



**FCC 47 CFR PART 15 SUBPART E
CERTIFICATION TEST REPORT**

FOR

TABLET DEVICE

MODEL NUMBER: A1652

FCC ID: BCGA1652

REPORT NUMBER: 14U19185-E9V4

ISSUE DATE: SEPTEMBER 14, 2015

Prepared for
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NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
V1	09/03/2015	Initial Review	M. Mekuria
V2	09/09/2015	Revised Report to Address TCB's Questions	C. Pang
V3	09/10/2015	Updated Antenna Gain	J.Vang
V4	09/14/2015	Revised Reports to Address TCB's Questions	T. Chu

TABLE OF CONTENTS

1. ATTESTATION OF TEST RESULTS	12
2. TEST METHODOLOGY	13
3. FACILITIES AND ACCREDITATION	13
4. CALIBRATION AND UNCERTAINTY	14
4.1. MEASURING INSTRUMENT CALIBRATION	14
4.2. SAMPLE CALCULATION	14
4.3. MEASUREMENT UNCERTAINTY	14
5. EQUIPMENT UNDER TEST.....	15
5.1. DESCRIPTION OF EUT.....	15
5.2. MAXIMUM OUTPUT POWER	15
5.3. DESCRIPTION OF AVAILABLE ANTENNAS.....	18
5.4. SOFTWARE AND FIRMWARE	18
5.5. WORST-CASE CONFIGURATION AND MODE.....	19
5.6. DESCRIPTION OF TEST SETUP	20
6. TEST AND MEASUREMENT EQUIPMENT	25
7. ON TIME, DUTY CYCLE AND MEASUREMENT METHODS	26
7.1. ON TIME AND DUTY CYCLE.....	26
7.2. MEASUREMENT METHODS.....	30
8. ANTENNA PORT TEST RESULTS.....	31
8.1. 802.11a SISO MODE IN THE 5.2 GHz BAND	31
8.2. 802.11n HT20 CHAIN 0 MODE IN THE 5.2 GHz BAND	32
8.2.1. 26 dB BANDWIDTH	32
8.2.2. 99% BANDWIDTH.....	35
8.2.3. AVERAGE POWER.....	38
8.2.4. OUTPUT POWER AND PSD	39
8.3. 802.11n HT20 CHAIN 1 MODE IN THE 5.2 GHz BAND	43
8.3.1. 26 dB BANDWIDTH	43
8.3.2. 99% BANDWIDTH.....	46
8.3.3. AVERAGE POWER.....	49
8.3.4. OUTPUT POWER AND PSD	50
8.4. 802.11a CDD 2TX MODE IN THE 5.2 GHz BAND	54
8.5. 802.11n HT20 2Tx CDD MODE IN THE 5.2 GHz BAND	55
8.5.1. 26 dB BANDWIDTH	55
8.5.2. 99% BANDWIDTH.....	59
8.5.3. AVERAGE POWER.....	63
8.5.4. OUTPUT POWER AND PSD	64

8.6.	802.11n HT20 2Tx STBC MODE IN THE 5.2 GHz BAND.....	70
8.6.1.	26 dB BANDWIDTH	70
8.6.2.	99% BANDWIDTH.....	74
8.6.3.	AVERAGE POWER.....	78
8.6.4.	OUTPUT POWER AND PSD	79
8.7.	802.11n HT20 2Tx SDM MODE IN THE 5.2 GHz BAND	85
8.9.	802.11n HT40 CHAIN 0 MODE IN THE 5.2 GHz BAND	86
8.9.1.	26 dB BANDWIDTH	86
8.9.2.	99% BANDWIDTH.....	88
8.9.3.	AVERAGE POWER.....	90
8.9.4.	OUTPUT POWER AND PSD	91
8.10.	802.11n HT40 CHAIN 1 MODE IN THE 5.2 GHz BAND	94
8.10.1.	26 dB BANDWIDTH.....	94
8.10.2.	99% BANDWIDTH	96
8.10.3.	AVERAGE POWER	98
8.10.4.	OUTPUT POWER AND PSD	99
8.11.	802.11n HT40 2Tx CDD MODE IN THE 5.2 GHz BAND	102
8.11.1.	26 dB BANDWIDTH.....	102
8.11.2.	99% BANDWIDTH	105
8.11.3.	AVERAGE POWER	108
8.11.4.	OUTPUT POWER AND PSD	109
8.12.	802.11n HT40 2Tx STBC MODE IN THE 5.2 GHz BAND	114
8.12.1.	26 dB BANDWIDTH.....	114
8.12.2.	99% BANDWIDTH	117
8.12.3.	AVERAGE POWER	120
8.12.4.	OUTPUT POWER AND PSD	121
8.13.	802.11n HT40 2Tx SDM MODE IN THE 5.2 GHz BAND.....	126
8.15.	802.11ac VHT80 CHAIN 0 MODE IN THE 5.2 GHz BAND	127
8.15.1.	26 dB BANDWIDTH.....	127
8.15.2.	99% BANDWIDTH	128
8.15.3.	AVERAGE POWER	129
8.15.4.	OUTPUT POWER AND PSD	130
8.16.	802.11ac VHT80 CHAIN 1 MODE IN THE 5.2 GHz BAND	133
8.16.1.	26 dB BANDWIDTH.....	133
8.16.2.	99% BANDWIDTH	134
8.16.3.	AVERAGE POWER	135
8.16.4.	OUTPUT POWER AND PSD	136
8.17.	802.11ac VHT80 2Tx CDD MODE IN THE 5.2 GHz BAND.....	139
8.17.1.	26 dB BANDWIDTH.....	139
8.17.2.	99% BANDWIDTH	141
8.17.3.	AVERAGE POWER	143
8.17.4.	OUTPUT POWER AND PSD	144
8.18.	802.11ac HT80 2Tx STBC/SDM MODE IN THE 5.2 GHz BAND.....	148
8.19.	802.11a SISO MODE IN THE 5.3 GHz BAND.....	149
8.20.	802.11n HT20 CHAIN 0 MODE IN THE 5.3 GHz BAND	150
8.20.1.	26 dB BANDWIDTH.....	150
8.20.2.	99% BANDWIDTH	153

8.20.3.	AVERAGE POWER	156
8.20.4.	OUTPUT POWER AND PSD	157
8.21.	<i>802.11n HT20 CHAIN 1 MODE IN THE 5.3 GHz BAND</i>	<i>161</i>
8.21.1.	26 dB BANDWIDTH	161
8.21.2.	99% BANDWIDTH	164
8.21.3.	AVERAGE POWER	167
8.21.4.	OUTPUT POWER AND PSD	168
8.22.	<i>802.11a CDD 2TX MODE IN THE 5.3 GHz BAND</i>	<i>172</i>
8.23.	<i>802.11n HT20 2Tx CDD MODE IN THE 5.3 GHz BAND</i>	<i>173</i>
8.23.1.	26 dB BANDWIDTH	173
8.23.2.	99% BANDWIDTH	177
8.23.3.	AVERAGE POWER	181
8.23.4.	OUTPUT POWER AND PSD	182
8.24.	<i>802.11n HT20 2Tx STBC MODE IN THE 5.3 GHz BAND</i>	<i>187</i>
8.24.1.	26 dB BANDWIDTH	187
8.24.2.	99% BANDWIDTH	191
8.24.3.	AVERAGE POWER	195
8.24.4.	OUTPUT POWER AND PSD	196
8.25.	<i>802.11n HT20 2Tx SDM MODE IN THE 5.3 GHz BAND</i>	<i>201</i>
8.26.	<i>802.11n HT40 CHAIN 0 MODE IN THE 5.3 GHz BAND</i>	<i>202</i>
8.26.1.	26 dB BANDWIDTH	202
8.26.2.	99% BANDWIDTH	204
8.26.3.	AVERAGE POWER	206
8.26.4.	OUTPUT POWER AND PSD	207
8.27.	<i>802.11n HT40 CHAIN 1 MODE IN THE 5.3 GHz BAND</i>	<i>210</i>
8.27.1.	26 dB BANDWIDTH	210
8.27.2.	99% BANDWIDTH	212
8.27.3.	AVERAGE POWER	214
8.27.4.	OUTPUT POWER AND PSD	215
8.28.	<i>802.11n HT40 2Tx CDD MODE IN THE 5.3 GHz BAND</i>	<i>218</i>
8.28.1.	26 dB BANDWIDTH	218
8.28.2.	99% BANDWIDTH	221
8.28.3.	AVERAGE POWER	224
8.28.4.	OUTPUT POWER AND PSD	225
8.29.	<i>802.11n HT40 2Tx STBC MODE IN THE 5.3 GHz BAND</i>	<i>229</i>
8.29.1.	26 dB BANDWIDTH	229
8.29.2.	99% BANDWIDTH	232
8.29.3.	AVERAGE POWER	235
8.29.4.	OUTPUT POWER AND PSD	236
8.30.	<i>802.11n HT40 2Tx SDM MODE IN THE 5.3 GHz BAND</i>	<i>240</i>
8.31.	<i>802.11ac VHT80 CHAIN 0 MODE IN THE 5.3 GHz BAND</i>	<i>241</i>
8.31.1.	26 dB BANDWIDTH	241
8.31.2.	99% BANDWIDTH	242
8.31.3.	AVERAGE POWER	243
8.31.4.	OUTPUT POWER AND PSD	244
8.32.	<i>802.11ac VHT80 CHAIN 1 MODE IN THE 5.3 GHz BAND</i>	<i>247</i>
8.32.1.	26 dB BANDWIDTH	247

8.32.2.	99% BANDWIDTH	248
8.32.3.	AVERAGE POWER	249
8.32.4.	OUTPUT POWER AND PSD	250
8.33.	<i>802.11ac VHT80 2Tx CDD MODE IN THE 5.3 GHz BAND</i>	253
8.33.1.	26 dB BANDWIDTH	253
8.33.2.	99% BANDWIDTH	255
8.33.3.	AVERAGE POWER	257
8.33.4.	OUTPUT POWER AND PSD	258
8.34.	<i>802.11ac VHT80 2Tx STBC/SDM MODE IN THE 5.3 GHz BAND</i>	261
8.35.	<i>802.11a SISO MODE IN THE 5.6 GHz BAND</i>	262
8.36.	<i>802.11n HT20 CHAIN 0 MODE IN THE 5.6 GHz BAND</i>	263
8.36.1.	26 dB BANDWIDTH	263
8.36.2.	99% BANDWIDTH	266
8.36.3.	AVERAGE POWER	269
8.36.4.	OUTPUT POWER AND PSD	270
8.36.5.	STRADDLE CHANNEL 144 RESULTS	274
8.36.6.	6 dB BANDWIDTH	278
8.37.	<i>802.11n HT20 CHAIN 1 MODE IN THE 5.6 GHz BAND</i>	279
8.37.1.	26 dB BANDWIDTH	279
8.37.2.	99% BANDWIDTH	282
8.37.3.	AVERAGE POWER	285
8.37.4.	OUTPUT POWER AND PSD	286
8.37.5.	STRADDLE CHANNEL 144 RESULTS	290
8.37.6.	6 dB BANDWIDTH	294
8.38.	<i>802.11a CDD 2TX MODE IN THE 5.6 GHz BAND</i>	295
8.39.	<i>802.11n HT20 2Tx CDD MODE IN THE 5.6 GHz BAND</i>	296
8.39.1.	26 dB BANDWIDTH	296
8.39.2.	99% BANDWIDTH	301
8.39.3.	AVERAGE POWER	306
8.39.4.	OUTPUT POWER AND PSD	307
8.39.5.	STRADDLE CHANNEL 144 RESULTS	312
8.39.6.	6 dB BANDWIDTH	317
8.40.	<i>802.11n HT20 2Tx STBC/SDM MODE IN THE 5.6 GHz BAND</i>	319
8.41.	<i>802.11n HT40 CHAIN 0 MODE IN THE 5.6 GHz BAND</i>	320
8.41.1.	26 dB BANDWIDTH	320
8.41.2.	99% BANDWIDTH	323
8.41.3.	AVERAGE POWER	326
8.41.4.	OUTPUT POWER AND PSD	327
8.41.5.	STRADDLE CH 142 RESULTS	331
8.41.6.	6 dB BANDWIDTH	335
8.42.	<i>802.11n HT40 CHAIN 1 MODE IN THE 5.6 GHz BAND</i>	336
8.42.1.	26 dB BANDWIDTH	336
8.42.2.	99% BANDWIDTH	339
8.42.3.	AVERAGE POWER	342
8.42.4.	OUTPUT POWER AND PSD	343
8.42.5.	STRADDLE CH 142 RESULTS	347
8.42.6.	6 dB BANDWIDTH	351
8.43.	<i>802.11n HT40 2Tx CDD MODE IN THE 5.6 GHz BAND</i>	352

8.43.1.	26 dB BANDWIDTH	352
8.43.2.	99% BANDWIDTH	357
8.43.3.	AVERAGE POWER	362
8.43.4.	OUTPUT POWER AND PSD	363
8.43.5.	STRADDLE CHANNEL 142 RESULTS.....	368
8.43.6.	6 dB BBANDWIDTH	373
8.44.	<i>802.11n HT40 2Tx STBC/SDM MODE IN THE 5.6 GHz BAND</i>	<i>375</i>
8.45.	<i>802.11ac VHT80 CHAIN 0 MODE IN THE 5.6 GHz BAND</i>	<i>376</i>
8.45.1.	26 dB BANDWIDTH	376
8.45.2.	99% BANDWIDTH	379
8.45.3.	AVERAGE POWER	382
8.45.4.	OUTPUT POWER AND PSD	383
8.45.5.	STRADDLE CHANNEL 138 RESULTS.....	386
8.45.6.	6 dB BANDWIDTH.....	390
8.46.	<i>802.11ac VHT80 CHAIN 1 MODE IN THE 5.6 GHz BAND</i>	<i>391</i>
8.46.1.	26 dB BANDWIDTH.....	391
8.46.2.	99% BANDWIDTH	394
8.46.3.	AVERAGE POWER	397
8.46.4.	OUTPUT POWER AND PSD	398
8.46.5.	STRADDLE CHANNEL 138 RESULTS.....	401
8.46.6.	6 dB BANDWIDTH.....	405
8.47.	<i>802.11ac VHT80 2Tx CDD MODE IN THE 5.6 GHz BAND (5610MHz for FCC only).....</i>	<i>406</i>
8.47.1.1.	26 dB BANDWIDTH.....	406
8.47.2.	99% BANDWIDTH	410
8.47.3.	AVERAGE POWER	414
8.47.4.	OUTPUT POWER AND PSD	415
8.47.5.	STRADDLE CHANNEL 138 RESULTS.....	419
8.47.6.	6 dB BANDWIDTH.....	424
8.48.	<i>802.11ac VHT80 2Tx STBC/SDM MODE IN THE 5.6 GHz BAND (5610MHz for FCC only) 426</i>	
8.49.	<i>802.11a SISO MODE IN THE 5.8 GHz BAND.....</i>	<i>427</i>
8.50.	<i>802.11n HT20 CHAIN 0 MODE IN THE 5.8 GHz BAND</i>	<i>428</i>
8.50.1.	6 dB BANDWIDTH.....	428
8.50.2.	26 dB BANDWIDTH.....	431
8.50.3.	99% BANDWIDTH	434
8.50.4.	AVERAGE POWER	437
8.50.5.	OUTPUT POWER.....	438
8.50.6.	PSD	440
8.51.	<i>802.11n HT20 CHAIN 1 MODE IN THE 5.8 GHz BAND</i>	<i>443</i>
8.51.1.	6 dB BANDWIDTH.....	443
8.51.2.	26 dB BANDWIDTH.....	446
8.51.3.	99% BANDWIDTH	449
8.51.4.	AVERAGE POWER	452
8.51.5.	OUTPUT POWER.....	453
8.51.6.	PSD	455
8.52.	<i>802.11a CDD 2TX MODE IN THE 5.8 GHz BAND.....</i>	<i>458</i>
8.53.	<i>802.11n HT20 2Tx CDD MODE IN THE 5.8 GHz BAND.....</i>	<i>459</i>
8.53.1.	6 dB BANDWIDTH.....	459

8.53.2.	26 dB BANDWIDTH	463
8.53.3.	99% BANDWIDTH	467
8.53.4.	AVERAGE POWER	471
8.53.5.	OUTPUT POWER.....	472
8.53.6.	PSD	474
8.54.	802.11n HT20 2Tx STBC/SDM MODE IN THE 5.8 GHz BAND	479
8.55.	802.11n HT40 CHAIN 0 MODE IN THE 5.8 GHz BAND	480
8.55.1.	6 dB BANDWIDTH.....	480
8.55.2.	26 dB BANDWIDTH.....	482
8.55.3.	99% BANDWIDTH	484
8.55.4.	AVERAGE POWER	486
8.55.5.	OUTPUT POWER.....	487
8.55.6.	PSD	489
8.56.	802.11n HT40 CHAIN 1 MODE IN THE 5.8 GHz BAND	492
8.56.1.	6 dB BANDWIDTH.....	492
8.56.2.	26 dB BANDWIDTH.....	494
8.56.3.	99% BANDWIDTH	496
8.56.4.	AVERAGE POWER	498
8.56.5.	OUTPUT POWER.....	499
8.56.6.	PSD	501
8.57.	802.11n HT40 2Tx CDD MODE IN THE 5.8 GHz BAND	504
8.57.1.	6 dB BANDWIDTH.....	504
8.57.2.	26 dB BANDWIDTH.....	507
8.57.3.	99% BANDWIDTH	510
8.57.4.	AVERAGE POWER	513
8.57.5.	OUTPUT POWER.....	514
8.57.6.	PSD	516
8.58.	802.11n HT40 2Tx STBC/SDM MODE IN THE 5.8 GHz BAND	520
8.59.	802.11ac VHT80 CHAIN 0 MODE IN THE 5.8 GHz BAND	521
8.59.1.	6 dB BANDWIDTH.....	521
8.59.2.	26 dB BANDWIDTH.....	522
8.59.3.	99% BANDWIDTH	523
8.59.4.	AVERAGE POWER	524
8.59.5.	OUTPUT POWER.....	525
8.59.6.	PSD	527
8.60.	802.11ac VHT80 CHAIN 1 MODE IN THE 5.8 GHz BAND	529
8.60.1.	6 dB BANDWIDTH.....	529
8.60.2.	26 dB BANDWIDTH.....	530
8.60.3.	99% BANDWIDTH	531
8.60.4.	AVERAGE POWER	532
8.60.5.	OUTPUT POWER.....	533
8.60.6.	PSD	534
8.61.	802.11ac VHT80 2Tx CDD MODE IN THE 5.8 GHz BAND.....	536
8.61.1.	6 dB BANDWIDTH.....	536
8.61.2.	26 dB BANDWIDTH.....	538
8.61.3.	99% BANDWIDTH	540
8.61.4.	AVERAGE POWER	542
8.61.5.	OUTPUT POWER.....	543
8.61.6.	PSD	544

8.62.	802.11ac VHT80 2Tx STBC/SDM MODE IN THE 5.8 GHz BAND	546
9.	RADIATED TEST RESULTS	547
9.1.	LIMITS AND PROCEDURE.....	547
9.1.	802.11n HT20 1Tx MODE IN THE 5.2 GHz BAND	548
9.2.	802.11n HT20 2Tx CDD MODE IN THE 5.2 GHz BAND	564
9.3.	802.11n HT40 1Tx MODE IN THE 5.2 GHz BAND	572
9.4.	802.11n HT40 2Tx CDD MODE IN THE 5.2 GHz BAND	584
9.5.	802.11ac VHT80 1Tx MODE IN THE 5.2 GHz BAND	590
9.6.	802.11ac VHT80 2Tx CDD MODE IN THE 5.2 GHz BAND	598
9.7.	802.11n HT20 1Tx MODE IN THE 5.3 GHz BAND	602
9.8.	802.11n HT20 2Tx CDD MODE IN THE 5.3 GHz BAND	618
9.9.	802.11n HT40 1Tx MODE IN THE 5.3 GHz BAND	626
9.10.	802.11n HT40 2Tx CDD MODE IN THE 5.3 GHz BAND	638
9.11.	802.11ac VHT80 1Tx MODE IN THE 5.3 GHz BAND	644
9.12.	802.11ac VHT80 2Tx CDD MODE IN THE 5.3 GHz BAND	652
9.13.	802.11n HT20 1Tx MODE IN THE 5.6 GHz BAND	656
9.14.	802.11n HT20 2Tx CDD MODE IN THE 5.6 GHz BAND	680
9.15.	802.11n HT40 1Tx MODE IN THE 5.6 GHz BAND	692
9.16.	802.11n HT40 2Tx CDD MODE IN THE 5.6 GHz BAND	716
9.17.	802.11ac VHT80 1Tx MODE IN THE 5.6 GHz BAND	728
9.18.	802.11ac VHT80 2Tx CDD MODE IN THE 5.6 GHz BAND	744
9.19.	802.11n HT20 1Tx MODE IN THE 5.8 GHz BAND	752
9.20.	802.11n HT20 2Tx CDD MODE IN THE 5.8 GHz BAND	772
9.21.	802.11n HT40 1Tx MODE IN THE 5.8 GHz BAND	782
9.22.	802.11n HT40 2Tx CDD MODE IN THE 5.8 GHz BAND	798
9.23.	802.11ac VHT80 1Tx MODE IN THE 5.8 GHz BAND	806
9.24.	802.11ac VHT80 2Tx CDD MODE IN THE 5.8 GHz BAND	818
9.25.	WORST CASE CO-LOCATION	824
9.26.	WORST-CASE BELOW 1 GHz	828
9.27.	WORST-CASE ABOVE 18 GHz	830
10.	AC POWER LINE CONDUCTED EMISSIONS	834
10.1.	EUT POWERED BY AC ADAPTER	835
10.2.	EUT POWERED BY HOST PC VIA USB CABLE	837
11.	DYNAMIC FREQUENCY SELECTION	839
11.1.	OVERVIEW	839
11.1.1.	LIMITS	839

11.1.1.	TEST AND MEASUREMENT SYSTEM	843
11.1.2.	SETUP OF EUT (CLIENT MODE)	846
11.1.3.	SETUP OF EUT (CLIENT-TO-CLIENT COMMUNICATIONS MODE).....	847
11.1.4.	DESCRIPTION OF EUT	848
11.2.	CLIENT MODE RESULTS FOR 20 MHz BANDWIDTH	850
11.2.1.	TEST CHANNEL.....	850
11.2.2.	RADAR WAVEFORM AND TRAFFIC	850
11.2.3.	OVERLAPPING CHANNEL TESTS	853
11.2.4.	MOVE AND CLOSING TIME	853
11.3.	CLIENT MODE RESULTS FOR 40 MHz BANDWIDTH	857
11.3.1.	TEST CHANNEL.....	857
11.3.2.	RADAR WAVEFORM AND TRAFFIC	857
11.3.3.	OVERLAPPING CHANNEL TESTS	860
11.3.4.	MOVE AND CLOSING TIME	860
11.3.5.	10-MINUTE CLIENT Tx MONITORING PERIOD	864
11.4.	CLIENT MODE RESULTS FOR 80 MHz BANDWIDTH	865
11.4.1.	TEST CHANNEL.....	865
11.4.2.	RADAR WAVEFORM AND TRAFFIC	865
11.4.3.	OVERLAPPING CHANNEL TESTS	868
11.4.4.	MOVE AND CLOSING TIME	868
11.4.5.	10-MINUTE CLIENT Tx MONITORING PERIOD	872
11.5.	-CLIENT-TO-CLIENT COMMUNICATIONS MODE RESULTS FOR 20 MHz BANDWIDTH 873	
11.5.1.	TEST CHANNEL.....	873
11.5.2.	RADAR WAVEFORM AND TRAFFIC	873
11.5.3.	OVERLAPPING CHANNEL TESTS	876
11.5.4.	MOVE AND CLOSING TIME	876
11.6.	CLIENT-TO-CLIENT COMMUNICATIONS MODE RESULTS FOR 40 MHz BANDWIDTH 880	
11.6.1.	TEST CHANNEL.....	880
11.6.2.	RADAR WAVEFORM AND TRAFFIC	880
11.6.3.	OVERLAPPING CHANNEL TESTS	883
11.6.4.	MOVE AND CLOSING TIME	883
11.6.5.	10-MINUTE CLIENT Tx MONITORING PERIOD	887
11.7.	CLIENT-TO-CLIENT COMMUNICATIONS MODE RESULTS FOR 80 MHz BANDWIDTH 888	
11.7.1.	TEST CHANNEL.....	888
11.7.2.	RADAR WAVEFORM AND TRAFFIC	888
11.7.3.	OVERLAPPING CHANNEL TESTS	891
11.7.4.	MOVE AND CLOSING TIME	891
11.7.5.	10-MINUTE CLIENT Tx MONITORING PERIOD	895
12.	SETUP PHOTOS.....	896
12.1.	ANTENNA PORT CONDUCTED RF MEASUREMENT SETUP	896
12.2.	RADIATED RF MEASUREMENT SETUP (BELOW 1 GHz).....	896
12.3.	RADIATED RF MEASUREMENT SETUP FOR PORTABLE CONFIGURATION	897
12.4.	POWERLINE CONDUCTED EMISSIONS MEASUREMENT SETUP	899
12.5.	DYNAMIC FREQUENCY SELECTION MEASUREMENT SETUP	901

12.5.1.	STANDARD CLIENT MODE	901
12.5.2.	CLIENT TO CLIENT MODE	903

1. ATTESTATION OF TEST RESULTS

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

EUT DESCRIPTION: TABLET DEVICE

MODEL: A1652

SERIAL NUMBER: DLXPV01CGPD3 (CONDUCTED); DLXQ1001GPD2 (RADIATED)

DATE TESTED: JULY 20 TO SEPTEMBER 02, 2015

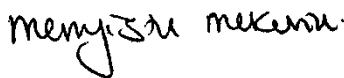
APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart E	Pass

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.

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UL VERIFICATION SERVICES INC.



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UL VERIFICATION SERVICES INC.

2. TEST METHODOLOGY

FCC: The tests documented in this report were performed in accordance with FCC CFR 47 Part 2, FCC CFR 47 Part 15, FCC 14-30, FCC KDB 662911 D01 v02r01, FCC KDB 905462 D02 v01r01/D03 v01r01/D06 v01, FCC KDB 789033 D02, FCC KDB 644545 D03 v01 ANSI C63.10-2013.

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

The above test sites and facilities are covered under FCC Test Firm Registration # 208313. Chambers A through H are covered under Industry Canada company address code 2324B with site numbers 2324B -1 through 2324B-8, respectively.

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:

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

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
Radiated Disturbance, 1 to 6 GHz	± 3.86 dB
Radiated Disturbance, 6 to 18 GHz	± 4.23 dB
Radiated Disturbance, 18 to 26 GHz	± 5.30 dB
Radiated Disturbance, 26 to 40 GHz	± 5.23 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), Cellular GSM/GPRS/EGPRS/CDMA2000 1xRTT/1x Advanced/EVDO Rev.A/EVDO Rev.B /WCDMA /HSPA+/DC-HSDPA/LTE FDD & Carrier Aggregation/TDD/TD-SCDMA radio, IEEE 802.11a/b/g/n/ac radio, and Bluetooth radio. The rechargeable battery is not user accessible.

5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum conducted output power as follows:

5.2GHz Band

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
5180 - 5240	802.11a	Covered by 802.11n HT20 SISO	
	802.11n HT20 SISO	17.00	50.12
	802.11a 2TX CDD	Covered by 802.11n HT20 CDD 2TX	
	802.11n HT20 2TX CDD	19.49	88.92
	802.11n HT20 2TX STBC	19.99	99.77
	802.11n HT20 2TX SDM	Covered by 802.11n HT20 STBC 2TX	
5190 - 5230	802.11n HT40 SISO	16.90	48.98
	802.11n HT40 2TX CDD	19.38	86.70
	802.11n HT40 2TX STBC	19.89	97.50
	802.11n HT40 2TX SDM	Covered by 802.11n HT40 STBC 2TX	
5210	802.11ac VHT80 SISO	12.84	19.23
	802.11ac VHT80 2TX CDD	15.28	33.73
	802.11ac VHT80 2TX STBC/SDM	Covered by 802.11ac VHT80 CDD 2TX	

5.3GHz Band

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
5260 - 5320	802.11a	Covered by 802.11n HT20 SISO	
	802.11n HT20 SISO	16.96	49.66
	802.11a 2TX CDD	Covered by 802.11n HT20 CDD 2TX	
	802.11n HT20 2TX CDD	18.96	78.70
	802.11n HT20 2TX STBC	19.74	94.19
	802.11n HT20 2TX SDM	Covered by 802.11n HT20 STBC 2TX	
5270 - 5310	802.11n HT40 SISO	16.98	49.89
	802.11n HT40 2TX CDD	18.96	78.70
	802.11n HT40 2TX STBC	19.74	94.19
	802.11n HT20 2TX SDM	Covered by 802.11n HT20 STBC 2TX	
5290	802.11ac VHT80 SISO	14.28	26.79
	802.11ac VHT80 2TX CDD	15.79	37.93
	802.11ac VHT80 2TX STBC/SDM	Covered by 802.11ac VHT80 CDD 2TX	

5.6GHz Band

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
5500 - 5700	802.11a	Covered by 802.11n HT20 SISO	
5720	802.11a	Covered by 802.11n HT20 SISO	
5500 - 5700	802.11n HT20 SISO	15.96	39.45
5720	802.11n HT20 SISO	15.00	31.62
5500 - 5700	802.11a 2TX CDD	Covered by 802.11n HT20 CDD 2TX	
5720	802.11a 2TX CDD	Covered by 802.11n HT20 CDD 2TX	
5500 - 5700	802.11n HT20 2TX CDD	18.62	72.78
5720	802.11n HT20 2TX CDD	17.70	58.88
5500 - 5700	802.11n HT20 2TX STBC/SDM	Covered by 802.11n HT20 CDD 2TX	
5720	802.11n HT20 2TX STBC/SDM	Covered by 802.11n HT20 CDD 2TX	
5510 - 5670	802.11n HT40 SISO	15.97	39.54
5710	802.11n HT40 SISO	14.81	30.27
5510 - 5670	802.11n HT40 2TX CDD	18.69	73.96
5710	802.11n HT40 2TX CDD	16.91	49.09
5510 - 5670	802.11n HT40 2TX STBC/SDM	Covered by 802.11n HT40 CDD 2TX	
5710	802.11n HT40 STBC/SDM 2TX	Covered by 802.11n HT40 CDD 2TX	
5530-5610	802.11ac VHT80 SISO	15.83	38.28
5690	802.11ac VHT80 SISO	15.95	39.36
5530-5610	802.11ac VHT80 CDD 2TX	18.72	74.47
5690	802.11ac VHT80 CDD 2TX	18.71	74.30
5530-5610	802.11ac VHT80 2TX STBC/SDM	Covered by 802.11ac VHT80 CDD 2TX	
5690	802.11ac VHT80 2TX STBC/SDM	Covered by 802.11ac VHT80 CDD 2TX	

5.8GHz Band

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
5745 - 5825	802.11a	Covered by 802.11n HT20 SISO	
5745 - 5825	802.11n HT20 SISO	16.49	44.57
5745 - 5825	802.11a 2TX CDD	Covered by 802.11n HT20 CDD 2TX	
5745 - 5825	802.11n HT20 CDD 2TX	19.22	83.56
5745 - 5825	802.11n HT20 STBC/SDM 2TX	Covered by 802.11n HT20 CDD 2TX	
5755 - 5795	802.11n HT40 SISO	15.98	39.63
5755 - 5795	802.11n HT40 CDD 2TX	18.46	70.15
5755 - 5795	802.11n HT40 STBC/SDM 2TX	Covered by 802.11n HT40 CDD 2TX	
5775	802.11ac VHT80 SISO	14.26	26.67
5775	802.11ac VHT80 CDD 2TX	16.74	47.21
5775	802.11ac VHT80 STBC/SDM 2TX	Covered by 802.11ac VHT80 CDD 2TX	

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

Frequency Band (GHz)	Antenna Gain	
	Chain 0	Chain 1
5.2	1.90	2.30
5.3	2.30	2.90
5.5	2.70	3.10
5.8	2.40	3.10

5.4. SOFTWARE AND FIRMWARE

The software installed in the EUT during testing was 13B72.

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.

For SISO modes, there are two transmission antennas. The antenna used in any given time can be either Chain 0 or Chain 1. Both antenna ports have the same power; output power and PSD measurement for SISO modes on both antennas are reported. For MIMO modes, both Chain 0 and Chain 1 used at the same time.

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

Frequency Band (GHz)	Mode	Antenna Port	Worst-case Orientation
5.2-5.8	1TX SISO	Chain 0	Z-Portrait
		Chain 1	Y-Landscape
	2TX MIMO	Chain 0 + Chain 1	X-Flatbed

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

802.11a mode: 6 Mbps
802.11n HT20 mode: MCS0
802.11n HT40 mode: MCS0
802.11ac VHT20 mode: MCS0
802.11ac VHT40 mode: MCS0
802.11ac VHT80 mode: MCS0

802.11ac VHT20 and VHT40 mode are different from 802.11nHT20 and HT40 only in control messages and have the same power settings.

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.

For simultaneous transmission of multiple channels from the same antenna in BT/BLE and WLAN 5 GHz bands. Baseline testing was performed on various configurations to determine the worst case on radiated emissions.

The following configurations were investigated on AC line conducted test.

