



FCC 47 CFR PART 15 SUBPART E

CERTIFICATION TEST REPORT

FOR

TABLET DEVICE

MODEL NUMBER: A1566

FCC ID: BCGA1566

REPORT NUMBER: 14U18207-E5, Revision B

ISSUE DATE: SEPTEMBER 30, 2014

Prepared for

APPLE, INC.

1 INFINITE LOOP

CUPERTINO, CA 95014, U.S.A.

Prepared by

UL VERIFICATION SERVICES INC.

47173 BENICIA STREET

FREMONT, CA 94538, U.S.A.

TEL: (510) 771-1000

FAX: (510) 661-0888



NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
--	09/02/14	Initial Issue	F. de Anda
A	09/13/14	Update per TCB comments.	D. Garcia
B	09/30/14	Updated per TCB comments	D. Garcia

TABLE OF CONTENTS

1. ATTESTATION OF TEST RESULTS.....	10
2. TEST METHODOLOGY.....	11
3. FACILITIES AND ACCREDITATION.....	11
4. CALIBRATION AND UNCERTAINTY	11
4.1. MEASURING INSTRUMENT CALIBRATION.....	11
4.2. SAMPLE CALCULATION.....	11
4.3. MEASUREMENT UNCERTAINTY	11
5. EQUIPMENT UNDER TEST	12
5.1. DESCRIPTION OF EUT.....	12
5.2. MAXIMUM OUTPUT POWER.....	12
5.3. DESCRIPTION OF AVAILABLE ANTENNAS	14
5.4. SOFTWARE AND FIRMWARE.....	14
5.5. WORST-CASE CONFIGURATION AND MODE	14
5.6. DESCRIPTION OF TEST SETUP	15
6. TEST AND MEASUREMENT EQUIPMENT	19
7. MEASUREMENT METHODS	20
8. ON TIME, DUTY CYCLE AND MEASUREMENT METHODS.....	21
8.1. ON TIME AND DUTY CYCLE RESULTS.....	21
8.1. DUTY CYCLE PLOTS.....	22
9. ANTENNA PORT TEST RESULTS	26
9.1. 802.11a MODE IN THE 5.2 GHz BAND	26
9.1.1. 26 dB BANDWIDTH	26
9.1.2. 99% BANDWIDTH	29
9.1.3. AVERAGE POWER	32
9.1.4. OUTPUT POWER AND PSD	33
9.2. 802.11n HT20 2TX CDD MODE IN THE 5.2 GHz BAND	40
9.2.1. 26 dB BANDWIDTH	40
9.2.2. 99% BANDWIDTH	44
9.2.3. AVERAGE POWER	48
9.2.4. OUTPUT POWER AND PSD	49
9.3. 802.11n HT20 2TX STBC MODE IN THE 5.2 GHz BAND.....	54
9.3.1. 26 dB BANDWIDTH	54
9.3.2. 99% BANDWIDTH	58
9.3.3. AVERAGE POWER	62

9.3.4.	OUTPUT POWER AND PSD	63
9.4.	<i>802.11n HT40 MODE IN THE 5.2 GHz BAND</i>	69
9.4.1.	26 dB BANDWIDTH	69
9.4.2.	99% BANDWIDTH	71
9.4.3.	AVERAGE POWER	73
9.4.4.	OUTPUT POWER AND PSD	74
9.5.	<i>802.11n HT40 2TX CDD MODE IN THE 5.2 GHz BAND</i>	79
9.5.1.	26 dB BANDWIDTH	79
9.5.2.	99% BANDWIDTH	82
9.5.3.	AVERAGE POWER	85
9.5.4.	OUTPUT POWER AND PSD	86
9.6.	<i>802.11n HT40 2TX STBC MODE IN THE 5.2 GHz BAND</i>	90
9.6.1.	26 dB BANDWIDTH	90
9.6.2.	99% BANDWIDTH	93
9.6.3.	AVERAGE POWER	96
9.6.4.	OUTPUT POWER AND PSD	97
9.7.	<i>802.11ac VHT80 MODE IN THE 5.2 GHz BAND</i>	101
9.7.1.	26 dB BANDWIDTH	101
9.7.2.	99% BANDWIDTH	102
9.7.3.	AVERAGE POWER	103
9.7.4.	OUTPUT POWER AND PSD	104
9.8.	<i>802.11ac VHT80 2TX MODE CDD IN THE 5.2 GHz BAND</i>	108
9.8.1.	26 dB BANDWIDTH	108
9.8.2.	99% BANDWIDTH	110
9.8.3.	AVERAGE POWER	112
9.8.4.	OUTPUT POWER AND PSD	113
9.9.	<i>802.11ac VHT80 2TX MODE STBC IN THE 5.2 GHz BAND</i>	116
9.9.1.	26 dB BANDWIDTH	116
9.9.2.	99% BANDWIDTH	118
9.9.3.	AVERAGE POWER	120
9.9.4.	OUTPUT POWER AND PSD	121
9.10.	<i>802.11a MODE IN THE 5.3 GHz BAND</i>	124
9.10.1.	26 dB BANDWIDTH	124
9.10.2.	99% BANDWIDTH	127
9.10.3.	AVERAGE POWER	130
9.10.4.	OUTPUT POWER AND PSD	131
9.11.	<i>802.11n HT20 2TX CDD MODE IN THE 5.3 GHz BAND</i>	138
9.11.1.	26 dB BANDWIDTH	138
9.11.2.	99% BANDWIDTH	142
9.11.3.	AVERAGE POWER	146
9.11.4.	OUTPUT POWER AND PSD	147
9.12.	<i>802.11n HT20 2TX STBC MODE IN THE 5.3 GHz BAND</i>	152
9.12.1.	26 dB BANDWIDTH	152
9.12.2.	99% BANDWIDTH	156
9.12.3.	AVERAGE POWER	160
9.12.4.	OUTPUT POWER AND PSD	161
9.13.	<i>802.11n HT40 MODE IN THE 5.3 GHz BAND</i>	166

9.13.1.	26 dB BANDWIDTH	166
9.13.2.	99% BANDWIDTH.....	168
9.13.3.	AVERAGE POWER.....	170
9.13.4.	OUTPUT POWER AND PSD.....	171
9.14.	<i>802.11n HT40 2TX CDD MODE IN THE 5.3 GHz BAND</i>	<i>176</i>
9.14.1.	26 dB BANDWIDTH	176
9.14.2.	99% BANDWIDTH.....	179
9.14.3.	AVERAGE POWER.....	182
9.14.4.	OUTPUT POWER AND PSD.....	183
9.15.	<i>802.11n HT40 2TX STBC MODE IN THE 5.3 GHz BAND</i>	<i>187</i>
9.15.1.	26 dB BANDWIDTH	187
9.15.2.	99% BANDWIDTH.....	190
9.15.3.	AVERAGE POWER.....	193
9.15.4.	OUTPUT POWER AND PSD.....	194
9.16.	<i>802.11ac VHT80 MODE IN THE 5.3 GHz BAND</i>	<i>198</i>
9.16.1.	26 dB BANDWIDTH	198
9.16.2.	99% BANDWIDTH.....	199
9.16.3.	AVERAGE POWER.....	200
9.16.4.	OUTPUT POWER AND PSD.....	201
9.17.	<i>802.11ac VHT80 2TX CDD MODE IN THE 5.3 GHz BAND</i>	<i>205</i>
9.17.1.	26 dB BANDWIDTH	205
9.17.2.	99% BANDWIDTH.....	207
9.17.3.	AVERAGE POWER.....	209
9.17.4.	OUTPUT POWER AND PSD.....	210
9.18.	<i>802.11ac VHT80 2TX STBC MODE IN THE 5.3 GHz BAND</i>	<i>213</i>
9.18.1.	26 dB BANDWIDTH	213
9.18.2.	99% BANDWIDTH.....	215
9.18.3.	AVERAGE POWER.....	217
9.18.4.	OUTPUT POWER AND PSD.....	218
9.19.	<i>802.11a MODE IN THE 5.6 GHz BAND</i>	<i>221</i>
9.19.1.	26 dB BANDWIDTH	221
9.19.2.	99% BANDWIDTH.....	224
9.19.3.	AVERAGE POWER.....	227
9.19.4.	OUTPUT POWER AND PSD.....	228
9.20.	<i>802.11n HT20 2TX CDD MODE IN THE 5.6 GHz BAND</i>	<i>245</i>
9.20.1.	26 dB BANDWIDTH	245
9.20.2.	99% BANDWIDTH.....	250
9.20.3.	AVERAGE POWER.....	255
9.20.4.	OUTPUT POWER AND PSD.....	256
9.21.	<i>802.11n HT20 2TX STBC MODE IN THE 5.6 GHz BAND</i>	<i>267</i>
9.21.1.	26 dB BANDWIDTH	267
9.21.2.	99% BANDWIDTH.....	272
9.21.3.	AVERAGE POWER.....	277
9.21.4.	OUTPUT POWER AND PSD.....	278
9.22.	<i>802.11n HT40 MODE IN THE 5.6 GHz BAND</i>	<i>289</i>
9.22.1.	26 dB BANDWIDTH	289
9.22.2.	99% BANDWIDTH.....	292
9.22.3.	AVERAGE POWER.....	295

9.22.4.	OUTPUT POWER AND PSD.....	296
9.23.	<i>802.11n HT40 2TX CDD MODE IN THE 5.6 GHz BAND</i>	313
9.23.1.	26 dB BANDWIDTH	313
9.23.2.	99% BANDWIDTH.....	318
9.23.3.	AVERAGE POWER.....	323
9.23.4.	OUTPUT POWER AND PSD.....	324
9.24.	<i>802.11n HT40 2TX STBC MODE IN THE 5.6 GHz BAND</i>	335
9.24.1.	26 dB BANDWIDTH	335
9.24.2.	99% BANDWIDTH.....	340
9.24.3.	AVERAGE POWER.....	345
9.24.4.	OUTPUT POWER AND PSD.....	346
9.25.	<i>802.11ac VHT80 MODE IN THE 5.6 GHz BAND</i>	357
9.25.1.	26 dB BANDWIDTH	357
9.25.2.	99% BANDWIDTH.....	359
9.25.3.	AVERAGE POWER.....	362
9.25.4.	OUTPUT POWER AND PSD.....	363
9.26.	<i>802.11ac HT80 2TX CDD MODE IN THE 5.6 GHz BAND</i>	379
9.26.1.	26 dB BANDWIDTH	379
9.26.2.	99% BANDWIDTH.....	383
9.26.3.	AVERAGE POWER.....	387
9.26.4.	OUTPUT POWER AND PSD.....	388
9.27.	<i>802.11ac HT80 2TX STBC MODE IN THE 5.6 GHz BAND</i>	398
9.27.1.	26 dB BANDWIDTH	398
9.27.2.	99% BANDWIDTH.....	402
9.27.3.	AVERAGE POWER.....	406
9.27.4.	OUTPUT POWER AND PSD.....	407
9.28.	<i>802.11a MODE IN THE 5.8 GHz BAND</i>	417
9.28.1.	6 dB BANDWIDTH	417
9.28.2.	26 dB BANDWIDTH	420
9.28.3.	99% BANDWIDTH.....	423
9.28.4.	AVERAGE POWER.....	426
9.28.5.	OUTPUT POWER	427
9.28.1.	MAXIMUM POWER SPECTRAL DENSITY (PSD)	430
9.29.	<i>802.11n HT20 2TX CDD MODE IN THE 5.8 GHz BAND</i>	437
9.29.1.	6 dB BANDWIDTH	437
9.29.2.	26 dB BANDWIDTH	441
9.29.3.	99% BANDWIDTH.....	446
9.29.4.	AVERAGE POWER.....	451
9.29.5.	OUTPUT POWER	452
9.29.6.	MAXIMUM POWER SPECTRAL DENSITY (PSD)	454
9.30.	<i>802.11n HT20 2TX STBC MODE IN THE 5.8 GHz BAND</i>	459
9.31.	<i>802.11n HT40 MODE IN THE 5.8 GHz BAND</i>	460
9.31.1.	6 dB BANDWIDTH	460
9.31.2.	26 dB BANDWIDTH	462
9.31.3.	99% BANDWIDTH.....	464
9.31.4.	AVERAGE POWER.....	466
9.31.5.	OUTPUT POWER	467
9.31.6.	MAXIMUM POWER SPECTRAL DENSITY (PSD)	469

9.32.	802.11n HT40 2TX CDD MODE IN THE 5.8 GHz BAND	474
9.32.1.	6 dB BANDWIDTH	474
9.32.2.	26 dB BANDWIDTH	477
9.32.3.	99% BANDWIDTH.....	480
9.32.4.	AVERAGE POWER.....	483
9.32.5.	OUTPUT POWER	484
9.32.6.	MAXIMUM POWER SPECTRAL DENSITY (PSD)	486
9.33.	802.11n HT40 2TX STBC MODE IN THE 5.8 GHz BAND	490
9.34.	802.11ac VHT80 MODE IN THE 5.8 GHz BAND	491
9.34.1.	6 dB BANDWIDTH	491
9.34.2.	26 dB BANDWIDTH	492
9.34.3.	99% BANDWIDTH.....	493
9.34.4.	AVERAGE POWER.....	494
9.34.5.	OUTPUT POWER	495
9.34.6.	MAXIMUM POWER SPECTRAL DENSITY (PSD)	497
9.35.	802.11ac VHT80 2TX CDD MODE IN THE 5.8 GHz BAND	500
9.35.1.	6 dB BANDWIDTH	500
9.35.2.	26 dB BANDWIDTH	502
9.35.3.	99% BANDWIDTH.....	504
9.35.4.	AVERAGE POWER.....	506
9.35.5.	OUTPUT POWER	507
9.35.6.	MAXIMUM POWER SPECTRAL DENSITY (PSD)	509
9.36.	802.11ac VHT80 2TX STBC MODE IN THE 5.8 GHz BAND	512
10.	RADIATED TEST RESULTS	513
10.1.	LIMITS AND PROCEDURE	513
10.2.	TRANSMITTER ABOVE 1 GHz.....	514
10.2.1.	TX ABOVE 1 GHz 802.11a 1TX MODE IN THE 5.2 GHz BAND	514
10.2.2.	TX ABOVE 1 GHz 802.11n HT20 CDD 2TX MODE IN THE 5.2 GHz BAND	522
10.2.3.	TX ABOVE 1 GHz 802.11n HT40 1TX MODE IN THE 5.2 GHz BAND	530
10.2.4.	TX ABOVE 1 GHz 802.11n HT40 CDD 2TX MODE IN THE 5.2 GHz BAND	536
10.2.5.	TX ABOVE 1G 802.11ac 80MHz 1TX MODE IN THE 5.2 GHz BAND	542
10.2.6.	TX ABOVE 1G 802.11ac 80MHz 2TX MODE IN THE 5.2 GHz BAND	546
10.2.7.	TX ABOVE 1 GHz 802.11a 1TX MODE IN THE 5.3 GHz BAND	550
10.2.8.	TX ABOVE 1 GHz 802.11n HT20 CDD 2TX MODE IN THE 5.3 GHz BAND	558
10.2.9.	TX ABOVE 1 GHz 802.11n HT40 1TX MODE IN THE 5.3 GHz BAND	566
10.2.10.	TX ABOVE 1 GHz 802.11n HT40 CDD 2TX MODE IN THE 5.3 GHz BAND	572
10.2.11.	TX ABOVE 1G 802.11ac 80MHz 1TX MODE IN THE 5.3 GHz BAND	578
10.2.12.	TX ABOVE 1G 802.11ac 80MHz 2TX MODE IN THE 5.3 GHz BAND	582
10.2.13.	TX ABOVE 1 GHz 802.11a 1TX MODE IN THE 5.6 GHz BAND	586
10.2.14.	TX ABOVE 1 GHz 802.11n HT20 CDD 2TX MODE IN THE 5.6 GHz BAND	597
10.2.15.	TX ABOVE 1 GHz 802.11n HT20 MODE, CHANNEL 144, 5.6 GHz BAND	606
10.2.16.	TX ABOVE 1 GHz 802.11n HT40 1TX MODE IN THE 5.6 GHz BAND	608
10.2.17.	TX ABOVE 1 GHz 802.11n HT40 CDD 2TX MODE IN THE 5.6 GHz BAND	619
10.2.18.	TX ABOVE 1 GHz 802.11n HT40 2TX MODE, CHANNEL 142, 5.6 GHz BAND	628
10.2.19.	TX ABOVE 1G 802.11ac 80MHz 1TX MODE IN THE 5.6 GHz BAND	630
10.2.20.	TX ABOVE 1 GHz 802.11n ac80 1TX MODE, CHANNEL 138, 5.6 GHz BAND	637
10.2.21.	TX ABOVE 1G 802.11ac 80MHz 2TX MODE IN THE 5.6 GHz BAND	640
10.2.22.	TX ABOVE 1G 802.11ac 80MHz 2TX MODE, CHANNEL 138, 5.6 GHz BAND	647

10.2.23.	TX ABOVE 1 GHz 802.11a 1TX MODE IN THE 5.8 GHz BAND	649
10.2.24.	TX ABOVE 1 GHz 802.11n HT20 CDD 2TX MODE IN THE 5.8 GHz BAND	657
10.2.25.	TX ABOVE 1 GHz 802.11n HT40 1TX MODE IN THE 5.8 GHz BAND	665
10.2.26.	TX ABOVE 1 GHz 802.11n HT40 CDD 2TX MODE IN THE 5.8 GHz BAND	671
10.2.27.	TX ABOVE 1G 802.11ac 80MHz 1TX MODE IN THE 5.8 GHz BAND	677
10.2.28.	TX ABOVE 1G 802.11ac 80MHz 2TX MODE IN THE 5.8 GHz BAND	681
10.2.29.	2.4GHZ AND 5GHZ BAND CO-LOCATION.....	685
10.3.	WORST-CASE BELOW 1 GHz	693
10.4.	WORST-CASE 18 to 26 GHz	695
10.5.	WORST-CASE 26 to 40 GHz	696
11.	AC POWER LINE CONDUCTED EMISSIONS.....	697
12.	DYNAMIC FREQUENCY SELECTION	702
12.1.	OVERVIEW	702
12.1.1.	LIMITS.....	702
12.1.2.	TEST AND MEASUREMENT SYSTEM.....	706
12.1.3.	SETUP OF EUT (CLIENT MODE).....	709
12.1.4.	SETUP OF EUT (CLIENT-TO-CLIENT COMMUNICATIONS MODE)	710
12.1.5.	DESCRIPTION OF EUT	711
12.2.	CLIENT MODE RESULTS FOR 20 MHz BANDWIDTH.....	713
12.2.1.	TEST CHANNEL	713
12.2.2.	RADAR WAVEFORM AND TRAFFIC.....	713
12.2.3.	OVERLAPPING CHANNEL TESTS.....	715
12.2.4.	MOVE AND CLOSING TIME	715
12.3.	CLIENT MODE RESULTS FOR 40 MHz BANDWIDTH.....	719
12.3.1.	TEST CHANNEL	719
12.3.2.	RADAR WAVEFORM AND TRAFFIC.....	719
12.3.3.	OVERLAPPING CHANNEL TESTS.....	721
12.3.4.	MOVE AND CLOSING TIME	721
12.3.5.	NON-OCCUPANCY PERIOD	725
12.4.	CLIENT MODE RESULTS FOR 80 MHz BANDWIDTH.....	726
12.4.1.	TEST CHANNEL	726
12.4.2.	RADAR WAVEFORM AND TRAFFIC.....	726
12.4.3.	OVERLAPPING CHANNEL TESTS.....	728
12.4.4.	MOVE AND CLOSING TIME	728
12.4.5.	NON-OCCUPANCY PERIOD	733
12.5.	CLIENT-TO-CLIENT COMMUNICATIONS MODE RESULTS FOR 20 MHz BANDWIDTH	734
12.5.1.	TEST CHANNEL	734
12.5.2.	RADAR WAVEFORM AND TRAFFIC.....	734
12.5.3.	OVERLAPPING CHANNEL TESTS.....	736
12.5.4.	MOVE AND CLOSING TIME	736
12.6.	CLIENT-TO-CLIENT COMMUNICATIONS MODE RESULTS FOR 40 MHz BANDWIDTH	741
12.6.1.	TEST CHANNEL	741
12.6.2.	RADAR WAVEFORM AND TRAFFIC.....	741
12.6.3.	OVERLAPPING CHANNEL TESTS.....	743
12.6.4.	MOVE AND CLOSING TIME	743
12.7.	CLIENT-TO-CLIENT COMMUNICATIONS MODE RESULTS FOR 80 MHz BANDWIDTH	748

12.7.1.	TEST CHANNEL	748
12.7.2.	RADAR WAVEFORM AND TRAFFIC.....	748
12.7.3.	OVERLAPPING CHANNEL TESTS.....	750
12.7.4.	MOVE AND CLOSING TIME	750
13.	SETUP PHOTOS	755

1. ATTESTATION OF TEST RESULTS

COMPANY NAME: APPLE, INC.
1 INFINITE LOOP
CUPERTINO, CA 95014, U.S.A.

EUT DESCRIPTION: TABLET DEVICE

MODEL: A1566

SERIAL NUMBER: DLXMX010G4LV (Conducted), DLXMX00JG4LV (Radiated)

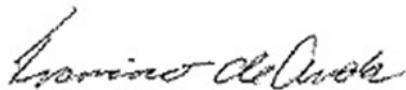
DATE TESTED: JULY 8, 2014 – AUGUST 28, 2014

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart E	Pass

UL Verification Services Inc. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL Verification Services Inc. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL Verification Services Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Inc. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government.

Approved & Released For
UL Verification Services Inc. By:



FRANCISCO DE ANDA
PROJECT LEAD
UL VERIFICATION SERVICES INC.

Tested By:



MONA HUA
EMC TECHNICIAN
UL VERIFICATION SERVICES INC.

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC CFR 47 Part 2, FCC CFR 47 Part 15, FCC KDB 905462 D02, FCC KDB 789033 and ANSI C63.10-2009.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 and 47266 Benicia Street, Fremont, California, USA. Line conducted emissions are measured only at the 47173 address. The following table identifies which facilities were utilized for radiated emission measurements documented in this report. Specific facilities are also identified in the test results sections.

47173 Benicia Street	47266 Benicia Street
☐ Chamber A	☒ Chamber D
☐ Chamber B	☒ Chamber E
☐ Chamber C	☐ Chamber F
	☒ Chamber G
	☒ Chamber H

UL Verification Services Inc. is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at <http://ts.nist.gov/standards/scopes/2000650.htm>.

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

$$\begin{aligned} \text{Field Strength (dBuV/m)} &= \text{Measured Voltage (dBuV)} + \text{Antenna Factor (dB/m)} + \text{Cable Loss} \\ &\quad (\text{dB}) - \text{Preamp Gain (dB)} \\ 36.5 \text{ dBuV} + 18.7 \text{ dB/m} + 0.6 \text{ dB} - 26.9 \text{ dB} &= 28.9 \text{ dBuV/m} \end{aligned}$$

4.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	UNCERTAINTY
Conducted Disturbance, 0.15 to 30 MHz	±3.52 dB
Radiated Disturbance, 30 to 1000 MHz	±4.94 dB

Uncertainty figures are valid to a confidence level of 95%.

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a tablet with multimedia functions (music, application support, and video), IEEE 802.11a/b/g/n/ac radio, Bluetooth and BLE radio. The rechargeable battery is not user accessible.

5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum conducted output power as follows:

Note: The output power on covered modes is equal to or less than the one referenced.

5.2GHz Band

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
5180 - 5240	802.11a	17.99	62.95
5180 - 5240	802.11n HT20 SISO	Covered by 802.11a	
5180 - 5240	802.11a 2TX CDD	Covered by 802.11n HT20 CDD 2TX	
5180 - 5240	802.11n HT20 CDD 2TX	17.96	62.52
5180 - 5240	802.11n HT20 STBC 2TX	19.71	93.54
5180 - 5240	802.11n HT20 SDM 2TX	Covered by 802.11n HT20 STBC 2TX	
5190 - 5230	802.11n HT40 SISO	17.93	62.09
5190 - 5230	802.11n HT40 CDD 2TX	19.95	98.86
5190 - 5230	802.11n HT40 STBC 2TX	20.18	104.23
5190 - 5230	802.11n HT40 SDM 2TX	Covered by 802.11n HT40 STBC 2TX	
5210	802.11ac VHT80 SISO	12.66	18.45
5210	802.11ac VHT80 CDD 2TX	14.15	26.00
5210	802.11ac VHT80 STBC 2TX	14.15	26.00
5210	802.11ac VHT80 SDM 2TX	Covered by 802.11ac VHT80 SDM 2TX	

5.3GHz Band

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
5260 - 5320	802.11a	17.99	62.95
5260 - 5320	802.11n HT20 SISO	Covered by 802.11a	
5260 - 5320	802.11a 2TX CDD	Covered by 802.11n HT20 CDD 2TX	
5260 - 5320	802.11n HT20 CDD 2TX	17.98	62.81
5260 - 5320	802.11n HT20 STBC 2TX	19.68	92.90
5260 - 5320	802.11n HT20 SDM 2TX	Covered by 802.11n HT20 STBC 2TX	
5270 - 5310	802.11n HT40 SISO	17.91	61.80
5270 - 5310	802.11n HT40 CDD 2TX	19.88	97.27
5270 - 5310	802.11n HT40 STBC 2TX	20.23	105.44
5270 - 5310	802.11n HT40 SDM 2TX	Covered by 802.11n HT40 STBC 2TX	
5290	802.11ac VHT80 SISO	13.65	23.17
5290	802.11ac VHT80 CDD 2TX	15.15	32.73
5290	802.11ac VHT80 STBC 2TX	15.06	32.06
5290	802.11ac VHT80 SDM 2TX	Covered by 802.11n HT80 STBC 2TX	

5.6GHz Band

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
5500 - 5700	802.11a	17.86	61.09
5720	802.11a	17.98	62.81
5500 - 5700	802.11n HT20 SISO	Covered by 802.11a	
5720	802.11n HT20 SISO	Covered by 802.11a	
5500 - 5700	802.11a 2TX CDD	Covered by 802.11n HT20 CDD 2TX	
5500 - 5700	802.11n HT20 CDD 2TX	17.43	55.34
5720	802.11n HT20 CDD 2TX	17.44	55.46
5500 - 5700	802.11n HT20 STBC 2TX	20.00	100.00
5720	802.11n HT20 STBC 2TX	19.95	98.86
5500 - 5700	802.11n HT20 SDM 2TX	Covered by 802.11n HT20 STBC 2TX	
5720	802.11n HT20 SDM 2TX	Covered by 802.11n HT20 STBC 2TX	
5510 - 5670	802.11n HT40 SISO	17.95	62.37
5710	802.11n HT40 SISO	17.94	62.23
5510 - 5670	802.11n HT40 CDD 2TX	19.91	97.95
5710	802.11n HT40 CDD 2TX	19.94	98.63
5510 - 5670	802.11n HT40 STBC 2TX	20.56	113.76
5710	802.11n HT40 STBC 2TX	20.68	116.95
5510 - 5670	802.11n HT40 SDM 2TX	Covered by 802.11n HT40 STBC 2TX	
5710	802.11n HT40 SDM 2TX	Covered by 802.11n HT40 STBC 2TX	
5530-5610	802.11ac VHT80 SISO	13.56	22.70
5690	802.11ac VHT80 SISO	17.96	62.52
5530-5610	802.11ac VHT80 CDD 2TX	20.19	104.47
5690	802.11ac VHT80 CDD 2TX	20.38	109.14
5530-5610	802.11ac VHT80 STBC 2TX	20.02	100.46
5690	802.11ac VHT80 STBC 2TX	20.58	114.29
5530-5610	802.11ac VHT80 SDM 2TX	Covered by 802.11ac VHT80 STBC 2TX	
5690	802.11ac VHT80 SDM 2TX	Covered by 802.11ac VHT80 STBC 2TX	

5.8GHz Band

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
5745 - 5825	802.11a	17.94	62.23
5745 - 5825	802.11n HT20 SISO	Covered by 802.11a	
5745 - 5825	802.11a 2TX CDD	Covered by 802.11n HT20 CDD 2TX	
5745 - 5825	802.11n HT20 CDD 2TX	20.47	111.43
5745 - 5825	802.11n HT20 STBC/SDM 2TX	Covered by 802.11n HT20 CDD 2TX	
5755 - 5795	802.11n HT40 SISO	15.85	38.46
5755 - 5795	802.11n HT40 CDD 2TX	17.93	62.09
5755 - 5795	802.11n HT40 STBC/SDM 2TX	Covered by 802.11n HT40 CDD 2TX	
5775	802.11ac VHT80 SISO	13.69	23.39
5775	802.11ac VHT80 CDD 2TX	16.17	41.40
5775	802.11ac VHT80 STBC/SDM 2TX	Covered by 802.11ac VHT80 CDD 2TX	

Note: The output power on covered modes is equal to or less than one referenced.

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a PiFA antenna, with a maximum gain as below table:

Frequency Band (GHz)	Antenna Gain	
	ANTENNA A	ANTENNA B
5.2	+3.714	+3.708
5.3	+3.434	+3.875
5.6	+4.293	+4.247
5.8	+4.342	+4.283

5.4. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was 12B331

5.5. WORST-CASE CONFIGURATION AND MODE

Radiated emission and power line conducted emission were performed with the EUT set to transmit at the channel with highest output power as worst-case scenario.

The fundamental of the EUT was investigated in three orthogonal orientations X (Flatbed), Y (Landscape), Z (Portrait), it was determined that X orientation was worst-case orientation; therefore, all final radiated testing was performed with the EUT in X (Flatbed) orientation.

Worst-case data rates as provided by the client were:

802.11a mode: 6 Mbps
802.11n HT20mode: MCS0
802.11n HT40mode: MCS0
802.11n AC80mode: MCS0

Radiated emissions for EUT with antenna was performed and passed; therefore, antenna port spurious was not performed.

There are two vendors of the WiFi/Bluetooth radio modules: variant 1 and variant 2. The Wi-Fi/Bluetooth radio modules have the same mechanical outline (e.g., the same package dimension and pin-out layout), use the same on-board antenna matching circuit, have an identical antenna structure, and are built and tested to conform to the same specifications and to operate within the same tolerances.

Baseline testing was performed on the two variants to determine the worst case on all conducted power and radiated emissions.

5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
AC/DC adapter	Apple	A1357	N/A	NA
Earphone	Apple	NA	NA	NA
Laptop	Apple	A1278	C02HJ0A7DTY4	NA
DC power supply	Sorensen	XT 15-4	1319A02780	NA

I/O CABLES (CONDUCTED TEST)

I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	Antenna	1	SMA	Un-Shielded	0.2	To spectrum Analyzer
2	USB	1	USB	Shielded	1	N/A
3	DC	1	DC	Un-shielded	0.8	N/A

I/O CABLES (RADIATED ABOVE 1 GHZ)

I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
None used						

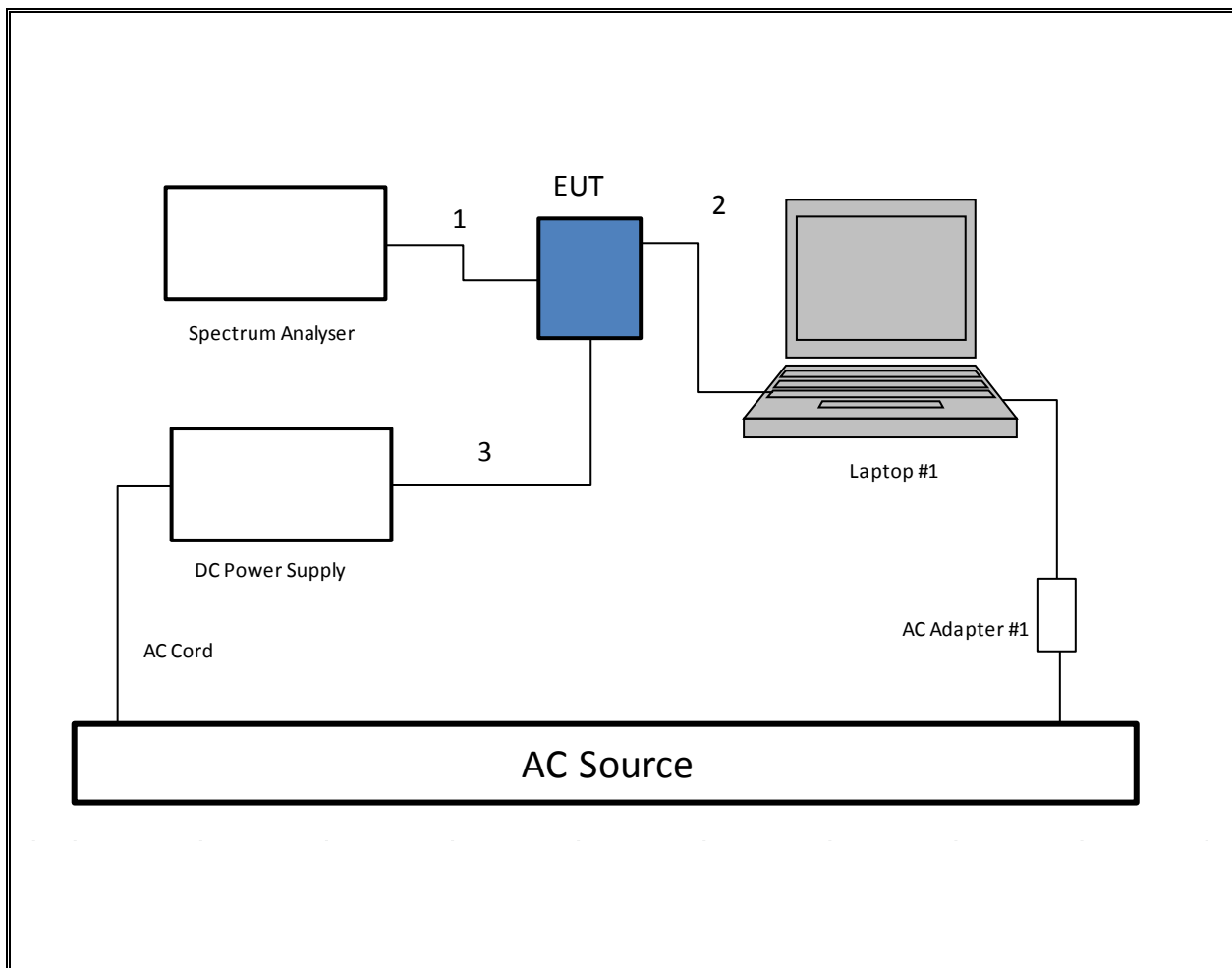
I/O CABLES (AC POWER CONDUCTED TEST and below 1 GHZ)

I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	AC	1	US115	Un-Shielded	0.8	NA
2	DC	1	lightning	Un-Shielded	1	NA
3	Audio	1	Jack	Un-Shielded	0.5	NA

TEST SETUP- CONDUCTED PORT

The EUT was tested connected to a host Laptop via USB cable adapter and spectrum analyzer to antenna port. Test software exercised the EUT.

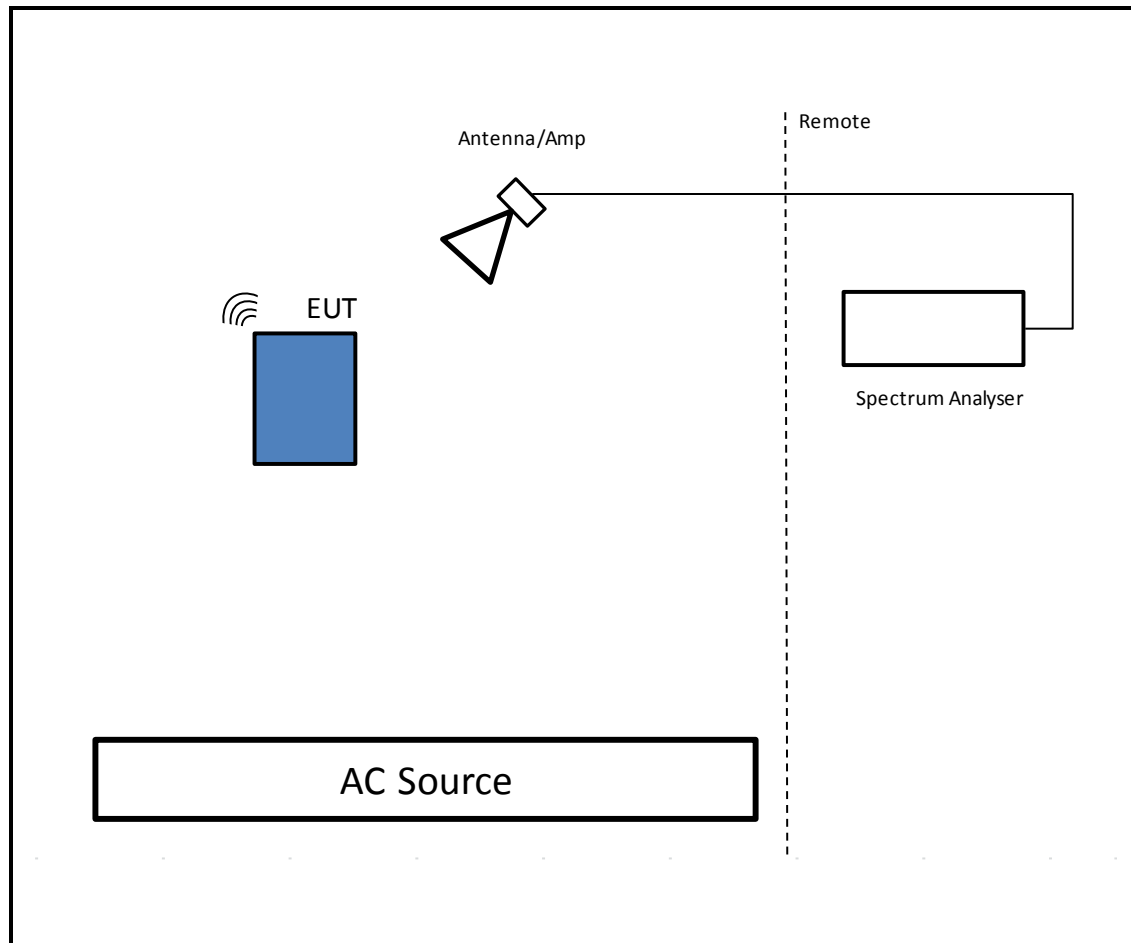
SETUP DIAGRAM



TEST SETUP- RADIATED-ABOVE 1 GHZ

The EUT was tested battery powered. Test software exercised the EUT.

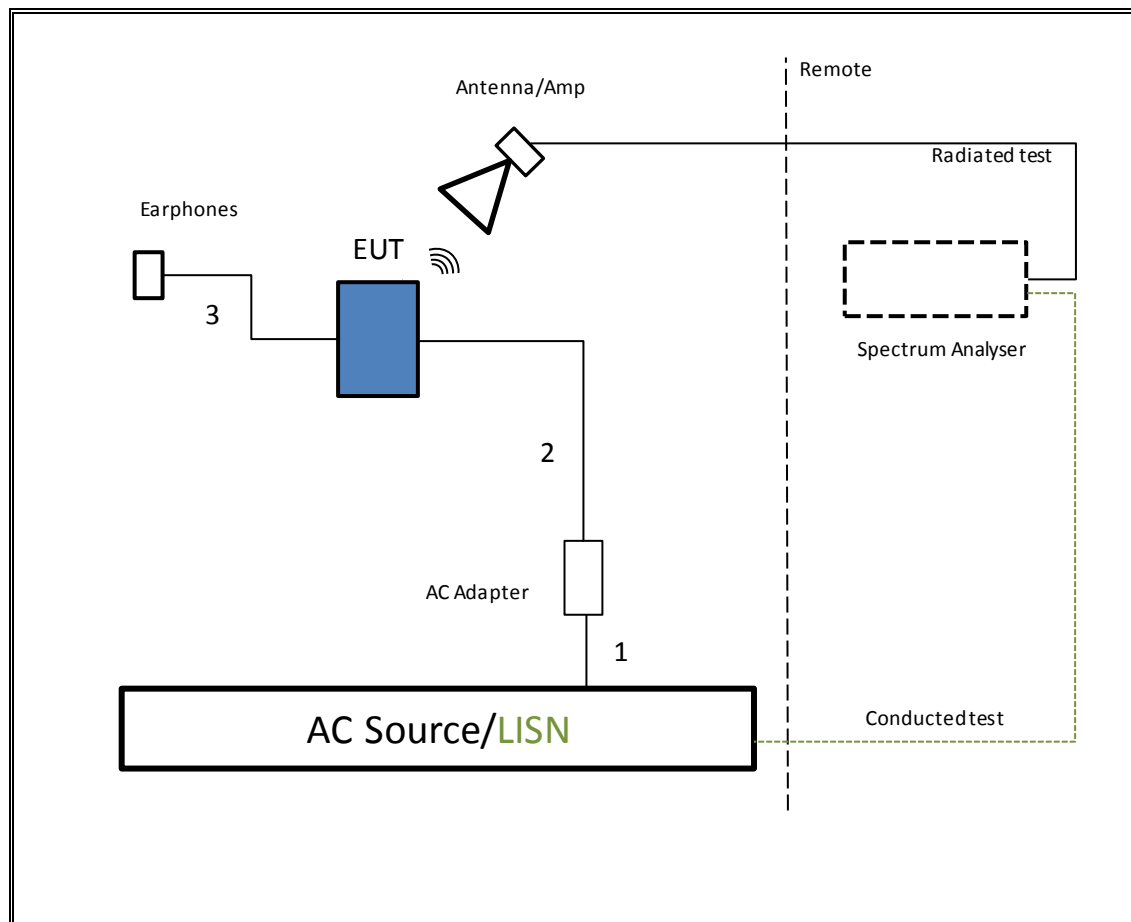
SETUP DIAGRAM



TEST SETUP- BELOW 1GHZ & AC LINE CONDUCTED TESTS

The EUT was tested with earphones connected and powered by AC adapter. Test software exercised the EUT.

SETUP DIAGRAM



6. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

TEST EQUIPMENT LIST				
Description	Manufacturer	Model	Asset	Cal Due
Antenna, Horn, 18 GHz	ETS Lindgren	3117	F00131	02/18/15
Antenna, Horn, 26.5 GHz	ARA	MWH-1826/B	C00589	11/26/14
Antenna, Horn, 40 GHz	ARA	MWH-2640/B	F00195	05/09/15
Peak / Average Power Sensor	Agilent / HP	N1911A	F00153	03/06/15
Peak Power Meter	Agilent / HP	E9323A	F00025	04/30/15
Spectrum Analyzer, 44 GHz	Agilent / HP	N9030A	F00129	02/22/15
Antenna, Bilog, 2 GHz	Sunol Sciences	JB1	F00168	03/28/15
Preamplifier, 1300 MHz	Sonoma	310	F00008	05/27/15
Preamplifier, 26.5 GHz	Agilent / HP	8449B	F00165	03/25/15
Preamplifier, 40 GHz	Miteq	NSP4000-SP2	C00990	09/03/15
EMI Test Receiver, 9 kHz-7 GHz	R & S	ESCI 7	F00092	09/05/15
LISN, 30 MHz	FCC	LISN-50/250-25-2	C00626	01/14/15
Peak Power Sensor	Boonton	57006	C01202	07/17/15
Peak Power Meter	Boonton	4541	C01186	07/17/15
Spectrum Analyzer, 44 Ghz	Agilent	N9030A	N/A	05/17/15
Spectrum Analyzer, 40 Ghz	Agilent	8564E	C00951	08/06/15

7. MEASUREMENT METHODS

26 dB Emission BW: KDB 789033 D02 v01, Section C.

99% Occupied BW: KDB 789033 D02 v01, Section D.

Power and PSD: KDB 789033 D02 v01, Section E.3.a (Method PM).

Power Spectral Density: KDB 789033 D02 v01, Section F.

Unwanted emissions in restricted bands: KDB 789033 D02 v01, Sections G.3, G.4, G.5, and G.6.

Unwanted emissions in non-restricted bands: KDB 789033 D02 v01, Sections G.3, G.4, and G.5.

Note: CDD implementation uses long delay which results in uncorrelated transmission.

8. ON TIME, DUTY CYCLE AND MEASUREMENT METHODS

LIMITS

None; for reporting purposes only.

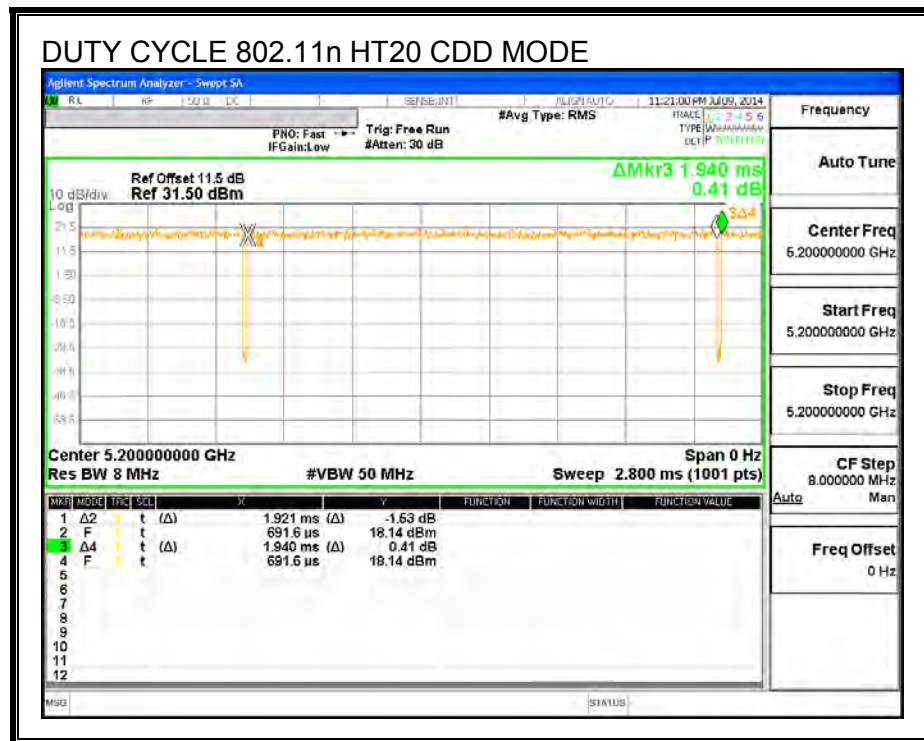
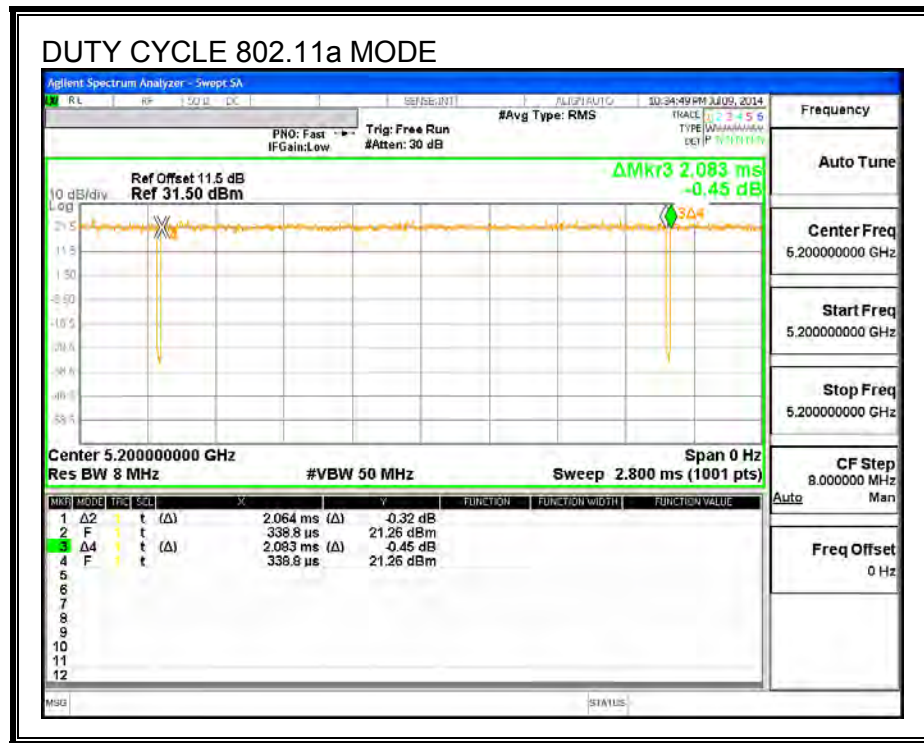
PROCEDURE

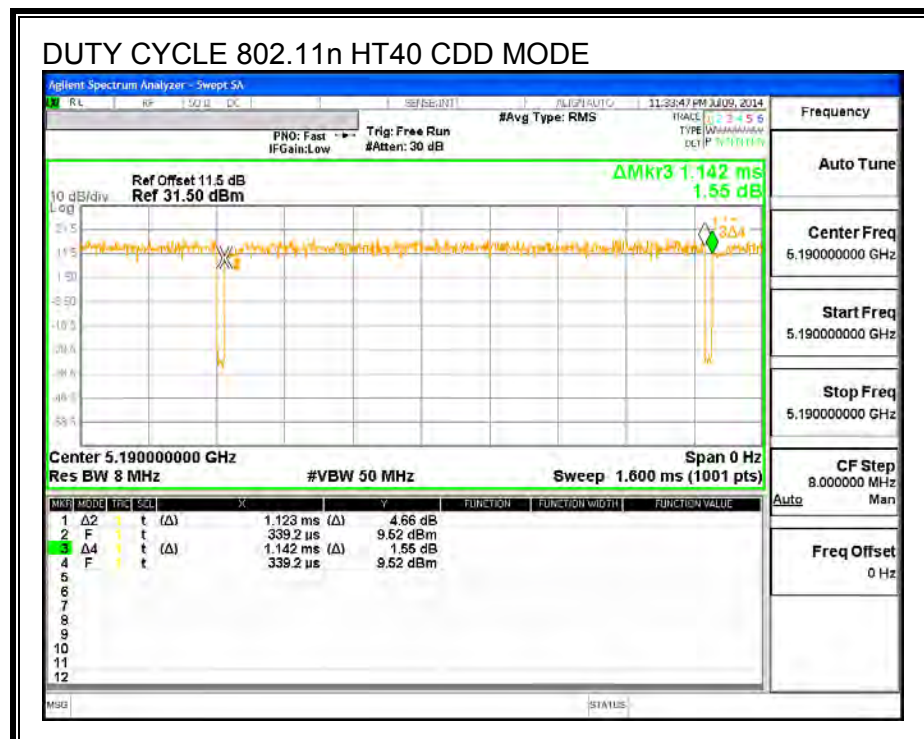
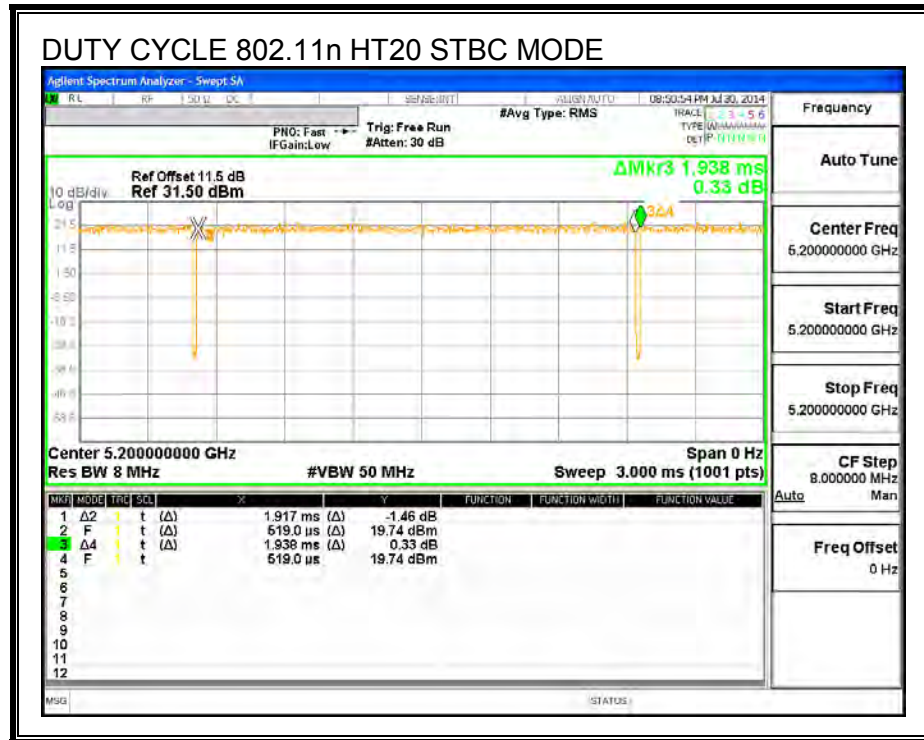
KDB 789033 Zero-Span Spectrum Analyzer Method.

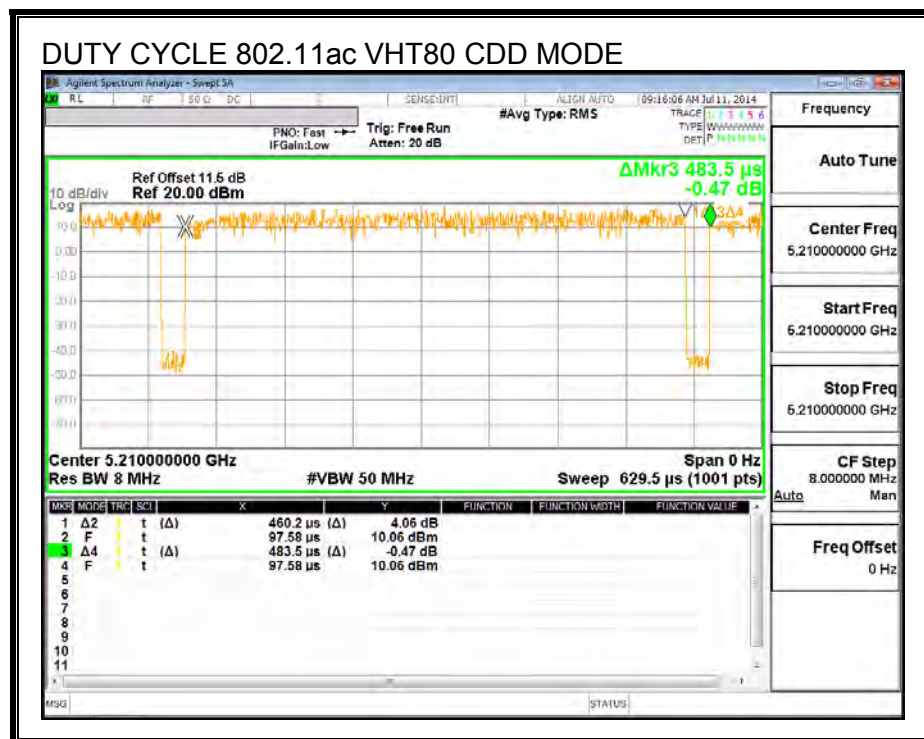
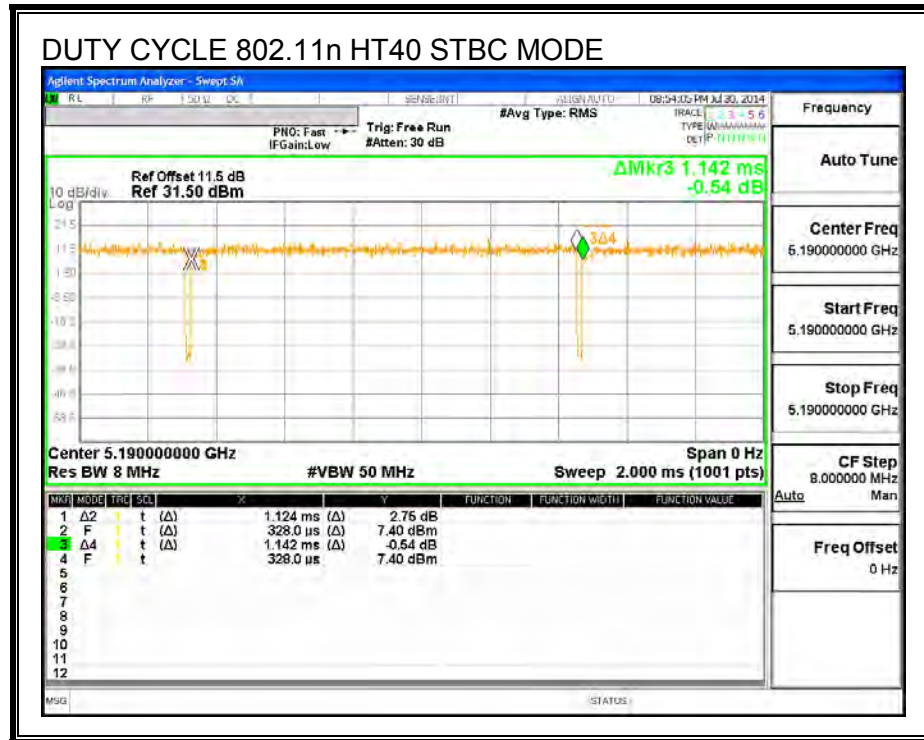
8.1. ON TIME AND DUTY CYCLE RESULTS

Mode	ON Time B (msec)	Period (msec)	Duty Cycle x (linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	1/B Minimum VBW (kHz)
802.11a	2.064	2.083	0.991	99.09%	0.00	0.010
802.11n HT20 CDD	1.921	1.940	0.990	99.02%	0.00	0.010
802.11n HT20 STBC	1.917	1.938	0.989	98.92%	0.00	0.010
802.11n HT40 CDD	1.123	1.142	0.983	98.34%	0.00	0.010
802.11n HT40 STBC	1.124	1.142	0.984	98.42%	0.00	0.010
802.11ac VHT80 CDD	0.460	0.484	0.952	95.18%	0.21	2.173
802.11ac VHT80 STBC	0.460	0.483	0.952	95.24%	0.21	2.174

8.1. DUTY CYCLE PLOTS









9. ANTENNA PORT TEST RESULTS

9.1. 802.11a MODE IN THE 5.2 GHz BAND

9.1.1. 26 dB BANDWIDTH

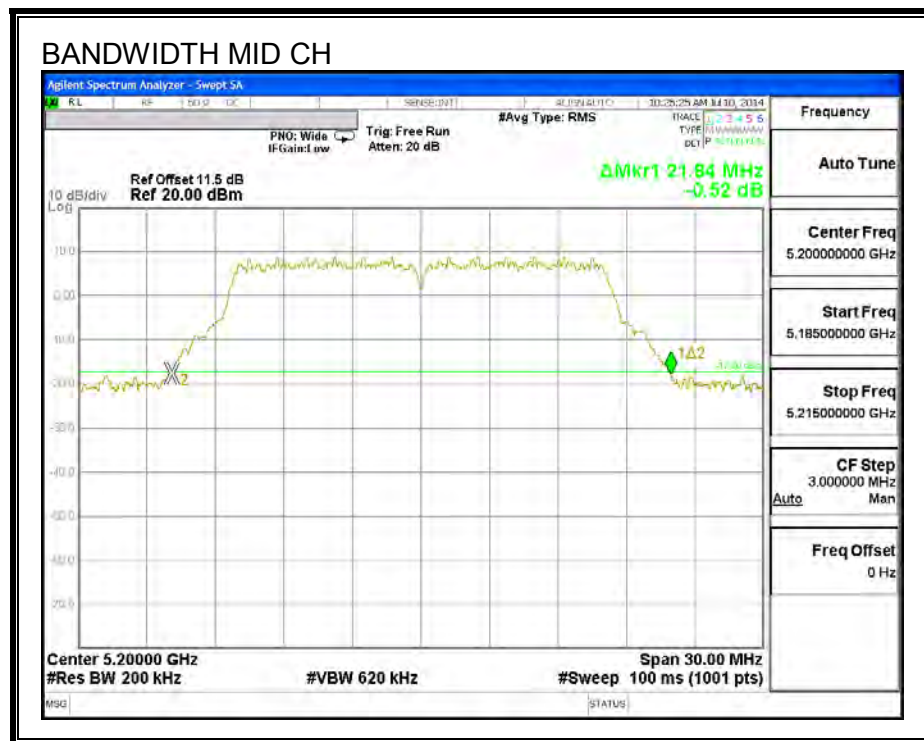
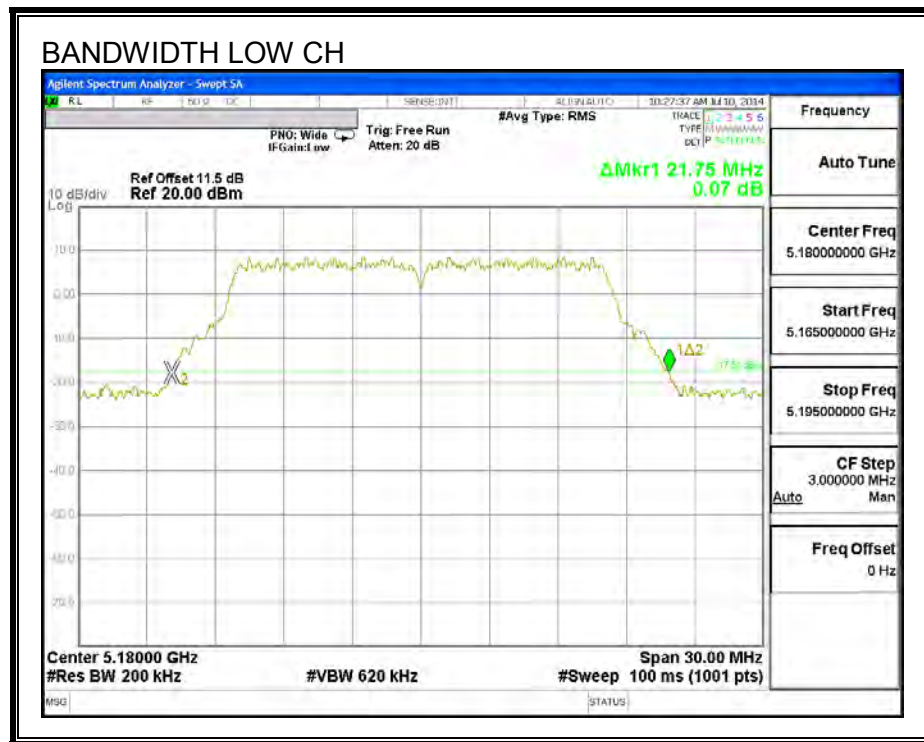
LIMITS

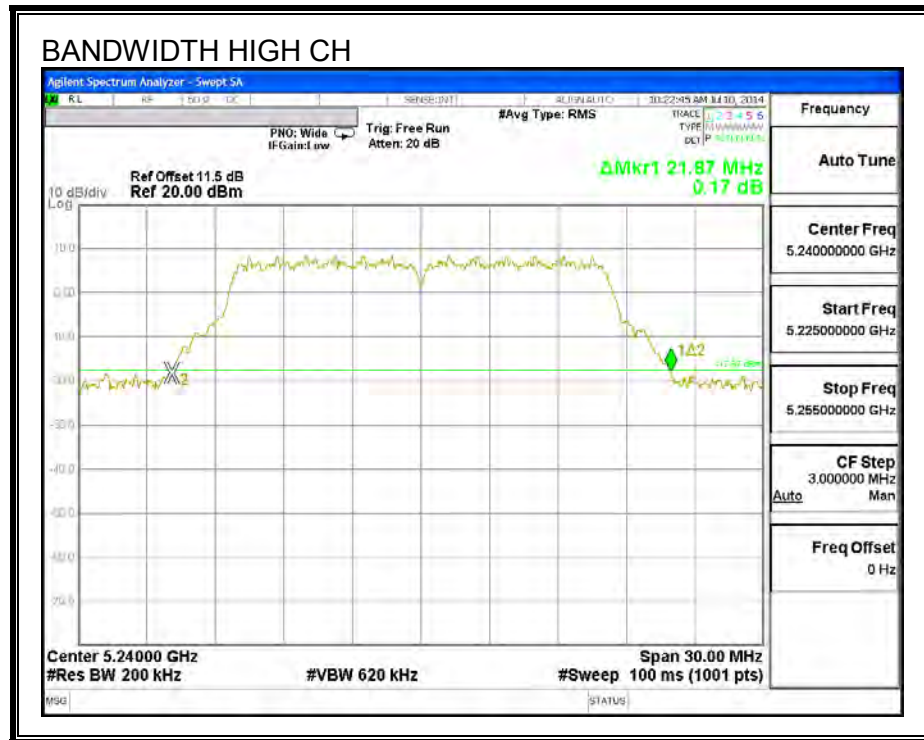
None; for reporting purposes only.

