FCC PART 15E TEST REPORT

TESTING
CNAS L3572

Issued to

TCT Mobile Limited

For

Wifi Display Dongle

Model Name:	HOME V102/V102
Trade Name:	ALCATEL onetouch
Brand Name:	ALCATEL onetouch
FCC ID:	RAD507
Standard:	47 CFR Part 15 Subpart E
Test date:	2014-4-14 to 2014-7-7
Issue date:	2014-7-7

by

Shenzhen Morlab Communications Technology Co., Ltd.
FL.3, Building A, FeiYang Science Park, No.8 LongChang Road,Block 67, BaoAn District,
ShenZhen, GuangDong Province P. R. China 518101

Tested by	Nie Quan (Test Engineer)	***Approved by***	Zeng Dexin (Chief Engineer)	***Reviewed by***	Peng Huarui (Dept. Manager)
Date	2014.7.7	***Date***	2014.7.7	***Date***	2014.7.7

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Change History		
Issue	Date	Reason for change
1.0	July 7, 2014	First Edition

1. General Information

1.1. EUT Description

EUT Type..... :	Wifi Display Dongle
Serial No. ..... :	(n.a, marked #1 by test site)
Hardware Version..... :	V1.2
Software Version..... :	V1.1.4
Applicant..... :	TCT Mobile Limited 5F, C building, No. 232, Liang Jing Road, ZhangJiang High-Tech Park, Pudong Area, Shanghai, P.R. China. 201203
Manufacturer ..... :	TCL COMMUNICATION TECHNOLOGY HOLDINGS LIMITED 70 Huifeng 4rd,ZhongKai Hi-tech Development District , Huizhou, Guangdong 516006 P.R.China （TCL Mobile Communication Co.,LTD.Huizhou）
Frequency Range..... :	802.11b/g/n: 2.400GHz - 2.4835GHz 802.11a/n: 5.150GHz- 5.350GHz 5.470GHz- 5725GHz 5.725GHz- 5.825GHz
Channel Number ..... :	2.4GHz Band: 802.11b/g/n-20MHz: 11 5GHz Band: 802.11a/n-20MHz: 5.150GHz--5.350GHz: 8 Channels 5.470GHz--5.725GHz: 8 Channels 5.725GHz--5.825GHz: 4 Channels 802.11n-40MHz: 5.150GHz--5.350GHz: 4 Channels 5.470GHz--5.725GHz: 3 Channels 5.725GHz--5.825GHz: 2 Channels
Modulation Type..... :	DSSS, OFDM
Antenna Type ..... :	PCB Antenna
Antenna Gain..... :	2.0dBi (ANT1 and ANT2) for 2.4GHz 2.0dBi (ANT3 and ANT4) for 5GHz

Note :

1. The U-NII band is applicable to this report, another bands of operation (2.4GHz) is documented in a separate report.
2. For 802.11n-20MHz (5.150GHz – 5.350GHz), the frequencies allocated is F (MHz) =5180+20*(n-1) (1<=n<=8). For 5.150GHz – 5.250GHz The channel of the EUT used and tested in this report are separately 36 (5180MHz), 44 (5220MHz) and 48 (5240MHz). For 5.250GHz – 5.350GHz,The channel of the EUT used and tested in this report are separately 52 (5260MHz), 60 (5300MHz) and 48 (5240MHz).
3. For 802.11n-20MHz (5.470GHz – 5.725GHz), the frequencies allocated is F (MHz) =5550+20*(n-1) (1<=n<=8). The channel of the EUT used and tested in this report are separately 100(5500MHz), 116

(5580MHz) and 140(5700MHz).

4. For 802.11n-20MHz (5.725GHz – 5.825GHz), the frequencies allocated is F (MHz) =5745+20*(n-1) (1<=n<=4). The channel of the EUT used and tested in this report are separately CH149(5745MHz), CH157(5785MHz) and CH165(5825GHz) are tested in this report.
5. For 802.11n-40MHz (5150GHz–5350GHz),the frequencies allocated is F (MHz) =5190MHz+40*(n-1) (1<=n<=4). For 5.150GHz – 5.250GHz,The channel of the EUT used and tested in this report are separately 38 (5190MHz), 46 (5230MHz). For 5.250GHz – 5.350GHz,The channel of the EUT used and tested in this report are separately 54 (5270MHz), 62 (5310MHz)
6. For 802.11n-40MHz (5470–5725GHz),the frequencies allocated is F (MHz) =5510MHz+40*(n-1) (1<=n<=5). The channel of the EUT used and tested in this report are separately 102 (5510MHz), 110 (5550MHz) ,102 (5670MHz).
7. For 802.11n-40MHz (5725–5825GHz),the frequencies allocated is F (MHz) =5755MHz+40*(n-1) (1<=n<=2). The channel of the EUT used and tested in this report are separately CH151(5755MHz), CH159(5795MHz)
8. The 5600~5650 is notched for WiFi operation.
9. During test, the duty cycle of the EUT was setting to 100%.
10. For a more detailed description, please refer to Specification or User's Manual supplied by the applicant and/or manufacturer.
11. The antenna connector of EUT is designed with permanent attachment and no consideration of replacement.
12. The EUT incorporates a MIMO function. Physically, the EUT provides two completed transmitters and two receivers(2T2R) for 2.4GHz band and 5GHz band.

Operation Mode / TX Mode	1TX	2TX
802.11b	ANT1 or ANT2	
802.11g	ANT1 or ANT2	
802.11a	ANT3 or ANT4	
802.11n(20MHz)		ANT1 & ANT2 ANT3 & ANT4
802.11n(40MHz)		ANT1 & ANT2 ANT3 & ANT4

Note: The EUT has 4 antennas, ANT1 & ANT2 for 2.4GHz Band, ANT3 & ANT4 for 5GHz Band.

1.2. Test Standards and Results

The objective of the report is to perform testing according to 47 CFR Part 15 Subpart E (UNII band) for the EUT FCC ID Certification:

No.	Identity	Document Title
1	47 CFR Part 15 (10-1-13 Edition)	Radio Frequency Devices

Test detailed items/section required by FCC rules and results are as below:

No.	Section	Description	Result
1	15.203	Antenna Requirement	**PASS**
2	15.407(a)	26dB Emission Bandwidth	**PASS**
3	15.407(a)	Maximum conducted output Power	**PASS**
4	15.407(a)	Peak Power spectral density	**PASS**
5	15.407(b)	Restricted Frequency Bands	**PASS**
6	15.407(b)	Conducted Band Edge	**PASS**
7	15.407(a)	Peak Excursion	**PASS**
8	15.407(g)	Frequency Stability	**PASS**
9	15.207	Conducted Emission	**PASS**
10	15.407(b)	Radiated Emission	**PASS**

The tests of Conducted Emission and Radiated Emission were performed according to the method of measurements prescribed in ANSI C63.4 2009.

These RF tests were performed according to the method of measurements prescribed in KDB789033 D01 v01r03 (04/08/2013).

1.3. Facilities and Accreditations

1.3.1. Facilities

Shenzhen Morlab Communications Technology Co., Ltd. Morlab Laboratory is a testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L3572.

All measurement facilities used to collect the measurement data are located at FL.1, Building A, FeiYang Science Park, Block 67, BaoAn District, Shenzhen, 518101 P. R. China. The test site is constructed in conformance with the requirements of ANSI C63.10 2009, ANSI C63.4 2009 and CISPR Publication 22; the FCC registration number is 695796.

1.3.2. Test Environment Conditions

During the measurement, the environmental conditions were within the listed ranges:

Temperature (°C):	15 - 35
Relative Humidity (%):	30 -60
Atmospheric Pressure (kPa):	86-106

2. 47 CFR Part 15E Requirements

2.1. Antenna requirement

2.1.1. Applicable Standard

According to FCC 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

2.1.2. Result: Compliant

The EUT has a permanently and irreplaceable attached antenna. Please refer to the EUT internal photos.

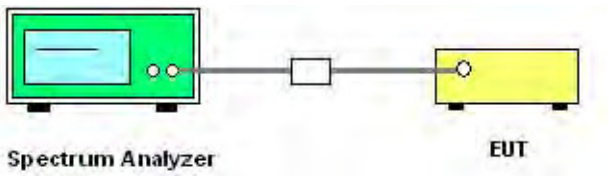
2.2. 26dB Emission Bandwidth

2.2.1. Requirement

For purposes of this subpart the emission bandwidth shall be determined by measuring the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, that are 26 dB down relative to the maximum level of the modulated carrier. Determination of the emissions bandwidth is based on the use of measurement instrumentation employing a peak detector function with an instrument resolution bandwidth approximately equal to 1.0 percent of the emission bandwidth of the device under measurement.

2.2.2. Test Description

A. Test Set:



The EUT which is powered by the Battery, is coupled to the Spectrum Analyzer; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading.

A. Test Procedure

KDB 789033 Section C) Emission Bandwidth was used in order to prove compliance

1) Set RBW = approximately 1% of the emission bandwidth.

2) Set the VBW > RBW.

3) Detector = Peak.

4) Trace mode = max hold.

5) Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

B. Equipments List:

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
EXA Signal Analzyer	Agilent	N9010A	MY51440152	2014.02.26	2015.02.25

2.2.3. Test Result

The lowest, middle and highest channels are selected to perform testing to record the 6 dB bandwidth of the Module.

2.2.3.1. 802.11a Test mode

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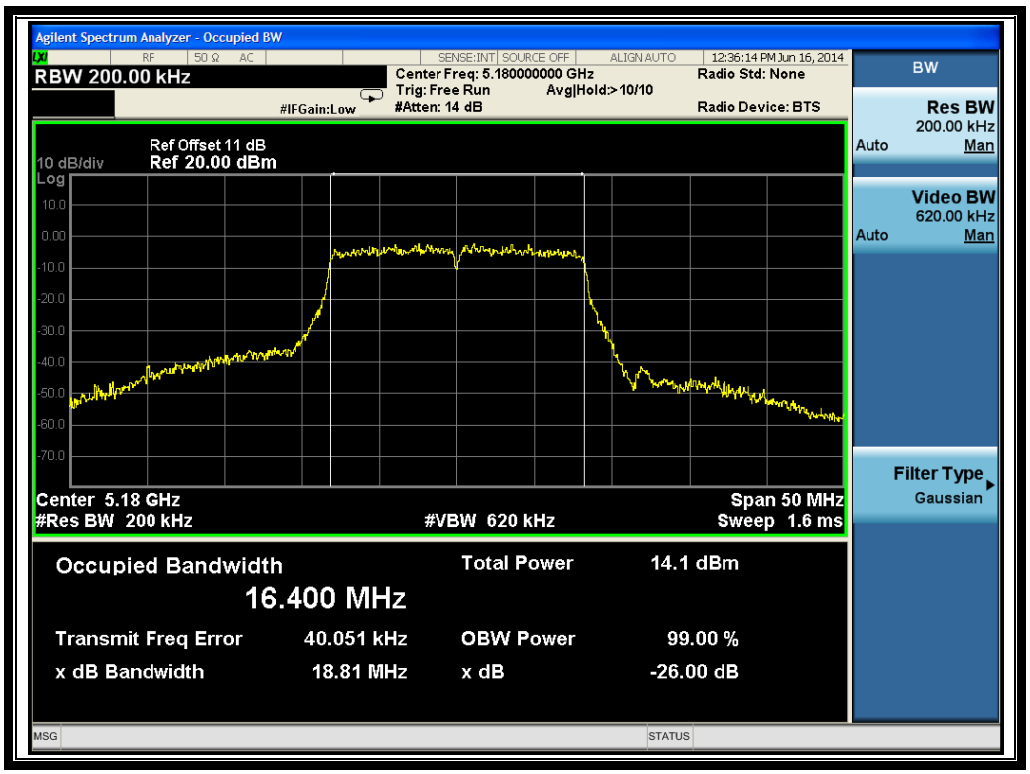
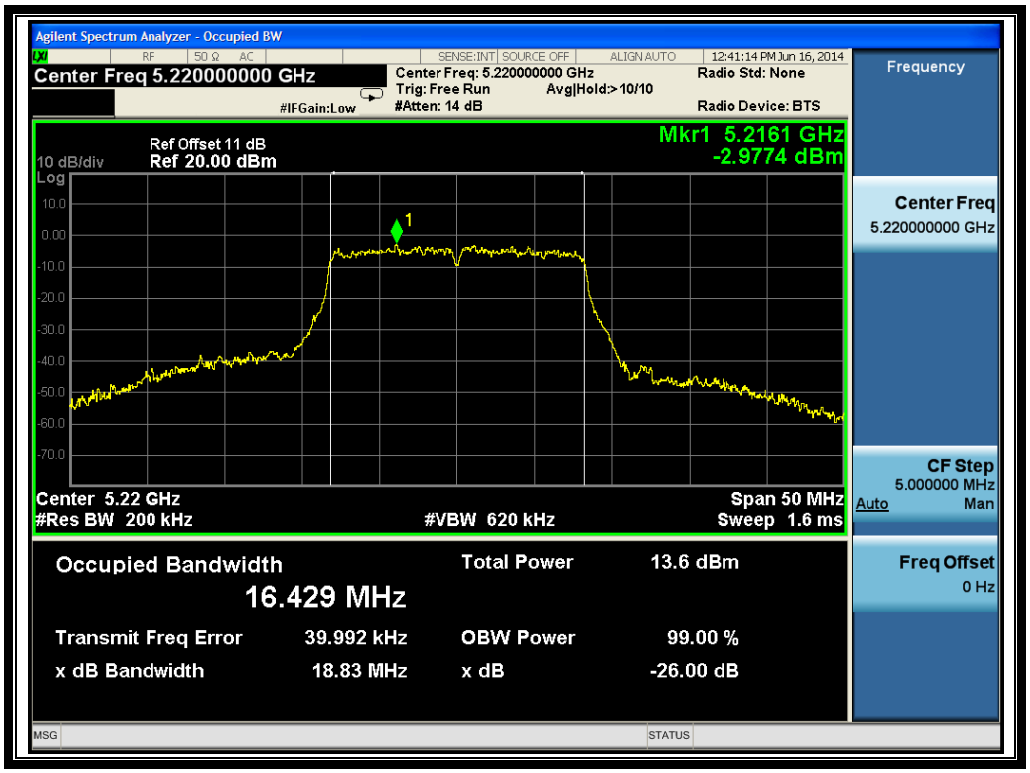
A. Test Verdict:

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
36	5180	18.81
44	5220	18.83
48	5240	18.78
52	5260	18.87
60	5300	18.85
64	5320	18.81
100	5500	18.78
116	5580	18.64
140	5700	18.85
149	5745	18.83
157	5785	18.88
161	5805	18.83

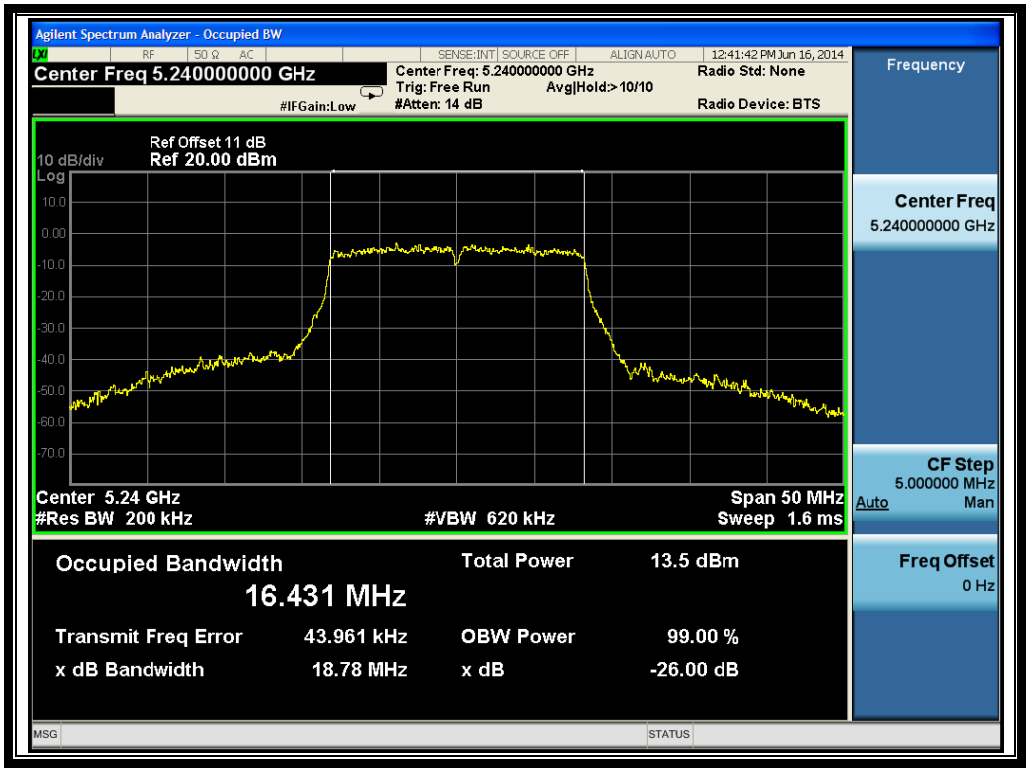
B. Test Plots



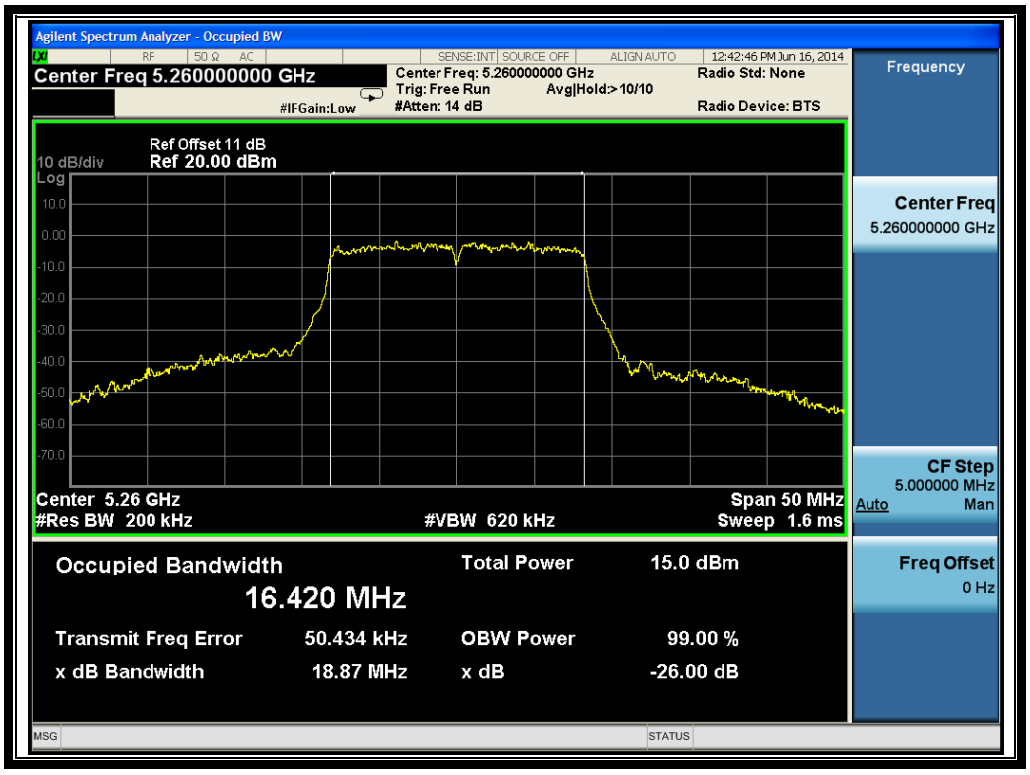
(Channel 36: 5180MHz @ 802.11a)



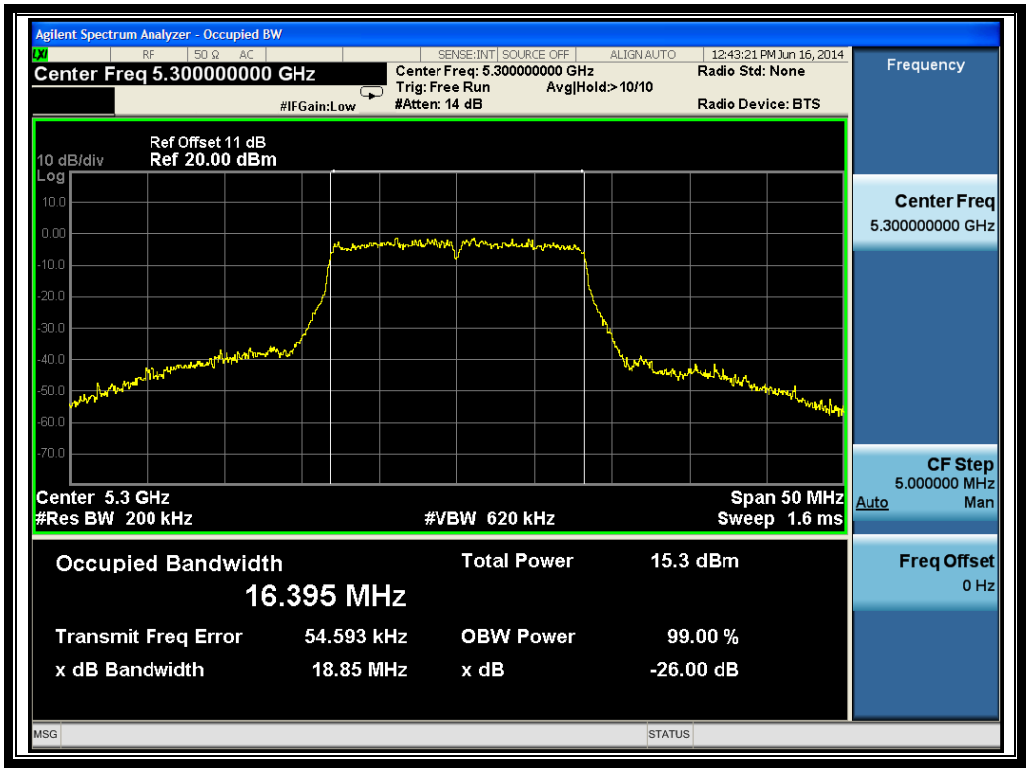
(Channel 44: 5220 MHz @ 802.11a)



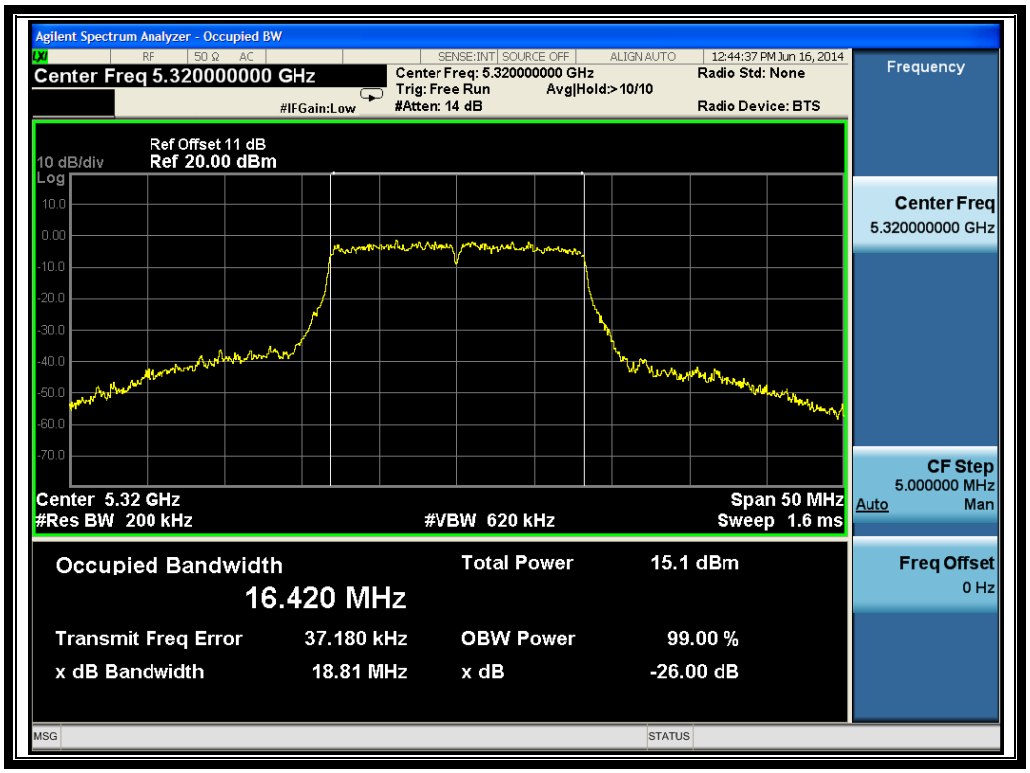
(Channel 48: 5240MHz @ 802.11a)



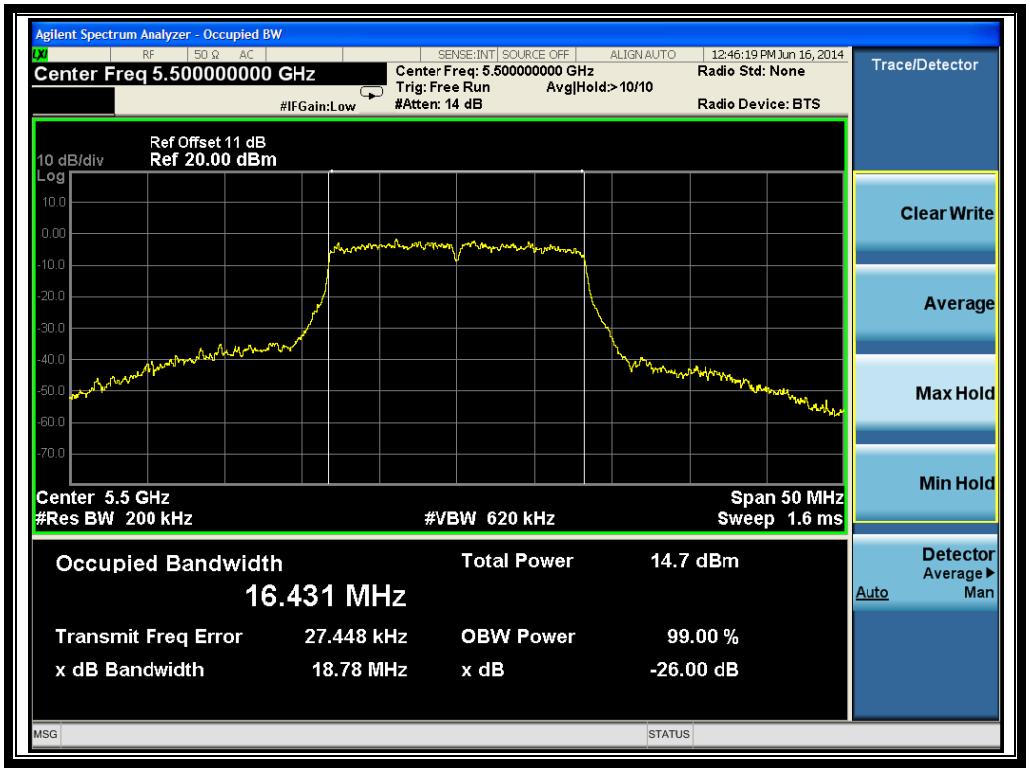
(Channel 52: 5260MHz @ 802.11a)



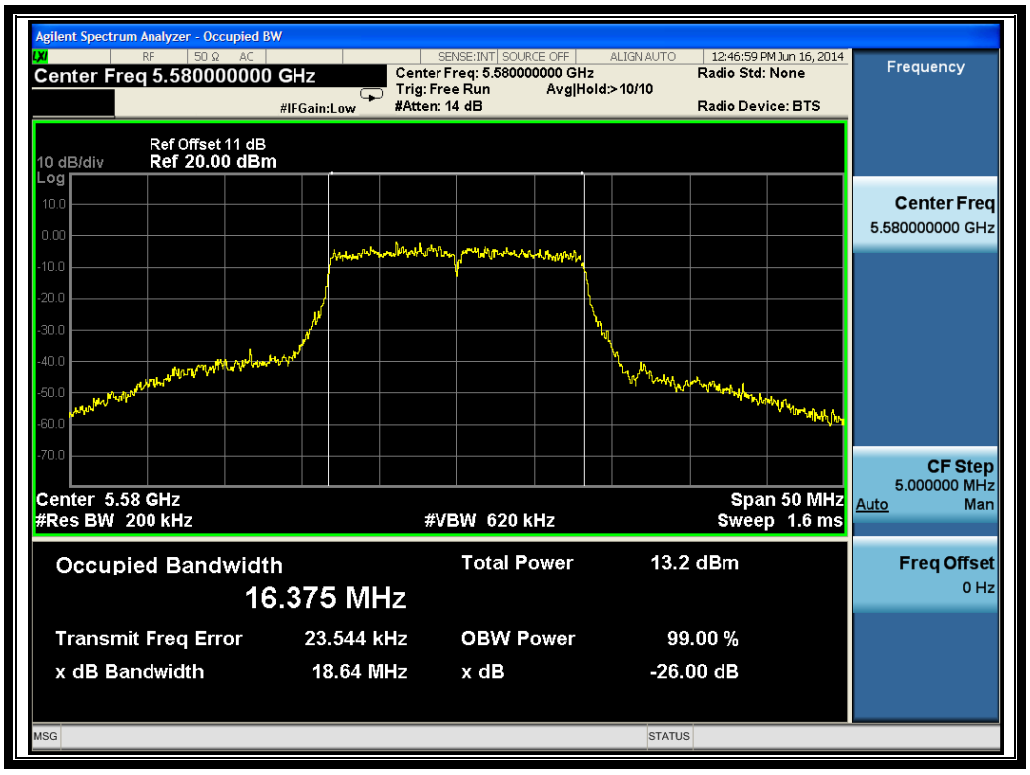
(Channel 60: 5300 MHz @ 802.11a)



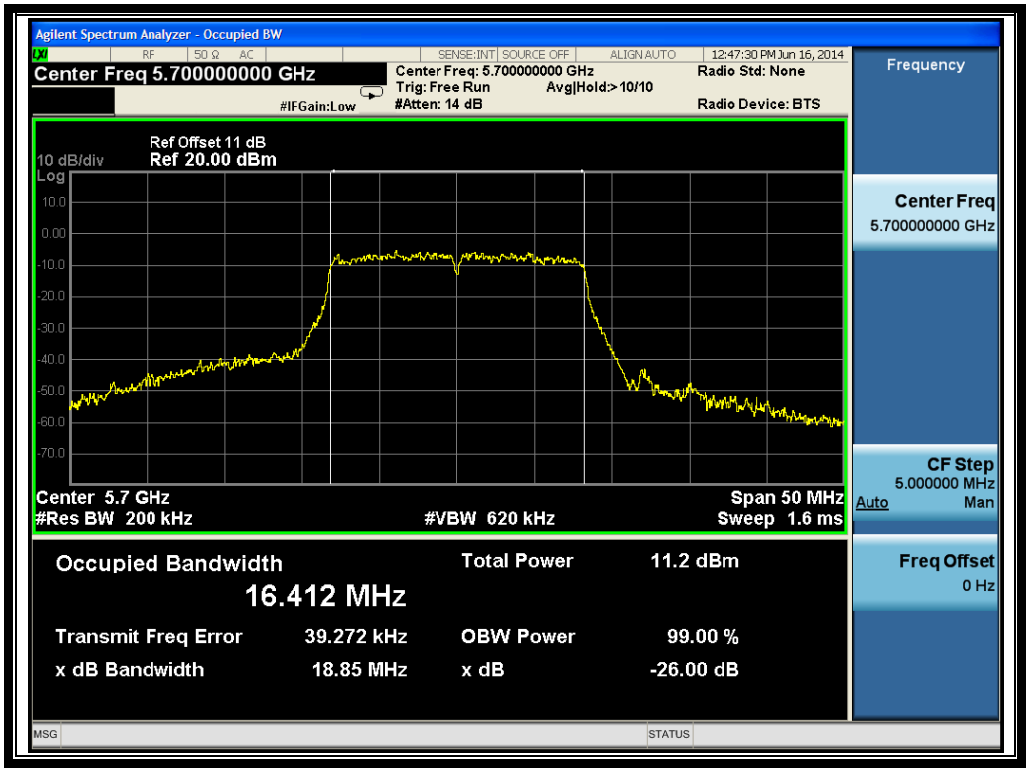
(Channel 64: 5320MHz @ 802.11a)



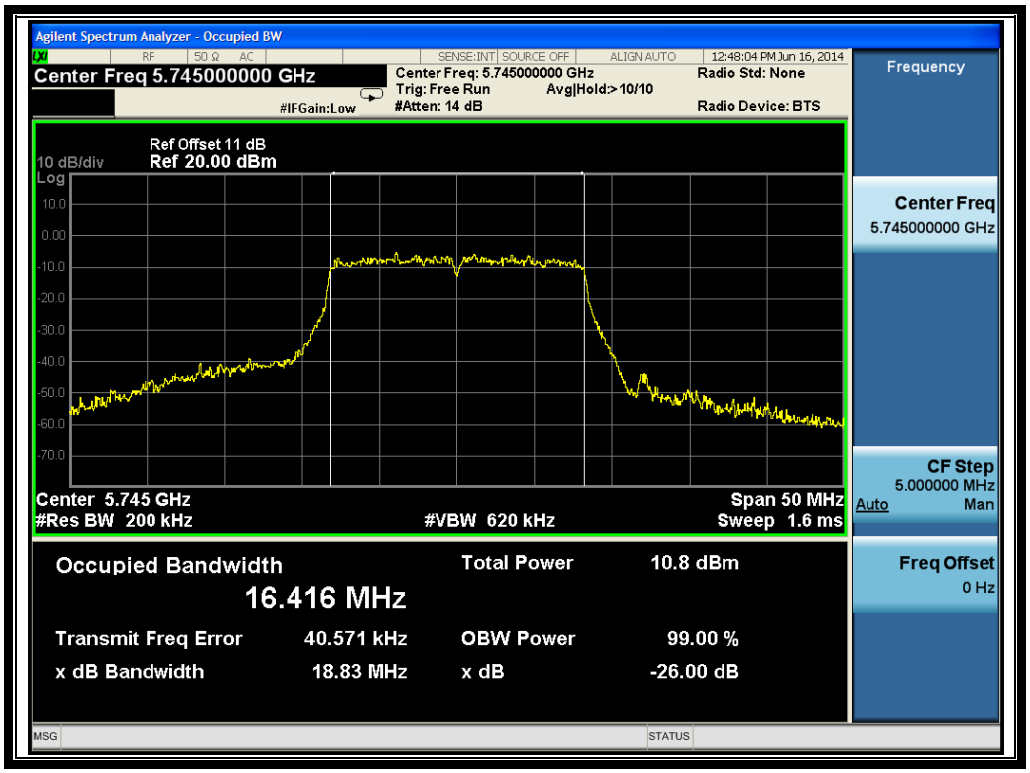
(Channel 100: 5500MHz @ 802.11a)



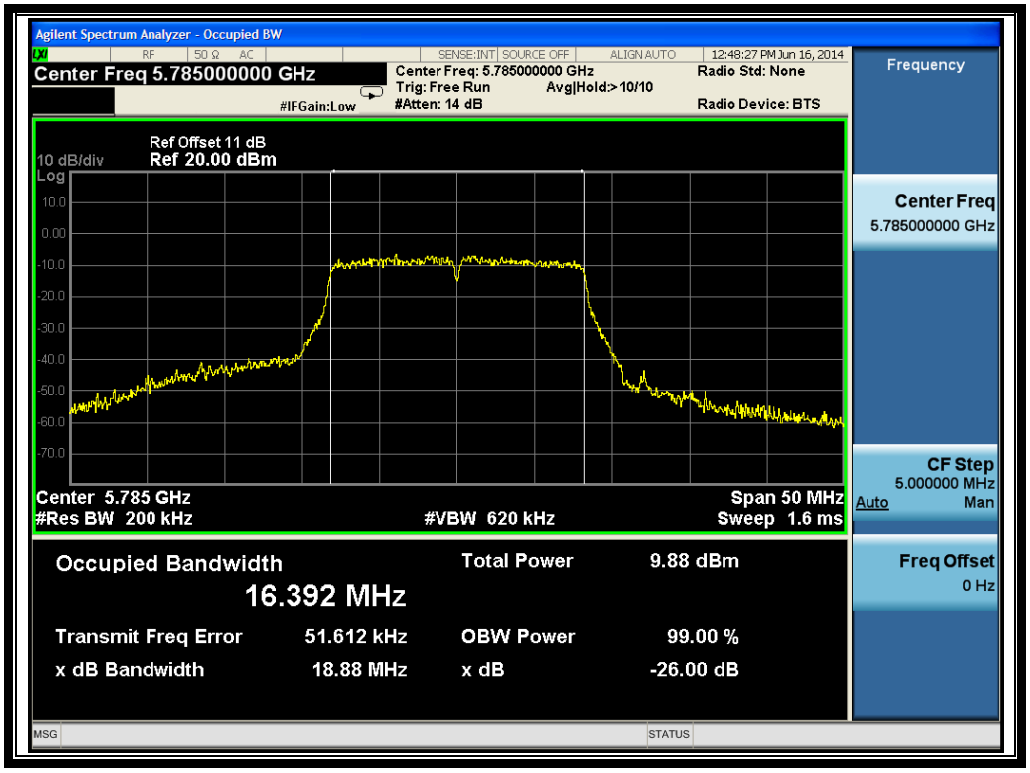
(Channel 116: 5580 MHz @ 802.11a)



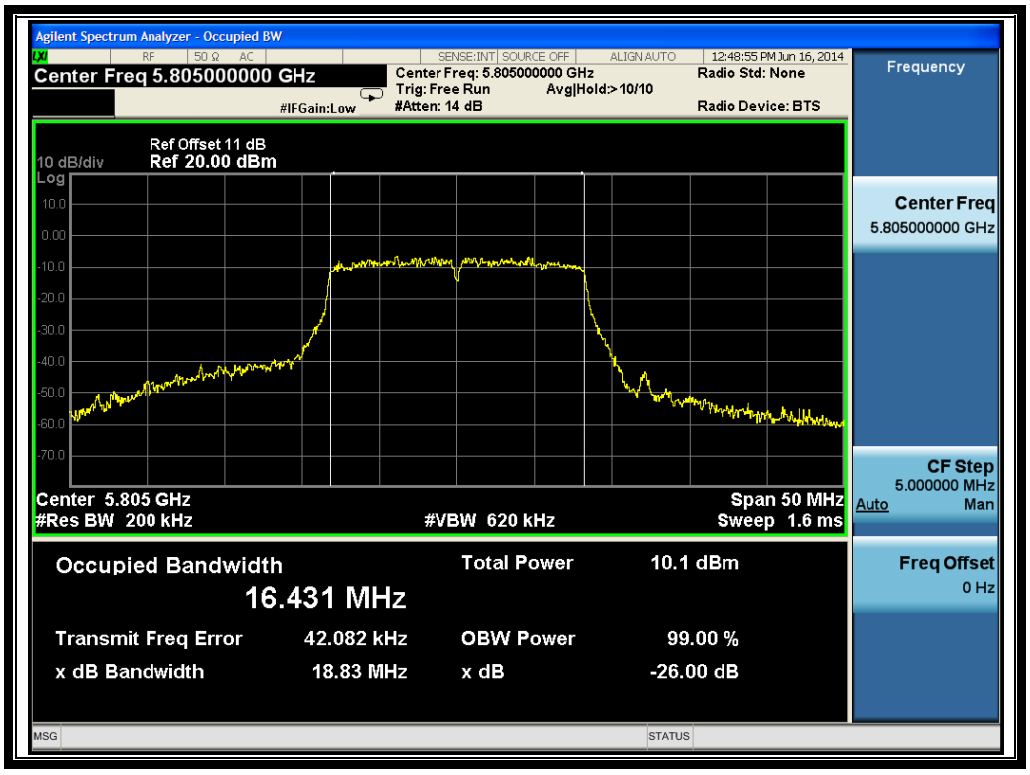
(Channel 140: 5700MHz @ 802.11a)



(Channel 149: 5745MHz @ 802.11a)



(Channel 157: 5785 MHz @ 802.11a)



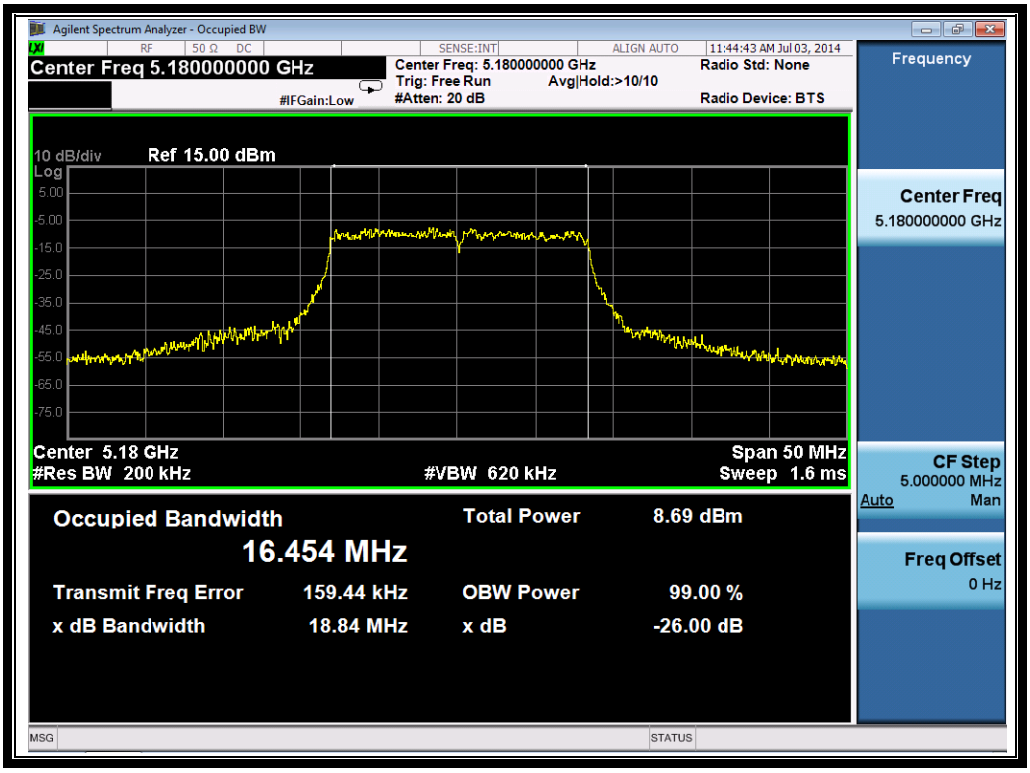
(Channel 161: 5805MHz @ 802.11a)

ANT 4

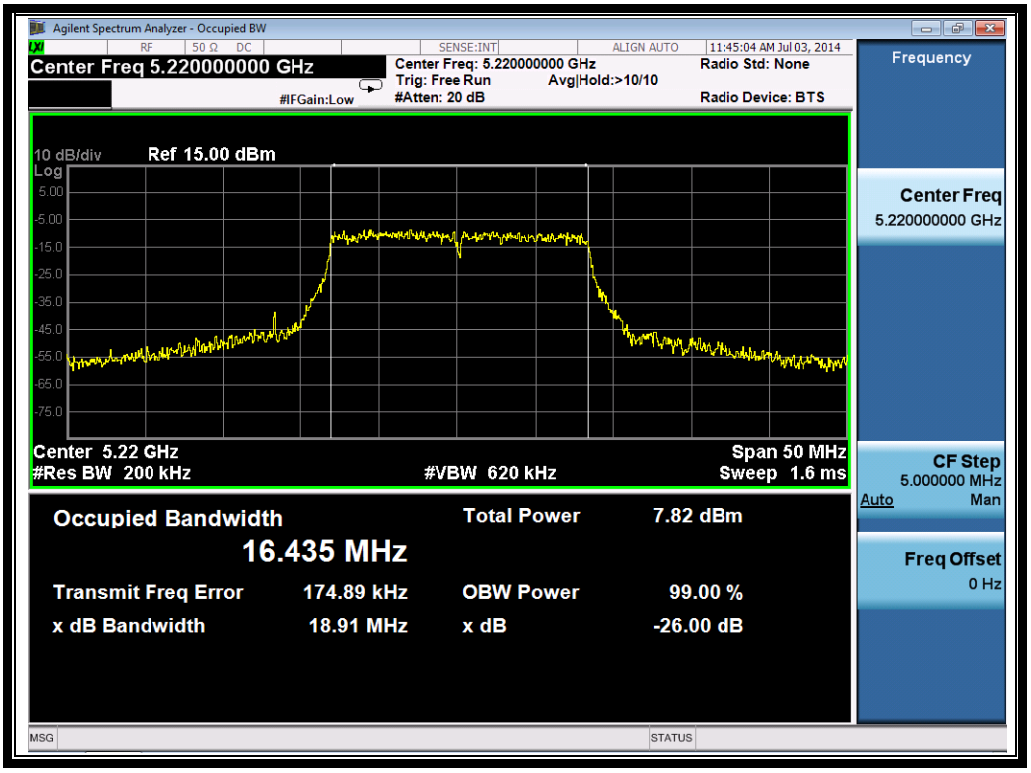
A. Test Verdict:

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
36	5180	18.84
44	5220	18.91
48	5240	18.76
52	5260	18.42
60	5300	18.52
64	5320	18.68
100	5500	18.79
116	5580	18.56
140	5700	18.58
149	5745	18.50
157	5785	18.43
161	5805	18.43

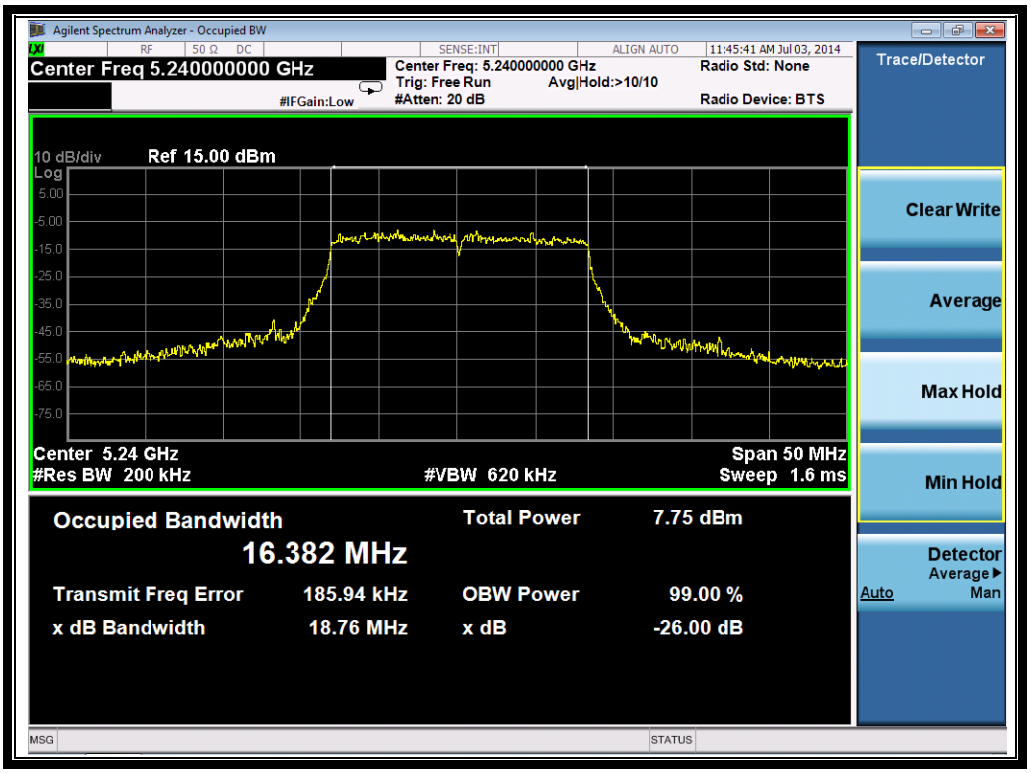
B. Test Plots



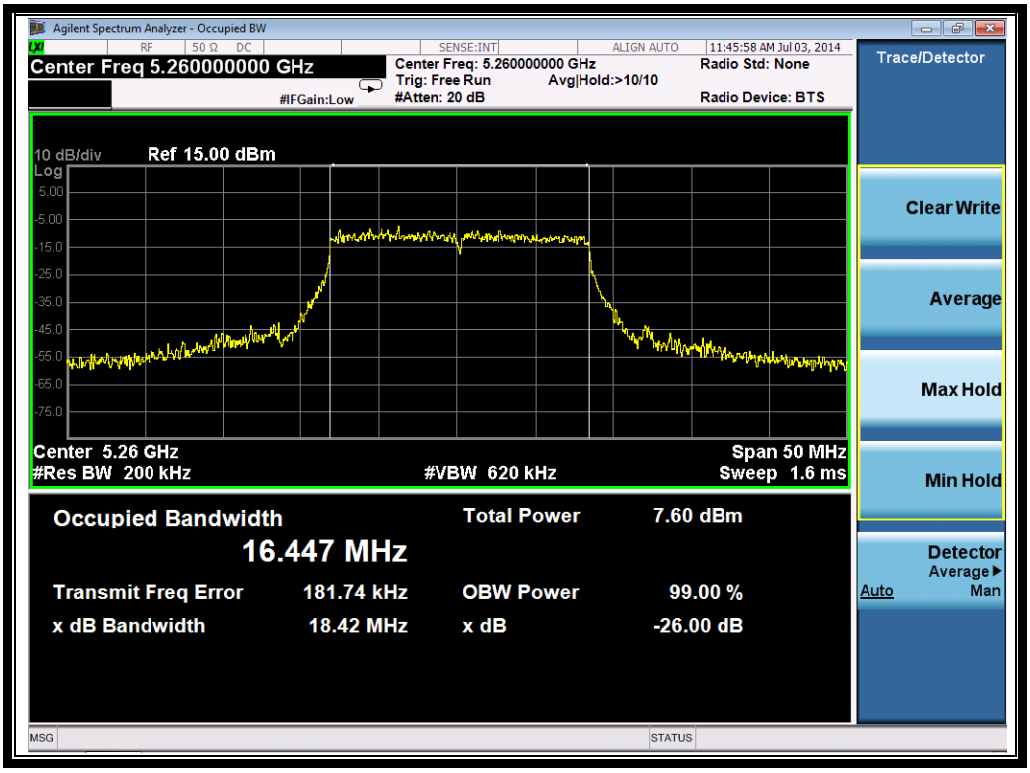
(Channel 36: 5180MHz @ 802.11a)



