FCC 47 CFR PART 15 SUBPART E

TEST REPORT

For

Computer

Model:
TREK-773;TREK-773XXXXXXXXXXXXXXX(where "X" may be any alphanumeric character , “-” or blank)

Trade Name: Advantech

Issued to

Advantech Co.Ltd.
No.1, Alley 20, Lane 26, Rueiguang Road, Neihu District, Taipei 114, Taiwan, R.O.C.

Issued by

Compliance Certification Services Inc.
No.11, Wugong 6th Rd., Wugu Dist.,
New Taipei City 24891, Taiwan. (R.O.C.)
http://www.ccsrf.com
service@ccsrf.com
Issued Date: February 4, 2016

Testing Laboratory
1309

Revision History

Rev.		Issue Date		Revisions	Effect Page	Revised By
00		February 4, 2016		Initial Issue	ALL	Doris Chu
01		November 4, 2016		1. Modify EUT DESCRIPTION. 2. Modify MRA number. 3. Modify Section 7.4 BAND EDGES data.	P.5, P.12, P.28 ~ P.43	Doris Chu

TABLE OF CONTENTS

1. TEST RESULT CERTIFICATION

Applicant:	Advantech Co.Ltd. No.1, Alley 20, Lane 26, Rueiguang Road, Neihu District, Taipei 114, Taiwan, R.O.C.
Equipment Under Test:	Computer
Trade Name:	Advantech
Model:	TREK-773;TREK-773XXXXXXXXXXXXXXXX(where "X" may be any alphanumeric character , “-” or blank)
Date of Test:	January 28 ~ February 1, 2016

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

We hereby certify that:

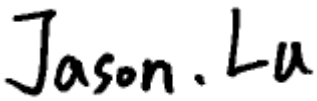
Compliance Certification Services Inc. tested the above equipment. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10: 2013 and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits of FCC Rules Part 15.407.

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

Approved by:

Miller Lee
Manager
Compliance Certification Services Inc.

Tested by:



Jason Lu
Engineer
Compliance Certification Services Inc.

2. EUT DESCRIPTION

<table>
<tr><td>Product</td><td>Computer</td></tr>
<tr><td>Trade Name</td><td>Advantech</td></tr>
<tr><td>Model Number</td><td>TREK-773;TREK-773XXXXXXXXXXXXXXX(where "X" may be any alphanumeric character , “-” or blank)</td></tr>
<tr><td>Model Discrepancy</td><td>All the above models are identical except for the designation of model numbers. The suffix of (where "X" may be any alphanumeric character , “-” or blank) on model number is just for marketing purpose only.</td></tr>
<tr><td>Received Date</td><td>November 24, 2015</td></tr>
<tr><td>Power Supply</td><td>Supports 12/24 V car power system
(9V ~ 32V wide DC input)</td></tr>
<tr><td>Frequency Range</td><td>IEEE 802.11a, IEEE 802.11n HT20 mode: 5745 ~ 5825MHz
IEEE 802.11n HT40 mode: 5755 ~ 5795MHz</td></tr>
<tr><td>Channel Number</td><td>IEEE 802.11a, IEEE 802.11n HT20 mode: 5 Channels
IEEE 802.11n HT40 mode: 2 Channels</td></tr>
<tr><td>Transmit Power</td><td>
<table>
<tr><th></th><th>Mode</th><th>Frequency Range (MHz)</th><th>Transmit Power (dBm)</th><th>Transmit Power (W)</th></tr>
<tr><td rowspan="3">U-NII-3</td><td>IEEE 802.11a</td><td>5745 ~ 5825</td><td>19.28</td><td>0.0847</td></tr>
<tr><td>IEEE 802.11n HT 20 MHz</td><td>5745 ~ 5825</td><td>21.14</td><td>0.1300</td></tr>
<tr><td>IEEE 802.11n HT 40 MHz</td><td>5755 ~ 5795</td><td>9.82</td><td>0.0096</td></tr>
</table>
</td></tr>
<tr><td>Modulation Technique</td><td>OFDM (QPSK, BPSK, 16-QAM, 64-QAM)</td></tr>
<tr><td>Transmit Data Rate</td><td>IEEE 802.11a mode: OFDM (54, 48, 36, 24, 18, 12, 9, 6 Mbps)
IEEE 802.11n HT 20 mode: OFDM (6.5, 7.2, 13, 14.4, 14.44, 19.5, 21.7, 26, 28.9, 39, 43.3, 52, 57.8, 58.5, 65.0, 72.2, 78, 86.67, 104, 115.56, 117, 130, 144.44 Mbps)
IEEE 802.11n HT 40 mode: OFDM (13.5, 15, 27, 30, 40.5, 45, 54, 60, 81, 90, 108, 120, 121.5, 135, 150, 162, 180, 216, 240, 243, 270, 300 Mbps)</td></tr>
<tr><td>Antenna Specification</td><td>Cortec / AN2450-16HM01BRS
Gain: 6.67 dBi</td></tr>
<tr><td>Antenna Designation</td><td>Dipole Antenna</td></tr>
<tr><td>Antenna Category</td><td>☒ Integral: antenna permanently attached
☐ External dedicated antennas
☐ External Unique antenna connector</td></tr>
</table>

Remark:

1. *The sample selected for test was engineering sample that approximated to production product and was provided by manufacturer.*
2. *This submittal(s) (test report) is intended for FCC ID: **M82-TREK773LTE** filing to comply with Section 15.407 of the FCC Part 15, Subpart E Rules.*
3. *The EUT Antenna requirement was follow Part 15.203 rule.*

3. TEST METHODOLOGY

Both conducted and radiated testing was performed according to the procedures in ANSI C63.10: 2013 Radiated testing was performed at an antenna to EUT distance 3 meters.

The tests documented in this report were performed in accordance with ANSI C63.10: 2013, FCC CFR 47 Part 15.207, 15.209, 15.407 and KDB 789033 D02 General UNII Test Procedures New Rules v01.

3.1 EUT CONFIGURATION

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

3.2 EUT EXERCISE

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

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

3.3 GENERAL TEST PROCEDURES

Conducted Emissions

According to the requirements in 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

The EUT is placed on a turntable, Above 1 GHz is 1.5m high and below 1 GHz is 0.8m high above ground plane. 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 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	4.5 - 5.15
[1]0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 -	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.52525	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	156.7 - 156.9	3260 - 3267	23.6 - 24.0
12.29 - 12.293	162.0125 - 167.17	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	167.72 - 173.2	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	240 - 285	3600 - 4400	([2])
13.36 - 13.41	322 - 335.4		

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

[2] Above 38.6

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

3.5 DESCRIPTION OF TEST MODES

The EUT (model: TREK-773) had been tested under operating condition.

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

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

U-NII-3

IEEE 802.11a mode / 5745 ~ 5825MHz

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

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

Channel Low(5745MHz), Channel Mid(5785MHz) and Channel High(5825MHz) with 6.5Mbps data rate were chosen for full testing.

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

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

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

4. INSTRUMENT CALIBRATION

4.1 MEASURING INSTRUMENT CALIBRATION

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

4.2 MEASUREMENT EQUIPMENT USED

Equipment Used for Emissions Measurement

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

Conducted Emissions Test Site				
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
Spectrum Analyzer	Agilent	E4446A	US42510252	12/07/2016
Thermostatic/Humidity Chamber	TAICHY	MHG-150LF	930619	10/07/2016
AC Power Source	EXTECH	6205	1140845	N.C.R
DC Power Supply	ABM	8301HD	D011531	N.C.R
Power Meter	Anritsu	ML2495A	1012009	07/07/2016
Power Sensor	Anritsu	MA2411A	0917072	07/07/2016
Spectrum Analyzer	ROHDE&SCHWARZ	FSV40	101073	07/19/2016

Wugu 966 Chamber A				
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
Spectrum Analyzer	Agilent	E4446A	US42510268	01/24/2017
EMI Test Receiver	R&S	ESCI	100064	06/03/2016
Bilog Antenna	Sunol Sciences	JB3	A030105	08/05/2016
Horn Antenna	EMCO	3117	00055165	01/25/2017
Horn Antenna	EMCO	3116	26370	12/24/2016
Turn Table	CCS	CC-T-1F	N/A	N.C.R
Antenna Tower	CCS	CC-A-1F	N/A	N.C.R
Controller	CCS	CC-C-1F	N/A	N.C.R
Pre-Amplifier	MITEQ	1652-3000	1490939	08/09/2016
Pre-Amplifier	EMC	EMC 012635	980151	06/04/2016
Pre-Amplifier	MITEQ	AMF-6F-260400-40-8P	985646	12/24/2016
Coaxial Cable	Huber+Suhner	102	29212/2	12/24/2016
Coaxial Cable	Huber+Suhner	102	29406/2	12/24/2016
Test S/W	EZ-EMC (CCS-3A1RE)			

4.3 MEASUREMENT UNCERTAINTY

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

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

5. FACILITIES AND ACCREDITATIONS

5.1 FACILITIES

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

☐ No.139, Wugong Rd., Wugu Dist., New Taipei City 24891, Taiwan (R.O.C.)
Tel: 886-2-2298-4086 / Fax: 886-2-2298-1470

☒ No.11, Wugong 6th Rd., Wugu Dist., New Taipei City 24891, Taiwan. (R.O.C.)
Tel: 886-2-2299-9720 / Fax: 886-2-2298-4045

☐ No.81-1, Lane 210, Bade 2nd Rd., Lujhu Township, Taoyuan County 33841, TAIWAN, R.O.C.
Tel: 886-3-324-0332 / Fax: 886-3-324-5235

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.10: 2013 and CISPR Publication 22.

5.2 EQUIPMENT

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

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

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

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

5.3 TABLE OF ACCREDITATIONS AND LISTINGS

Country	Agency	Scope of Accreditation	Logo
USA	FCC	3M Semi Anechoic Chamber (FCC MRA: TW1039) to perform FCC Part 15 measurements	FCC MRA: TW1039
Taiwan	TAF	LP0002, RTTE01, FCC Method-47 CFR Part 15 Subpart C, D, E, RSS-210, RSS-310 IDA TS SRD, AS/NZS 4268, AS/NZS 4771, TS 12.1 & 12,2, ETSI EN 300 440-1, ETSI EN 300 440-2, ETSI EN 300 328, ETSI EN 300 220-1, ETSI EN 300 220-2, ETSI EN 301 893, ETSI EN 301 489-1/3/7/17 FCC OET Bulletin 65 + Supplement C, EN 50360, EN 50361, EN 50371, RSS 102, EN 50383, EN 50385, EN 50392, IEC 62209, CNS 14958-1, CNS 14959 FCC Method –47 CFR Part 15 Subpart B IEC / EN 61000-3-2, IEC / EN 61000-3-3, IEC / EN 61000-4-2/3/4/5/6/8/11	TAF Testing Laboratory 1309
Canada	Industry Canada	3M Semi Anechoic Chamber (IC 2324G-1 / IC 2324G-2) to perform	Canada IC 2324G-1 IC 2324G-2

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

6. SETUP OF EQUIPMENT UNDER TEST

6.1 SETUP CONFIGURATION OF EUT

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

6.2 SUPPORT EQUIPMENT

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

Remark:

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

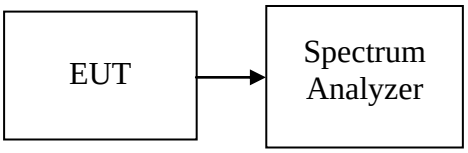
7. FCC PART 15 REQUIREMENTS

7.1 6DB BANDWIDTH

LIMIT

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

Test Configuration



TEST PROCEDURE

1. Place the EUT on the table and set it in the transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set the spectrum analyzer as RBW: 100kHz / VBW: 300kHz, Span = 50MHz, Sweep = auto.
4. Mark the peak frequency and –6dB (upper and lower) frequency.
5. Repeat until all the rest channels are investigated.

TEST RESULTS

No non-compliance noted

Test Data

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

Channel	Frequency (MHz)	6db Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5745	16.3942	16.7307
Mid	5785	16.3461	24.6634
High	5825	16.3942	22.8365

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

Channel	Frequency (MHz)	6db Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5745	17.5480	17.7884
Mid	5785	17.5961	24.9519
High	5825	17.5961	17.9326

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

Channel	Frequency (MHz)	6db Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5745	17.5961	17.7884
Mid	5785	17.5480	21.5865
High	5825	17.5961	17.7884

Test mode: IEEE 802.11n HT 40 MHz mode / 5755 ~ 5815MHz / Chain 0

Channel	Frequency (MHz)	6db Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5755	35.1282	36.0256
High	5795	35.1282	36.1538

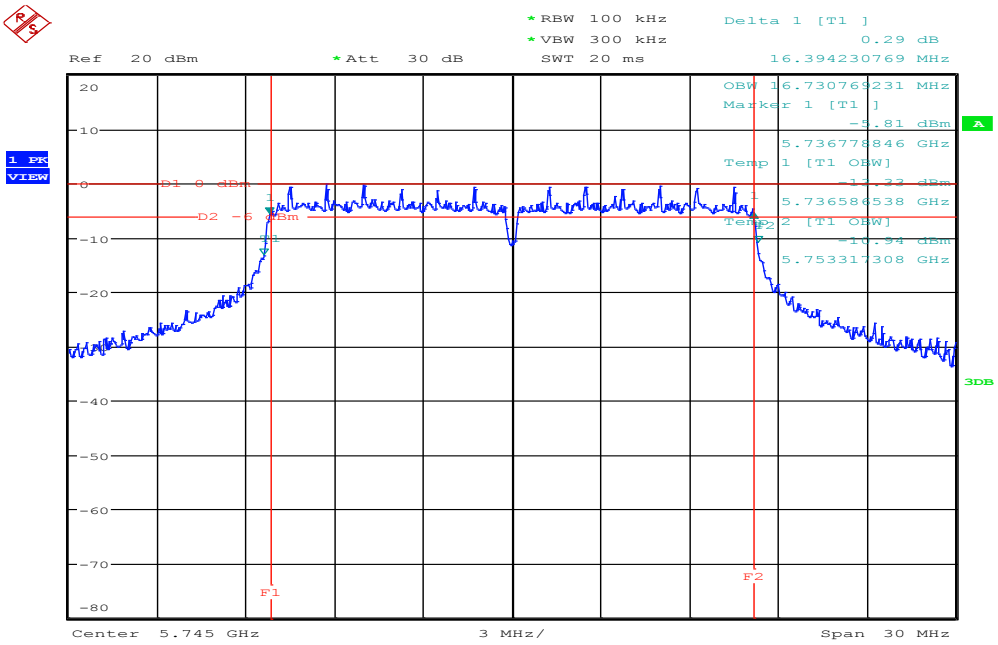
Test mode: IEEE 802.11n HT 40 MHz mode / 5755 ~ 5815MHz / Chain 1

Channel	Frequency (MHz)	6db Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5755	35.1282	36.0256
High	5795	35.0000	36.0256

Test Plot

IEEE 802.11a mode / 5745 ~ 5825MHz

CH Low



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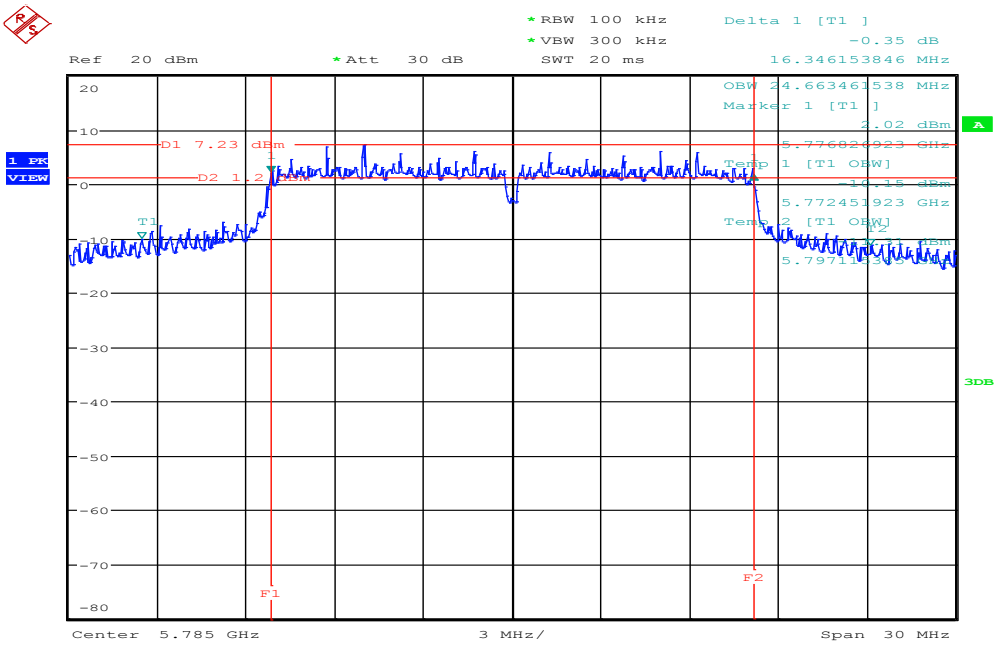
CH Mid



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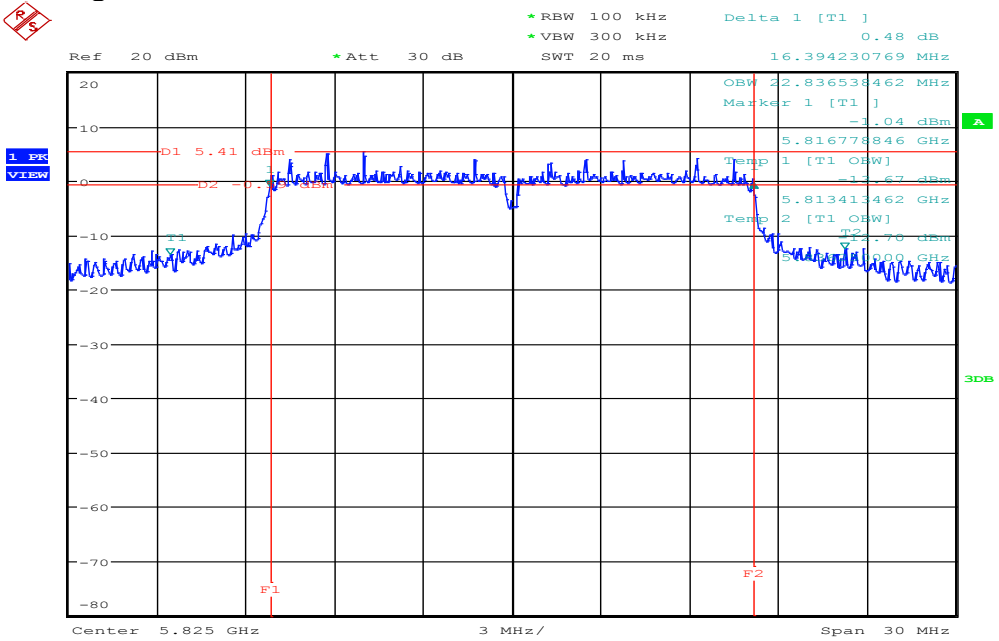
CH High



