52
802.11n20 mode			
36	5180	17.53	19.65
44	5220	17.53	19.63
48	5240	17.54	19.64
802.11ac20 mode			
36	5180	17.53	19.61
44	5220	17.55	19.69
48	5240	17.53	19.72

RADIO 1 Ant A

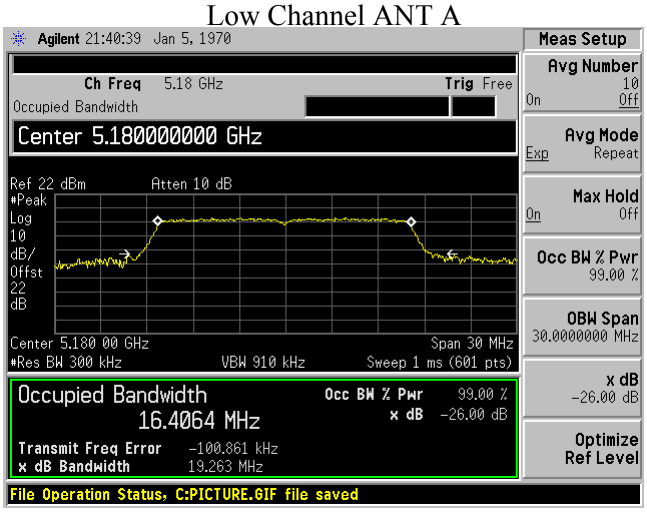
Channel	Frequency (MHz)	99% OBW (MHz)	26 dB OBW (MHz)
802.11a mode			
36	5180	16.38	18.59
44	5220	16.37	18.72
48	5240	16.35	18.83
802.11n20 mode			
36	5180	17.54	19.71
44	5220	17.53	19.64
48	5240	17.52	19.70
802.11ac20 mode			
36	5180	17.55	19.70
44	5220	17.52	19.66
48	5240	17.54	19.56

Please refer to the following plots:

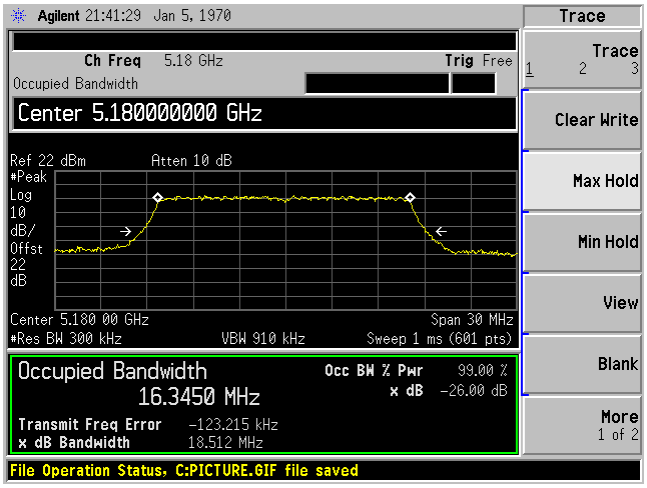
FCC:

5150 - 5250 MHz
RADIO 2
802.11a Mode

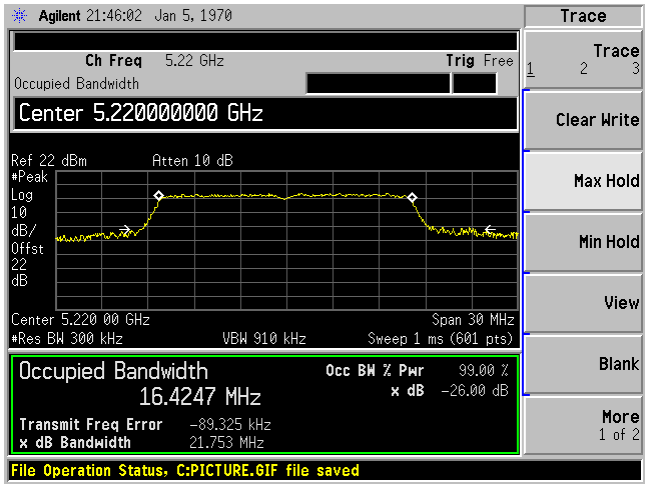
Low Channel ANT A



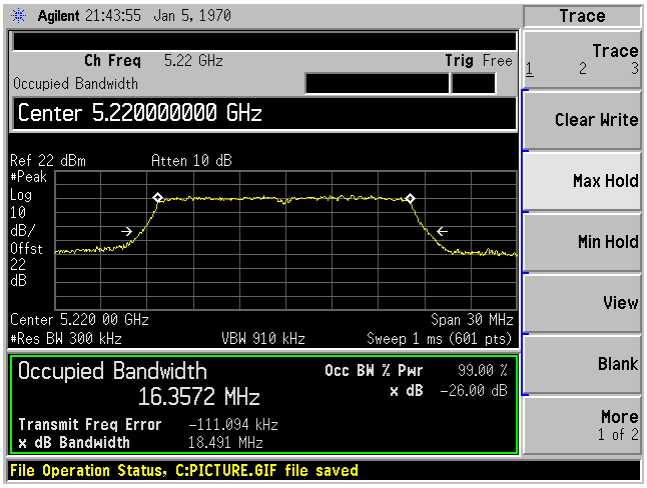
Low Channel ANT B



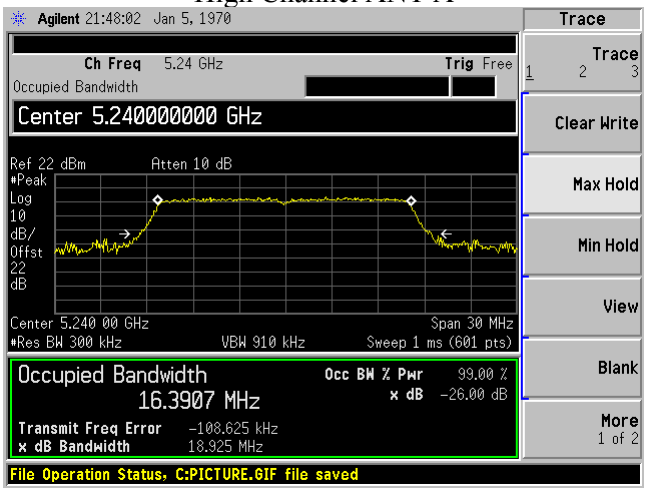
Mid Channel ANT A



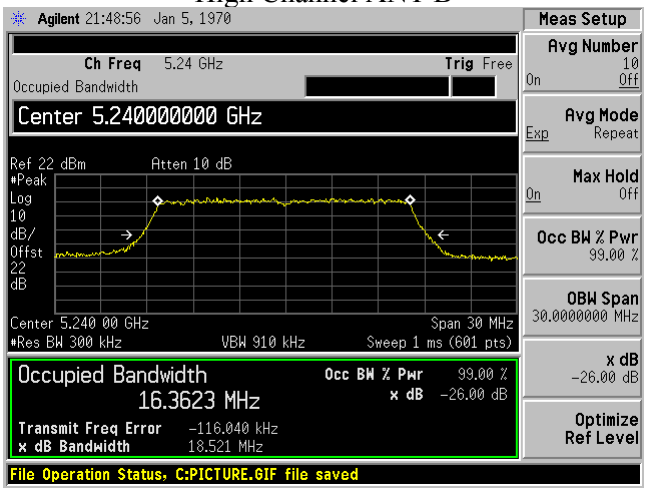
Mid Channel ANT B



High Channel ANT A



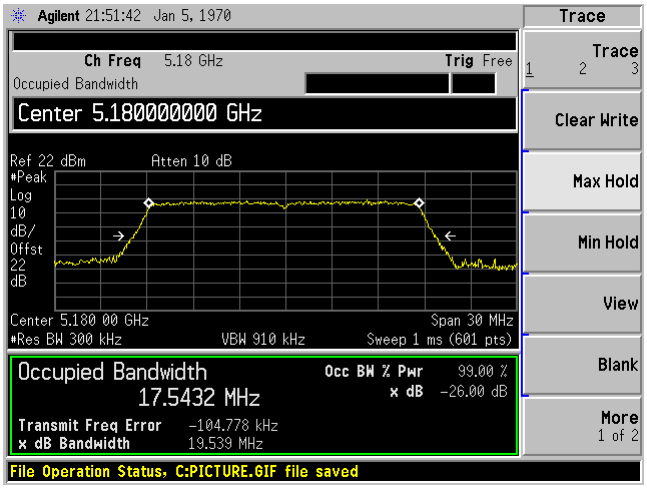
High Channel ANT B



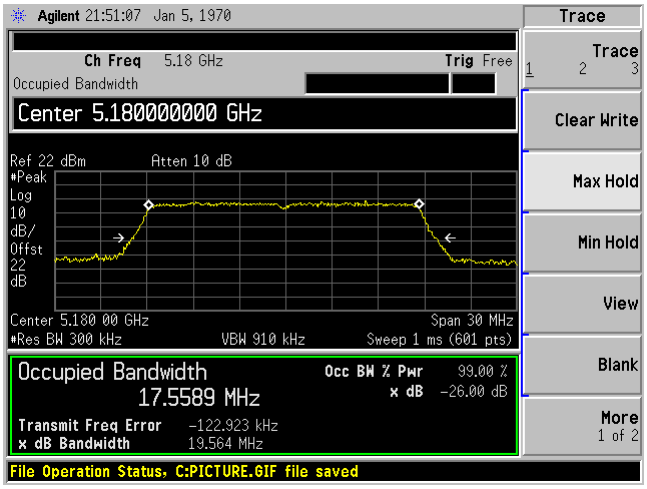
5150 - 5250 MHz
RADIO 2

802.11n20 Mode

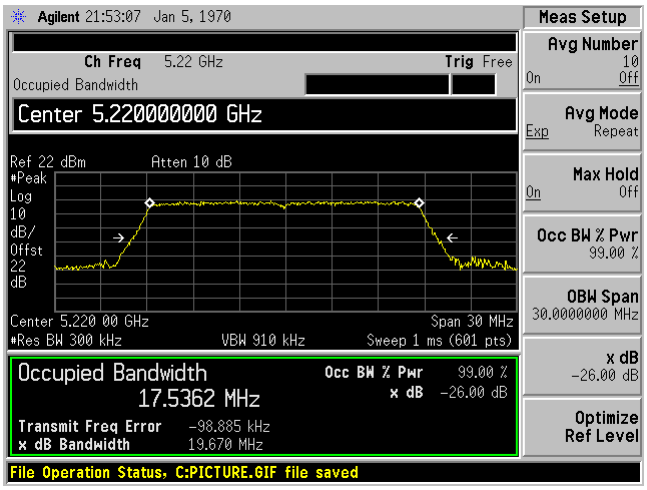
Low Channel ANT A



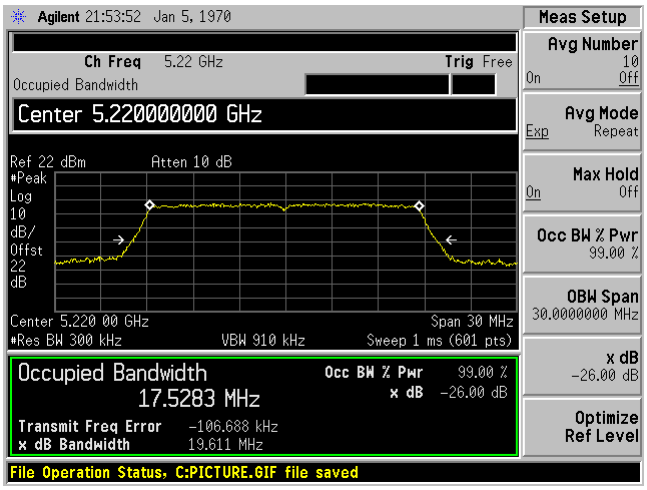
Low Channel ANT B



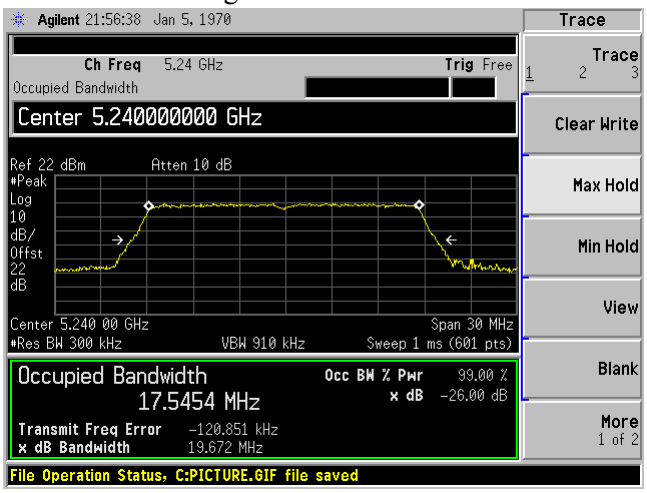
Mid Channel ANT A



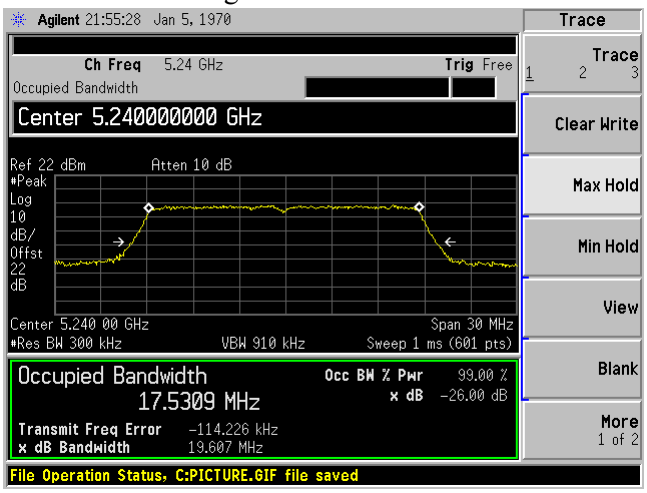
Mid Channel ANT B



High Channel ANT A



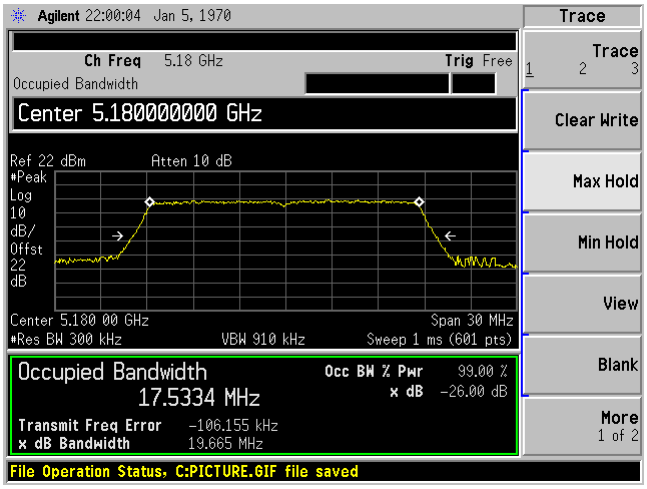
High Channel ANT B



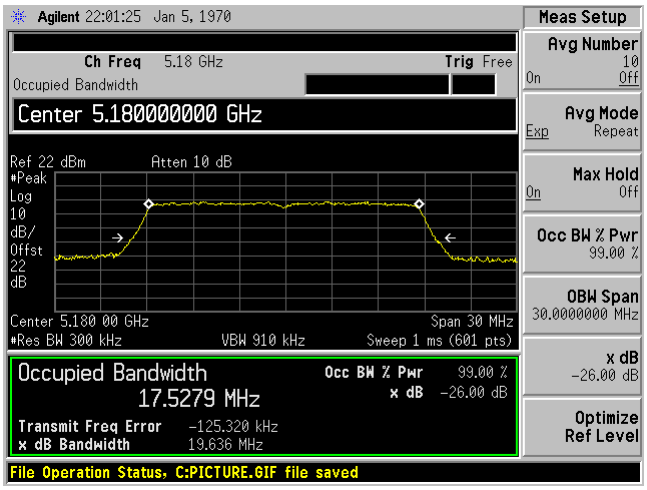
5150 - 5250 MHz
RADIO 2

802.11ac20 Mode

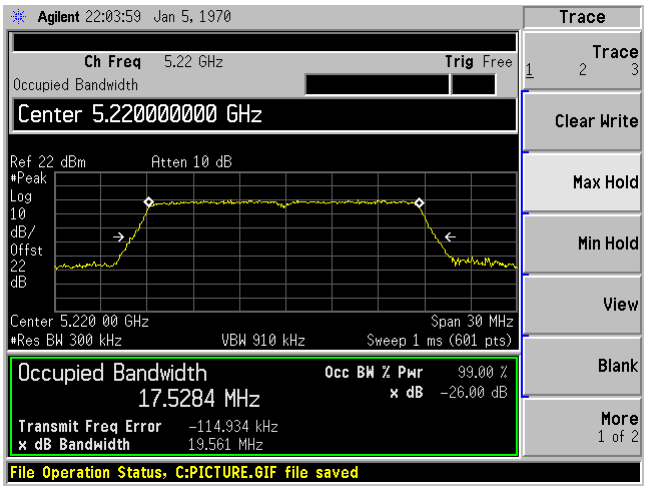
Low Channel ANT A



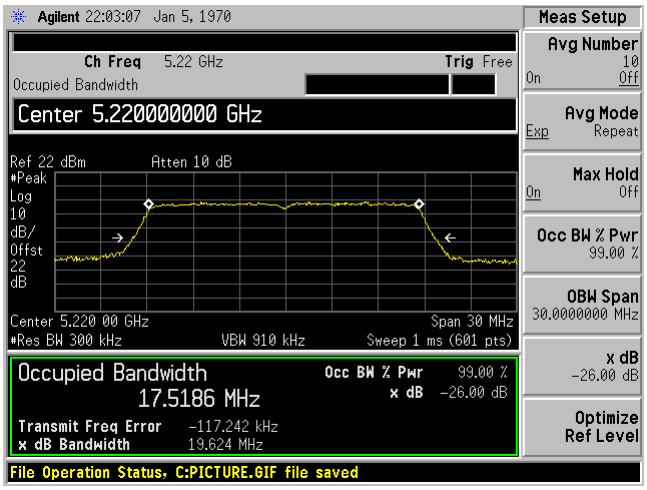
Low Channel ANT B



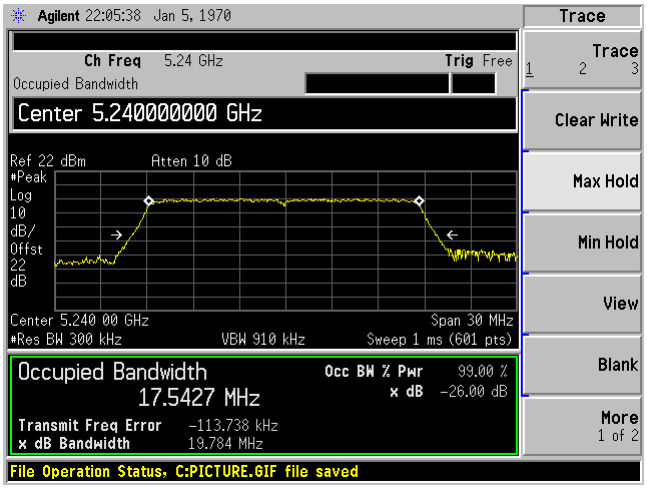
Mid Channel ANT A



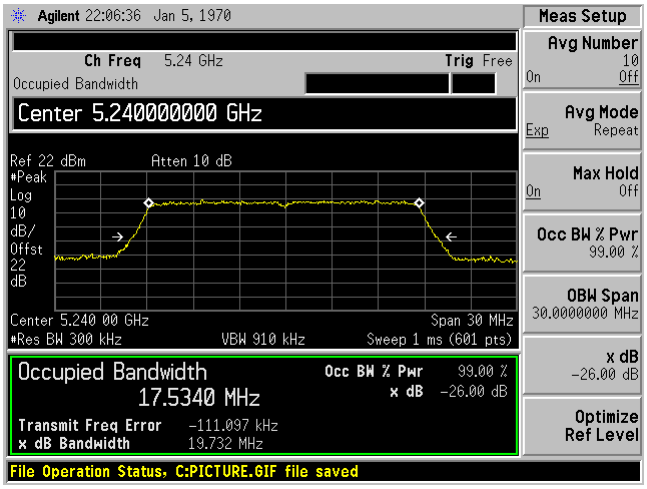
Mid Channel ANT B



High Channel ANT A



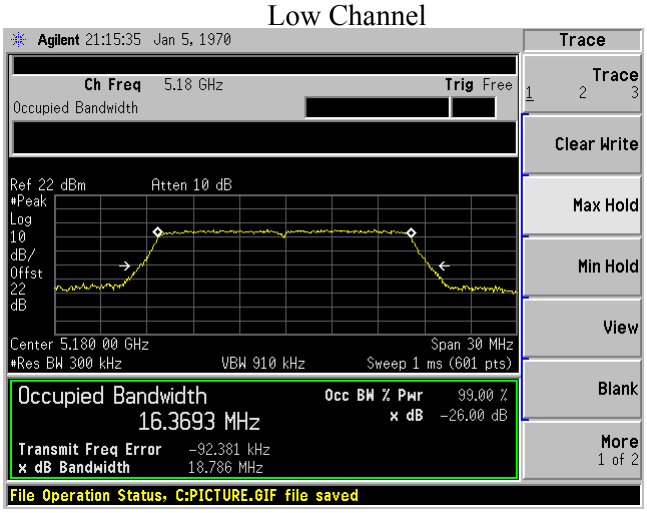
High Channel ANT B



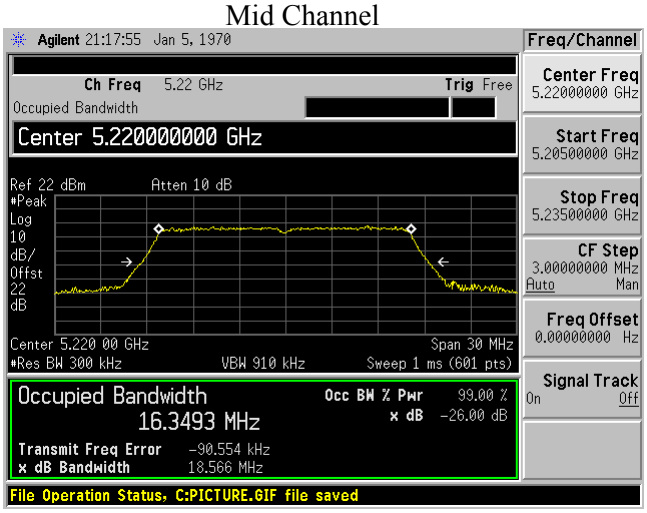
5150 - 5250 MHz
RADIO 1

802.11a Mode

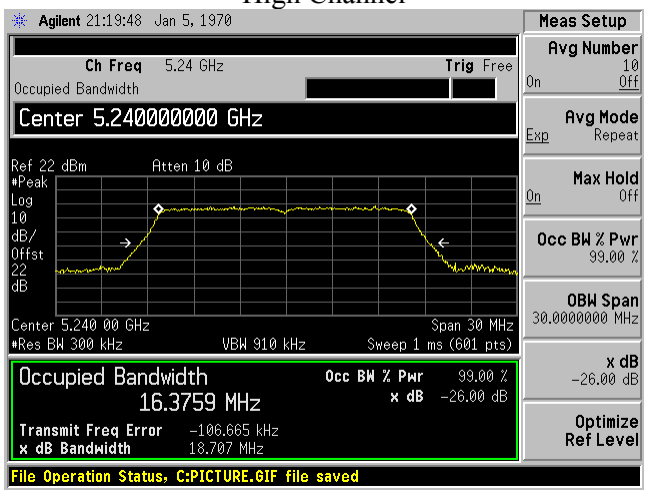
Low Channel



Mid Channel



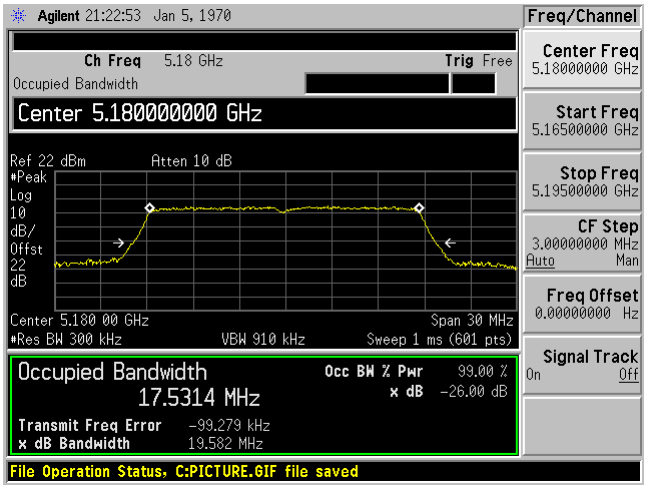
High Channel



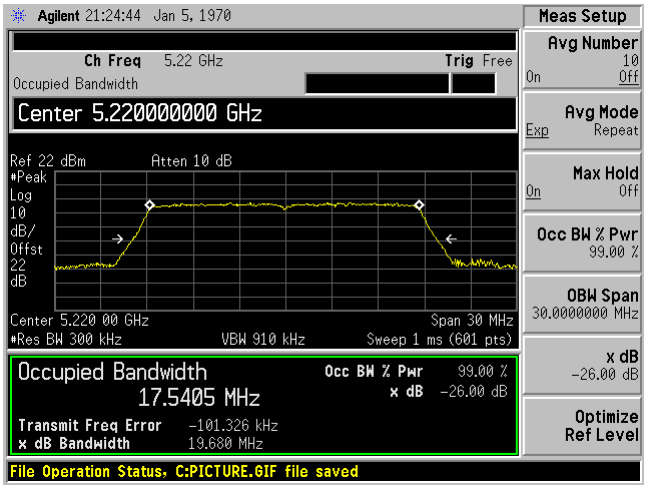
5150 - 5250 MHz
RADIO 1

802.11n20 Mode

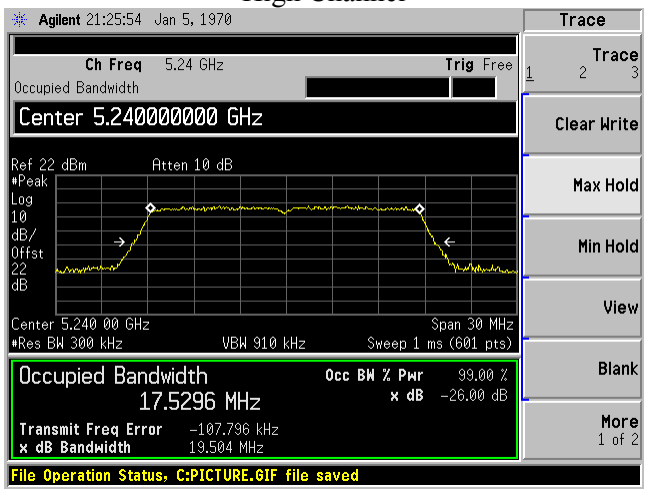
Low Channel



Mid Channel



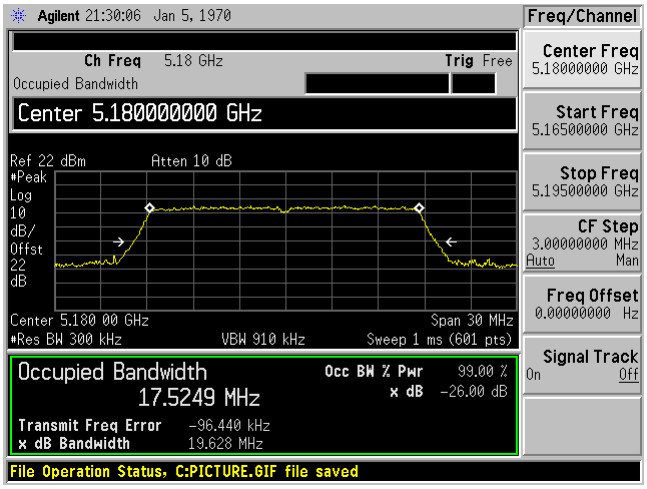
High Channel



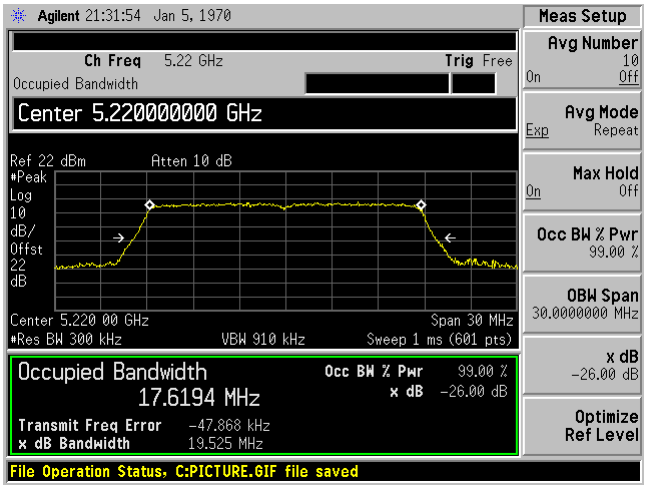
5150 - 5250 MHz
RADIO 1

802.11ac20 Mode

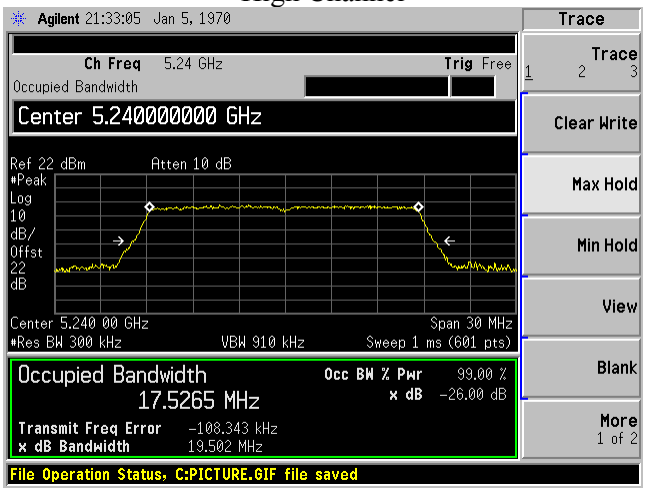
Low Channel



Mid Channel



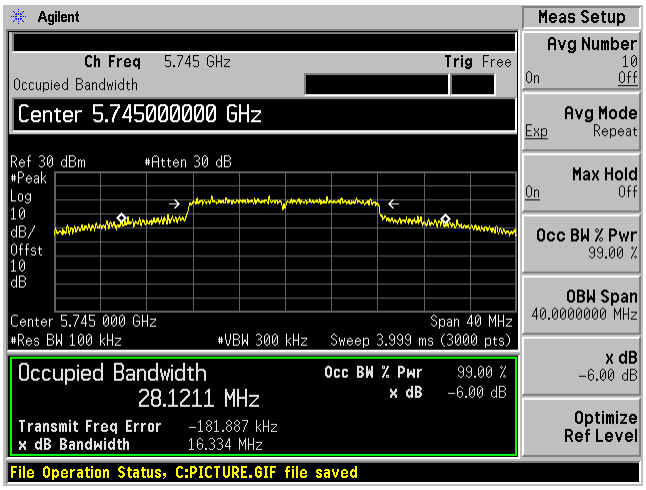
High Channel



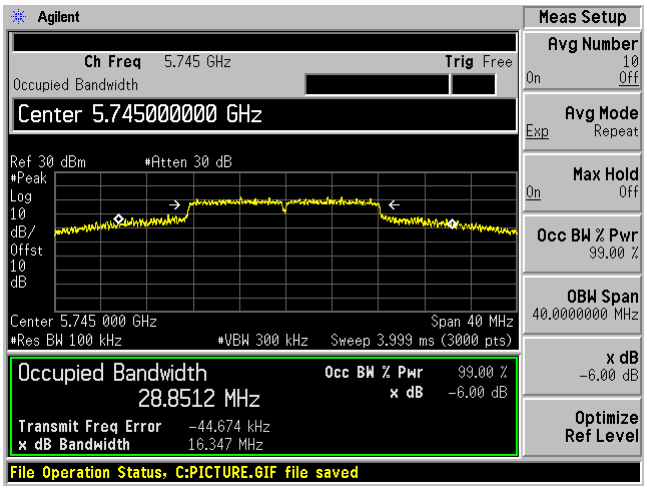
5725 - 5850 MHz
RADIO 2

802.11a Mode

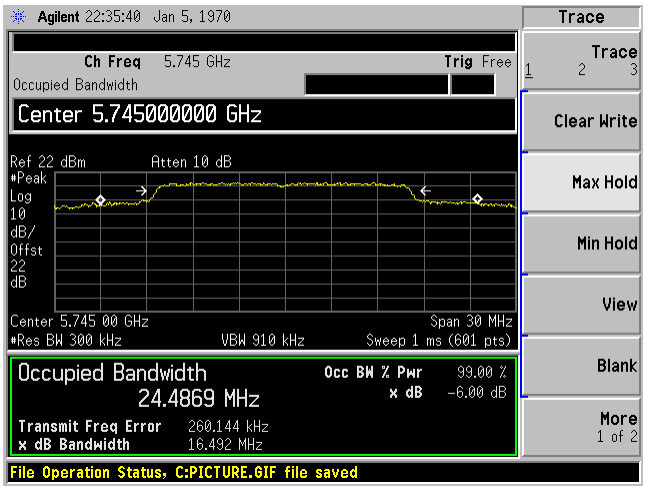
Low Channel 6 dB OBW ANT A



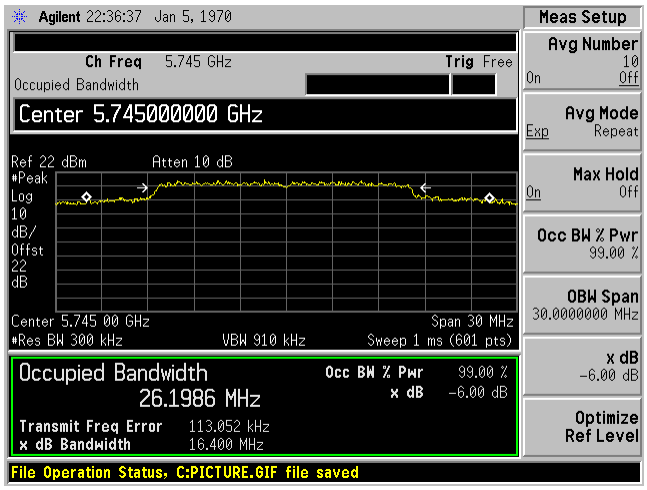
Low Channel 6 dB OBW Antenna B



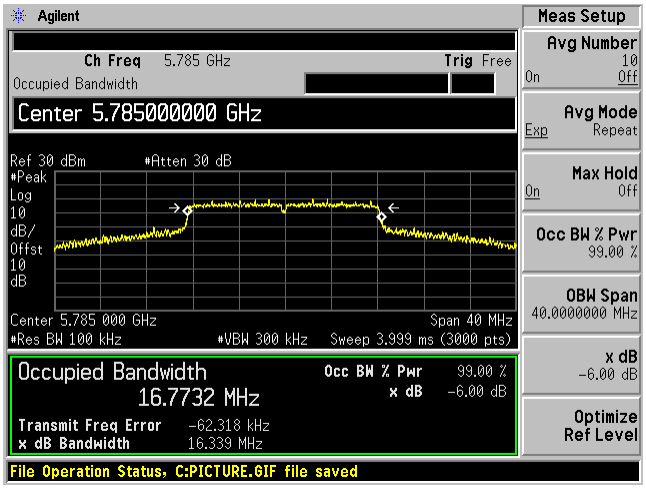
Low Channel 99% dB OBW Antenna A



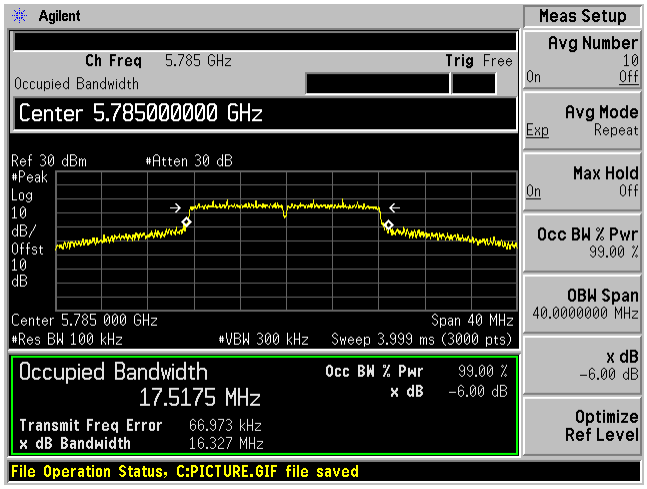
Low Channel 99% dB OBW Antenna B



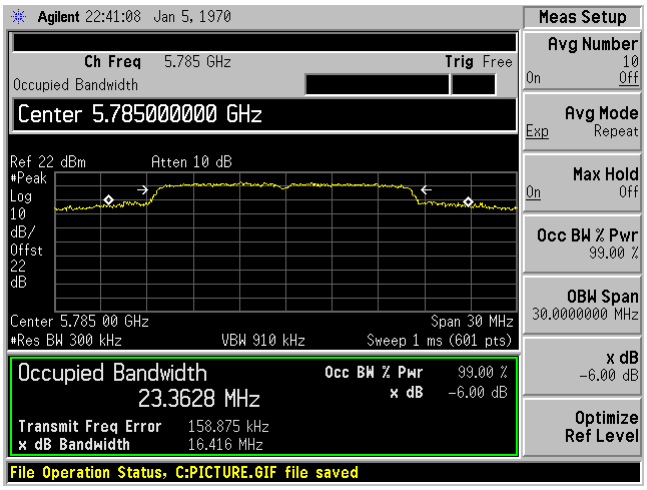
Middle Channel 6 dB OBW ANT A



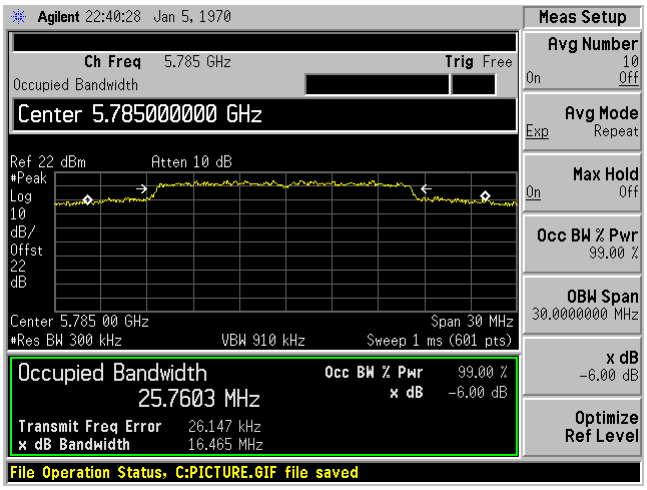
Middle Channel 6 dB OBW Antenna B



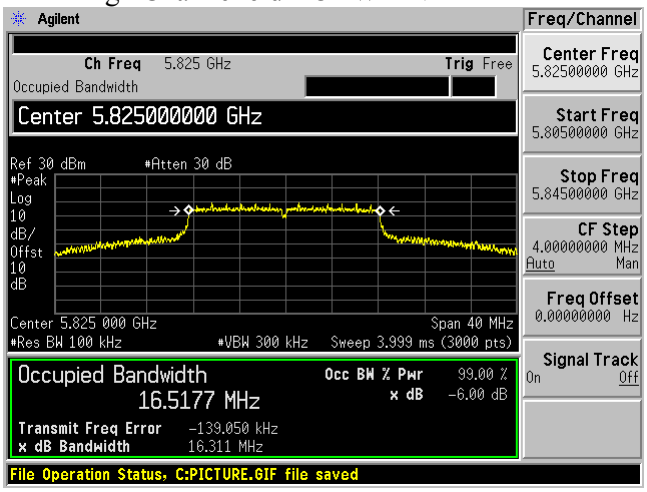
Middle Channel 99% dB OBW Antenna A



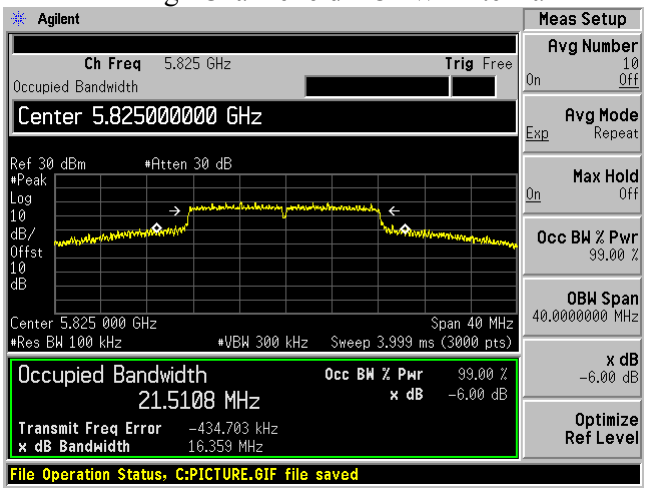
Middle Channel 99% dB OBW Antenna B



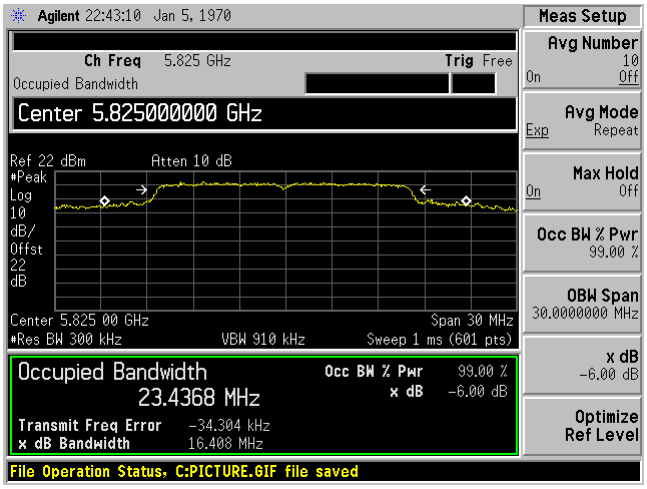
High Channel 6 dB OBW ANT A



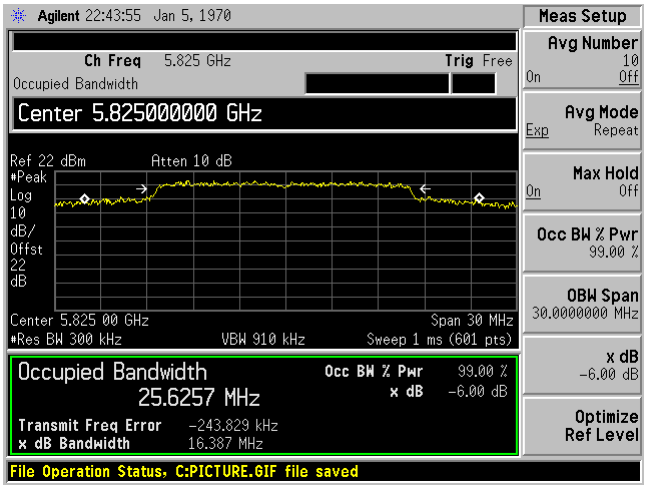
High Channel 6 dB OBW Antenna B



High Channel 99% dB OBW Antenna A



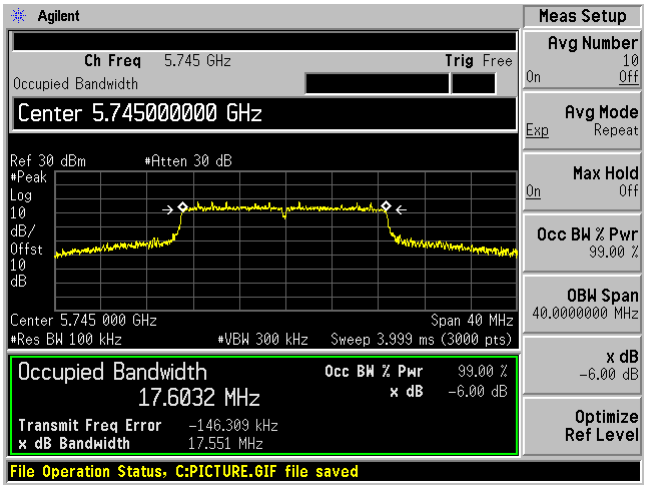
High Channel 99% dB OBW Antenna B



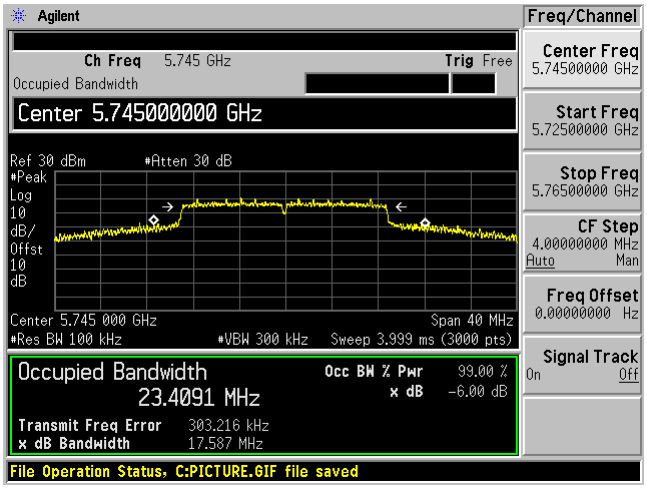
RADIO 2

802.11n20 Mode

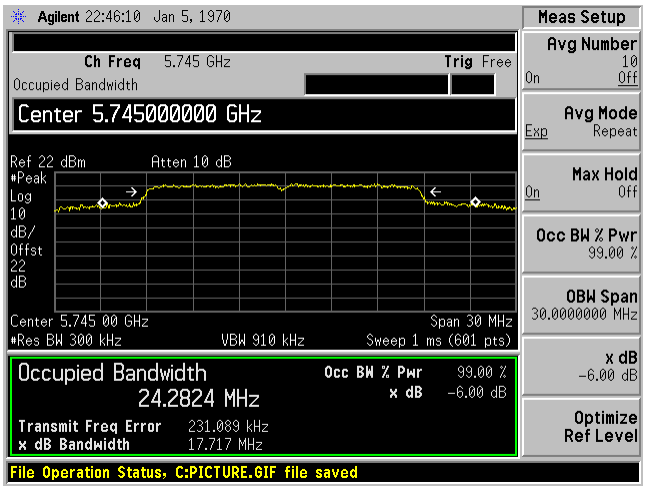
Low Channel 6 dB OBW ANT A



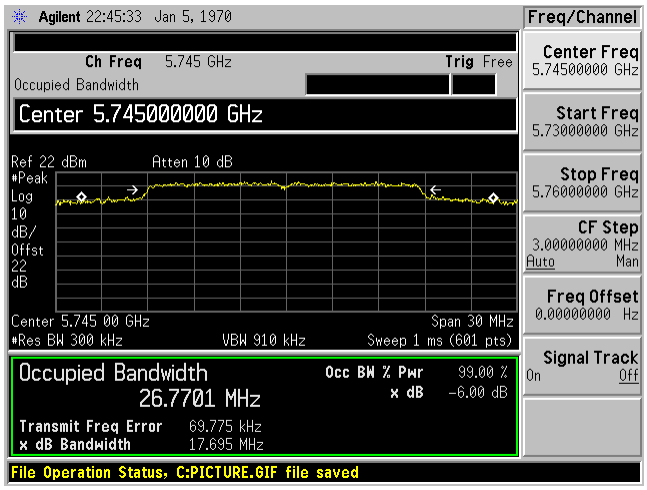
Low Channel 6 dB OBW Antenna B



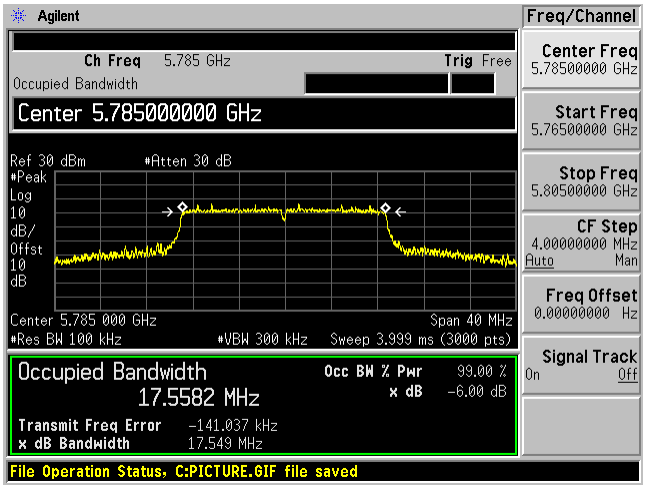
Low Channel 99% dB OBW Antenna A



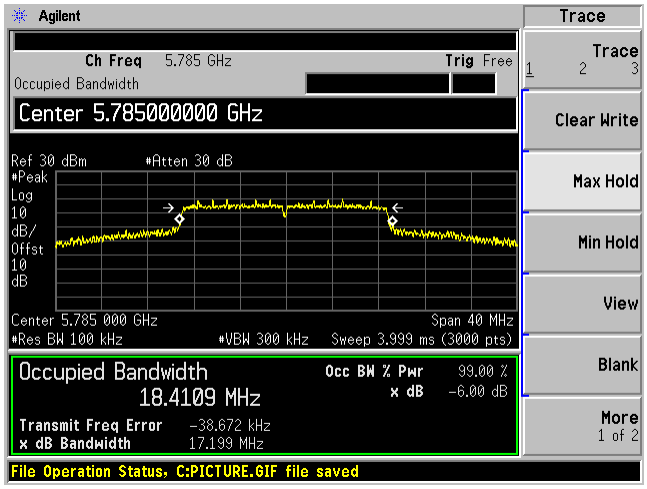
Low Channel 99% dB OBW Antenna B



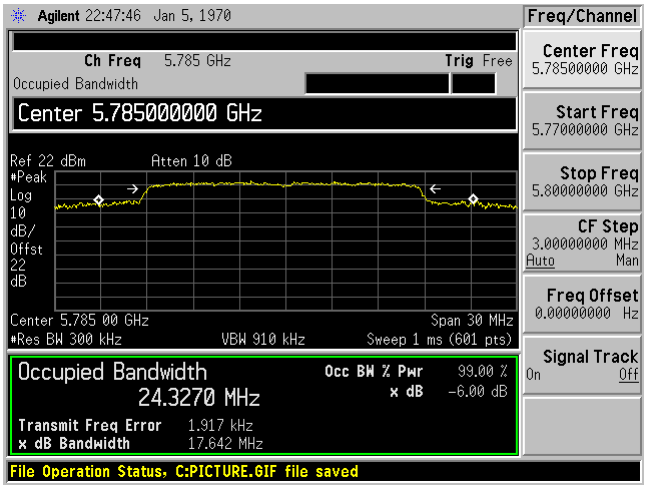
Middle Channel 6 dB OBW ANT A



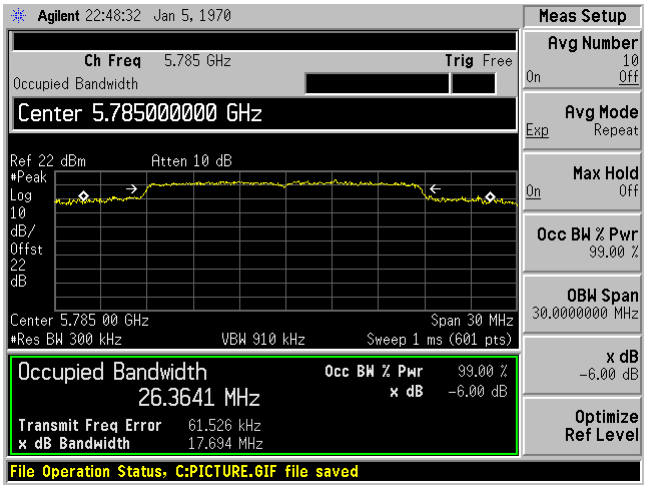
Middle Channel 6 dB OBW Antenna B



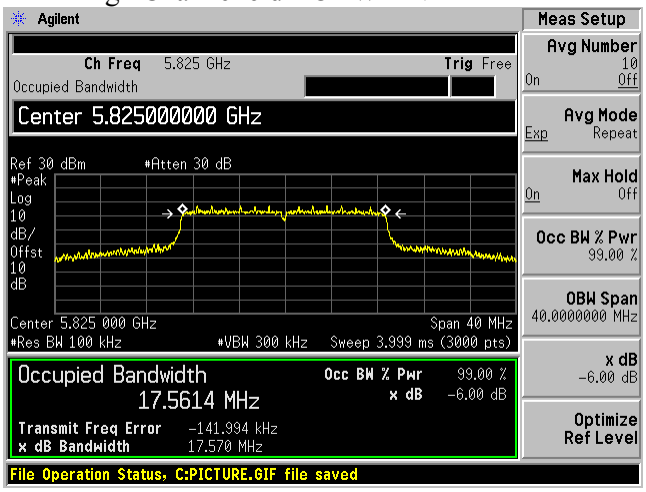
Middle Channel 99% dB OBW Antenna A



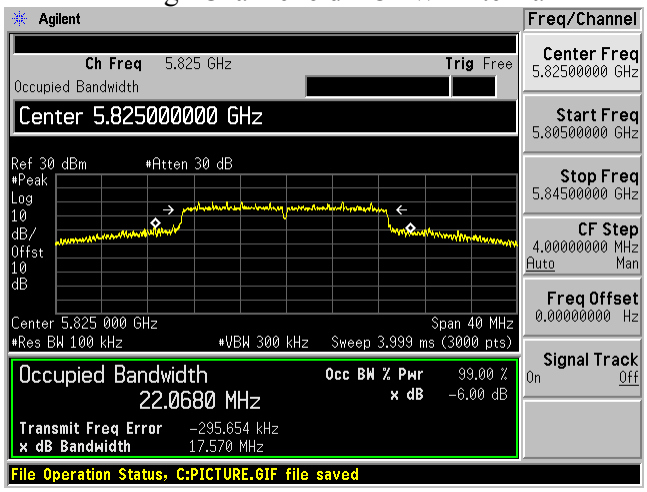
Middle Channel 99% dB OBW Antenna B



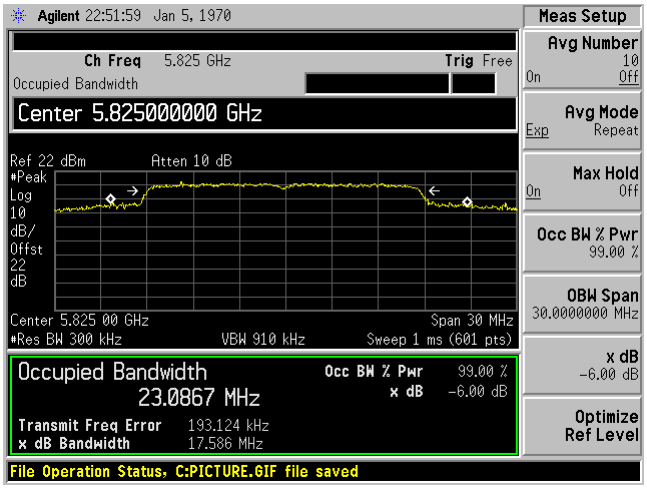
High Channel 6 dB OBW ANT A



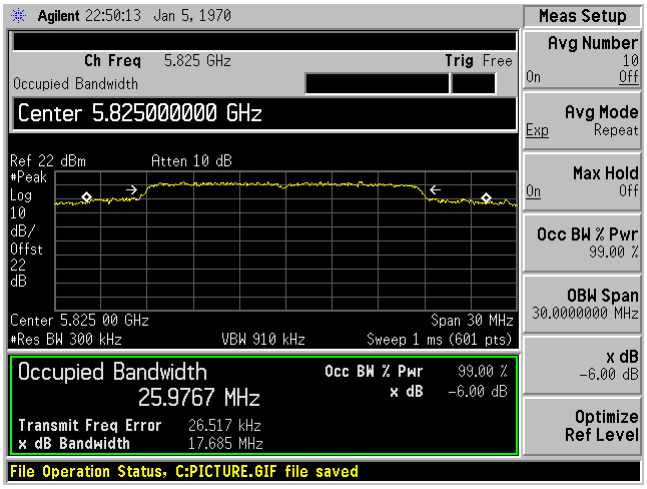
High Channel 6 dB OBW Antenna B



High Channel 99% dB OBW Antenna A



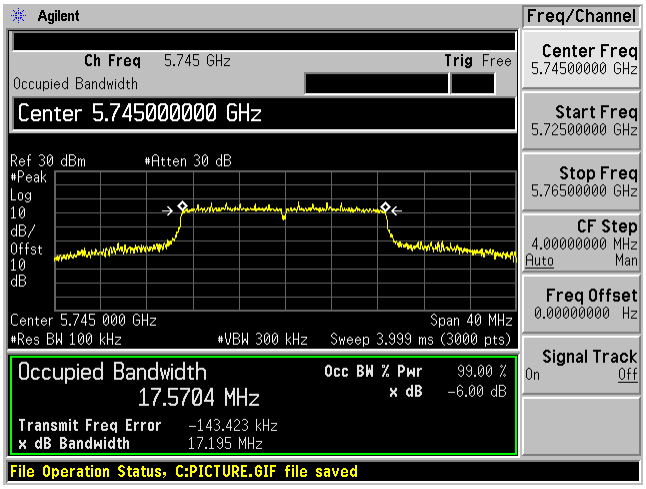
High Channel 99% dB OBW Antenna B



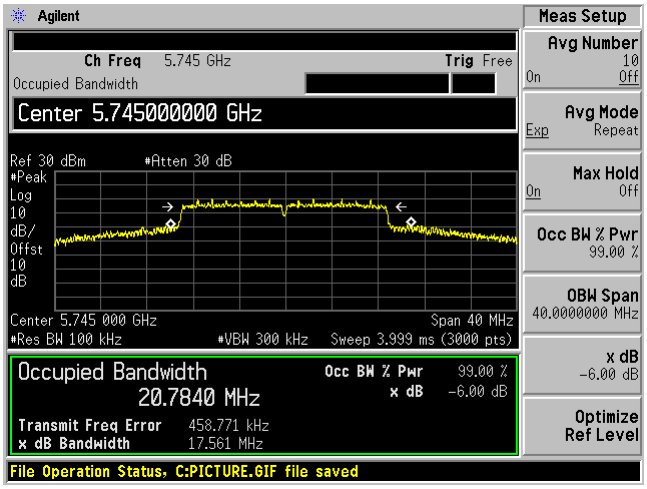
RADIO 2

802.11ac20 Mode

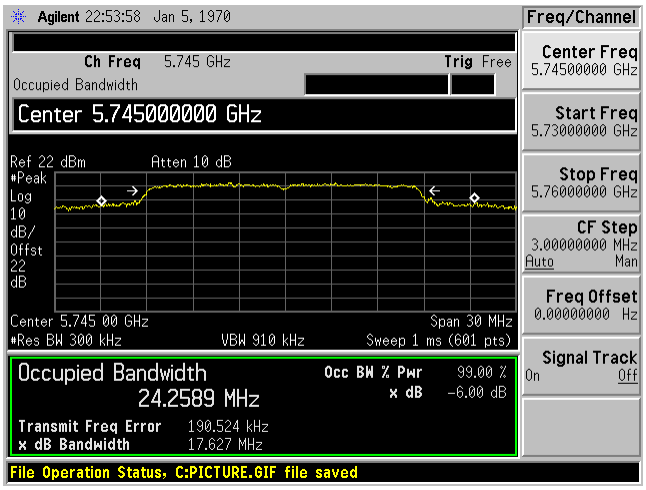
Low Channel 6 dB OBW ANT A



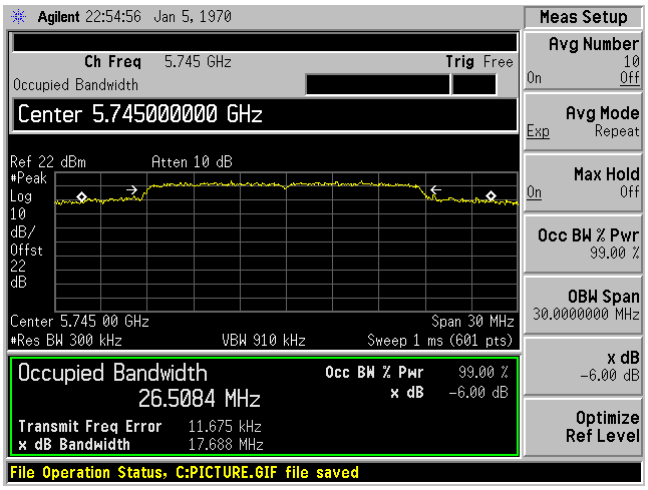
Low Channel 6 dB OBW Antenna B



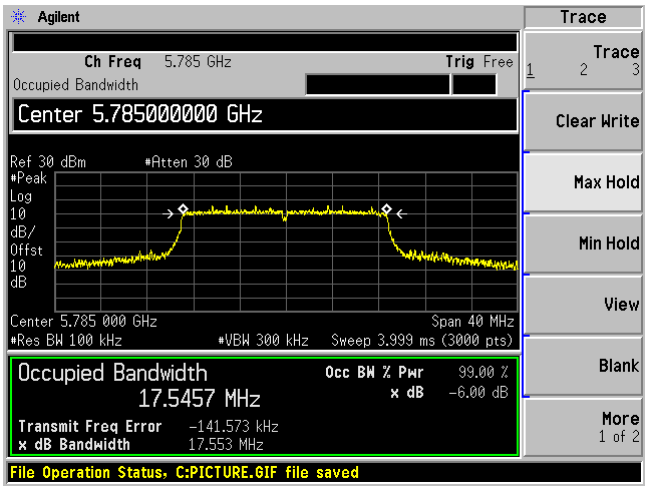
Low Channel 99% dB OBW Antenna A



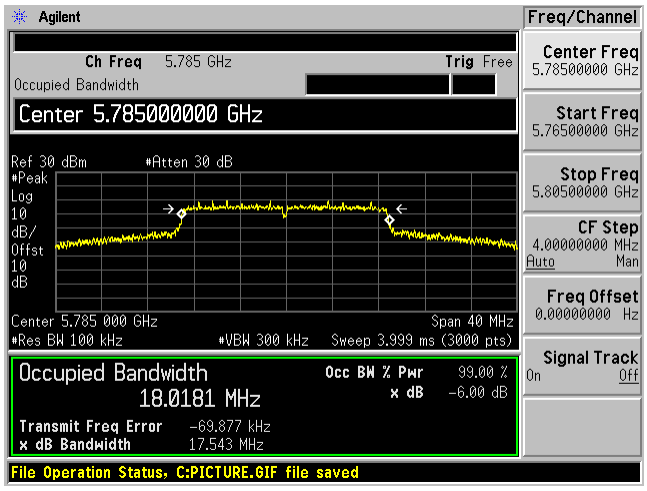
Low Channel 99% dB OBW Antenna B



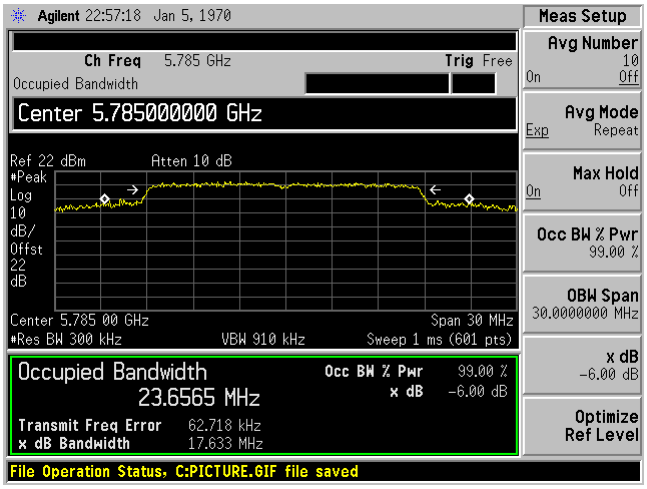
Middle Channel 6 dB OBW ANT A



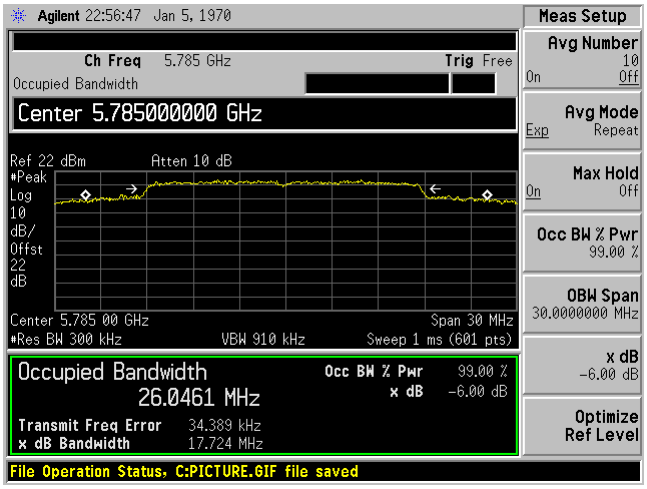
Middle Channel 6 dB OBW Antenna B



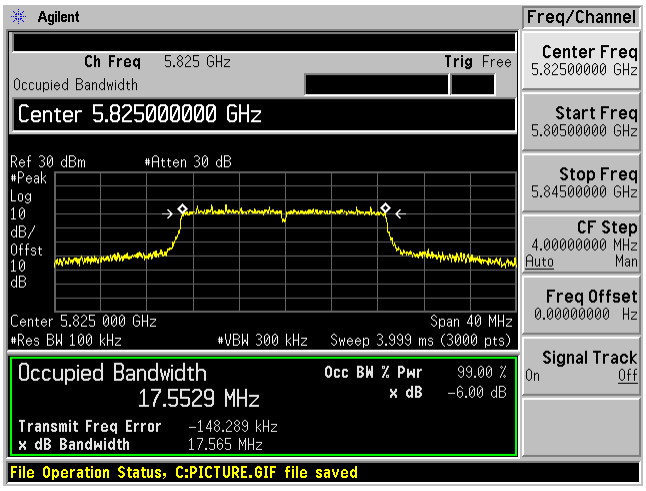
Middle Channel 99% dB OBW Antenna A



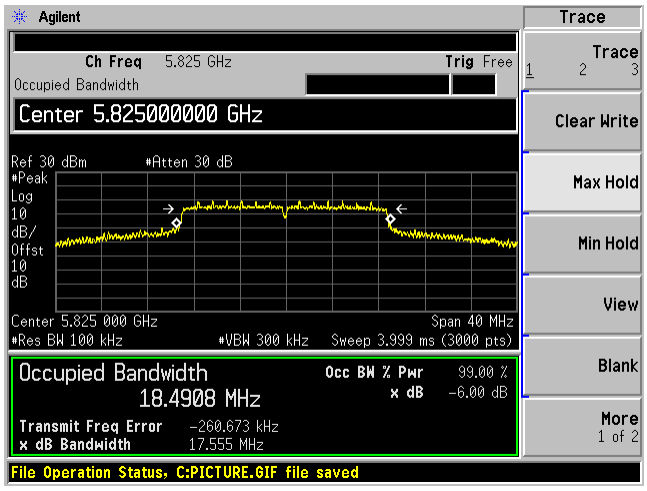
Middle Channel 99% dB OBW Antenna B



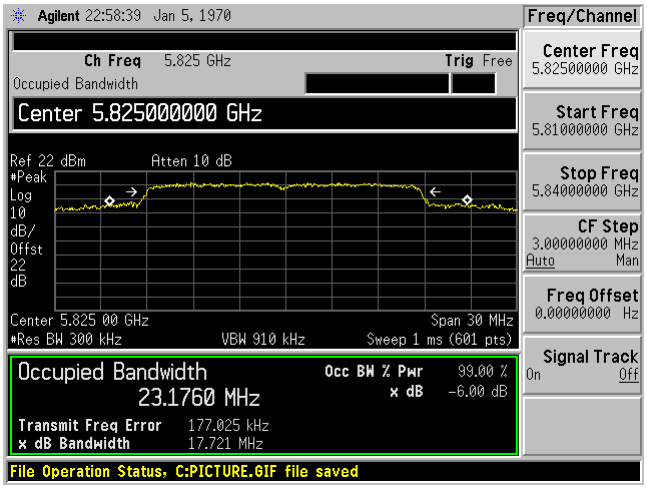
High Channel 6 dB OBW ANT A



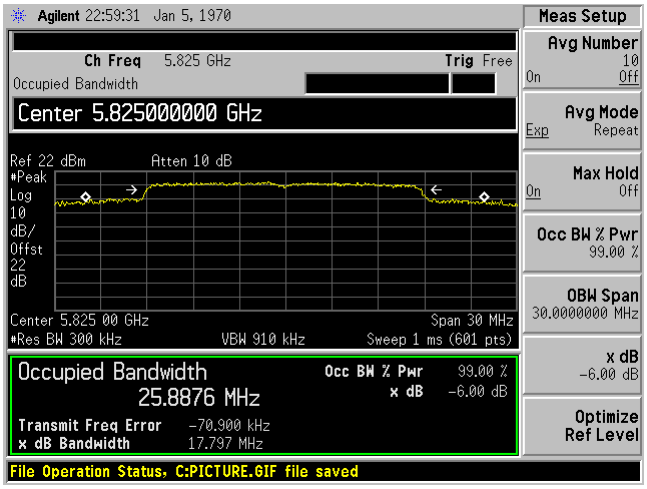
High Channel 6 dB OBW Antenna B



High Channel 99% dB OBW Antenna A



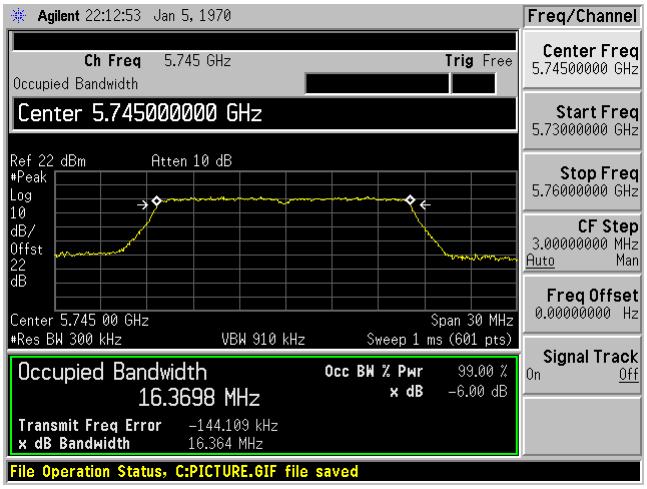
High Channel 99% dB OBW Antenna B



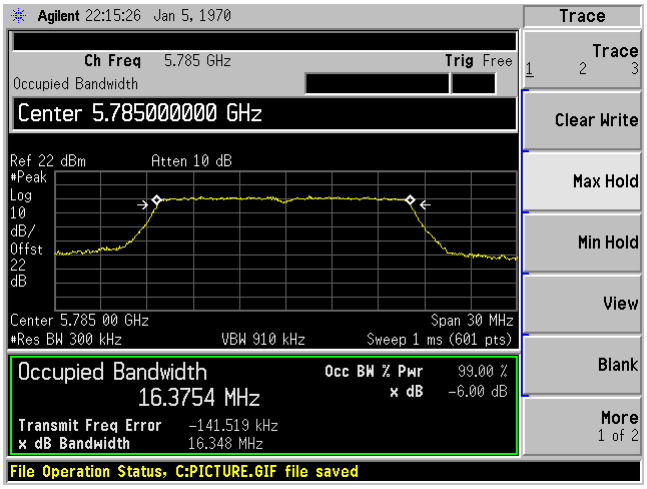
5725 - 5850 MHz
RADIO 1

802.11a Mode

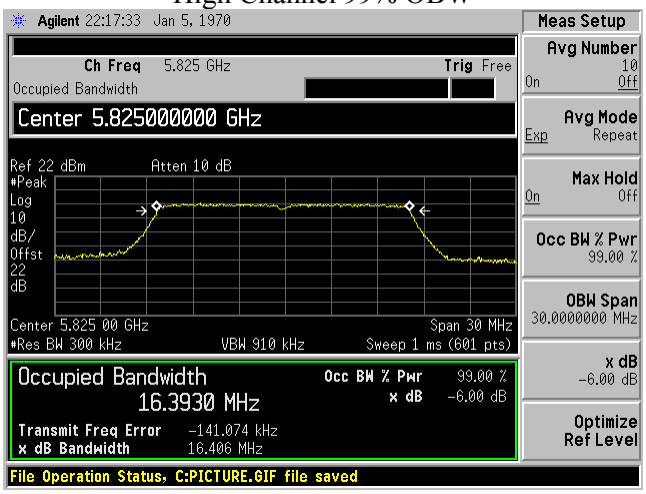
Low Channel 99% OBW



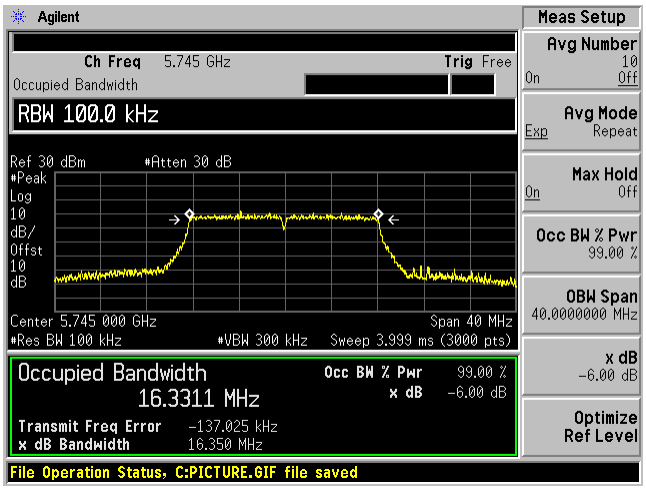
Mid Channel99% OBW



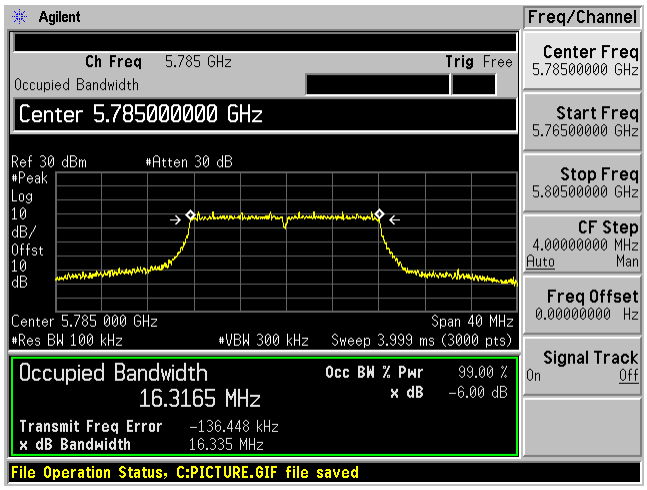
High Channel 99% OBW



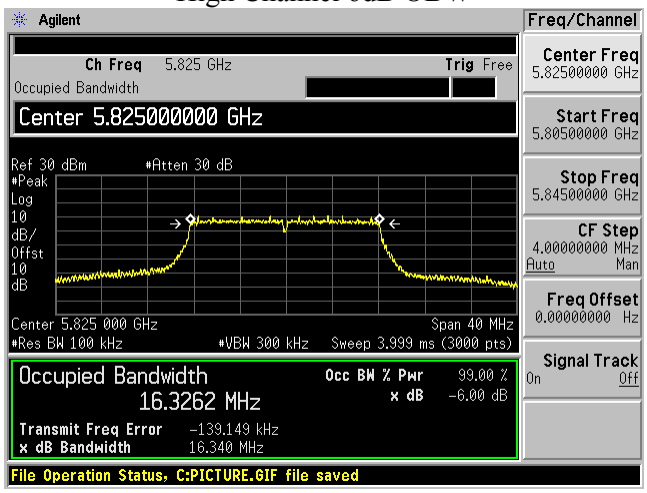
Low Channel 6dB OBW



Mid Channel 6dB OBW



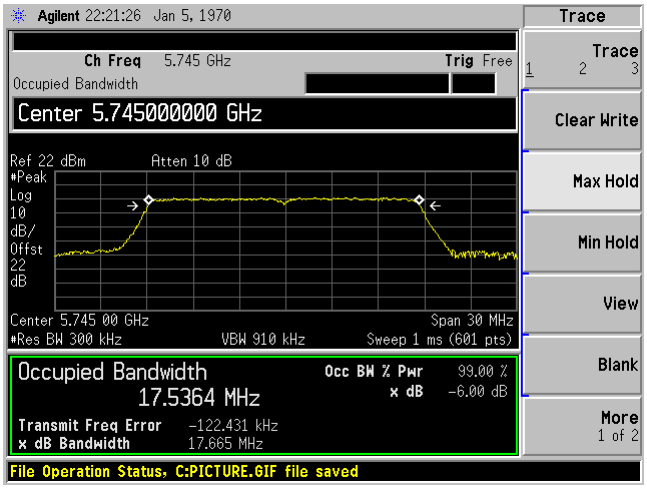
High Channel 6dB OBW



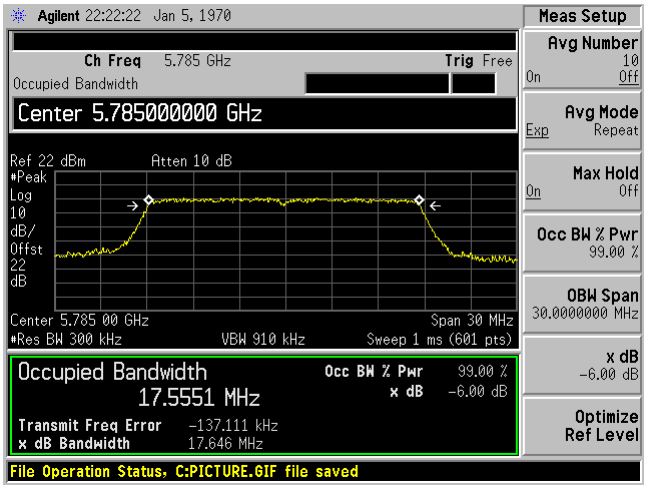
5725 - 5850 MHz
RADIO 1

802.11n20 Mode

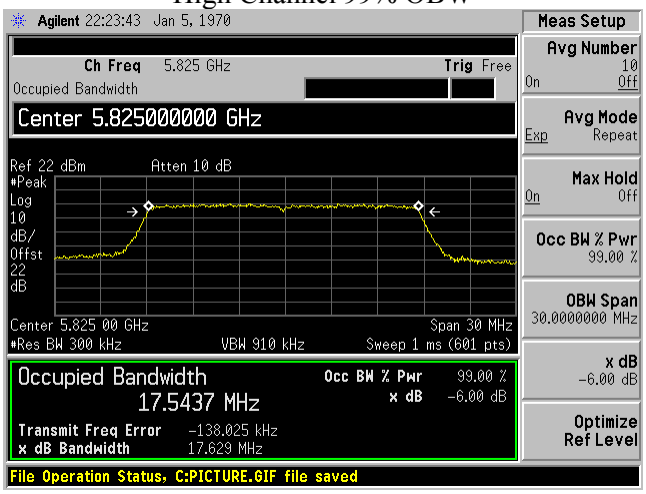
Low Channel 99% OBW



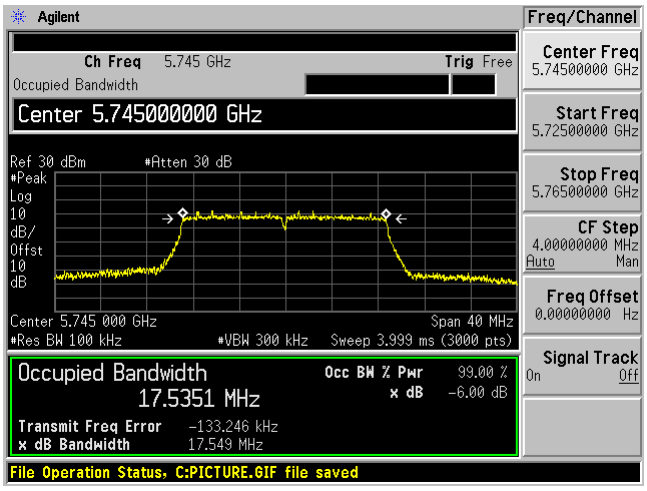
Mid Channel 99% OBW



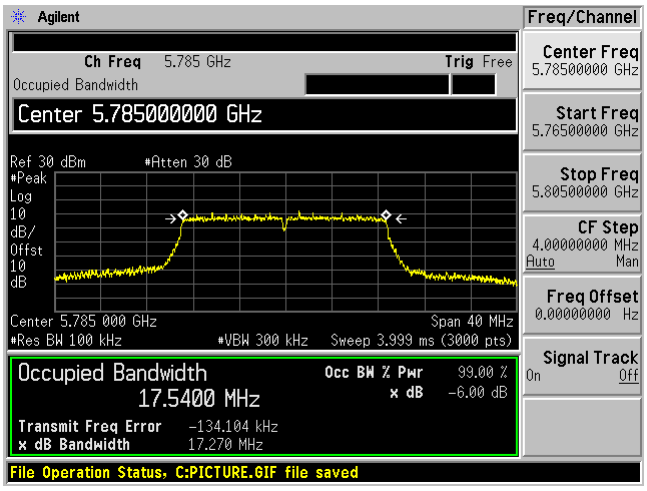
High Channel 99% OBW



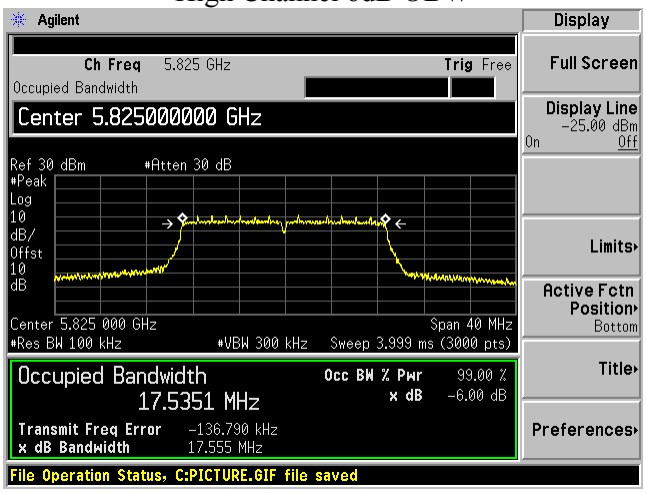
Low Channel 6dB OBW



Mid Channel 6dB OBW



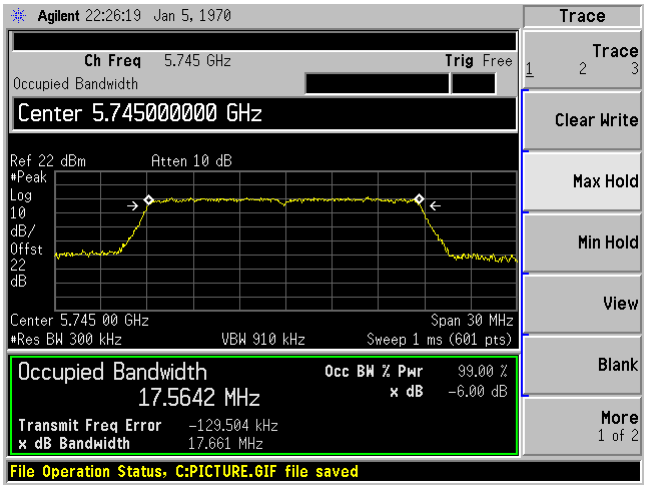
High Channel 6dB OBW



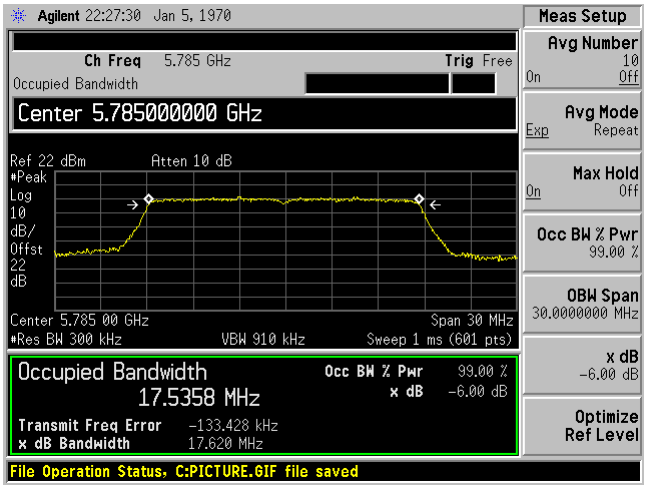
5725 - 5850 MHz
RADIO 1

802.11ac20 Mode

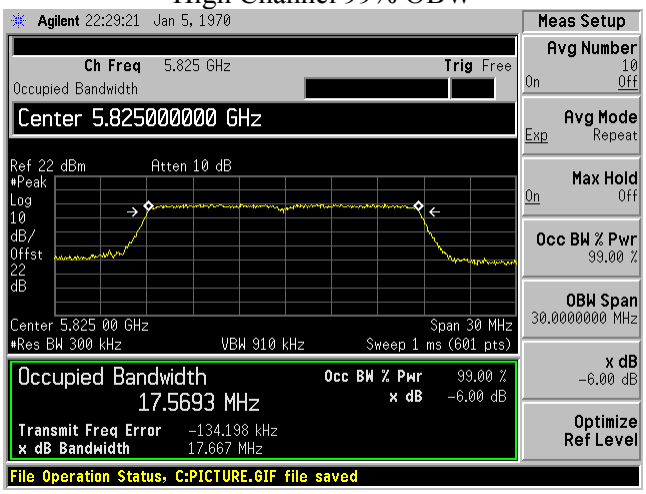
Low Channel 99% OBW



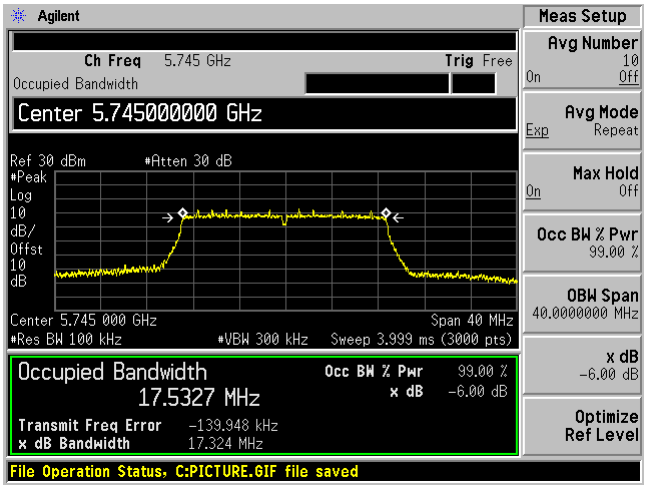
Mid Channel 99% OBW



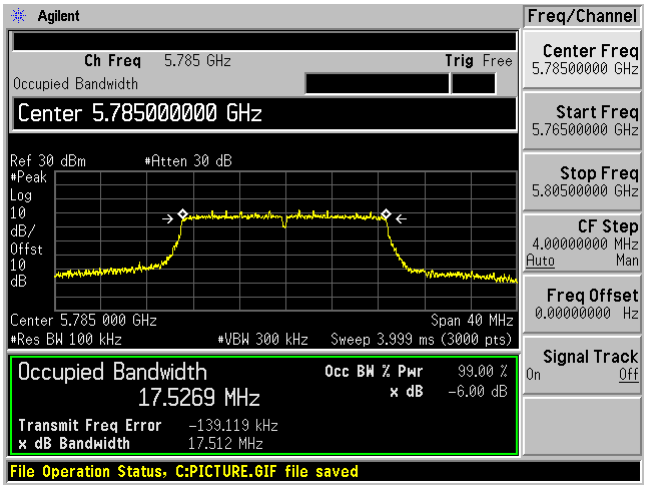
High Channel 99% OBW



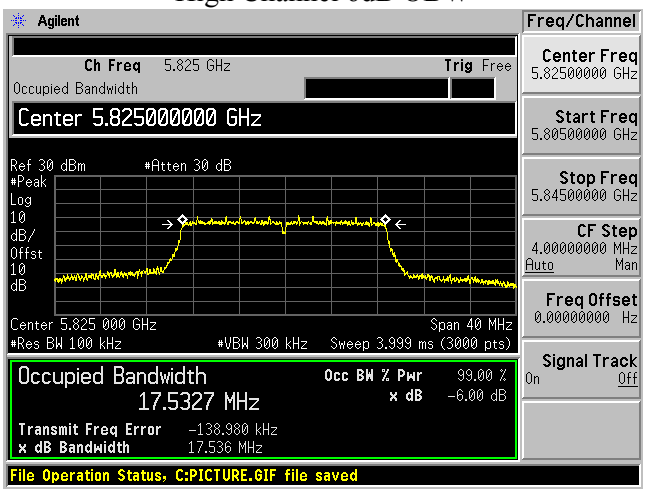
Low Channel 6dB OBW



Mid Channel 6dB OBW



High Channel 6dB OBW

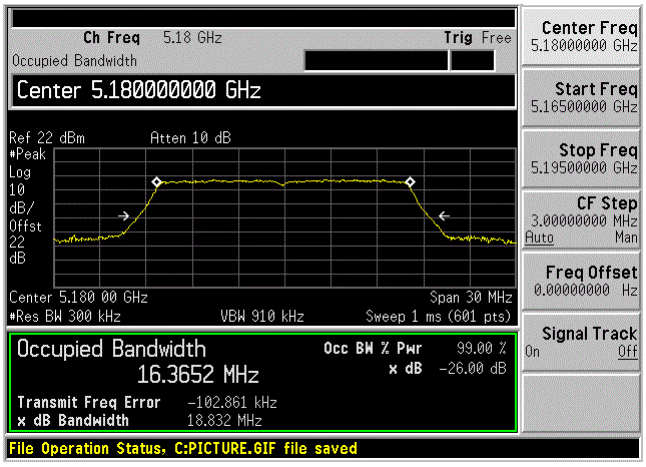


IC:

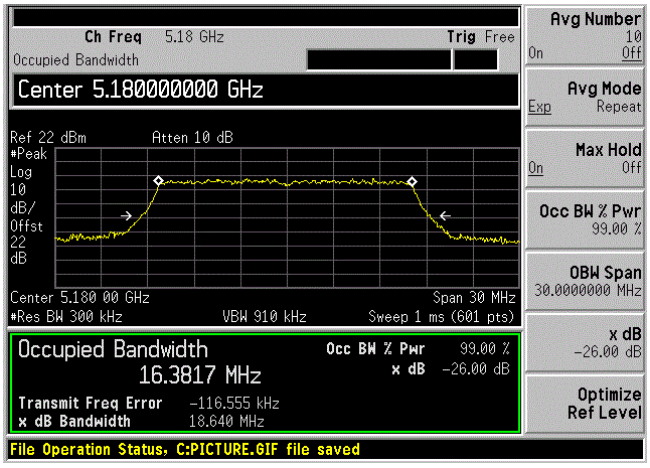
5150 - 5250 MHz
RADIO 2

802.11a Mode

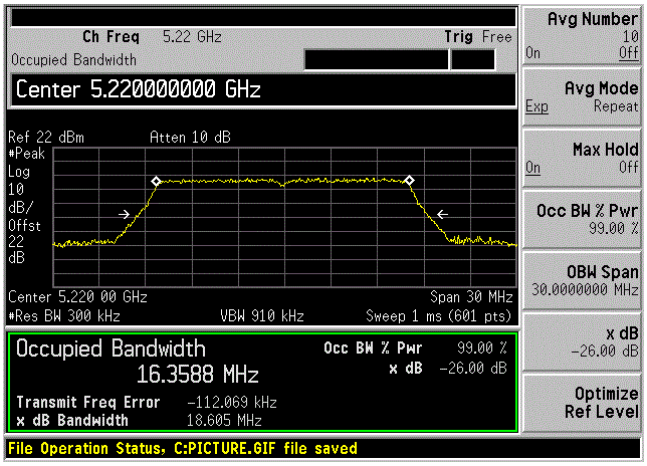
Low Channel ANT A



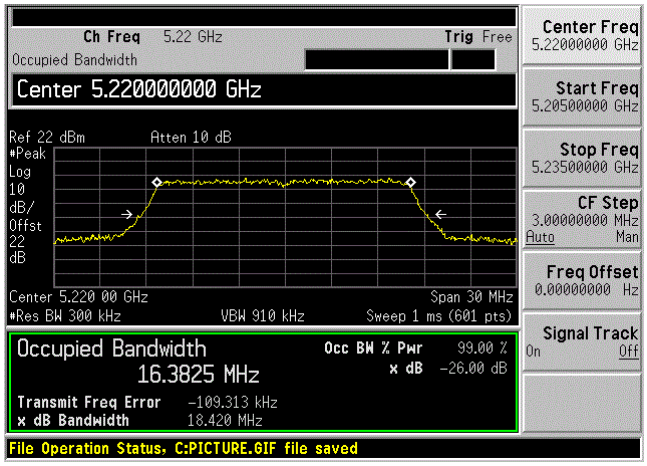
Low Channel ANT B



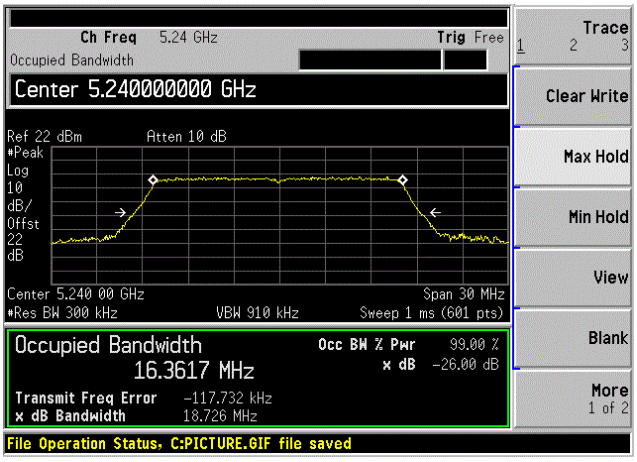
Mid Channel ANT A



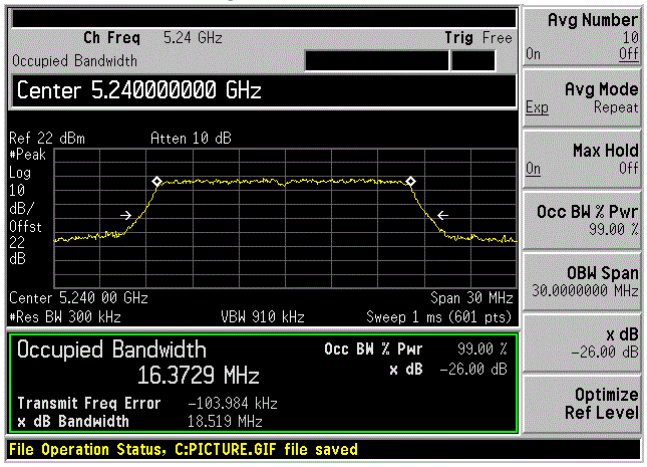
Mid Channel ANT B



High Channel ANT A



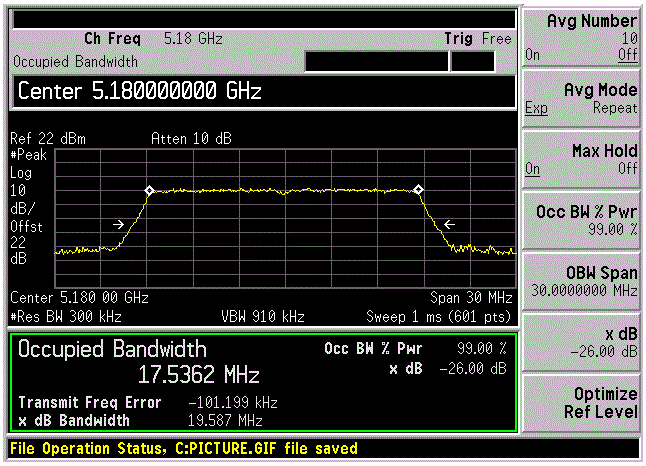
High Channel ANT B



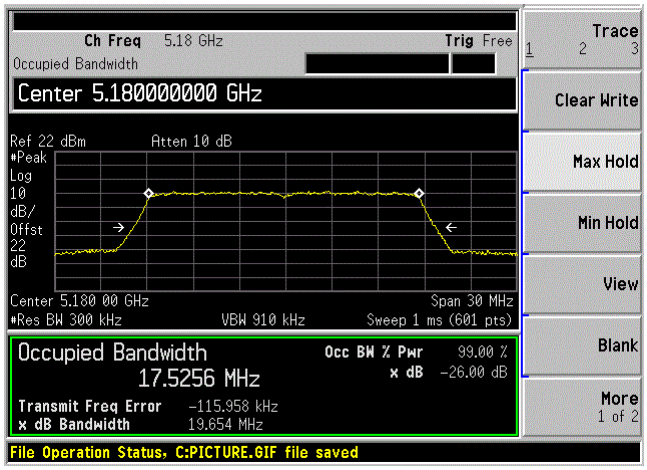
5150 - 5250 MHz
RADIO 2

802.11n20 Mode

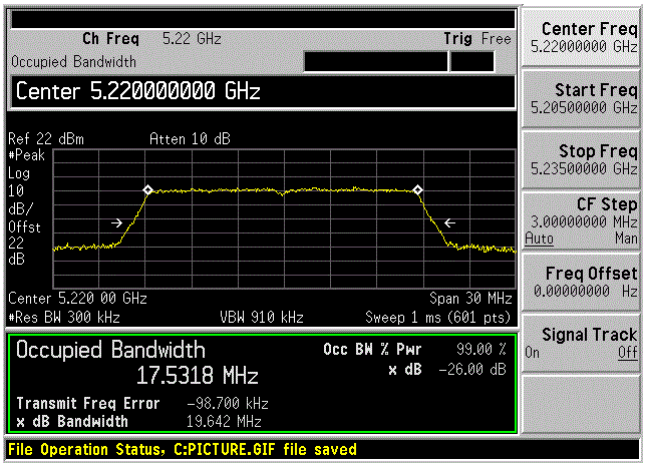
Low Channel ANT A



Low Channel ANT B



Mid Channel ANT A



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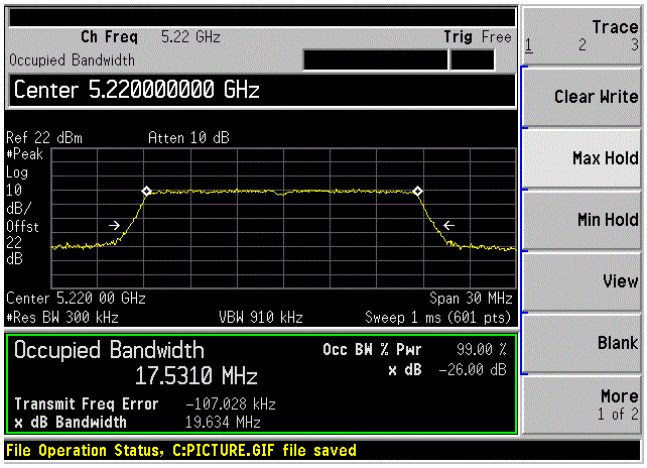
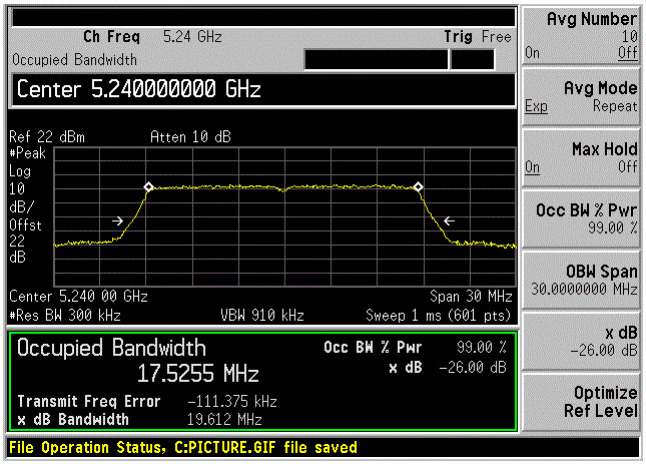
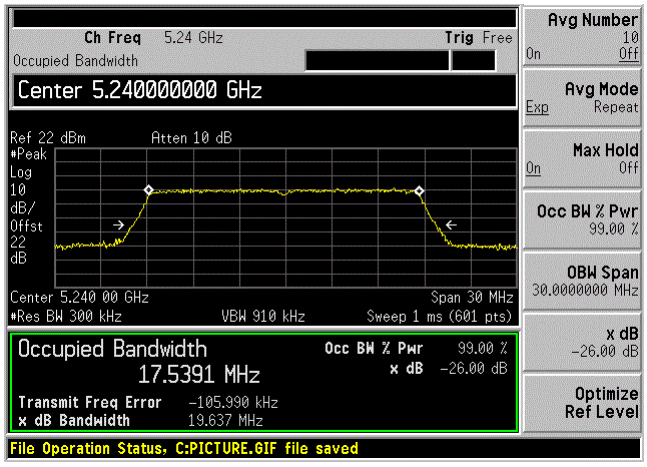