RESULTS

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Low	5180	21.75
Mid	5200	21.84
High	5240	21.87

26 dB BANDWIDTH





9.1.2. 99% BANDWIDTH

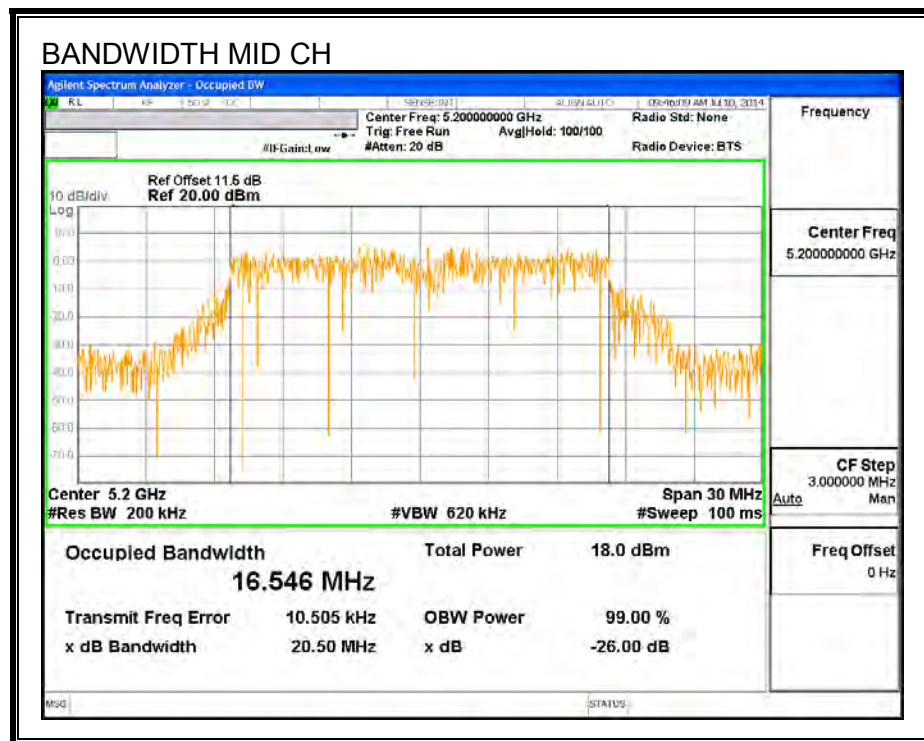
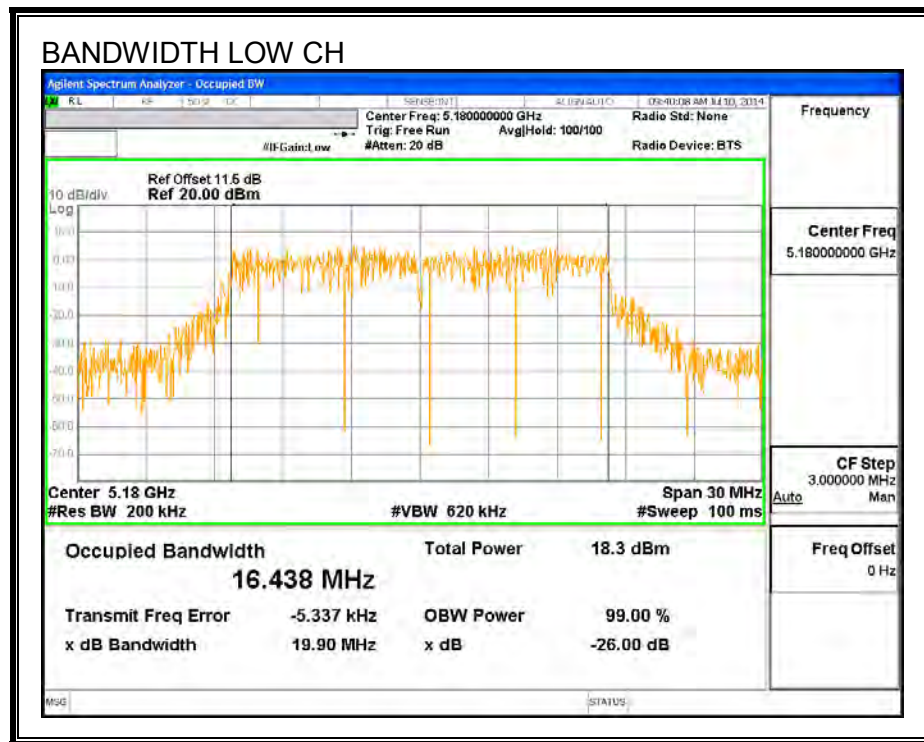
LIMITS

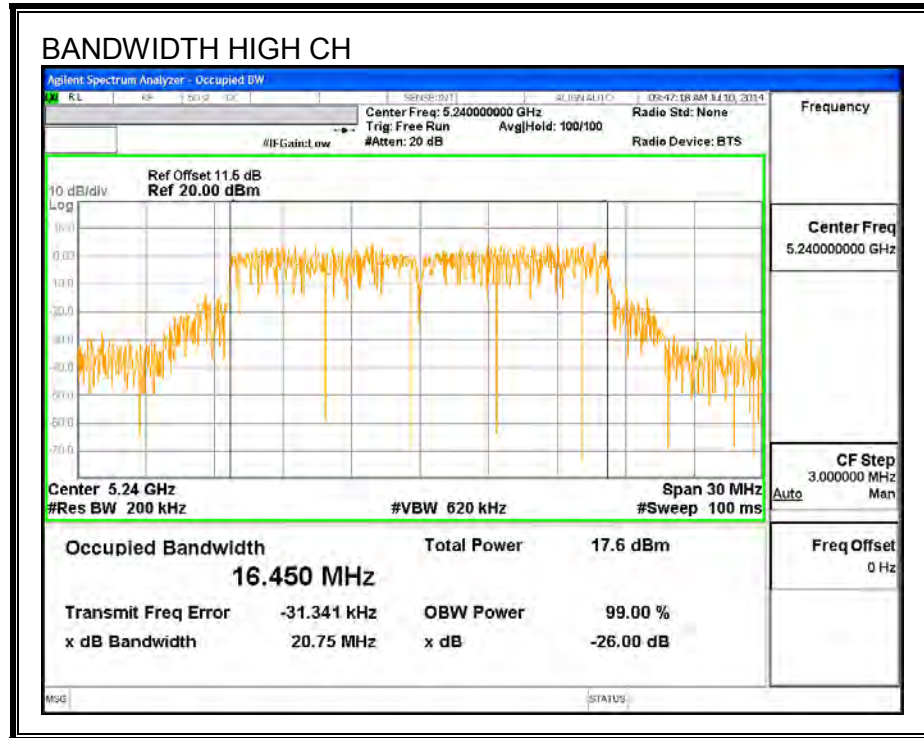
None; for reporting purposes only.

RESULTS

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5180	16.438
Mid	5200	16.546
High	5240	16.450

99% BANDWIDTH





9.1.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter. The power meter was setup for a gated power measurement.

The cable assembly insertion loss of 11.5 dB (including 10 dB pad and 1.5 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

RESULTS

Channel	Frequency (MHz)	Antenna A Power (dBm)	Antenna B Power (dBm)
Low	5180	15.87	15.98
Mid	5200	17.99	16.45
High	5240	17.97	16.38

9.1.4. OUTPUT POWER AND PSD

LIMITS

FCC §15.407 (a) (1)

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

TEST PROCEDURE

The transmitter output is connected to a power meter. The power meter was setup for a gated power measurement.

The cable assembly insertion loss of 11.5 dB (including 10 dB pad and 1.5 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

DIRECTIONAL ANTENNA GAIN

There is only one transmitter output therefore the directional gain is equal to the antenna gain.

ANTENNA A

Antenna Gain (dBi)
3.714

ANTENNA B

Antenna Gain (dBi)
3.708

ANTENNA A RESULTS

Antenna Gain and Limits

Channel	Frequency (MHz)	Directional Gain for Power (dBi)	Directional Gain for PSD (dBi)	Power Limit (dBm)	PSD Limit (dBm)
Low	5180	3.714	3.714	24.00	11.00
Mid	5200	3.714	3.714	24.00	11.00
High	5240	3.714	3.714	24.00	11.00

Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd Power & PSD
--------------------	------	--

Output Power Results

Channel	Frequency (MHz)	Antenna A Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5180	15.87	15.87	24.00	-8.13
Mid	5200	17.99	17.99	24.00	-6.01
High	5240	17.97	17.97	24.00	-6.03

PSD Results

Channel	Frequency (MHz)	Antenna A Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low	5180	5.40	5.40	11.00	-5.60
Mid	5200	7.29	7.29	11.00	-3.71
High	5240	6.73	6.73	11.00	-4.27

ANTENNA B RESULTS

Channel	Frequency (MHz)	Directional Gain for Power (dBi)	Directional Gain for PSD (dBi)	Power Limit (dBm)	PSD Limit (dBm)
Low	5180	3.708	3.708	24.00	11.00
Mid	5200	3.708	3.708	24.00	11.00
High	5240	3.708	3.708	24.00	11.00

Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd Power & PSD
--------------------	------	--

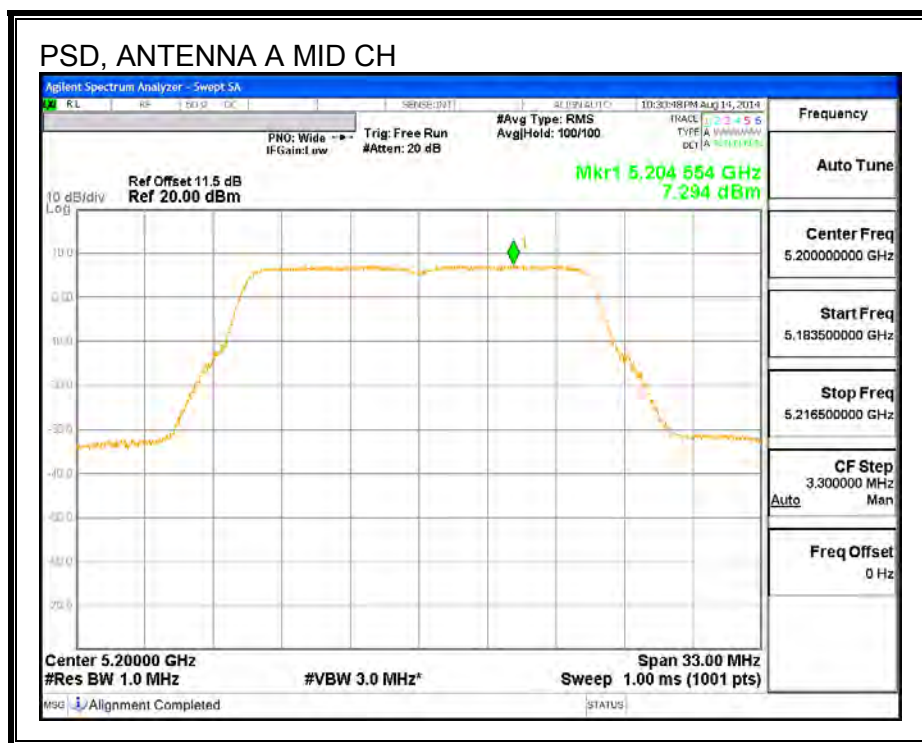
Output Power Results

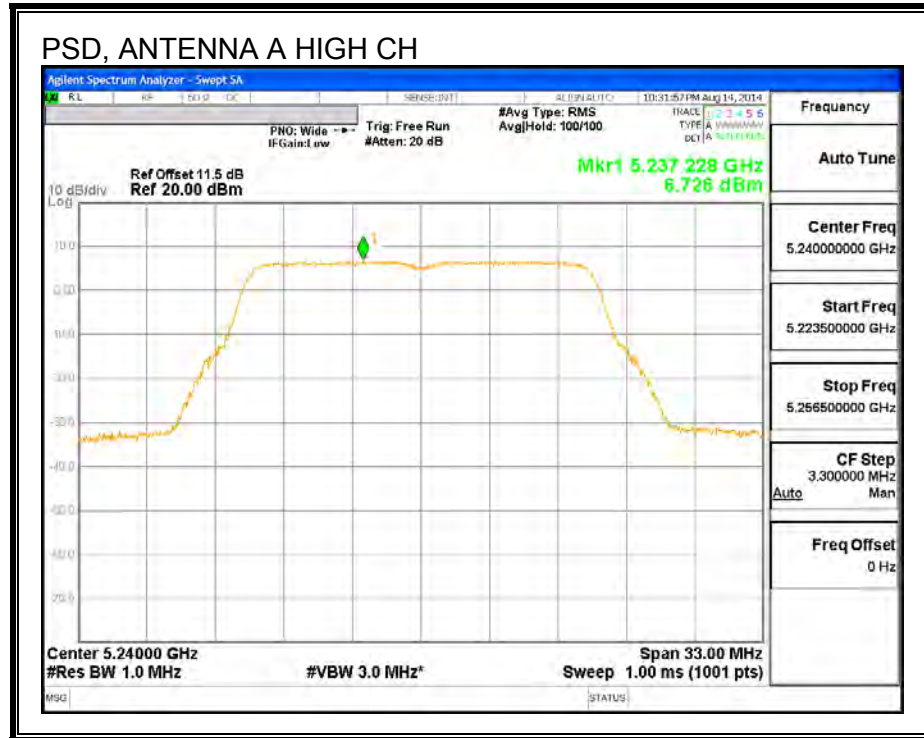
Channel	Frequency (MHz)	Antenna B Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5180	15.98	15.98	24.00	-8.02
Mid	5200	16.45	16.45	24.00	-7.55
High	5240	16.38	16.38	24.00	-7.62

PSD Results

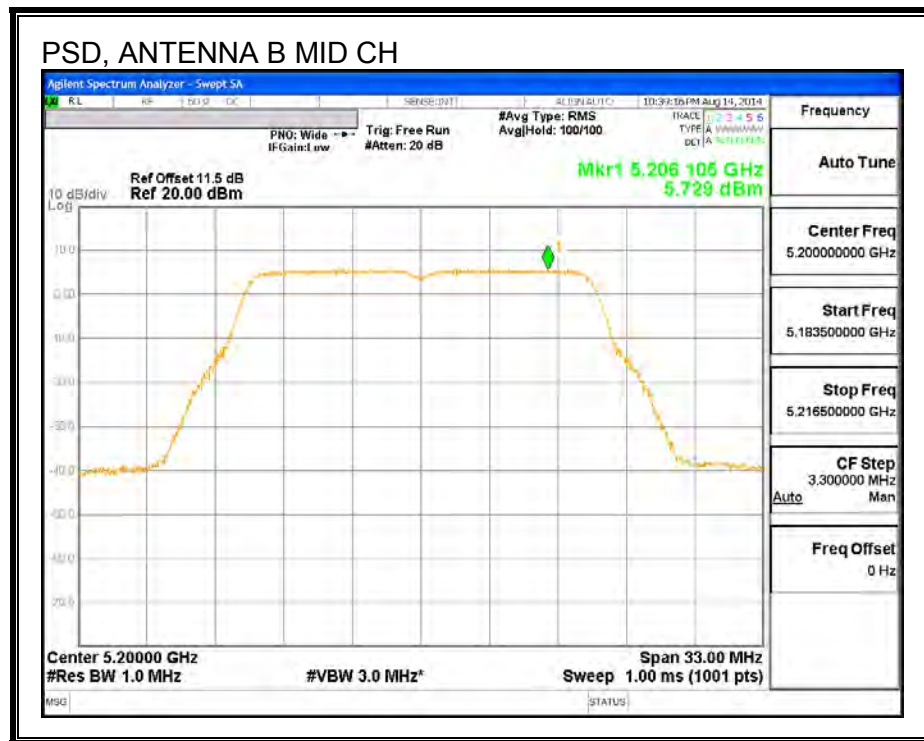
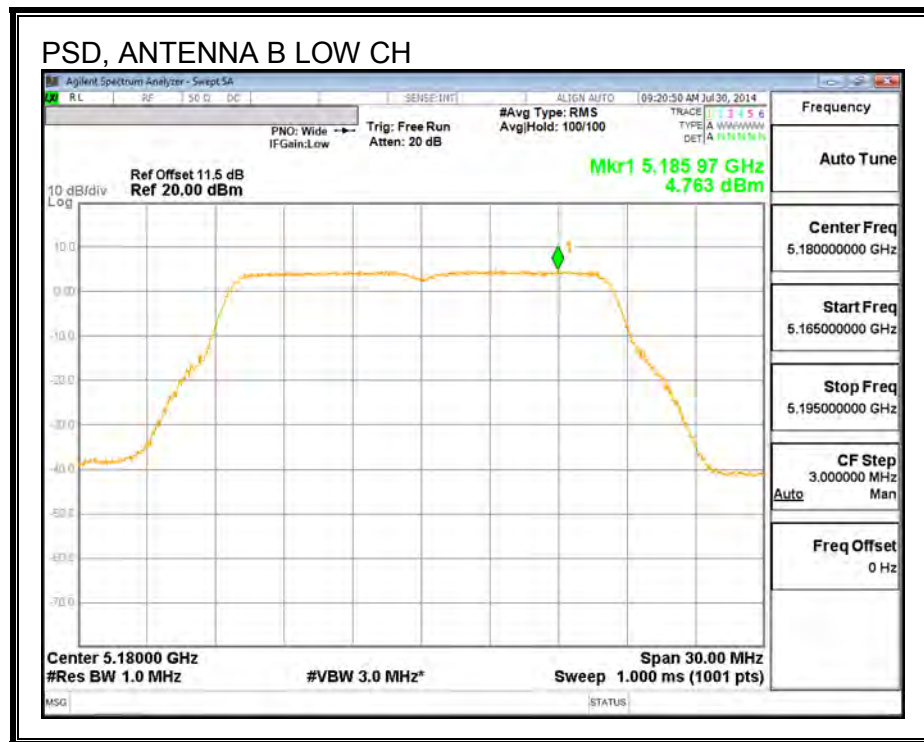
Channel	Frequency (MHz)	Antenna B Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low	5180	4.76	4.76	11.00	-6.24
Mid	5200	5.73	5.73	11.00	-5.27
High	5240	5.23	5.23	11.00	-5.77

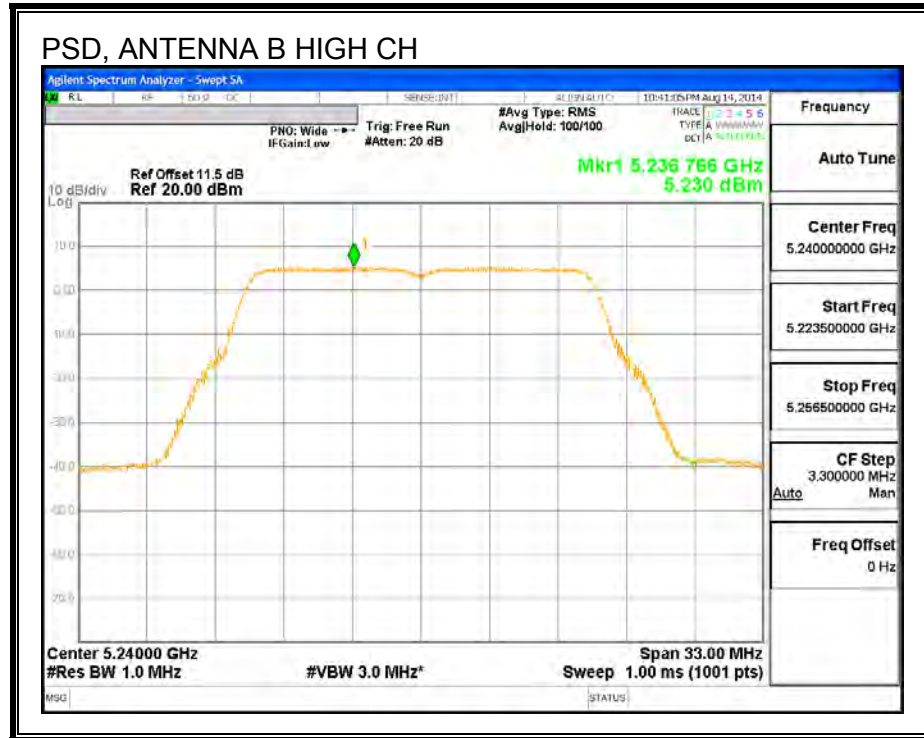
PSD, ANTENNA A LOW CH





PSD, ANTENNA B





9.2. 802.11n HT20 2TX CDD MODE IN THE 5.2 GHz BAND

9.2.1. 26 dB BANDWIDTH

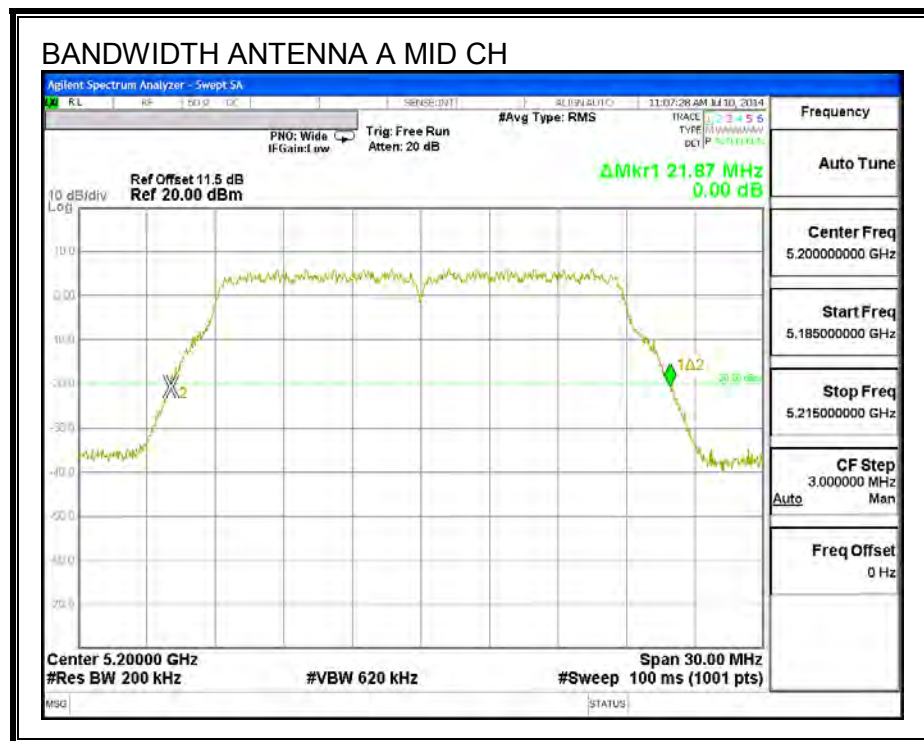
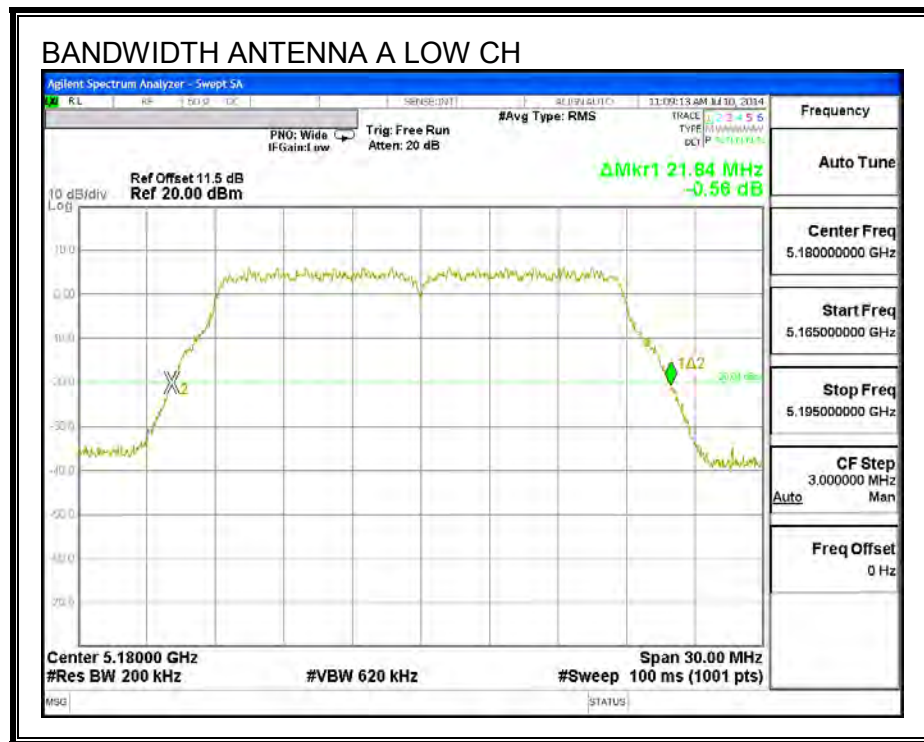
LIMITS

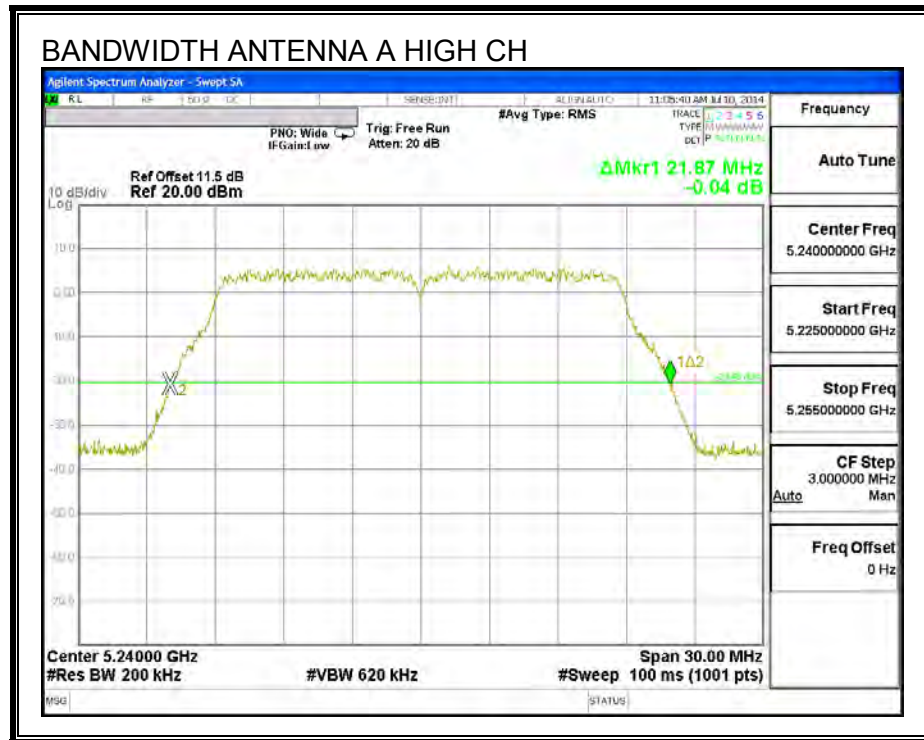
None; for reporting purposes only.

RESULTS

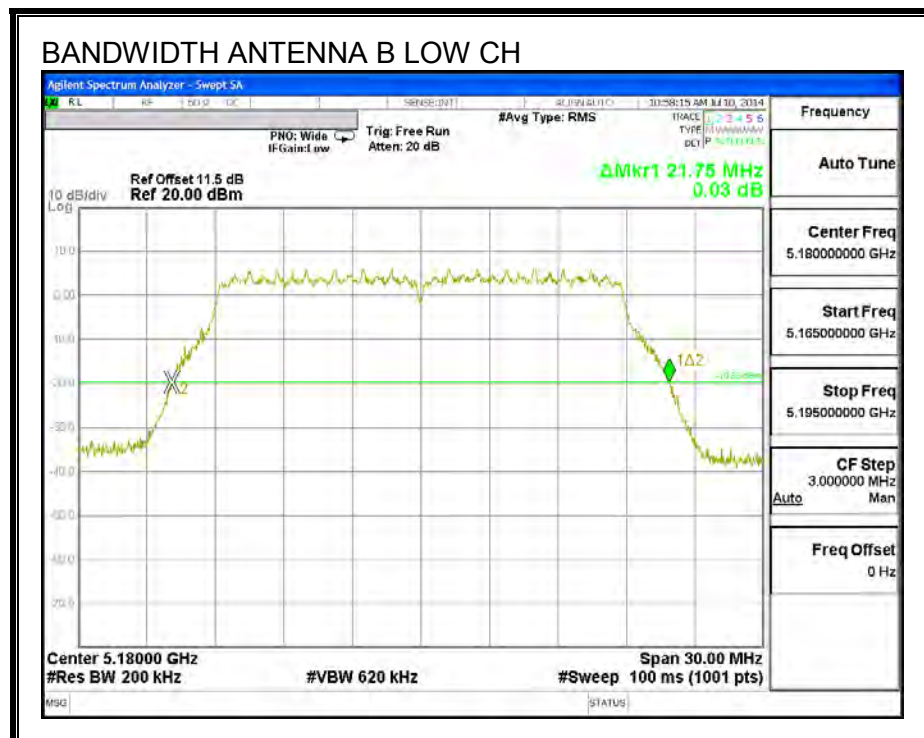
Channel	Frequency (MHz)	26 dB BW Antenna A (MHz)	26 dB BW Antenna B (MHz)
Low	5180	21.84	21.75
Mid	5200	21.87	21.84
High	5240	21.87	21.93

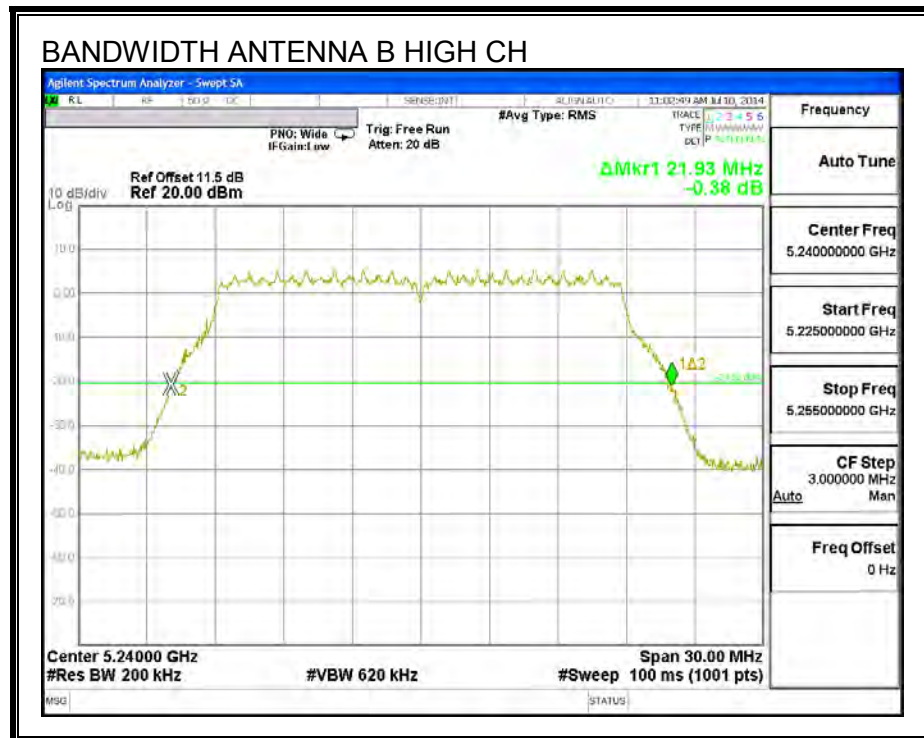
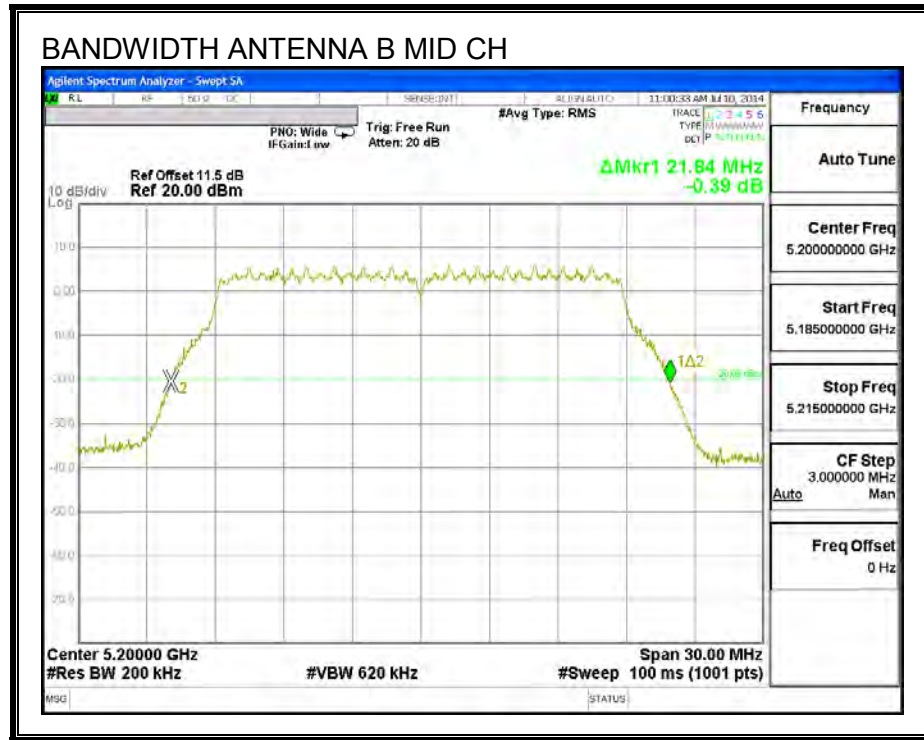
26 dB BANDWIDTH, ANTENNA A





26 dB BANDWIDTH, ANTENNA B





9.2.2. 99% BANDWIDTH

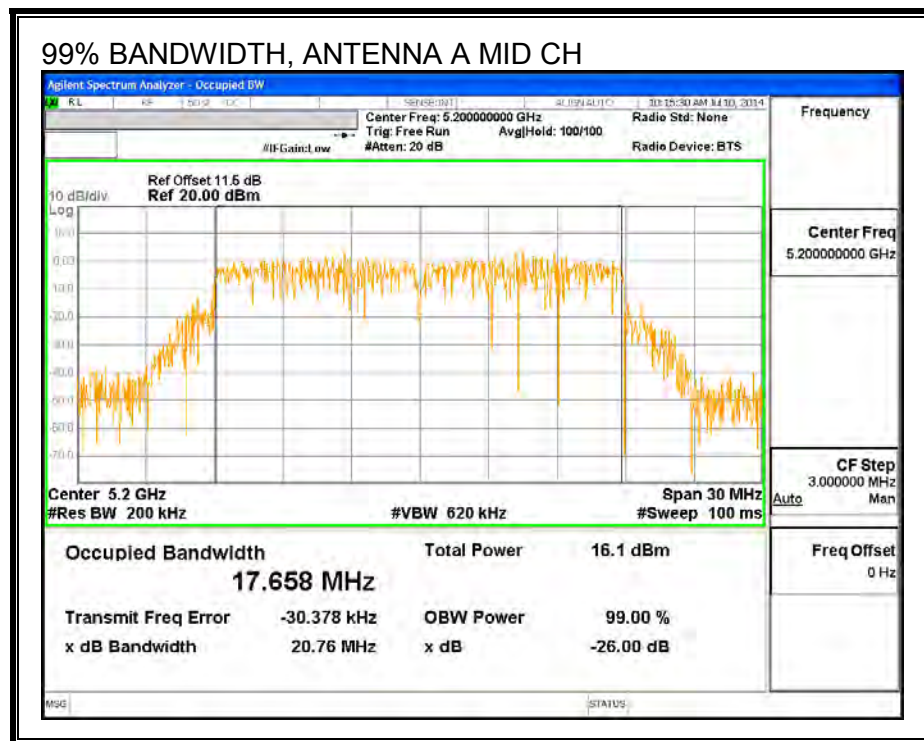
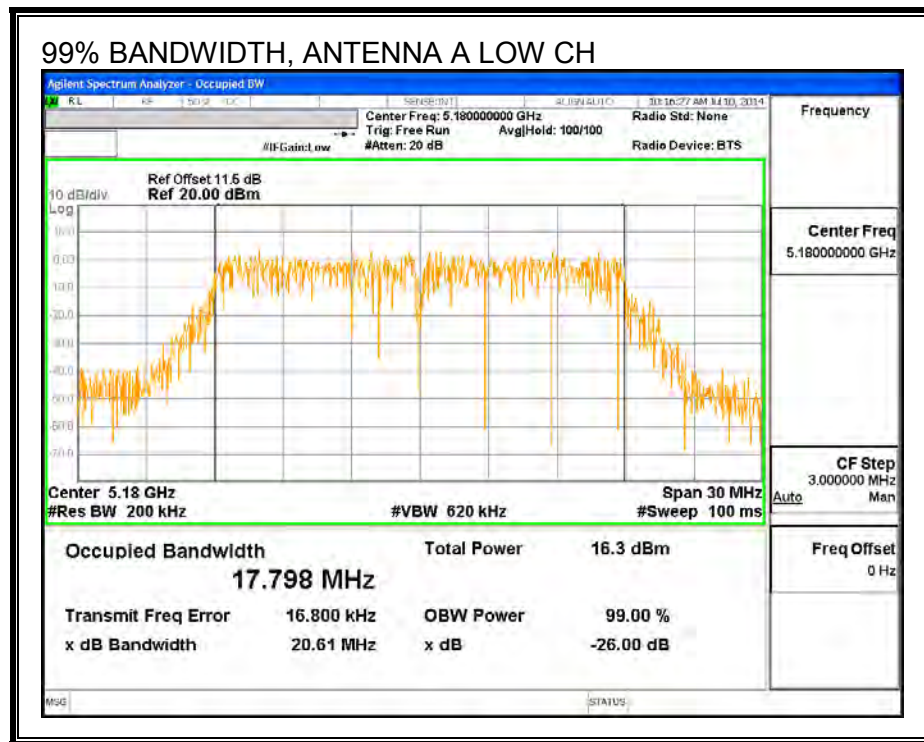
LIMITS

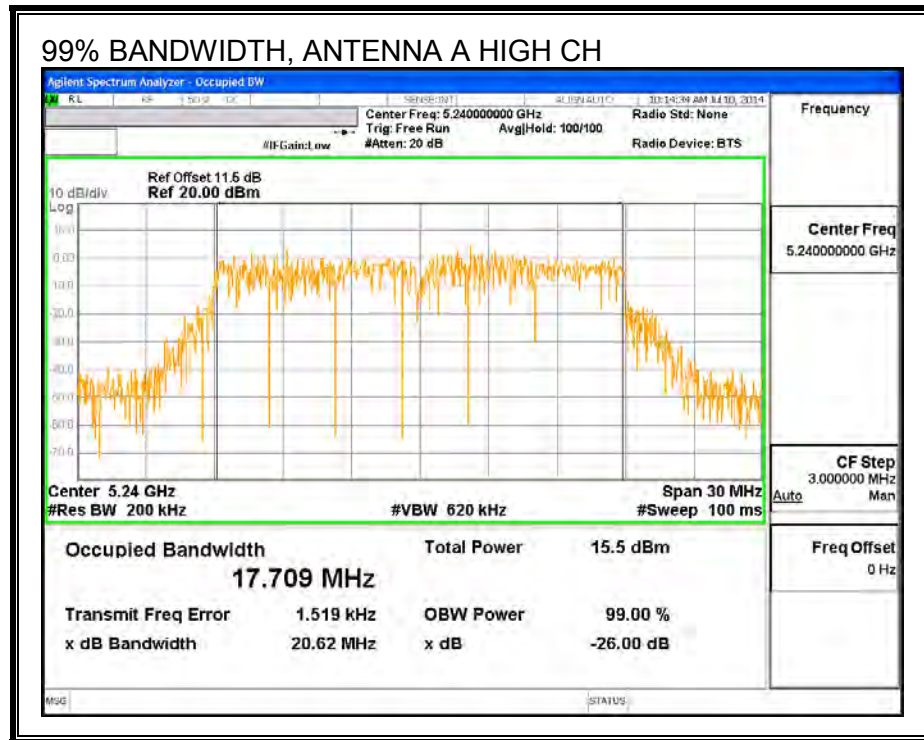
None; for reporting purposes only.

RESULTS

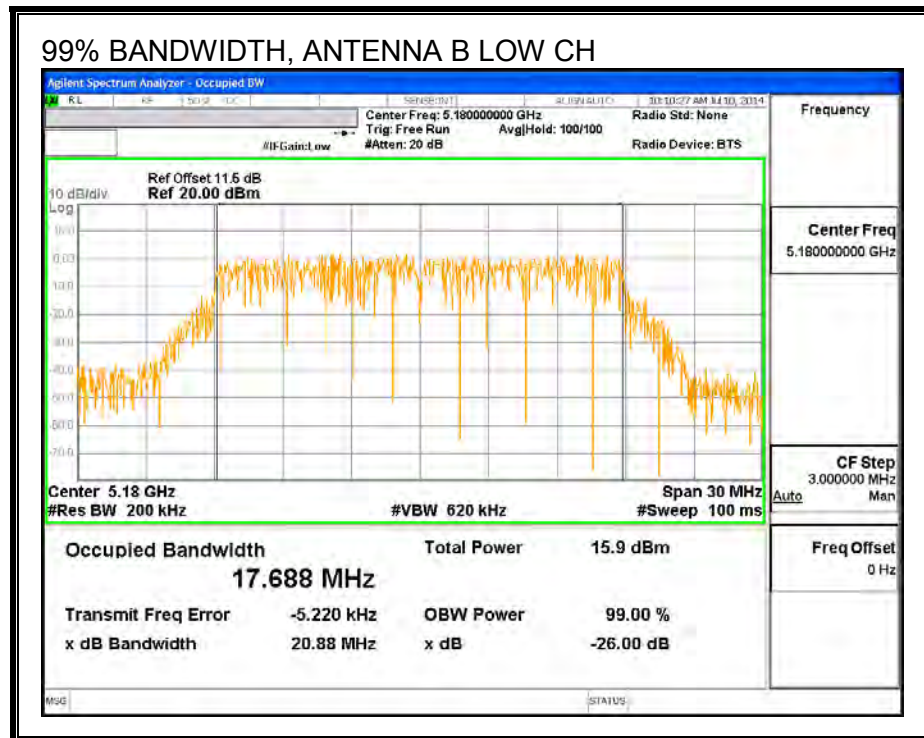
Channel	Frequency (MHz)	99% BW Antenna A (MHz)	99% BW Antenna B (MHz)
Low	5180	17.798	17.688
Mid	5200	17.658	17.700
High	5240	17.709	17.658

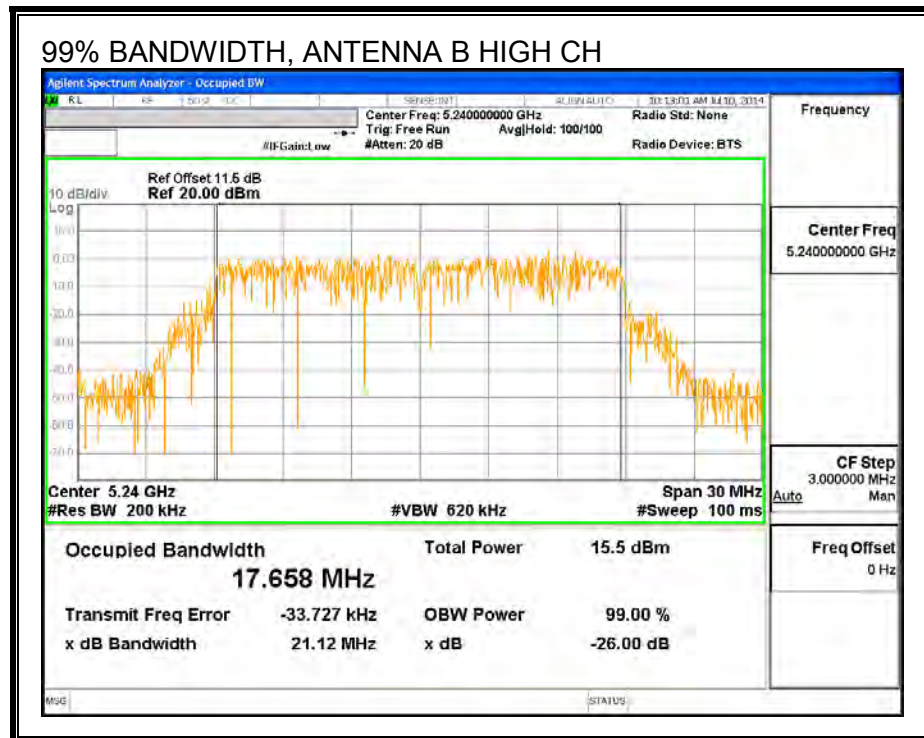
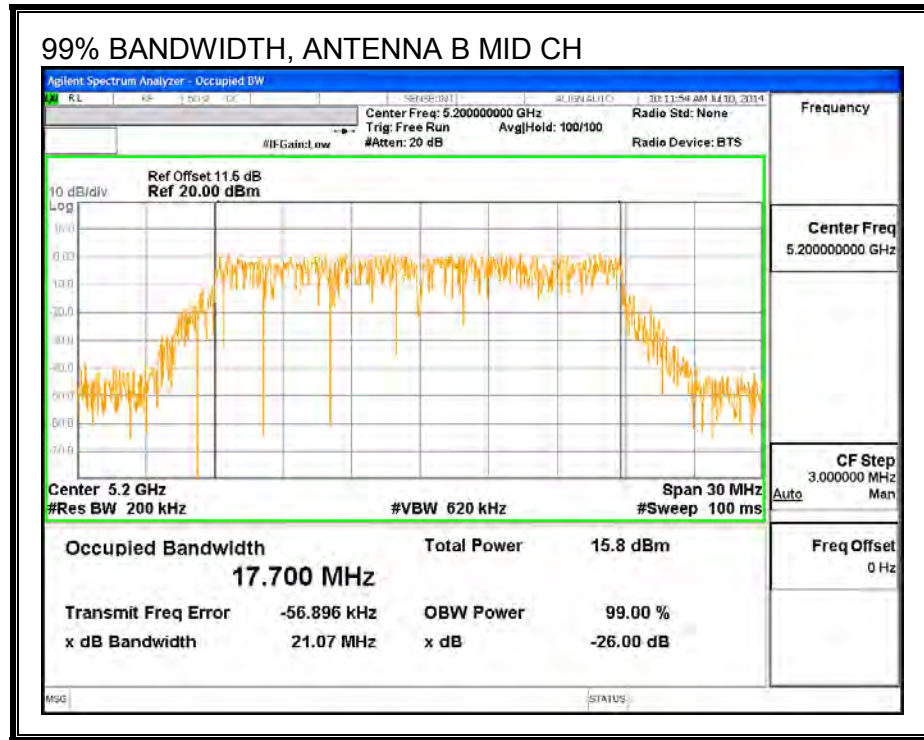
99% BANDWIDTH, ANTENNA A





99% BANDWIDTH, ANTENNA B





9.2.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter. The power meter was setup for a gated power measurement.

The cable assembly insertion loss of 11.5 dB (including 10 dB pad and 1.5 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

RESULTS

Average Power Results

Channel	Frequency (MHz)	Antenna A Power (dBm)	Antenna B Power (dBm)	Total Power (dBm)
Low	5180	14.89	14.92	17.92
Mid	5200	14.93	14.97	17.96
High	5240	14.80	14.74	17.78

9.2.4. OUTPUT POWER AND PSD

LIMITS

FCC §15.407 (a) (1)

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

TEST PROCEDURE

The transmitter output is connected to a power meter. The power meter was setup for a gated power measurement.

