

# FCC REPORT

**Applicant:** Quantum Creations LLC.

**Address of Applicant:** 16410 NE 19th Avenue Suite 102 North, Miami Beach, Florida  
United States 33162

**Equipment Under Test (EUT)**

Product Name: PC Stick

Model No.: A-1063-AAP, A-1063-AAP-1, A-1063-AAP-2, A-1063-AAP-3,  
A-1063-AAP-4, A-1063-AAP-5, A-1063-AAP-6, A-1063-AAP-7,  
A-1063-AAP-8

Trade Mark: Azulle

**FCC ID:** 2AFJ120161063

**Applicable standards:** FCC CFR Title 47 Part 15 Subpart C Section 15.407:2015

**Date of sample receipt:** August 25, 2016

**Date of Test:** August 26-September 02, 2016

**Date of report issue:** September 07, 2016

**Test Result :** PASS \*

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

Authorized Signature:

A circular logo for GTS (Global United Technology Services Co., Ltd.) is overlaid with a handwritten signature in black ink. The signature appears to read 'Robinson Lo' and is dated 'September 7, 2016'. The logo contains the text 'GTS', 'GLOBAL UNITED TECHNOLOGY SERVICES CO., LTD.', and 'WIRELESS TESTING'.

**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.

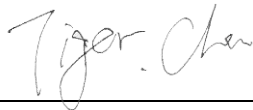
This report may only be reproduced and distributed in full. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of GTS or testing done by GTS in connection with, distribution or use of the product described in this report must be approved by GTS in writing.

This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.

## 2 Version

Version No.	Date	Description
00	September 07, 2016	Original

**Prepared By:**

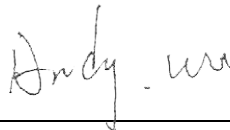


**Date:**

September 07, 2016

**Project Engineer**

**Check By:**



**Date:**

September 07, 2016

**Reviewer**

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## 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(f)	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	± 4.34dB	(1)
Radiated Emission	30MHz ~ 1000MHz	± 4.24dB	(1)
Radiated Emission	1GHz ~ 40GHz	± 4.68dB	(1)
AC Power Line Conducted Emission	0.15MHz ~ 30MHz	± 3.45dB	(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:	Quantum Creations LLC.
Address of Applicant:	16410 NE 19th Avenue Suite 102 North, Miami Beach, Florida United States 33162
Manufacturer:	SHENZHEN MELE STAR TECHNOLOGY LIMITED
Address of Manufacturer:	3F,Bldg#1,28 Cuijing Road, Pingshan New District, Shenzhen, PR China.
Factory:	Shenzhen MeLE Precision Technology Limited
Address of Factory:	3F East,Bldg#1,28 Cuijing Road, Pingshan New District, Shenzhen, PR China.

### 5.2 General Description of EUT

Product Name:	PC Stick
Model No.:	A-1063-AAP, A-1063-AAP-1, A-1063-AAP-2, A-1063-AAP-3, A-1063-AAP-4, A-1063-AAP-5, A-1063-AAP-6, A-1063-AAP-7, A-1063-AAP-8
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:	ANT 1: FPCB Antenna ANT 2: Integral Antenna
Antenna gain:	ANT 1: 0.5dBi ANT 2: 3.7dBi
Power supply:	SWITCHING ADAPTER: Model No.:FJ-SW0503000N Input: AC 100~240V~50/60Hz 0.6A Max Output: DC 5V 3A

**REMARK:**

802.11a:SISO MODE ONLY

802.11n(HT20)/802.11ac(HT20)/802.11n(HT40)/ 802.11ac(HT40)/802.11ac(HT80): MIMO MODE ONLY

### 5.3 Test mode

Transmitting mode	Keep the EUT in MIMO transmitting with modulation. EUT was test with 98% 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, the duty cycle is 98% 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

<p>The test facility is recognized, certified, or accredited by the following organizations:</p> <ul style="list-style-type: none"> <li>● <b>FCC —Registration No.: 600491</b> 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 22, 2016.</li> <li>● <b>Industry Canada (IC) —Registration No.: 9079A-2</b> 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, August 15, 2016.</li> </ul>
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### 5.5 Test Location

All tests were performed at:
<p>Global United Technology Services Co., Ltd. Address: No. 301-309, 3/F., Jinyuan Business Building, No.2, Laodong Industrial Zone, Xixiang Road, Baoan District, Shenzhen, Guangdong, China Tel: 0755-27798480 Fax: 0755-27798960</p>

### 5.6 Description of Support Units

None.
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### 5.7 Deviation from Standards

None.
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### 5.8 Abnormalities from Standard Conditions

None.
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### 5.9 Other Information Requested by the Customer

None.
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## 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	July. 03 2015	July. 02 2020
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. 29 2016	June. 28 2017
4	Spectrum analyzer	Agilent	E4447A	GTS516	June. 29 2016	June. 28 2017
5	Spectrum Analyzer	Agilent	E4440A	GTS533	June. 29 2016	June. 28 2017
6	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	GTS214	June. 29 2016	June. 28 2017
7	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	9120D-829	GTS208	June. 29 2016	June. 28 2017
8	Horn Antenna	ETS-LINDGREN	3160	GTS217	June. 29 2016	June. 28 2017
9	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
10	Coaxial Cable	GTS	N/A	GTS213	June. 29 2016	June. 28 2017
11	Coaxial Cable	GTS	N/A	GTS211	June. 29 2016	June. 28 2017
12	Coaxial cable	GTS	N/A	GTS210	June. 29 2016	June. 28 2017
13	Coaxial Cable	GTS	N/A	GTS212	June. 29 2016	June. 28 2017
14	Amplifier(100kHz-3GHz)	HP	8347A	GTS204	June. 29 2016	June. 28 2017
15	Amplifier(2GHz-20GHz)	HP	8349B	GTS206	June. 29 2016	June. 28 2017
16	Amplifier (18-40GHz)	MITEQ	AMF-6F-18004000-29-8P	GTS534	June. 29 2016	June. 28 2017
17	Band filter	Amindeon	82346	GTS219	June. 29 2016	June. 28 2017
18	Constant temperature and humidity box	Oregon Scientific	BA-888	GTS248	June. 29 2016	June. 28 2017
19	D.C. Power Supply	Instek	PS-3030	GTS232	June. 29 2016	June. 28 2017
20	Universal radio communication tester	Rohde & Schwarz	CMU200	GTS235	June. 29 2016	June. 28 2017
21	Splitter	Agilent	11636B	GTS237	June. 29 2016	June. 28 2017
22	Power Meter	Anritsu	ML2495A	GTS540	June. 29 2016	June. 28 2017
23	Power Sensor	Anritsu	MA2411B	GTS541	June. 29 2016	June. 28 2017

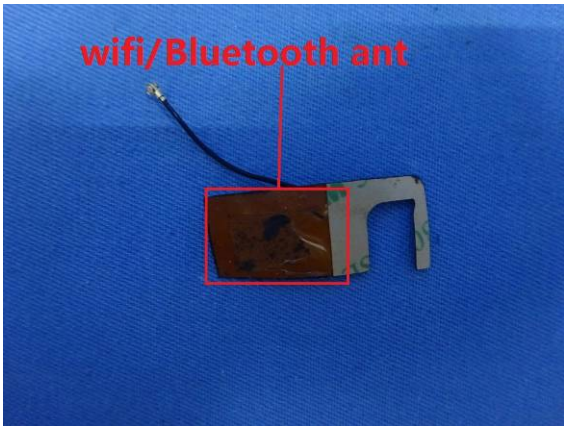
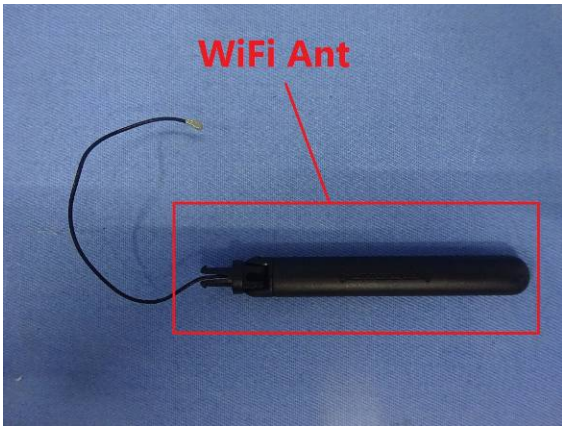
<b>Conducted Emission:</b>						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	Shielding Room	ZhongYu Electron	7.3(L)x3.1(W)x2.9(H)	GTS252	May 16 2014	May 15 2019
2	EMI Test Receiver	R&S	ESCI 7	GTS552	June 29 2016	June 28 2017
3	Pulse Limiter	R&S	ESH3-Z2	GTS224	June 29 2016	June 28 2017
4	Coaxial Switch	ANRITSU CORP	MP59B	GTS225	June 29 2016	June 28 2017
5	Artificial Mains Network	SCHWARZBECK MESS	NSLK8127	GTS226	June 29 2016	June 28 2017
6	Coaxial Cable	GTS	N/A	GTS227	June 29 2016	June 28 2017
7	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
8	Thermo meter	KTJ	TA328	GTS233	June 29 2016	June 28 2017

<b>General used equipment:</b>						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	Barometer	ChangChun	DYM3	GTS257	June 29 2016	June 28 2017



## 5 Test results and Measurement Data

### 5.1 Antenna requirement:

<b>Standard requirement:</b>	FCC Part15 C Section 15.203
<p><i>15.203 requirement:</i></p> <p><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></p>	
<b>E.U.T Antenna:</b>	
<p>The antenna is Integral antenna. The best case gain of the antenna is 3.7dBi.</p> <p>ANT 1</p> <p>ANT 2</p> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> </div> <p>Directional Gain Calculations is below:</p> <p>The same digital data are transmitted from the two antennas in a given symbol period, thus the antennas is categorization as correlated.</p> <p>Accroding to KDB 662911 D01 Multiple Transmitter Output v02r01 Section F)2)a)(i), the Directional Gain = <math>G_{ANT} + 10\log(2)</math> dBi = 3.7 + 3.01 dBi = 6.71dBi.</p>	

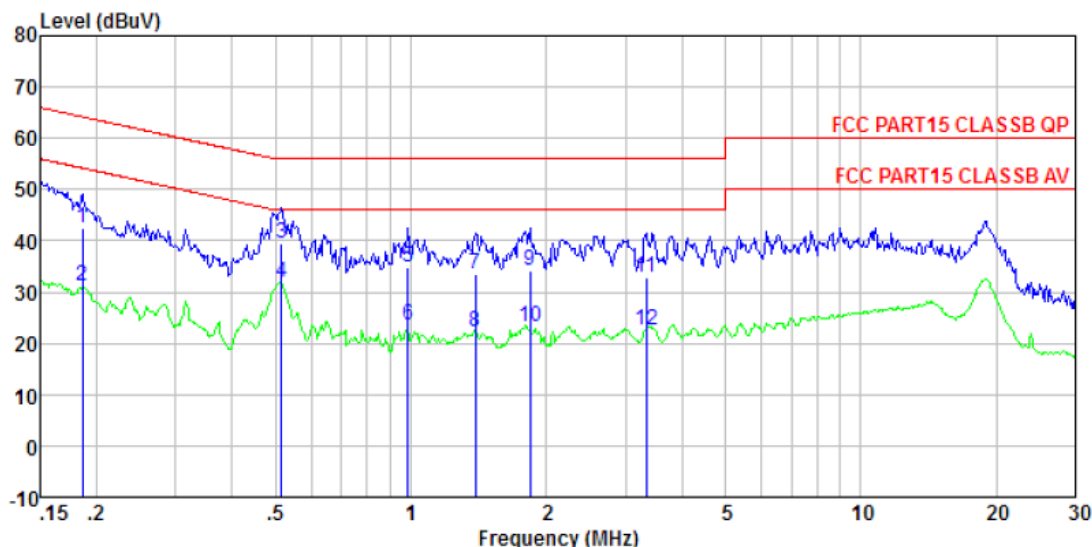
## 5.2 Conducted Emissions

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:	<table border="1"> <thead> <tr> <th rowspan="2">Frequency range (MHz)</th> <th colspan="2">Limit (dBuV)</th> </tr> <tr> <th>Quasi-peak</th> <th>Average</th> </tr> </thead> <tbody> <tr> <td>0.15-0.5</td> <td>66 to 56*</td> <td>56 to 46*</td> </tr> <tr> <td>0.5-5</td> <td>56</td> <td>46</td> </tr> <tr> <td>5-30</td> <td>60</td> <td>50</td> </tr> </tbody> </table> <p>* Decreases with the logarithm of the frequency.</p>	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
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													
Test procedure	<p>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.</p>														
Test setup:	<p><i>Remark</i>  <i>E.U.T: Equipment Under Test</i>  <i>LISN: Line Impedance Stabilization Network</i>  <i>Test table height=0.8m</i></p>														
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.

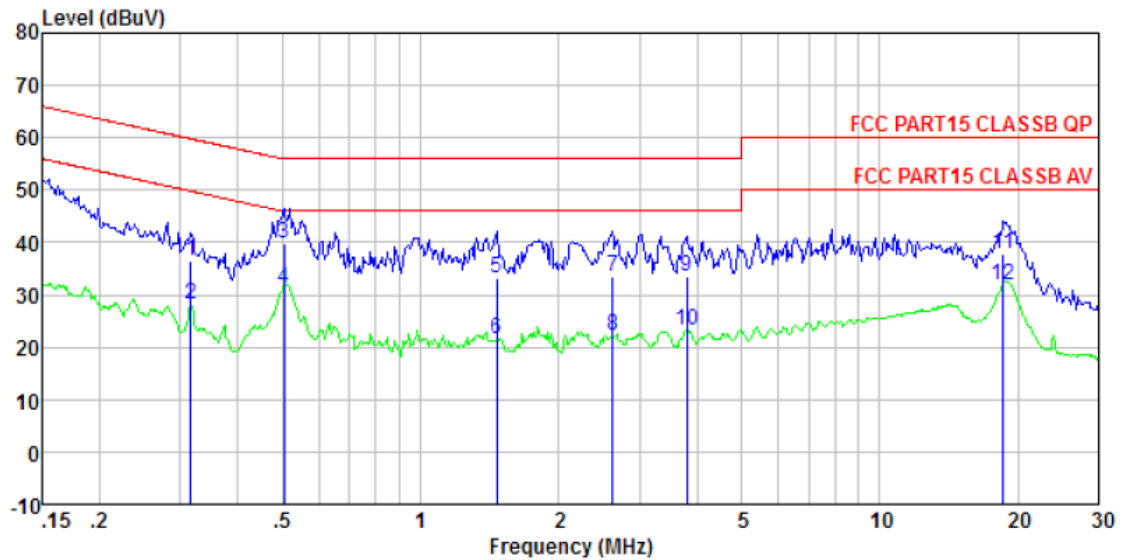
**Line:**



Site : Shielded room  
 Condition : FCC PART15 CLASSB QP LISN-2013 LINE  
 Job No. : 0121  
 Test mode : 5G Transmitting mode  
 Test Engineer: Boy

	Read Freq	Read Level	Aux Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.186	42.23	0.00	0.13	42.50	64.20	-21.70	QP
2	0.186	30.76	0.00	0.13	31.03	54.20	-23.17	Average
3	0.516	39.26	0.00	0.11	39.49	56.00	-16.51	QP
4	0.516	31.48	0.00	0.11	31.71	46.00	-14.29	Average
5	0.984	34.51	0.00	0.13	34.78	56.00	-21.22	QP
6	0.984	23.36	0.00	0.13	23.63	46.00	-22.37	Average
7	1.388	33.29	0.00	0.13	33.54	56.00	-22.46	QP
8	1.388	21.80	0.00	0.13	22.05	46.00	-23.95	Average
9	1.839	33.78	0.00	0.14	34.04	56.00	-21.96	QP
10	1.839	22.86	0.00	0.14	23.12	46.00	-22.88	Average
11	3.328	32.63	0.00	0.15	32.96	56.00	-23.04	QP
12	3.328	22.13	0.00	0.15	22.46	46.00	-23.54	Average

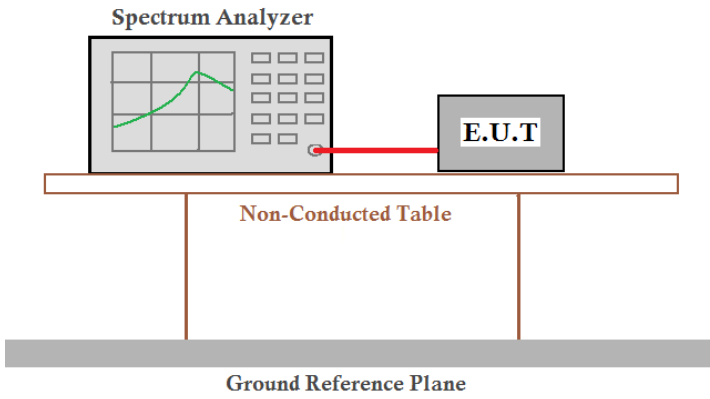
**Neutral:**



Site : Shielded room  
 Condition : FCC PART15 CLASSB QP LISN-2013 NEUTRAL  
 Job No. : 0121  
 Test mode : 5G Transmitting mode  
 Test Engineer: Boy

	Read Freq	Read Level	Aux Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.317	36.44	0.00	0.10	36.60	59.80	-23.20	QP
2	0.317	28.08	0.00	0.10	28.24	49.80	-21.56	Average
3	0.505	39.76	0.00	0.11	39.93	56.00	-16.07	QP
4	0.505	30.99	0.00	0.11	31.16	46.00	-14.84	Average
5	1.464	32.79	0.00	0.13	33.01	56.00	-22.99	QP
6	1.464	21.33	0.00	0.13	21.55	46.00	-24.45	Average
7	2.622	33.41	0.00	0.15	33.66	56.00	-22.34	QP
8	2.622	21.92	0.00	0.15	22.17	46.00	-23.83	Average
9	3.799	33.22	0.00	0.15	33.51	56.00	-22.49	QP
10	3.799	22.88	0.00	0.15	23.17	46.00	-22.83	Average
11	18.622	37.02	0.00	0.22	37.68	60.00	-22.32	QP
12	18.622	31.07	0.00	0.22	31.73	50.00	-18.27	Average

### 5.3 Emission Bandwidth and 99% Occupied Bandwidth

Test Requirement:	FCC Part15 E Section 15.407
Test Method:	KDB 789033 D02 General UNII Test Procedures New Rules v01
Limit:	N/A
Test setup:	 <p>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 two vertical legs. Below the table is a Ground Reference Plane.</p>
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(HT20)	802.11ac(HT20)	802.11a	802.11n(HT20)	802.11ac(HT20)
36	5180.00	16.5334	17.5439	17.5621	19.516	19.663	19.858
40	5200.00	16.5410	17.5425	17.5480	19.434	19.941	19.962
48	5240.00	16.5061	17.5498	17.5657	19.240	19.774	19.952

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	35.9657	35.9089	39.914	39.845
46	5230.00	35.9010	35.9732	39.678	39.668

CH. No.	Frequency (MHz)	99% Occupied Bandwidth (MHz)	26dB Occupied Bandwidth (MHz)
		802.11ac(HT80)	802.11ac(HT80)
42	5210.00	74.8604	80.643