High Channel ANT A



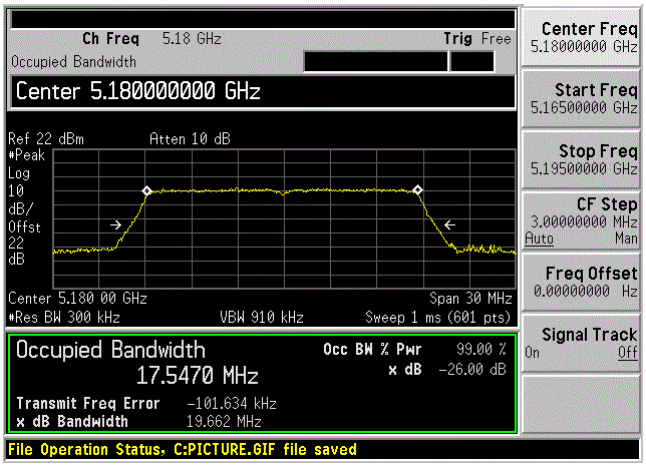
High Channel ANT B



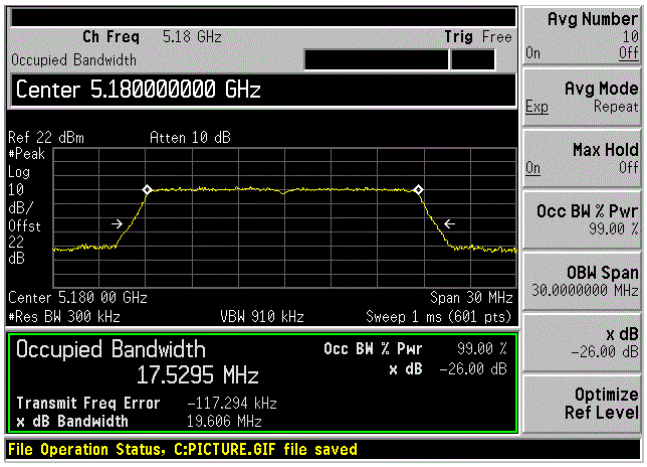
5150 - 5250 MHz
RADIO 2

802.11ac20 Mode

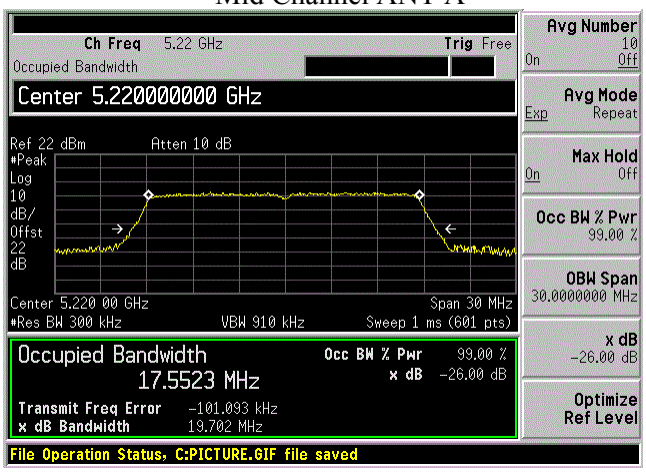
Low Channel ANT A



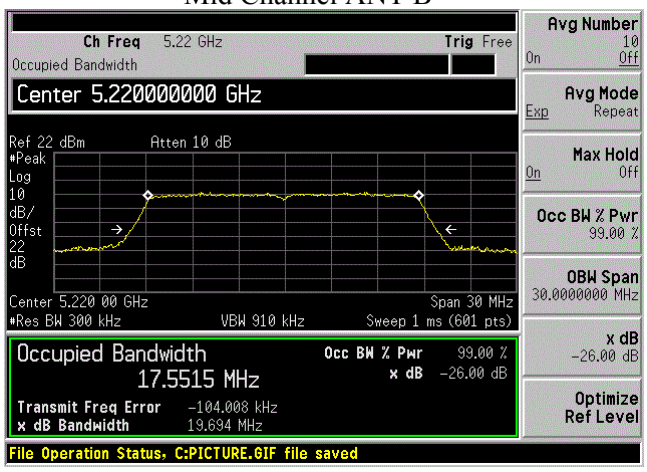
Low Channel ANT B



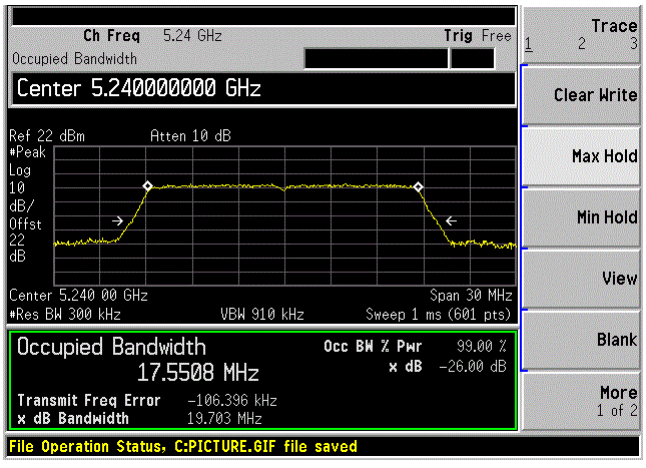
Mid Channel ANT A



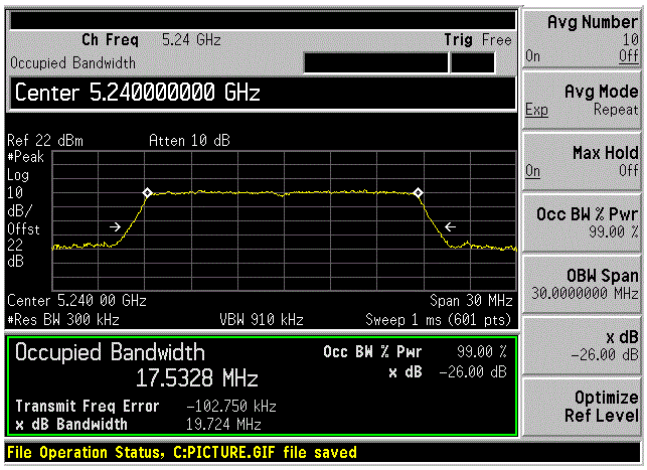
Mid Channel ANT B



High Channel ANT A



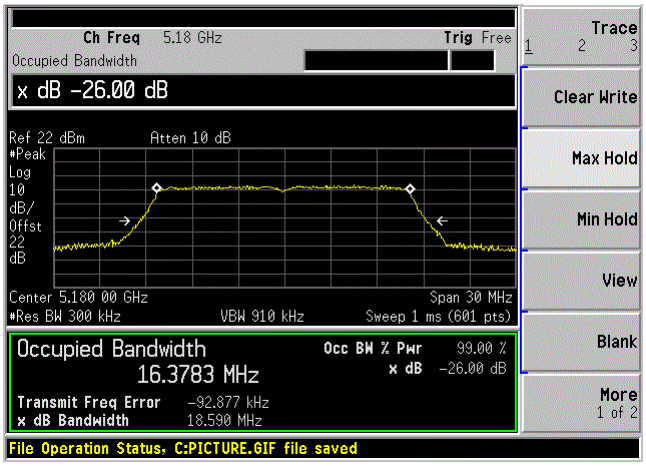
High Channel ANT B



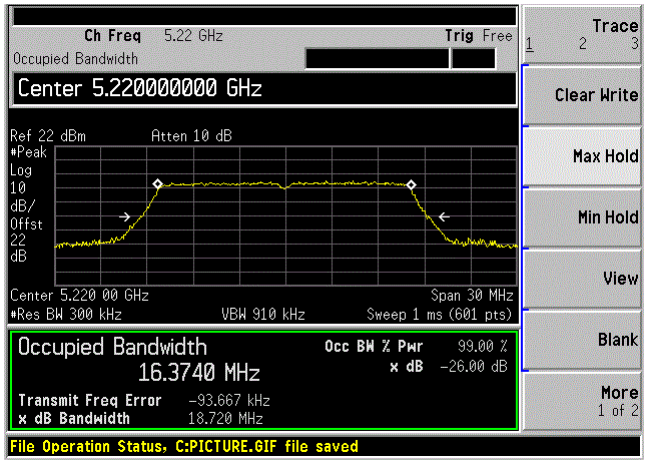
5725 - 5850 MHz
RADIO 1

802.11a Mode

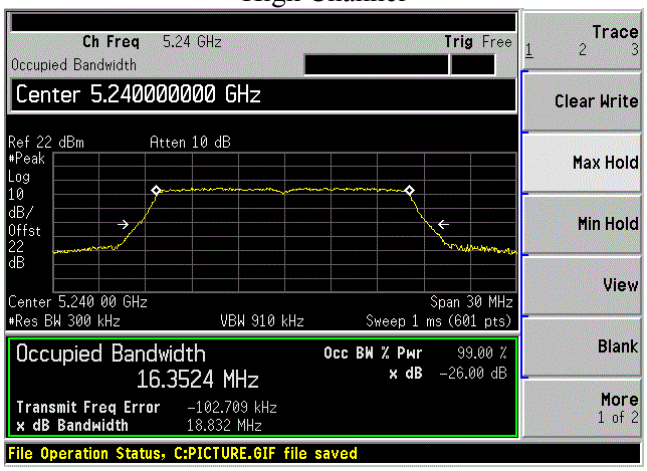
Low Channel



Mid Channel



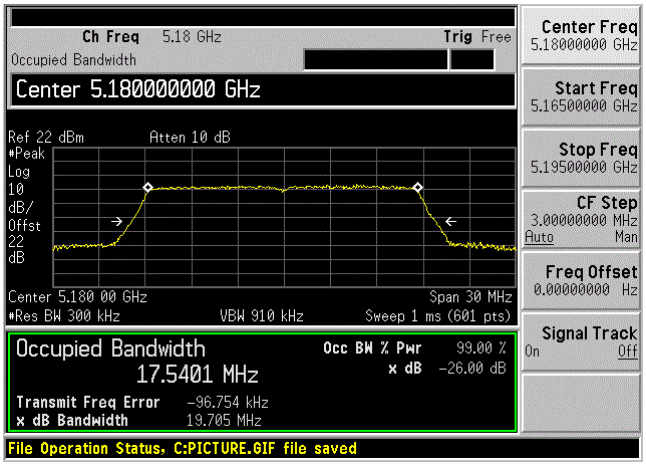
High Channel



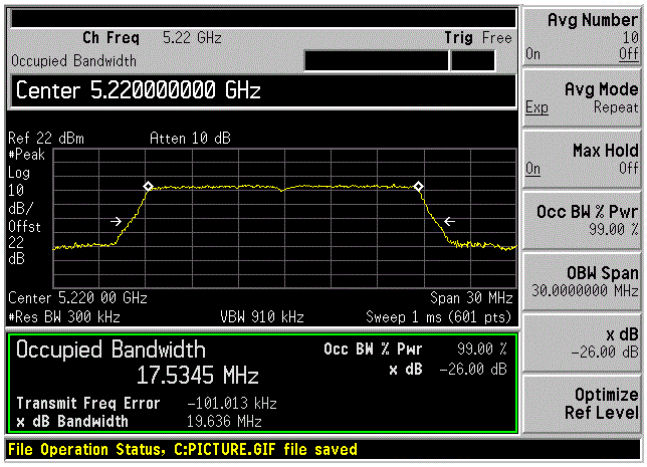
5725 - 5850 MHz
RADIO 1

802.11n20 Mode

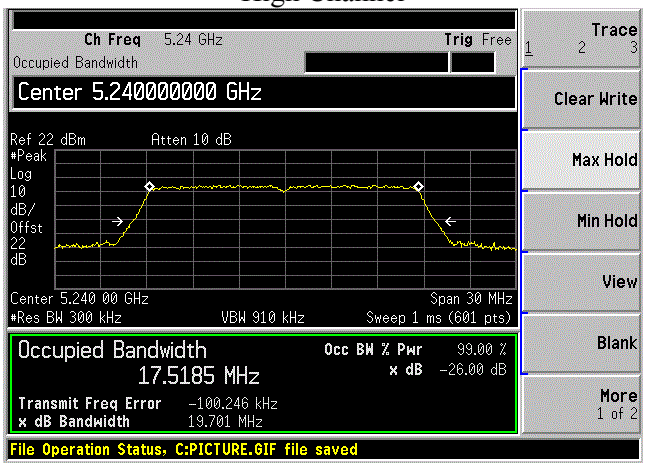
Low Channel



Mid Channel



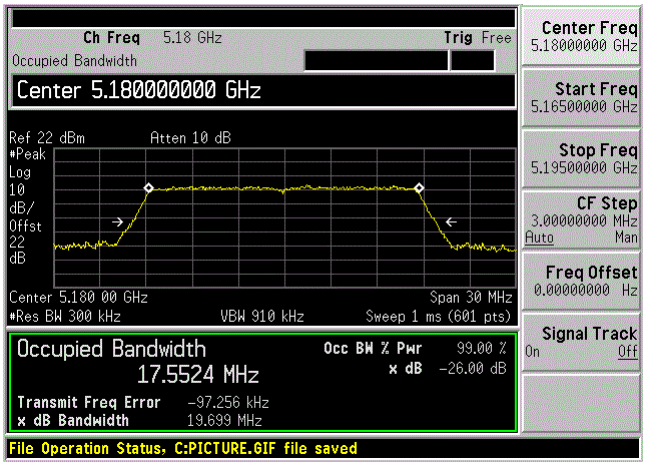
High Channel



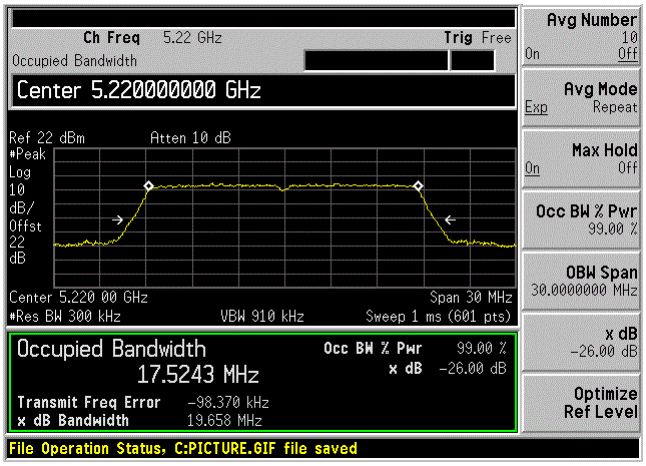
5725 - 5850 MHz
RADIO 1

802.11ac20 Mode

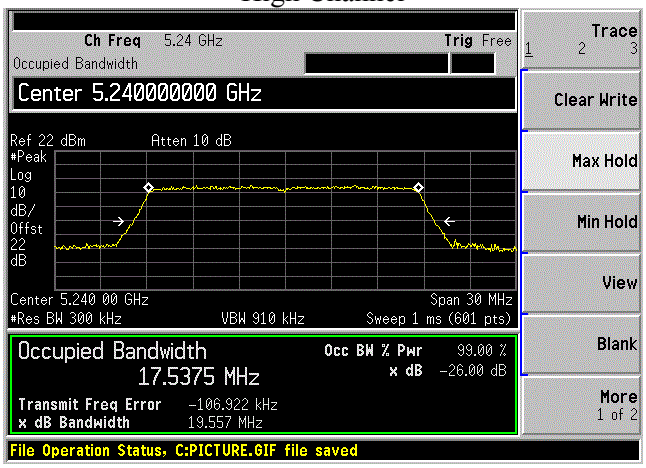
Low Channel



Mid Channel



High Channel



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

9.1 Applicable Standards

According to FCC §15.407(a):

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

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

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

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

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

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

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

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

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

The maximum conducted output power shall not exceed 250 mW or $11 + 10 \log_{10}B$, dBm, whichever is less. The power spectral density shall not exceed 11 dBm in any 1.0 MHz band.
The maximum e.i.r.p. shall not exceed 1.0 W or $17 + 10 \log_{10}B$, dBm, whichever is less. B is the 99% emission bandwidth in megahertz. Note that devices with a maximum e.i.r.p. greater than 500 mW shall implement TPC in order to have the capability to operate at least 6 dB below the maximum permitted e.i.r.p. of 1 W.

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

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

9.2 Measurement Procedure

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 Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
Agilent	Spectrum Analyzer	E4446A	MY48250238	2019-06-26	1 year
-	RF cable	-	-	Each time[1]	N/A
-	20 dB attenuator	-	-	Each time[1]	N/A
ETS- Lingerin	Power Sensor	7002-006	160097	2018-12-31	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 calibrations have been performed per the A2LA requirements, traceable to the NIST.*

9.4 Test Environmental Conditions

Temperature:	23º C
Relative Humidity:	42 %
ATM Pressure:	102.7 KPa

The testing was performed by Tri Pham & Christian McCaig from 2020-05-13 to 2020-05-22 in RF site.

9.5 Test Results

5150 - 5250 MHz

FCC Results

RADIO 2

Channel	Frequency (MHz)	Conducted Output Power (dBm)		Total (dBm)	FCC Limit (dBm)
		ANT A	ANT B		
802.11a mode					
Low	5180	14.66	13.13	-	24.00
Middle	5220	15.68	13.28	-	24.00
High	5240	15.15	15.7	-	24.00
802.11n20 mode					
Low	5180	10.34	9.67	13.03	22.50
Middle	5220	10.07	9.25	12.69	22.50
High	5240	11.43	9.94	13.76	22.50
802.11ac20 mode					
Low	5180	10.58	9.81	13.22	22.50
Middle	5220	11.1	9.58	13.42	22.50
High	5240	11.66	10.16	13.98	22.50

Note: When the directional gain is greater than 6dBi, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The directional antenna gain for 802.11n20/ac20 mode is 7.5 dBi calculated based on method specified in KDB 662911 D01

RADIO 1

Channel	Frequency (MHz)	Conducted Output Power (dBm)	FCC Limit (dBm)
802.11a mode			
Low	5180	12.5	24.00
Middle	5220	13.45	24.00
High	5240	13.92	24.00
802.11n20 mode			
Low	5180	11.73	24.00
Middle	5220	13.78	24.00
High	5240	14.38	24.00
802.11ac20 mode			
Low	5180	11.65	24.00
Middle	5220	13.85	24.00
High	5240	14.25	24.00

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

ISEDC Results

RADIO 2

Channel	Frequency (MHz)	Conducted Output Power (dBm)		Total (dBm)	Antenna Gain (dBi)	EIRP (dBm)		ISEDC EIRP Limit (dBm)
		ANT A	ANT B			ANT A	ANT B	
802.11a mode								
Low	5180	8.7	8.48	-	4.5	13.2	12.98	22.14
Middle	5220	9.3	8.75	-	4.5	13.8	13.25	22.14
High	5240	9.31	9.43	-	4.5	13.81	13.93	22.14
802.11n20 mode								
Low	5180	3.02	2.68	5.86	7.5	13.36		22.44
Middle	5220	3.47	1.77	5.71	7.5	13.21		22.44
High	5240	4.05	2.44	6.33	7.5	13.83		22.44
802.11ac20 mode								
Low	5180	3.17	2.91	6.05	7.5	13.55		22.44
Middle	5220	3.55	2.06	5.88	7.5	13.38		22.44
High	5240	4.35	2.63	6.58	7.5	14.08		22.44

Note: The directional antenna gain for 802.11n20/ac20 mode is 7.5 dBi calculated based on method specified in KDB 662911 D01.

RADIO 1

Channel	Frequency (MHz)	Conducted Output Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	ISEDC EIRP Limit (dBm)
802.11a mode					
Low	5180	8.22	4.5	12.72	22.14
Middle	5220	8.06	4.5	12.56	22.14
High	5240	8.4	4.5	12.9	22.14
802.11n20 mode					
Low	5180	8.28	4.5	12.78	22.44
Middle	5220	8.2	4.5	12.7	22.44
High	5240	8.7	4.5	13.2	22.44
802.11ac20 mode					
Low	5180	8.35	4.5	12.85	22.44
Middle	5220	8.65	4.5	13.15	22.44
High	5240	8.44	4.5	12.94	22.44

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

5745 - 5825 MHz

FCC/ISEDC Results:

RADIO 2

Channel	Frequency (MHz)	Conducted Output Power (dBm)		Total (dBm)	FCC/ISEDC Limit (dBm)
		ANT A	ANT B		
802.11a mode					
Low	5745	23.55	23.39	-	30
Middle	5785	20.59	19.9	-	30
High	5825	19.91	20.67	-	30
802.11n20 mode					
Low	5745	18.85	20.74	22.91	28.50
Middle	5785	16.91	19.81	21.61	28.50
High	5825	18.65	21.05	23.02	28.50
802.11ac20 mode					
Low	5745	17.62	20.39	22.23	28.50
Middle	5785	16.8	19.28	21.23	28.50
High	5825	17.65	19.78	21.85	28.50

Note: When the directional gain is greater than 6dBi, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The directional antenna gain for 802.11n20/ac20 mode is 7.5 dBi calculated based on method specified in KDB 662911 D01

RADIO 1

Channel	Frequency (MHz)	Conducted Output Power (dBm)	FCC/ISEDC Limit (dBm)
802.11a mode			
Low	5745	21.68	30.00
Middle	5785	21.67	30.00
High	5825	21.12	30.00
802.11n20 mode			
Low	5745	21.67	30.00
Middle	5785	21.74	30.00
High	5825	21.21	30.00
802.11ac20 mode			
Low	5745	21.76	30.00
Middle	5785	21.77	30.00
High	5825	21.2	30.00

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

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

10.1 Applicable Standards

According to FCC §15.407(a):

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

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

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

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

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

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

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

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

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

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

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

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

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

10.2 Measurement Procedure

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

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
Agilent	Spectrum Analyzer	E4446A	MY48250238	2019-06-26	1 year
-	RF cable	-	-	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 calibrations have been performed per the A2LA requirements, traceable to the NIST.*

10.4 Test Environmental Conditions

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

The testing was performed by Tri Pham & Christian McCaig from 2020-05-13 to 2020-05-22 in RF site.

10.5 Test Results

5150 - 5250 MHz

FCC:

RADIO 2

Channel	Frequency (MHz)	PSD (dBm/MHz)		Total PSD (dBm/MHz)	DCCF (dB)	Corrected PSD (dBm/MHz)		FCC Limit (dBm/MHz)
		ANT A	ANT B			ANT A	ANT B	
801.11a mode								
Low	5180	3.43	1.97	-	0.27	3.7	2.24	11.00
Middle	5220	4.01	2.03	-	0.27	4.28	2.3	11.00
High	5240	3.29	2.3	-	0.27	3.56	2.57	11.00
801.11n20 mode								
Low	5180	-1.79	-1.41	1.41	0.33	1.74		9.50
Middle	5220	-0.37	-1.99	1.91	0.33	2.24		9.50
High	5240	-0.19	-1.14	2.37	0.33	2.70		9.50
801.11ac20 mode								
Low	5180	-0.78	-1.11	2.07	0.53	2.60		9.50
Middle	5220	0.01	-1.28	2.42	0.53	2.95		9.50
High	5240	0.41	-0.75	2.88	0.53	3.41		9.50

Corrected Total PSD (dBm/MHz) = PSD (dBm/MHz) + Duty Cycle Correction (dB)

Note: When the directional gain is greater than 6dBi, the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The directional antenna gain for 802.11n20/ac20 mode is 7.5 dBi calculated based on method specified in KDB 662911 D01.

RADIO 1

Channel	Frequency (MHz)	PSD (dBm/MHz)	DCCF (dB)	Corrected PSD (dBm/MHz)	FCC Limit (dBm/MHz)
801.11a mode					
Low	5180	2.66	0.16	2.82	11.00
Middle	5220	3.79	0.16	3.95	11.00
High	5240	4.18	0.16	4.34	11.00
801.11n20 mode					
Low	5180	1.92	0.22	2.14	11.00
Middle	5220	3.73	0.22	3.95	11.00
High	5240	4.15	0.22	4.37	11.00
801.11ac20 mode					
Low	5180	1.68	0.24	1.92	11.00
Middle	5220	3.86	0.24	4.10	11.00
High	5240	4.00	0.24	4.24	11.00

Note: Corrected PSD (dBm/MHz) = PSD (dBm/MHz) + Duty Cycle Correction Factor (dB)

IC:

RADIO 2

Channel	Frequency (MHz)	PSD (dBm/MHz)		Total PSD (dBm/MHz)	Antenna Gain (dBi)	DCCF (dB)	Corrected EIRP PSD (dBm/MHz)		IC EIRP PSD Limit (dBm/MHz)
		ANT A	ANT B				ANT A	ANT B	
801.11a mode									
Low	5180	-2.29	-2.51	-	4.5	0.27	2.48	2.26	10.00
Middle	5220	-1.84	-2.07	-	4.5	0.27	2.93	2.7	10.00
High	5240	-2.08	-1.76	-	4.5	0.27	2.69	3.01	10.00
801.11n20 mode									
Low	5180	-7.90	-8.25	-5.06	7.5	0.33	2.77		10.00
Middle	5220	-7.36	-8.63	-4.94	7.5	0.33	2.89		10.00
High	5240	-6.86	-8.34	-4.53	7.5	0.33	3.3		10.00
801.11ac20 mode									
Low	5180	-7.50	-8.06	-4.76	7.5	0.53	3.27		10.00
Middle	5220	-7.07	-8.60	-4.76	7.5	0.53	3.27		10.00
High	5240	-6.95	-8.39	-4.60	7.5	0.53	3.43		10.00

Corrected PSD (dBm/MHz) = PSD (dBm/MHz) + Duty Cycle Correction (dB)
Corrected EIRP PSD (dBm/MHz) = Corrected PSD (dBm/MHz) + Antenna Gain (dBi)

Note: The directional antenna gain for 802.11n20/ac20 mode is 7.5 dBi calculated based on method specified in KDB 662911 D01.

RADIO 1

Channel	Frequency (MHz)	PSD (dBm/MHz)	Antenna Gain (dBi)	DCCF (dB)	Corrected EIRP PSD (dBm/MHz)	IC EIRP PSD Limit (dBm/MHz)
802.11a mode						
Low	5180	-1.51	4.5	0.16	3.15	10.00
Middle	5220	-1.66	4.5	0.16	3	10.00
High	5240	-1.06	4.5	0.16	3.6	10.00
802.11n20 mode						
Low	5180	-1.70	4.5	0.22	3.02	10.00
Middle	5220	-1.96	4.5	0.22	2.76	10.00
High	5240	-1.69	4.5	0.22	3.03	10.00
802.11ac20 mode						
Low	5180	-1.75	4.5	0.24	2.99	10.00
Middle	5220	-1.16	4.5	0.24	3.58	10.00
High	5240	-1.07	4.5	0.24	3.67	10.00

Corrected EIRP PSD (dBm/MHz) = PSD (dBm/MHz) + Duty Cycle Correction Factor + Antenna Gain (dBi)

5745 - 5825 MHz

FCC/IC:

RADIO 2

Channel	Frequency (MHz)	PSD (dBm/300 kHz)		Total PSD (dBm/300 kHz)	DCCF (dB)	Corrected PSD (dBm/500 kHz)		FCC/ISEDC Limit (dBm/500 kHz)
		ANT A	ANT B			ANT A	ANT B	
801.11a mode								
Low	5745	7.38	7.96	-	0.27	9.86	10.44	30
Middle	5785	7.33	7.75	-	0.27	9.81	10.23	30
High	5825	6.70	6.96	-	0.27	9.18	9.44	30
801.11n20 mode								
Low	5745	2.07	4.61	6.53	0.33	9.08		30
Middle	5785	2.33	4.85	6.78	0.33	9.33		30
High	5825	1.64	4.15	6.08	0.33	8.63		30
801.11ac20 mode								
Low	5745	2.32	4.51	6.56	0.53	9.31		30
Middle	5785	2.35	4.72	6.71	0.53	9.46		30
High	5825	1.75	3.96	6.00	0.53	8.75		30

Note: Correct PSD (dBm/500 kHz) = Total PSD (dBm/300 kHz) + Duty Cycle Correction Factor(dB) + 10*log(500 kHz/300 kHz)

RADIO 1

Channel	Frequency (MHz)	PSD (dBm/300 kHz)	DCCF (dB)	Corrected PSD (dBm/500 MHz)	Limit (dBm/500 kHz)
801.11a mode					
Low	5745	4.69	0.18	7.09	30
Middle	5785	5.20	0.18	7.60	30
High	5825	4.65	0.18	7.05	30
801.11n20 mode					
Low	5745	4.52	0.19	6.93	30
Middle	5785	4.88	0.19	7.29	30
High	5825	4.42	0.19	6.83	30
801.11ac20 mode					
Low	5745	4.52	0.15	6.89	30
Middle	5785	5.04	0.15	7.41	30
High	5825	4.39	0.15	6.76	30

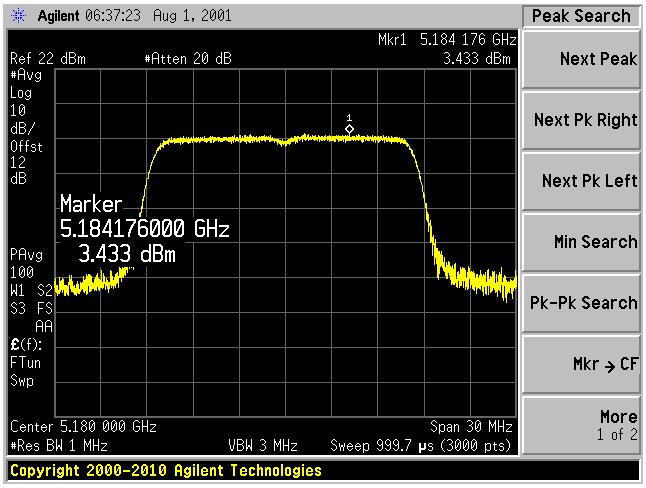
Note: Correct PSD (dBm/500 kHz) = PSD (dBm/300 kHz) + Duty Cycle Correction Factor (dB) + 10*log(500 kHz/300 kHz)

Please refer to the following plots.

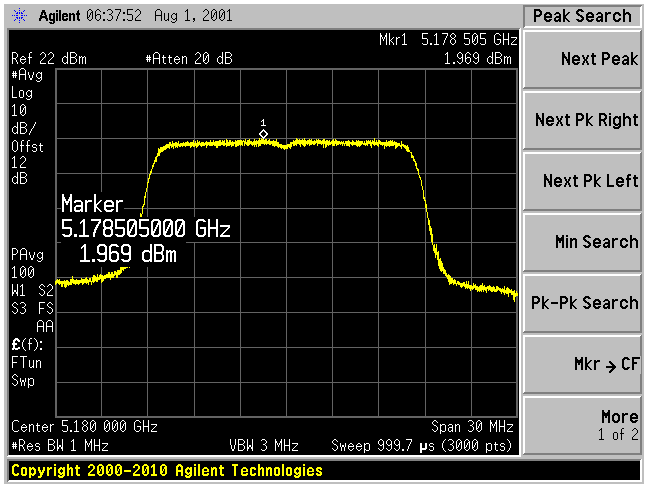
FCC:

