FCC 47 CFR PART 15 SUBPART E
(Class II Permissive Change)

TEST REPORT

For

Wireless-N Selectable-Band Access Point with PoE

Model: WAP321

Trade Name: Cisco

Issued to

Sercomm Corporation
8F, No. 3-1, YuanQu St., NanKang, Taipei 115, Taiwan, R.O.C.

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: July 23, 2015

Testing Laboratory
1309

Revision History

Rev.		Issue Date		Revisions	Effect Page	Revised By
00		July 23, 2015		Initial Issue	ALL	Doris Chu

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1. TEST RESULT CERTIFICATION

Applicant: Sercomm Corporation
8F, No. 3-1, YuanQu St., NanKang, Taipei 115, Taiwan, R.O.C.

Equipment Under Test: Wireless-N Selectable-Band Access Point with PoE

Trade Name: Cisco

Model: WAP321

Date of Test: July 12, 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>Wireless-N Selectable-Band Access Point with PoE</td></tr>
<tr><td>Trade Name</td><td>Cisco</td></tr>
<tr><td>Model Number</td><td>WAP321</td></tr>
<tr><td>Model Discrepancy</td><td>N/A</td></tr>
<tr><td>Received Date</td><td>June 22, 2015</td></tr>
<tr><td>Power Supply</td><td>1. Sunny/ SYS1381-121-W2C
I/P: 100-240V~, 0.5A MAX, 50-60Hz
O/P: 12V, 1.0A
2. LEADER / MU12-G120100-A2
I/P: 100-240V~, 50-60Hz, 0.5A
O/P: 12V, 1A
3. Sunny/ SYS1381-1212-W2
I/P: 100-240V~, 0.5A MAX, 50-60Hz
O/P: 12V, 1.0A
4. LEADER / MU12-G120100-A1
I/P: 100-240V~, 50-60Hz, 0.5A
O/P: 12V, 1A</td></tr>
<tr><td>Operating Frequency Range & Number of Channels</td><td>
<table>
<tr><th></th><th>Mode</th><th>Frequency Range (MHz)</th><th>Number of Channels</th></tr>
<tr><td rowspan="3">UNII Band IV</td><td>IEEE 802.11a</td><td>5745 ~ 5825</td><td>5 Channels</td></tr>
<tr><td>IEEE 802.11n HT 20 mode</td><td>5745 ~ 5825</td><td>5 Channels</td></tr>
<tr><td>IEEE 802.11n HT 40 mode</td><td>5755 ~ 5795</td><td>2 Channels</td></tr>
</table>
</td></tr>
<tr><td>Transmit Power</td><td>IEEE 802.11a mode: 14.83 dBm
Mode 1:
IEEE 802.11n HT 20 MHz Mode : 14.83 dBm
IEEE 802.11n HT 40 MHz Mode: 15.86 dBm
Mode 2:
IEEE 802.11n HT 20 MHz Mode : 15.89 dBm
IEEE 802.11n HT 40 MHz Mode: 14.87 dBm
Mode 3:
IEEE 802.11n HT 20 MHz Mode: 15.13 dBm
IEEE 802.11n HT 40 MHz Mode: 15.36 dBm</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 (6.50, 13.00, 19.50, 26.00, 39.00, 52.00, 58.50, 65.00, 78.00, 104.0, 117.0, 130.0, 156.0, 175.5, 195.0Mbps)
IEEE 802.11n HT 40 mode: OFDM (13.50, 27.00, 40.50, 54.00, 81.00, 108.0, 121.5, 135.0, 162.0, 216.0, 243.0, 270.0, 324.0, 364.5, 405.0Mbps)</td></tr>
<tr><td>Antenna Specification</td><td>Antenna 1 (chain 0): 4.32 dBi
Antenna 2 (chain 1): 4.67 dBi
Antenna 3 (chain 2): 3.96 dBi</td></tr>
<tr><td>Antenna Designation</td><td>PIFA Antenna</td></tr>
</table>

Remark:

1. *The sample selected for test was production product and was provided by manufacturer.*
2. *This submittal(s) (test report) is intended for FCC ID: **P27-WAP321** 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: 2009 Radiated testing was performed at an antenna to EUT distance 3 meters.

The tests documented in this report were performed in accordance with ANSI C63.10: 2009, FCC CFR 47 Part 15.207, 15.209, 15.407 and KDB 789033 D02 General UNII Test Procedures New Rules v01.

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 ANSI C63.10: 2009, 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 ANSI C63.10: 2009.

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: WAP321) comes with four types of power adapter (SYS1381-121-W2C, MU12-G120100-A2, SYS1381-1212-W2, MU12-G120100-A1) for sale. After the preliminary test, the EUT with power adapter (Model: MU12-G120100-A1) was found to emit the worst emissions and therefore had been tested under operating condition.

The EUT comes with three modes: mode 1 & mode 2 & mode 3.

"Mode 1" antenna 1 (chain 0), antenna 2 (chain 1)
"Mode 2" antenna 2 (chain 1), antenna 3 (chain 2)
"Mode 3" antenna 1 (chain 0), antenna 3 (chain 2)

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 Chain 1)(Chain 1 and Chain 2)(Chain 0 and Chain 2)

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

After verification, all tests carried out are with the worst-case test modes as shown below except radiated spurious emission below 1GHz and power line conducted emissions below 30MHz, which worst case was in normal link mode

Band IV

IEEE 802.11a mode / 5745 ~ 5825MHz

During the preliminary test, Chain 0, Chain 1,Chain 2 with IEEE 802.11a mode were pre-tested and found that Chain 1 emits the highest output power.

Channel Low (5745MHz), Channel Mid (5785MHz) and Channel High (5825MHz) with chain 1 at 6Mbps data rate were chosen for full testing.

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

During the preliminary test, MCS0 : Chain 0,Chain 1,Chain 2 and MCS8 : Chain 0+Chain 1,Chain 1 +Chain 2,Chain 0 + chain 2 with IEEE 802.11n HT 20 MHz were pre-tested and found that Chain 0+Chain 1,Chain 1 +Chain 2,Chain 0 + chain 2 emits the highest output power.
Channel Low(5745MHz), Channel Mid(5785MHz) and Channel High(5825MHz) with chain 0 + chain 1 and chain 1 + chain 2 and chain 0 + chain 2 at MCS 8 data rate were chosen for full testing.

IEEE 802.11n HT 40 mode / 5755 ~ 5795MHz

During the preliminary test, MCS0 : Chain 0,Chain 1,Chain 2 and MCS8 : Chain 0+Chain 1,Chain 1 +Chain 2,Chain 0 + chain 2 with IEEE 802.11n HT 40 MHz were pre-tested and found that Chain 0+Chain 1,Chain 1 +Chain 2,Chain 0 + chain 2 emits the highest output power.

Channel Low(5755MHz) and Channel High(5795MHz) with chain 0 + chain 1 and chain 1 + chain 2 and chain 0 + chain 2 at MCS 8 data rate were chosen for full testing.

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 (Y axis) and the worst case was recorded.

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	10/07/2015
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	09/18/2015
EMI Test Receiver	R&S	ESCI	100064	06/04/2016
Bilog Antenna	Sunol Sciences	JB3	A030105	08/19/2015
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 01265	4035	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**
TEST RECEIVER	R&S	ESCI	100234	06/09/2016
LISN (EUT)	FCC	FCC-LISN-50-32-2	08009	03/23/2016
LISN	SCHWARZBECK	NSLK 8127	8127382	12/30/2015
BNC CABLE	MIYAZAKI	5D-FB	BNC B3	08/04/2015
Pulse Limiter	R&S	ESH3-Z2	100374	01/05/2016
THERMO-HYGRO METER	WISEWIND	201A	1006	05/19/2016
Test S/W	CCS-3A1-CE			

4.3 MEASUREMENT UNCERTAINTY

PARAMETER	UNCERTAINTY
Powerline Conducted Emission	+/-1.1089
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.

Tel: 886-2-2217-0894 / Fax: 886-2-2217-1029

***Remark**: The powerline conducted emissions test items was tested at Compliance Certification Services Inc. (Sindian Lab.) The test equipments were listed in page 10 and the test data, please refer page 104-105.*

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

Tel: 886-2-2299-9720 / Fax: 886-2-2298-4045

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

Tel: 886-3-324-0332 / Fax: 886-3-324-5235

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.10: 2009 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, ridged waveguide, horn and/or Loop. 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-247, 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	Model No.	Serial No.	FCC ID	Brand Name	Data Cable	Power Cord
1	USB Mouse	M-UAE96	F93A90A5BU90L20	FCC DOC	HP	Shielded, 1.8m	N/A
2	USB Keyboard	KU-0316	BC3870FVBWH079	FCC DOC	HP	Shielded, 1.8m	N/A
3	Printer	Deskjet D2360	TH73C1492F	FCC DOC	HP	Shielded, 1.8m	Unshielded, 1.8m
4	Monitor	933SN+	CM19HVKSB00002	FCC DOC	SAMSUNG	Shielded, 1.8m with two cores	Unshielded, 1.8m
5	Host PC	T3500	8X36VBX	FCC DOC	DELL	Unshielded, 1.5m	Unshielded, 1.8m
6	Modem	AL-56ERM	0MERM04A0224	FCC DOC	GALILEO	Shielded, 1.0m	Unshielded, 1.8m
7	Server PC	xw4400	N/A	FCC DOC	HP	N/A	Unshielded, 1.8m
8.	Notebook PC	dv6-1332TX	CNF9491GM9	PD9112BNHU	HP	N/A	AC I/P: Unshielded, 1.8m DC O/P: Unshielded, 1.8m with a core

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.*

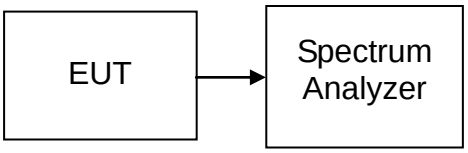
7. FCC PART 15 REQUIREMENTS

7.1 6DB BANDWIDTH

LIMIT

According to §15.407, systems using digital modulation techniques may operate in the 5725 - 5850 MHz bands. The minimum 6dB bandwidth shall be at least 500 kHz.

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 = VBW = 100kHz, Span = 50MHz, Sweep = auto.
4. Mark the peak frequency and –6dB (upper and lower) frequency.
5. Repeat until all the rest channels are investigated.

TEST RESULTS

No non-compliance noted

Test Data

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

Channel	Frequency (MHz)	6db Bandwidth (MHz)
Low	5745	16.578
Mid	5785	16.466
High	5825	16.676

Mode 1

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

Channel	Frequency (MHz)	6db Bandwidth (MHz)
Low	5745	17.776
Mid	5785	17.706
High	5825	17.769

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

Channel	Frequency (MHz)	6db Bandwidth (MHz)
Low	5745	17.888
Mid	5785	17.735
High	5825	17.785

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

Channel	Frequency (MHz)	6db Bandwidth (MHz)
Low	5755	36.276
High	5795	36.191

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

Channel	Frequency (MHz)	6db Bandwidth (MHz)
Low	5755	36.257
High	5795	36.213

Mode 2

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

Channel	Frequency (MHz)	6db Bandwidth (MHz)
Low	5745	17.738
Mid	5785	17.774
High	5825	17.823

Test mode: IEEE 802.11n HT 20 mode / 5745 ~ 5825MHz / / Chain 2

Channel	Frequency (MHz)	6db Bandwidth (MHz)
Low	5745	17.772
Mid	5785	17.662
High	5825	17.685

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

Channel	Frequency (MHz)	6db Bandwidth (MHz)
Low	5755	36.318
High	5795	36.442

Test mode: IEEE 802.11n HT 40 mode / 5755 ~ 5795MHz / Chain 2

Channel	Frequency (MHz)	6db Bandwidth (MHz)
Low	5755	36.279
High	5795	36.224

Mode 3

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

Channel	Frequency (MHz)	6db Bandwidth (MHz)
Low	5745	17.733
Mid	5785	17.820
High	5825	17.783

Test mode: IEEE 802.11n HT 20 mode / 5745 ~ 5825MHz / Chain 2

Channel	Frequency (MHz)	6db Bandwidth (MHz)
Low	5745	17.726
Mid	5785	17.757
High	5825	17.817

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

Channel	Frequency (MHz)	6db Bandwidth (MHz)
Low	5755	36.315
High	5795	36.514

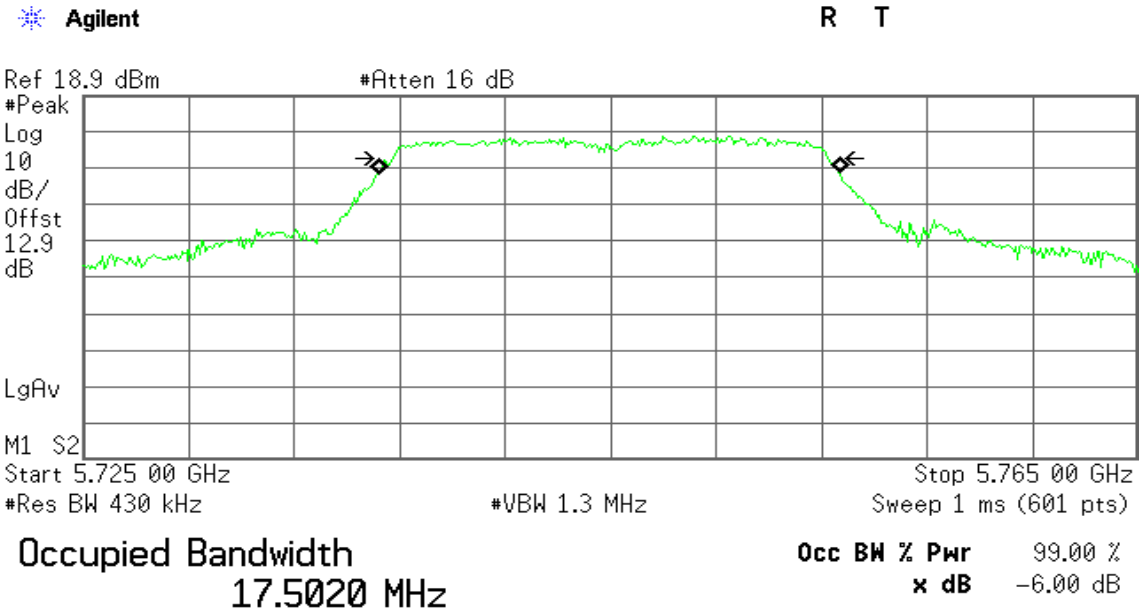
Test mode: IEEE 802.11n HT 40 mode / 5755 ~ 5795MHz / Chain 2

Channel	Frequency (MHz)	6db Bandwidth (MHz)
Low	5755	36.435
High	5795	36.262

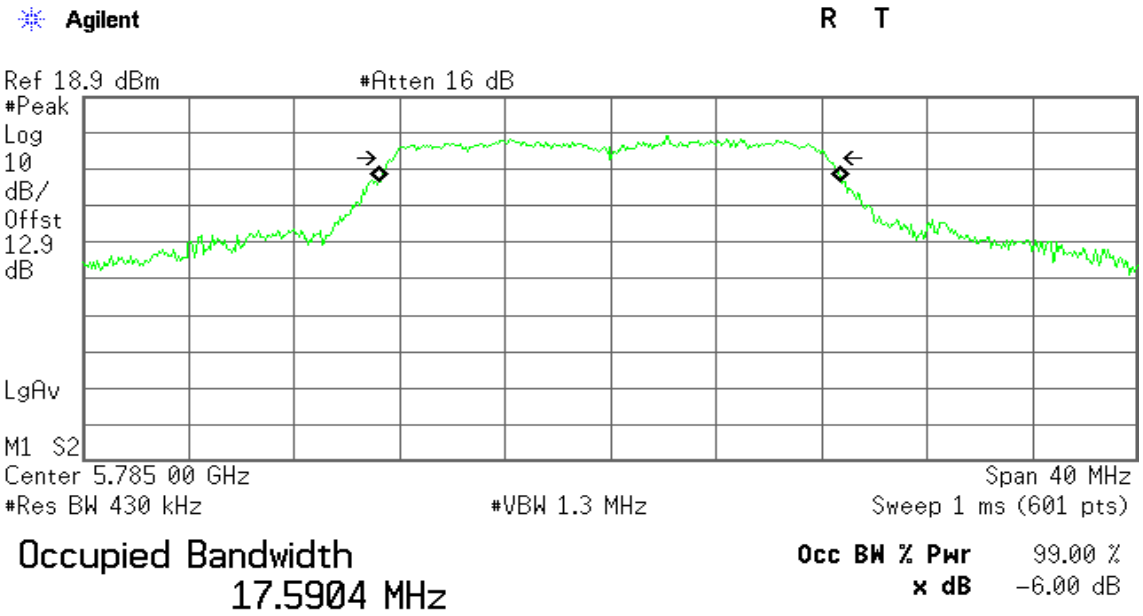
Test Plot

IEEE 802.11a mode / 5745 ~ 5825MHz

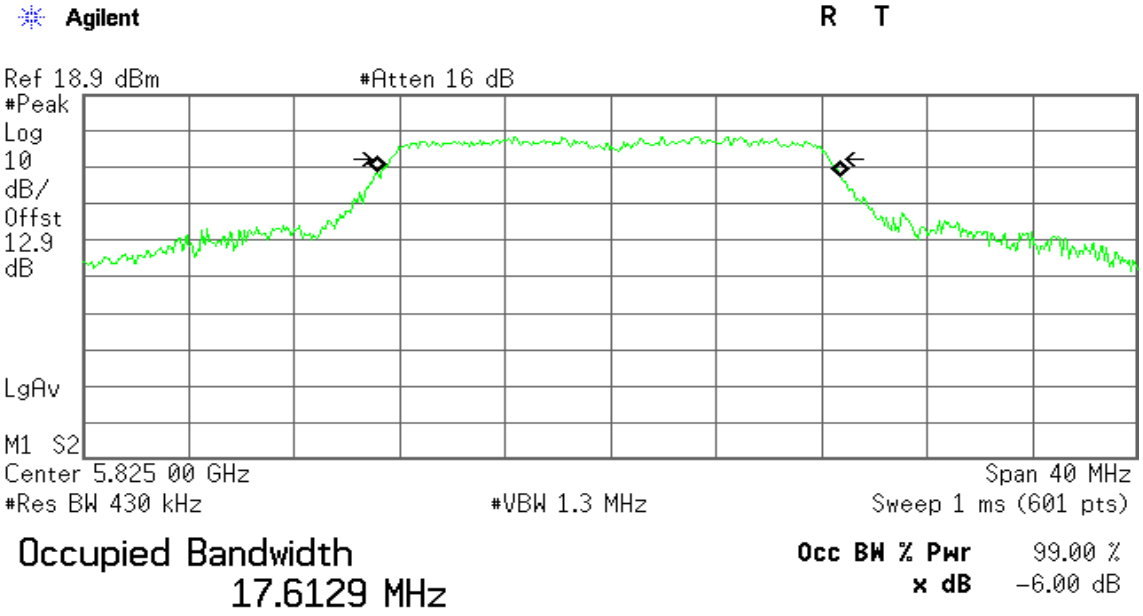
CH Low



CH Mid



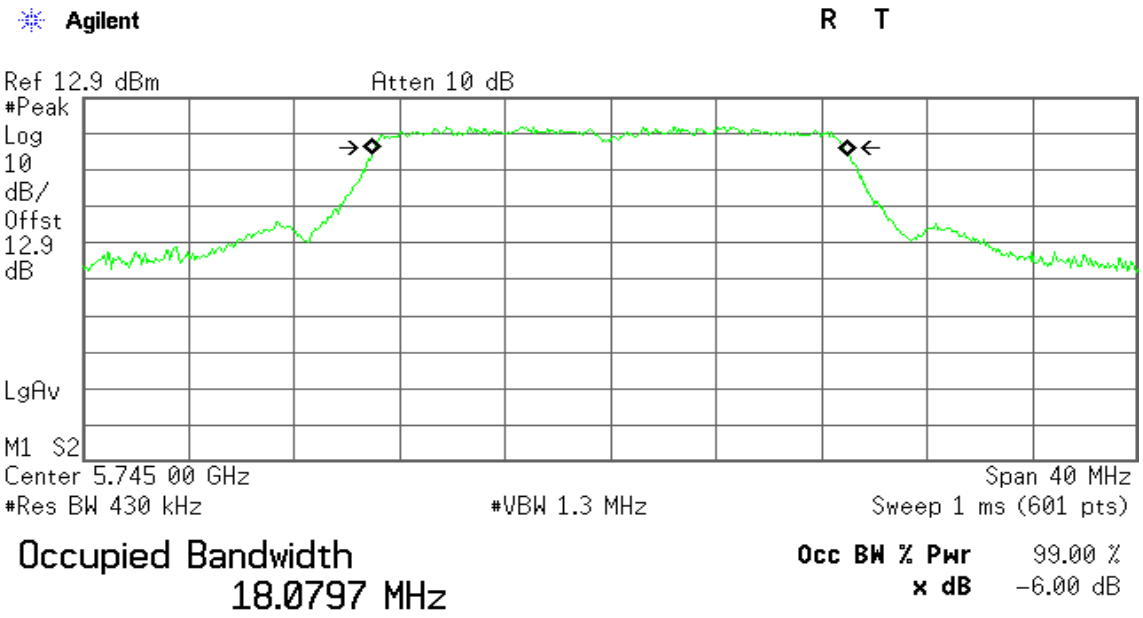
CH High


Agilent
R T
Ref 18.9 dBm
#Atten 16 dB
#Peak
Log
10
dB/
Offst
12.9
dB
LgAv
M1 S2
Center 5.825 00 GHz
Span 40 MHz
#Res BW 430 kHz
#VBW 1.3 MHz
Sweep 1 ms (601 pts)
Occupied Bandwidth
17.6129 MHz
Occ BW % Pwr 99.00 %
x dB -6.00 dB
Transmit Freq Error -62.737 kHz
x dB Bandwidth 16.676 MHz

Mode 1

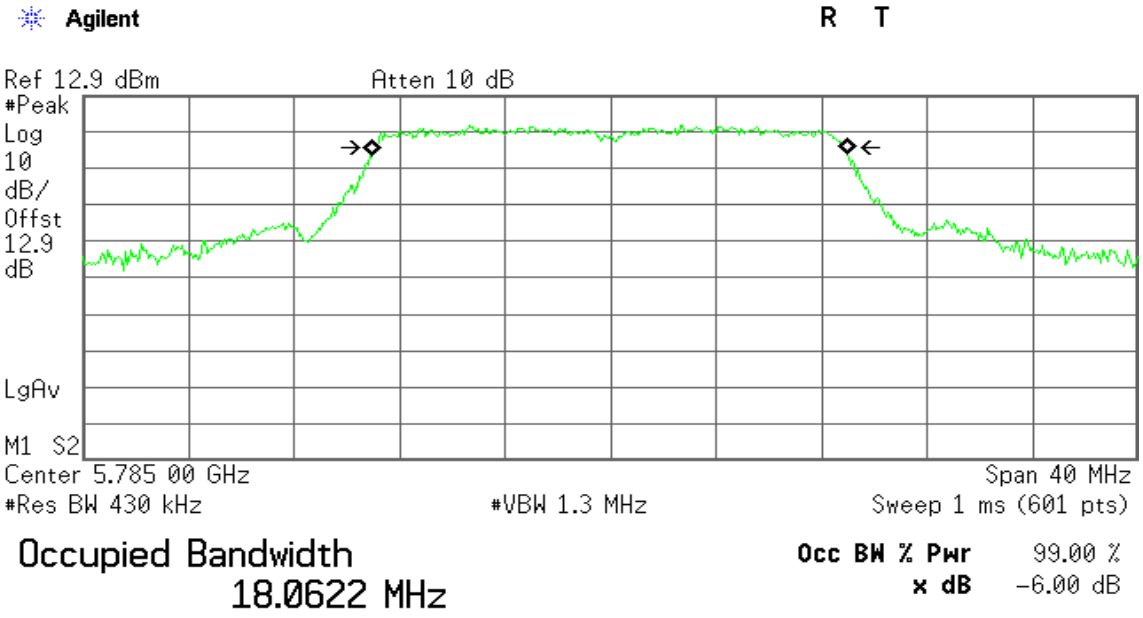
IEEE 802.11n HT 20 mode / 5745 ~ 5825MHz / Chain 0

CH Low



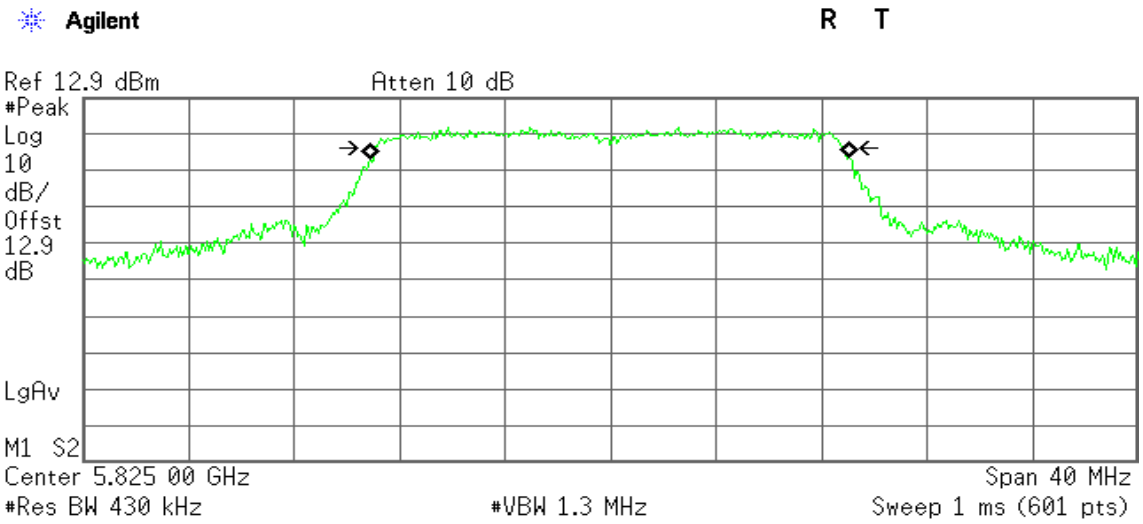
Transmit Freq Error −9.542 kHz
x dB Bandwidth 17.776 MHz

CH Mid



Transmit Freq Error −33.375 kHz
x dB Bandwidth 17.706 MHz

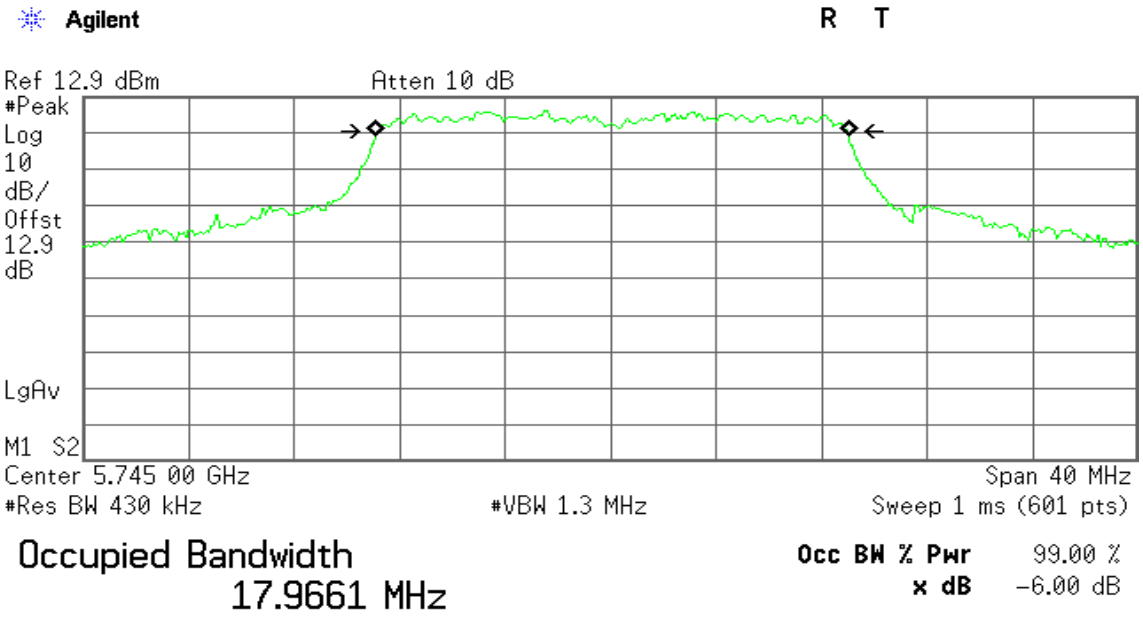
CH High



Transmit Freq Error	-20.739 kHz
x dB Bandwidth	17.769 MHz

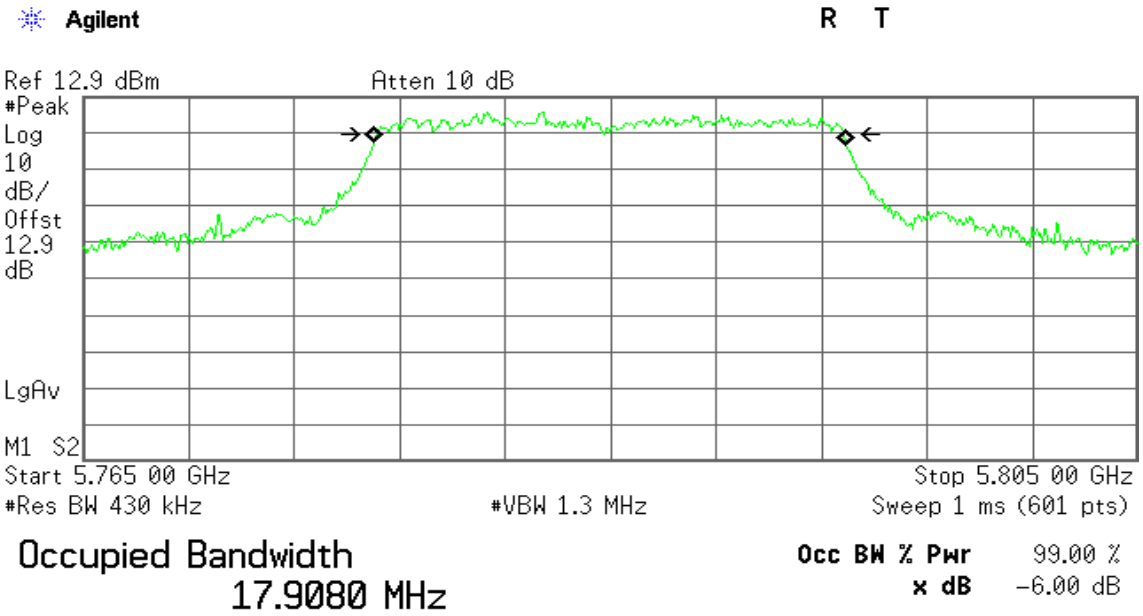
IEEE 802.11n HT 20 mode / 5745 ~ 5825MHz / Chain 1

CH Low



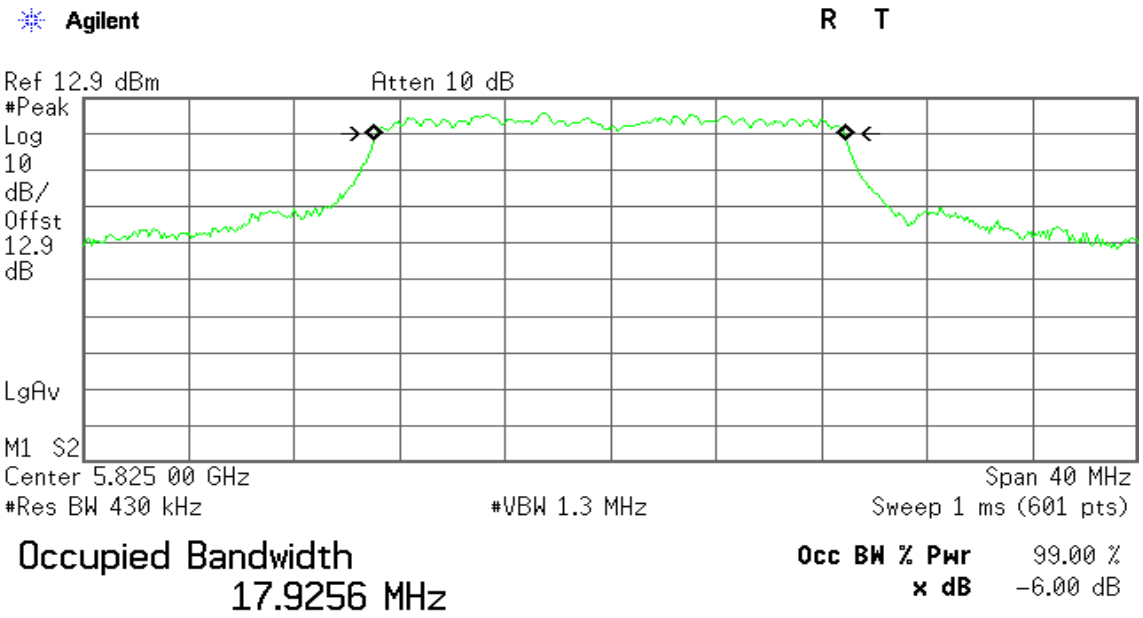
Transmit Freq Error	50.964 kHz
x dB Bandwidth	17.888 MHz