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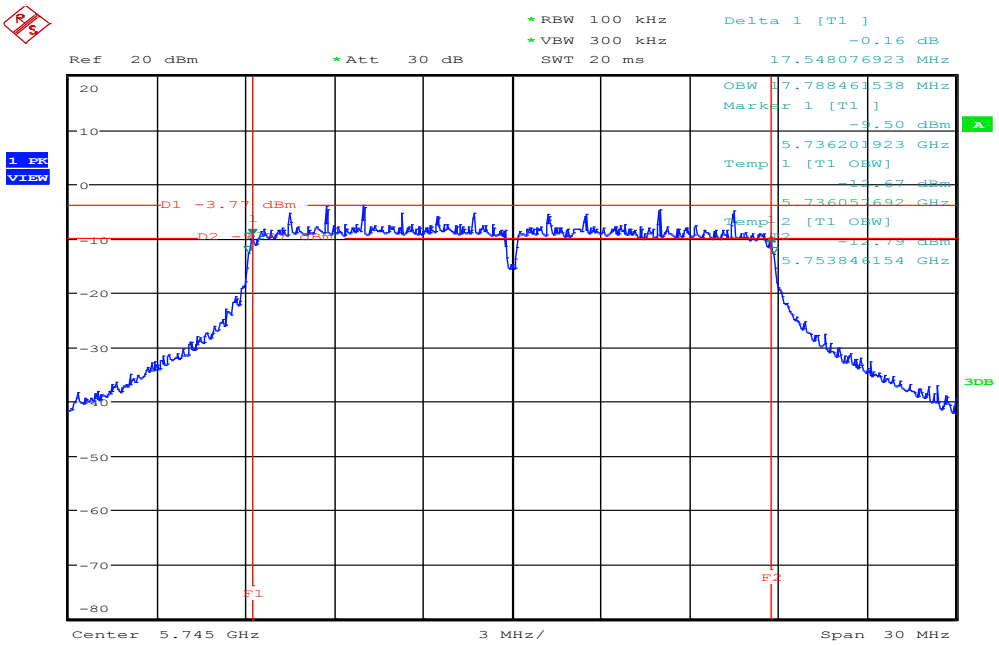
IEEE 802.11n HT 20 MHz mode / 5745 ~ 5825MHz / Chain 0

CH Low



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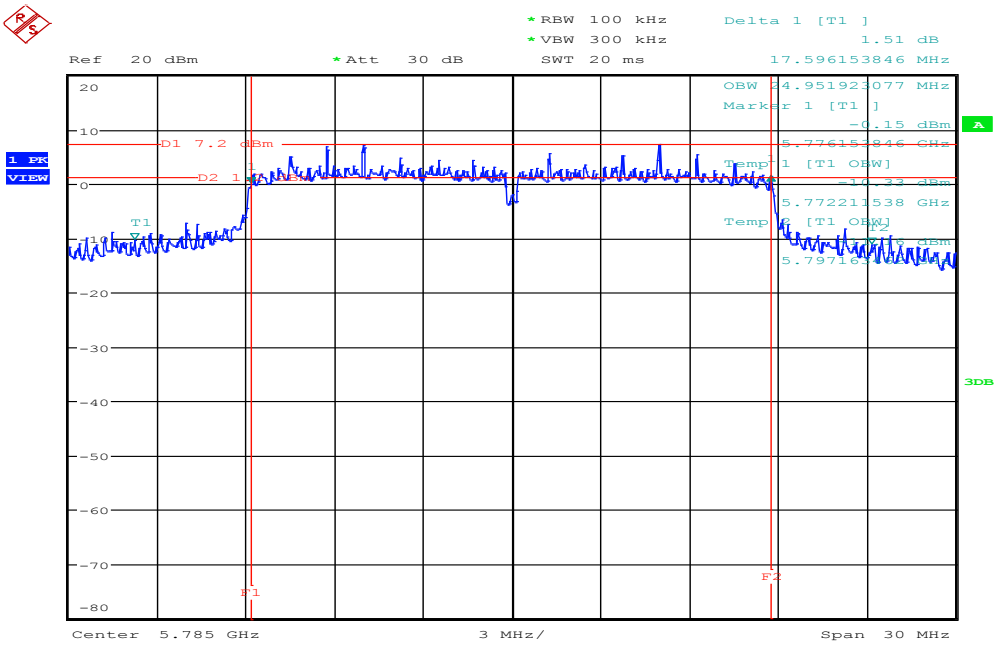
CH Mid



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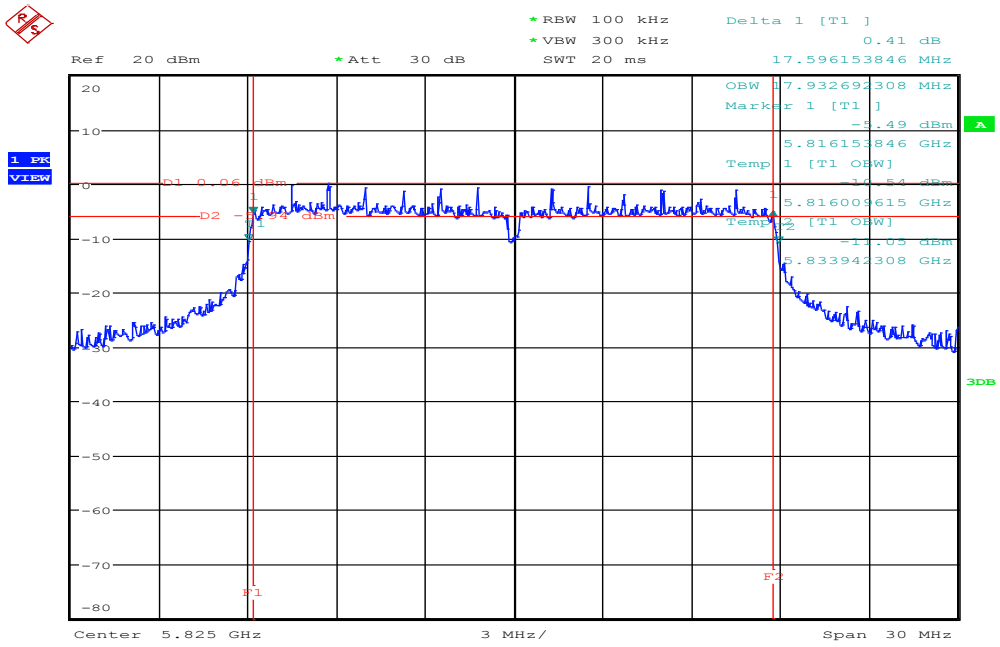
CH High



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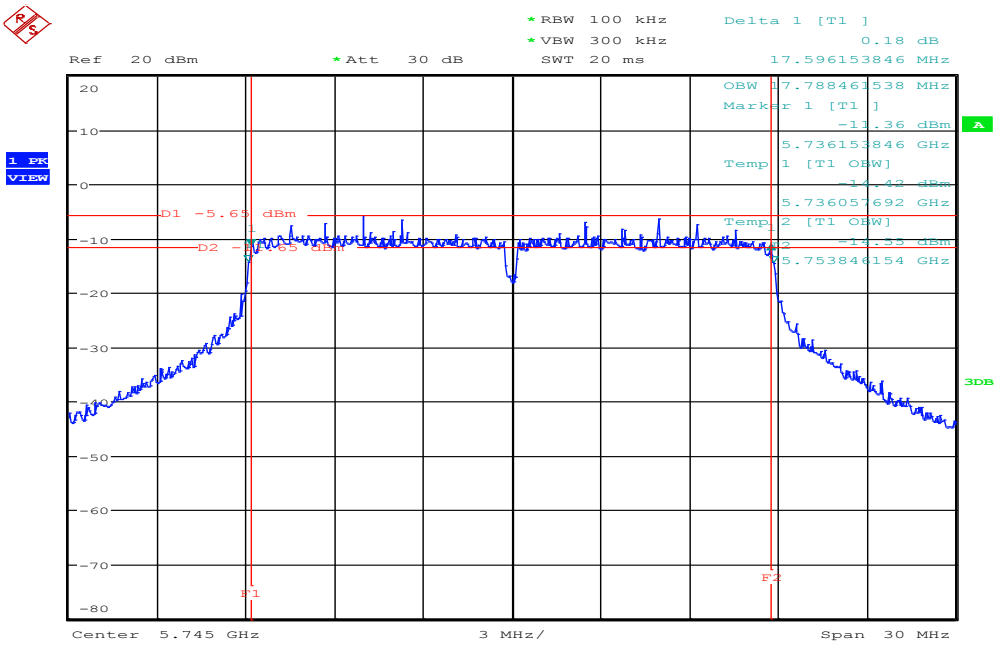
IEEE 802.11n HT 20 MHz mode / 5745 ~ 5825MHz / Chain 1

CH Low



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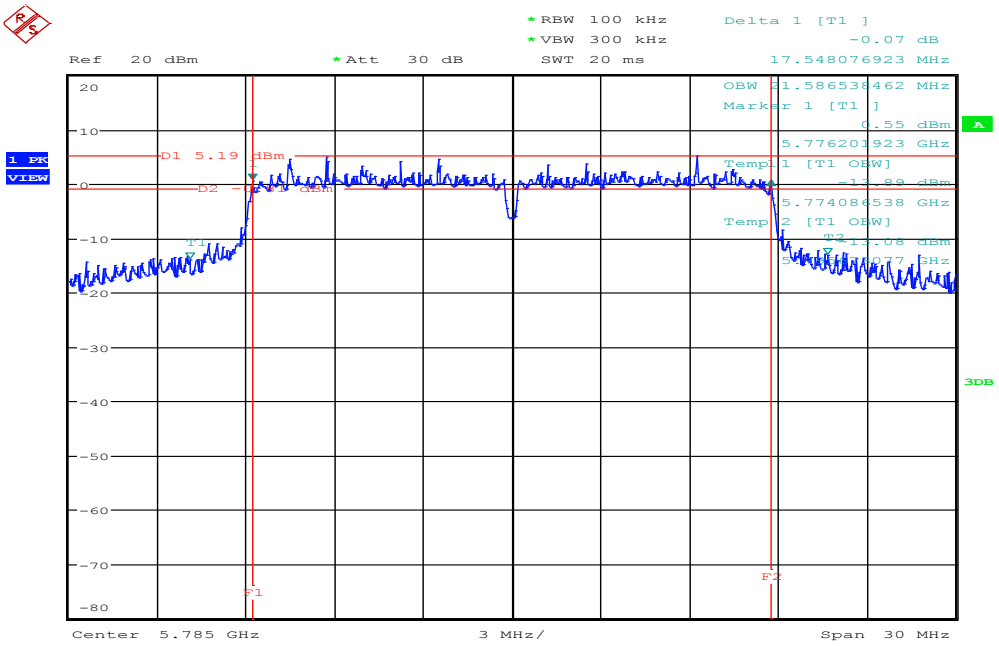
CH Mid



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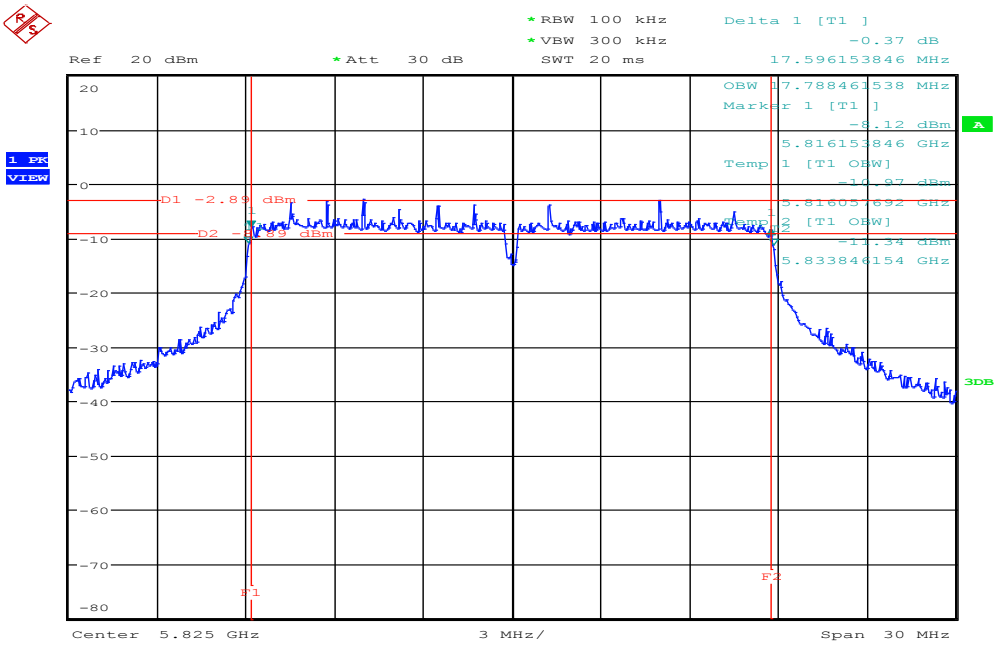

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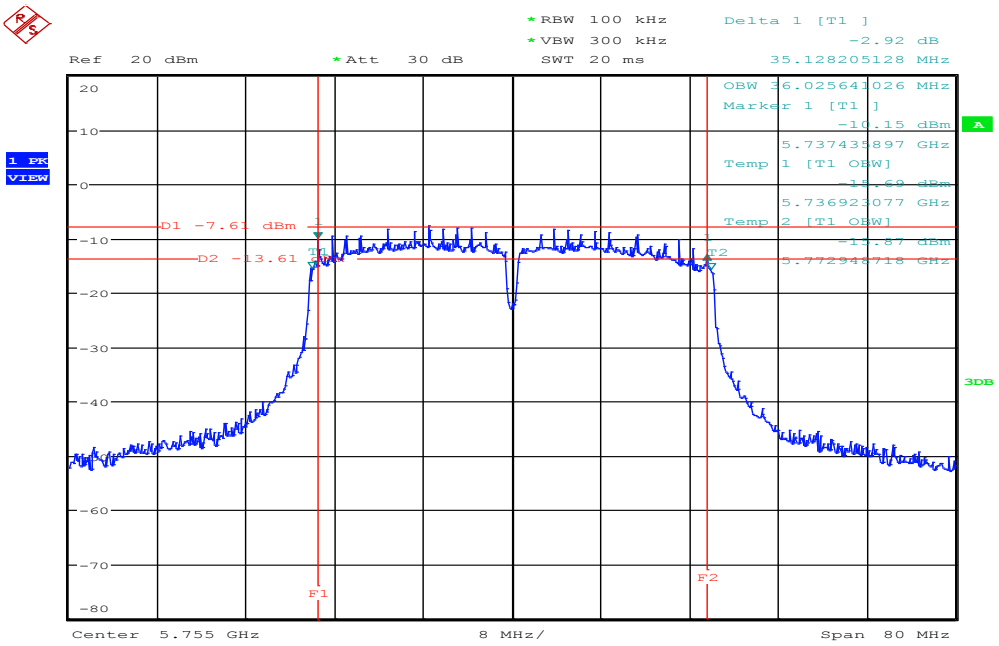
IEEE 802.11n HT 40 MHz mode / 5755 ~ 5795MHz / Chain 0

CH Low



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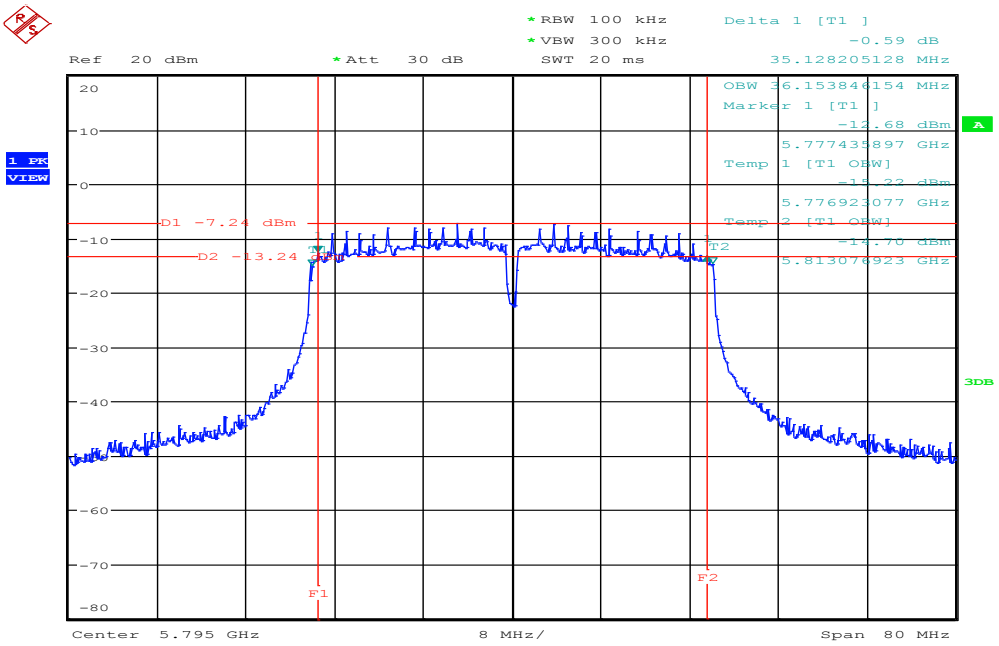
CH High