The cable assembly insertion loss of 11.5 dB (including 10 dB pad and 1.5 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

DIRECTIONAL ANTENNA GAIN

The TX chains are uncorrelated and the antenna gain is unequal among the chains. The directional gain is:

Antenna A	Antenna B	Uncorrelated Chains Directional
Gain (dBi)	Gain (dBi)	Gain (dBi)
3.714	3.708	3.711

The TX chains are correlated and the antenna gain is unequal among the chains. The directional gain is:

Antenna A	Antenna B	Correlated Chains Directional
Gain (dBi)	Gain (dBi)	Gain (dBi)
3.714	3.708	6.721

RESULTS

Antenna Gain and Limits

Channel	Frequency (MHz)	Directional Gain for Power (dBi)	Directional Gain for PSD (dBi)	Power Limit (dBm)	PSD Limit (dBm)
Low	5180	3.71	6.72	24.00	10.28
Mid	5200	3.71	6.72	24.00	10.28
High	5240	3.71	6.72	24.00	10.28

Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd Power & PSD
---------------------------	------	---

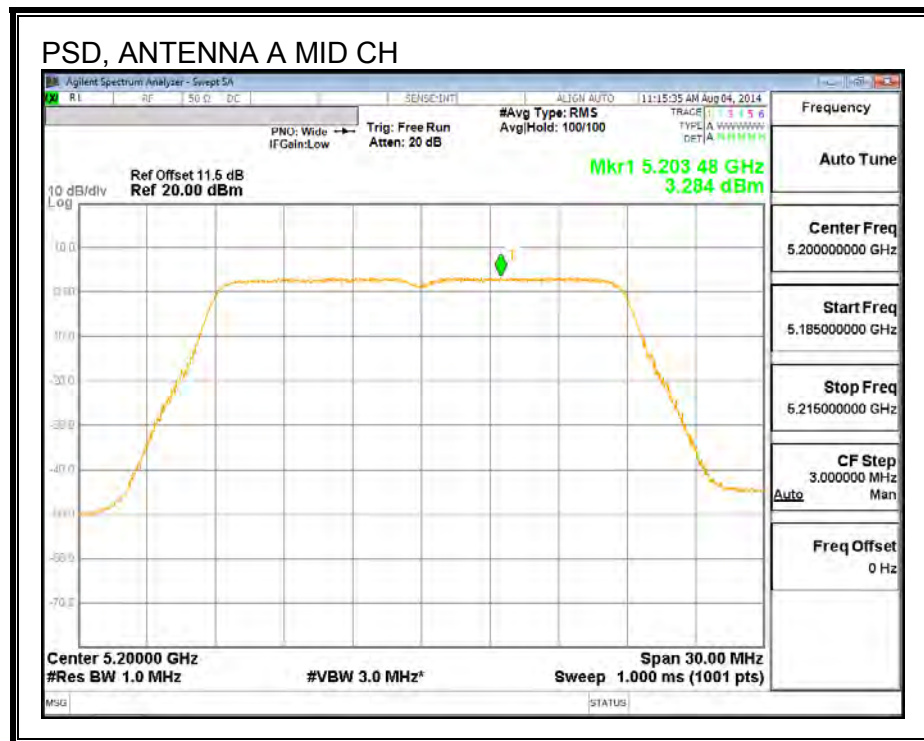
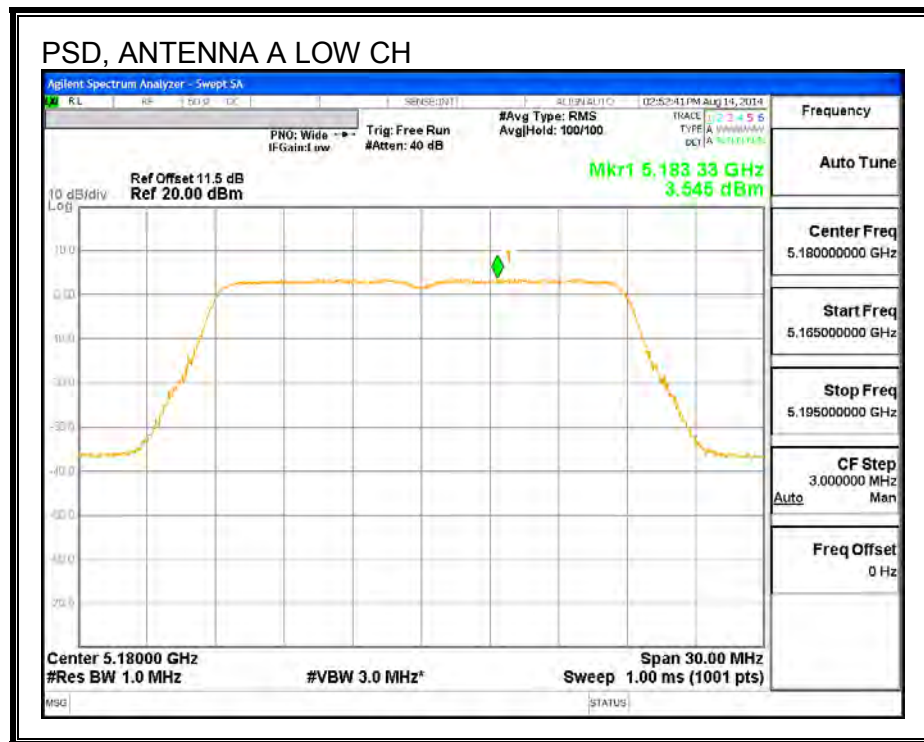
Output Power Results

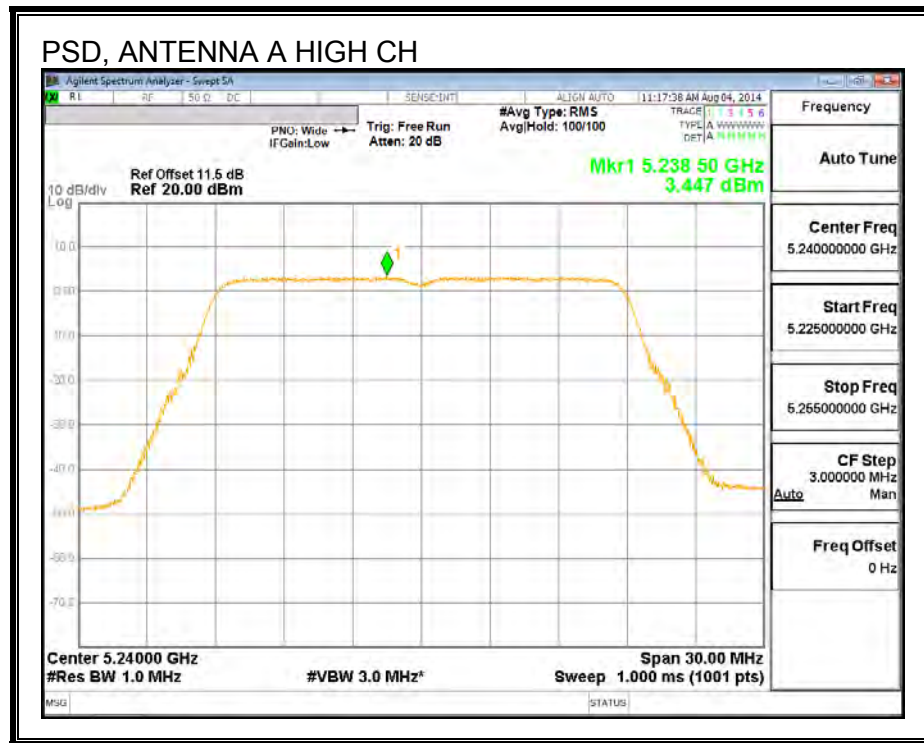
Channel	Frequency (MHz)	Antenna A Meas Power (dBm)	Antenna B Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5180	14.89	14.92	17.92	24.00	-6.08
Mid	5200	14.93	14.97	17.96	24.00	-6.04
High	5240	14.80	14.74	17.78	24.00	-6.22

PSD Results

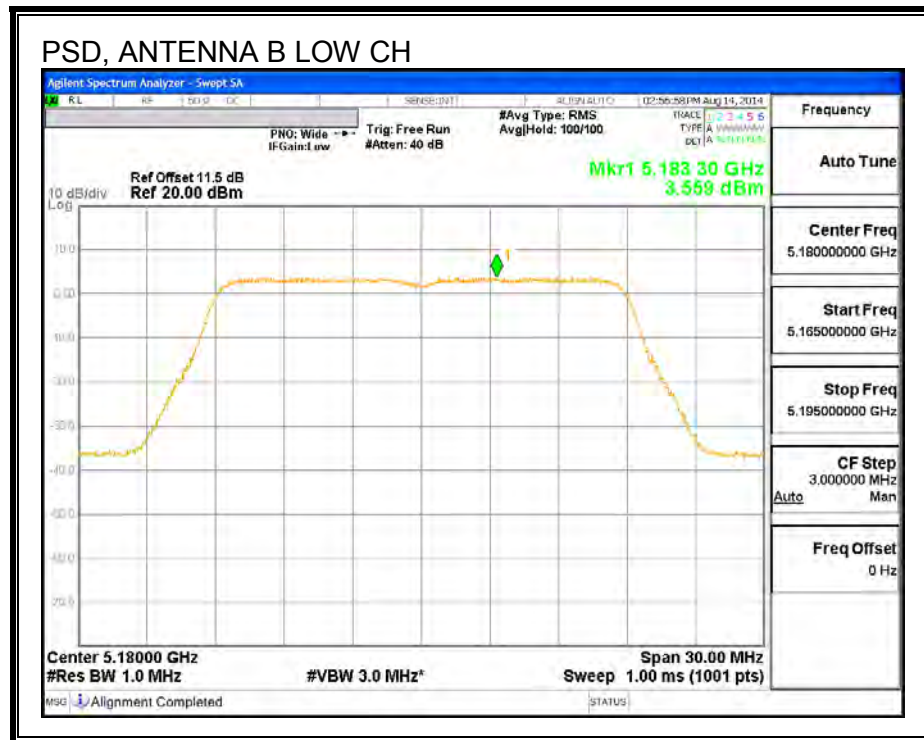
Channel	Frequency (MHz)	Antenna A Meas PSD (dBm)	Antenna B Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low	5180	3.55	3.56	6.56	10.28	-3.72
Mid	5200	3.28	3.42	6.36	10.28	-3.91
High	5240	3.45	3.53	6.50	10.28	-3.78

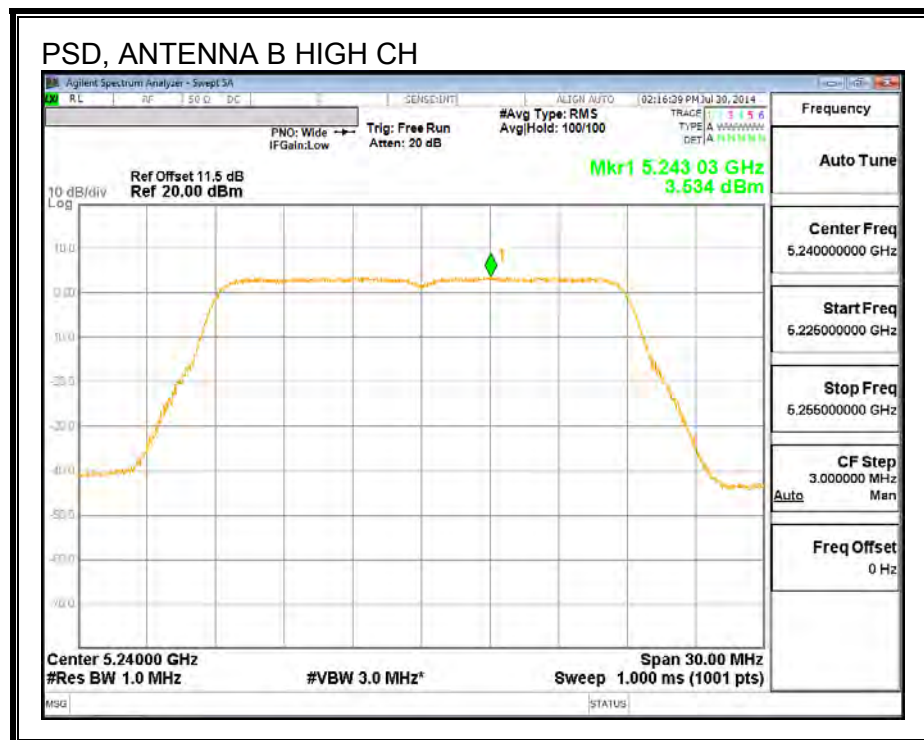
PSD, ANTENNA A





PSD, ANTENNA B





9.3. 802.11n HT20 2TX STBC MODE IN THE 5.2 GHz BAND

9.3.1. 26 dB BANDWIDTH

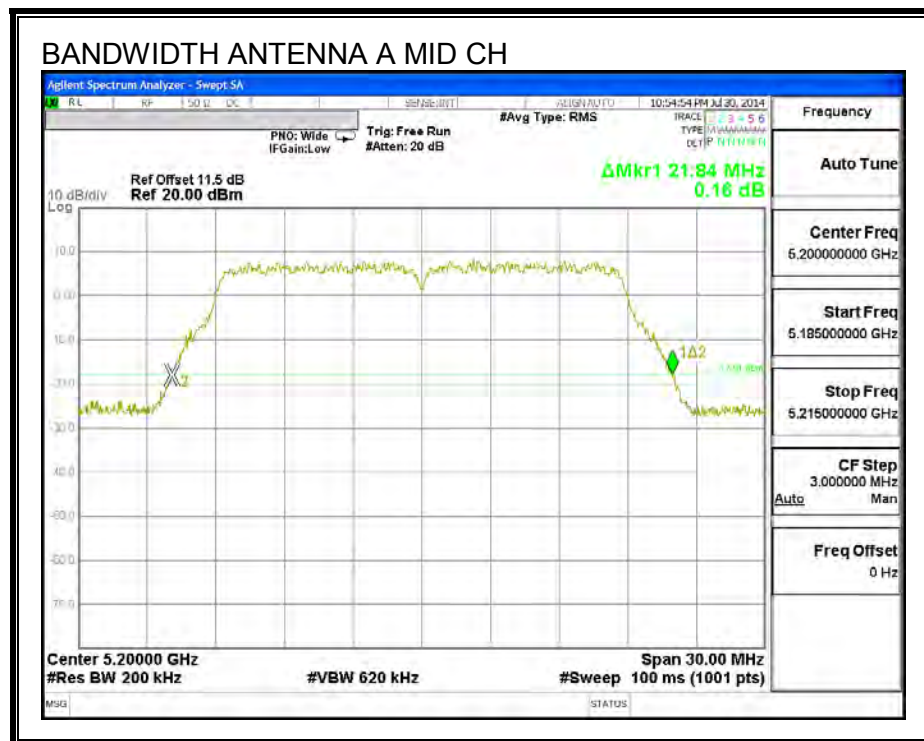
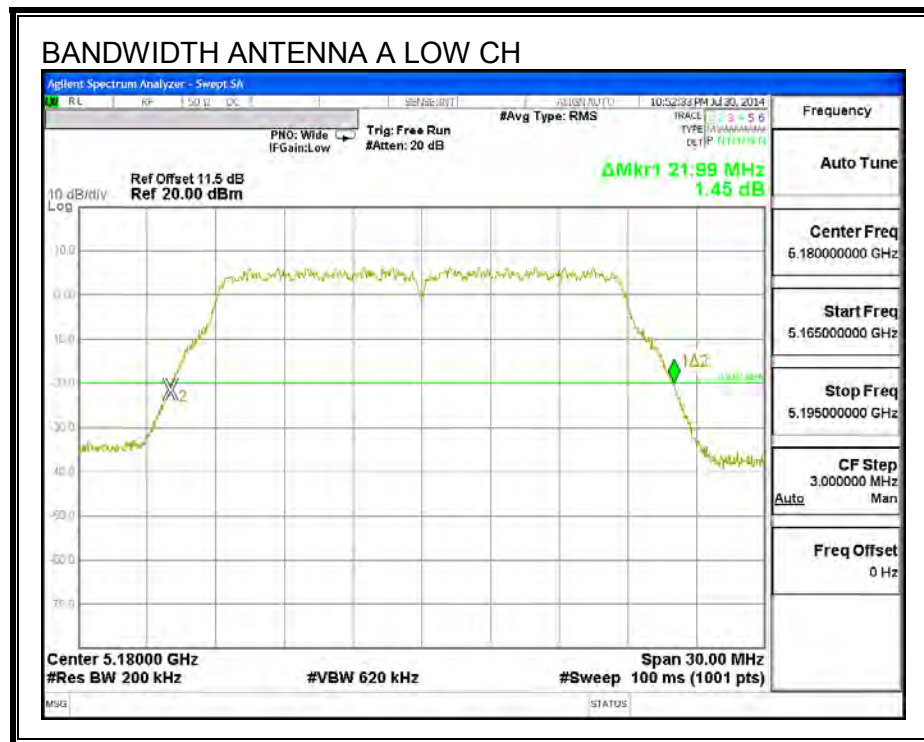
LIMITS

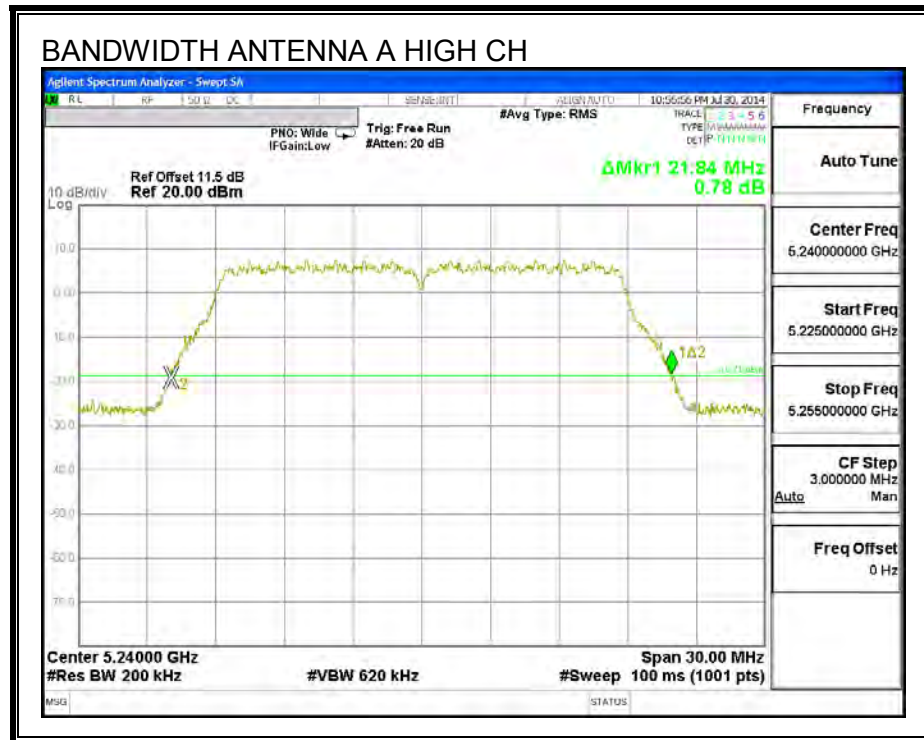
None; for reporting purposes only.

RESULTS

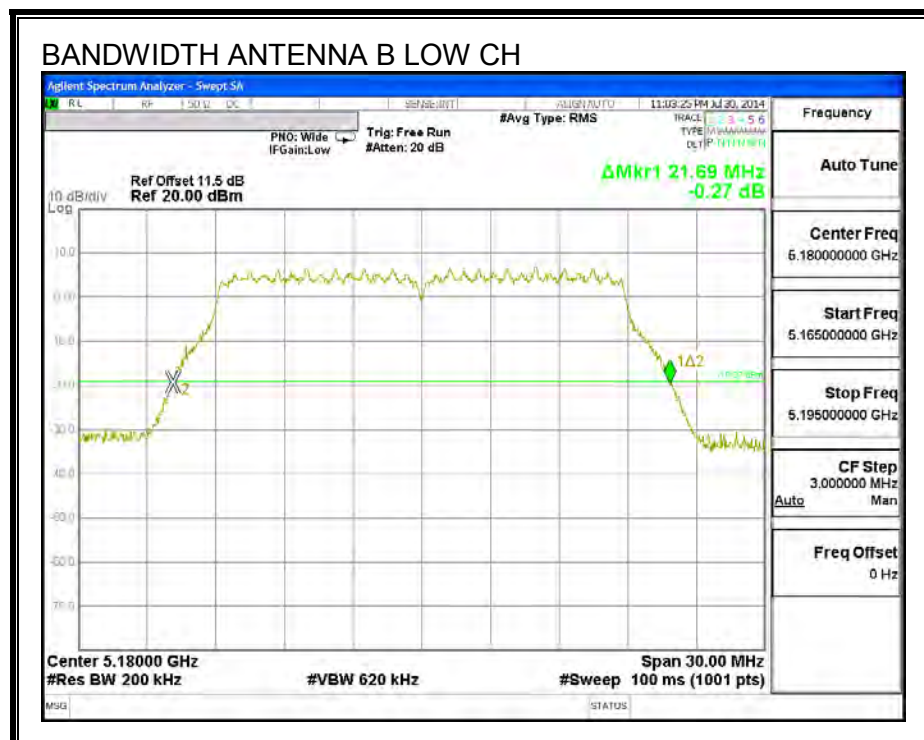
Channel	Frequency (MHz)	26 dB BW Antenna A (MHz)	26 dB BW Antenna B (MHz)
Low	5180	21.99	21.69
Mid	5200	21.84	21.72
High	5240	21.84	21.72

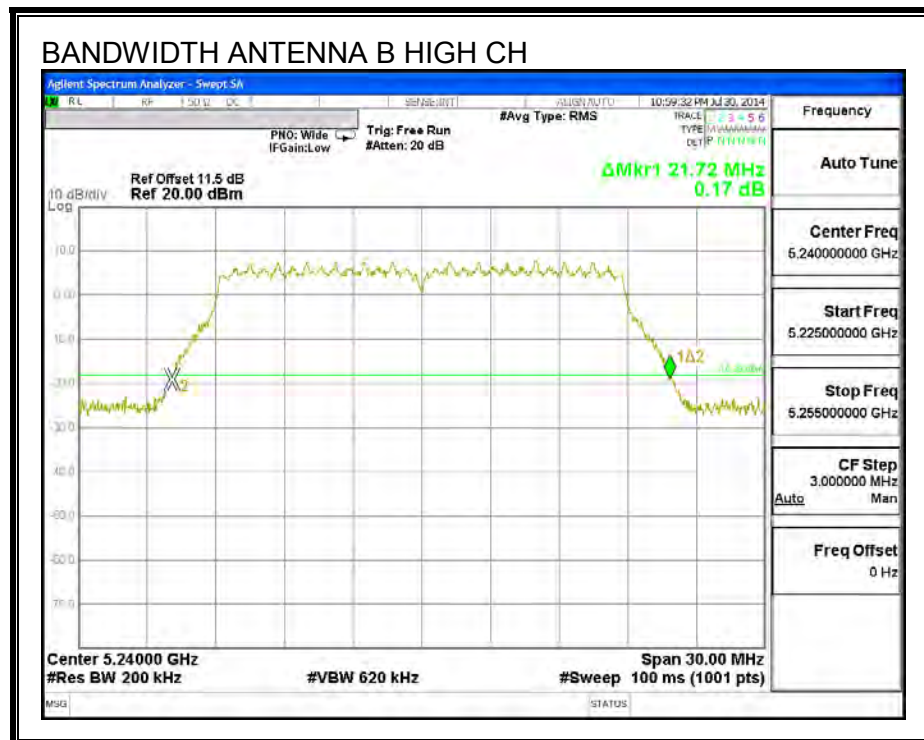
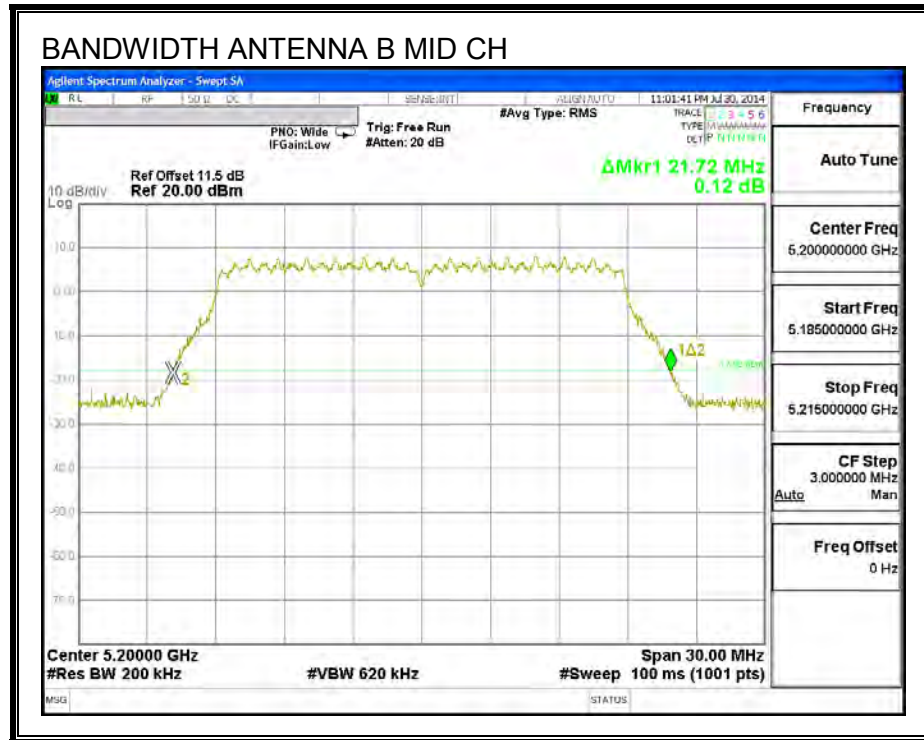
26 dB BANDWIDTH, ANTENNA A





26 dB BANDWIDTH, ANTENNA B





9.3.2. 99% BANDWIDTH

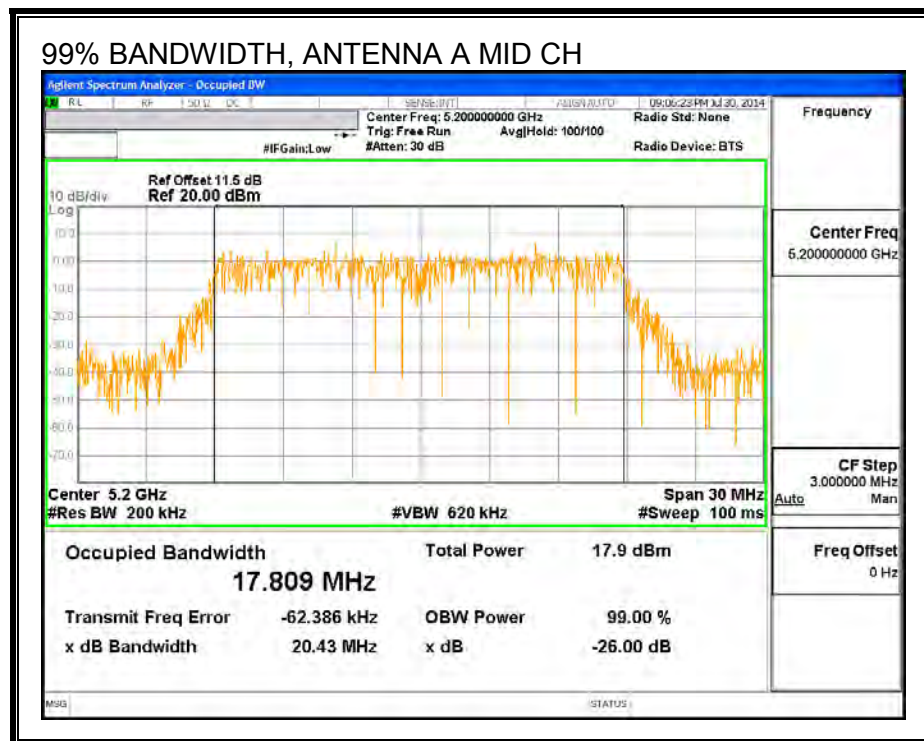
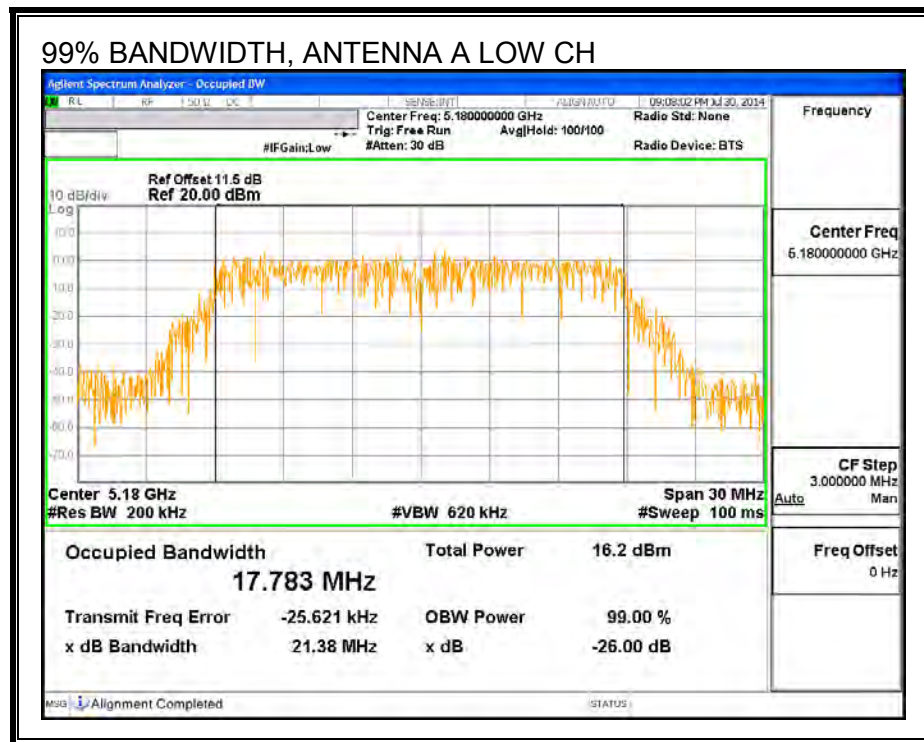
LIMITS

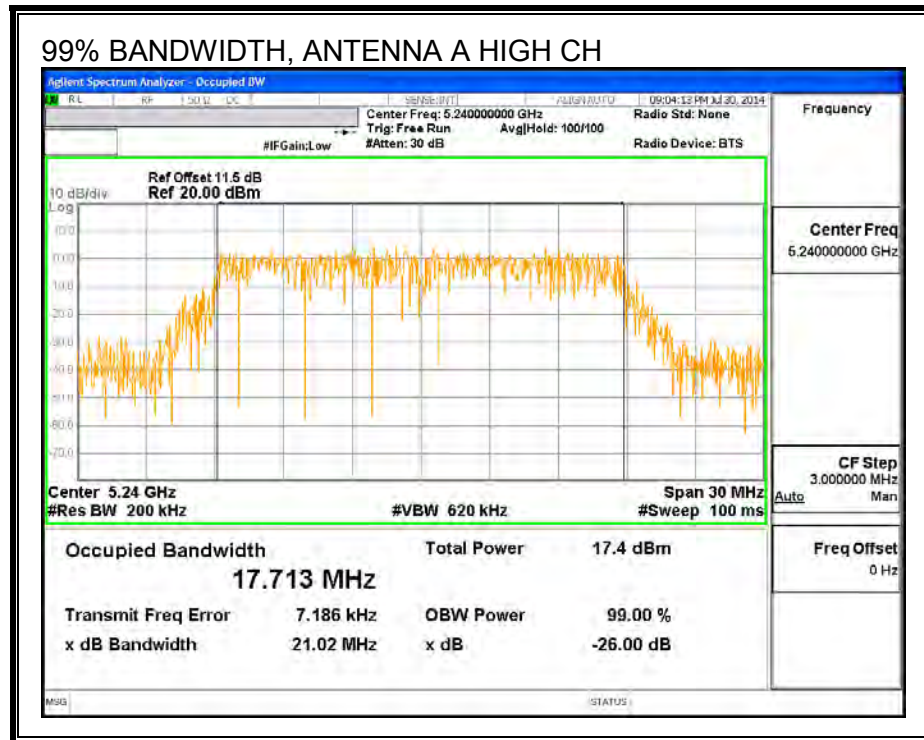
None; for reporting purposes only.

RESULTS

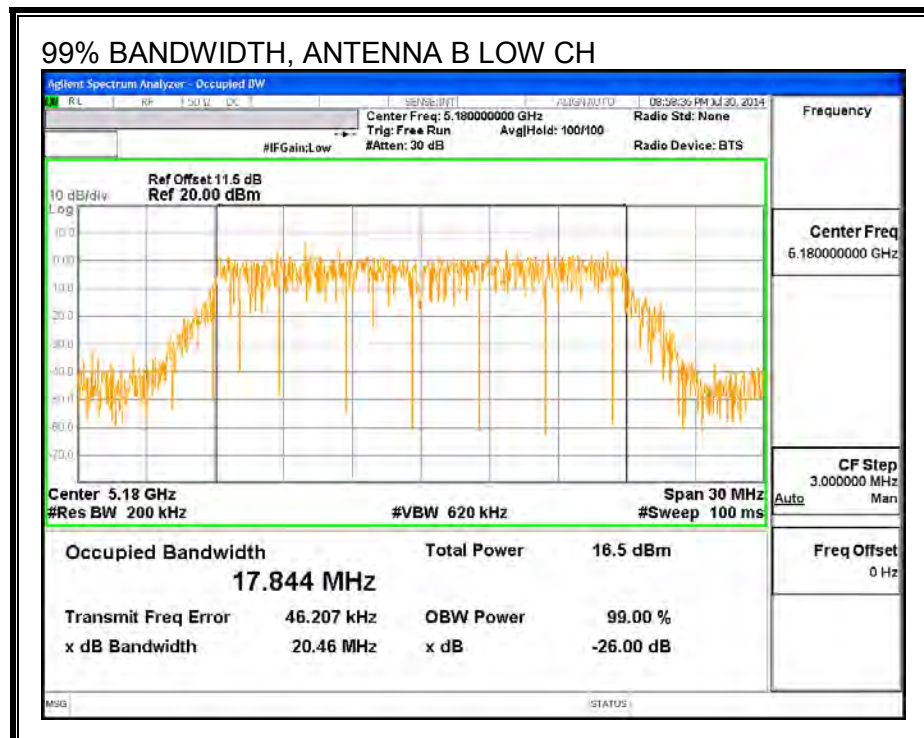
Channel	Frequency (MHz)	99% BW Antenna A (MHz)	99% BW Antenna B (MHz)
Low	5180	17.783	17.844
Mid	5200	17.809	17.698
High	5240	17.713	17.913

99% BANDWIDTH, ANTENNA A

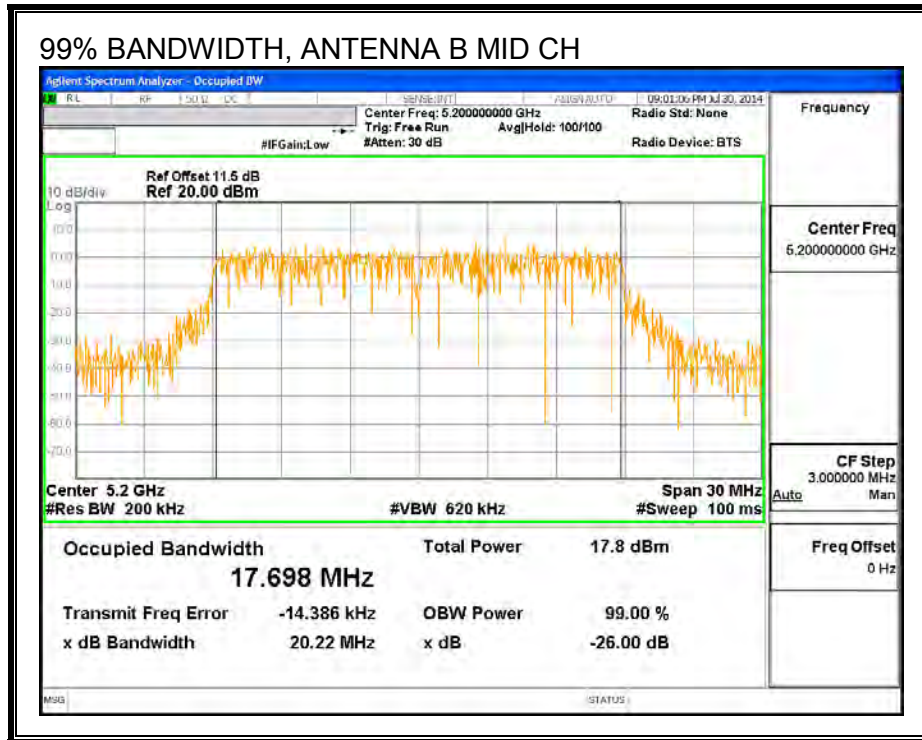




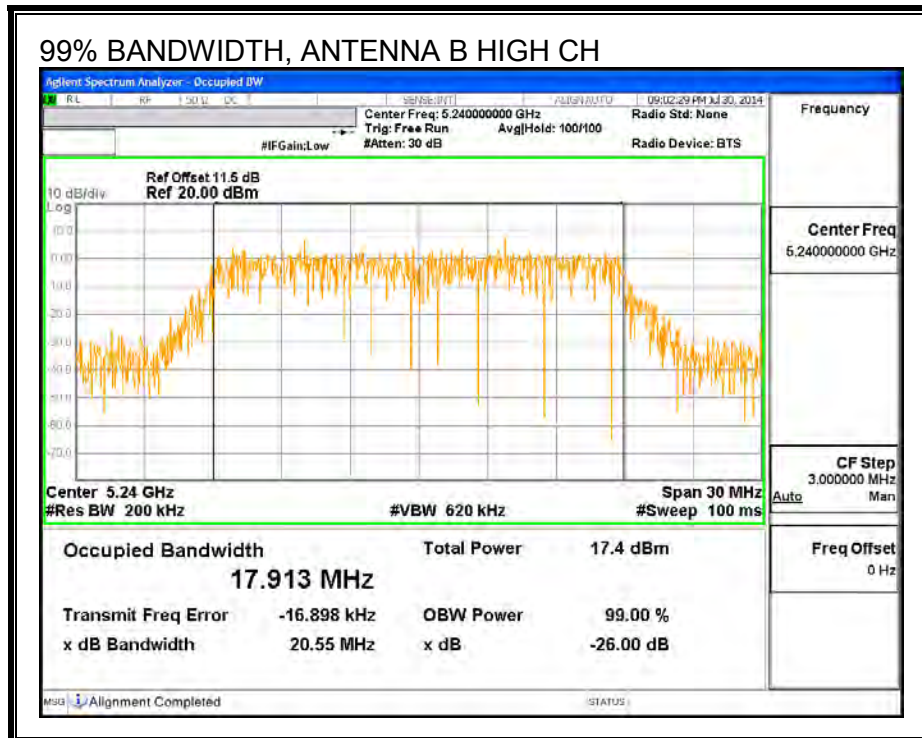
99% BANDWIDTH, ANTENNA B



99% BANDWIDTH, ANTENNA B MID CH



99% BANDWIDTH, ANTENNA B HIGH CH



9.3.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter. The power meter was setup for a gated power measurement.

The cable assembly insertion loss of 11.5 dB (including 10 dB pad and 1.5 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

RESULTS

Average Power Results

Channel	Frequency (MHz)	Antenna A Power (dBm)	Antenna B Power (dBm)	Total Power (dBm)
Low	5180	15.46	15.44	18.46
Mid	5200	16.95	16.34	19.67
High	5240	16.98	16.41	19.71

9.3.4. OUTPUT POWER AND PSD

LIMITS

FCC §15.407 (a) (1)

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

TEST PROCEDURE

The transmitter output is connected to a power meter. The power meter was setup for a gated power measurement.

The cable assembly insertion loss of 11.5 dB (including 10 dB pad and 1.5 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

DIRECTIONAL ANTENNA GAIN

The TX chains are uncorrelated and the antenna gain is unequal among the chains. The directional gain is:

Antenna A	Antenna B	Uncorrelated Chains Directional
Gain (dBi)	Gain (dBi)	Gain (dBi)
3.714	3.708	3.711

RESULTS

Antenna Gain and Limits

Channel	Frequency (MHz)	Directional Gain for Power (dBi)	Directional Gain for PSD (dBi)	Power Limit (dBm)	PSD Limit (dBm)
Low	5180	3.71	3.71	24.00	11.00
Mid	5200	3.71	3.71	24.00	11.00
High	5240	3.71	3.71	24.00	11.00

Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd Power & PSD
---------------------------	------	---

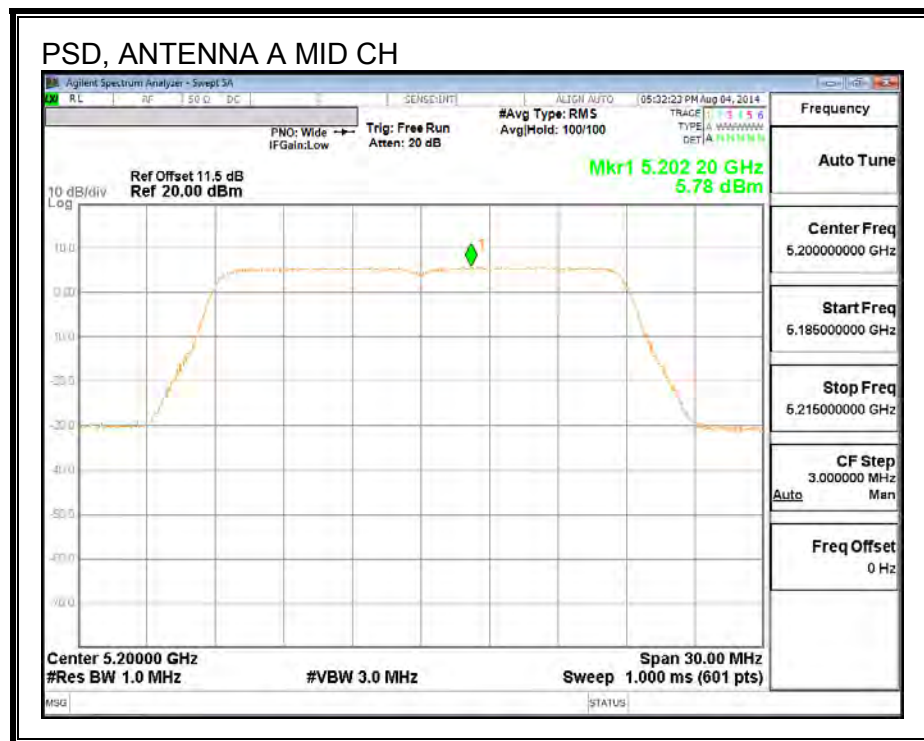
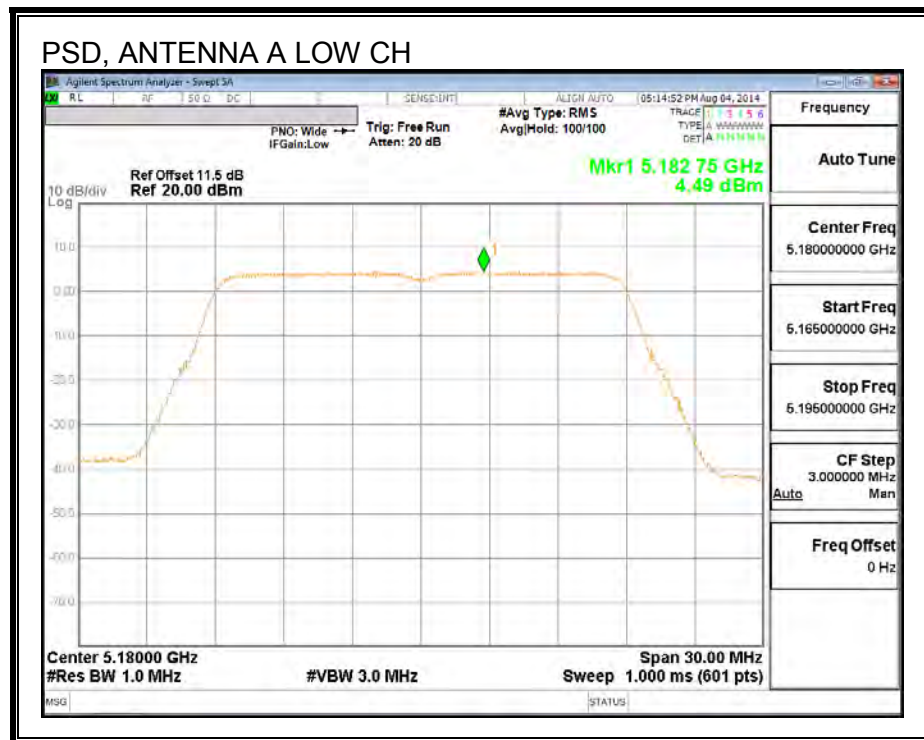
Output Power Results

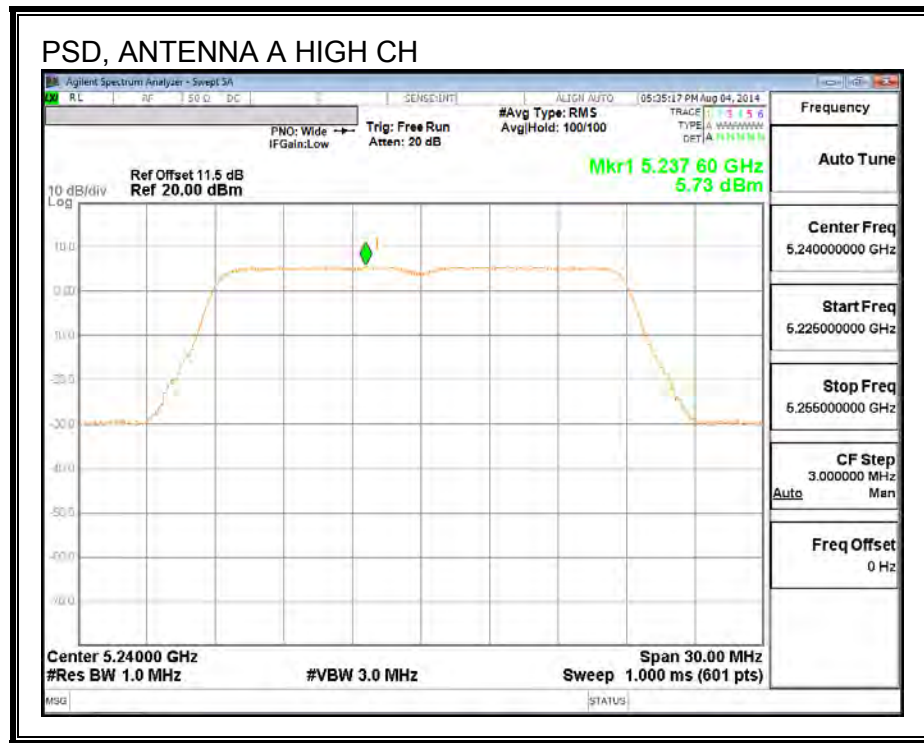
Channel	Frequency (MHz)	Antenna A Meas Power (dBm)	Antenna B Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5180	15.46	15.44	18.46	24.00	-5.54
Mid	5200	16.95	16.34	19.67	24.00	-4.33
High	5240	16.98	16.41	19.71	24.00	-4.29

PSD Results

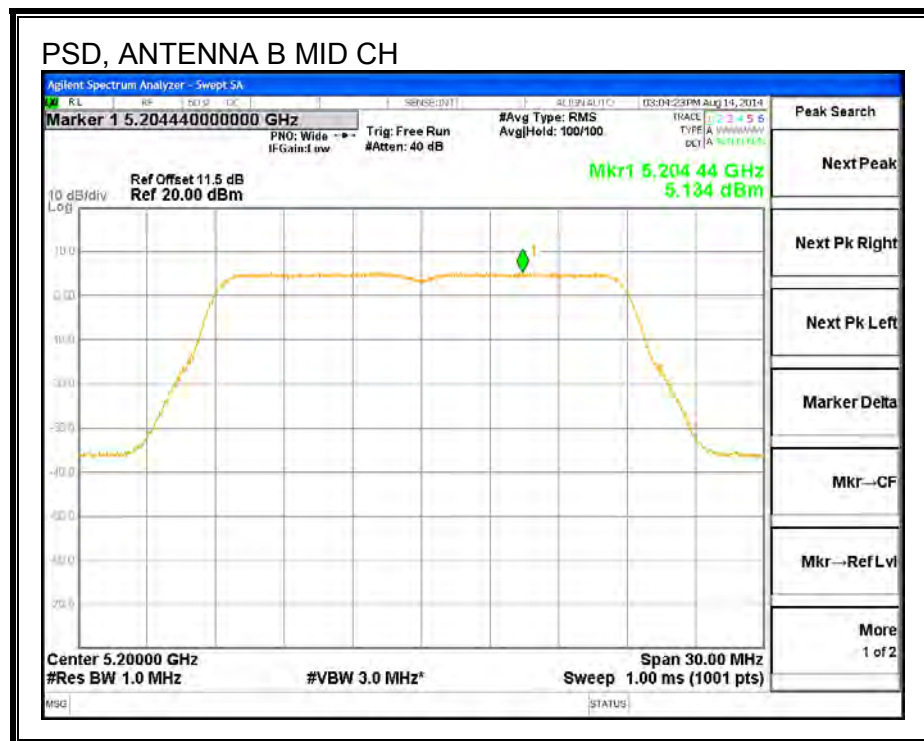
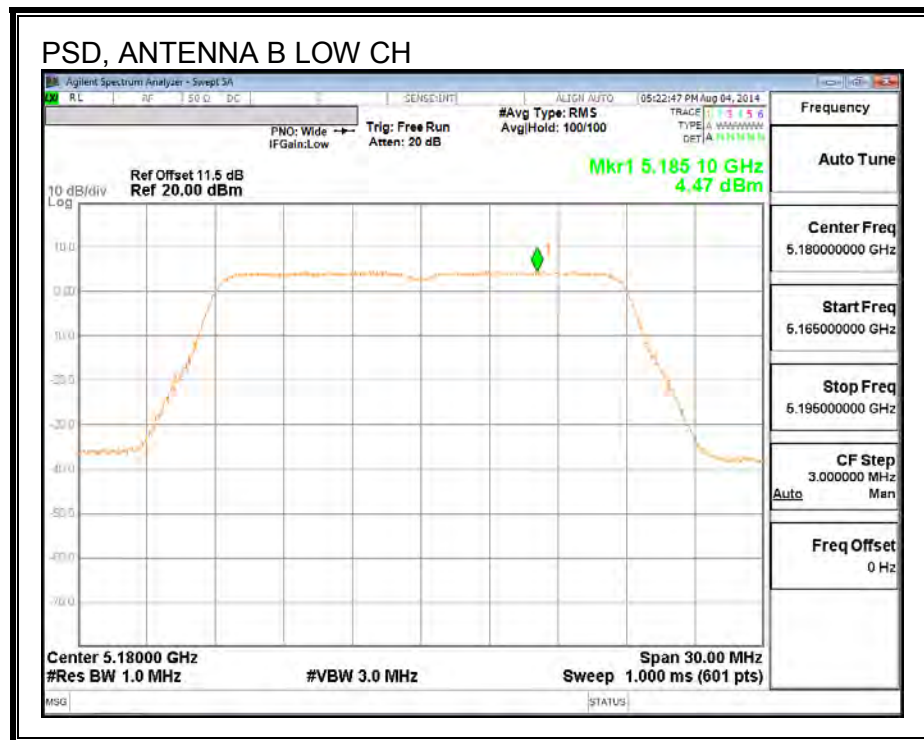
Channel	Frequency (MHz)	Antenna A Meas PSD (dBm)	Antenna B Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low	5180	4.49	4.47	7.49	11.00	-3.51
Mid	5200	5.78	5.13	8.48	11.00	-2.52
High	5240	5.73	5.09	8.43	11.00	-2.57

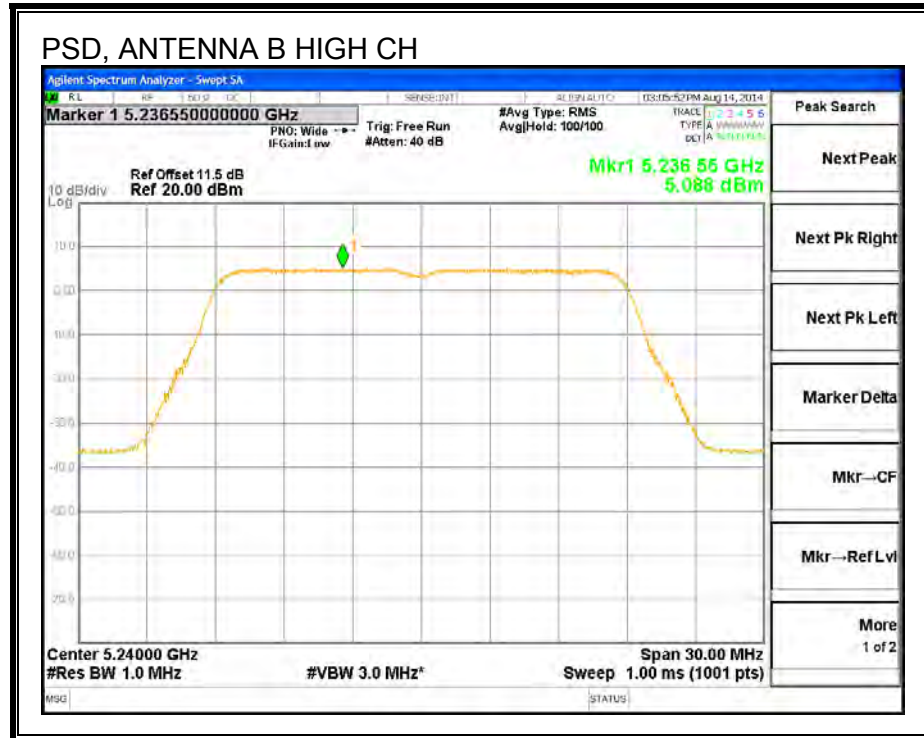
PSD, ANTENNA A





PSD, ANTENNA B





9.4. 802.11n HT40 MODE IN THE 5.2 GHz BAND

9.4.1. 26 dB BANDWIDTH

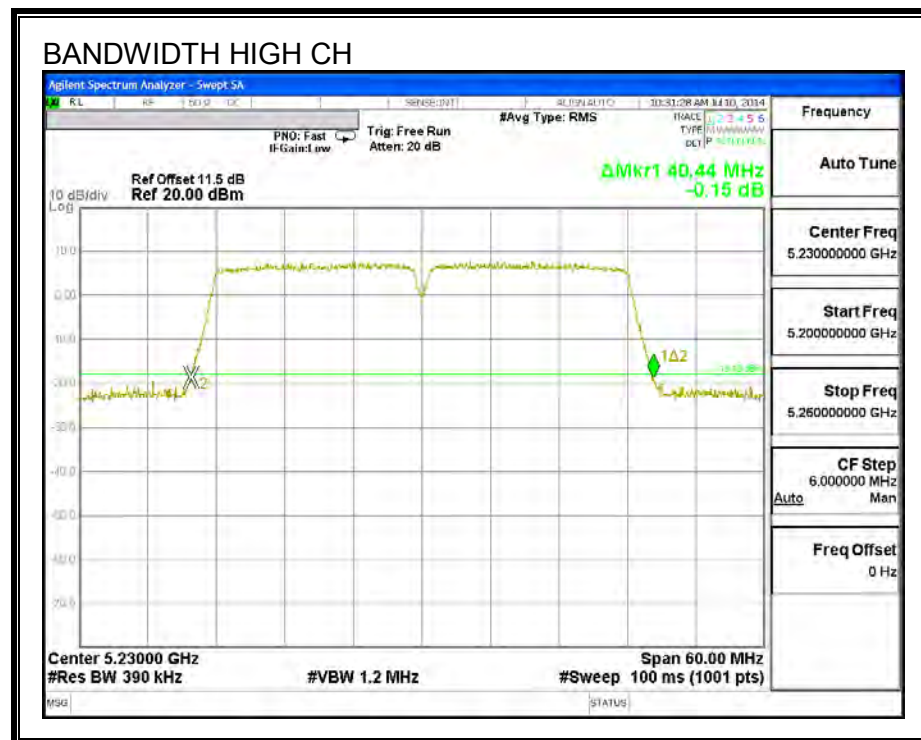
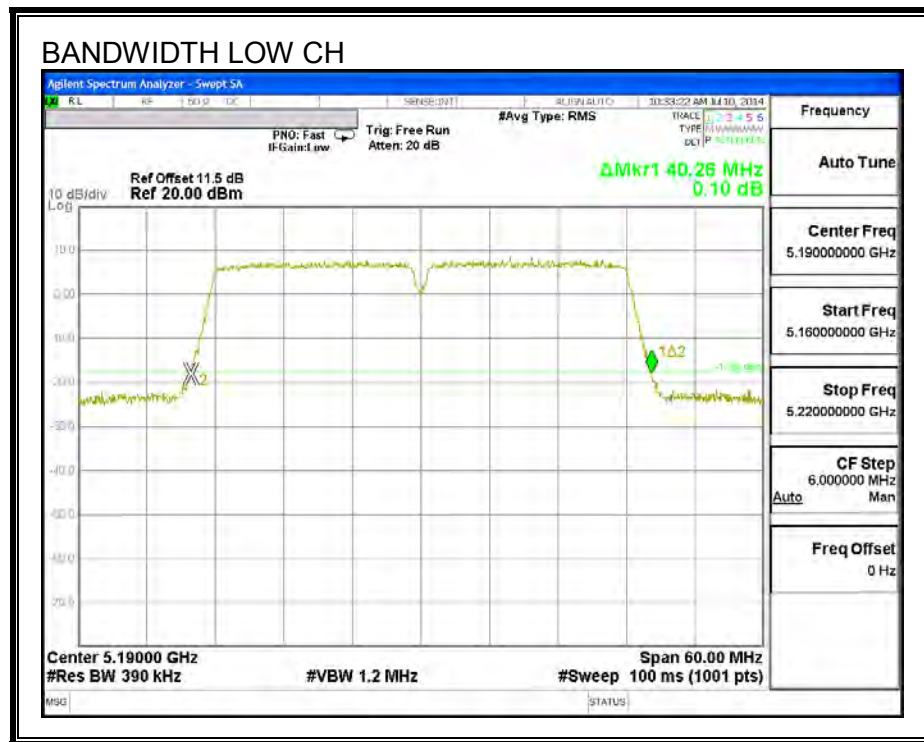
LIMITS

None; for reporting purposes only.

RESULTS

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Low	5190	40.26
High	5230	40.44

26 dB BANDWIDTH



9.4.2. 99% BANDWIDTH

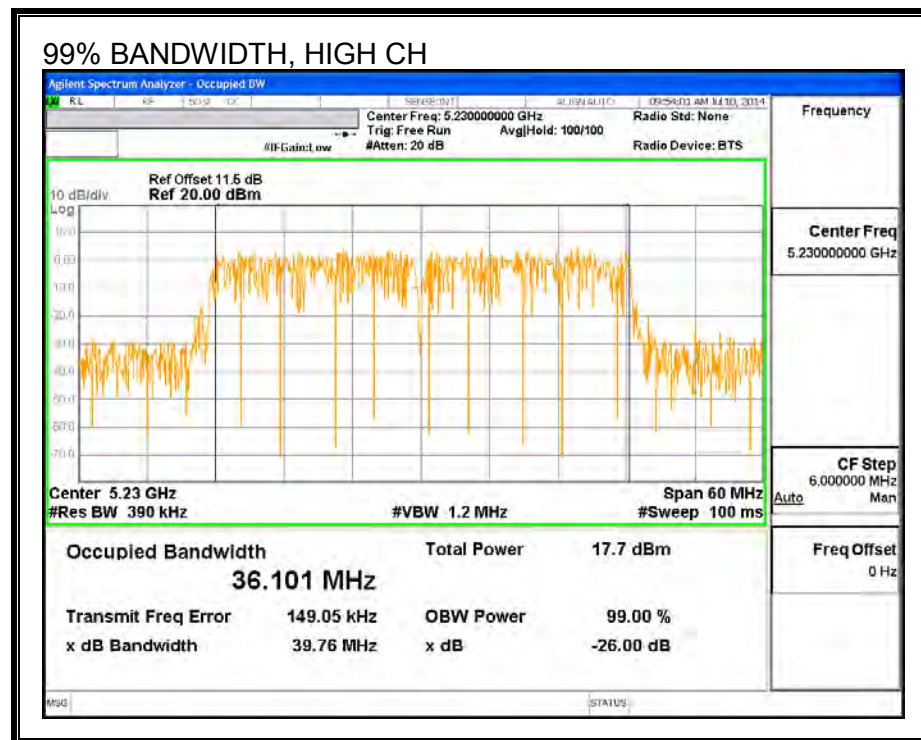
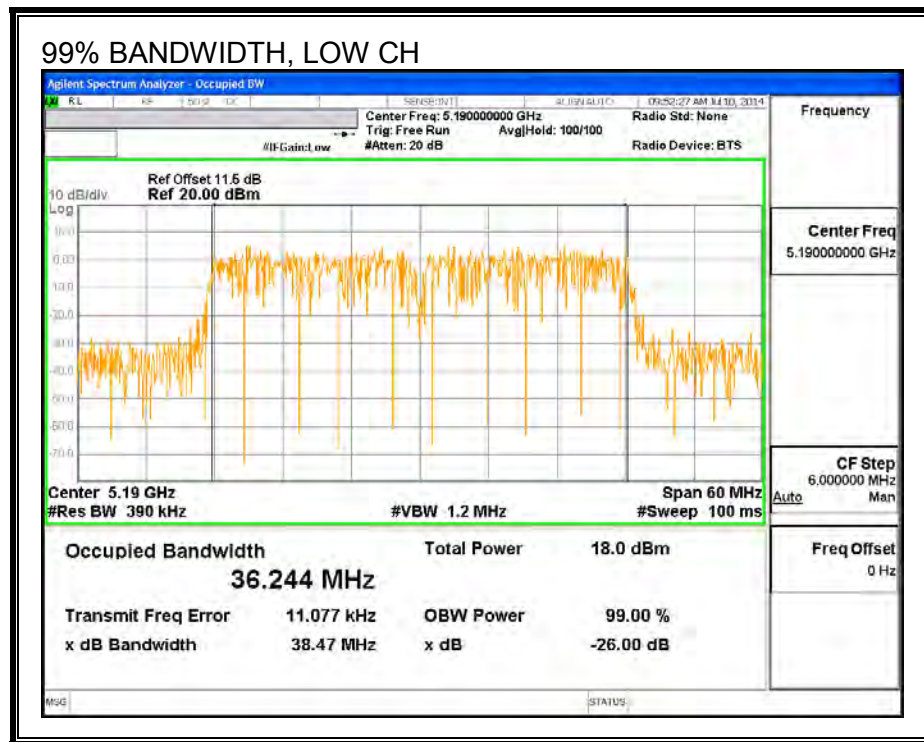
LIMITS

None; for reporting purposes only.

RESULTS

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5190	36.244
High	5230	36.101

99% BANDWIDTH



9.4.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter. The power meter was setup for a gated power measurement.

The cable assembly insertion loss of 11.5 dB (including 10 dB pad and 1.5 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

RESULTS

Channel	Frequency (MHz)	Antenna A Power (dBm)	Antenna B Power (dBm)
Low	5190	12.83	12.87
High	5230	17.93	16.38

9.4.4. OUTPUT POWER AND PSD

LIMITS

FCC §15.407 (a) (1)

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

TEST PROCEDURE

The transmitter output is connected to a power meter. The power meter was setup for a gated power measurement.

The cable assembly insertion loss of 11.5 dB (including 10 dB pad and 1.5 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

DIRECTIONAL ANTENNA GAIN

There is only one transmitter output therefore the directional gain is equal to the antenna gain.

