FCC 47 CFR PART 15 SUBPART E

TEST REPORT

For

AC1200 Wireless LAN Concurrent Dual Band Gigabit Router

Model: BR-6478AC V2

Trade Name: EDIMAX

Issued to

EDIMAX TECHNOLOGY CO., LTD.
No.3, Wu-Chuan 3rd Road, Wu-Ku Industrial Park, New Taipei City, Taiwan

Issued by

Compliance Certification Services Inc.
No.11, Wugong 6th Rd., Wugu Dist.,
New Taipei City 24891, Taiwan. (R.O.C.)
http://www.ccsrf.com
service@ccsrf.com
Issued Date: November 23, 2015

Testing Laboratory
1309

Revision History

Rev.		Issue Date		Revisions	Effect Page	Revised By
00		November 23, 2015		Initial Issue	ALL	Kelly Cheng
01		December 11, 2015		1. Added the KDB 662911 D01 2. Modify data.	6, 16, 44	Kelly Cheng

TABLE OF CONTENTS

1. TEST RESULT CERTIFICATION

Applicant:	EDIMAX TECHNOLOGY CO., LTD. No.3, Wu-Chuan 3rd Road, Wu-Ku Industrial Park, New Taipei City, Taiwan
Equipment Under Test:	AC1200 Wireless LAN Concurrent Dual Band Gigabit Router
Trade Name:	EDIMAX
Model:	BR-6478AC V2
Date of Test:	October 17, 2015 ~ November 13, 2015

APPLICABLE STANDARDS	
STANDARD	**TEST RESULT**
FCC 47 CFR Part 15 Subpart E	No non-compliance noted

We hereby certify that:

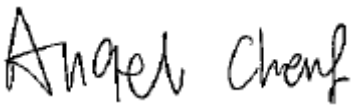
Compliance Certification Services Inc. tested the above equipment. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10: 2009 and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits of FCC Rules Part 15.407.

The test results of this report relate only to the tested sample identified in this report.

Approved by:

Miller Lee
Manager
Compliance Certification Services Inc.

Reviewed by:



Angel Cheng
Section Manager
Compliance Certification Services Inc.

2. EUT DESCRIPTION

<table>
<tr><td>Product</td><td>AC1200 Wireless LAN Concurrent Dual Band Gigabit Router</td></tr>
<tr><td>Trade Name</td><td>EDIMAX</td></tr>
<tr><td>Model Number</td><td>BR-6478AC V2</td></tr>
<tr><td>Model Discrepancy</td><td>N/A</td></tr>
<tr><td>Received Date</td><td>October 11, 2015</td></tr>
<tr><td>Power Adapter</td><td>VDC from Power Adapter
1. APD / Model: WB-18D12FU
I/P: 100-240Vac, 50-60Hz, 0.5A
O/P: 12Vdc, 1.5A
2. DVE / Model: DSA-15P-12 US
I/P: 100-240Vac, 50-60Hz, 0.5A
O/P: 12Vdc, 1.25A</td></tr>
<tr><td>Frequency Range</td><td>IEEE 802.11a, IEEE 802.11n HT20 : 5180MHz ~ 5240MHz; 5745 ~ 5825MHz
IEEE 802.11n HT40 : 5190MHz ~ 5230MHz; 5755 ~ 5795MHz
IEEE 802.11ac VHT80 mode: 5210MHz; 5775MHz</td></tr>
<tr><td>Channel Number</td><td>IEEE 802.11a, IEEE 802.11n HT20 : 5180MHz ~ 5825MHz : 9 Channels
IEEE 802.11n HT40 : 5190MHz ~ 5795MHz : 4 Channels
IEEE 802.11ac VHT80 mode: 5210MHz ~ 5775MHz : 2 Channels</td></tr>
<tr><td>Transmit Power</td><td>
<table>
<tr><th></th><th>Mode</th><th>Frequency Range (MHz)</th><th>Transmit Power (dBm)</th><th>Transmit Power (W)</th></tr>
<tr><td rowspan="4">UNII Band I</td><td>IEEE 802.11a</td><td>5180 – 5240</td><td>20.91</td><td>0.1233</td></tr>
<tr><td>IEEE 802.11n HT 20 mode</td><td>5180 – 5240</td><td>20.96</td><td>0.1247</td></tr>
<tr><td>IEEE 802.11n HT 40 mode</td><td>5190 ~ 5230</td><td>19.60</td><td>0.0912</td></tr>
<tr><td>IEEE 802.11ac VHT80 mode</td><td>5210</td><td>16.64</td><td>0.0461</td></tr>
<tr><td rowspan="4">UNII Band IV</td><td>IEEE 802.11a</td><td>5745 ~ 5825</td><td>24.16</td><td>0.2606</td></tr>
<tr><td>IEEE 802.11n HT 20 mode</td><td>5745 ~ 5825</td><td>21.38</td><td>0.1374</td></tr>
<tr><td>IEEE 802.11n HT 40 mode</td><td>5755 ~ 5815</td><td>21.62</td><td>0.1452</td></tr>
<tr><td>IEEE 802.11ac VHT80 mode</td><td>5775</td><td>17.66</td><td>0.0583</td></tr>
</table>
</td></tr>
<tr><td>Modulation Technique</td><td>OFDM (QPSK, BPSK, 16-QAM, 64-QAM, 256QAM)</td></tr>
<tr><td>Transmit Data Rate</td><td>IEEE 802.11a mode: 54, 48, 36, 24, 18, 12, 9, 6 Mbps
IEEE 802.11n HT 20 mode: OFDM (6.5, 7.2, 13, 14.4, 14.44, 19.5, 21.7, 26, 28.89, 28.9, 39, 43.3, 43.33 52, 57.78, 57.8, 58.5, 65.0, 72.2, 78, 86.67, 104, 115.56, 117, 130, 144.44 Mbps)
IEEE 802.11n HT 40 mode: OFDM (13.5, 15, 27, 30, 40.5, 45, 54, 60, 81, 90, 108, 120, 121.5, 135, 150, 162, 180, 216, 240, 243, 270, 300 Mbps)
IEEE 802.11ac VHT80 mode: OFDM (29.3, 58.5, 87.8, 117, 175.5, 234, 263.3, 292.5, 351, 390, 468, 526.5, 585, 702, 780 Mbps)</td></tr>
<tr><td>Antenna Specification</td><td>1. Master Wave Technology Co., Ltd. / 98202PYYF000
Dipole Antenna /Gain: 4.95dBi
2. Master Wave Technology Co., Ltd. / 98202PYYF001
Dipole Antenna /Gain: 4.88dBi
MIMO: Total ANT=7.93 dBi</td></tr>
</table>

Remark:

1. *The sample selected for test was engineering sample that approximated to production product and was provided by manufacturer.*
2. *This submittal(s) (test report) is intended for FCC ID: **NDD9564781503** filing to comply with Section 15.407 of the FCC Part 15, Subpart E Rules.*

3. TEST METHODOLOGY

Both conducted and radiated testing was performed according to the procedures in ANSI C63.10 Radiated testing was performed at an antenna to EUT distance 3 meters, KDB 789033 D02.

KDB 662911 D01 Multiple Transmitter Output v02r01

3.1 EUT CONFIGURATION

The EUT configuration for testing is installed for RF field strength measurement to meet the Commissions requirement, and is operated in a manner intended to generate the maximum emission in a continuous normal application.

3.2 EUT EXERCISE

The EUT is operated in the engineering mode to fix the Tx frequency for the purposes of measurement.

According to its specifications, the EUT must comply with the requirements of Section 15.407 under the FCC Rules Part 15 Subpart E.

3.3 GENERAL TEST PROCEDURES

Conducted Emissions

The EUT is placed on the turntable, which is positioned at 0.8 m above the ground plane. According to the requirements in Section 13.1.4.1 of ANSI C63.10, the conducted emission from the EUT is measured in the frequency range between 0.15 MHz and 30MHz, using the CISPR Quasi-Peak detector mode.

Radiated Emissions

The EUT is placed on the turntable, which is 1.5 m above the ground plane. The turntable is then rotated for 360 degrees to determine the proper orientation for the maximum emission level. The EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission level. And, each emission is to be maximized by changing the horizontal and vertical polarization of the receiving antenna. In order to find out the maximum emissions, exploratory radiated emission measurements were made according to the requirements in Section 13.1.4.1 of ANSI C63.10.

3.4 FCC PART 15.205 RESTRICTED BANDS OF OPERATIONS

(a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
[1]0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 -	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.52525	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	156.7 - 156.9	3260 - 3267	23.6 - 24.0
12.29 - 12.293	162.0125 - 167.17	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	167.72 - 173.2	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	240 - 285	3600 - 4400	([2])
13.36 - 13.41	322 - 335.4		

[1] Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

[2] Above 38.6

(b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

3.5 DESCRIPTION OF TEST MODES

The EUT (model: BR-6478AC V2) had been tested under operating condition.

The EUT is a 2x2 configuration spatial MIMO (2Tx & 2Rx) without beam forming function that operate in double TX chains and double RX chains. The 2x2 configuration is implemented with two outside TX & RX chains (Chain 0 and 1).

Software used to control the EUT for staying in continuous transmitting mode was programmed.

The field strength of spurious emission was measured in the following position: EUT stand-up position (Z axis), lie-down position (X, Y axis). The worst emission was found in lie-down position (X axis) and the worst case was recorded.

After verification, all tests were carried out with the worst case test modes as shown below except radiated spurious emission below 1GHz, which worst case was in normal link mode only.

Band I

IEEE 802.11a mode / 5180 ~ 5240MHz:

Channel Low (5180MHz), Channel Mid (5220MHz) and Channel High (5240MHz) with 6Mbps data rate were chosen for full testing.

IEEE 802.11n HT 20 mode / 5180 ~ 5240MHz:

Channel Low (5180MHz), Channel Mid (5220MHz) and Channel High (5240MHz) with 6.5Mbps data rate were chosen for full testing.

IEEE 802.11n HT 40 mode / 5190 ~ 5230MHz:

Channel Low (5190MHz) and Channel High (5230MHz) with 13.5Mbps data rate were chosen for full testing.

IEEE 802.11ac VHT80 Mode for 5210MHz:
Channel (5210MHz) with 6.5Mbps data rate were chosen for full testing.

Band IV

IEEE 802.11a mode / 5745 ~ 5825MHz
Channel Low (5745MHz), Channel Mid (5785MHz) and Channel High (5825MHz) with 6Mbps data rate were chosen for full testing.

IEEE 802.11n HT 20 mode: / 5745 ~ 5825MHz
Channel Low(5745MHz), Channel Mid(5785MHz) and Channel High(5825MHz) with 6.5Mbps data rate were chosen for full testing.

IEEE 802.11n HT 40 mode / 5755 ~ 5795MHz
Channel Low(5755MHz) and Channel High(5795MHz) with 13.5Mbps data rate were chosen for full testing.

IEEE 802.11ac VHT80 Mode for 5775MHz:
Channel (5775MHz) with 6.5Mbps data rate were chosen for full testing.

4. INSTRUMENT CALIBRATION

4.1 MEASURING INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.

4.2 MEASUREMENT EQUIPMENT USED

Equipment Used for Emissions Measurement

Remark: *Each piece of equipment is scheduled for calibration once a year and Loop Antenna is scheduled for calibration once three years.*

Conducted Emissions Test Site				
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
Spectrum Analyzer	Agilent	E4446A	US42510252	11/23/2015
Thermostatic/Hrgrosatic Chamber	TAICHY	MHG-150LF	930619	10/06/2016
AC Power Source	EXTECH	6205	1140845	N.C.R
DC Power Supply	ABM	8301HD	D011531	N.C.R
Power Meter	Anritsu	ML2495A	1012009	06/07/2016
Power Sensor	Anritsu	MA2411A	0917072	06/08/2016
Spectrum Analyzer	ROHDE&SCHWARZ	FSV40	101073	07/08/2016

Wugu 966 Chamber A				
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
Spectrum Analyzer	Agilent	E4446A	US42510268	01/25/2016
EMI Test Receiver	R&S	ESCI	100064	06/03/2016
Bilog Antenna	Sunol Sciences	JB3	A030105	08/05/2016
Horn Antenna	EMCO	3117	00055165	01/26/2016
Horn Antenna	EMCO	3116	26370	12/25/2015
Turn Table	CCS	CC-T-1F	N/A	N.C.R
Antenna Tower	CCS	CC-A-1F	N/A	N.C.R
Controller	CCS	CC-C-1F	N/A	N.C.R
Pre-Amplifier	MITEQ	1652-3000	1490939	08/09/2016
Pre-Amplifier	EMC	EMC 012635	980151	06/04/2016
Pre-Amplifier	MITEQ	AMF-6F-260400-40-8P	985646	12/25/2015
Coaxial Cable	Huber+Suhner	102	29212/2	12/25/2015
Coaxial Cable	Huber+Suhner	102	29406/2	12/25/2015
Test S/W	EZ-EMC (CCS-3A1RE)			

Conducted Emission Room # B				
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
EMI Test Receiver	R&S	ESCI	101073	09/08/2016
LISN	R&S	ENV216	101054	06/06/2016
LISN	SCHWARZBECK	NSLK 8127	8127-541	11/25/2015
Capacitive Voltage Probe	FCC	F-CVP-1	100185	03/12/2016
Test S/W	CCS-3A1-CE			

4.3 MEASUREMENT UNCERTAINTY

PARAMETER	UNCERTAINTY
Powerline Conducted Emission	+/- 1.2159
3M Semi Anechoic Chamber / <200M	+/- 4.0138
3M Semi Anechoic Chamber / 200M~1000M	+/- 3.9483
3M Semi Anechoic Chamber / 1G~8G	+/- 2.5975
3M Semi Anechoic Chamber / 8G~18G	+/- 2.6112
3M Semi Anechoic Chamber / 18G~26G	+/- 2.7389
3M Semi Anechoic Chamber / 26G~40G	+/- 2.9683

***Remark**: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.*

5. FACILITIES AND ACCREDITATIONS

5.1 FACILITIES

All measurement facilities used to collect the measurement data are located at

☐ No.199, Chunghsen Road, Hsintien City, Taipei Hsien, Taiwan, R.O.C.

☐ No.139, Wugong Rd., Wugu Dist., New Taipei City 24886, Taiwan (R.O.C.)

☒ No.11, Wugong 6th Rd., Wugu Dist., New Taipei City 24891, Taiwan. (R.O.C.)

☐ No.81-1, Lane 210, Bade 2nd Rd., Lujhu Township, Taoyuan County 33841, TAIWAN, R.O.C.

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.10 and CISPR Publication 22.

5.2 EQUIPMENT

Radiated emissions are measured with one or more of the following types of linearly polarized antennas: tuned dipole, biconical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements.

Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers.

Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, “Radio Interference Measuring Apparatus and Measurement Methods.”

5.3 TABLE OF ACCREDITATIONS AND LISTINGS

Country	Agency	Scope of Accreditation	Logo
USA	FCC	3M Semi Anechoic Chamber (FCC MRA: TW1039) to perform FCC Part 15 measurements	FCC MRA: TW1039
Taiwan	TAF	LP0002, RTTE01, FCC Method-47 CFR Part 15 Subpart C, D, E, RSS-310 IDA TS SRD, AS/NZS 4268, AS/NZS 4771, TS 12.1 & 12,2, ETSI EN 300 440-1, ETSI EN 300 440-2, ETSI EN 300 328, ETSI EN 300 220-1, ETSI EN 300 220-2, ETSI EN 301 893, ETSI EN 301 489-1/3/7/17 FCC OET Bulletin 65 + Supplement C, EN 50360, EN 50361, EN 50371, RSS 102, EN 50383, EN 50385, EN 50392, IEC 62209, CNS 14958-1, CNS 14959 FCC Method –47 CFR Part 15 Subpart B IEC / EN 61000-3-2, IEC / EN 61000-3-3, IEC / EN 61000-4-2/3/4/5/6/8/11	TAF Testing Laboratory 1309
Canada	Industry Canada	3M Semi Anechoic Chamber (IC 2324G-1 / IC 2324G-2) to perform	Canada IC 2324G-1 IC 2324G-2

** No part of this report may be used to claim or imply product endorsement by A2LA or any agency of the US Government.*

6. SETUP OF EQUIPMENT UNDER TEST

6.1 SETUP CONFIGURATION OF EUT

See test photographs attached in Appendix I for the actual connections between EUT and support equipment.

6.2 SUPPORT EQUIPMENT

No	Equipment	Brand	Model	Series No.	FCC ID	Data Cable	Power Cord
	N/A						

Remark:

1. *All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.*
2. *Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.*

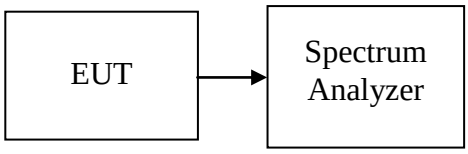
7. FCC PART 15 REQUIREMENTS

7.1 26 DB EMISSION BANDWIDTH

LIMIT

According to §15.303(c), for purposes of this subpart the emission bandwidth shall be determined by measuring the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, that are 26 dB down relative to the maximum level of the modulated carrier. Compliance with the emissions limits is based on the use of measurement instrumentation employing a peak detector function with an instrument resolutions bandwidth approximately equal to 1.0 percent of the emission bandwidth of the device under measurement.

Test Configuration



TEST PROCEDURE

1. Place the EUT on the table and set it in the transmitting mode.
2. Remove the antenna from the EUT and then connect a low-loss RF cable from the antenna port to the spectrum analyzer.
3. Set the spectrum analyzer as RBW > 1%EBW, VBW > RBW, Span >26dB bandwidth, and Sweep = auto.
4. Mark the peak frequency and –26dB (upper and lower) frequency.
5. Repeat until all the rest channels were investigated.

TEST RESULTS

No non-compliance noted

Test Data

Test mode: IEEE 802.11a mode / 5180 ~ 5240MHz

Channel	Frequency (MHz)	Chain 0 Bandwidth (MHz)	Chain 1 Bandwidth (MHz)
Low	5180	20.272	20.352
Mid	5220	20.272	25.000
High	5240	20.352	28.926

Test mode: IEEE 802.11n HT 20 mode / 5180 ~ 5240MHz

Channel	Frequency (MHz)	Chain 0 Bandwidth (MHz)	Chain 1 Bandwidth (MHz)
Low	5180	20.432	20.432
Mid	5220	20.352	20.592
High	5240	20.512	20.512

Test mode: IEEE 802.11ac VHT 20 mode / 5180 ~ 5240MHz

Channel	Frequency (MHz)	Chain 0 Bandwidth (MHz)	Chain 1 Bandwidth (MHz)
Low	5180	19.871	26.522
Mid	5220	20.753	35.737
High	5240	30.128	35.817

Test mode: IEEE 802.11n HT 40 mode / 5190 ~ 5230MHz

Channel	Frequency (MHz)	Chain 0 Bandwidth (MHz)	Chain 1 Bandwidth (MHz)
Low	5190	42.435	36.666
High	5230	42.435	42.307

Test mode: IEEE 802.11ac VHT 40 mode / 5190 ~ 5230MHz

Channel	Frequency (MHz)	Chain 0 Bandwidth (MHz)	Chain 1 Bandwidth (MHz)
Low	5190	42.031	56.538
High	5230	42.307	44.102

Test mode: IEEE 802.11ac VHT80 Mode/ 5210MHz

Channel	Frequency (MHz)	Chain 0 Bandwidth (MHz)	Chain 1 Bandwidth (MHz)
Mid	5210	117.628	179.487

Test mode: IEEE 802.11a mode / 5745 ~ 5825MHz

Channel	Frequency (MHz)	Chain 0 Bandwidth (MHz)	Chain 1 Bandwidth (MHz)
Low	5745	16.394	16.538
Mid	5785	16.442	16.490
High	5825	16.394	16.394

Test mode: IEEE 802.11n HT 20 mode / 5745 ~ 5825MHz

Channel	Frequency (MHz)	Chain 0 Bandwidth (MHz)	Chain 1 Bandwidth (MHz)
Low	5745	17.644	17.692
Mid	5785	17.692	17.692
High	5825	17.692	17.788

Test mode: IEEE 802.11ac VHT 20 mode / 5745 ~ 5825MHz

Channel	Frequency (MHz)	Chain 0 Bandwidth (MHz)	Chain 1 Bandwidth (MHz)
Low	5745	17.788	17.692
Mid	5785	17.692	17.692
High	5825	17.692	17.692

Test mode: IEEE 802.11n HT 40 mode / 5755 ~ 5815MHz

Channel	Frequency (MHz)	Chain 0 Bandwidth (MHz)	Chain 1 Bandwidth (MHz)
Low	5755	36.538	36.538
High	5795	36.410	36.410

Test mode: IEEE 802.11ac VHT 40 mode / 5755 ~ 5815MHz

Channel	Frequency (MHz)	Chain 0 Bandwidth (MHz)	Chain 1 Bandwidth (MHz)
Low	5755	36.538	36.410
High	5795	36.410	36.410

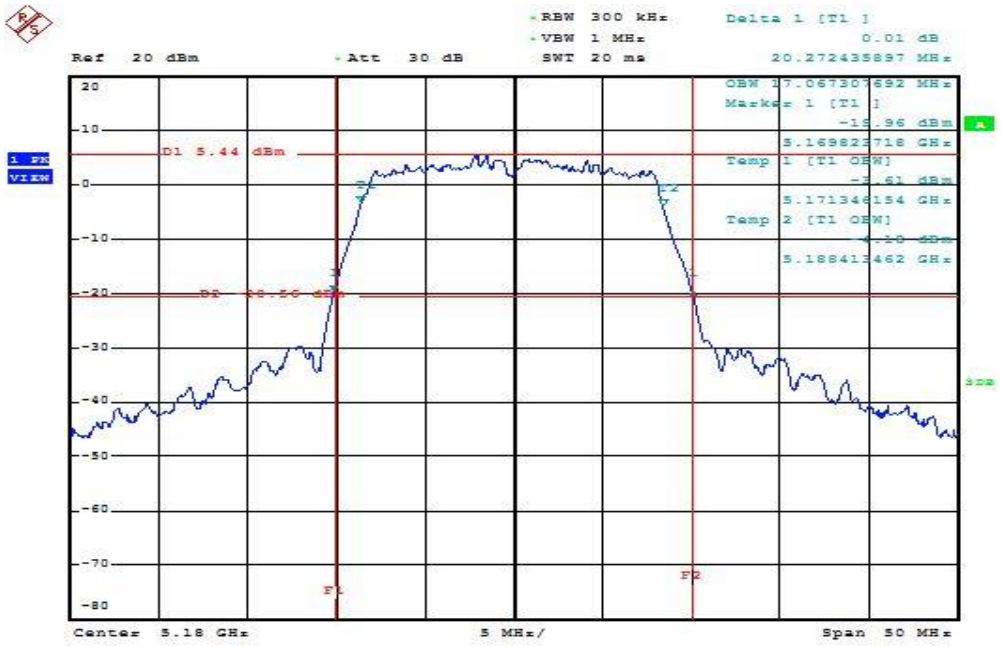
Test mode: IEEE 802.11ac VHT80 Mode/ 5775MHz

Channel	Frequency (MHz)	Chain 0 Bandwidth (MHz)	Chain 1 Bandwidth (MHz)
Mid	5775	76.410	76.410

Test Plot

IEEE 802.11a mode / 5180 ~ 5240MHz Chain 0

CH Low



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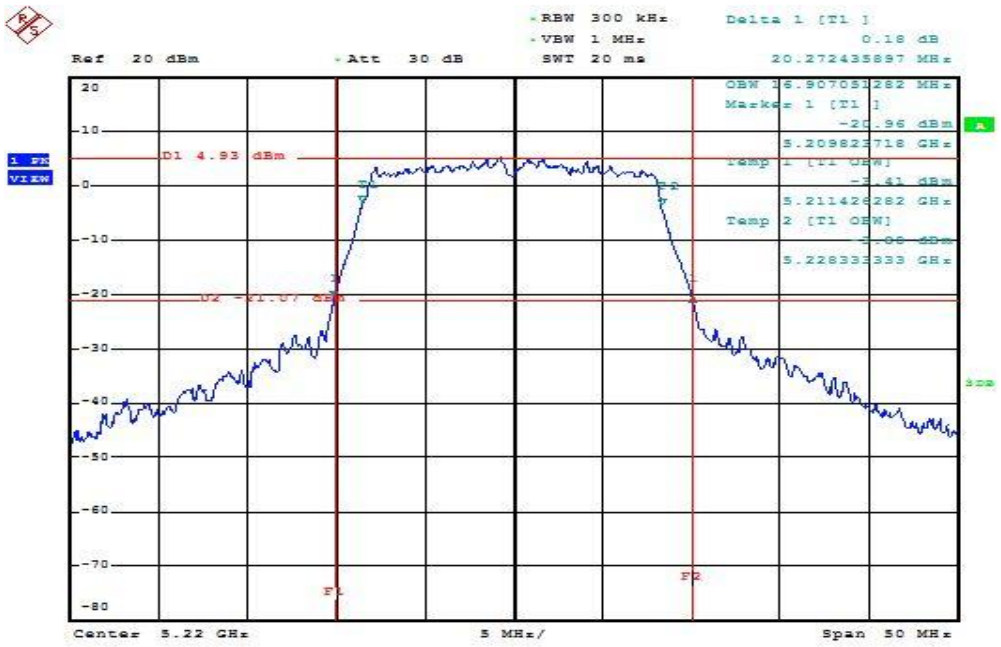
CH Mid



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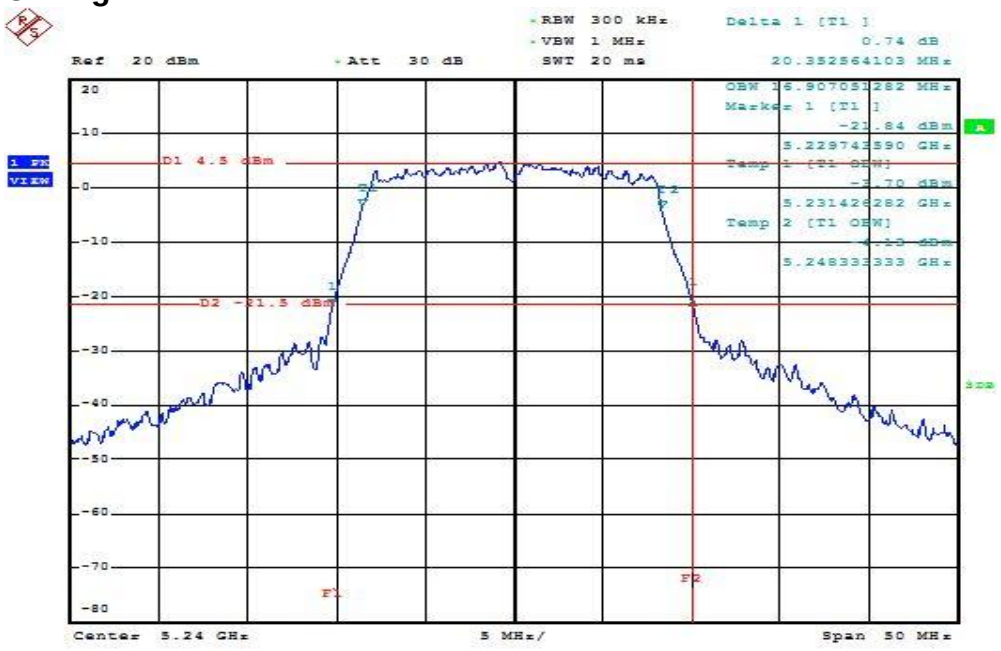
CH High



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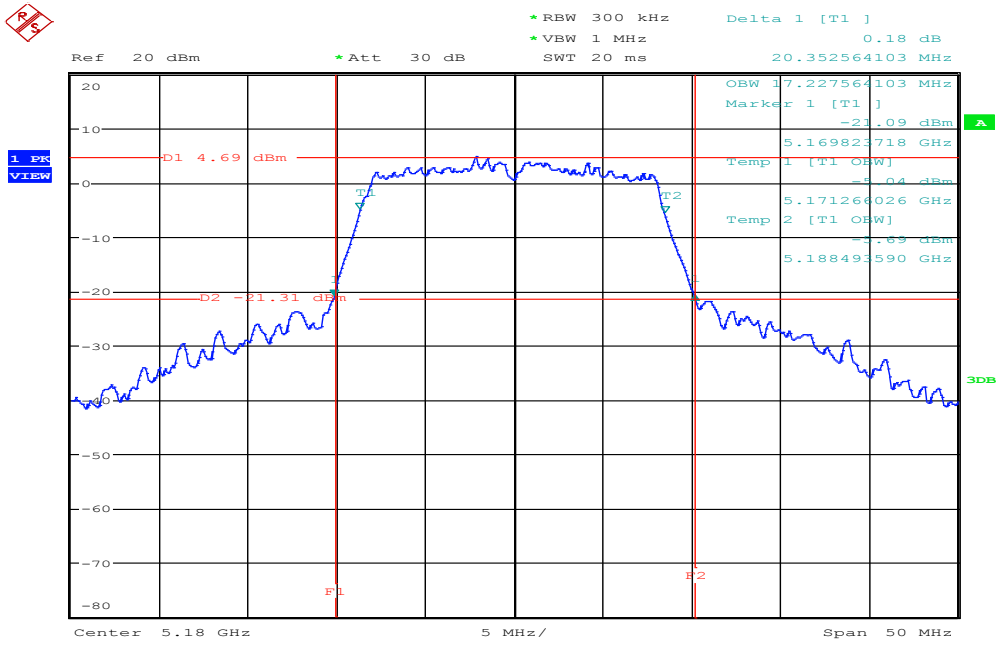
IEEE 802.11a mode / 5180 ~ 5240MHz Chain 1

CH Low



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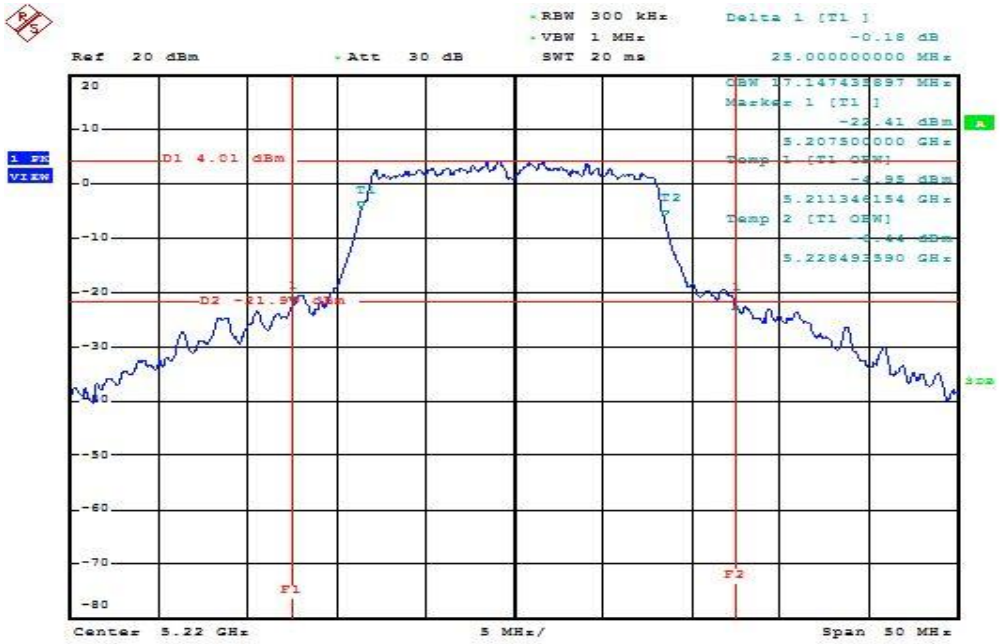
CH Mid



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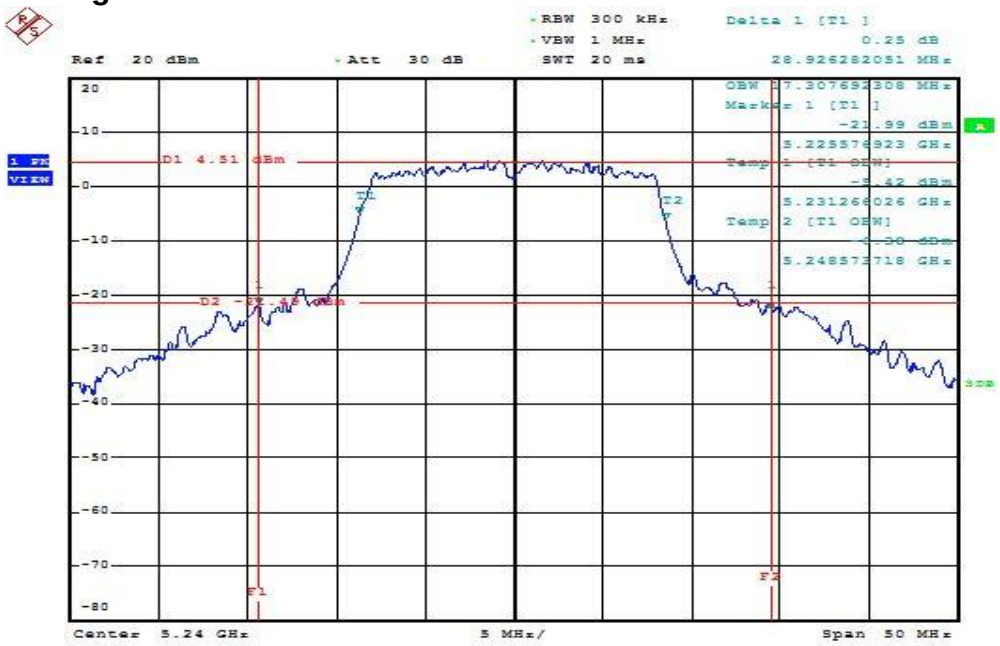
CH High



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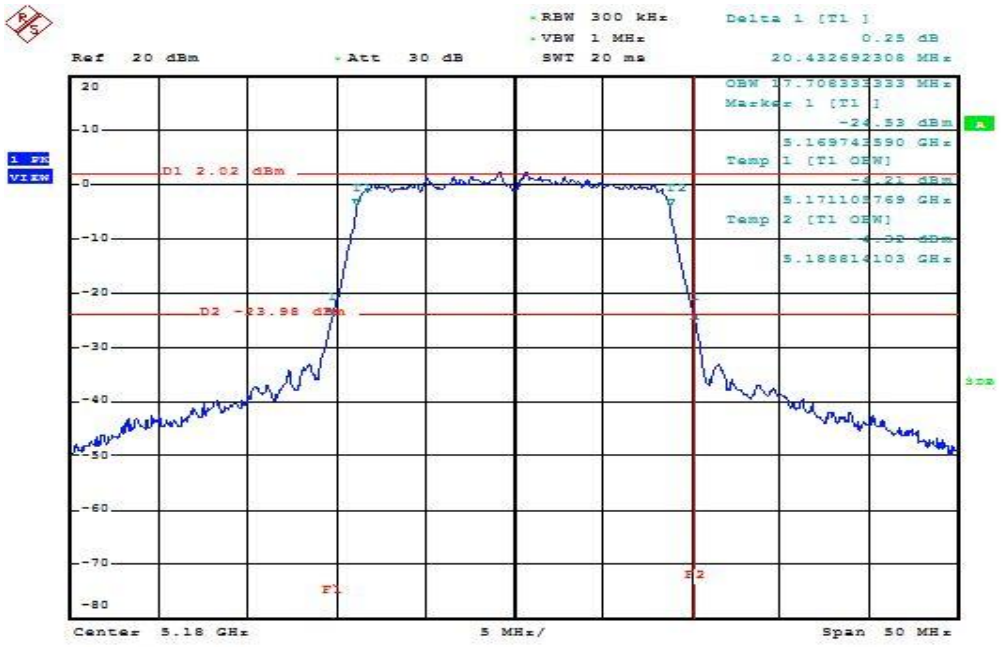
IEEE 802.11n HT 20 mode / 5180 ~ 5240MHz / Chain 0

CH Low



Date: 11.NOV.2015 13:53:47

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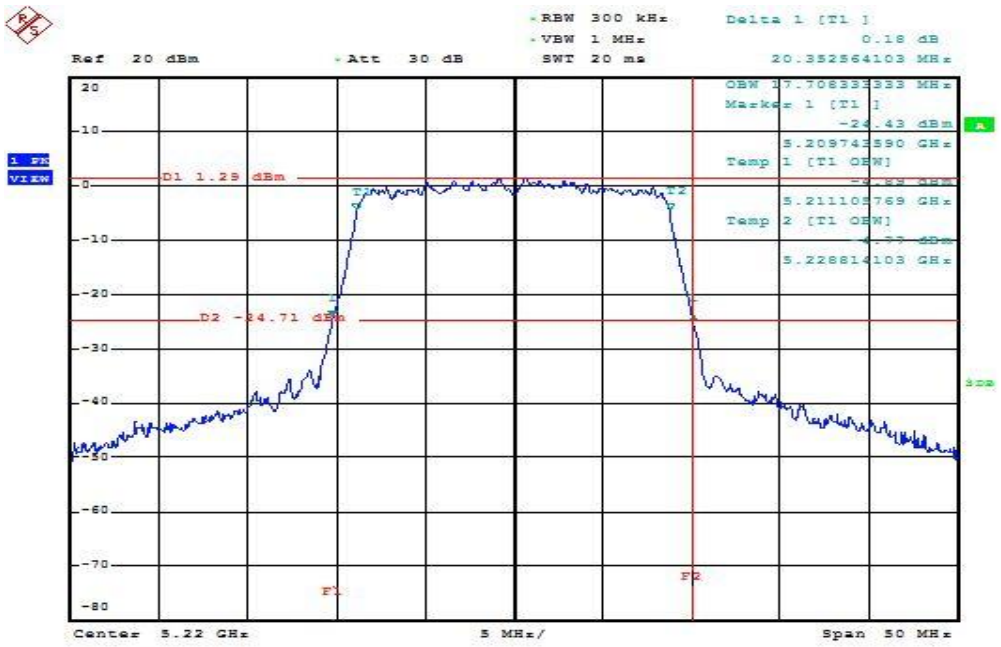

Date: 11.NOV.2015 14:20:29

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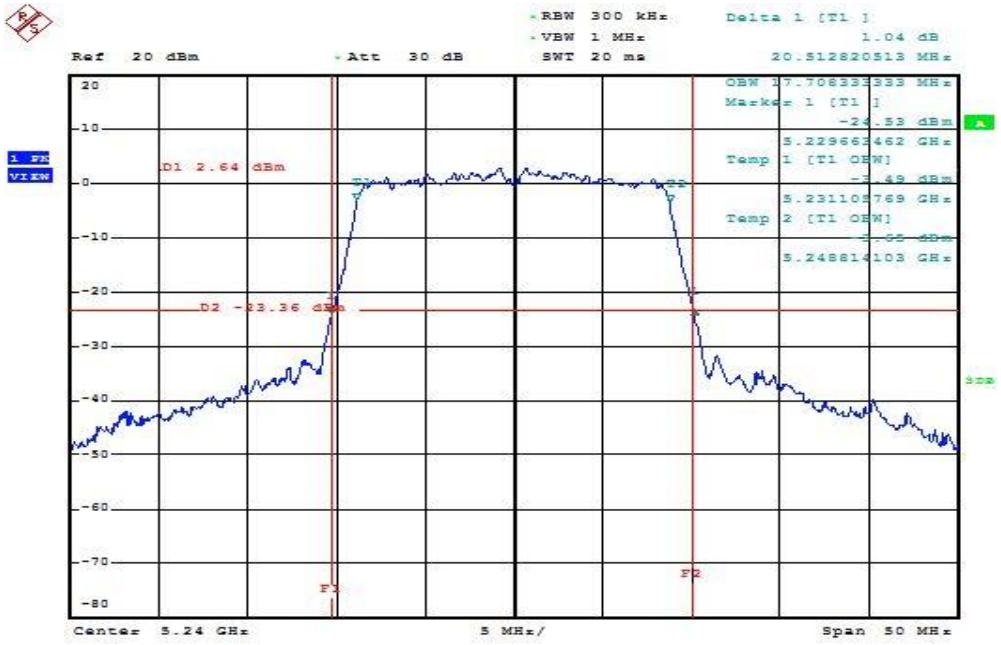
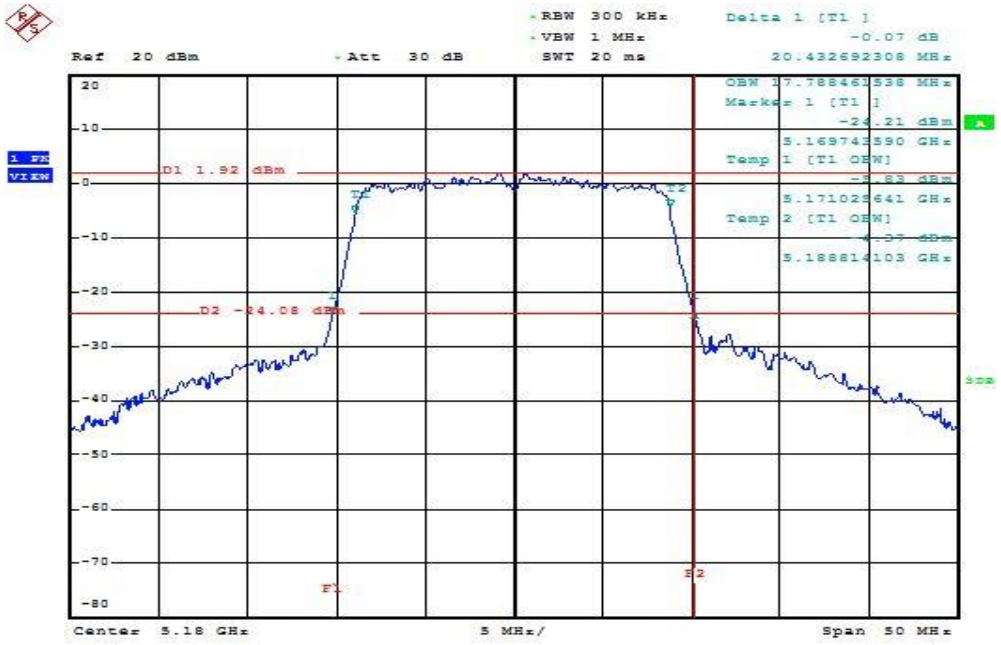


Date: 11.NOV.2015 14:23:09

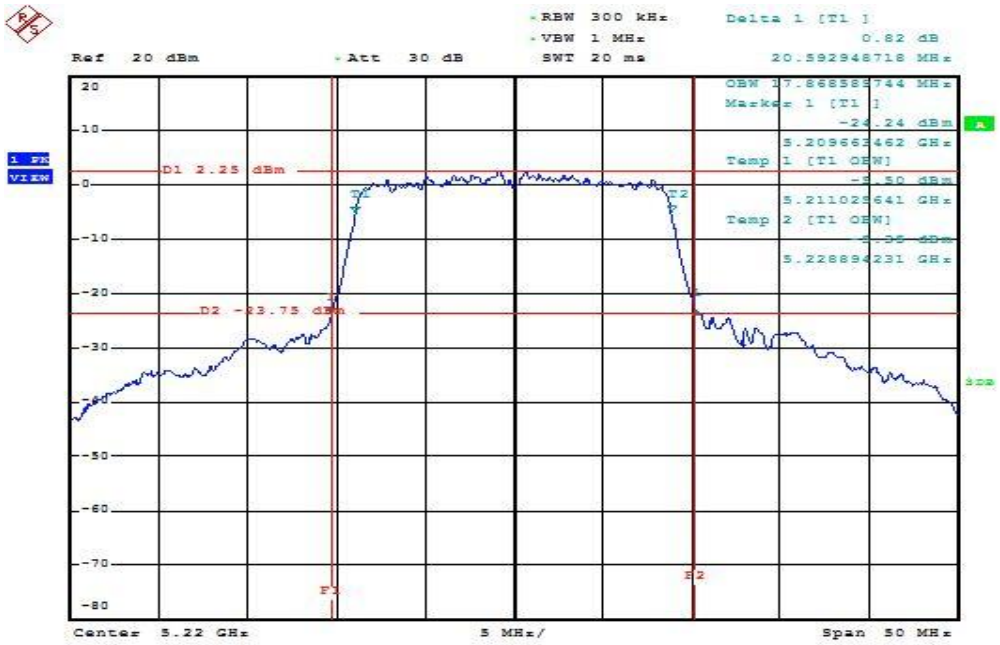
IEEE 802.11n HT 20 mode / 5180 ~ 5240MHz / Chain 1

