

FCC REPORT

Applicant: Shenzhen Awood Computer Technology Co., Ltd.

Address of Applicant: 8/F.Huichao technology Building, Jinhai Rd, Xixiang-Baoan District, Shenzhen, China

Equipment Under Test (EUT)

Product Name: Notebook Computer

Model No.: X1

FCC ID: 2AFLU-X1

Applicable standards: FCC CFR Title 47 Part 15 Subpart C Section 15.407:2014

Date of sample receipt: July 20, 2015

Date of Test: July 21-30, 2015

Date of report issue: August 03, 2015

Test Result : PASS *

* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:



Robinson Lo

Laboratory Manager

This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product and does not permit the use of the GTS product certification mark. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

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2 Version

Version No.	Date	Description
00	August 03, 2015	Original

Prepared By:

Sam. Gao

Date:

August 03, 2015

Project Engineer

Check By:

Hank. Yan

Date:

August 03, 2015

Reviewer

3 Contents

	Page
1 COVER PAGE	1
2 VERSION	2
3 CONTENTS	3
4 TEST SUMMARY	4
4.1 MEASUREMENT UNCERTAINTY	4
5 GENERAL INFORMATION	5
5.1 CLIENT INFORMATION	5
5.2 GENERAL DESCRIPTION OF EUT	5
5.3 TEST MODE	6
5.4 TEST FACILITY	6
5.5 TEST LOCATION	6
5.6 DESCRIPTION OF SUPPORT UNITS	6
5.7 DEVIATION FROM STANDARDS	6
5.8 ABNORMALITIES FROM STANDARD CONDITIONS	6
5.9 OTHER INFORMATION REQUESTED BY THE CUSTOMER	6
5.10 TEST INSTRUMENTS LIST	7
5 TEST RESULTS AND MEASUREMENT DATA	9
5.1 ANTENNA REQUIREMENT:	9
5.2 CONDUCTED EMISSIONS	10
5.3 EMISSION BANDWIDTH AND 99% OCCUPIED BANDWIDTH	13
5.4 PEAK TRANSMIT POWER	25
5.5 PEAK POWER SPECTRAL DENSITY	27
5.6 BAND EDGE	41
5.7 RADIATED EMISSION	50
5.8 FREQUENCY STABILITY	56
6 TEST SETUP PHOTO	61
7 EUT CONSTRUCTIONAL DETAILS	63

4 Test Summary

Test Item	Section in CFR 47	Result
Antenna requirement	15.203	PASS
AC Power Line Conducted Emission	15.207	PASS
Peak Transmit Power	15.407(a)(1)	PASS
Power Spectral Density	15.407(a)(1)	PASS
Undesirable Emission	15.407(b)(6), 15.205/15.209	PASS
Radiated Emission	15.205/15.209	PASS
Band Edge	15.205	PASS
Frequency Stability	15.407(g)	PASS

Remark:

Pass: The EUT complies with the essential requirements in the standard.

Fail: The EUT does not comply with the essential requirements in the standard.

4.1 Measurement Uncertainty

Test Item	Frequency Range	Measurement Uncertainty	Notes
Radiated Emission	9kHz ~ 30MHz	$\pm 4.34\text{dB}$	(1)
Radiated Emission	30MHz ~ 1000MHz	$\pm 4.24\text{dB}$	(1)
Radiated Emission	1GHz ~ 40GHz	$\pm 4.68\text{dB}$	(1)
AC Power Line Conducted Emission	0.15MHz ~ 30MHz	$\pm 3.45\text{dB}$	(1)

Note (1): The measurement uncertainty is for coverage factor of k=2 and a level of confidence of 95%.

Remark: Test according to ANSI C63.10:2013 and ANSI C63.4:2014

5 General Information

5.1 Client Information

Applicant:	Shenzhen Awood Computer Technology Co., Ltd.
Address of Applicant:	8/F.Huichao technology Building, Jinhai Rd, Xixiang-Baoan District, Shenzhen, China
Manufacturer:	Shenzhen Awood Computer Technology Co., Ltd.
Address of Manufacturer:	8/F.Huichao technology Building, Jinhai Rd, Xixiang-Baoan District, Shenzhen, China
Factory:	SHENZHEN IEZO ELECTRONIC TECHNOLOGIES CO., LTD.
Address of Factory:	102 Room for F Buliding 1 Floor, 3 Floor, 2 Floor for Eest West, 4 Floor for East , 201 Room for E Buliding, New Wood Road 6th, New Wood Community, Pinghu Street, Longgang District, Shenzhen, China

5.2 General Description of EUT

Product Name:	Notebook Computer
Model No.:	X1
Operation Frequency:	802.11a/802.11n(HT20)/802.11ac(HT20): 5180MHz ~ 5240MHz; 802.11n(HT40)/ 802.11ac(HT40): 5190MHz ~ 5230MHz 802.11ac(HT80): 5210MHz
Channel numbers:	802.11a/802.11n(HT20)/802.11ac(HT20): 4; 802.11n(HT40)/ 802.11ac(HT40): 2 802.11ac(HT80): 1
Channel separation:	802.11a/802.11n(HT20)/802.11ac(HT20): 20MHz; 802.11n(HT40)/ 802.11ac(HT40): 40MHz 802.11ac(HT80): 80MHz
Modulation technology:	OFDM
Antenna Type:	Integral Antenna
Antenna gain:	0.85dBi (declare by Applicant)
Power supply:	Adapter: Model No.:HKA03619021-6C Input: AC 100~240V~50/60Hz 1.0A Output: DC 19.0V 2.1A

5.3 Test mode

Transmitting mode	Keep the EUT in transmitting with modulation. EUT was test with 99% duty cycle at its maximum power control level.
<i>Remark: During the test, the test voltage was tuned from 85% to 115% of the nominal rated supply voltage, and found that the worst case was under the nominal rated supply condition. So the report just shows that condition's data.</i>	

5.4 Test Facility

The test facility is recognized, certified, or accredited by the following organizations: ● FCC —Registration No.: 600491 Global United Technology Services Co., Ltd., Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in files. Registration 600491, June 28, 2013. ● Industry Canada (IC) —Registration No.: 9079A-2 The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. Has been Registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 9079A-2, June 26, 2013.

5.5 Test Location

All tests were performed at:
Global United Technology Services Co., Ltd. Address: Room 301-309, 3th Floor, Block A, Huafeng Jinyuan Business Building, No. 300 Laodong Industrial Zone, Xixiang Road, Baoan District, Shenzhen 518102 Tel: 0755-27798480 Fax: 0755-27798960

5.6 Description of Support Units

None.

5.7 Deviation from Standards

None.

5.8 Abnormalities from Standard Conditions

None.

5.9 Other Information Requested by the Customer

None.

5.10 Test Instruments list

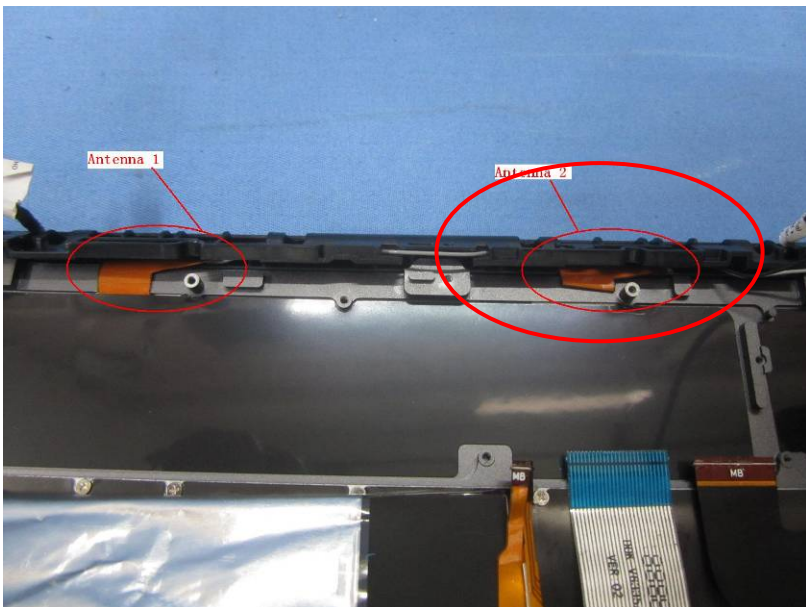
Radiated Emission:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	3m Semi- Anechoic Chamber	ZhongYu Electron	9.2(L)*6.2(W)*6.4(H)	GTS250	Mar. 28 2015	Mar. 27 2016
2	Control Room	ZhongYu Electron	6.2(L)*2.5(W)*2.4(H)	GTS251	N/A	N/A
3	EMI Test Receiver	Rohde & Schwarz	ESU26	GTS203	June 30 2015	June 29 2016
4	Spectrum analyzer	Agilent	E4447A	GTS516	June 30 2015	June 29 2016
5	Spectrum Analyzer	Agilent	E4440A	GTS533	Nov. 19 2014	Nov. 18 2015
6	BiConiLog Antenna	SCHWARZBECK MESS- ELEKTRONIK	VULB9163	GTS214	Feb. 22 2015	Feb. 21 2016
7	Double -ridged waveguide horn	SCHWARZBECK MESS- ELEKTRONIK	9120D-829	GTS208	June 30 2015	June 29 2016
8	Horn Antenna	ETS-LINDGREN	3160	GTS217	Mar. 28 2015	Mar. 27 2016
9	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
10	Coaxial Cable	GTS	N/A	GTS213	Mar. 28 2015	Mar. 27 2016
11	Coaxial Cable	GTS	N/A	GTS211	Mar. 28 2015	Mar. 27 2016
12	Coaxial cable	GTS	N/A	GTS210	Mar. 28 2015	Mar. 27 2016
13	Coaxial Cable	GTS	N/A	GTS212	Mar. 28 2015	Mar. 27 2016
14	Amplifier(100kHz-3GHz)	HP	8347A	GTS204	June 30 2015	June 29 2016
15	Amplifier(2GHz-20GHz)	HP	8349B	GTS206	June 30 2015	June 29 2016
16	Amplifier (18-40GHz)	MITEQ	AMF-6F-18004000-29-8P	GTS534	June 30 2015	June 29 2016
17	Band filter	Amindeon	82346	GTS219	Mar. 28 2015	Mar. 27 2016
18	Constant temperature and humidity box	Oregon Scientific	BA-888	GTS248	Mar. 28 2015	Mar. 27 2016
19	D.C. Power Supply	Instek	PS-3030	GTS232	Mar. 28 2015	Mar. 27 2016
20	Universal radio communication tester	Rohde & Schwarz	CMU200	GTS235	Mar. 28 2015	Mar. 27 2016
21	Splitter	Agilent	11636B	GTS237	Mar. 28 2015	Mar. 27 2016
22	Power Meter	Anritsu	ML2495A	GTS540	June 30 2015	June 29 2016
23	Power Sensor	Anritsu	MA2411B	GTS541	June 30 2015	June 29 2016

Conducted Emission:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	Shielding Room	ZhongYu Electron	7.0(L)x3.0(W)x3.0(H)	GTS264	June 30 2015	June 29 2016
2	EMI Test Receiver	Rohde & Schwarz	ESCS30	GTS223	June 30 2015	June 29 2016
3	10dB Pulse Limita	Rohde & Schwarz	N/A	GTS224	June 30 2015	June 29 2016
4	Coaxial Switch	ANRITSU CORP	MP59B	GTS225	June 30 2015	June 29 2016
5	LISN	SCHWARZBECK MESS- ELEKTRONIK	NSLK 8127	GTS226	June 30 2015	June 29 2016
6	Coaxial Cable	GTS	N/A	GTS227	June 30 2015	June 29 2016
7	EMI Test Software	AUDIX	E3	N/A	N/A	N/A

General used equipment:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	Barometer	ChangChun	DYM3	GTS257	July 07 2015	July 06 2016

5 Test results and Measurement Data

5.1 Antenna requirement:

Standard requirement:	FCC Part15 C Section 15.203
<i>15.203 requirement:</i> <i>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, 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.</i>	
E.U.T Antenna:	<i>The antenna is Integral antenna. The best case gain of the antenna is 0.85dBi.</i>  Directional Gain Calculations is below: The same digital data are transmitted from the two antennas in a given symbol period, thus the antennas is categorization as correlated. Accroding to KDB 662911 D01 Multiple Transmitter Output v02r01 Section F)2)a)(i), the Directional Gain = $G_{ANT} + 10\log(2)$ dBi = $0.85 + 3.01$ dBi = 3.86dBi.

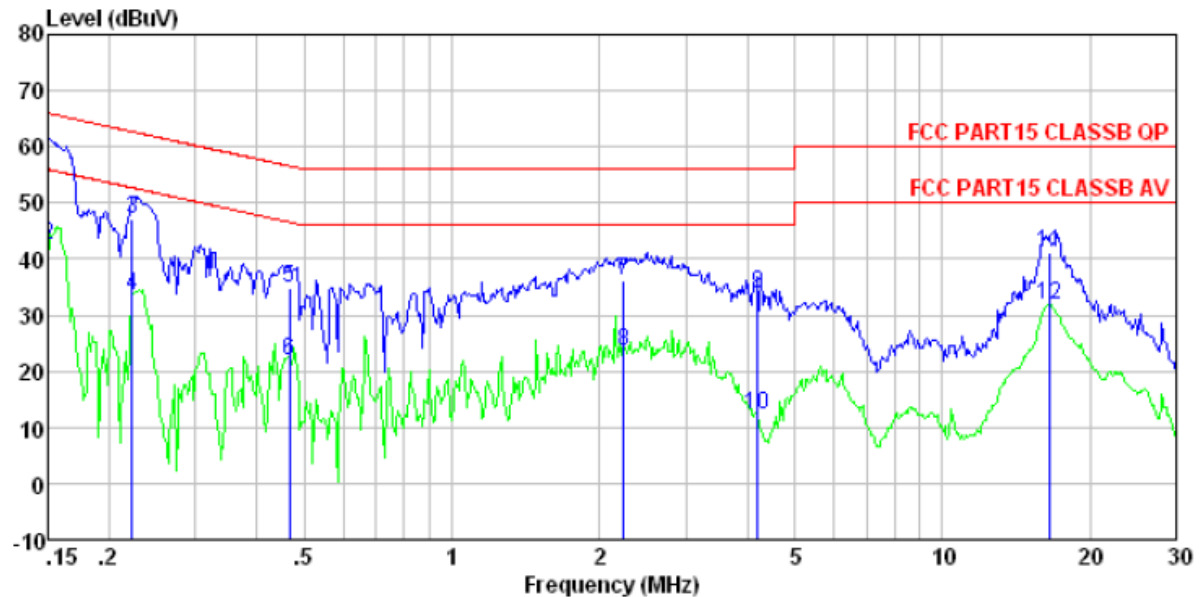
5.2 Conducted Emissions

Test Requirement:	FCC Part15 C Section 15.207		
Test Method:	ANSI C63.10:2013		
Test Frequency Range:	150KHz to 30MHz		
Class / Severity:	Class B		
Receiver setup:	RBW=9KHz, VBW=30KHz		
Limit:	Frequency range (MHz)	Limit (dBuV)	
		Quasi-peak	Average
	0.15-0.5	66 to 56*	56 to 46*
	0.5-5	56	46
	5-30	60	50
* Decreases with the logarithm of the frequency.			
Test procedure	The E.U.T and simulators are connected to the main power through a line impedance stabilization network(L.I.S.N.). The provide a 50ohm/50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refers to the block diagram of the test setup and photographs). Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10:2013 on conducted measurement.		
Test setup:	Reference Plane LISN AUX Equipment E.U.T 40cm 80cm LISN Filter EMI Receiver AC power Test table/Insulation plane Remark: E.U.T: Equipment Under Test LISN: Line Impedance Stabilization Network Test table height=0.8m		
Test Instruments:	Refer to section 5.10 for details		
Test mode:	Refer to section 5.3 for details. All of list mode were tested, and found the 802.11n(HT40) mode as the worst case. Only the data of worst case is reported.		
Test results:	Pass		

Measurement Data

An initial pre-scan was performed on the live and neutral lines with peak detector. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected.

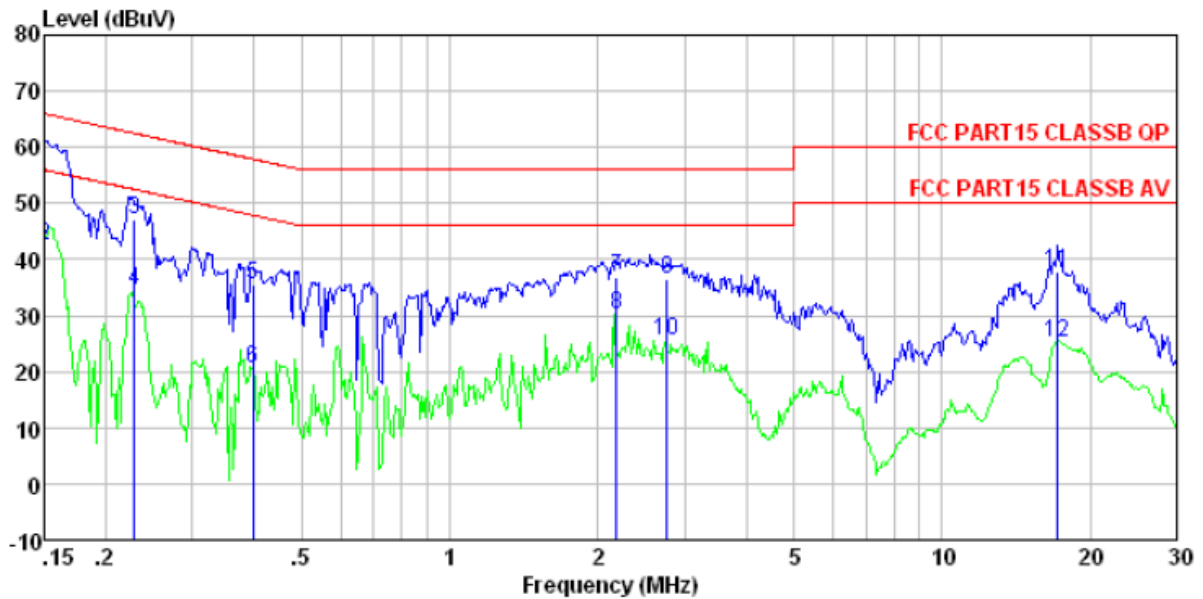
Line:



Condition : FCC PART15 CLASSB QP LISN-2013 LINE
 Job No. : 1138RF
 Test mode : Wifi mode(5G)
 Test Engineer: Song

	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.150	58.07	0.15	0.12	58.34	66.00	-7.66	QP
2	0.150	42.34	0.15	0.12	42.61	56.00	-13.39	Average
3	0.223	46.90	0.12	0.12	47.14	62.70	-15.56	QP
4	0.223	33.15	0.12	0.12	33.39	52.70	-19.31	Average
5	0.466	34.49	0.12	0.11	34.72	56.58	-21.86	QP
6	0.466	21.71	0.12	0.11	21.94	46.58	-24.64	Average
7	2.237	35.91	0.13	0.15	36.19	56.00	-19.81	QP
8	2.237	23.18	0.13	0.15	23.46	46.00	-22.54	Average
9	4.202	33.44	0.20	0.15	33.79	56.00	-22.21	QP
10	4.202	11.79	0.20	0.15	12.14	46.00	-33.86	Average
11	16.486	40.61	0.39	0.22	41.22	60.00	-18.78	QP
12	16.486	31.22	0.39	0.22	31.83	50.00	-18.17	Average

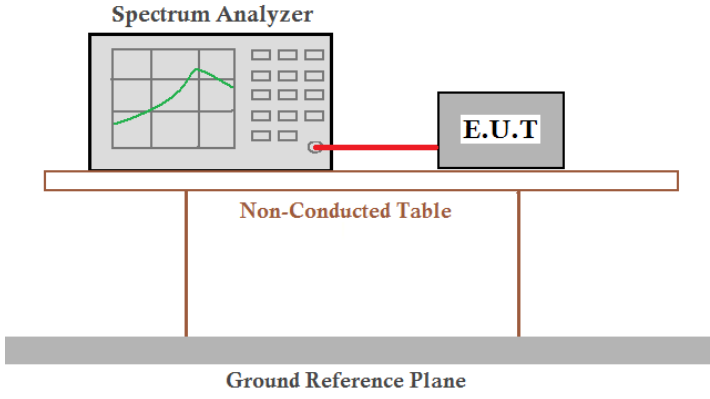
Neutral:



Condition : FCC PART15 CLASSB QP LISN-2013 NEUTRAL
 Job No. : 1138RF
 Test mode : Wifi mode(5G)
 Test Engineer: Song

	Read Freq	LISN Level	Cable Factor	Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV		dB	dBuV	dBuV	dB	
1	0.150	58.21	0.07	0.12	58.40	66.00	-7.60	QP
2	0.150	42.40	0.07	0.12	42.59	56.00	-13.41	Average
3	0.229	46.97	0.06	0.12	47.15	62.48	-15.33	QP
4	0.229	34.16	0.06	0.12	34.34	52.48	-18.14	Average
5	0.398	35.26	0.06	0.11	35.43	57.90	-22.47	QP
6	0.398	20.43	0.06	0.11	20.60	47.90	-27.30	Average
7	2.178	36.69	0.09	0.15	36.93	56.00	-19.07	QP
8	2.178	29.93	0.09	0.15	30.17	46.00	-15.83	Average
9	2.765	36.09	0.10	0.15	36.34	56.00	-19.66	QP
10	2.765	25.35	0.10	0.15	25.60	46.00	-20.40	Average
11	17.109	37.06	0.39	0.22	37.67	60.00	-22.33	QP
12	17.109	24.67	0.39	0.22	25.28	50.00	-24.72	Average

5.3 Emission Bandwidth and 99% Occupied Bandwidth

Test Requirement:	FCC Part15 E Section 15.407
Test Method:	ANSI C63.10:2013 and KDB 789033 D02 General UNII Test Procedures New Rules v01
Limit:	N/A
Test setup:	 The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T. (Equipment Under Test) via a red cable. Both are placed on a Non-Conducted Table, which is supported by a Ground Reference Plane.
Test procedure:	According to KDB 789033 D02 General UNII Test Procedures New Rules v01.
Test Instruments:	Refer to section 5.10 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass

Measurement Data:

ANT:1

CH. No.	Frequency (MHz)	99% Occupied Bandwidth (MHz)			26dB Occupied Bandwidth (MHz)		
		802.11a	802.11n(HT 20)	802.11ac(H T20)	802.11a	802.11n(HT 20)	802.11ac(H T20)
36	5180.00	16.527	17.831	17.890	20.473	25.557	24.627
40	5200.00	16.511	17.872	17.874	20.101	24.950	24.212
48	5240.00	16.492	17.866	17.911	20.427	23.634	24.857

CH. No.	Frequency (MHz)	99% Occupied Bandwidth (MHz)		26dB Occupied Bandwidth (MHz)	
		802.11n(HT40)	802.11ac(HT40)	802.11n(HT40)	802.11ac(HT40)
38	5190.00	35.910	35.916	41.117	42.749
46	5230.00	35.925	35.952	41.131	42.866

CH. No.	Frequency (MHz)	99% Occupied Bandwidth (MHz)	26dB Occupied Bandwidth (MHz)
		802.11ac(HT80)	802.11ac(HT80)
42	5210.00	74.664	80.691

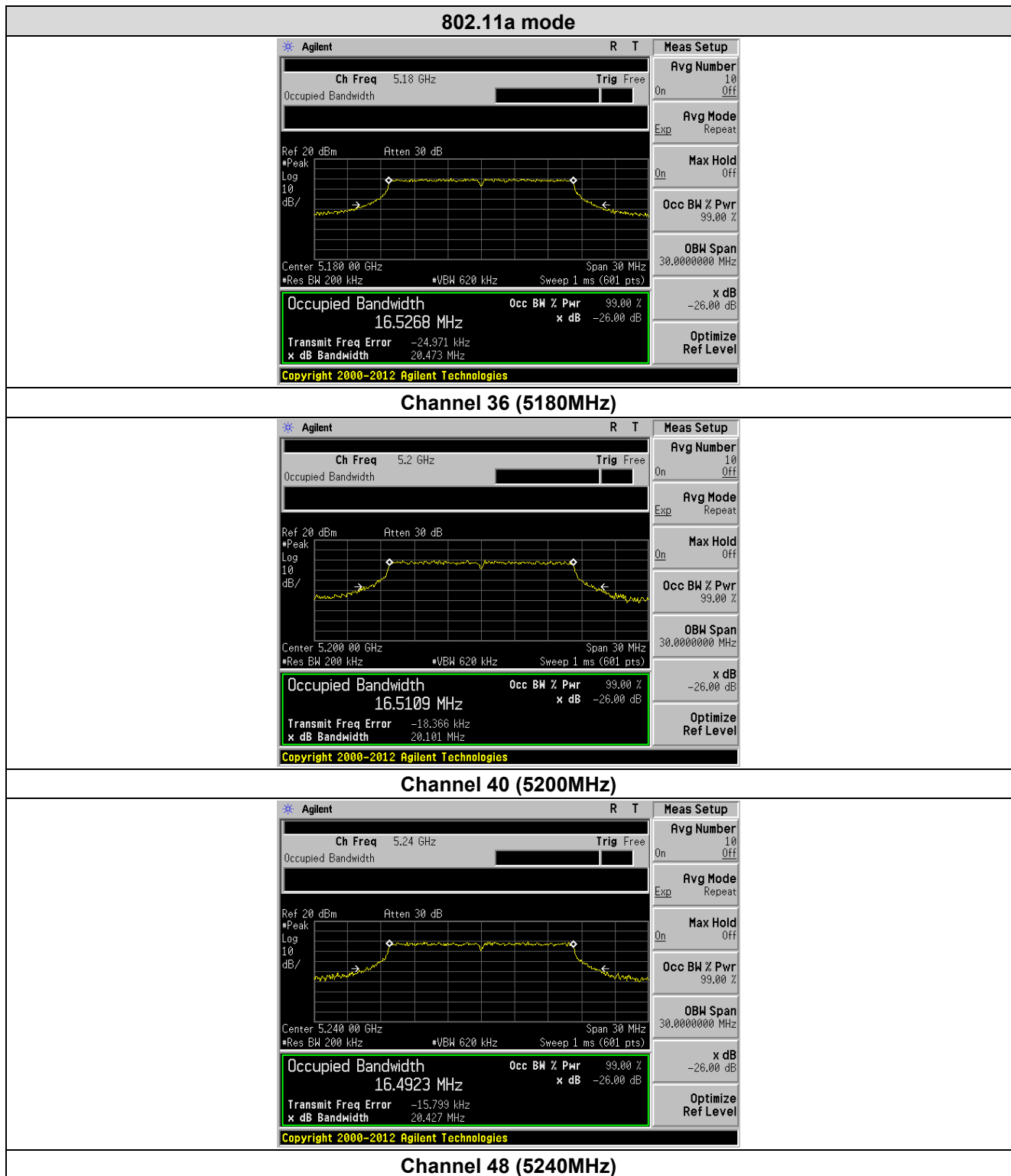
ANT:2

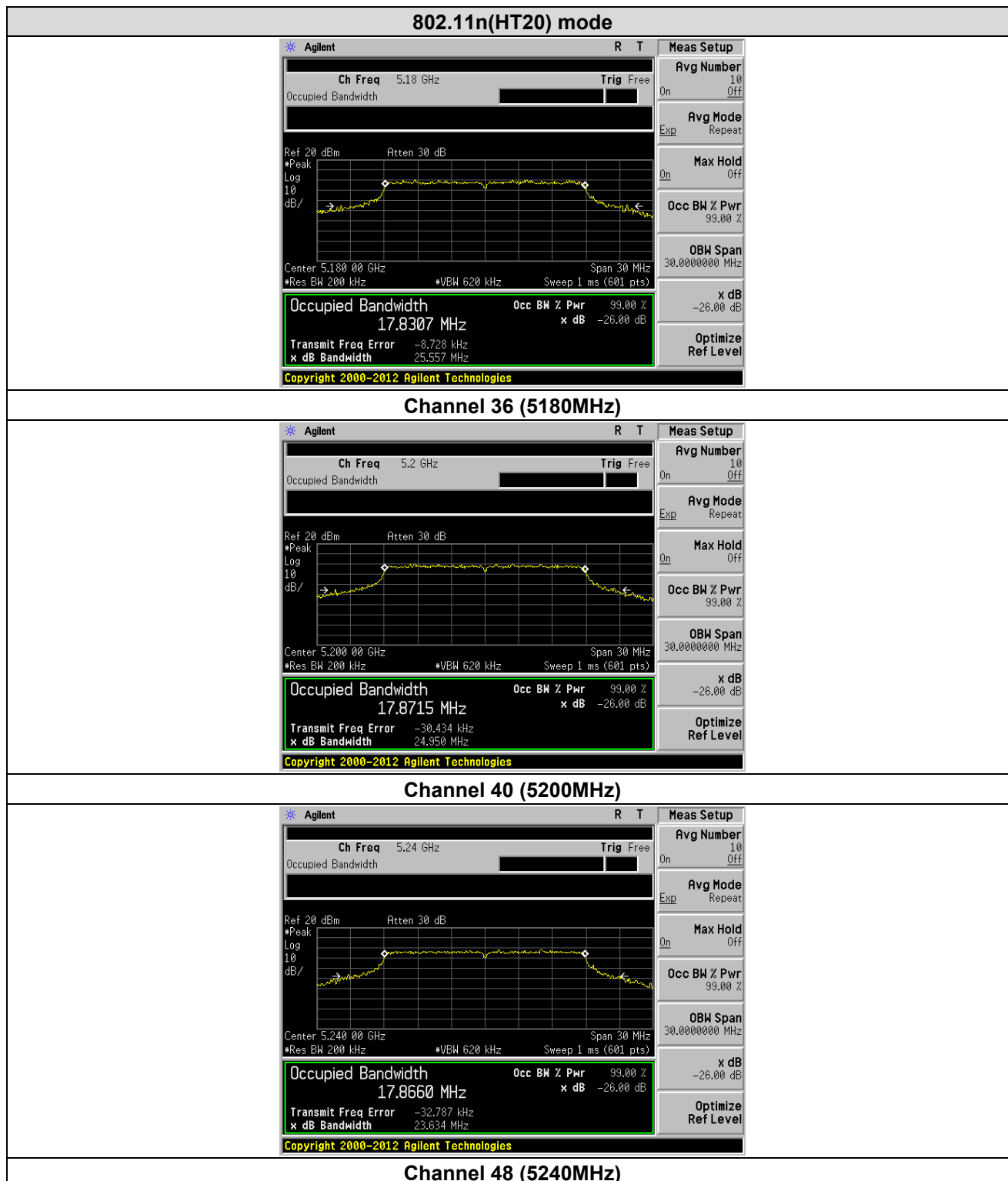
CH. No.	Frequency (MHz)	99% Occupied Bandwidth (MHz)			26dB Occupied Bandwidth (MHz)		
		802.11a	802.11n(HT 20)	802.11ac(H T20)	802.11a	802.11n(HT 20)	802.11ac(H T20)
36	5180.00	16.532	17.840	17.983	20.340	22.954	25.333
40	5200.00	16.490	17.829	17.869	20.047	22.880	24.598
48	5240.00	16.518	17.850	17.897	20.408	22.959	24.155

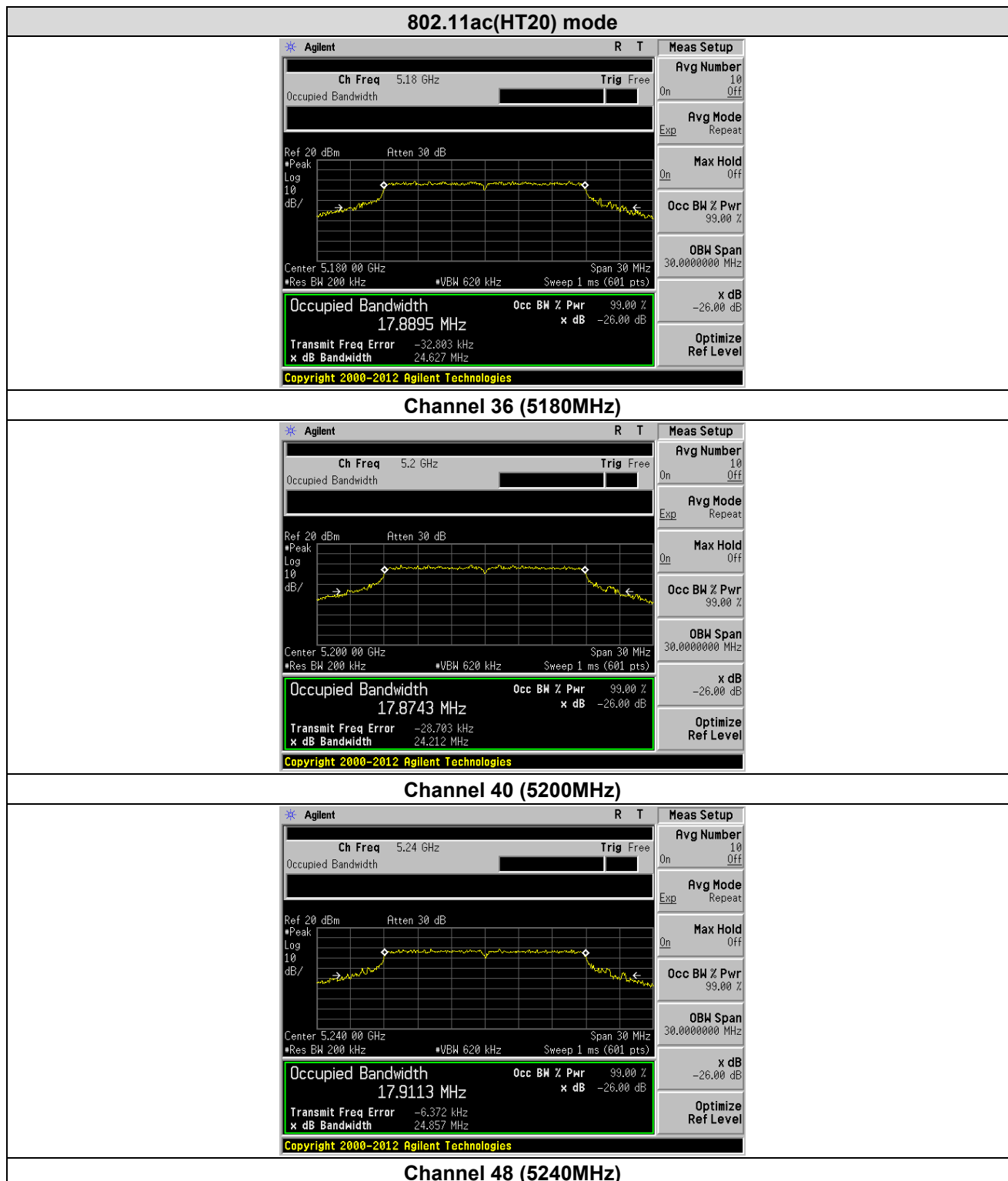
CH. No.	Frequency (MHz)	99% Occupied Bandwidth (MHz)		26dB Occupied Bandwidth (MHz)	
		802.11n(HT40)	802.11ac(HT40)	802.11n(HT40)	802.11ac(HT40)
38	5190.00	35.879	35.951	41.433	42.481
46	5230.00	35.840	35.883	41.173	42.125

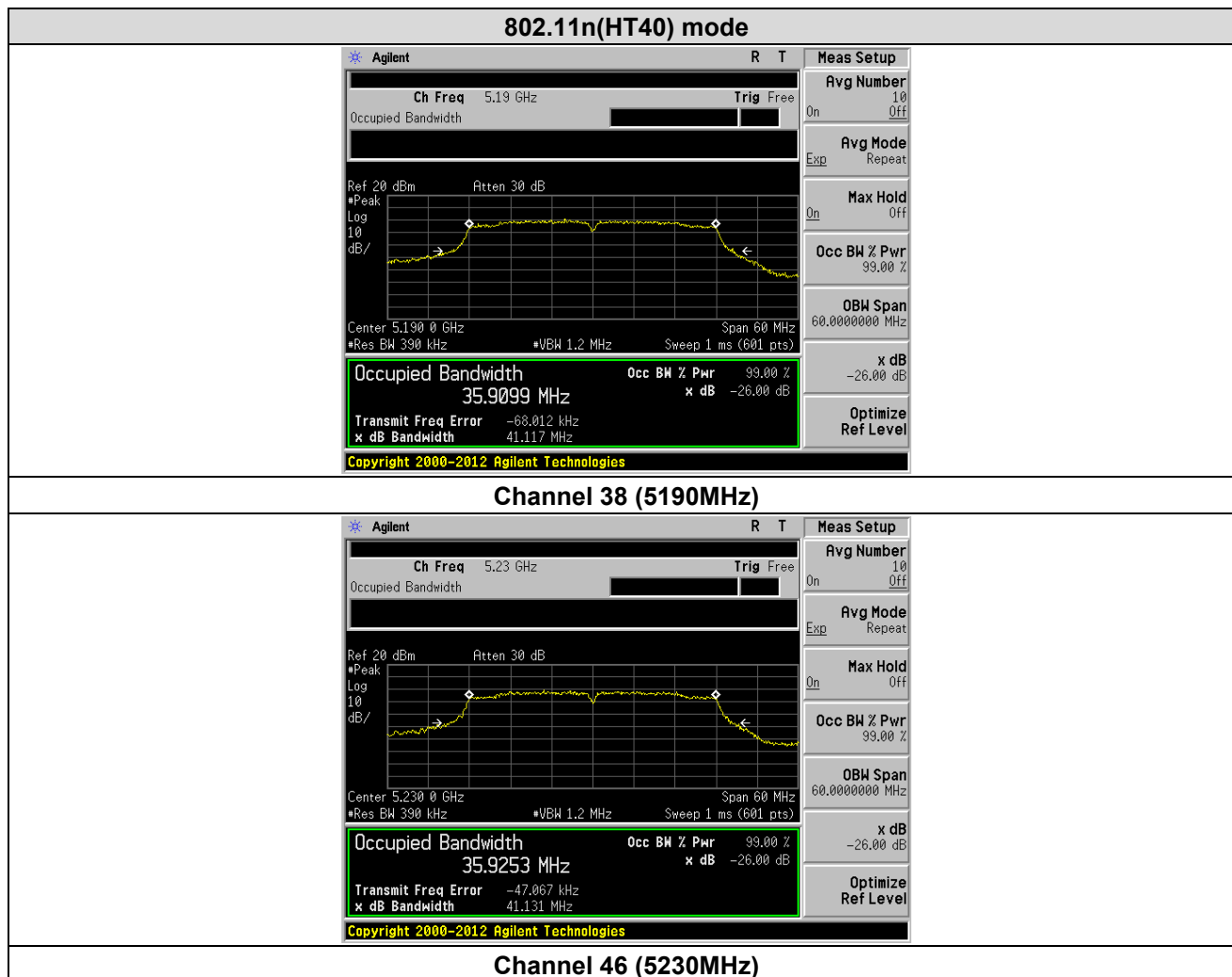
CH. No.	Frequency (MHz)	99% Occupied Bandwidth (MHz)	26dB Occupied Bandwidth (MHz)
		802.11ac(HT80)	802.11ac(HT80)
42	5210.00	74.679	81.315

Test plots as followed:
ANT:1

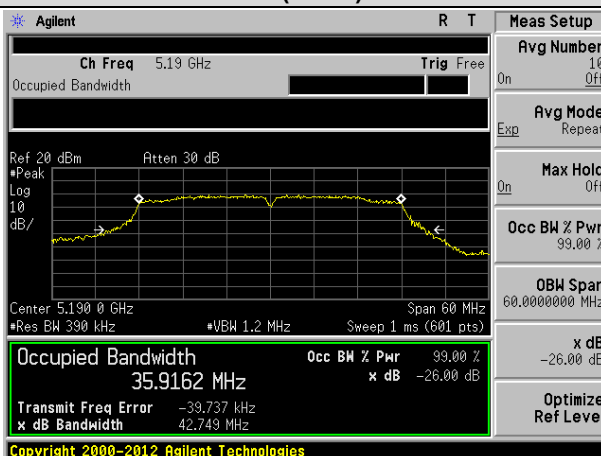




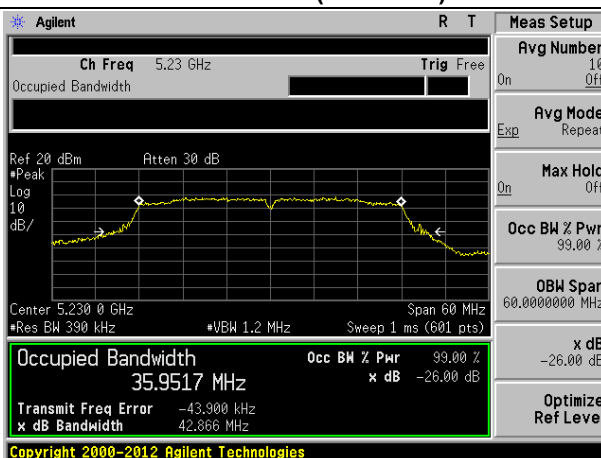




802.11ac(HT40) mode

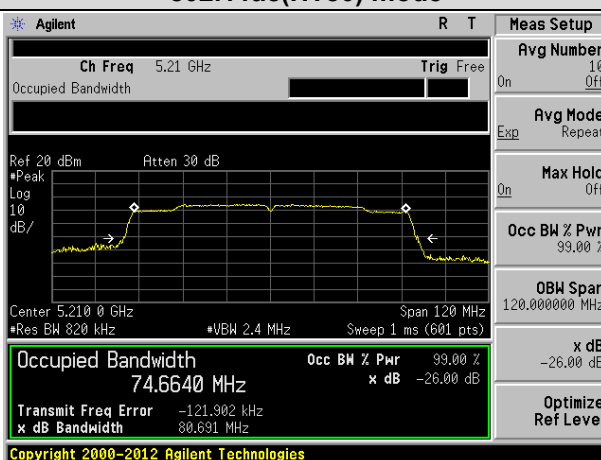


Channel 38 (5190MHz)



