



FCC 47 CFR PART 15 SUBPART E

TEST REPORT

For

AC1200 Wireless Dual Band High Power USB Adapter

Model: WF2561

Trade Name: netis

Issued to

**NETIS SYSTEMS CO., LTD
4F & 5F, R&D Building, Oriental Cyberport, High-Tech Industrial Park,
Nanshan, Shenzhen, China**

Issued by

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**Revision History**

Rev.	Issue Date	Revisions	Effect Page	Revised By
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1. TEST RESULT CERTIFICATION

NETIS SYSTEMS CO., LTD

Applicant: 4F & 5F, R&D Building, Oriental Cyberport, High-Tech Industrial Park, Nanshan, Shenzhen, China

Shenzhen Netcore Industrial Ltd.

Manufacturer: 4F & 5F, R&D Building, Oriental Cyberport, High-Tech Industrial Park, Nanshan, Shenzhen, China

Equipment Under Test: AC1200 Wireless Dual Band High Power USB Adapter

Trade Name: netis

Model: WF2561

Date of Test: June 8 ~ November 7, 2014

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 C63.4: 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:

Stan Lin
Section Manager

Reviewed by:

Angel Hu
Section Manager



2. EUT DESCRIPTION

Product	AC1200 Wireless Dual Band High Power USB Adapter				
Trade Name	netis				
Model Number	WF2561				
Model Discrepancy	N/A				
EUT Power Rating	5VDC				
Received Date	June 5, 2014				
RF Module Manufacturer	RealTek	Model	RTL8812AU		
Operating Frequency Range & Number of Channels	UNII Band I	Band	Mode	Frequency Range (MHz)	Number of Channels
			IEEE 802.11a	5180-5240	4 Channels
			IEEE 802.11n HT20	5180-5240	4 Channels
			IEEE 802.11n HT40	5190-5230	2 Channels
	UNII Band III		IEEE 802.11ac HT80	5210	1 Channels
			IEEE 802.11a	5745-5825	5 Channels
			IEEE 802.11n HT20	5745-5825	5 Channels
			IEEE 802.11n HT40	5755-5795	2 Channels
			IEEE 802.11ac HT80	5775	1 Channels
Transmit Power	UNII Band I	Band	Mode	Frequency Range	Output Power (dBm)
			IEEE 802.11a	5180-5240	15.68
			IEEE 802.11n HT20	5180-5240	18.61
			IEEE 802.11n HT40	5190-5230	16.73
	UNII Band III		IEEE 802.11ac HT80	5210	14.24
			IEEE 802.11a	5745-5825	17.53
			IEEE 802.11n HT20	5745-5825	15.67
			IEEE 802.11n HT40	5755-5795	16.49
			IEEE 802.11ac HT80	5775	13.41
Modulation Technique	OFDM (QPSK, BPSK, 16-QAM, 64-QAM)				
Transmit Data Rate	IEEE 802.11a: 54, 48, 36, 24, 18, 12, 9, 6 Mbps IEEE 802.11n HT20: 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 HT40: 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 HT80: OFDM (29.3, 32.5, 58.5, 65, 87.8, 97.5, 117, 130, 175.5, 195, 234, 260, 263.3, 292.5, 292.5, 325, 351, 390, 433.3 Mbps)				
Antenna Specification	Chain 0: PIFA Antenna / Gain: 5.01 dBi (For IEEE 802.11 a) Chain 1: PIFA Antenna / Gain: 5.01 dBi (For IEEE 802.11 a) MIMO: $5.01+10\log(2)=8.02$ (For IEEE 802.11 n)				

**Operation Frequency:**

UNLICENSED NATIONAL INFORMATION INFRASTRUCTURE (U-NII)	
CHANNEL	MHz
36	5180
38	5190
40	5200
42	5210
44	5220
46	5230
48	5240
149	5745
151	5755
153	5765
155	5775
157	5785
159	5795
161	5805
165	5825

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: **T58WF2561R** filing to comply with Section 15.207, 15.209 and 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 C63.4: 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 C63.4: 2009 and FCC CFR 47 Part 15.207, 15.209 and 15.407.

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 C63.4, 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 0.8 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 C63.4: 2003.



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 is a 2Tx2R MIMO transmitter.

The EUT (model: WF2561) had been tested under operating condition.

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

The worst case data rate is determined as the data rate with highest output power.

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, which worst case was in Data Link mode and receiving radiated spurious emission above 1GHz, which worst case was in CH Mid mode only.

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

UNII Band I:

IEEE 802.11a mode for 5180-5240MHz:

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

IEEE 802.11n HT20 mode for 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 HT40 mode for 5190-5230MHz:

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

IEEE 802.11ac HT80 mode for 5210MHz:

Channel (5210MHz) with 29.3Mbps data rate were chosen for full testing.

UNII Band III:

IEEE 802.11a for 5745-5825MHz:

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

IEEE 802.11n HT20 for 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 HT40 for 5755-5795 MHz:

Channel Low(5755MHz) and Channel High(5795MHz) with 13.5Mbps data rate were chosen for full testing.

IEEE 802.11ac HT80 for 5775MHz:

Channel (5775MHz) with 29.3Mbps 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

Conducted Emissions Test Site				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY48250064	01/01/2015
Spectrum Analyzer	Agilent	N9010A	MY52220817	03/20/2015
Spectrum Analyzer	R&S	FSL	100837	11/11/2014
Power meter	Anritsu	ML2495A	1033009	09/25/2015
Power Sensor	Anritsu	MA2411B	0917221	09/28/2015

3M Semi Anechoic Chamber				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY48250064	01/01/2015
Spectrum Analyzer	R&S	FSL	100837	11/11/2014
Pre-Amplifier	HP	8447D	2944A06530	05/02/2015
Pre-Amplifier	EMEC	EM01M26G	060570	07/28/2015
Pre-Amplifier	MITEQ	AMF-6F-26040 0-40-8P	985646	06/12/2015
Pre-Amplifier	Agilent	8449B	3008A01738	08/11/2015
EMI Test Receiver	SCHAFFNER	SCR 3501	430	03/30/2015
Loop Antenna	EMCO	6502	8905-2356	09/23/2015
Bilog Antenna	TESEQ	CBL 6112D	35378	08/21/2015
Horn Antenna	EMCO	3115	00022250	08/05/2015
Horn Antenna	EMCO	3116	00026370	12/29/2014
Antenna Tower	CCS	CC-A-1F	N/A	N.C.R
Test S/W	EZ-EMC			

NOTE: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

2. N.C.R = No Calibration Request.



Powerline Conducted Emissions Test Site #3				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
EMI Test Receiver	R&S	ESCI	101338	01/16/2015
LISN	R&S	ENV216	101549	07/23/2015
LISN	FCC	FCC-LISN-50/2 50-16-2-07	06012	12/02/2014
Test S/W			EZ-EMC	

NOTE: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

2. N.C.R = No Calibration Request.

**For UNII Band III:**

Radiated Emission / 966Chamber_B				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY46180323	04/15/2015
EMI Test Receiver	ROHDE & SCHWARZ	ESCI	101131	03/25/2015
Broad-Band Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-778	08/19/2015
Bi-log Antenna	SCHWARZBECK	VULB 9168	9168-250	08/21/2015
Double-Ridged Waveguide Horn	ETS-LINDGREN	3117	00078733	12/05/2014
Horn Antenna	COM-POWER	AH-840	03077	12/18/2014
Pre-Amplifier	Agilent	8447D	2944A10052	07/15/2015
Pre-Amplifier	Agilent	8449B	3008A01916	07/15/2015
LOOP Antenna	EMCO	6502	8905-2356	09/23/2015
Notch Filters Band Reject	Micro-Tronics	BRM05702-01	026	N.C.R
Band Reject Filter	Micro-Tronics	BR50703-01	004	N.C.R
Band Reject Filter	Micro-Tronics	BR50704-01	004	N.C.R
Band Reject Filter	Micro-Tronics	BR50705-01	007	N.C.R

NOTE: 1. Each piece of equipment is scheduled for calibration once a year.

2. N.C.R = No Calibration Request.

RF Conducted

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY43360132	06/10/2015
Power Meter	ANRITSU	ML2495A	1149001	12/06/2014
Power Sensor	ANRITSU	MA2411B	1126148	12/06/2014

NOTE: Each piece of equipment is scheduled for calibration once a year.



4.3 MEASUREMENT UNCERTAINTY

Parameter	Uncertainty
Powerline Conducted Emission	±2.1876
3M Semi Anechoic Chamber / 30MHz ~ 200MHz	±3.5921
3M Semi Anechoic Chamber / 200MHz ~ 1GHz	±3.5657
3M Semi Anechoic Chamber / 1 ~ 8GHz	±2.5873
3M Semi Anechoic Chamber / 8 ~ 18GHz	±2.6646
3M Semi Anechoic Chamber / 18 ~ 26GHz	±2.9617
3M Semi Anechoic Chamber / 26 ~ 40GHz	±3.4250

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

For UNII Band III:

The following table is for the measurement uncertainty, which is calculated as per the document CISPR 16-4-2.

PARAMETER	UNCERTAINTY
Semi Anechoic Chamber (966 Chamber_B) / Radiated Emission, 30 to 1000 MHz	+/- 3.97
Semi Anechoic Chamber (966 Chamber_B) / Radiated Emission, 1 to 18GHz	+/- 3.58
Semi Anechoic Chamber (966 Chamber_B) / Radiated Emission, 18 to 26 GHz	+/- 3.59
Semi Anechoic Chamber (966 Chamber_B) / Radiated Emission, 26 to 40 GHz	+/- 3.81
Conducted Emission (Mains Terminals), 9kHz to 30MHz	+/- 2.48

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

Consistent with industry standard (e.g. CISPR 22, clause 11, Measurement Uncertainty) determining compliance with the limits shall be base on the results of the compliance measurement. Consequently the measure emissions being less than the maximum allowed emission result in this be a compliant test or passing test.

The acceptable measurement uncertainty value without requiring revision of the compliance statement is base on conducted and radiated emissions being less than U_{CISPR} which is 3.6dB and 5.2dB respectively. CCS values (called U_{Lab} in CISPR 16-4-2) is less than U_{CISPR} as shown in the table above. Therefore, MU need not be considered for compliance.



5. FACILITIES AND ACCREDITATIONS

5.1 FACILITIES

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

- No. 163-1, Jhongsheng Rd., Sindien District, Taipei City 23151, Taiwan
Tel: 886-2-2217-0894 / Fax: 886-2-2217-1029
- No 11, Wugong 6th Rd, Wugu District, 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
Tel: 886-3-324-0332 / Fax: 886-3-324-5235
- NO. 989-1 Wen Shan Rd., Shang Shan Village, Qionglin Shiang Hsinchu County 30741, Taiwan, R.O.C (For UNII Band III)
TEL:03-5921698#502 / FAX:03-5921108

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 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 LABORATORY ACCREDITATIONS AND LISTING

The test facilities used to perform radiated and conducted emissions tests are accredited by American Association for Laboratory Accreditation Program for the specific scope accreditation under Lab Code: 0824-01 to perform Electromagnetic Interference tests according to FCC Part 15 and CISPR 22 requirements. In addition, the test facilities are listed with Industry Canada, Certification and Engineering Bureau, IC 2324G-1 for 3M Semi Anechoic Chamber A, 2324G-2 for 3M Semi Anechoic Chamber B.

**5.4 TABLE OF ACCREDITATIONS AND LISTINGS**

Country	Agency	Scope of Accreditation	Logo
USA	A2LA	CFR 47, FCC Part15/18, CISPR 22, EN 55022, ICES-003, AS/NZS CISPR 22, VCCI V-3, EN 55011, CISPR 11, IEC/EN 61000-4-2/3/4/5/6/8/11, EN 61000-6-1/2/3/4, EN 55024, CISPR 24, AS/NZS CISPR 24, AS/NZS 61000.6.2, EN 55014-1/-2, ETSI EN 300 386 v1.3.2/v1.3.3, IEC/EN 61000-3-2, AS/NZS 61000.3.2, IEC/EN 61000-3-3, AS/NZS 61000.3.3	 TESTING CERT #0824.01
USA	FCC MRA	3 meter Open Area Test Sites to perform FCC Part 15/18 measurements	 TW1026
Japan	VCCI	3/10 meter Open Area Test Sites and conducted test sites to perform radiated/conducted measurements	VCCI R-2882/2541/2798/725/1868 C-402/747/912 T-1930/1646
Taiwan	TAF	EN 55014-1, CISPR 14, CNS 13781-1, EN 55013, CISPR 13, CNS 13439, EN 55011, CISPR 11, CNS 13803, PLMN09, IS2045-0, LP0002 FCC Part 27/90, Part 15B/C/D/E, RSS-192/193/210/310 ETSI EN 300 328/ 300 220-1/ 300 220-2/ 301 893/ 301 489-01/ 301 489-03/ 301 489-07 / 301 489-17/ 300 440-1/ 300 440-2 AS/NZS 4268, AS/NZS 4771 CISPR 22, EN 55022, CNS 13438, AS/NZS CISPR 22, VCCI, IEC/EN 61000-4-2/3/4/5/6/8/11, CNS 14676-2/3/4/5/6/8, CNS 14934-2/3, CNS 13783-1, CNS 13439, CNS 13803	 Testing Laboratory 0363
Taiwan	BSMI	CNS 13438, CNS 13783-1, CNS 13439, CNS 14115	SL2-IS-E-0014 / IN-E-0014 /A1-E-0014 /R1-E-0014 /R2-E-0014 /L1-E-0014
Canada	Industry Canada	RSS-Gen Issue 3	 IC 2324C-5

* 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

For Radiated Emissions(Below 1GHz) & Conducted Emission							
No.	Device Type	Model	Series No.	FCC ID	Brand	Data Cable	Power Cord
1	Notebook PC	ThinkPad T430u	PB-VZLGG 12/09	FCC DOC	LENOVO	USB Cable: Shielded, 1.8m	AC I/P: Unshielded, 1.8m DC O/P: Unshielded, 1.8m with a core
2	LCD	2408WFB	CN-0G293H-74261 -87C-0LVS-A00	FCC DOC	DELL	HDMI Cable: Shielded, 1.8m	Shielded, 1.8m
3	USB MOUSE	M100	N/A	N/A	Logitech	Unshielded, 1.8m	N/A

For Radiated Emissions(Above 1GHz) & Powerline Conducted Emission							
No.	Device Type	Model	Series No.	FCC ID	Brand	Data Cable	Power Cord
1	Notebook PC	ThinkPad T430u	PB-VZLGG 12/09	FCC DOC	LENOVO	USB Cable: Shielded, 1.8m	AC I/P: Unshielded, 1.8m DC O/P: Unshielded, 1.8m with a core

Remark: Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.



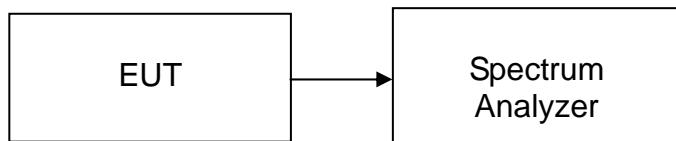
7. FCC PART 15 REQUIREMENTS

7.1 26 dB EMISSION BANDWIDTH

LIMIT

According to §15.403(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 / 5150 ~ 5250MHz**

Channel	Frequency (MHz)	Bandwidth (MHz)
Low	5180	22.434
Mid	5220	22.215
High	5240	22.121

Test mode: IEEE 802.11n HT20 mode / 5150 ~ 5250MHz / Chain 0

Channel	Frequency (MHz)	Bandwidth (MHz)
Low	5180	21.552
Mid	5220	21.809
High	5240	21.543

Test mode: IEEE 802.11n HT20 mode / 5150 ~ 5250MHz / Chain 1

Channel	Frequency (MHz)	Bandwidth (MHz)
Low	5180	21.097
Mid	5220	21.278
High	5240	21.193

Test mode: IEEE 802.11n HT40 mode / 5150 ~ 5250MHz / Chain 0

Channel	Frequency (MHz)	Bandwidth (MHz)
Low	5190	42.995
High	5230	42.908

Test mode: IEEE 802.11n HT40 mode / 5150 ~ 5250MHz / Chain 1

Channel	Frequency (MHz)	Bandwidth (MHz)
Low	5190	41.993
High	5230	42.435

Test mode: IEEE 802.11ac HT80 mode / 5210MHz / Chain 0

Frequency (MHz)	Bandwidth (MHz)
5210	84.760

Test mode: IEEE 802.11ac HT80 mode / 5210MHz / Chain 1

Frequency (MHz)	Bandwidth (MHz)
5210	86.322

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

Channel	Frequency (MHz)	Bandwidth (MHz)
Low	5745	26.239
Mid	5785	26.335
High	5825	24.294

Test mode: IEEE 802.11n HT20 / 5745 ~ 5825MHz / Chain 0

Channel	Frequency (MHz)	Bandwidth (MHz)
Low	5745	21.552
Mid	5785	21.372
High	5825	21.319

Test mode: IEEE 802.11n HT20 / 5745 ~ 5825MHz / Chain 1

Channel	Frequency (MHz)	Bandwidth (MHz)
Low	5745	21.266
Mid	5785	20.895
High	5825	21.069

Test mode: IEEE 802.11n HT40 / 5755 ~ 5795MHz / Chain 0

Channel	Frequency (MHz)	Bandwidth (MHz)
Low	5755	45.762
High	5795	43.172

Test mode: IEEE 802.11n HT40 / 5755 ~ 5795MHz / Chain 1

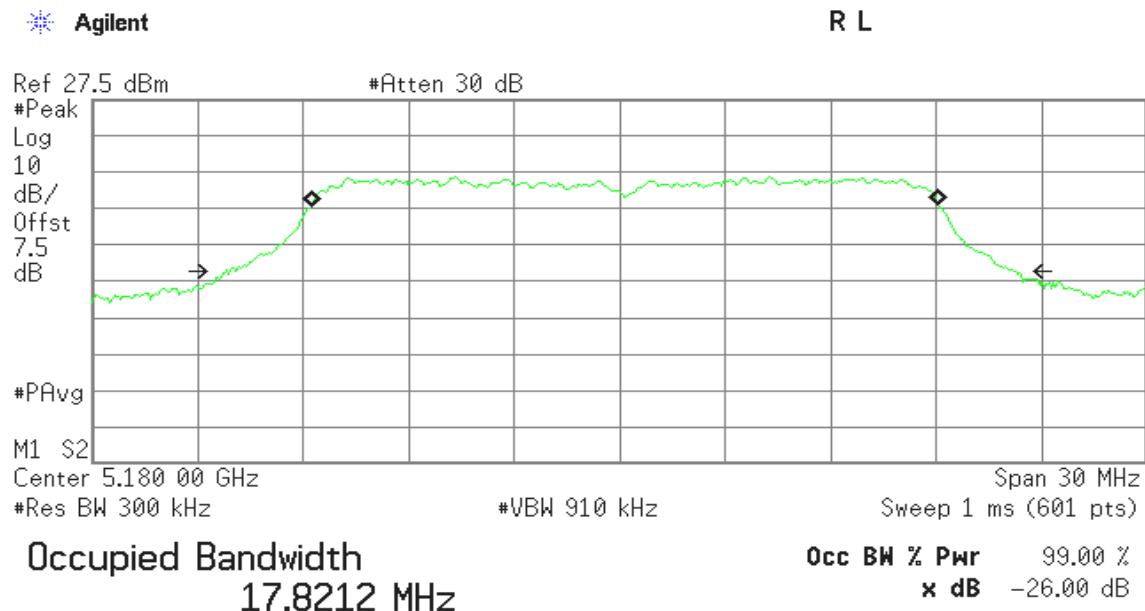
Channel	Frequency (MHz)	Bandwidth (MHz)
Low	5755	42.456
High	5795	41.581

Test mode: IEEE 802.11ac HT80 / 5775MHz / Chain 0

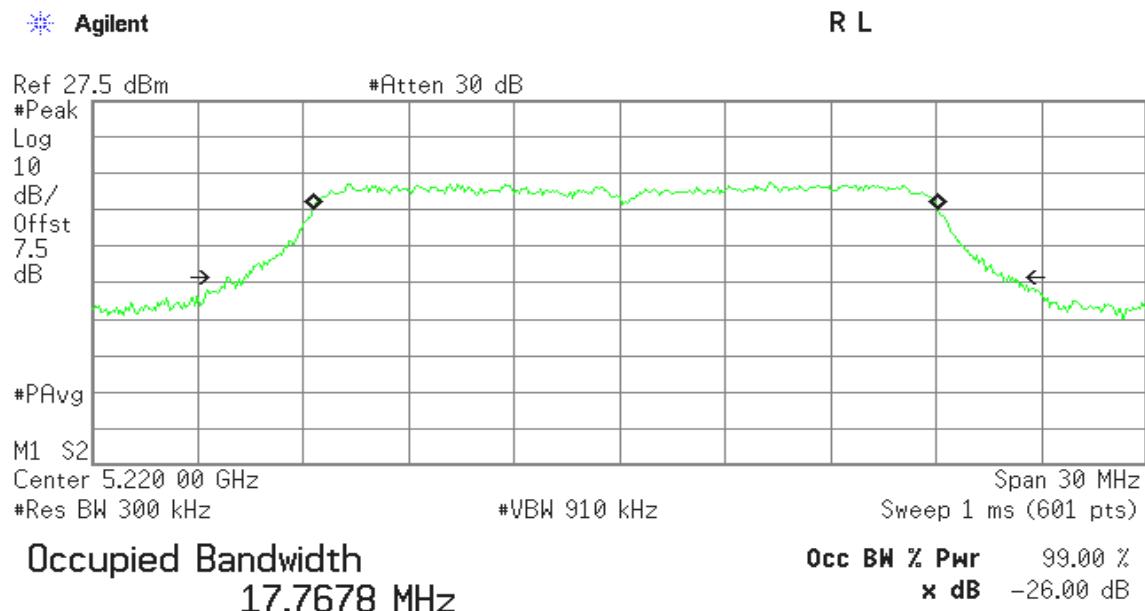
Frequency (MHz)	Bandwidth (MHz)
5775	83.252

Test mode: IEEE 802.11ac HT80 / 5775MHz / Chain 1

Frequency (MHz)	Bandwidth (MHz)
5775	83.860

**Test Plot****IEEE 802.11a / 5180 ~ 5240MHz****CH Low**

Transmit Freq Error 142.329 kHz
x dB Bandwidth 22.434 MHz

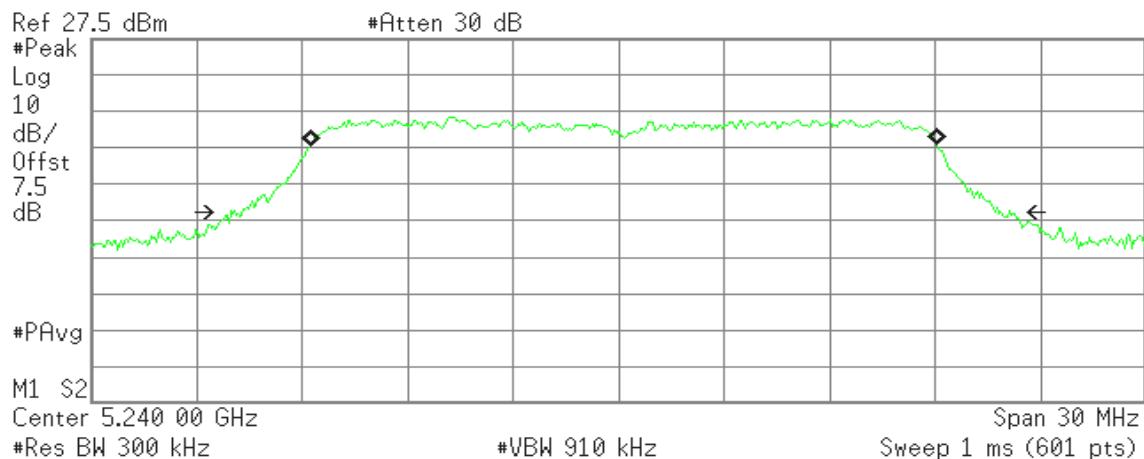
CH Mid

Transmit Freq Error 169.054 kHz
x dB Bandwidth 22.215 MHz

**CH High**

Agilent

R L

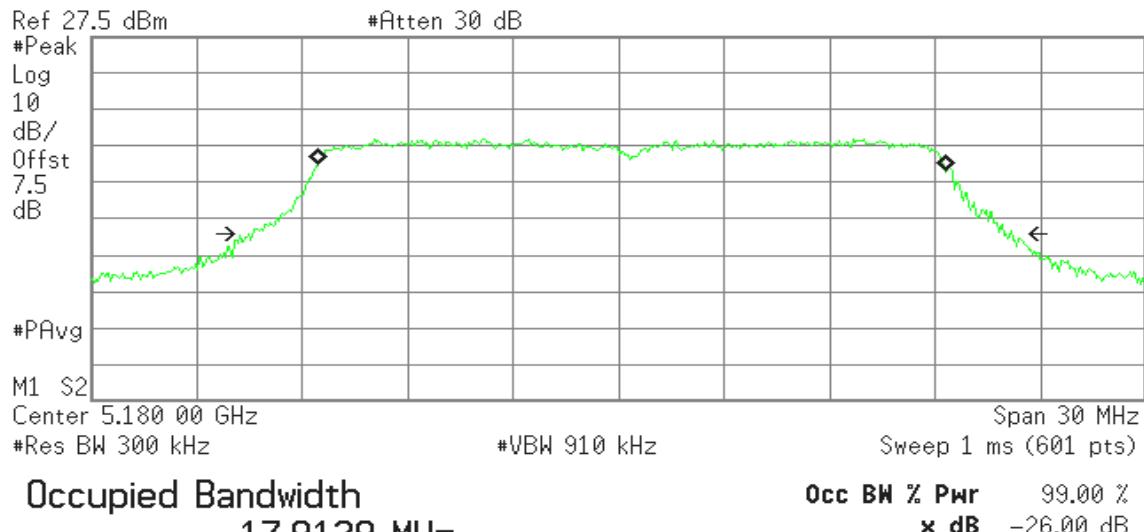


Transmit Freq Error 139.505 kHz
x dB Bandwidth 22.121 MHz

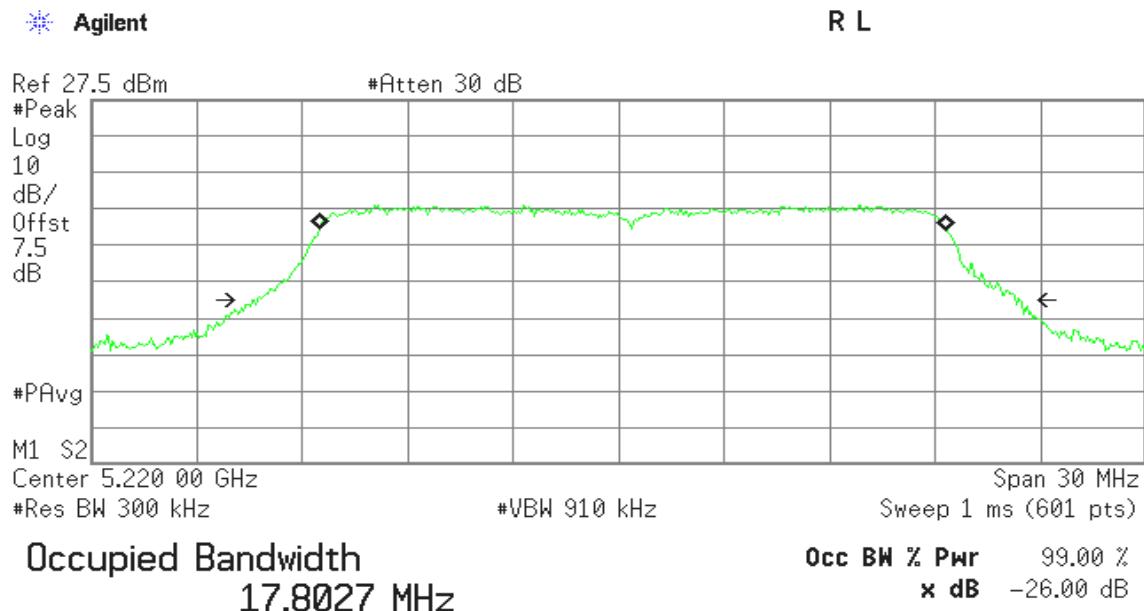
IEEE 802.11n HT20 / 5180 ~ 5240MHz / Chain 0**CH Low**

Agilent

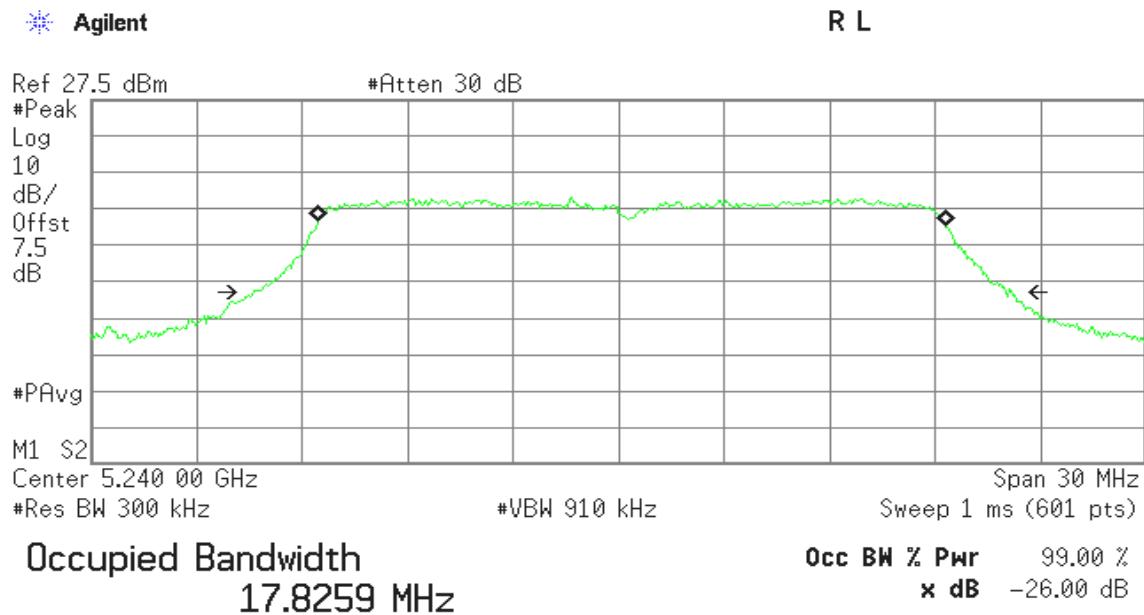
R L



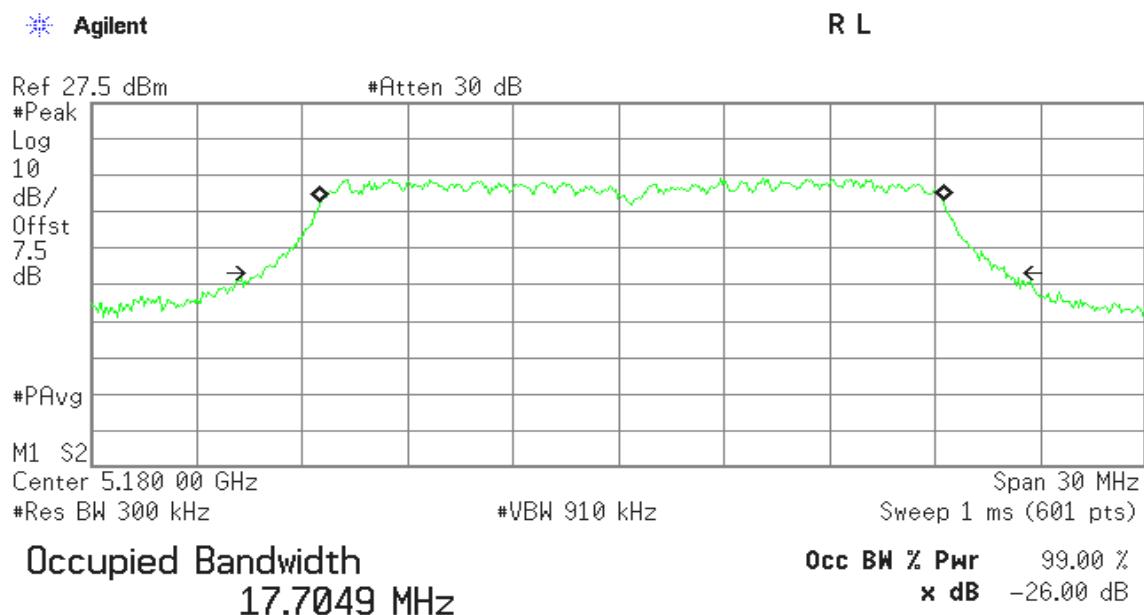
Transmit Freq Error 380.280 kHz
x dB Bandwidth 21.552 MHz

**CH Mid**

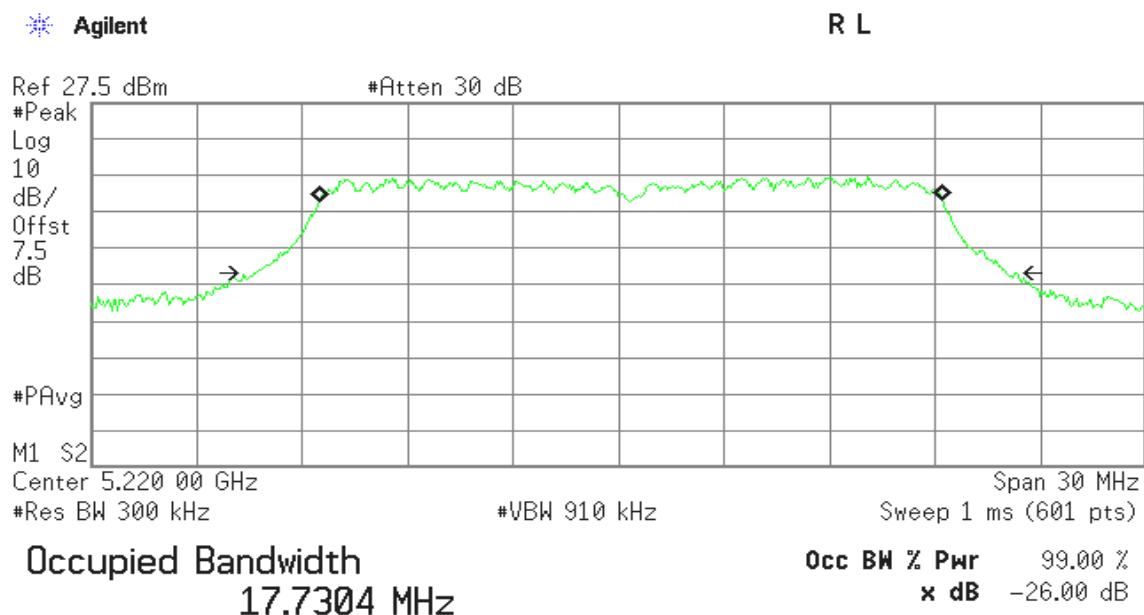
Transmit Freq Error 410.258 kHz
x dB Bandwidth 21.809 MHz

CH High

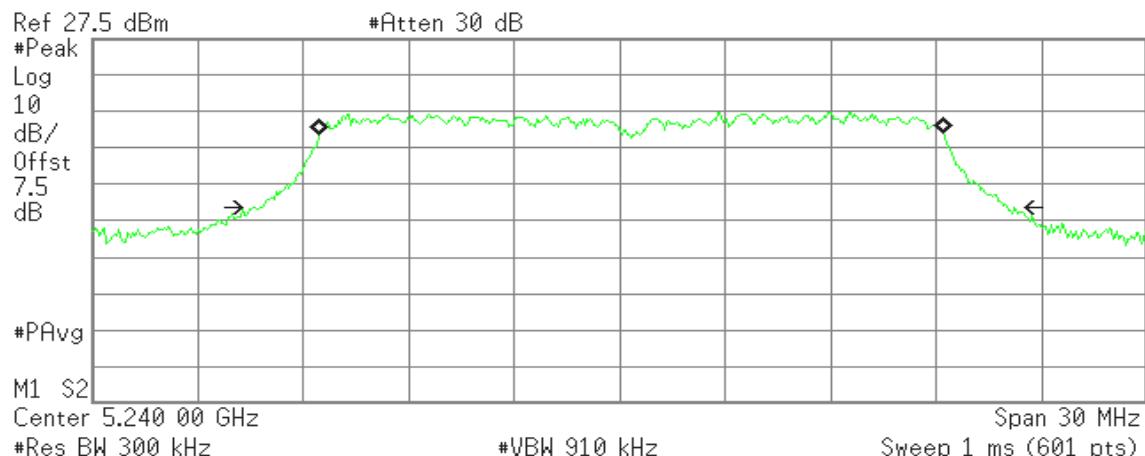
Transmit Freq Error 368.878 kHz
x dB Bandwidth 21.543 MHz