CH Low



Date: 11.NOV.2015 13:55:28

CH Mid



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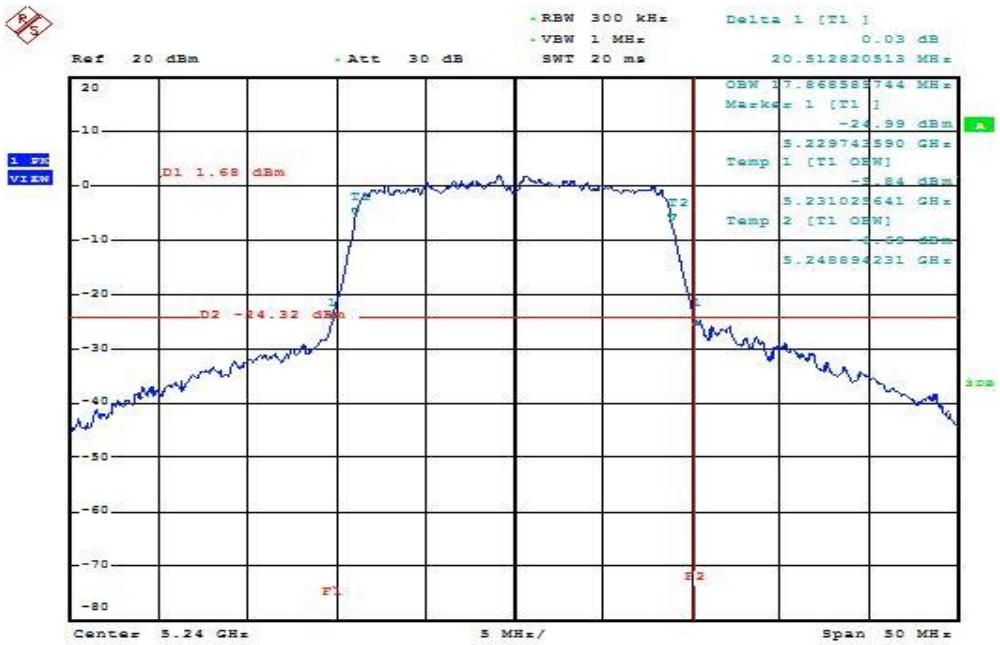
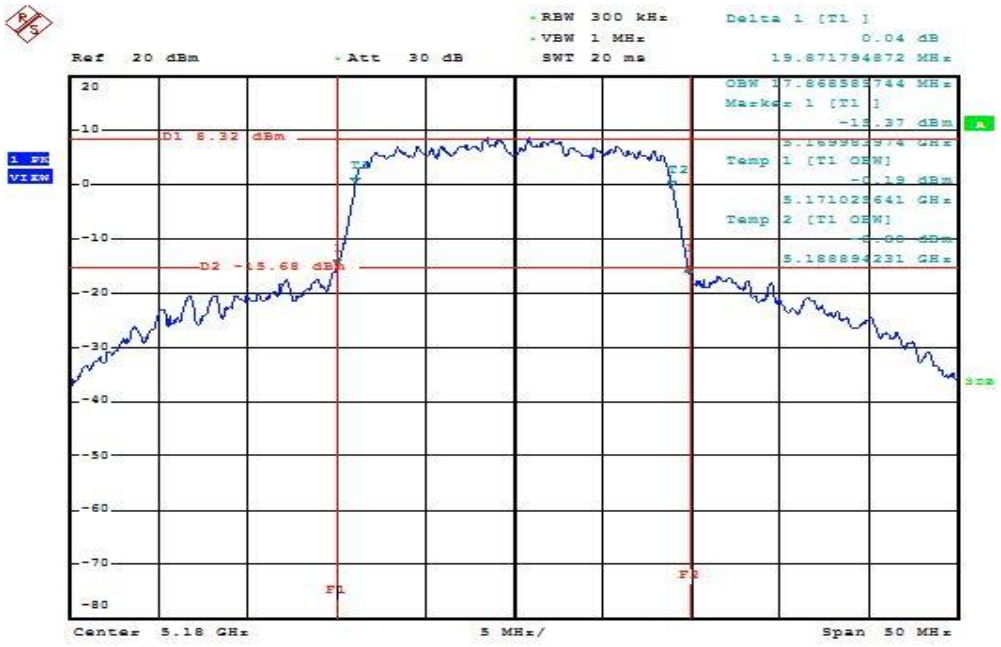


Date: 11.NOV.2015 14:30:17

IEEE 802.11ac VHT 20 mode / 5180 ~ 5240MHz / Chain 0

CH Low



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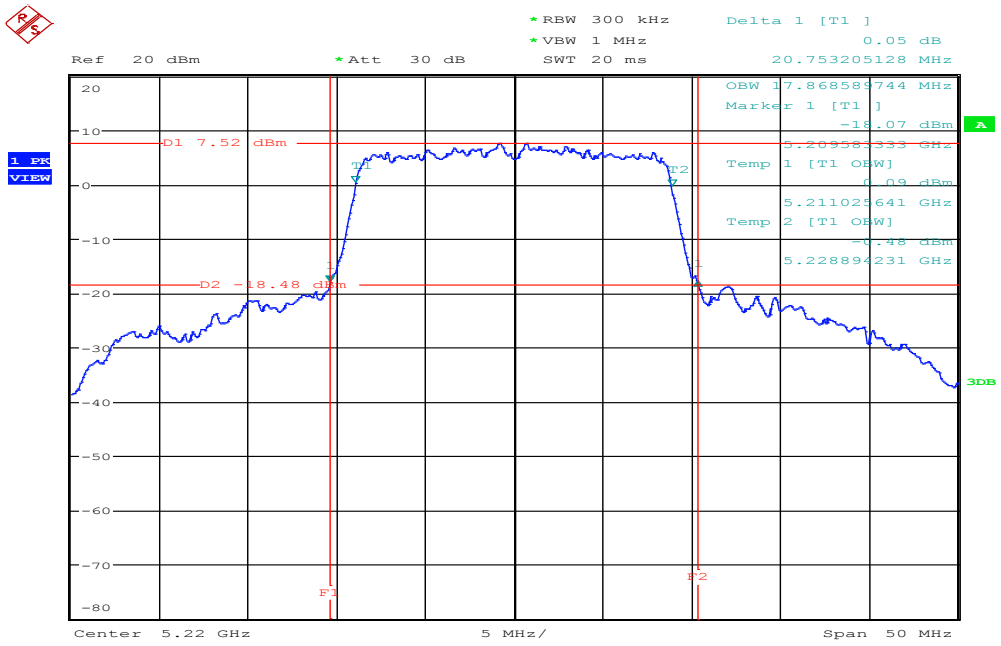
CH Mid



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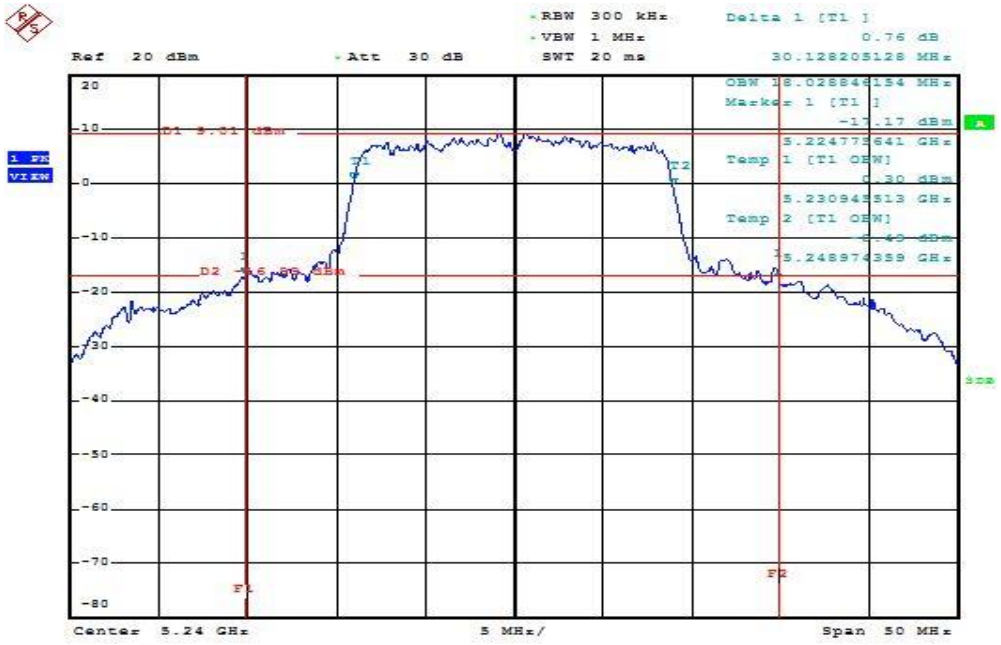
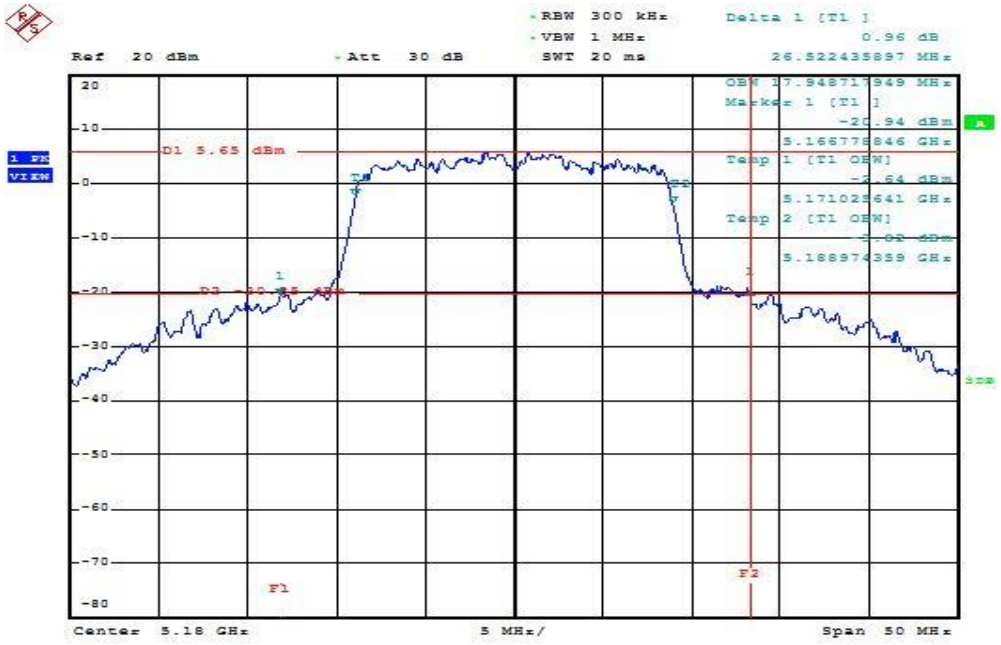


Date: 11.NOV.2015 18:56:17

IEEE 802.11ac VHT 20 mode / 5180 ~ 5240MHz / Chain 1

CH Low



Date: 11.NOV.2015 18:46:49

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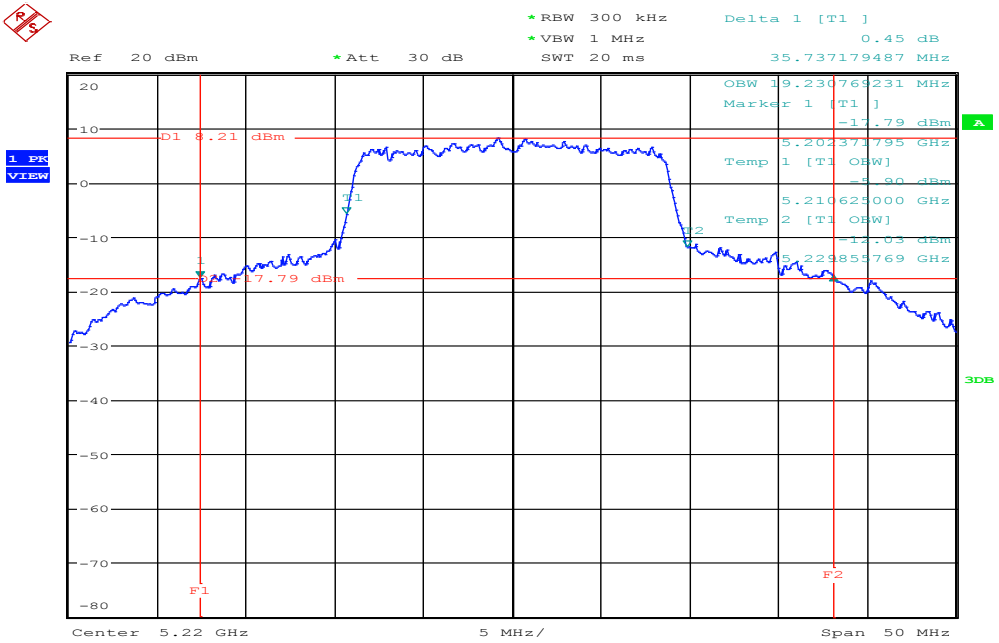

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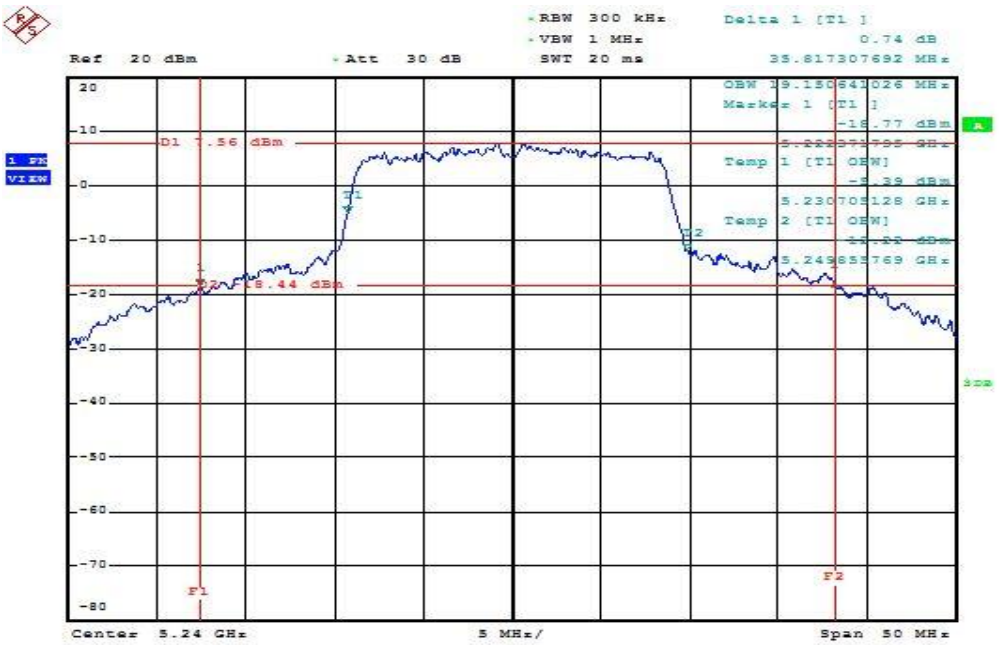
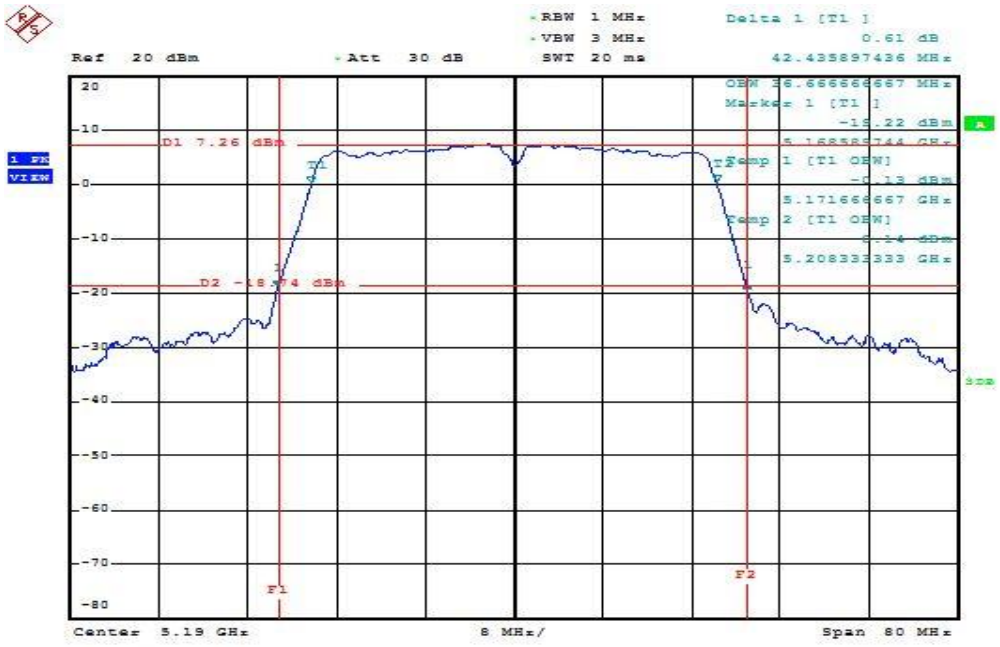


Date: 11.NOV.2015 19:00:12

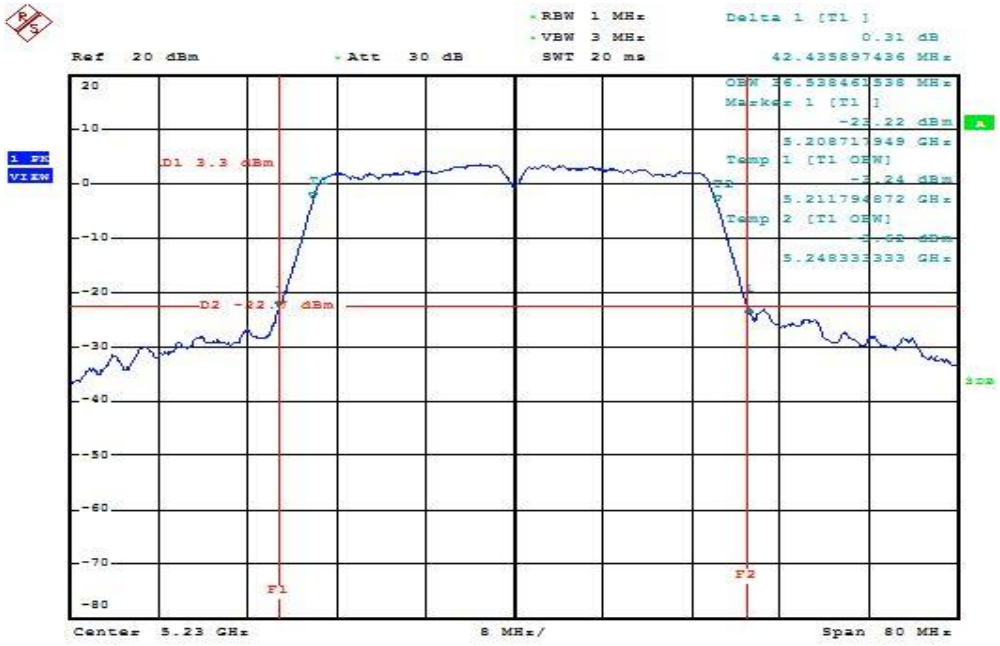
IEEE 802.11n HT 40 mode / 5190 ~ 5230MHz / Chain 0

CH Low



Date: 11.NOV.2015 16:37:00

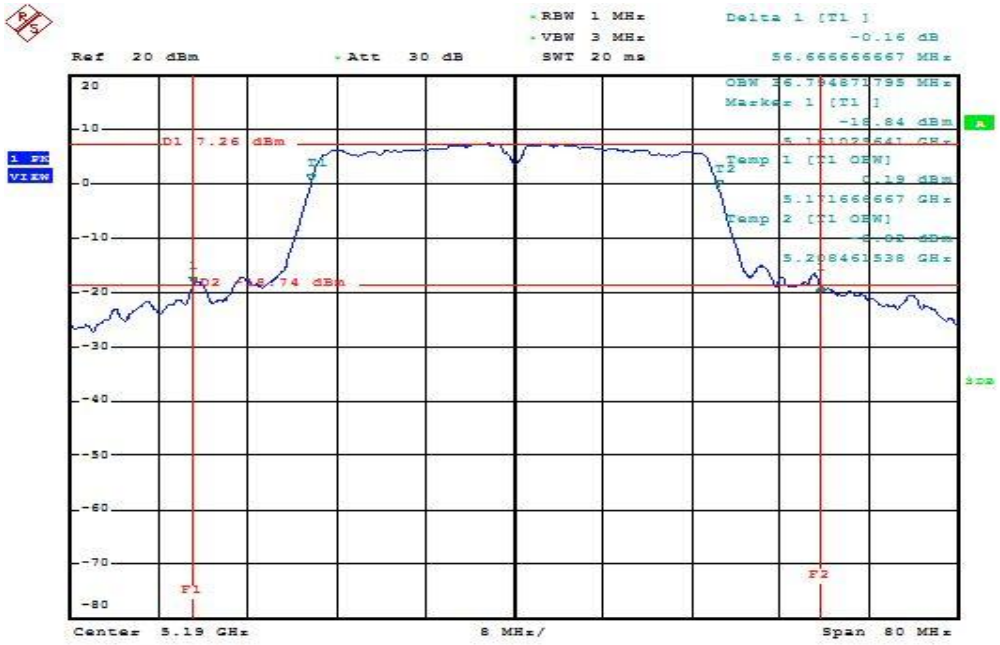
CH High



Date: 11.NOV.2015 17:02:00

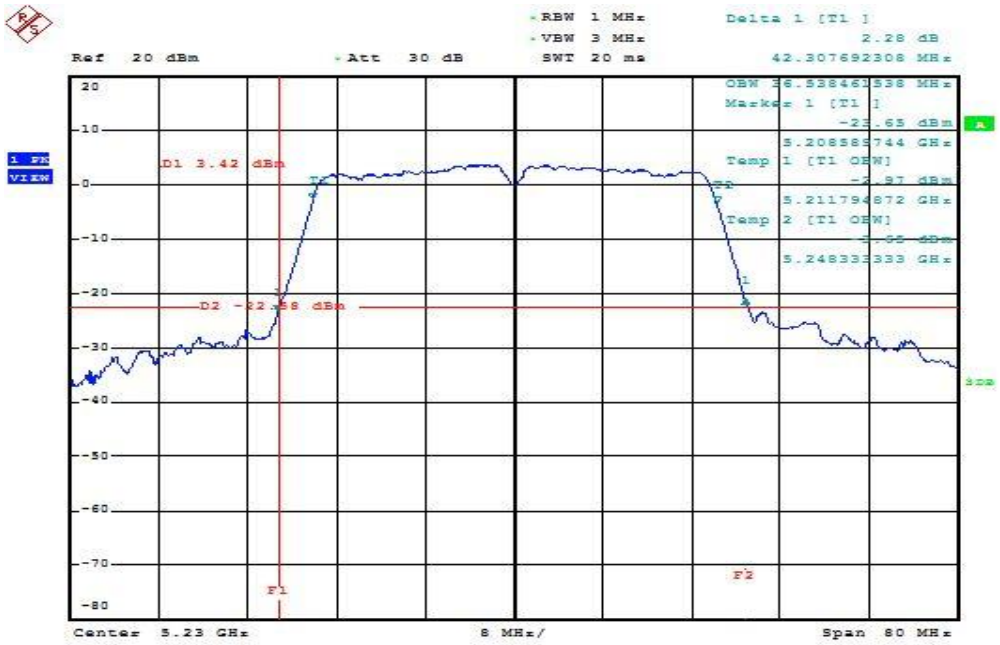
IEEE 802.11n HT 40 mode / 5190 ~ 5230MHz / Chain 1

CH Low



Date: 11.NOV.2015 16:27:58

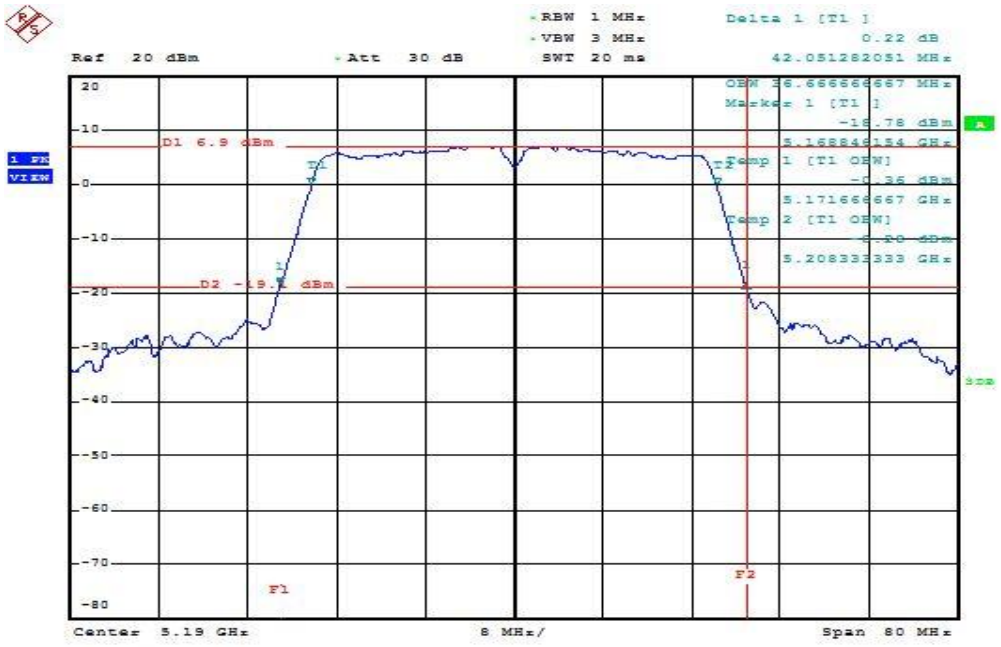
CH High



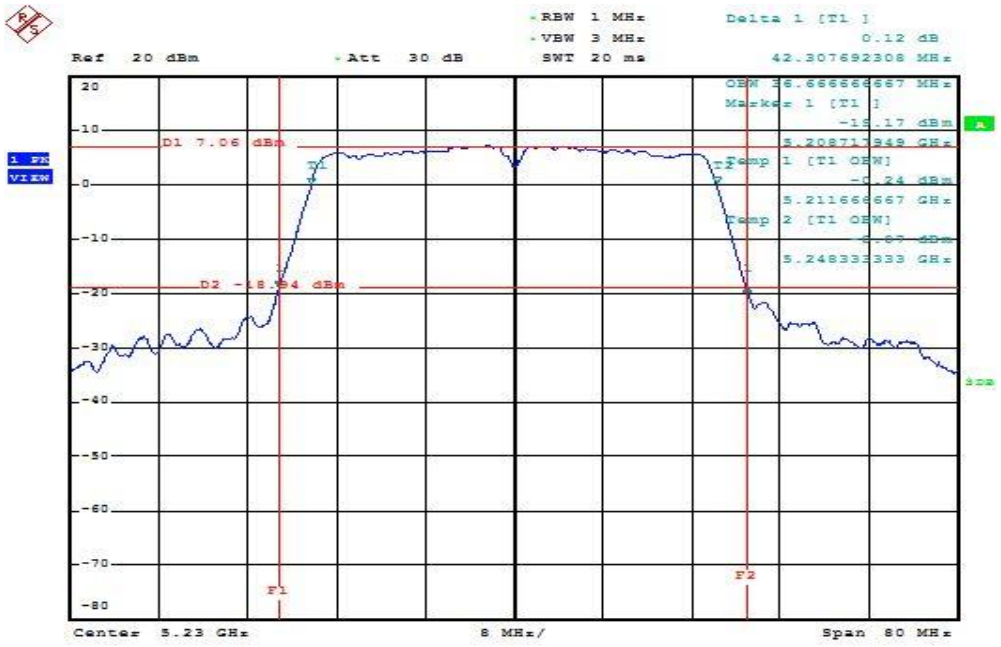
Date: 11.NOV.2015 16:53:05

IEEE 802.11ac VHT 40 mode / 5190 ~ 5230MHz / Chain 0

CH Low

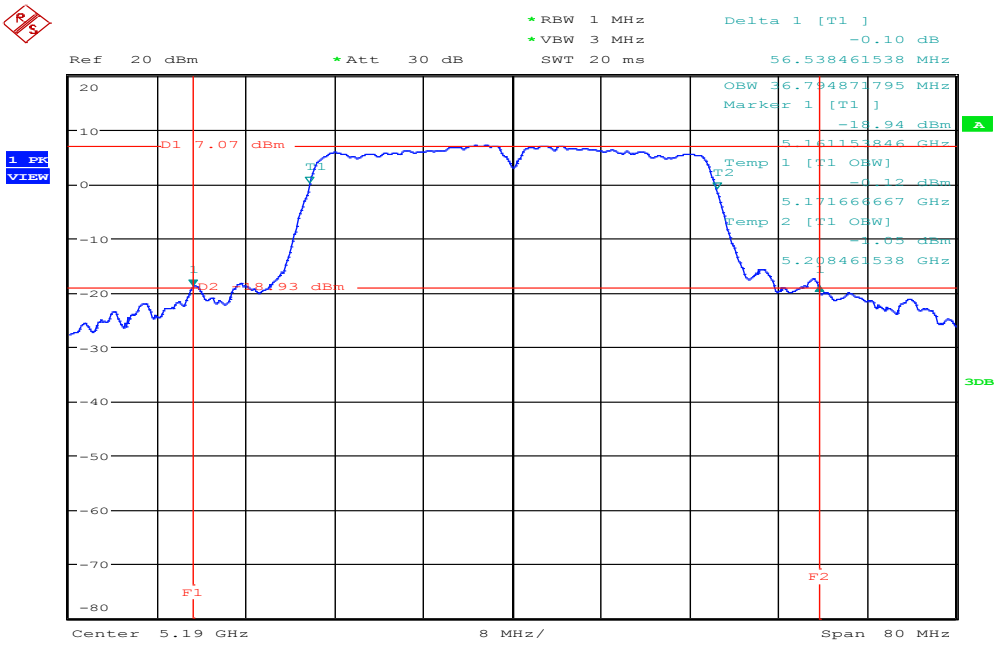


CH High



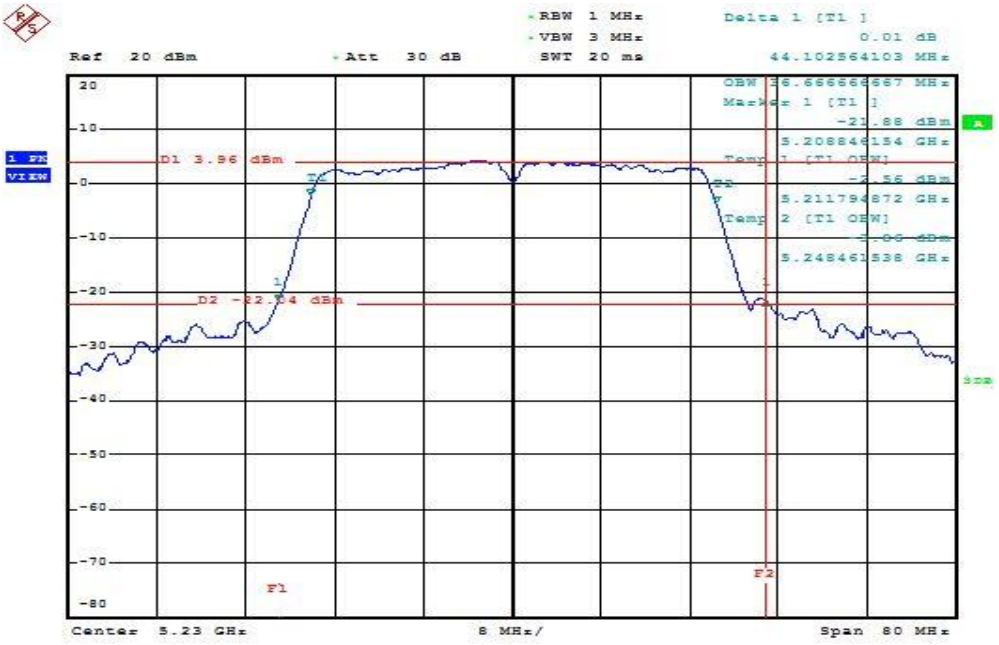
IEEE 802.11ac VHT 40 mode / 5190 ~ 5230MHz / Chain 1

CH Low



Date: 11.NOV.2015 19:02:42

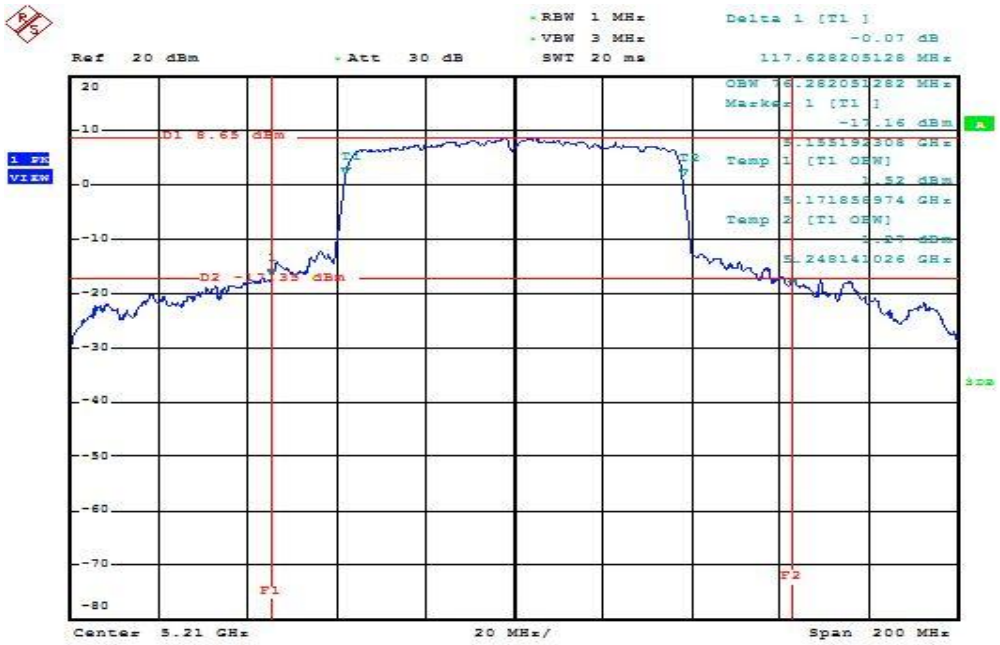
CH High



Date: 11.NOV.2015 19:25:06

IEEE 802.11ac VHT80 Mode / 5210MHz / Chain 0

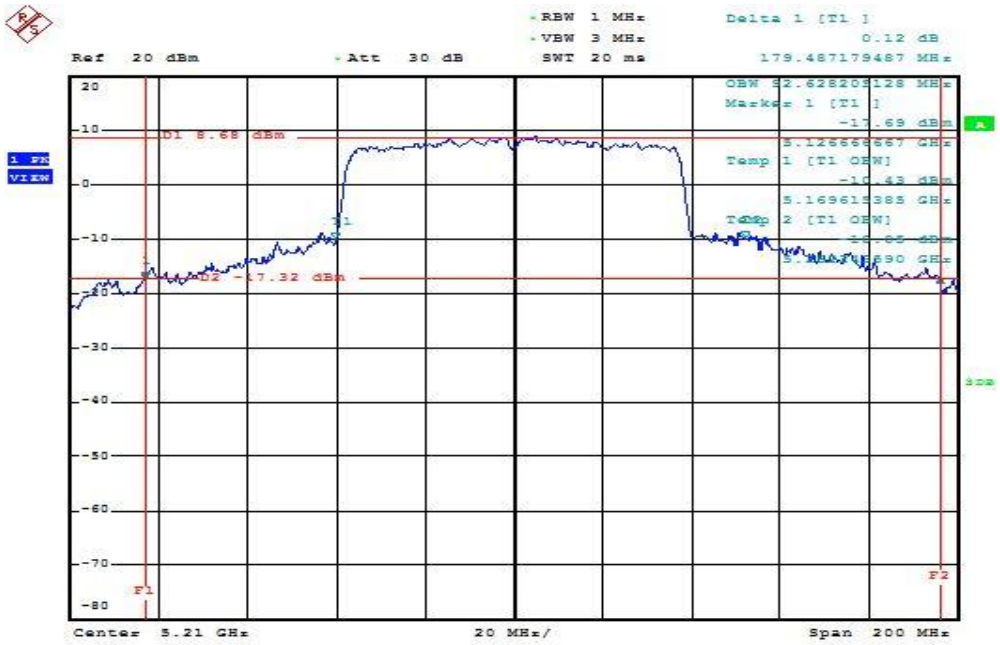
CH Mid



Date: 11.NOV.2015 19:46:54

IEEE 802.11ac VHT80 Mode / 5210MHz / Chain 1

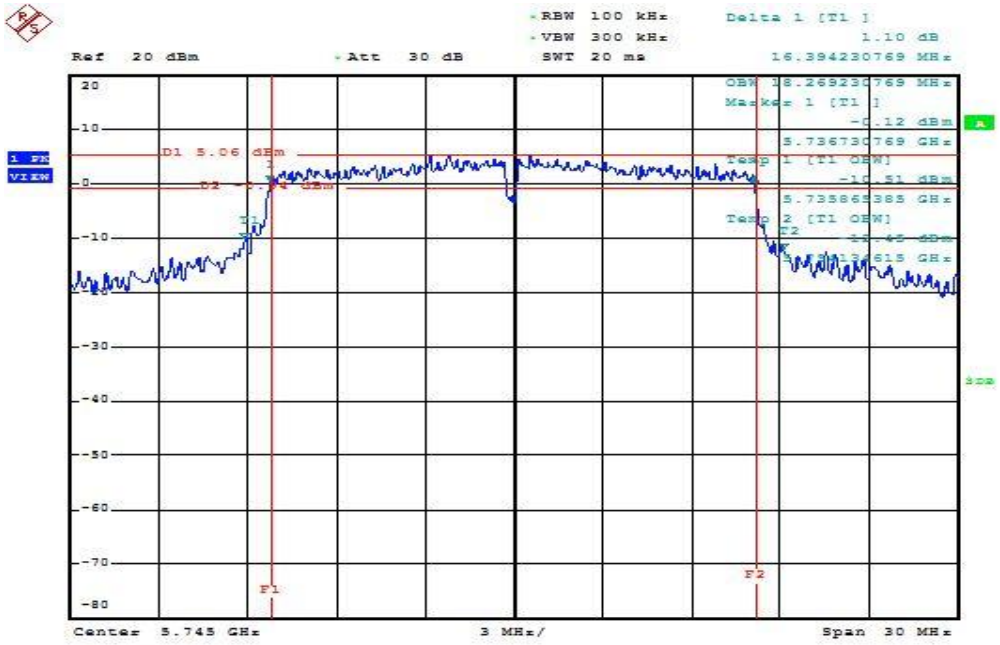
CH Mid



Date: 11.NOV.2015 19:42:17

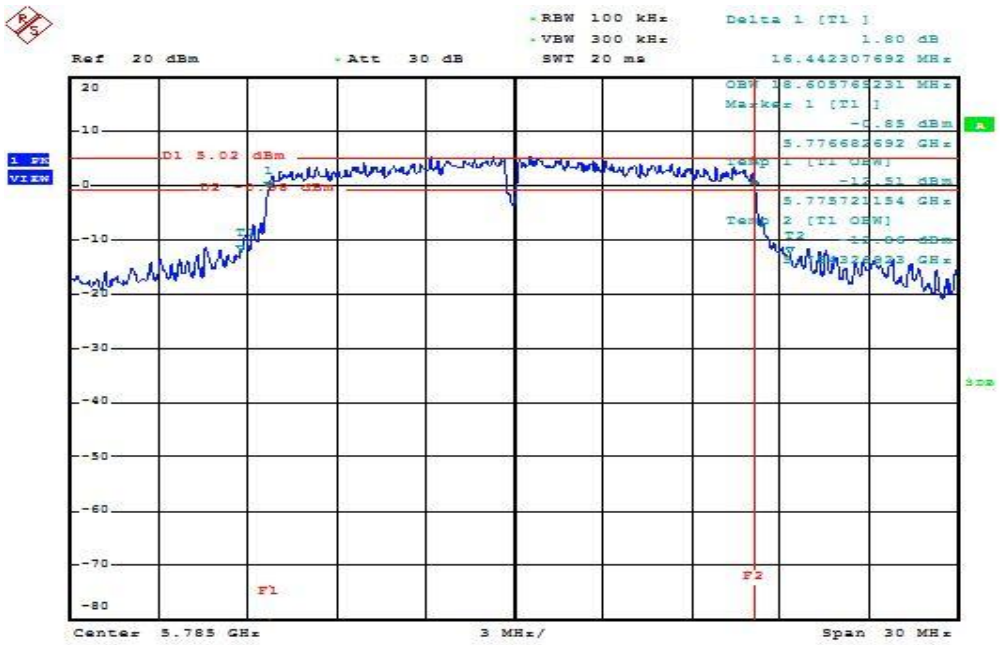
IEEE 802.11a mode / 5745 ~ 5825MHz / Chain 0

CH Low



Date: 11.NOV.2015 20:04:19

CH Mid



Date: 11.NOV.2015 20:07:47

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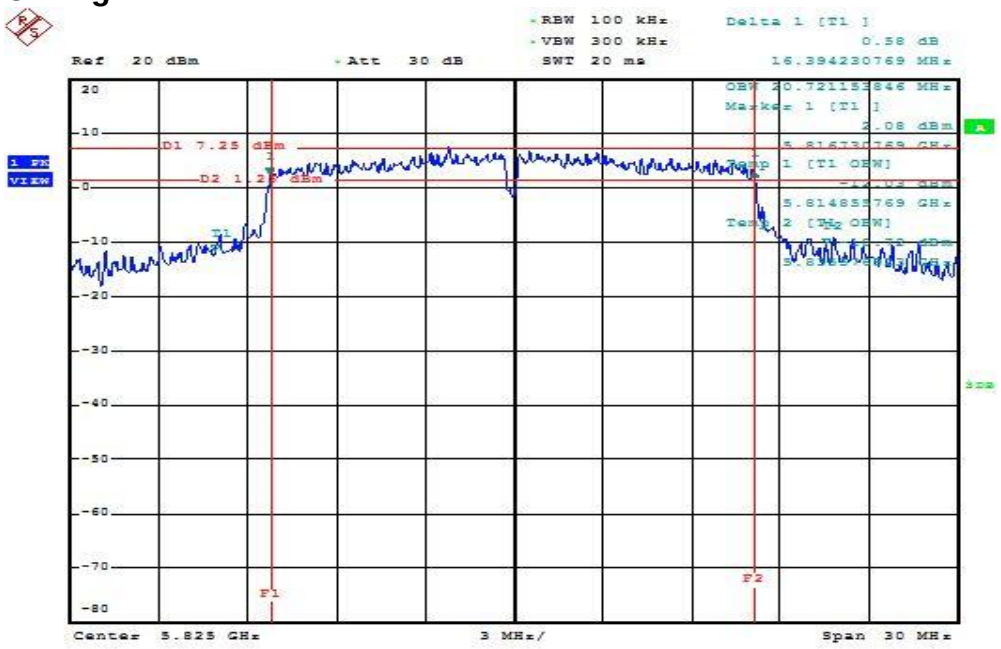
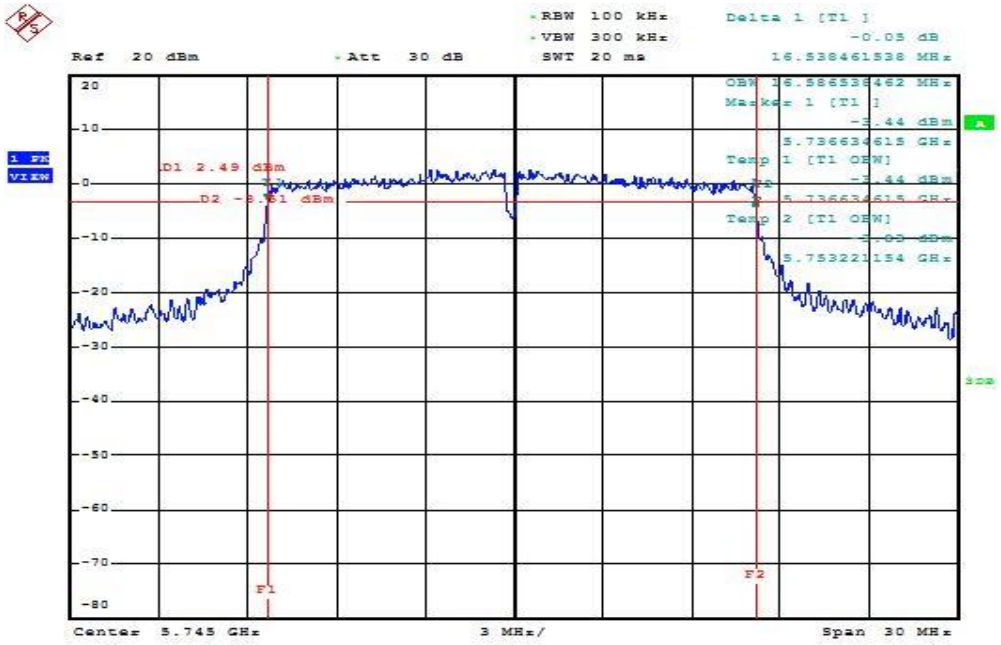


Date: 11.NOV.2015 20:09:50

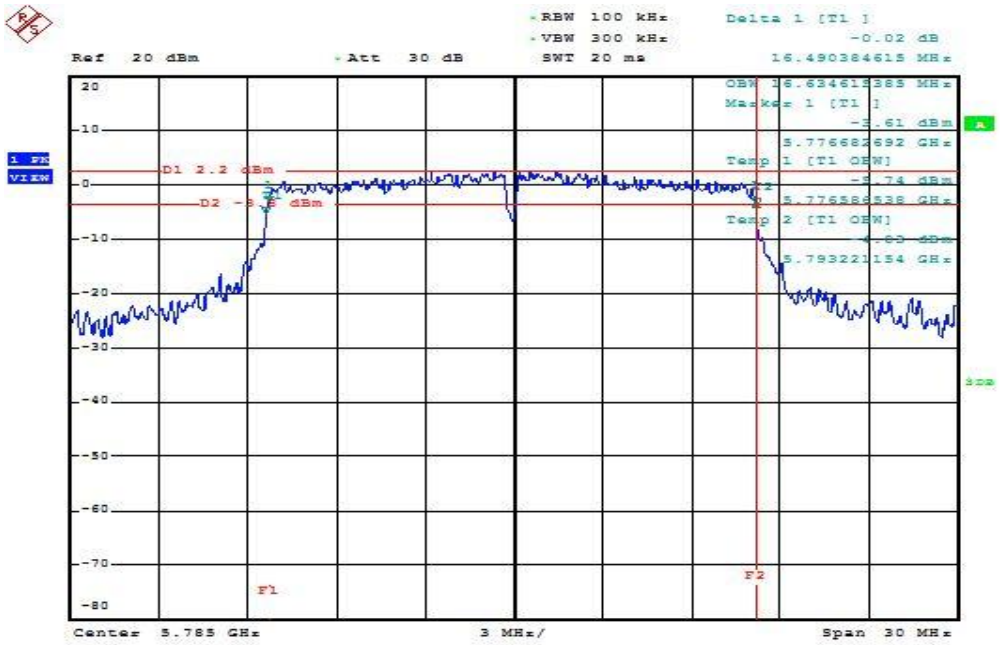
IEEE 802.11a mode / 5745 ~ 5825MHz / Chain 1

