FCC PART 15.247
IC RSS-210, ISSUE 8, DEC 2010
TEST AND MEASUREMENT REPORT

For

Ruckus Wireless, Inc.

350 West Java Drive,

Sunnyvale, CA 94089, USA

FCC ID: S9G-MPE5N33A
IC: 5912A-MPE5N33A

Report Type:	**Product Type:**
CIIPC	802.11 a/n Wireless Module

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Report Number:	R1206071-247-5.8GHz	
Report Date:	2012-10-12	
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TABLE OF CONTENTS

DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
0	R1206071-247-5.8GHz	CIIPC Report	2012-10-12

1 General Description

1.1 Product Description for Equipment under Test (EUT)

This test and measurement report was prepared on behalf of *Ruckus Wireless, Inc*., and their product model: *MPE5N33A, with FCC ID: S9G-MPE5N33A, IC: 5912A-MPE5N33A* which will henceforth be referred to as the EUT (Equipment Under Test). The EUT is a 5GHz 802.11a/n wireless module.

1.2 Mechanical Description of EUT

The "EUT" measures approximately 6.*9cm (L) x 3.9cm (W) x 1.0cm (H)*, and weighs approximately 16.*0*g.

The test data gathered are from typical production sample, serial number: 203, provided by the manufacturer.

1.3 Objective

This report is prepared on behalf of *Ruckus Wireless, Inc.,* in accordance with Part 2, Subpart J, and Part 15, Subparts B and C of the Federal Communication Commissions rules and IC RSS-210 Issue 8, Dec 2010.

The objective is to add additional antenna with class II permissive change on the original application by determine compliance with FCC/IC rules for Antenna Requirements, Conducted Emissions, Occupied Bandwidth, Output Power, Power Spectral Density, Radiated and Conducted Spurious Emissions, and Band Edge. Please refer to the detail antenna list in the antenna requirement section.

1.4 Related Submittal(s)/Grant(s)

FCC Part 15.407 NII with FCC ID: S9G-MPE5N33A
IC RSS-210 with IC: 5912A-MPE5N33A

1.5 Test Methodology

All measurements contained in this report were conducted in accordance with ANSI C63.4-2009, 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.

1.6 Measurement Uncertainty

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

Based on CISPR16-4-2:2003, The Treatment of Uncertainty in EMC Measurements, the values ranging from $\pm$2.0 dB for Conducted Emissions tests and $\pm$4.0 dB for Radiated Emissions tests are the most accurate estimates pertaining to uncertainty of EMC measurements at BACL Corp.

All radiated and conducted emissions measurement was performed at Bay Area Compliance Laboratory, Corp. The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

1.7 Test Facility

The test site used by BACL Corp. to collect radiated and conducted emissions measurement data is located at its facility in Sunnyvale, California, USA.

The test site at BACL Corp. has been fully described in reports submitted to the Federal Communication Commission (FCC) and Voluntary Control Council for Interference (VCCI). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on February 11 and December 10, 1997, and Article 8 of the VCCI regulations on December 25, 1997. The test site also complies with the test methods and procedures set forth in CISPR 22:2008 §10.4 for measurements below 1 GHz and §10.6 for measurements above 1 GHz as well as ANSI C63.4-2003, ANSI C63.4-2009, TIA/EIA-603 & CISPR 24:2010.

The Federal Communications Commission and Voluntary Control Council for Interference have the reports on file and they are listed under FCC registration number: 90464 and VCCI Registration No.: A-0027. The test site has been approved by the FCC and VCCI for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, BACL Corp. is an American Association for Laboratory Accreditation (A2LA) accredited laboratory (Lab Code 3297-02). The current scope of accreditations can be found at

http://www.a2la.org/scopepdf/3297-02.pdf?CFID=1132286&CFTOKEN=e42a3240dac3f6ba-6DE17DCB-1851-9E57-477422F667031258&jsessionid=8430d44f1f47cf2996124343c704b367816b

2 System Test Configuration

2.1 Justification

The EUT was configured for testing according to ANSI C63.4-2009.

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 to be as follows for each mode based upon investigation by measuring the average power, peak power and PPSD across all data rates bandwidths, and modulations.

2.2 EUT Exercise Software

The software used, 3CDaemon Version 2.0, Putty Version 0.60.0.0, and Art version 2.18.2 were provided by client and verified by Ning Ma to comply with the standard requirements being tested against.

2.3 Equipment Modifications

No modifications were made to the EUT.

2.4 Special Accessories

Manufacturer	Description	Model No.	Serial No.
Atheros Communications	Module Supporting Board	250-01865-020	PB92-020

2.5 Local Support Equipment

Manufacturer	Description	Model No.	Serial No.
Dell	Laptop	Latitude E5420	CHZMLQ1

2.6 EUT Internal Configuration

NA: Only the module card was tested.

3 Summary of Test Results

Results reported relate only to the product tested.

FCC & IC Rules	Description of Test	Results
FCC §15.247(i), §2.1091 IC RSS-102	RF Exposure	Compliant
FCC §15.203 IC RSS-Gen §7.1.2	Antenna Requirement	Compliant
FCC §15.207(a) IC RSS-Gen §7.2.4	AC Power Line Conducted Emissions	NA [1]
FCC §15.247(d) IC RSS-210 §A8.5	Spurious Emissions at Antenna Port	NA [1]
FCC §15.205 IC RSS-210 §2.2	Restricted Bands	Compliant
FCC §15.209, §15.247 IC RSS-210 §A8.5	Radiated Spurious Emissions	Compliant
FCC §15.247(a)(2) IC RSS-210 §A8.2	6 dB Emission Bandwidth	NA [1]
FCC §15.247(b)(3) IC RSS-210 §A8.4	Maximum Peak Output Power	Compliant[2]
FCC §15.247(d) IC RSS-210 §A8.5	100 kHz Bandwidth of Frequency Band Edge	Compliant[2]
FCC §15.247(e) IC RSS-210 §A8.2 (b)	Power Spectral Density	Compliant[2]
IC §RSS-210 §2.3 RSS-Gen §6	Receiver Spurious Emission	Compliant

Note: [1] Share with original application report results. (FCC ID: S9G-MPE5N33A)
[2] The 5 dBi antenna result share with original application report result. (FCC ID: S9G-MPE5N33A)

4 FCC §15.247(i), §2.1091 & IC RSS-102 - RF Exposure

4.1 Applicable Standard

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.

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

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 fields.

According to IC RSS-102 Issue 2 section 4.1, RF limits used for general public will be applied to the EUT.

Frequency Range (MHz)	Electric Field (V/m rms)	Magnetic Field (A/m rms)	Power Density (W/m^2)	Time Averaging (min)
0.003 - 1	280	2.19	-	6
1 - 10	280 / f	2.19 / f	-	6
10 - 30	28	2.19 / f	-	6
30 – 300	28	0.073	2*	6
300 – 1 500	$1.585\ f^{0.5}$	$0.0042\ f^{0.5}$	f / 150	6
1 500 – 15 000	61.4	0.163	10	6
15 000 – 150 000	61.4	0.163	10	$616000 / f^{1.2}$
150 000- 300 000	$0.158\ f^{0.5}$	$4.21 \times 10^{-4}\ f^{0.5}$	$6.67 \times 10^{-5}\ f$	$616000 / f^{1.2}$

Note: *f* is frequency in MHz
* Power density limit is applicable at frequencies greater than 100 MHz

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

Antenna gain 5 dBi

Maximum peak output power at antenna input terminal (dBm):	23.81
Maximum peak output power at antenna input terminal (mW):	240.44
Prediction distance (cm):	20
Prediction frequency (MHz):	5745
Maximum Antenna Gain, typical (dBi):	5
Maximum Antenna Gain (numeric):	3.16
Power density of prediction frequency at 20.0 cm (mW/cm^2):	0.15
Power density of prediction frequency at 20.0 cm (W/m^2):	1.5
MPE limit for uncontrolled exposure at prediction frequency (mW/cm^2):	1.0
MPE limit for uncontrolled exposure at prediction frequency (W/m^2):	10

Antenna gain 12 dBi

Maximum peak output power at antenna input terminal (dBm):	23.74
Maximum peak output power at antenna input terminal (mW):	236.59
Prediction distance (cm):	20
Prediction frequency (MHz):	5745
Maximum Antenna Gain, typical (dBi):	12
Maximum Antenna Gain (numeric):	15.85
Power density of prediction frequency at 20.0 cm (mW/cm^2):	0.75
Power density of prediction frequency at 20.0 cm (W/m^2):	7.5
MPE limit for uncontrolled exposure at prediction frequency (mW/cm^2):	1.0
MPE limit for uncontrolled exposure at prediction frequency (W/m^2):	10

Antenna gain 15 dBi

Maximum peak output power at antenna input terminal (dBm):	20.98
Maximum peak output power at antenna input terminal (mW):	125.31
Prediction distance (cm):	20
Prediction frequency (MHz):	5795
Maximum Antenna Gain, typical (dBi):	15
Maximum Antenna Gain (numeric):	31.62
Power density of prediction frequency at 20.0 cm (mW/cm^2):	0.78
Power density of prediction frequency at 20.0 cm (W/m^2):	7.8
MPE limit for uncontrolled exposure at prediction frequency (mW/cm^2):	1.0
MPE limit for uncontrolled exposure at prediction frequency (W/m^2):	10

The device is compliance with the FCC/IC MPE limit for the uncontrolled exposure environment at 20 cm distance.

5 FCC §15.203 & IC RSS-Gen §7.1.2 – Antenna Requirements

5.1 Applicable Standard

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.

As per IC RSS-Gen §7.1.2: Transmitter Antenna

A transmitter can only be sold or operated with antennas with which it was certified. A transmitter may be certified with multiple antenna types. An antenna type comprises antennas having similar in-band and out-of-band radiation patterns. Testing shall be performed using the highest-gain antenna of each combination of transmitter and antenna type for which certification is being sought, with the transmitter output power set at the maximum level. Any antenna of the same type and having equal or lesser gain as an antenna that had been successfully tested for certification with the transmitter, will also be considered certified with the transmitter, and may be used and marketed with the transmitter. The manufacturer shall include with the application for certification a list of acceptable antenna types to be used with the transmitter.
When a measurement at the antenna connector is used to determine RF output power, the effective gain of the device's antenna shall be stated, based on measurement or on data from the antenna manufacturer. Any antenna gain in excess of 6 dBi (6 dB above isotropic gain) shall be added to the measured RF output power before using the power limits specified in RSS-210 or RSS-310 for devices of RF output powers of 10 milliwatts or less. For devices of output powers greater than 10 milliwatts, except devices subject to RSS-210 Annex 8 (Frequency Hopping and Digital Modulation Systems Operating in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz Bands) or RSS-210 Annex 9 (Local Area Network Devices), the total antenna gain shall be added to the measured RF output power before using the specified power limits. For devices subject to RSS-210 Annex 8 or Annex 9, the antenna gain shall not be added.

5.2 Antenna List

Manufacturer	Model	Gain
Ruckus	ZoneFlex 7982 Omni	3
Ruckus	Corfu Omni	3
MARS	ME-WE2458-3H	5
Laird	AT-0536-HP	5
Larson Antenna	AT-0636-VP	5
Ruckus	TBolts3	8
Ruckus	TBolts2	15
MARS	AT-1212-DP	12

6 FCC §15.205, §15.209, §15.247(d) & IC RSS-210 §A8.5 – Spurious Radiated Emissions

6.1 Applicable Standard

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

As per FCC §15.209(a) and RSS-210: Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table

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

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

As Per FCC §15.205(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 §15.247 (d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c).

As per IC RSS-210 A8.5 Out-of-band Emissions, In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under Section A8.4 (4), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required.

6.2 Test Setup

The radiated emissions tests were performed in the 5-meter Chamber, using the setup in accordance with ANSI C63.4-2009. The specification used was the FCC 15 Subpart C and IC RSS-210 limits.

6.3 EUT Setup

The radiated emissions tests were performed using the setup accordance with the ANSI C63.4-2009. The specification used was the FCC 15C and IC RSS-210 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.

6.4 Test Procedure

For the radiated emissions test, the EUT host, and all support equipment power cords was 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 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 = 1MHz / Sweep = Auto
(2) Average: RBW = 1MHz / VBW = 10Hz / Sweep = Auto

6.5 Corrected Amplitude & 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 the indicated Amplitude (Ai) reading. The basic equation is as follows:

CA = Ai + AF + CL + Atten – Ga

For example, the Corrected Amplitude (CA) of 40.3 dBuV/m = indicated Amplitude reading (Ai) 32.5 dBuV + Antenna Factor (AF) 23.5dB + Cable Loss (CL) 3.7 dB + Attenuator (Atten) 10 dB - Amplifier Gain (Ga) 29.4 dB

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

Margin = Corrected Amplitude - Limit

6.6 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
Rohde & Schwarz	EMI Test Receiver	ESCI 1166.5950K03	100337	2011-03-21	1 year
Agilent	Spectrum Analyzer	E4440A	MY44303352	2011-05-10	1 year
Sunol Science Corp	System Controller	SC99V	122303-1	N/R	-
Sunol Science Corp	Combination Antenna	JB3	A0020106-3	2011-06-29	1 year
EMCO	Horn antenna	3115	9511-4627	2011-10-03	1 year
ARA	Horn antenna	DRG-118	1132	2010-11-29[Note 1]	1 year
Hewlett Packard	Pre amplifier	8447D	2944A06639	2011-06-09	1 year
Mini-Circuits	Pre Amplifier	ZVA-183-S	570400946	2011-05-09	1 year

Note[1]: radiated emission above 1GHz was done on 2011-10-28 to 2011-11-01.

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

6.7 Test Environmental Conditions

Temperature:	18~23 °C
Relative Humidity:	36~45 %
ATM Pressure:	101-102 kPa

The testing was performed by Quinn Jiang on 2011-10-28 to 2011-11-01 and 2011-28-2011 to 11-29-2011 in 5 meter chamber 3.

6.8 Summary of Test Results

According to the data hereinafter, the EUT complied with the FCC Part 15, Subpart C, section 15.205, 15.209 and 15.247 & IC RSS-210, RSS-Gen standard's radiated emissions limits, and had the worst margin of:

Mode: Transmitting			
Margin (dB)	**Frequency (MHz)**	**Polarization (Horizontal/Vertical)**	**Range**
-0.069	5460	Vertical	30 MHz – 40 GHz

Please refer to the following table and plots for specific test result details

6.9 Radiated Emissions Test Result Data

Radiated Emission at 3 meters:

Antenna gain 15 dBi – Tbolt2

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/IC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Low Channel 5475 MHz, measured at 3 meters											
5745	86.64	185	100	V	33.674	4.62	0	124.934	-	-	Peak
5745	83.45	183	100	H	33.699	4.62	0	121.769	-	-	Peak
5745	72.31	185	100	V	33.674	4.62	0	110.604	-	-	Ave
5745	70.75	183	100	H	33.699	4.62	0	109.069	-	-	Ave
11490	36.95	230	100	V	38.69	6.2	27.54	54.3	74	-19.7	Peak
11490	32.26	0	100	H	38.691	6.2	27.54	49.611	74	-24.389	Peak
11490	19.14	230	100	V	38.69	6.2	27.54	36.49	54	-17.51	Ave
11490	17.39	0	100	H	38.691	6.2	27.54	34.741	54	-19.259	Ave
17235	37.75	319	100	V	43.048	8.31	25.18	63.928	104.934	-41.006	Peak
17235	31.28	0	100	H	43.05	8.31	25.18	57.46	101.769	-44.309	Peak
17235	19.26	319	100	V	43.048	8.31	25.18	45.438	90.604	-45.166	Ave
17235	17.55	0	100	H	43.05	8.31	25.18	43.73	89.069	-45.339	Ave
22980	32.4	0	100	V	35.4	12.25	34.81	45.24	104.934	-59.694	Peak
22980	32.25	0	100	H	35.4	12.25	34.81	45.09	101.769	-56.679	Peak
22980	18.02	0	100	V	35.4	12.25	34.81	30.86	90.604	-59.744	Ave
22980	17.82	0	100	H	35.4	12.25	34.81	30.66	89.069	-58.409	Ave
5460	31.51	185	100	V	33.915	4.57	0	69.995	74	-4.005	Peak
5460	30.39	183	100	H	33.081	4.57	0	68.041	74	-5.959	Peak
5460	16.28	185	100	V	33.081	4.57	0	53.931	54	-0.069	Ave
5460	16.19	183	100	H	33.081	4.57	0	53.841	54	-0.159	Ave
250	40.26	255	100	V	12.3	11.32	25.2	38.68	46	-7.32	QP

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Middle Channel 5785 MHz, measured at 3 meters											
5785	87.46	184	100	V	33.525	4.72	0	125.705	-	-	Peak
5785	84.14	184	100	H	33.625	4.72	0	122.485	-	-	Peak
5785	72.99	184	100	V	33.525	4.72	0	111.235	-	-	Ave
5785	72.08	184	100	H	33.625	4.72	0	110.425	-	-	Ave
11570	34.34	231	100	V	38.834	6.23	27.38	52.024	74	-21.976	Peak
11570	35.48	280	100	H	38.834	6.23	27.38	53.164	74	-20.836	Peak
11570	22.62	231	100	V	38.834	6.23	27.38	40.304	54	-13.696	Ave
11570	19.63	280	100	H	38.834	6.23	27.38	37.314	54	-16.686	Ave
17355	37.25	300	100	V	43.976	8.31	25.08	64.456	105.705	-41.249	Peak
17355	33.81	0	100	H	44.018	8.31	25.08	61.058	102.485	-41.427	Peak
17355	20.765	300	100	V	43.976	8.31	25.08	47.971	91.235	-43.264	Ave
17355	18.22	0	100	H	44.018	8.31	25.08	45.468	90.425	-44.957	Ave
23140	32.644	0	100	V	35.2	12.25	34.74	45.354	105.705	-60.351	Peak
23140	32.547	0	100	H	35.2	12.25	34.74	45.257	102.485	-57.228	Peak
23140	18.289	0	100	V	35.2	12.25	34.74	30.999	91.235	-60.236	Ave
23140	18.3	0	100	H	35.2	12.25	34.74	31.01	90.425	-59.415	Ave
250	42.61	262	100	V	12.3	11.32	25.2	41.03	46	-4.97	QP

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
High Channel 5825 MHz, measured at 3 meters											
5825	87.16	183	100	V	33.525	4.72	0	125.405	-	-	Peak
5825	82.71	185	100	H	33.625	4.72	0	121.055	-	-	Peak
5825	72.7	183	100	V	33.525	4.72	0	110.945	-	-	Ave
5825	70.1	185	100	H	33.625	4.72	0	108.445	-	-	Ave
11150	37.65	0	100	V	38.69	6.2	27.14	55.4	74	-18.6	Peak
11150	32.84	0	100	H	38.691	6.2	27.14	50.591	74	-23.409	Peak
11150	19.11	0	100	V	38.69	6.2	27.14	36.86	54	-17.14	Ave
11150	17.15	0	100	H	38.691	6.2	27.14	34.901	54	-19.099	Ave
17475	36.7	284	100	V	46.493	8.49	25.02	66.663	105.405	-38.742	Peak
17475	34.8	296	100	H	47.561	8.49	25.02	65.831	101.055	-35.224	Peak
17475	19.82	284	100	V	46.493	8.49	25.02	49.783	90.945	-41.162	Ave
17475	18.87	296	100	H	47.561	8.49	25.02	49.901	88.445	-38.544	Ave
23300	32.13	0	100	V	35.3	12.25	34.71	44.97	105.405	-60.435	Peak
23300	32.94	0	100	H	35.3	12.25	34.71	45.78	101.055	-55.275	Peak
23300	17.95	0	100	V	35.3	12.25	34.71	30.79	90.945	-60.155	Ave
23300	17.96	0	100	H	35.3	12.25	34.71	30.8	88.445	-57.645	Ave
7250	29.49	184	100	V	33.525	4.93	27.48	40.465	74	-33.535	Peak
7250	29.47	183	100	H	33.625	4.93	27.48	40.545	74	-33.455	Peak
7250	15.14	184	100	V	33.525	4.93	27.48	26.115	54	-27.885	Ave
7250	15.13	183	100	H	33.625	4.93	27.48	26.205	54	-27.795	Ave
250	38.93	260	100	V	12.3	11.32	25.2	37.35	46	-8.65	QP

802.11 n 40 Mode:

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Low Channel 5755 MHz, measured at 3 meters											
5755	84.24	184	100	V	33.674	4.62	0	122.534	-	-	Peak
5755	81.94	185	100	H	33.699	4.62	0	120.259	-	-	Peak
5755	69.95	184	100	V	33.674	4.62	0	108.244	-	-	Ave
5755	68.3	185	100	H	33.699	4.62	0	106.619	-	-	Ave
11510	36.56	227	100	V	38.69	6.2	27.54	53.91	74	-20.09	Peak
11510	32.32	0	100	H	38.691	6.2	27.54	49.671	74	-24.329	Peak
11510	19.76	277	100	V	38.69	6.2	27.54	37.11	54	-16.89	Ave
11510	17.86	0	100	H	38.691	6.2	27.54	35.211	54	-18.789	Ave
17265	31.65	0	100	V	43.048	8.31	25.22	24.88	102.534	-77.654	Peak
17265	32.71	0	100	H	43.05	8.31	25.22	24.88	100.259	-75.379	Peak
17265	18.01	0	100	V	43.048	8.31	25.22	24.88	88.244	-63.364	Ave
17265	17.58	0	100	H	43.05	8.31	25.22	24.88	86.619	-61.739	Ave
23020	32.15	0	100	V	35.4	12.25	34.81	44.99	102.534	-57.544	Peak
23020	32.06	0	100	H	35.4	12.25	34.81	44.9	100.259	-55.359	Peak
23020	18.14	0	100	V	35.4	12.25	34.81	30.98	88.244	-57.264	Ave
23020	18.04	0	100	H	35.4	12.25	34.81	30.88	86.619	-55.739	Ave
5460	33.41	185	100	V	33.915	4.57	0	71.895	74	-2.105	Peak
5460	32.46	183	100	H	33.081	4.57	0	70.111	74	-3.889	Peak
5460	16.232	185	100	V	33.081	4.57	0	53.883	54	-0.117	Ave
5460	16.221	183	100	H	33.081	4.57	0	53.872	54	-0.128	Ave
250	41.82	247	100	V	12.3	11.32	25.2	40.24	46	-5.76	QP