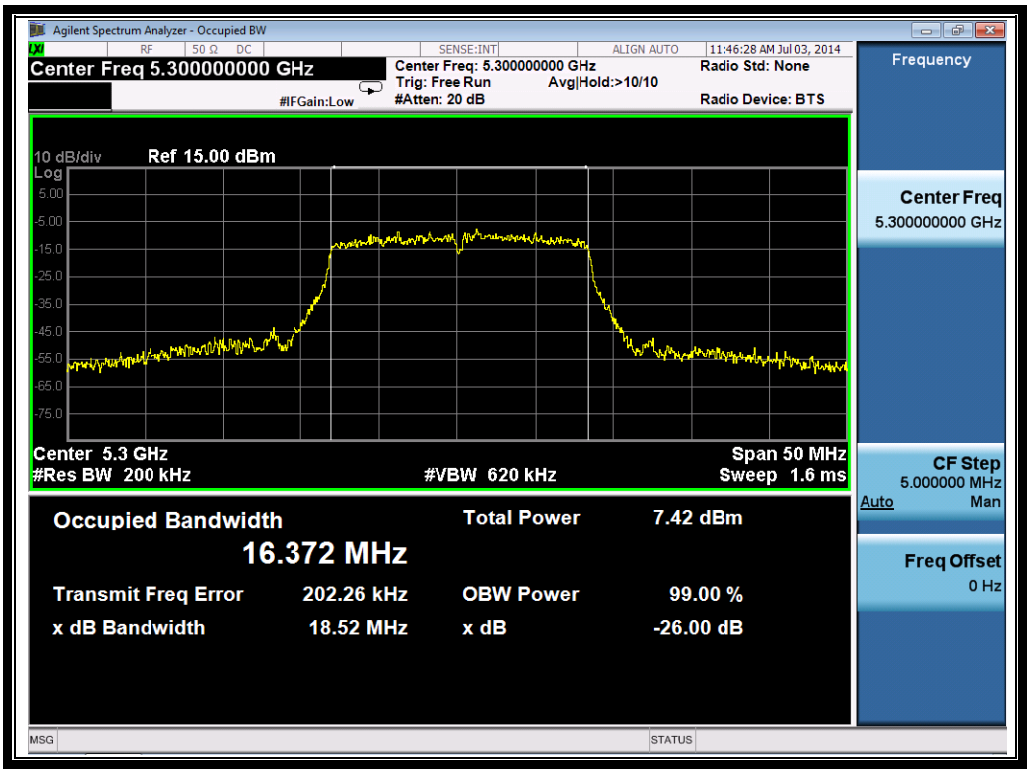
(Channel 44: 5220 MHz @ 802.11a)



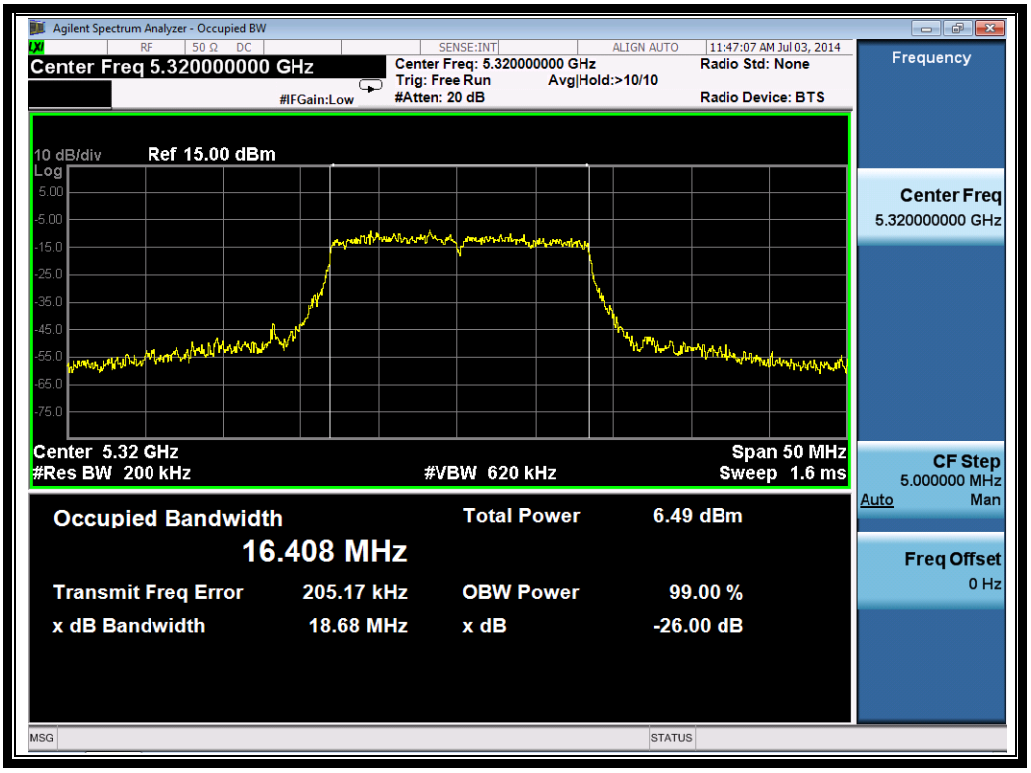
(Channel 48: 5240MHz @ 802.11a)



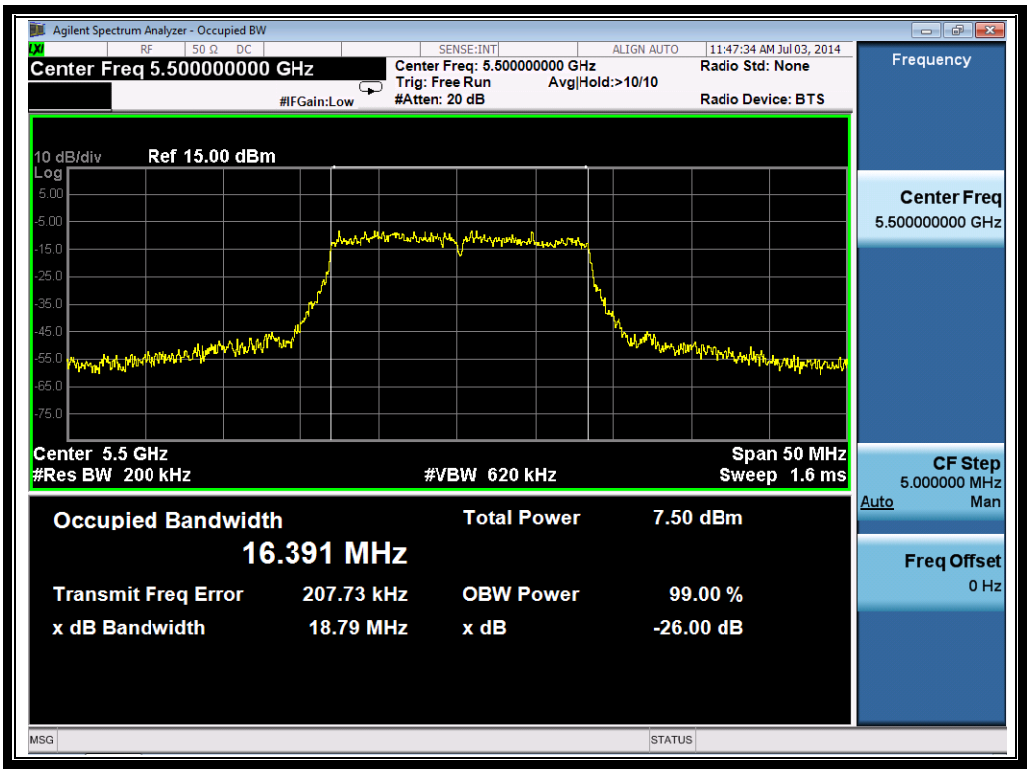
(Channel 52: 5260MHz @ 802.11a)



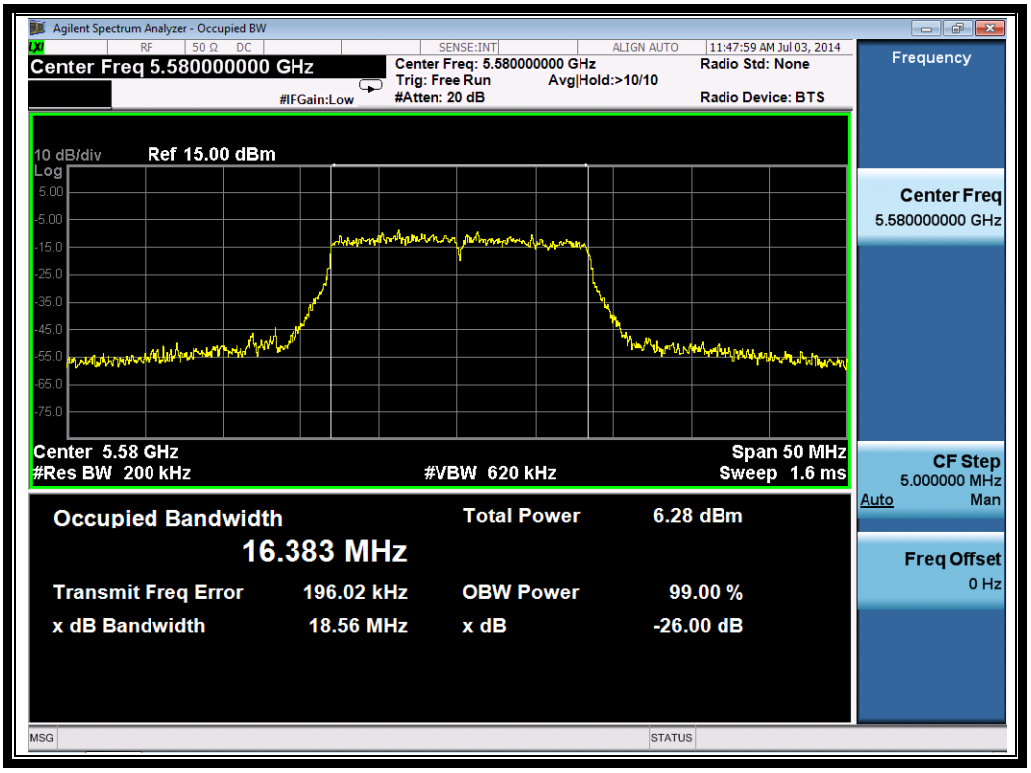
(Channel 60: 5300 MHz @ 802.11a)



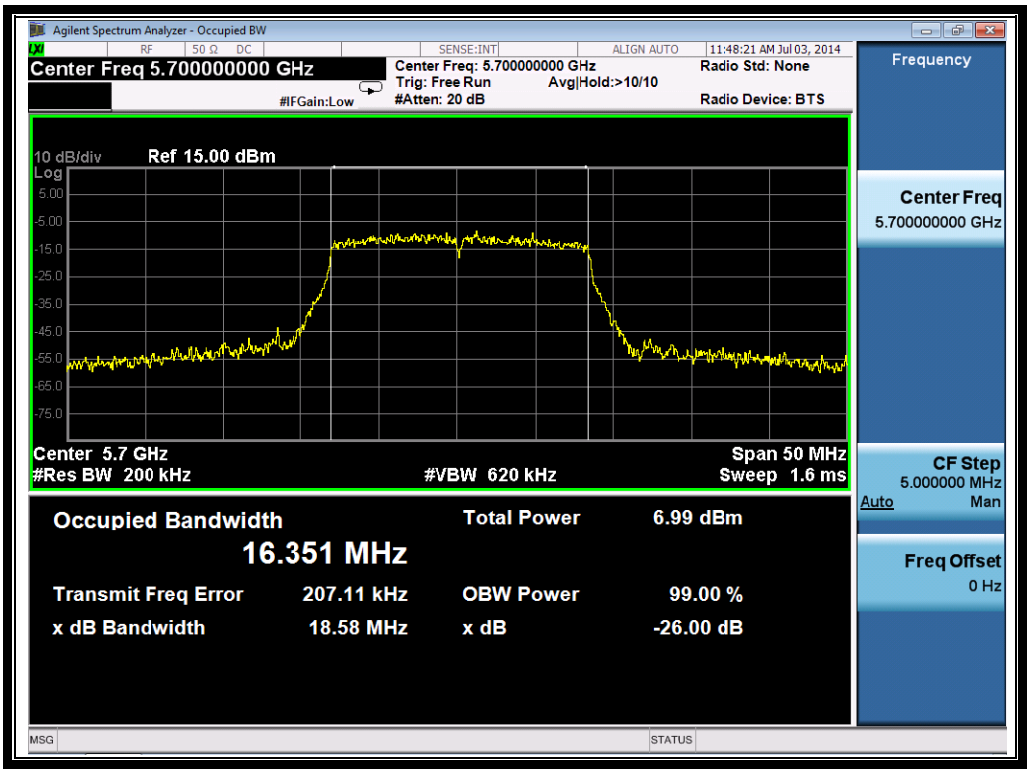
(Channel 64: 5320MHz @ 802.11a)



(Channel 100: 5500MHz @ 802.11a)

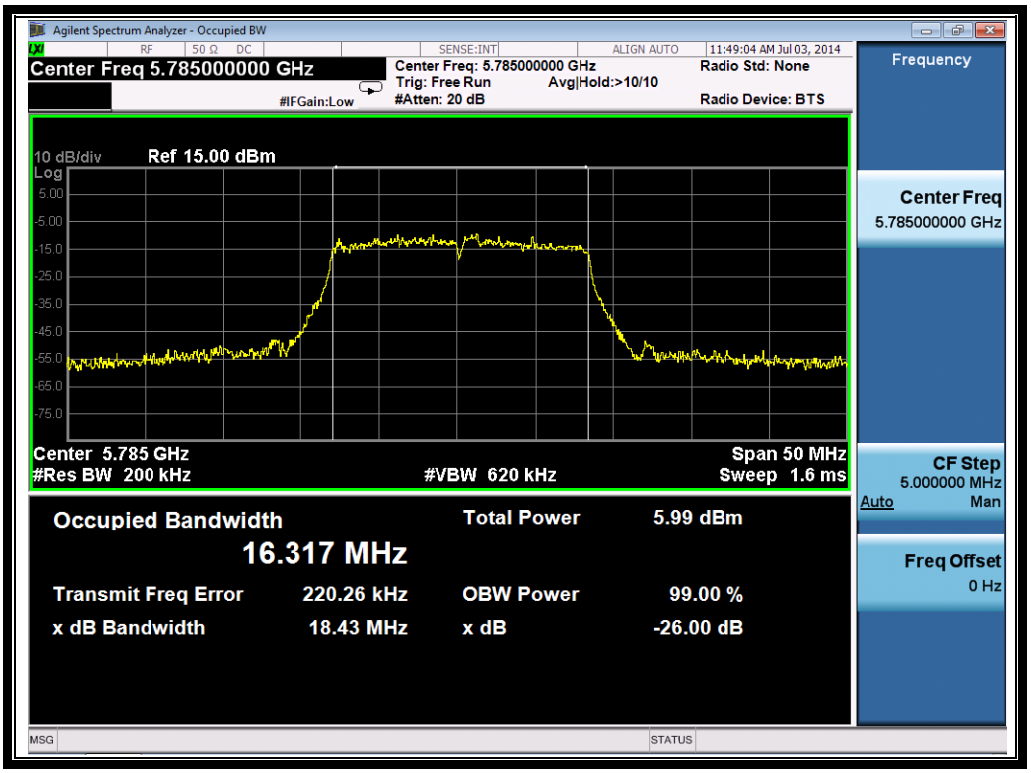


(Channel 116: 5580 MHz @ 802.11a)

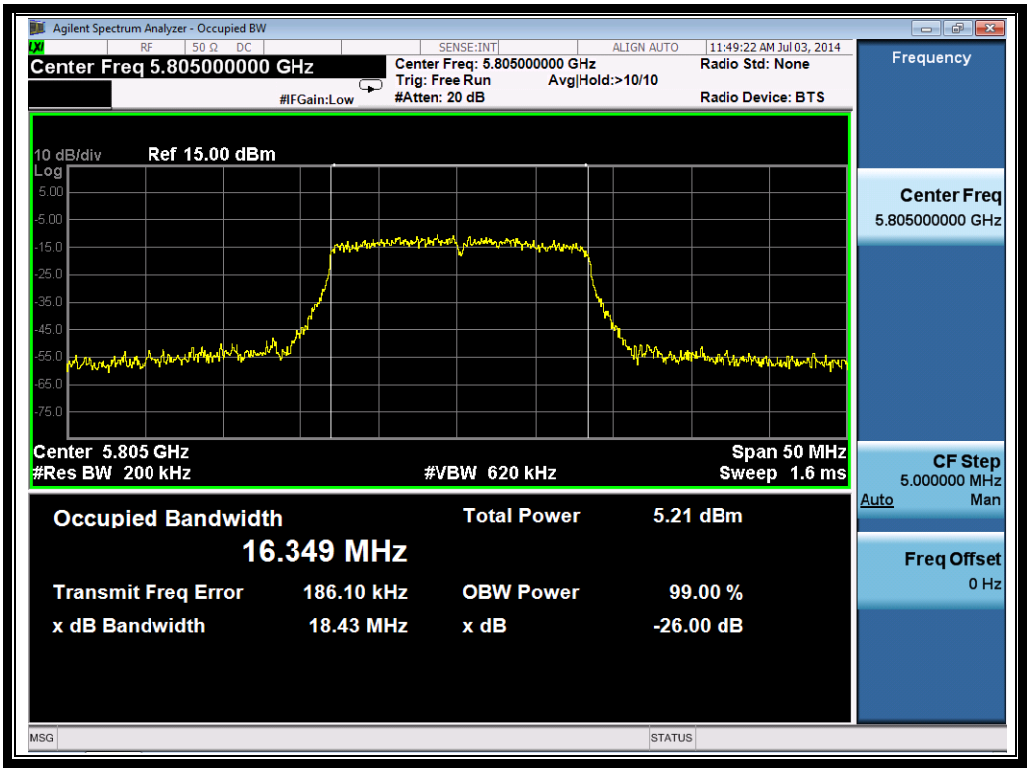


(Channel 140: 5700MHz @ 802.11a)

(Channel 149: 5745MHz @ 802.11a)



(Channel 157: 5785 MHz @ 802.11a)



(Channel 161: 5805MHz @ 802.11a)

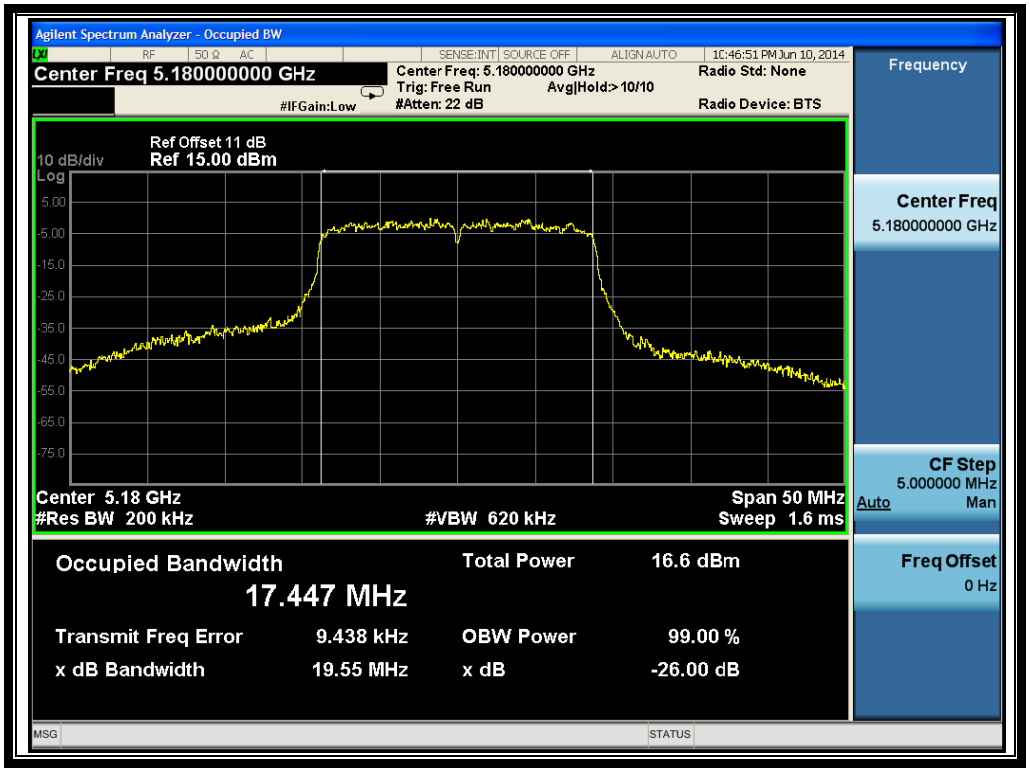
2.2.3.2. 802.11n-20MHz Test mode

ANT 3

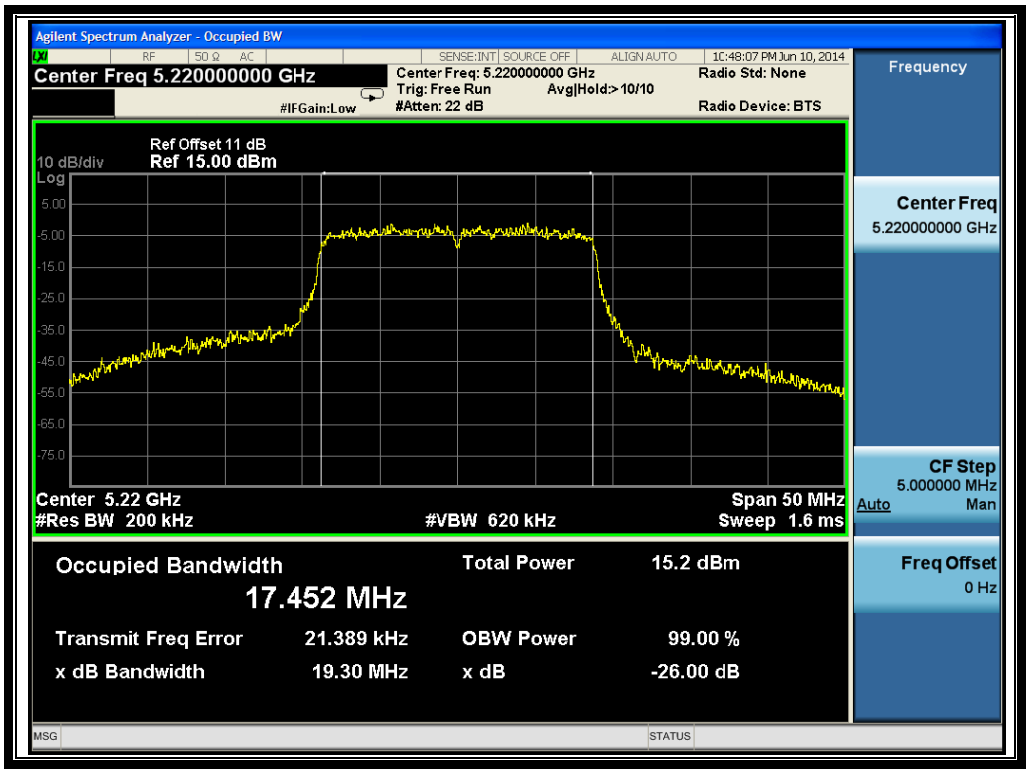
A. Test Verdict:

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
36	5180	19.55
44	5220	19.30
48	5240	19.35
52	5260	19.50
60	5300	19.56
64	5320	19.63
100	5500	19.53
116	5580	19.46
140	5700	19.30
149	5745	19.47
157	5785	19.62
161	5805	19.40

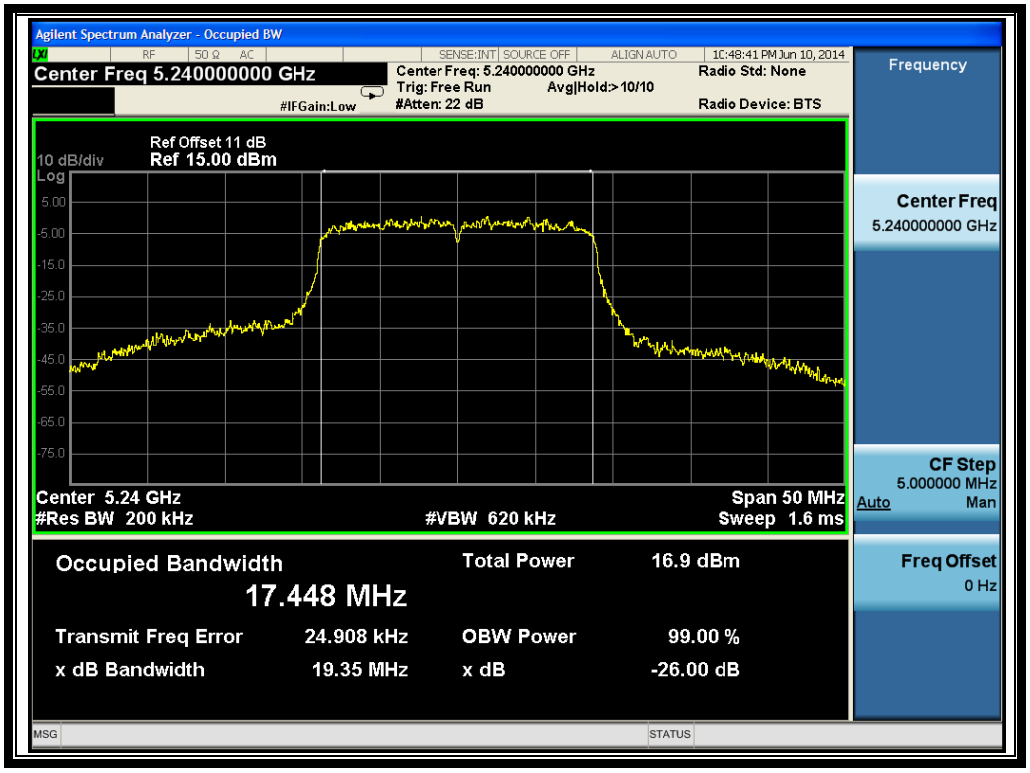
B. Test Plots



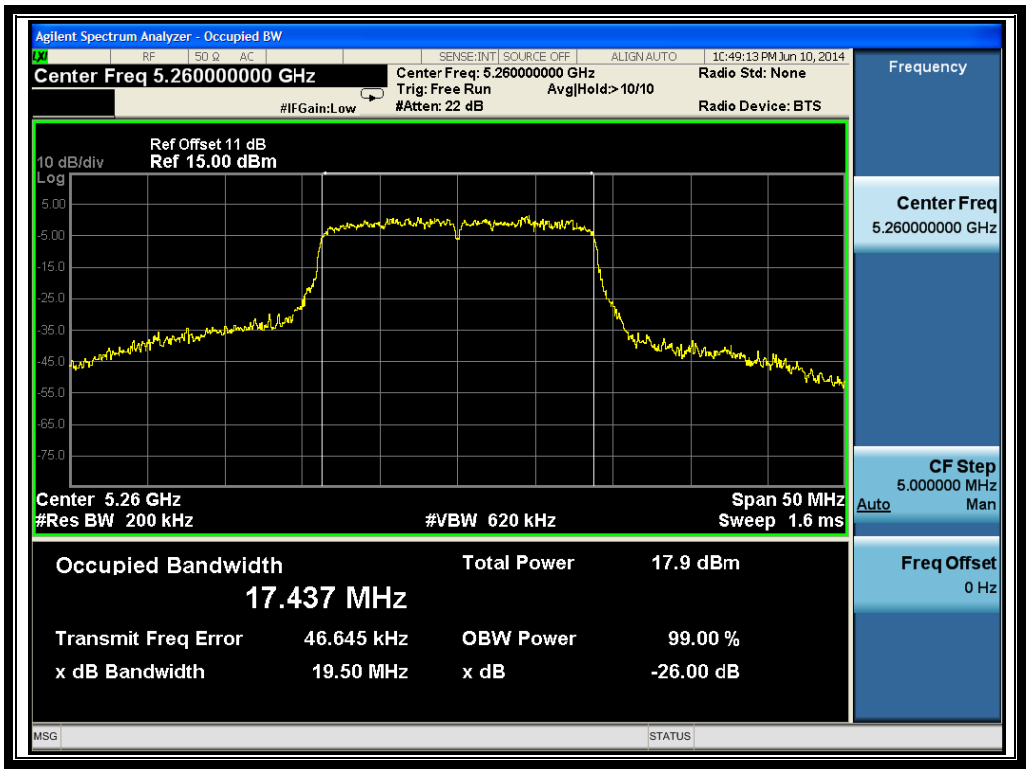
(Channel 36: 5180MHz @ 802.11n-20MHz)



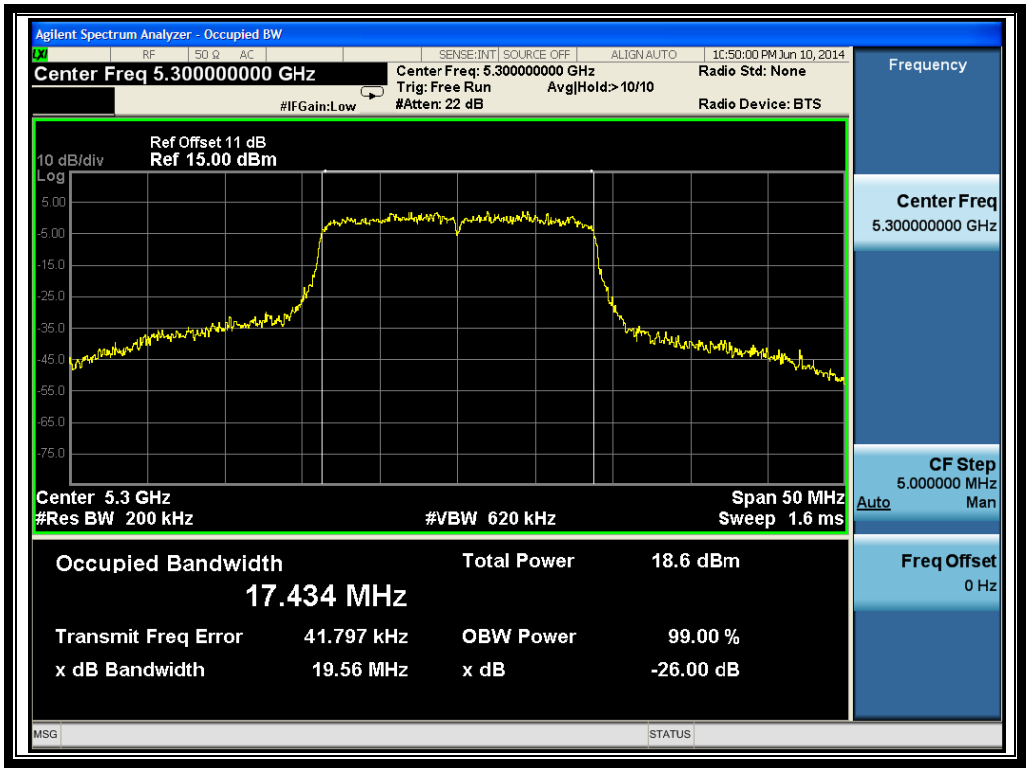
(Channel 44: 5220 MHz @ 802.11n-20MHz)



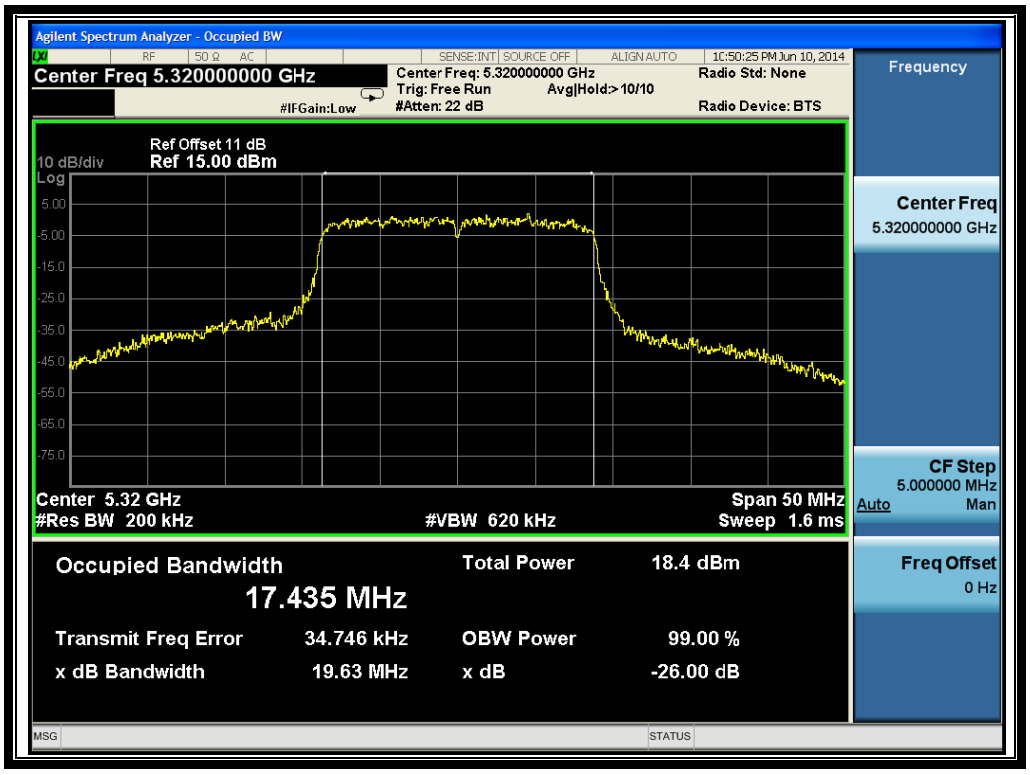
(Channel 48: 5240MHz @ 802.11n-20MHz)



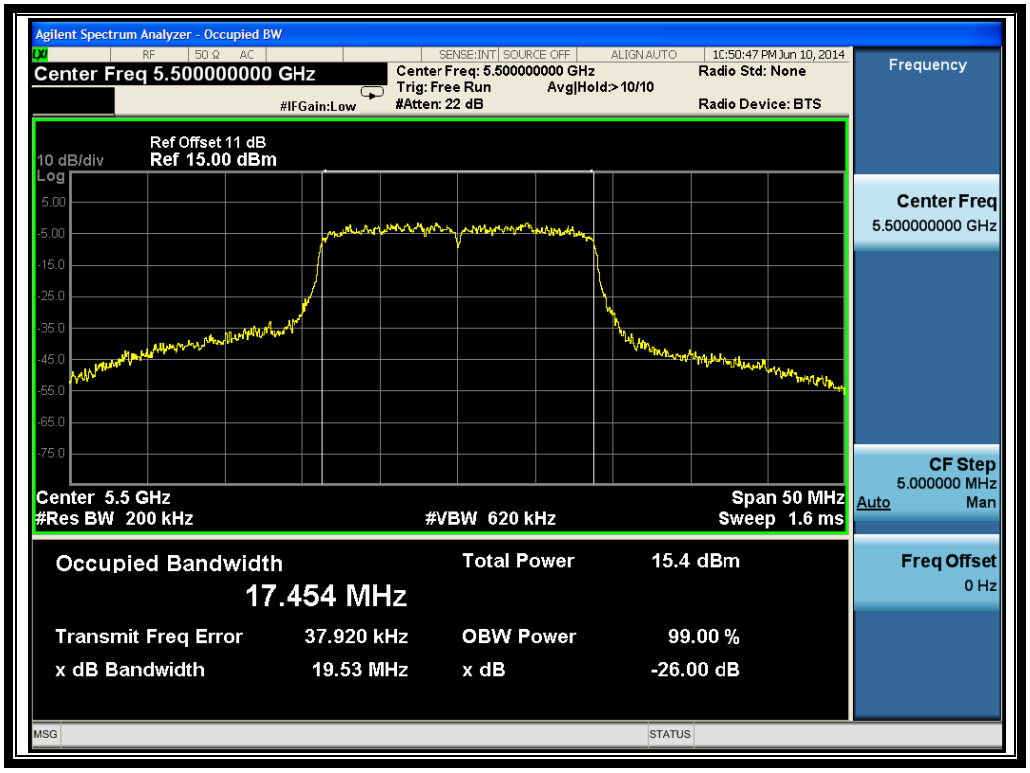
(Channel 52: 5260MHz @ 802.11n-20MHz)



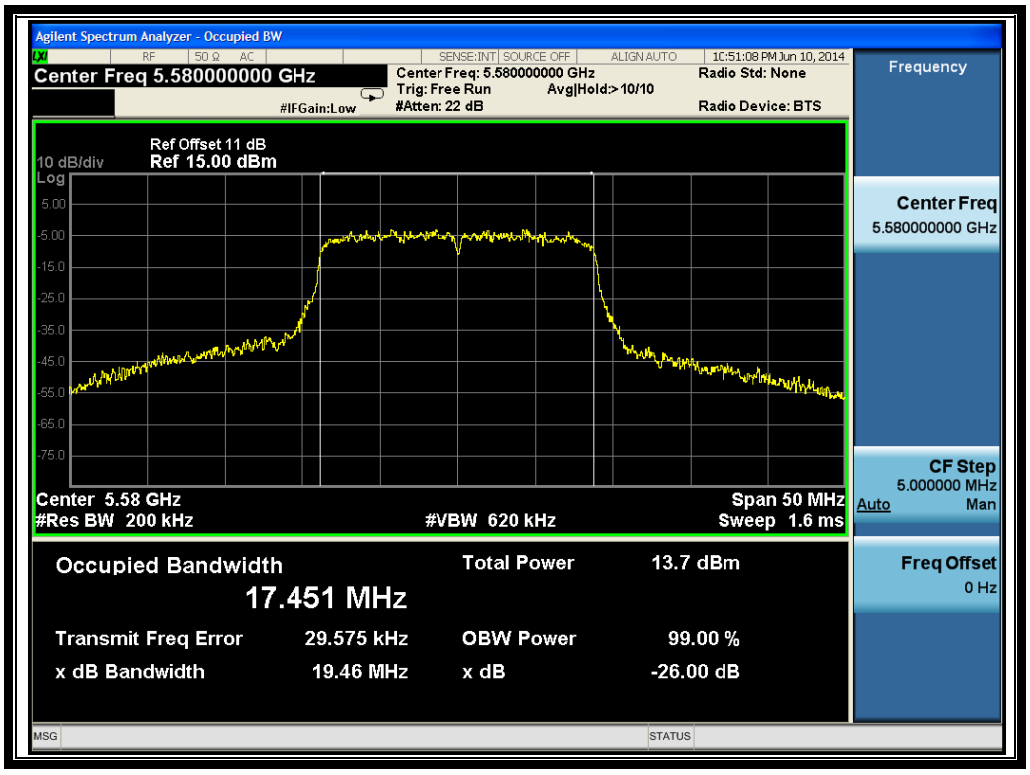
(Channel 60: 5300 MHz @ 802.11n-20MHz)



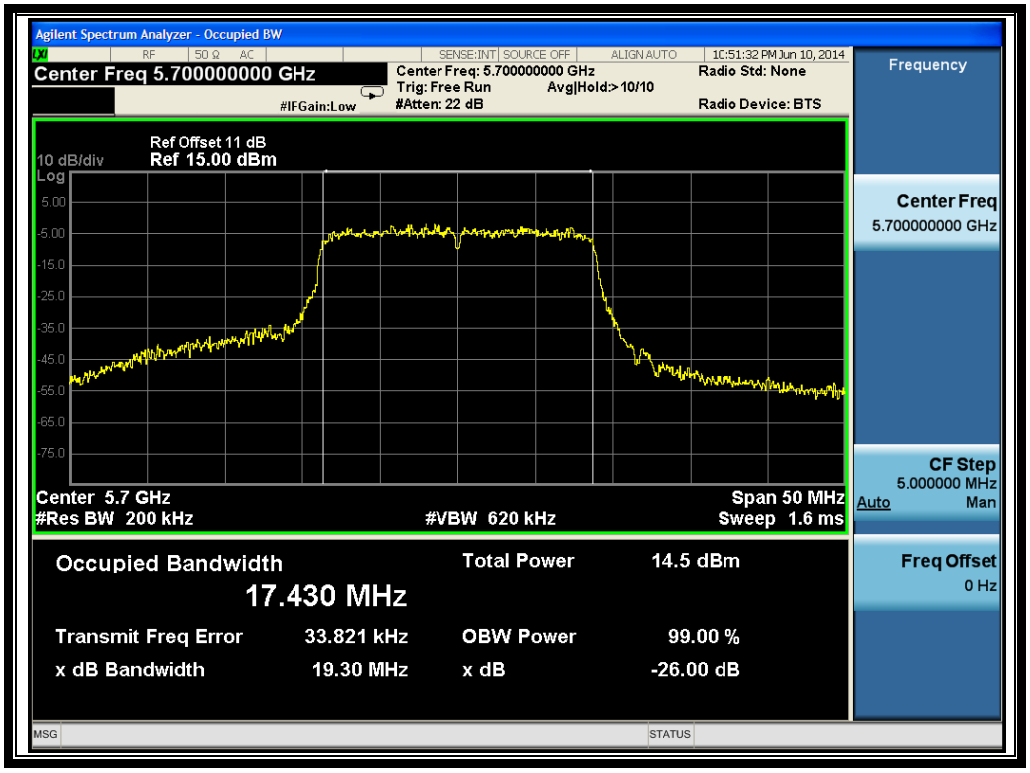
(Channel 64: 5320MHz @ 802.11n-20MHz)



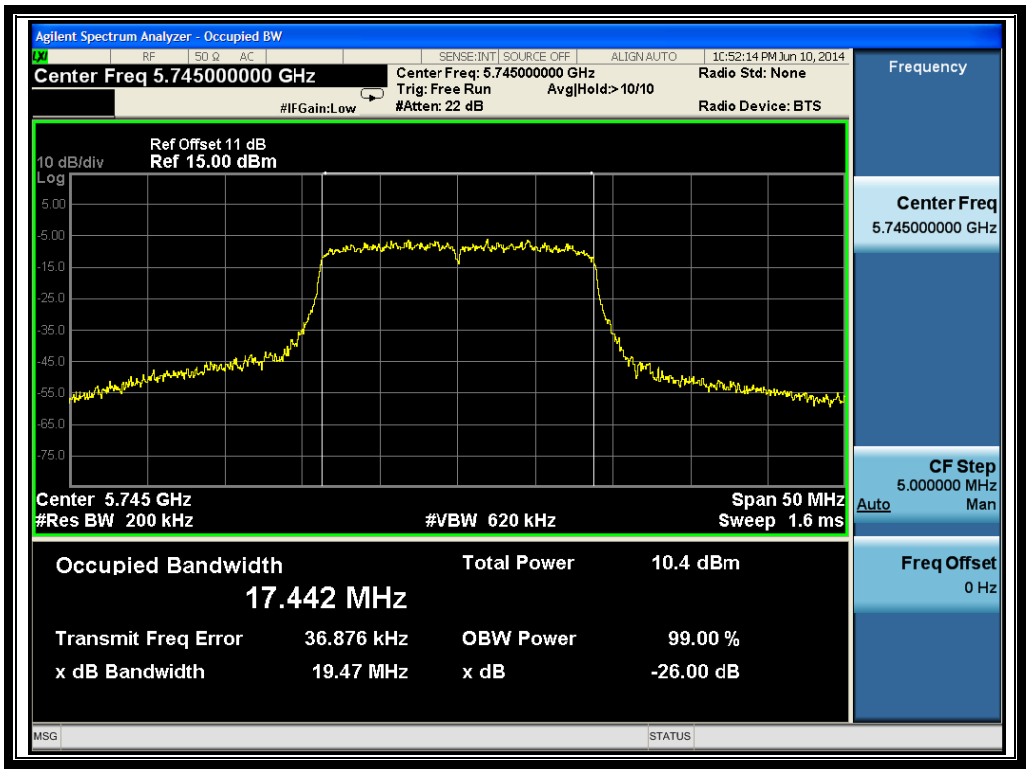
(Channel 100: 5500MHz @ 802.11n-20MHz)



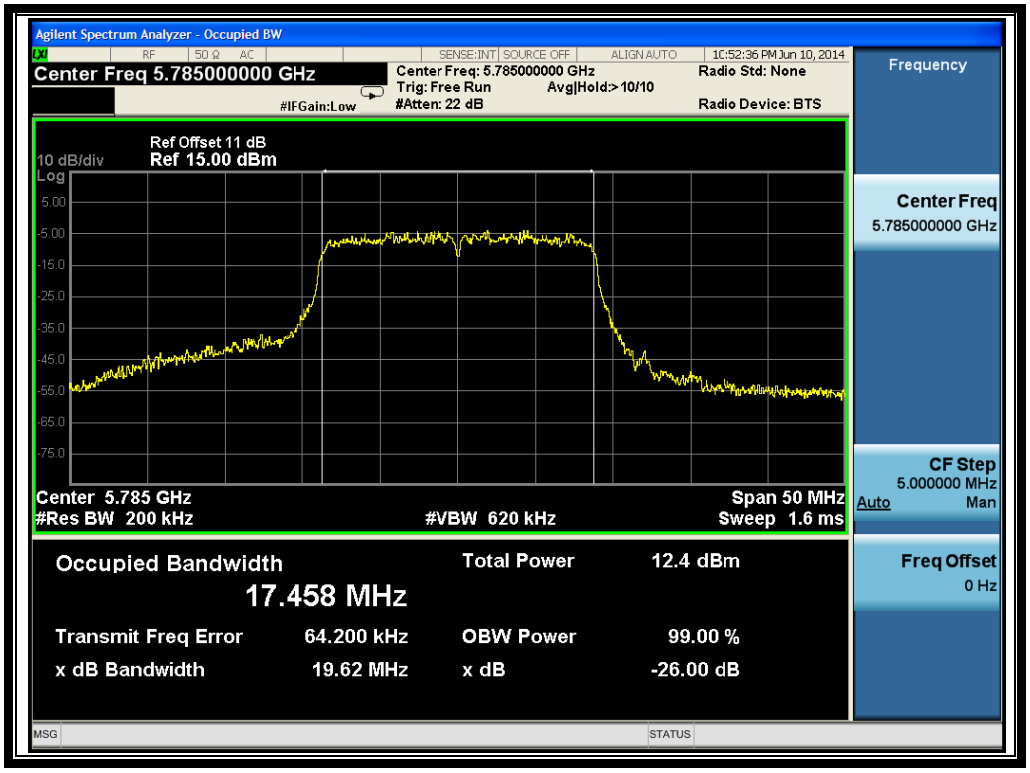
(Channel 116: 5580 MHz @ 802.11n-20MHz)