Configuration	Descriptions
1	EUT powered by AC/DC adapter via USB cable
2	EUT powered by host PC via USB cable

5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Description	Manufacturer	Model	Serial Number	FCC ID
Laptop	Apple	MacBook Pro	73043BDQAGU	N/A
Laptop AC/DC adapter	Apple	A1172	MV7211FJAX4XA	N/A
Earphone	Apple	NA	NA	N/A
EUT AC/DC adapter	Apple	A1357	W010A051	N/A

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	AC	1	AC	Un-shielded	3	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	Connector Type	Cable Type	Cable Length (m)	Remarks
1	Headphones Jack	1	3.5mm Audio	Shielded	0.9	N/A
2	AC	1	AC	Un-shielded	3	N/A

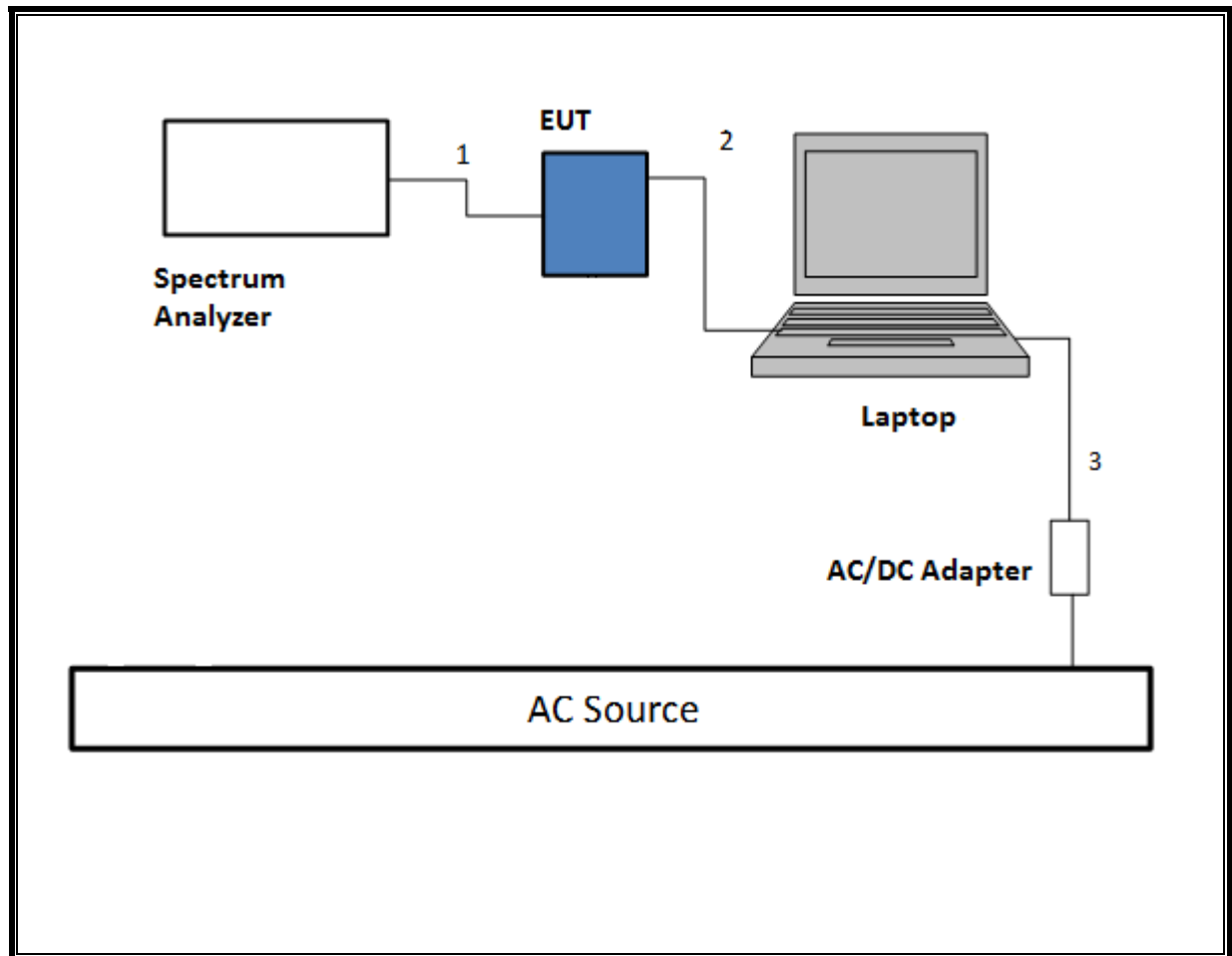
I/O CABLES (AC LINE CONDUCTED: LAPTOP CONFIGUARTION)

I/O Cable List						
Cable No	Port	# of identical	Connector Type	Cable Type	Cable Length (m)	Remarks
1	Headphones Jack	1	3.5mm Audio	Shielded	0.9	N/A
2	USB	1	USB	Shielded	1	N/A
3	AC	1	AC	Un-shielded	3	N/A

TEST SETUP - CONDUCTED TESTS

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

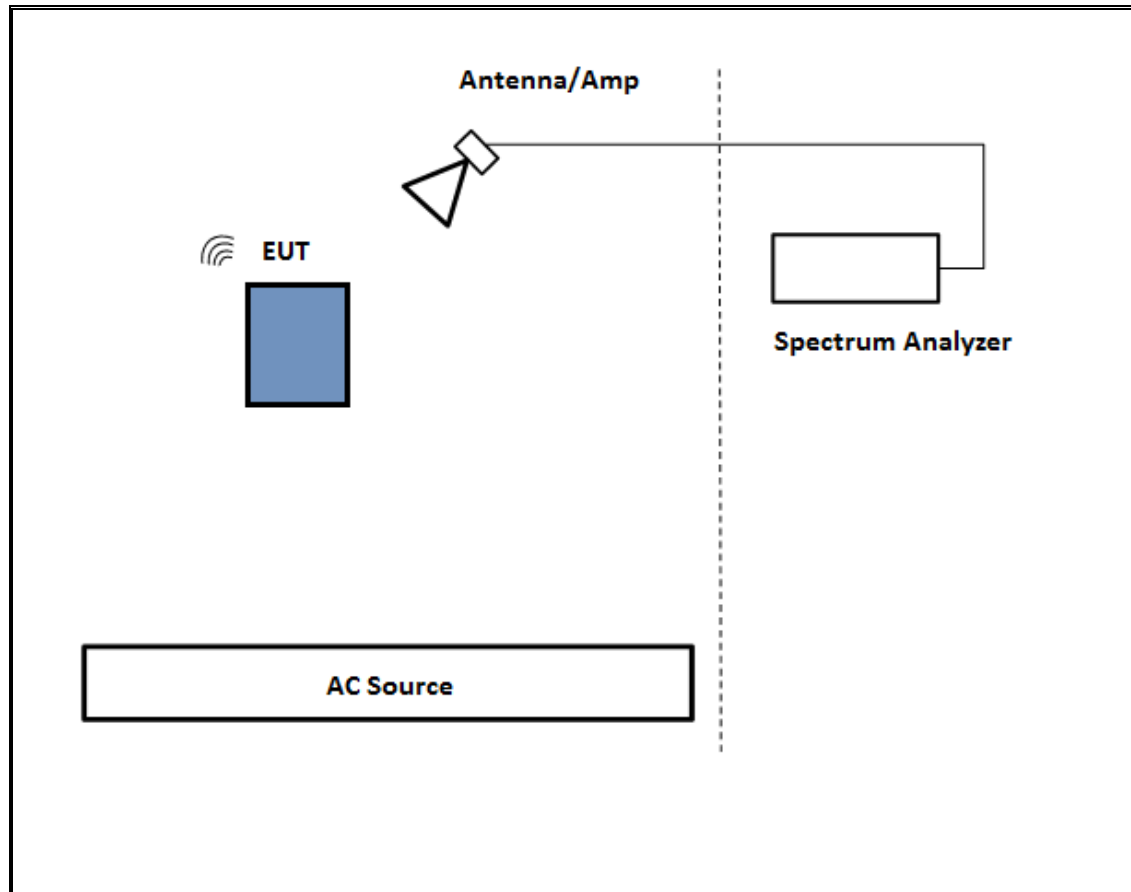
SETUP DIAGRAM



TEST SETUP- RADIATED-ABOVE 1 GHZ

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

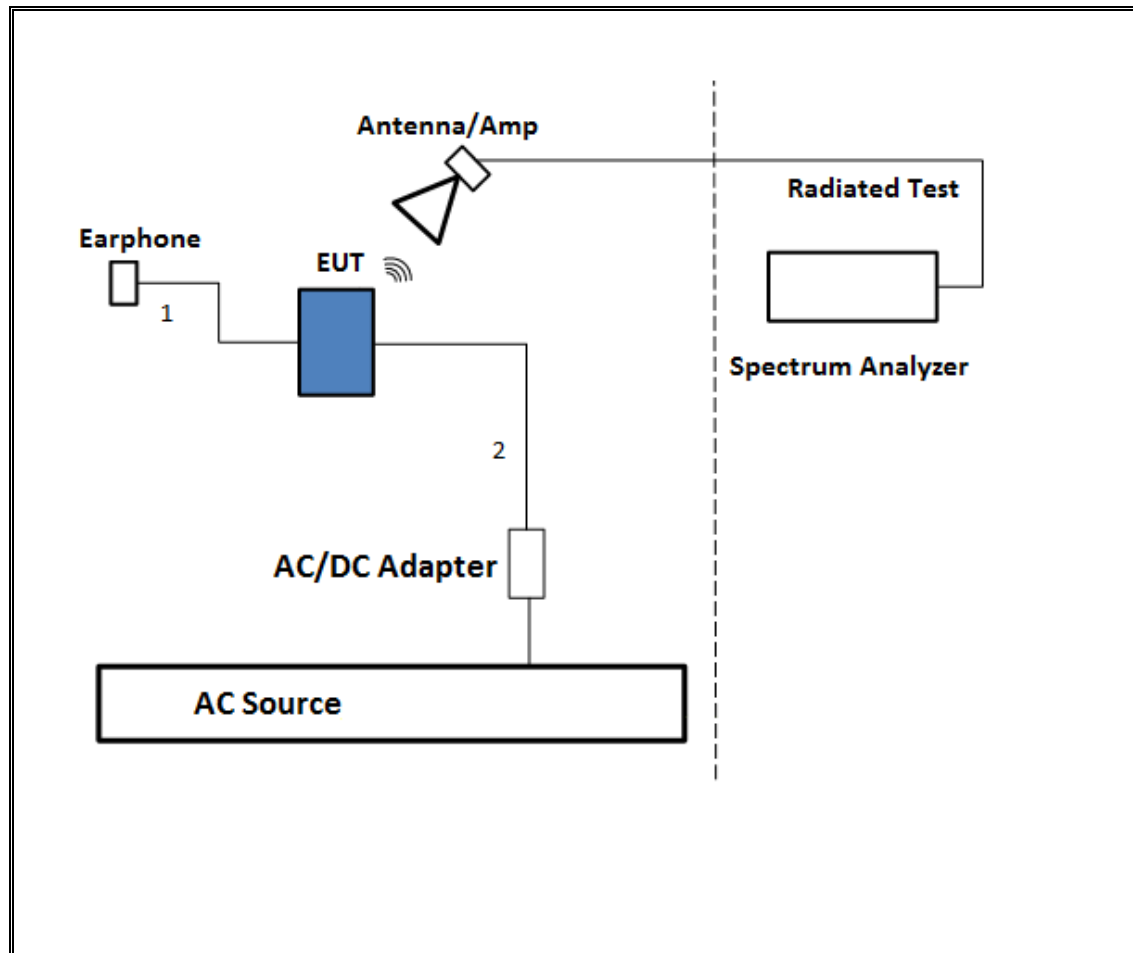
SETUP DIAGRAM



TEST SETUP- BELOW 1GHz

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

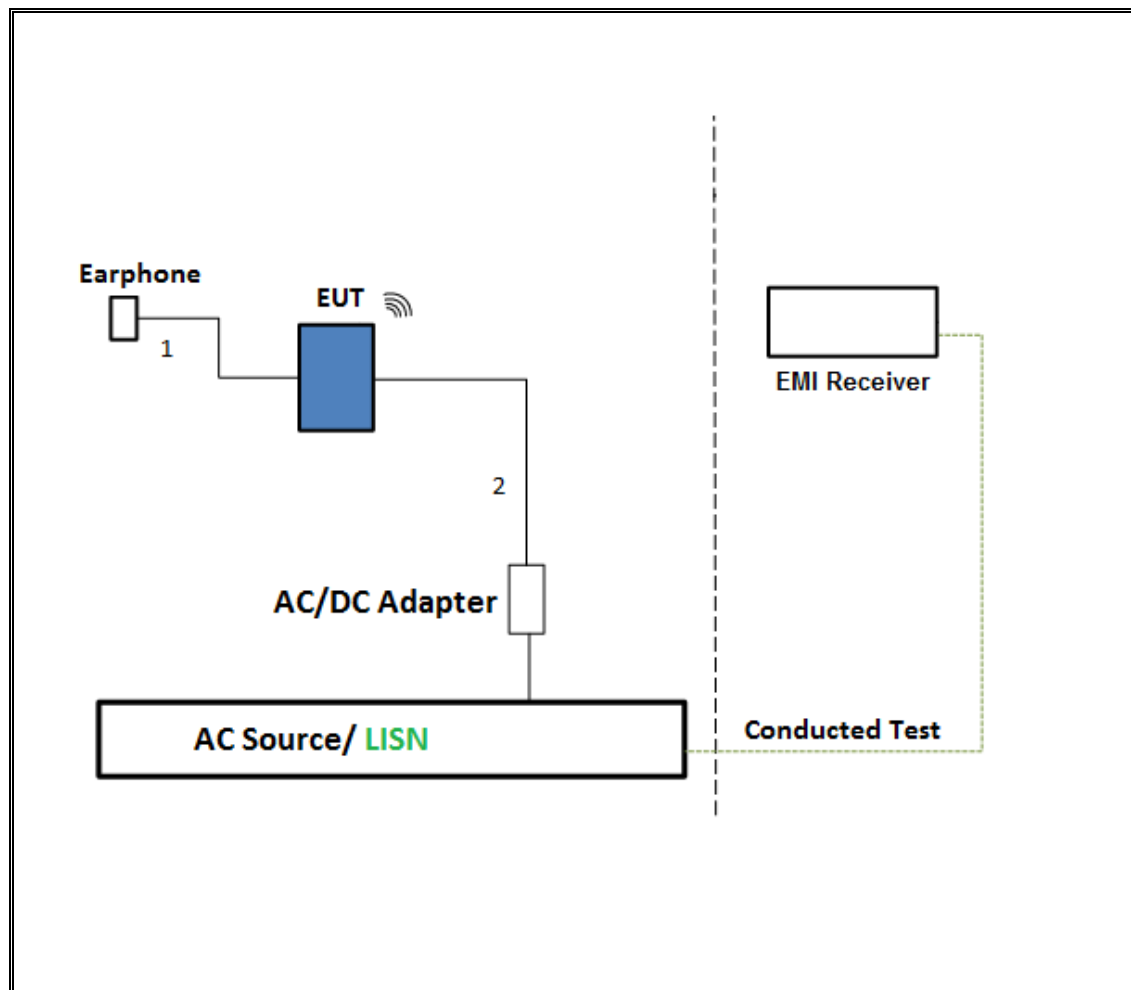
SETUP DIAGRAM



TEST SETUP- AC LINE CONDUCTED: AC/DC ADAPTER

The EUT was tested with earphone connected and powered by AC/DC adapter via USB cable. 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 1-18GHz	ETS Lindgren	3117	00143448	2/10/2016
Antenna, Broadband Hybrid, 30MHz to 2000MHz	Sunol Sciences	JB3	A022813-1	1/14/2016
Amplifier, 1 - 18GHz	Miteq	AFS42-00101800-25-S-42	1782158	1/26/2016
Amplifier, 10KHz to 1GHz, 32dB	Sonoma	310N	323561	6/8/2016
Spectrum Analyzer, PXA, 3Hz to 50GHz	Agilent	N9030A	MY52350427	9/13/2015
Amplifier, 10KHz to 1GHz, 32dB	Sonoma	310N	325117	6/9/2016
Spectrum Analyzer, PXA, 3Hz to 44GHz	Agilent	N9030A-544	US51160264	12/23/2015
Power Meter, P-series single channel	Agilent	N1911A	GB45100212	10/9/2015
Power Sensor, P - series, 50MHz to 18GHz, Wideband	Agilent	N1921A	MY53260010	7/12/2016
Antenna, Horn 18 to 26.5GHz	ARA	MWH-1826	1049	12/17/2015
Horn Antenna, 40GHz	ARA	MWH-2640/B	1029	7/15/2016
Spectrum Analyzer, 40 GHz	Agilent	8564E	3943A01643	8/6/2016
Amplifier, 1 to 26.5GHz, 23.5dB Gain minimum	Agilent	8449B	3008A01114	10/4/2015
Amplifier, 26 to 40GHz	Miteq	NSP4000-SP2	1029	9/3/2015
AC Line Conducted				
EMI Test Receiver 9KHz-7GHz	Rohde & Schwarz	ESCI7	100935	9/16/2015
LISN for Conducted Emissions CISPR-16	FCC	50/250-25-2	114	1/16/2016
Power Cable, Line Conducted Emissions ANSI 63.4	UL	PG1	N/A	7/28/2016
UL SOFTWARE				
*Radiated Software	UL	UL EMC	Ver 9.5, July 22, 2014	
*Conducted Software	UL	UL EMC	Ver 2.2, March 31, 2015	
*AC Line Conducted Software	UL	UL EMC	Ver 9.5, April 3, 2015	

Note: * indicates automation software version used in the compliance certification testing

7. ON TIME, DUTY CYCLE AND MEASUREMENT METHODS

7.1. ON TIME AND DUTY CYCLE

LIMITS

None; for reporting purposes only.

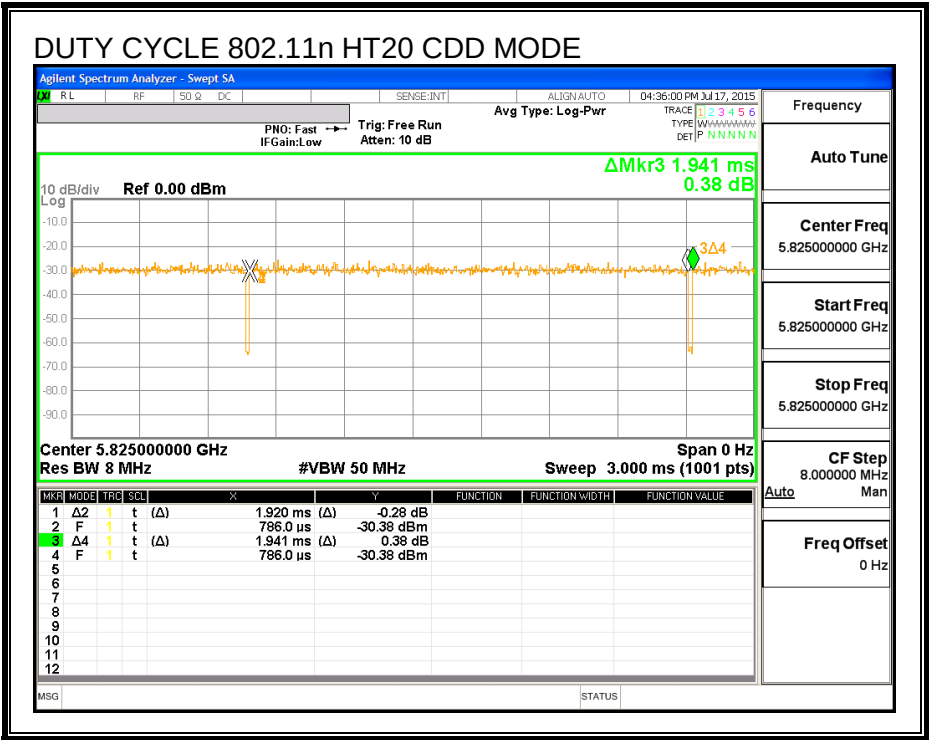
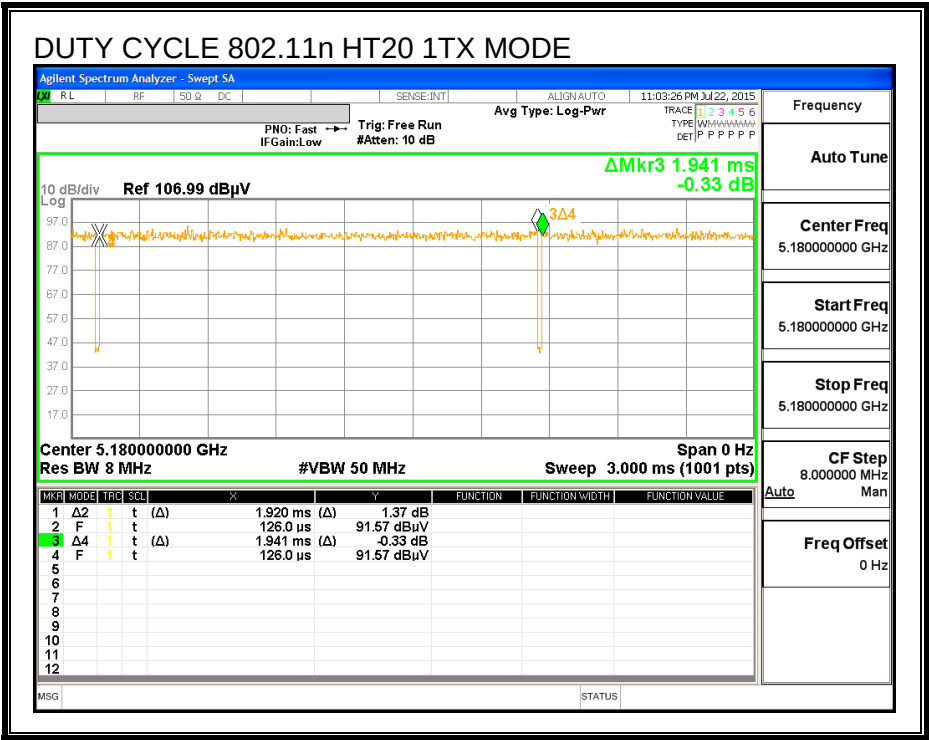
PROCEDURE

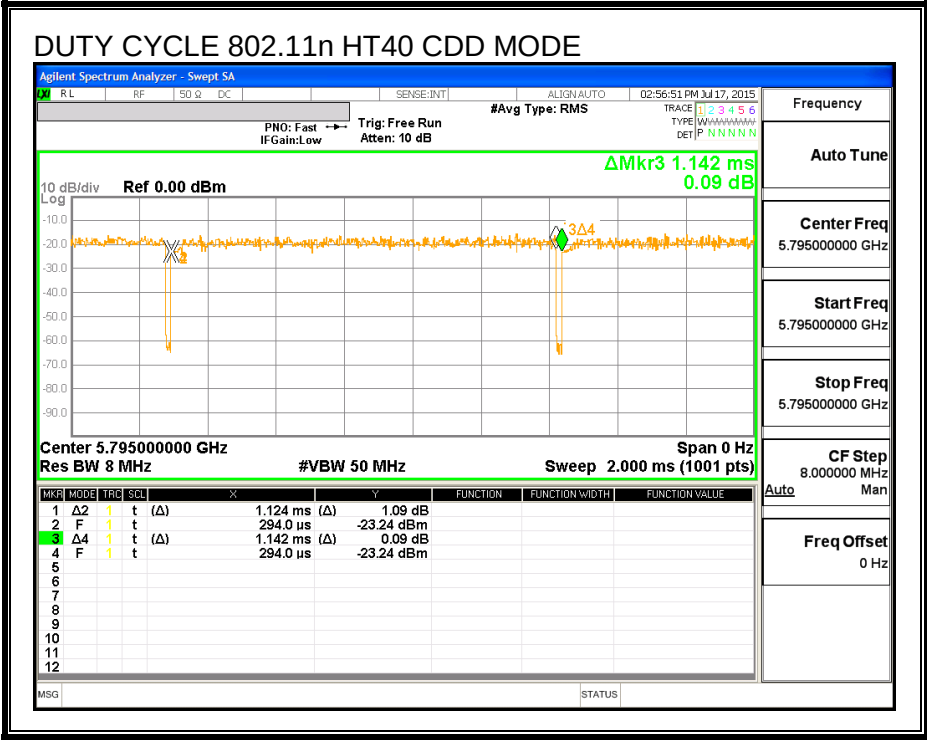
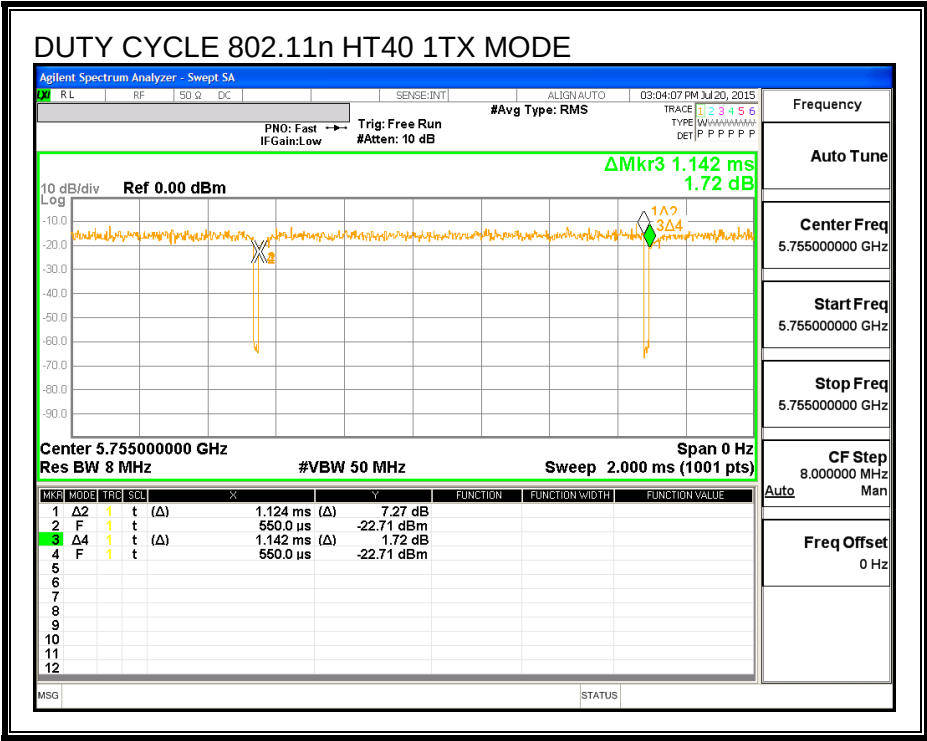
KDB 789033 Zero-Span Spectrum Analyzer Method.

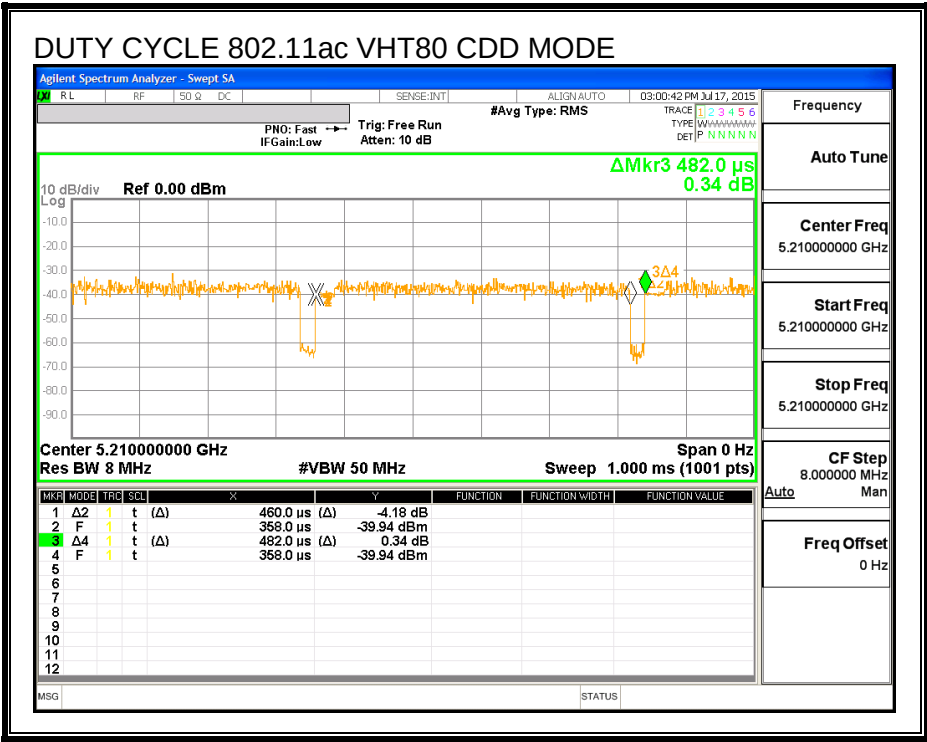
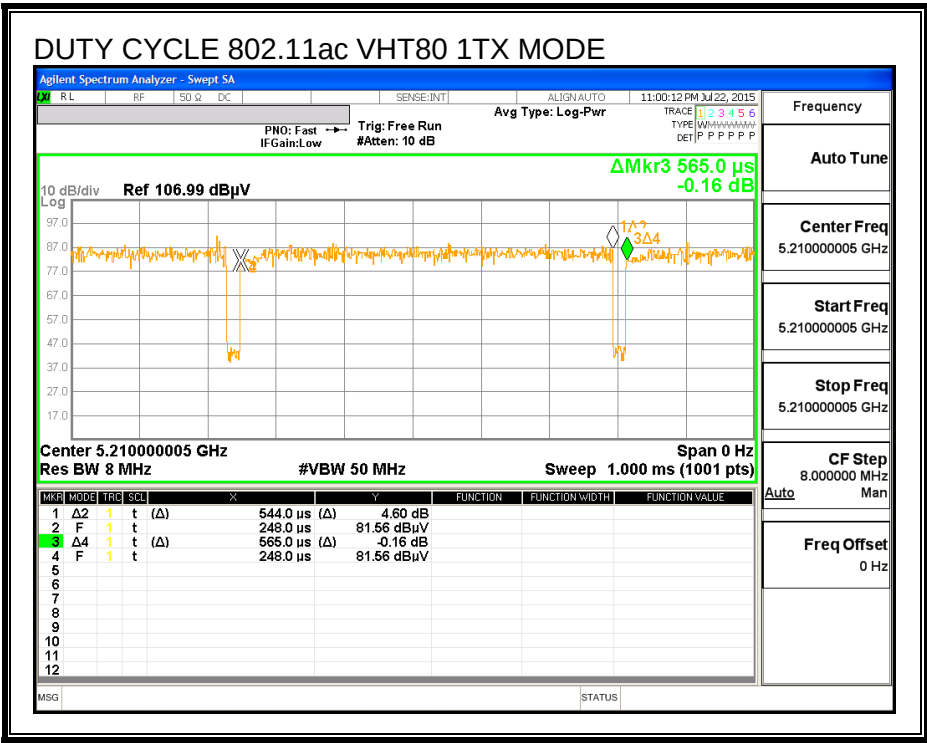
RESULTS

Mode	ON Time B (msec)	Period (msec)	Duty Cycle x (linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	1/B Minimum VBW (kHz)
802.11n HT20 1TX	1.920	1.941	0.989	98.92%	0.00	0.010
802.11n HT20 CDD	1.920	1.941	0.989	98.92%	0.00	0.010
802.11n HT40 1TX	1.124	1.142	0.984	98.42%	0.00	0.010
802.11n HT40 CDD	1.124	1.142	0.984	98.42%	0.00	0.010
802.11ac VHT80 1TX	0.544	0.565	0.963	96.28%	0.16	1.838
802.11ac VHT80 CDD	0.460	0.482	0.954	95.44%	0.20	2.174

DUTY CYCLE PLOTS







7.2. MEASUREMENT METHODS

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

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

Conducted Output Power: 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.

8. ANTENNA PORT TEST RESULTS

8.1. 802.11a SISO MODE IN THE 5.2 GHz BAND

Note: Covered by 802.11n HT20 SISO MODE.

8.2. 802.11n HT20 CHAIN 0 MODE IN THE 5.2 GHz BAND

8.2.1. 26 dB BANDWIDTH

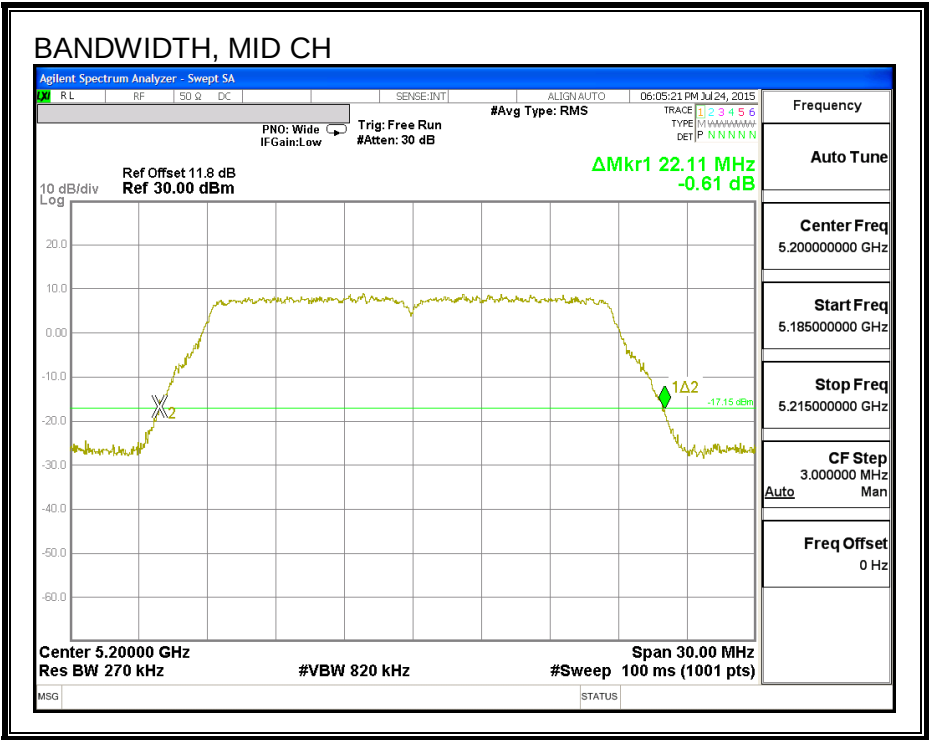
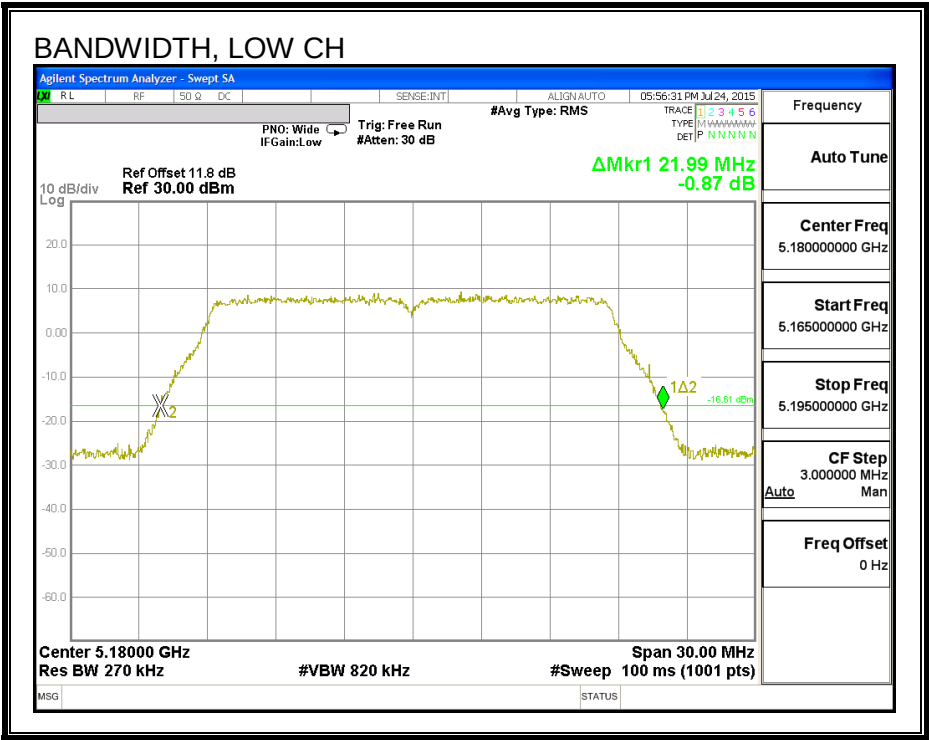
LIMITS

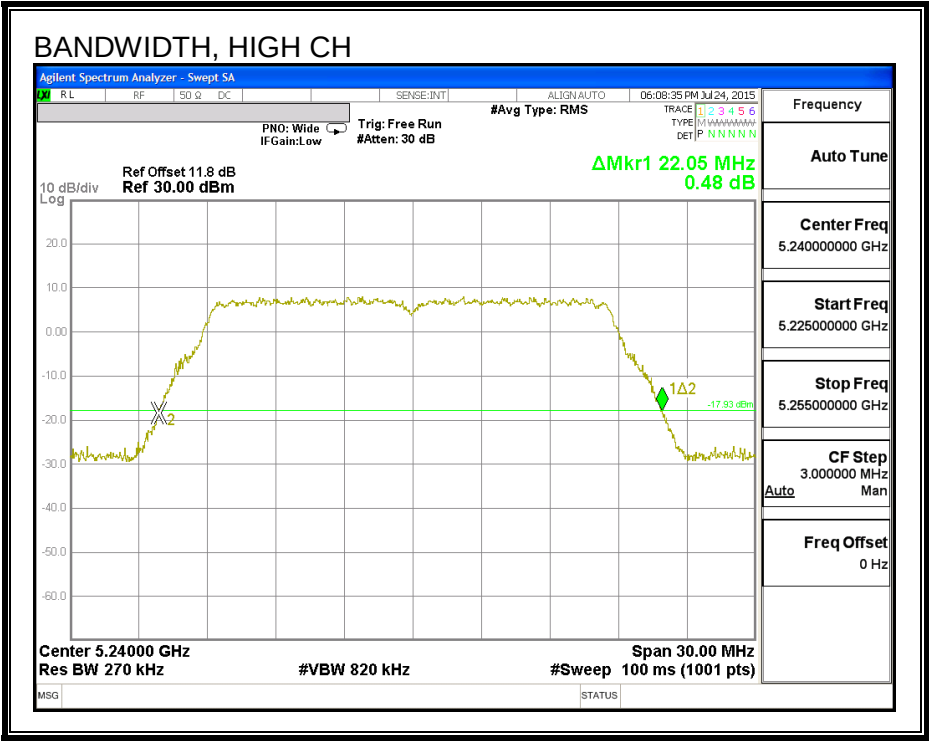
None; for reporting purposes only.