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
High Channel 5795 MHz, measured at 3 meters											
5795	84.34	184	100	V	33.525	4.72	0	122.585	-	-	Peak
5795	80.95	184	100	H	33.625	4.72	0	119.295	-	-	Peak
5795	69.42	184	100	V	33.525	4.72	0	107.665	-	-	Ave
5795	67.38	184	100	H	33.625	4.72	0	105.725	-	-	Ave
11590	37.39	231	100	V	38.69	6.2	27.38	54.9	74	-19.10	Peak
11590	32.87	0	100	H	38.834	6.2	27.38	50.524	74	-23.476	Peak
11590	20.97	231	100	V	38.69	6.2	27.38	38.48	54	-15.52	Ave
11590	17.44	0	100	H	38.834	6.2	27.38	35.094	54	-18.906	Ave
17385	34.08	0	100	V	45.058	8.31	25.09	62.358	102.585	-40.227	Peak
17385	31.31	0	100	H	45.163	8.31	25.09	59.693	99.295	-39.602	Peak
17385	17.16	0	100	V	45.058	8.31	25.09	45.438	87.665	-42.227	Ave
17385	16.98	0	100	H	45.163	8.31	25.09	45.363	85.725	-40.362	Ave
23180	32.47	0	100	V	35.2	12.25	34.74	45.18	102.585	-57.405	Peak
23180	33.06	0	100	H	35.2	12.25	34.74	45.77	99.295	-53.525	Peak
23180	18.22	0	100	V	35.2	12.25	34.74	30.93	87.665	-56.735	Ave
23180	18.2	0	100	H	35.2	12.25	34.74	30.91	85.725	-54.815	Ave
7250	29.21	184	100	V	33.525	4.93	27.48	40.185	74	-33.815	Peak
7250	28.83	184	100	H	33.625	4.93	27.48	39.905	74	-34.095	Peak
7250	15.11	184	100	V	33.525	4.93	27.48	26.085	54	-27.915	Ave
7250	15.12	183	100	H	33.625	4.93	27.48	26.195	54	-27.805	Ave
250	40.86	228	100	V	12.3	11.32	25.2	39.28	46	-6.72	QP

Antenna gain 5 dBi – AP-0505-MP

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/IC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Low Channel 5475 MHz, measured at 3 meters											
5745	78.85	323	100	V	33.674	4.62	0	117.144	-	-	Peak
5745	77.22	346	100	H	33.699	4.62	0	115.539	-	-	Peak
5745	66.6	323	100	V	33.674	4.62	0	104.894	-	-	Ave
5745	63.86	346	100	H	33.699	4.62	0	102.179	-	-	Ave
11490	36.05	350	100	V	38.69	6.2	27.54	53.4	74	-20.6	Peak
11490	33.8	0	100	H	38.691	6.2	27.54	51.151	74	-22.849	Peak
11490	19.41	350	100	V	38.69	6.2	27.54	36.76	54	-17.24	Ave
11490	17.8	0	100	H	38.691	6.2	27.54	35.151	54	-18.849	Ave
17235	40.3	281	100	V	43.048	8.31	25.18	66.478	97.144	-30.666	Peak
17235	36.82	0	100	H	43.05	8.31	25.18	63	95.539	-32.539	Peak
17235	20.94	281	100	V	43.048	8.31	25.18	47.118	84.894	-37.776	Ave
17235	17.32	0	100	H	43.05	8.31	25.18	43.5	82.179	-38.679	Ave
22980	32.51	0	100	V	35.4	12.25	34.81	45.35	97.144	-51.794	Peak
22980	32.76	0	100	H	35.4	12.25	34.81	45.6	95.539	-49.939	Peak
22980	18.02	0	100	V	35.4	12.25	34.81	30.86	84.894	-54.034	Ave
22980	17.99	0	100	H	35.4	12.25	34.81	30.83	82.179	-51.349	Ave
5460	27.45	323	100	V	33.915	4.57	0	65.935	74	-8.065	Peak
5460	27.96	346	100	H	33.081	4.57	0	65.611	74	-8.389	Peak
5460	13.68	323	100	V	33.081	4.57	0	51.331	54	-2.669	Ave
5460	13.97	346	100	H	33.081	4.57	0	51.621	54	-2.379	Ave
250	40.55	269	100	V	12.3	11.32	25.2	38.97	46	-7.03	QP

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Middle Channel 5785 MHz, measured at 3 meters											
5785	78.84	306	100	V	33.525	4.72	0	117.085	-	-	Peak
5785	76.73	329	100	H	33.625	4.72	0	115.075	-	-	Peak
5785	66.38	306	100	V	33.525	4.72	0	104.625	-	-	Ave
5785	64.29	329	100	H	33.625	4.72	0	102.635	-	-	Ave
11570	42.07	347	100	V	38.834	6.23	27.38	59.754	74	-14.246	Peak
11570	36.49	317	100	H	38.834	6.23	27.38	54.174	74	-19.826	Peak
11570	24.53	347	100	V	38.834	6.23	27.38	42.214	54	-11.786	Ave
11570	21.41	317	100	H	38.834	6.23	27.38	39.094	54	-14.906	Ave
17355	42.07	284	100	V	43.976	8.31	25.08	69.276	97.085	-27.809	Peak
17355	35.05	295	100	H	44.018	8.31	25.08	62.298	95.075	-32.777	Peak
17355	25.11	284	100	V	43.976	8.31	25.08	52.316	84.625	-32.309	Ave
17355	19.11	295	100	H	44.018	8.31	25.08	46.358	82.635	-36.277	Ave
23140	32.56	0	100	V	35.2	12.25	34.74	45.27	97.085	-51.815	Peak
23140	32.6	0	100	H	35.2	12.25	34.74	45.31	95.075	-49.765	Peak
23140	18.26	0	100	V	35.2	12.25	34.74	30.97	84.625	-53.655	Ave
23140	18.27	0	100	H	35.2	12.25	34.74	30.98	82.635	-51.655	Ave
250	40.32	259	100	V	12.3	11.32	25.2	38.74	46	-7.26	QP

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
High Channel 5825 MHz, measured at 3 meters											
5825	78.67	287	100	V	33.525	4.72	0	116.915	-	-	Peak
5825	76.93	328	100	H	33.625	4.72	0	115.275	-	-	Peak
5825	65.8	287	100	V	33.525	4.72	0	104.045	-	-	Ave
5825	63.74	328	100	H	33.625	4.72	0	102.085	-	-	Ave
11650	39.48	328	100	V	38.69	6.2	27.14	57.23	74	-16.77	Peak
11650	34.7	294	100	H	38.691	6.2	27.14	52.451	74	-21.549	Peak
11650	22.73	328	100	V	38.69	6.2	27.14	40.48	54	-13.52	Ave
11650	19.39	294	100	H	38.691	6.2	27.14	37.141	54	-16.859	Ave
17475	39.01	307	100	V	46.493	8.49	25.02	68.973	74	-5.027	Peak
17475	32.76	0	100	H	47.561	8.49	25.02	63.791	74	-10.209	Peak
17475	21.07	307	100	V	46.493	8.49	25.02	51.033	54	-2.967	Ave
17475	17.11	0	100	H	47.561	8.49	25.02	48.141	54	-5.859	Ave
23300	32.01	0	100	V	35.3	12.25	34.71	44.85	96.915	-52.065	Peak
23300	32.22	0	100	H	35.3	12.25	34.71	45.06	95.275	-50.215	Peak
23300	17.95	0	100	V	35.3	12.25	34.71	30.79	84.045	-53.255	Ave
23300	17.95	0	100	H	35.3	12.25	34.71	30.79	82.085	-51.295	Ave
7250	29.94	0	100	V	33.525	4.93	27.48	40.915	74	-33.085	Peak
7250	28.6	0	100	H	33.625	4.93	27.48	39.675	74	-34.325	Peak
7250	15.13	0	100	V	33.525	4.93	27.48	26.105	54	-27.895	Ave
7250	15.12	0	100	H	33.625	4.93	27.48	26.195	54	-27.805	Ave
250	41.27	258	100	V	12.3	11.32	25.2	39.69	46	-6.31	QP

802.11 n 40 Mode:

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Low Channel 5755 MHz, measured at 3 meters											
5755	78.3	324	100	V	33.674	4.62	0	116.594	-	-	Peak
5755	75.87	339	100	H	33.699	4.62	0	114.189	-	-	Peak
5755	64.56	324	100	V	33.674	4.62	0	102.854	-	-	Ave
5755	62.11	339	100	H	33.699	4.62	0	100.429	-	-	Ave
11510	35.84	329	100	V	38.69	6.2	27.54	53.19	74	-20.81	Peak
11510	33.11	0	100	H	38.691	6.2	27.54	50.461	74	-23.539	Peak
11510	19.98	329	100	V	38.69	6.2	27.54	37.33	54	-16.67	Ave
11510	17.62	0	100	H	38.691	6.2	27.54	34.971	54	-19.029	Ave
17265	38.04	288	100	V	43.048	8.31	25.22	24.88	96.594	-71.714	Peak
17265	32.02	0	100	H	43.05	8.31	25.22	24.88	94.189	-69.309	Peak
17265	21.56	288	100	V	43.048	8.31	25.22	24.88	82.854	-57.974	Ave
17265	17.55	0	100	H	43.05	8.31	25.22	24.88	80.429	-55.549	Ave
23020	32.67	0	100	V	35.4	12.25	34.81	45.51	96.594	-51.084	Peak
23020	32.94	0	100	H	35.4	12.25	34.81	45.78	94.189	-48.409	Peak
23020	18.11	0	100	V	35.4	12.25	34.81	30.95	82.854	-51.904	Ave
23020	18.12	0	100	H	35.4	12.25	34.81	30.96	80.429	-49.469	Ave
5460	27.78	0	100	V	33.915	4.57	0	66.265	74	-7.735	Peak
5460	27.39	0	100	H	33.081	4.57	0	65.041	74	-8.959	Peak
5460	14.11	0	100	V	33.081	4.57	0	51.761	54	-2.239	Ave
5460	12.88	0	100	H	33.081	4.57	0	50.531	54	-3.469	Ave
250	40.83	254	100	V	12.3	11.32	25.2	39.25	46	-6.75	QP

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
High Channel 5795 MHz, measured at 3 meters											
5795	76.44	310	100	V	33.525	4.72	0	114.685	-	-	Peak
5795	74.59	320	100	H	33.625	4.72	0	112.935	-	-	Peak
5795	62.42	310	100	V	33.525	4.72	0	100.665	-	-	Ave
5795	59.59	320	100	H	33.625	4.72	0	97.935	-	-	Ave
11590	37.56	305	100	V	38.69	6.2	27.38	55.07	74	-18.93	Peak
11590	34.67	235	100	H	38.834	6.2	27.38	52.324	74	-21.676	Peak
11590	23.089	305	100	V	38.69	6.2	27.38	40.599	54	-13.401	Ave
11590	19.12	235	100	H	38.834	6.2	27.38	36.774	54	-17.226	Ave
17385	37.62	299	100	V	45.058	8.31	25.09	65.898	94.685	-28.787	Peak
17385	32.78	0	100	H	45.163	8.31	25.09	61.163	92.935	-31.772	Peak
17385	21.33	299	100	V	45.058	8.31	25.09	49.608	80.665	-31.057	Ave
17385	17.846	0	100	H	45.163	8.31	25.09	46.229	77.935	-31.706	Ave
23180	32.64	0	100	V	35.3	12.25	34.71	45.48	94.685	-49.205	Peak
23180	32.89	0	100	H	35.3	12.25	34.71	45.73	92.935	-47.205	Peak
23180	18.2	0	100	V	35.3	12.25	34.71	31.04	80.665	-49.625	Ave
23180	18.2	0	100	H	35.3	12.25	34.71	31.04	77.935	-46.895	Ave
7250	29.85	0	100	V	33.525	4.93	27.48	40.825	74	-33.175	Peak
7250	29.63	0	100	H	33.625	4.93	27.48	40.705	74	-33.295	Peak
7250	14.63	0	100	V	33.525	4.93	27.48	25.605	54	-28.395	Ave
7250	14.63	0	100	H	33.625	4.93	27.48	25.705	54	-28.295	Ave
250	41.08	261	100	V	12.3	11.32	25.2	39.5	46	-6.5	QP

Antenna gain 5 dBi – AT-0636-VP

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/IC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Low Channel 5475 MHz, measured at 3 meters											
5745	63.15	229	100	V	33.708	4.62	0	101.478	-	-	Peak
5745	79.46	253	100	H	33.708	4.62	0	117.788	-	-	Peak
5745	50.87	229	100	V	33.708	4.62	0	89.198	-	-	Ave
5745	67.38	253	100	H	33.708	4.62	0	105.708	-	-	Ave
11490	34.01	352	100	V	40.472	6.2	26.94	53.742	74	-20.258	Peak
11490	40.44	303	126	H	40.472	6.2	26.94	60.172	74	-13.828	Peak
11490	19.46	352	100	V	40.472	6.2	26.94	39.192	54	-14.808	Ave
11490	23.83	303	126	H	40.472	6.2	26.94	43.562	54	-10.438	Ave
17235	36.91	297	115	V	45.403	8.31	25.94	64.683	101.478	-36.795	Peak
17235	33.76	43	100	H	45.403	8.31	25.94	61.533	117.788	-56.255	Peak
17235	20.52	297	115	V	45.403	8.31	25.94	48.293	89.198	-40.905	Ave
17235	18.37	43	100	H	45.403	8.31	25.94	46.143	105.708	-59.565	Ave
22980	32.38	0	100	V	35.4	12.25	34.81	45.22	74	-28.78	Peak
22980	32.38	0	100	H	35.4	12.25	34.81	45.22	74	-28.78	Peak
22980	17.43	0	100	V	35.4	12.25	34.81	30.27	54	-23.73	Ave
22980	17.43	0	100	H	35.4	12.25	34.81	30.27	54	-23.73	Ave
5460	28.71	0	100	V	33.951	4.76	0	67.421	74	-6.579	Peak
5460	27.58	0	100	H	33.951	4.76	0	66.291	74	-7.709	Peak
5460	14.77	0	100	V	33.951	4.76	0	53.481	54	-0.519	Ave
5460	13.37	0	100	H	33.951	4.76	0	52.081	54	-1.919	Ave
250	42.18	219	100	V	12.3	11.32	25.2	40.6	46	-5.4	QP

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Middle Channel 5785 MHz, measured at 3 meters											
5785	87.65	0	100	V	34.005	4.82	0	126.475	-	-	Peak
5785	69.13	211	100	H	34.005	4.82	0	107.955	-	-	Peak
5785	74.41	0	100	V	34.005	4.82	0	113.235	-	-	Ave
5785	56.47	211	100	H	34.005	4.82	0	95.295	-	-	Ave
11570	35.97	307	117	V	40.295	6.2	26.96	55.505	74	-18.495	Peak
11570	36.51	210	100	H	40.295	6.2	26.96	56.045	74	-17.955	Peak
11570	21.25	307	117	V	40.295	6.2	26.96	40.785	54	-13.215	Ave
11570	21.26	210	100	H	40.295	6.2	26.96	40.795	54	-13.205	Ave
17355	36.9	293	107	V	46.192	8.49	25.86	65.722	126.475	-60.753	Peak
17355	36.27	277	100	H	46.192	8.49	25.86	65.092	107.955	-42.863	Peak
17355	20.87	293	107	V	46.192	8.49	25.86	49.692	113.235	-63.543	Ave
17355	19.8	277	100	H	46.192	8.49	25.86	48.622	95.295	-46.673	Ave
23140	32.03	0	100	V	35.2	12.25	34.74	44.74	126.475	-81.735	Peak
23140	32.03	0	100	H	35.2	12.25	34.74	44.74	107.955	-63.215	Peak
23140	17.73	0	100	V	35.2	12.25	34.74	30.44	113.235	-82.795	Ave
23140	17.73	0	100	H	35.2	12.25	34.74	30.44	95.295	-64.855	Ave
250	42.08	225	100	V	12.3	11.32	25.2	40.5	46	-5.5	QP

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
High Channel 5825 MHz, measured at 3 meters											
5825	85.16	11	100	V	34.005	4.85	0	124.015	-	-	Peak
5825	66.6	207	100	H	34.005	4.85	0	105.455	-	-	Peak
5825	71.95	11	100	V	34.005	4.85	0	110.805	-	-	Ave
5825	54.81	207	100	H	34.005	4.85	0	93.665	-	-	Ave
11150	38.34	298	121	V	40.312	6.23	26.94	57.942	74	-16.058	Peak
11150	34.41	228	99	H	40.312	6.23	26.94	54.012	74	-19.988	Peak
11150	22.94	298	121	V	40.312	6.23	26.94	42.542	54	-11.458	Ave
11150	20.08	228	99	H	40.312	6.23	26.94	39.682	54	-14.318	Ave
17475	36.26	303	111	V	46.445	8.49	25.79	65.405	124.015	-58.61	Peak
17475	33.08	277	99	H	46.445	8.49	25.79	62.225	105.455	-43.23	Peak
17475	19.16	303	111	V	46.445	8.49	25.79	48.305	110.805	-62.5	Ave
17475	17.72	277	99	H	46.445	8.49	25.79	46.865	93.665	-46.8	Ave
23300	32.58	0	100	V	35.3	12.25	34.71	45.42	124.015	-78.595	Peak
23300	32.58	0	100	H	35.3	12.25	34.71	45.42	105.455	-60.035	Peak
23300	17.85	0	100	V	35.3	12.25	34.71	30.69	110.805	-80.115	Ave
23300	17.85	0	100	H	35.3	12.25	34.71	30.69	93.665	-62.975	Ave
7250	35.87	0	100	V	38.647	5.49	27.58	52.427	74	-21.573	Peak
7250	33.16	0	100	H	38.647	5.49	27.58	49.717	74	-24.283	Peak
7250	18.26	0	100	V	38.647	5.49	27.58	34.817	54	-19.183	Ave
7250	17.33	0	100	H	38.647	5.49	27.58	33.887	54	-20.113	Ave
250	41.67	198	100	V	12.3	11.32	25.2	40.09	46	-5.91	QP

802.11 n 40 Mode:

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Low Channel 5755 MHz, measured at 3 meters											
5755	83.45	0	100	V	33.784	4.82	0	122.054	-	-	Peak
5755	65.89	0	100	H	33.784	4.82	0	104.494	-	-	Peak
5755	69.4	0	100	V	33.784	4.82	0	108.004	-	-	Ave
5755	53.21	0	100	H	33.784	4.82	0	91.814	-	-	Ave
11510	33.66	282	99	V	40.472	6.2	26.69	53.642	74	-20.358	Peak
11510	35.42	228	100	H	40.472	6.2	26.69	55.402	74	-18.598	Peak
11510	18.97	282	99	V	40.472	6.2	26.69	38.952	54	-15.048	Ave
11510	19.82	228	100	H	40.472	6.2	26.69	39.802	54	-14.198	Ave
17265	36.4	300	112	V	45.403	8.31	25.94	64.173	122.054	-57.881	Peak
17265	34.09	281	100	H	45.403	8.31	25.94	61.863	104.494	-42.631	Peak
17265	21.1	300	112	V	45.403	8.31	25.94	48.873	108.004	-59.131	Ave
17265	19.31	281	100	H	45.403	8.31	25.94	47.083	91.814	-44.731	Ave
23020	31.81	0	100	V	35.4	12.25	34.81	44.65	74	-29.35	Peak
23020	31.81	0	100	H	35.4	12.25	34.81	44.65	74	-29.35	Peak
23020	17.32	0	100	V	35.4	12.25	34.81	30.16	54	-23.84	Ave
23020	17.32	0	100	H	35.4	12.25	34.81	30.16	54	-23.84	Ave
5460	28.45	0	100	V	33.951	4.76	0	67.161	74	-6.839	Peak
5460	27.87	0	100	H	33.951	4.76	0	66.581	74	-7.419	Peak
5460	14.05	0	100	V	33.951	4.76	0	52.761	54	-1.239	Ave
5460	13.45	0	100	H	33.951	4.76	0	52.161	54	-1.839	Ave
250	42.07	219	100	V	12.3	11.32	25.2	40.49	46	-5.51	QP

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
High Channel 5795 MHz, measured at 3 meters											
5795	82.1	0	100	V	34.005	4.82		120.925	-	-	Peak
5795	66.1	205	100	H	34.005	4.82		104.925	-	-	Peak
5795	68.31	0	100	V	34.005	4.82		107.135	-	-	Ave
5795	53.18	205	100	H	34.005	4.82		92.005	-	-	Ave
11590	33.2	283	100	V	40.136	6.23	27	52.566	74	-21.434	Peak
11590	35.14	230	119	H	40.136	6.23	27	54.506	74	-19.494	Peak
11590	18.35	283	100	V	40.136	6.23	27	37.716	54	-16.284	Ave
11590	19.04	230	119	H	40.136	6.23	27	38.406	54	-15.594	Ave
17385	33.96	293	110	V	46.392	8.49	25.86	62.982	120.925	-57.943	Peak
17385	32.68	272	99	H	46.392	8.49	25.86	61.702	104.925	-43.223	Peak
17385	19.58	293	110	V	46.392	8.49	25.86	48.602	107.135	-58.533	Ave
17385	18.27	272	99	H	46.392	8.49	25.86	47.292	92.005	-44.713	Ave
23180	32.49	0	100	V	35.2	12.25	34.74	45.2	120.925	-75.725	Peak
23180	32.49	0	100	H	35.2	12.25	34.74	45.2	104.925	-59.725	Peak
23180	17.84	0	100	V	35.2	12.25	34.74	30.55	107.135	-76.585	Ave
23180	17.84	0	100	H	35.2	12.25	34.74	30.55	92.005	-61.455	Ave
7250	36.91	0	100	V	38.647	5.49	27.58	53.467	74	-20.533	Peak
7250	35.82	0	100	H	38.647	5.49	27.58	52.377	74	-21.623	Peak
7250	19.63	0	100	V	38.647	5.49	27.58	36.187	54	-17.813	Ave
7250	18.24	0	100	H	38.647	5.49	27.58	34.797	54	-19.203	Ave
250	41.29	222	100	V	12.3	11.32	25.2	39.71	46	-6.29	QP

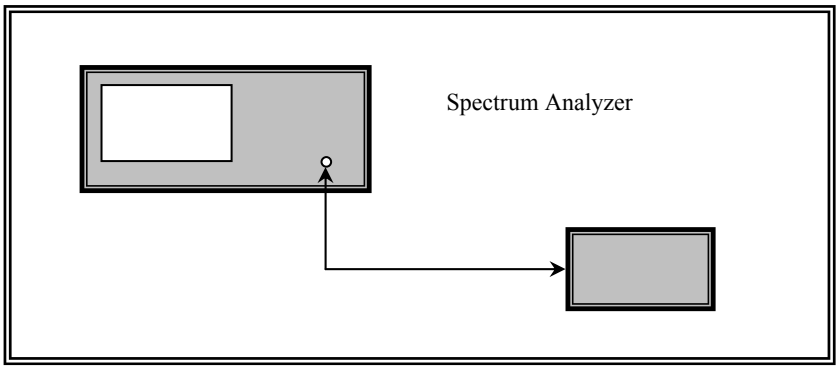
7 FCC §15.247(b) & IC RSS-210 §A8.4 - Peak Output Power Measurement

7.1 Applicable Standard

According to FCC §15.247(b) (3) and IC RSS-210 § A8.4 (4) for systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt.

7.2 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 spectrum analyzer.
3. Add a correction factor to the display.



7.3 Test Equipment List and Details

Manufacturers	Description	Models	Serial Numbers	Calibration Dates	Calibration Interval
Agilent	Spectrum Analyzer	E4446A	US44300386	2011-08-11	1 year

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

7.4 Test Environmental Conditions

Temperature:	23 °C
Relative Humidity:	42 %
ATM Pressure:	101.5 kPa

The testing was performed by Ning Ma on 2012-06-22 in RF site.