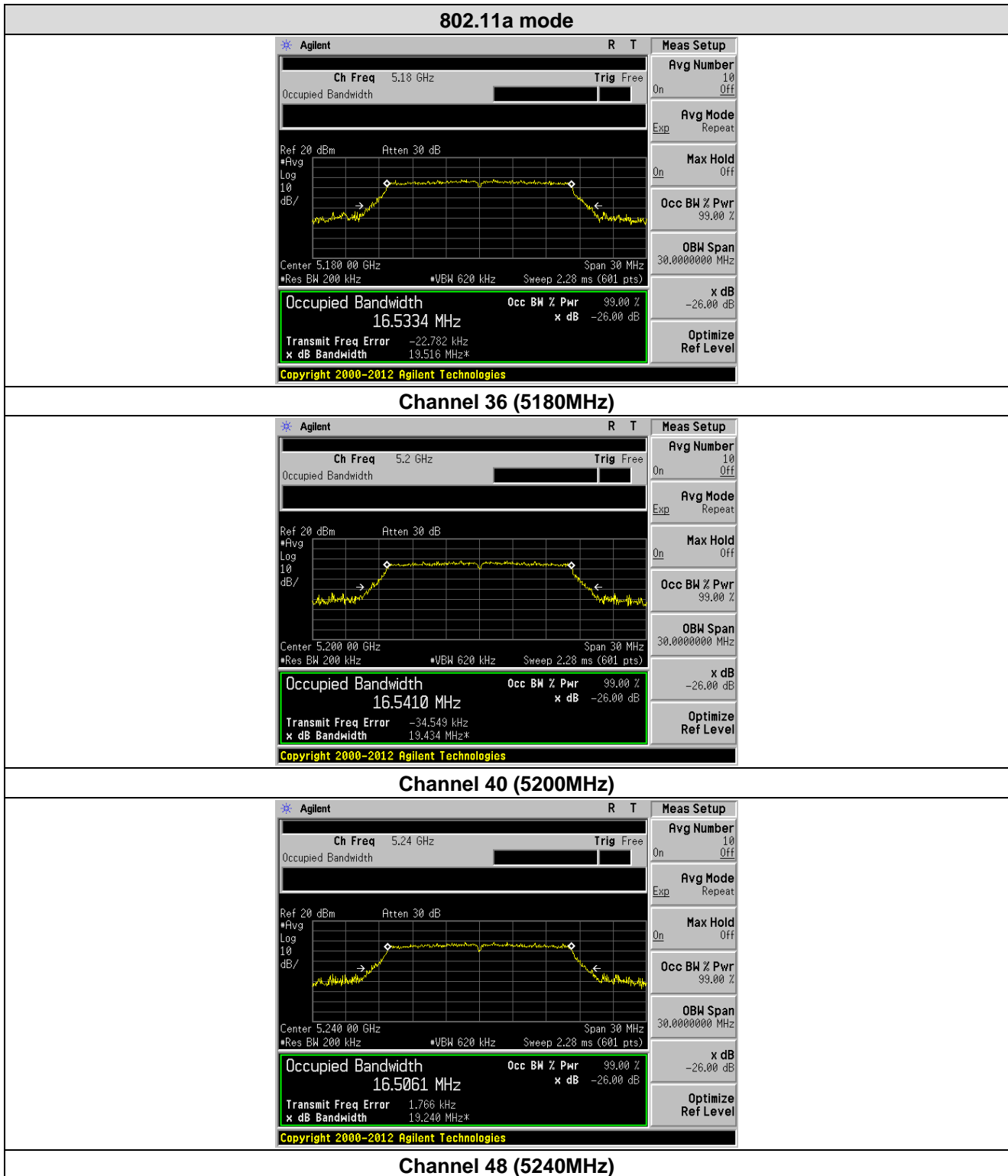
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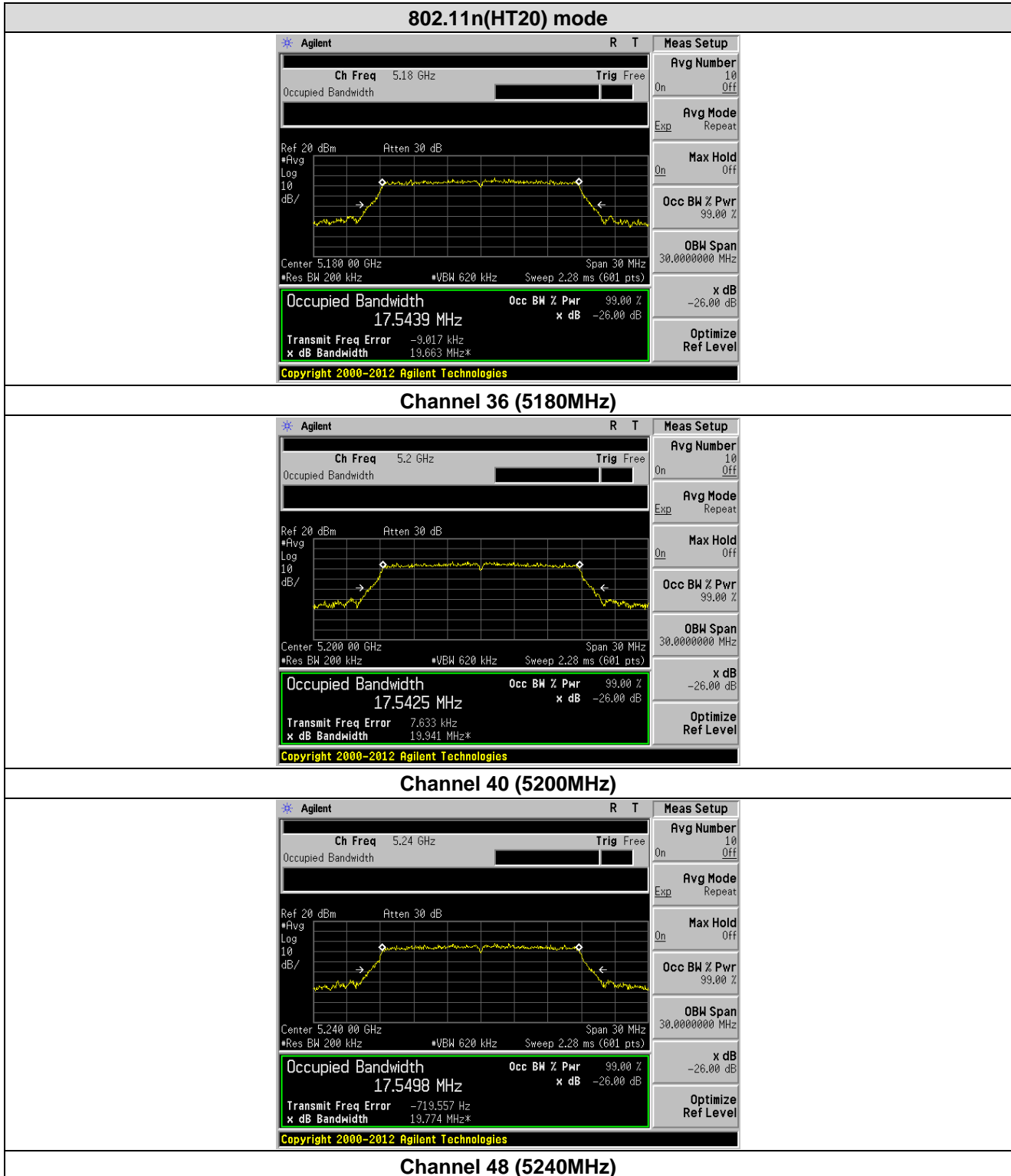
CH. No.	Frequency (MHz)	99% Occupied Bandwidth (MHz)			26dB Occupied Bandwidth (MHz)		
		802.11a	802.11n(HT20)	802.11ac(HT20)	802.11a	802.11n(HT20)	802.11ac(HT20)
36	5180.00	16.4994	17.5614	17.5648	19.430	19.805	19.759
40	5200.00	16.5361	17.5347	17.5526	19.613	19.741	19.654
48	5240.00	16.5395	17.5498	17.5509	19.335	19.755	19.918

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	35.9114	35.9215	39.719	39.798
46	5230.00	35.9867	35.9812	39.746	39.862

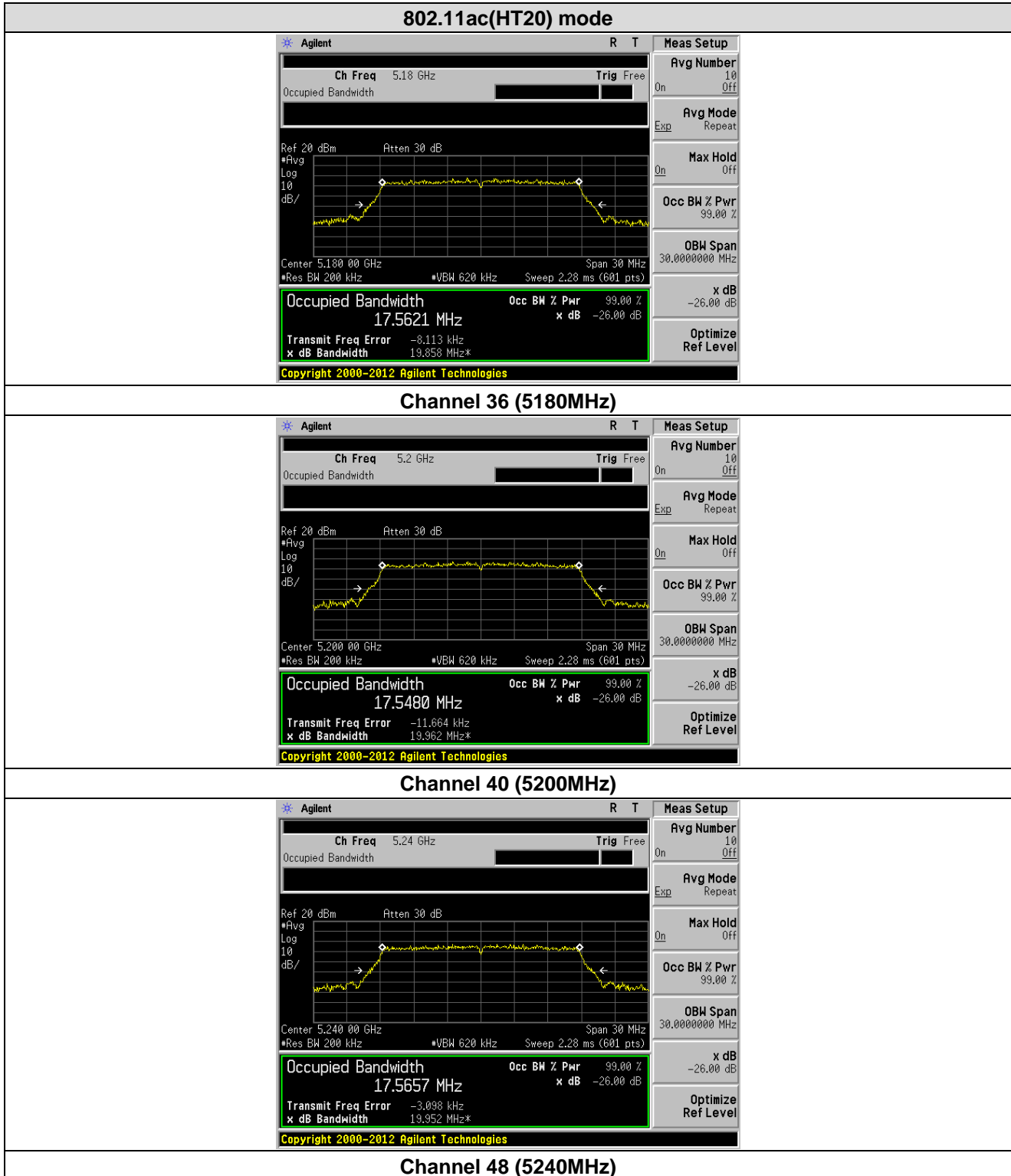
CH. No.	Frequency (MHz)	99% Occupied Bandwidth (MHz)	26dB Occupied Bandwidth (MHz)
		802.11ac(HT80)	802.11ac(HT80)
42	5210.00	74.7723	80.773

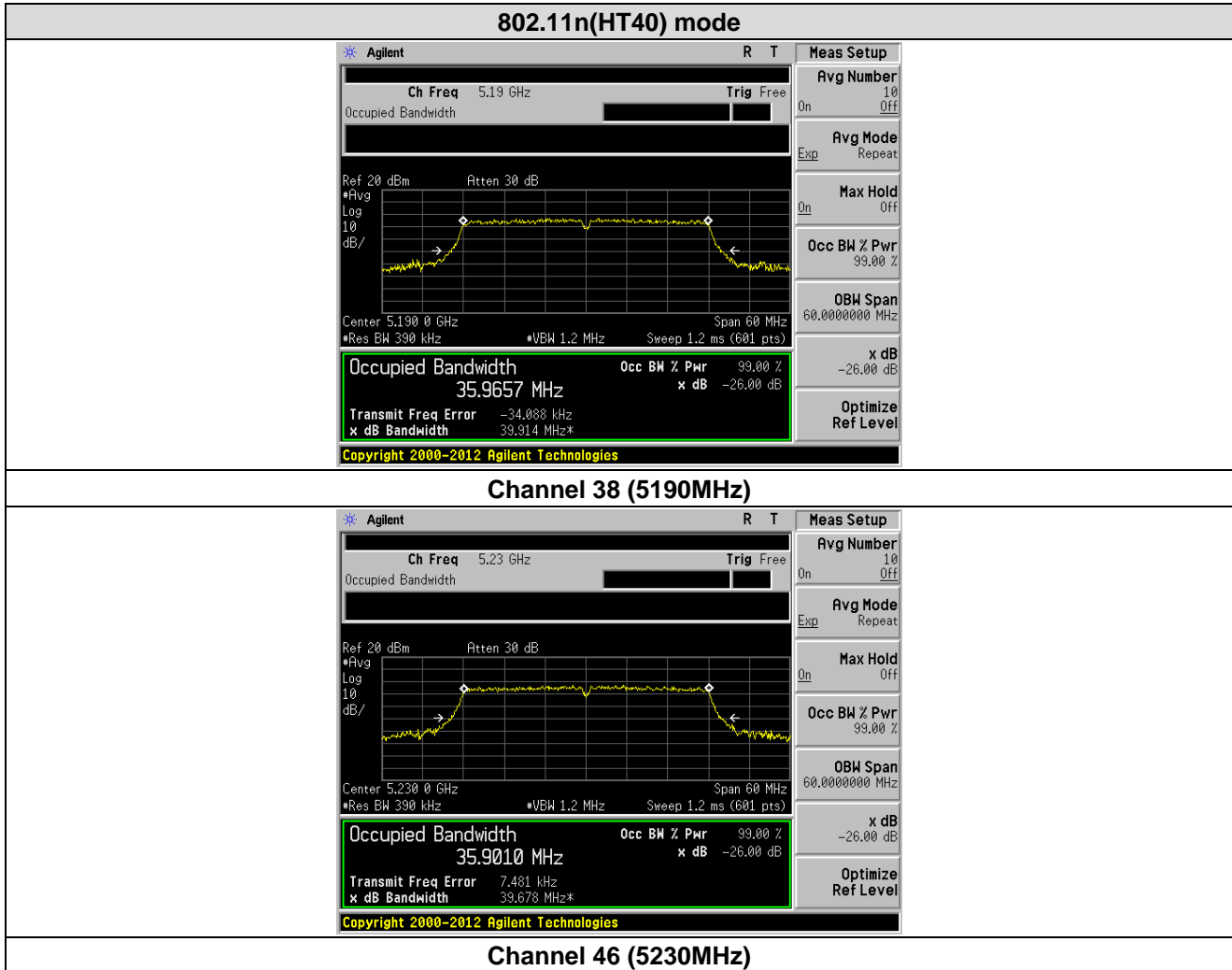
Test plots as followed:  
ANT:1

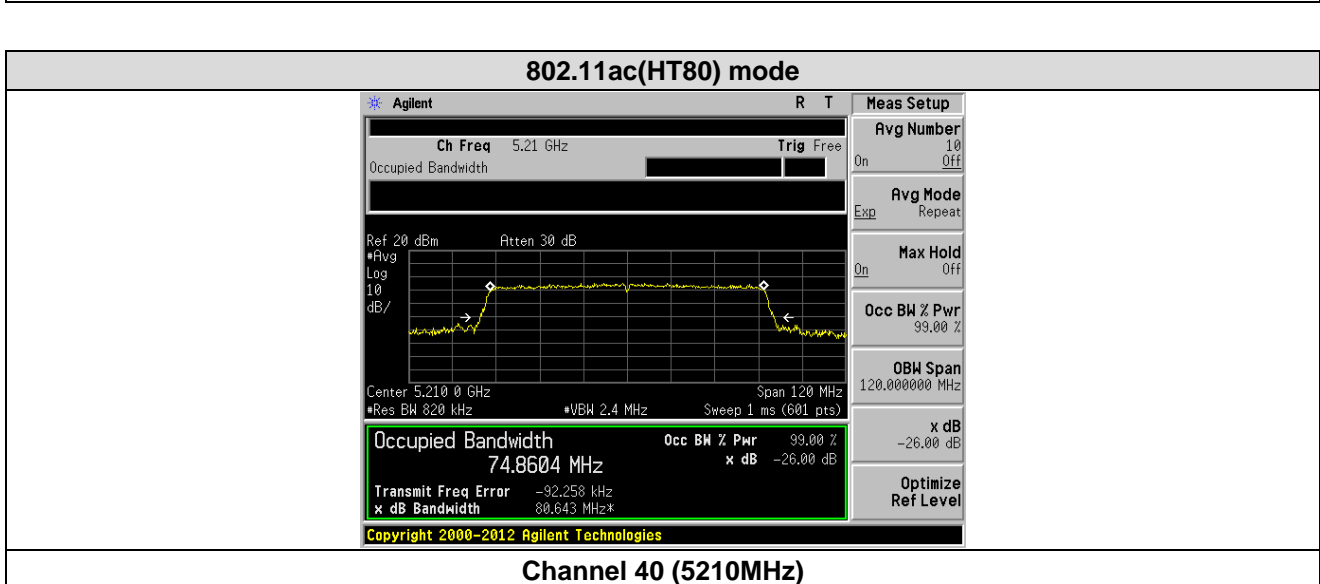
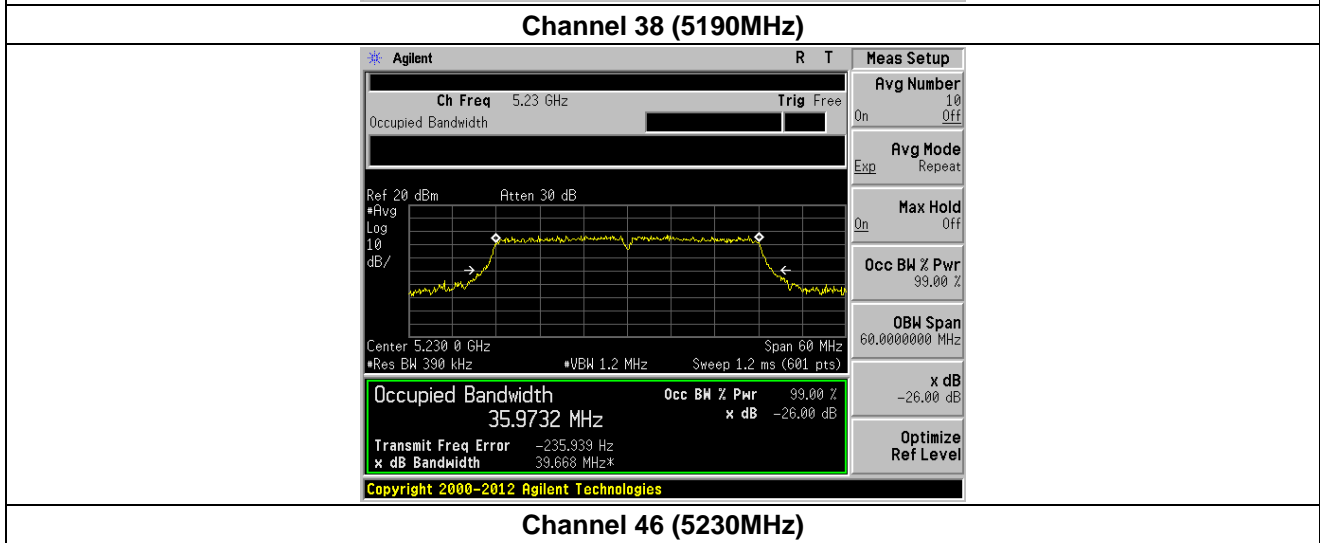
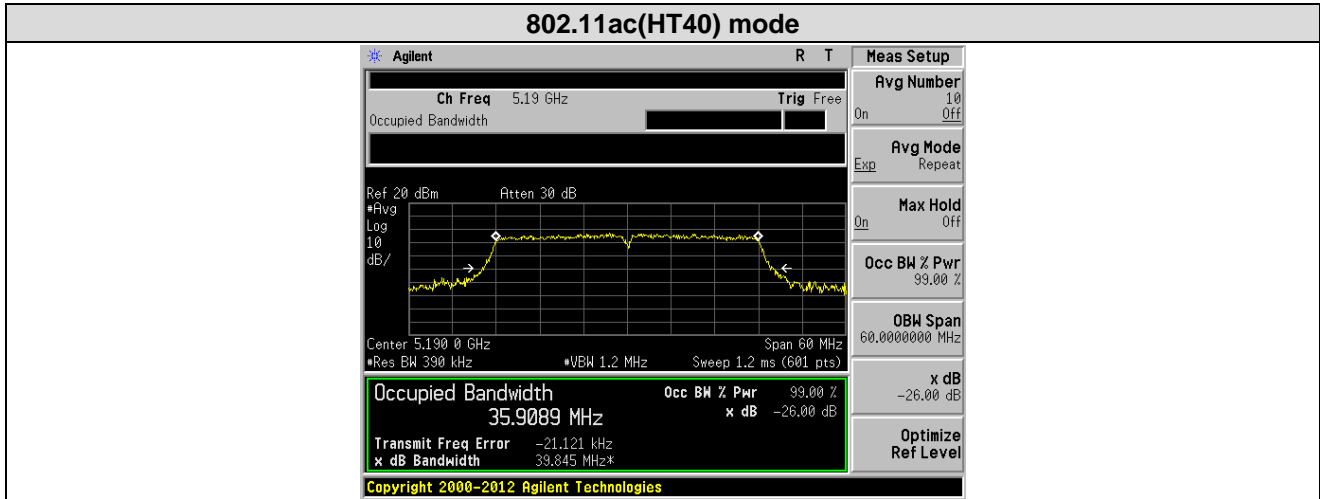




