FCC 47 CFR PART15 SUBPART E

Test Report

For

Product Name: Intelligent Biometric Identification Terminal

Brand Name: opzoon

Model No.: OFR-T1-G

Series Model.:N/A

FCC ID: 2AN4A-OPG1AA001

Test Report Number:

C171101R03-RPW2

Issued for

Opzoon Technology Co., Ltd.

11th floor, Tower B, Yintai Center 2 Jianguomenwai St., Beijing, China 100022

Issued by

Compliance Certification Services Inc.

Kun shan Laboratory

**No.10 Weiye Rd., Innovation park, Eco&Tec,
Development Zone, Kunshan City, Jiangsu, China**

TEL: 86-512-57355888

FAX: 86-512-57370818

TESTING CERT #2541.01

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Revision History

Rev.	Issue Date	Report NO.	Effect Page	Contents
00	November 24, 2017	C171101R03-RPW2	ALL	N/A

1 TEST RESULT CERTIFICATION

Product Name:	Intelligent Biometric Identification Terminal
Trade Name:	opzoon
Model Name.:	OFR-T1-G
Series Model:	N/A
Applicant Discrepancy:	Initial
Device Category:	mobile unit
Date of Test:	November 9,2017~November 22, 2017
Applicant:	**Opzoon Technology Co., Ltd.** 11th floor, Tower B, Yintai Center 2 Jianguomenwai St., Beijing, China 100022
Manufacturer:	**Opzoon Technology Co., Ltd.** 11th floor, Tower B, Yintai Center 2 Jianguomenwai St., Beijing, China 100022
Application Type:	Certification

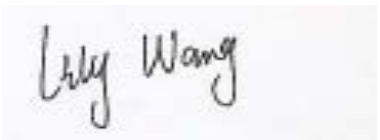
APPLICABLE STANDARDS	
STANDARD	**TEST RESULT**
FCC 47 CFR Part 15 Subpart E	No non-compliance noted

The above equipment was tested by Compliance Certification Services Inc. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10: 2013 and the energy emitted by the sample EUT tested as described in this report is in compliance with the requirements of FCC Rules Part 15.207, 15.209, 15.407and KDB 789033.
The test results of this report relate only to the tested sample EUT identified in this report.

Approved by:

Jeff.Fang
RF Manager
Compliance Certification Service Inc.

Tested by:



Lily.Wang
Test Engineer
Compliance Certification Service Inc.

2 EUT DESCRIPTION

Product Name:	Intelligent Biometric Identification Terminal			
Brand Name:	opzoon			
Model Name:	OFR-T1-G			
Series Model:	N/A			
Model Discrepancy:	N/A			
Power Supply:	Input: 100-240V~,3A ,50-60Hz			
Frequency Range :	5725MHz-5850MHz			
Transmit Power :	IEEE802.11a mode: 15.76dBm IEEE802.11an HT20 mode: 15.80dBm IEEE802.11an HT40 mode: 15.46dBm IEEE802.11ac VHT20 mode: 15.65dBm IEEE802.11ac VHT40 mode: 15.25dBm IEEE802.11ac VHT80 mode: 13.13dBm			
Modulation Technique :	IEEE802.11a mode: OFDM (6,9,12,18,24,36,48 and 54 Mbps) IEEE802.11an HT20 mode: OFDM (MCS0~MCS15) IEEE802.11an HT40 mode: OFDM (MCS0~MCS15) IEEE802.11ac VHT20 mode: OFDM (VHTMCS0~VHTMCS9) IEEE802.11ac VHT40 mode: OFDM (VHTMCS0~VHTMCS9) IEEE802.11ac VHT80 mode: OFDM (VHTMCS0~VHTMCS9)			
Number of Channels :	IEEE 802.11a/n HT20/ac VHT20 mode: 5 Channels IEEE 802.11n HT40/ac VHT40 Mode:2 Channels IEEE 802.11ac VHT80 MHz Mode:1 Channel			
Antenna Specification:		Gain(dBi)		
		2.4G	BandI	BandIV
	Antenna 1	2.04	3.96	3.40
	Antenna 2	2.04	3.96	3.40
Beamforming Function:	☐ With beamforming		☒ Without beamforming	

Remark:

1. The sample selected for test was engineering sample that approximated to production product and was provided by manufacturer.
2. This submittal(s) (test report) is intended for ***FCC ID: 2AN4A-OPG1AA001*** filing to comply with FCC Part 15, Subpart E Rules.

3 TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10:2013 and FCC CFR 47 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 13.3 of ANSI C63.10:2013, 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

Under 1GHz

The EUT is placed on a turn table, which is 0.8 m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna, which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the maximum emissions, exploratory radiated emission measurements were made according to the requirements in Section 13.1.4.1 of ANSI C63.10:2013.

Above 1GHz

The EUT is placed on a turn table, which is 1.5 m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna, which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the maximum emissions, exploratory radiated emission measurements were made according to the requirements in Section 13.1.4.1 of ANSI C63.10:2013.

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	4.50 - 5.15
0.495 - 0.505 (1)	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960.0 - 1240	7.25 - 7.75
4.125 - 4.128	25.50 - 25.67	1300 - 1427	8.025 - 8.500
4.17725 - 4.17775	37.50 - 38.25	1435.0 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73.00 - 74.60	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.80 - 75.20	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108.00 - 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	149.90 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 – 2500.0	17.7 - 21.4
8.37625 - 8.38675	156.70 - 156.90	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.1700	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.20	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358.0	36.43 - 36.5(2)
12.57675 - 12.57725	322.0- 335.4	3600 - 4400	
13.36 - 13.41			

[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

Description	Modulation Technology	Modulation Type
6dB Bandwidth	OFDM	BPSK
Maximum conducted output power	OFDM	BPSK
Band edges measurement	OFDM	BPSK
Peak Power Spectral Density	OFDM	BPSK
Radiated undesirable emission	OFDM	BPSK
Conducted undesirable emission	OFDM	BPSK
Powerline conducted emission	OFDM	BPSK

IEEE 802.11a mode:

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

IEEE 802.11n HT20 mode:

Channel Low (5745MHz), Channel Mid (5785MHz) and Channel High (5825MHz) with MCS0 data rate were chosen for full testing.

IEEE 802.11n HT40 mode:

Channel Low (5755MHz) and Channel High (5795MHz) with MCS0 data rate were chosen for full testing.

IEEE 802.11ac VHT20 mode:

Channel Low (5745MHz), Channel Mid (5785MHz) and Channel High (5825MHz) with VHTMCS0 data rate were chosen for full testing.

IEEE 802.11ac VHT40 mode:

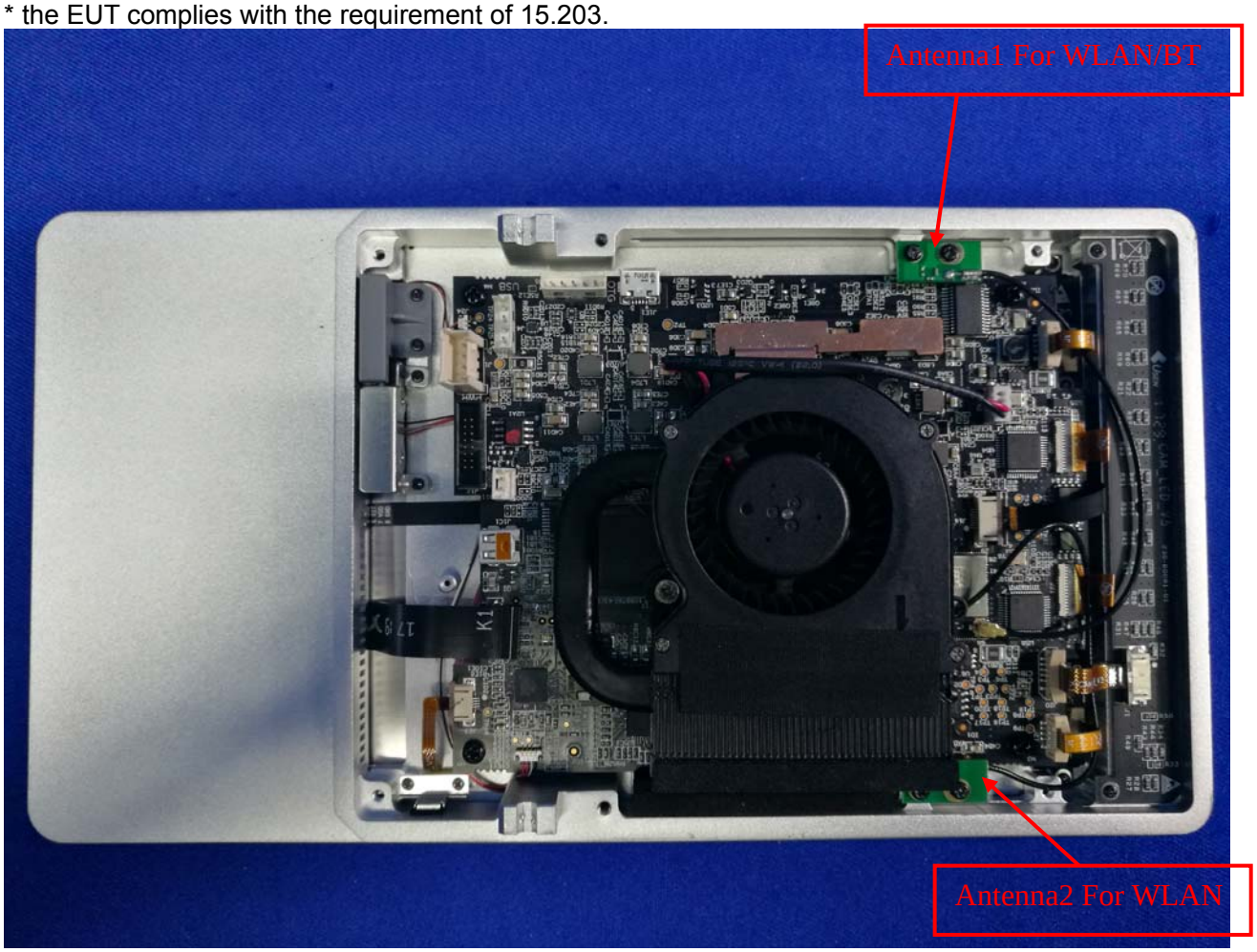
Channel Low (5755MHz) and Channel High (5795MHz) with VHTMCS0 data rate were chosen for full testing.

IEEE 802.11ac VHT80 mode:

Channel Mid (5775MHz) with VHTMCS0 data rate were chosen for full testing.

3.6 ANTENNA DESCRIPTION

an intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can be used with the device. The use of a permanently attached or an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section”
* the antenna of this EUT is a unique(Slot Antenna for WLAN)
* the EUT complies with the requirement of 15.203.



4 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.

4.1 MEASUREMENT EQUIPMENT USED

Conducted Emissions Test Site					
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Data**	**Calibration Due**
Spectrum Analyzer	Agilent	E4446A	MY44020154	2017-9-4	2018-9-3
Spectrum Analyzer	RS	FSU26	200789	2017-7-20	2018-7-19
Power meter	Anritsu	ML2495A	1445010	2017-4-26	2018-4-25
Power sensor	Anritsu	MA2411B	1339220	2017-4-26	2018-4-25
Power SPLITTER	Mini-Circuits	ZN2PD-9G	SF078500430	N.C.R	N.C.R
DC Power Supply	AGILENT	E3632A	MY50340053	N.C.R	N.C.R
Temp. / Humidity Gauge	Anymetre	TH603	CCS007	2017-10-24	2018-10-23
Test Software			EZ-EMC		

977 Chamber					
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Data**	**Calibration Due**
Spectrum Analyzer	Agilent	E4446A	MY44020154	2017-9-4	2018-9-3
Spectrum Analyzer	RS	FSU26	200789	2017-7-20	2018-7-19
EMI Test Receiver	R&S	ESCI	101378	2017-1-5	2018-1-4
Amplifier	COM-POWER	PAM-840A	461332	2017-8-30	2018-8-29
Amplifier	MITEQ	JS41-00101800-32-10P	1675713	2017-7-20	2018-7-19
Broad-Band Horn Antenna	SCHWARZBECK	BBHA 9170	9170-515	2017-3-6	2018-3-5
Bilog Antenna	Sunol	JB1	A062604	2017-5-27	2018-5-26
Bilog Antenna	Sunol	JB1	A110204-1	2017-5-27	2018-5-26
Loop Antenna	Hengweiyi	39501C	2014012	2017-1-5	2018-1-4
Horn-antenna	SCHWARZBECK	9120D	D:266	2017-2-28	2018-2-27
Horn-antenna	SCHWARZBECK	9120D	D:267	2017-11-5	2018-11-4
Turn Table	CT	CT123	4165	N.C.R	N.C.R
Antenna Tower	CT	CTERG23	3256	N.C.R	N.C.R
Controller	CT	CT1OO	95637	N.C.R	N.C.R
Test Software			EZ-EMC		

Conducted Emission					
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Data**	**Calibration Due**
EMI TEST RECEIVER	R&S	ESCI	100781	2017-2-28	2018-2-27
V (V-LISN)	SCHWARZBECK	NNLK 8129	8129-143	2017-10-29	2018-10-28
TWO-LINE V-NETWORK	R&S	ENV216	101604	2017-10-29	2018-10-28
Pulse LIMITER	R&S	ESH3-Z2	100524	2017-1-5	2018-1-4
Test Software			EZ-EMC		

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

4.2 MEASUREMENT UNCERTAINTY

For the test methods, according to the present document, the measurement uncertainty figures shall be calculated in accordance with TR 100 028-1 [2] and shall correspond to an expansion factor (coverage factor) k = 1,96 or k = 2 (which provide confidence levels of respectively 95 % and 95,45 % in the case where the distributions characterizing the actual measurement uncertainties are normal (Gaussian)).

Table 6 is based on such expansion factors.

Table 6: Maximum measurement uncertainty

Parameter	Uncertainty
RF output power, conducted	±1.129dB
Unwanted Emissions, conducted	±2.406dB
RF Power density, conducted	±2.379dB
Conducted emissions	±2.582dB
All emissions, radiated (Below 1GHz)	±4.725dB
All emissions, radiated (Above 1GHz)	± 4.818dB
Temperature	±0.3dB
Supply voltages	±0.2%

5 FACILITIES AND ACCREDITATIONS

5.1 FACILITIES

All measurement facilities used to collect the measurement data are located at
☒ **No.10Weiye Rd., Innovation park, Eco&Tec, Development Zone, Kunshan City, Jiangsu, China.**
The sites are constructed in conformance with the requirements of ANSI C63.10:2013 and CISPR Publication 22. All receiving equipment conforms to CISPR Publication 16-1, “Radio Interference Measuring Apparatus and Measurement Methods.”

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 preselectors and quasi-peak detectors are used to perform radiated measurements.

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

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

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

5.3 TABLE OF ACCREDITATIONS AND LISTINGS

FCC –Designation Number: CN1172.

Compliance Certification Services Inc. Kun shan Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files and the Designation Number: CN1172.

5.4 TABLE OF ACCREDITATIONS AND LISTINGS

Country	Agency	Scope of Accreditation	Logo
USA	A2LA	47 CFR FCC Part 15/18 (using ANSI C63.10 :2013)；VCCI V3; CNS 13438; CNS 13439; CNS 13803; CISPR 11; EN 55011; CISPR 13; EN 55013; CISPR 22:2005; CISPR 22:1997 +A1 :2000+A2 :2002；EN 55022:2006; EN55022 :1998 +A1 :2001+A2 :2003；EN 61000-6-3 (excluding discontinuous interference); EN 61000-6-4; AS/NZS CISPR 22；CAN/CSA-CEI/IEC CISPR 22；EN 61000-3-2；EN 61000-3-3；EN550024； EN 61000-4-2；EN 61000-4-3；EN61000-4-4；EN 61000-4-5； EN 61000-4-6；IEC 61000-4-8；EN 61000-4-11；IEC61000-3-2；IEC61000-3-3；IEC 61000-4-2； IEC 61000-4-3；IEC 61000-4-4； IEC 61000-4-5；IEC 61000-4-6；IEC 61000-4-8；IEC 61000-4-11；EN 300 220-3; EN 300 328; EN 300 330-2; EN 300 440-1; EN 300-440-2; EN 300 893; EN 301 489-01; EN 301 489-3; EN 301 489-07; EN 301 489-17；47 CFR FCC Part 15, 22, 24	ACCREDITED TESTING CERT #2541.01
USA	FCC	3/10 meter Sites to perform FCC Part 15/18 measurements	CN1172
Japan	VCCI	3/10 meter Sites and conducted test sites to perform radiated/conducted measurements	VCCI R-1600 C-1707 G-216

** 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 1 for the actual connections between EUT and support equipment.

6.2 SUPPORT EQUIPMENT

No.	Equipment	Model No.	Serial No.
	Notebook	E5430	CN8YYW1

Remark:

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.

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

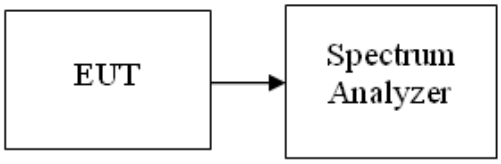
7 FCC PART 15 REQUIREMENTS

7.1 6 DB BANDWIDTH MEASUREMENT

LIMIT

Section 15.407(e) specifies the minimum 6 dB emission bandwidth of at least 500 KHz for the band 5.715-5.85 GHz.

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≥ 3RBW, Detector = Peak. Trace mode = max hold.
4. Measure the maximum width of the emission that is 6 dB down from the peak of the emission.
5. Measure and record the results in the test report.

TEST RESULTS

No non-compliance noted

Test Data

Test mode: IEEE 802.11a mode/ Chain 0

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	FCC 6 dB Bandwidth Min. Limit (MHz)
Low	5745	16.587	0.5
Mid	5785	16.587	0.5
High	5825	16.587	0.5

Test mode: IEEE 802.11a mode/ Chain 1

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	FCC 6 dB Bandwidth Min. Limit (MHz)
Low	5745	16.702	0.5
Mid	5785	16.587	0.5
High	5825	16.667	0.5

Test mode: IEEE 802.11n HT20 mode/ Chain 0

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	FCC 6 dB Bandwidth Min. Limit (MHz)
Low	5745	17.788	0.5
Mid	5785	17.788	0.5
High	5825	17.708	0.5

Test mode: IEEE 802.11n HT20 mode/ Chain 1

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	FCC 6 dB Bandwidth Min. Limit (MHz)
Low	5745	17.708	0.5
Mid	5785	17.788	0.5
High	5825	17.788	0.5

Test mode: IEEE 802.11n HT40 mode/ Chain 0

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	FCC 6 dB Bandwidth Min. Limit (MHz)
Low	5755	36.538	0.5
High	5795	36.442	0.5

Test mode: IEEE 802.11n HT40 mode/ Chain 1

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	FCC 6 dB Bandwidth Min. Limit (MHz)
Low	5755	36.442	0.5
High	5795	36.346	0.5

Test mode: IEEE 802.11ac VHT20 mode/ Chain 0

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	FCC 6 dB Bandwidth Min. Limit (MHz)
Low	5745	17.644	0.5
Mid	5785	17.788	0.5
High	5825	17.788	0.5

Test mode: IEEE 802.11ac VHT20 mode/ Chain 1

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	FCC 6 dB Bandwidth Min. Limit (MHz)
Low	5745	17.788	0.5
Mid	5785	17.788	0.5
High	5825	17.788	0.5

Test mode: IEEE 802.11ac VHT40 mode/ Chain 0

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	FCC 6 dB Bandwidth Min. Limit (MHz)
Low	5755	36.538	0.5
High	5795	36.538	0.5

Test mode: IEEE 802.11ac VHT40 mode/ Chain 1

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	FCC 6 dB Bandwidth Min. Limit (MHz)
Low	5755	36.538	0.5
High	5795	36.538	0.5

Test mode: IEEE 802.11ac VHT80 mode/ Chain 0

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	FCC 6 dB Bandwidth Min. Limit (MHz)
Mid	5775	76.827	0.5

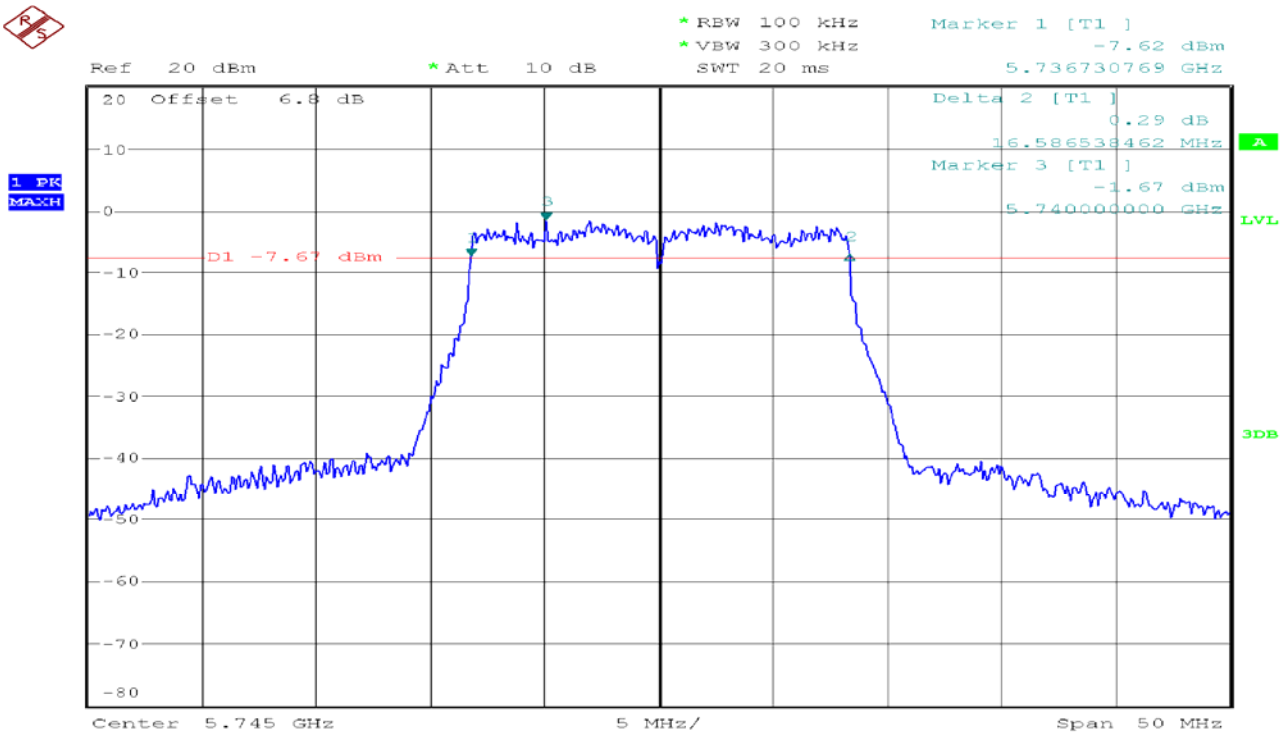
Test mode: IEEE 802.11ac VHT80 mode/ Chain 1

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	FCC 6 dB Bandwidth Min. Limit (MHz)
Mid	5775	76.827	0.5

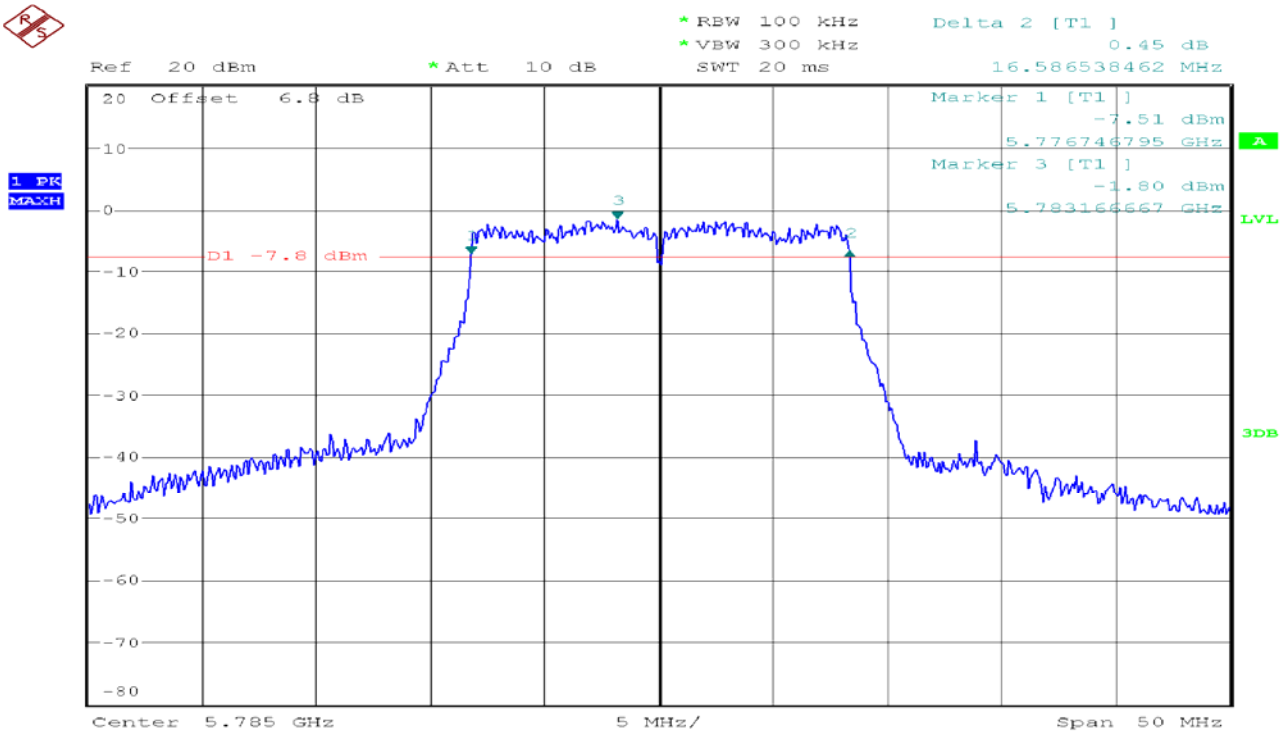
Test Plot

IEEE 802.11a mode/Chain 0:

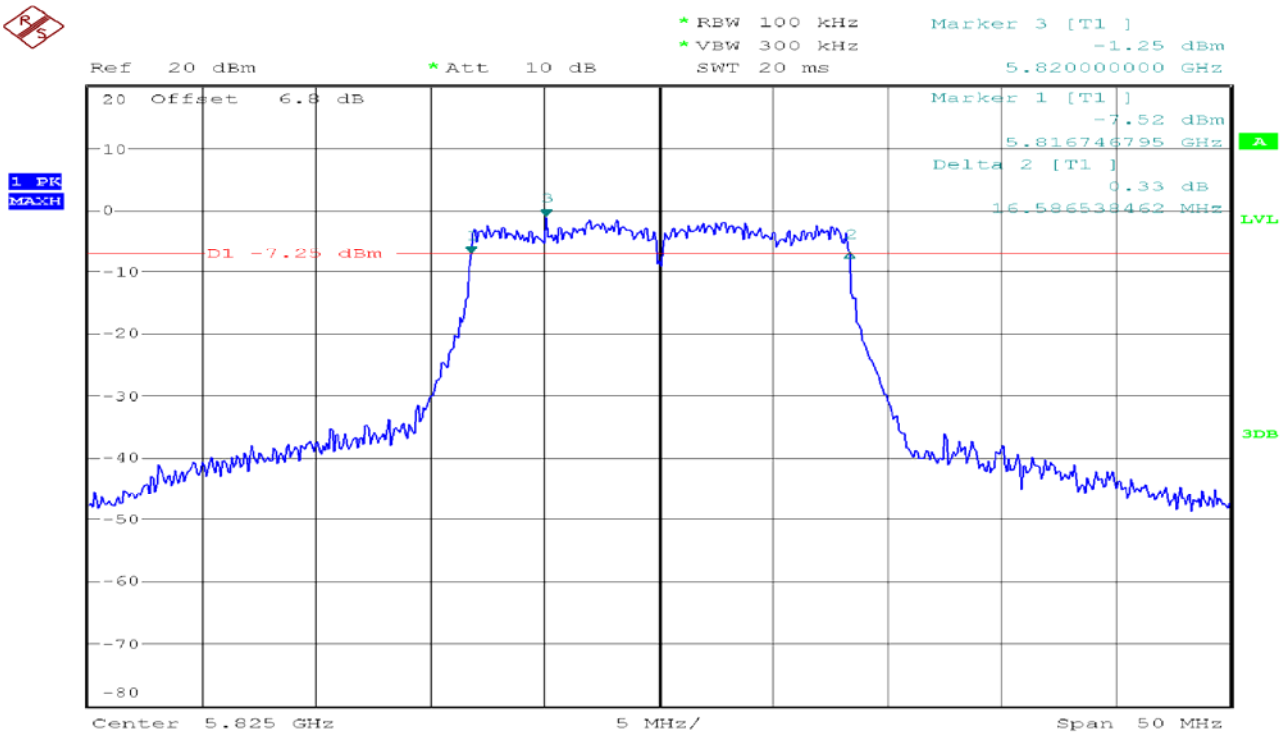
6dB Bandwidth (CH Low)



6dB Bandwidth (CH Mid)

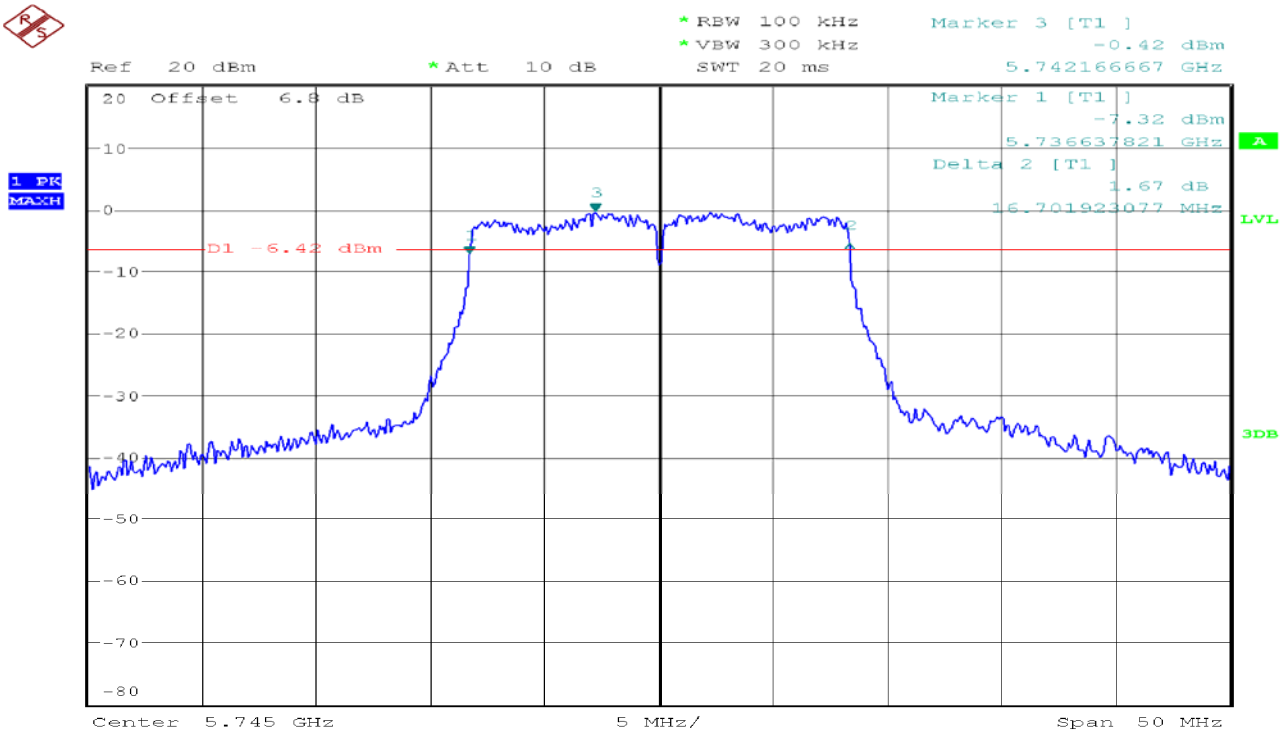


6dB Bandwidth (CH High)