CH Low



Date: 11.NOV.2015 20:17:50

CH Mid



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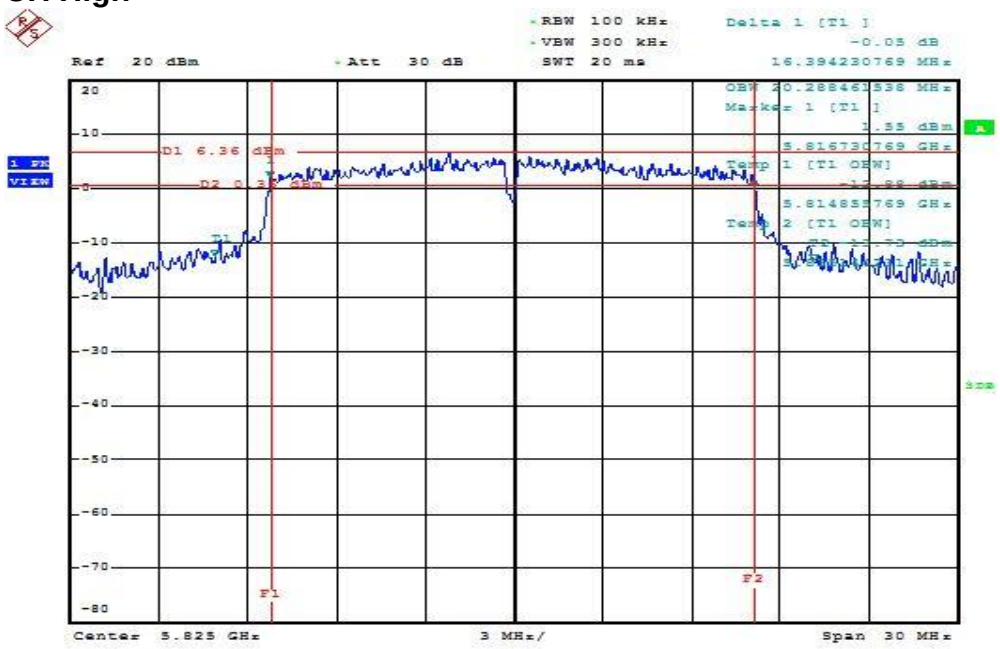
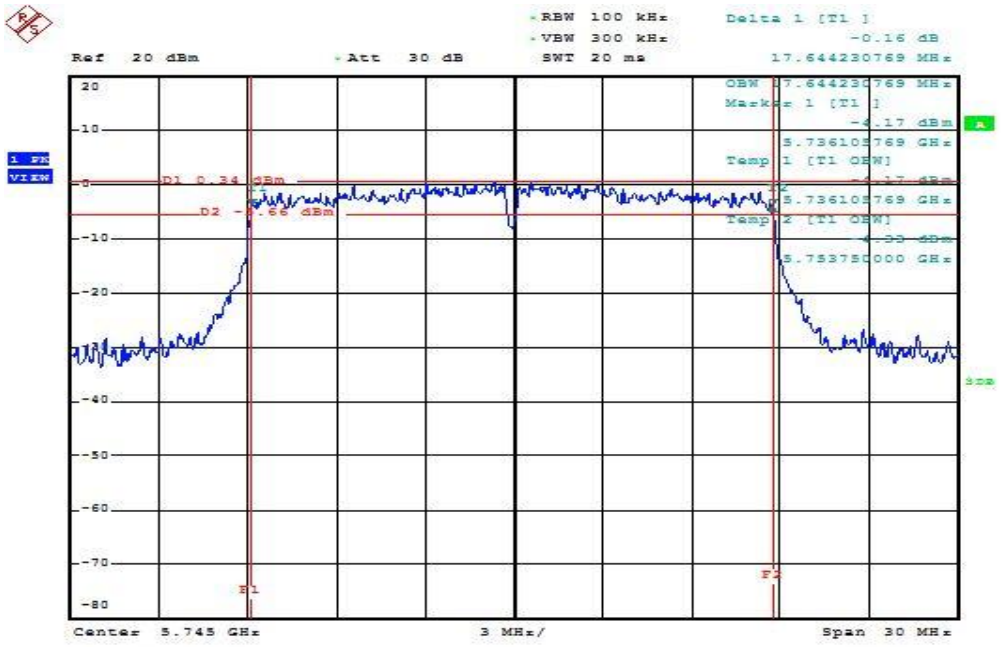


Date: 11.NOV.2015 20:14:00

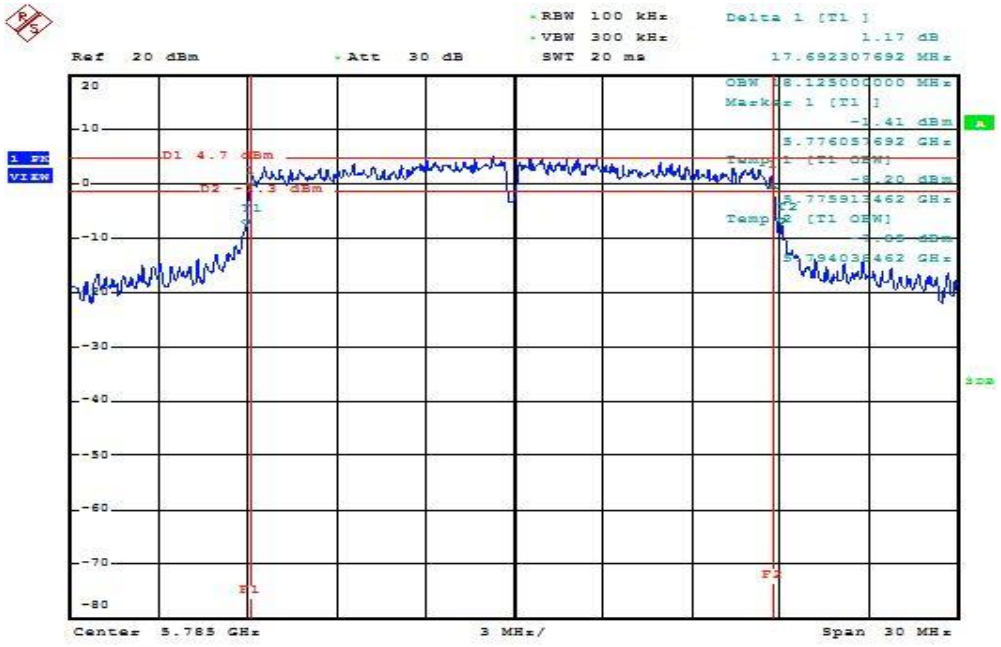
IEEE 802.11n HT 20 mode / 5745 ~ 5825MHz / Chain 0

CH Low



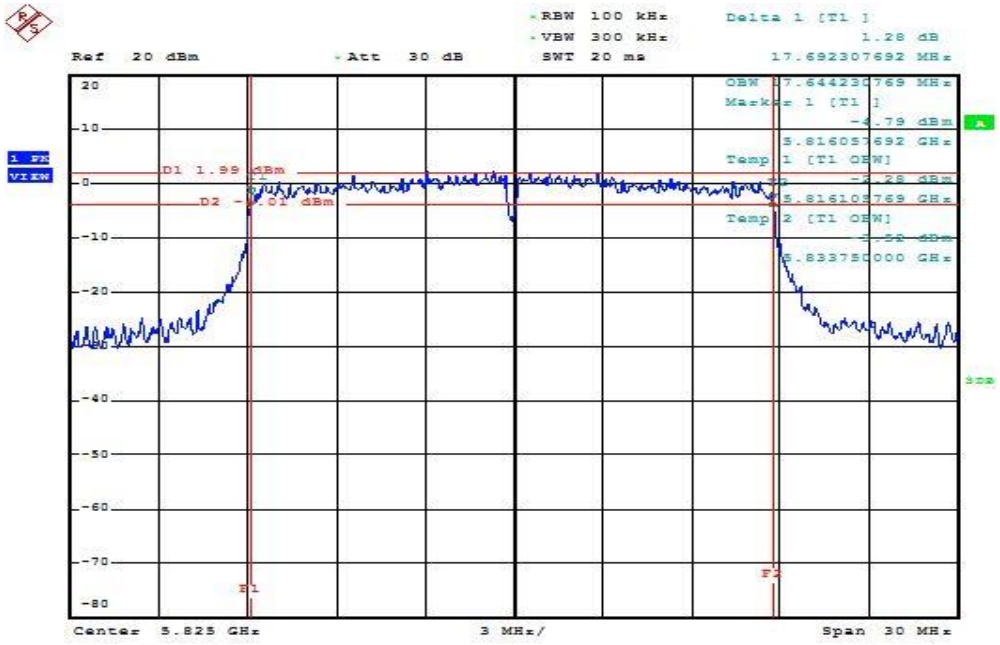
Date: 11.NOV.2015 20:31:11

CH Mid



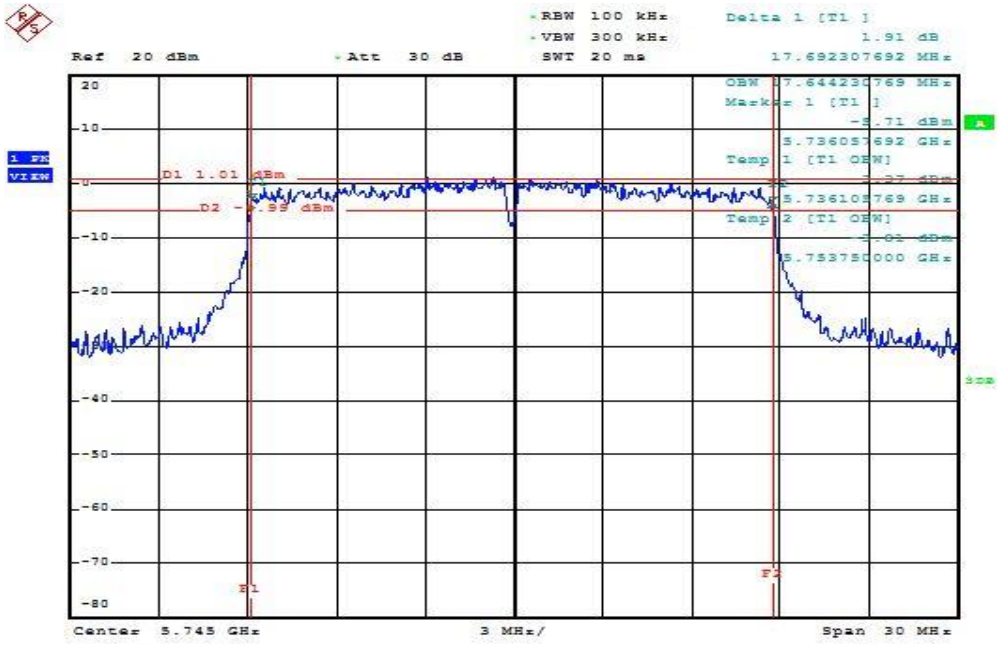
Date: 11.NOV.2015 20:35:12

CH High

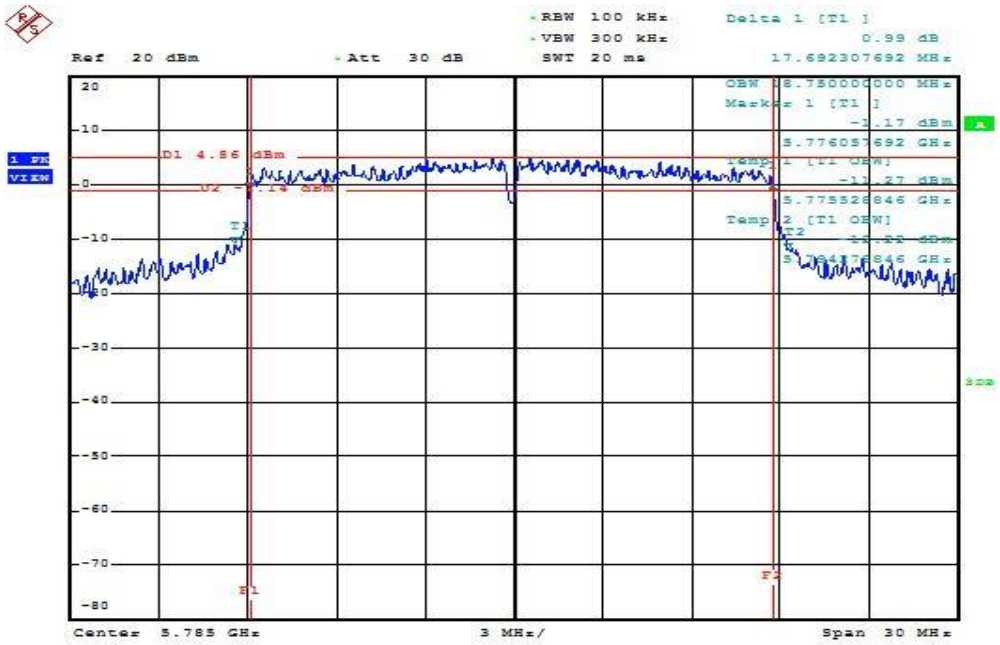


IEEE 802.11n HT 20 mode / 5745 ~ 5825MHz / Chain 1

CH Low

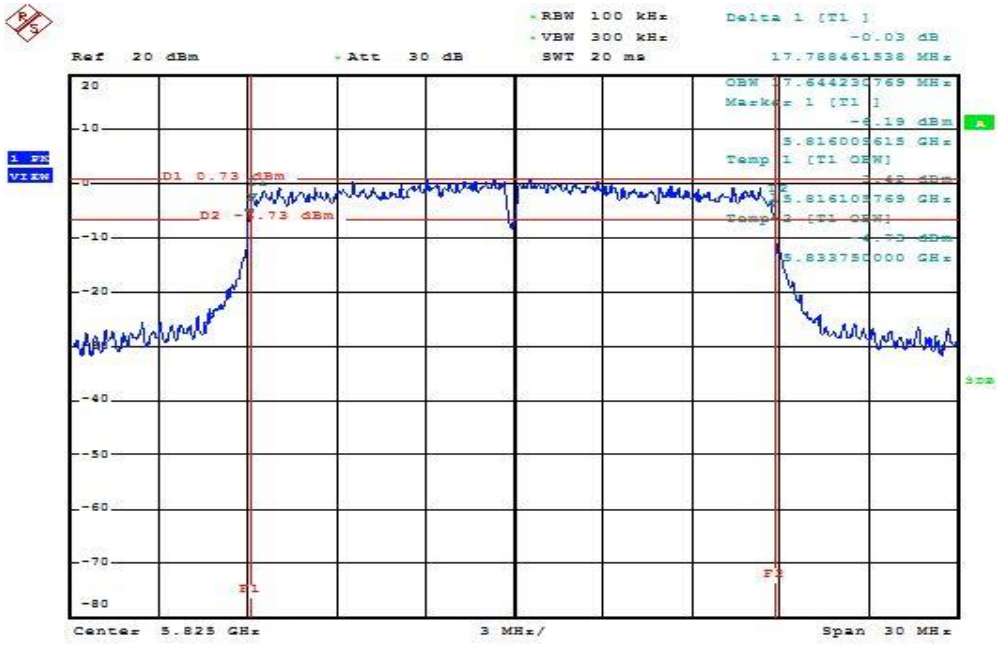


CH Mid



Date: 11.NOV.2015 20:38:43

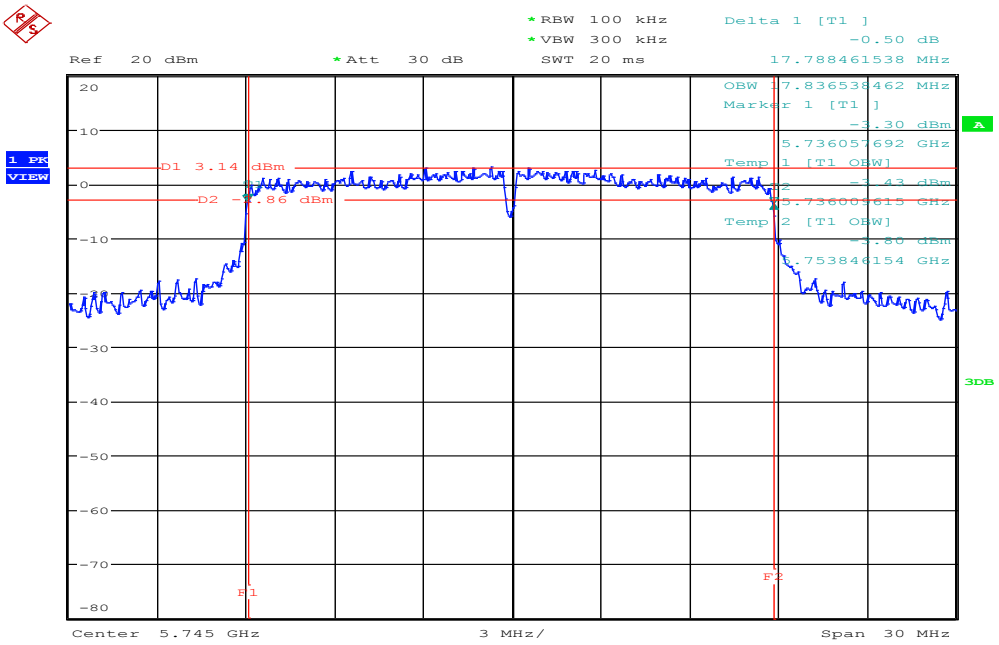
CH High



Date: 11.NOV.2015 20:40:47

IEEE 802.11ac VHT 20 mode / 5745 ~ 5825MHz / Chain 0

CH Low



Date: 11.NOV.2015 22:48:41

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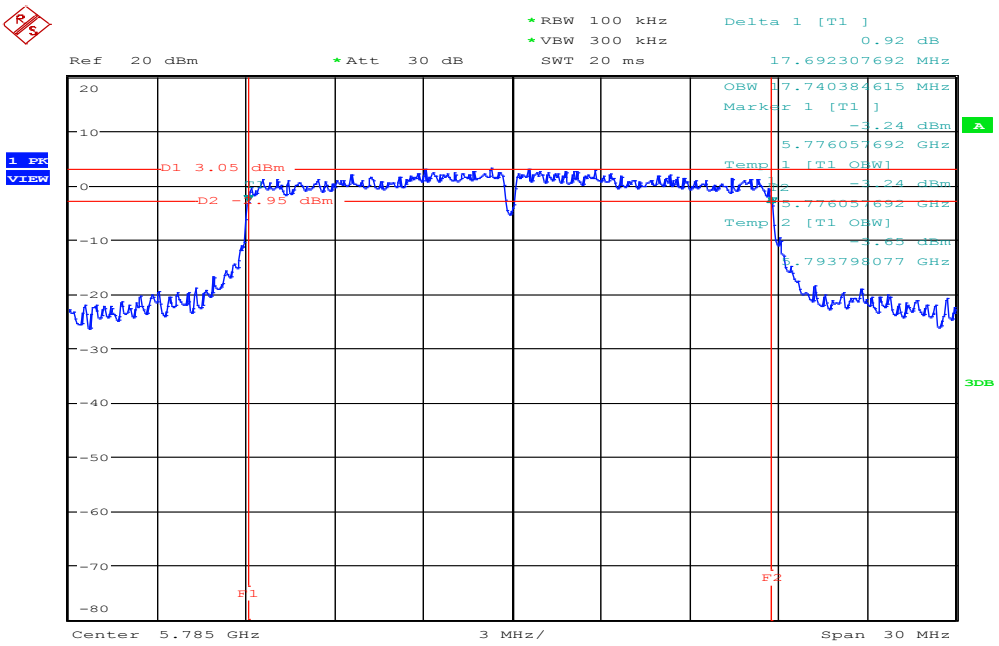

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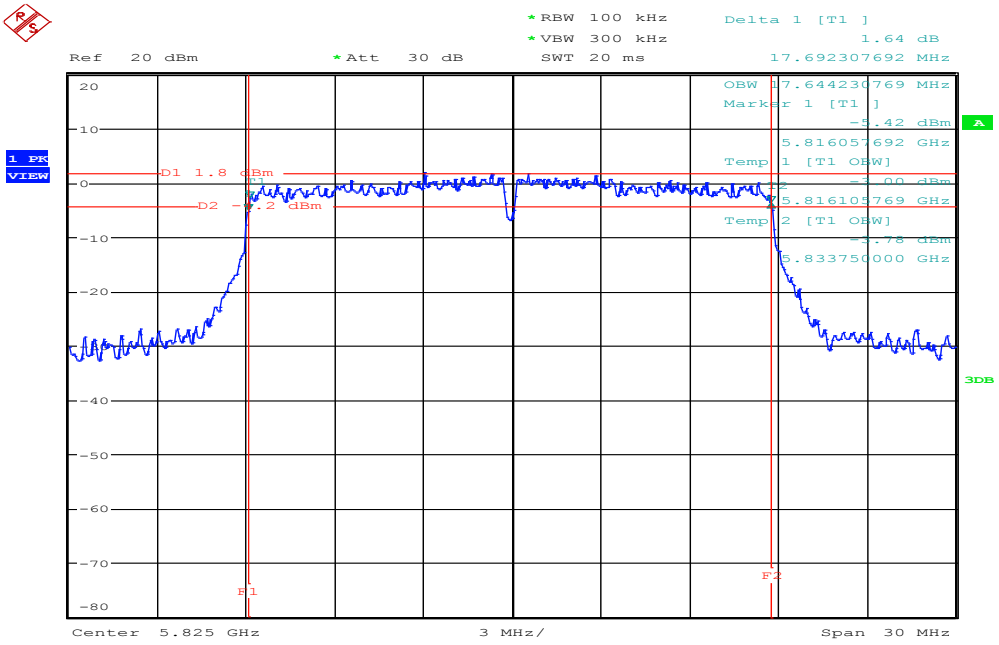
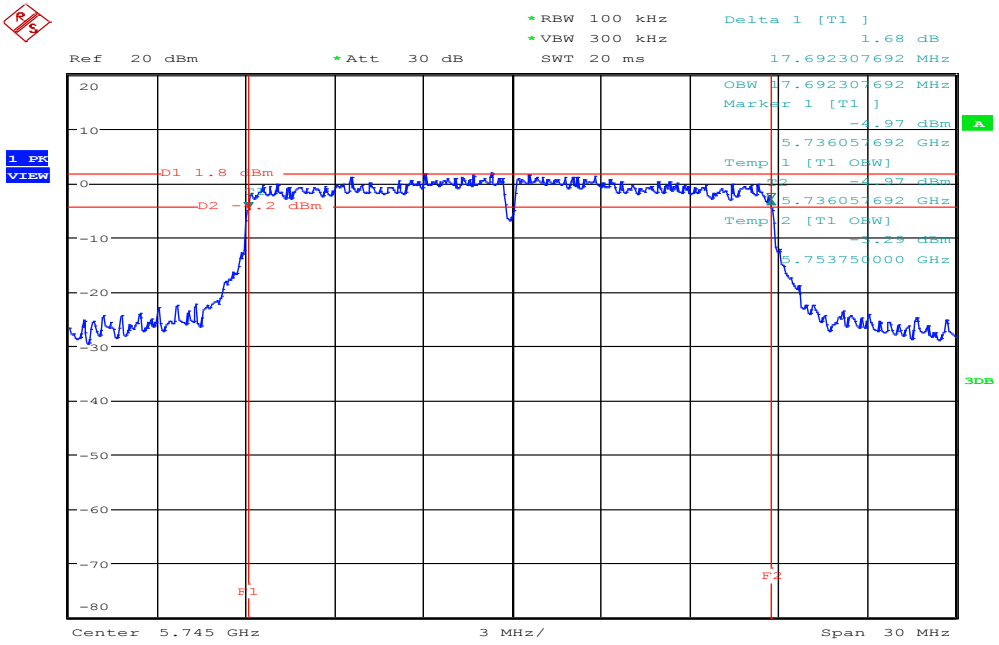
CH High



Date: 11.NOV.2015 23:00:53

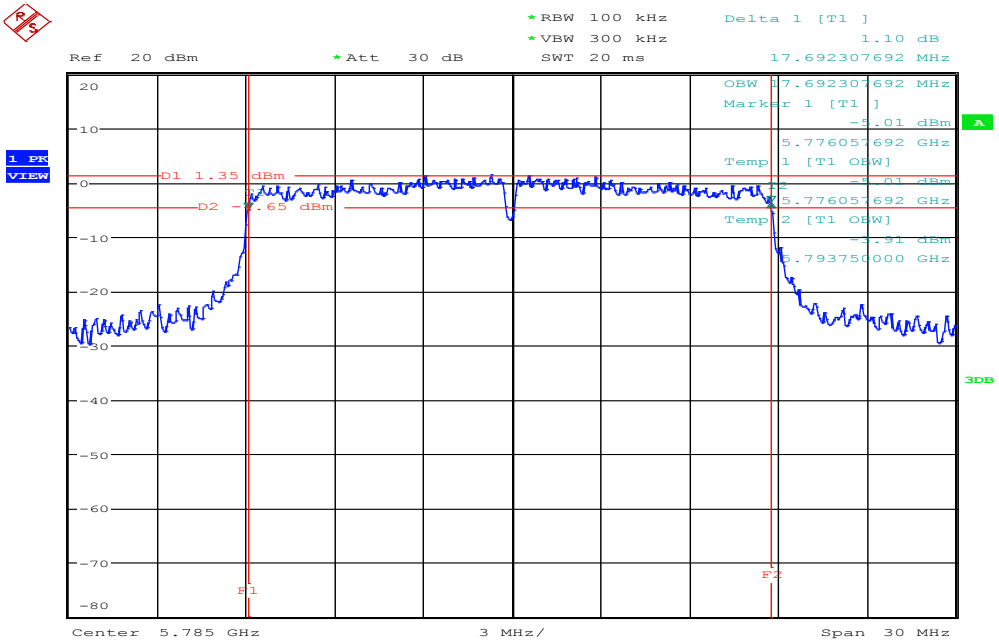
IEEE 802.11ac VHT 20 mode / 5745 ~ 5825MHz / Chain 1

CH Low



Date: 11.NOV.2015 22:53:13

CH Mid



Date: 11.NOV.2015 22:56:13

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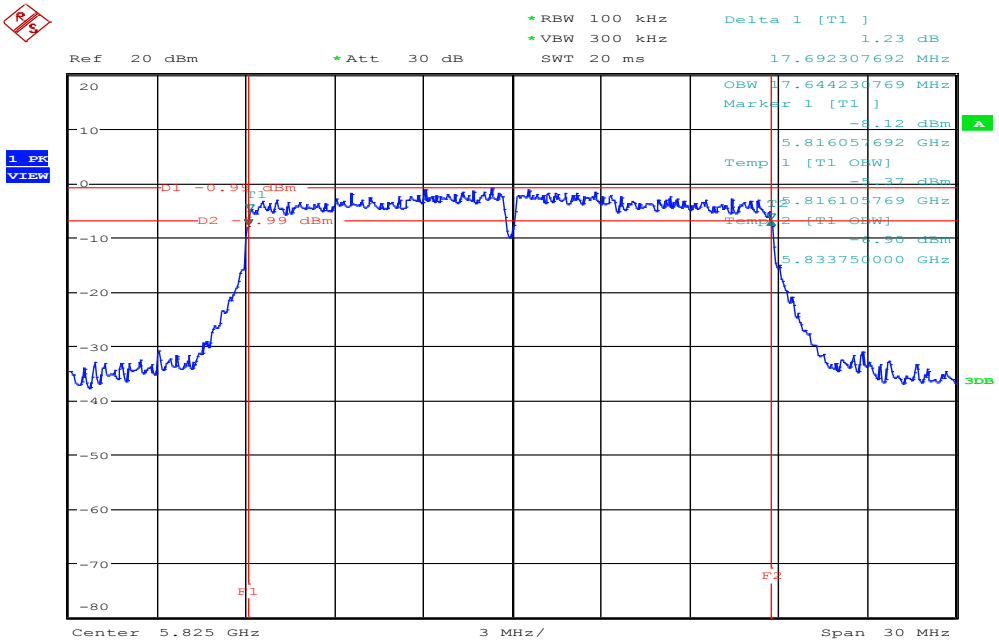
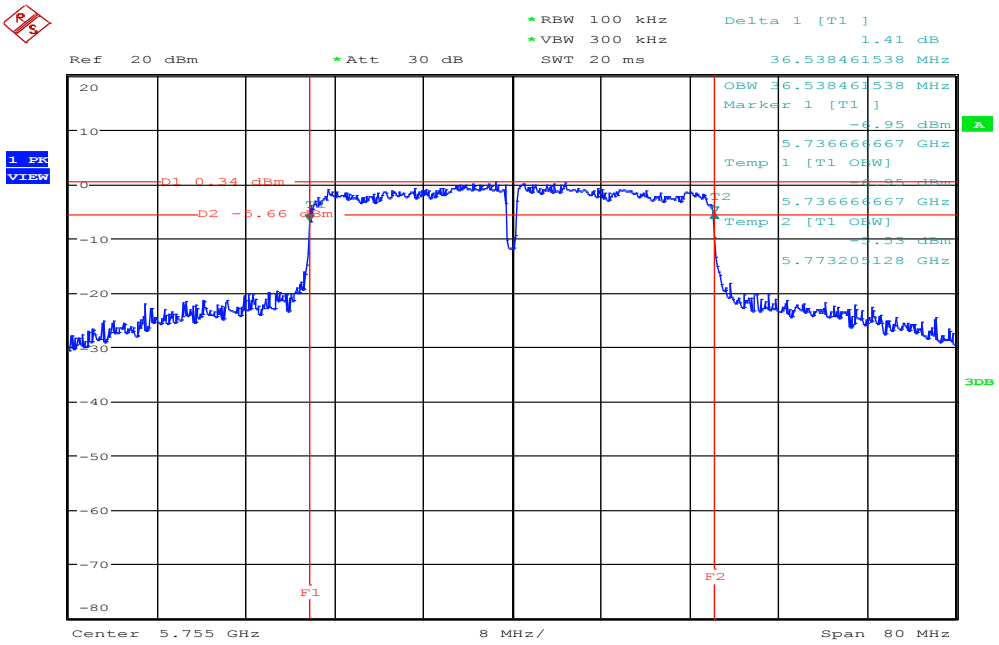


Date: 12.NOV.2015 02:54:08

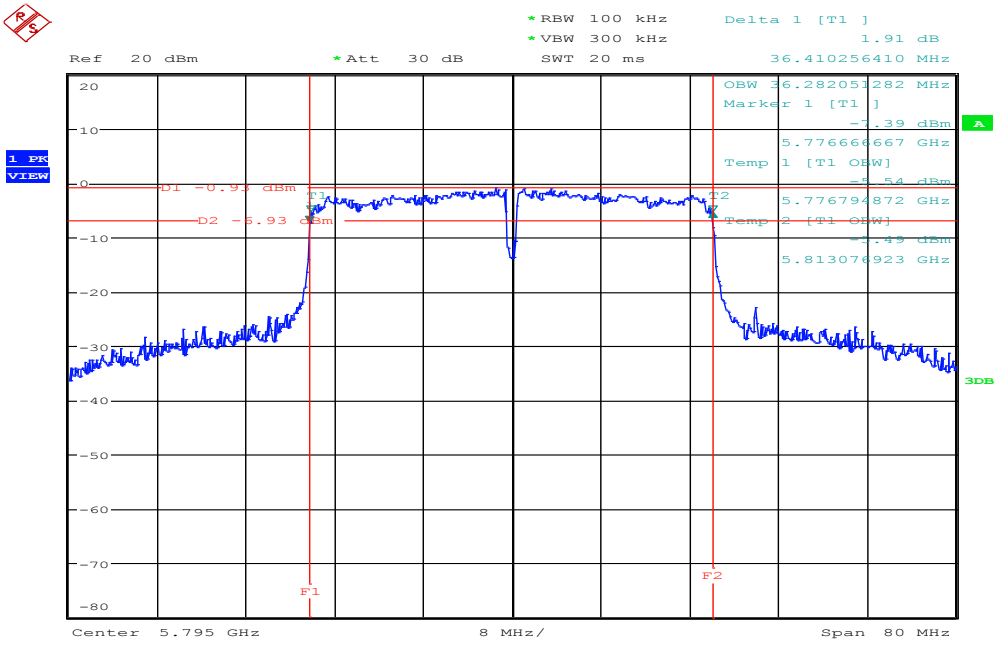
IEEE 802.11n HT 40 mode / 5755 ~ 5795MHz / Chain 0

CH Low



Date: 11.NOV.2015 21:19:04

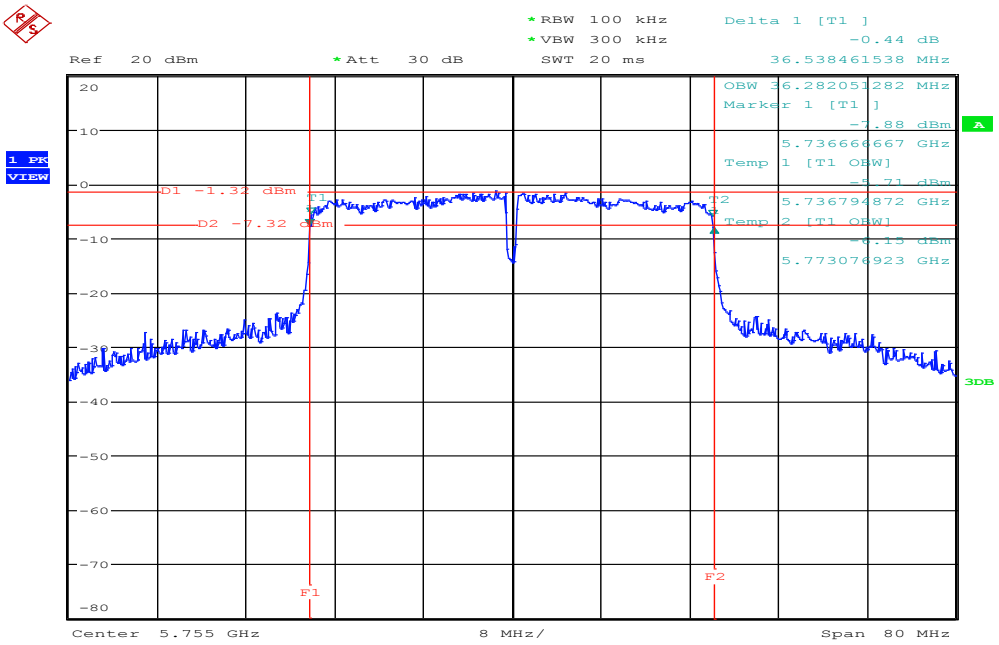
CH High



Date: 11.NOV.2015 21:27:19

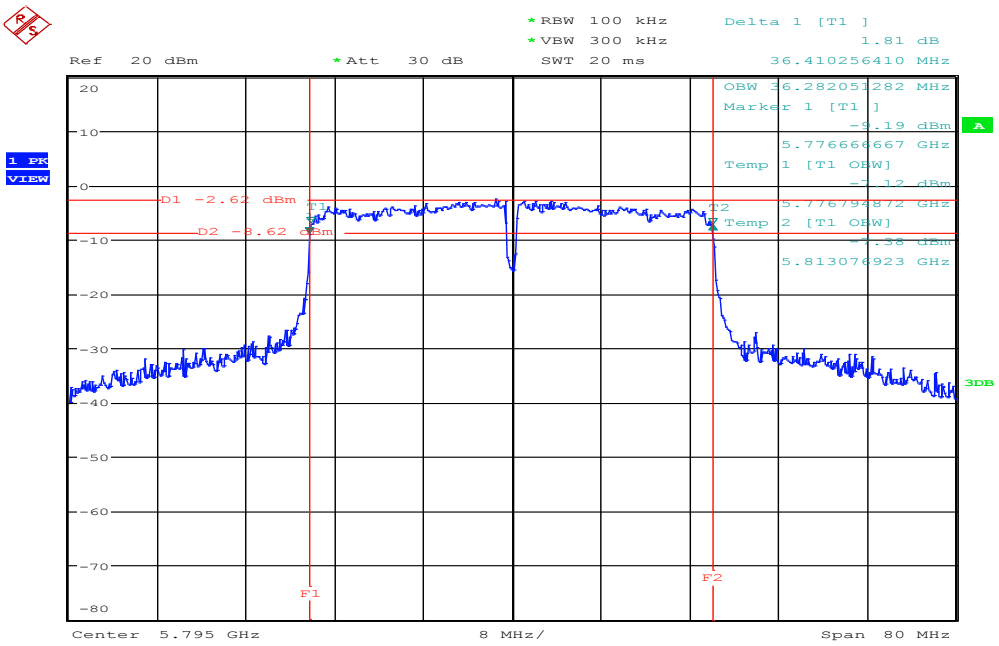
IEEE 802.11n HT 40 mode / 5755 ~ 5795MHz / Chain 1

CH Low



Date: 11.NOV.2015 21:21:41

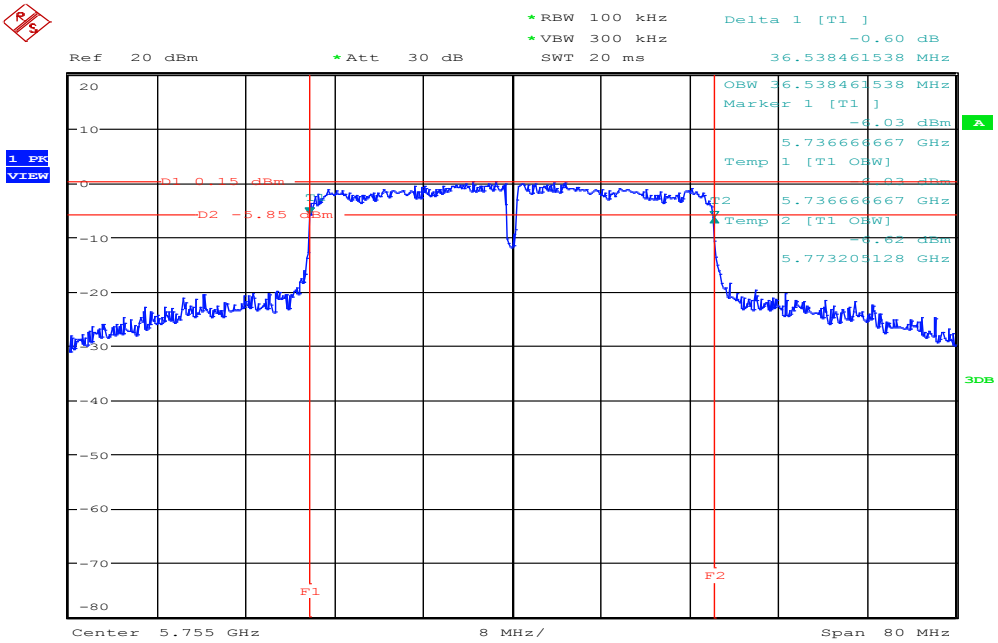
CH High



Date: 11.NOV.2015 21:26:07

IEEE 802.11ac VHT 40 mode / 5755 ~ 5795MHz / Chain 0

CH Low



Date: 11.NOV.2015 21:36:44

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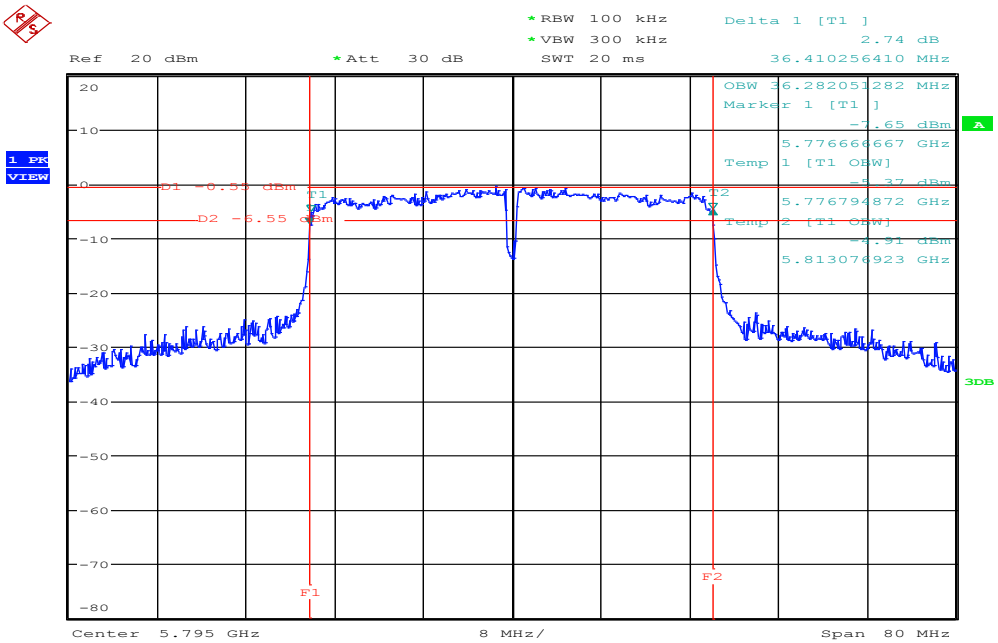
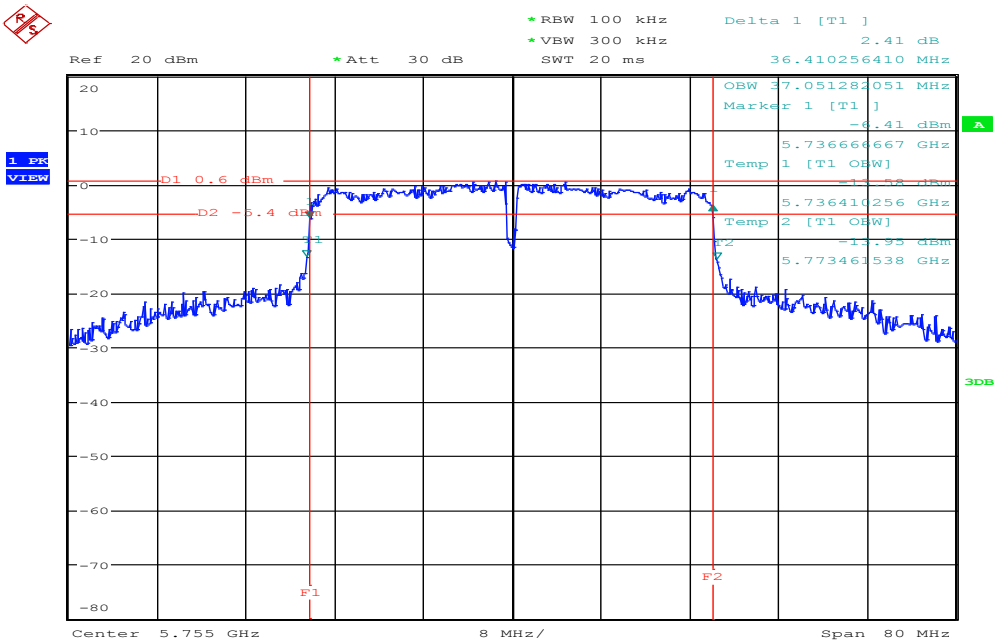


Date: 11.NOV.2015 21:29:24

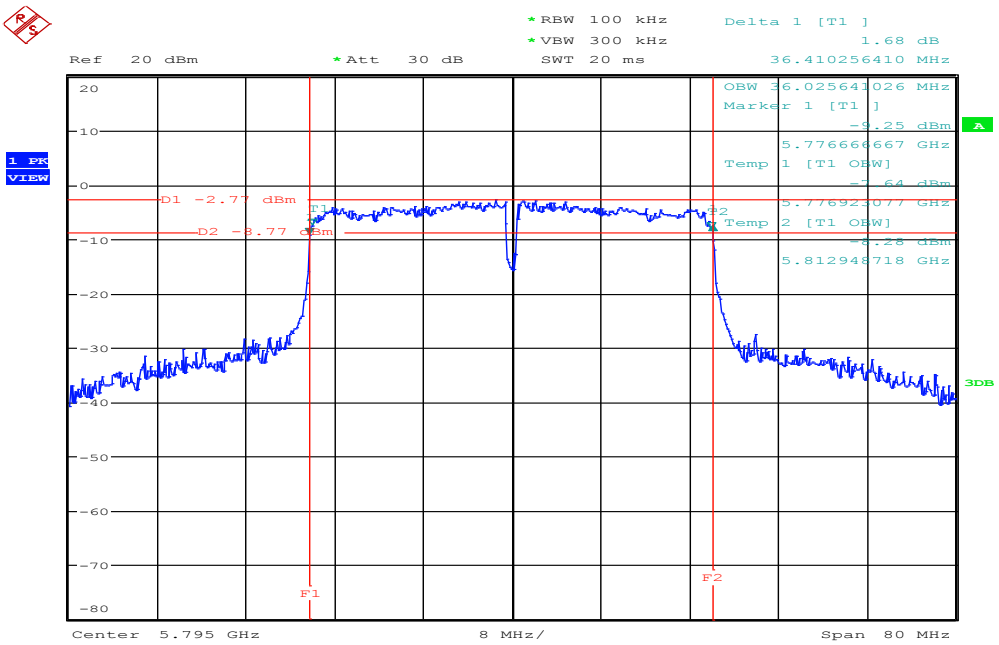
IEEE 802.11ac VHT 40 mode / 5755 ~ 5795MHz / Chain 1

CH Low



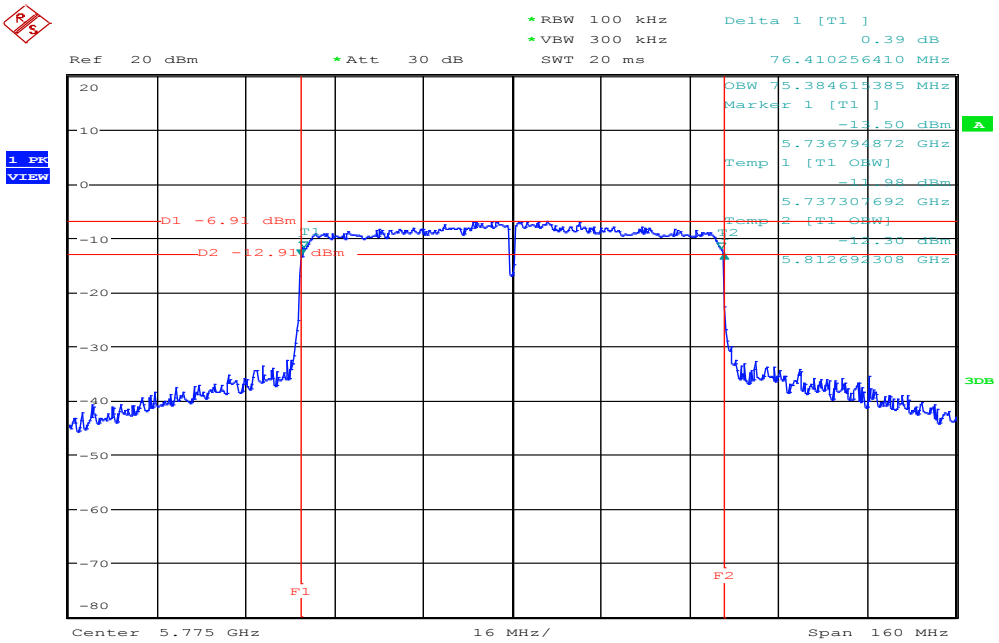
Date: 11.NOV.2015 21:34:49

CH High



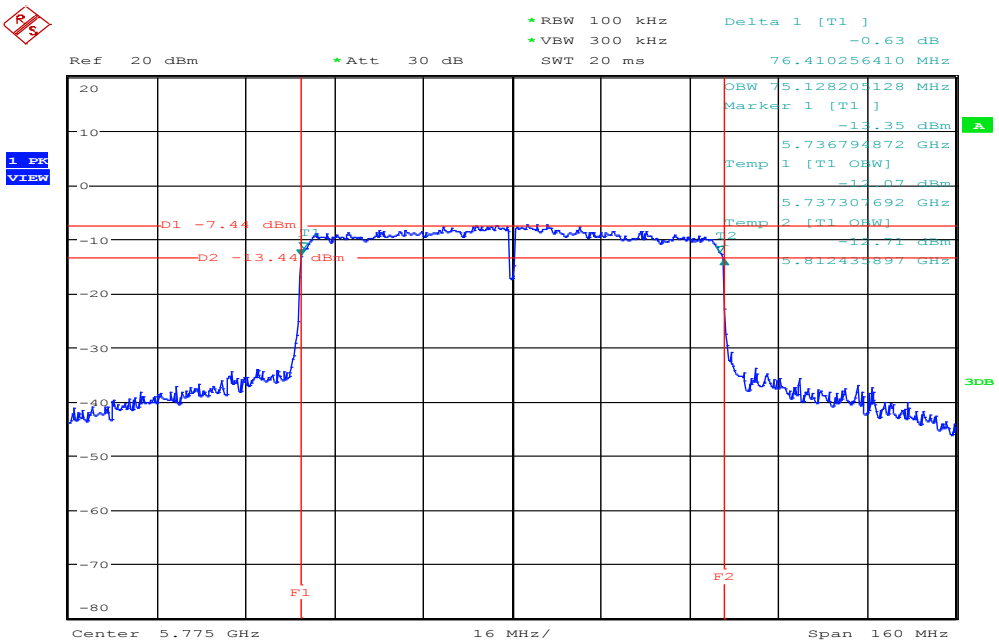
Date: 11.NOV.2015 21:30:49

IEEE 802.11ac VHT80 Mode / 5775MHz / Chain 0



Date: 11.NOV.2015 23:29:43

IEEE 802.11ac VHT80 Mode / 5775MHz / Chain 1

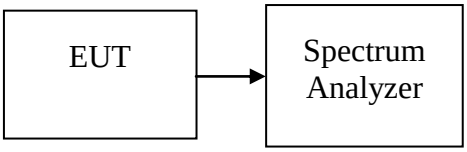


Date: 11.NOV.2015 23:26:09

7.2 MAXIMUM CONDUCTED OUTPUT POWER

Test Configuration

The EUT was connected to a spectrum analyzer through a 50Ω RF cable.