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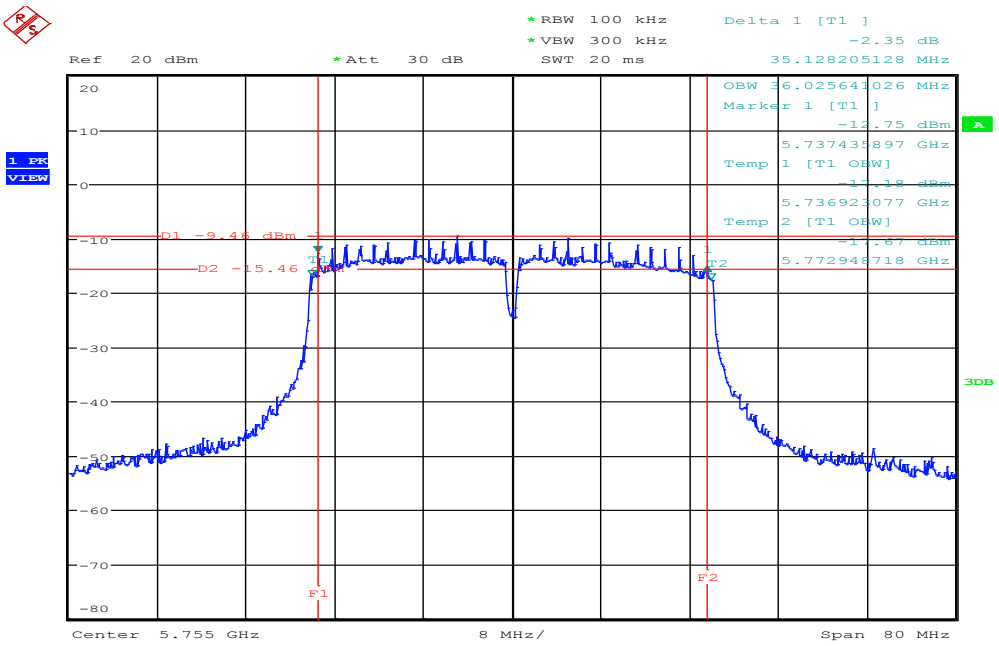
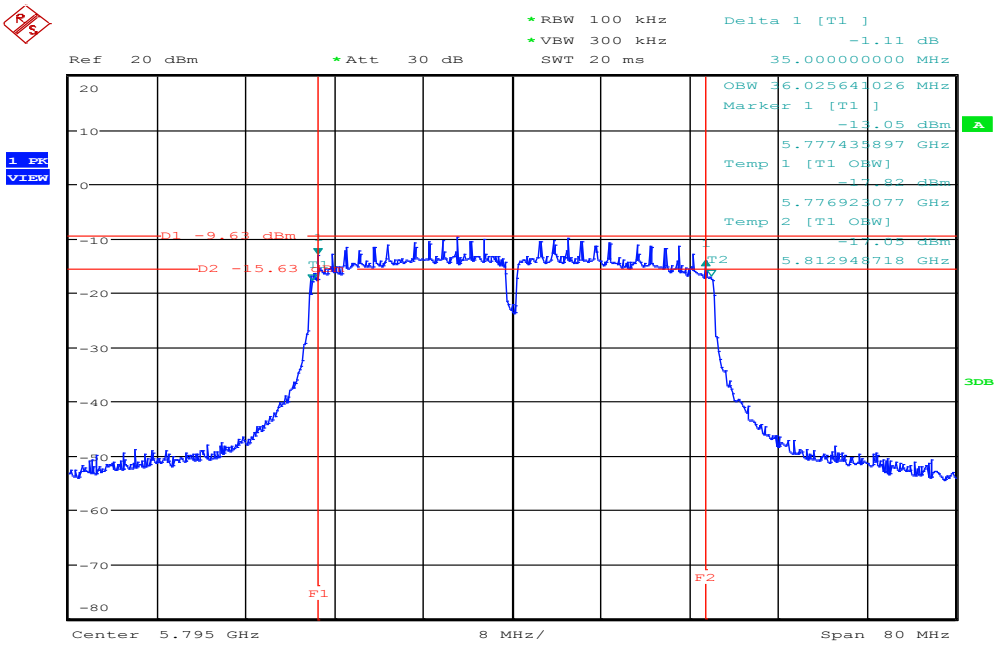
IEEE 802.11n HT 40 MHz mode / 5755 ~ 5795MHz / Chain 1

CH Low



Date: 1.FEB.2016 22:08:58

CH High



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7.2 MAXIMUM OUTPUT POWER

LIMIT

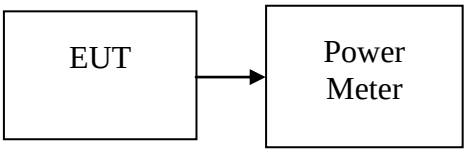
According to §15.407(a)

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

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

Test Configuration

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



TEST PROCEDURE

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

TEST RESULTS

No non-compliance noted

Test Data

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

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (dBm)
Low	5745	12.43	0.0175	30
Mid	5785	19.19	0.0830	30
High	5825	***19.28**	0.0847	30

Test mode: IEEE 802.11n HT 20 MHz mode / 5245 ~ 5825MHz

Channel	Frequency (MHz)	Chain 0 Output Power (dBm)	Chain 1 Output Power (dBm)	Output Power (dBm)	Output Power (W)	Limit (dBm)
Low	5745	8.52	6.58	10.67	0.0117	29.33
Mid	5785	18.72	17.45	***21.14**	0.1300	29.33
High	5825	12.45	9.36	14.18	0.0262	29.33

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

Channel	Frequency (MHz)	Chain 0 Output Power (dBm)	Chain 1 Output Power (dBm)	Output Power (dBm)	Output Power (W)	Limit (dBm)
Low	5755	7.35	5.43	9.51	0.0089	29.33
High	5795	7.89	5.37	***9.82**	0.0096	29.33

Remark:

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

2. The maximum antenna gain is 6.67dBi; therefore the reduction due to antenna gain is 0.67dBi, so the limit is 29.33dBm.

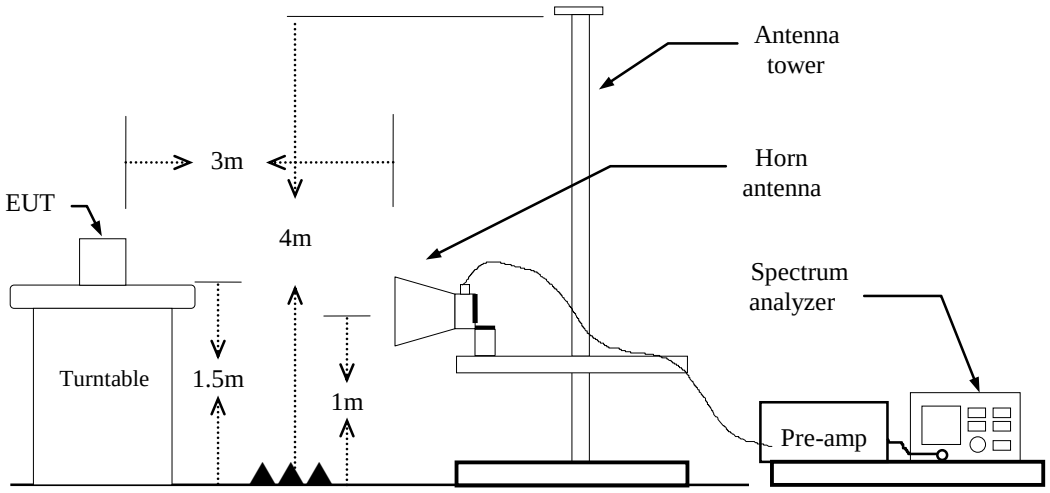
7.3 BAND EDGES MEASUREMENT

LIMIT

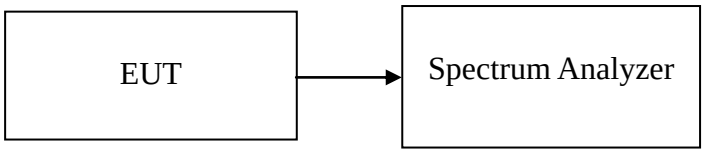
According to §15.407(b),
(1) The provisions of Section 15.205 of this part apply to intentional radiators operating under this section.
(2) When measuring the emission limits, the nominal carrier frequency shall be adjusted as close to the upper and lower frequency block edges as the design of the equipment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

Test Configuration

For Radiated Emission above 1GHz



For Conducted



TEST PROCEDURE

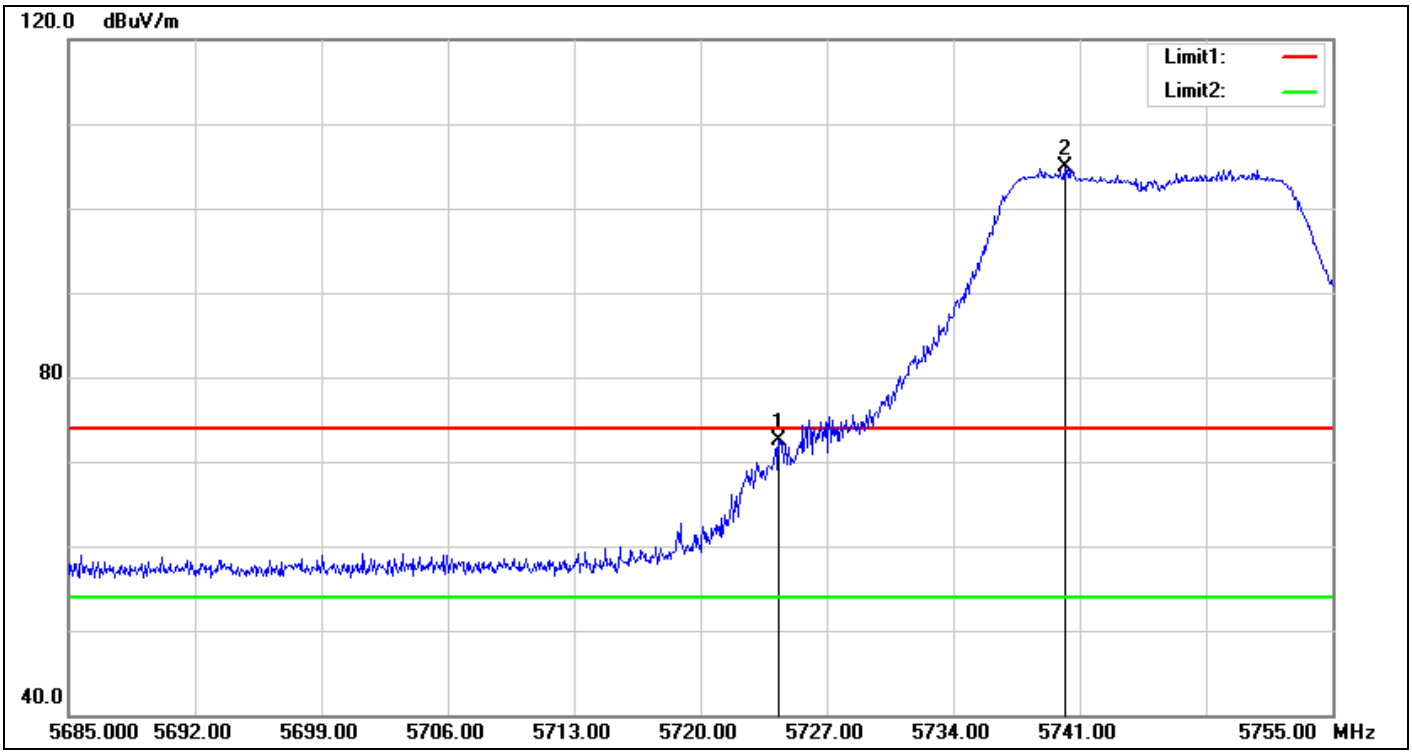
1. The EUT is placed on a turntable, which is 1.5m above the ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission.
4. Set the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

TEST RESULTS

Refer to attach spectrum analyzer data chart.

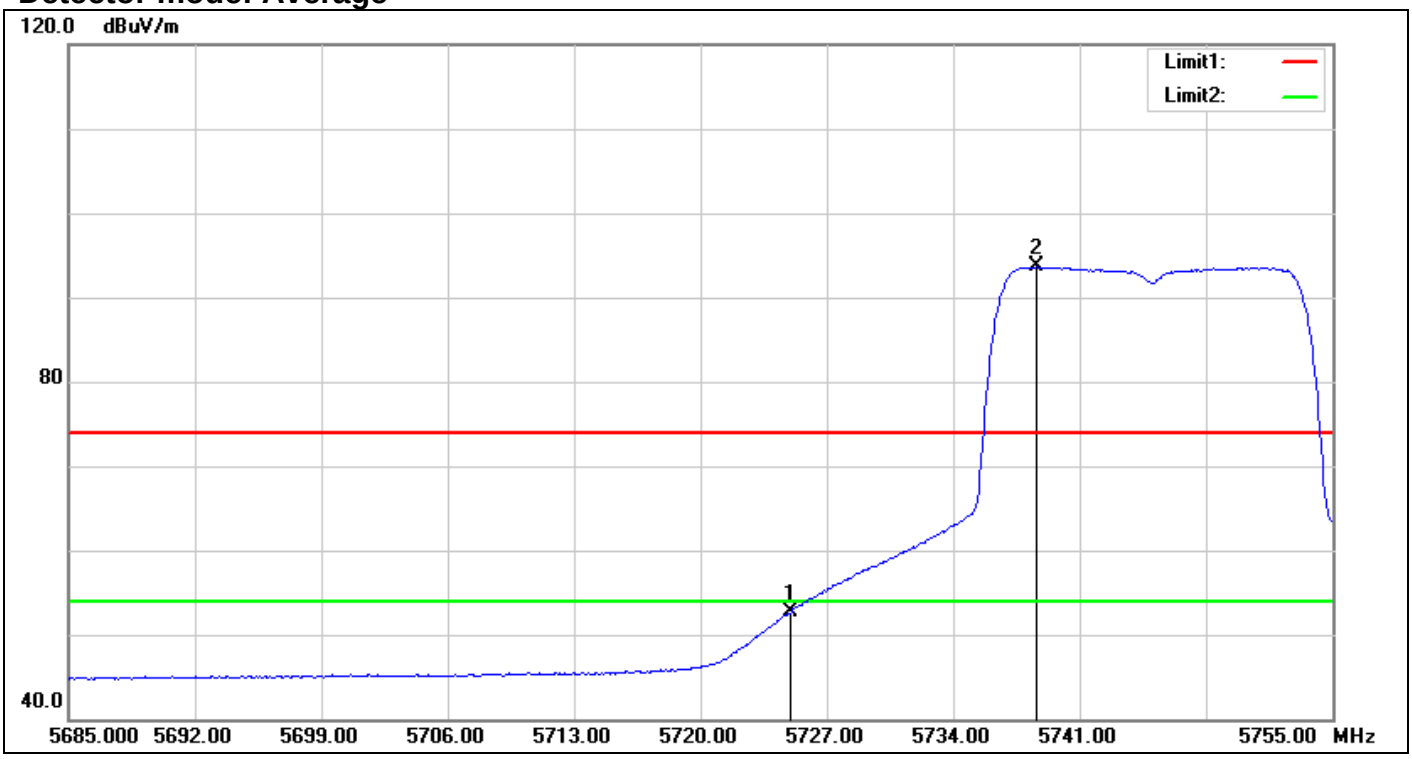
Band Edges (IEEE 802.11a mode / CH 5745 MHz)

Detector mode: Peak



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	5724.340	66.37	6.21	72.58	74.00	-1.42	peak
2	5740.160	98.62	6.27	104.89	-	-	peak

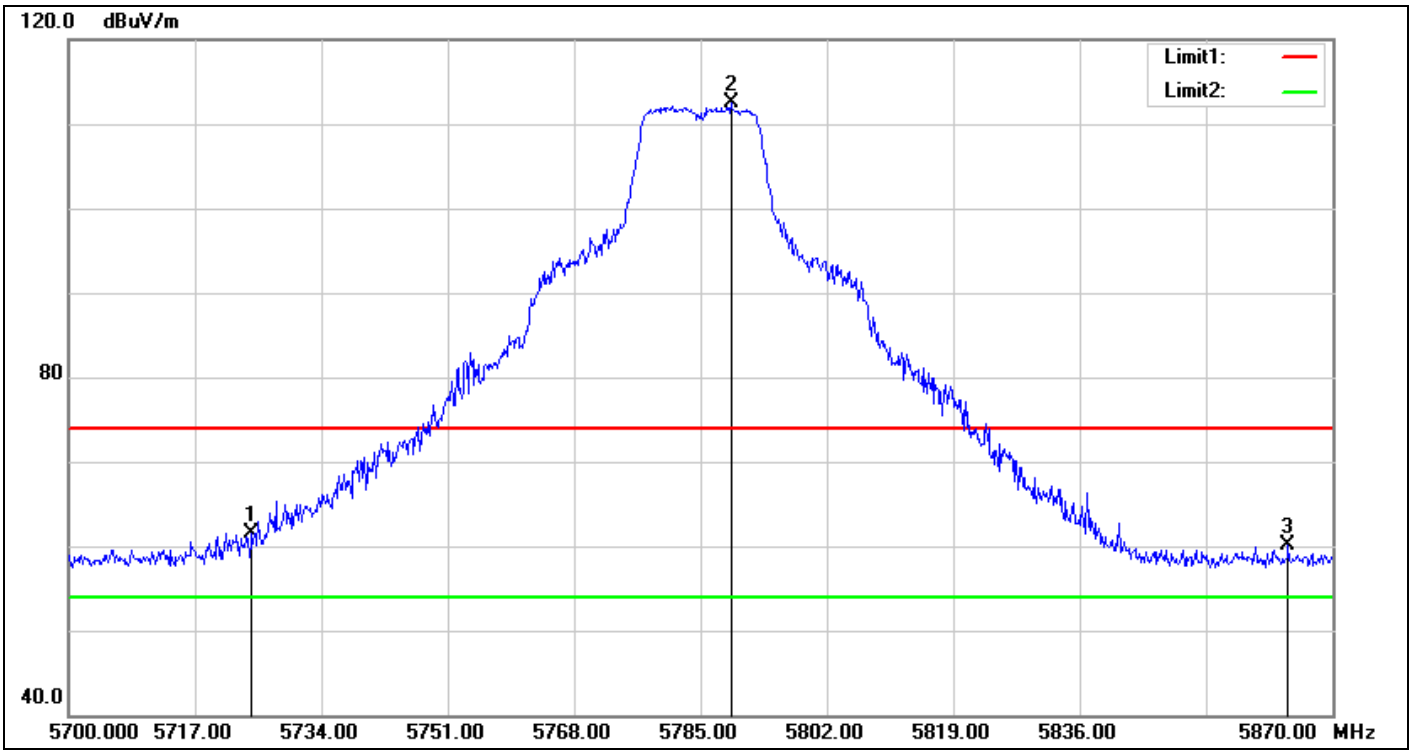
Detector mode: Average



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5725.000	46.55	6.21	52.76	54.00	-1.24	AVG
2	5738.620	87.37	6.27	93.64	-	-	AVG

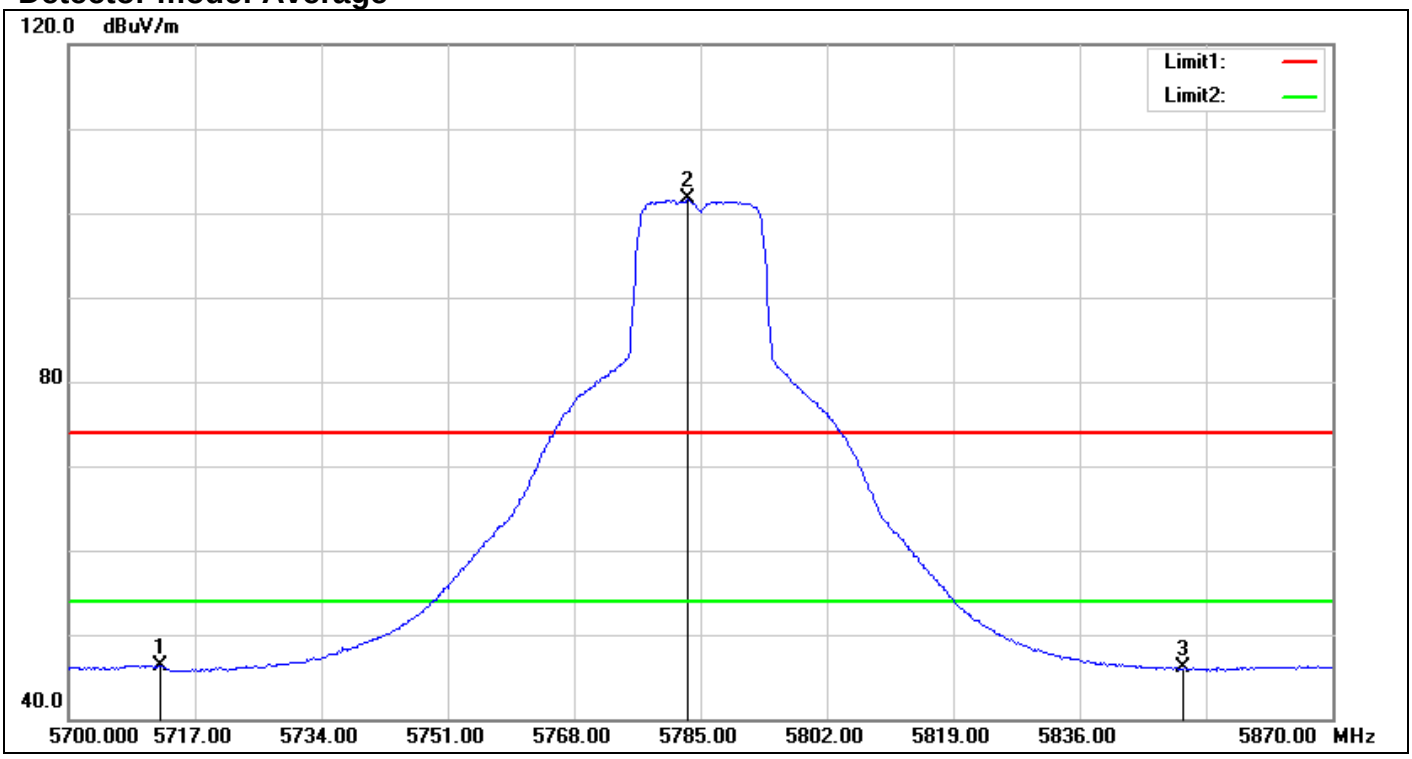
Band Edges (IEEE 802.11a mode / CH 5785 MHz)