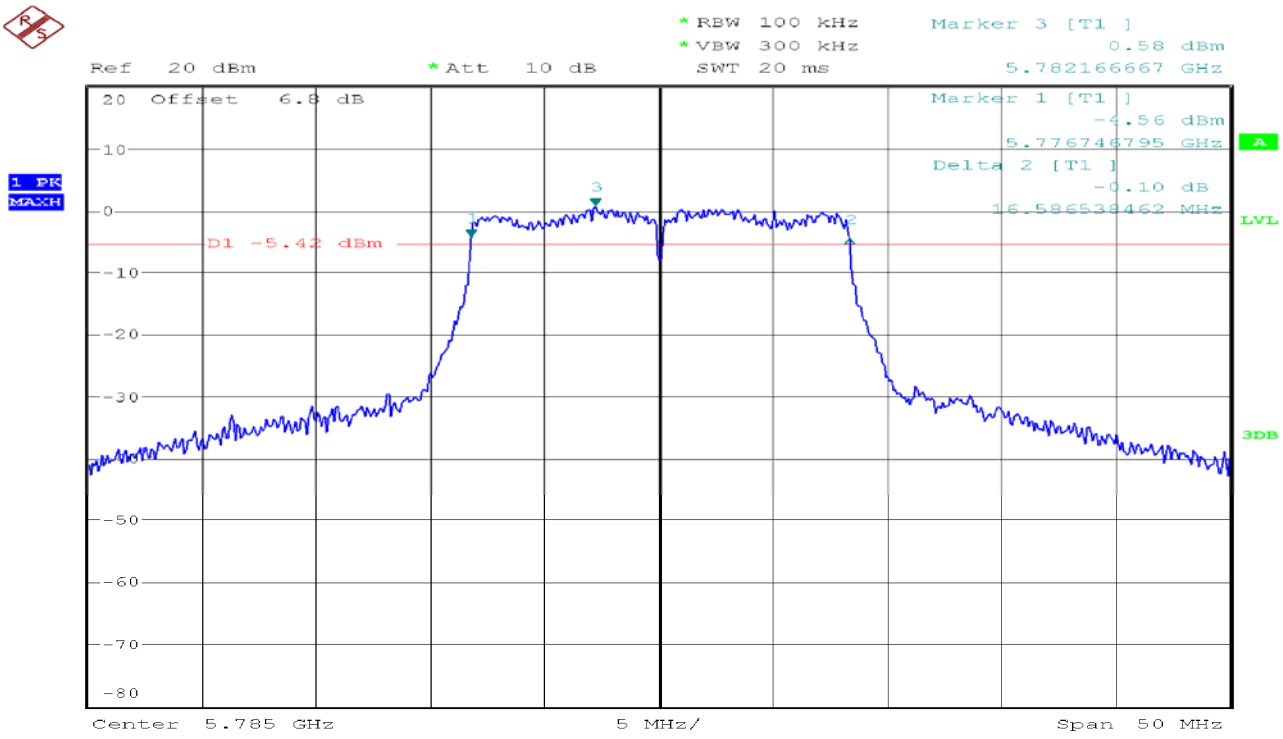


IEEE 802.11a mode/Chain 1:

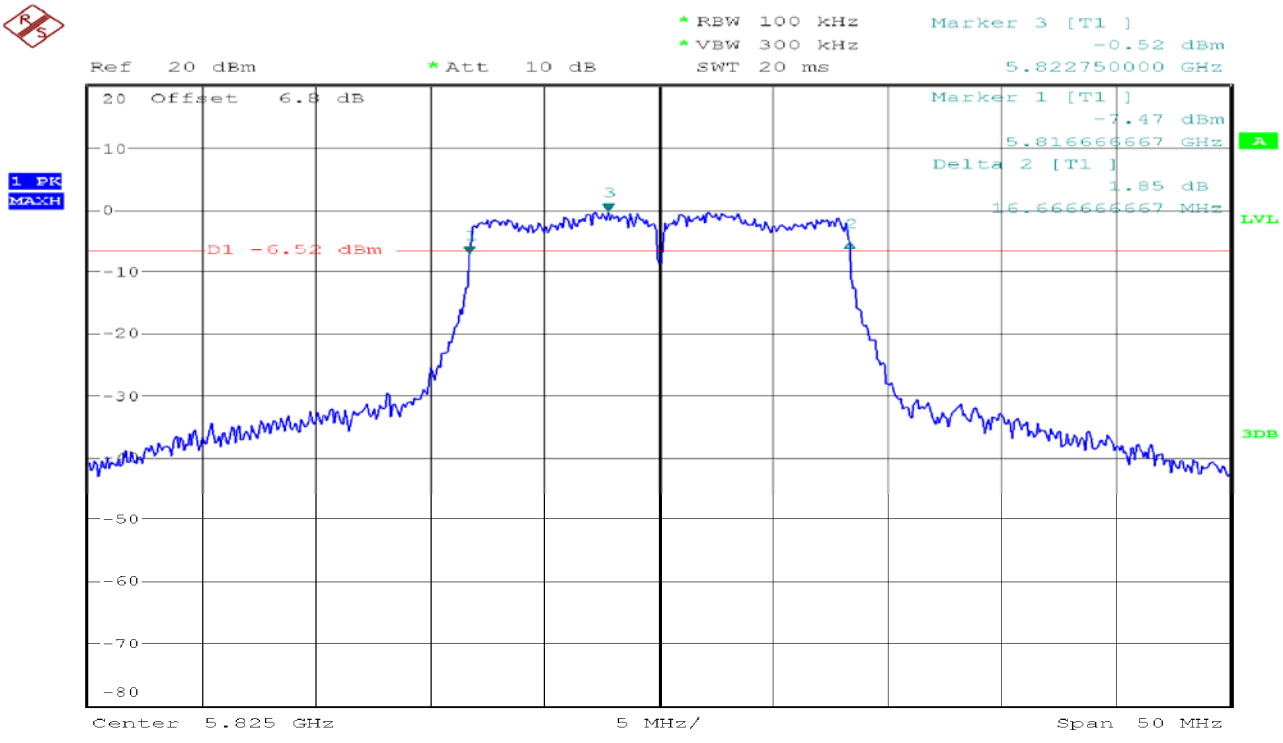
6dB Bandwidth (CH Low)



6dB Bandwidth (CH Mid)

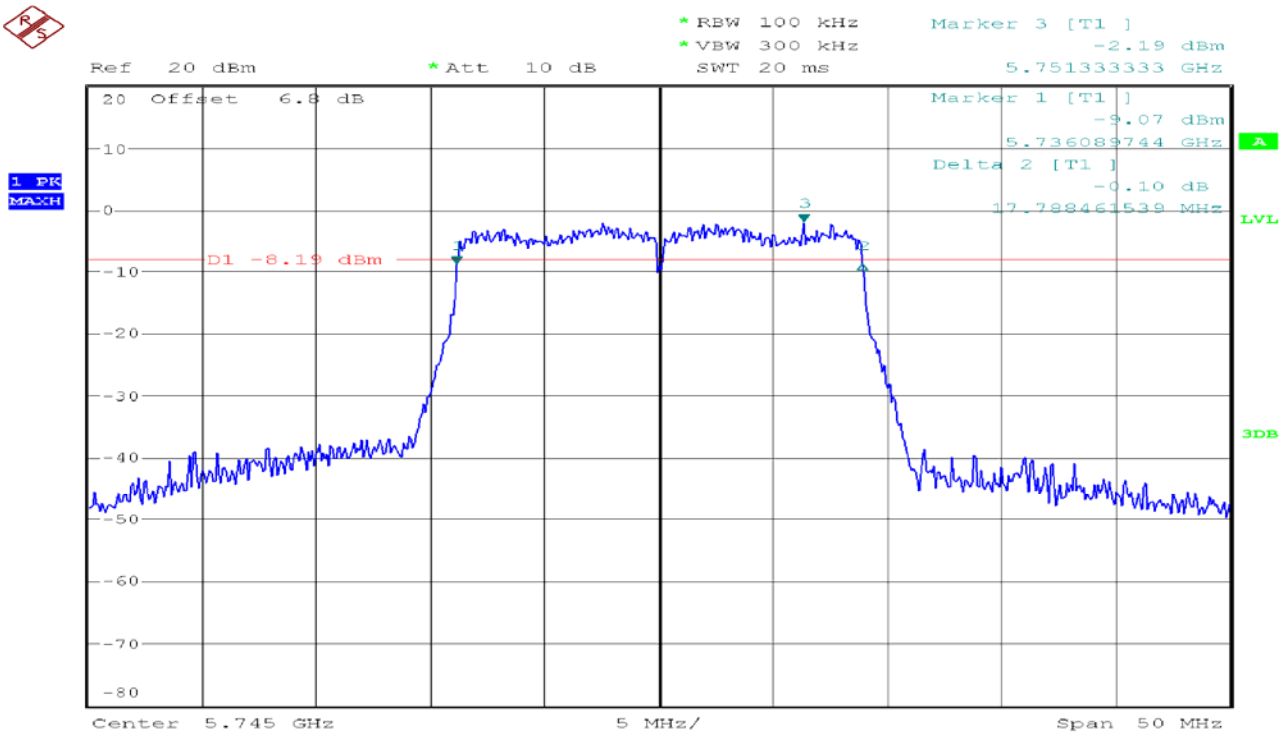


6dB Bandwidth (CH High)

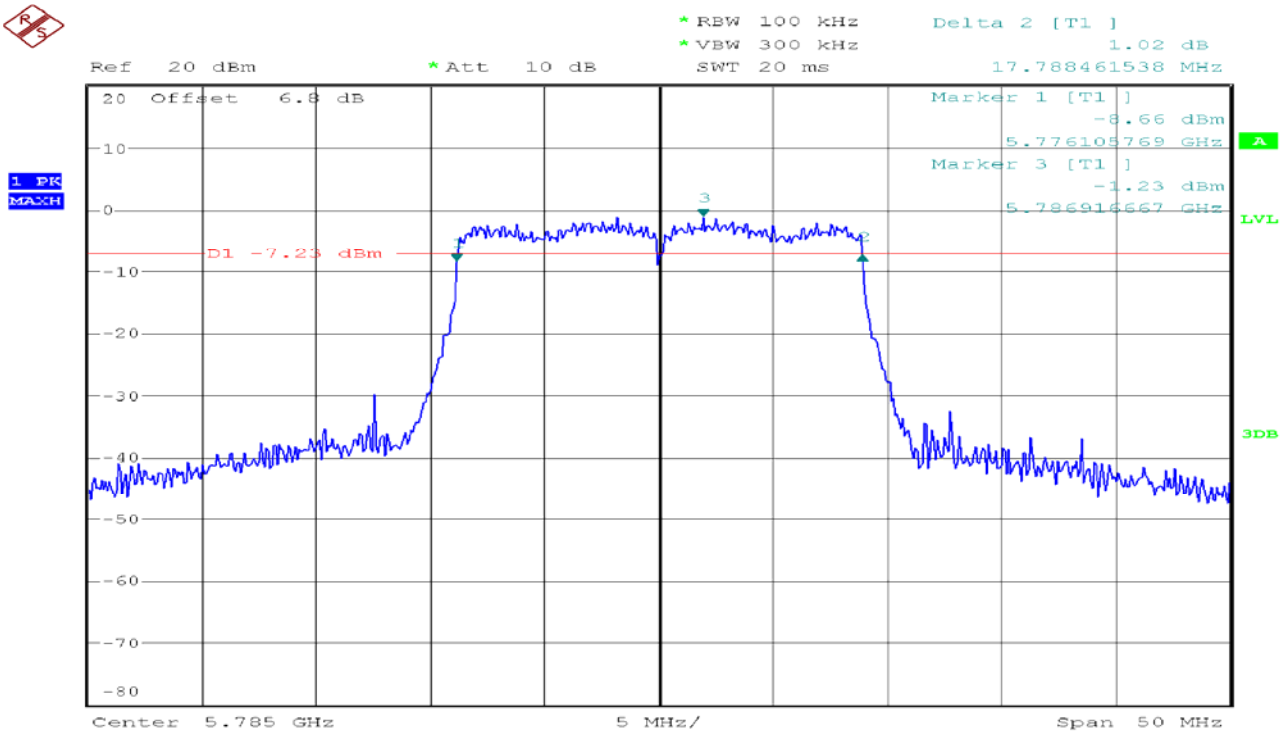


IEEE 802.11n HT20 mode/Chain 0:

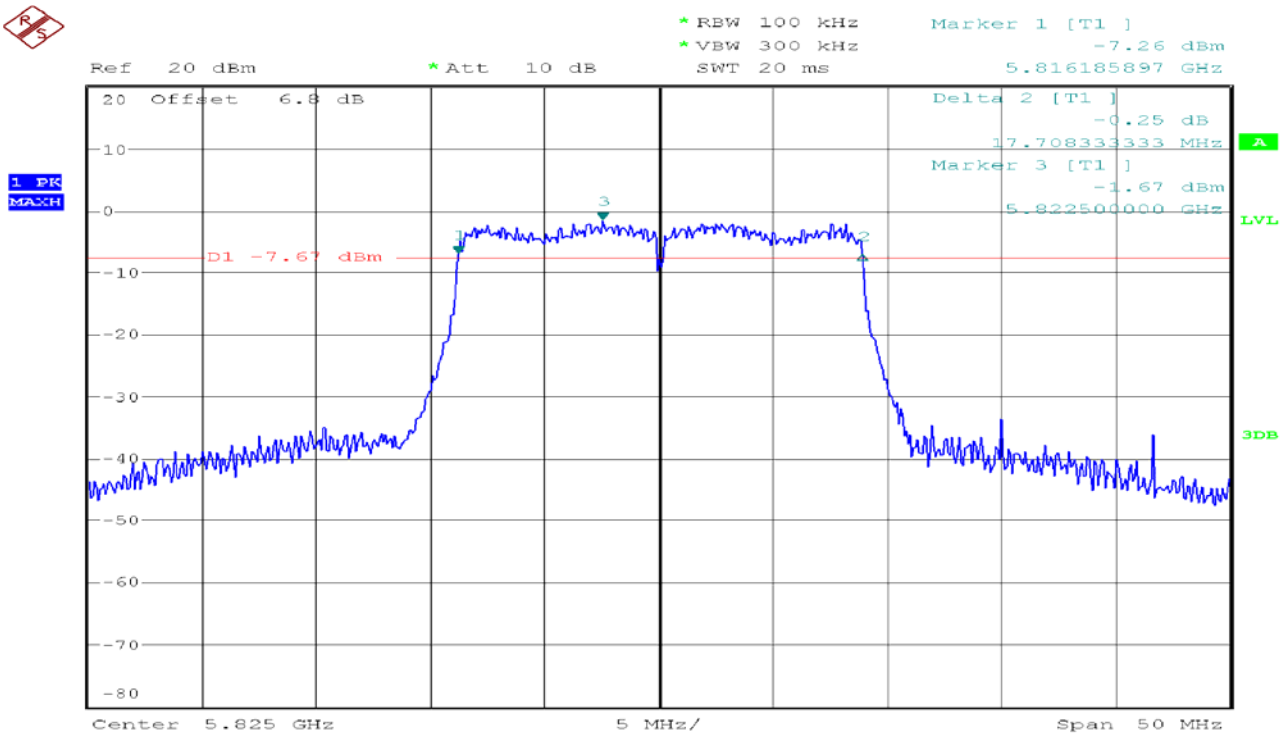
6dB Bandwidth (CH Low)



6dB Bandwidth (CH Mid)

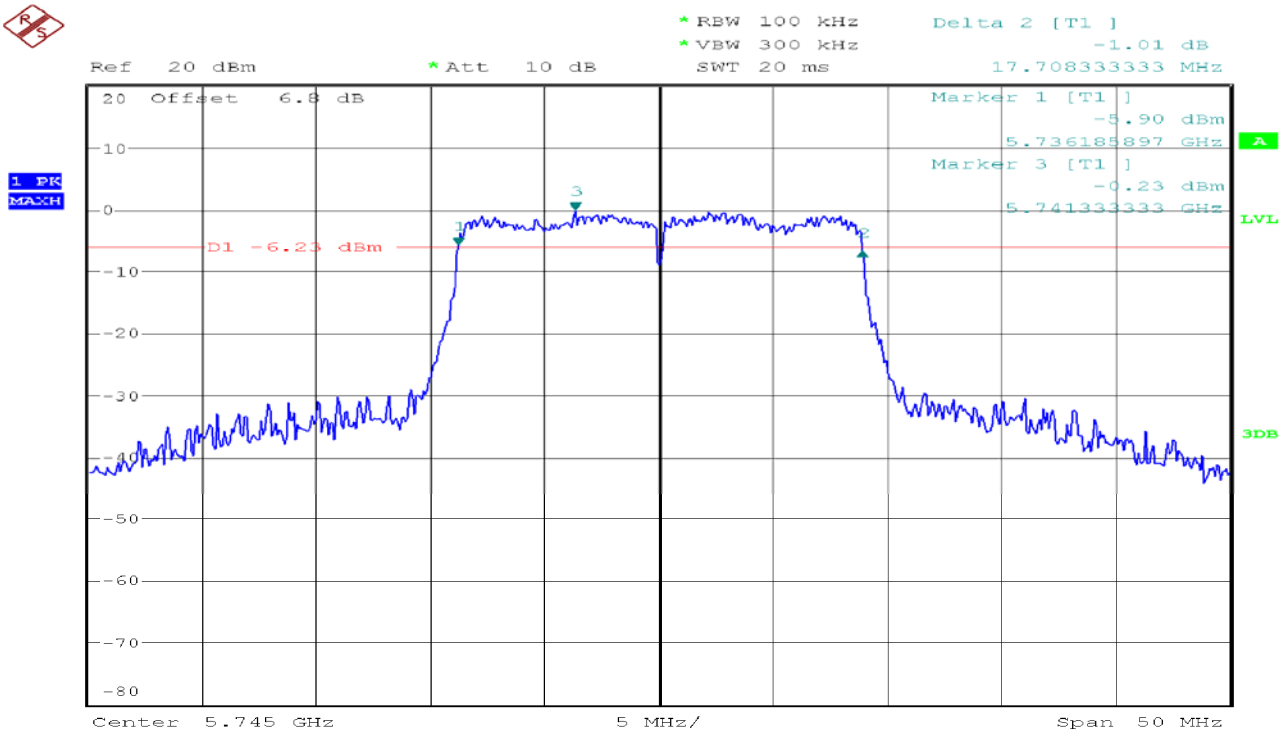


6dB Bandwidth (CH High)

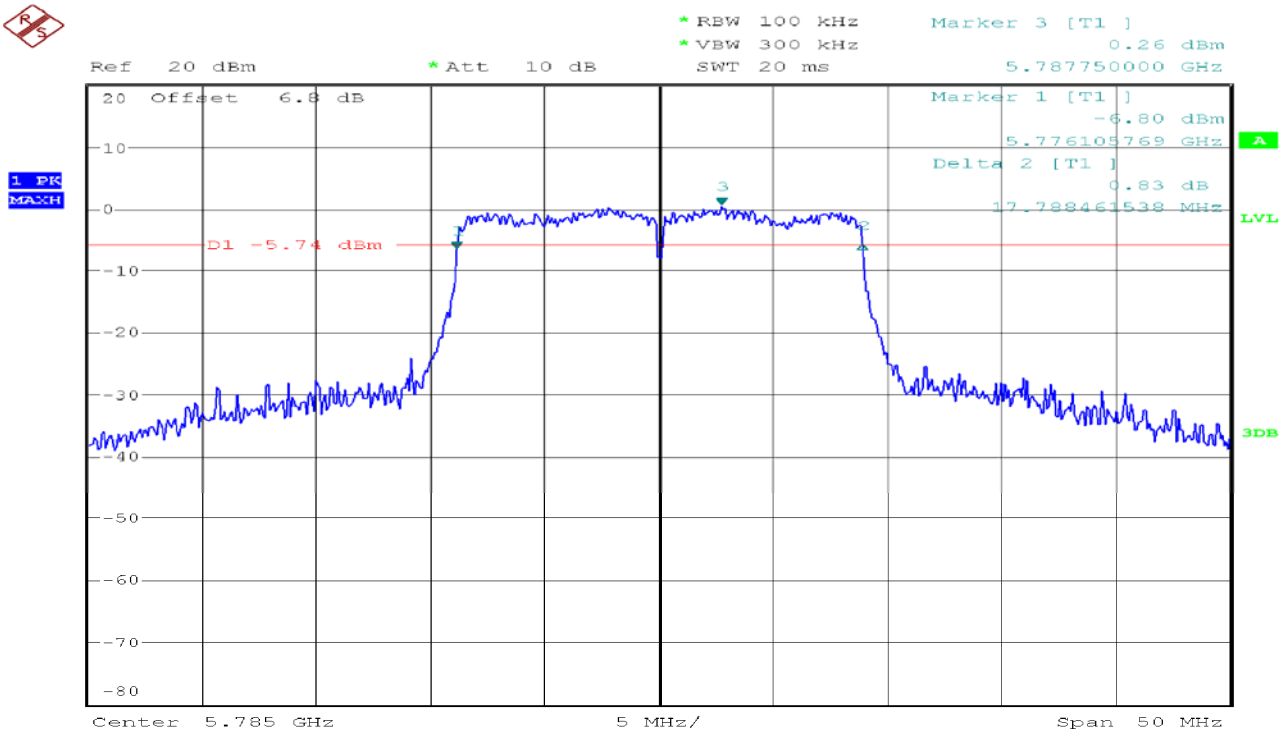


IEEE 802.11n HT20 mode/Chain 1:

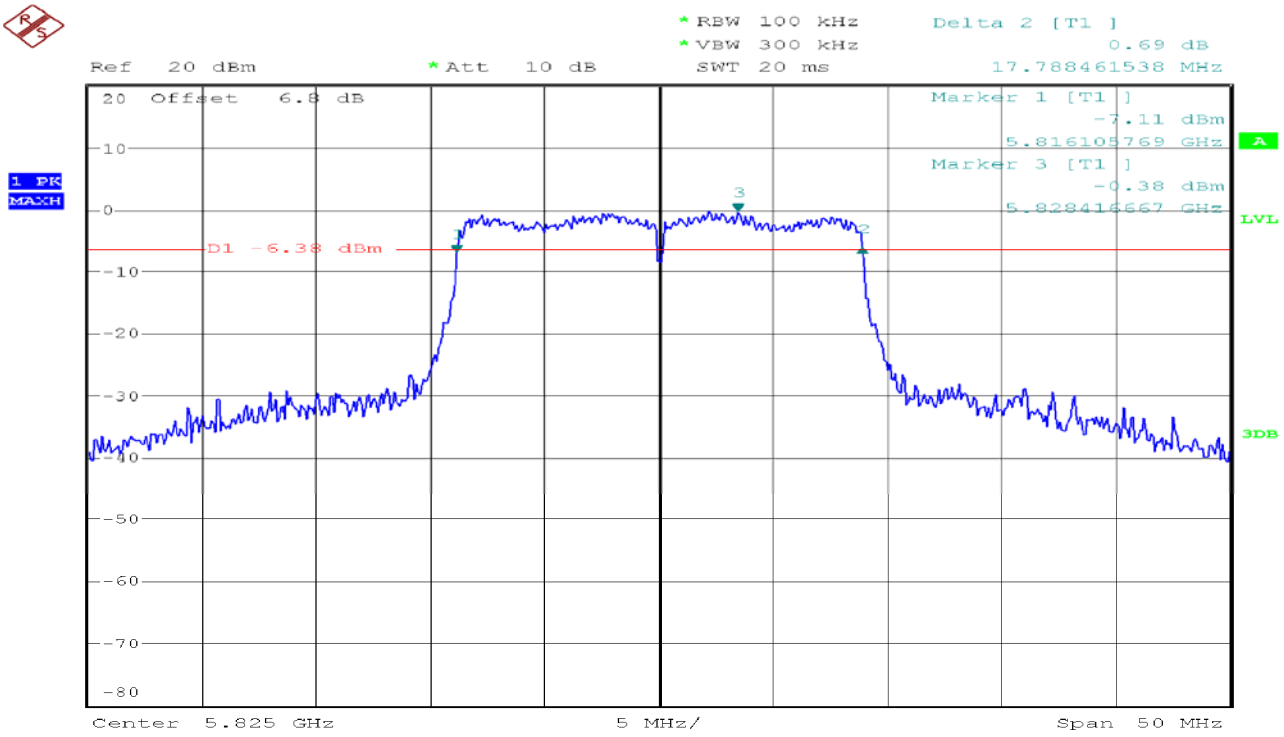
6dB Bandwidth (CH Low)



6dB Bandwidth (CH Mid)

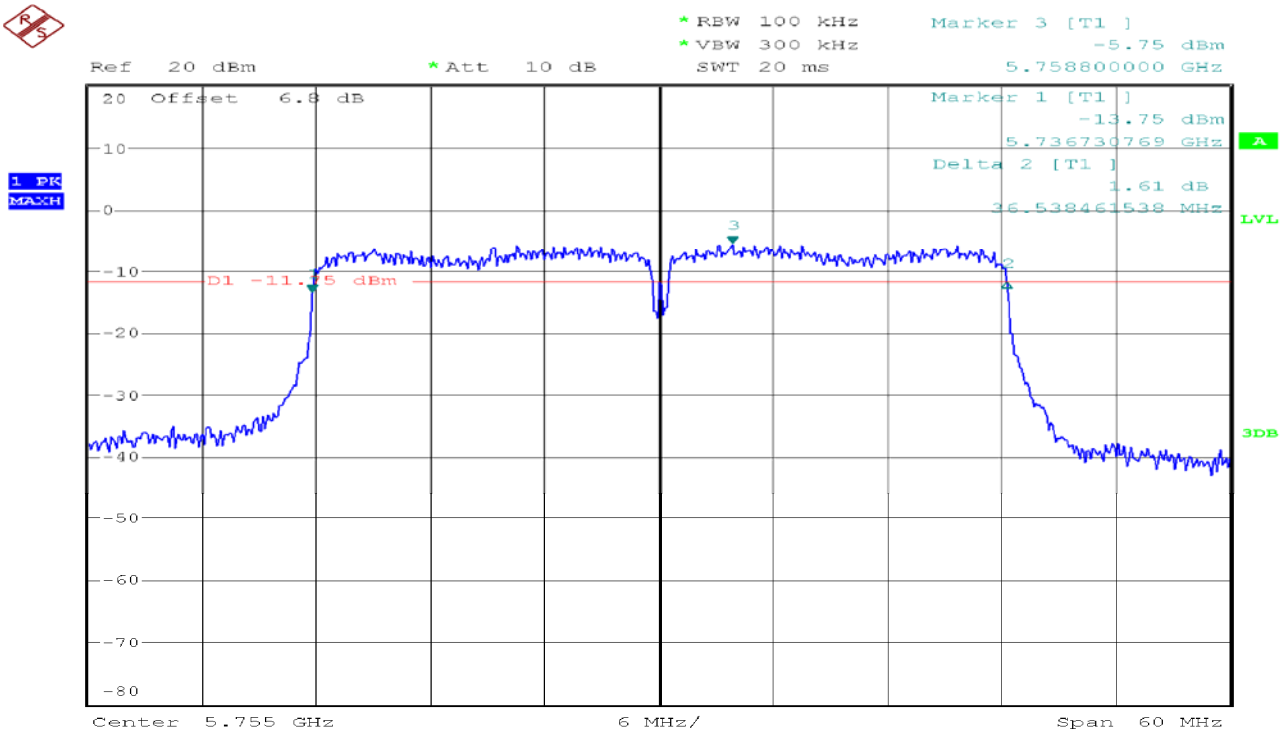


6dB Bandwidth (CH High)

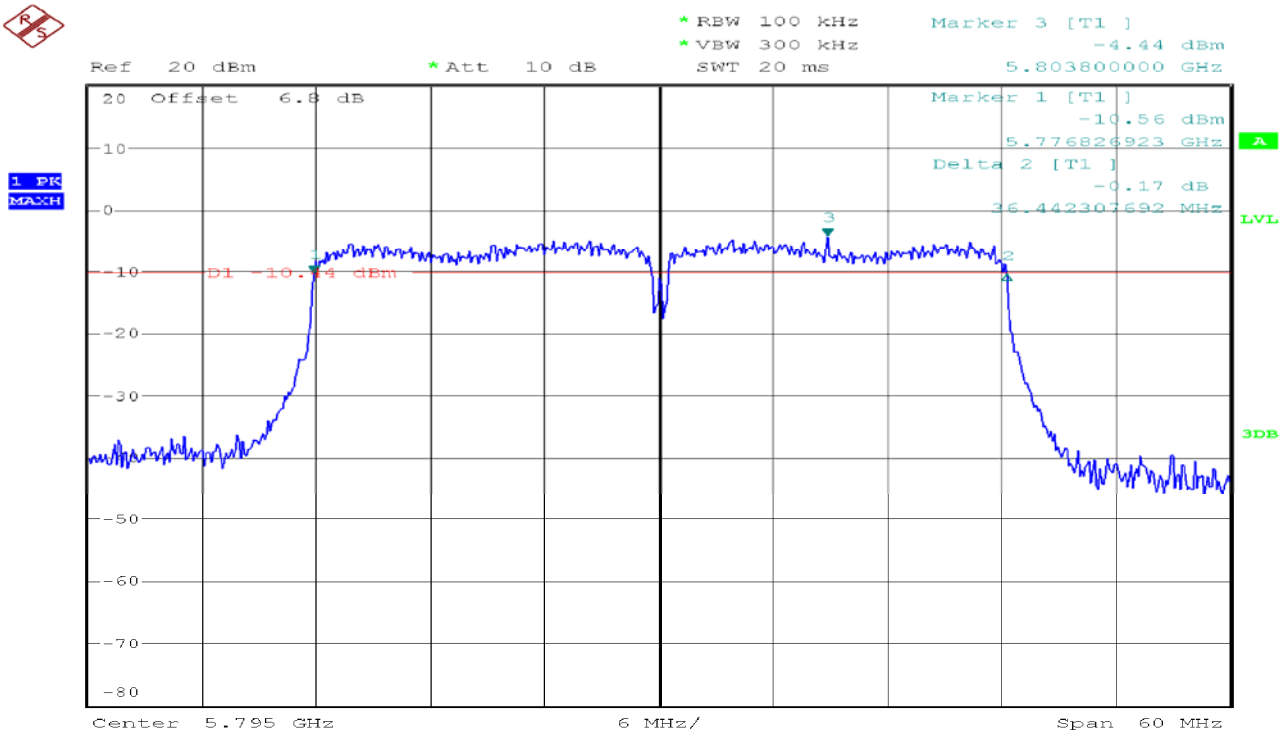


IEEE 802.11n HT40 mode/Chain 0:

6dB Bandwidth (CH Low)

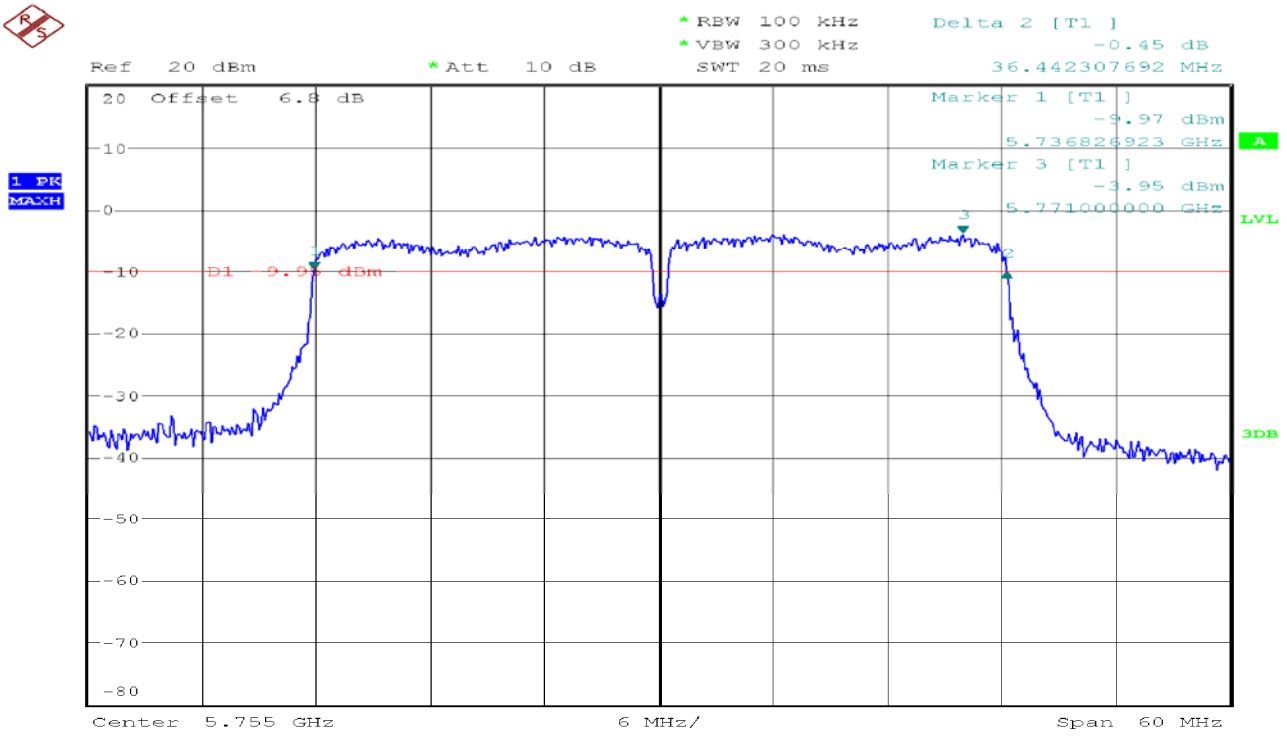


6dB Bandwidth (CH High)

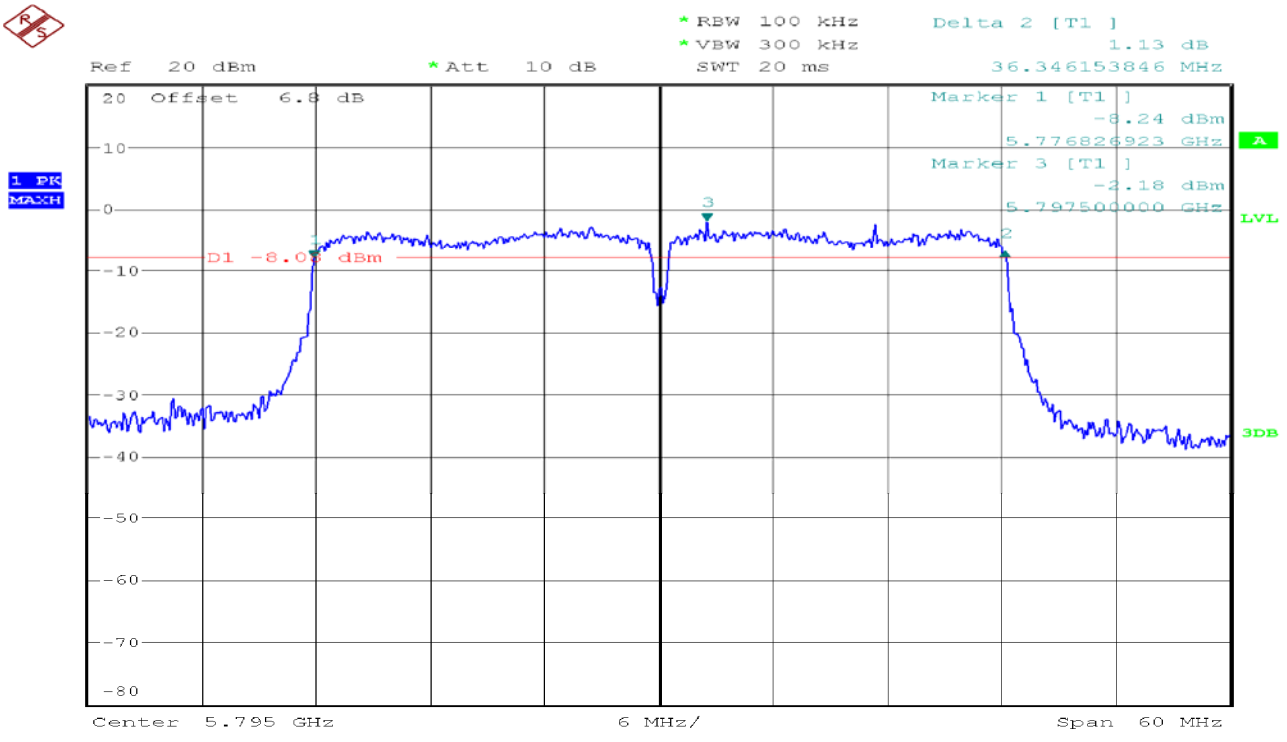


IEEE 802.11n HT40 mode/Chain 1:

6dB Bandwidth (CH Low)

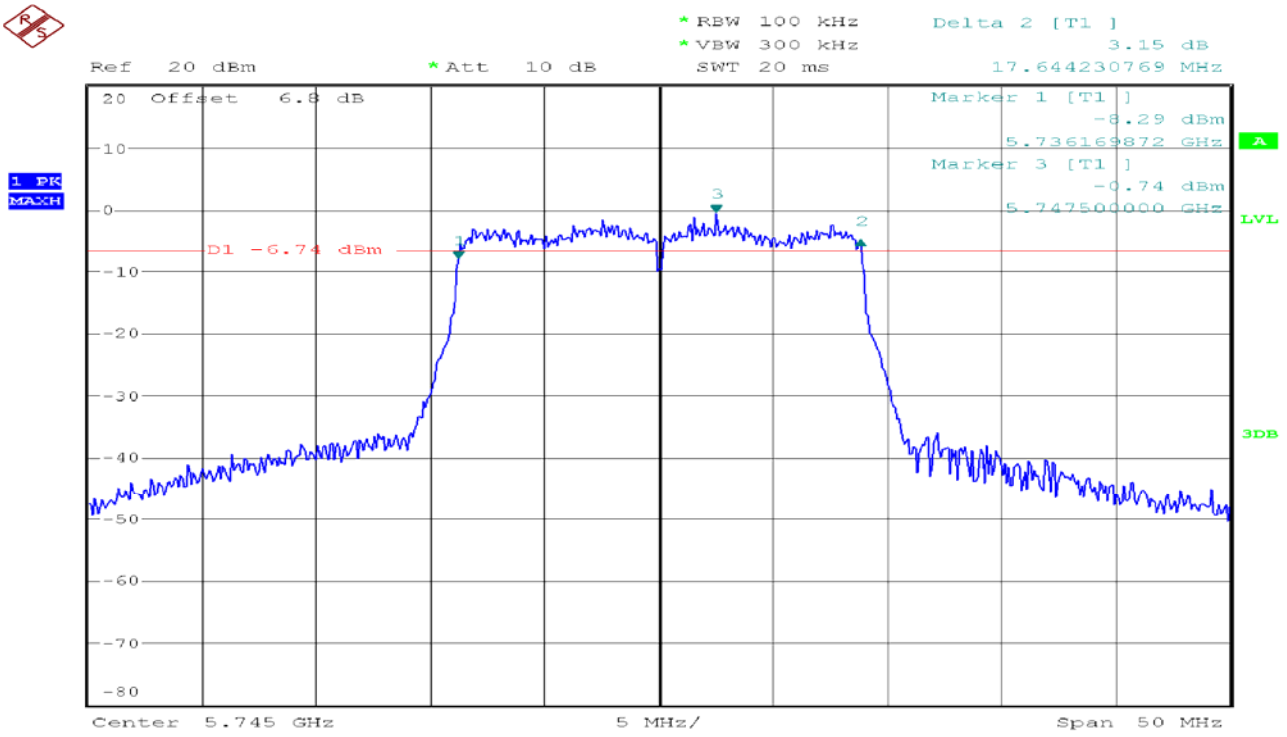


6dB Bandwidth (CH High)

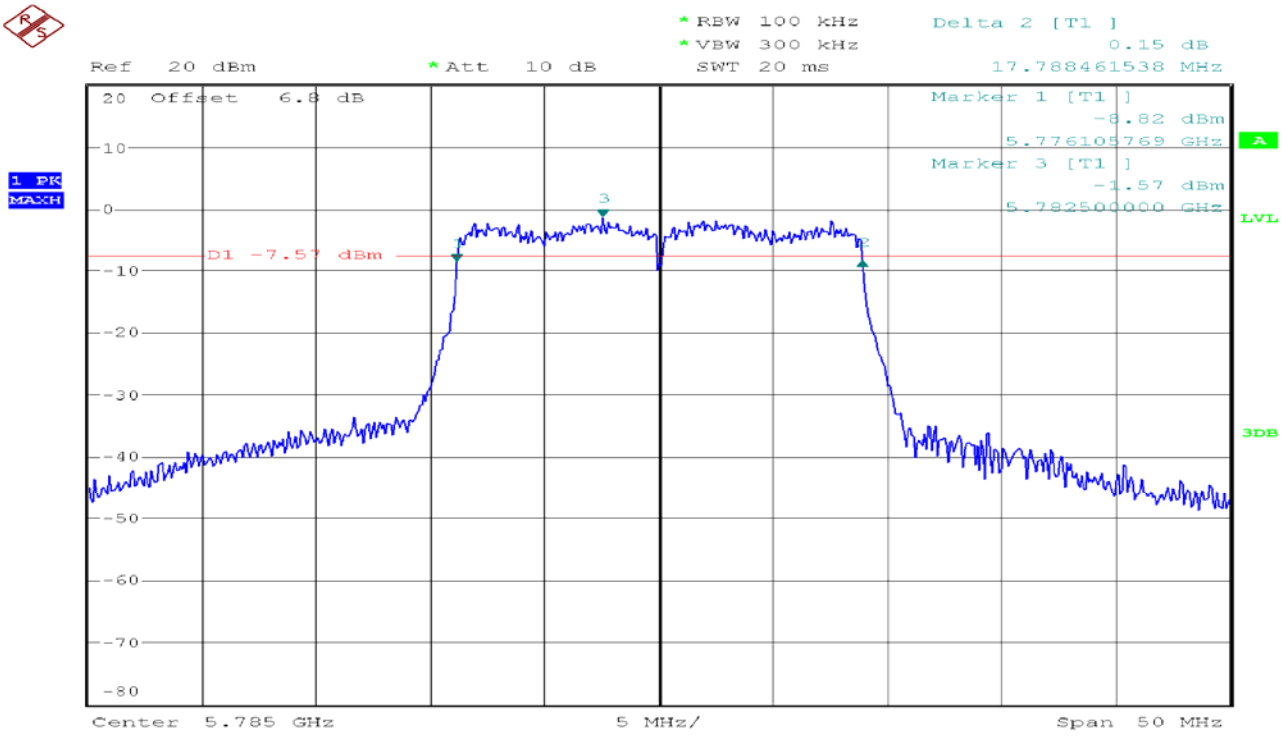


IEEE 802.11ac VHT20 mode/Chain 0:

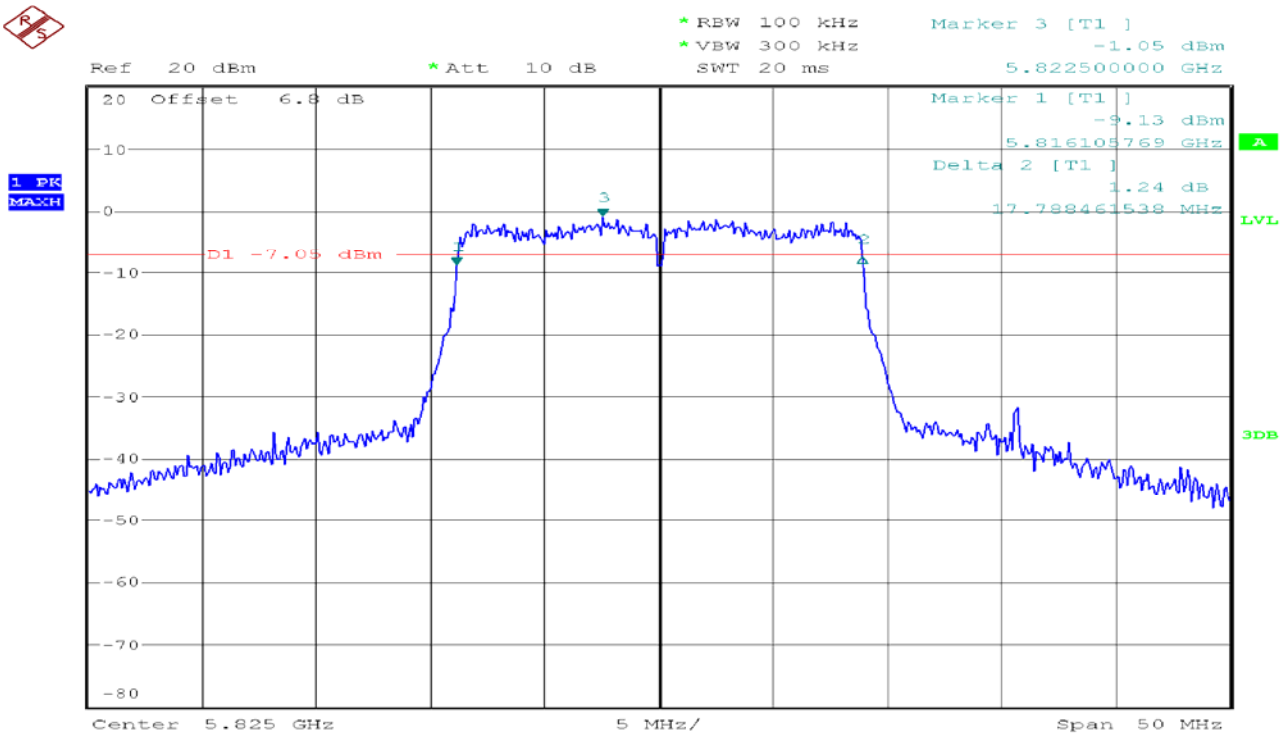
6dB Bandwidth (CH Low)



6dB Bandwidth (CH Mid)

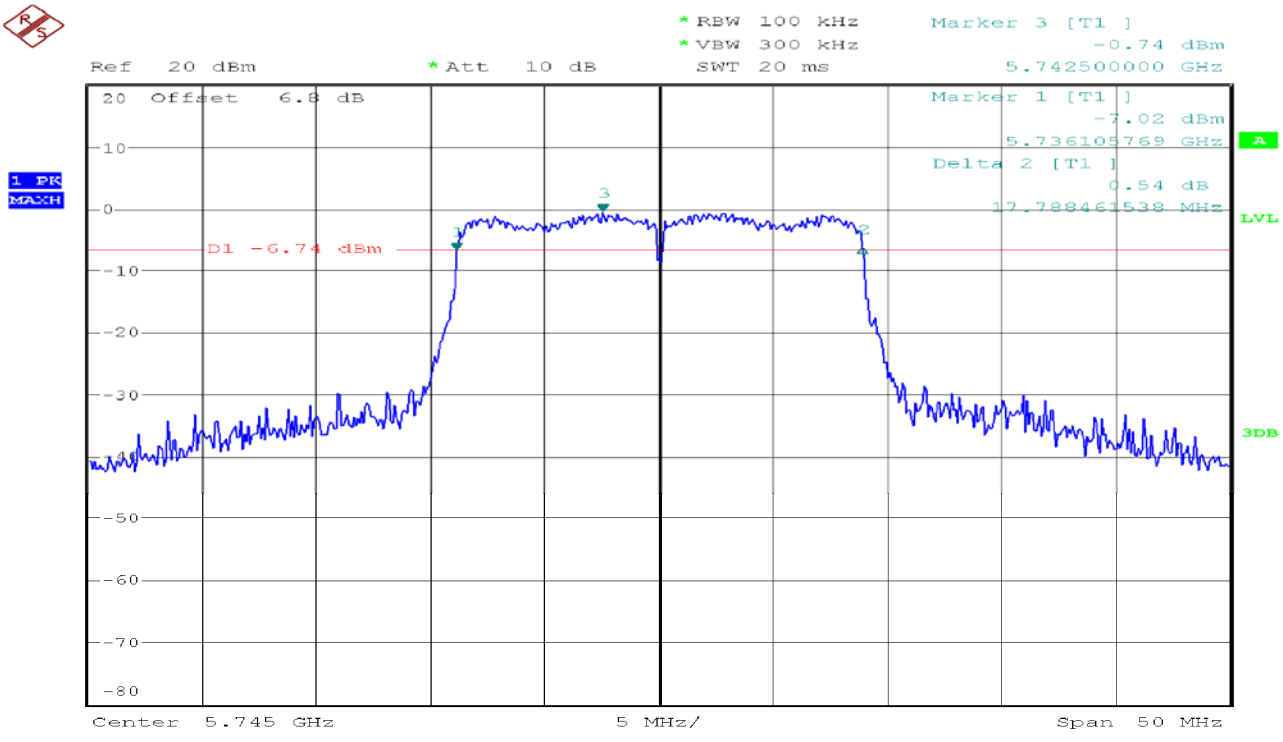


6dB Bandwidth (CH High)

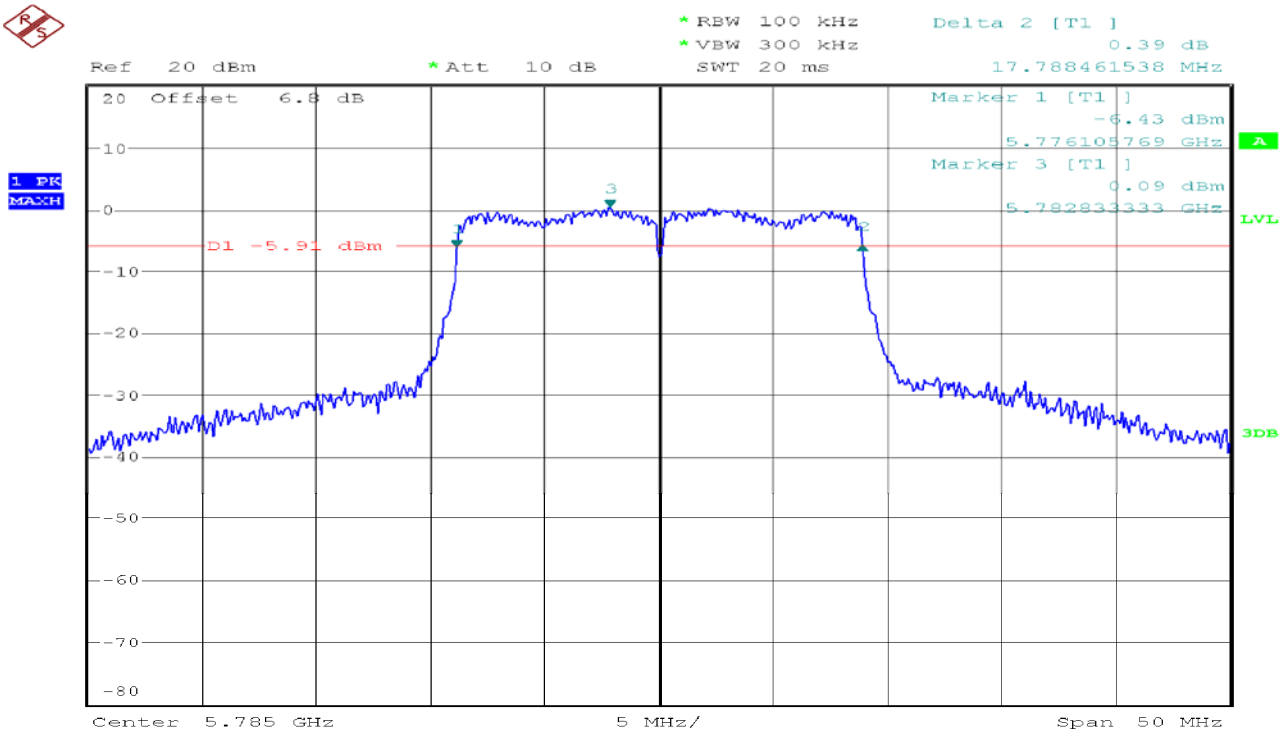


IEEE 802.11ac VHT20 mode/Chain 1:

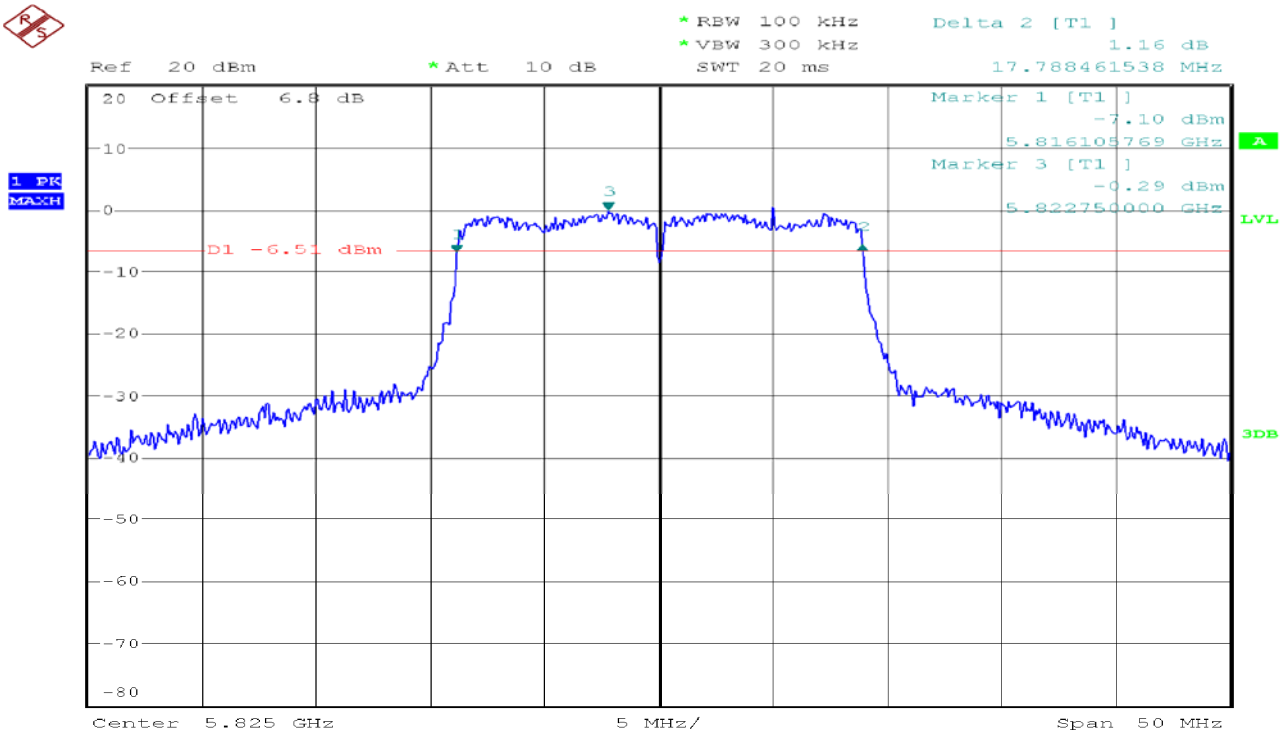
6dB Bandwidth (CH Low)



6dB Bandwidth (CH Mid)

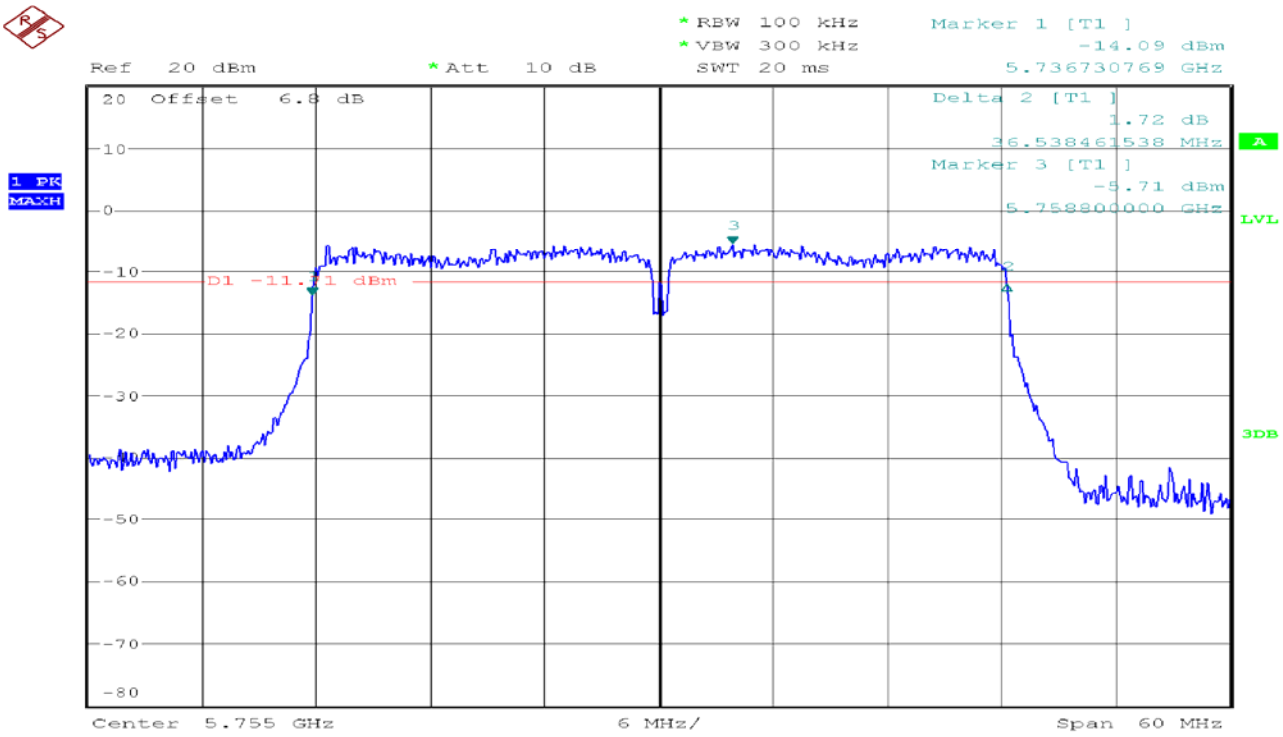


6dB Bandwidth (CH High)

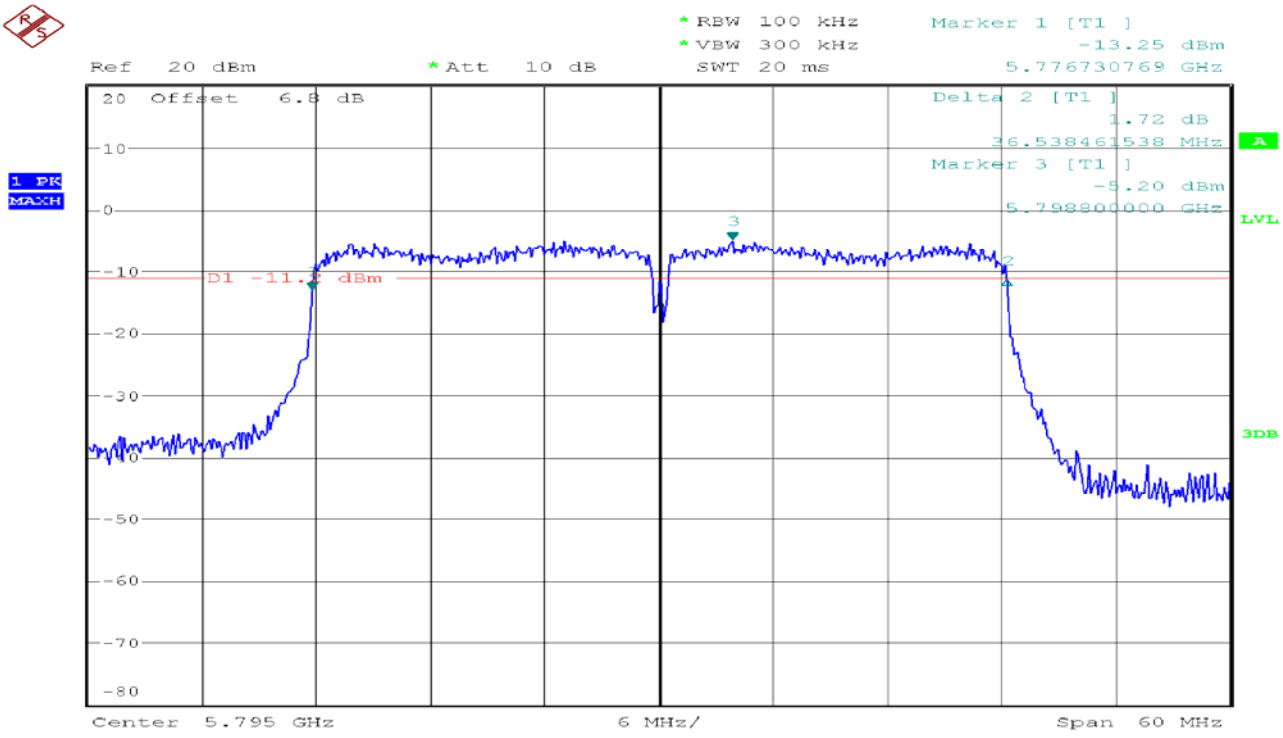


IEEE 802.11ac VHT40 mode/Chain 0:

6dB Bandwidth (CH Low)