TEST PROCEDURE

Set span to encompass the entire emission bandwidth (EBW) of the signal.

Set RBW = 1 MHz / Set VBW = 3 MHz.

Use sample detector mode if bin width (i.e., span/number of points in spectrum display) < 0.5 RBW. Otherwise use peak detector mode. Use a video trigger with the trigger level set to enable triggering only on full power pulses. Transmitter must operate at full control power for entire sweep of every sweep. If the device transmits continuously, with no off intervals or reduced power intervals, the trigger may be set to “free run”.·Trace average 100 traces in power averaging mode. Compute power by integrating the spectrum across the 26 dB EBW of the signal. The integration can be performed using the spectrum analyzer’s band power measurement function with band limits set equal to the EBW band edges or by summing power levels in each 1 MHz band in linear power terms. Te 1 MHz band power levels to be summed can be obtained by averaging, in linear power terms, power levels in each frequency bin across the 1 MHz.

TEST RESULTS

No non-compliance noted

Test Data

Test mode: IEEE 802.11a mode / 5180 ~ 5240MHz

Channel	Frequency (MHz)	Chain 0 Output Power (dBm)	Chain 1 Output Power (dBm)	Total Maximum Conducted Output Power (dBm)	Limit (dBm)
Low	5180	18.11	17.67	***20.91**	28.07
Mid	5220	16.43	17.73	20.14	28.07
High	5240	16.32	17.85	20.16	28.07

Test mode: IEEE 802.11n HT 20 mode / 5180 ~ 5240MHz

Channel	Frequency (MHz)	Chain 0 Output Power (dBm)	Chain 1 Output Power (dBm)	Total Maximum Conducted Output Power (dBm)	Limit (dBm)
Low	5180	18.12	17.31	20.74	28.07
Mid	5220	17.34	17.71	20.54	28.07
High	5240	17.39	18.45	***20.96**	28.07

Test mode: IEEE 802.11n HT 40 mode / 5190 ~ 5230MHz

Channel	Frequency (MHz)	Chain 0 Output Power (dBm)	Chain 1 Output Power (dBm)	Total Maximum Conducted Output Power (dBm)	Limit (dBm)
Low	5190	14.15	14.11	17.14	28.07
High	5230	16.75	16.42	***19.60**	28.07

Test mode: IEEE 802.11ac VHT80 Mode / 5210MHz

Channel	Frequency (MHz)	Chain 0 Output Power (dBm)	Chain 1 Output Power (dBm)	Total Maximum Conducted Output Power (dBm)	Limit (dBm)
Mid	5210	13.50	13.75	***16.64**	28.07

Remark:

1. Total Output Power (w) = Chain 0 (10^(Output Power /10)/1000) + Chain 1 (10^(Output Power /10)/1000))

2. The maximum antenna gain is 7.93dBi; therefore the reduction due to antenna gain is 1.93dB, so the limit is 28.07dBm.

Test mode: IEEE 802.11a mode / 5745 ~ 5825MHz

Channel	Frequency (MHz)	Chain 0 Output Power (dBm)	Chain 1 Output Power (dBm)	Total Maximum Conducted Output Power (dBm)	Limit (dBm)
Low	5745	20.11	19.84	22.99	28.07
Mid	5785	20.37	19.76	23.09	28.07
High	5825	21.18	21.11	***24.16**	28.07

Test mode: IEEE 802.11n HT 20 mode / 5745~5825MHz

Channel	Frequency (MHz)	Chain 0 Output Power (dBm)	Chain 1 Output Power (dBm)	Total Maximum Conducted Output Power (dBm)	Limit (dBm)
Low	5745	18.23	18.18	21.22	28.07
Mid	5785	18.39	18.34	***21.38**	28.07
High	5825	16.97	16.61	19.80	28.07

Test mode: IEEE 802.11n HT 40 mode / 5755 ~ 5795MHz

Channel	Frequency (MHz)	Chain 0 Output Power (dBm)	Chain 1 Output Power (dBm)	Total Maximum Conducted Output Power (dBm)	Limit (dBm)
Low	5755	18.54	18.67	***21.62**	28.07
High	5795	17.95	18.36	21.17	28.07

Test mode: IEEE 802.11ac VHT80 Mode / 5775MHz

Channel	Frequency (MHz)	Chain 0 Output Power (dBm)	Chain 1 Output Power (dBm)	Total Maximum Conducted Output Power (dBm)	Limit (dBm)
Mid	5775	14.25	15.01	***17.66**	28.07

Remark:

1. Total Output Power (w) = Chain 0 (10^(Output Power /10)/1000) + Chain 1 (10^(Output Power /10)/1000))

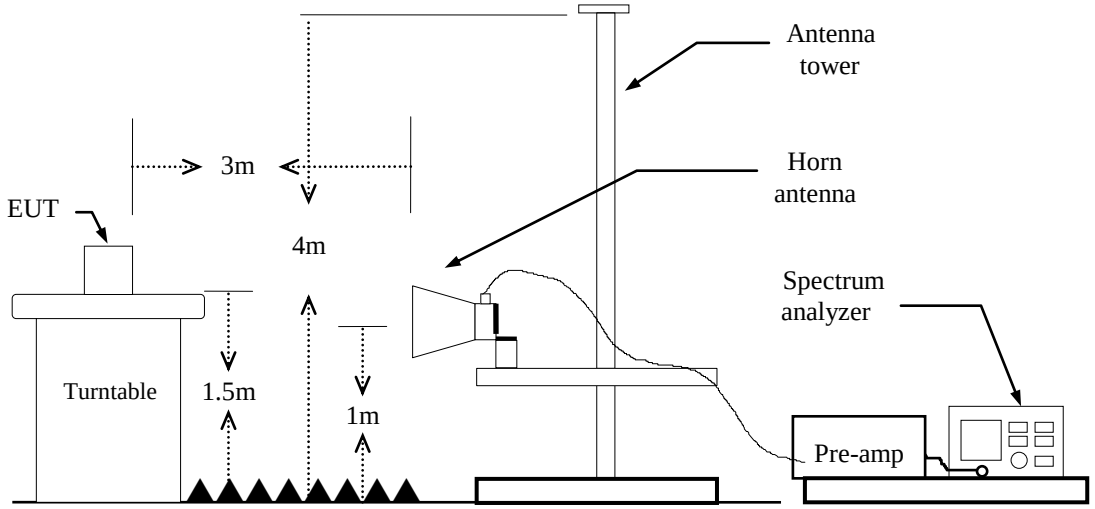
2. The maximum antenna gain is 7.93dBi; therefore the reduction due to antenna gain is 1.93dB, so the limit is 28.07dBm.

7.3 BAND EDGES MEASUREMENT

LIMIT

According to §15.407(b),
(1) The provisions of Section 15.205 of this part apply to intentional radiators operating under this section.
(2) When measuring the emission limits, the nominal carrier frequency shall be adjusted as close to the upper and lower frequency block edges as the design of the equipment permits.

Test Configuration



TEST PROCEDURE

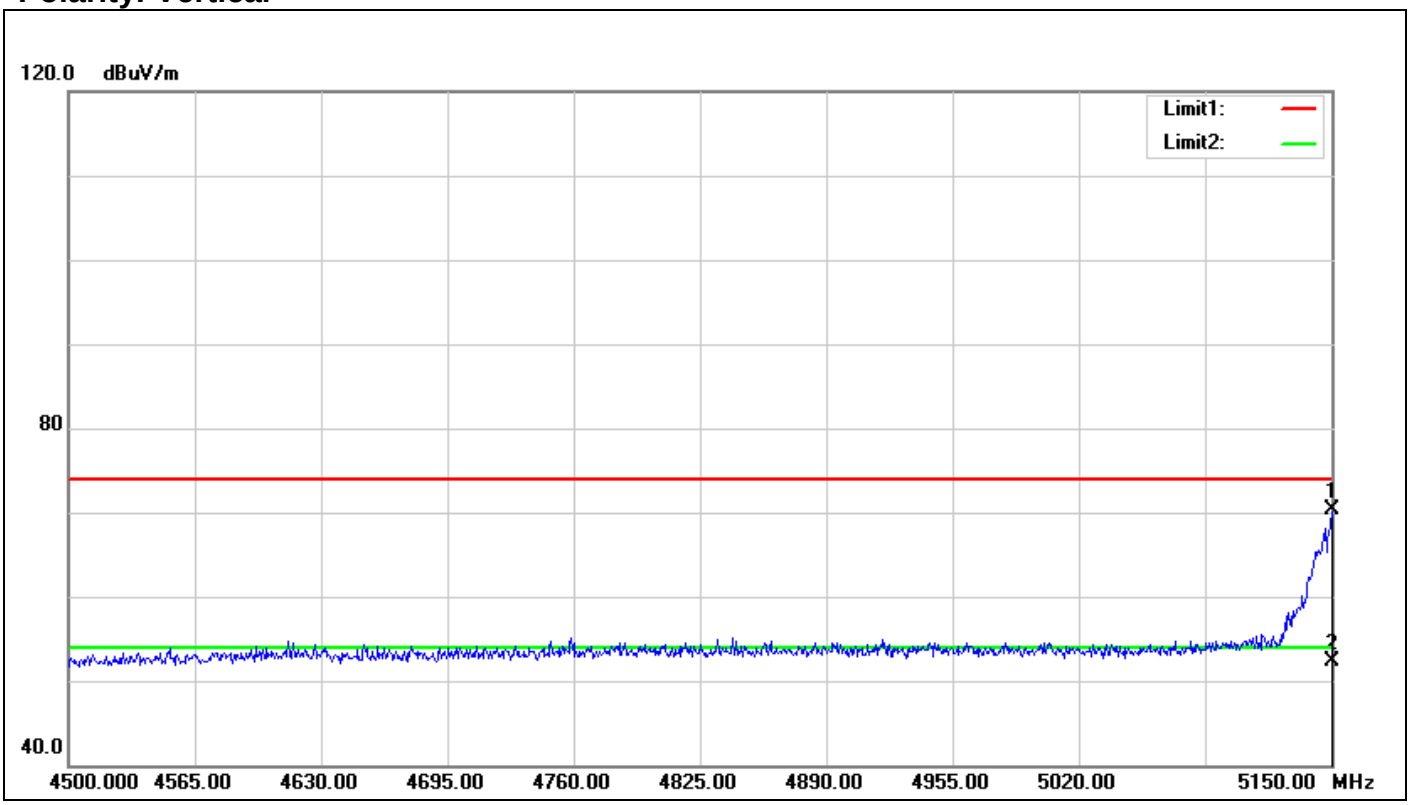
1. The EUT is placed on a turntable, which is 1.5m above the ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission.
4. Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of the emission:
   (a) PEAK: RBW=VBW=3MHz / Sweep=AUTO
   (b) AVERAGE: RBW=1MHz,
   if duty cycle≧98%, VBW=10Hz.
   if duty cycle<98% VBW=1/T.
   IEEE 802.11a mode: =88%, VBW=750Hz
   IEEE 802.11n HT 20 mode: =78%, VBW=1.5KHz
   IEEE 802.11n HT 40 mode: =64%, VBW=3KHz
   IEEE 802.11ac VHT80 Mode: =27%=VBW 15KHz
5. Repeat the procedures until all the PEAK and AVERAGE versus POLARIZATION are measured.

TEST RESULTS

Refer to attach spectrum analyzer data chart.

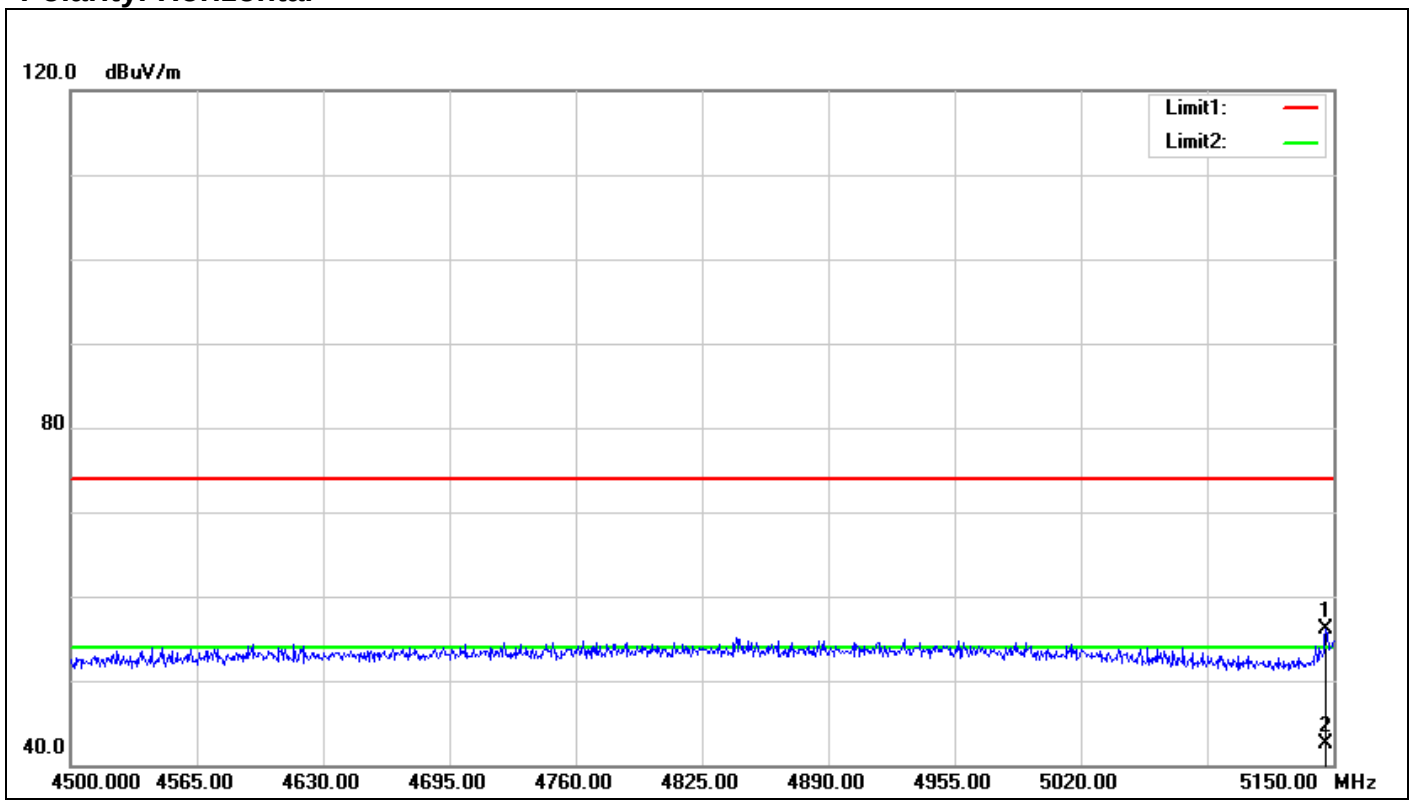
Band Edges (IEEE 802.11a mode / 5180 MHz)

Polarity: Vertical



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
1	5150.000	67.27	3.04	70.31	74.00	-3.69	150	46	peak
2	5150.000	49.27	3.04	52.31	54.00	-1.69	150	46	AVG

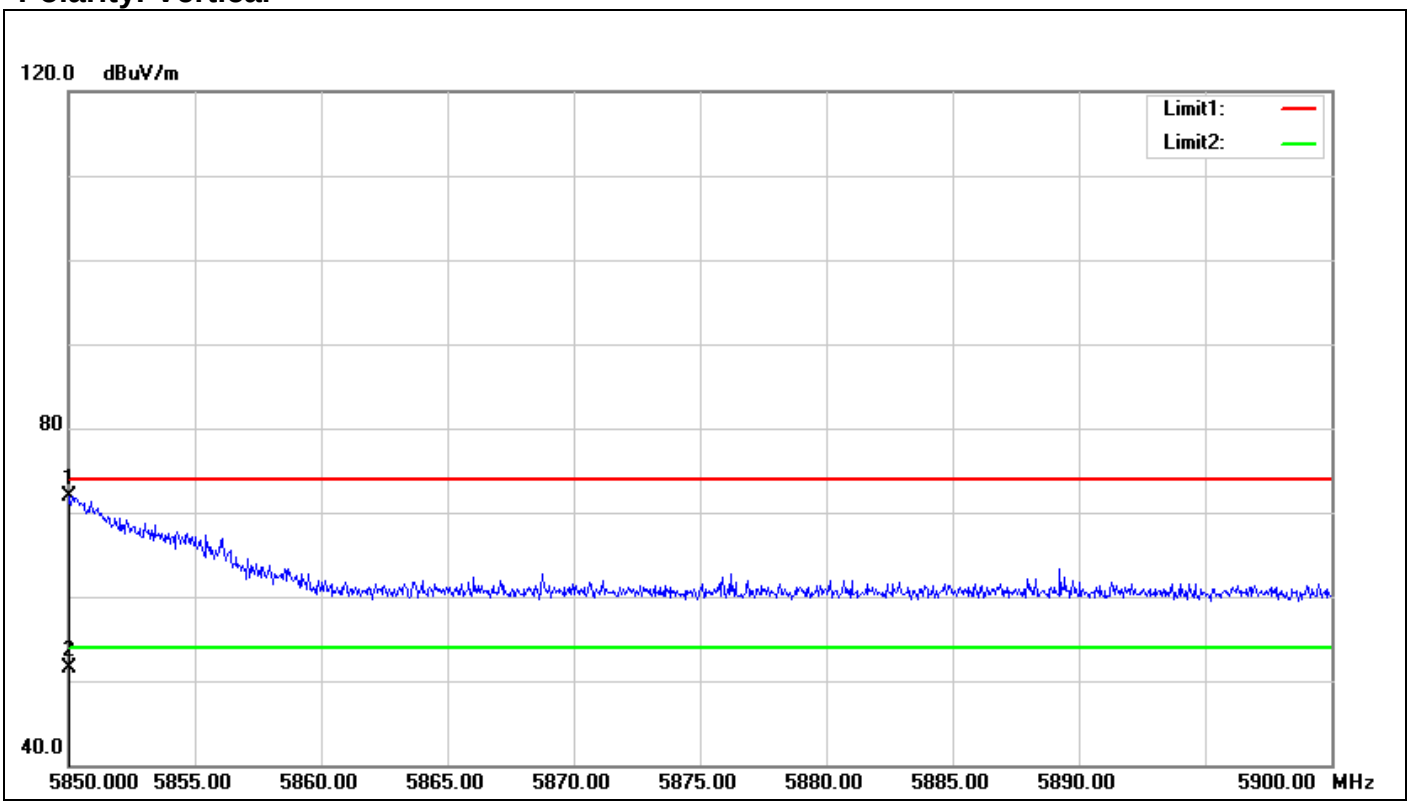
Polarity: Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
1	5146.100	53.15	3.01	56.16	74.00	-17.84	150	82	peak
2	5146.100	39.52	3.01	42.53	54.00	-11.47	150	82	AVG

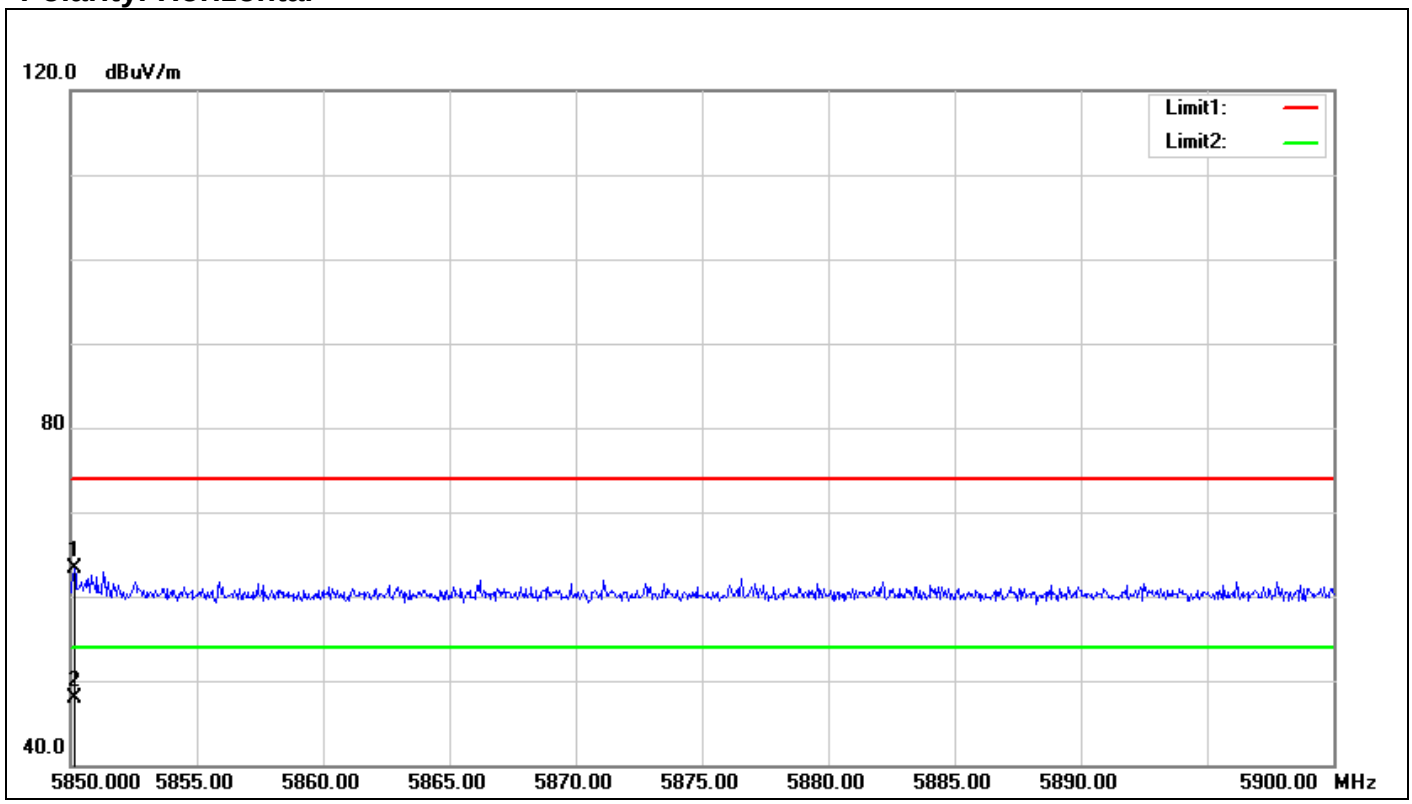
Band Edges (IEEE 802.11a mode / 5825 MHz)

Polarity: Vertical



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
1	5850.000	65.19	6.74	71.93	74.00	-2.07	150	92	peak
2	5850.000	44.71	6.74	51.45	54.00	-2.55	150	92	AVG

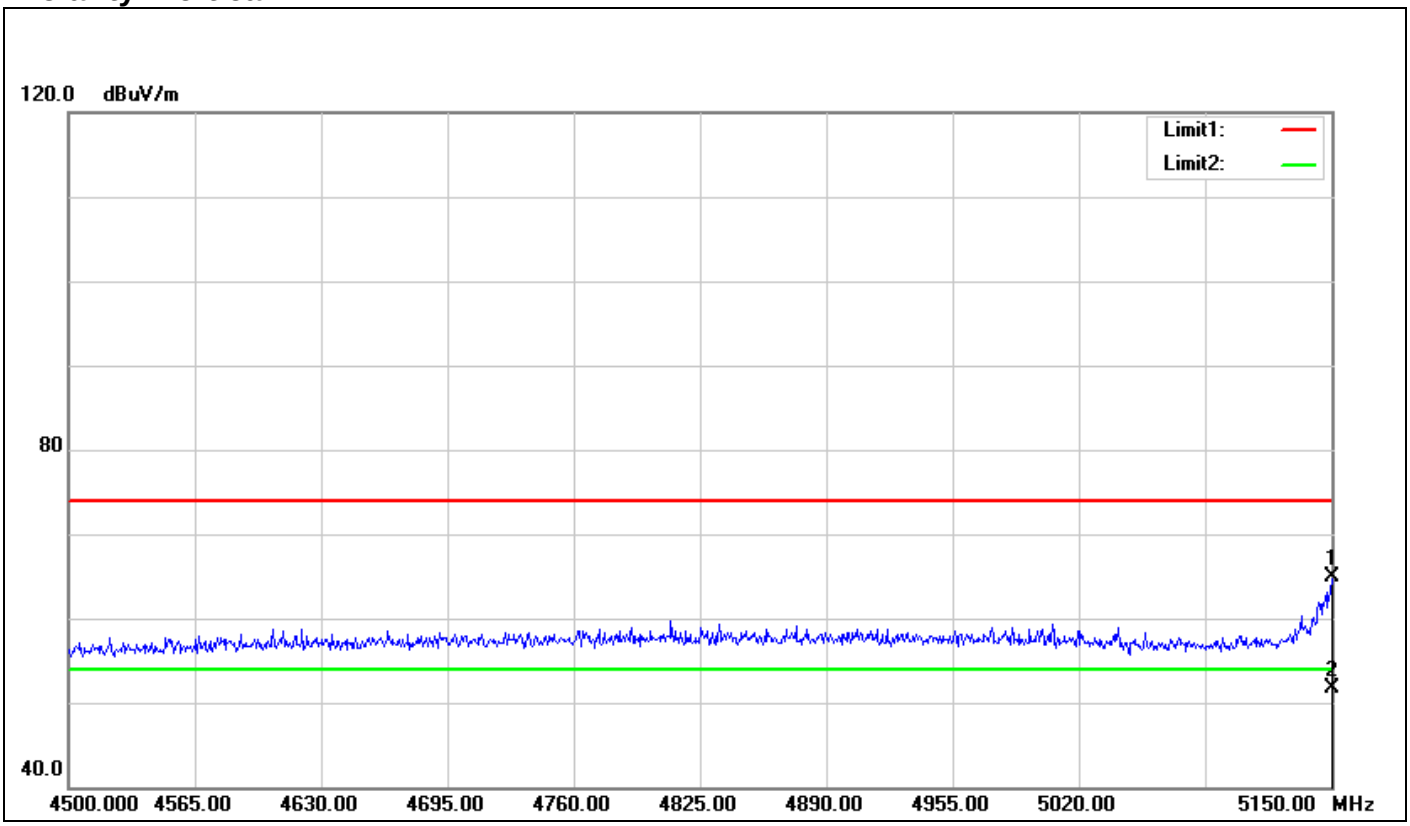
Polarity: Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
1	5850.150	56.53	6.74	63.27	74.00	-10.73	150	48	peak
2	5850.150	41.26	6.74	48.00	54.00	-6.00	150	48	AVG

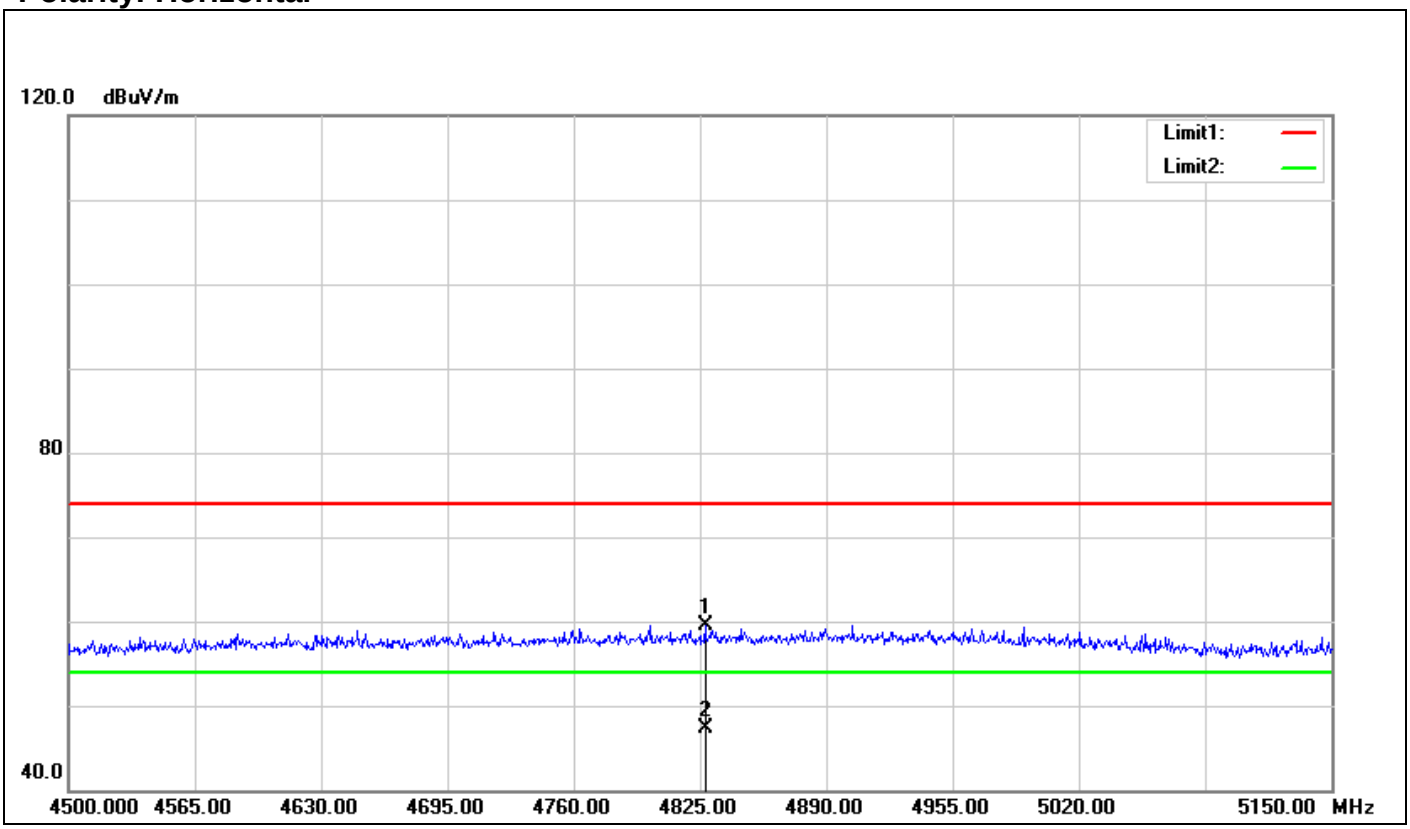
Band Edges (IEEE 802.11n HT 20 mode / 5180 MHz)

Polarity: Vertical



No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(°)	
1	5150.000	61.81	3.04	64.85	74.00	-9.15	150	42	peak
2	5150.000	48.76	3.04	51.80	54.00	-2.20	150	42	AVG

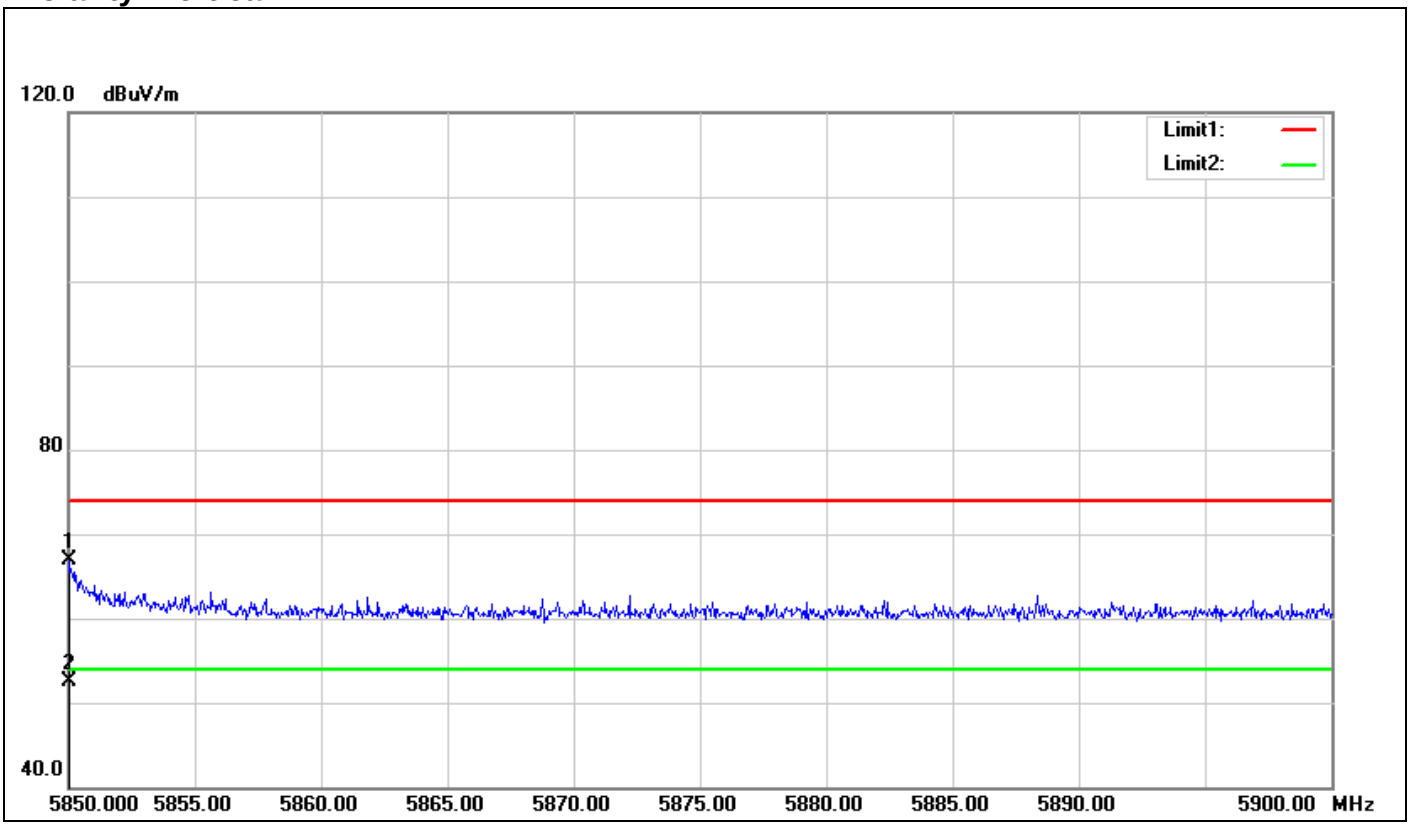
Polarity: Horizontal



No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(°)	
1	4827.600	55.52	4.00	59.52	74.00	-14.48	150	130	peak
2	4827.600	43.21	4.00	47.21	54.00	-6.79	150	130	AVG

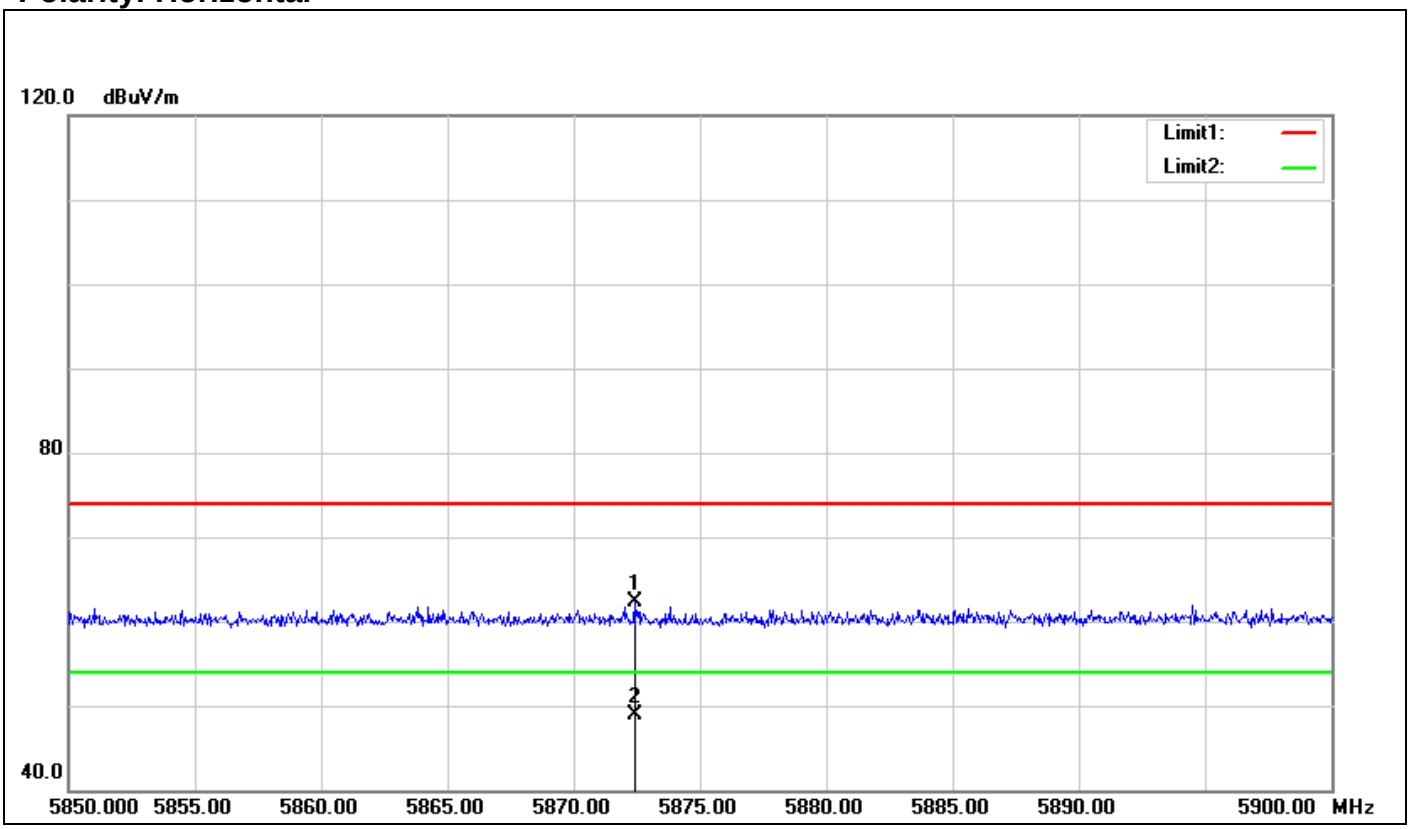
Band Edges (IEEE 802.11n HT 20 mode / 5825 MHz)

Polarity: Vertical



No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(°)	
1	5850.000	60.08	6.74	66.82	74.00	-7.18	150	203	peak
2	5850.000	45.71	6.74	52.45	54.00	-1.55	150	203	AVG

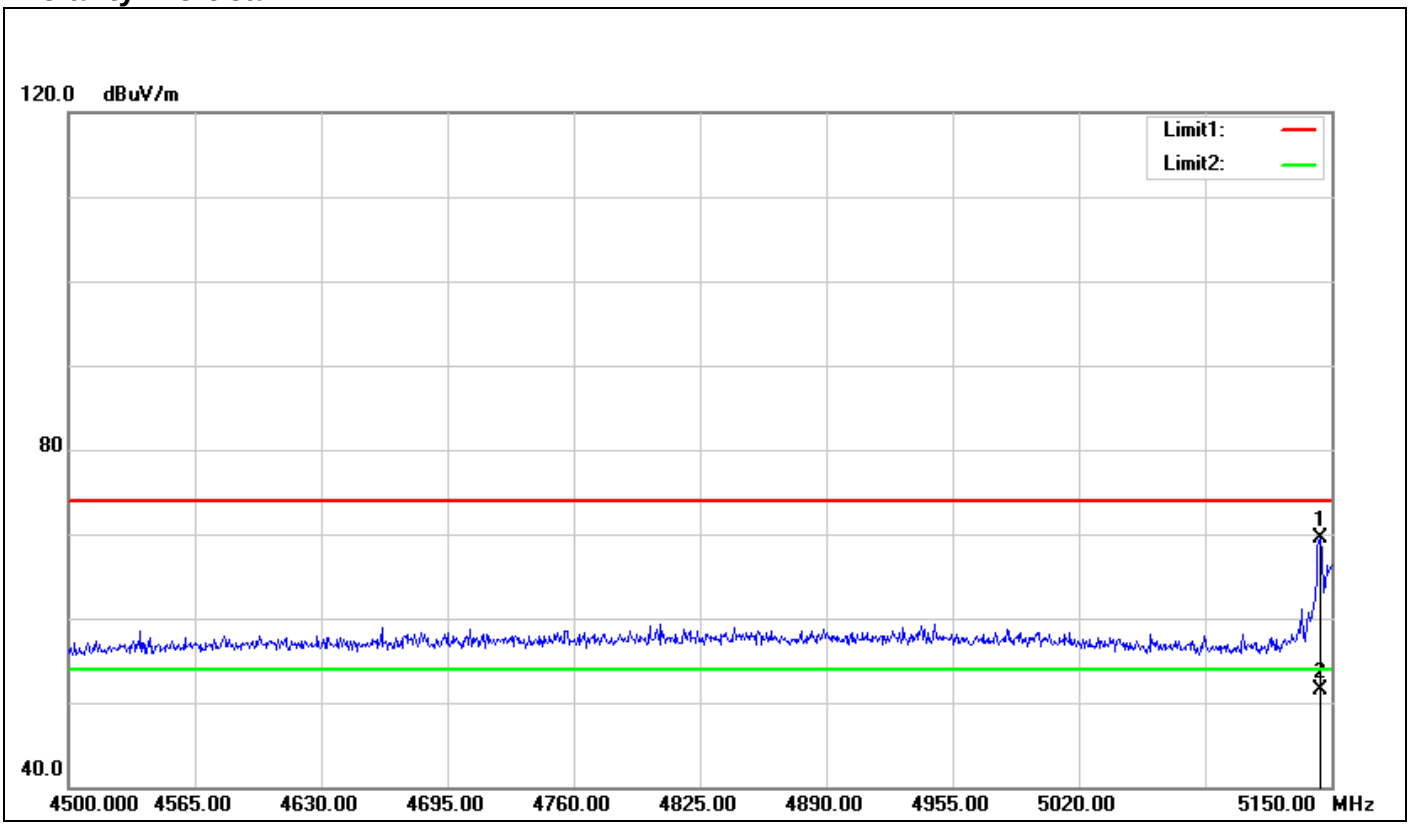
Polarity: Horizontal



No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(°)	
1	5872.400	55.36	6.84	62.20	74.00	-11.80	150	27	peak
2	5872.400	42.01	6.84	48.85	54.00	-5.15	150	27	AVG