ANTENNA A

Antenna Gain (dBi)
3.714

ANTENNA B

Antenna Gain (dBi)
3.708

ANTENNA A RESULTS

Antenna Gain and Limits

Channel	Frequency (MHz)	Directional Gain for Power (dBi)	Directional Gain for PSD (dBi)	Power Limit (dBm)	PSD Limit (dBm)
Low	5190	3.71	3.71	24.00	11.00
High	5230	3.71	3.71	24.00	11.00

Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd Power & PSD
--------------------	------	--

Output Power Results

Channel	Frequency (MHz)	Antenna A Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5190	12.83	12.83	24.00	-11.17
High	5230	17.93	17.93	24.00	-6.07

PSD Results

Channel	Frequency (MHz)	Antenna A Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low	5190	-1.65	-1.65	11.00	-12.65
High	5230	3.38	3.38	11.00	-7.63

ANTENNA B RESULTS

Antenna Gain and Limits

Channel	Frequency (MHz)	Directional Gain for Power (dBi)	Directional Gain for PSD (dBi)	Power Limit (dBm)	PSD Limit (dBm)
Low	5190	3.71	3.71	24.00	11.00
High	5230	3.71	3.71	24.00	11.00

Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd Power & PSD
--------------------	------	--

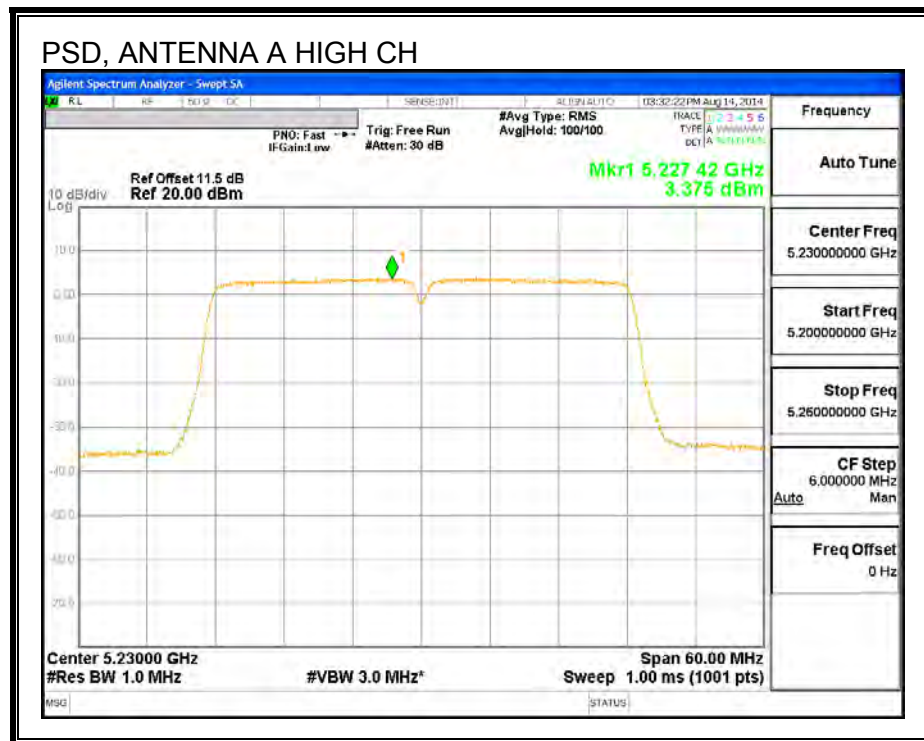
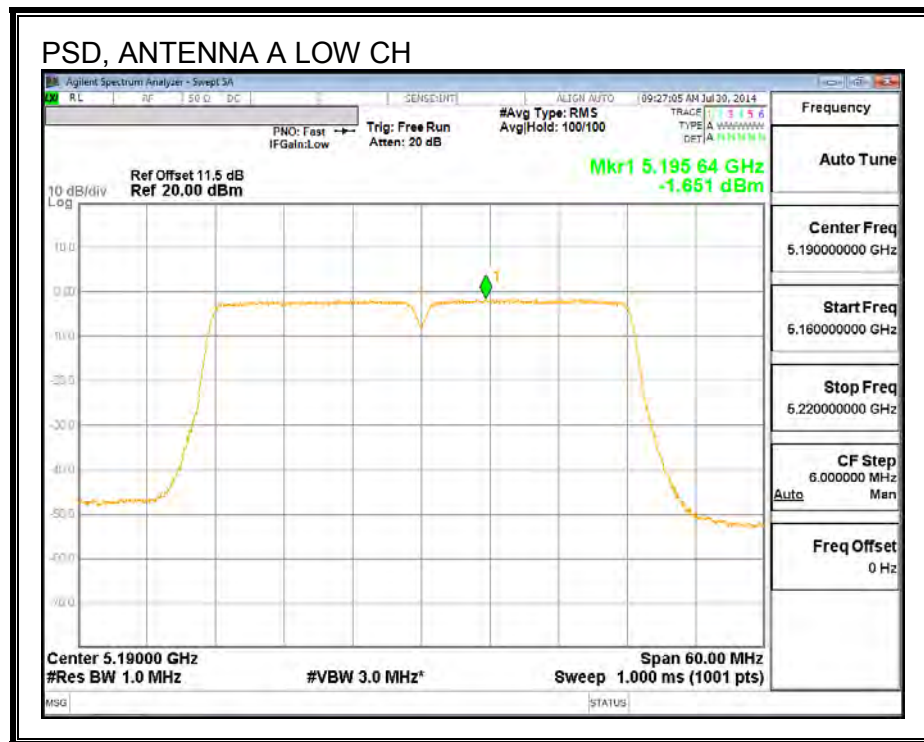
Output Power Results

Channel	Frequency (MHz)	Antenna B Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5190	12.87	12.87	24.00	-11.13
High	5230	16.38	16.38	24.00	-7.62

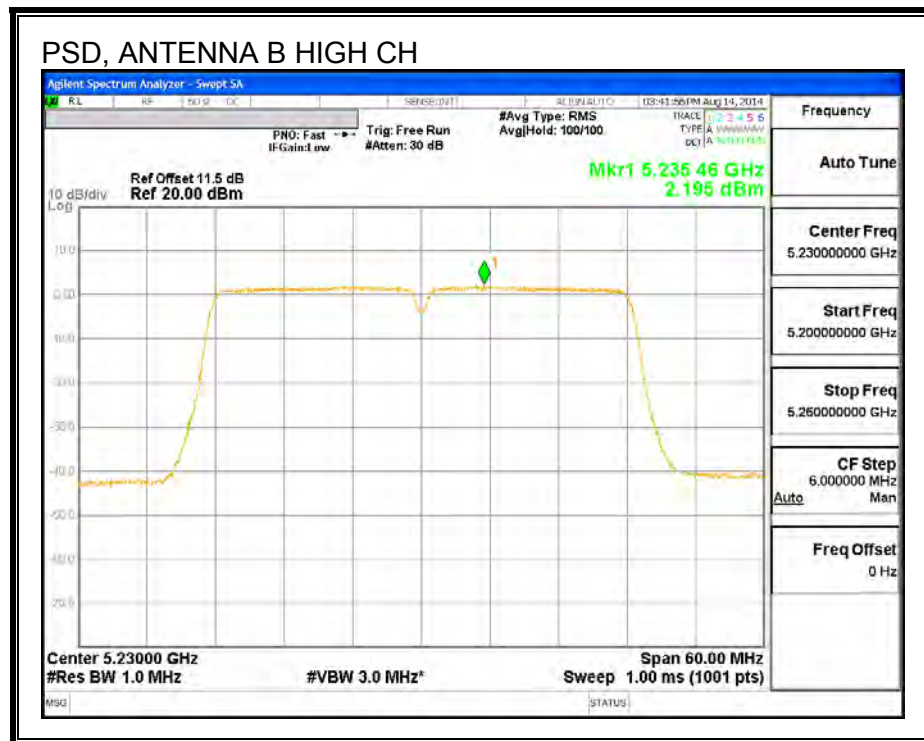
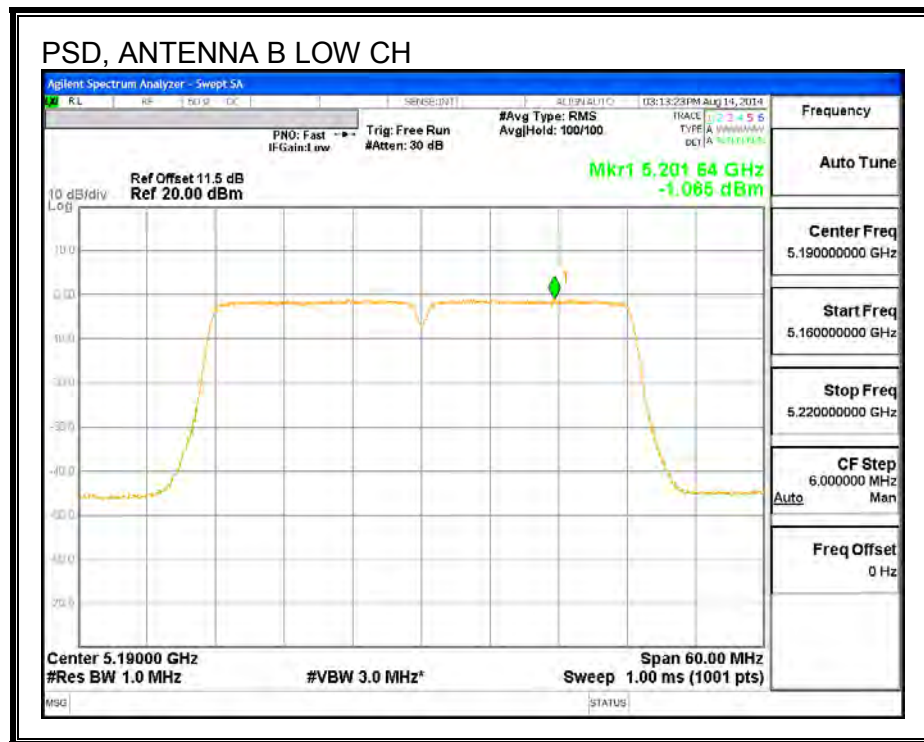
PSD Results

Channel	Frequency (MHz)	Antenna B Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low	5190	-1.07	-1.07	11.00	-12.07
High	5230	2.20	2.20	11.00	-8.81

PSD, ANTENNA A



PSD, ANTENNA B



9.5. 802.11n HT40 2TX CDD MODE IN THE 5.2 GHz BAND

9.5.1. 26 dB BANDWIDTH

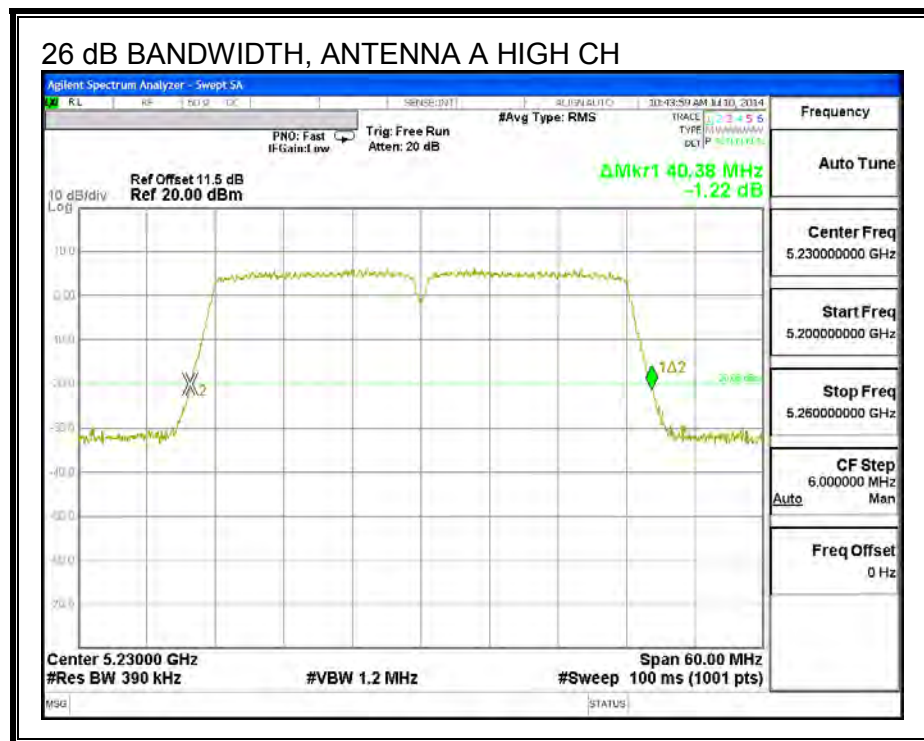
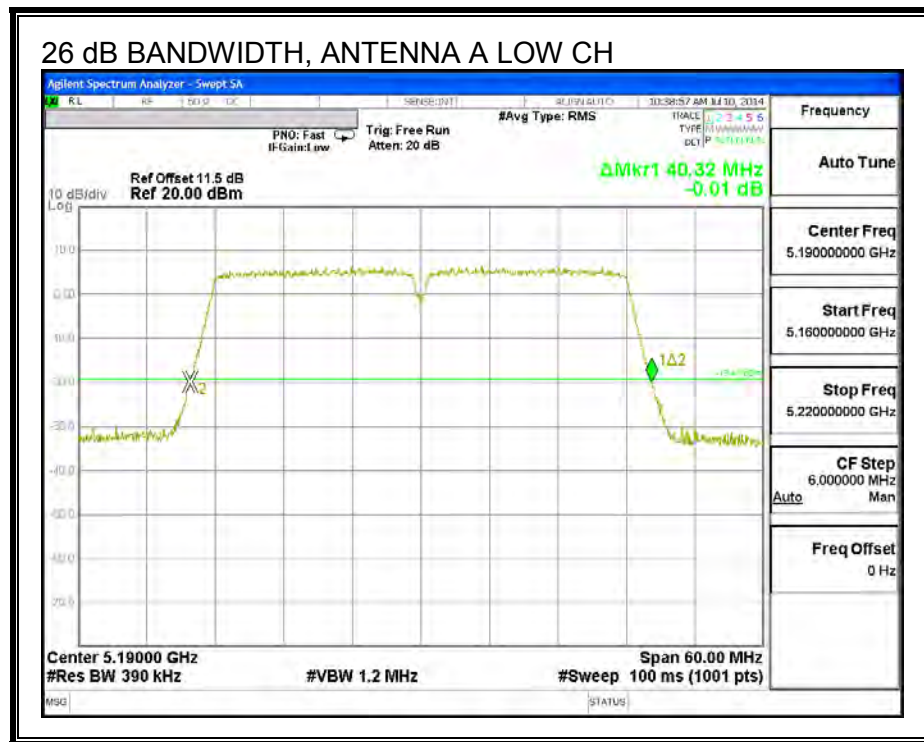
LIMITS

None; for reporting purposes only.

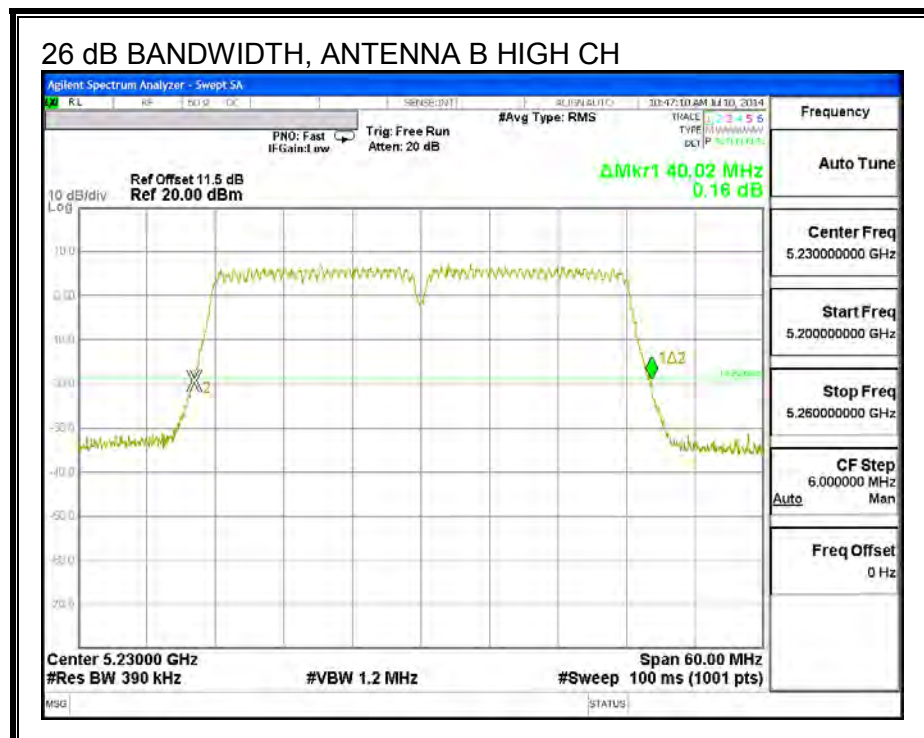
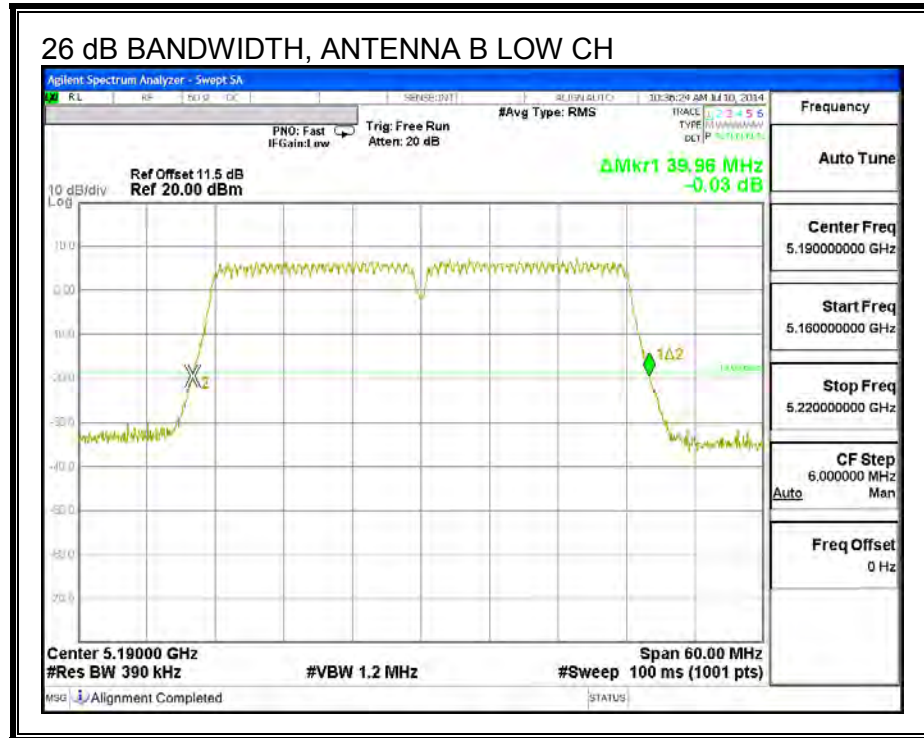
RESULTS

Channel	Frequency (MHz)	26 dB BW Antenna A (MHz)	26 dB BW Antenna B (MHz)
Low	5190	40.32	39.96
High	5230	40.38	40.02

26 dB BANDWIDTH, ANTENNA A



26 dB BANDWIDTH, ANTENNA B



9.5.2. 99% BANDWIDTH

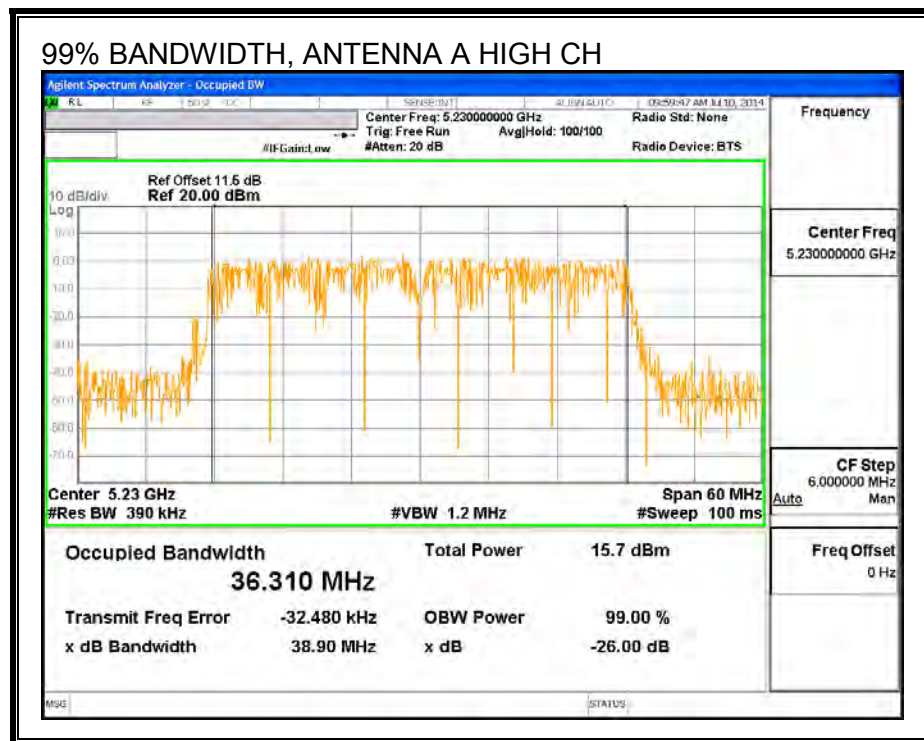
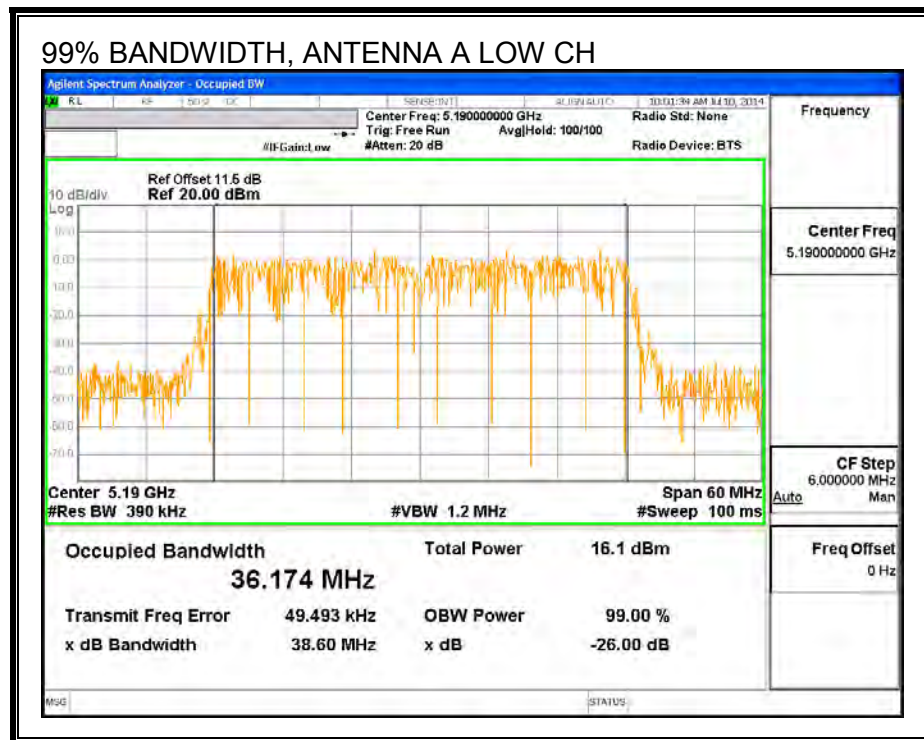
LIMITS

None; for reporting purposes only.

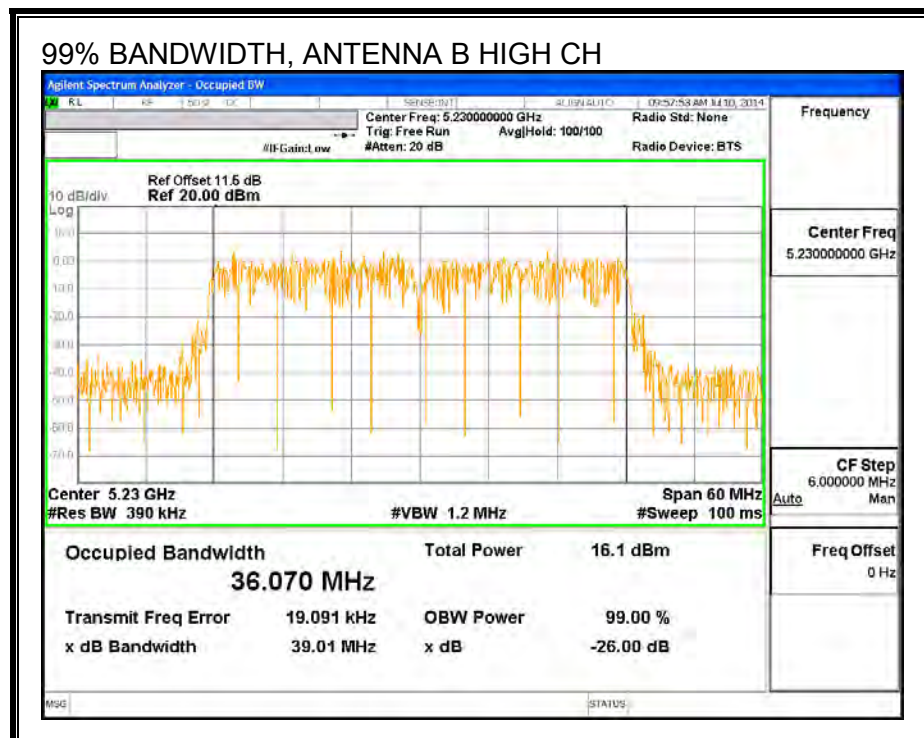
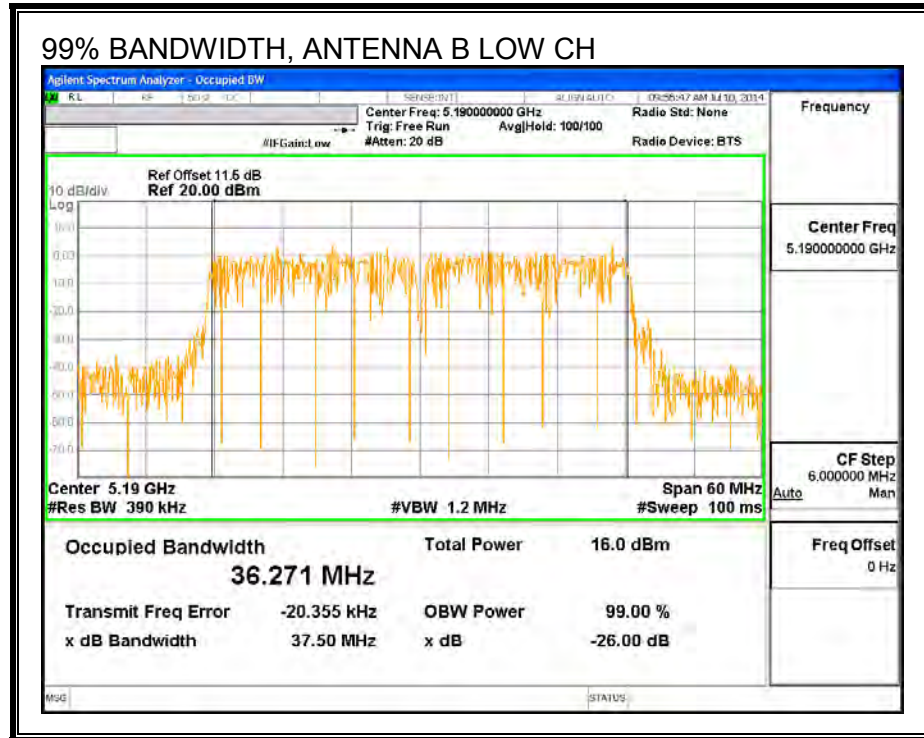
RESULTS

Channel	Frequency (MHz)	99% BW Antenna A (MHz)	99% BW Antenna B (MHz)
Low	5190	36.174	36.271
High	5230	36.310	36.070

99% BANDWIDTH, ANTENNA A



99% BANDWIDTH, ANTENNA B



9.5.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter. The power meter was setup for a gated power measurement.

The cable assembly insertion loss of 11.5 dB (including 10 dB pad and 1.5 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

RESULTS

Average Power Results

Channel	Frequency	Antenna A	Antenna B	Total
	(MHz)	Power (dBm)	Power (dBm)	Power (dBm)
Low	5190	11.87	11.76	14.83
High	5230	17.40	16.42	19.95

9.5.4. OUTPUT POWER AND PSD

LIMITS

FCC §15.407 (a) (1)

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

TEST PROCEDURE

The transmitter output is connected to a power meter. The power meter was setup for a gated power measurement.

The cable assembly insertion loss of 11.5 dB (including 10 dB pad and 1.5 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

DIRECTIONAL ANTENNA GAIN

The TX chains are uncorrelated and the antenna gain is unequal among the chains. The directional gain is:

Antenna A	Antenna B	Uncorrelated Chains Directional
Gain (dBi)	Gain (dBi)	Gain (dBi)
3.714	3.708	3.711

The TX chains are correlated and the antenna gain is unequal among the chains. The directional gain is:

Antenna A	Antenna B	Correlated Chains Directional
Gain (dBi)	Gain (dBi)	Gain (dBi)
3.714	3.708	6.721

RESULTS

Antenna Gain and Limits

Channel	Frequency (MHz)	Directional Gain for Power (dBi)	Directional Gain for PSD (dBi)	Power Limit (dBm)	PSD Limit (dBm)
Low	5190	3.71	6.72	24.00	10.28
High	5230	3.71	6.72	24.00	10.28

Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd Power & PSD
--------------------	------	--

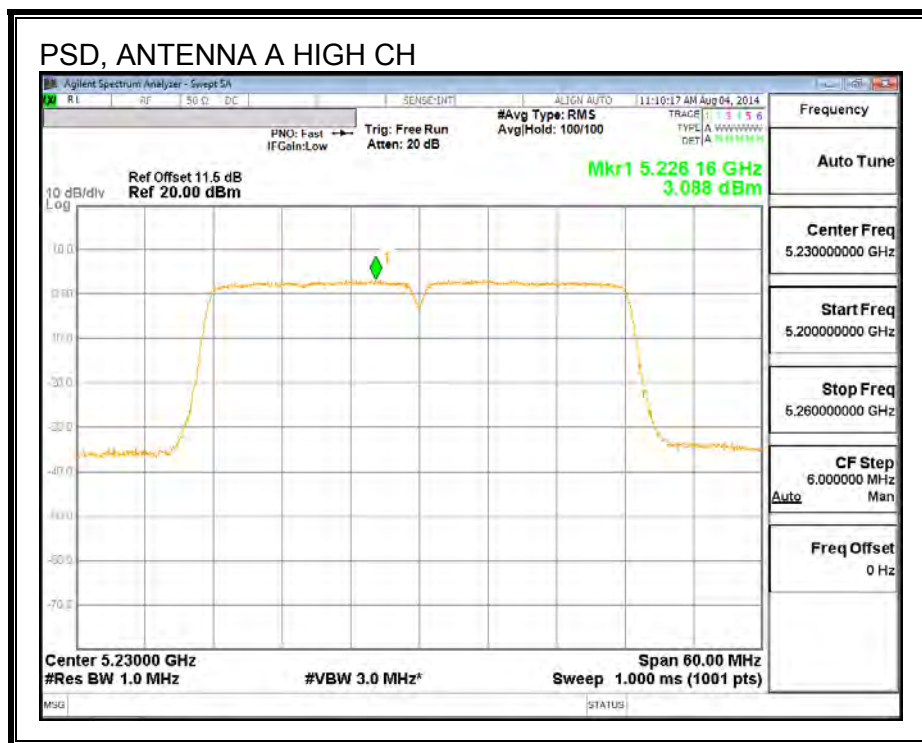
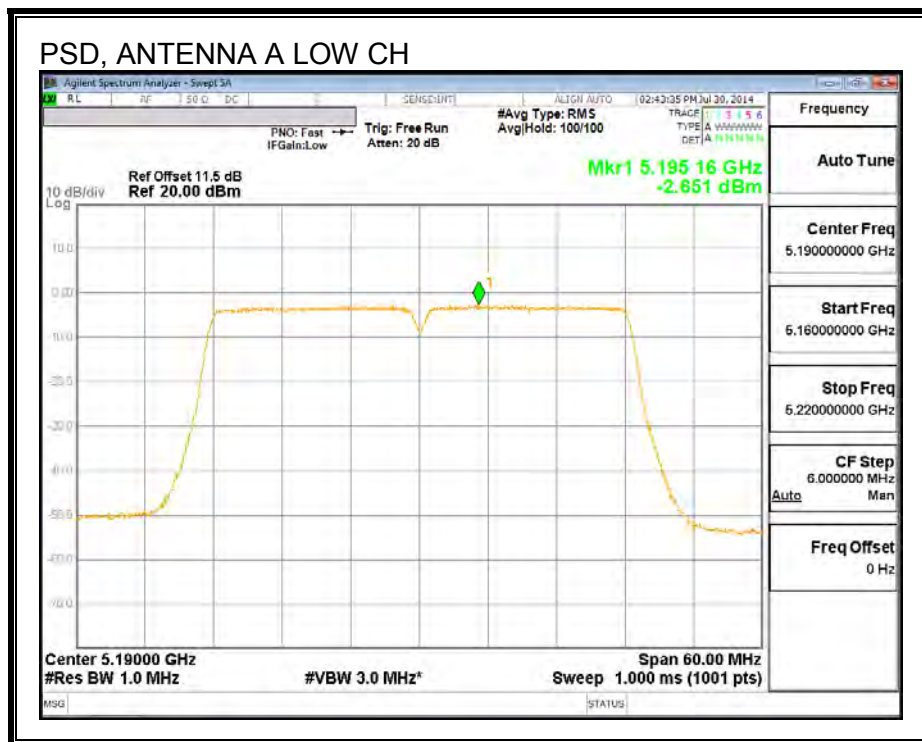
Output Power Results

Channel	Frequency (MHz)	Antenna A Meas Power (dBm)	Antenna B Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5190	11.87	11.76	14.83	24.00	-9.17
High	5230	17.40	16.42	19.95	24.00	-4.05

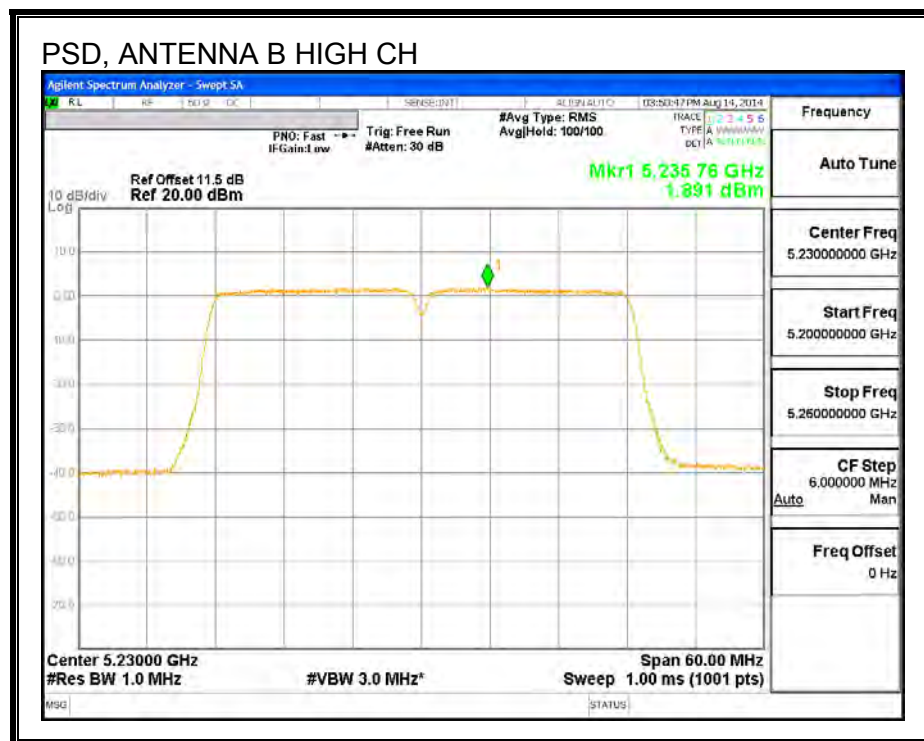
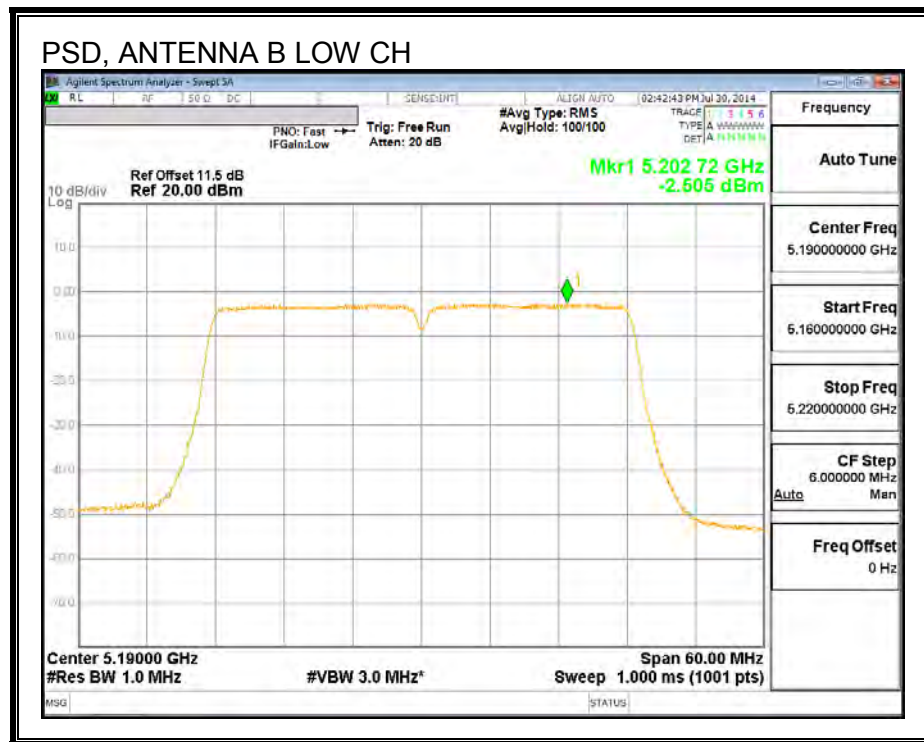
PSD Results

Channel	Frequency (MHz)	Antenna A Meas PSD (dBm)	Antenna B Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low	5190	-2.65	-2.51	0.43	10.28	-9.85
High	5230	3.09	1.89	5.54	10.28	-4.74

PSD, ANTENNA A



PSD, ANTENNA B



9.6. 802.11n HT40 2TX STBC MODE IN THE 5.2 GHz BAND

9.6.1. 26 dB BANDWIDTH

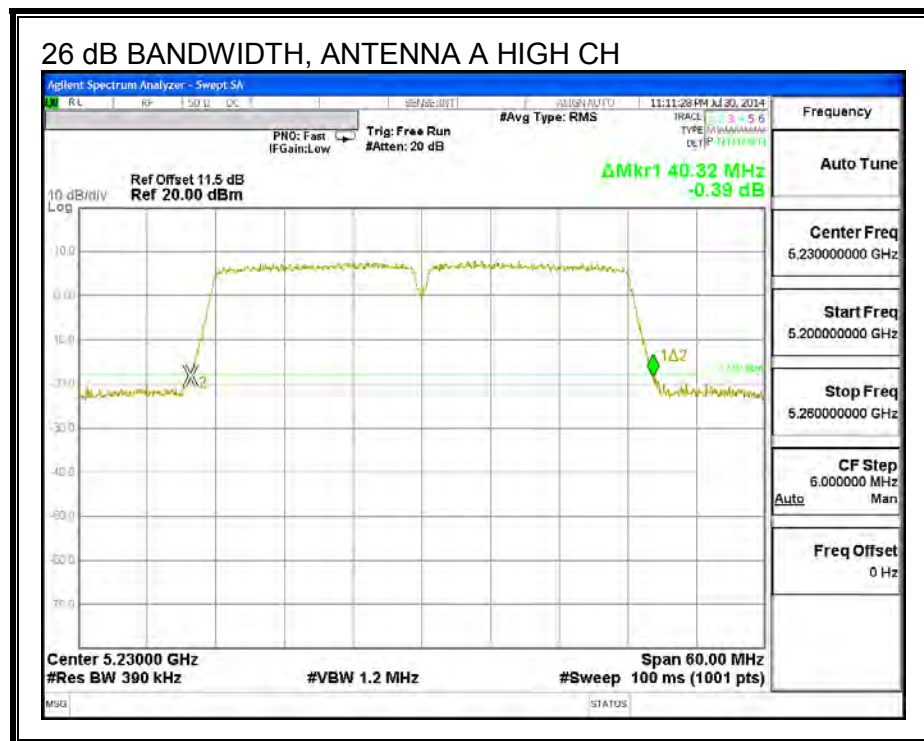
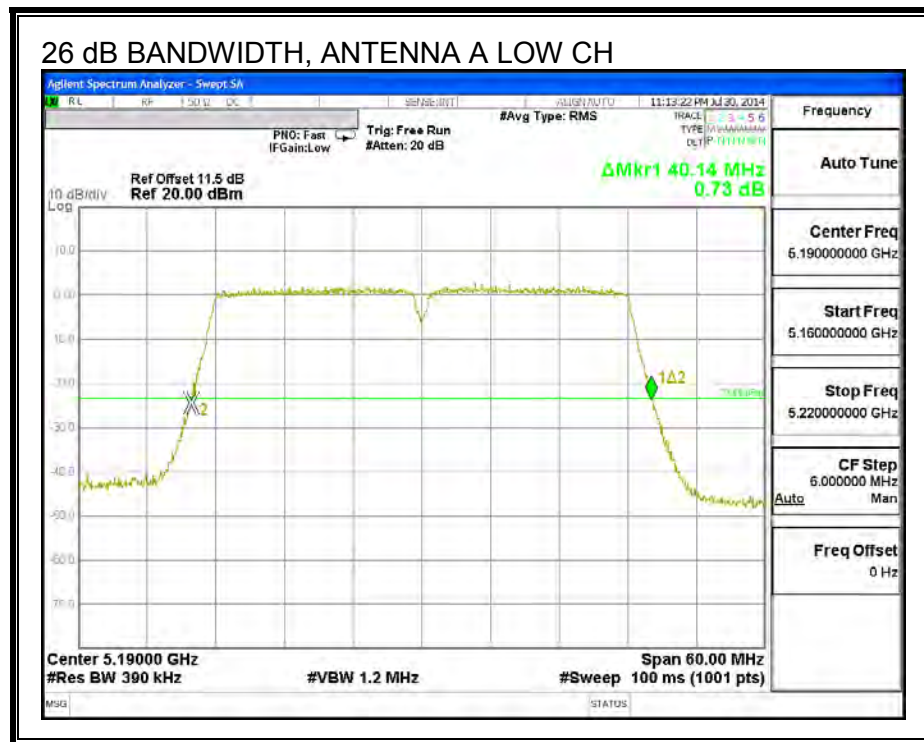
LIMITS

None; for reporting purposes only.

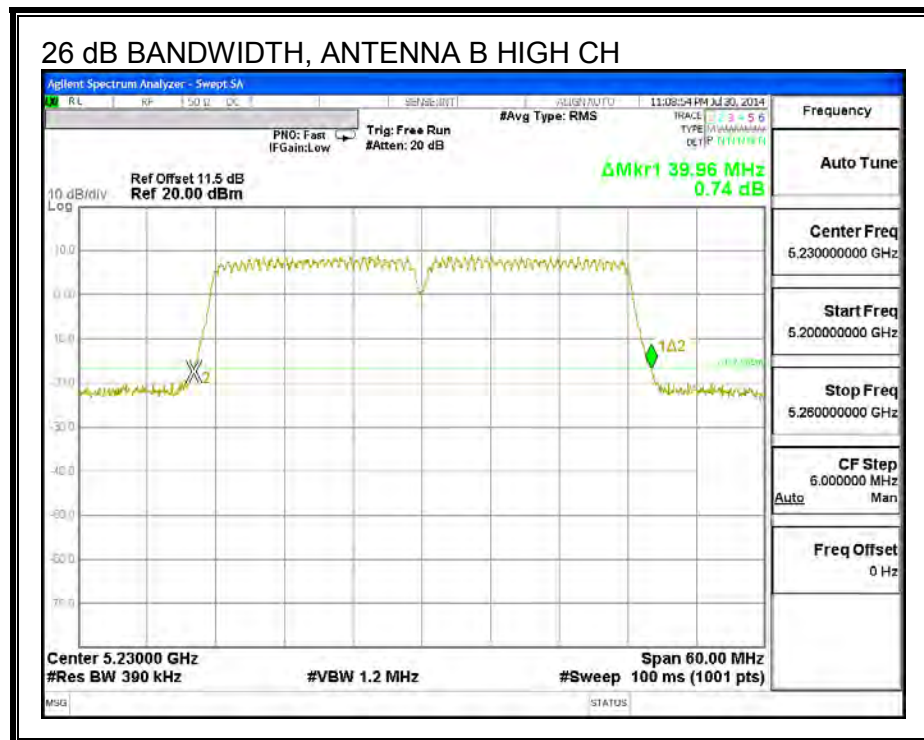
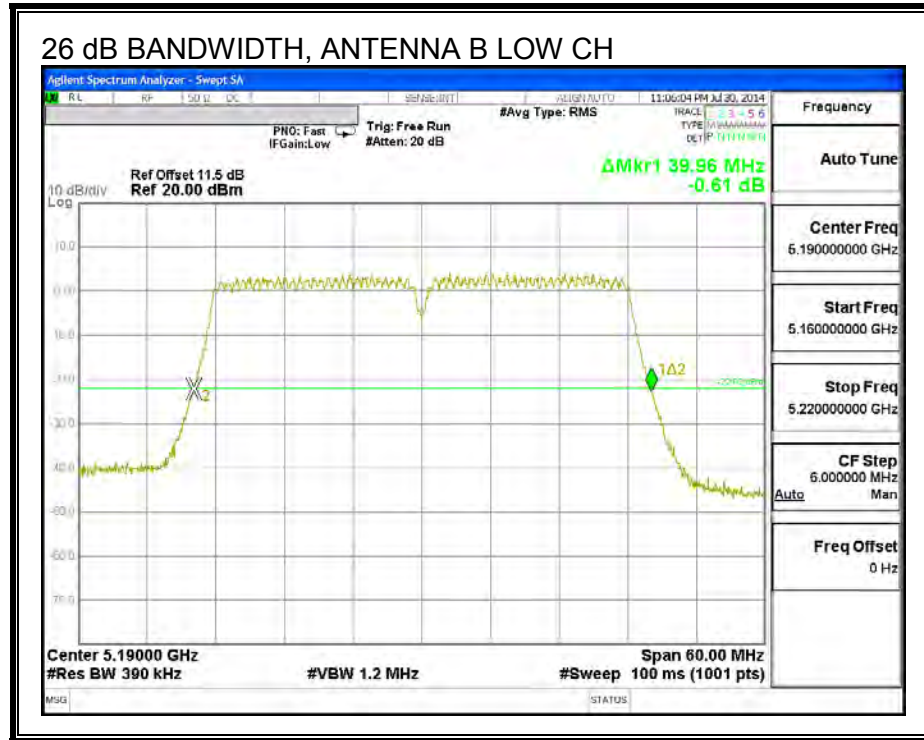
RESULTS

Channel	Frequency (MHz)	26 dB BW Antenna A (MHz)	26 dB BW Antenna B (MHz)
Low	5190	40.14	39.96
High	5230	40.32	39.96

26 dB BANDWIDTH, ANTENNA A



26 dB BANDWIDTH, ANTENNA B



9.6.2. 99% BANDWIDTH

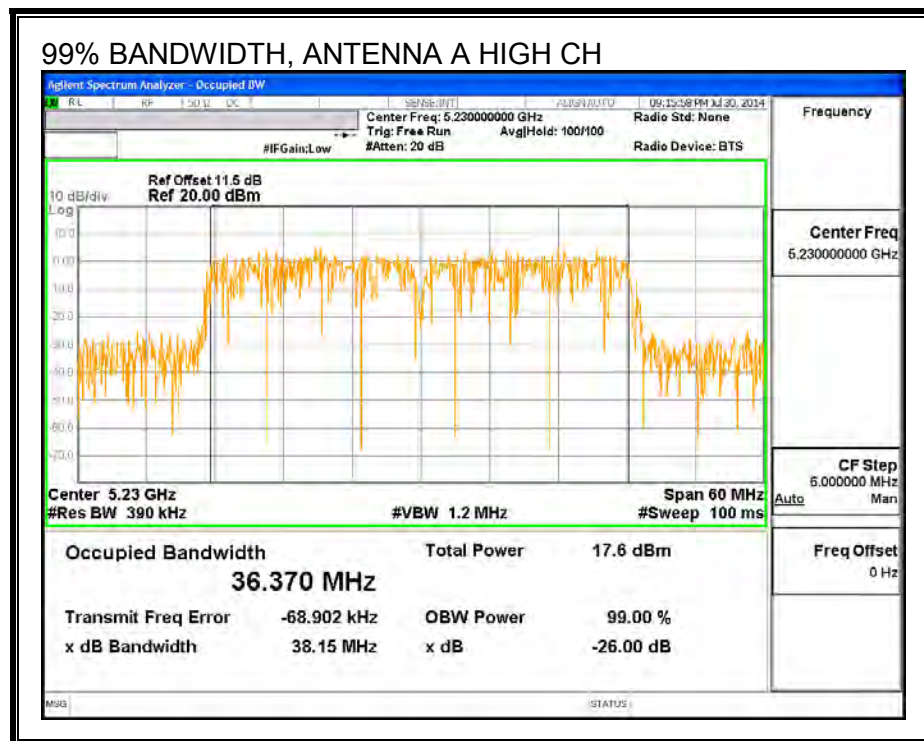
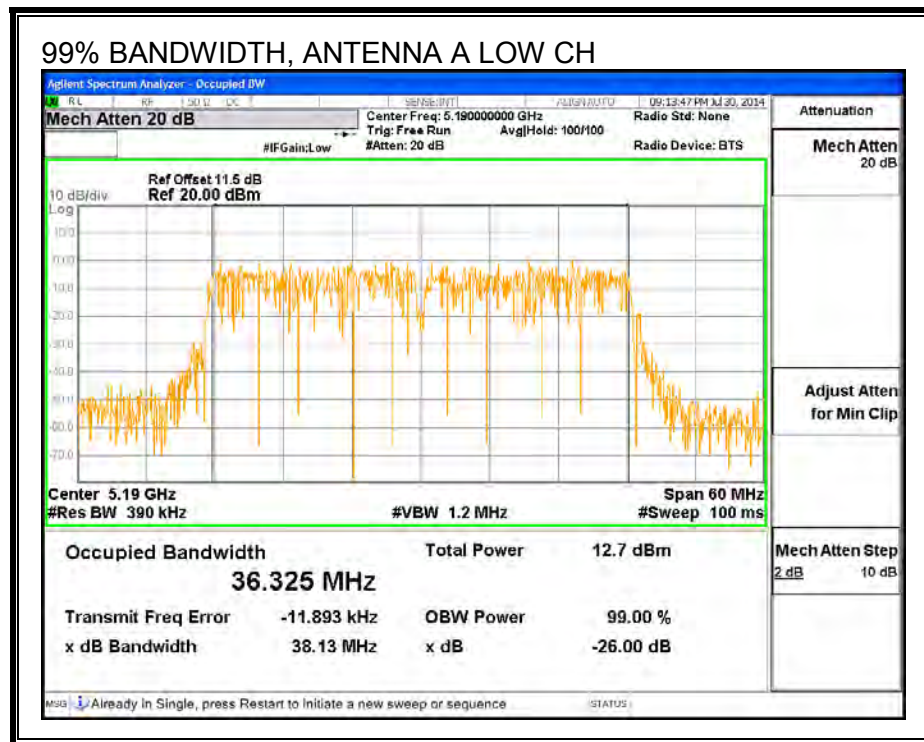
LIMITS

None; for reporting purposes only.

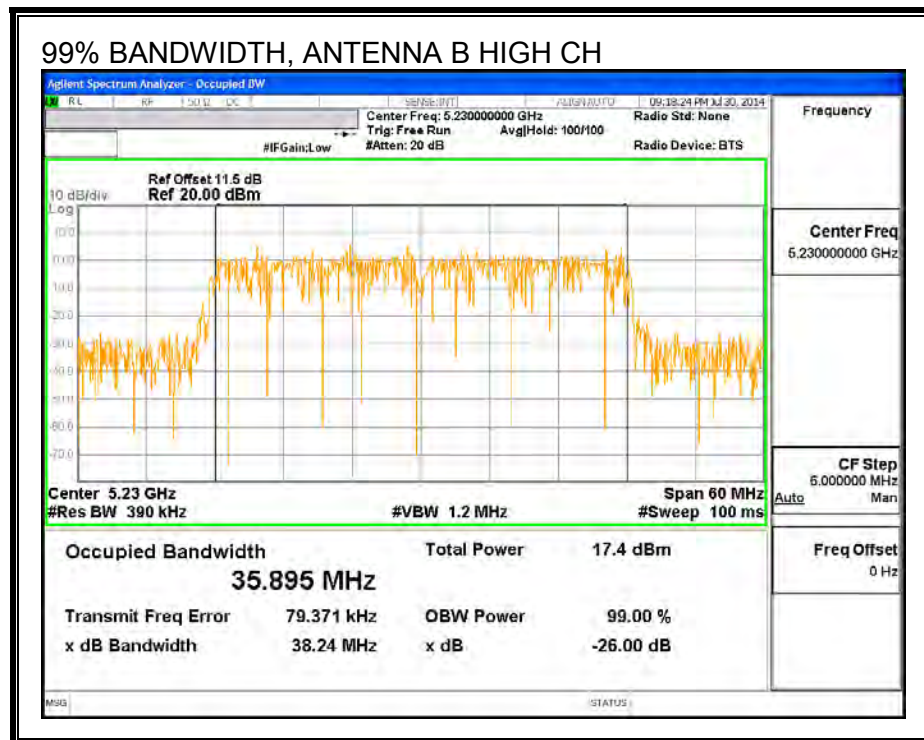
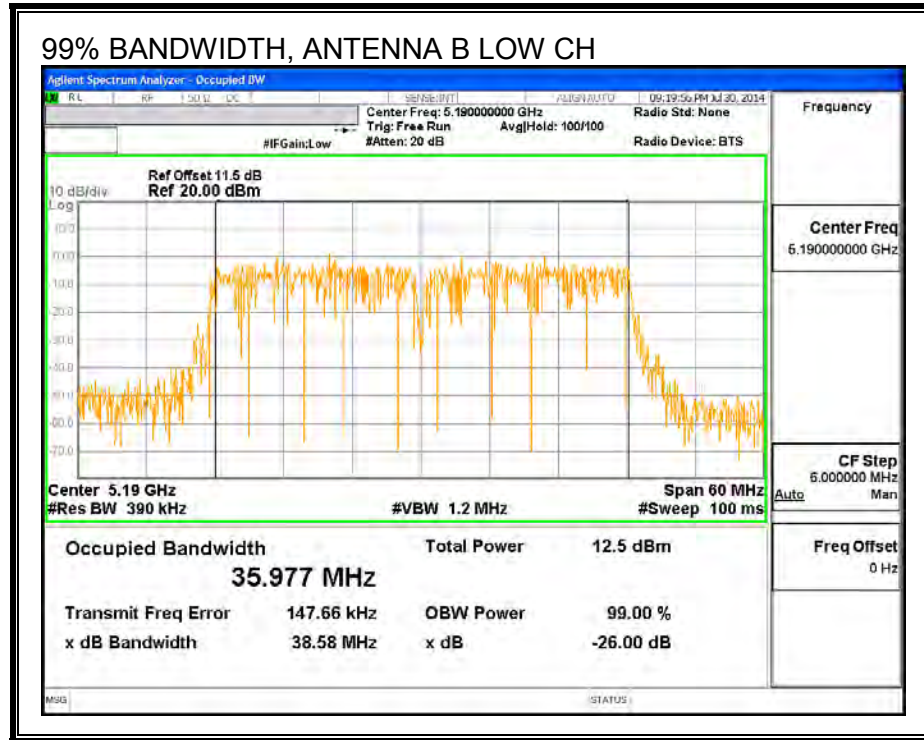
RESULTS

Channel	Frequency (MHz)	99% BW Antenna A (MHz)	99% BW Antenna B (MHz)
Low	5190	36.325	35.977
High	5230	36.370	35.895

99% BANDWIDTH, ANTENNA A



99% BANDWIDTH, ANTENNA B



9.6.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter. The power meter was setup for a gated power measurement.

The cable assembly insertion loss of 11.5 dB (including 10 dB pad and 1.5 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

RESULTS

Average Power Results

Channel	Frequency	Antenna A	Antenna B	Total
	(MHz)	Power (dBm)	Power (dBm)	Power (dBm)
Low	5190	11.93	11.89	14.92
High	5230	17.83	16.38	20.18

9.6.4. OUTPUT POWER AND PSD

LIMITS

FCC §15.407 (a) (1)

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

TEST PROCEDURE

The transmitter output is connected to a power meter. The power meter was setup for a gated power measurement.