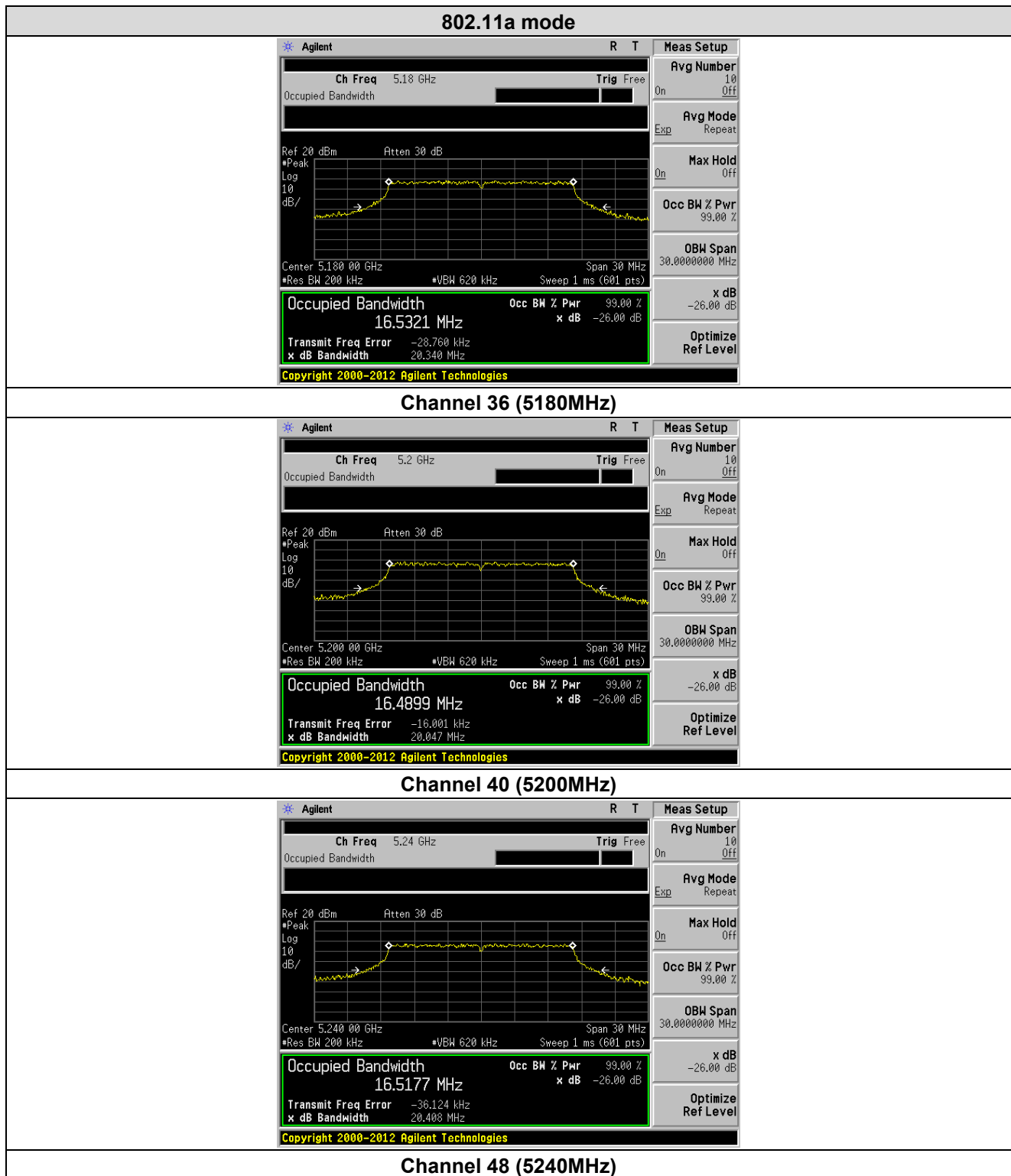
Channel 46 (5230MHz)

802.11ac(HT80) mode

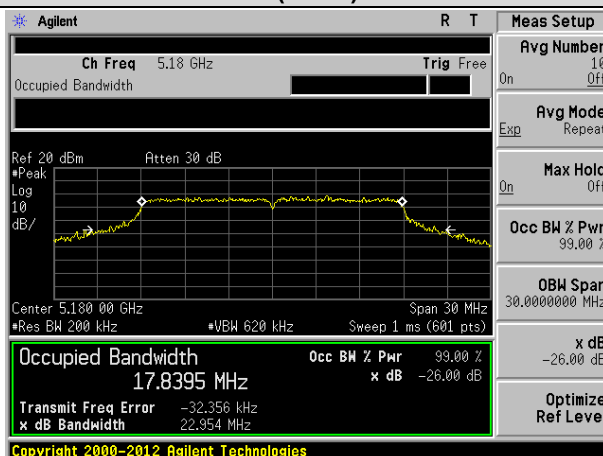


Channel 40 (5210MHz)

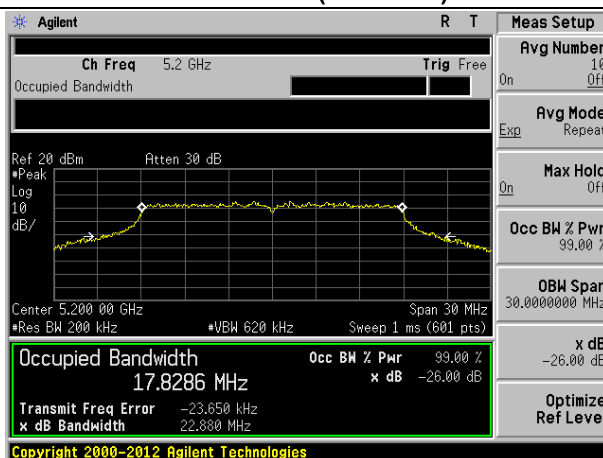
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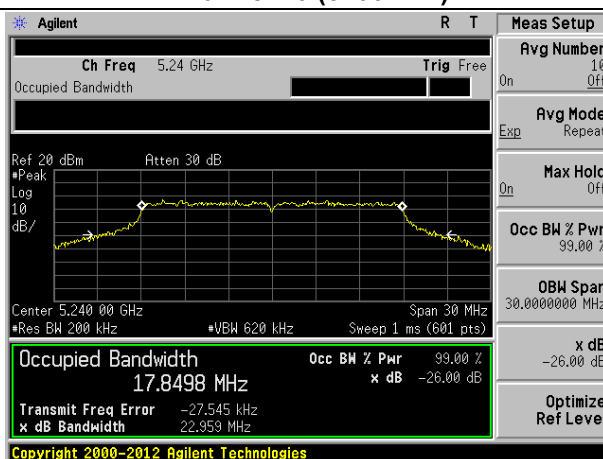
802.11n(HT20) mode



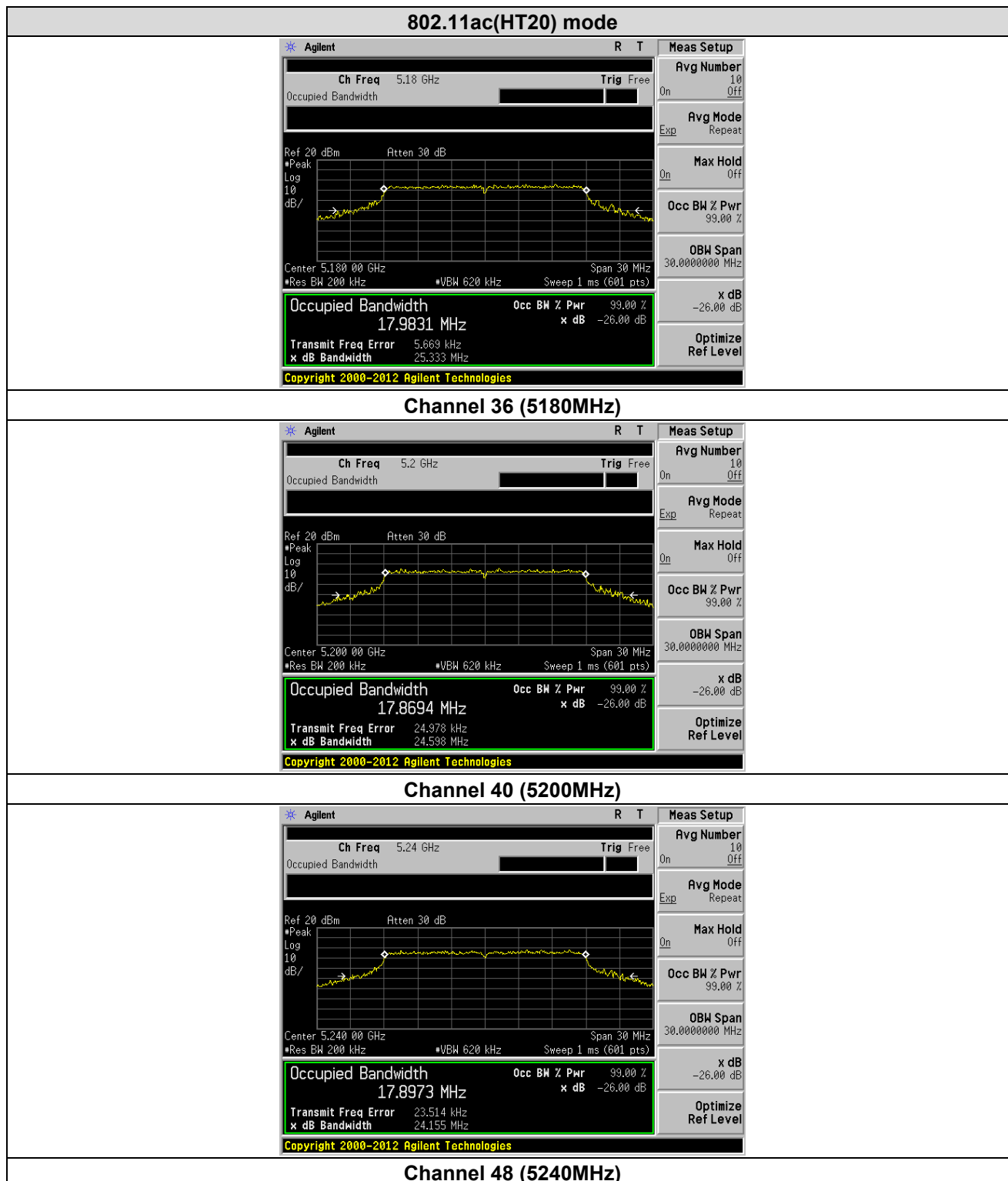
Channel 36 (5180MHz)

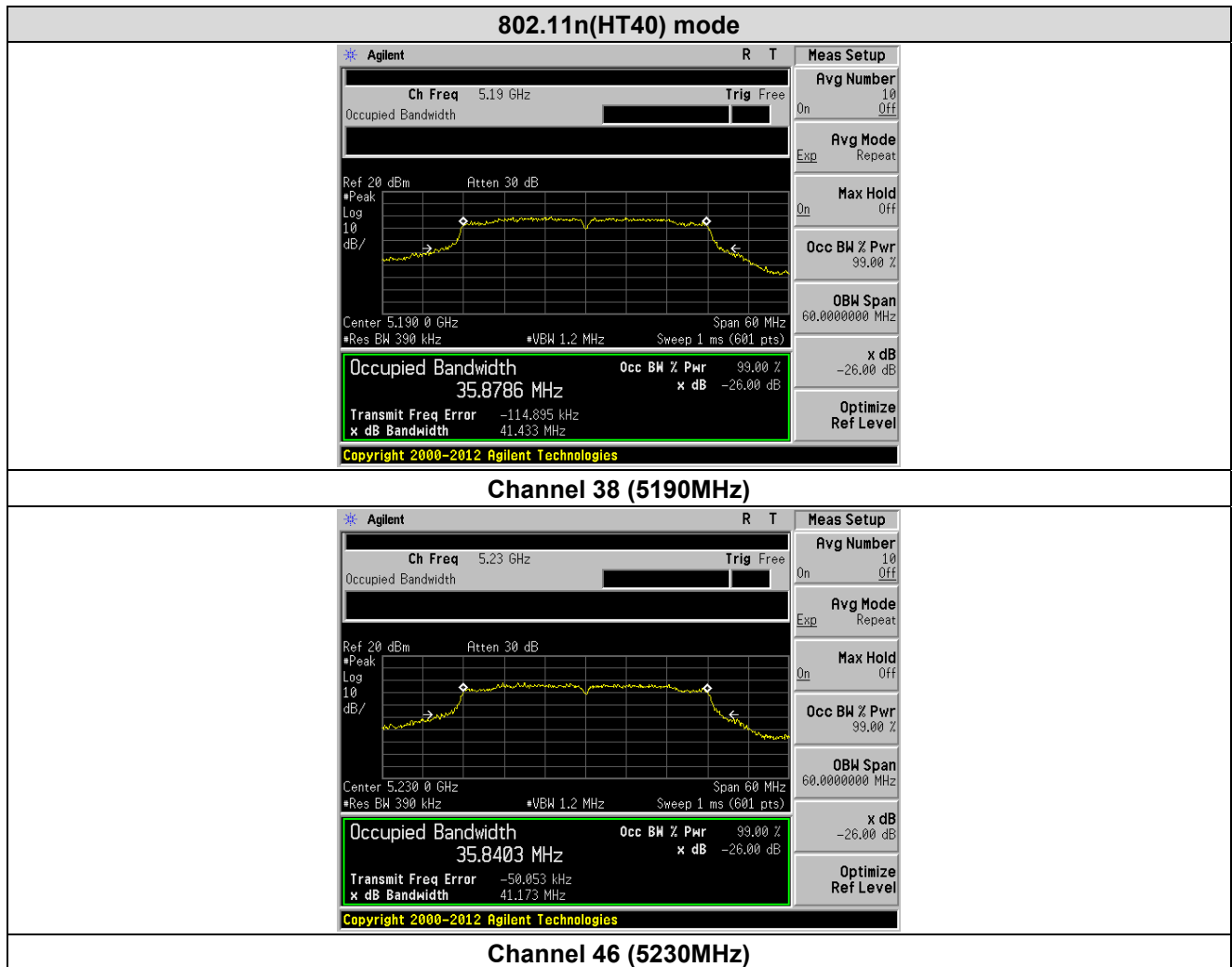


Channel 40 (5200MHz)

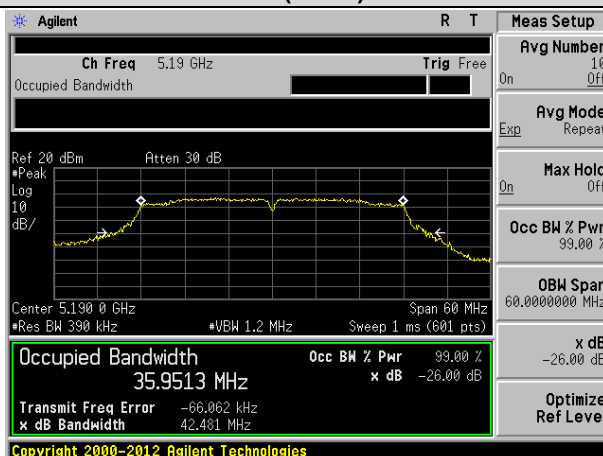


Channel 48 (5240MHz)

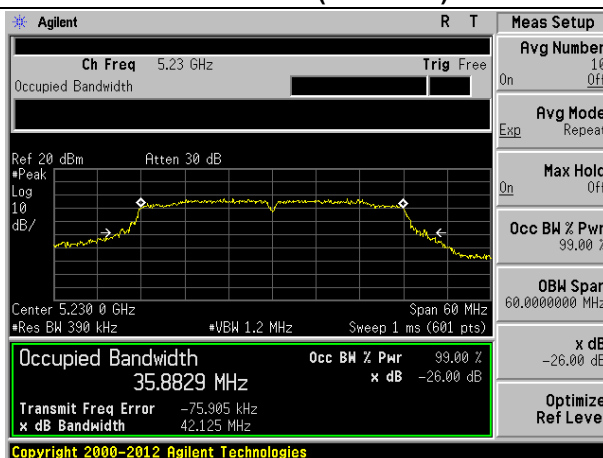




802.11ac(HT40) mode

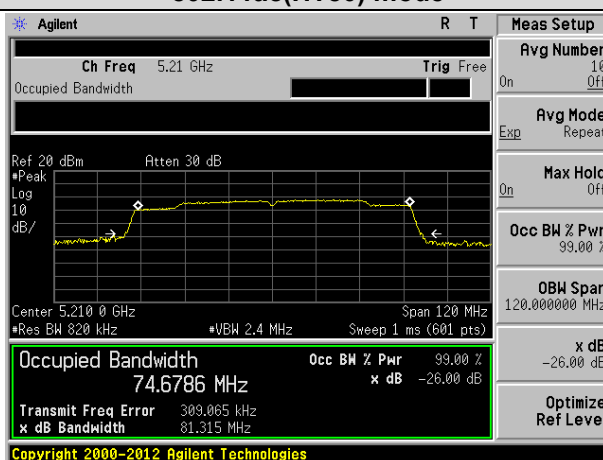


Channel 38 (5190MHz)



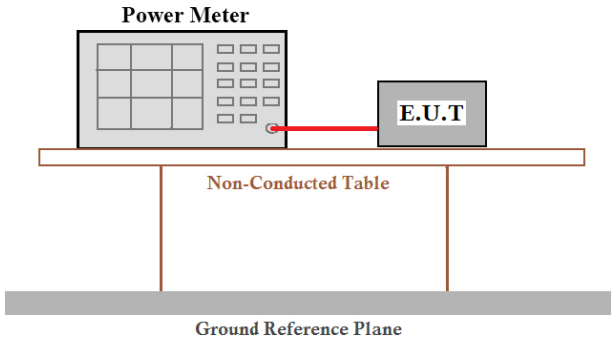
Channel 46 (5230MHz)

802.11ac(HT80) mode



Channel 40 (5210MHz)

5.4 Peak Transmit Power

Test Requirement:	FCC Part15 E Section 15.407
Test Method:	ANSI C63.10:2013 and KDB 789033 D02 General UNII Test Procedures New Rules v01
Limit:	For the band 5.15-5.25 GHz, the maximum conducted output power over the frequency bands of operation shall not exceed 250 mW.
Test setup:	 The diagram illustrates the test setup. A Power Meter is connected to an E.U.T. (Equipment Under Test) via a red cable. Both the Power Meter and the E.U.T. are placed on a Non-Conducted Table. The table is supported by a Ground Reference Plane.
Test procedure:	Measurement using an RF average power meter (i) Measurements may be performed using a wideband RF power meter with a thermocouple detector or equivalent if all of the conditions listed below are satisfied a) The EUT is configured to transmit continuously or to transmit with a constant duty cycle. b) At all times when the EUT is transmitting, it must be transmitting at its maximum power control level. c) The integration period of the power meter exceeds the repetition period of the transmitted signal by at least a factor of five. (ii) If the transmitter does not transmit continuously, measure the duty cycle, x, of the transmitter output signal as described in section B). (iii) Measure the average power of the transmitter. This measurement is an average over both the on and off periods of the transmitter. (iv) Adjust the measurement in dBm by adding $10 \log(1/x)$ where x is the duty cycle (e.g., $10 \log(1/0.25)$ if the duty cycle is 25 percent).
Test Instruments:	Refer to section 5.10 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass

Measurement Data

802.11a mode (SISO)								
CH No.	Frequency (MHz)	Measured Power (dBm)					Limit (dBm)	Result
		ANT1	ANT2	Duty Factor	Total ANT1 Output Power (dBm)	Total ANT2 Output Power (dBm)		
36	5180.00	16.08	16.14	0.04	16.12	16.18	23.98	Pass
40	5200.00	16.13	16.20	0.04	16.17	16.24	23.98	Pass
48	5240.00	16.17	16.24	0.04	16.21	16.28	23.98	Pass

802.11n(HT20) mode (MIMO)									
CH No.	Frequency (MHz)	Measured Power (dBm)					Output Power (dBm)	Limit (dBm)	Result
		ANT1	ANT2	Duty Factor	Total ANT1	Total ANT2			
36	5180.00	11.45	11.58	0.04	11.49	11.62	14.57	23.98	Pass
40	5200.00	11.37	11.50	0.04	11.41	11.54	14.49	23.98	Pass
48	5240.00	11.22	11.43	0.04	11.26	11.47	14.38	23.98	Pass

802.11ac(HT20) mode (MIMO)									
CH No.	Frequency (MHz)	Measured Power (dBm)					Output Power (dBm)	Limit (dBm)	Result
		ANT1	ANT2	Duty Factor	Total ANT1	Total ANT2			
36	5180.00	11.60	11.75	0.04	11.64	11.79	14.73	23.98	Pass
40	5200.00	11.54	11.64	0.04	11.58	11.68	14.64	23.98	Pass
48	5240.00	11.48	11.57	0.04	11.52	11.61	14.58	23.98	Pass

802.11n(HT40) mode (MIMO)									
CH No.	Frequency (MHz)	Measured Power (dBm)					Output Power (dBm)	Limit (dBm)	Result
		ANT1	ANT2	Duty Factor	Total ANT1	Total ANT2			
38	5190.00	11.32	11.47	0.04	11.36	11.51	14.45	23.98	Pass
46	5230.00	11.35	11.49	0.04	11.39	11.53	14.47	23.98	Pass

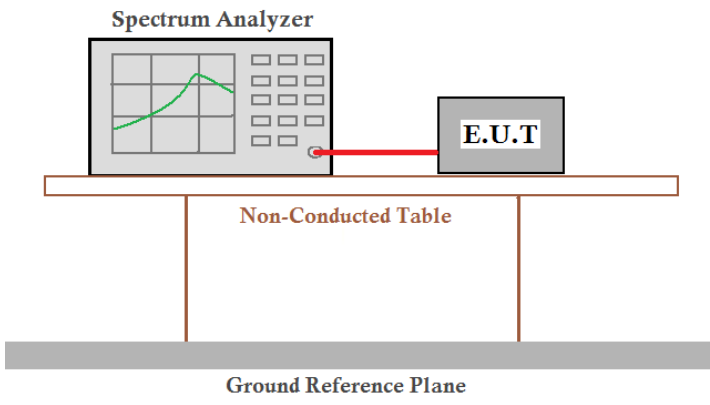
802.11ac(HT40) mode (MIMO)									
CH No.	Frequency (MHz)	Measured Power (dBm)					Output Power (dBm)	Limit (dBm)	Result
		ANT1	ANT2	Duty Factor	Total ANT1	Total ANT2			
38	5190.00	11.34	11.48	0.04	11.38	11.52	14.46	23.98	Pass
46	5230.00	11.38	11.43	0.04	11.42	11.47	14.46	23.98	Pass

802.11ac(HT80) mode (MIMO)									
CH No.	Frequency (MHz)	Measured Power (dBm)					Output Power (dBm)	Limit (dBm)	Result
		ANT1	ANT2	Duty Factor	Total ANT1	Total ANT2			
42	5210.00	10.35	10.47	0.04	10.39	10.51	13.46	23.98	Pass

Note: Output Power = Measured Power + Duty Factor

Duty Factor = 10 log (1/Duty Cycle)