**IEEE 802.11n HT20 / 5180 ~ 5240MHz / Chain 1****CH Low**

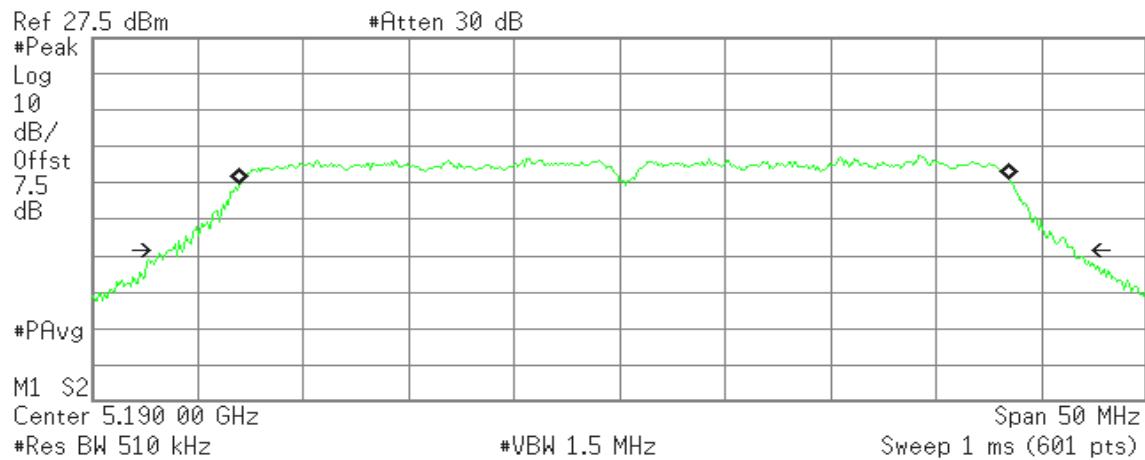
Transmit Freq Error 374.891 kHz
x dB Bandwidth 21.097 MHz

CH Mid

Transmit Freq Error 340.844 kHz
x dB Bandwidth 21.278 MHz

**CH High****Agilent****R L**

Transmit Freq Error 338.867 kHz
x dB Bandwidth 21.193 MHz

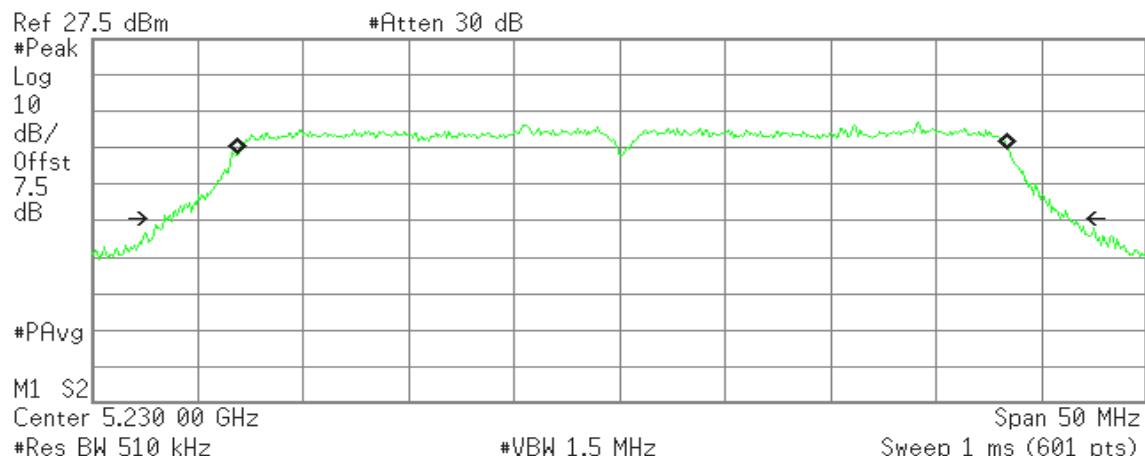
IEEE 802.11n HT40 / 5190 ~ 5230MHz / Chain 0**CH Low****Agilent****R L**

Transmit Freq Error 246.113 kHz
x dB Bandwidth 42.995 MHz

**CH High**

Agilent

R L

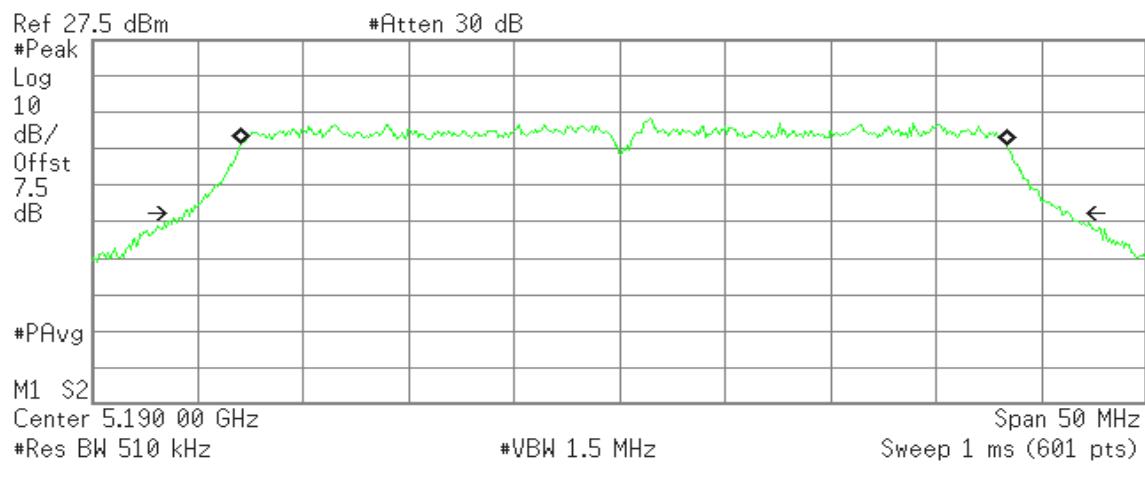


Transmit Freq Error 139.105 kHz
x dB Bandwidth 42.908 MHz

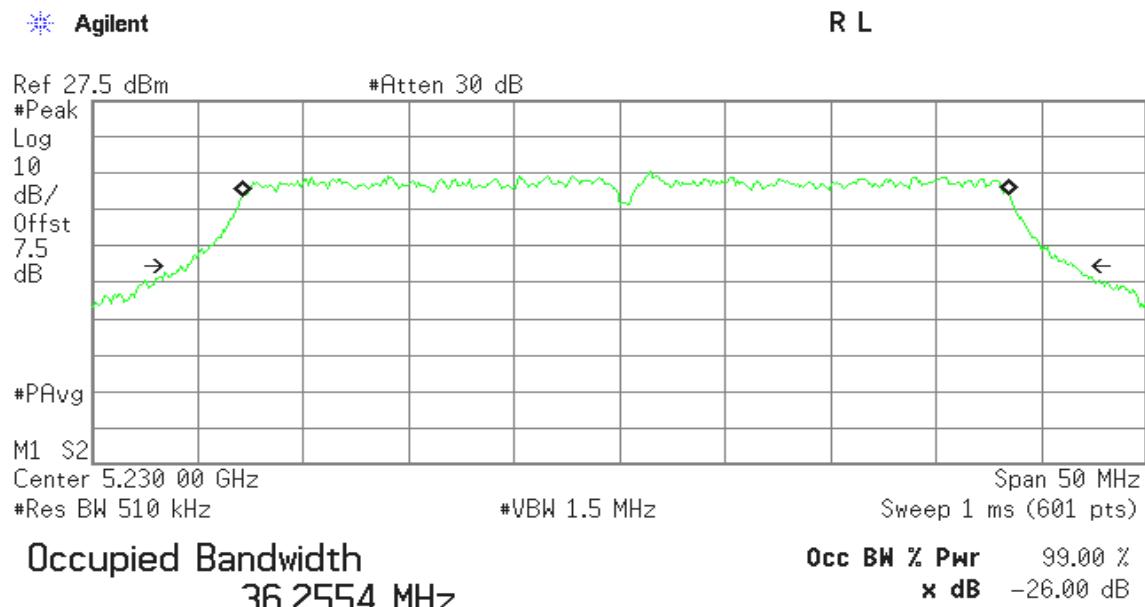
IEEE 802.11n HT40 / 5190 ~ 5230MHz / Chain 1**CH Low**

Agilent

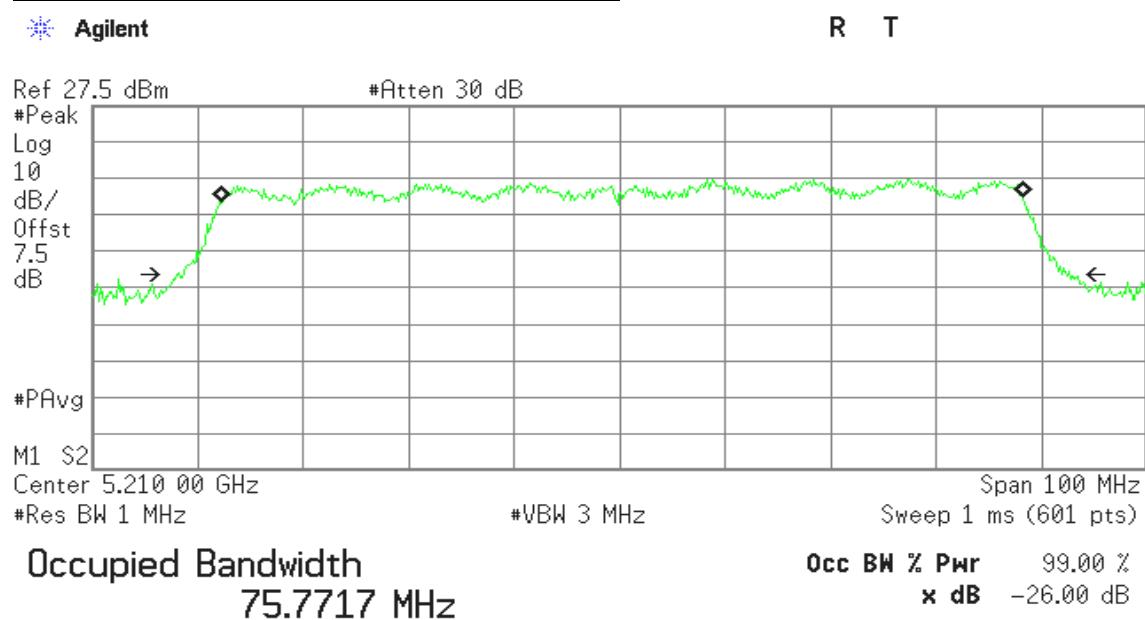
R T



Transmit Freq Error 208.012 kHz
x dB Bandwidth 41.993 MHz

**CH High**

Transmit Freq Error 303.372 kHz
x dB Bandwidth 42.435 MHz

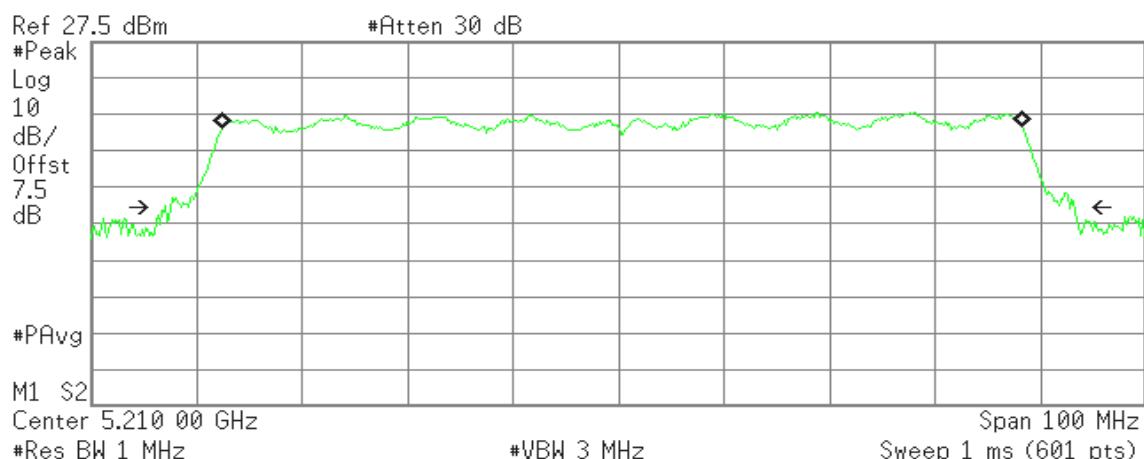
IEEE 802.11ac HT80 / 5210MHz / Chain 0

Transmit Freq Error 261.459 kHz
x dB Bandwidth 84.760 MHz

**IEEE 802.11ac HT80 / 5210MHz / Chain 1**

Agilent

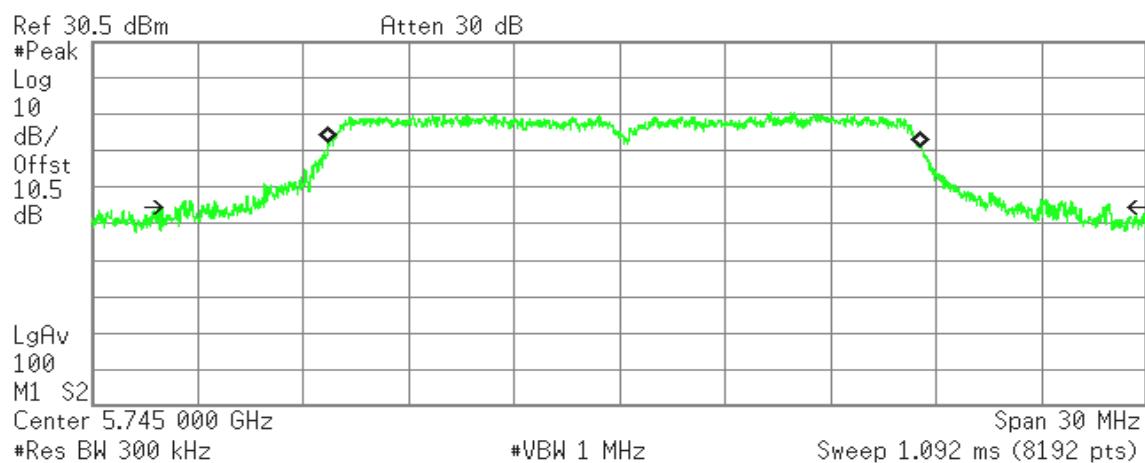
R L

**Occupied Bandwidth**
75.7283 MHz**Occ BW % Pwr** 99.00 %
x dB -26.00 dB**Transmit Freq Error** 351.474 kHz
x dB Bandwidth 86.322 MHz

**IEEE 802.11a / 5745 ~ 5825MHz****CH Low**

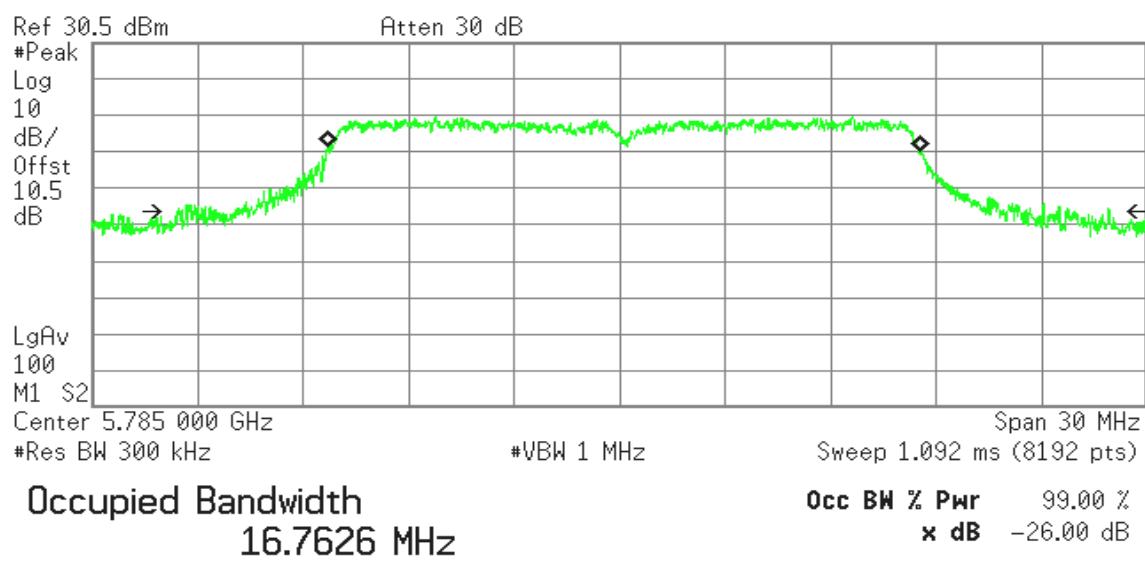
Agilent

R T

**Transmit Freq Error** 142.668 kHz
Occupied Bandwidth 26.239 MHz**CH Mid**

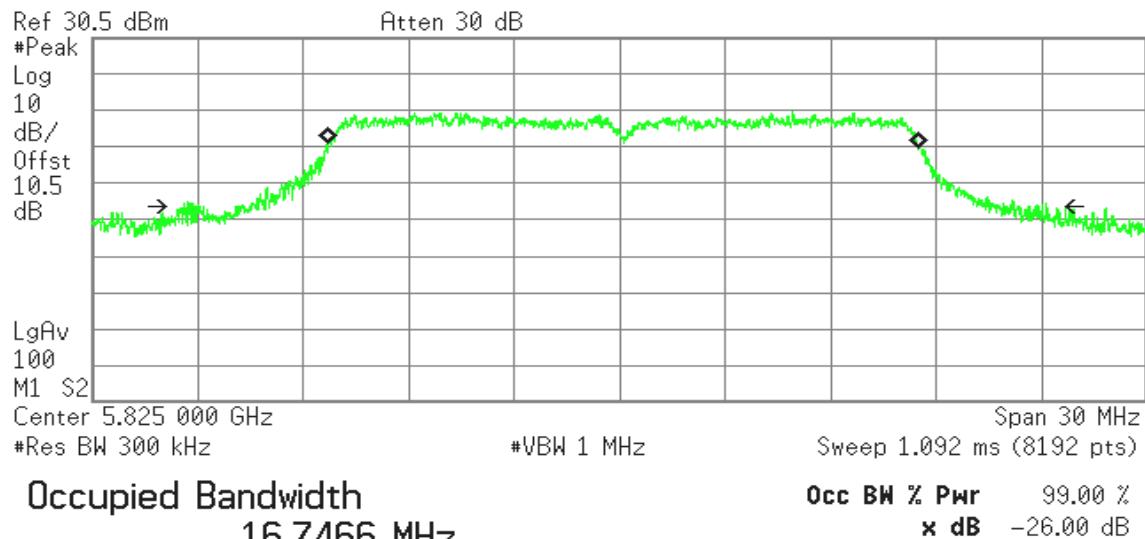
Agilent

R T

**Transmit Freq Error** 132.013 kHz
Occupied Bandwidth 26.335 MHz

**CH High**

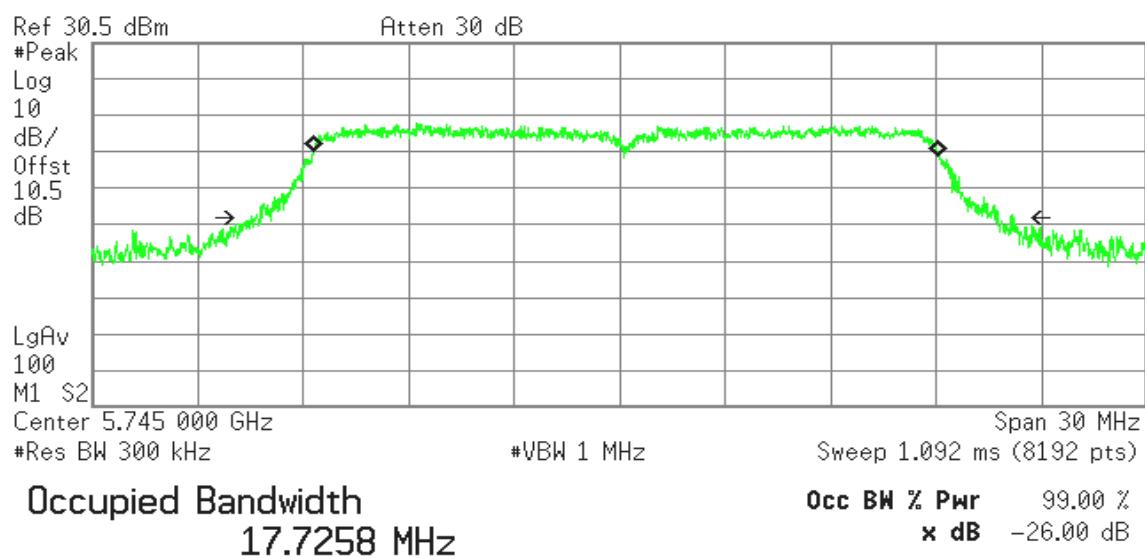
R T



Transmit Freq Error 131.689 kHz
Occupied Bandwidth 24.294 MHz

IEEE 802.11n HT20 / 5745 ~ 5825MHz / Chain 0**CH Low**

R T

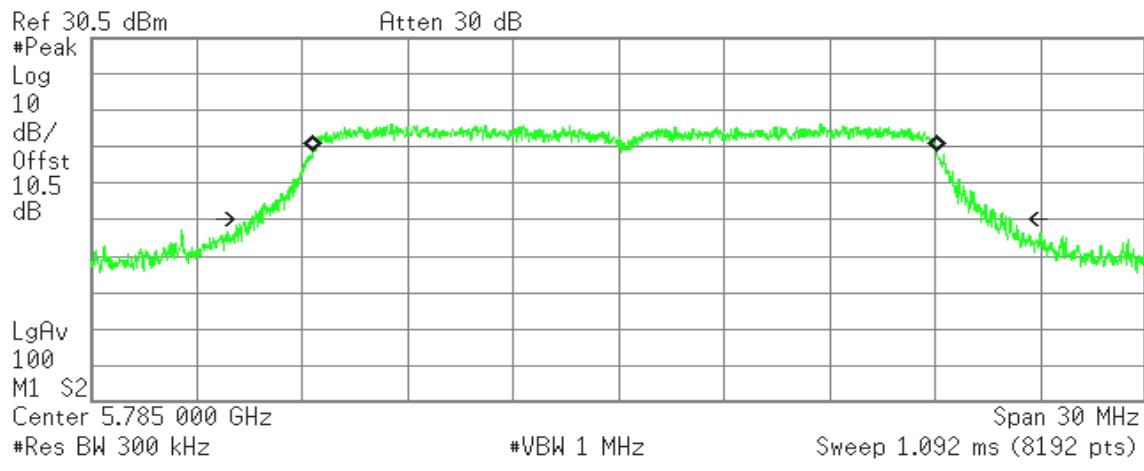


Transmit Freq Error 168.801 kHz
Occupied Bandwidth 21.552 MHz

**CH Mid**

Agilent

R T

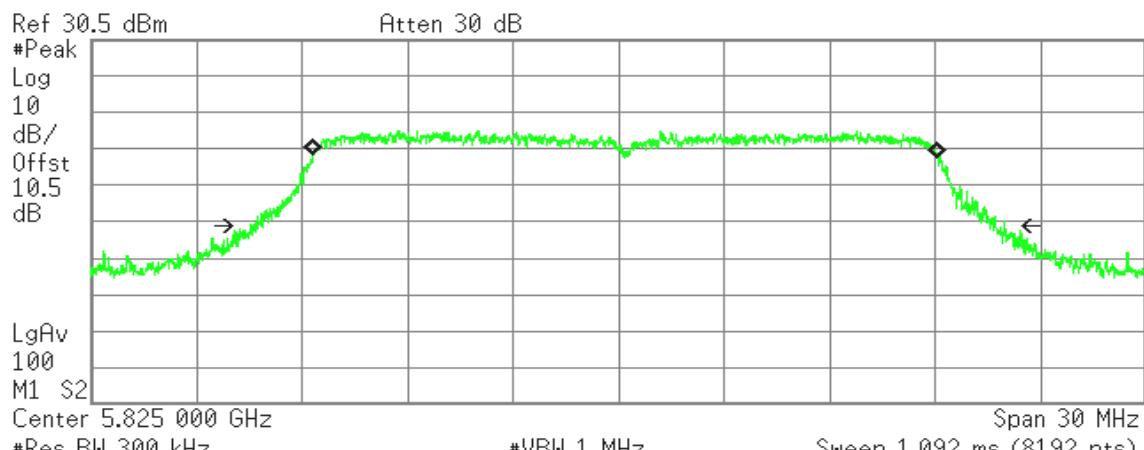


Transmit Freq Error 184.558 kHz
Occupied Bandwidth 21.372 MHz

CH High

Agilent

R T

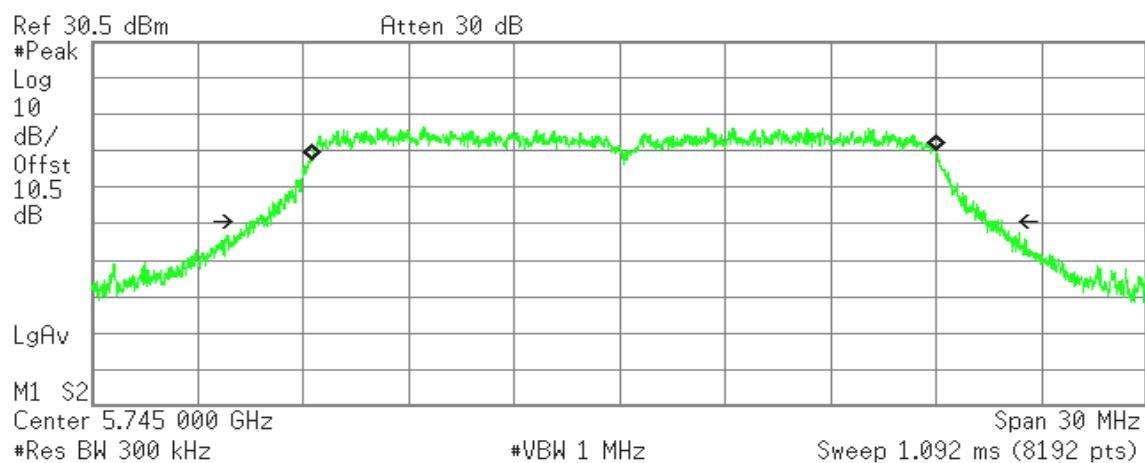


Transmit Freq Error 189.322 kHz
Occupied Bandwidth 21.319 MHz

**IEEE 802.11n HT20 / 5745 ~ 5825MHz / Chain 1****CH Low**

Agilent

R T

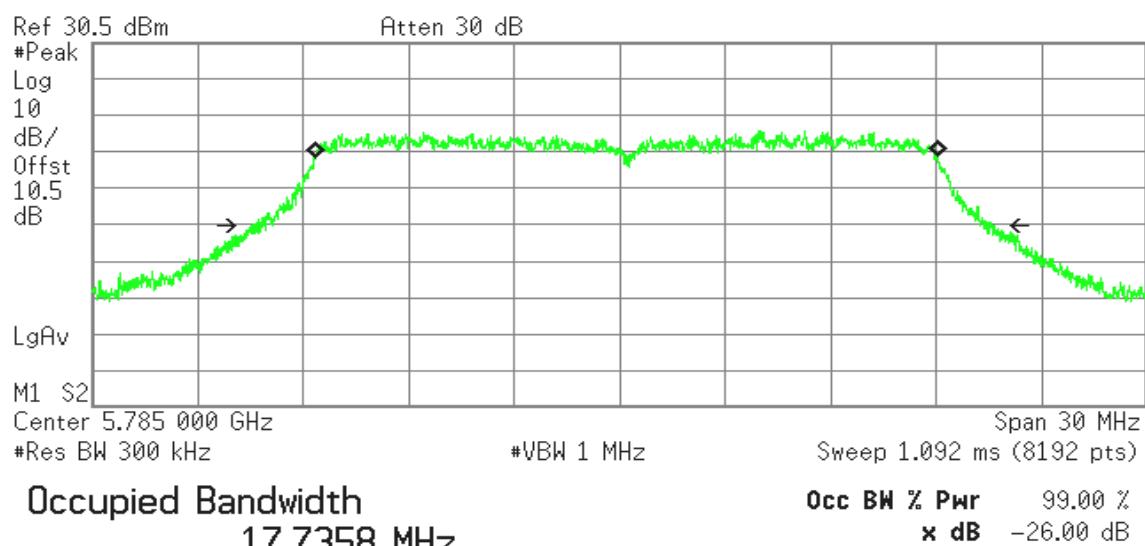


Transmit Freq Error 139.243 kHz
Occupied Bandwidth 21.266 MHz

CH Mid

Agilent

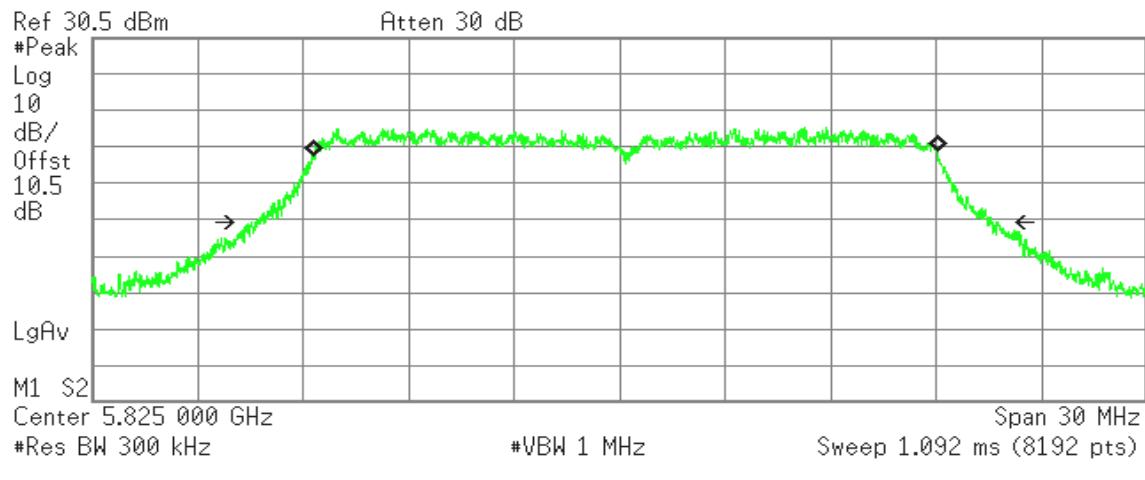
R T



Transmit Freq Error 186.790 kHz
Occupied Bandwidth 20.895 MHz

**CH High**

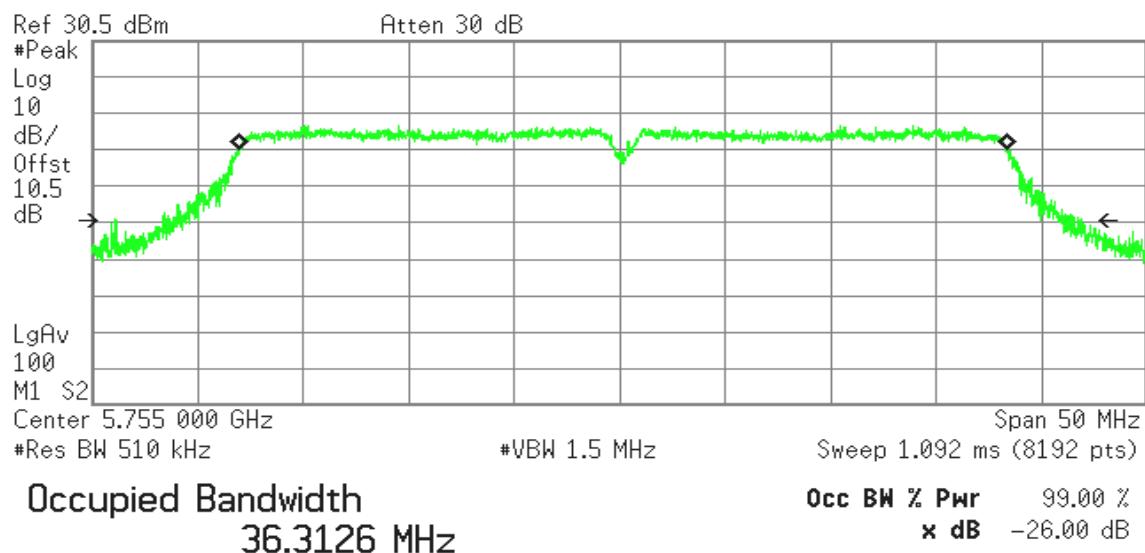
R T



Transmit Freq Error 173.027 kHz
Occupied Bandwidth 21.069 MHz

IEEE 802.11n HT40 / 5755 ~ 5795MHz / Chain 0**CH Low**

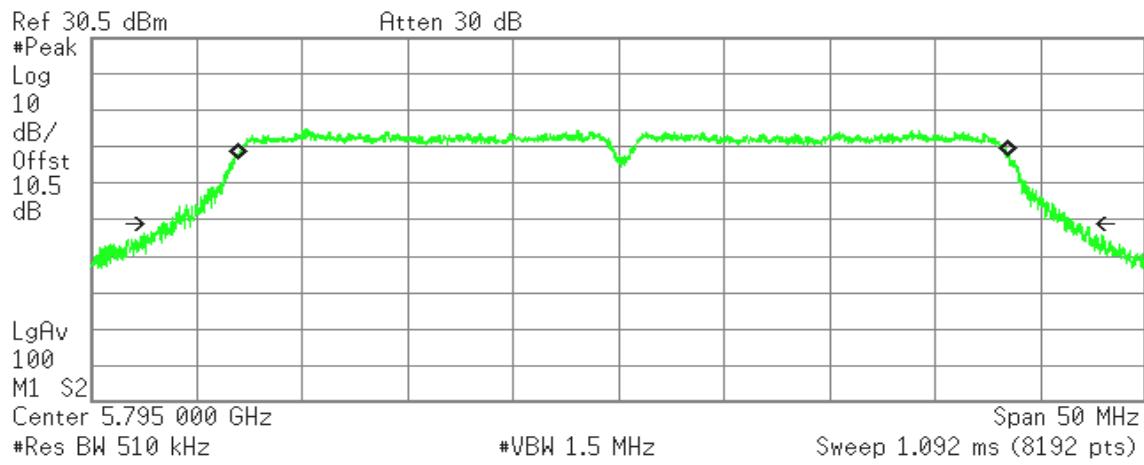
R T



Transmit Freq Error 165.395 kHz
Occupied Bandwidth 45.762 MHz

**CH High**

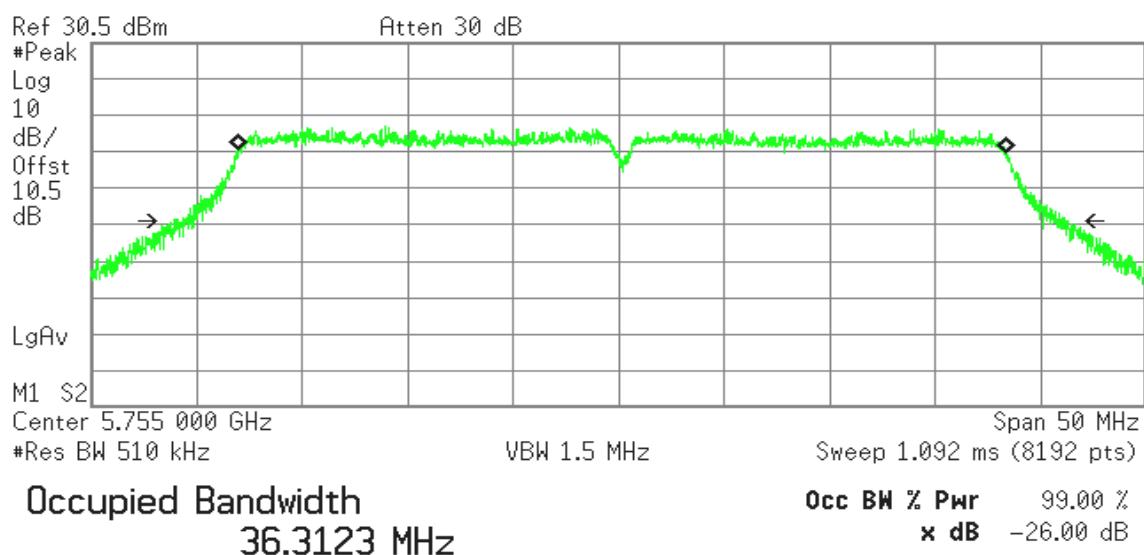
R T



Transmit Freq Error 195.553 kHz
Occupied Bandwidth 43.172 MHz

IEEE 802.11n HT40 / 5755 ~ 5795MHz / Chain 1**CH Low**

R T

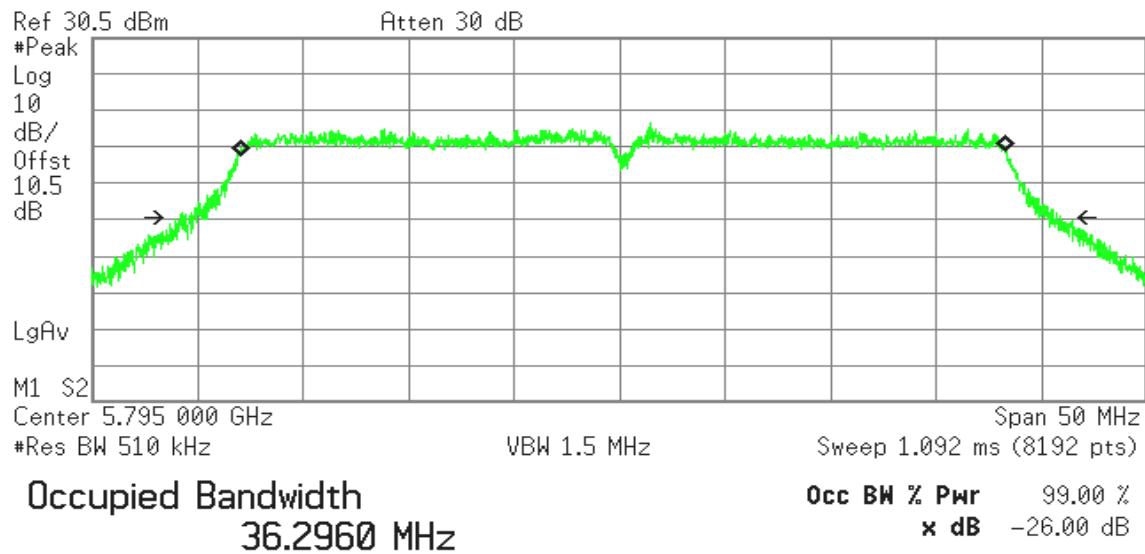


Transmit Freq Error 163.142 kHz
Occupied Bandwidth 42.456 MHz

**CH High**

Agilent

R T

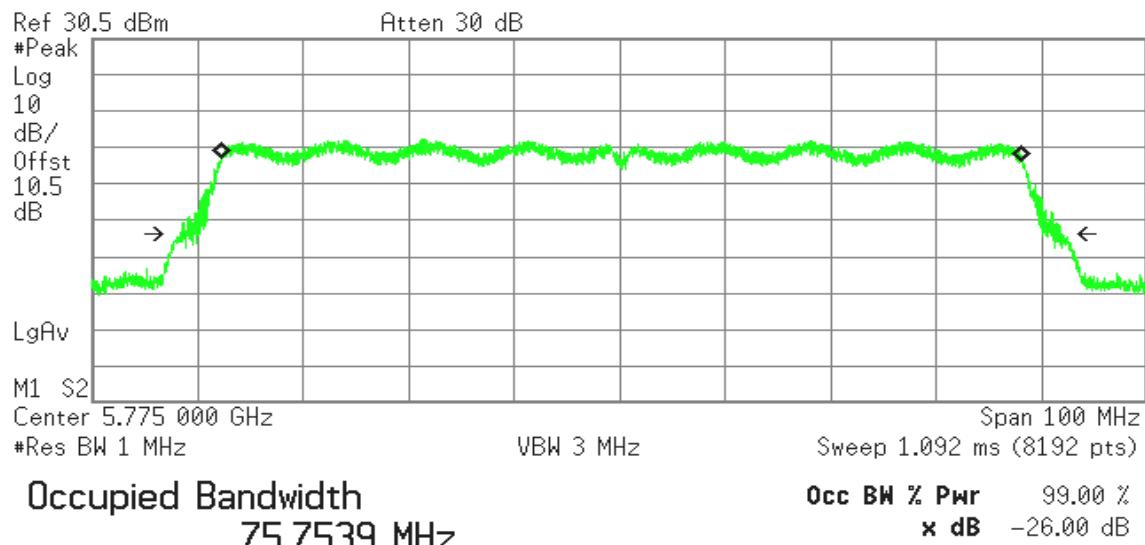


Transmit Freq Error 164.175 kHz
Occupied Bandwidth 41.581 MHz

**IEEE 802.11ac HT80 / 5775MHz / Chain 0**

Agilent

R T

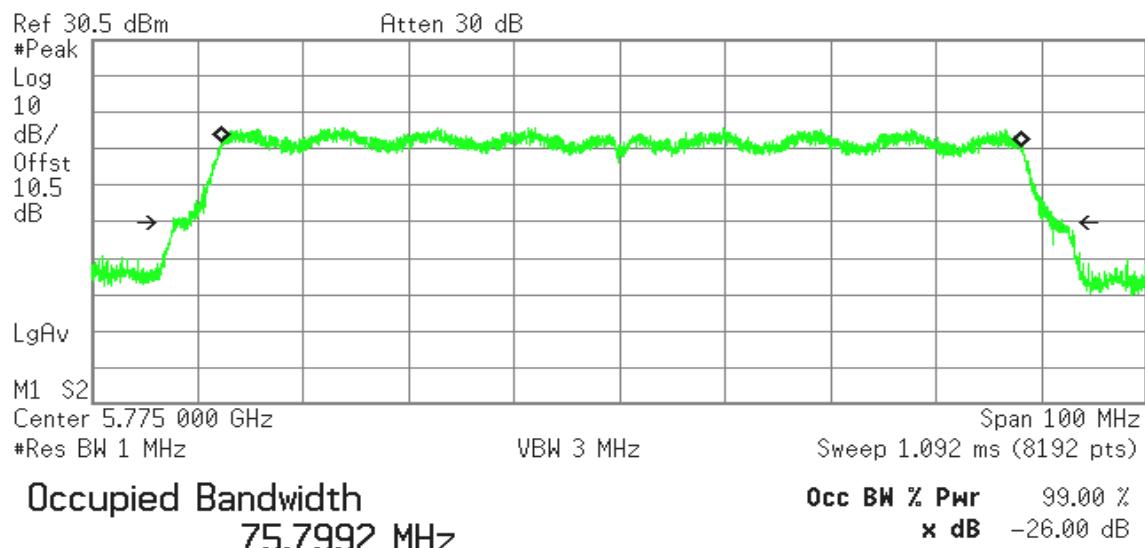


Transmit Freq Error 200.649 kHz
Occupied Bandwidth 83.252 MHz

IEEE 802.11ac HT80 / 5775MHz / Chain 1

Agilent

R T



Transmit Freq Error 124.905 kHz
Occupied Bandwidth 83.860 MHz

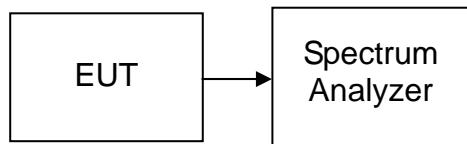


7.2 6DB BANDWIDTH

LIMIT

According to §15.407 (e), within the 5.725-5.85 GHz band, the minimum 6 dB bandwidth of U-NII devices 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 = 100kHz, VBW = 300kHz, Sweep = auto, Span = 30MHz (IEEE 802.11a, IEEE 802.11n HT20) or Span = 60MHz (IEEE 802.11n HT40) or Span = 120MHz (IEEE 802.11ac HT80).
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 mode: IEEE 802.11a / 5745 ~ 5825MHz**