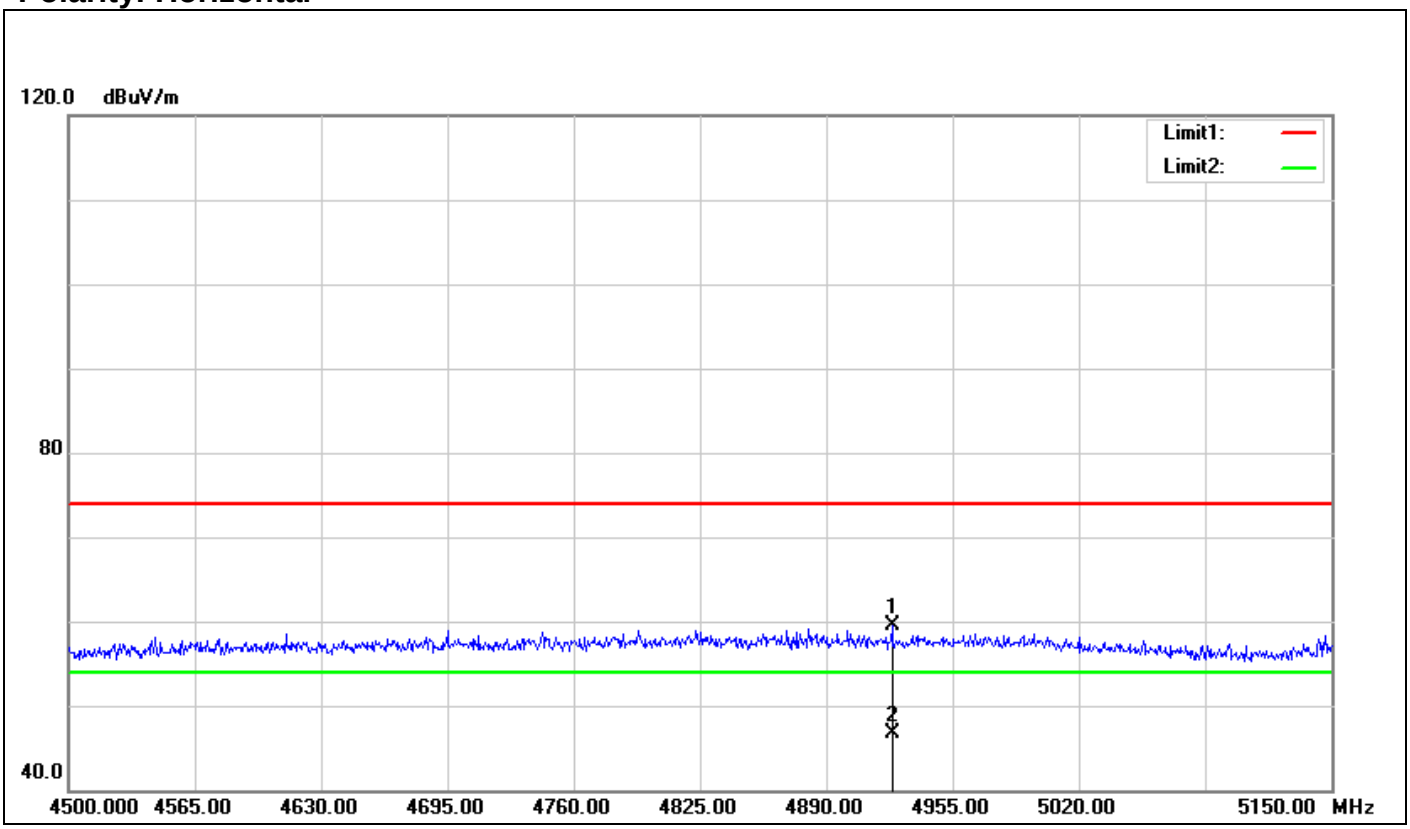
Band Edges (IEEE 802.11n HT 40 mode / 5190 MHz)

Polarity: Vertical



No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(°)	
1	5144.150	66.50	3.00	69.50	74.00	-4.50	150	31	peak
2	5144.150	48.45	3.00	51.45	54.00	-2.55	150	31	AVG

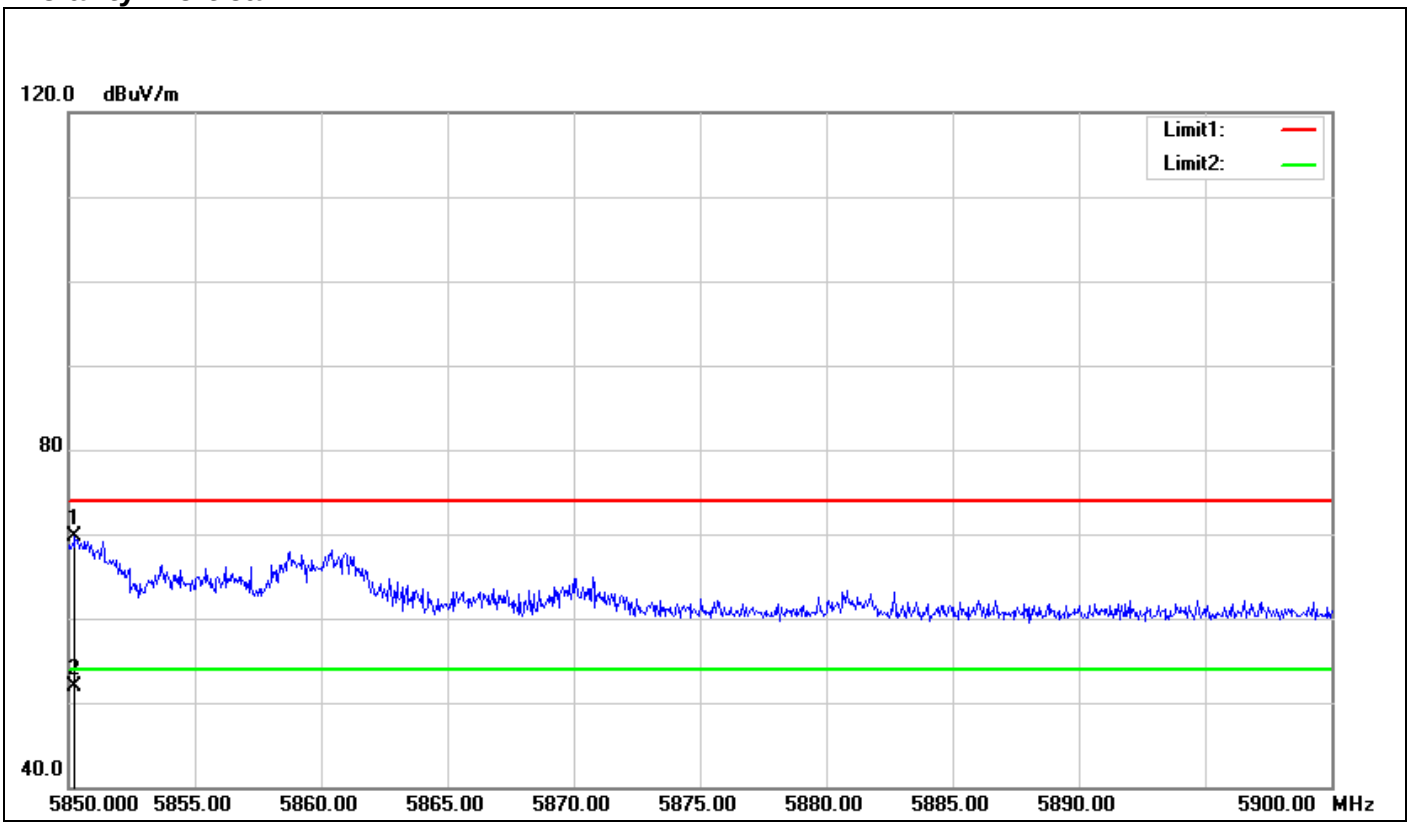
Polarity: Horizontal



No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(°)	
1	4923.800	55.61	3.90	59.51	74.00	-14.49	150	153	peak
2	4923.800	42.70	3.90	46.60	54.00	-7.40	150	153	AVG

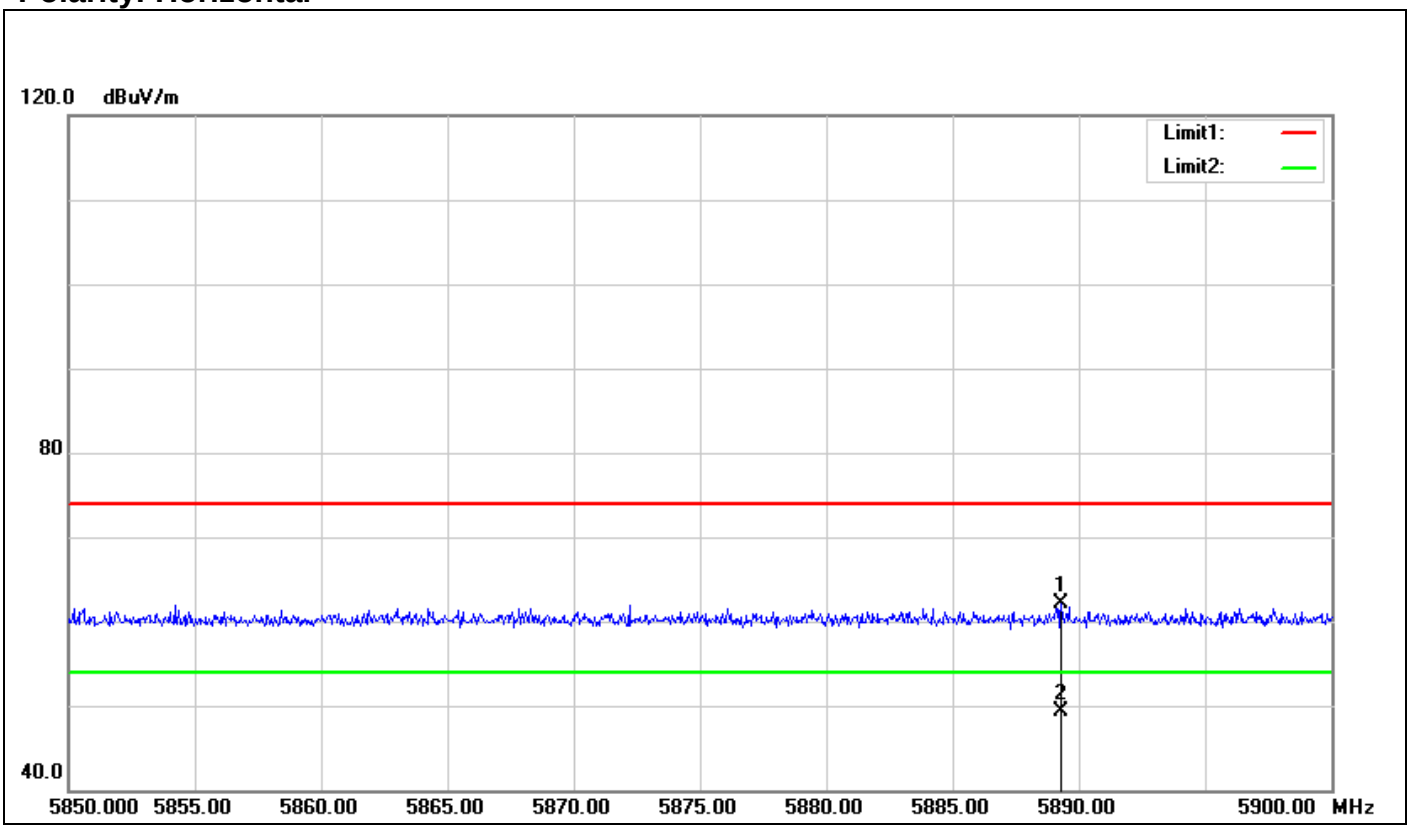
Band Edges (IEEE 802.11n HT 40 mode / 5795 MHz)

Polarity: Vertical



No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(°)	
1	5850.250	63.05	6.74	69.79	74.00	-4.21	150	281	peak
2	5850.250	45.10	6.74	51.84	54.00	-2.16	150	281	AVG

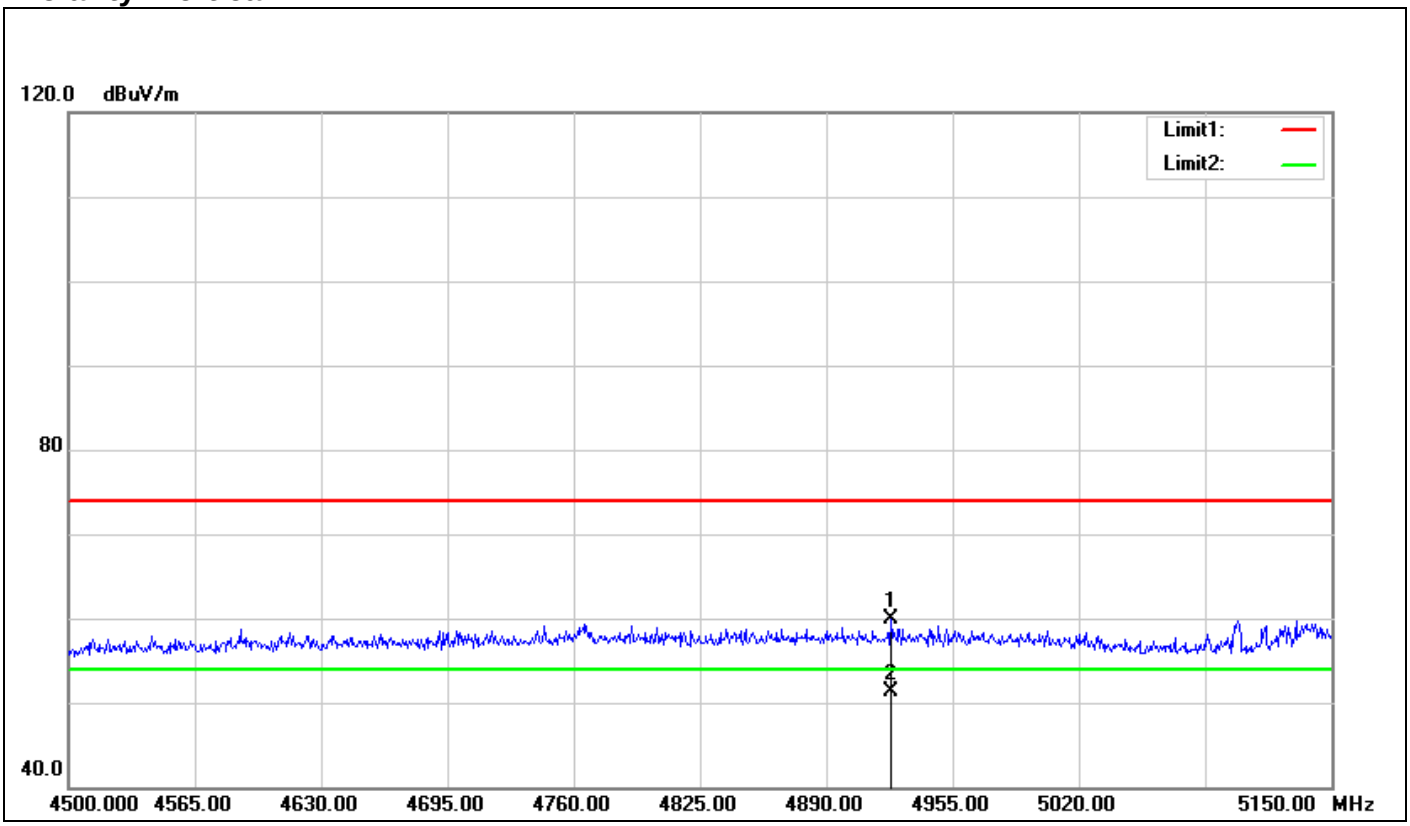
Polarity: Horizontal



No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(°)	
1	5889.300	55.14	6.91	62.05	74.00	-11.95	150	2	peak
2	5889.300	42.29	6.91	49.20	54.00	-4.80	150	2	AVG

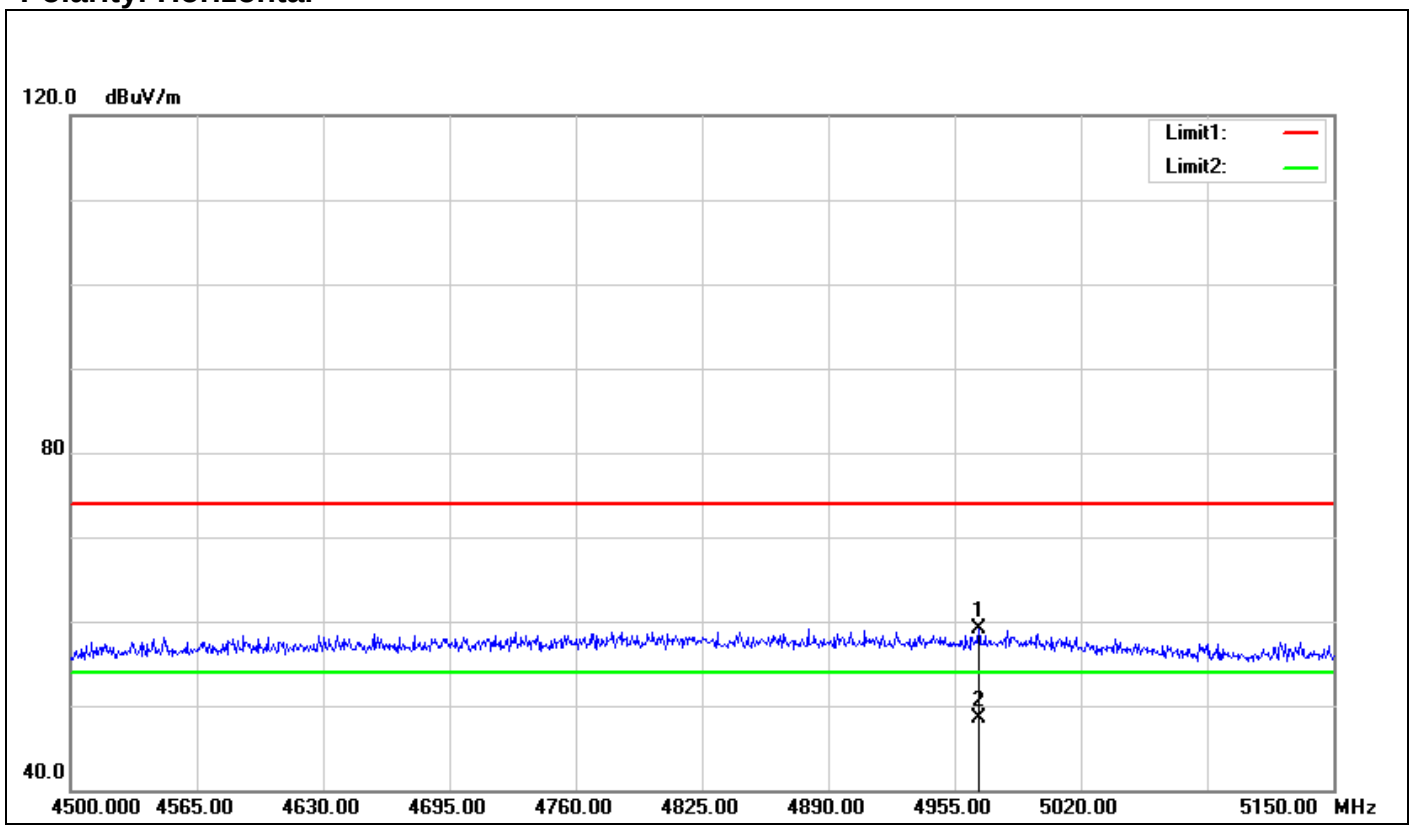
Band Edges (IEEE 802.11ac VHT80 Mode / CH 5210 MHz)

Polarity: Vertical



No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(°)	
1	4923.150	55.96	3.90	59.86	74.00	-14.14	150	145	peak
2	4923.150	47.39	3.90	51.29	54.00	-2.71	150	145	AVG

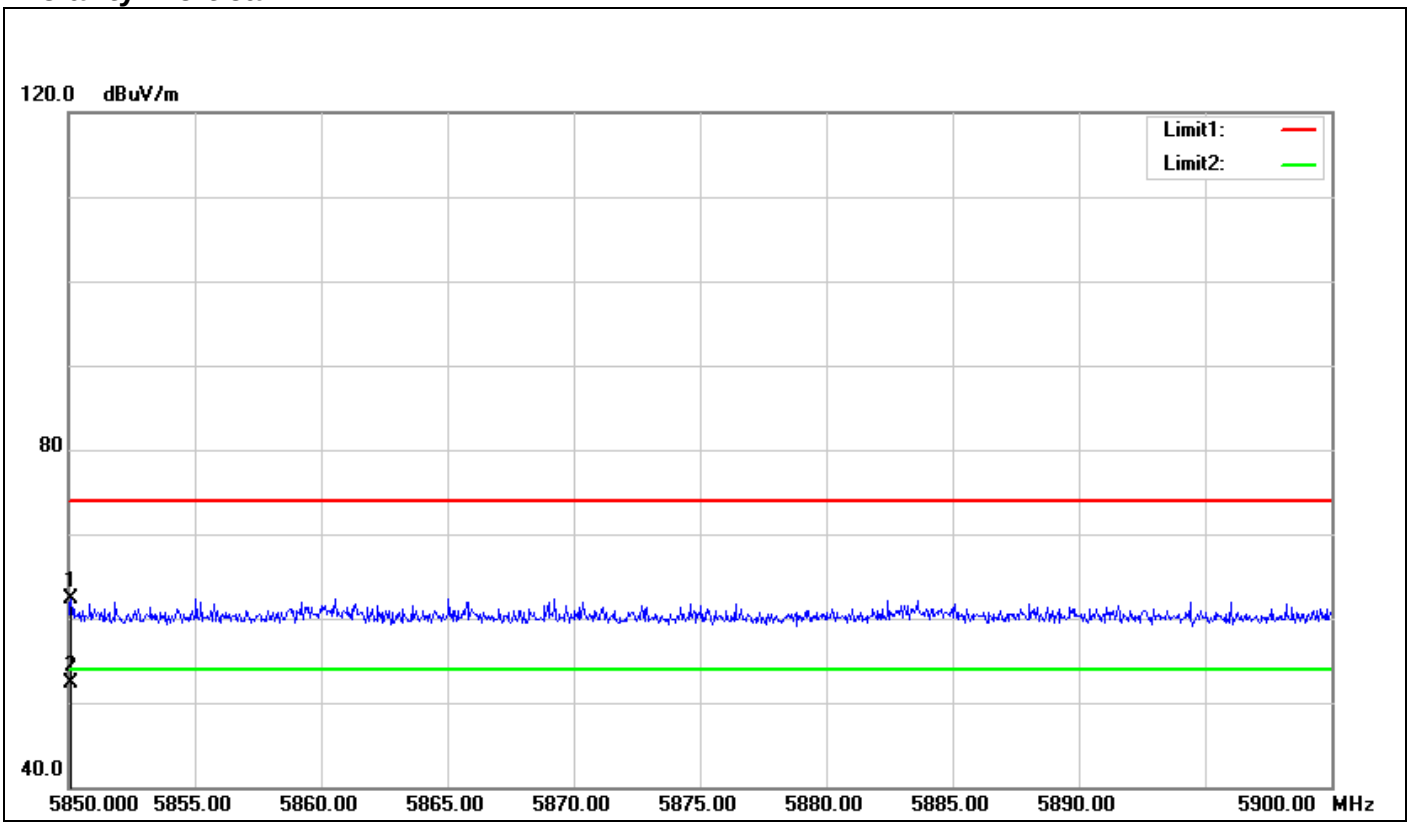
Polarity: Horizontal



No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(°)	
1	4967.350	55.17	3.93	59.10	74.00	-14.90	150	178	peak
2	4967.350	44.63	3.93	48.56	54.00	-5.44	150	178	AVG

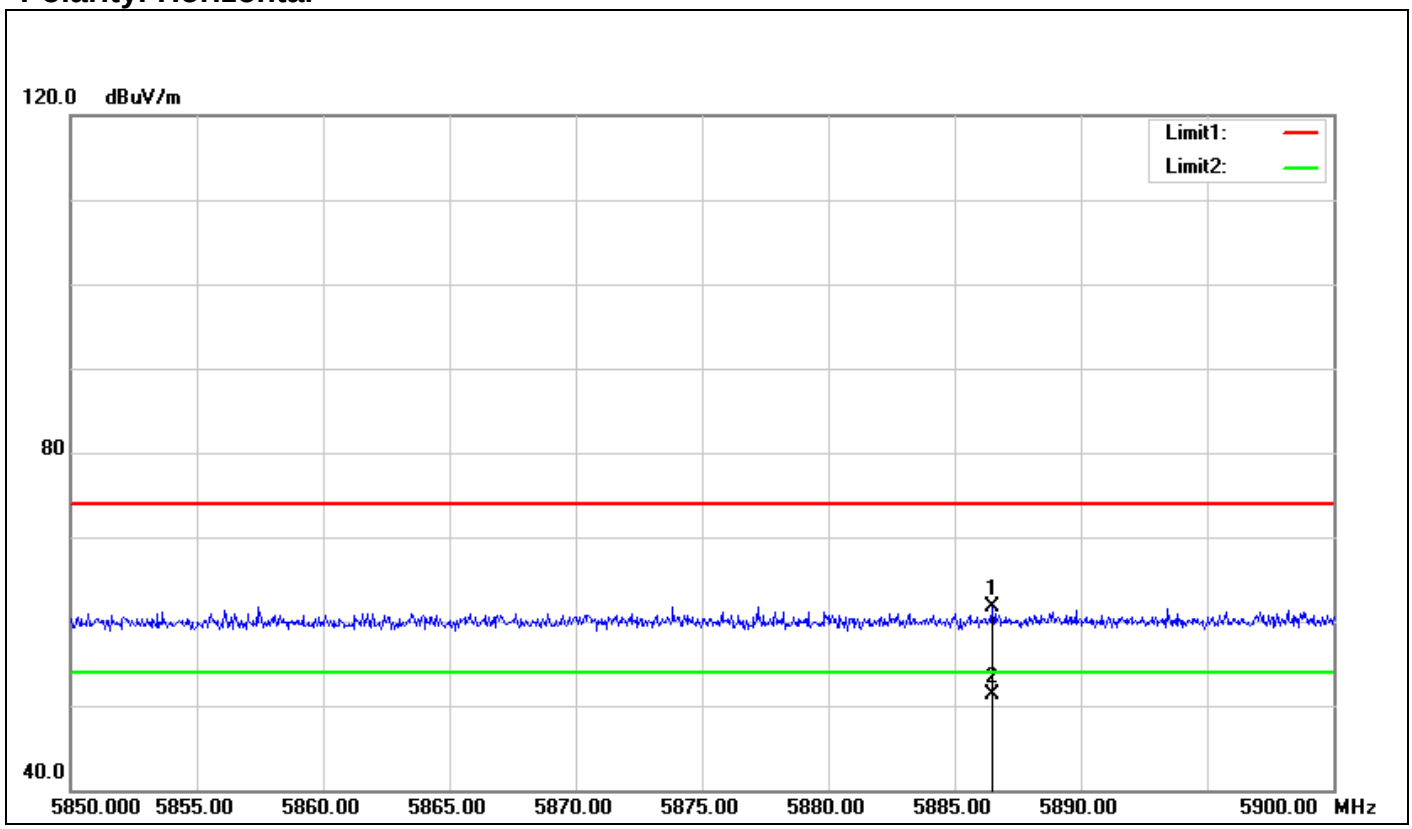
Band Edges (IEEE 802.11ac VHT80 Mode / CH 5775 MHz)

Polarity: Vertical



No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(°)	
1	5850.100	55.53	6.74	62.27	74.00	-11.73	150	267	peak
2	5850.100	45.60	6.74	52.34	54.00	-1.66	150	267	AVG

Polarity: Horizontal



No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(°)	
1	5886.500	54.86	6.90	61.76	74.00	-12.24	150	186	peak
2	5886.500	44.49	6.90	51.39	54.00	-2.61	150	186	AVG

7.4 PEAK POWER SPECTRAL DENSITY

LIMIT

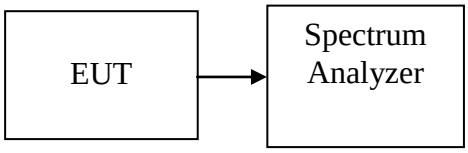
According to §15.407(a),

(1) For the band 5.15-5.25 GHz, the peak power spectral density shall not exceed 17dBm in any 1MHz band.

(2) For the band 5.47-5.725 GHz bands, the peak power spectral density shall not exceed 30dBm in any 500KHz band.

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

Test Configuration



TEST PROCEDURE

1. Place the EUT on the table and set it in transmitting mode.
   Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
2. Set the spectrum analyzer as RBW = 1MHz, VBW = 3MHz, Span = Sweep= AUTO
3. Record the max. reading.
4. Repeat the above procedure until the measurements for all frequencies are completed

TEST RESULTS

No non-compliance noted

Test Data

Test mode: IEEE 802.11a mode / 5180 ~ 5240MHz

Channel	Frequency (MHz)	Chain 0 PPSD (dBm)	Chain 1 PPSD (dBm)	PPSD (dBm)	Limit (dBm)	Result
Low	5180	11.88	9.71	13.94	15.07	PASS
Mid	5220	11.92	10.28	14.19	15.07	PASS
High	5240	12.01	10.76	14.44	15.07	PASS

Test mode: IEEE 802.11n HT 20 mode / 5180 ~ 5240MHz

Channel	Frequency (MHz)	Chain 0 PPSD (dBm)	Chain 1 PPSD (dBm)	PPSD (dBm)	Limit (dBm)	Result
Low	5180	10.31	7.92	12.29	15.07	PASS
Mid	5220	10.87	8.64	12.91	15.07	PASS
High	5240	11.04	5.58	12.13	15.07	PASS

Test mode: IEEE 802.11ac VHT 20 mode / 5180 ~ 5240MHz

Channel	Frequency (MHz)	Chain 0 PPSD (dBm)	Chain 1 PPSD (dBm)	PPSD (dBm)	Limit (dBm)	Result
Low	5180	10.42	8.36	12.52	15.07	PASS
Mid	5220	10.34	8.64	12.58	15.07	PASS
High	5240	11.09	9.17	13.25	15.07	PASS

Test mode: IEEE 802.11n HT 40 mode / 5190 ~ 5230MHz

Channel	Frequency (MHz)	Chain 0 PPSD (dBm)	Chain 1 PPSD (dBm)	PPSD (dBm)	Limit (dBm)	Result
Low	5190	4.39	1.75	6.28	15.07	PASS
High	5230	7.47	3.59	8.96	15.07	PASS

Test mode: IEEE 802.11ac VHT 40 mode / 5190 ~ 5230MHz

Channel	Frequency (MHz)	Chain 0 PPSD (dBm)	Chain 1 PPSD (dBm)	PPSD (dBm)	Limit (dBm)	Result
Low	5190	4.47	2.00	6.42	15.07	PASS
High	5230	7.17	3.12	8.61	15.07	PASS

Test mode: IEEE 802.11ac VHT80 Mode / 5210MHz

Channel	Frequency (MHz)	Chain 0 PPSD (dBm)	Chain 1 PPSD (dBm)	PPSD (dBm)	Limit (dBm)	Result
Mid	5210	6.58	8.16	10.45	15.07	PASS

Remark:

*1. Total PPSD (dBm) = 10*LOG(10^(Chain 0 PPSD / 10)+10^(Chain 1 PPSD /10))*

2. The maximum antenna gain is 7.93dBi; therefore the reduction due to antenna gain is 1.93dB, so the limit is 15.07dBm.

Test mode: IEEE 802.11a mode/ 5745 ~ 5825MHz

Channel	Frequency (MHz)	Chain 0 PPSD (dBm)	Chain 1 PPSD (dBm)	PPSD (dBm)	Limit (dBm)	Result
Low	5745	12.99	13.71	16.38	28.05	PASS
Mid	5785	12.94	13.36	16.17	28.05	PASS
High	5825	13.75	13.85	16.81	28.05	PASS

Test mode: IEEE 802.11n HT 20 mode / 5745 ~ 5825MHz

Channel	Frequency (MHz)	Chain 0 PPSD (dBm)	Chain 1 PPSD (dBm)	PPSD (dBm)	Limit (dBm)	Result
Low	5745	10.65	9.48	13.11	28.05	PASS
Mid	5785	11.03	9.44	13.32	28.05	PASS
High	5825	8.93	6.78	11.00	28.05	PASS

Test mode: IEEE 802.11ac VHT 20 mode / 5745 ~ 5825MHz

Channel	Frequency (MHz)	Chain 0 PPSD (dBm)	Chain 1 PPSD (dBm)	PPSD (dBm)	Limit (dBm)	Result
Low	5745	10.92	9.49	13.27	28.05	PASS
Mid	5785	10.77	9.35	13.13	28.05	PASS
High	5825	9.29	7.30	11.42	28.05	PASS

Test mode: IEEE 802.11n HT 40 mode / 5755 ~ 5795MHz

Channel	Frequency (MHz)	Chain 0 PPSD (dBm)	Chain 1 PPSD (dBm)	PPSD (dBm)	Limit (dBm)	Result
Low	5755	7.55	6.16	9.92	28.05	PASS
High	5795	6.95	4.86	9.04	28.05	PASS

Test mode: IEEE 802.11ac VHT 40 mode / 5755 ~ 5795MHz

Channel	Frequency (MHz)	Chain 0 PPSD (dBm)	Chain 1 PPSD (dBm)	PPSD (dBm)	Limit (dBm)	Result
Low	5755	8.07	6.46	10.35	28.05	PASS
High	5795	6.67	5.05	8.95	28.05	PASS

Test mode: IEEE 802.11ac VHT80 Mode / 5775MHz

Channel	Frequency (MHz)	Chain 0 PPSD (dBm)	Chain 1 PPSD (dBm)	PPSD (dBm)	Limit (dBm)	Result
Mid	5775	5.76	5.72	8.75	28.05	PASS

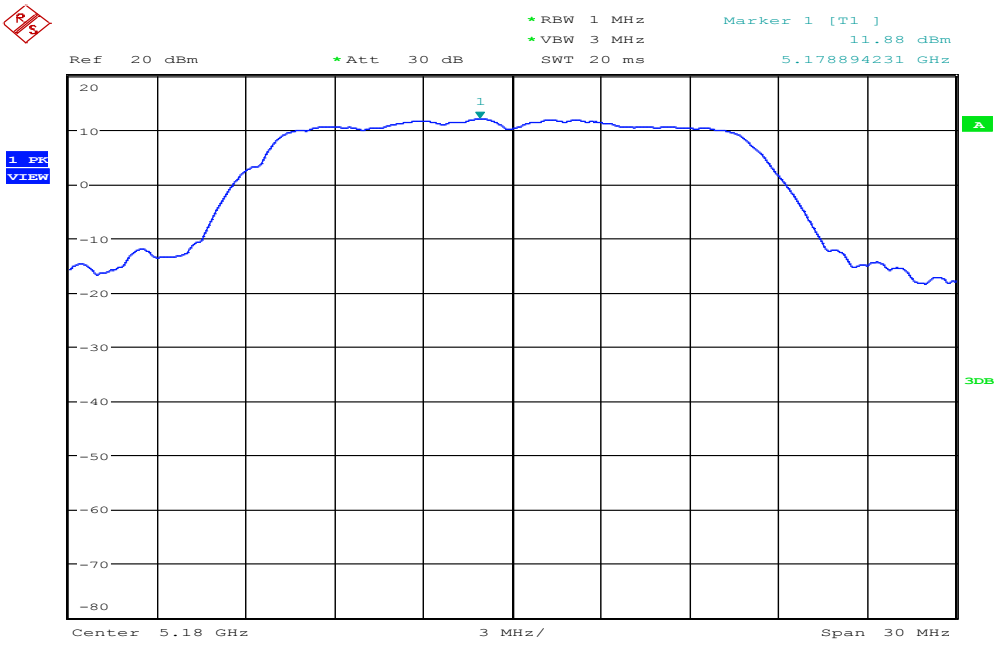
Remark:

*1. Total PPSD (dBm) = 10*LOG(10^(Chain 0 PPSD / 10)+10^(Chain 1 PPSD /10))*

2. The maximum antenna gain is 7.95dBi; therefore the reduction due to antenna gain is 1.95dB, so the limit is 28.05dBm.

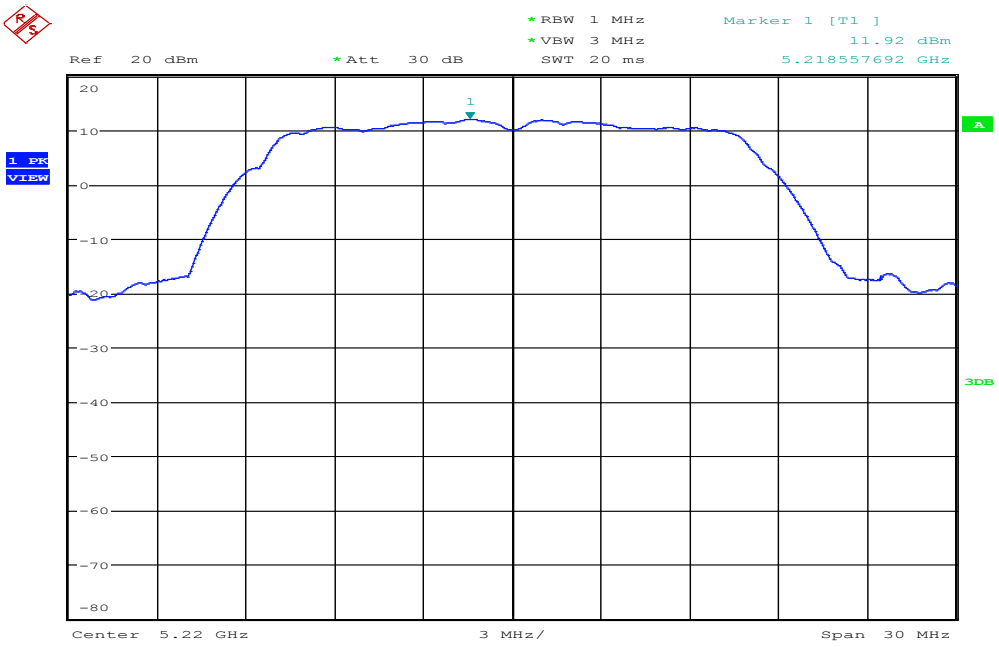
Test Plot
IEEE 802.11a mode / 5180 ~ 5240MHz / Chain 0

CH Low



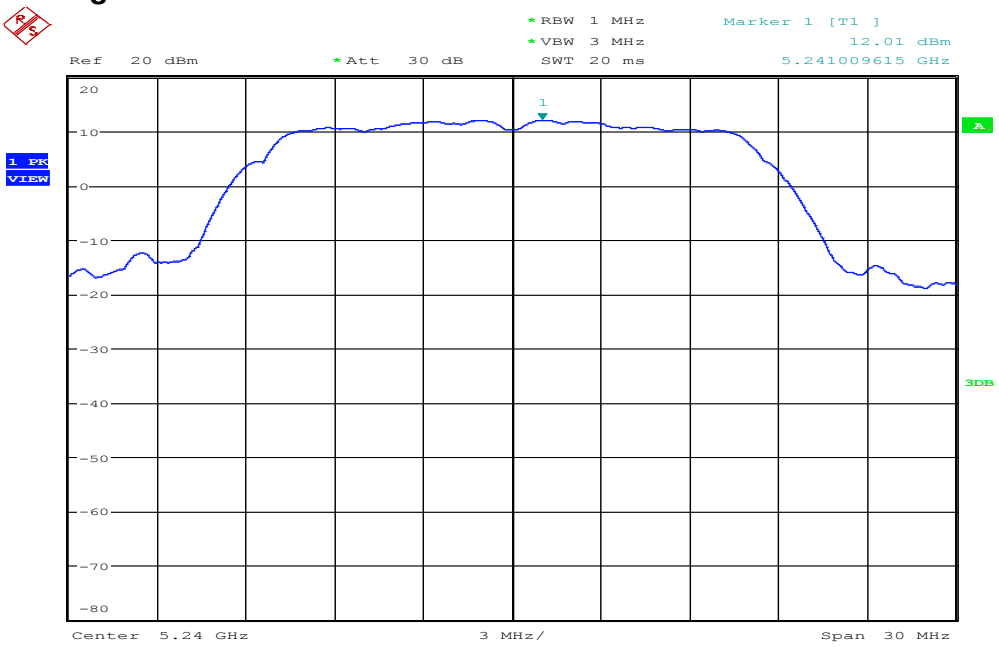
Date: 12.NOV.2015 00:28:13

CH Mid



Date: 12.NOV.2015 03:34:01

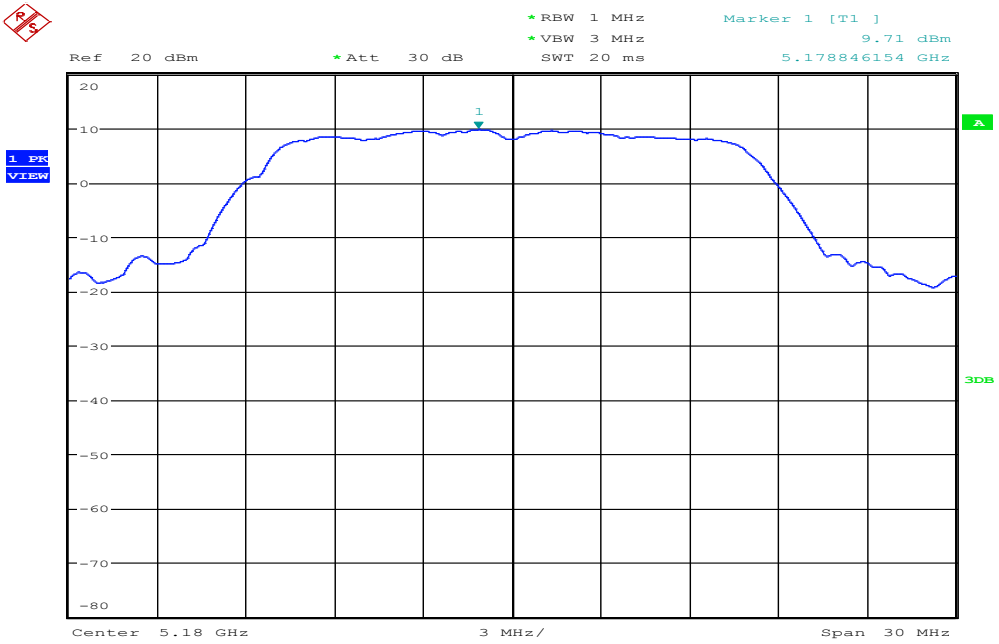
CH High



Date: 12.NOV.2015 03:38:31

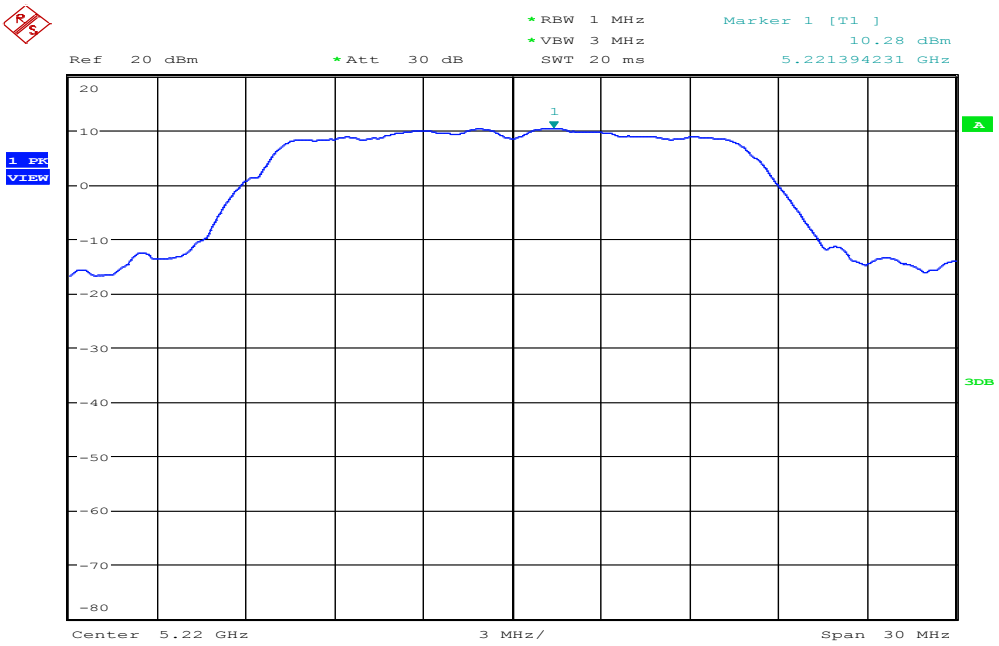
IEEE 802.11a mode / 5180 ~ 5240MHz / Chain 1