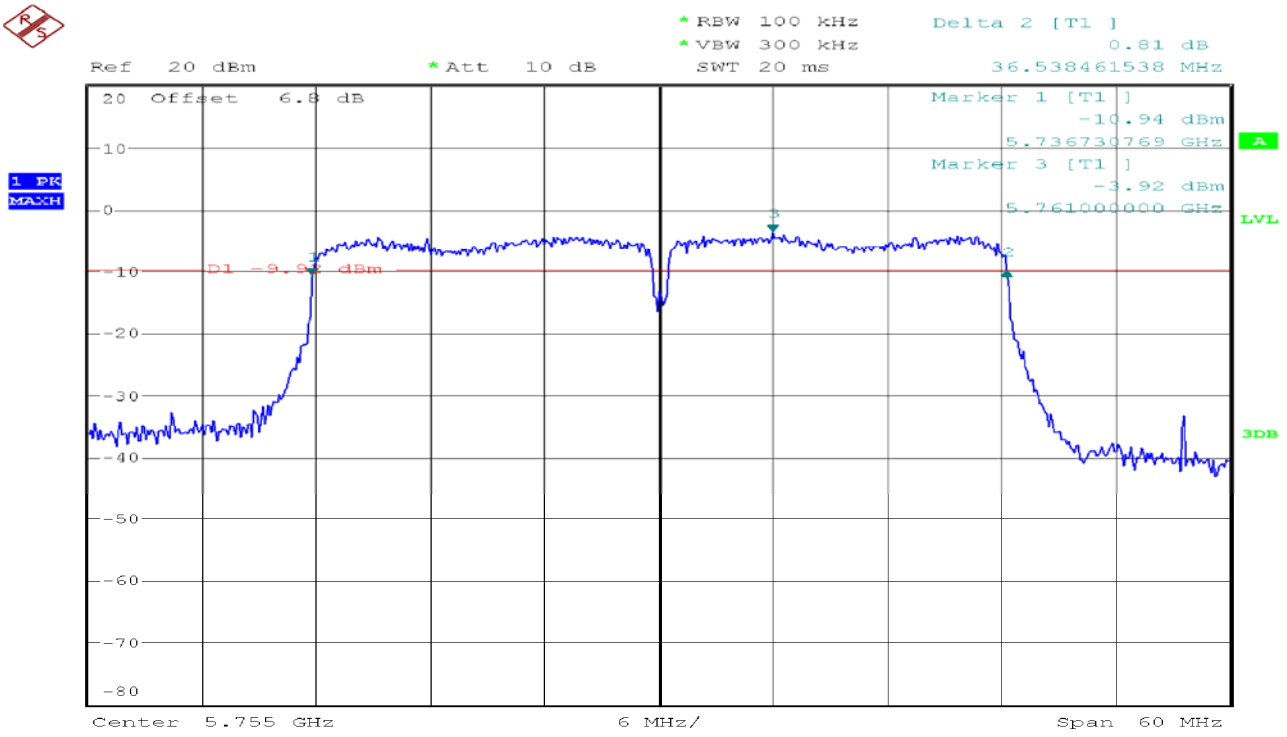


6dB Bandwidth (CH High)

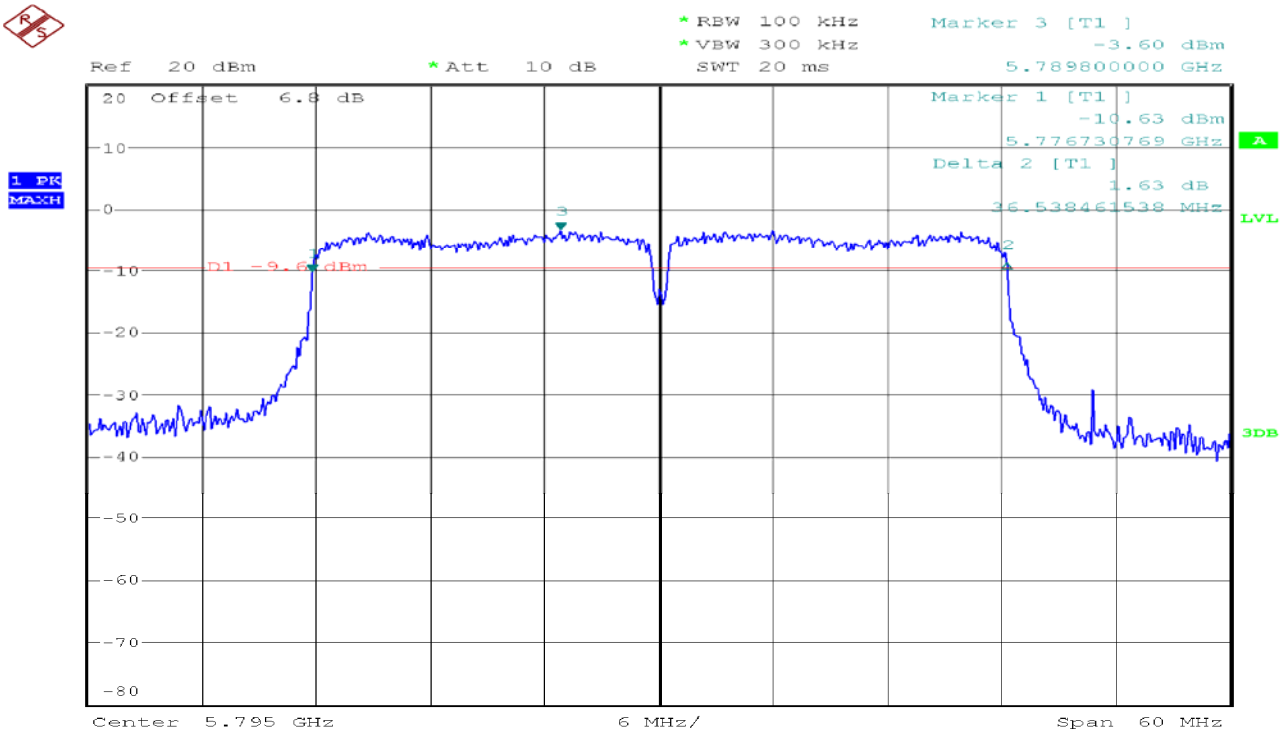


IEEE 802.11ac VHT40 mode/Chain 1:

6dB Bandwidth (CH Low)

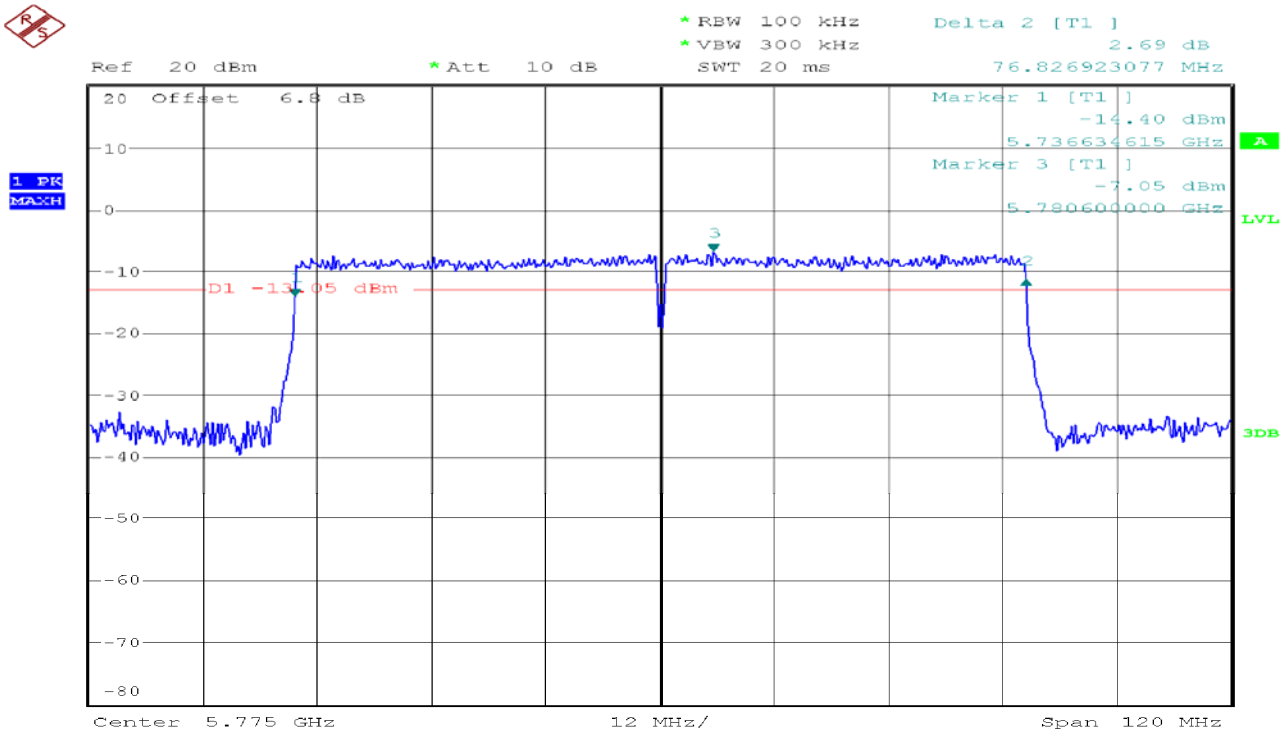


6dB Bandwidth (CH High)



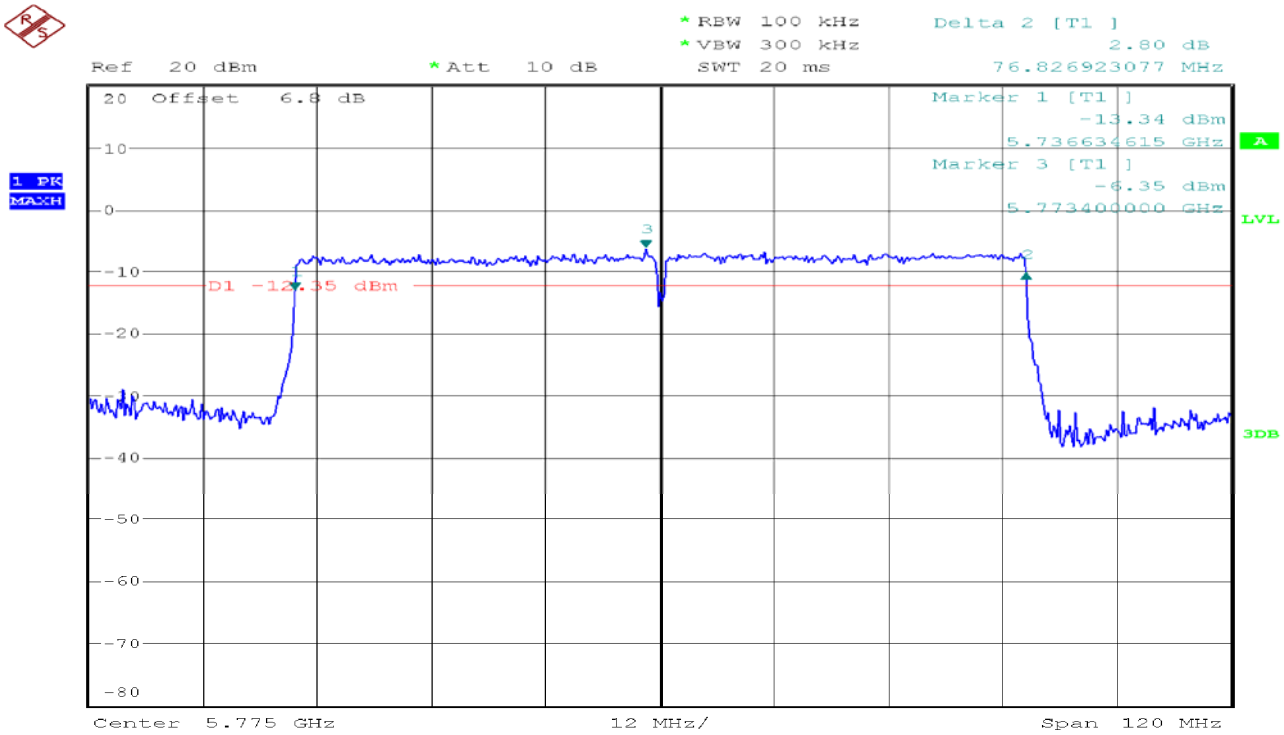
IEEE 802.11ac VHT80 mode/Chain 0:

6dB Bandwidth (CH Mid)



IEEE 802.11ac VHT80 mode/Chain 1:

6dB Bandwidth (CH Mid)



7.2 MAXIMUM CONDUCTED OUTPUT POWER

LIMIT

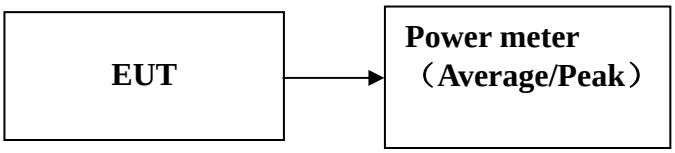
According to §15.407(a),

For the band 5.725–5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W.

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.

Directional Gain=G_{ANT}=3.40dBi<6dBi

Test Configuration



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

TEST PROCEDURE

The testing follows Method PM of FCC KDB 789033 D02 General UNII Test Procedures New Rules v01.Method PM (Measurement using an RF average power meter):

1. Measurement is performed using a wideband RF power meter.
2. The EUT is configured to transmit continuously with a consistent duty cycle at its maximum power control level.
3. Measure the average power of the transmitter, and the average power is corrected with duty factor, 10 log(1/x), where x is the duty cycle.

TEST RESULTS

No non-compliance noted

Test Data

Test mode: IEEE 802.11a mode

5725~5850MHz

Channel	Frequency (MHz)	Chain 0 AV Output Power (dBm)	Chain 1 AV Output Power (dBm)	Total Maximum Conducted AV Output Power (dBm)	Limit (dBm)
Low	5745	10.88	12.72	14.91	30
Mid	5785	11.33	13.82	15.76	30
High	5825	11.60	13.66	15.76	30

Test mode: IEEE 802.11n HT20 mode
5725~5850MHz

Channel	Frequency (MHz)	Chain 0 AV Output Power (dBm)	Chain 1 AV Output Power (dBm)	Total Maximum Conducted AV Output Power (dBm)	Limit (dBm)
Low	5745	11.05	12.75	14.99	30
Mid	5785	11.63	13.70	15.80	30
High	5825	11.60	13.21	15.49	30

Test mode: IEEE 802.11n HT40 mode
5725~5850MHz

Channel	Frequency (MHz)	Chain 0 AV Output Power (dBm)	Chain 1 AV Output Power (dBm)	Total Maximum Conducted AV Output Power (dBm)	Limit (dBm)
Low	5755	11.40	13.30	15.46	30
High	5795	11.35	13.19	15.38	30

Test mode: IEEE 802.11ac VHT20 mode

5725~5850MHz

Channel	Frequency (MHz)	Chain 0 AV Output Power (dBm)	Chain 1 AV Output Power (dBm)	Total Maximum Conducted AV Output Power (dBm)	Limit (dBm)
Low	5745	11.10	12.70	14.98	30
Mid	5785	11.60	13.35	15.57	30
High	5825	11.92	13.25	15.65	30

Test mode: IEEE 802.11ac VHT40 mode

5725~5850MHz

Channel	Frequency (MHz)	Chain 0 AV Output Power (dBm)	Chain 1 AV Output Power (dBm)	Total Maximum Conducted AV Output Power (dBm)	Limit (dBm)
Low	5755	10.52	13.47	15.25	30
High	5795	10.45	13.22	15.06	30

Test mode: IEEE 802.11ac VHT80 mode

5725~5850MHz

Channel	Frequency (MHz)	Chain 0 AV Output Power (dBm)	Chain 1 AV Output Power (dBm)	Total Maximum Conducted AV Output Power (dBm)	Limit (dBm)
Mid	5775	9.15	10.92	13.13	30

Remark: 1.Total Output Power (dBm) = 10*LOG(10^(Chain 0 Output Power / 10)+10^(Chain 1 Output Power /10))
2.Duty factor has been offseted with cableloss

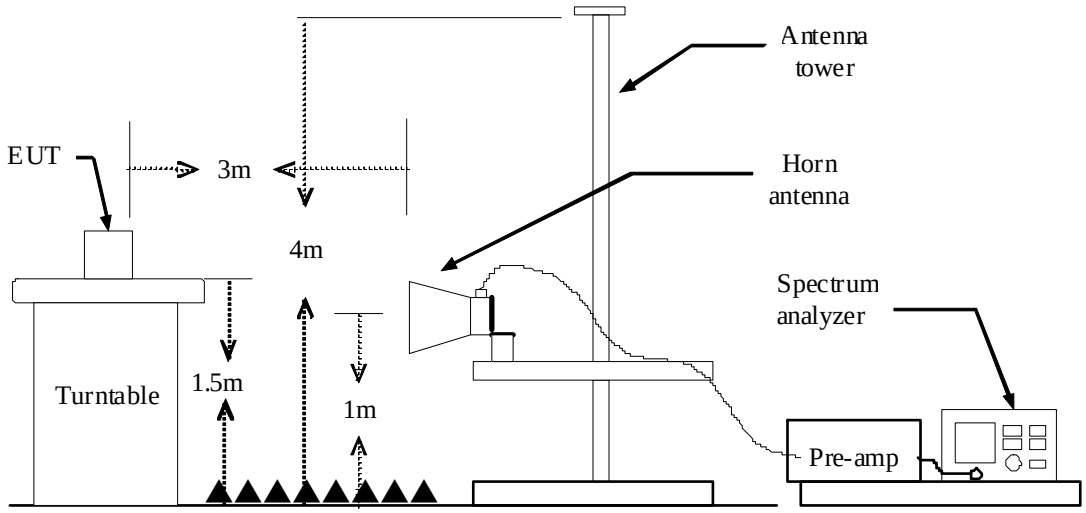
7.3 BAND EDGES MEASUREMENT

LIMIT

According to §15.407(b)(4)(i),
(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.

All emissions shall be limited to a level of −27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

Test Configuration



TEST PROCEDURE

1. The EUT is placed on a turntable, which is 1.5m above the ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission.
4. Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of the emission:
   (a) PEAK: RBW=VBW=1MHz / Sweep=AUTO
   (b) AVERAGE: RBW=1MHz / Sweep=AUTO

   VBW=10Hz,when duty cycle is no less than 98 percent.

   VBW≧1/T,when duty cycle is less than 98 percent,where T is the minimum

transmission duration over which the transmitter is on and is transmitting at its maximun power control level for the tested mode of operation.

Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
IEEE 802.11 a	96.4	993.3	0.001	10Hz
IEEE 802.11n HT20	96.4	993.3	0.001	10Hz
IEEE 802.11n HT40	96.4	993.3	0.001	10Hz
IEEE 802.11ac VHT20	96.4	993.3	0.001	10Hz
IEEE 802.11ac VHT40	96.4	993.3	0.001	10Hz
IEEE 802.11ac VHT80	95.8	996.7	0.001	10Hz

5. Repeat the procedures until all the PEAK and AVERAGE versus POLARIZATION are measured.

TEST RESULTS

Refer to attach spectrum analyzer data chart.

Operation Mode:	Tx / IEEE 802.11a mode CH/ Low	**Test Date:**	2017-11-16
Temperature:	25°C	**Tested by:**	Lily.Wang
Humidity:	55% RH	**Polarity:**	Ver. / Hor.

Vertical

No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	5713.942	60.84	-1.71	59.13	109.10	-49.97	100	268	peak
2	5718.750	61.70	-1.69	60.01	110.45	-50.44	100	265	peak
3	N/A								

Horizontal

No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	5714.543	56.33	-1.71	54.62	109.27	-54.65	100	275	peak
2	5720.553	57.15	-1.68	55.47	112.06	-56.59	100	285	peak
3	N/A								

Operation Mode:	Tx / IEEE 802.11a mode/ CH High	**Test Date:**	2017-11-16
Temperature:	25°C	**Tested by:**	Lily.Wang
Humidity:	55% RH	**Polarity:**	Ver. / Hor.

Vertical

No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	5853.365	59.97	-1.05	58.92	114.53	-55.61	200	225	peak
2	5855.168	60.10	-1.04	59.06	110.75	-51.69	100	291	peak
3	N/A								

Horizontal

No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	5855.168	56.09	-1.04	55.05	110.75	-55.70	100	15	peak
2	5863.582	55.91	-1.00	54.91	108.40	-53.49	200	0	peak
3	N/A								

Operation Mode:	Tx / IEEE 802.11n HT20 mode/ CH Low	**Test Date:**	2017-11-16
Temperature:	25°C	**Tested by:**	Lily.Wang
Humidity:	55% RH	**Polarity:**	Ver. / Hor.

Vertical

No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	5711.538	60.54	-1.72	58.82	108.43	-49.61	100	287	peak
2	5716.346	61.58	-1.70	59.88	109.78	-49.90	100	289	peak
3	N/A								

Horizontal

No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	5716.346	57.67	-1.70	55.97	109.78	-53.81	100	280	peak
2	5718.750	59.56	-1.69	57.87	110.45	-52.58	100	274	peak
3	N/A								

Operation Mode:	Tx / IEEE 802.11n HT20 mode/ CH High	**Test Date:**	2017-11-16
Temperature:	25°C	**Tested by:**	Lily.Wang
Humidity:	55% RH	**Polarity:**	Ver. / Hor.

Vertical

No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	5853.365	62.16	-1.05	61.11	114.53	-53.42	100	256	peak
2	5856.370	61.54	-1.03	60.51	110.42	-49.91	100	261	peak
3	N/A								

Horizontal

No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	5853.365	59.26	-1.05	58.21	114.53	-56.32	200	18	peak
2	5856.370	57.72	-1.03	56.69	110.42	-53.73	100	15	peak
3	N/A								

Operation Mode:	Tx / IEEE 802.11n HT40 mode/ CH Low	**Test Date:**	2017-11-16
Temperature:	25°C	**Tested by:**	Lily.Wang
Humidity:	55% RH	**Polarity:**	Ver. / Hor.

Vertical

No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	5714.543	61.87	-1.71	60.16	109.27	-49.11	100	265	peak
2	5718.750	63.88	-1.69	62.19	110.45	-48.26	100	262	peak
3	N/A								

Horizontal

No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	5716.947	60.46	-1.70	58.76	109.95	-51.19	100	264	peak
2	5720.553	62.83	-1.68	61.15	112.06	-50.91	100	274	peak
3	N/A								
4									

Operation Mode:	Tx / IEEE 802.11n HT40 mode/ CH High	**Test Date:**	2017-11-16
Temperature:	25°C	**Tested by:**	Lily.Wang
Humidity:	55% RH	**Polarity:**	Ver. / Hor.

Vertical

No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	5858.173	56.45	-1.03	55.42	109.91	-54.49	100	267	peak
2	5861.178	55.80	-1.01	54.79	109.07	-54.28	200	98	peak
3	N/A								

Horizontal

No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	5855.168	55.63	-1.04	54.59	110.75	-56.16	200	0	peak
2	5860.577	55.55	-1.01	54.54	109.24	-54.70	200	199	peak
3	N/A								

Operation Mode:	Tx / IEEE 802.11ac VHT20 mode/ CH Low	**Test Date:**	2017-11-16
Temperature:	25°C	**Tested by:**	Lily.Wang
Humidity:	55% RH	**Polarity:**	Ver. / Hor.

Vertical

No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	5717.436	58.04	-1.70	56.34	110.08	-53.74	100	88	peak
2	5720.481	59.17	-1.68	57.49	111.90	-54.41	100	40	peak
3	N/A								

Horizontal

No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	5715.609	62.41	-1.70	60.71	109.57	-48.86	100	96	peak
2	5719.872	64.32	-1.68	62.64	110.76	-48.12	100	79	peak
3	N/A								

Operation Mode:	Tx / IEEE 802.11ac VHT20 mode/ CH High	**Test Date:**	2017-11-16
Temperature:	25°C	**Tested by:**	Lily.Wang
Humidity:	55% RH	**Polarity:**	Ver. / Hor.

Vertical

No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	5853.237	59.77	-1.05	58.72	114.82	-56.10	100	74	peak
2	5859.936	59.11	-1.02	58.09	109.42	-51.33	100	81	peak
3	N/A								

Horizontal

No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	5852.628	67.48	-1.05	66.43	116.21	-49.78	100	85	peak
2	5855.673	63.28	-1.04	62.24	110.61	-48.37	100	65	peak
3	N/A								

Operation Mode:	Tx / IEEE 802.11ac VHT40 mode/ CH Low	**Test Date:**	2017-11-16
Temperature:	25°C	**Tested by:**	Lily.Wang
Humidity:	55% RH	**Polarity:**	Ver. / Hor.

Vertical

No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	5713.173	59.29	-1.72	57.57	108.89	-51.32	100	93	peak
2	5716.827	62.45	-1.70	60.75	109.91	-49.16	100	80	peak
3	N/A								

Horizontal

No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	5716.827	67.36	-1.70	65.66	109.91	-44.25	100	69	peak
2	5719.263	68.04	-1.69	66.35	110.59	-44.24	100	91	peak
3	N/A								

Operation Mode:	Tx / IEEE 802.11ac VHT40 mode/ CH High	**Test Date:**	2017-11-16
Temperature:	25°C	**Tested by:**	Lily.Wang
Humidity:	55% RH	**Polarity:**	Ver. / Hor.

Vertical

No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	5853.237	57.26	-1.05	56.21	114.82	-58.61	100	208	peak
2	5861.154	56.94	-1.01	55.93	109.08	-53.15	100	82	peak
3	N/A								

Horizontal

No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	5848.365	61.70	-1.07	60.63	135.00	-74.37	100	92	peak
2	5857.500	59.83	-1.03	58.80	110.10	-51.30	100	85	peak
3	N/A								

Operation Mode:	Tx / IEEE 802.11ac VHT80 mode/ CH Mid	**Test Date:**	2017-11-16
Temperature:	25°C	**Tested by:**	Lily.Wang
Humidity:	55% RH	**Polarity:**	Ver. / Hor.

Vertical

No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	5698.317	73.11	-1.79	71.32	103.95	-32.63	100	272	peak
2	5706.731	71.74	-1.75	69.99	107.08	-37.09	100	82	peak
5	N/A								

Horizontal

No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	5695.913	67.74	-1.80	65.94	102.18	-36.24	100	271	peak
2	5698.317	68.25	-1.79	66.46	103.95	-37.49	100	265	peak
5	N/A								

7.4 POWER SPECTRAL DENSITY

LIMIT

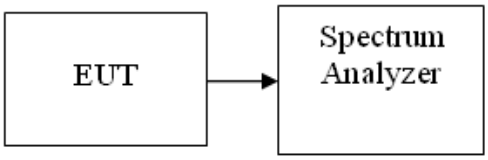
According to §15.407(a),

For the band 5.725–5.85 GHz, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band.

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

Directional Gain=G_{ANT}=3.40dBi<6dBi

Test Configuration



TEST PROCEDURE

1. The testing follows Method SA-2 of FCC KDB 789033 D02 General UNII Test Procedures v01r04.
2. Measure the duty cycle, Set span to encompass the entire emission bandwidth (EBW) of the signal. Set RBW = 300 kHz. Set VBW ≥ 1 MHz. Number of points in sweep ≥ 2 Span / RBW. Sweep time = auto. Detector = RMS, Trace average at least 100 traces in power averaging mode. Add 10 log(500kHz/RBW) to the test result. Add 10 log(1/x), where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times. For example, add 10 log(1/0.25) = 6 dB if the duty cycle is 25 percent.
3. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
4. Each plot has already offset with cable loss, and attenuator loss. Measure the PPSD and record it.
5. For MIMO mode, calculation method follows FCC KDB 662911 D01 Multiple Transmitter Output v02r01.

Method (1): Measure and sum the spectra across the outputs. The total final Power Spectral Density is from a device with 2 transmitter outputs. The spectrum measurements of the individual outputs are all performed with the same span and number of points, the spectrum value in the first spectral bin of output 1 is summed with that in the first spectral bin of output 2 to obtain the value for the first frequency bin of the summed spectrum.