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Result
Low	5745	16.455	>500	PASS
Mid	5785	16.455		PASS
High	5825	16.495		PASS

Test mode: IEEE 802.11n HT20 / 5745 ~ 5825MHz / Chain 0

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Result
Low	5745	17.690	>500	PASS
Mid	5785	17.715		PASS
High	5825	17.735		PASS

Test mode: IEEE 802.11n HT20 / 5745 ~ 5825MHz / Chain 1

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Result
Low	5745	17.665	>500	PASS
Mid	5785	17.625		PASS
High	5825	17.635		PASS

Test mode: IEEE 802.11n HT40 / 5755 ~ 5795MHz / Chain 0

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Result
Low	5755	36.455	>500	PASS
High	5795	36.480		PASS

Test mode: IEEE 802.11n HT40 / 5755 ~ 5795MHz / Chain 1

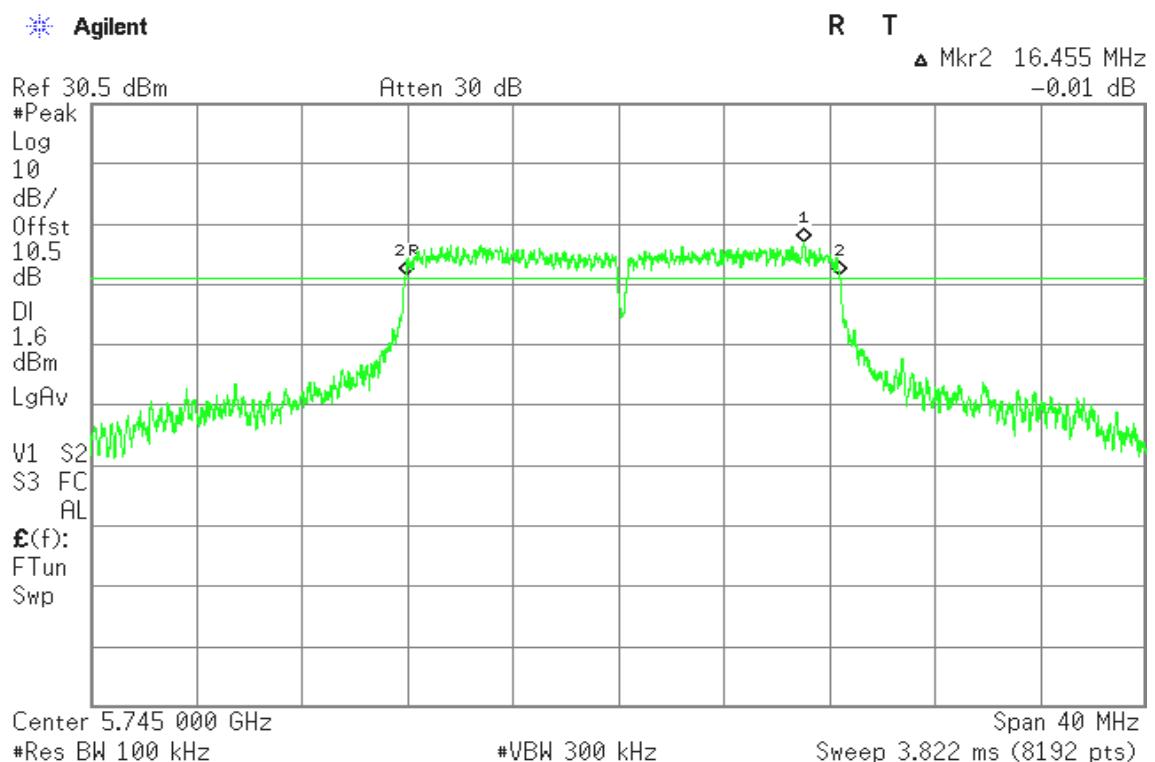
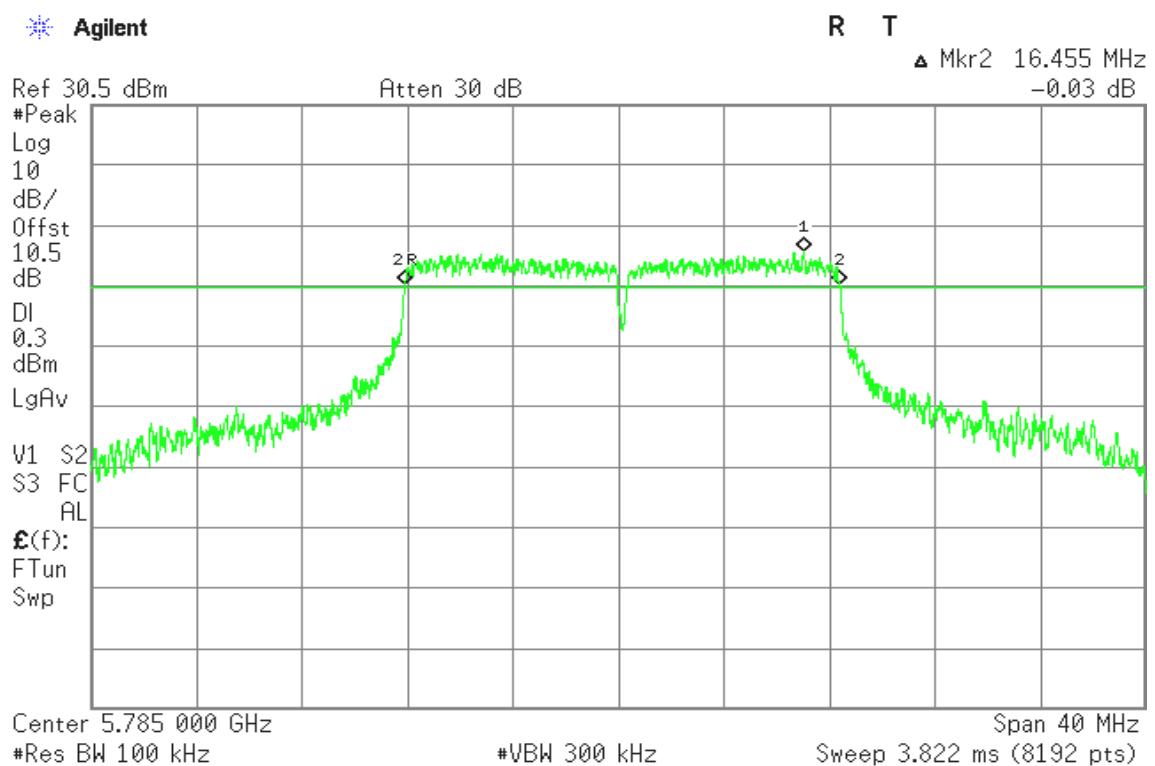
Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Result
Low	5755	36.445	>500	PASS
High	5795	36.405		PASS

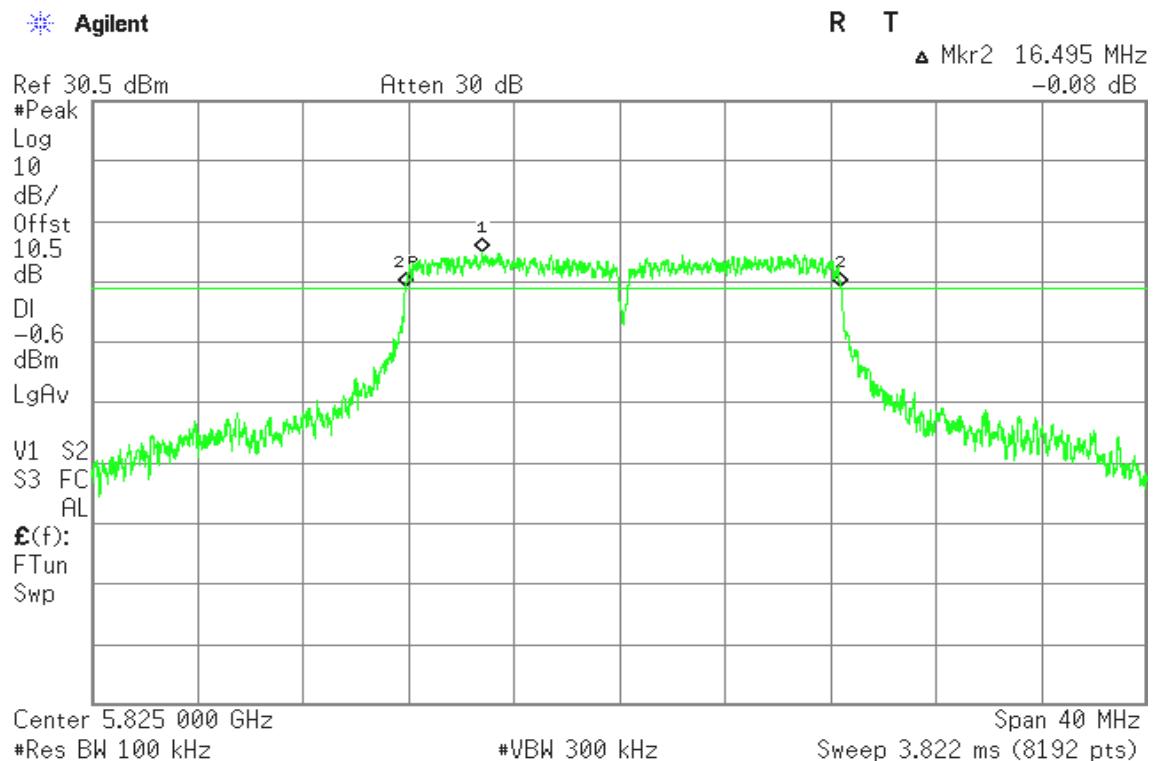
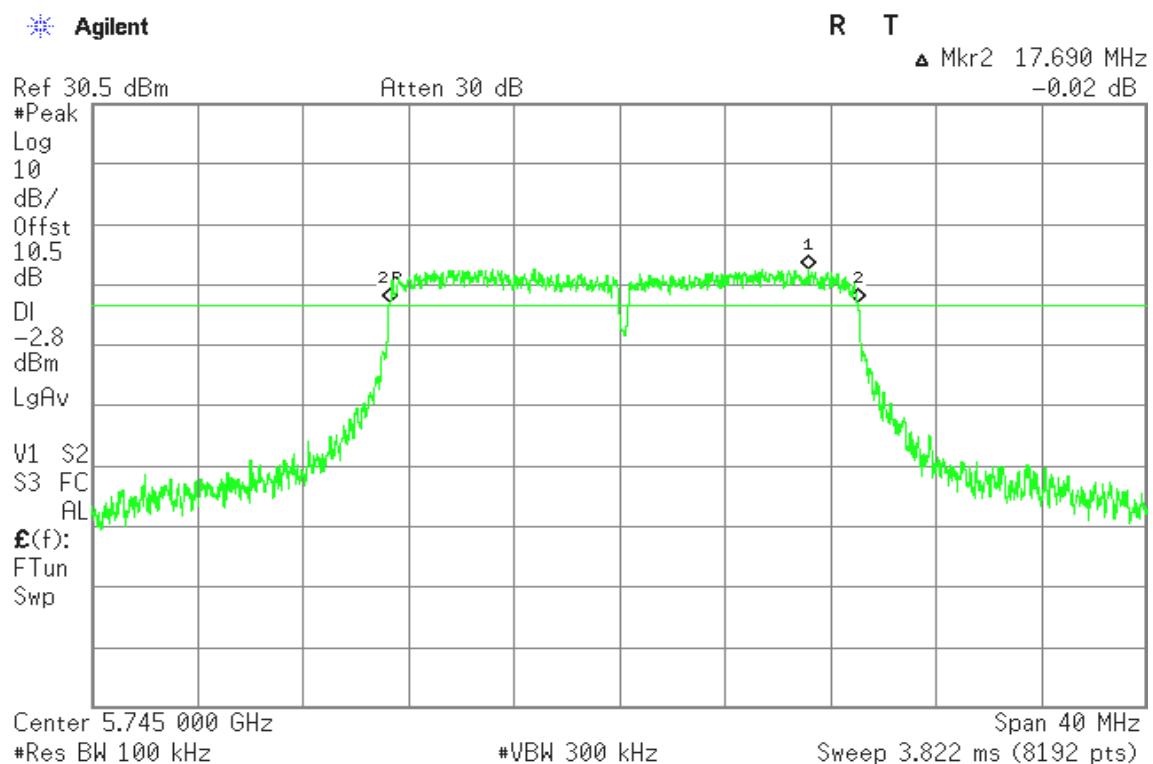
Test mode: IEEE 802.11ac HT80 / 5775MHz / Chain 0

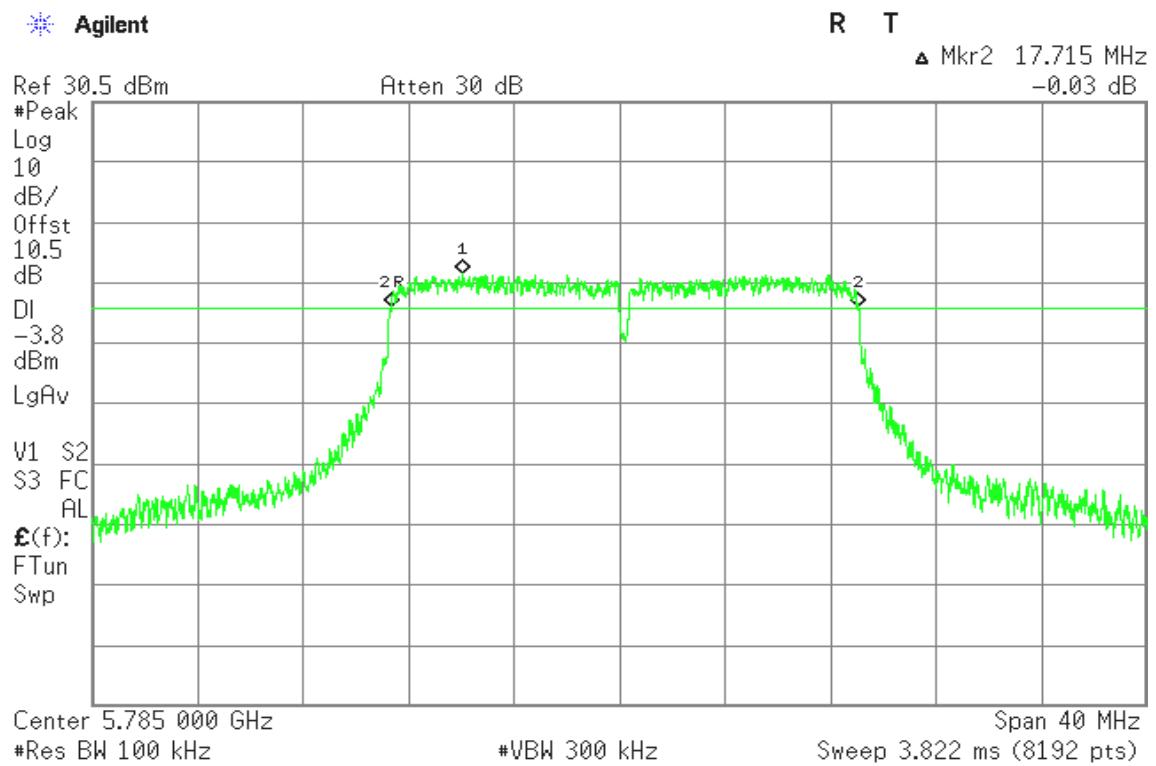
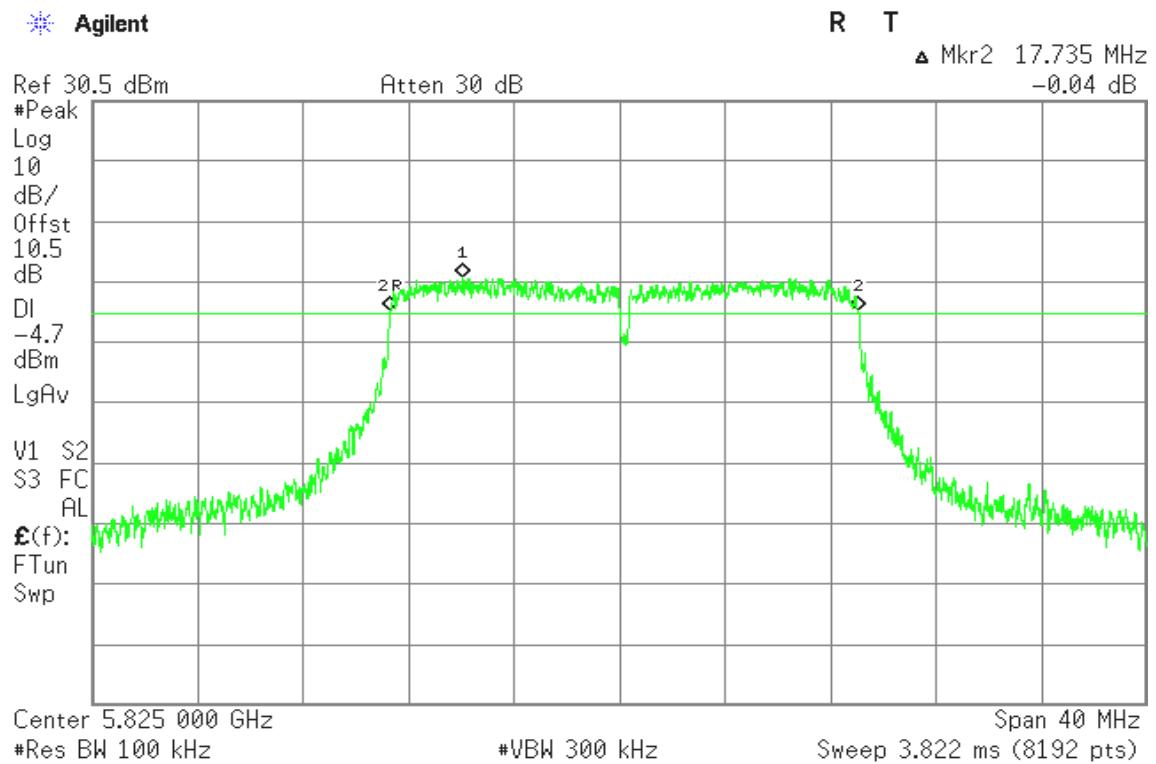
Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Result
5775	76.420	>500	PASS

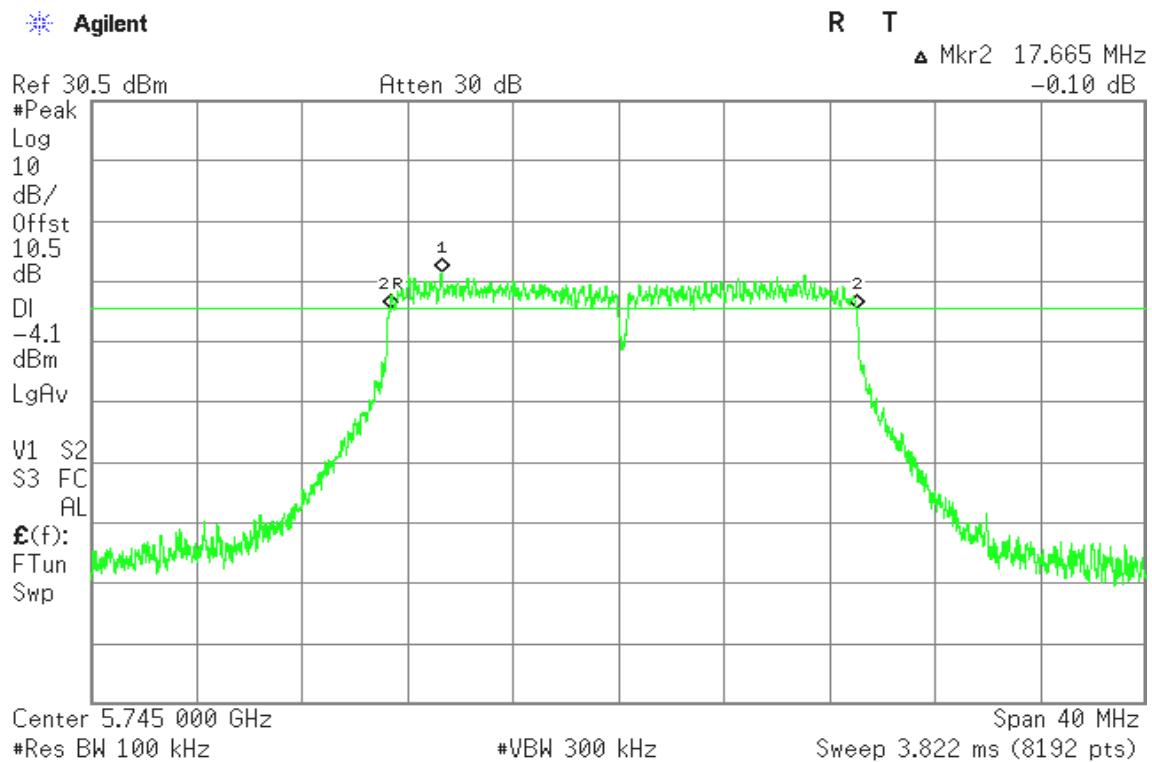
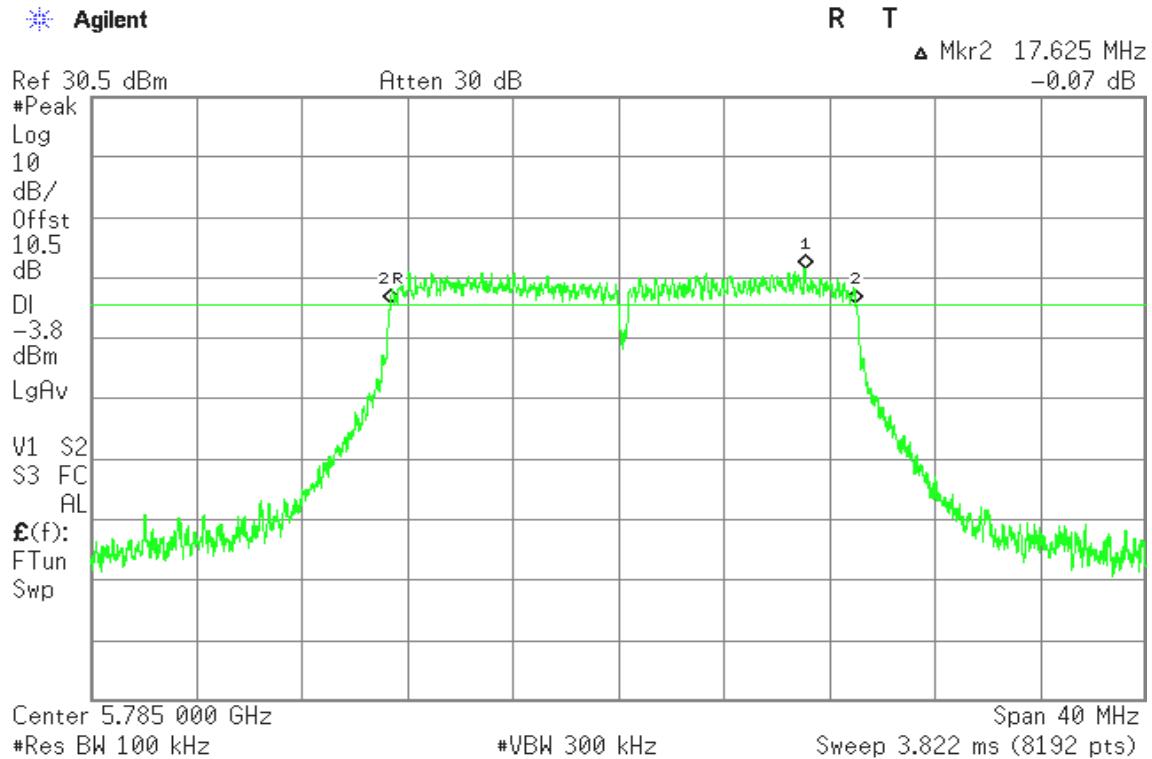
Test mode: IEEE 802.11ac HT80 / 5775MHz / Chain 1

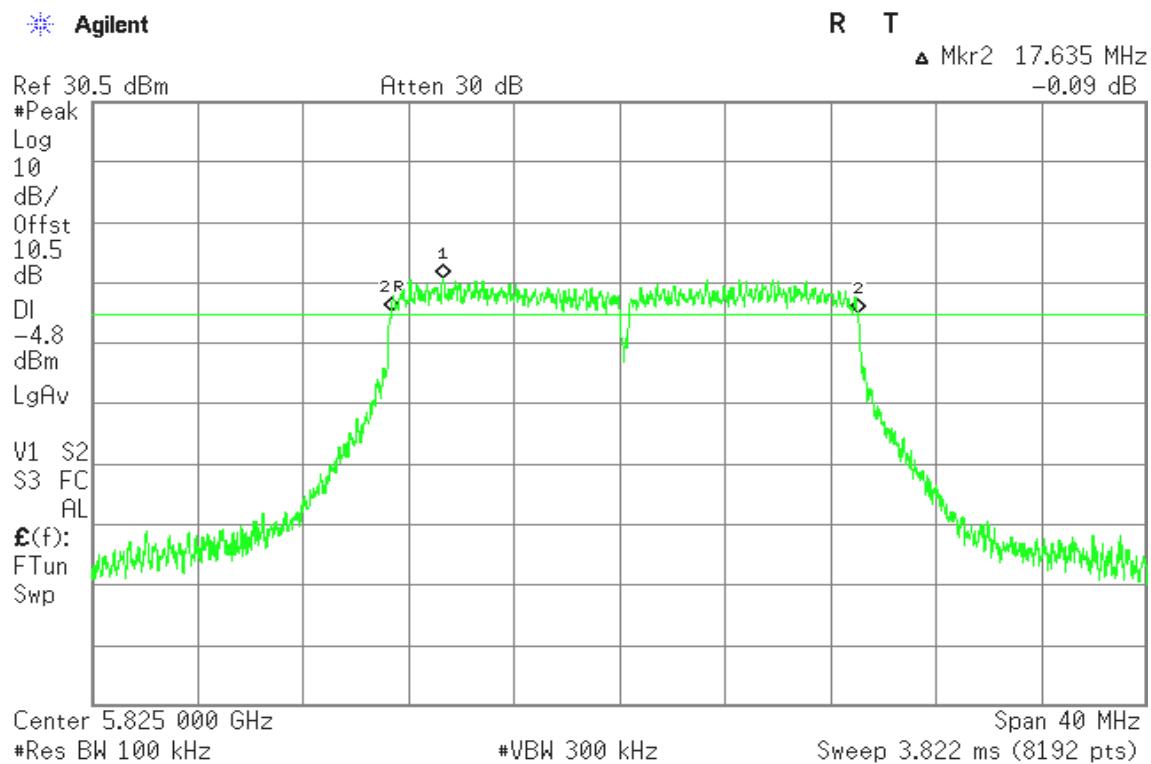
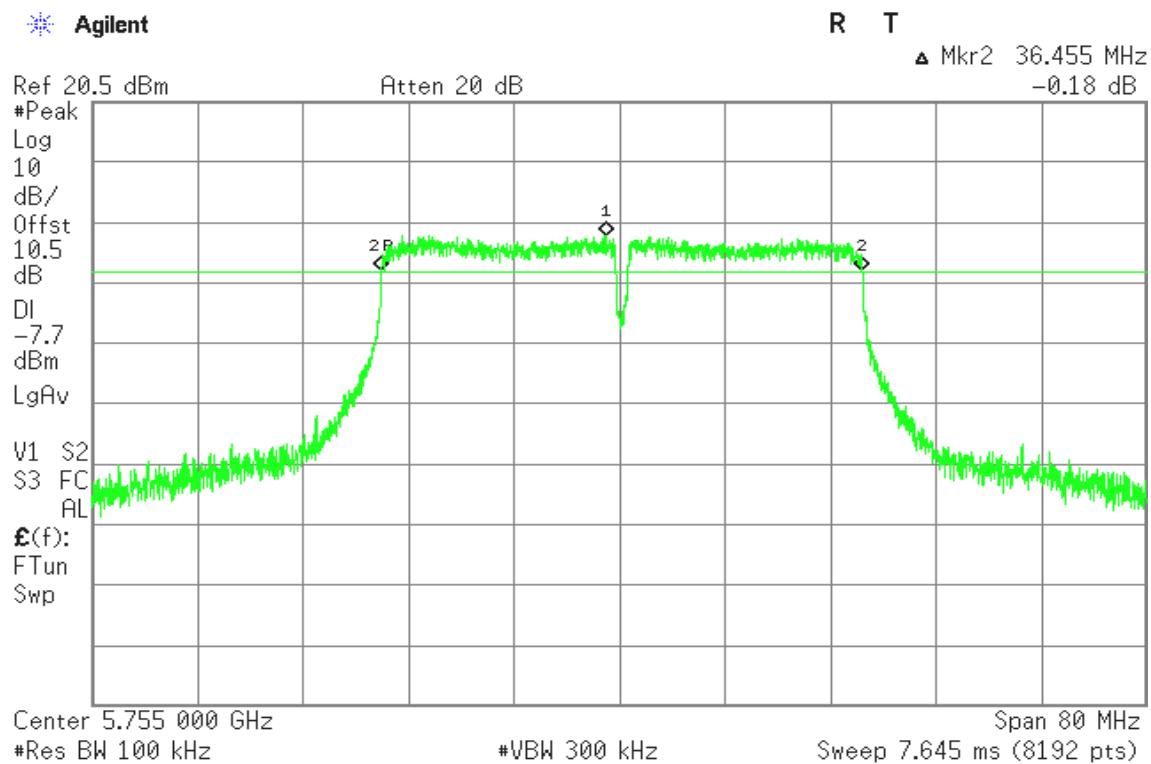
Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Result
5775	16.400	>500	PASS