CH Low



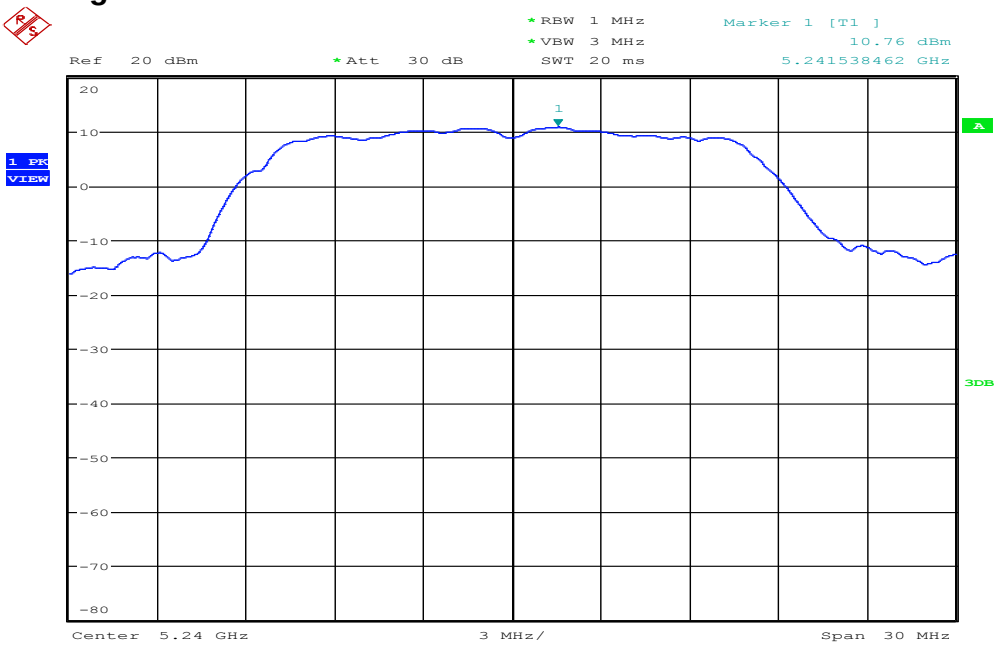
Date: 12.NOV.2015 00:25:54

CH Mid



Date: 12.NOV.2015 00:32:04

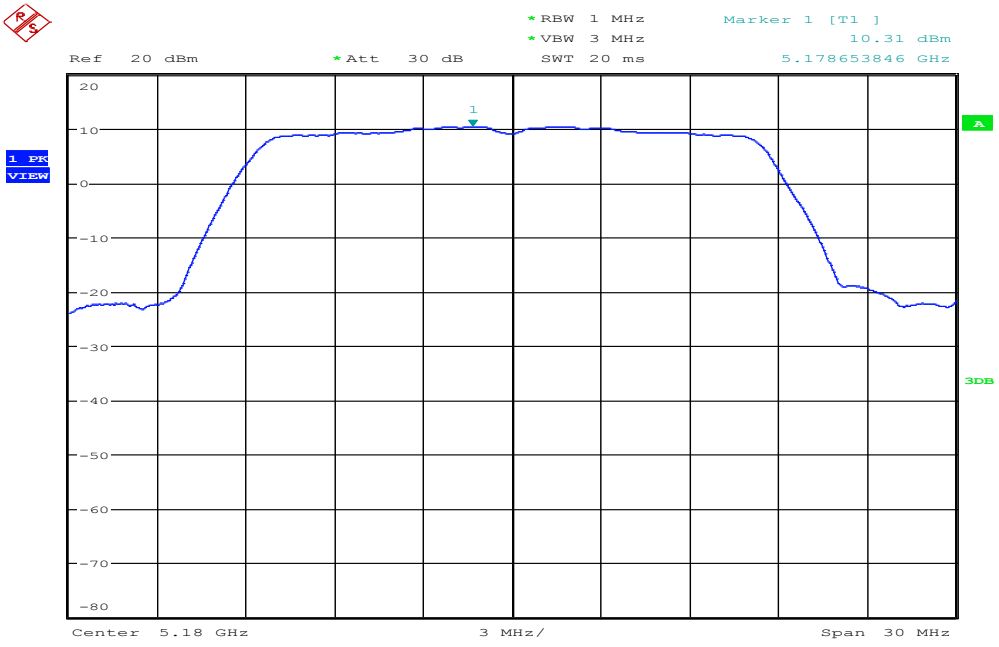
CH High



Date: 12.NOV.2015 00:36:17

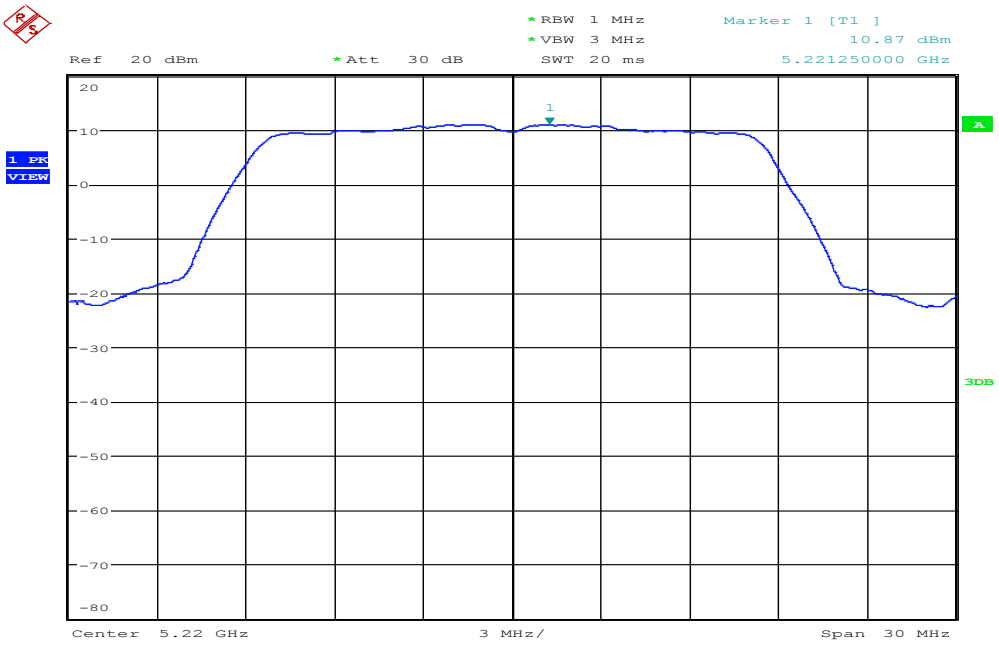
IEEE 802.11n HT 20 mode / 5180 ~ 5240MHz / Chain 0

CH Low



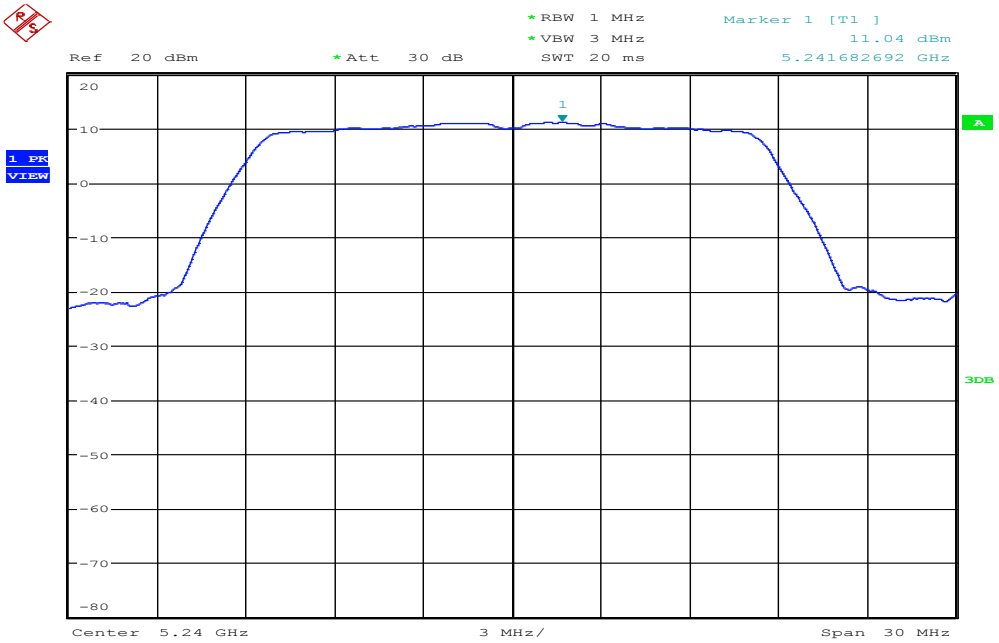
Date: 12.NOV.2015 00:44:58

CH Mid



Date: 12.NOV.2015 00:40:17

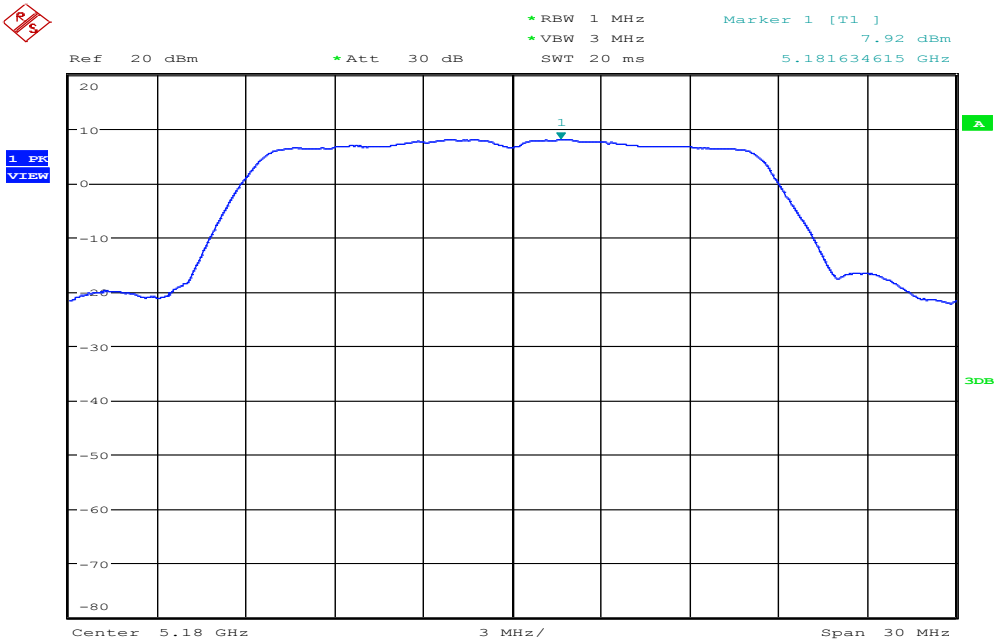
CH High



Date: 12.NOV.2015 00:39:04

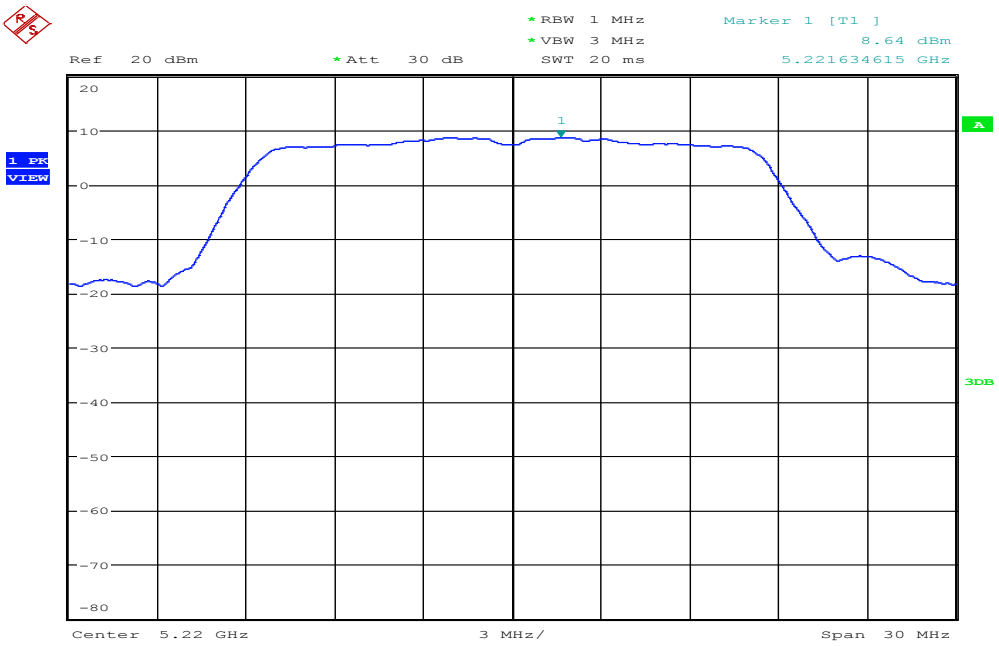
IEEE 802.11n HT 20 mode / 5180 ~ 5240MHz / Chain 1

CH Low



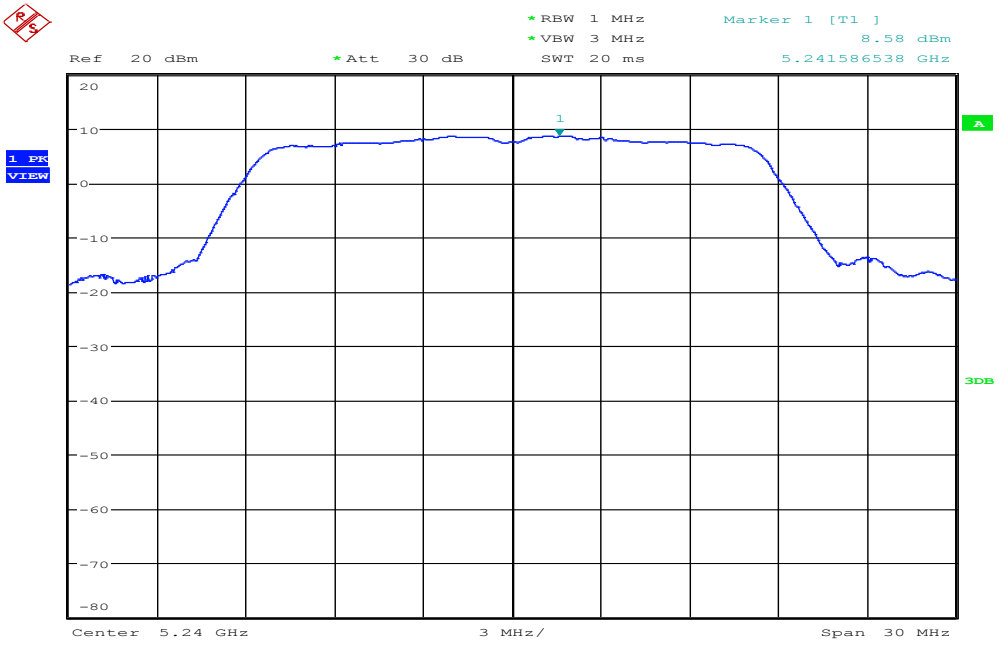
Date: 12.NOV.2015 00:43:46

CH Mid



Date: 12.NOV.2015 00:42:20

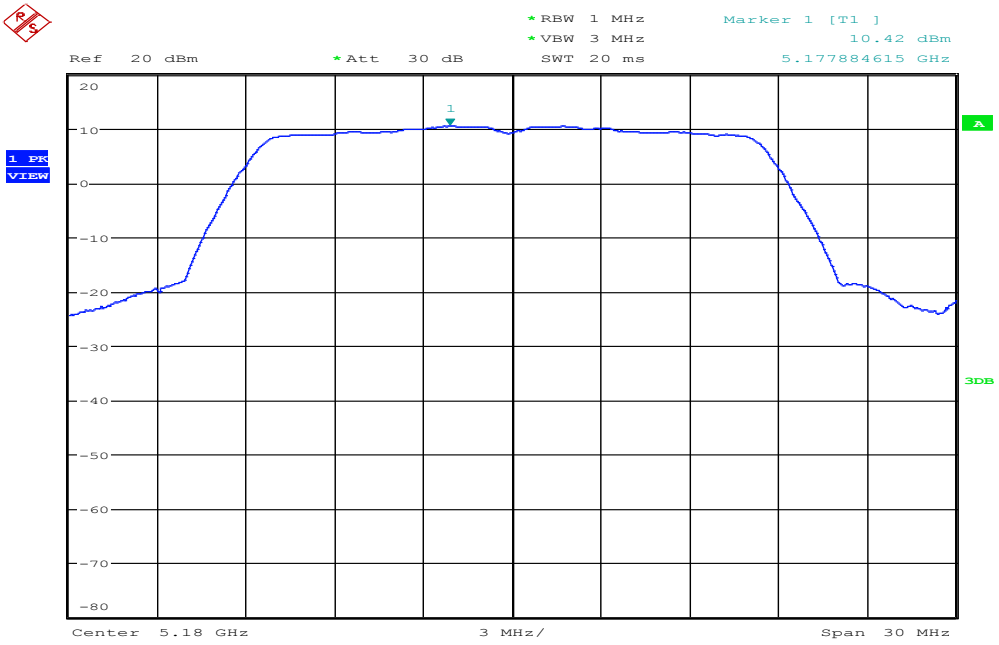
CH High



Date: 12.NOV.2015 00:37:30

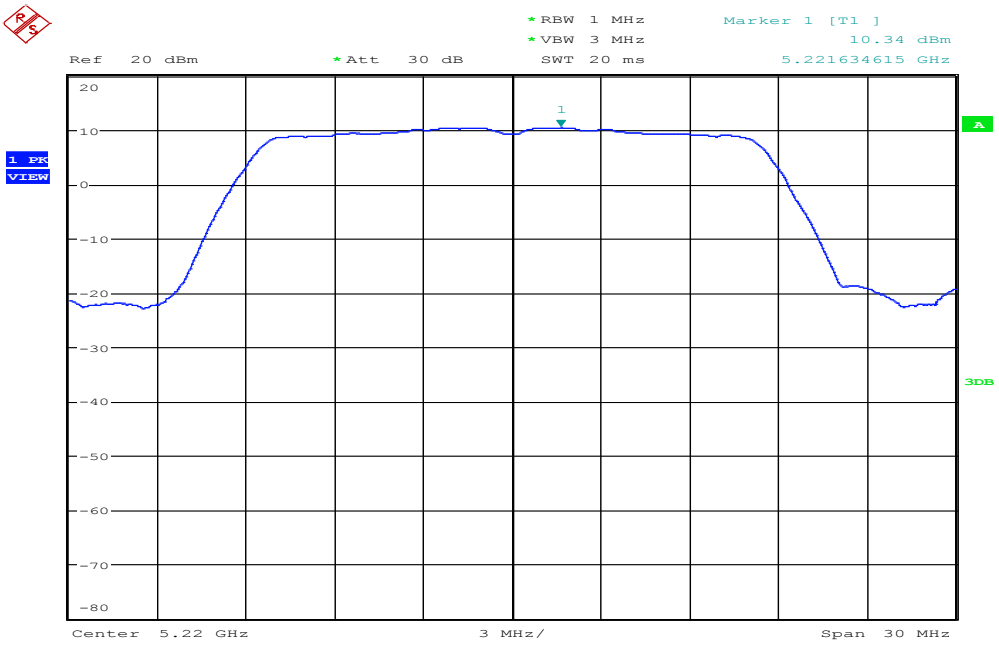
IEEE 802.11ac VHT 20 mode / 5180 ~ 5240MHz / Chain 0

CH Low



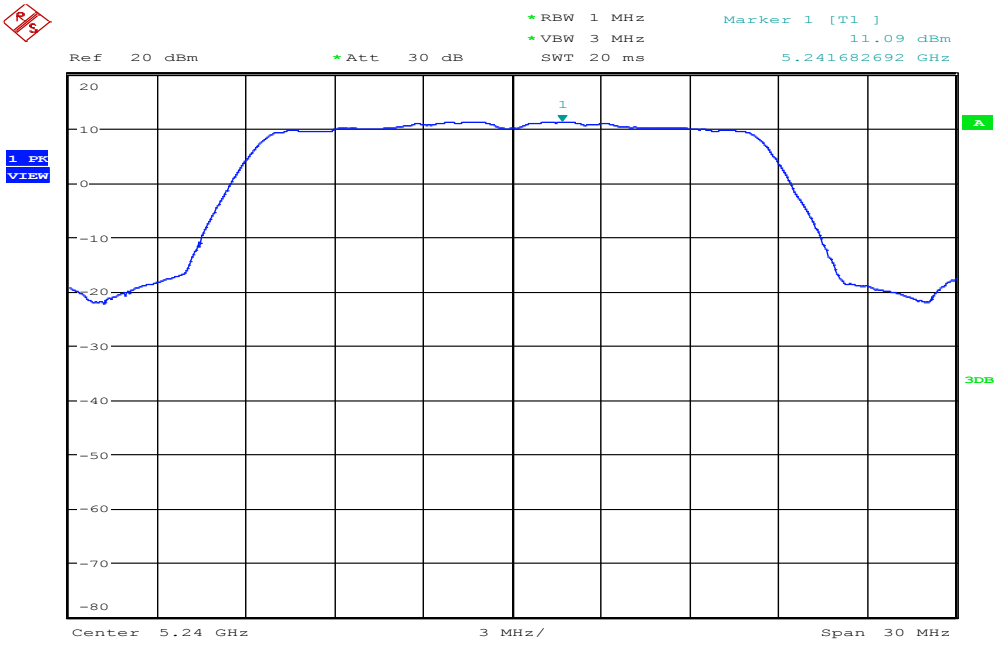
Date: 12.NOV.2015 00:46:54

CH Mid



Date: 12.NOV.2015 00:51:21

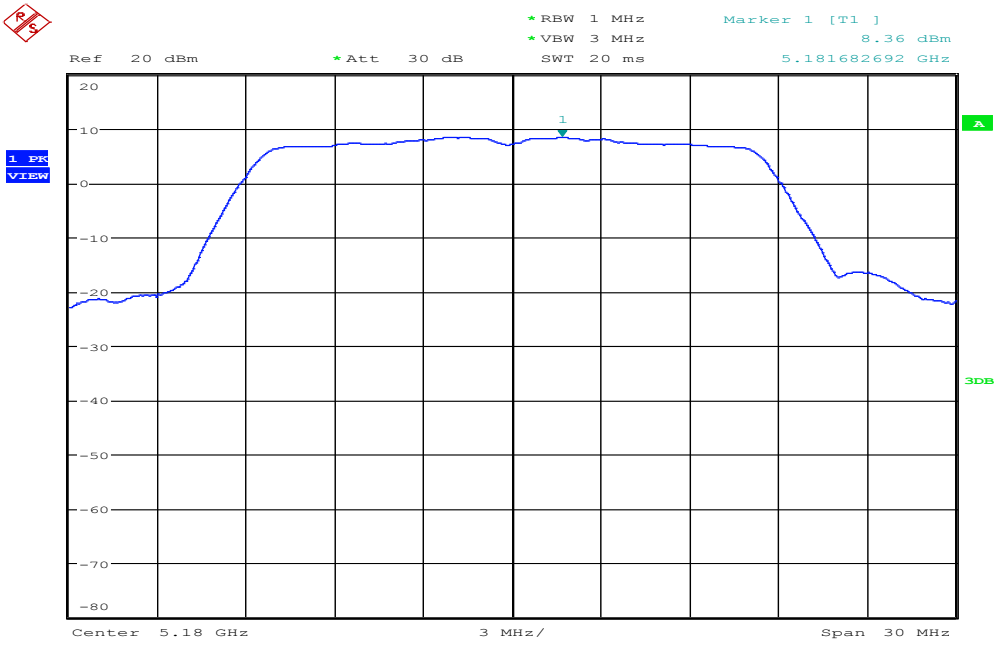
CH High



Date: 12.NOV.2015 00:52:50

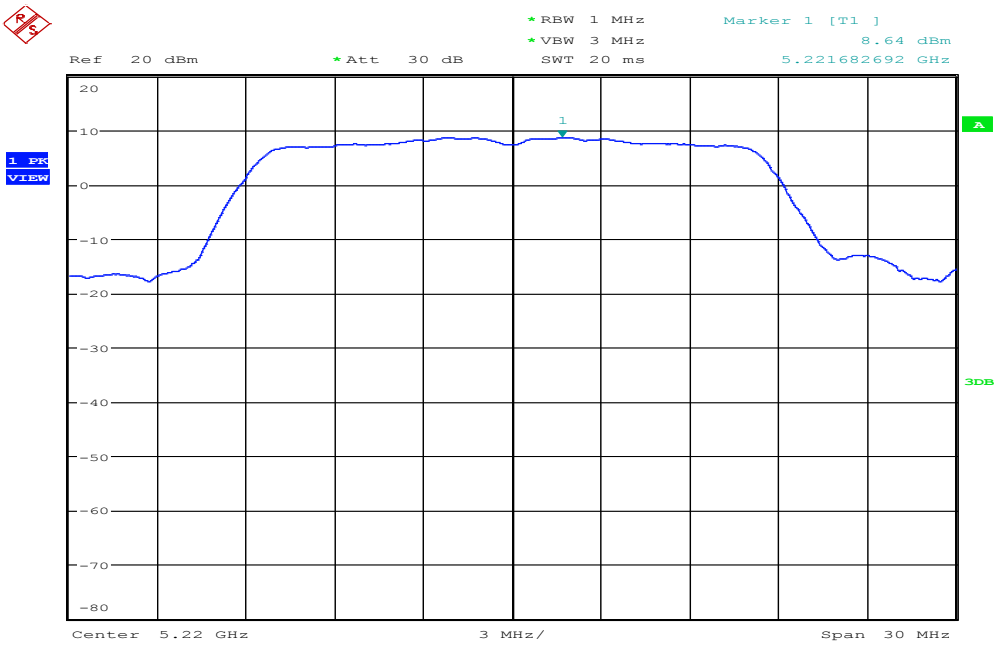
IEEE 802.11ac VHT 20 mode / 5180 ~ 5240MHz / Chain 1

CH Low



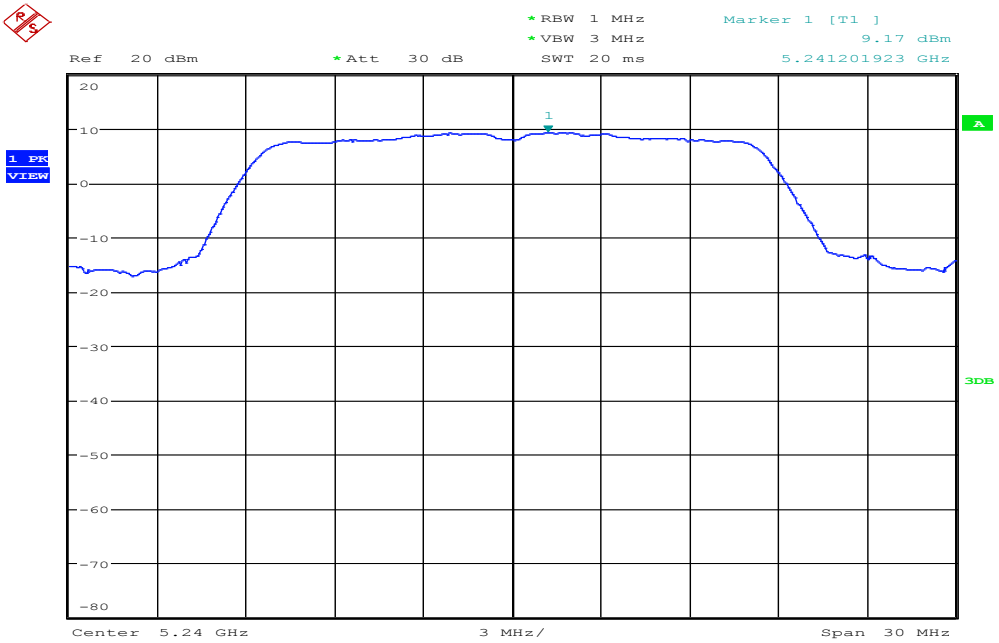
Date: 12.NOV.2015 00:48:21

CH Mid



Date: 12.NOV.2015 00:49:37

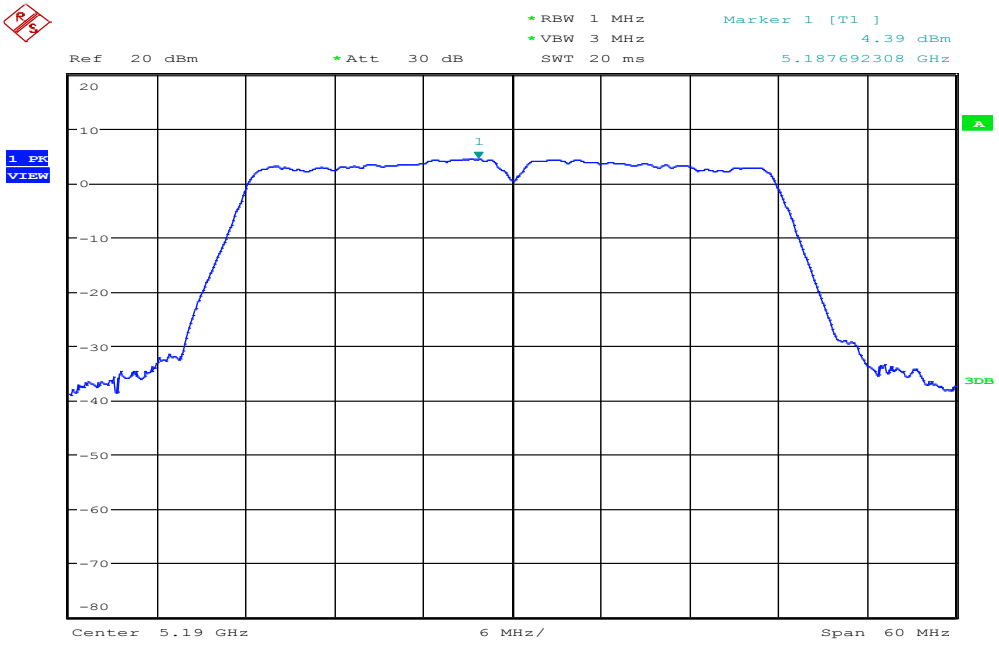
CH High



Date: 12.NOV.2015 00:53:49

IEEE 802.11n HT 40 mode / 5190 ~ 5230MHz / Chain 0

CH Low



Date: 12.NOV.2015 01:04:13

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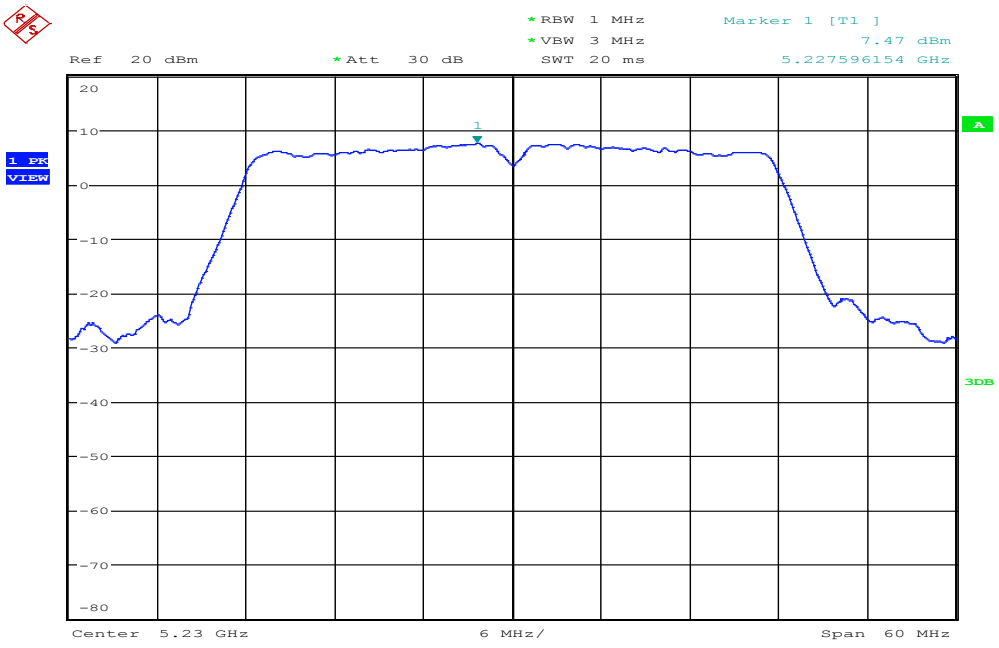
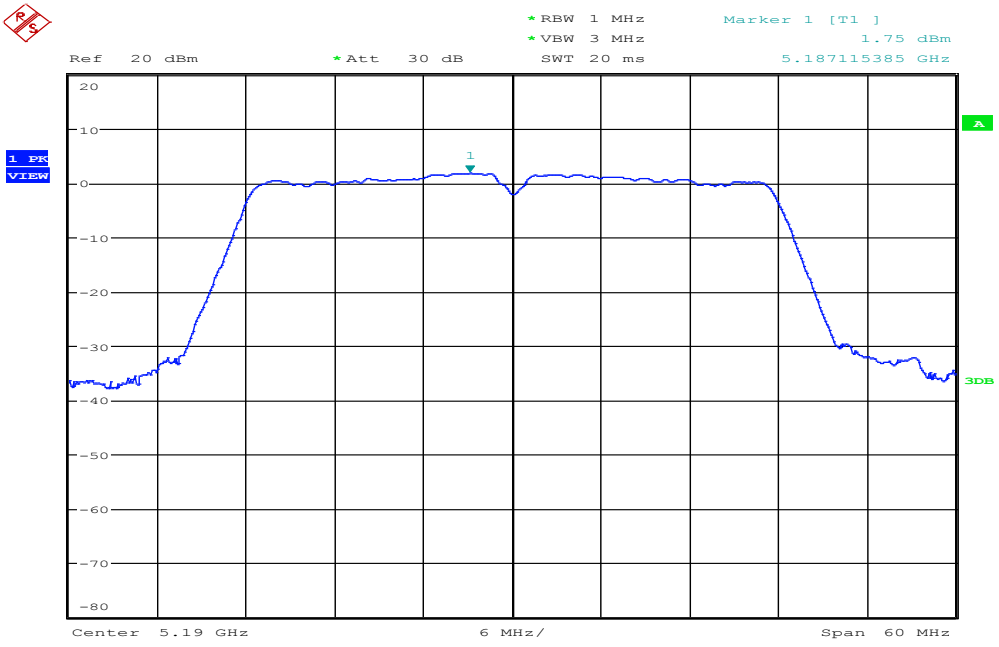


Date: 12.NOV.2015 01:01:37

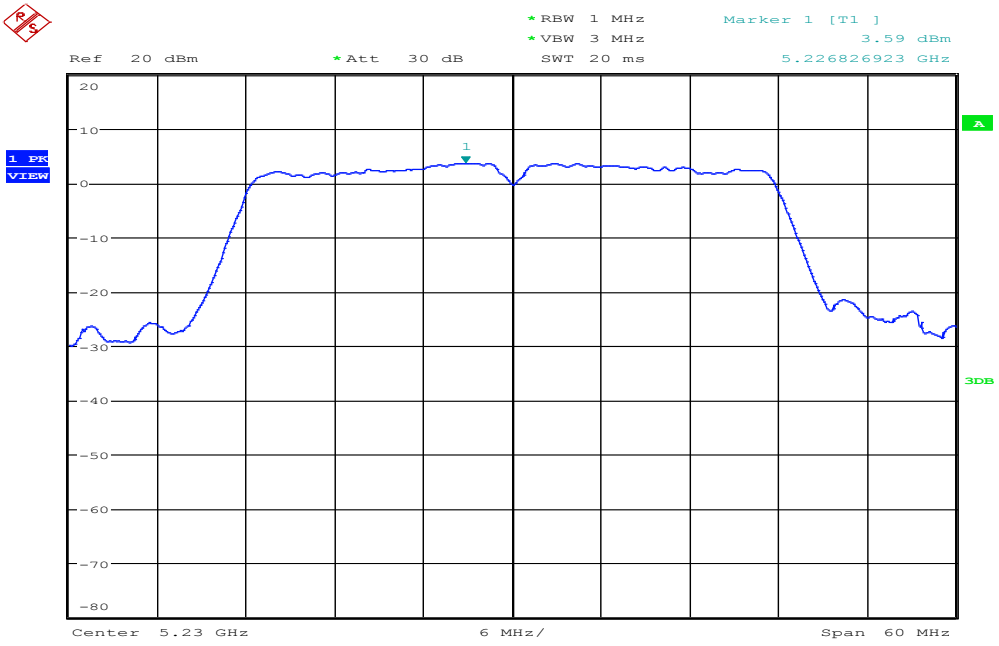
IEEE 802.11n HT 40 mode / 5190 ~ 5230MHz / Chain 1

CH Low



Date: 12.NOV.2015 01:03:31

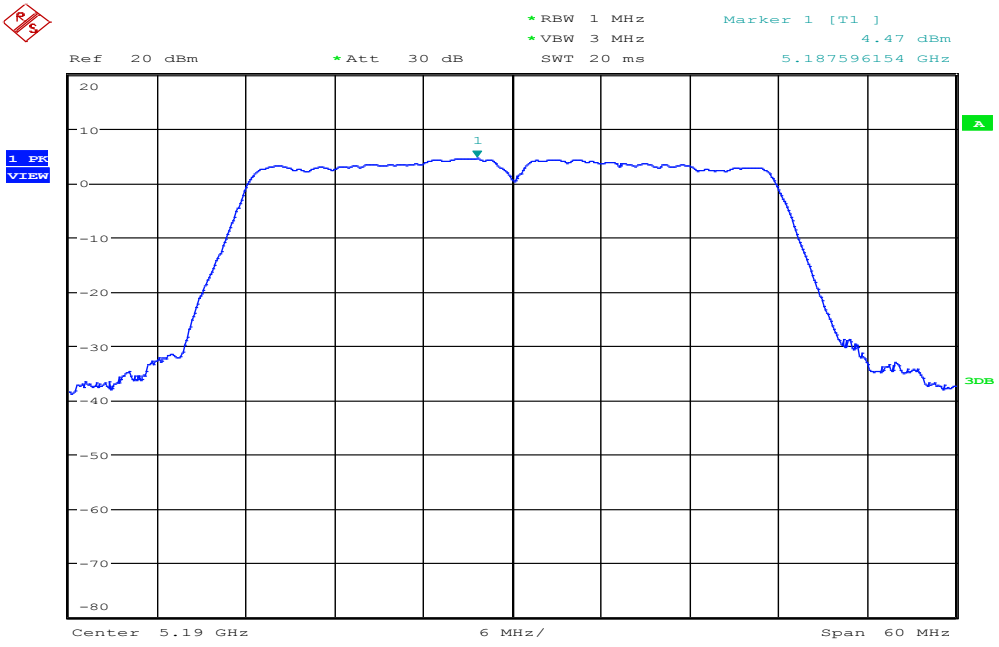
CH High



Date: 12.NOV.2015 01:02:27

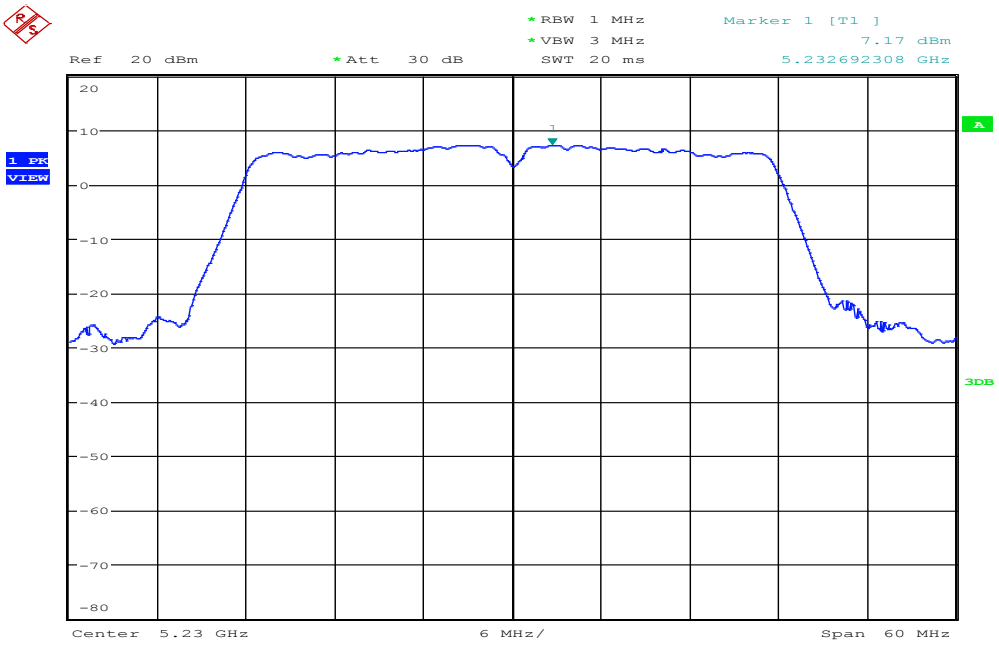
IEEE 802.11ac VHT 40 mode / 5190 ~ 5230MHz / Chain 0

CH Low



Date: 12.NOV.2015 00:57:45

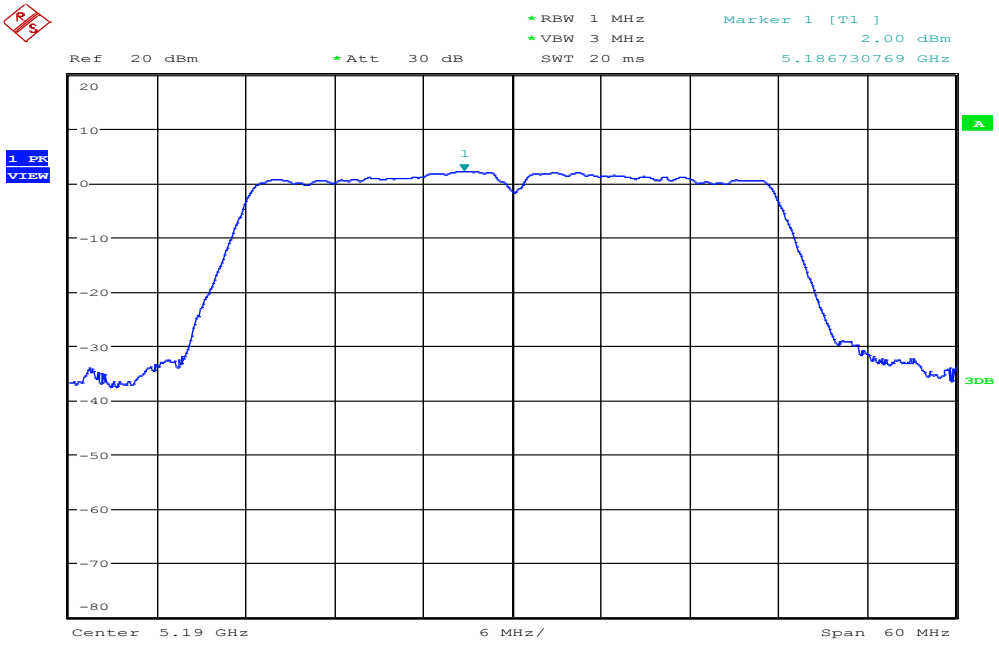
CH High



Date: 12.NOV.2015 01:00:22

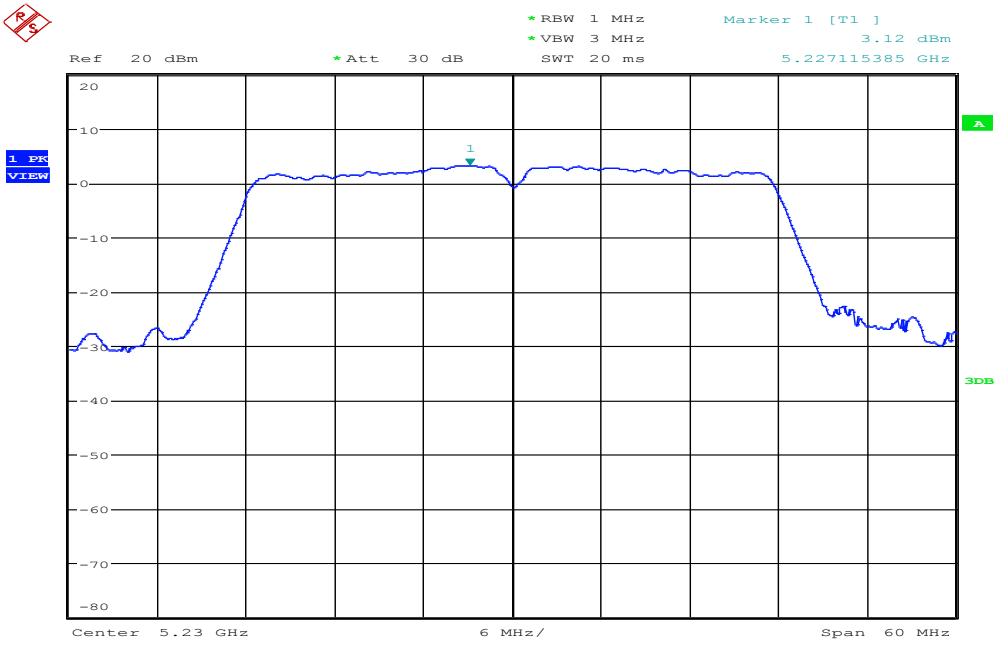
IEEE 802.11ac VHT 40 mode / 5190 ~ 5230MHz / Chain 1