RESULTS

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Low	5180	21.99
Mid	5200	22.11
High	5240	22.05

26 dB BANDWIDTH





8.2.2. 99% BANDWIDTH

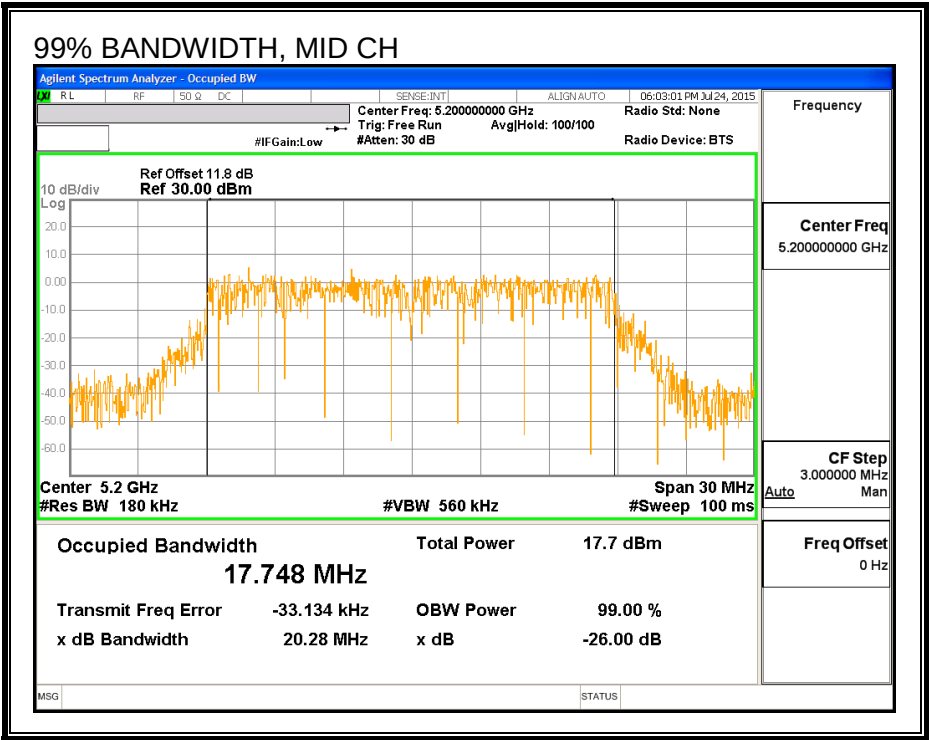
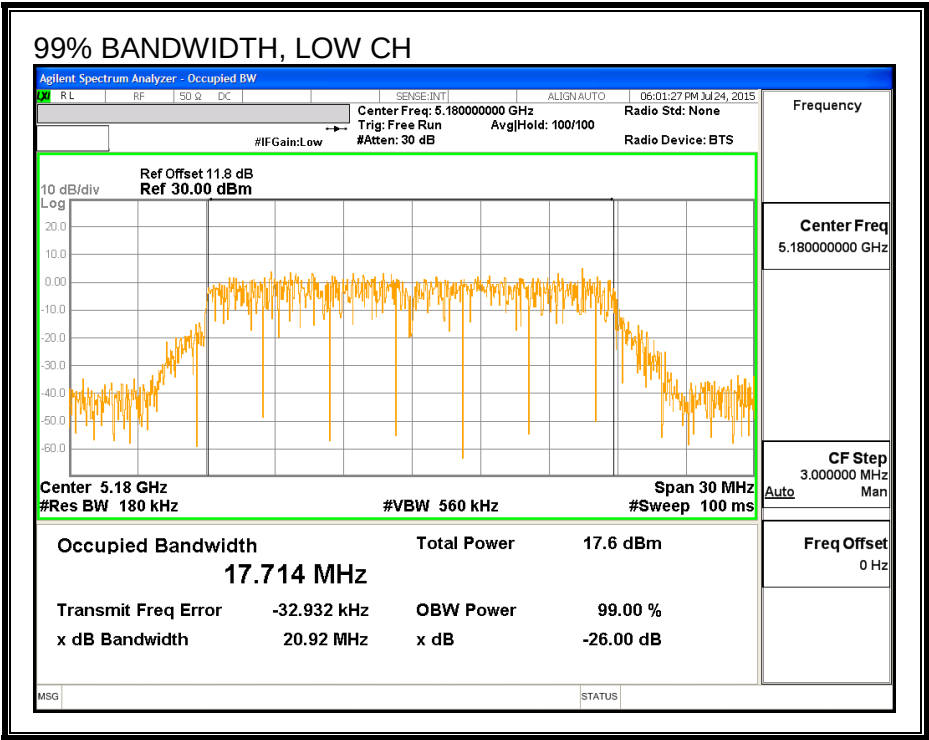
LIMITS

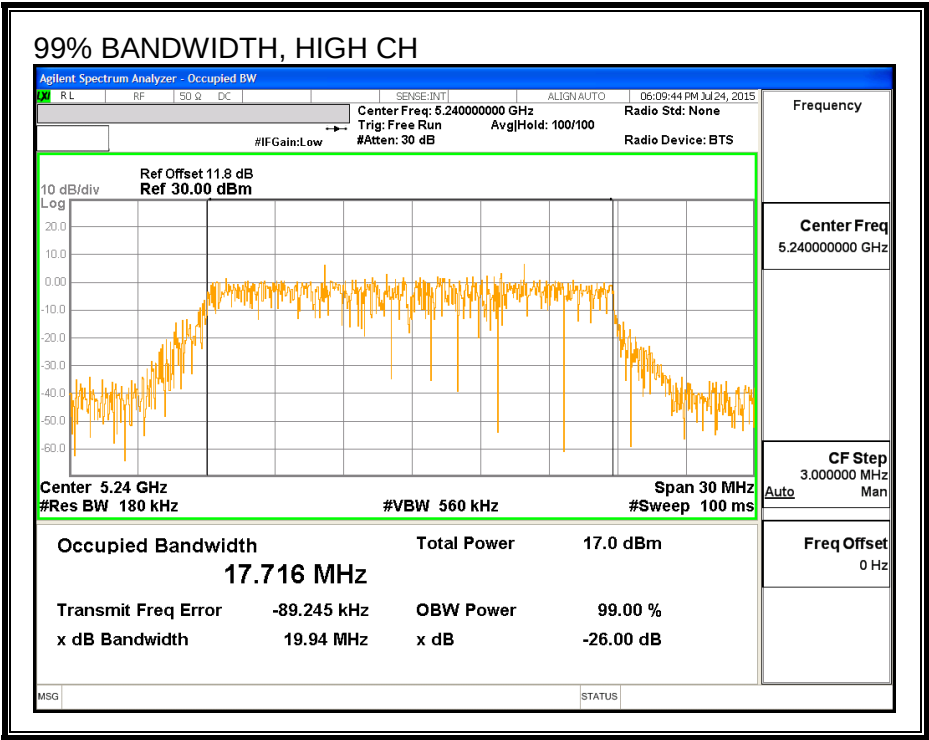
None; for reporting purposes only.

RESULTS

Channel	Frequency (MHz)	99% BW (MHz)
Low	5180	17.714
Mid	5200	17.748
High	5240	17.716

99% BANDWIDTH





8.2.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

RESULTS

Channel	Frequency (MHz)	Power (dBm)
Low	5180	16.48
Mid	5200	16.91
High	5240	16.88

8.2.4. OUTPUT POWER AND PSD

LIMITS

FCC §15.407 (a) (1)

(i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 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. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 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.

(iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple colocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

(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.

DIRECTIONAL ANTENNA GAIN

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

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	1.90	1.90	24.00	11.00
Mid	5200	1.90	1.90	24.00	11.00
High	5240	1.90	1.90	24.00	11.00

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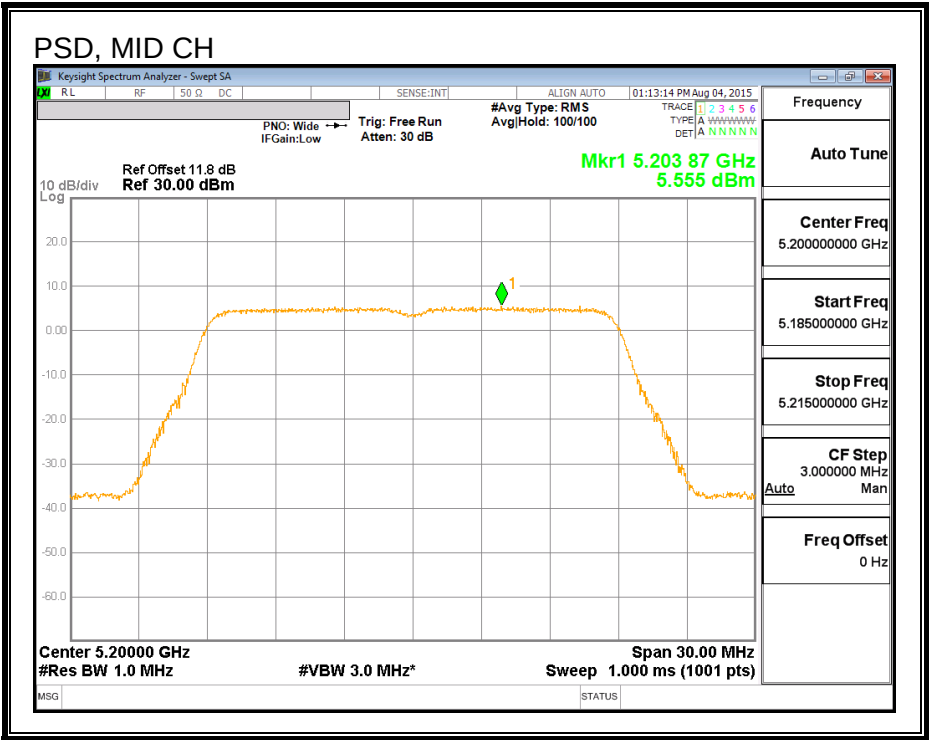
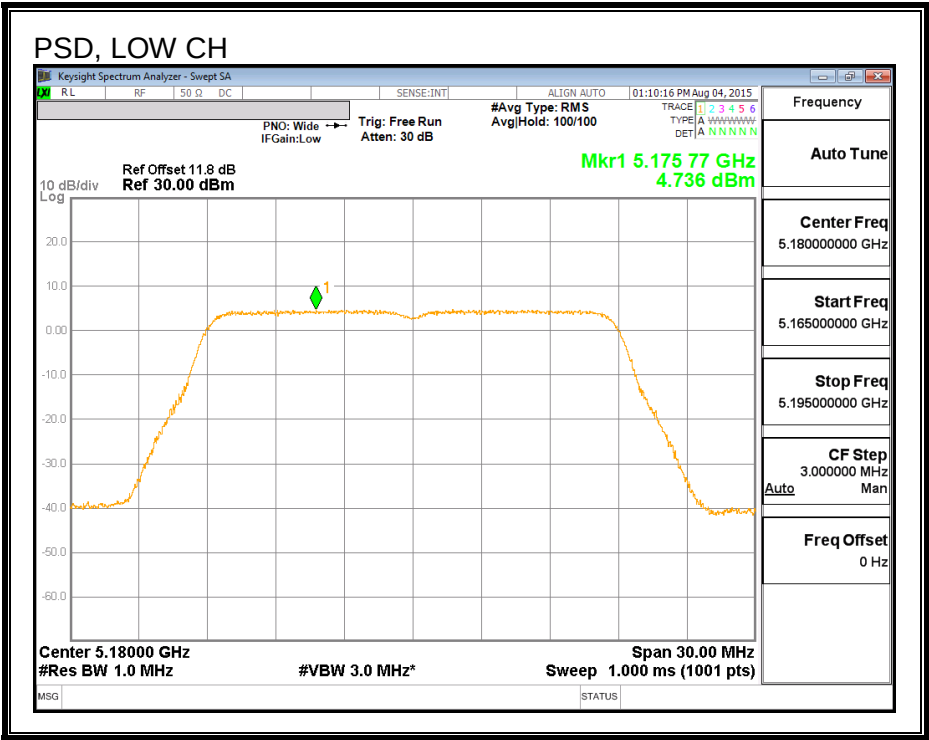
Output Power Results

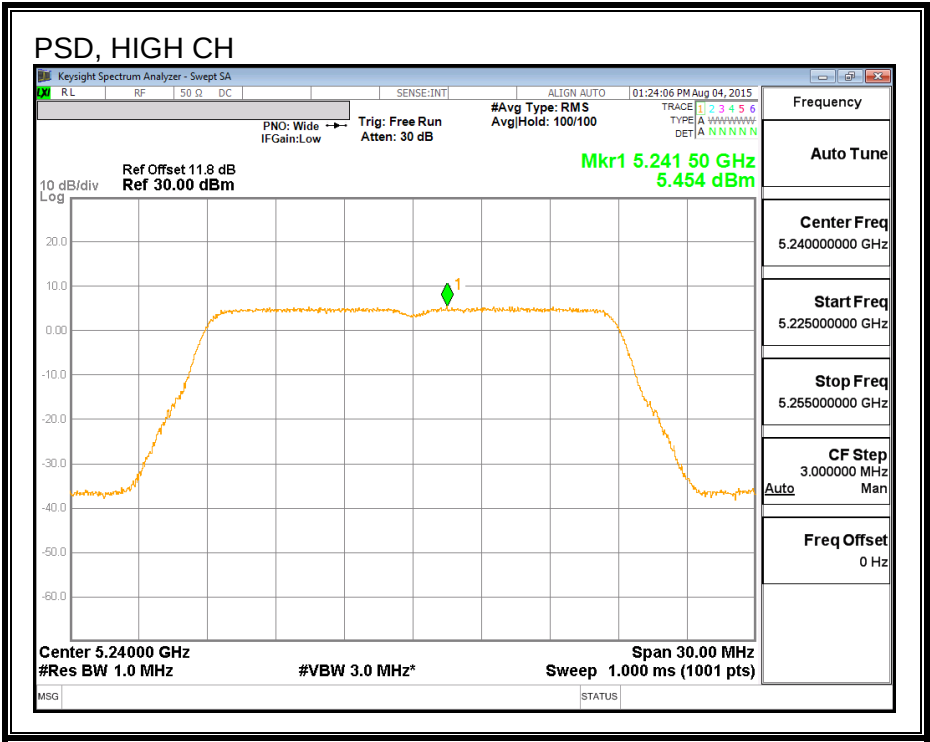
Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5180	16.48	16.48	24.00	-7.52
Mid	5200	16.91	16.91	24.00	-7.09
High	5240	16.88	16.88	24.00	-7.12

PSD Results

Channel	Frequency (MHz)	Chain 0 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low	5180	4.74	4.74	11.00	-6.26
Mid	5200	5.56	5.56	11.00	-5.45
High	5240	5.45	5.45	11.00	-5.55

PSD





8.3. 802.11n HT20 CHAIN 1 MODE IN THE 5.2 GHz BAND

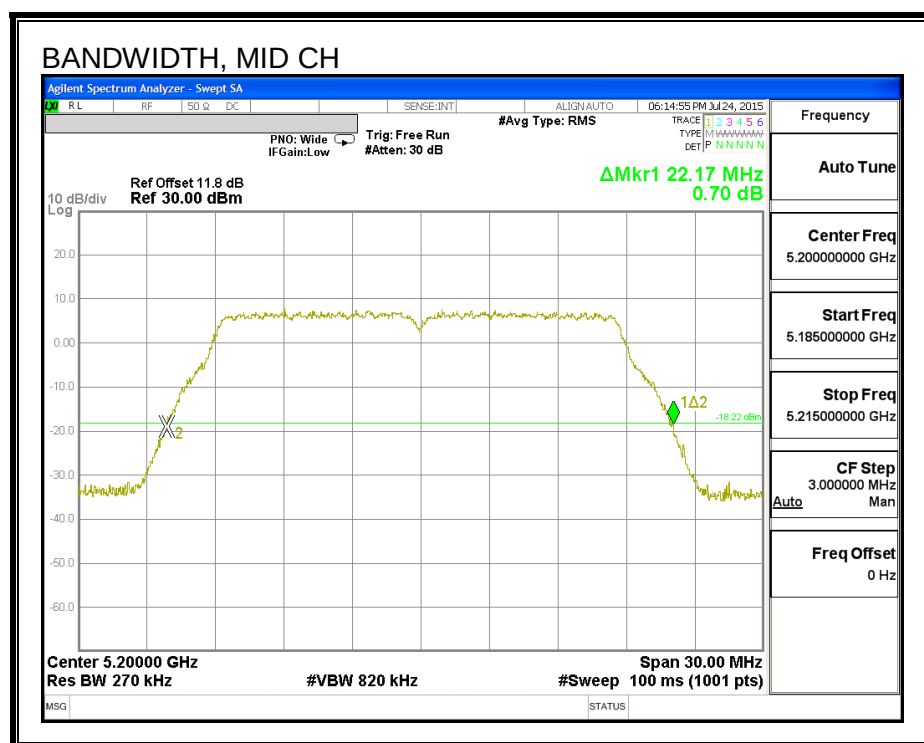
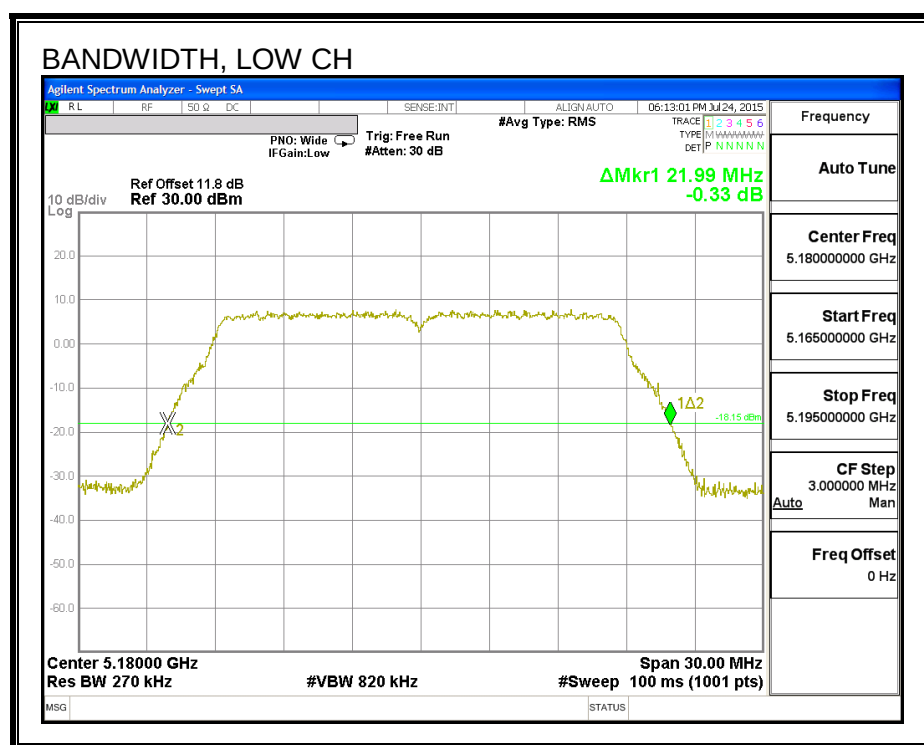
8.3.1. 26 dB BANDWIDTH

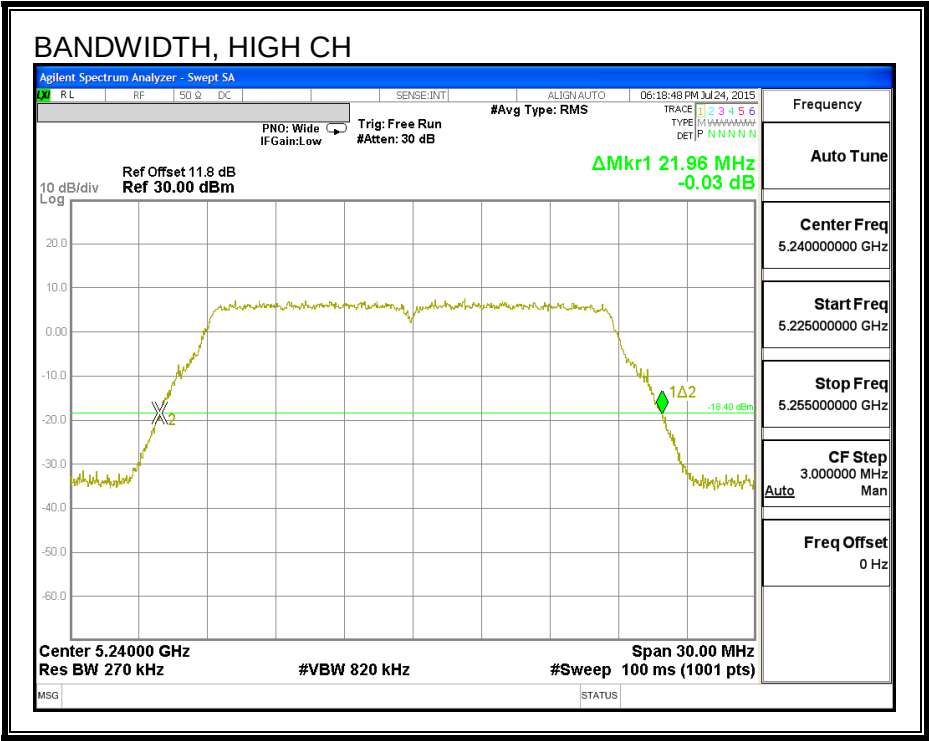
LIMITS

None; for reporting purposes only.

RESULTS

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Low	5180	21.99
Mid	5200	22.17
High	5240	21.96





8.3.2. 99% BANDWIDTH

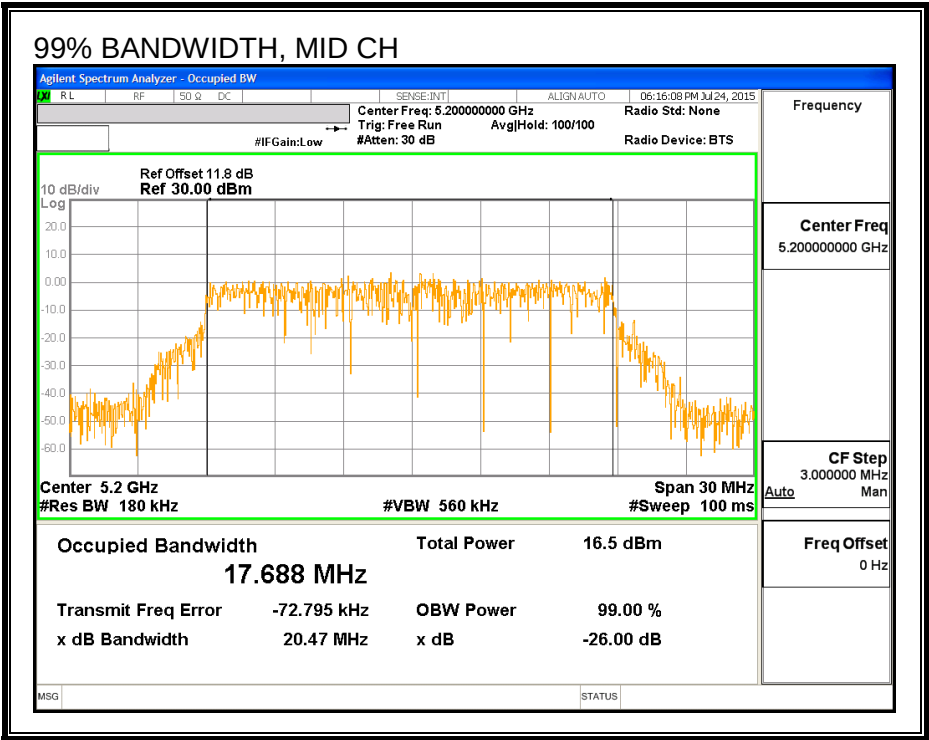
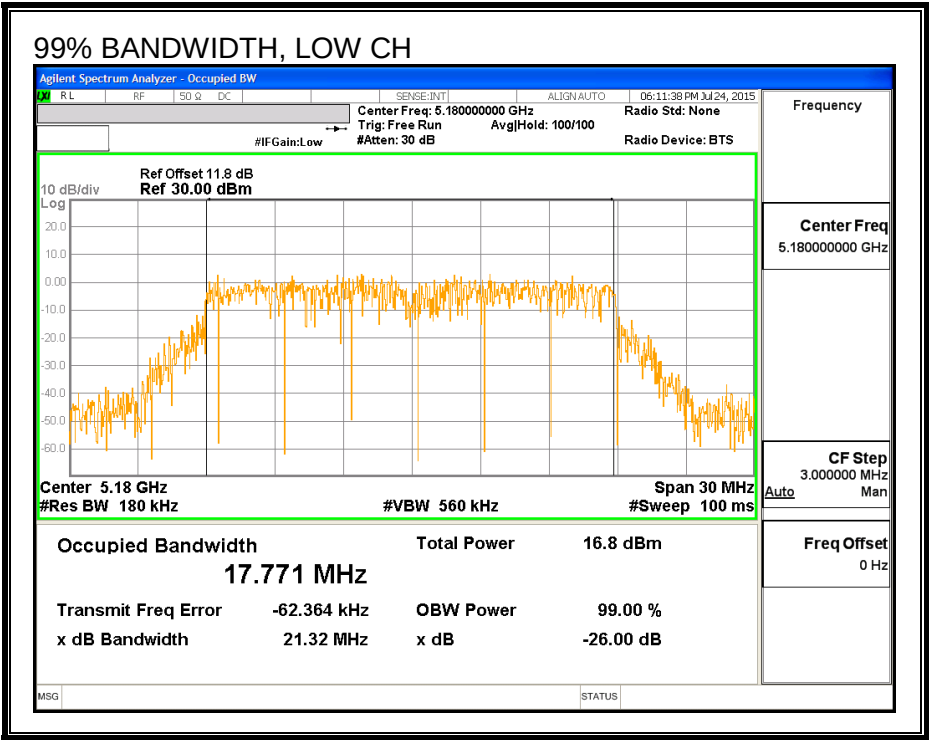
LIMITS

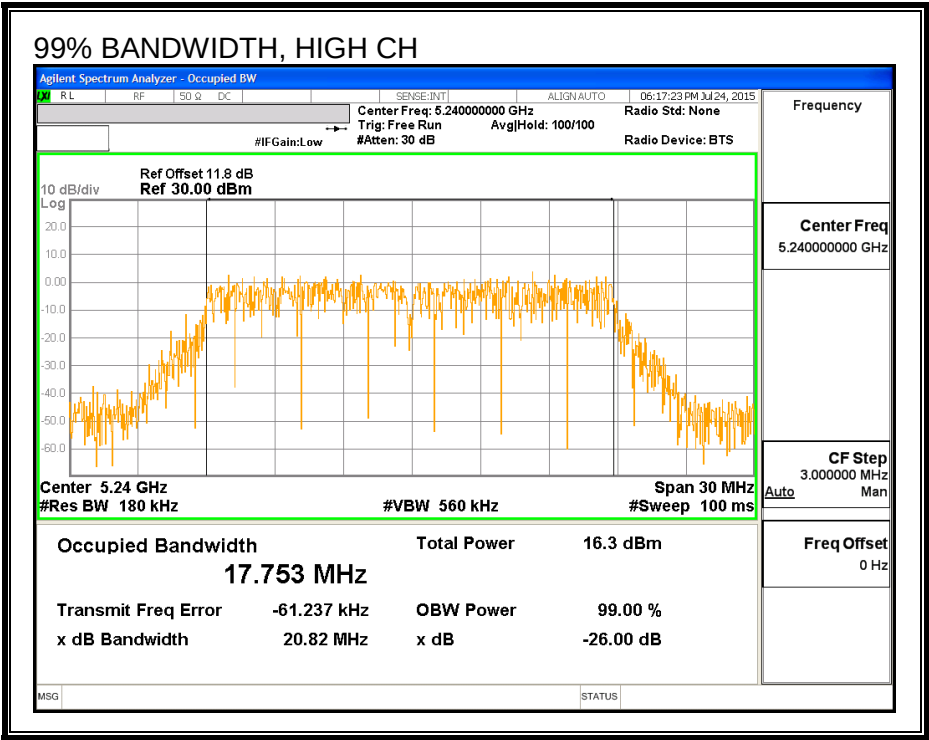
None; for reporting purposes only.

RESULTS

Channel	Frequency (MHz)	99% BW (MHz)
Low	5180	17.771
Mid	5200	17.688
High	5240	17.753

99% BANDWIDTH





8.3.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

RESULTS

Channel	Frequency (MHz)	Power (dBm)
Low	5180	16.50
Mid	5200	16.96
High	5240	17.00

8.3.4. OUTPUT POWER AND PSD

LIMITS

FCC §15.407 (a) (1)

(i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 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. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 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.

(iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple colocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

(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.

DIRECTIONAL ANTENNA GAIN

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

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	2.30	2.30	24.00	11.00
Mid	5200	2.30	2.30	24.00	11.00
High	5240	2.30	2.30	24.00	11.00

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

Channel	Frequency (MHz)	Chain 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5180	16.50	16.50	24.00	-7.50
Mid	5200	16.96	16.96	24.00	-7.04
High	5240	17.00	17.00	24.00	-7.00

PSD Results

Channel	Frequency (MHz)	Chain 1 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low	5180	4.89	4.89	11.00	-6.11
Mid	5200	5.39	5.39	11.00	-5.61
High	5240	5.51	5.51	11.00	-5.50

PSD, LOW CH

Keysight Spectrum Analyzer - Swept SA

RL RF 50 Ω DC SENSE:INT ALIGN: AUTO 01:28:32 PM Aug 04, 2015

PNO: Wide IF Gain: Low Trig: Free Run Atten: 30 dB #Avg Type: RMS Avg/Hold: 100/100

TRACE 1 2 3 4 5 6 TYPE: A W W W W W W W W DET: A N N N N N

Ref Offset 11.8 dB Ref 30.00 dBm

Mkr1 5.177 75 GHz 4.886 dBm

10 dB/div Log

Center 5.18000 GHz #Res BW 1.0 MHz #VBW 3.0 MHz* Span 30.00 MHz Sweep 1.000 ms (1001 pts)

Frequency Auto Tune

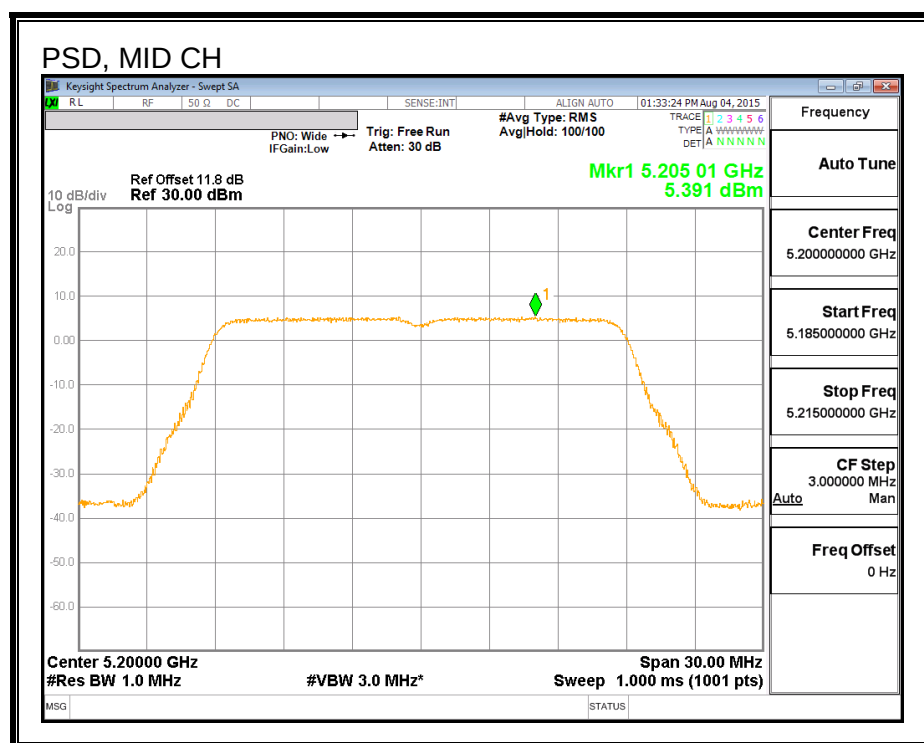
Center Freq 5.180000000 GHz

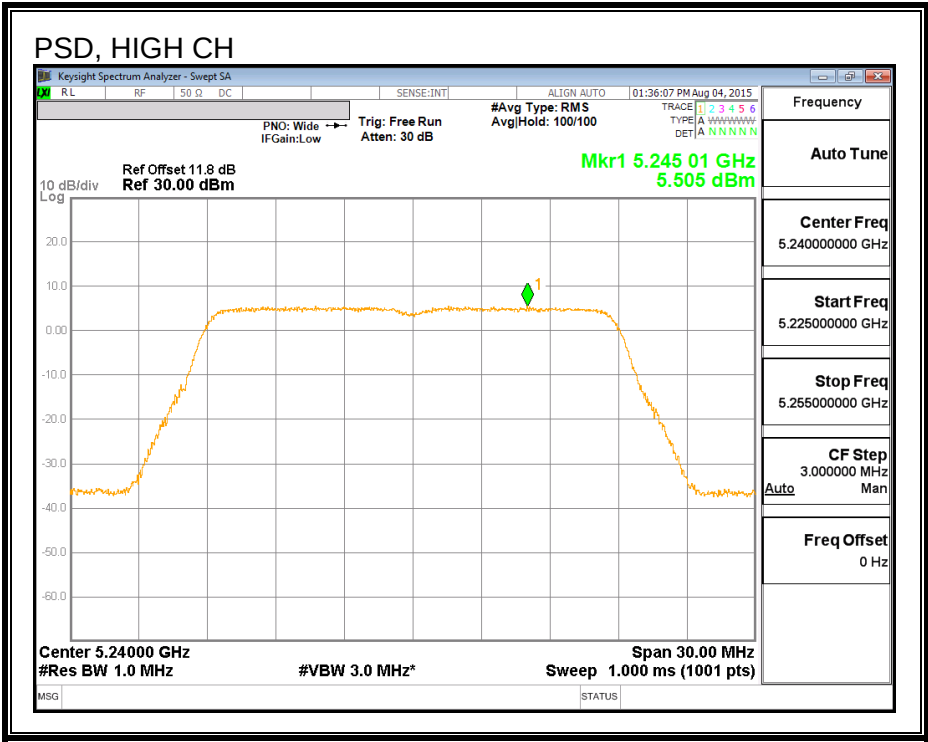
Start Freq 5.165000000 GHz

Stop Freq 5.195000000 GHz

CF Step 3.000000 MHz Auto Man

Freq Offset 0 Hz





8.4. 802.11a CDD 2TX MODE IN THE 5.2 GHz BAND

Note: Covered by 802.11n HT20 CDD 2TX MODE.

8.5. 802.11n HT20 2Tx CDD MODE IN THE 5.2 GHz BAND

8.5.1. 26 dB BANDWIDTH

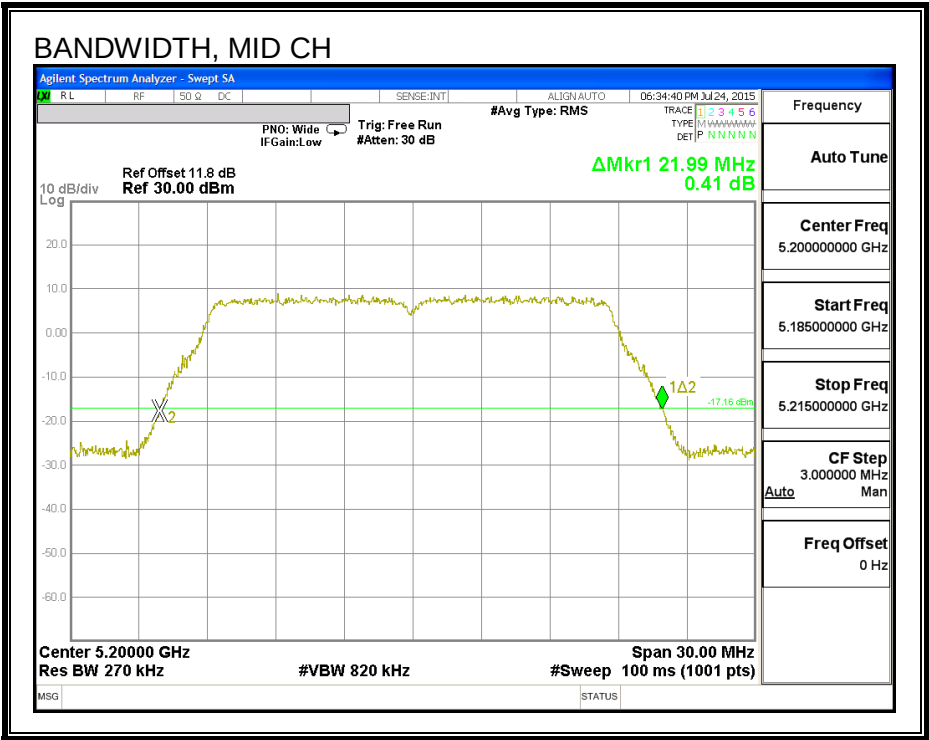
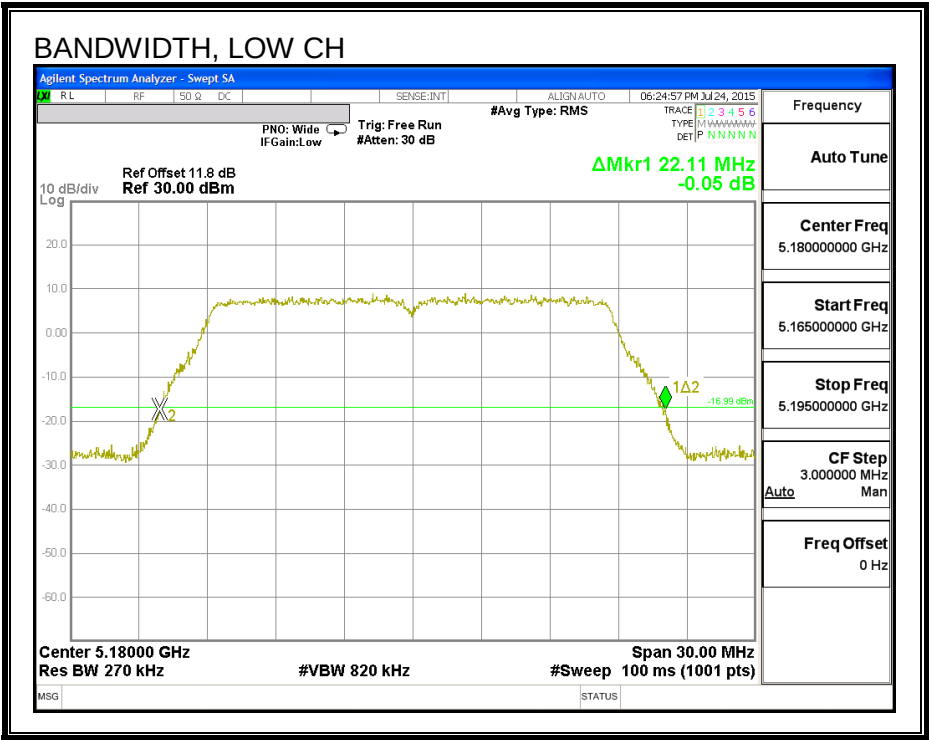
LIMITS

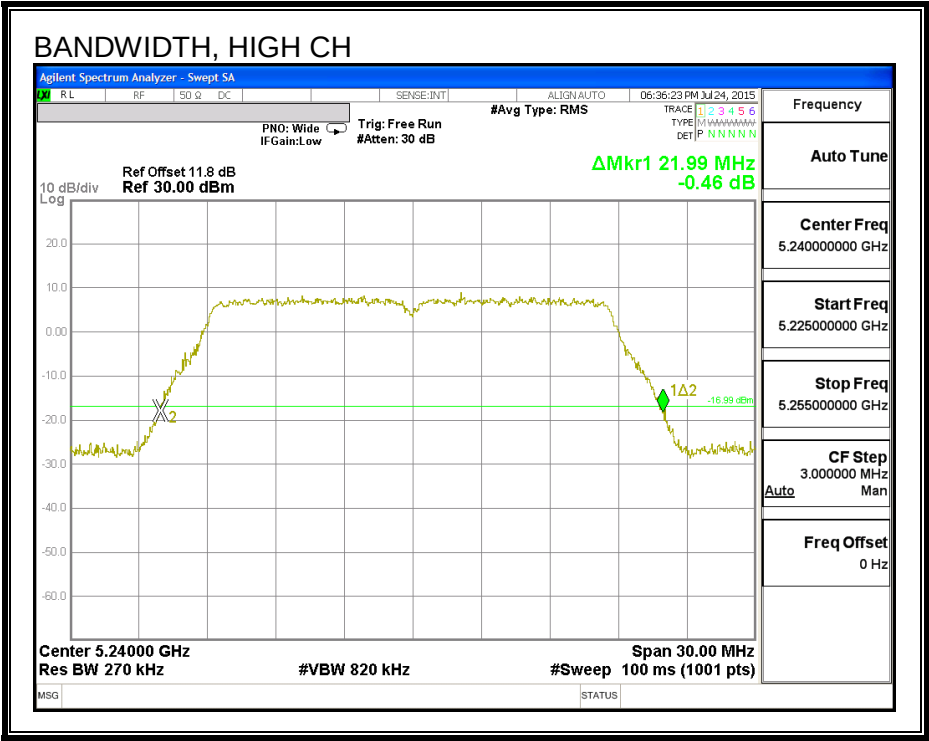
None; for reporting purposes only.