The cable assembly insertion loss of 11.5 dB (including 10 dB pad and 1.5 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

DIRECTIONAL ANTENNA GAIN

The TX chains are uncorrelated and the antenna gain is unequal among the chains. The directional gain is:

Antenna A	Antenna B	Uncorrelated Chains Directional
Gain (dBi)	Gain (dBi)	Gain (dBi)
3.714	3.708	3.711

RESULTS

Antenna Gain and Limits

Channel	Frequency (MHz)	Directional Gain for Power (dBi)	Directional Gain for PSD (dBi)	Power Limit (dBm)	PSD Limit (dBm)
Low	5190	3.71	3.71	24.00	11.00
High	5230	3.71	3.71	24.00	11.00

Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd Power & PSD
--------------------	------	--

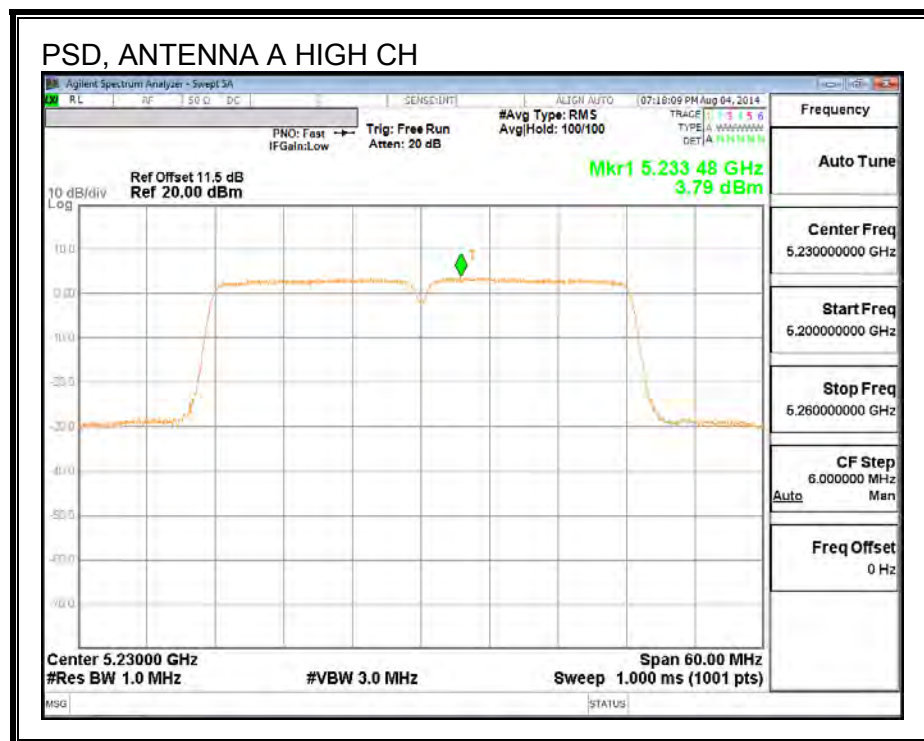
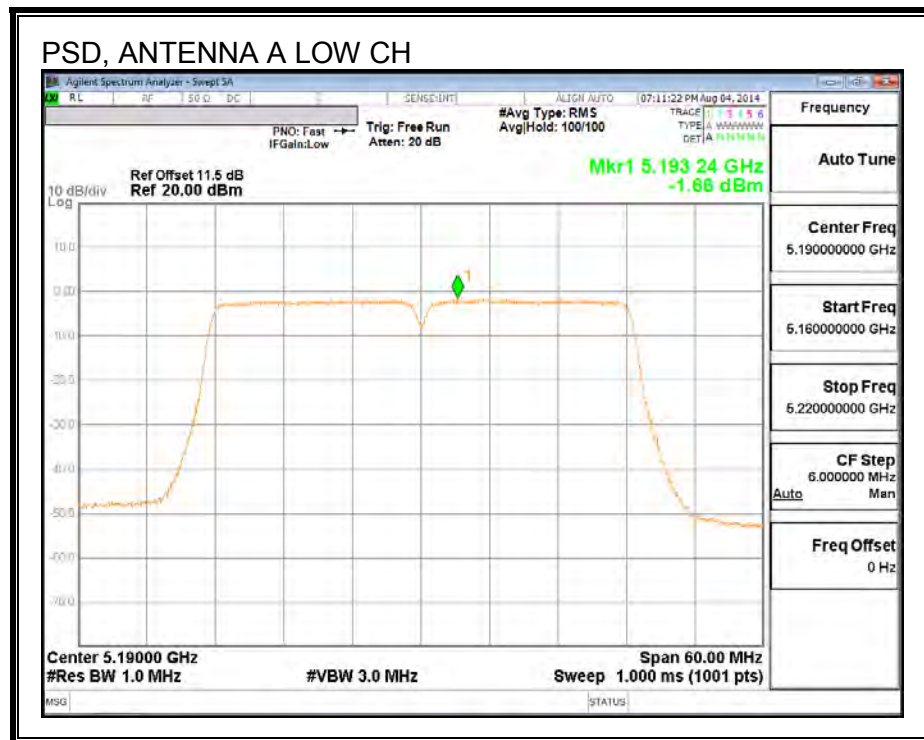
Output Power Results

Channel	Frequency (MHz)	Antenna A Meas Power (dBm)	Antenna B Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5190	11.93	11.89	14.92	24.00	-9.08
High	5230	17.83	16.38	20.18	24.00	-3.82

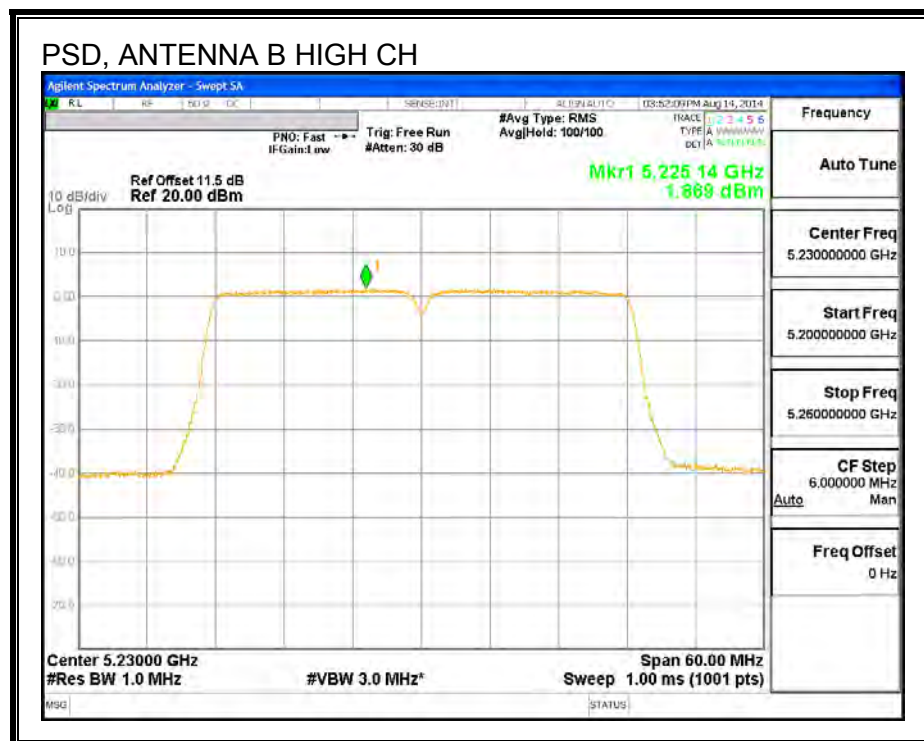
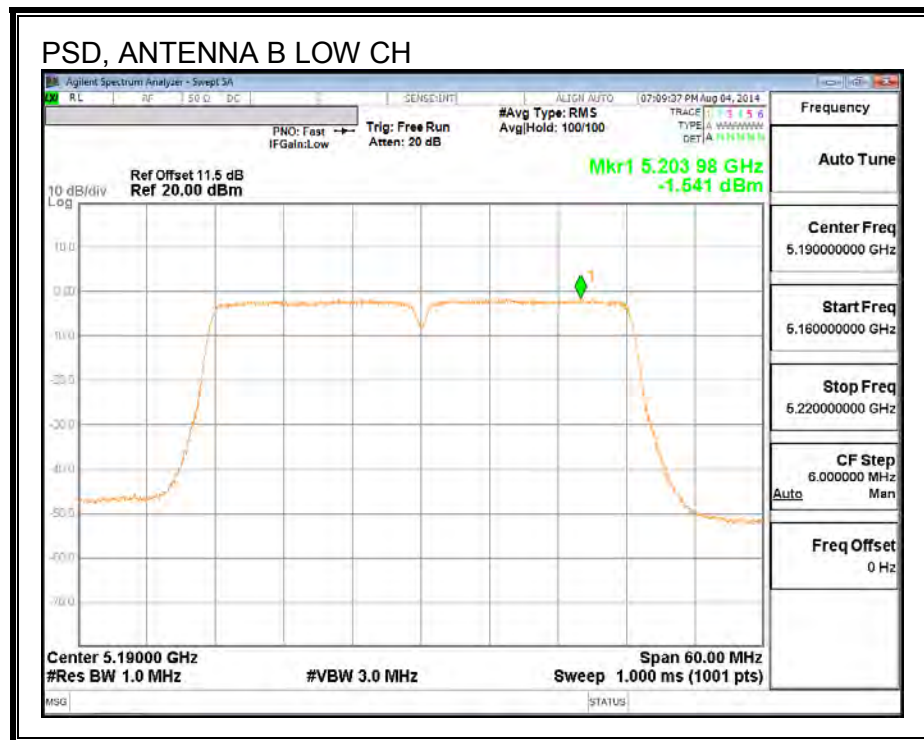
PSD Results

Channel	Frequency (MHz)	Antenna A Meas PSD (dBm)	Antenna B Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low	5190	-1.66	-1.54	1.41	11.00	-9.59
High	5230	3.79	1.87	5.95	11.00	-5.05

PSD, ANTENNA A



PSD, ANTENNA B



9.7. 802.11ac VHT80 MODE IN THE 5.2 GHz BAND

9.7.1. 26 dB BANDWIDTH

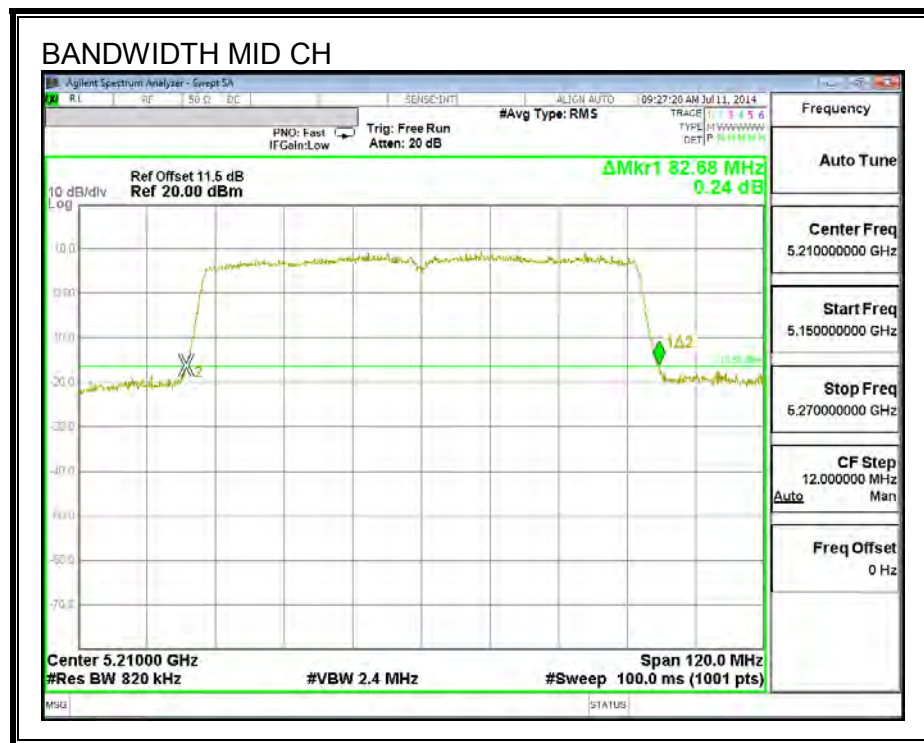
LIMITS

None; for reporting purposes only.

RESULTS

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Mid	5210	82.68

26 dB BANDWIDTH



9.7.2. 99% BANDWIDTH

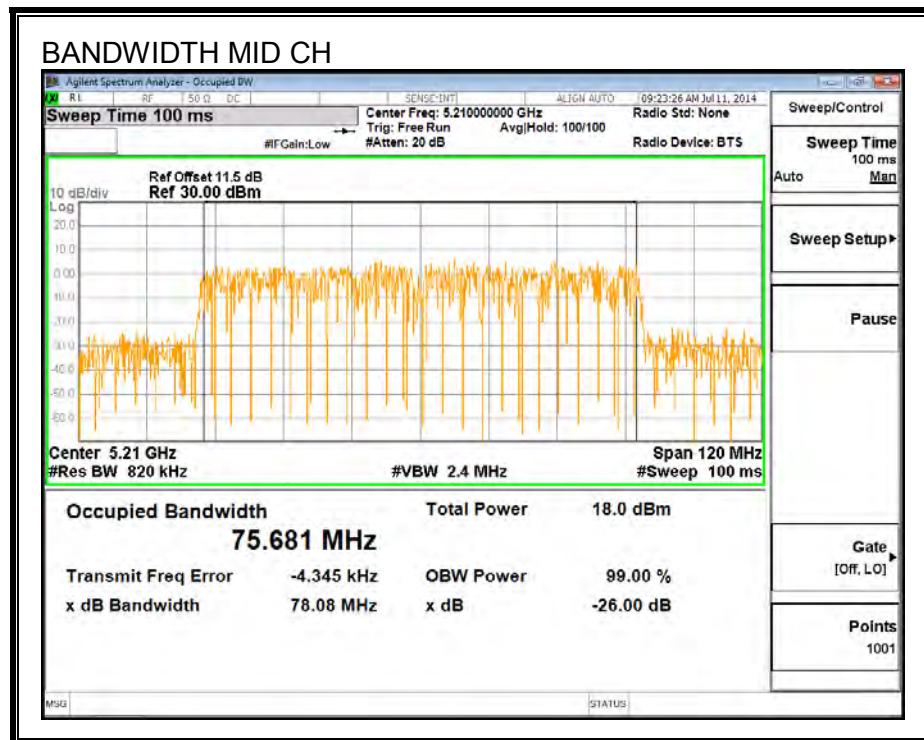
LIMITS

None; for reporting purposes only.

RESULTS

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Mid	5210	75.681

99% BANDWIDTH



9.7.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter. The power meter was setup for a gated power measurement.

The cable assembly insertion loss of 11.5 dB (including 10 dB pad and 1.5 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

RESULTS

Channel	Frequency (MHz)	Antenna A Power (dBm)	Antenna B Power (dBm)
Mid	5210	12.42	12.45

9.7.4. OUTPUT POWER AND PSD

LIMITS

FCC §15.407 (a) (1)

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

TEST PROCEDURE

The transmitter output is connected to a power meter. The power meter was setup for a gated power measurement.

The cable assembly insertion loss of 11.5 dB (including 10 dB pad and 1.5 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

DIRECTIONAL ANTENNA GAIN

There is only one transmitter output therefore the directional gain is equal to the antenna gain.

ANTENNA A

Antenna Gain (dBi)
3.714

ANTENNA B

Antenna Gain (dBi)
3.708

ANTENNA A RESULTS

Antenna Gain and Limits

Channel	Frequency (MHz)	Directional Gain for Power (dBi)	Directional Gain for PSD (dBi)	Power Limit (dBm)	PSD Limit (dBm)
Mid	5210	3.714	3.714	24.00	11.00

Duty Cycle CF (dB)	0.21	Included in Calculations of Corr'd Power & PSD
--------------------	------	--

Output Power Results

Channel	Frequency (MHz)	Antenna A Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Mid	5210	12.42	12.63	24.00	-11.37

PSD Results

Channel	Frequency (MHz)	Antenna A Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Mid	5210	-4.78	-4.57	11.00	-15.57

ANTENNA B RESULTS

Antenna Gain and Limits

Channel	Frequency (MHz)	Directional Gain for Power (dBi)	Directional Gain for PSD (dBi)	Power Limit (dBm)	PSD Limit (dBm)
Mid	5210	3.708	3.708	24.00	11.00

Duty Cycle CF (dB)	0.21	Included in Calculations of Corr'd Power & PSD
--------------------	------	--

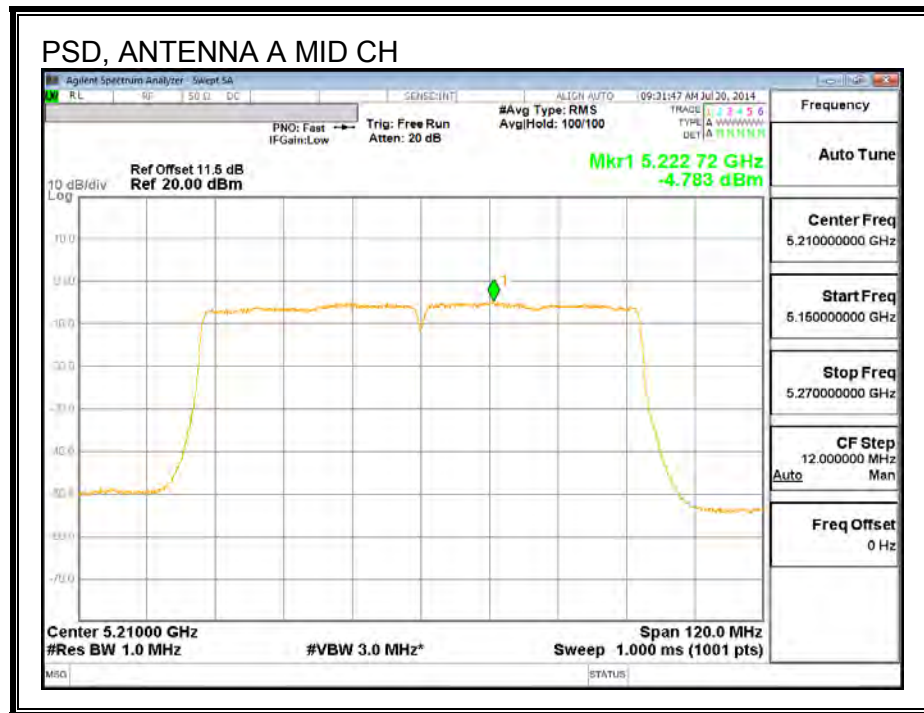
Output Power Results

Channel	Frequency (MHz)	Antenna B Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Mid	5210	12.45	12.66	24.00	-11.34

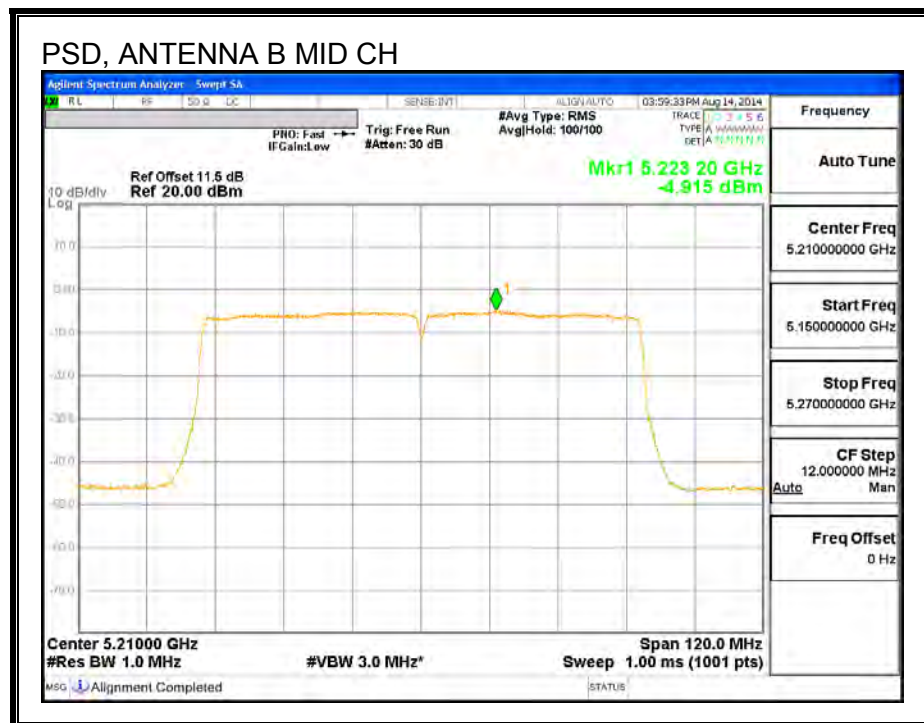
PSD Results

Channel	Frequency (MHz)	Antenna B Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Mid	5210	-4.92	-4.71	11.00	-15.71

PSD, ANTENNA A



PSD, ANTENNA B



9.8. 802.11ac VHT80 2TX MODE CDD IN THE 5.2 GHz BAND

9.8.1. 26 dB BANDWIDTH

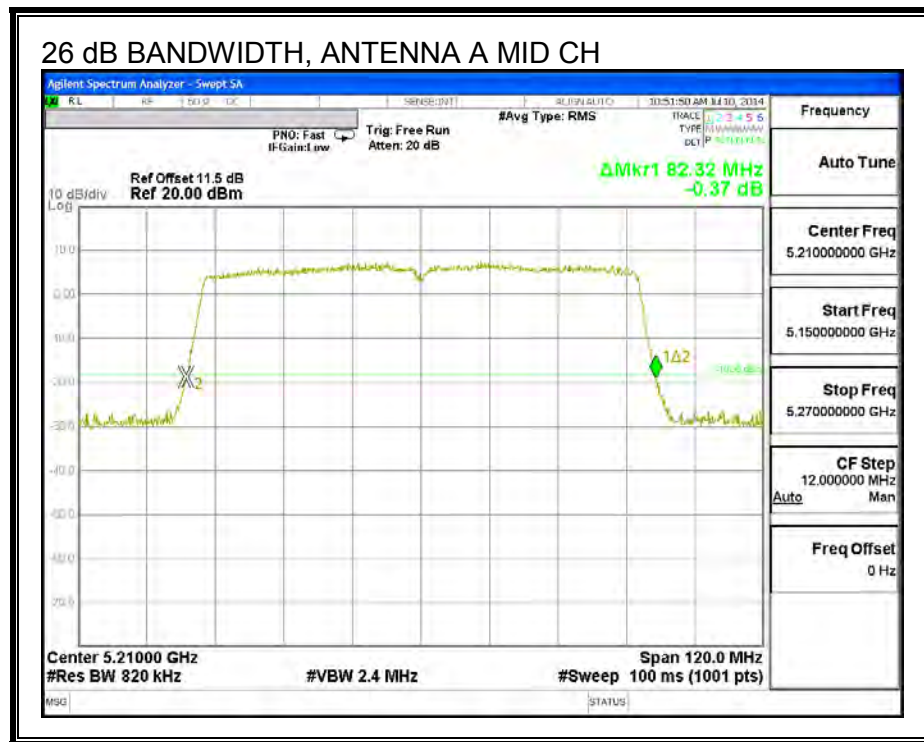
LIMITS

None; for reporting purposes only.

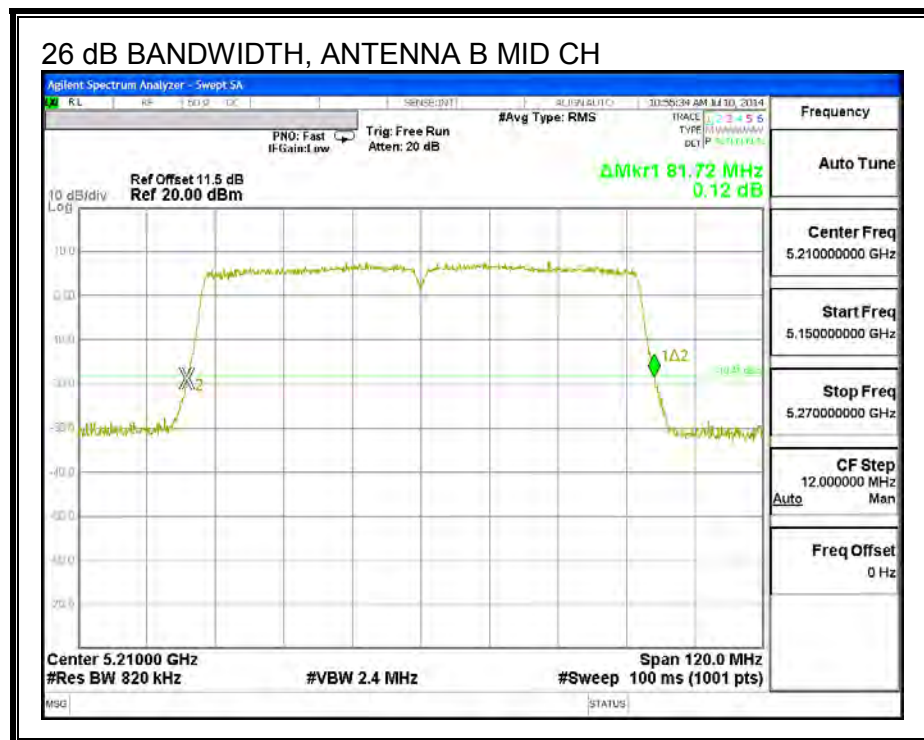
RESULTS

Channel	Frequency (MHz)	26 dB BW Antenna A (MHz)	26 dB BW Antenna B (MHz)
Mid	5210	82.32	81.72

26 dB BANDWIDTH, ANTENNA A



26 dB BANDWIDTH, ANTENNA B



9.8.2. 99% BANDWIDTH

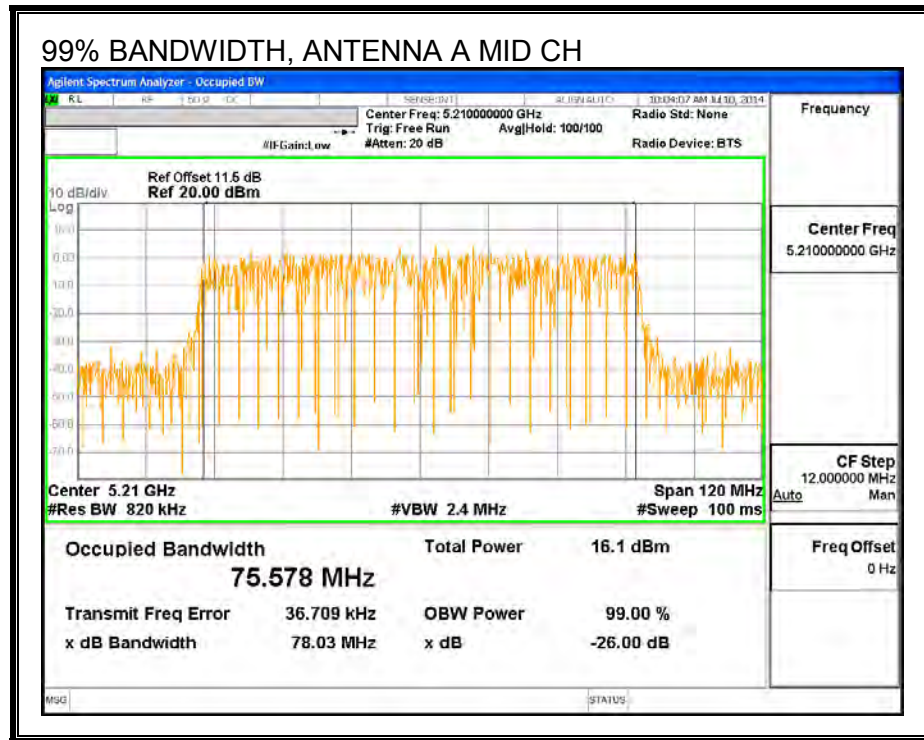
LIMITS

None; for reporting purposes only.

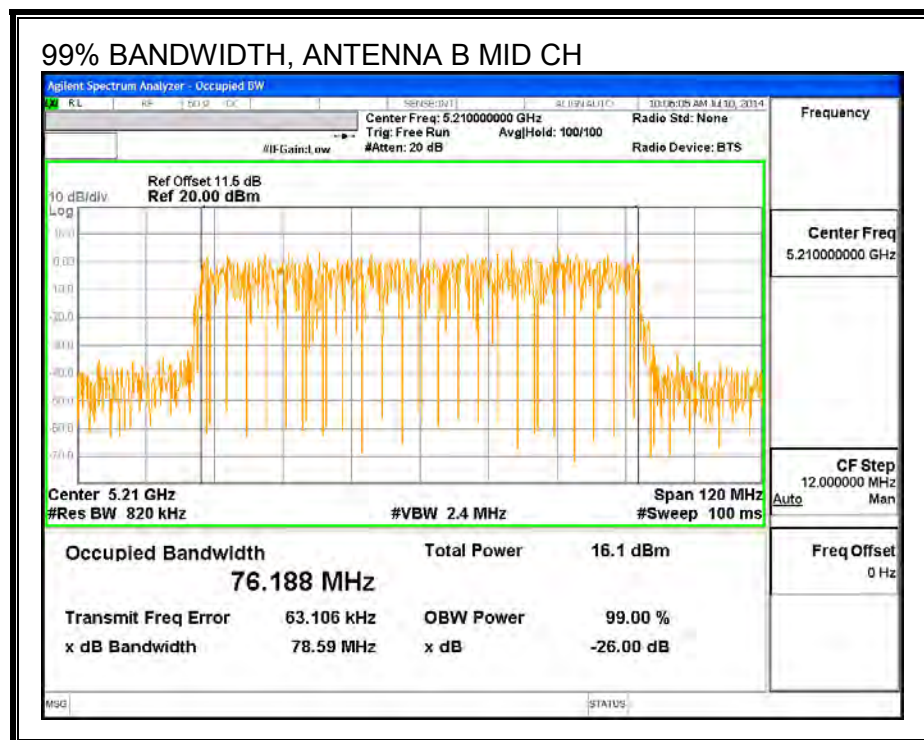
RESULTS

Channel	Frequency (MHz)	99% BW Antenna A (MHz)	99% BW Antenna B (MHz)
Mid	5210	75.578	76.188

99% BANDWIDTH, ANTENNA A



99% BANDWIDTH, ANTENNA B



9.8.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter. The power meter was setup for a gated power measurement.

The cable assembly insertion loss of 11.5 dB (including 10 dB pad and 1.5 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

RESULTS

Average Power Results

Channel	Frequency	Antenna A	Antenna B	Total
	(MHz)	Power (dBm)	Power (dBm)	Power (dBm)
Mid	5210	10.97	10.88	13.94

9.8.4. OUTPUT POWER AND PSD

LIMITS

FCC §15.407 (a) (1)

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

TEST PROCEDURE

The transmitter output is connected to a power meter. The power meter was setup for a gated power measurement.

The cable assembly insertion loss of 11.5 dB (including 10 dB pad and 1.5 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

DIRECTIONAL ANTENNA GAIN

The TX chains are uncorrelated and the antenna gain is unequal among the chains. The directional gain is:

Antenna A	Antenna B	Uncorrelated Chains Directional
Gain (dBi)	Gain (dBi)	Gain (dBi)
3.714	3.708	3.711

The TX chains are correlated and the antenna gain is unequal among the chains. The directional gain is:

Antenna A	Antenna B	Correlated Chains Directional
Gain (dBi)	Gain (dBi)	Gain (dBi)
3.714	3.708	6.721

RESULTS

Antenna Gain and Limits

Channel	Frequency (MHz)	Directional Gain for Power (dBi)	Directional Gain for PSD (dBi)	Power Limit (dBm)	PSD Limit (dBm)
MID	5210	3.71	6.72	24.00	10.28

Duty Cycle CF (dB)	0.21	Included in Calculations of Corr'd Power & PSD
--------------------	------	--

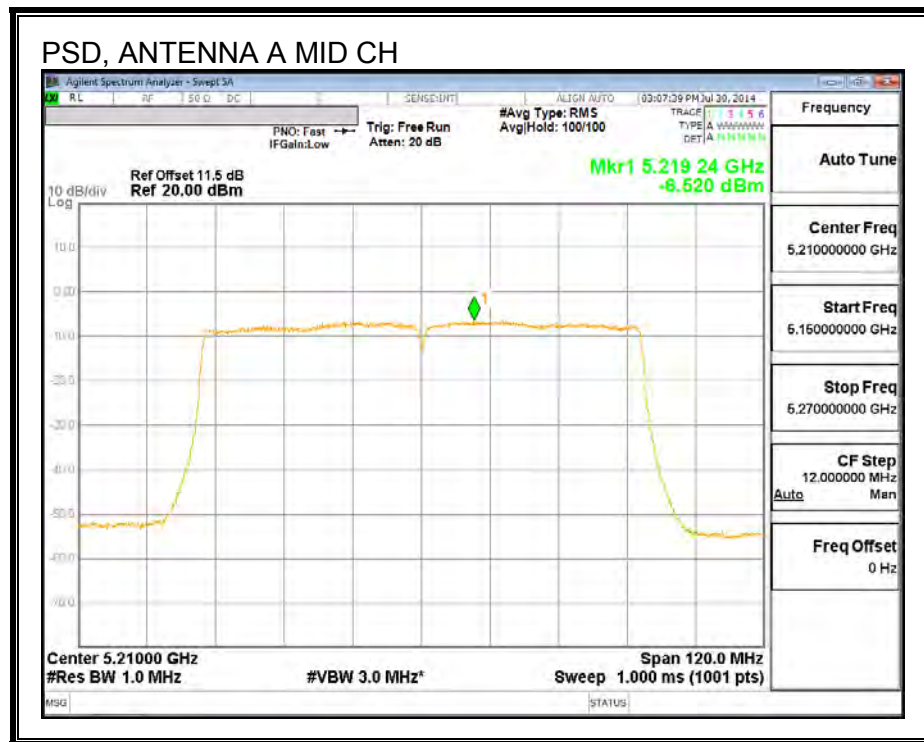
Output Power Results

Channel	Frequency (MHz)	Antenna A Meas Power (dBm)	Antenna B Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
MID	5210	10.97	10.88	14.15	24.00	-9.85

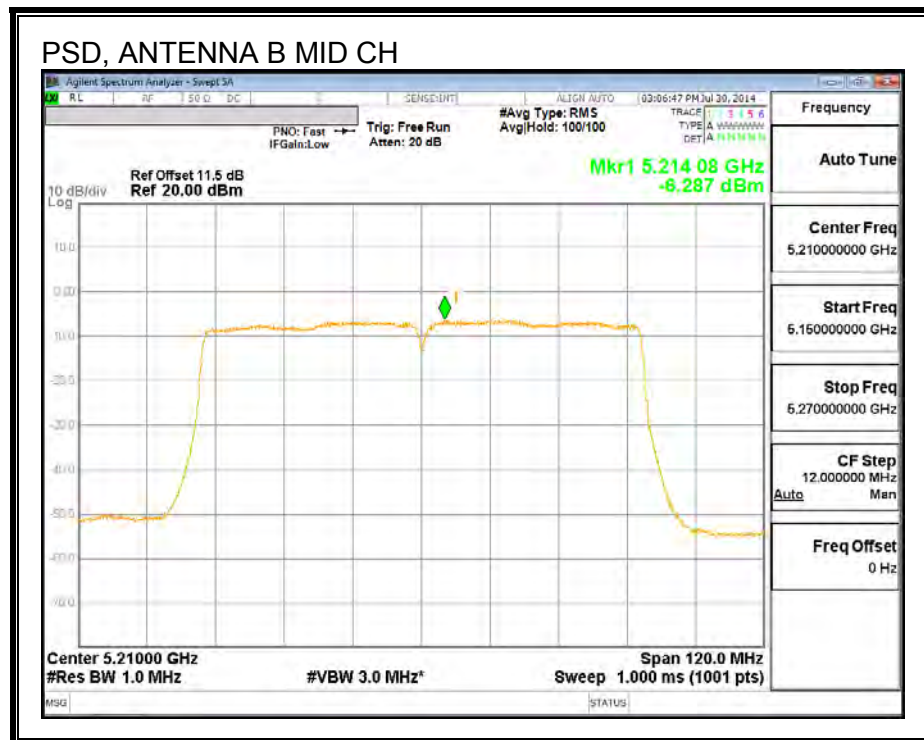
PSD Results

Channel	Frequency (MHz)	Antenna A Meas PSD (dBm)	Antenna B Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
MID	5210	-6.52	-6.29	-3.18	10.28	-13.46

PSD, ANTENNA A



PSD, ANTENNA B



9.9. 802.11ac VHT80 2TX MODE STBC IN THE 5.2 GHz BAND

9.9.1. 26 dB BANDWIDTH

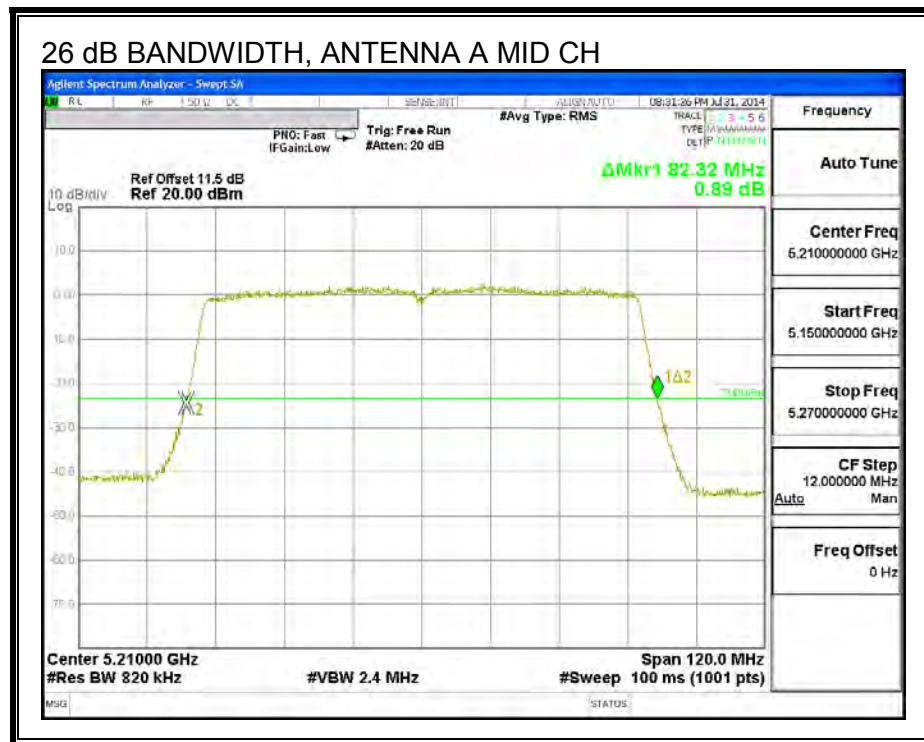
LIMITS

None; for reporting purposes only.

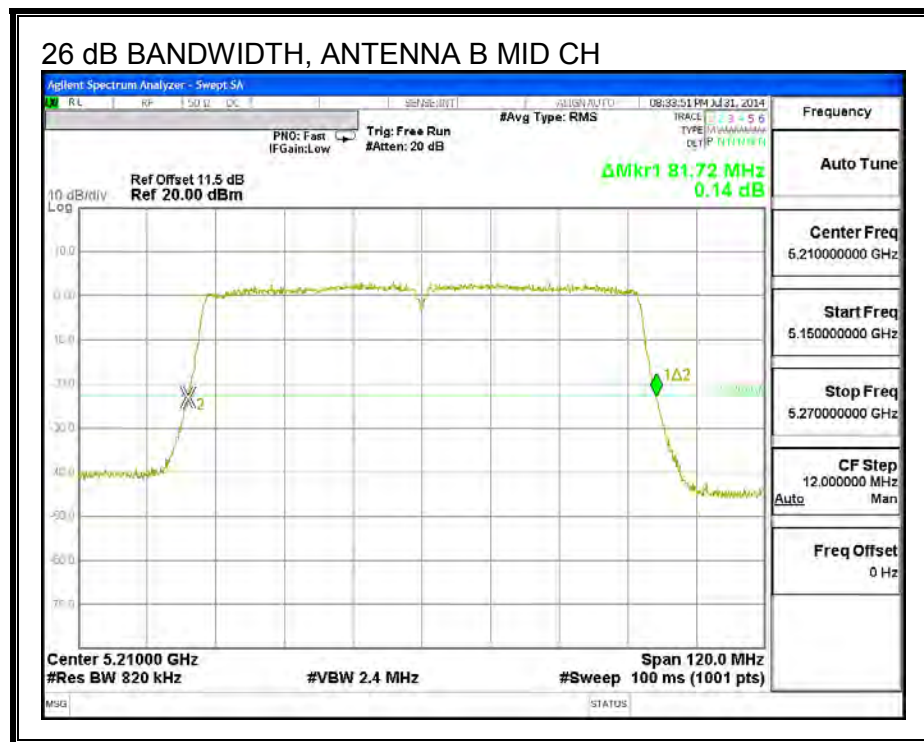
RESULTS

Channel	Frequency (MHz)	26 dB BW Antenna A (MHz)	26 dB BW Antenna B (MHz)
Mid	5210	82.32	81.72

26 dB BANDWIDTH, ANTENNA A



26 dB BANDWIDTH, ANTENNA B



9.9.2. 99% BANDWIDTH

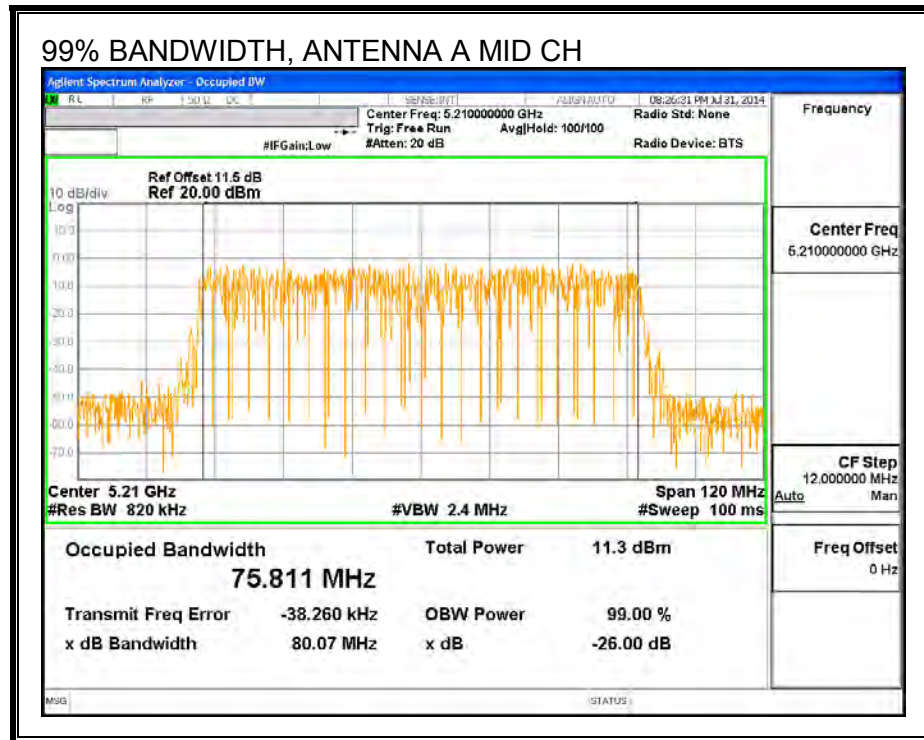
LIMITS

None; for reporting purposes only.

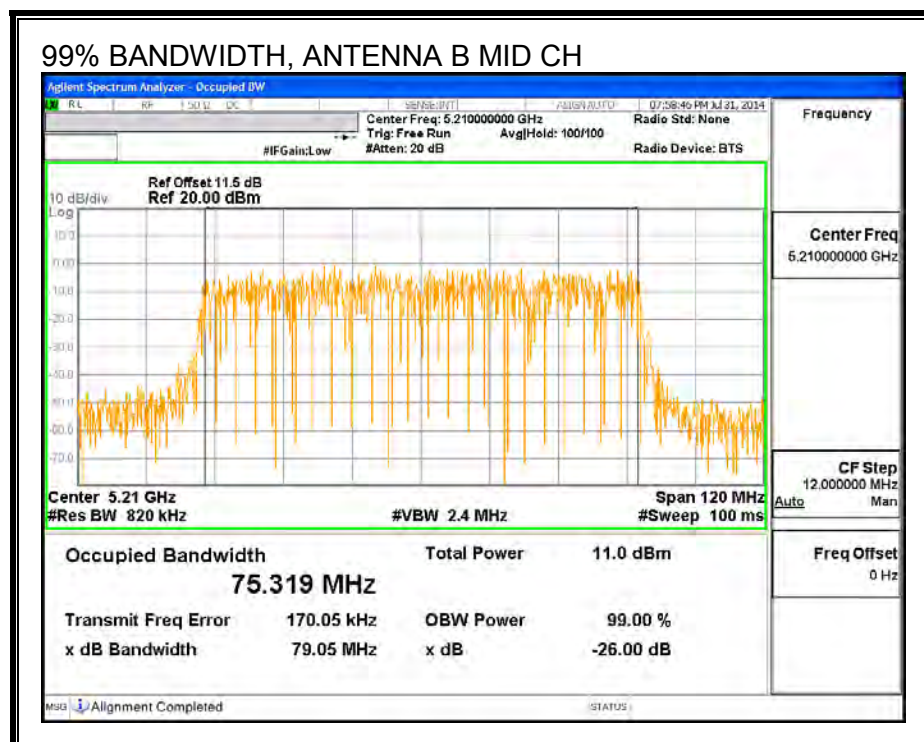
RESULTS

Channel	Frequency (MHz)	99% BW Antenna A (MHz)	99% BW Antenna B (MHz)
Mid	5210	75.811	75.319

99% BANDWIDTH, ANTENNA A



99% BANDWIDTH, ANTENNA B



9.9.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter. The power meter was setup for a gated power measurement.

The cable assembly insertion loss of 11.5 dB (including 10 dB pad and 1.5 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

RESULTS

Average Power Results

Channel	Frequency	Antenna A	Antenna B	Total
	(MHz)	Power (dBm)	Power (dBm)	Power (dBm)
Mid	5210	10.89	10.94	13.93

9.9.4. OUTPUT POWER AND PSD

LIMITS

FCC §15.407 (a) (1)

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

TEST PROCEDURE

The transmitter output is connected to a power meter. The power meter was setup for a gated power measurement.

The cable assembly insertion loss of 11.5 dB (including 10 dB pad and 1.5 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

DIRECTIONAL ANTENNA GAIN

The TX chains are uncorrelated and the antenna gain is unequal among the chains. The directional gain is:

Antenna A	Antenna B	Uncorrelated Chains Directional
Gain (dBi)	Gain (dBi)	Gain (dBi)
3.714	3.708	3.71

RESULTS

Antenna Gain and Limits

Channel	Frequency (MHz)	Directional Gain for Power (dBi)	Directional Gain for PSD (dBi)	Power Limit (dBm)	PSD Limit (dBm)
MID	5210	3.71	3.71	24.00	11.00

Duty Cycle CF (dB)	0.22	Included in Calculations of Corr'd Power & PSD
--------------------	------	--

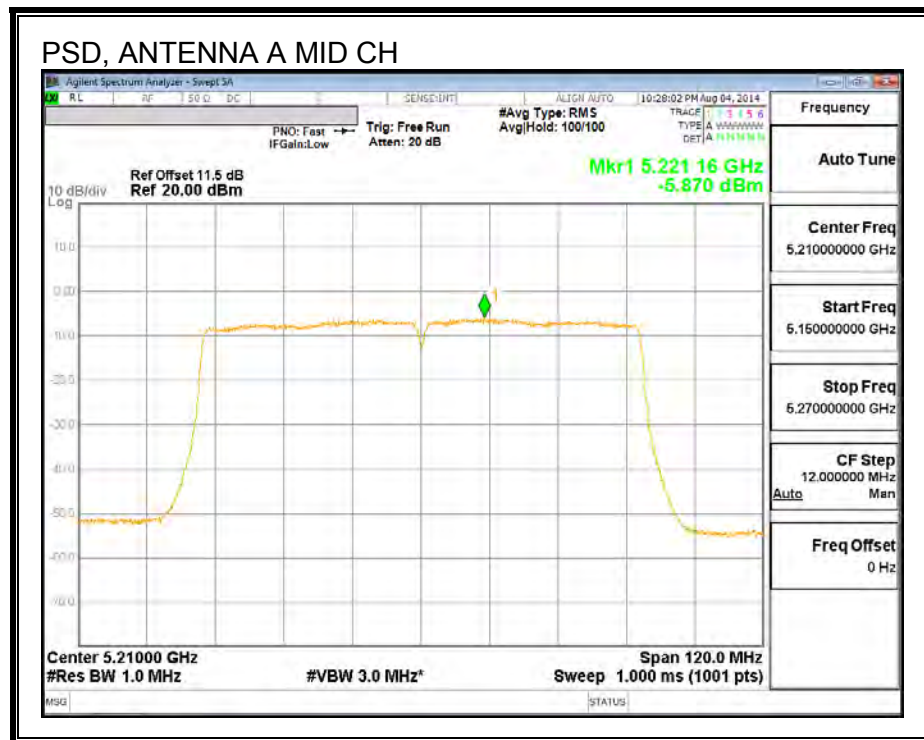
Output Power Results

Channel	Frequency (MHz)	Antenna A Meas Power (dBm)	Antenna B Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
MID	5210	10.89	10.94	14.15	24.00	-9.85

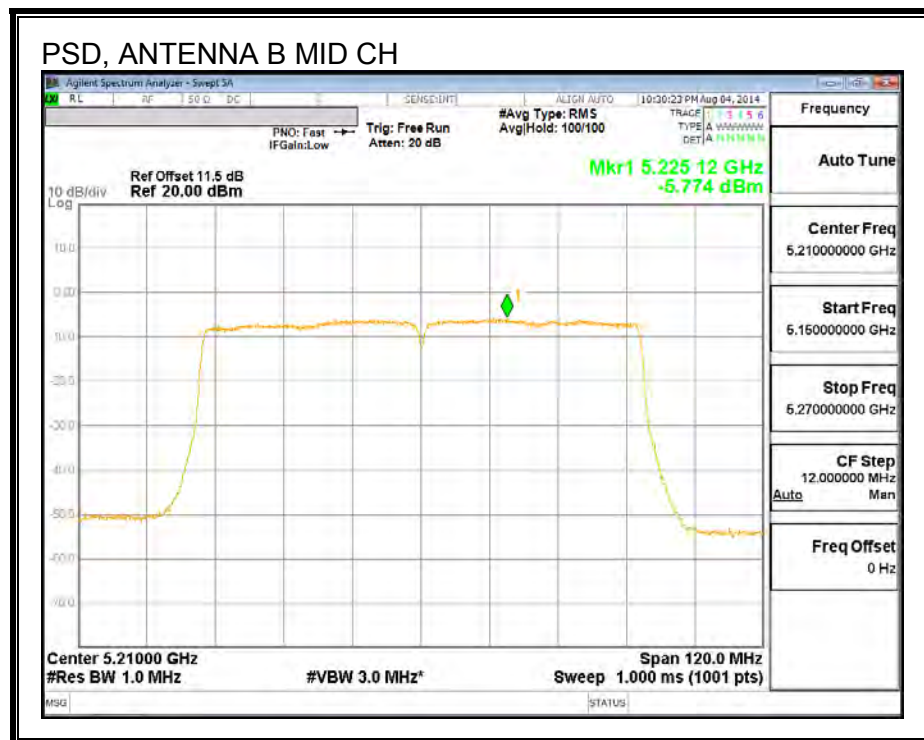
PSD Results

Channel	Frequency (MHz)	Antenna A Meas PSD (dBm)	Antenna B Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
MID	5210	-5.87	-5.77	-2.59	11.00	-13.59

PSD, ANTENNA A



PSD, ANTENNA B



9.10. 802.11a MODE IN THE 5.3 GHz BAND

9.10.1. 26 dB BANDWIDTH

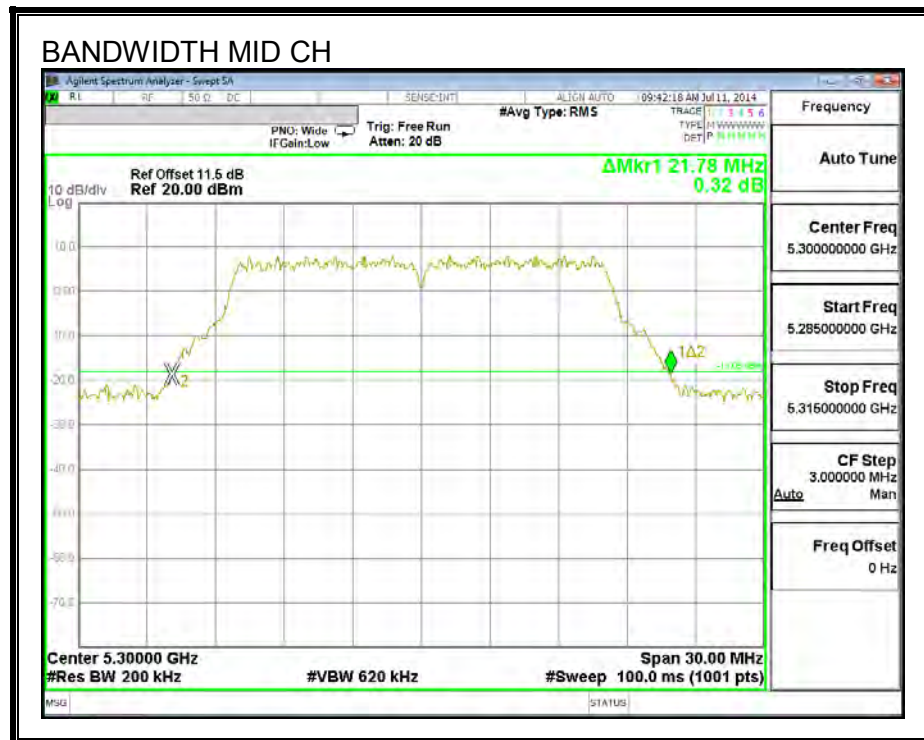
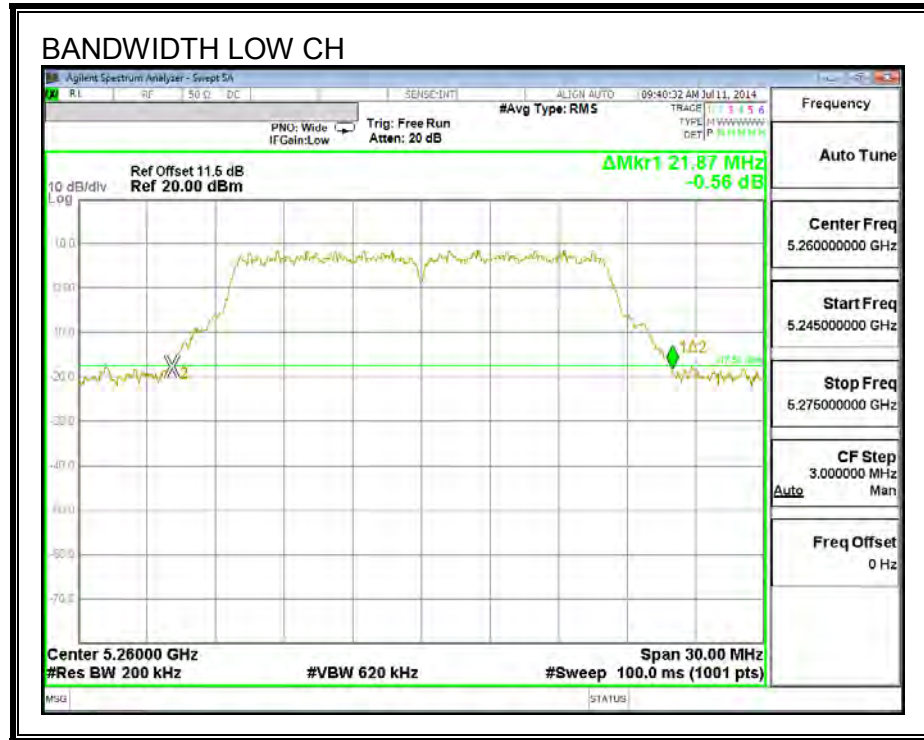
LIMITS

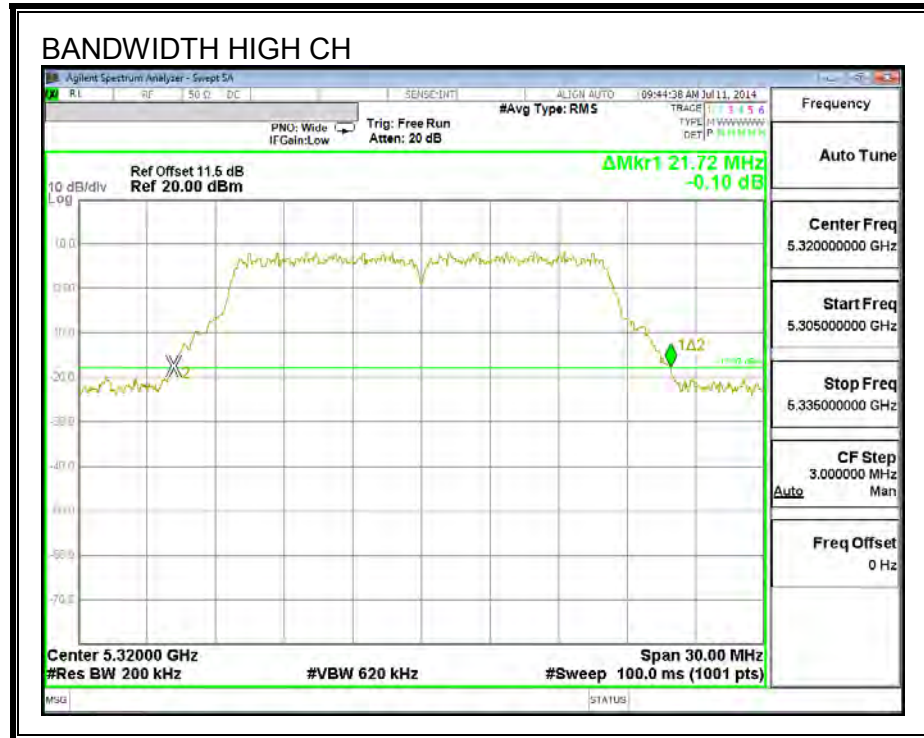
None; for reporting purposes only.

RESULTS

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Low	5260	21.87
Mid	5300	21.78
High	5320	21.72

26 dB BANDWIDTH





9.10.2. 99% BANDWIDTH

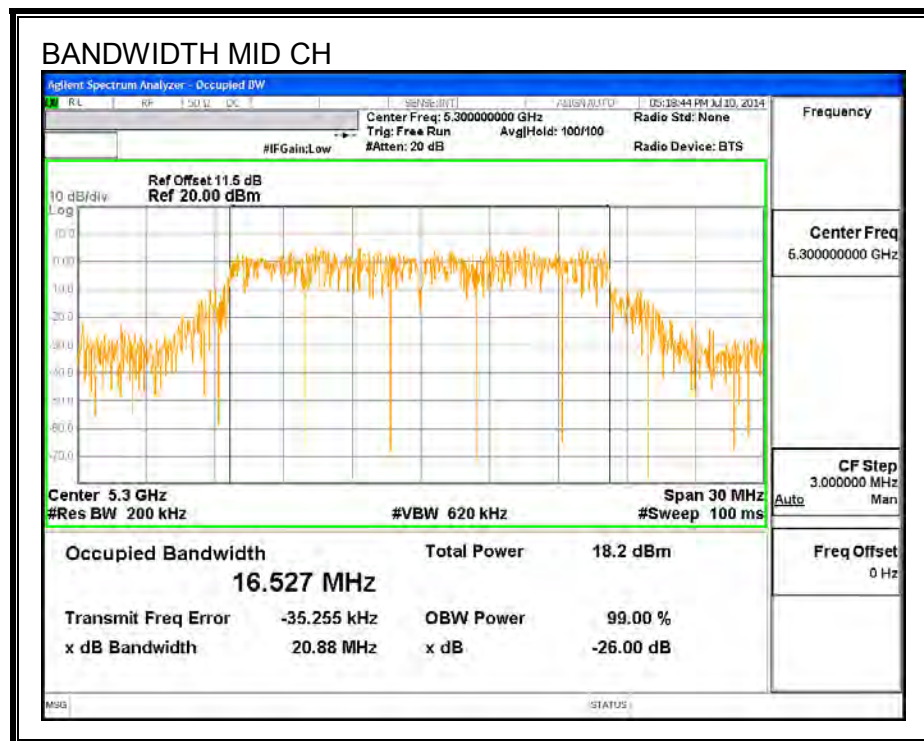
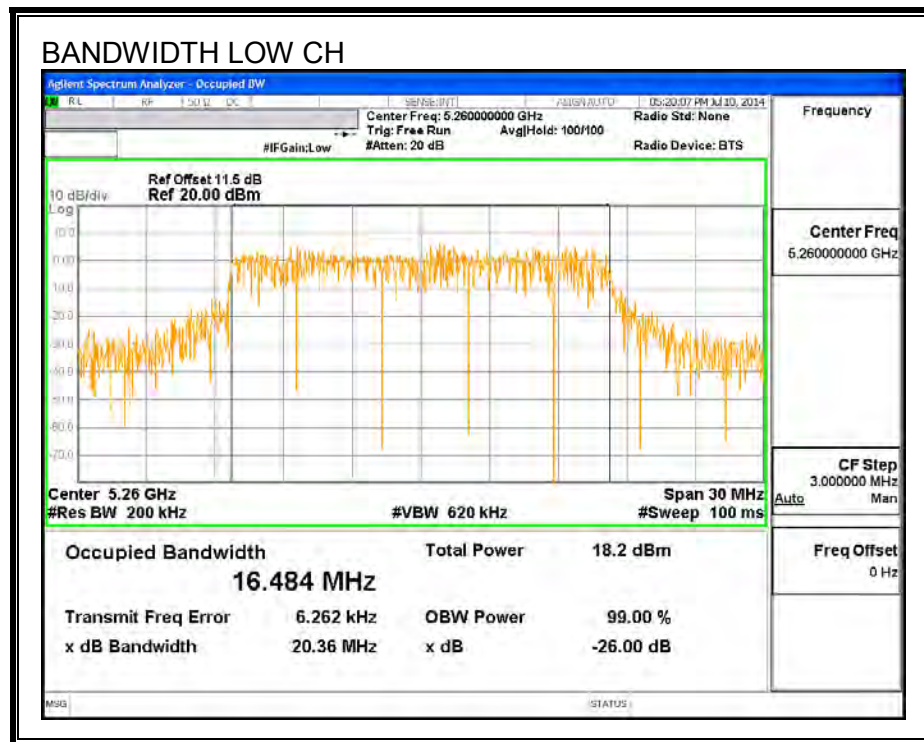
LIMITS

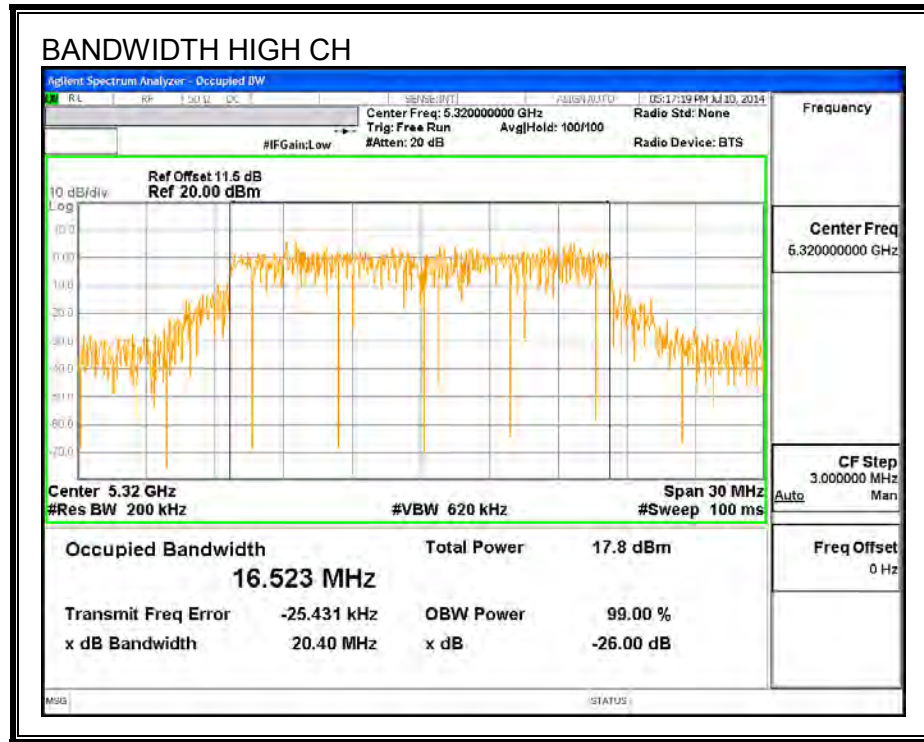
None; for reporting purposes only.