5150 - 5250 MHz
RADIO 2
802.11a Mode

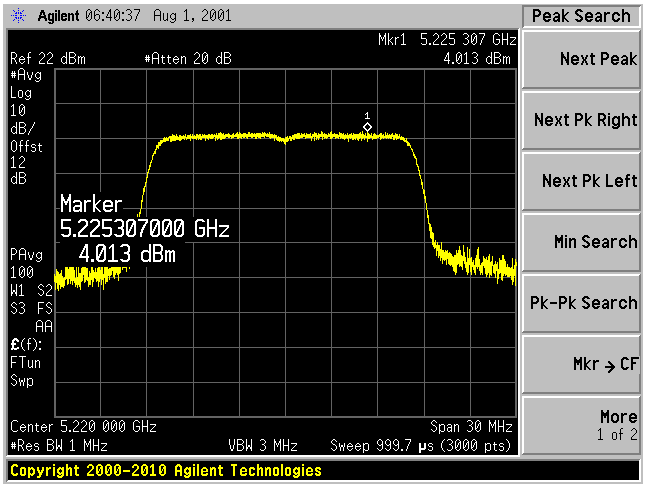
Low Channel ANT A



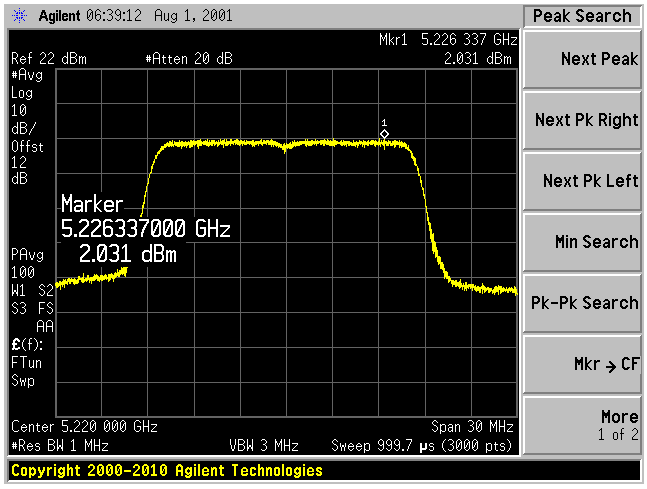
Low Channel ANT B



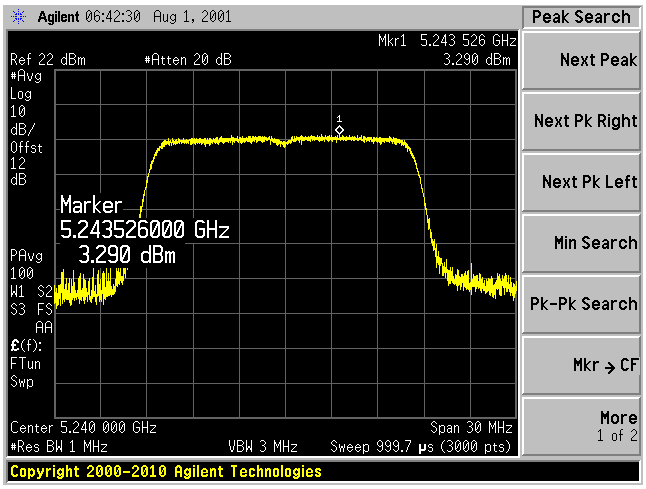
Mid Channel ANT A



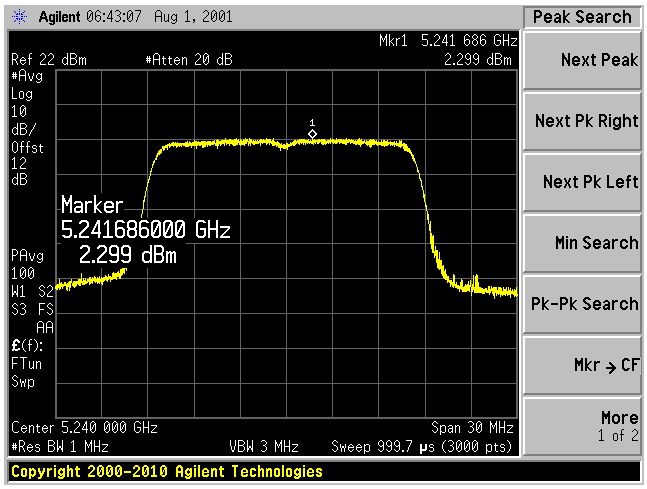
Mid Channel ANT B



High Channel ANT A

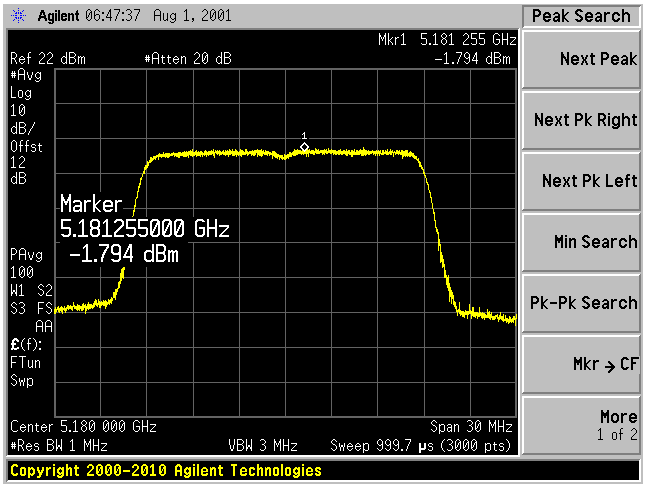


High Channel ANT B

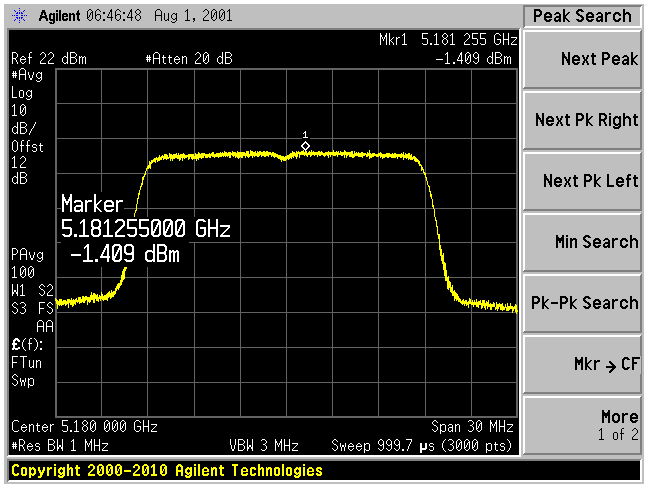


5150 - 5250 MHz
RADIO 2
802.11n20 Mode

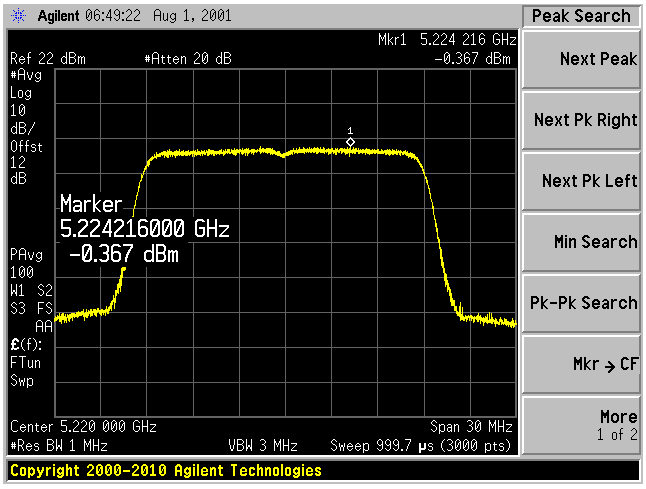
Low Channel ANT A



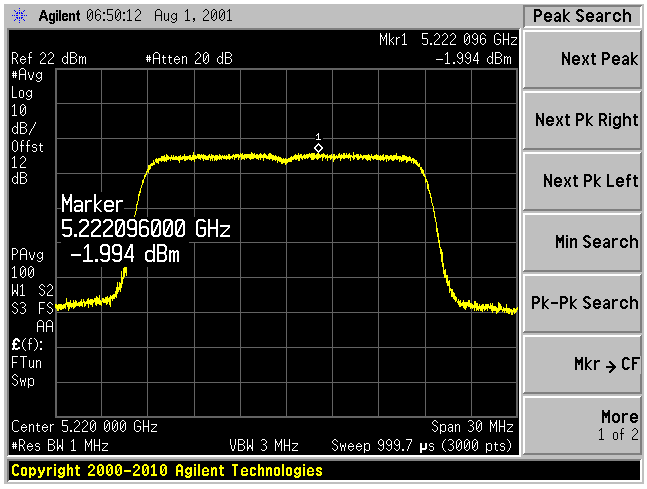
Low Channel ANT B



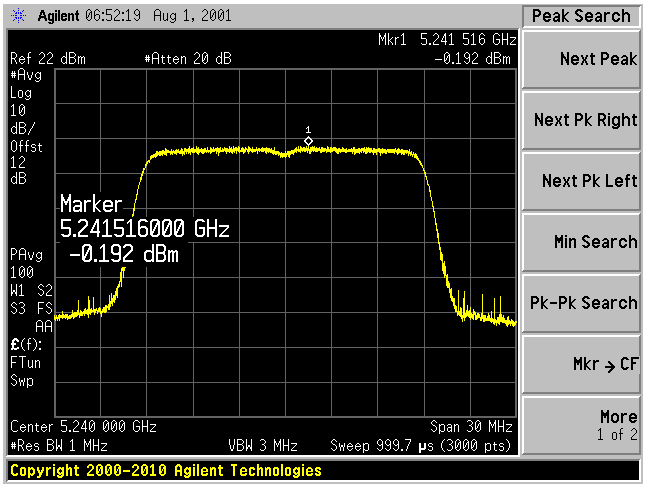
Mid Channel ANT A



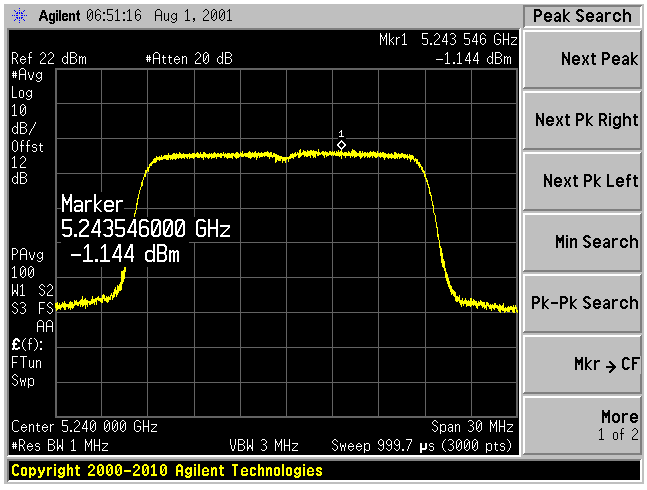
Mid Channel ANT B



High Channel ANT A

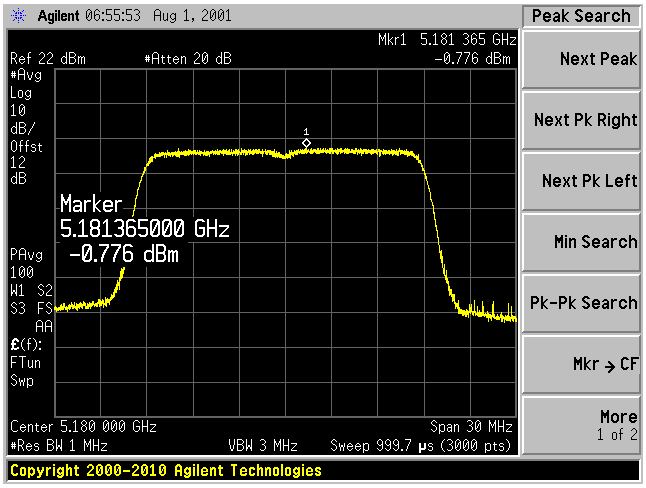


High Channel ANT B

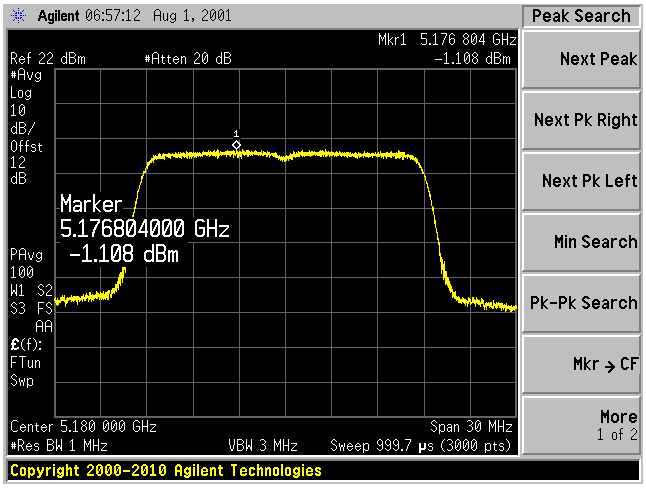


5150 - 5250 MHz
RADIO 2
802.11ac20 Mode

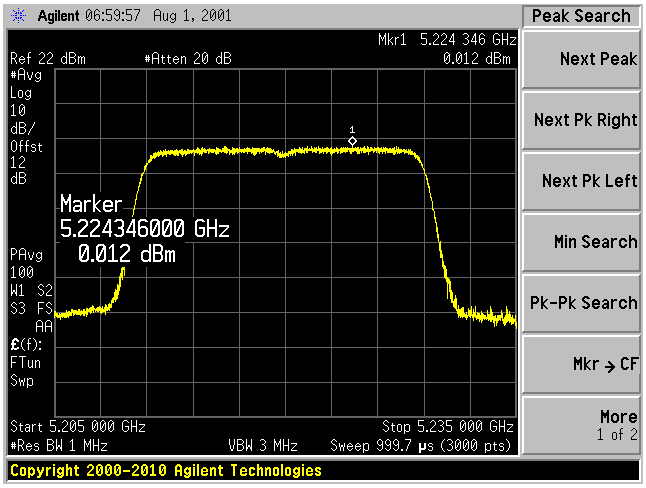
Low Channel ANT A



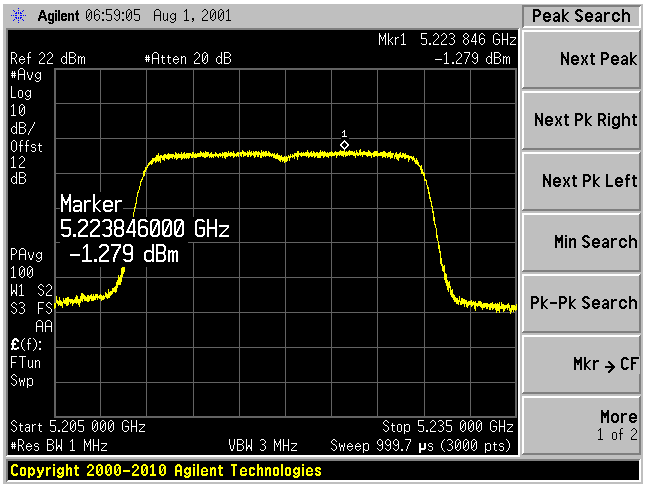
Low Channel ANT B



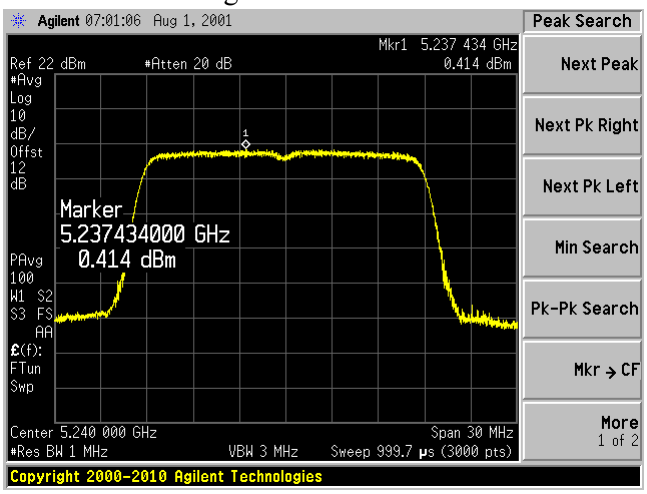
Mid Channel ANT A



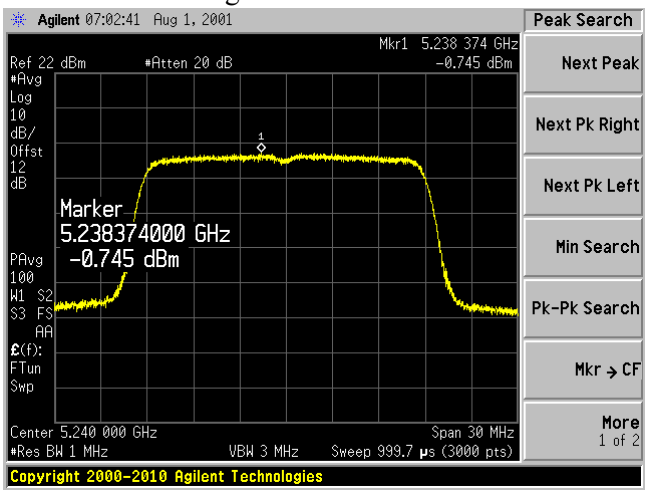
Mid Channel ANT B



High Channel ANT A

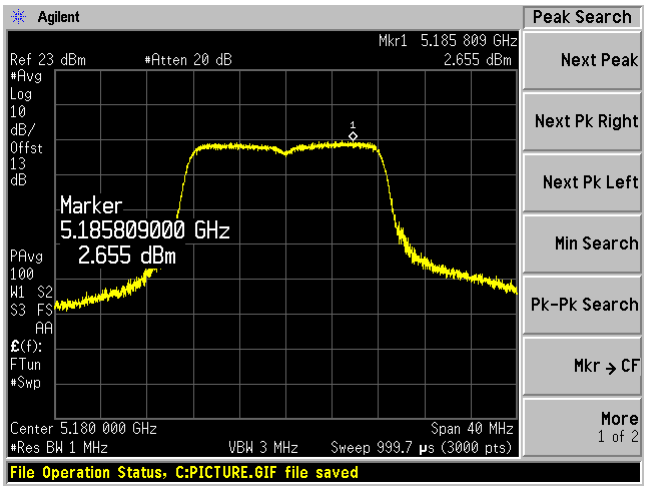


High Channel ANT B

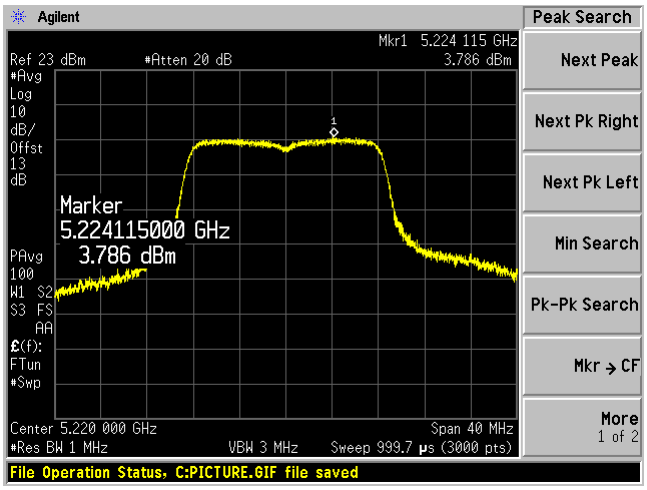


5150 - 5250 MHz
RADIO 1
802.11a Mode

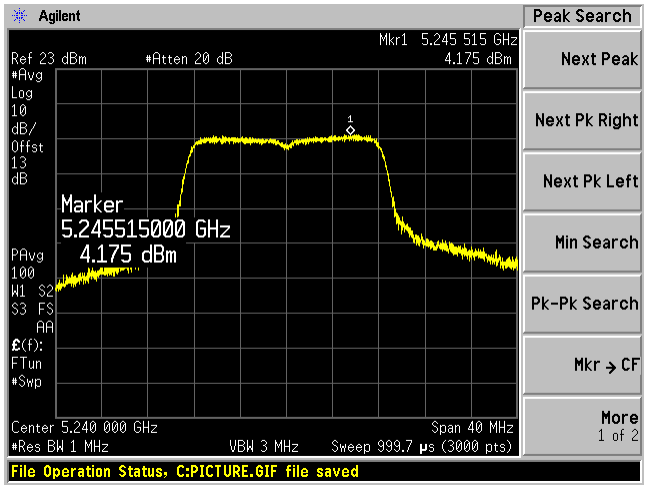
Low Channel



Mid Channel

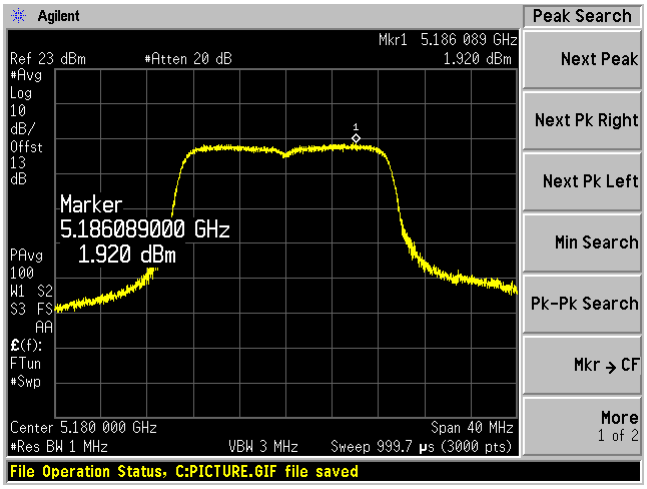


High Channel

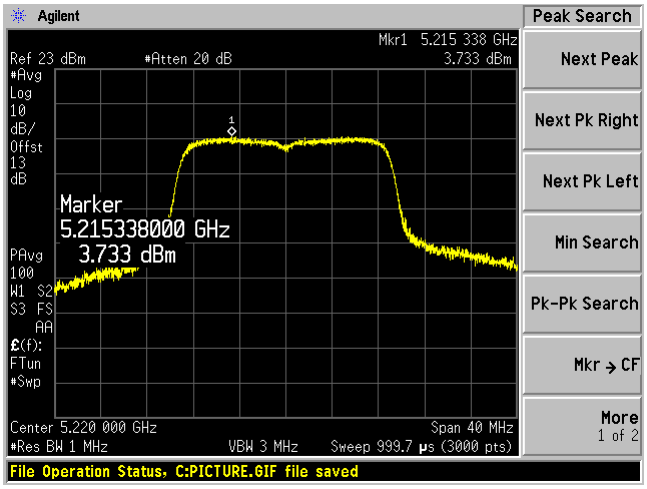


5150 - 5250 MHz
RADIO 1
802.11n20 Mode

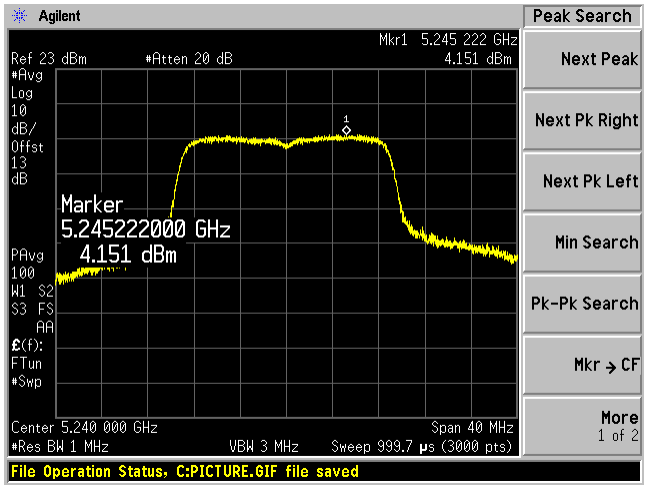
Low Channel



Mid Channel

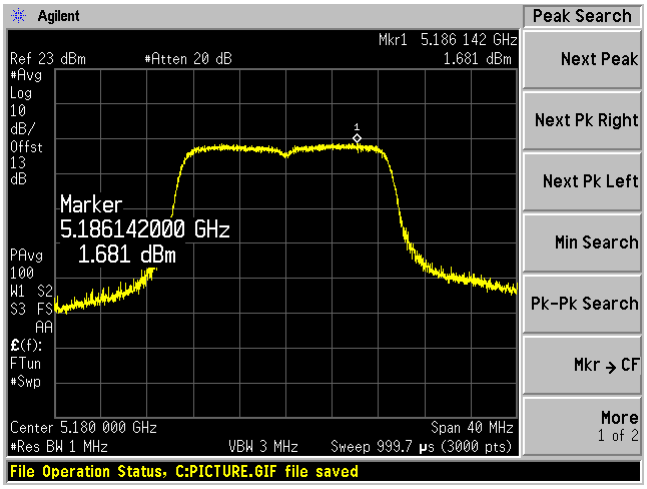


High Channel

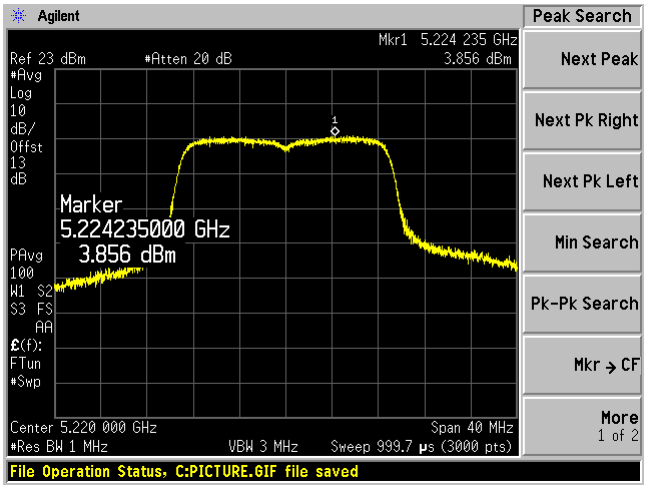


5150 - 5250 MHz
RADIO 1
802.11ac20 Mode

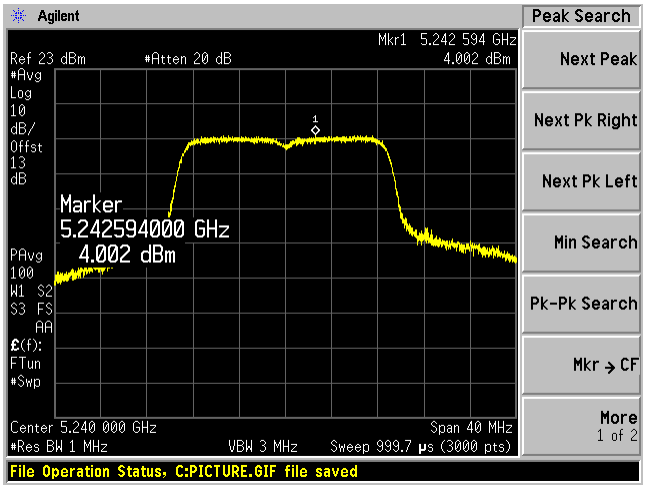
Low Channel



Mid Channel

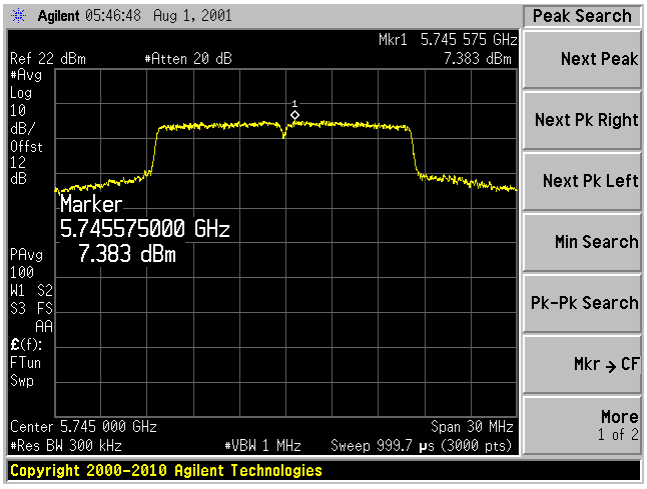


High Channel

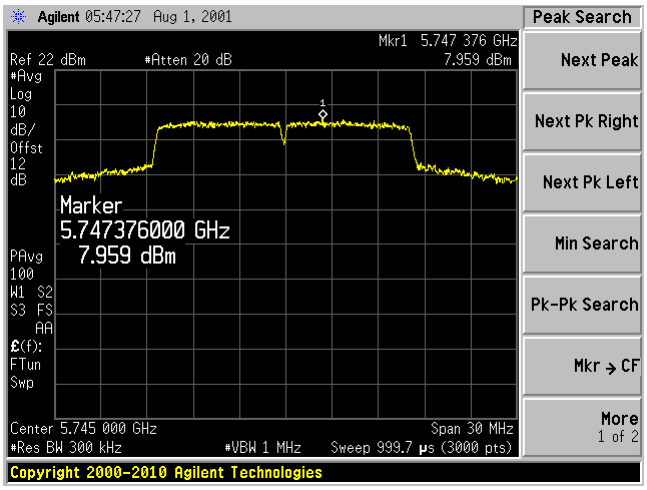


5745 - 5825 MHz
RADIO 2
802.11a Mode

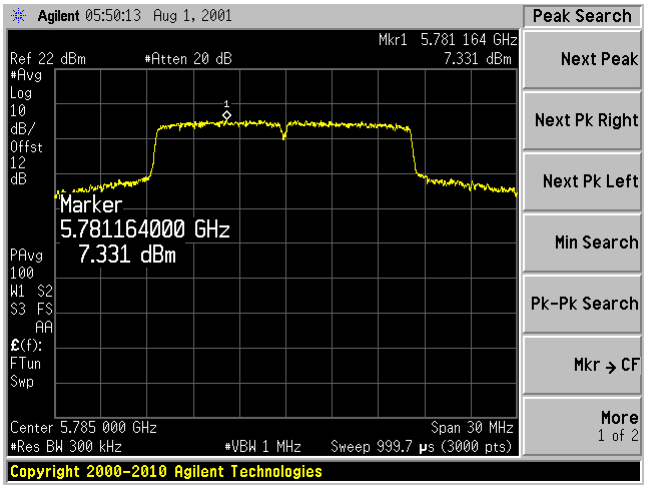
Low Channel ANT A



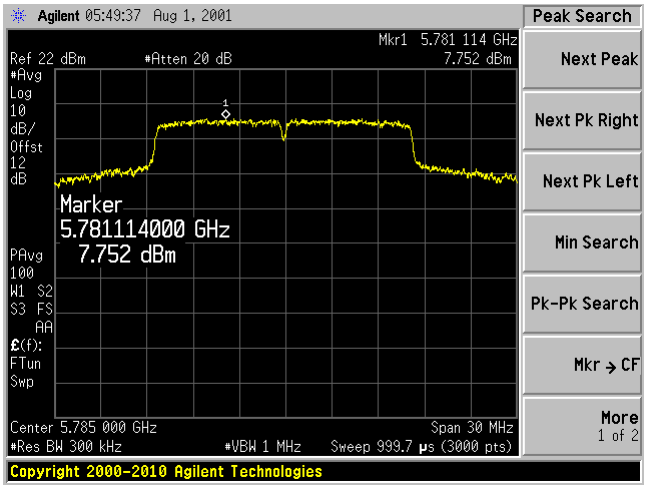
Low Channel ANT B



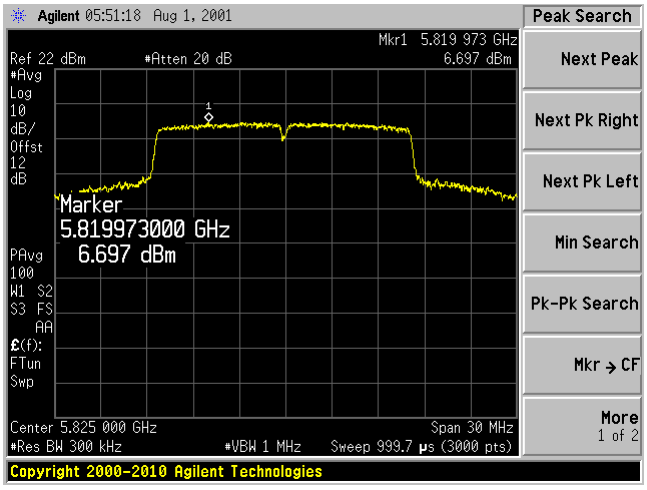
Mid Channel ANT A



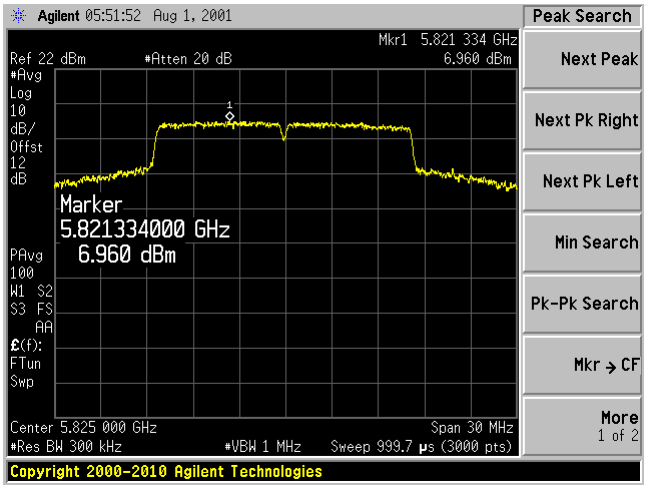
Mid Channel ANT B



High Channel ANT A

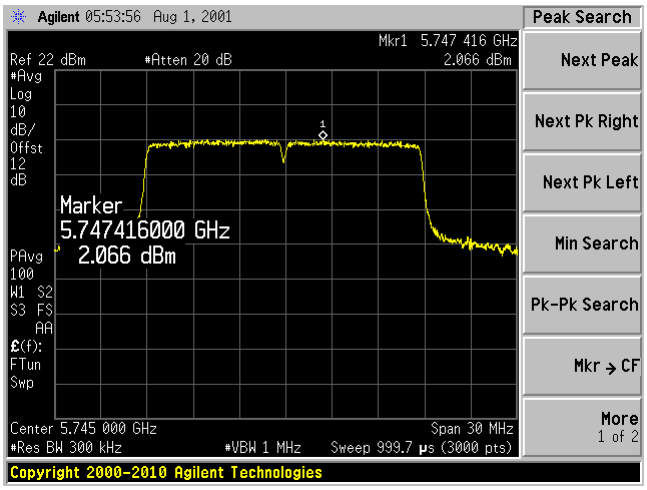


High Channel ANT B

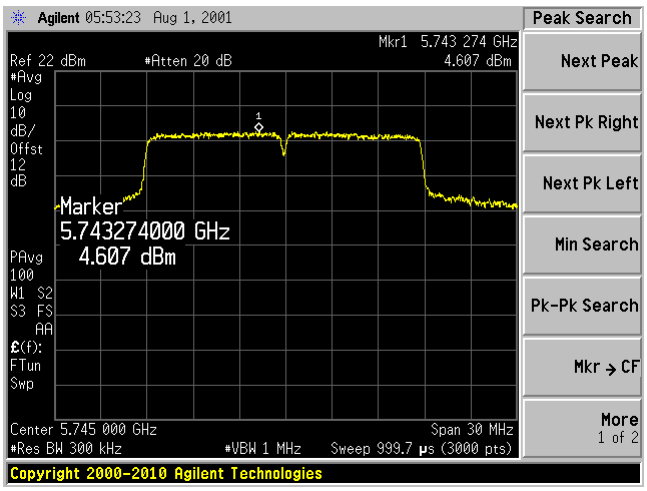


5745 - 5825 MHz
RADIO 2
802.11n20 Mode

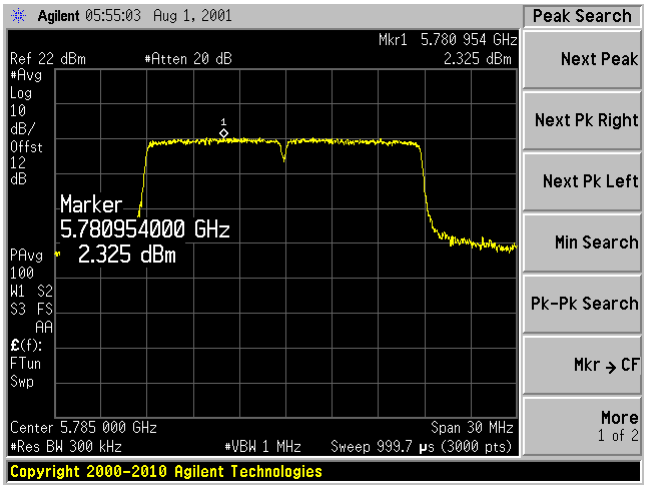
Low Channel ANT A



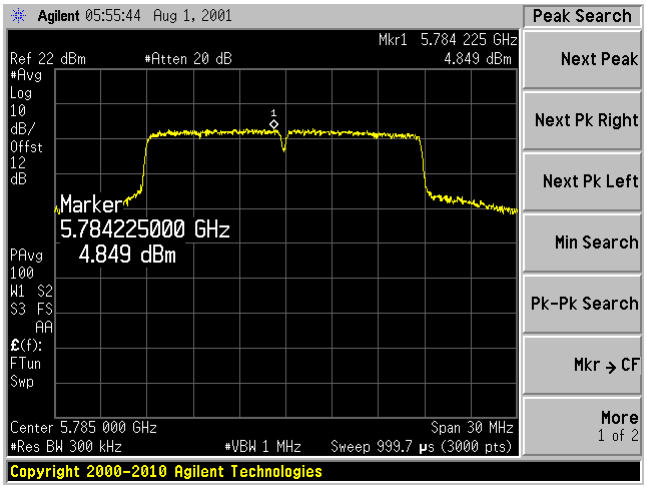
Low Channel ANT B



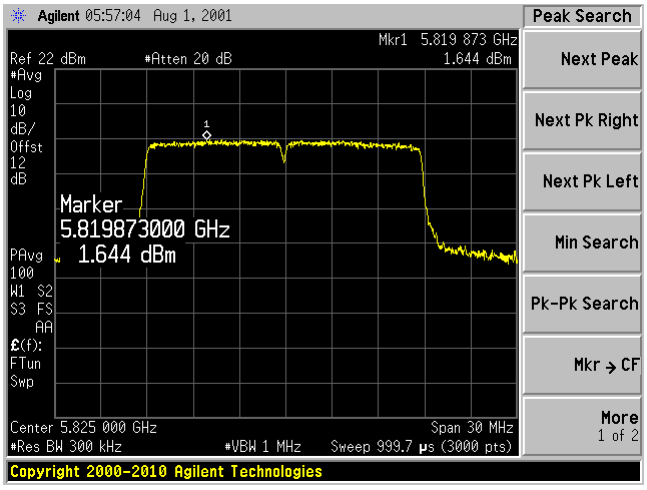
Mid Channel ANT A



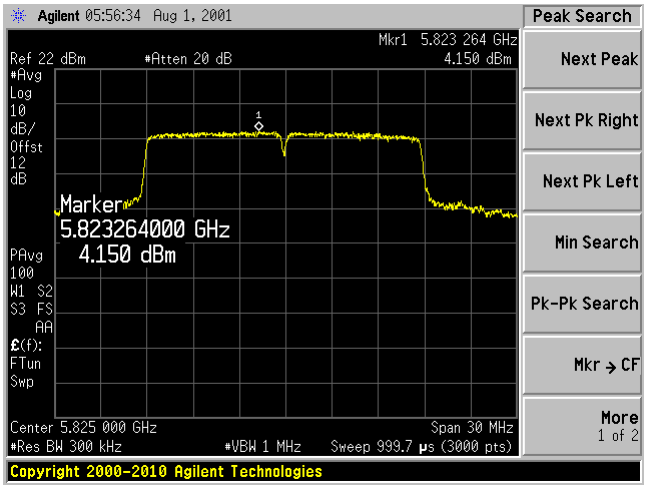
Mid Channel ANT B



High Channel ANT A

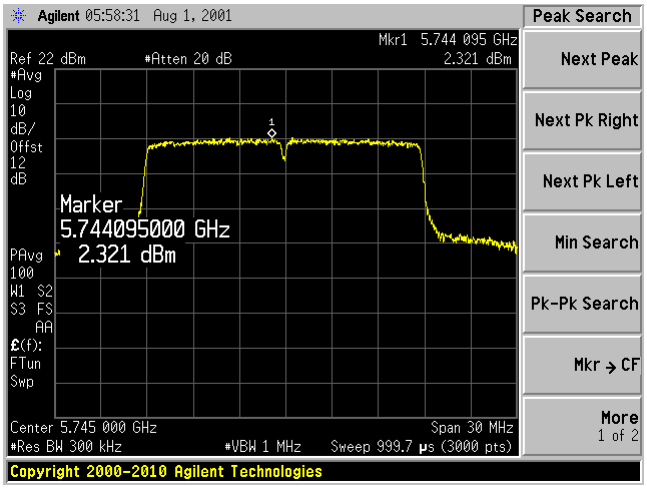


High Channel ANT B

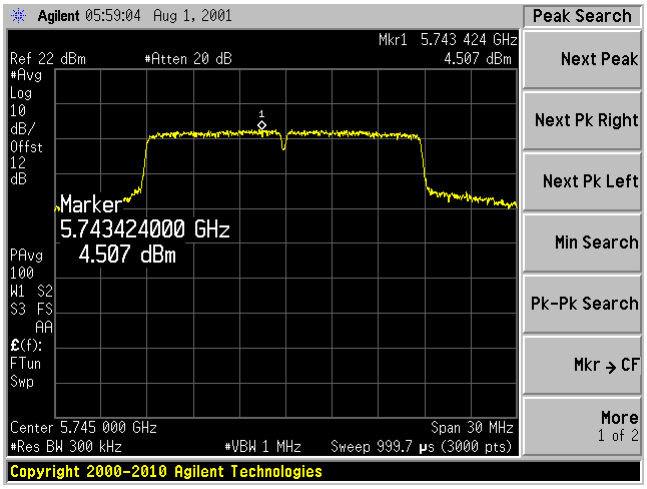


5745 - 5825 MHz
RADIO 2
802.11ac20 Mode

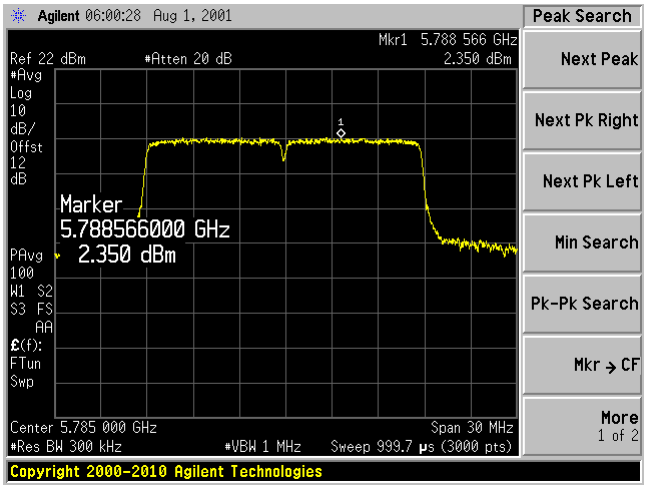
Low Channel ANT A



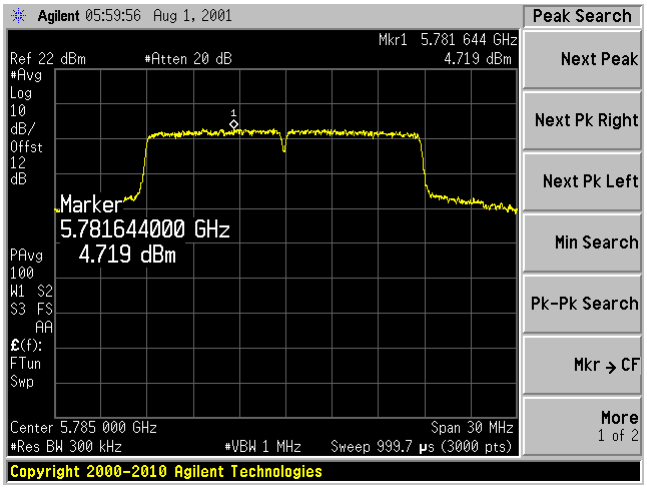
Low Channel ANT B



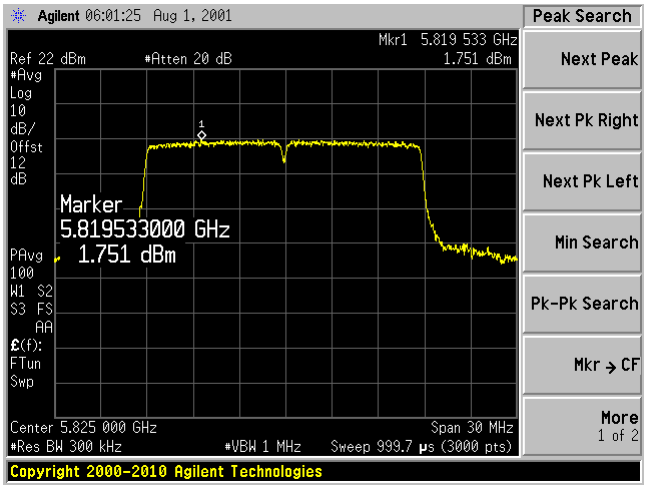
Mid Channel ANT A



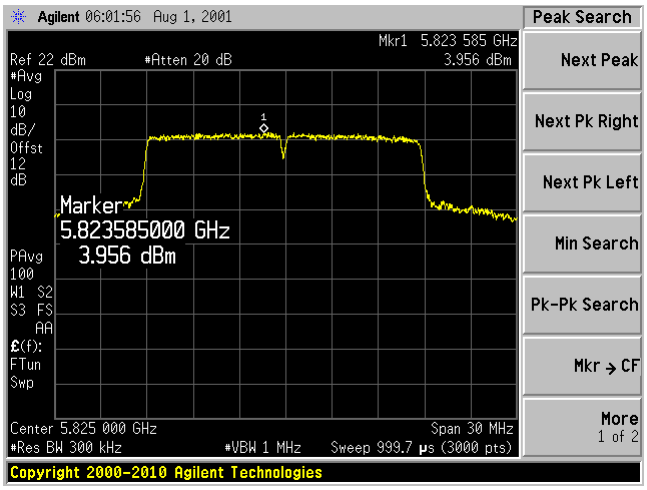
Mid Channel ANT B



High Channel ANT A

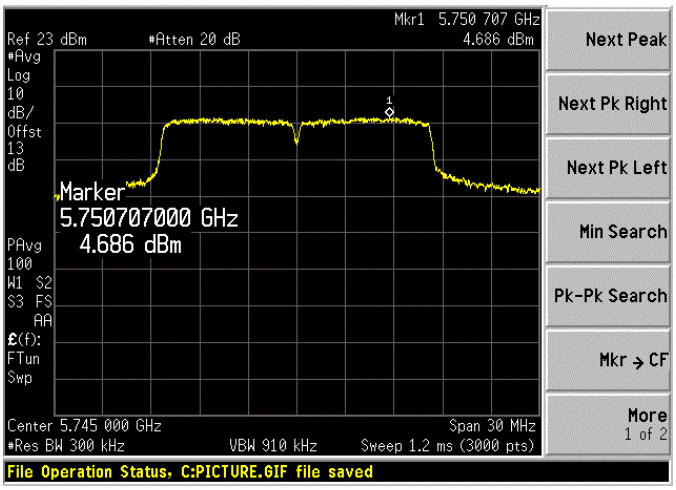


High Channel ANT B

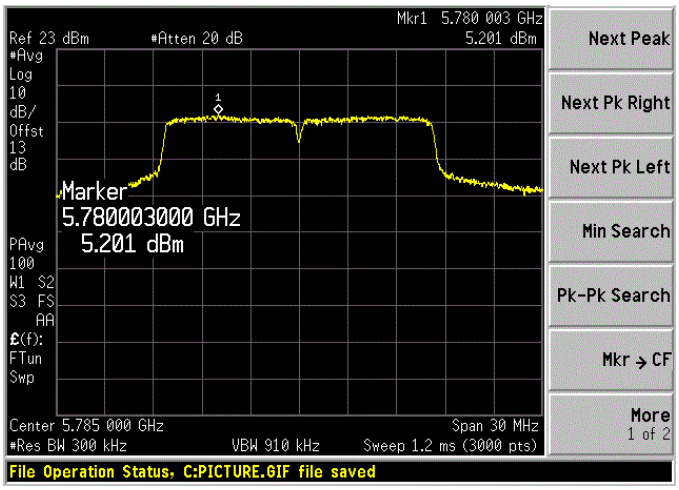


5745 - 5825 MHz
RADIO 1
802.11a Mode

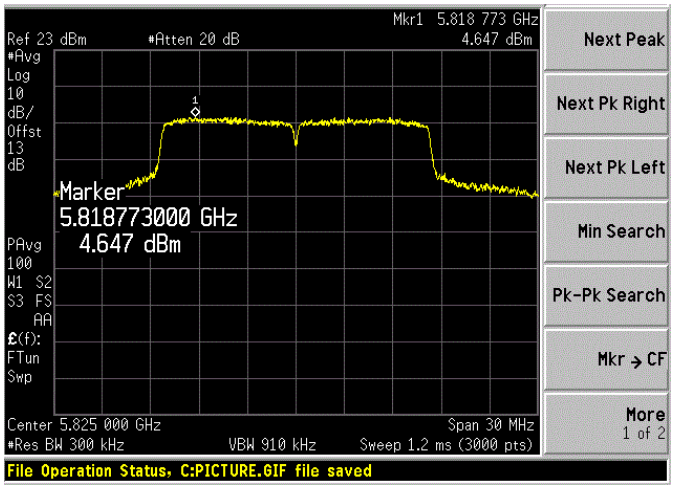
Low Channel



Mid Channel

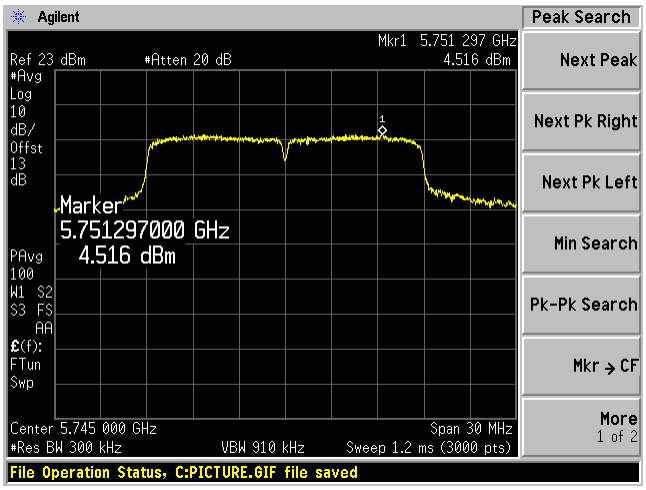


High Channel

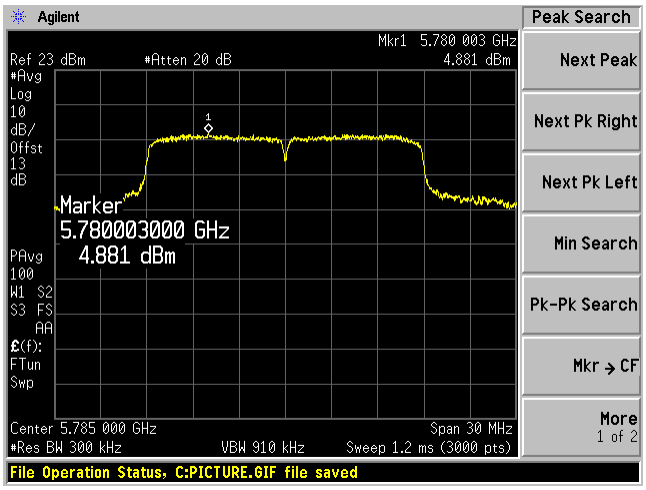


5745 - 5825 MHz
RADIO 1
802.11n20 Mode

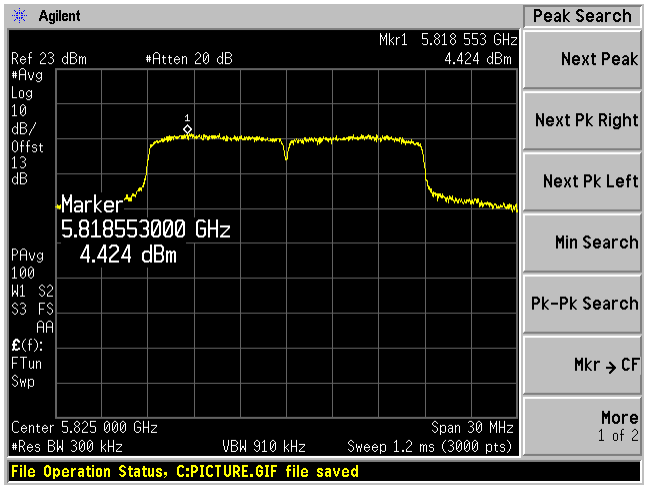
Low Channel



Mid Channel

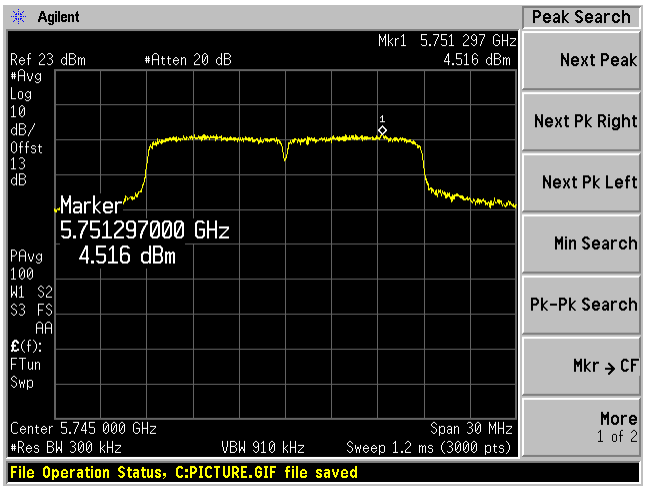


High Channel

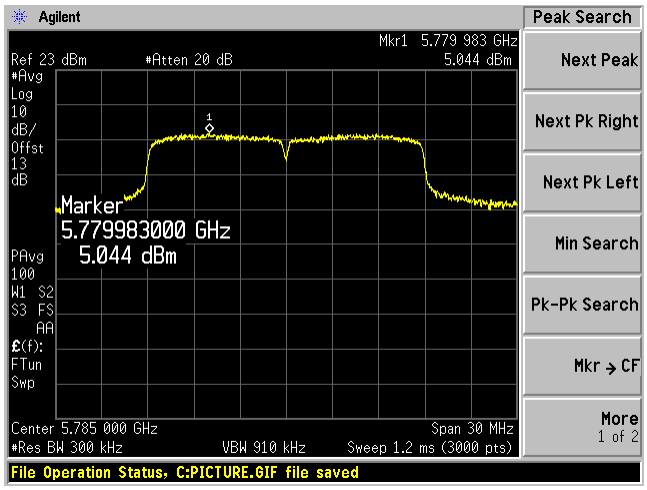


5745 - 5825 MHz
RADIO 1
802.11ac20 Mode

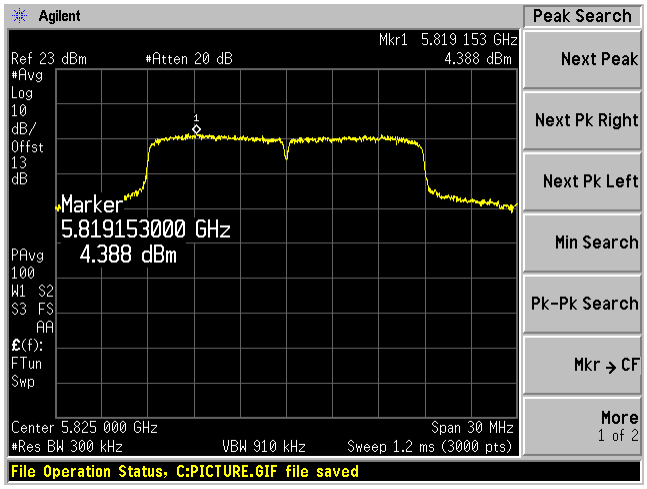
Low Channel



Mid Channel



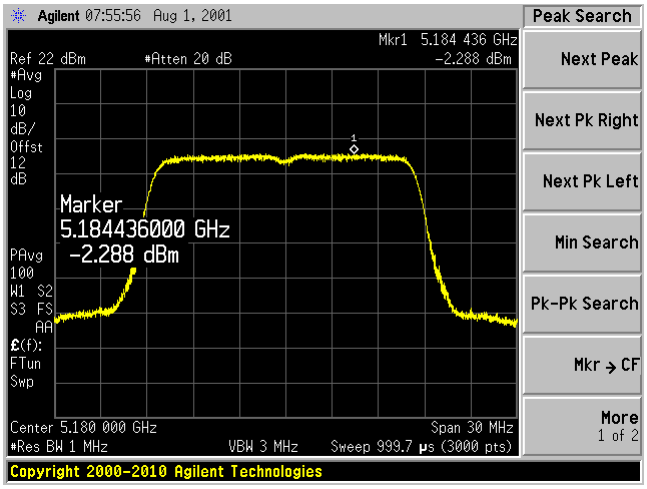
High Channel



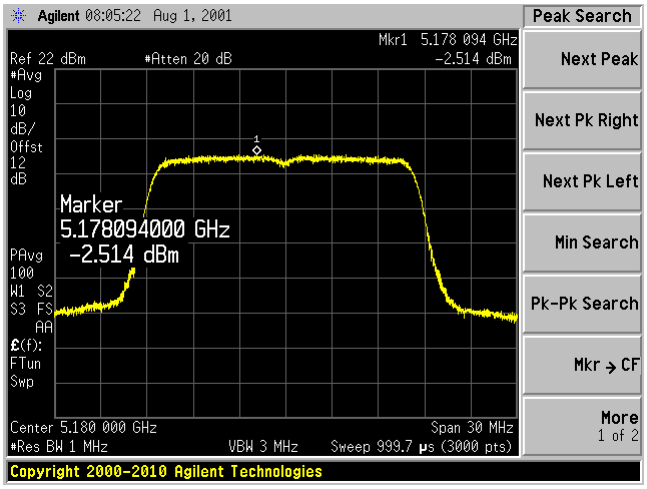
IC:

5150 - 5250 MHz
RADIO 2
802.11a Mode

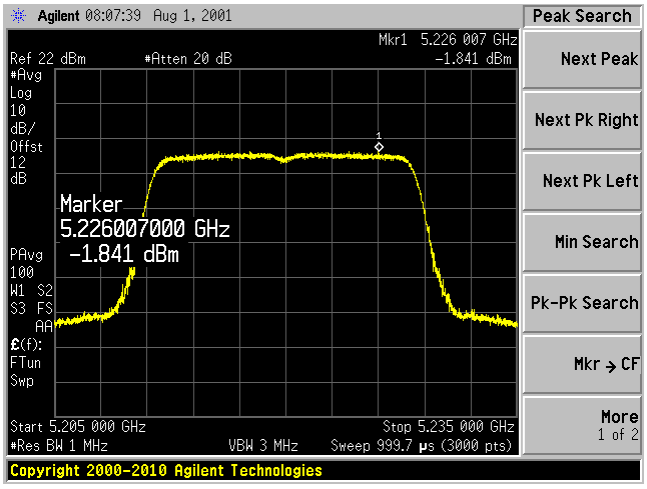
Low Channel ANT A



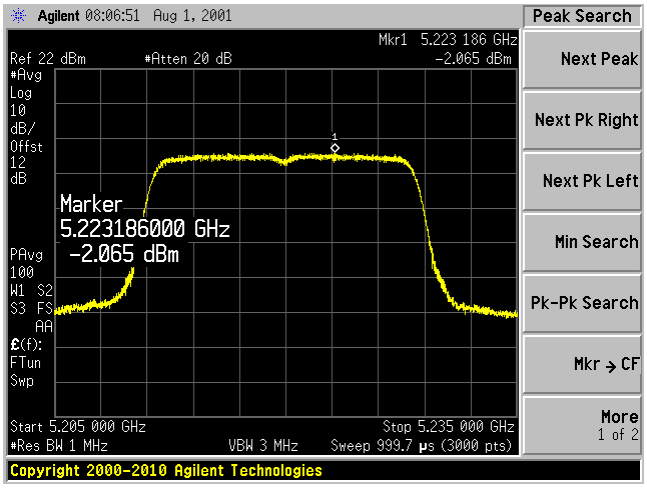
Low Channel ANT B



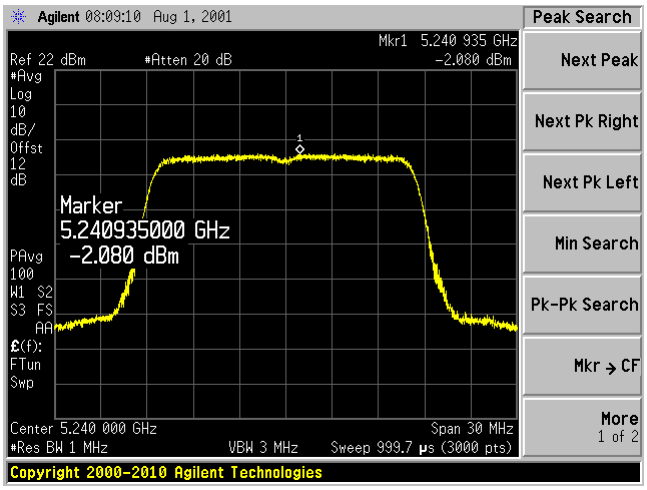
Mid Channel ANT A



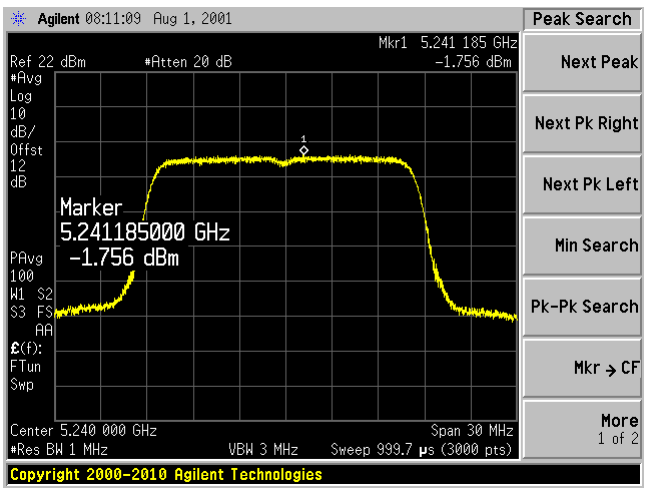
Mid Channel ANT B



High Channel ANT A

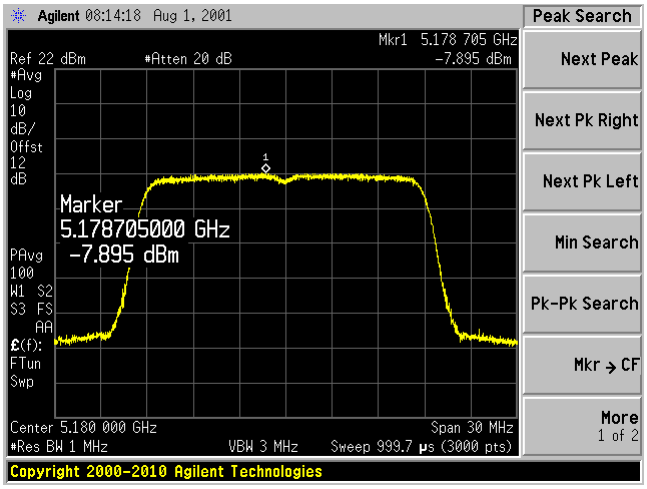


High Channel ANT B

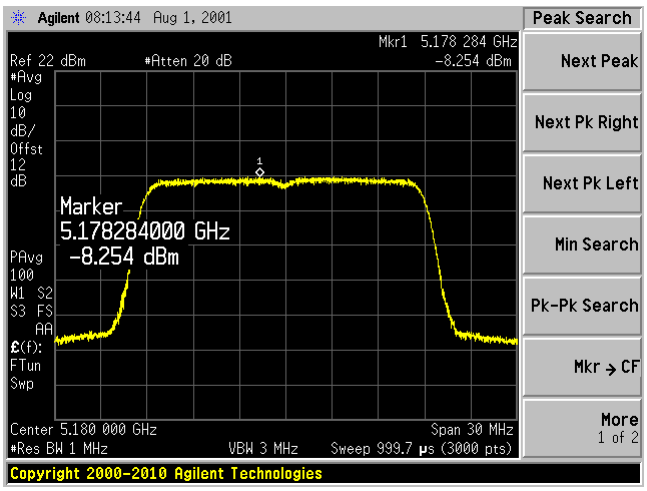


5150 - 5250 MHz
RADIO 2
802.11n20 Mode

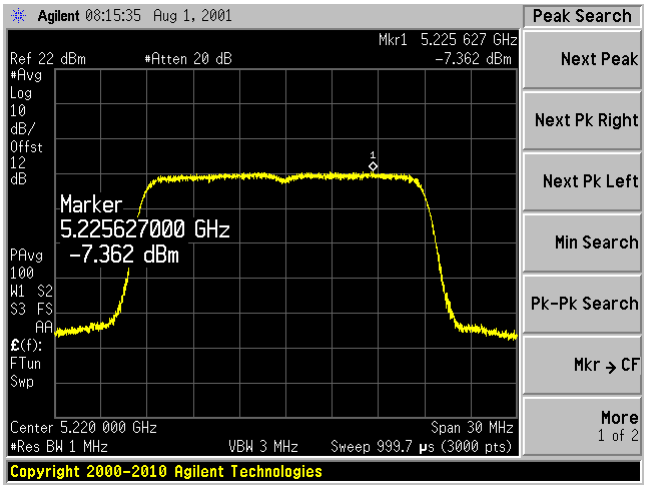
Low Channel ANT A



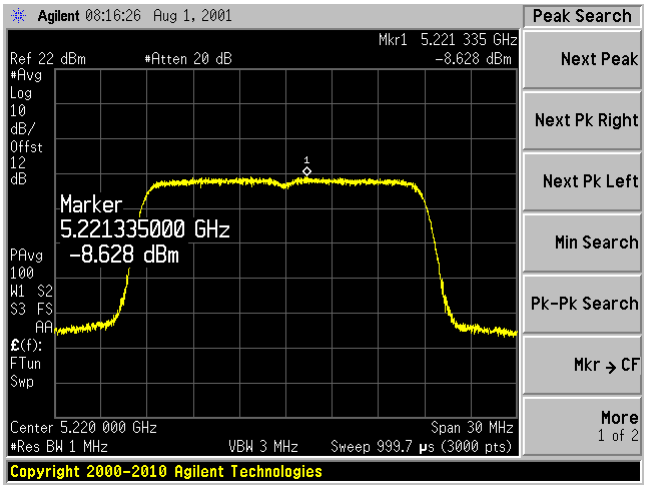
Low Channel ANT B



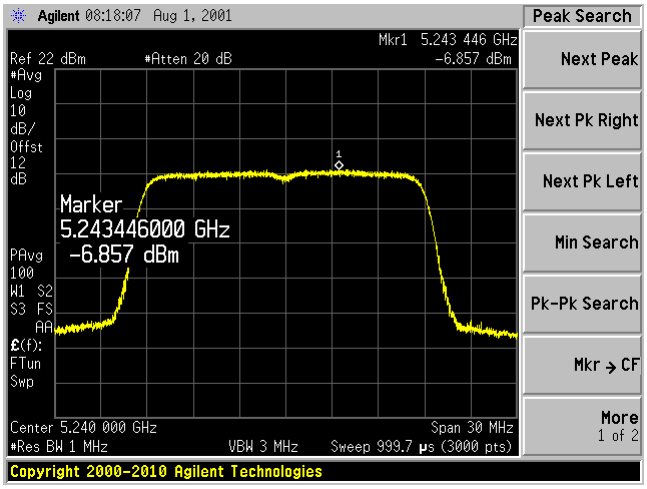
Mid Channel ANT A



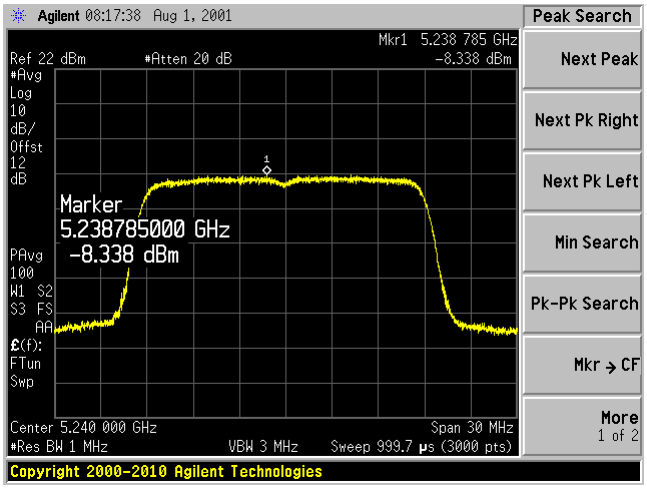
Mid Channel ANT B



High Channel ANT A

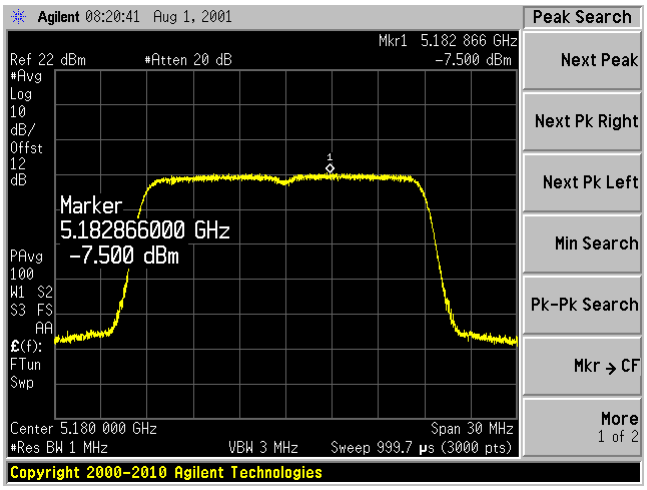


High Channel ANT B

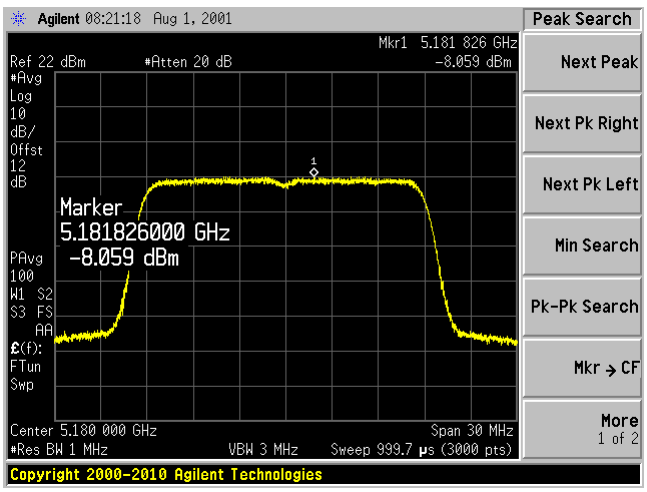


5150 - 5250 MHz
RADIO 2
802.11ac20 Mode

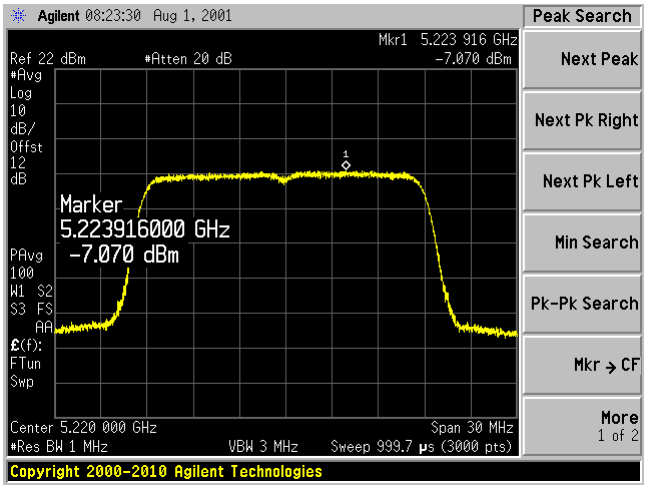
Low Channel ANT A



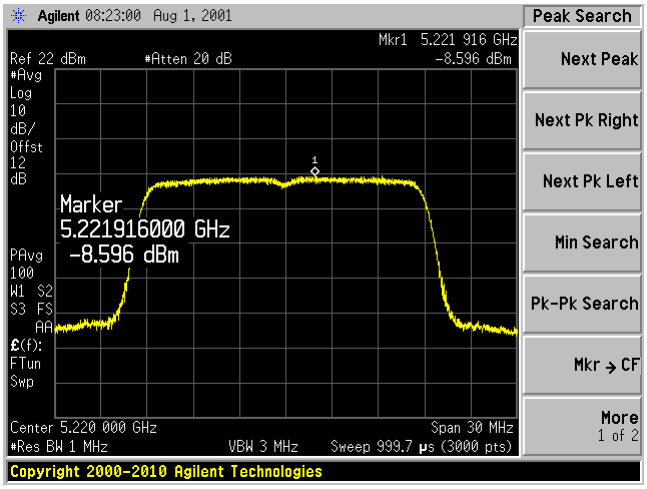
Low Channel ANT B



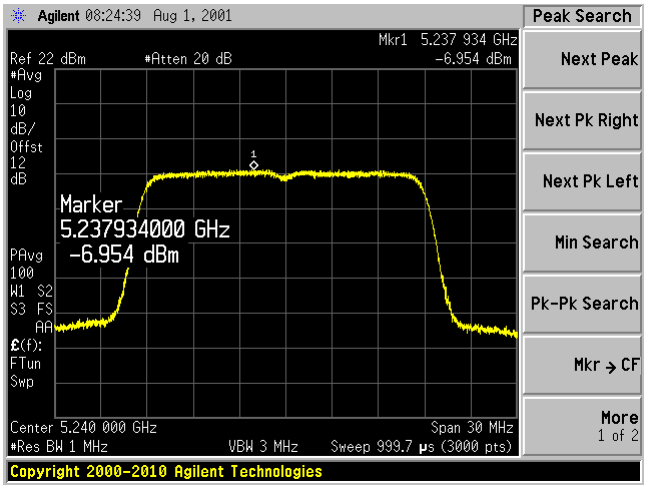
Mid Channel ANT A



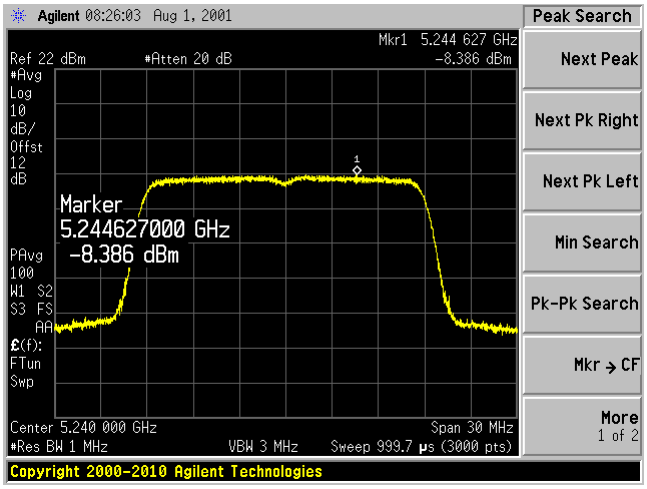
Mid Channel ANT B



High Channel ANT A

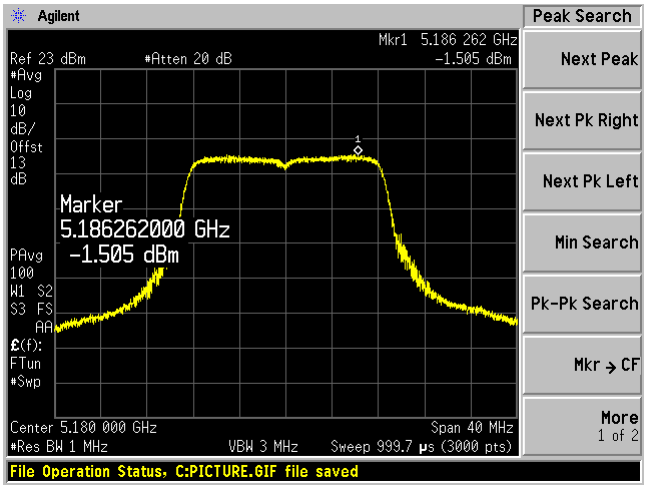


High Channel ANT B

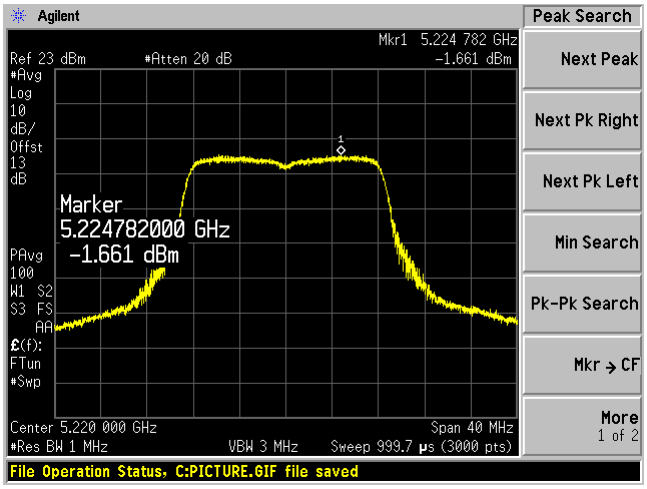


5150 - 5250 MHz
RADIO 1
802.11a Mode

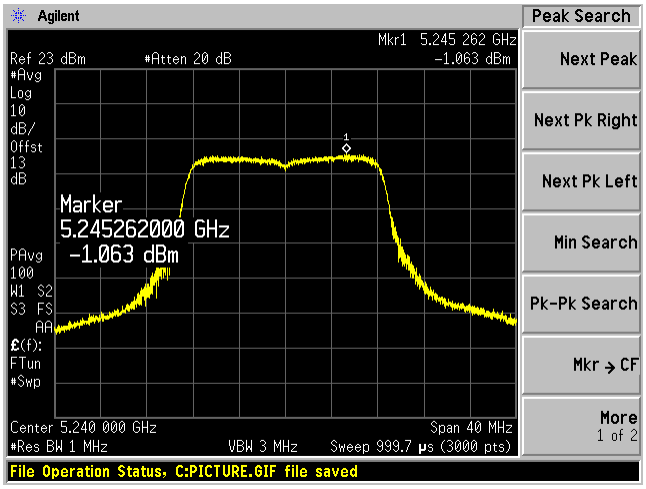
Low Channel



Mid Channel



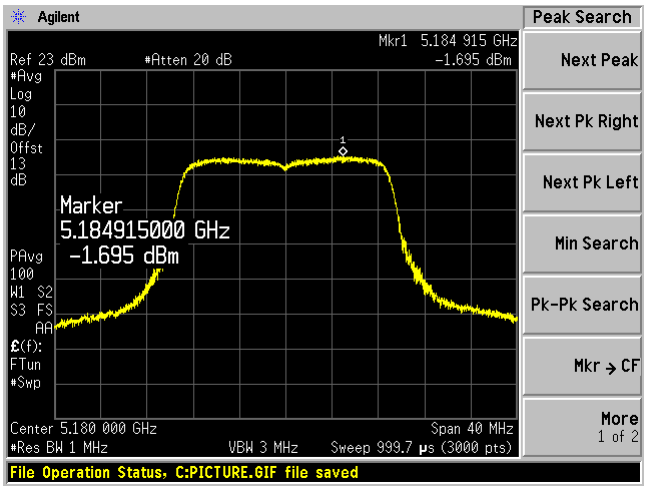
High Channel



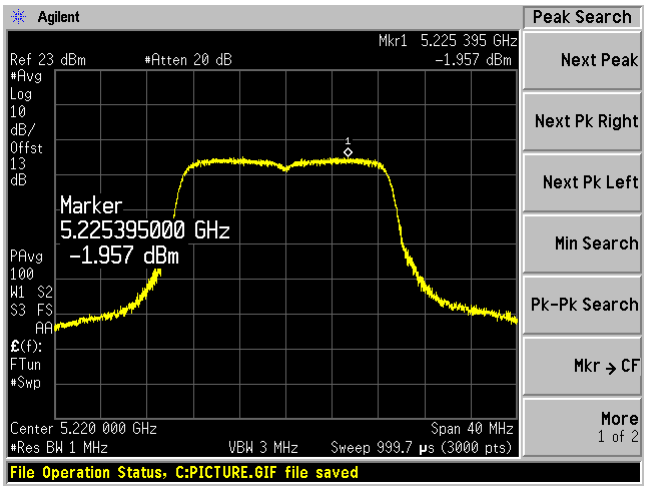
5150 - 5250 MHz

RADIO 1
802.11n20 Mode

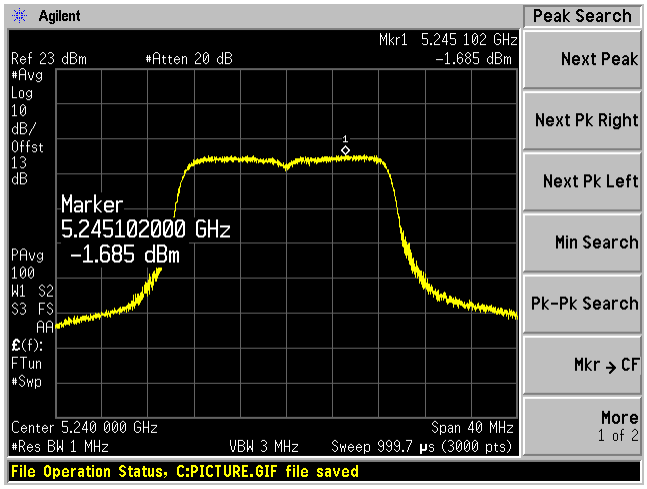
Low Channel



Mid Channel

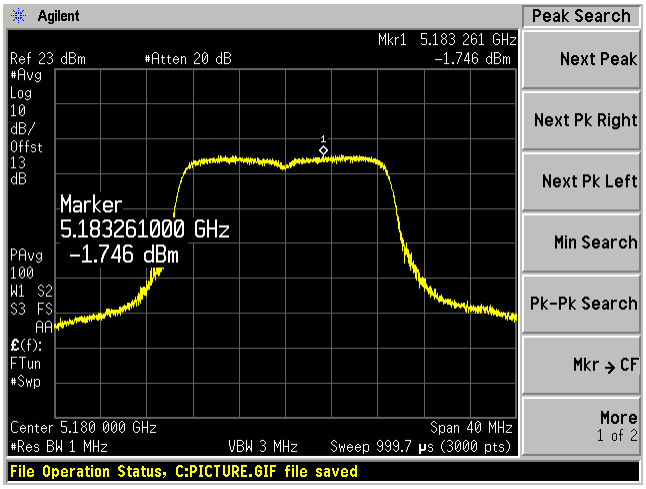


High Channel

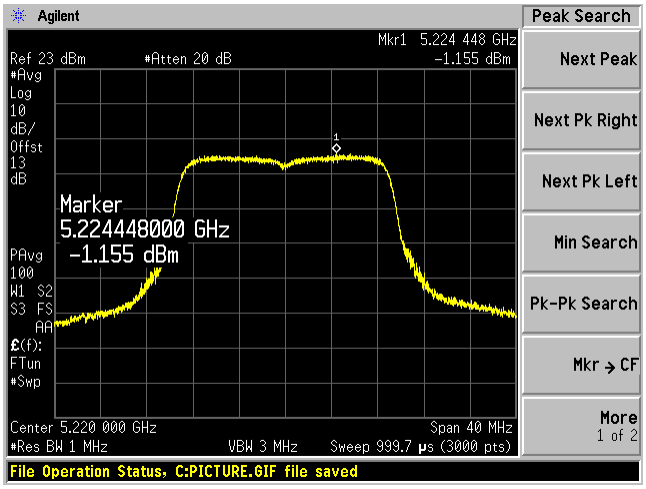


5150 - 5250 MHz
RADIO 1
802.11ac20 Mode

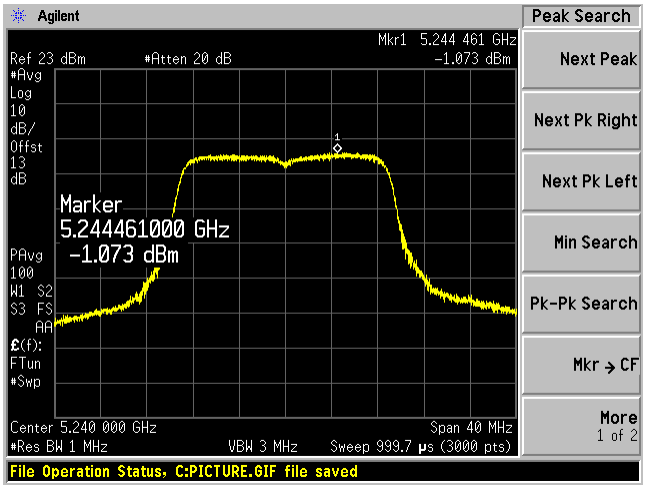
Low Channel



Mid Channel



High Channel



11 FCC §15.407(b) & ISEDC RSS-247 §6.2 - Out of Band Emissions

11.1 Applicable Standards

According to FCC §15.407(b):

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.

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.

For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.

For transmitters operating in the 5.725-5.85 GHz band: All emissions shall be limited to a level of −27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

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.

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

According to ISEDC RSS-247 §6.2.1 for devices operatinging in the frequency band 5150-5250 MHz:

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.

According to ISEDC RSS-247 §6.2.2 for devices operatinging in the frequency 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.”
According to ISEDC RSS-247 §6.2.3 for devices operatinging in the frequency band 5470-5600 MHz and 5650-5725 MHz. Emissions outside the band 5470-5725 MHz shall not exceed -27 dBm/MHz e.i.r.p.

According to ISEDC RSS-247 §6.2.4 for devices operatinging in the frequency band 5725-5850 MHz:
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.

11.2 Measurement Procedure

Add a correction factor (antenna gain+ Attenuator loss+cable loss) to the offset of the spectrum analyzer.

Unwanted Emission Measurement:

Maximum emission levels are measured by setting the analyzer as follows:

i. RBW = 1 MHz
ii. VBW ≥ 3 MHz
iii. Detector = Peak
iv. Sweep time = auto
v. Trace mode = max hold

Integration Method:

1. For peak emissions measurements, follow the procedures described in section H)5), "Procedures for Peak Unwanted Emissions Measurements above 1000 MHz", except for the following changes:

- Set RBW = 100 kHz
- Set VBW = 3RBW
- Perform a band-power integration across the 1 MHz bandwidth in which the band-edge emission level is to be measured. CAUTION: You must ensure that the spectrum analyzer or EMI receiver is set for peak-detection and max-hold for this measurement.

2. For average emissions measurements, follow the procedures described in section H)6), "Procedures for Average Unwanted Emissions Measurements above 1000 MHz", except for the following changes:

- Set RBW = 100 kHz
- Set VBW = 3RBW
- Perform a band-power integration across the 1 MHz bandwidth in which the band-edge emission level is to be measured.

11.3 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
Agilent	Spectrum Analyzer	E4446A	MY48250238	2019-06-26	1 year
-	RF cable	-	-	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 calibrations have been performed per the A2LA requirements, traceable to the NIST.*

11.4 Test Environmental Conditions

Temperature:	22-24º C
Relative Humidity:	40-41 %
ATM Pressure:	103.1-104.1 kPa

The testing was performed by Tri Pham & Christian McCaig from 2020-05-13 to 2020-05-22 in RF site.

11.5 Test Results

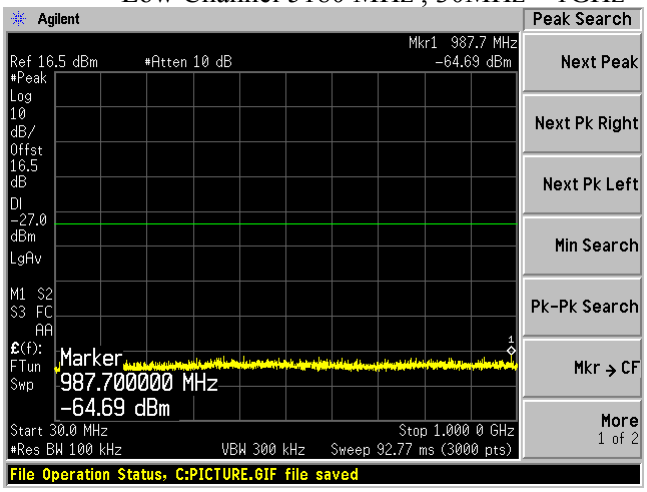
Please refer to the following plots

FCC:

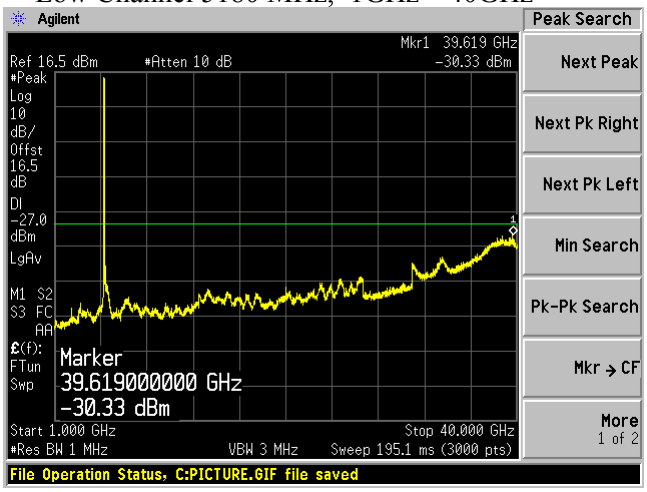
Spurious Emissions

RADIO 2, 5150 - 5250 MHz, 802.11a Mode, ANTENNA A

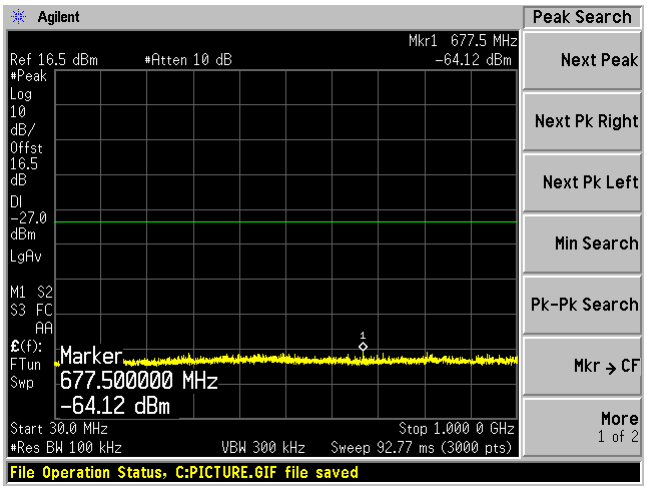
Low Channel 5180 MHz , 30MHz – 1GHz



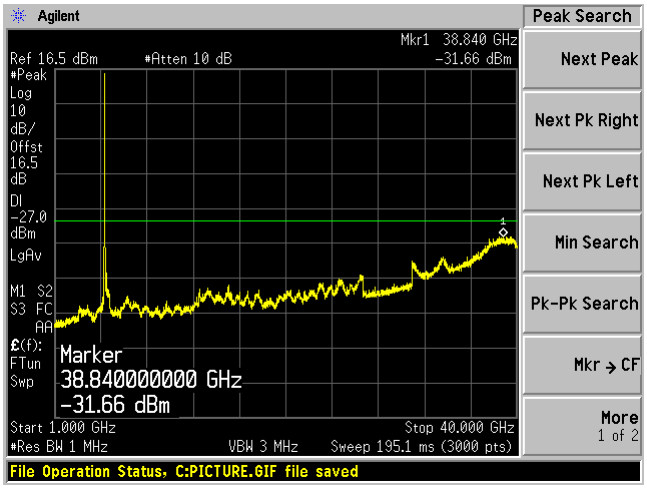
Low Channel 5180 MHz, 1GHz – 40GHz



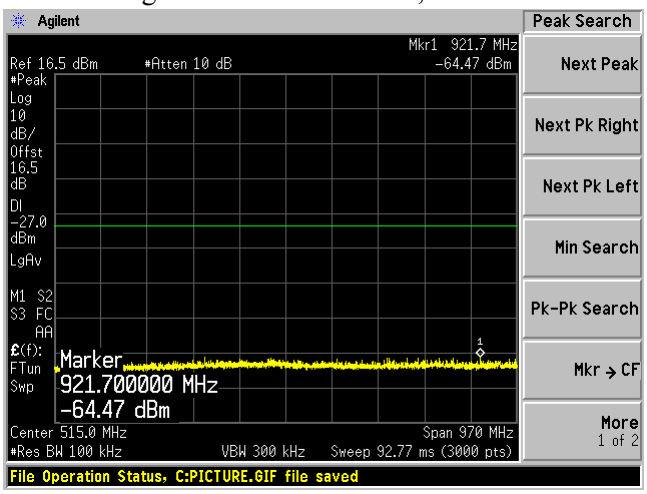
Mid Channel 5220 MHz , 30MHz – 1GHz



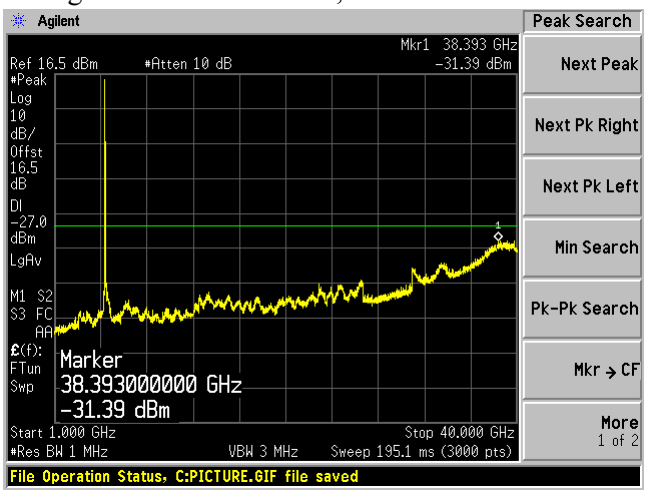
Mid Channel 5220 MHz, 1GHz – 40GHz



High Channel 5240 MHz , 30MHz – 1GHz

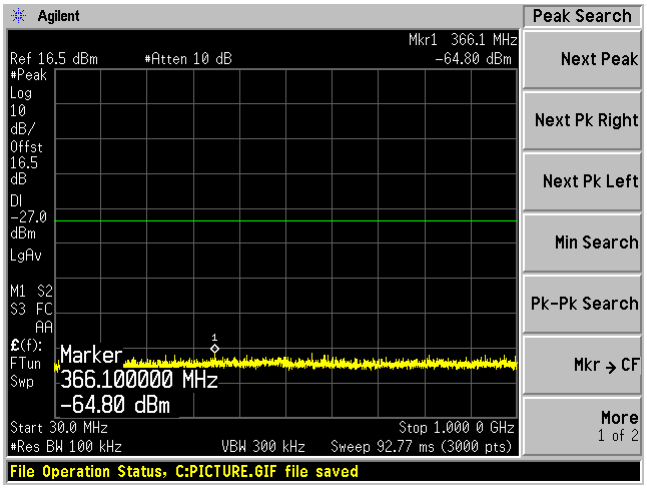


High Channel 5240 MHz, 1GHz – 40GHz

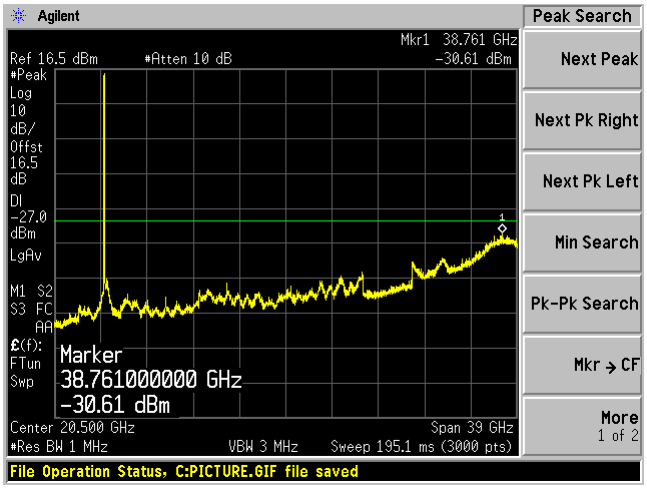


RADIO 2, 5150 - 5250 MHz, 802.11a Mode, ANTENNA B

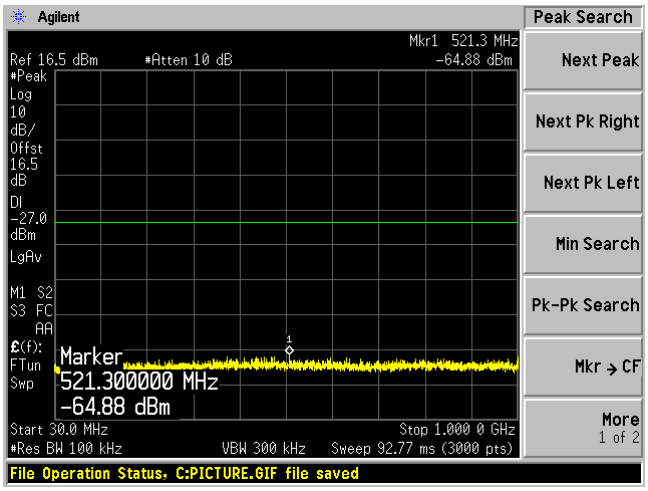
Low Channel 5180 MHz , 30MHz – 1GHz



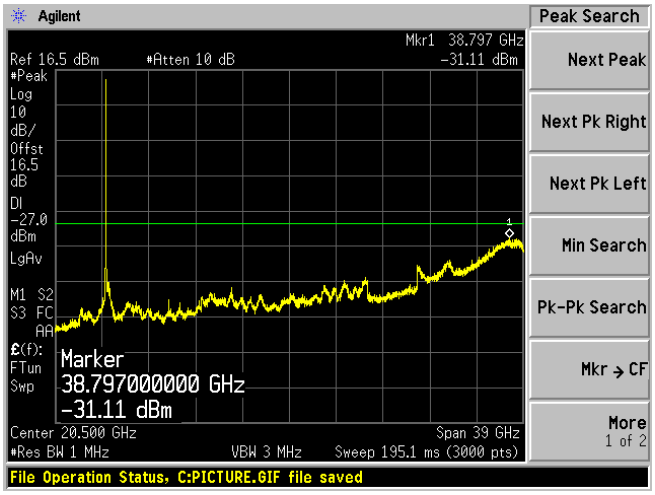
Low Channel 5180 MHz, 1GHz – 40GHz



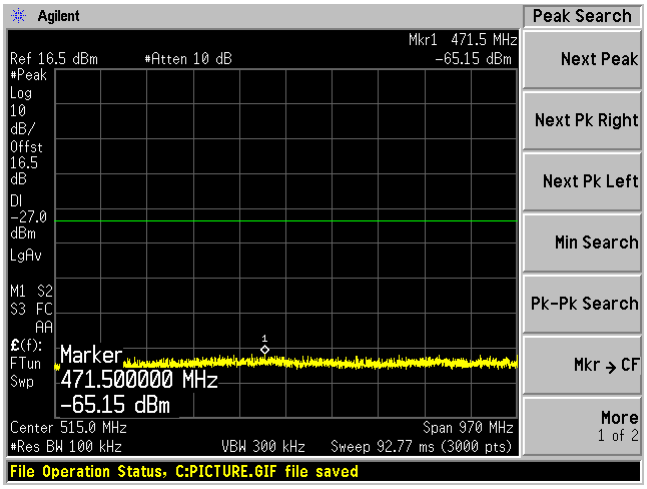
Mid Channel 5220 MHz , 30MHz – 1GHz



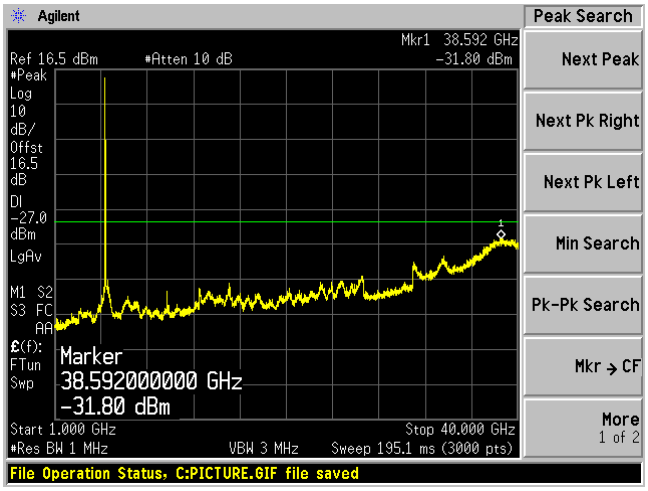
Mid Channel 5220 MHz, 1GHz – 40GHz



High Channel 5240 MHz , 30MHz – 1GHz

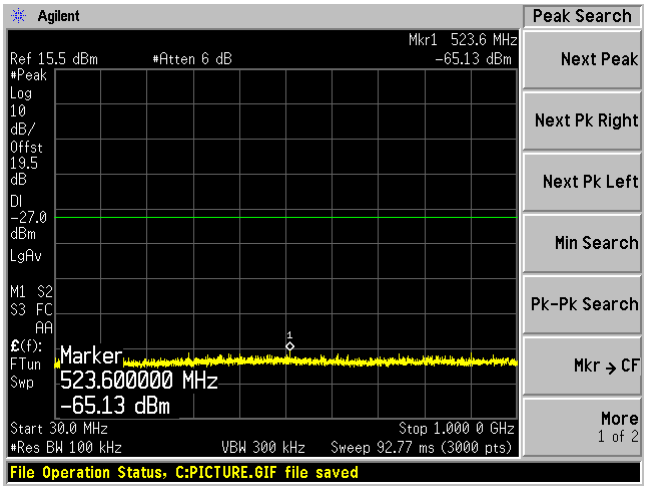


High Channel 5240 MHz, 1GHz – 40GHz

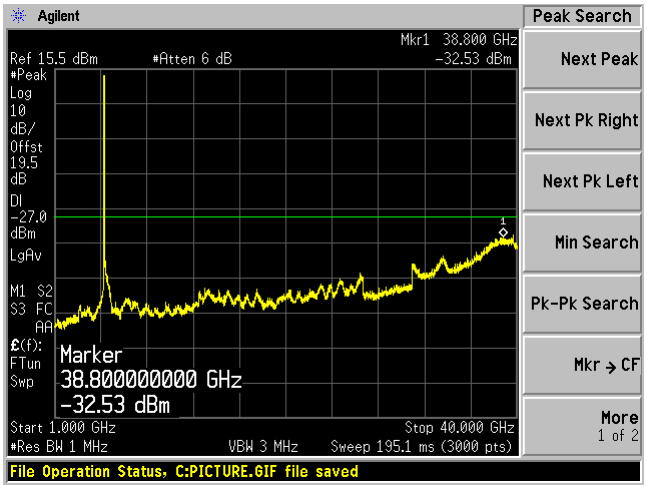


RADIO 2, 5150 - 5250 MHz, 802.11n20 Mode, ANTENNA A

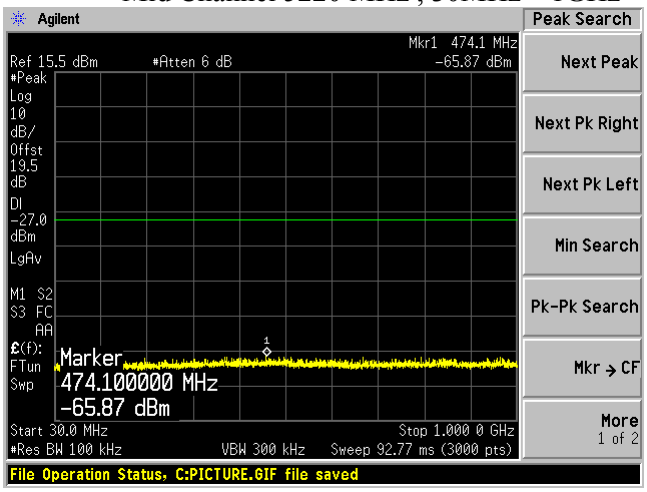
Low Channel 5180 MHz , 30MHz – 1GHz



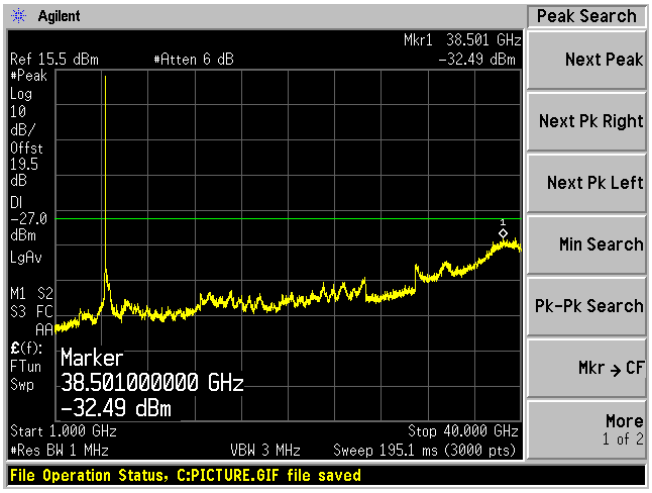
Low Channel 5180 MHz, 1GHz – 40GHz



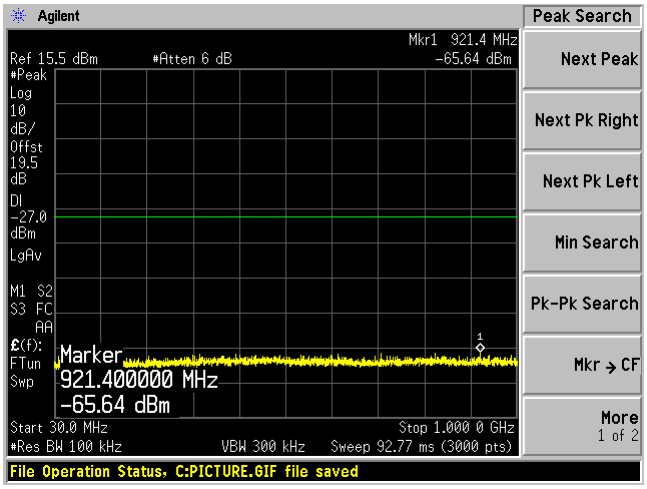
Mid Channel 5220 MHz , 30MHz – 1GHz



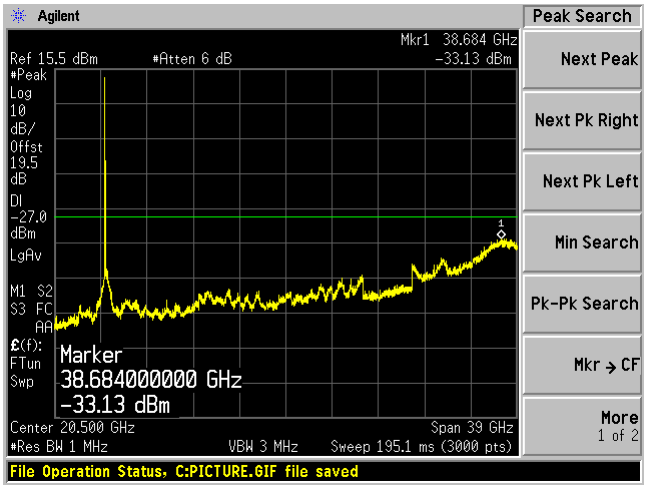
Mid Channel 5220 MHz, 1GHz – 40GHz



High Channel 5240 MHz , 30MHz – 1GHz

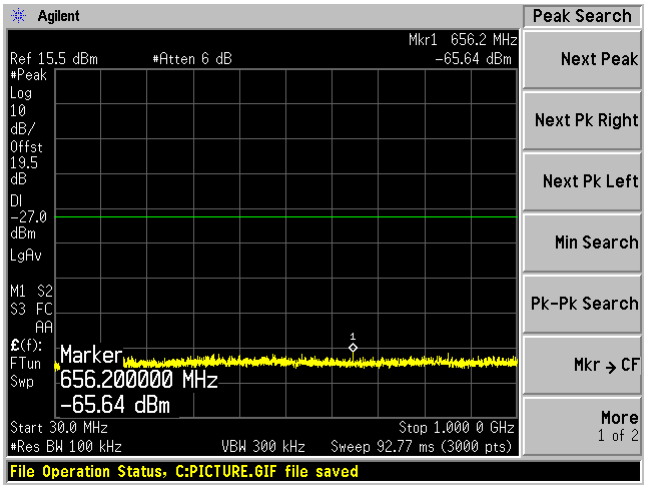


High Channel 5240 MHz, 1GHz – 40GHz

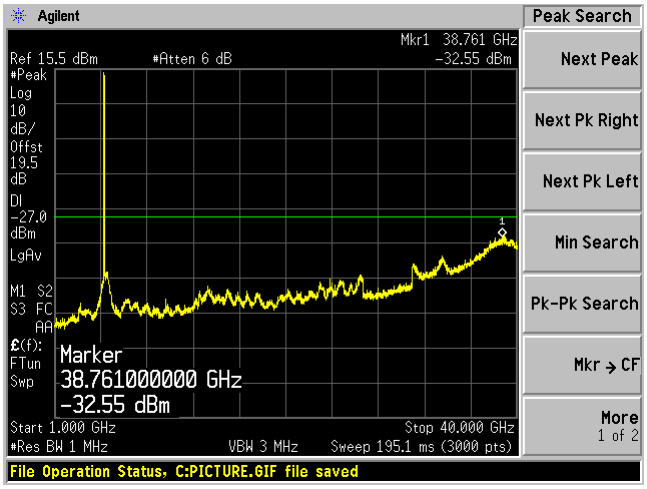


RADIO 2, 5150 - 5250 MHz, 802.11n20 Mode, ANTENNA B

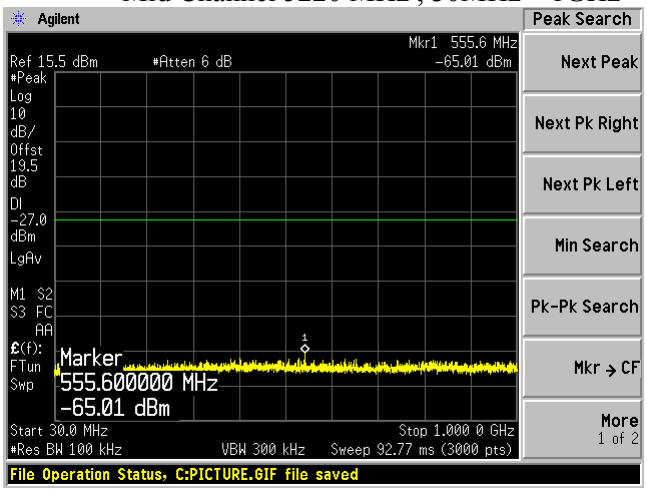
Low Channel 5180 MHz , 30MHz – 1GHz



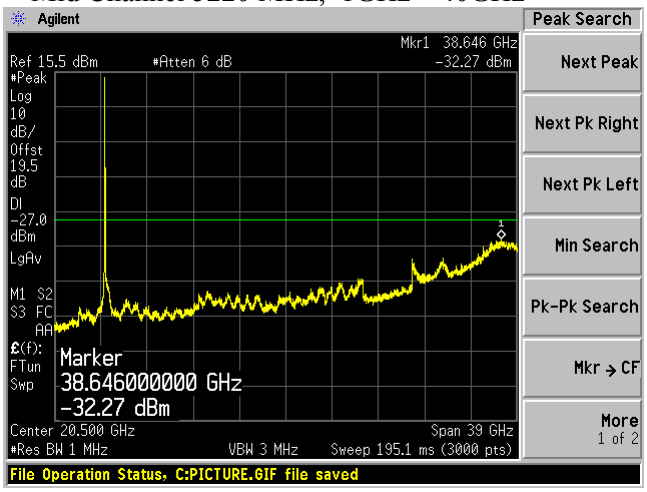
Low Channel 5180 MHz, 1GHz – 40GHz



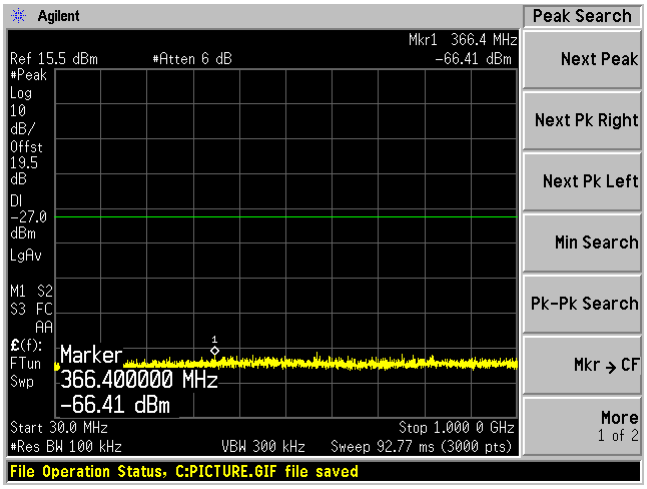
Mid Channel 5220 MHz , 30MHz – 1GHz



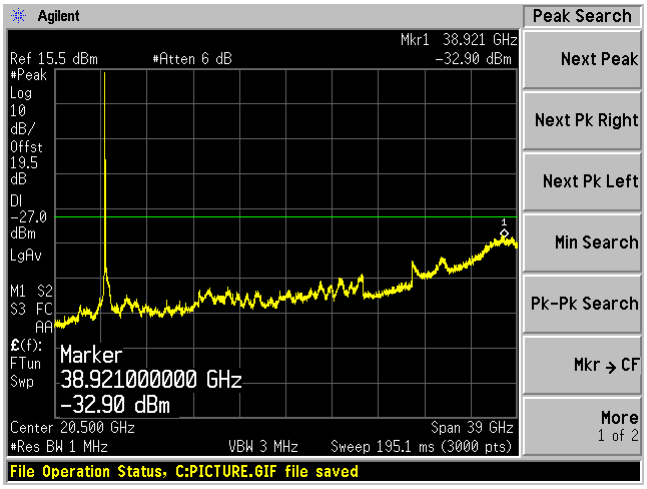
Mid Channel 5220 MHz, 1GHz – 40GHz



High Channel 5240 MHz , 30MHz – 1GHz

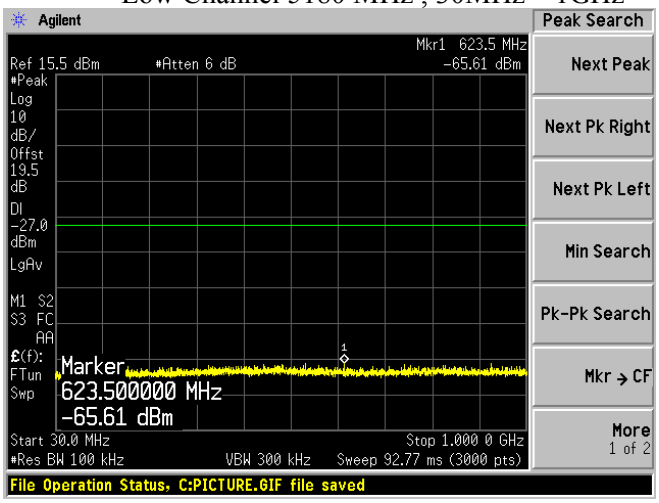


High Channel 5240 MHz, 1GHz – 40GHz

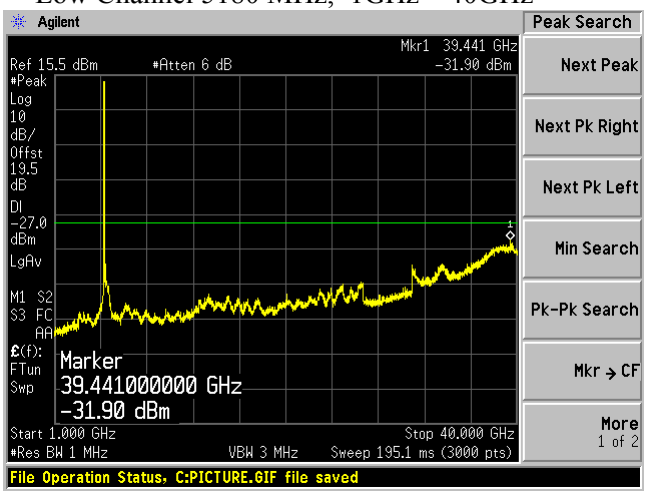


RADIO 2, 5150 - 5250 MHz, 802.11ac20 Mode, ANTENNA A

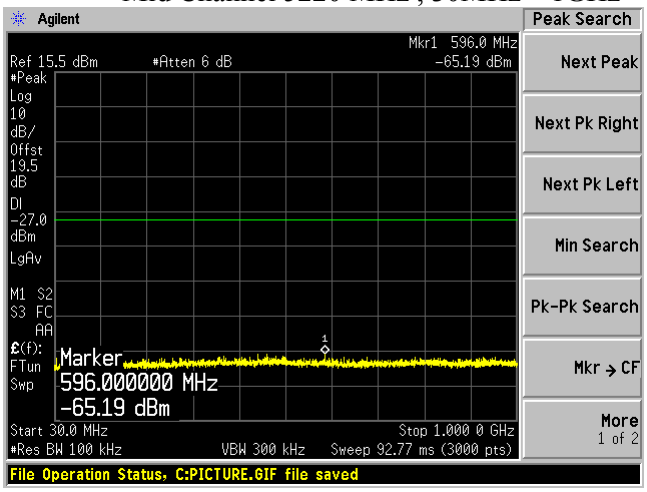
Low Channel 5180 MHz , 30MHz – 1GHz



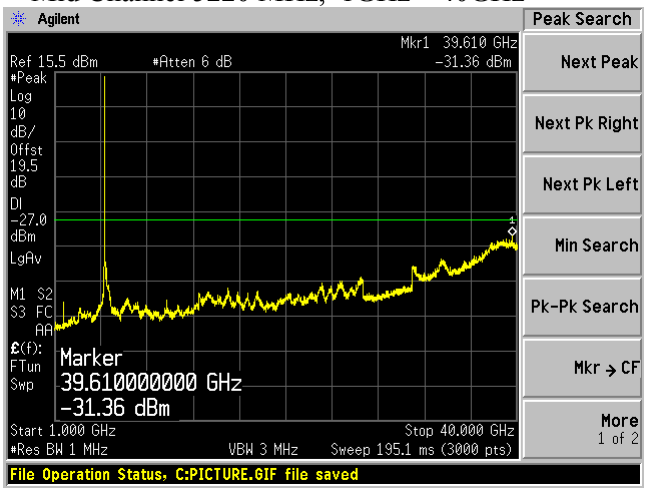
Low Channel 5180 MHz, 1GHz – 40GHz



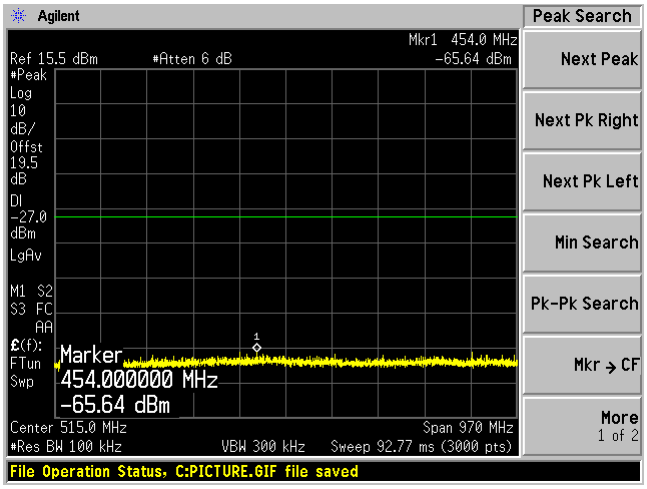
Mid Channel 5220 MHz , 30MHz – 1GHz



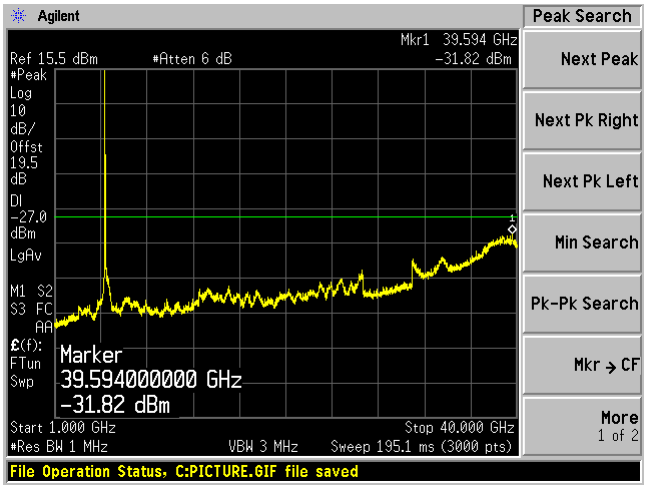
Mid Channel 5220 MHz, 1GHz – 40GHz



High Channel 5240 MHz , 30MHz – 1GHz

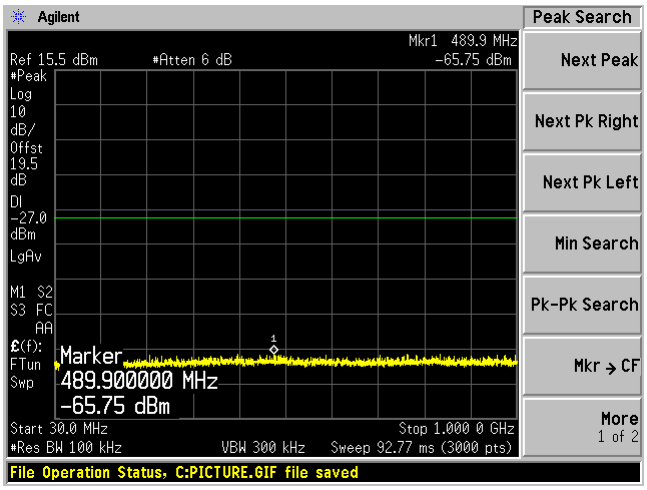


High Channel 5240 MHz, 1GHz – 40GHz

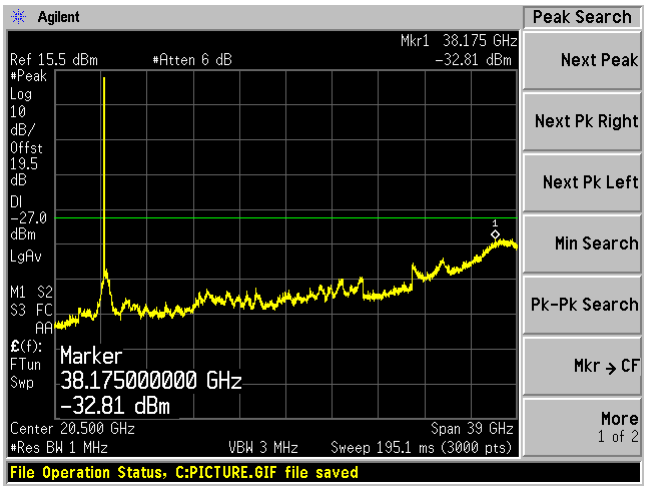


RADIO 2, 5150 - 5250 MHz, 802.11ac20 Mode, ANTENNA B

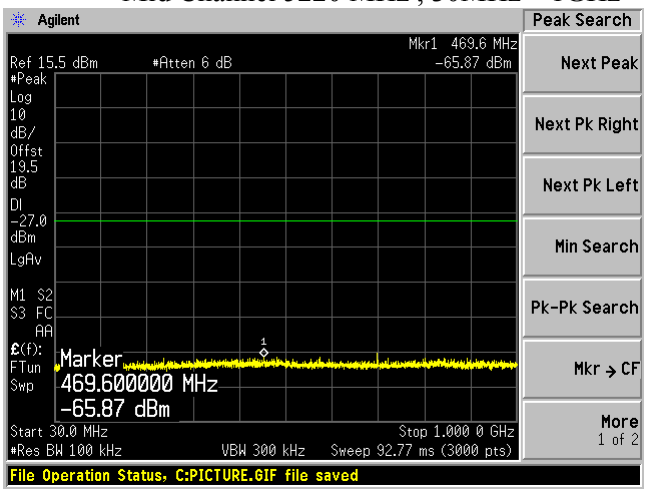
Low Channel 5180 MHz , 30MHz – 1GHz



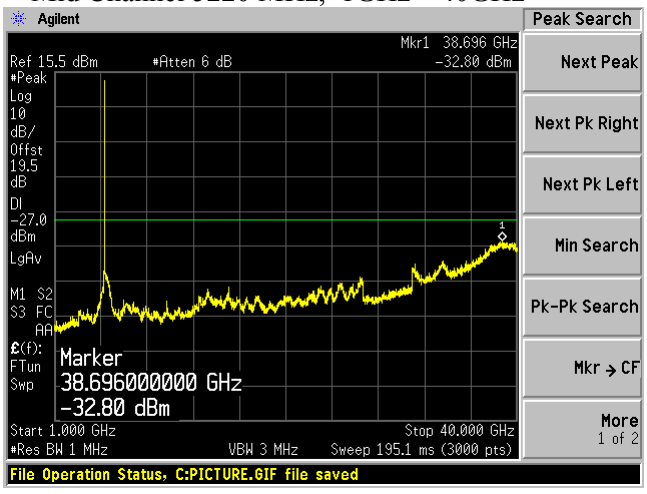
Low Channel 5180 MHz, 1GHz – 40GHz



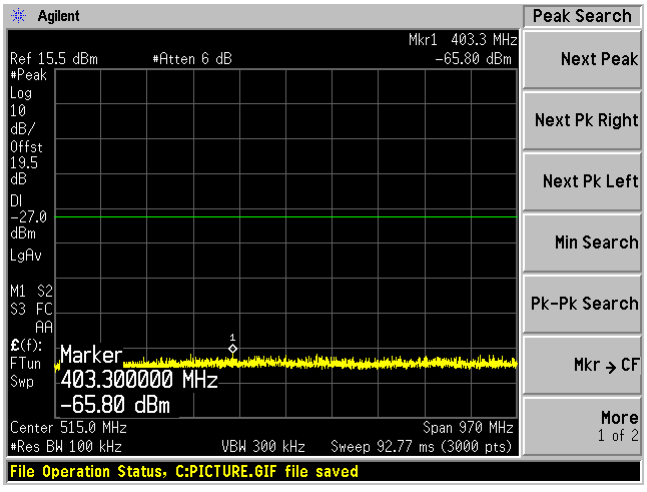
Mid Channel 5220 MHz , 30MHz – 1GHz



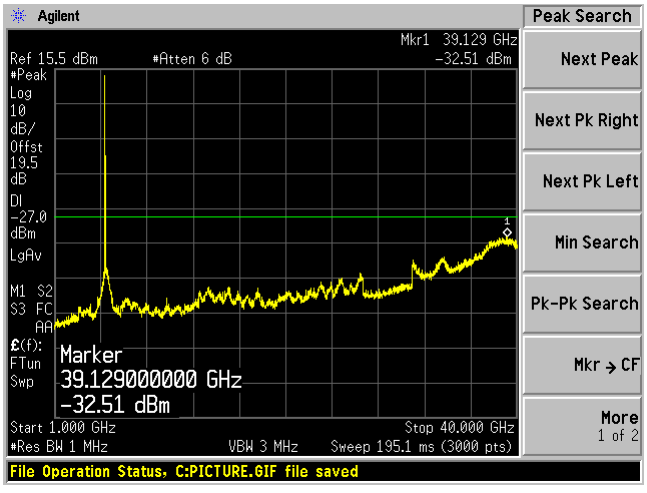
Mid Channel 5220 MHz, 1GHz – 40GHz



High Channel 5240 MHz , 30MHz – 1GHz

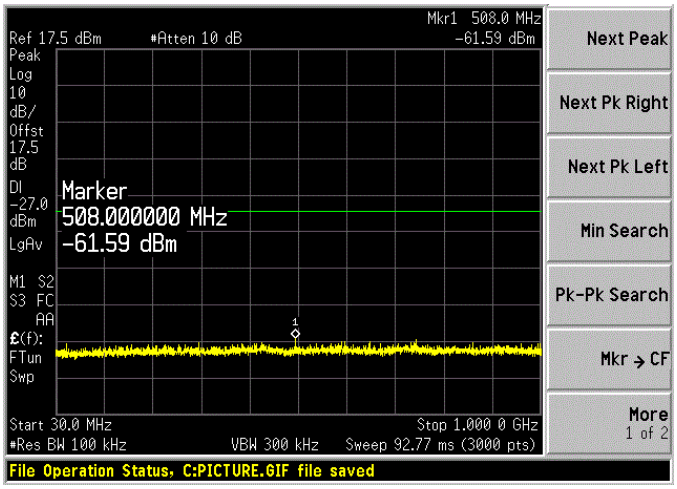


High Channel 5240 MHz, 1GHz – 40GHz

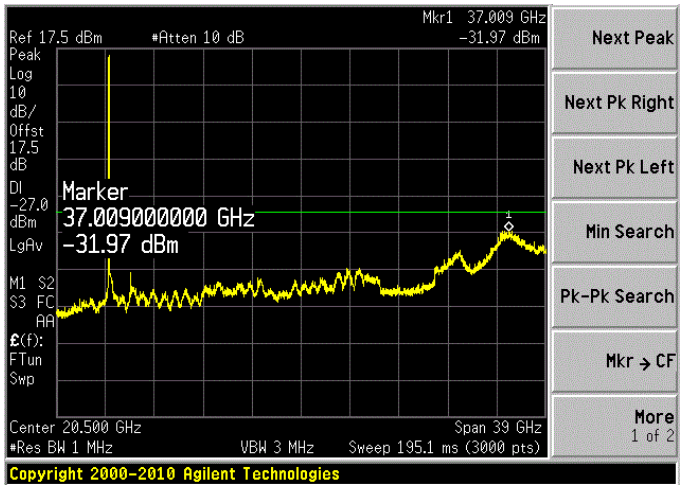


RADIO 1, 5150 - 5250 MHz, 802.11a Mode

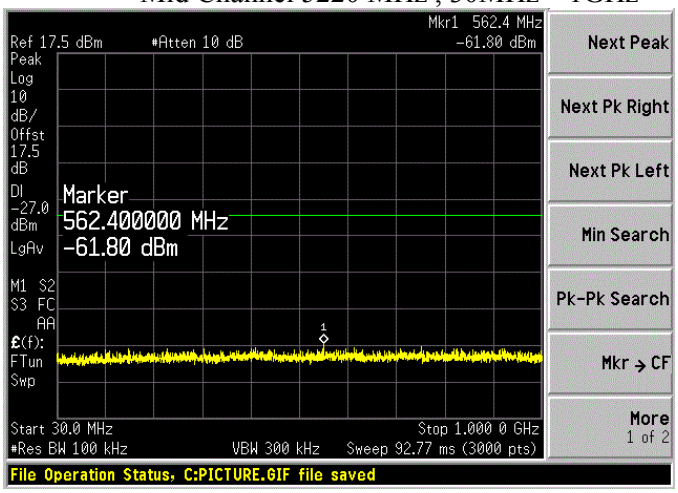
Low Channel 5180 MHz , 30MHz – 1GHz



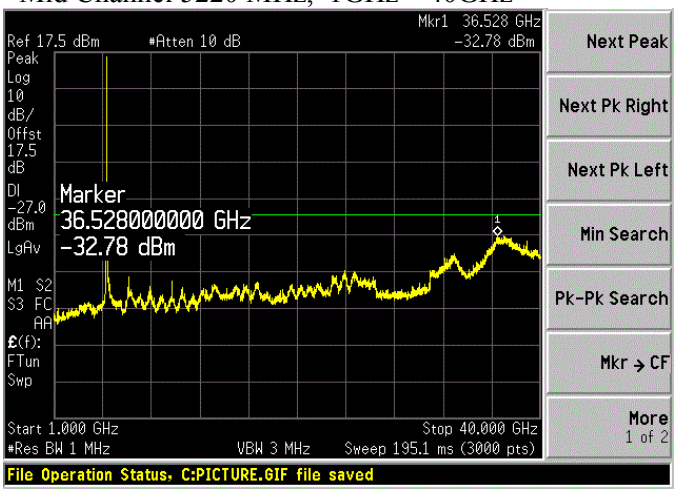
Low Channel 5180 MHz, 1GHz – 40GHz



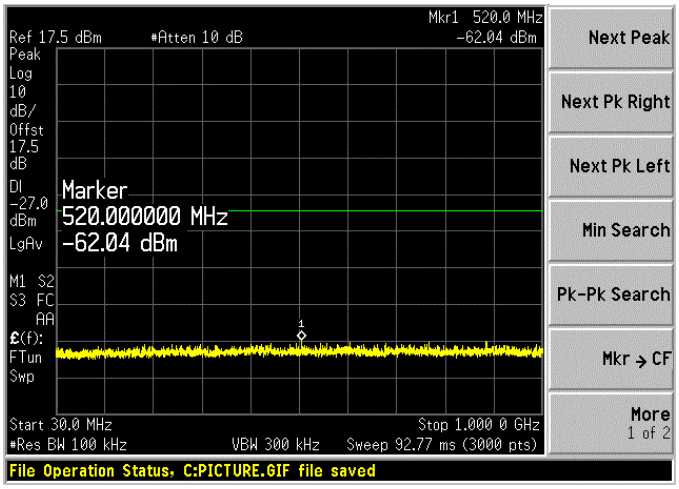
Mid Channel 5220 MHz , 30MHz – 1GHz



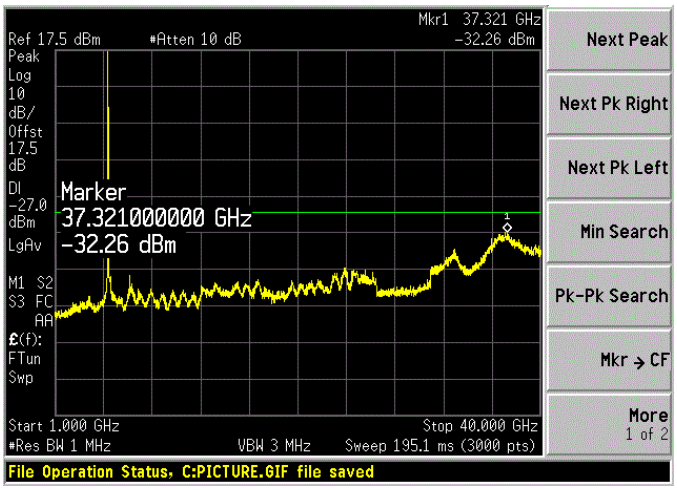
Mid Channel 5220 MHz, 1GHz – 40GHz



High Channel 5240 MHz , 30MHz – 1GHz

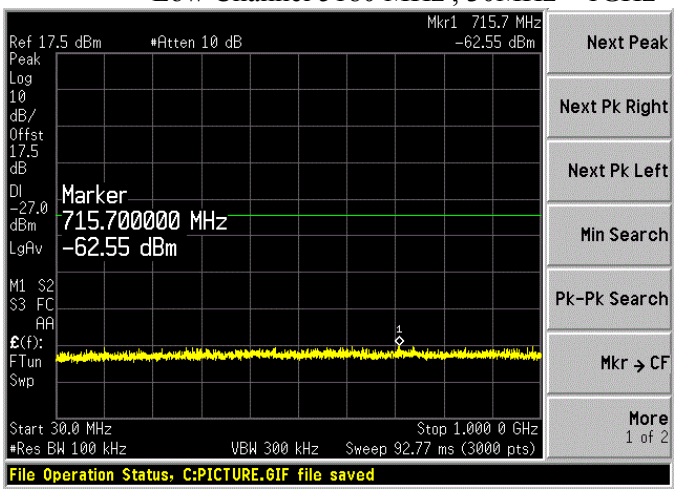


High Channel 5240 MHz, 1GHz – 40GHz

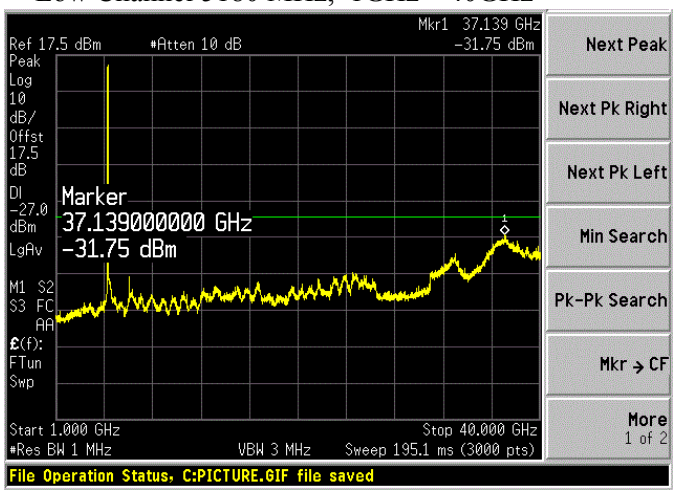


RADIO 1, 5150 - 5250 MHz, 802.11n20 Mode

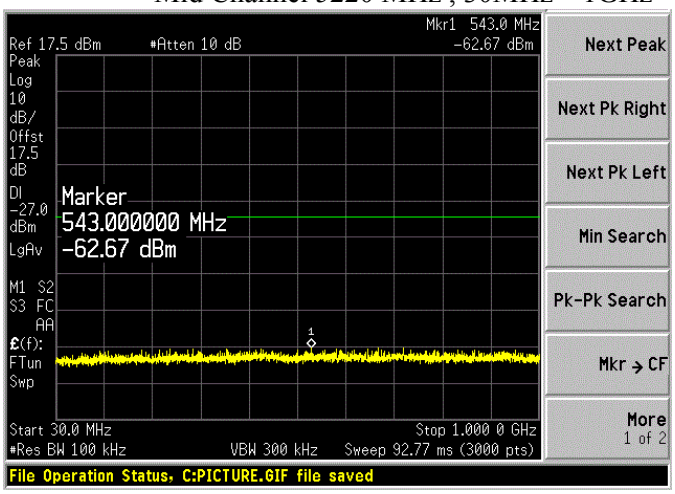
Low Channel 5180 MHz , 30MHz – 1GHz



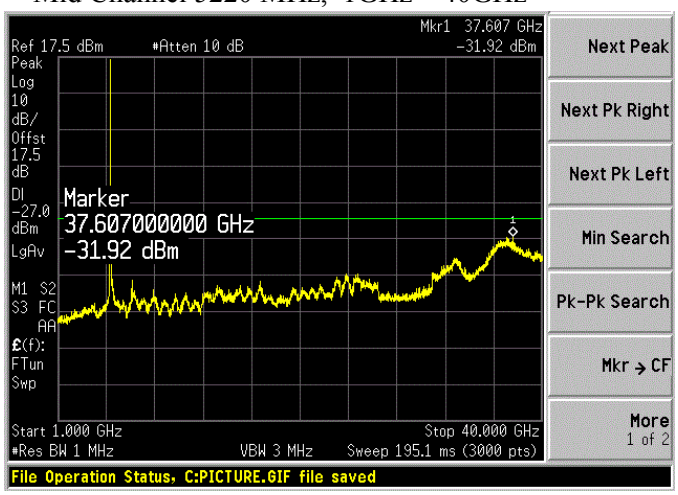
Low Channel 5180 MHz, 1GHz – 40GHz



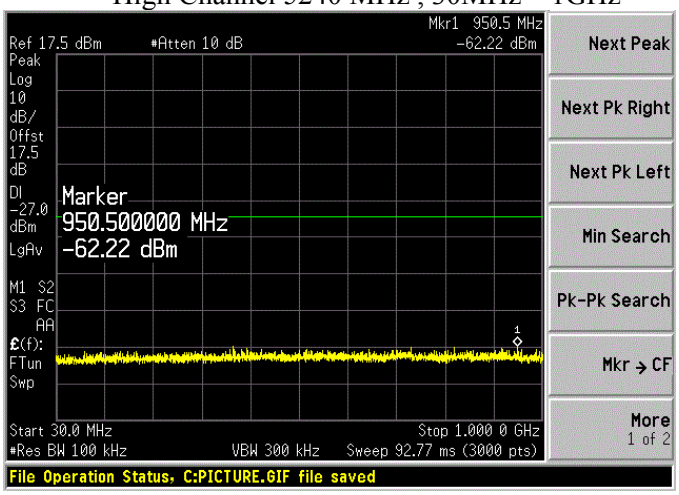
Mid Channel 5220 MHz , 30MHz – 1GHz



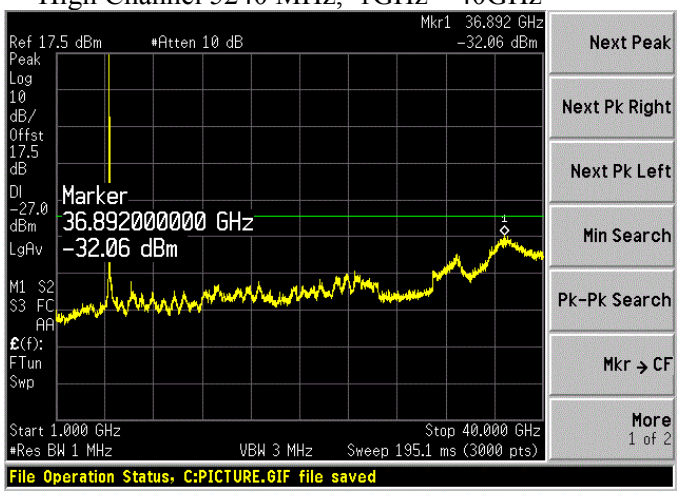
Mid Channel 5220 MHz, 1GHz – 40GHz



High Channel 5240 MHz , 30MHz – 1GHz

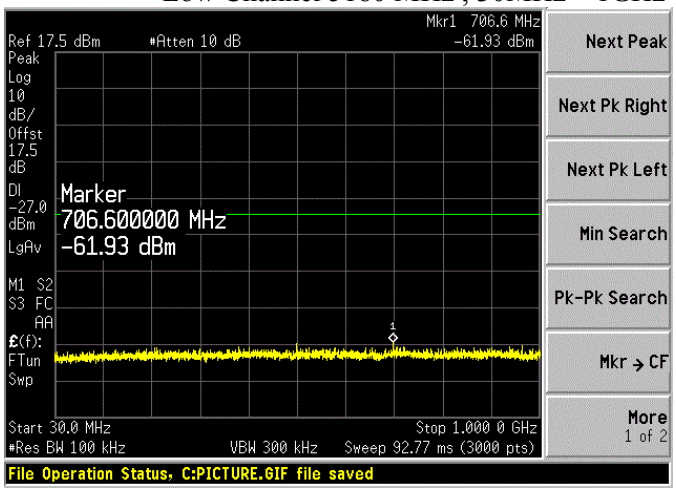


High Channel 5240 MHz, 1GHz – 40GHz

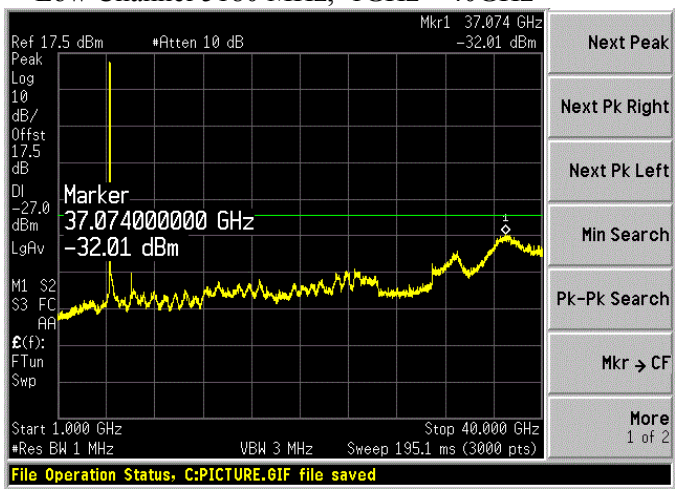


RADIO 1, 5150 - 5250 MHz, 802.11ac20 Mode

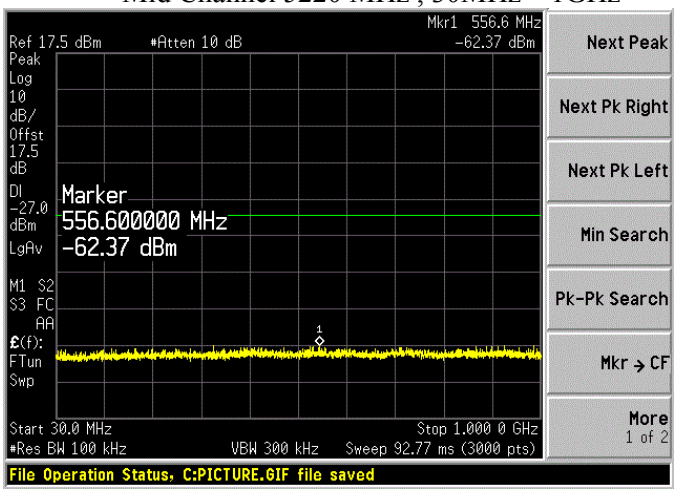
Low Channel 5180 MHz , 30MHz – 1GHz



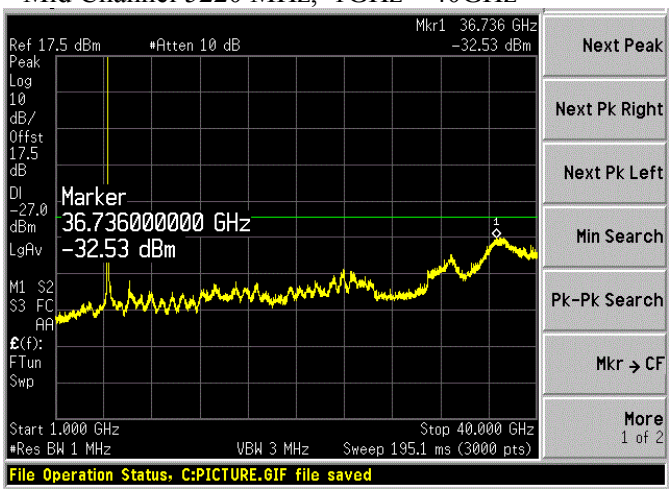
Low Channel 5180 MHz, 1GHz – 40GHz



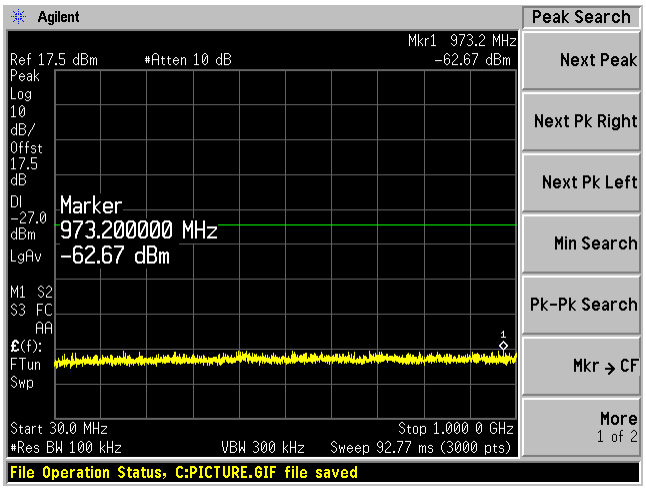
Mid Channel 5220 MHz , 30MHz – 1GHz



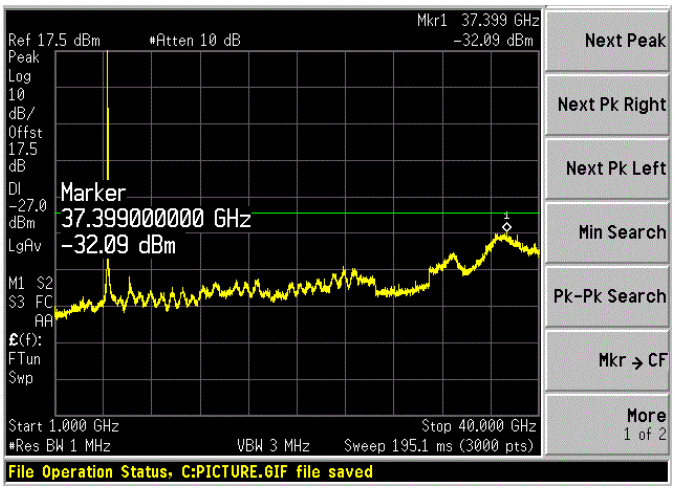
Mid Channel 5220 MHz, 1GHz – 40GHz



High Channel 5240 MHz , 30MHz – 1GHz

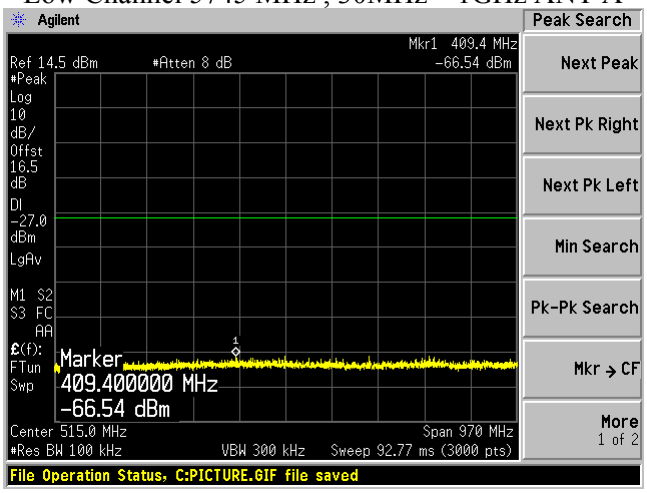


High Channel 5240 MHz, 1GHz – 40GHz

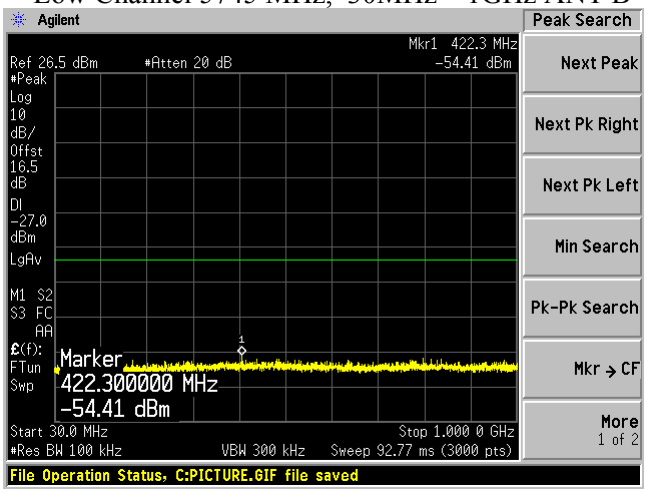


RADIO 2, 5745 - 5825 MHz, 802.11a Mode

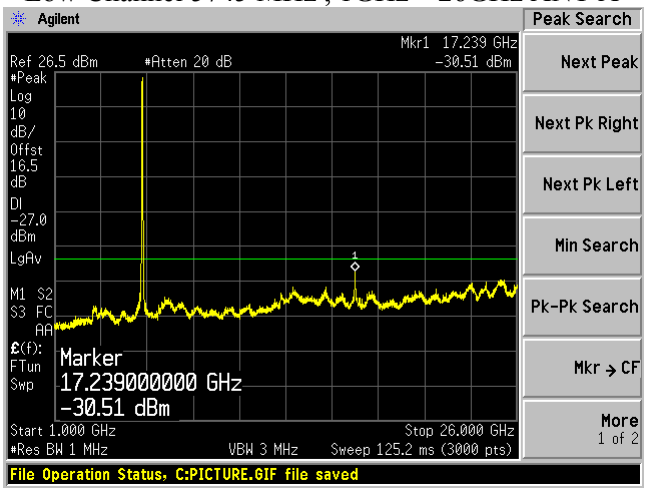
Low Channel 5745 MHz , 30MHz – 1GHz ANT A



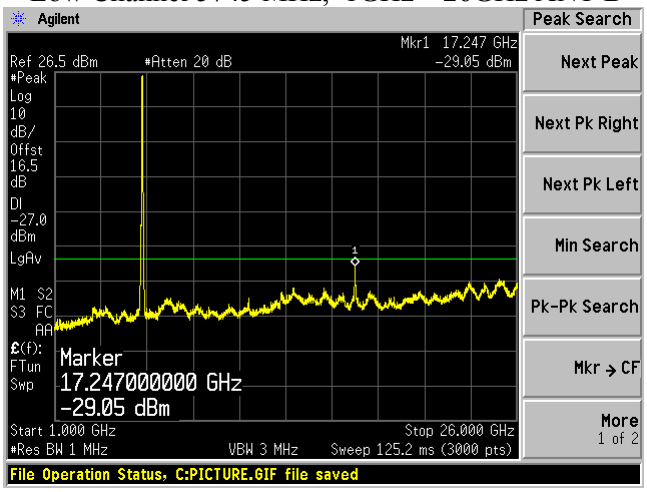
Low Channel 5745 MHz, 30MHz – 1GHz ANT B



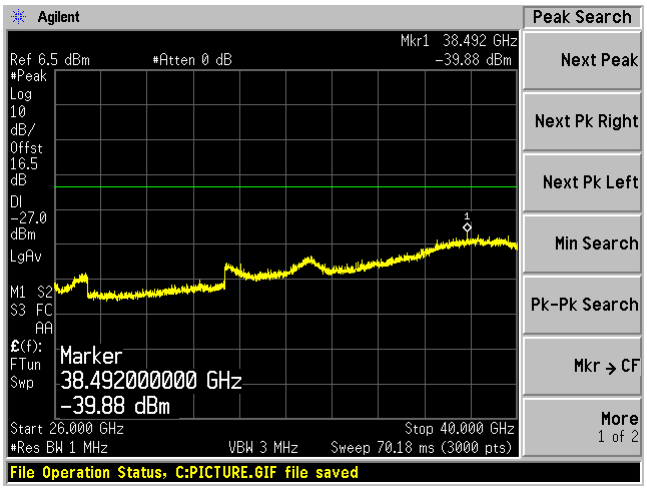
Low Channel 5745 MHz , 1GHz – 26GHz ANT A



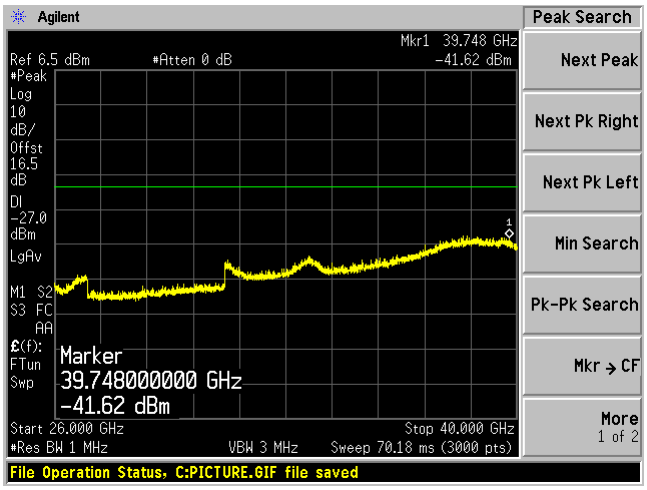
Low Channel 5745 MHz, 1GHz – 26GHz ANT B



Low Channel 5745 MHz , 26GHz – 40GHz ANT A

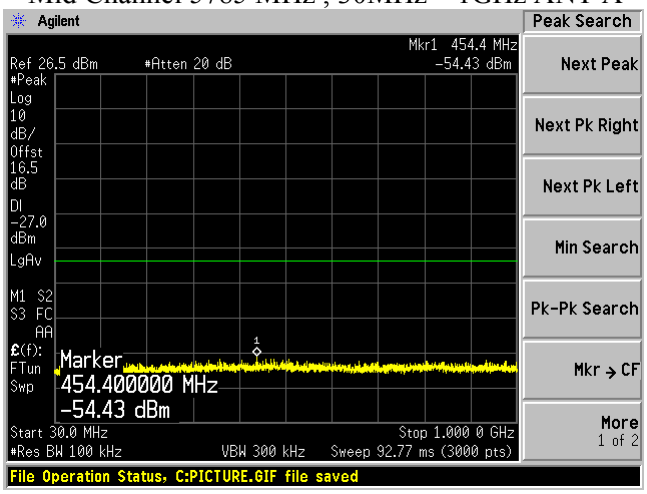


Low Channel 5745 MHz, 26GHz – 40GHz ANT B

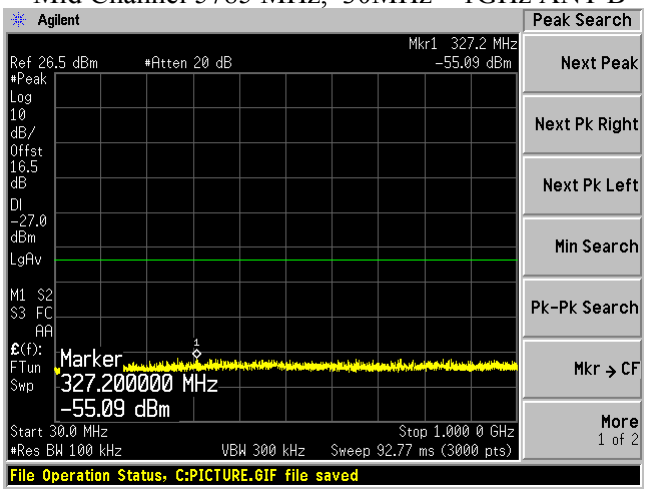


RADIO 2, 5745 - 5825 MHz, 802.11a Mode

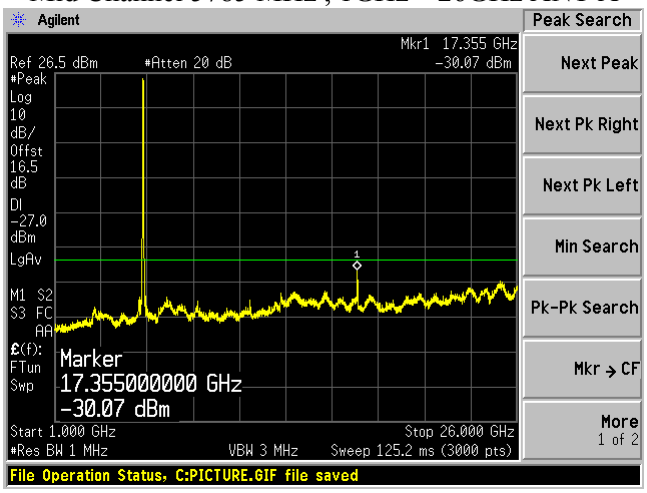
Mid Channel 5785 MHz , 30MHz – 1GHz ANT A



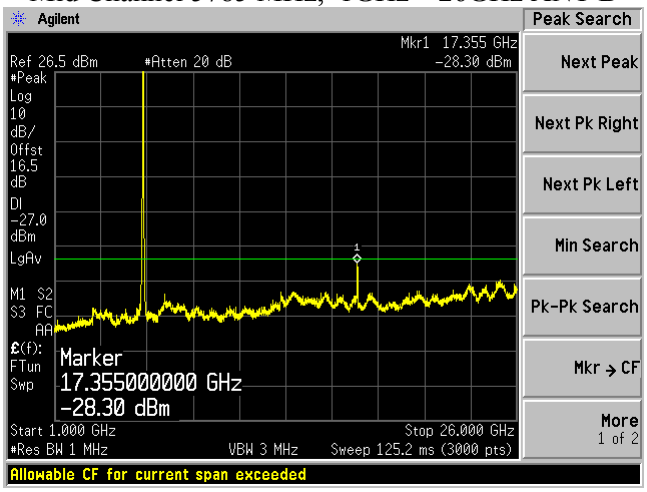
Mid Channel 5785 MHz, 30MHz – 1GHz ANT B



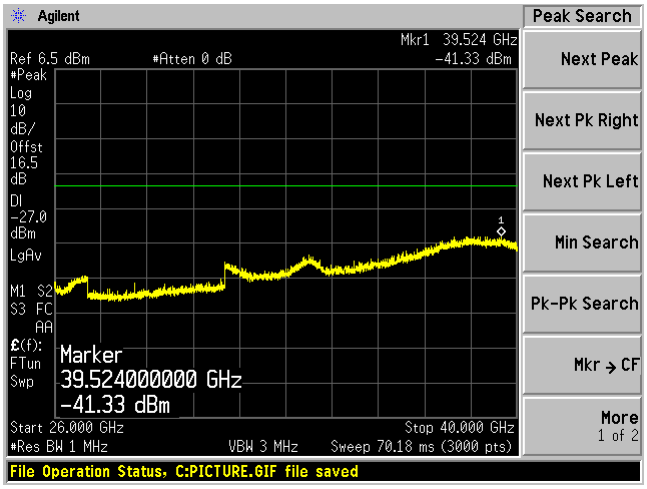
Mid Channel 5785 MHz , 1GHz – 26GHz ANT A