RESULTS

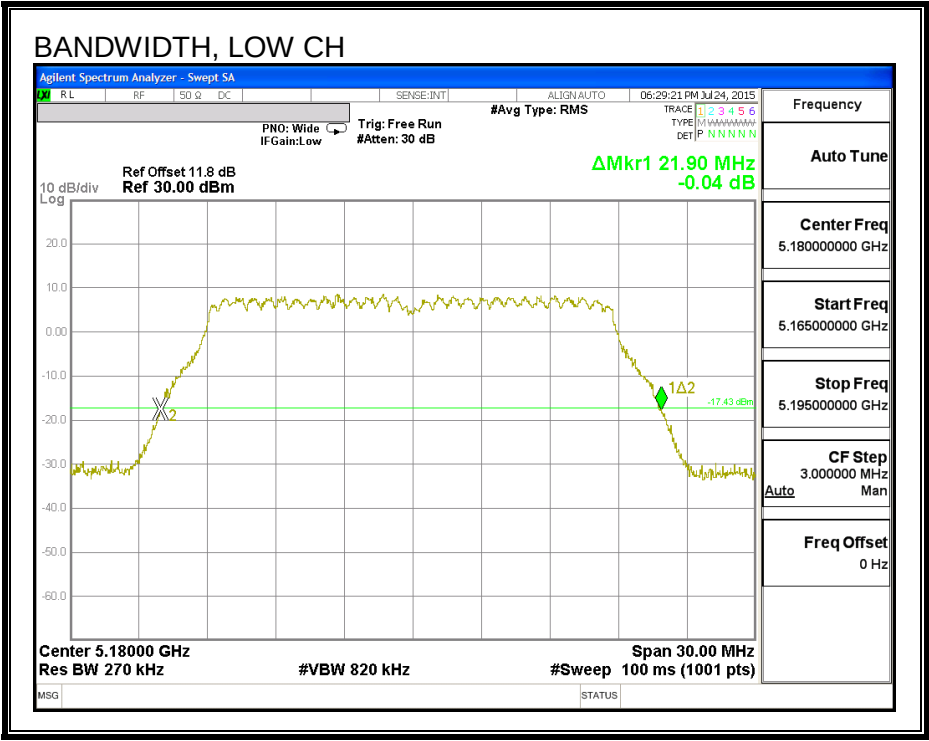
Channel	Frequency (MHz)	26 dB BW Chain 0 (MHz)	26 dB BW Chain 1 (MHz)
Low	5180	22.11	21.90
Mid	5200	21.99	21.90
High	5240	21.99	21.90

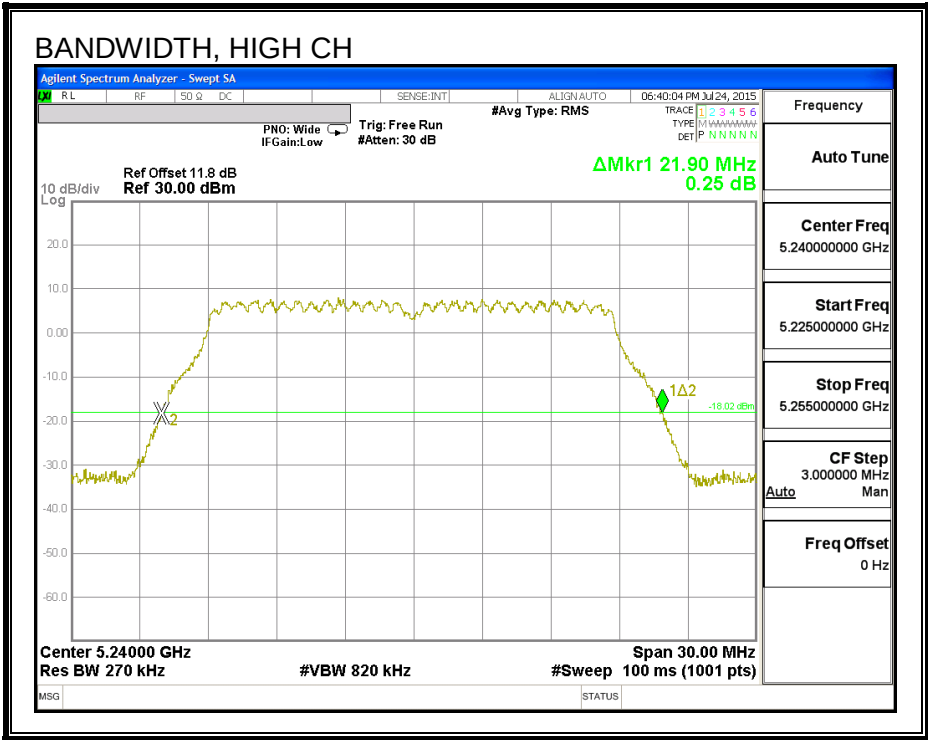
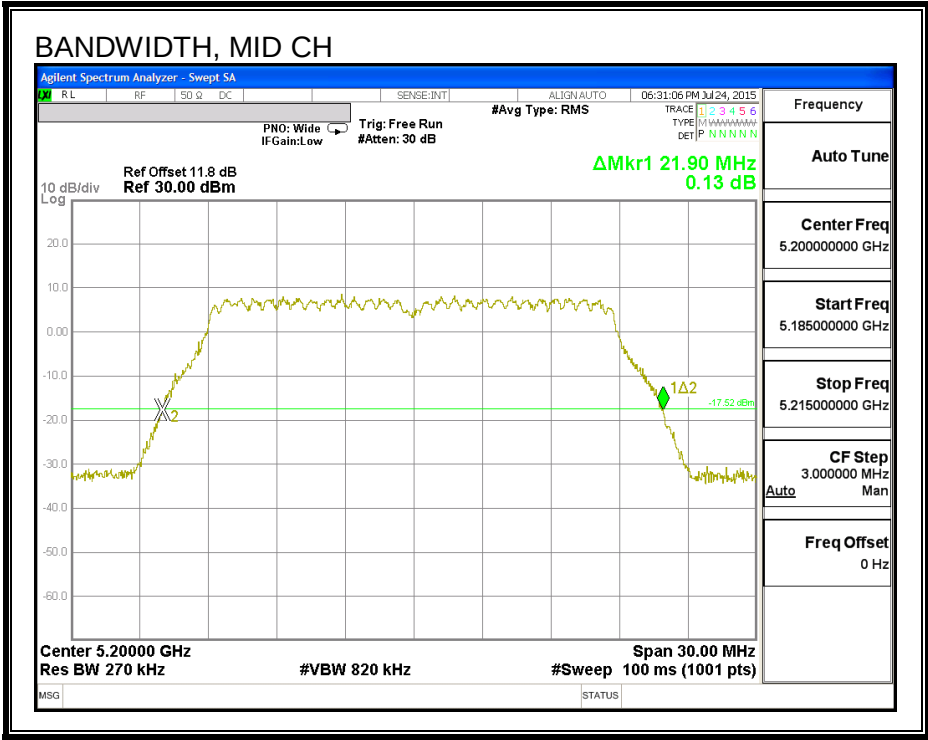
26 DB BANDWIDTH, CHAIN 0





26 DB BANDWIDTH, CHAIN 1





8.5.2. 99% BANDWIDTH

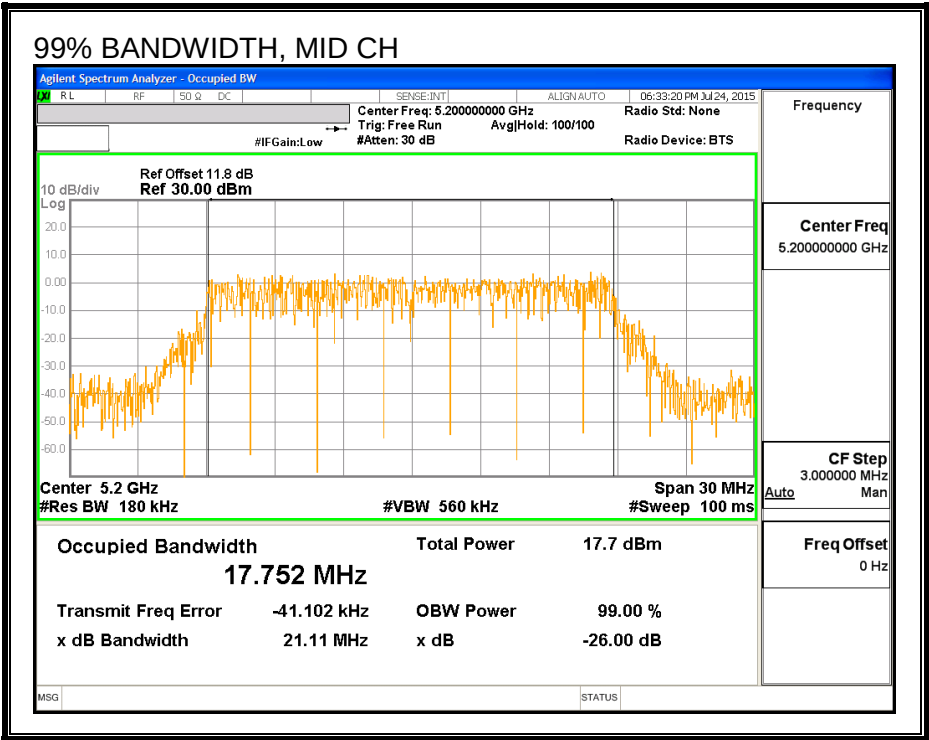
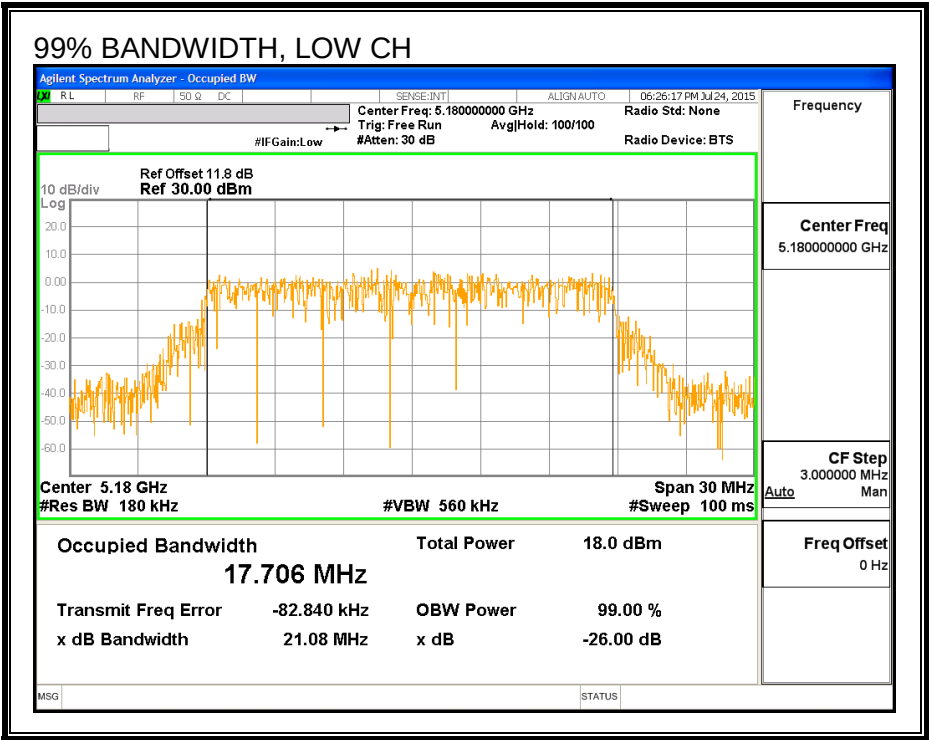
LIMITS

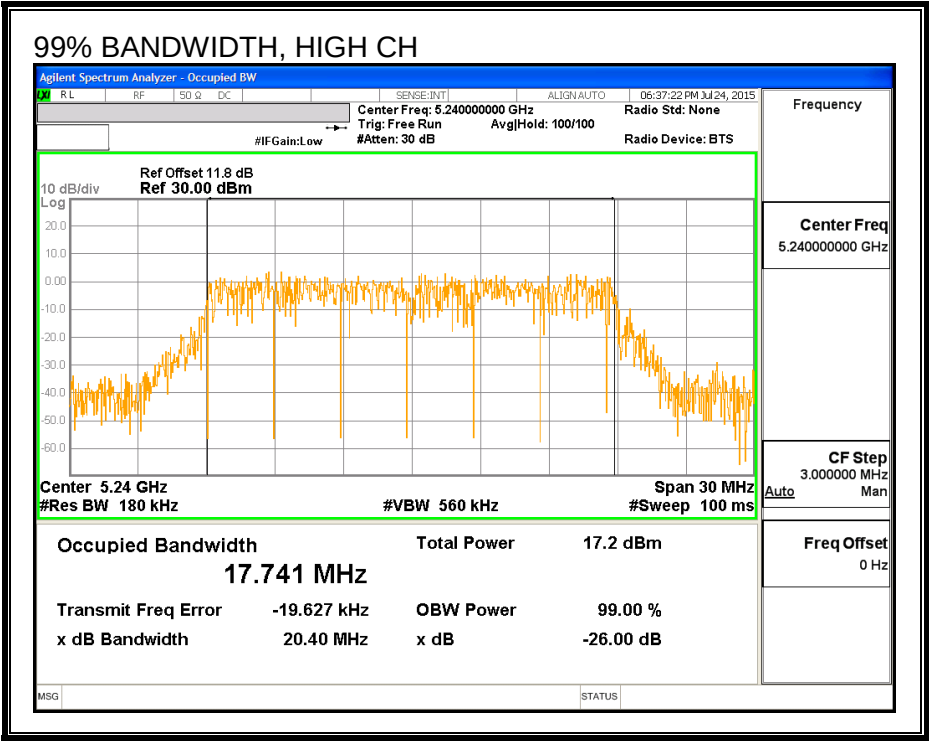
None; for reporting purposes only.

RESULTS

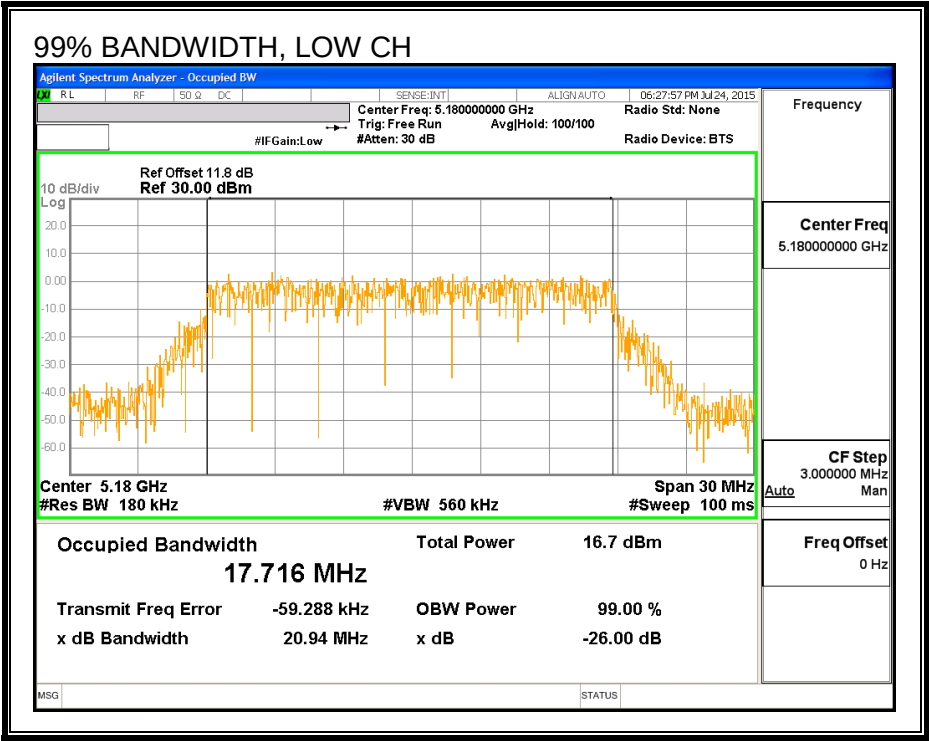
Channel	Frequency (MHz)	99% BW Chain 0 (MHz)	99% BW Chain 1 (MHz)
Low	5180	17.706	17.716
Mid	5200	17.752	17.710
High	5240	17.741	17.693

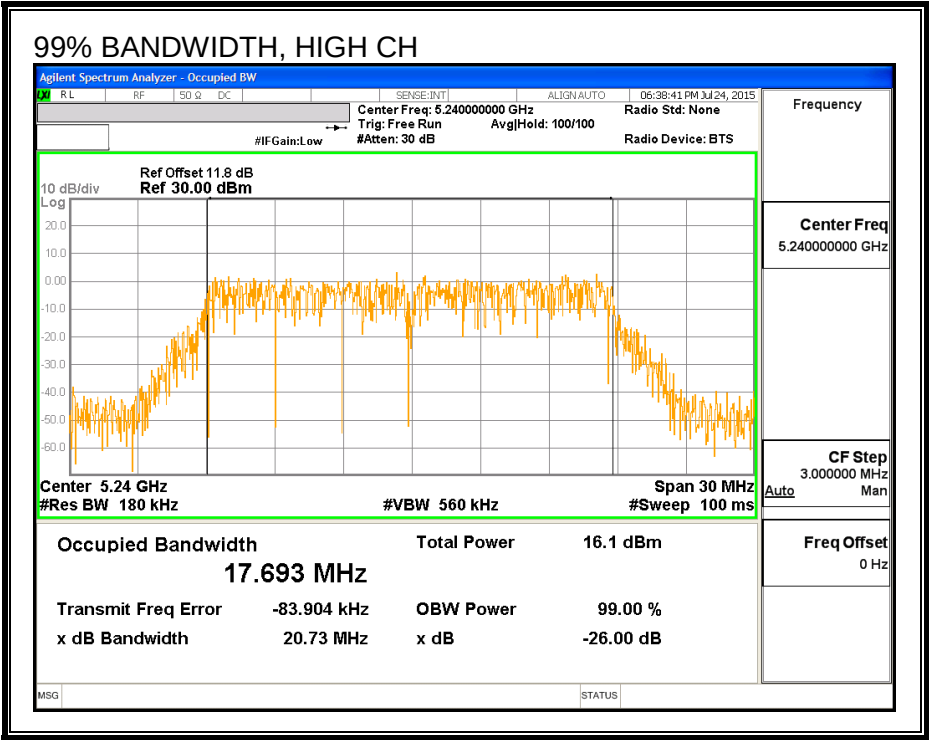
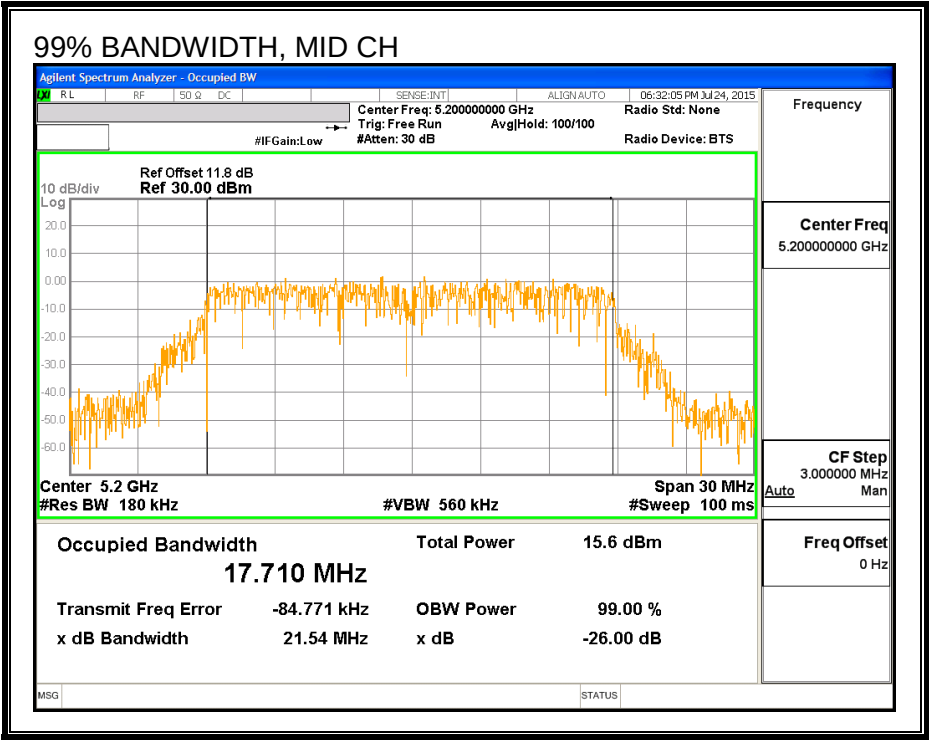
99% BANDWIDTH, CHAIN 0





99% BANDWIDTH, CHAIN 1





8.5.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

RESULTS

Channel	Frequency (MHz)	Chain 0 Power (dBm)	Chain 1 Power (dBm)	Total Power (dBm)
Low	5180	14.90	14.93	17.93
Mid	5200	16.49	16.46	19.49
High	5240	16.40	16.49	19.46

8.5.4. OUTPUT POWER AND PSD

LIMITS

FCC §15.407 (a) (1)

(i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 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. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 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.

(iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

(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.

DIRECTIONAL ANTENNA GAIN

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

Chain 0 Antenna Gain (dBi)	Chain 1 Antenna Gain (dBi)	Uncorrelated Chains Directional Gain (dBi)
1.90	2.30	2.10

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

Chain 0 Antenna Gain (dBi)	Chain 1 Antenna Gain (dBi)	Correlated Chains Directional Gain (dBi)
1.90	2.30	5.11

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	2.10	5.11	24.00	11.00
Mid	5200	2.10	5.11	24.00	11.00
High	5240	2.10	5.11	24.00	11.00

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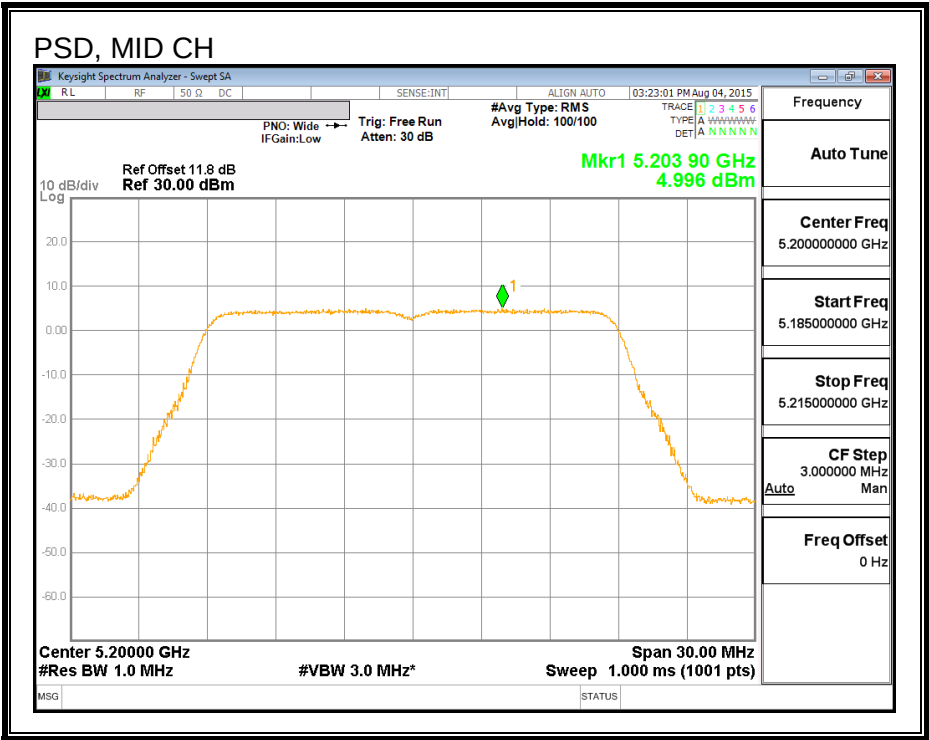
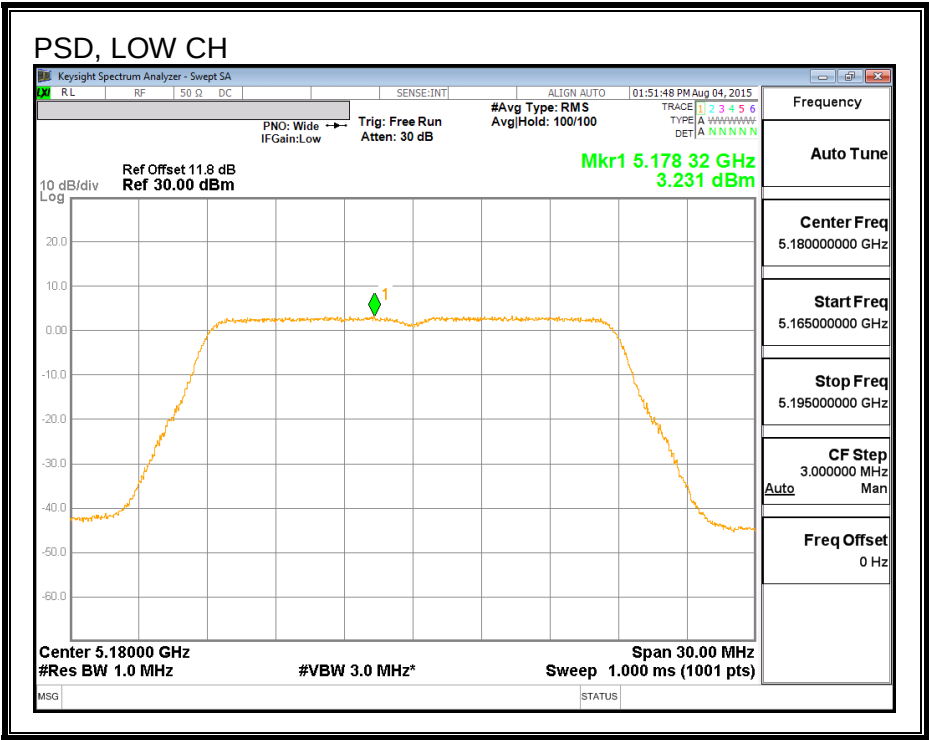
Output Power Results

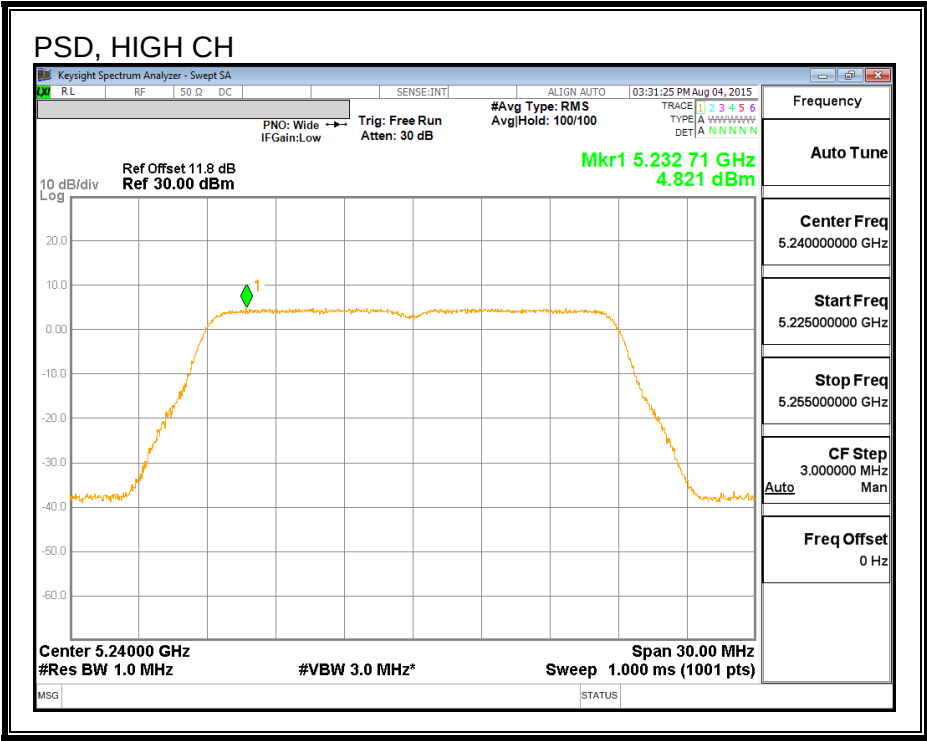
Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Chain 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5180	14.90	14.93	17.93	24.00	-6.07
Mid	5200	16.49	16.46	19.49	24.00	-4.51
High	5240	16.40	16.49	19.46	24.00	-4.54

PSD Results

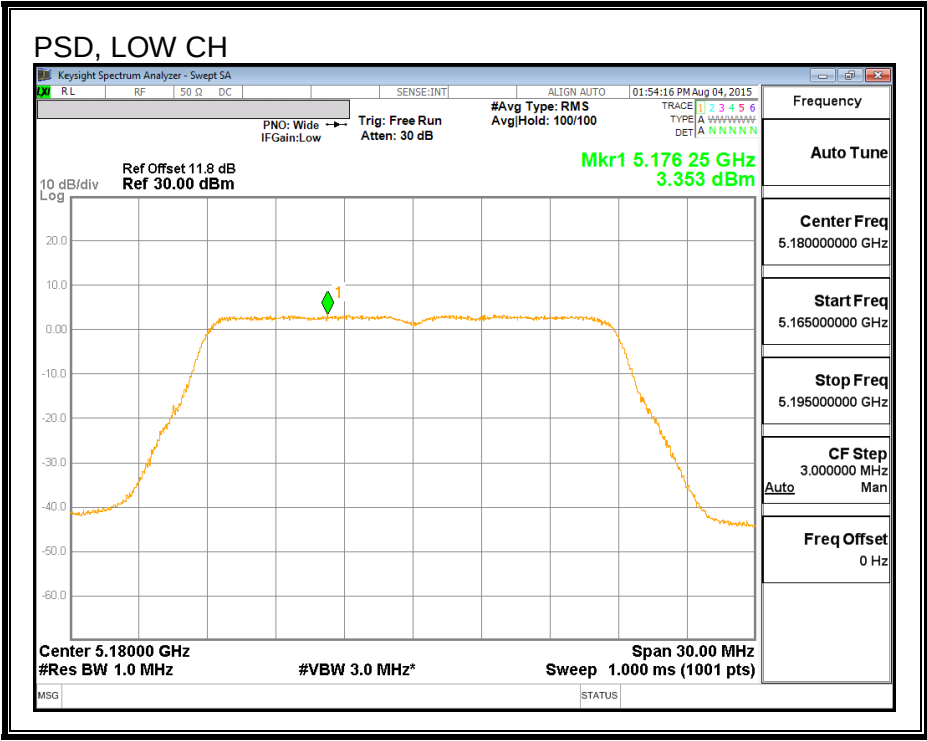
Channel	Frequency (MHz)	Chain 0 Meas PSD (dBm)	Chain 1 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low	5180	3.23	3.35	6.30	11.00	-4.70
Mid	5200	5.00	4.89	7.95	11.00	-3.05
High	5240	4.82	4.94	7.89	11.00	-3.11

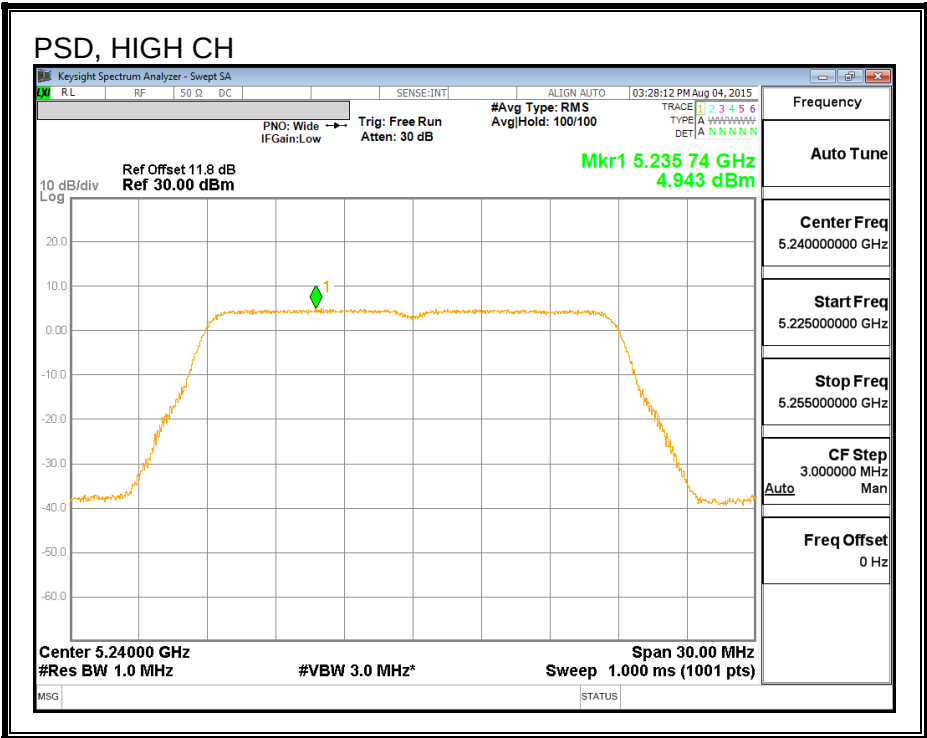
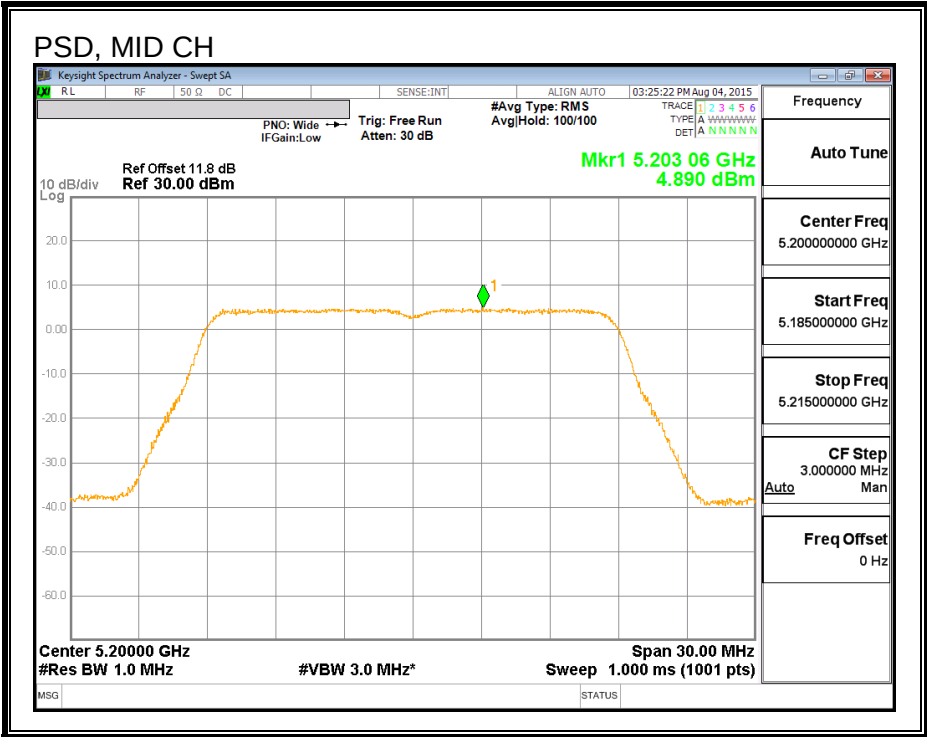
PSD, CHAIN 0





PSD, CHAIN 1





8.6. 802.11n HT20 2Tx STBC MODE IN THE 5.2 GHz BAND

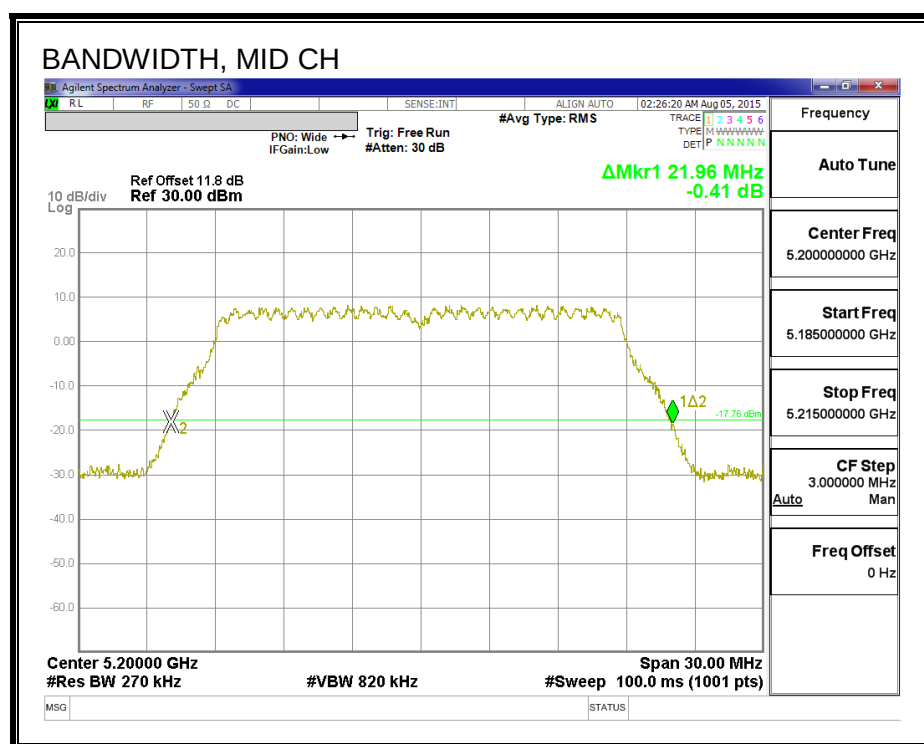
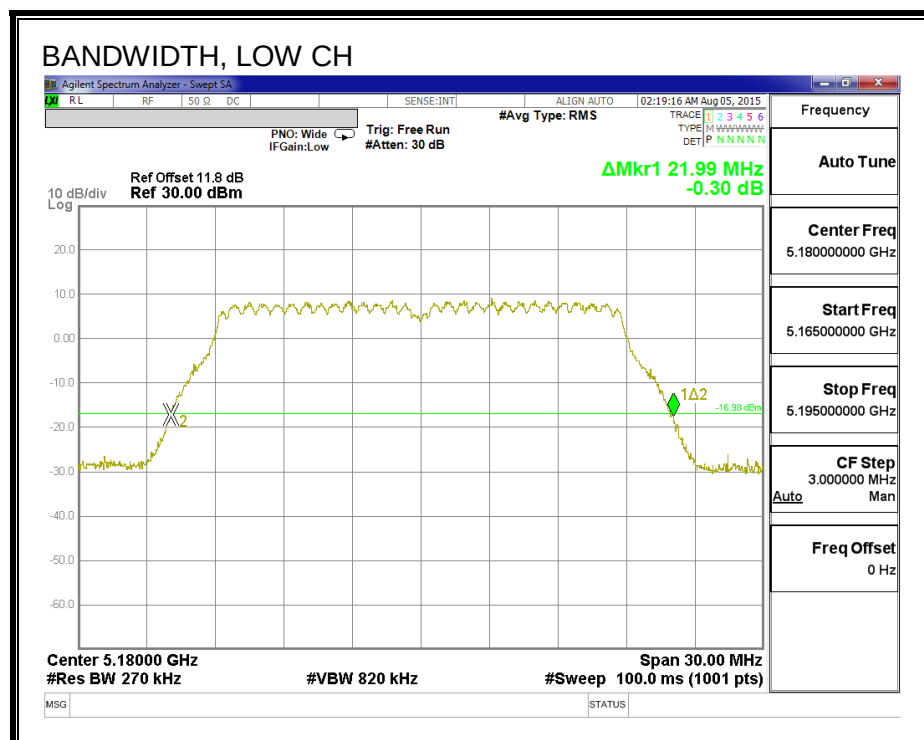
8.6.1. 26 dB BANDWIDTH

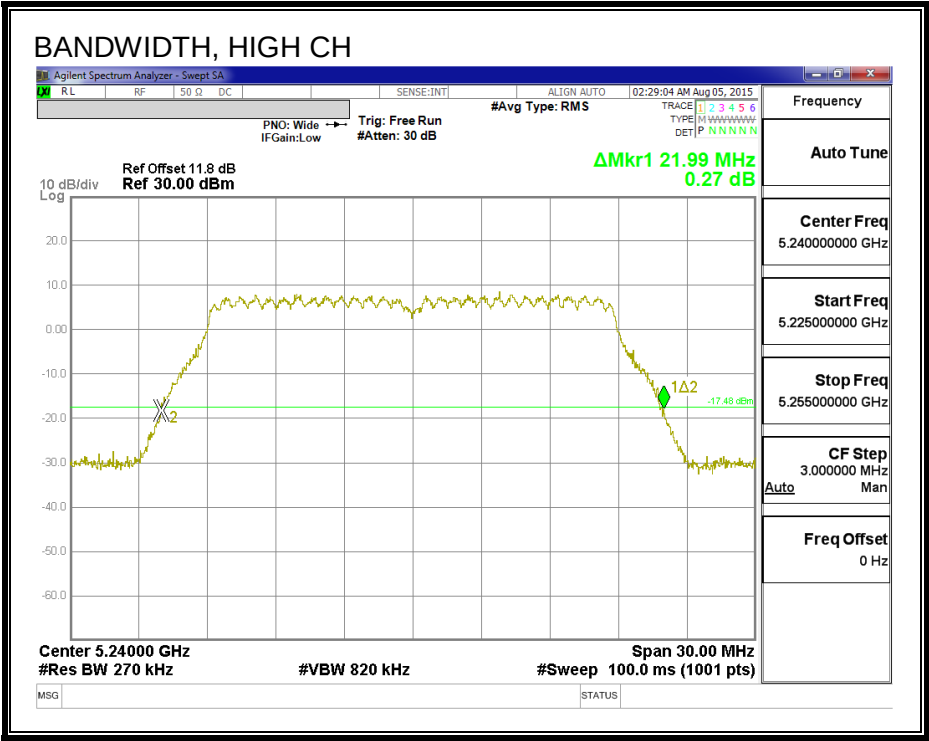
LIMITS

None; for reporting purposes only.