RESULTS

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5260	16.484
Mid	5300	16.527
High	5320	16.523

99% BANDWIDTH





9.10.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter. The power meter was setup for a gated power measurement.

The cable assembly insertion loss of 11.5 dB (including 10 dB pad and 1.5 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

RESULTS

Channel	Frequency (MHz)	Antenna A Power (dBm)	Antenna B Power (dBm)
Low	5260	17.76	16.47
Mid	5300	17.99	16.25
High	5320	15.97	15.95

9.10.4. OUTPUT POWER AND PSD

LIMITS

FCC §15.407 (a) (2)

For the band 5.25–5.35 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW or $11 \text{ dBm} + 10 \log B$, where B is the 26–dB emission bandwidth in MHz. In addition, the peak power spectral density shall not exceed 11 dBm 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.

TEST PROCEDURE

The transmitter output is connected to a power meter. The power meter was setup for a gated power measurement.

The cable assembly insertion loss of 11.5 dB (including 10 dB pad and 1.5 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

DIRECTIONAL ANTENNA GAIN

There is only one transmitter output therefore the directional gain is equal to the antenna gain.

ANTENNA A

Antenna Gain (dBi)
3.434

ANTENNA B

Antenna Gain (dBi)
3.875

ANTENNA A RESULTS

Bandwidth, Antenna Gain, and Limits

Channel	Frequency (MHz)	Min 26 dB BW (MHz)	Directional Gain (dBi)	Power Limit (dBm)	PSD Limit (dBm)
Low	5260	21.87	3.434	24.00	11.00
Mid	5300	21.78	3.434	24.00	11.00
High	5320	21.72	3.434	24.00	11.00

Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd Power & PSD
--------------------	------	--

Output Power Results

Channel	Frequency (MHz)	Antenna A Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5260	17.76	17.76	24.00	-6.24
Mid	5300	17.99	17.99	24.00	-6.01
High	5320	15.97	15.97	24.00	-8.03

PSD Results

Channel	Frequency (MHz)	Antenna A Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low	5260	6.60	6.60	11.00	-4.40
Mid	5300	6.85	6.85	11.00	-4.15
High	5320	5.06	5.06	11.00	-5.94

ANTENNA B RESULTS

Bandwidth, Antenna Gain, and Limits

Channel	Frequency (MHz)	Min 26 dB BW (MHz)	Directional Gain (dBi)	Power Limit (dBm)	PSD Limit (dBm)
Low	5260	21.87	3.875	24.00	11.00
Mid	5300	21.78	3.875	24.00	11.00
High	5320	21.72	3.875	24.00	11.00

Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd Power & PSD
---------------------------	------	---

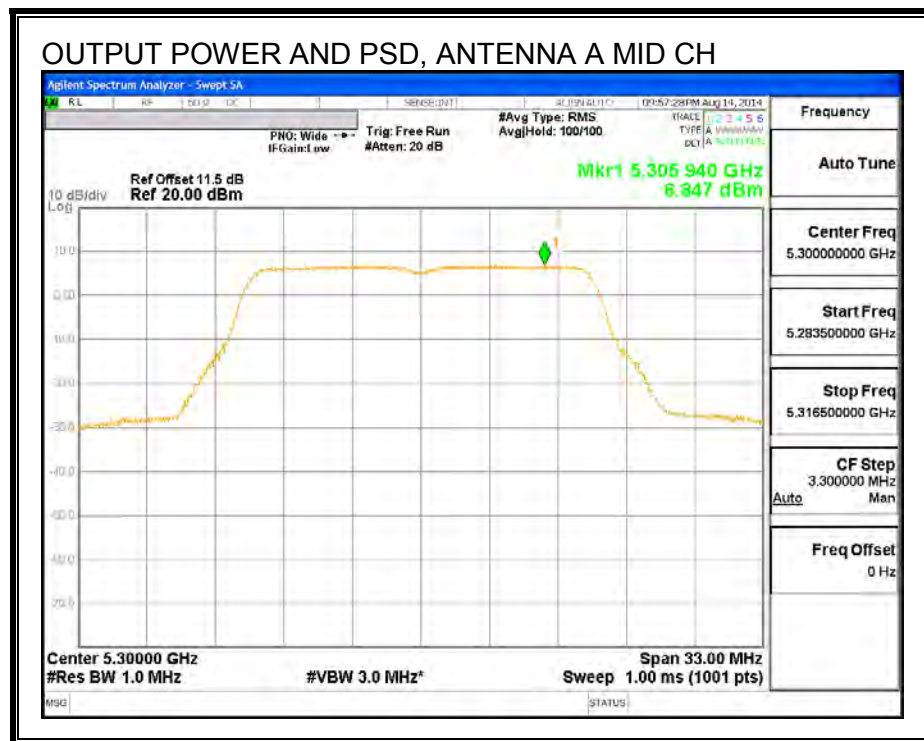
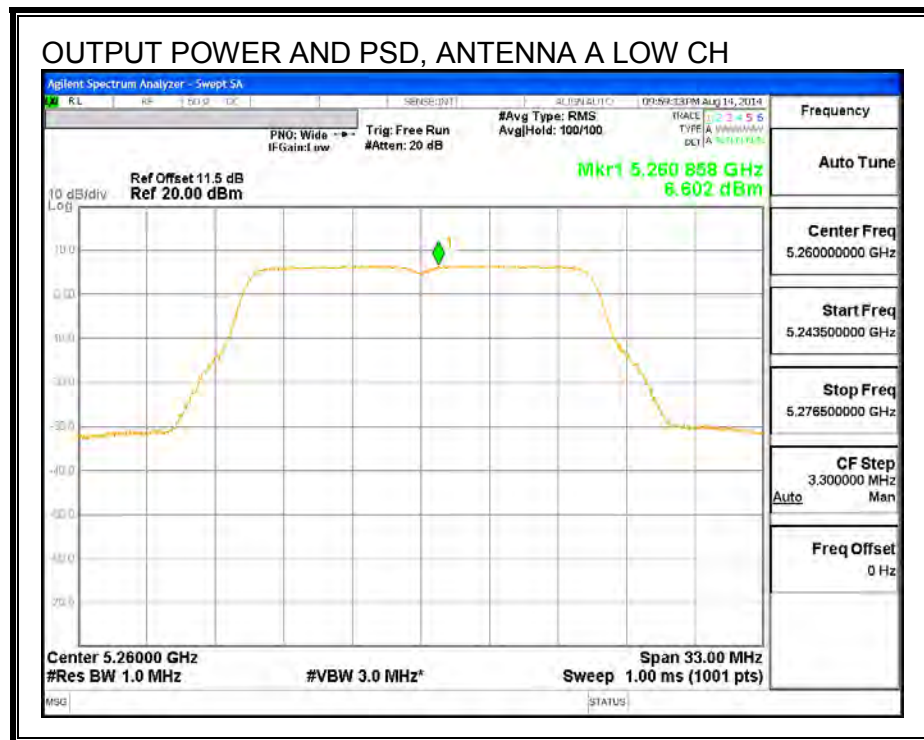
Output Power Results

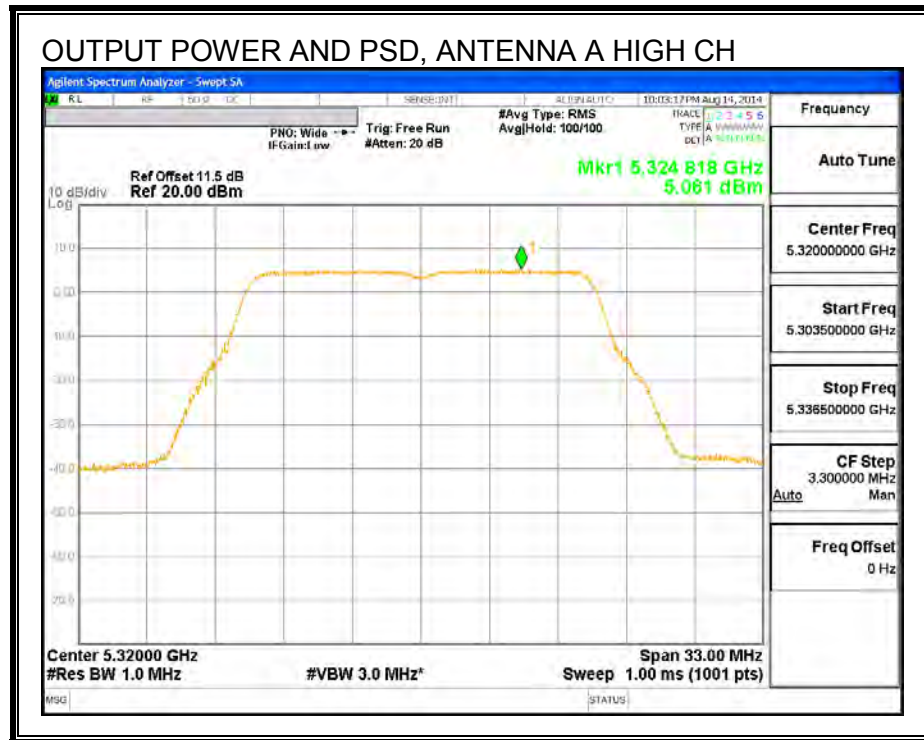
Channel	Frequency (MHz)	Antenna B Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5260	16.47	16.47	24.00	-7.53
Mid	5300	16.25	16.25	24.00	-7.75
High	5320	15.95	15.95	24.00	-8.05

PSD Results

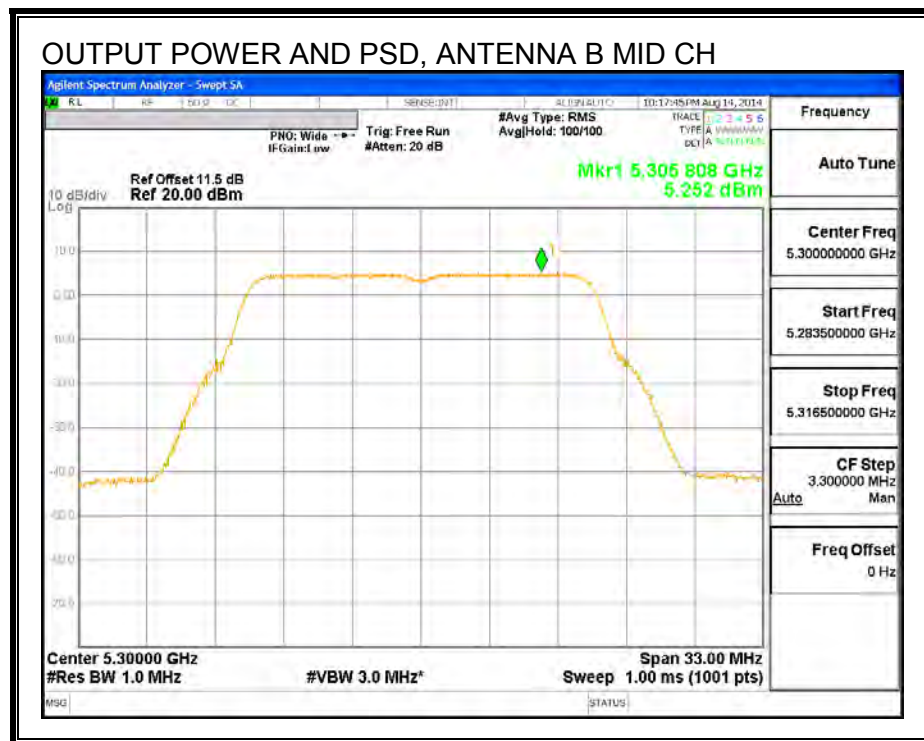
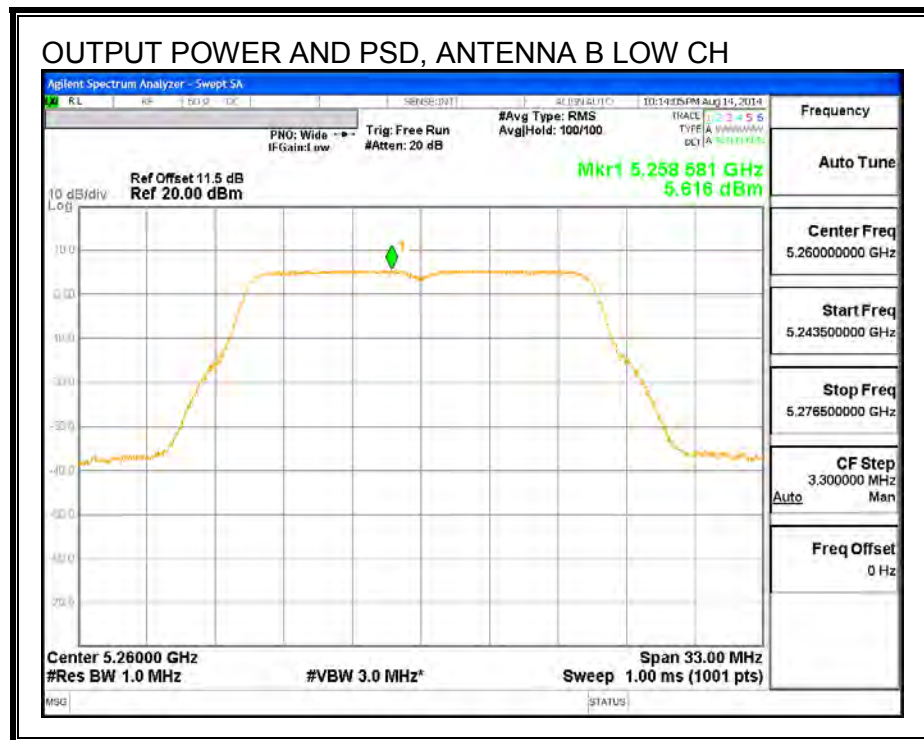
Channel	Frequency (MHz)	Antenna B Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low	5260	5.62	5.62	11.00	-5.38
Mid	5300	5.25	5.25	11.00	-5.75
High	5320	4.71	4.71	11.00	-6.29

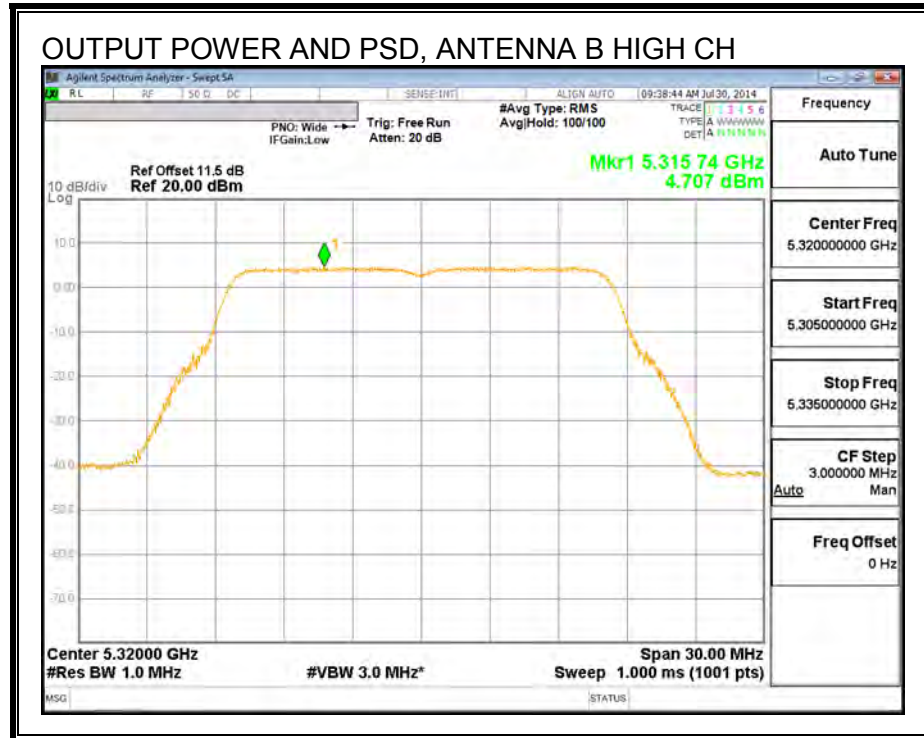
OUTPUT POWER AND PSD, ANTENNA A





OUTPUT POWER AND PSD, ANTENNA B





9.11. 802.11n HT20 2TX CDD MODE IN THE 5.3 GHz BAND

9.11.1. 26 dB BANDWIDTH

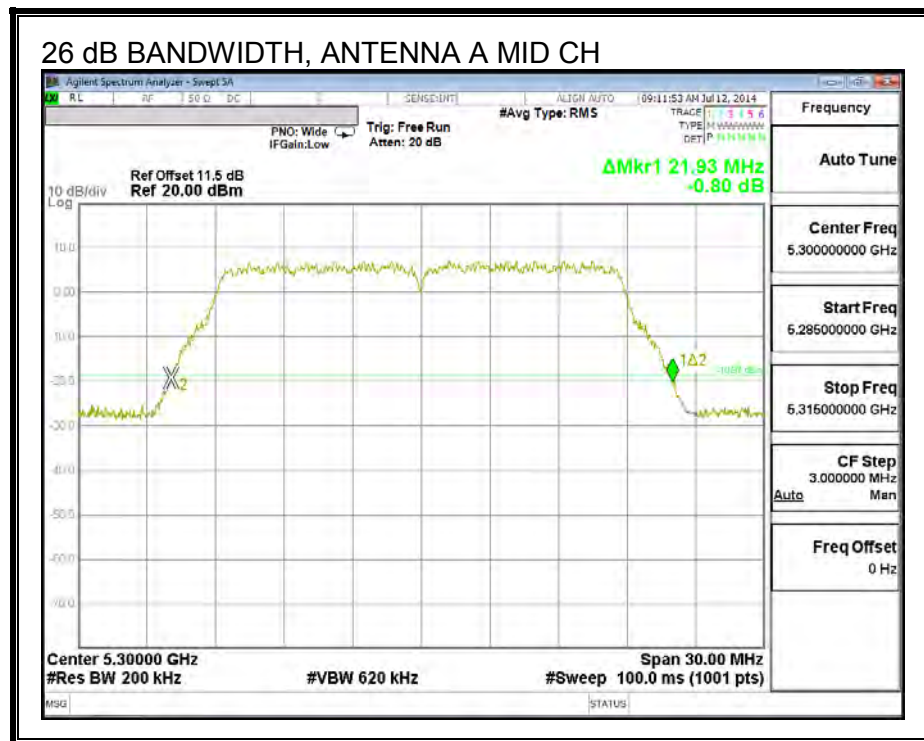
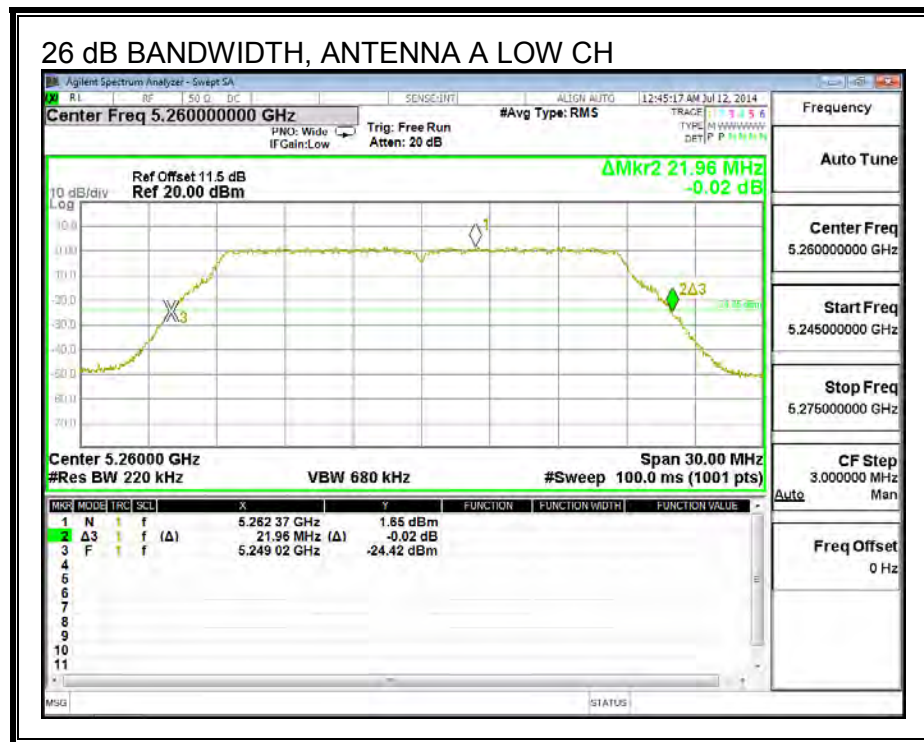
LIMITS

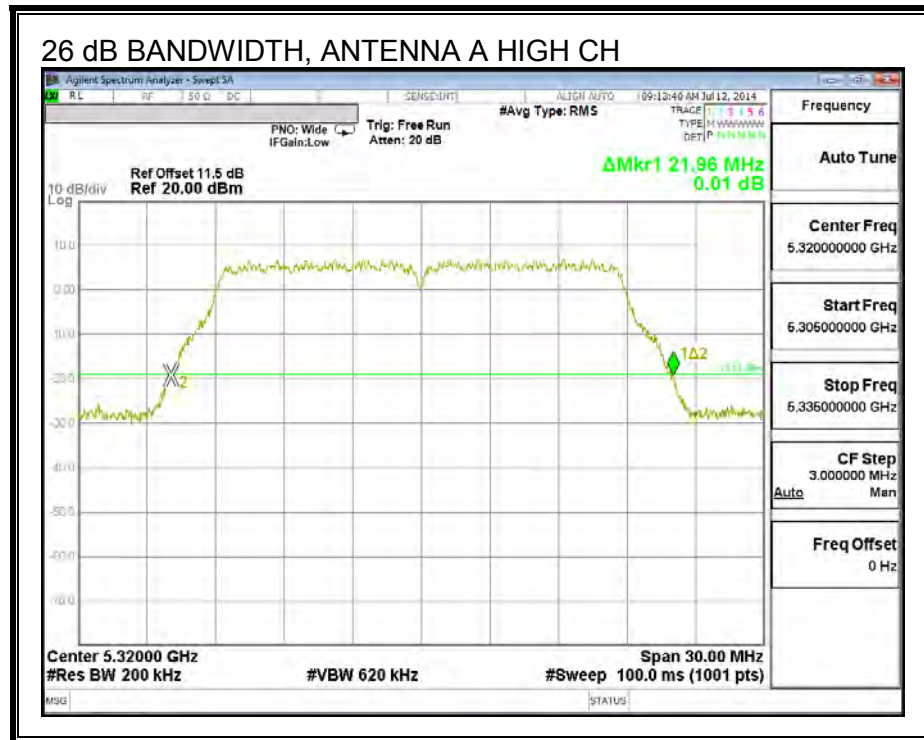
None; for reporting purposes only.

RESULTS

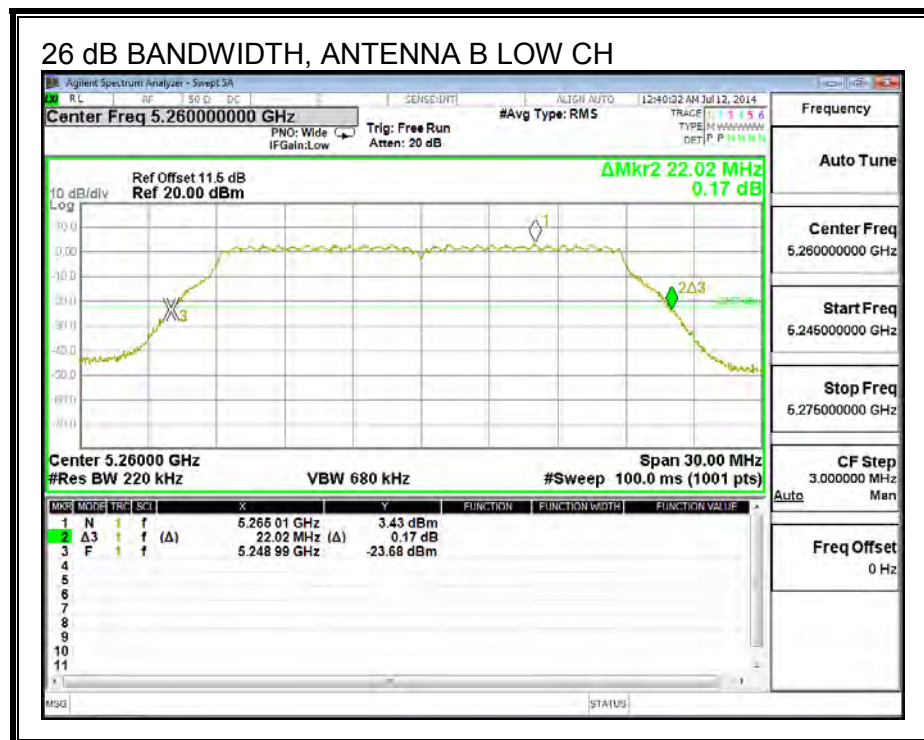
Channel	Frequency (MHz)	26 dB BW Antenna A (MHz)	26 dB BW Antenna B (MHz)
Low	5260	21.96	22.02
Mid	5300	21.93	21.72
High	5320	21.96	21.69

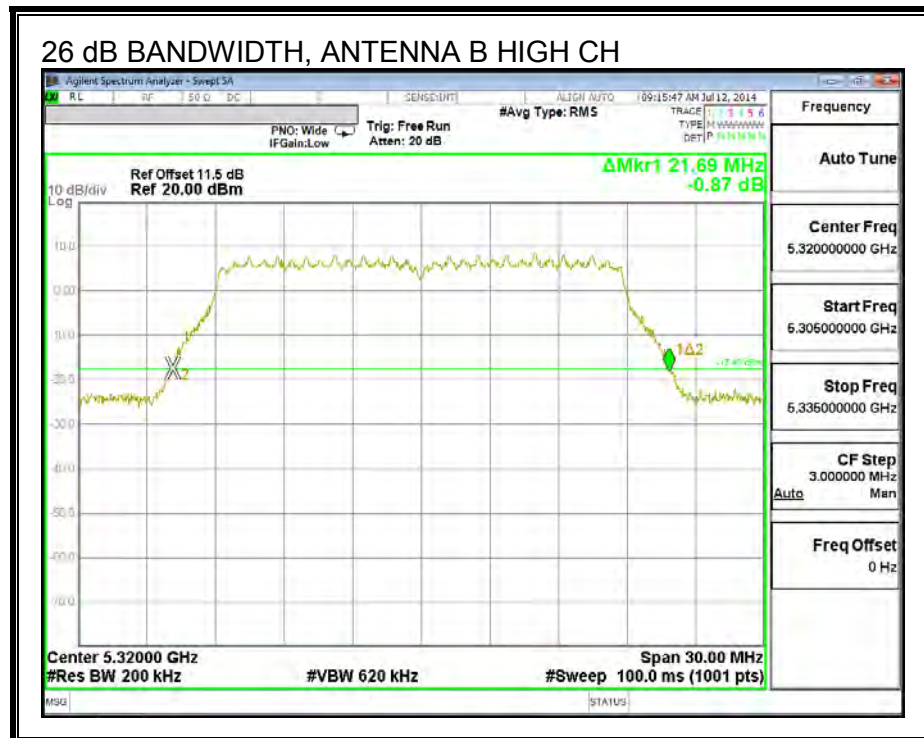
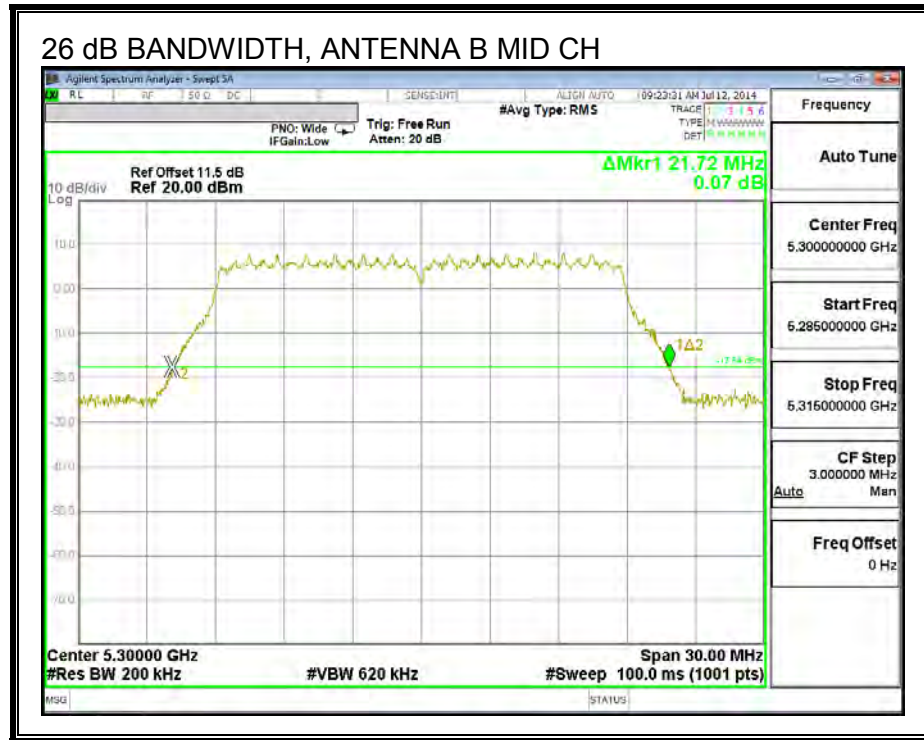
26 dB BANDWIDTH, ANTENNA A





26 dB BANDWIDTH, ANTENNA B





9.11.2. 99% BANDWIDTH

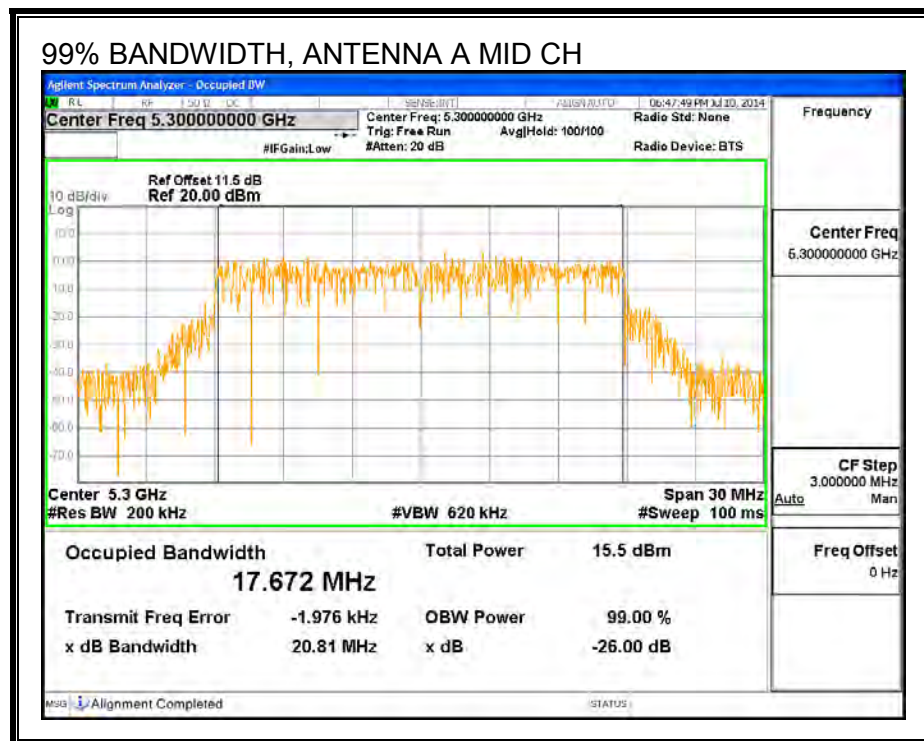
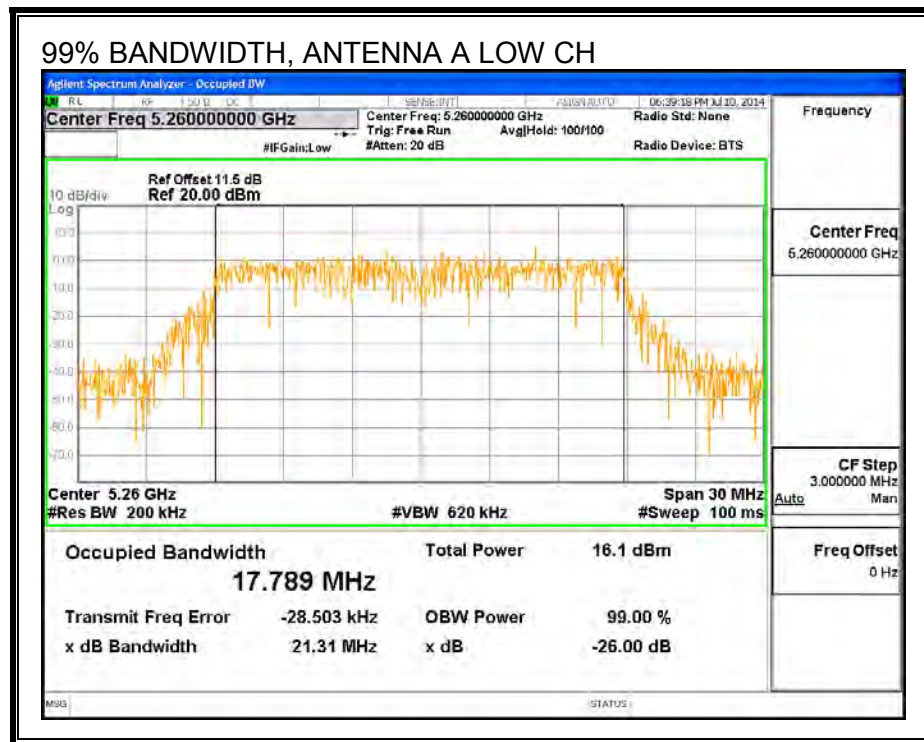
LIMITS

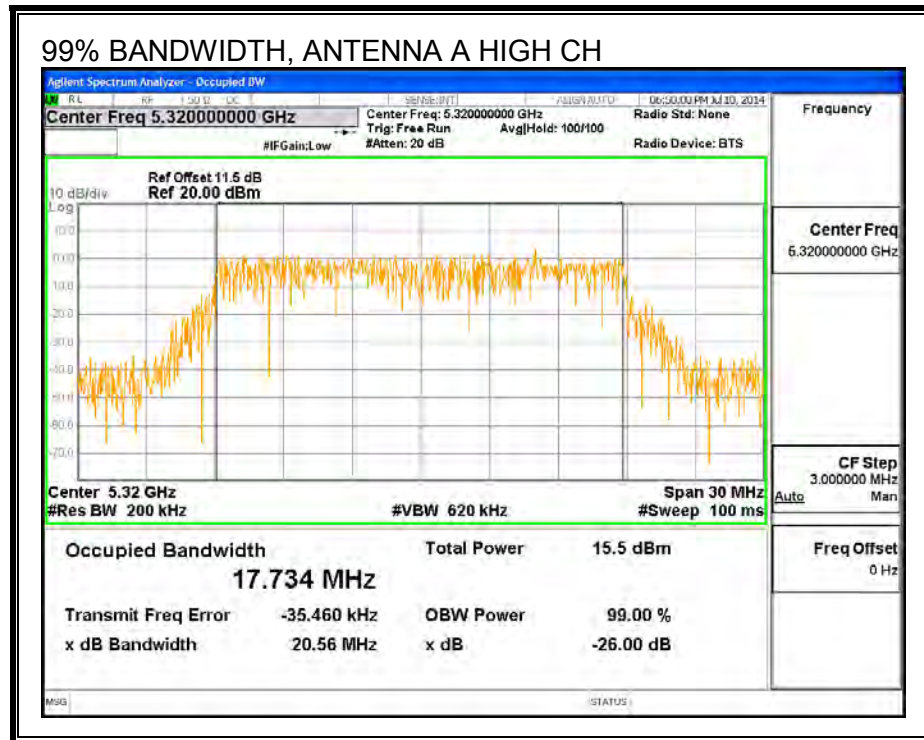
None; for reporting purposes only.

RESULTS

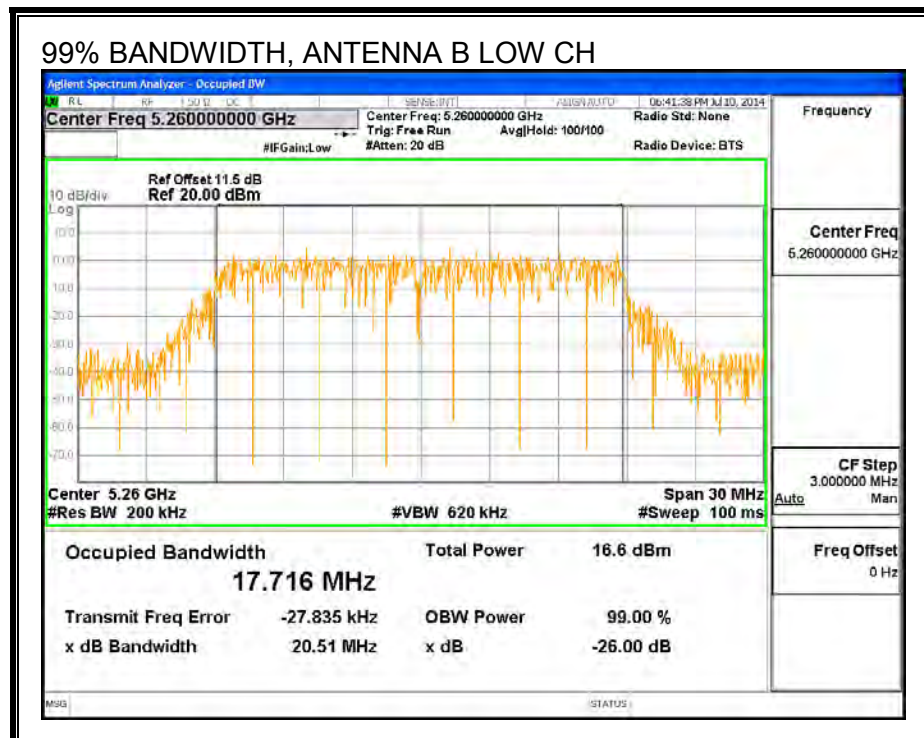
Channel	Frequency (MHz)	99% BW Antenna A (MHz)	99% BW Antenna B (MHz)
Low	5260	17.789	17.716
Mid	5300	17.672	17.672
High	5320	17.734	17.687

99% BANDWIDTH, ANTENNA A

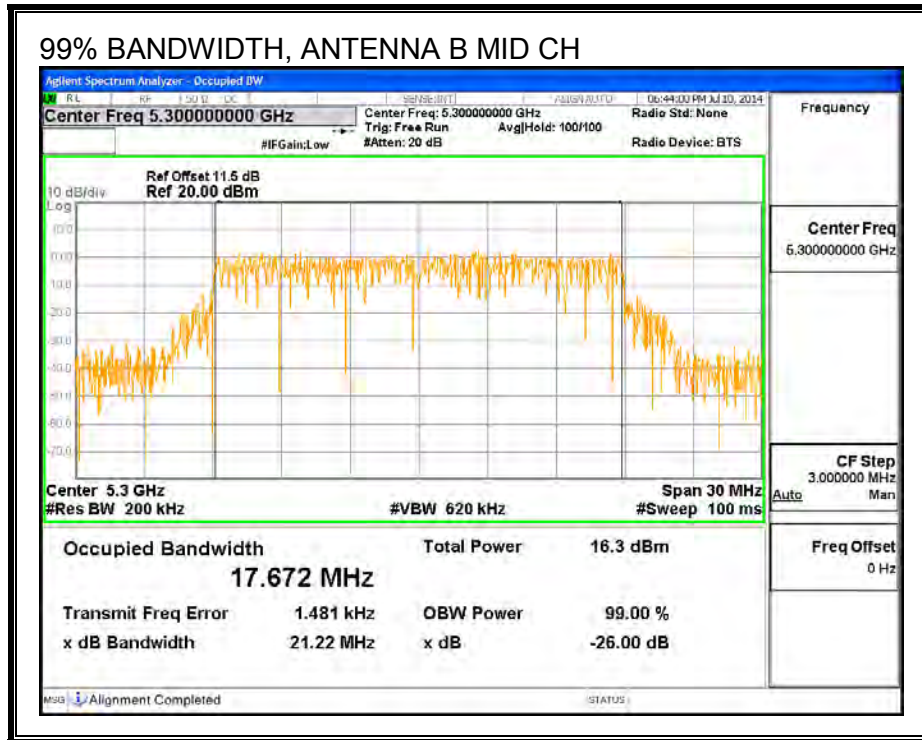




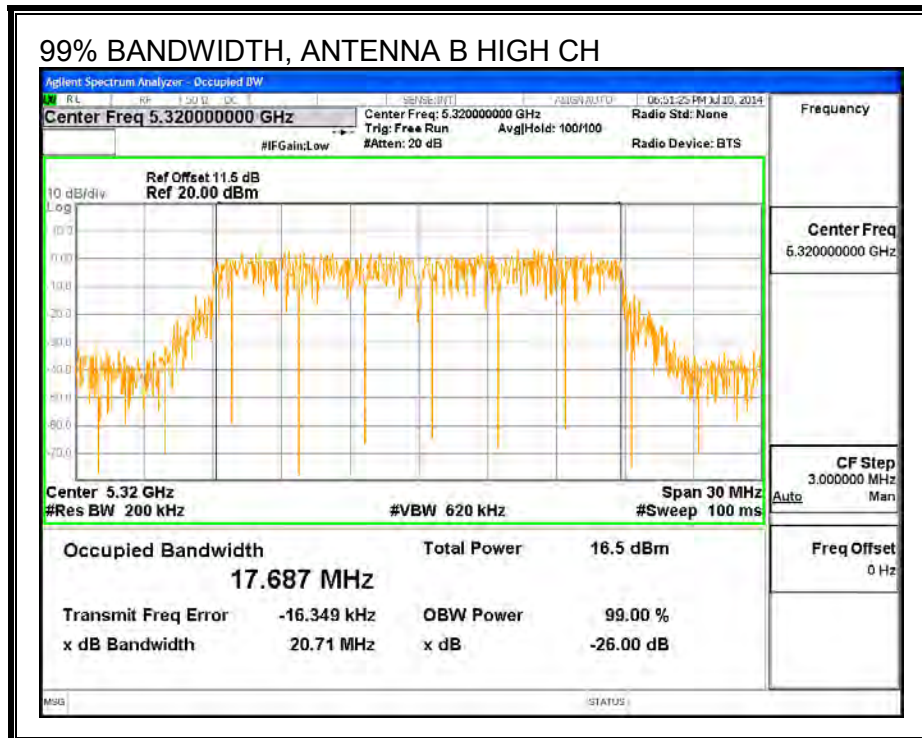
99% BANDWIDTH, ANTENNA B



99% BANDWIDTH, ANTENNA B MID CH



99% BANDWIDTH, ANTENNA B HIGH CH



9.11.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter. The power meter was setup for a gated power measurement.

The cable assembly insertion loss of 11.5 dB (including 10 dB pad and 1.5 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

RESULTS

Average Power Results

Channel	Frequency	Antenna A	Antenna B	Total
	(MHz)	Power (dBm)	Power (dBm)	Power (dBm)
Low	5260	14.85	14.87	17.87
Mid	5300	14.84	14.82	17.84
High	5320	14.96	14.98	17.98

9.11.4. OUTPUT POWER AND PSD

LIMITS

FCC §15.407 (a) (2)

For the band 5.25–5.35 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW or $11 \text{ dBm} + 10 \log B$, where B is the 26–dB emission bandwidth in MHz. In addition, the maximum power spectral density shall not exceed 11 dBm 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.

TEST PROCEDURE

The transmitter output is connected to a power meter. The power meter was setup for a gated power measurement.

The cable assembly insertion loss of 11.5 dB (including 10 dB pad and 1.5 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

DIRECTIONAL ANTENNA GAIN

The TX chains are uncorrelated and the antenna gain is unequal among the chains. The directional gain is:

Antenna A	Antenna B	Uncorrelated Chains Directional
Gain (dBi)	Gain (dBi)	Gain (dBi)
3.434	3.875	3.66

The TX chains are correlated and the antenna gain is unequal among the chains. The directional gain is:

Antenna A	Antenna B	Correlated Chains Directional
Gain (dBi)	Gain (dBi)	Gain (dBi)
3.434	3.875	6.67

RESULTS

Bandwidth, Antenna Gain and Limits

Channel	Frequency (MHz)	Min 26 dB BW (MHz)	Directional Gain for Power (dBi)	Directional Gain for PSD (dBi)	Power Limit (dBm)	PSD Limit (dBm)
Low	5260	21.96	3.66	6.67	24.00	10.33
Mid	5300	21.72	3.66	6.67	24.00	10.33
High	5320	21.69	3.66	6.67	24.00	10.33

Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd Power & PSD
--------------------	------	--

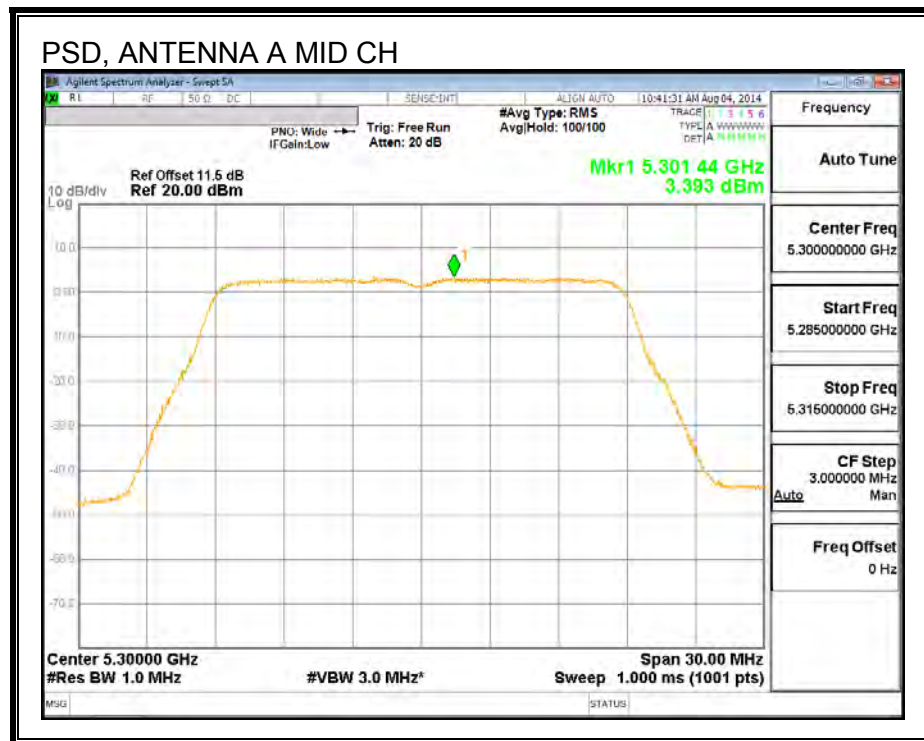
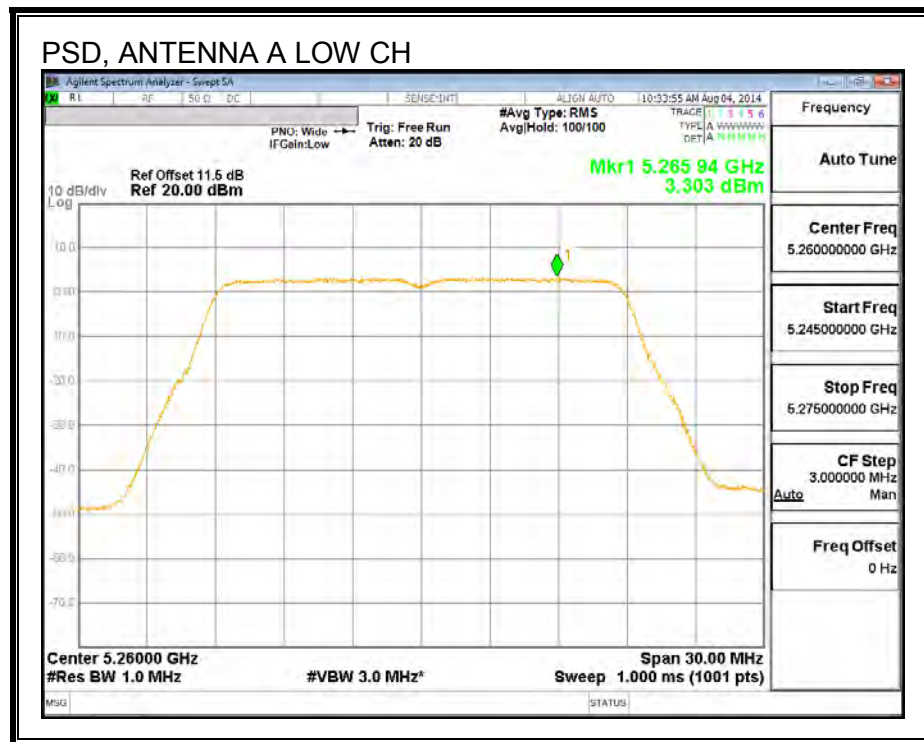
Output Power Results

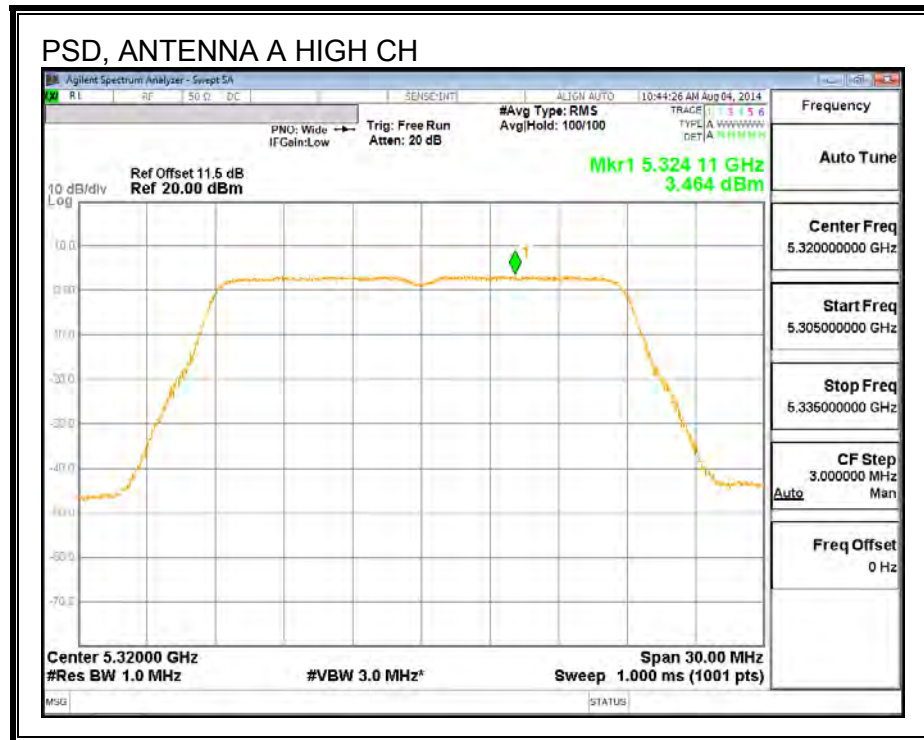
Channel	Frequency (MHz)	Antenna A Meas Power (dBm)	Antenna B Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5260	14.85	14.87	17.87	24.00	-6.13
Mid	5300	14.84	14.82	17.84	24.00	-6.16
High	5320	14.96	14.98	17.98	24.00	-6.02

PSD Results

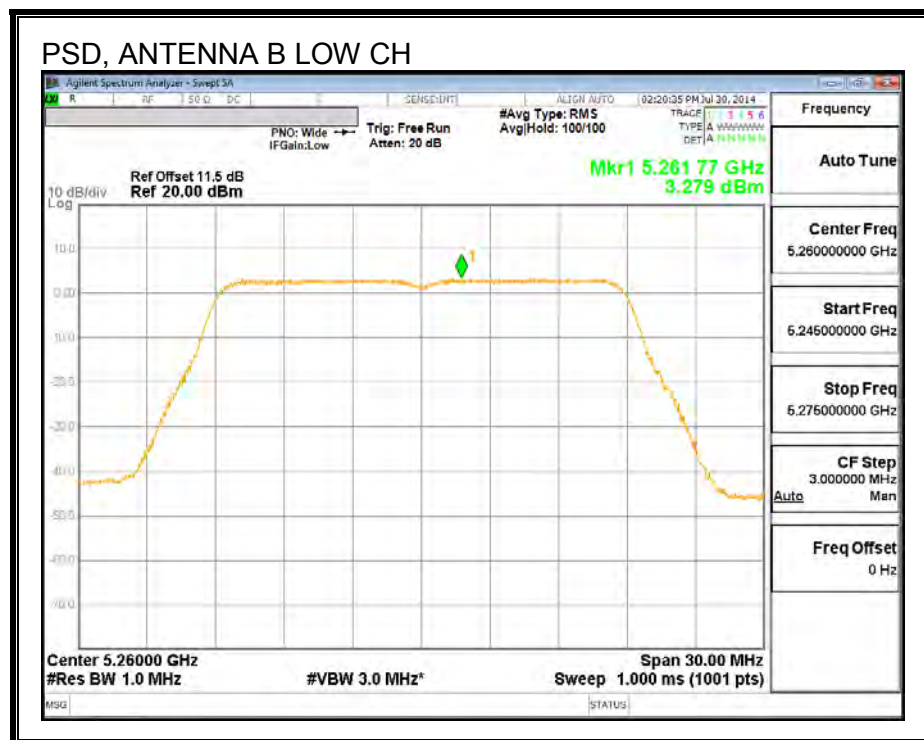
Channel	Frequency (MHz)	Antenna A Meas PSD (dBm)	Antenna B Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low	5260	3.30	3.28	6.30	10.33	-4.03
Mid	5300	3.39	3.50	6.46	10.33	-3.87
High	5320	3.46	3.42	6.45	10.33	-3.88

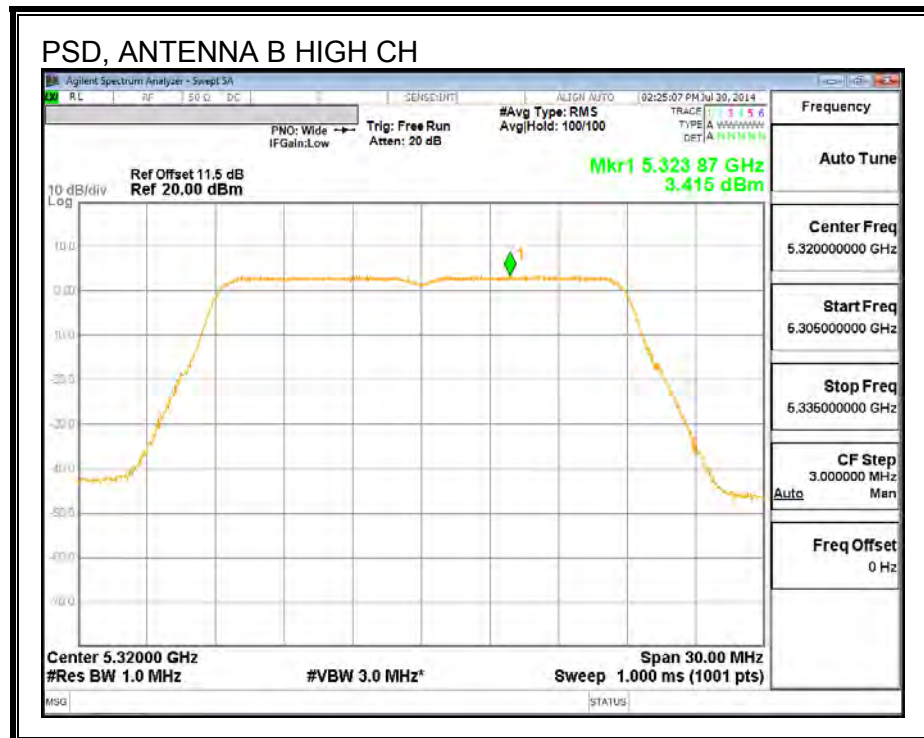
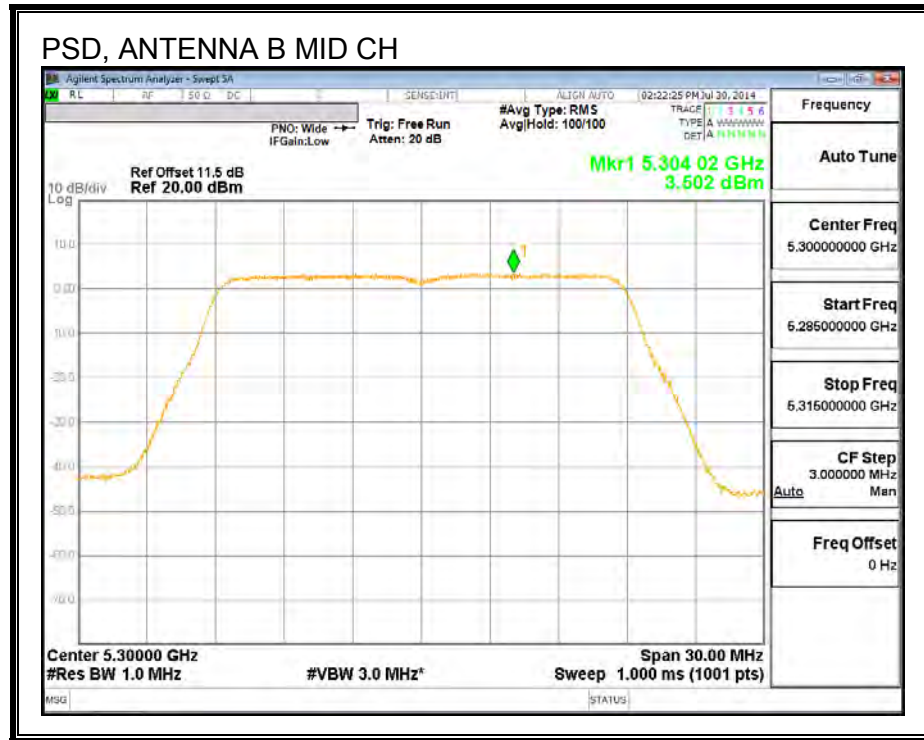
PSD, ANTENNA A





PSD, ANTENNA B





9.12. 802.11n HT20 2TX STBC MODE IN THE 5.3 GHz BAND

9.12.1. 26 dB BANDWIDTH

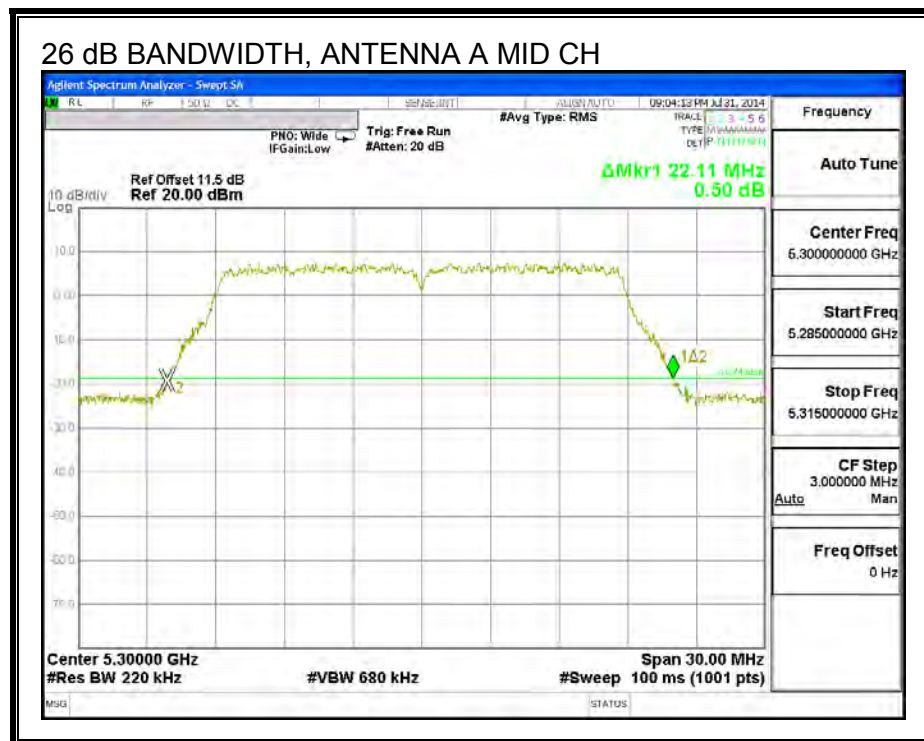
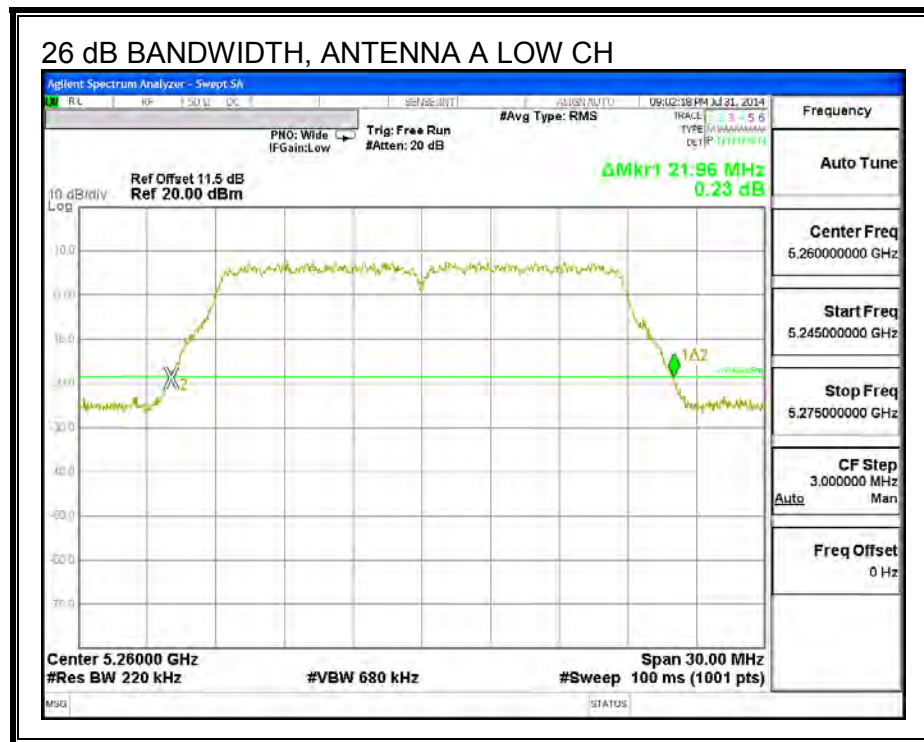
LIMITS

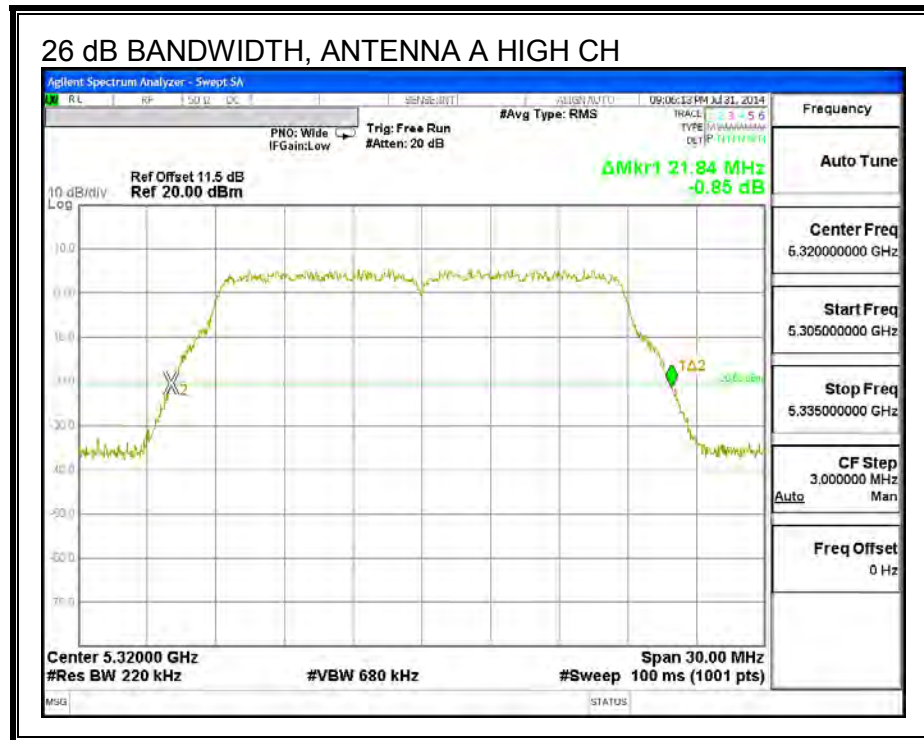
None; for reporting purposes only.