Detector mode: Peak



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5724.650	55.33	6.21	61.54	74.00	-12.46	peak
2	5789.080	105.99	6.48	112.47	-	-	peak
3	5864.050	53.32	6.80	60.12	74.00	-13.88	peak

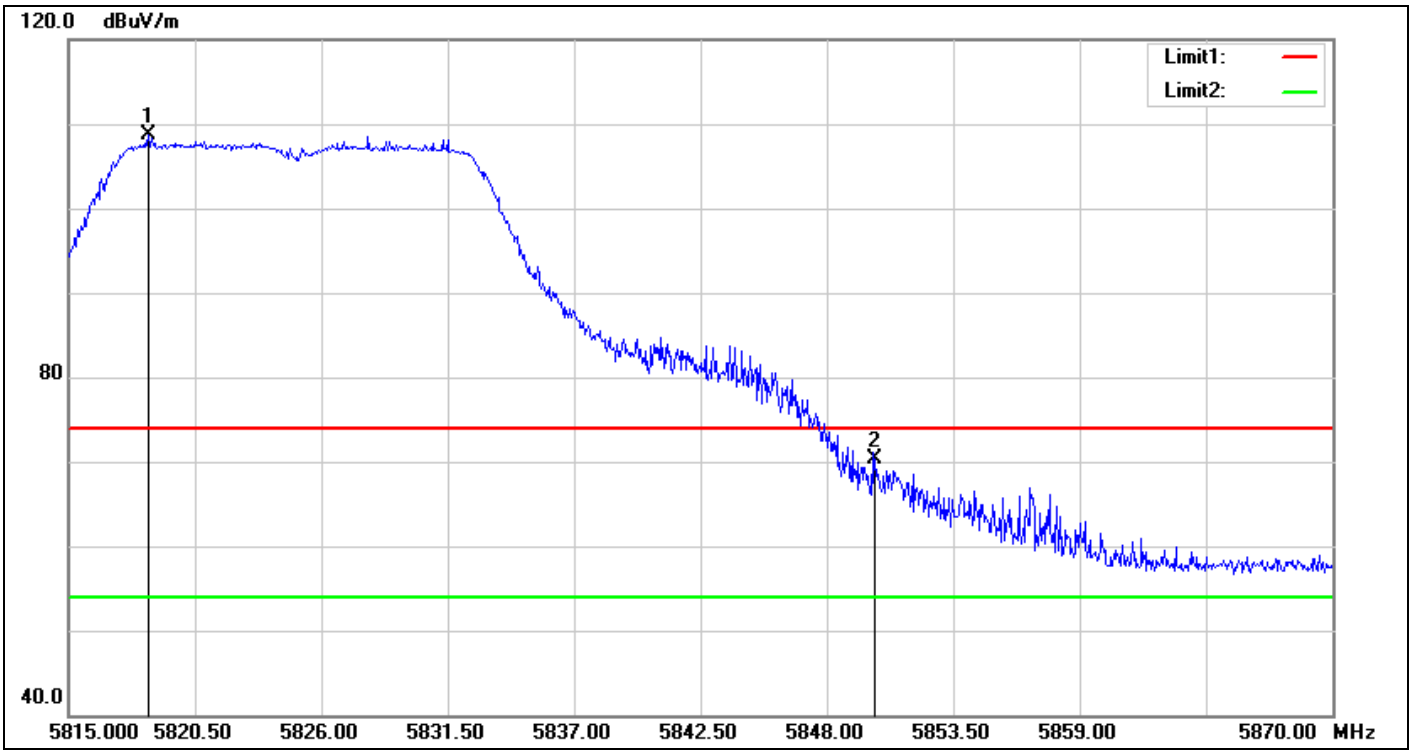
Detector mode: Average



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5712.410	40.18	6.15	46.33	54.00	-7.67	AVG
2	5783.300	95.15	6.46	101.61	-	-	AVG
3	5850.000	39.34	6.74	46.08	54.00	-7.92	AVG

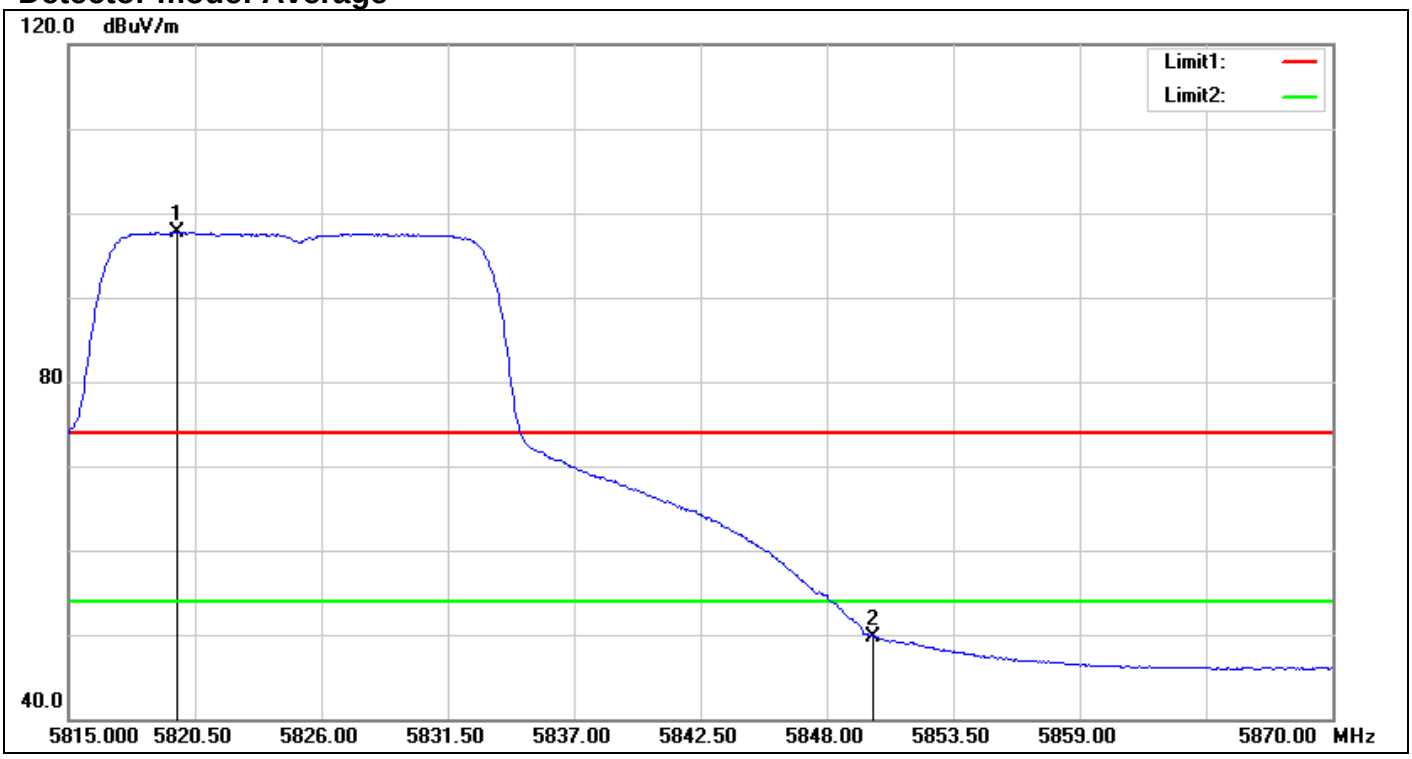
Band Edges (IEEE 802.11a mode / CH 5825 MHz)

Detector mode: Peak



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5818.465	102.17	6.61	108.78	-	-	peak
2	5850.090	63.60	6.74	70.34	74.00	-3.66	peak

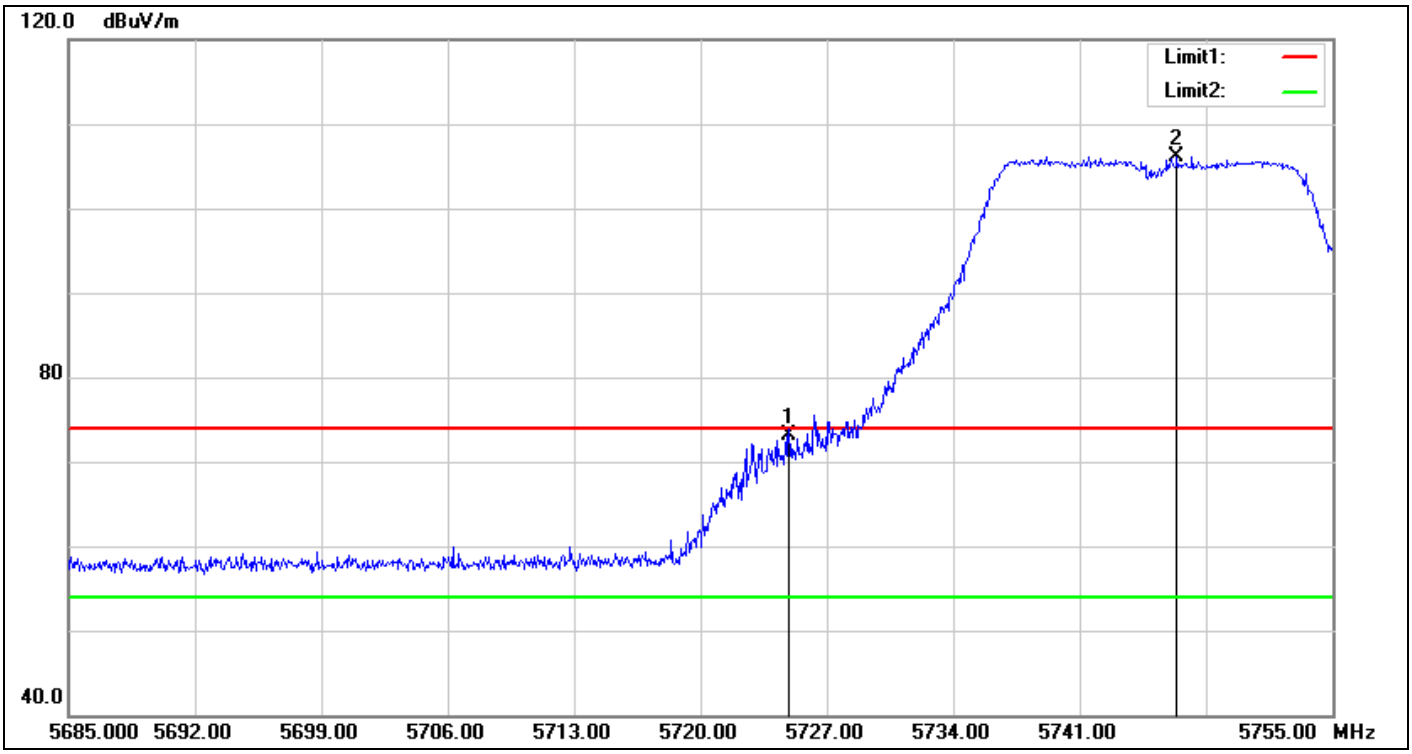
Detector mode: Average



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5819.730	91.12	6.61	97.73	-	-	AVG
2	5850.000	43.00	6.74	49.74	54.00	-4.26	AVG

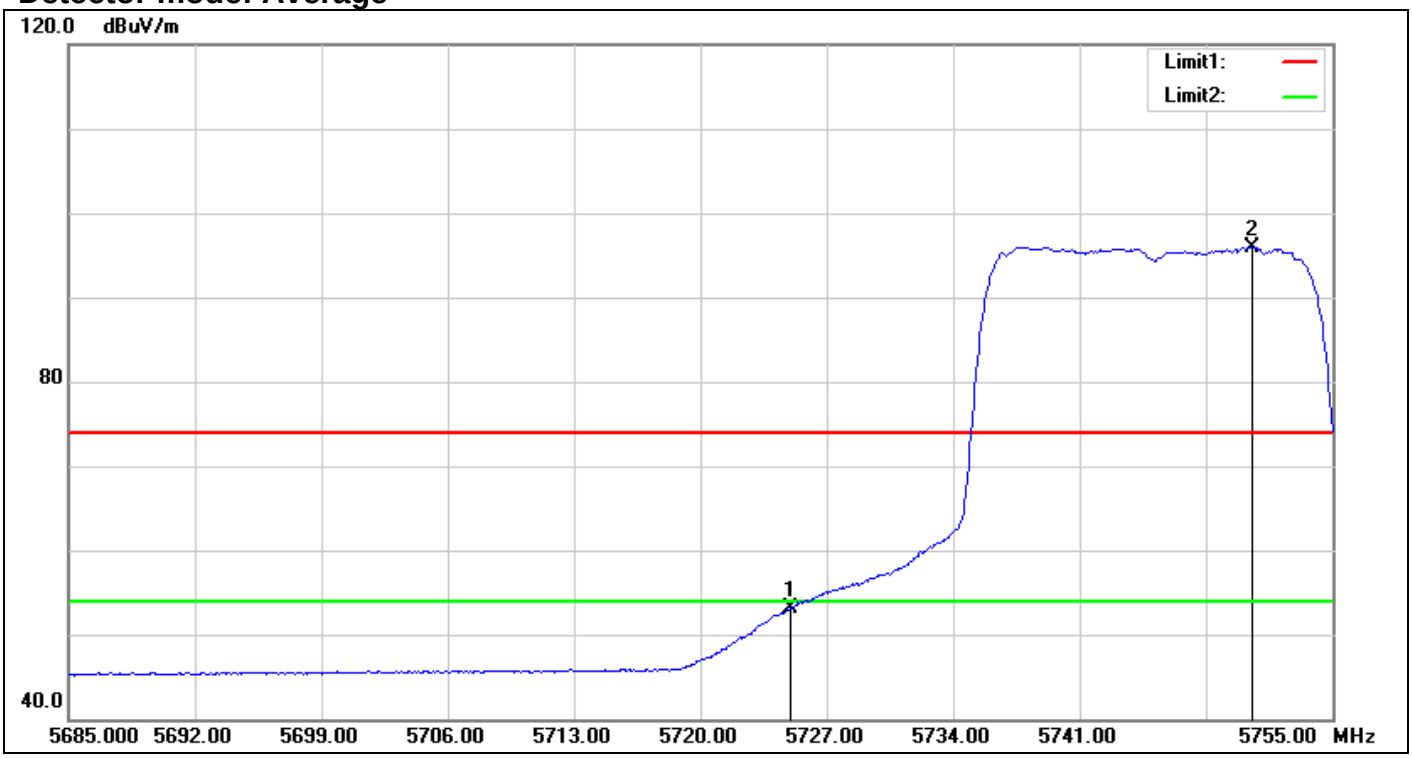
Band Edges (IEEE 802.11n HT 20 MHz Channel mode / CH 5745 MHz)

Detector mode: Peak



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5724.900	66.84	6.21	73.05	74.00	-0.95	peak
2	5746.390	99.84	6.30	106.14	-	-	peak

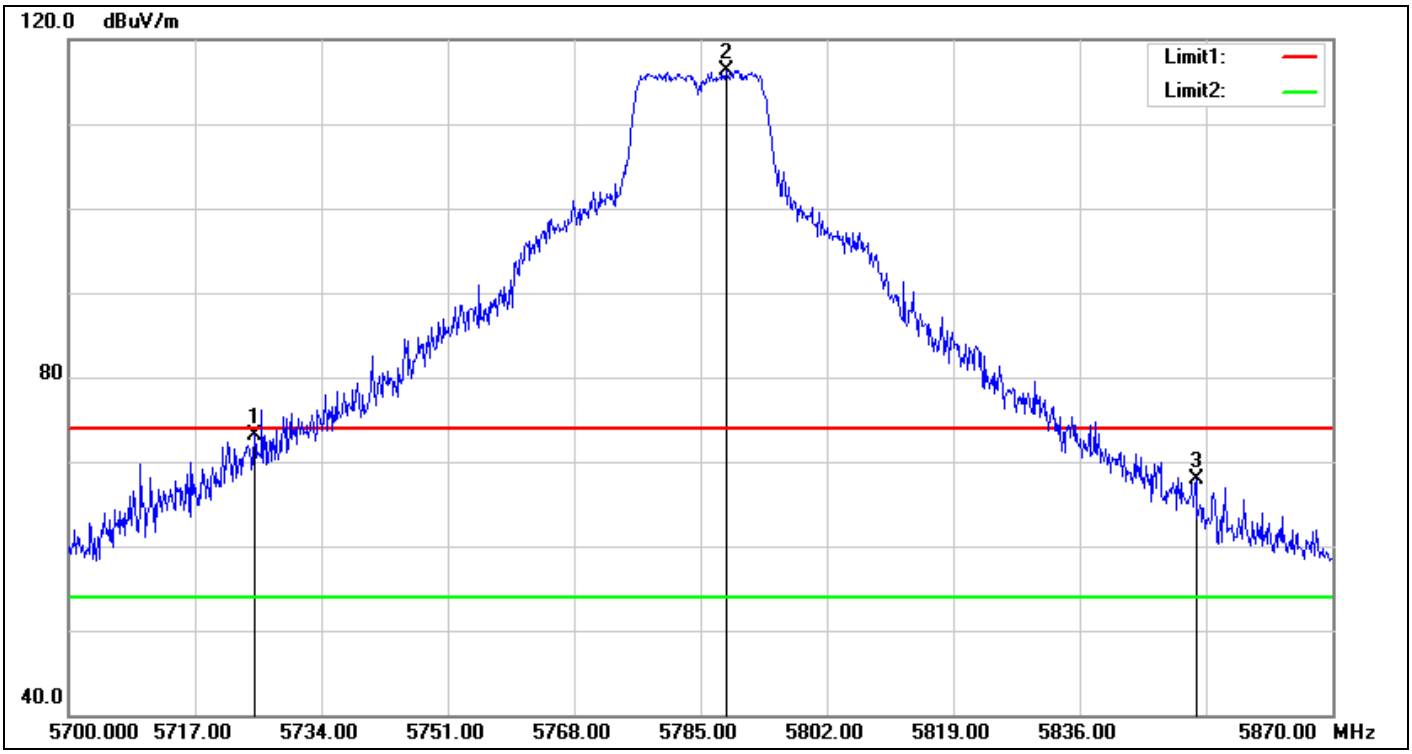
Detector mode: Average



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5725.000	46.88	6.21	53.09	54.00	-0.91	AVG
2	5750.520	89.62	6.32	95.94	-	-	AVG