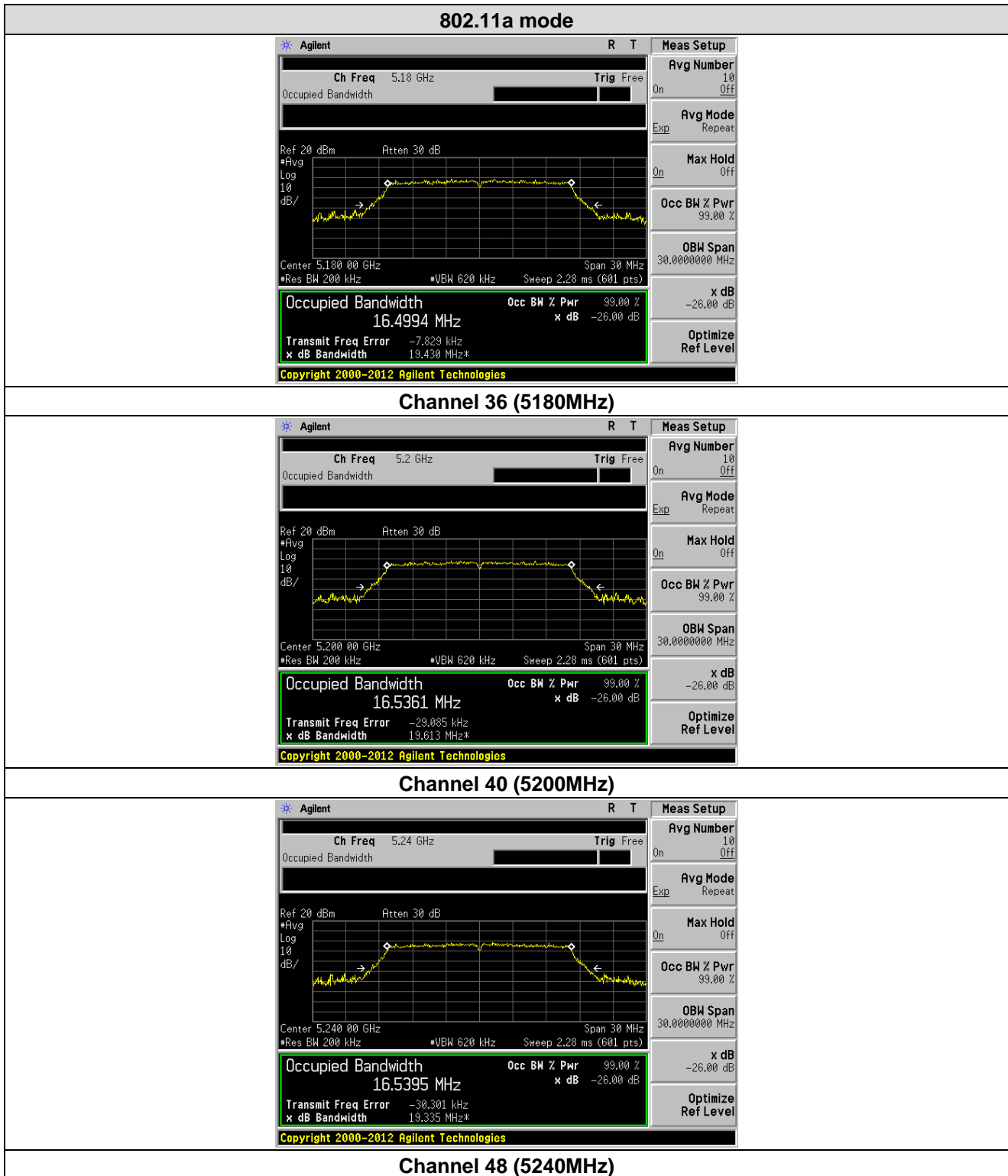


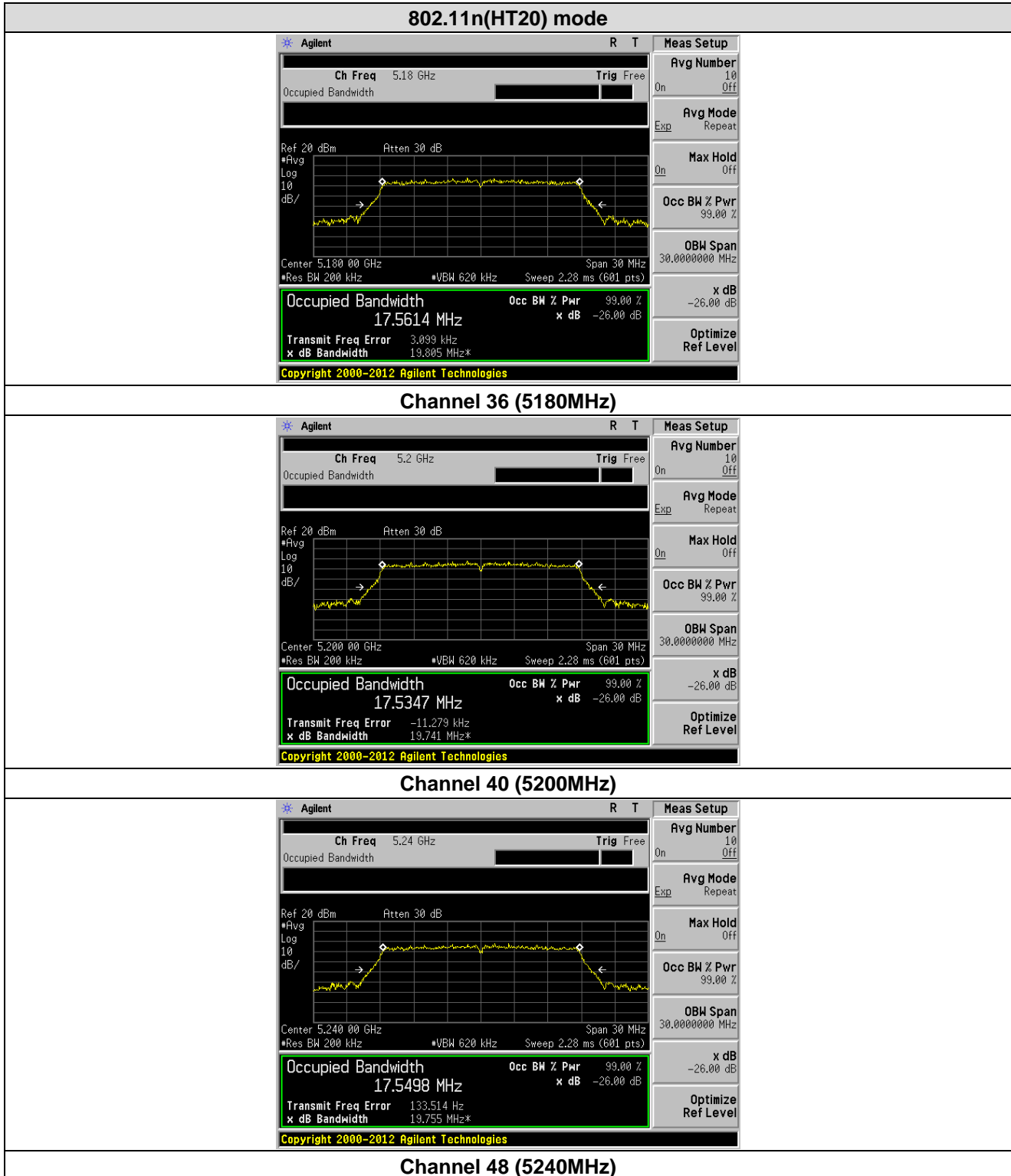


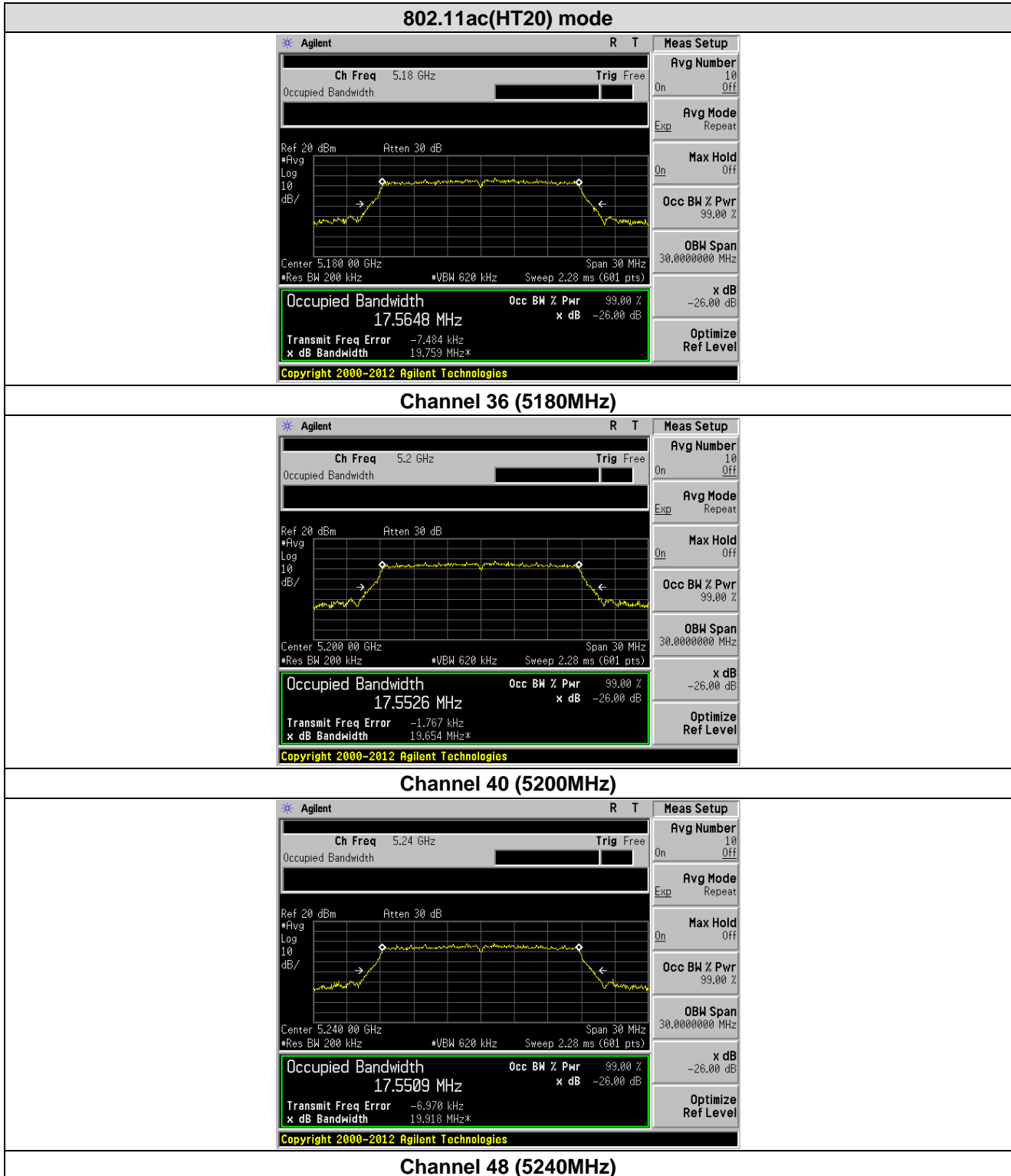


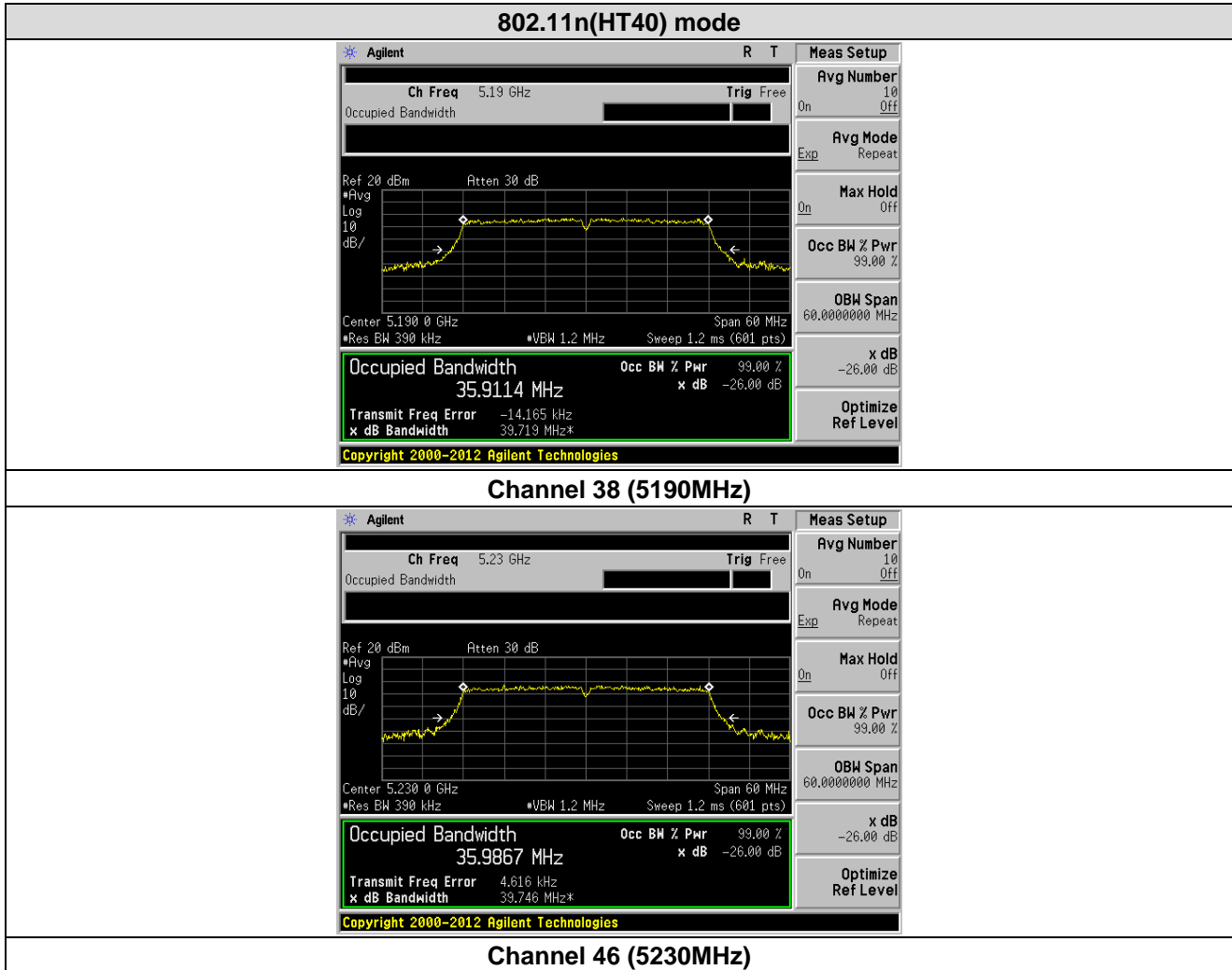


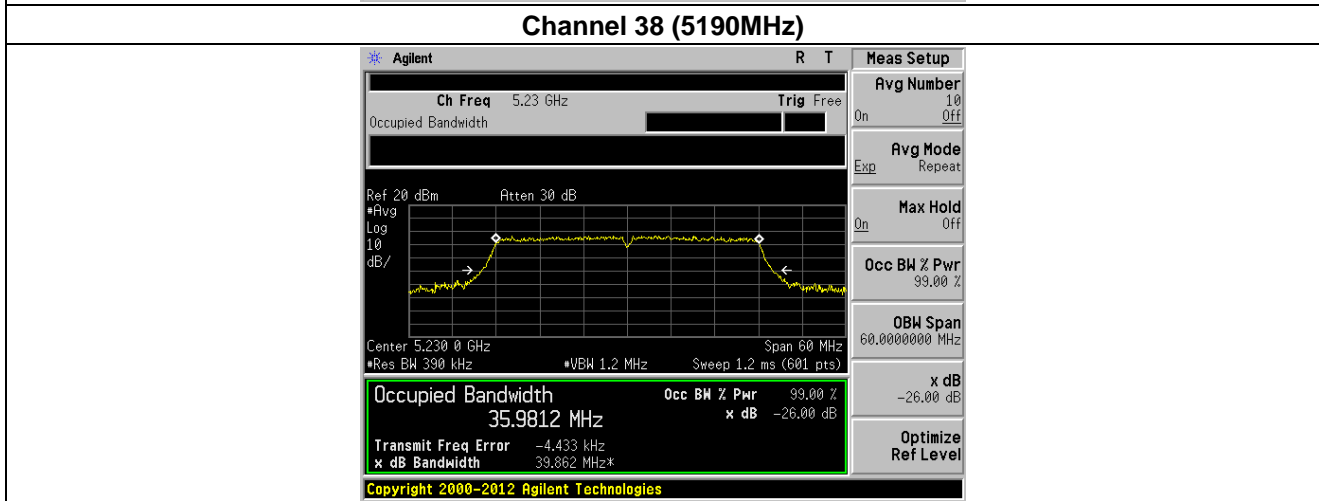
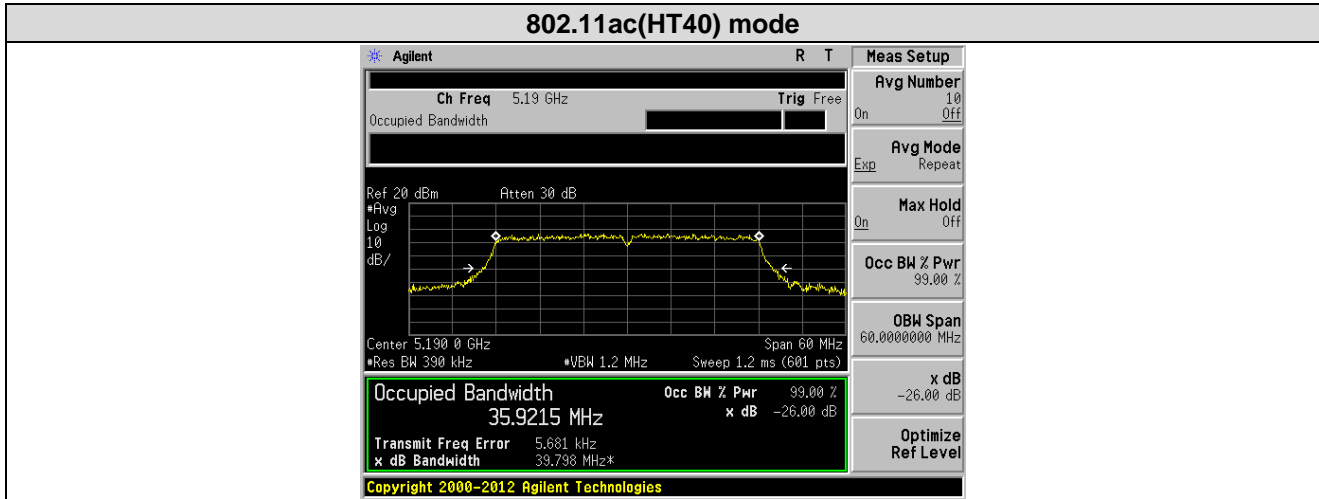
**ANT:2**