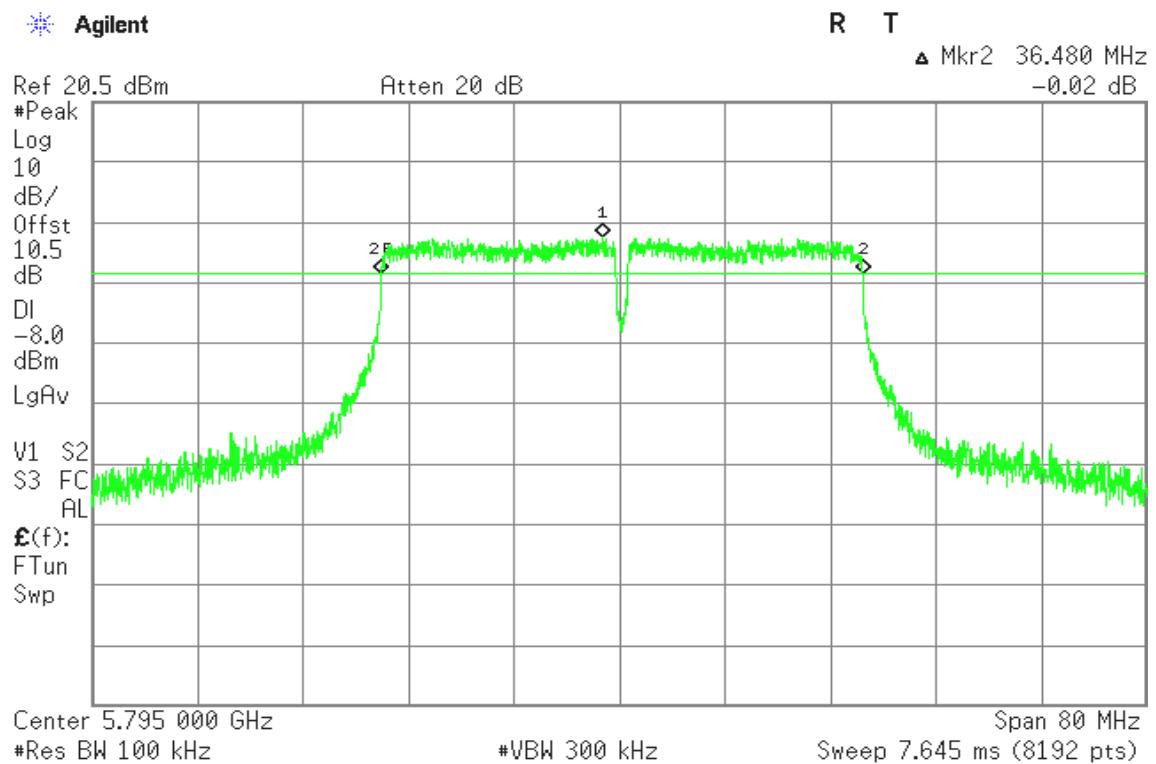
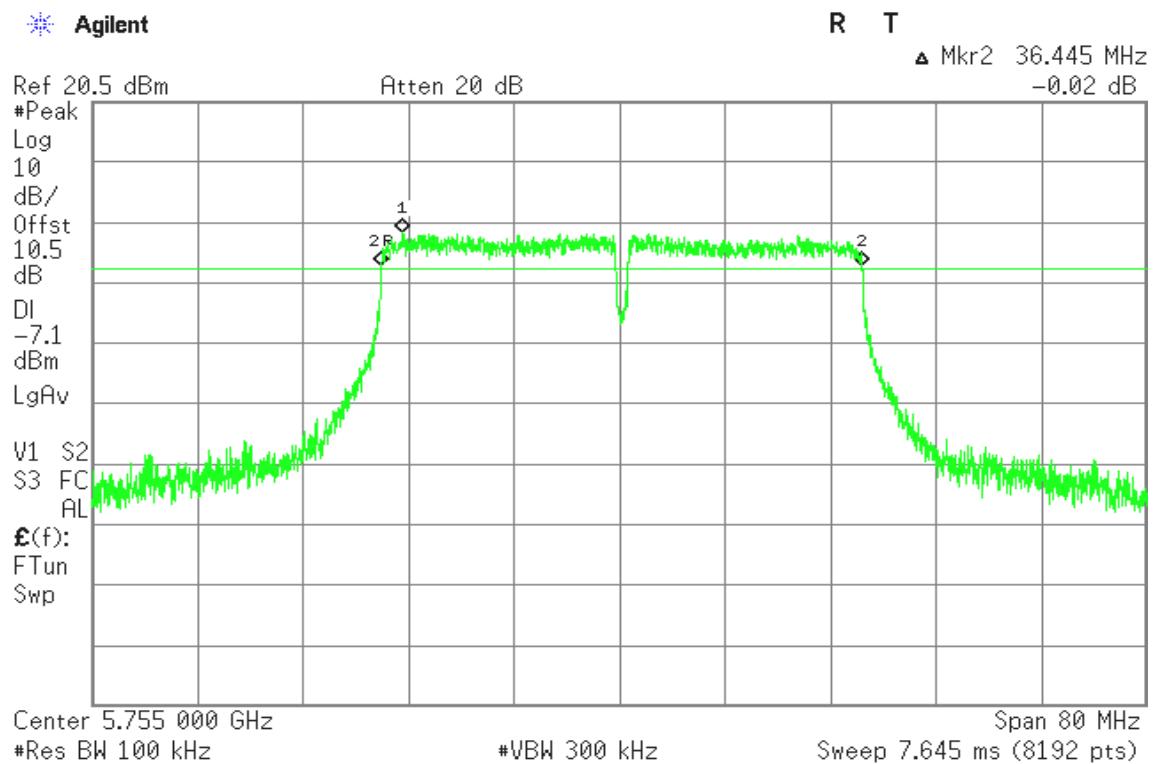
**Test Plot****IEEE 802.11a / 5745 ~ 5825MHz****CH Low****CH Mid**

**CH High****IEEE 802.11n HT20 / 5745 ~ 5825MHz / Chain 0****CH Low**

**CH Mid****CH High**

**IEEE 802.11n HT20 / 5745 ~ 5825MHz / Chain 1****CH Low****CH Mid**

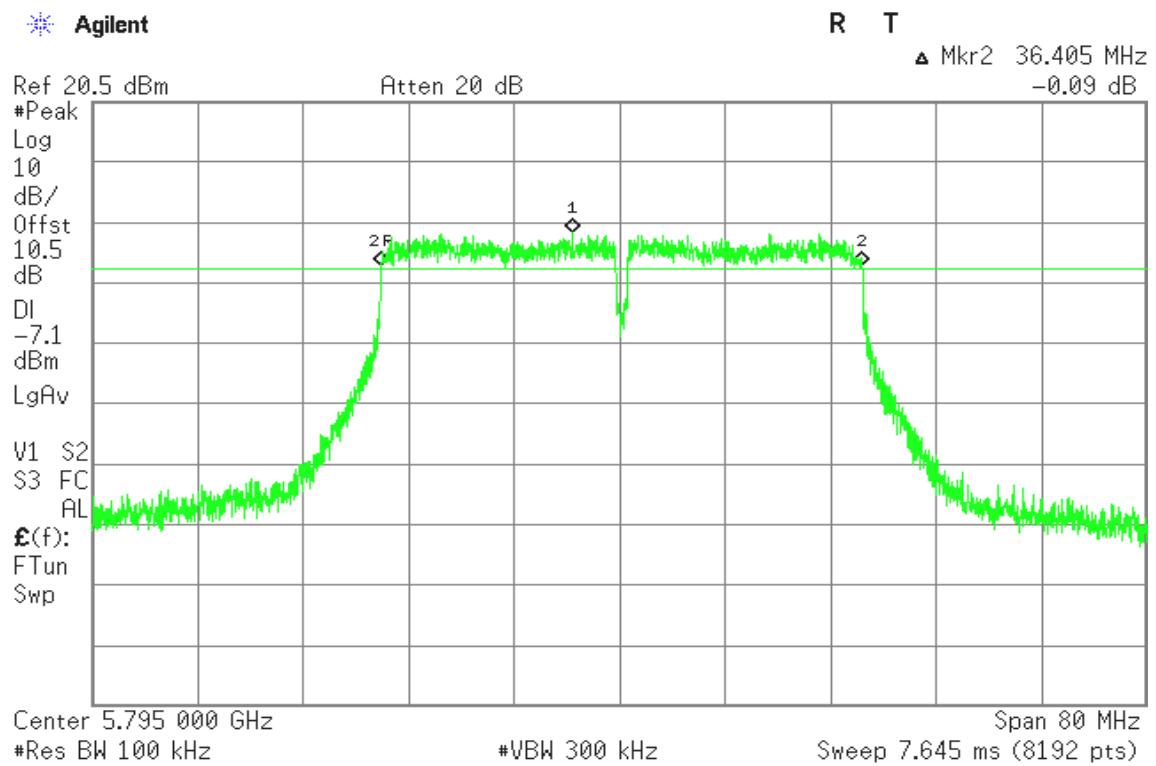
**CH High****IEEE 802.11n HT40 / 5755 ~ 5795MHz / Chain 0****CH Low**

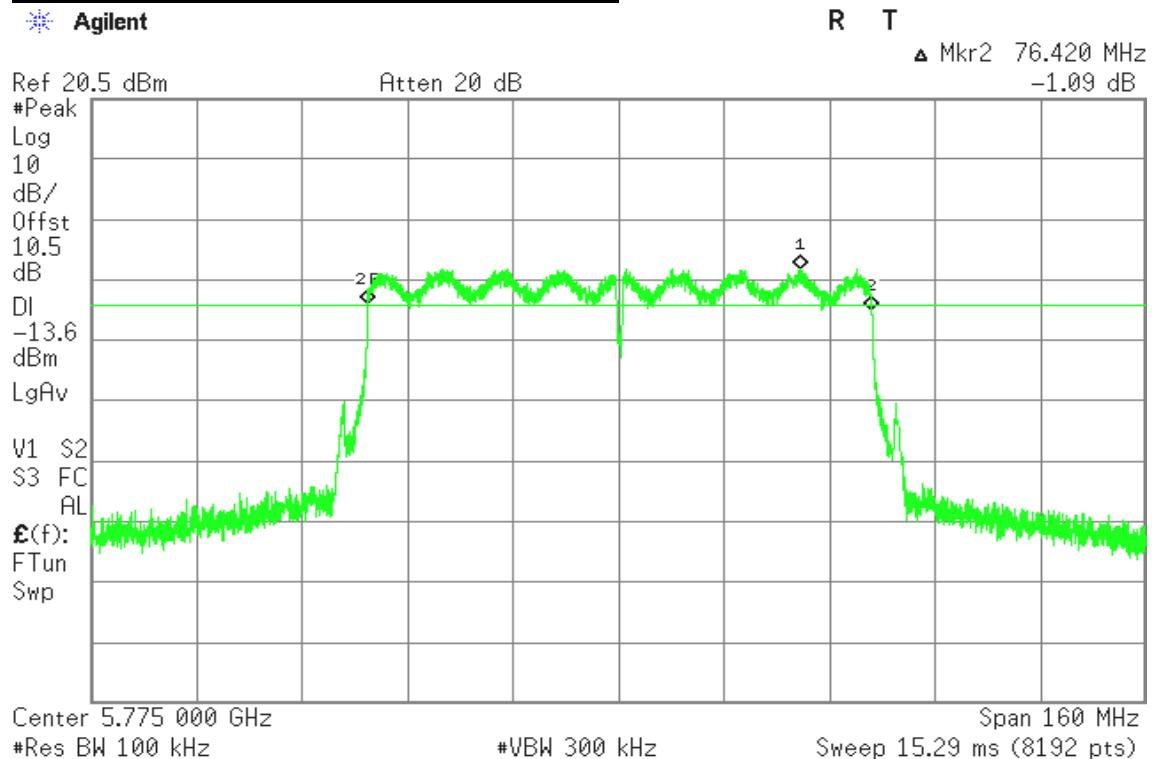
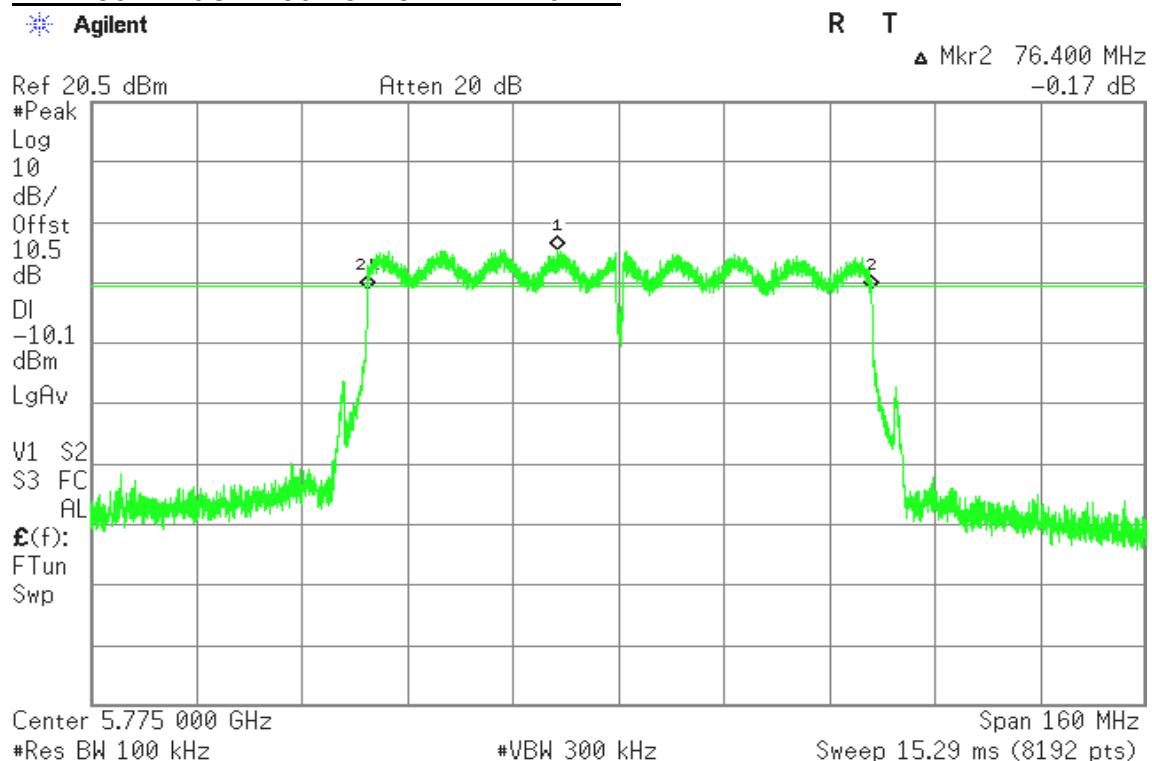
**CH High****IEEE 802.11n HT40 / 5755 ~ 5795MHz / Chain 1****CH Low**



CH High

* Agilent



**IEEE 802.11ac HT80 / 5775MHz / Chain 0****IEEE 802.11ac HT80 / 5775MHz / Chain 1**



7.3 MAXIMUM CONDUCTED OUTPUT POWER

LIMIT

According to § 15.407(a)

(1) For the band 5.15-5.25 GHz.

- (i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).
- (ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.
- (iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.
- (iv) For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.



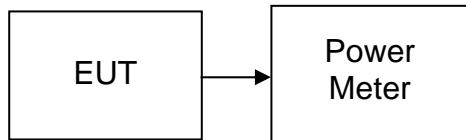
(2) For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm $10 \log B$, where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(3) For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.



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. The 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 / 5180 ~ 5240MHz**

Channel	Frequency (MHz)	Maximum Conducted Output Power (dBm)	Limit (dBm)
Low	5180	15.68	24.00
Mid	5220	15.05	24.00
High	5240	15.36	24.00

Test mode: IEEE 802.11n HT20 / 5180 ~ 5240MHz

Channel	Frequency (MHz)	Chain 0 Maximum Conducted Output Power (dBm)	Chain 1 Maximum Conducted Output Power (dBm)	Total Maximum Conducted Output Power (dBm)	Limit (dBm)
Low	5180	11.11	17.76	18.61	21.98
Mid	5220	10.53	17.25	18.09	21.98
High	5240	10.34	17.83	18.54	21.98

Test mode: IEEE 802.11n HT40 / 5190 ~ 5230MHz

Channel	Frequency (MHz)	Chain 0 Maximum Conducted Output Power (dBm)	Chain 1 Maximum Conducted Output Power (dBm)	Total Maximum Conducted Output Power (dBm)	Limit (dBm)
Low	5190	6.01	12.76	13.59	21.98
High	5230	9.82	15.74	16.73	21.98

Test mode: IEEE 802.11ac HT80 / 5210MHz

Frequency (MHz)	Chain 0 Maximum Conducted Output Power (dBm)	Chain 1 Maximum Conducted Output Power (dBm)	Total Maximum Conducted Output Power (dBm)	Limit (dBm)
5210	8.36	12.94	14.24	21.98

**Test mode: IEEE 802.11a / 5745-5825MHz**

Channel	Frequency (MHz)	Maximum Conducted Output Power (dBm)	Limit (dBm)
Low	5745	17.53	30.00
Mid	5785	17.49	30.00
High	5825	16.78	30.00

Test mode: IEEE 802.11n HT20 / 5745-5825MHz

Channel	Frequency (MHz)	Chain 0 Maximum Conducted Output Power (dBm)	Chain 1 Maximum Conducted Output Power (dBm)	Total Maximum Conducted Output Power (dBm)	Limit (dBm)
Low	5180	13.08	12.2	15.67	21.98
Mid	5220	12.24	12.36	15.31	21.98
High	5240	11.09	13.51	15.48	21.98

Test mode: IEEE 802.11n HT40 / 5755-5795MHz

Channel	Frequency (MHz)	Chain 0 Maximum Conducted Output Power (dBm)	Chain 1 Maximum Conducted Output Power (dBm)	Total Maximum Conducted Output Power (dBm)	Limit (dBm)
Low	5190	12.32	14.4	16.49	21.98
High	5230	12.09	12.46	15.29	21.98

Test mode: IEEE 802.11ac HT80 / 5775MHz

Frequency (MHz)	Chain 0 Maximum Conducted Output Power (dBm)	Chain 1 Maximum Conducted Output Power (dBm)	Total Maximum Conducted Output Power (dBm)	Limit (dBm)
5210	10.55	10.25	13.41	21.98



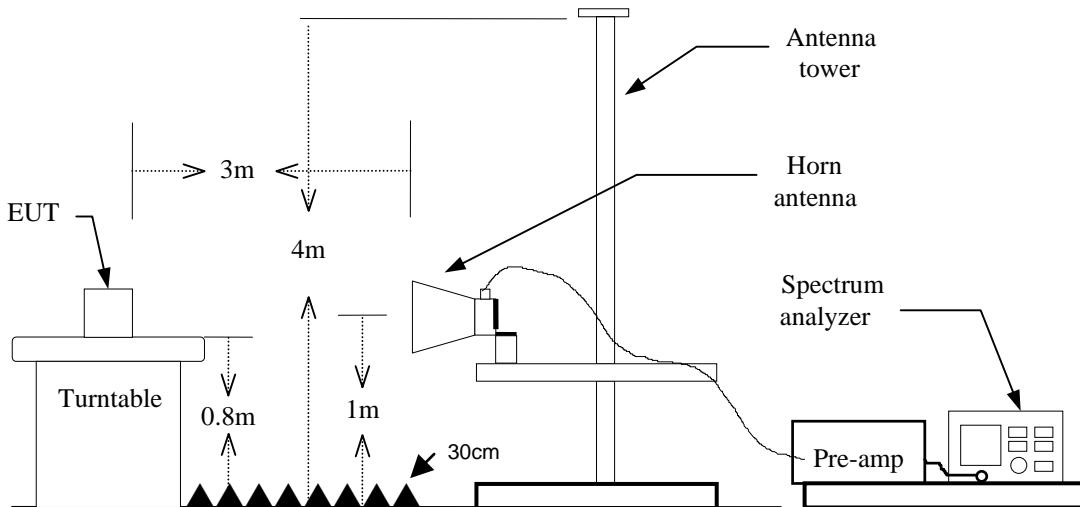
7.4 BAND EDGES MEASUREMENT

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



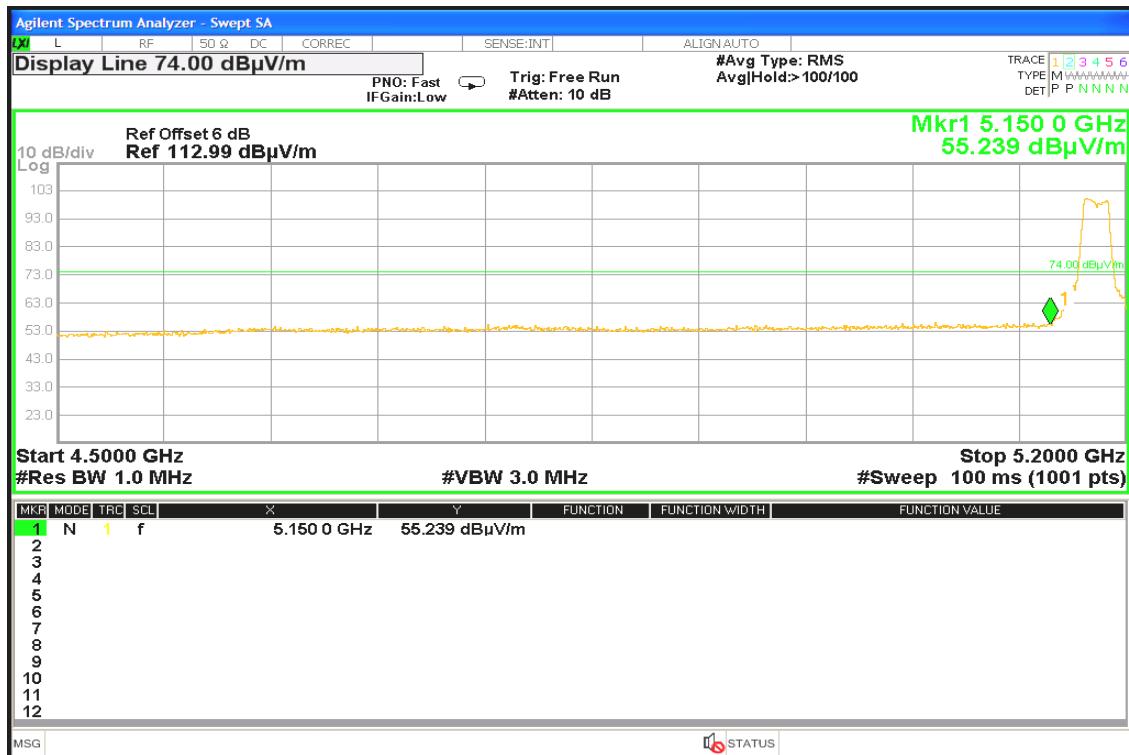
TEST PROCEDURE

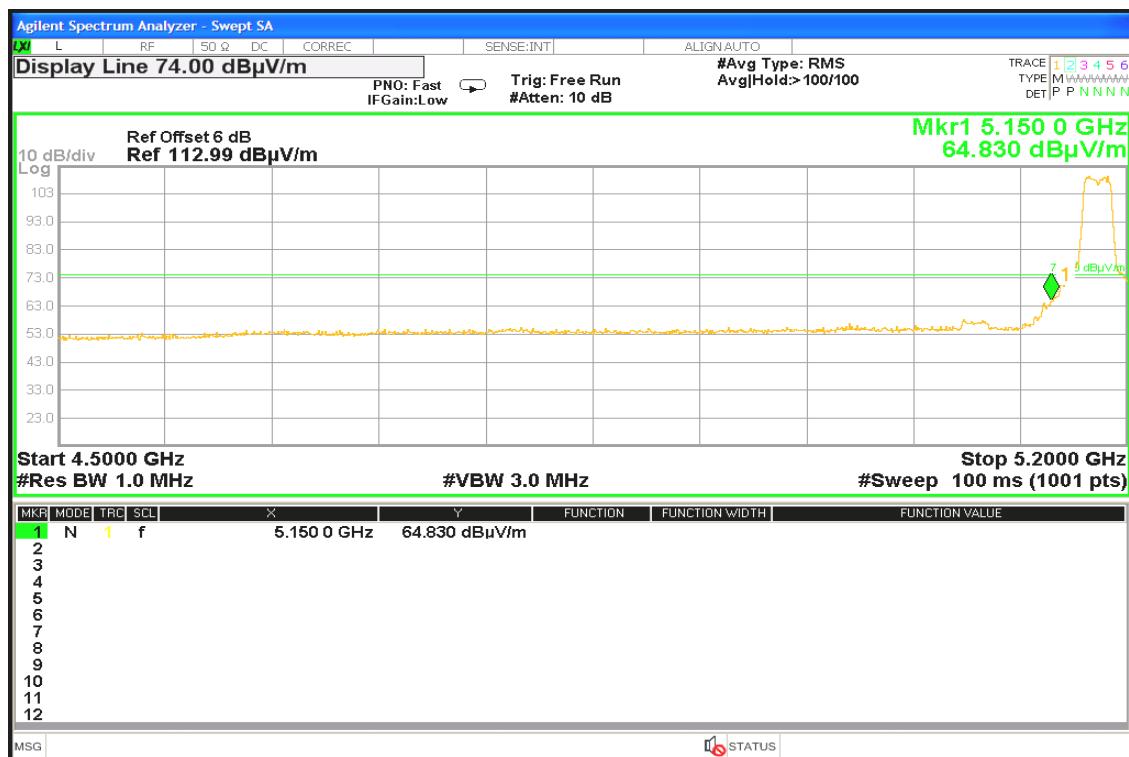
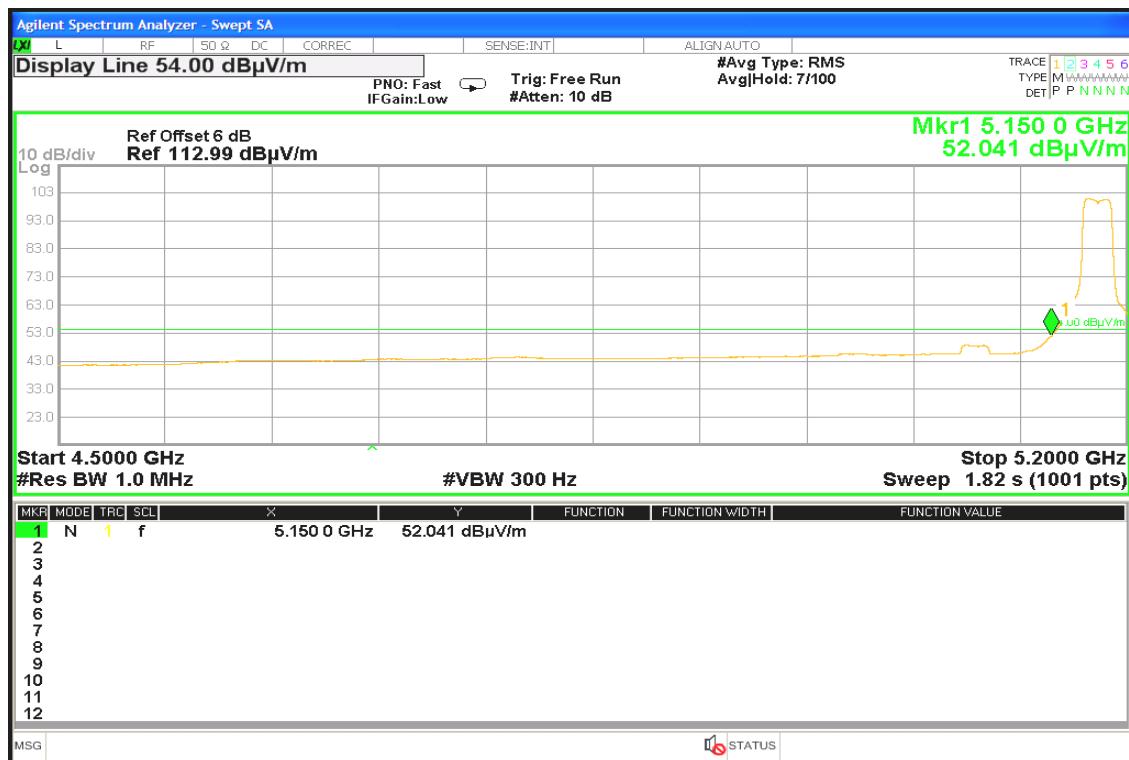
1. The EUT is placed on a turntable, which is 0.8m above the ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission.
4. Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of the emission:
 - (a) PEAK: RBW=1MHz / VBW=3MHz / Sweep=AUTO
 - (b) AVERAGE: RBW=1MHz / VBW=300Hz / Sweep=AUTO
5. Repeat the procedures until all the PEAK and AVERAGE versus POLARIZATION are measured.

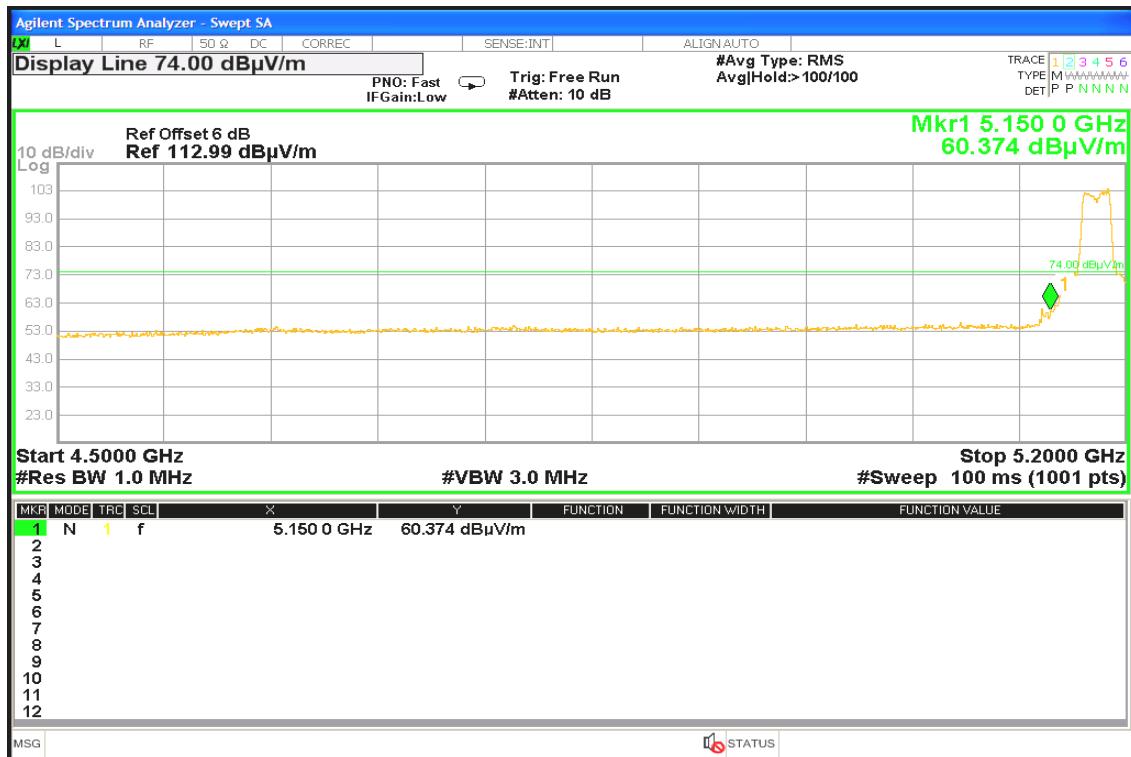
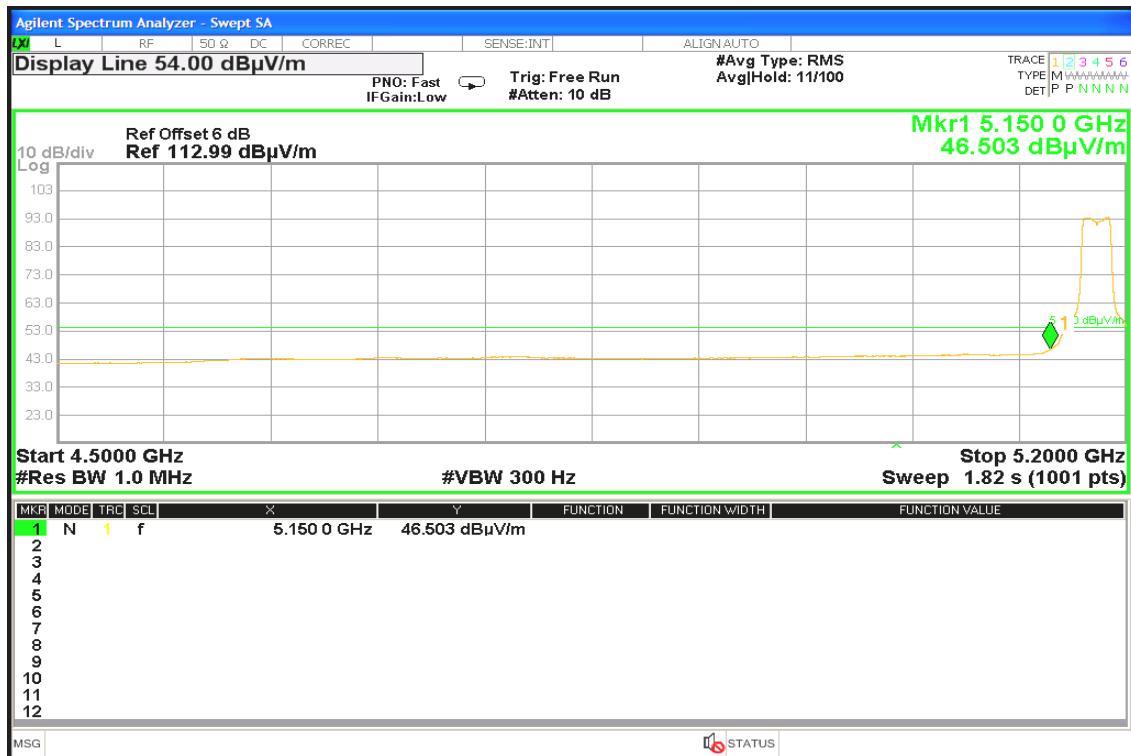
TEST RESULTS

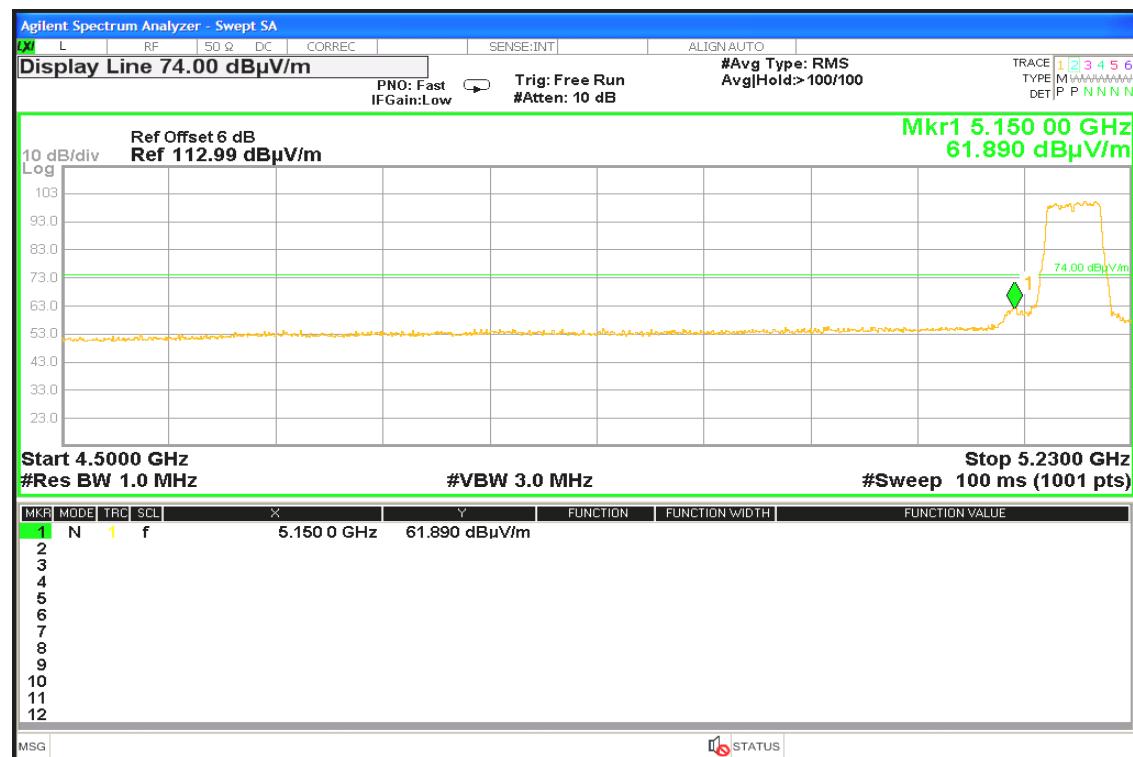
Refer to attach spectrum analyzer data chart.