CH Mid



Transmit Freq Error	-21.869 kHz
x dB Bandwidth	17.735 MHz

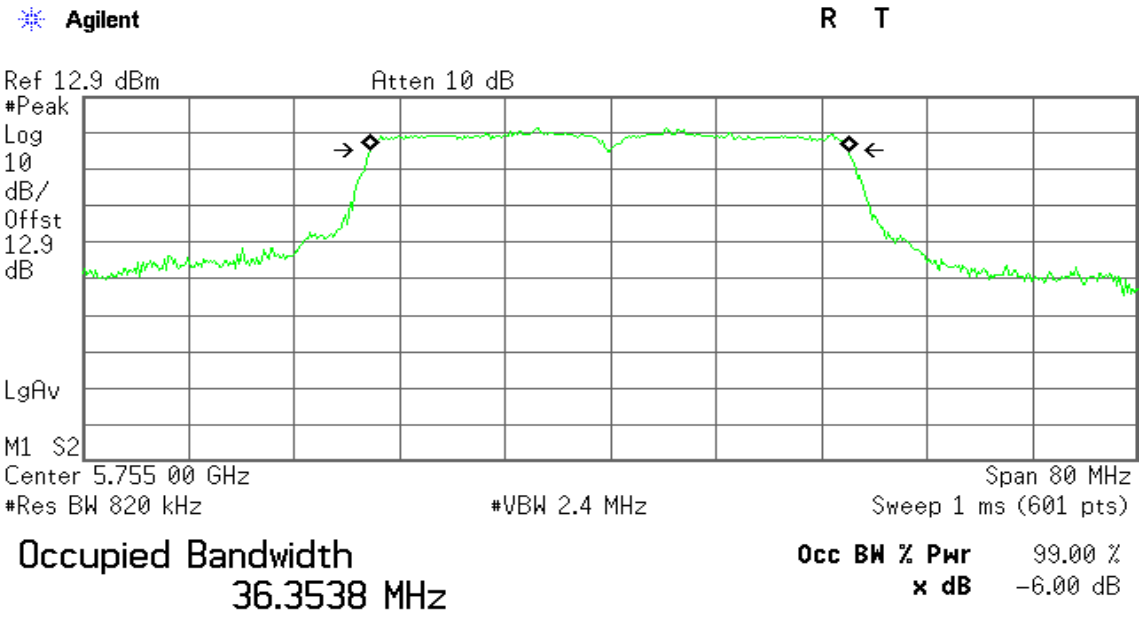
CH High



Transmit Freq Error −23.860 kHz
x dB Bandwidth 17.785 MHz

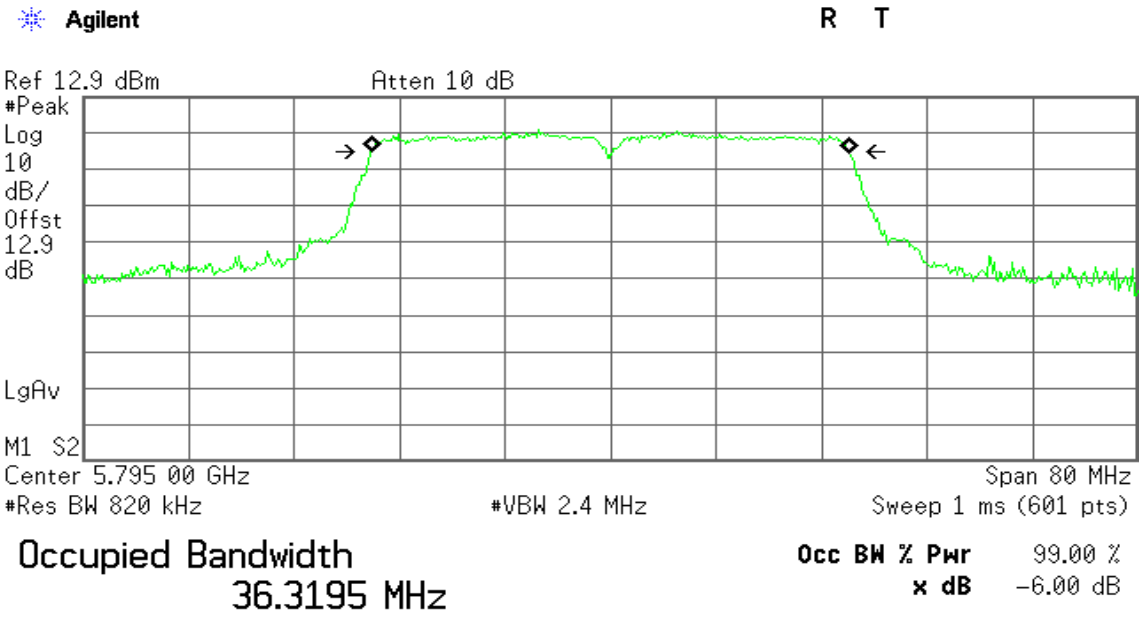
IEEE 802.11n HT 40 mode / 5755 ~ 5795MHz / Chain 0

CH Low



Transmit Freq Error −82.155 kHz
x dB Bandwidth 36.276 MHz

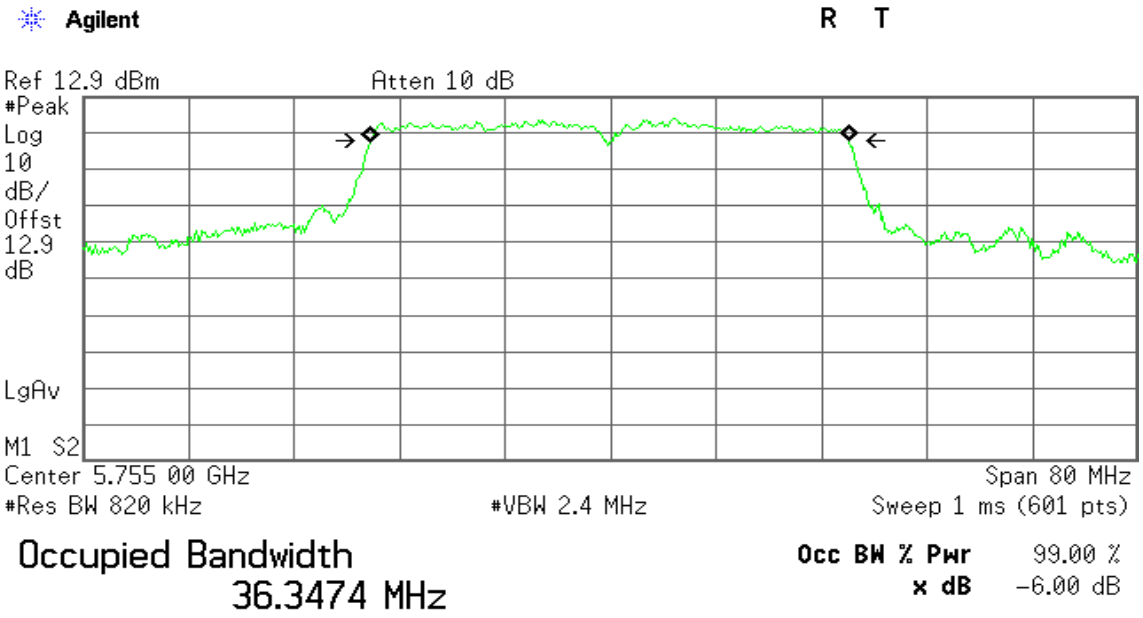
CH High



Transmit Freq Error −7.409 kHz
x dB Bandwidth 36.191 MHz

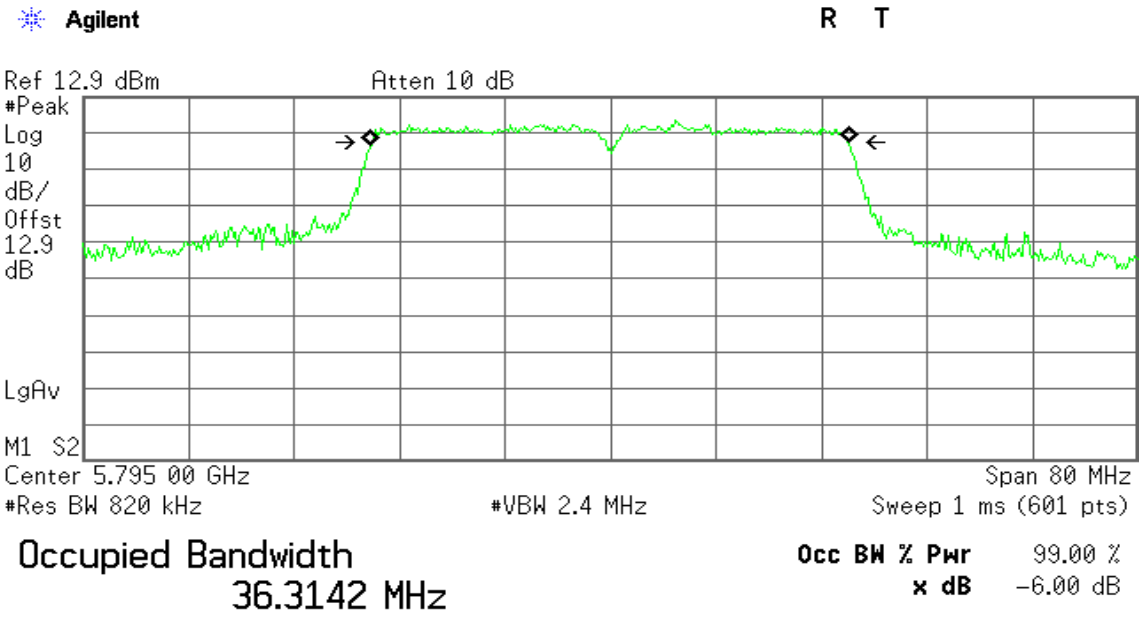
IEEE 802.11n HT 40 mode / 5755 ~ 5795MHz / Chain 1

CH Low



Transmit Freq Error −79.459 kHz
x dB Bandwidth 36.257 MHz

CH High

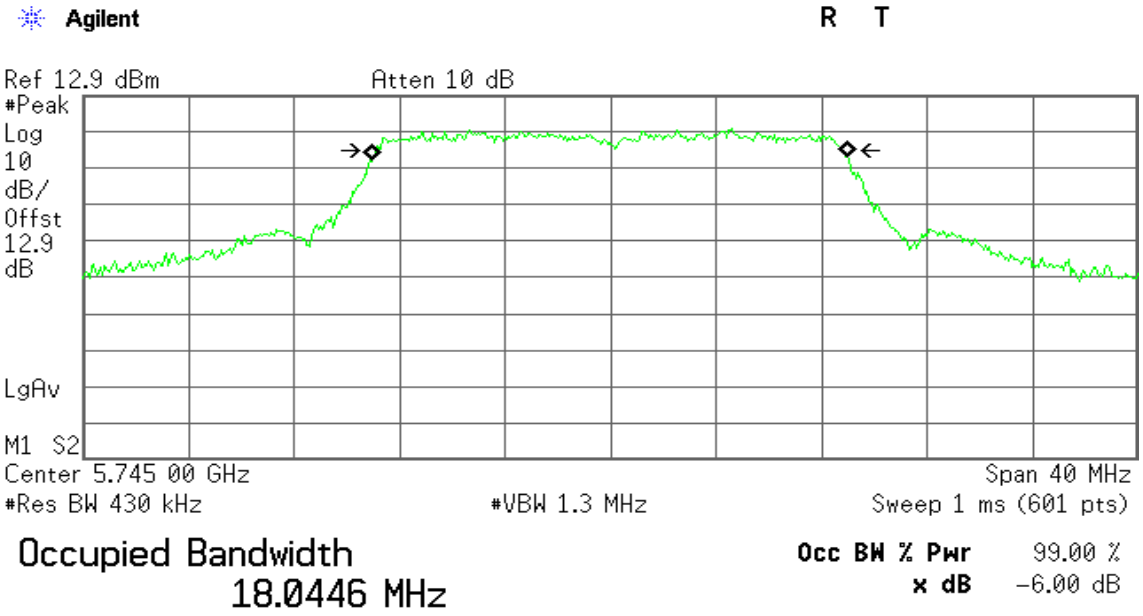


Transmit Freq Error −55.102 kHz
x dB Bandwidth 36.213 MHz

Mode 2

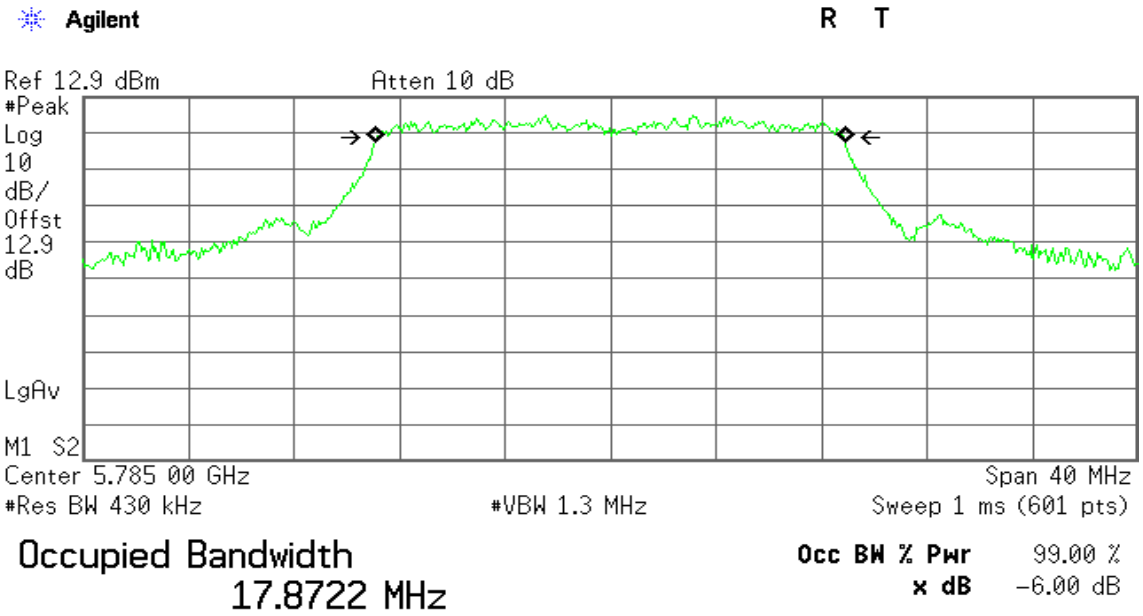
IEEE 802.11n HT 20 mode / 5745 ~ 5825MHz / Chain 1

CH Low



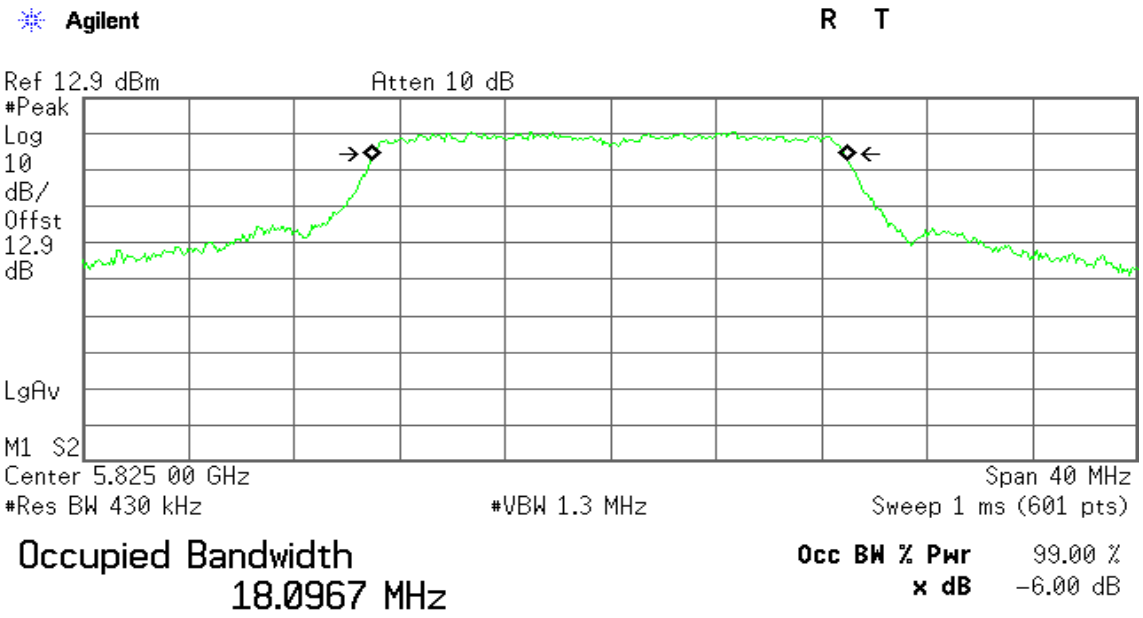
Transmit Freq Error	-19.159 kHz
x dB Bandwidth	17.738 MHz

CH Mid



Transmit Freq Error	-17.788 kHz
x dB Bandwidth	17.774 MHz

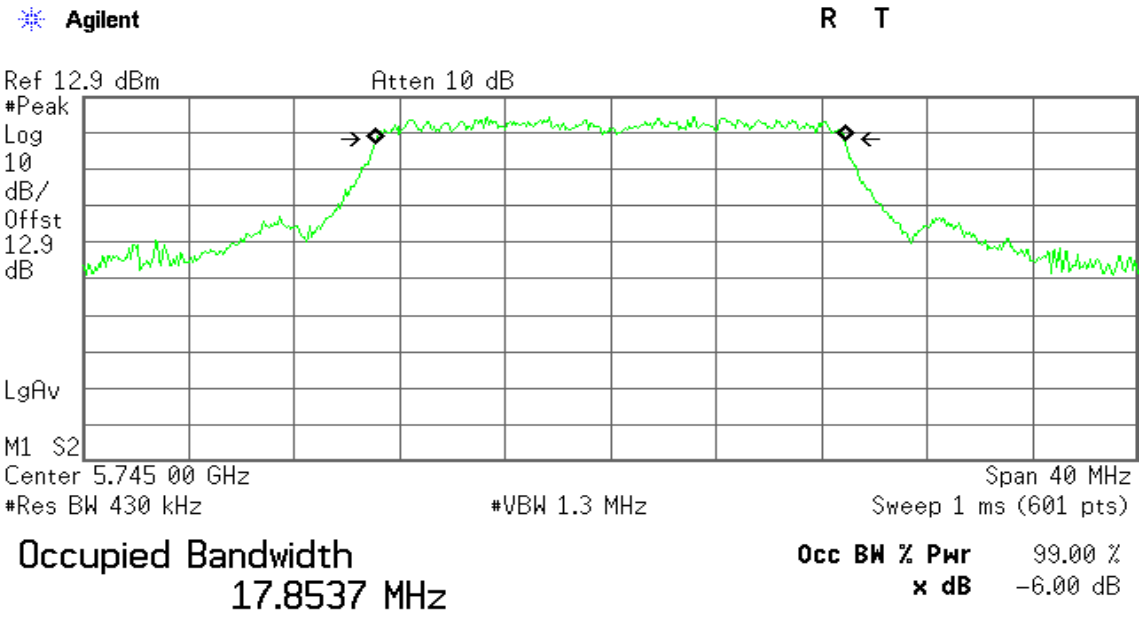
CH High



Transmit Freq Error −35.873 kHz
x dB Bandwidth 17.823 MHz

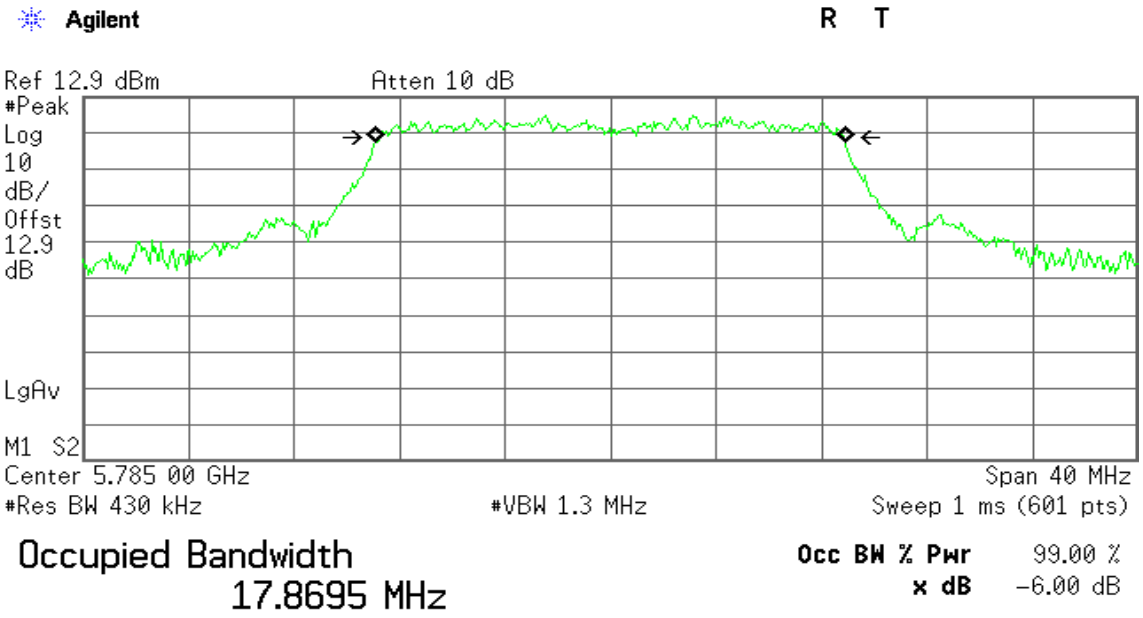
IEEE 802.11n HT 20 mode / 5745 ~ 5825MHz / Chain 2

CH Low



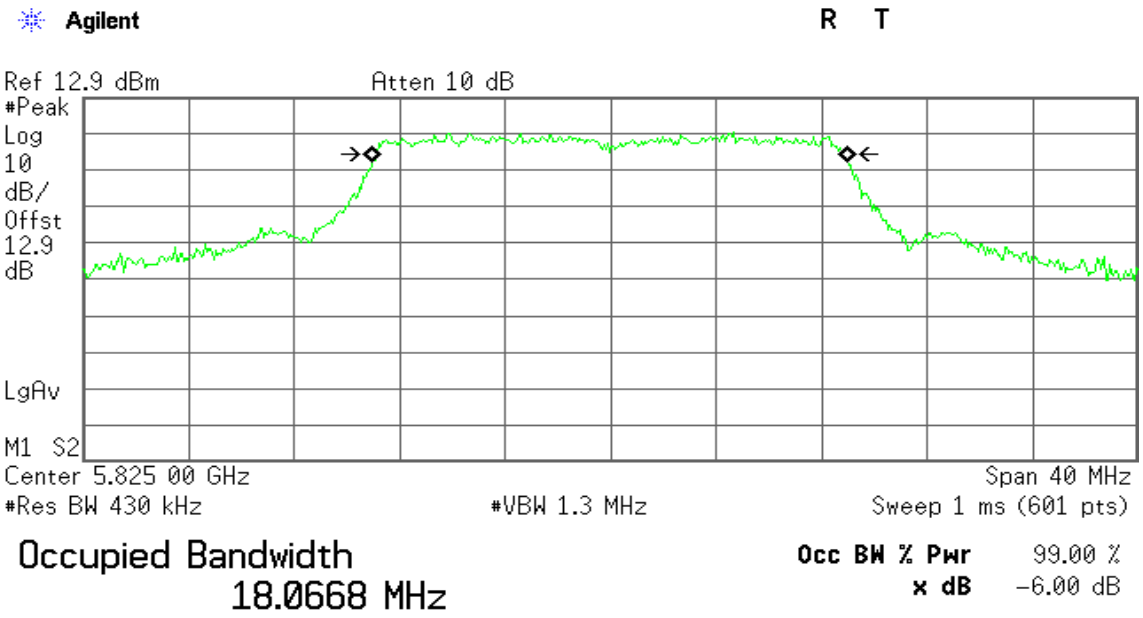
Transmit Freq Error −25.813 kHz
x dB Bandwidth 17.772 MHz

CH Mid



Transmit Freq Error −20.456 kHz
x dB Bandwidth 17.662 MHz

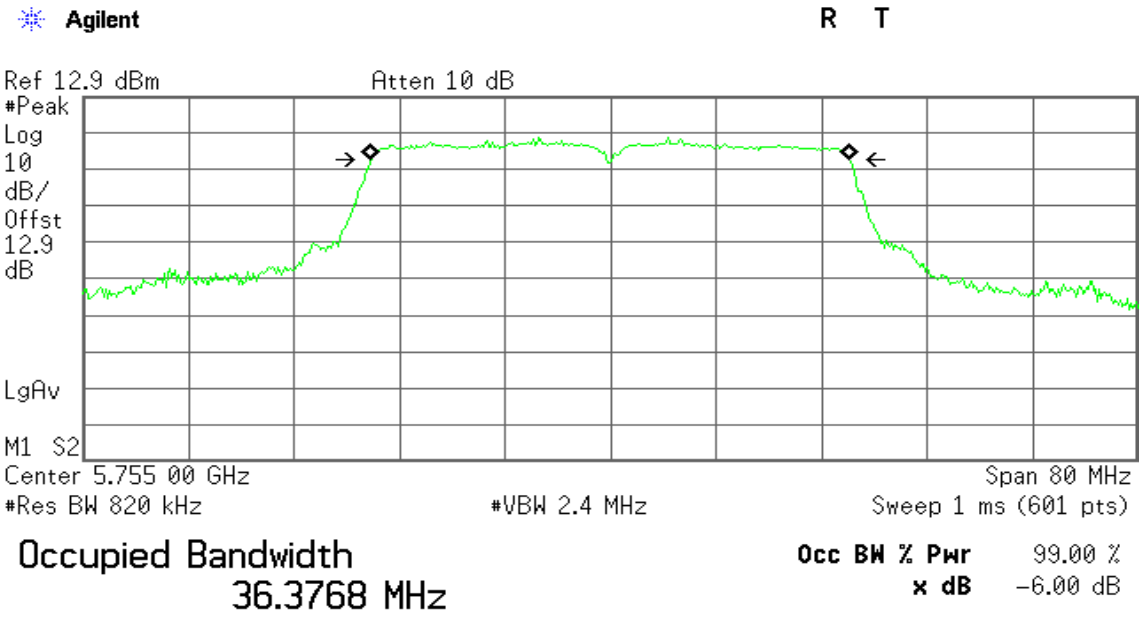
CH High



Transmit Freq Error	-12.949 kHz
x dB Bandwidth	17.685 MHz

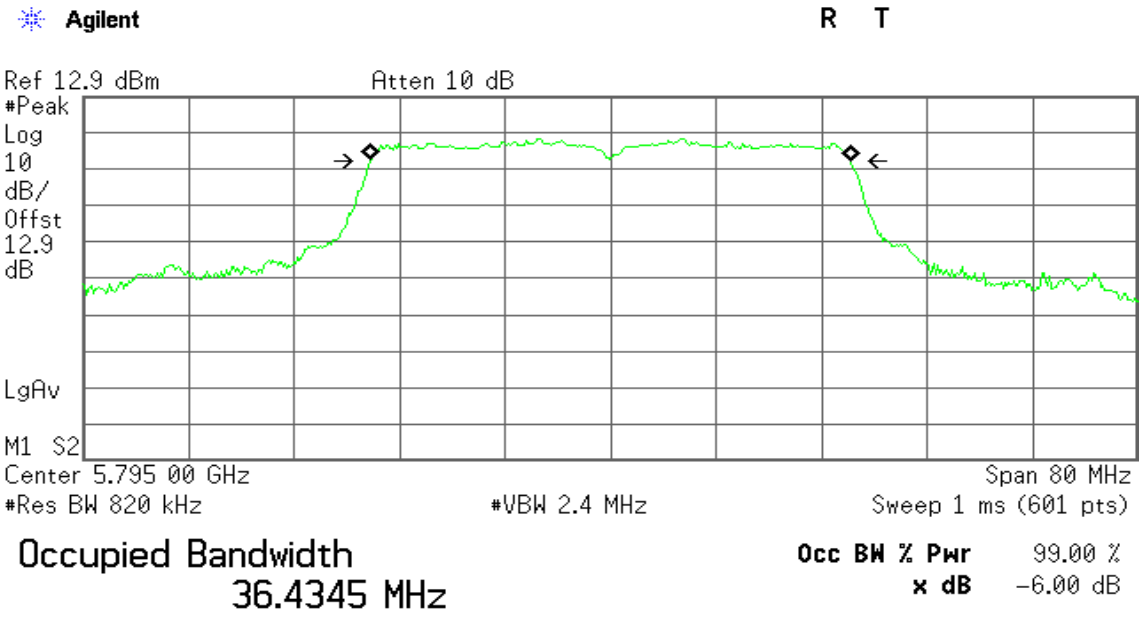
IEEE 802.11n HT 40 mode / 5755 ~ 5795MHz / Chain 1

CH Low



Transmit Freq Error -32.632 kHz
x dB Bandwidth 36.318 MHz

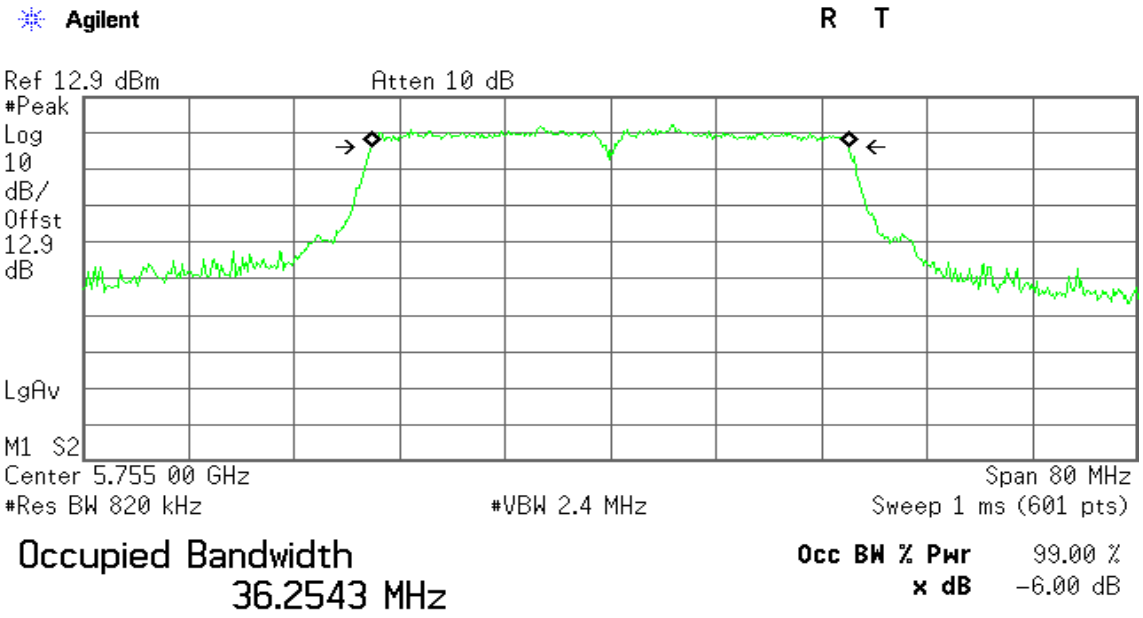
CH High



Transmit Freq Error 6.034 kHz
x dB Bandwidth 36.442 MHz

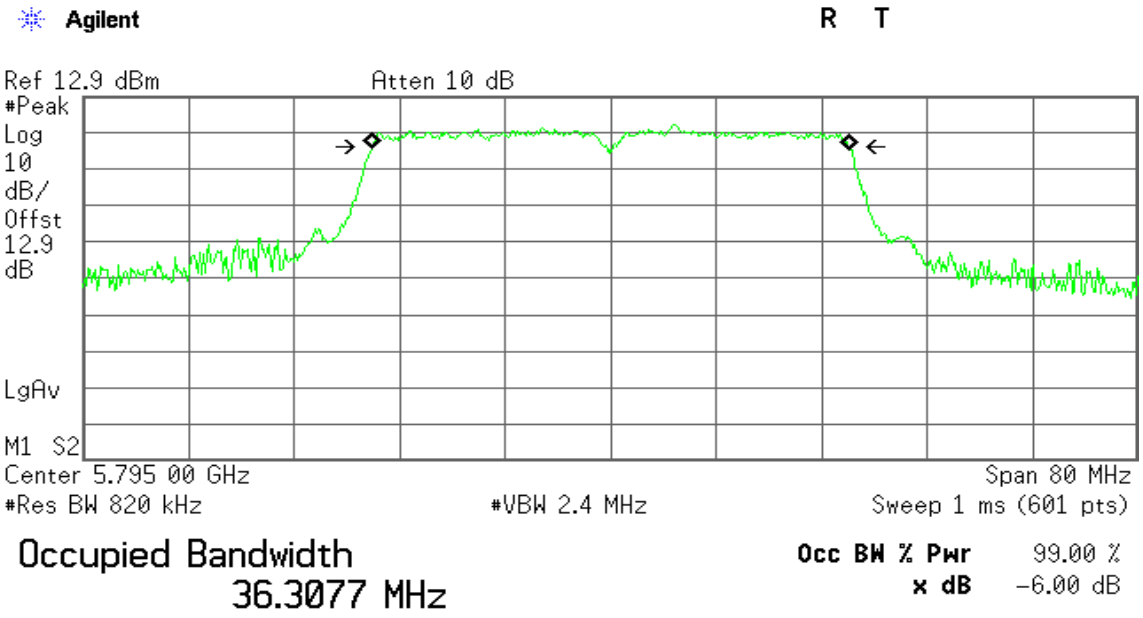
IEEE 802.11n HT 40 mode / 5755 ~ 5795MHz / Chain 2