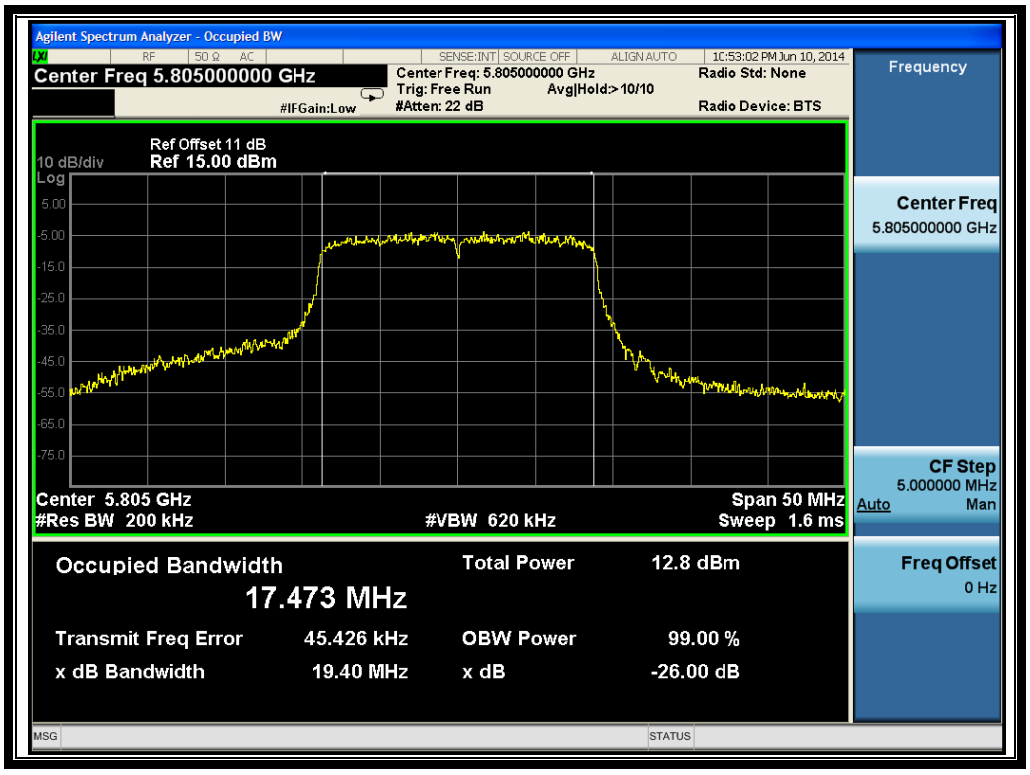
(Channel 140: 5700MHz @ 802.11n-20MHz)



(Channel 149: 5745MHz @ 802.11n-20MHz)



(Channel 157: 5785 MHz @ 802.11n-20MHz)



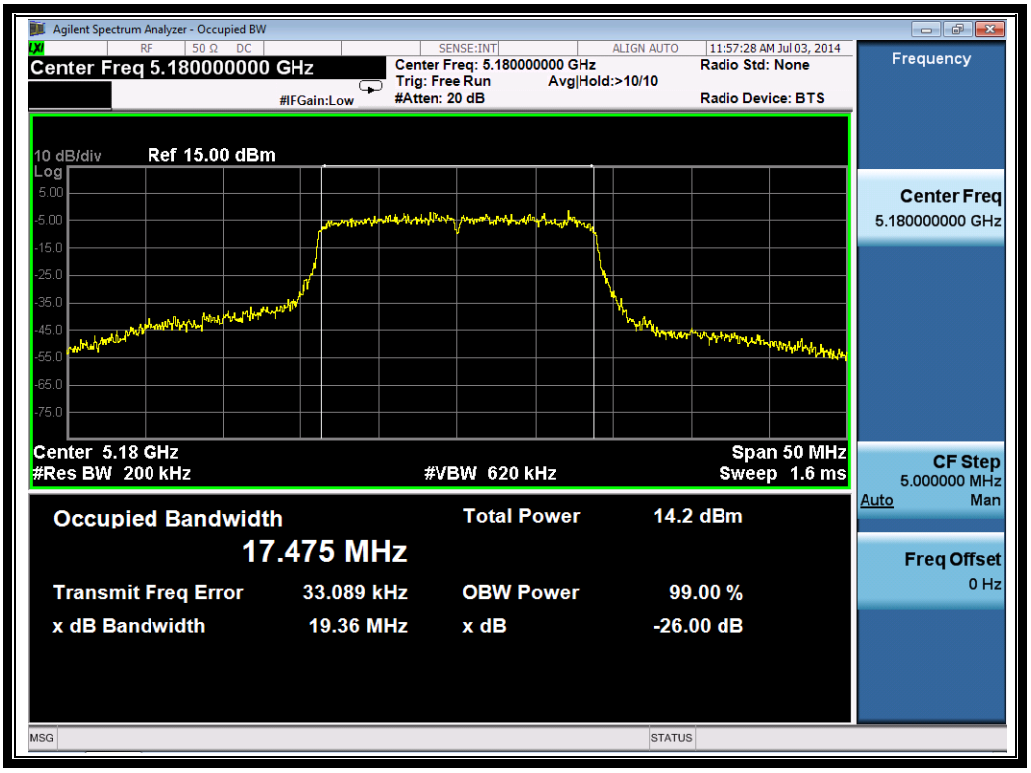
(Channel 161: 5805MHz @ 802.11n-20MHz)

ANT 4

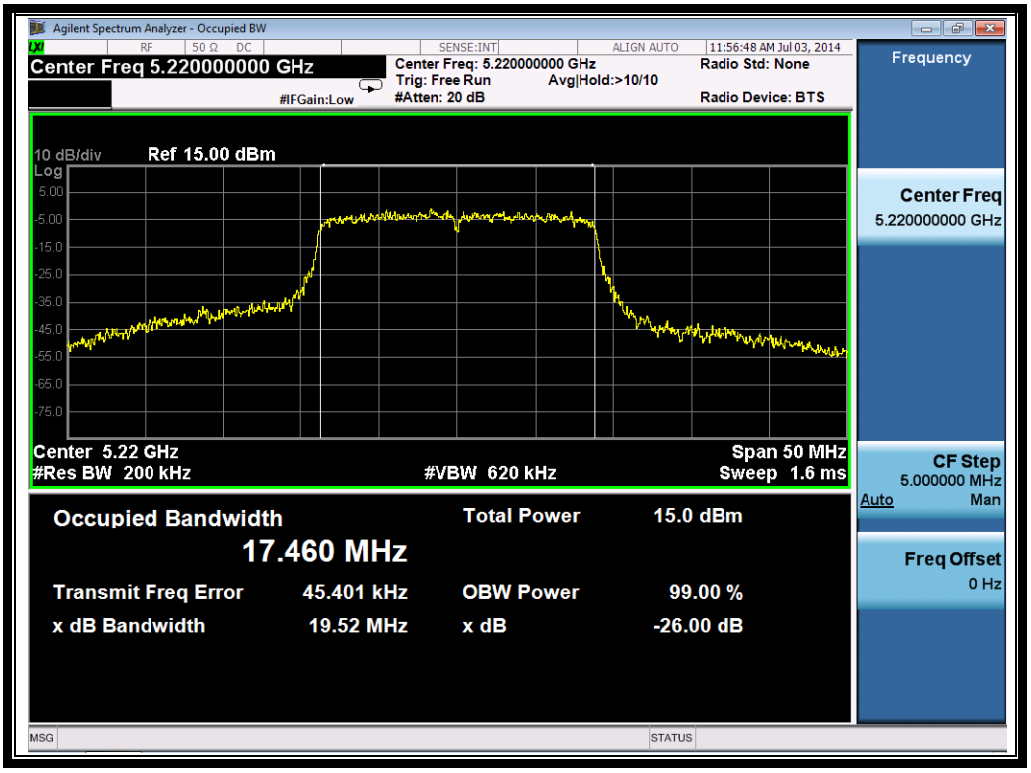
A. Test Verdict:

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
36	5180	19.36
44	5220	19.52
48	5240	19.21
52	5260	19.24
60	5300	19.29
64	5320	19.10
100	5500	19.21
116	5580	19.34
140	5700	19.21
149	5745	19.13
157	5785	18.99
161	5805	19.20

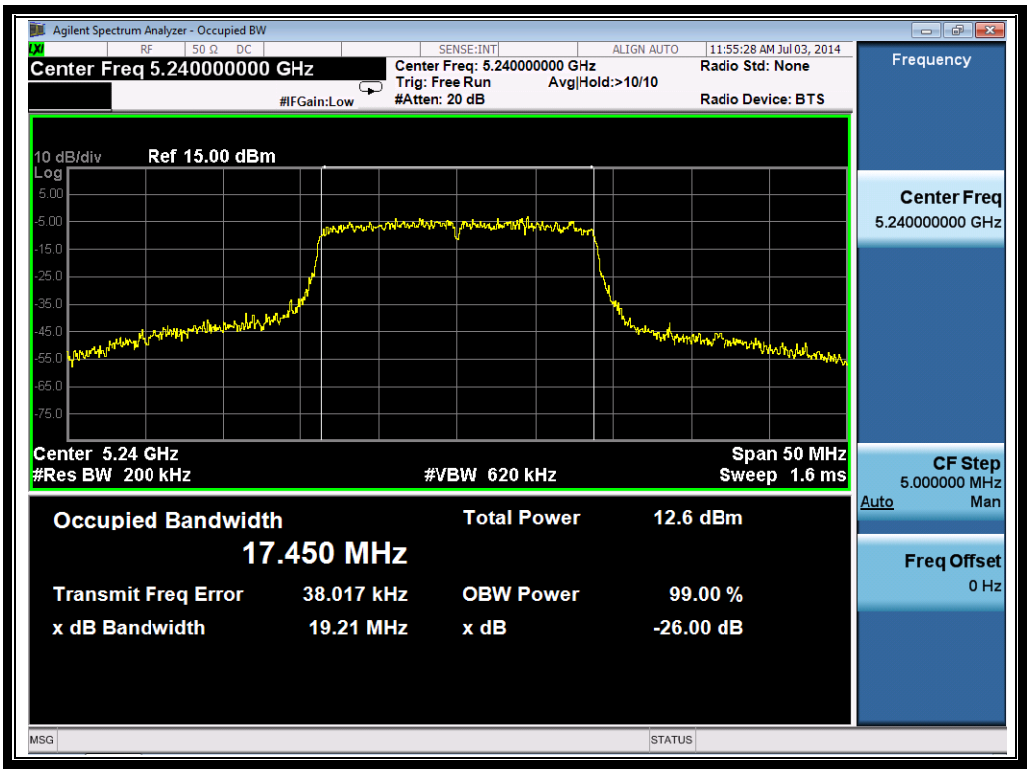
B. Test Plots



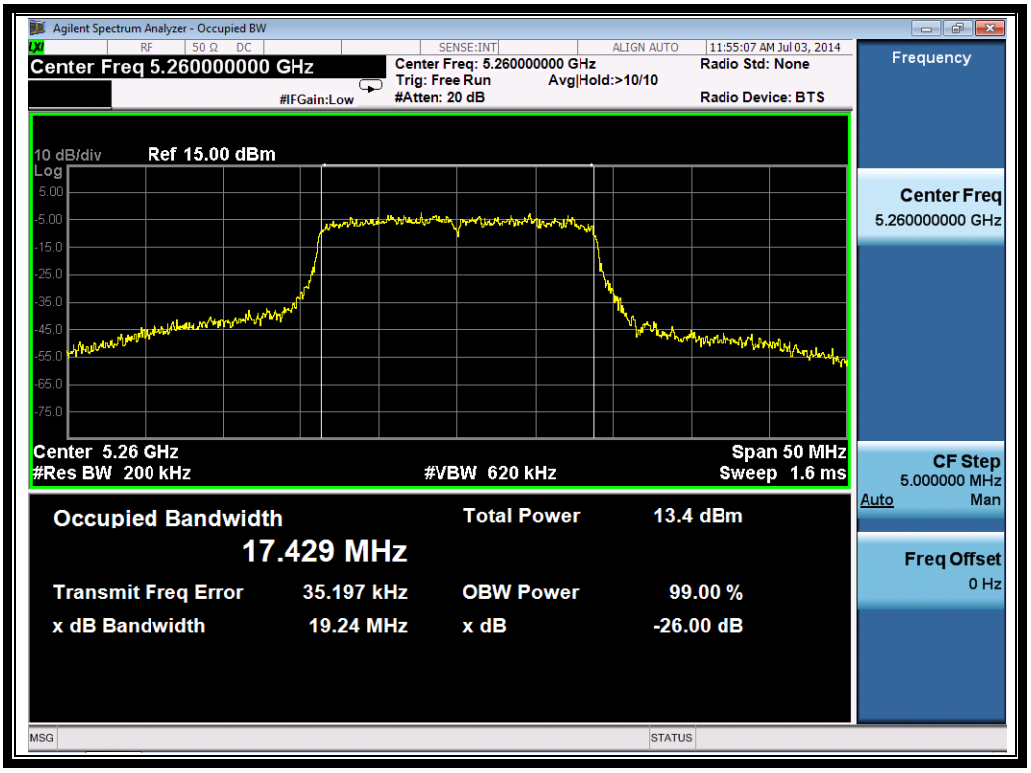
(Channel 36: 5180MHz @ 802.11n-20MHz)



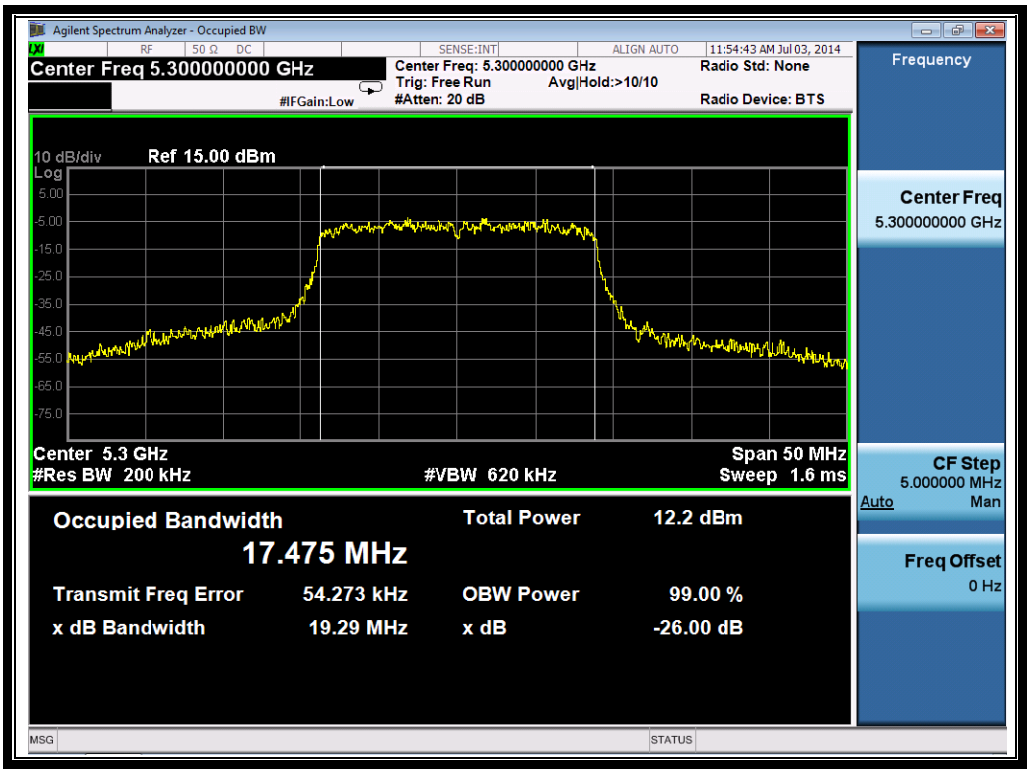
(Channel 44: 5220 MHz @ 802.11n-20MHz)



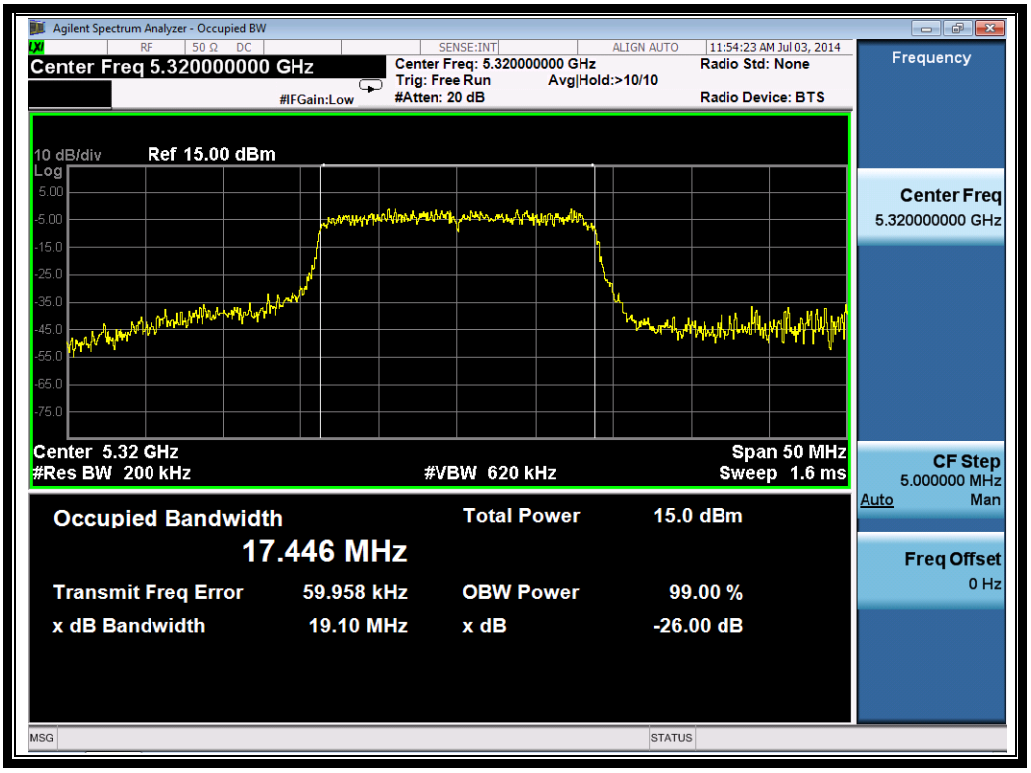
(Channel 48: 5240MHz @ 802.11n-20MHz)



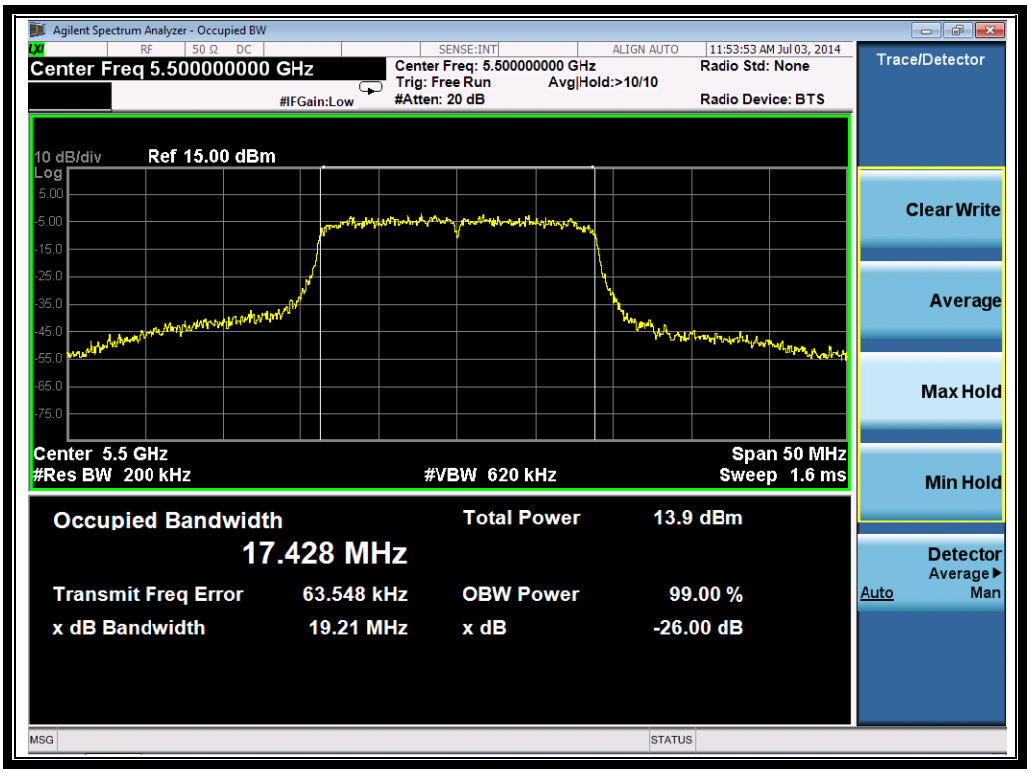
(Channel 52: 5260MHz @ 802.11n-20MHz)



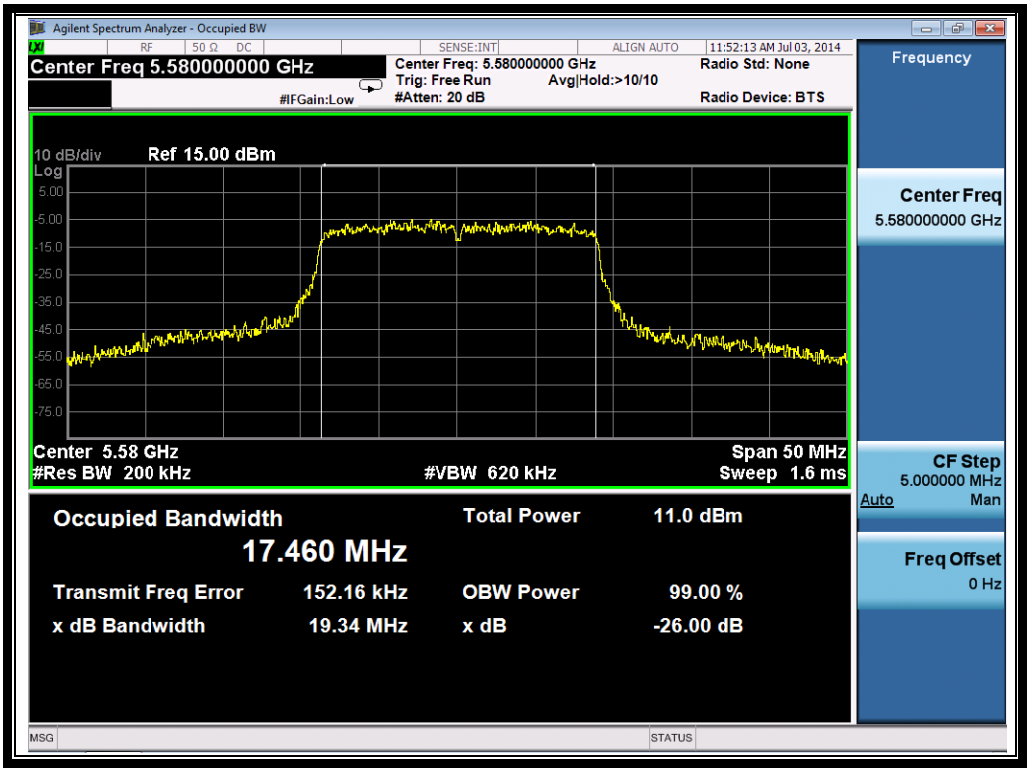
(Channel 60: 5300 MHz @ 802.11n-20MHz)



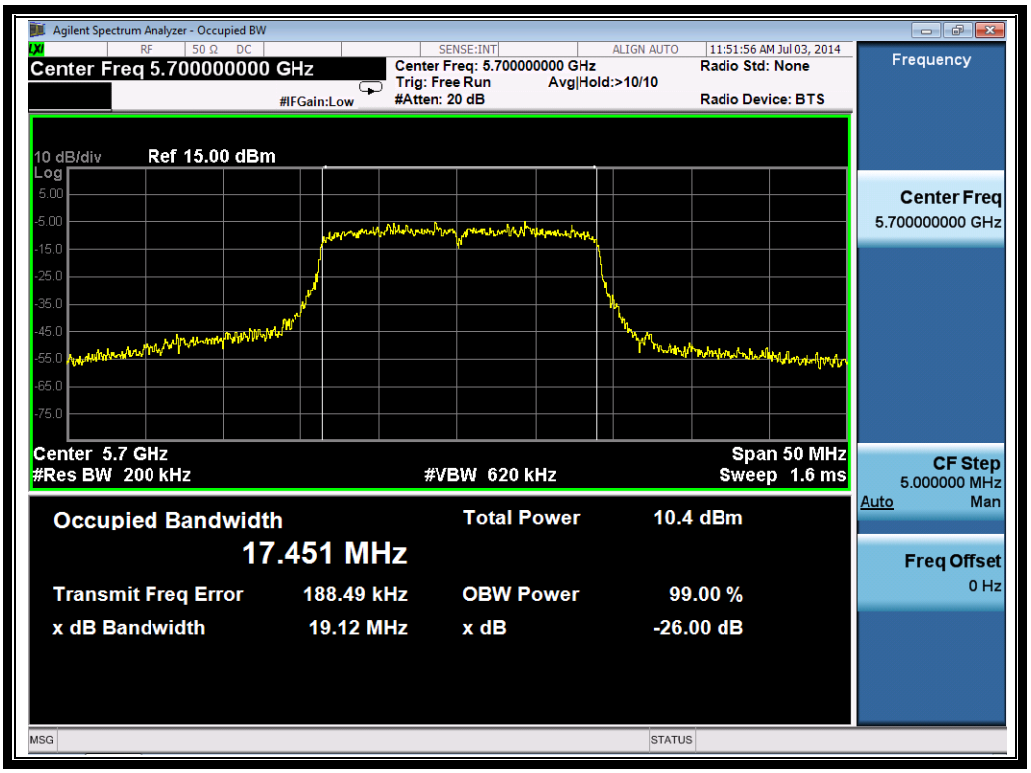
(Channel 64: 5320MHz @ 802.11n-20MHz)



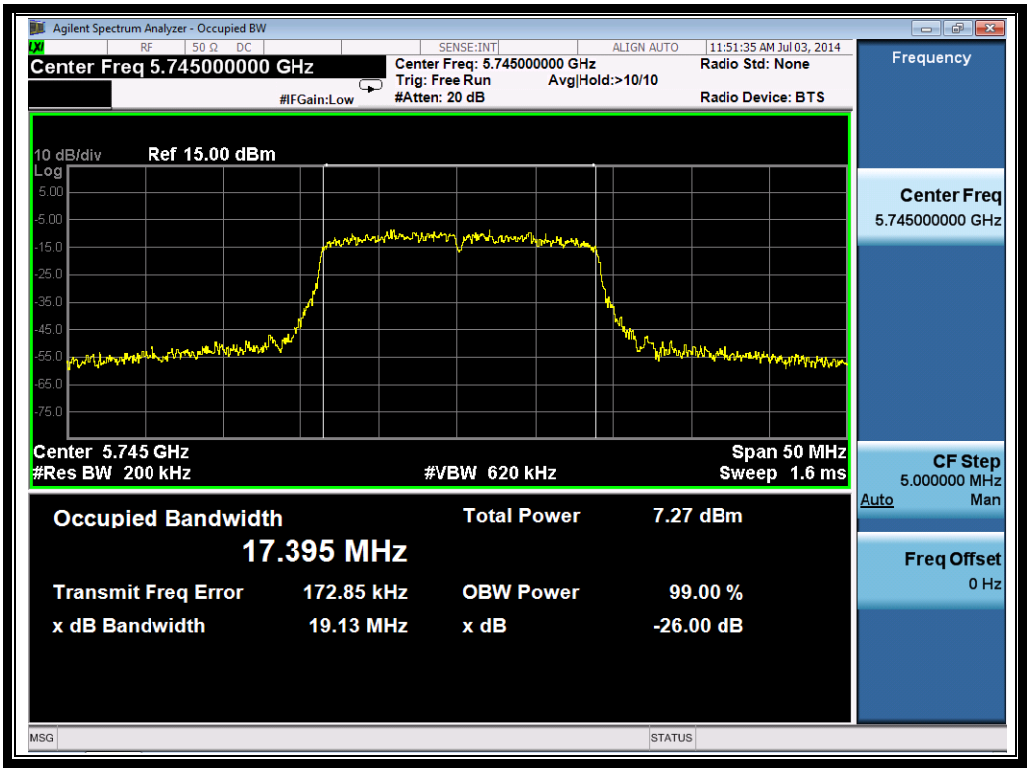
(Channel 100: 5500MHz @ 802.11n-20MHz)



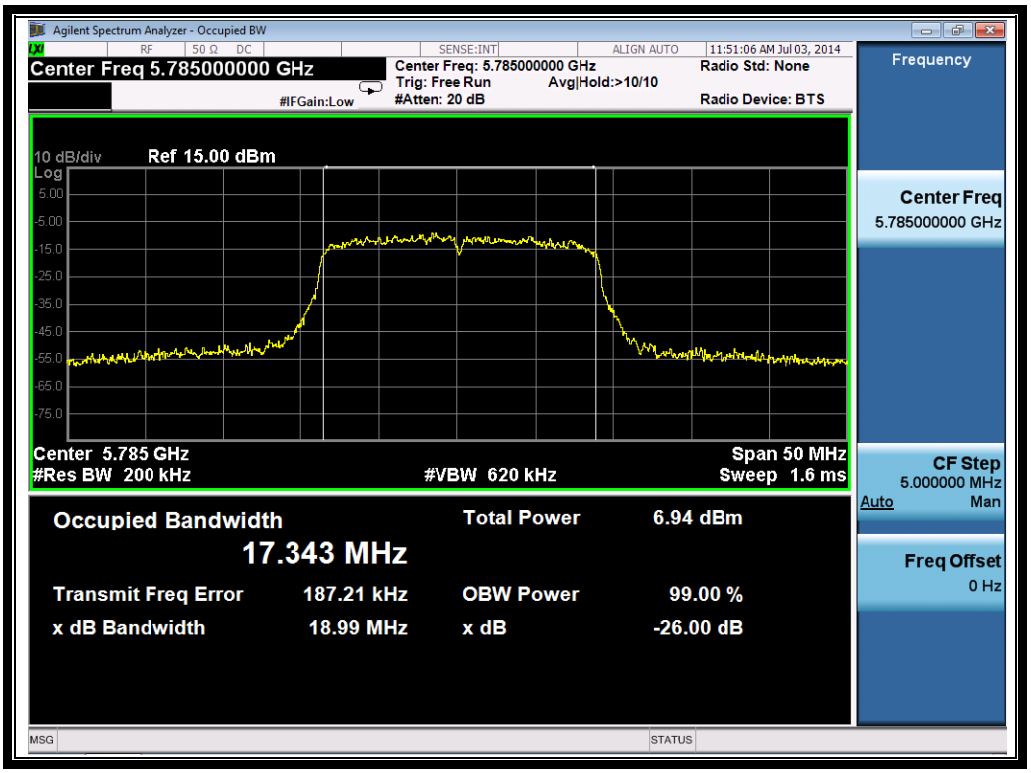
(Channel 116: 5580 MHz @ 802.11n-20MHz)



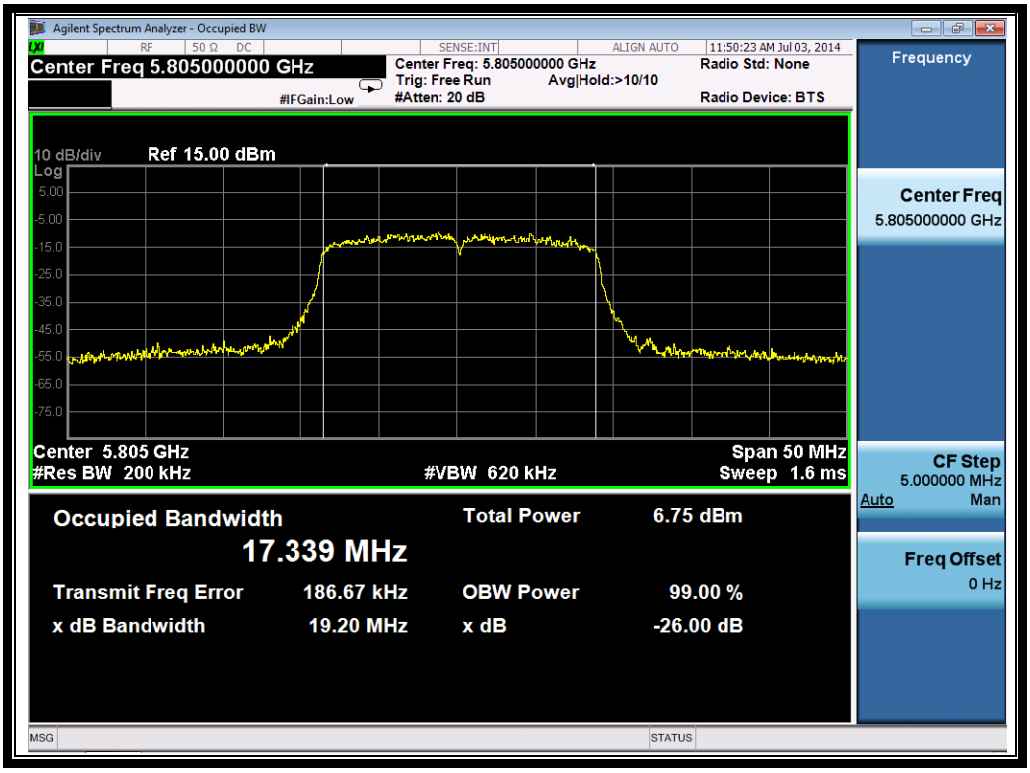
(Channel 140: 5700MHz @ 802.11n-20MHz)



(Channel 149: 5745MHz @ 802.11n-20MHz)



(Channel 157: 5785 MHz @ 802.11n-20MHz)



(Channel 161: 5805MHz @ 802.11n-20MHz)

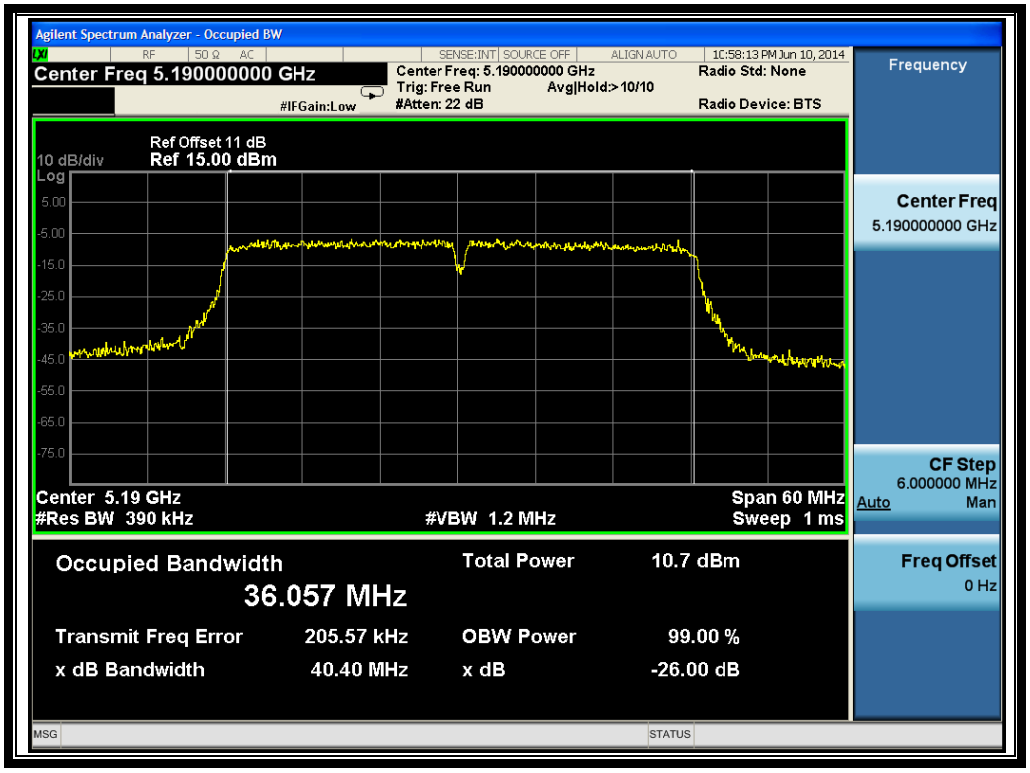
2.2.3.3. 802.11n-40MHz Test mode

ANT 3

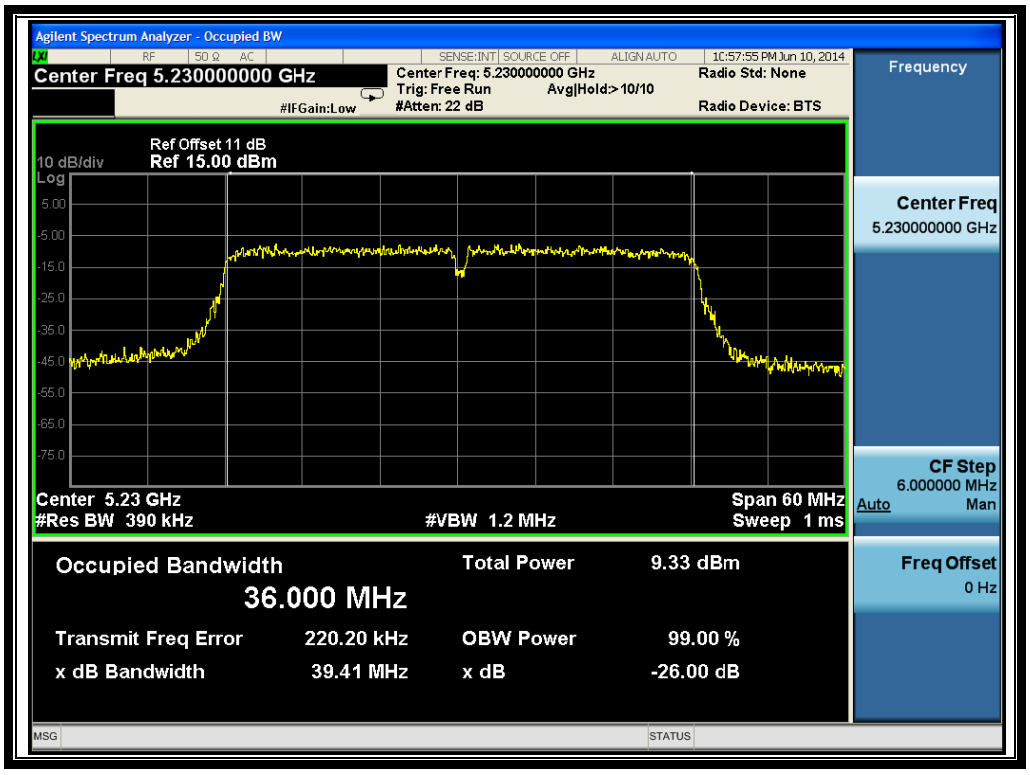
A. Test Verdict:

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
38	5190	40.40
46	5230	39.41
54	5270	39.59
62	5310	40.01
102	5510	39.87
110	5550	39.62
134	5670	39.76
151	5755	39.53
159	5795	39.53

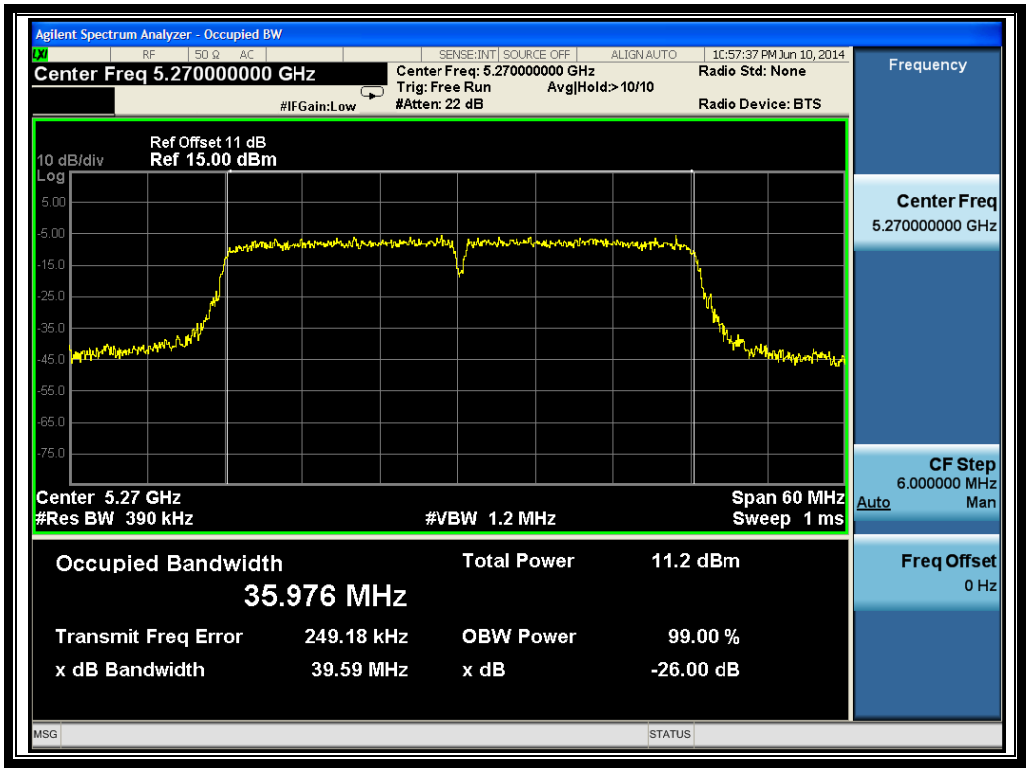
B. Test Plots



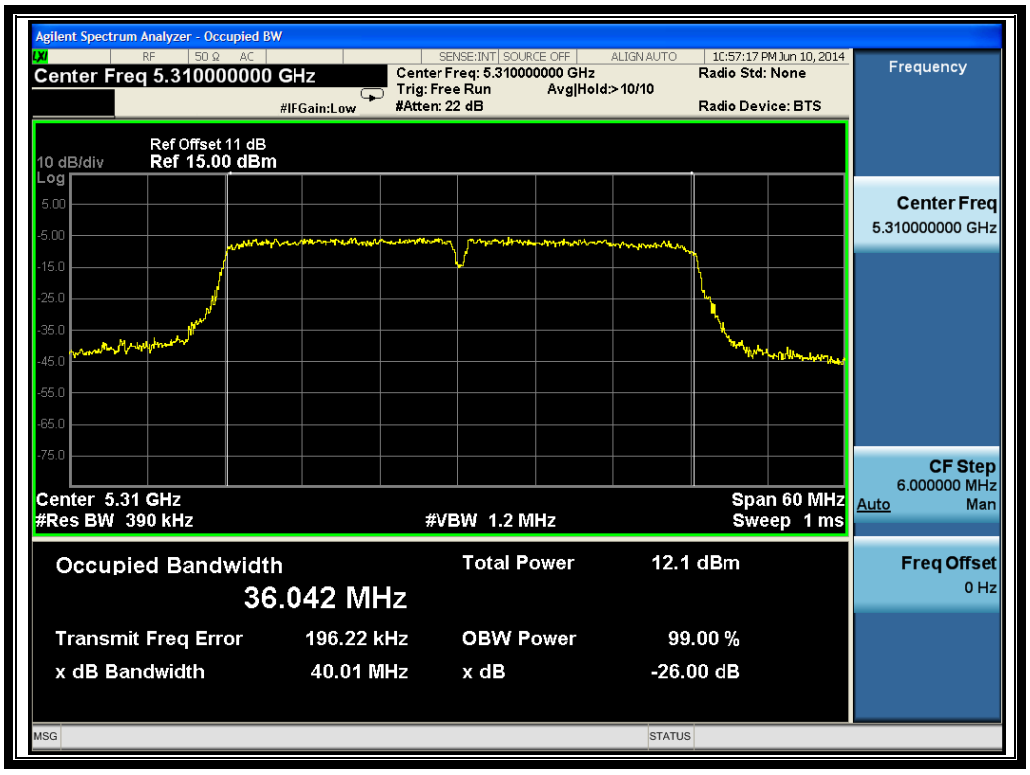
(Channel 38: 5190MHz @ 802.11n-40MHz)



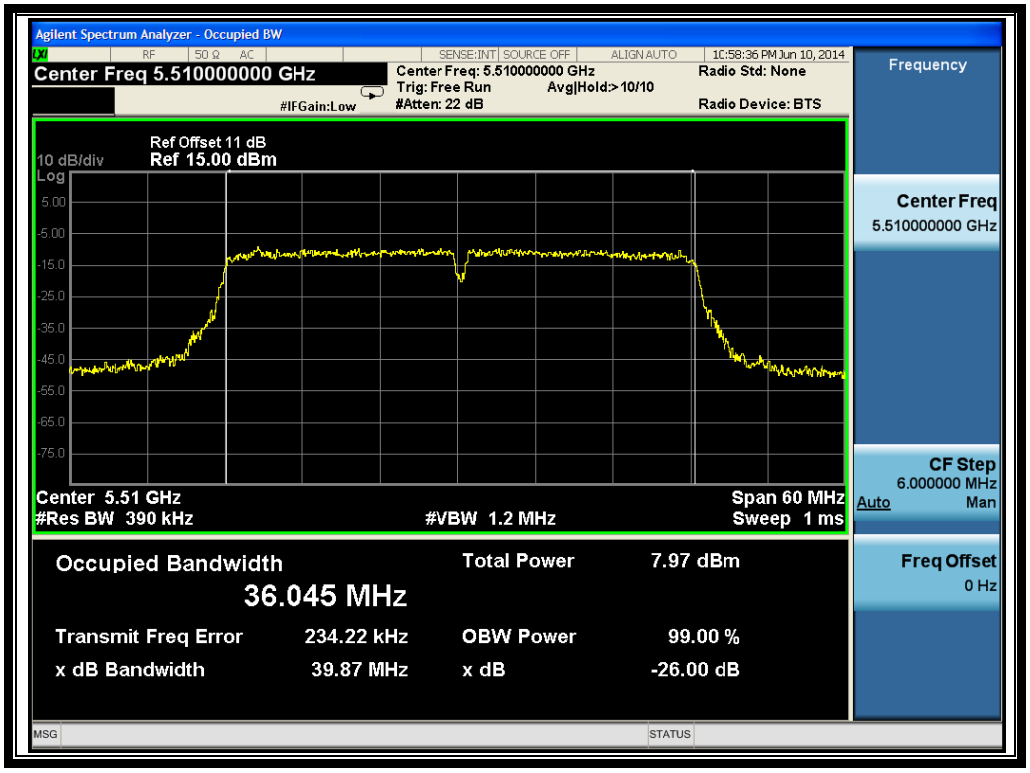
(Channel 46: 5230 MHz @ 802.11n-40MHz)



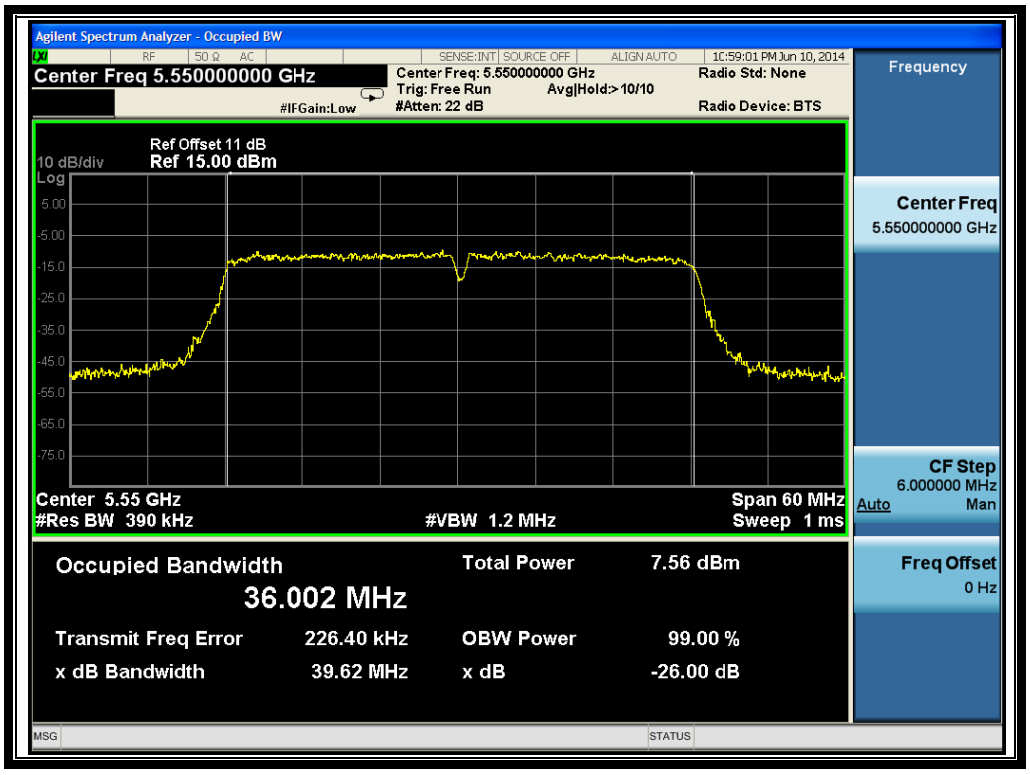
(Channel 54: 5270MHz @ 802.11n-40MHz)