RESULTS

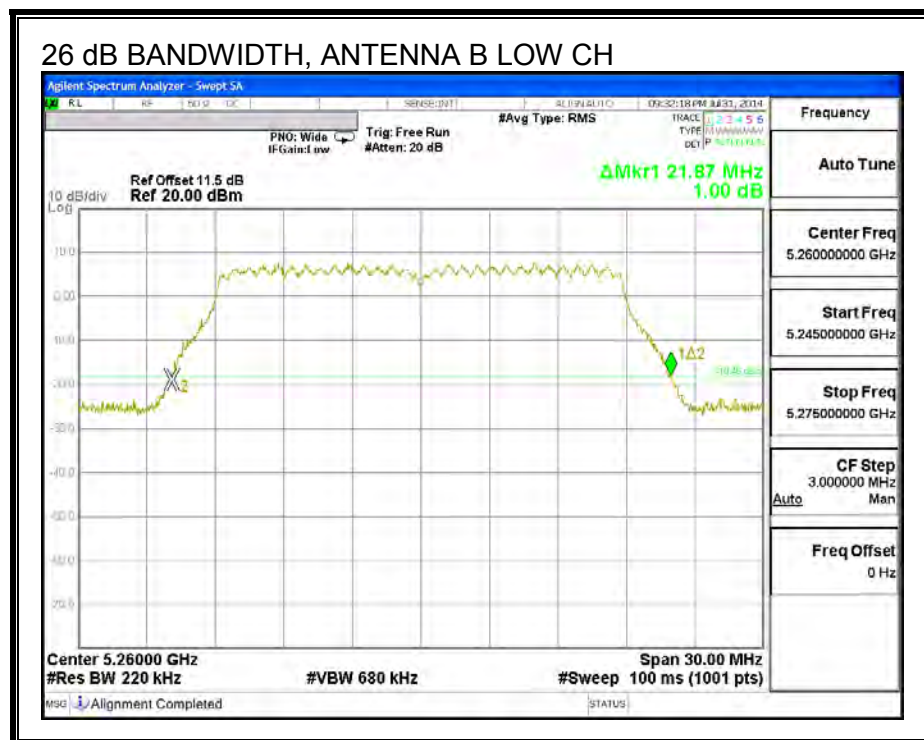
Channel	Frequency (MHz)	26 dB BW Antenna A (MHz)	26 dB BW Antenna B (MHz)
Low	5260	21.96	21.87
Mid	5300	22.11	21.84
High	5320	21.84	21.81

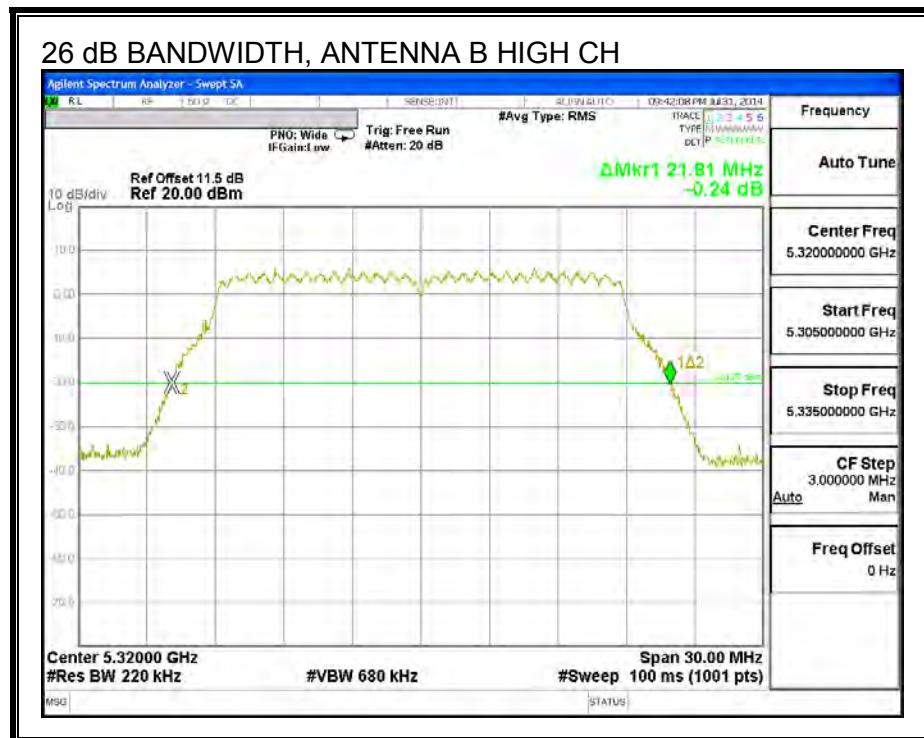
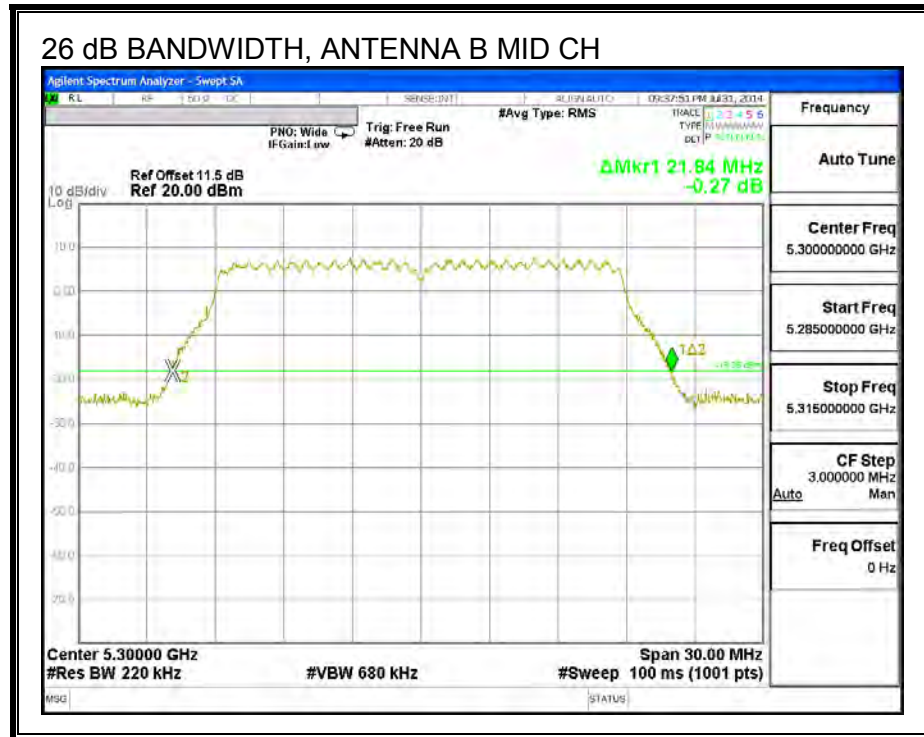
26 dB BANDWIDTH, ANTENNA A





26 dB BANDWIDTH, ANTENNA B





9.12.2. 99% BANDWIDTH

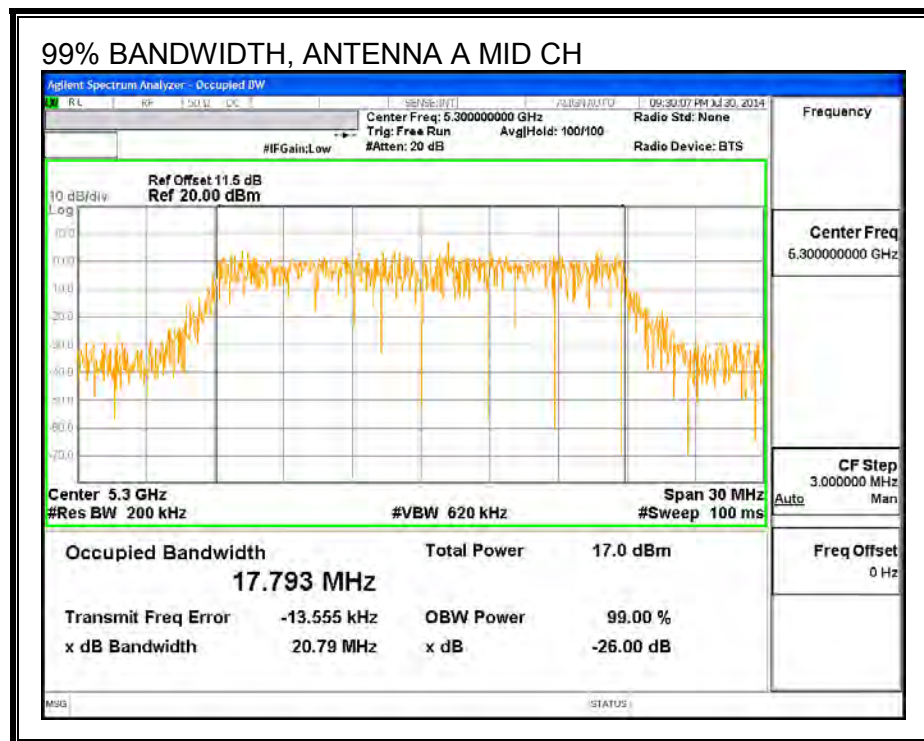
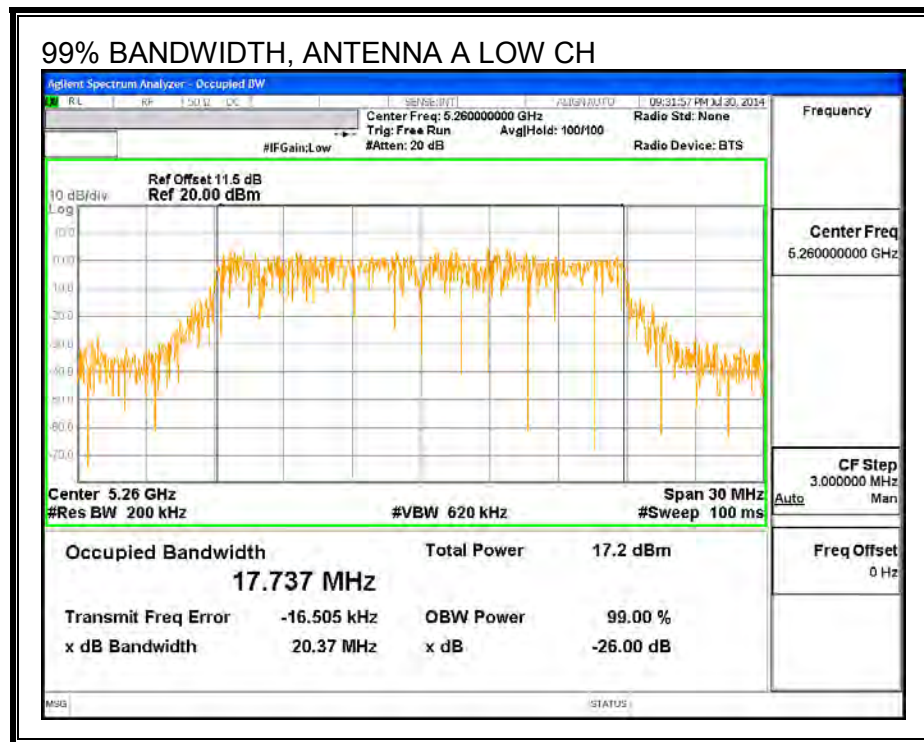
LIMITS

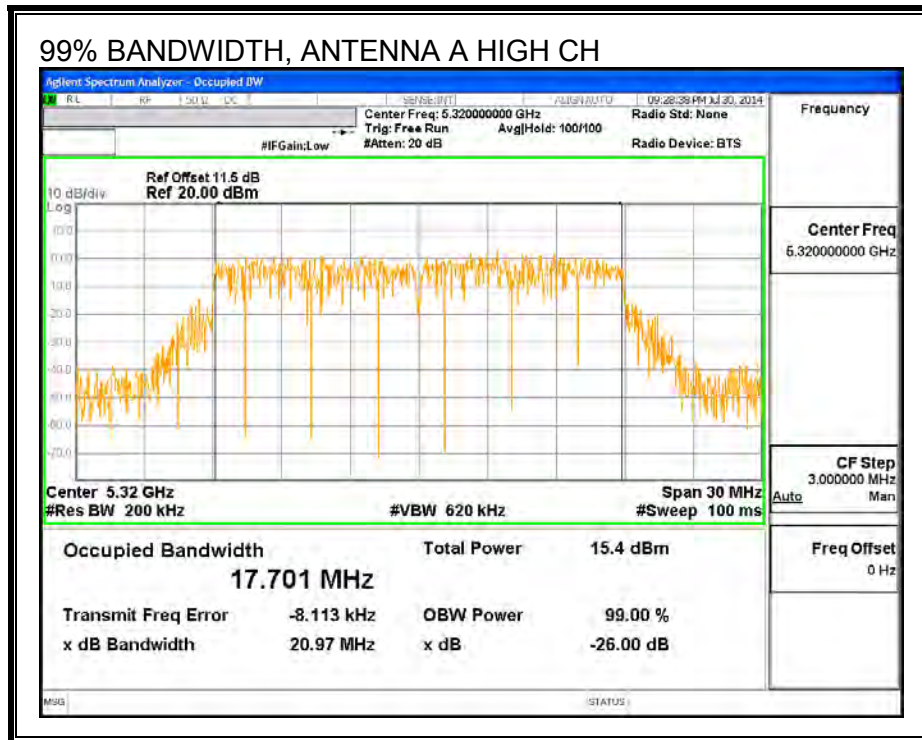
None; for reporting purposes only.

RESULTS

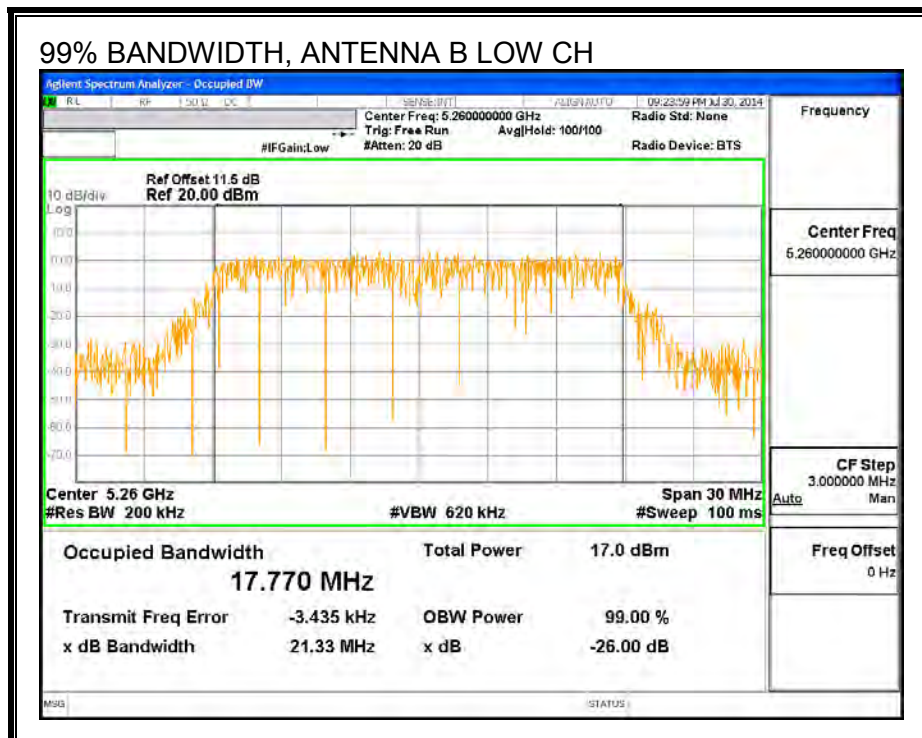
Channel	Frequency (MHz)	99% BW Antenna A (MHz)	99% BW Antenna B (MHz)
Low	5260	17.737	17.770
Mid	5300	17.793	17.684
High	5320	17.701	17.843

99% BANDWIDTH, ANTENNA A

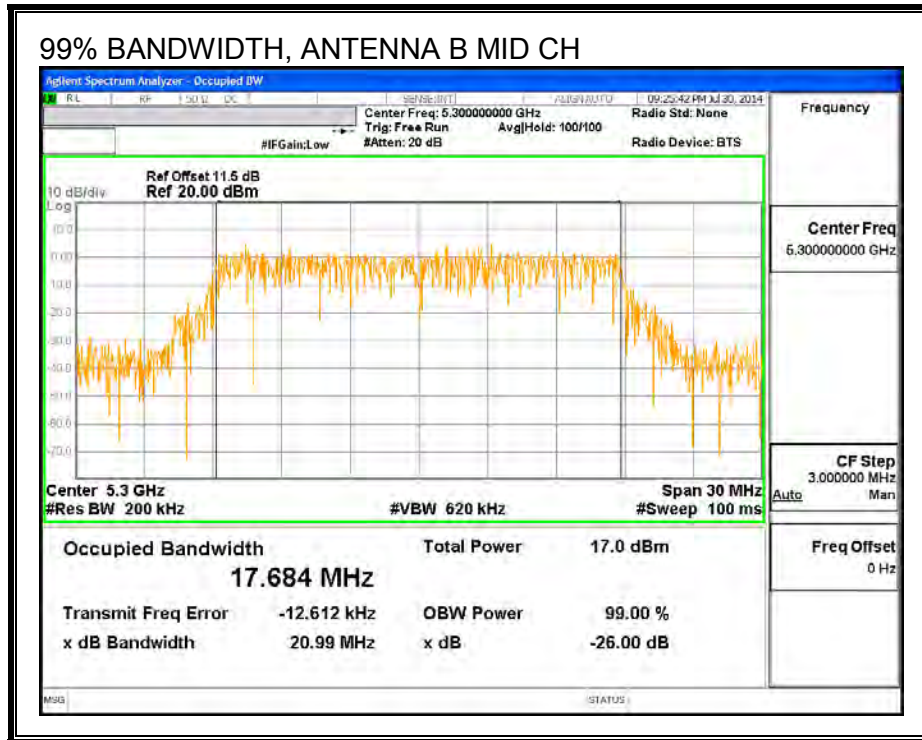




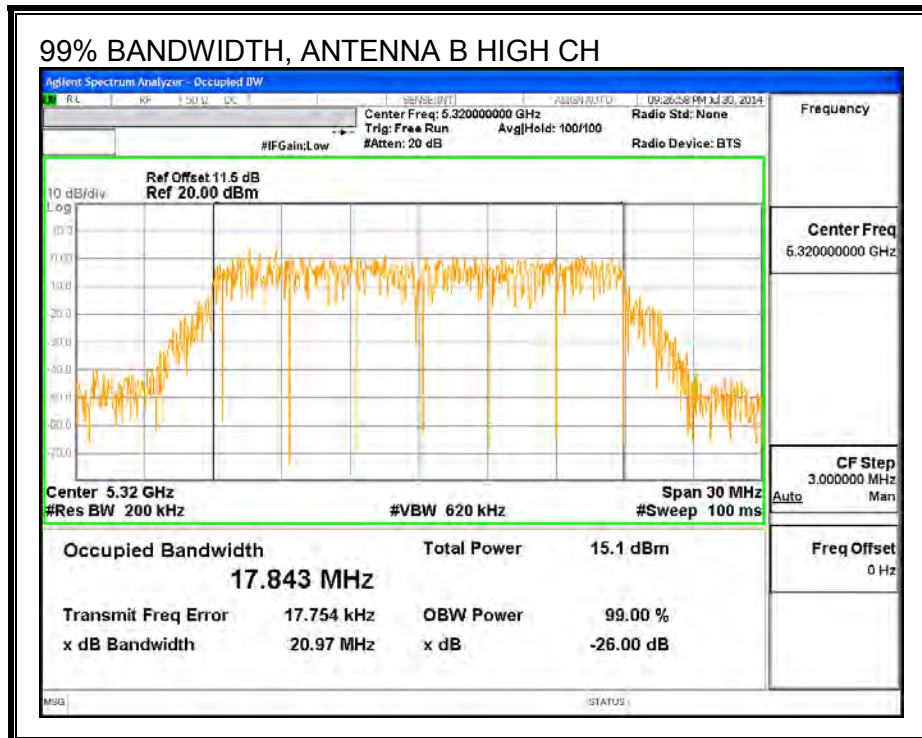
99% BANDWIDTH, ANTENNA B



99% BANDWIDTH, ANTENNA B MID CH



99% BANDWIDTH, ANTENNA B HIGH CH



9.12.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter. The power meter was setup for a gated power measurement.

The cable assembly insertion loss of 11.5 dB (including 10 dB pad and 1.5 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

RESULTS

Average Power Results

Channel	Frequency	Antenna A	Antenna B	Total
	(MHz)	Power (dBm)	Power (dBm)	Power (dBm)
Low	5260	16.93	16.39	19.68
Mid	5300	16.87	16.42	19.66
High	5320	14.92	14.96	17.95

9.12.4. OUTPUT POWER AND PSD

LIMITS

FCC §15.407 (a) (2)

For the band 5.25–5.35 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26–dB emission bandwidth in MHz. In addition, the maximum power spectral density shall not exceed 11 dBm 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.

TEST PROCEDURE

The transmitter output is connected to a power meter. The power meter was setup for a gated power measurement.

The cable assembly insertion loss of 11.5 dB (including 10 dB pad and 1.5 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

DIRECTIONAL ANTENNA GAIN

The TX chains are uncorrelated and the antenna gain is unequal among the chains. The directional gain is:

Antenna A	Antenna B	Uncorrelated Chains Directional
Gain (dBi)	Gain (dBi)	Gain (dBi)
3.434	3.875	3.66

RESULTS

Bandwidth, Antenna Gain and Limits

Channel	Frequency (MHz)	Min 26 dB BW (MHz)	Directional Gain for Power (dBi)	Directional Gain for PSD (dBi)	Power Limit (dBm)	PSD Limit (dBm)
Low	5260	21.88	3.66	3.66	24.00	11.00
Mid	5300	21.84	3.66	3.66	24.00	11.00
High	5320	21.81	3.66	3.66	24.00	11.00

Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd Power & PSD
--------------------	------	--

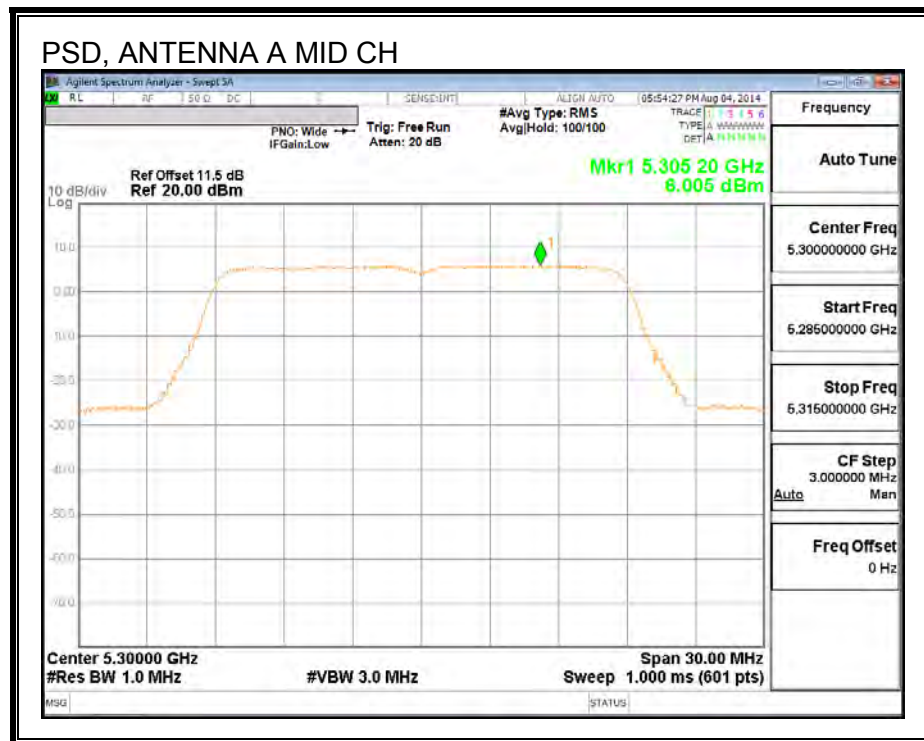
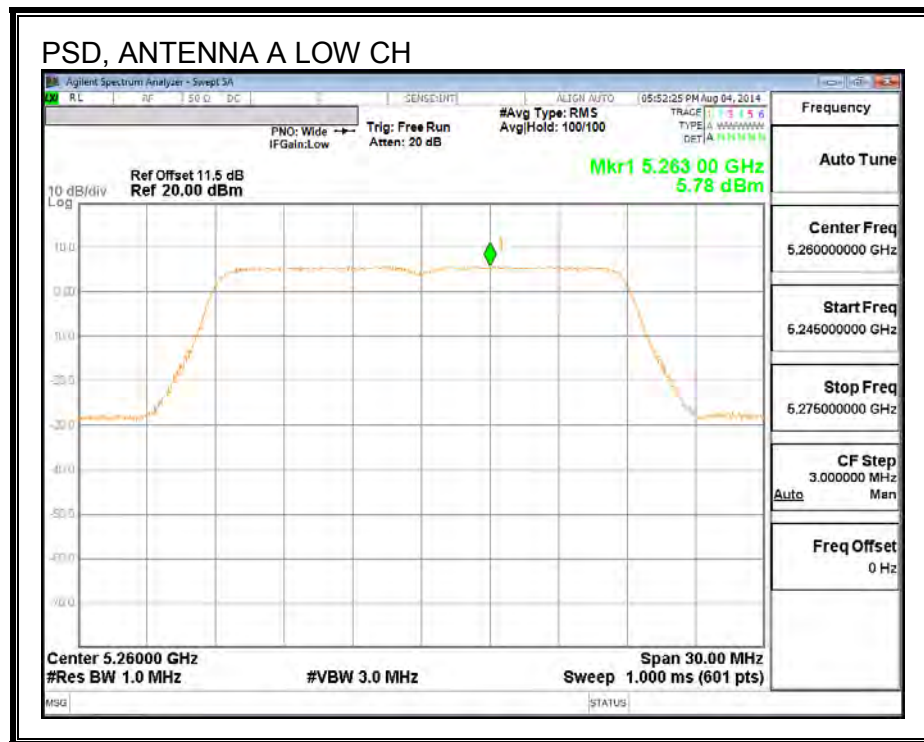
Output Power Results

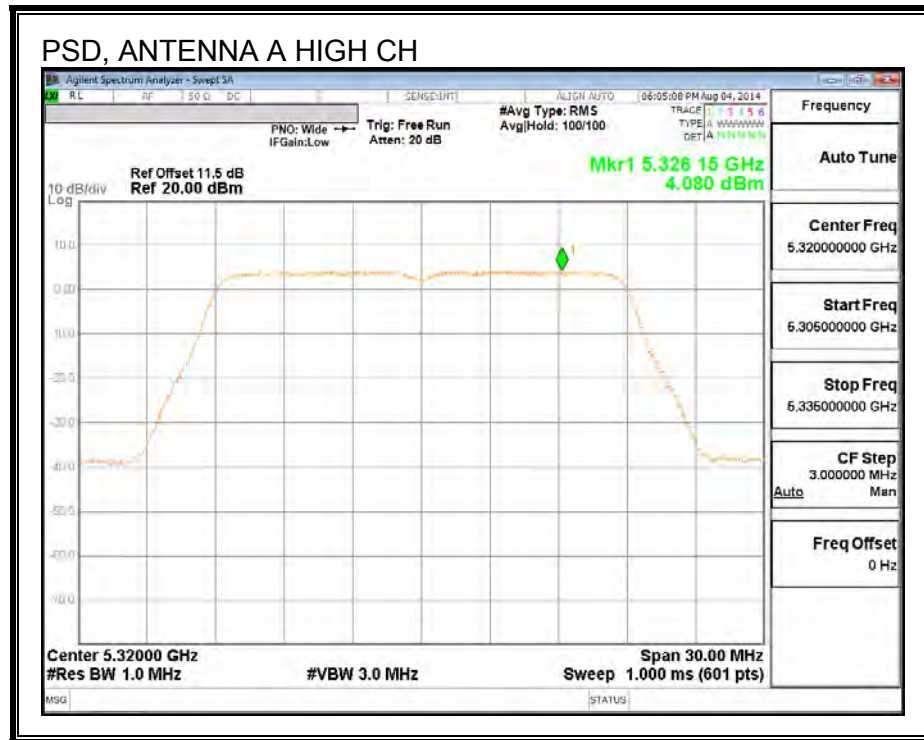
Channel	Frequency (MHz)	Antenna A Meas Power (dBm)	Antenna B Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5260	16.93	16.39	19.68	24.00	-4.32
Mid	5300	16.87	16.42	19.66	24.00	-4.34
High	5320	14.92	14.96	17.95	24.00	-6.05

PSD Results

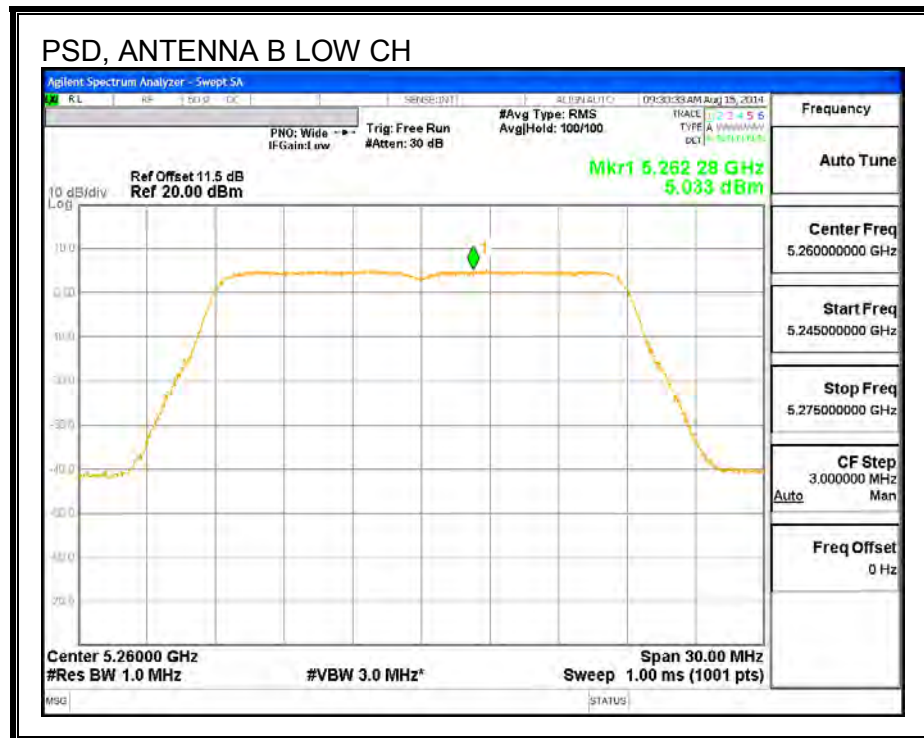
Channel	Frequency (MHz)	Antenna A Meas PSD (dBm)	Antenna B Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low	5260	5.78	5.03	8.43	11.00	-2.57
Mid	5300	6.01	5.08	8.58	11.00	-2.42
High	5320	4.08	4.16	7.13	11.00	-3.87

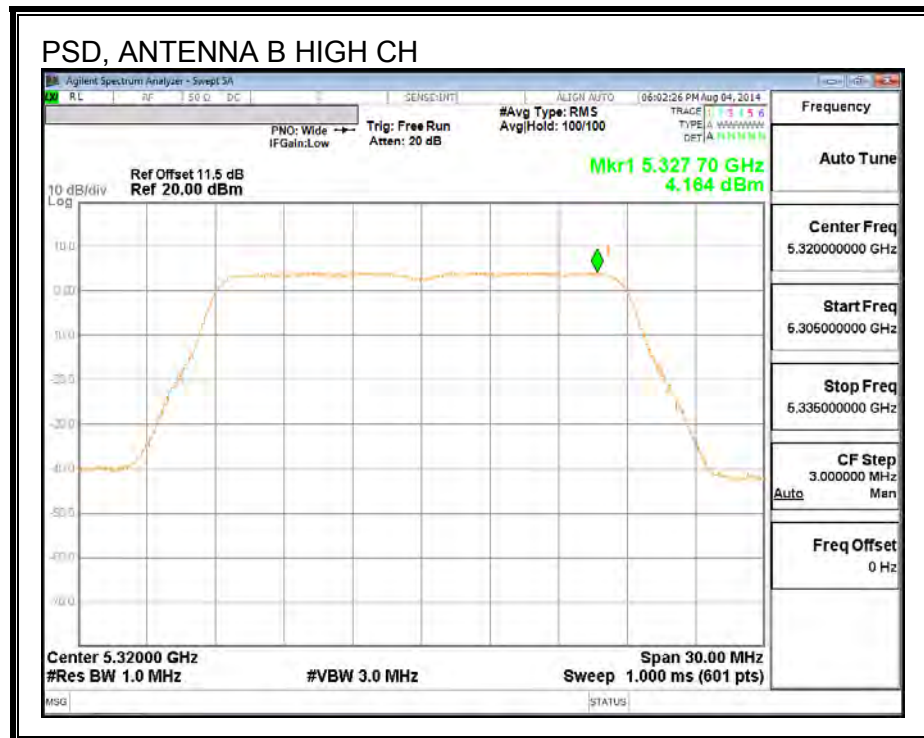
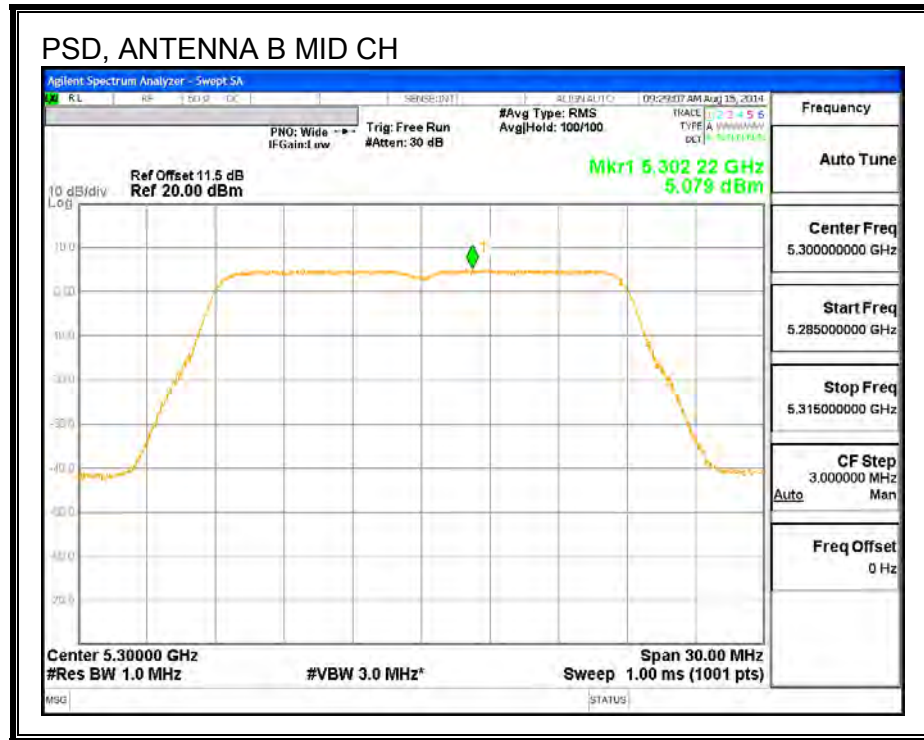
PSD, ANTENNA A





PSD, ANTENNA B





9.13. 802.11n HT40 MODE IN THE 5.3 GHz BAND

9.13.1. 26 dB BANDWIDTH

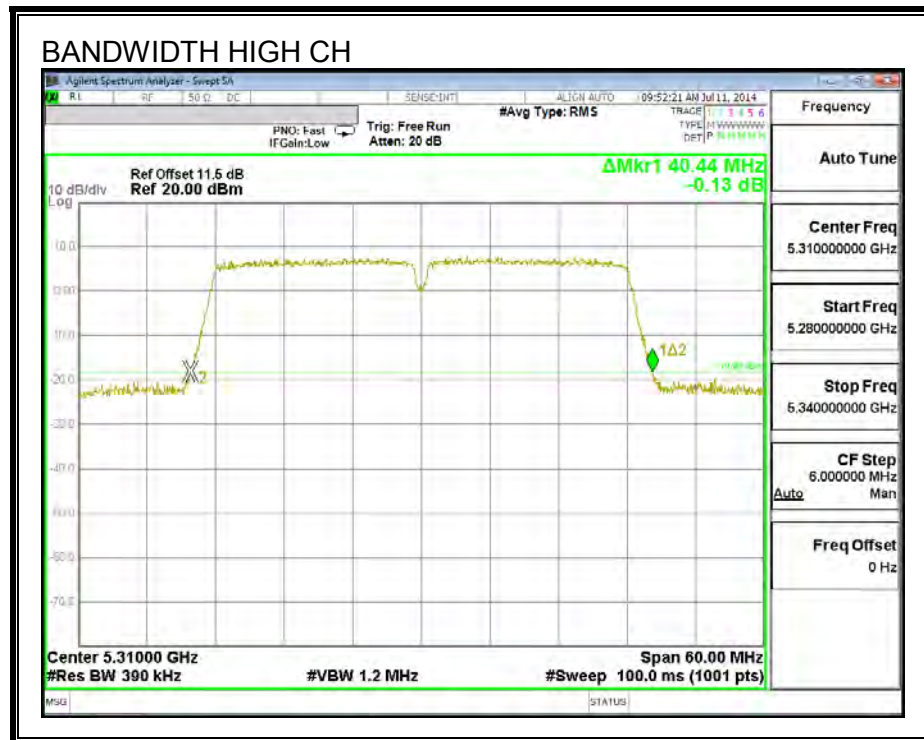
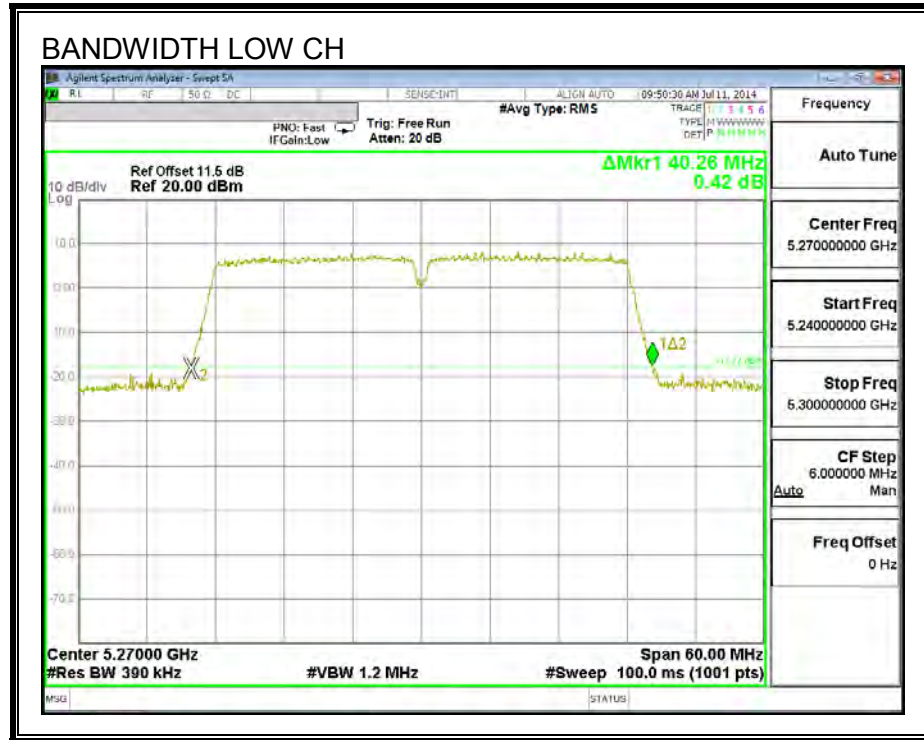
LIMITS

None; for reporting purposes only.

RESULTS

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Low	5270	40.26
High	5310	40.44

26 dB BANDWIDTH



9.13.2. 99% BANDWIDTH

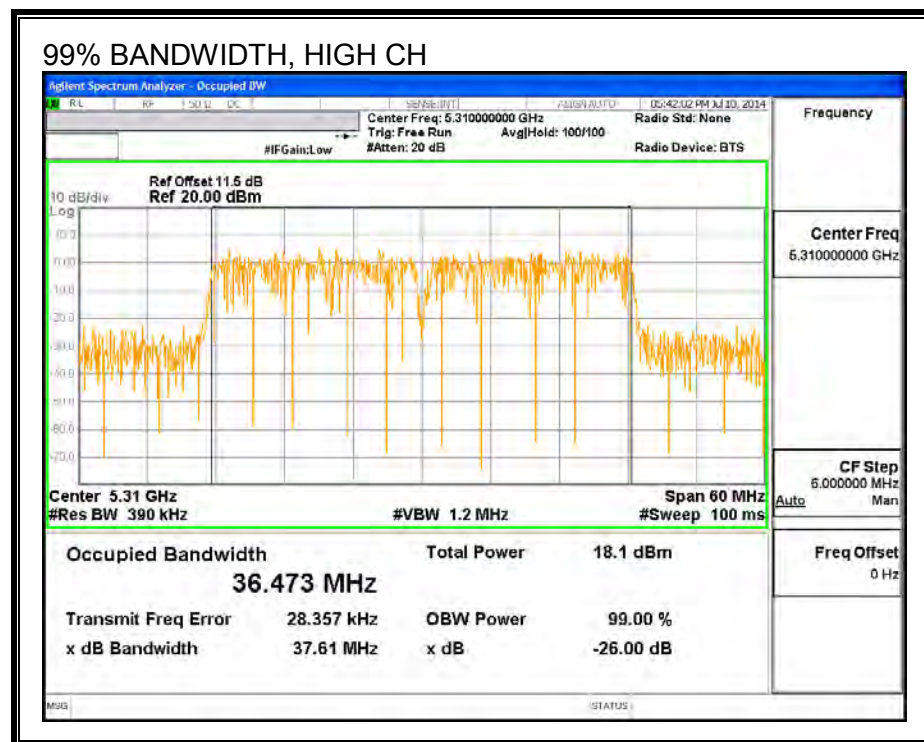
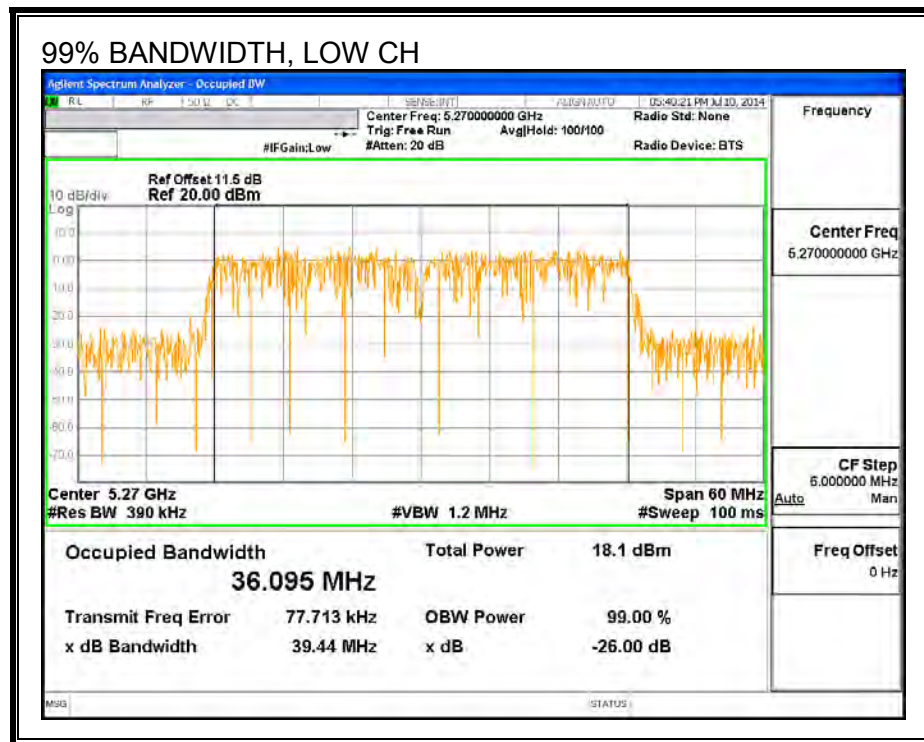
LIMITS

None; for reporting purposes only.

RESULTS

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5270	36.095
High	5310	36.473

99% BANDWIDTH



9.13.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter. The power meter was setup for a gated power measurement.

The cable assembly insertion loss of 11.5 dB (including 10 dB pad and 1.5 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

RESULTS

Channel	Frequency (MHz)	Antenna A Power (dBm)	Antenna B Power (dBm)
Low	5270	17.91	16.40
High	5310	14.86	15.00

9.13.4. OUTPUT POWER AND PSD

LIMITS

FCC §15.407 (a) (2)

For the band 5.25–5.35 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW or $11 \text{ dBm} + 10 \log B$, where B is the 26–dB emission bandwidth in MHz. In addition, the peak power spectral density shall not exceed 11 dBm 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.

TEST PROCEDURE

The transmitter output is connected to a power meter. The power meter was setup for a gated power measurement.

The cable assembly insertion loss of 11.5 dB (including 10 dB pad and 1.5 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

DIRECTIONAL ANTENNA GAIN

There is only one transmitter output therefore the directional gain is equal to the antenna gain

ANTENNA A

Antenna Gain (dBi)
3.434

ANTENNA B

Antenna Gain (dBi)
3.875

ANTENNA A RESULTS

Bandwidth, Antenna Gain, and Limits

Channel	Frequency (MHz)	Min 26 dB BW (MHz)	Directional Gain (dBi)	Power Limit (dBm)	PSD Limit (dBm)
Low	5270	40.26	3.88	24.00	11.00
High	5310	40.44	3.88	24.00	11.00

Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd Power & PSD
---------------------------	------	---

Output Power Results

Channel	Frequency (MHz)	Antenna A Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5270	17.91	17.91	24.00	-6.09
High	5310	14.86	14.86	24.00	-9.14

PSD Results

Channel	Frequency (MHz)	Antenna A Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low	5270	4.28	4.28	11.00	-6.72
High	5310	0.78	0.78	11.00	-10.22

ANTENNA B RESULTS

Bandwidth, Antenna Gain, and Limits

Channel	Frequency (MHz)	Min 26 dB BW (MHz)	Directional Gain (dBi)	Power Limit (dBm)	PSD Limit (dBm)
Low	5270	40.26	3.88	24.00	11.00
High	5310	40.44	3.88	24.00	11.00

Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd Power & PSD
---------------------------	------	---

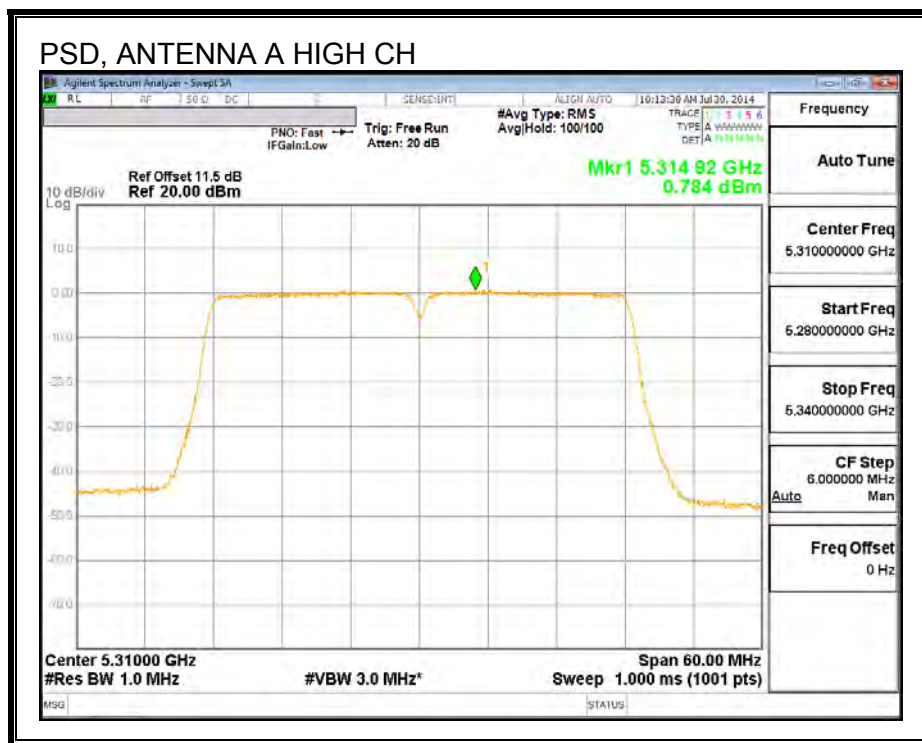
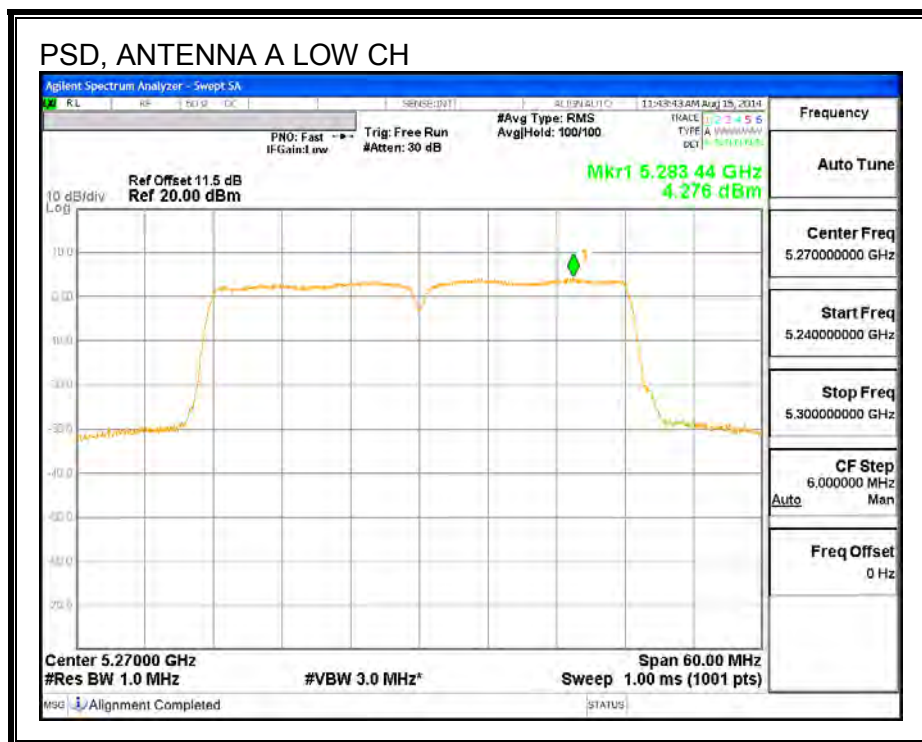
Output Power Results

Channel	Frequency (MHz)	Antenna B Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5270	16.40	16.40	24.00	-7.60
High	5310	15.00	15.00	24.00	-9.00

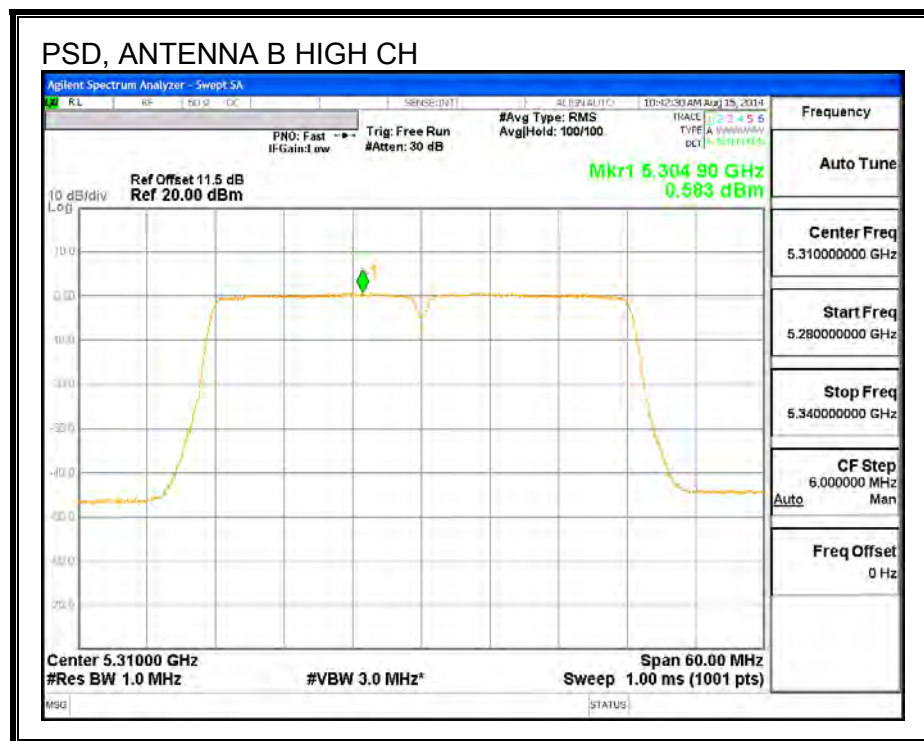
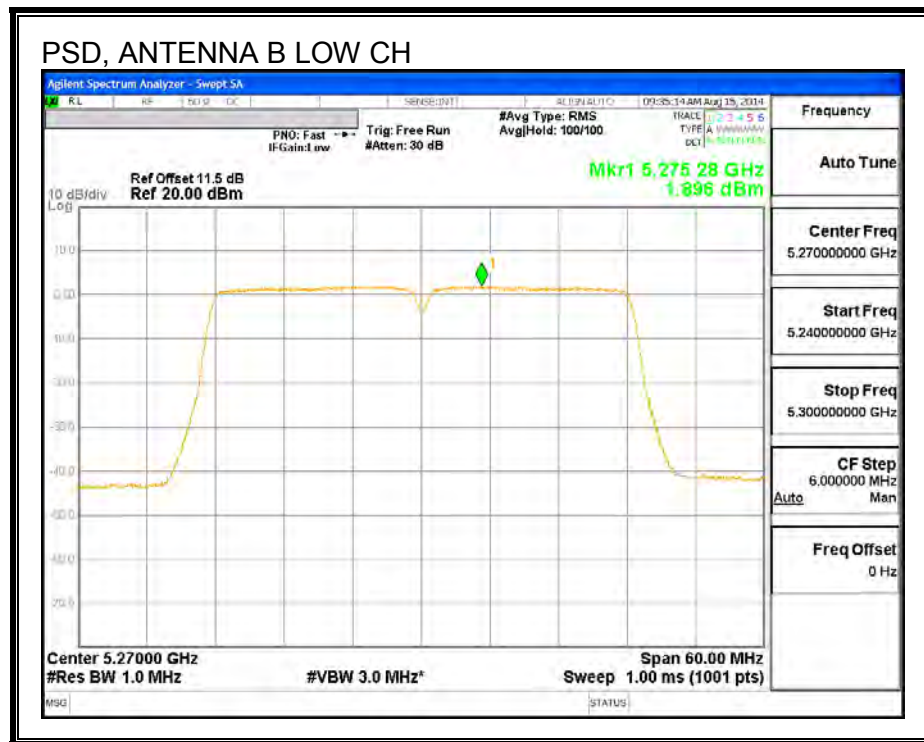
PSD Results

Channel	Frequency (MHz)	Antenna B Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low	5270	1.90	1.90	11.00	-9.10
High	5310	0.58	0.58	11.00	-10.42

PSD, ANTENNA A



PSD, ANTENNA B



9.14. 802.11n HT40 2TX CDD MODE IN THE 5.3 GHz BAND

9.14.1. 26 dB BANDWIDTH

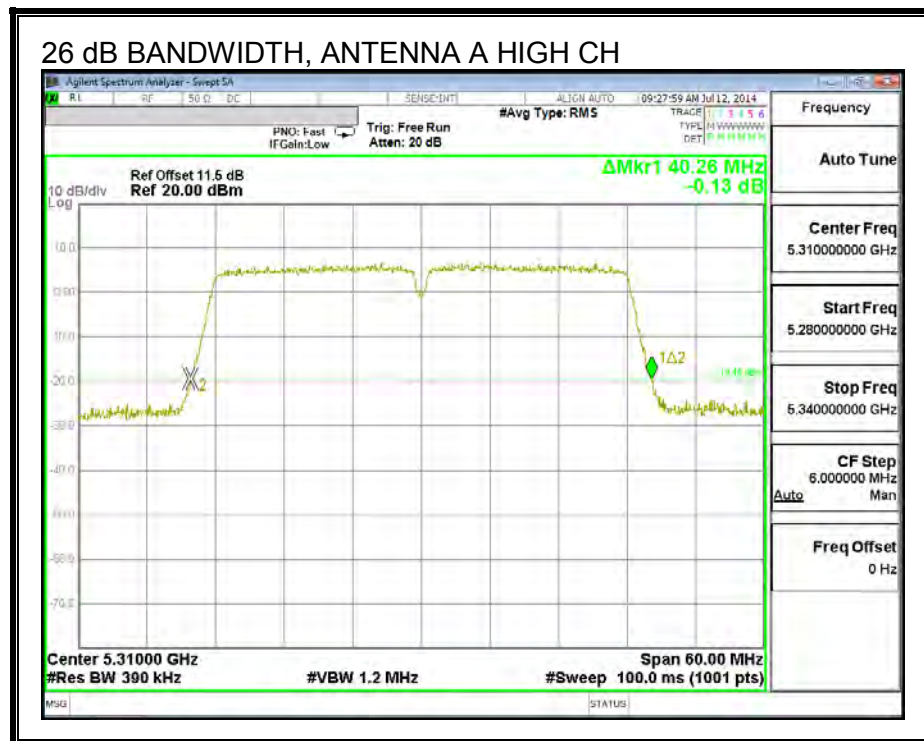
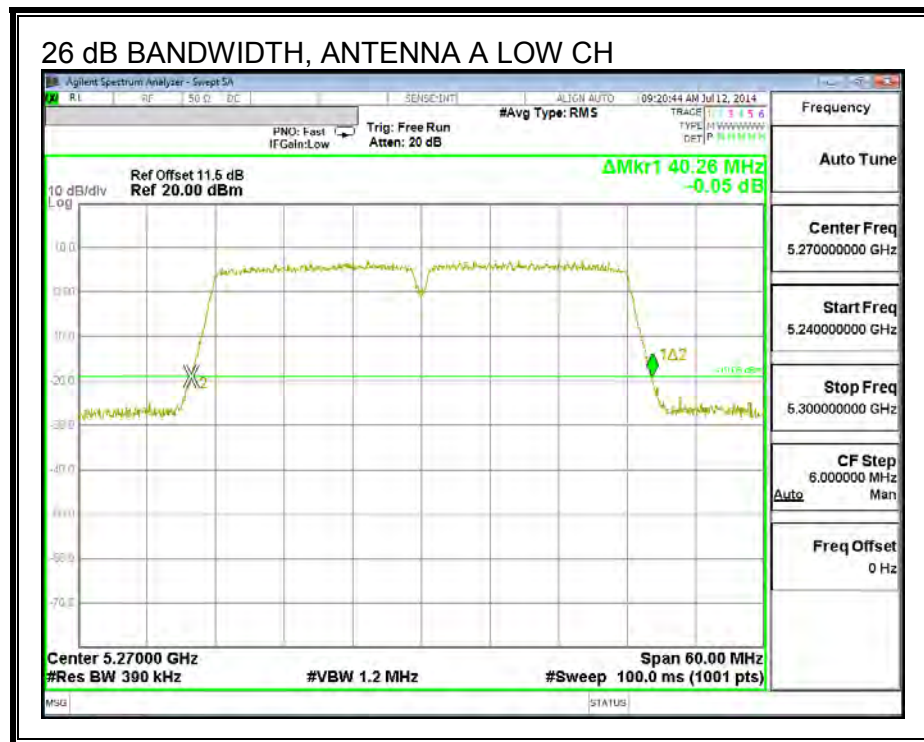
LIMITS

None; for reporting purposes only.