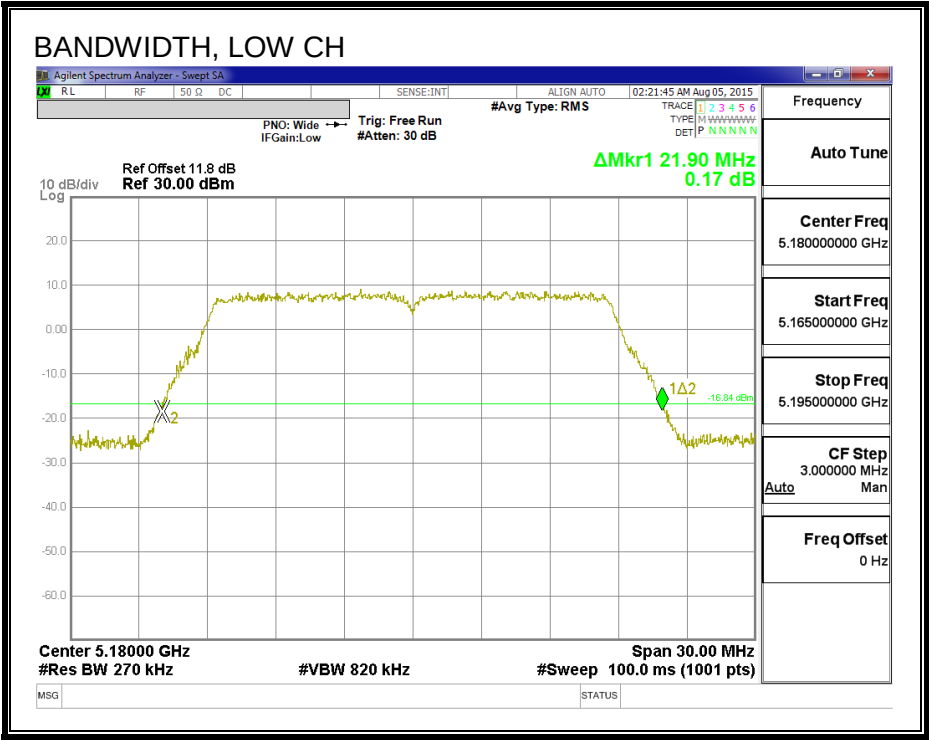
RESULTS

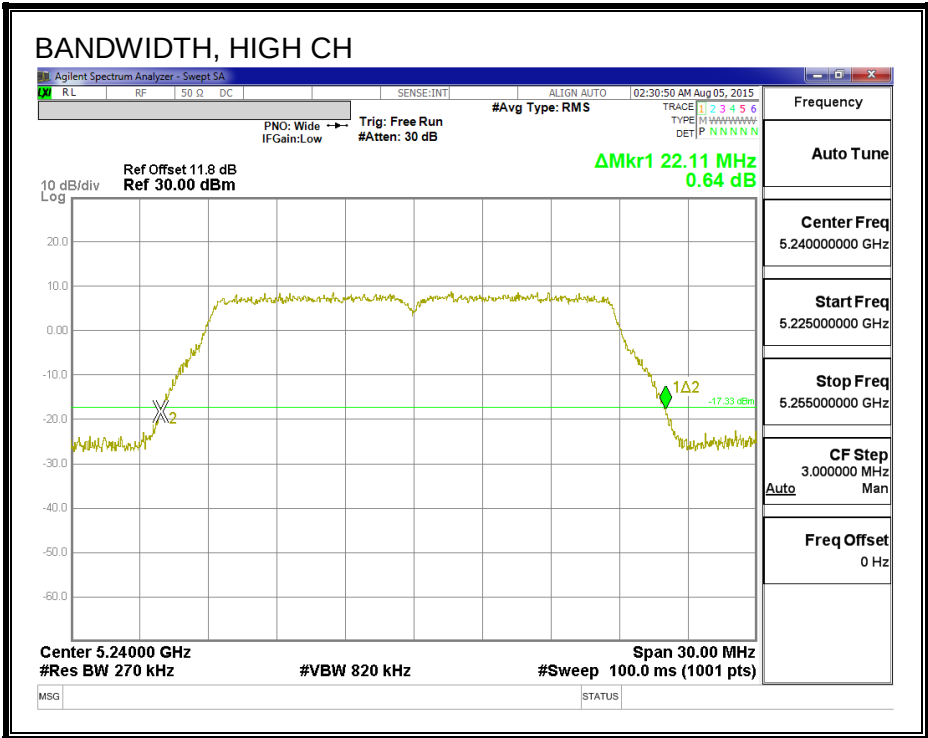
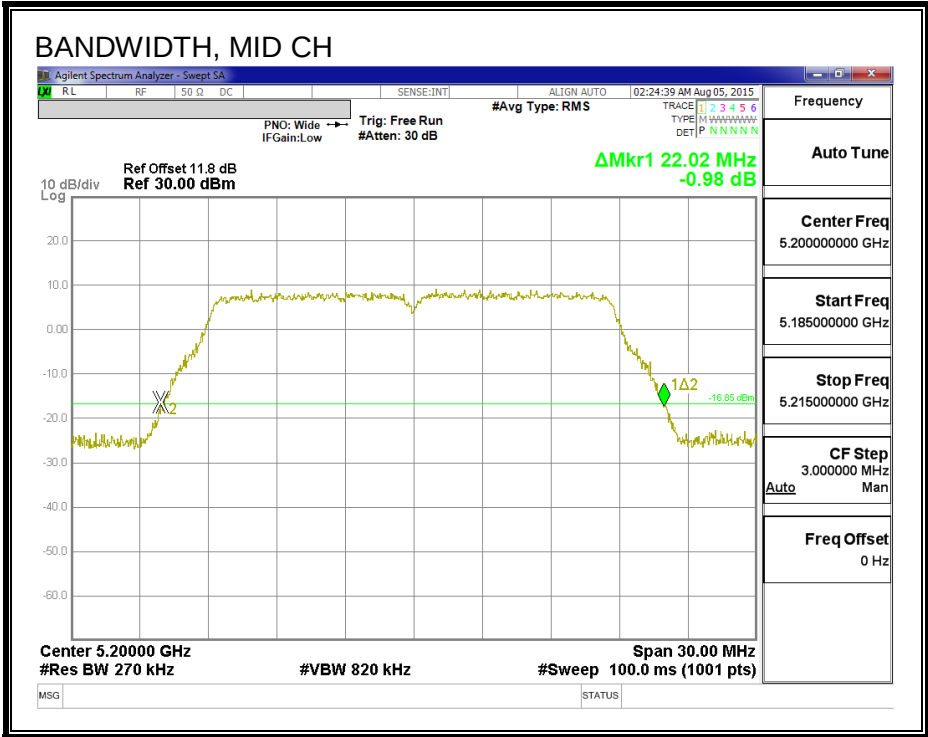
Channel	Frequency (MHz)	26 dB BW Chain 0 (MHz)	26 dB BW Chain 1 (MHz)
Low	5180	21.99	21.90
Mid	5200	21.96	22.02
High	5240	21.99	22.11





26 DB BANDWIDTH, CHAIN 1





8.6.2. 99% BANDWIDTH

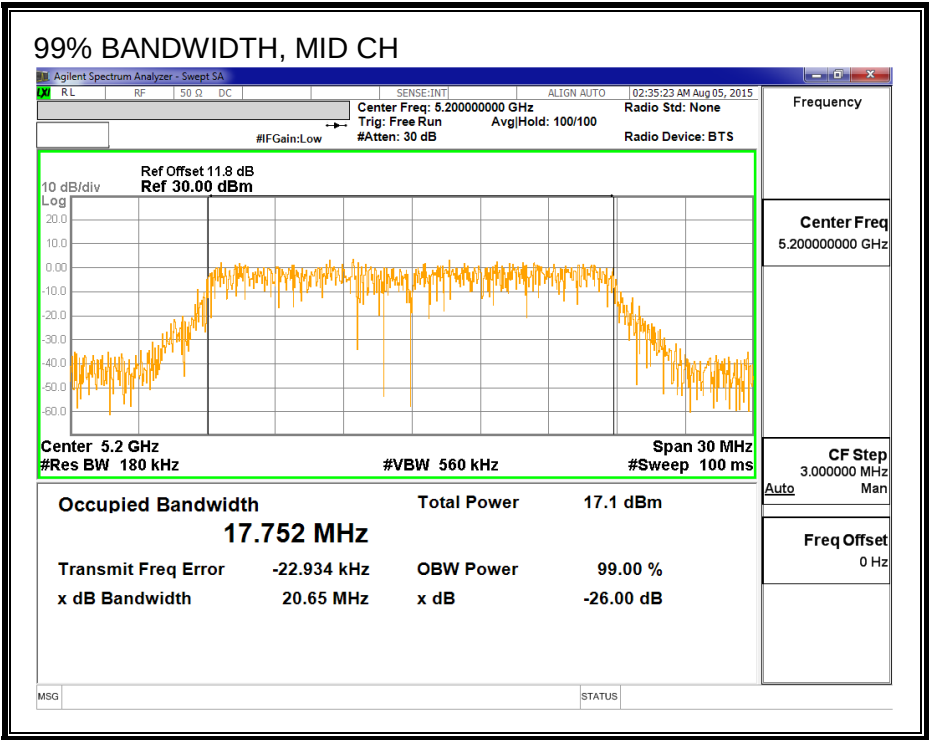
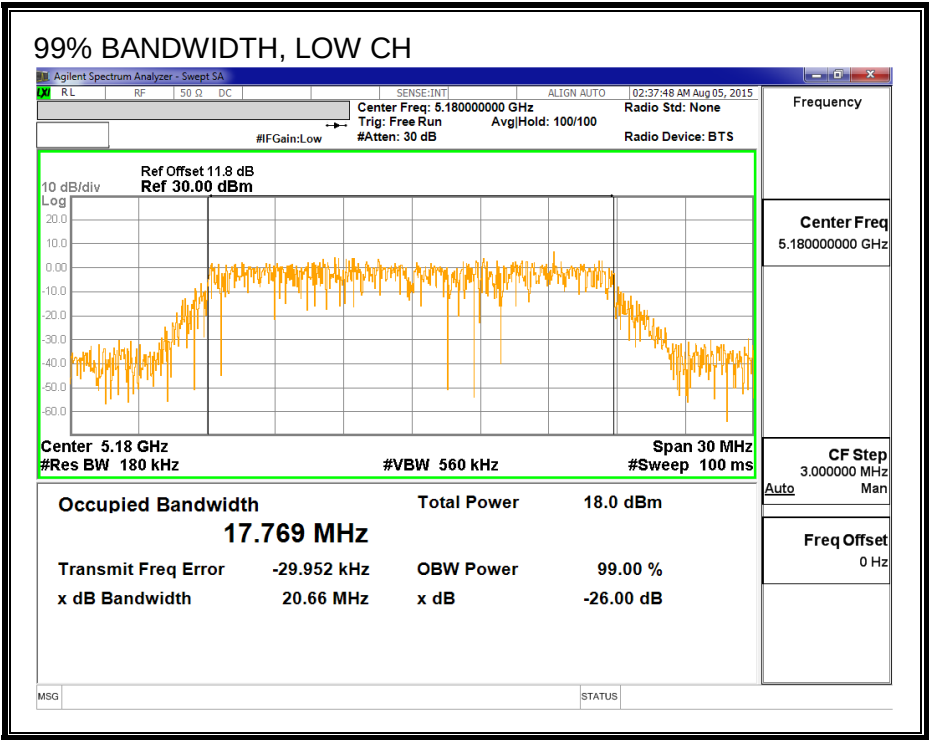
LIMITS

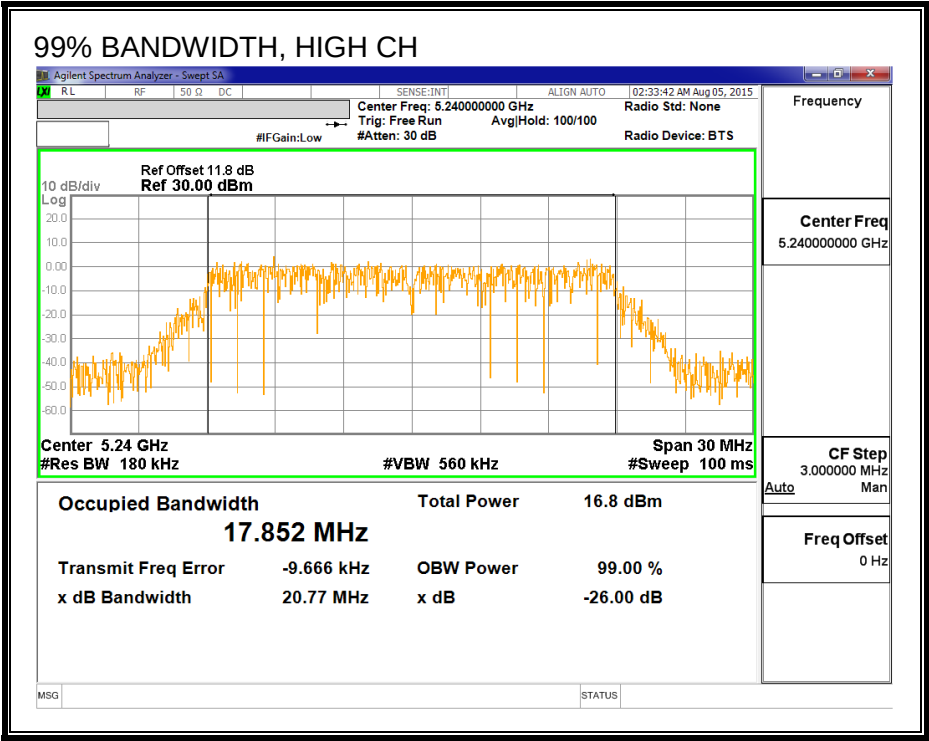
None; for reporting purposes only.

RESULTS

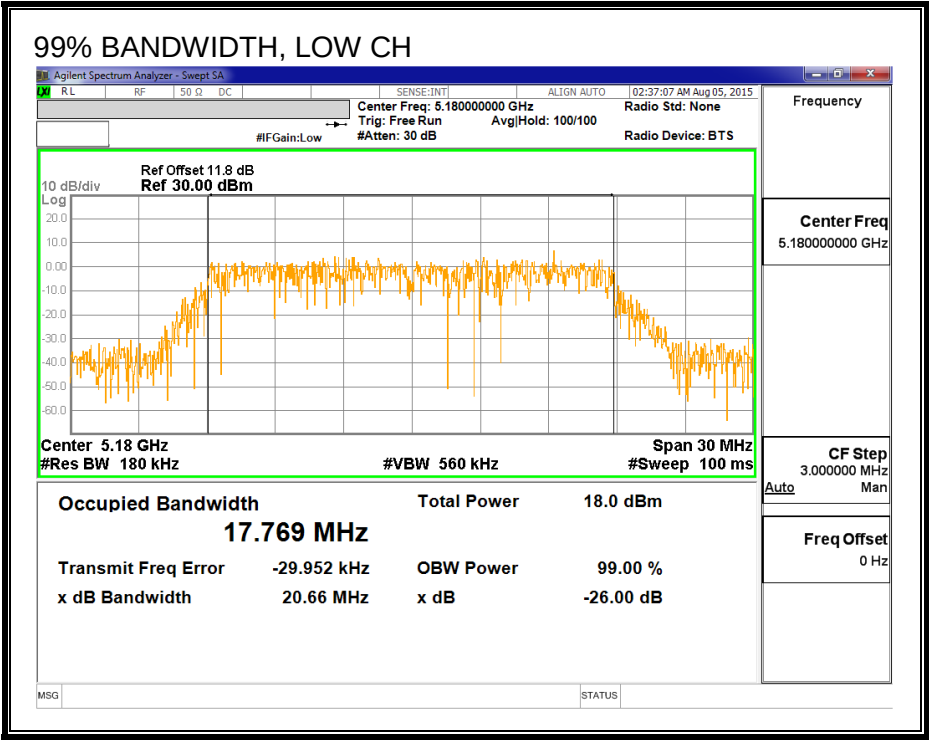
Channel	Frequency (MHz)	99% BW Chain 0 (MHz)	99% BW Chain 1 (MHz)
Low	5180	17.769	17.769
Mid	5200	17.752	17.661
High	5240	17.852	17.747

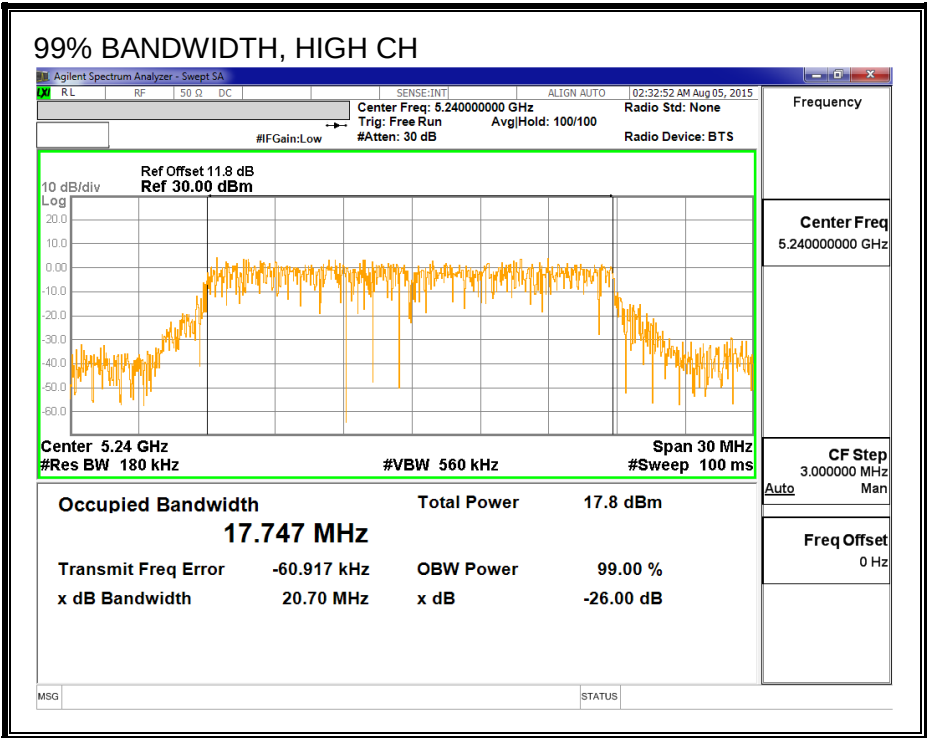
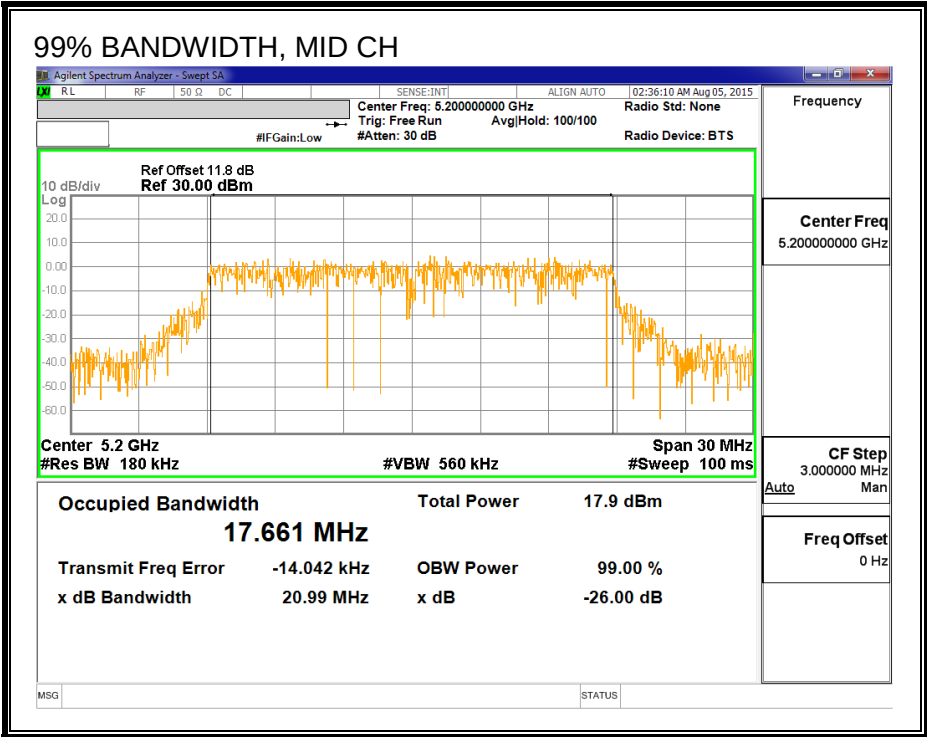
99% BANDWIDTH, CHAIN 0





99% BANDWIDTH, CHAIN 1





8.6.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

RESULTS

Channel	Frequency (MHz)	Chain 0 Power (dBm)	Chain 1 Power (dBm)	Total Power (dBm)
Low	5180	14.82	14.77	17.81
Mid	5200	16.92	17.00	19.97
High	5240	16.97	16.98	19.99

8.6.4. OUTPUT POWER AND PSD

LIMITS

FCC §15.407 (a) (1)

(i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 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. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 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.

(iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

(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.

DIRECTIONAL ANTENNA GAIN

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

Chain 0 Antenna Gain (dBi)	Chain 1 Antenna Gain (dBi)	Uncorrelated Chains Directional Gain (dBi)
1.90	2.30	2.10

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	2.10	2.10	24.00	11.00
Mid	5200	2.10	2.10	24.00	11.00
High	5240	2.10	2.10	24.00	11.00

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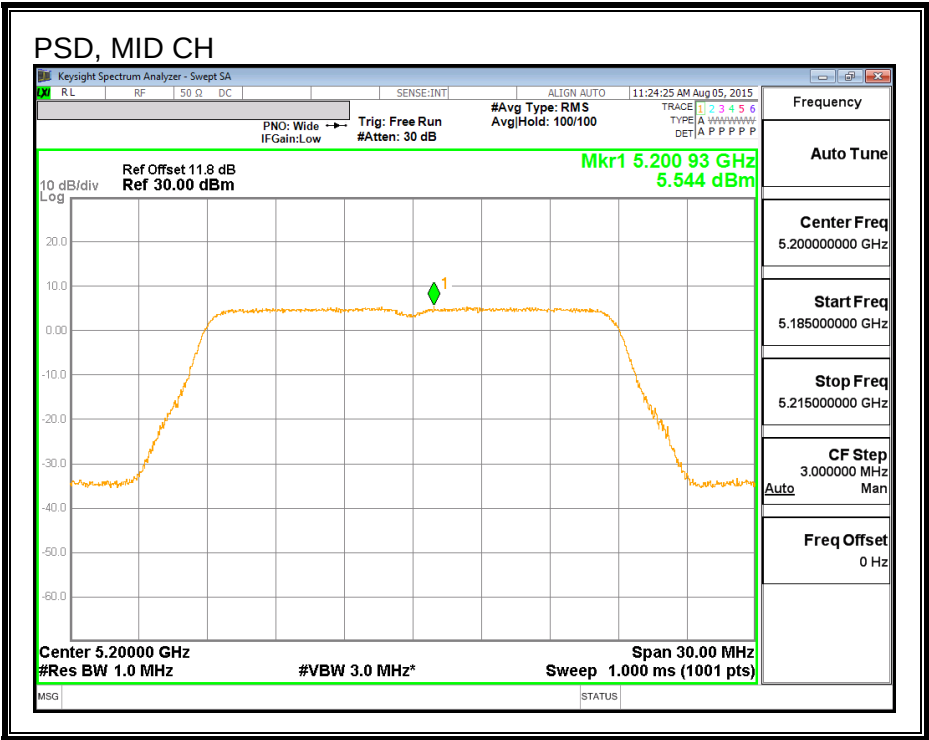
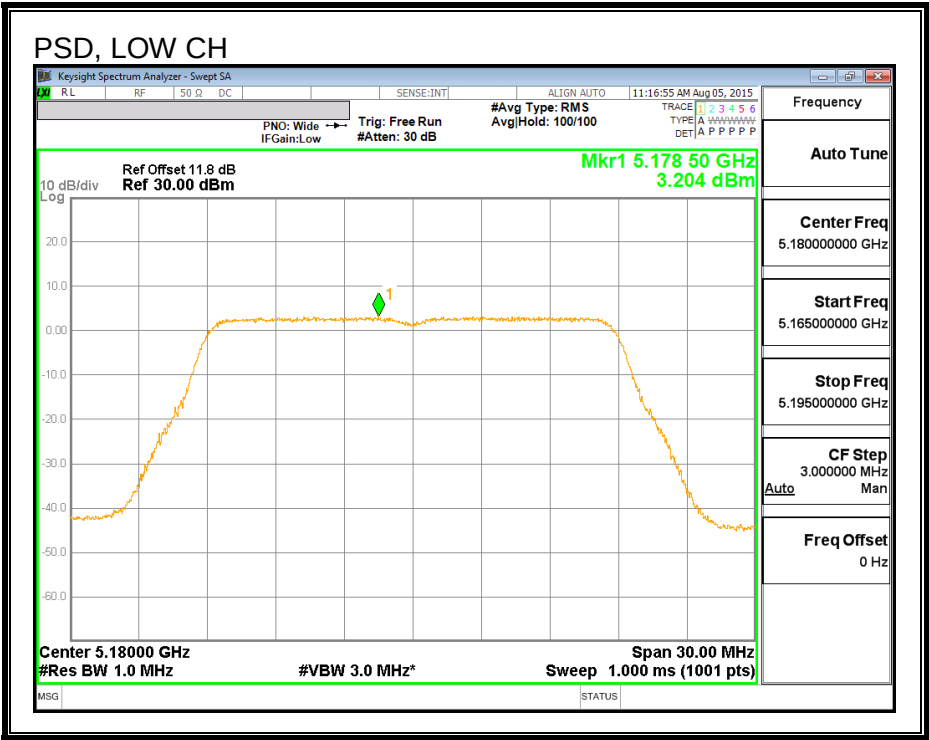
Output Power Results

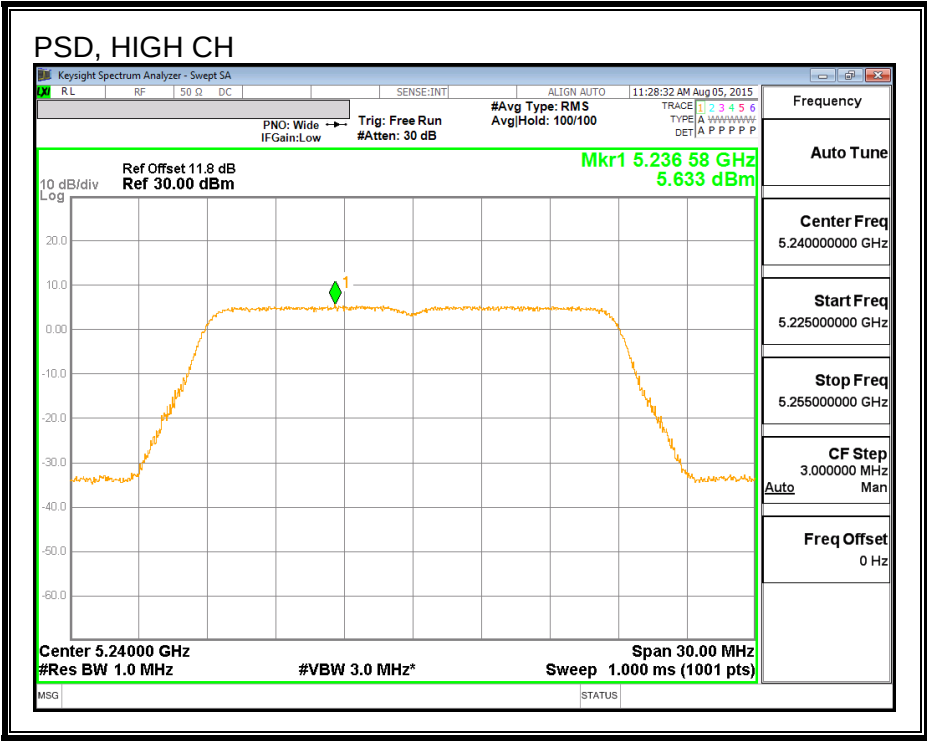
Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Chain 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5180	14.82	14.77	17.81	24.00	-6.19
Mid	5200	16.92	17.00	19.97	24.00	-4.03
High	5240	16.97	16.98	19.99	24.00	-4.01

PSD Results

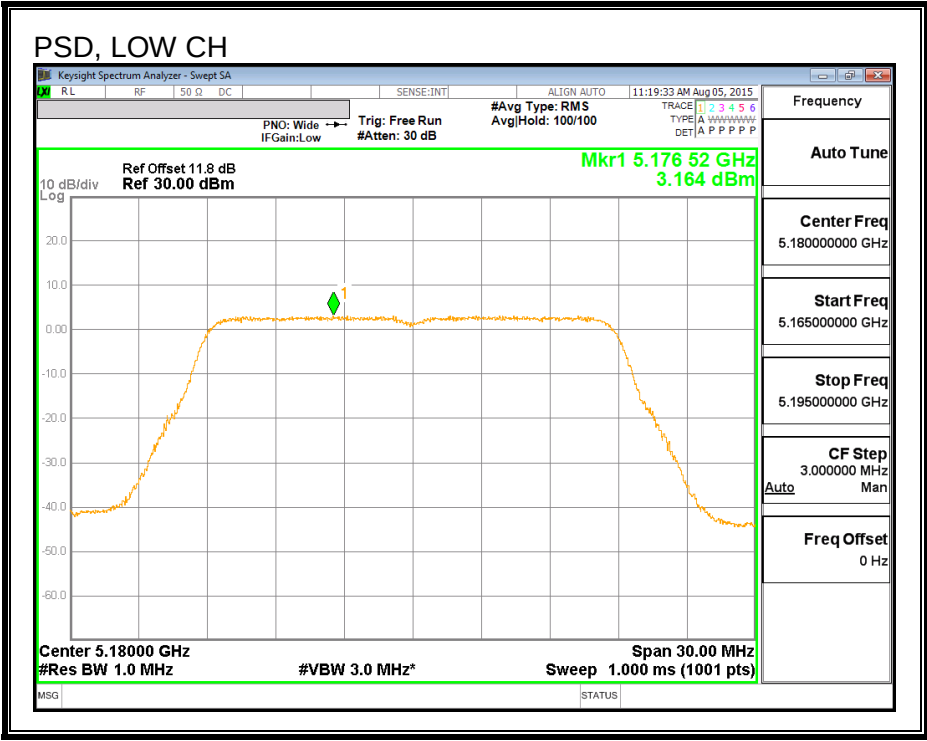
Channel	Frequency (MHz)	Chain 0 Meas PSD (dBm)	Chain 1 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low	5180	3.20	3.16	6.19	11.00	-4.81
Mid	5200	5.54	5.68	8.62	11.00	-2.38
High	5240	5.63	5.64	8.65	11.00	-2.35

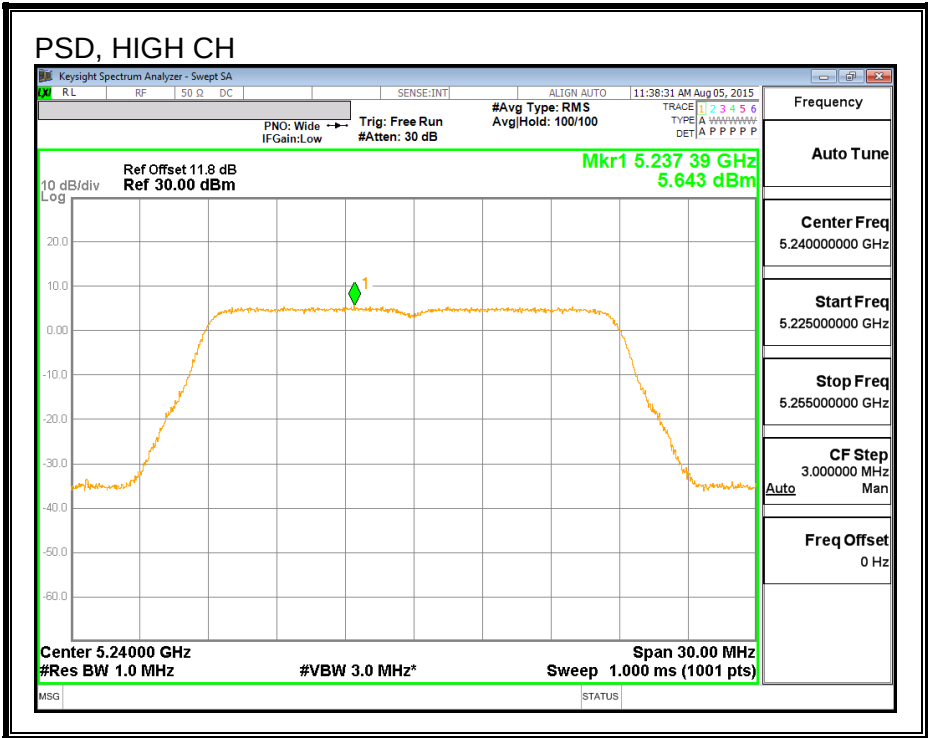
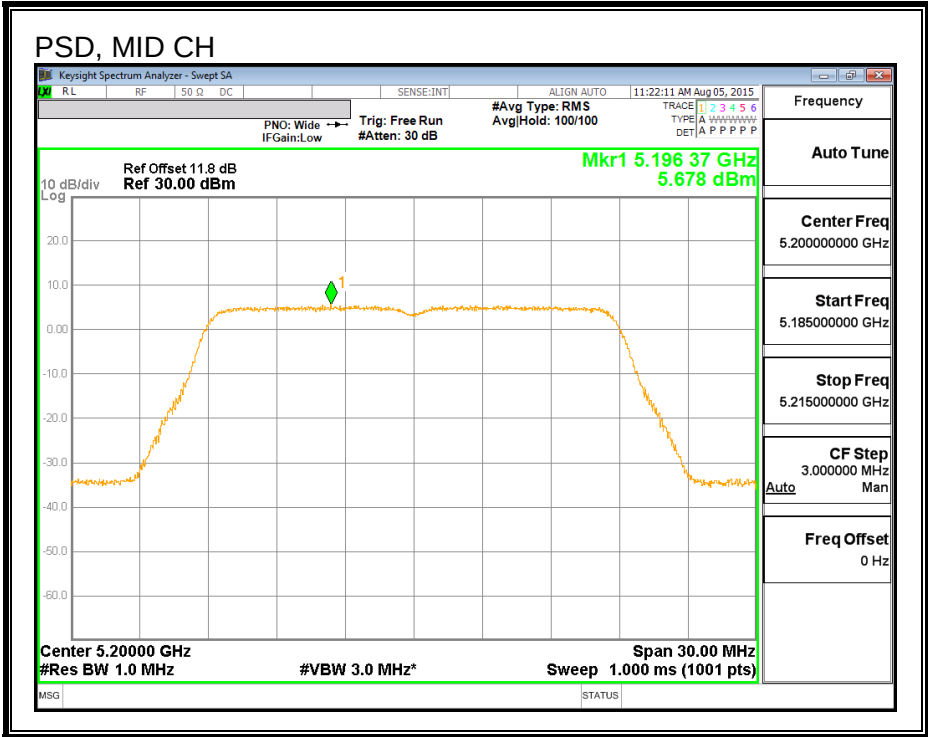
PSD, CHAIN 0





PSD, CHAIN 1





8.7. 802.11n HT20 2Tx SDM MODE IN THE 5.2 GHz BAND

Note: Covered by 802.11n HT20 2Tx STBC MODE

8.9. 802.11n HT40 CHAIN 0 MODE IN THE 5.2 GHz BAND

8.9.1. 26 dB BANDWIDTH

LIMITS

None; for reporting purposes only.