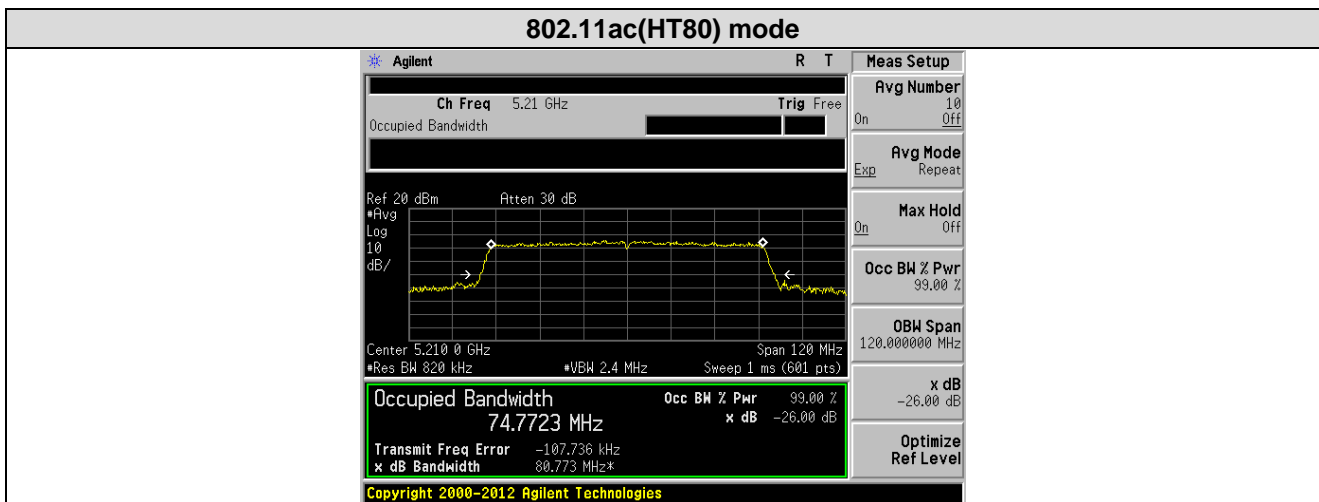








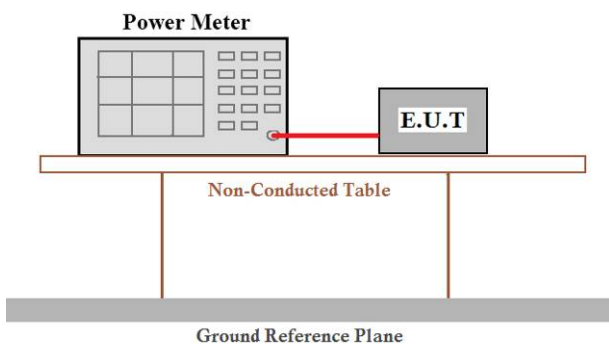
### Channel 46 (5230MHz)



### Channel 40 (5210MHz)



## 5.4 Peak Transmit Power

Test Requirement:	FCC Part15 E Section 15.407
Test Method:	KDB 789033 D02 General UNII Test Procedures New Rules v01
Limit:	29.29dBm
Test setup:	 <p>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 two vertical legs. Below the table is a 'Ground Reference Plane'.</p>
Test procedure:	<p><b>Measurement using an RF average power meter</b></p> <ul style="list-style-type: none"> <li>(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 <ul style="list-style-type: none"> <li>a) The EUT is configured to transmit continuously or to transmit with a constant duty cycle.</li> <li>b) At all times when the EUT is transmitting, it must be transmitting at its maximum power control level.</li> <li>c) The integration period of the power meter exceeds the repetition period of the transmitted signal by at least a factor of five.</li> </ul> </li> <li>(ii) If the transmitter does not transmit continuously, measure the duty cycle, x, of the transmitter output signal as described in section B).</li> <li>(iii) Measure the average power of the transmitter. This measurement is an average over both the on and off periods of the transmitter.</li> <li>(iv) Adjust the measurement in dBm by adding <math>10 \log(1/x)</math> where x is the duty cycle (e.g., <math>10 \log(1/0.25)</math> if the duty cycle is 25 percent).</li> </ul>
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(HT20) 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	12.24	11.98	0.08	12.32	12.06	24	Pass
40	5200.00	10.11	11.82	0.08	10.19	11.90	24	Pass
48	5240.00	12.37	11.56	0.08	12.45	11.64	24	Pass

**ANT1 + ANT2:**

802.11n(HT20) mode (MIMO)									
CH No.	Frequency (MHz)	Measured Power (dBm)					MIMO Output Power (dBm)	Limit (dBm)	Result
		ANT1	ANT2	Duty Factor	Total ANT1	Total ANT2			
36	5180.00	13.03	11.12	0.08	13.11	11.20	15.27	24	Pass
40	5200.00	12.76	10.36	0.08	12.84	10.44	14.81	24	Pass
48	5240.00	11.98	10.09	0.08	12.06	10.17	14.23	24	Pass

802.11ac(HT20) mode (MIMO)									
CH No.	Frequency (MHz)	Measured Power (dBm)					MIMO Output Power (dBm)	Limit (dBm)	Result
		ANT1	ANT2	Duty Factor	Total ANT1	Total ANT2			
36	5180.00	11.88	10.20	0.08	11.96	10.28	14.21	24	Pass
40	5200.00	10.96	10.34	0.08	11.04	10.42	13.75	24	Pass
48	5240.00	10.75	10.73	0.08	10.83	10.81	13.83	24	Pass

802.11n(HT40) mode (MIMO)									
CH No.	Frequency (MHz)	Measured Power (dBm)					MIMO Output Power (dBm)	Limit (dBm)	Result
		ANT1	ANT2	Duty Factor	Total ANT1	Total ANT2			
38	5190.00	12.19	11.03	0.08	12.27	11.11	14.74	24	Pass
46	5230.00	11.37	10.72	0.08	11.45	10.80	14.13	24	Pass

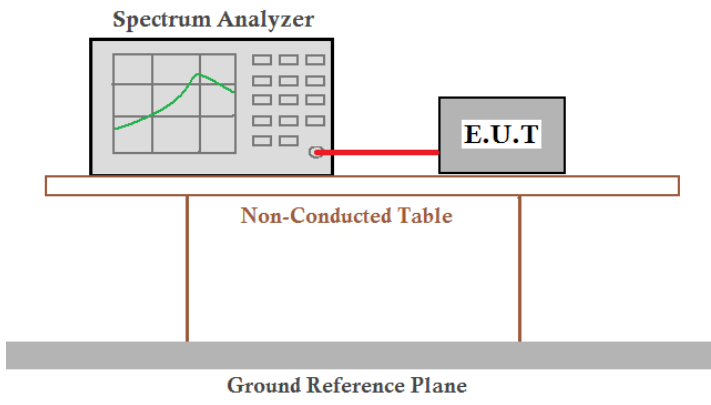
802.11ac(HT40) mode (MIMO)									
CH No.	Frequency (MHz)	Measured Power (dBm)					MIMO Output Power (dBm)	Limit (dBm)	Result
		ANT1	ANT2	Duty Factor	Total ANT1	Total ANT2			
38	5190.00	12.07	11.77	0.08	12.15	11.85	15.01	24	Pass
46	5230.00	12.48	10.02	0.08	12.56	10.10	14.51	24	Pass

802.11ac(HT80) mode (MIMO)									
CH No.	Frequency (MHz)	Measured Power (dBm)					MIMO Output Power (dBm)	Limit (dBm)	Result
		ANT1	ANT2	Duty Factor	Total ANT1	Total ANT2			
42	5210.00	12.48	11.26	0.08	12.56	11.34	15.00	24	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:	16.29 dBm/MHz
Test setup:	 <p>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 two vertical legs. Below the table is a Ground Reference Plane.</p>
Test procedure:	<ol style="list-style-type: none"> <li>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...".</li> <li>2) Use the peak search function on the instrument to find the peak of the spectrum.</li> <li>3) Make the following adjustments to the peak value of the spectrum, if applicable: <ol style="list-style-type: none"> <li>a) If Method SA-2 or SA-2 Alternative was used, add <math>10 \log(1/x)</math>, where <math>x</math> is the duty cycle, to the peak of the spectrum.</li> <li>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.</li> </ol> </li> <li>4) The result is the PPSD.</li> </ol>
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	6.01	6.09	11.00	Pass
40	5200.00	5.91	6.09	11.00	Pass
48	5240.00	4.62	6.09	11.00	Pass

ANT:2

802.11a mode (SISO)					
Channel No.	Frequency (MHz)	Measured PPSD (dBm/MHz)	Total PPSD (dBm/MHz)	Limit (dBm/MHz)	Result
36	5180.00	5.58	5.66	11.00	Pass
40	5200.00	5.72	5.80	11.00	Pass
48	5240.00	5.70	5.78	11.00	Pass

ANT 1+ANT 2

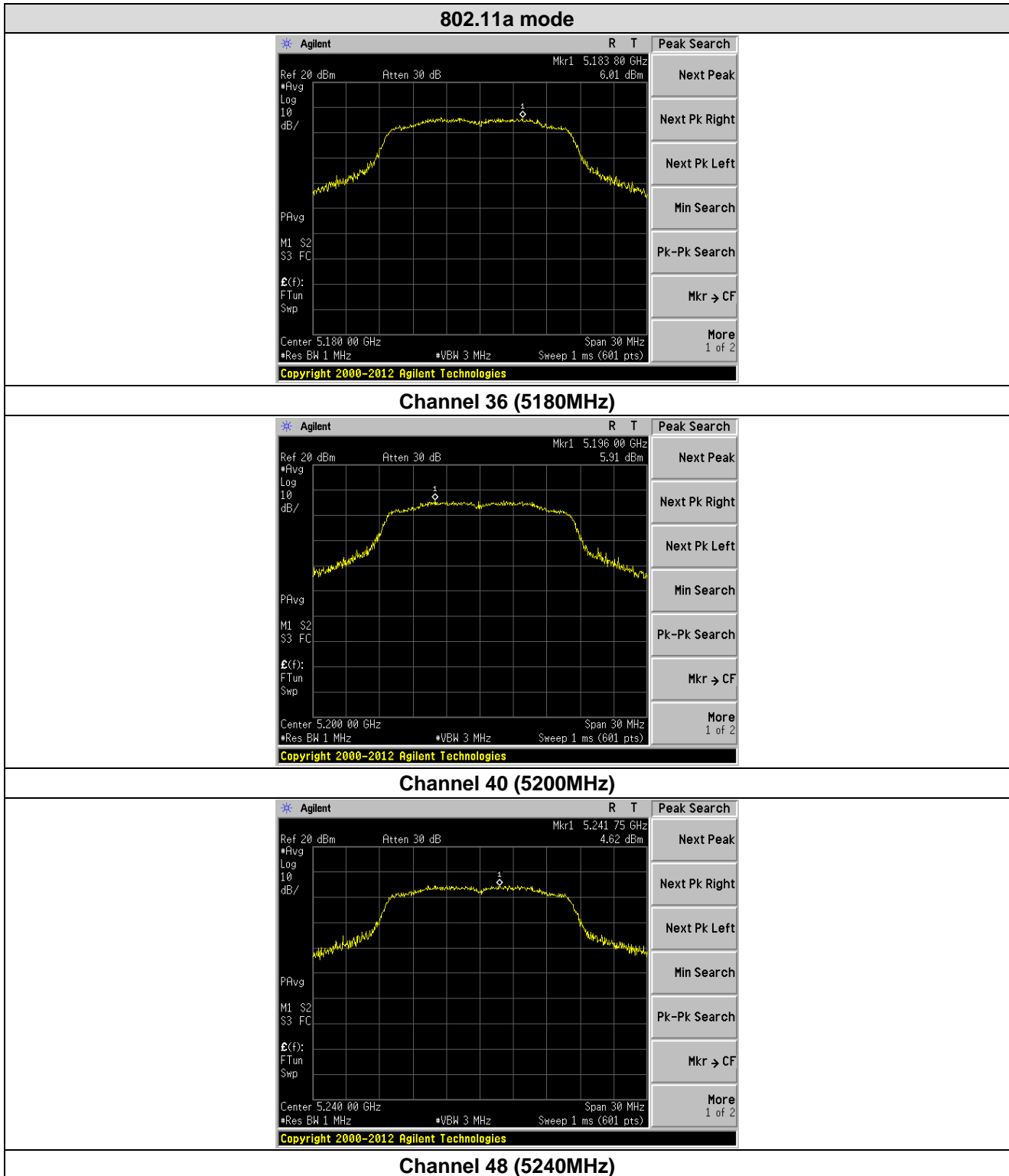
802.11n(HT20) mode (MIMO)						
Channel No.	Frequency (MHz)	ANT 1 Total PPSD (dBm/MHz)	ANT 2 Total PPSD (dBm/MHz)	Total	(dBm/MHz)	Result
36	5180.00	5.26	4.83	8.06	11.00	Pass
40	5200.00	3.96	3.94	6.96	11.00	Pass
48	5240.00	3.66	3.38	6.53	11.00	Pass
802.11ac(HT20) mode (MIMO)						
Channel No.	Frequency (MHz)	ANT 1 Total PPSD (dBm/MHz)	ANT 2 Total PPSD (dBm/MHz)	Total	(dBm/MHz)	Result
36	5180.00	4.86	4.82	7.85	11.00	Pass
40	5200.00	5.38	5.55	8.48	11.00	Pass
48	5240.00	3.85	4.43	7.16	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	1.08	1.17	4.14	11.00	Pass
46	5230.00	0.37	0.20	3.30	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	1.10	1.37	4.25	11.00	Pass
46	5230.00	-0.54	-0.32	2.58	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	-2.24	-0.21	1.90	11.00	Pass

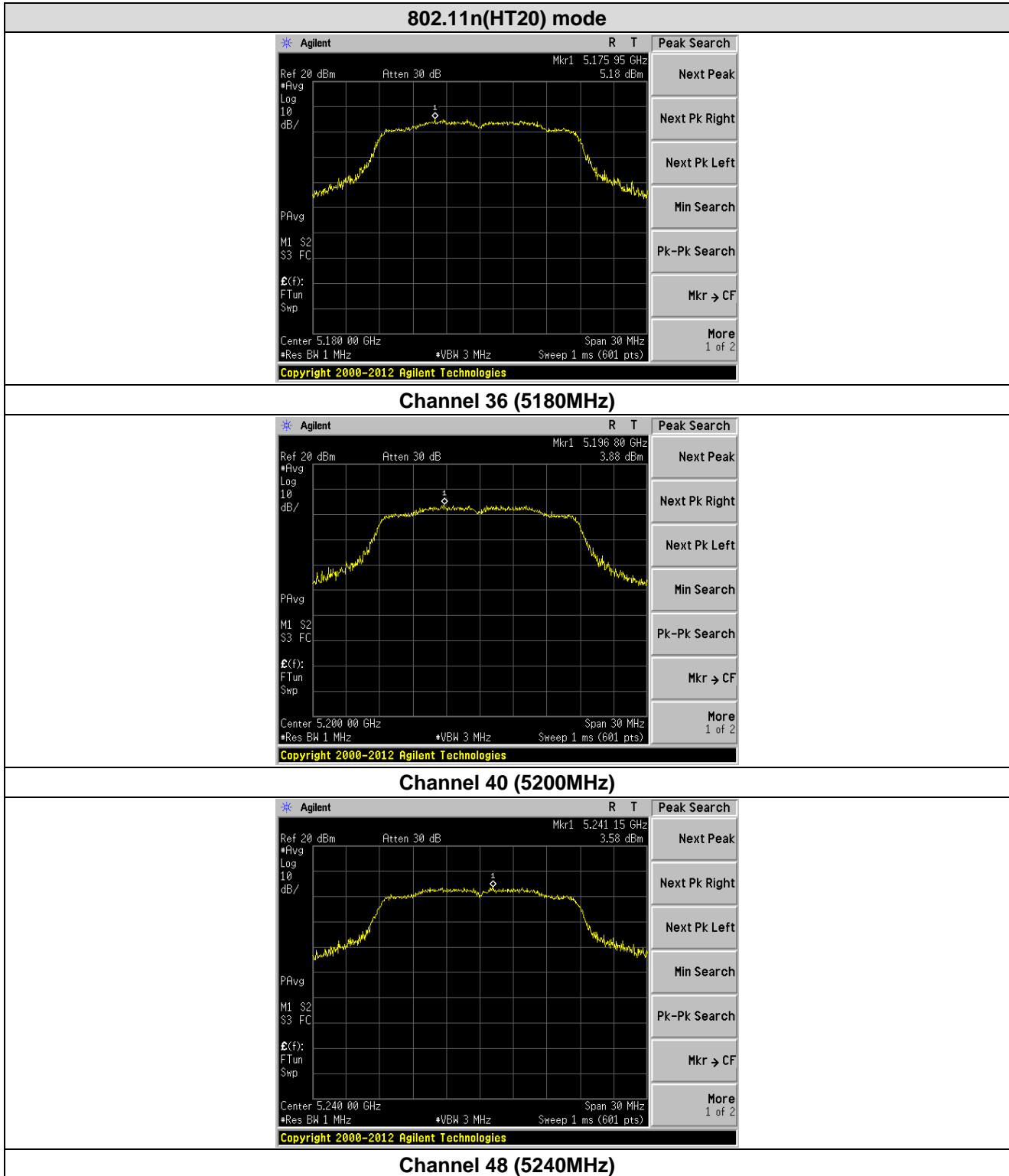
Note: Total PSD= PSD + 10 log (1/Duty Cycle) =PSD+0.08