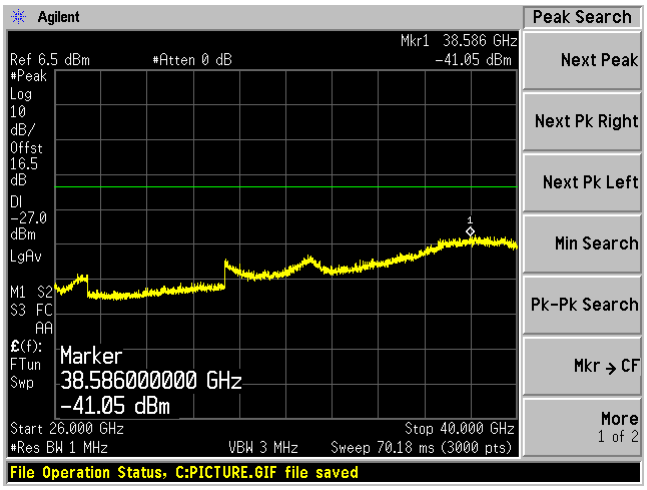
Mid Channel 5785 MHz, 1GHz – 26GHz ANT B



Mid Channel 5785 MHz , 26GHz – 40GHz ANT A

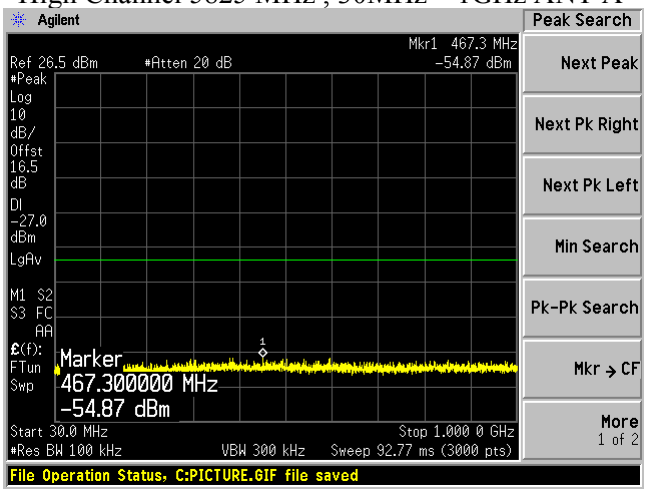


Mid Channel 5785 MHz, 26GHz – 40GHz ANT B

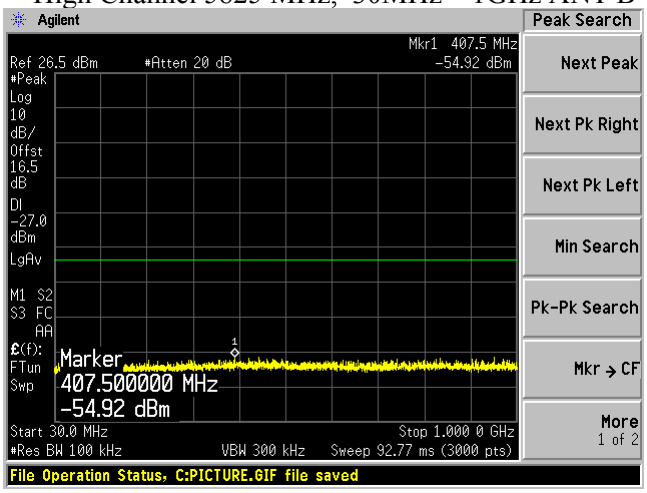


RADIO 2, 5745 - 5825 MHz, 802.11a Mode

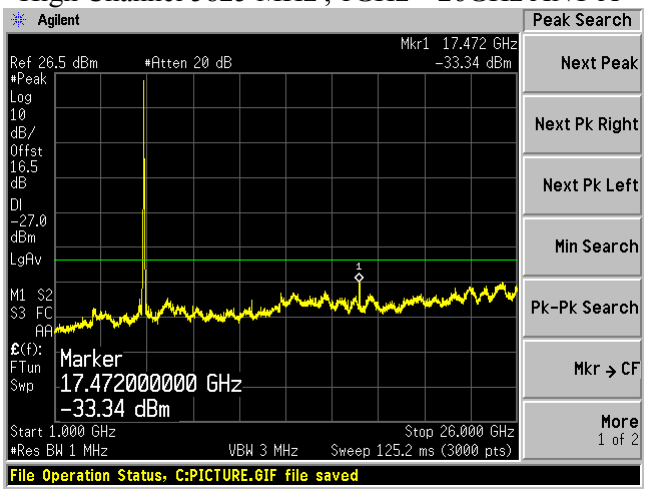
High Channel 5825 MHz , 30MHz – 1GHz ANT A



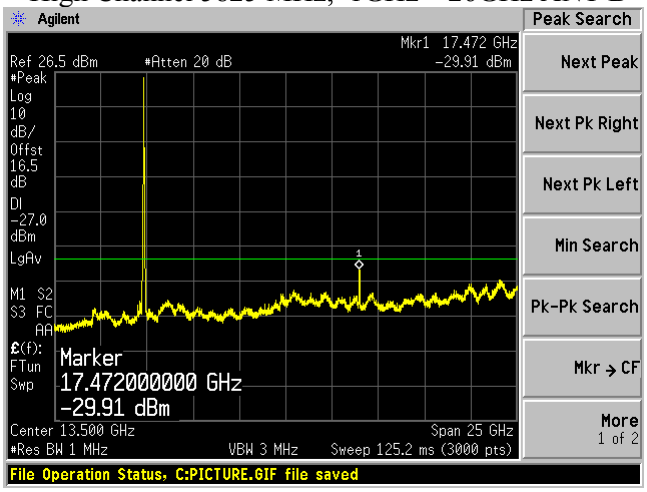
High Channel 5825 MHz, 30MHz – 1GHz ANT B



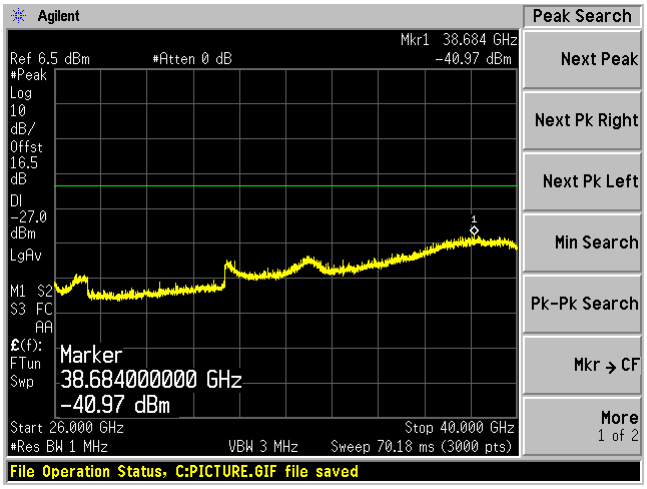
High Channel 5825 MHz , 1GHz – 26GHz ANT A



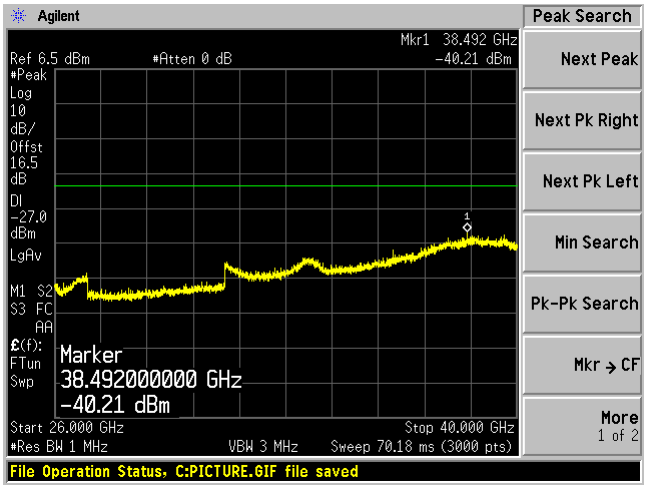
High Channel 5825 MHz, 1GHz – 26GHz ANT B



High Channel 5825 MHz , 26GHz – 40GHz ANT A

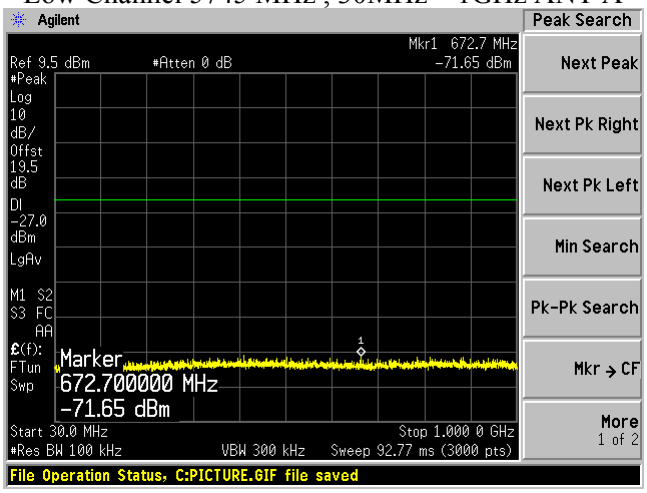


High Channel 5825 MHz, 26GHz – 40GHz ANT B

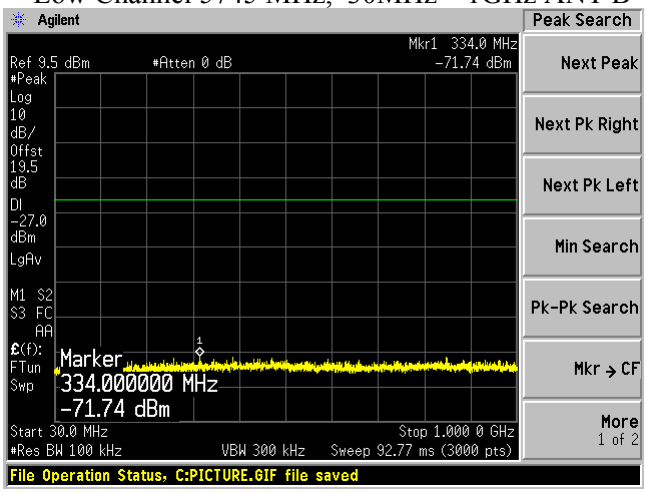


RADIO 2, 5745 - 5825 MHz, 802.11n20 Mode

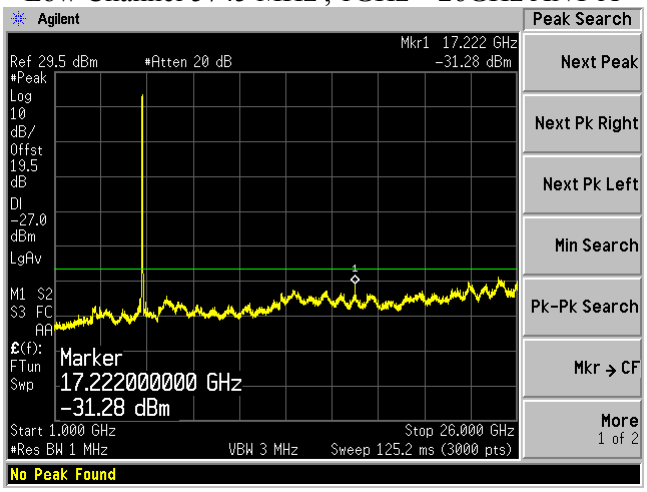
Low Channel 5745 MHz , 30MHz – 1GHz ANT A



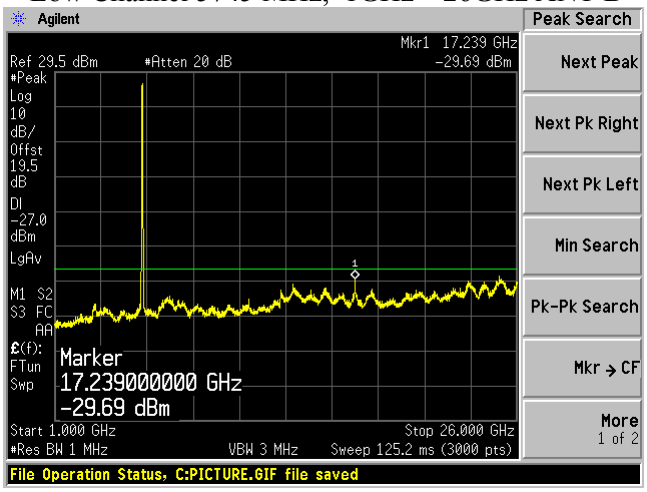
Low Channel 5745 MHz, 30MHz – 1GHz ANT B



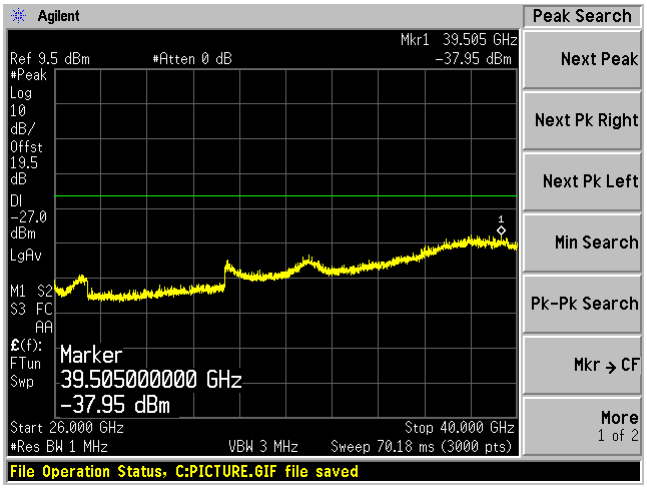
Low Channel 5745 MHz , 1GHz – 26GHz ANT A



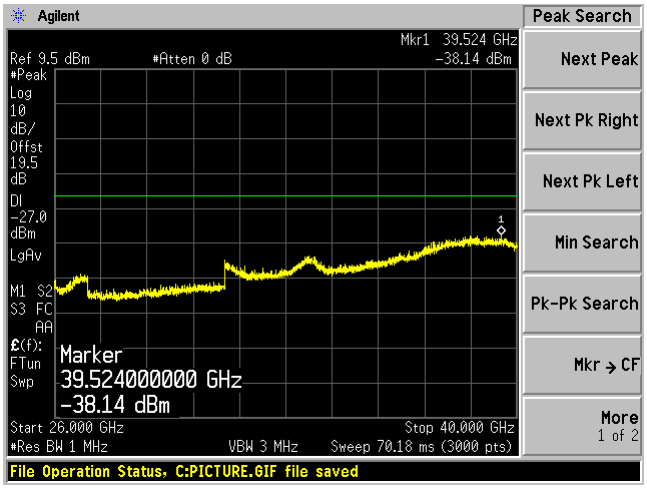
Low Channel 5745 MHz, 1GHz – 26GHz ANT B



Low Channel 5745 MHz , 26GHz – 40GHz ANT A

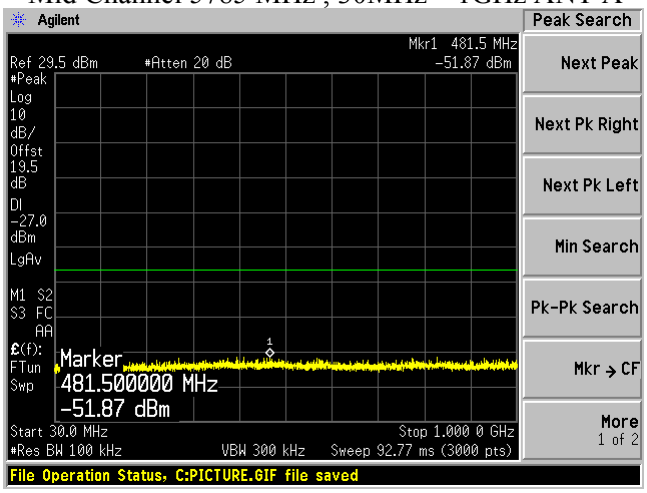


Low Channel 5745 MHz, 26GHz – 40GHz ANT B

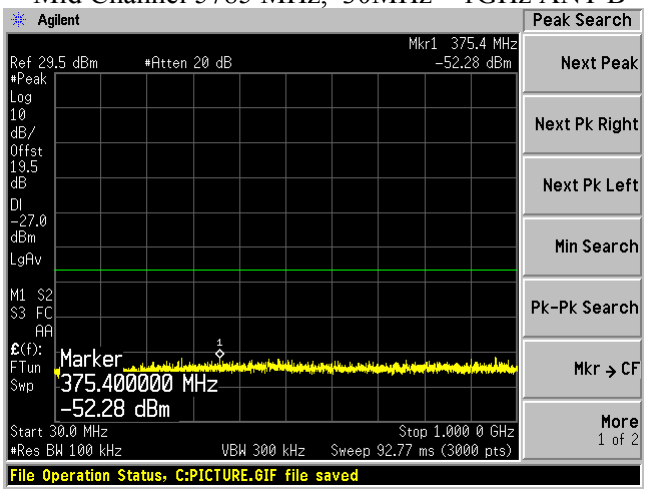


RADIO 2, 5745 - 5825 MHz, 802.11n20 Mode

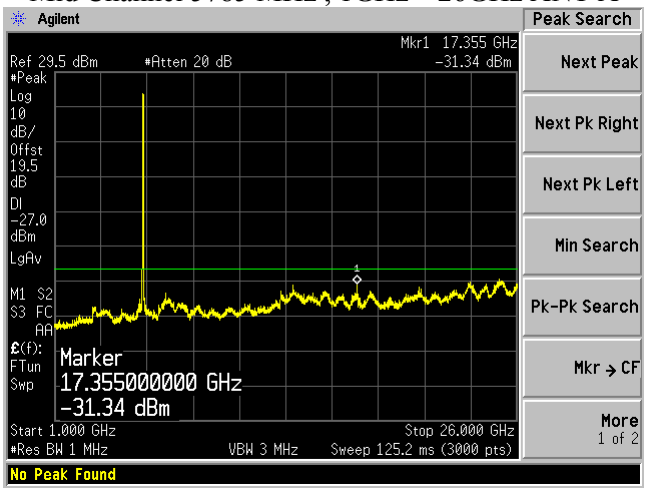
Mid Channel 5785 MHz , 30MHz – 1GHz ANT A



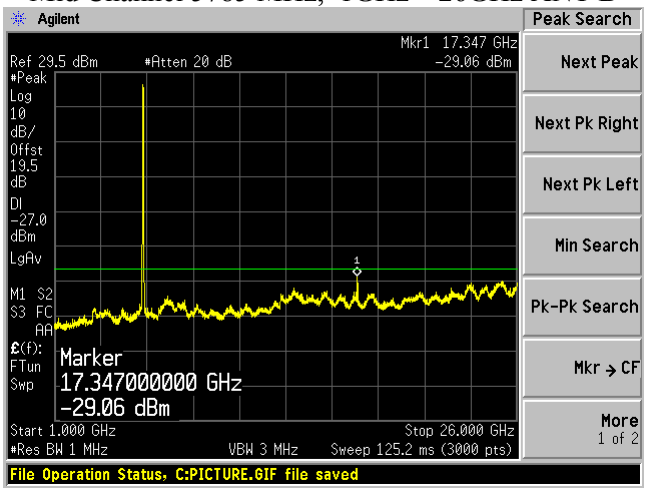
Mid Channel 5785 MHz, 30MHz – 1GHz ANT B



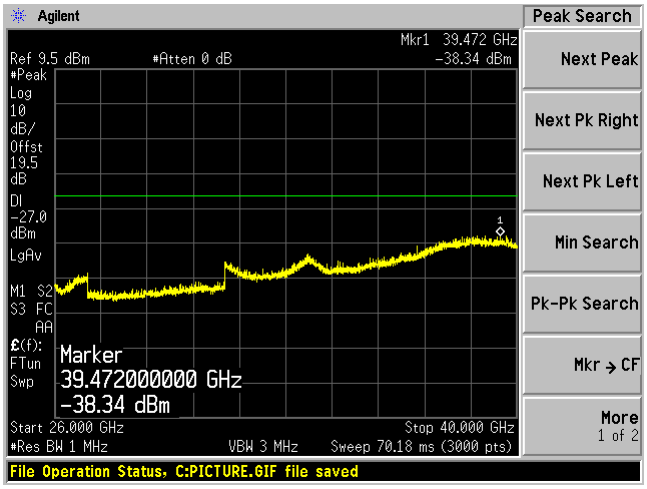
Mid Channel 5785 MHz , 1GHz – 26GHz ANT A



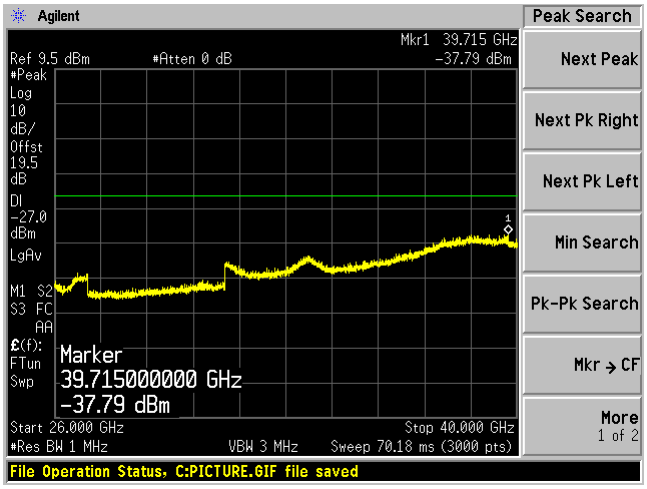
Mid Channel 5785 MHz, 1GHz – 26GHz ANT B



Mid Channel 5785 MHz , 26GHz – 40GHz ANT A

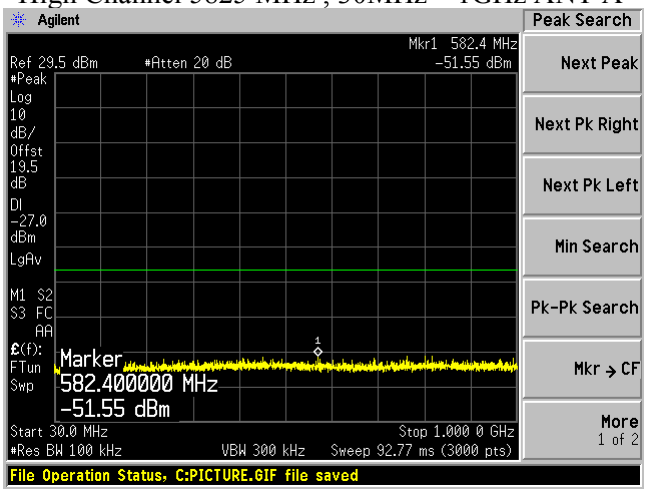


Mid Channel 5785 MHz, 26GHz – 40GHz ANT B

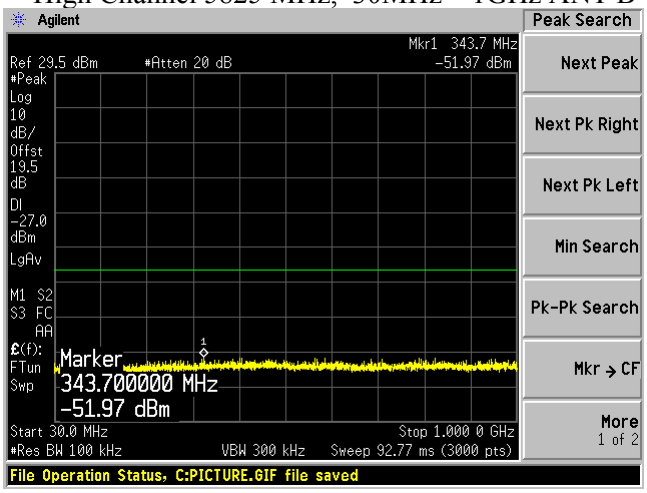


RADIO 2, 5745 - 5825 MHz, 802.11n20 Mode

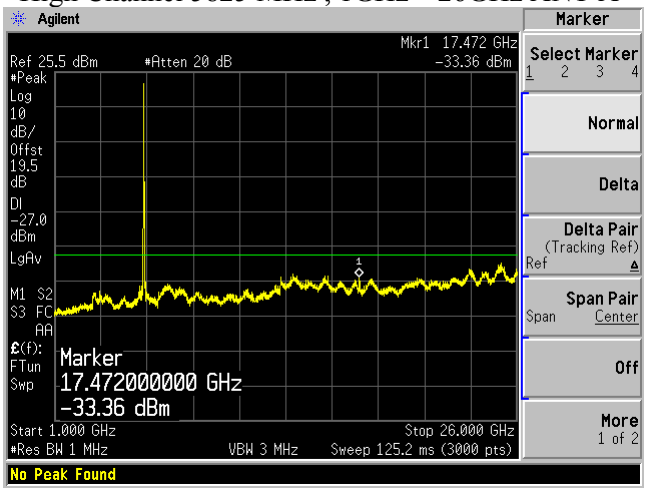
High Channel 5825 MHz , 30MHz – 1GHz ANT A



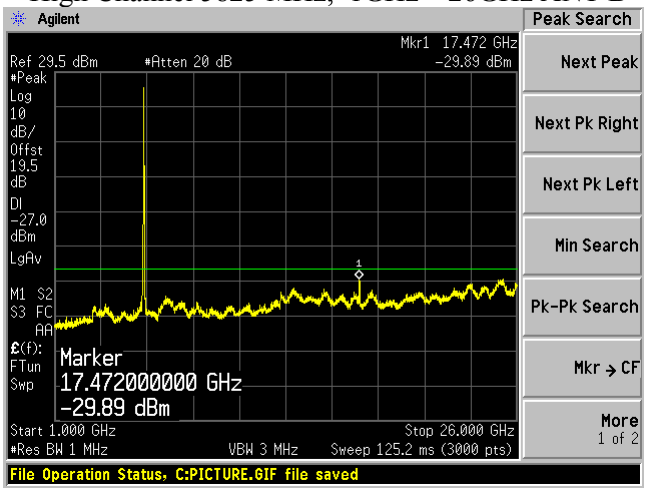
High Channel 5825 MHz, 30MHz – 1GHz ANT B



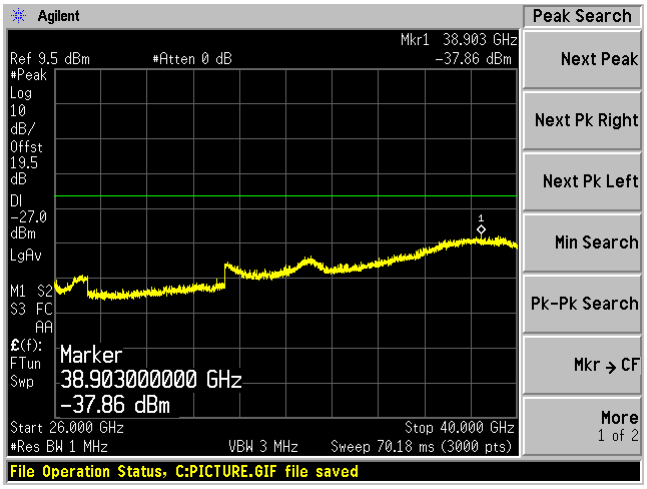
High Channel 5825 MHz , 1GHz – 26GHz ANT A



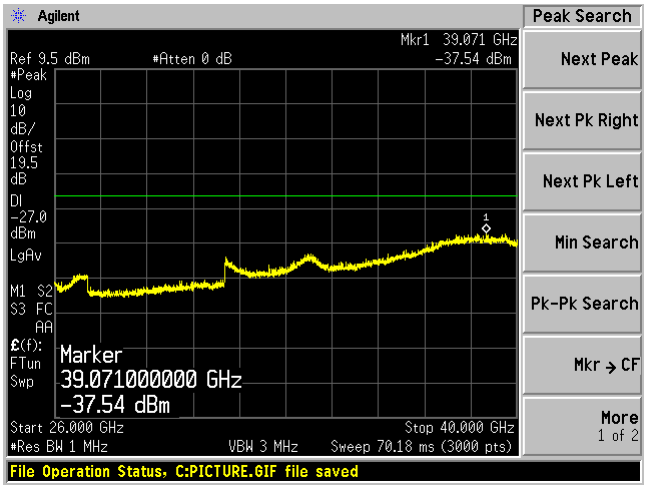
High Channel 5825 MHz, 1GHz – 26GHz ANT B



High Channel 5825 MHz , 26GHz – 40GHz ANT A

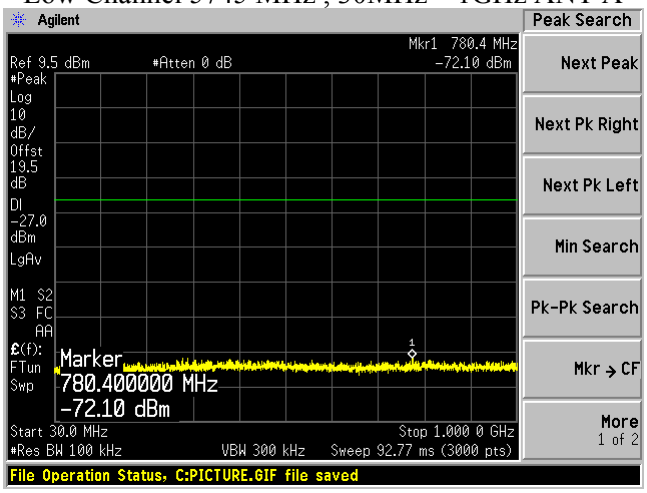


High Channel 5825 MHz, 26GHz – 40GHz ANT B

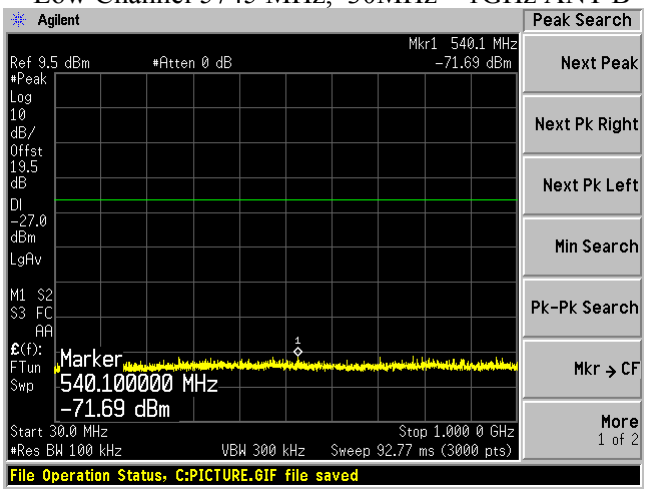


RADIO 2, 5745 - 5825 MHz, 802.11ac20 Mode

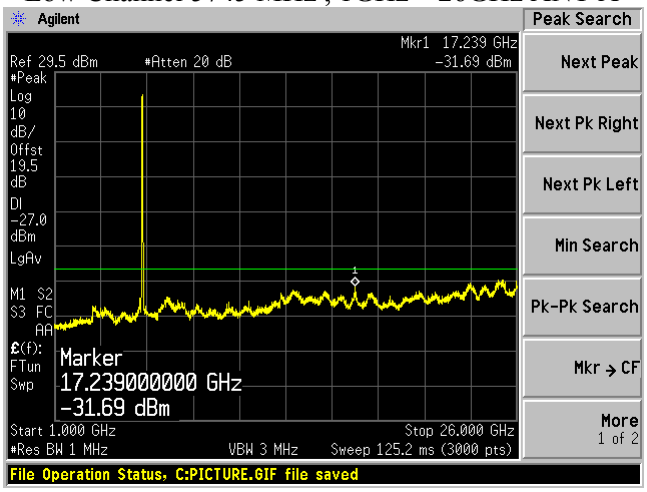
Low Channel 5745 MHz , 30MHz – 1GHz ANT A



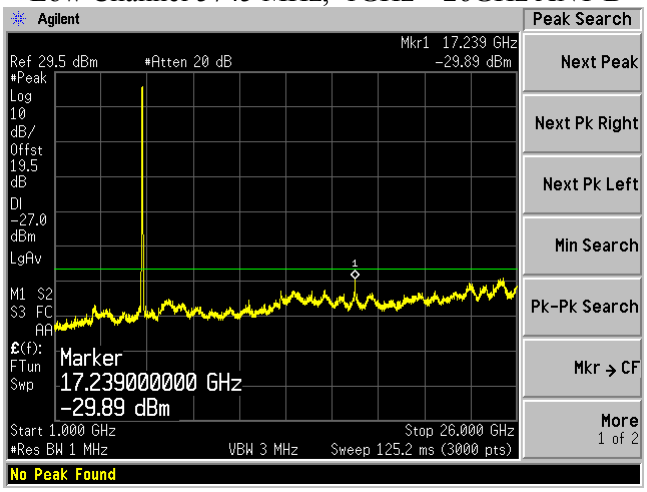
Low Channel 5745 MHz, 30MHz – 1GHz ANT B



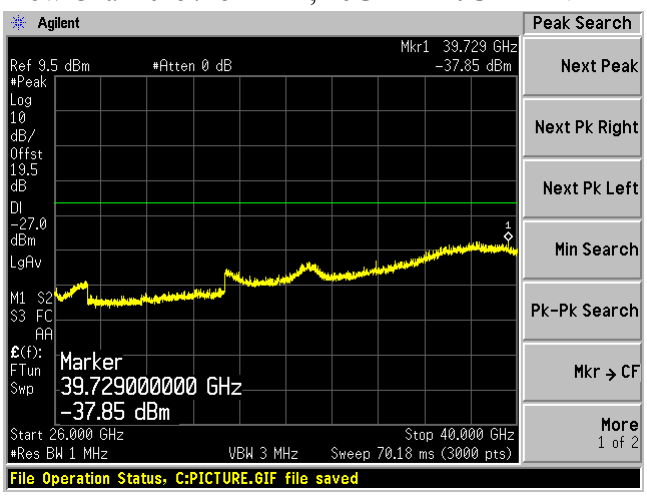
Low Channel 5745 MHz , 1GHz – 26GHz ANT A



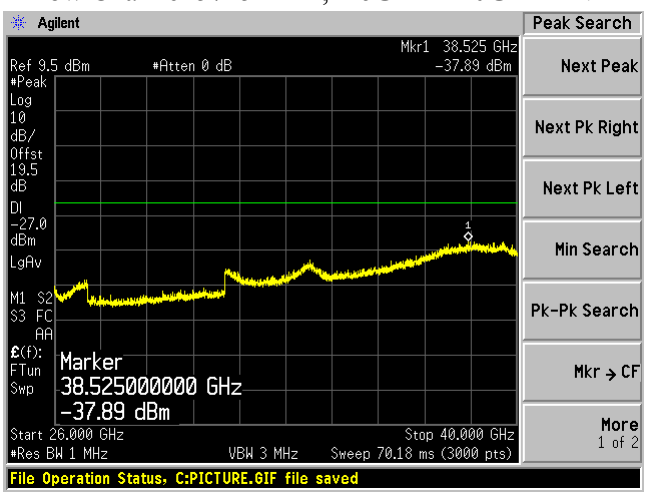
Low Channel 5745 MHz, 1GHz – 26GHz ANT B



Low Channel 5745 MHz , 26GHz – 40GHz ANT A

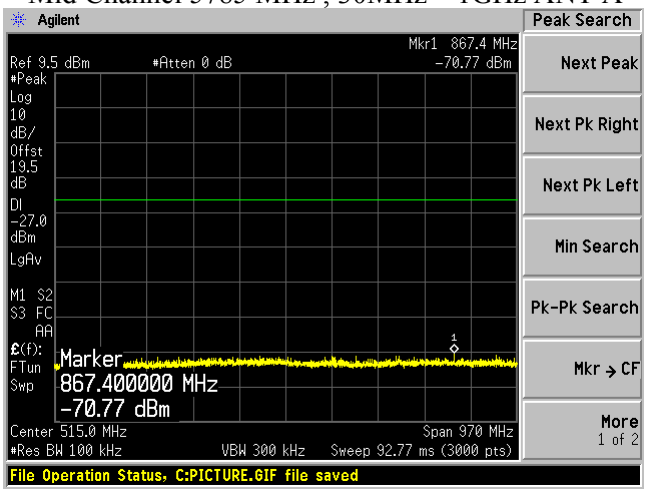


Low Channel 5745 MHz, 26GHz – 40GHz ANT B

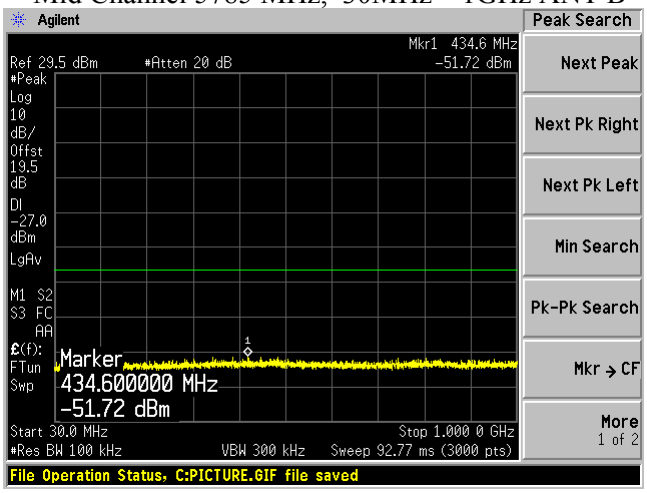


RADIO 2, 5745 - 5825 MHz, 802.11ac20 Mode

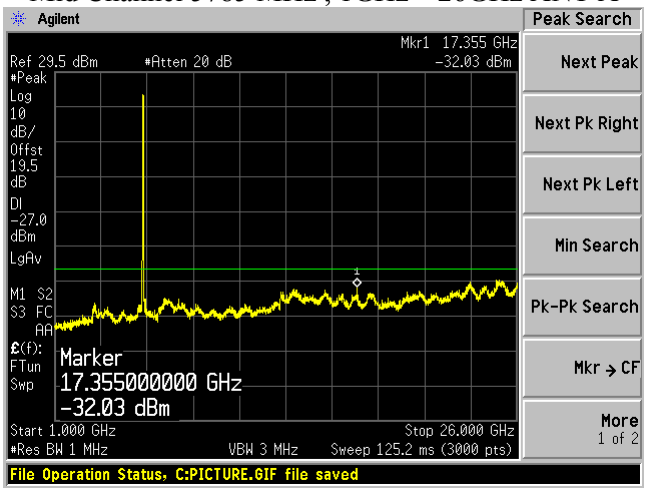
Mid Channel 5785 MHz , 30MHz – 1GHz ANT A



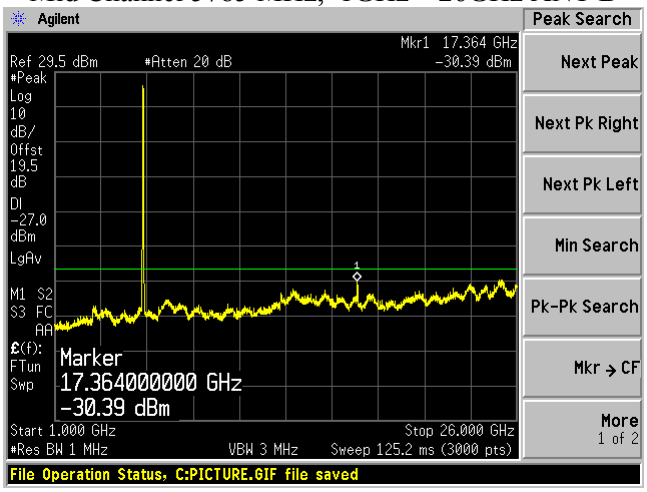
Mid Channel 5785 MHz, 30MHz – 1GHz ANT B



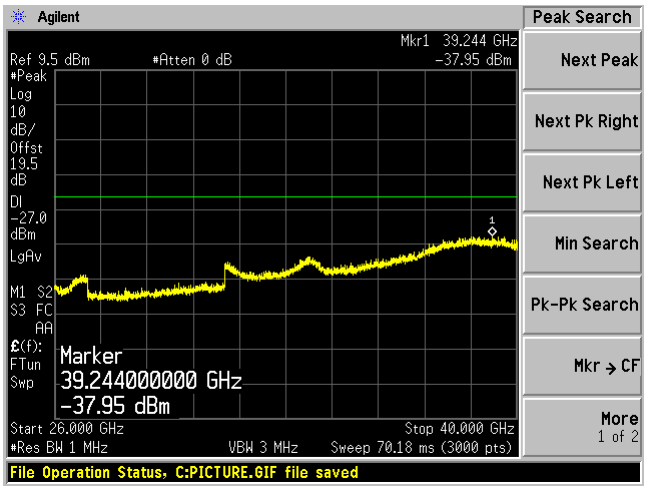
Mid Channel 5785 MHz , 1GHz – 26GHz ANT A



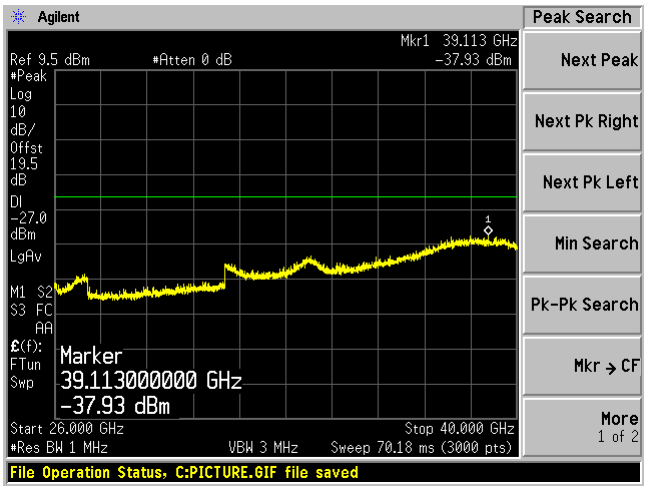
Mid Channel 5785 MHz, 1GHz – 26GHz ANT B



Mid Channel 5785 MHz , 26GHz – 40GHz ANT A

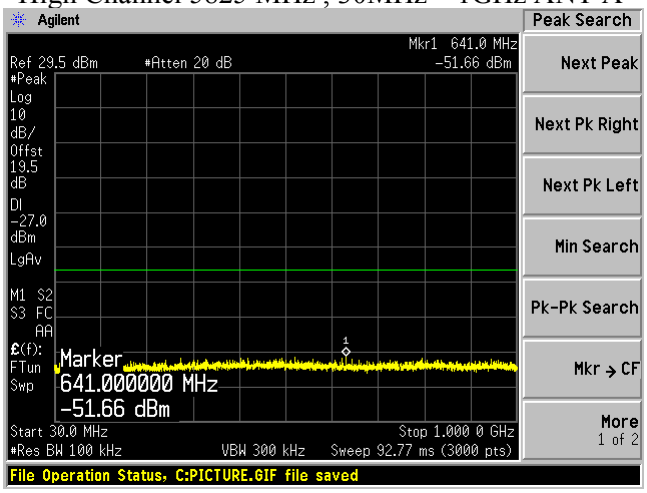


Mid Channel 5785 MHz, 26GHz – 40GHz ANT B

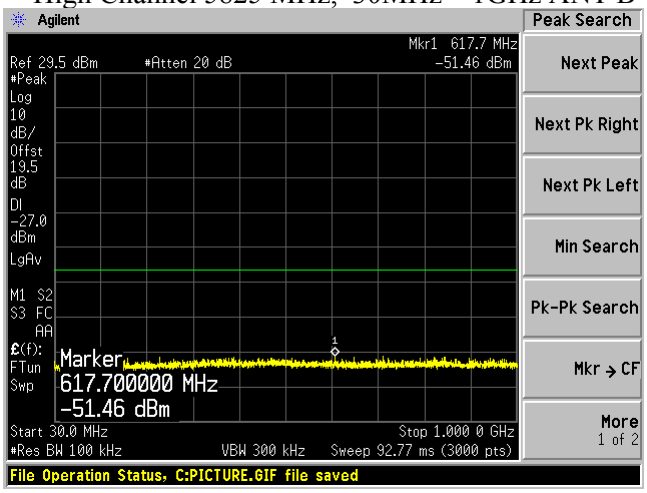


RADIO 2, 5745 - 5825 MHz, 802.11ac20 Mode

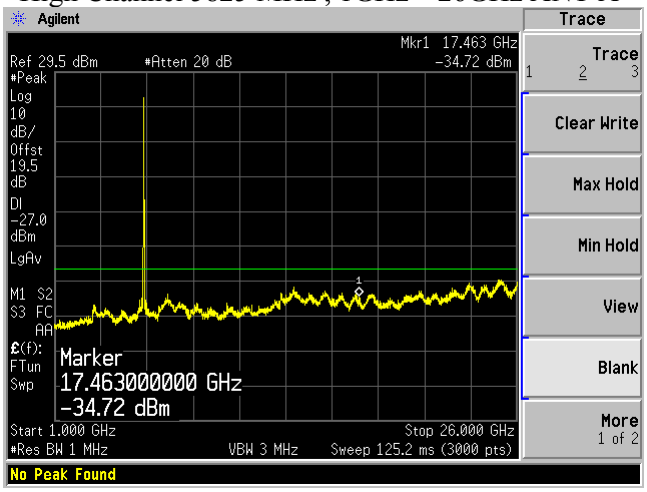
High Channel 5825 MHz , 30MHz – 1GHz ANT A



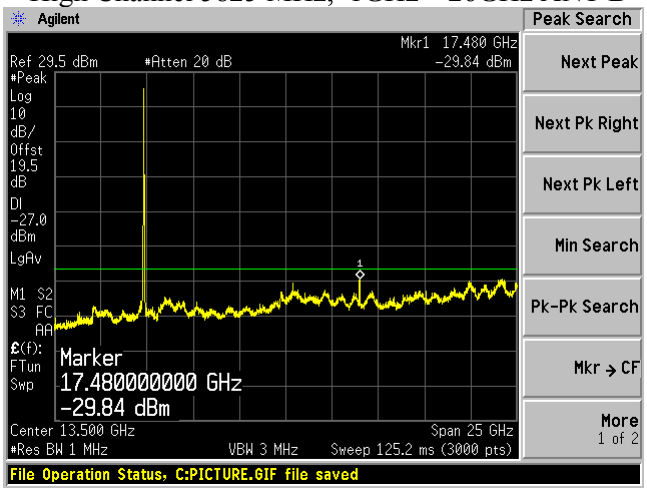
High Channel 5825 MHz, 30MHz – 1GHz ANT B



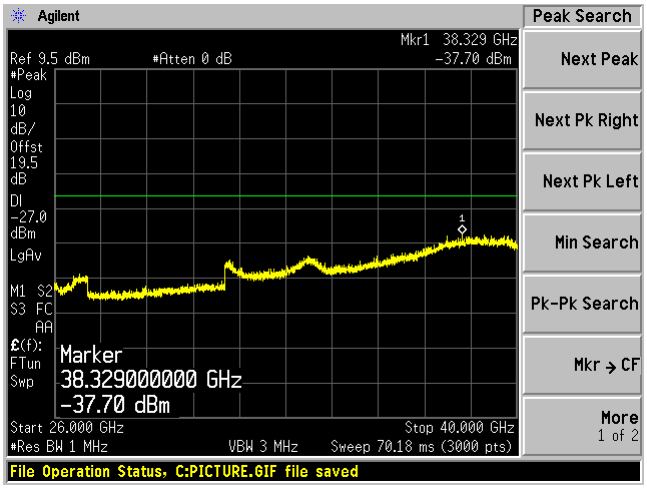
High Channel 5825 MHz , 1GHz – 26GHz ANT A



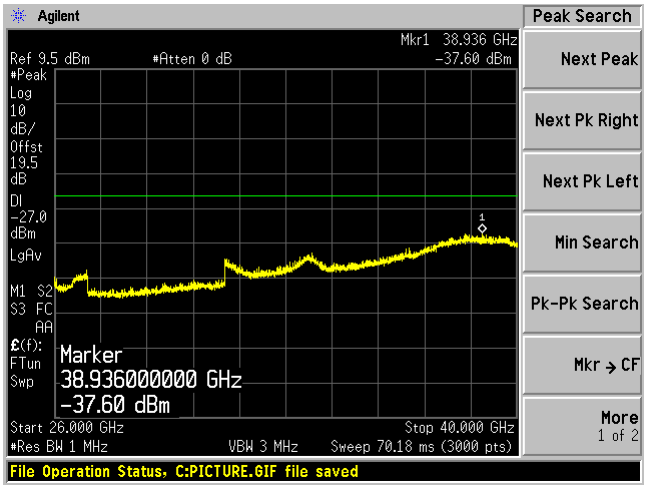
High Channel 5825 MHz, 1GHz – 26GHz ANT B