CH Low



Transmit Freq Error	-41.376 kHz
x dB Bandwidth	36.279 MHz

CH High

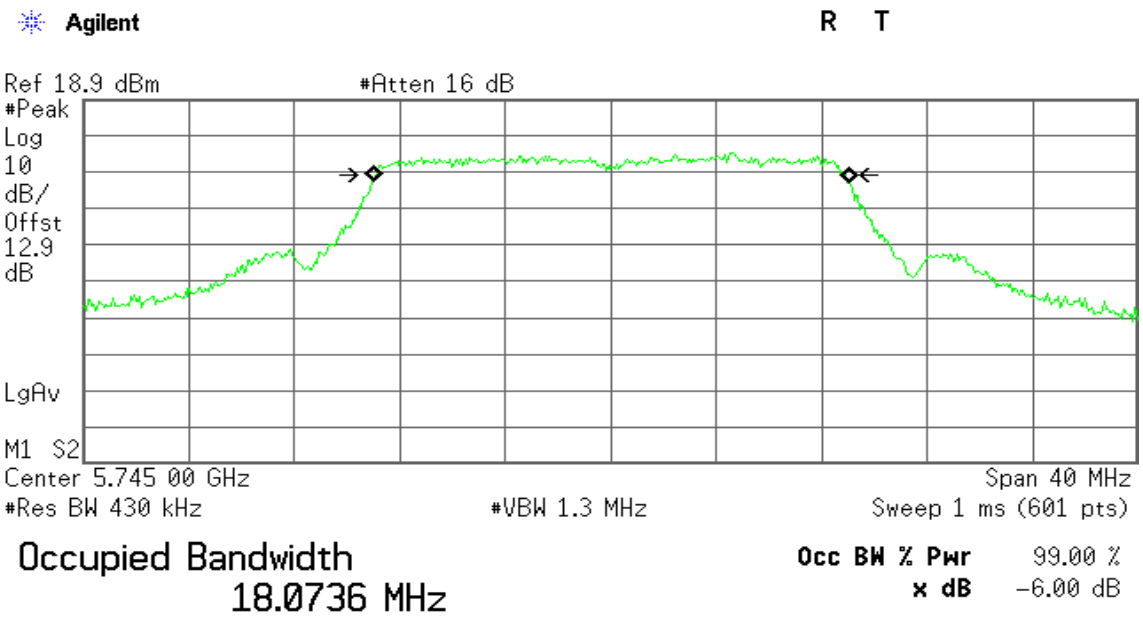


Transmit Freq Error	-5.951 kHz
x dB Bandwidth	36.224 MHz

Mode 3

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

CH Low

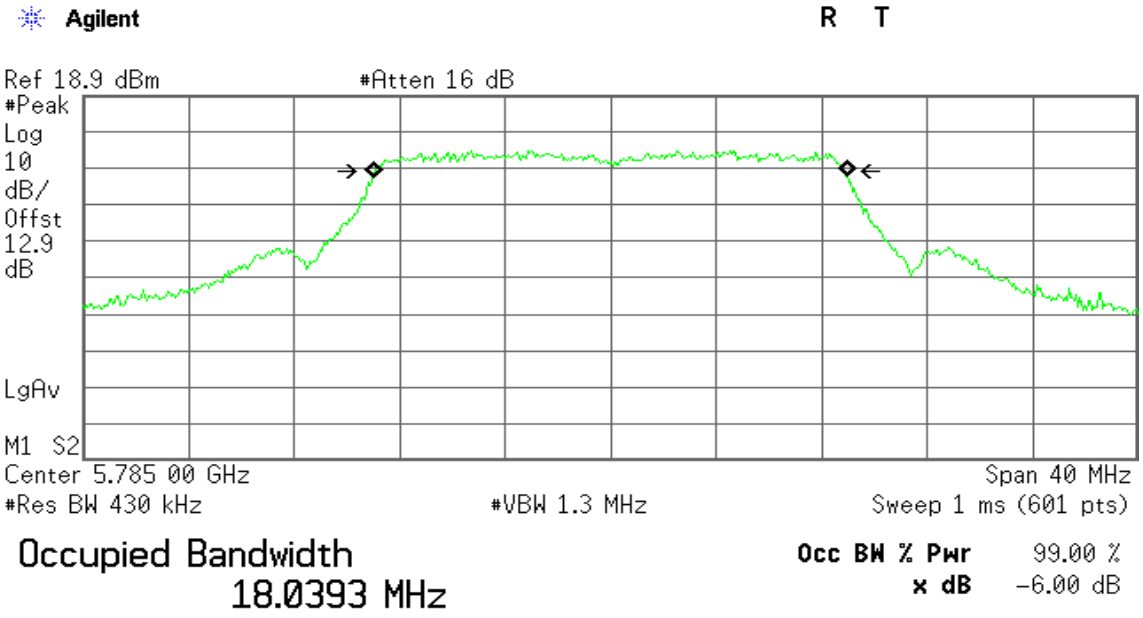


Occupied Bandwidth
18.0736 MHz

Occ BW % Pwr	99.00 %
x dB	-6.00 dB

Transmit Freq Error	9.061 kHz
x dB Bandwidth	17.733 MHz

CH Mid

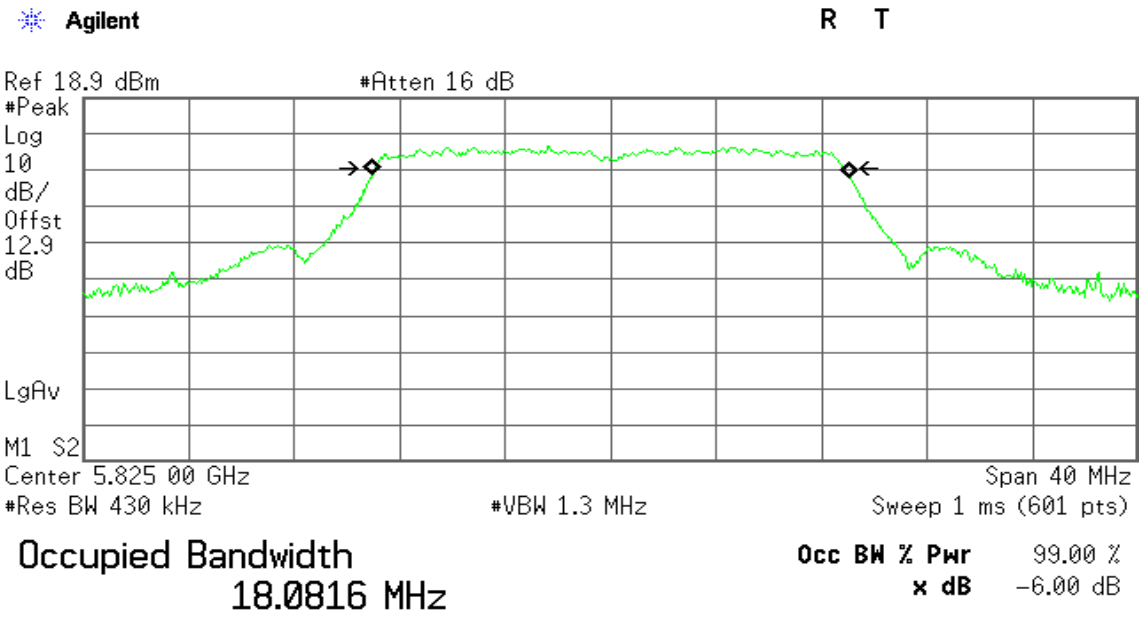


Occupied Bandwidth
18.0393 MHz

Occ BW % Pwr	99.00 %
x dB	-6.00 dB

Transmit Freq Error	-11.407 kHz
x dB Bandwidth	17.820 MHz

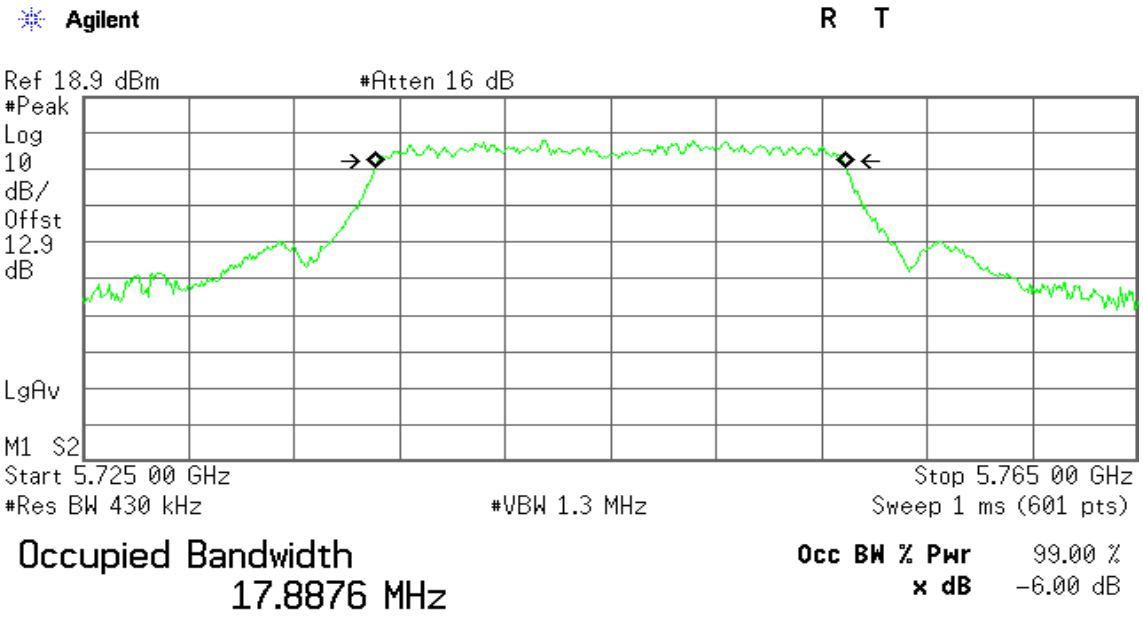
CH High



Transmit Freq Error	-3.802 kHz
x dB Bandwidth	17.783 MHz

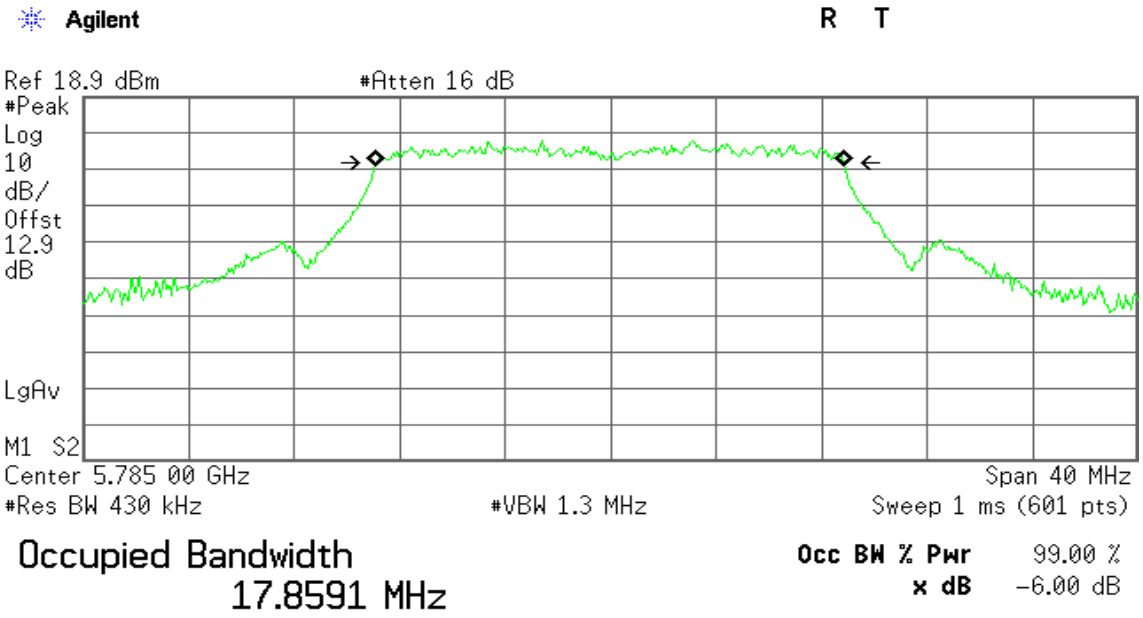
IEEE 802.11n HT 20 mode / 5745 ~ 5825MHz / Chain 2

CH Low



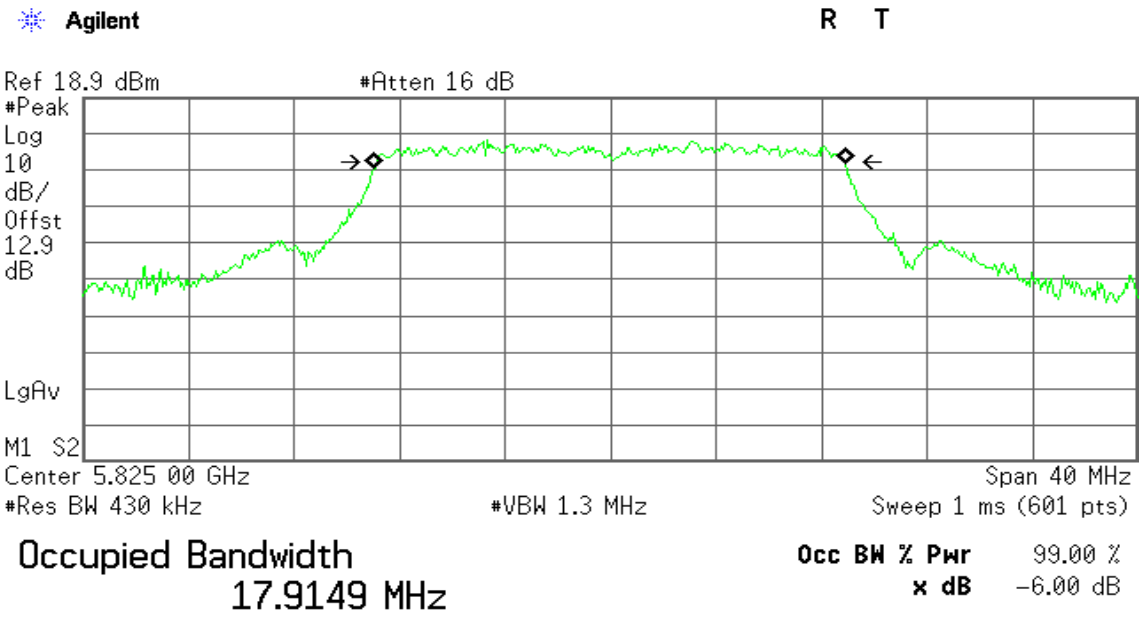
Transmit Freq Error −2.488 kHz
x dB Bandwidth 17.726 MHz

CH Mid



Transmit Freq Error −31.244 kHz
x dB Bandwidth 17.757 MHz

CH High



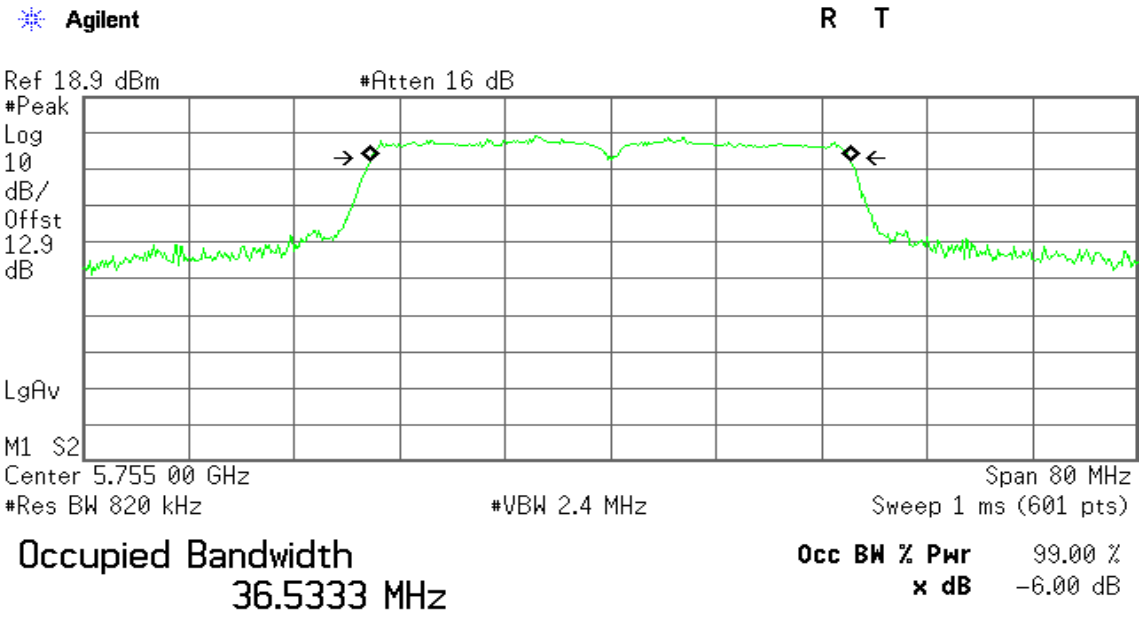
Occupied Bandwidth
17.9149 MHz

Occ BW % Pwr	99.00 %
x dB	-6.00 dB

Transmit Freq Error	-17.015 kHz
x dB Bandwidth	17.817 MHz

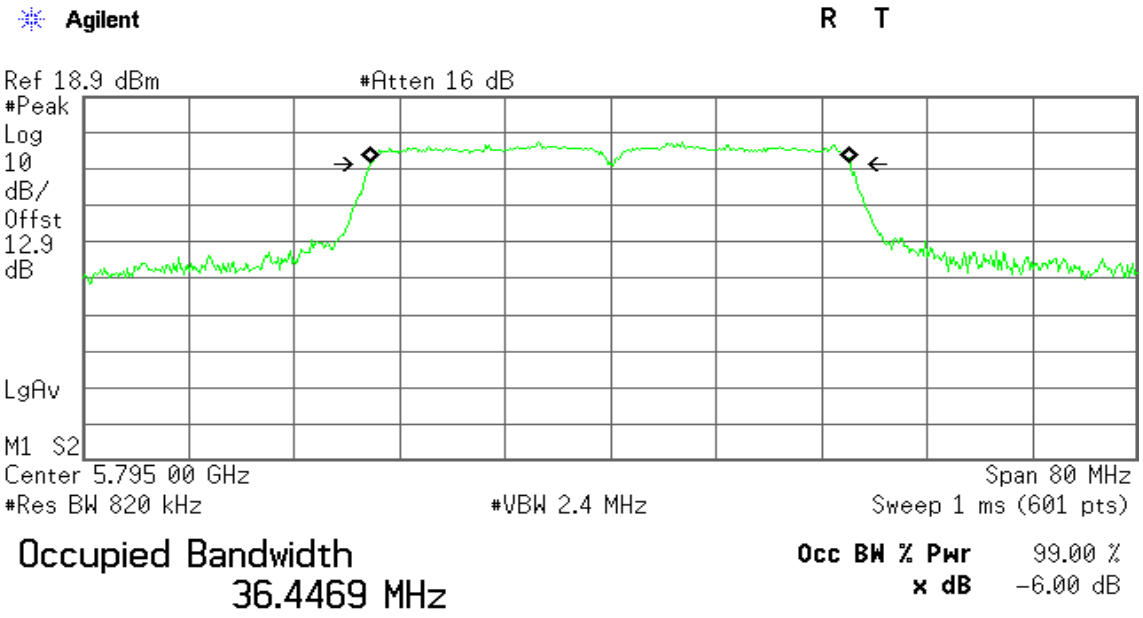
IEEE 802.11n HT 40 mode / 5755 ~ 5795MHz / Chain 0

CH Low



Transmit Freq Error −30.155 kHz
x dB Bandwidth 36.315 MHz

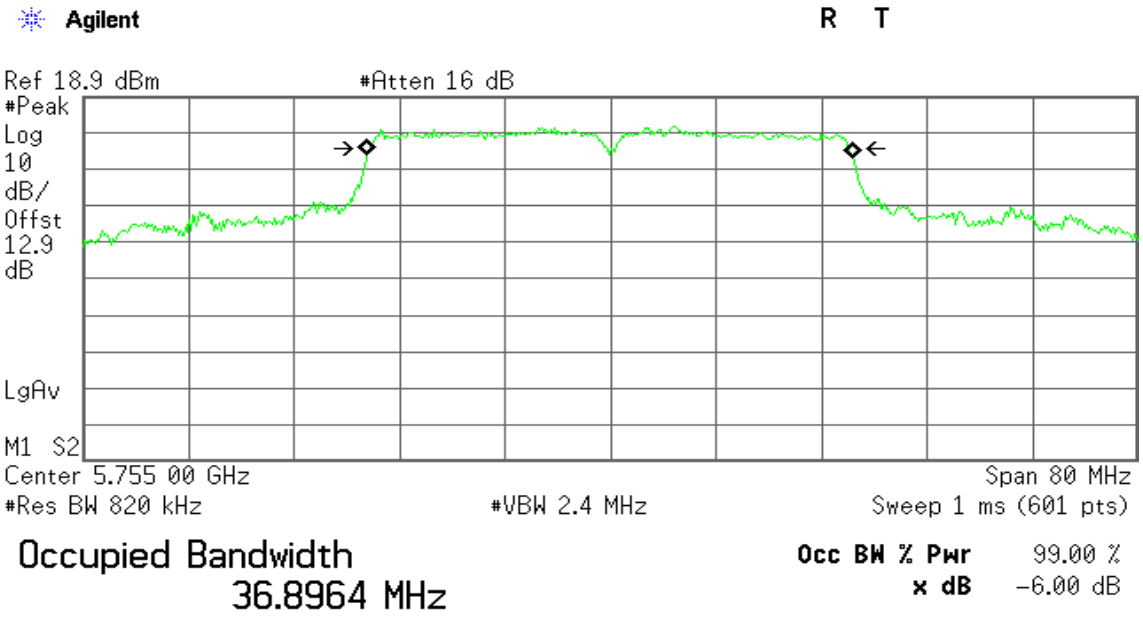
CH High



Transmit Freq Error −29.790 kHz
x dB Bandwidth 36.514 MHz

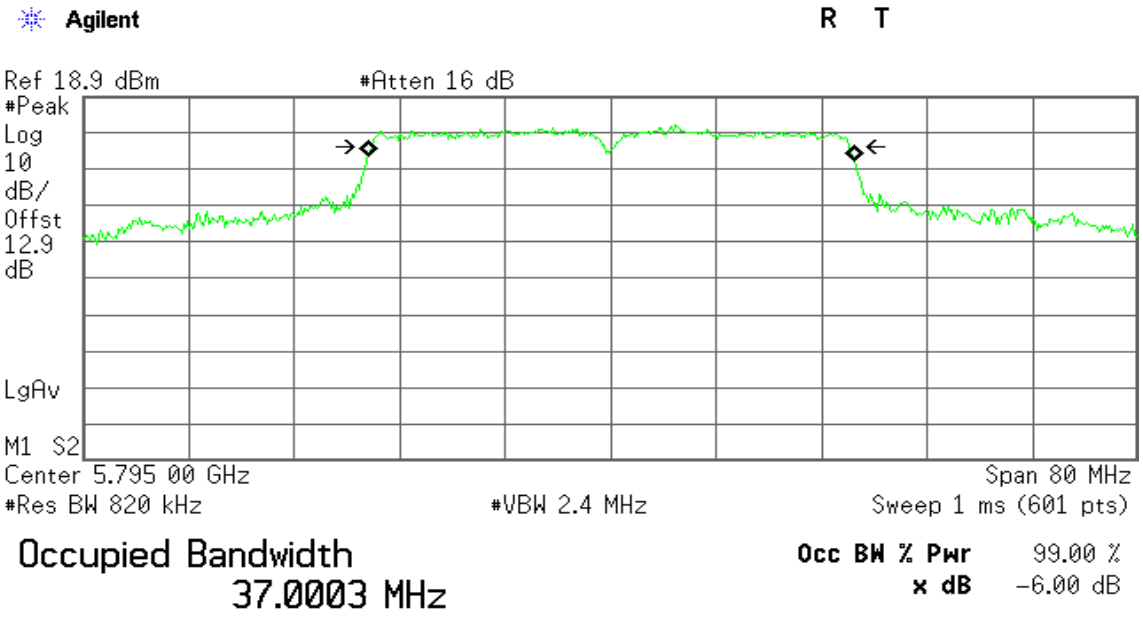
IEEE 802.11n HT 40 mode / 5755 ~ 5795MHz / Chain 2

CH Low



Transmit Freq Error -21.398 kHz
x dB Bandwidth 36.435 MHz

CH High



Transmit Freq Error 41.030 kHz
x dB Bandwidth 36.262 MHz

7.2 MAXIMUM CONDUCTED OUTPUT POWER

LIMIT

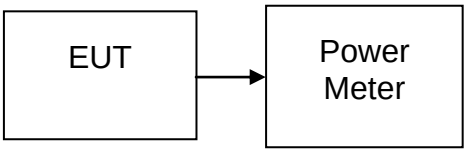
According to §15.407(a)

(1) For the band 5.725-5.850 GHz bands, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 30 dBm, where B is the 6 dB emission bandwidth in MHz.

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

The EUT was connected to a Power Meter through a 50Ω RF cable



TEST PROCEDURE

The transmitter output is connected to the Power Meter. The Power Meter is set to the avg power detection. The EUT is configured to transmit continuously.

TEST RESULTS

No non-compliance noted

Test Data

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

Channel	Frequency (MHz)	Maximum Conducted Output Power (dBm)	Limit (dBm)
Low	5745	14.71	30.00
Mid	5785	***14.83**	30.00
High	5825	13.85	30.00

Mode 1

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	11.69	11.59	14.65	28.06
Mid	5785	11.81	11.84	***14.83**	28.06
High	5825	10.95	11.30	14.14	28.06

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	11.93	13.29	15.68	28.06
High	5795	12.38	13.26	***15.86**	28.06

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 7.94dBi; therefore the reduction due to antenna gain is 1.94dB, so the limit is 28.06dBm.

Mode 2

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

Channel	Frequency (MHz)	Chain 1 Output Power (dBm)	Chain 2 Output Power (dBm)	Total Maximum Conducted Output Power (dBm)	Limit (dBm)
Low	5745	11.36	13.52	15.58	28.13
Mid	5785	11.82	13.71	15.88	28.13
High	5825	11.85	13.72	***15.89**	28.13

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

Channel	Frequency (MHz)	Chain 1 Output Power (dBm)	Chain 2 Output Power (dBm)	Total Maximum Conducted Output Power (dBm)	Limit (dBm)
Low	5755	9.98	13.02	14.77	28.13
High	5795	10.56	12.86	***14.87**	28.13

Remark:

1. Total Output Power (w) = Chain 1 (10^(Output Power /10)/1000) + Chain 2 (10^(Output Power /10)/1000))

2. The maximum antenna gain is 7.87dBi; therefore the reduction due to antenna gain is 1.87dB, so the limit is 28.13dBm.

Mode 3

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

Channel	Frequency (MHz)	Chain 0 Output Power (dBm)	Chain 2 Output Power (dBm)	Total Maximum Conducted Output Power (dBm)	Limit (dBm)
Low	5745	11.77	12.14	14.97	28.18
Mid	5785	11.67	12.33	15.02	28.18
High	5825	11.83	12.39	***15.13**	28.18

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

Channel	Frequency (MHz)	Chain 0 Output Power (dBm)	Chain 2 Output Power (dBm)	Total Maximum Conducted Output Power (dBm)	Limit (dBm)
Low	5755	11.84	12.80	***15.36**	28.18
High	5795	10.69	12.04	14.43	28.18

Remark:

1. Total Output Power (w) = Chain 0 (10^(Output Power /10)/1000) + Chain 2 (10^(Output Power /10)/1000))

2. The maximum antenna gain is 7.82dBi; therefore the reduction due to antenna gain is 1.82dB, so the limit is 28.18dBm.

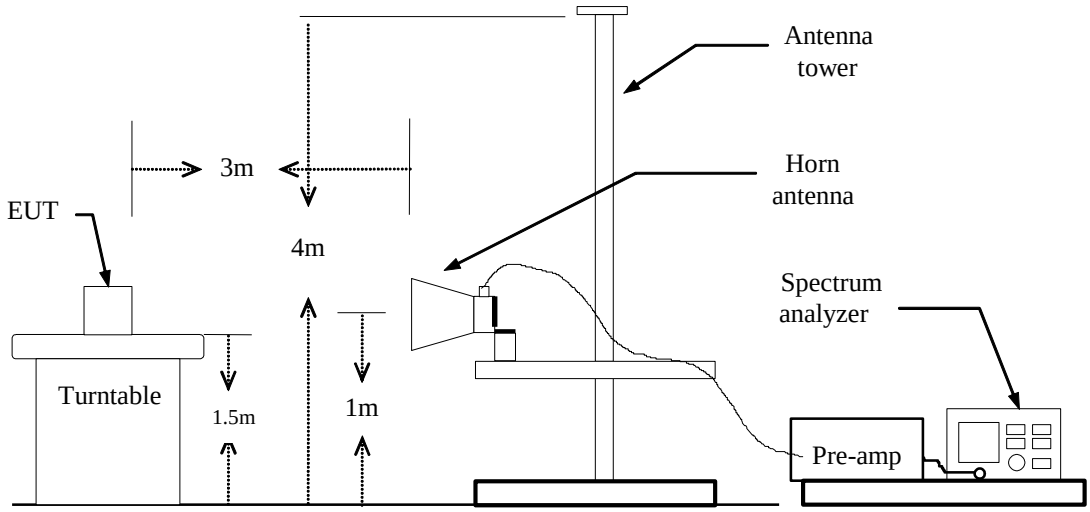
7.3 BAND EDGES MEASUREMENT

LIMIT

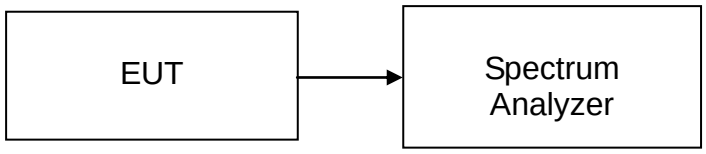
According to §15.247(d), in any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator in operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in 15.209(a) (see Section 15.205(c)).

Test Configuration

For Radiated



For Conducted



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=1MHz / Sweep=AUTO
   (b) AVERAGE: RBW=1MHz,
   if duty cycle≧98%, VBW=10Hz.
   if duty cycle<98% VBW=1/T.
   IEEE 802.11a mode: = 95%, VBW=510Hz
   IEEE 802.11n HT 20 MHz mode: = 92%, VBW=1.1KHz
   IEEE 802.11n HT 40 MHz mode: = 85%, VBW=2.2KHz
5. Repeat the procedures until all the PEAK and AVERAGE versus POLARIZATION are measured.

For Conducted
Conducted RF measurements of the transmitter output were made to confirm that the EUT antenna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation or measurements on the radiated emissions site.

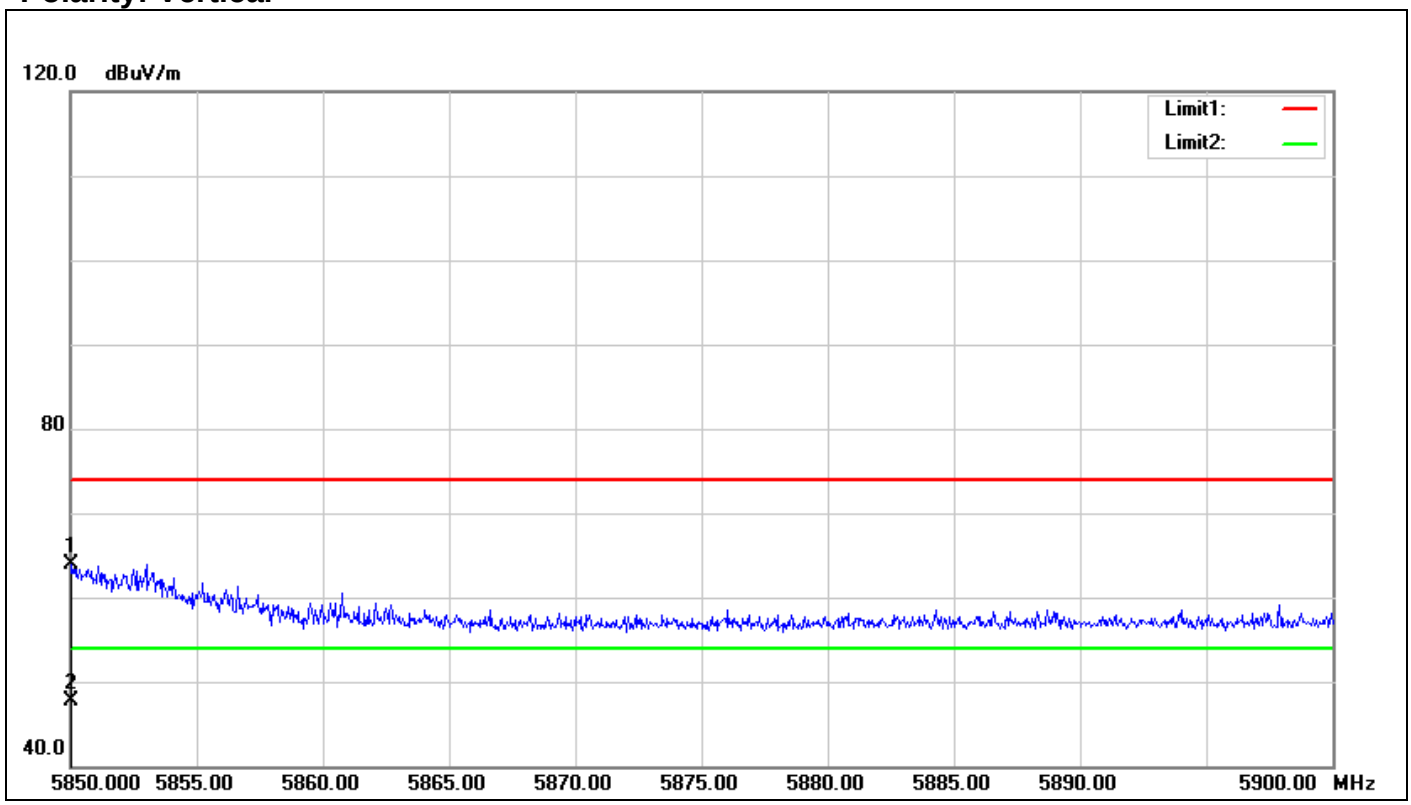
The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 100 kHz.