RESULTS

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Low	5190	40.32
High	5230	40.32

8.9.2. 99% BANDWIDTH

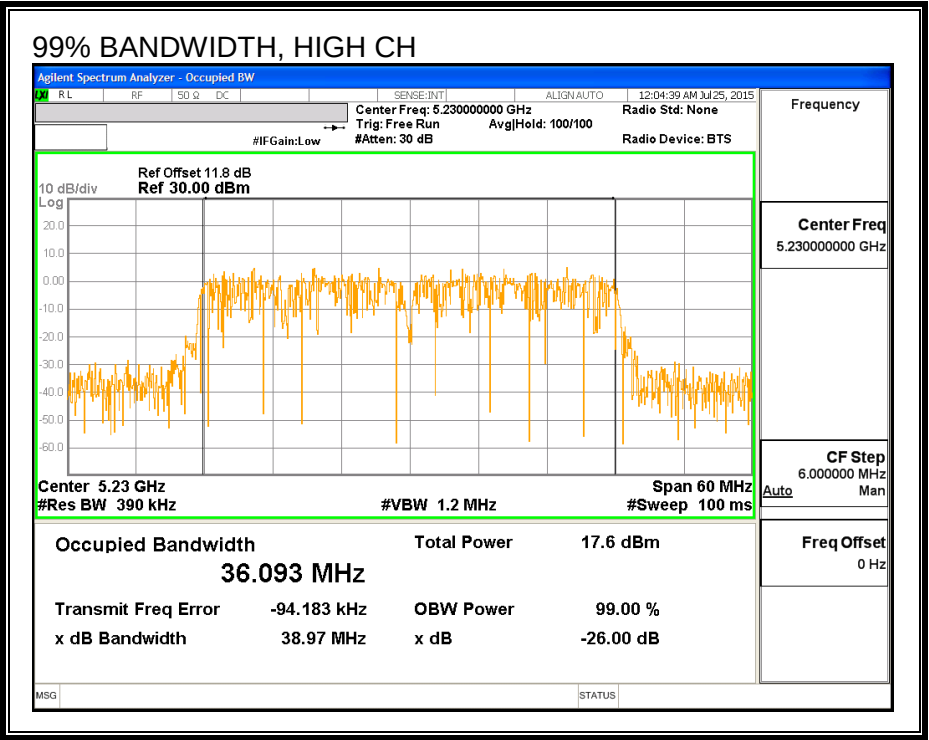
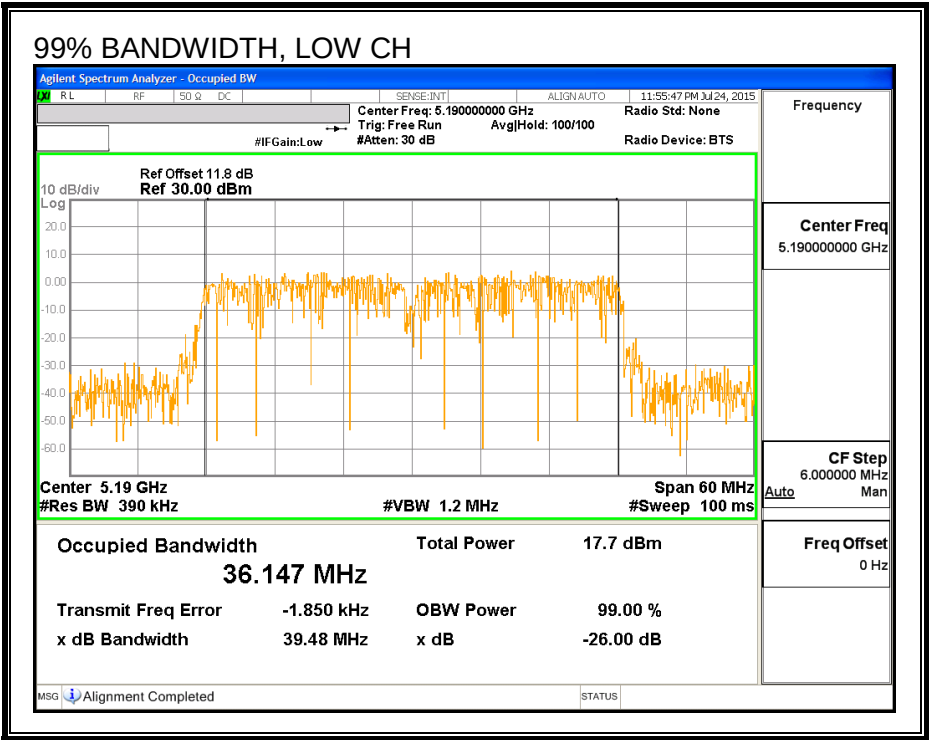
LIMITS

None; for reporting purposes only.

RESULTS

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5190	36.147
High	5230	36.093

99% BANDWIDTH



8.9.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

RESULTS

Channel	Frequency (MHz)	Power (dBm)
Low	5190	14.32
High	5230	16.90

8.9.4. OUTPUT POWER AND PSD

LIMITS

FCC §15.407 (a) (1)

(i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 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. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 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.

(iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple colocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

(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.

DIRECTIONAL ANTENNA GAIN

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

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	1.90	1.90	24.00	11.00
High	5230	1.90	1.90	24.00	11.00

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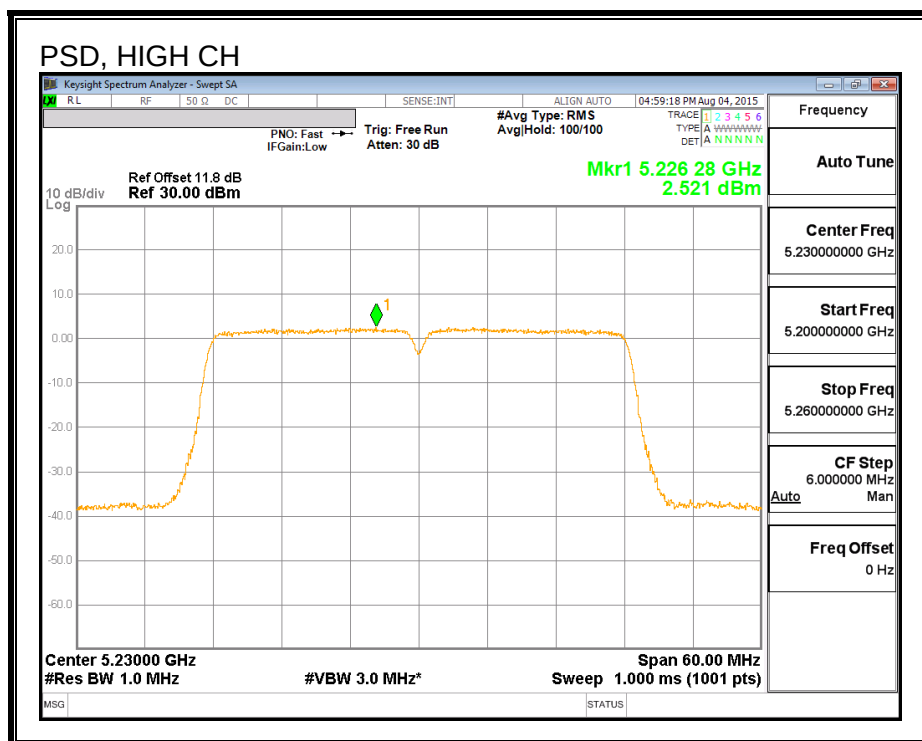
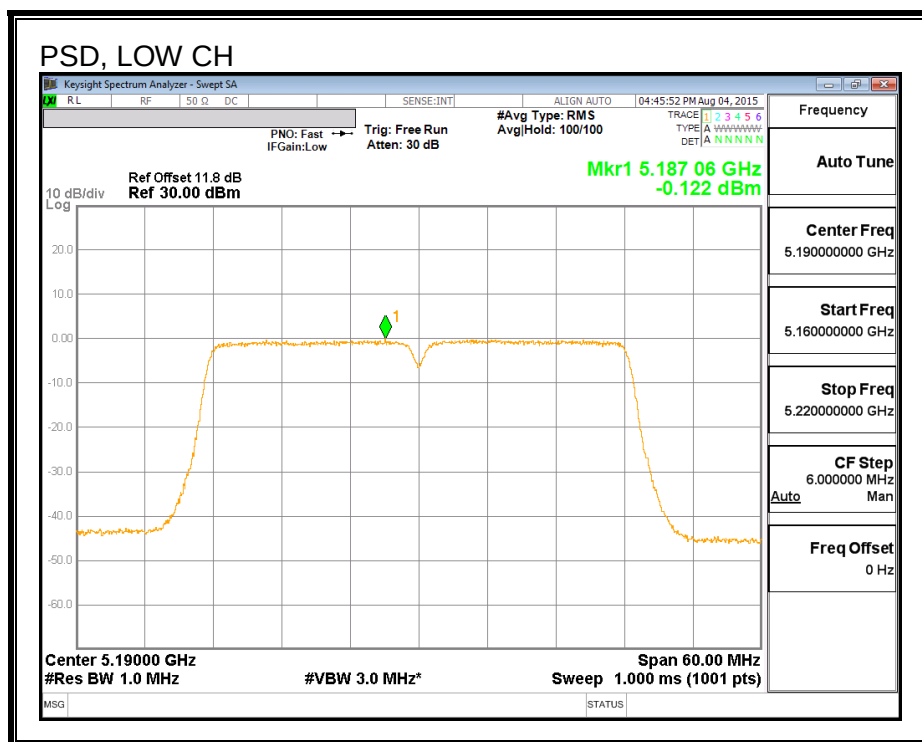
Output Power Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5190	14.32	14.32	24.00	-9.68
High	5230	16.90	16.90	24.00	-7.10

PSD Results

Channel	Frequency (MHz)	Chain 0 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low	5190	-0.12	-0.12	11.00	-11.12
High	5230	2.52	2.52	11.00	-8.48

PSD



8.10. 802.11n HT40 CHAIN 1 MODE IN THE 5.2 GHz BAND

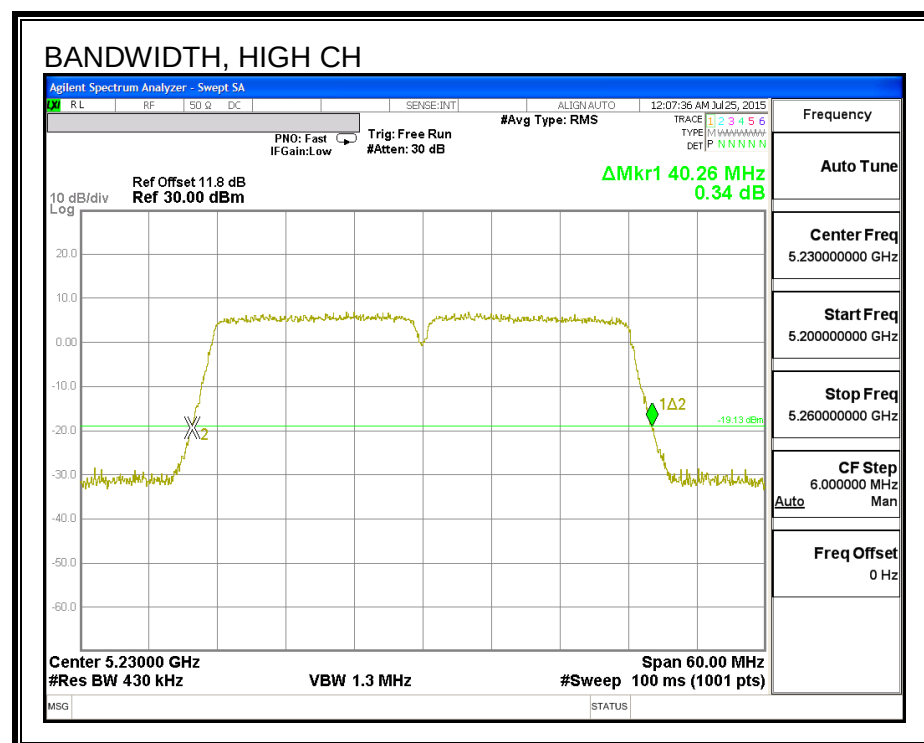
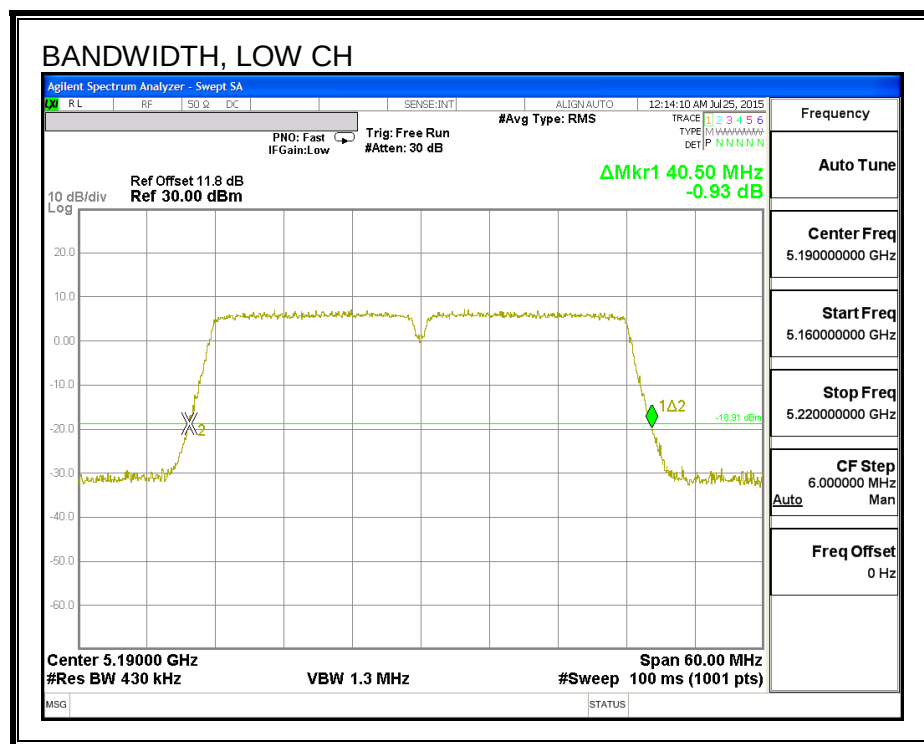
8.10.1. 26 dB BANDWIDTH

LIMITS

None; for reporting purposes only.

RESULTS

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Low	5190	40.50
High	5230	40.26



8.10.2. 99% BANDWIDTH

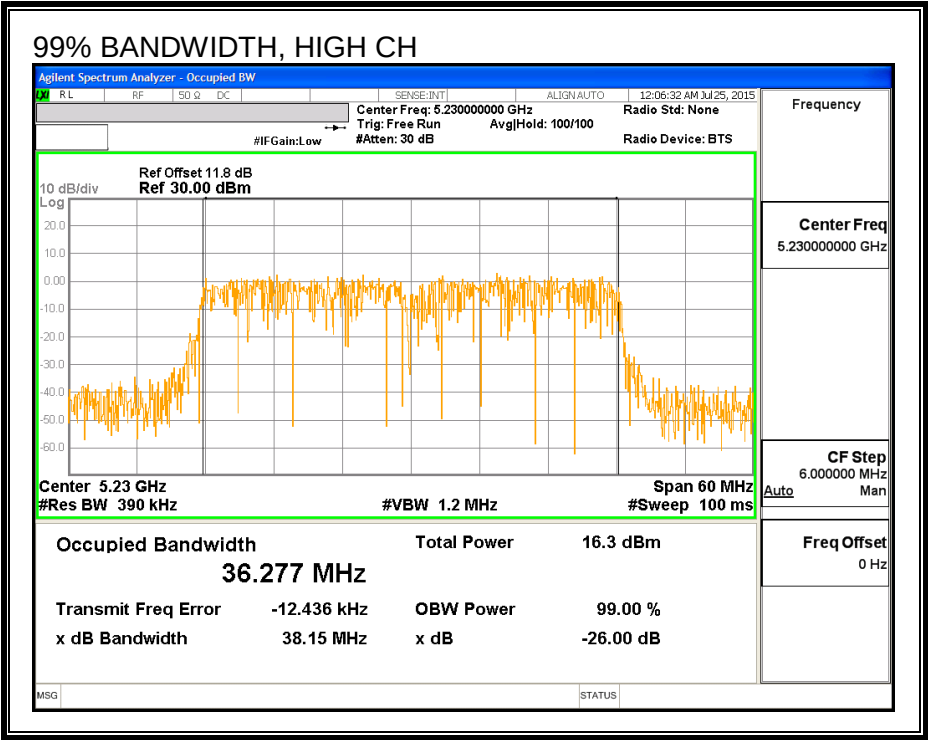
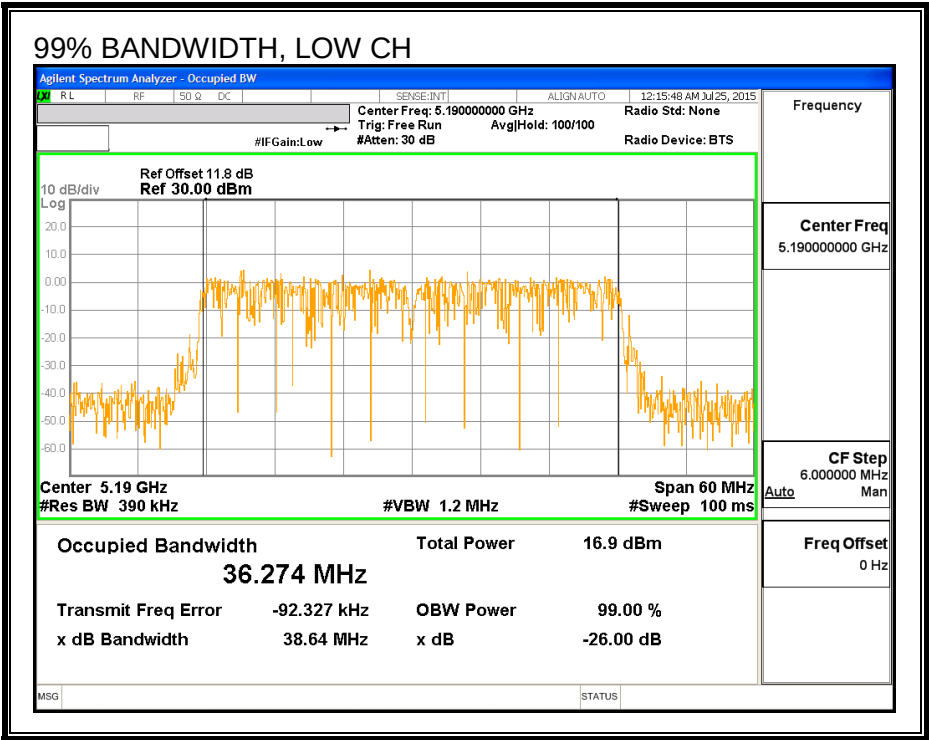
LIMITS

None; for reporting purposes only.

RESULTS

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5190	36.274
High	5230	36.277

99% BANDWIDTH



8.10.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

RESULTS

Channel	Frequency (MHz)	Power (dBm)
Low	5190	14.42
High	5230	16.79

8.10.4. OUTPUT POWER AND PSD

LIMITS

FCC §15.407 (a) (1)

(i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 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. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 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.

(iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple colocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

(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.

DIRECTIONAL ANTENNA GAIN

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

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	2.30	2.30	24.00	11.00
High	5230	2.30	2.30	24.00	11.00

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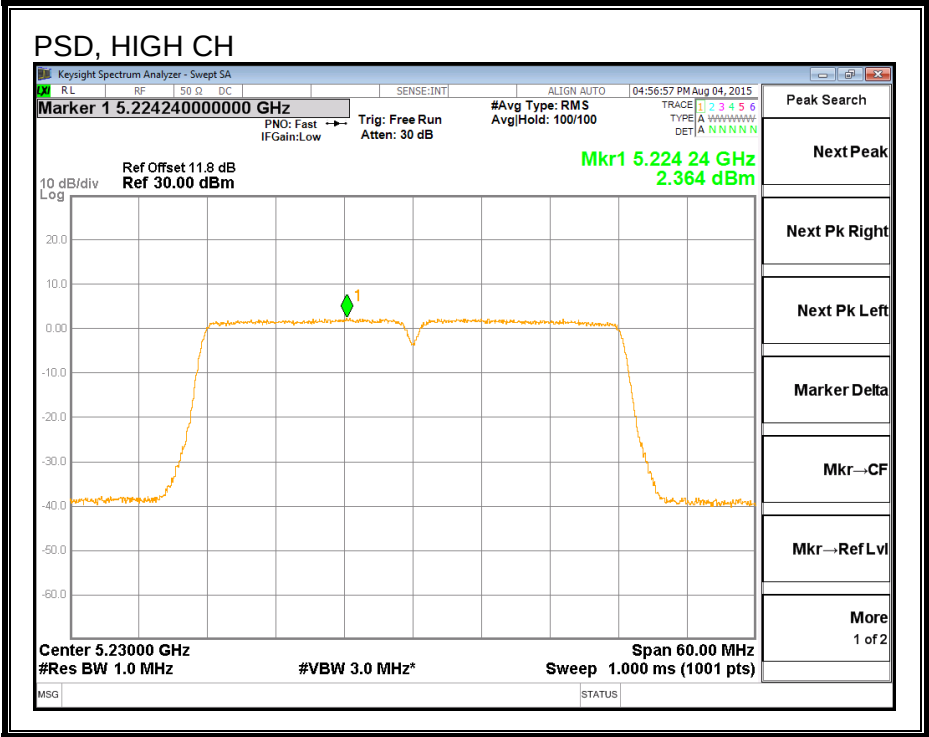
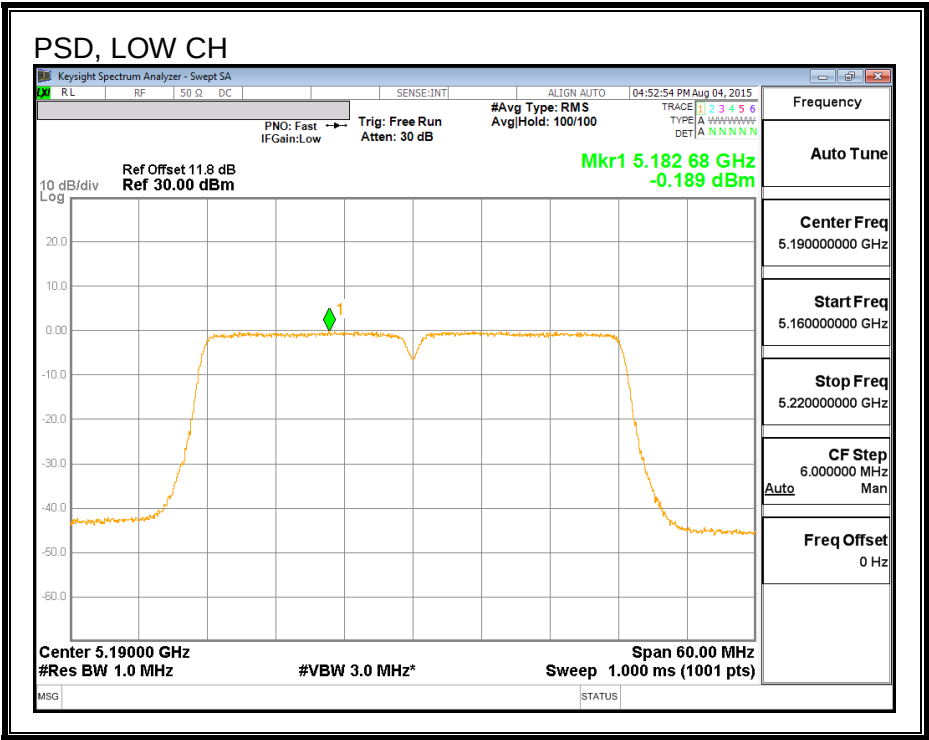
Output Power Results

Channel	Frequency (MHz)	Chain 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5190	14.42	14.42	24.00	-9.58
High	5230	16.79	16.79	24.00	-7.21

PSD Results

Channel	Frequency (MHz)	Chain 1 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low	5190	-0.19	-0.19	11.00	-11.19
High	5230	2.36	2.36	11.00	-8.64

PSD



8.11. 802.11n HT40 2Tx CDD MODE IN THE 5.2 GHz BAND

8.11.1. 26 dB BANDWIDTH

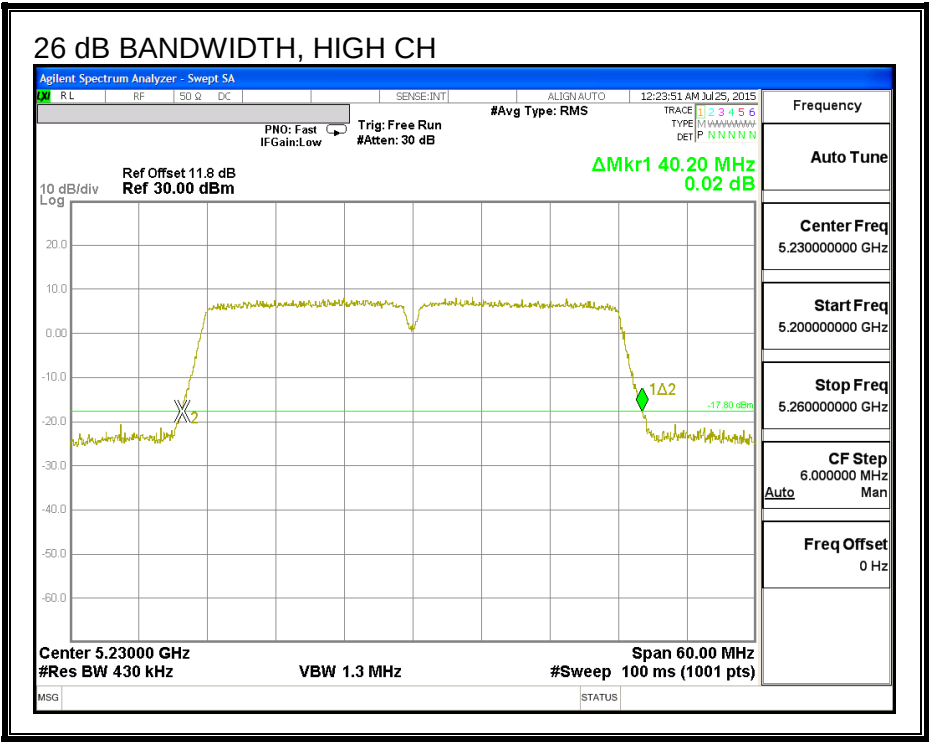
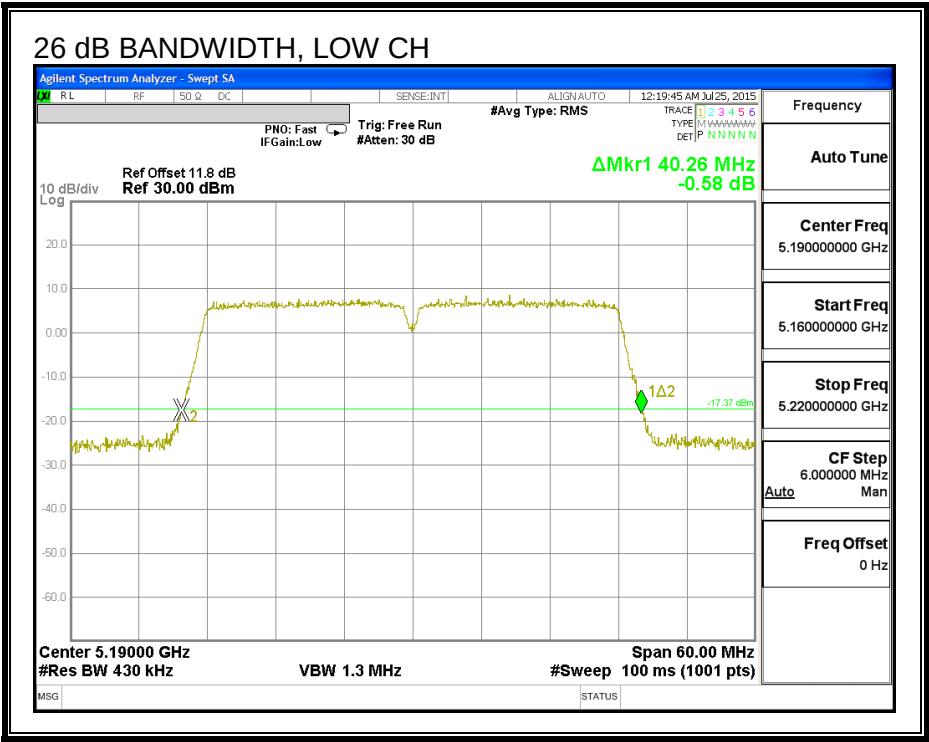
LIMITS

None; for reporting purposes only.

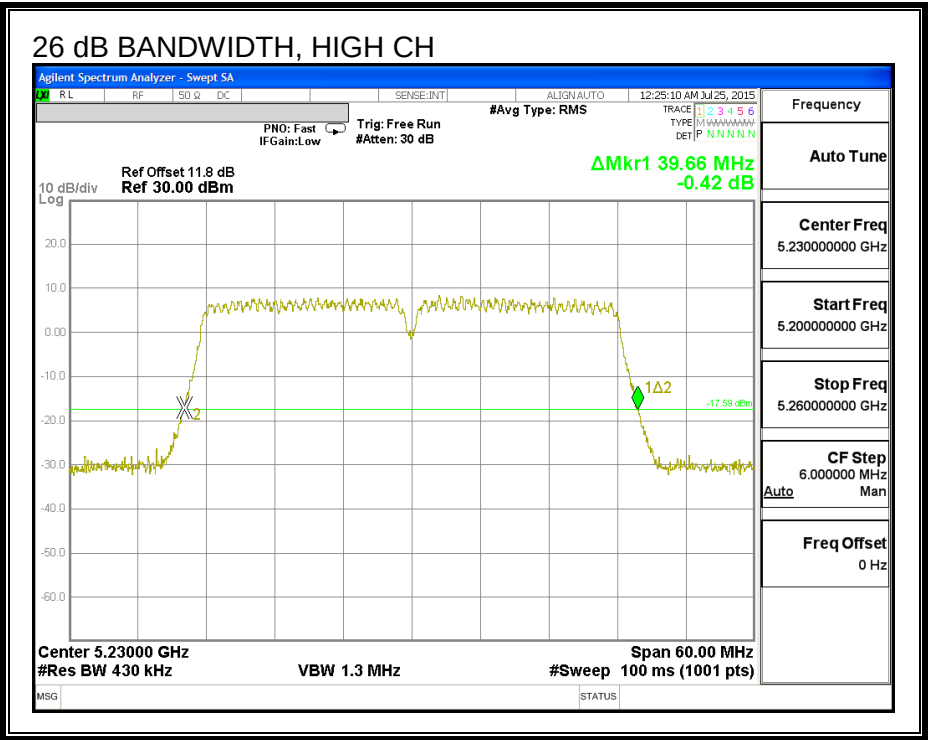
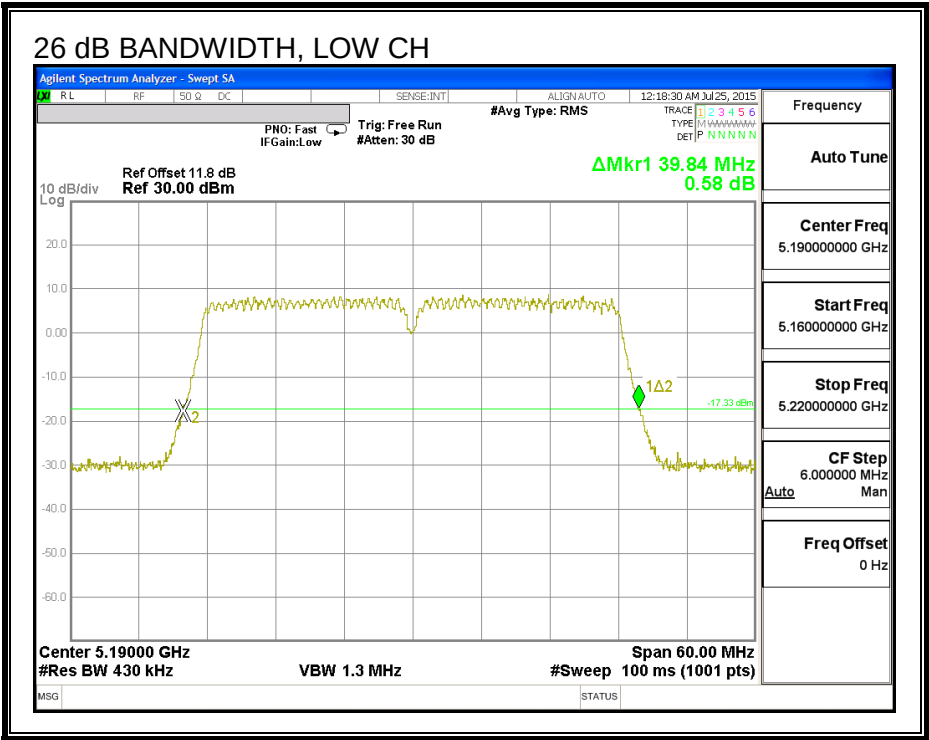
RESULTS

Channel	Frequency (MHz)	26 dB BW Chain 0 (MHz)	26 dB BW Chain 1 (MHz)
Low	5190	40.26	39.84
High	5230	40.20	39.66

26 DB BANDWIDTH, CHAIN 0



26 DB BANDWIDTH, CHAIN 1



8.11.2. 99% BANDWIDTH

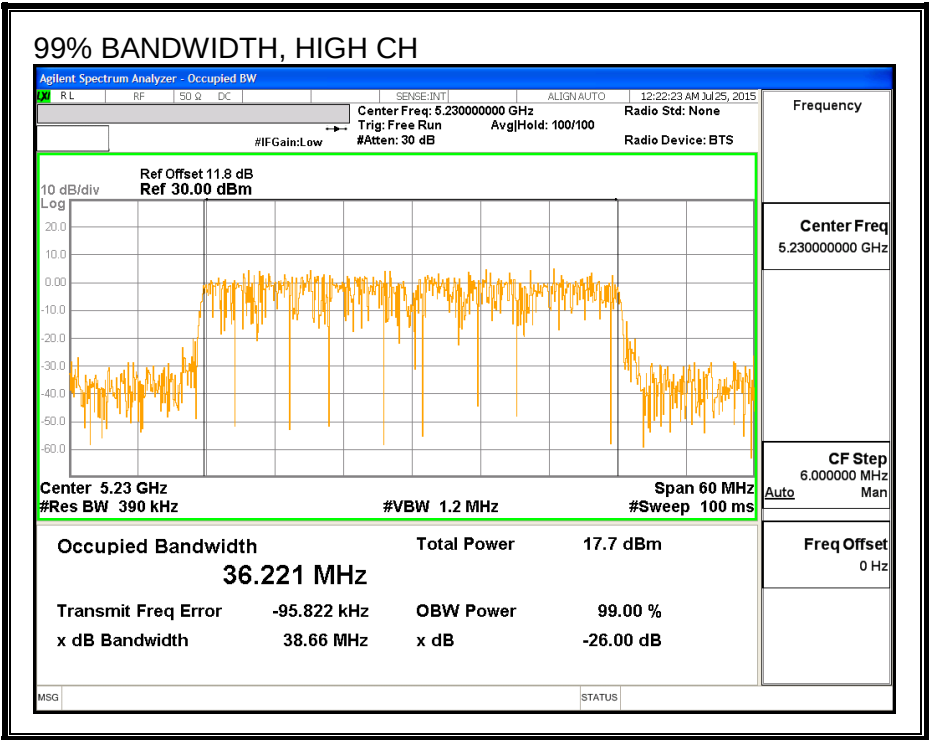
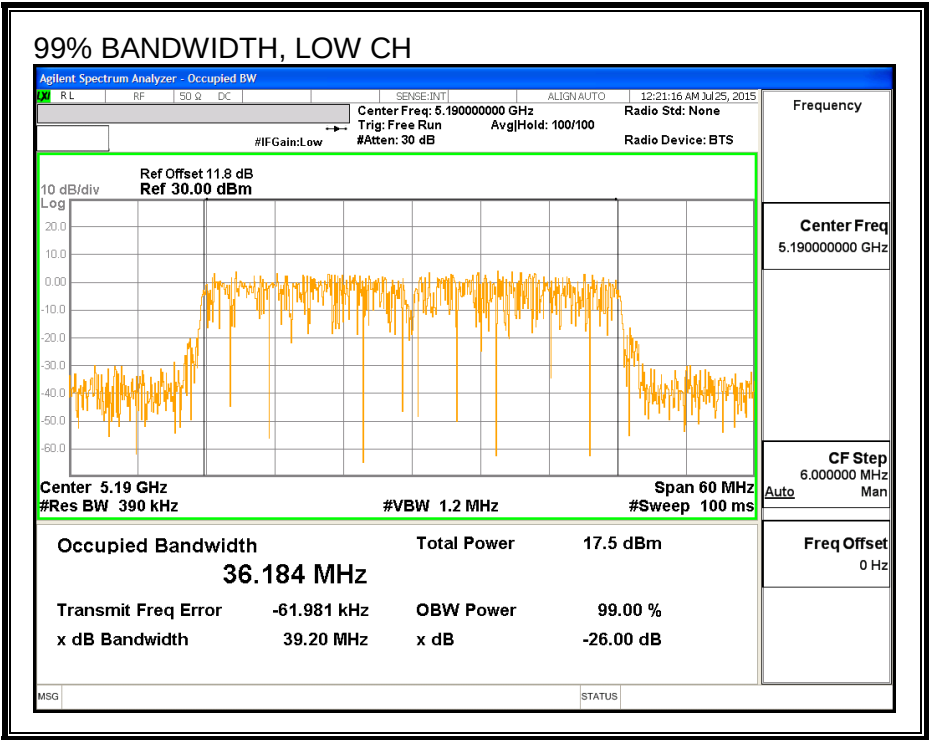
LIMITS

None; for reporting purposes only.