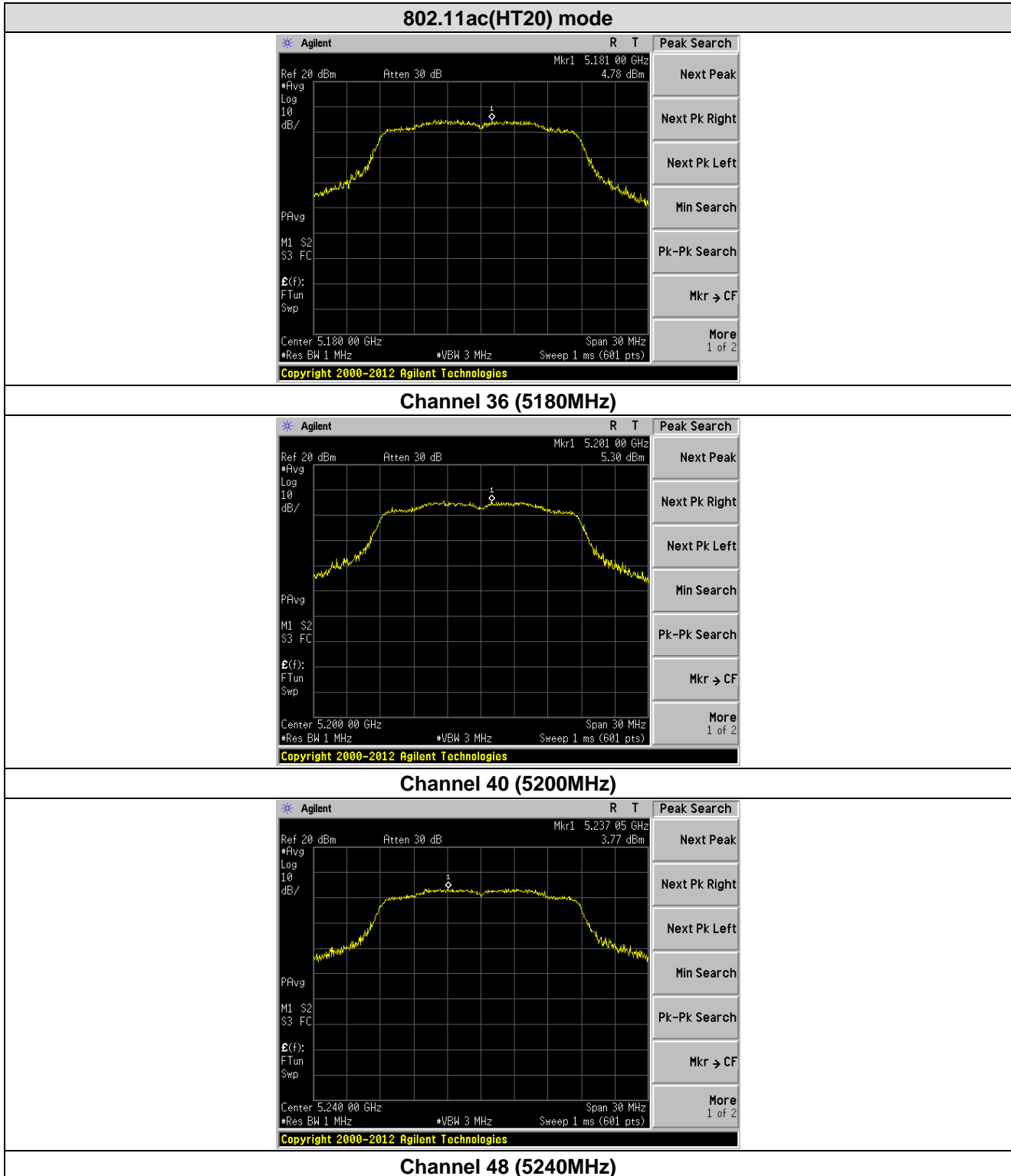
Worse case is 8.48+0.08=8.56dBm<11dBm

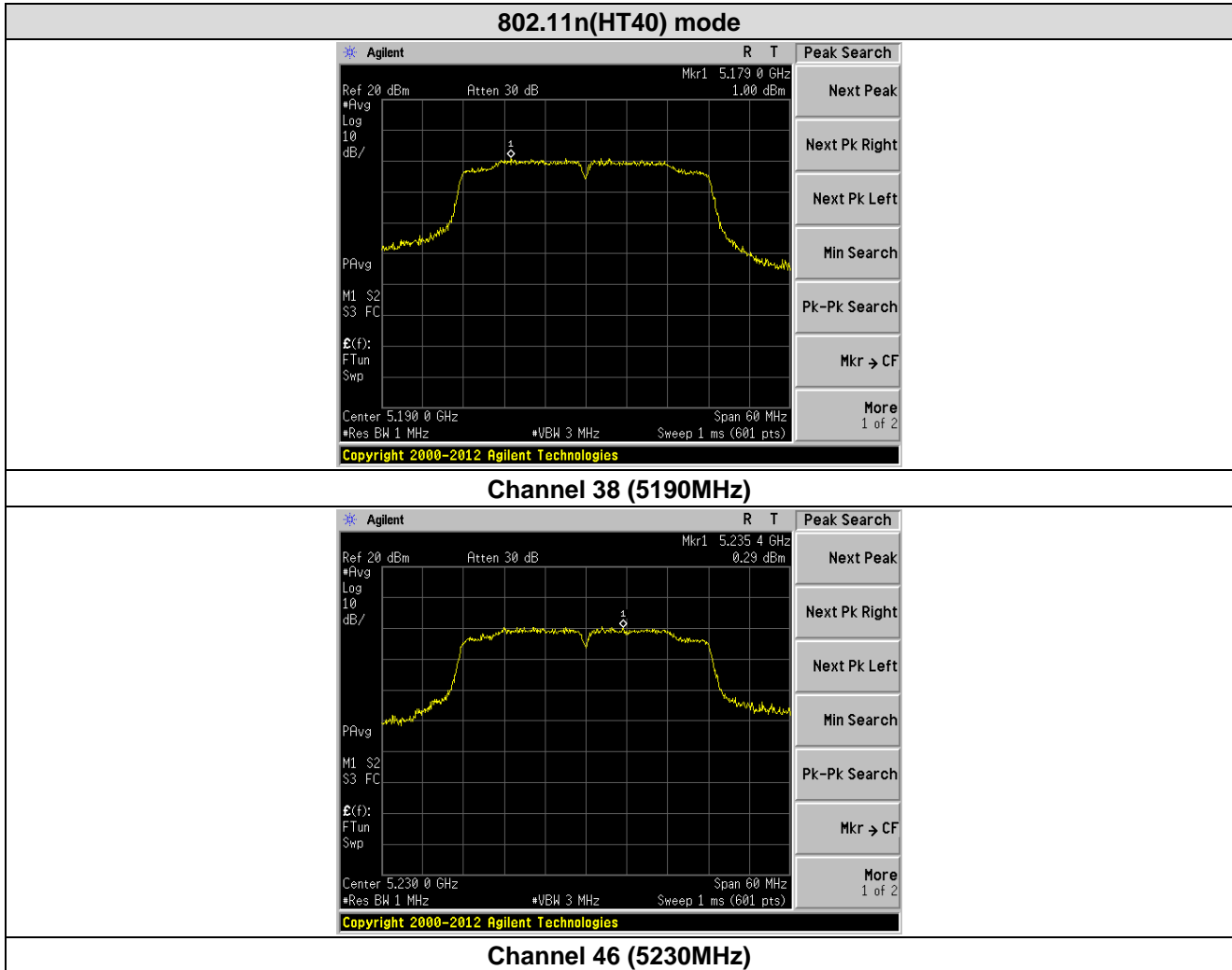
Test plots as followed:

ANT:1

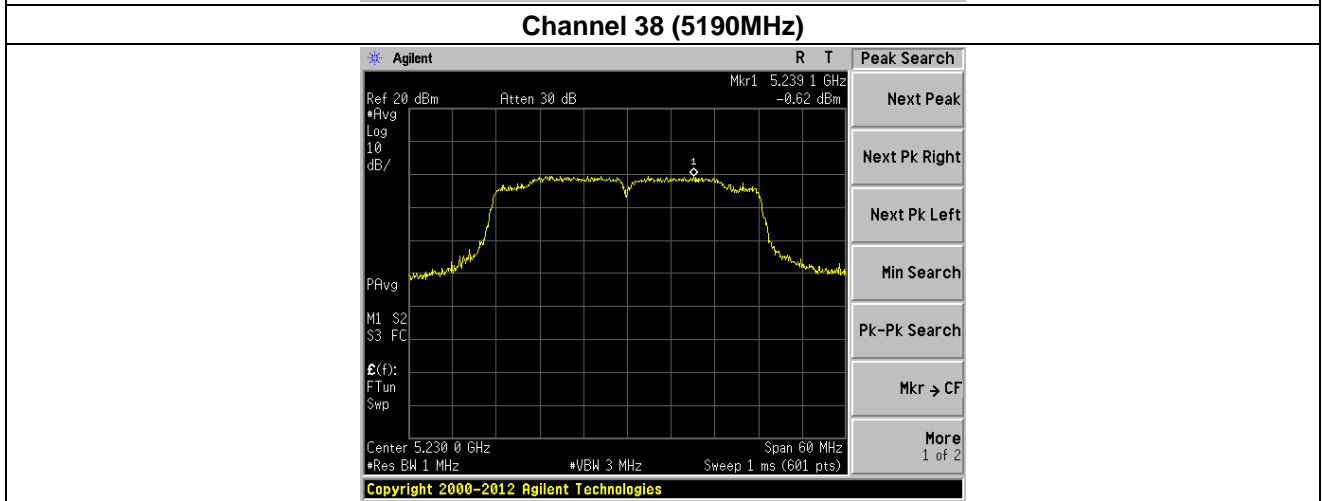
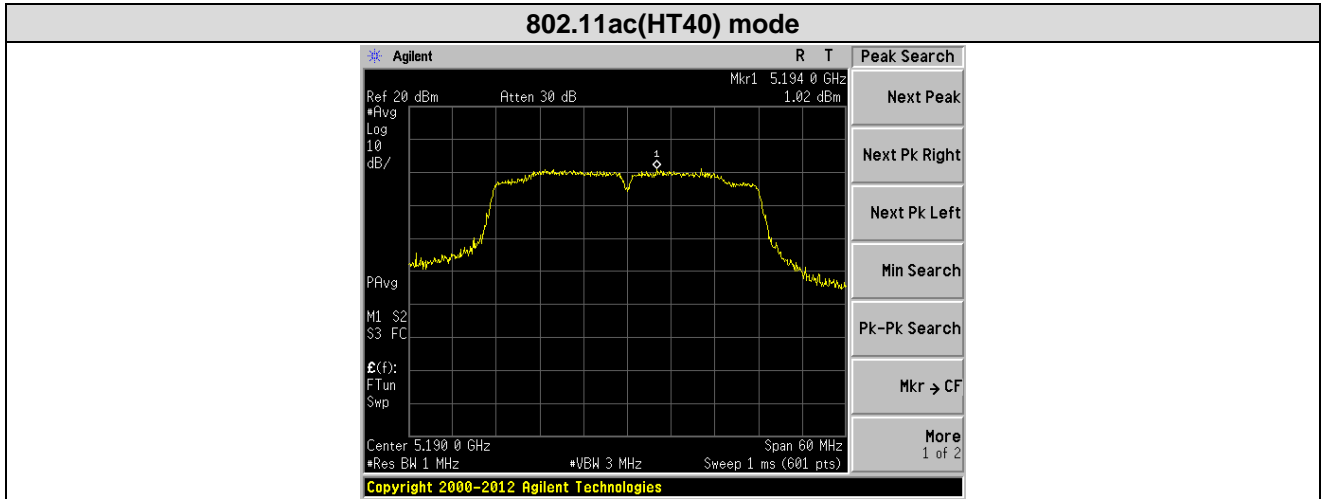