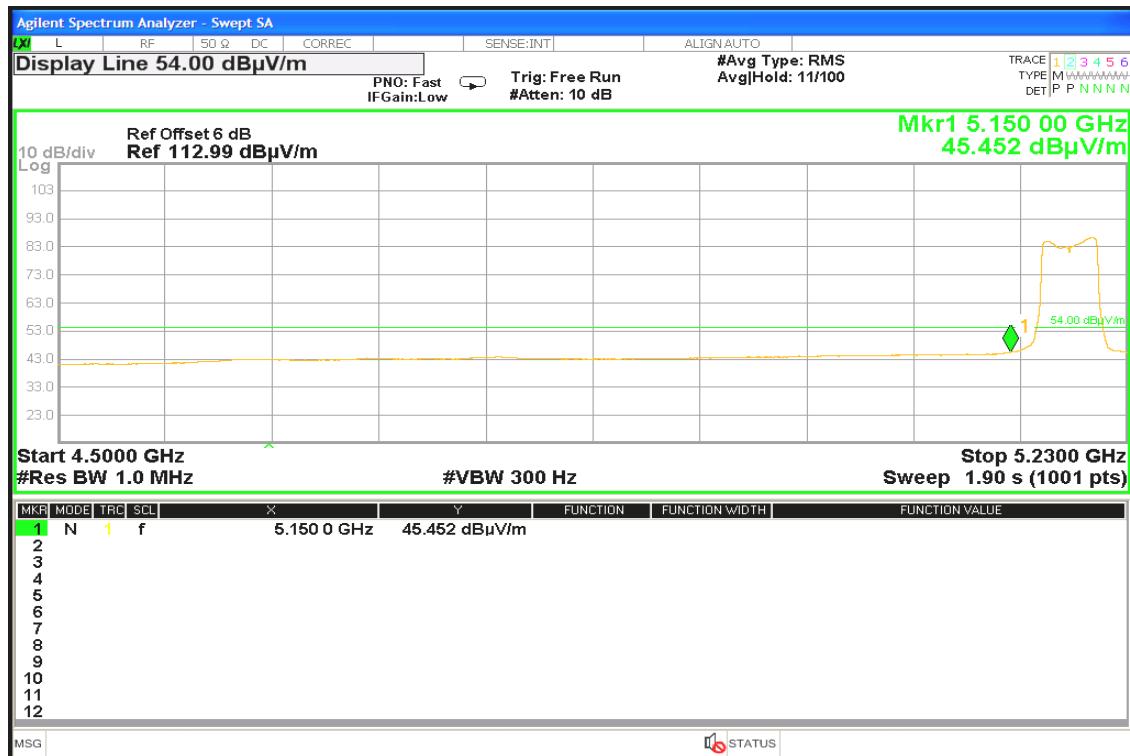
**IEEE 802.11a / 5180-5240MHz / CH Low****Detector mode: Peak****Polarity: Vertical****Detector mode: Average****Polarity: Vertical**

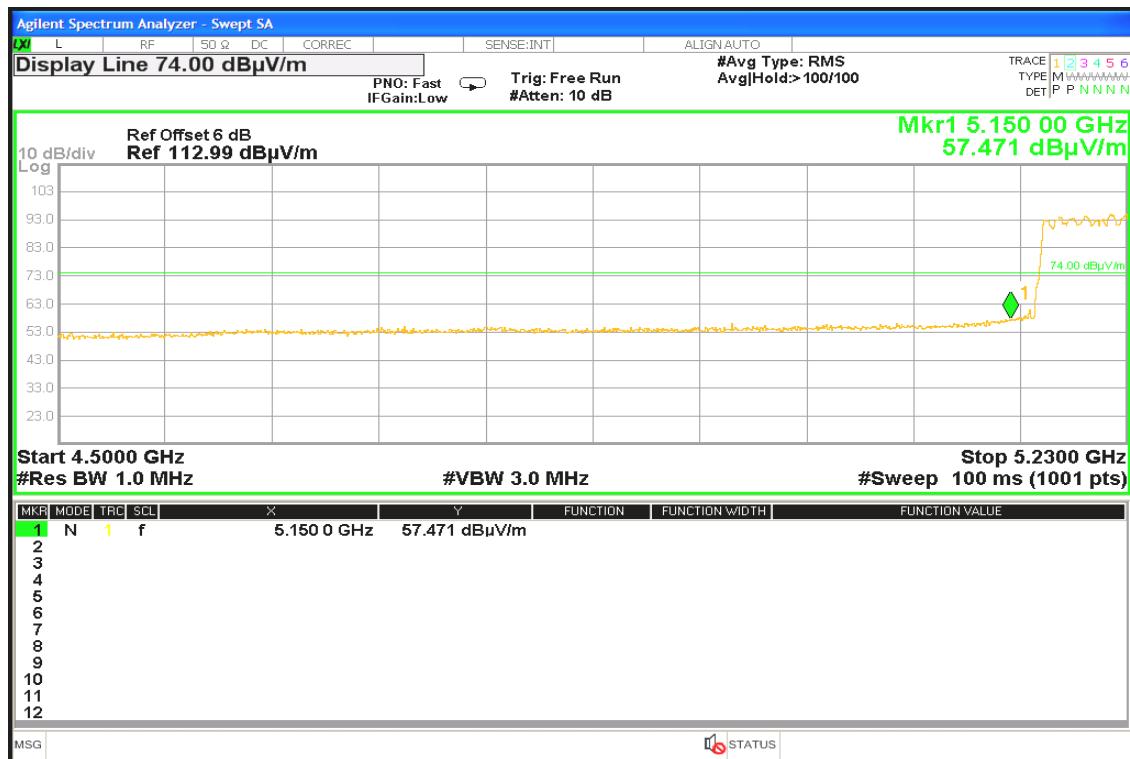
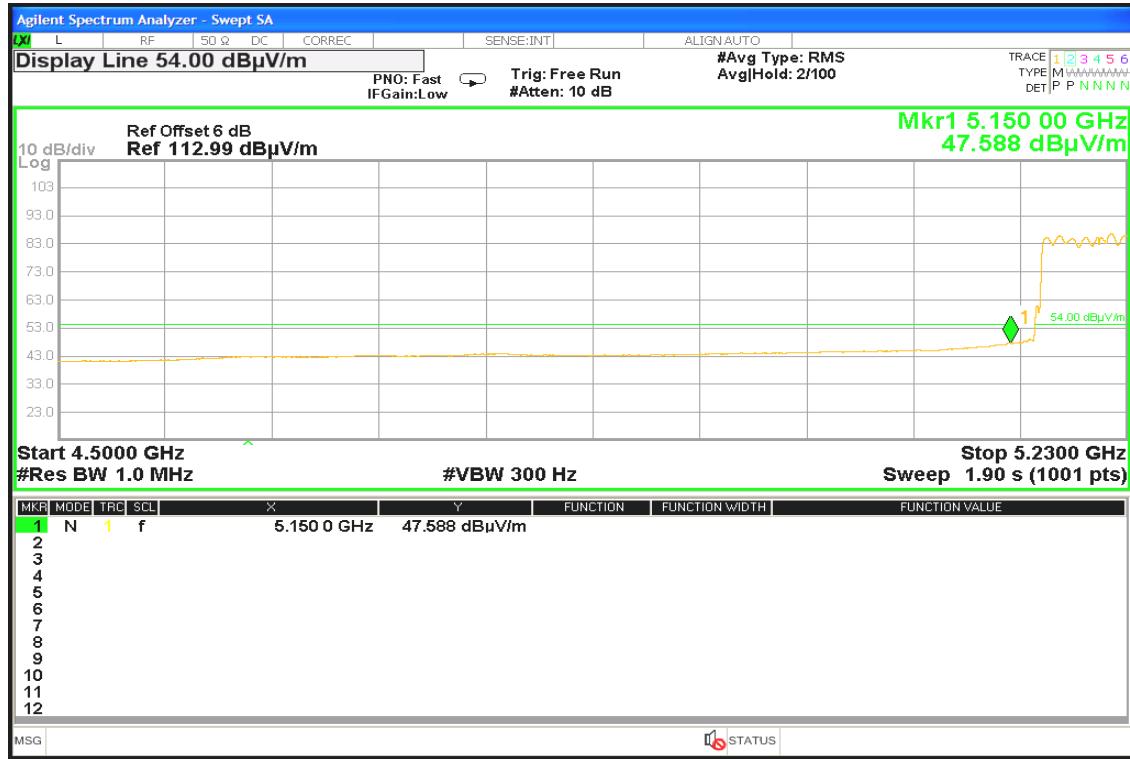
**Detector mode: Peak****Polarity: Horizontal****Detector mode: Average****Polarity: Horizontal**

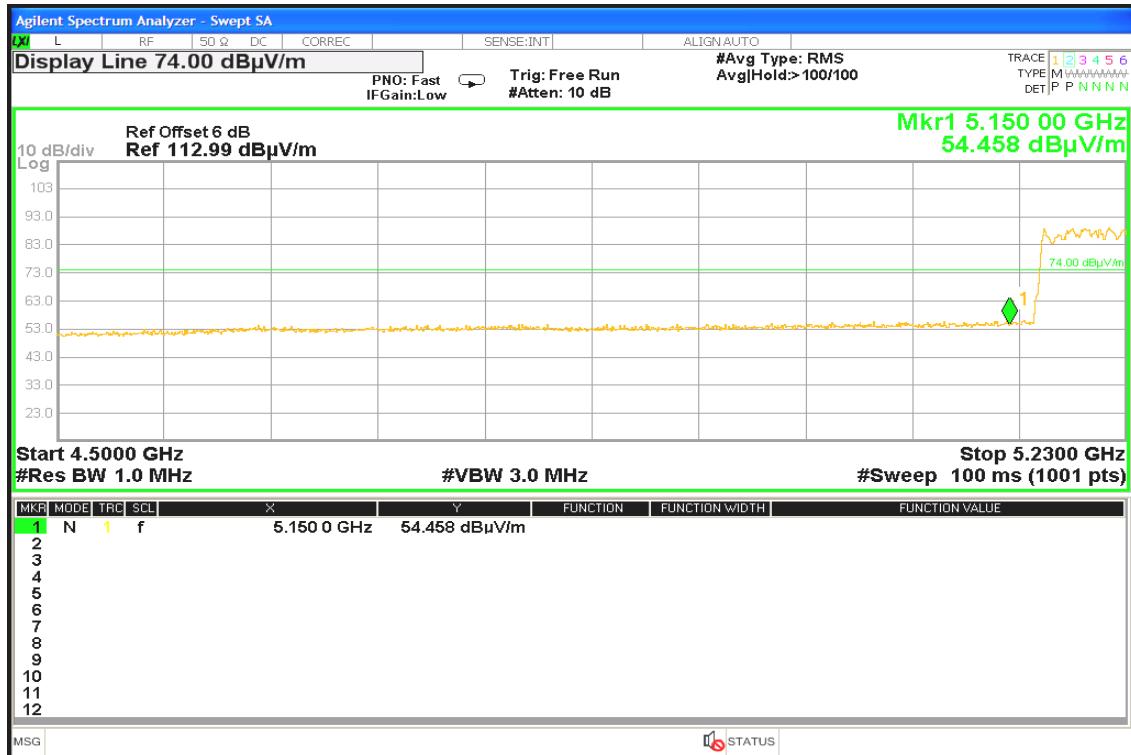
**Band Edges / IEEE 802.11n HT20 / 5180-5240MHz / CH Low****Detector mode: Peak****Polarity: Vertical****Detector mode: Average****Polarity: Vertical**

**Detector mode: Peak****Polarity: Horizontal****Detector mode: Average****Polarity: Horizontal**

**Band Edges / IEEE 802.11n HT40 / 5190-5230MHz / CH Low****Detector mode: Peak****Polarity: Vertical****Detector mode: Average****Polarity: Vertical**

**Detector mode: Peak****Polarity: Horizontal****Detector mode: Average****Polarity: Horizontal**

**Band Edges / IEEE 802.11ac HT80 / 5210MHz / CH Low****Detector mode: Peak****Polarity: Vertical****Detector mode: Average****Polarity: Vertical**

**Detector mode: Peak****Polarity: Horizontal****Detector mode: Average****Polarity: Horizontal**



7.5 PEAK POWER SPECTRAL DENSITY

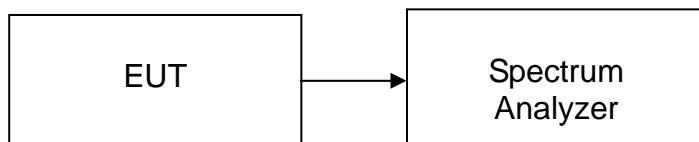
LIMIT

According to §15.407(a)

- (1) For the band 5.15-5.25 GHz, the peak power spectral density shall not exceed 11dBm in any 1MHz band.
- (2) For the band 5.25-5.35 GHz and 5.47-5.725GHz, the peak power spectral density shall not exceed 11dBm 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 = 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 / 5150 ~ 5250MHz**

Channel	Frequency (MHz)	PEAK POWER SPECTRAL DENSITY	Limit (dB)	Margin (dB)	Result
Low	5180	8.14	11.00	-2.86	PASS
Mid	5220	7.09	11.00	-3.91	PASS
High	5240	6.15	11.00	-4.85	PASS

Test mode: IEEE 802.11n HT20 mode / 5150 ~ 5250MHz

Channel	Frequency (MHz)	PEAK POWER SPECTRAL DENSITY (Chain 0) (dB)	PEAK POWER SPECTRAL DENSITY (Chain 1) (dB)	PEAK POWER SPECTRAL DENSITY (Total) (dB)	Limit (dB)	Margin (dB)	Result
Low	5180	6.05	5.14	8.63	8.98	-0.35	PASS
Mid	5220	5.65	5.55	8.61	8.98	-0.37	PASS
High	5240	5.27	5.99	8.66	8.98	-0.32	PASS

Test mode: IEEE 802.11n HT40 mode / 5150 ~ 5250MHz

Channel	Frequency (MHz)	PEAK POWER SPECTRAL DENSITY (Chain 0) (dB)	PEAK POWER SPECTRAL DENSITY (Chain 1) (dB)	PEAK POWER SPECTRAL DENSITY (Total) (dB)	Limit (dB)	Margin (dB)	Result
Low	5190	-2.39	2.63	3.82	8.98	-5.16	PASS
High	5230	2.31	5.59	7.26	8.98	-1.72	PASS

Test mode: IEEE 802.11ac HT80 mode / 5210MHz

Frequency (MHz)	PEAK POWER SPECTRAL DENSITY (Chain 0) (dB)	PEAK POWER SPECTRAL DENSITY (Chain 1) (dB)	PEAK POWER SPECTRAL DENSITY (Total) (dB)	Limit (dB)	Margin (dB)	Result
5230	2.12	3.39	5.81	8.98	-3.17	PASS

Remark:

1. Total PPSD (dBm) = $10 \cdot \log(10^{(Chain\ 0\ PPSD\ /10)} + 10^{(Chain\ 1\ PPSD\ /10)})$
2. The maximum antenna gain is 8.02dBi; therefore the reduction due to antenna gain is 2.02dBi, so the limit is 8.98dBm

**Test mode: IEEE 802.11a / 5745-5825MHz**

Channel	Frequency (MHz)	PEAK POWER SPECTRAL DENSITY	Limit (dB)	Margin (dB)	Result
Low	5180	4.18	11.00	-6.82	PASS
Mid	5220	4.44	11.00	-6.56	PASS
High	5240	4.22	11.00	-6.78	PASS

Test mode: IEEE 802.11n HT20 / 5745-5825MHz

Channel	Frequency (MHz)	PEAK POWER SPECTRAL DENSITY (Chain 0) (dB)	PEAK POWER SPECTRAL DENSITY (Chain 1) (dB)	PEAK POWER SPECTRAL DENSITY (Total) (dB)	Limit (dB)	Margin (dB)	Result
Low	5180	1.13	-0.63	3.35	8.98	-5.63	PASS
Mid	5220	1.03	1.23	4.14	8.98	-4.84	PASS
High	5240	0.97	0.87	3.93	8.98	-5.05	PASS

Test mode: IEEE 802.11n HT40 / 5755-5795MHz

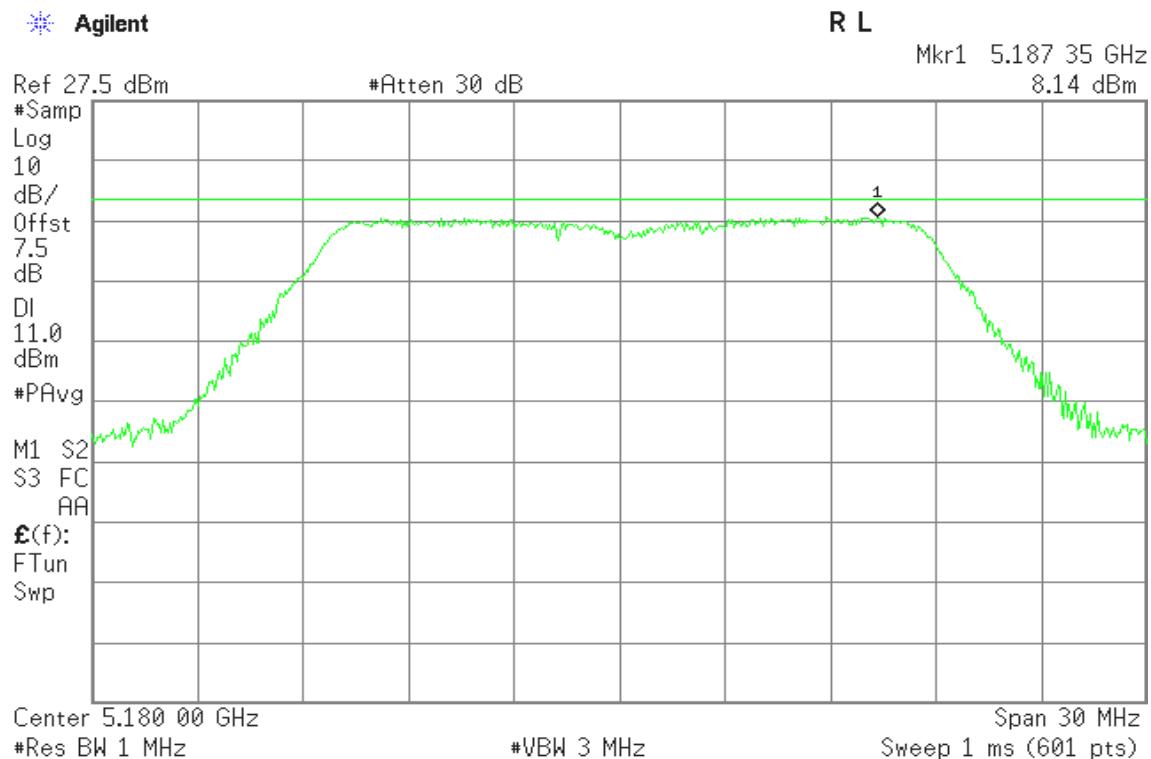
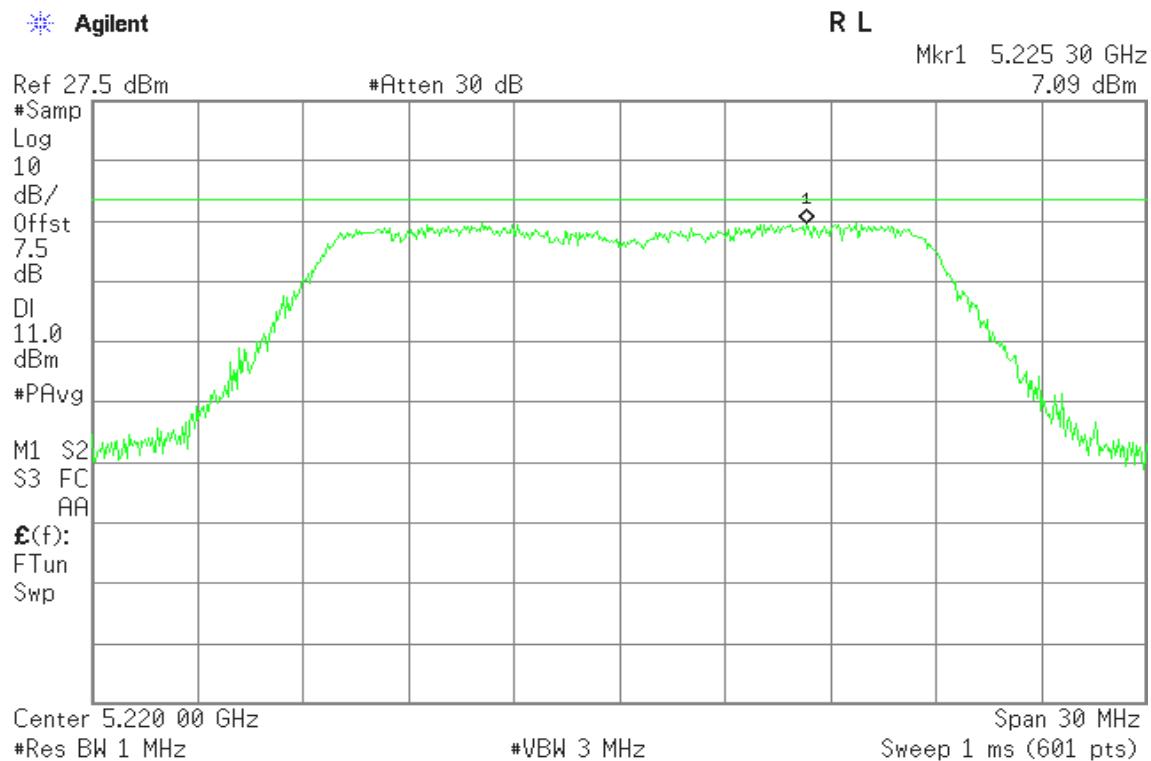
Channel	Frequency (MHz)	PEAK POWER SPECTRAL DENSITY (Chain 0) (dB)	PEAK POWER SPECTRAL DENSITY (Chain 1) (dB)	PEAK POWER SPECTRAL DENSITY (Total) (dB)	Limit (dB)	Margin (dB)	Result
Low	5190	-0.15	-0.68	2.60	8.98	-6.38	PASS
High	5230	-1.85	-2.35	0.92	8.98	-8.06	PASS

Test mode: IEEE 802.11ac HT80 / 5775MHz

Frequency (MHz)	PEAK POWER SPECTRAL DENSITY (Chain 0) (dB)	PEAK POWER SPECTRAL DENSITY (Chain 1) (dB)	PEAK POWER SPECTRAL DENSITY (Total) (dB)	Limit (dB)	Margin (dB)	Result
5230	-5.63	-5.49	-2.55	8.98	-11.53	PASS

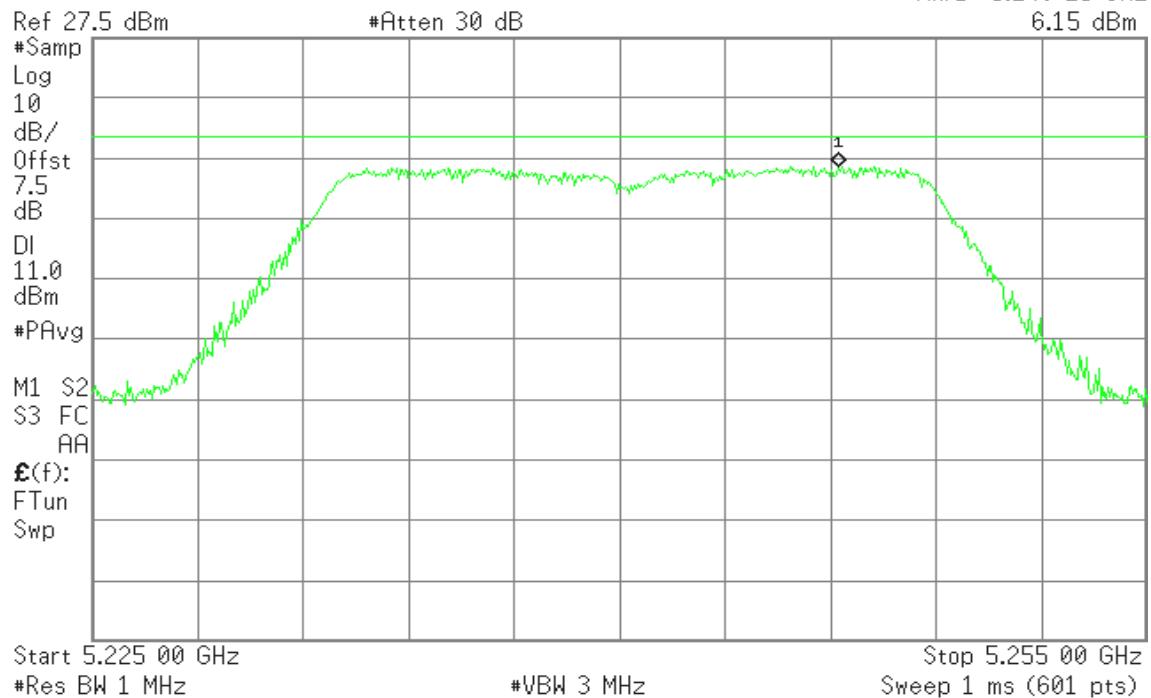
Remark:

1. Total PPSD (dBm) = $10 * \log(10^8 (Chain 0 PPSD / 10) + 10^8 (Chain 1 PPSD / 10))$
2. The maximum antenna gain is 8.02dBi; therefore the reduction due to antenna gain is 2.02dBi, so the limit is 8.98dBm

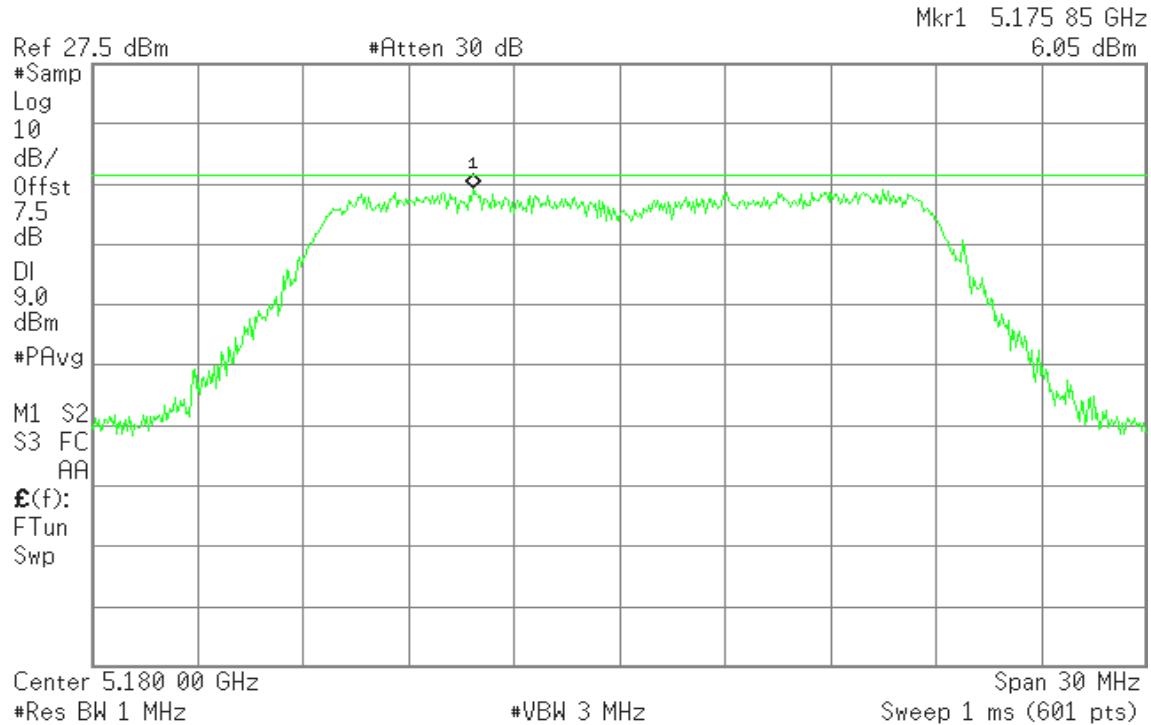
**Test Plot****IEEE 802.11a mode / 5180-5240MHz****CH Low****CH Mid**

**CH High**

Agilent

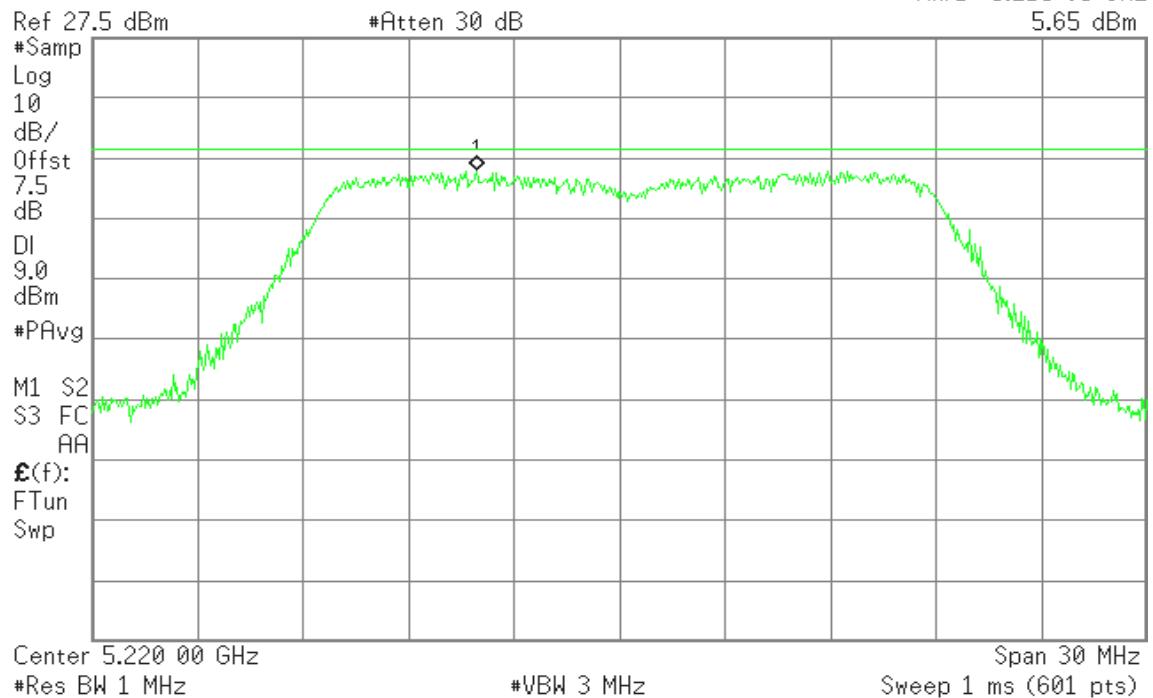
**IEEE 802.11n HT20 mode / 5180-5240MHz / Chain 0****CH Low**

Agilent

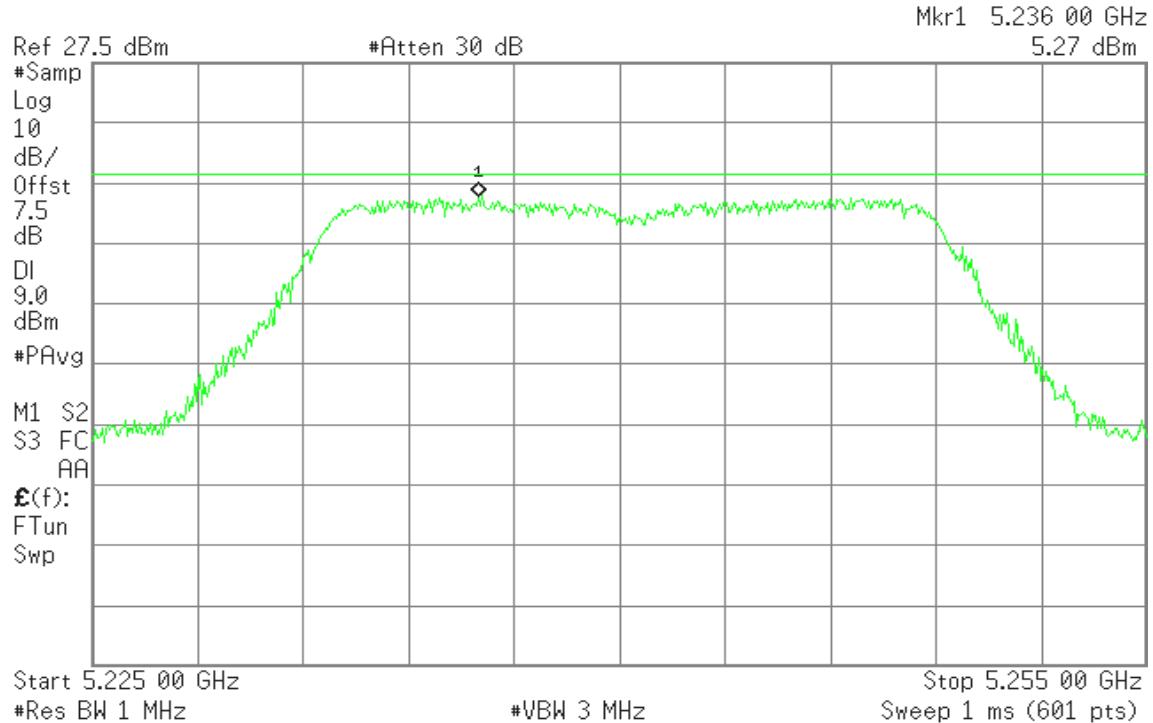


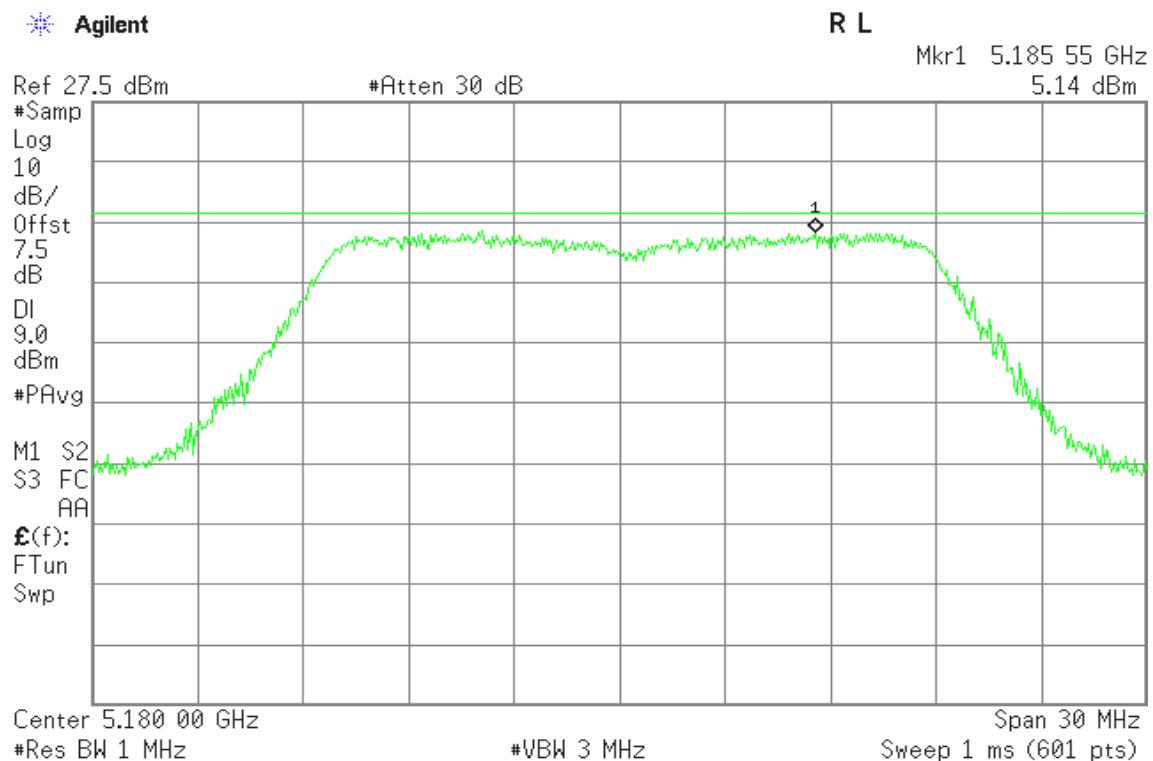
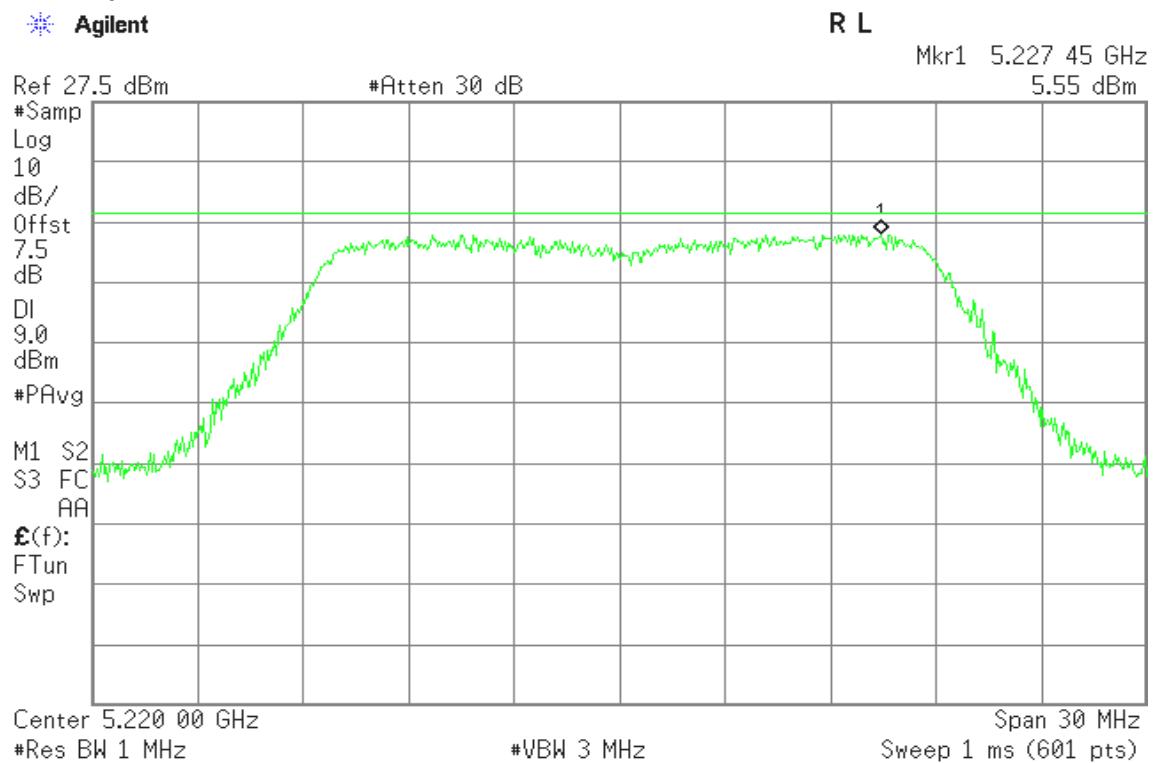
**CH Mid**