TEST RESULTS

No non-compliance noted

Test Data

Test mode: IEEE 802.11a mode

5725~5850MHz

Channel	Frequency (MHz)	Average PSD (dBm/300kHz)		10log (500kHz/ RBW) Factor (dB)	Average PSD (dBm/500kHz)		Total Average PSD (dBm/500kHz)	Average PSD Limit (dBm/ 500kHz)	Result
		Chain 0	Chain 1		Chain 0	Chain 1			
Low	5745	-2.72	-1.12	2.22	-0.5	1.1	3.38	30.00	PASS
Mid	5785	-2.51	-0.16	2.22	-0.29	2.06	4.05	30.00	PASS
High	5825	-2.23	-1.07	2.22	-0.01	1.15	3.62	30.00	PASS

Test mode: IEEE 802.11n HT20 mode

5725~5850MHz

Channel	Frequency (MHz)	Average PSD (dBm/300kHz)		10log (500kHz/ RBW) Factor (dB)	Average PSD (dBm/500kHz)		Total Average PSD (dBm/500kHz)	Average PSD Limit (dBm/ 500kHz)	Result
		Chain 0	Chain 1		Chain 0	Chain 1			
Low	5745	-2.63	-1.63	2.22	-0.41	0.59	3.13	30.00	PASS
Mid	5785	-2.19	-0.30	2.22	0.03	1.92	4.09	30.00	PASS
High	5825	-2.14	-1.03	2.22	0.08	1.19	3.68	30.00	PASS

Test mode: IEEE 802.11n HT40 mode

5725~5850MHz

Channel	Frequency (MHz)	Average PSD (dBm/300kHz)		10log (500kHz/ RBW) Factor (dB)	Average PSD (dBm/500kHz)		Total Average PSD (dBm/500kHz)	Average PSD Limit (dBm/ 500kHz)	Result
		Chain 0	Chain 1		Chain 0	Chain 1			
Low	5755	-6.16	-4.41	2.22	-3.94	-2.19	0.03	30.00	PASS
High	5795	-6.17	-3.71	2.22	-3.95	-1.49	0.46	30.00	PASS

Test mode: IEEE 802.11ac VHT20 mode

5725~5850MHz

Channel	Frequency (MHz)	Average PSD (dBm/300kHz)		10log (500kHz/ RBW) Factor (dB)	Average PSD (dBm/500kHz)		Total Average PSD (dBm/500kHz)	Average PSD Limit (dBm/ 500kHz)	Result
		Chain 0	Chain 1		Chain 0	Chain 1			
Low	5745	-2.95	-0.86	2.22	-0.73	1.36	3.45	30.00	PASS
Mid	5785	-2.31	-0.12	2.22	-0.09	2.1	4.15	30.00	PASS
High	5825	-1.93	-0.96	2.22	0.29	1.26	3.81	30.00	PASS

Test mode: IEEE 802.11ac VHT40 mode

5725~5850MHz

Channel	Frequency (MHz)	Average PSD (dBm/300kHz)		10log (500kHz/ RBW) Factor (dB)	Average PSD (dBm/500kHz)		Total Average PSD (dBm/500kHz)	Average PSD Limit (dBm/ 500kHz)	Result
		Chain 0	Chain 1		Chain 0	Chain 1			
Low	5755	-6.59	-4.25	2.22	-4.37	-2.03	-0.03	30.00	PASS
High	5795	-6.12	-3.55	2.22	-3.9	-1.33	0.58	30.00	PASS

Test mode: IEEE 802.11ac VHT80 mode

5725~5850MHz

Channel	Frequency (MHz)	Average PSD (dBm/300kHz)		10log (500kHz/ RBW) Factor (dB)	Average PSD (dBm/500kHz)		Total Average PSD (dBm/500kHz)	Average PSD Limit (dBm/ 500kHz)	Result
		Chain 0	Chain 1		Chain 0	Chain 1			
Mid	5775	-8.42	-7.08	2.22	-6.2	-4.86	-2.47	30.00	PASS

***Remark**: 1. Total PSD(dBm) = 10*LOG(10^(Chain 0 PSD10)+10^(Chain 1 PSD/10)),*

PSD:500KHz

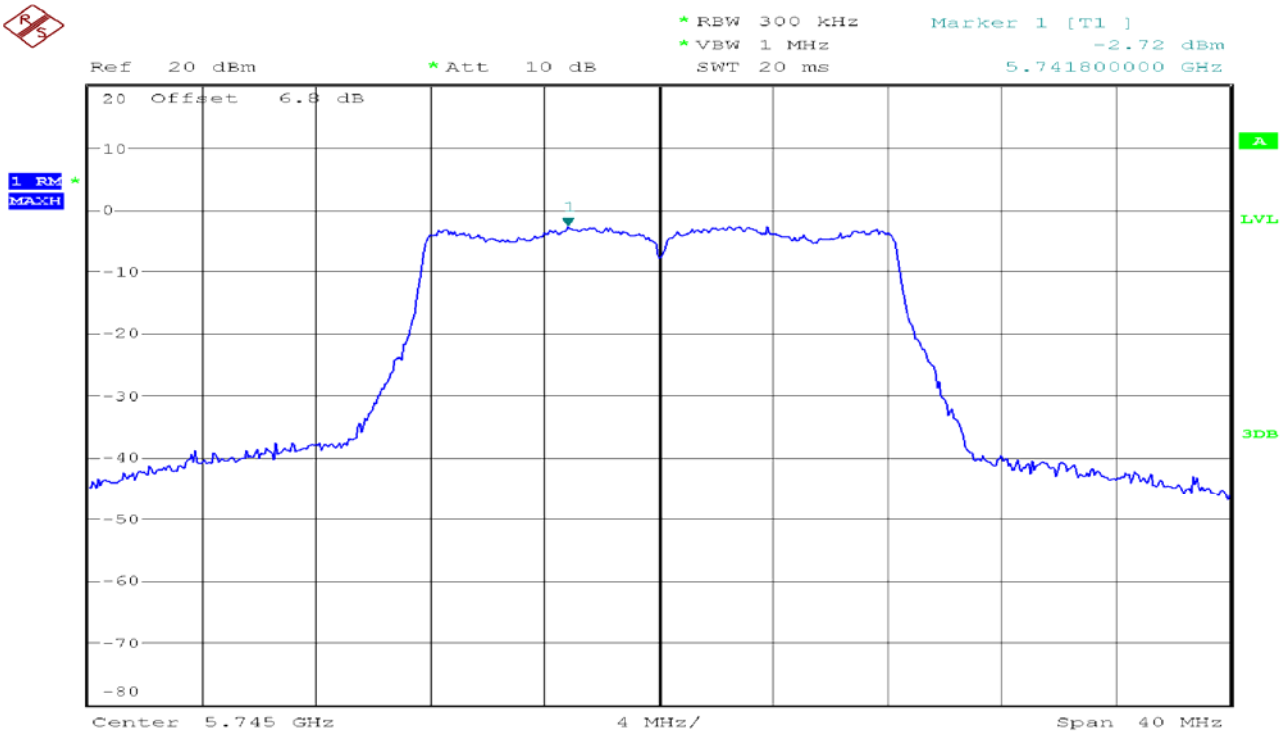
2.Duty factor has been offseted with cableloss

Test Plot

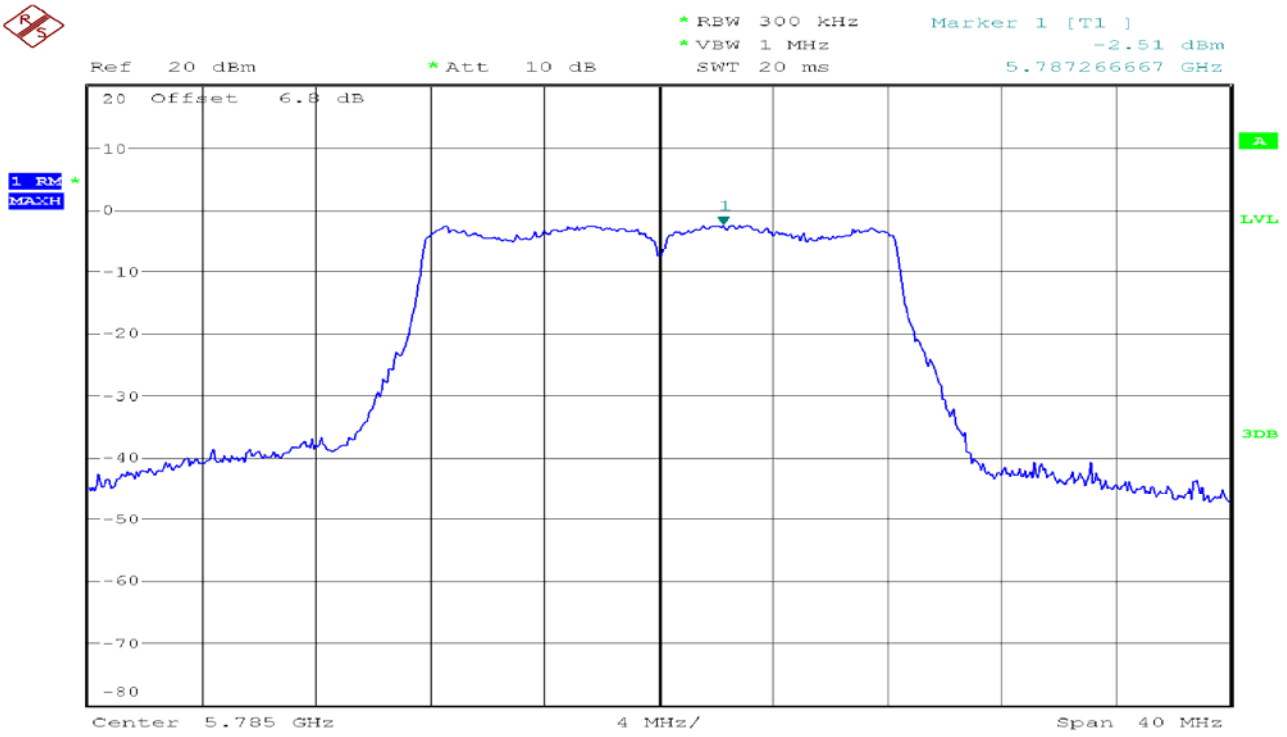
IEEE 802.11a mode/chain 0

5725~5850MHz

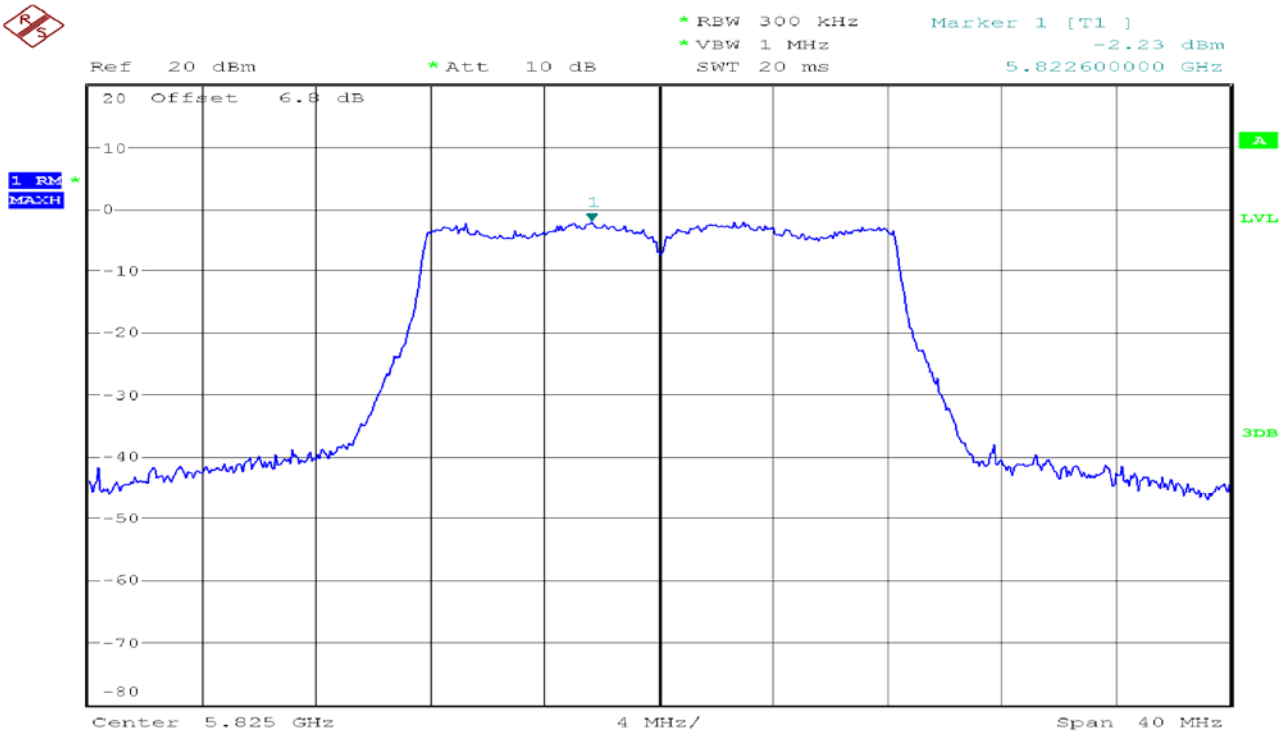
CH Low



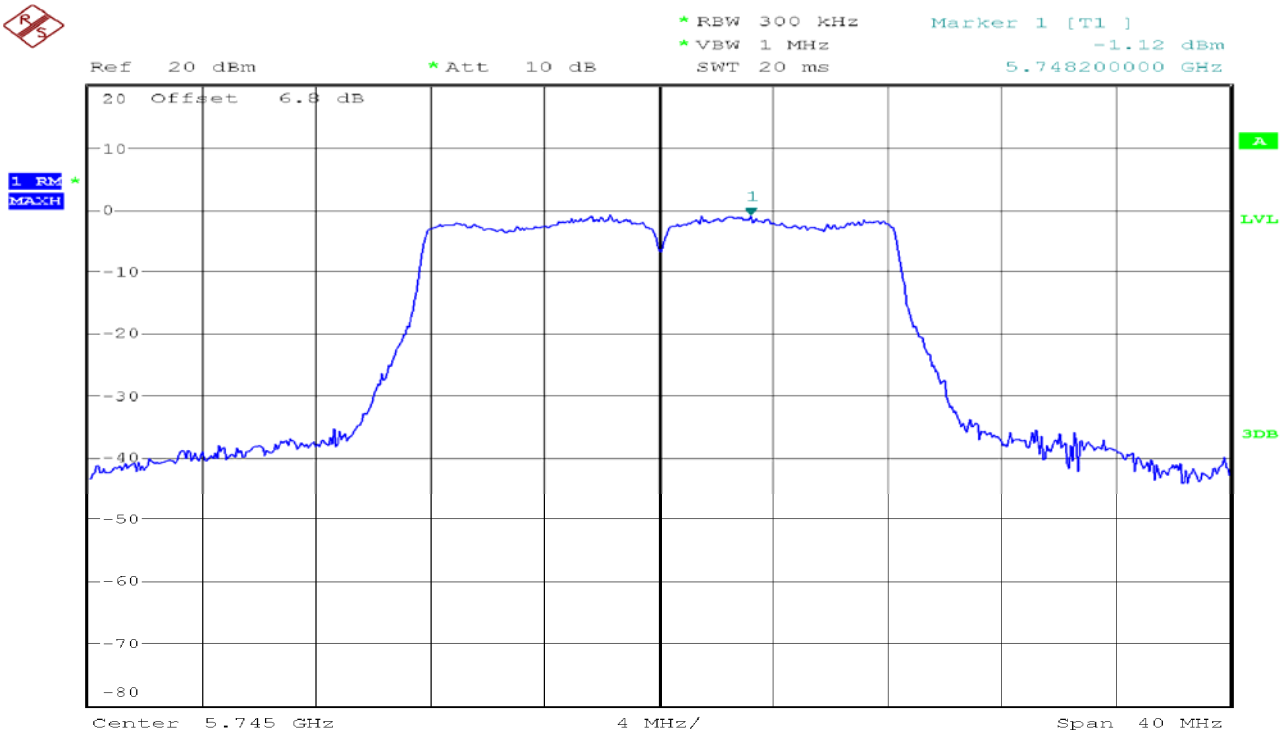
CH Mid



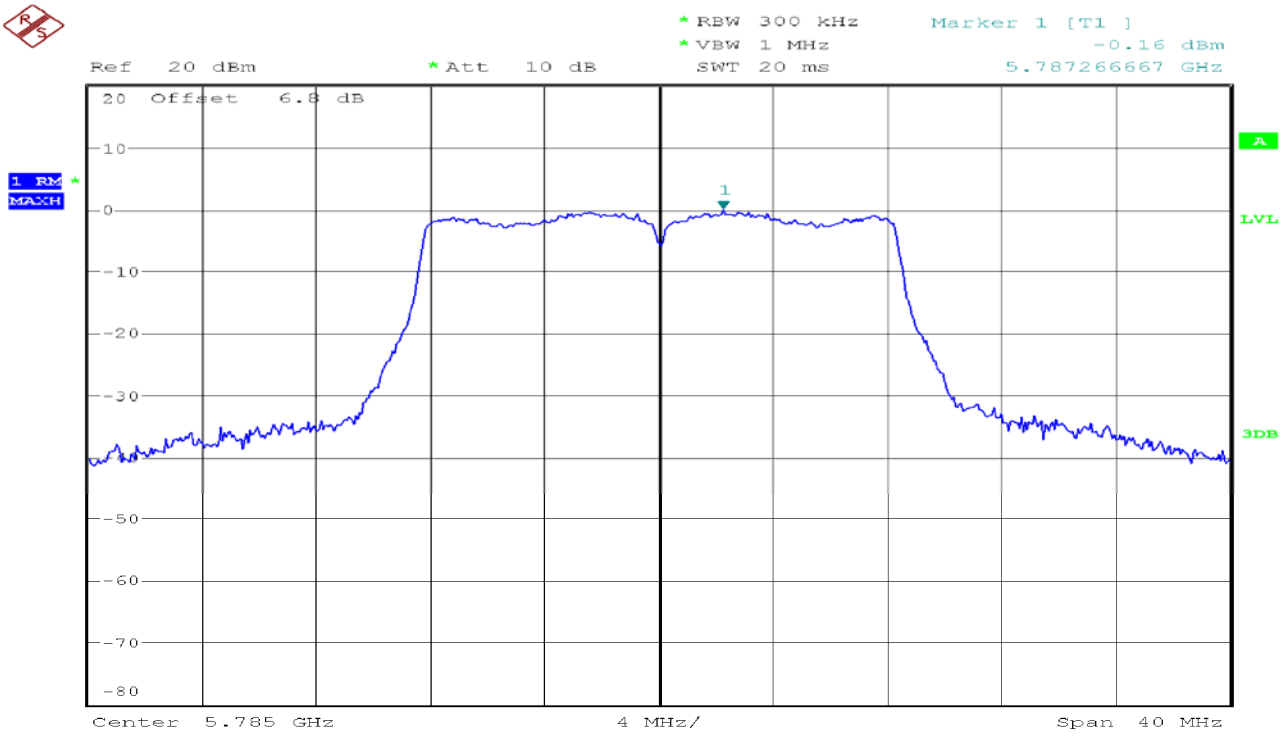
CH High



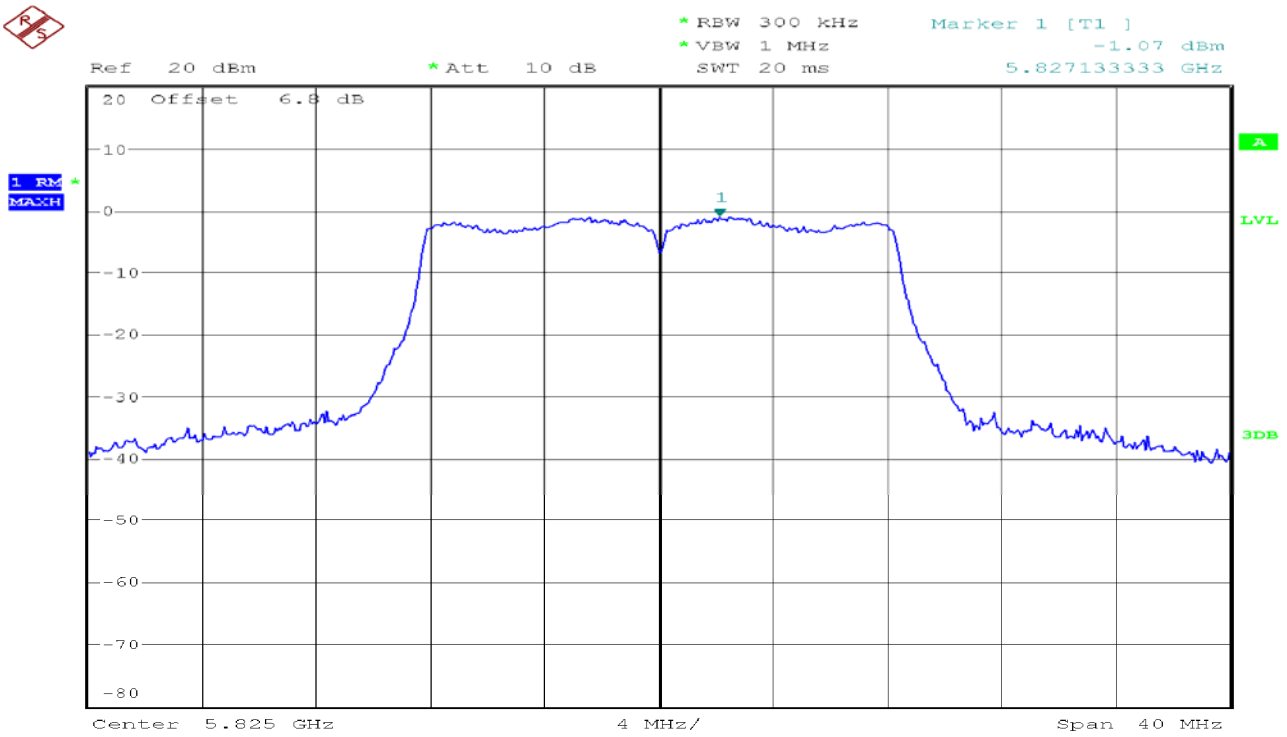
IEEE 802.11a mode/chain 1
5725~5850MHz
CH Low



CH Mid

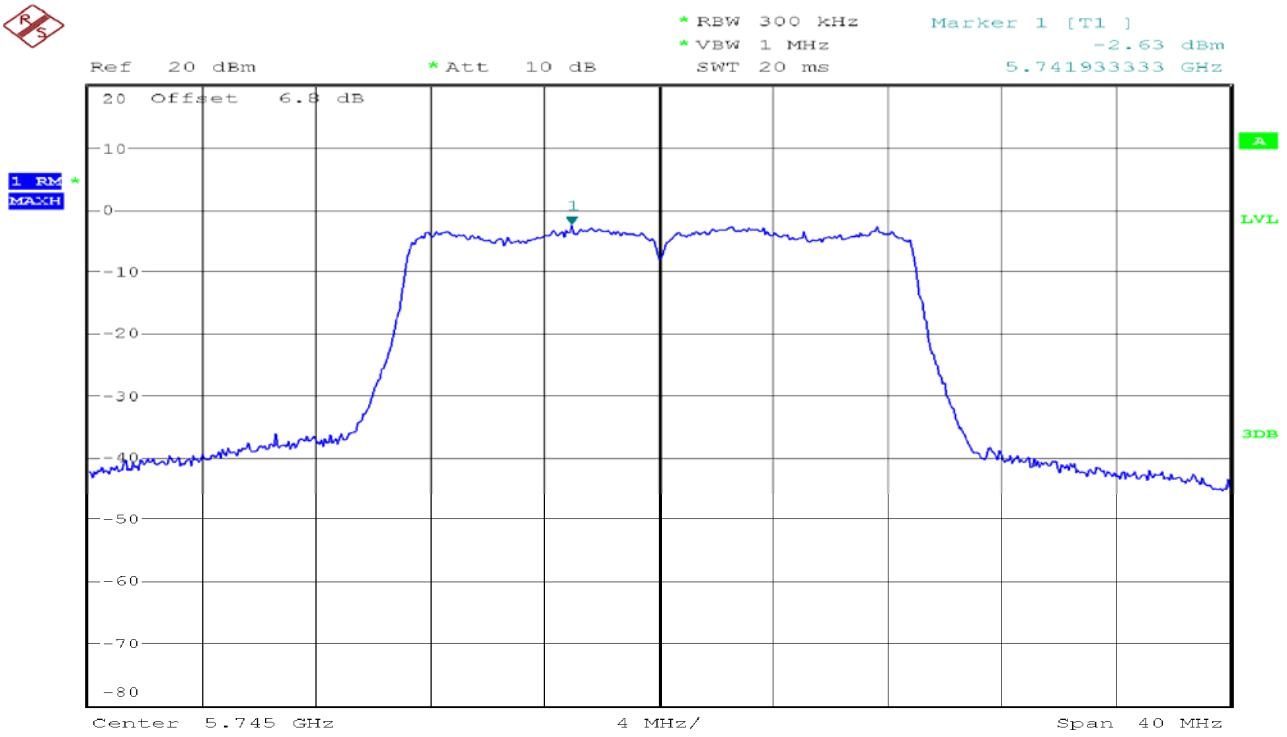


CH High

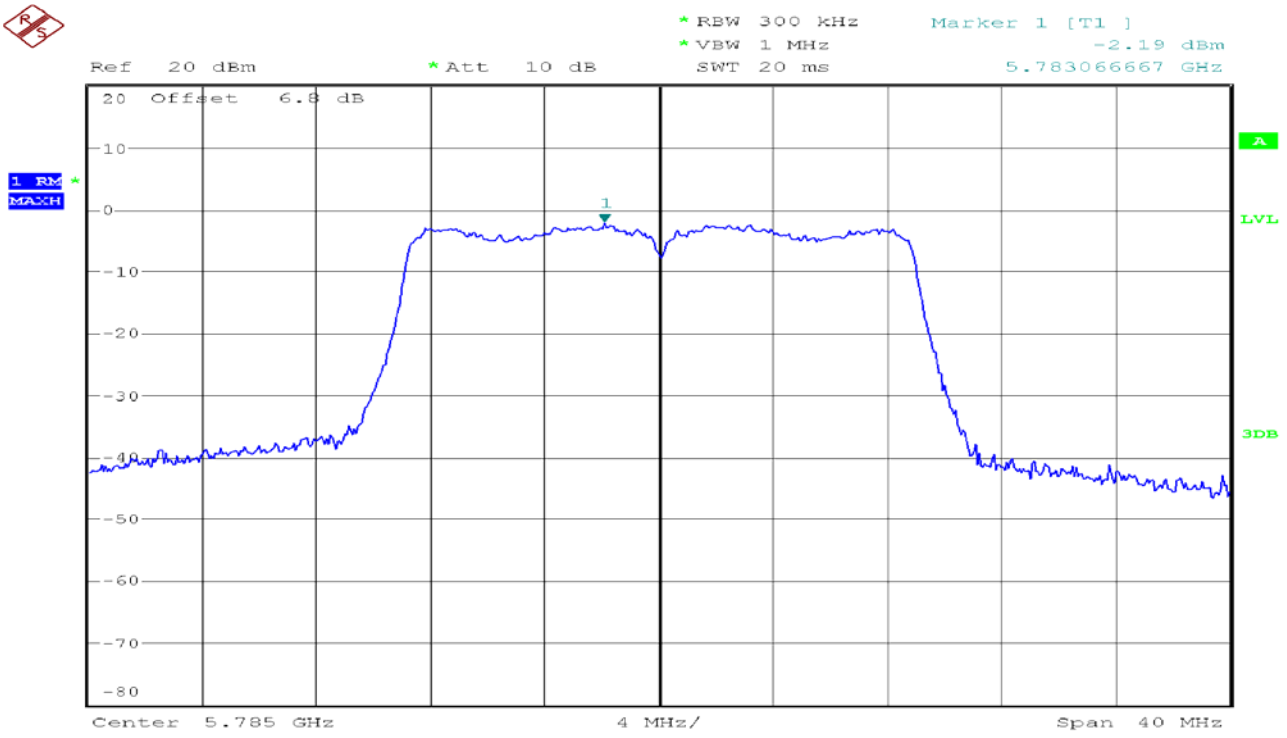


IEEE 802.11n HT20 mode/chain 0
5725~5850MHz

CH Low



CH Mid



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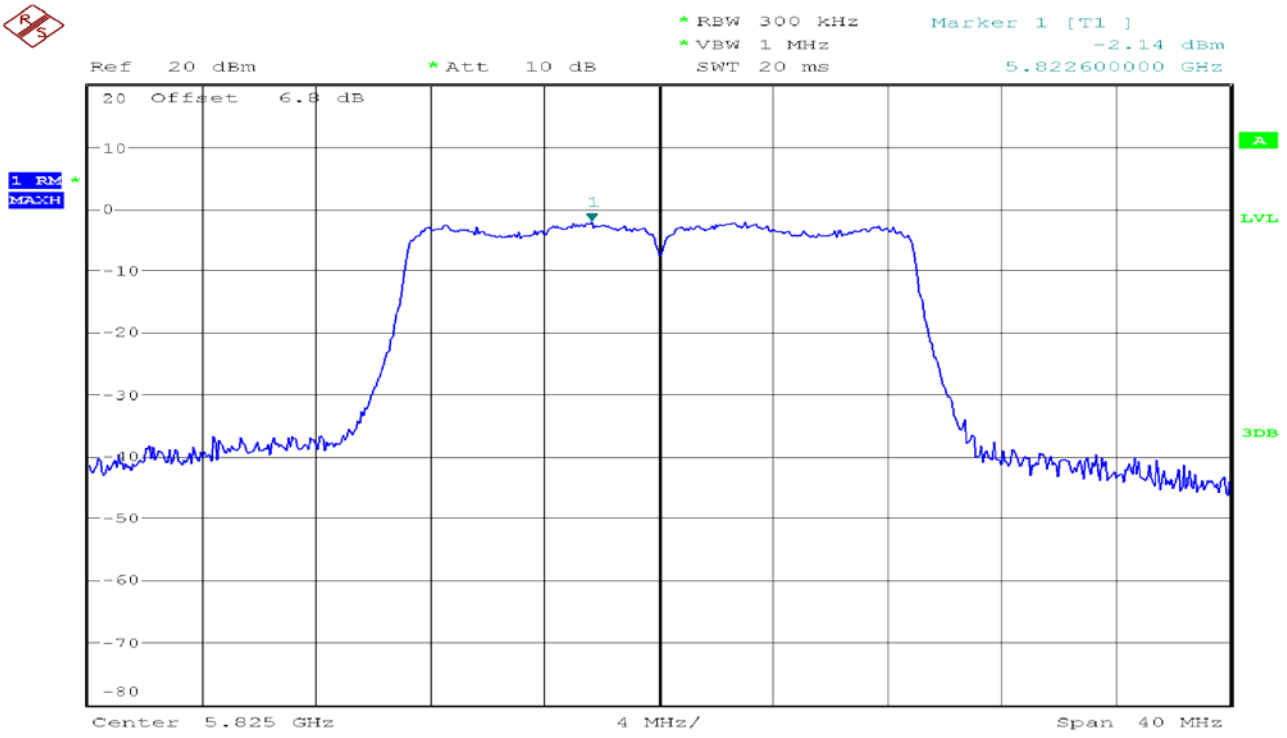
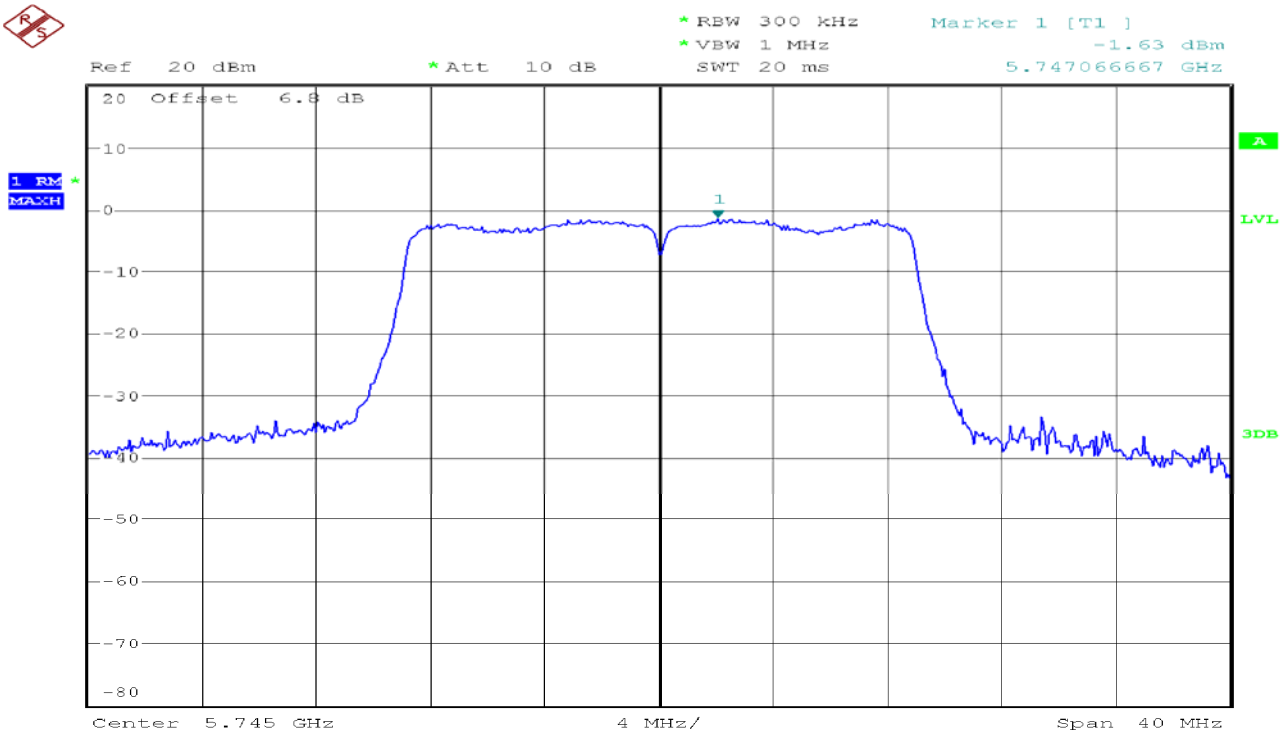