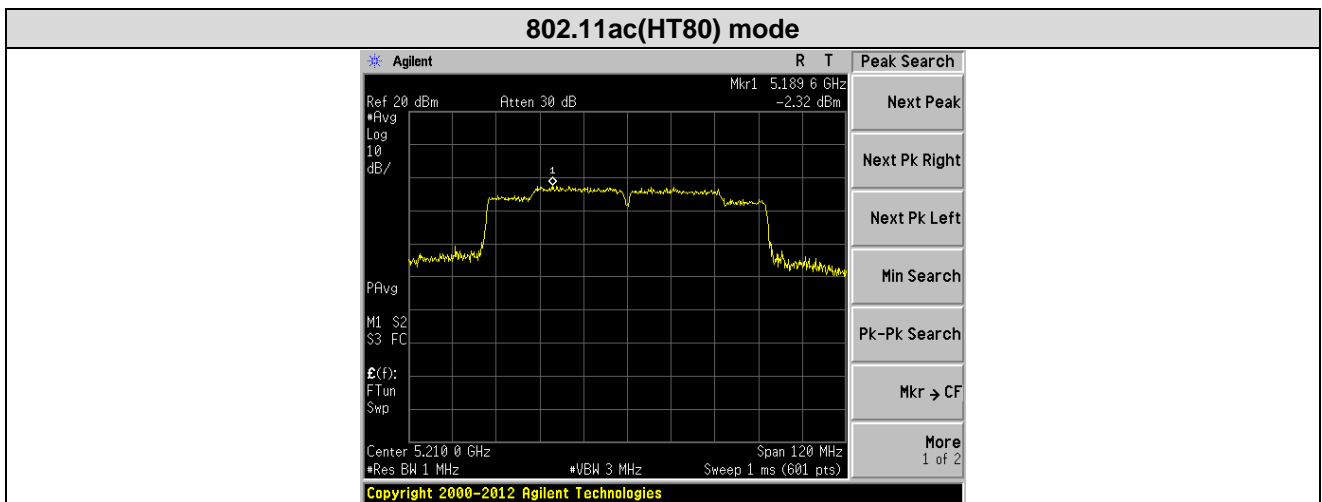






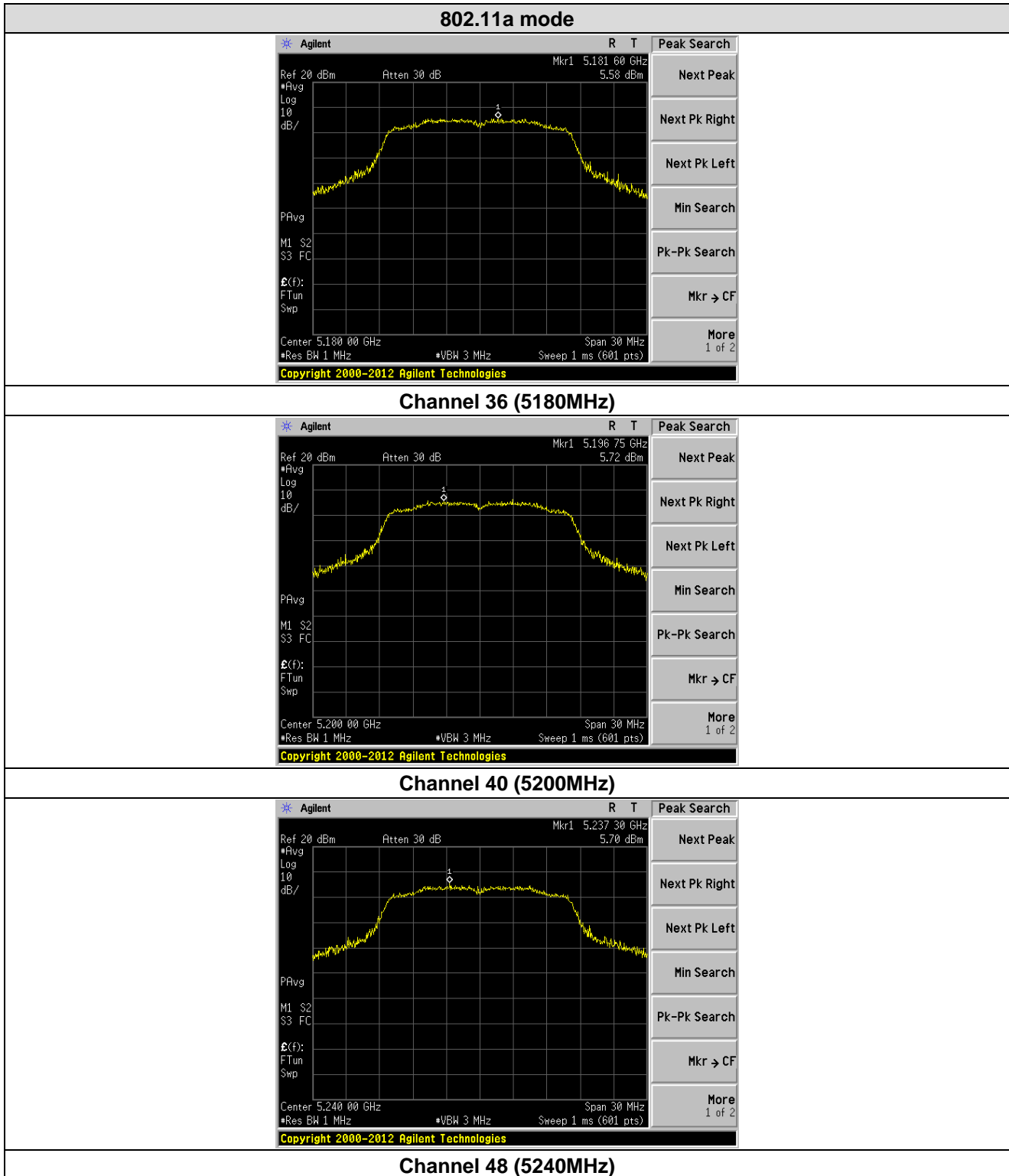


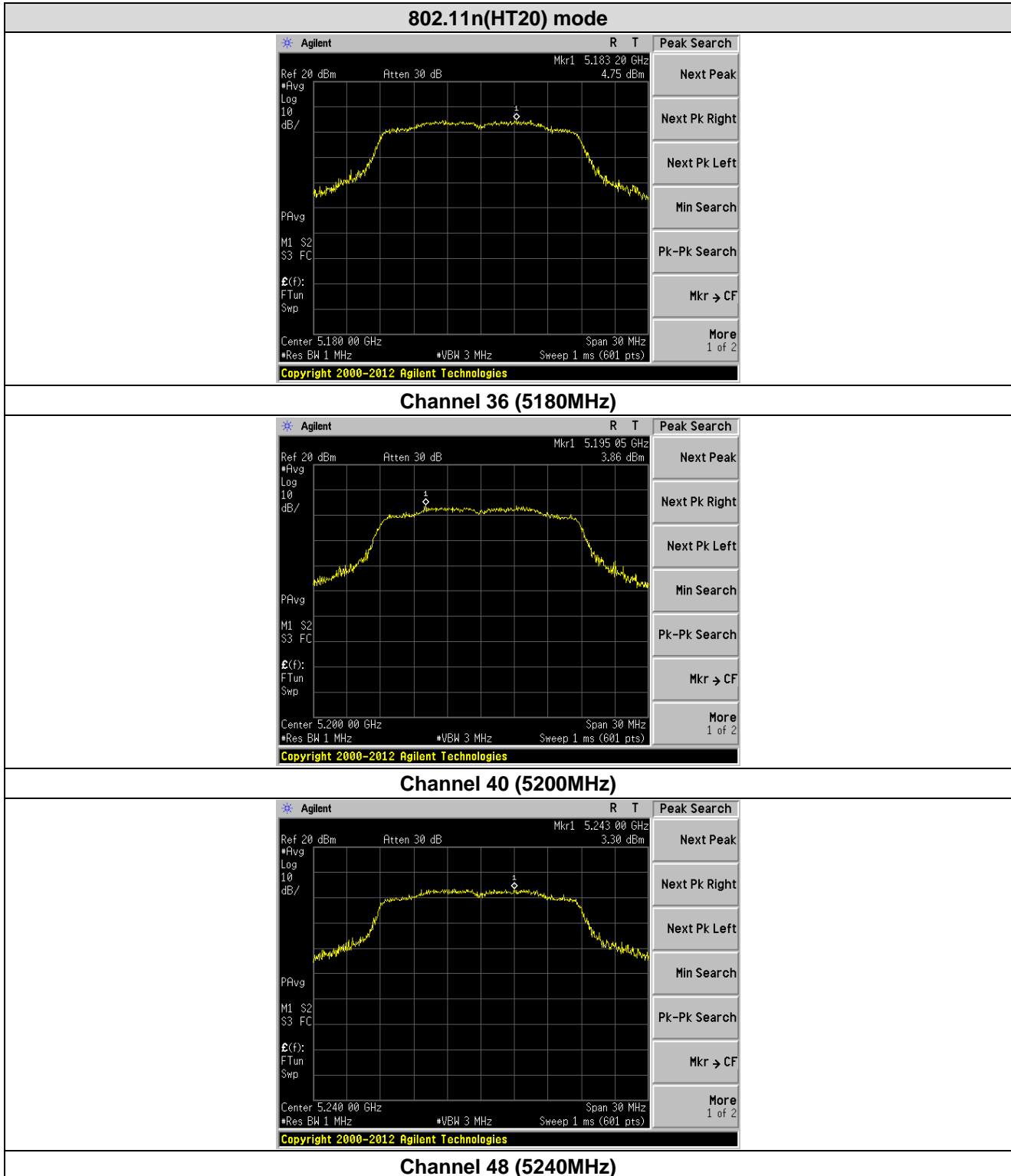
**Channel 46 (5230MHz)**

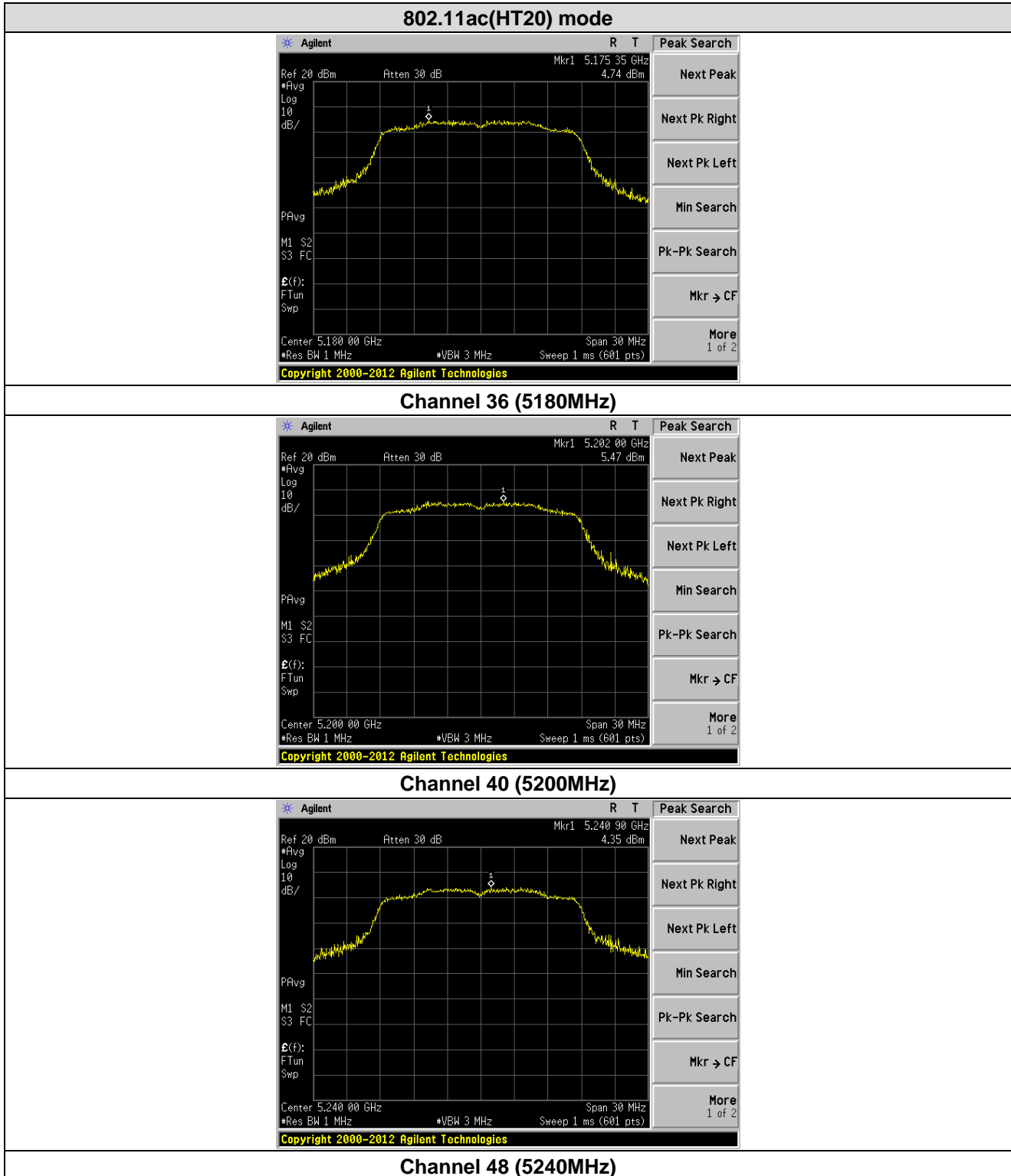


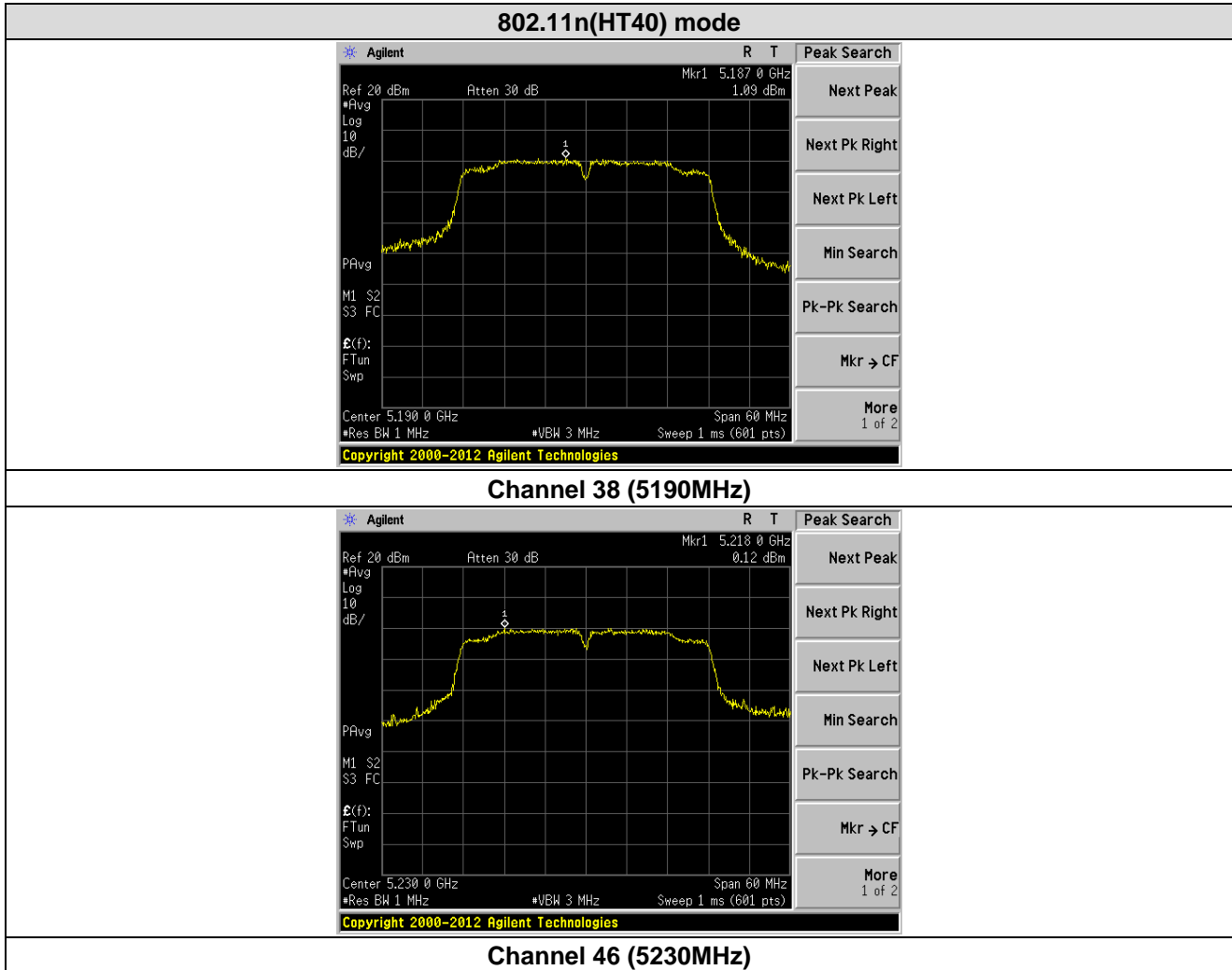
**Channel 40 (5210MHz)**

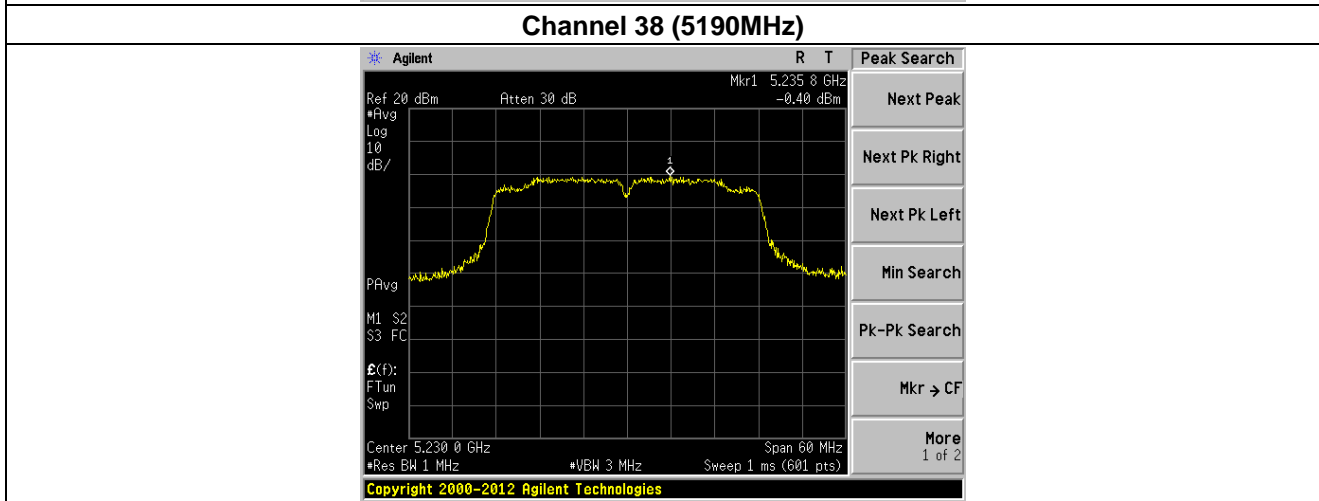
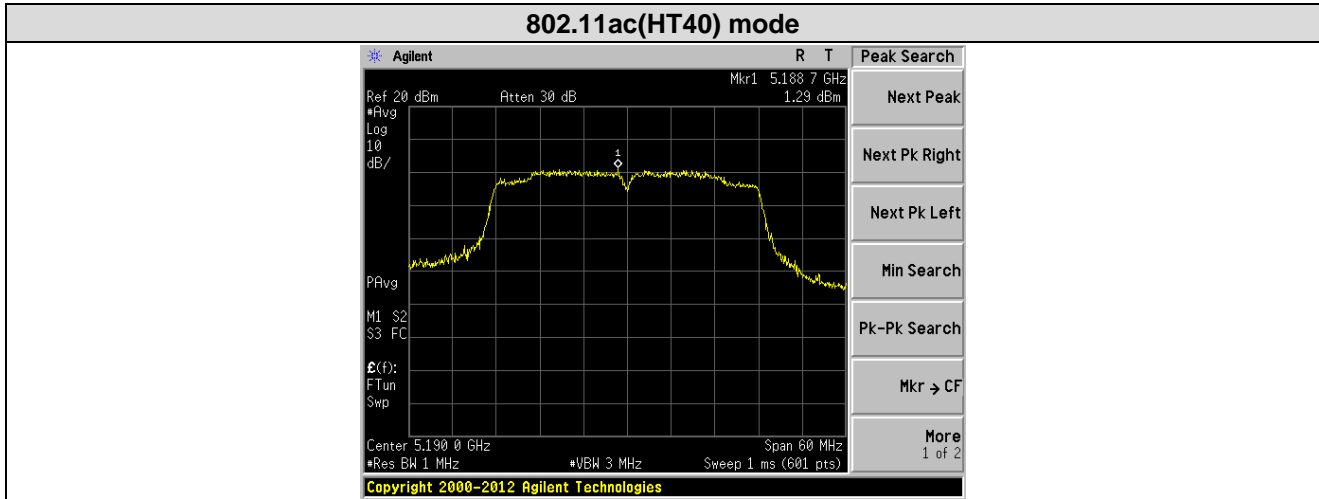
ANT:2



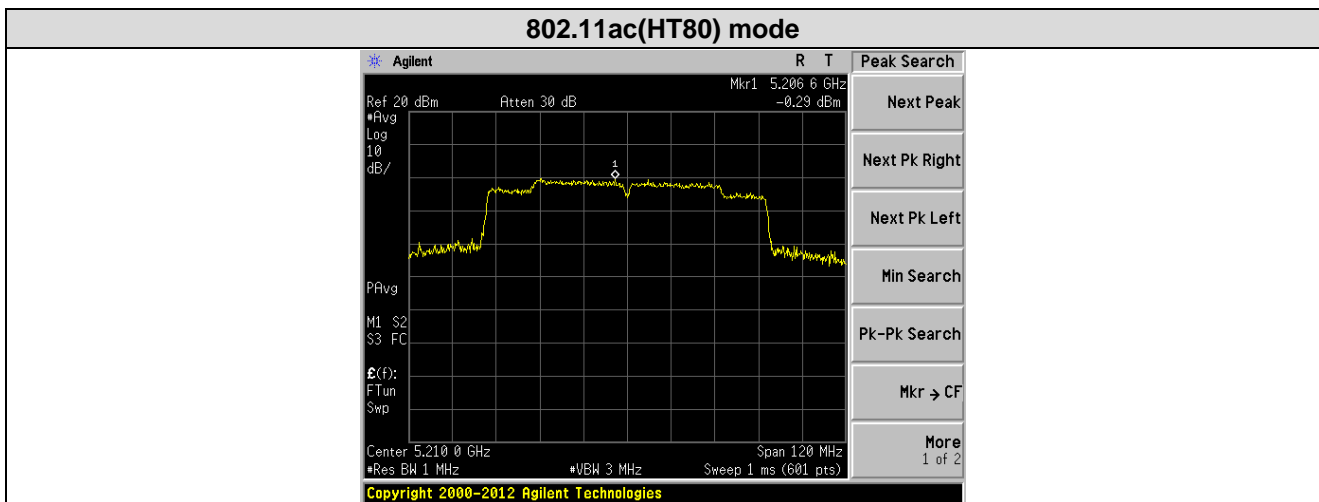








**Channel 46 (5230MHz)**



**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:	Frequency	Detector	RBW	VBW	Remark
	30MHz-1GHz	Quasi-peak	100KHz	300KHz	Quasi-peak Value
	Above 1GHz	Peak	1MHz	3MHz	Peak Value
		RMS	1MHz	3MHz	Average Value
Limit:	<p>Undesirable emission limits:</p> <p>(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.</p> <p>(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.</p> <p>(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.</p>				
Test Procedure:	<p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</p> <p>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.</p>				
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:**

Mode:		802.11a		Frequency:		5180MHz	
Antenna Pol.	Frequency (MHz)	Reading Level(dBuV)	Factor (dB/m)	Measure Level(dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
H	5150.00	34.57	17.18	51.75	68.20	-16.45	PK
V	5150.00	36.06	17.18	53.24	68.20	-14.96	PK
Mode:		802.11a		Frequency:		5180MHz	
Antenna Pol.	Frequency (MHz)	Reading Level(dBuV)	Factor (dB/m)	Measure Level(dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
H	5150.00	31.43	17.18	48.61	54	-5.39	AV
V	5150.00	29.33	17.18	46.51	54	-3.49	AV
Mode:		802.11a		Frequency:		5240MHz	
Antenna Pol.	Frequency (MHz)	Reading Level(dBuV)	Factor (dB/m)	Measure Level(dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
H	5350.00	34.12	17.2	51.32	68.2	-16.88	PK
V	5350.00	37.76	17.2	54.96	68.2	-13.24	PK
Mode:		802.11a		Frequency:		5240MHz	
Antenna Pol.	Frequency (MHz)	Reading Level(dBuV)	Factor (dB/m)	Measure Level(dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
H	5350.00	28.89	17.2	46.09	54	-7.91	AV
V	5350.00	28.47	17.2	45.67	54	-8.33	AV

REMARK :For 802.11a mode , ANT 1 and ANT 2 mode SISO mode all have been tested , only worse case is reported

Mode: MIMO		802.11n(HT20)		Frequency:		5180MHz	
Antenna Pol.	Frequency (MHz)	Reading Level(dBuV)	Factor (dB/m)	Measure Level(dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
H	5150.00	37.27	17.18	54.45	68.2	-13.75	PK
V	5150.00	44.20	17.18	61.38	68.2	-6.82	PK
Mode: MIMO		802.11n(HT20)		Frequency:		5180MHz	
Antenna Pol.	Frequency (MHz)	Reading Level(dBuV)	Factor (dB/m)	Measure Level(dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
H	5150.00	33.21	17.18	50.39	54	-3.61	AV
V	5150.00	33.51	17.18	50.69	54	-3.31	AV
Mode: MIMO		802.11n(HT20)		Frequency:		5240MHz	
Antenna Pol.	Frequency (MHz)	Reading Level(dBuV)	Factor (dB/m)	Measure Level(dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
H	5350.00	36.13	17.2	53.33	68.2	-14.87	PK
V	5350.00	37.09	17.2	54.29	68.2	-13.91	PK
Mode: MIMO		802.11n(HT20)		Frequency:		5240MHz	
Antenna Pol.	Frequency (MHz)	Reading Level(dBuV)	Factor (dB/m)	Measure Level(dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
H	5350.00	32.56	17.2	49.76	54	-4.24	AV
V	5350.00	28.00	17.2	45.20	54	-8.80	AV

Mode: MIMO		802.11ac(HT20)		Frequency:		5180MHz	
Antenna Pol.	Frequency (MHz)	Reading Level(dBuV)	Factor (dB/m)	Measure Level(dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
H	5150.00	38.15	17.18	55.33	68.20	-12.87	PK
V	5150.00	38.75	17.18	55.93	68.20	-12.27	PK
Mode: MIMO		802.11ac(HT20)		Frequency:		5180MHz	
Antenna Pol.	Frequency (MHz)	Reading Level(dBuV)	Factor (dB/m)	Measure Level(dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
H	5150.00	27.82	17.18	45.00	54.00	-9.00	AV
V	5150.00	26.30	17.18	43.48	54.00	-10.52	AV
Mode: MIMO		802.11ac(HT20)		Frequency:		5240MHz	
Antenna Pol.	Frequency (MHz)	Reading Level(dBuV)	Factor (dB/m)	Measure Level(dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
H	5350.00	34.32	17.20	51.52	68.20	-16.68	PK
V	5350.00	35.11	17.20	52.31	68.20	-15.89	PK
Mode: MIMO		802.11ac(HT20)		Frequency:		5240MHz	
Antenna Pol.	Frequency (MHz)	Reading Level(dBuV)	Factor (dB/m)	Measure Level(dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
H	5350.00	27.64	17.20	44.84	54.00	-9.16	AV
V	5350.00	26.11	17.20	43.31	54.00	-10.69	AV

Mode: MIMO		802.11n(HT40)		Frequency:		5190MHz	
Antenna Pol.	Frequency (MHz)	Reading Level(dBuV)	Factor (dB/m)	Measure Level(dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
H	5150.00	39.31	17.18	56.49	68.20	-11.71	PK
V	5150.00	38.76	17.18	55.94	68.20	-11.26	PK
Mode: MIMO		802.11n(HT40)		Frequency:		5190MHz	
Antenna Pol.	Frequency (MHz)	Reading Level(dBuV)	Factor (dB/m)	Measure Level(dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
H	5150.00	27.65	17.18	44.83	54.00	-9.17	AV
V	5150.00	28.38	17.18	45.56	54.00	-8.44	AV
Mode: MIMO		802.11n(HT40)		Frequency:		5230MHz	
Antenna Pol.	Frequency (MHz)	Reading Level(dBuV)	Factor (dB/m)	Measure Level(dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
H	5350.00	40.40	17.20	57.60	68.20	-10.60	PK
V	5350.00	39.77	17.20	56.97	68.20	-11.23	PK
Mode: MIMO		802.11n(HT40)		Frequency:		5230MHz	
Antenna Pol.	Frequency (MHz)	Reading Level(dBuV)	Factor (dB/m)	Measure Level(dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
H	5350.00	28.33	17.20	45.53	54.00	-8.47	AV
V	5350.00	27.36	17.20	44.56	54.00	-9.44	AV

Mode: MIMO		802.11ac(HT40)		Frequency:		5190MHz	
Antenna Pol.	Frequency (MHz)	Reading Level(dBuV)	Factor (dB/m)	Measure Level(dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
H	5150.00	38.70	17.18	55.88	68.20	-12.32	PK
V	5150.00	39.77	17.18	56.95	68.20	-11.25	PK
Mode: MIMO		802.11ac(HT40)		Frequency:		5190MHz	
Antenna Pol.	Frequency (MHz)	Reading Level(dBuV)	Factor (dB/m)	Measure Level(dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
H	5150.00	27.92	17.18	45.10	54.00	-8.90	AV
V	5150.00	29.83	17.18	47.01	54.00	-6.99	AV
Mode: MIMO		802.11ac(HT40)		Frequency:		5230MHz	
Antenna Pol.	Frequency (MHz)	Reading Level(dBuV)	Factor (dB/m)	Measure Level(dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
H	5350.00	38.31	17.20	55.51	68.20	-12.69	PK
V	5350.00	39.66	17.20	56.86	68.20	-11.34	PK
Mode: MIMO		802.11ac(HT40)		Frequency:		5230MHz	
Antenna Pol.	Frequency (MHz)	Reading Level(dBuV)	Factor (dB/m)	Measure Level(dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
H	5350.00	28.45	17.20	45.65	54.00	-8.35	AV
V	5350.00	27.73	17.20	44.93	54.00	-9.07	AV

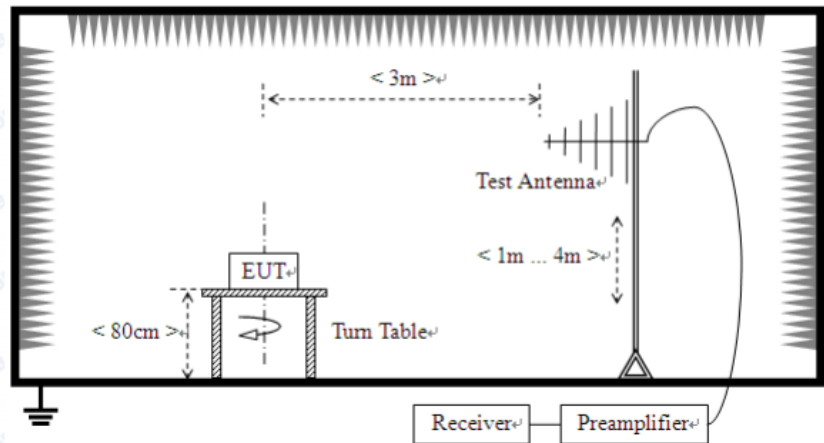
Mode: MIMO		802.11ac(HT80)		Frequency:		5210MHz	
Antenna Pol.	Frequency (MHz)	Reading Level(dBuV)	Factor (dB/m)	Measure Level(dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
H	5150.00	36.71	17.18	53.89	68.20	-14.31	PK
H	5350.00	37.23	17.20	54.43	68.20	-13.77	PK
V	5150.00	36.08	17.18	53.26	68.20	-14.94	PK
V	5350.00	38.44	17.20	55.64	68.20	-12.56	PK
Mode: MIMO		802.11ac(HT80)		Frequency:		5210MHz	
Antenna Pol.	Frequency (MHz)	Reading Level(dBuV)	Factor (dB/m)	Measure Level(dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
H	5150.00	27.41	17.18	44.59	54.00	-9.41	AV
H	5350.00	28.29	17.20	45.49	54.00	-8.51	AV
V	5150.00	27.60	17.18	44.78	54.00	-9.22	AV
V	5350.00	29.03	17.20	46.23	54.00	-7.77	AV