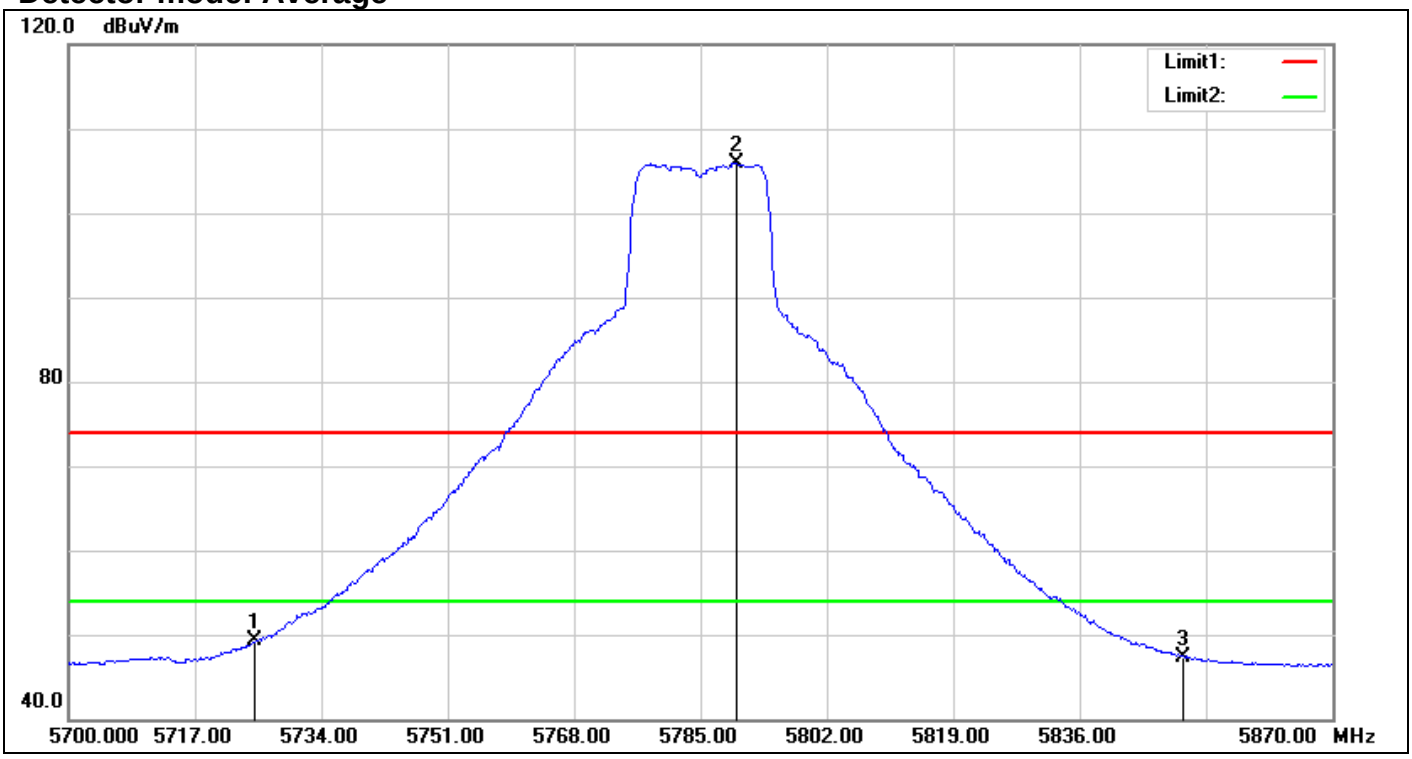
Band Edges (IEEE 802.11n HT 20 MHz Channel mode / CH 5785 MHz)

Detector mode: Peak



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5724.990	66.89	6.21	73.10	74.00	-0.90	peak
2	5788.570	109.87	6.48	116.35	-	-	peak
3	5851.640	61.12	6.75	67.87	74.00	-6.13	peak

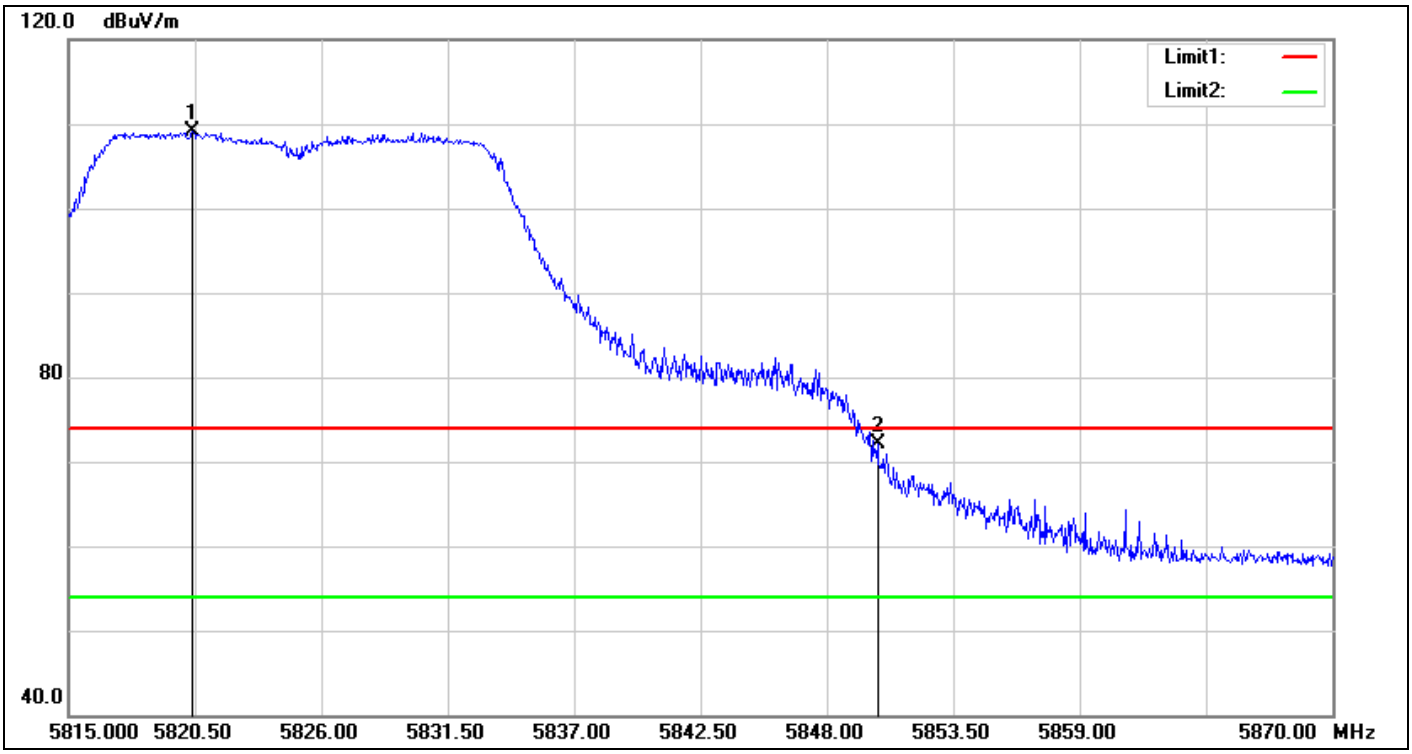
Detector mode: Average



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5725.000	43.01	6.21	49.22	54.00	-4.78	AVG
2	5789.930	99.50	6.49	105.99	-	-	AVG
3	5850.000	40.65	6.74	47.39	54.00	-6.61	AVG

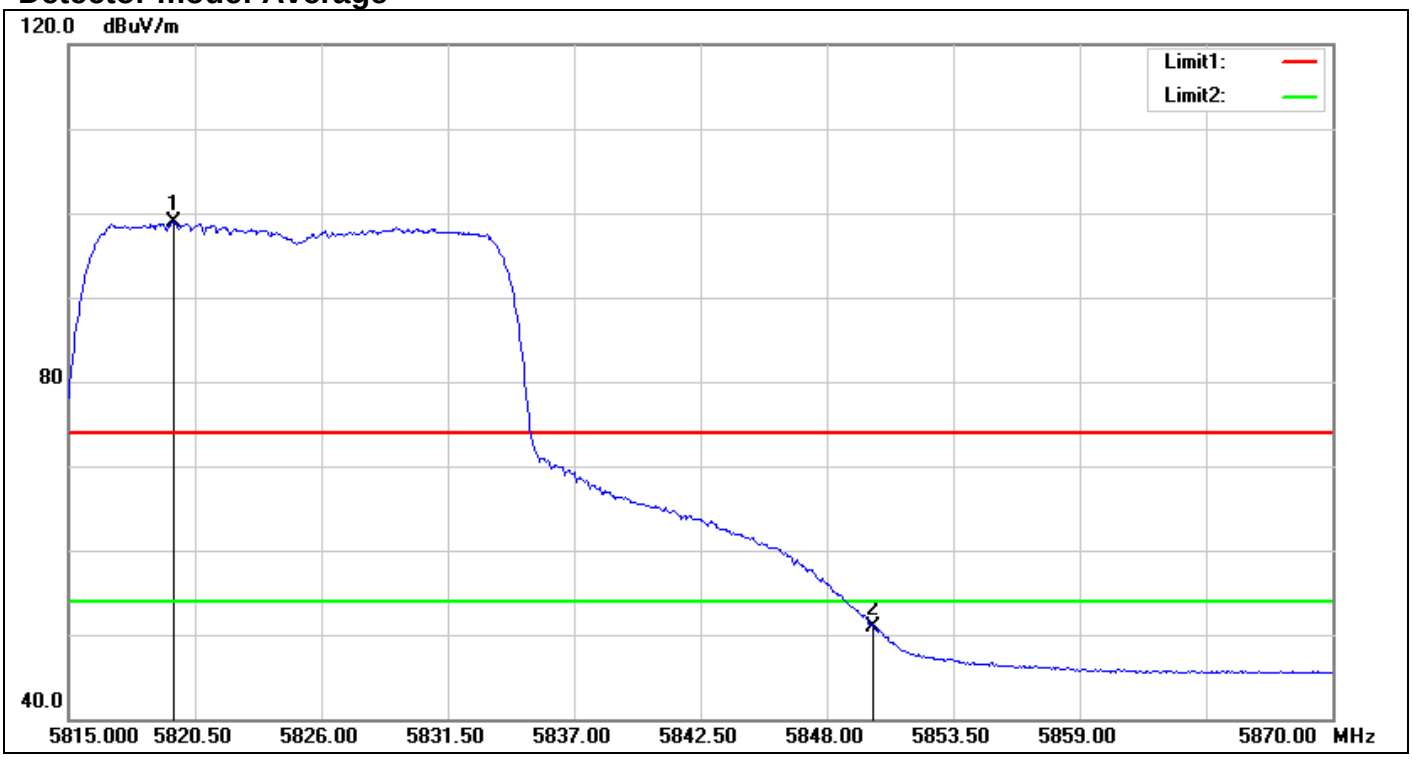
Band Edges (IEEE 802.11n HT 20 MHz Channel mode / CH 5825 MHz)

Detector mode: Peak



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5820.390	102.59	6.61	109.20	-	-	peak
2	5850.200	65.42	6.74	72.16	74.00	-1.84	peak

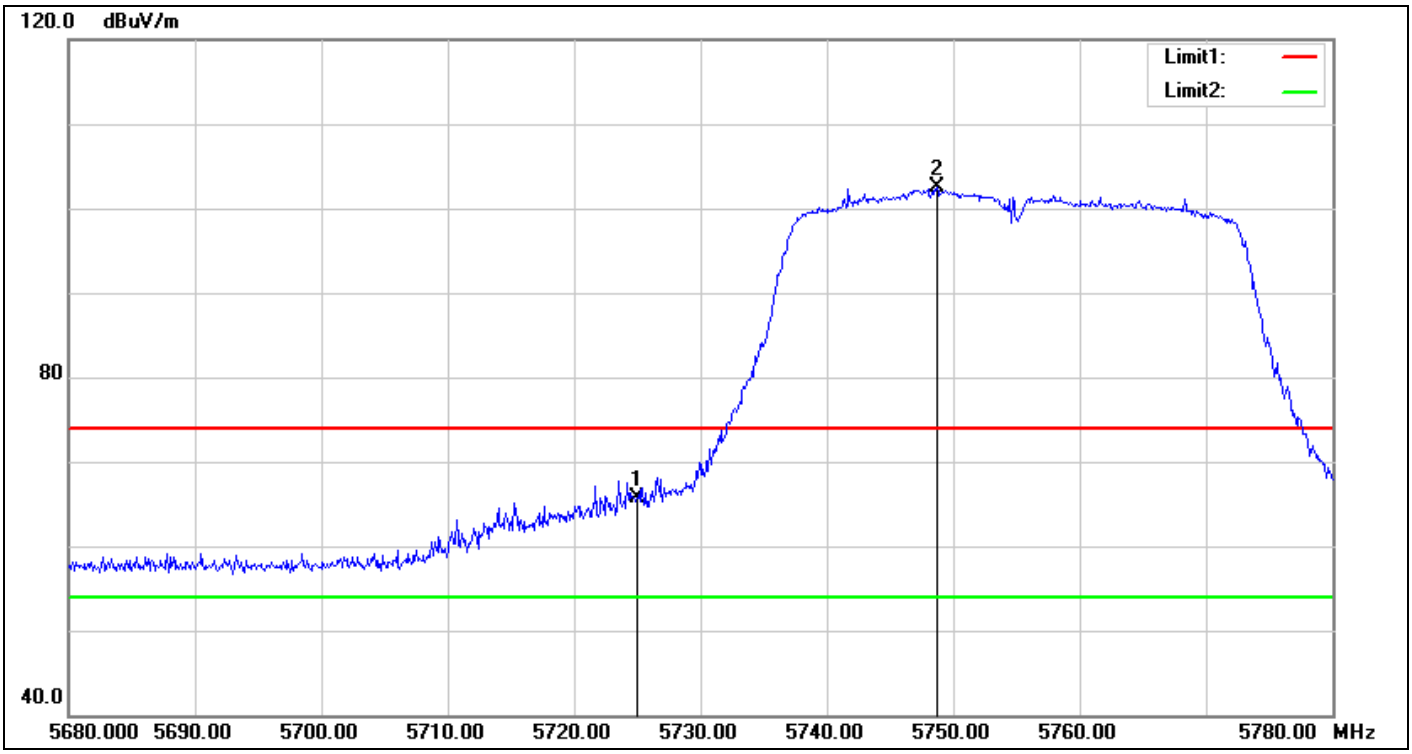
Detector mode: Average



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5819.565	92.33	6.61	98.94	-	-	AVG
2	5850.000	44.22	6.74	50.96	54.00	-3.04	AVG

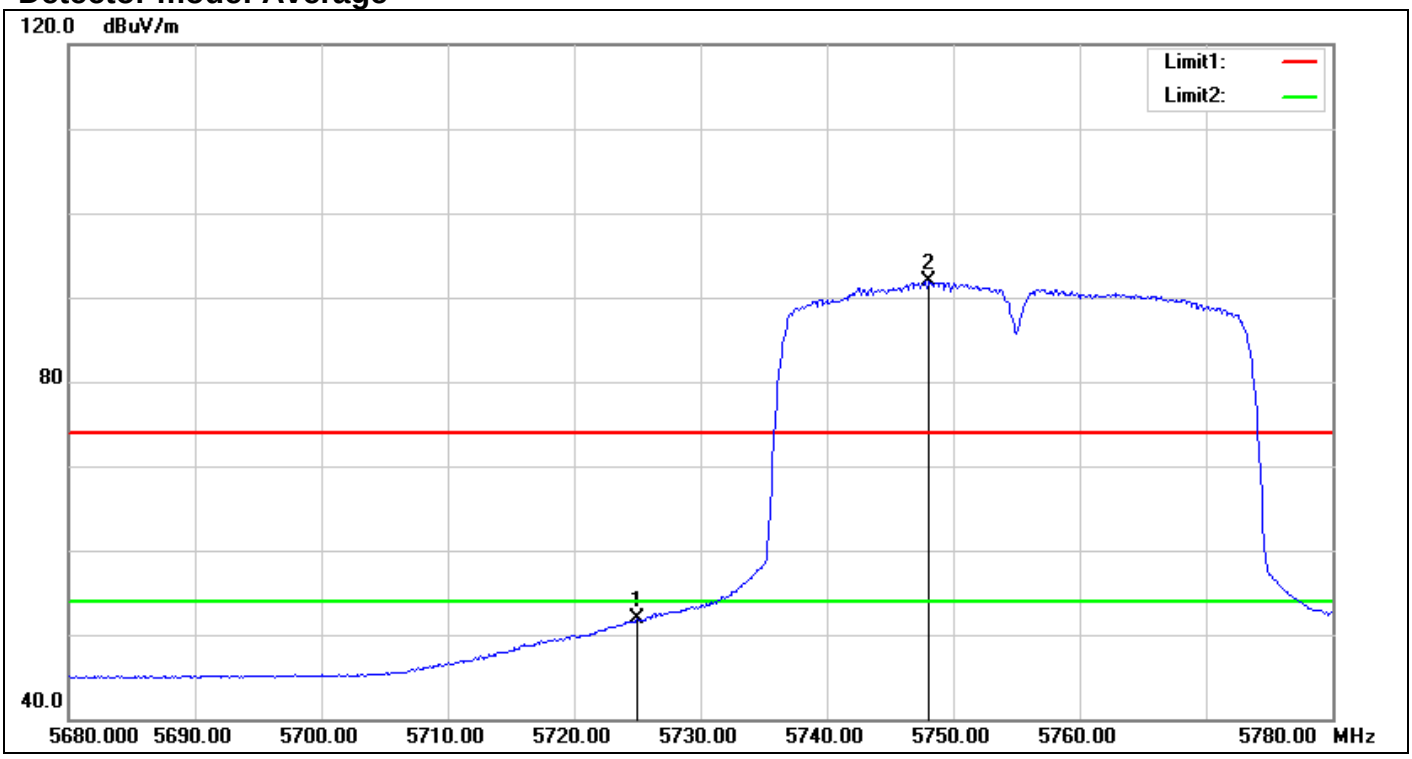
Band Edges (IEEE 802.11n HT 40 MHz mode / CH 5755 MHz)

Detector mode: Peak



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	5725.000	59.53	6.21	65.74	74.00	-8.26	peak
2	5748.700	96.10	6.31	102.41	-	-	peak