Temperature:	24 °C
Relative Humidity:	41.8 %
ATM Pressure:	101.1 kPa

The testing was performed by Ning Ma on 2012-10-04 in RF site

7.5 Test Results

Antenna gain 12 dBi

802.11a mode

Channel	Frequency (MHz)	TX Chain J10 Power (dBm)	TX Chain J8 Power (dBm)	TX Chain J6 Power (dBm)	Max Power (dBm)	Limit (dBm)	Margin (dB)	Power Setting
Low	5745	17.4	16.82	17.67	17.67	24	-6.33	19
Middle	5785	18.38	18.1	19.04	19.04	24	-4.96	21
High	5825	17.41	17.11	18.14	18.14	24	-5.86	20

802.11 n20 mode

Channel	Frequency (MHz)	TX Chain J10 Power (dBm)	TX Chain J8 Power (dBm)	TX Chain J6 Power (dBm)	Total Power (dBm)	Limit (dBm)	Margin (dB)	Power Setting
Low	5745	19.11	18.28	19.44	23.74	24	-0.26	21
Middle	5785	18.61	18.38	19.13	23.49	24	-0.51	21
High	5825	17.96	17.98	17.73	22.66	24	-1.34	21

802.11n40 mode

Channel	Frequency (MHz)	TX Chain J10 Power (dBm)	TX Chain J8 Power (dBm)	TX Chain J6 Power (dBm)	Total Power (dBm)	Limit (dBm)	Margin (dB)	Power Setting
Low	5755	18.56	18.22	18.98	23.37	24	-0.63	21
High	5795	18.03	17.44	18.71	22.86	24	-1.14	21

Antenna gain 15 dBi

802.11a mode

Channel	Frequency (MHz)	TX Chain J10 Power (dBm)	TX Chain J8 Power (dBm)	TX Chain J6 Power (dBm)	Max Power (dBm)	Limit (dBm)	Margin (dB)	Power Setting
Low	5745	17.82	16.65	17.6	17.82	21	-3.4	21
Middle	5785	17.47	16.1	17.34	17.47	21	-3.66	21
High	5825	18	16.85	16.81	18	21	-4.19	21

802.11 n20 mode

Channel	Frequency (MHz)	TX Chain J10 Power (dBm)	TX Chain J8 Power (dBm)	TX Chain J6 Power (dBm)	Max Power (dBm)	Limit (dBm)	Margin (dB)	Power Setting
Low	5745	16.08	14.18	15.71	20.17	21	-0.83	18
Middle	5785	16.17	14.63	16.05	20.44	21	-0.56	19
High	5825	15.72	14.73	15.46	20.09	21	-0.91	19

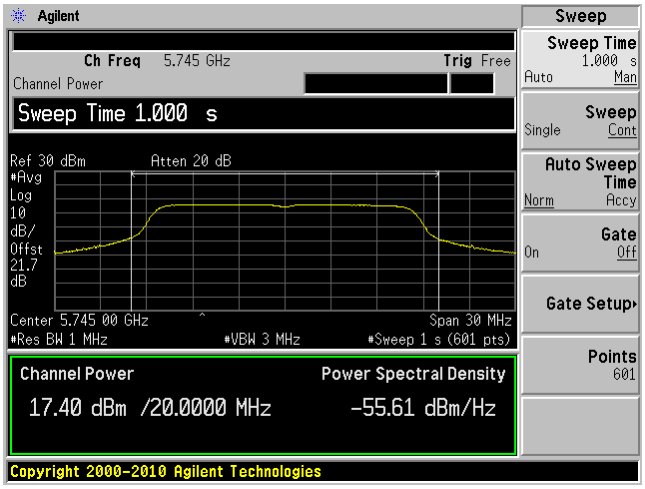
802.11n40 mode

Channel	Frequency (MHz)	TX Chain J10 Power (dBm)	TX Chain J8 Power (dBm)	TX Chain J6 Power (dBm)	Total Power (dBm)	Limit (dBm)	Margin (dB)	Power Setting
Low	5755	16.52	14.76	16.2	20.67	21	-0.33	19
High	5795	16.65	15.47	16.4	20.98	21	-0.02	20