## 5.7 Radiated Emission

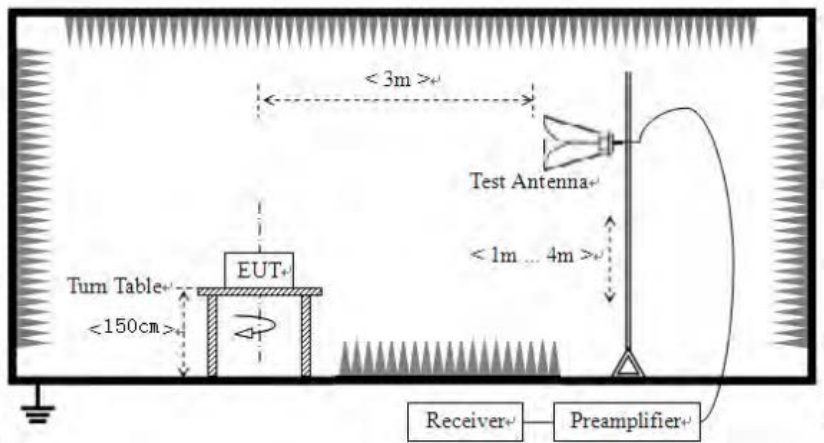
Test Requirement:	FCC Part15 C Section 15.209 and 15.205				
Test Method:	ANSI C63.10:2013				
Test Frequency Range:	30MHz to 40GHz				
Test site:	Measurement Distance: 3m (Semi-Anechoic Chamber)				
Receiver setup:	Frequency	Detector	RBW	VBW	Value
	30MHz-1GHz	Quasi-peak	100KHz	300KHz	Quasi-peak Value
	Above 1GHz	Peak	1MHz	3MHz	Peak Value
RMS		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
	Above 1GHz	54.0			Average Value
		74.0			Peak Value
Test Procedure:	<p>Substitution method was performed to determine the actual ERP emission levels of the EUT. The following test procedure as below:</p> <p>1&gt;.Below 1GHz test procedure:</p> <ol style="list-style-type: none"> <li>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.</li> <li>The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.</li> <li>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.</li> <li>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.</li> <li>The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</li> <li>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.</li> </ol> <p>2&gt;.Above 1GHz test procedure:</p> <ol style="list-style-type: none"> <li>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.</li> </ol>				

	<ol style="list-style-type: none"> <li>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.</li> <li>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.</li> <li>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.</li> <li>5. Repeat step 4 for test frequency with the test antenna polarized horizontally.</li> <li>6. Remove the transmitter and replace it with a substitution antenna</li> <li>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.</li> <li>8. Repeat step 7 with both antennas horizontally polarized for each test frequency.</li> <li>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:  <math display="block">\text{EIRP(dBm)} = \text{Pg(dBm)} - \text{cable loss (dB)} + \text{antenna gain (dBi)}</math>                     where:                      Pg is the generator output power into the substitution antenna.</li> </ol>
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**

**802.11a ANT1:**

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
51.48	45.99	15.19	0.79	29.99	31.98	40.00	-8.02	Vertical
127.22	47.14	11.32	1.41	29.53	30.34	43.50	-13.16	Vertical
256.52	52.44	14.06	2.16	29.70	38.96	46.00	-7.04	Vertical
428.02	47.69	17.51	2.99	29.44	38.75	46.00	-7.25	Vertical
599.32	41.41	20.45	3.72	29.30	36.28	46.00	-9.72	Vertical
768.75	42.42	21.68	4.35	29.20	39.25	46.00	-6.75	Vertical
209.31	43.17	12.87	1.89	29.29	28.64	43.50	-14.86	Horizontal
341.98	44.52	16.15	2.58	29.77	33.48	46.00	-12.52	Horizontal
389.36	49.17	16.83	2.80	29.55	39.25	46.00	-6.75	Horizontal
465.60	45.79	17.71	3.16	29.37	37.29	46.00	-8.71	Horizontal
560.69	45.03	19.77	3.56	29.30	39.06	46.00	-6.94	Horizontal
684.75	42.52	20.75	4.04	29.21	38.10	46.00	-7.90	Horizontal

**802.11a ANT2:**

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
35.25	47.06	14.39	0.61	30.07	31.99	40.00	-8.01	Vertical
143.83	45.46	10.22	1.53	29.44	27.77	43.50	-15.73	Vertical
341.98	46.46	16.15	2.58	29.77	35.42	46.00	-10.58	Vertical
513.63	46.84	18.89	3.36	29.30	39.79	46.00	-6.21	Vertical
684.75	40.46	20.75	4.04	29.21	36.04	46.00	-9.96	Vertical
942.13	37.20	23.37	5.01	29.10	36.48	46.00	-9.52	Vertical
228.49	41.61	13.57	2.01	29.47	27.72	46.00	-18.28	Horizontal
379.91	50.88	16.59	2.76	29.59	40.64	46.00	-5.36	Horizontal
428.02	48.98	17.51	2.99	29.44	40.04	46.00	-5.96	Horizontal
513.63	47.32	18.89	3.36	29.30	40.27	46.00	-5.73	Horizontal
599.32	43.78	20.45	3.72	29.30	38.65	46.00	-7.35	Horizontal
768.75	42.27	21.68	4.35	29.20	39.10	46.00	-6.90	Horizontal

ANT1 + ANT2: all MIMO mode have been tested , only worse case is reported

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
34.88	46.14	14.30	0.61	30.07	30.98	40.00	-9.02	Vertical
51.84	44.52	15.16	0.79	29.98	30.49	40.00	-9.51	Vertical
106.39	37.84	14.59	1.25	29.65	24.03	43.50	-19.47	Vertical
129.92	45.74	10.93	1.44	29.51	28.60	43.50	-14.90	Vertical
204.24	42.67	12.70	1.86	29.25	27.98	43.50	-15.52	Vertical
428.02	43.10	17.51	2.99	29.44	34.16	46.00	-11.84	Vertical
54.45	40.82	15.05	0.81	29.96	26.72	40.00	-13.28	Horizontal
134.56	42.63	10.56	1.47	29.49	25.17	43.50	-18.33	Horizontal
232.53	43.85	13.72	2.03	29.50	30.10	46.00	-15.90	Horizontal
399.03	49.43	17.06	2.85	29.51	39.83	46.00	-6.17	Horizontal
513.63	48.78	18.89	3.36	29.30	41.73	46.00	-4.27	Horizontal
742.26	42.61	21.34	4.24	29.20	38.99	46.00	-7.01	Horizontal

**Above 1GHz:**

**ANT1:**

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

802.11 a mode								
CH. No.	Antenna Pol.	Frequency (MHz)	Reading Level(dBuV)	Factor (dB/m)	Measure Level(dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
36	H	10360.00	14.22	21.64	35.86	54(Note3)	-18.14	PK
	H	15540.00	15.06	21.80	36.86	54(Note3)	-17.14	PK
	V	10360.00	22.19	21.64	43.83	54(Note3)	-10.17	PK
	V	15540.00	15.73	21.80	37.53	54(Note3)	-16.47	PK
40	H	10400.00	13.92	21.67	35.59	54(Note3)	-18.41	PK
	H	15600.00	19.98	21.83	41.81	54(Note3)	-12.19	PK
	V	10400.00	20.38	21.67	42.05	54(Note3)	-11.95	PK
	V	15600.00	18.23	21.83	40.06	54(Note3)	-13.94	PK
48	H	10480.00	13.42	21.64	35.06	54(Note3)	-18.94	PK
	H	15720.00	13.46	22.16	35.62	54(Note3)	-18.38	PK
	V	10480.00	20.31	21.64	41.95	54(Note3)	-12.05	PK
	V	15720.00	16.47	22.16	38.63	54(Note3)	-15.37	PK

**ANT2:**

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

802.11 a mode								
CH. No.	Antenna Pol.	Frequency (MHz)	Reading Level(dBuV)	Factor (dB/m)	Measure Level(dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
36	H	10360.00	19.31	21.64	40.95	54(Note3)	-13.05	PK
	H	15540.00	19.42	21.80	41.22	54(Note3)	-12.78	PK
	V	10360.00	13.56	21.64	35.20	54(Note3)	-18.80	PK
	V	15540.00	18.14	21.80	39.94	54(Note3)	-14.06	PK
40	H	10400.00	20.85	21.67	42.52	54(Note3)	-11.48	PK
	H	15600.00	20.34	21.83	42.17	54(Note3)	-11.83	PK
	V	10400.00	18.52	21.67	40.19	54(Note3)	-13.81	PK
	V	15600.00	19.60	21.83	41.43	54(Note3)	-12.57	PK
48	H	10480.00	13.06	21.64	34.70	54(Note3)	-19.30	PK
	H	15720.00	11.67	22.16	33.83	54(Note3)	-20.17	PK
	V	10480.00	15.18	21.64	36.82	54(Note3)	-17.18	PK
	V	15720.00	21.32	22.16	43.48	54(Note3)	-10.52	PK

## ANT1 + ANT2: MIMO mode

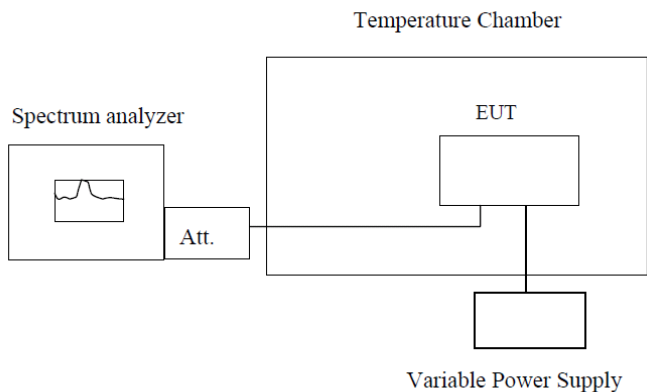
Only the data of worst case at each channel plan (nominal bandwidth =20MHz, 40MHz, 80MHz) is reported.

802.11 n(HT20) mode								
CH. No.	Antenna Pol.	Frequency (MHz)	Reading Level(dBuV)	Factor (dB/m)	Measure Level(dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
36	H	10360.00	14.40	21.64	36.04	54(Note3)	-17.96	PK
	H	15540.00	13.37	21.80	35.17	54(Note3)	-18.83	PK
	V	10360.00	18.51	21.64	40.15	54(Note3)	-13.85	PK
	V	15540.00	14.23	21.80	36.03	54(Note3)	-17.97	PK
40	H	10400.00	19.28	21.67	40.95	54(Note3)	-13.05	PK
	H	15600.00	16.30	21.83	38.13	54(Note3)	-15.87	PK
	V	10400.00	16.42	21.67	38.09	54(Note3)	-15.91	PK
	V	15600.00	15.30	21.83	37.13	54(Note3)	-16.87	PK
48	H	10480.00	11.88	21.64	33.52	54(Note3)	-20.48	PK
	H	15720.00	13.11	22.16	35.27	54(Note3)	-18.73	PK
	V	10480.00	18.34	21.64	39.98	54(Note3)	-14.02	PK
	V	15720.00	20.08	22.16	42.24	54(Note3)	-11.76	PK
802.11n(HT40) mode								
CH. No.	Antenna Pol.	Frequency (MHz)	Reading Level(dBuV)	Factor (dB/m)	Measure Level(dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
38	H	10380.00	19.09	21.64	40.73	54(Note3)	-13.27	PK
	H	15570.00	19.88	21.80	41.68	54(Note3)	-12.32	PK
	V	10380.00	13.36	21.64	35.00	54(Note3)	-19.00	PK
	V	15570.00	18.89	21.80	40.69	54(Note3)	-13.31	PK
46	H	10460.00	14.38	21.67	36.05	54(Note3)	-17.95	PK
	H	15690.00	11.46	21.83	33.29	54(Note3)	-20.71	PK
	V	10460.00	18.76	21.67	40.43	54(Note3)	-13.57	PK
	V	15690.00	11.39	21.83	33.22	54(Note3)	-20.78	PK
802.11ac(HT80) mode								
CH. No.	Antenna Pol.	Frequency (MHz)	Reading Level(dBuV)	Factor (dB/m)	Measure Level(dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
42	H	10420.00	16.51	21.65	38.16	54(Note3)	-15.84	PK
	H	15630.00	16.00	21.81	37.81	54(Note3)	-16.19	PK
	V	10420.00	15.68	21.65	37.33	54(Note3)	-16.67	PK
	V	15630.00	21.14	21.81	42.95	54(Note3)	-11.05	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, 2003; tested to 2.1055 for compliance to FCC Part 15.407(g) requirements.
Test setup:	 <p style="text-align: center;"><b>Note :</b> Measurement setup for testing on Antenna connector</p>
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	5179.3900	5180.4302	5181.2834	5179.3409
	5200	5199.7358	5200.8922	5200.4664	5199.6501
	5220	5219.8152	5220.9935	5220.0400	5219.5366
	5240	5239.0317	5240.8838	5240.6395	5239.0413
-20	5180	5179.8594	5180.5304	5180.9920	5179.6644
	5200	5199.2254	5200.9459	5200.3614	5199.2621
	5220	5219.6799	5220.4225	5220.3316	5219.7227
	5240	5239.8509	5240.6913	5240.4697	5239.3872
-10	5180	5179.4833	5180.9986	5180.7941	5179.6366
	5200	5199.1111	5200.7852	5200.4042	5199.7067
	5220	5219.5915	5220.4426	5220.8519	5219.6115
	5240	5239.8505	5240.2472	5240.8283	5239.6368
0	5180	5179.9053	5180.8093	5180.5005	5179.0738
	5200	5199.5049	5200.1406	5200.5802	5199.0456
	5220	5219.5402	5220.4818	5220.9114	5219.1127
	5240	5239.1087	5240.6540	5240.1344	5239.7148
10	5180	5179.7970	5180.1279	5180.6510	5179.5427
	5200	5199.7431	5200.1663	5200.7023	5199.2366
	5220	5219.4983	5220.1503	5220.8579	5219.5115
	5240	5239.6791	5240.3988	5240.6535	5239.1430
20	5180	5179.1699	5180.5235	5180.0540	5179.0170
	5200	5199.5293	5200.6272	5200.5161	5199.7583
	5220	5219.2271	5220.0538	5220.5960	5219.9666
	5240	5239.9081	5240.7387	5240.3496	5239.6423
30	5180	5179.9892	5180.9680	5180.8311	5179.2188
	5200	5199.0612	5200.8695	5200.9199	5199.8172
	5220	5219.1244	5220.9173	5220.7411	5219.3485
	5240	5239.4150	5240.7036	5240.6642	5239.0037
40	5180	5179.5698	5180.2898	5180.2626	5179.9924
	5200	5199.9012	5200.0612	5200.7691	5199.7898
	5220	5219.3615	5220.3309	5220.5997	5219.4002
	5240	5239.1021	5240.3280	5240.6689	5239.0056
50	5180	5179.6074	5180.9497	5180.8072	5179.8478
	5200	5199.8604	5200.7754	5200.4974	5199.8040
	5220	5219.0129	5220.3957	5220.9845	5219.9772
	5240	5239.5926	5240.5795	5240.2278	5239.5200

Frequency stability versus Voltage					
Temperature: 25°C					
Power Supply (VDC)	Operating Frequency (MHz)	0 minute	2 minute	5 minute	10 minute
		Measured Frequency (MHz)	Measured Frequency (MHz)	Measured Frequency (MHz)	Measured Frequency (MHz)
3.3	5180	5182.0173	5180.4796	5176.6915	5178.2778
	5200	5201.6467	5200.9769	5196.8010	5198.5261
	5220	5220.9301	5220.2484	5219.3765	5219.6535
	5240	5240.6515	5240.8189	5239.8425	5239.8743
3.7	5180	5180.6673	5180.5956	5179.5673	5179.5044
	5200	5200.7179	5200.5907	5199.0971	5199.5995
	5220	5220.9683	5220.8501	5219.8751	5219.3421
	5240	5240.9025	5240.5040	5239.7319	5239.3985
4.1	5180	5180.4227	5180.0247	5179.4972	5179.8079
	5200	5200.1771	5200.5086	5199.2319	5199.7188
	5220	5220.1390	5220.9114	5219.5367	5219.9357
	5240	5240.7299	5240.3372	5239.9980	5239.9725

Note: The worst case is FL=5176.6915MHz, FH=5240.9025MHz

**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	5178.3589	5181.0946	5182.9222	5177.9548
	5200	5199.9456	5201.6159	5201.1477	5198.5778
	5220	5219.2729	5220.5043	5220.5525	5219.6804
	5240	5239.6953	5240.2424	5240.6150	5239.3338
-20	5180	5179.6148	5180.8542	5180.3976	5179.2823
	5200	5199.5001	5200.7894	5200.4607	5199.9911
	5220	5219.3561	5220.2611	5220.4452	5219.9200
	5240	5239.3401	5240.1185	5240.5004	5239.4842
-10	5180	5179.9966	5180.3709	5180.2947	5179.5970
	5200	5199.4133	5200.2082	5200.6751	5199.1162
	5220	5219.8482	5220.4841	5220.1326	5219.5593
	5240	5239.4227	5240.2076	5240.6139	5239.5086
0	5180	5179.7428	5180.4294	5180.3857	5179.0747
	5200	5199.3727	5200.3878	5200.8998	5199.7142
	5220	5219.5825	5220.5819	5220.4828	5219.9071
	5240	5239.4100	5240.2057	5240.8300	5239.4985
10	5180	5179.6808	5180.7160	5180.0223	5179.9576
	5200	5199.5241	5200.6118	5200.3646	5199.3489
	5220	5219.8301	5220.3228	5220.5387	5219.4471
	5240	5239.9064	5240.3986	5240.9744	5239.3937
20	5180	5179.1005	5180.8360	5180.8886	5179.4737
	5200	5199.9510	5200.6527	5200.8079	5199.4268
	5220	5219.8274	5220.5385	5220.7170	5219.6150
	5240	5239.5639	5240.8652	5240.0839	5239.4132
30	5180	5179.5815	5180.0059	5180.3535	5179.3311
	5200	5199.6355	5200.0613	5200.4067	5199.1067
	5220	5219.7176	5220.6410	5220.4598	5219.4024
	5240	5239.8276	5240.2588	5240.2614	5239.0384
40	5180	5179.2389	5180.5886	5180.4026	5179.5478
	5200	5199.3242	5200.0186	5200.4443	5199.3288
	5220	5219.0141	5220.0310	5220.1750	5219.8016
	5240	5239.4384	5240.2146	5240.5233	5239.0957
50	5180	5179.2625	5180.4555	5180.5123	5179.8817
	5200	5199.7017	5200.0638	5200.9747	5199.5205
	5220	5219.0242	5220.9735	5220.1893	5219.2247
	5240	5239.9705	5240.2311	5240.1165	5239.2705