5.5 Peak Power Spectral Density

Test Requirement:	FCC Part15 E Section 15.407
Test Method:	ANSI C63.10:2013 and KDB 789033 D02 General UNII Test Procedures New Rules v01
Limit:	11dBm/MHz
Test setup:	 The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T. (Equipment Under Test) via a red cable. Both the Spectrum Analyzer and the E.U.T. are placed on a Non-Conducted Table. The table is supported by two vertical legs. Below the table is a Ground Reference Plane.
Test procedure:	1) Create an average power spectrum for the EUT operating mode being tested by following the instructions in section E)2) for measuring maximum conducted output power using a spectrum analyzer or EMI receiver: select the appropriate test method (SA-1, SA-2, SA-3, or alternatives to each) and apply it up to, but not including, the step labeled, "Compute power...". 2) Use the peak search function on the instrument to find the peak of the spectrum. 3) Make the following adjustments to the peak value of the spectrum, if applicable: a) If Method SA-2 or SA-2 Alternative was used, add $10 \log(1/x)$, where x is the duty cycle, to the peak of the spectrum. b) If Method SA-3 Alternative was used and the linear mode was used in step E)2)g)(viii), add 1 dB to the final result to compensate for the difference between linear averaging and power averaging. 4) The result is the PPSD.
Test Instruments:	Refer to section 5.10 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass

Measurement Data

ANT:1

802.11a mode (SISO)					
Channel No.	Frequency (MHz)	Measured PPSD (dBm/MHz)	Total PPSD (dBm/MHz)	Limit (dBm/MHz)	Result
36	5180.00	-0.10	-0.06	11.00	Pass
40	5200.00	-0.84	-0.80	11.00	Pass
48	5240.00	1.17	1.21	11.00	Pass

802.11n(HT20) mode (MIMO)					
Channel No.	Frequency (MHz)	Measured PPSD (dBm/MHz)	Total PPSD (dBm/MHz)	Limit (dBm/MHz)	Result
36	5180.00	1.21	1.25	11.00	Pass
40	5200.00	1.51	1.55	11.00	Pass
48	5240.00	0.98	1.02	11.00	Pass

802.11ac(HT20) mode (MIMO)					
Channel No.	Frequency (MHz)	Measured PPSD (dBm/MHz)	Total PPSD (dBm/MHz)	Limit (dBm/MHz)	Result
36	5180.00	0.19	0.23	11.00	Pass
40	5200.00	1.63	1.67	11.00	Pass
48	5240.00	2.10	2.14	11.00	Pass

802.11n(HT40) mode (MIMO)					
Channel No.	Frequency (MHz)	Measured PPSD (dBm/MHz)	Total PPSD - (dBm/MHz)	Limit (dBm/MHz)	Result
38	5190.00	-1.65	-1.61	11.00	Pass
46	5230.00	-0.99	-0.95	11.00	Pass

802.11ac(HT40) mode (MIMO)					
Channel No.	Frequency (MHz)	Measured PPSD (dBm/MHz)	Total PPSD (dBm/MHz)	Limit (dBm/MHz)	Result
38	5190.00	-1.78	-1.74	11.00	Pass
46	5230.00	-0.26	-0.22	11.00	Pass

802.11ac(HT80) mode (MIMO)					
Channel No.	Frequency (MHz)	Measured PPSD (dBm/MHz)	Total PPSD (dBm/MHz)	Limit (dBm/MHz)	Result
42	5210.00	-3.45	-3.41	11.00	Pass

ANT:2

802.11a mode (SISO)					
Channel No.	Frequency (MHz)	Measured PPSP (dBm/MHz)	Total PPSP (dBm/MHz)	Limit (dBm/MHz)	Result
36	5180.00	-0.31	-0.27	11.00	Pass
40	5200.00	-1.38	-1.34	11.00	Pass
48	5240.00	1.15	1.19	11.00	Pass

802.11n(HT20) mode (MIMO)					
Channel No.	Frequency (MHz)	Measured PPSP (dBm/MHz)	Total PPSP (dBm/MHz)	Limit (dBm/MHz)	Result
36	5180.00	-1.03	-0.99	11.00	Pass
40	5200.00	-0.31	-0.27	11.00	Pass
48	5240.00	0.69	0.73	11.00	Pass

802.11ac(HT20) mode (MIMO)					
Channel No.	Frequency (MHz)	Measured PPSP (dBm/MHz)	Total PPSP (dBm/MHz)	Limit (dBm/MHz)	Result
36	5180.00	-0.75	-0.71	11.00	Pass
40	5200.00	-1.18	-1.14	11.00	Pass
48	5240.00	1.31	1.35	11.00	Pass

802.11n(HT40) mode (MIMO)					
Channel No.	Frequency (MHz)	Measured PPSP (dBm/MHz)	Total PPSP (dBm/MHz)	Limit (dBm/MHz)	Result
38	5190.00	-3.05	-3.01	11.00	Pass
46	5230.00	-1.37	-1.33	11.00	Pass

802.11ac(HT40) mode (MIMO)					
Channel No.	Frequency (MHz)	Measured PPSP (dBm/MHz)	Total PPSP (dBm/MHz)	Limit (dBm/MHz)	Result
38	5190.00	-3.88	-3.84	11.00	Pass
46	5230.00	-1.13	-1.09	11.00	Pass

802.11ac(HT80) mode (MIMO)					
Channel No.	Frequency (MHz)	Measured PPSP (dBm/MHz)	Total PPSP (dBm/MHz)	Limit (dBm/MHz)	Result
42	5210.00	-4.61	-4.57	11.00	Pass

ANT 1+ANT 2

802.11n(HT20) mode (MIMO)						
Channel No.	Frequency (MHz)	ANT 1 Total PPSD (dBm/MHz)	ANT 2 Total PPSD (dBm/MHz)	Total	(dBm/MHz)	Result
36	5180.00	1.25	-0.99	3.28	11.00	Pass
40	5200.00	1.55	-0.27	3.74	11.00	Pass
48	5240.00	1.02	0.73	3.89	11.00	Pass

802.11ac(HT20) mode (MIMO)						
Channel No.	Frequency (MHz)	ANT 1 Total PPSD (dBm/MHz)	ANT 2 Total PPSD (dBm/MHz)	Total	(dBm/MHz)	Result
36	5180.00	0.23	-0.71	2.80	11.00	Pass
40	5200.00	1.67	-1.14	3.50	11.00	Pass
48	5240.00	2.14	1.35	4.77	11.00	Pass

802.11n(HT40) mode (MIMO)						
Channel No.	Frequency (MHz)	ANT 1 Total PPSD (dBm/MHz)	ANT 2 Total PPSD (dBm/MHz)	Total	(dBm/MHz)	Result
38	5190.00	-1.61	-3.01	0.76	11.00	Pass
46	5230.00	-0.95	-1.33	1.87	11.00	Pass

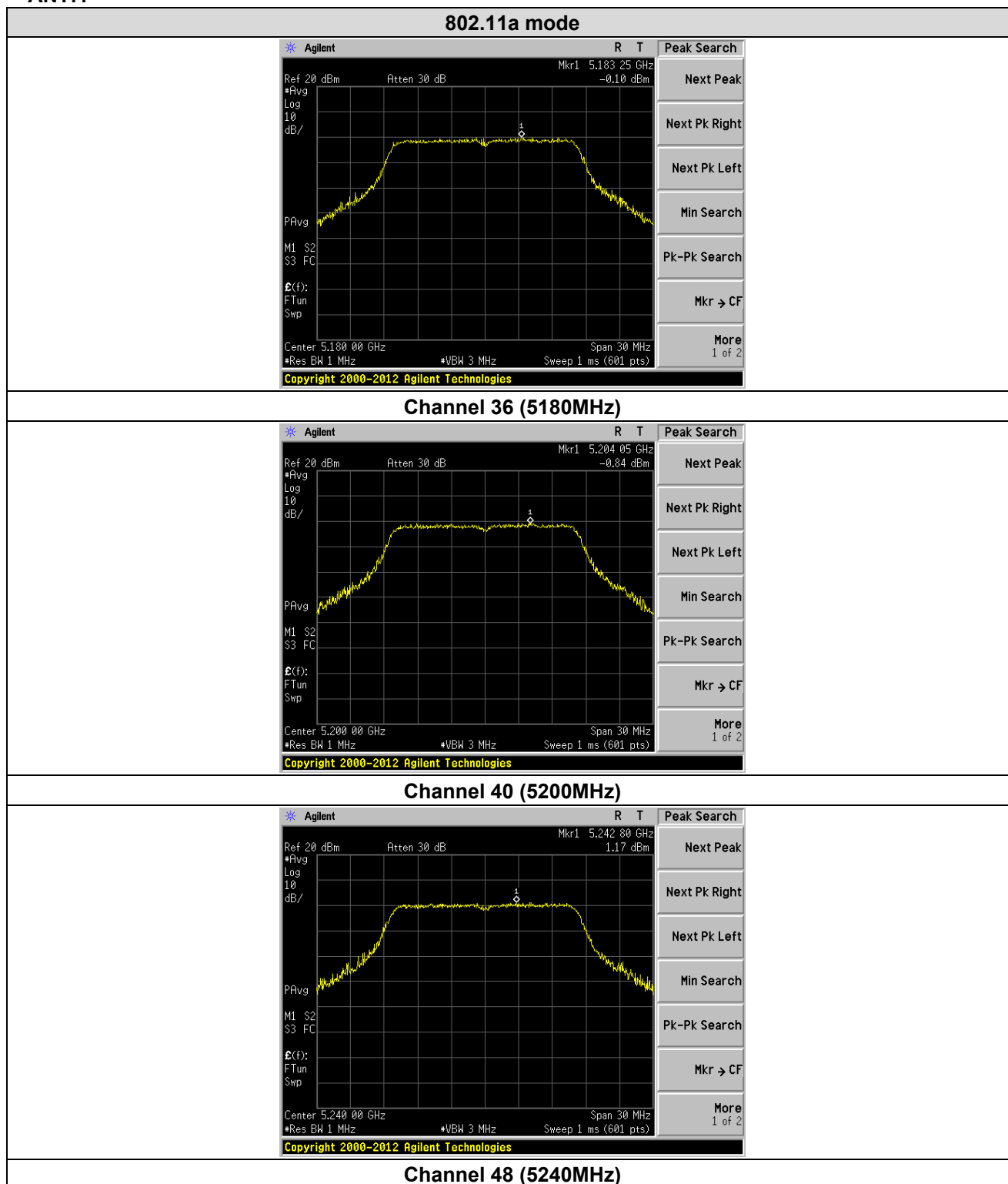
802.11ac(HT40) mode (MIMO)						
Channel No.	Frequency (MHz)	ANT 1 Total PPSD (dBm/MHz)	ANT 2 Total PPSD (dBm/MHz)	Total	(dBm/MHz)	Result
38	5190.00	-1.74	-3.84	0.34	11.00	Pass
46	5230.00	-0.22	-1.09	2.38	11.00	Pass

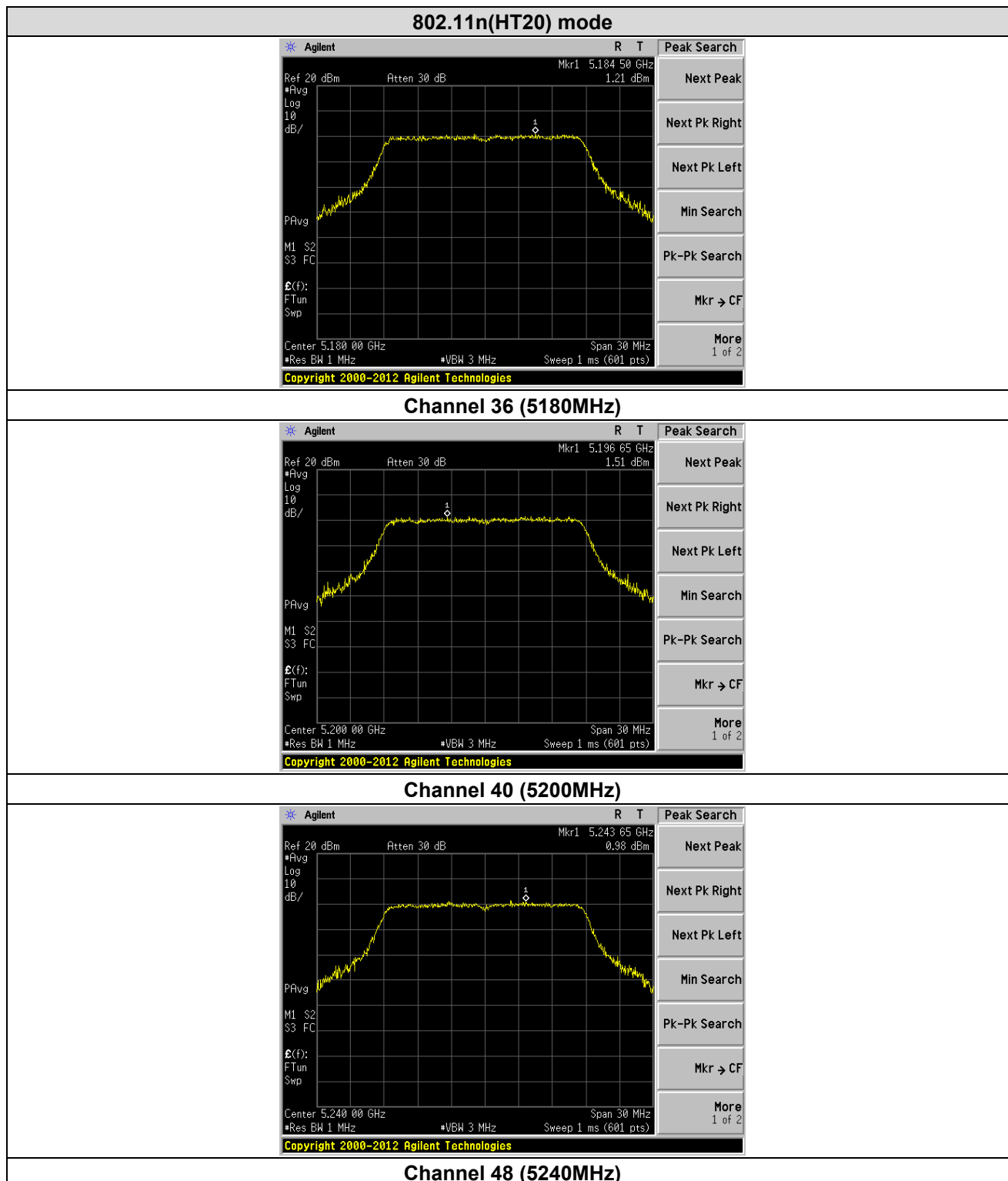
802.11ac(HT80) mode (MIMO)						
Channel No.	Frequency (MHz)	ANT 1 Total PPSD (dBm/MHz)	ANT 2 Total PPSD (dBm/MHz)	Total	(dBm/MHz)	Result
42	5210.00	-3.41	-4.57	-0.94	11.00	Pass

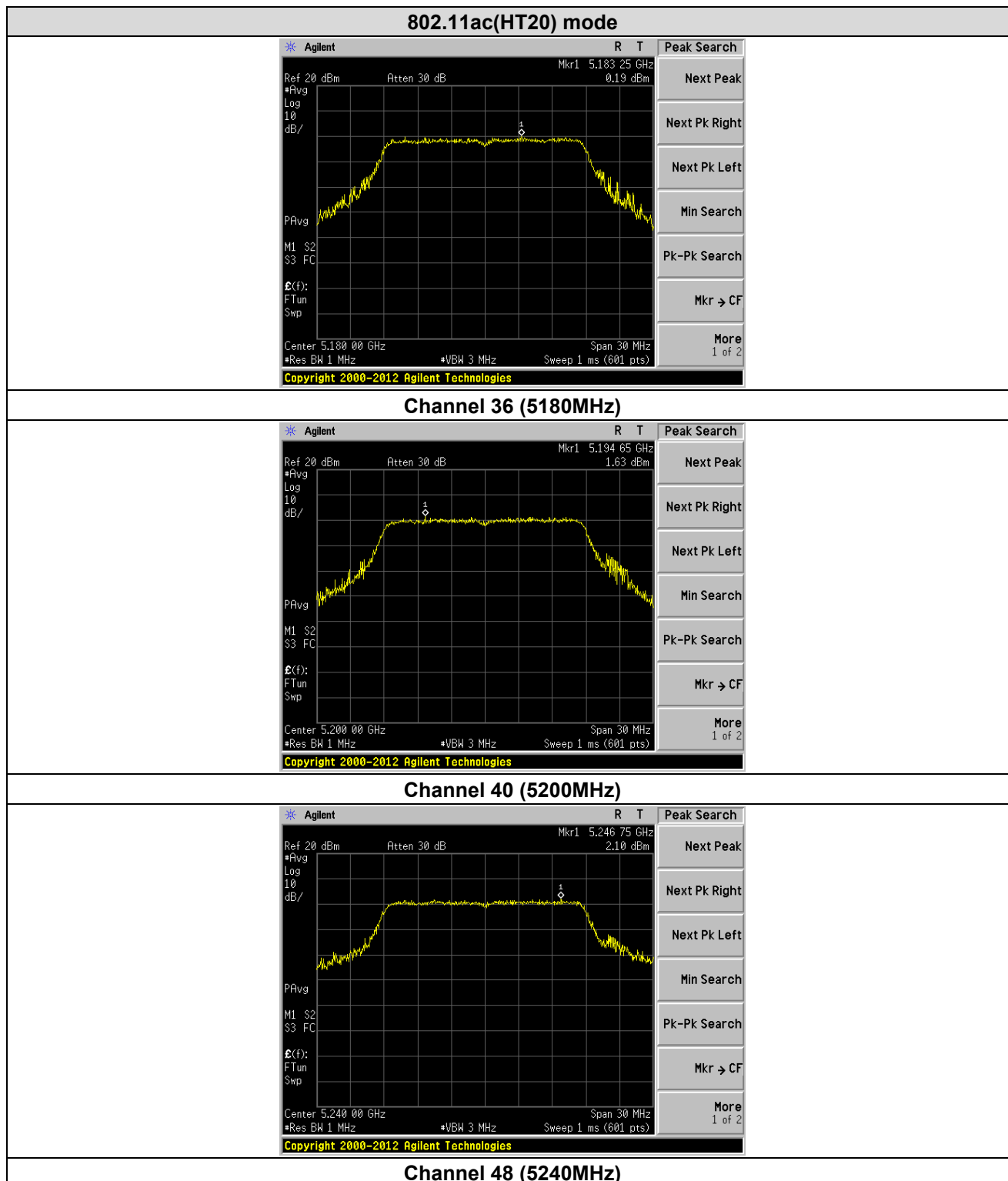
Note: Total PPSD = Measured PPSD + 10 log (1/Duty Cycle)

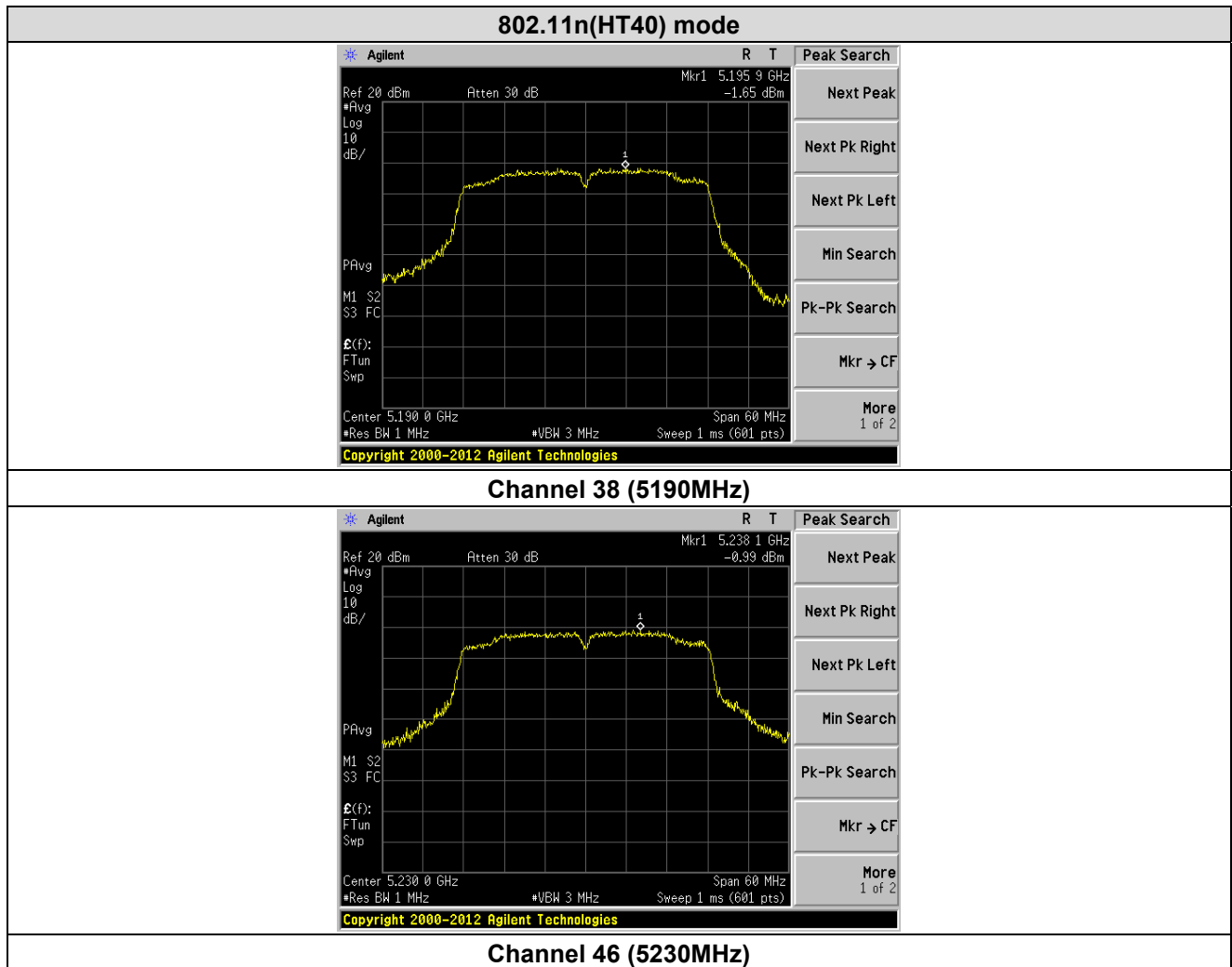
Test plots as followed:

ANT:1

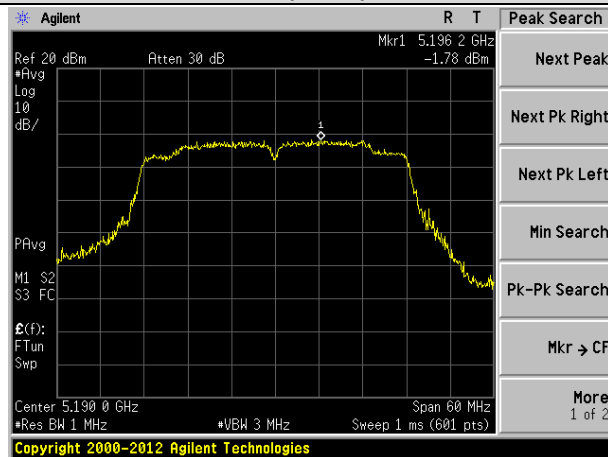




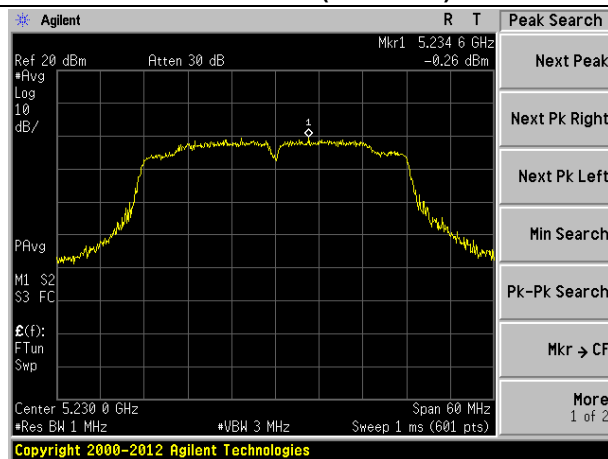




802.11ac(HT40) mode

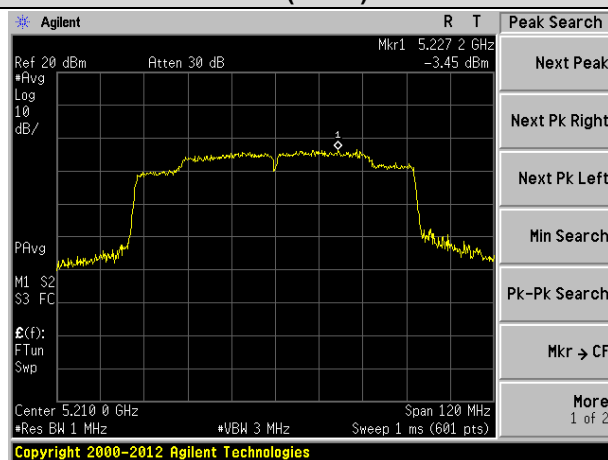


Channel 38 (5190MHz)



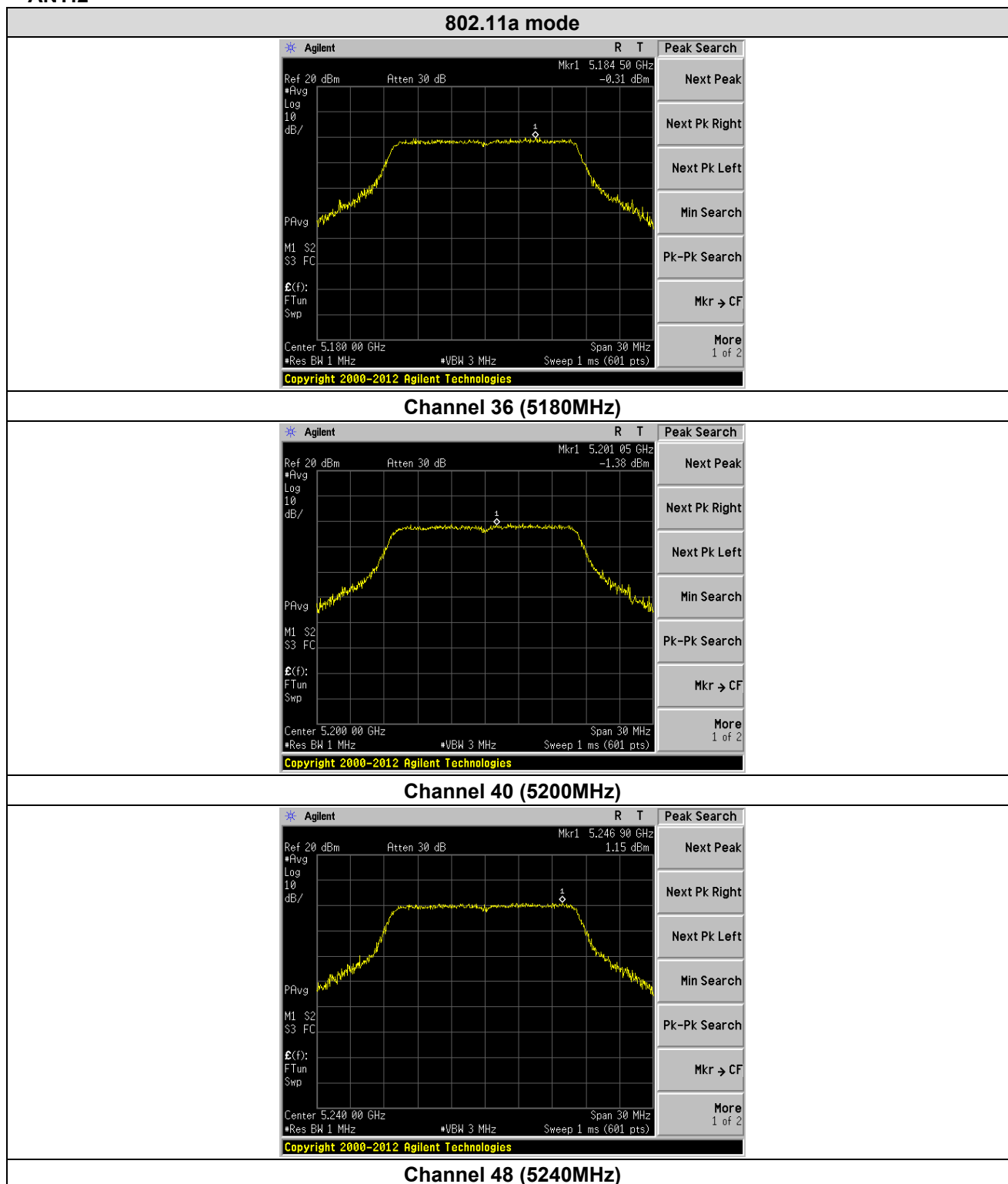
Channel 46 (5230MHz)

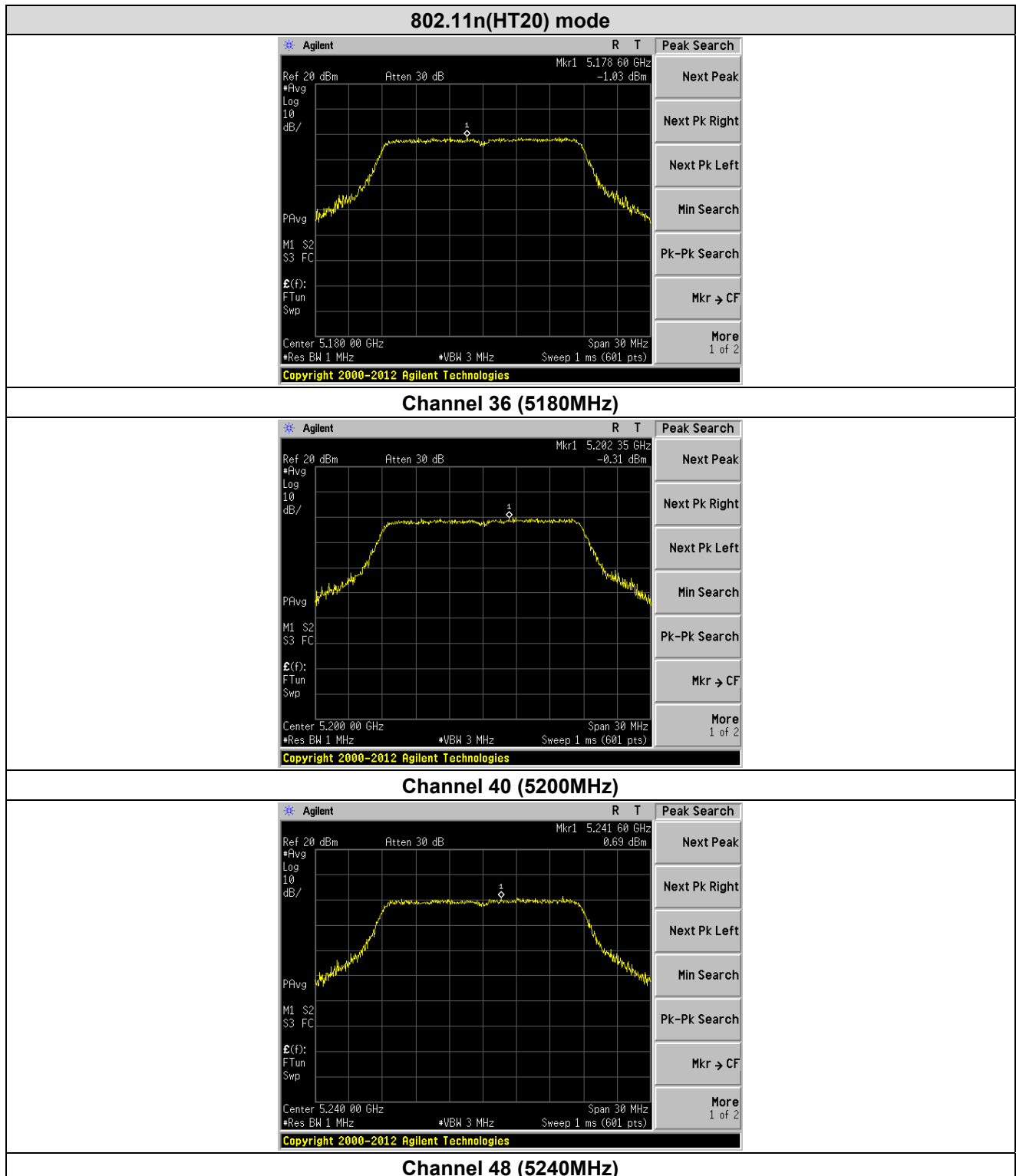
802.11ac(HT80) mode

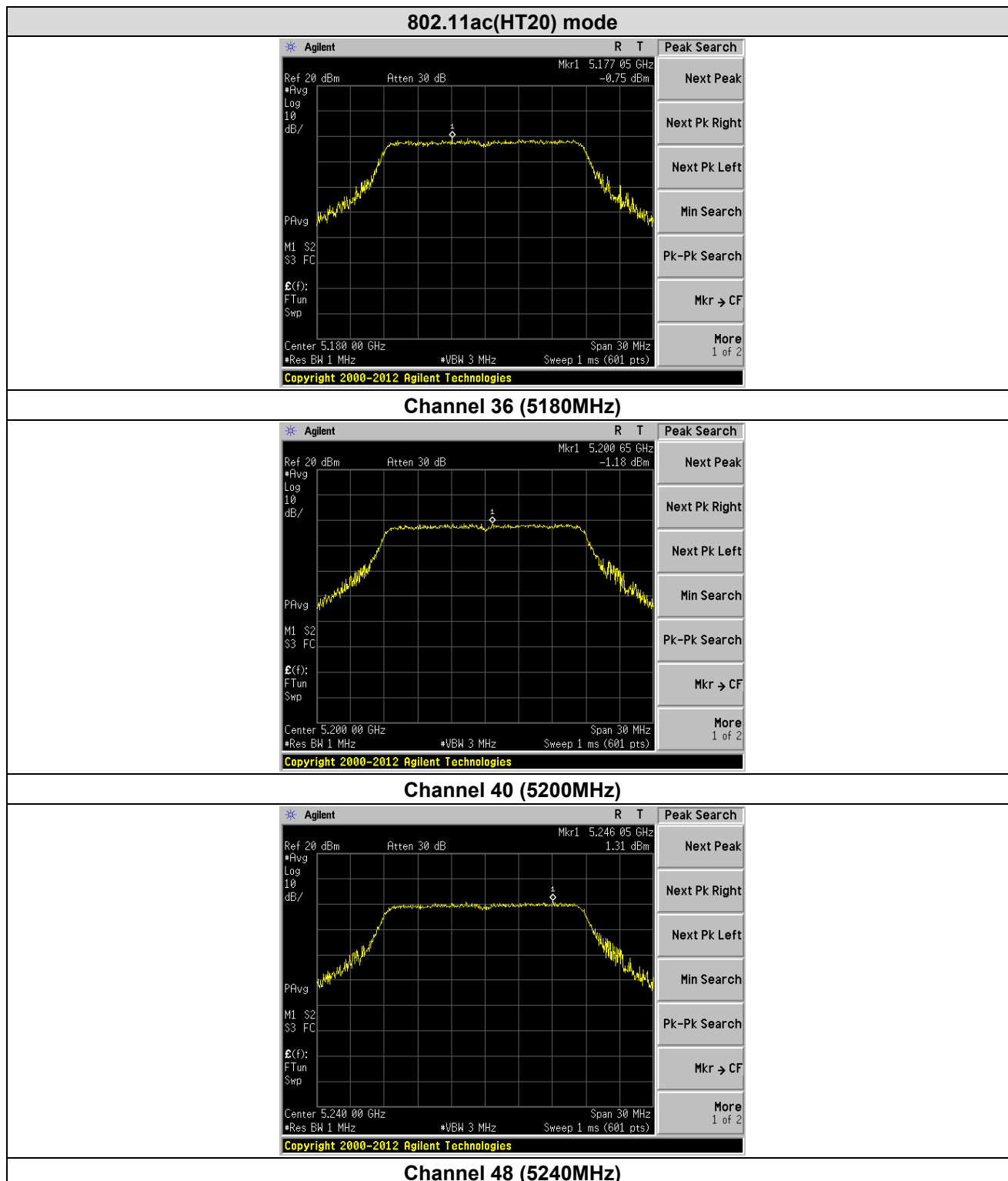


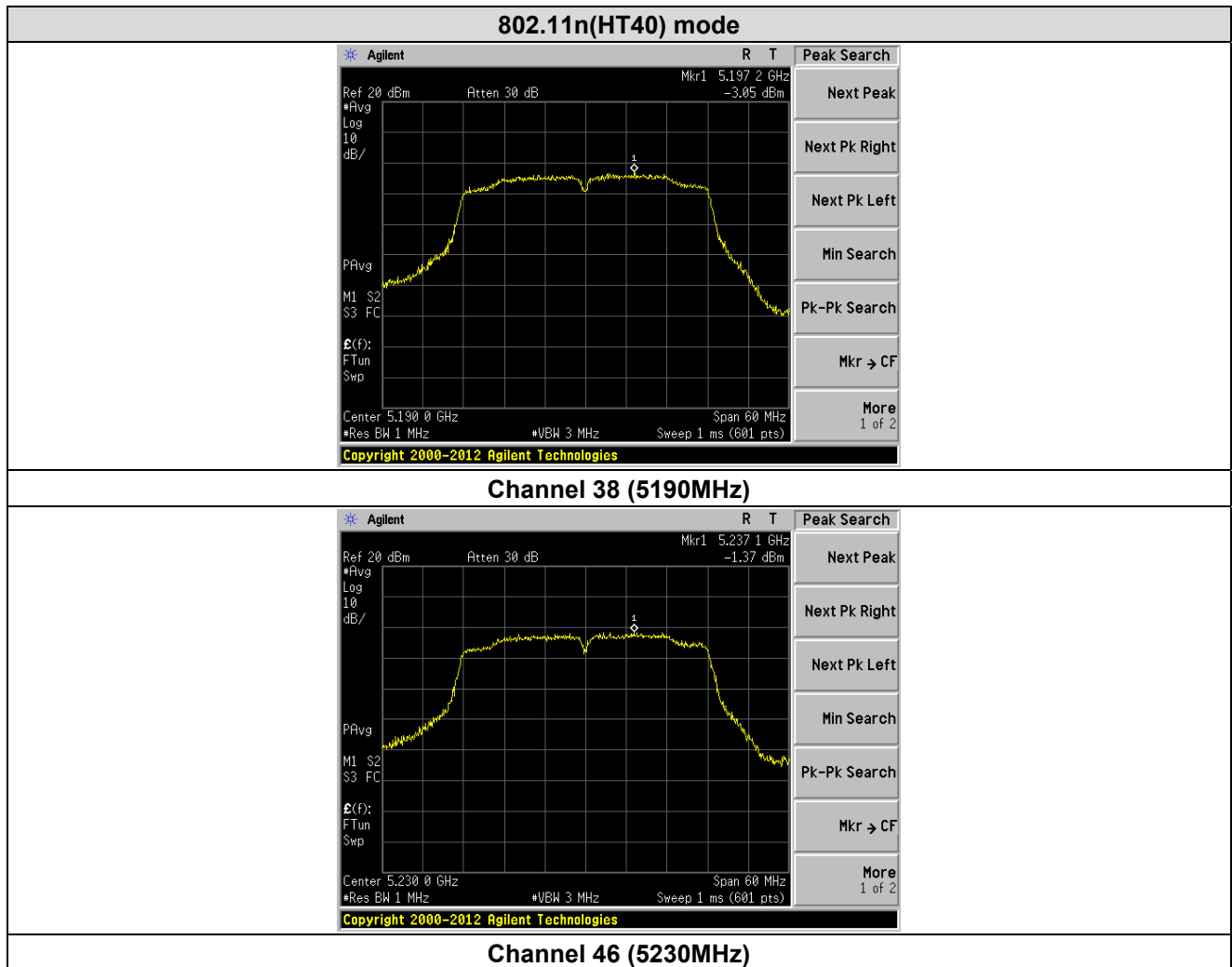
Channel 40 (5210MHz)

ANT:2

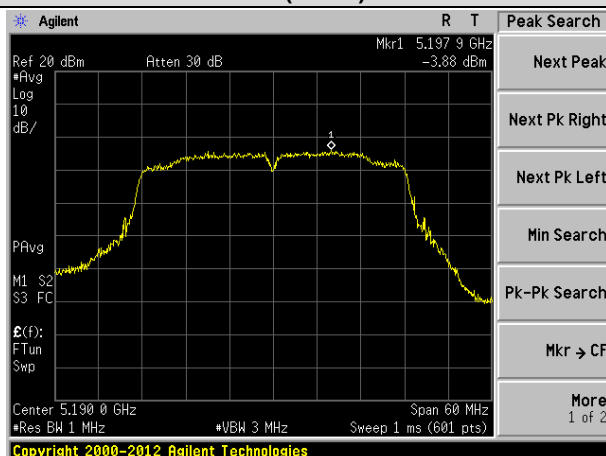




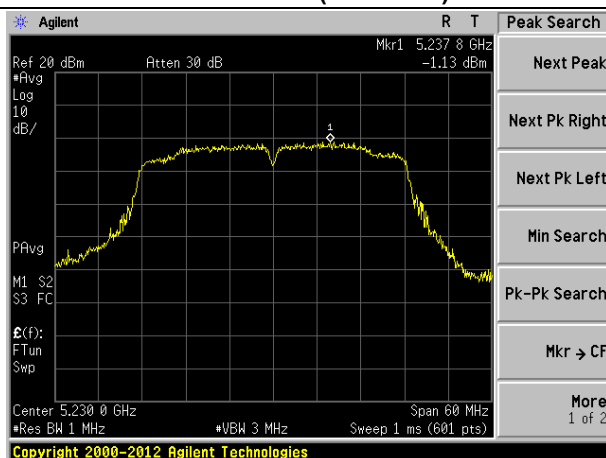




802.11ac(HT40) mode

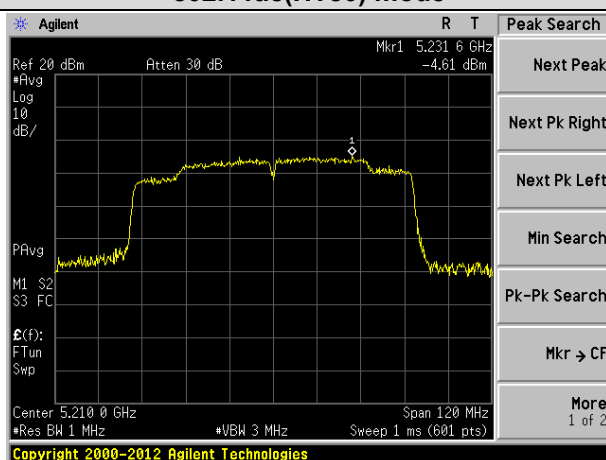


Channel 38 (5190MHz)



Channel 46 (5230MHz)

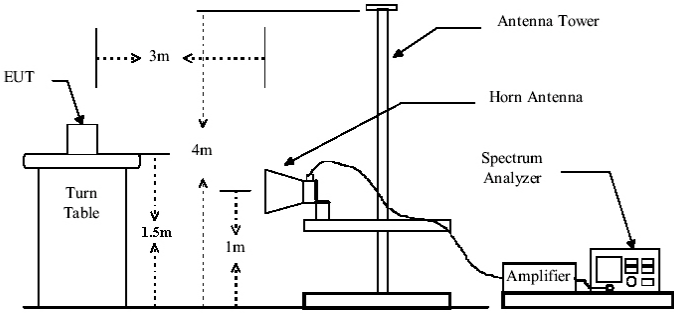
802.11ac(HT80) mode



Channel 40 (5210MHz)