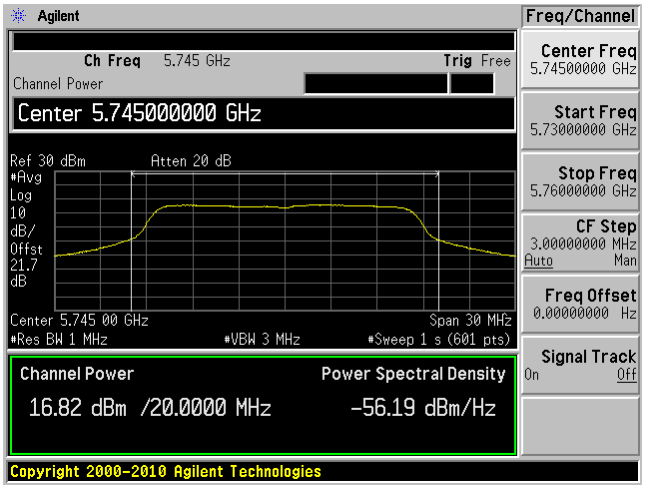
Antenna gain is 12 dBi

802.11 a mode

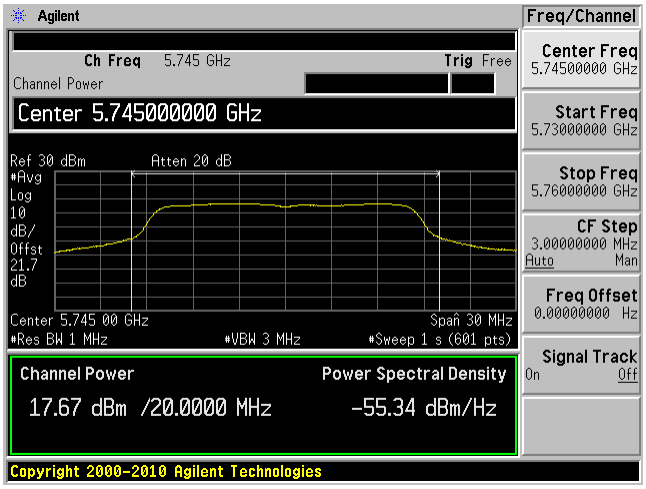
5745 MHz, Chain J10



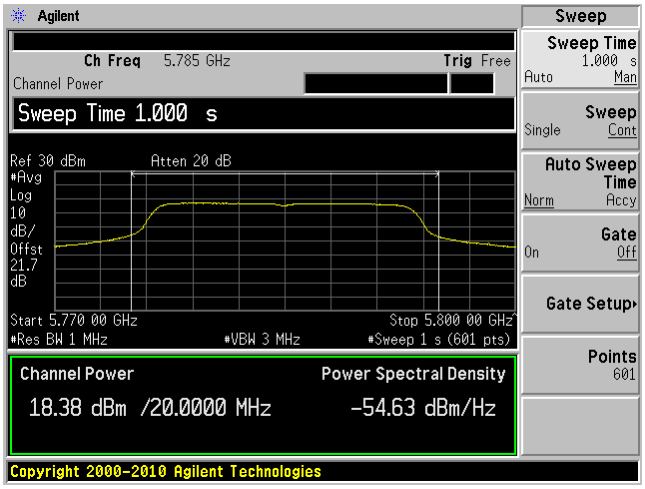
5745 MHz, Chain J8



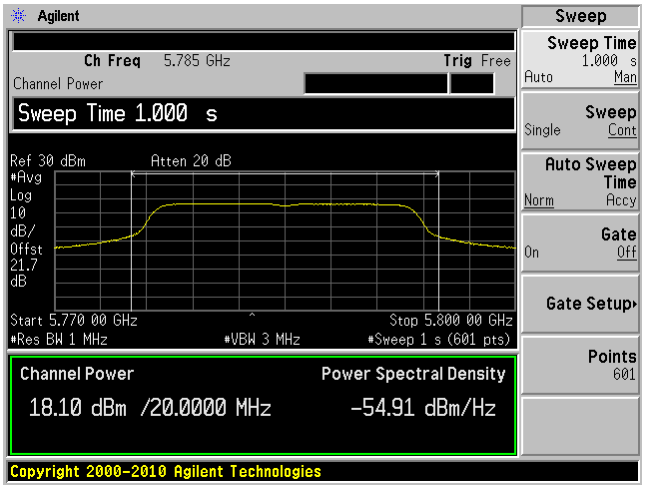
5745 MHz, Chain J6



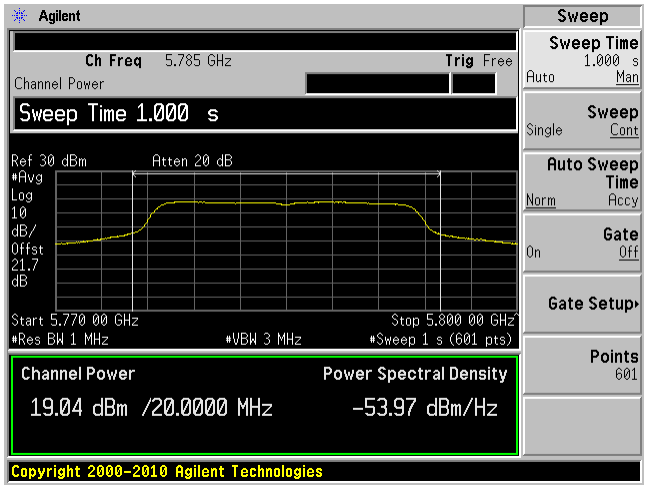
5785 MHz, Chain J10



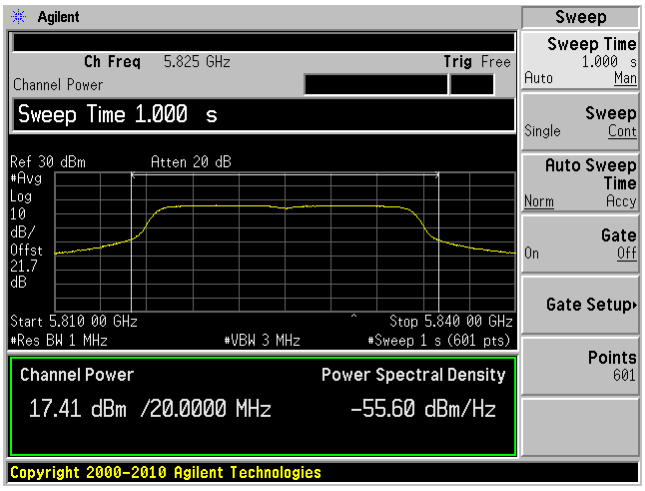
5785 MHz, Chain J8



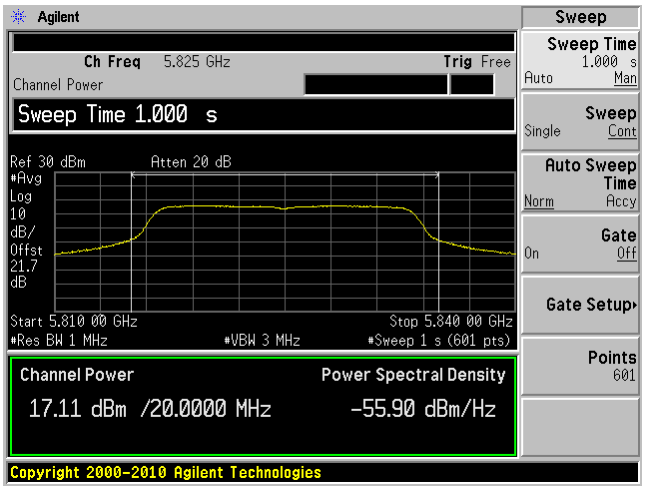
5785 MHz, Chain J6



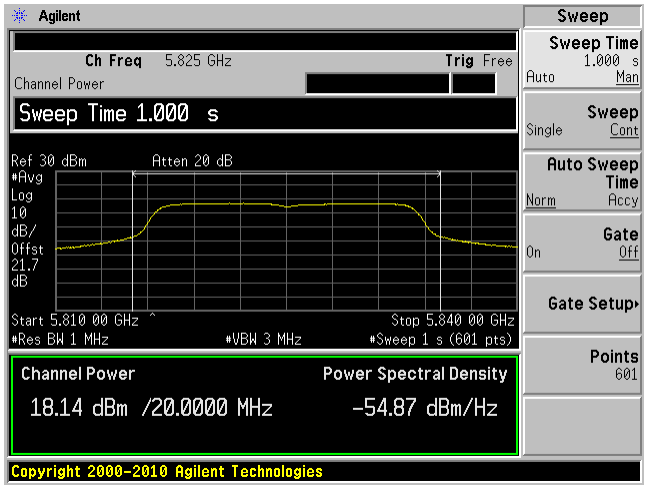
5825 MHz, Chain J10



5825 MHz, Chain J8

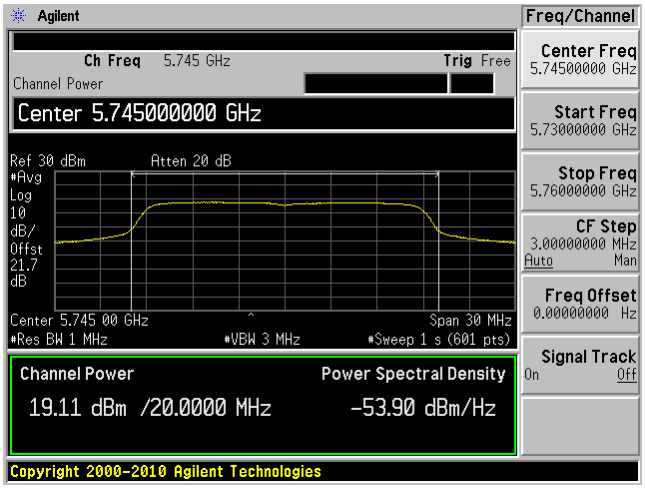


5825 MHz, Chain J6

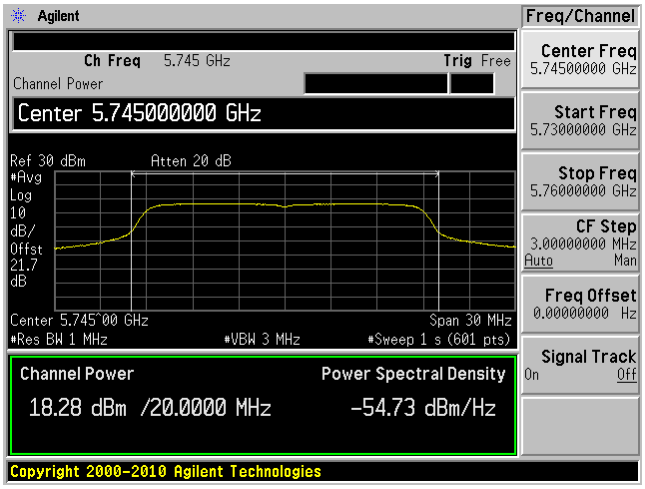


802.11 n 20 mode

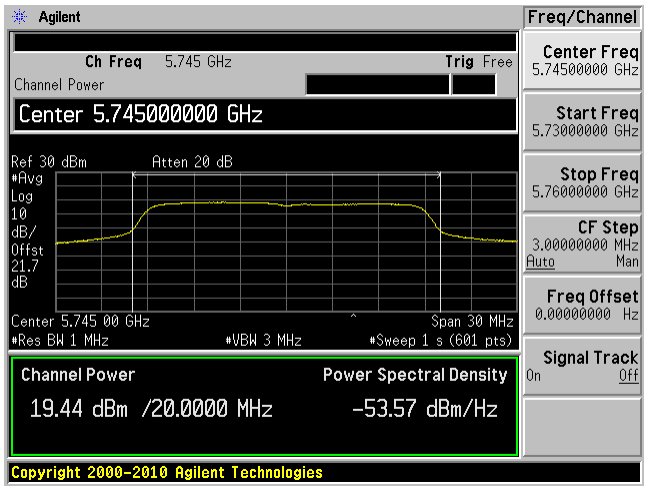
5745 MHz, Chain J10



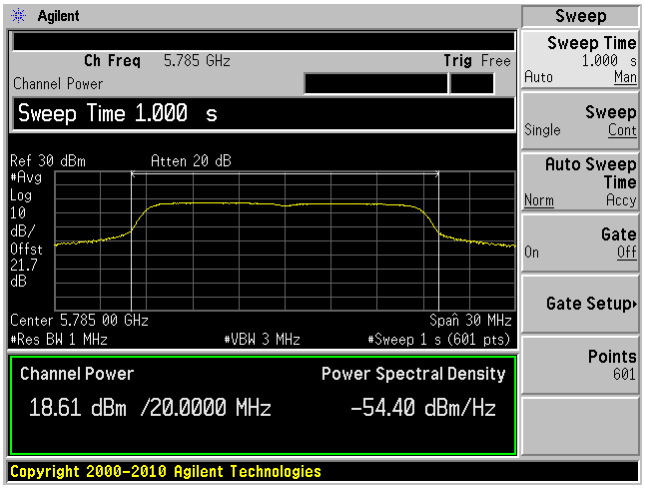
5745 MHz, Chain J8



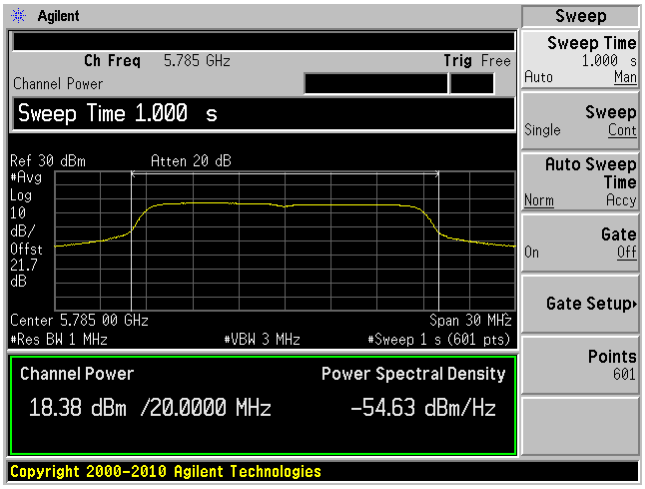
5745 MHz, Chain J6



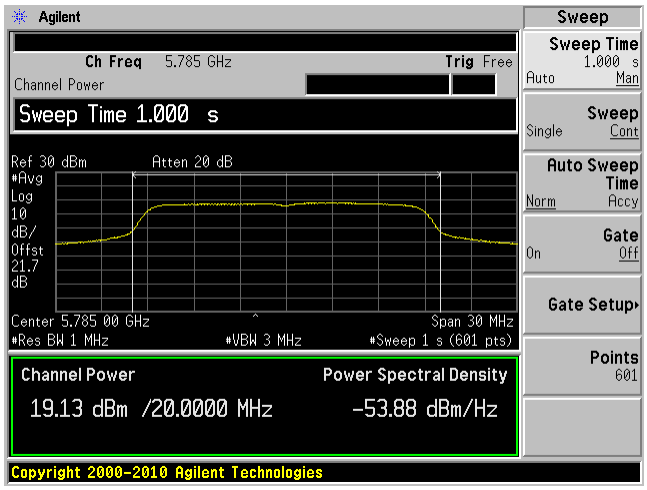
5785 MHz, Chain J10



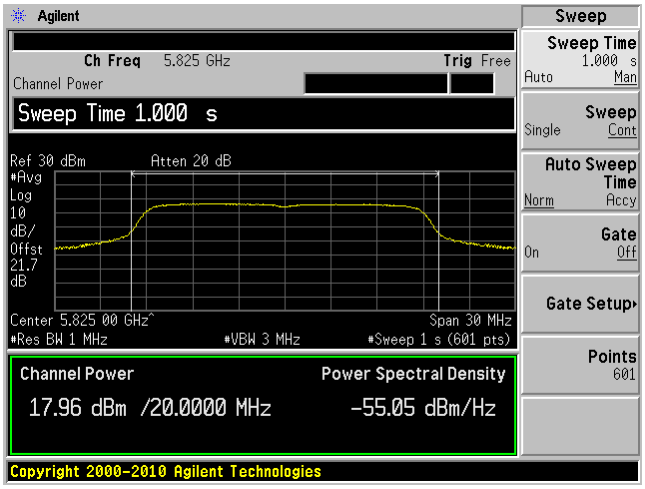
5785 MHz, Chain J8



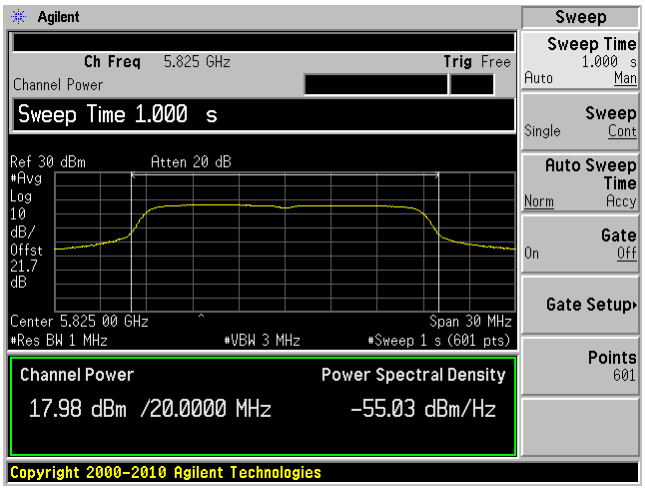
5785 MHz, Chain J6



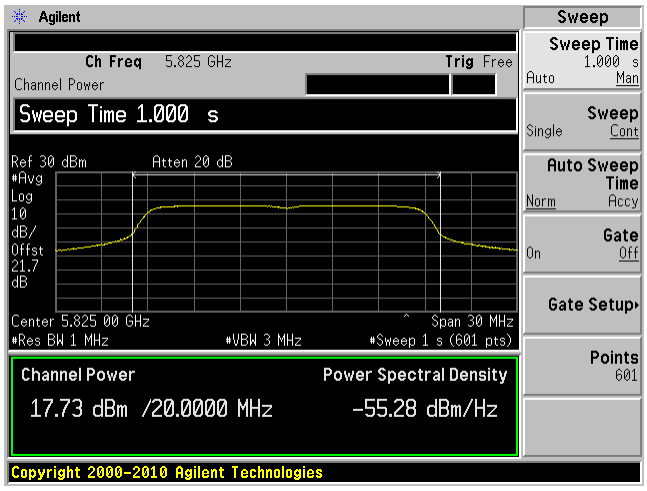
5825 MHz, Chain J10



5825 MHz, Chain J8

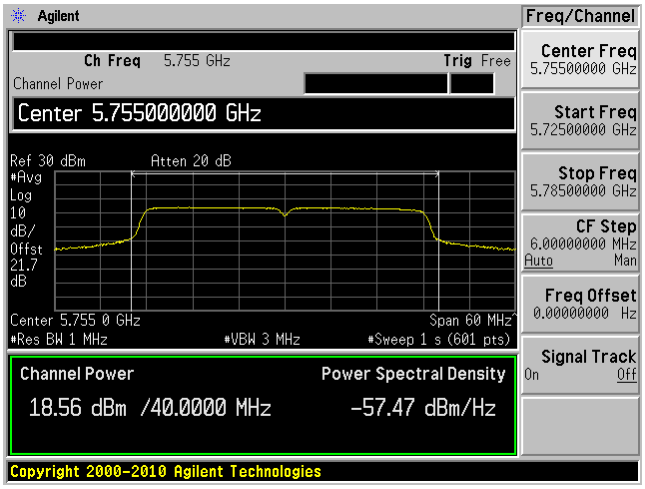


5825 MHz, Chain J6

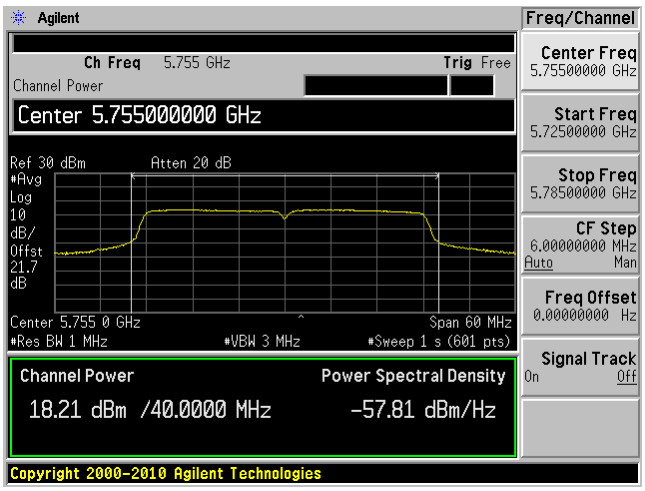


802.11 n 40 mode

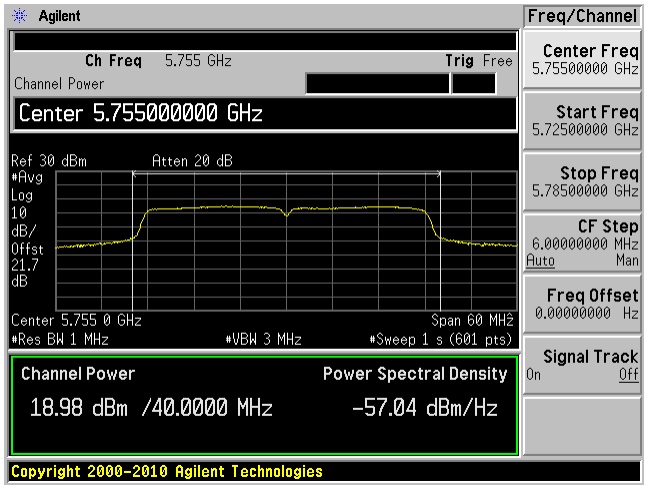
5755 MHz, Chain J10



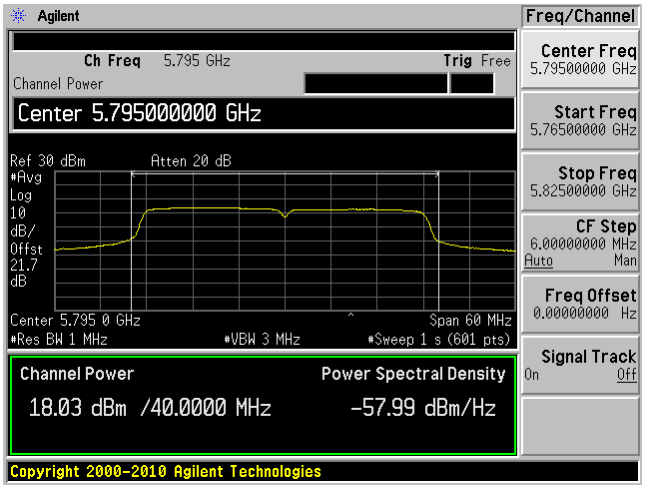
5755 MHz, Chain J8



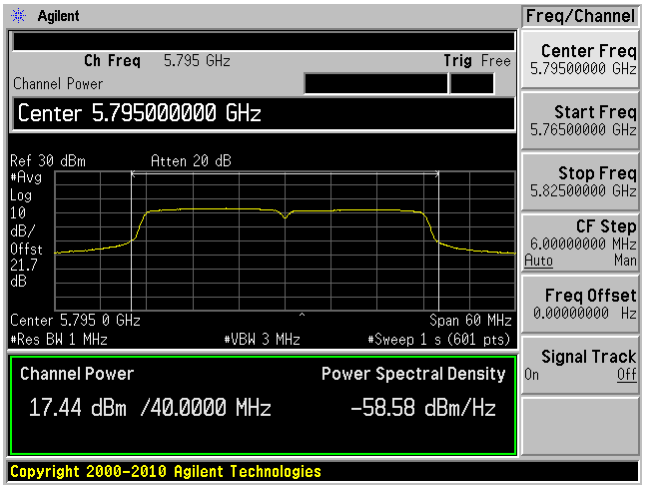
5755 MHz, Chain J6



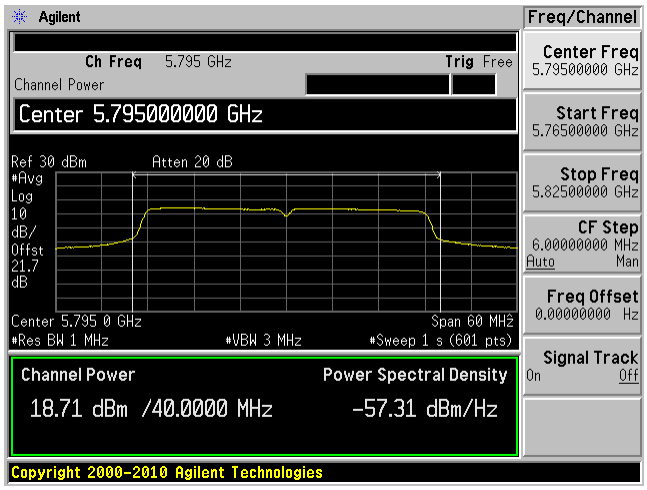
5795 MHz, Chain J10



5795 MHz, Chain J8



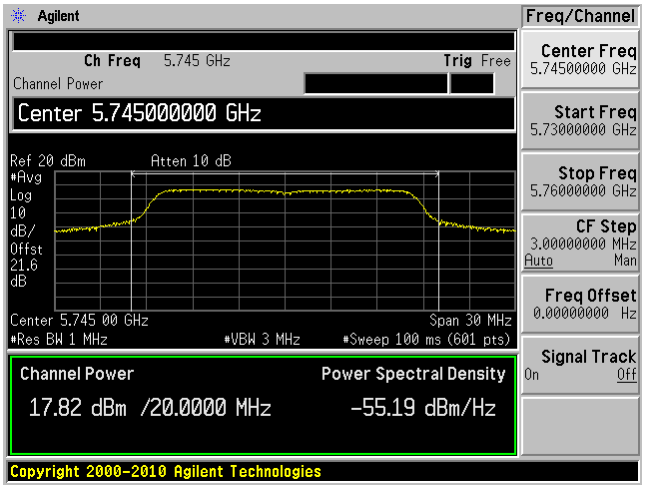
5795 MHz, Chain J6



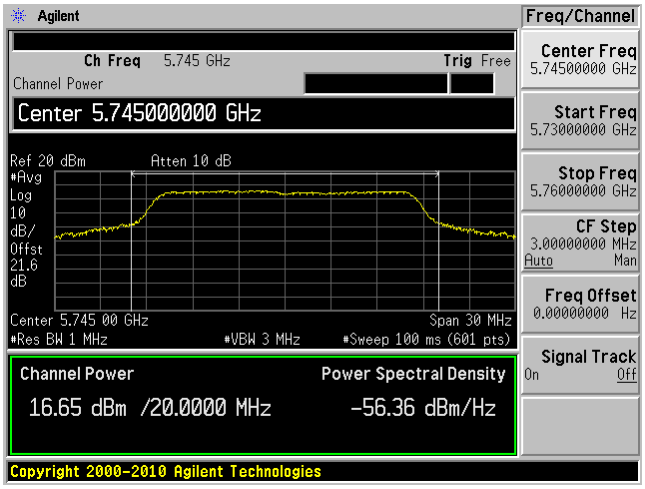
Antenna gain is 15 dBi

802.11 a mode

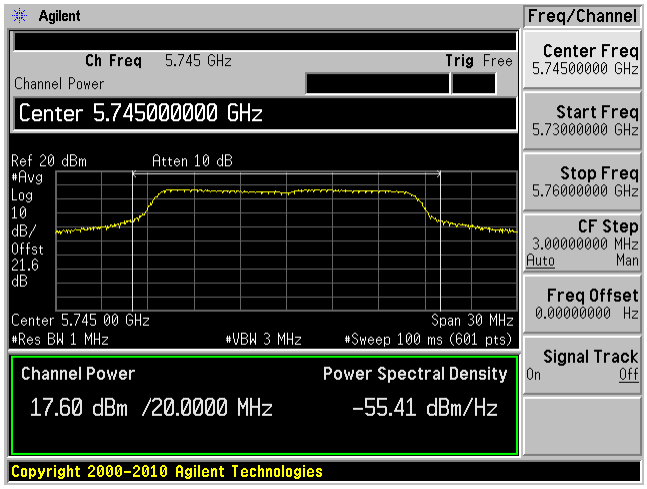
5745 MHz, Chain J10



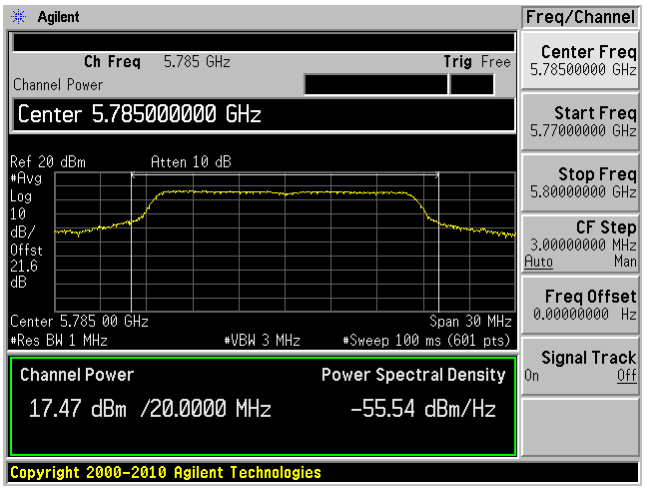
5745 MHz, Chain J8



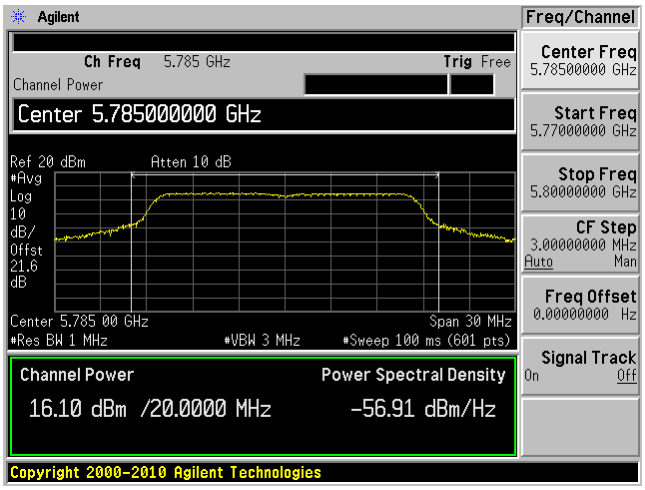
5745 MHz, Chain J6



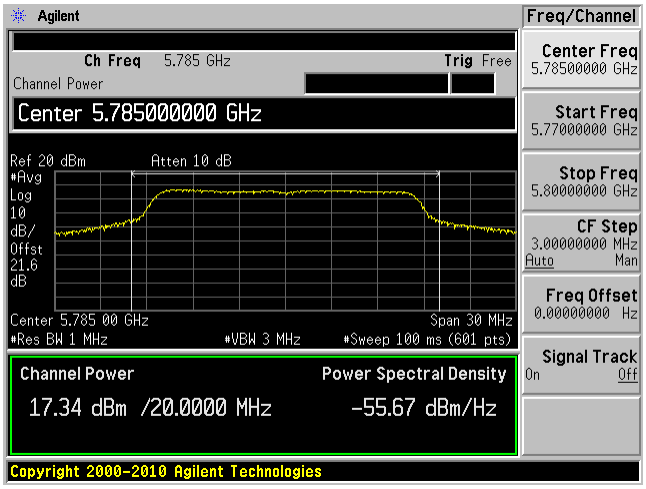
5785 MHz, Chain J10



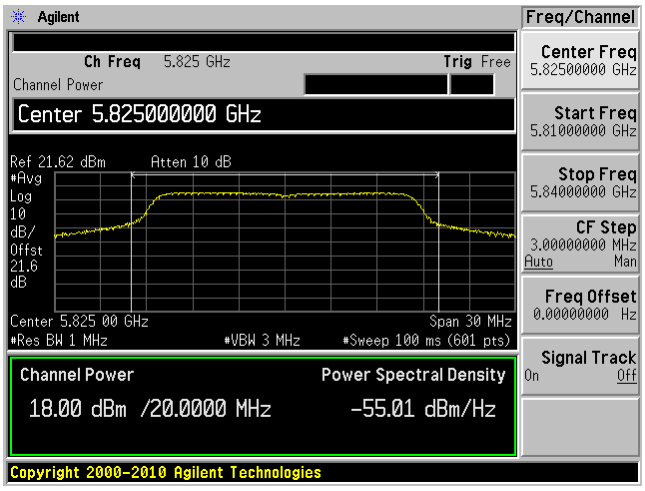
5785 MHz, Chain J8



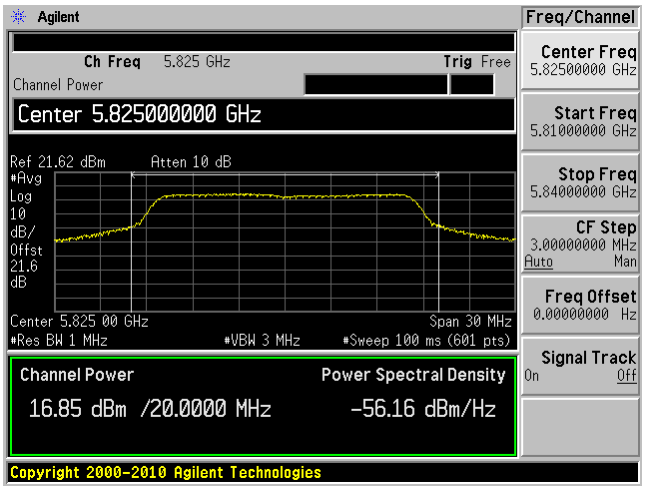
5785 MHz, Chain J6



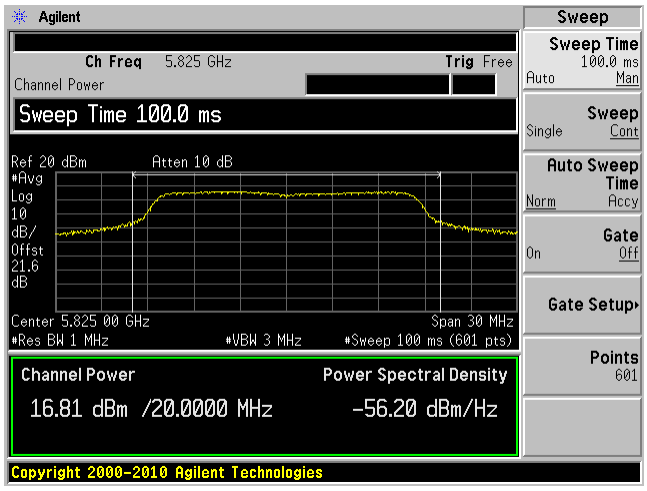
5825 MHz, Chain J10



5825 MHz, Chain J8

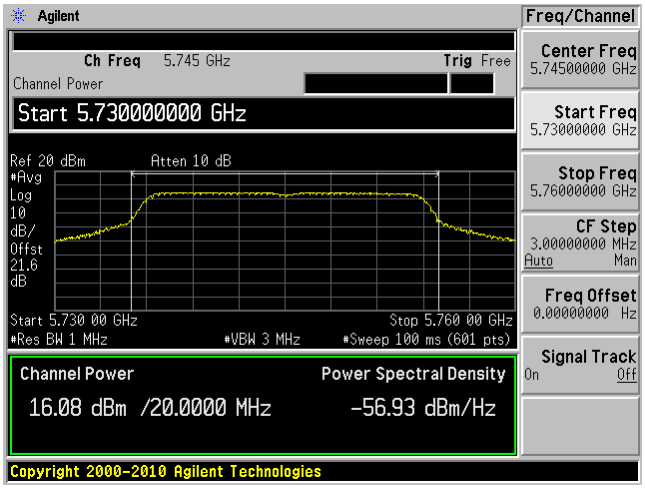


5825 MHz, Chain J6

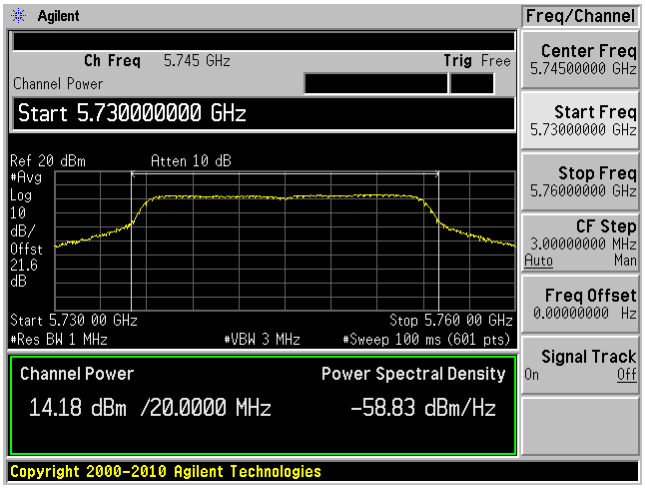


802.11 n 20 mode

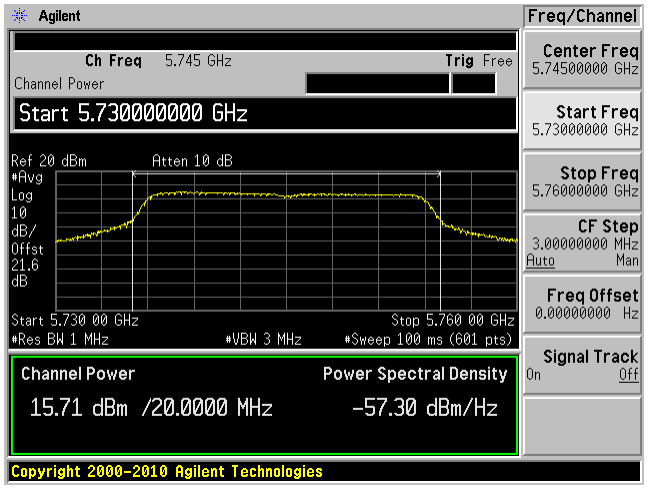
5745 MHz, Chain J10



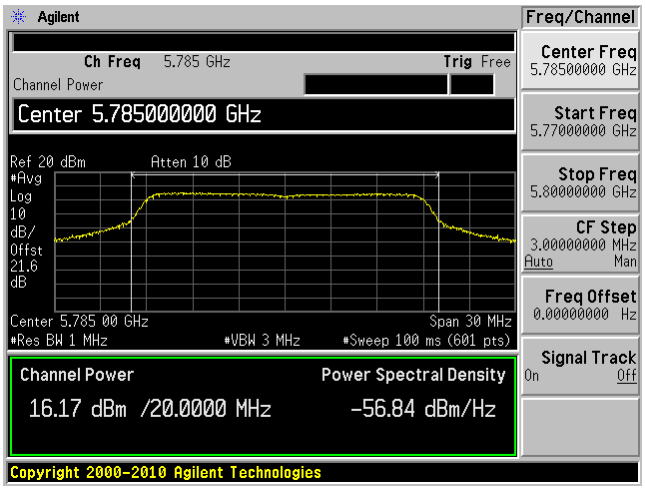
5745 MHz, Chain J8



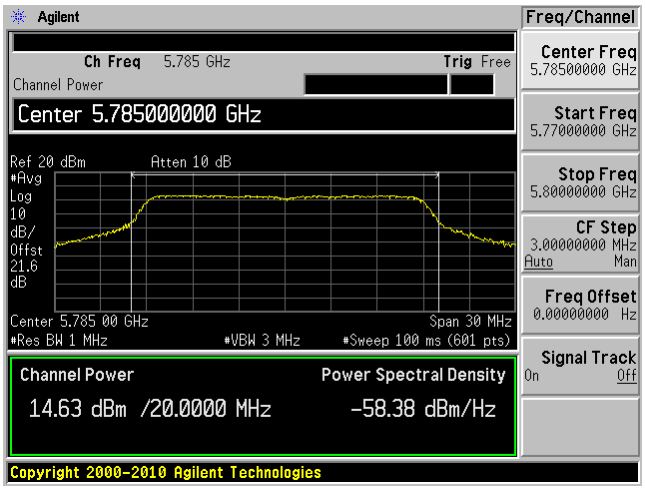
5745 MHz, Chain J6



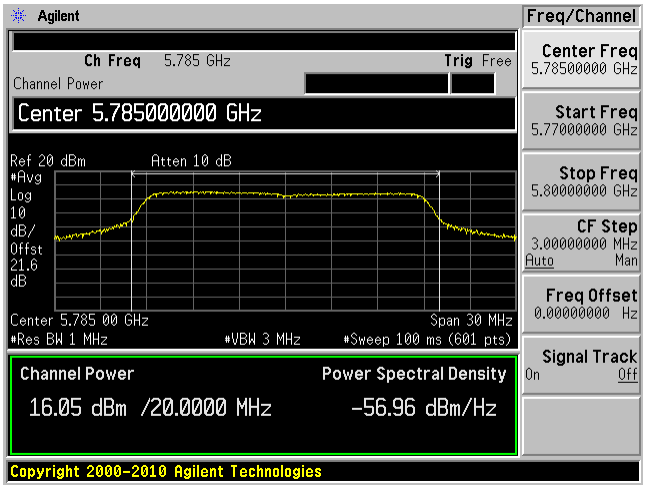
5785 MHz, Chain J10



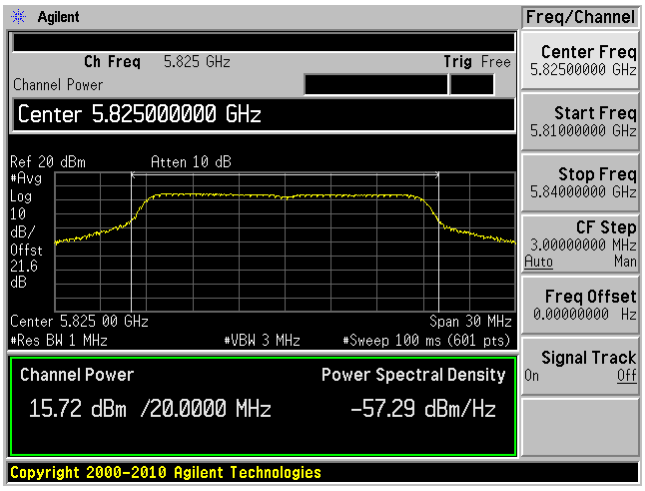
5785 MHz, Chain J8



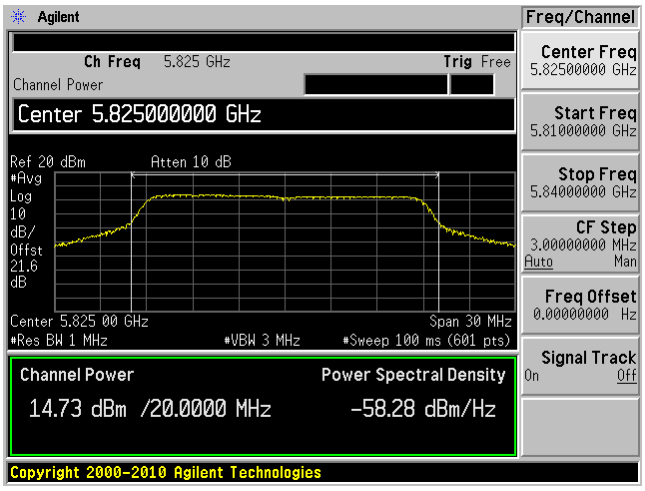
5785 MHz, Chain J6



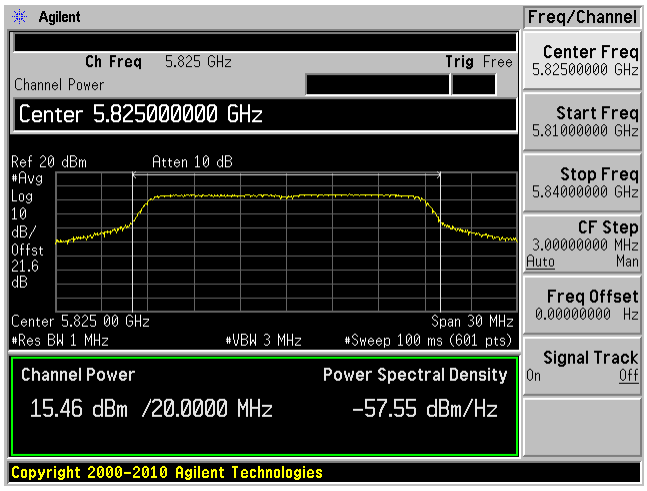
5825 MHz, Chain J10



5825 MHz, Chain J8

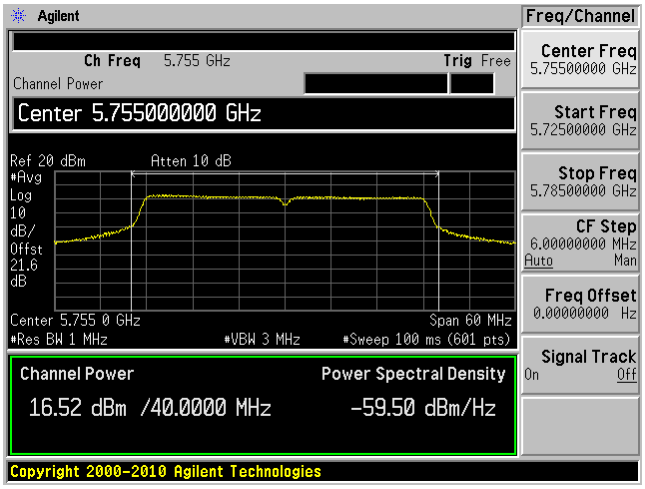


5825 MHz, Chain J6

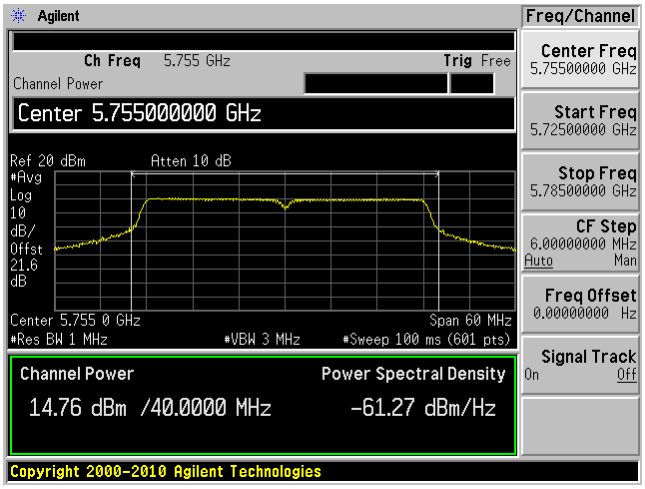