TEST RESULTS

Refer to attach spectrum analyzer data chart.

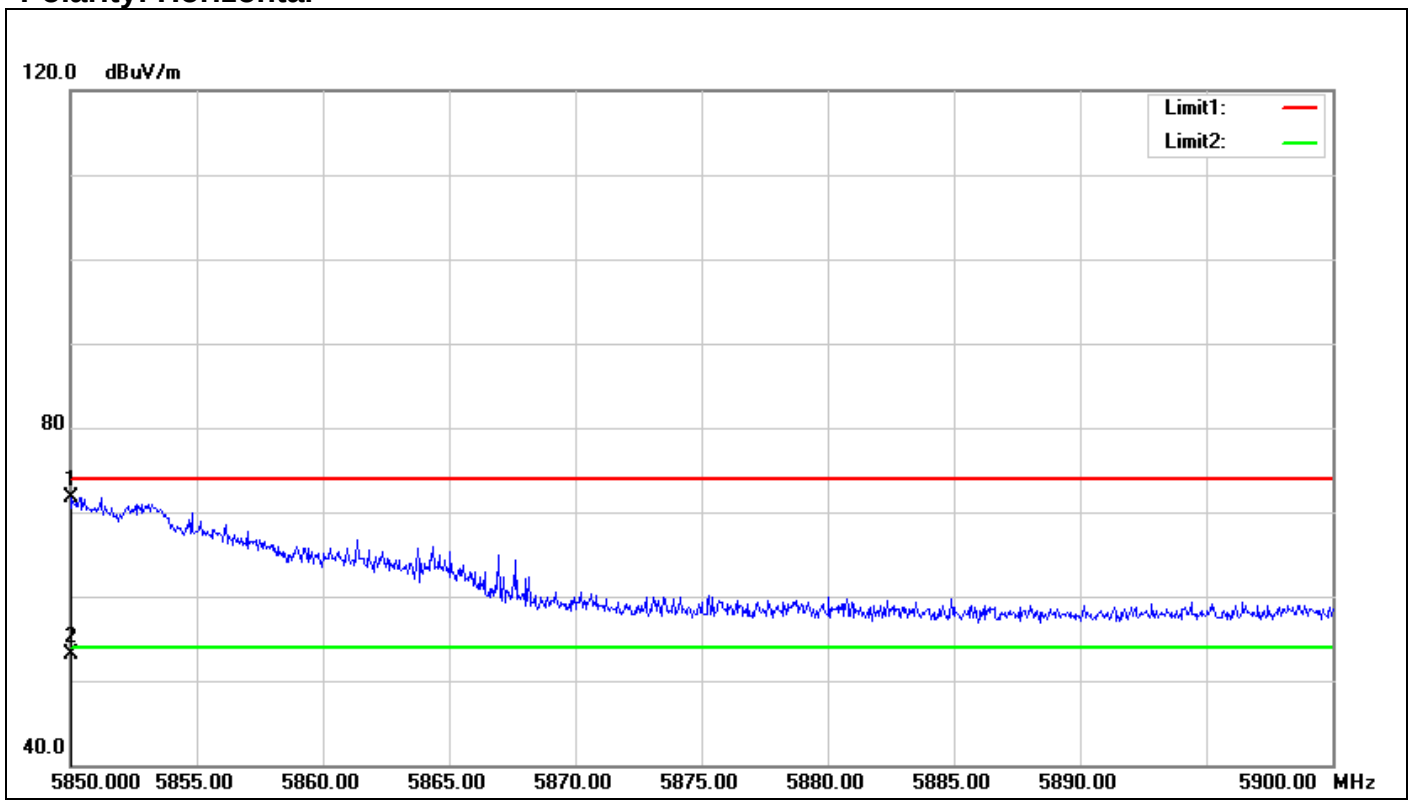
Band Edges (IEEE 802.11a mode / CH 5825 MHz)

Polarity: Vertical



No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(°)	
1	5850.050	57.19	6.74	63.93	74.00	-10.07	100	193	peak
2	5850.050	40.97	6.74	47.71	54.00	-6.29	100	193	AVG

Polarity: Horizontal

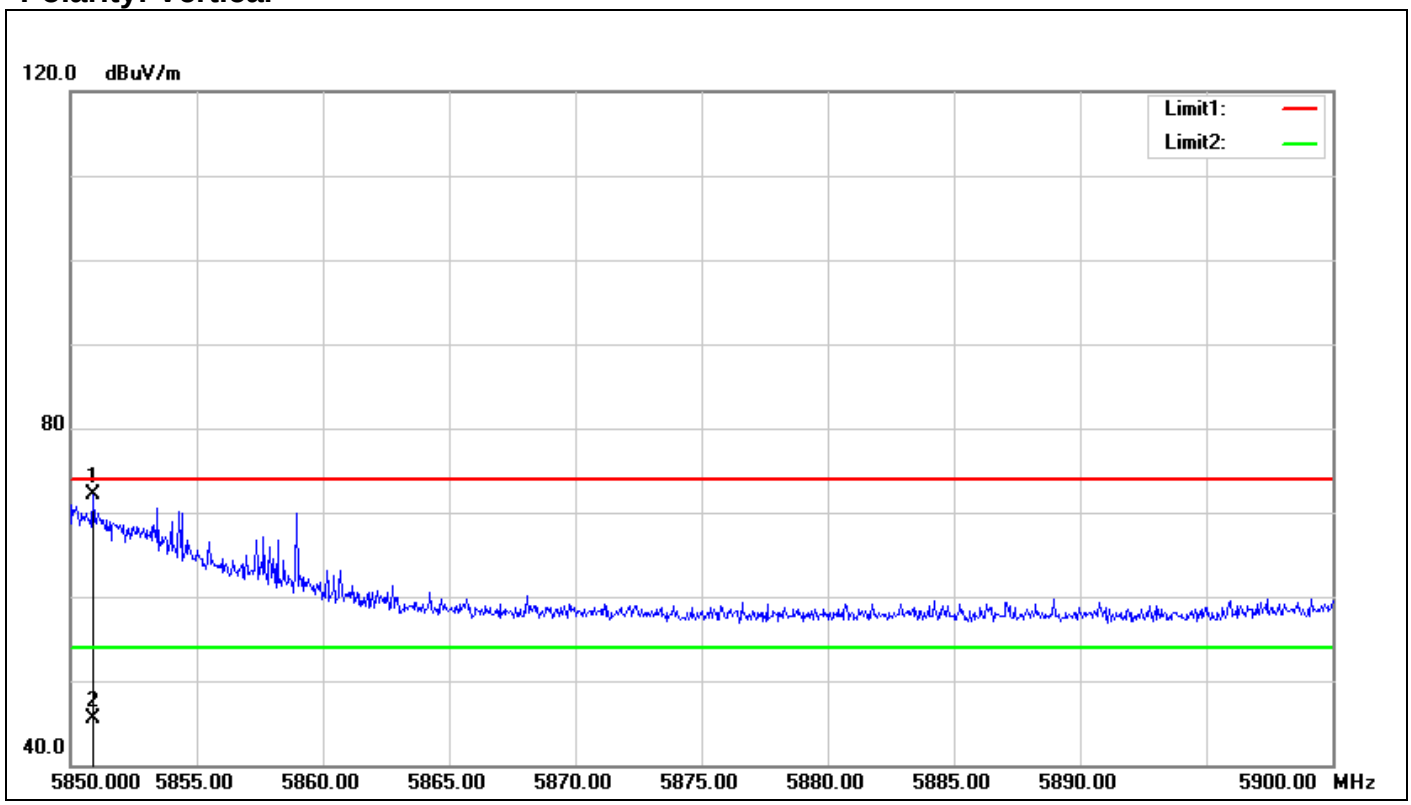


No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(°)	
1	5850.000	65.06	6.74	71.80	74.00	-2.20	100	164	peak
2	5850.000	46.45	6.74	53.19	54.00	-0.81	100	164	AVG

Mode 1

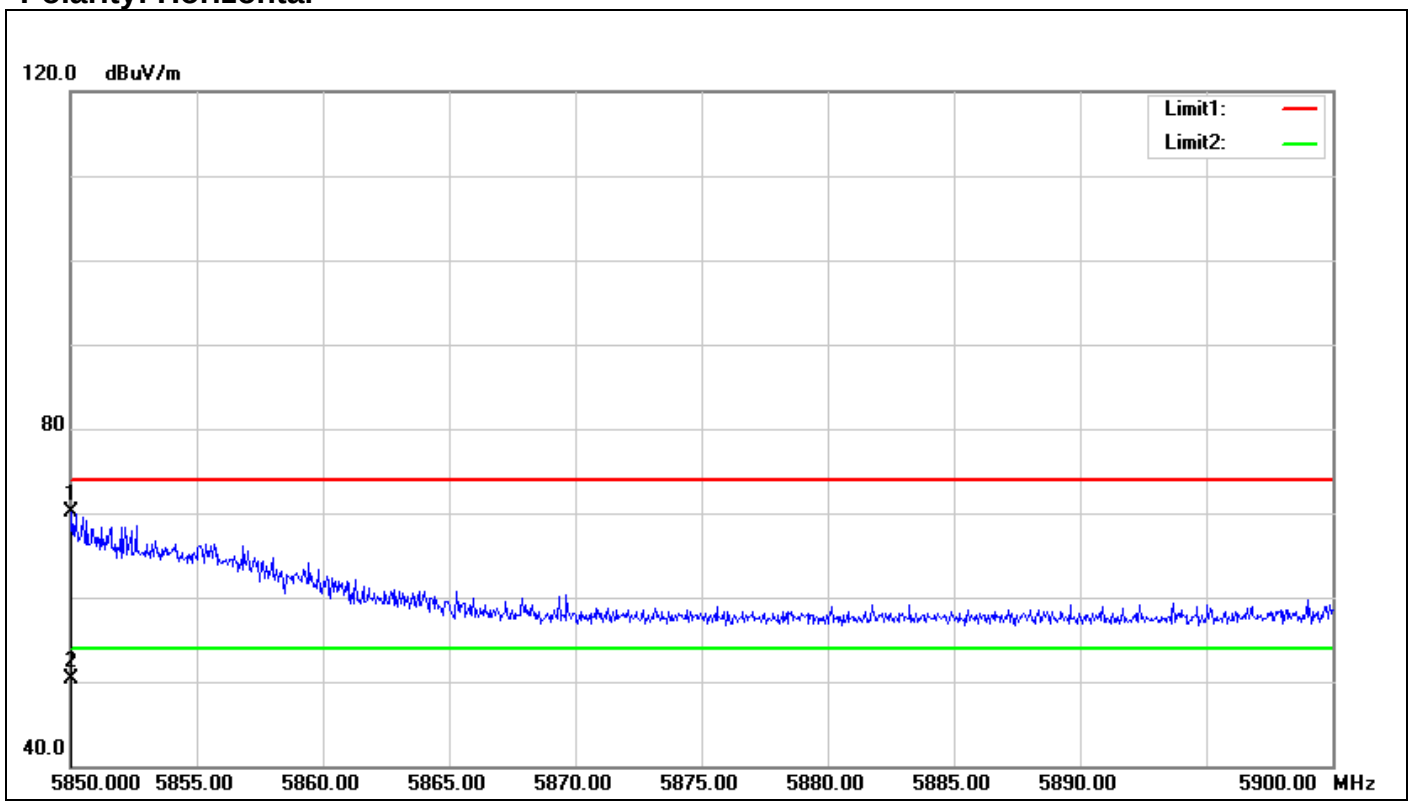
Band Edges (IEEE 802.11n HT 20 MHz mode / CH 5825 MHz)

Polarity: Vertical



No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(°)	
1	5850.900	65.39	6.74	72.13	74.00	-1.87	100	6	peak
2	5850.900	38.72	6.74	45.46	54.00	-8.54	100	6	AVG

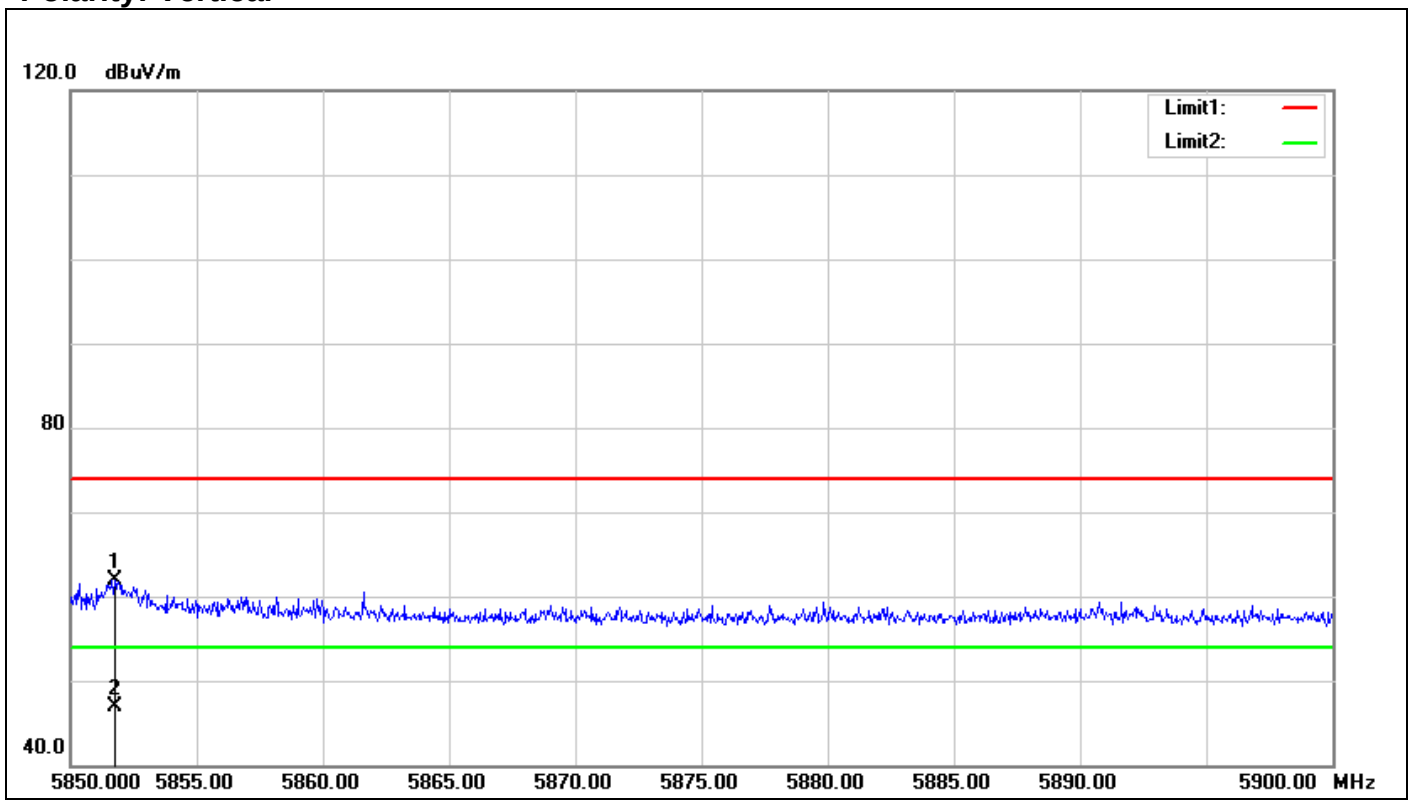
Polarity: Horizontal



No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(°)	
1	5850.050	63.37	6.74	70.11	74.00	-3.89	100	296	peak
2	5850.050	43.58	6.74	50.32	54.00	-3.68	100	296	AVG

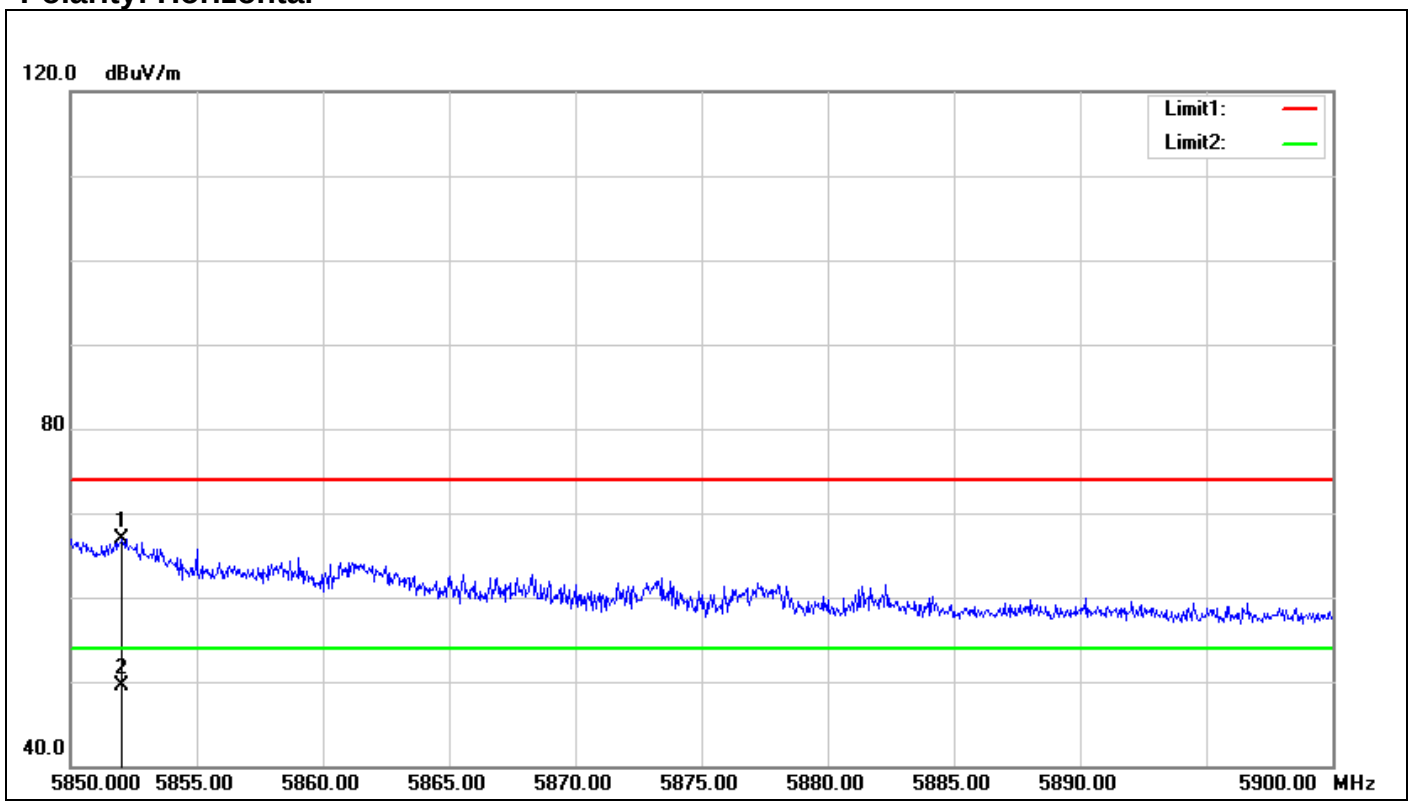
Band Edges (IEEE 802.11n HT 40 MHz mode / CH 5795 MHz)

Polarity: Vertical



No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(°)	
1	5851.750	55.11	6.75	61.86	74.00	-12.14	100	181	peak
2	5851.750	40.22	6.75	46.97	54.00	-7.03	100	181	AVG

Polarity: Horizontal

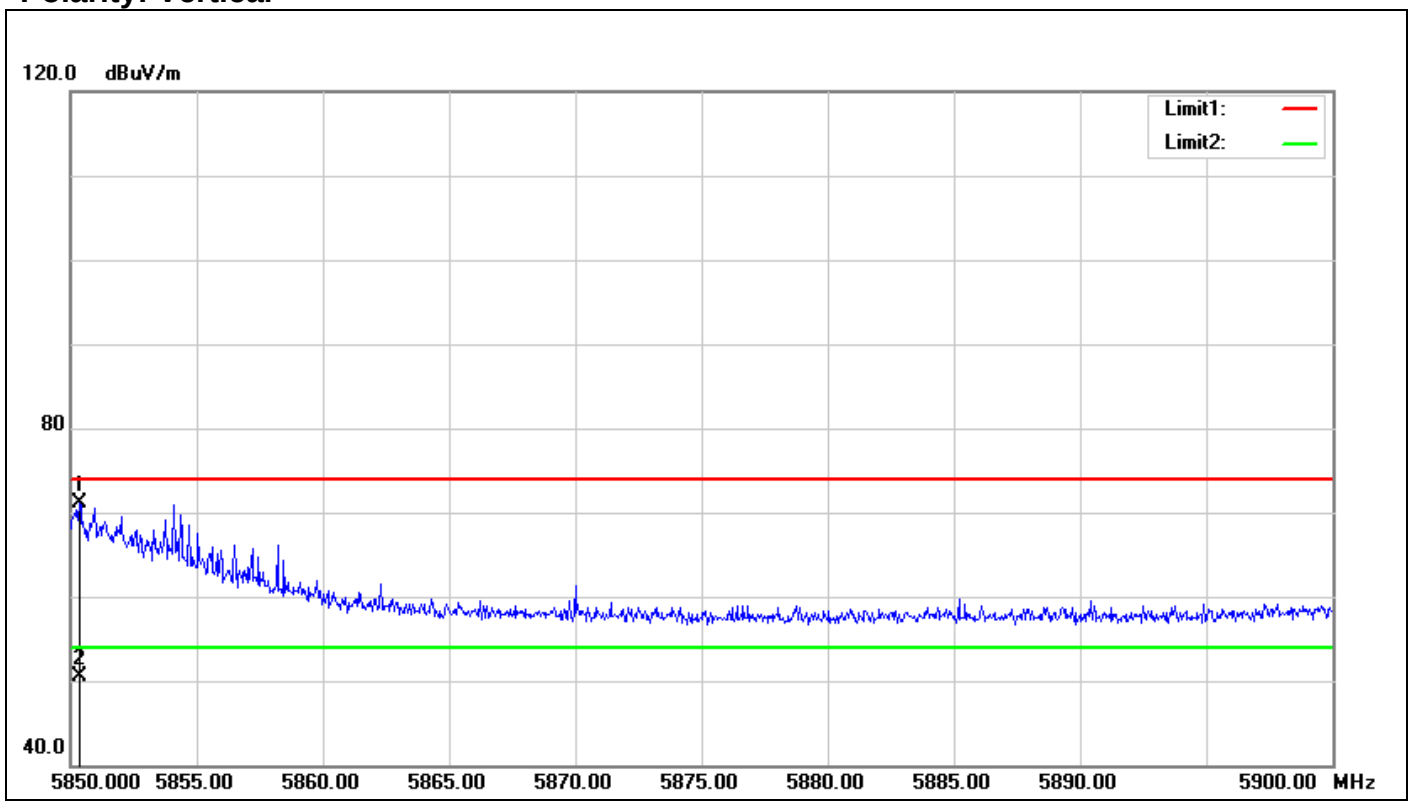


No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(°)	
1	5852.050	60.19	6.75	66.94	74.00	-7.06	100	122	peak
2	5852.050	42.81	6.75	49.56	54.00	-4.44	100	122	AVG

Mode 2

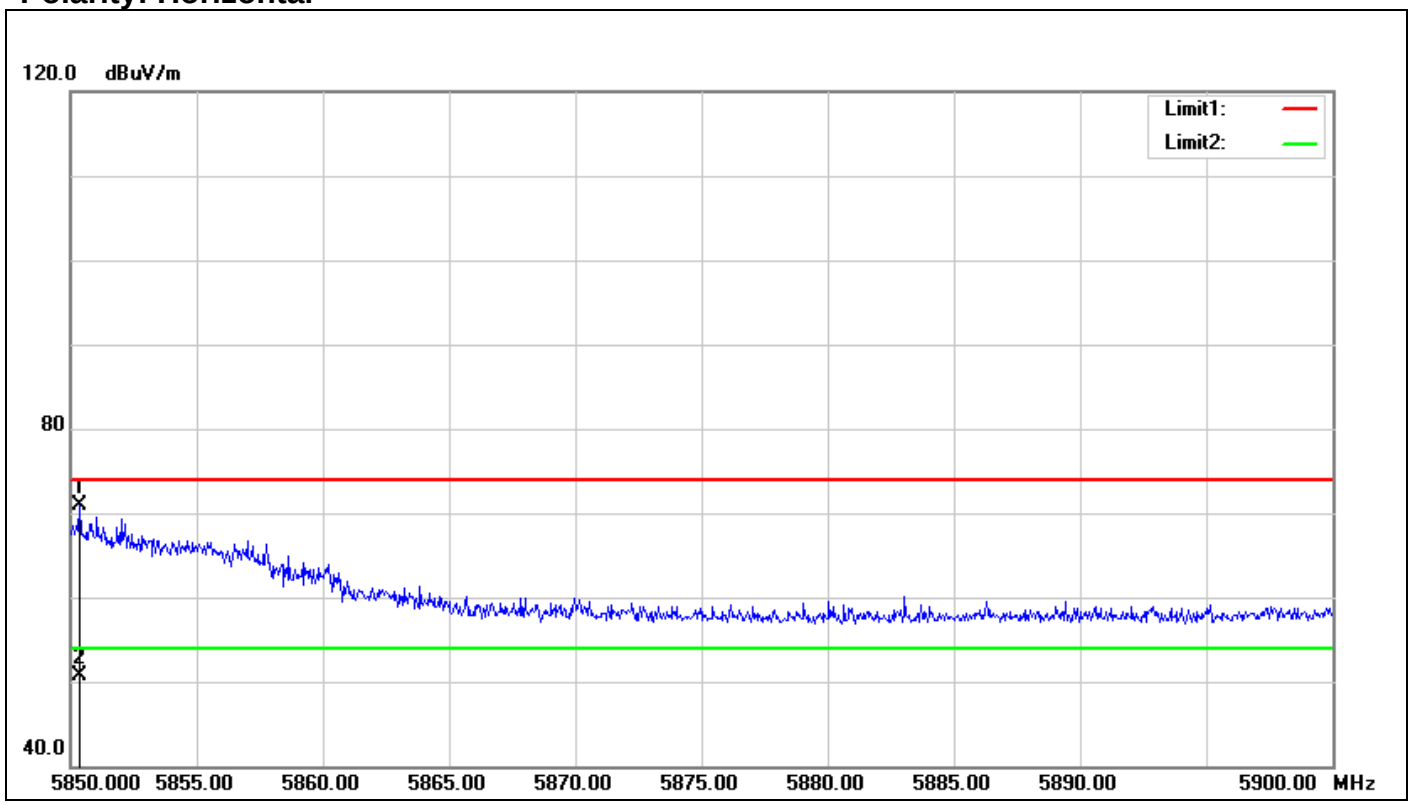
Band Edges (IEEE 802.11n HT 20 MHz mode / CH 5825 MHz)

Polarity: Vertical



No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(°)	
1	5850.350	64.33	6.74	71.07	74.00	-2.93	100	160	peak
2	5850.350	43.67	6.74	50.41	54.00	-3.59	100	160	AVG

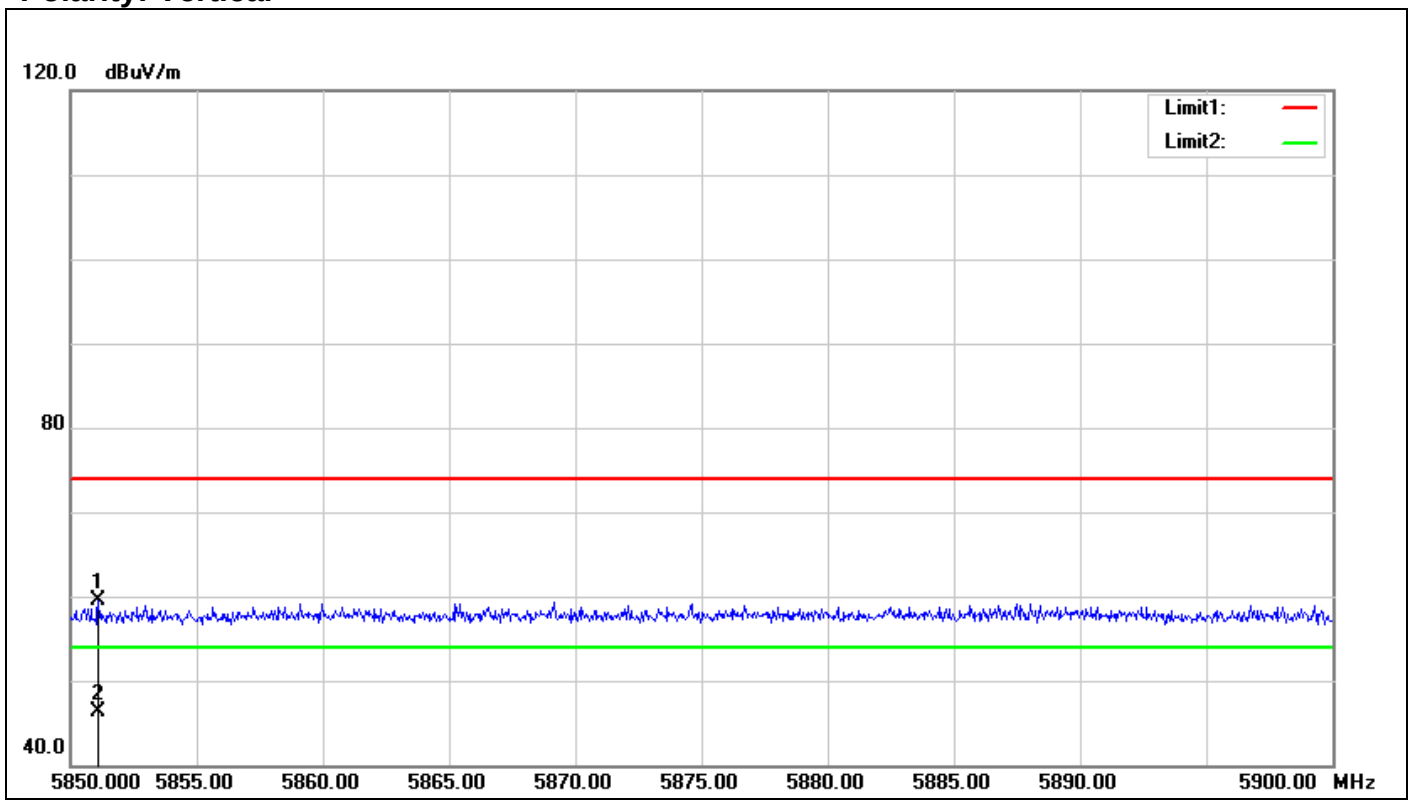
Polarity: Horizontal



No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(°)	
1	5850.350	64.25	6.74	70.99	74.00	-3.01	100	314	peak
2	5850.350	43.94	6.74	50.68	54.00	-3.32	100	314	AVG

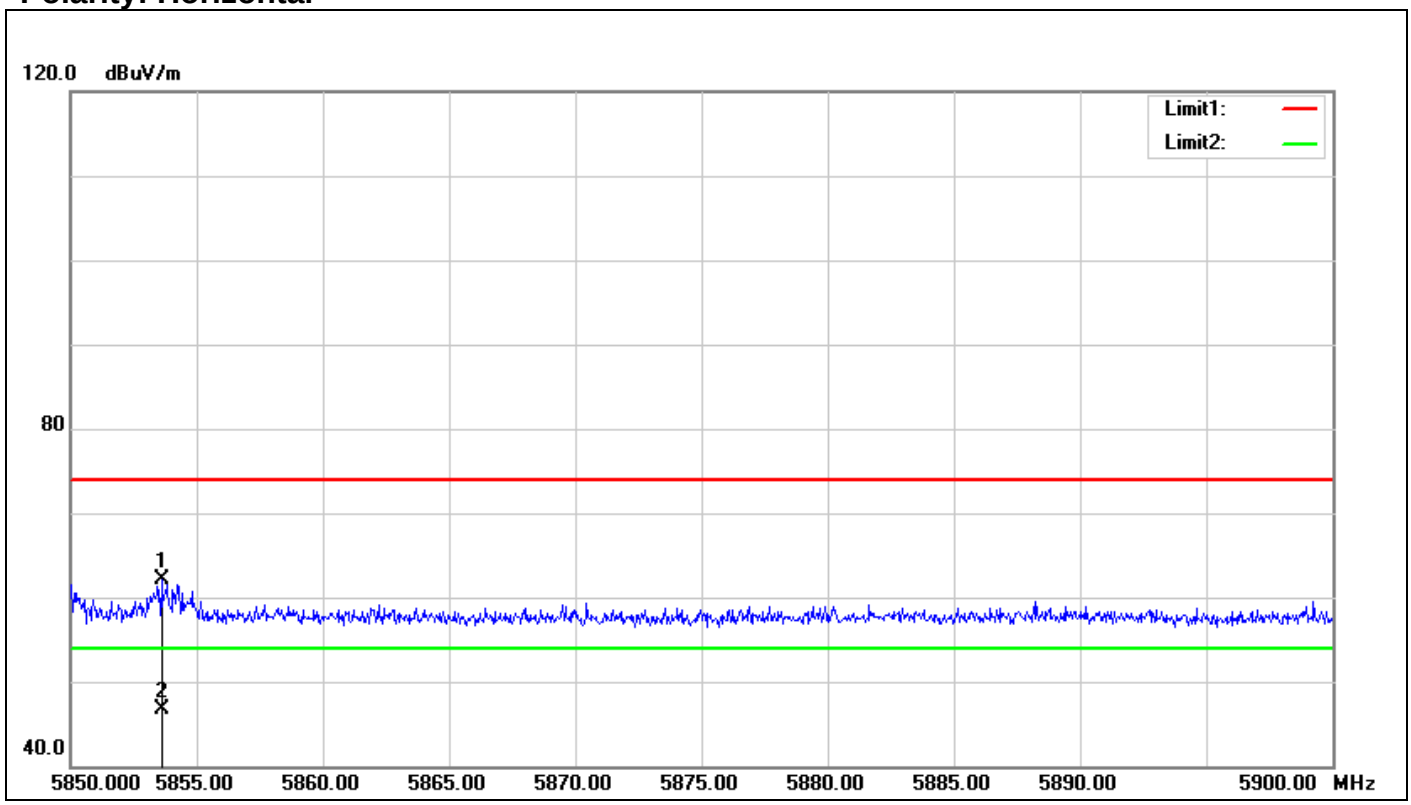
Band Edges (IEEE 802.11n HT 40 MHz mode / CH 5795 MHz)