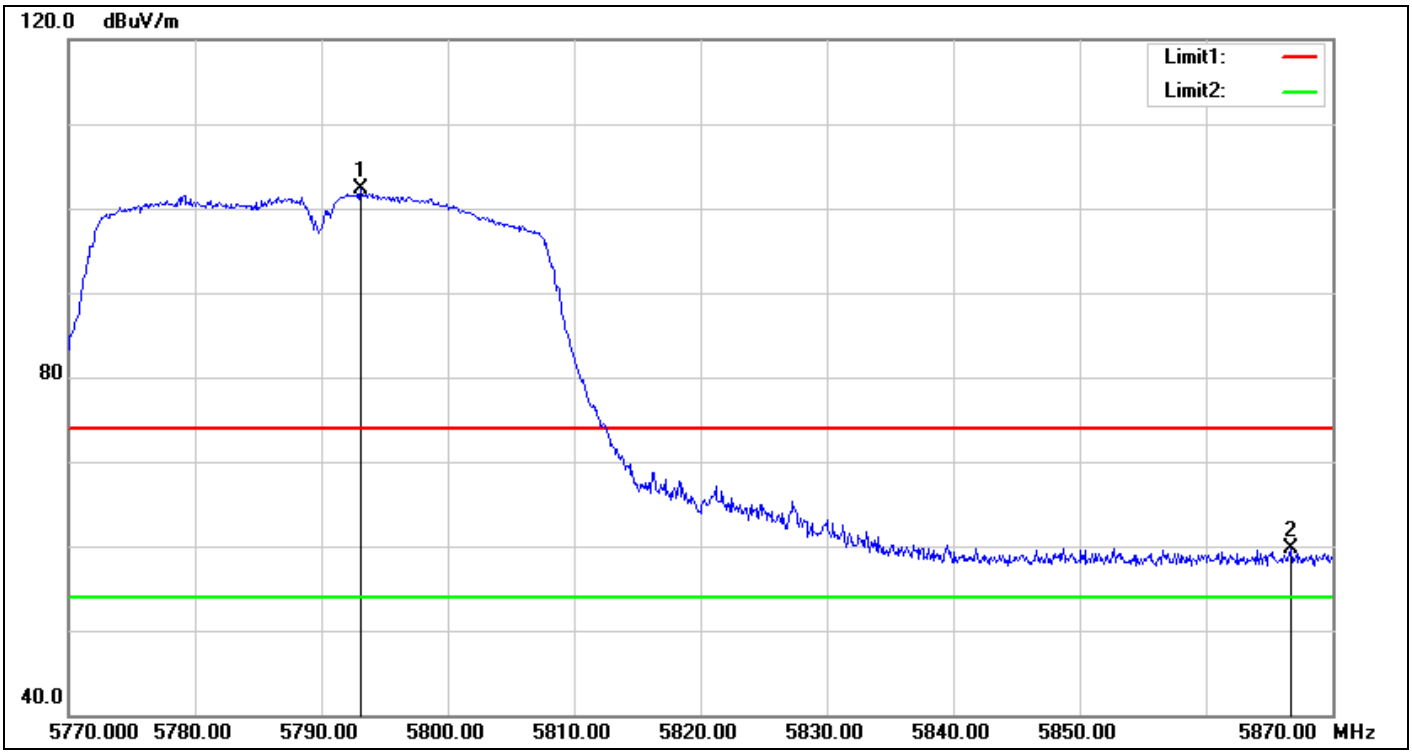
Detector mode: Average



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5725.000	45.69	6.21	51.90	54.00	-2.10	AVG
2	5748.100	85.53	6.31	91.84	-	-	AVG

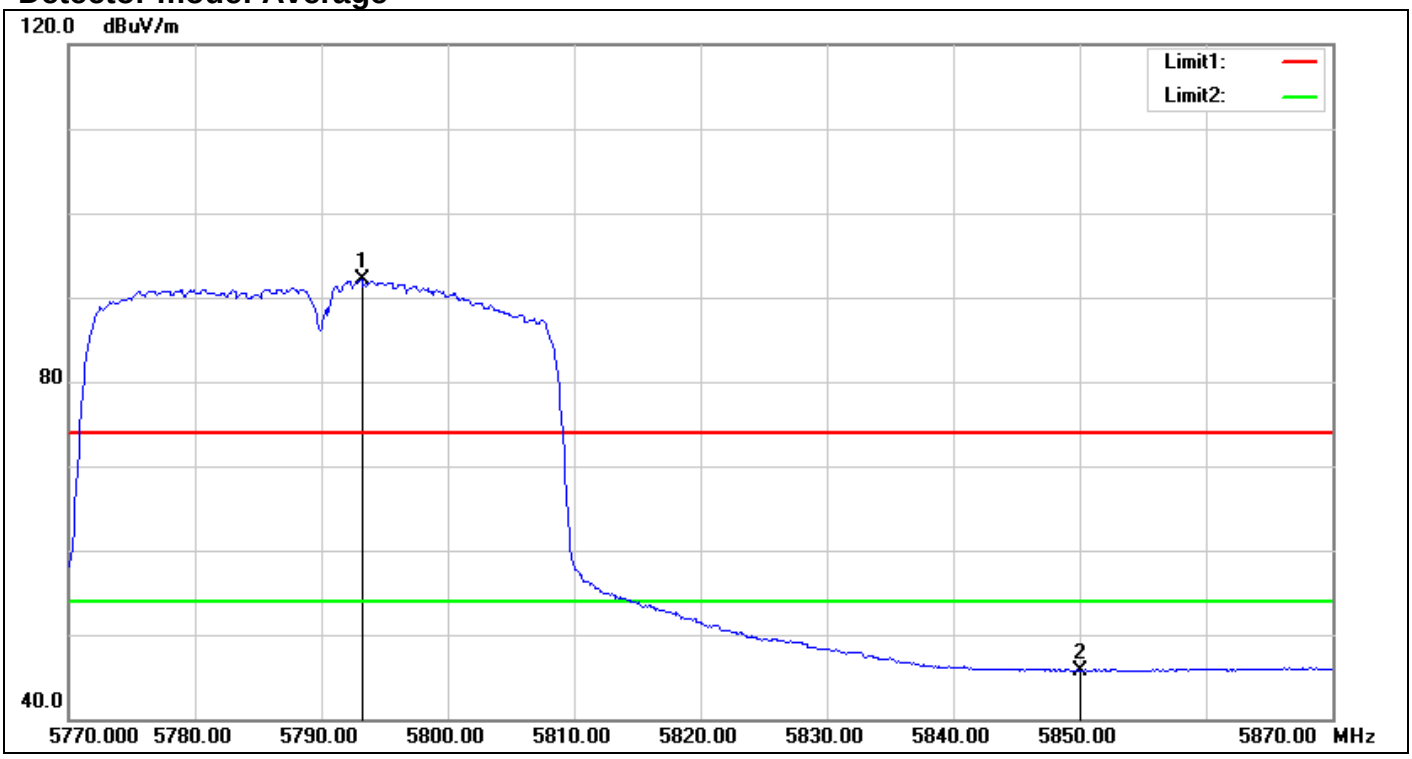
Band Edges (IEEE 802.11n HT 40 MHz mode / CH 5795 MHz)

Detector mode: Peak



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5793.100	95.89	6.50	102.39	-	-	peak
2	5866.700	52.97	6.81	59.78	74.00	-14.22	peak

Detector mode: Average



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5793.200	85.61	6.50	92.11	-	-	AVG
2	5850.000	39.01	6.74	45.75	54.00	-8.25	AVG

7.4 PEAK POWER SPECTRAL DENSITY

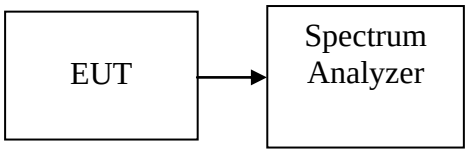
LIMIT

According to §15.407(a),

(1) For the band 5.725-5.850 GHz, the peak power spectral density shall not exceed 30dBm in any 1MHz band.

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

Test Configuration



TEST PROCEDURE

1. Place the EUT on the table and set it in transmitting mode.
   Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
2. Set the spectrum analyzer as RBW = 500kHHz, VBW = 3*RBW, Span = Sweep= AUTO
3. Record the max. reading.
4. Repeat the above procedure until the measurements for all frequencies are completed

TEST RESULTS

No non-compliance noted

Test Data

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

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Result
Low	5745	7.05	30.00	PASS
Mid	5785	13.47		PASS
High	5825	12.16		PASS

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

Channel	Frequency (MHz)	Chain 0 PPSD (dBm)	Chain 1 PPSD (dBm)	PPSD (dBm)	Limit (dBm)	Result
Low	5745	2.12	0.63	4.45	29.33	PASS
Mid	5785	12.22	11.31	14.80		PASS
High	5825	6.43	3.36	8.17		PASS

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

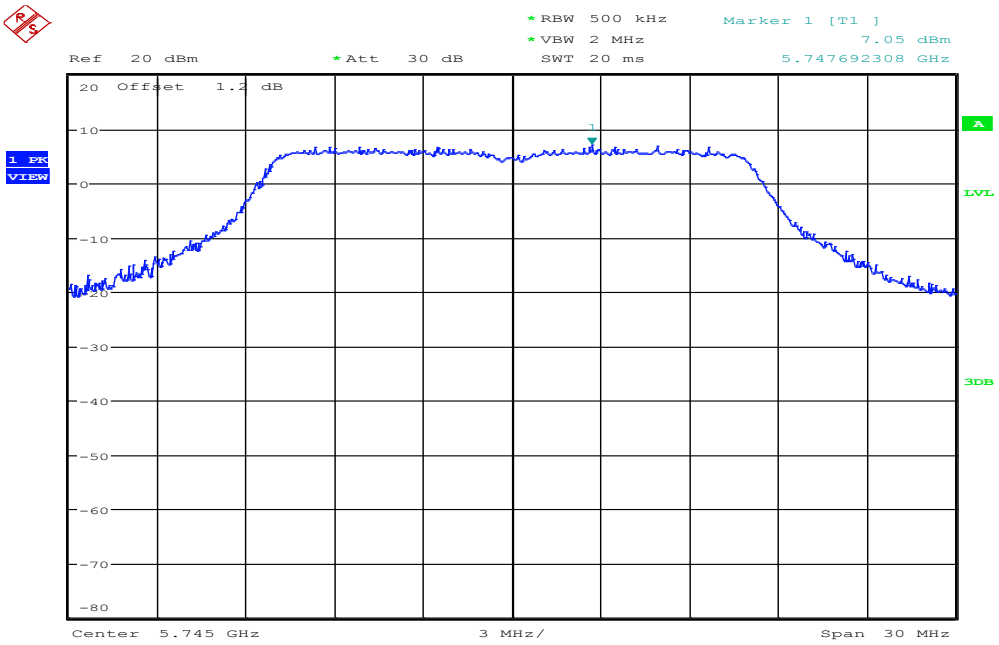
Channel	Frequency (MHz)	Chain 0 PPSD (dBm)	Chain 1 PPSD (dBm)	PPSD (dBm)	Limit (dBm)	Result
Low	5755	-0.84	-3.33	1.10	29.33	PASS
High	5795	-0.57	-4.11	1.02		PASS

Remark:
1. Total Output Power (w) = Chain 0 (10^(Output Power /10)/1000)+ Chain 1 (10^(Output Power /10)/1000)
2. The maximum antenna gain is 6.67dBi; therefore the reduction due to antenna gain is 0.67dBi, so the limit is 29.33dBm.

Test Plot

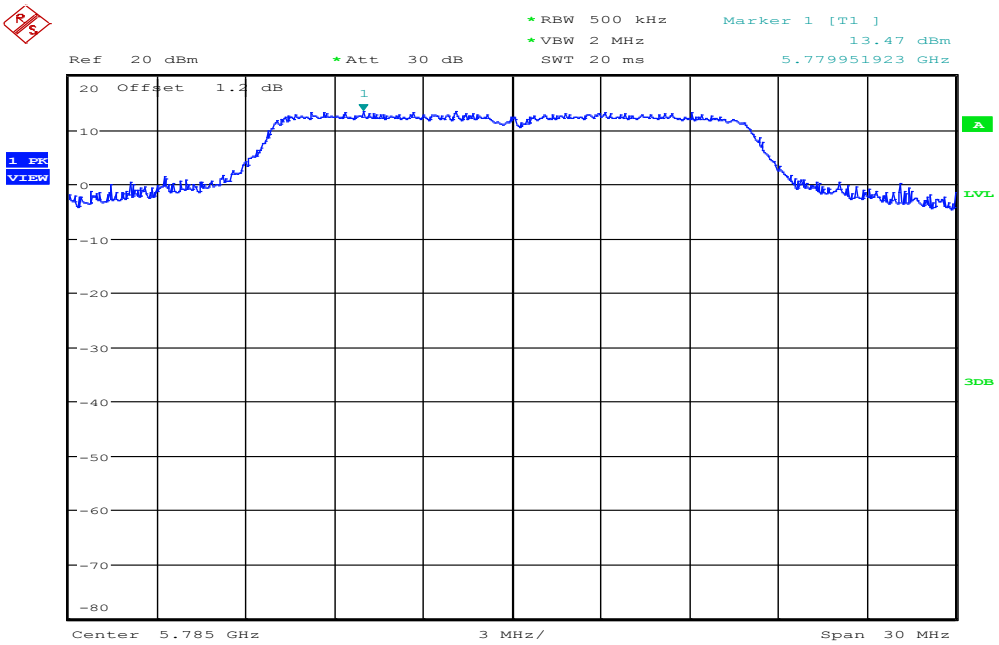
IEEE 802.11a MHz mode / 5745 ~ 5825MHz

CH Low



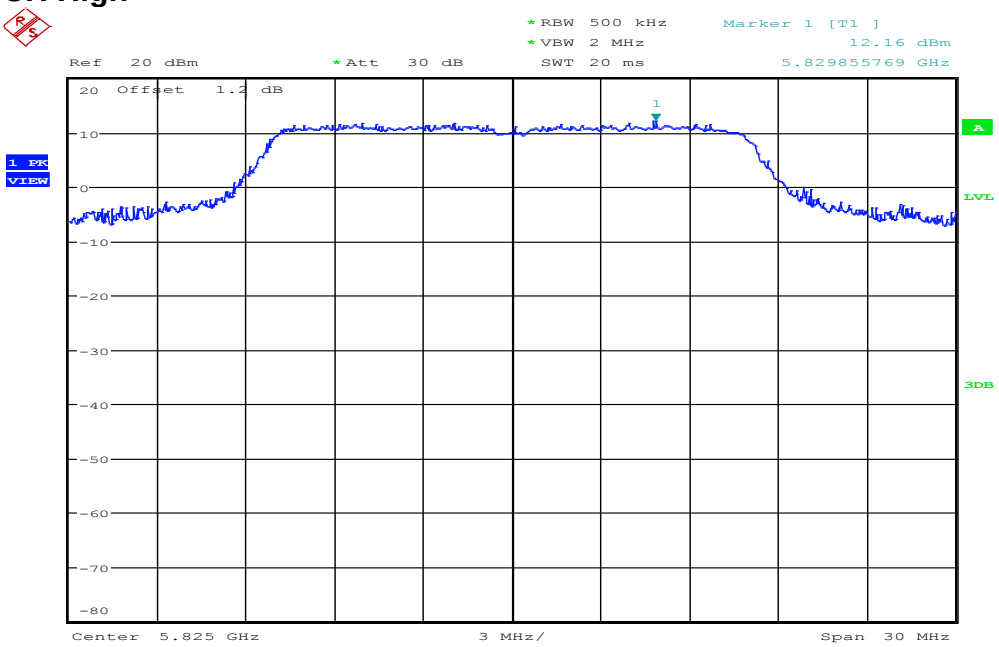
Date: 30.JAN.2016 20:18:23

CH Mid



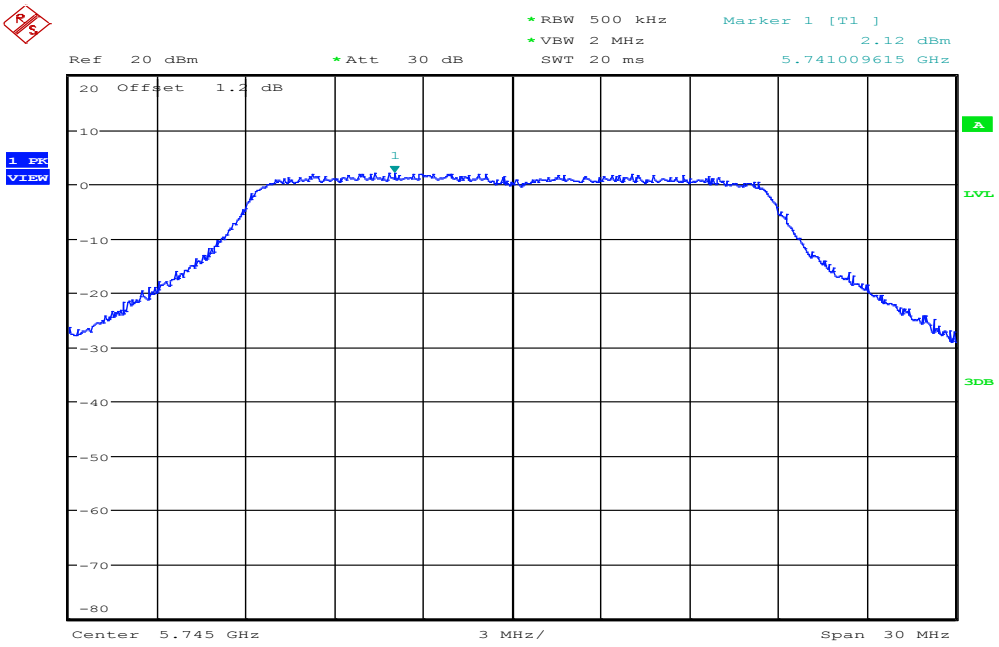
Date: 30.JAN.2016 20:19:29

CH High


RBW 500 kHz
VBW 2 MHz
SWT 20 ms
Marker 1 [T1]
12.16 dBm
5.829855769 GHz
Ref 20 dBm
Att 30 dB
Offset 1.2 dB
1 PK
VIEW
A
LVL
3DB
Center 5.825 GHz
3 MHz/
Span 30 MHz
Date: 30.JAN.2016 20:20:42

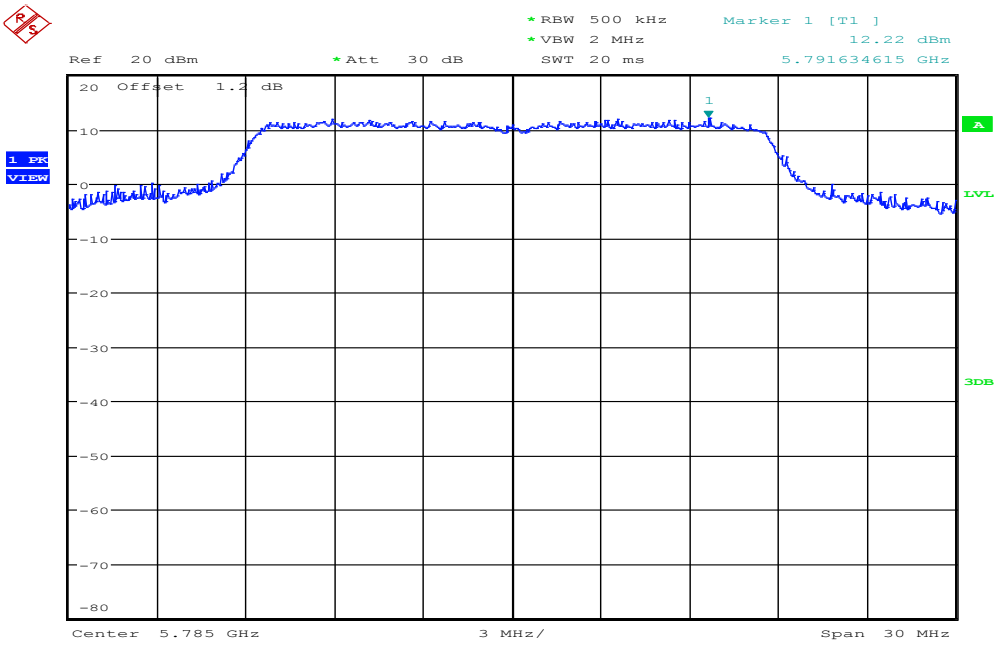
IEEE 802.11n HT 20 MHz mode / 5745 ~ 5825MHz / Chain 0