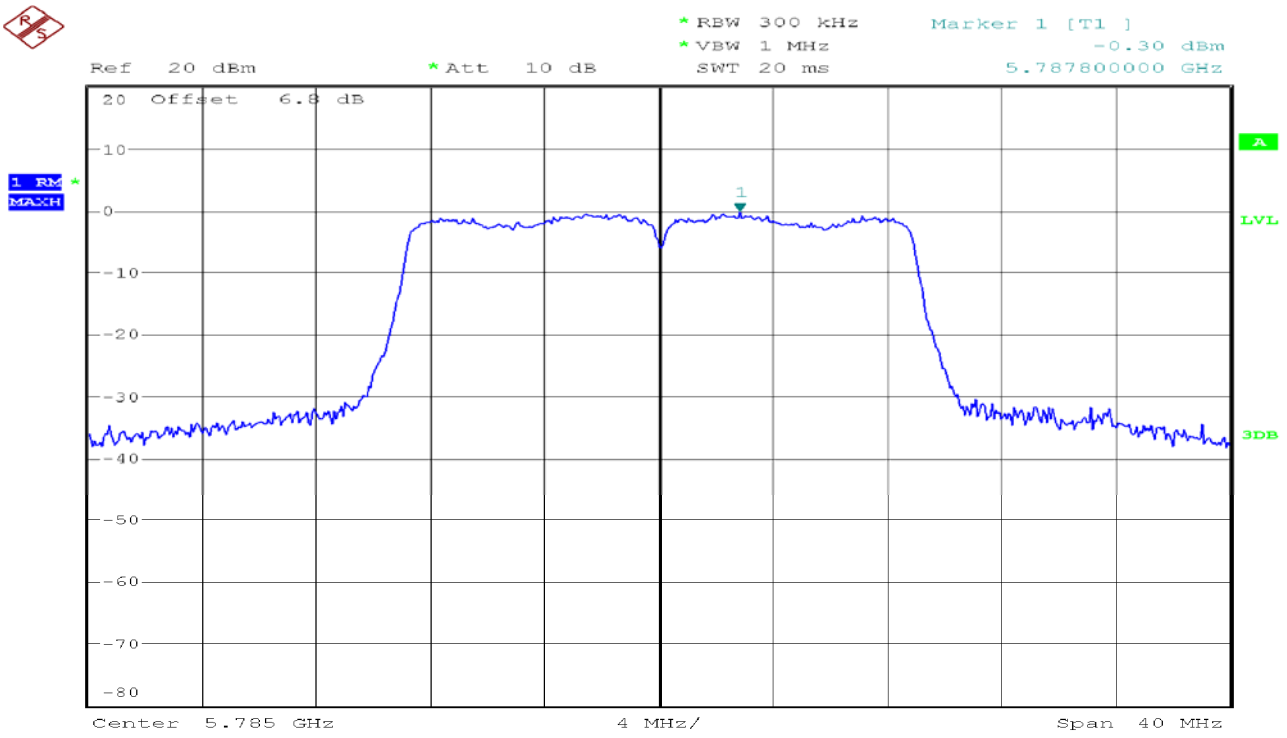
IEEE 802.11n HT20 mode/chain 1

5725~5850MHz

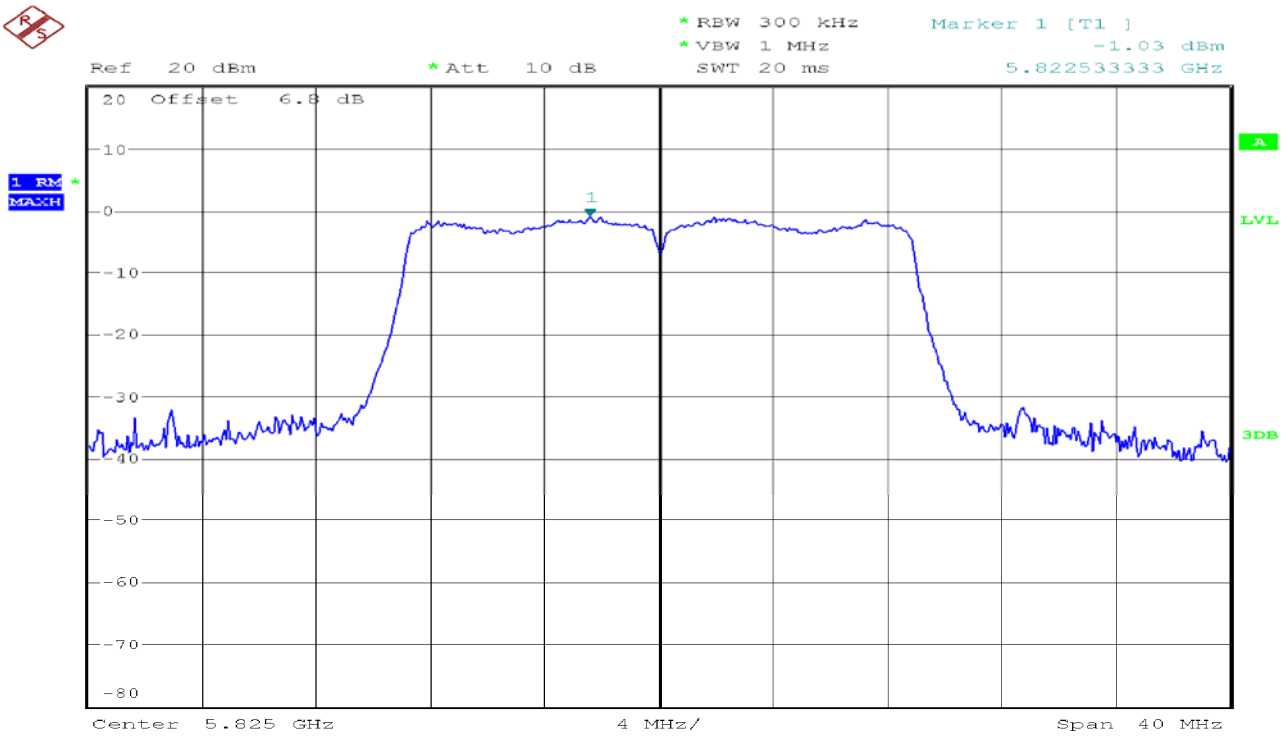
CH Low



CH Mid

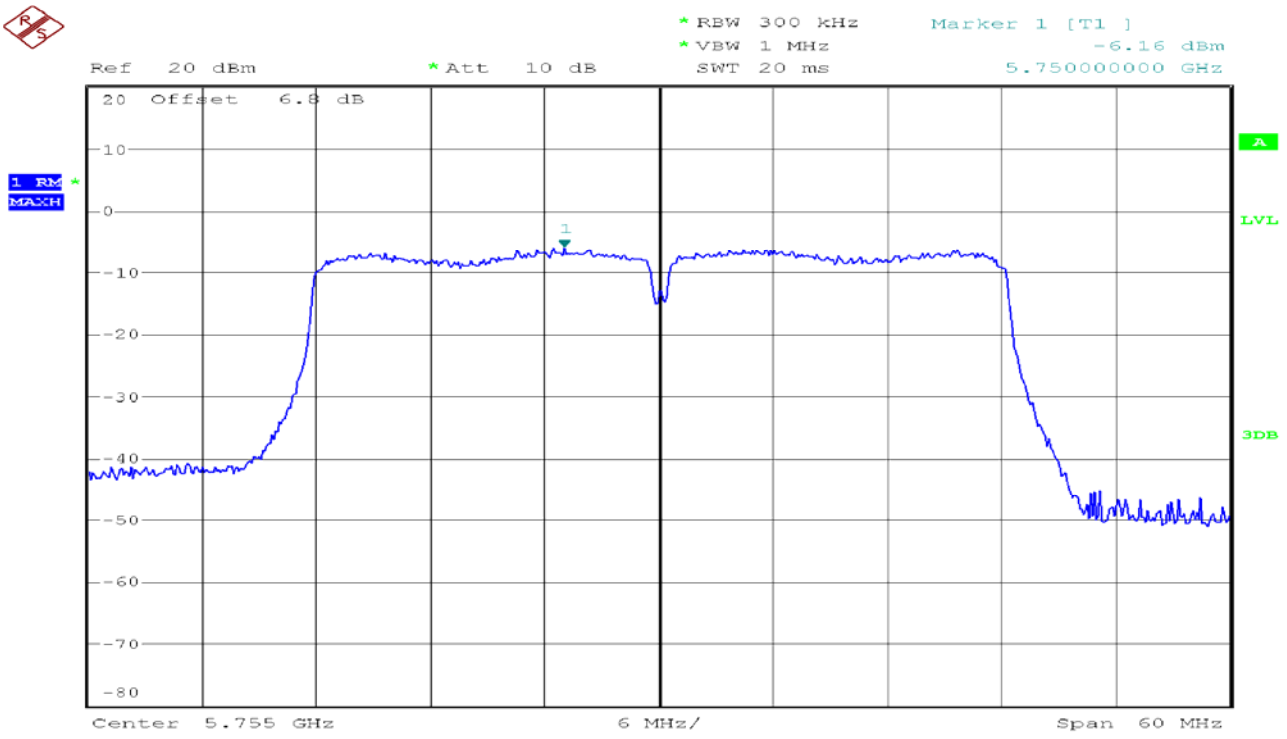


CH High

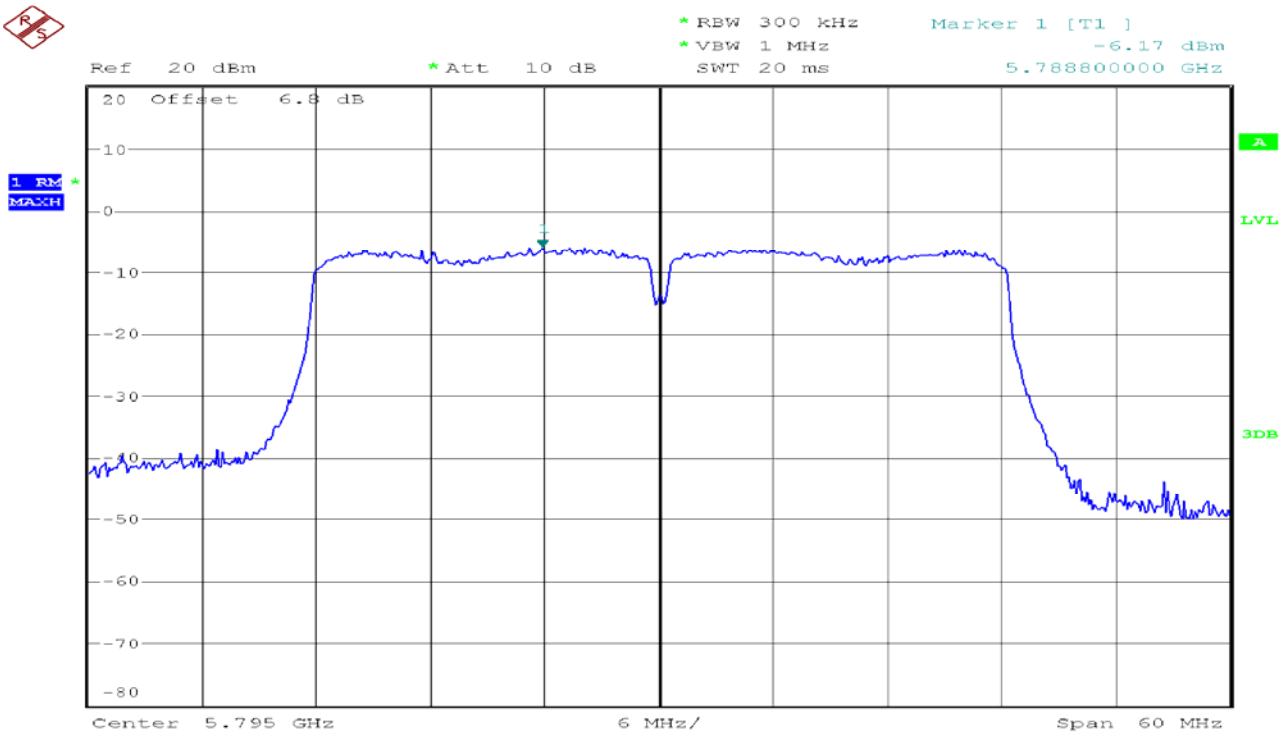


IEEE 802.11n HT40 mode/chain 0
5725~5850MHz

CH Low

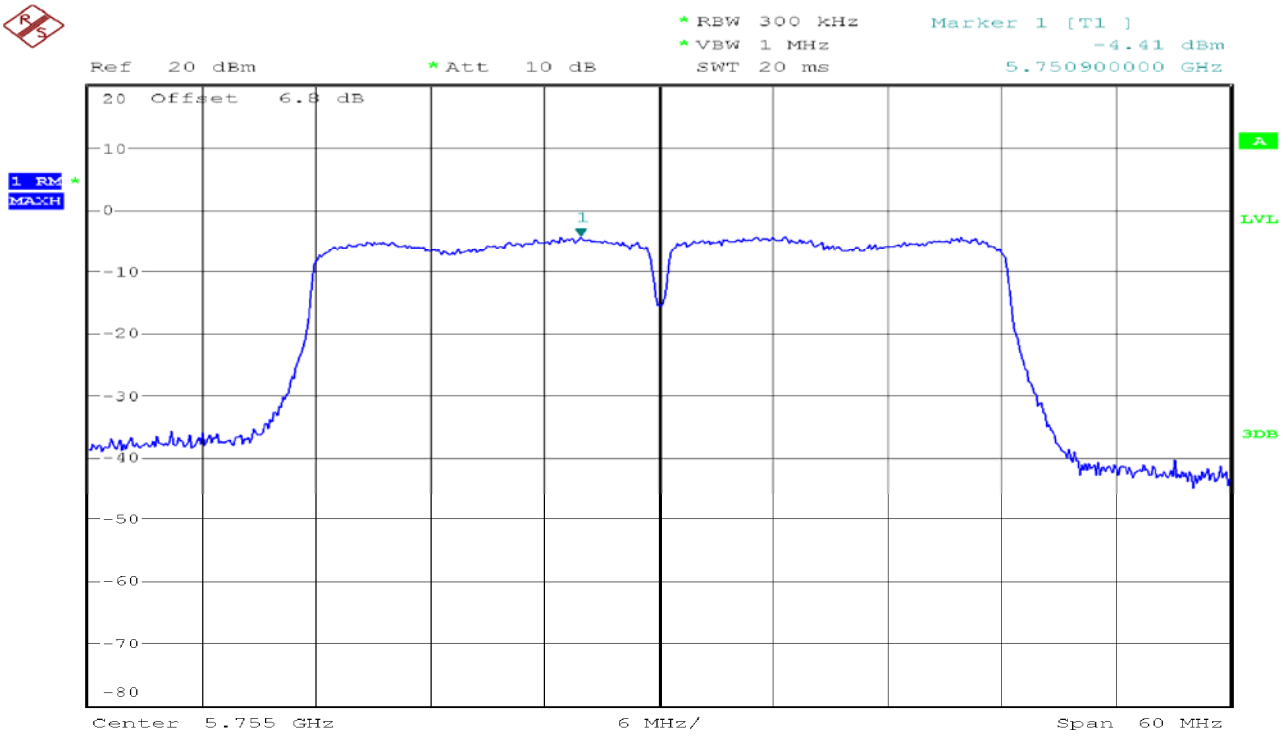


CH High

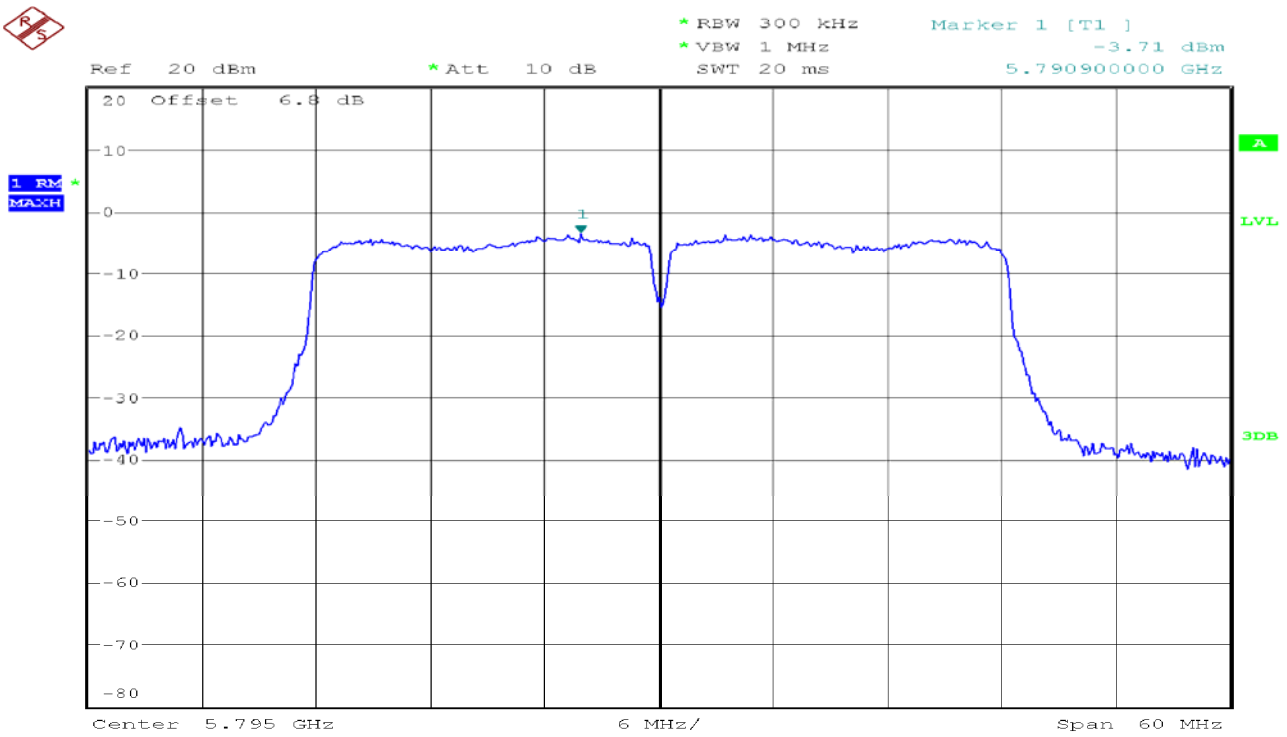


IEEE 802.11n HT40 mode/chain 1
5725~5850MHz

CH Low

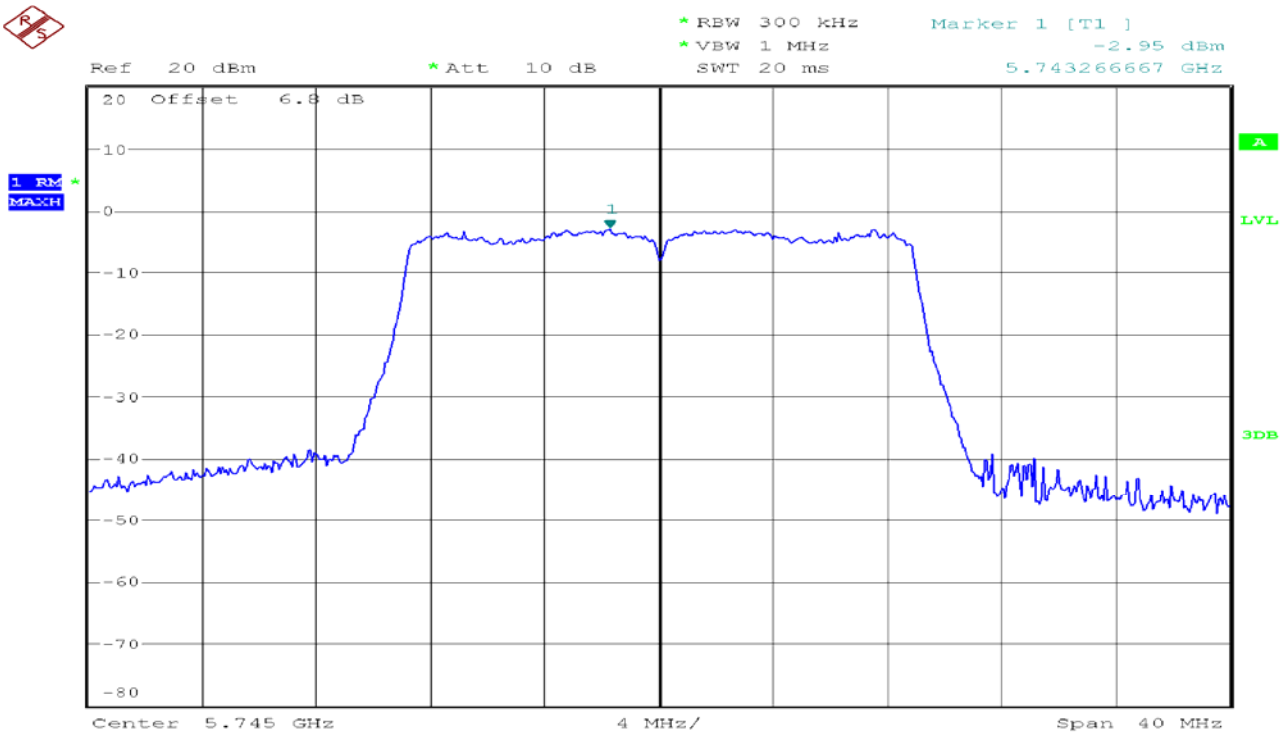


CH High

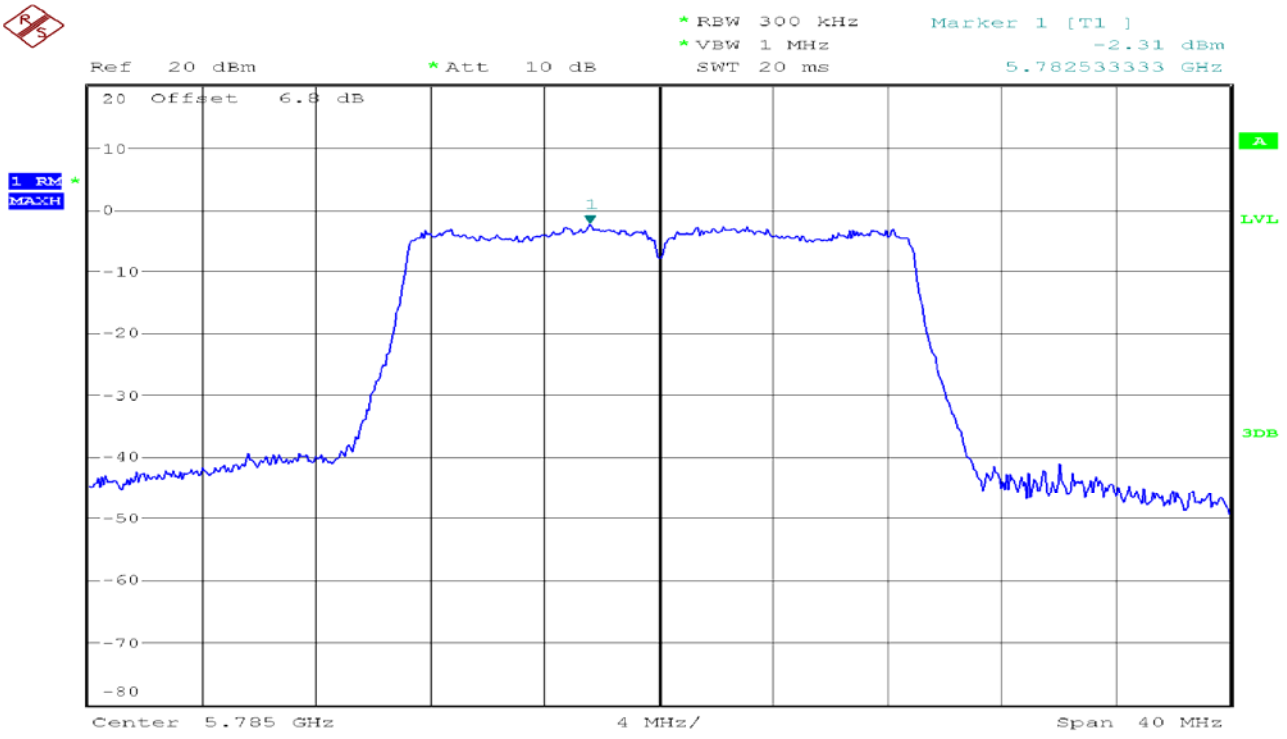


IEEE 802.11ac VHT20 mode/chain 0
5725~5850MHz

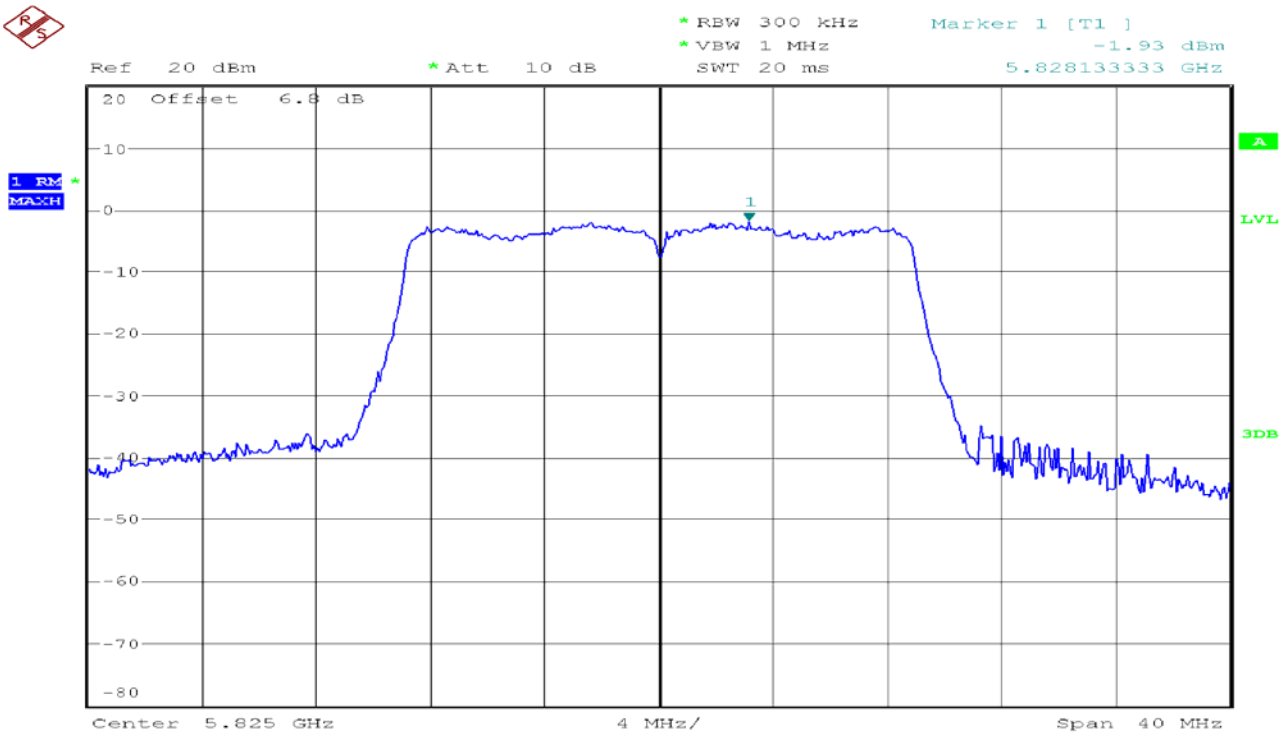
CH Low



CH Mid

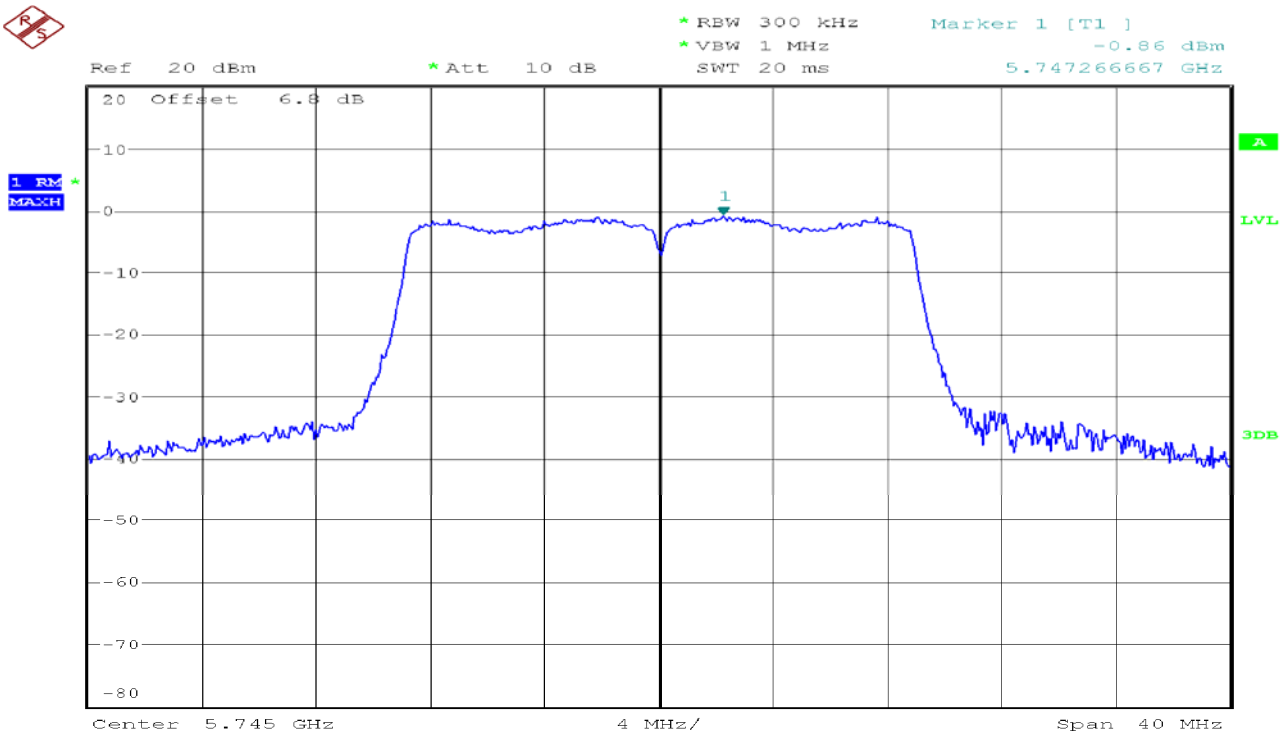


CH High

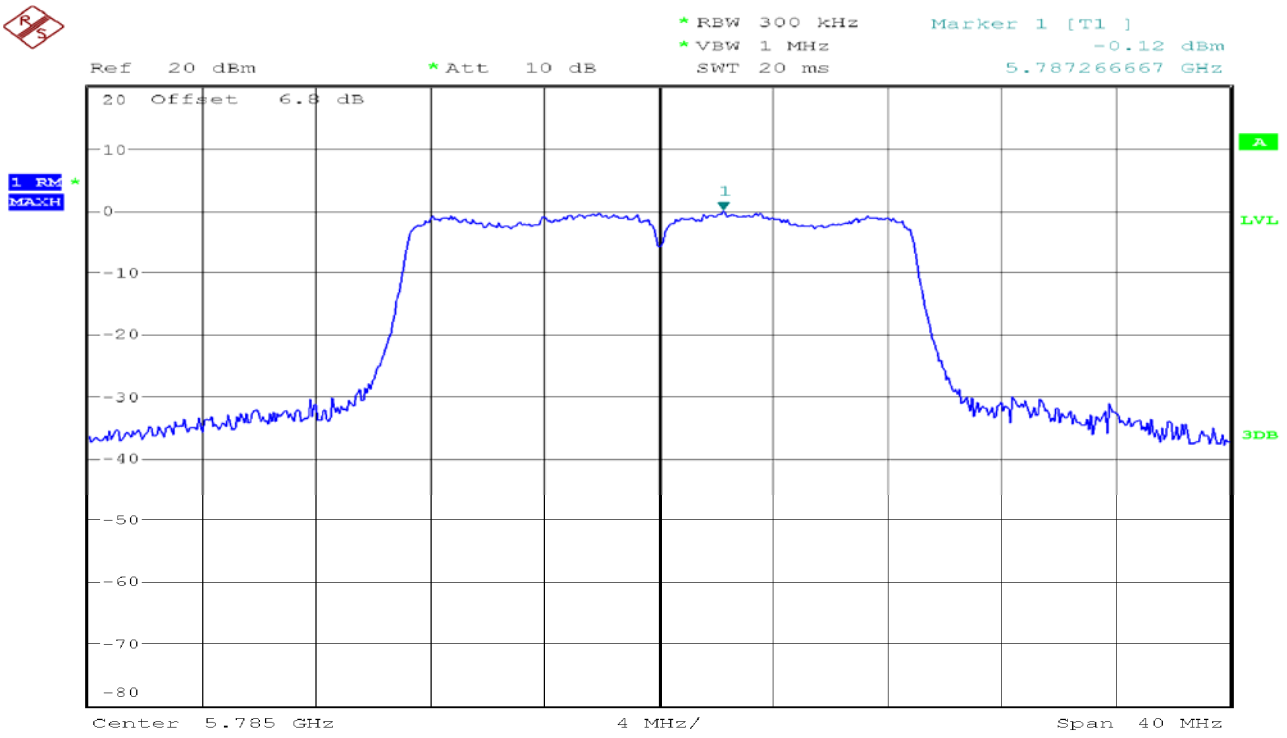


IEEE 802.11ac VHT20 mode/chain 1
5725~5850MHz

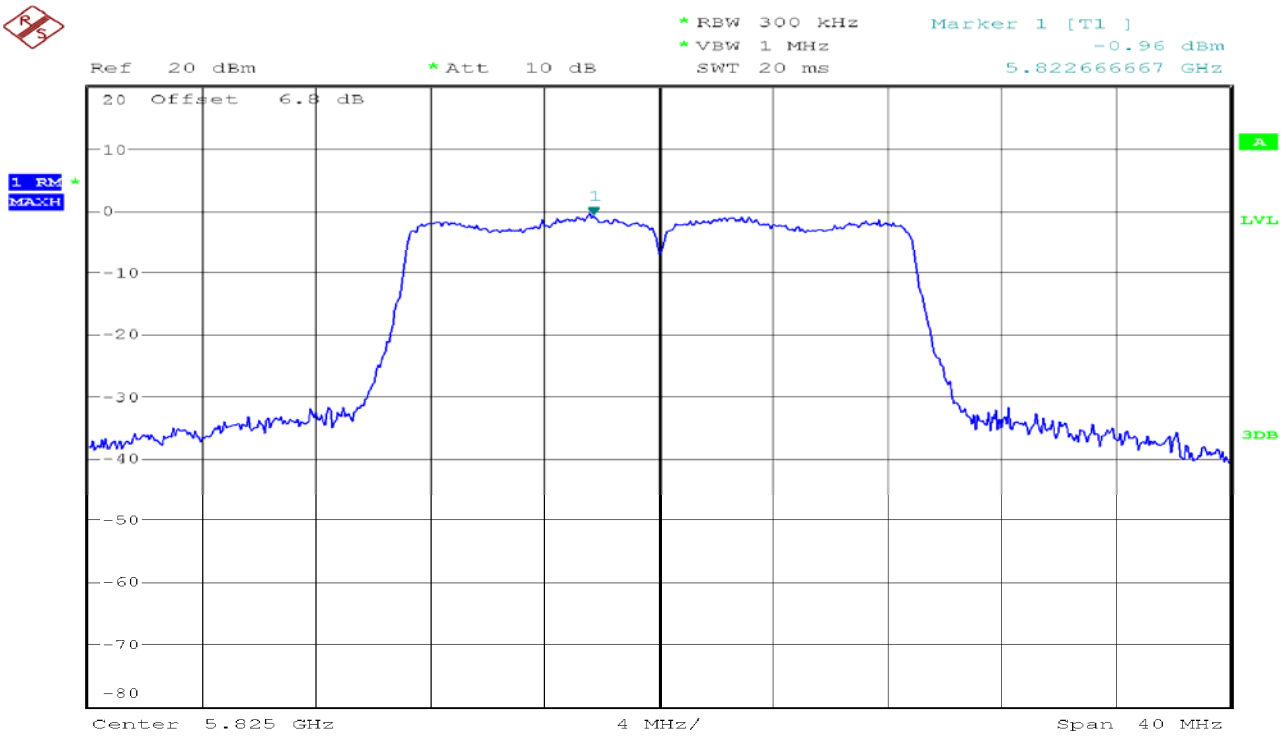
CH Low



CH Mid

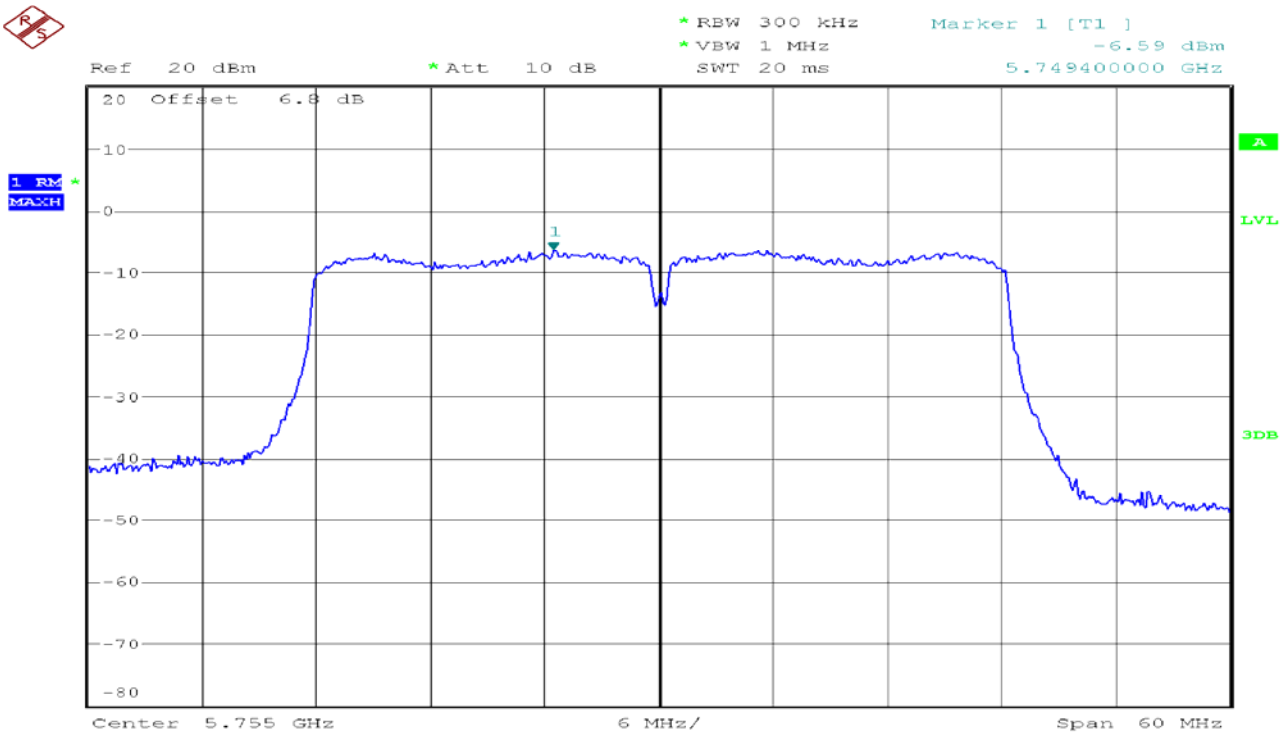


CH High

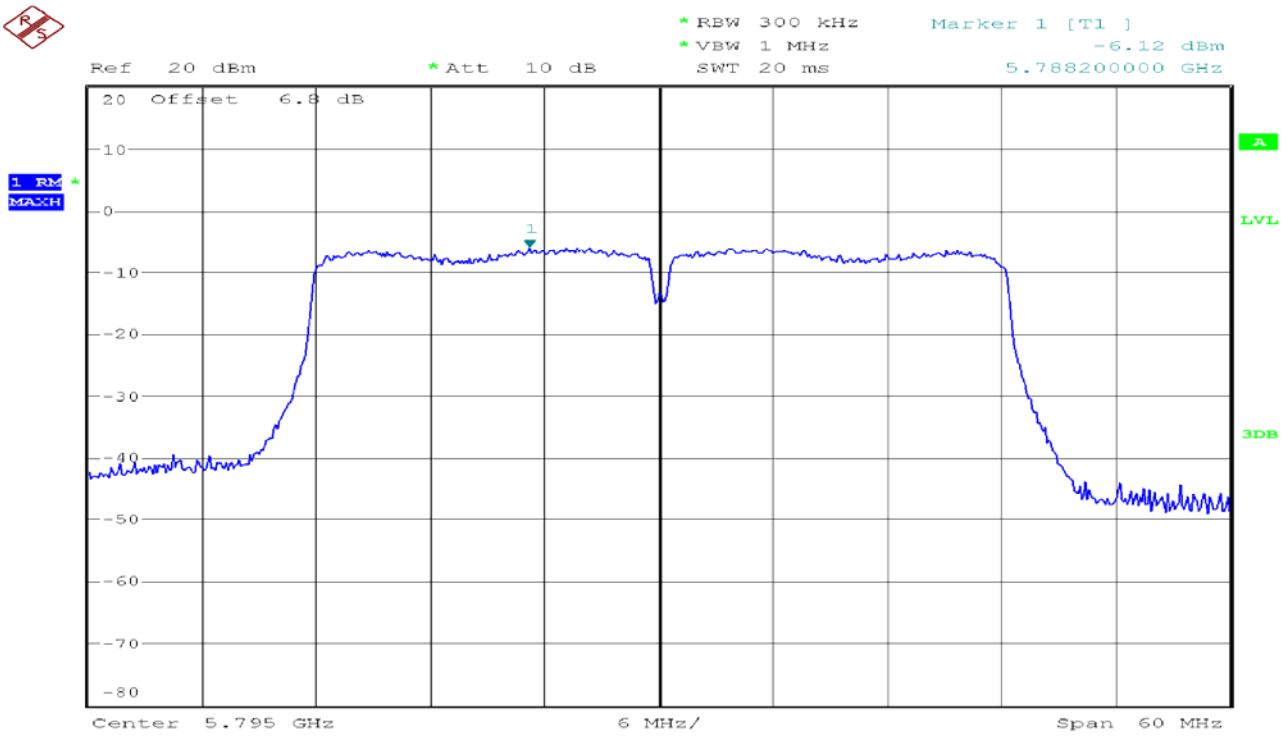


IEEE 802.11ac VHT40 mode/chain 0
5725~5850MHz

CH Low

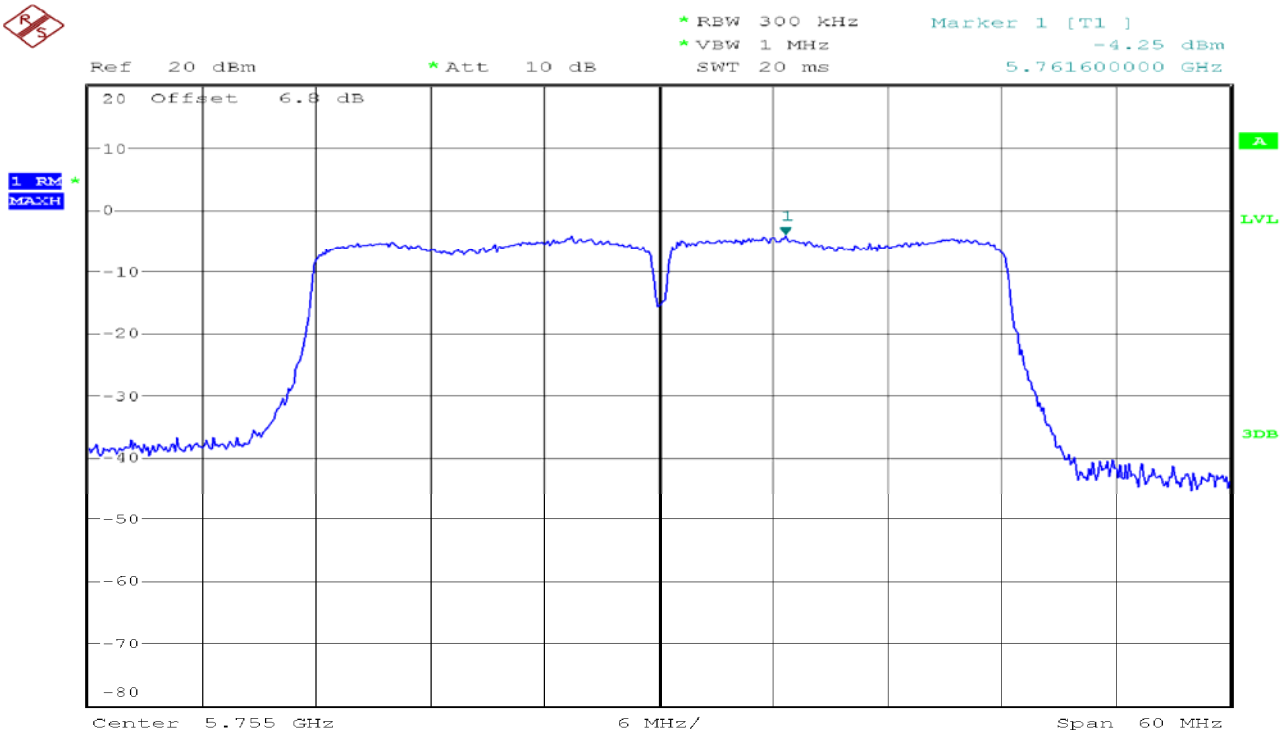


CH High

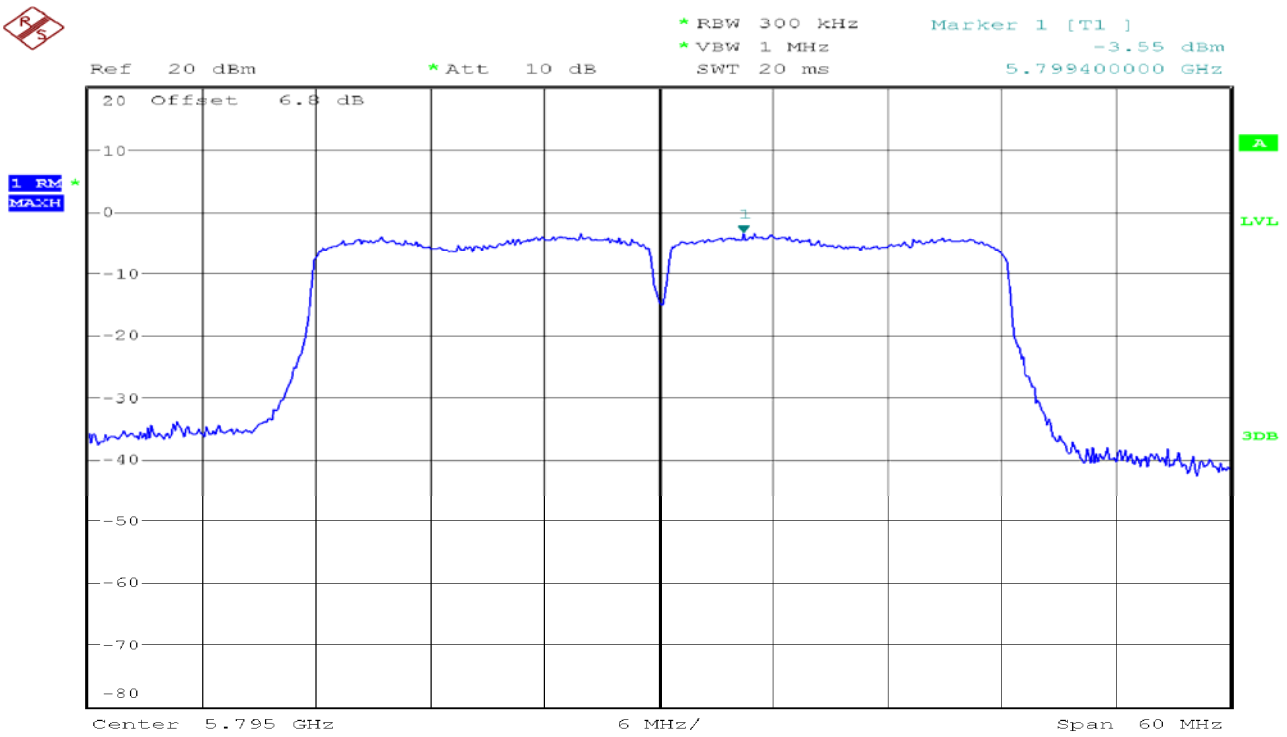


IEEE 802.11ac VHT40 mode/chain 1
5725~5850MHz

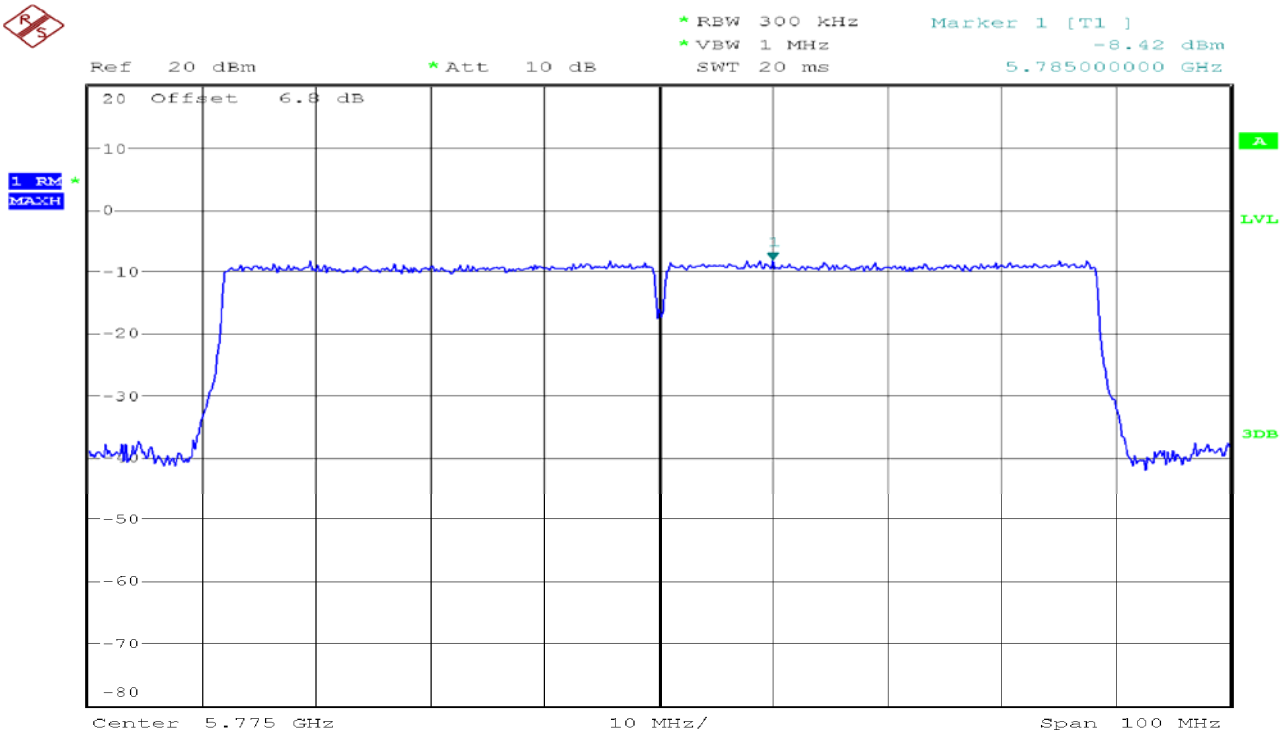
CH Low



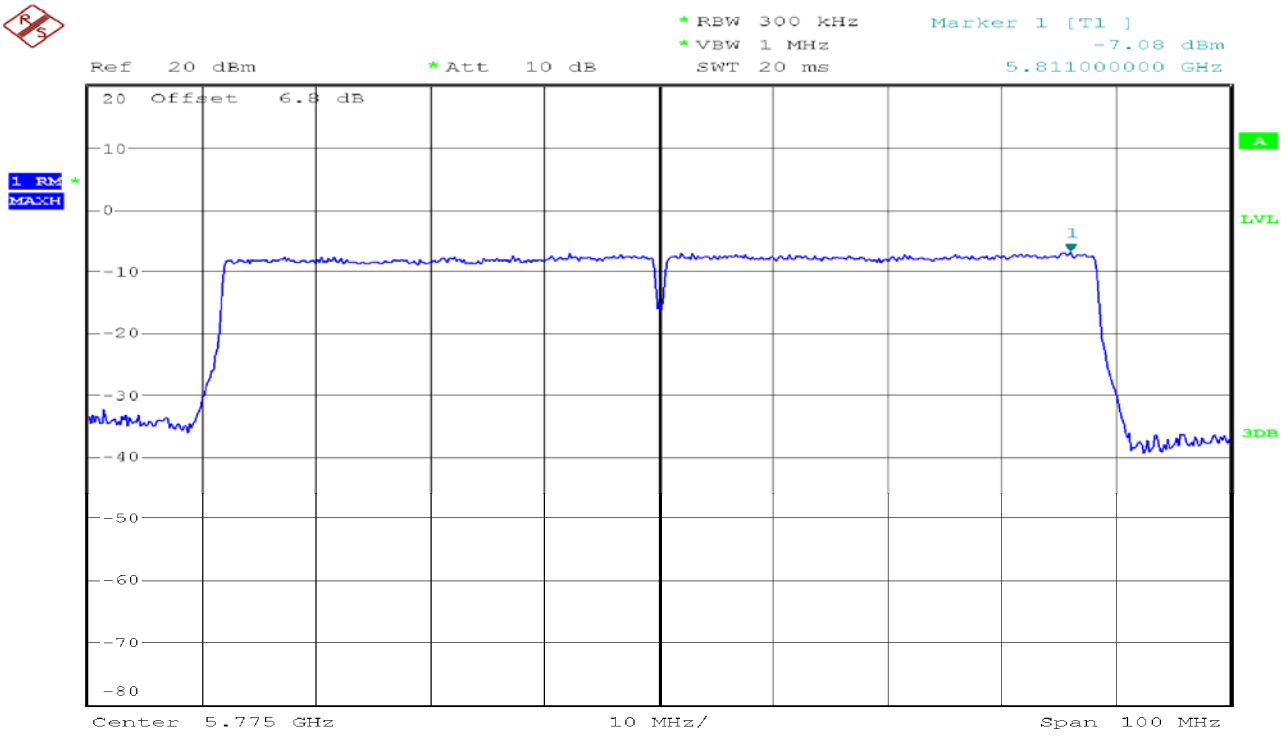
CH High



IEEE 802.11ac VHT80 mode/chain 0
5725~5850MHz
CH Mid



IEEE 802.11ac VHT80 mode/chain 1
5725~5850MHz
CH Mid

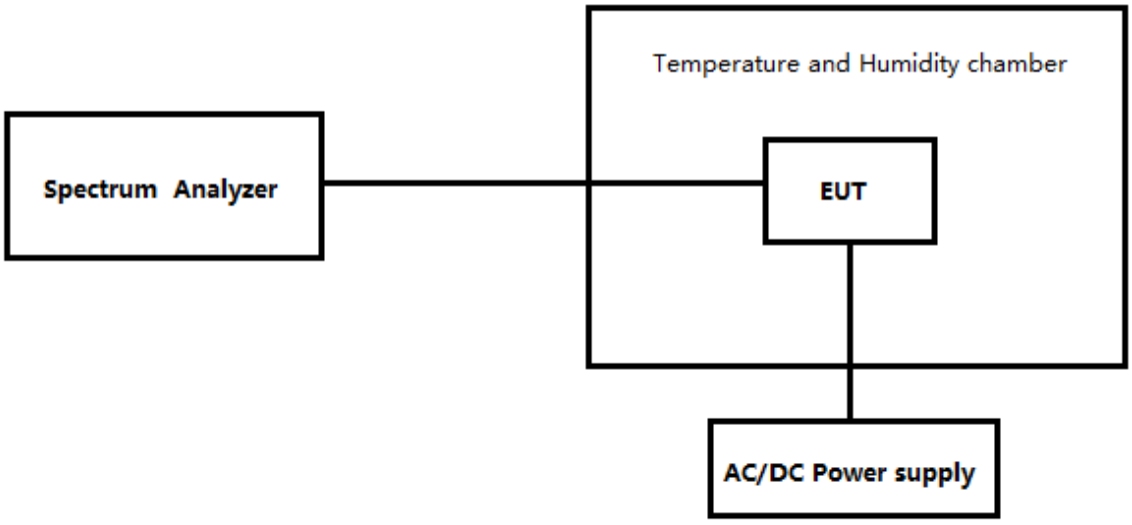


7.5 FREQUENCY STABILITY MEASUREMENT

LIMIT

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

TEST CONFIGURATION



TEST PROCEDURE

1. To ensure emission at the band edge is maintained within the authorized band, those values shall be measured by radiation emissions at upper and lower frequency points, and finally compensated by frequency deviation as procedures below.
2. The EUT was operated at the maximum output power, and connected to the spectrum analyzer, which is set to maximum hold function and peak detector. The peak value of the power envelope was measured and noted. The upper and lower frequency points were respectively measured relatively 10dB lower than the measured peak value.
3. The frequency deviation was calculated by adding the upper frequency point and the lower frequency point divided by two. Those detailed values of frequency deviation are provided in table below.

TEST RESULTS

U-NII-3-(5725MHz-5850MHz)					
Freq.(MHz)	Center Frequency (MHz)	Frequency Deviation (MHz)	Frequency Stability (ppm)	Temperature (°C)	Voltage (V)