802.11 n 40 mode

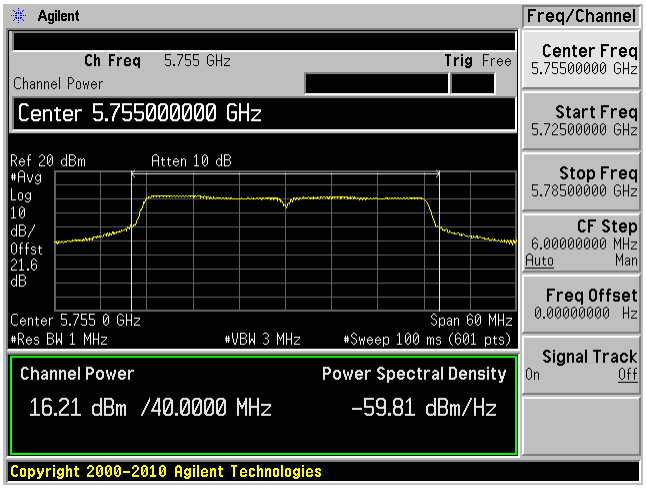
5755 MHz, Chain J10



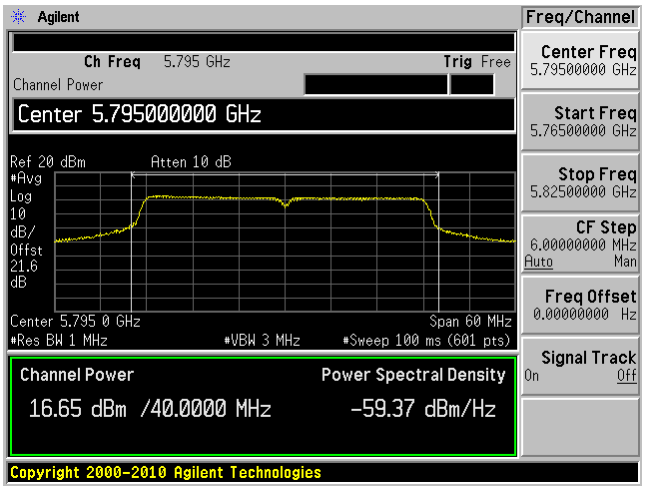
5755 MHz, Chain J8



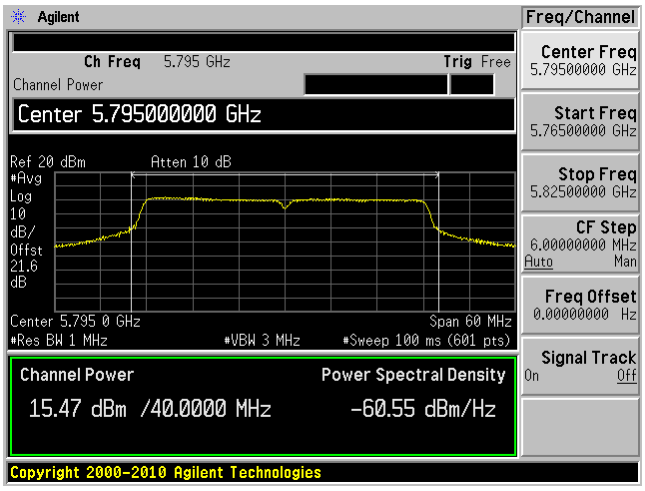
5755 MHz, Chain J6



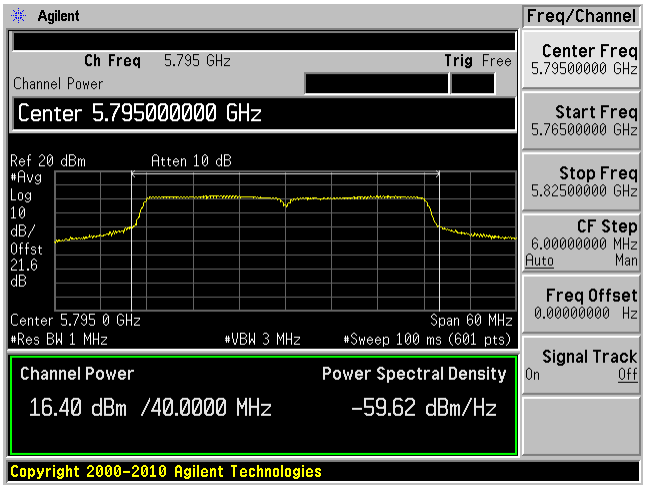
5795 MHz, Chain J10



5795 MHz, Chain J8



5795 MHz, Chain J6



8 FCC §15.247(d) & IC RSS-210 §A8.5 - 100 kHz Bandwidth of Band Edges

8.1 Applicable Standard

According to FCC §15.247(d), in any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emissions limits specified in §15.209(a) see §15.205(c).

According to IC RSS-210 §A8.5, in any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the radio frequency power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under section A8.4(4), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Tables 2 and 3 is not required.

8.2 Measurement Procedure

The measurement of unwanted emissions at the edge of the authorized frequency bands can be complicated by the leakage of RF energy from the fundamental emission into the RBW passband. Thus, for measurements at the band edges, a narrower resolution bandwidth (no less then 10 KHz) can be used within the first 1 MHz beyond the fundamental emission, provided that that measured energy is subsequently integration over the appropriate reference bandwidth (i.e., 100 KHz or 1 MHz). This integration can be performed using the band power function of the spectrum analyzer or by summing the spectral levels (in linear power units) over the appropriate reference bandwidth.

8.3 Test Equipment List and Details

Manufacturers	Description	Models	Serial Numbers	Calibration Dates	Calibration Interval
Agilent	Spectrum Analyzer	E4446A	US44300386	2011-08-11	1 year

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:	24 °C
Relative Humidity:	42 %
ATM Pressure:	101.9 kPa

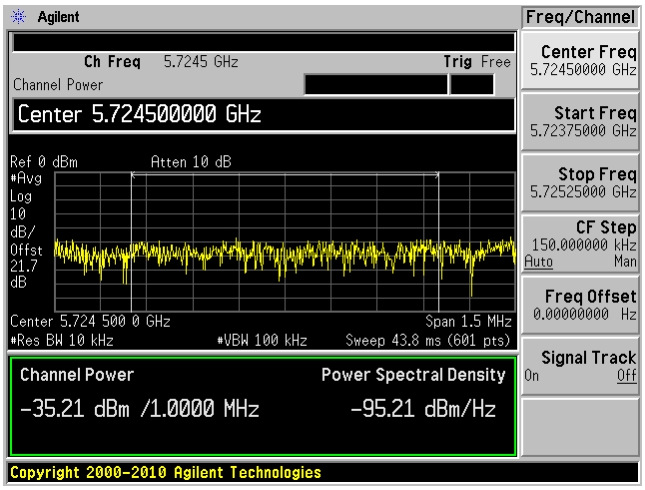
The testing was performed by Ning Ma on 2012-06-22 in RF site.

8.5 Test Results

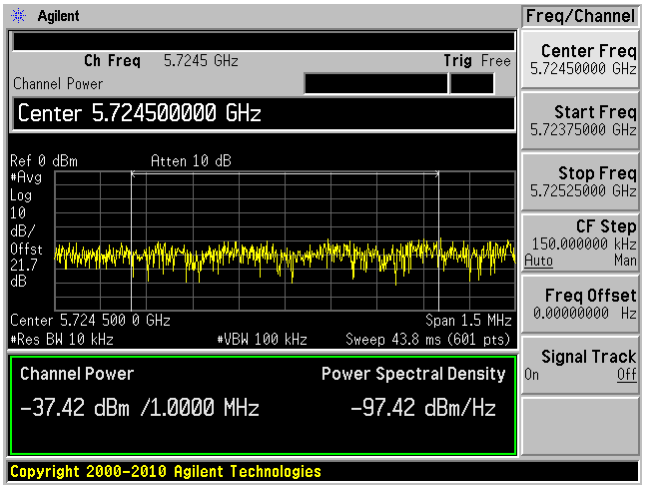
Please refer to following pages for plots of band edge.

5725 – 5845 MHz

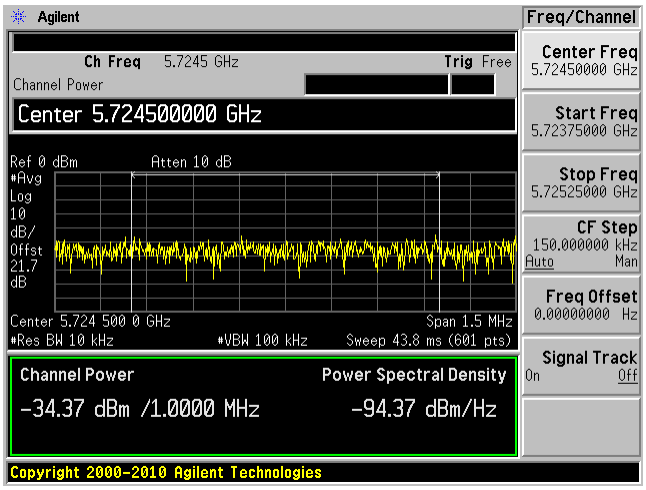
802.11a mode, Lowest Channel, Chain J10



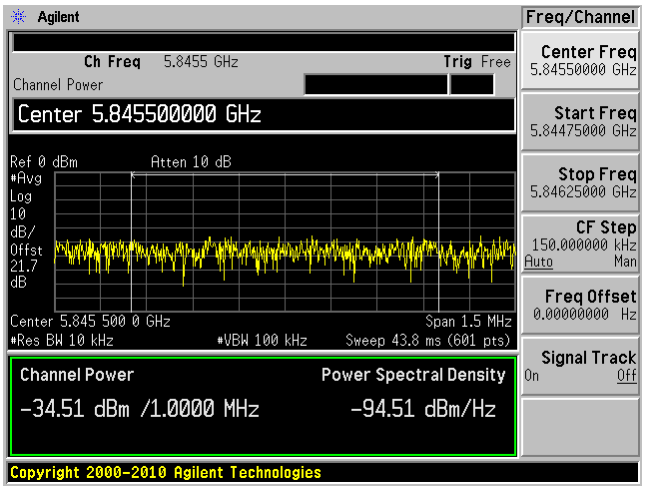
802.11a mode, Lowest Channel, Chain J8



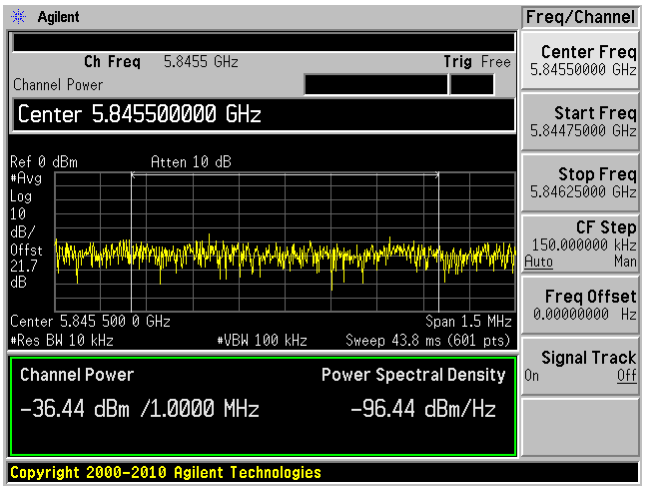
802.11 a mode, Lowest Channel, Chain J6



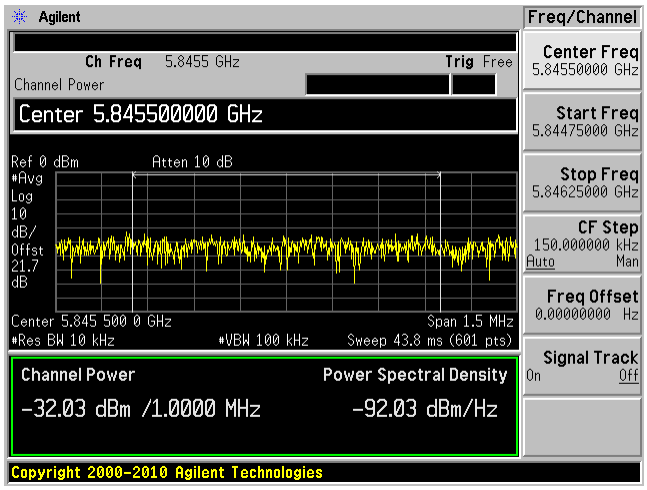
802.11a mode, Highest Channel, Chain J10



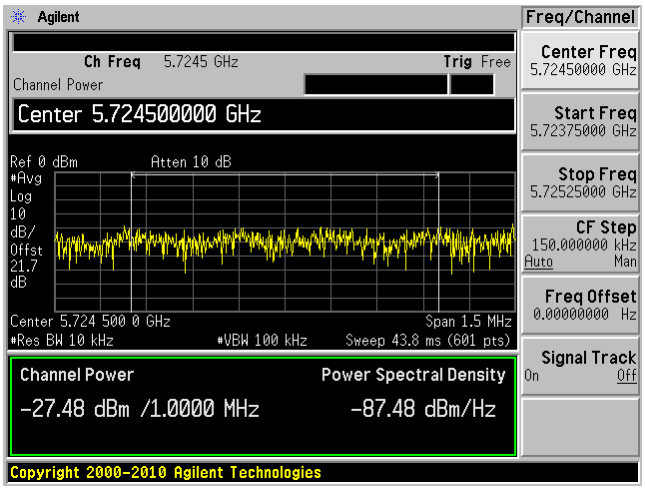
802.11a mode, Highest Channel, Chain J8



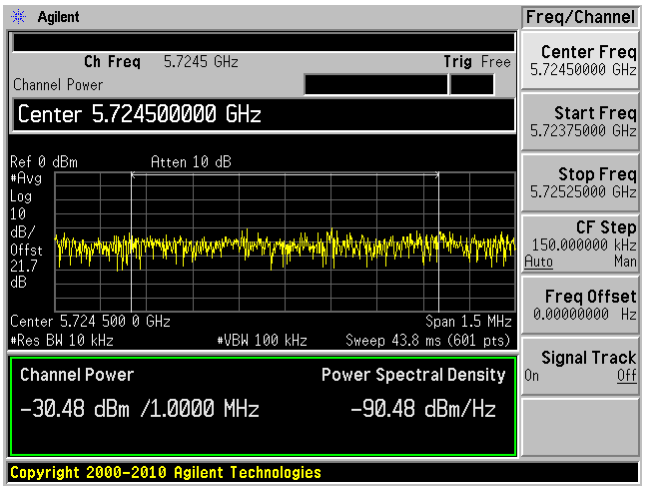
802.11a mode, Highest Channel, Chain J6



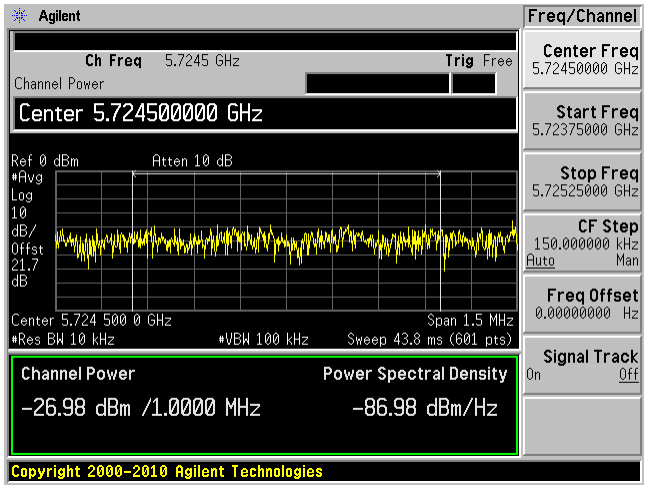
802.11n20 mode, Lowest Channel, Chain J10



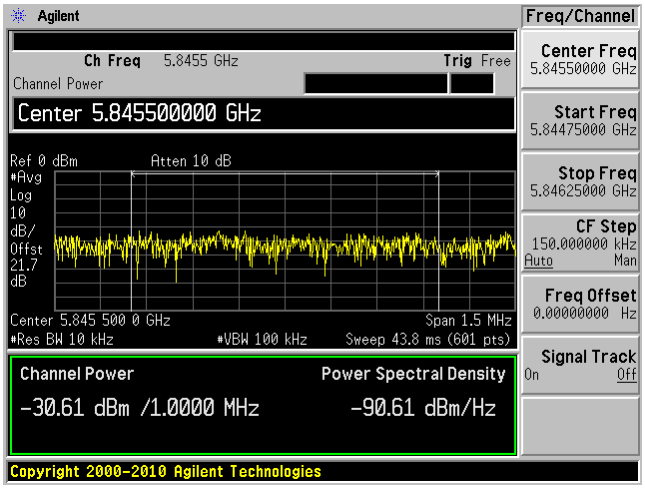
802.11n20 mode, Lowest Channel, Chain J8



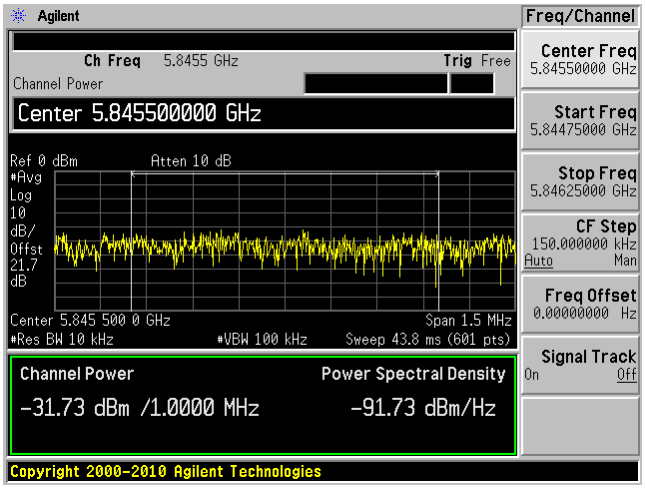
802.11n20 mode, Lowest Channel, Chain J6