CH Low



Date: 12.NOV.2015 00:58:28

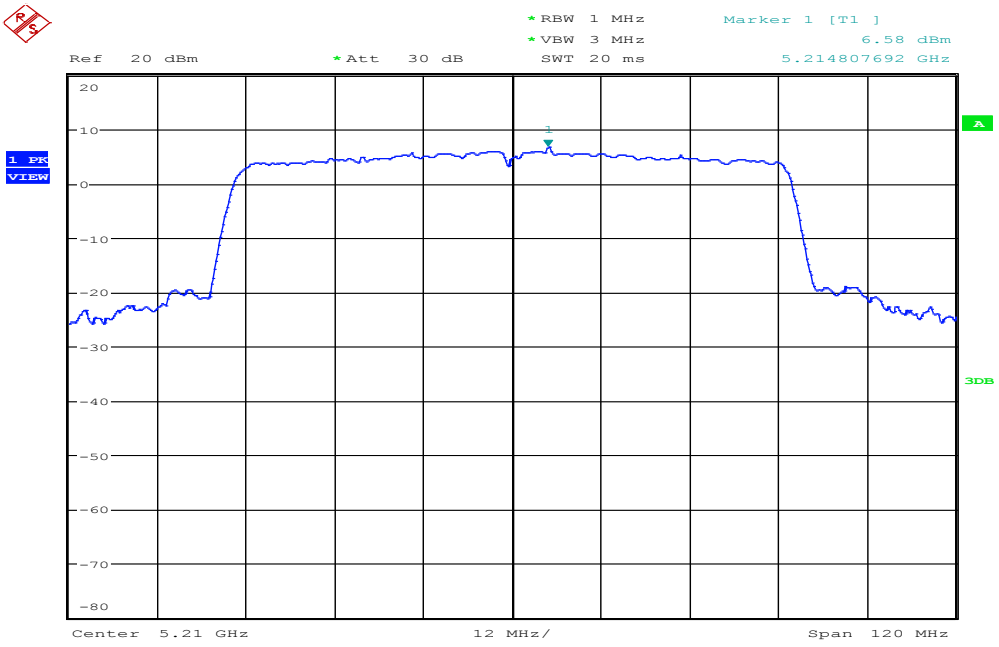
CH High



Date: 12.NOV.2015 00:59:30

IEEE 802.11ac VHT80 Mode / 5210MHz / Chain 0

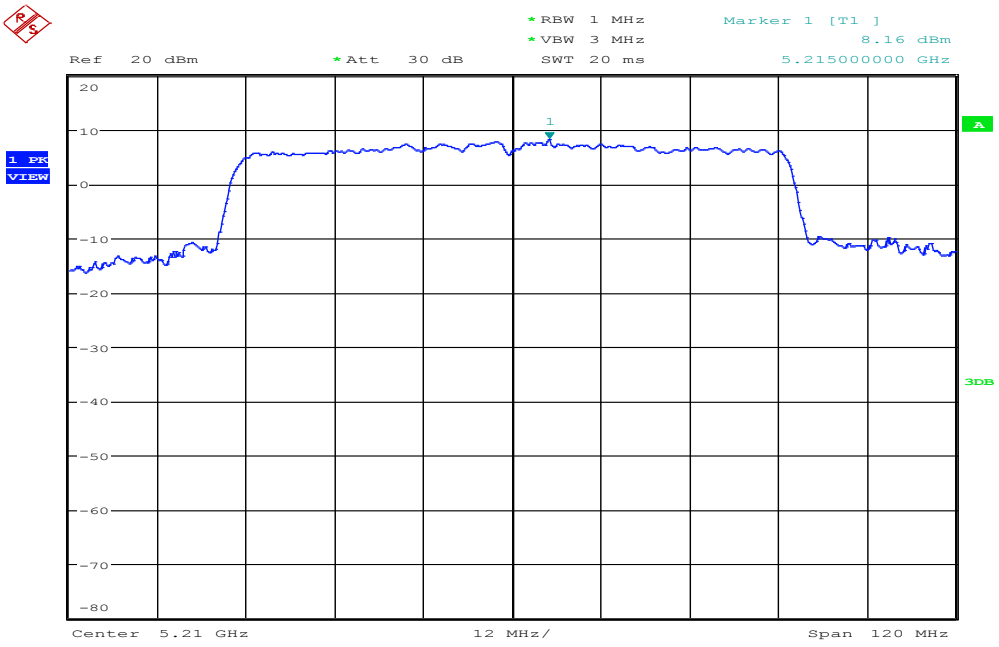
CH Mid



Date: 12.NOV.2015 01:06:28

IEEE 802.11ac VHT80 Mode / 5210MHz / Chain 1

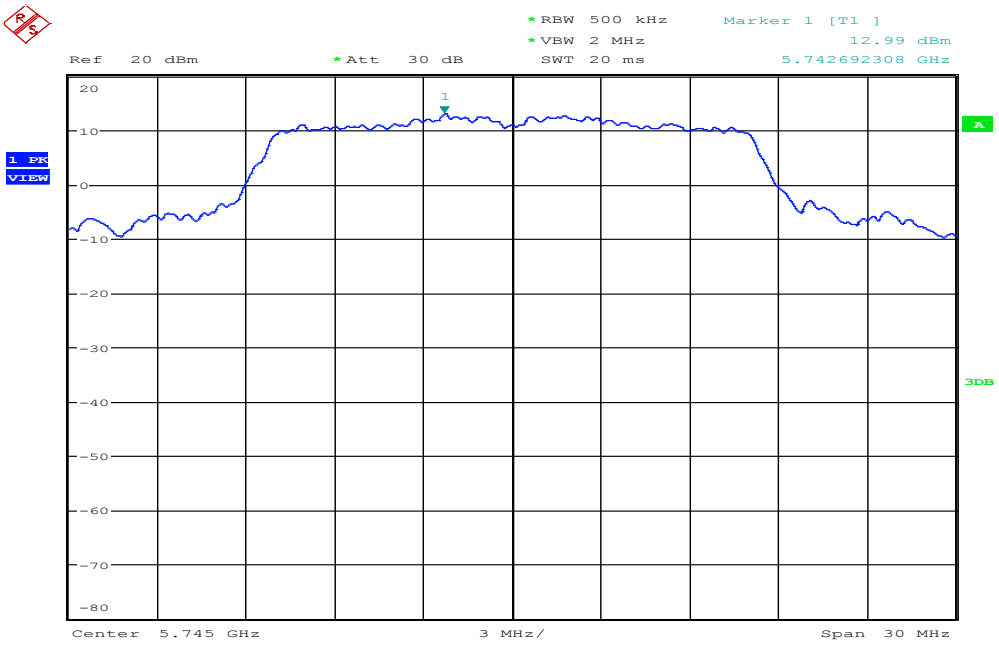
CH Mid



Date: 12.NOV.2015 01:07:21

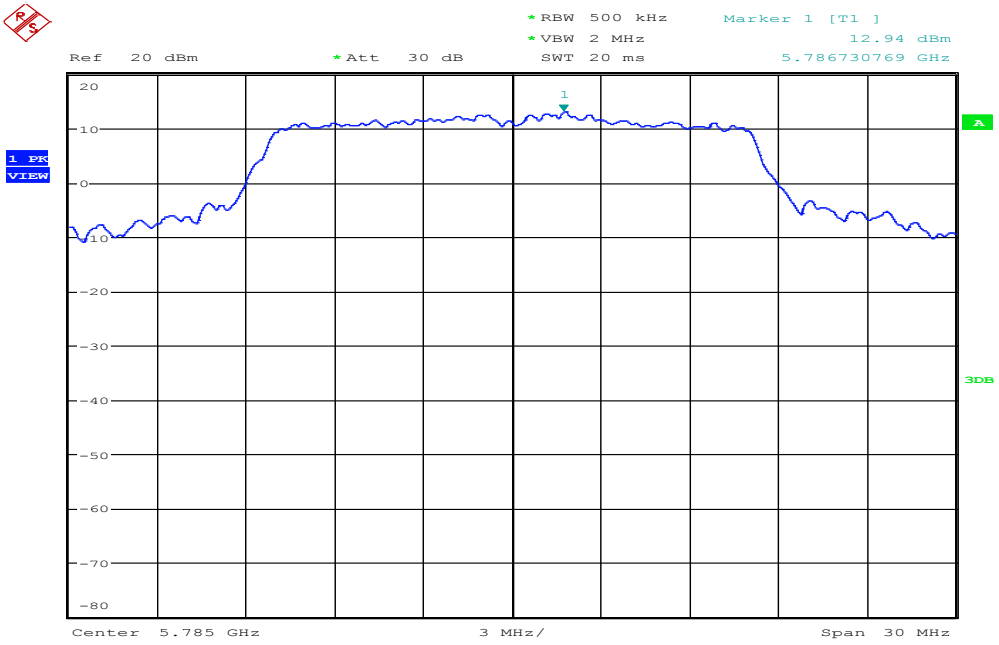
IEEE 802.11a mode / 5745 ~ 5825MHz / Chain 0

CH Low



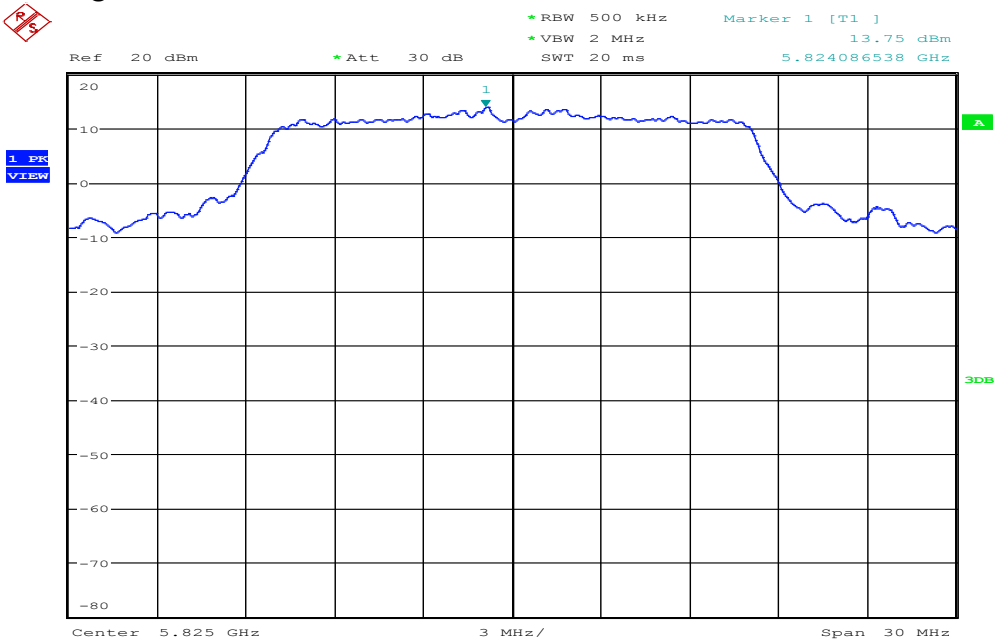
Date: 12.NOV.2015 02:33:39

CH Mid



Date: 12.NOV.2015 02:36:40

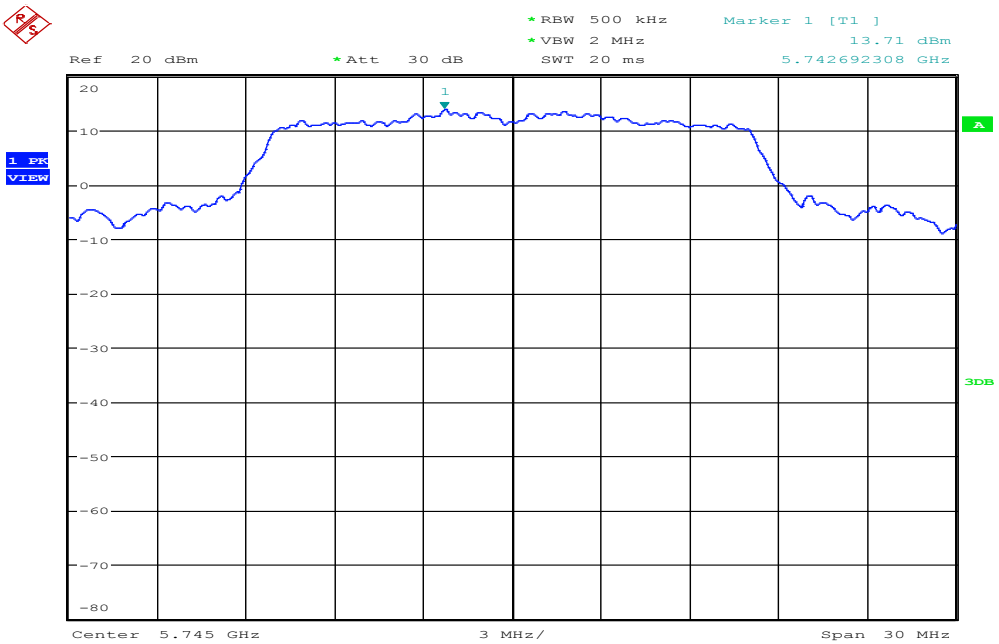
CH High



Date: 12.NOV.2015 02:37:53

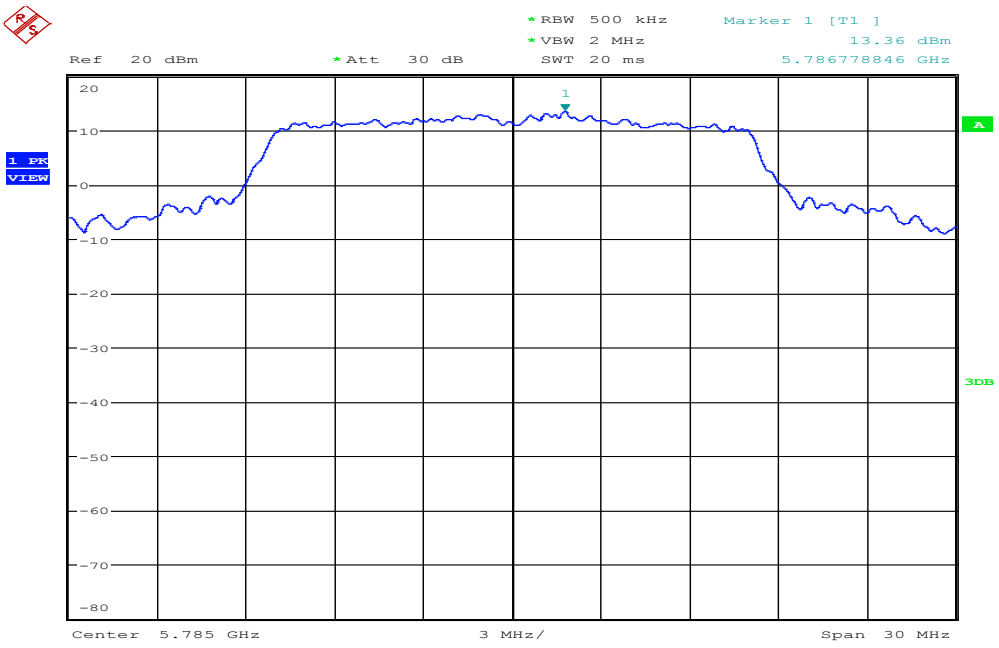
IEEE 802.11a mode / 5745 ~ 5825MHz / Chain 1

CH Low



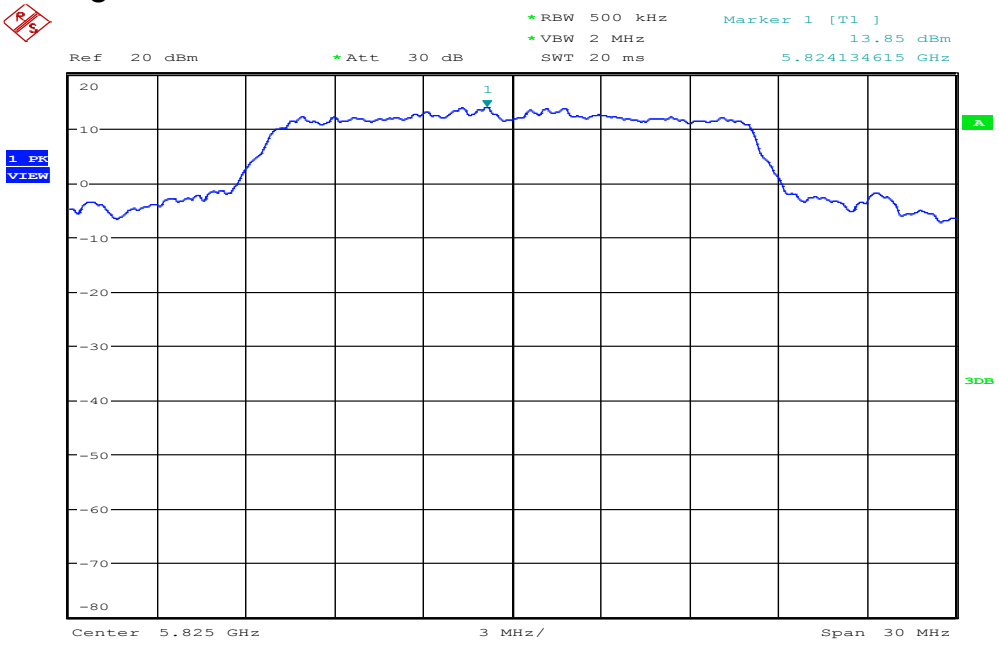
Date: 12.NOV.2015 02:34:58

CH Mid



Date: 12.NOV.2015 02:35:58

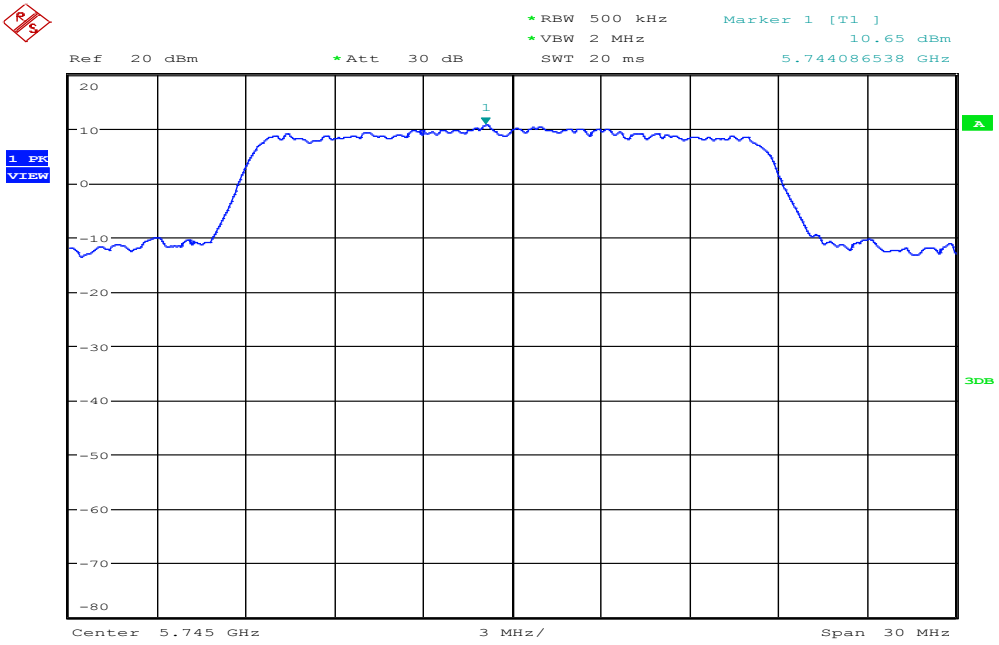
CH High



Date: 12.NOV.2015 02:38:38

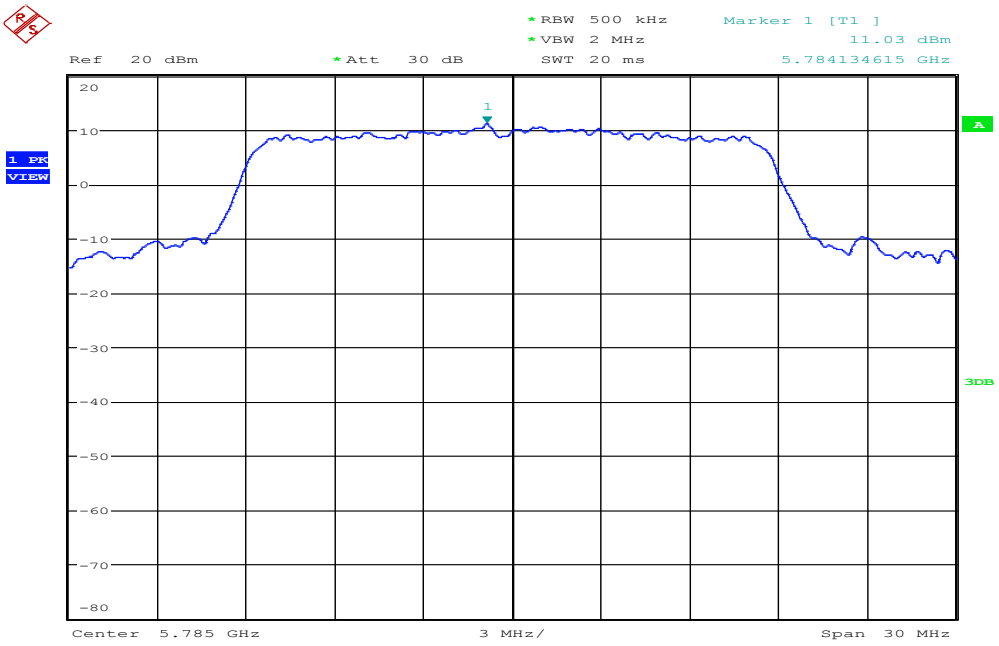
IEEE 802.11n HT 20 mode / 5745 ~ 5825MHz / Chain 0

CH Low



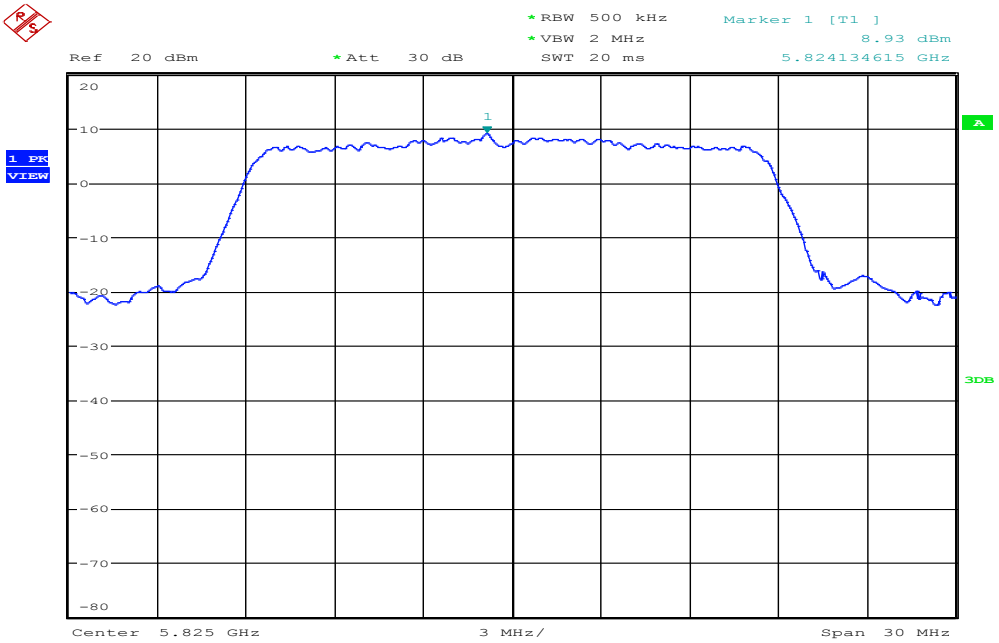
Date: 12.NOV.2015 02:40:23

CH Mid



Date: 12.NOV.2015 02:42:06

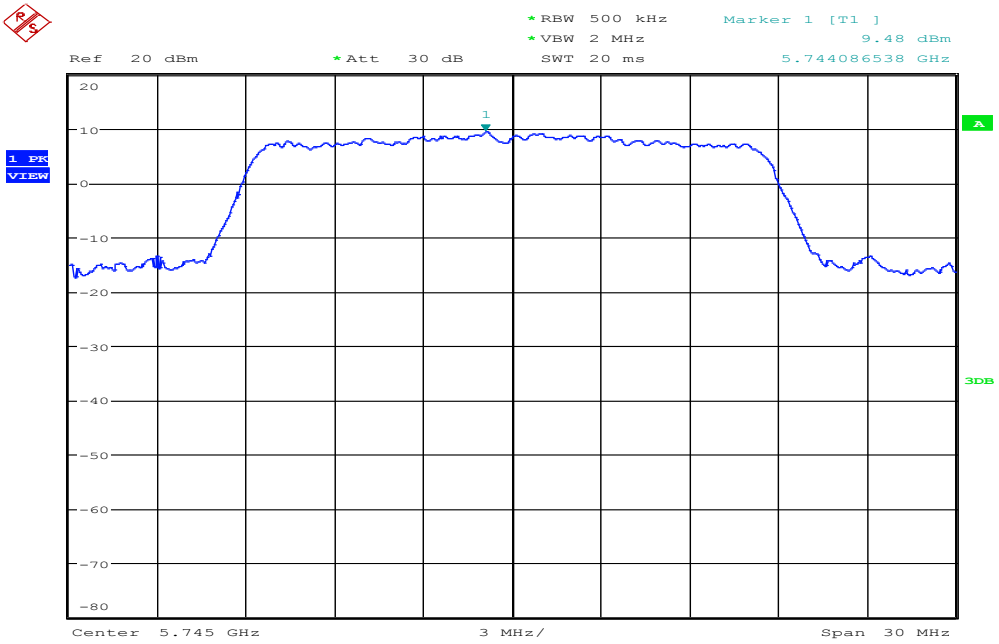
CH High



Date: 12.NOV.2015 02:44:49

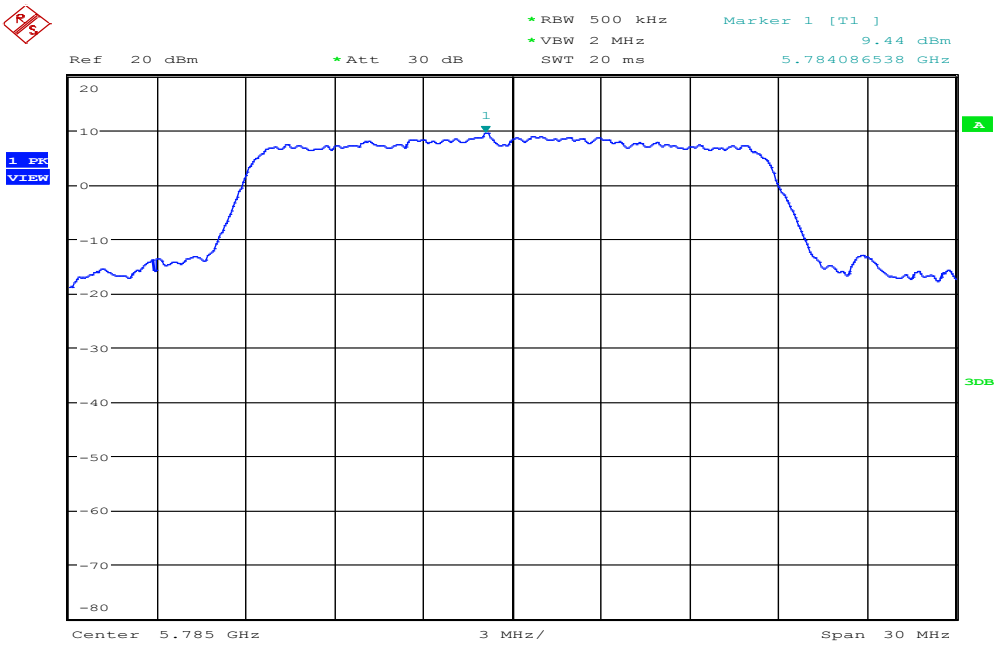
IEEE 802.11n HT 20 mode / 5745 ~ 5825MHz / Chain 1

CH Low



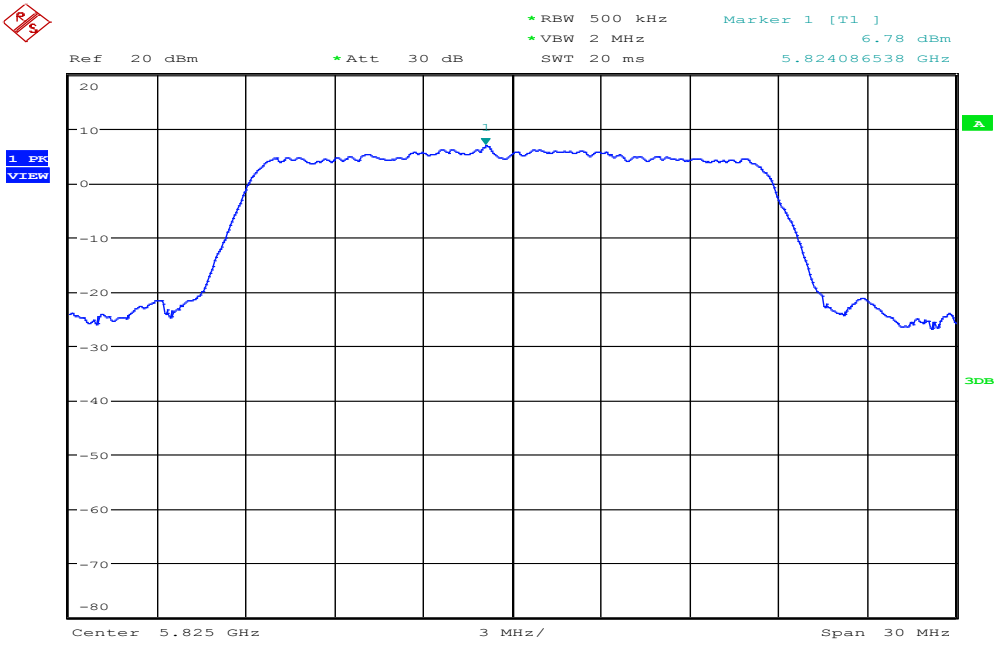
Date: 12.NOV.2015 02:39:41

CH Mid



Date: 12.NOV.2015 02:43:01

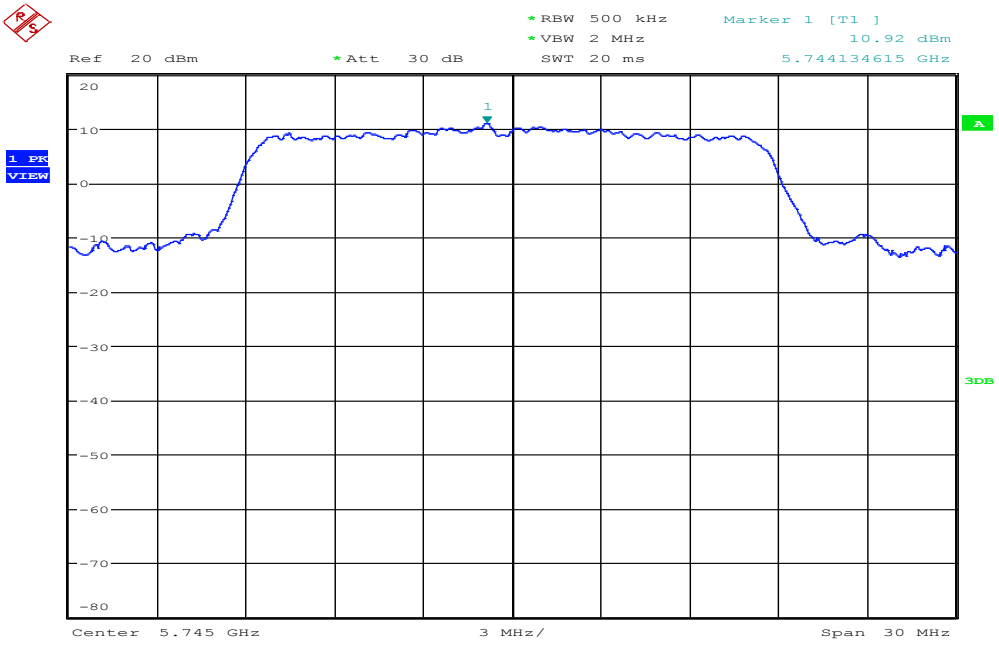
CH High



Date: 12.NOV.2015 02:43:49

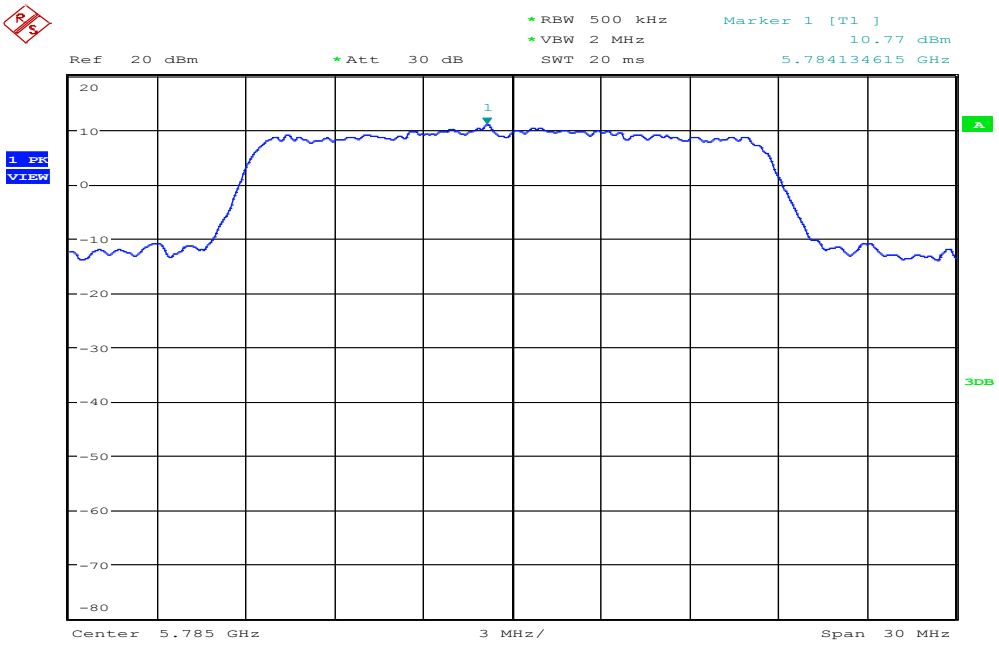
IEEE 802.11ac VHT 20 mode / 5745 ~ 5825MHz / Chain 0

CH Low



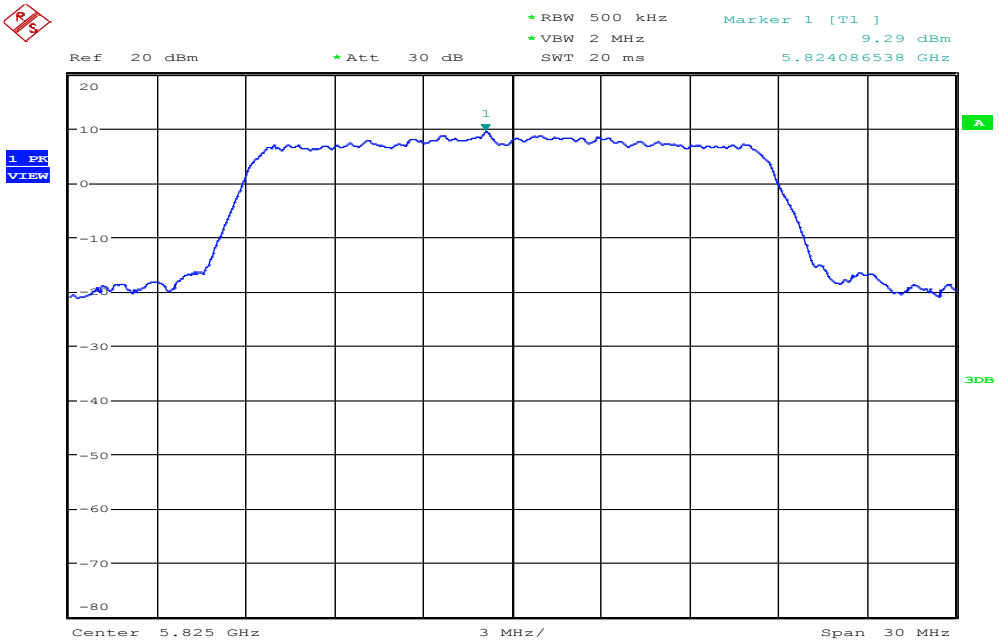
Date: 12.NOV.2015 02:50:54

CH Mid



Date: 12.NOV.2015 02:49:35

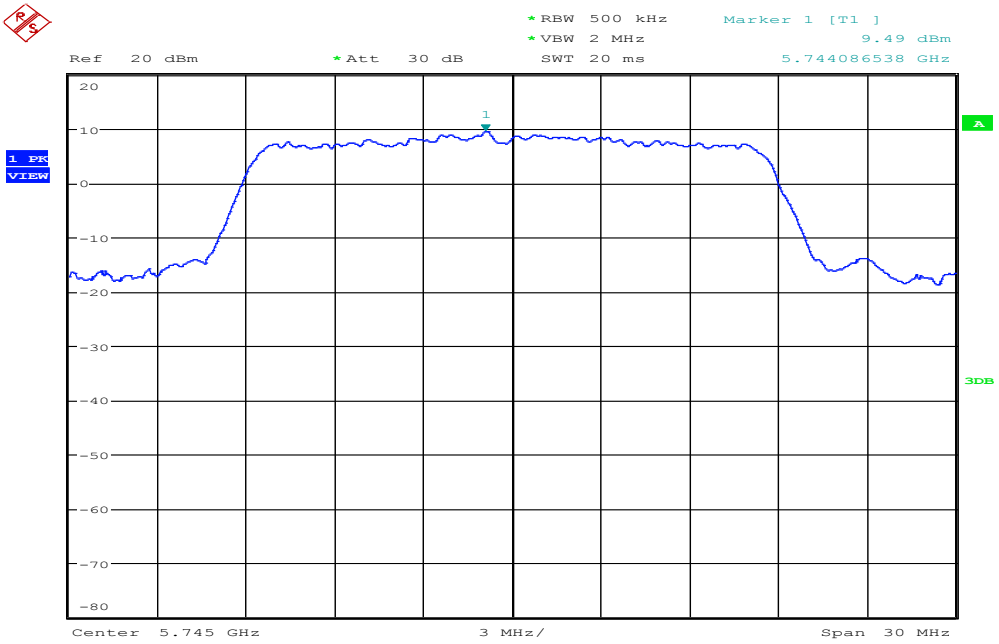
CH High



Date: 12.NOV.2015 02:46:04

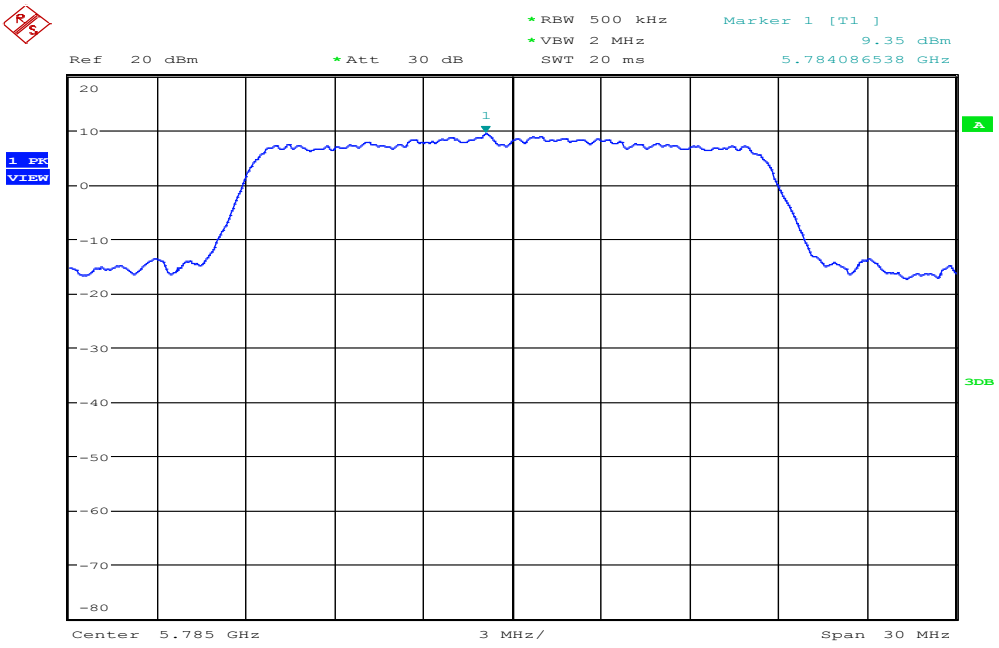
IEEE 802.11ac VHT 20 mode / 5745 ~ 5825MHz / Chain 1

CH Low



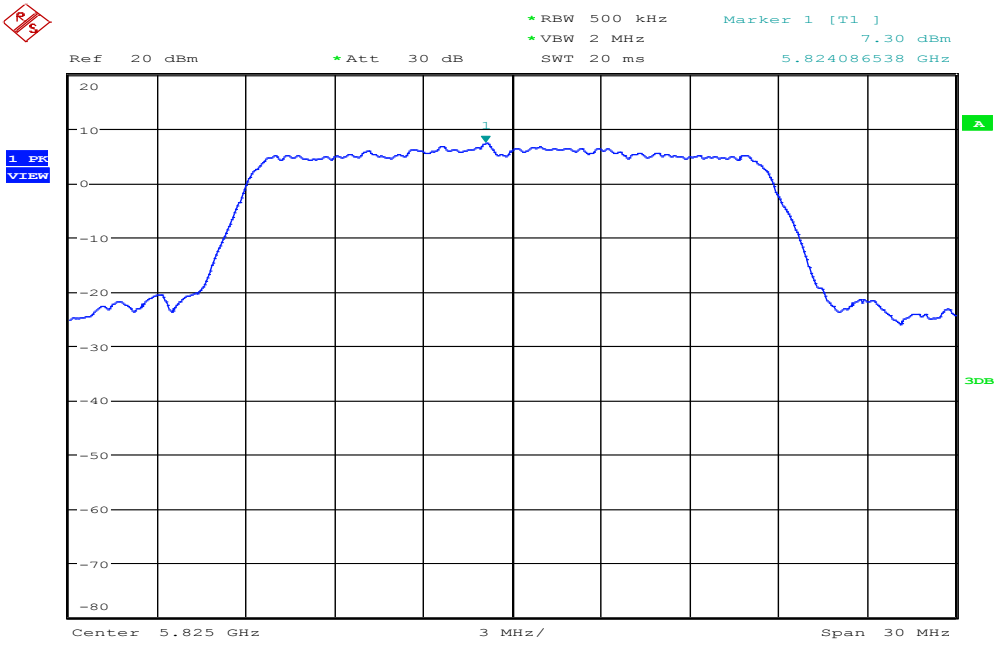
Date: 12.NOV.2015 02:51:57

CH Mid



Date: 12.NOV.2015 02:48:33

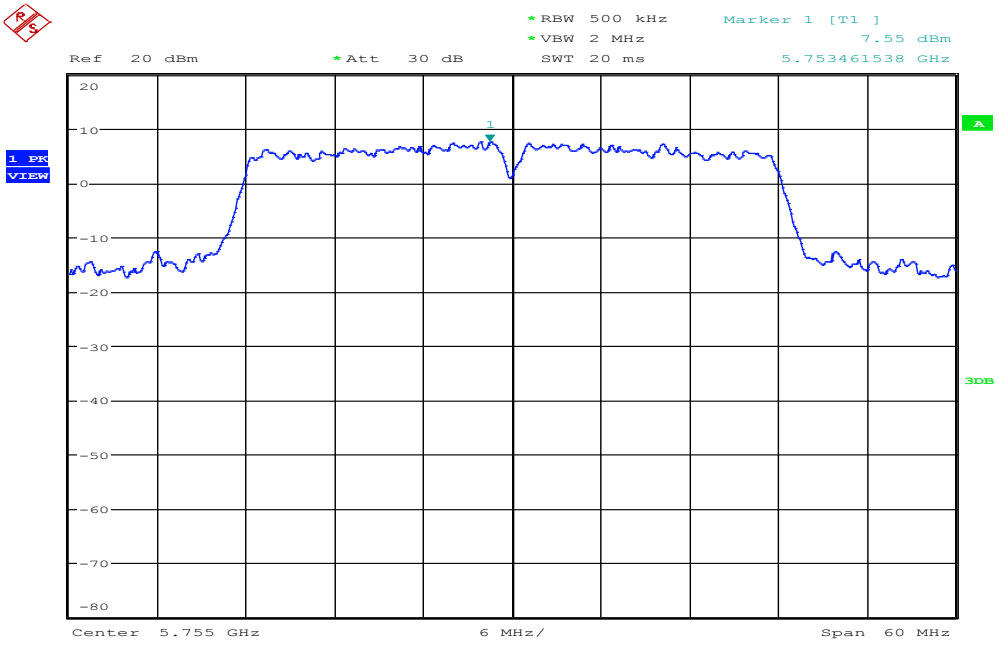
CH High



Date: 12.NOV.2015 02:46:58

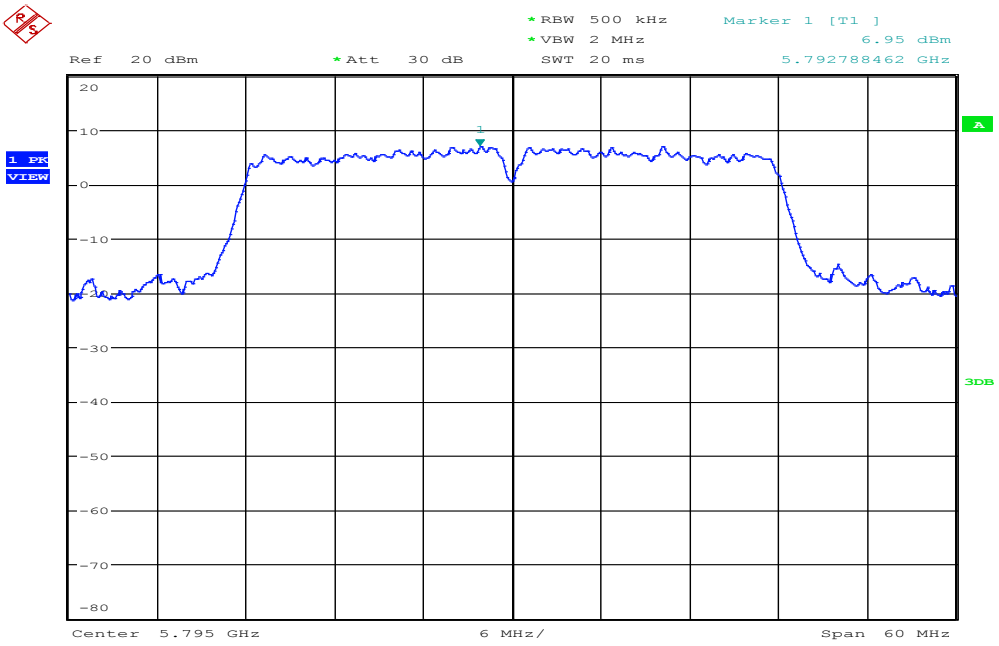
IEEE 802.11n HT 40 mode / 5755 ~ 5795MHz / Chain 0

CH Low



Date: 12.NOV.2015 02:31:56

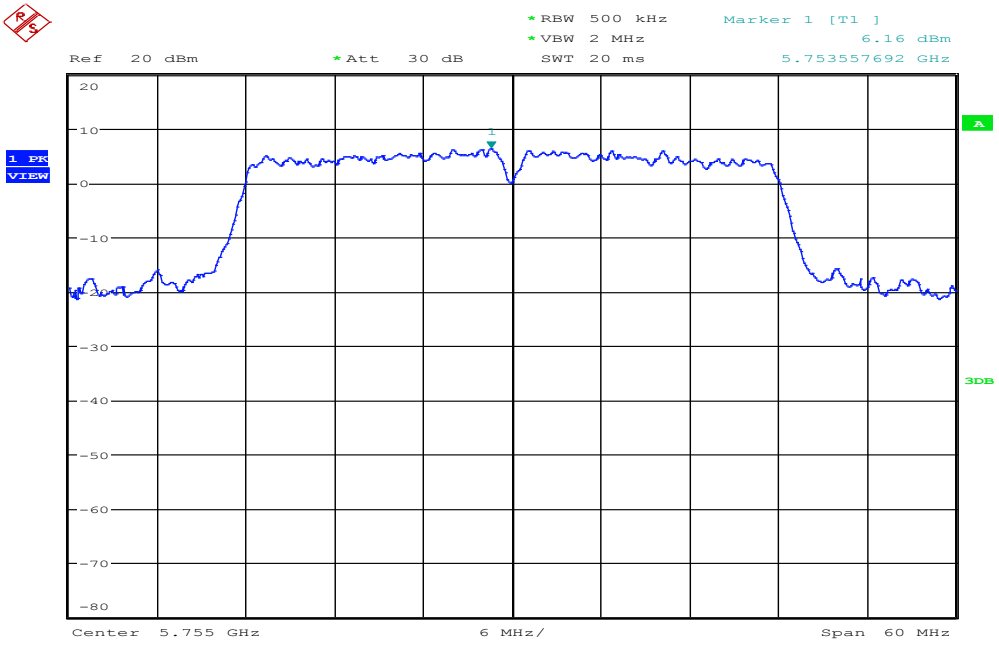
CH High



Date: 12.NOV.2015 02:28:59

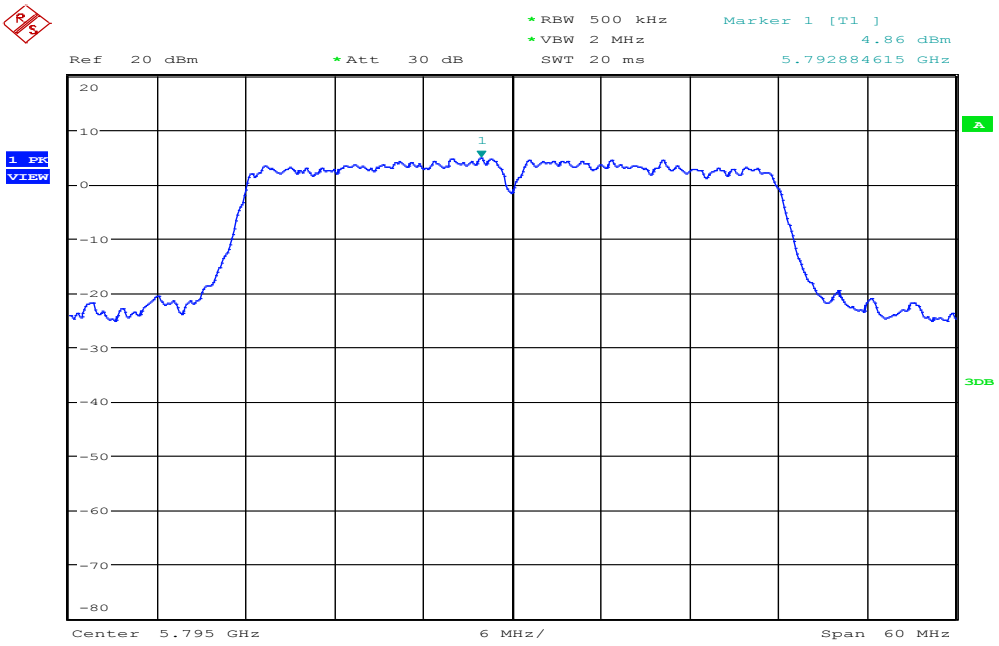
IEEE 802.11n HT 40 mode / 5755 ~ 5795MHz / Chain 1