Polarity: Vertical



No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(°)	
1	5851.100	52.76	6.75	59.51	74.00	-14.49	100	263	peak
2	5851.100	39.60	6.75	46.35	54.00	-7.65	100	263	AVG

Polarity: Horizontal

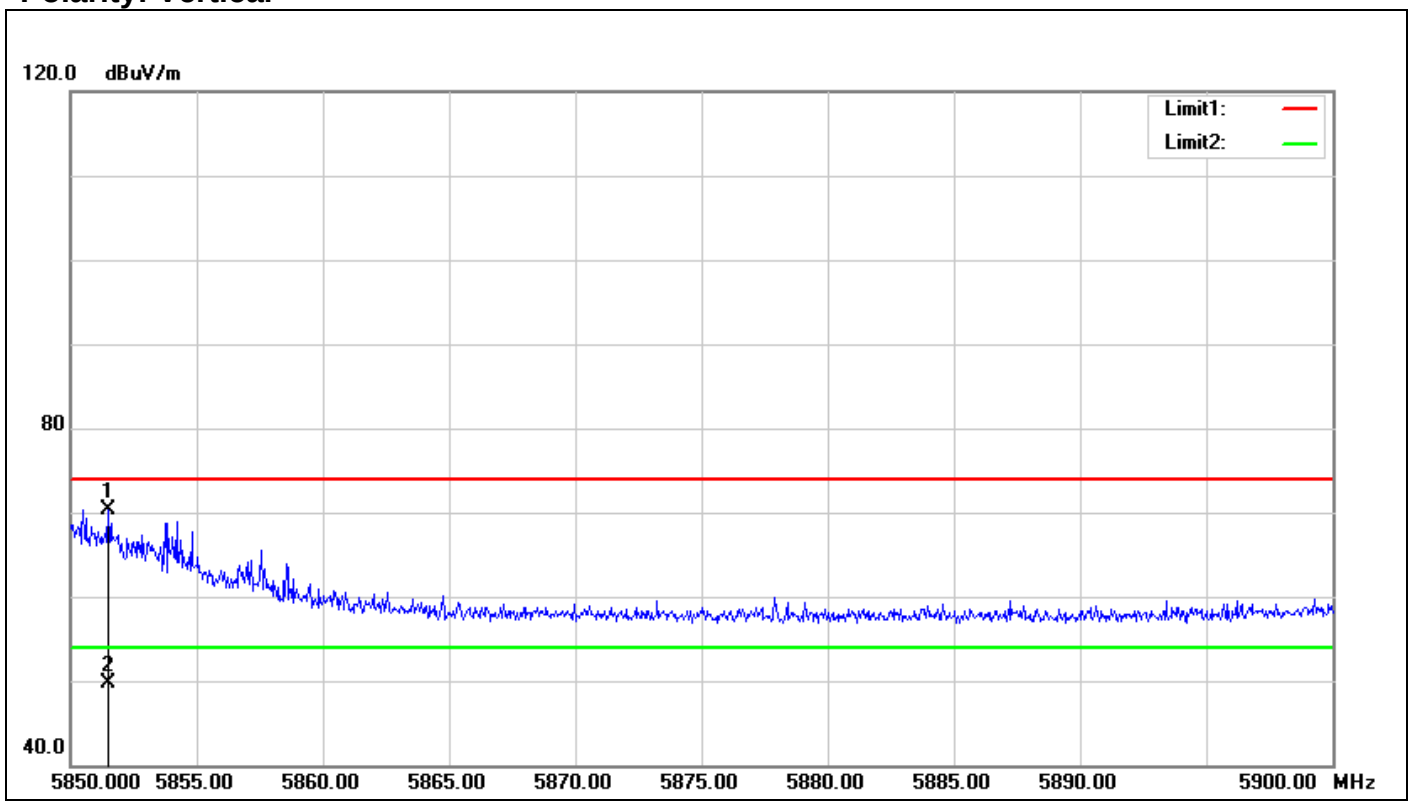


No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(°)	
1	5853.600	55.38	6.76	62.14	74.00	-11.86	100	170	peak
2	5853.600	40.03	6.76	46.79	54.00	-7.21	100	170	AVG

Mode 3

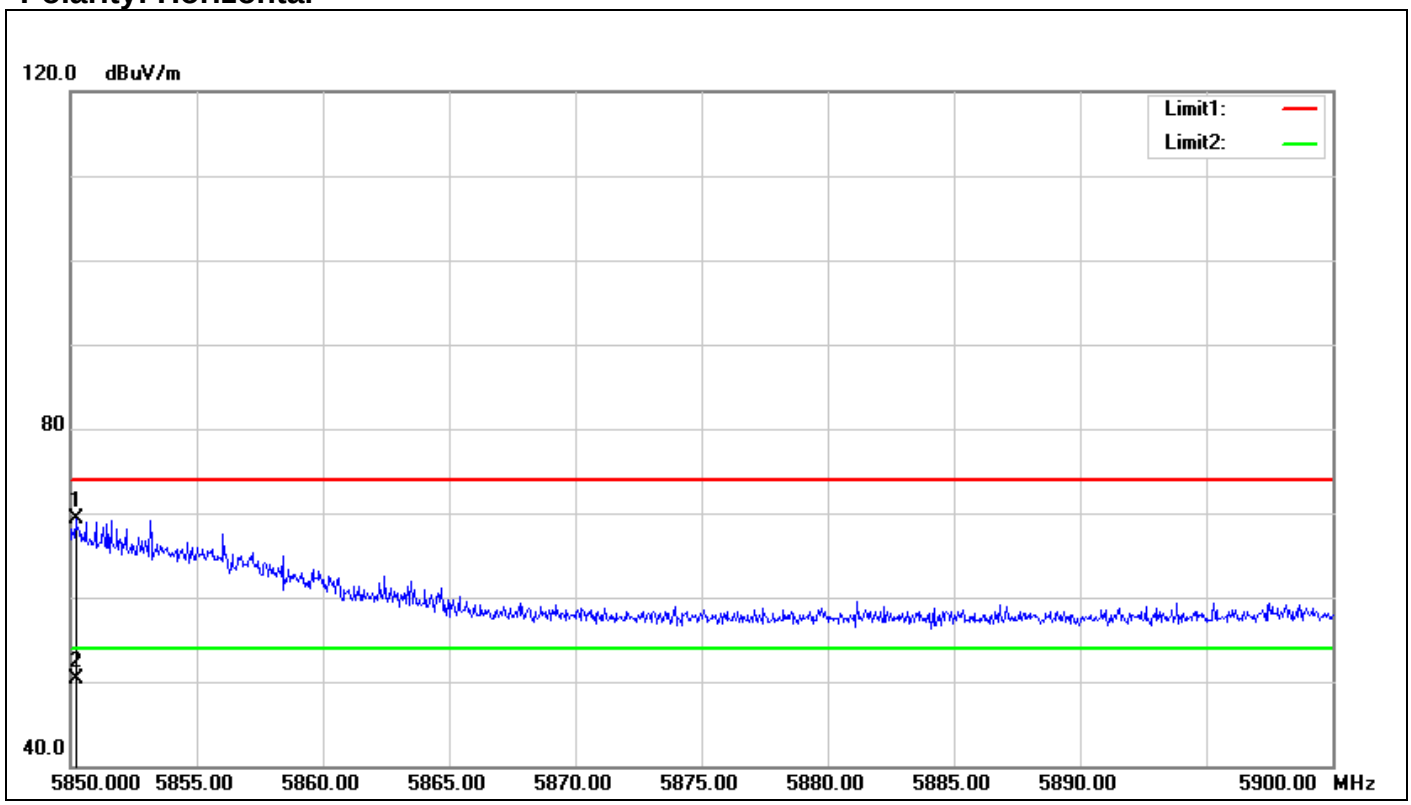
Band Edges (IEEE 802.11n HT 20 MHz mode / CH 5825 MHz)

Polarity: Vertical



No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(°)	
1	5851.500	63.64	6.75	70.39	74.00	-3.61	100	186	peak
2	5851.500	42.91	6.75	49.66	54.00	-4.34	100	186	AVG

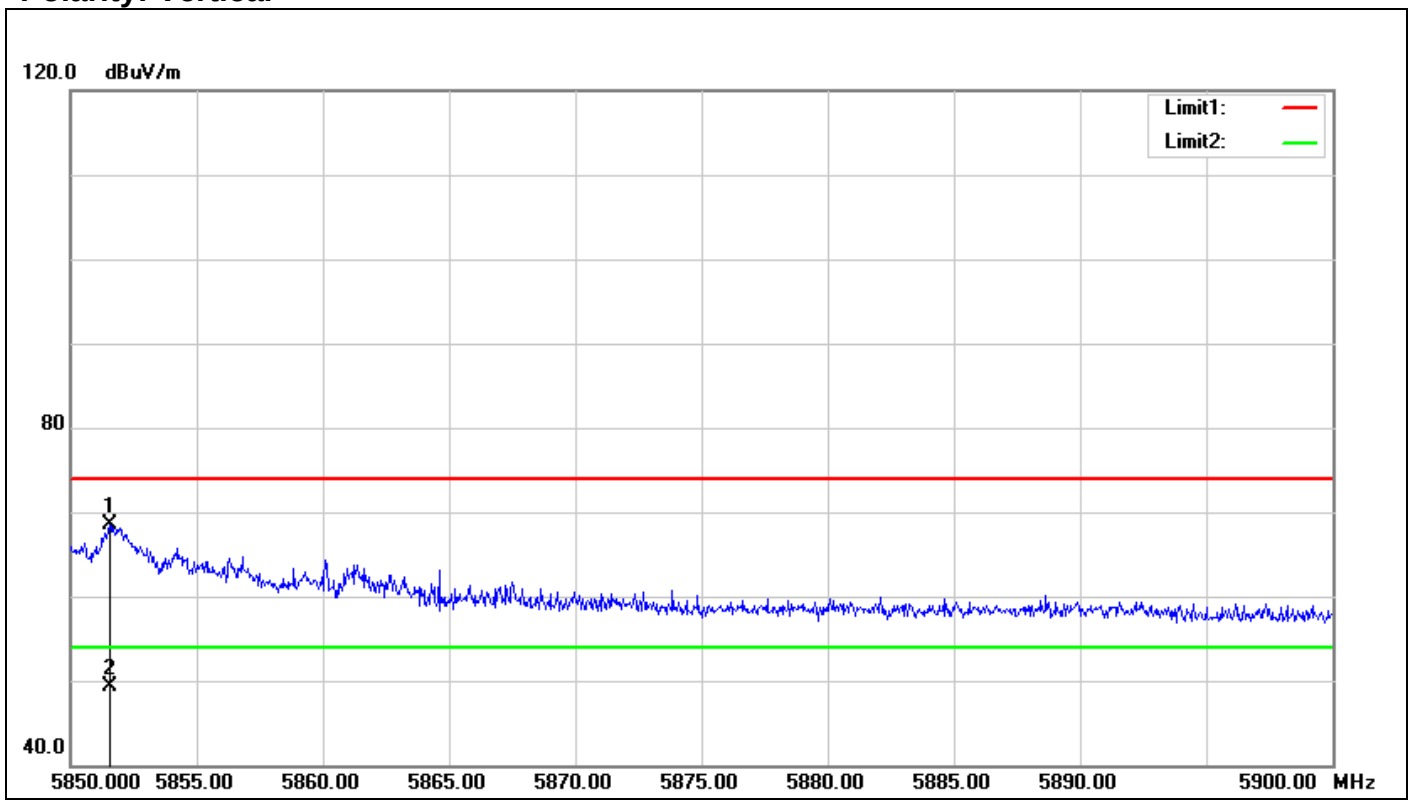
Polarity: Horizontal



No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(°)	
1	5850.200	62.55	6.74	69.29	74.00	-4.71	100	186	peak
2	5850.200	43.52	6.74	50.26	54.00	-3.74	100	186	AVG

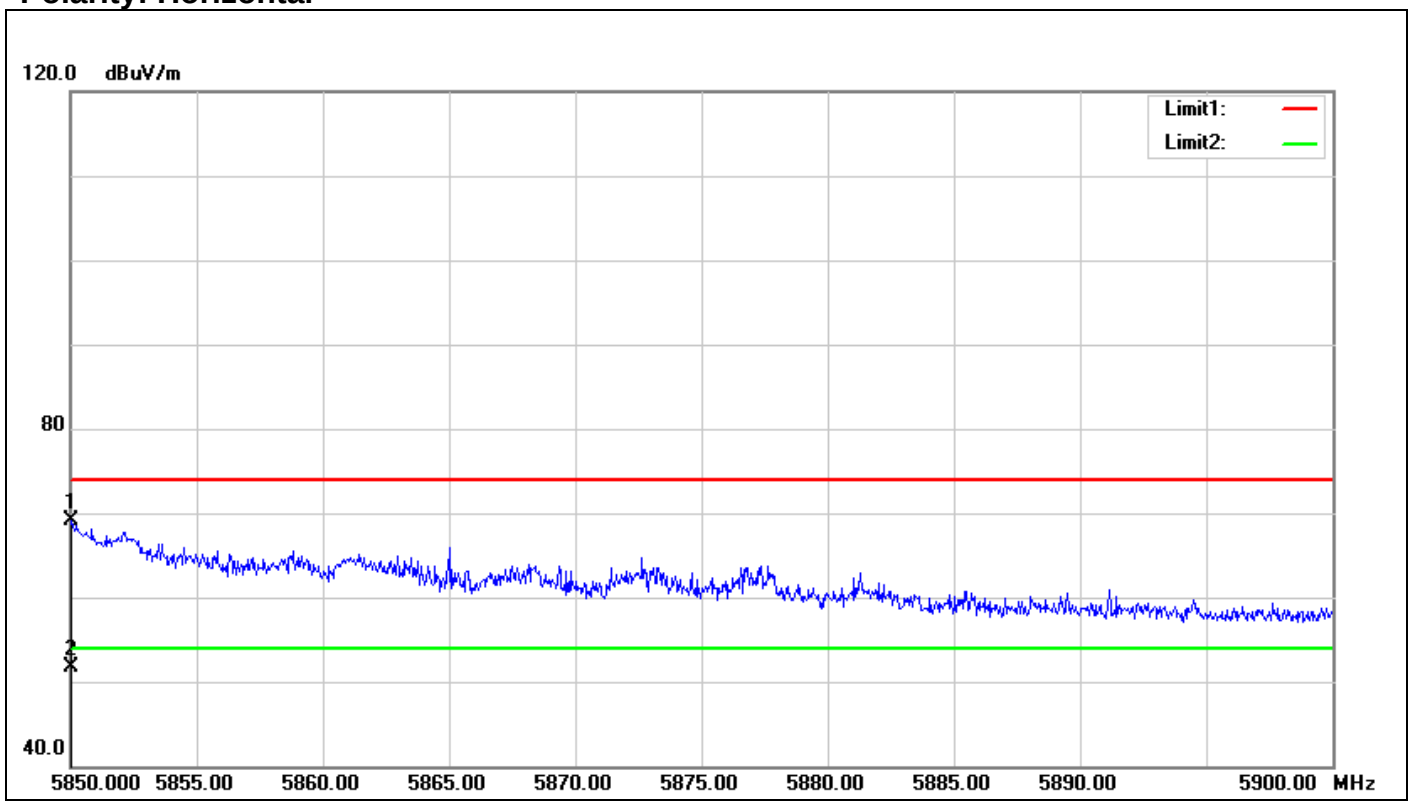
Band Edges (IEEE 802.11n HT 40 MHz mode / CH 5795 MHz)

Polarity: Vertical



No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(°)	
1	5851.550	61.75	6.75	68.50	74.00	-5.50	100	240	peak
2	5851.550	42.55	6.75	49.30	54.00	-4.70	100	240	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	5850.000	62.33	6.74	69.07	74.00	-4.93	100	152	peak
2	5850.000	44.95	6.74	51.69	54.00	-2.31	100	152	AVG

7.4 PEAK POWER SPECTRAL DENSITY

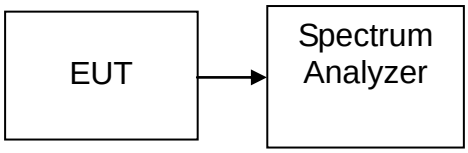
LIMIT

According to §15.407(a),

(1) For the band 5.725-5.850 GHz, the peak power spectral density shall not exceed 30dBm in any 1MHz 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 = 500kHHz, VBW = 3*RBW, 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/ 5745 ~ 5825MHz

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin	Result
Low	5745	-5.32	30	-35.32	PASS
Mid	5785	-5.12	30	-35.12	PASS
High	5825	-4.64	30	-34.64	PASS

Mode 1

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)	Margin	Result
Low	5745	-6.07	0.39	1.27	28.06	-26.79	PASS
Mid	5785	-6.31	0.41	1.25	28.06	-26.81	PASS
High	5825	-5.25	0.14	1.24	28.06	-26.82	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)	Margin	Result
Low	5755	-5.27	-4.02	-1.59	28.06	-29.65	PASS
High	5795	-5.41	-4.33	-1.83	28.06	-29.89	PASS

Remark:

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

2. The maximum antenna gain is 7.94dBi; therefore the reduction due to antenna gain is 1.94dB, so the limit is 28.06dBm.

Mode 2

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

Channel	Frequency (MHz)	Chain 1 PPSD (dBm)	Chain 2 PPSD (dBm)	PPSD (dBm)	Limit (dBm)	Margin	Result
Low	5745	-5.87	-4.69	-2.23	28.13	-30.36	PASS
Mid	5785	-4.18	-1.22	0.56	28.13	-27.57	PASS
High	5825	-4.97	-0.97	0.49	28.13	-27.64	PASS

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

Channel	Frequency (MHz)	Chain 1 PPSD (dBm)	Chain 2 PPSD (dBm)	PPSD (dBm)	Limit (dBm)	Margin	Result
Low	5755	-9.56	-5.86	-4.32	28.13	-32.45	PASS
High	5795	-9.14	-5.91	-4.22	28.13	-32.35	PASS

Remark:

*1. Total PPSD (dBm) = 10*LOG(10^(Chain 1 PPSD / 10)+10^(Chain 2 PPSD /10))*

2. The maximum antenna gain is 7.87dBi; therefore the reduction due to antenna gain is 1.87dB, so the limit is 28.13dBm.

Mode 3

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

Channel	Frequency (MHz)	Chain 0 PPSD (dBm)	Chain 2 PPSD (dBm)	PPSD (dBm)	Limit (dBm)	Margin	Result
Low	5745	-9.28	-2.81	-1.93	28.18	-30.11	PASS
Mid	5785	-8.79	-2.61	-1.67	28.18	-29.85	PASS
High	5825	-6.88	-1.48	-0.38	28.18	-28.56	PASS

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

Channel	Frequency (MHz)	Chain 0 PPSD (dBm)	Chain 2 PPSD (dBm)	PPSD (dBm)	Limit (dBm)	Margin	Result
Low	5755	-7.83	-0.70	0.07	28.18	-28.11	PASS
High	5795	-9.16	-1.49	-0.80	28.18	-28.98	PASS

Remark:

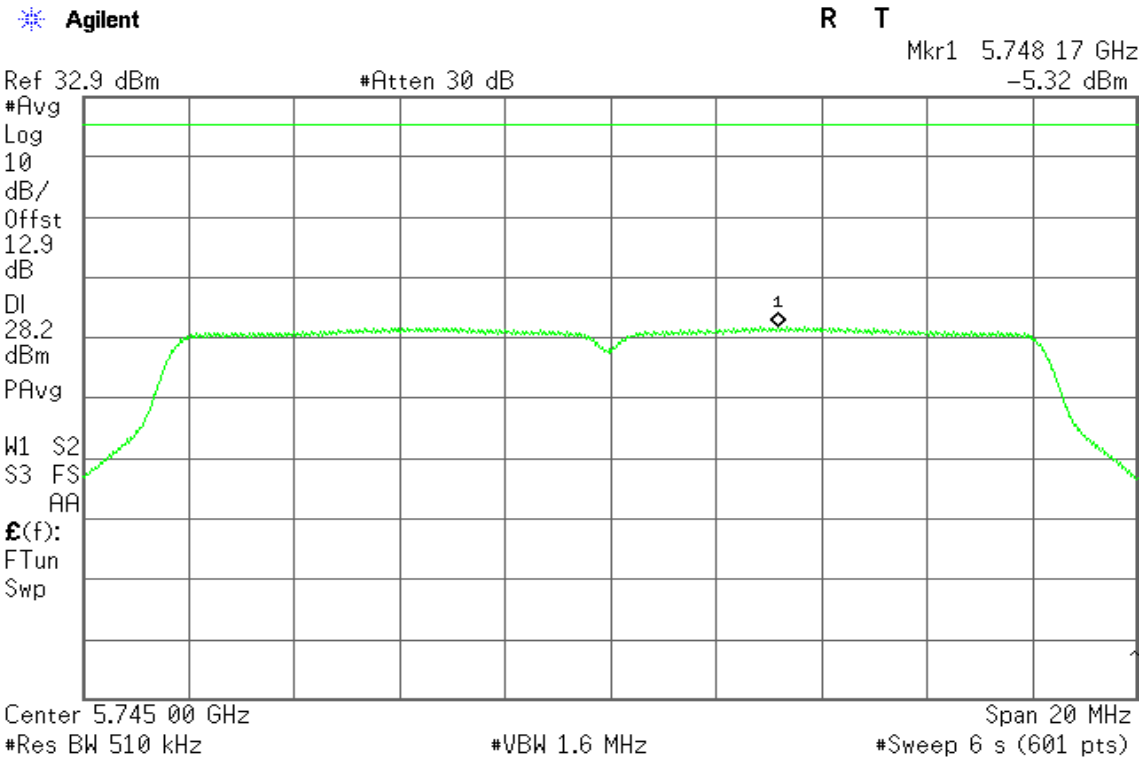
*1. Total PPSD (dBm) = 10*LOG(10^(Chain 0 PPSD / 10)+10^(Chain 2PPSD /10))*

2. The maximum antenna gain is 7.82dBi; therefore the reduction due to antenna gain is 1.82dB, so the limit is 28.18dBm.

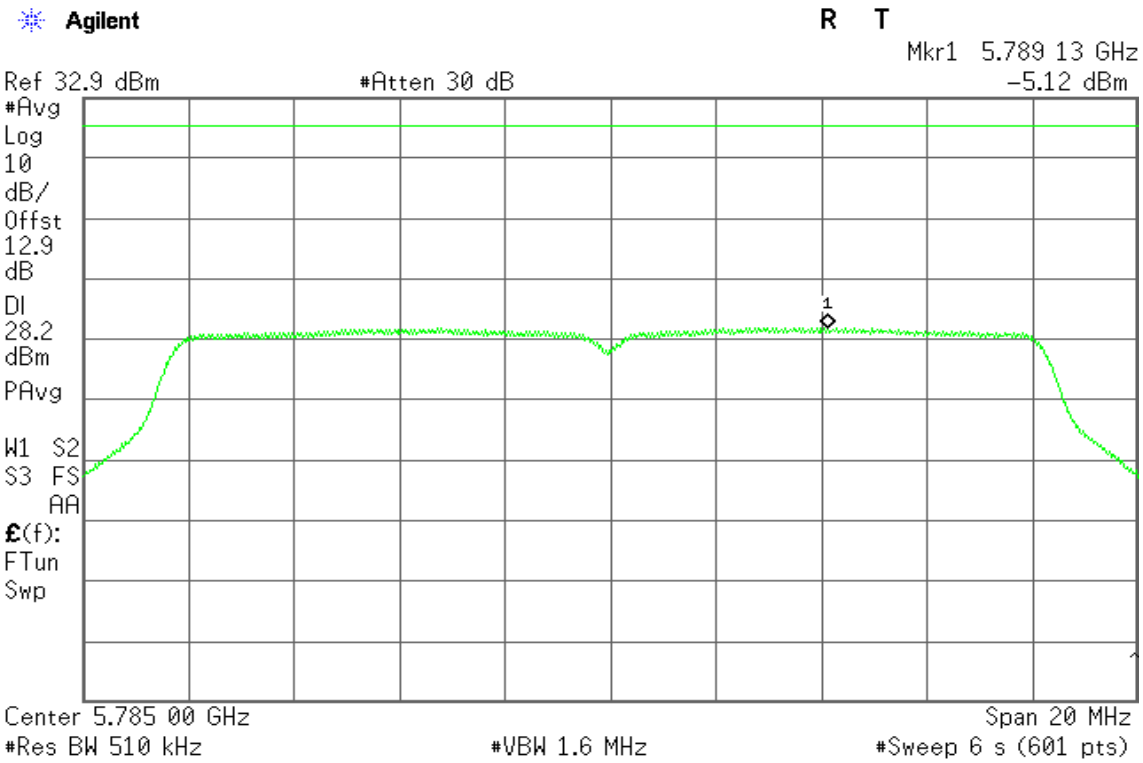
Test Plot

IEEE 802.11a mode / 5745 ~ 5825MHz

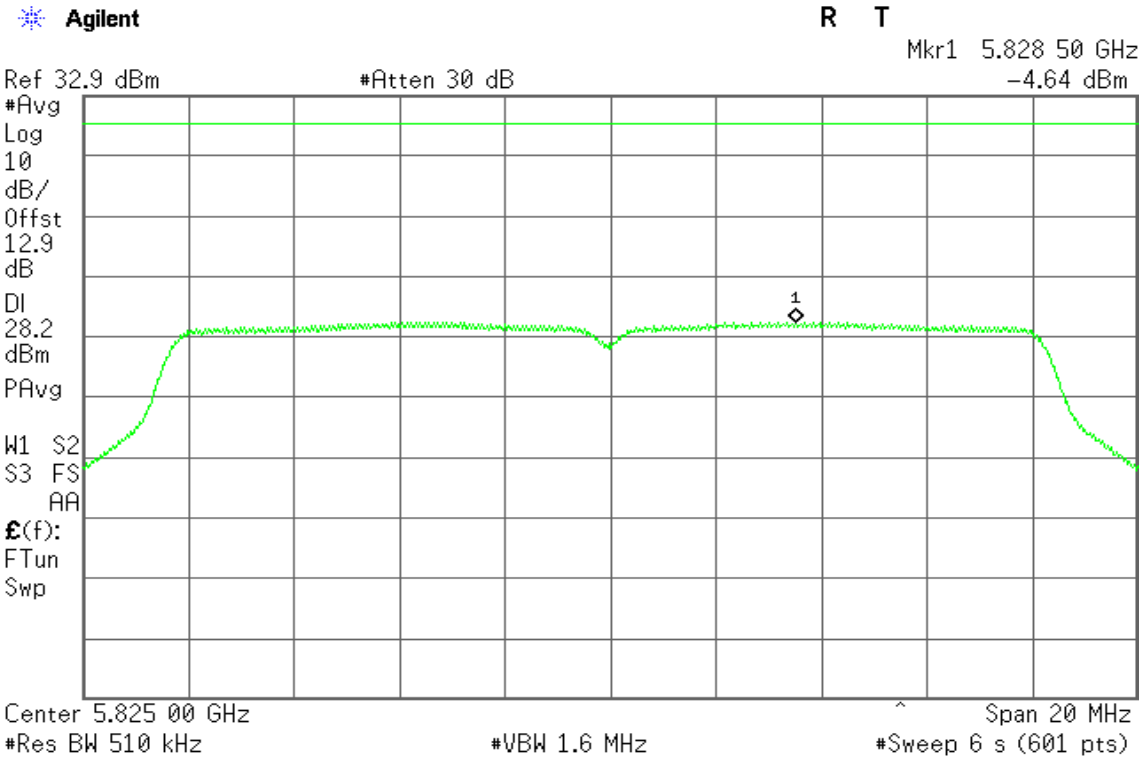
CH Low



CH Mid



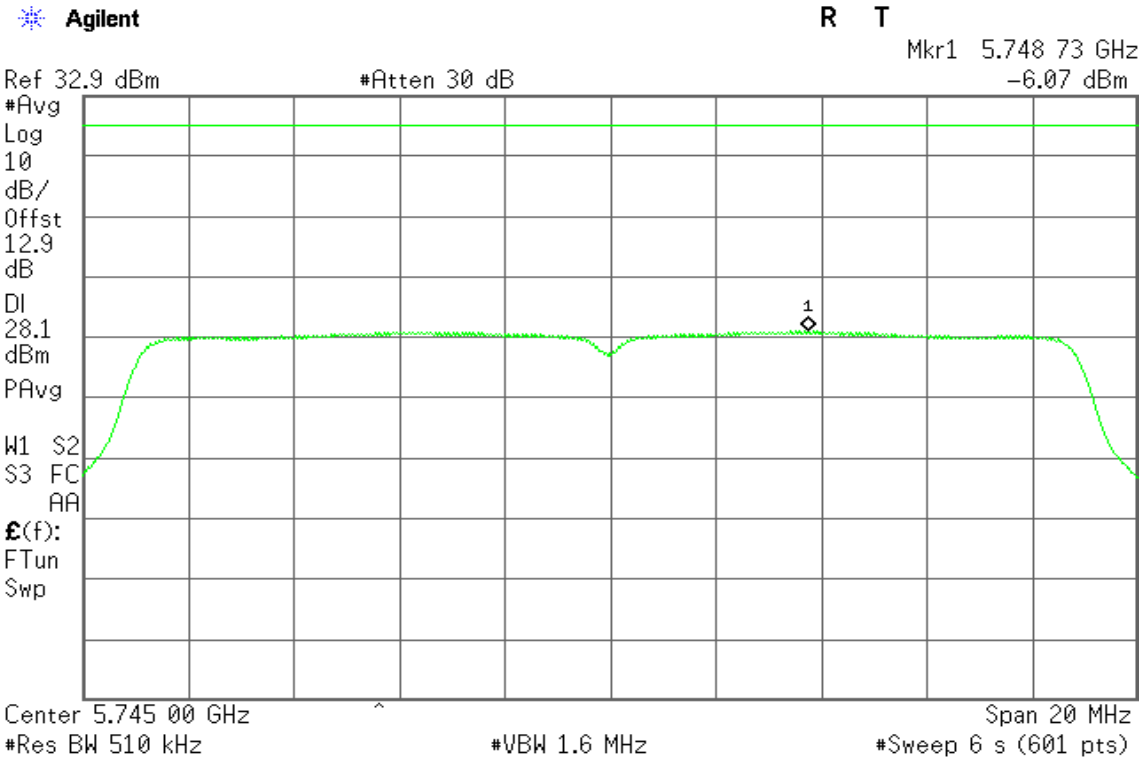
CH High


Agilent
R T
Mkr1 5.828 50 GHz
Ref 32.9 dBm
#Atten 30 dB
-4.64 dBm
#Avg
Log
10
dB/
Offst
12.9
dB
Dl
28.2
dBm
PAvg
W1 S2
S3 FS
AA
£(f):
FTun
Swp
1
Center 5.825 00 GHz
Span 20 MHz
#Res BW 510 kHz
#VBW 1.6 MHz
#Sweep 6 s (601 pts)