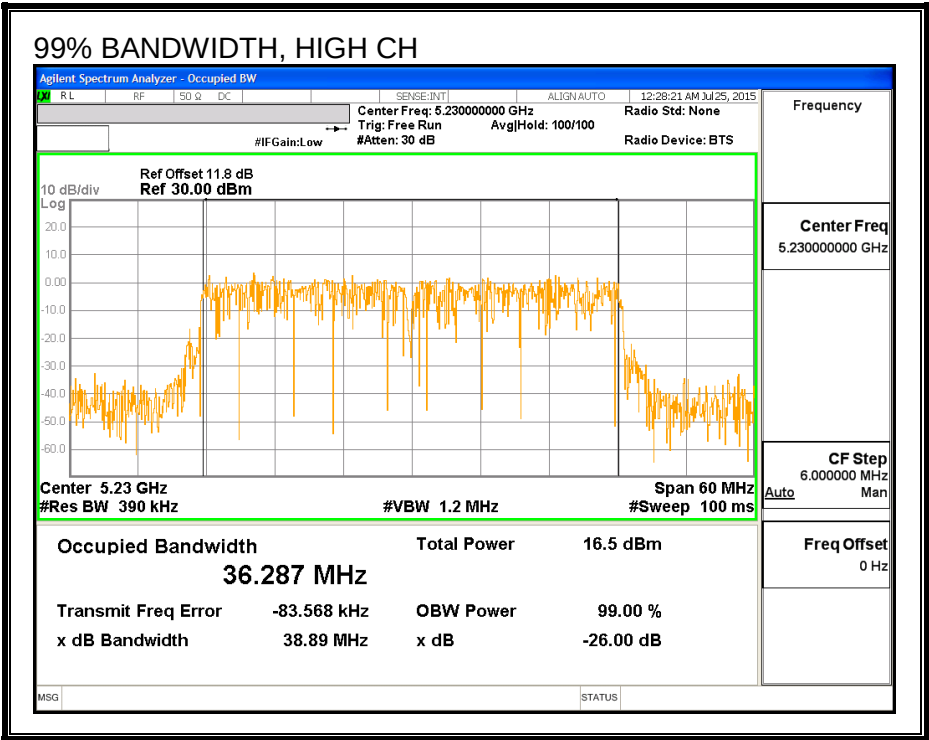
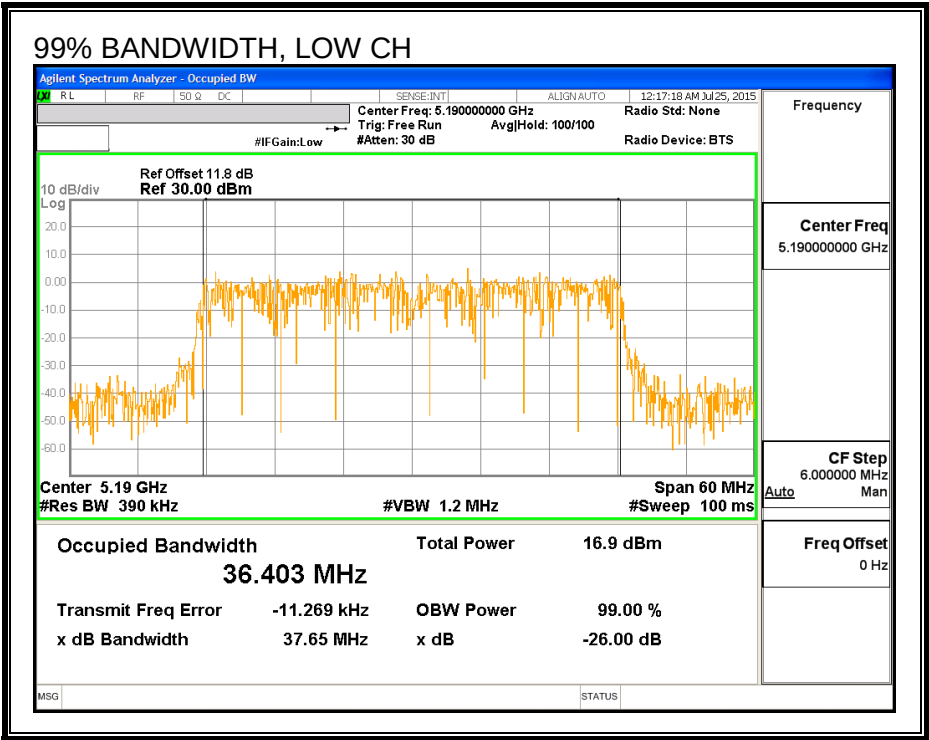
RESULTS

Channel	Frequency (MHz)	99% BW Chain 0 (MHz)	99% BW Chain 1 (MHz)
Low	5190	36.184	36.403
High	5230	36.221	36.287

99% BANDWIDTH, CHAIN 0



99% BANDWIDTH, CHAIN 1



8.11.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

RESULTS

Average Power Results

Channel	Frequency (MHz)	Chain 0 Power (dBm)	Chain 1 Power (dBm)	Total Power (dBm)
Low	5190	12.97	12.92	15.96
High	5230	16.34	16.40	19.38

8.11.4. OUTPUT POWER AND PSD

LIMITS

FCC §15.407 (a) (1)

(i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 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. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 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.

(iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple colocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

(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.

DIRECTIONAL ANTENNA GAIN

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

Chain 0 Antenna Gain (dBi)	Chain 1 Antenna Gain (dBi)	Uncorrelated Chains Directional Gain (dBi)
1.90	2.30	2.10

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

Chain 0 Antenna Gain (dBi)	Chain 1 Antenna Gain (dBi)	Correlated Chains Directional Gain (dBi)
1.90	2.30	5.11

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	2.10	5.11	24.00	11.00
High	5230	2.10	5.11	24.00	11.00

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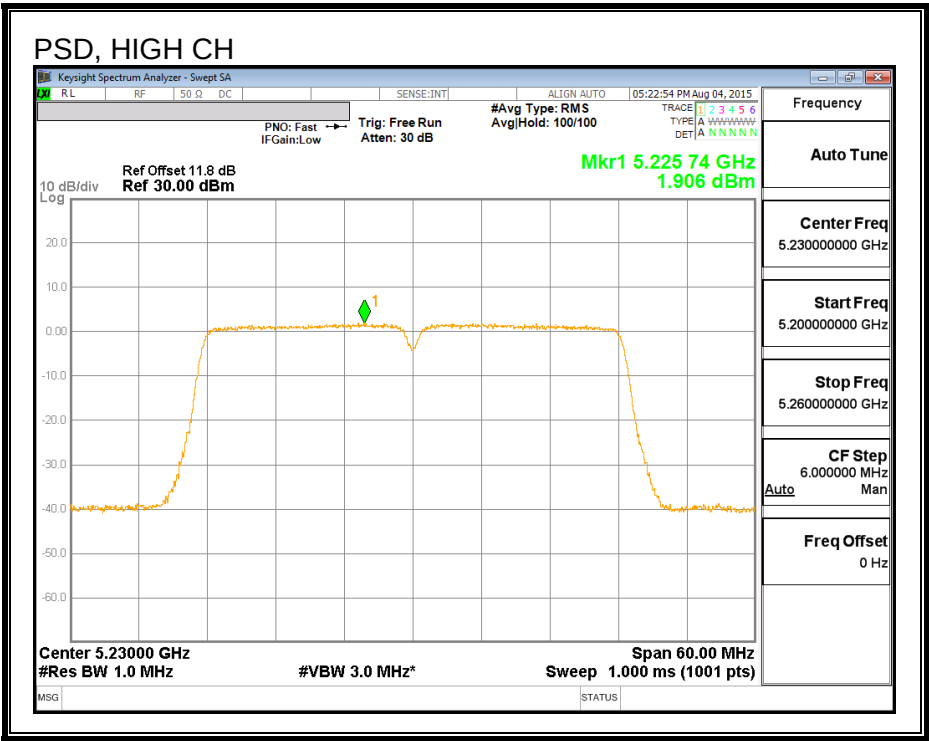
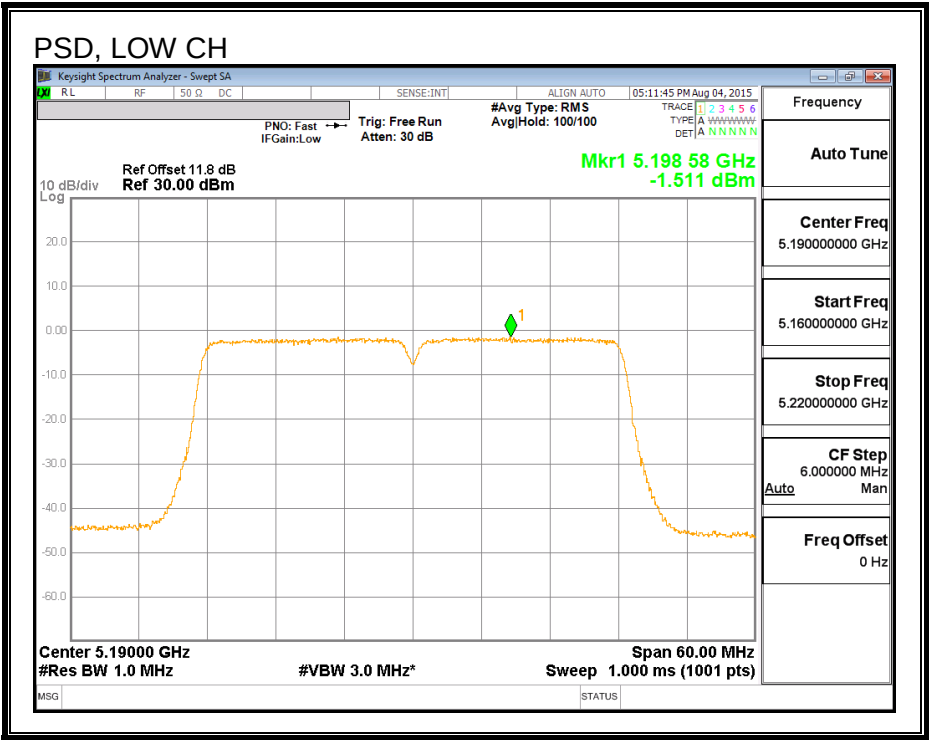
Output Power Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Chain 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5190	12.97	12.92	15.96	24.00	-8.04
High	5230	16.34	16.40	19.38	24.00	-4.62

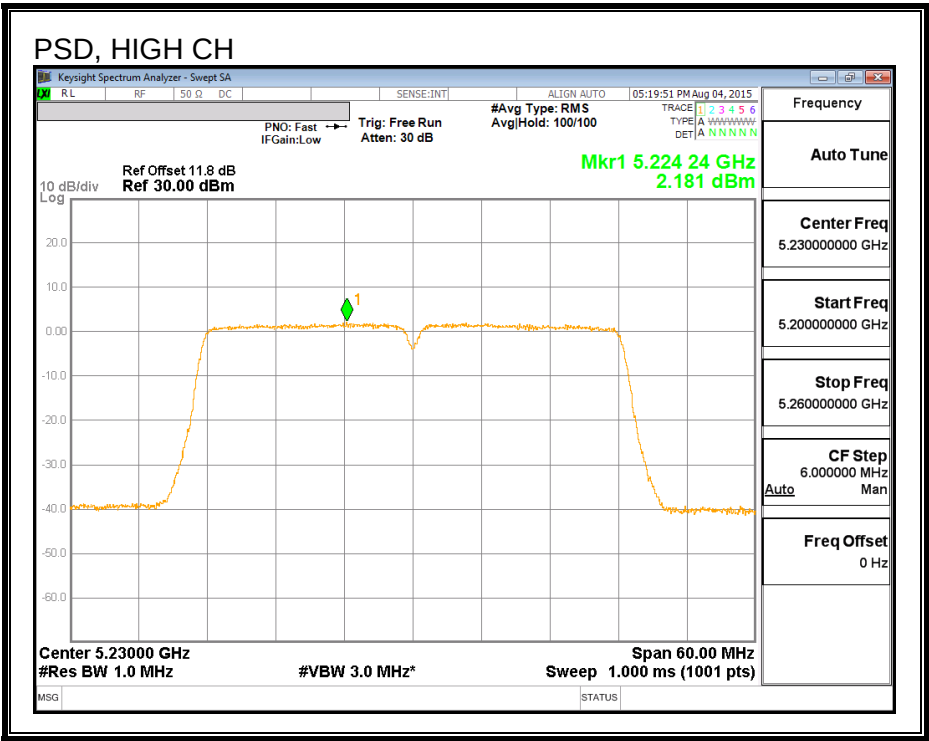
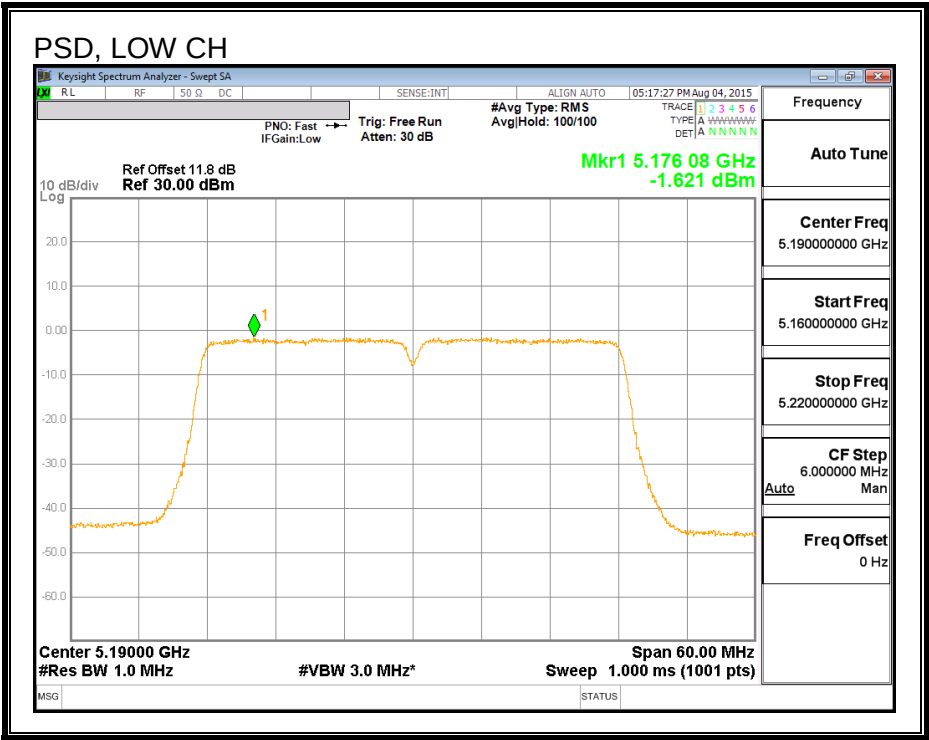
PSD Results

Channel	Frequency (MHz)	Chain 0 Meas PSD (dBm)	Chain 1 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low	5190	-1.51	-1.62	1.44	11.00	-9.56
High	5230	1.91	2.18	5.06	11.00	-5.94

PSD, CHAIN 0



PSD, CHAIN 1



8.12. 802.11n HT40 2Tx STBC MODE IN THE 5.2 GHz BAND

8.12.1. 26 dB BANDWIDTH

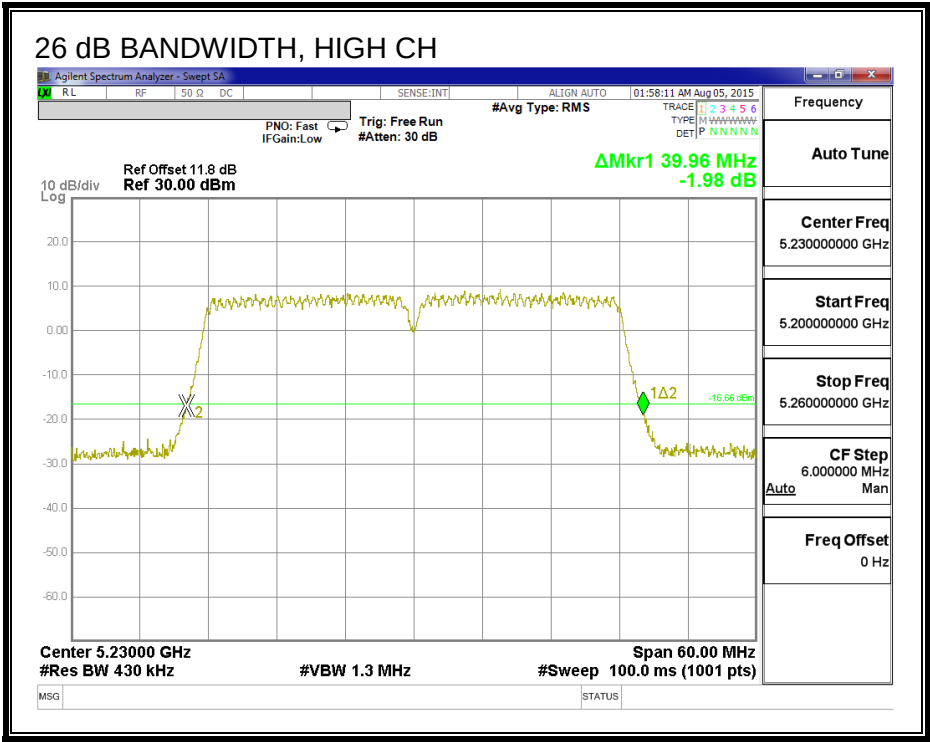
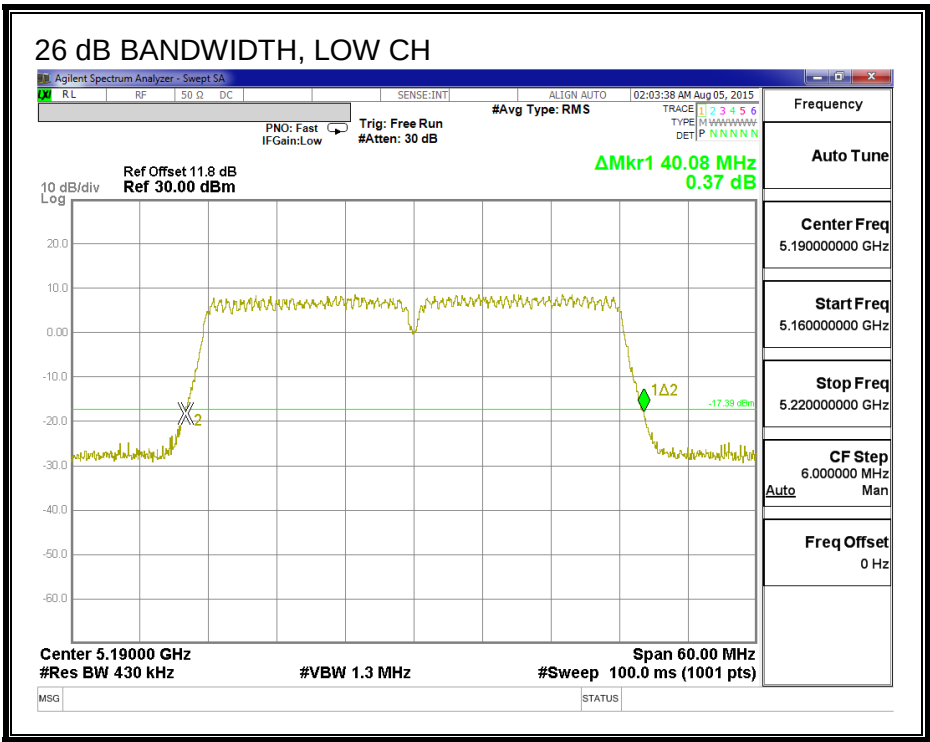
LIMITS

None; for reporting purposes only.

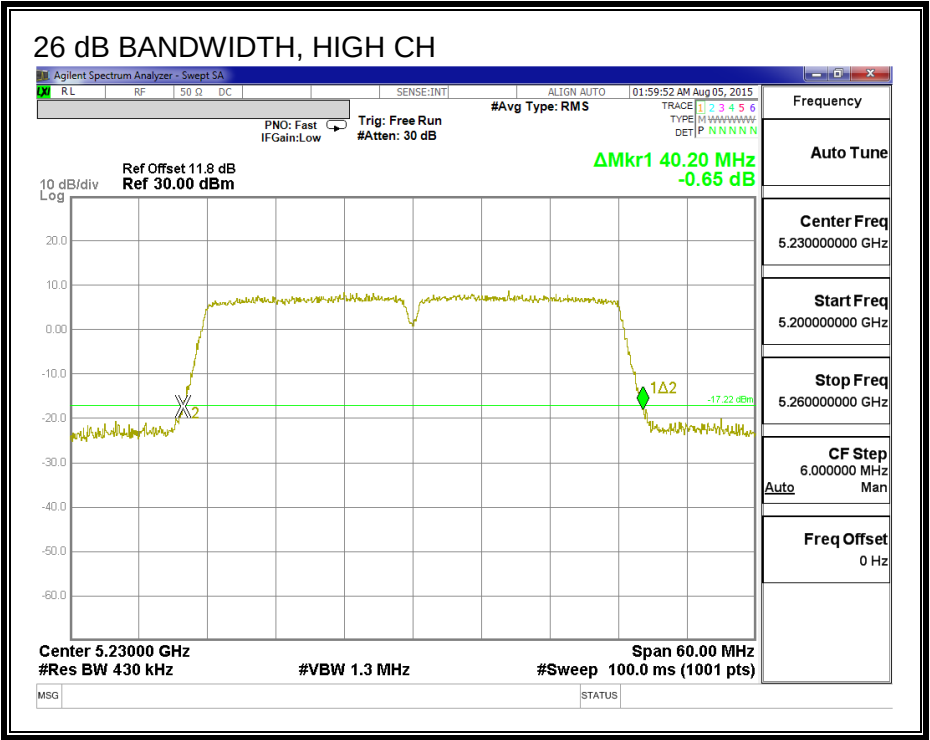
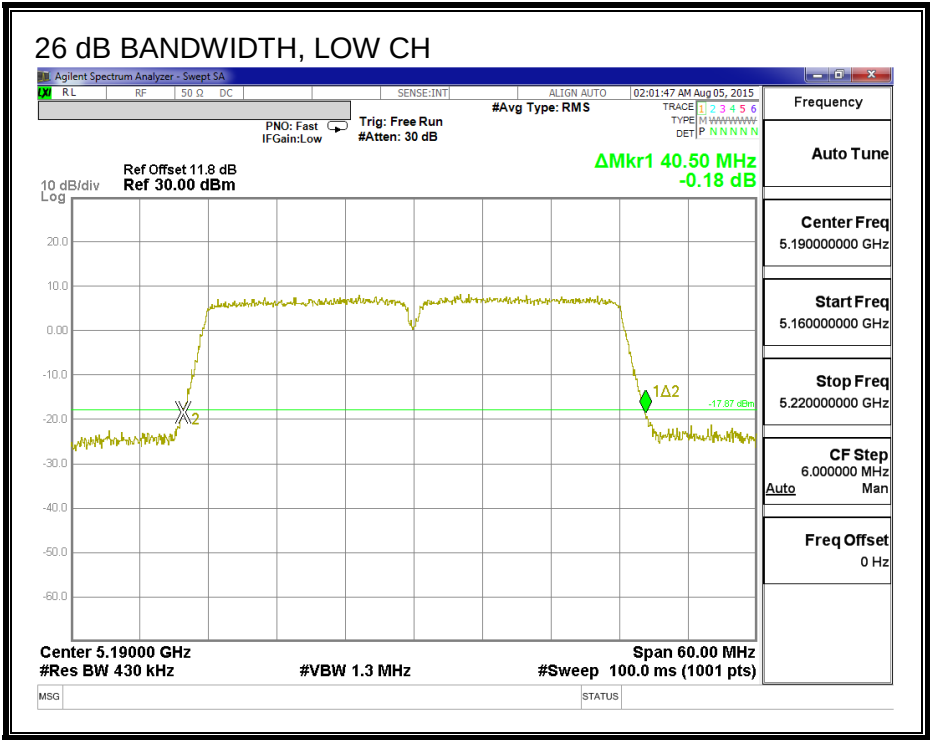
RESULTS

Channel	Frequency (MHz)	26 dB BW Chain 0 (MHz)	26 dB BW Chain 1 (MHz)
Low	5190	40.08	40.50
High	5230	39.96	40.20

26 DB BANDWIDTH, CHAIN 0



26 DB BANDWIDTH, CHAIN 1



8.12.2. 99% BANDWIDTH

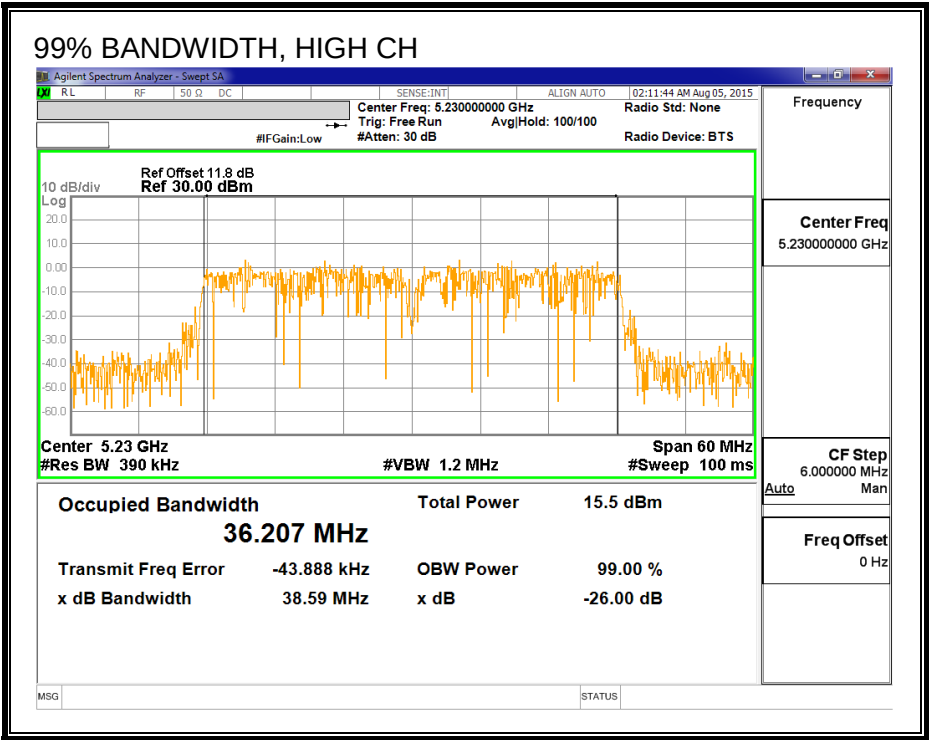
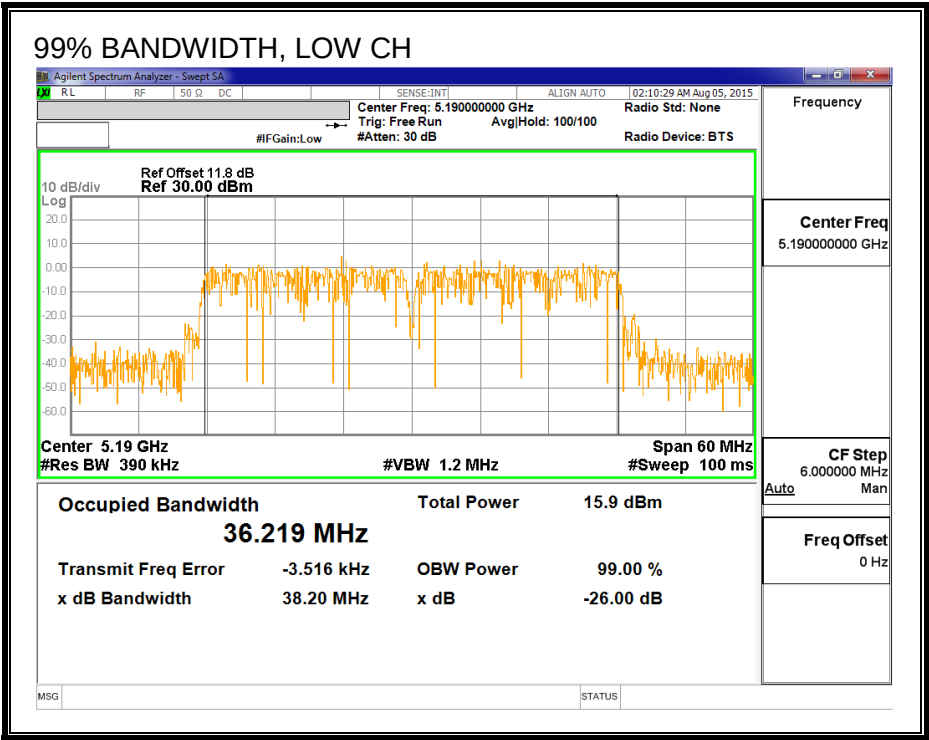
LIMITS

None; for reporting purposes only.

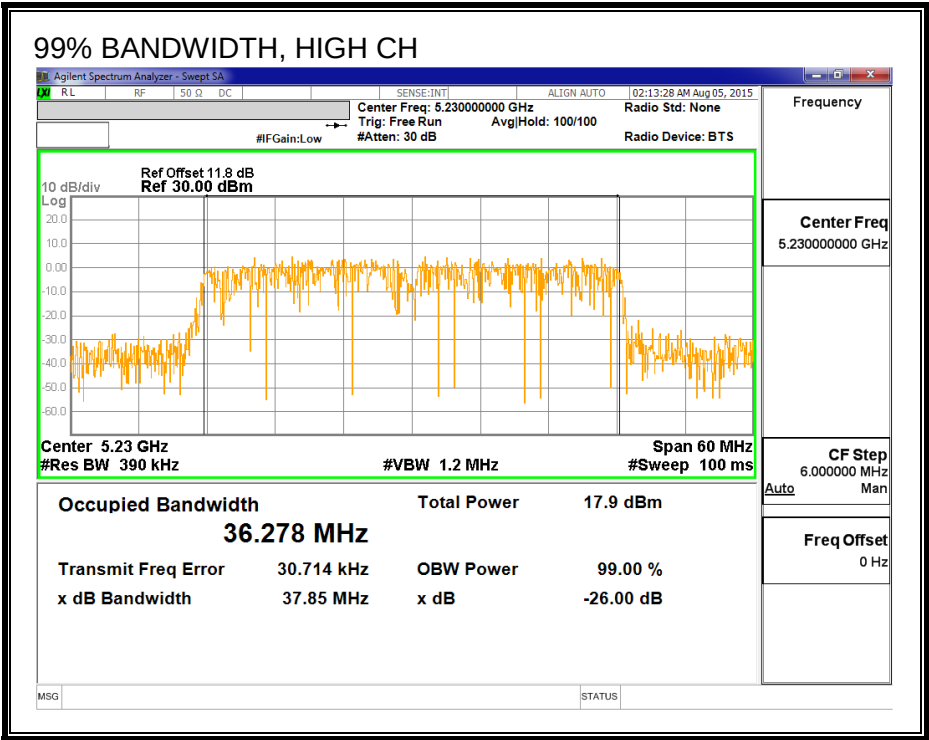
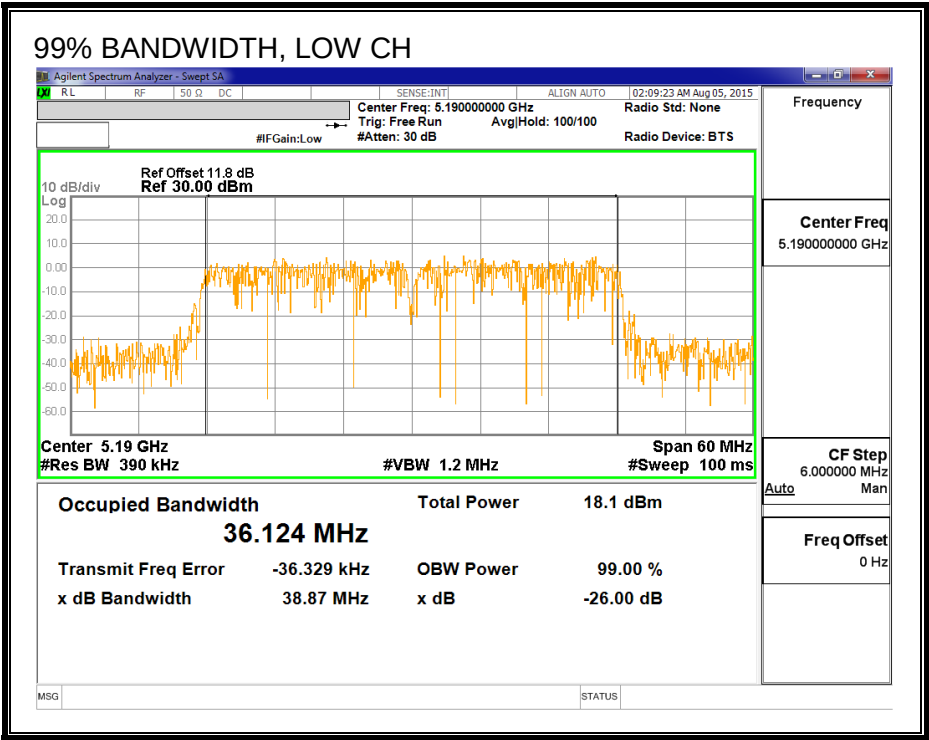
RESULTS

Channel	Frequency (MHz)	99% BW Chain 0 (MHz)	99% BW Chain 1 (MHz)
Low	5190	36.219	36.124
High	5230	36.207	36.278

99% BANDWIDTH, CHAIN 0



99% BANDWIDTH, CHAIN 1



8.12.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

RESULTS

Average Power Results

Channel	Frequency (MHz)	Chain 0 Power (dBm)	Chain 1 Power (dBm)	Total Power (dBm)
Low	5190	12.93	13.00	15.98
High	5230	16.93	16.83	19.89

8.12.4. OUTPUT POWER AND PSD

LIMITS

FCC §15.407 (a) (1)

(i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 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. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 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.

(iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

(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.