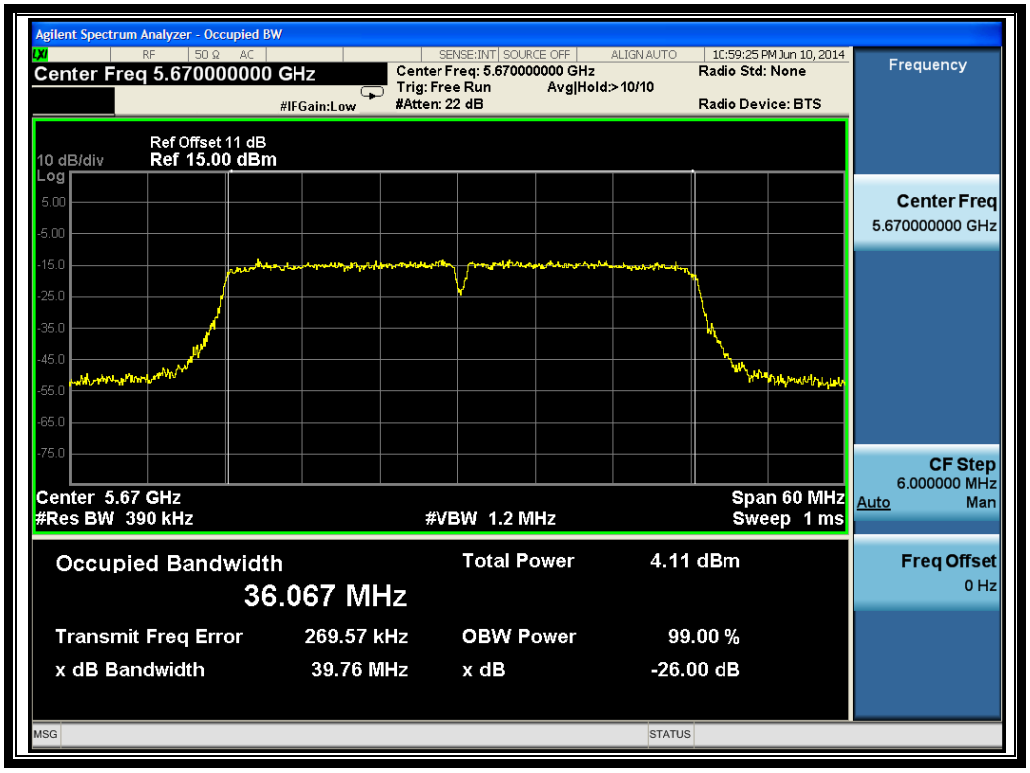
(Channel 62: 5310MHz @ 802.11n-40MHz)



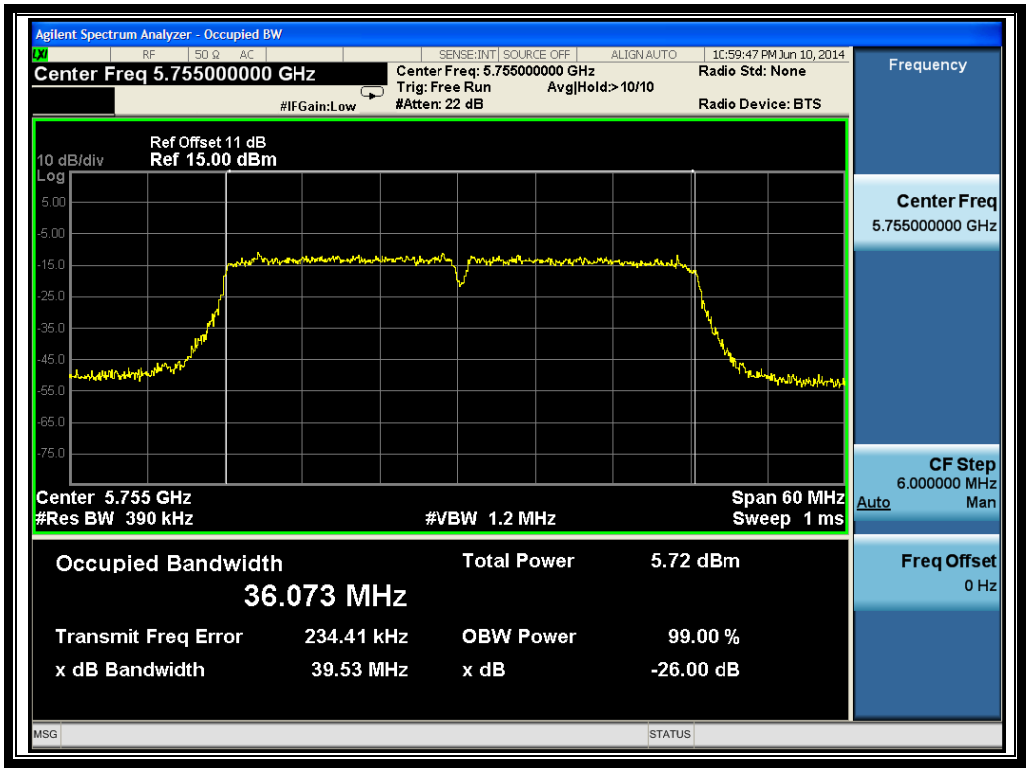
(Channel 102: 5510MHz @ 802.11n-40MHz)



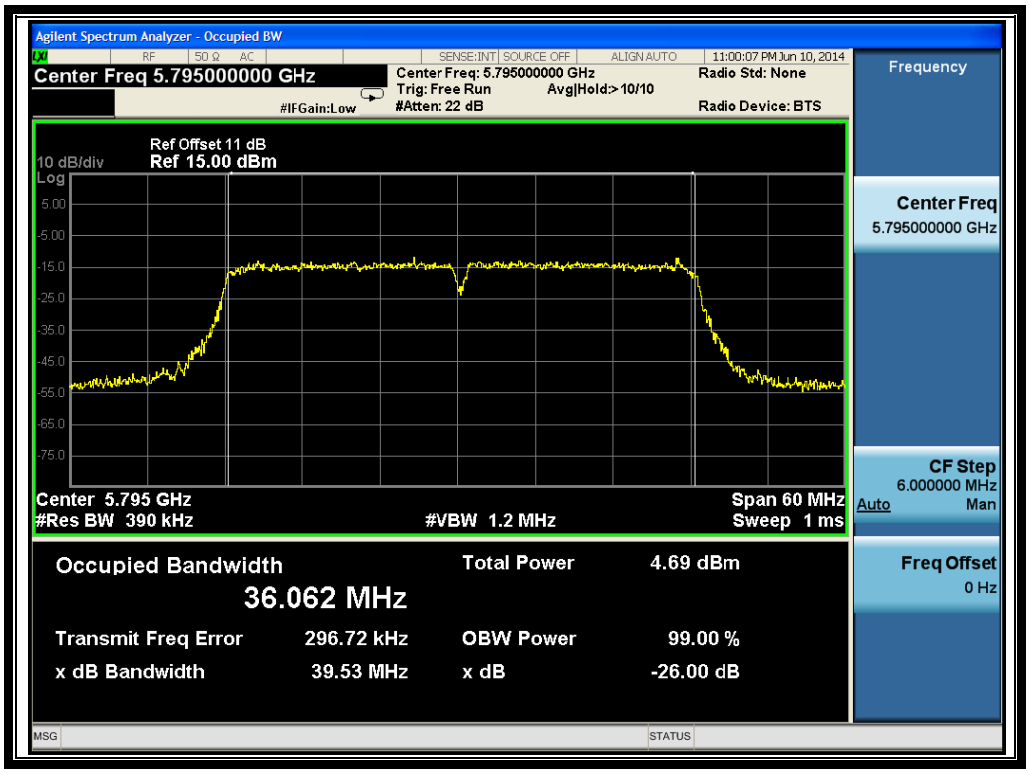
(Channel 110: 5550MHz @ 802.11n-40MHz)



(Channel 134: 5670MHz @ 802.11n-40MHz)



(Channel 151: 5755MHz @ 802.11n-40MHz)



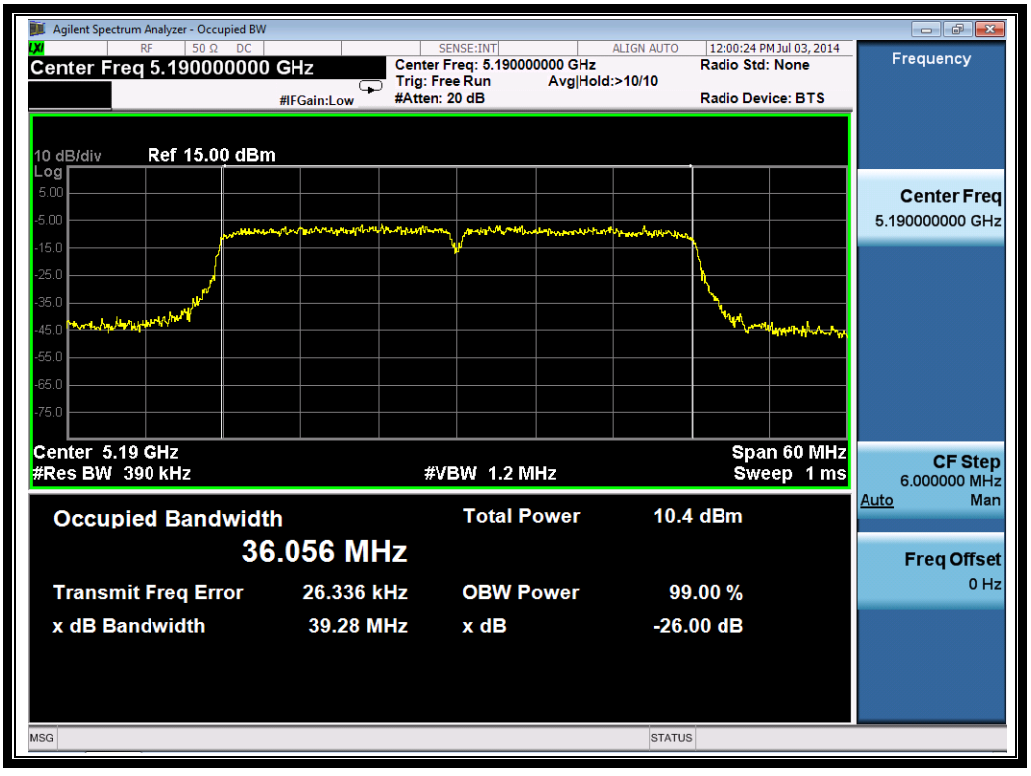
(Channel 134: 5795MHz @ 802.11n-40MHz)

ANT 4

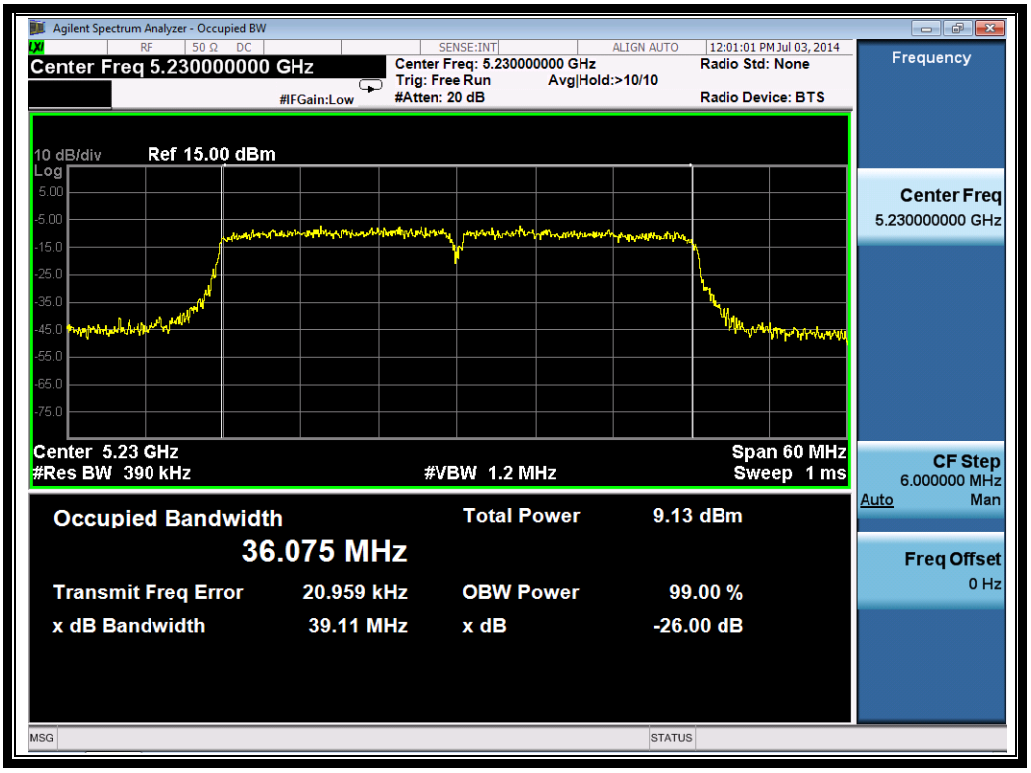
A. Test Verdict:

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
38	5190	39.28
46	5230	39.11
54	5270	39.45
62	5310	39.17
102	5510	39.27
110	5550	39.08
134	5670	39.11
151	5755	39.06
159	5795	39.03

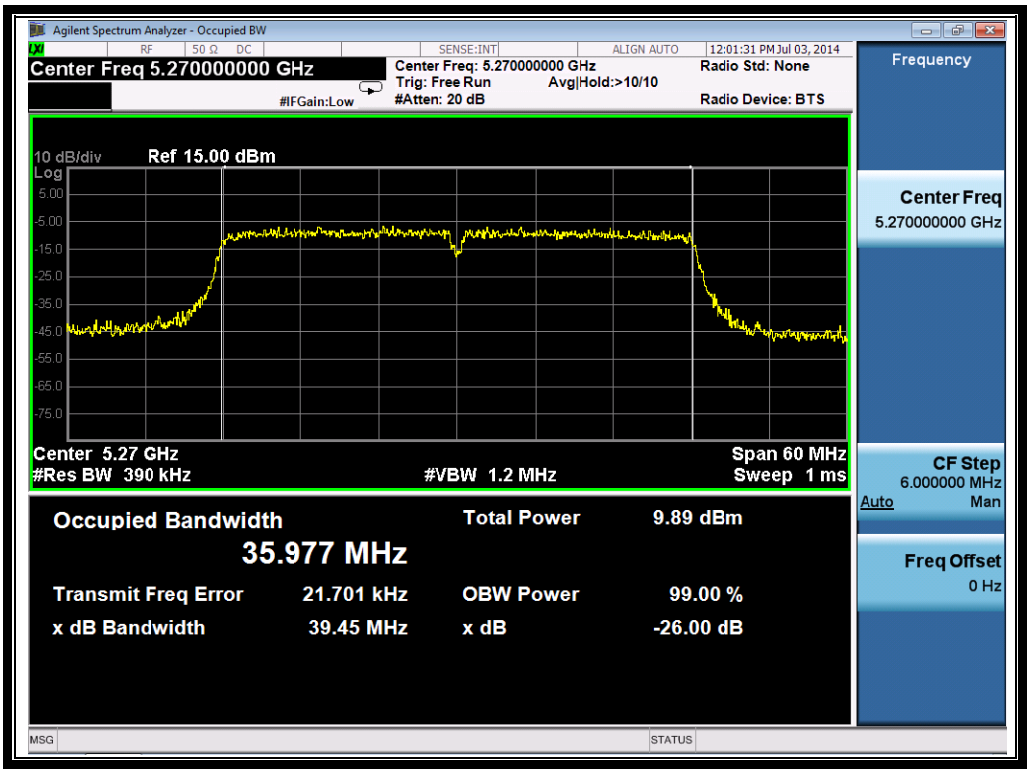
B. Test Plots



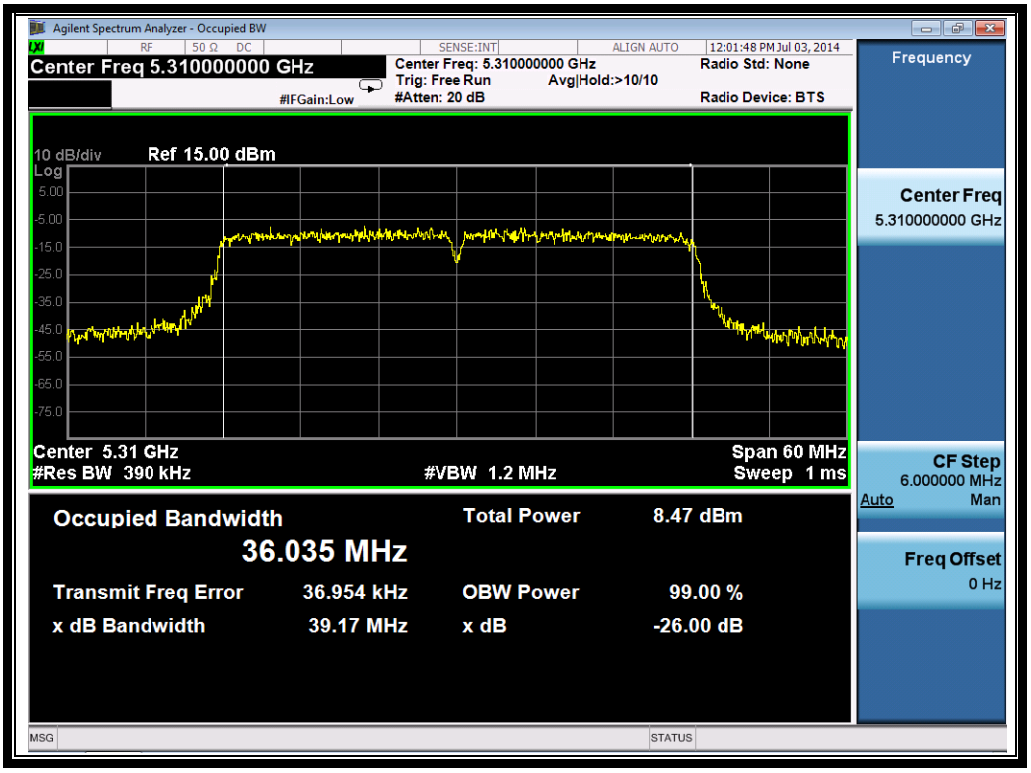
(Channel 38: 5190MHz @ 802.11n-40MHz)



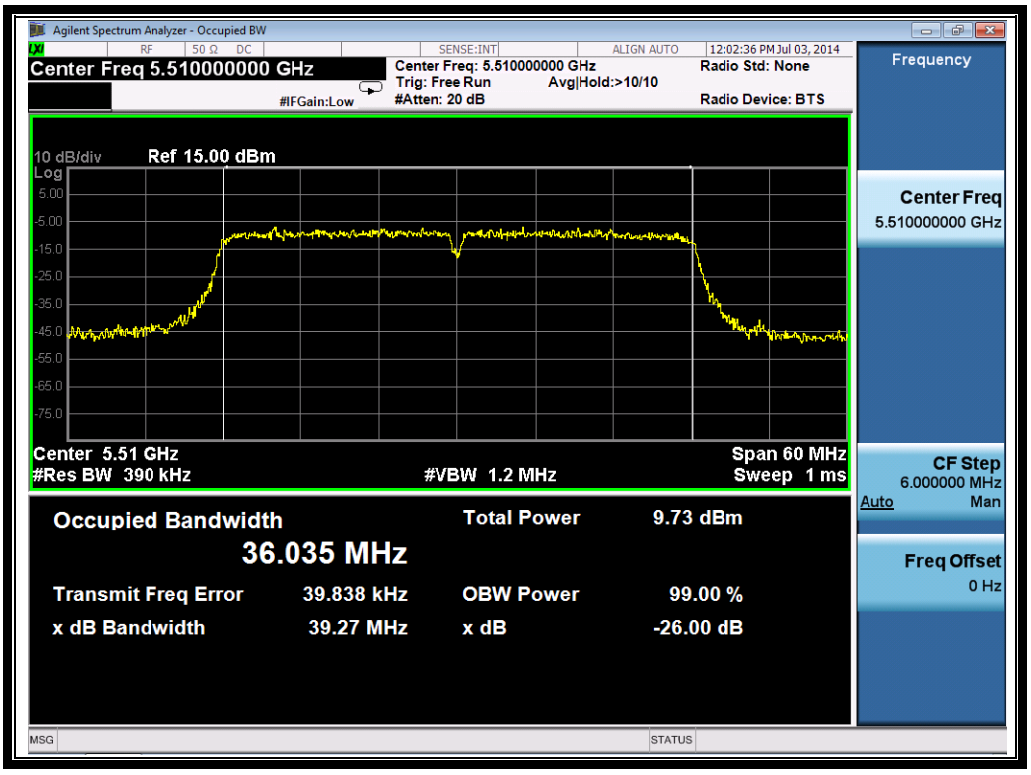
(Channel 46: 5230 MHz @ 802.11n-40MHz)



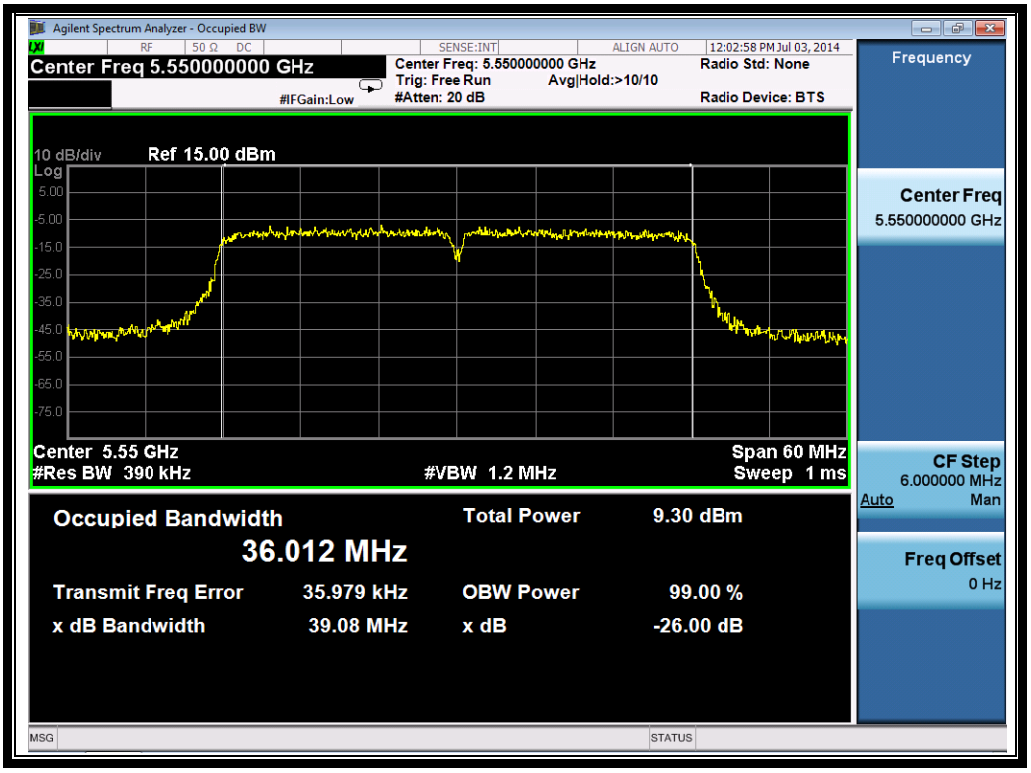
(Channel 54: 5270MHz @ 802.11n-40MHz)



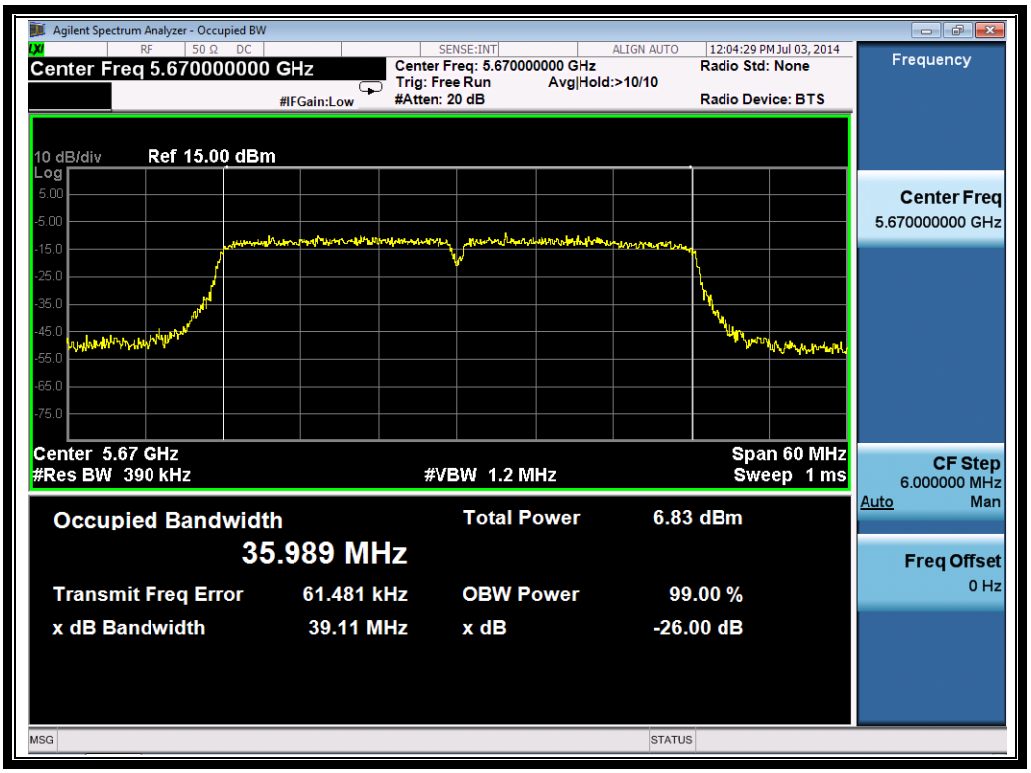
(Channel 62: 5310MHz @ 802.11n-40MHz)



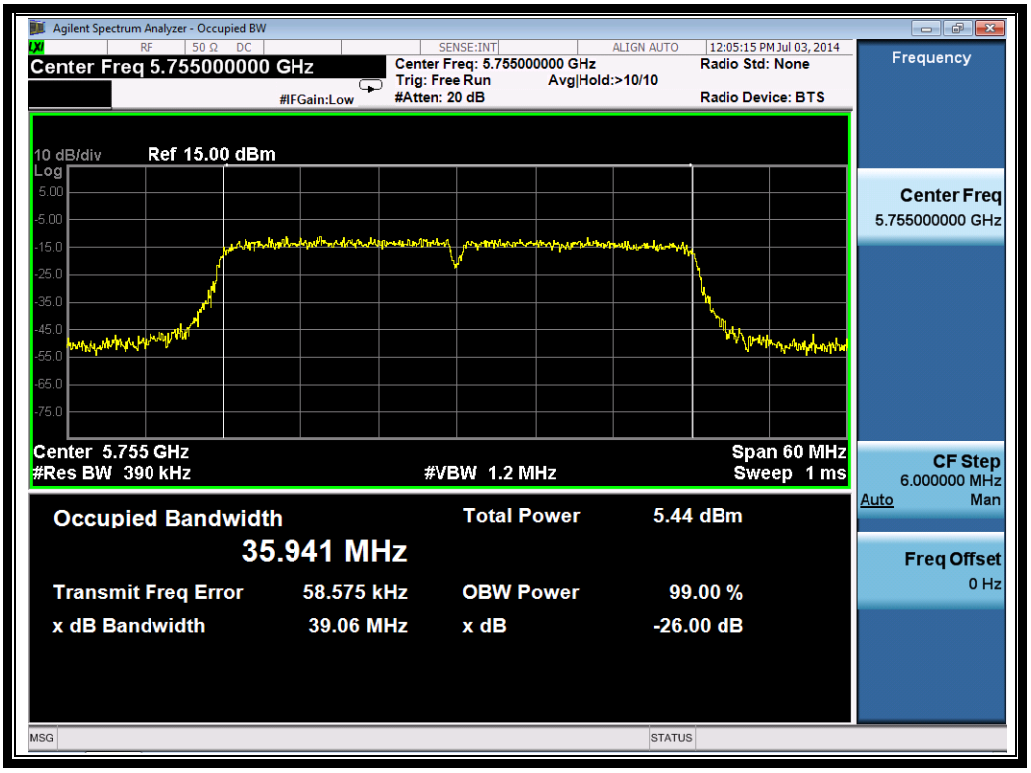
(Channel 102: 5510MHz @ 802.11n-40MHz)



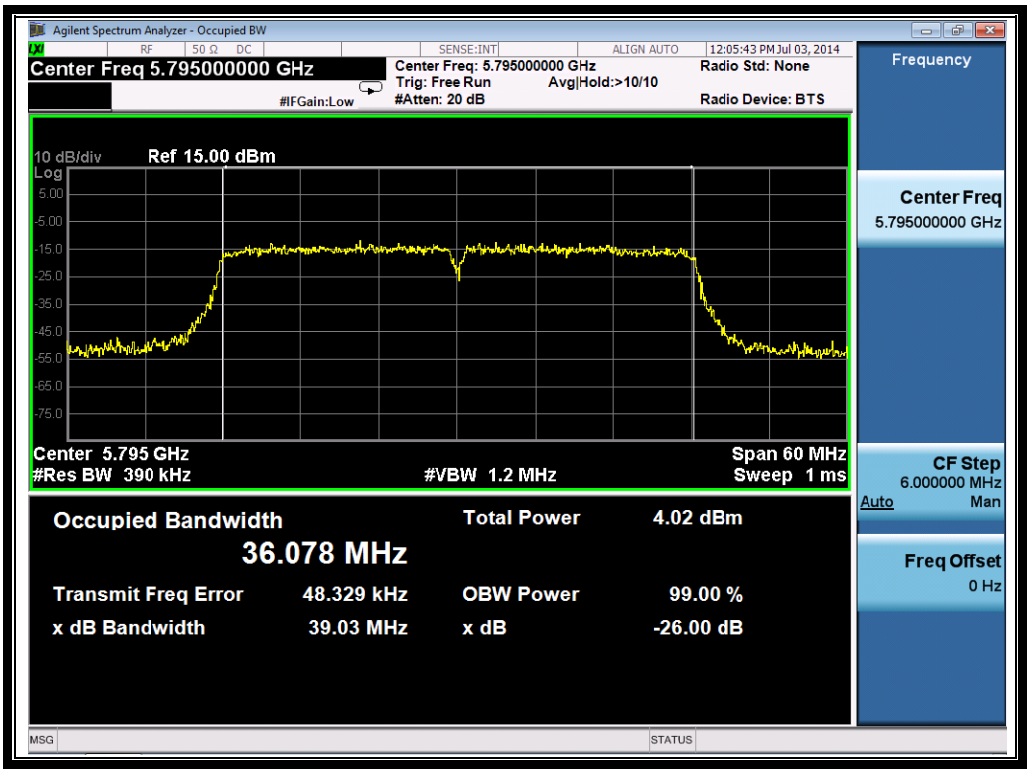
(Channel 110: 5550MHz @ 802.11n-40MHz)



(Channel 134: 5670MHz @ 802.11n-40MHz)



(Channel 151: 5755MHz @ 802.11n-40MHz)



(Channel 134: 5795MHz @ 802.11n-40MHz)

2.3. Maximum conducted output Power

2.3.1. Requirement

(1) For the band 5.15–5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 50mW or 4dBm + 10logB, where B is the 26dB emission bandwidth in MHz.

(2) For the 5.25–5.35 GHz and 5.47–5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250mW or 11dBm + 10log B, where B is the 26 dB emission bandwidth in megahertz.

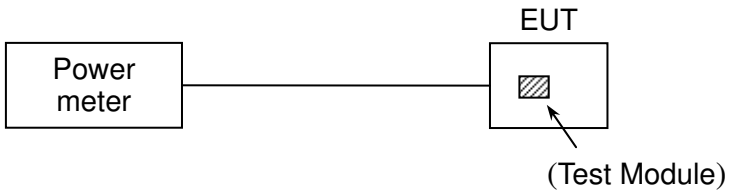
(3) For the band 5.725–5.825 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 1 W or 17dBm+ 10logB, where B is the 26dB emission bandwidth in MHz.
If transmitting antennas of directional gain greater than 6dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

2.3.2. Test Description

Section E) 3) of KDB 789033 defines a methodology using an RF average power meter.

The measured output power was calculated by the reading of the Power Meter.

A. Test Setup:



The EUT (Equipment under the test) which is powered by the Battery is coupled to the Power Meter; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading, all test result in power meter.

B. Equipments List:

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
EPM Series Power Meter	Agilent	E4418B	GB43318055	2014.02.26	2015.02.25
Power Sensor	Agilent	8482A	MY41091706	2014.02.26	2015.02.25

2.3.3. Test Result

2.3.3.1. 802.11a Test mode

ANT 3

Channel	Frequency (MHz)	Measured Output Power dBm	Limit dBm	Verdict
36	5180	11.24	17	PASS
44	5220	10.23		
48	5240	10.02		
52	5260	11.06	24	
60	5300	11.03		
64	5320	10.61		
100	5500	10.71		
116	5580	9.57		
140	5700	10.62		
149	5745	9.81	30	
157	5785	8.99		
161	5805	9.22		

ANT 4

Channel	Frequency (MHz)	Measured Output Power dBm	Limit dBm	Verdict
36	5180	11.01	17	PASS
44	5220	9.87		
48	5240	9.62		
52	5260	10.53	24	
60	5300	9.98		
64	5320	10.11		
100	5500	10.53		
116	5580	9.10		
140	5700	9.98		
149	5745	8.90	30	
157	5785	8.75		
161	5805	9.18		

2.3.3.2. 802.11n-20MHz Test mode

ANT 3

Channel	Frequency (MHz)	Measured Output Power dBm	Limit dBm	Verdict
36	5180	11.63	17	PASS
44	5220	10.23		
48	5240	9.76		
52	5260	10.62	24	
60	5300	10.68		
64	5320	10.24		
100	5500	10.70		
116	5580	9.66		
140	5700	10.44		
149	5745	9.24	30	
157	5785	8.19		
161	5805	8.41		

ANT 4

Channel	Frequency (MHz)	Measured Output Power dBm	Limit dBm	Verdict
36	5180	11.57	17	PASS
44	5220	10.31		
48	5240	9.57		
52	5260	9.98	24	
60	5300	10.04		
64	5320	9.86		
100	5500	9.72		
116	5580	9.34		
140	5700	10.01		
149	5745	9.01	30	
157	5785	7.89		
161	5805	8.02		

ANT 3 + ANT 4

Channel	Frequency (MHz)	Measured Output Power dBm	Limit dBm	Verdict
36	5180	14.61	17	PASS
44	5220	13.28		
48	5240	12.68		
52	5260	13.32	24	
60	5300	13.38		
64	5320	13.06		
100	5500	13.25		
116	5580	12.51		
140	5700	13.24		
149	5745	12.14	30	
157	5785	11.05		
161	5805	11.23		

2.3.3.3. 802.11n-40MHz Test mode

ANT 3

Channel	Frequency (MHz)	Measured Output Power dBm	Limit dBm	Verdict
38	5190	10.07	17	PASS
46	5230	9.20		
54	5270	10.10	24	
62	5310	9.94		
102	5510	10.14		
110	5550	9.97		
134	5670	6.80		
151	5755	8.63	30	
159	5795	7.93		

ANT 4

Channel	Frequency (MHz)	Measured Output Power dBm	Limit dBm	Verdict
38	5190	9.93	17	PASS
46	5230	9.25		
54	5270	10.06	24	
62	5310	9.54		
102	5510	10.21		
110	5550	9.77		
134	5670	6.59		
151	5755	8.35	30	
159	5795	7.83		

ANT 3 + ANT 4

Channel	Frequency (MHz)	Measured Output Power dBm	Limit dBm	Verdict
38	5190	13.01	17	PASS
46	5230	12.24		
54	5270	13.09	24	
62	5310	12.75		
102	5510	13.19		
110	5550	12.88		
134	5670	9.71		
151	5755	11.50	30	
159	5795	10.89		

Note: Each antenna port was measured individually, and the aggregated power was summed mathematically.

Remark:

1) The MIMO test requirement, RF conducted output power shall measure each transmitter chain. And after obtain each individual transmitter chain power, then sum the output power by using the following formula;

((dBm/Chain 1)/10^Log)+ (dBm/Chain 2)/10^Log))+ (dBm/Chain N)/10^Log))= Combined output power in mW.

2.4. Peak Power spectral density

2.4.1. Requirement

(1)For the band 5.15–5.25 GHz, the peak power spectral density shall not exceed 4 dBm in any 1–MHz band.

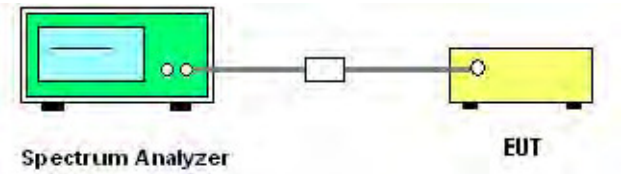
(2) For the 5.25–5.35 GHz and 5.47–5.725GHz bands, the peak power spectral density shall not exceed 11dBm in any 1 megahertz band.

(3) For the band 5.725–5.825 GHz, the peak power spectral density shall not exceed 17dBm in any 1–MHz band.

If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

2.4.2. Test Description

A. Test Set:



The EUT which is powered by the Battery, is coupled to the Spectrum Analyzer; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading.

B. Test Procedure

KDB 789033 Section F) Peak power spectral density(PPSD) Method SA-1 was used in order to prove compliance

1) Set span to encompass the entire 26-dB emission bandwidth

2) Set RBW = 1 MHz. Set VBW ≥ 3 MHz.

3) Number of points in sweep ≥ 2 Span / RBW. Sweep time = auto.

4) Detector = RMS (i.e., power averaging)

5) Trace average at least 100 traces in power averaging (i.e., RMS) mode

6) Record the max value

C. Equipments List:

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
EXA Signal Analzyer	Agilent	N9010A	MY51440152	2014.02.26	2015.02.25

2.4.2.1. Test Result

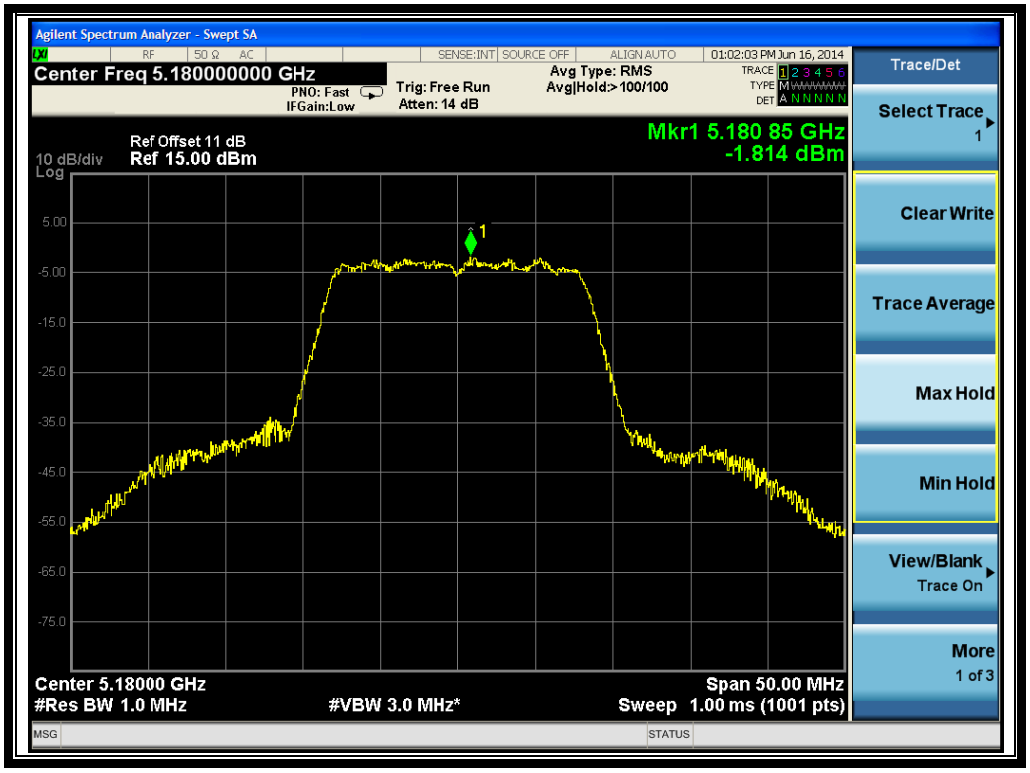
2.4.2.2. 802.11a Test mode

ANT 3

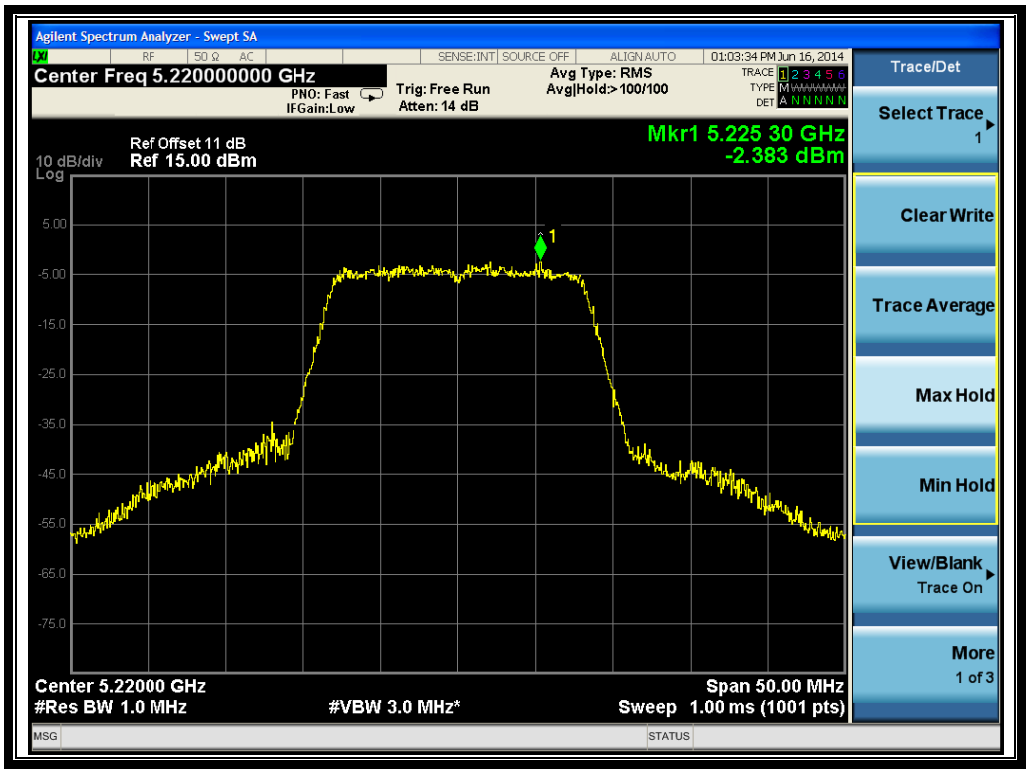
A. Test Verdict:

Channel	Frequency (MHz)	Measured PPSD (dBm)	Limit (dBm)	Verdict
36	5180	-1.814	4	PASS
44	5220	-2.383		
48	5240	-2.526		
52	5260	-1.789	11	
60	5300	-1.473		
64	5320	-1.965		
100	5500	-2.644		
116	5580	-3.224		
140	5700	-2.160		
149	5745	-3.771	17	
157	5785	-3.961		
161	5805	-3.940		

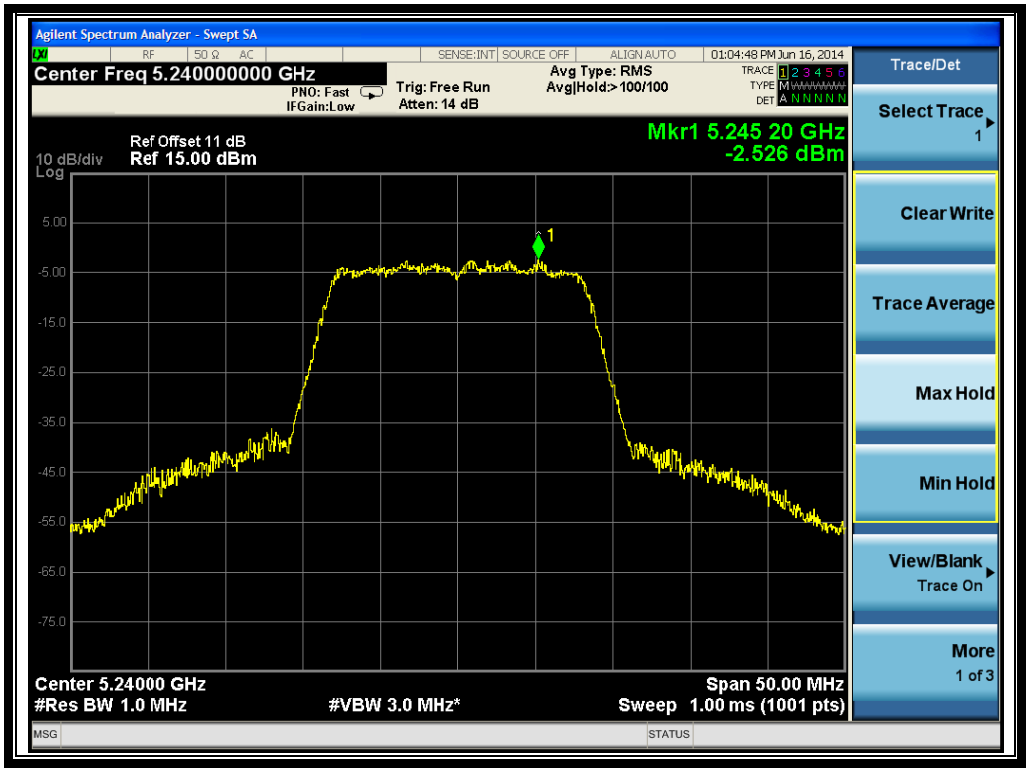
B. Test Plots



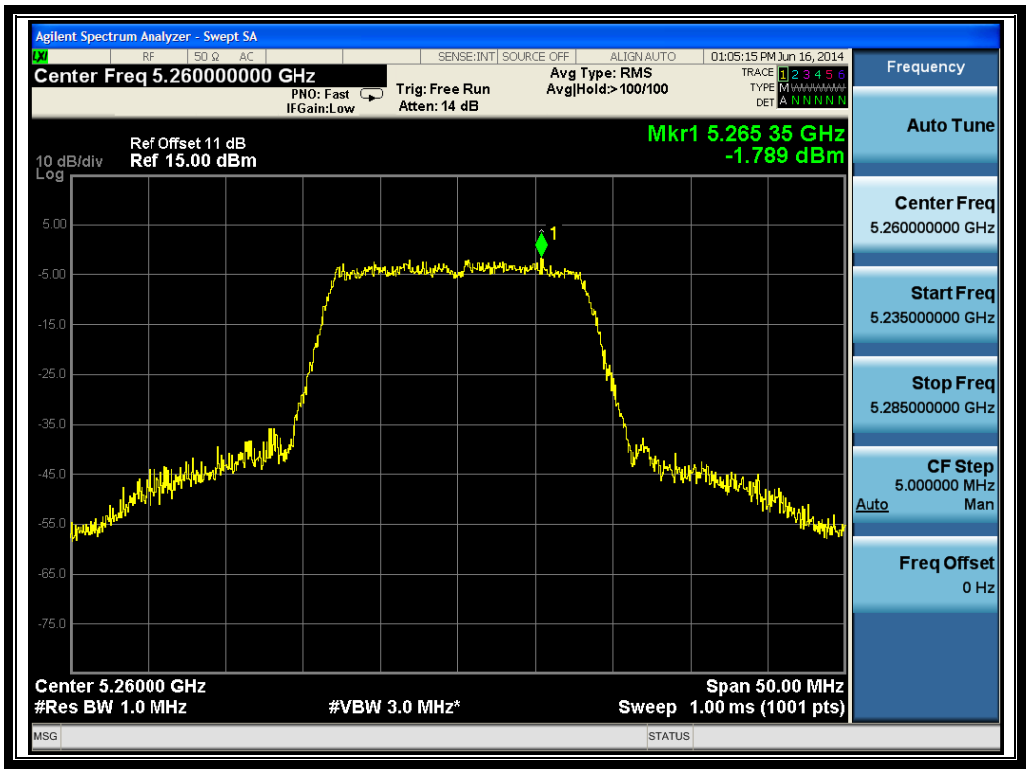
(Channel 36: 5180MHz @ 802.11a)