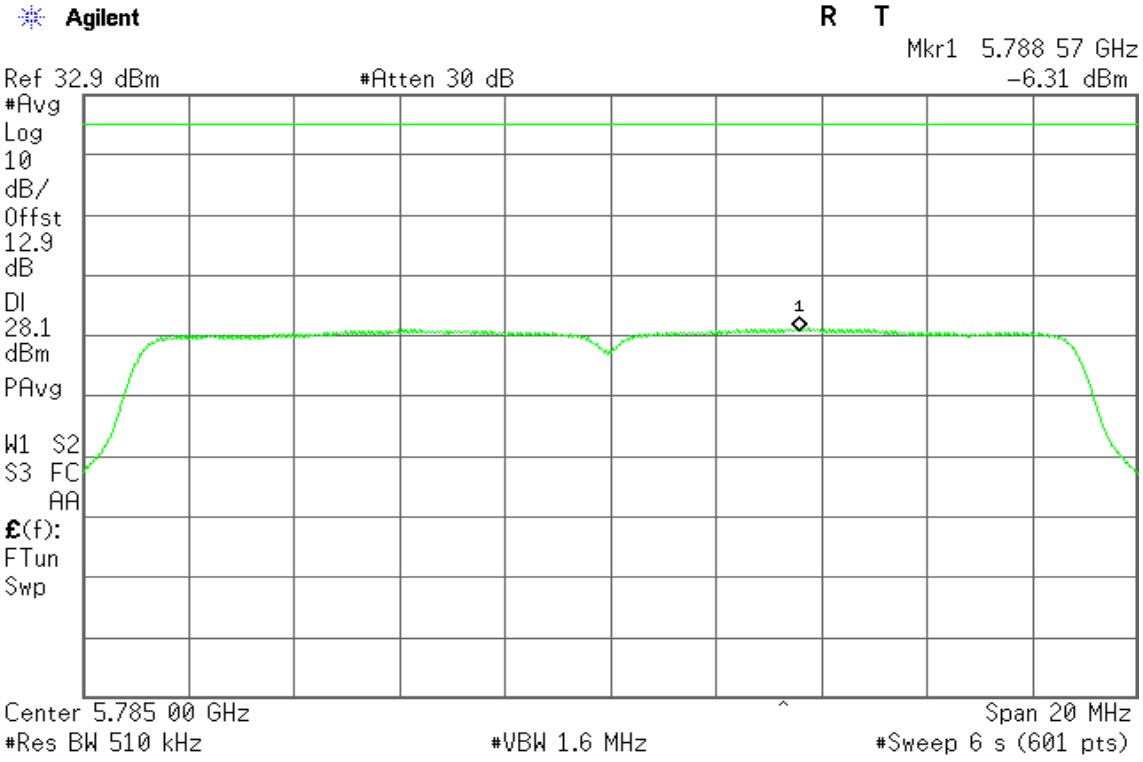
Mode 1

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

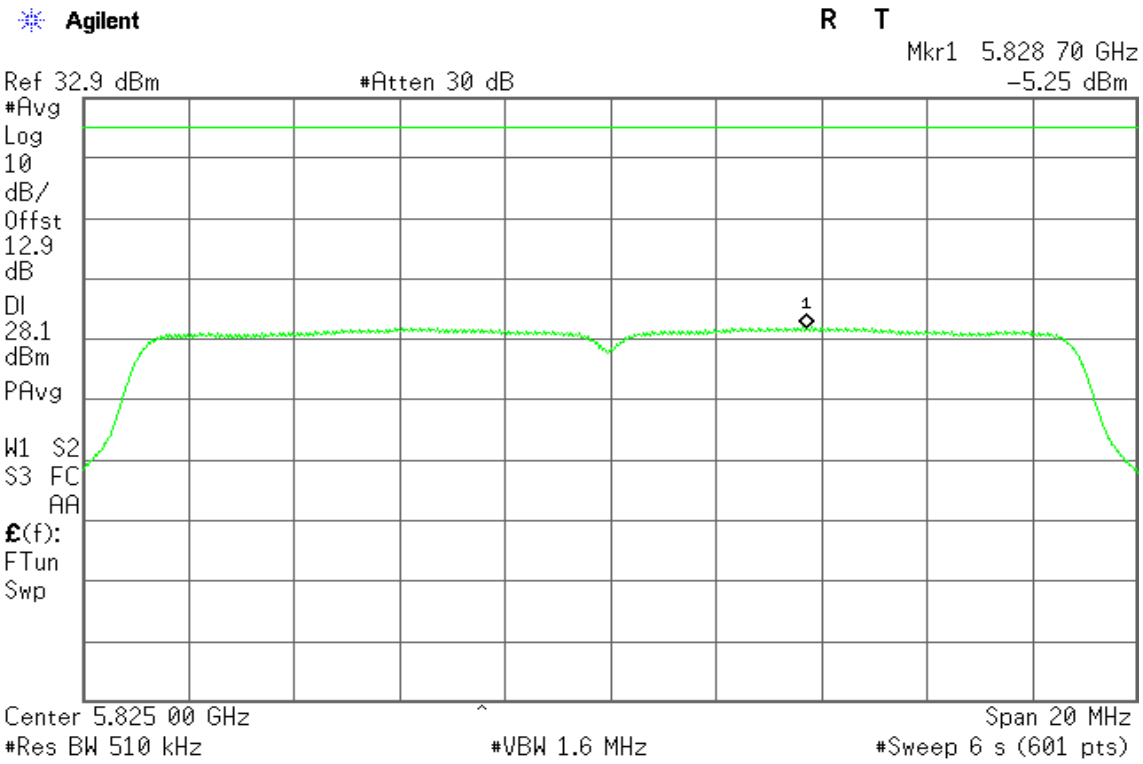
CH Low



CH Mid

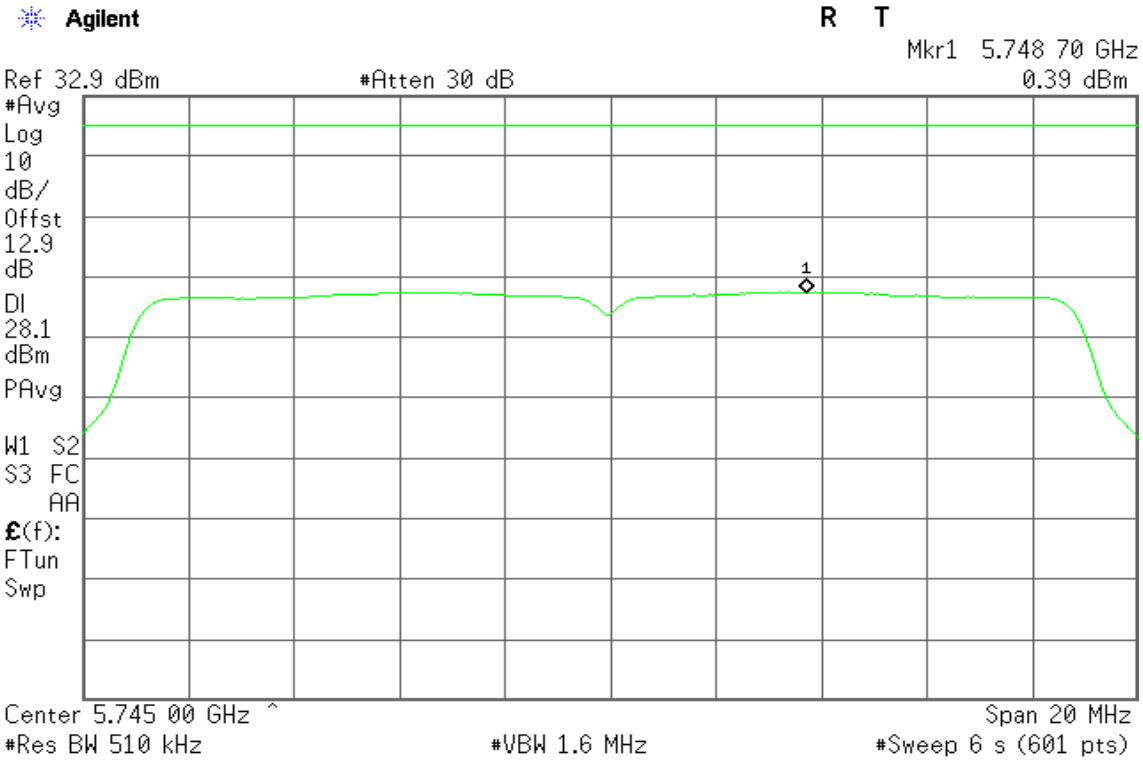


CH High

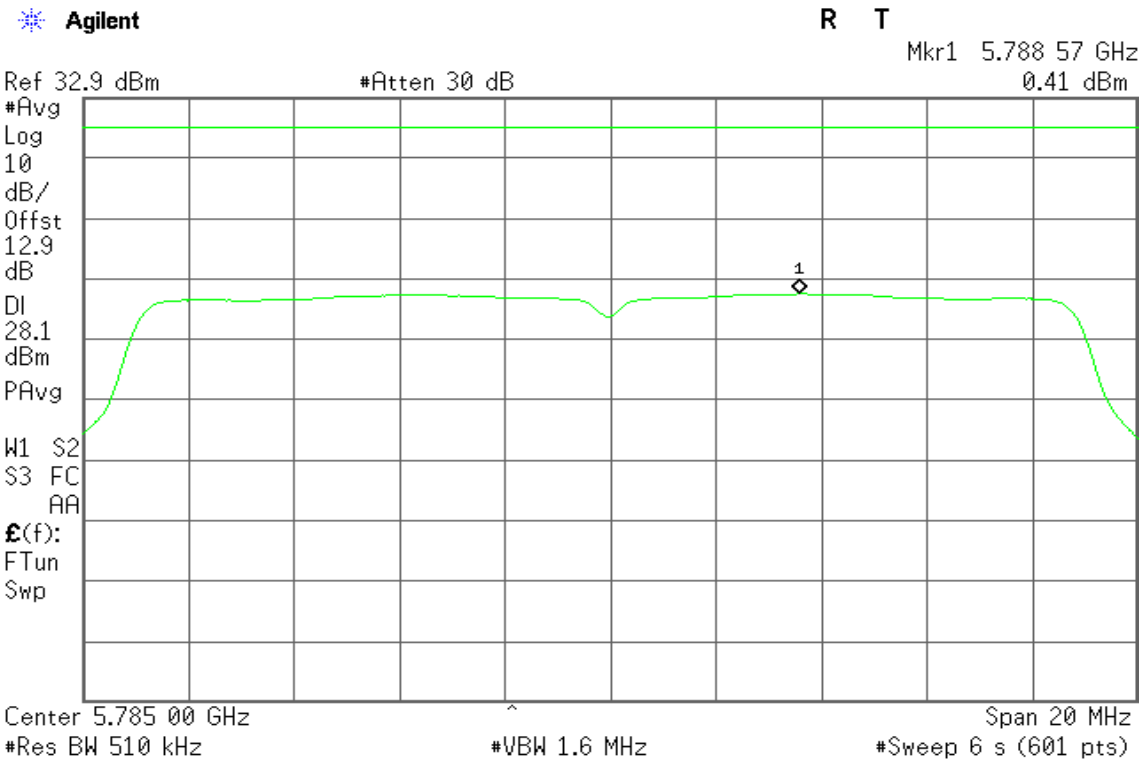

Agilent
R T
Mkr1 5.828 70 GHz
Ref 32.9 dBm
#Atten 30 dB
-5.25 dBm
#Avg
Log
10
dB/
Offst
12.9
dB
Dl
28.1
dBm
PAvg
W1 S2
S3 FC
AA
£(f):
FTun
Swp
1
Center 5.825 00 GHz
Span 20 MHz
#Res BW 510 kHz
#VBW 1.6 MHz
#Sweep 6 s (601 pts)

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

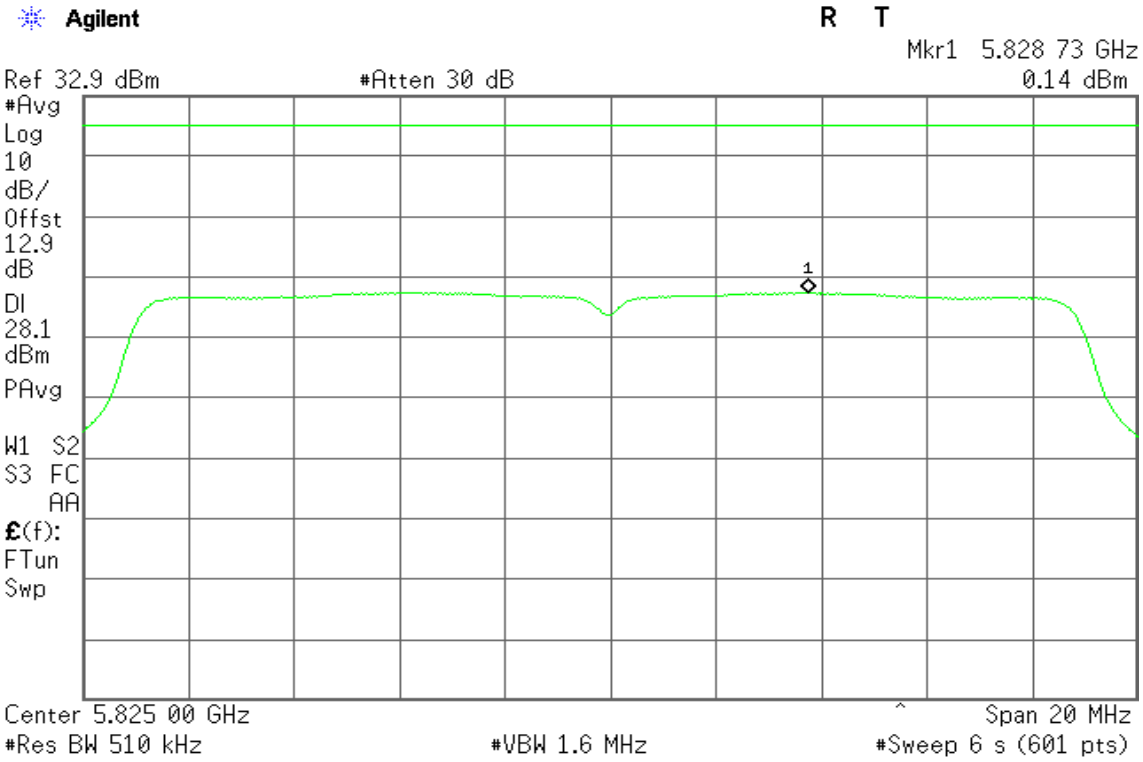
CH Low



CH Mid

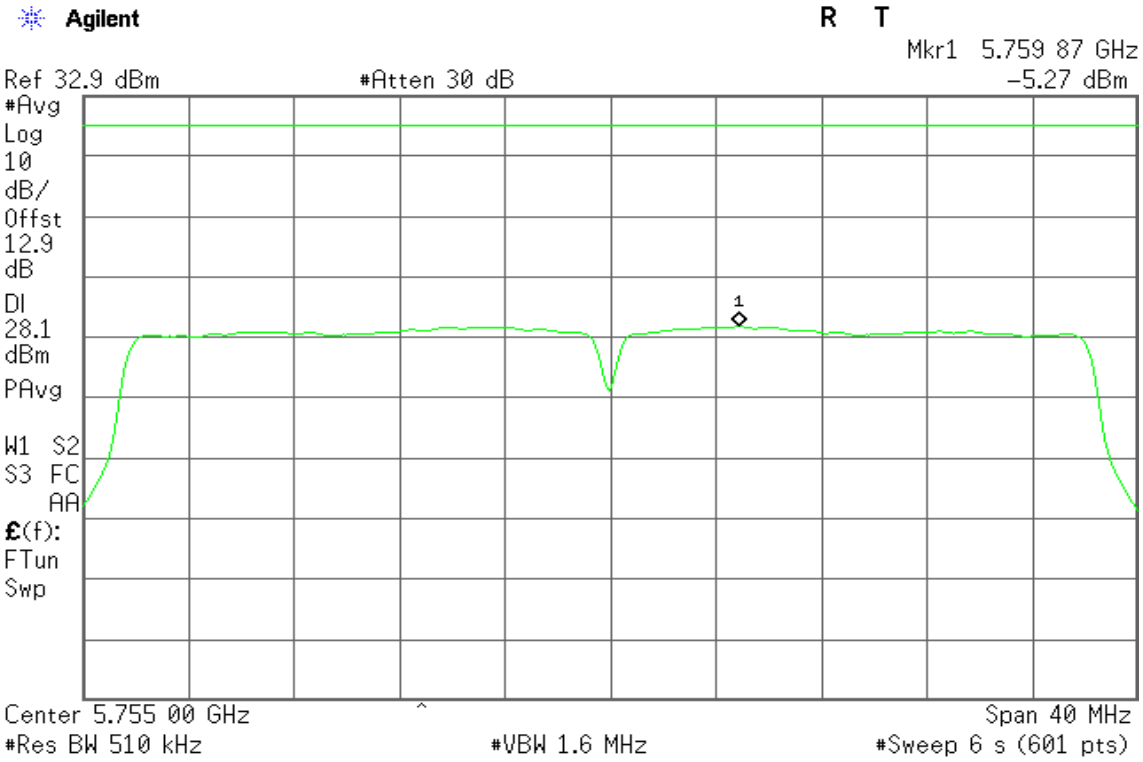


CH High

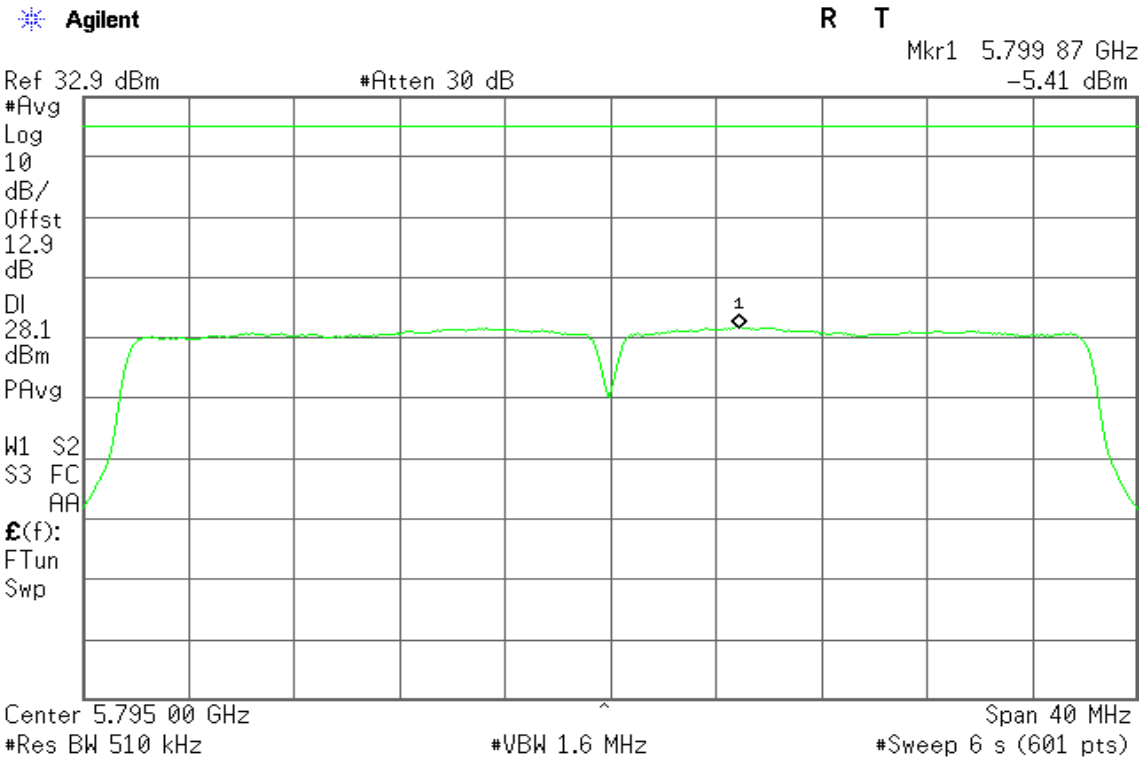

Agilent
R T
Mkr1 5.828 73 GHz
0.14 dBm
Ref 32.9 dBm
#Atten 30 dB
#Avg
Log
10
dB/
Offst
12.9
dB
Dl
28.1
dBm
PAvg
W1 S2
S3 FC
AA
£(f):
FTun
Swp
1
Center 5.825 00 GHz
Span 20 MHz
#Res BW 510 kHz
#VBW 1.6 MHz
#Sweep 6 s (601 pts)

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

CH Low

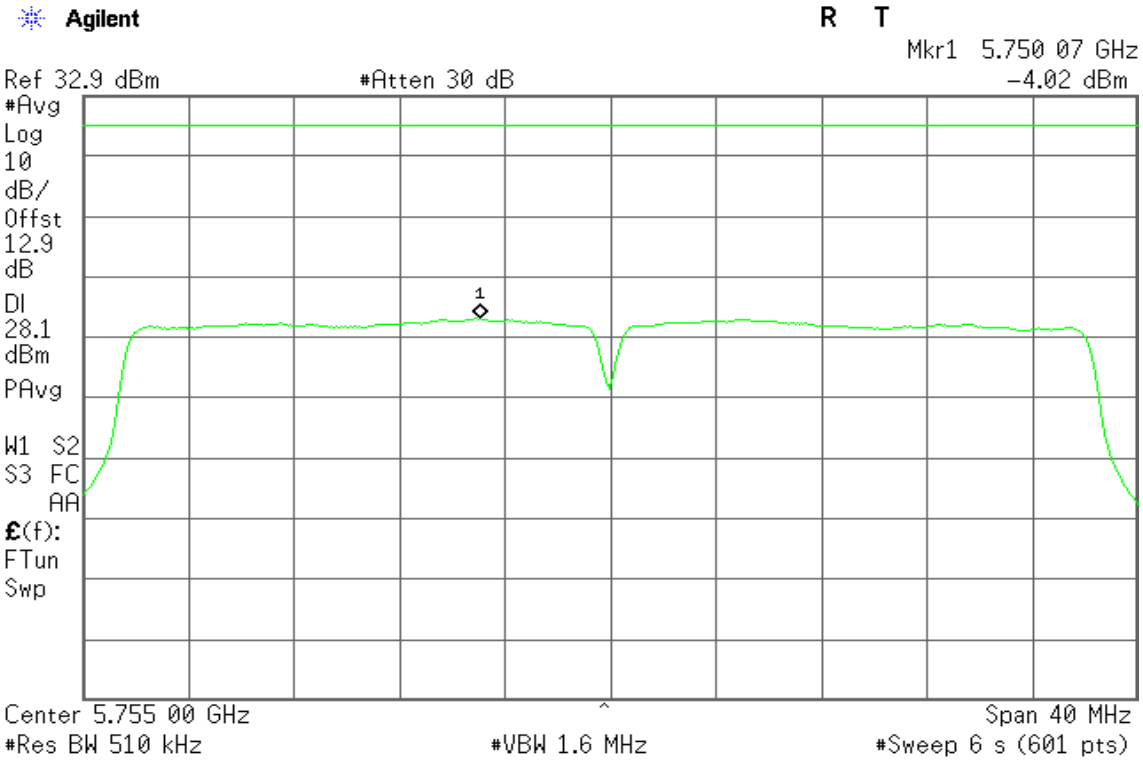


CH High

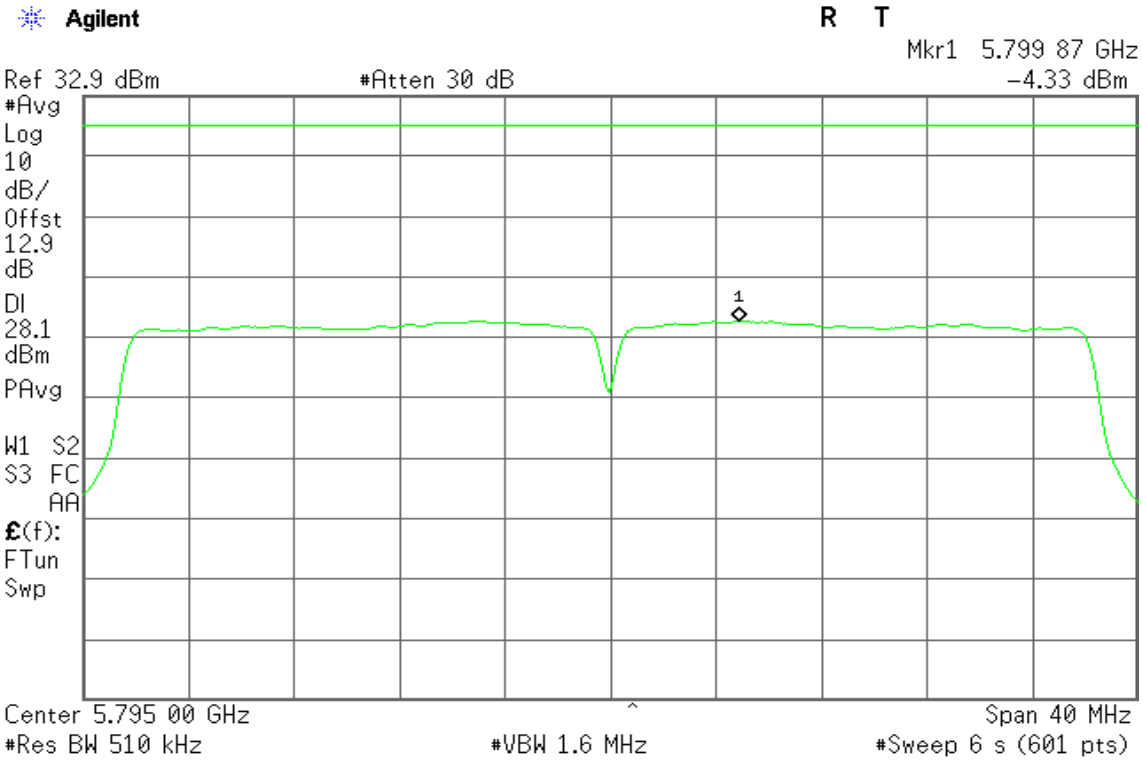


IEEE 802.11n HT 40 mode / 5755 ~ 5795MHz / Chain 1

CH Low



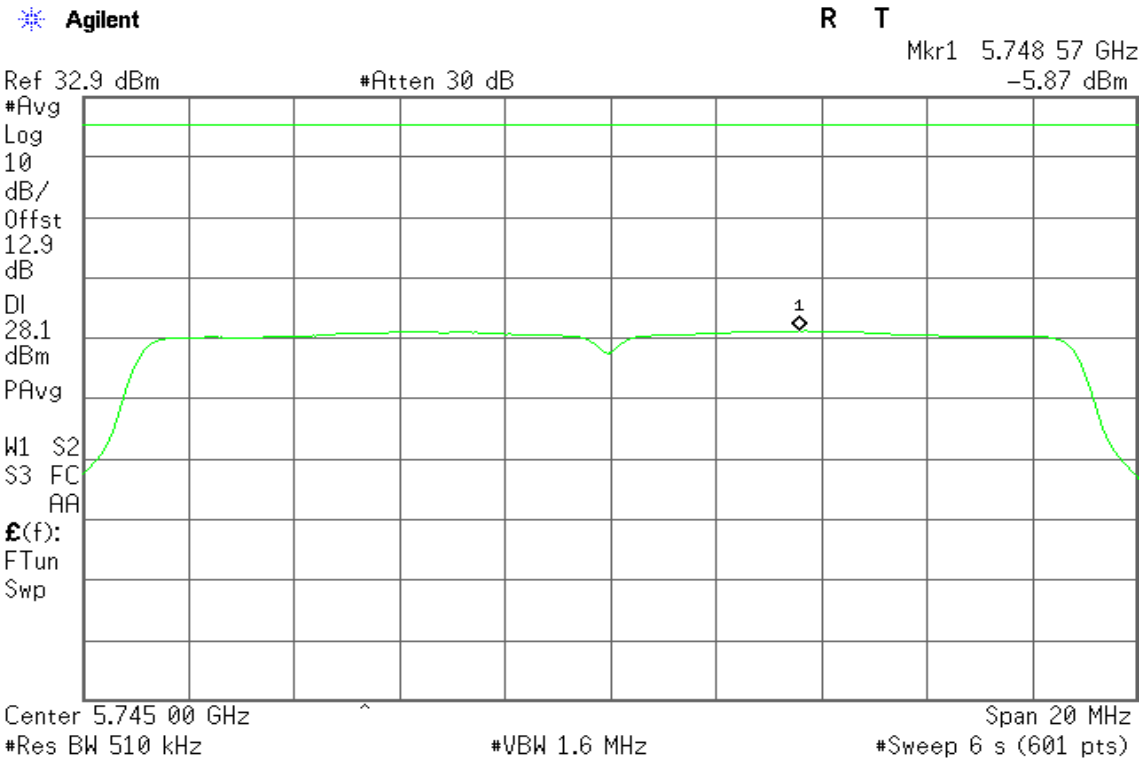
CH High



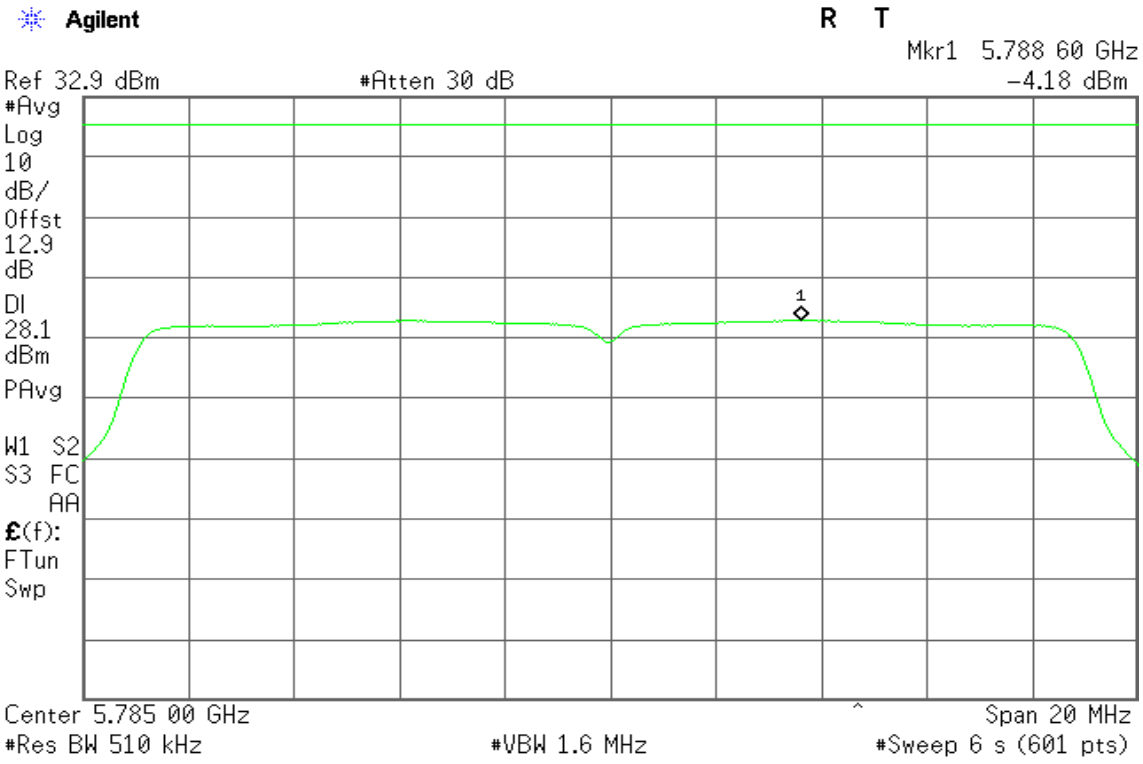
Mode 2

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

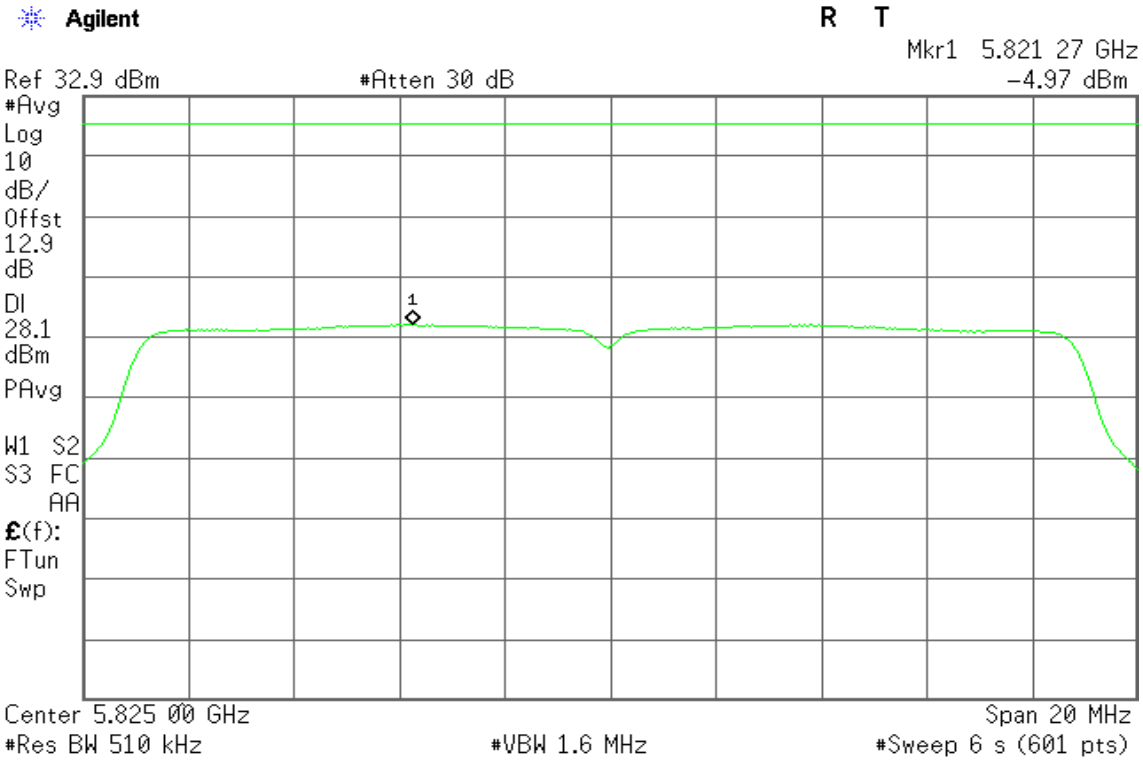
CH Low



CH Mid

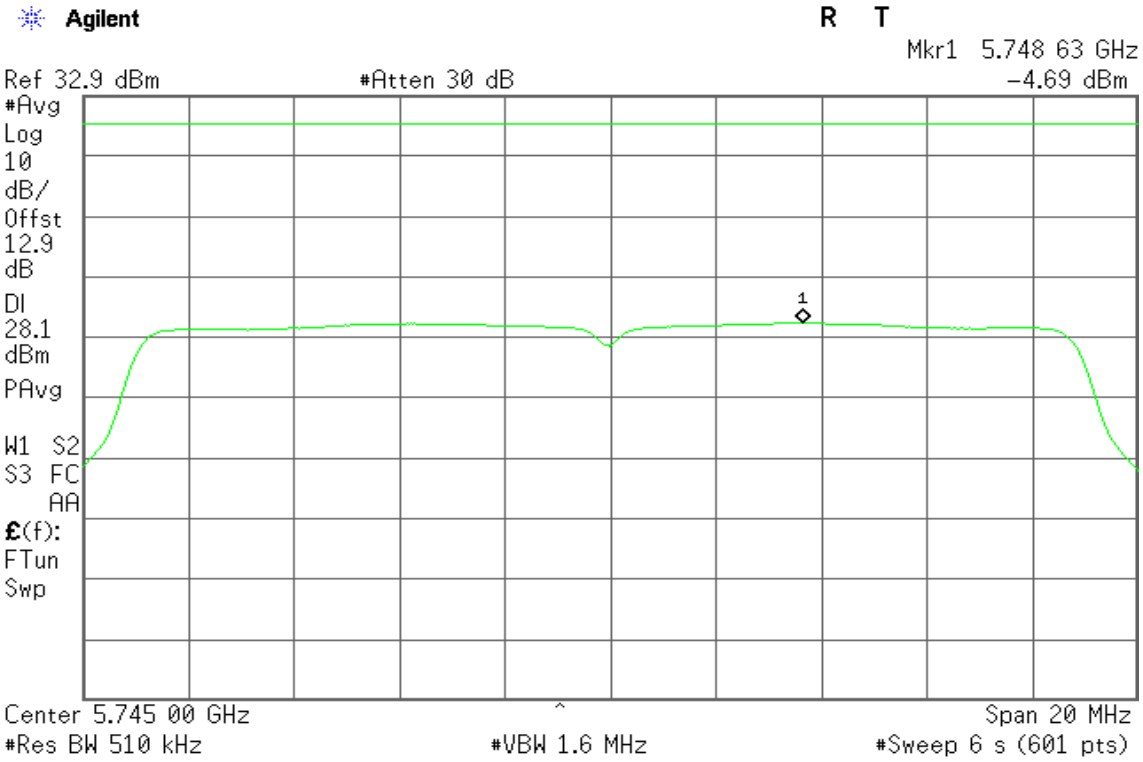


CH High

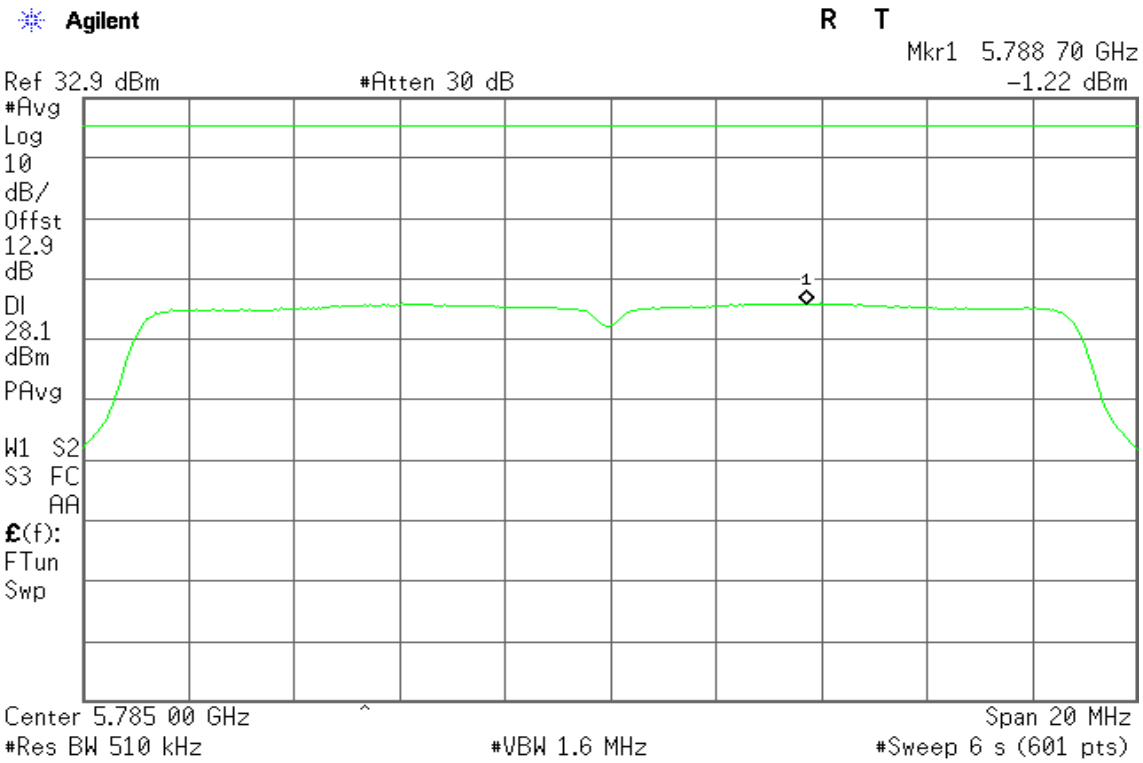

Agilent
R T
Mkr1 5.821 27 GHz
Ref 32.9 dBm
#Atten 30 dB
-4.97 dBm
#Avg
Log
10
dB/
Offst
12.9
dB
Dl
28.1
dBm
PAvg
W1 S2
S3 FC
AA
£(f):
FTun
Swp
1
Center 5.825 00 GHz
Span 20 MHz
#Res BW 510 kHz
#VBW 1.6 MHz
#Sweep 6 s (601 pts)