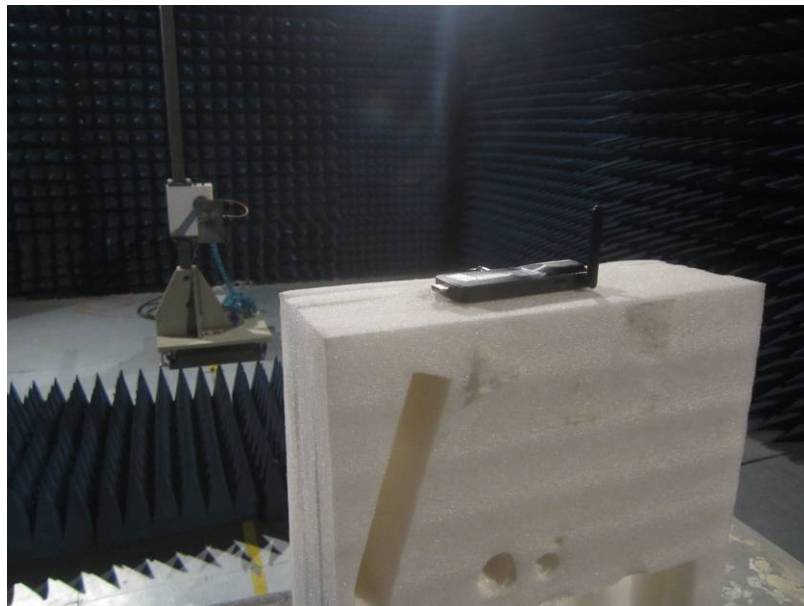
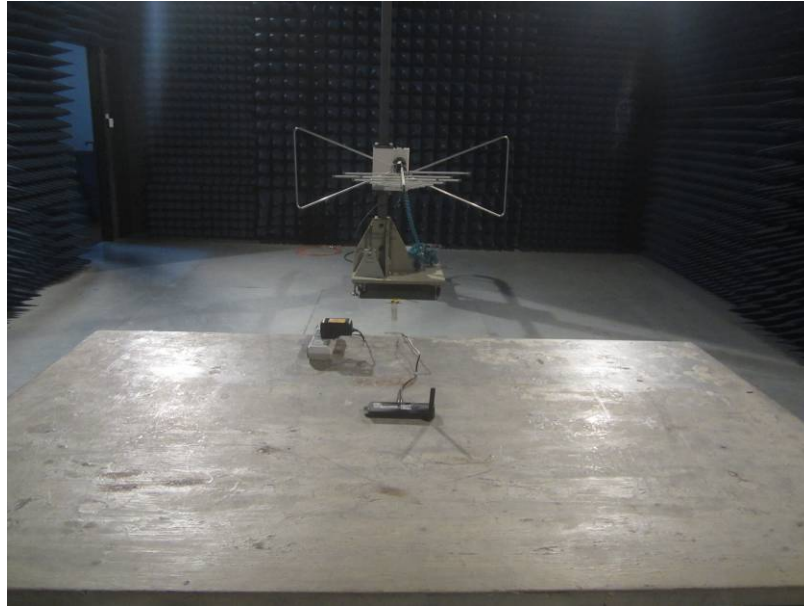


Frequency stability versus Voltage					
Temperature: 25°C					
Power Supply (VDC)	Operating Frequency (MHz)	0 minute	2 minute	5 minute	10 minute
		Measured Frequency (MHz)	Measured Frequency (MHz)	Measured Frequency (MHz)	Measured Frequency (MHz)
3.3	5180	5182.7863	5180.4771	5178.5313	5177.2606
	5200	5201.0274	5200.2066	5199.2261	5198.3794
	5220	5221.9433	5220.3855	5219.4848	5219.4078
	5240	5240.7702	5240.3231	5239.5184	5239.4016
3.7	5180	5180.5039	5180.2776	5179.0776	5179.6903
	5200	5200.2532	5200.8549	5199.2132	5199.8860
	5220	5220.4412	5220.4675	5219.5046	5219.3331
	5240	5240.4837	5240.2999	5239.8342	5239.3040
4.1	5180	5180.9396	5180.0360	5179.6778	5179.6201
	5200	5200.2361	5200.3572	5199.1549	5199.9635
	5220	5220.0027	5220.2017	5219.1266	5219.8602
	5240	5240.4295	5240.2689	5239.3707	5239.1850

Note: The worst case is FL=5177.2606MHz, FH=5240.9744MHz

## 6 Test Setup Photo

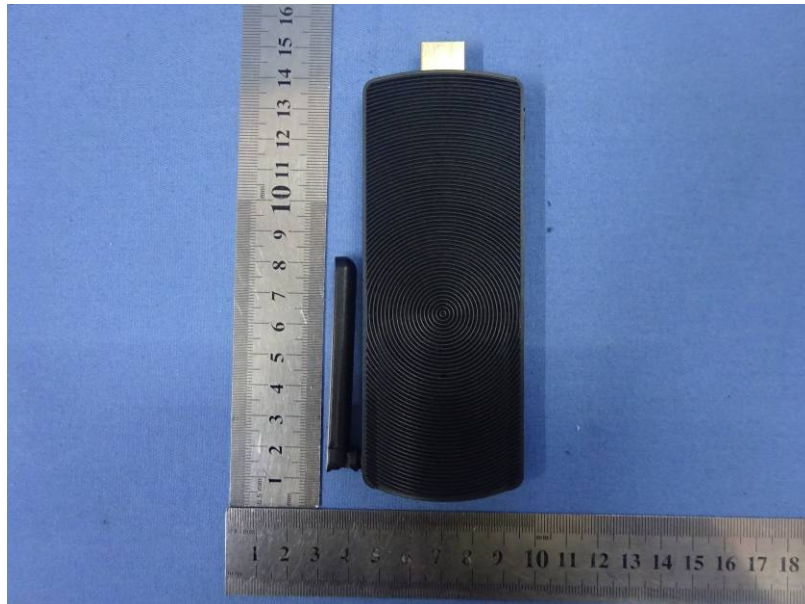
Radiated Emission

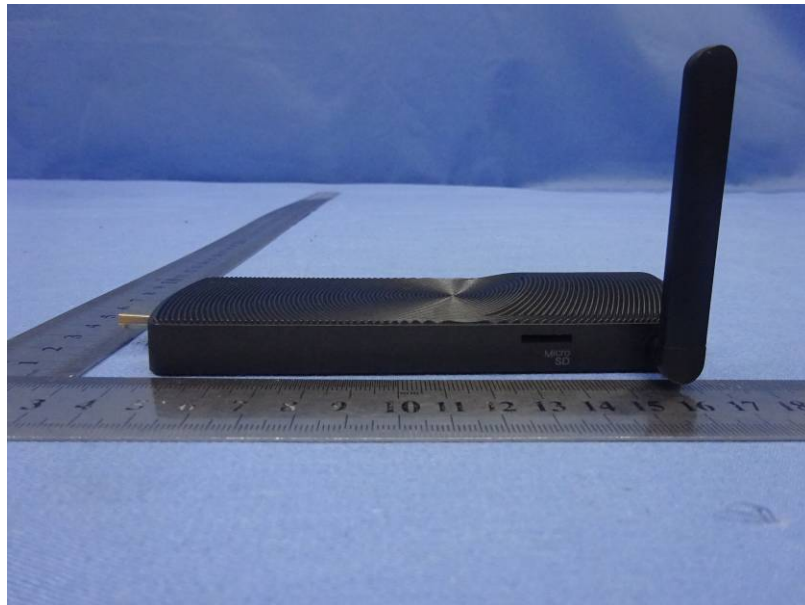


## Conducted Emission

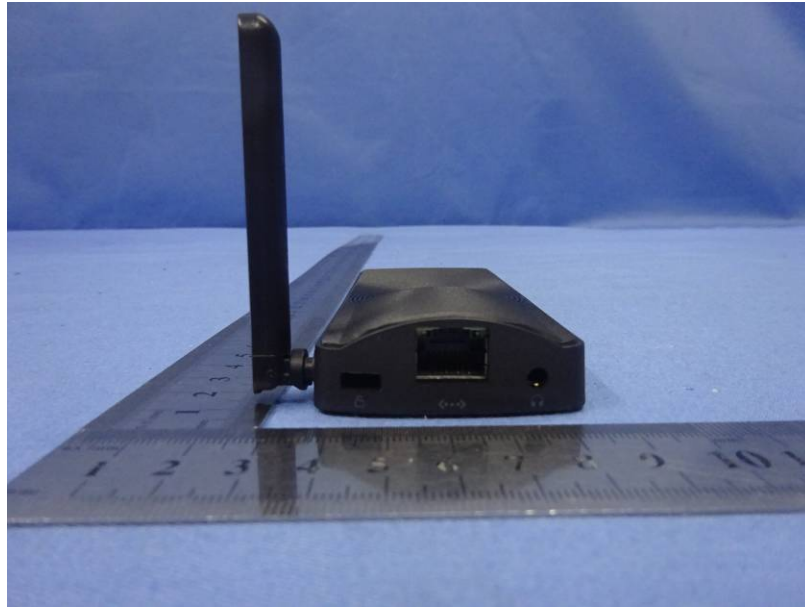


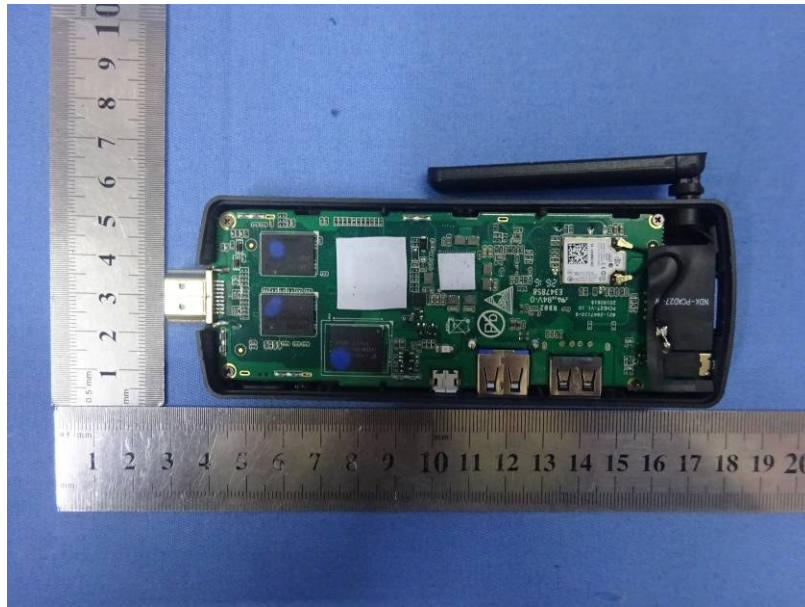
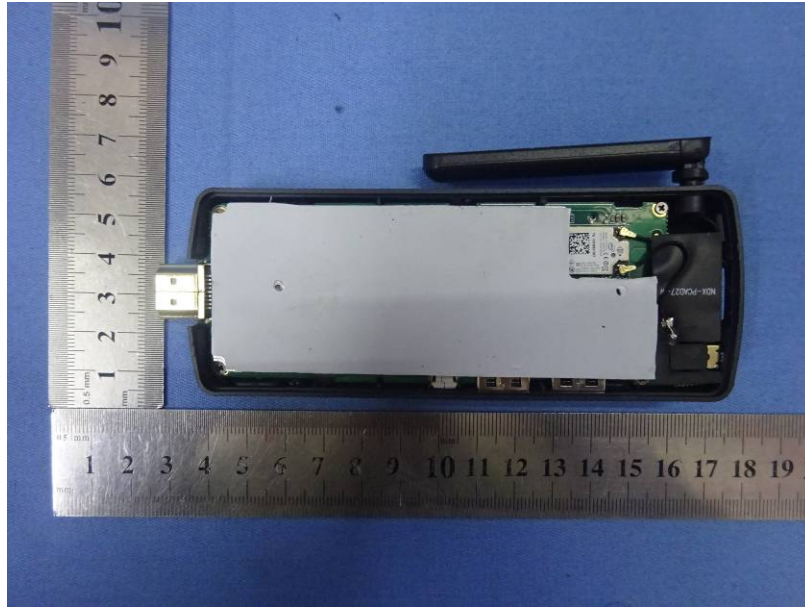
## 7 EUT Constructional Details



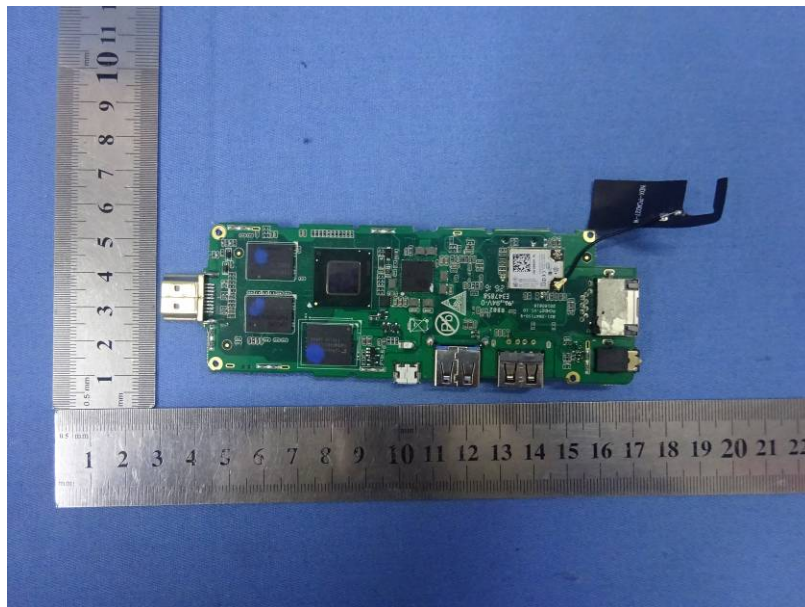
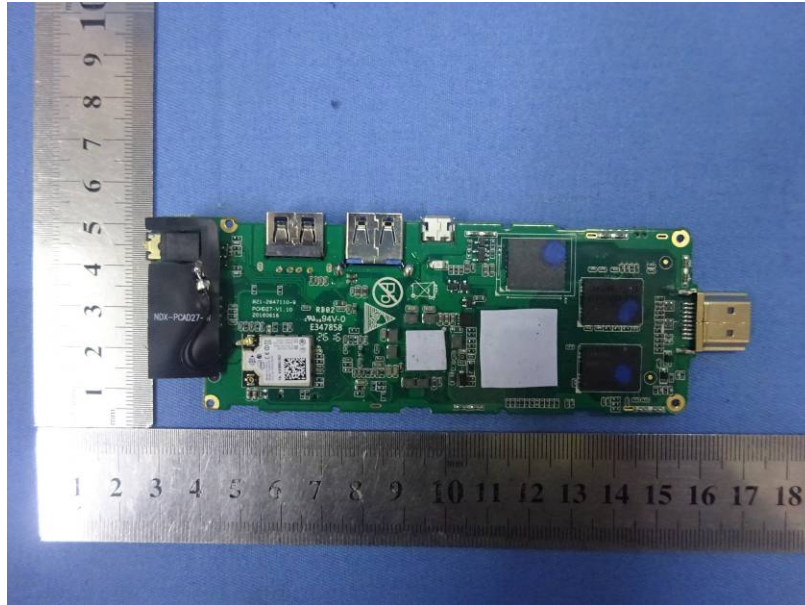


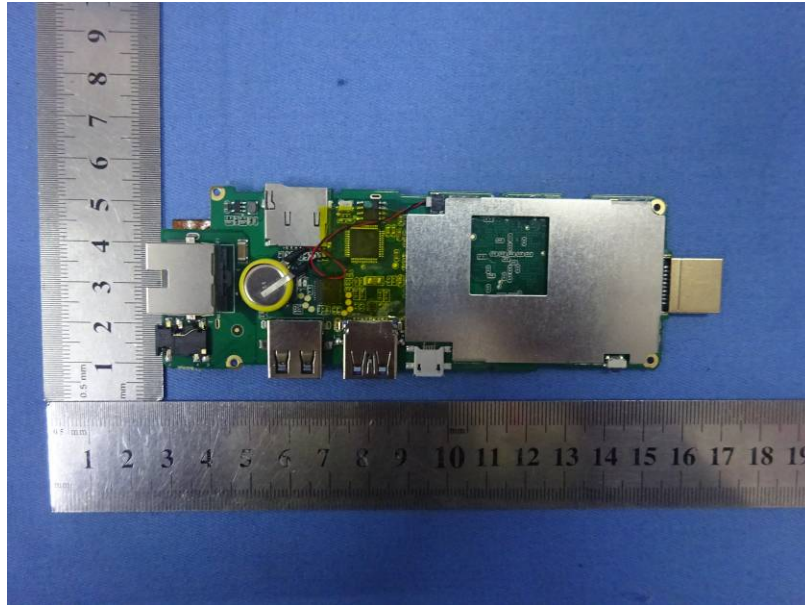


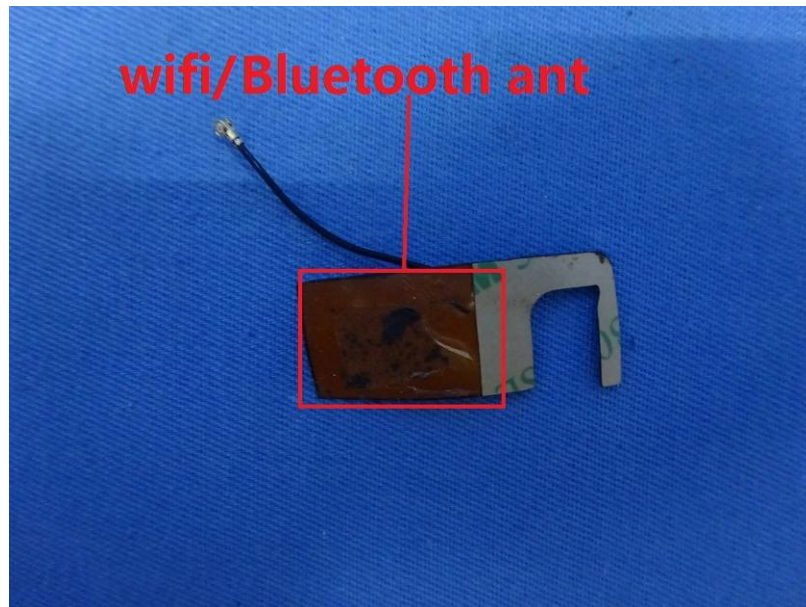
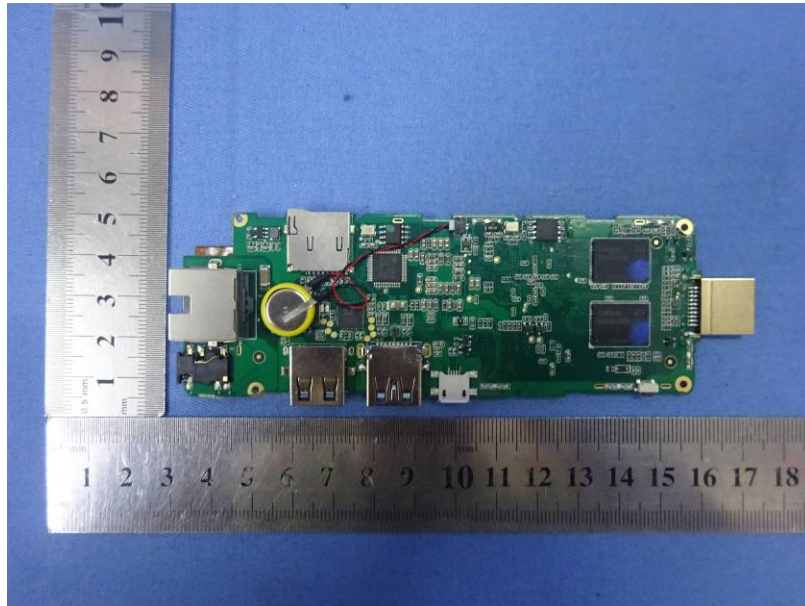


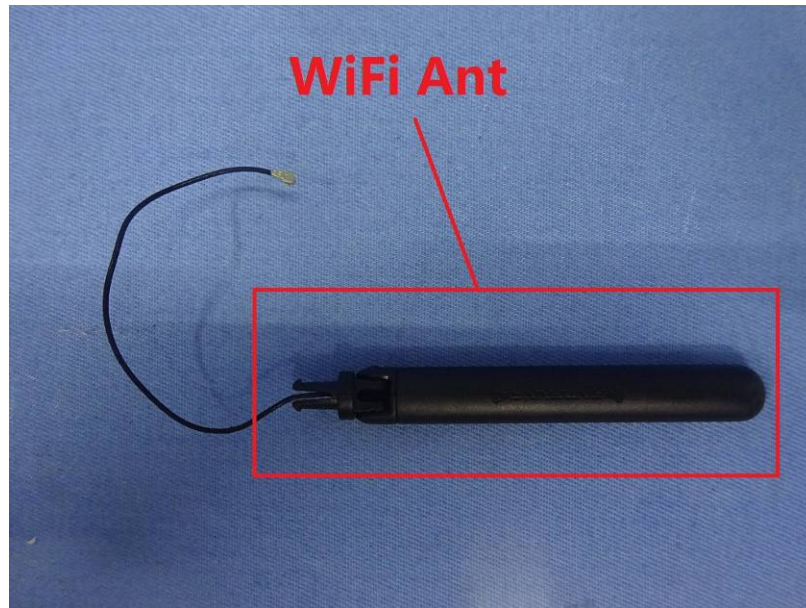












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