5.6 Band Edge

Test Requirement:	FCC Part15 E Section 15.407 and 5.205																								
Test Method:	ANSI C63.10:2013																								
Test site:	Measurement Distance: 3m (Semi-Anechoic Chamber)																								
Receiver setup:	<table><tr><td>Frequency</td><td>Detector</td><td>RBW</td><td>VBW</td><td>Remark</td></tr><tr><td>30MHz-1GHz</td><td>Quasi-peak</td><td>100KHz</td><td>300KHz</td><td>Quasi-peak Value</td></tr><tr><td rowspan="2">Above 1GHz</td><td>Peak</td><td>1MHz</td><td>3MHz</td><td>Peak Value</td></tr><tr><td>AV</td><td>1MHz</td><td>3MHz</td><td>Average Value</td></tr></table>					Frequency	Detector	RBW	VBW	Remark	30MHz-1GHz	Quasi-peak	100KHz	300KHz	Quasi-peak Value	Above 1GHz	Peak	1MHz	3MHz	Peak Value	AV	1MHz	3MHz	Average Value	
Frequency	Detector	RBW	VBW	Remark																					
30MHz-1GHz	Quasi-peak	100KHz	300KHz	Quasi-peak Value																					
Above 1GHz	Peak	1MHz	3MHz	Peak Value																					
	AV	1MHz	3MHz	Average Value																					
Limit:	<table><tr><td>Frequency</td><td>Limit (dBuV/m @3m)</td><td>Remark</td></tr><tr><td>30MHz-88MHz</td><td>40.0</td><td>Quasi-peak Value</td></tr><tr><td>88MHz-216MHz</td><td>43.5</td><td>Quasi-peak Value</td></tr><tr><td>216MHz-960MHz</td><td>46.0</td><td>Quasi-peak Value</td></tr><tr><td>960MHz-1GHz</td><td>54.0</td><td>Quasi-peak Value</td></tr><tr><td rowspan="2">Above 1GHz</td><td>54.0</td><td>Average Value</td></tr><tr><td>74.0</td><td>Peak Value</td></tr></table> Undesirable emission limits: (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 EIRP 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 EIRP of -27 dBm/MHz. Devices operating in the 5.25-5.35 GHz band that generate emissions in the 5.15-5.25 GHz band must meet all applicable technical requirements for operation in the 5.15-5.25 GHz band (including indoor use) or alternatively meet an out-of-band emission EIRP limit of -27 dBm/MHz in the 5.15-5.25 GHz band. (3) 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 EIRP of -27 dBm/MHz.					Frequency	Limit (dBuV/m @3m)	Remark	30MHz-88MHz	40.0	Quasi-peak Value	88MHz-216MHz	43.5	Quasi-peak Value	216MHz-960MHz	46.0	Quasi-peak Value	960MHz-1GHz	54.0	Quasi-peak Value	Above 1GHz	54.0	Average Value	74.0	Peak Value
Frequency	Limit (dBuV/m @3m)	Remark																							
30MHz-88MHz	40.0	Quasi-peak Value																							
88MHz-216MHz	43.5	Quasi-peak Value																							
216MHz-960MHz	46.0	Quasi-peak Value																							
960MHz-1GHz	54.0	Quasi-peak Value																							
Above 1GHz	54.0	Average Value																							
	74.0	Peak Value																							
Test Procedure:	a. The EUT was placed on the top of a rotating table 1.5 m above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation. b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement. d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading. e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not																								

	have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
Test setup:	Above 1GHz 
Test Instruments:	Refer to section 5.10 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass

Remark:

According to KDB 789033 D02V01 section G) 1) (d), for For measurements above 1000 MHz @ 3m distance, the limit of field strength is computed as follows:

$$E[\text{dBuV/m}] = \text{EIRP}[\text{dBm}] + 95.2;$$

For example, if $\text{EIRP} = -27\text{dBm}$

$$E[\text{dBuV/m}] = -27 + 95.2 = 68.2\text{dBuV/m}.$$

Measurement Data:

ANT 1:

Mode:		802.11a		Frequency:		5180MHz	
Antenna Pol.	Frequency (MHz)	Reading Level	Factor	Measure Level	Limit (dBuV/m)	Margin (dB)	Detector
H	5150.00	38.42	17.18	55.60	68.20	-12.60	PK
H	5178.00	78.83	17.16	95.99	N/A	N/A	PK
V	5150.00	40.26	17.18	57.44	68.20	-10.76	PK
V	5178.00	85.71	17.16	102.87	N/A	N/A	PK
Mode:		802.11a		Frequency:		5180MHz	
Antenna Pol.	Frequency (MHz)	Reading Level	Factor	Measure Level	Limit (dBuV/m)	Margin (dB)	Detector
H	5150.00	28.35	17.18	45.53	54.00	-8.47	AV
H	5178.00	70.12	17.16	87.28	N/A	N/A	AV
V	5150.00	30.16	17.18	47.34	54.00	-6.66	AV
V	5178.00	77.49	17.16	94.65	N/A	N/A	AV
Mode:		802.11a		Frequency:		5240MHz	
Antenna Pol.	Frequency (MHz)	Reading Level	Factor	Measure Level	Limit (dBuV/m)	Margin (dB)	Detector
H	5237.94	78.45	17.11	95.56	N/A	N/A	PK
H	5350.00	35.58	17.20	52.78	68.20	-15.42	PK
V	5237.94	85.40	17.11	102.51	N/A	N/A	PK
V	5350.00	36.26	17.20	53.46	68.20	-14.74	PK
Mode:		802.11a		Frequency:		5240MHz	
Antenna Pol.	Frequency (MHz)	Reading Level	Factor	Measure Level	Limit (dBuV/m)	Margin (dB)	Detector
H	5237.94	70.05	17.11	87.16	N/A	N/A	AV
H	5350.00	26.39	17.20	43.59	54.00	-10.41	AV
V	5237.94	76.38	17.11	93.49	N/A	N/A	AV
V	5350.00	27.66	17.20	44.86	54.00	-9.14	AV

ANT 2:

Mode:		802.11a		Frequency:		5180MHz	
Antenna Pol.	Frequency (MHz)	Reading Level	Factor	Measure Level	Limit (dBuV/m)	Margin (dB)	Detector
H	5150.00	38.92	17.18	56.10	68.20	-12.10	PK
H	5178.00	76.35	17.16	93.51	N/A	N/A	PK
V	5150.00	39.89	17.18	57.07	68.20	-11.13	PK
V	5178.00	78.03	17.16	95.19	N/A	N/A	PK
Mode:		802.11a		Frequency:		5180MHz	
Antenna Pol.	Frequency (MHz)	Reading Level	Factor	Measure Level	Limit (dBuV/m)	Margin (dB)	Detector
H	5150.00	29.25	17.18	46.43	54.00	-7.57	AV
H	5178.00	66.30	17.16	83.46	N/A	N/A	AV
V	5150.00	30.08	17.18	47.26	54.00	-6.74	AV
V	5178.00	69.29	17.16	86.45	N/A	N/A	AV
Mode:		802.11a		Frequency:		5240MHz	
Antenna Pol.	Frequency (MHz)	Reading Level	Factor	Measure Level	Limit (dBuV/m)	Margin (dB)	Detector
H	5237.94	75.87	17.11	92.98	N/A	N/A	PK
H	5350.00	39.25	17.20	56.45	68.20	-11.75	PK
V	5237.94	77.47	17.11	94.58	N/A	N/A	PK
V	5350.00	39.19	17.20	56.39	68.20	-11.81	PK
Mode:		802.11a		Frequency:		5240MHz	
Antenna Pol.	Frequency (MHz)	Reading Level	Factor	Measure Level	Limit (dBuV/m)	Margin (dB)	Detector
H	5237.94	66.63	17.11	83.74	N/A	N/A	AV
H	5350.00	26.03	17.20	43.23	54.00	-10.77	AV
V	5237.94	67.81	17.11	84.92	N/A	N/A	AV
V	5350.00	26.86	17.20	44.06	54.00	-9.94	AV

ANT 1 + ANT 2:

Mode:		802.11n(HT20)		Frequency:		5180MHz	
Antenna Pol.	Frequency (MHz)	Reading Level	Factor	Measure Level	Limit (dBuV/m)	Margin (dB)	Detector
H	5150.00	37.78	17.18	54.96	68.20	-13.24	PK
H	5178.00	79.35	17.16	96.51	N/A	N/A	PK
V	5150.00	39.71	17.18	56.89	68.20	-11.31	PK
V	5178.00	86.27	17.16	103.43	N/A	N/A	PK
Mode:		802.11n(HT20)		Frequency:		5180MHz	
Antenna Pol.	Frequency (MHz)	Reading Level	Factor	Measure Level	Limit (dBuV/m)	Margin (dB)	Detector
H	5150.00	27.64	17.18	44.82	54.00	-9.18	AV
H	5178.00	70.26	17.16	87.42	N/A	N/A	AV
V	5150.00	29.59	17.18	46.77	54.00	-7.23	AV
V	5178.00	77.67	17.16	94.83	N/A	N/A	AV
Mode:		802.11n(HT20)		Frequency:		5240MHz	
Antenna Pol.	Frequency (MHz)	Reading Level	Factor	Measure Level	Limit (dBuV/m)	Margin (dB)	Detector
H	5238.00	79.52	17.11	96.63	N/A	N/A	PK
H	5350.00	36.29	17.20	53.49	68.20	-14.71	PK
V	5238.00	85.91	17.11	103.02	N/A	N/A	PK
V	5350.00	37.23	17.20	54.43	68.20	-13.77	PK
Mode:		802.11n(HT20)		Frequency:		5240MHz	
Antenna Pol.	Frequency (MHz)	Reading Level	Factor	Measure Level	Limit (dBuV/m)	Margin (dB)	Detector
H	5238.00	70.14	17.11	87.25	N/A	N/A	AV
H	5350.00	27.06	17.20	44.26	54.00	-9.74	AV
V	5238.00	78.42	17.11	95.53	N/A	N/A	AV
V	5350.00	27.79	17.20	44.99	54.00	-9.01	AV

Mode:		802.11ac(HT20)		Frequency:		5180MHz	
Antenna Pol.	Frequency (MHz)	Reading Level	Factor	Measure Level	Limit (dBuV/m)	Margin (dB)	Detector
H	5150.00	38.15	17.18	55.33	68.20	-12.87	PK
H	5178.00	78.57	17.16	95.73	N/A	N/A	PK
V	5150.00	38.75	17.18	55.93	68.20	-12.27	PK
V	5178.00	85.36	17.16	102.52	N/A	N/A	PK
Mode:		802.11ac(HT20)		Frequency:		5180MHz	
Antenna Pol.	Frequency (MHz)	Reading Level	Factor	Measure Level	Limit (dBuV/m)	Margin (dB)	Detector
H	5150.00	28.82	17.18	46.00	54.00	-8.00	AV
H	5178.00	68.99	17.16	86.15	N/A	N/A	AV
V	5150.00	29.30	17.18	46.48	54.00	-7.52	AV
V	5178.00	76.58	17.16	93.74	N/A	N/A	AV
Mode:		802.11ac(HT20)		Frequency:		5240MHz	
Antenna Pol.	Frequency (MHz)	Reading Level	Factor	Measure Level	Limit (dBuV/m)	Margin (dB)	Detector
H	5238.00	77.68	17.11	94.79	N/A	N/A	PK
H	5350.00	35.32	17.20	52.52	68.20	-15.68	PK
V	5238.00	84.87	17.11	101.98	N/A	N/A	PK
V	5350.00	36.11	17.20	53.31	68.20	-14.89	PK
Mode:		802.11ac(HT20)		Frequency:		5240MHz	
Antenna Pol.	Frequency (MHz)	Reading Level	Factor	Measure Level	Limit (dBuV/m)	Margin (dB)	Detector
H	5238.00	68.61	17.11	85.72	N/A	N/A	AV
H	5350.00	26.64	17.20	43.84	54.00	-10.16	AV
V	5238.00	75.88	17.11	92.99	N/A	N/A	AV
V	5350.00	27.11	17.20	44.31	54.00	-9.69	AV

Mode:		802.11n(HT40)		Frequency:		5190MHz	
Antenna Pol.	Frequency (MHz)	Reading Level	Factor	Measure Level	Limit (dBuV/m)	Margin (dB)	Detector
H	5150.00	40.31	17.18	57.49	68.20	-10.71	PK
H	5185.20	75.61	17.16	92.77	N/A	N/A	PK
V	5150.00	41.76	17.18	58.94	68.20	-9.26	PK
V	5185.20	83.41	17.16	100.57	N/A	N/A	PK
Mode:		802.11n(HT40)		Frequency:		5190MHz	
Antenna Pol.	Frequency (MHz)	Reading Level	Factor	Measure Level	Limit (dBuV/m)	Margin (dB)	Detector
H	5150.00	30.65	17.18	47.83	54.00	-6.17	AV
H	5185.20	66.72	17.16	83.88	N/A	N/A	AV
V	5150.00	31.38	17.18	48.56	54.00	-5.44	AV
V	5185.20	74.30	17.16	91.46	N/A	N/A	AV
Mode:		802.11n(HT40)		Frequency:		5230MHz	
Antenna Pol.	Frequency (MHz)	Reading Level	Factor	Measure Level	Limit (dBuV/m)	Margin (dB)	Detector
H	5226.25	75.91	17.12	93.03	N/A	N/A	PK
H	5350.00	41.40	17.20	58.60	68.20	-9.60	PK
V	5226.25	83.41	17.12	100.53	N/A	N/A	PK
V	5350.00	42.77	17.20	59.97	68.20	-8.23	PK
Mode:		802.11n(HT40)		Frequency:		5230MHz	
Antenna Pol.	Frequency (MHz)	Reading Level	Factor	Measure Level	Limit (dBuV/m)	Margin (dB)	Detector
H	5226.25	66.42	17.12	83.54	N/A	N/A	AV
H	5350.00	30.33	17.20	47.53	54.00	-6.47	AV
V	5226.25	74.27	17.12	91.39	N/A	N/A	AV
V	5350.00	31.36	17.20	48.56	54.00	-5.44	AV

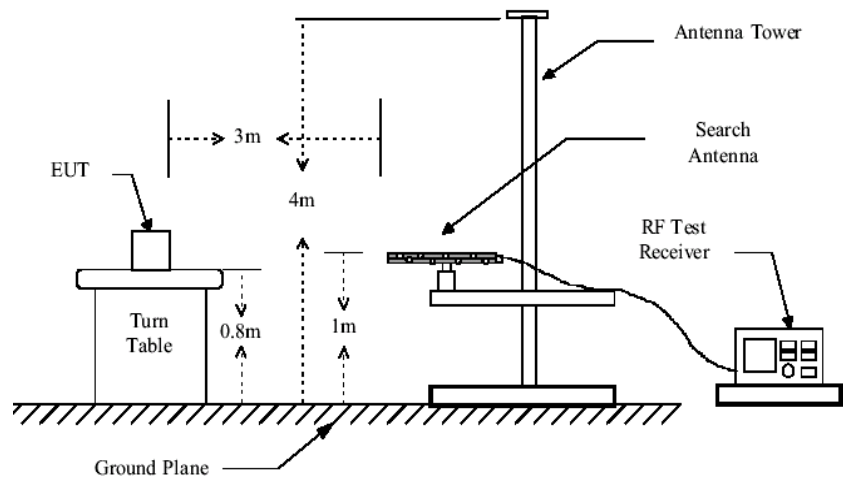
Mode:		802.11ac(HT40)		Frequency:		5190MHz	
Antenna Pol.	Frequency (MHz)	Reading Level	Factor	Measure Level	Limit (dBuV/m)	Margin (dB)	Detector
H	5150.00	40.70	17.18	57.88	68.20	-10.32	PK
H	5185.20	75.79	17.16	92.95	N/A	N/A	PK
V	5150.00	41.77	17.18	58.95	68.20	-9.25	PK
V	5185.20	84.06	17.16	101.22	N/A	N/A	PK
Mode:		802.11ac(HT40)		Frequency:		5190MHz	
Antenna Pol.	Frequency (MHz)	Reading Level	Factor	Measure Level	Limit (dBuV/m)	Margin (dB)	Detector
H	5150.00	30.92	17.18	48.10	54.00	-5.90	AV
H	5185.20	67.09	17.16	84.25	N/A	N/A	AV
V	5150.00	31.83	17.18	49.01	54.00	-4.99	AV
V	5185.20	74.55	17.16	91.71	N/A	N/A	AV
Mode:		802.11ac(HT40)		Frequency:		5230MHz	
Antenna Pol.	Frequency (MHz)	Reading Level	Factor	Measure Level	Limit (dBuV/m)	Margin (dB)	Detector
H	5226.25	76.11	17.12	93.23	N/A	N/A	PK
H	5350.00	41.31	17.20	58.51	68.20	-9.69	PK
V	5226.25	83.68	17.12	100.80	N/A	N/A	PK
V	5350.00	42.66	17.20	59.86	68.20	-8.34	PK
Mode:		802.11ac(HT40)		Frequency:		5230MHz	
Antenna Pol.	Frequency (MHz)	Reading Level	Factor	Measure Level	Limit (dBuV/m)	Margin (dB)	Detector
H	5226.25	67.00	17.12	84.12	N/A	N/A	AV
H	5350.00	30.45	17.20	47.65	54.00	-6.35	AV
V	5226.25	74.54	17.12	91.66	N/A	N/A	AV
V	5350.00	31.73	17.20	48.93	54.00	-5.07	AV

Mode:		802.11ac(HT80)		Frequency:		5210MHz	
Antenna Pol.	Frequency (MHz)	Reading Level	Factor	Measure Level	Limit (dBuV/m)	Margin (dB)	Detector
H	5150.00	42.71	17.18	59.89	68.20	-8.31	PK
H	5204.00	70.93	17.18	88.11	N/A	N/A	PK
H	5350.00	37.23	17.20	54.43	68.20	-13.77	PK
V	5150.00	43.08	17.18	60.26	68.20	-7.94	PK
V	5204.00	80.07	17.18	97.25	N/A	N/A	PK
V	5350.00	37.44	17.20	54.64	68.20	-13.56	PK
Mode:		802.11ac(HT80)		Frequency:		5210MHz	
Antenna Pol.	Frequency (MHz)	Reading Level	Factor	Measure Level	Limit (dBuV/m)	Margin (dB)	Detector
H	5150.00	31.41	17.18	48.59	54.00	-5.41	AV
H	5204.00	62.13	17.18	79.31	N/A	N/A	AV
H	5350.00	28.29	17.20	45.49	54.00	-8.51	AV
V	5150.00	31.60	17.18	48.78	54.00	-5.22	AV
V	5204.00	70.41	17.18	87.59	N/A	N/A	AV
V	5350.00	29.03	17.20	46.23	54.00	-7.77	AV

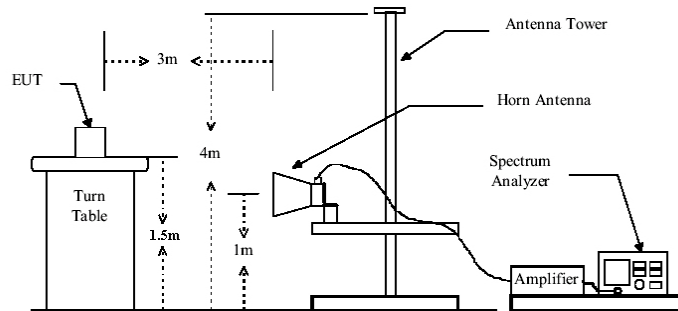
5.7 Radiated Emission

Test Requirement:	FCC Part15 C Section 15.209 and 15.205				
Test Method:	ANSI C63.10:2013				
Test Frequency Range:	30MHz to 40GHz				
Test site:	Measurement Distance: 3m (Semi-Anechoic Chamber)				
Receiver setup:	Frequency	Detector	RBW	VBW	Value
	30MHz-1GHz	Quasi-peak	100KHz	300KHz	Quasi-peak Value
	Above 1GHz	Peak	1MHz	3MHz	Peak Value
AV		1MHz	3MHz	Average Value	
Limit:	Frequency		Limit (dBuV/m @3m)		Remark
	30MHz-88MHz		40.0		Quasi-peak Value
	88MHz-216MHz		43.5		Quasi-peak Value
	216MHz-960MHz		46.0		Quasi-peak Value
	960MHz-1GHz		54.0		Quasi-peak Value
	Frequency		Limit (dBm/MHz)		Remark
	Above 1GHz		-27.0		Peak Value
Test Procedure:	Substitution method was performed to determine the actual ERP emission levels of the EUT. The following test procedure as below:				
	1>.Below 1GHz test procedure:				
	1. The EUT was placed on the top of a rotating table (0.8m for below 1GHz and 1.5 meters for above 1GHz) above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.				
Test Procedure:	2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.				
	3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.				
	4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.				
Test Procedure:	5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.				
	6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.				
	2>.Above 1GHz test procedure:				
Test Procedure:	1. On the test site as test setup graph above,the EUT shall be placed at the 0.8m support on the turntable and in the position closest to normal use as declared by the provider.				