IEEE 802.11n HT 20 mode / 5745 ~ 5825MHz / Chain 2

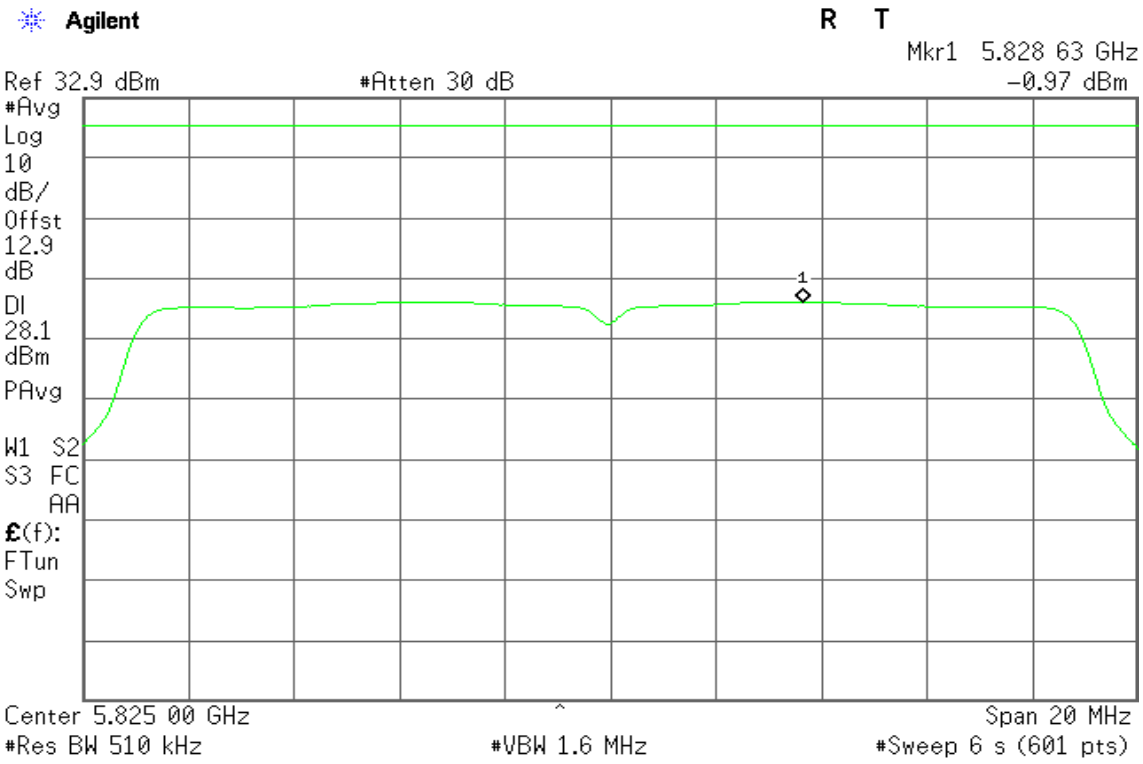
CH Low



CH Mid

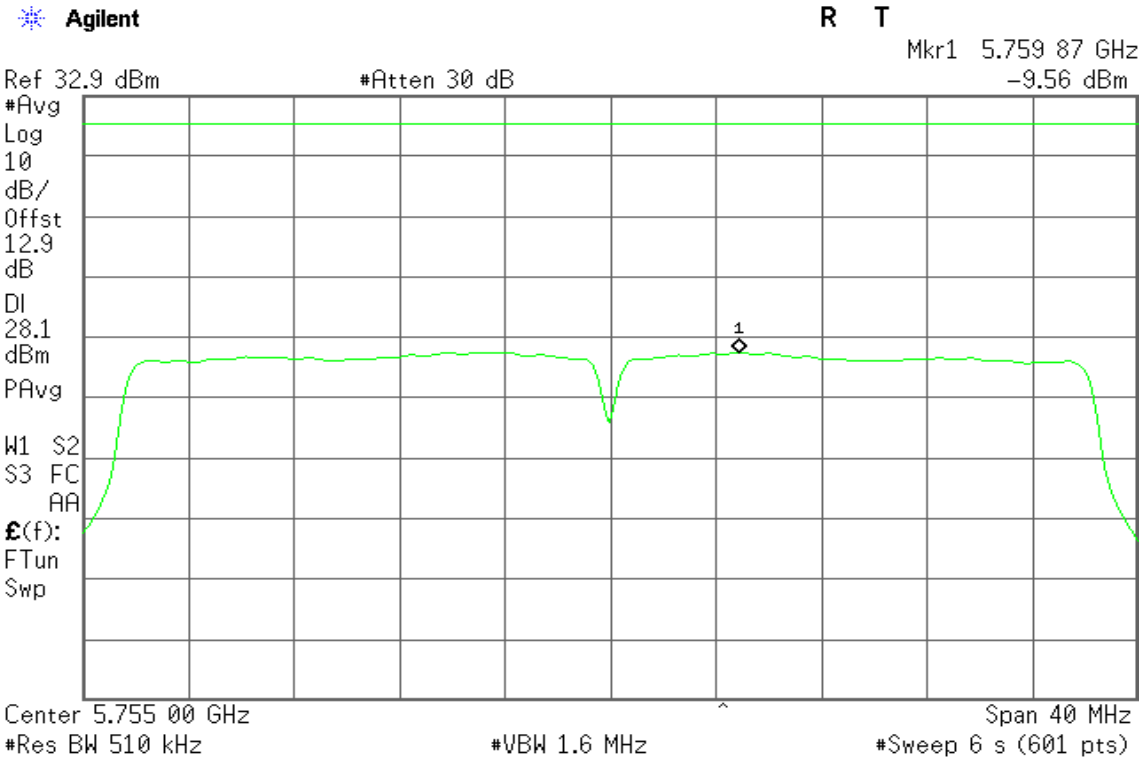


CH High

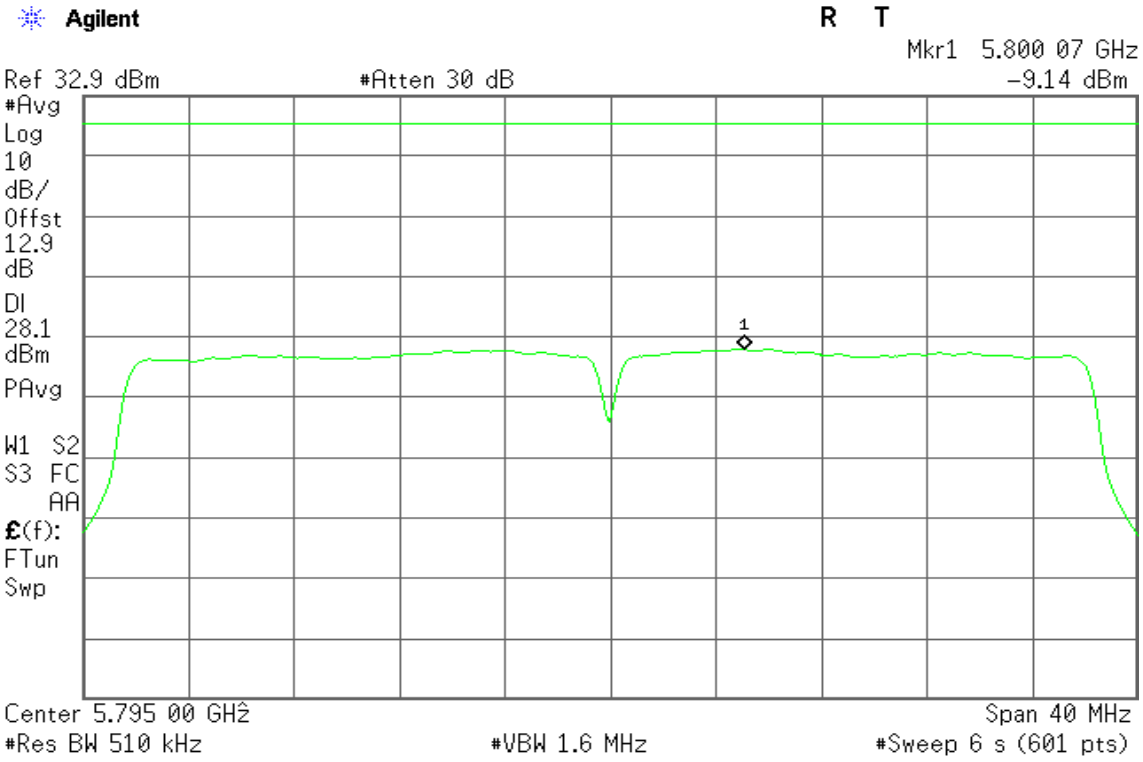

Agilent
R T
Mkr1 5.828 63 GHz
Ref 32.9 dBm
#Atten 30 dB
-0.97 dBm
#Avg
Log
10
dB/
Offst
12.9
dB
Dl
28.1
dBm
PAvg
W1 S2
S3 FC
AA
£(f):
FTun
Swp
1
Center 5.825 00 GHz
Span 20 MHz
#Res BW 510 kHz
#VBW 1.6 MHz
#Sweep 6 s (601 pts)

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

CH Low

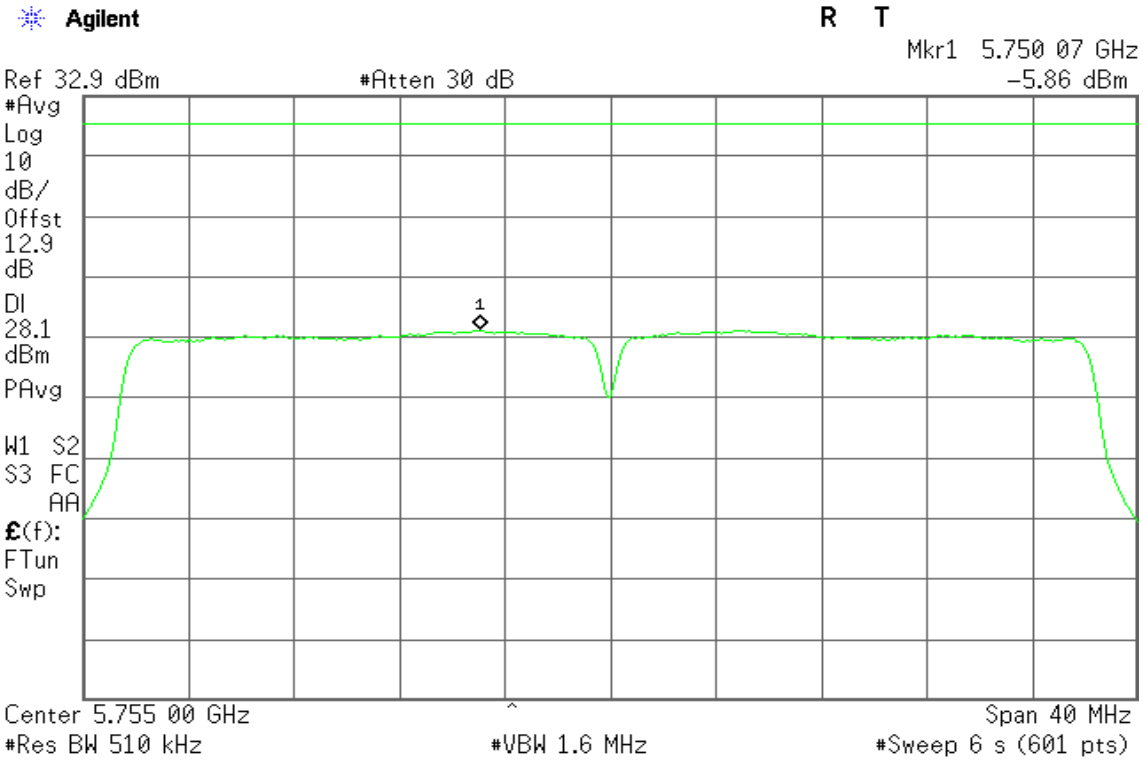


CH High

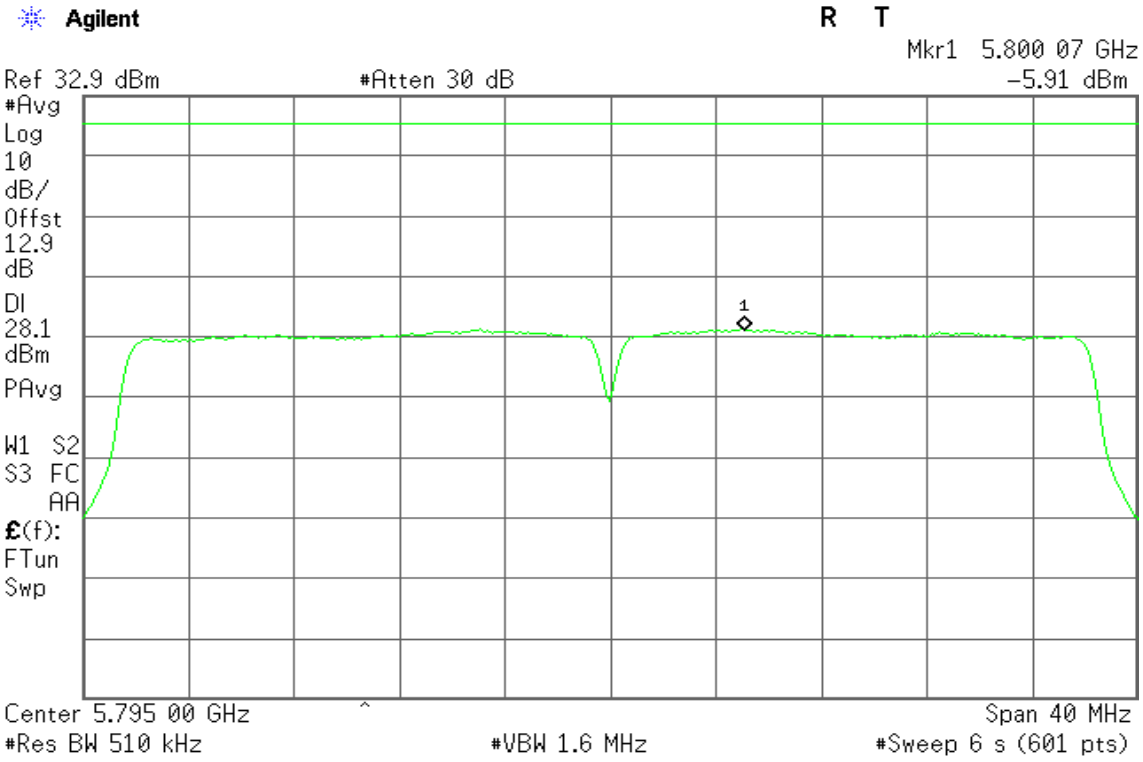


IEEE 802.11n HT 40 mode / 5755 ~ 5795MHz / Chain 2

CH Low



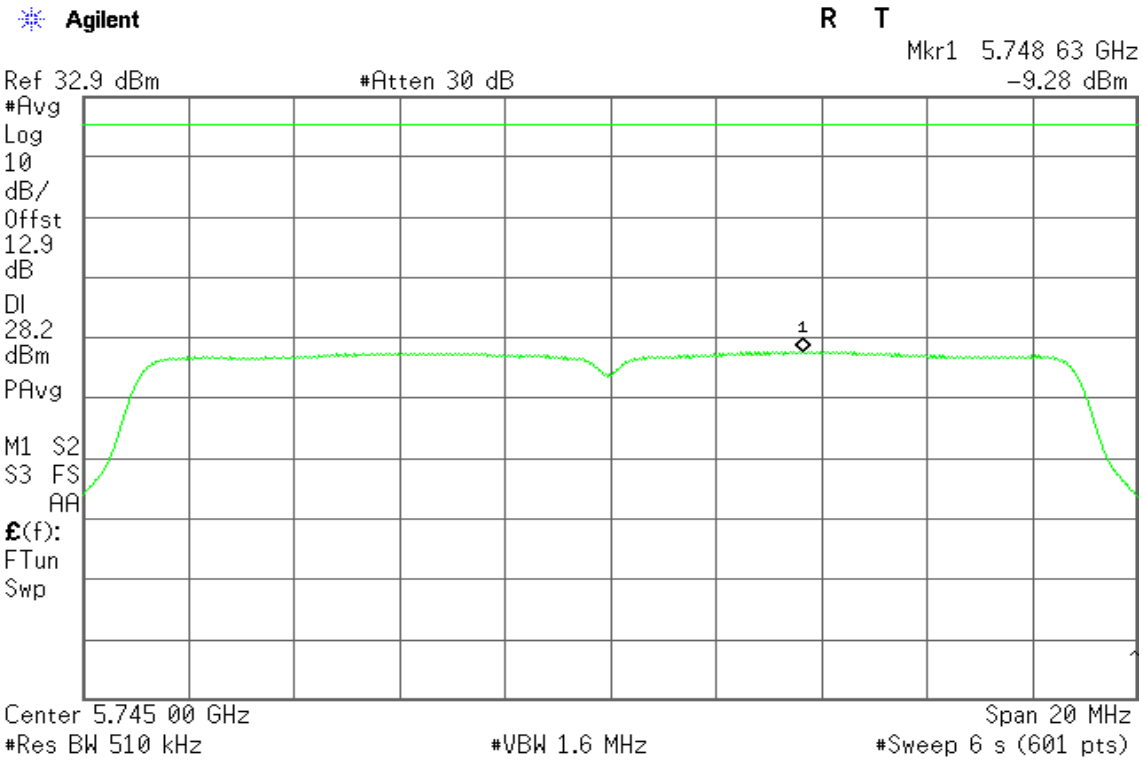
CH High



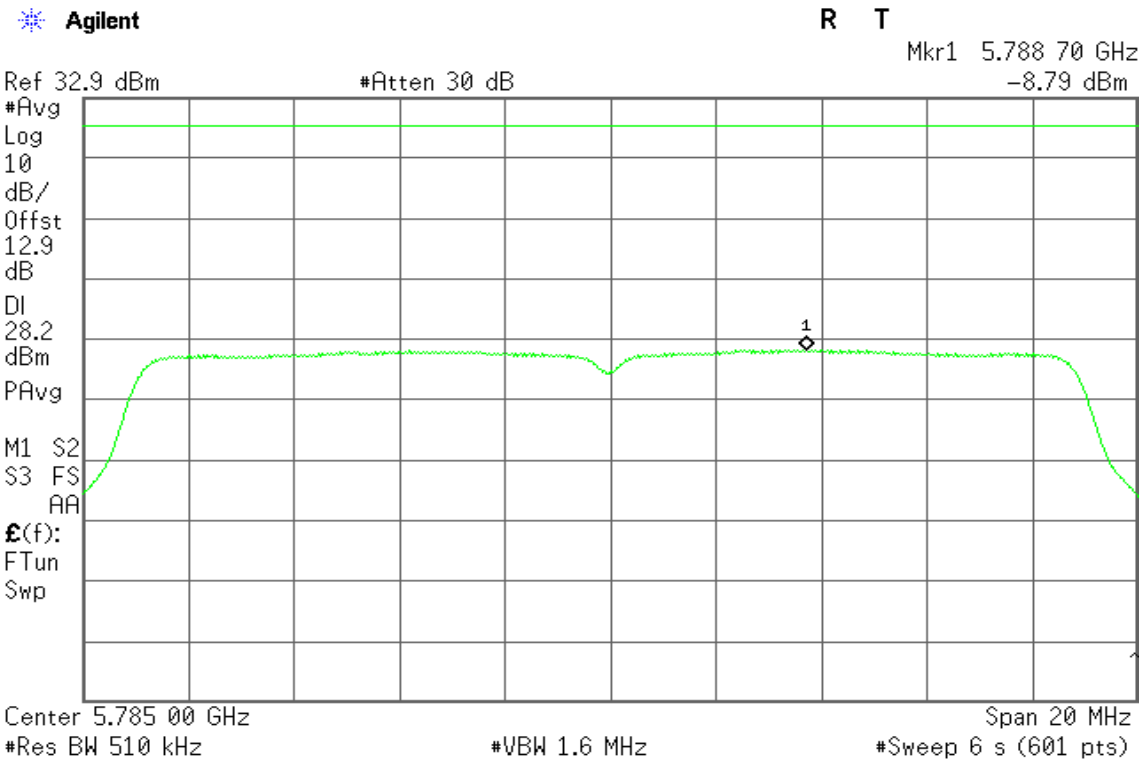
Mode 3

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

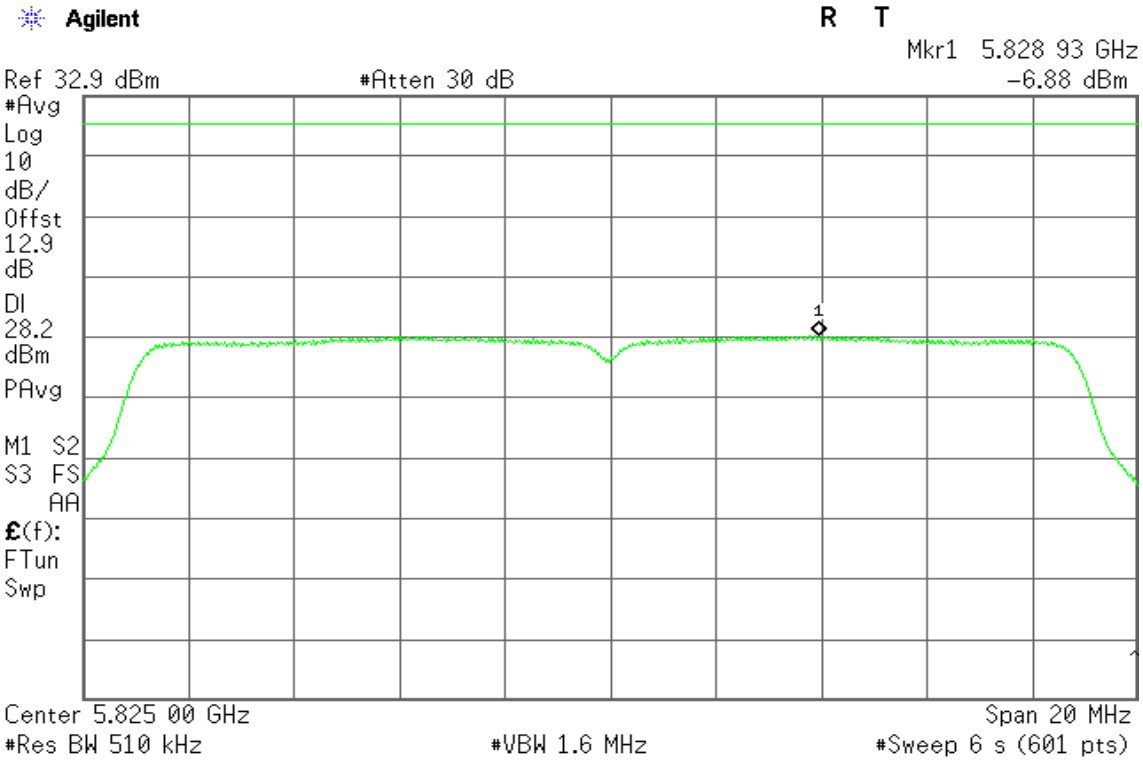
CH Low



CH Mid

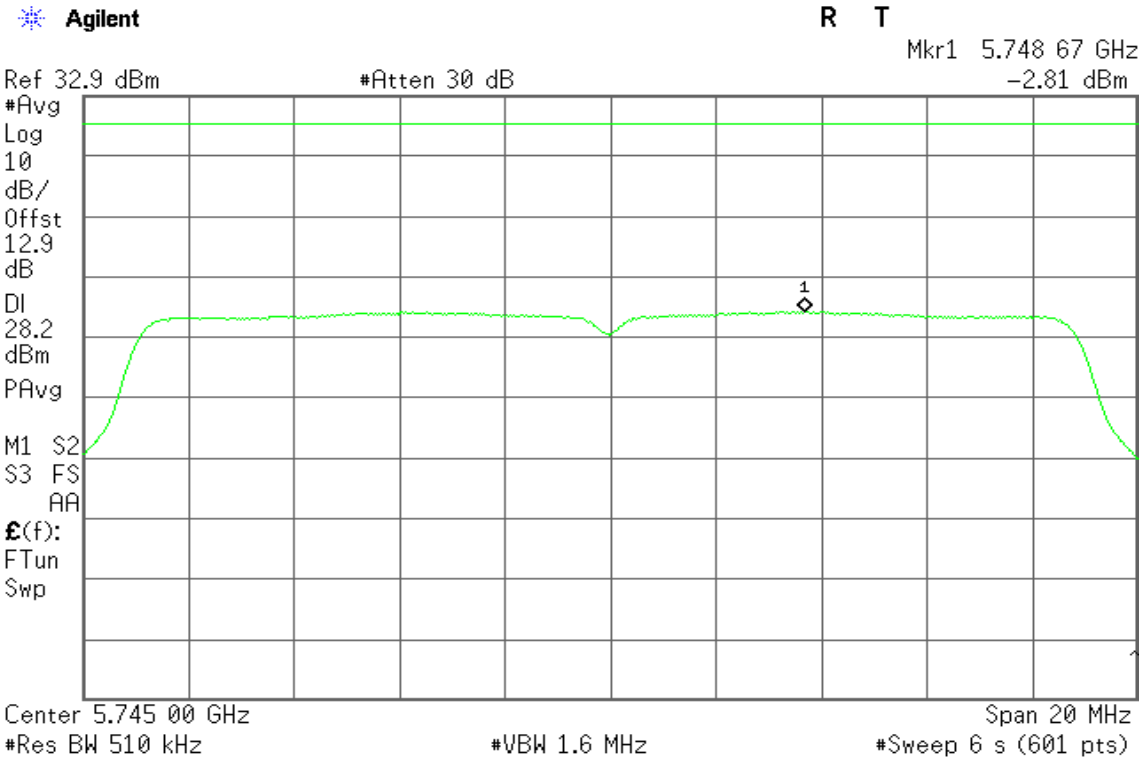


CH High

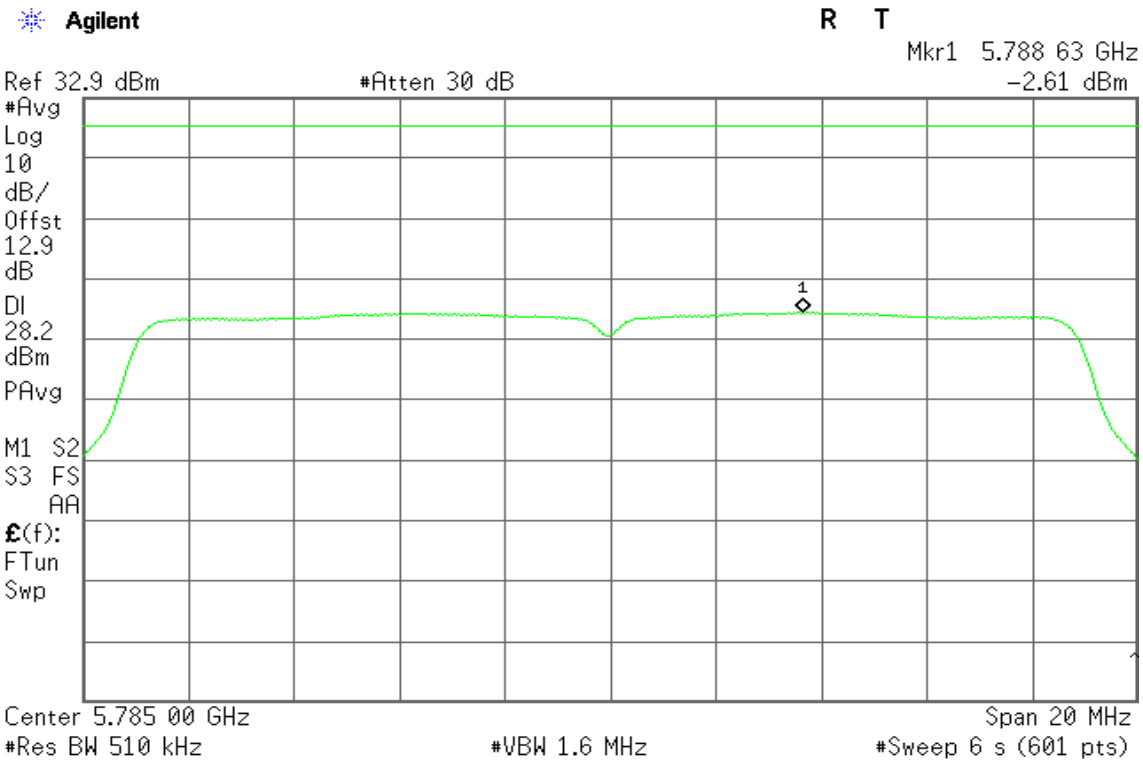

Agilent
R T
Mkr1 5.828 93 GHz
Ref 32.9 dBm
#Atten 30 dB
-6.88 dBm
#Avg
Log
10
dB/
Offst
12.9
dB
Dl
28.2
dBm
PAvg
M1 S2
S3 FS
AA
£(f):
FTun
Swp
Center 5.825 00 GHz
Span 20 MHz
#Res BW 510 kHz
#VBW 1.6 MHz
#Sweep 6 s (601 pts)