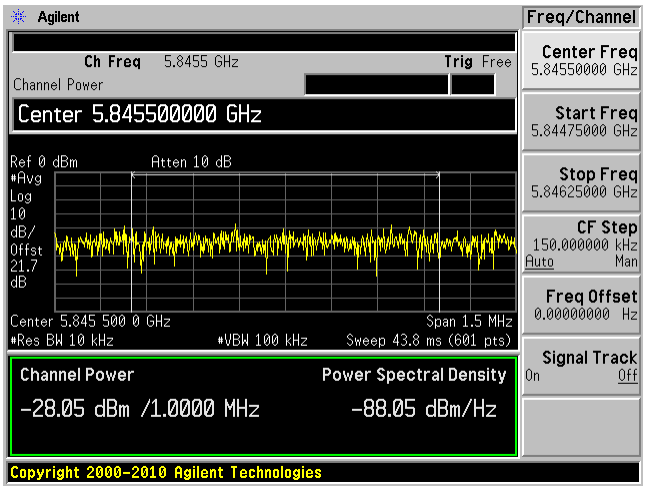
802.11n20 mode, Highest Channel, Chain J10



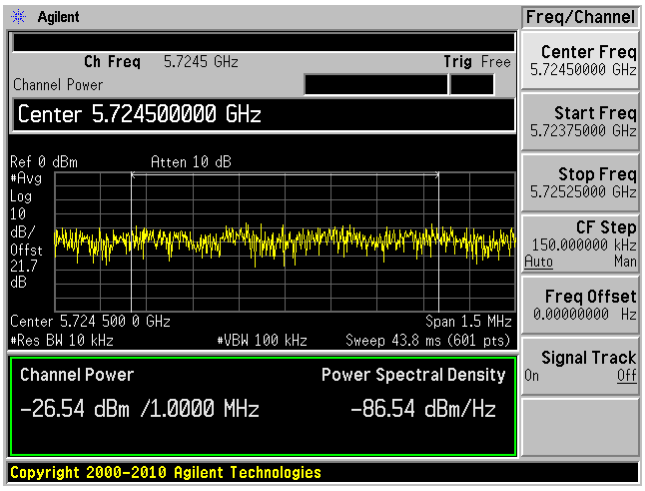
802.11n20 mode, Highest Channel, Chain J8



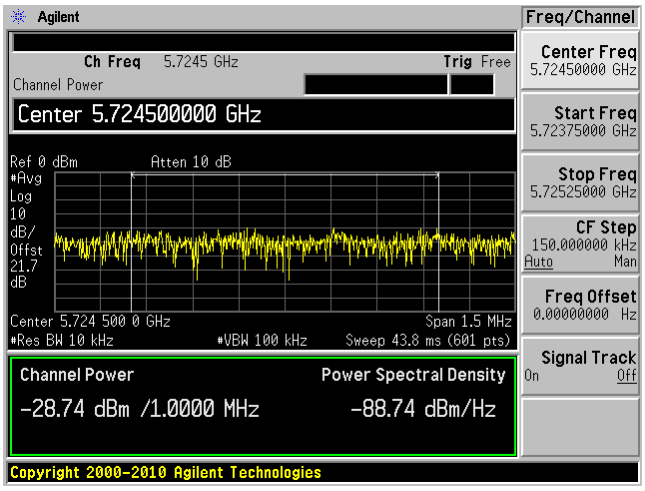
802.11n20 mode, Highest Channel, Chain J6



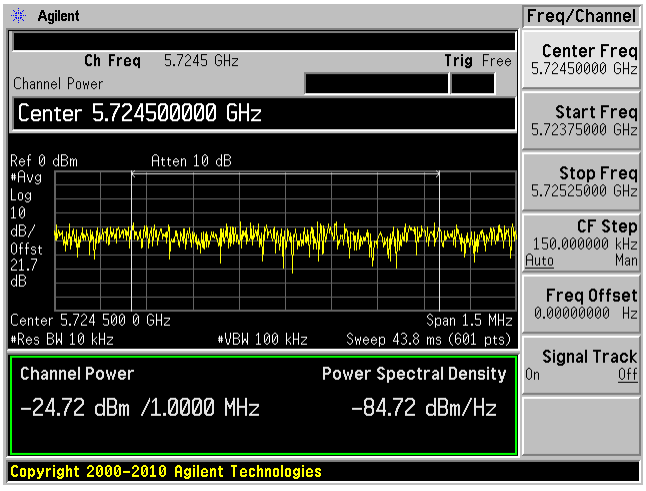
802.11n40 mode, Lowest Channel, Chain J10



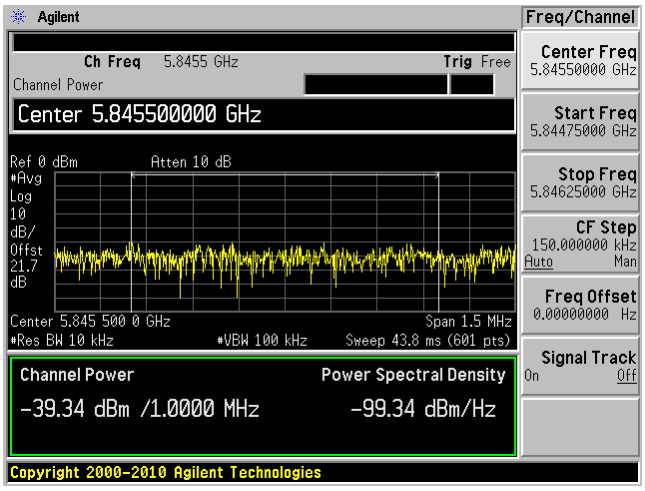
802.11n40 mode, Lowest Channel, Chain J8



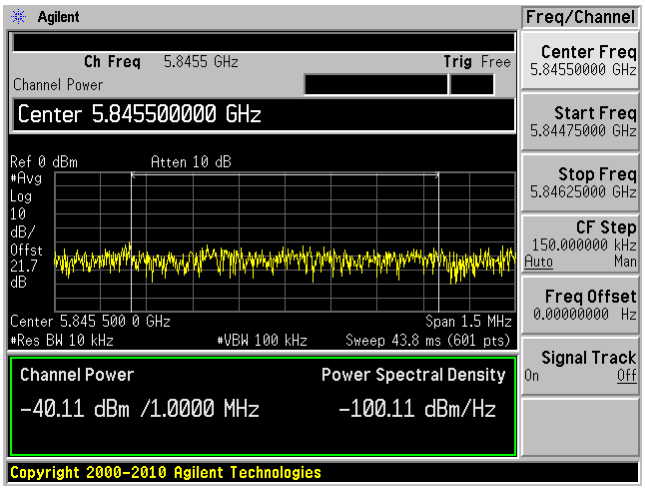
802.11n40 mode, Lowest Channel, Chain J6



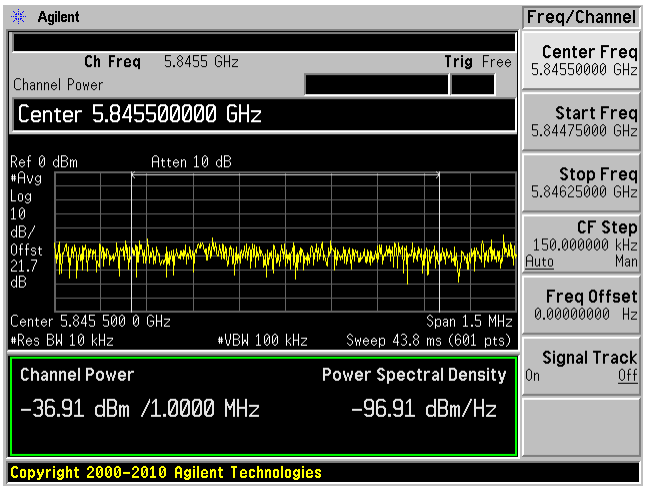
802.11n40 mode, Highest Channel, Chain J10



802.11n40 mode, Highest Channel, Chain J8



802.11n40 mode, Highest Channel, Chain J6



9 FCC §15.247(e) & IC RSS-210 §A8.2 (b) - Power Spectral Density

9.1 Applicable Standard

According to FCC §15.247 (e) and IC RSS-210 §A8.2 (b) , for digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

9.2 Measurement Procedure

1. Use this procedure when the maximum peak conducted output power in the fundamental emission is used to demonstrate compliance.
2. Set the RBW = 100 kHz.
3. Set the VBW ≥ 300 kHz.
4. Set the span to 5-30 % greater than the EBW.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.
10. Scale the observed power level to an equivalent value in 3 kHz by adjusting (reducing) the measured power by a bandwidth correction factor (BWCF) where BWCF = 10log (3 kHz/100 kHz = -15.2 dB).
11. The resulting peak PSD level must be ≤ 8 dBm.

9.3 Test Equipment List and Details

Manufacturers	Description	Models	Serial Numbers	Calibration Dates	Calibration Interval
Agilent	Spectrum Analyzer	E4446A	US44300386	2011-08-11	1 year

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:	24 °C
Relative Humidity:	45 %
ATM Pressure:	101.9 kPa

The testing was performed by Ning Ma on 2012-06-22 in RF site.

Temperature:	24 °C
Relative Humidity:	41.8 %
ATM Pressure:	101.1 kPa

The testing was performed by Ning Ma on 2012-10-04 in RF site

9.5 Test Results

Antenna gain is 12 dBi

5725-5845 MHz

802.11a mode

Channel	Frequency (MHz)	TX Chain J1 PSD (dBm)	TX Chain J2 PSD (dBm)	TX Chain J3 PSD (dBm)	Cord. Max PSD (dBm)	Limit (dBm/3kHz)	Margin (dB)	Power Setting
Low	5745	7.27	6.35	7.25	-7.93	8	-12.98	19
Middle	5785	8.82	7.45	9.24	-5.96	8	-10.62	21
High	5825	7.08	6.37	7.33	-7.87	8	-12.44	20

802.11n HT20 mode

Channel	Frequency (MHz)	TX Chain J1 PSD (dBm)	TX Chain J2 PSD (dBm)	TX Chain J3 PSD (dBm)	Cord. Total PSD (dBm)	Limit (dBm/3kHz)	Margin (dB)	Power Setting
Low	5745	8.8	7.49	8.84	-2.01	8	-10.07	21
Middle	5785	8.64	7.32	9.29	-1.94	8	-8.03	21
High	5825	7.74	7.37	8.64	-2.48	8	-9.37	21

802.11n HT40 mode

Channel	Frequency (MHz)	TX Chain J1 PSD (dBm)	TX Chain J2 PSD (dBm)	TX Chain J3 PSD (dBm)	Cord. Total PSD (dBm)	Limit (dBm/3kHz)	Margin (dB)	Power Setting
Low	5755	6.13	5	5.86	-4.74	8	-12.74	21
High	5795	5.03	4.58	5.62	-5.34	8	-13.34	21

Antenna gain is 15 dBi

5725-5845 MHz

802.11a mode

Channel	Frequency (MHz)	TX Chain J1 PSD (dBm)	TX Chain J2 PSD (dBm)	TX Chain J3 PSD (dBm)	Max Output Power (dBm)	Cord. Max PSD (dBm)	Limit (dBm/3k Hz)	Margin (dB)	Power Setting
Low	5745	7.36	6.14	7.44	7.44	-7.76	8	-15.76	21
Middle	5785	6.25	5.25	6.71	6.71	-8.49	8	-16.49	21
High	5825	6.86	5.38	6.04	6.86	-8.34	8	-16.34	21

802.11n HT20 mode

Channel	Frequency (MHz)	TX Chain J1 PSD (dBm)	TX Chain J2 PSD (dBm)	TX Chain J3 PSD (dBm)	Total Output Power (dBm)	Cord. Total PSD (dBm)	Limit (dBm/3k Hz)	Margin (dB)	Power Setting
Low	5745	6.21	3.83	5.45	10.04	-5.16	8	-13.16	18
Middle	5785	6.46	4.34	6.3	10.57	-4.63	8	-12.63	19
High	5825	5.23	4.2	5.49	9.78	-5.42	8	-13.42	19

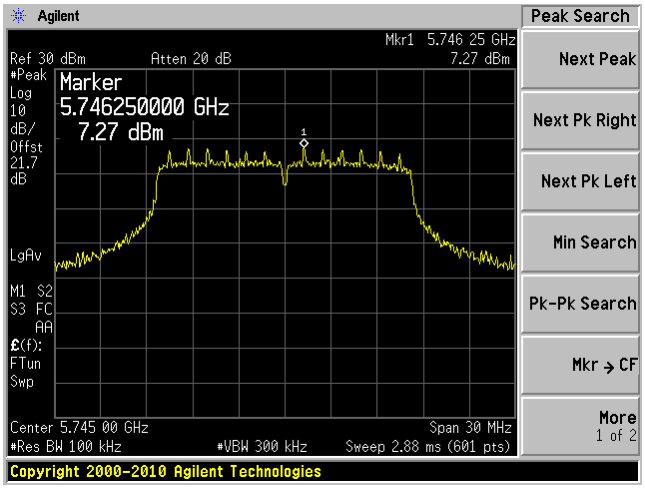
802.11n HT40 mode

Channel	Frequency (MHz)	TX Chain J1 PSD (dBm)	TX Chain J2 PSD (dBm)	TX Chain J3 PSD (dBm)	Total Output Power (dBm)	Cord. Total PSD (dBm)	Limit (dBm/3k Hz)	Margin (dB)	Power Setting
Low	5755	3.6	2.08	4.19	8.15	-7.05	8	-15.05	19
High	5795	3.9	2.74	4.1	8.39	-6.81	8	-14.81	20