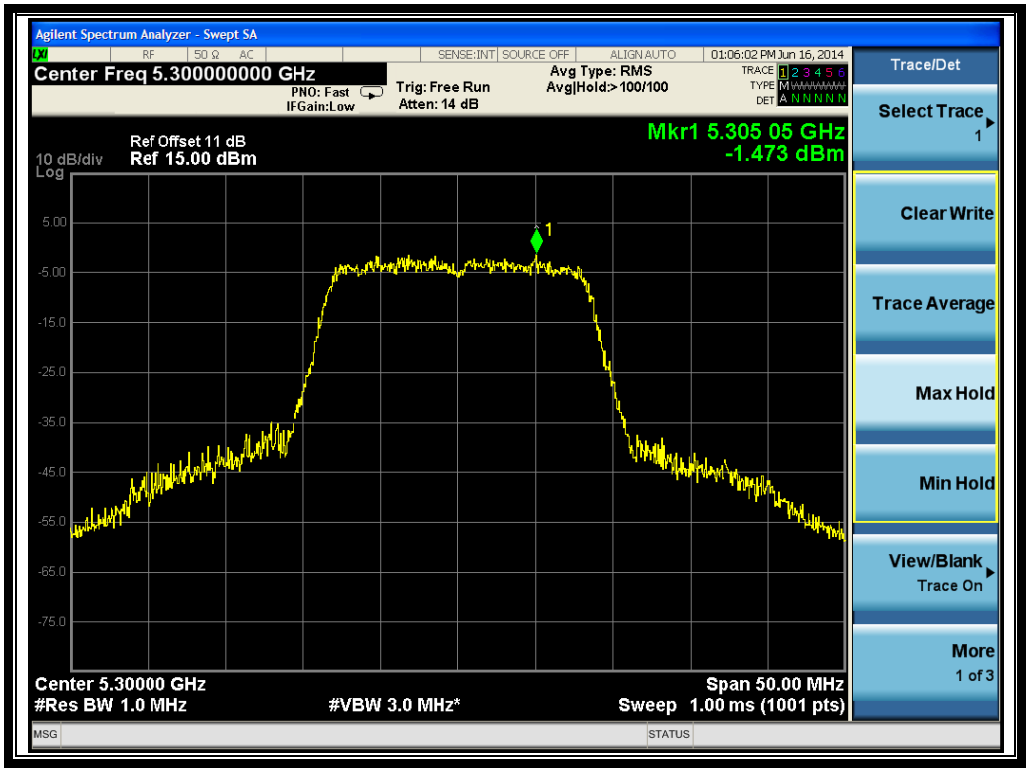
(Channel 44: 5220 MHz @ 802.11a)



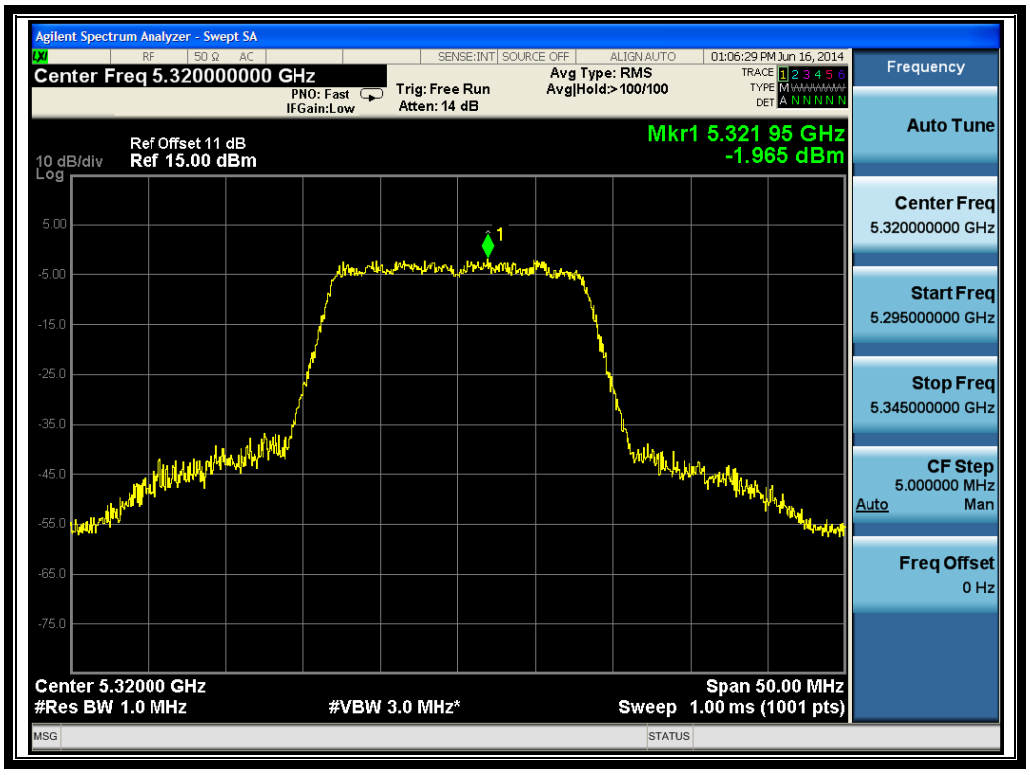
(Channel 48: 5240MHz @ 802.11a)



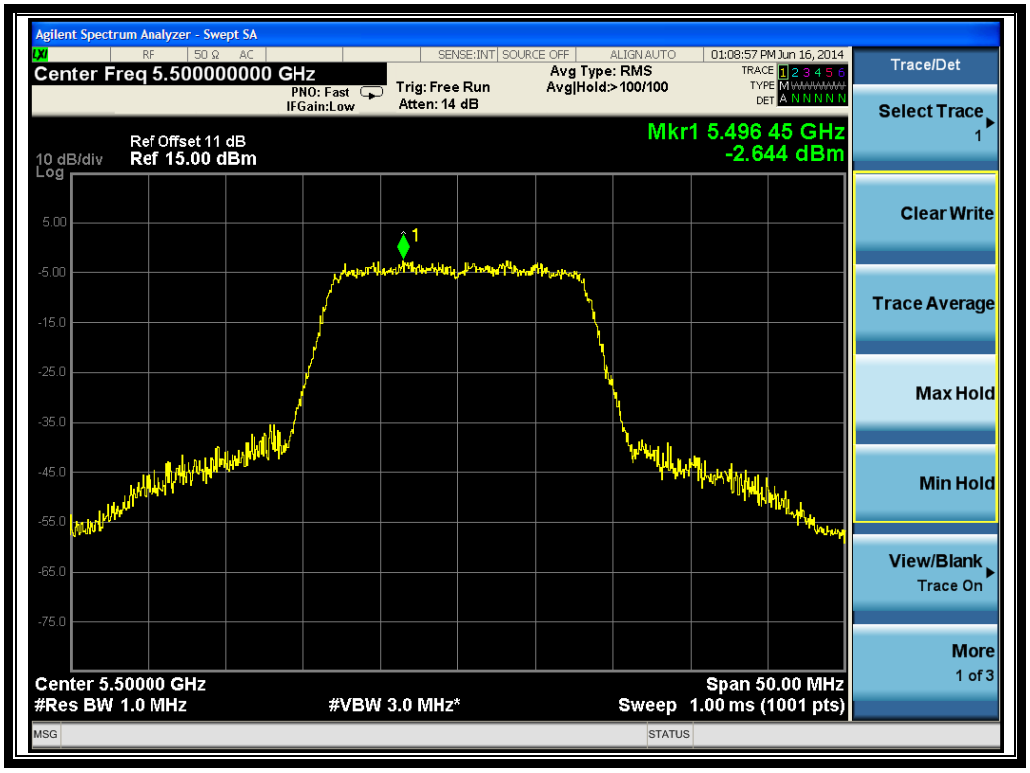
(Channel 52: 5260MHz @ 802.11a)



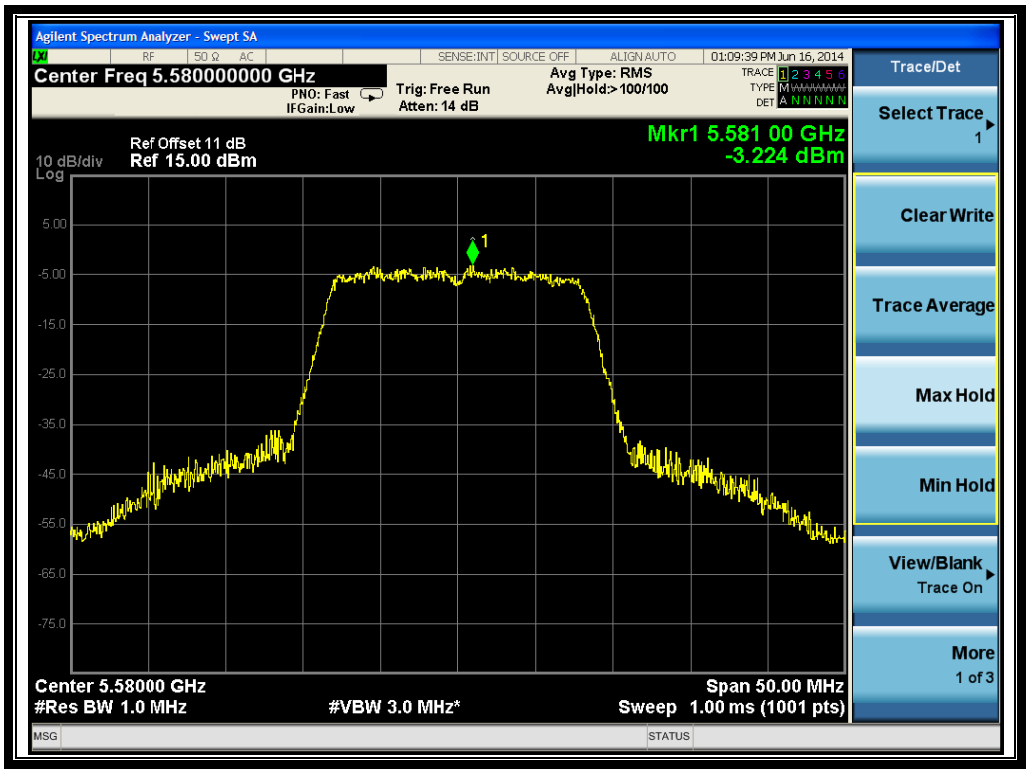
(Channel 60: 5300 MHz @ 802.11a)



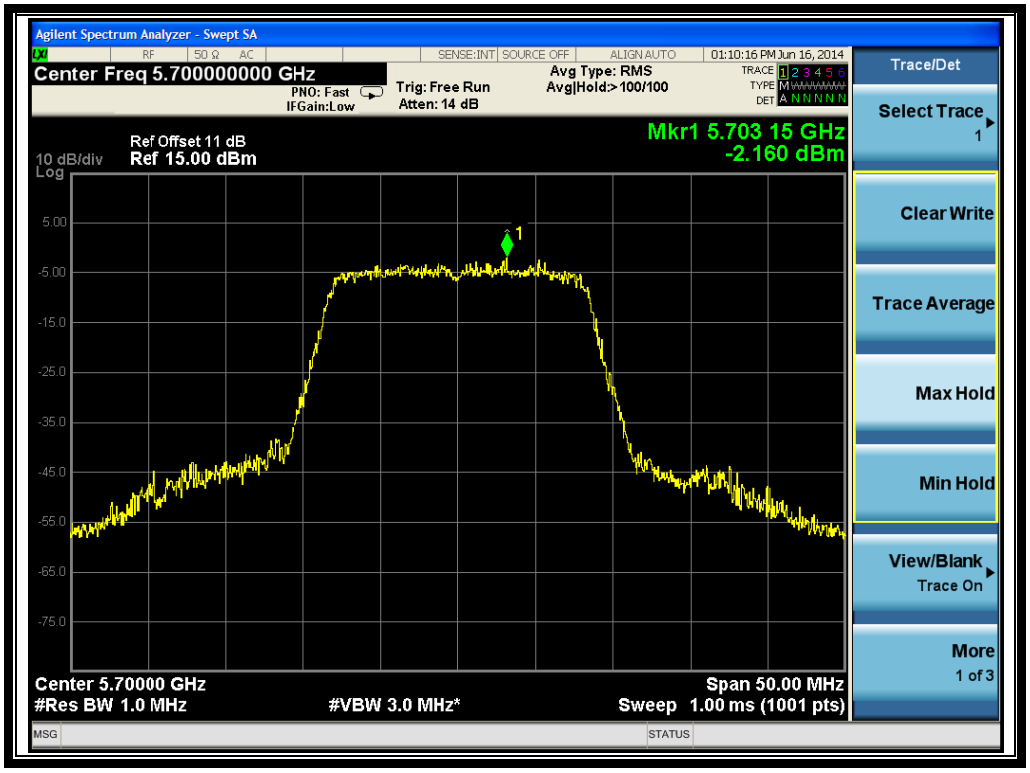
(Channel 64: 5320MHz @ 802.11a)



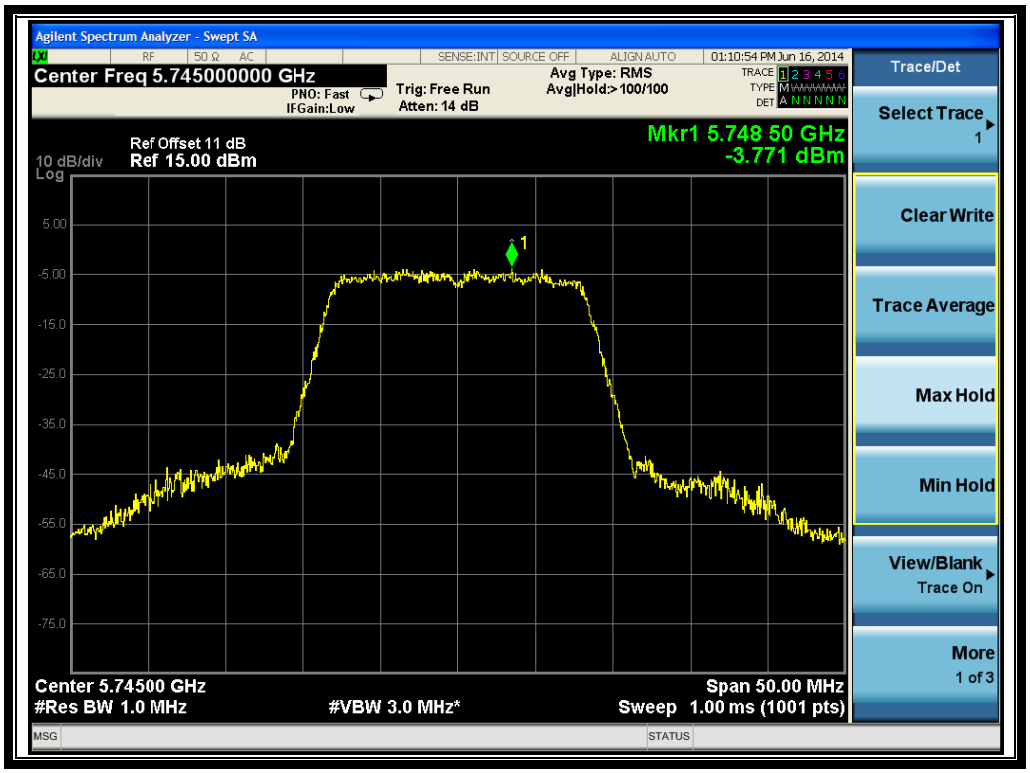
(Channel 100: 5500MHz @ 802.11a)



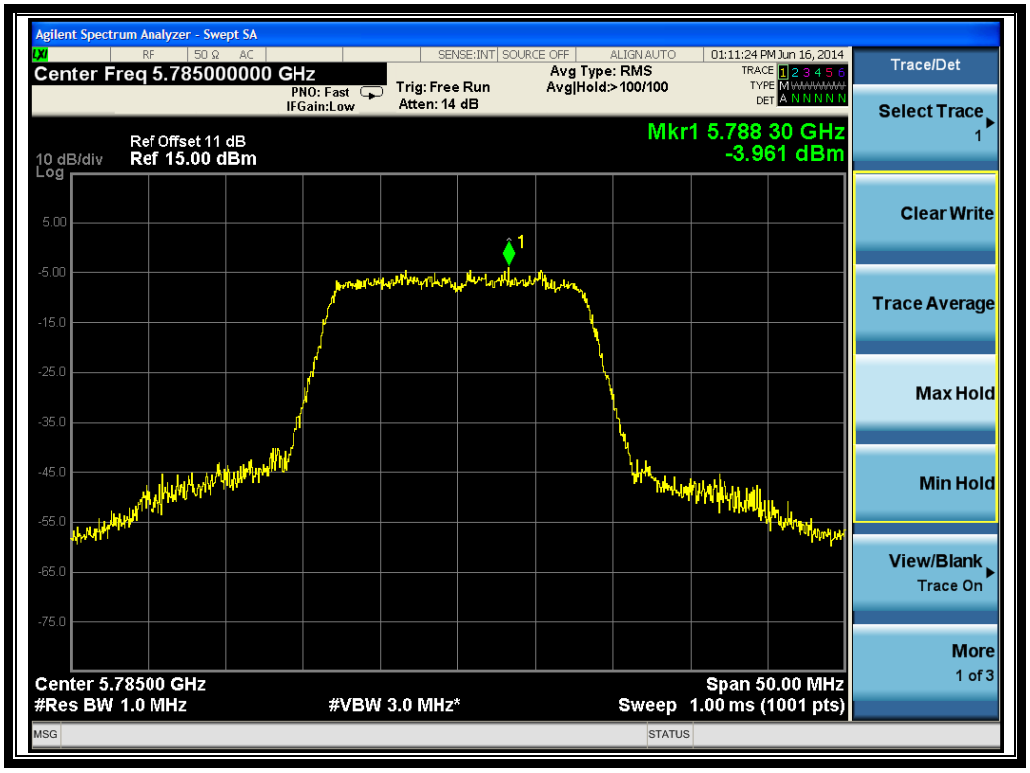
(Channel 116: 5580 MHz @ 802.11a)



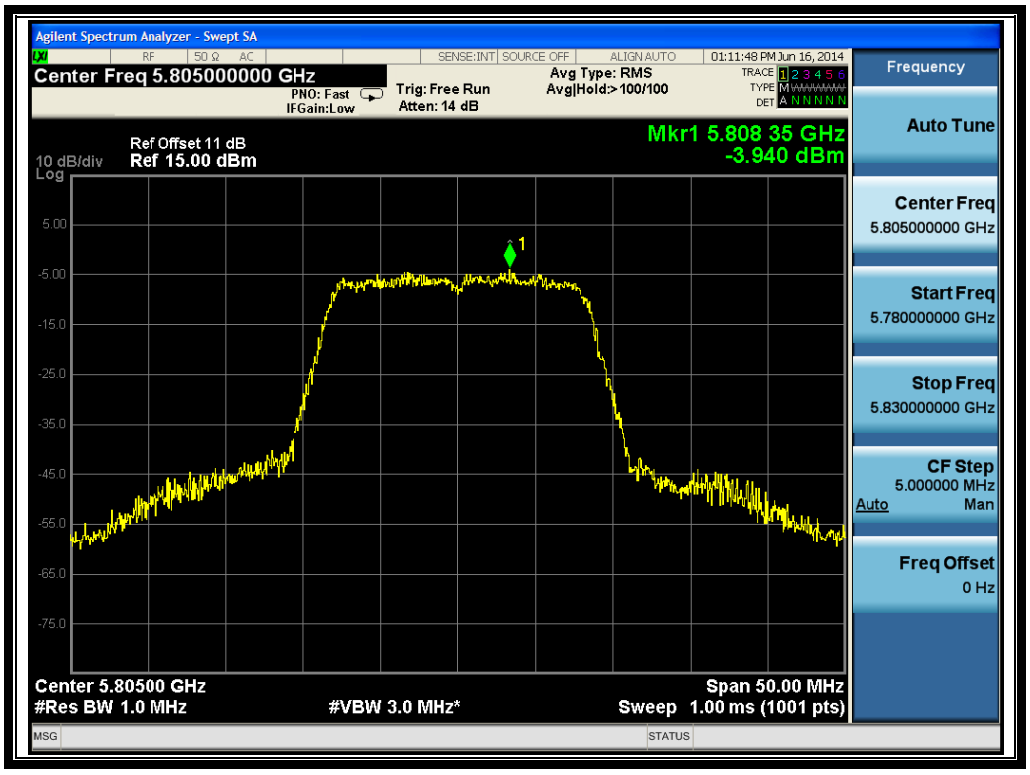
(Channel 140: 5700MHz @ 802.11a)



(Channel 149: 5745MHz @ 802.11a)



(Channel 157: 5785 MHz @ 802.11a)



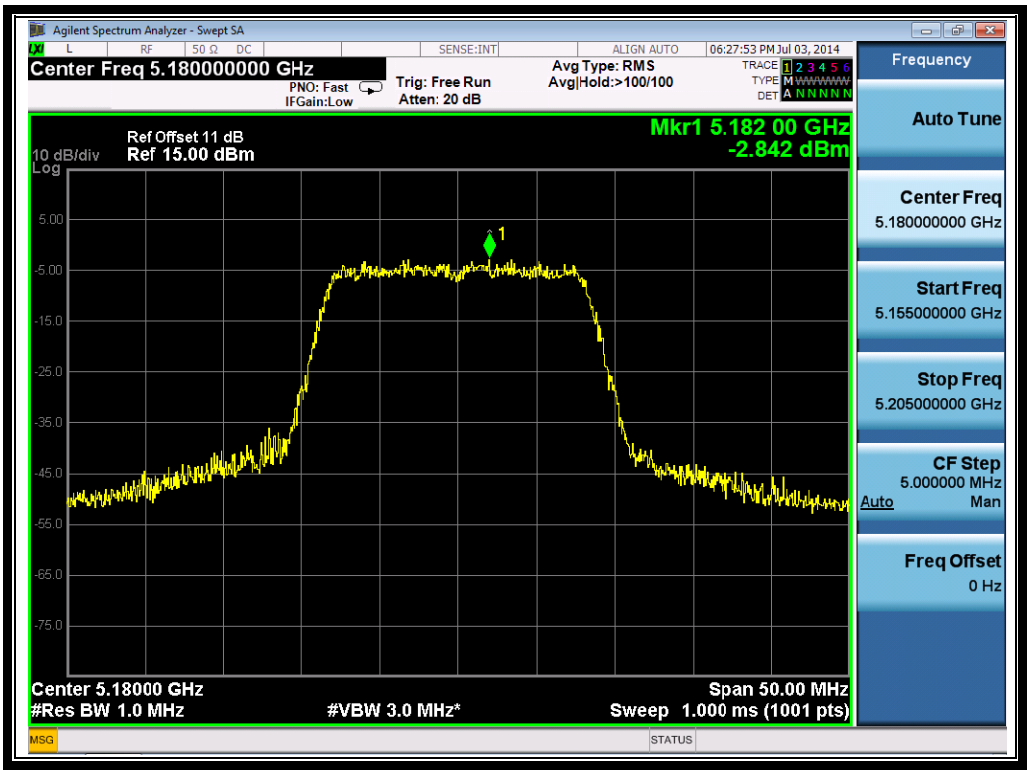
(Channel 161: 5805MHz @ 802.11a)

ANT 4

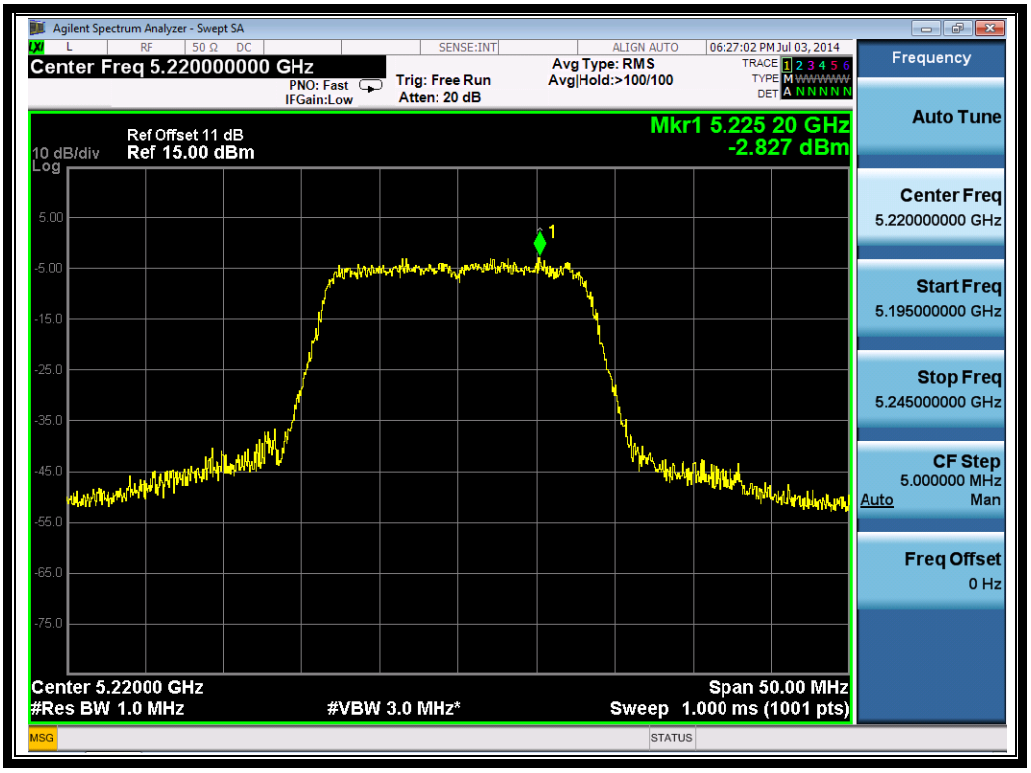
A. Test Verdict:

Channel	Frequency (MHz)	Measured PPSD (dBm)	Limit (dBm)	Verdict
36	5180	-2.842	4	PASS
44	5220	-2.827		
48	5240	-3.274		
52	5260	-3.259	11	
60	5300	-2.178		
64	5320	-2.009		
100	5500	-2.393		
116	5580	-3.624		
140	5700	-2.705		
149	5745	-3.352	17	
157	5785	-3.216		
161	5805	-3.759		

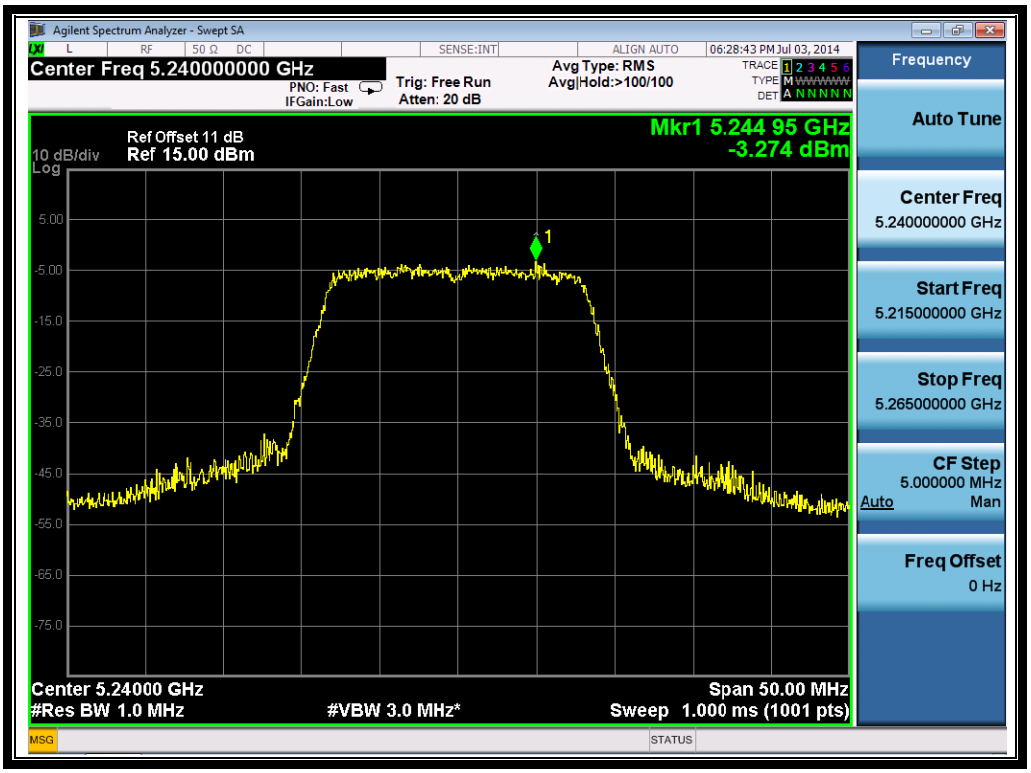
B. Test Plots



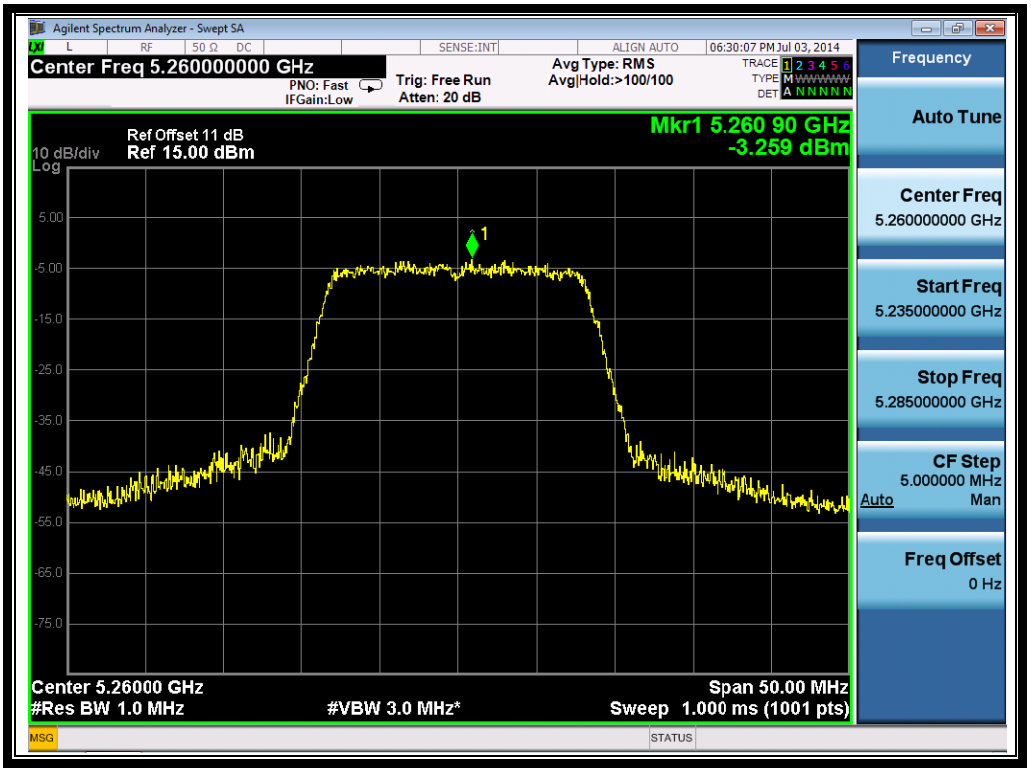
(Channel 36: 5180MHz @ 802.11a)



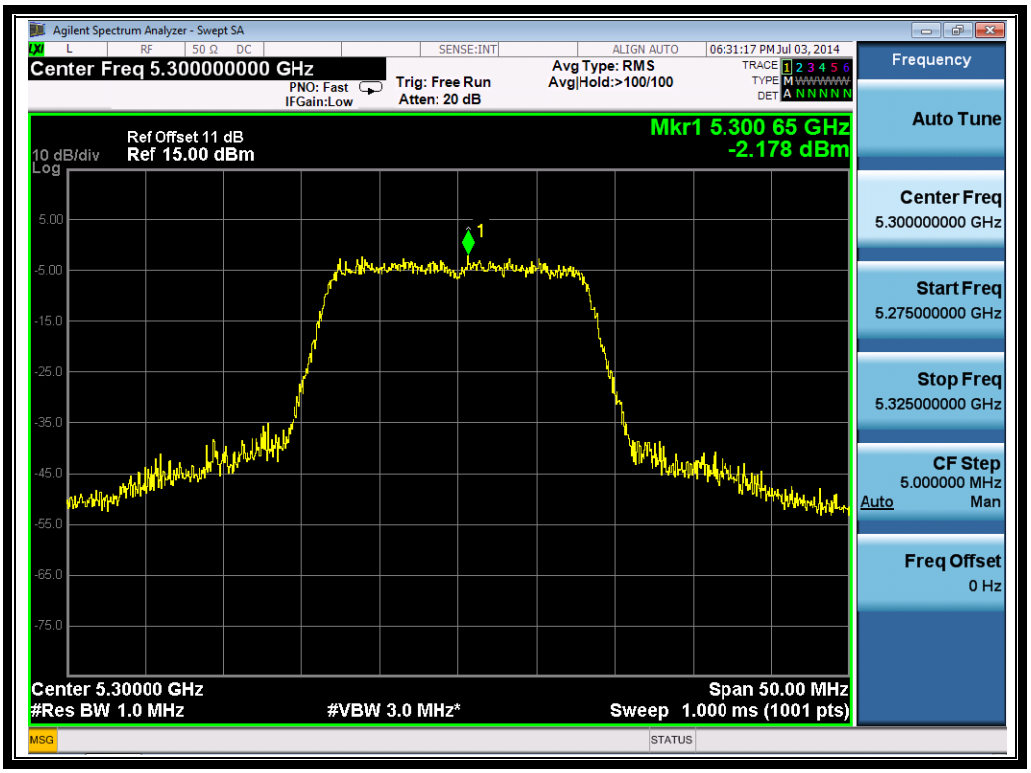
(Channel 44: 5220 MHz @ 802.11a)



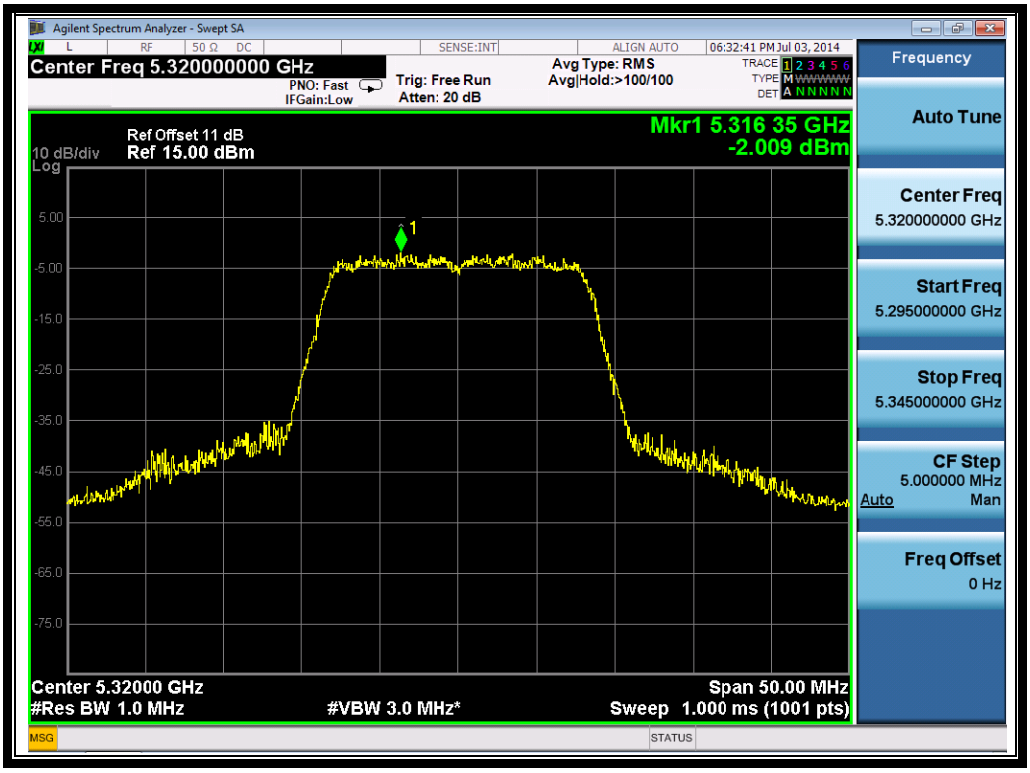
(Channel 48: 5240MHz @ 802.11a)



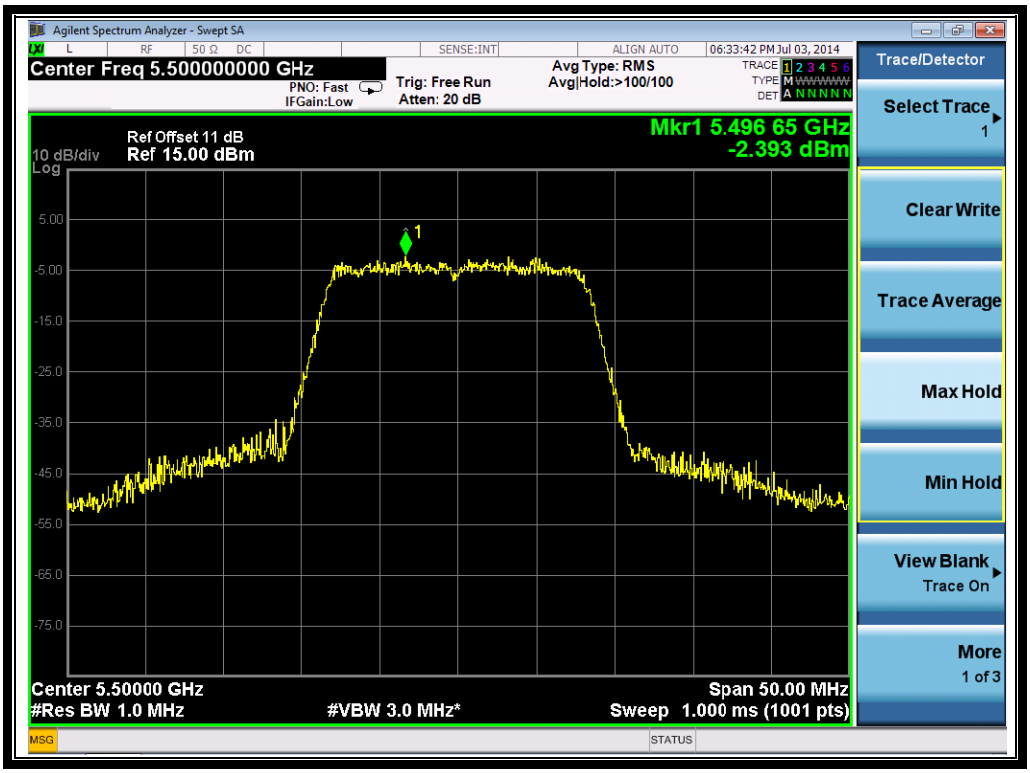
(Channel 52: 5260MHz @ 802.11a)



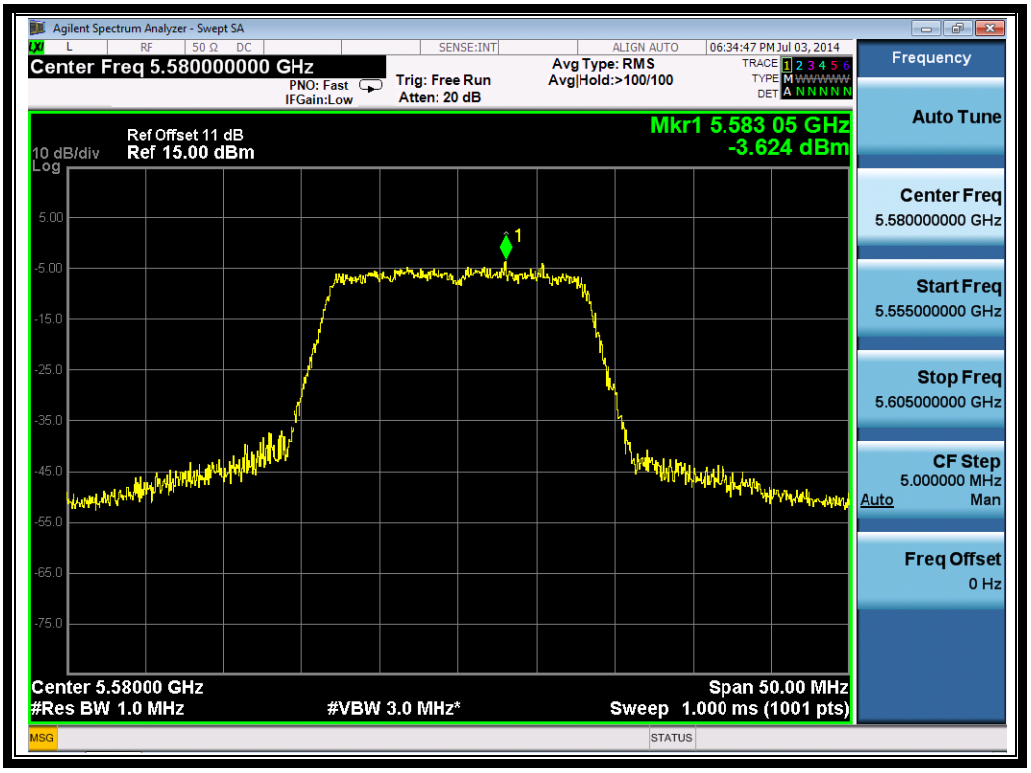
(Channel 60: 5300 MHz @ 802.11a)



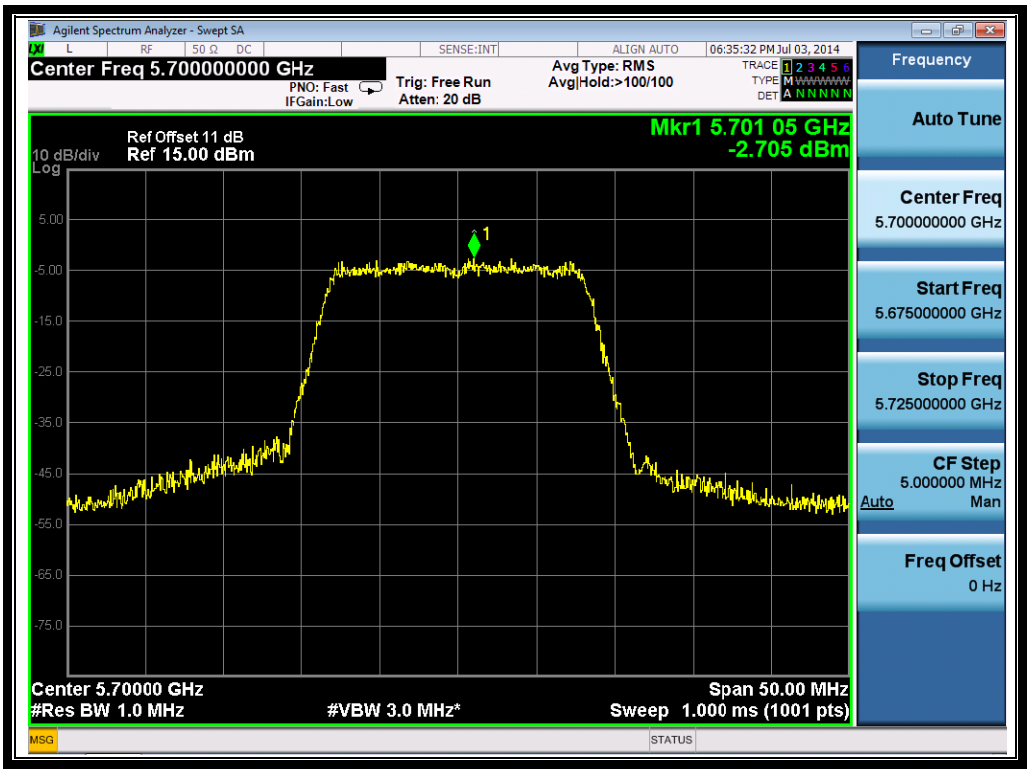
(Channel 64: 5320MHz @ 802.11a)



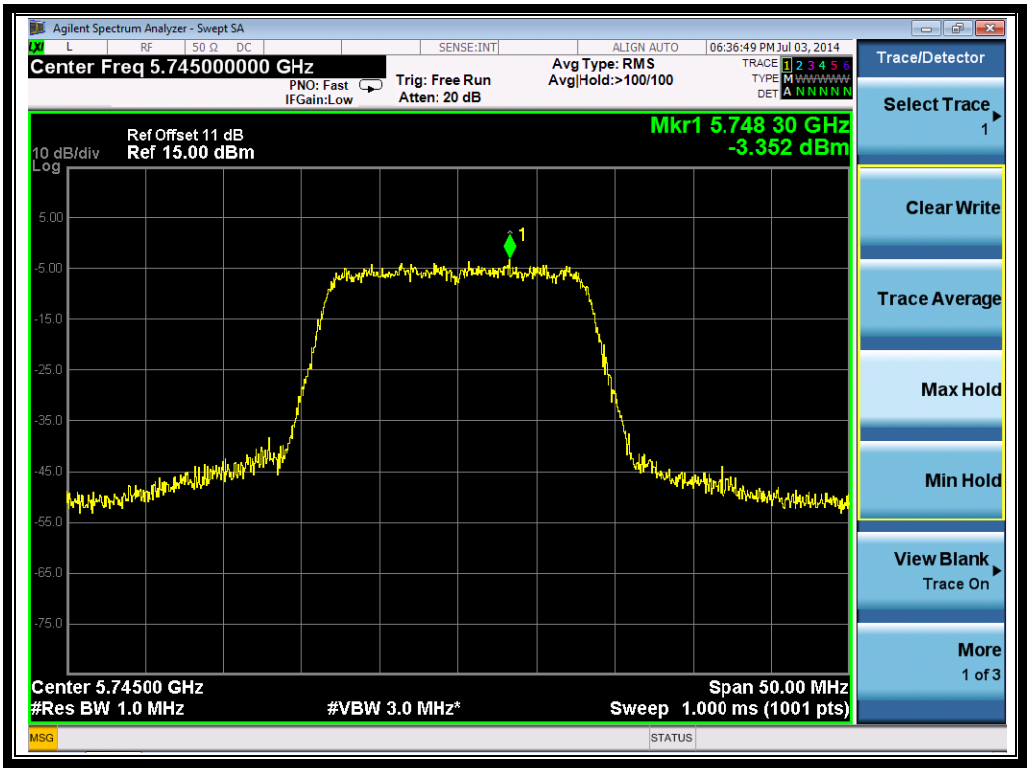
(Channel 100: 5500MHz @ 802.11a)



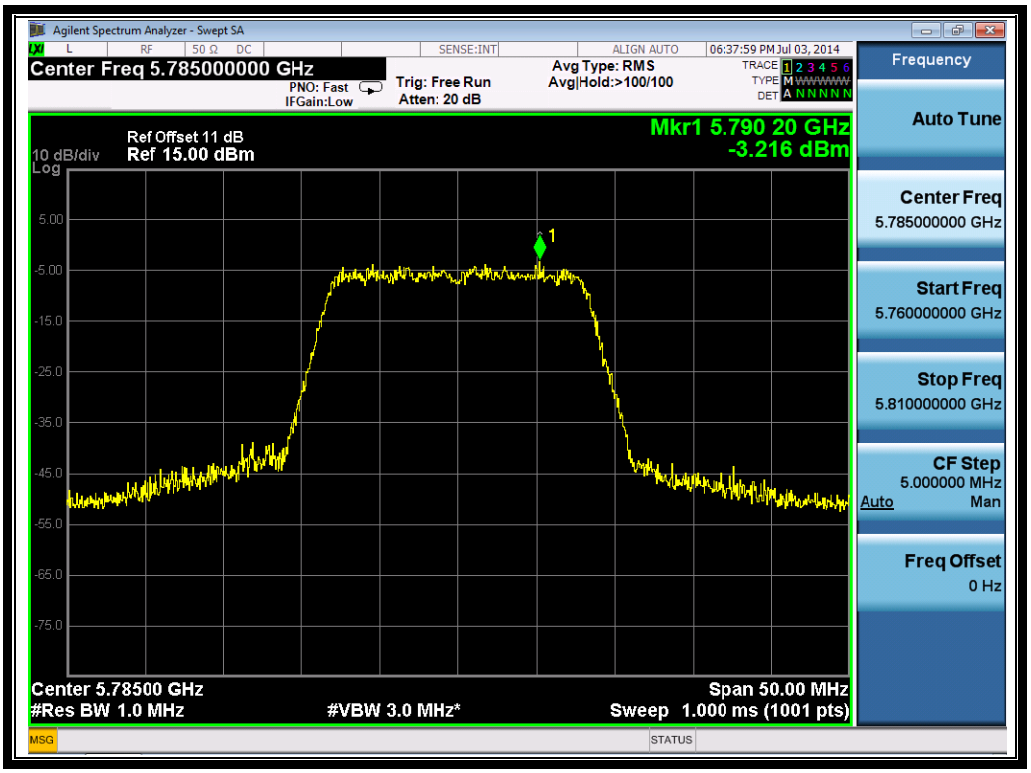
(Channel 116: 5580 MHz @ 802.11a)