DIRECTIONAL ANTENNA GAIN

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

Chain 0 Antenna Gain (dBi)	Chain 1 Antenna Gain (dBi)	Uncorrelated Chains Directional Gain (dBi)
1.90	2.30	2.10

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	2.10	2.10	24.00	11.00
High	5230	2.10	2.10	24.00	11.00

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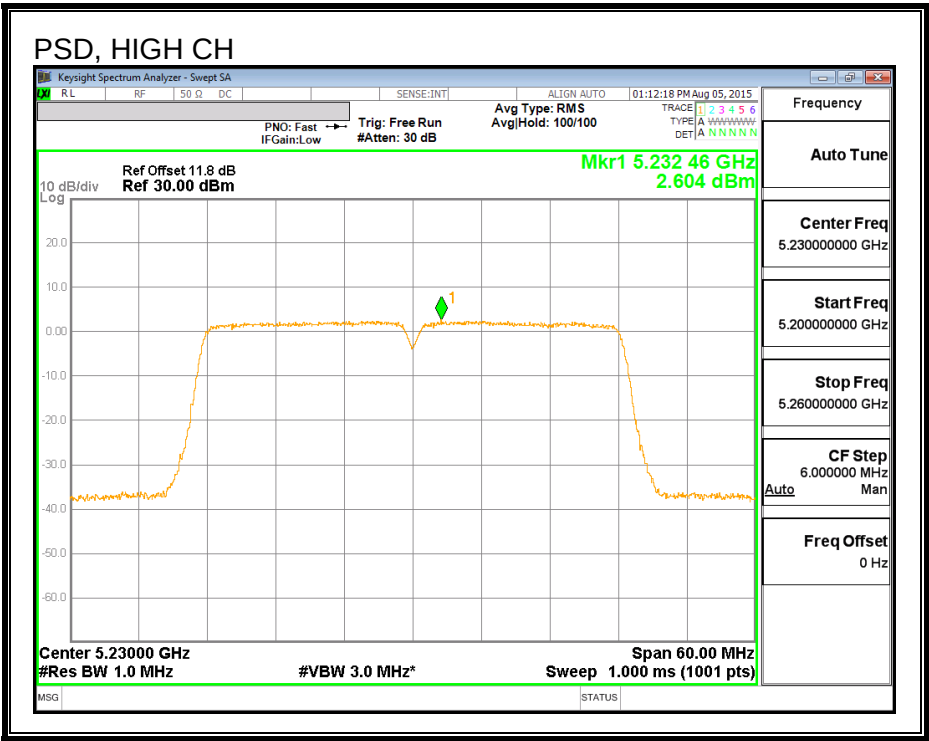
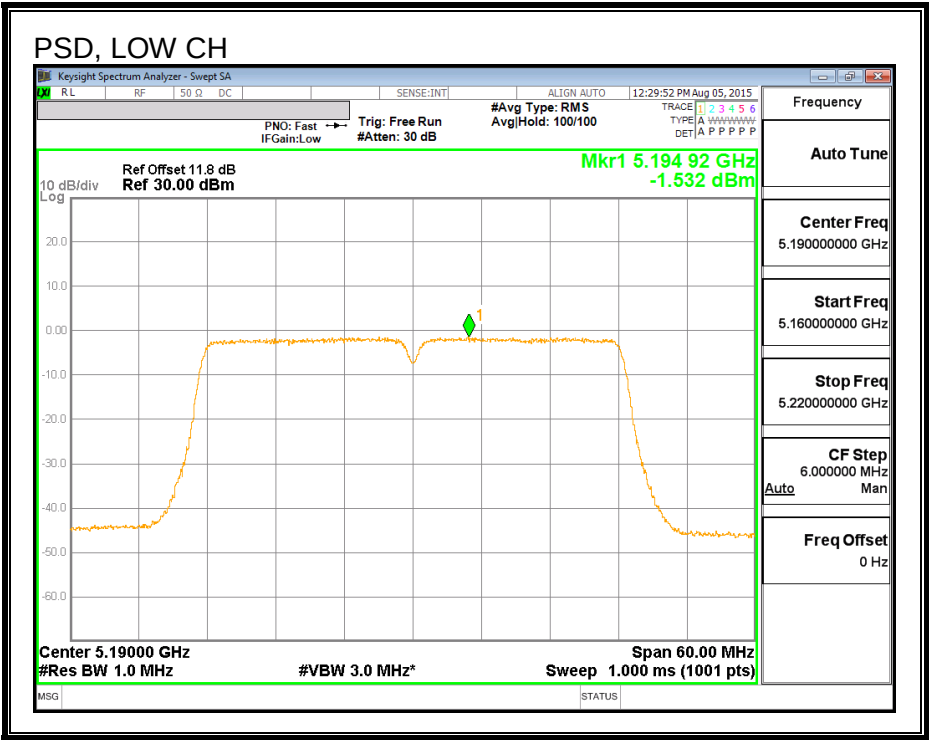
Output Power Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Chain 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5190	12.93	13.00	15.98	24.00	-8.02
High	5230	16.93	16.83	19.89	24.00	-4.11

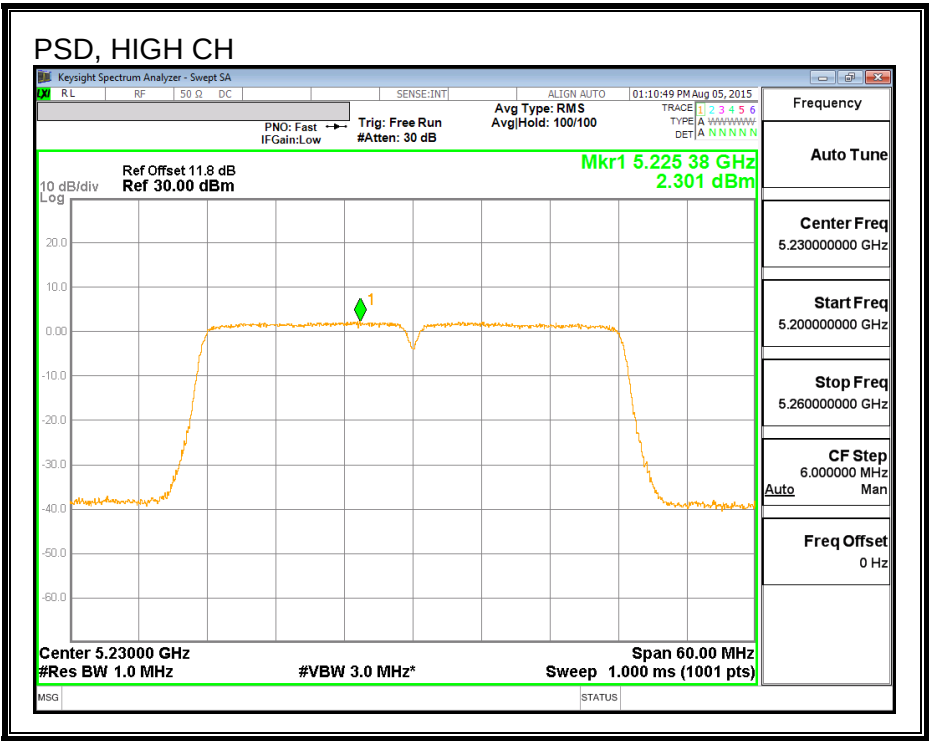
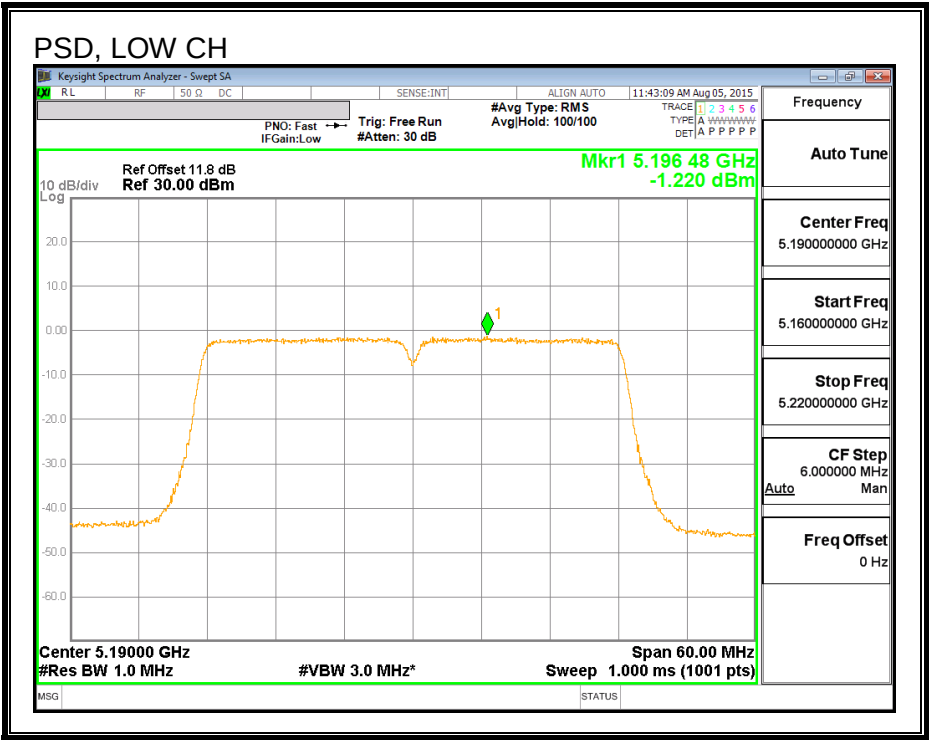
PSD Results

Channel	Frequency (MHz)	Chain 0 Meas PSD (dBm)	Chain 1 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low	5190	-1.53	-1.22	1.64	11.00	-9.36
High	5230	2.60	2.30	5.47	11.00	-5.53

PSD, CHAIN 0



PSD, CHAIN 1



8.13. 802.11n HT40 2Tx SDM MODE IN THE 5.2 GHz BAND

Note: Covered by 802.11n HT40 2Tx STBC MODE

8.15. 802.11ac VHT80 CHAIN 0 MODE IN THE 5.2 GHz BAND

8.15.1. 26 dB BANDWIDTH

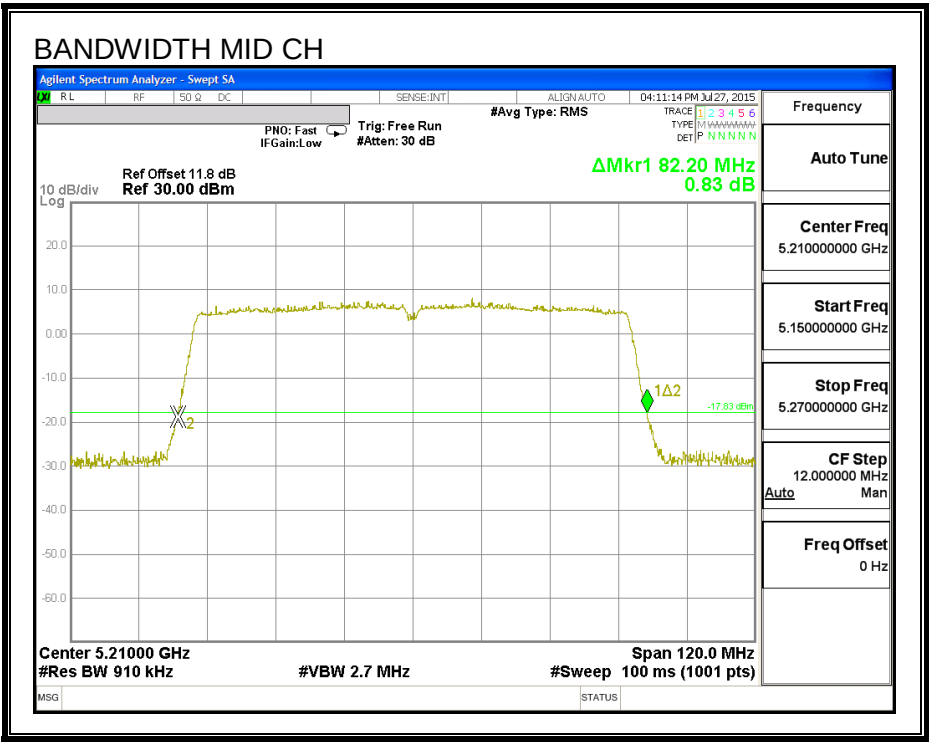
LIMITS

None; for reporting purposes only.

RESULTS

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Mid	5210	82.20

26 dB BANDWIDTH



8.15.2. 99% BANDWIDTH

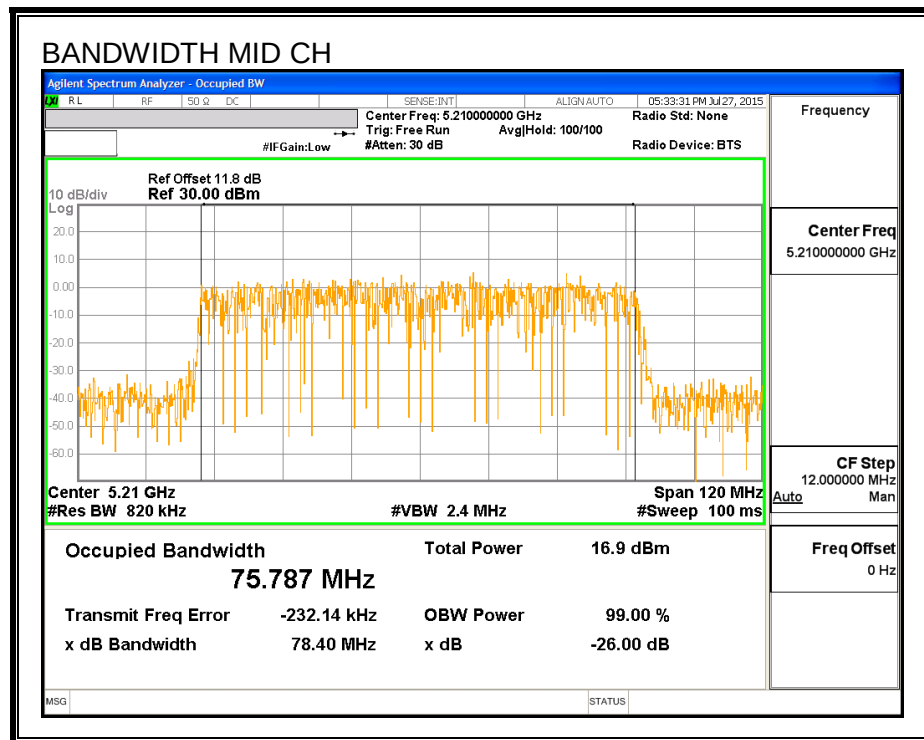
LIMITS

None; for reporting purposes only.

RESULTS

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Mid	5210	75.787

99% BANDWIDTH



8.15.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

RESULTS

Channel	Frequency (MHz)	Power (dBm)
Mid	5210	12.76

8.15.4. OUTPUT POWER AND PSD

LIMITS

FCC §15.407 (a) (1)

(i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 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. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 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.

(iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple colocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

(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.

DIRECTIONAL ANTENNA GAIN

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

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	1.90	1.90	24.00	11.00

Duty Cycle CF (dB)	0.16	Included in Calculations of Corr'd Power & PSD
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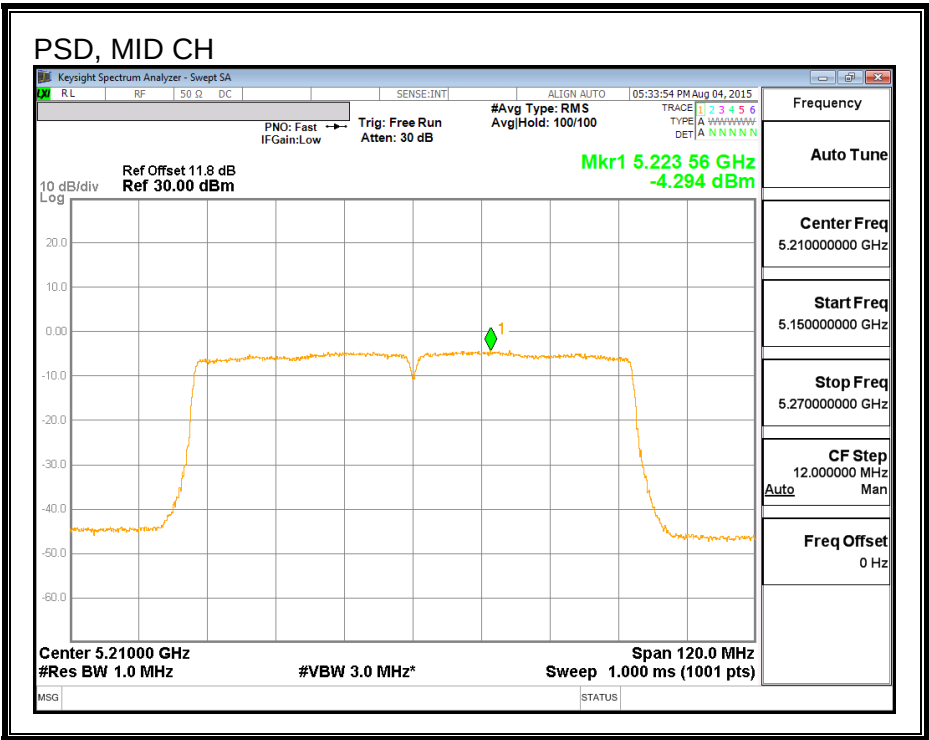
Output Power Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Mid	5210	12.60	12.76	24.00	-11.24

PSD Results

Channel	Frequency (MHz)	Chain 0 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Mid	5210	-4.29	-4.13	11.00	-15.13

PSD



8.16.2. 99% BANDWIDTH

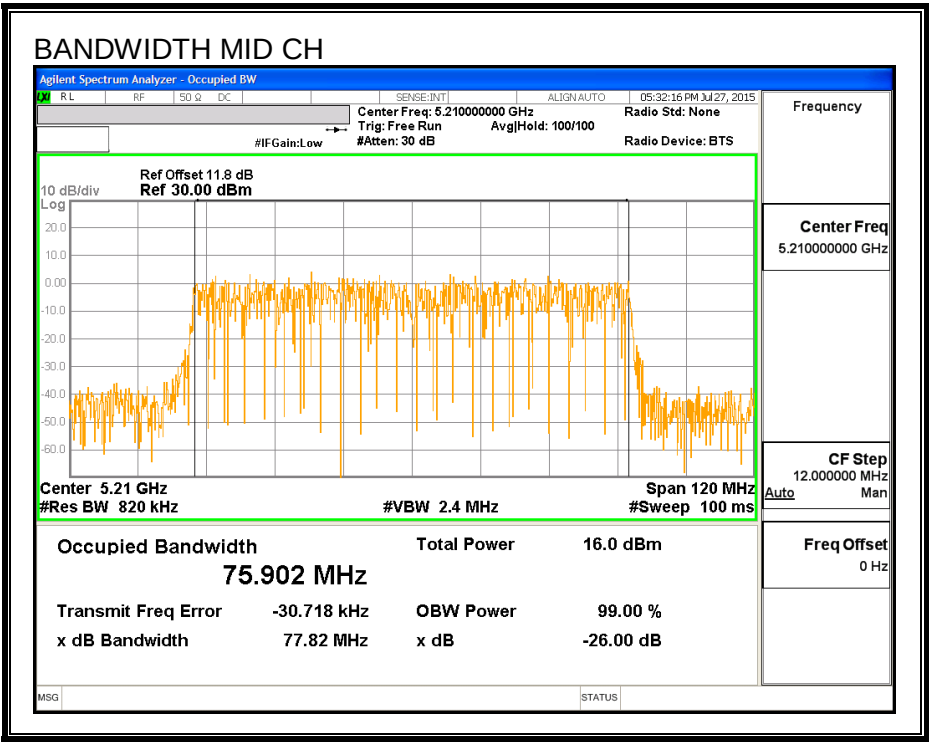
LIMITS

None; for reporting purposes only.

RESULTS

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Mid	5210	75.902

99% BANDWIDTH



8.16.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

RESULTS

Channel	Frequency (MHz)	Power (dBm)
Mid	5210	12.84

8.16.4. OUTPUT POWER AND PSD

LIMITS

FCC §15.407 (a) (1)

(i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 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. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 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.

(iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple colocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

(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.

DIRECTIONAL ANTENNA GAIN

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

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	2.30	2.30	24.00	11.00

Duty Cycle CF (dB)	0.16	Included in Calculations of Corr'd Power & PSD
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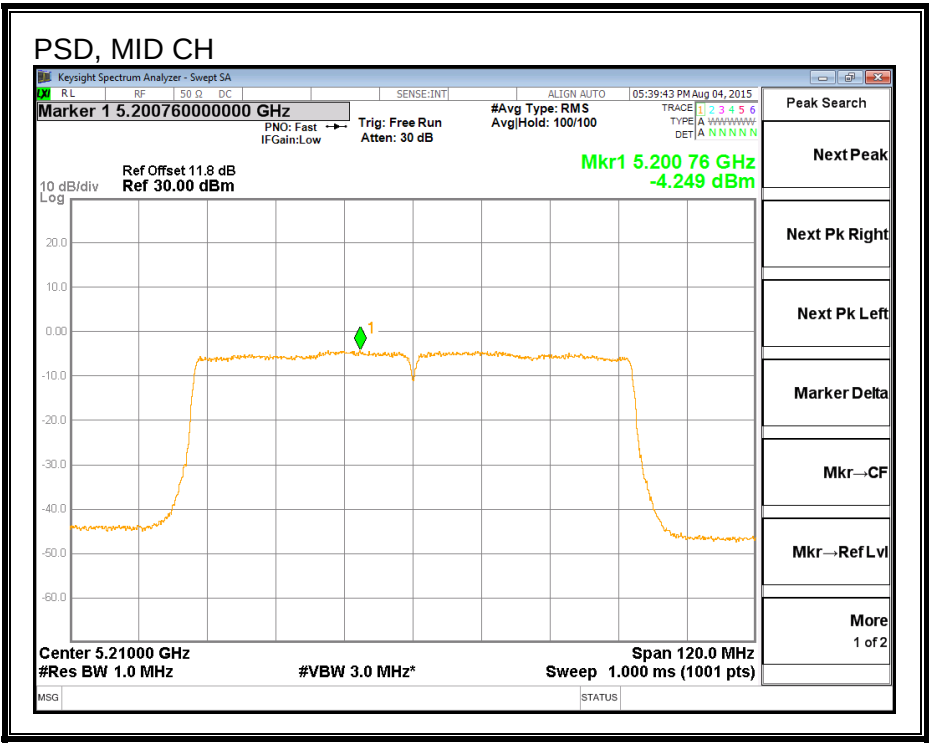
Output Power Results

Channel	Frequency (MHz)	Chain 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Mid	5210	12.68	12.84	24.00	-11.16

PSD Results

Channel	Frequency (MHz)	Chain 1 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Mid	5210	-4.25	-4.09	11.00	-15.09

PSD



8.17. 802.11ac VHT80 2Tx CDD MODE IN THE 5.2 GHz BAND

8.17.1. 26 dB BANDWIDTH

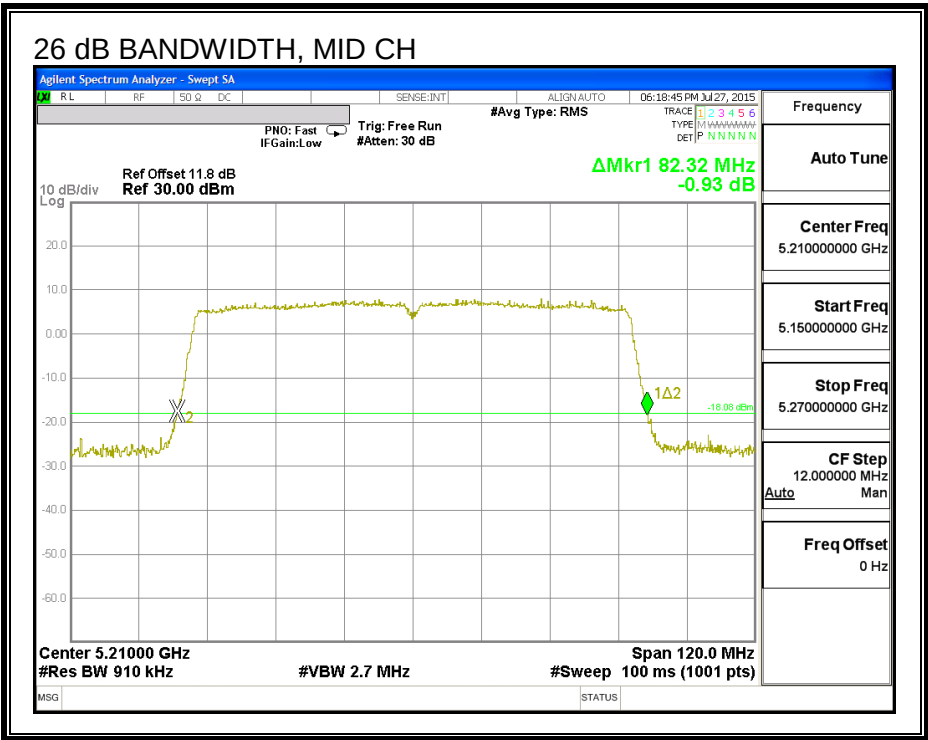
LIMITS

None; for reporting purposes only.

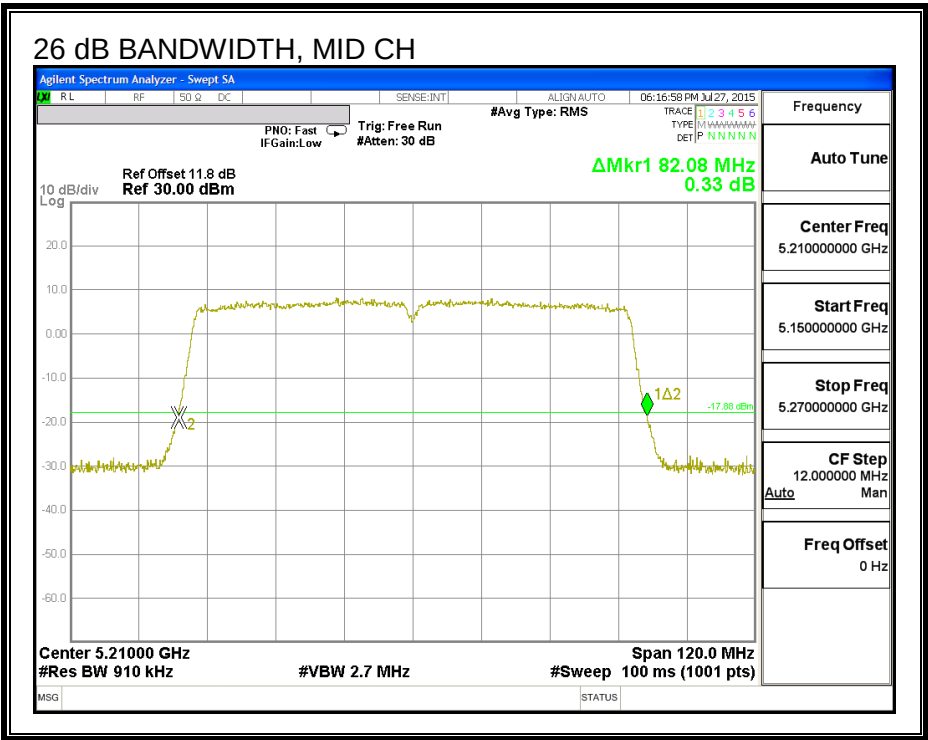
RESULTS

Channel	Frequency (MHz)	26 dB BW Chain 0 (MHz)	26 dB BW Chain 1 (MHz)
Mid	5210	82.32	82.08

26 DB BANDWIDTH, CHAIN 0



26 DB BANDWIDTH, CHAIN 1



8.17.2. 99% BANDWIDTH

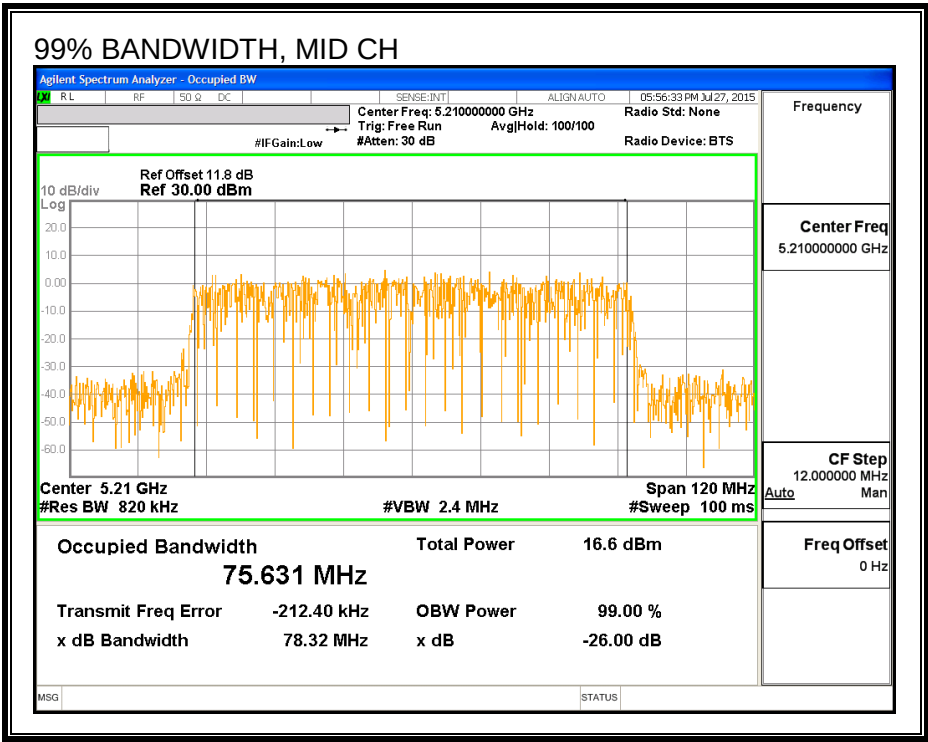
LIMITS

None; for reporting purposes only.

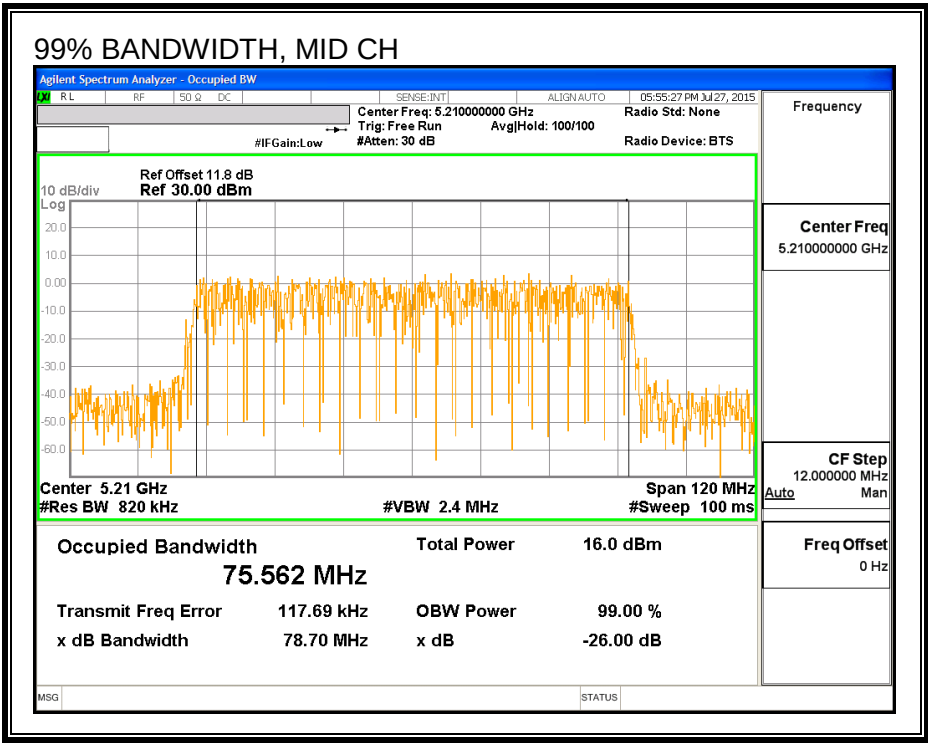
RESULTS

Channel	Frequency (MHz)	99% BW Chain 0 (MHz)	99% BW Chain 1 (MHz)
Mid	5210	75.631	75.562

99% BANDWIDTH, CHAIN 0



99% BANDWIDTH, CHAIN 1



8.17.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

RESULTS

Channel	Frequency (MHz)	Chain 0 Power (dBm)	Chain 1 Power (dBm)	Total Power (dBm)
Mid	5210	12.26	12.27	15.28

8.17.4. OUTPUT POWER AND PSD

LIMITS

FCC §15.407 (a) (1)

(i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 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. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 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.

(iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

(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.

DIRECTIONAL ANTENNA GAIN

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

Chain 0 Antenna Gain (dBi)	Chain 1 Antenna Gain (dBi)	Uncorrelated Chains Directional Gain (dBi)
1.90	2.30	2.10

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

Chain 0 Antenna Gain (dBi)	Chain 1 Antenna Gain (dBi)	Correlated Chains Directional Gain (dBi)
1.90	2.30	5.11

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	2.10	5.11	24.00	11.00

Duty Cycle CF (dB)	0.20	Included in Calculations of Corr'd Power & PSD
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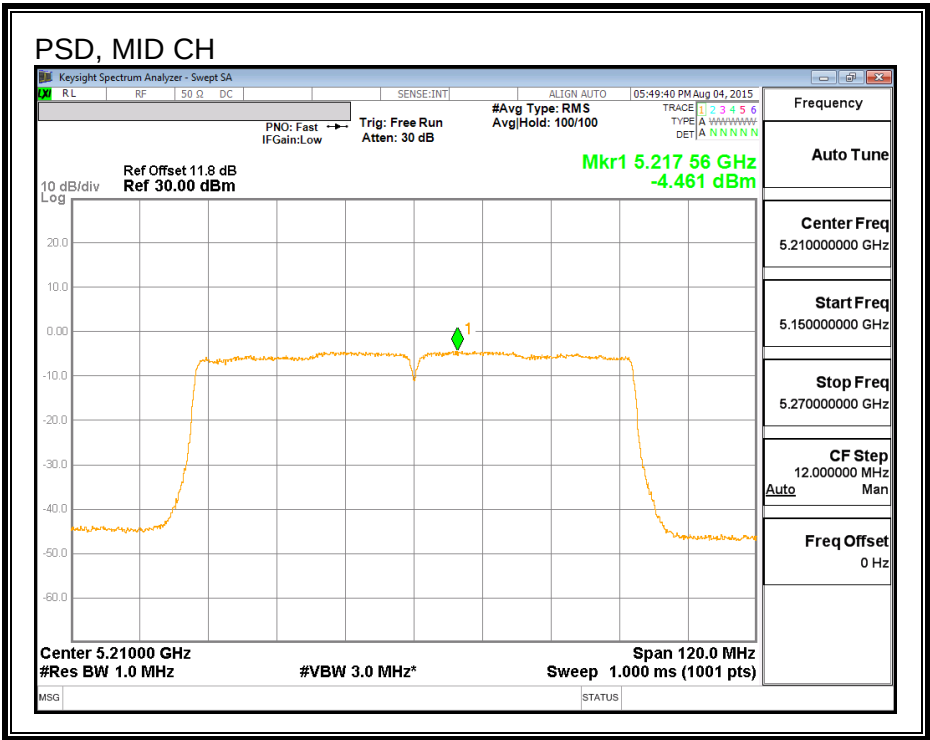
Output Power Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Chain 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Mid	5210	12.06	12.07	15.28	24.00	-8.72

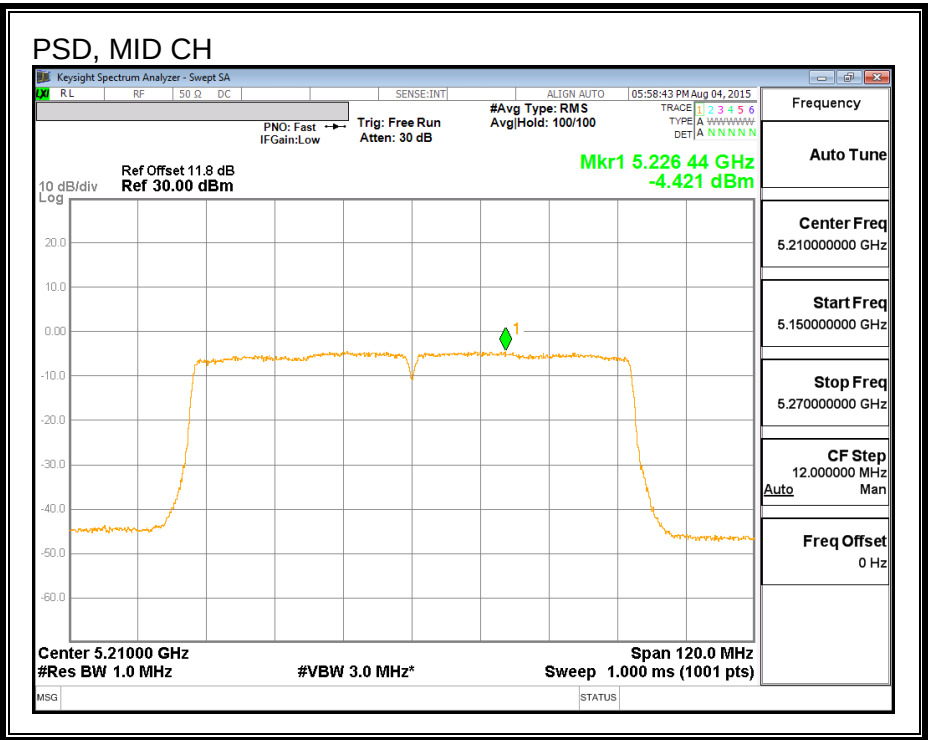
PSD Results

Channel	Frequency (MHz)	Chain 0 Meas PSD (dBm)	Chain 1 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Mid	5210	-4.46	-4.42	-1.23	11.00	-12.23

PSD, CHAIN 0



PSD, CHAIN 1



8.18. 802.11ac HT80 2Tx STBC/SDM MODE IN THE 5.2 GHz BAND

Note: Covered by 802.11ac HT80 2Tx CDD MODE

8.19. 802.11a SISO MODE IN THE 5.3 GHz BAND

Note: Covered by 802.11n HT20 SISO MODE