CH Low



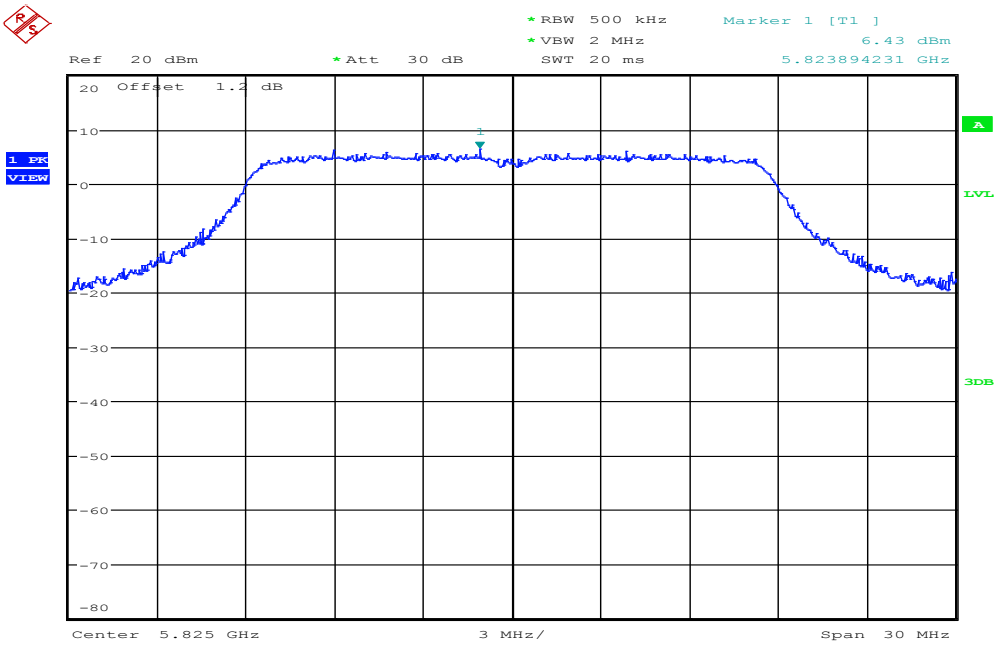
Date: 1.FEB.2016 13:31:40

CH Mid



Date: 1.FEB.2016 14:53:55

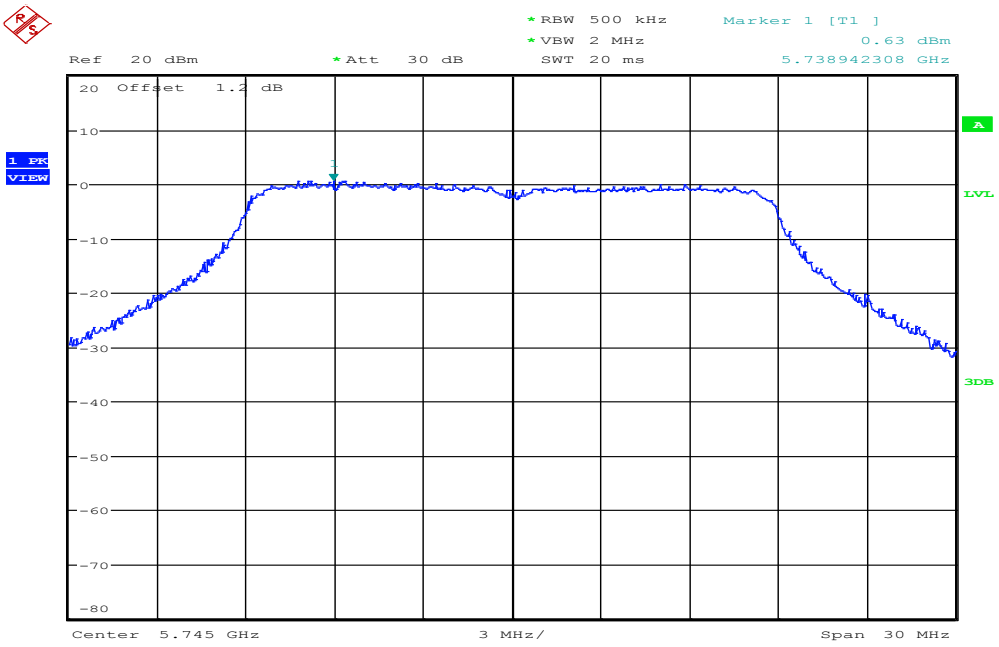
CH High



Date: 1.FEB.2016 14:54:58

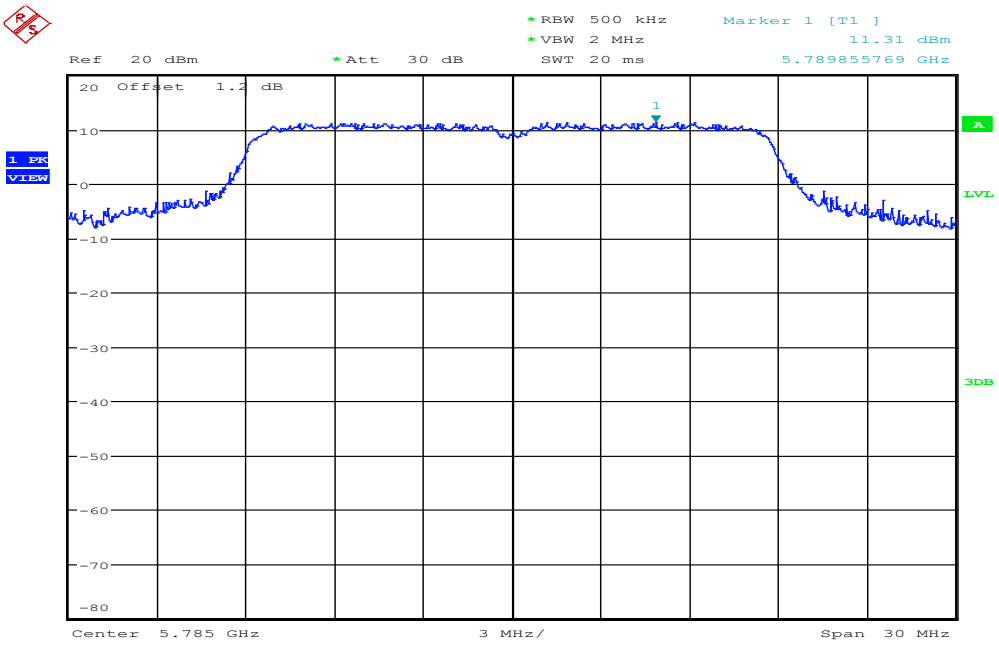
IEEE 802.11n HT 20 MHz mode / 5745 ~ 5825MHz / Chain 1

CH Low



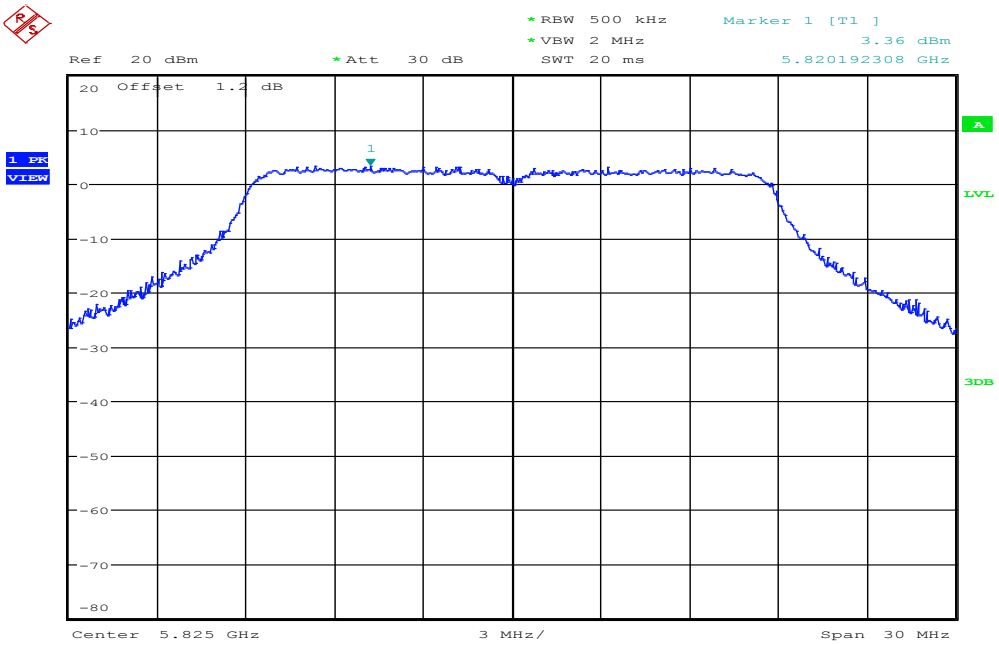
Date: 1.FEB.2016 15:05:04

CH Mid



Date: 1.FEB.2016 15:05:59

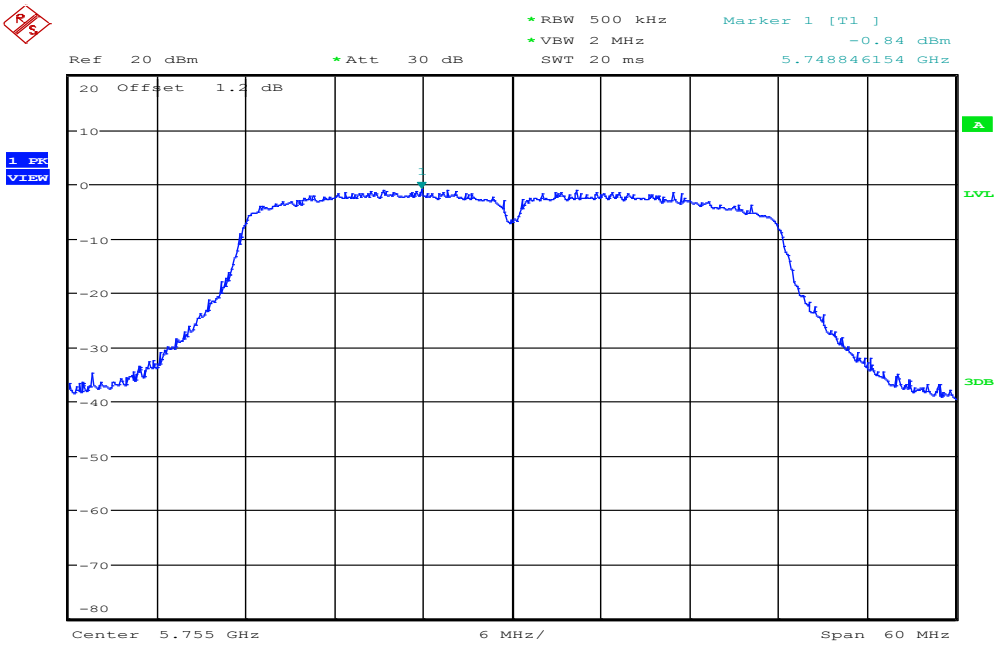
CH High



Date: 1.FEB.2016 15:06:51

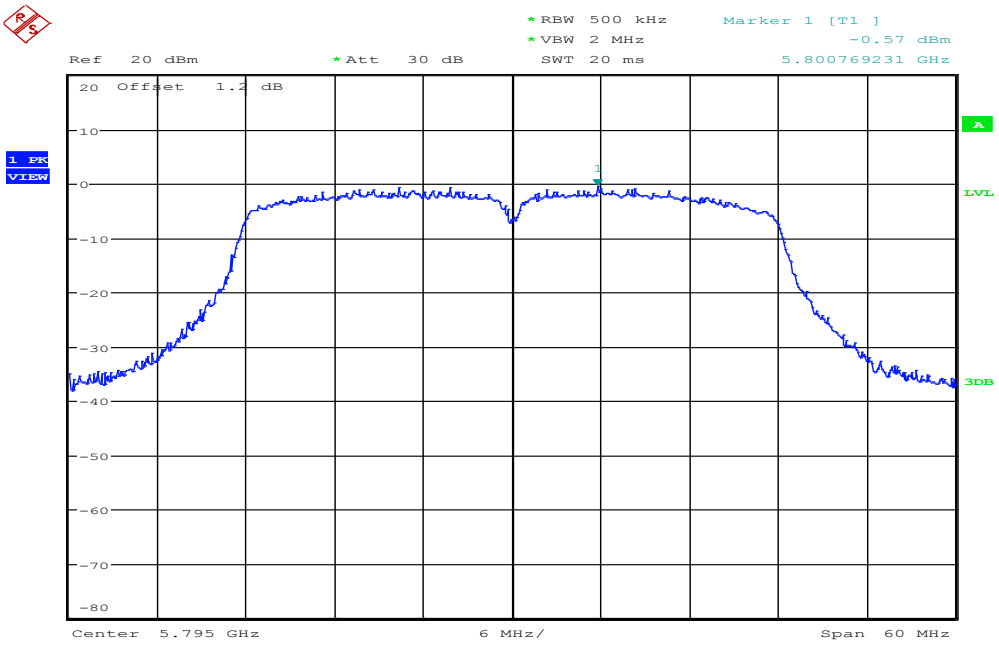
IEEE 802.11n HT 40 MHz mode / 5755 ~ 5795MHz / Chain 0

CH Low



Date: 1.FEB.2016 20:27:46

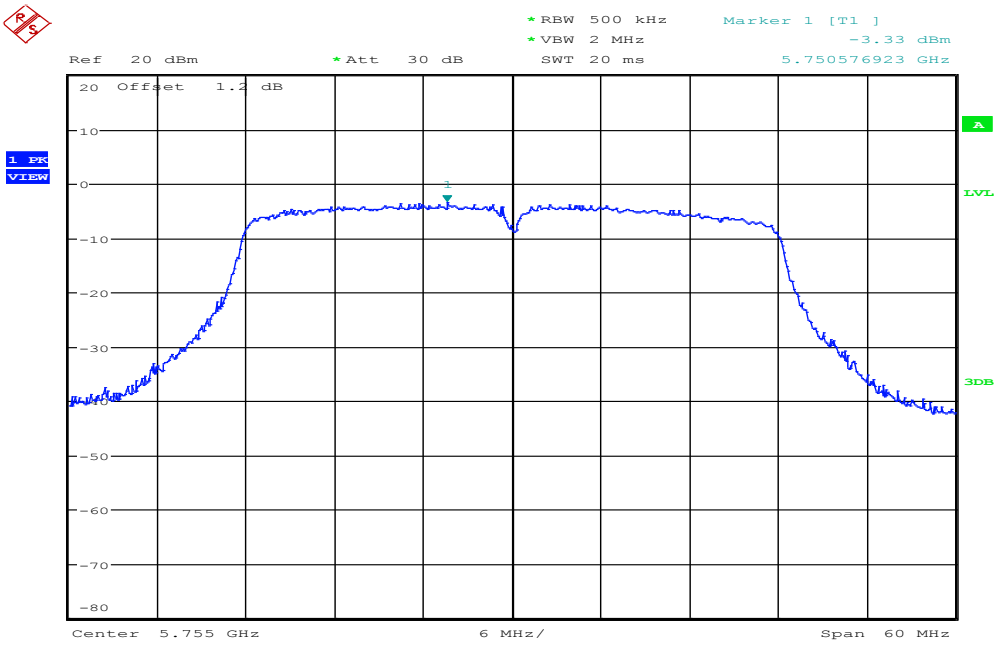
CH High



Date: 1.FEB.2016 20:28:49

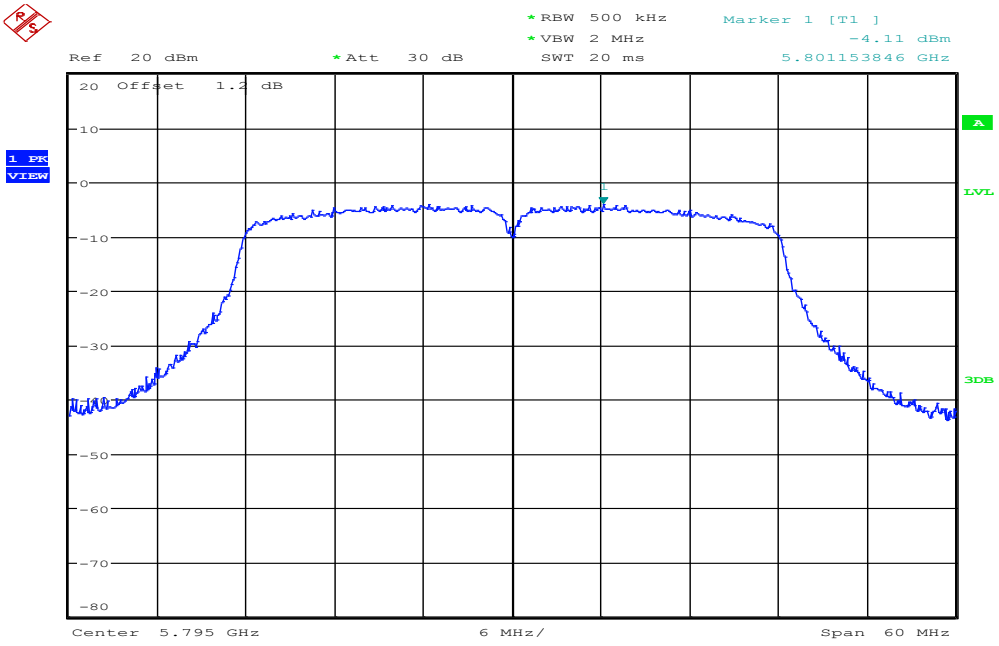
IEEE 802.11n HT 40 MHz mode / 5755 ~ 5795MHz / Chain 1