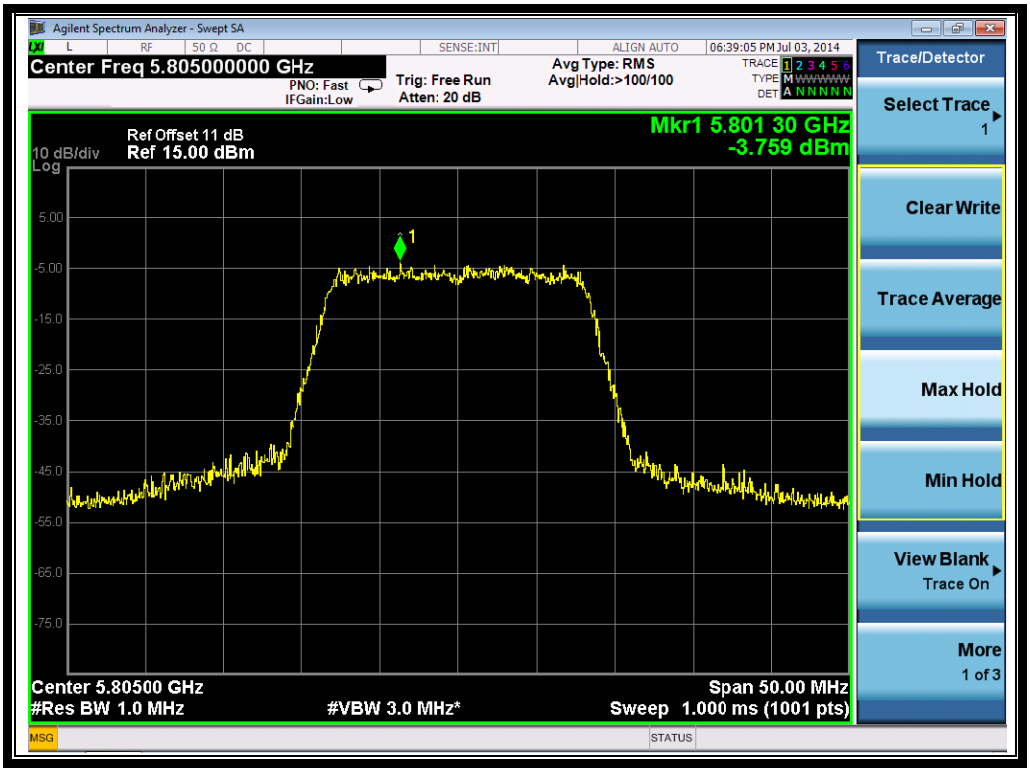
(Channel 140: 5700MHz @ 802.11a)



(Channel 149: 5745MHz @ 802.11a)



(Channel 157: 5785 MHz @ 802.11a)



(Channel 161: 5805MHz @ 802.11a)

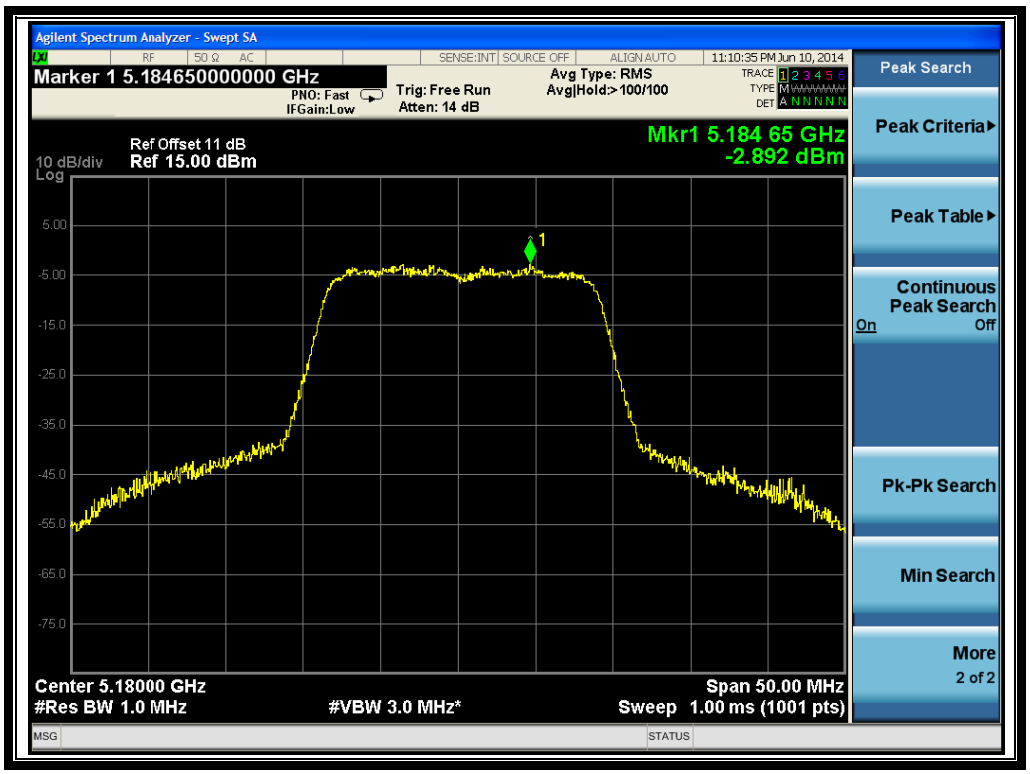
2.4.2.3. 802.11n-20MHz Test mode

ANT 3

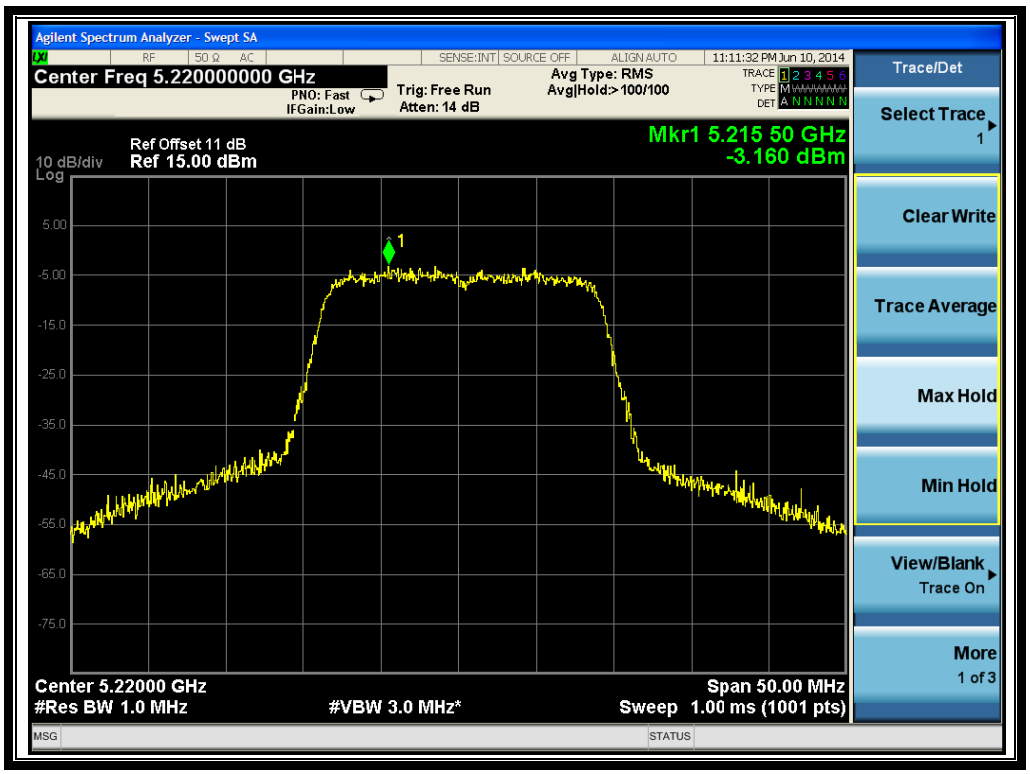
A. Test Verdict:

Channel	Frequency (MHz)	Measured PPSD (dBm)	Limit (dBm)	Verdict
36	5180	-2.892	4	PASS
44	5220	-3.160		
48	5240	-2.313		
52	5260	-1.323	11	
60	5300	-4.018		
64	5320	-3.673		
100	5500	-3.703		
116	5580	-4.313		
140	5700	-4.270		
149	5745	-5.814	17	
157	5785	-6.708		
161	5805	-7.378		

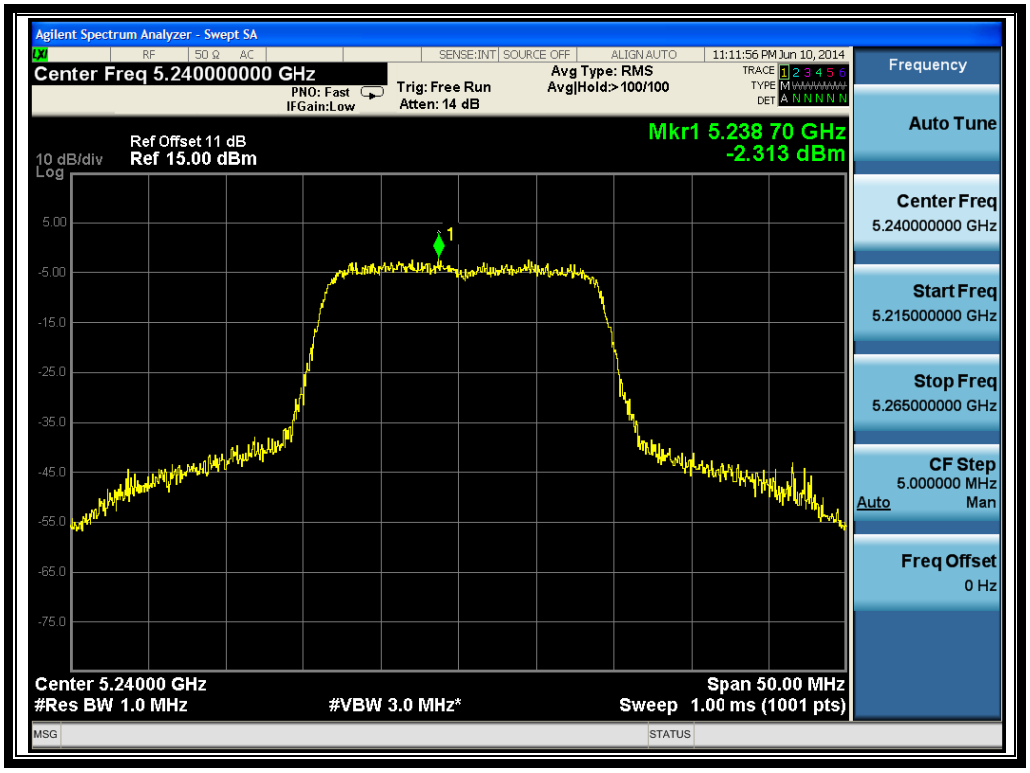
B. Test Plots:



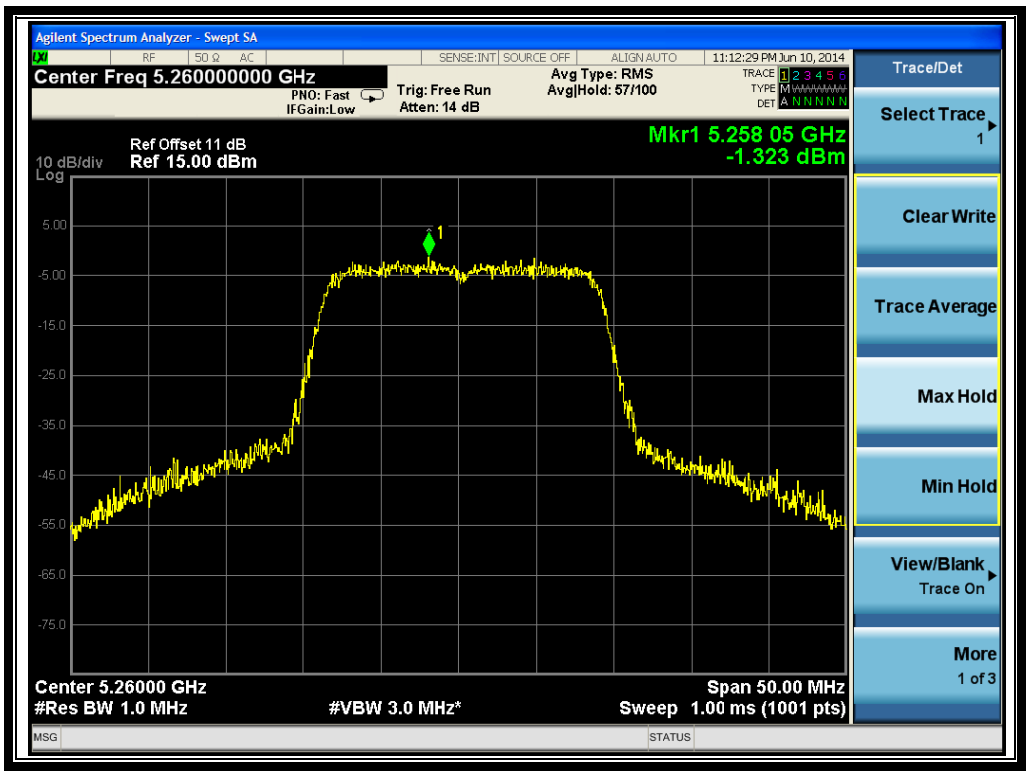
(Channel 36: 5180MHz @ 802.11n-20MHz)



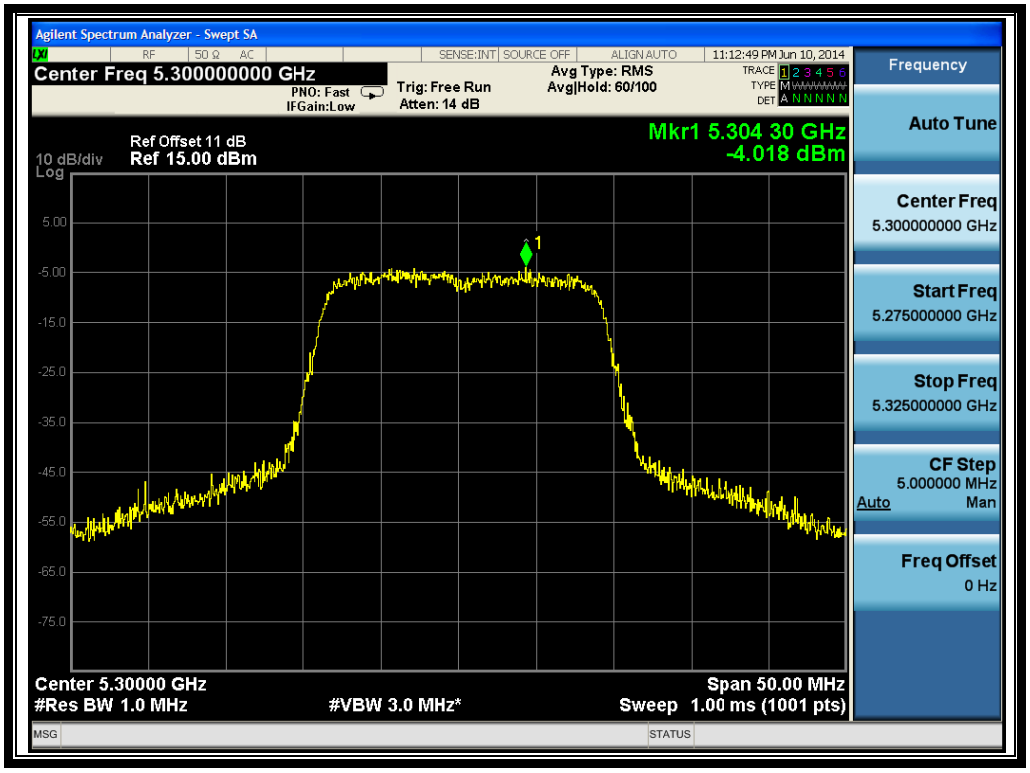
(Channel 44: 5220 MHz @ 802.11n-20MHz)



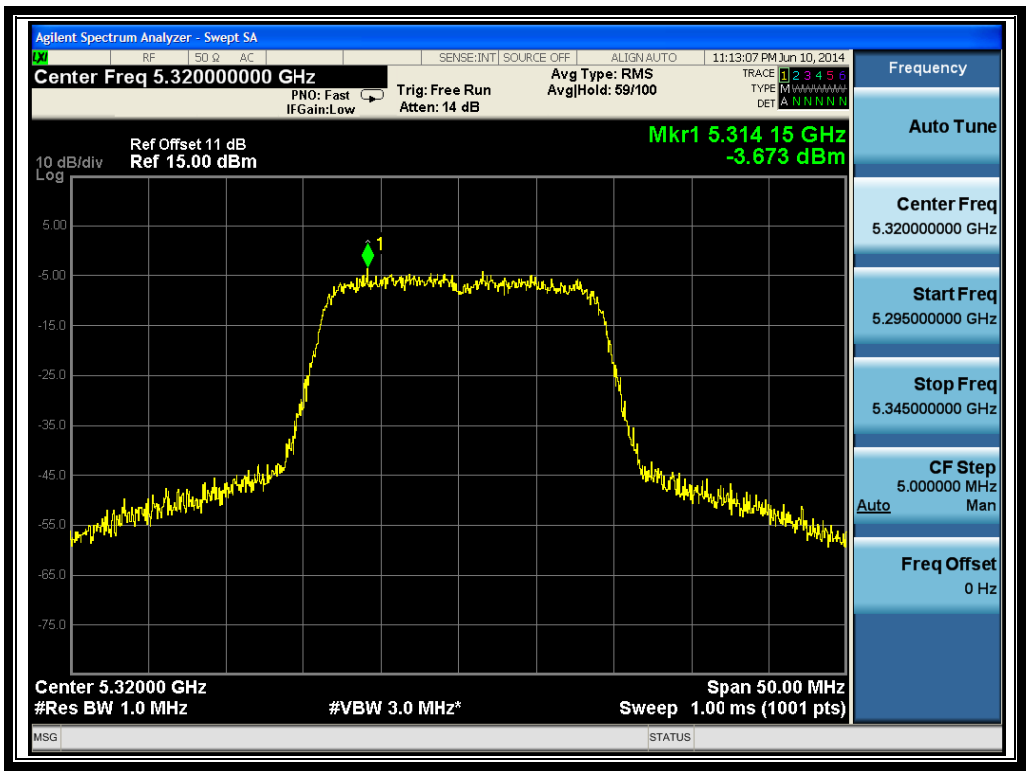
(Channel 48: 5240MHz @ 802.11n-20MHz)



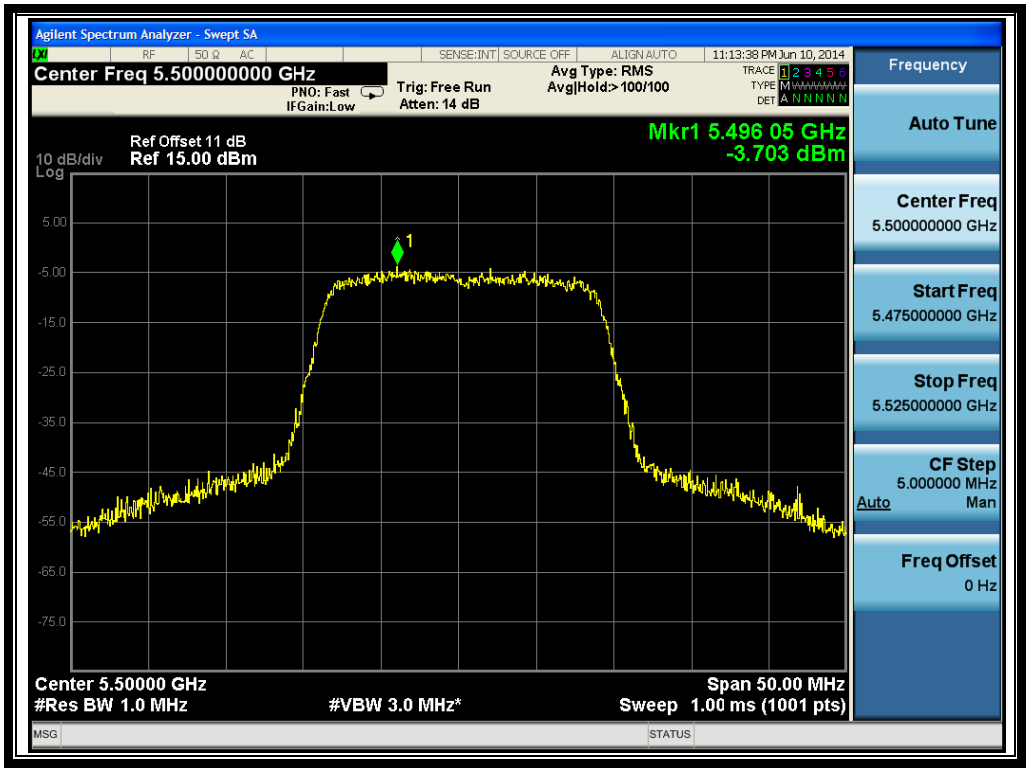
(Channel 52: 5260MHz @ 802.11n-20MHz)



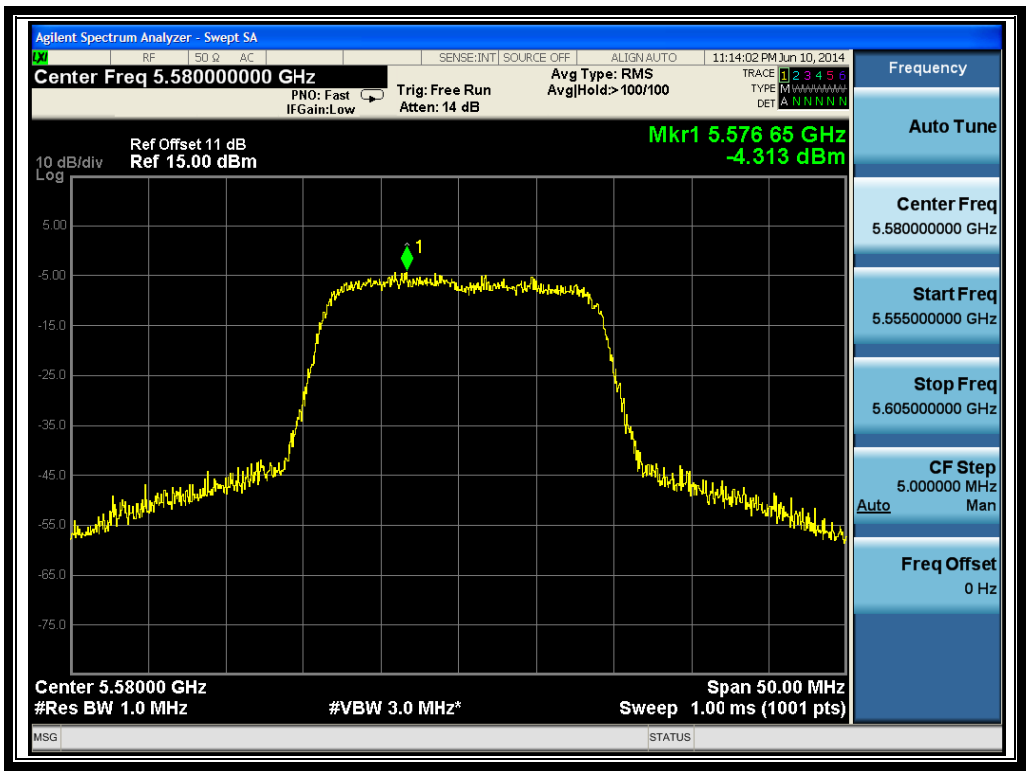
(Channel 60: 5300 MHz @ 802.11n-20MHz)



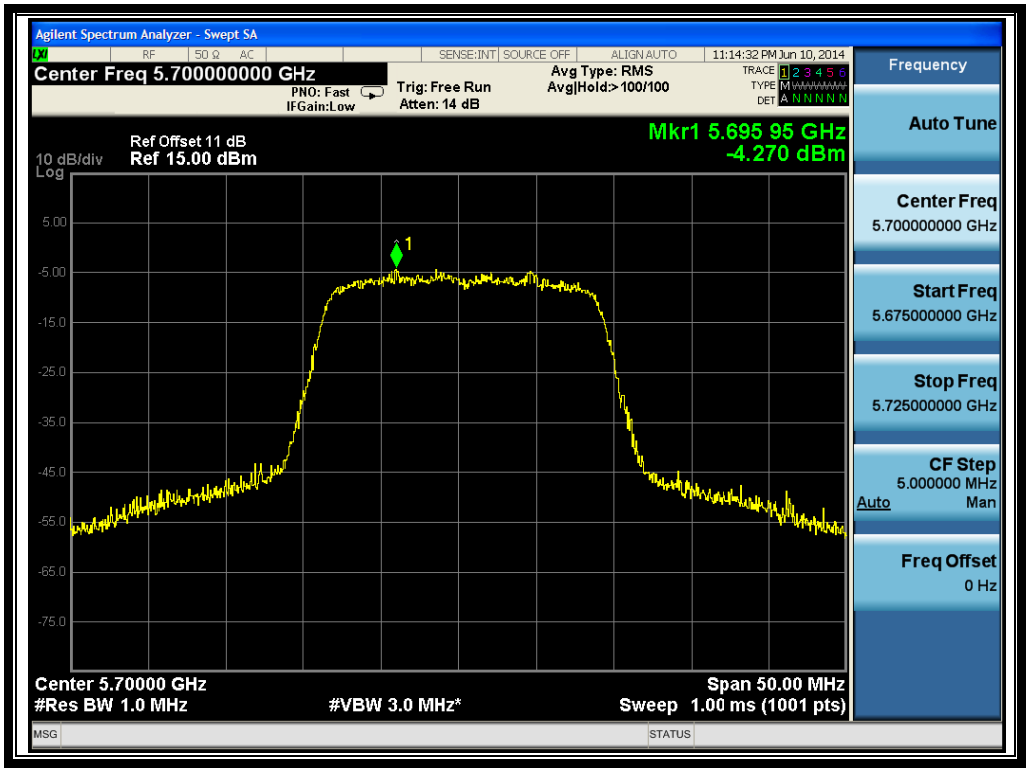
(Channel 64: 5320MHz @ 802.11n-20MHz)



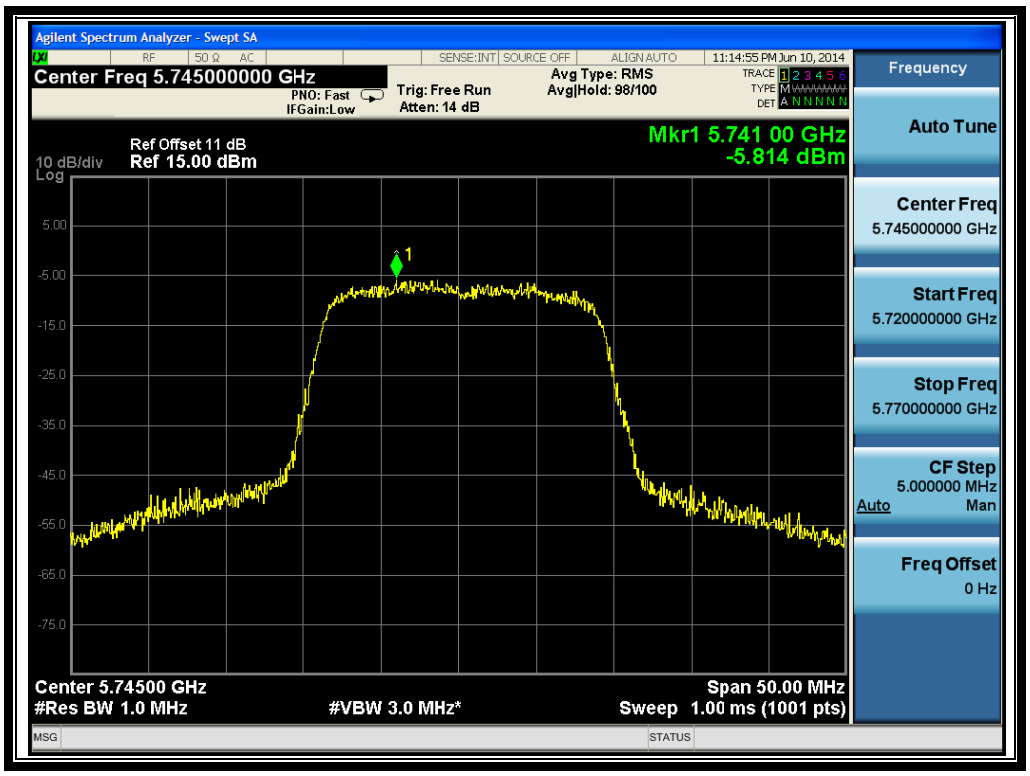
(Channel 100: 5500MHz @ 802.11n-20MHz)



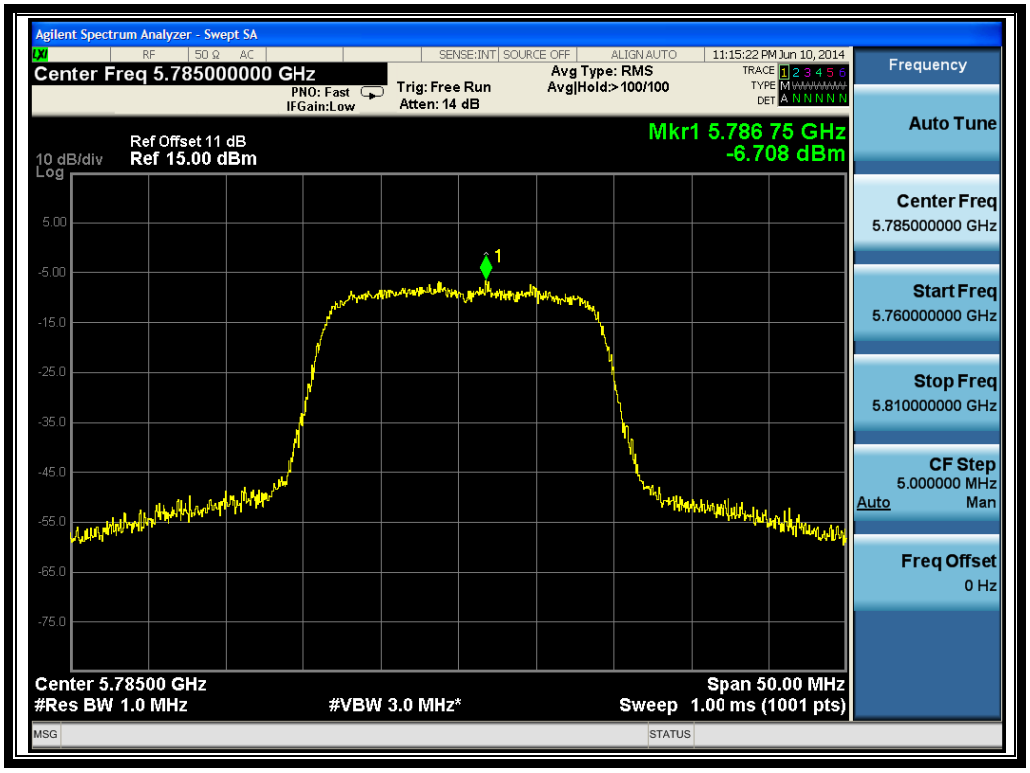
(Channel 116: 5580 MHz @ 802.11n-20MHz)



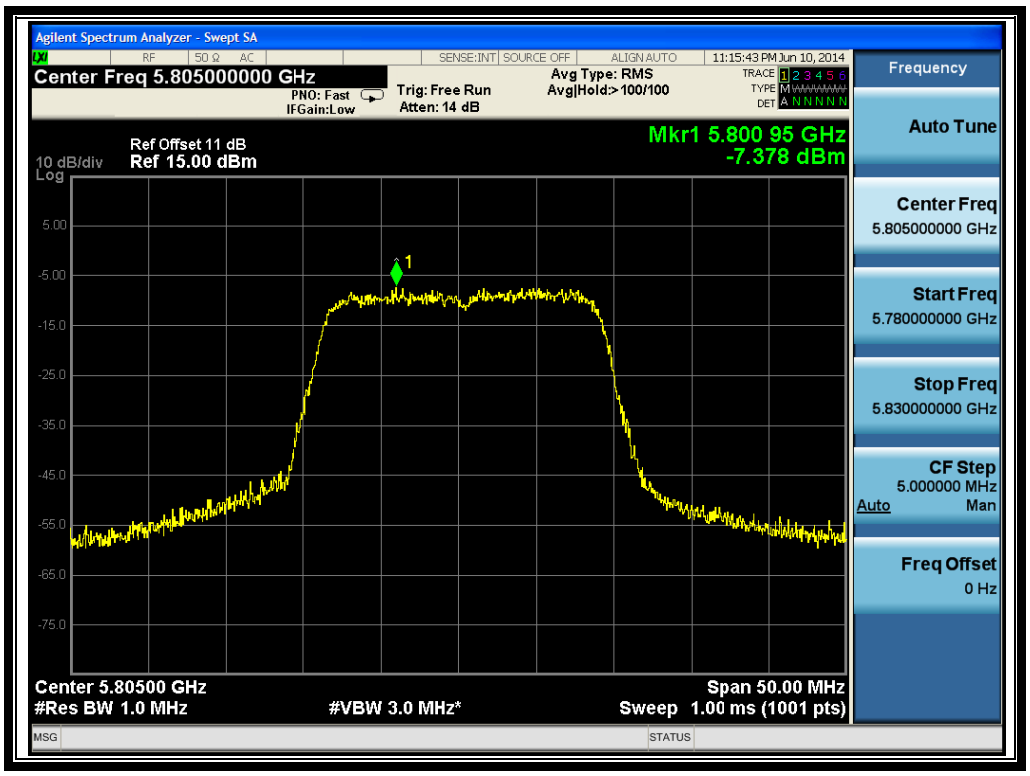
(Channel 140: 5700MHz @ 802.11n-20MHz).



(Channel 149: 5745MHz @ 802.11n-20MHz)



(Channel 157: 5785MHz @ 802.11n-20MHz)



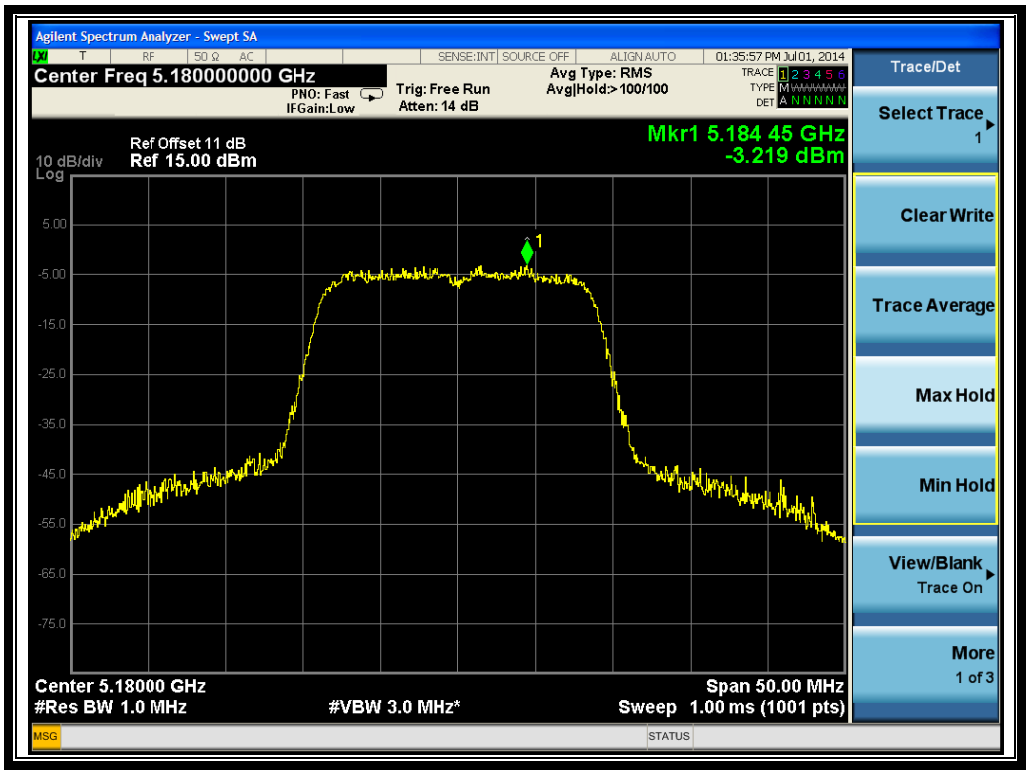
(Channel 161: 5805MHz @ 802.11n-20MHz)

ANT 4

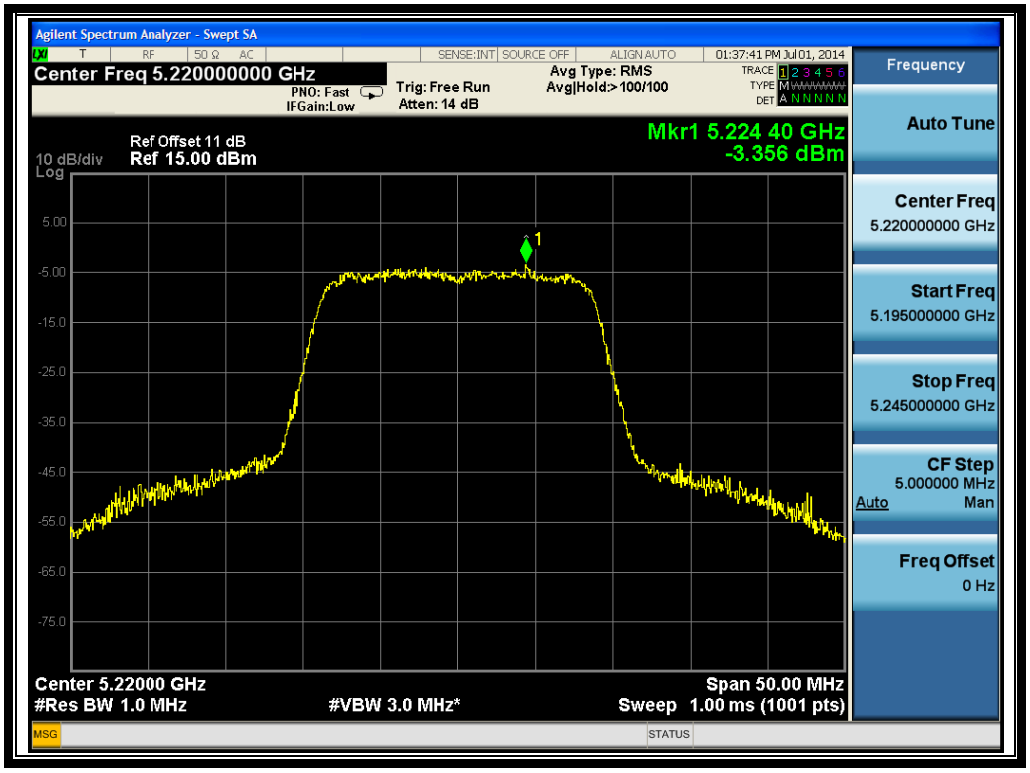
A. Test Verdict:

Channel	Frequency (MHz)	Measured PPSD (dBm)	Limit (dBm)	Verdict
36	5180	-3.219	4	PASS
44	5220	-3.356		
48	5240	-3.352		
52	5260	-2.582	11	
60	5300	-3.754		
64	5320	-3.325		
100	5500	-3.739		
116	5580	-4.349		
140	5700	-4.118		
149	5745	-5.631	17	
157	5785	-6.405		
161	5805	-7.206		

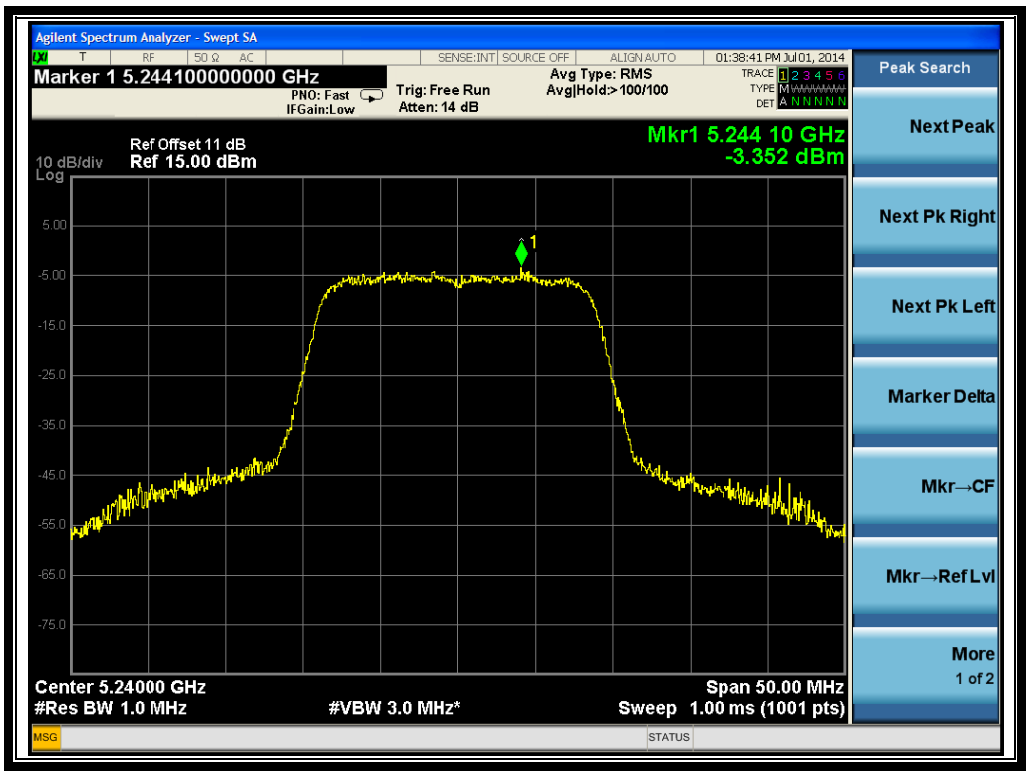
B. Test Plots:



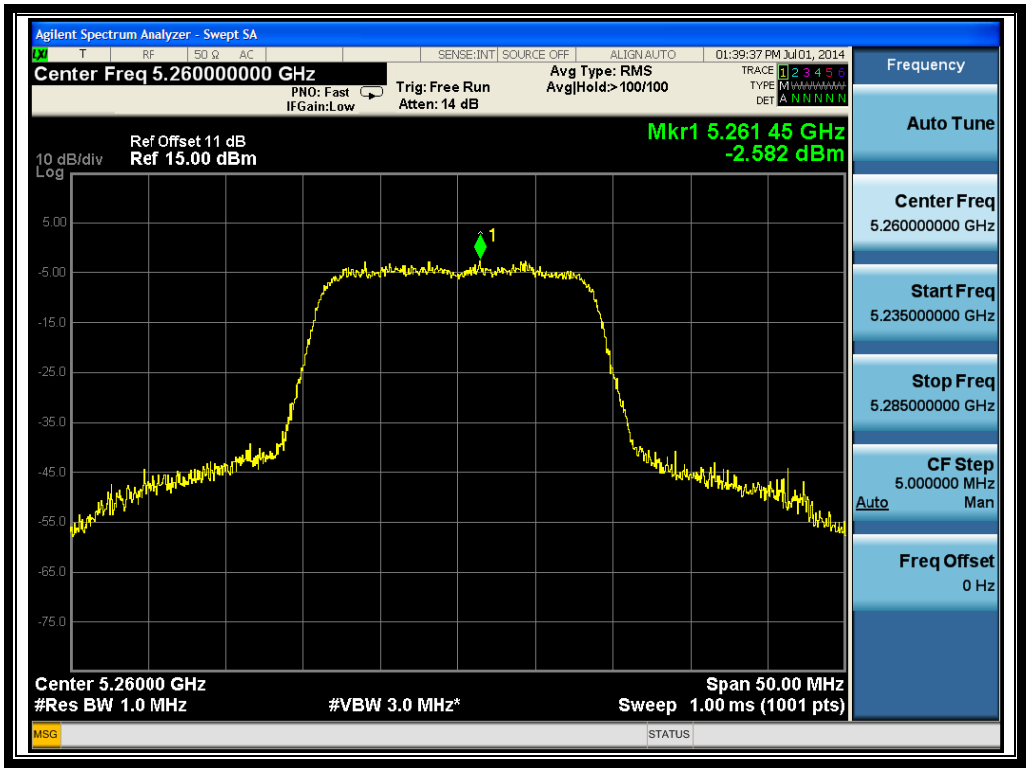
(Channel 36: 5180MHz @ 802.11n-20MHz)



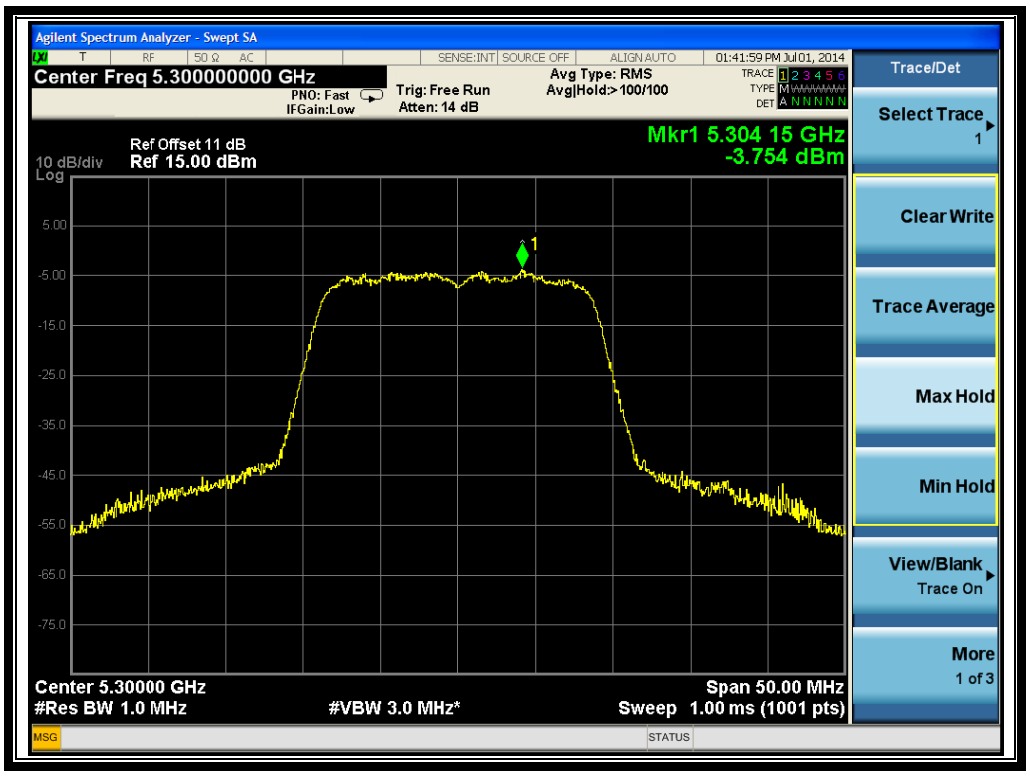
(Channel 44: 5220 MHz @ 802.11n-20MHz)