CH Low



Date: 12.NOV.2015 02:31:12

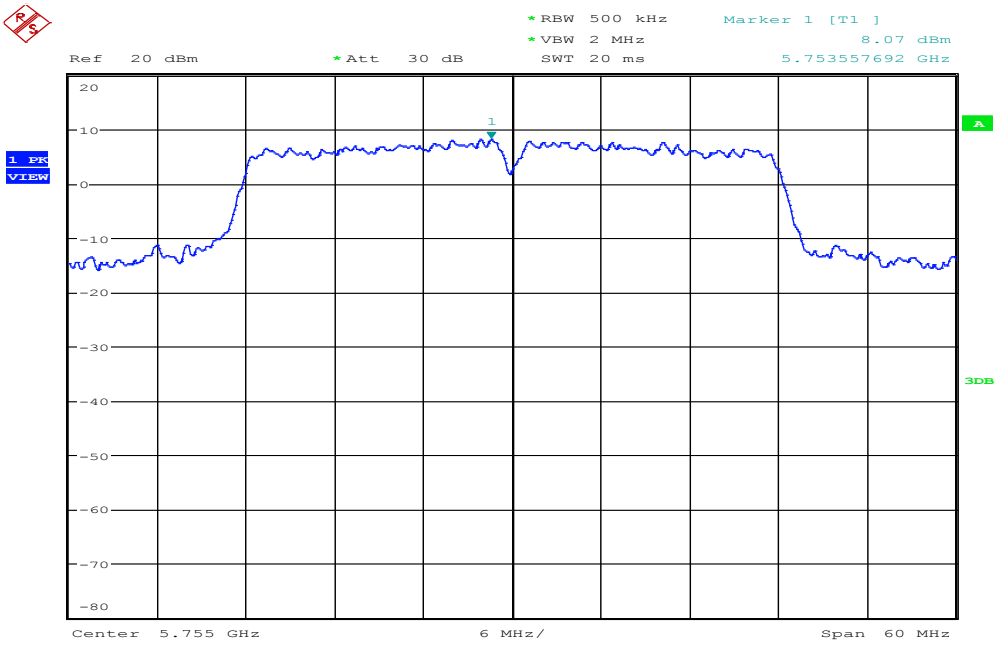
CH High



Date: 12.NOV.2015 02:30:09

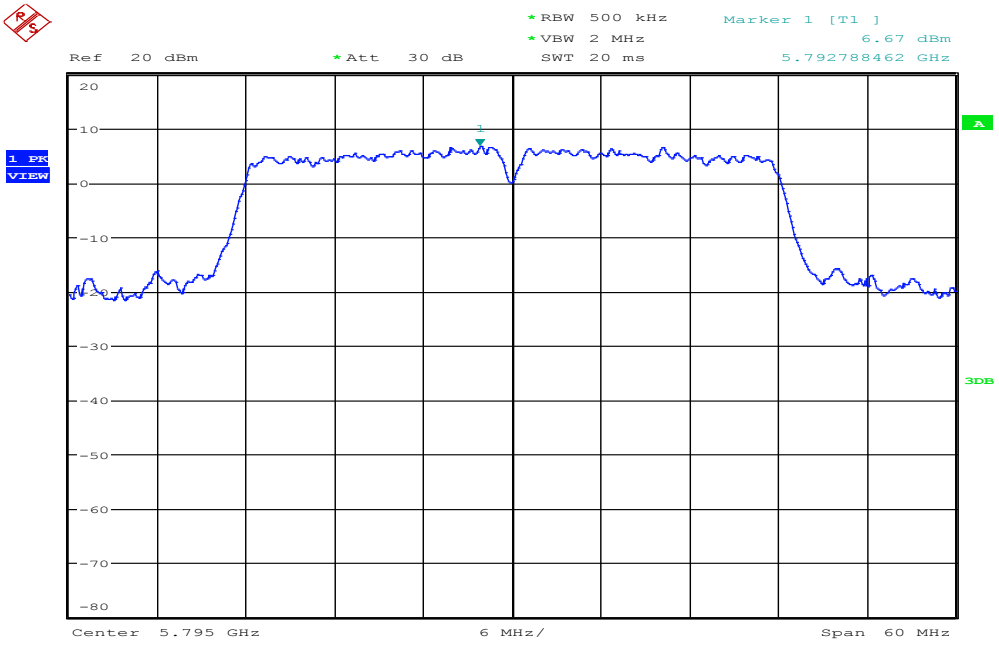
IEEE 802.11ac VHT 40 mode / 5755 ~ 5795MHz / Chain 0

CH Low



Date: 12.NOV.2015 02:24:58

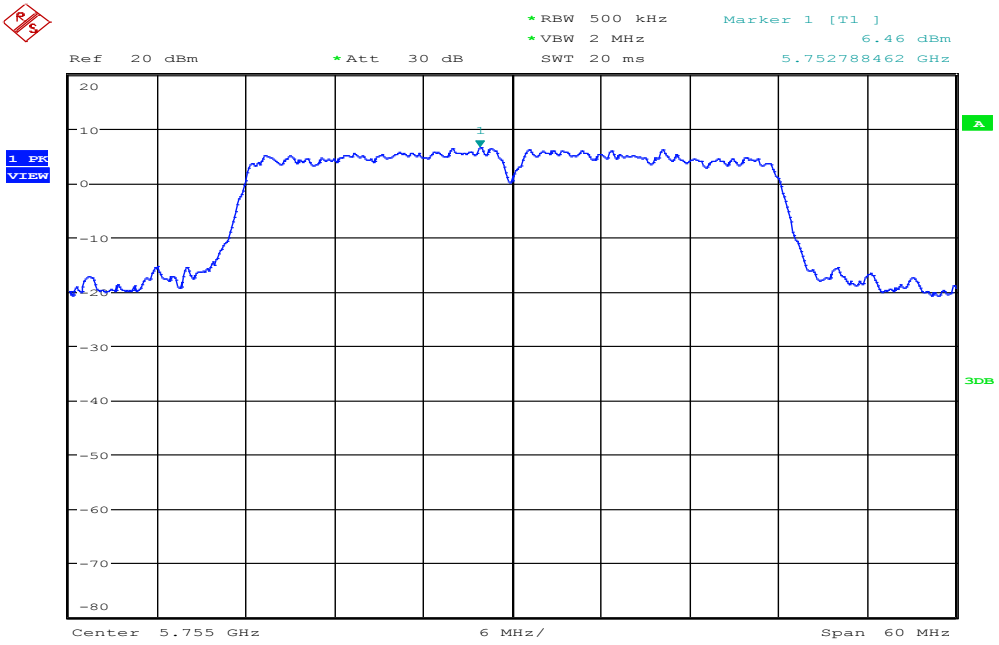
CH High



Date: 12.NOV.2015 02:28:10

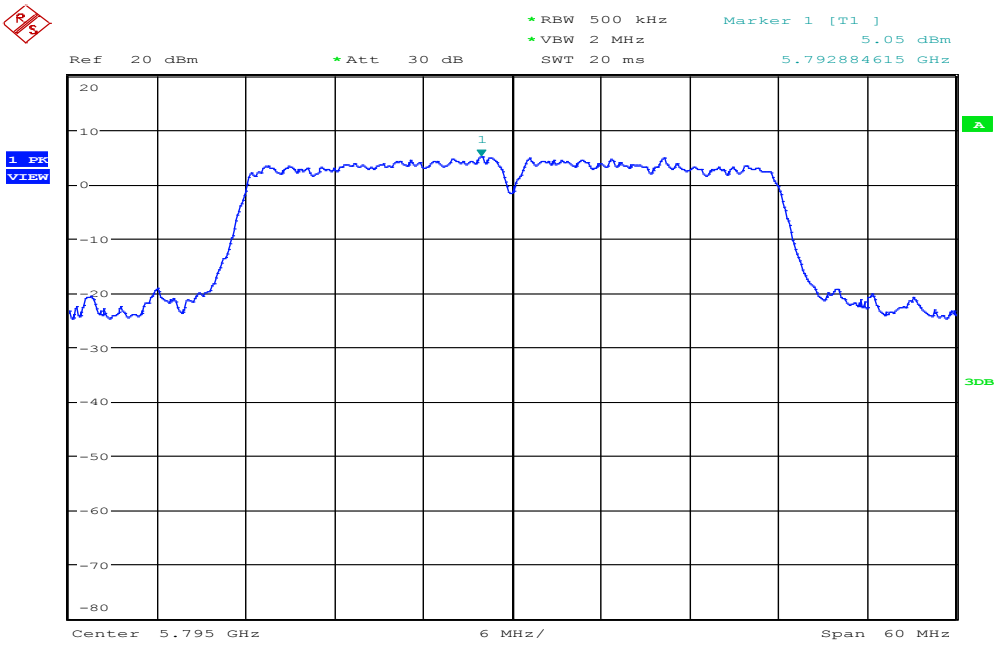
IEEE 802.11ac VHT 40 mode / 5755 ~ 5795MHz / Chain 1

CH Low



Date: 12.NOV.2015 02:26:04

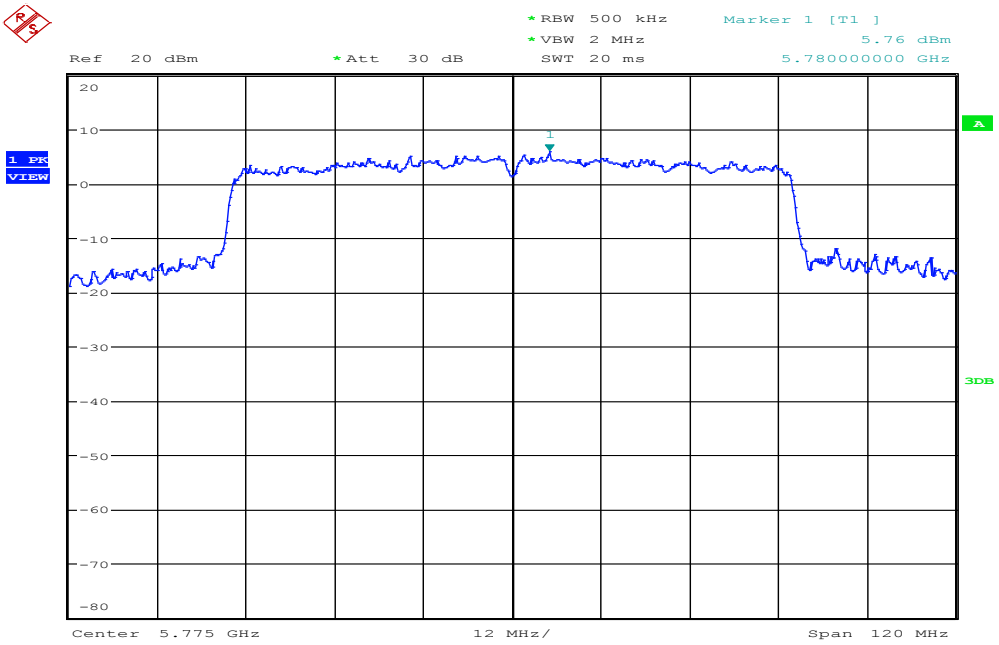
CH High



Date: 12.NOV.2015 02:27:24

IEEE 802.11ac VHT80 Mode / 5775MHz / Chain 0

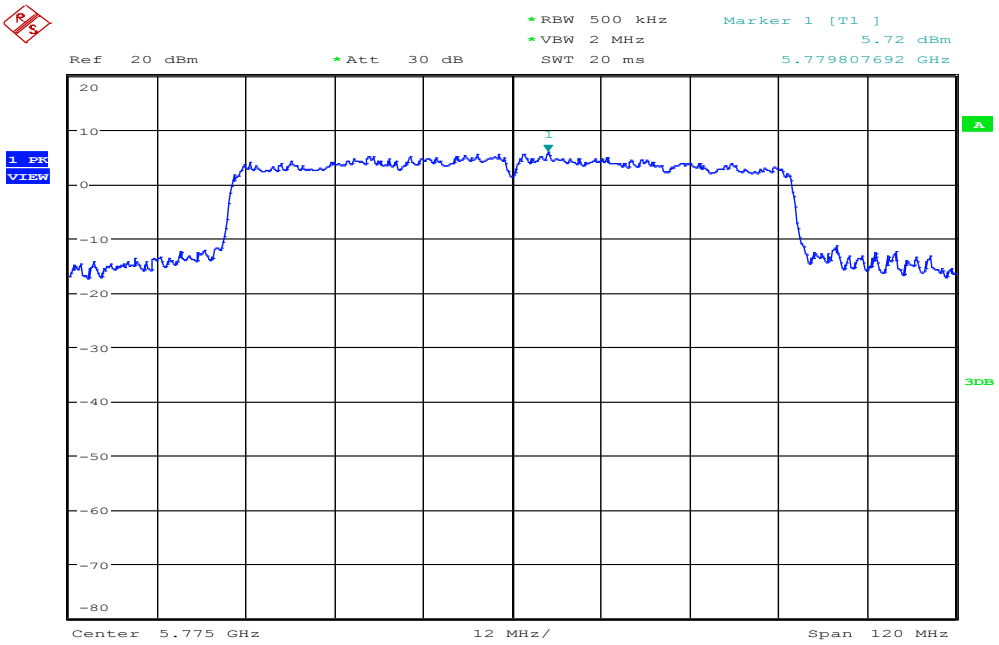
CH Mid



Date: 12.NOV.2015 01:11:58

IEEE 802.11ac VHT80 Mode / 5775MHz / Chain 1

CH Mid



Date: 12.NOV.2015 01:10:39

7.5 RADIATED UNDESIRABLE EMISSION

1. According to §15.209(a), except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (μV/m)	Measurement Distance (m)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 – 30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

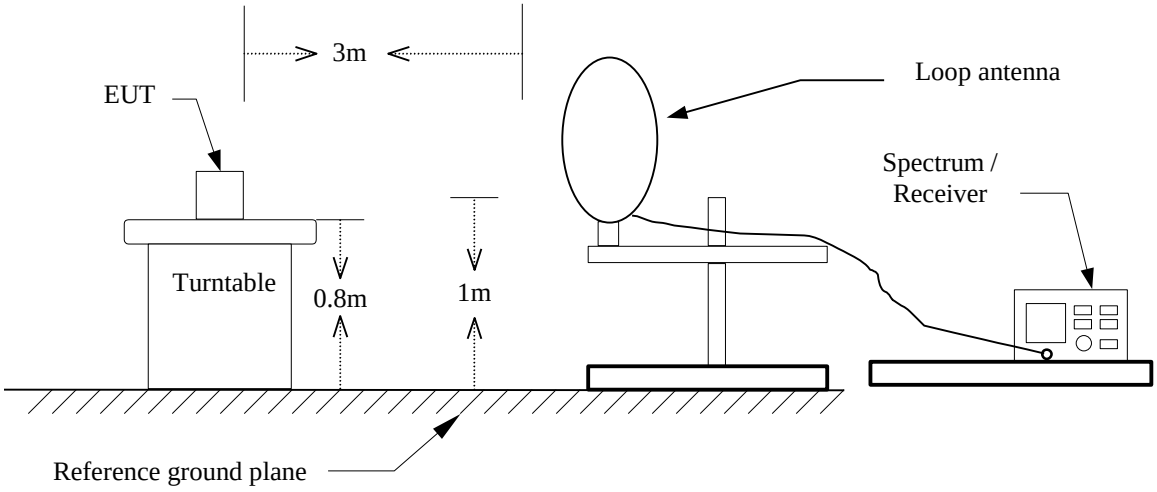
Remark: *Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.*

2. In the emission table above, the tighter limit applies at the band edges.

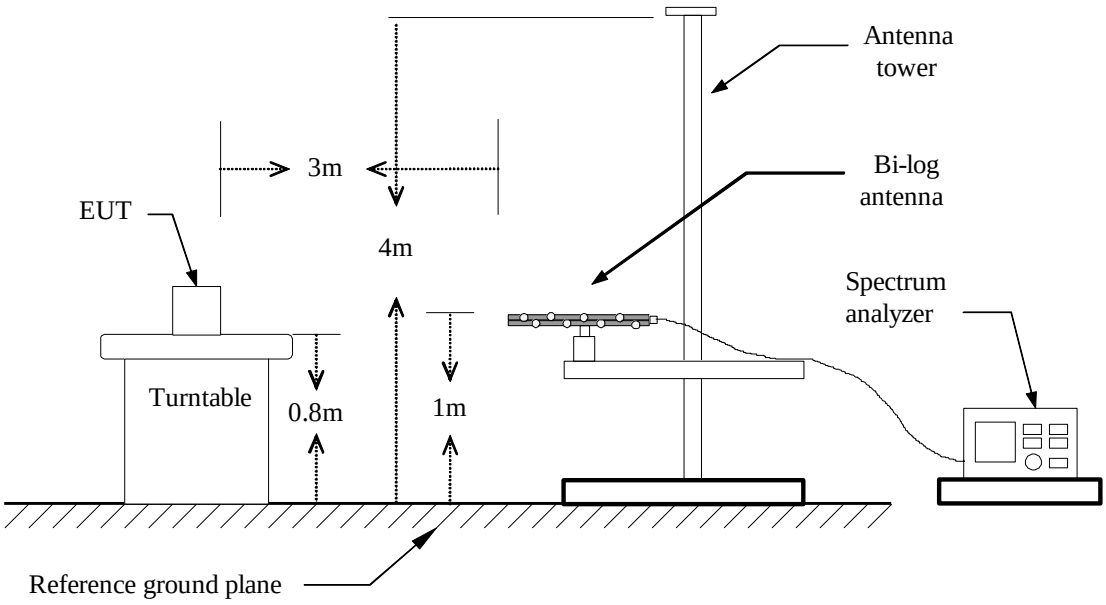
Frequency (MHz)	Field Strength (μV/m at 3-meter)	Field Strength (dBμV/m at 3-meter)
0.009 - 0.490	2400/F(kHz) +80	20LOG((2400/F(kHz))+80)
0.490 - 1.705	24000/F(kHz) +40	20LOG((24000/F(kHz))+40)
1.705 – 30.0	30	69.54
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

Test Configuration

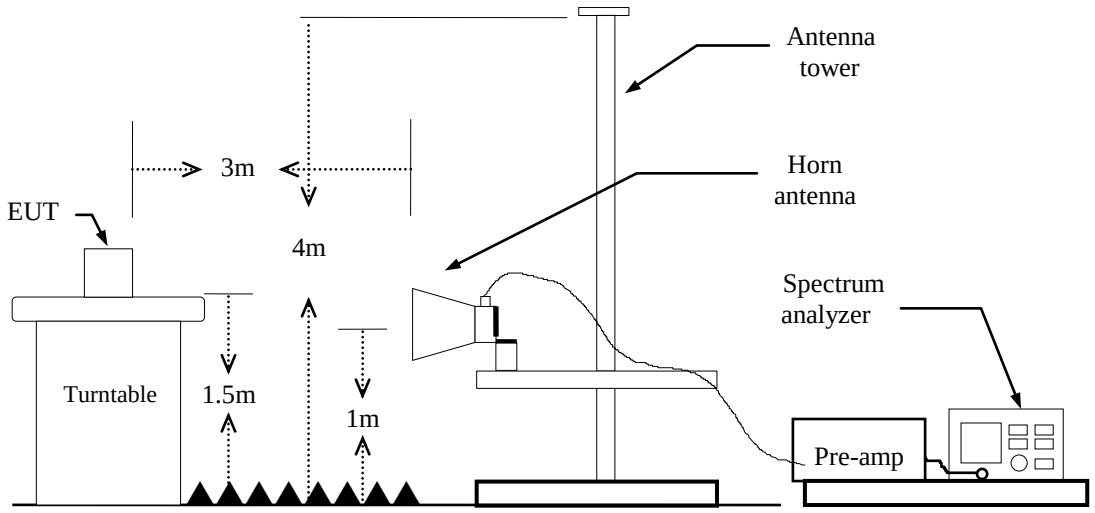
9kHz ~ 30MHz



30MHz ~ 1GHz



Above 1 GHz



TEST PROCEDURE

1. The EUT is placed on a turntable, Above 1 GHz is 1.5m high and below 1 GHz is 0.8m high above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Set the spectrum analyzer in the following setting as:

   Below 1GHz:

   RBW=100kHz / VBW=300kHz / Sweep=AUTO

   Above 1GHz:

   (a) PEAK: RBW=VBW=3MHz / Sweep=AUTO

   (b) AVERAGE: RBW=1MHz,
   if duty cycle ≧ 98%, VBW=10Hz.
   if duty cycle<98% VBW=1/T.
   IEEE 802.11a mode: =88%, VBW=750Hz
   IEEE 802.11n HT 20 mode: =78%, VBW=1.5KHz
   IEEE 802.11n HT 40 mode: =64%, VBW=3KHz
   IEEE 802.11ac VHT80 Mode: =27%=VBW 15KHz
7. Repeat above procedures until the measurements for all frequencies are complete.

TEST RESULTS

Below 1 GHz

Operation Mode: Normal Link **Test Date:** October 17, 2015

Temperature: 27°C **Tested by:** Jason Lu

Humidity: 53% RH **Polarity:** Ver. / Hor.

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit 3m (dBuV/m)	Margin (dB)	Detector Mode (PK/QP)	Ant.Pol. (H/V)
39.7000	51.32	-15.12	36.20	40.00	-3.80	peak	V
59.1000	55.09	-22.02	33.07	40.00	-6.93	QP	V
375.3200	42.98	-12.29	30.69	46.00	-15.31	peak	V
482.9900	41.68	-9.56	32.12	46.00	-13.88	peak	V
624.6100	41.54	-7.17	34.37	46.00	-11.63	peak	V
749.7400	39.57	-4.93	34.64	46.00	-11.36	peak	V
59.1000	57.81	-22.02	35.79	40.00	-4.21	peak	H
192.9600	46.95	-16.18	30.77	43.50	-12.73	peak	H
375.3200	41.69	-12.29	29.40	46.00	-16.60	peak	H
624.6100	38.61	-7.17	31.44	46.00	-14.56	peak	H
749.7400	41.95	-4.93	37.02	46.00	-8.98	peak	H
918.5200	36.34	-2.90	33.44	46.00	-12.56	peak	H

Remark:

1. *Measuring frequencies from 30 MHz to the 1GHz.*
2. *Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using peak/quasi-peak detector mode.*
3. *Quasi-peak test would be performed if the peak result were greater than the quasi-peak limit or as required by the applicant.*
4. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
5. *Margin (dB) = Remark result (dBuV/m) – Quasi-peak limit (dBuV/m).*

Above 1 GHz

Operation Mode: Tx / IEEE 802.11a mode / 5180 ~ 5240MHz / CH Low

Test Date: November 8, 2015

Temperature: 27°C

Tested by: Jason Lu

Humidity: 53% RH

Polarity: Ver. / Hor.

Frequency (MHz)	Reading (dBuV)	Correction (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Pol. (H/V)
3443.000	51.32	-1.05	50.27	74.00	-23.73	peak	V
10360.000	37.18	16.52	53.70	74.00	-20.30	peak	V
10360.000	27.78	16.52	44.30	54.00	-9.70	AVG	V
N/A							
3212.000	52.50	-1.60	50.90	74.00	-23.10	peak	H
N/A							

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

Operation Mode:	Tx / IEEE 802.11a mode / 5180 ~ 5240MHz / CH Mid	**Test Date:**	November 8, 2015
Temperature:	27°C	**Tested by:**	Jason Lu
Humidity:	53% RH	**Polarity:**	Ver. / Hor.

Frequency (MHz)	Reading (dBuV)	Correction (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Pol. (H/V)
3660.000	50.48	-0.23	50.25	74.00	-23.75	peak	V
10440.000	38.55	16.89	55.44	74.00	-18.56	peak	V
10440.000	31.65	16.89	48.54	54.00	-5.46	AVG	V
15670.000	40.31	19.15	59.46	74.00	-14.54	peak	V
15670.000	28.95	19.15	48.10	54.00	-5.90	AVG	V
N/A							
3261.000	51.69	-1.48	50.21	74.00	-23.79	peak	H
N/A							

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

Operation Mode:	Tx / IEEE 802.11a mode / 5180 ~ 5240MHz / CH High	**Test Date:**	November 8, 2015
Temperature:	27°C	**Tested by:**	Jason Lu
Humidity:	53% RH	**Polarity:**	Ver. / Hor.

Frequency (MHz)	Reading (dBuV)	Correction (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Pol. (H/V)
2554.000	54.11	-3.01	51.10	74.00	-22.90	peak	V
10480.000	38.55	17.07	55.62	74.00	-18.38	peak	V
10480.000	29.16	17.07	46.23	54.00	-7.77	AVG	V
15720.000	39.34	19.19	58.53	74.00	-15.47	peak	V
15720.000	27.91	19.19	47.10	54.00	-6.90	AVG	V
N/A							
2561.000	54.81	-3.00	51.81	74.00	-22.19	peak	H
N/A							

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

Operation Mode:	Tx / IEEE 802.11n HT 20 mode / 5180 ~ 5240MHz / CH Low	**Test Date:**	November 8, 2015
Temperature:	27°C	**Tested by:**	Jason Lu
Humidity:	53% RH	**Polarity:**	Ver. / Hor.

Frequency (MHz)	Reading (dBuV)	Correction (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Pol. (H/V)
2645.000	53.80	-2.83	50.97	74.00	-23.03	peak	V
10360.000	37.91	16.52	54.43	74.00	-19.57	peak	V
10360.000	30.92	16.52	47.44	54.00	-6.56	AVG	V
N/A							
2869.000	54.10	-2.37	51.73	74.00	-22.27	peak	H
N/A							

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

Operation Mode:	Tx / IEEE 802.11n HT 20 mode / 5180 ~ 5240MHz / CH Mid	**Test Date:**	November 8, 2015
Temperature:	27°C	**Tested by:**	Jason Lu
Humidity:	53% RH	**Polarity:**	Ver. / Hor.

Frequency (MHz)	Reading (dBuV)	Correction (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Pol. (H/V)
2617.000	54.78	-2.88	51.90	74.00	-22.10	peak	V
10440.000	34.29	16.89	51.18	74.00	-22.82	peak	V
15660.000	37.21	19.14	56.35	74.00	-17.65	peak	V
15660.000	26.68	19.14	45.82	54.00	-8.18	AVG	V
N/A							
2666.000	53.83	-2.78	51.05	74.00	-22.95	peak	H
N/A							

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

Operation Mode:	Tx / IEEE 802.11n HT 20 mode / 5180 ~ 5240MHz / CH High	**Test Date:**	November 8, 2015
Temperature:	27°C	**Tested by:**	Jason Lu
Humidity:	53% RH	**Polarity:**	Ver. / Hor.

Frequency (MHz)	Reading (dBuV)	Correction (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Pol. (H/V)
2841.000	53.83	-2.43	51.40	74.00	-22.60	peak	V
10480.000	34.18	17.07	51.25	74.00	-22.75	peak	V
15720.000	37.13	19.19	56.32	74.00	-17.68	peak	V
15720.000	29.05	19.19	48.24	54.00	-5.76	AVG	V
N/A							
2505.000	54.26	-3.11	51.15	74.00	-22.85	peak	H
N/A							

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

Operation Mode:	Tx / IEEE 802.11n HT 40 mode / 5190 ~ 5230MHz / CH Low	**Test Date:**	November 8, 2015
Temperature:	27°C	**Tested by:**	Jason Lu
Humidity:	53% RH	**Polarity:**	Ver. / Hor.

Frequency (MHz)	Reading (dBuV)	Correction (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Pol. (H/V)
2736.000	54.72	-2.64	52.08	74.00	-21.92	peak	V
N/A							
2680.000	54.35	-2.76	51.59	74.00	-22.41	peak	H
N/A							

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

Operation Mode:	Tx / IEEE 802.11n HT 40 mode / 5190 ~ 5230MHz / CH High	**Test Date:**	November 8, 2015
Temperature:	27°C	**Tested by:**	Jason Lu
Humidity:	53% RH	**Polarity:**	Ver. / Hor.

Frequency (MHz)	Reading (dBuV)	Correction (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Pol. (H/V)
2764.000	53.66	-2.59	51.07	74.00	-22.93	peak	V
10460.000	36.13	16.98	53.11	74.00	-20.89	peak	V
10460.000	26.57	16.98	43.55	54.00	-10.45	AVG	V
N/A							
2631.000	54.07	-2.86	51.21	74.00	-22.79	peak	H
N/A							

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

Operation Mode:	Tx / IEEE 802.11ac VHT80 Mode / 5210MHz / CH Mid	**Test Date:**	November 8, 2015
Temperature:	27°C	**Tested by:**	Jason Lu
Humidity:	53% RH	**Polarity:**	Ver. / Hor.

Frequency (MHz)	Reading (dBuV)	Correction (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Pol. (H/V)
2722.000	53.82	-2.67	51.15	74.00	-22.85	peak	V
N/A							
2925.000	54.10	-2.26	51.84	74.00	-22.16	peak	H
N/A							

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

Operation Mode:	Tx / IEEE 802.11a mode / 5745 ~ 5825MHz / CH Low	**Test Date:**	November 8, 2015
Temperature:	27°C	**Tested by:**	Jason Lu
Humidity:	53% RH	**Polarity:**	Ver. / Hor.

Frequency (MHz)	Reading (dBuV)	Correction (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Pol. (H/V)
2687.000	54.41	-2.74	51.67	74.00	-22.33	peak	V
N/A							
2638.000	54.29	-2.84	51.45	74.00	-22.55	peak	H
N/A							

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

Operation Mode:	Tx / IEEE 802.11a mode / 5745 ~ 5825MHz / CH Mid	**Test Date:**	November 8, 2015
Temperature:	27°C	**Tested by:**	Jason Lu
Humidity:	53% RH	**Polarity:**	Ver. / Hor.

Frequency (MHz)	Reading (dBuV)	Correction (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Pol. (H/V)
2701.000	54.23	-2.71	51.52	74.00	-22.48	peak	V
N/A							
2512.000	55.30	-3.10	52.20	74.00	-21.80	peak	H
N/A							

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

Operation Mode:	Tx / IEEE 802.11a mode / 5745 ~ 5825MHz / CH High	**Test Date:**	November 8, 2015
Temperature:	27°C	**Tested by:**	Jason Lu
Humidity:	53% RH	**Polarity:**	Ver. / Hor.

Frequency (MHz)	Reading (dBuV)	Correction (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Pol. (H/V)
2624.000	54.19	-2.87	51.32	74.00	-22.68	peak	V
N/A							
2687.000	54.12	-2.74	51.38	74.00	-22.62	peak	H
N/A							

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

Operation Mode:	Tx / IEEE 802.11n HT 20 mode / 5745 ~ 5825MHz / CH Low	**Test Date:**	November 8, 2015
Temperature:	27°C	**Tested by:**	Jason Lu
Humidity:	53% RH	**Polarity:**	Ver. / Hor.

Frequency (MHz)	Reading (dBuV)	Correction (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Pol. (H/V)
2561.000	54.73	-3.00	51.73	74.00	-22.27	peak	V
N/A							
2582.000	53.83	-2.95	50.88	74.00	-23.12	peak	H
N/A							

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

Operation Mode:	Tx / IEEE 802.11n HT 20 mode / 5745 ~ 5825MHz / CH Mid	**Test Date:**	November 8, 2015
Temperature:	27°C	**Tested by:**	Jason Lu
Humidity:	53% RH	**Polarity:**	Ver. / Hor.

Frequency (MHz)	Reading (dBuV)	Correction (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Pol. (H/V)
2932.000	54.12	-2.25	51.87	74.00	-22.13	peak	V
N/A							
2743.000	53.90	-2.63	51.27	74.00	-22.73	peak	H
N/A							

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

Operation Mode:	Tx / IEEE 802.11n HT 20 mode / 5745 ~ 5825MHz / CH High	**Test Date:**	November 8, 2015
Temperature:	27°C	**Tested by:**	Jason Lu
Humidity:	53% RH	**Polarity:**	Ver. / Hor.

Frequency (MHz)	Reading (dBuV)	Correction (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Pol. (H/V)
2575.000	54.63	-2.97	51.66	74.00	-22.34	peak	V
N/A							
2512.000	54.27	-3.10	51.17	74.00	-22.83	peak	H
N/A							

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

Operation Mode:	Tx / IEEE 802.11n HT 40 mode / 5755 ~ 5795MHz / CH Low	**Test Date:**	November 8, 2015
Temperature:	27°C	**Tested by:**	Jason Lu
Humidity:	53% RH	**Polarity:**	Ver. / Hor.

Frequency (MHz)	Reading (dBuV)	Correction (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Pol. (H/V)
2666.000	54.57	-2.78	51.79	74.00	-22.21	peak	V
N/A							
2624.000	54.16	-2.87	51.29	74.00	-22.71	peak	H
N/A							

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

Operation Mode:	Tx / IEEE 802.11n HT 40 mode / 5755 ~ 5795MHz / CH High	**Test Date:**	November 8, 2015
Temperature:	27°C	**Tested by:**	Jason Lu
Humidity:	53% RH	**Polarity:**	Ver. / Hor.

Frequency (MHz)	Reading (dBuV)	Correction (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Pol. (H/V)
2526.000	55.12	-3.07	52.05	74.00	-21.95	peak	V
N/A							
2547.000	54.68	-3.03	51.65	74.00	-22.35	peak	H
N/A							

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

Operation Mode:	Tx / IEEE 802.11ac VHT80 Mode / 5775MHz / CH Mid	**Test Date:**	November 8, 2015
Temperature:	27°C	**Tested by:**	Jason Lu
Humidity:	53% RH	**Polarity:**	Ver. / Hor.

Frequency (MHz)	Reading (dBuV)	Correction (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Pol. (H/V)
2631.000	54.10	-2.86	51.24	74.00	-22.76	peak	V
N/A							
2722.000	54.36	-2.67	51.69	74.00	-22.31	peak	H
N/A							

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit or as required by the applicant.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

7.6 POWERLINE CONDUCTED EMISSIONS

LIMIT

According to §15.207(a), except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 µH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency Range (MHz)	Limits (dBµV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56*	56 to 46*
0.50 to 5	56	46
5 to 30	60	50

** Decreases with the logarithm of the frequency.*

TEST CONFIGURATION

See test photographs attached in Appendix 1 for the actual connections between EUT and support equipment.

TEST PROCEDURE

1. The EUT was placed on a table, which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured were complete.

TEST RESULTS

The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range. Significant peaks are then marked as shown on the following data page, and these signals are then quasi-peaked.

Test Data

Operation Mode:	Normal Link	**Test Date:**	November 13, 2015
Temperature:	25.4°C	***Tested by:***	Rick Wu
Humidity:	44% RH		

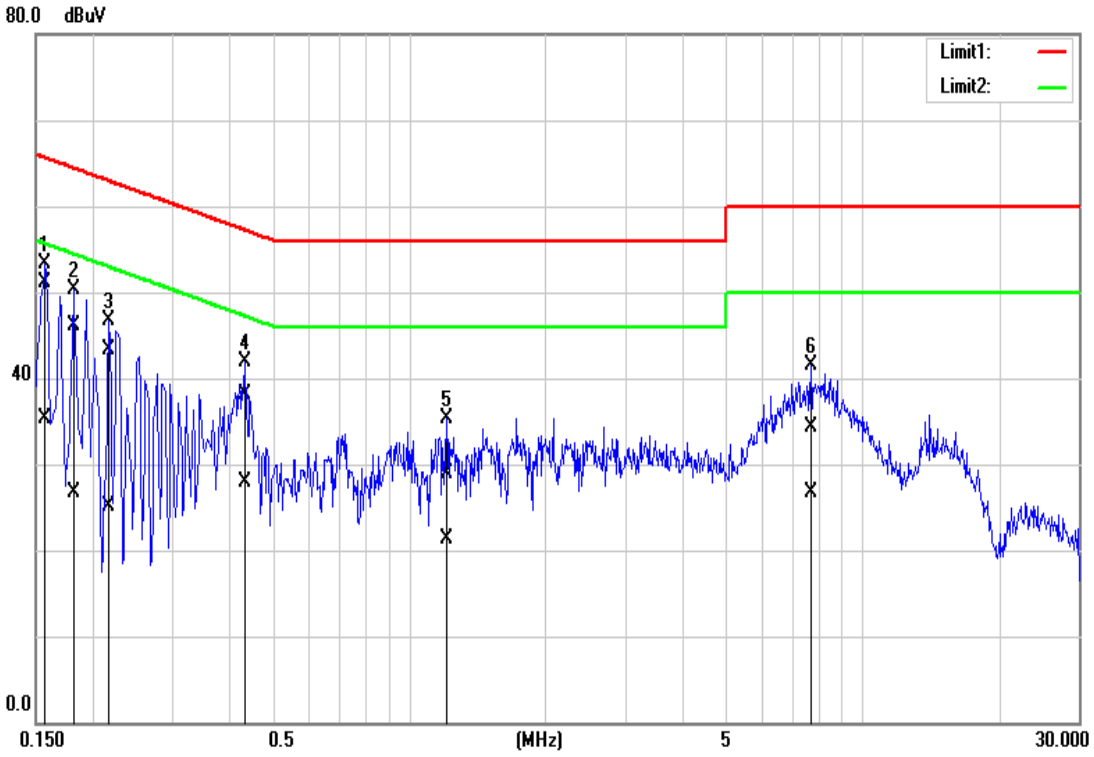
Freq. (MHz)	QP Reading (dBuV)	AV Reading (dBuV)	Corr. factor (dB/m)	QP Result (dBuV/m)	AV Result (dBuV/m)	QP Limit (dBuV)	AV Limit (dBuV)	QP Margin (dB)	AV Margin (dB)	Note
0.1580	41.44	25.71	9.69	51.13	35.40	65.56	55.57	-14.43	-20.17	L1
0.1819	36.43	16.93	9.68	46.11	26.61	64.39	54.40	-18.28	-27.79	L1
0.2180	33.69	15.42	9.68	43.37	25.10	62.89	52.89	-19.52	-27.79	L1
0.4340	28.45	18.22	9.74	38.19	27.96	57.18	47.18	-18.99	-19.22	L1
1.2100	18.62	11.00	10.36	28.98	21.36	56.00	46.00	-27.02	-24.64	L1
7.7060	24.50	16.73	9.89	34.39	26.62	60.00	50.00	-25.61	-23.38	L1
0.1580	41.10	25.00	9.64	50.74	34.64	65.57	55.57	-14.83	-20.93	L2
0.1900	37.61	22.81	9.64	47.25	32.45	64.04	54.04	-16.79	-21.59	L2
0.2180	33.80	16.95	9.64	43.44	26.59	62.89	52.89	-19.45	-26.30	L2
0.4220	23.49	11.60	9.68	33.17	21.28	57.41	47.41	-24.24	-26.13	L2
0.9540	17.25	11.75	10.42	27.67	22.17	56.00	46.00	-28.33	-23.83	L2
7.8220	20.62	14.23	9.86	30.48	24.09	60.00	50.00	-29.52	-25.91	L2

Remark:

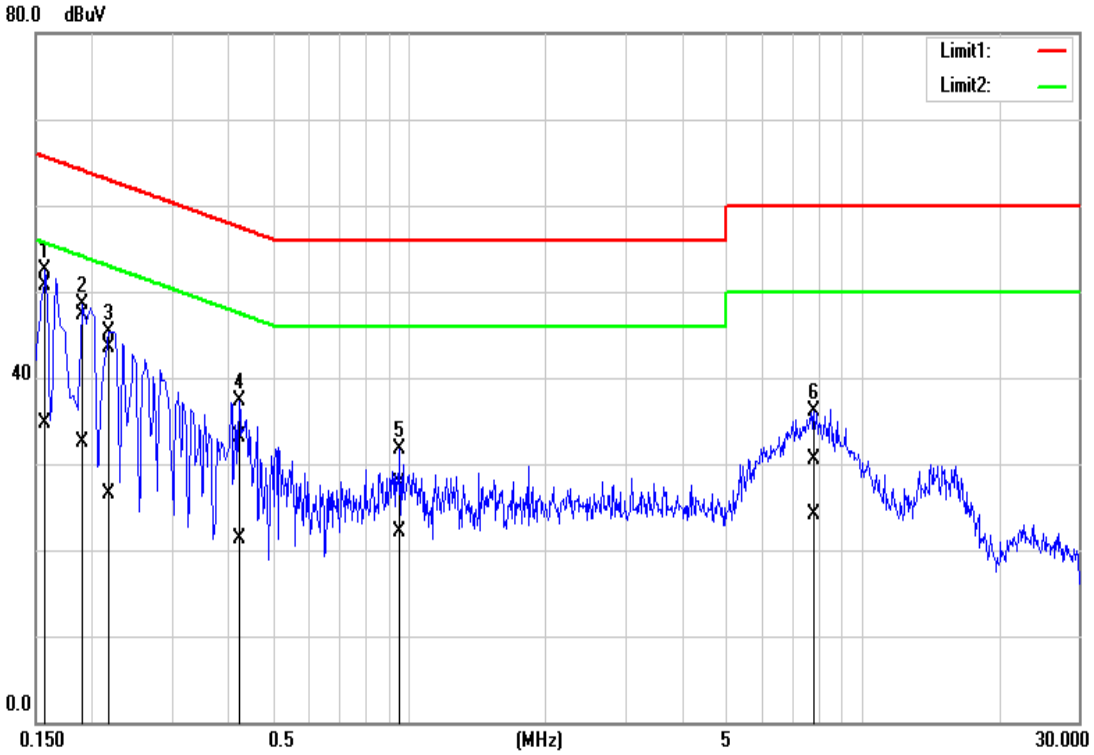
1. *Measuring frequencies from 0.15 MHz to 30MHz.*
2. *The emissions measured in frequency range from 0.15 MHz to 30MHz were made with an instrument using Quasi-peak detector and average detector.*
3. *The IF bandwidth of SPA between 0.15MHz to 30MHz was 10kHz; the IF bandwidth of Test Receiver between 0.15MHz to 30MHz was 9kHz;*
4. *L1 = Line One (Live Line) / L2 = Line Two (Neutral Line)*

Test Plots

Conducted emissions (Line 1)



Conducted emissions (Line 2)

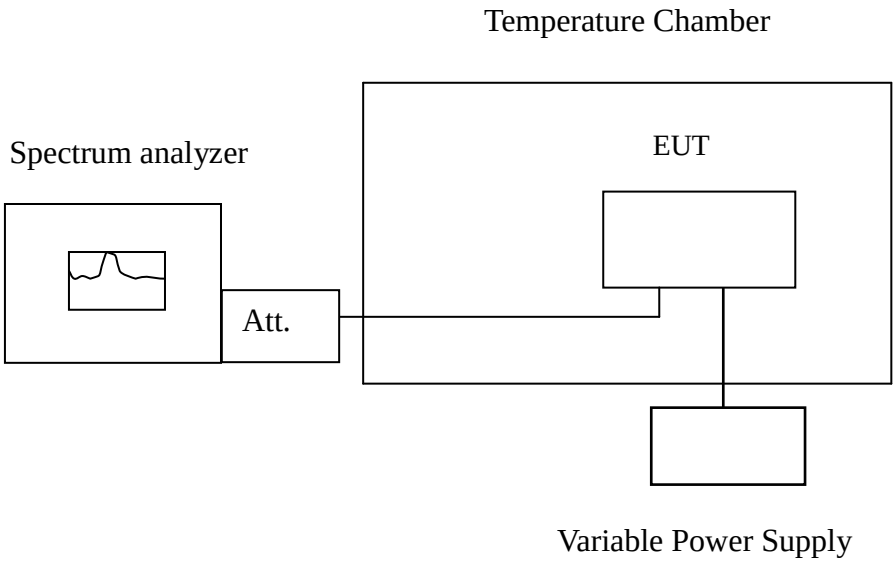


7.7 FREQUENCY STABILITY

LIMIT

According to §15.407(g), manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

Test Configuration



Remark: *Measurement setup for testing on Antenna connector*

TEST PROCEDURE

The equipment under test was connected to an external AC or DC power supply and input rated voltage. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators. The EUT was placed inside the temperature chamber. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 20°C operating frequency as reference frequency. Turn EUT off and set the chamber temperature to –20°C. After the temperature stabilized for approximately 30 minutes recorded the frequency. Repeat step measure with 10°C increased per stage until the highest temperature of +50°C reached.

TEST RESULTS

No non-compliance noted.

Operating Frequency: 5220 MHz					
Environment Temperature (°C)	**Voltage (V)**	**Measured Frequency (MHz)**	**Delta Frequency (kHz)**	**20 ppm Limit (+/- kHz)**	**Margin (kHz)**
50	120	5179.992489	-78.37	104.40	-26.03
40	120	5180.003508	-78.15	104.40	-26.25
30	120	5180.007950	-60.90	104.40	-43.50
20	120	5179.999686	-51.92	104.40	-52.48
10	120	5180.002704	-31.56	104.40	-72.84
0	120	5180.002225	-3.85	104.40	-100.55
-10	120	5179.993573	32.65	104.40	-71.75
-20	120	5180.006847	41.83	104.40	-62.57

Operating Frequency: 5220 MHz					
Environment Temperature (°C)	**Voltage (V)**	**Measured Frequency (MHz)**	**Delta Frequency (kHz)**	**20 ppm Limit (+/- kHz)**	**Margin (kHz)**
20	102	5179.999914	-79.33	104.40	-25.07
	120	5180.008567	-51.92	104.40	-52.48
	138	5180.000384	-79.33	104.40	-25.07