	2. The test antenna shall be oriented initially for vertical polarization and shall be chosen to correspond to the frequency of the transmitter. The output of the test antenna shall be connected to the measuring receiver. 3. The transmitter shall be switched on, if possible, without modulation and the measuring receiver shall be tuned to the frequency of the transmitter under test. 4. The test antenna shall be raised and lowered from 1m to 4m until a maximum signal level is detected by the measuring receiver. Then the turntable should be rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver. 5. Repeat step 4 for test frequency with the test antenna polarized horizontally. 6. Remove the transmitter and replace it with a substitution antenna 7. Feed the substitution antenna at the transmitter end with a signal generator connected to the antenna by means of a nonradiating cable. With the antennas at both ends vertically polarized, and with the signal generator tuned to a particular test frequency, raise and lower the test antenna to obtain a maximum reading at the spectrum analyzer. Adjust the level of the signal generator output until the previously recorded maximum reading for this set of conditions is obtained. This should be done carefully repeating the adjustment of the test antenna and generator output. 8. Repeat step 7 with both antennas horizontally polarized for each test frequency. 9. Calculate power in dBm into a reference ideal half-wave dipole antenna by reducing the readings obtained in steps 7 and 8 by the power loss in the cable between the generator and the antenna, and further corrected for the gain of the substitution antenna used relative to an ideal half-wave dipole antenna by the following formula: $\text{EIRP(dBm)} = \text{Pg(dBm)} - \text{cable loss (dB)} + \text{antenna gain (dBi)}$ where: Pg is the generator output power into the substitution antenna.
Test setup:	Below 1GHz



Above 1GHz



Test Instruments:	Refer to section 5.10 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass

Measurement Data:

Below 1GHz

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
46.02	31.72	15.49	0.73	30.02	17.92	40.00	-22.08	Vertical
76.51	25.14	10.03	1.00	29.82	6.35	40.00	-33.65	Vertical
144.84	36.87	10.23	1.53	29.43	19.20	43.50	-24.30	Vertical
239.99	27.14	14.09	2.07	29.56	13.74	46.00	-32.26	Vertical
383.93	26.19	16.68	2.78	29.57	16.08	46.00	-29.92	Vertical
675.21	23.99	20.72	4.00	29.22	19.49	46.00	-26.51	Vertical
41.42	24.08	15.57	0.68	30.04	10.29	40.00	-29.71	Horizontal
62.21	31.89	13.77	0.88	29.91	16.63	40.00	-23.37	Horizontal
107.51	30.16	14.49	1.26	29.65	16.26	43.50	-27.24	Horizontal
189.74	38.85	12.48	1.79	29.24	23.88	43.50	-19.62	Horizontal
293.08	26.14	14.92	2.32	29.95	13.43	46.00	-32.57	Horizontal
642.86	24.86	20.61	3.88	29.26	20.09	46.00	-25.91	Horizontal

Above 1GHz:

Only the data of worst case at each channel plan (nominal bandwidth =20MHz, 40MHz, 80MHz) is reported.

ANT1:

802.11 a mode								
CH. No.	Antenna Pol.	Frequency (MHz)	Reading Level	Factor	Measure Level	Limit (dBuV/m)	Margin (dB)	Detector
36	H	10360.00	27.64	21.64	49.28	54(Note3)	-4.72	PK
	H	15540.00	28.08	21.80	49.88	54(Note3)	-4.12	PK
	V	10360.00	29.58	21.64	51.22	54(Note3)	-2.78	PK
	V	15540.00	29.71	21.80	51.51	54(Note3)	-2.49	PK
40	H	10400.00	28.18	21.67	49.85	54(Note3)	-4.15	PK
	H	15600.00	29.20	21.83	51.03	54(Note3)	-2.97	PK
	V	10400.00	29.76	21.67	51.43	54(Note3)	-2.57	PK
	V	15600.00	28.19	21.83	50.02	54(Note3)	-3.98	PK
48	H	10480.00	28.11	21.64	49.75	54(Note3)	-4.25	PK
	H	15720.00	26.27	22.16	48.43	54(Note3)	-5.57	PK
	V	10480.00	27.79	21.64	49.43	54(Note3)	-4.57	PK
	V	15720.00	26.86	22.16	49.02	54(Note3)	-4.98	PK

ANT2:

802.11 a mode								
CH. No.	Antenna Pol.	Frequency (MHz)	Reading Level	Factor	Measure Level	Limit (dBuV/m)	Margin (dB)	Detector
36	H	10360.00	27.68	21.64	49.32	54(Note3)	-4.68	PK
	H	15540.00	28.13	21.80	49.93	54(Note3)	-4.07	PK
	V	10360.00	29.62	21.64	51.26	54(Note3)	-2.74	PK
	V	15540.00	29.75	21.80	51.55	54(Note3)	-2.45	PK
40	H	10400.00	28.23	21.67	49.90	54(Note3)	-4.10	PK
	H	15600.00	29.25	21.83	51.08	54(Note3)	-2.92	PK
	V	10400.00	29.81	21.67	51.48	54(Note3)	-2.52	PK
	V	15600.00	28.25	21.83	50.08	54(Note3)	-3.92	PK
48	H	10480.00	28.15	21.64	49.79	54(Note3)	-4.21	PK
	H	15720.00	26.31	22.16	48.47	54(Note3)	-5.53	PK
	V	10480.00	27.83	21.64	49.47	54(Note3)	-4.53	PK
	V	15720.00	26.92	22.16	49.08	54(Note3)	-4.92	PK

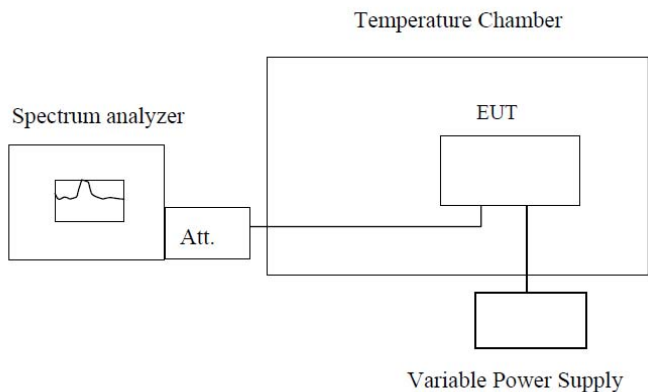
ANT1 + ANT2:

802.11 n(HT20) mode								
CH. No.	Antenna Pol.	Frequency (MHz)	Reading Level	Factor	Measure Level	Limit (dBuV/m)	Margin (dB)	Detector
36	H	10360.00	26.90	21.64	48.54	54(Note3)	-5.46	PK
	H	15540.00	27.08	21.80	48.88	54(Note3)	-5.12	PK
	V	10360.00	28.65	21.64	50.29	54(Note3)	-3.71	PK
	V	15540.00	28.88	21.80	50.68	54(Note3)	-3.32	PK
40	H	10400.00	27.03	21.67	48.70	54(Note3)	-5.30	PK
	H	15600.00	28.12	21.83	49.95	54(Note3)	-4.05	PK
	V	10400.00	28.85	21.67	50.52	54(Note3)	-3.48	PK
	V	15600.00	26.86	21.83	48.69	54(Note3)	-5.31	PK
48	H	10480.00	27.32	21.64	48.96	54(Note3)	-5.04	PK
	H	15720.00	25.39	22.16	47.55	54(Note3)	-6.45	PK
	V	10480.00	26.98	21.64	48.62	54(Note3)	-5.38	PK
	V	15720.00	25.73	22.16	47.89	54(Note3)	-6.11	PK
802.11n(HT40) mode								
CH. No.	Antenna Pol.	Frequency (MHz)	Reading Level	Factor	Measure Level	Limit (dBuV/m)	Margin (dB)	Detector
38	H	10380.00	28.66	21.64	50.30	54(Note3)	-3.70	PK
	H	15570.00	28.51	21.80	50.31	54(Note3)	-3.69	PK
	V	10380.00	26.99	21.64	48.63	54(Note3)	-5.37	PK
	V	15570.00	28.18	21.80	49.98	54(Note3)	-4.02	PK
46	H	10460.00	28.38	21.67	50.05	54(Note3)	-3.95	PK
	H	15690.00	27.23	21.83	49.20	54(Note3)	-4.80	PK
	V	10460.00	27.17	21.67	48.84	54(Note3)	-5.16	PK
	V	15690.00	25.38	21.83	47.35	54(Note3)	-6.65	PK
802.11ac(HT80) mode								
CH. No.	Antenna Pol.	Frequency (MHz)	Reading Level	Factor	Measure Level	Limit (dBuV/m)	Margin (dB)	Detector
42	H	10420.00	28.56	21.65	50.21	54(Note3)	-3.79	PK
	H	15630.00	28.37	21.81	50.18	54(Note3)	-3.82	PK
	V	10420.00	26.87	21.65	48.52	54(Note3)	-5.48	PK
	V	15630.00	28.07	21.81	49.88	54(Note3)	-4.12	PK

Note:

1. Measure Level = Reading Level + Factor.
2. The test trace is same as the ambient noise (the test frequency range: 18GHz~40GHz), therefore no data appear in the report.
3. This limit applies for using average detector, if the test result on peak is lower than average limit, then average measurement needn't be performed.

5.8 Frequency stability

Test Requirement:	FCC Part15 C Section 15.407(g)
Test Method:	ANSI C63.10:2013, FCC Part 2.1055
Limit:	Manufactures of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified
Test Procedure:	The EUT was setup to ANSI C63.4, 2014; tested to 2.1055 for compliance to FCC Part 15.407(g) requirements.
Test setup:	 Note : Measurement setup for testing on Antenna connector
Test Instruments:	Refer to section 5.10 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass

Measurement data:
ANT:1

Frequency stability versus Temp.					
Power Supply: DC 3.7V					
Temp. (°C)	Operating Frequency (MHz)	0 minute Measured Frequency (MHz)	2 minute Measured Frequency (MHz)	5 minute Measured Frequency (MHz)	10 minute Measured Frequency (MHz)
-30	5180	5179.9851	5179.9858	5179.9875	5179.9876
	5200	5199.9856	5199.9862	5199.9880	5199.9880
	5220	5219.9860	5219.9867	5219.9884	5219.9884
	5240	5239.9865	5239.9871	5239.9888	5239.9888
-20	5180	5179.9869	5179.9876	5179.9892	5179.9891
	5200	5199.9874	5199.9880	5199.9896	5199.9895
	5220	5219.9878	5219.9884	5219.9899	5219.9898
	5240	5239.9882	5239.9888	5239.9903	5239.9902
-10	5180	5179.9886	5179.9891	5179.9906	5179.9905
	5200	5199.9890	5199.9895	5199.9910	5199.9908
	5220	5219.9894	5219.9899	5219.9913	5219.9911
	5240	5239.9897	5239.9902	5239.9916	5239.9914
0	5180	5179.9856	5179.9862	5179.9880	5179.9880
	5200	5199.9860	5199.9867	5199.9884	5199.9884
	5220	5219.9865	5219.9871	5219.9888	5219.9888
	5240	5239.9869	5239.9875	5239.9892	5239.9891
10	5180	5179.9874	5179.9880	5179.9895	5179.9895
	5200	5199.9878	5199.9884	5199.9899	5199.9898
	5220	5219.9882	5219.9887	5219.9903	5219.9902
	5240	5239.9886	5239.9891	5239.9906	5239.9905
20	5180	5179.9890	5179.9895	5179.9910	5179.9908
	5200	5199.9894	5199.9898	5199.9913	5199.9911
	5220	5219.9897	5219.9902	5219.9916	5219.9914
	5240	5239.9901	5239.9905	5239.9919	5239.9917
30	5180	5179.9849	5179.9856	5179.9874	5179.9874
	5200	5199.9854	5199.9861	5199.9878	5199.9879
	5220	5219.9859	5219.9866	5219.9882	5219.9883
	5240	5239.9864	5239.9870	5239.9887	5239.9886
40	5180	5179.9868	5179.9874	5179.9890	5179.9890
	5200	5199.9872	5199.9878	5199.9894	5199.9894
	5220	5219.9877	5219.9882	5219.9898	5219.9897
	5240	5239.9881	5239.9886	5239.9902	5239.9901
50	5180	5179.9885	5179.9890	5179.9905	5179.9904
	5200	5199.9889	5199.9894	5199.9909	5199.9907
	5220	5219.9892	5219.9897	5219.9912	5219.9910
	5240	5239.9896	5239.9901	5239.9915	5239.9913

Frequency stability versus Voltage					
Temperature: 25°C					
Power Supply (VDC)	Operating Frequency (MHz)	0 minute Measured Frequency (MHz)	2 minute Measured Frequency (MHz)	5 minute Measured Frequency (MHz)	10 minute Measured Frequency (MHz)
3.3	5180	5179.9864	5179.9871	5179.9888	5179.9887
	5200	5199.9867	5199.9874	5199.9890	5199.9890
	5220	5219.9870	5219.9877	5219.9893	5219.9893
	5240	5239.9873	5239.9879	5239.9895	5239.9895
3.7	5180	5179.9876	5179.9882	5179.9898	5179.9897
	5200	5199.9879	5199.9885	5199.9900	5199.9900
	5220	5219.9882	5219.9887	5219.9903	5219.9902
	5240	5239.9885	5239.9890	5239.9905	5239.9904
4.1	5180	5179.9887	5179.9893	5179.9908	5179.9907
	5200	5199.9890	5199.9895	5199.9910	5199.9909
	5220	5219.9892	5219.9898	5219.9912	5219.9911
	5240	5239.9895	5239.9900	5239.9914	5239.9913

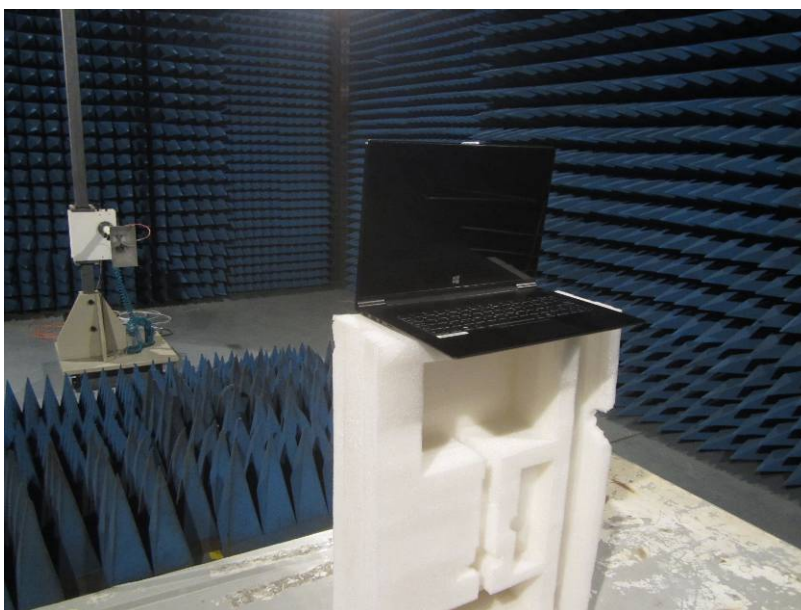
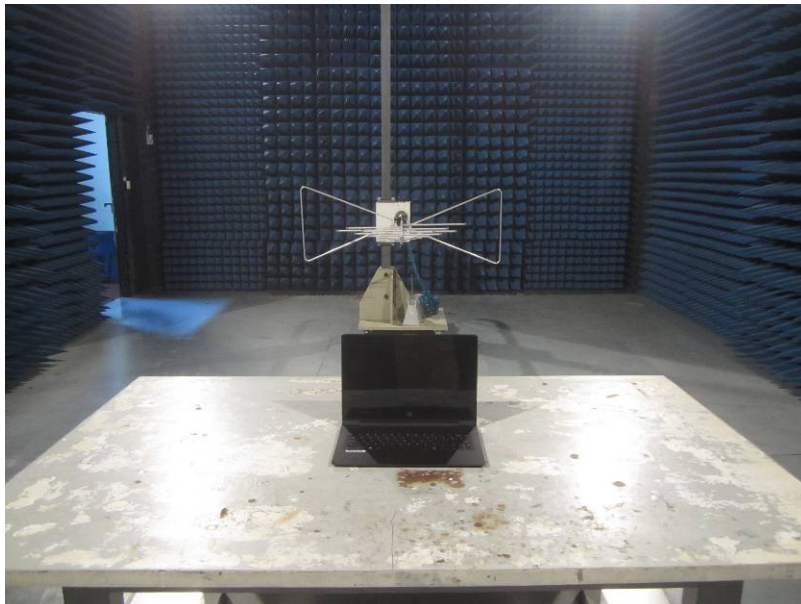
ANT:2

Frequency stability versus Temp.					
Power Supply: DC 3.7V					
Temp. (°C)	Operating Frequency (MHz)	0 minute Measured Frequency (MHz)	2 minute Measured Frequency (MHz)	5 minute Measured Frequency (MHz)	10 minute Measured Frequency (MHz)
-30	5180	5179.9864	5179.9871	5179.9888	5179.9889
	5200	5199.9869	5199.9875	5199.9893	5199.9893
	5220	5219.9873	5219.9880	5219.9897	5219.9897
	5240	5239.9878	5239.9884	5239.9901	5239.9901
-20	5180	5179.9882	5179.9889	5179.9905	5179.9904
	5200	5199.9887	5199.9893	5199.9909	5199.9908
	5220	5219.9891	5219.9897	5219.9912	5219.9911
	5240	5239.9895	5239.9901	5239.9916	5239.9915
-10	5180	5179.9899	5179.9904	5179.9919	5179.9918
	5200	5199.9903	5199.9908	5199.9923	5199.9921
	5220	5219.9907	5219.9912	5219.9926	5219.9924
	5240	5239.9910	5239.9915	5239.9929	5239.9927
0	5180	5179.9869	5179.9875	5179.9893	5179.9893
	5200	5199.9873	5199.9880	5199.9897	5199.9897
	5220	5219.9878	5219.9884	5219.9901	5219.9901
	5240	5239.9882	5239.9888	5239.9905	5239.9904
10	5180	5179.9887	5179.9893	5179.9908	5179.9908
	5200	5199.9891	5199.9897	5199.9912	5199.9911
	5220	5219.9895	5219.9900	5219.9916	5219.9915
	5240	5239.9899	5239.9904	5239.9919	5239.9918
20	5180	5179.9903	5179.9908	5179.9923	5179.9921
	5200	5199.9907	5199.9911	5199.9926	5199.9924
	5220	5219.9910	5219.9915	5219.9929	5219.9927
	5240	5239.9914	5239.9918	5239.9932	5239.9930
30	5180	5179.9862	5179.9869	5179.9887	5179.9887
	5200	5199.9867	5199.9874	5199.9891	5199.9892
	5220	5219.9872	5219.9879	5219.9895	5219.9896
	5240	5239.9877	5239.9883	5239.9900	5239.9899
40	5180	5179.9881	5179.9887	5179.9903	5179.9903
	5200	5199.9885	5199.9891	5199.9907	5199.9907
	5220	5219.9890	5219.9895	5219.9911	5219.9910
	5240	5239.9894	5239.9899	5239.9915	5239.9914
50	5180	5179.9898	5179.9903	5179.9918	5179.9917
	5200	5199.9902	5199.9907	5199.9922	5199.9920
	5220	5219.9905	5219.9910	5219.9925	5219.9923
	5240	5239.9909	5239.9914	5239.9928	5239.9926

Frequency stability versus Voltage					
Temperature: 25°C					
Power Supply (VDC)	Operating Frequency (MHz)	0 minute Measured Frequency (MHz)	2 minute Measured Frequency (MHz)	5 minute Measured Frequency (MHz)	10 minute Measured Frequency (MHz)
3.3	5180	5179.9869	5179.9876	5179.9893	5179.9892
	5200	5199.9872	5199.9879	5199.9895	5199.9895
	5220	5219.9875	5219.9882	5219.9898	5219.9898
	5240	5239.9878	5239.9884	5239.9900	5239.9900
3.7	5180	5179.9881	5179.9887	5179.9903	5179.9902
	5200	5199.9884	5199.9890	5199.9905	5199.9905
	5220	5219.9887	5219.9892	5219.9908	5219.9907
	5240	5239.9890	5239.9895	5239.9910	5239.9909
4.1	5180	5179.9892	5179.9898	5179.9913	5179.9912
	5200	5199.9895	5199.9900	5199.9915	5199.9914
	5220	5219.9897	5219.9903	5219.9917	5219.9916
	5240	5239.9900	5239.9905	5239.9919	5239.9918

6 Test Setup Photo

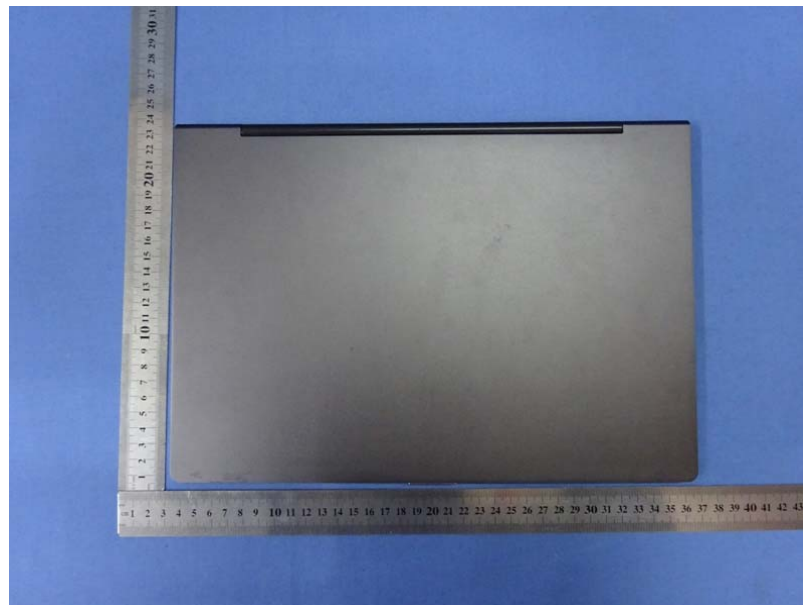
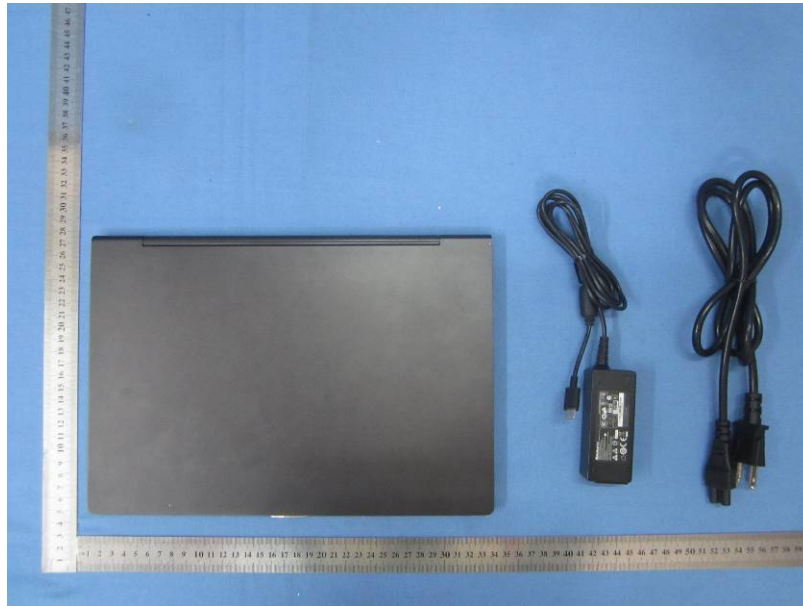
Radiated Emission