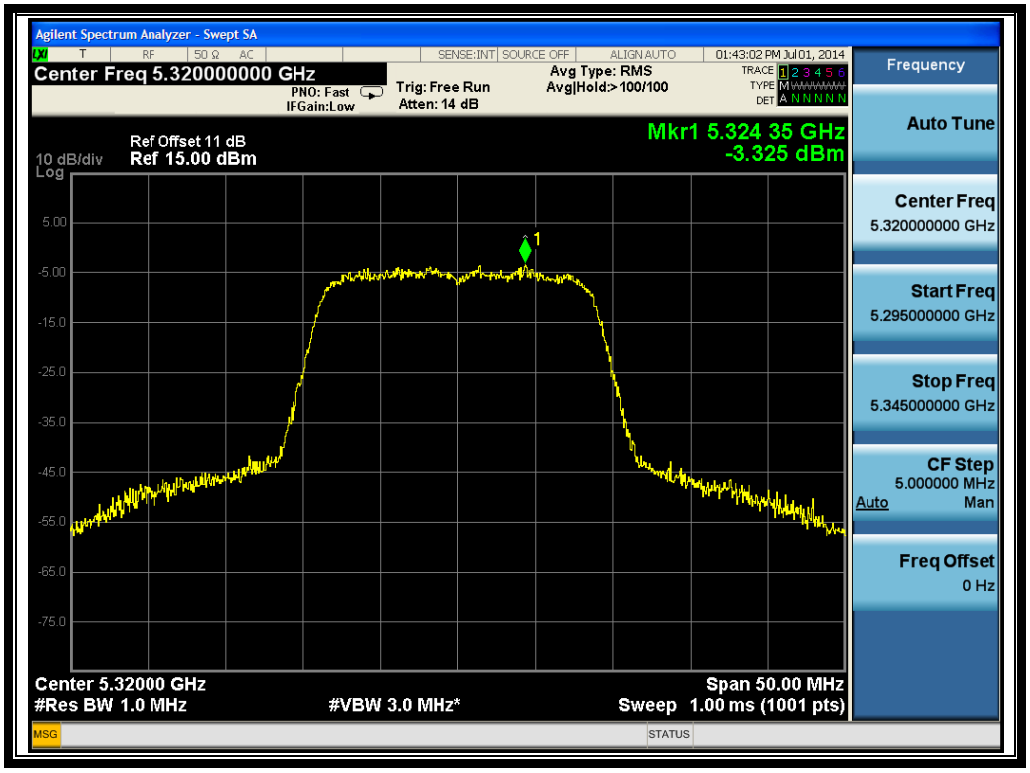
(Channel 48: 5240MHz @ 802.11n-20MHz)



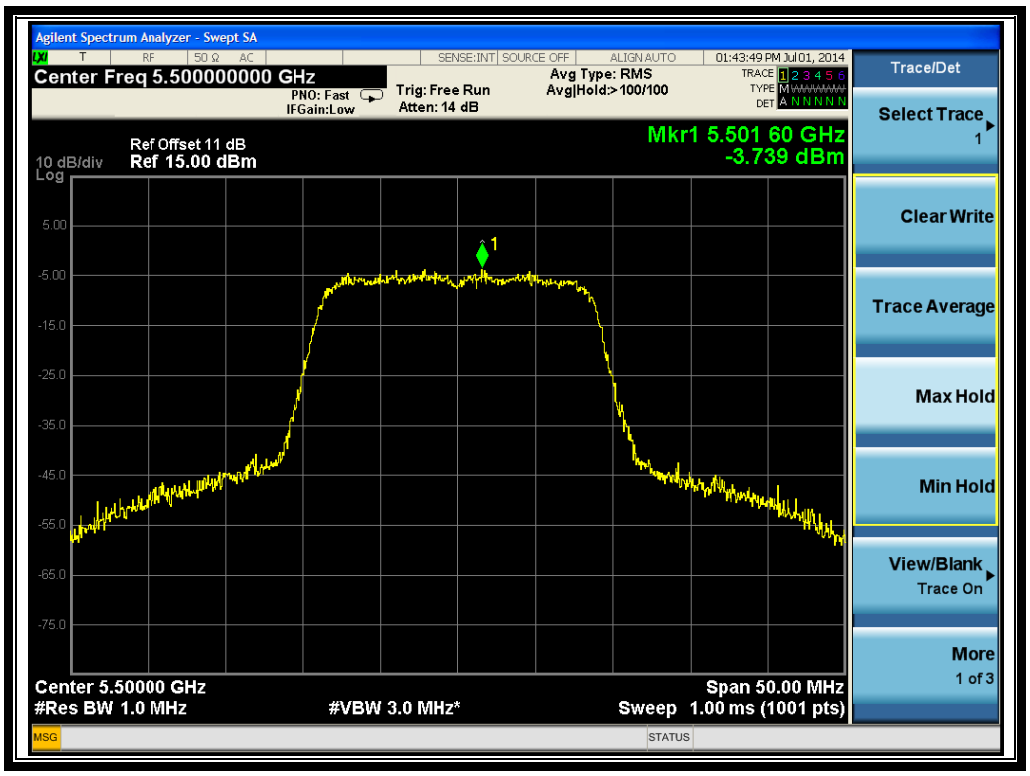
(Channel 52: 5260MHz @ 802.11n-20MHz)



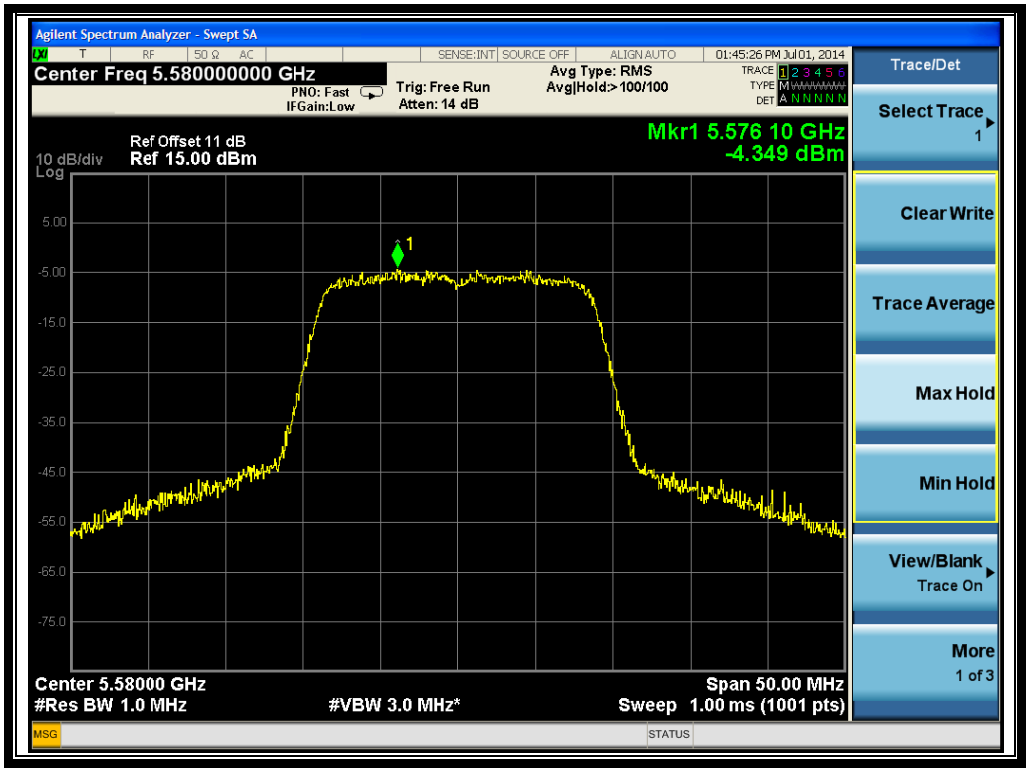
(Channel 60: 5300 MHz @ 802.11n-20MHz)



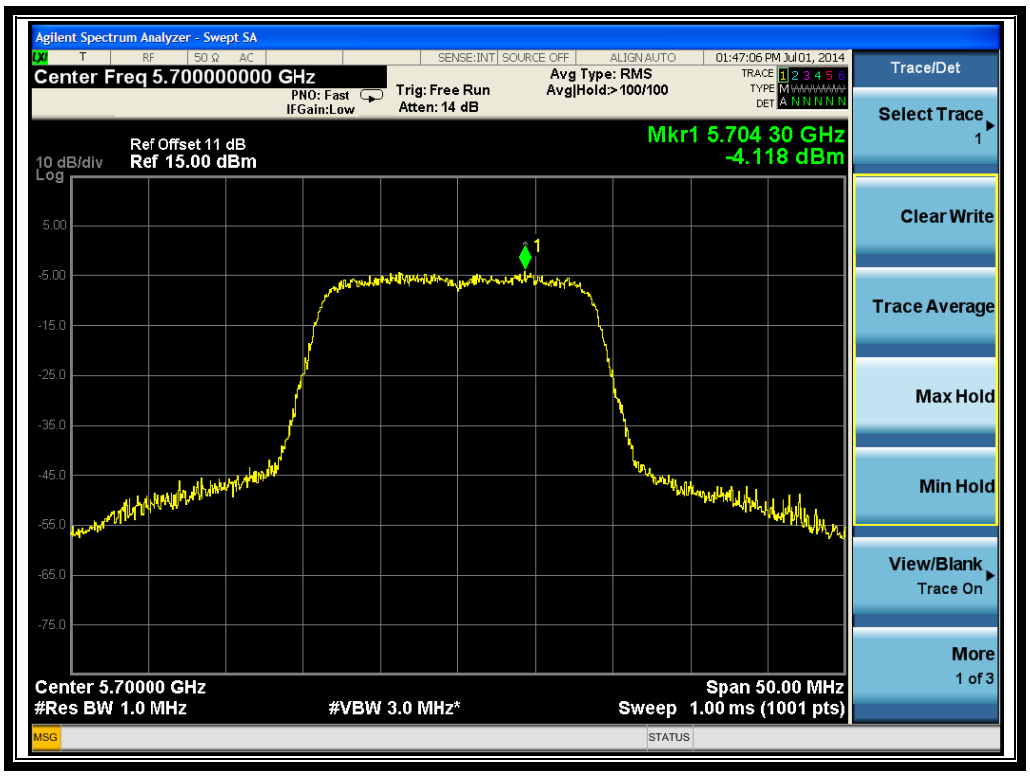
(Channel 64: 5320MHz @ 802.11n-20MHz)



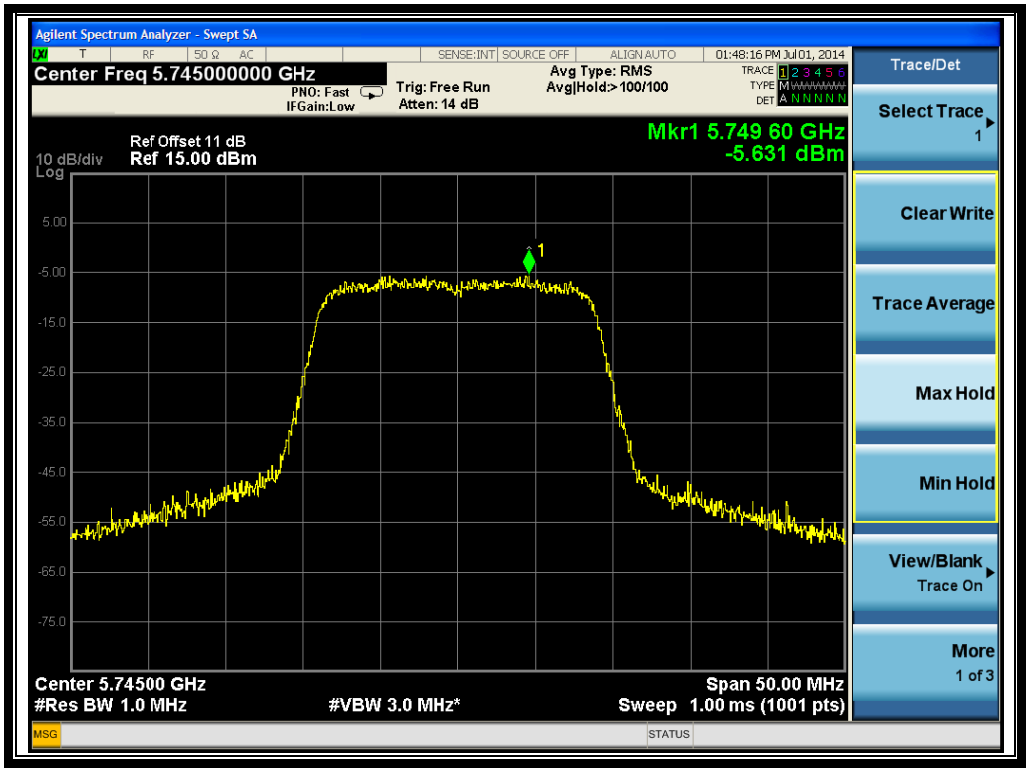
(Channel 100: 5500MHz @ 802.11n-20MHz)



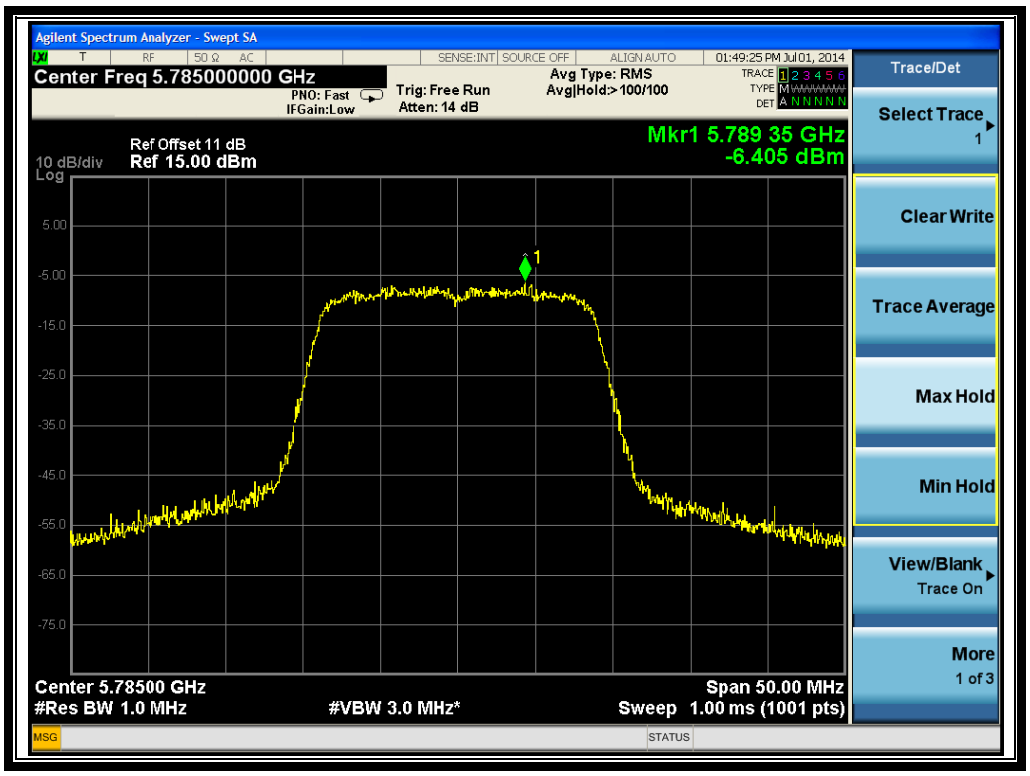
(Channel 116: 5580 MHz @ 802.11n-20MHz)



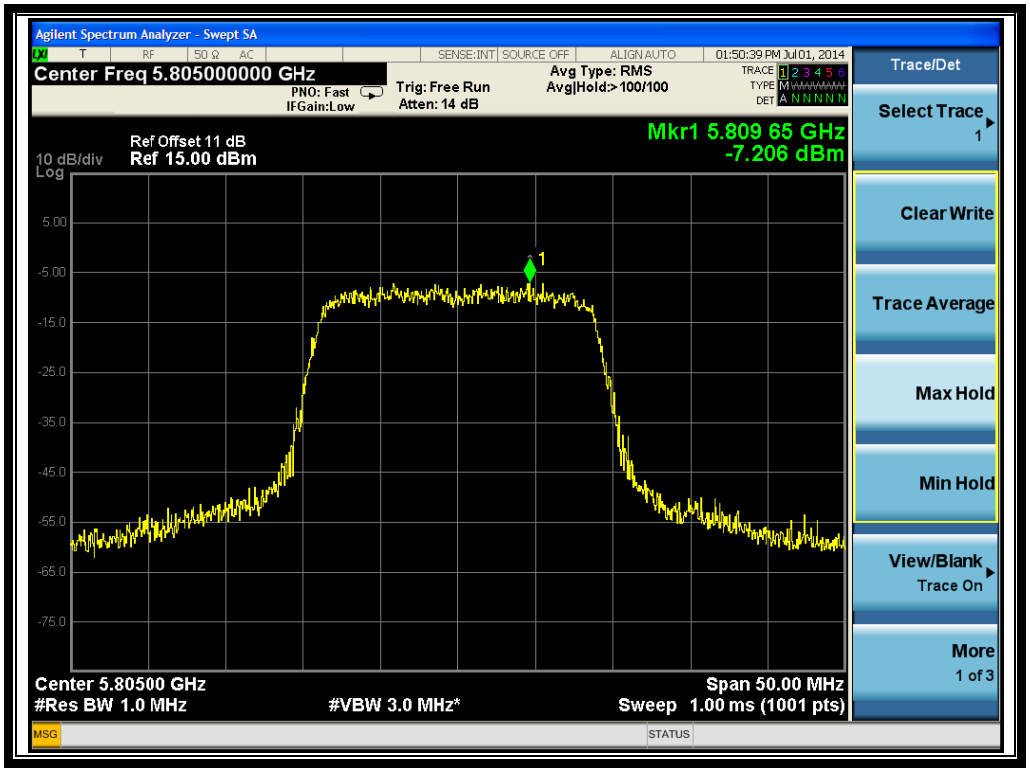
(Channel 140: 5700MHz @ 802.11n-20MHz).



(Channel 149: 5745MHz @ 802.11n-20MHz)



(Channel 157: 5785MHz @ 802.11n-20MHz)



(Channel 161: 5805MHz @ 802.11n-20MHz)

ANT 3 + ANT 4

Channel	Frequency (MHz)	Measured PPSD (dBm)	Limit (dBm)	Verdict
36	5180	-0.042	4	PASS
44	5220	-0.246		
48	5240	0.209		
52	5260	1.103	11	
60	5300	-0.874		
64	5320	-0.485		
100	5500	-0.711		
116	5580	-1.321		
140	5700	-1.183		
149	5745	-2.711	17	
157	5785	-3.544		
161	5805	-4.281		

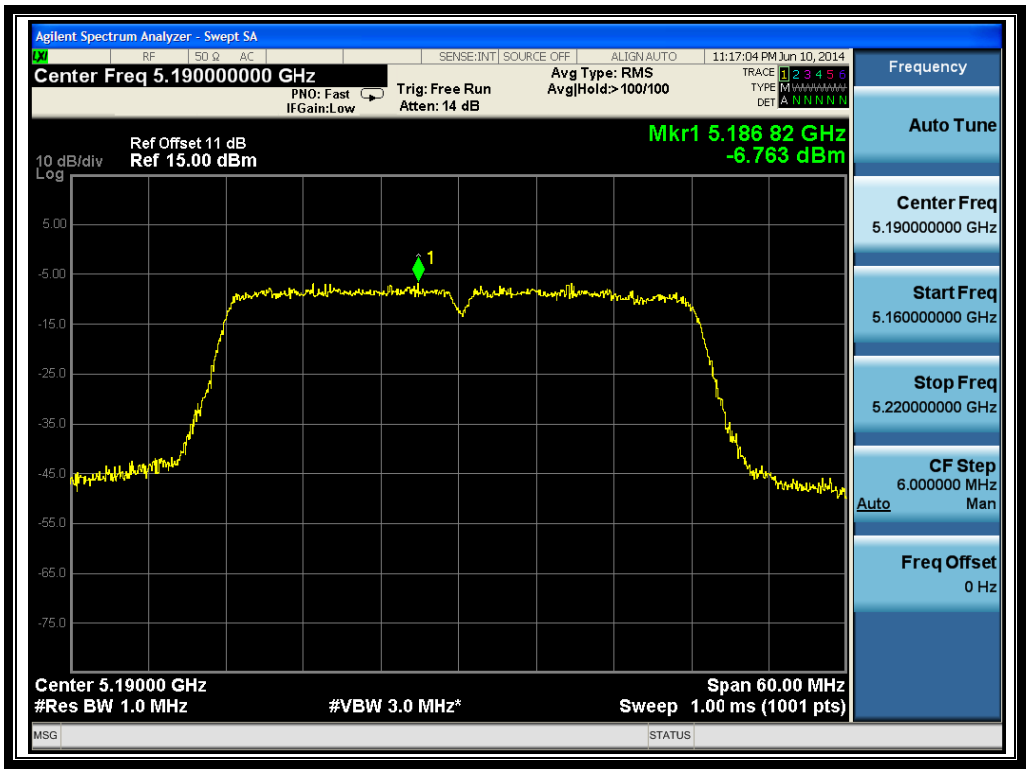
2.4.2.4. 802.11n-40MHz Test mode

ANT 3

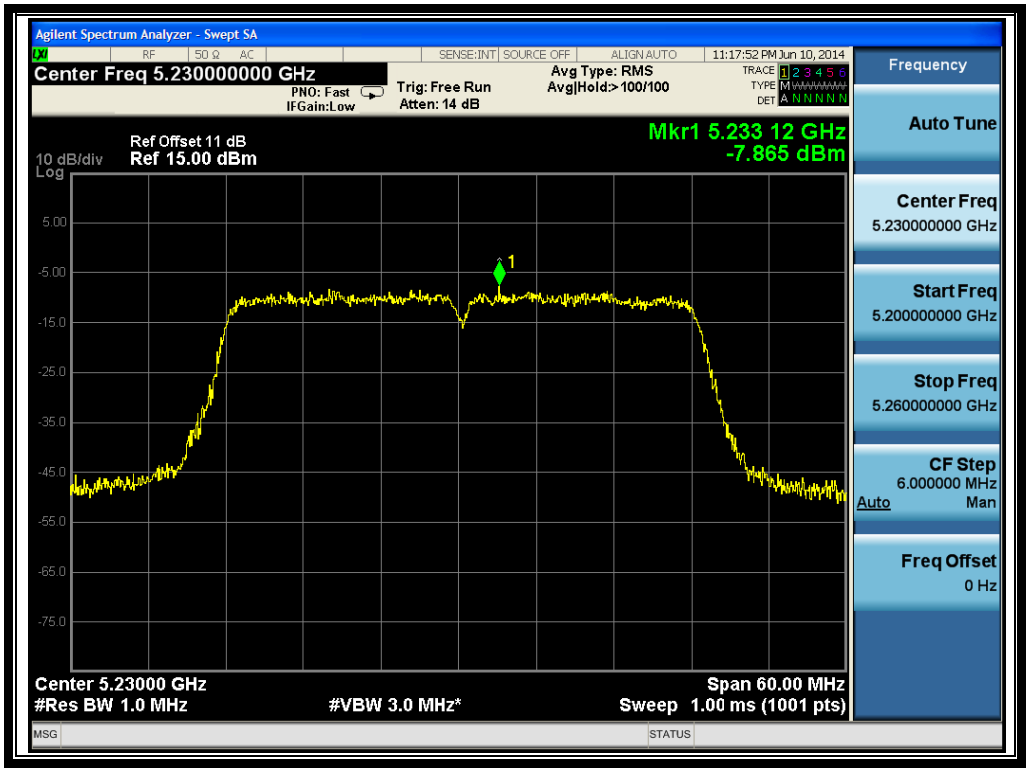
A. Test Verdict:

Channel	Frequency (MHz)	Measured PPSD (dBm)	Limit (dBm)	Verdict
38	5190	-6.763	4	PASS
46	5230	-7.865		
54	5270	-6.606	11	
62	5310	-7.148		
102	5510	-7.274		
110	5550	-8.137		
134	5670	-9.800		
151	5755	-9.629	17	
159	5795	-9.946		

B. Test Plots:

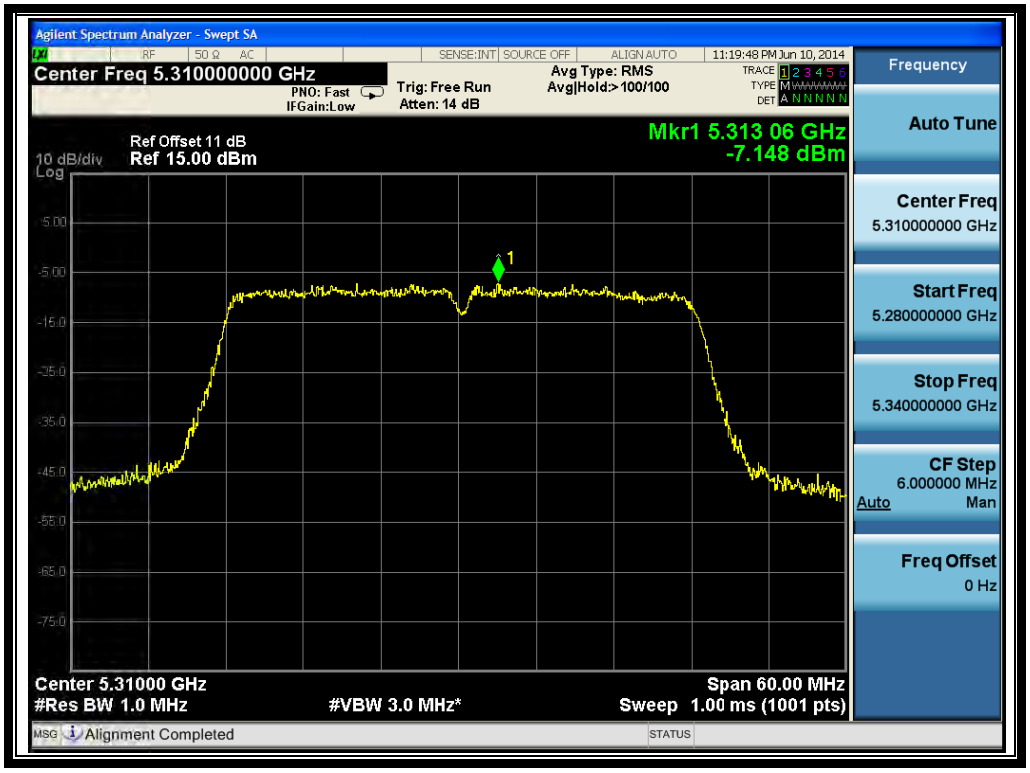


(Channel 38: 5190MHz @ 802.11n-40MHz)



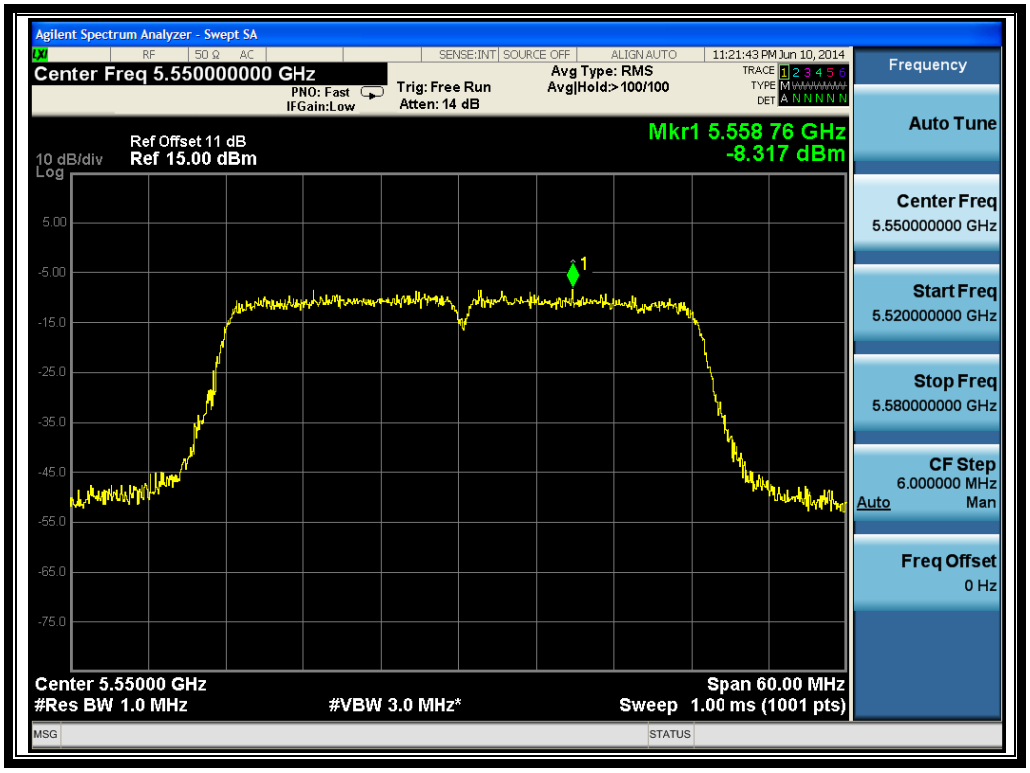
(Channel 46: 5230 MHz @ 802.11n-40MHz)

(Channel 54: 5270MHz @ 802.11n-40MHz)



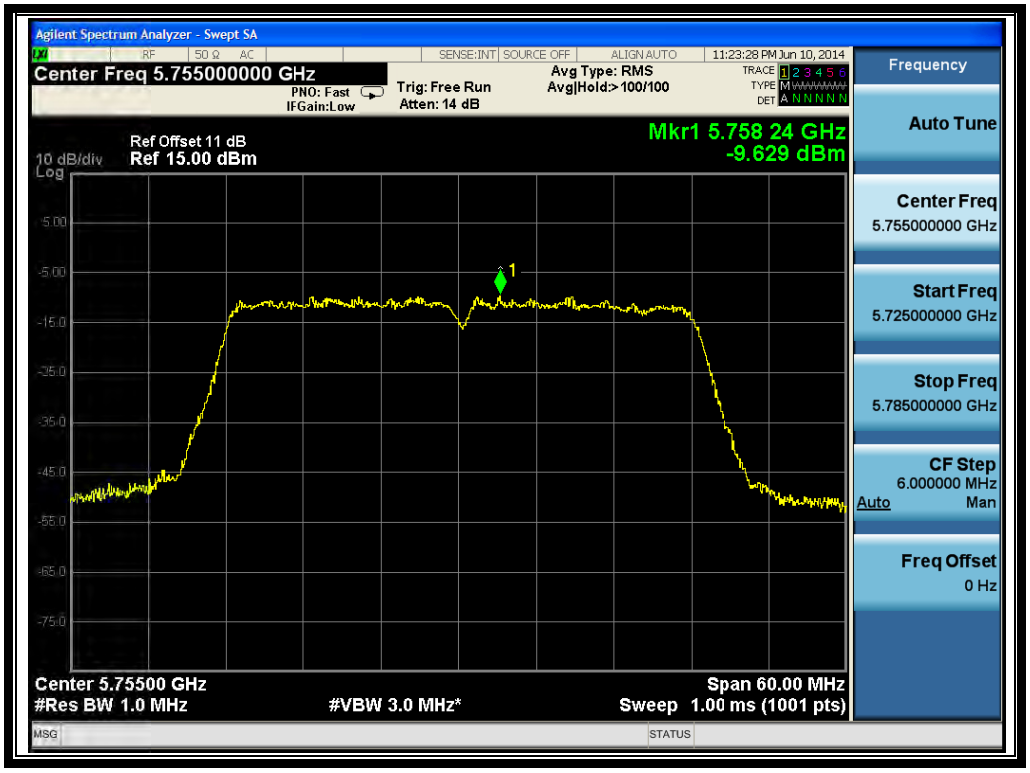
(Channel 62: 5310MHz @ 802.11n-40MHz)

(Channel 102: 5510 MHz @ 802.11n-40MHz)

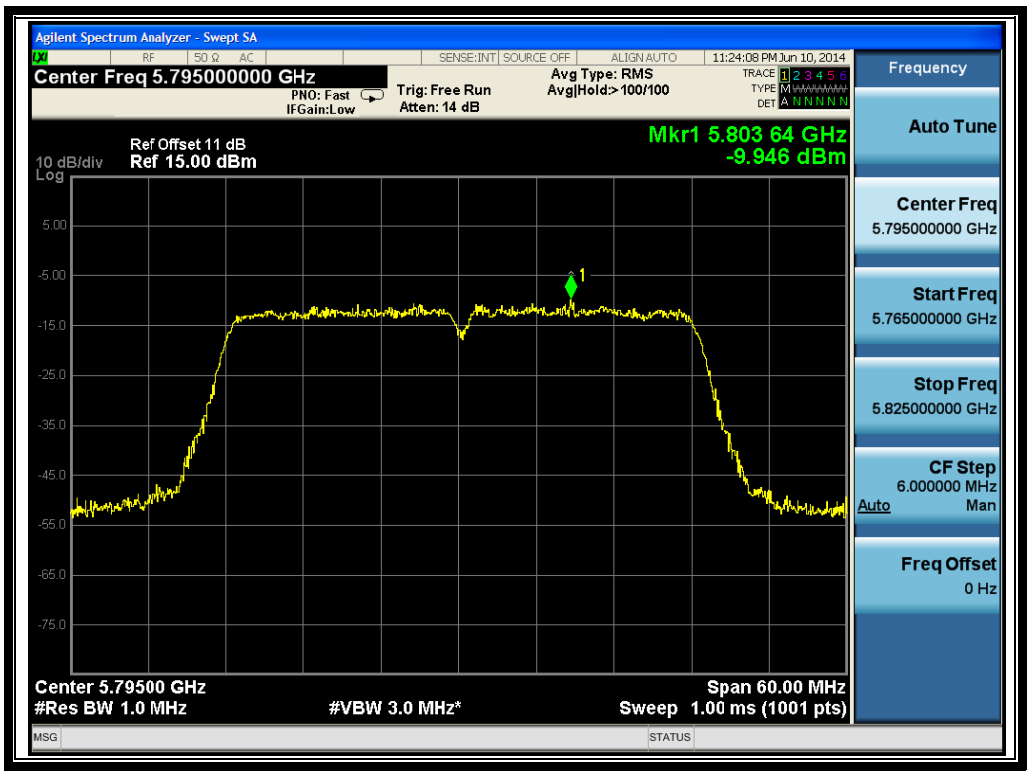


(Channel 110: 5550MHz @ 802.11n-40MHz)

(Channel 134: 5670MHz @ 802.11n-40MHz)



(Channel 151: 5755MHz @ 802.11n-40MHz)



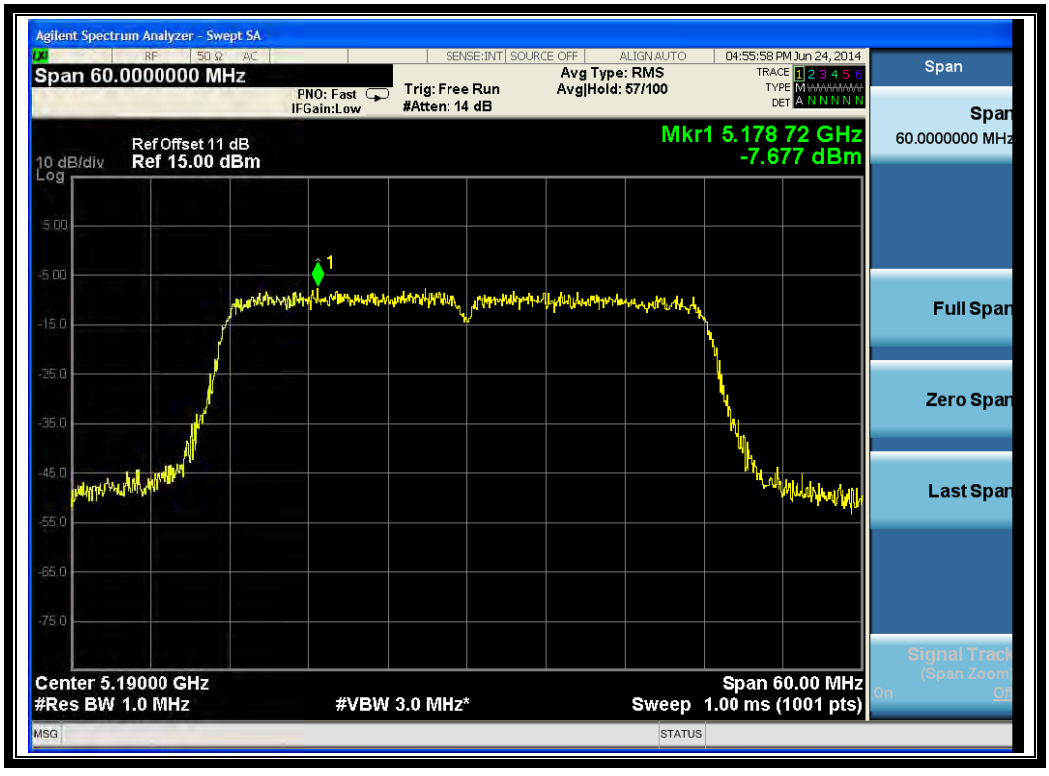
(Channel 159: 5795MHz @ 802.11n-40MHz)

ANT 4

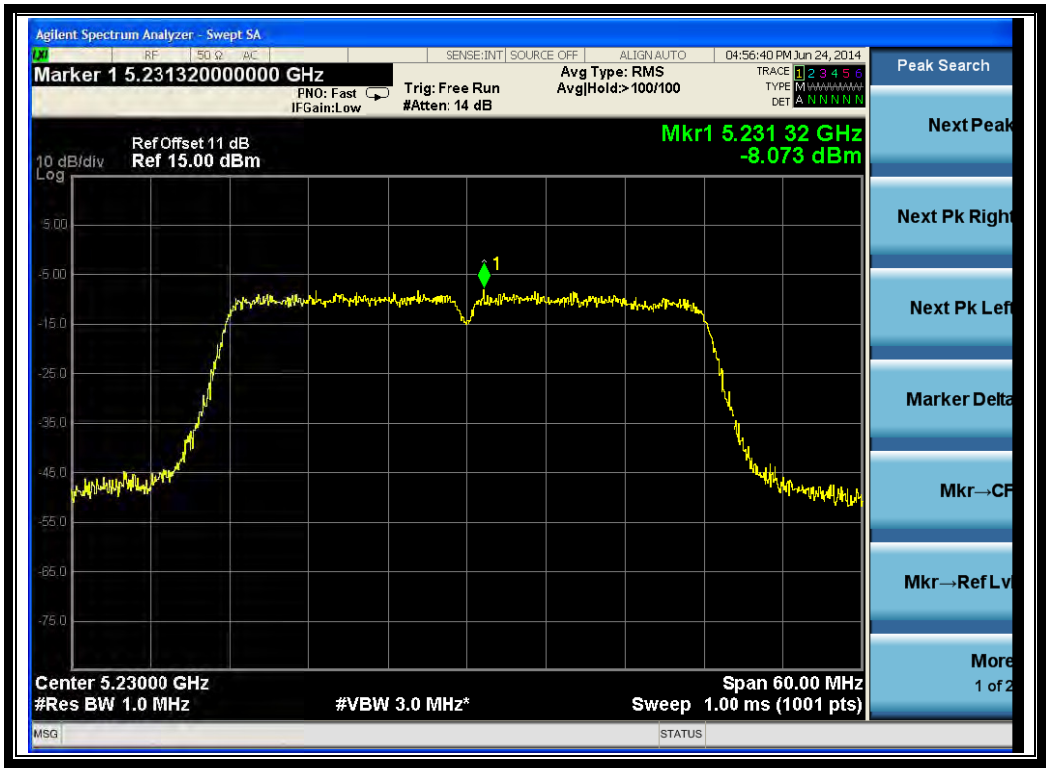
A. Test Verdict:

Channel	Frequency (MHz)	Measured PPSD (dBm)	Limit (dBm)	Verdict
38	5190	-7.677	4	PASS
46	5230	-8.073		
54	5270	-8.108	11	
62	5310	-7.990		
102	5510	-6.901		
110	5550	-9.174		
134	5670	-9.929		
151	5755	-9.743	17	
159	5795	-10.654		

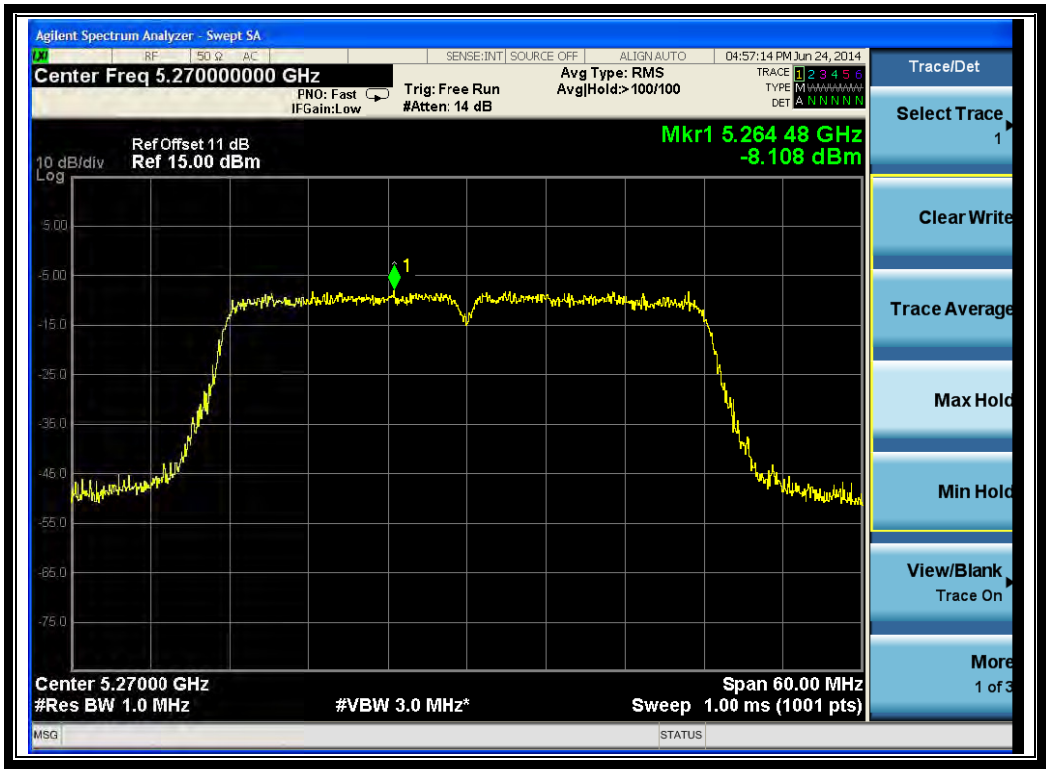
B. Test Plots:



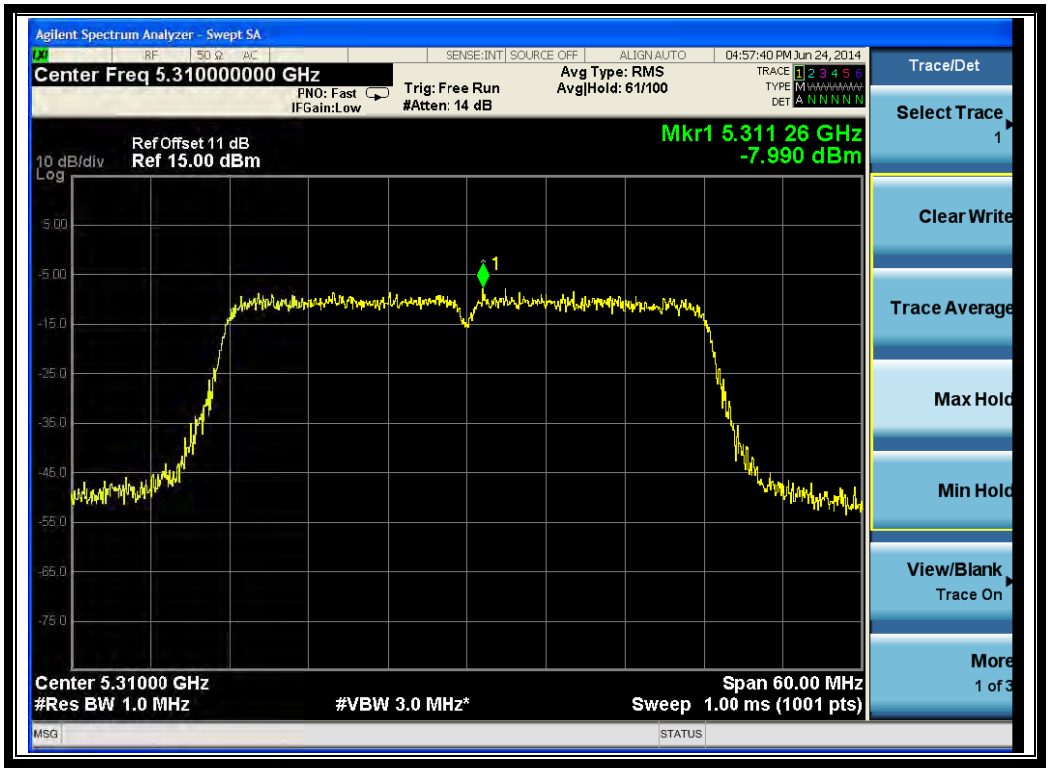
(Channel 38: 5190MHz @ 802.11n-40MHz)



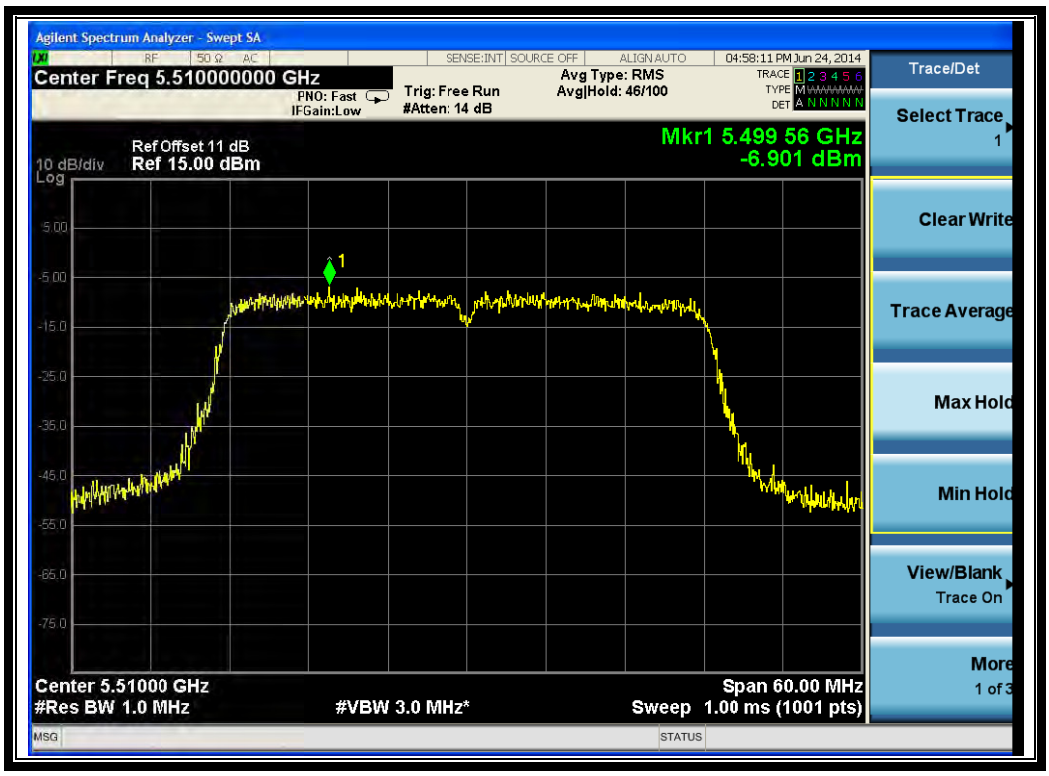
(Channel 46: 5230 MHz @ 802.11n-40MHz)



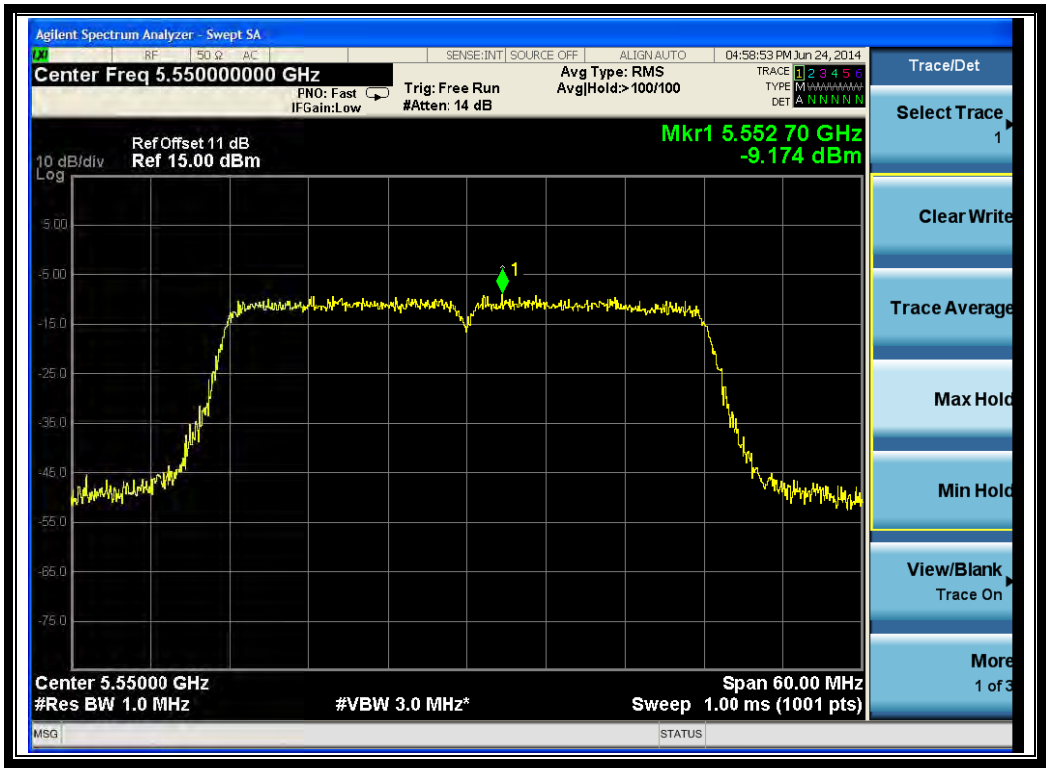
(Channel 54: 5270MHz @ 802.11n-40MHz)