Agilent

**CH High**

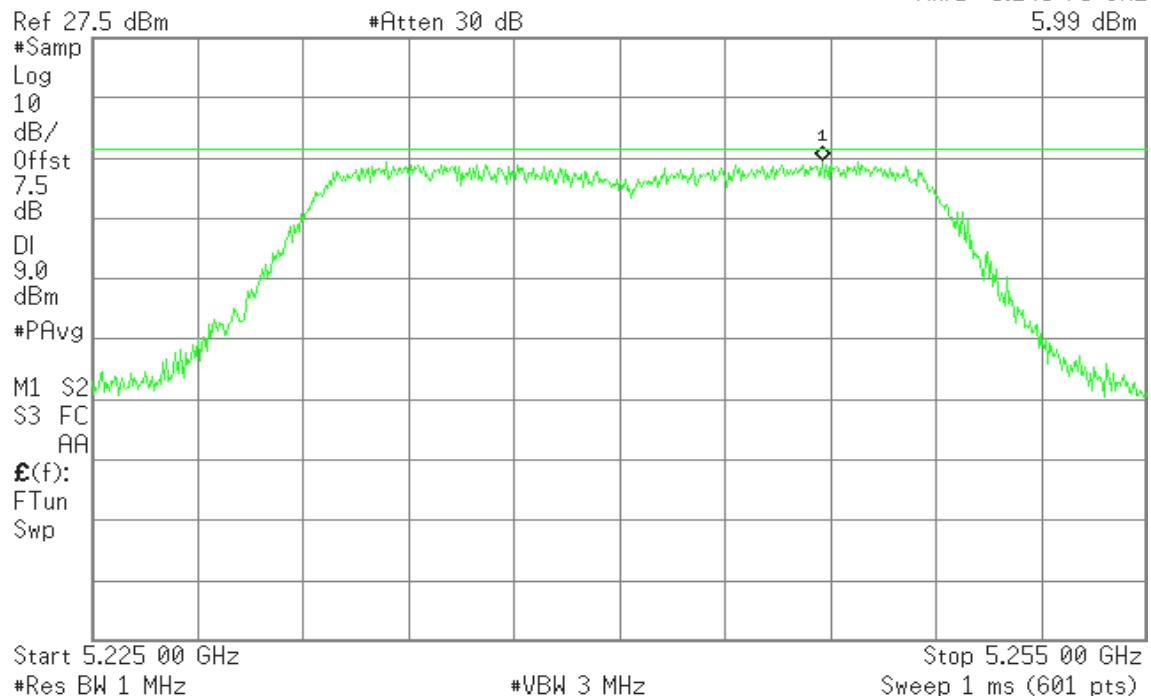
Agilent



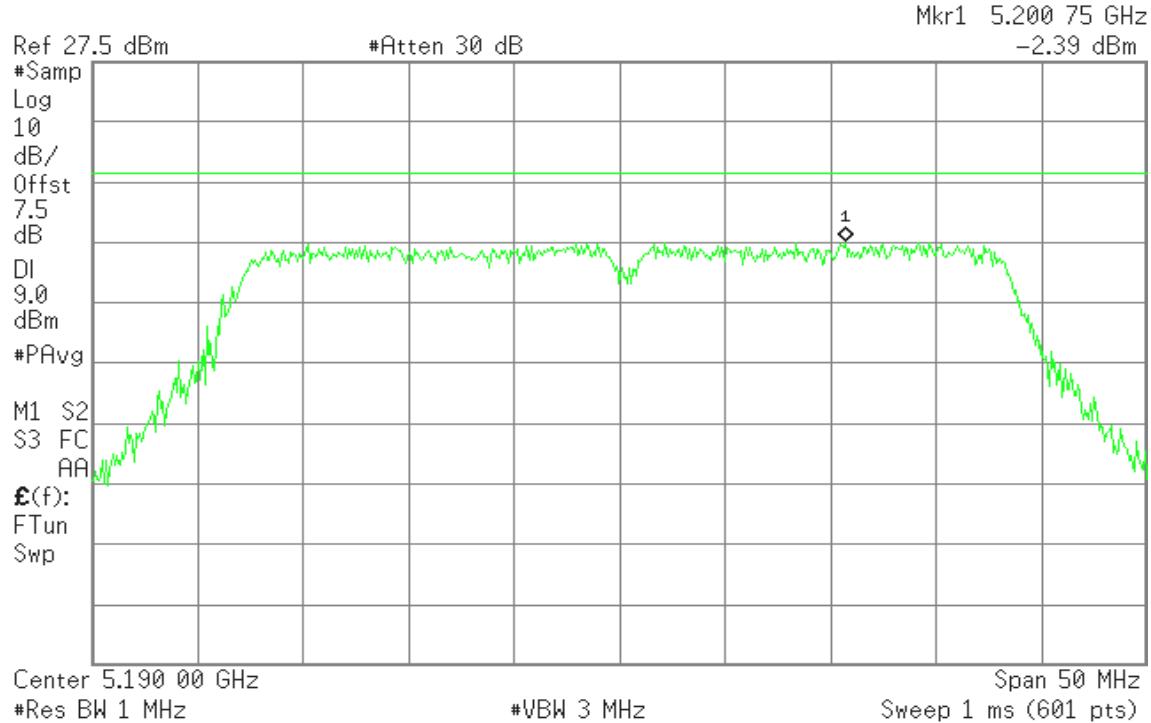
**IEEE 802.11n HT20 mode / 5180-5240MHz / Chain 1****CH Low****CH Mid**

**CH High**

Agilent

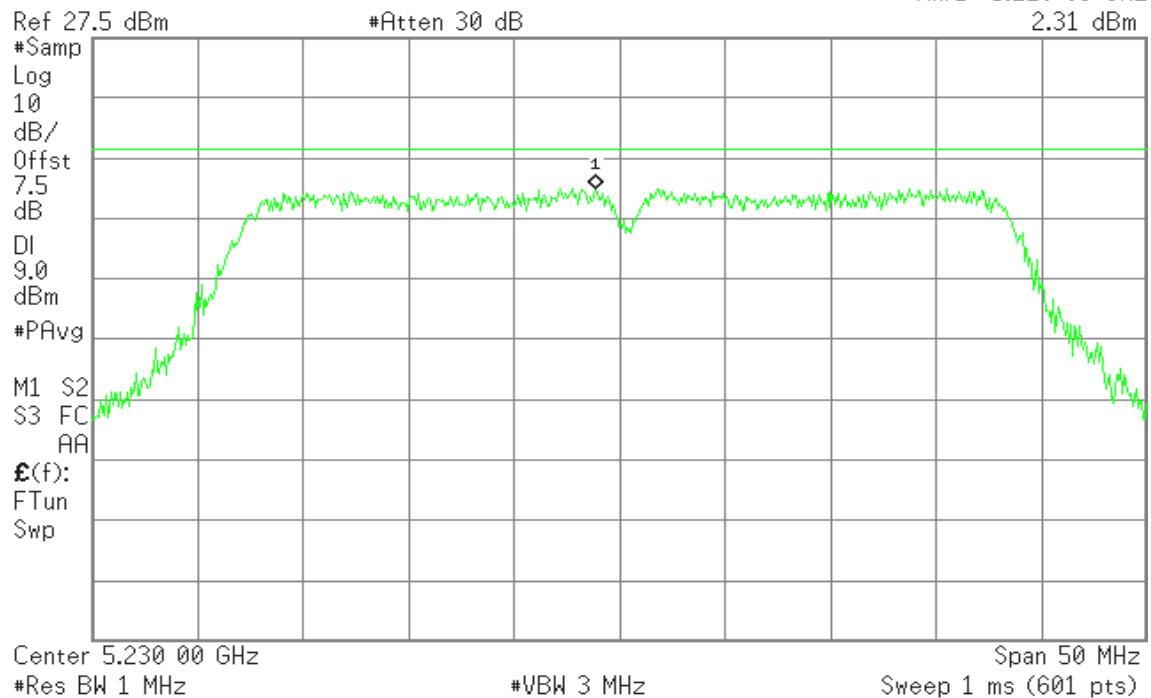
**IEEE 802.11n HT40 mode / 5190-5230MHz / Chain 0****CH Low**

Agilent

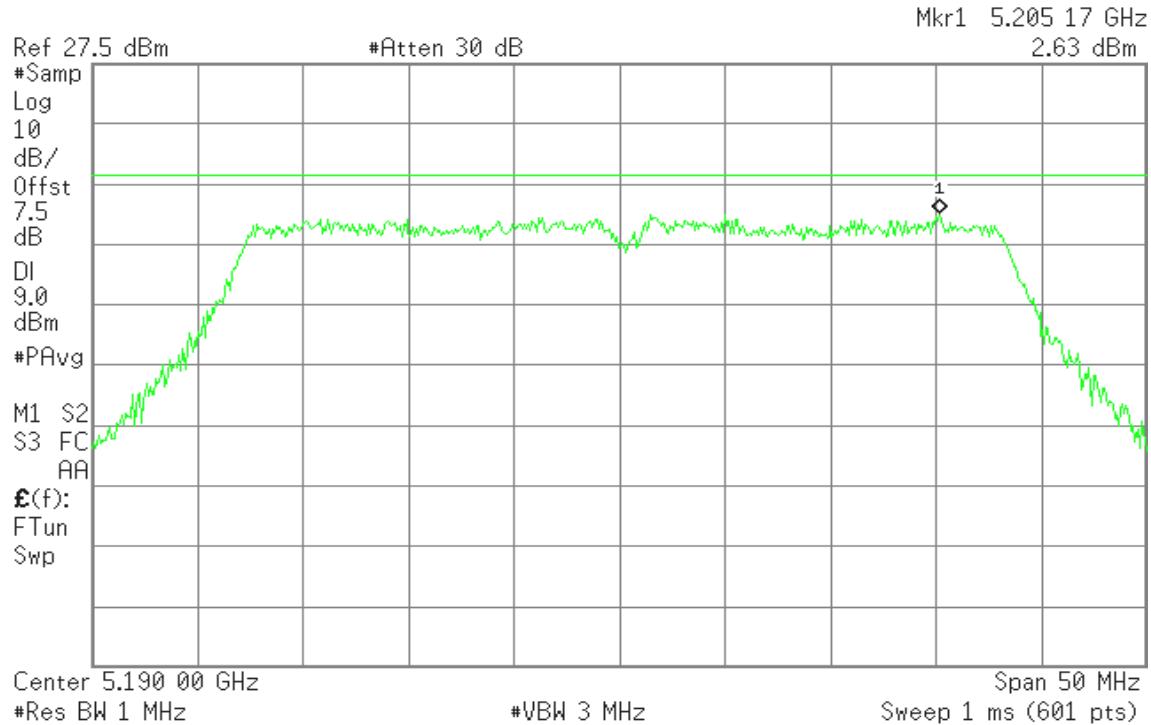


**CH High**

Agilent

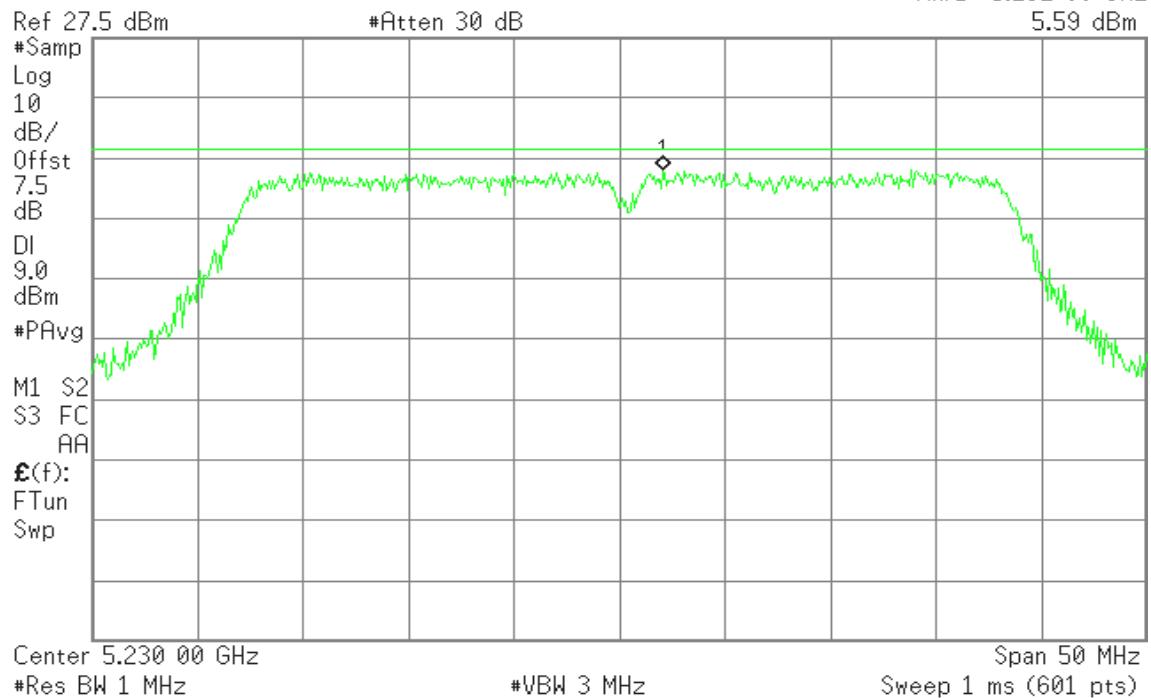
**IEEE 802.11n HT40 mode / 5190-5230MHz / Chain 1****CH Low**

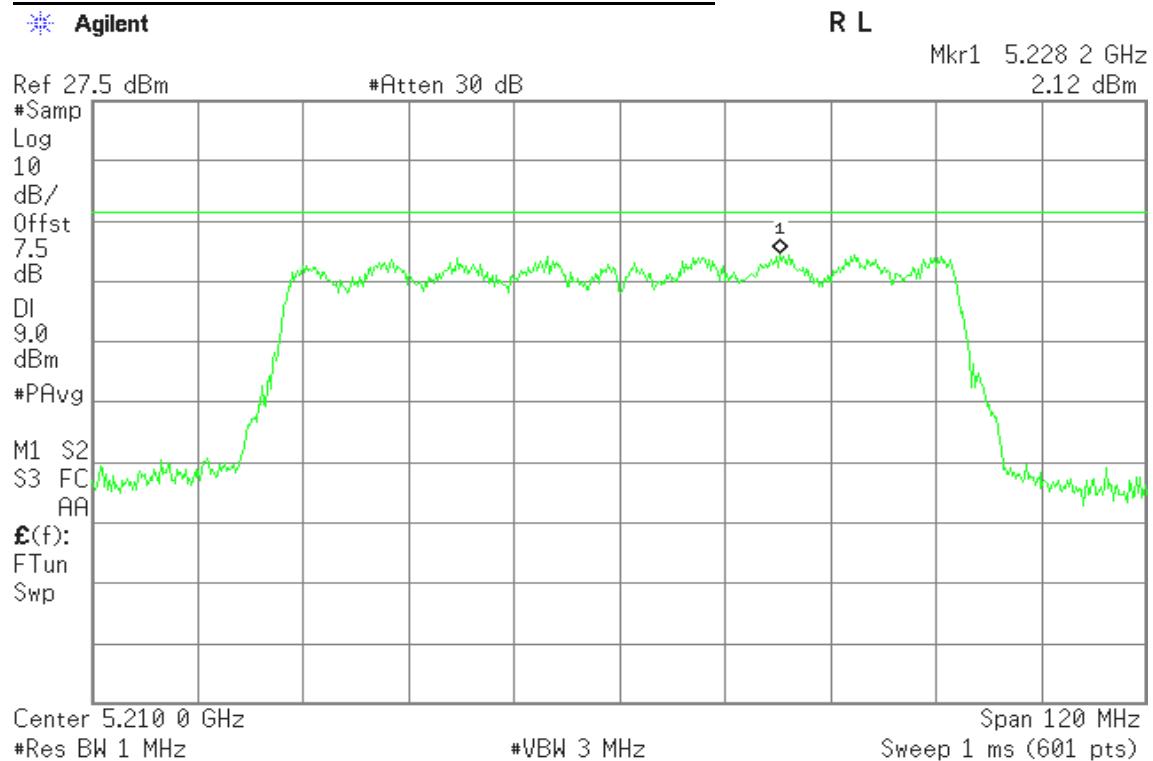
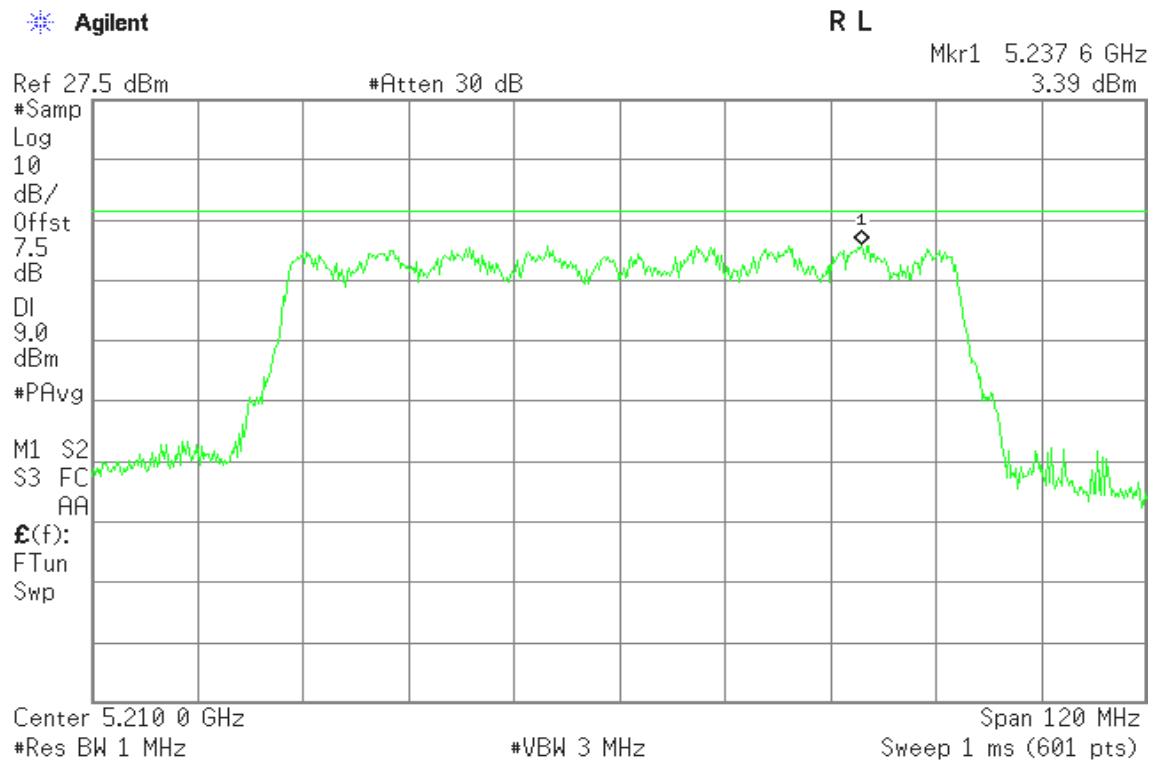
Agilent

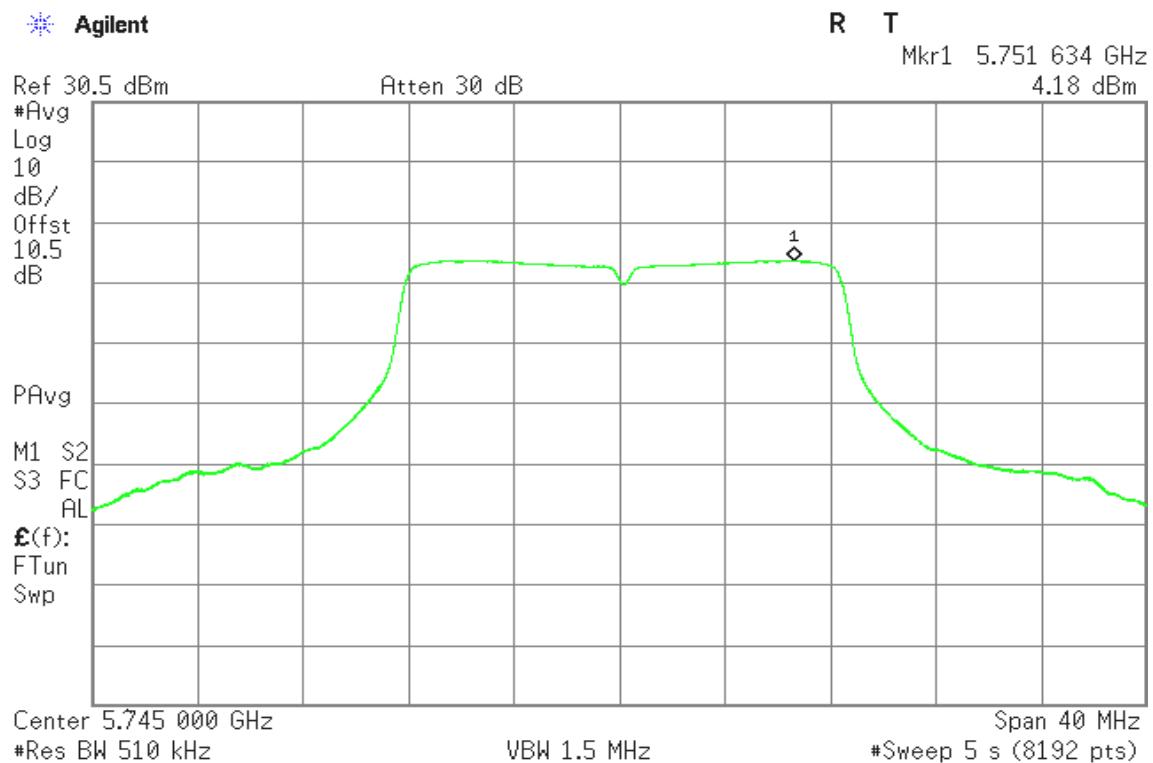
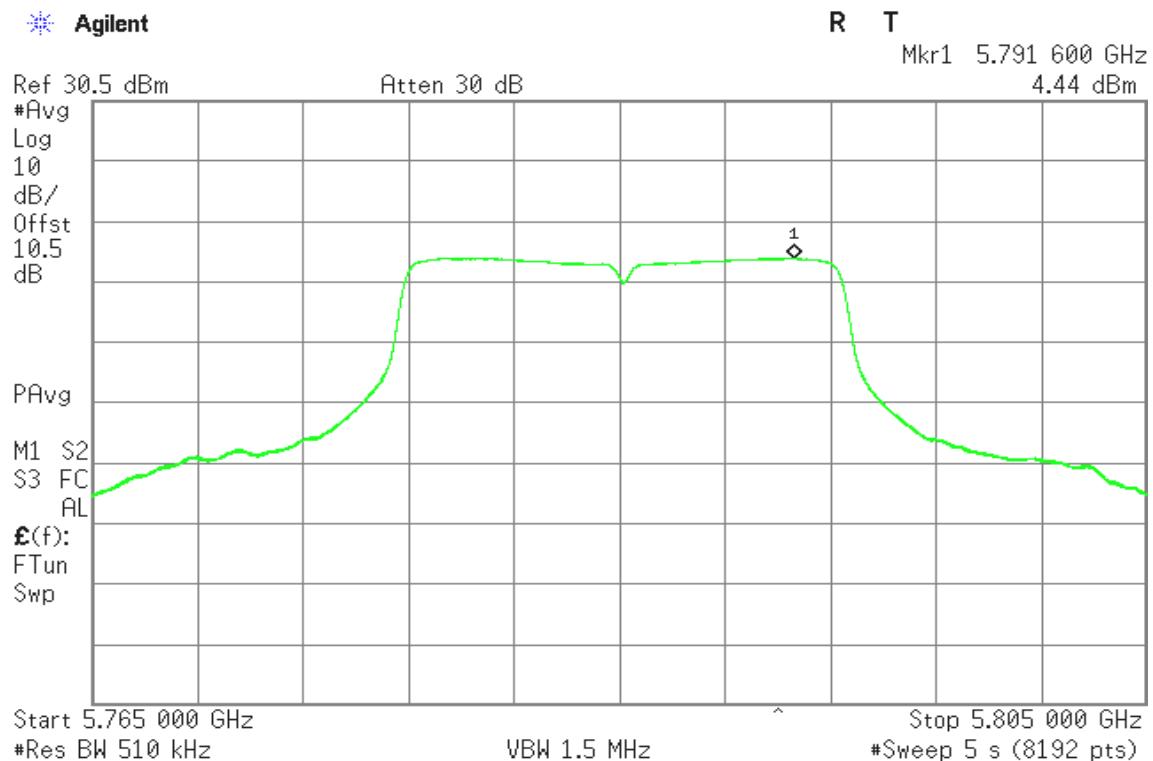


**CH High**

Agilent

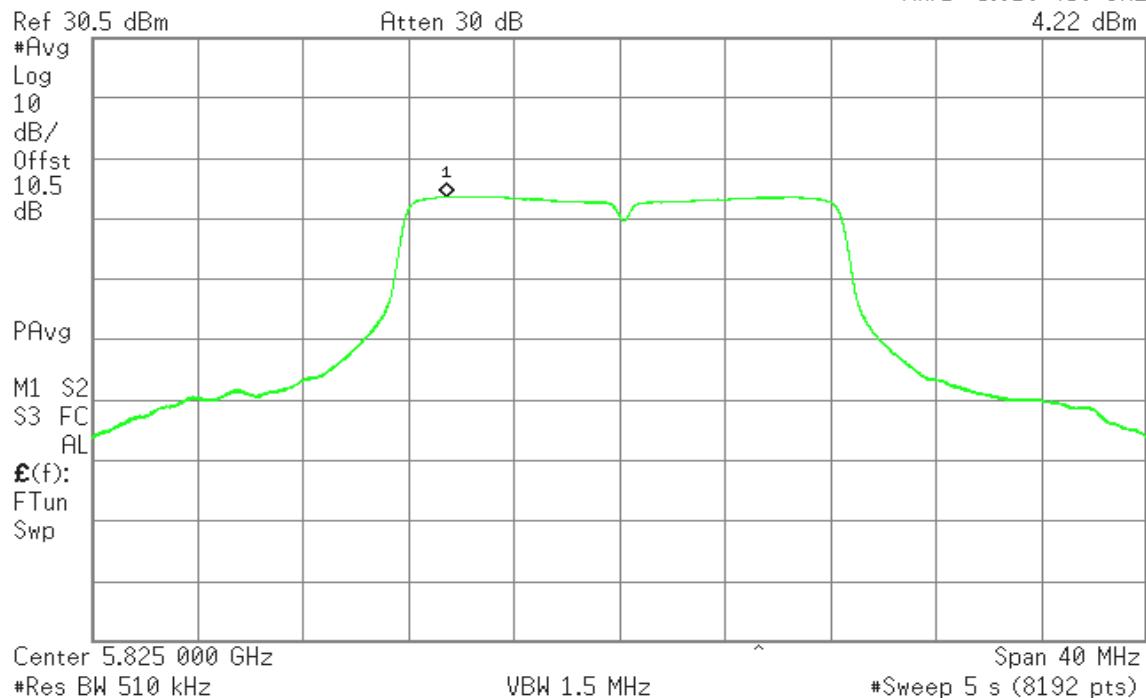


**IEEE 802.11ac HT80 mode / 5210MHz / Chain 0****IEEE 802.11ac HT80 mode / 5210MHz / Chain 1**

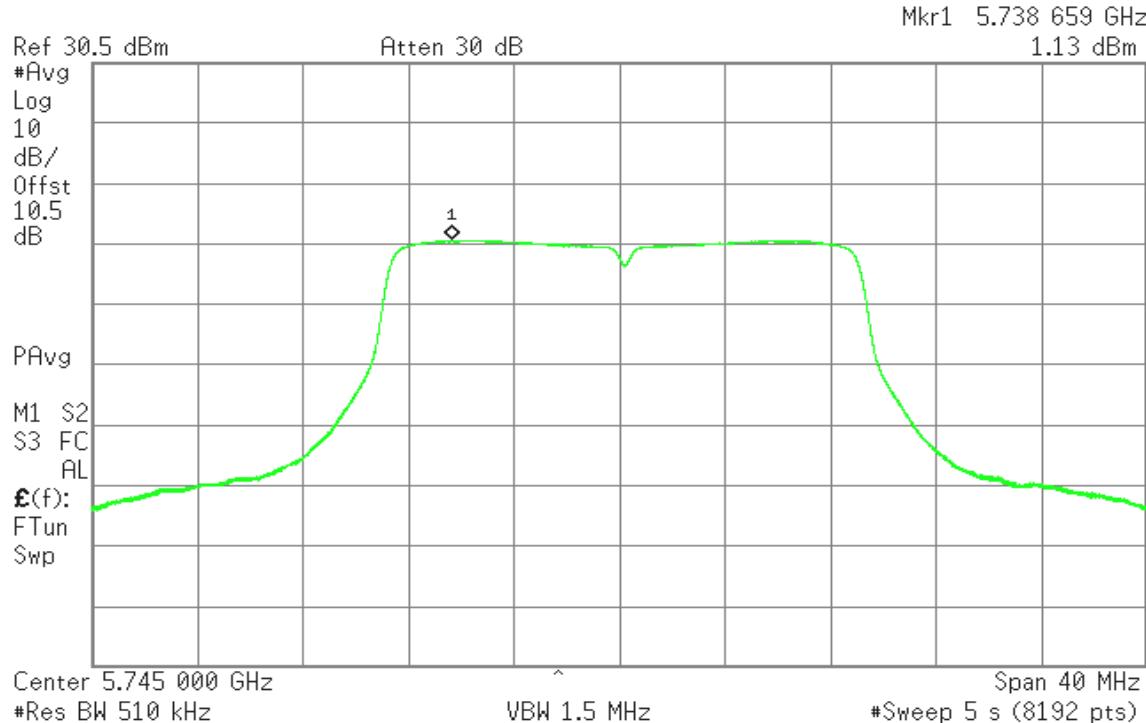
**IEEE 802.11a mode / 5745-5825MHz****CH Low****CH Mid**

**CH High**

Agilent

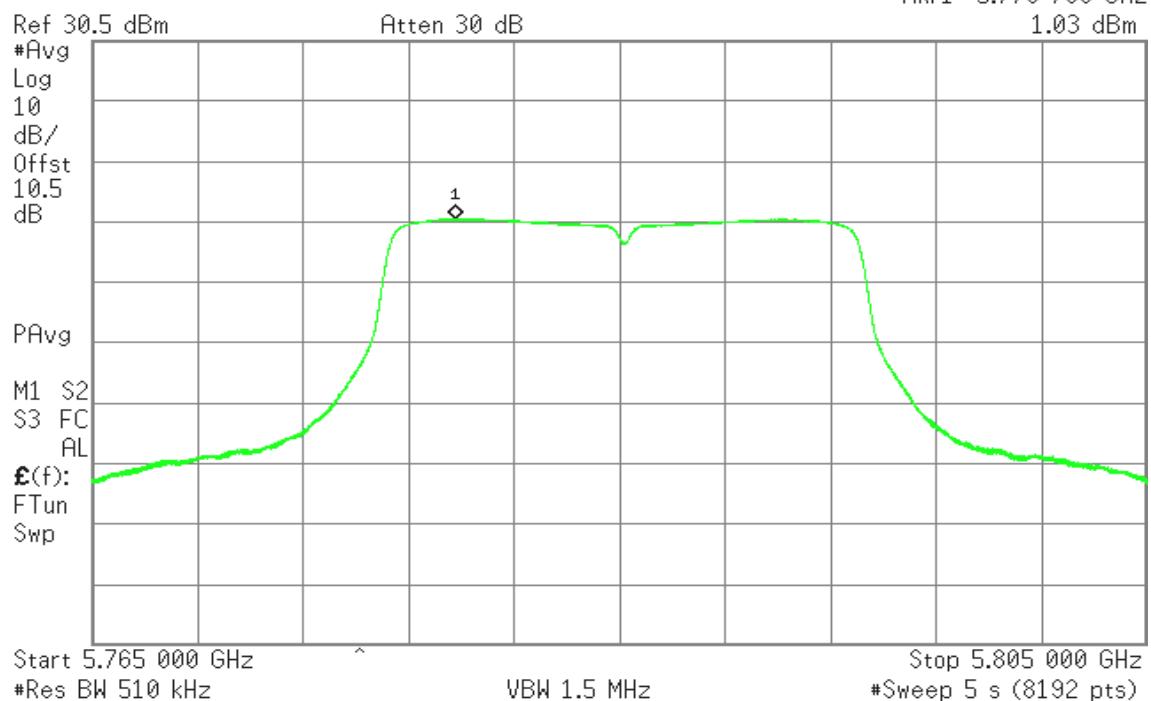
**IEEE 802.11n HT20 mode / 5745-5825MHz / Chain 0****CH Low**

Agilent

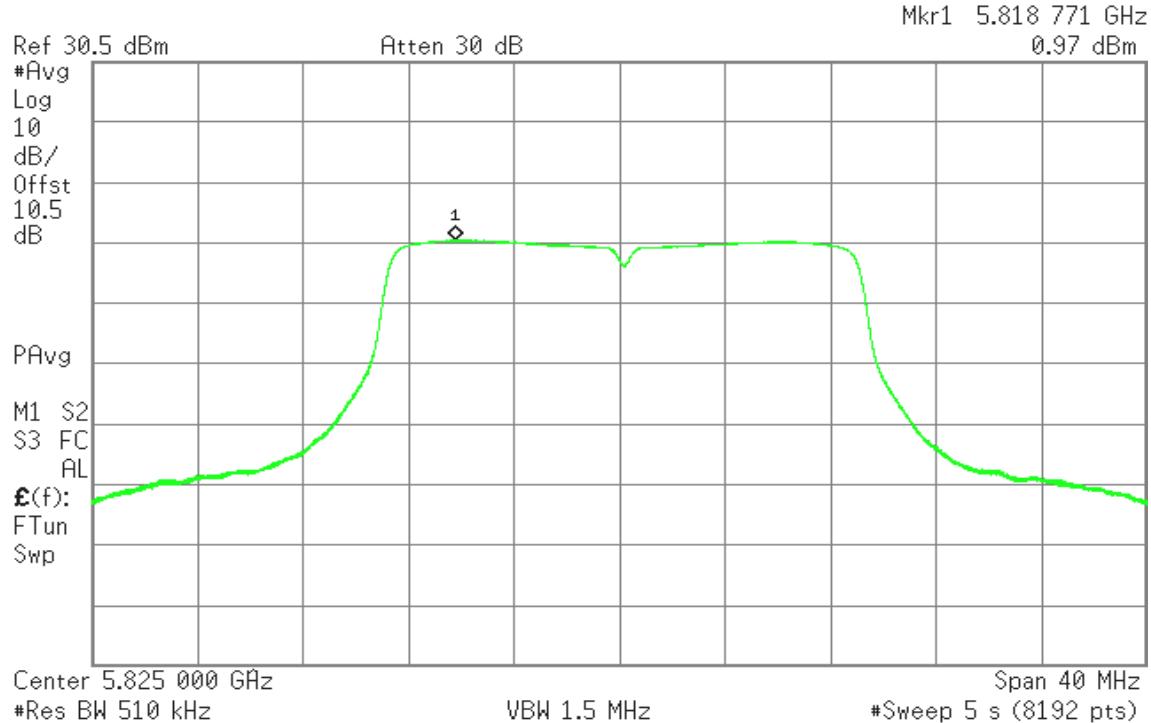


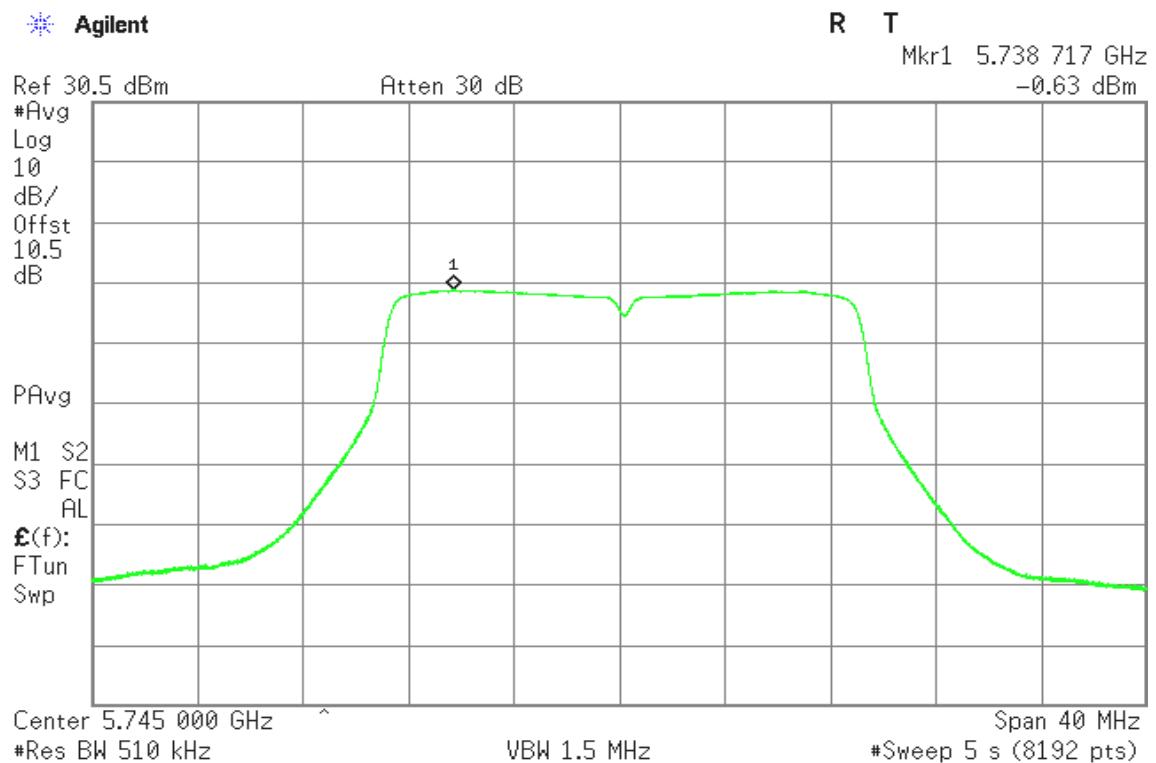
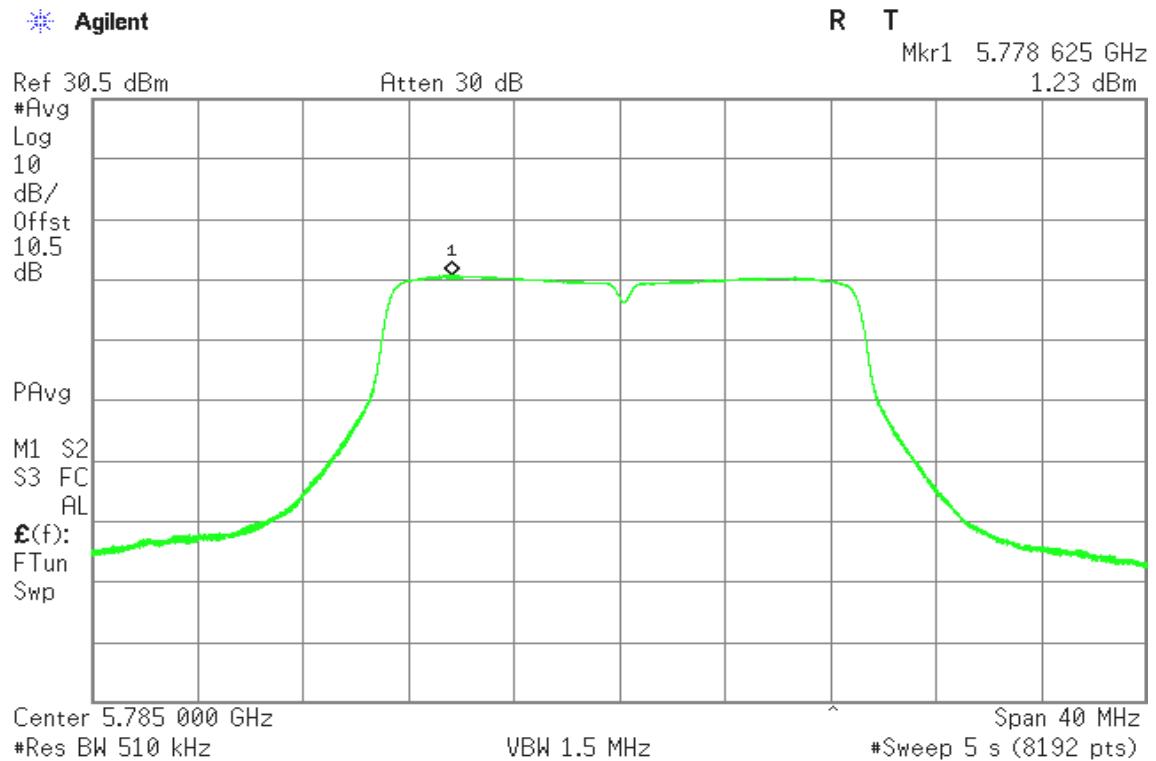
**CH Mid**