5745	5745.034	0.034	5.92	25	V_{min}
5745	5745.026	0.026	4.53	25	V_{max}
5745	5745.015	0.015	2.61	25	V_{nor}
5745	5745.022	0.022	3.83	-10	V_{nor}
5745	5745.030	0.030	5.22	50	V_{nor}

7.6 RADIATED UNDESIRABLE EMISSION

LIMIT

Radiated emissions from 9 kHz to 25 GHz were measured according to the methods defines in ANSI C63.10-2013. The EUT was placed above the ground plane, 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz. The interface cables and equipment positions were varied within limits of reasonable applications to determine the positions producing maximum radiated emissions.

1. For transmitters operating in the 5725-5850 MHz band: all emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an EIRP of -17 dBm/MHz (78.3dBμV/m); for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an EIRP of -27 dBm/MHz (68.3dBμV/m).
2. KDB789033 v01 G)2)c) As specified in 15.407(b), emissions above 1000 MHz that are outside of the restricted bands are subject to a peak emission limit of -27 dBm/MHz (or -17 dBm/MHz as specified in 15.407(b)(4)). However, an out-of-band emission that complies with both the average and peak limits of 15.209 is not required to satisfy the -27 dBm/MHz or -17 dBm/MHz peak emission limit.
3. According to APPENDIX A Final Rules of FCC-16-24A1,For transmitters operating in the 5.725-5.85 GHz band:
   All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.
4. 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:

FREQUENCIES(MHz)	FIELD STRENGTH (microvolts/meter)	MEASUREMENT DISTANCE(meters)
0.009~0.490	2400/F(kHz)	300
0.490~1.705	24000/F(kHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

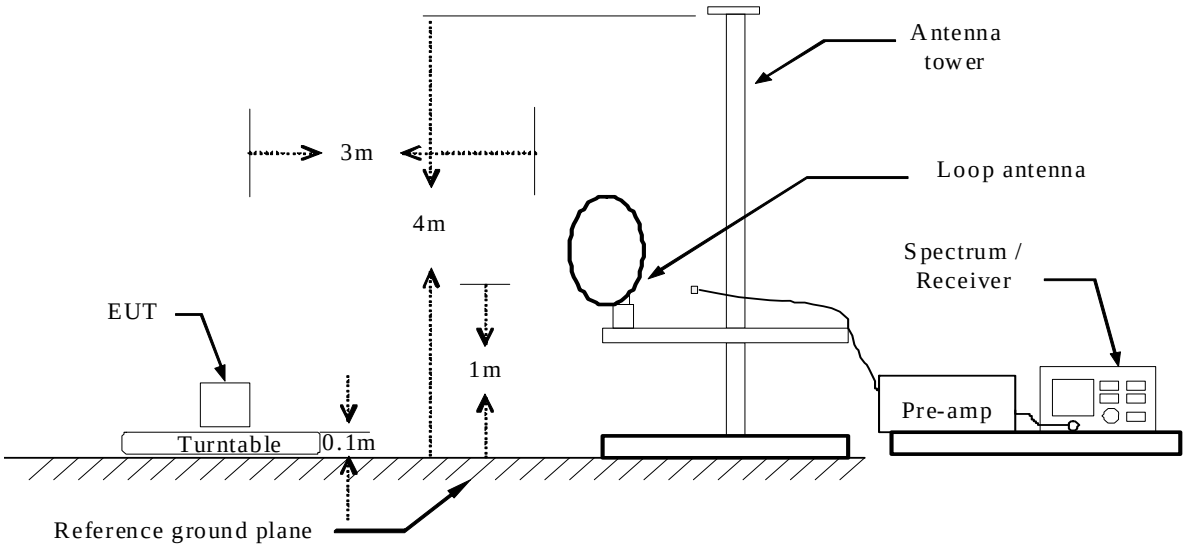
Remark: *Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of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

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

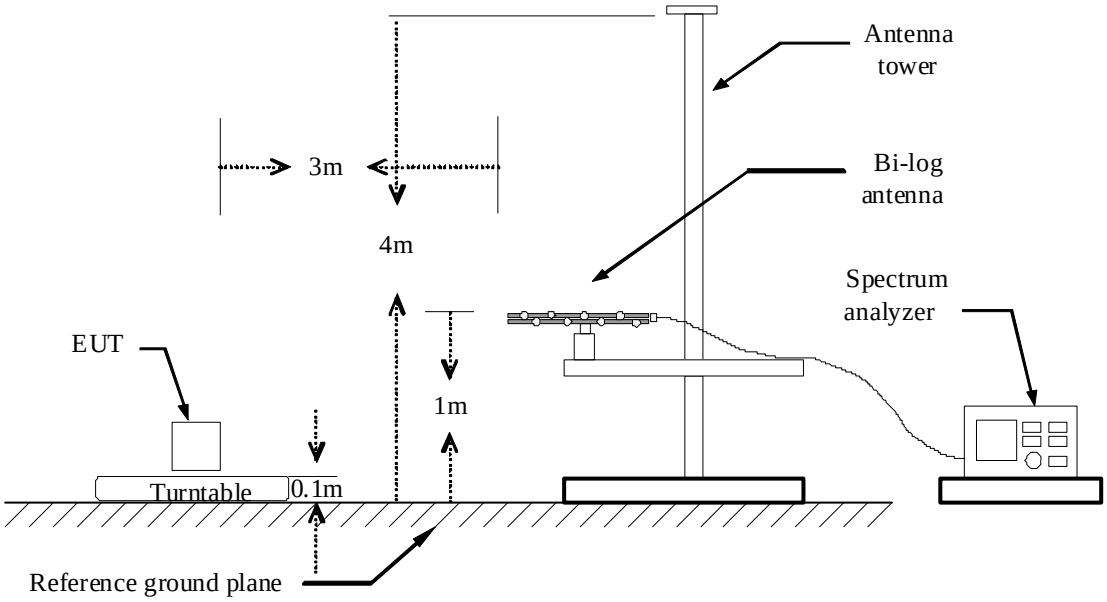
Frequency (MHz)	Field Strength (μV/m at 3-meter)	Field Strength (dBμV/m at 3-meter)
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

Test Configuration

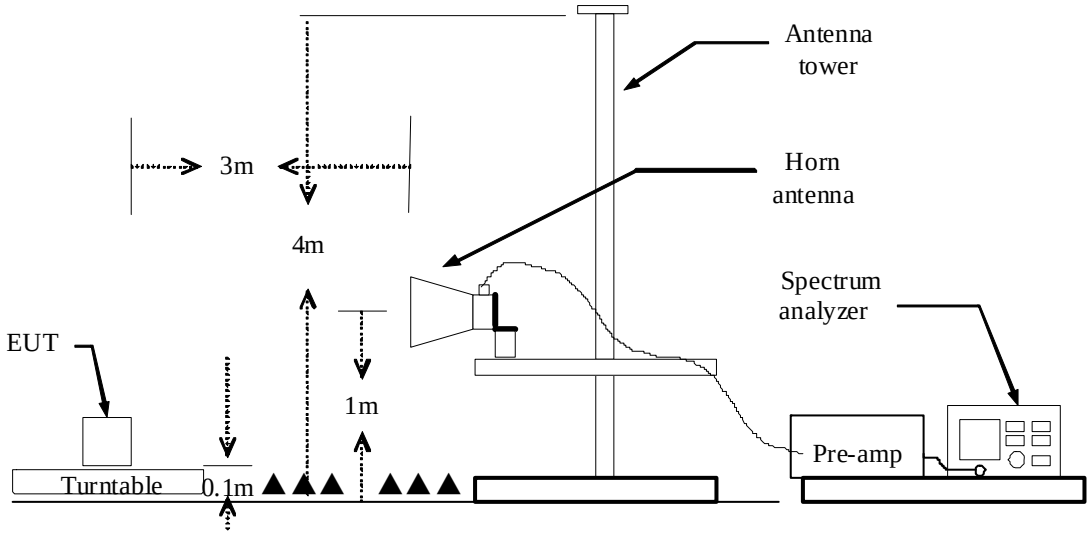
Below 30MHz



Below 1 GHz



Above 1 GHz



TEST PROCEDURE

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

Below 1GHz:

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

Above 1GHz:

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

(b) AVERAGE: RBW=1MHz / Sweep=AUTO

VBW=10Hz,when duty cycle is no less than 98 percent.