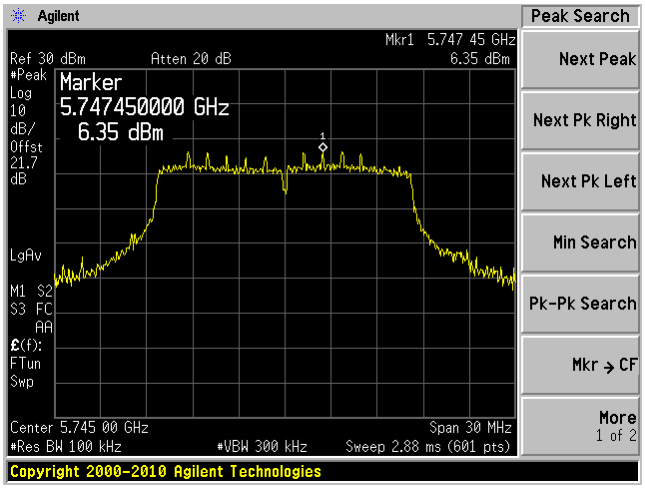
Antenna gain is 12 dBi

5725 – 5845 MHz

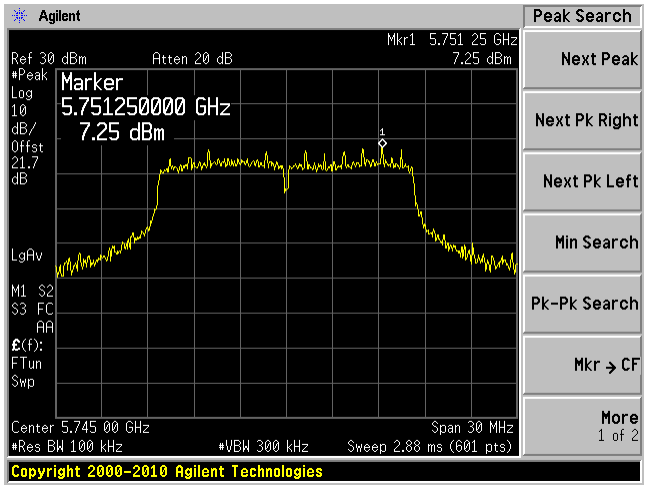
802.11a mode, Low Channel, Chain J10



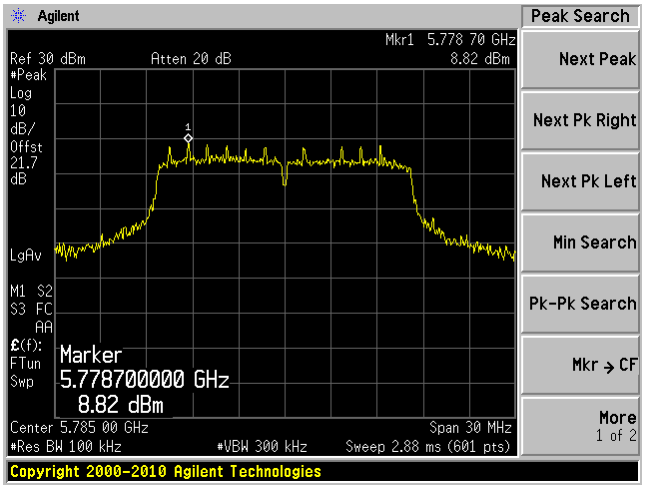
802.11a mode, Low Channel, Chain J8



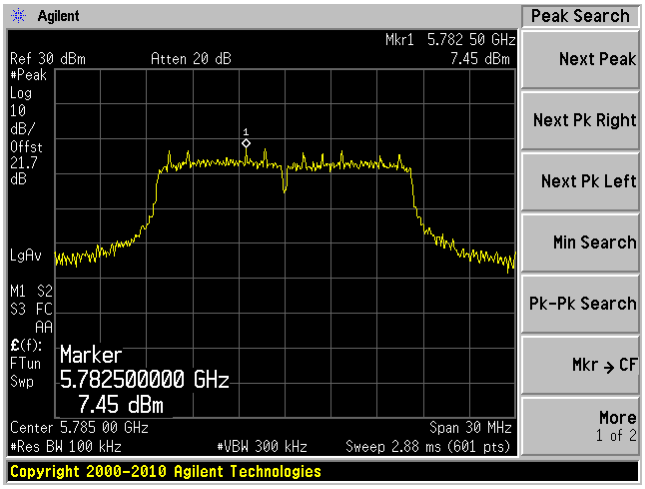
802.11a mode, Low Channel, Chain J6



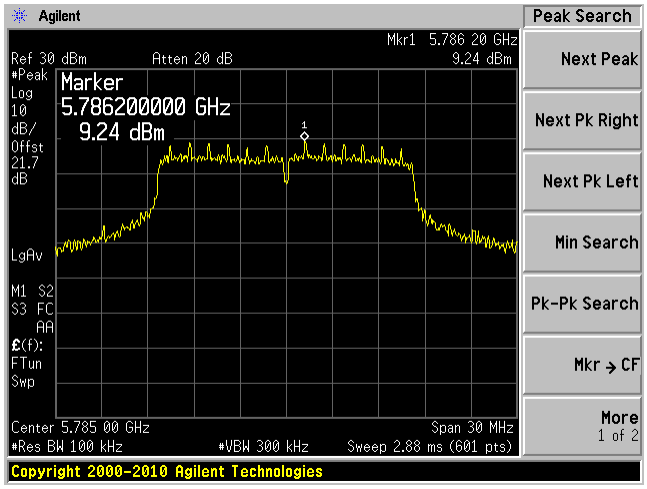
802.11a mode, Middle Channel, Chain J10



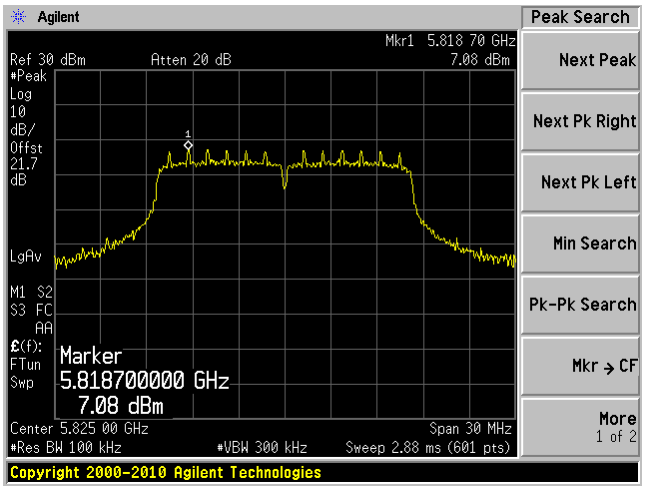
802.11a mode, Middle Channel, Chain J8



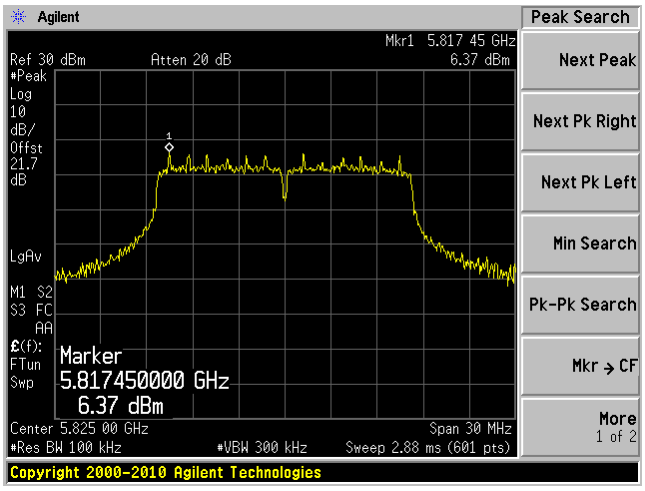
802.11a mode, Middle Channel, Chain J6



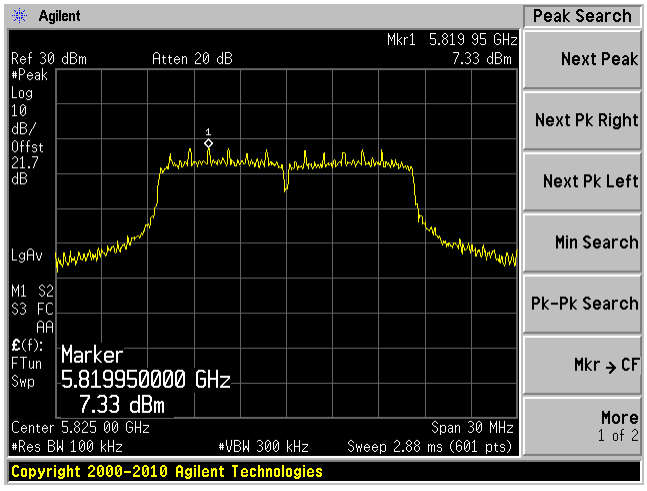
802.11a mode, High Channel, Chain J10



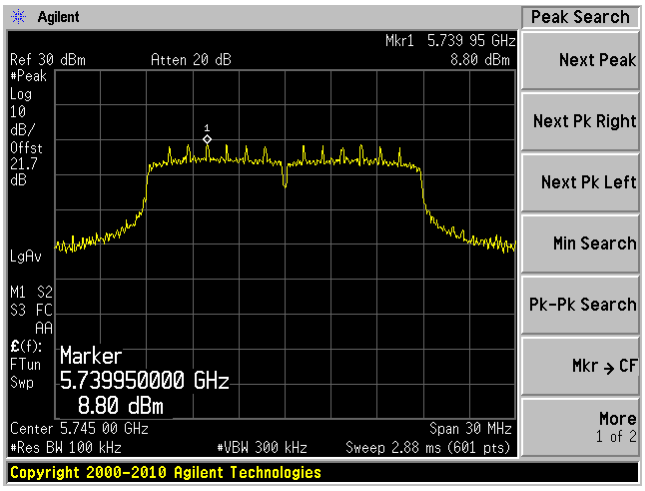
802.11a mode, High Channel, Chain J8



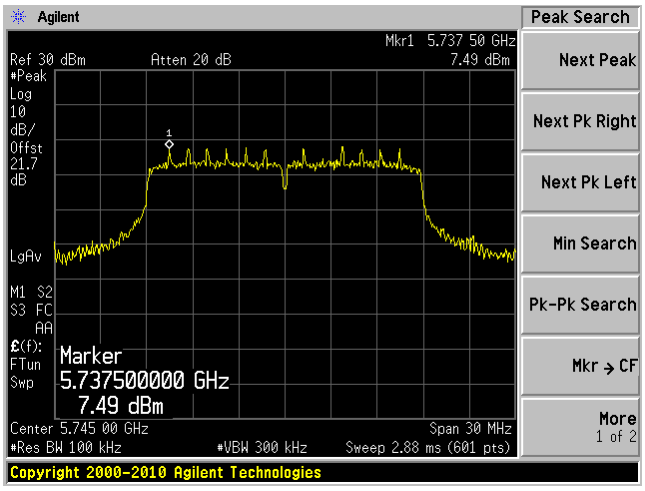
802.11a mode, High Channel, Chain J6



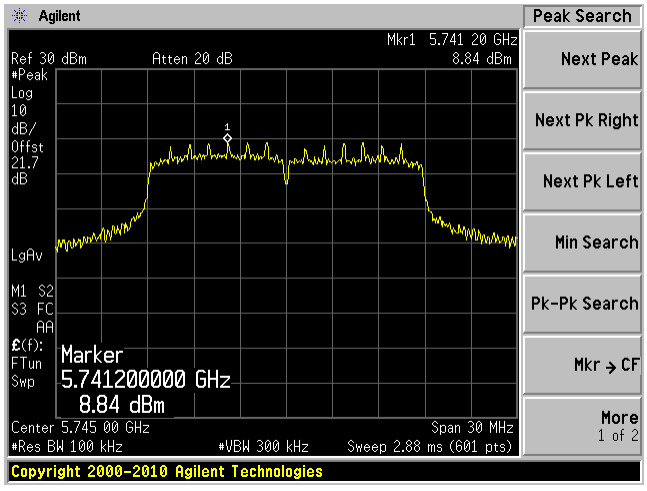
802.11n20 mode, Low Channel, Chain J10



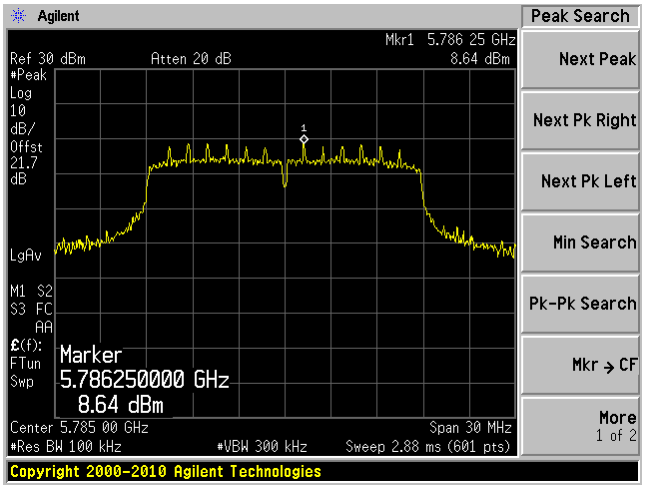
802.11n20 mode, Low Channel, Chain J8



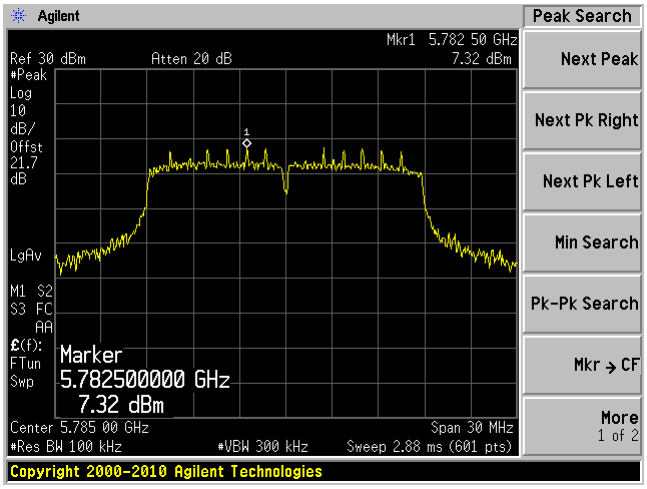
802.11n20 mode, Low Channel, Chain J6



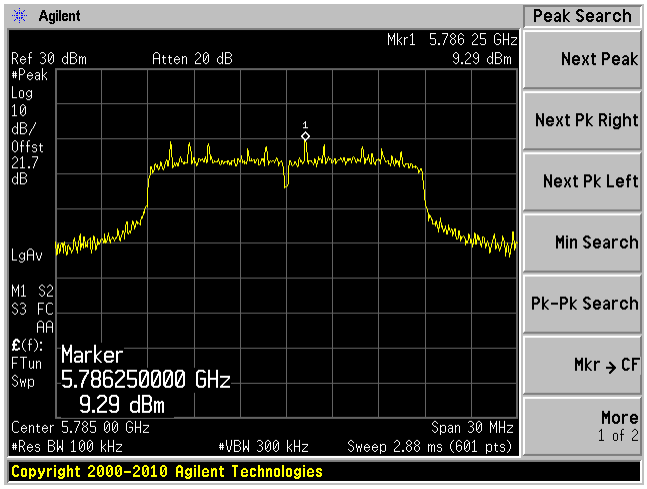
802.11n20 mode, Middle Channel, Chain J10



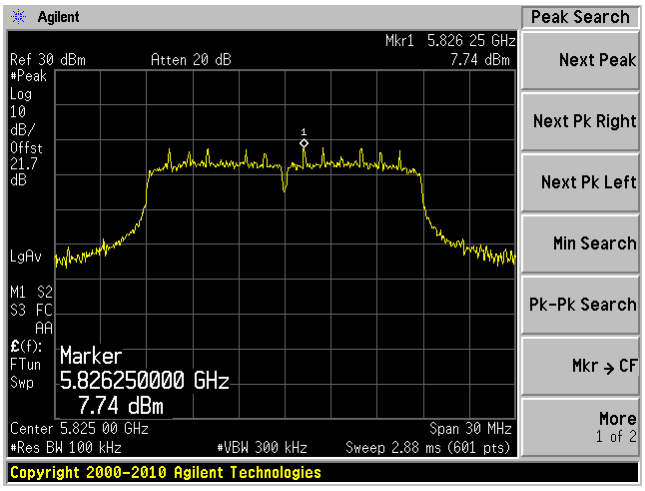
802.11n20 mode, Middle Channel, Chain J8



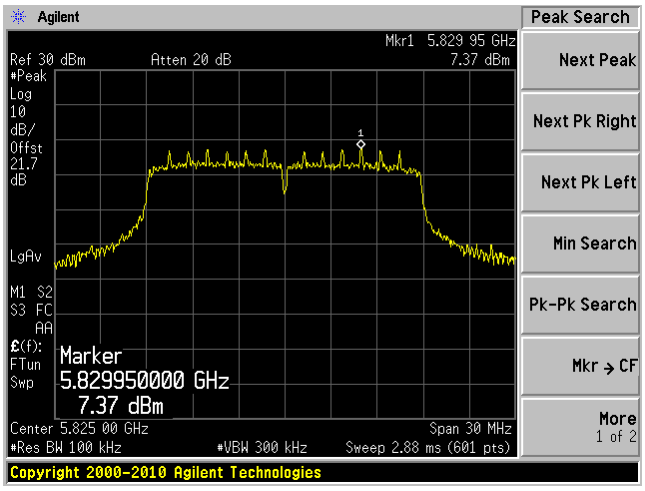
802.11n20 mode, Middle Channel, Chain J6



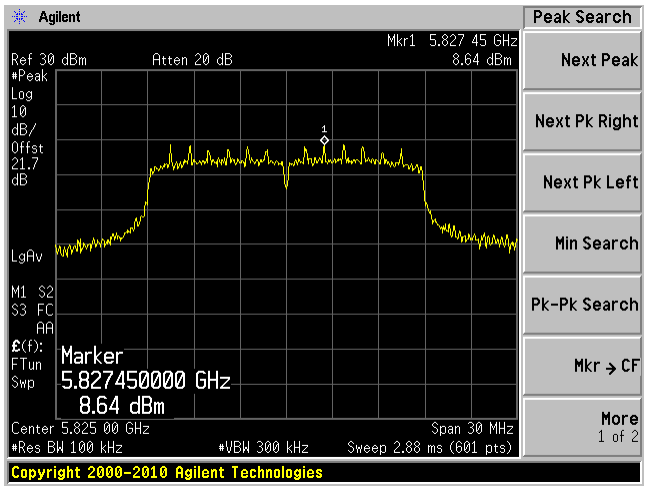
802.11 n20 mode, High Channel, Chain J10