Agilent

**CH High**

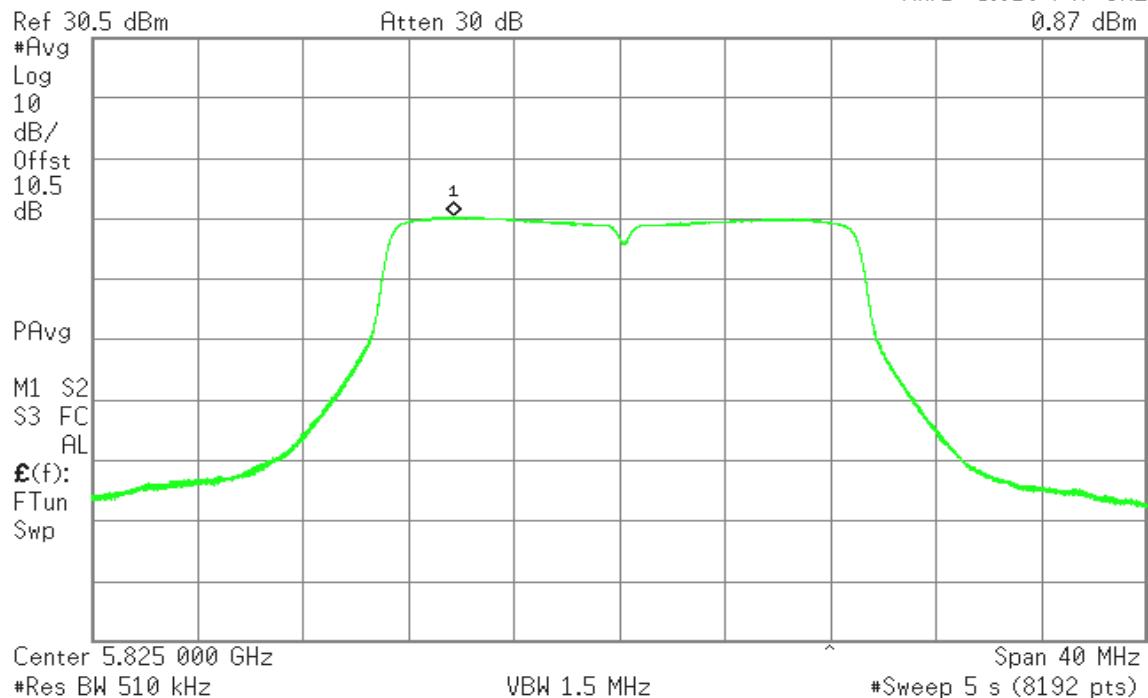
Agilent



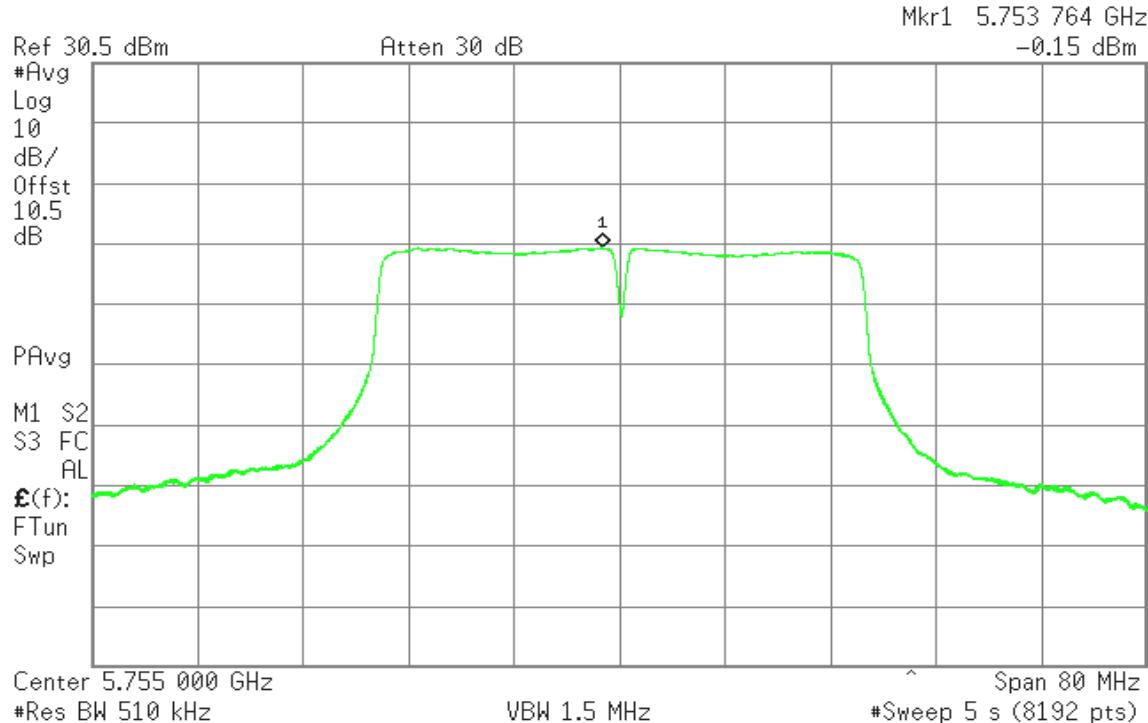
**IEEE 802.11n HT20 mode / 5745-5825MHz / Chain 1****CH Low****CH Mid**

**CH High**

Agilent

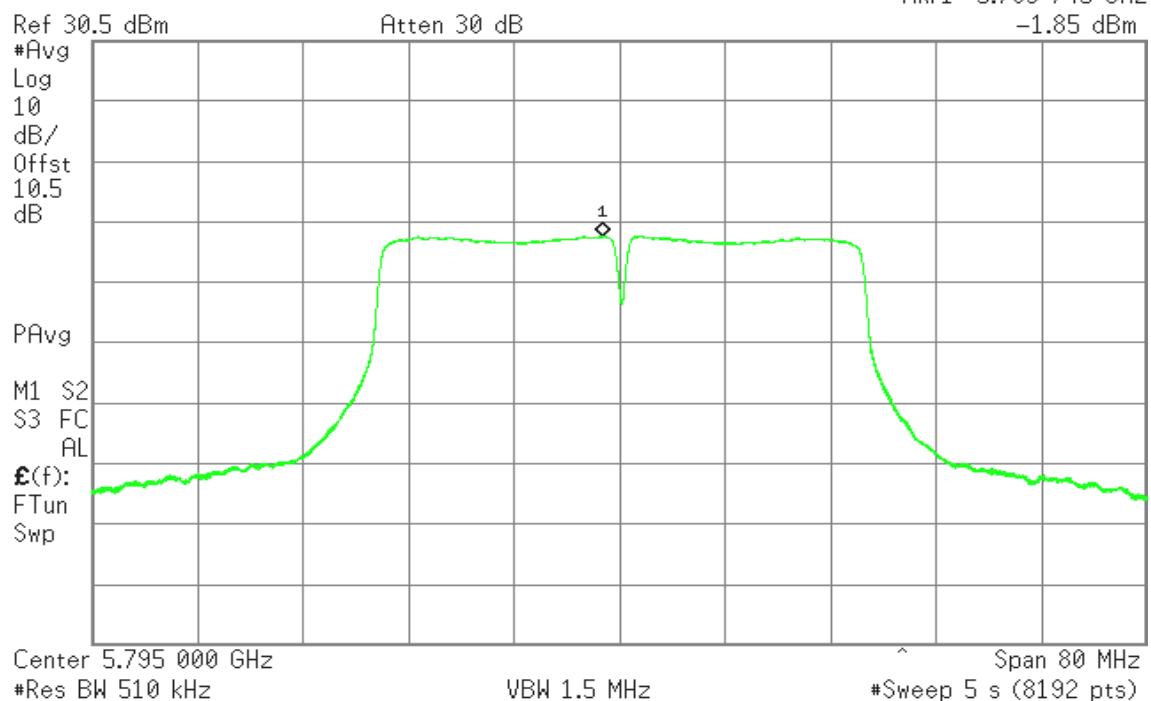
**IEEE 802.11n HT40 mode / 5755-5795MHz / Chain 0****CH Low**

Agilent

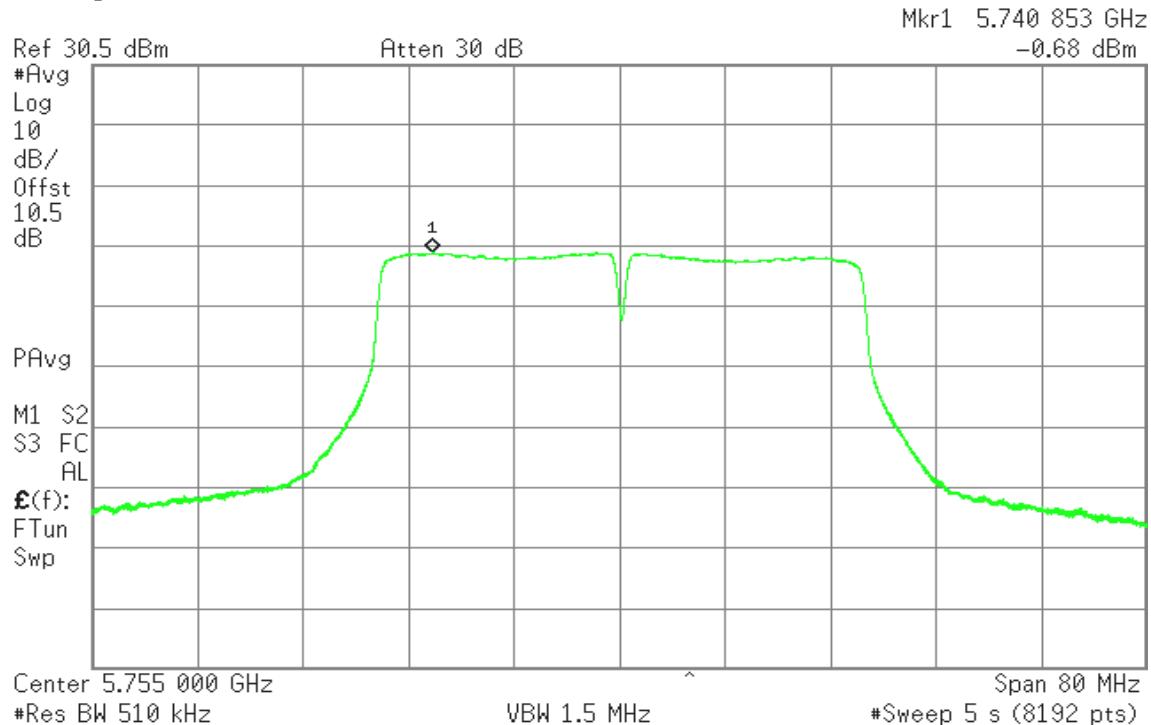


**CH High**

Agilent

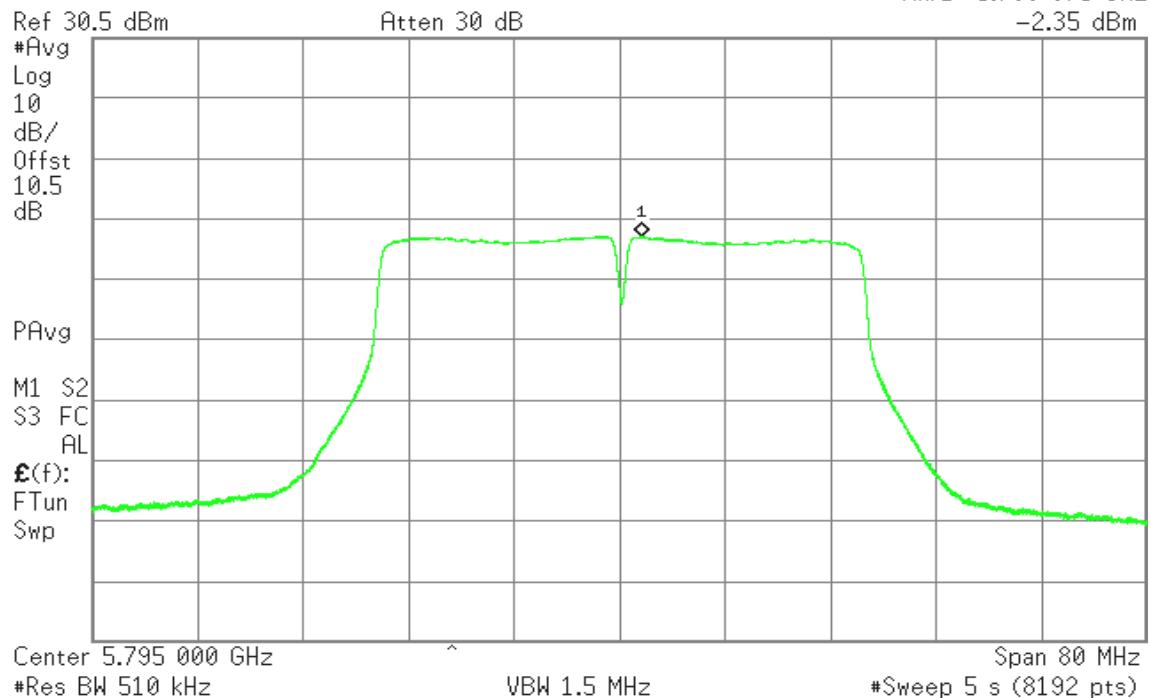
**IEEE 802.11n HT40 mode / 5755-5795MHz / Chain 1****CH Low**

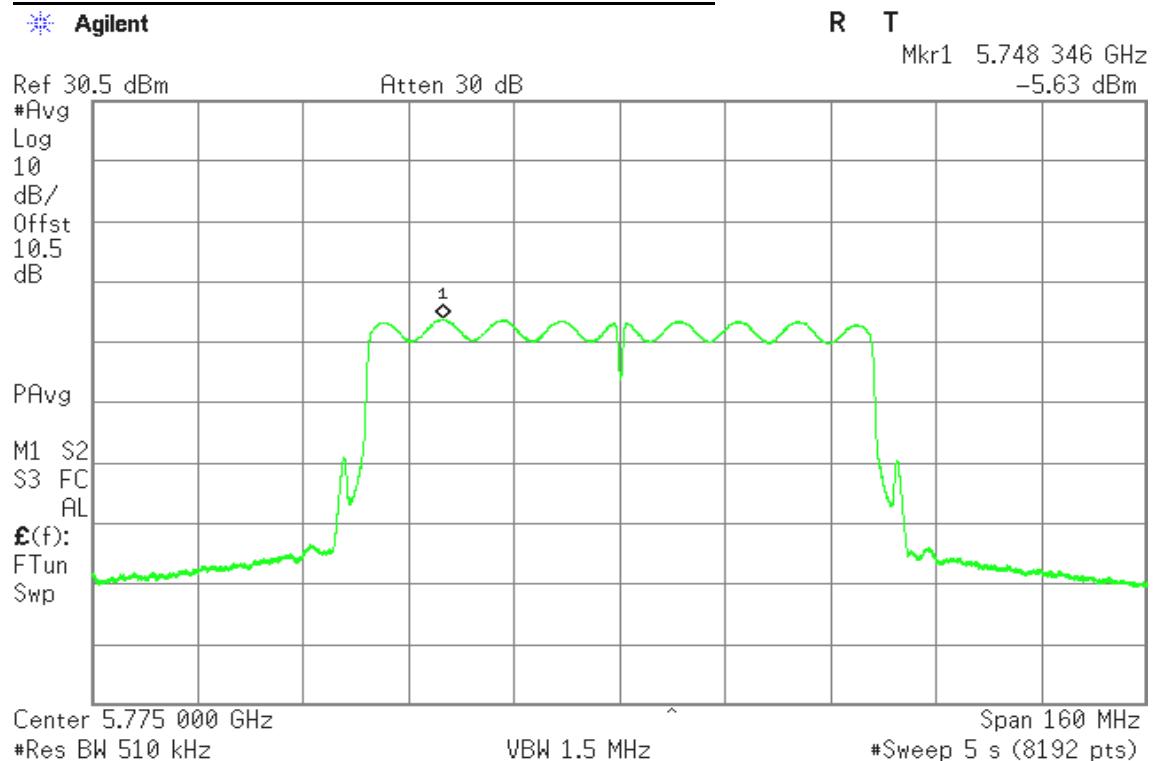
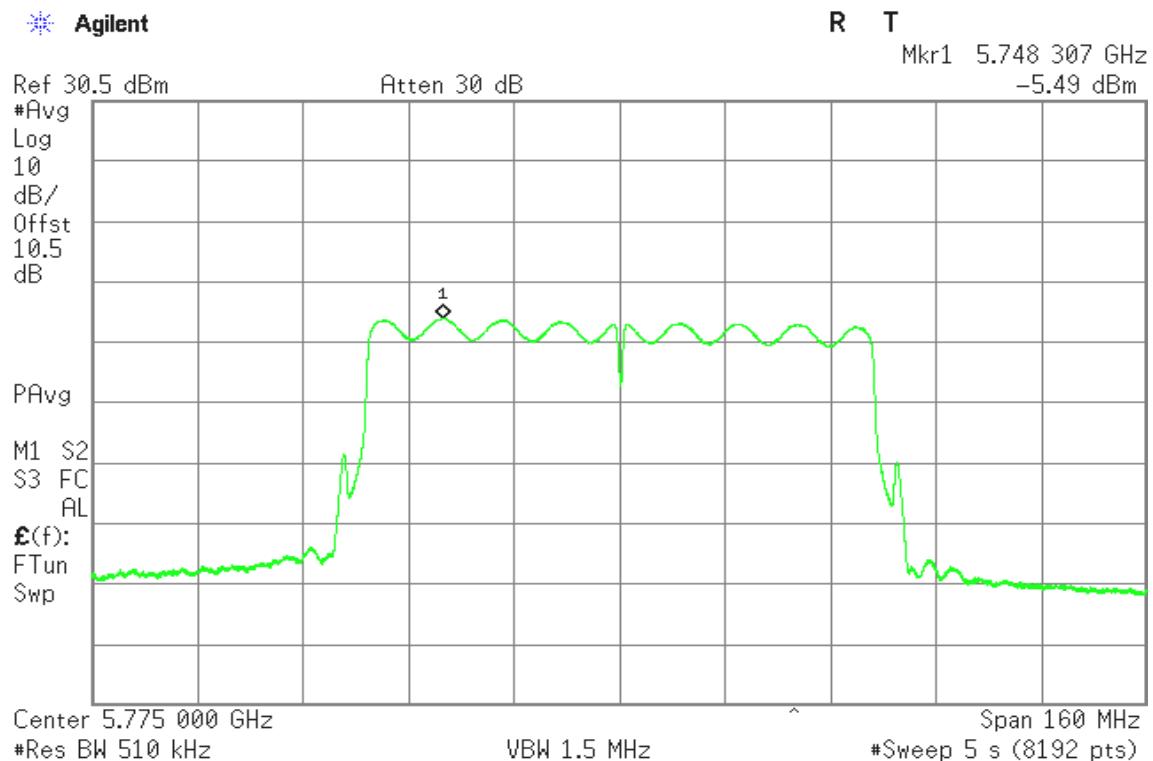
Agilent



**CH High**

Agilent



**IEEE 802.11ac HT80 mode / 5775MHz / Chain 0****IEEE 802.11ac HT80 mode / 5775MHz / Chain 1**



7.6 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 (μ V/m)	Measurement Distance (m)
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.

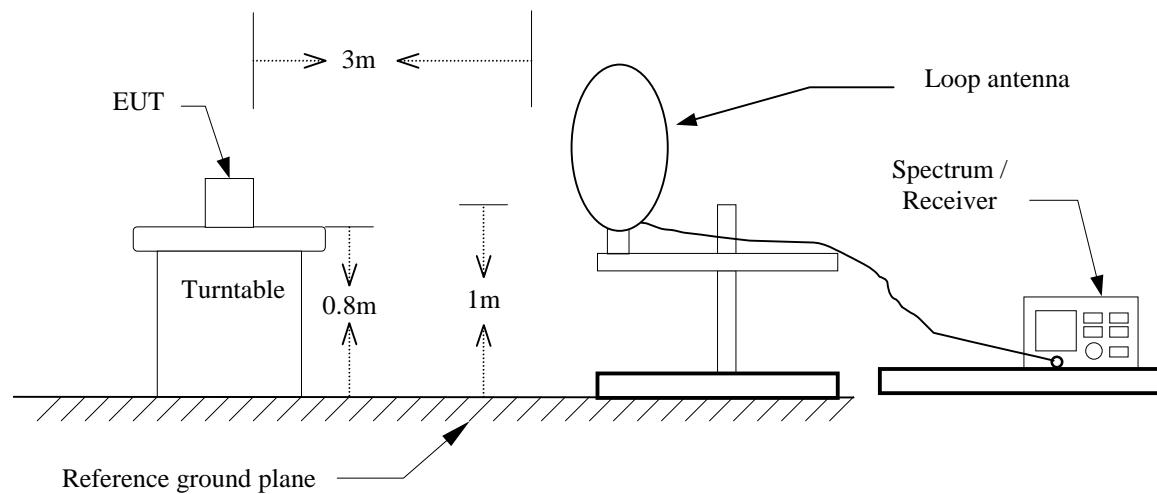
2. In the emission table above, the tighter limit applies at the band edges.

Frequency (MHz)	Field Strength (μ V/m at 3-meter)	Field Strength (dB μ V/m at 3-meter)
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

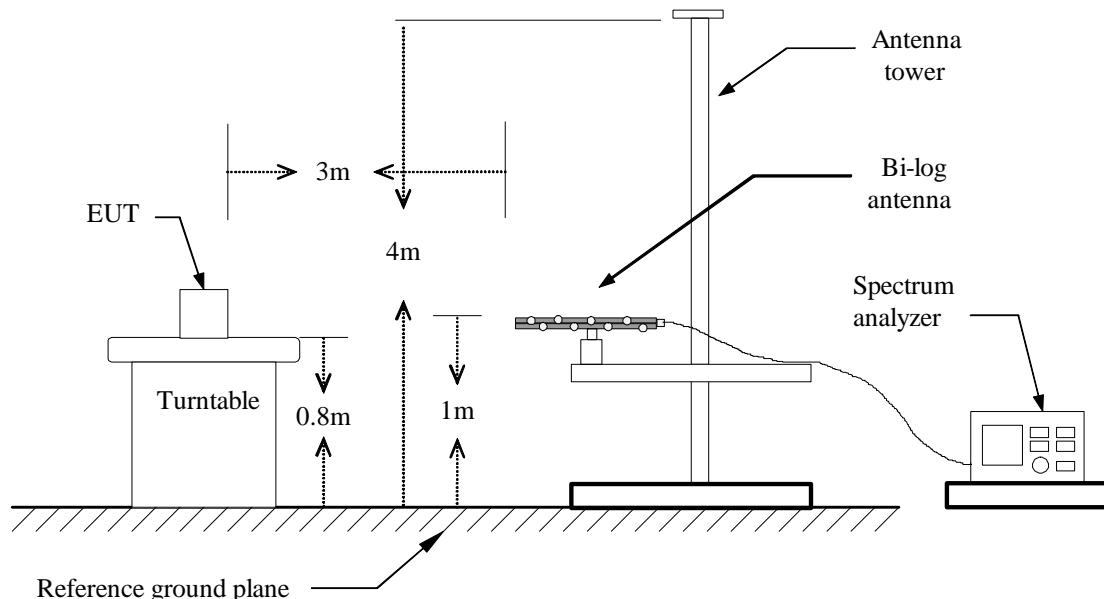


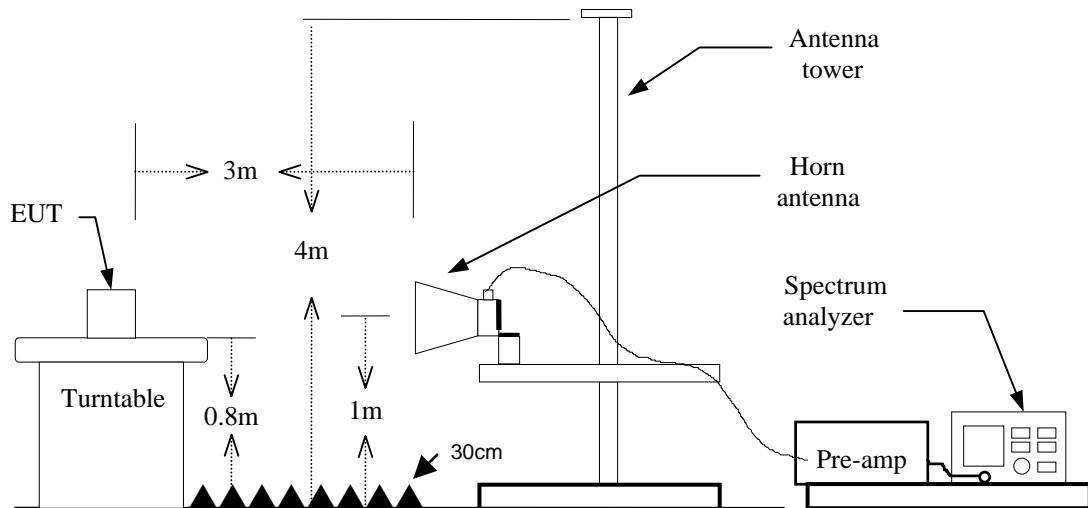
Test Configuration

9kHz ~ 30MHz



30MHz ~ 1GHz



**Above 1 GHz****TEST PROCEDURE**

1. The EUT is placed on a turntable, which is 0.8m 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 30MHz

RBW=10kHz / VBW=30kHz / Sweep=AUTO

30 ~ 1000MHz:

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

Above 1GHz:

a) PEAK: RBW=1MHz / VBW=3MHz / Sweep=AUTO

b) AVERAGE: RBW=1MHz / VBW=300Hz / Sweep=AUTO

7. Repeat above procedures until the measurements for all frequencies are complete.

**DATA SAMPLE****Below 1 GHz**

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant. Pol. (H/V)	Remark
x.xx	43.20	-20.71	22.49	40.00	-17.51	V	QP

Frequency (MHz)

= Emission frequency in MHz

Reading (dBuV)

= Uncorrected Analyzer / Receiver reading

Correction Factor (dB/m)

= Antenna factor – Amplifier gain + Cable loss

Result (dBuV/m)

= Reading (dBuV) + Corr. Factor (dB/m)

Limit (dBuV/m)

= Limit stated in standard

Margin (dB)

= Result (dBuV/m) – Limit (dBuV/m)

Q.P.

= Quasi-Peak

Above 1 GHz

Freq. (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant. Pol H/V	Remark
x.xx	45.25	6.91	52.16	74.00	-21.84	H	peak
x.xx	32.33	6.91	39.24	54.00	-14.76	H	AVG

Frequency (MHz)

= Emission frequency in MHz

Reading (dBuV)

= Uncorrected Analyzer / Receiver reading

Correction Factor (dB/m)

= Antenna factor + Cable loss – Amplifier gain

Result (dBuV/m)

= Reading (dBuV) + Corr. Factor (dB/m)

Limit (dBuV/m)

= Limit stated in standard

Margin (dB)

= Result (dBuV/m) – Limit (dBuV/m)

**Below 1 GHz****Operation Mode:** Data Link**Test Date:**

2016/11

Temperature: 26°C**Tested by:**

Francis Lee

Humidity: 56% RH**Polarity:**

Ver. / Hor.

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant. Pol. (H/V)	Remark
31.9400	38.70	-9.94	28.76	40.00	-11.24	V	QP
212.3600	45.00	-16.37	28.63	43.50	-14.87	V	QP
309.3599	33.20	-12.11	21.09	46.00	-24.91	V	QP
686.6900	31.90	-7.22	24.68	46.00	-21.32	V	QP
840.9199	35.60	-4.67	30.93	46.00	-15.07	V	QP
858.3799	34.50	-4.33	30.17	46.00	-15.83	V	QP
31.9400	34.80	-9.94	24.86	40.00	-15.14	H	QP
120.2100	46.60	-15.18	31.42	43.50	-12.08	H	QP
210.4200	52.60	-16.39	36.21	43.50	-7.29	H	QP
617.8200	36.90	-7.76	29.14	46.00	-16.86	H	QP
686.6900	33.50	-7.22	26.28	46.00	-19.72	H	QP
858.3799	38.30	-4.33	33.97	46.00	-12.03	H	QP

Remark:

1. No emission found between lowest internal used/generated frequency to 30MHz (9kHz~30MHz).
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 / **Test Date:** 2014/6/8~10
5180-5240MHz / Low**Temperature:** 26°C**Tested by:** Francis Lee**Humidity:** 56%RH**Polarity:** Ver. / Hor.

Freq. (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant. Pol H/V	Remark
2275.000	47.56	-1.50	46.06	74.00	-27.94	V	peak
3795.000	45.19	3.63	48.82	74.00	-25.18	V	peak
5885.000	44.32	6.09	50.41	74.00	-23.59	V	peak
10356.000	45.53	10.53	56.06	74.00	-17.94	V	peak
10356.000	37.19	10.53	47.72	54.00	-6.28	V	AVG
N/A							
2430.000	50.06	-5.59	44.47	74.00	-29.53	H	peak
4340.000	45.45	7.36	52.81	74.00	-21.19	H	peak
4340.000	32.88	7.36	40.24	54.00	-13.76	H	AVG
5635.000	42.76	8.81	51.57	74.00	-22.43	H	peak
10368.000	48.03	10.00	58.03	74.00	-15.97	H	peak
10368.000	37.83	10.00	47.83	54.00	-6.17	H	AVG

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 / **Test Date:** 2014/6/8~10
5180-5240MHz / Mid

Temperature: 26°C

Tested by: Francis Lee

Humidity: 56%RH

Polarity: Ver. / Hor.

Freq. (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant. Pol H/V	Remark
2205.000	47.43	-1.34	46.09	74.00	-27.91	V	peak
3795.000	45.06	3.63	48.69	74.00	-25.31	V	peak
5745.000	43.93	5.58	49.51	74.00	-24.49	V	peak
10440.000	44.55	9.88	54.43	74.00	-19.57	V	peak
10440.000	36.69	9.88	46.57	54.00	-7.43	V	AVG
N/A							
3110.000	45.88	1.31	47.19	74.00	-26.81	H	peak
4275.000	44.43	7.24	51.67	74.00	-22.33	H	peak
5600.000	42.17	9.20	51.37	74.00	-22.63	H	peak
10440.000	47.11	9.68	56.79	74.00	-17.21	H	peak
10440.000	40.04	9.68	49.72	54.00	-4.28	H	AVG
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 / **Test Date:** 2014/6/8~10
5180-5240MHz / High

Temperature: 26°C

Tested by: Francis Lee

Humidity: 56%RH

Polarity: Ver. / Hor.

Freq. (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant. Pol H/V	Remark
3085.000	45.83	0.19	46.02	74.00	-27.98	V	peak
4160.000	44.90	2.75	47.65	74.00	-26.35	V	peak
5720.000	44.19	5.78	49.97	74.00	-24.03	V	peak
10488.000	44.31	9.50	53.81	74.00	-20.19	V	peak
10488.000	33.85	9.50	43.35	54.00	-10.65	V	AVG
N/A							
3035.000	46.62	0.04	46.66	74.00	-27.34	H	peak
4315.000	43.88	7.55	51.43	74.00	-22.57	H	peak
5600.000	42.98	9.20	52.18	74.00	-21.82	H	peak
5600.000	31.67	9.20	40.87	54.00	-13.13	H	AVG
10476.000	48.21	9.52	57.73	74.00	-16.27	H	peak
10476.000	38.85	9.52	48.37	54.00	-5.63	H	AVG

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 HT20 mode /
5180-5240MHz / Low **Test Date:** 2014/6/8~10

Temperature: 26°C

Tested by: Francis Lee

Humidity: 56%RH

Polarity: Ver. / Hor.

Freq. (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant. Pol H/V	Remark
3835.000	45.96	2.91	48.87	74.00	-25.13	V	peak
4715.000	43.87	2.70	46.57	74.00	-27.43	V	peak
5520.000	44.10	6.17	50.27	74.00	-23.73	V	peak
10368.000	45.55	10.43	55.98	74.00	-18.02	V	peak
10368.000	34.92	10.43	45.35	54.00	-8.65	V	AVG
N/A							
3840.000	45.32	5.15	50.47	74.00	-23.53	H	peak
4840.000	46.16	6.13	52.29	74.00	-21.71	H	peak
4840.000	32.63	6.13	38.76	54.00	-15.24	H	AVG
5935.000	43.66	9.08	52.74	74.00	-21.26	H	peak
5935.000	32.42	9.08	41.50	54.00	-12.50	H	AVG
10356.000	47.84	10.06	57.90	74.00	-16.10	H	peak
10356.000	39.17	10.06	49.23	54.00	-4.77	H	AVG

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 HT20 mode /
5180-5240MHz / Mid **Test Date:** 2014/6/8~10

Temperature: 26°C

Tested by: Francis Lee

Humidity: 56%RH

Polarity: Ver. / Hor.

Freq. (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant. Pol H/V	Remark
3825.000	44.69	3.13	47.82	74.00	-26.18	V	peak
4280.000	45.18	2.06	47.24	74.00	-26.76	V	peak
5685.000	44.97	5.94	50.91	74.00	-23.09	V	peak
10440.000	42.09	9.88	51.97	74.00	-22.03	V	peak
N/A							
3180.000	45.41	1.13	46.54	74.00	-27.46	H	peak
4305.000	44.54	7.62	52.16	74.00	-21.84	H	peak
4305.000	32.68	7.62	40.30	54.00	-13.70	H	AVG
5595.000	43.71	9.18	52.89	74.00	-21.11	H	peak
5595.000	32.37	9.18	41.55	54.00	-12.45	H	AVG
10440.000	46.87	9.68	56.55	74.00	-17.45	H	peak
10440.000	38.02	9.68	47.70	54.00	-6.30	H	AVG

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 HT20 mode /
5180-5240MHz / High **Test Date:** 2014/6/8~10

Temperature: 26°C

Tested by: Francis Lee

Humidity: 56%RH

Polarity: Ver. / Hor.

Freq. (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant. Pol H/V	Remark
3805.000	44.62	3.58	48.20	74.00	-25.80	V	peak
4460.000	44.37	2.22	46.59	74.00	-27.41	V	peak
5565.000	44.43	6.02	50.45	74.00	-23.55	V	peak
10488.000	42.12	9.50	51.62	74.00	-22.38	V	peak
N/A							
3650.000	44.80	3.96	48.76	74.00	-25.24	H	peak
4315.000	44.01	7.55	51.56	74.00	-22.44	H	peak
5570.000	44.63	9.10	53.73	74.00	-20.27	H	peak
5570.000	32.70	9.10	41.80	54.00	-12.20	H	AVG
10476.000	47.69	9.52	57.21	74.00	-16.79	H	peak
10476.000	37.43	9.52	46.95	54.00	-7.05	H	AVG

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 HT40 mode /
5190-5230MHz / Low **Test Date:** 2014/6/8~10

Temperature: 26°C

Tested by: Francis Lee

Humidity: 56%RH

Polarity: Ver. / Hor.

Freq. (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant. Pol H/V	Remark
2205.000	47.27	-1.34	45.93	74.00	-28.07	V	peak
4025.000	45.36	3.40	48.76	74.00	-25.24	V	peak
5660.000	44.80	5.93	50.73	74.00	-23.27	V	peak
10392.000	44.02	10.25	54.27	74.00	-19.73	V	peak
10392.000	32.48	10.25	42.73	54.00	-11.27	V	AVG
N/A							
3595.000	44.84	4.05	48.89	74.00	-25.11	H	peak
4290.000	44.23	7.49	51.72	74.00	-22.28	H	peak
5515.000	43.72	8.91	52.63	74.00	-21.37	H	peak
5515.000	32.53	8.91	41.44	54.00	-12.56	H	AVG
10380.000	44.62	9.95	54.57	74.00	-19.43	H	peak
10380.000	34.27	9.95	44.22	54.00	-9.78	H	AVG

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 HT40 mode /
5190-5230MHz / High **Test Date:** 2014/6/8~10

Temperature: 26°C

Tested by: Francis Lee

Humidity: 56%RH

Polarity: Ver. / Hor.