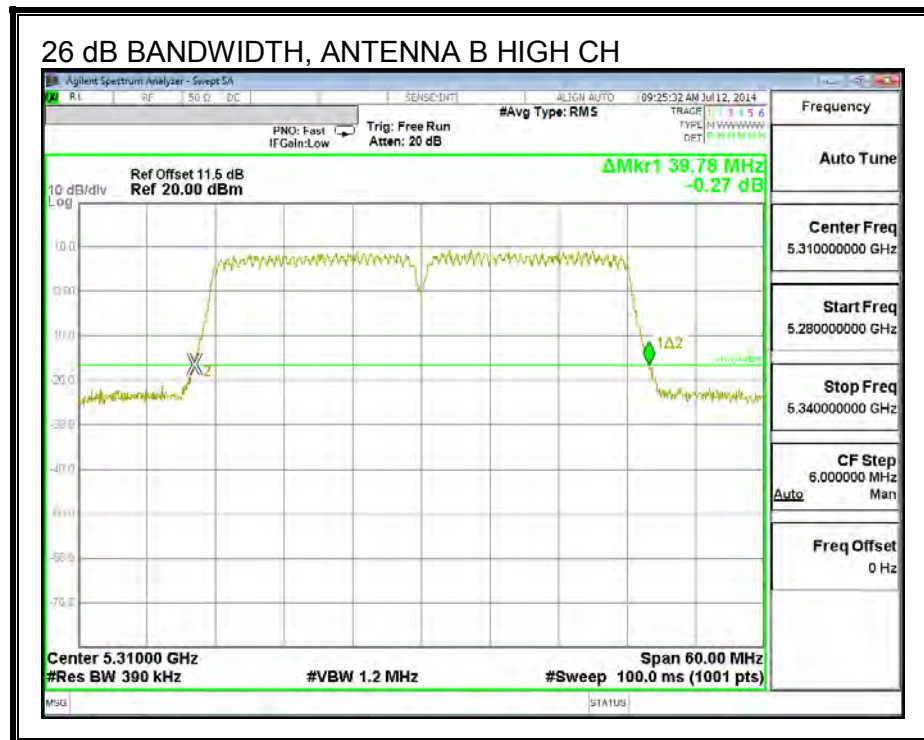
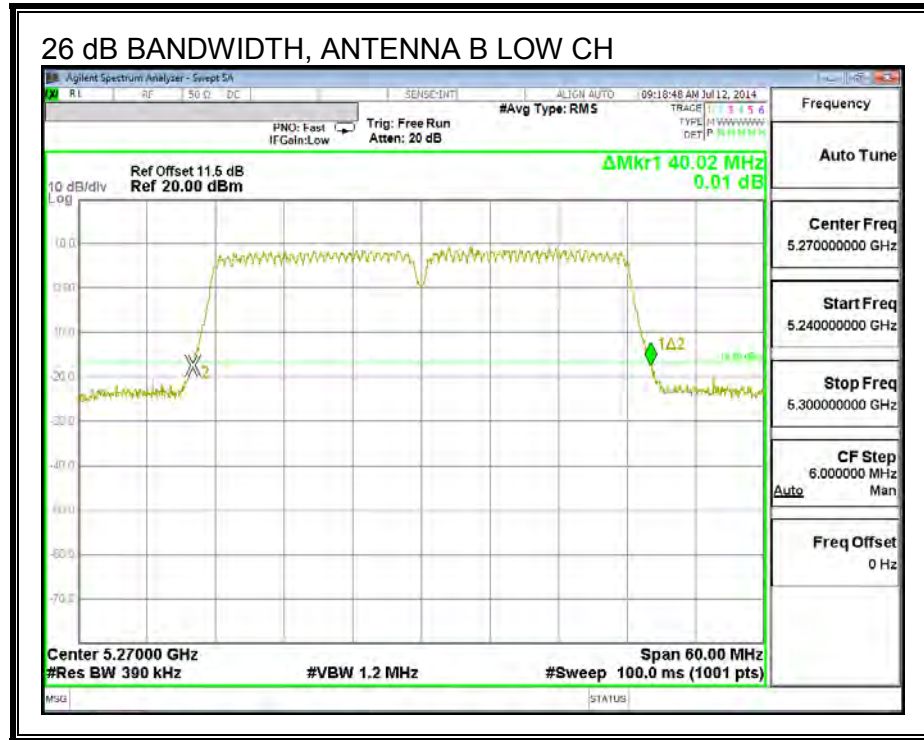
RESULTS

Channel	Frequency (MHz)	26 dB BW Antenna A (MHz)	26 dB BW Antenna B (MHz)
Low	5270	40.26	40.02
High	5310	40.26	39.78

26 dB BANDWIDTH, ANTENNA A



26 dB BANDWIDTH, ANTENNA B



9.14.2. 99% BANDWIDTH

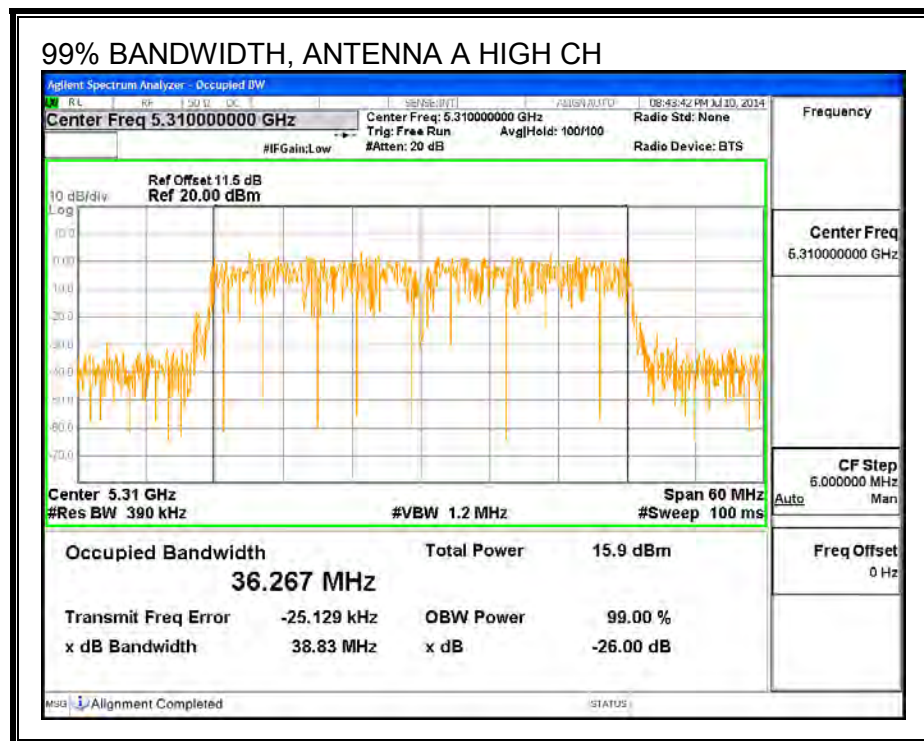
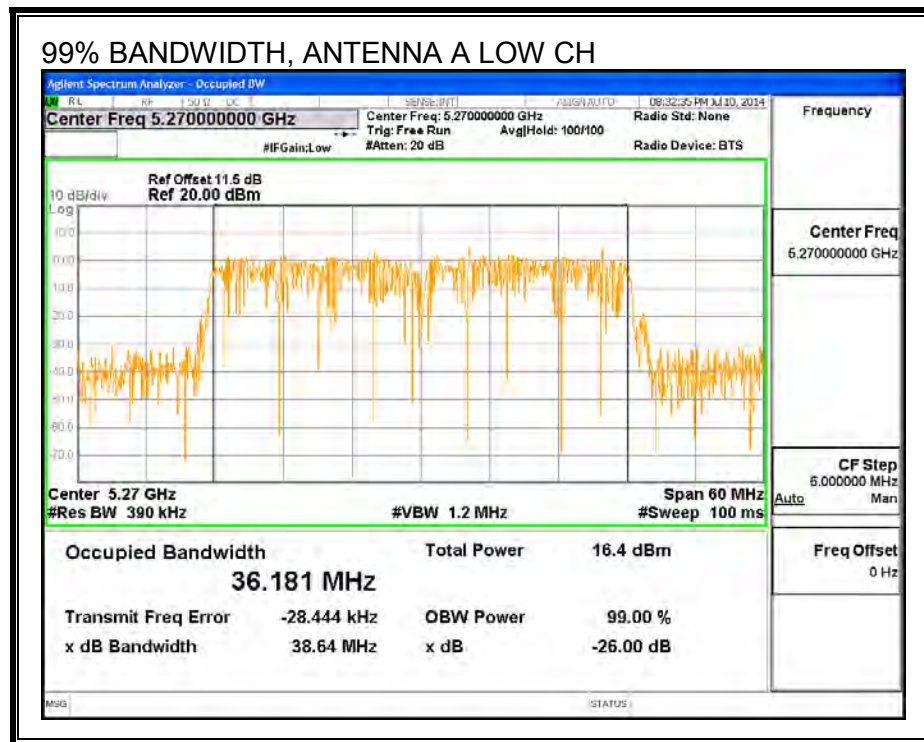
LIMITS

None; for reporting purposes only.

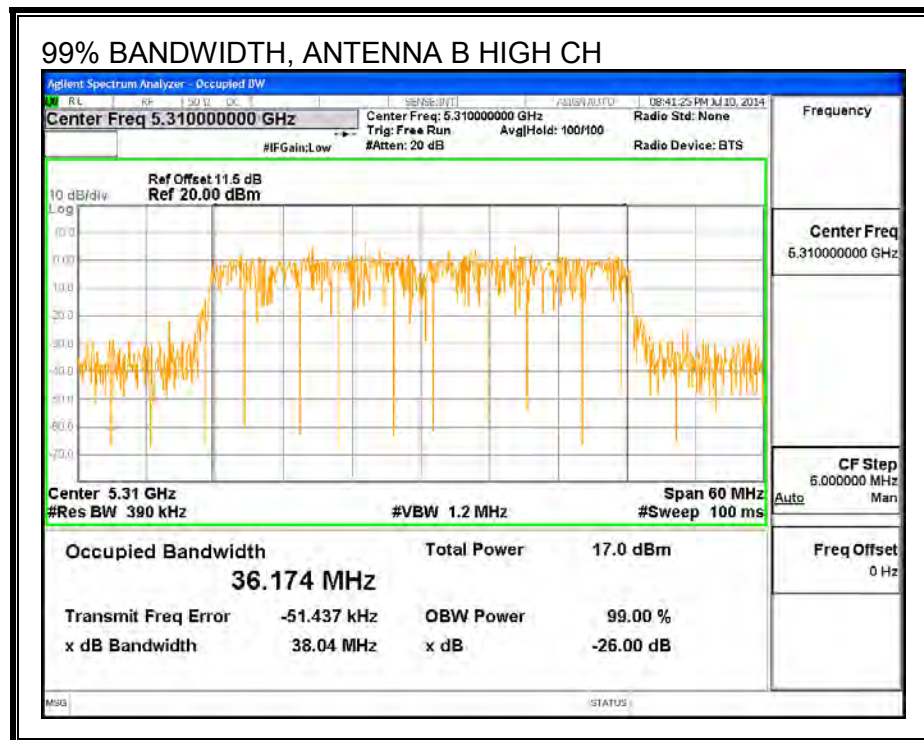
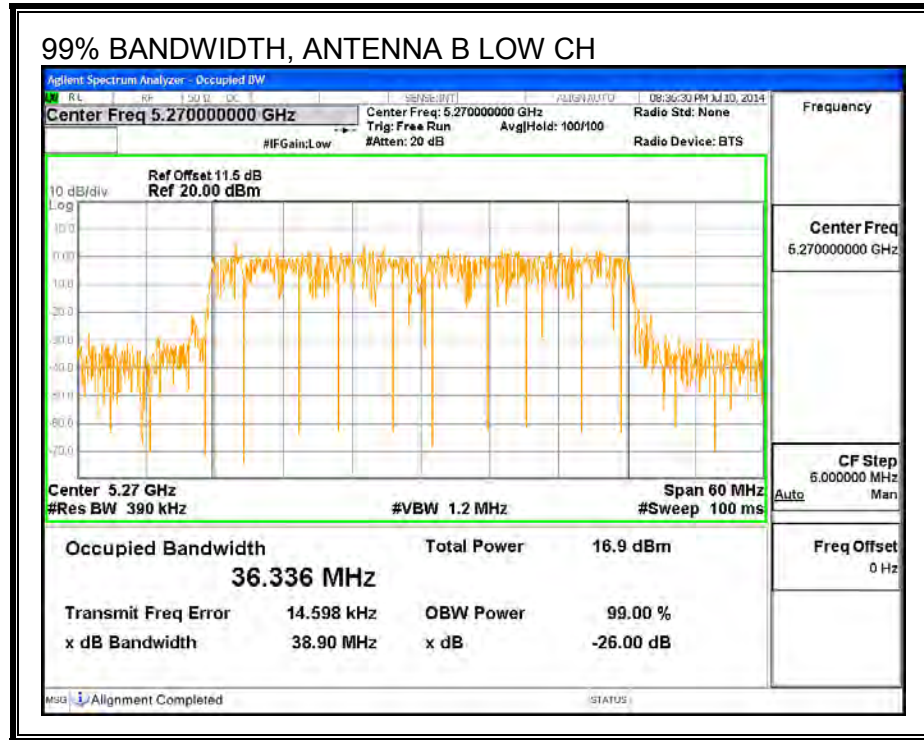
RESULTS

Channel	Frequency (MHz)	99% BW Antenna A (MHz)	99% BW Antenna B (MHz)
Low	5270	36.181	36.336
High	5310	36.267	36.174

99% BANDWIDTH, ANTENNA A



99% BANDWIDTH, ANTENNA B



9.14.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter. The power meter was setup for a gated power measurement.

The cable assembly insertion loss of 11.5 dB (including 10 dB pad and 1.5 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

RESULTS

Average Power Results

Channel	Frequency (MHz)	Antenna A Power (dBm)	Antenna B Power (dBm)	Total Power (dBm)
Low	5270	17.39	16.28	19.88
High	5310	13.46	13.48	16.48

9.14.4. OUTPUT POWER AND PSD

LIMITS

FCC §15.407 (a) (2)

For the band 5.25–5.35 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26–dB emission bandwidth in MHz. In addition, the maximum power spectral density shall not exceed 11 dBm 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.

TEST PROCEDURE

The transmitter output is connected to a power meter. The power meter was setup for a gated power measurement.

The cable assembly insertion loss of 11.5 dB (including 10 dB pad and 1.5 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

DIRECTIONAL ANTENNA GAIN

The TX chains are uncorrelated and the antenna gain is unequal among the chains. The directional gain is:

Antenna A	Antenna B	Uncorrelated Chains
Gain (dBi)	Gain (dBi)	Directional Gain (dBi)
3.434	3.875	3.66

The TX chains are correlated and the antenna gain is unequal among the chains. The directional gain is:

Antenna A	Antenna B	Correlated Chains
Gain (dBi)	Gain (dBi)	Directional Gain (dBi)
3.43	3.88	6.67

RESULTS

Bandwidth, Antenna Gain and Limits

Channel	Frequency (MHz)	Min 26 dB BW (MHz)	Directional Gain for Power (dBi)	Directional Gain for PSD (dBi)	Power Limit (dBm)	PSD Limit (dBm)
Low	5270	40.02	3.66	6.67	24.00	10.33
High	5310	39.78	3.66	6.67	24.00	10.33

Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd Power & PSD
--------------------	------	--

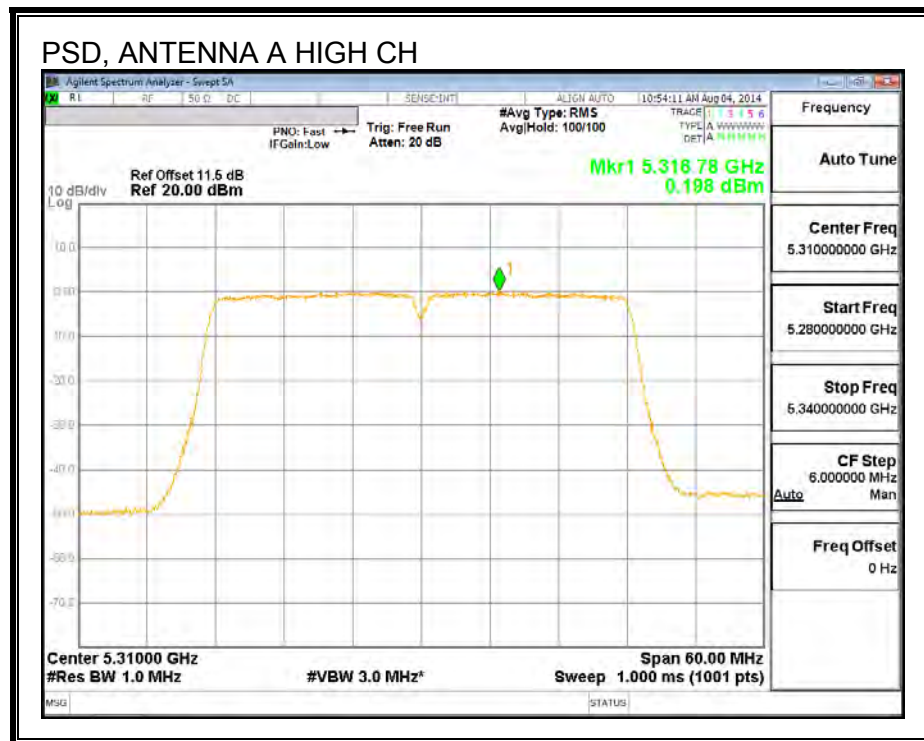
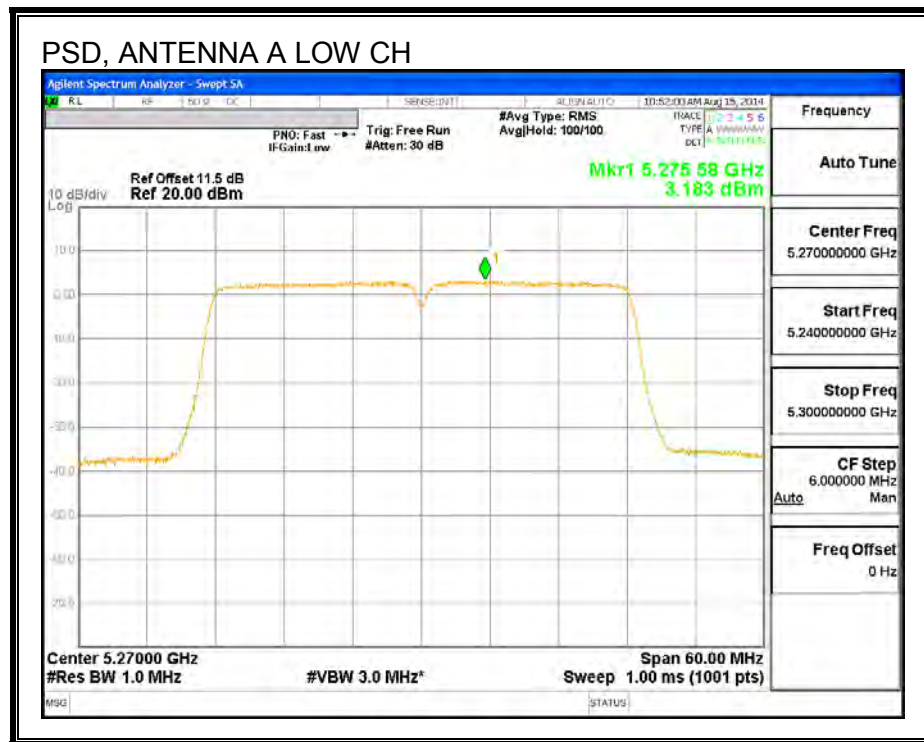
Output Power Results

Channel	Frequency (MHz)	Antenna A Meas Power (dBm)	Antenna B Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5270	17.39	16.28	19.88	24.00	-4.12
High	5310	13.46	13.48	16.48	24.00	-7.52

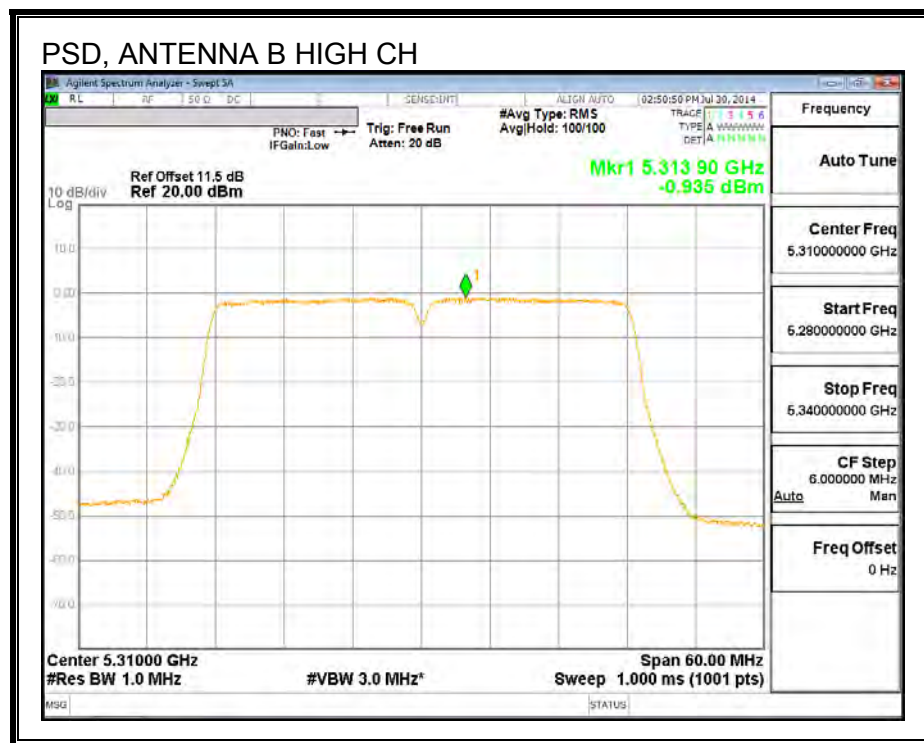
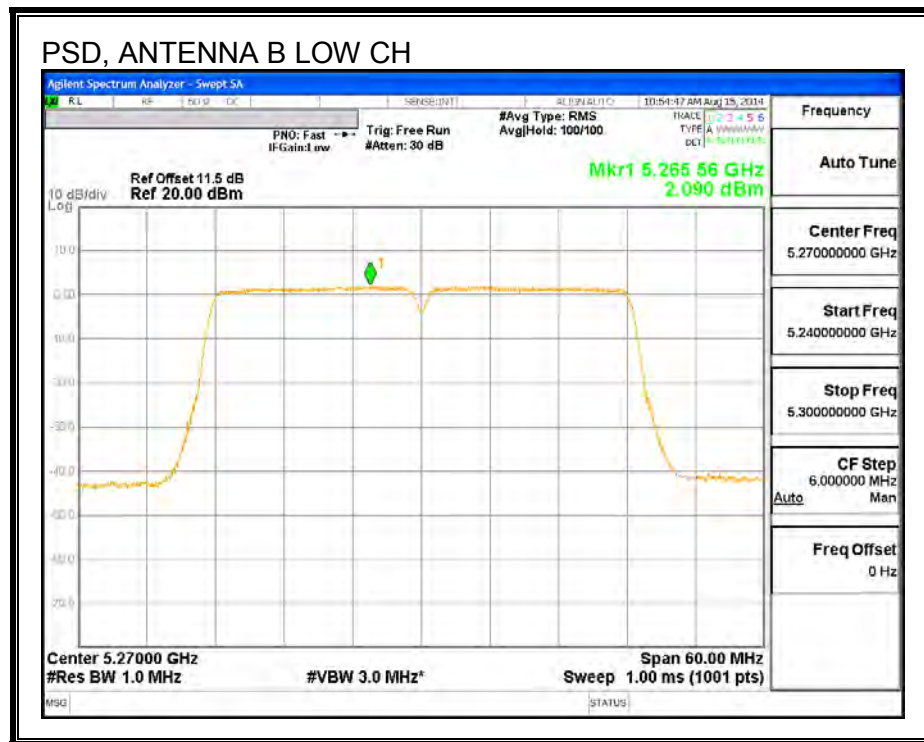
PSD Results

Channel	Frequency (MHz)	Antenna A Meas PSD (dBm)	Antenna B Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low	5270	3.18	2.09	5.68	10.33	-4.65
High	5310	0.20	-0.94	2.68	10.33	-7.65

PSD, ANTENNA A



PSD, ANTENNA B



9.15. 802.11n HT40 2TX STBC MODE IN THE 5.3 GHz BAND

9.15.1. 26 dB BANDWIDTH

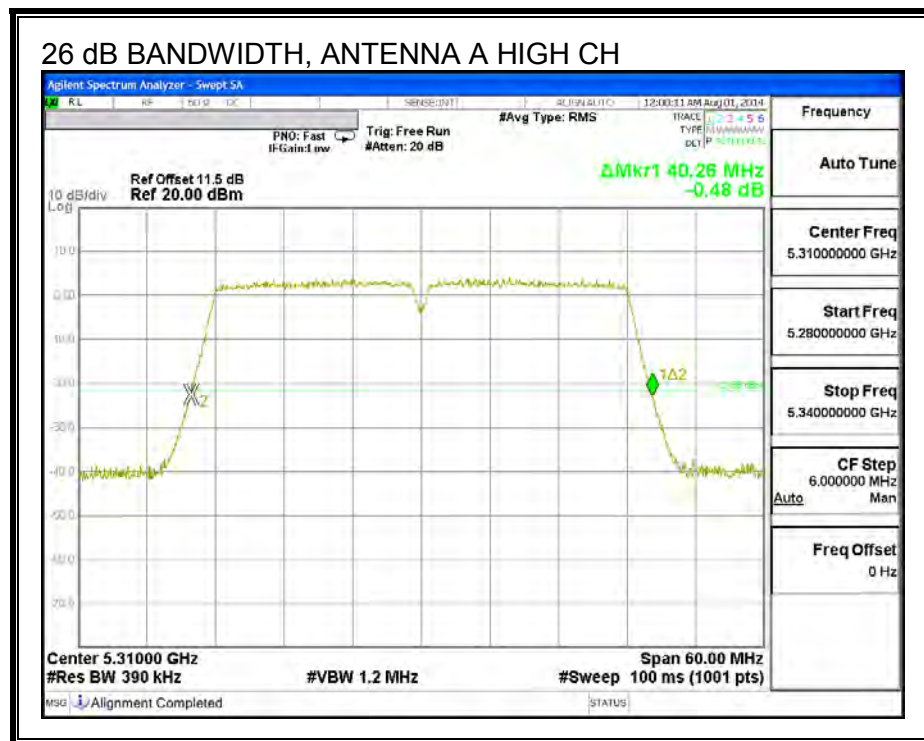
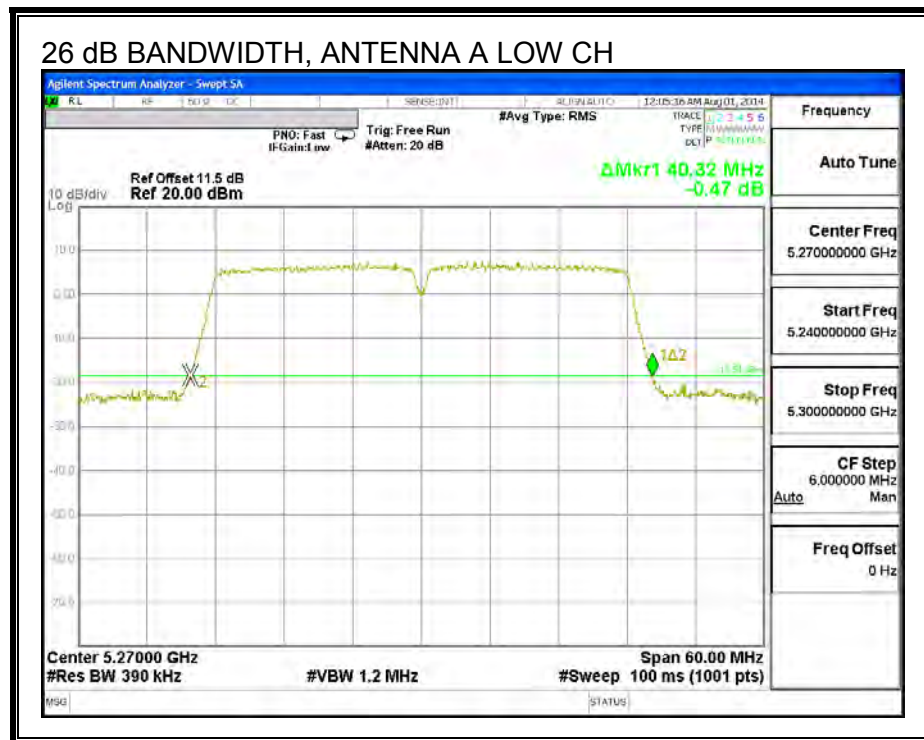
LIMITS

None; for reporting purposes only.

RESULTS

Channel	Frequency (MHz)	26 dB BW Antenna A (MHz)	26 dB BW Antenna B (MHz)
Low	5270	40.32	39.90
High	5310	40.26	39.84

26 dB BANDWIDTH, ANTENNA A



9.15.2. 99% BANDWIDTH

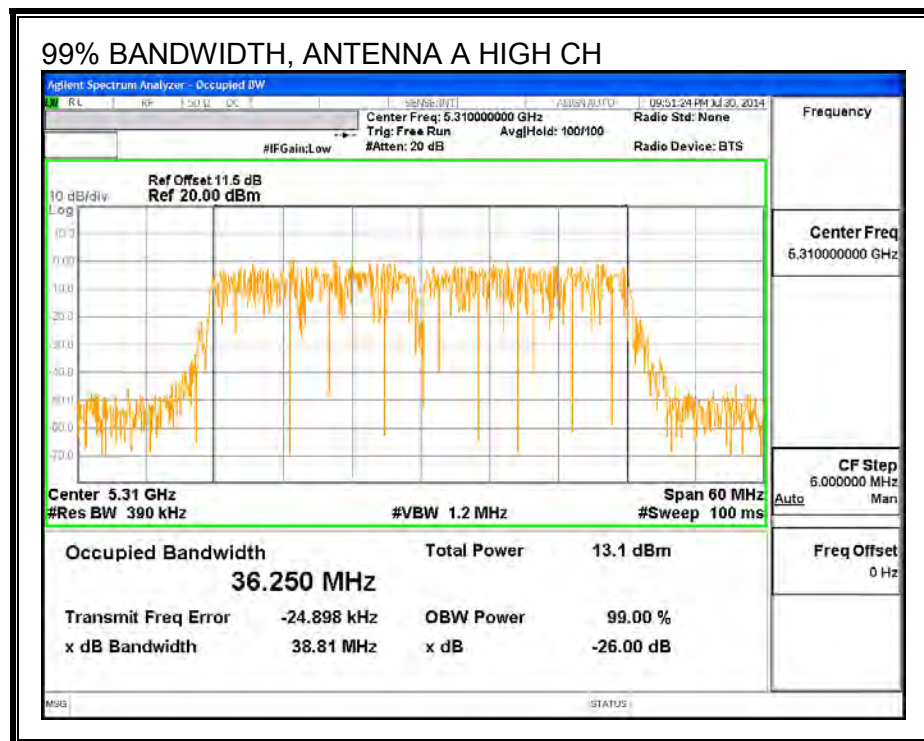
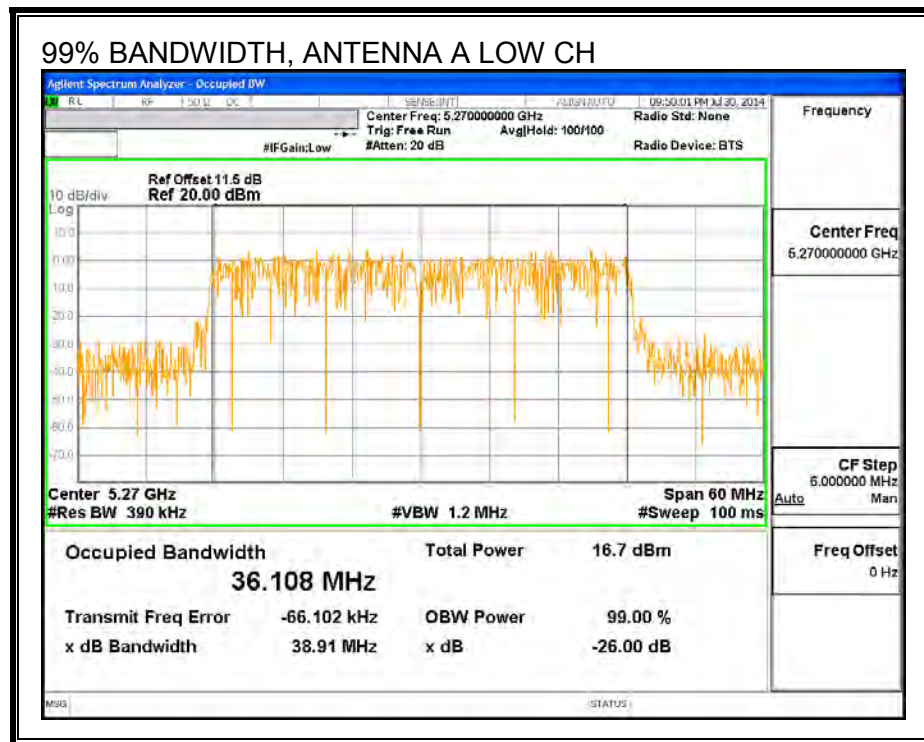
LIMITS

None; for reporting purposes only.

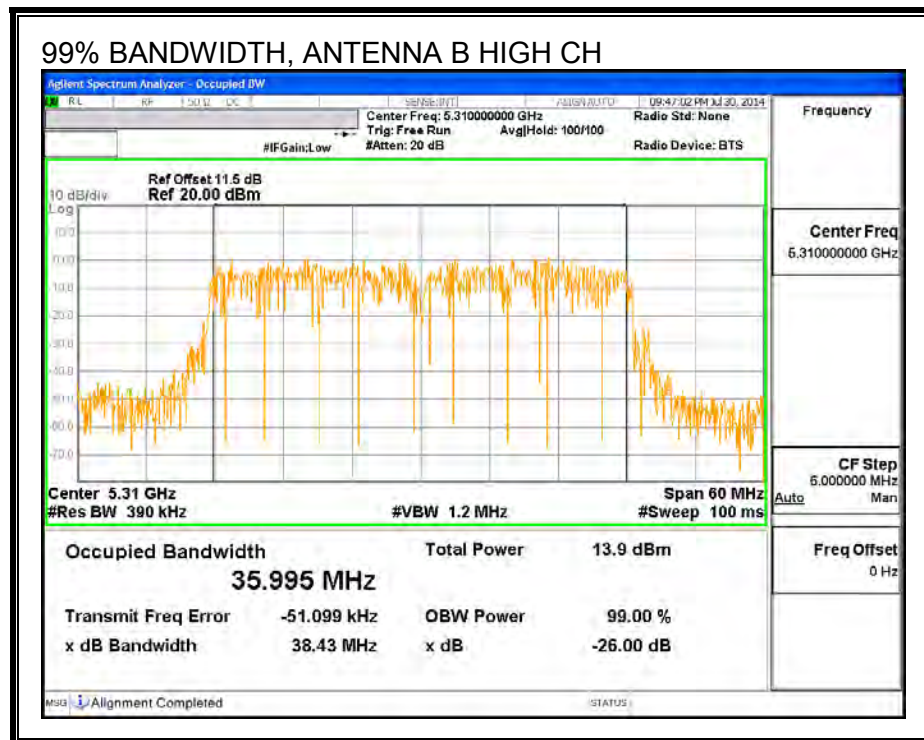
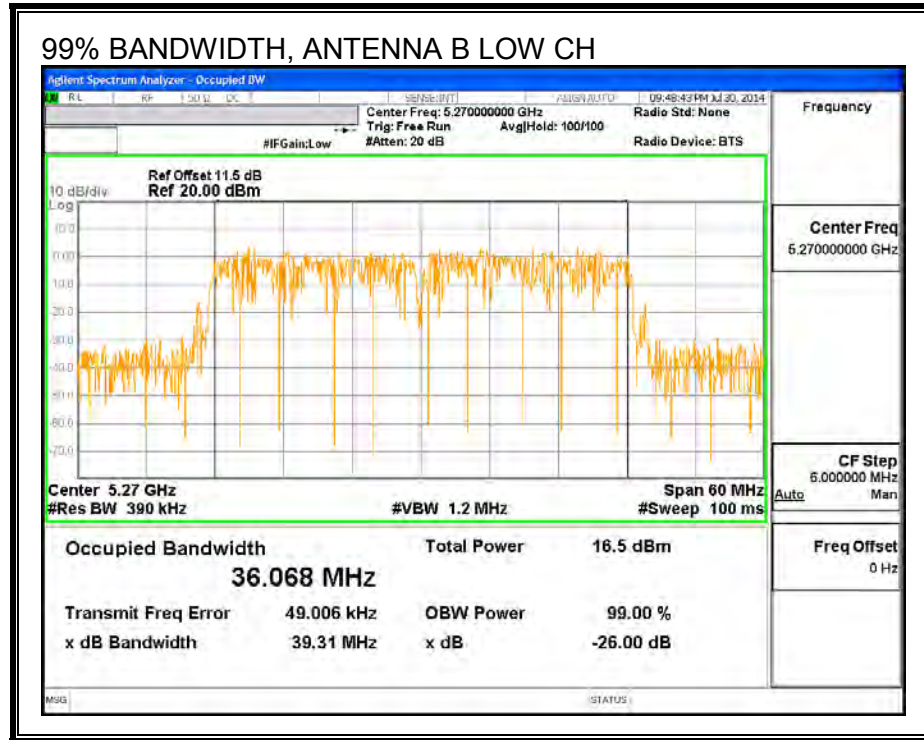
RESULTS

Channel	Frequency (MHz)	99% BW Antenna A (MHz)	99% BW Antenna B (MHz)
Low	5270	36.108	36.068
High	5310	36.250	35.995

99% BANDWIDTH, ANTENNA A



99% BANDWIDTH, ANTENNA B



9.15.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter. The power meter was setup for a gated power measurement.

The cable assembly insertion loss of 11.5 dB (including 10 dB pad and 1.5 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

RESULTS

Average Power Results

Channel	Frequency	Antenna A	Antenna B	Total
	(MHz)	Power (dBm)	Power (dBm)	Power (dBm)
Low	5270	17.95	16.34	20.23
High	5310	13.50	13.46	16.49

9.15.4. OUTPUT POWER AND PSD

LIMITS

FCC §15.407 (a) (2)

For the band 5.25–5.35 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW or $11 \text{ dBm} + 10 \log B$, where B is the 26–dB emission bandwidth in MHz. In addition, the maximum power spectral density shall not exceed 11 dBm 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.

TEST PROCEDURE

The transmitter output is connected to a power meter. The power meter was setup for a gated power measurement.

The cable assembly insertion loss of 11.5 dB (including 10 dB pad and 1.5 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

DIRECTIONAL ANTENNA GAIN

The TX chains are uncorrelated and the antenna gain is unequal among the chains. The directional gain is:

Antenna A	Antenna B	Uncorrelated Chains
Gain	Gain	Directional
(dBi)	(dBi)	Gain
(dBi)	(dBi)	(dBi)
3.434	3.875	3.66

RESULTS

Bandwidth, Antenna Gain and Limits

Channel	Frequency (MHz)	Min 26 dB BW (MHz)	Directional Gain for Power (dBi)	Directional Gain for PSD (dBi)	Power Limit (dBm)	PSD Limit (dBm)
Low	5270	39.90	3.66	3.66	24.00	11.00
High	5310	39.84	3.66	3.66	24.00	11.00

Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd Power & PSD
--------------------	------	--

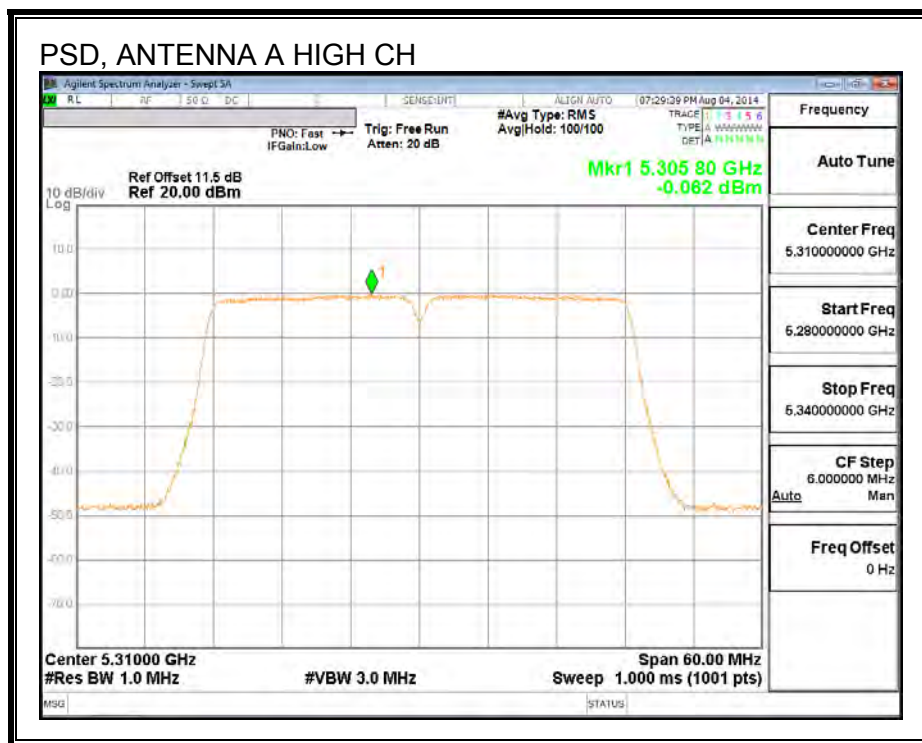
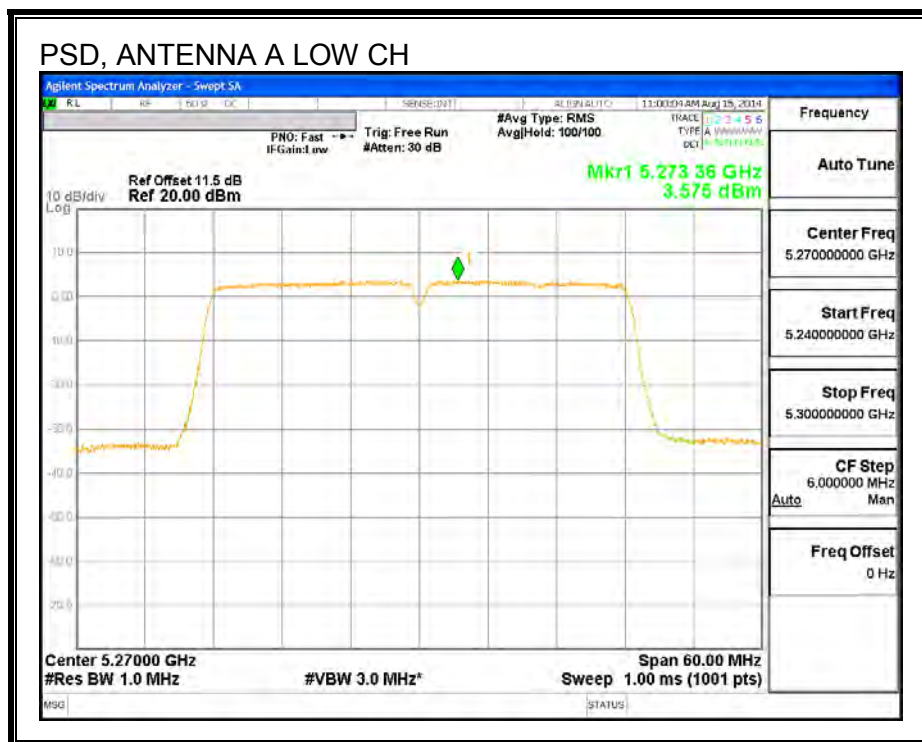
Output Power Results

Channel	Frequency (MHz)	Antenna A Meas Power (dBm)	Antenna B Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5270	17.95	16.34	20.23	24.00	-3.77
High	5310	13.50	13.46	16.49	24.00	-7.51

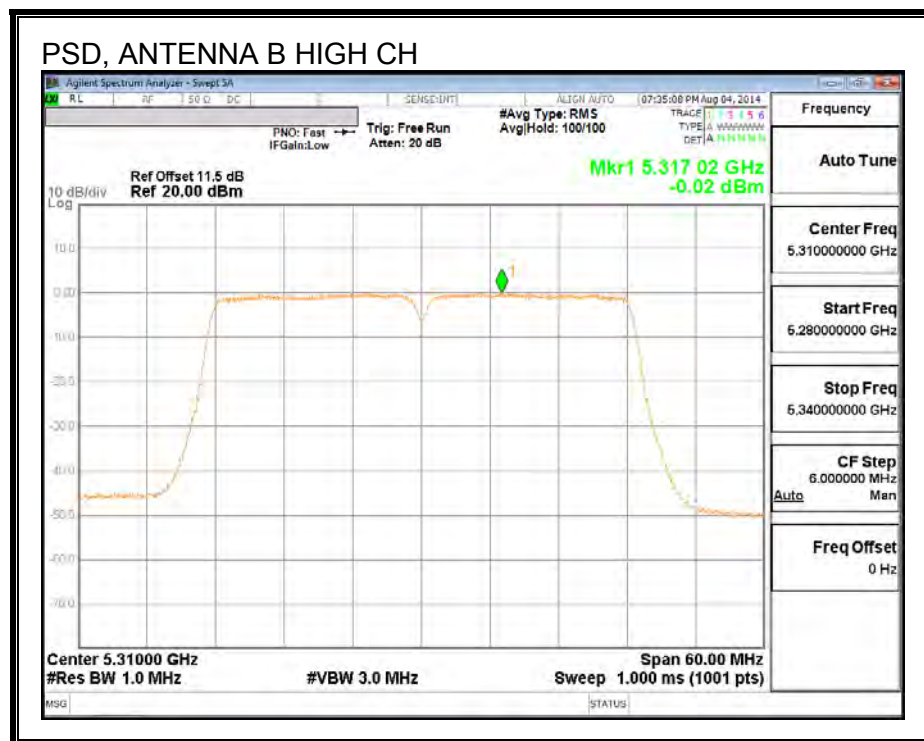
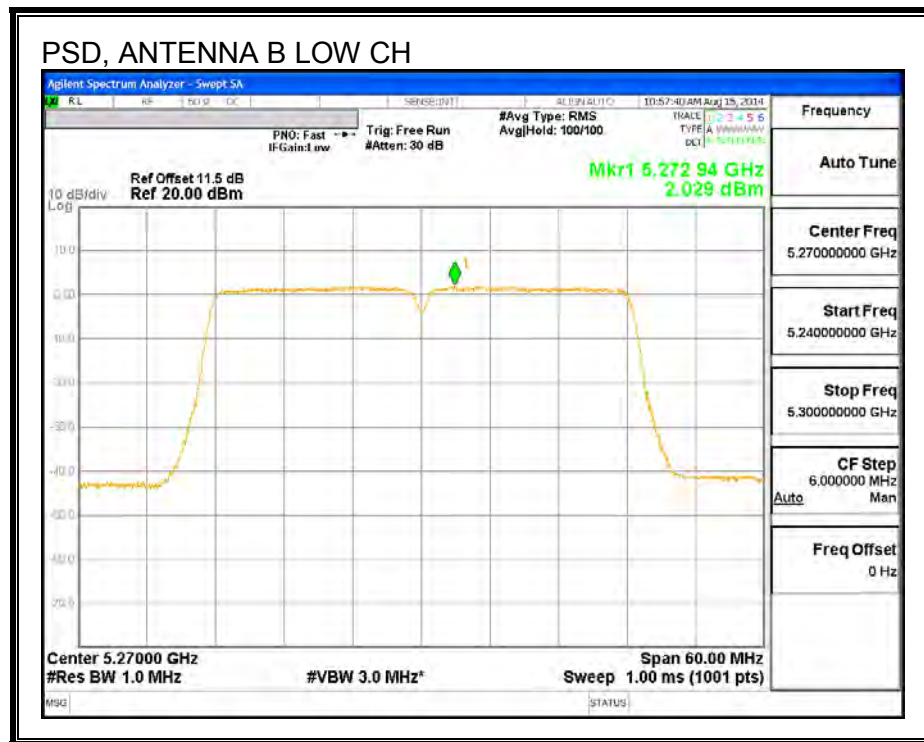
PSD Results

Channel	Frequency (MHz)	Antenna A Meas PSD (dBm)	Antenna B Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low	5270	3.58	2.03	5.88	11.00	-5.12
High	5310	-0.06	-0.02	2.97	11.00	-8.03

PSD, ANTENNA A



PSD, ANTENNA B



9.16. 802.11ac VHT80 MODE IN THE 5.3 GHz BAND

9.16.1. 26 dB BANDWIDTH

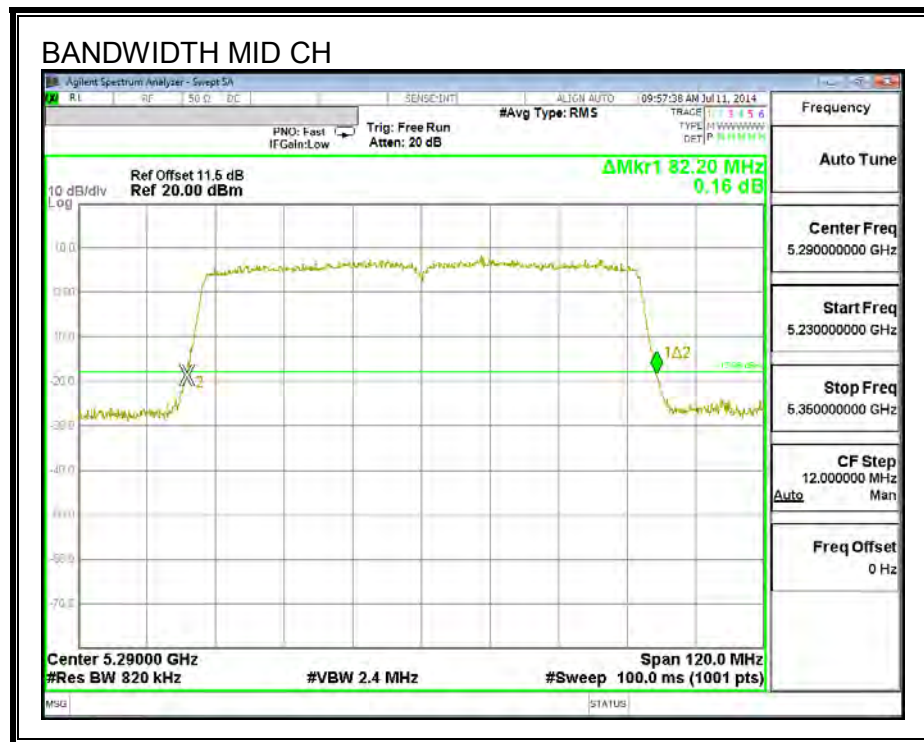
LIMITS

None; for reporting purposes only.

RESULTS

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Mid	5290	82.20

26 dB BANDWIDTH



9.16.2. 99% BANDWIDTH

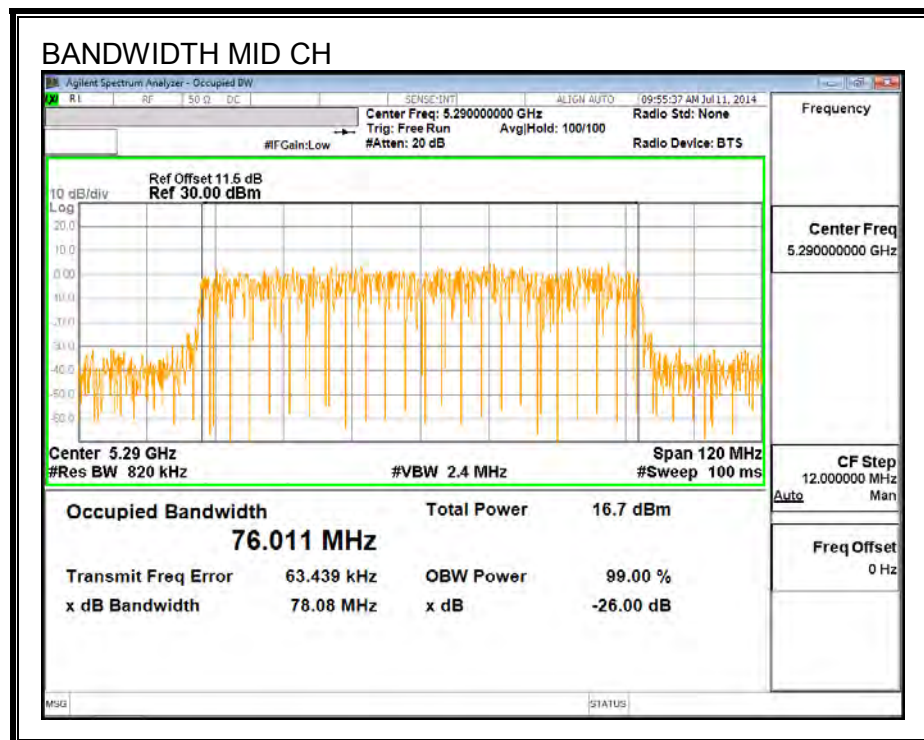
LIMITS

None; for reporting purposes only.

RESULTS

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Mid	5290	76.011

99% BANDWIDTH



9.16.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter. The power meter was setup for a gated power measurement.

The cable assembly insertion loss of 11.5 dB (including 10 dB pad and 1.5 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

RESULTS

Channel	Frequency (MHz)	Antenna A Power (dBm)	Antenna B Power (dBm)
Mid	5290	13.44	13.42