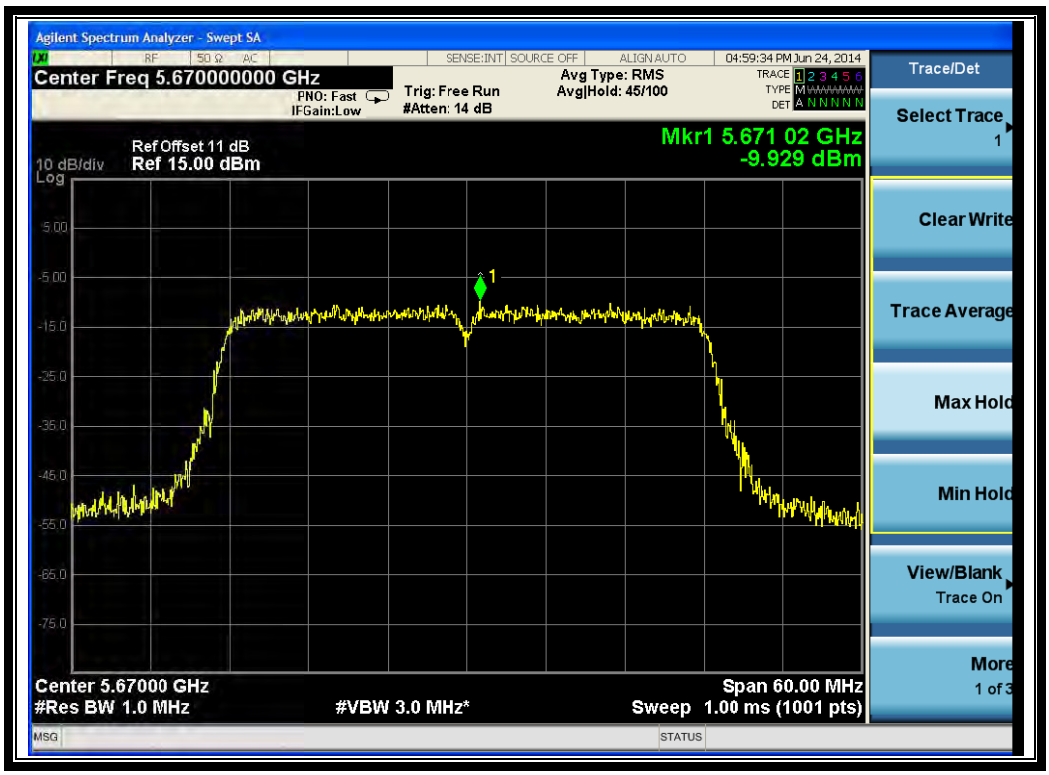
(Channel 62: 5310MHz @ 802.11n-40MHz)



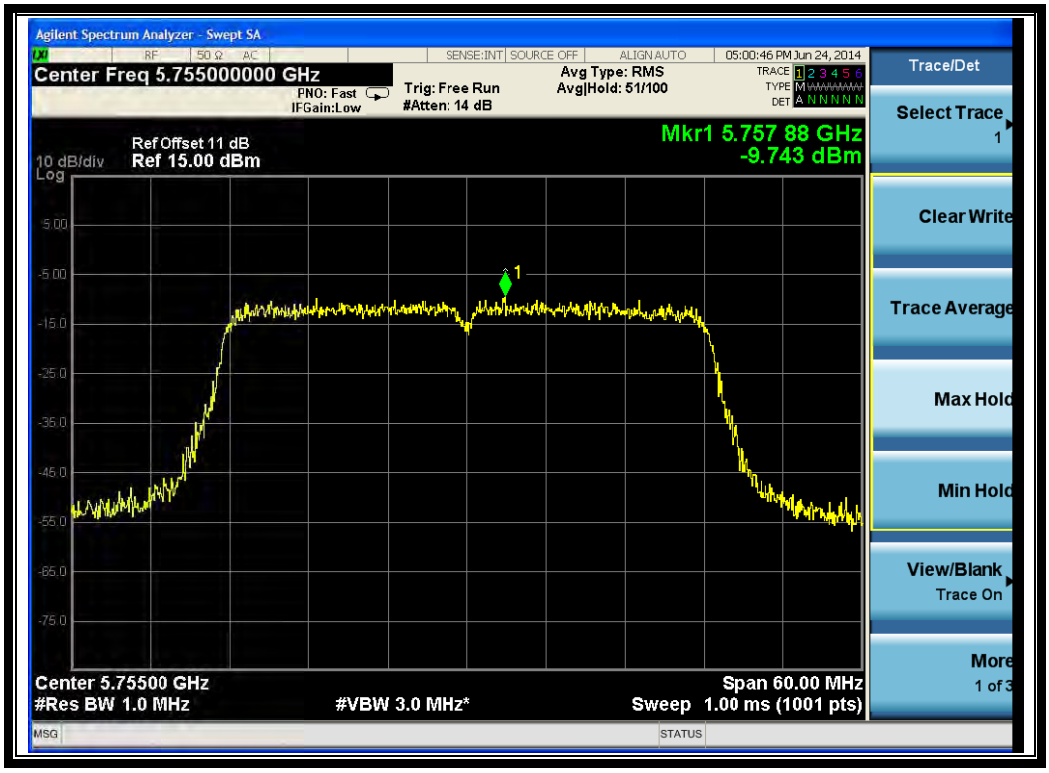
(Channel 102: 5510 MHz @ 802.11n-40MHz)



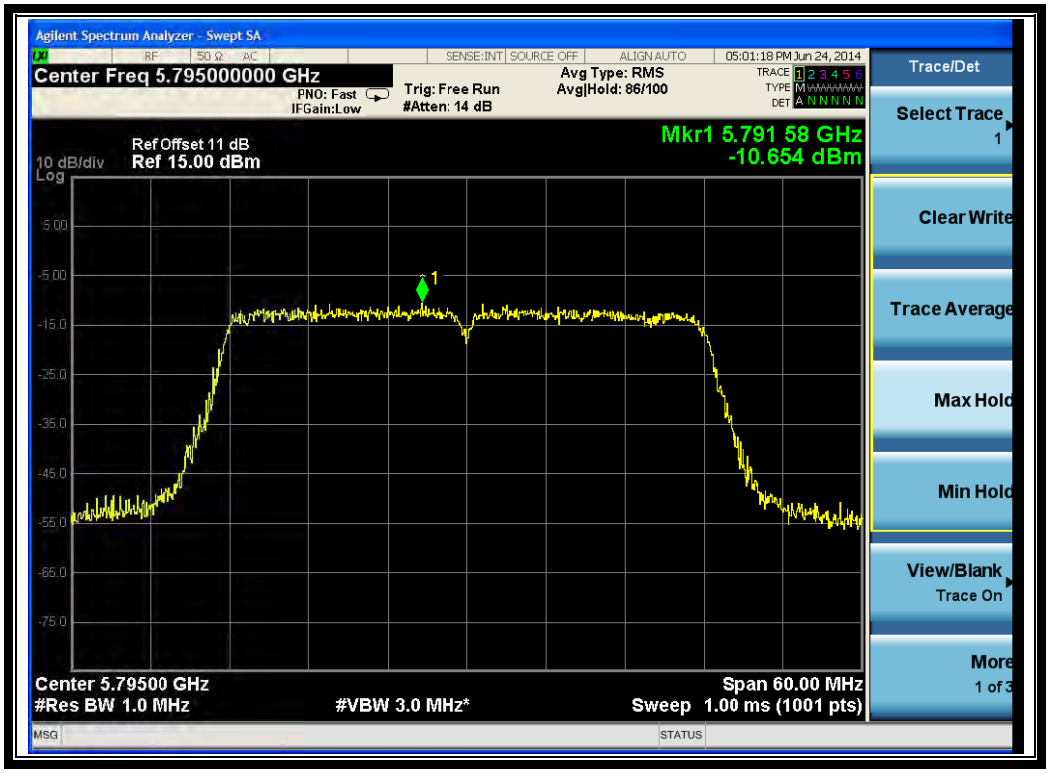
(Channel 110: 5550MHz @ 802.11n-40MHz)



(Channel 134: 5670MHz @ 802.11n-40MHz)



(Channel 151: 5755MHz @ 802.11n-40MHz)



(Channel 159: 5795MHz @ 802.11n-40MHz)

ANT 3 + ANT 4

Channel	Frequency (MHz)	Measured PPSD (dBm)	Limit (dBm)	Verdict
38	5190	-4.12	4	PASS
46	5230	-4.96		
54	5270	-4.28	11	
62	5310	-4.54		
102	5510	-4.07		
110	5550	-5.61		
134	5670	-6.86		
151	5755	-6.68	17	
159	5795	-7.27		

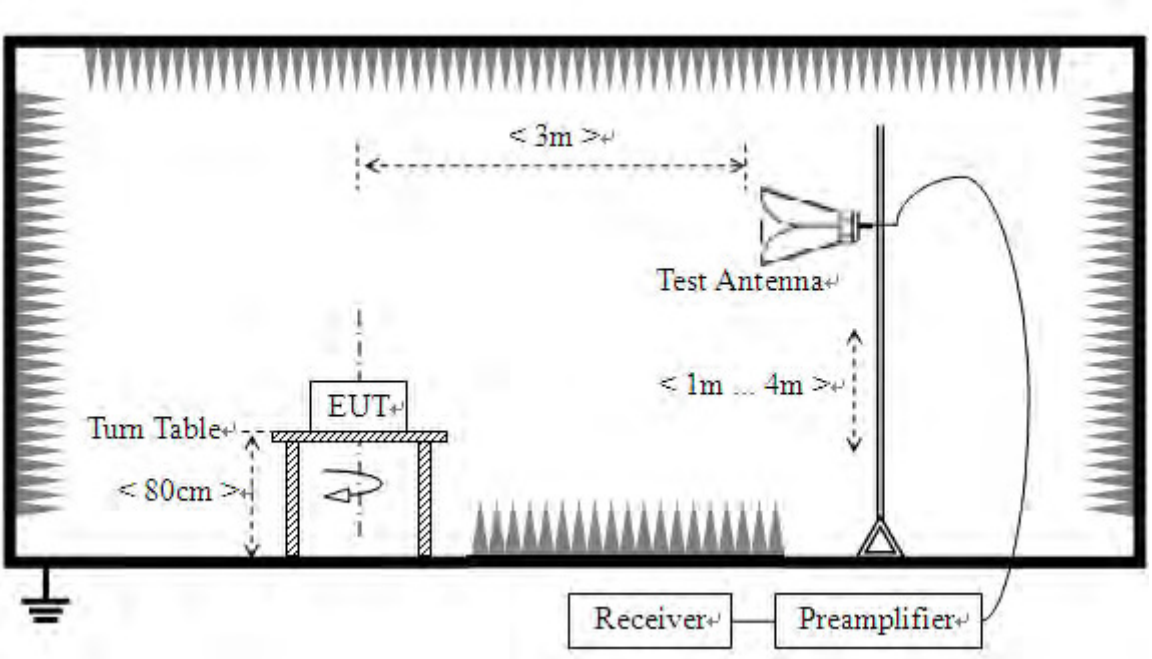
2.5. Restricted Frequency Bands

2.5.1. Requirement

According to FCC section 15.407(b)(7), in any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, In addition, radiated emissions which fall in the restricted bands, as defined in 15.205(a), must also comply with the radiated emission limits specified in 15.209(a).

2.5.2. Test Description

A. Test Setup



The Module is located in a 3m Semi-Anechoic Chamber; the antenna factors, cable loss and so on of the site as factors are calculated to correct the reading.

KDB 789033 Section H) 3)5)6(d)) was used in order to prove compliance

For the Test Antenna:

Test Antenna is 3m away from the EUT. Test Antenna height is varied from 1m to 4m above the ground to determine the maximum value of the field strength.

B. Equipments List:

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
Receiver	Agilent	E7405A	US44210471	2014.02.26	2015.02.25
Full-Anechoic Chamber	Albatross	9m*6m*6m	(n.a.)	2014.02.26	2015.02.25
Test Antenna - Horn	Schwarzbeck	BBHA 9120D	9120D-963	2014.02.26	2015.02.25

2.5.3. Test Result

The lowest and highest channels are tested to verify Restricted Frequency Bands.

The measurement results are obtained as below:
E [dBμV/m] =U_R + A_T + A_{Factor} [dB]; A_T =$L_{Cable\ loss}$ [dB]-G_{preamp} [dB]
A_T: Total correction Factor except Antenna
U_R: Receiver Reading
G_{preamp}: Preamplifier Gain
A_{Factor}: Antenna Factor at 3m

Note: Restricted Frequency Bands were performed when antenna was at vertical and horizontal polarity, and only the worse test condition (vertical) was recorded in this test report.

2.5.3.1. 802.11a Test mode

The lowest and highest channels are tested to verify the band edge emissions.

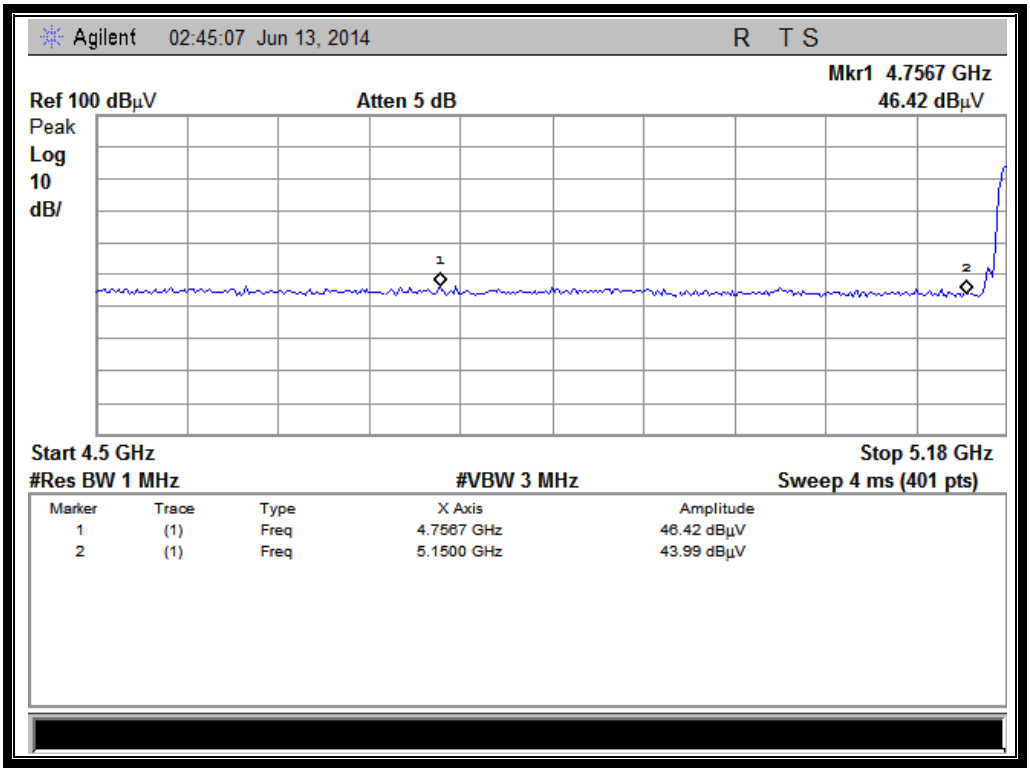
ANT 3

A. Test Verdict:

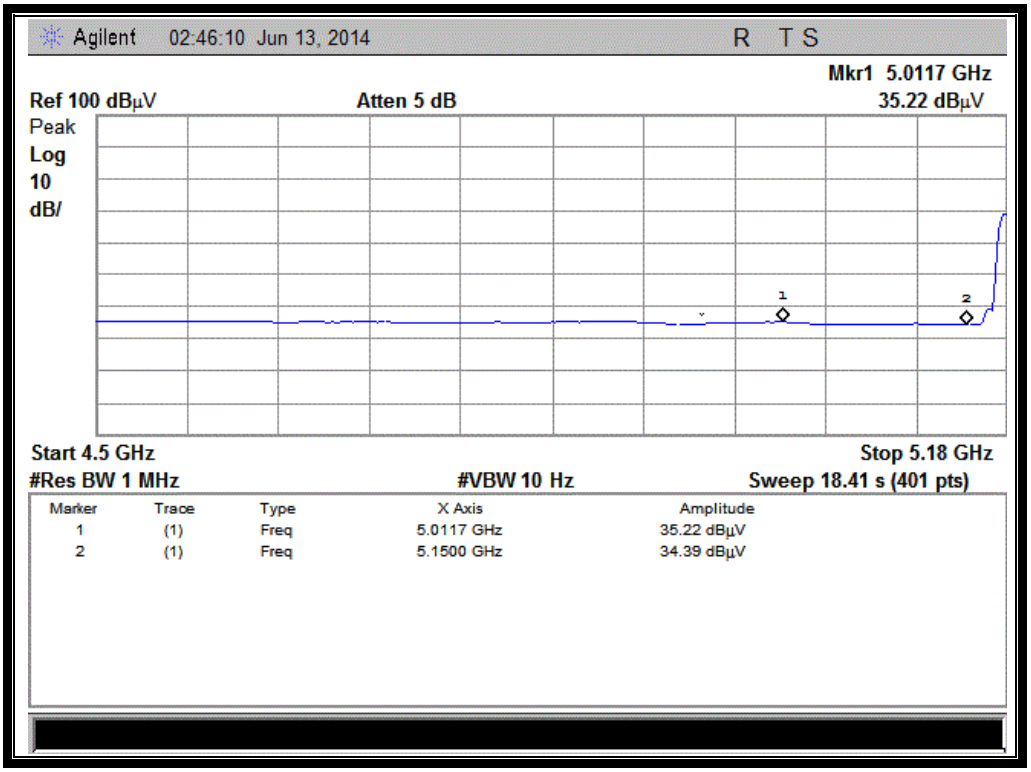
Channel	Frequency (MHz)	Detector PK/ AV	Receiver Reading UR (dBuV)	AT (dB)	AFactor (dB@3m)	Max. Emission E (dBμV/m)	Limit (dBμV/m)	Verdict
36	4756.70	PK	46.42	-43.13	32.11	35.40	74	Pass
36	5011.70	AV	35.22	-43.13	32.11	24.20	54	Pass
64	5440.40	PK	44.65	-42.79	31.69	33.55	74	Pass
64	5385.10	AV	33.79	-42.79	31.69	22.69	54	Pass
100	5403.63	PK	44.85	-42.79	31.69	33.75	74	Pass

Channel	Frequency (MHz)	Detector	Receiver Reading UR (dBuV)	AT (dB)	AFactor (dB@3m)	Max. Emission E (dBμV/m)	Limit (dBμV/m)	Verdict
		PK/ AV						
100	5414.50	AV	33.73	-42.79	31.69	22.63	54	Pass
140	5725.00	PK	44.01	-42.79	31.69	31.91	74	Pass
140	5794.10	AV	34.33	-42.79	31.69	23.23	54	Pass

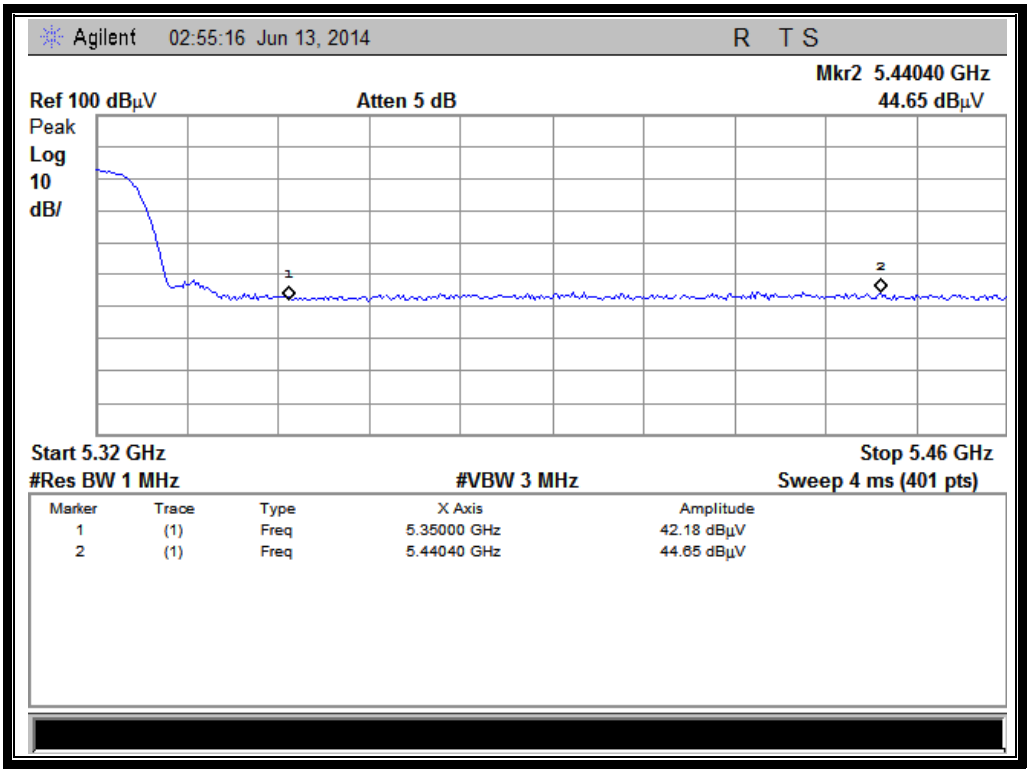
B. Test Plots:



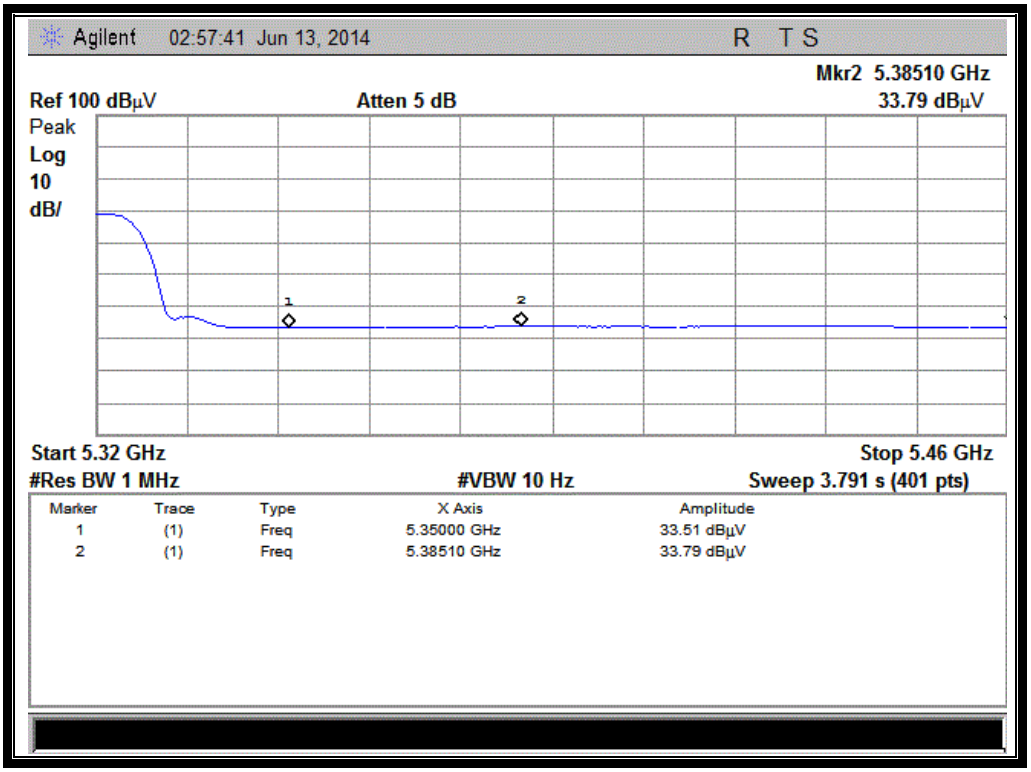
(Channel = 36 PEAK @ 802.11a)



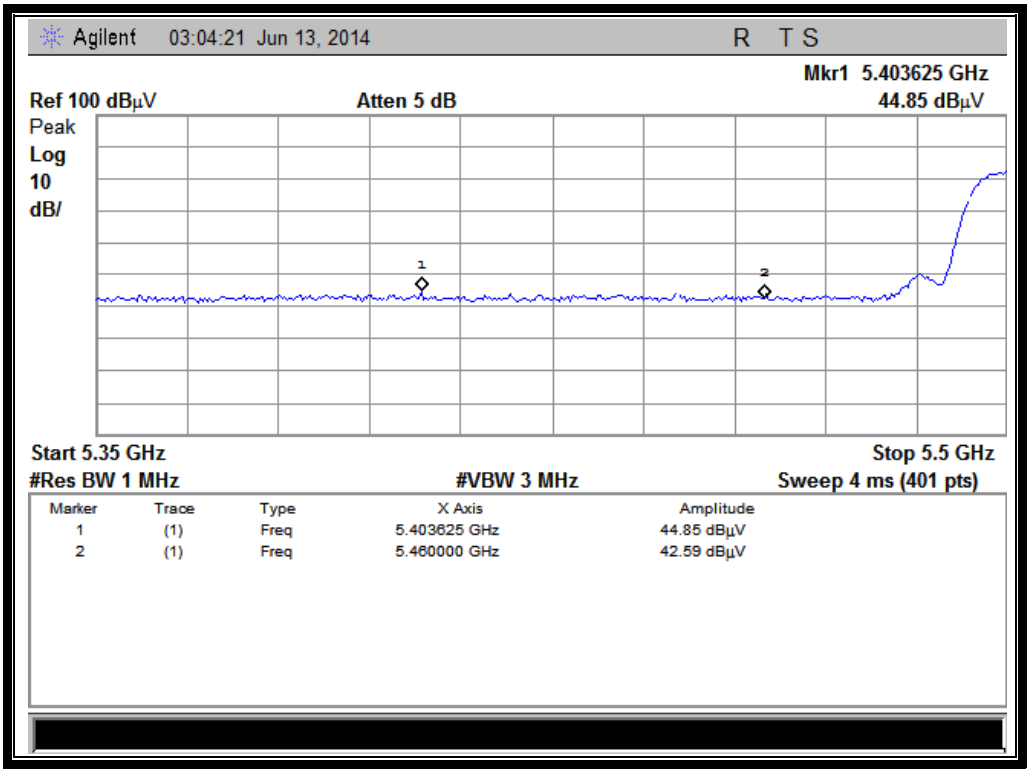
(Channel = 36 AVG @ 802.11a)



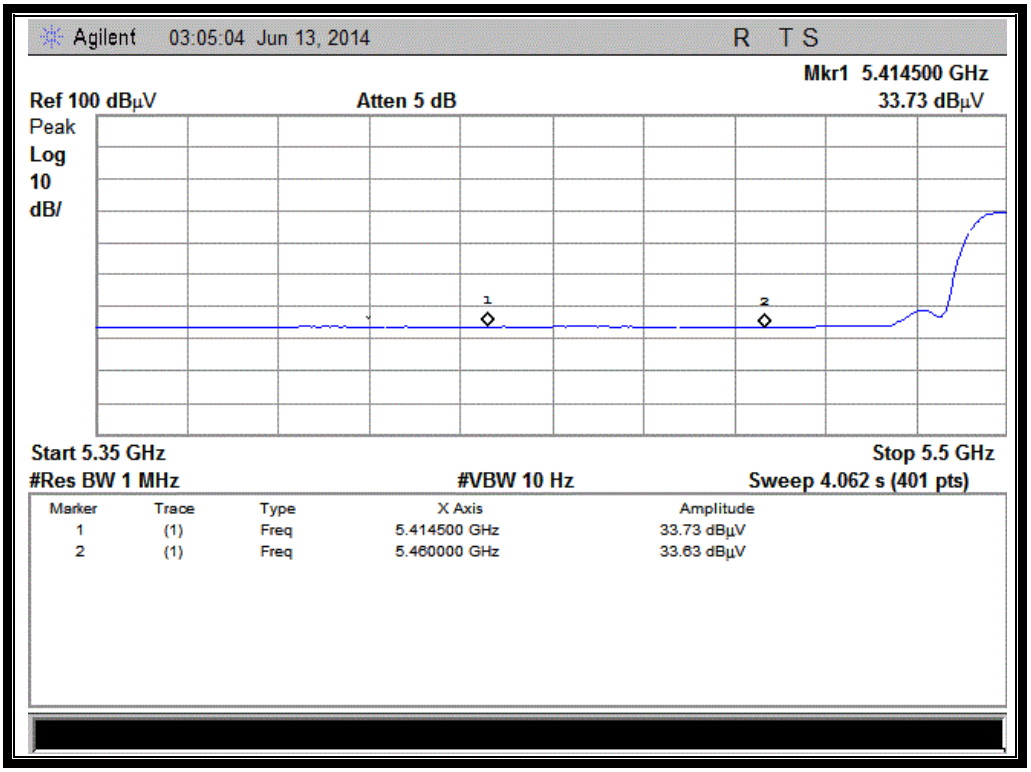
(Channel = 64 PEAK @ 802.11a)



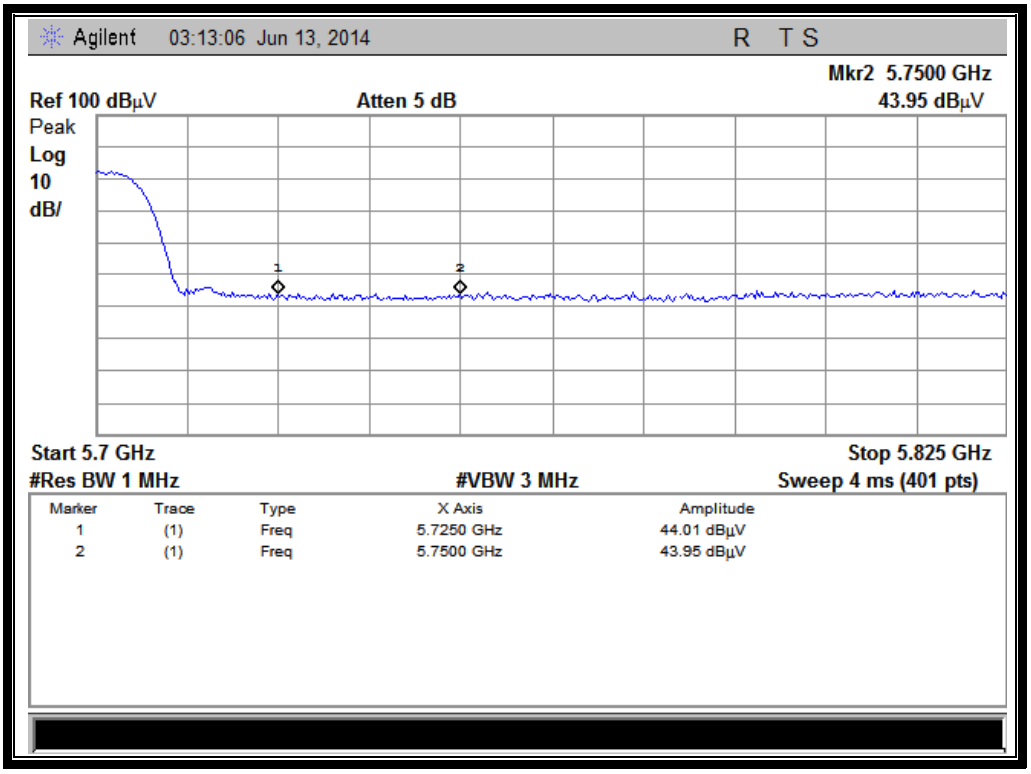
(Channel = 64 AVG @ 802.11a)



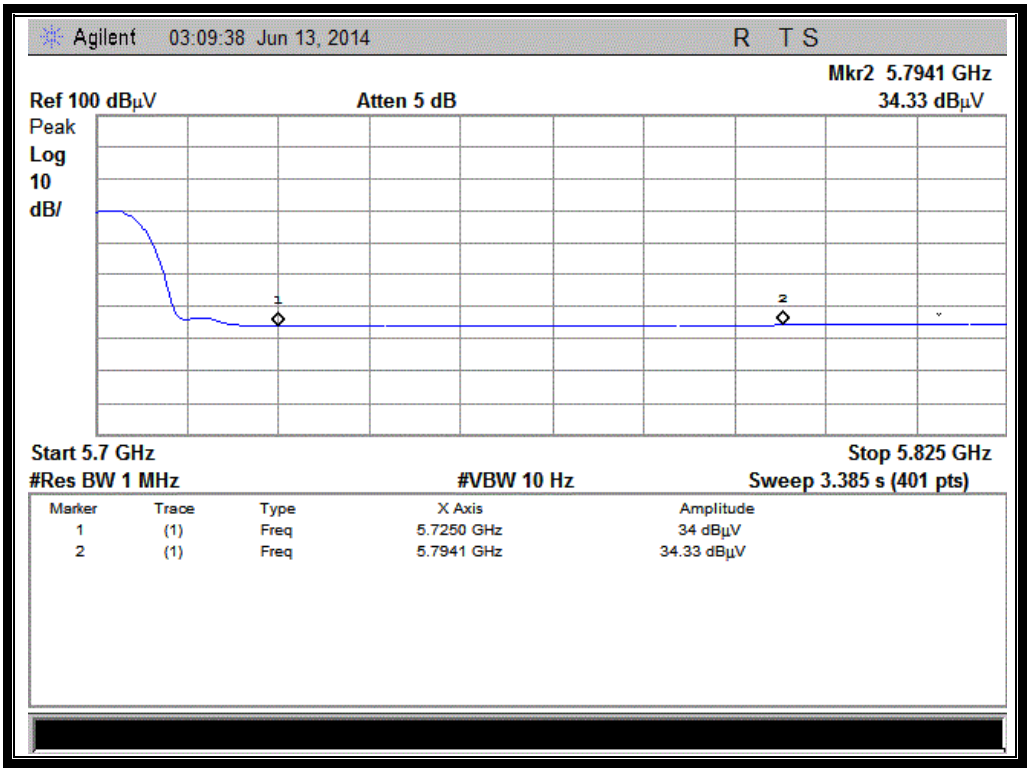
(Channel = 100 PEAK @ 802.11a)



(Channel = 100 AVG @ 802.11a)



(Channel = 140 PEAK @ 802.11a)



(Channel = 140 AVG @ 802.11a)

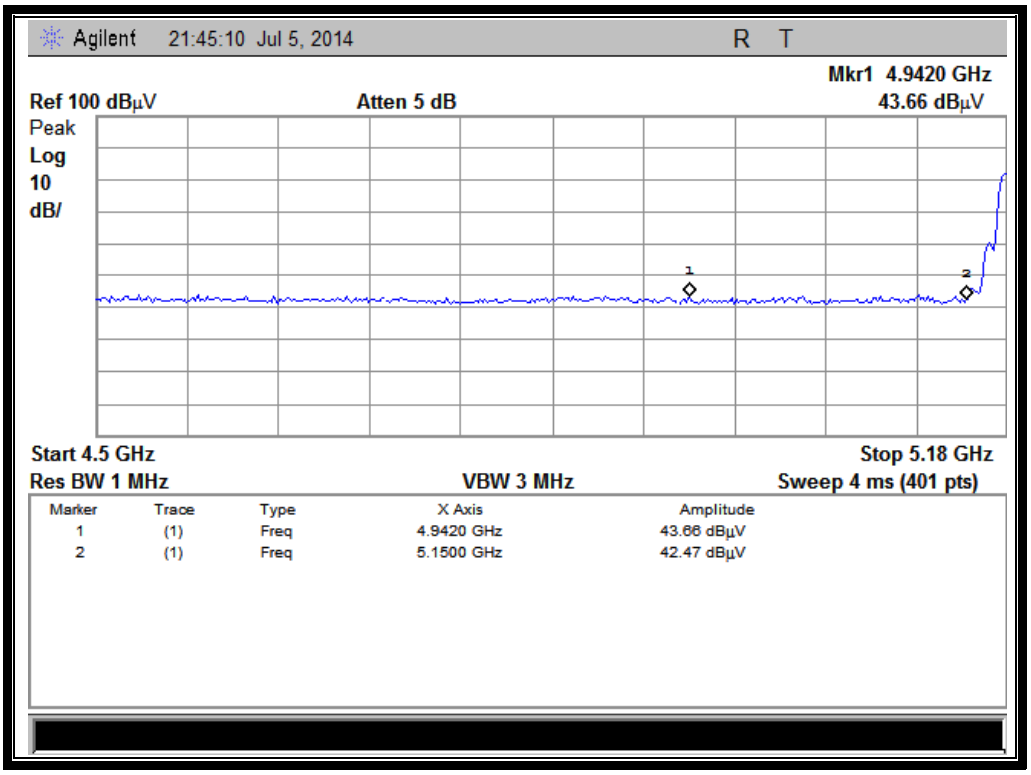
ANT 4

A. Test Verdict:

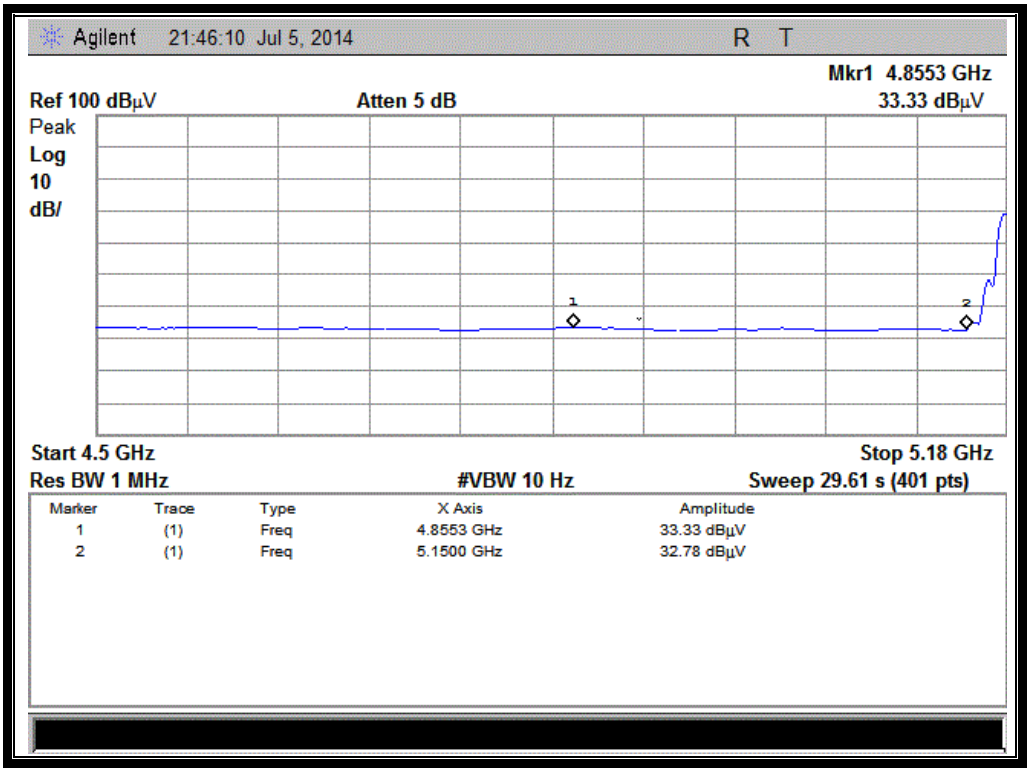
Channel	Frequency (MHz)	Detector	Receiver Reading UR (dBuV)	AT (dB)	AFactor (dB@3m)	Max. Emission E (dBµV/m)	Limit (dBµV/m)	Verdict
		PK/ AV						
36	4942.00	PK	43.66	-43.13	32.11	32.64	74	Pass
36	4855.30	AV	33.33	-43.13	32.11	22.31	54	Pass
64	5355.70	PK	43.54	-42.79	31.69	32.44	74	Pass
64	5350.00	AV	32.04	-42.79	31.69	20.94	54	Pass
100	5406.63	PK	42.84	-42.79	31.69	31.74	74	Pass
100	5402.50	AV	31.87	-42.79	31.69	20.77	54	Pass
140	5758.10	PK	41.48	-42.79	31.69	30.38	74	Pass

Channel	Frequency (MHz)	Detector	Receiver Reading UR (dBuV)	AT (dB)	AFactor (dB@3m)	Max. Emission E (dBμV/m)	Limit (dBμV/m)	Verdict
		PK/ AV						
140	5725.00	AV	30.90	-42.79	31.69	19.8	54	Pass

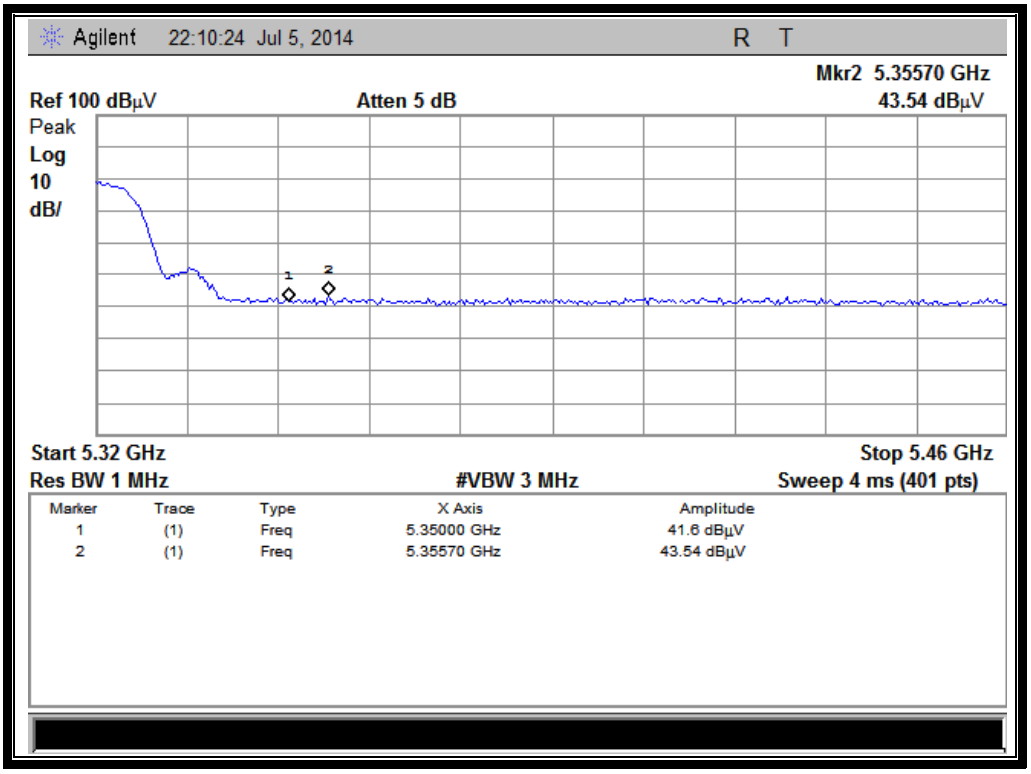
B. Test Plots:



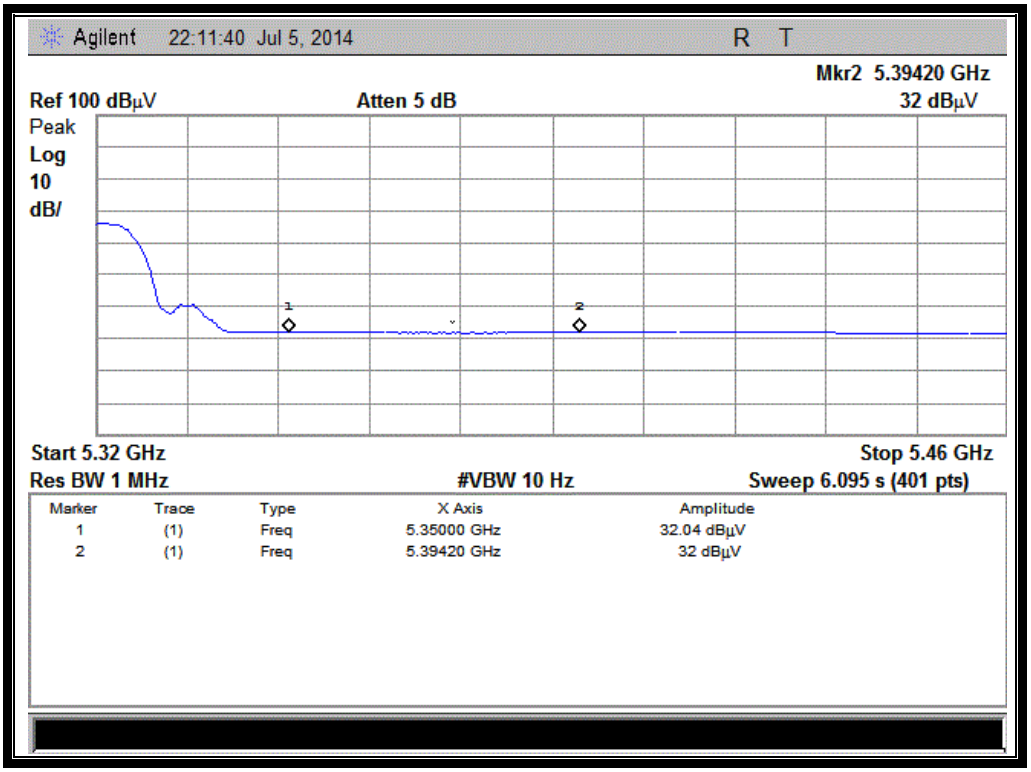
(Channel = 36 PEAK @ 802.11a)



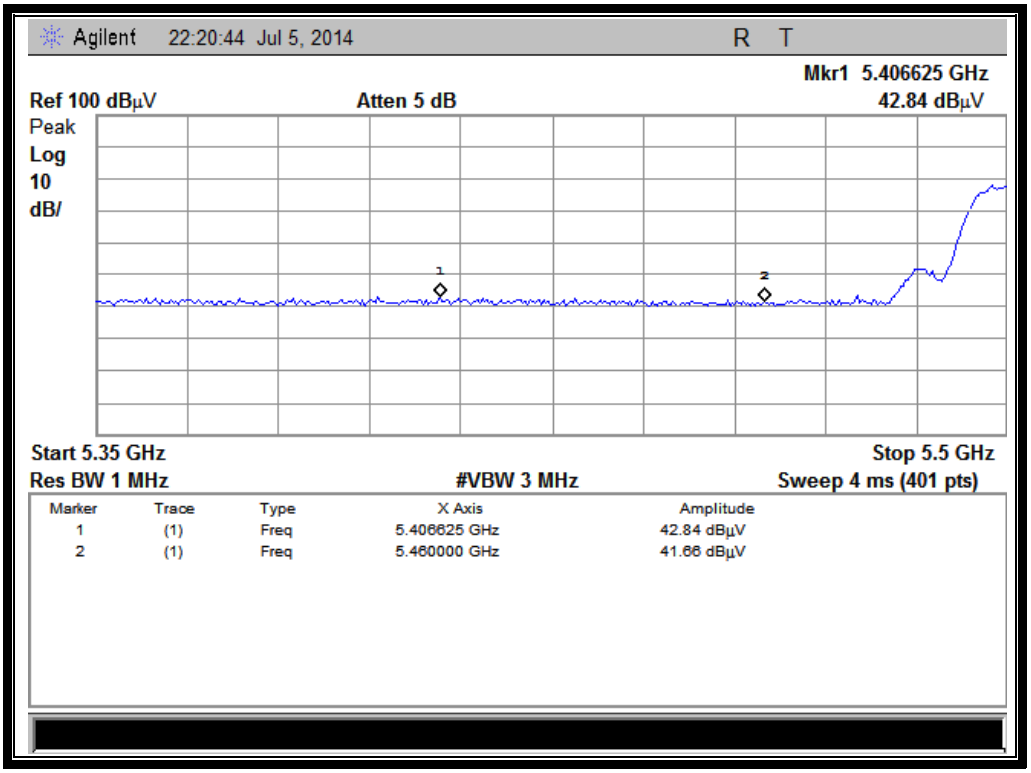
(Channel = 36 AVG @ 802.11a)



(Channel = 64 PEAK @ 802.11a)



(Channel = 64 AVG @ 802.11a)



(Channel = 100 PEAK @ 802.11a)