Freq. (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant. Pol H/V	Remark
2275.000	48.65	-1.50	47.15	74.00	-26.85	V	peak
3785.000	45.66	3.51	49.17	74.00	-24.83	V	peak
5680.000	44.64	5.93	50.57	74.00	-23.43	V	peak
10452.000	41.44	9.78	51.22	74.00	-22.78	V	peak
N/A							
3760.000	45.64	4.57	50.21	74.00	-23.79	H	peak
4910.000	45.11	7.19	52.30	74.00	-21.70	H	peak
4910.000	32.63	7.19	39.82	54.00	-14.18	H	AVG
5520.000	43.97	8.93	52.90	74.00	-21.10	H	peak
5520.000	32.36	8.93	41.29	54.00	-12.71	H	AVG
10440.000	45.24	9.68	54.92	74.00	-19.08	H	peak
10440.000	35.00	9.68	44.68	54.00	-9.32	H	AVG

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 HT80 mode / 5210MHz **Test Date:** 2014/6/8~10

Temperature: 26°C

Tested by: Francis Lee

Humidity: 56%RH

Polarity: Ver. / Hor.

Freq. (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant. Pol H/V	Remark
2215.000	47.94	-1.36	46.58	74.00	-27.42	V	peak
4015.000	44.29	3.43	47.72	74.00	-26.28	V	peak
5805.000	43.95	5.19	49.14	74.00	-24.86	V	peak
10404.000	40.72	10.15	50.87	74.00	-23.13	V	peak
N/A							
3900.000	45.14	5.22	50.36	74.00	-23.64	H	peak
4565.000	45.36	6.17	51.53	74.00	-22.47	H	peak
5935.000	44.36	9.08	53.44	74.00	-20.56	H	peak
5935.000	32.65	9.08	41.73	54.00	-12.27	H	AVG
10416.000	46.43	9.79	56.22	74.00	-17.78	H	peak
10416.000	35.10	9.79	44.89	54.00	-9.11	H	AVG

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:** 2014/6/10**Temperature:** 26°C**Tested by:** Francis Lee**Humidity:** 56%RH**Polarity:** Ver. / Hor.

Freq. (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant. Pol H/V	Remark
3605.000	45.67	2.91	48.58	74.00	-25.42	V	peak
4910.000	44.47	4.46	48.93	74.00	-25.07	V	peak
5905.000	43.90	6.21	50.11	74.00	-23.89	V	peak
11496.000	50.78	10.60	61.38	74.00	-12.62		peak
11496.000	40.88	10.60	51.48	54.00	-2.52		AVG
N/A							
3995.000	45.70	4.87	50.57	74.00	-23.43	H	peak
4985.000	43.92	7.52	51.44	74.00	-22.56	H	peak
5935.000	44.25	9.08	53.33	74.00	-20.67	H	peak
5935.000	32.40	9.08	41.48	54.00	-12.52	H	AVG
11484.000	48.15	10.59	58.74	74.00	-15.26	H	peak
11484.000	38.52	10.59	49.11	54.00	-4.89	H	AVG

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:** 2014/6/10**Temperature:** 26°C**Tested by:** Francis Lee**Humidity:** 56%RH**Polarity:** Ver. / Hor.

Freq. (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant. Pol H/V	Remark
3635.000	45.45	2.77	48.22	74.00	-25.78	V	peak
5010.000	45.78	5.23	51.01	74.00	-22.99	V	peak
5945.000	46.17	5.78	51.95	74.00	-22.05	V	peak
11568.000	47.95	10.62	58.57	74.00	-15.43	V	peak
11568.000	37.86	10.62	48.48	54.00	-5.52	V	AVG
N/A							
4300.000	44.10	7.66	51.76	74.00	-22.24	H	peak
5360.000	44.09	7.88	51.97	74.00	-22.03	H	peak
5940.000	43.62	9.06	52.68	74.00	-21.32	H	peak
5940.000	32.42	9.06	41.48	54.00	-12.52	H	AVG
11568.000	46.64	10.62	57.26	74.00	-16.74	H	peak
11568.000	38.47	10.62	49.09	54.00	-4.91	H	AVG

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:** 2014/6/10**Temperature:** 26°C**Tested by:** Francis Lee**Humidity:** 56%RH**Polarity:** Ver. / Hor.

Freq. (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant. Pol H/V	Remark
3800.000	44.09	3.69	47.78	74.00	-26.22	V	peak
4900.000	44.83	4.37	49.20	74.00	-24.80	V	peak
5440.000	43.30	6.33	49.63	74.00	-24.37	V	peak
11652.000	47.03	10.65	57.68	74.00	-16.32	V	peak
11652.000	37.89	10.65	48.54	54.00	-5.46	V	AVG
N/A							
3985.000	45.43	4.91	50.34	74.00	-23.66	H	peak
4965.000	44.79	7.44	52.23	74.00	-21.77	H	peak
4965.000	32.62	7.44	40.06	54.00	-13.94	H	AVG
5640.000	42.44	8.76	51.20	74.00	-22.80	H	peak
11652.000	44.94	10.65	55.59	74.00	-18.41	H	peak
11652.000	37.23	10.65	47.88	54.00	-6.12	H	AVG

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 HT20 mode / 5745-5825MHz / CH Low**Test Date:** 2014/6/10**Temperature:** 26°C**Tested by:** Francis Lee**Humidity:** 56%RH**Polarity:** Ver. / Hor.

Freq. (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant. Pol H/V	Remark
3800.000	44.57	3.69	48.26	74.00	-25.74	V	peak
5455.000	44.93	6.30	51.23	74.00	-22.77	V	peak
5910.000	44.81	6.15	50.96	74.00	-23.04	V	peak
11484.000	42.99	10.59	53.58	74.00	-20.42	V	peak
11484.000	34.82	10.59	45.41	54.00	-8.59	V	AVG
N/A							
3790.000	44.90	4.97	49.87	74.00	-24.13	H	peak
4695.000	44.91	7.24	52.15	74.00	-21.85	H	peak
4695.000	32.70	7.24	39.94	54.00	-14.06	H	AVG
5525.000	43.94	8.95	52.89	74.00	-21.11	H	peak
5525.000	32.36	8.95	41.31	54.00	-12.69	H	AVG
11496.000	40.69	10.60	51.29	74.00	-22.71	H	peak

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 HT20 mode / 5745-5825MHz / CH Mid**Test Date:** 2014/6/10**Temperature:** 26°C**Tested by:** Francis Lee**Humidity:** 56%RH**Polarity:** Ver. / Hor.

Freq. (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant. Pol H/V	Remark
3800.000	44.66	3.69	48.35	74.00	-25.65	V	peak
4710.000	45.19	2.73	47.92	74.00	-26.08	V	peak
5460.000	44.63	6.29	50.92	74.00	-23.08	V	peak
11568.000	41.82	10.62	52.44	74.00	-21.56	V	peak
11568.000	34.63	10.62	45.25	54.00	-8.75	V	AVG
N/A							
4260.000	44.35	6.99	51.34	74.00	-22.66	H	peak
4960.000	44.44	7.41	51.85	74.00	-22.15	H	peak
5470.000	44.39	8.72	53.11	74.00	-20.89	H	peak
5470.000	32.32	8.72	41.04	54.00	-12.96	H	AVG
11568.000	44.55	10.62	55.17	74.00	-18.83	H	peak
11568.000	31.12	10.62	41.74	54.00	-12.26	H	AVG

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 HT20 mode /
5745-5825MHz / CH High

Test Date: 2014/6/10

Temperature: 26°C

Tested by: Francis Lee

Humidity: 56%RH

Polarity: Ver. / Hor.

Freq. (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant. Pol H/V	Remark
3770.000	45.34	3.32	48.66	74.00	-25.34	V	peak
4955.000	44.14	4.89	49.03	74.00	-24.97	V	peak
5515.000	45.48	6.18	51.66	74.00	-22.34	V	peak
11652.000	41.60	10.65	52.25	74.00	-21.75	V	peak
11652.000	32.84	10.65	43.49	54.00	-10.51	V	AVG
N/A							
3815.000	45.02	5.12	50.14	74.00	-23.86	H	peak
4425.000	45.45	6.84	52.29	74.00	-21.71	H	peak
4425.000	32.62	6.84	39.46	54.00	-14.54	H	AVG
5525.000	44.98	8.95	53.93	74.00	-20.07	H	peak
5525.000	32.66	8.95	41.61	54.00	-12.39	H	AVG
11652.000	42.59	10.65	53.24	74.00	-20.76	H	peak
11652.000	33.26	10.65	43.91	54.00	-10.09	H	AVG

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 HT40 mode
/ 5745-5825MHz / CH Low

Test Date: 2014/6/10

Temperature: 26°C

Tested by: Francis Lee

Humidity: 56%RH

Polarity: Ver. / Hor.

Freq. (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant. Pol H/V	Remark
2420.000	48.05	-1.52	46.53	74.00	-27.47	V	peak
3790.000	44.78	3.57	48.35	74.00	-25.65	V	peak
5195.000	44.61	5.48	50.09	74.00	-23.91	V	peak
11520.000	43.07	10.61	53.68	74.00	-20.32	V	peak
11520.000	33.65	10.61	44.26	54.00	-9.74	V	AVG
N/A							
3650.000	44.55	3.96	48.51	74.00	-25.49	H	peak
4315.000	43.90	7.55	51.45	74.00	-22.55	H	peak
5485.000	43.20	8.79	51.99	74.00	-22.01	H	peak
11508.000	42.45	10.60	53.05	74.00	-20.95	H	peak
11508.000	30.48	10.60	41.08	54.00	-12.92	H	AVG
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 HT40 mode
/ 5745-5825MHz / CH High

Test Date: 2014/6/10

Temperature: 26°C

Tested by: Francis Lee

Humidity: 56%RH

Polarity: Ver. / Hor.

Freq. (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant. Pol H/V	Remark
3590.000	45.00	2.86	47.86	74.00	-26.14	V	peak
4970.000	45.43	5.04	50.47	74.00	-23.53	V	peak
5500.000	43.08	6.23	49.31	74.00	-24.69	V	peak
11592.000	42.01	10.63	52.64	74.00	-21.36	V	peak
11592.000	32.78	10.63	43.41	54.00	-10.59	V	AVG
N/A							
4310.000	44.25	7.59	51.84	74.00	-22.16	H	peak
4945.000	43.97	7.35	51.32	74.00	-22.68	H	peak
5590.000	42.01	9.17	51.18	74.00	-22.82	H	peak
11592.000	41.98	10.63	52.61	74.00	-21.39	H	peak
11592.000	29.13	10.63	39.76	54.00	-14.24	H	AVG
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 HT80 mode / 5775MHz**Test Date:** 2014/6/10**Temperature:** 26°C**Tested by:** Francis Lee**Humidity:** 56%RH**Polarity:** Ver. / Hor.

Freq. (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant. Pol H/V	Remark
2495.000	47.02	-0.97	46.05	74.00	-27.95	V	peak
3795.000	45.03	3.63	48.66	74.00	-25.34	V	peak
5185.000	43.30	5.36	48.66	74.00	-25.34	V	peak
11544.000	41.76	10.61	52.37	74.00	-21.63	V	peak
11544.000	33.08	10.61	43.69	54.00	-10.31	V	AVG
N/A							
3275.000	45.24	1.22	46.46	74.00	-27.54	H	peak
4305.000	45.15	7.62	52.77	74.00	-21.23	H	peak
4305.000	32.36	7.62	39.98	54.00	-14.02	H	AVG
4955.000	42.94	7.39	50.33	74.00	-23.67	H	peak
11520.000	39.98	10.61	50.59	74.00	-23.41	H	peak
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:** RX / 5180-5240MHz**Test Date:** 2014/6/9**Temperature:** 26°C**Tested by:** Francis Lee**Humidity:** 56%RH**Polarity:** Ver. / Hor.

Freq. (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant. Pol H/V	Remark
1715.000	52.79	-5.58	47.21	74.00	-26.79	V	peak
2495.000	48.86	-0.97	47.89	74.00	-26.11	V	peak
4005.000	40.35	3.47	43.82	74.00	-30.18	V	peak
5510.000	38.87	6.20	45.07	74.00	-28.93	V	peak
N/A							
2095.000	44.81	-3.91	40.90	74.00	-33.10	H	peak
3915.000	41.31	5.16	46.47	74.00	-27.53	H	peak
5595.000	38.71	9.18	47.89	74.00	-26.11	H	peak
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:** RX / 5745-5825 MHz**Test Date:** 2014/6/10**Temperature:** 26°C**Tested by:** Francis Lee**Humidity:** 56%RH**Polarity:** Ver. / Hor.

Freq. (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant. Pol H/V	Remark
1600.000	47.57	-4.79	42.78	74.00	-31.22	V	peak
2300.000	48.94	-1.55	47.39	74.00	-26.61	V	peak
3800.000	39.23	3.69	42.92	74.00	-31.08	V	peak
5440.000	38.25	6.33	44.58	74.00	-29.42	V	peak
N/A							
1405.000	42.49	-7.01	35.48	74.00	-38.52	H	peak
3915.000	39.29	5.16	44.45	74.00	-29.55	H	peak
5535.000	37.84	8.98	46.82	74.00	-27.18	H	peak
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).



7.7 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 μ H/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 (dB μ V)	
	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 II 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.

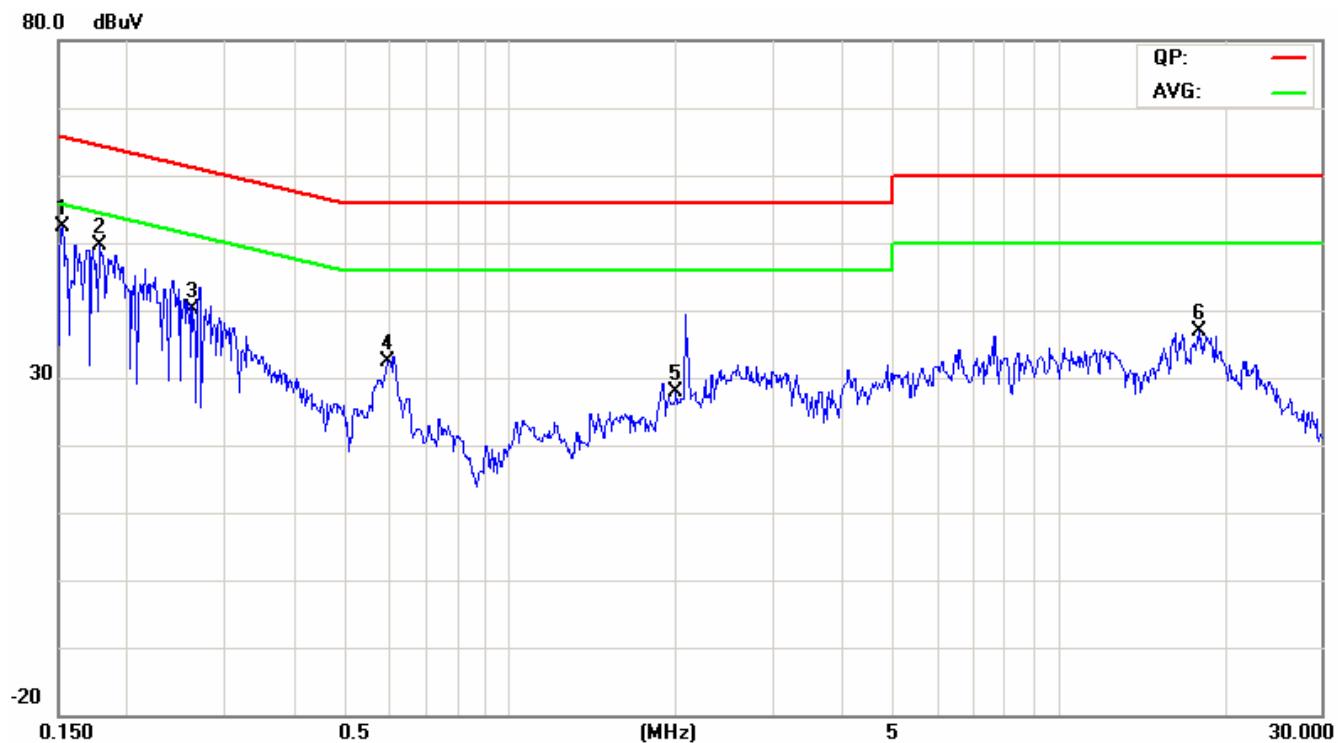
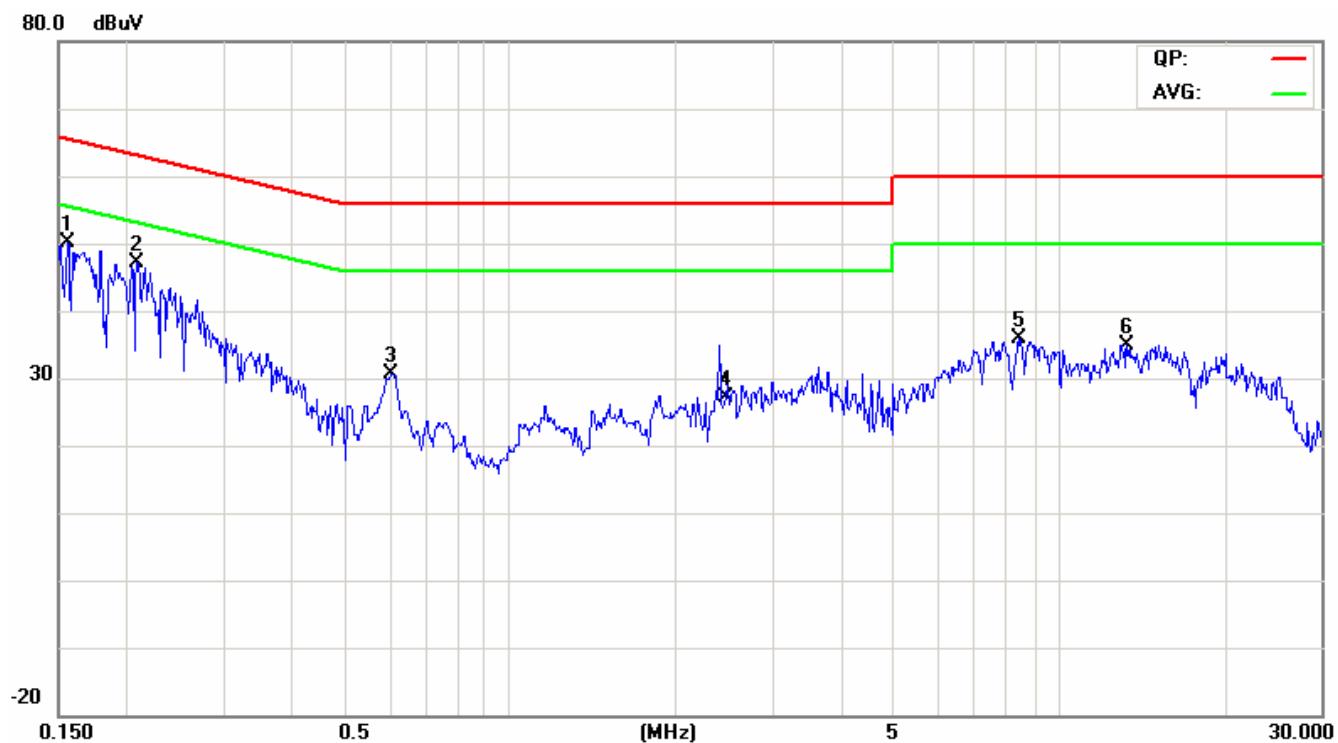
Test Data

Operation Mode:	Data Link	Test Date:	2014/7/11
Temperature:	25°C	Tested by:	Louis Shen
Humidity:	57% RH		

Freq. (MHz)	QP Reading	AV Reading	Corr. factor	QP Result	AV Result	QP Limit	AV Limit	QP Margin	AV Margin	Note
0.1505	38.98	22.58	9.79	48.77	32.37	65.97	55.97	-17.20	-23.60	L1
0.1785	37.87	20.83	9.75	47.62	30.58	64.56	54.56	-16.94	-23.98	L1
0.2664	26.20	12.62	9.72	35.92	22.34	61.23	51.23	-25.31	-28.89	L1
0.5933	18.84	13.87	9.74	28.58	23.61	56.00	46.00	-27.42	-22.39	L1
2.0004	13.95	9.36	9.79	23.74	19.15	56.00	46.00	-32.26	-26.85	L1
17.8359	22.97	18.09	10.06	33.03	28.15	60.00	50.00	-26.97	-21.85	L1
0.1554	38.01	17.66	9.76	47.77	27.42	65.71	55.71	-17.94	-28.29	L2
0.2071	29.71	13.15	9.72	39.43	22.87	63.32	53.32	-23.89	-30.45	L2
0.6065	19.60	13.98	9.72	29.32	23.70	56.00	46.00	-26.68	-22.30	L2
2.4432	15.82	10.85	9.78	25.60	20.63	56.00	46.00	-30.40	-25.37	L2
8.4041	23.19	17.80	9.96	33.15	27.76	60.00	50.00	-26.85	-22.24	L2
13.2182	20.25	14.24	10.03	30.28	24.27	60.00	50.00	-29.72	-25.73	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)***

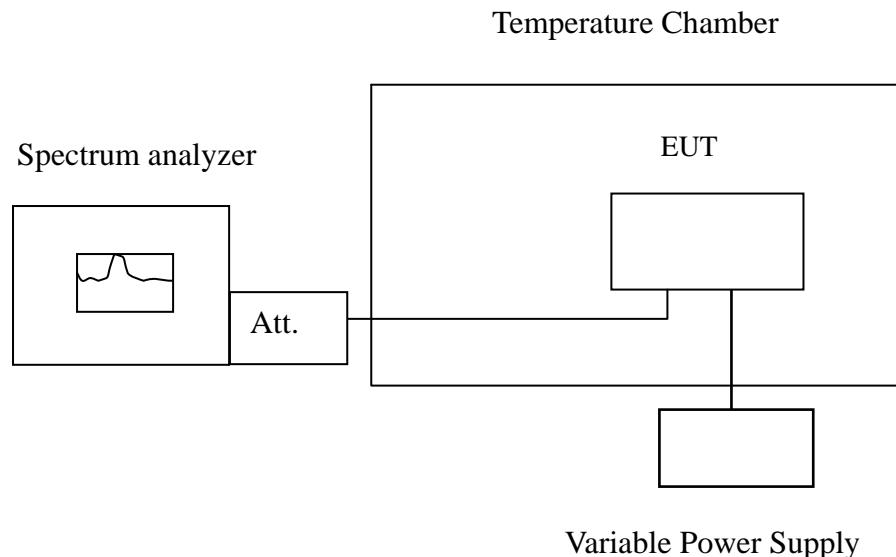


7.8 FREQUENCY STABILITY

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 operational description.

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.

**IEEE 802.11a mode / 5180 ~ 5240 MHz:****CH Low**

Operating Frequency: 5180 MHz				
Environment Temperature (°C)	Voltage (V)	Measured Frequency (MHz)	Limit Range	Test Result
-20	120	5179.926660	5150~5250	Pass
-10	120	5179.986645	5150~5250	Pass
0	120	5179.997948	5150~5250	Pass
10	120	5179.969094	5150~5250	Pass
20	120	5180.014998	5150~5250	Pass
30	120	5180.015550	5150~5250	Pass
40	120	5180.016026	5150~5250	Pass
50	120	5180.018787	5150~5250	Pass

Operating Frequency: 5180 MHz				
Environment Temperature (°C)	Voltage (V)	Measured Frequency (MHz)	Limit Range	Test Result
20	108	5179.993711	5150~5250	Pass
	120	5179.997326	5150~5250	Pass
	132	5180.018661	5150~5250	Pass

**CH High**

Operating Frequency: 5240 MHz				
Environment Temperature (°C)	Voltage (V)	Measured Frequency (MHz)	Limit Range	Test Result
-20	120	5239.939433	5150~5250	Pass
-10	120	5239.966546	5150~5250	Pass
0	120	5239.994256	5150~5250	Pass
10	120	5239.971610	5150~5250	Pass
20	120	5240.011666	5150~5250	Pass
30	120	5240.003019	5150~5250	Pass
40	120	5240.003987	5150~5250	Pass
50	120	5240.031335	5150~5250	Pass

Operating Frequency: 5240 MHz				
Environment Temperature (°C)	Voltage (V)	Measured Frequency (MHz)	Limit Range	Test Result
20	108	5239.963783	5150~5250	Pass
	120	5239.980098	5150~5250	Pass
	132	5240.024354	5150~5250	Pass

**IEEE 802.11n HT20 mode / 5180 ~ 5240 MHz:****CH Low**

Operating Frequency: 5180 MHz				
Environment Temperature (°C)	Voltage (V)	Measured Frequency (MHz)	Limit Range	Test Result
-20	120	5179.994117	5150~5250	Pass
-10	120	5179.964434	5150~5250	Pass
0	120	5179.951317	5150~5250	Pass
10	120	5179.988066	5150~5250	Pass
20	120	5180.007637	5150~5250	Pass
30	120	5180.006925	5150~5250	Pass
40	120	5180.029442	5150~5250	Pass
50	120	5180.010042	5150~5250	Pass

Operating Frequency: 5180 MHz				
Environment Temperature (°C)	Voltage (V)	Measured Frequency (MHz)	Limit Range	Test Result
20	108	5179.989368	5150~5250	Pass
	120	5179.98235	5150~5250	Pass
	132	5180.024947	5150~5250	Pass

**CH High**

Operating Frequency: 5240 MHz				
Environment Temperature (°C)	Voltage (V)	Measured Frequency (MHz)	Limit Range	Test Result
-20	120	5239.924244	5150~5250	Pass
-10	120	5239.949389	5150~5250	Pass
0	120	5239.956550	5150~5250	Pass
10	120	5239.997807	5150~5250	Pass
20	120	5240.008392	5150~5250	Pass
30	120	5240.025663	5150~5250	Pass
40	120	5240.009159	5150~5250	Pass
50	120	5240.028633	5150~5250	Pass

Operating Frequency: 5240 MHz				
Environment Temperature (°C)	Voltage (V)	Measured Frequency (MHz)	Limit Range	Test Result
20	108	5239.981746	5150~5250	Pass
	120	5239.984494	5150~5250	Pass
	108	5239.981746	5150~5250	Pass

**IEEE 802.11n HT40 mode / 5190 ~ 5230 MHz:****CH Low**

Operating Frequency: 5190 MHz				
Environment Temperature (°C)	Voltage (V)	Measured Frequency (MHz)	Limit Range	Test Result
-20	120	5189.972055	5150~5250	Pass
-10	120	5189.930555	5150~5250	Pass
0	120	5189.998744	5150~5250	Pass
10	120	5189.963809	5150~5250	Pass
20	120	5190.003999	5150~5250	Pass
30	120	5190.004826	5150~5250	Pass
40	120	5190.002215	5150~5250	Pass
50	120	5190.047754	5150~5250	Pass

Operating Frequency: 5190 MHz				
Environment Temperature (°C)	Voltage (V)	Measured Frequency (MHz)	Limit Range	Test Result
20	108	5189.972771	5150~5250	Pass
	120	5189.988039	5150~5250	Pass
	132	5190.026708	5150~5250	Pass

**CH High**

Operating Frequency: 5230 MHz				
Environment Temperature (°C)	Voltage (V)	Measured Frequency (MHz)	Limit Range	Test Result
-20	120	5229.941796	5150~5250	Pass
-10	120	5229.971650	5150~5250	Pass
0	120	5229.972792	5150~5250	Pass
10	120	5229.969937	5150~5250	Pass
20	120	5230.007923	5150~5250	Pass
30	120	5230.015958	5150~5250	Pass
40	120	5230.029029	5150~5250	Pass
50	120	5230.018438	5150~5250	Pass

Operating Frequency: 5230 MHz				
Environment Temperature (°C)	Voltage (V)	Measured Frequency (MHz)	Limit Range	Test Result
20	108	5229.995092	5150~5250	Pass
	120	5229.995514	5150~5250	Pass
	132	5230.010215	5150~5250	Pass

**IEEE 802.11ac HT80 / 5210MHz:**

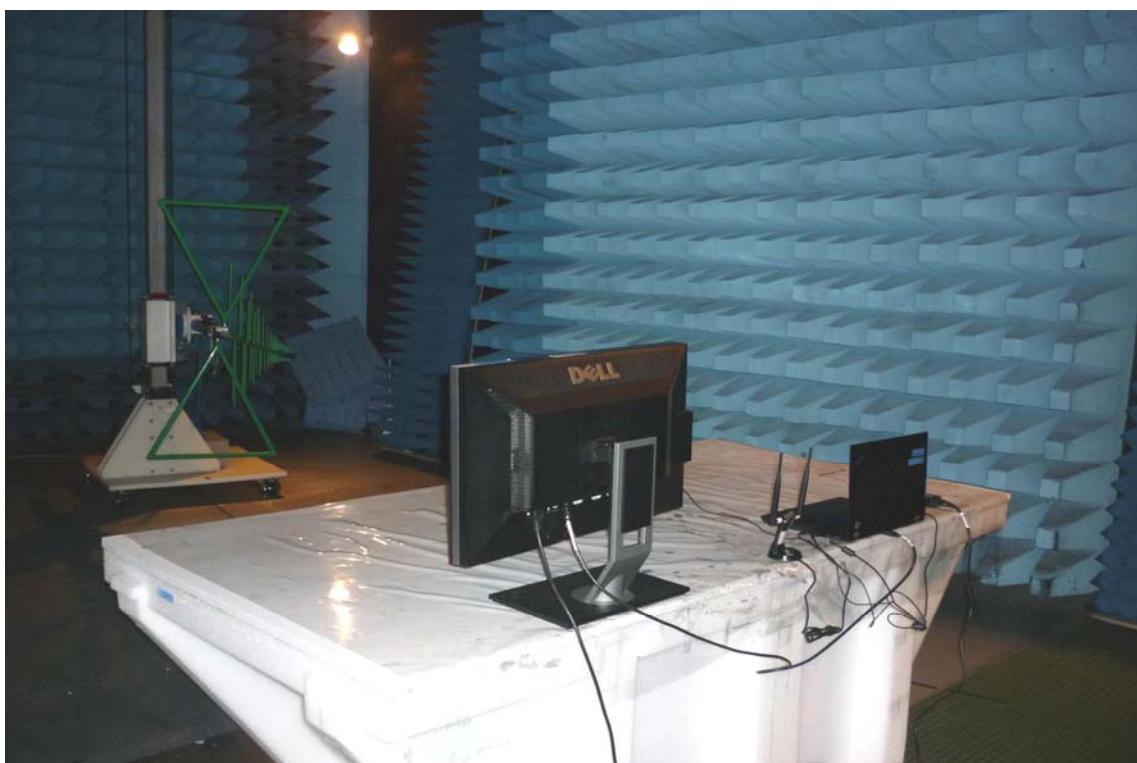
Operating Frequency: 5260 MHz				
Environment Temperature (°C)	Voltage (V)	Measured Frequency (MHz)	Limit Range	Test Result
-20	120	5209.968980	5150~5250	Pass
-10	120	5209.962700	5150~5250	Pass
0	120	5209.985214	5150~5250	Pass
10	120	5209.993716	5150~5250	Pass
20	120	5210.019411	5150~5250	Pass
30	120	5210.028509	5150~5250	Pass
40	120	5210.008419	5150~5250	Pass
50	120	5210.005829	5150~5250	Pass

Operating Frequency: 5260 MHz				
Environment Temperature (°C)	Voltage (V)	Measured Frequency (MHz)	Limit Range	Test Result
20	108	5209.997419	5150~5250	Pass
	120	5209.999860	5150~5250	Pass
	132	5210.021028	5150~5250	Pass



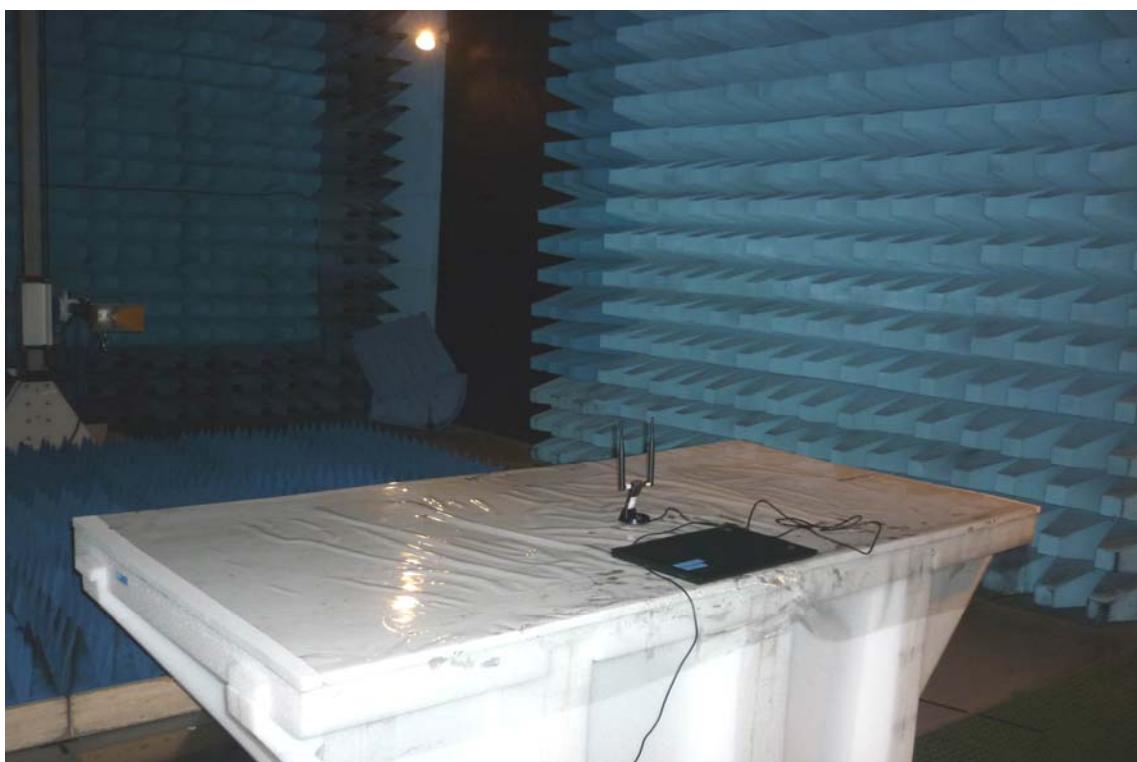
8. APPENDIX I PHOTOGRAPHS OF TEST SETUP

Radiated Emissions Setup Photos Below 1GHz



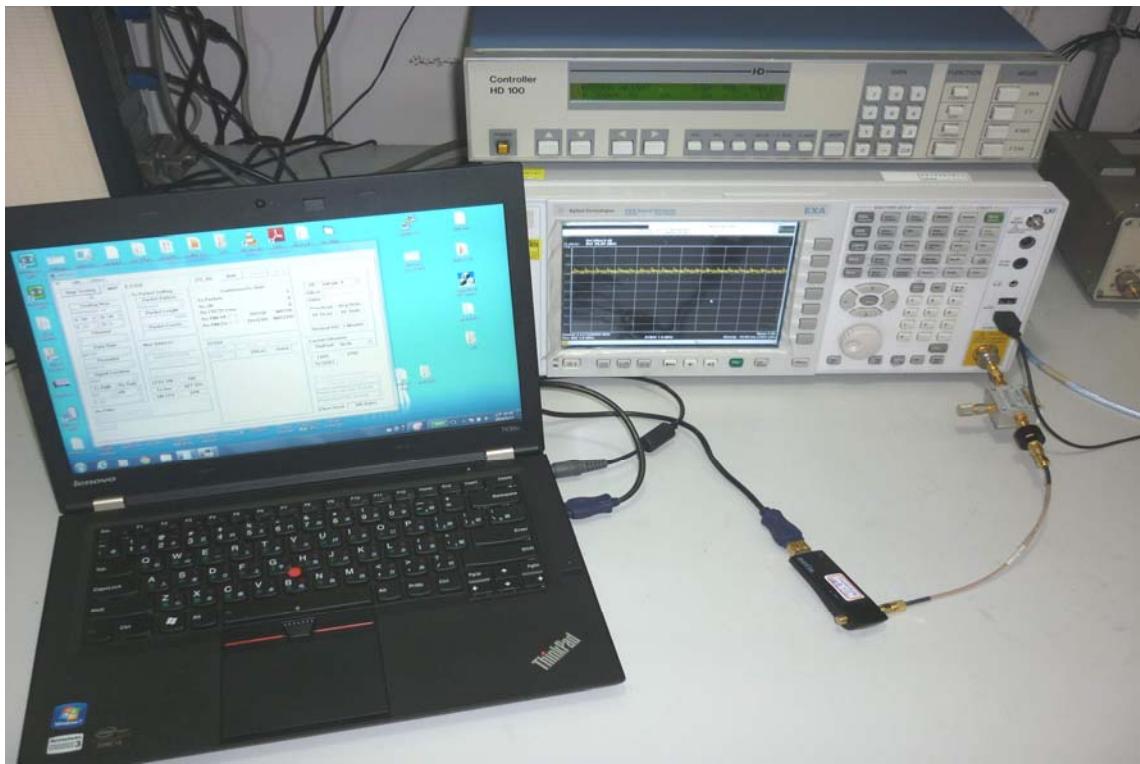


Above 1GHz





Conducted Emissions Setup Photo





Powerline Conducted Emissions Setup Photos





9. APPENDIX II: PHOTOGRAPHS OF EUT

Refer to T140605D06 External Photographs.