Conducted Emission

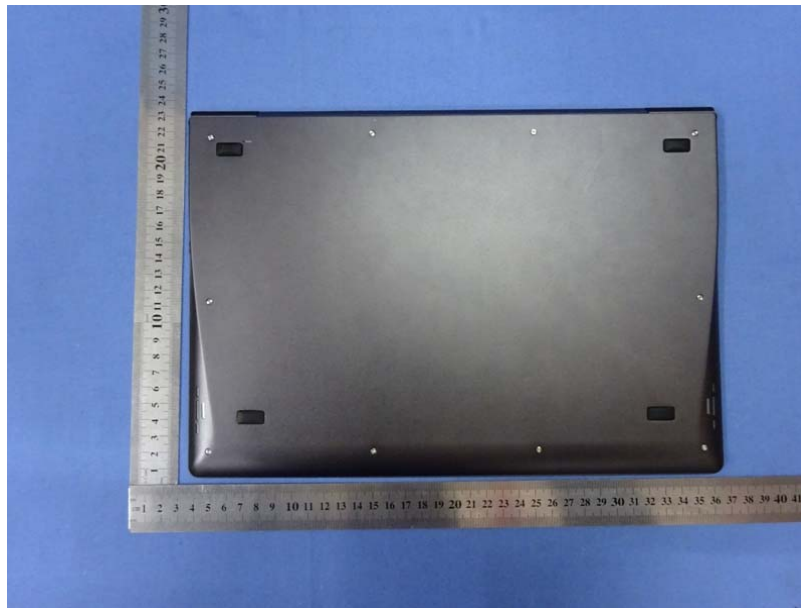


7 EUT Constructional Details

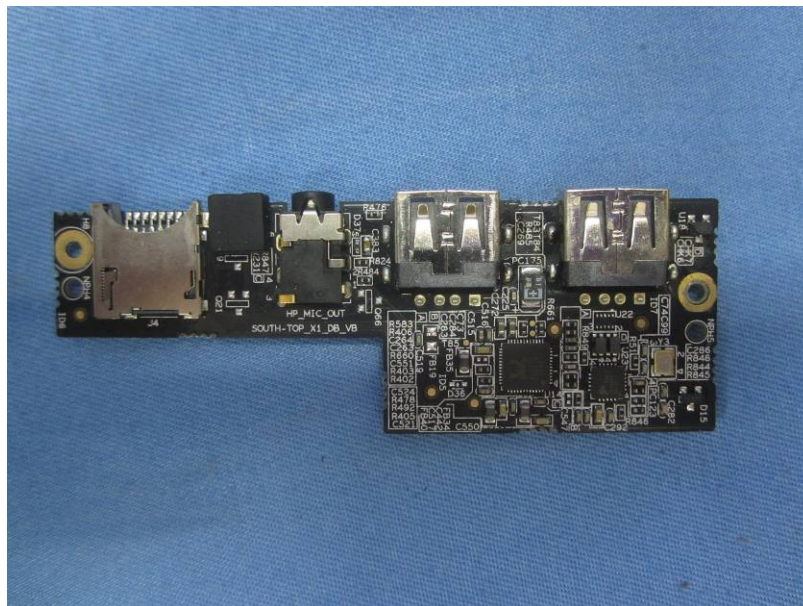
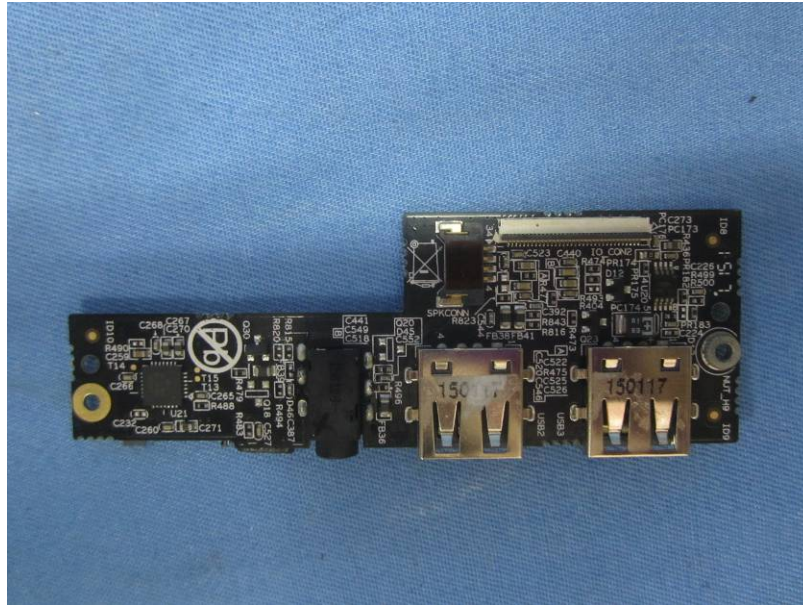


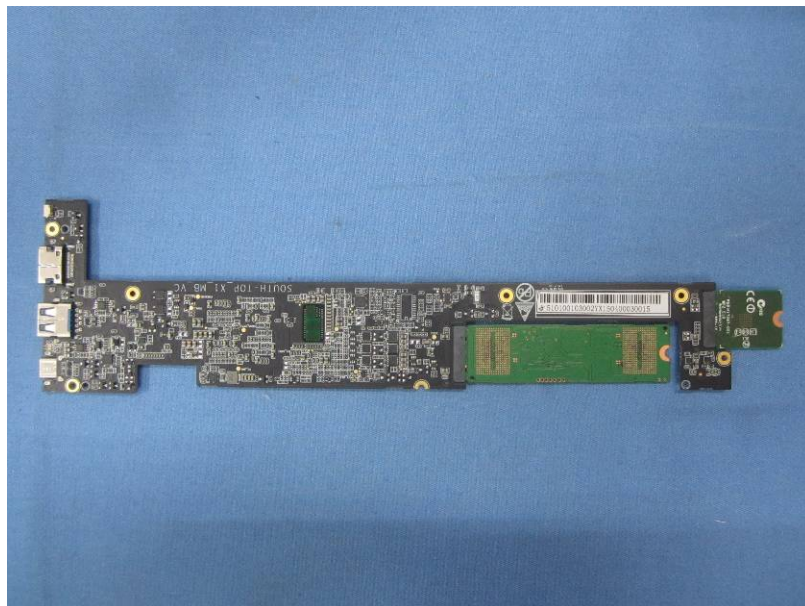
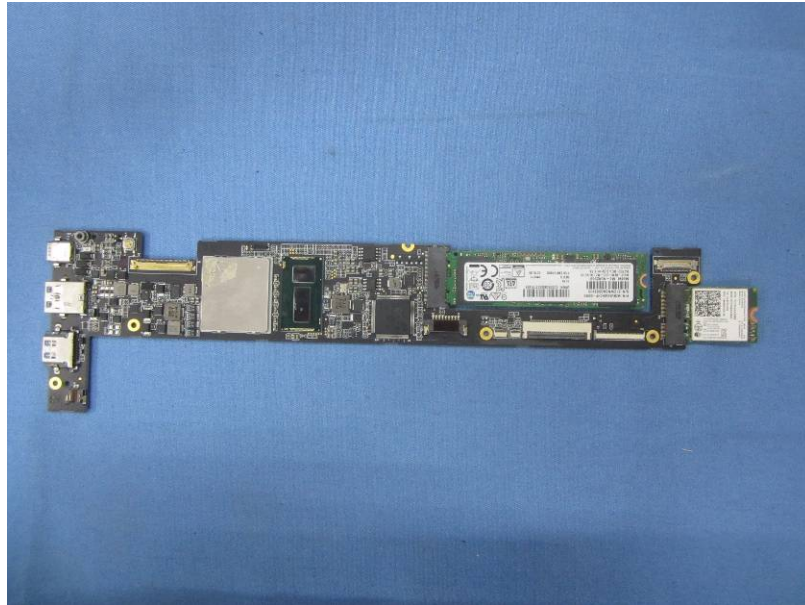


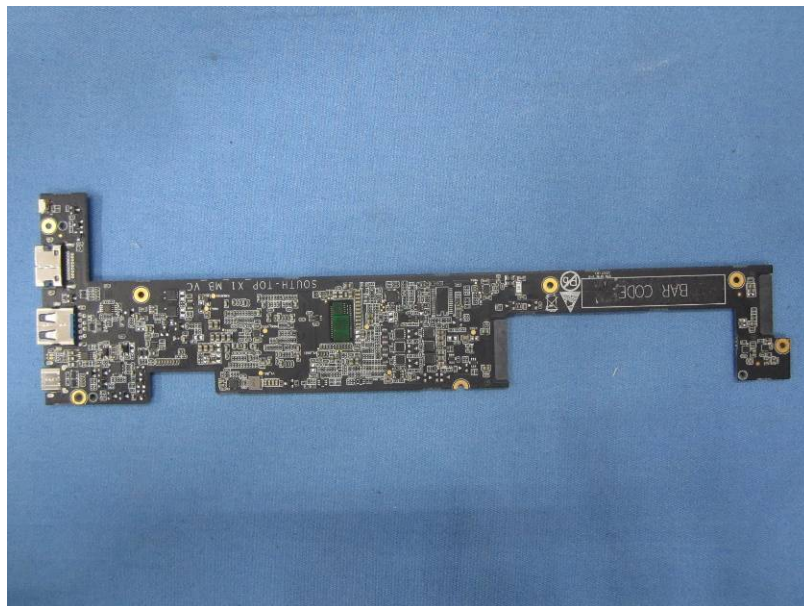
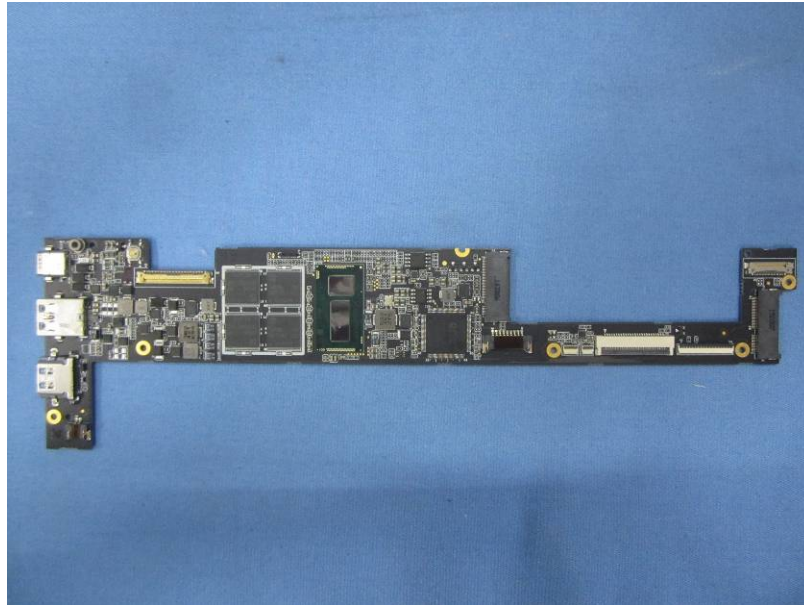


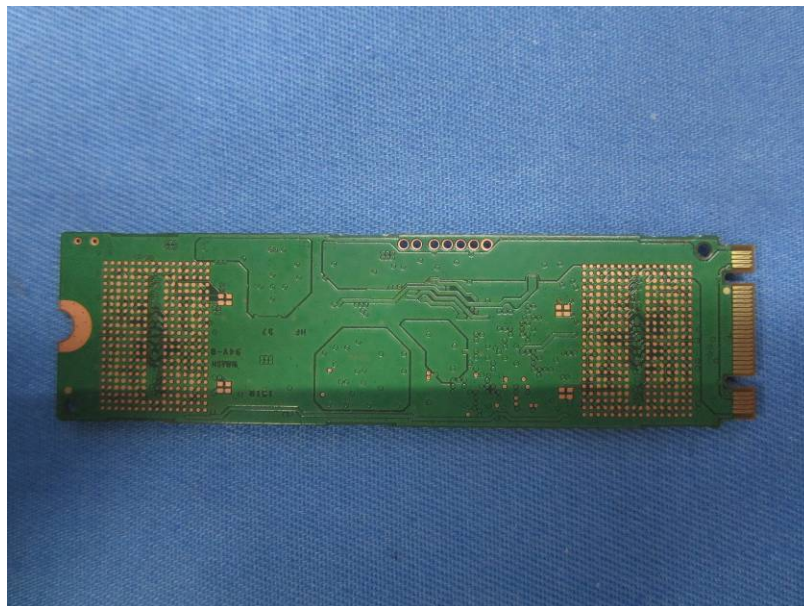
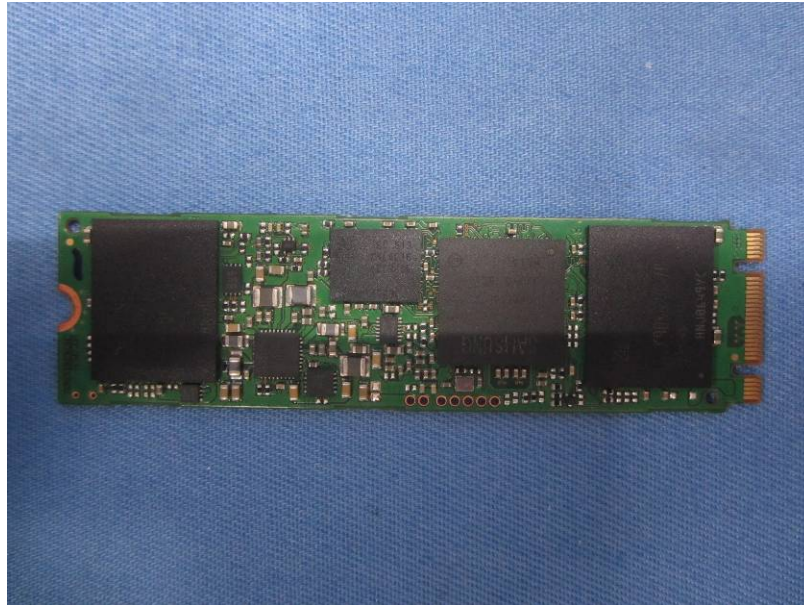




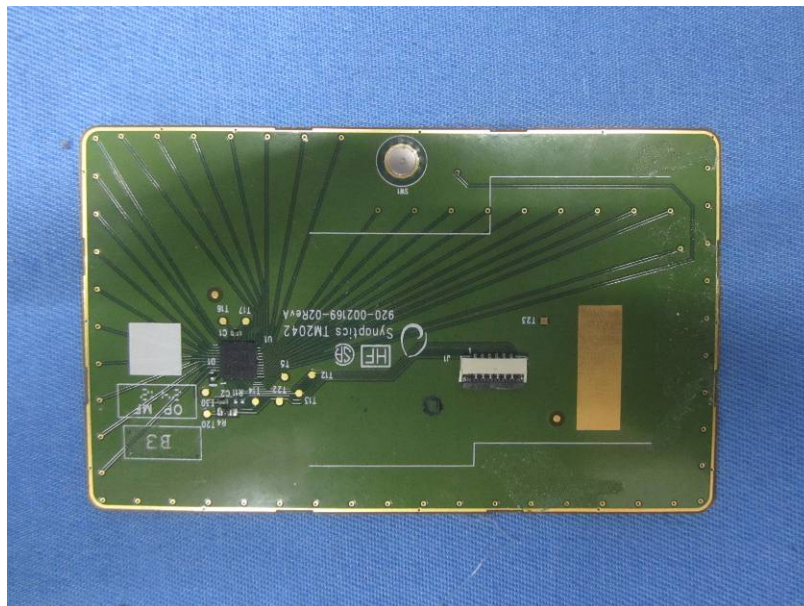
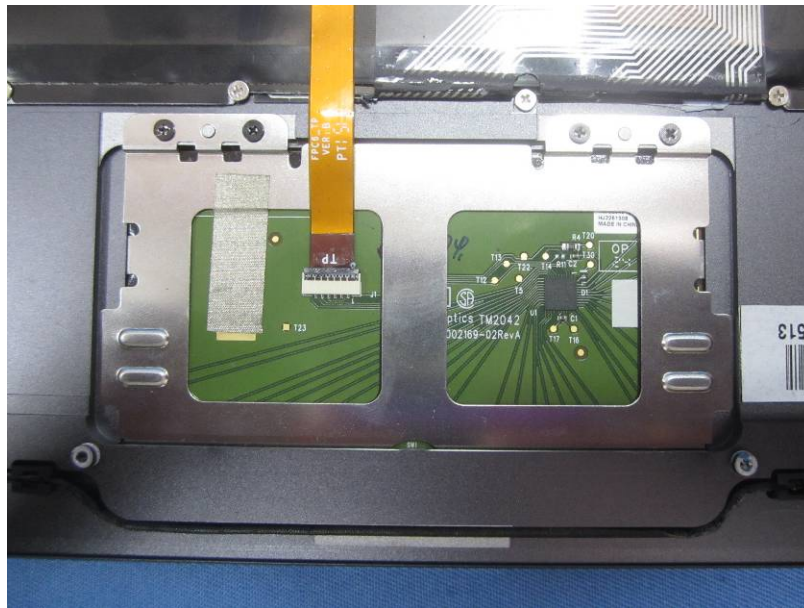


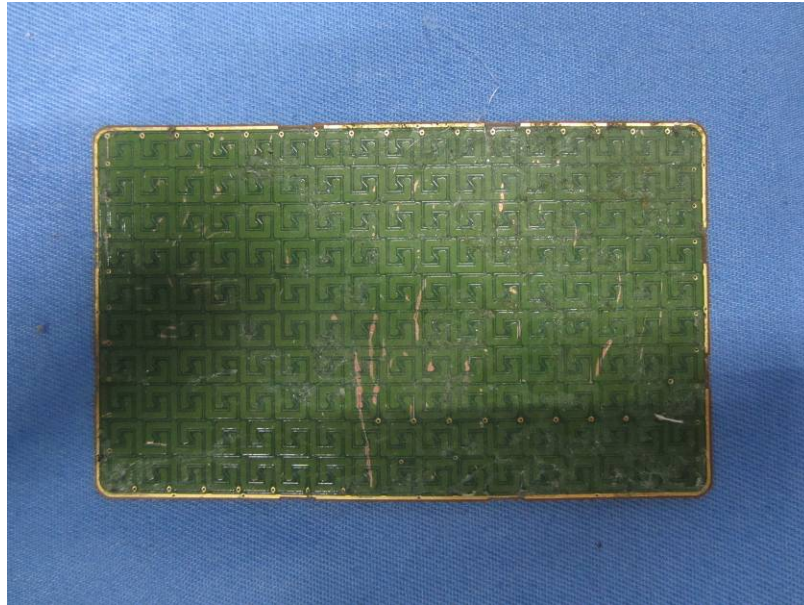




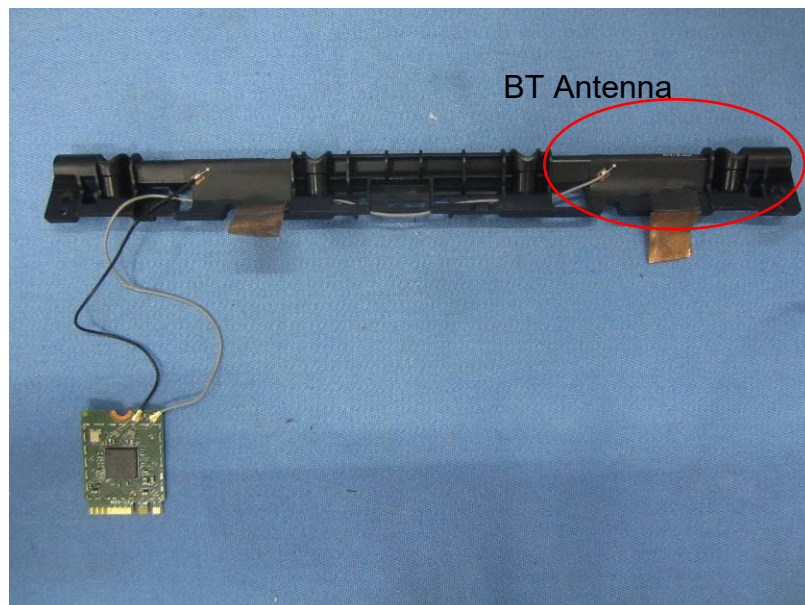
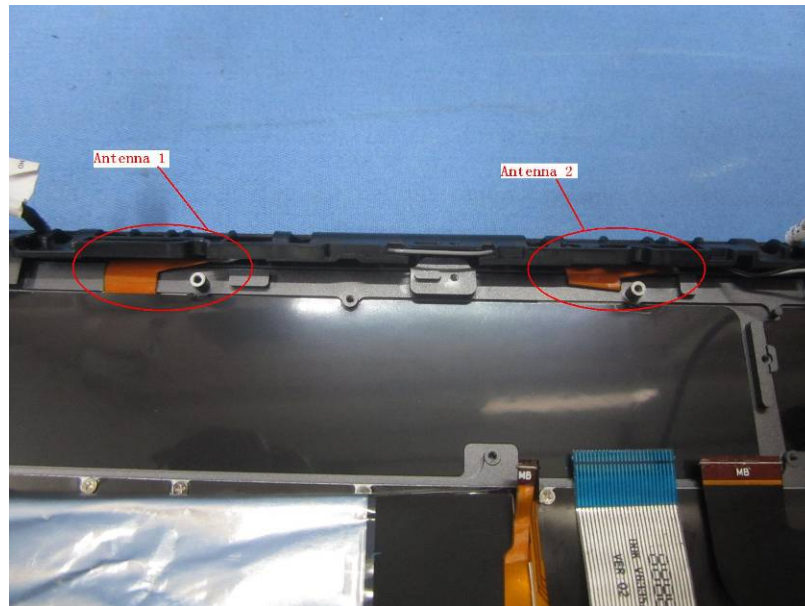












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