IEEE 802.11n HT 20 mode / 5745 ~ 5825MHz / Chain 2

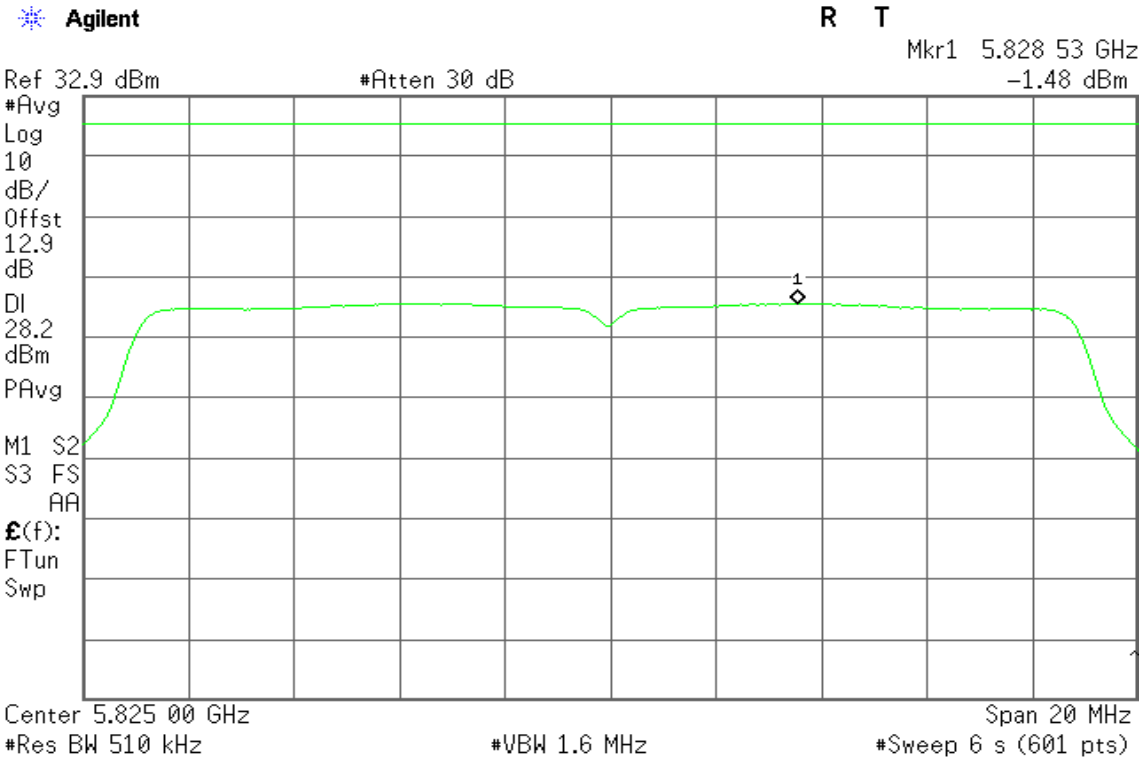
CH Low



CH Mid

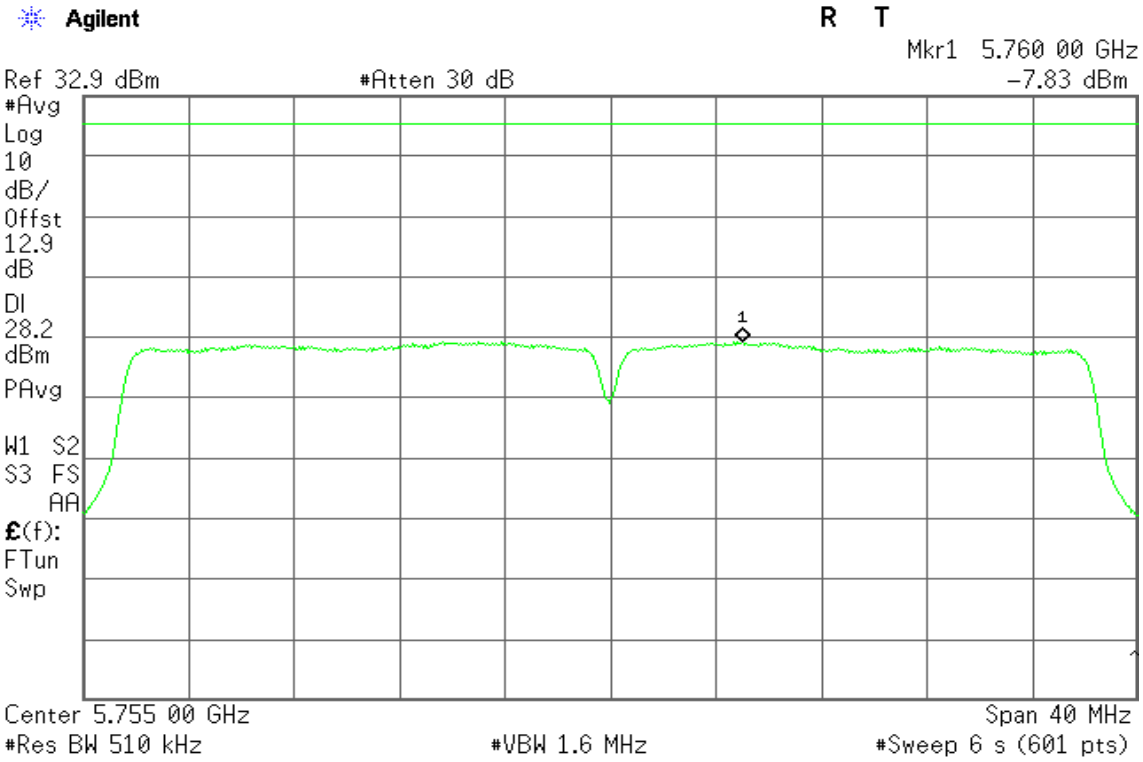


CH High

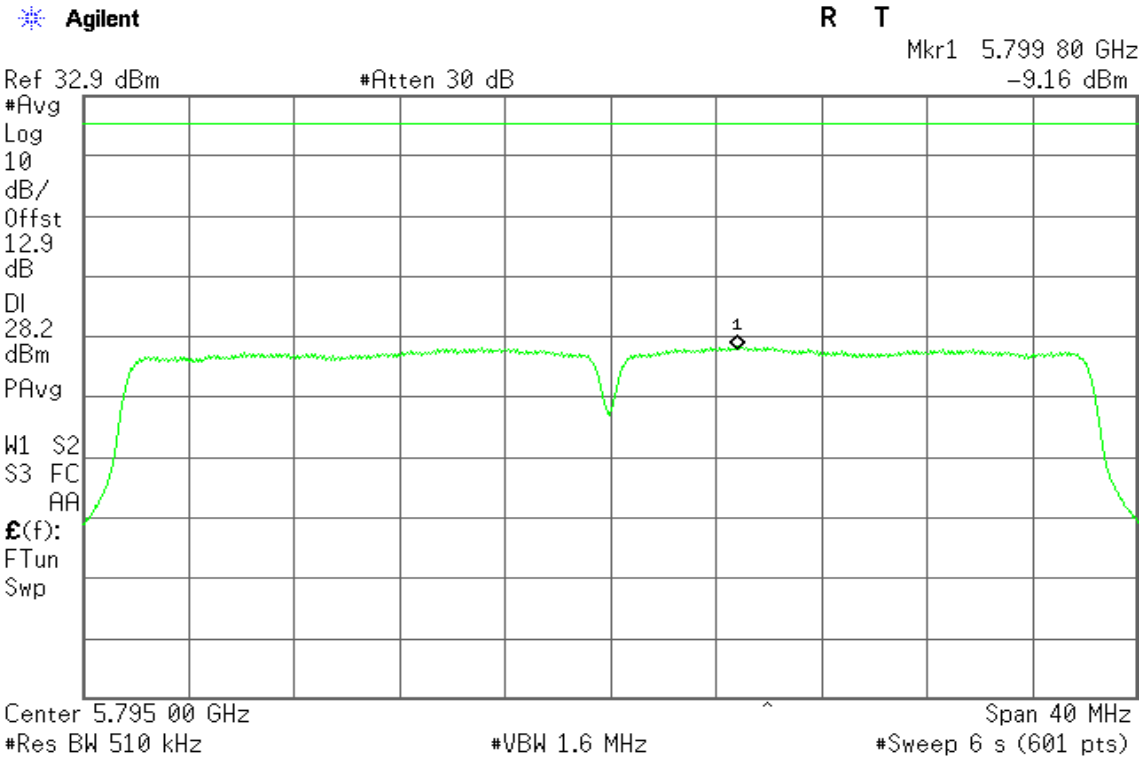

Agilent
R T
Mkr1 5.828 53 GHz
Ref 32.9 dBm
#Atten 30 dB
-1.48 dBm
#Avg
Log
10
dB/
Offst
12.9
dB
Dl
28.2
dBm
PAvg
M1 S2
S3 FS
AA
£(f):
FTun
Swp
1
Center 5.825 00 GHz
Span 20 MHz
#Res BW 510 kHz
#VBW 1.6 MHz
#Sweep 6 s (601 pts)

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

CH Low

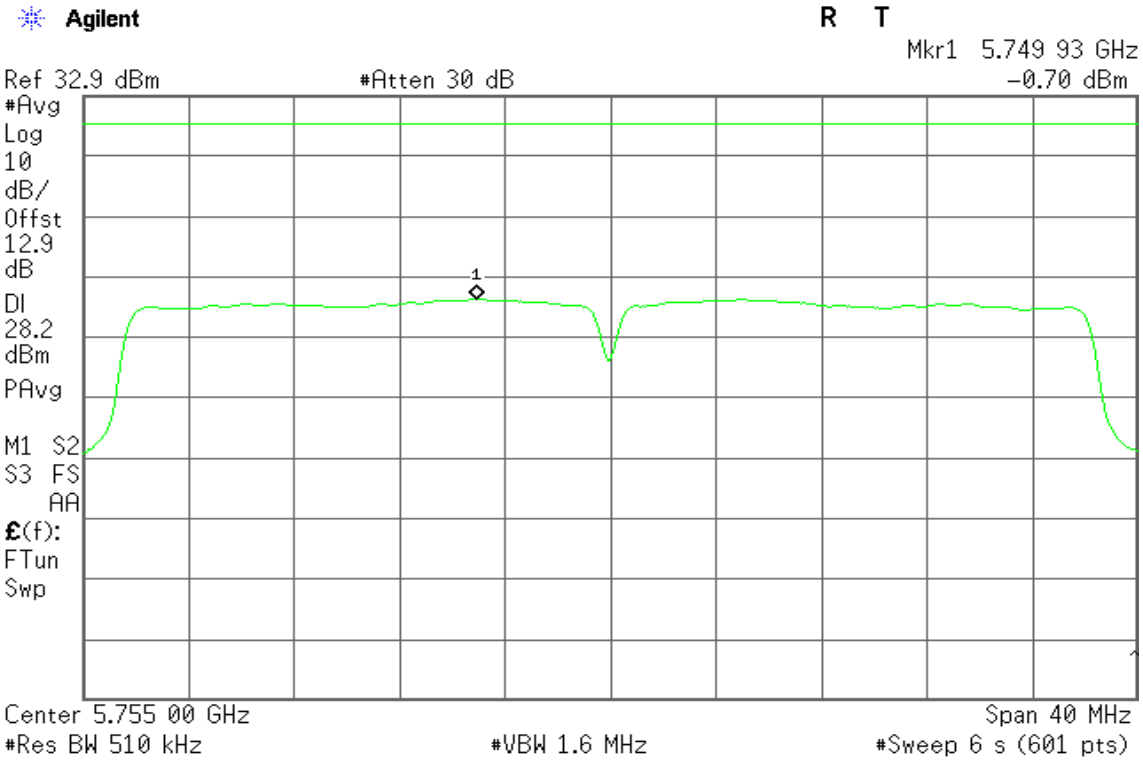


CH High

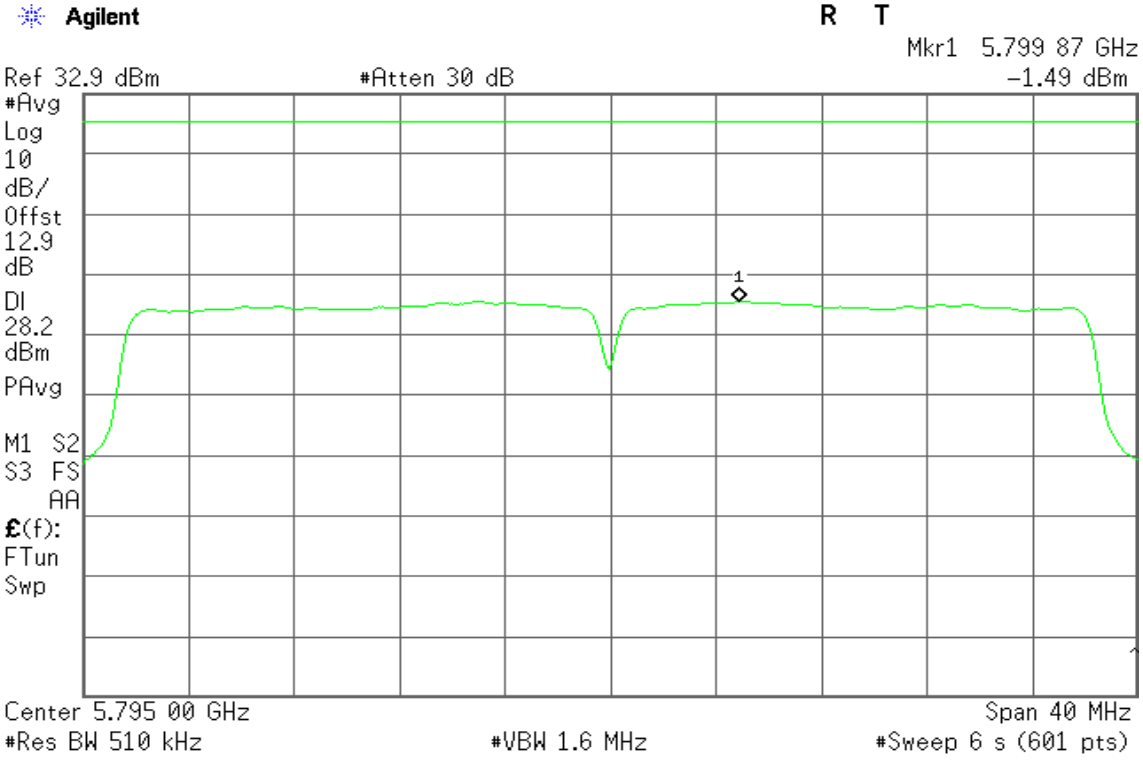


IEEE 802.11n HT 40 mode / 5755 ~ 5795MHz / Chain 2

CH Low



CH High



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

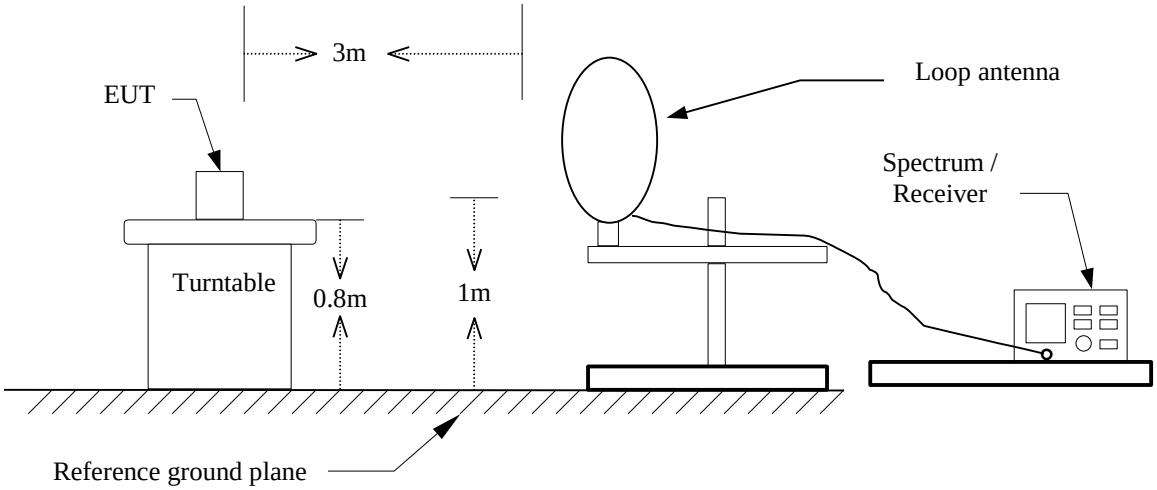
Remark: *Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of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

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

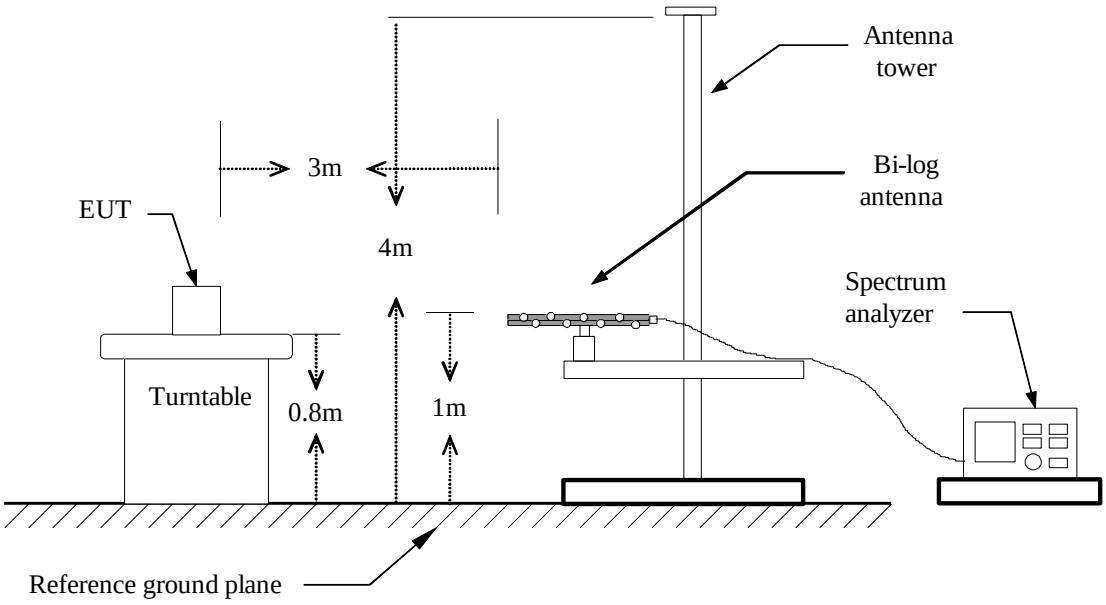
Frequency (MHz)	Field Strength (μV/m at 3-meter)	Field Strength (dBμV/m at 3-meter)
0.009 - 0.490	2400/F(kHz) +80	20LOG((2400/F(kHz))+80)
0.490 - 1.705	24000/F(kHz) +40	20LOG((24000/F(kHz))+40)
1.705 – 30.0	30	69.54
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

Test Configuration

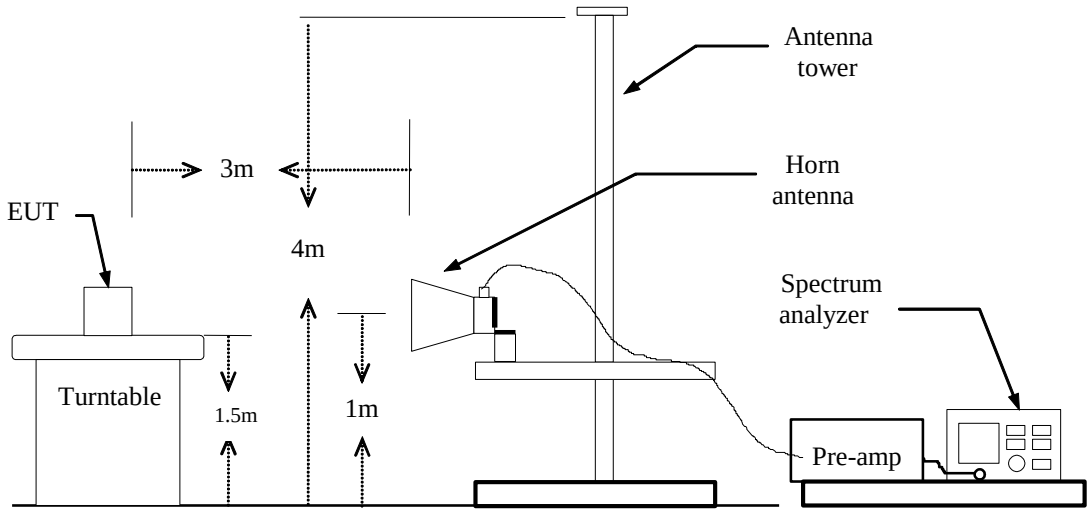
9kHz ~ 30MHz



30MHz ~ 1GHz



Above 1 GHz


Antenna
tower
3m
Horn
antenna
EUT
4m
Spectrum
analyzer
Turntable
1.5m
1m
Pre-amp

TEST PROCEDURE

1. The EUT is placed on a turntable, which is 1.5m 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=1MHz / Sweep=AUTO
   (b) AVERAGE: RBW=1MHz,
   if duty cycle≧98%, VBW=10Hz.
   if duty cycle<98% VBW=1/T.
   IEEE 802.11a mode: = 95%, VBW=510Hz
   IEEE 802.11n HT 20 MHz mode: = 92%, VBW=1.1KHz
   IEEE 802.11n HT 40 MHz mode: = 85%, VBW=2.2KHz
7. Repeat above procedures until the measurements for all frequencies are complete.

TEST RESULTS

Below 1 GHz

Operation Mode: Normal Link
Test Date: July 12, 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)
228.8500	53.94	-18.83	35.11	46.00	-10.89	Peak	V
256.3333	48.07	-17.94	30.13	46.00	-15.87	Peak	V
419.6167	47.34	-13.49	33.85	46.00	-12.15	Peak	V
539.2500	42.98	-11.18	31.80	46.00	-14.20	Peak	V
597.4500	39.26	-10.53	28.73	46.00	-17.27	Peak	V
767.2000	38.75	-7.71	31.04	46.00	-14.96	Peak	V
228.8500	58.81	-18.83	39.98	46.00	-6.02	Peak	H
259.5667	55.16	-17.71	37.45	46.00	-8.55	Peak	H
419.6167	44.02	-13.49	30.53	46.00	-15.47	Peak	H
618.4667	41.60	-10.07	31.53	46.00	-14.47	Peak	H
689.6000	38.37	-8.90	29.47	46.00	-16.53	Peak	H
768.8167	43.23	-7.69	35.54	46.00	-10.46	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 / 5745 ~ 5825MHz / CH Low	**Test Date:**	July 12, 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)
3191.000	53.03	-1.65	51.38	74.00	-22.62	peak	V
11500.000	34.86	16.78	51.64	74.00	-22.36	peak	V
N/A							
3828.000	50.05	0.49	50.54	74.00	-23.46	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:**	July 12, 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)
3107.000	52.39	-1.85	50.54	74.00	-23.46	peak	V
11570.000	34.61	16.84	51.45	74.00	-22.55	peak	V
N/A							
3198.000	52.09	-1.63	50.46	74.00	-23.54	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:**	July 12, 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)
3926.000	50.13	0.91	51.04	74.00	-22.96	peak	V
N/A							
3884.000	51.45	0.73	52.18	74.00	-21.82	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).*

For Mode 1

Operation Mode:	Tx / IEEE 802.11n HT 20 mode / 5745 ~ 5825MHz / CH Low	**Test Date:**	July 12, 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)
4290.000	48.94	2.33	51.27	74.00	-22.73	peak	V
N/A							
3275.000	52.16	-1.45	50.71	74.00	-23.29	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:**	July 12, 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)
3205.000	52.11	-1.62	50.49	74.00	-23.51	peak	V
11560.000	35.89	16.83	52.72	74.00	-21.28	peak	V
N/A							
3310.000	51.69	-1.37	50.32	74.00	-23.68	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:**	July 12, 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)
3296.000	51.47	-1.40	50.07	74.00	-23.93	peak	V
N/A							
3548.000	51.01	-0.70	50.31	74.00	-23.69	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:**	July 12, 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)
2386.000	54.18	-3.81	50.37	74.00	-23.63	peak	V
N/A							
4451.000	49.00	2.93	51.93	74.00	-22.07	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:**	July 12, 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)
4003.000	49.46	1.24	50.70	74.00	-23.30	peak	V
N/A							
3394.000	52.03	-1.16	50.87	74.00	-23.13	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).*

For Mode 2

Operation Mode:	Tx / IEEE 802.11n HT 20 mode / 5745 ~ 5825MHz / CH Low	**Test Date:**	July 12, 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)
3191.000	52.46	-1.65	50.81	74.00	-23.19	peak	V
N/A							
							V
3345.000	53.03	-1.28	51.75	74.00	-22.25	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:**	July 12, 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)
2393.000	53.98	-3.75	50.23	74.00	-23.77	peak	V
N/A							
4164.000	49.41	1.85	51.26	74.00	-22.74	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:**	July 12, 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)
3254.000	51.72	-1.50	50.22	74.00	-23.78	peak	V
N/A							
3891.000	50.36	0.76	51.12	74.00	-22.88	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:**	July 12, 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)
3289.000	51.77	-1.42	50.35	74.00	-23.65	peak	V
N/A							
3303.000	52.02	-1.38	50.64	74.00	-23.36	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:**	July 12, 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)
3310.000	51.61	-1.37	50.24	74.00	-23.76	peak	V
N/A							
3191.000	51.96	-1.65	50.31	74.00	-23.69	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).*

For Mode 3

Operation Mode:	Tx / IEEE 802.11n HT 20 mode / 5745 ~ 5825MHz / CH Low	**Test Date:**	July 12, 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)
2673.000	53.65	-2.77	50.88	74.00	-23.12	peak	V
N/A							
3121.000	52.59	-1.82	50.77	74.00	-23.23	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:**	July 12, 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)
2393.000	55.39	-3.75	51.64	74.00	-22.36	peak	V
N/A							
3310.000	51.66	-1.37	50.29	74.00	-23.71	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 20 mode / 5745 ~ 5825MHz / CH High	**Test Date:**	July 12, 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)
2386.000	54.51	-3.81	50.70	74.00	-23.30	peak	V
N/A							
3205.000	51.94	-1.62	50.32	74.00	-23.68	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:**	July 12, 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)
3268.000	51.61	-1.47	50.14	74.00	-23.86	peak	V
N/A							
3219.000	52.01	-1.58	50.43	74.00	-23.57	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:**	July 12, 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)
3198.000	52.62	-1.63	50.99	74.00	-23.01	peak	V
N/A							
3331.000	51.25	-1.32	49.93	74.00	-24.07	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).*

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

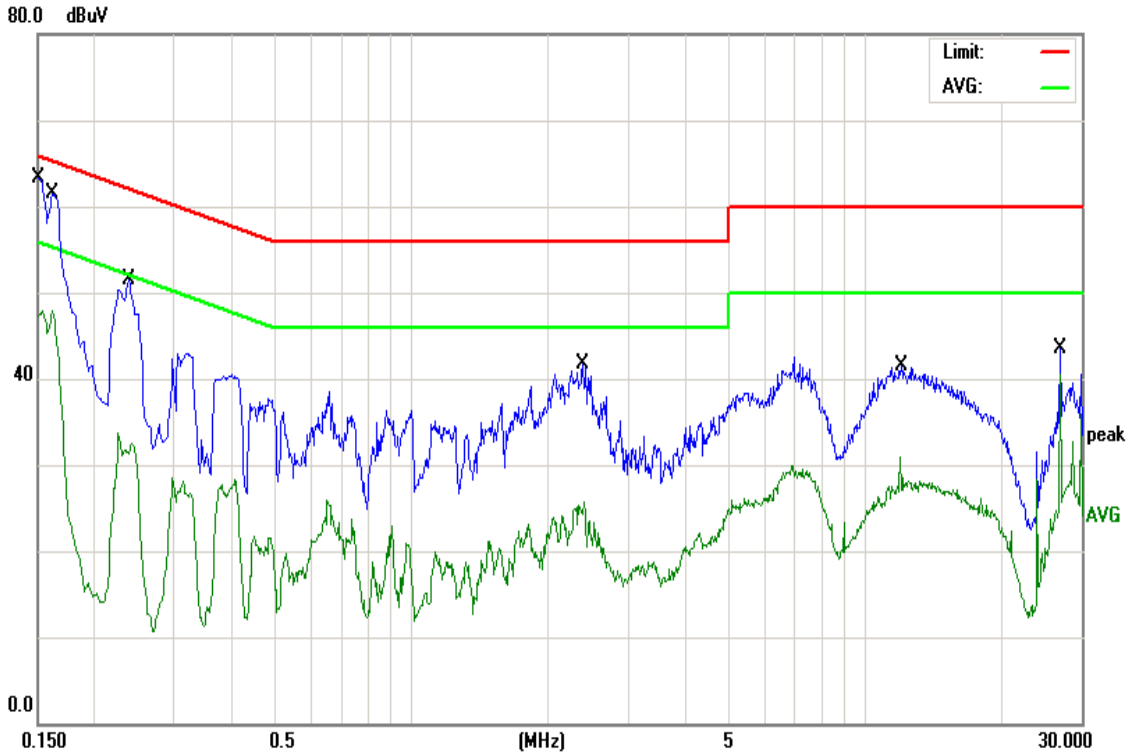
1. The EUT was placed on a table, which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured were complete.

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:**	July 14, 2015
Temperature:	24°C	**Tested by:**	Frank Liao
Humidity:	60% RH	**Line**	L1

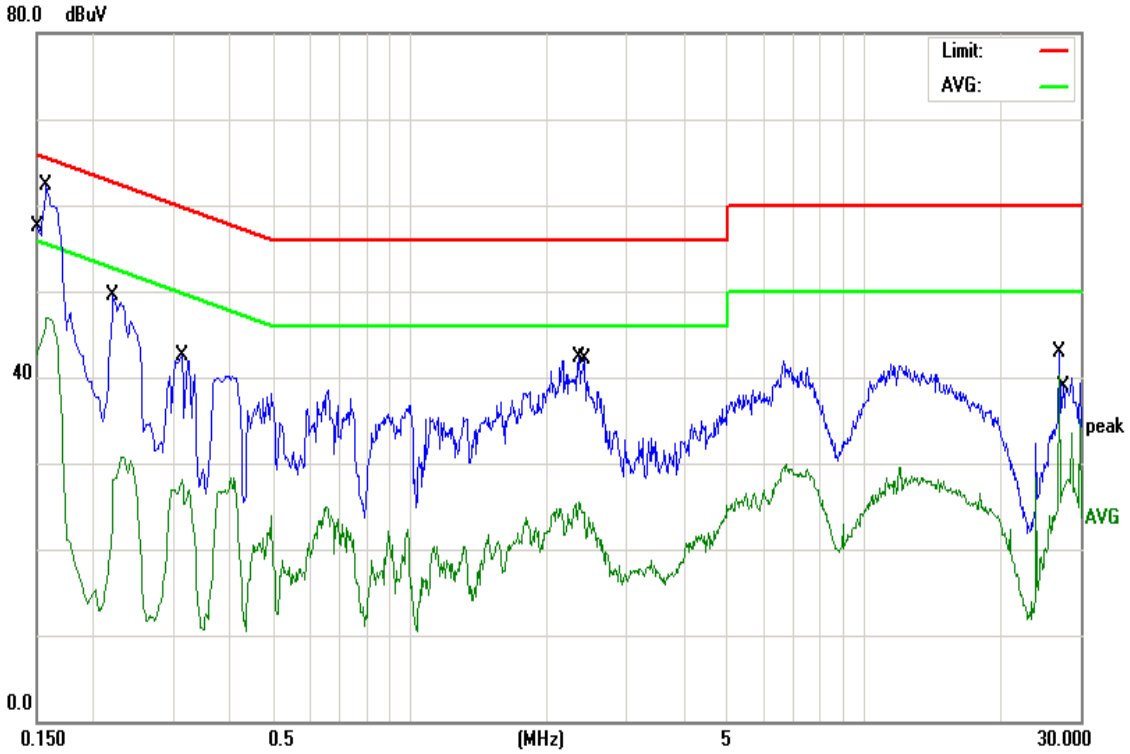


No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1500	47.87	10.26	58.13	65.99	-7.86	QP
2	0.1500	36.96	10.26	47.22	55.99	-8.77	AVG
3	0.1620	36.29	10.23	46.52	65.36	-18.84	QP
4	0.1620	14.62	10.23	24.85	55.36	-30.51	AVG
5	0.2380	21.76	10.12	31.88	62.16	-30.28	QP
6	0.2380	3.11	10.12	13.23	52.16	-38.93	AVG
7	2.3900	27.55	10.03	37.58	56.00	-18.42	QP
8	2.3900	15.24	10.03	25.27	46.00	-20.73	AVG
9	12.0580	20.21	10.21	30.42	60.00	-29.58	QP
10	12.0580	16.97	10.21	27.18	50.00	-22.82	AVG
11	26.9340	30.21	10.56	40.77	60.00	-19.23	QP
12	26.9340	15.48	10.56	26.04	50.00	-23.96	AVG

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)*

Operation Mode:	Normal Link	**Test Date:**	July 14, 2015
Temperature:	24°C	**Tested by:**	Frank Liao
Humidity:	60% RH	**Line**	L2



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1500	47.44	10.09	57.53	65.99	-8.46	QP
2	0.1500	32.59	10.09	42.68	55.99	-13.31	AVG
3	0.1580	42.18	10.07	52.25	65.56	-13.31	QP
4	0.1580	36.76	10.07	46.83	55.56	-8.73	AVG
5	0.2220	30.56	10.00	40.56	62.74	-22.18	QP
6	0.2220	18.11	10.00	28.11	52.74	-24.63	AVG
7	0.3140	32.60	9.94	42.54	59.86	-17.32	QP
8	0.3140	18.11	9.94	28.05	49.86	-21.81	AVG
9	2.3580	32.36	9.94	42.30	56.00	-13.70	QP
10	2.3900	14.33	9.94	24.27	46.00	-21.73	AVG
11	26.9340	32.42	10.50	42.92	60.00	-17.08	QP
12	27.3780	15.96	10.50	26.46	50.00	-23.54	AVG

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)*