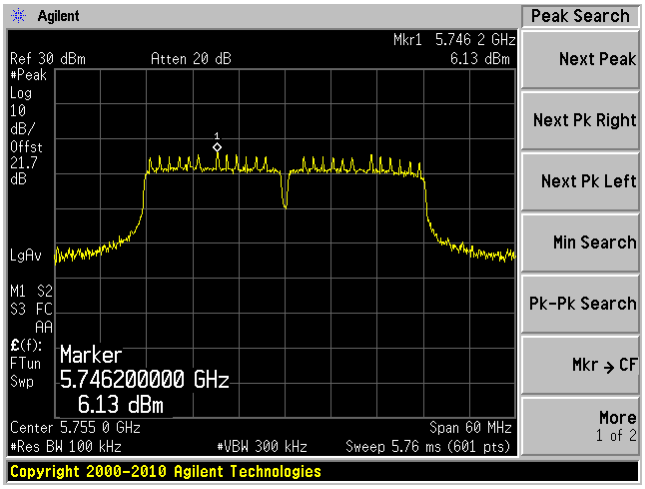
802.11 n20 mode, High Channel, Chain J8



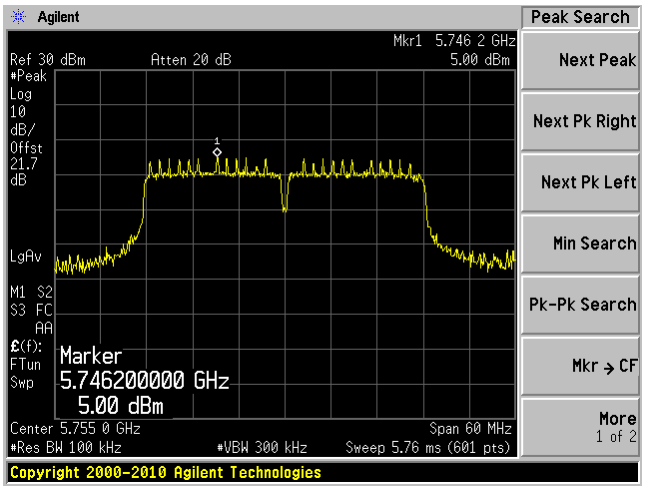
802.11 n20 mode, High Channel, Chain J6



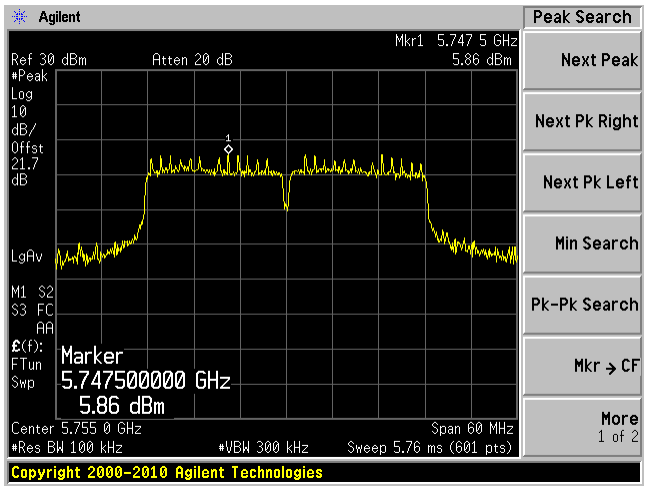
802.11n40 mode, Low Channel, Chain J10



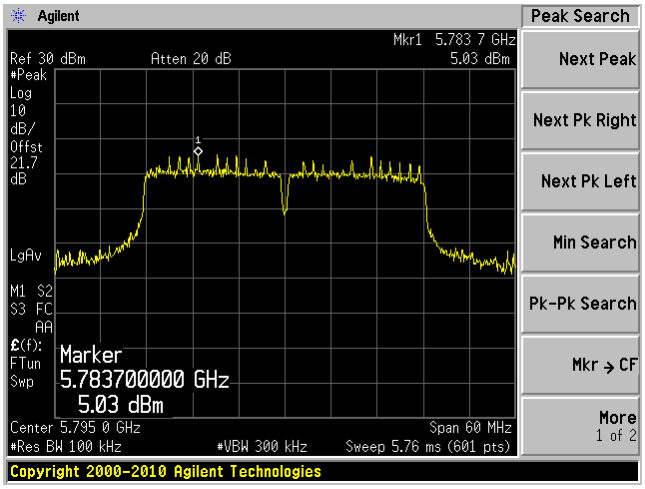
802.11n40 mode, Low Channel, Chain J8



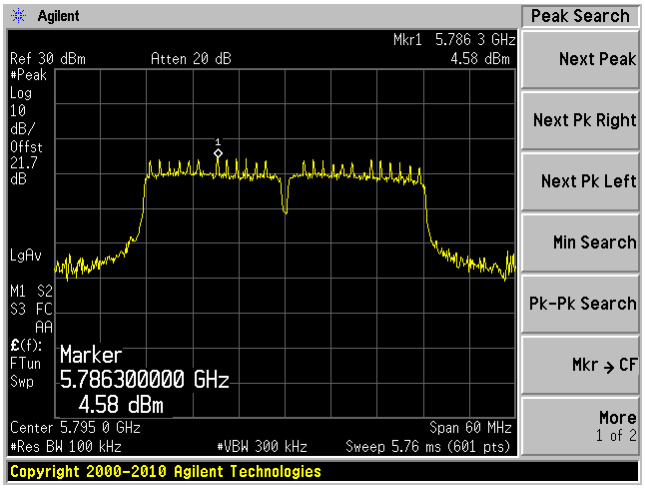
802.11n40 mode, Low Channel, Chain J6



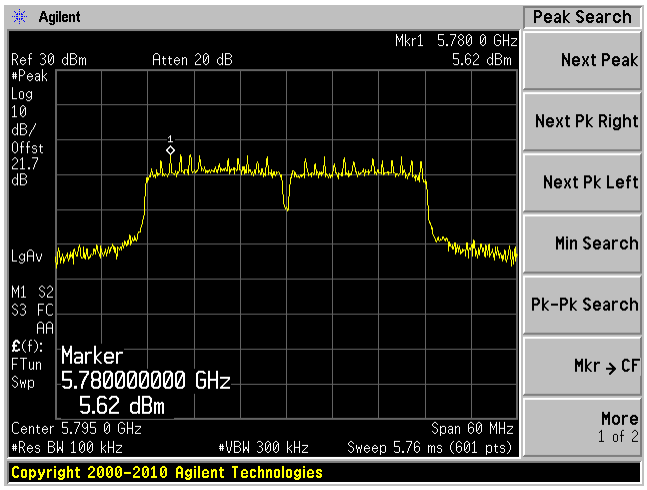
802.11n40 mode, High Channel, Chain J10



802.11n40 mode, High Channel, Chain J8



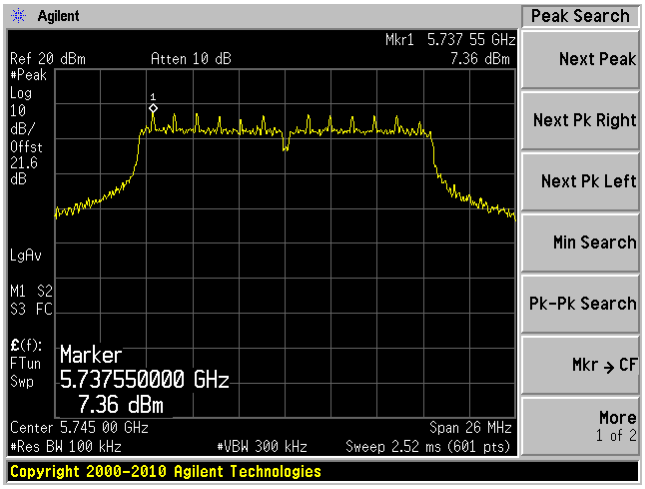
802.11n40 mode, High Channel, Chain J6



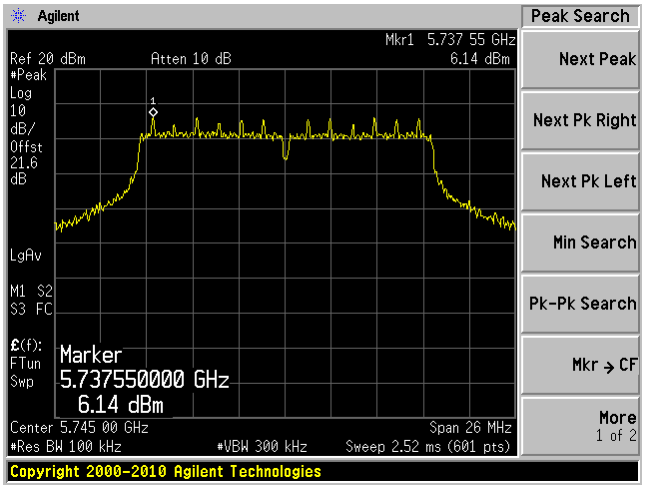
Antenna gain is 15 dBi

5725 – 5845 MHz

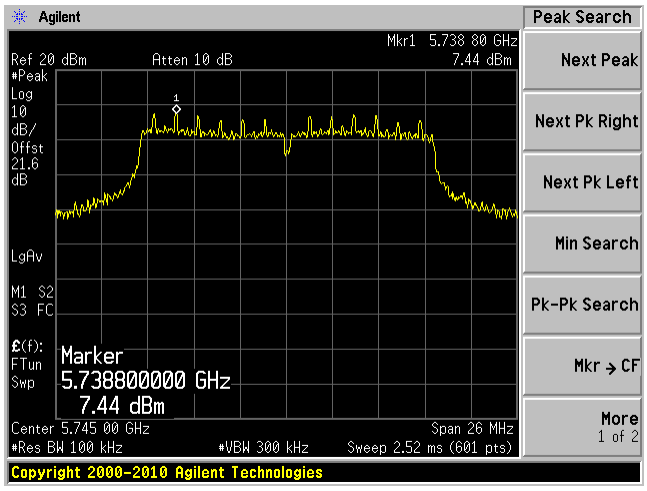
802.11a mode, Low Channel, Chain J10



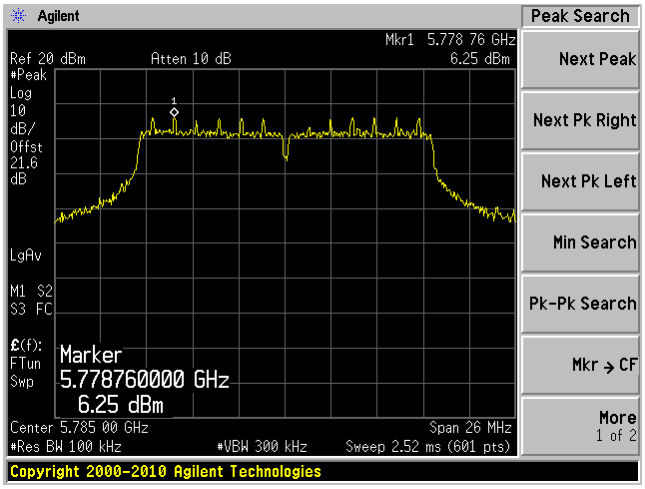
802.11a mode, Low Channel, Chain J8



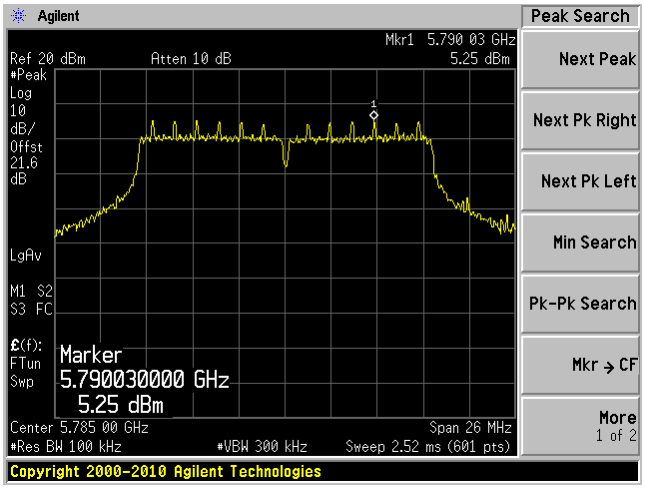
802.11a mode, Low Channel, Chain J6



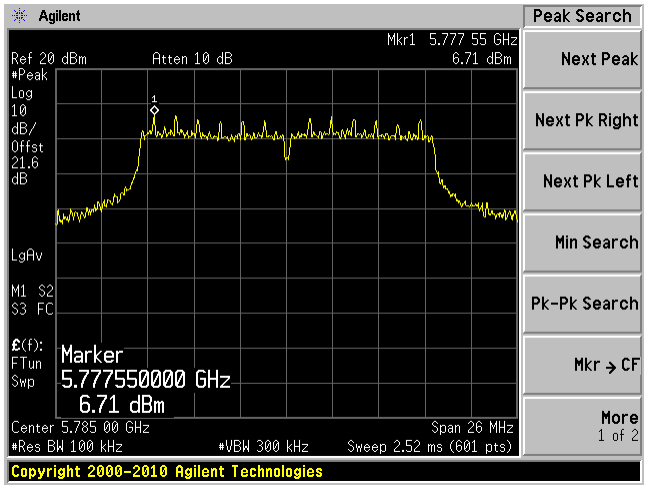
802.11a mode, Middle Channel, Chain J10



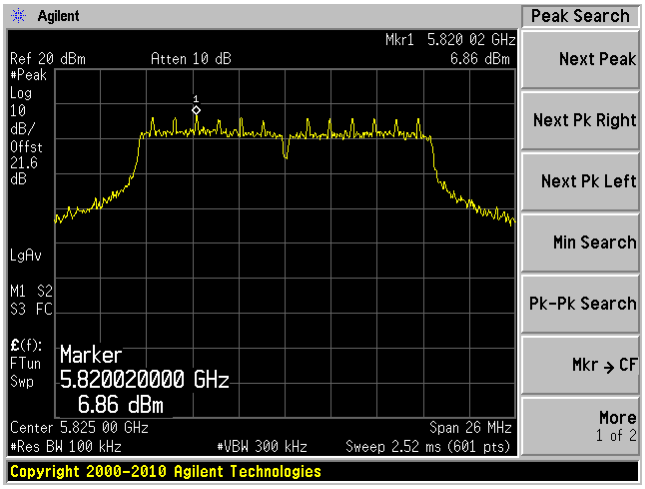
802.11a mode, Middle Channel, Chain J8



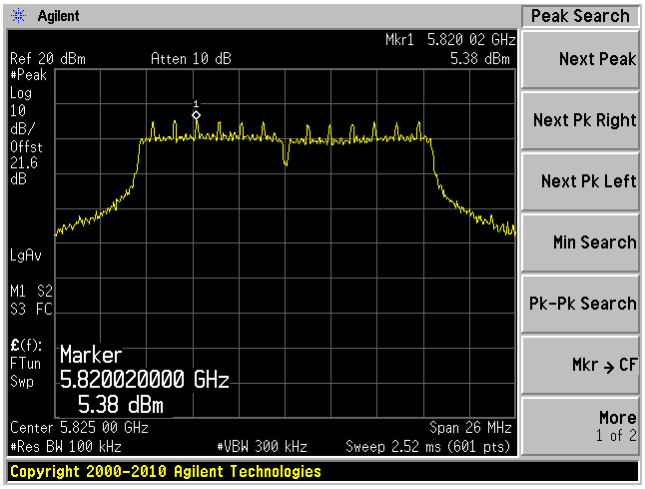
802.11a mode, Middle Channel, Chain J6



802.11a mode, High Channel, Chain J10



802.11a mode, High Channel, Chain J8



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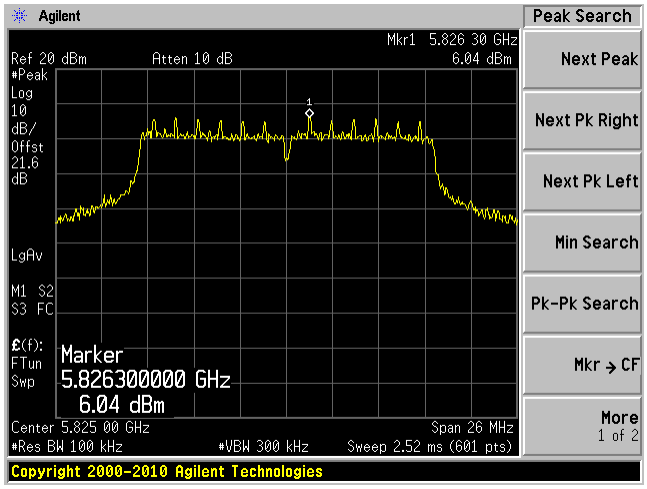
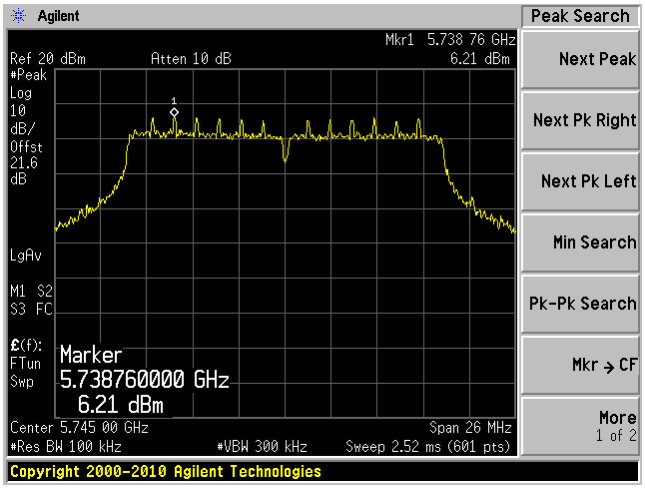
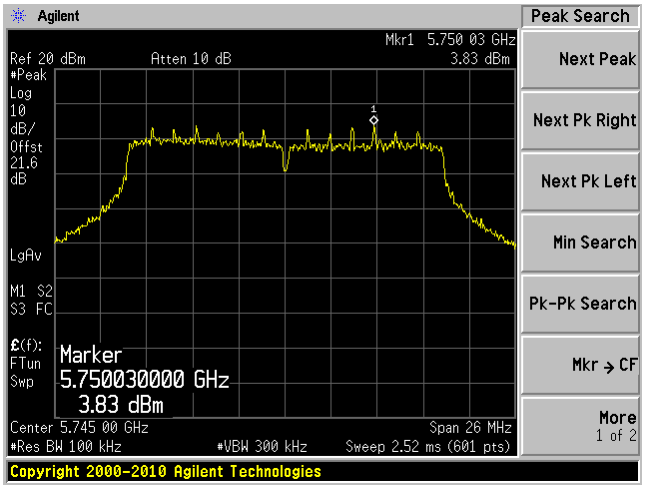


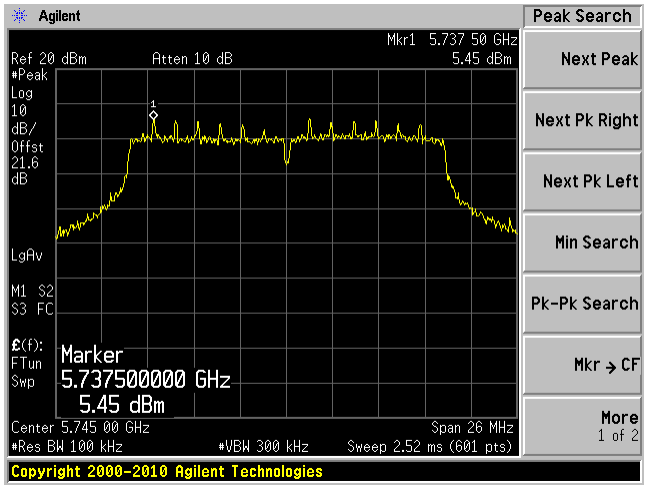
802.11n20 mode, Low Channel, Chain J10



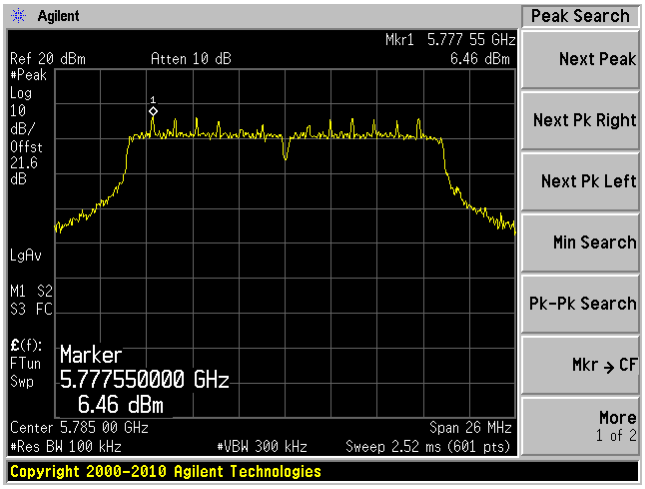
802.11n20 mode, Low Channel, Chain J8



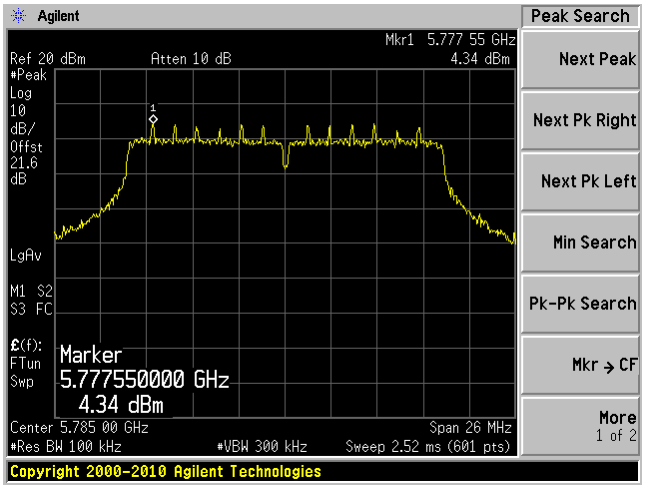
802.11n20 mode, Low Channel, Chain J6



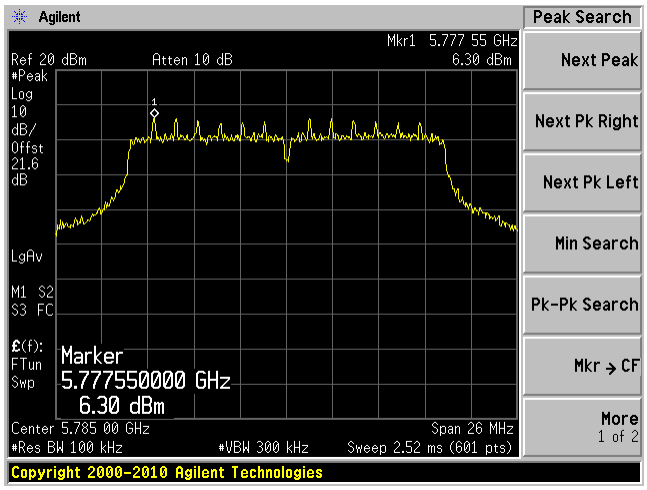
802.11n20 mode, Middle Channel, Chain J10



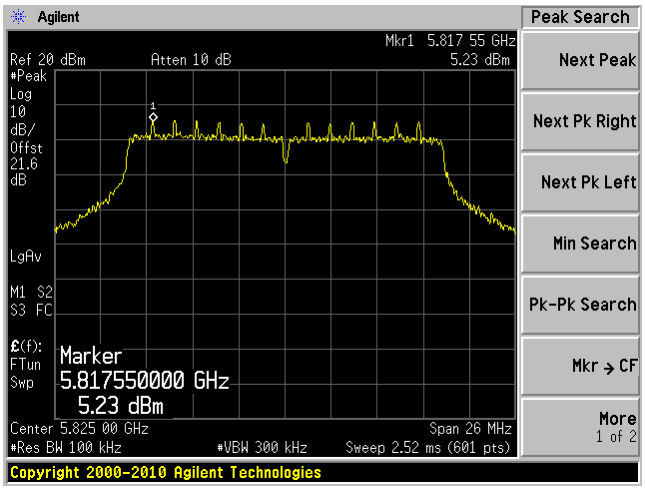
802.11n20 mode, Middle Channel, Chain J8



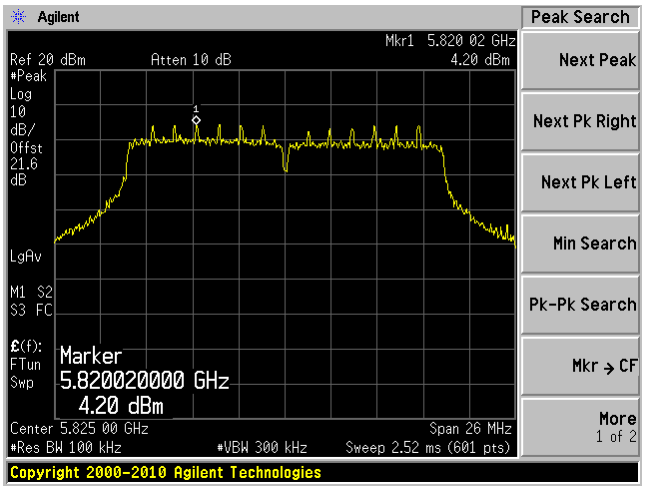
802.11n20 mode, Middle Channel, Chain J6



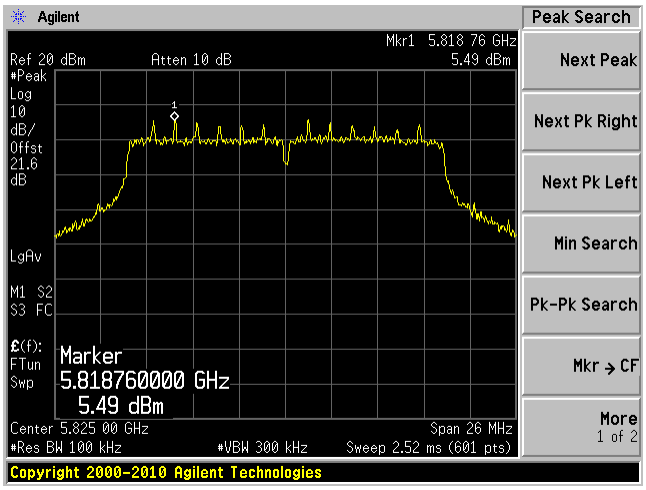
802.11 n20 mode, High Channel, Chain J10



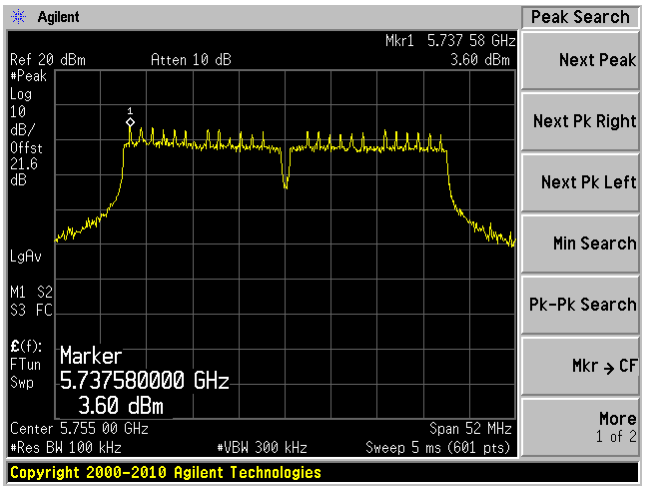
802.11 n20 mode, High Channel, Chain J8



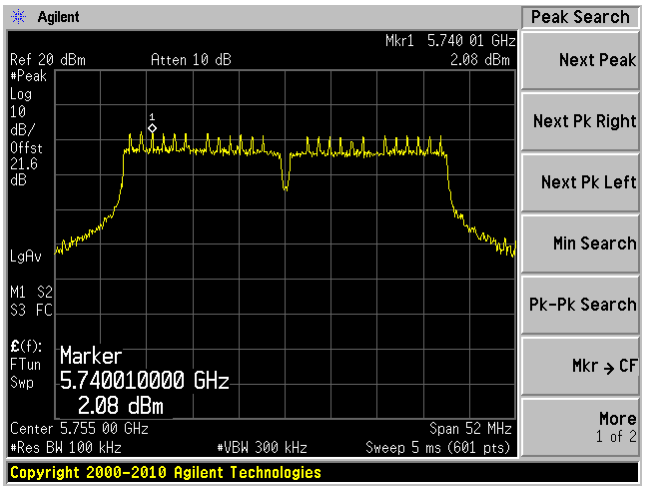
802.11 n20 mode, High Channel, Chain J6



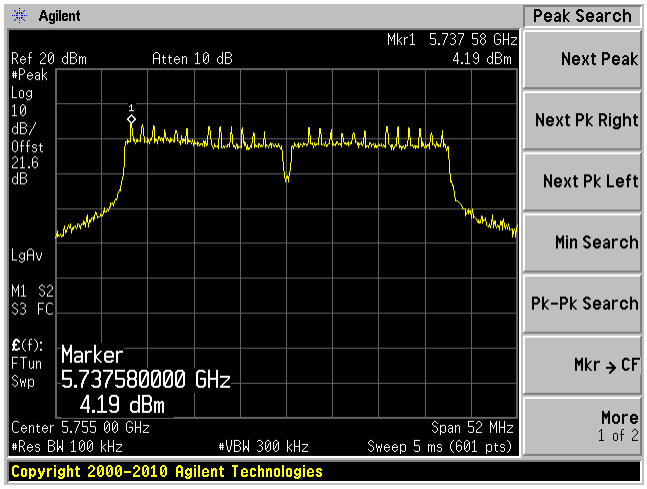
802.11n40 mode, Low Channel, Chain J10



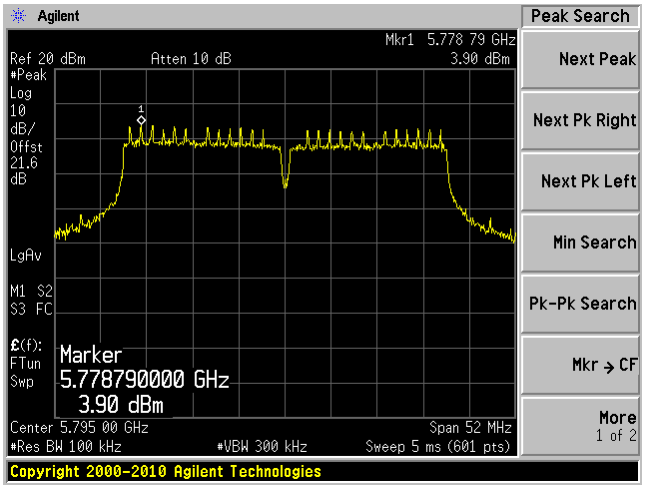
802.11n40 mode, Low Channel, Chain J8



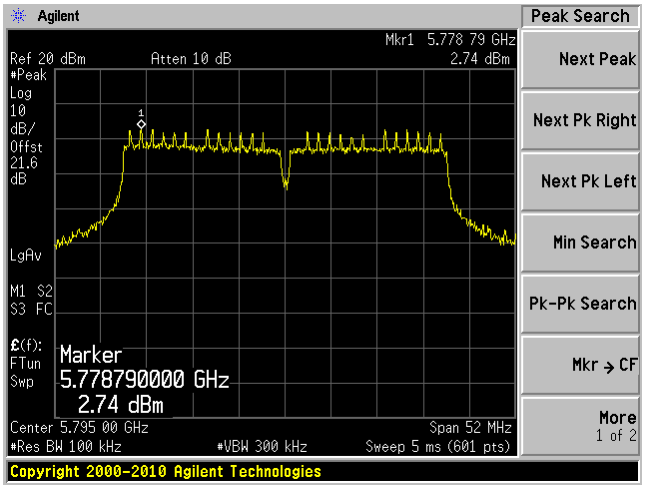
802.11n40 mode, Low Channel, Chain J6



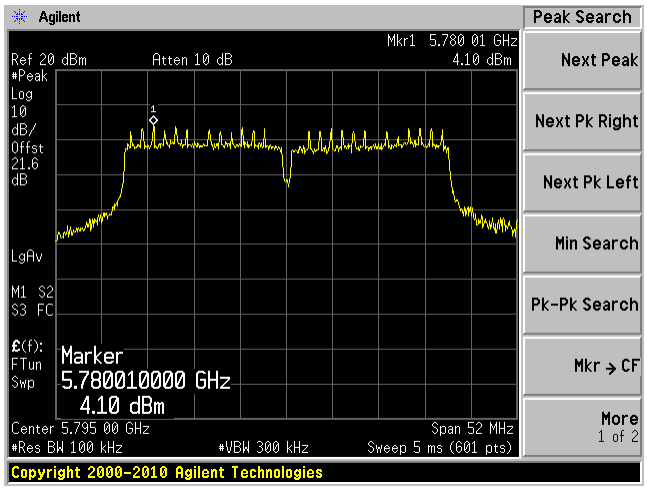
802.11n40 mode, High Channel, Chain J10



802.11n40 mode, High Channel, Chain J8



802.11n40 mode, High Channel, Chain J6



10 IC RSS-210 §2.3 & RSS-Gen §6 - Receiver Spurious Radiated Emissions

10.1 Applicable Standard

According to IC RSS-Gen §4.10, the receiver shall be operated in the normal receive mode near the mid-point of the band over which the receiver is designed to operate.

Unless otherwise specified in the applicable RSS, the radiated emission measurement is the standard measurement method (with the device's antenna in place) to measure receiver spurious emissions.

Radiated emission measurements are to be performed using a calibrated open-area test site.

For either method, the search for spurious emissions shall be from the lowest frequency internally generated or used in the receiver (e.g. local oscillator, intermediate or carrier frequency), or 30 MHz, whichever is the higher, to at least 3 times the highest tuneable or local oscillator frequency, whichever is the higher, without exceeding 40 GHz.

For emissions below 1 GHz, measurements shall be performed using a CISPR quasi-peak detector and the related measurement bandwidth. As an alternative to CISPR quasi-peak measurement, compliance with the emission limit can be demonstrated using measuring equipment employing a peak detector with the same measurement bandwidth as that for CISPR quasi-peak measurements. Above 1 GHz, measurements shall be performed using an average detector and a resolution bandwidth of 300 kHz to 1 MHz.

According to RSS-Gen §6.1, Table 2, the radiated limit of receiver spurious emissions

Frequency (MHz)	Field Strength (Microvolts/m at 3 meters)
30-88	100
88-216	150
216-960	200
Above 960	500

10.2 EUT Setup

The radiated emissions tests were performed in the 3 meter chamber, using the setup in accordance with ANSI C63.4-2009.

10.3 Test Procedure

Maximizing procedure was performed on the six (6) highest emissions to ensure EUT compliance is with all installation combinations.

All data were recorded in the peak detection mode. Quasi-peak readings was performed only when an emissions was found to be marginal (within -4 dB of specification limits), and are distinguished with a "**QP**" in the data table.

10.4 Corrected Amplitude & 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. The equation for margin calculation is as follows:

Margin = Corrected Amplitude – Limit

10.5 Test Equipment Lists and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Interval
Sunol Science Corp	Combination Antenna	JB3	A020106-3	2011-06-29	1 year
Rohde & Schwarz	EMI Test Receiver	ESCI 1166.5950K03	100337	2011-03-21	1 year
Sunol Science Corp	System Controller	SC99V	122303-1	N/R	-
EMCO	Horn antenna	3115	9511-4627	2011-10-03	1 year
Agilent	PSA Series Spectrum Analyzer	E4440A	MY44303352	2011-05-10	1 year
HP	Pre Amplifier	8449B	3147A00400	2011-02-03	1 year

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

10.6 Test Environmental Conditions

Temperature:	18~23 °C
Relative Humidity:	36~45 %
ATM Pressure:	101-102 kPa

The testing was performed by Quinn Jiang from 11-28-2011 to 11-29-2011 in 5 meter chamber 3.

10.7 Summary of Test Results

According to the test data, the EUT complied with the with the IC RSS-210/RSS-Gen, with the closest margins from the limit listed below:

Mode: Receiving			
Margin (dB)	**Frequency (MHz)**	**Polarization (Horizontal/Vertical)**	**Range (GHz)**
-1.303	1200	Vertical	Above 1 GHz

10.8 Test Results

Radiated Emission at 3 meters

Antenna gain 5 dBi

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC	
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)
1200	52.73	263	100	V	25.257	2	27.29	53.127	54	-1.303
1200	51.08	188	100	H	25.257	2	27.29	51.047	54	-2.953
2800	44.13	255	100	V	28.449	3.2	27.58	48.199	54	-5.801
2800	42.07	42	100	H	28.449	3.2	27.58	46.139	54	-7.861
250	40.69	272	100	V	12.3	11.32	25.2	39.11	46	-6.89

Antenna gain 15 dBi

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC	
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)
1200	51.03	271	100	V	25.257	2	27.29	50.997	54	-3.003
1200	50.88	155	100	H	25.257	2	27.29	50.847	54	-3.153
2800	45.16	260	100	V	28.449	3.2	27.58	49.229	54	-4.771
2800	43.92	45	100	H	28.449	3.2	27.58	47.989	54	-6.011
250	41.68	270	100	V	12.3	11.32	25.2	40.1	46	-5.9