High Channel 5825 MHz , 26GHz – 40GHz ANT A

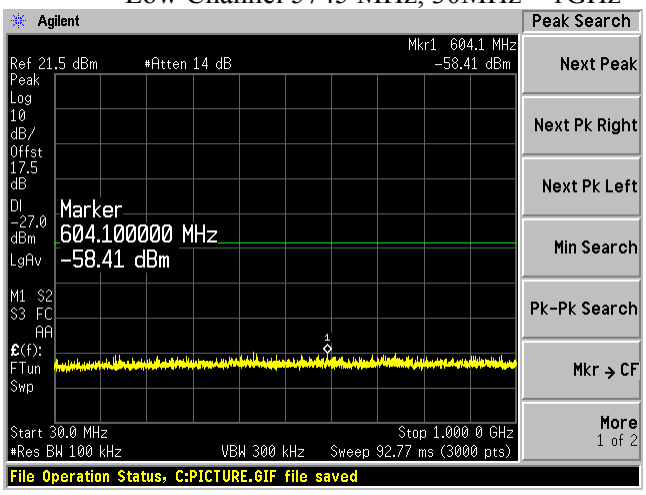


High Channel 5825 MHz, 26GHz – 40GHz ANT B

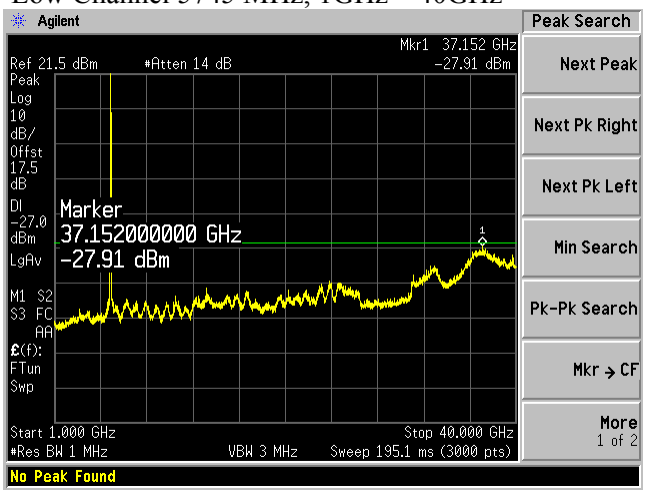


RADIO 1, 5745 - 5825 MHz, 802.11a Mode

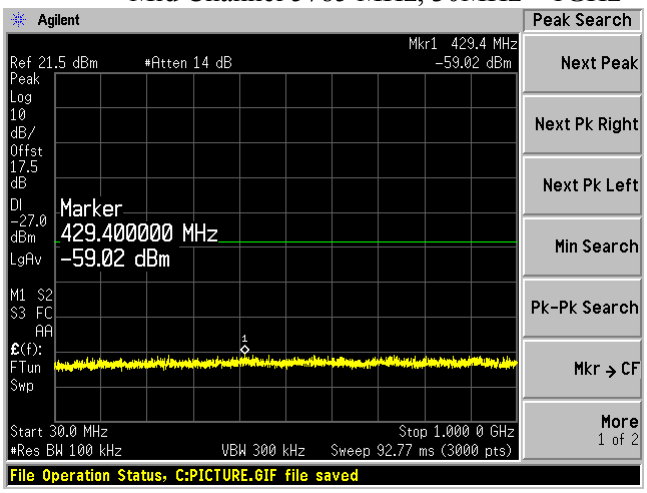
Low Channel 5745 MHz, 30MHz – 1GHz



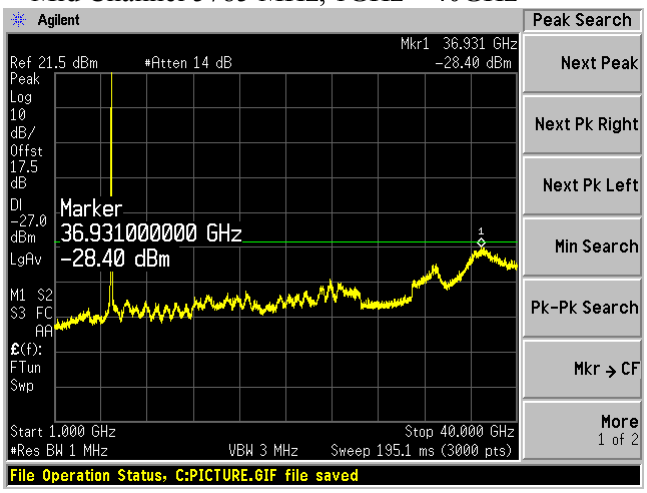
Low Channel 5745 MHz, 1GHz – 40GHz



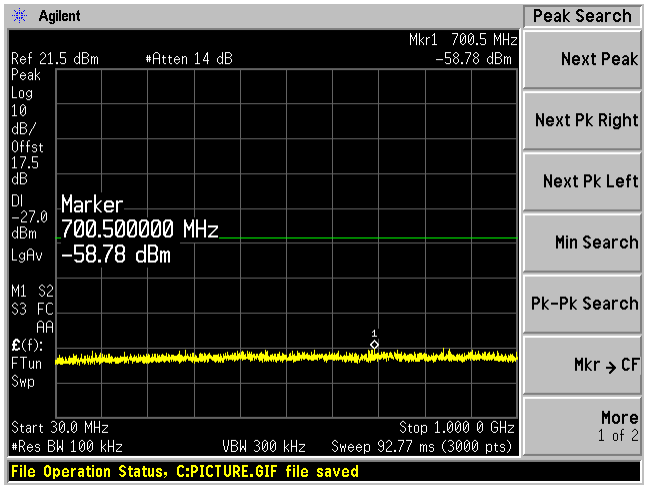
Mid Channel 5785 MHz, 30MHz – 1GHz



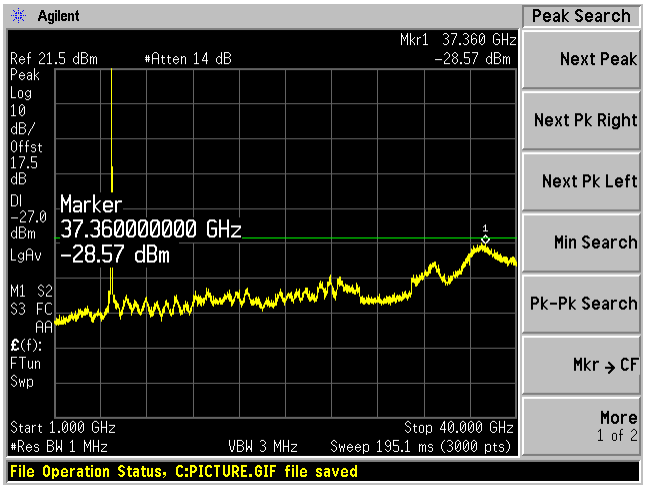
Mid Channel 5785 MHz, 1GHz – 40GHz



High Channel 5825 MHz, 30MHz – 1GHz

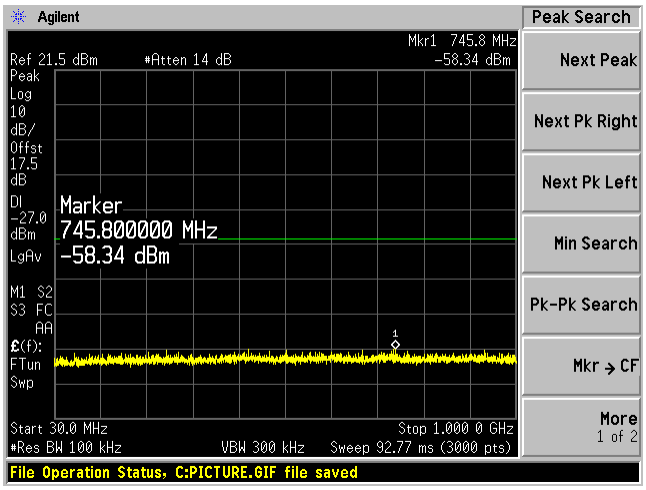


High Channel 5825 MHz, 1GHz – 40GHz

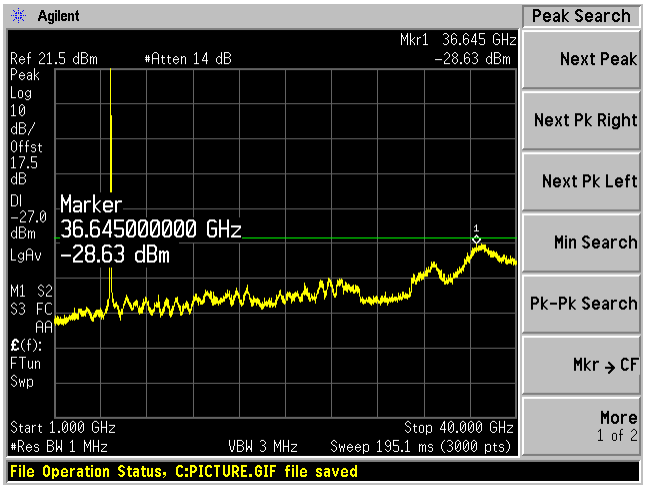


RADIO 1, 5745 - 5825 MHz, 802.11n20 Mode

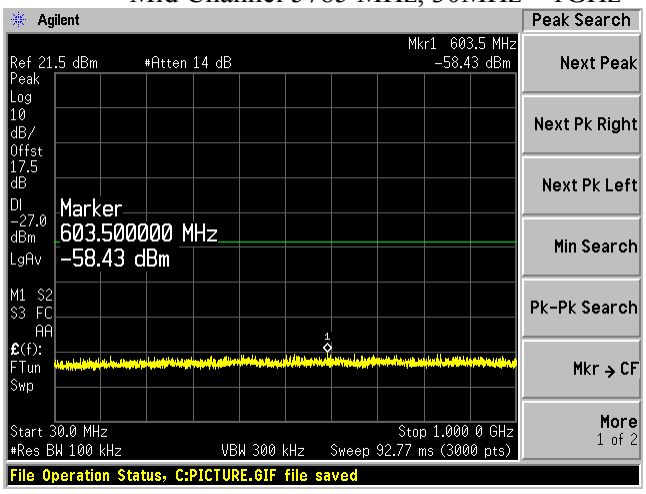
Low Channel 5745 MHz, 30MHz – 1GHz



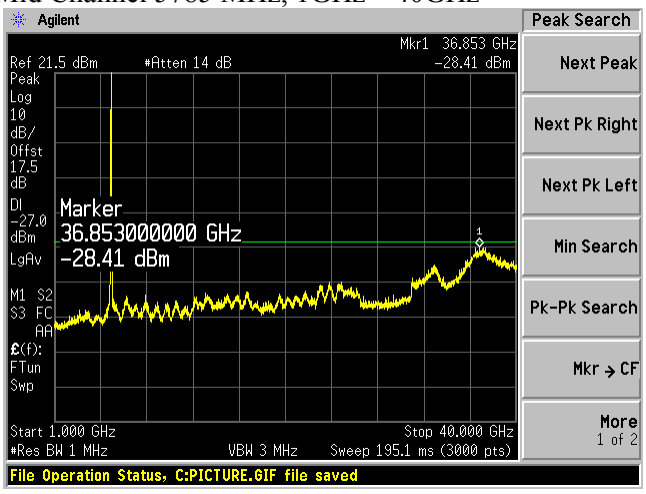
Low Channel 5745 MHz, 1GHz – 40GHz



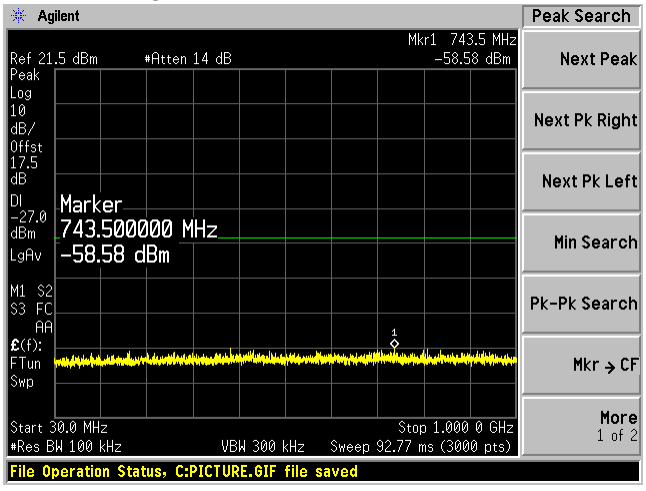
Mid Channel 5785 MHz, 30MHz – 1GHz



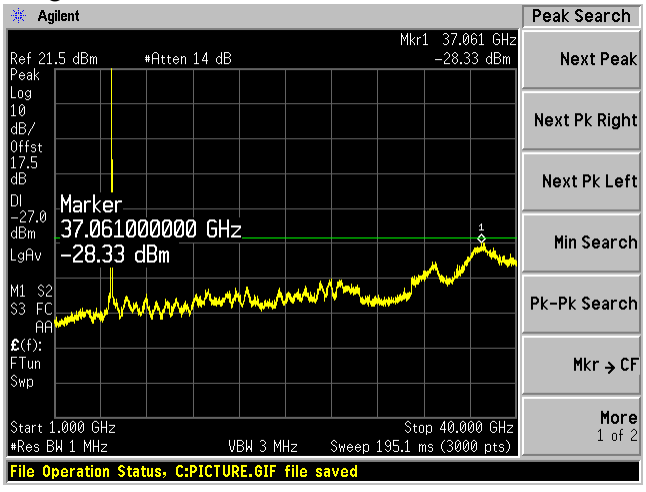
Mid Channel 5785 MHz, 1GHz – 40GHz



High Channel 5825 MHz, 30MHz – 1GHz

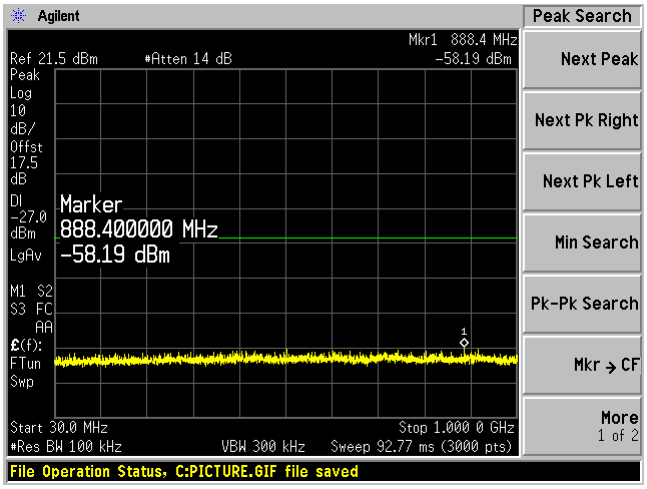


High Channel 5825 MHz, 1GHz – 40GHz

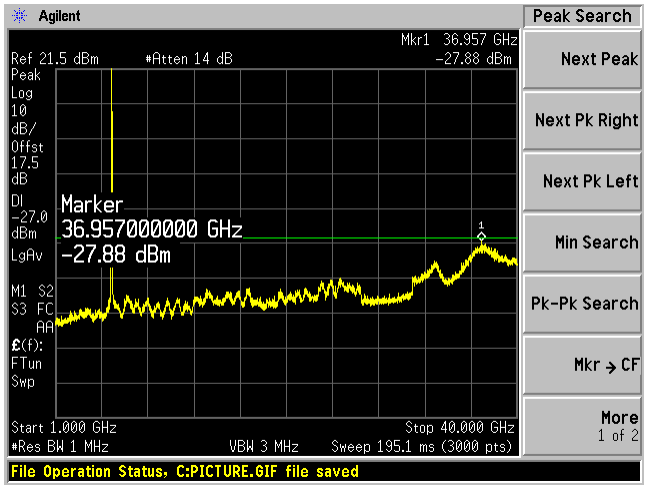


RADIO 1, 5745 - 5825 MHz, 802.11ac20 Mode

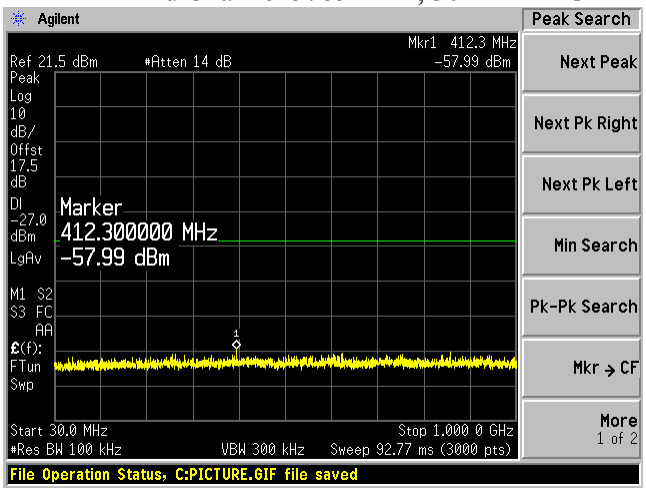
Low Channel 5745 MHz, 30MHz – 1GHz



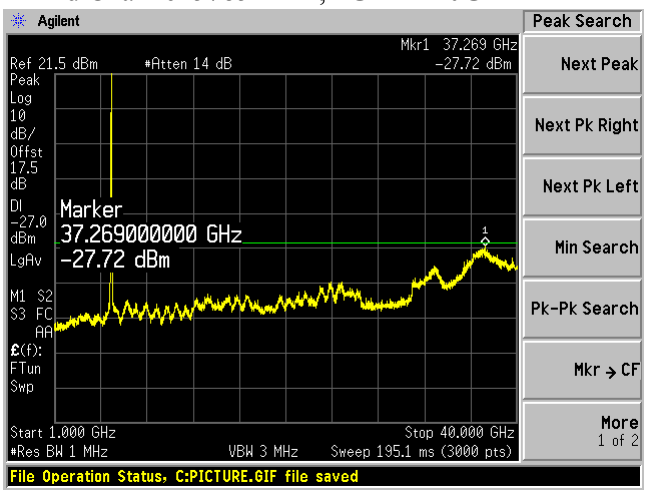
Low Channel 5745 MHz, 1GHz – 40GHz



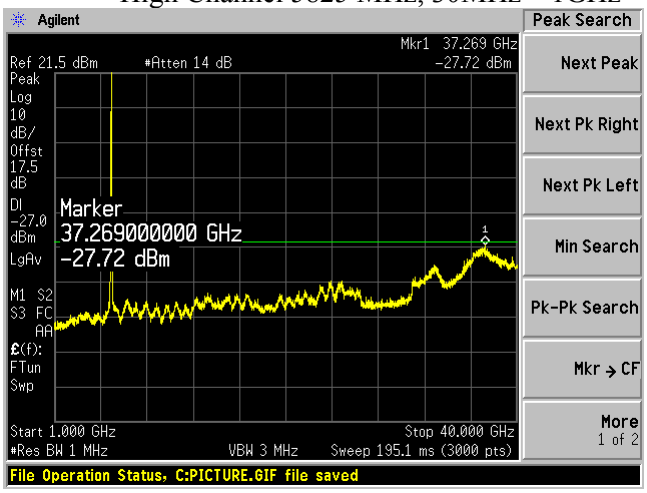
Mid Channel 5785 MHz, 30MHz – 1GHz



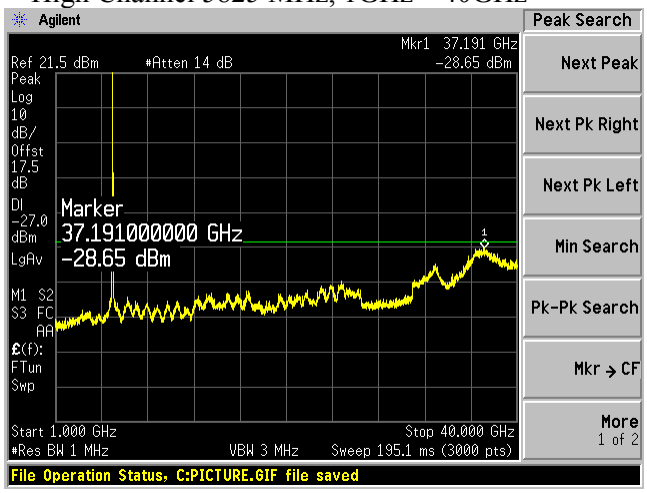
Mid Channel 5785 MHz, 1GHz – 40GHz



High Channel 5825 MHz, 30MHz – 1GHz



High Channel 5825 MHz, 1GHz – 40GHz

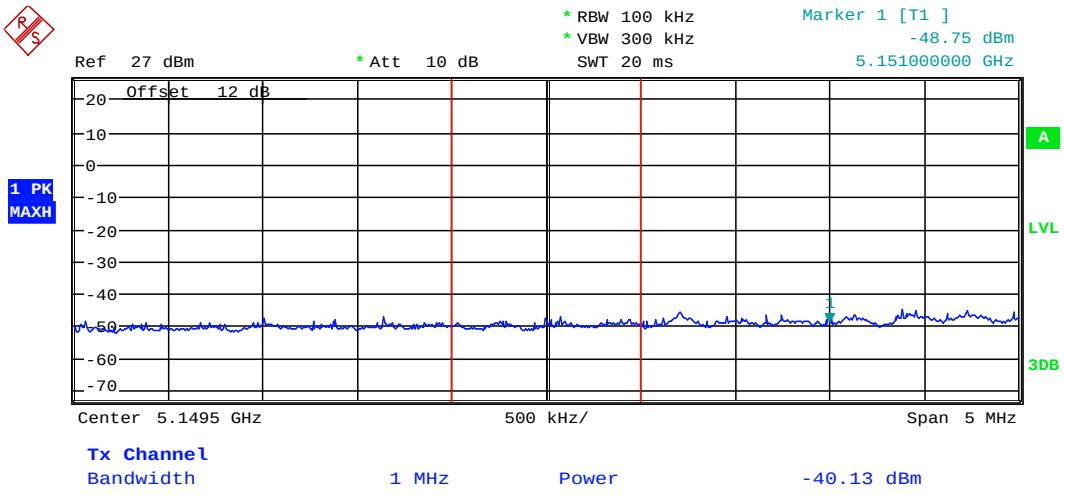


Band Edge Emissions

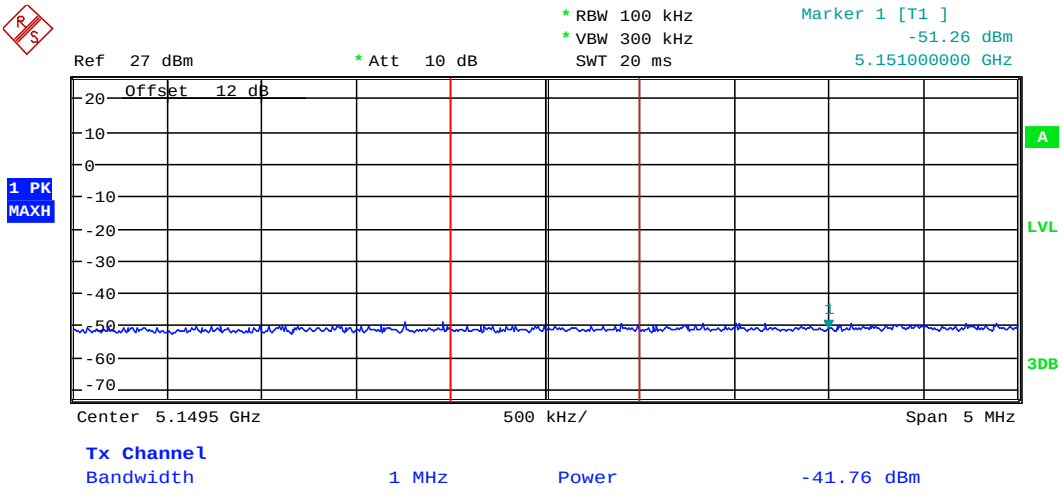
FCC:

RADIO 2, 5150 - 5250 MHz, 802.11a Mode

Ant A, Low Channel

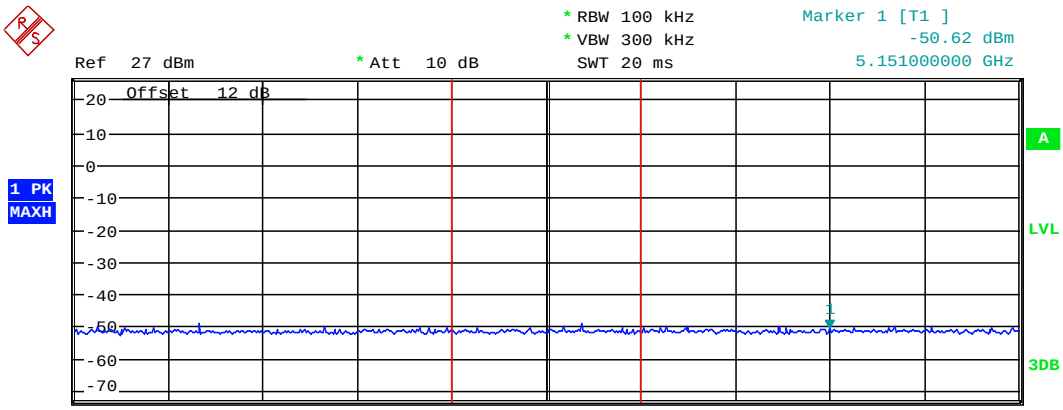


Ant B, Low Channel



RADIO 2, 5150 - 5250 MHz, 802.11n20 Mode

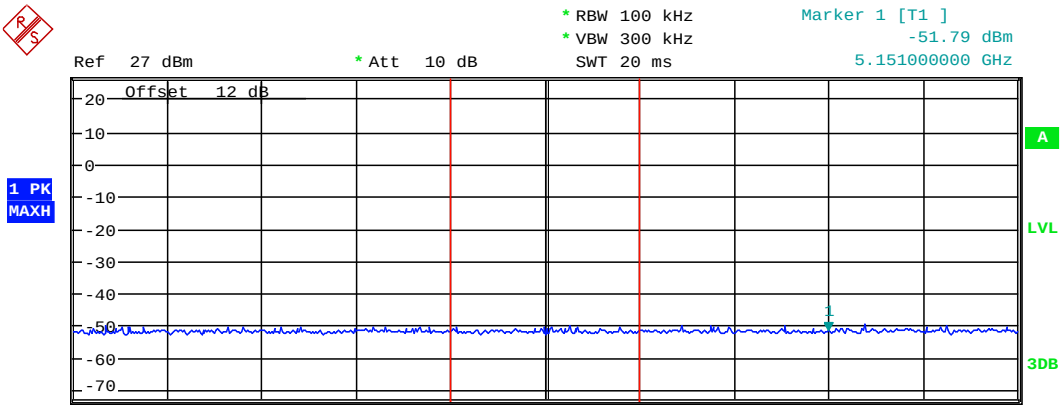
Ant A, Low Channel



Tx Channel

Bandwidth	1 MHz	Power	-41.94 dBm

Ant B, Low Channel

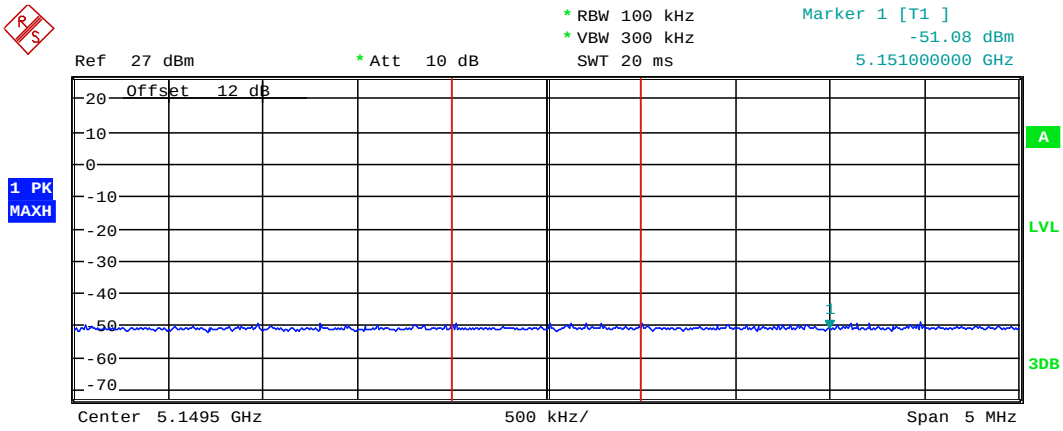


Tx Channel

Bandwidth	1 MHz	Power	-42.12 dBm

RADIO 2, 5150 - 5250 MHz, 802.11ac20 Mode

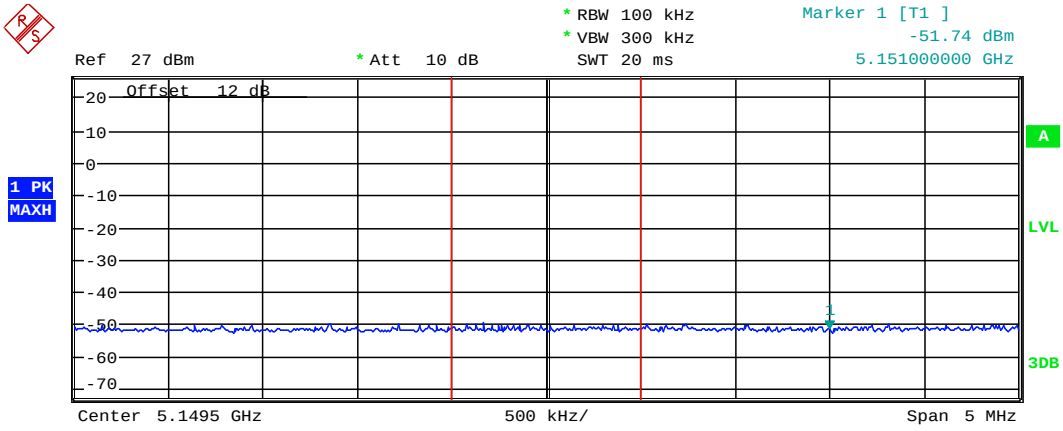
Ant A, Low Channel



Tx Channel

Bandwidth	1 MHz	Power	-41.42 dBm

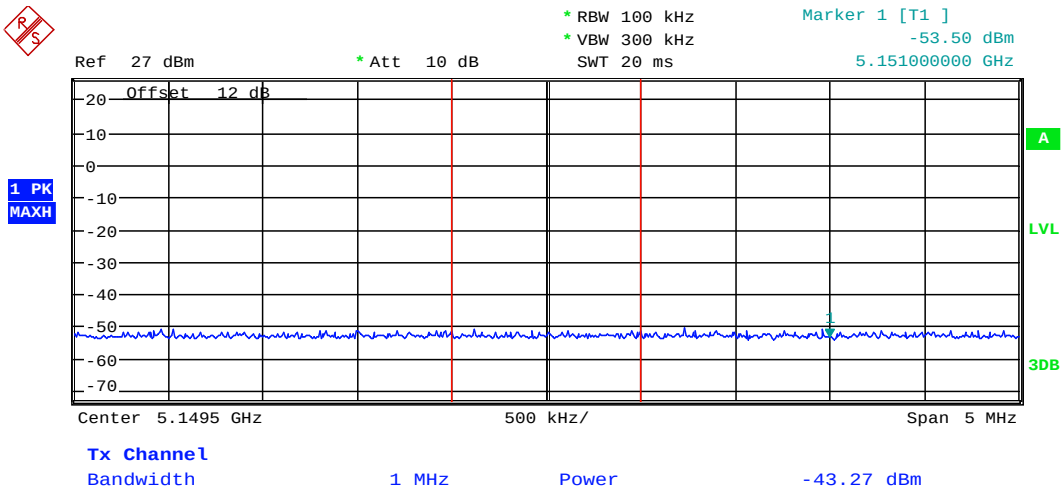
Ant B, Low Channel



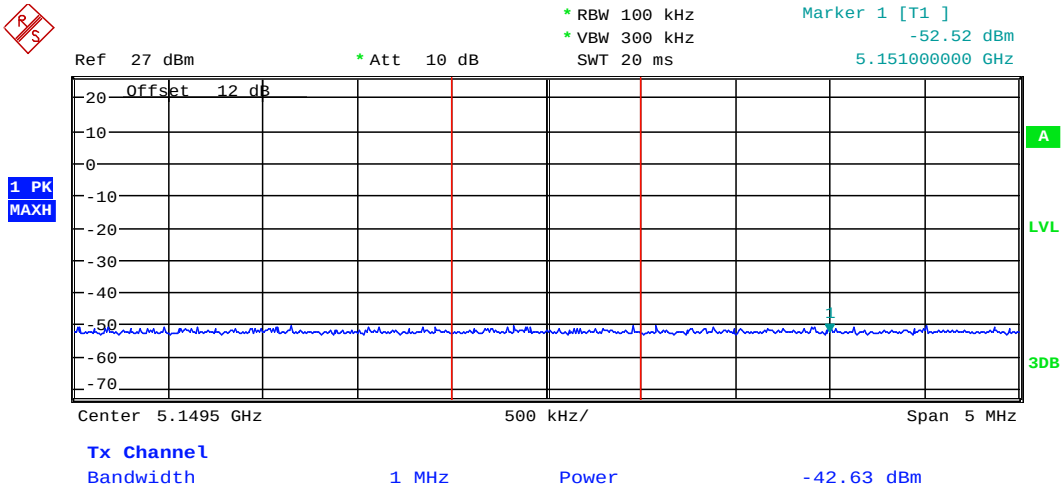
Tx Channel

Bandwidth	1 MHz	Power	-41.81 dBm

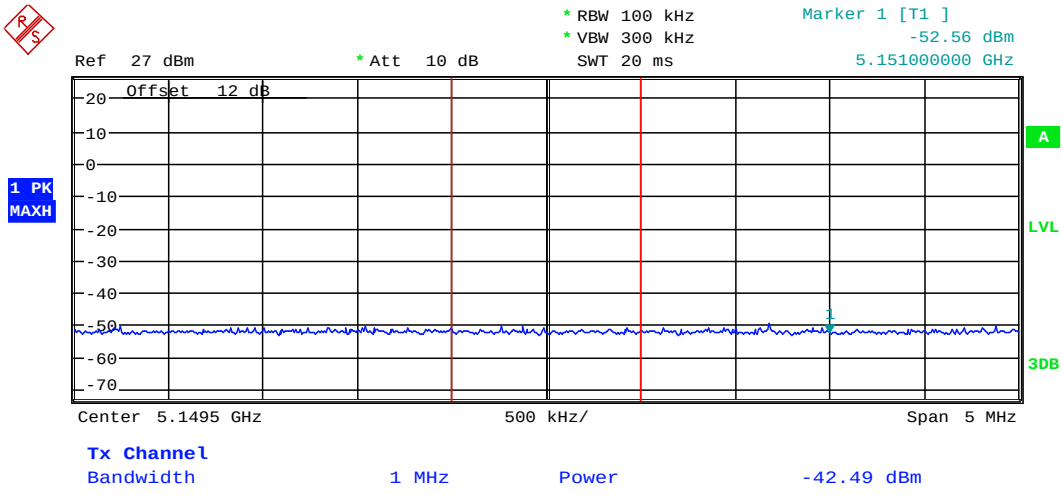
RADIO 1, 5150 - 5250 MHz, 802.11a Mode, Low Channel



RADIO 1, 5150 - 5250 MHz, 802.11n20 Mode, Low Channel



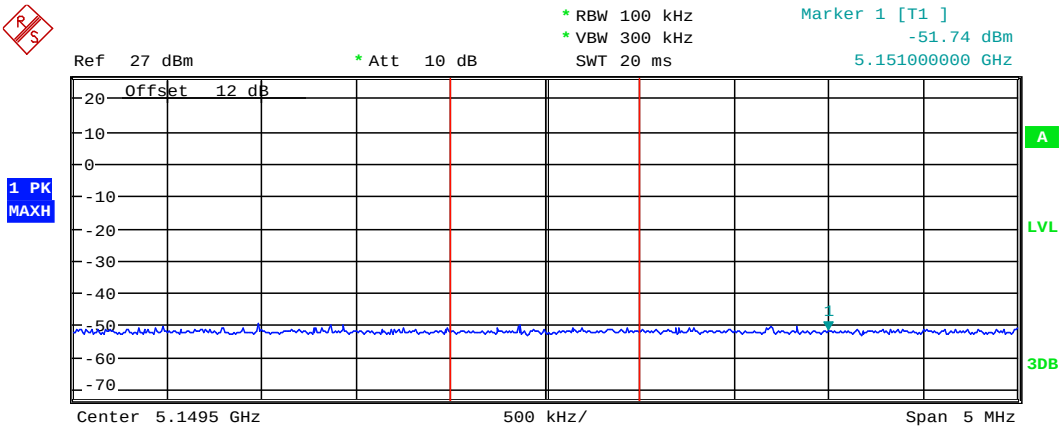
RADIO 1, 5150 - 5250 MHz, 802.11ac20 Mode, Low Channel



IC:

RADIO 2, 5150 - 5250 MHz, 802.11a Mode

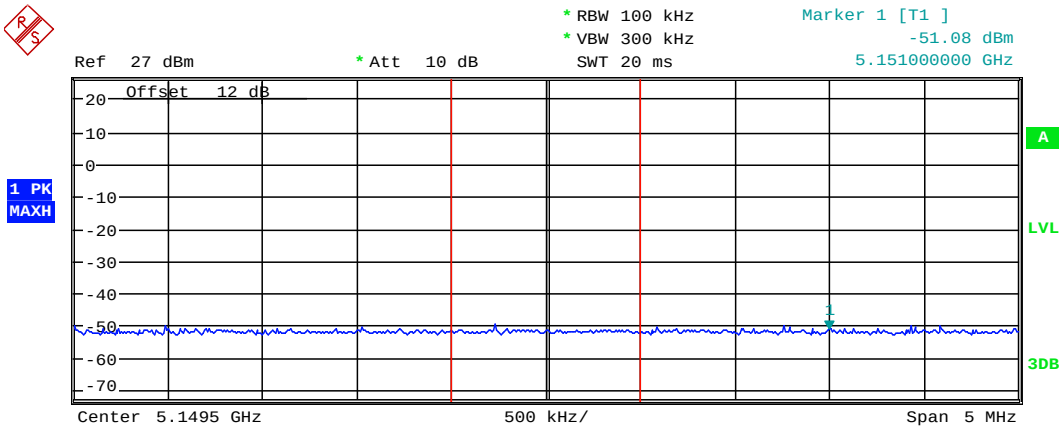
Ant A, Low Channel



Tx Channel

Bandwidth	1 MHz	Power	-42.43 dBm

Ant B, Low Channel

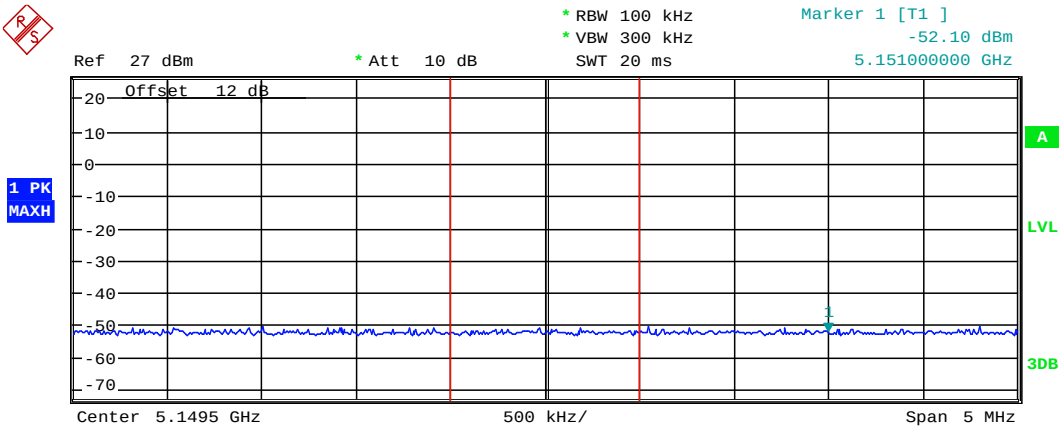


Tx Channel

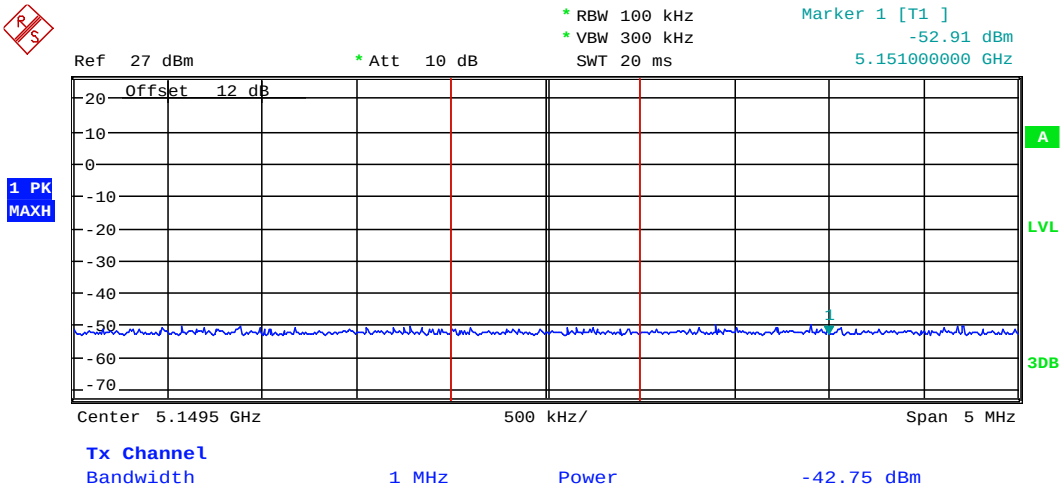
Bandwidth	1 MHz	Power	-42.22 dBm

RADIO 2, 5150 - 5250 MHz, 802.11n20 Mode

Ant A, Low Channel

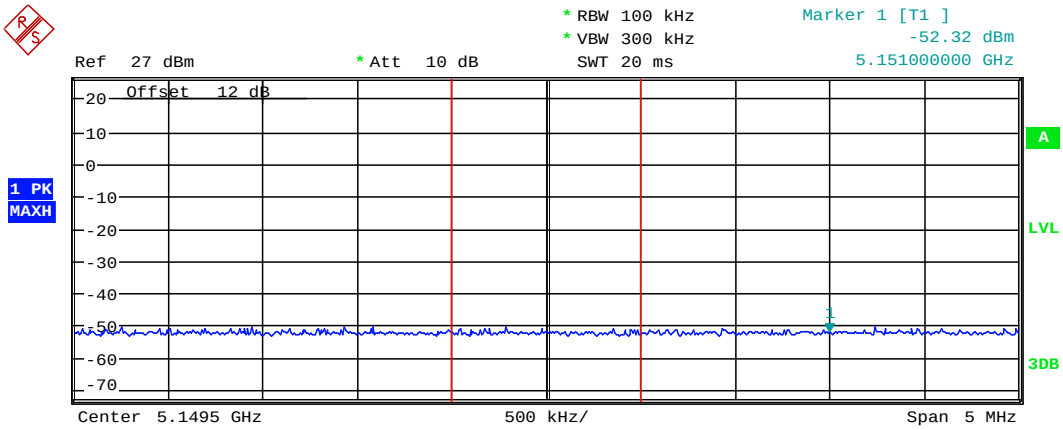


Ant B, Low Channel



RADIO 2, 5150 - 5250 MHz, 802.11ac20 Mode

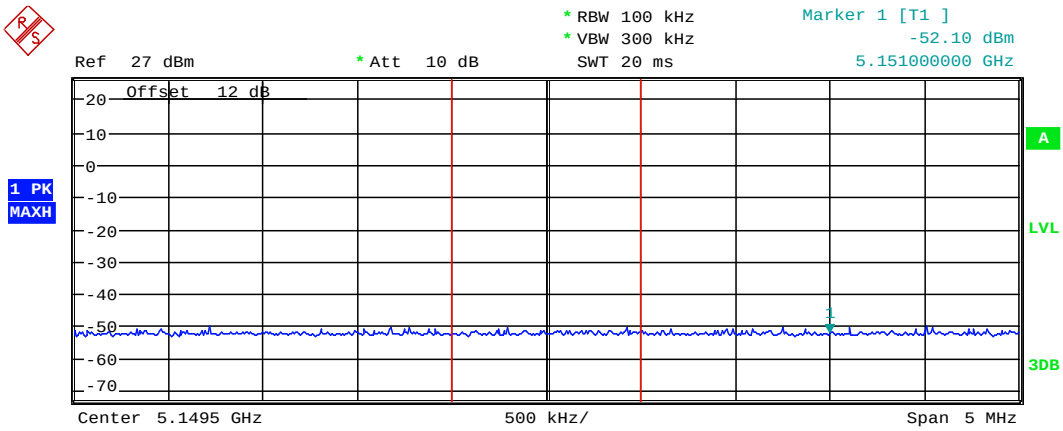
Ant A, Low Channel



Tx Channel

Bandwidth	1 MHz	Power	-42.67 dBm

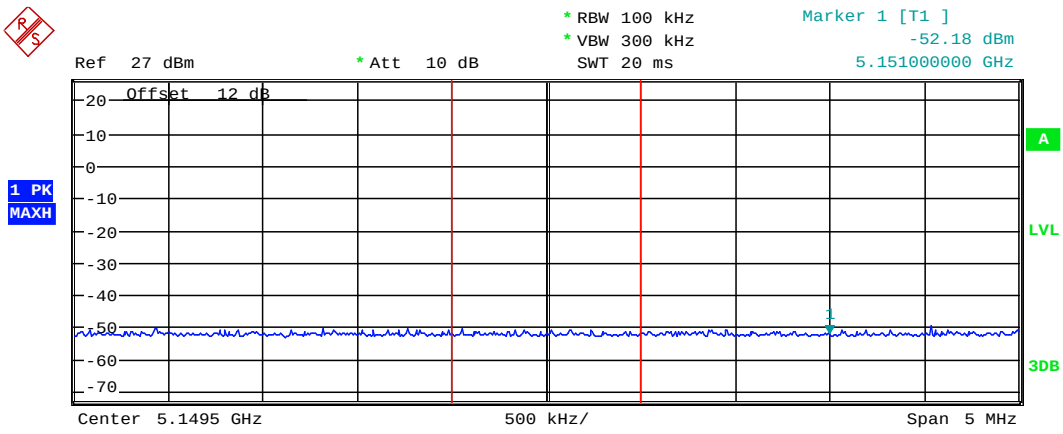
Ant B, Low Channel



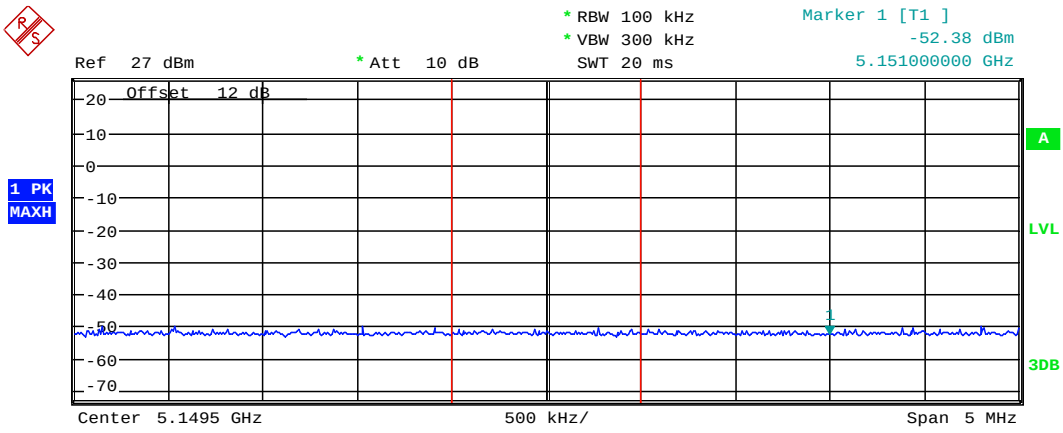
Tx Channel

Bandwidth	1 MHz	Power	-42.54 dBm

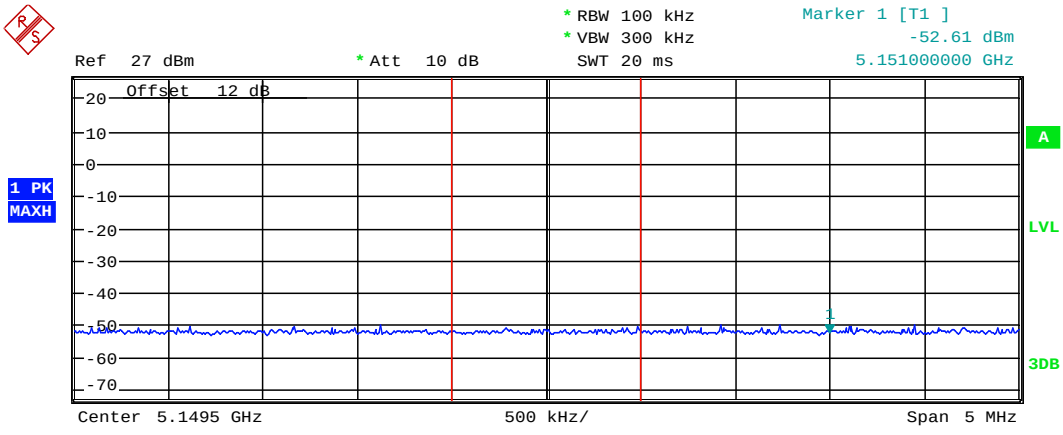
RADIO 1, 5150 - 5250 MHz, 802.11a Mode, Low Channel



RADIO 1, 5150 - 5250 MHz, 802.11n20 Mode, Low Channel



RADIO 1, 5150 - 5250 MHz, 802.11ac20 Mode, Low Channel



Please refer to Radiated spurious emissions results for 5.8 GHz Emissions Mask evaluation.

12 Annex A (Normative) - EUT Test Setup Photographs

Please refer to the attachment.

13 Annex B (Normative) - EUT External Photographs

Please refer to the attachment.

14 Annex C (Normative) - EUT Internal Photographs

Please refer to the attachment.

15 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 17025:2005 *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 2nd day of October 2018.

Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 3297.02
Valid to September 30, 2020
Revised June 5, 2019

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 ---