VBW≧1/T,when duty cycle is less than 98 percent,where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximun power control level for the tested mode of operation.

Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
IEEE 802.11 a	96.4	993.3	0.001	10Hz
IEEE 802.11n HT20	96.4	993.3	0.001	10Hz
IEEE 802.11n HT40	96.4	993.3	0.001	10Hz
IEEE 802.11ac VHT20	96.4	993.3	0.001	10Hz
IEEE 802.11ac VHT40	96.4	993.3	0.001	10Hz
IEEE 802.11ac VHT80	95.7	996.9	0.001	10Hz

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

Test Result of Radiated Emission

Below 30MHz

The interference of the frequency value is lower than the limit below 20 dB, measured as the background noise values and will not be recorded.

30MHz-1GHz

Operation Mode:	Normal Link	**Test Date:**	2017-11-9
Temperature:	25°C	**Tested by:**	Lily.Wang
Humidity:	48% RH	**Polarity:**	Ver. / Hor.

Frequency (MHz)	Ant. Pol. (H/V)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
38.7300	V	14.51	17.75	32.26	40.00	-7.74	peak
45.5200	V	16.71	14.25	30.96	40.00	-9.04	peak
119.2400	V	13.26	14.14	27.40	43.50	-16.10	peak
310.3300	V	19.63	17.79	37.42	46.00	-8.58	peak
315.1800	V	17.38	17.89	35.27	46.00	-10.73	peak
753.6200	V	5.80	27.21	33.01	46.00	-12.99	peak
30.0000	H	4.98	24.23	29.21	40.00	-10.79	peak
48.4300	H	12.61	12.90	25.51	40.00	-14.49	peak
82.3800	H	11.24	11.91	23.15	40.00	-16.85	peak
310.3300	H	13.46	17.79	31.25	46.00	-14.75	peak
330.7000	H	11.50	18.20	29.70	46.00	-16.30	peak
813.7600	H	6.38	27.28	33.66	46.00	-12.34	peak

Remark:

1. Measuring frequencies from 30 MHz to the 1GHz.(no emission found from the lowest internal used/generated frequency to 30MHz)
2. Radiated emissions measured 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 CH Low	**Test Date:**	2017-11-16
Temperature:	25°C	**Tested by:**	Lily.Wang
Humidity:	55% RH	**Polarity:**	Ver. / Hor.

Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	11951.923	39.41	10.39	49.80	74.00	-24.20	200	221	peak
2	17896.253	33.34	18.25	51.59	74.00	-22.41	100	160	peak
3	N/A								
4									
5									
6									

Vertical

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	12725.378	37.89	12.99	50.88	74.00	-23.12	100	296	peak
2	17896.541	33.80	18.25	52.05	74.00	-21.95	100	0	peak
3	N/A								
4									
5									
6									

Operation Mode:	Tx / IEEE 802.11a mode CH Mid	**Test Date:**	2017-11-16
Temperature:	25°C	**Tested by:**	Lily.Wang
Humidity:	55% RH	**Polarity:**	Ver. / Hor.

Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	11951.923	39.76	10.39	50.15	74.00	-23.85	100	0	peak
2	17264.423	33.73	16.44	50.17	74.00	-23.83	200	43	peak
3	N/A								
4									
5									
6									

Vertical

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	11829.327	38.78	10.69	49.47	74.00	-24.53	100	352	peak
2	17713.942	33.35	17.96	51.31	74.00	-22.69	200	224	peak
3	N/A								
4									
5									
6									

Operation Mode:	Tx / IEEE 802.11a mode CH High	Test Date:	2017-11-16
Temperature:	25°C	Tested by:	Lily.Wang
Humidity:	55% RH	Polarity:	Ver. / Hor.

Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	12401.442	37.93	12.00	49.93	74.00	-24.07	200	332	peak
2	17754.808	33.95	18.03	51.98	74.00	-22.02	100	55	peak
3	N/A								
4									
5									
6									

Vertical

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	11095.123	40.28	12.65	52.93	74.00	-21.07	100	159	peak
2	15287.368	38.63	13.37	52.00	74.00	-22.00	100	166	peak
3	N/A								
4									
5									
6									

Operation Mode:	TX / IEEE 802.11n HT20 mode /CH Low	Test Date:	2017-11-16
Temperature:	25°C	Tested by:	Lily.Wang
Humidity:	55% RH	Polarity:	Ver. / Hor.

Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	11134.615	39.48	12.54	52.02	74.00	-21.98	100	276	peak
2	17869.654	33.04	18.21	51.25	74.00	-22.75	100	62	peak
3	N/A								
4									
5									
6									

Vertical

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	11134.615	39.67	12.54	52.21	74.00	-21.79	200	250	peak
2	17383.664	35.02	17.04	52.06	74.00	-21.94	100	205	peak
3	N/A								
4									
5									
6									

Operation Mode:	TX / IEEE 802.11n HT20 mode /CH Mid	Test Date:	2017-11-16
Temperature:	25°C	Tested by:	Lily.Wang
Humidity:	55% RH	Polarity:	Ver. / Hor.

Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	11829.327	38.91	10.69	49.60	74.00	-24.40	200	223	peak
2	17346.154	33.87	16.85	50.72	74.00	-23.28	100	0	peak
3	N/A								
4									
5									
6									

Vertical

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	11829.327	38.59	10.69	49.28	74.00	-24.72	100	130	peak
2	17397.648	35.85	17.11	52.96	74.00	-21.04	100	184	peak
3	N/A								
4									
5									
6									

Operation Mode:	TX / IEEE 802.11n HT20 mode /CH High	Test Date:	2017-11-16
Temperature:	25°C	Tested by:	Lily.Wang
Humidity:	55% RH	Polarity:	Ver. / Hor.

Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	11788.461	39.32	10.79	50.11	74.00	-23.89	200	323	peak
2	17346.154	34.83	16.85	51.68	74.00	-22.32	200	326	peak
3	N/A								
4									
5									
6									

Vertical

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	11093.750	39.23	12.66	51.89	74.00	-22.11	100	173	peak
2	14812.500	36.53	15.47	52.00	74.00	-22.00	100	360	peak
3	N/A								
4									
5									
6									

Operation Mode:	TX / IEEE 802.11n HT40 mode /CH Low	Test Date:	2017-11-16
Temperature:	25°C	Tested by:	Lily.Wang
Humidity:	55% RH	Polarity:	Ver. / Hor.

Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	11706.731	39.58	11.00	50.58	74.00	-23.42	100	0	peak
2	17100.962	34.21	15.62	49.83	74.00	-24.17	100	227	peak
3	N/A								
4									
5									
6									

Vertical

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	12197.115	37.79	11.12	48.91	74.00	-25.09	200	150	peak
2	16692.308	34.31	15.58	49.89	74.00	-24.11	100	222	peak
3	N/A								
4									
5									
6									

Operation Mode:	TX / IEEE 802.11n HT40 mode /CH High	Test Date:	2017-11-16
Temperature:	25°C	Tested by:	Lily.Wang
Humidity:	55% RH	Polarity:	Ver. / Hor.

Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	11584.135	38.45	11.30	49.75	74.00	-24.25	200	52	peak
2	16447.115	36.05	15.62	51.67	74.00	-22.33	200	222	peak
3	N/A								
4									
5									
6									

Vertical

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	12769.231	38.23	13.10	51.33	74.00	-22.67	100	239	peak
2	17387.019	34.61	17.05	51.66	74.00	-22.34	141	0	peak
3	N/A								
4									
5									
6									

Operation Mode:	TX / IEEE 802.11ac VHT20 mode /CH Low	Test Date:	2017-11-16
Temperature:	25°C	Tested by:	Lily.Wang
Humidity:	55% RH	Polarity:	Ver. / Hor.

Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	11747.596	38.12	10.90	49.02	74.00	-24.98	100	240	peak
2	17060.096	33.79	15.41	49.20	74.00	-24.80	100	120	peak
3	N/A								
4									
5									
6									

Vertical

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	11543.269	38.07	11.40	49.47	74.00	-24.53	100	120	peak
2	17836.538	30.88	18.16	49.04	74.00	-24.96	100	310	peak
3	N/A								
4									
5									
6									

Operation Mode:	TX / IEEE 802.11ac VHT20 mode /CH Mid	Test Date:	2017-11-16
Temperature:	25°C	Tested by:	Lily.Wang
Humidity:	55% RH	Polarity:	Ver. / Hor.

Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	11584.135	38.21	11.30	49.51	74.00	-24.49	100	53	peak
2	17100.962	33.30	15.62	48.92	74.00	-25.08	100	150	peak
3	N/A								
4									
5									
6									

Vertical

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	11379.808	38.01	11.85	49.86	74.00	-24.14	100	120	peak
2	16201.923	34.29	14.41	48.70	74.00	-25.30	100	287	peak
3	N/A								
4									
5									
6									

Operation Mode:	TX / IEEE 802.11ac VHT20 mode /CH High	Test Date:	2017-11-16
Temperature:	25°C	Tested by:	Lily.Wang
Humidity:	55% RH	Polarity:	Ver. / Hor.

Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	11216.346	39.55	12.31	51.86	74.00	-22.14	100	10	peak
2	16487.981	32.96	15.82	48.78	74.00	-25.22	100	20	peak
3	N/A								
4									
5									
6									

Vertical

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	11134.615	39.26	12.54	51.80	74.00	-22.20	100	13	peak
2	16406.250	34.91	15.42	50.33	74.00	-23.67	100	233	peak
3	N/A								
4									
5									
6									

Operation Mode:	TX / IEEE 802.11ac VHT40 mode /CH Low	Test Date:	2017-11-16
Temperature:	25°C	Tested by:	Lily.Wang
Humidity:	55% RH	Polarity:	Ver. / Hor.

Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	10807.692	38.83	12.17	51.00	74.00	-23.00	100	136	peak
2	16406.250	34.91	15.42	50.33	74.00	-23.67	100	219	peak
3	N/A								
4									
5									
6									

Vertical

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	11584.135	34.82	11.30	46.12	74.00	-27.88	100	187	peak
2	16610.502	29.35	15.71	45.06	74.00	-28.94	100	239	peak
3	N/A								
4									
5									
6									

Operation Mode:	TX / IEEE 802.11ac VHT40 mode /CH High	Test Date:	2017-11-16
Temperature:	25°C	Tested by:	Lily.Wang
Humidity:	55% RH	Polarity:	Ver. / Hor.

Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	11258.321	39.09	12.19	51.28	74.00	-22.72	100	25	peak
2	16325.258	33.30	15.02	48.32	74.00	-25.68	100	310	peak
3	N/A								
4									
5									
6									

Vertical

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	11052.885	38.37	12.77	51.14	74.00	-22.86	100	333	peak
2	16406.250	34.91	15.42	50.33	74.00	-23.67	100	233	peak
3	N/A								
4									
5									
6									

Operation Mode:	TX / IEEE 802.11ac VHT80 mode /CH Mid	Test Date:	2017-11-16
Temperature:	25°C	Tested by:	Lily.Wang
Humidity:	55% RH	Polarity:	Ver. / Hor.

Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	12728.365	38.35	13.00	51.35	74.00	-22.65	100	225	peak
2	17468.552	33.72	17.46	51.18	74.00	-22.82	100	0	peak
3	N/A								
4									
5									
6									

Vertical

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	11093.750	39.51	12.66	52.17	74.00	-21.83	201	120	peak
2	17632.212	33.40	17.83	51.23	74.00	-22.77	201	99	peak
3	N/A								
4									
5									
6									

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 3 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

For equipment 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.

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

** Decreases with the logarithm of the frequency.*

TEST CONFIGURATION

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

TEST PROCEDURE

1. The EUT was placed on a table, which is 0.1m 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.

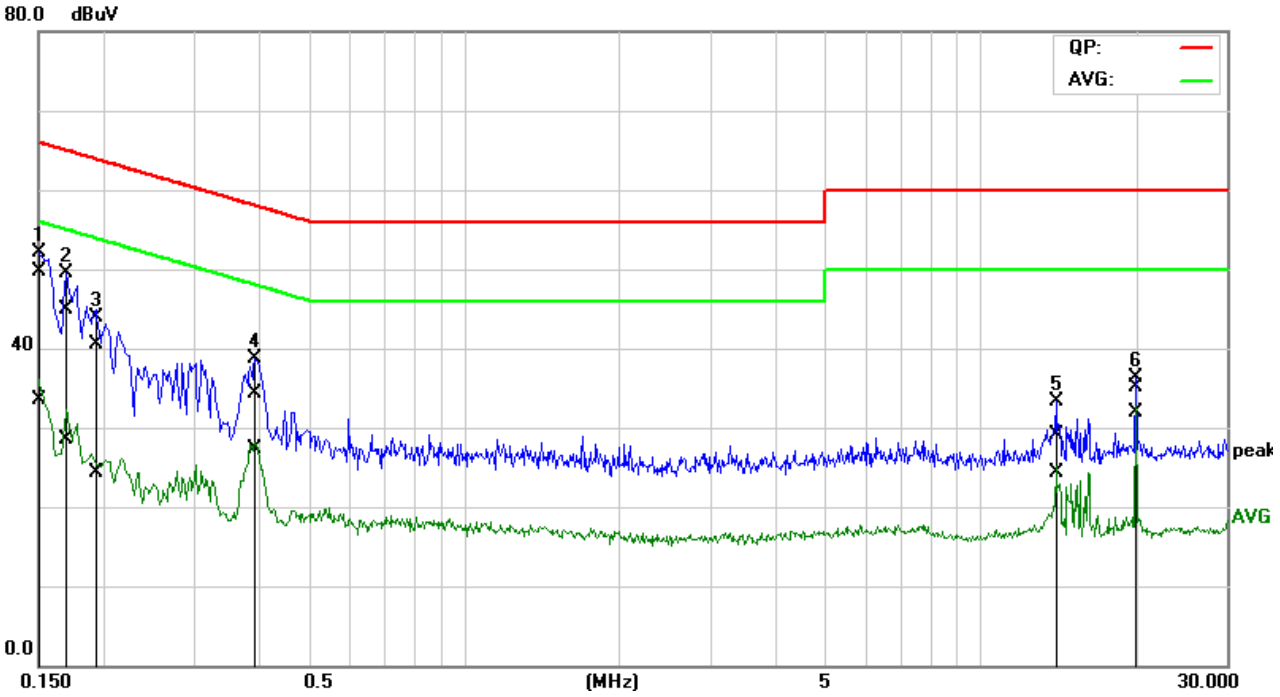
TEST RESULTS

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

Job No.:	C171101R03	Date:	2017/11/20
Model No.:	OFR-T1-G	Time:	17:23:53
Standard:	FCC Class B	Temp.(C)/Hum.(%):	22(C)/48%
Test item:	Conduction test	Test By:	Lily.Wang
Line:	L1	Test Voltage:	AC 120V/60Hz
Model:		Description:	

L1

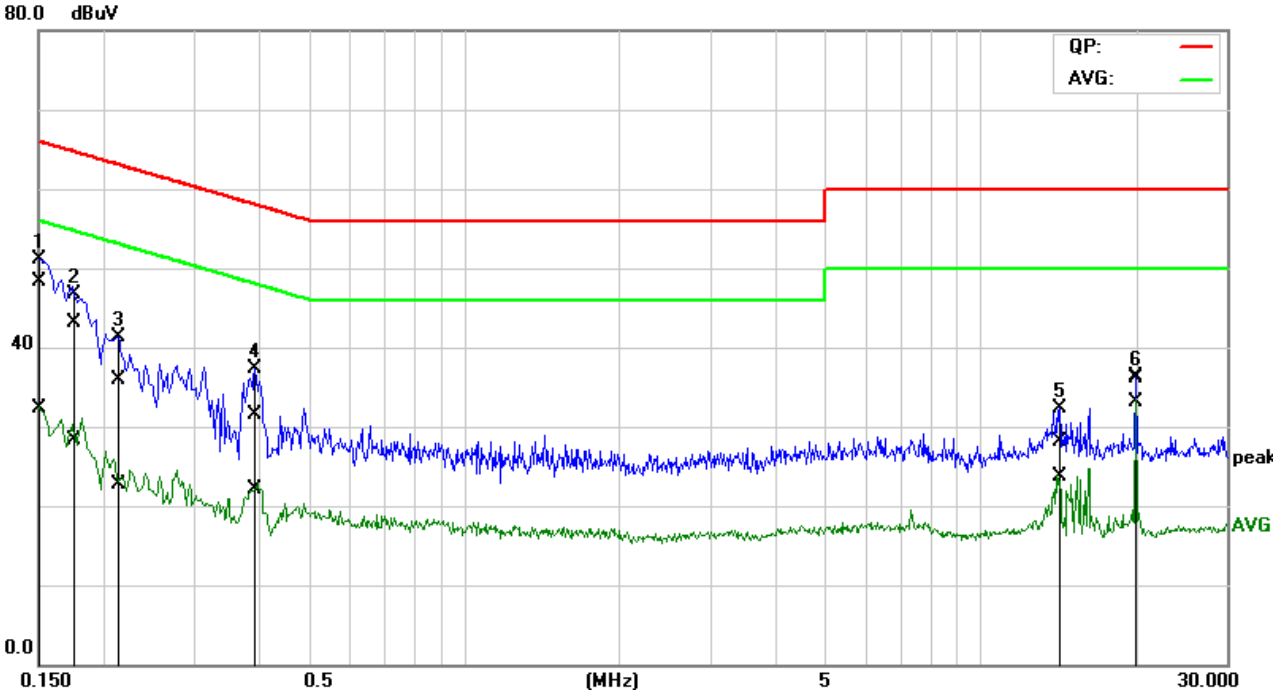


No.	Frequency	QuasiPeak reading	Average reading	Correction factor	QuasiPeak result	Average result	QuasiPeak limit	Average limit	QuasiPeak margin	Average margin	Remark
	(MHz)	(dBuV)	(dBuV)	(dB)	(dBuV)	(dBuV)	(dBuV)	(dBuV)	(dB)	(dB)	
1*	0.1501	29.02	12.99	20.59	49.61	33.58	65.99	55.99	-16.38	-22.41	Pass
2	0.1695	24.28	8.04	20.56	44.84	28.60	64.98	54.98	-20.14	-26.38	Pass
3	0.1960	19.96	3.86	20.52	40.48	24.38	63.77	53.78	-23.29	-29.40	Pass
4	0.3943	13.85	6.71	20.55	34.40	27.26	57.97	47.97	-23.57	-20.71	Pass
5	14.0290	8.37	3.58	20.79	29.16	24.37	60.00	50.00	-30.84	-25.63	Pass
6	19.9990	14.28	11.11	20.87	35.15	31.98	60.00	50.00	-24.85	-18.02	Pass

Note: 1. L1 = Line One (Live Line) / L2 = Line Two (Neutral Line).

Job No.:	C171101R03	Date:	2017/11/20
Model No.:	OFR-T1-G	Time:	17:30:15
Standard:	FCC Class B	Temp.(C)/Hum.(%):	22(C)/48%
Test item:	Conduction test	Test By:	Lily.Wang
Line:	L2	Test Voltage:	AC 120V/60Hz
Model:		Description:	

L2

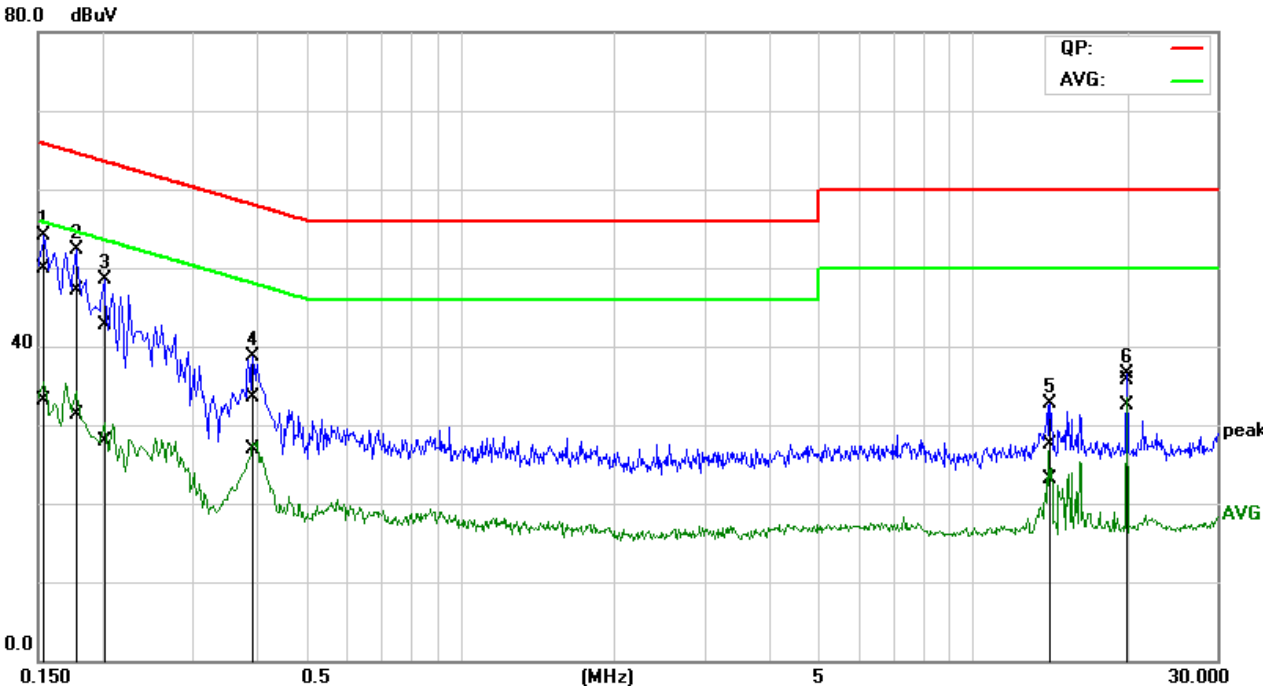


No.	Frequency	QuasiPeak reading	Average reading	Correction factor	QuasiPeak result	Average result	QuasiPeak limit	Average limit	QuasiPeak margin	Average margin	Remark
	(MHz)	(dBuV)	(dBuV)	(dB)	(dBuV)	(dBuV)	(dBuV)	(dBuV)	(dB)	(dB)	
1*	0.1512	27.87	11.89	20.36	48.23	32.25	65.93	55.93	-17.70	-23.68	Pass
2	0.1771	22.73	7.96	20.38	43.11	28.34	64.62	54.62	-21.51	-26.28	Pass
3	0.2123	15.59	2.31	20.41	36.00	22.72	63.11	53.11	-27.11	-30.39	Pass
4	0.3939	11.04	1.62	20.46	31.50	22.08	57.98	47.98	-26.48	-25.90	Pass
5	14.2140	7.32	2.97	20.83	28.15	23.80	60.00	50.00	-31.85	-26.20	Pass
6	20.0001	15.38	12.22	20.82	36.20	33.04	60.00	50.00	-23.80	-16.96	Pass

Note: 1. L1 = Line One (Live Line) / L2 = Line Two (Neutral Line).

Job No.:	C171101R03	Date:	2017/11/20
Model No.:	OFR-T1-G	Time:	17:12:20
Standard:	FCC Class B	Temp.(C)/Hum.(%):	22(C)/48%
Test item:	Conduction test	Test By:	Lily.Wang
Line:	L1	Test Voltage:	AC 240V/60Hz
Model:		Description:	

L1

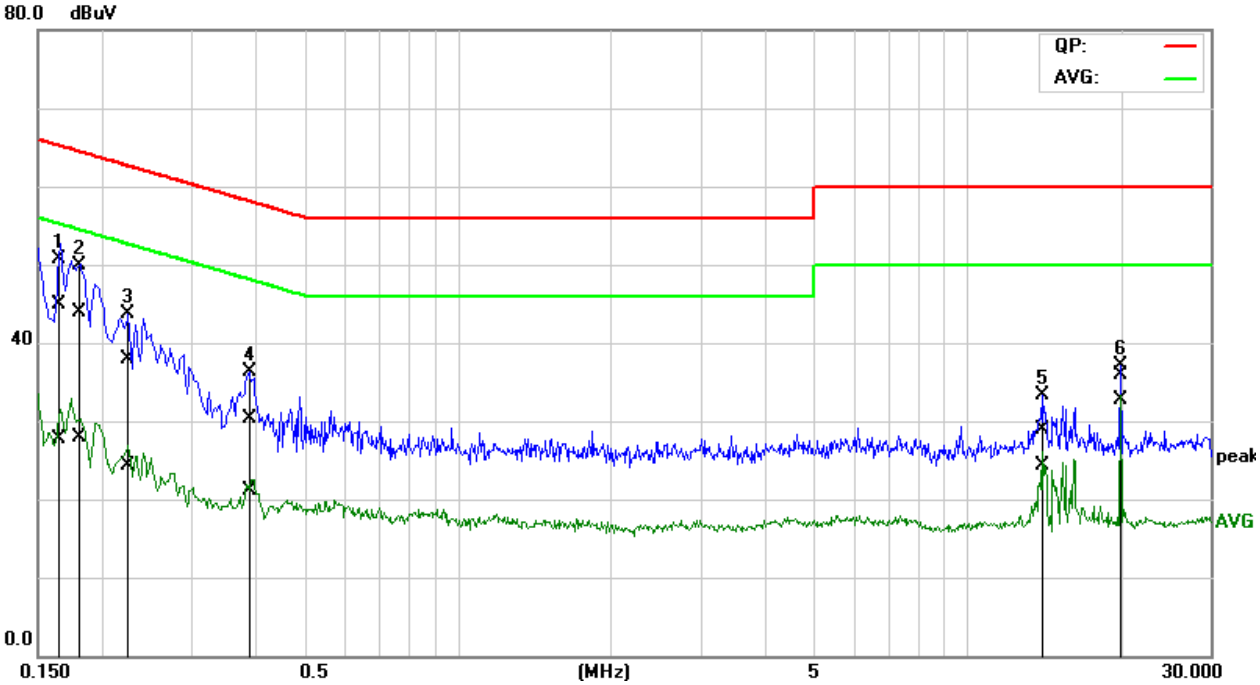


No.	Frequency	QuasiPeak reading	Average reading	Correction factor	QuasiPeak result	Average result	QuasiPeak limit	Average limit	QuasiPeak margin	Average margin	Remark
	(MHz)	(dBuV)	(dBuV)	(dB)	(dBuV)	(dBuV)	(dBuV)	(dBuV)	(dB)	(dB)	
1	0.1533	29.36	12.44	20.58	49.94	33.02	65.81	55.82	-15.87	-22.80	Pass
2	0.1784	26.57	10.83	20.55	47.12	31.38	64.56	54.56	-17.44	-23.18	Pass
3	0.2021	22.18	7.36	20.51	42.69	27.87	63.52	53.52	-20.83	-25.65	Pass
4	0.3935	12.99	6.40	20.55	33.54	26.95	57.99	47.99	-24.45	-21.04	Pass
5	14.1494	6.69	2.28	20.79	27.48	23.07	60.00	50.00	-32.52	-26.93	Pass
6*	20.0012	14.81	11.72	20.87	35.68	32.59	60.00	50.00	-24.32	-17.41	Pass

Note: 1. L1 = Line One (Live Line) / L2 = Line Two (Neutral Line).

Job No.:	C171101R03	Date:	2017/11/20
Model No.:	OFR-T1-G	Time:	17:18:46
Standard:	FCC Class B	Temp.(C)/Hum.(%):	22(C)/48%
Test item:	Conduction test	Test By:	Lily.Wang
Line:	L2	Test Voltage:	AC 240V/60Hz
Model:		Description:	

L2



No.	Frequency	QuasiPeak reading	Average reading	Correction factor	QuasiPeak result	Average result	QuasiPeak limit	Average limit	QuasiPeak margin	Average margin	Remark
	(MHz)	(dBuV)	(dBuV)	(dB)	(dBuV)	(dBuV)	(dBuV)	(dBuV)	(dB)	(dB)	
1	0.1629	24.53	7.29	20.37	44.90	27.66	65.31	55.31	-20.41	-27.65	Pass
2	0.1781	23.58	7.59	20.38	43.96	27.97	64.57	54.57	-20.61	-26.60	Pass
3	0.2259	17.45	3.79	20.42	37.87	24.21	62.60	52.60	-24.73	-28.39	Pass
4	0.3891	9.85	0.56	20.46	30.31	21.02	58.08	48.08	-27.77	-27.06	Pass
5	14.0290	8.16	3.39	20.83	28.99	24.22	60.00	50.00	-31.01	-25.78	Pass
6*	19.9995	15.13	11.96	20.82	35.95	32.78	60.00	50.00	-24.05	-17.22	Pass

Note: 1. L1 = Line One (Live Line) / L2 = Line Two (Neutral Line).

*R*emark:

1.The measuring frequencies range between 0.15 MHz and 30 MHz.

2.The emissions measured in the frequency range between 0.15 MHz and 30MHz were made with an instrument using Quasi-peak detector and Average detector.

3."---" denotes the emission level was or more than 2dB below the Average limit, and no re-check was made.

4.The IF bandwidth of SPA between 0.15MHz and 30MHz was 10KHz. The IF bandwidth of Test Receiver between 0.15MHz and 30MHz was 9kHz.

END OF REPORT