CH Low



Date: 1.FEB.2016 20:30:58

CH High



Date: 1.FEB.2016 20:29:47

7.5 RADIATED UNDESIRABLE EMISSION

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

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

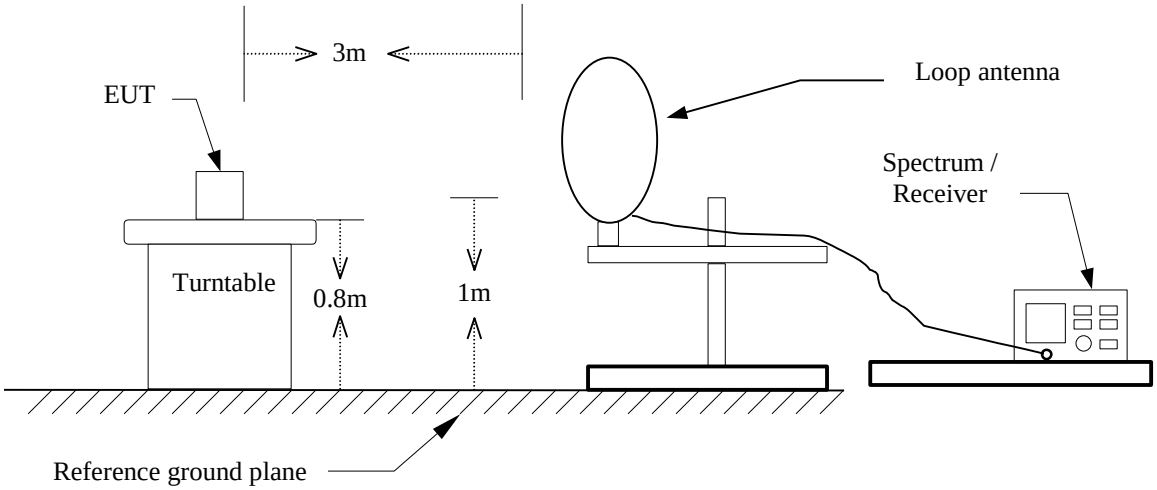
Remark: *Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of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

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

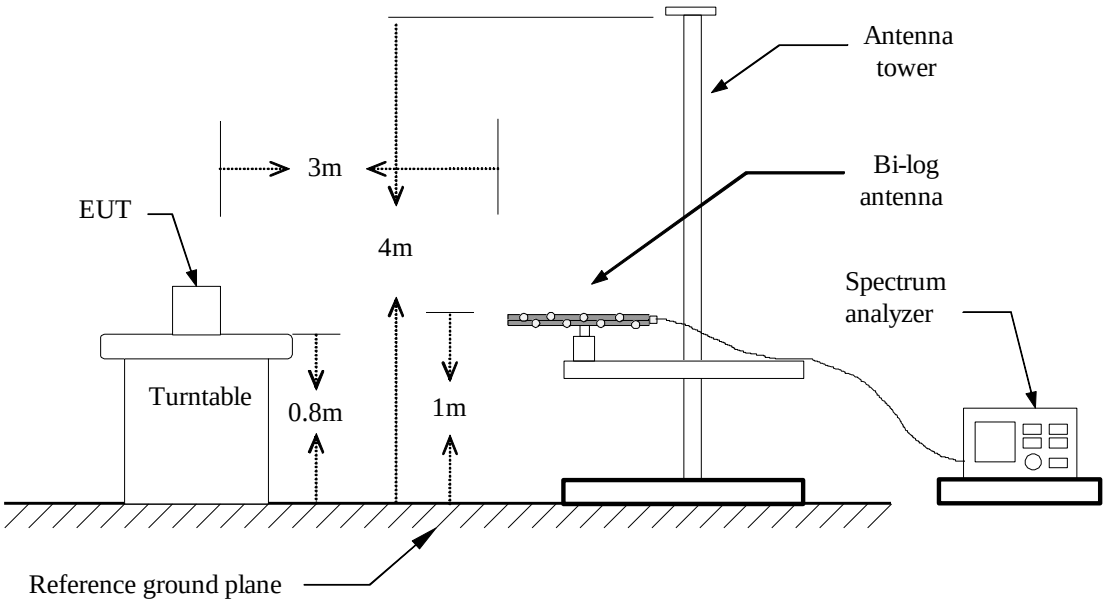
Frequency (MHz)	Field Strength (μV/m at 3-meter)	Field Strength (dBμV/m at 3-meter)
0.009 - 0.490	2400/F(kHz) +80	20LOG((2400/F(kHz))+80)
0.490 - 1.705	24000/F(kHz) +40	20LOG((24000/F(kHz))+40)
1.705 – 30.0	30	69.54
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

Test Configuration

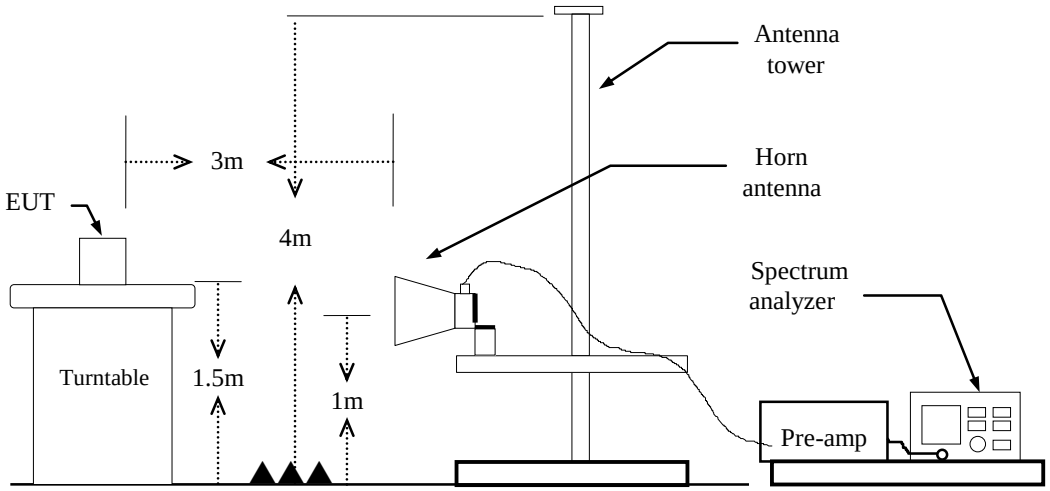
9kHz ~ 30MHz



30MHz ~ 1GHz



Above 1 GHz


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

TEST PROCEDURE

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

   Below 1GHz:

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

   Above 1GHz:

   (a) PEAK: RBW: 1MHz / VBW: 3MHz / Sweep=AUTO
   (b) AVERAGE: RBW=1MHz,
   if duty cycle≧98%, VBW=10Hz.
   if duty cycle<98% VBW=1/T.
   IEEE 802.11a mode: ≧98%, VBW=10Hz
   IEEE 802.11n HT 20 MHz mode: ≧98%, VBW=10Hz
   IEEE 802.11n HT 40 MHz mode: ≧98%, VBW=10Hz

7. Repeat above procedures until the measurements for all frequencies are complete.
8. Result = Spectrum Reading + cable loss(spectrum to Amp) - Amp Gain + Cable loss(Amp to receive Ant)+ Receive Ant

Note: We checked every harmonics frequencies from Fundamental frequencies with reduced VBW, and we mark a point to prove pass or not if we find any emission. For this case, there are no emissions hidden in the noise floor.

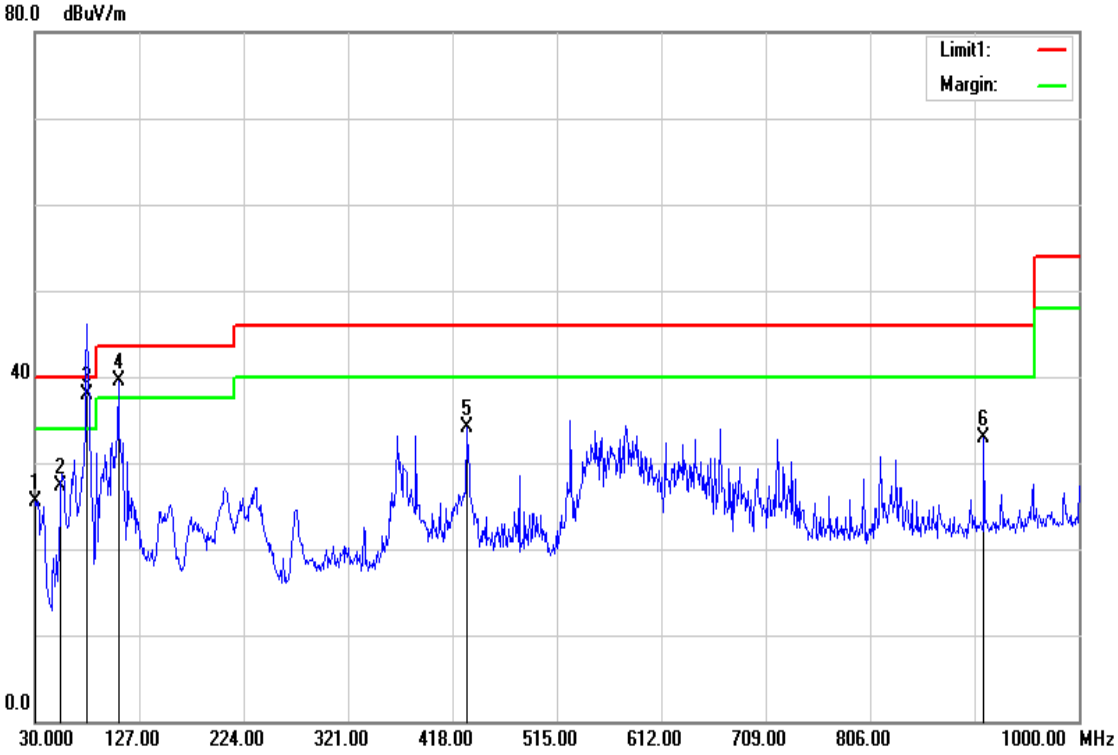
TEST RESULTS

Below 1GHz

Operation Mode: Normal Link **Test Date:** January 28, 2016

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

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

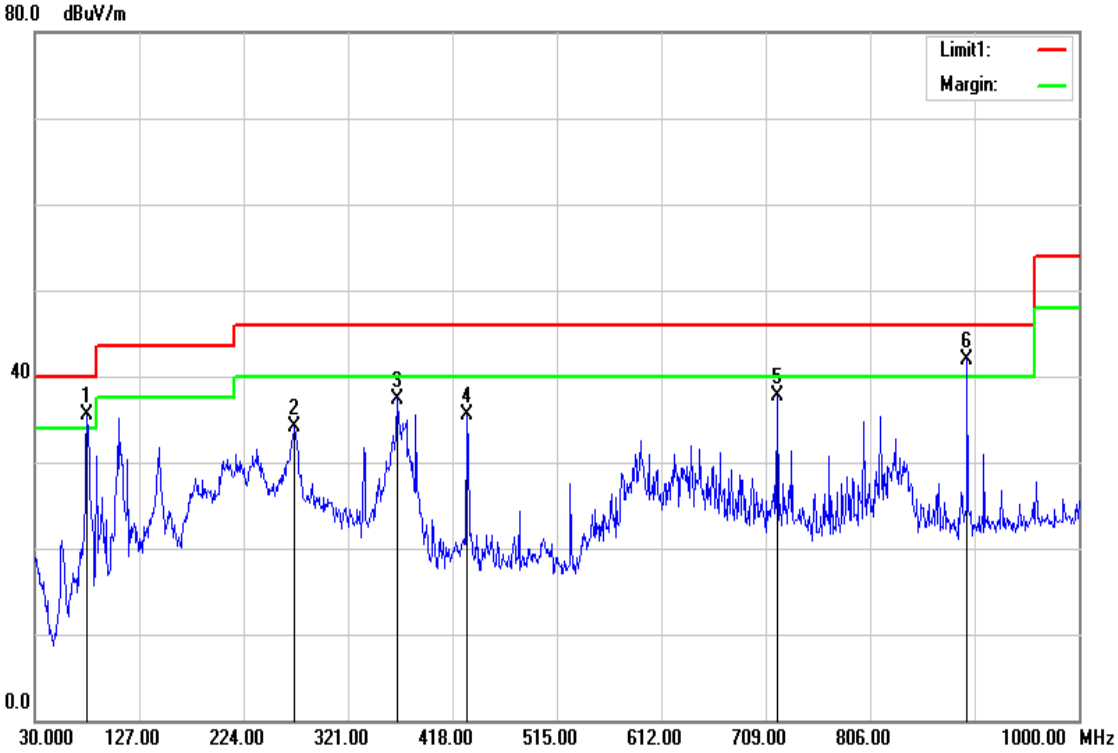


Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant. Pol. (H/V)
30.9700	34.20	-8.63	25.57	40.00	-14.43	peak	V
54.2500	48.87	-21.51	27.36	40.00	-12.64	peak	V
78.5000	59.12	-21.17	37.95	40.00	-2.05	QP	V
107.6000	57.23	-17.69	39.54	43.50	-3.96	peak	V
431.5800	44.90	-10.75	34.15	46.00	-11.85	peak	V
911.7300	35.96	-3.00	32.96	46.00	-13.04	peak	V

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) = Result (dBuV/m) – Limit (dBuV/m).*

Operation Mode:	Normal Link	**Test Date:**	January 28, 2016
Temperature:	27°C	**Tested by:**	Jason Lu
Humidity:	53% RH	**Polarity:**	Hor.



Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant. Pol. (H/V)
78.5000	56.61	-21.17	35.44	40.00	-4.56	peak	H
271.5300	48.92	-14.77	34.15	46.00	-11.85	peak	H
366.5900	49.90	-12.50	37.40	46.00	-8.60	peak	H
431.5800	46.24	-10.75	35.49	46.00	-10.51	peak	H
719.6700	43.27	-5.62	37.65	46.00	-8.35	peak	H
896.2100	45.23	-3.23	42.00	46.00	-4.00	peak	H

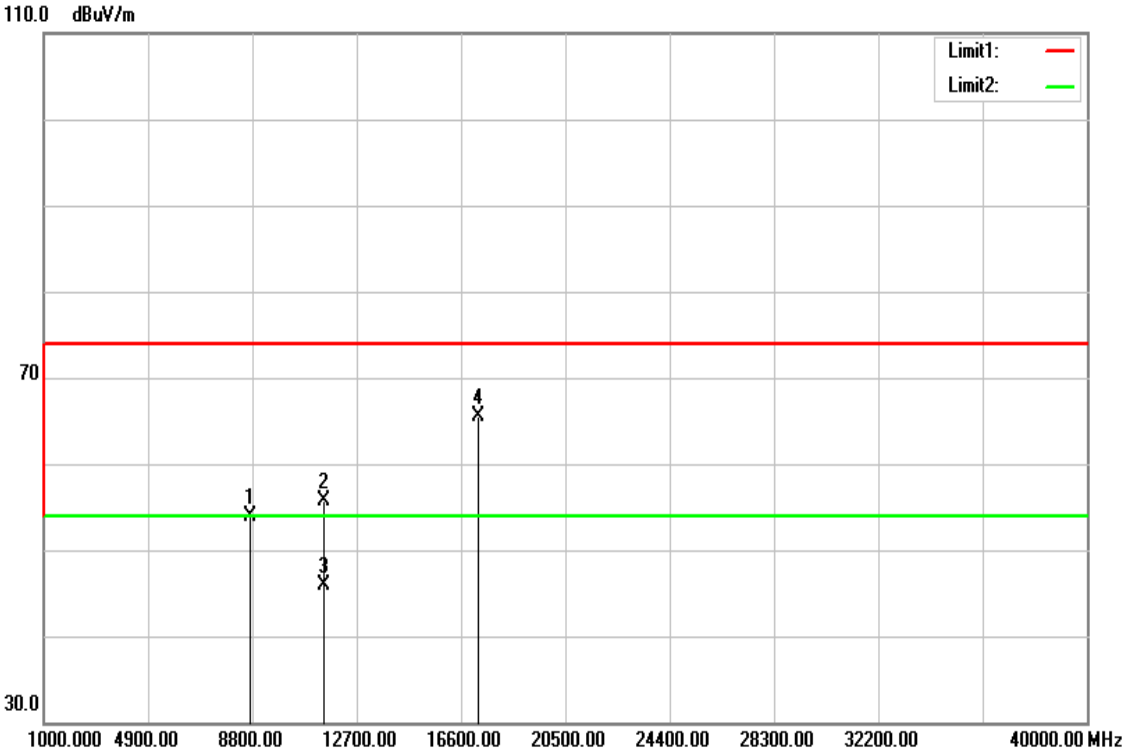
Remark:

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) = Result (dBuV/m) – Limit (dBuV/m).*

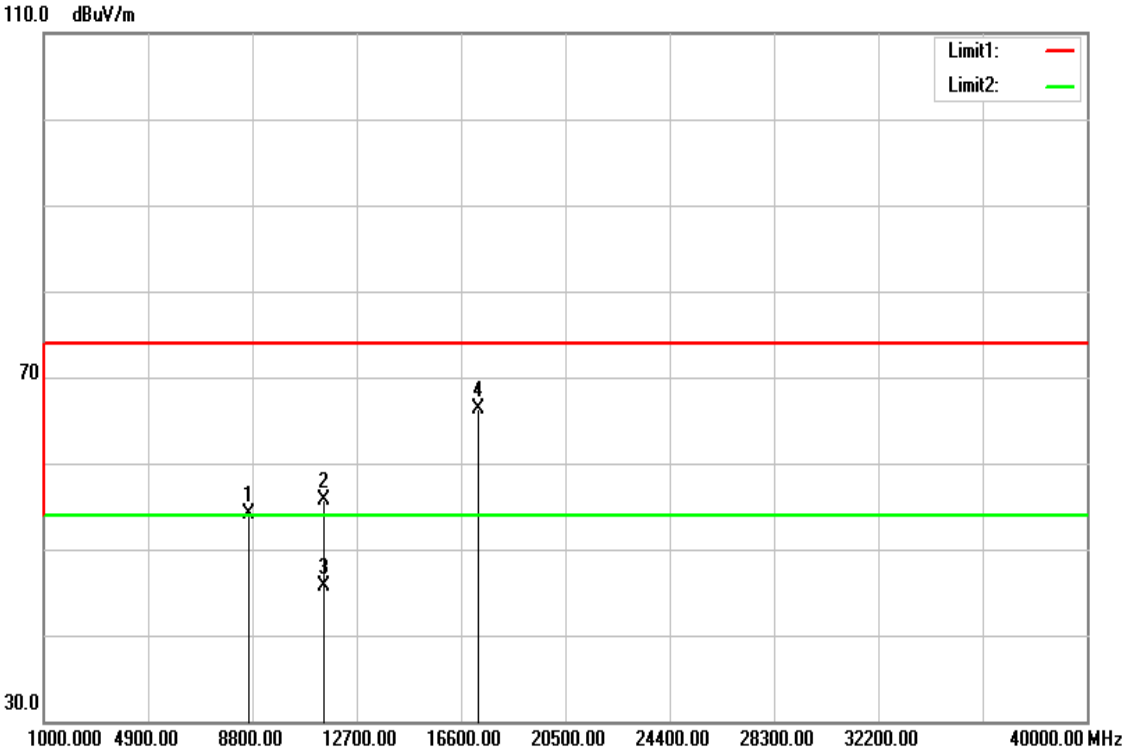
Above 1 GHz

Tx / IEEE 802.11a mode / 5745 ~ 5825MHz / CH Low

Polarity: Vertical



Polarity: Horizontal



Above 1 GHz

Operation Mode: Tx / IEEE 802.11a mode / 5745 ~ 5825MHz / CH Low
Test Date: January 30, 2016
Temperature: 27°C
Tested by: Jason Lu
Humidity: 53% RH
Polarity: Ver. / Hor.

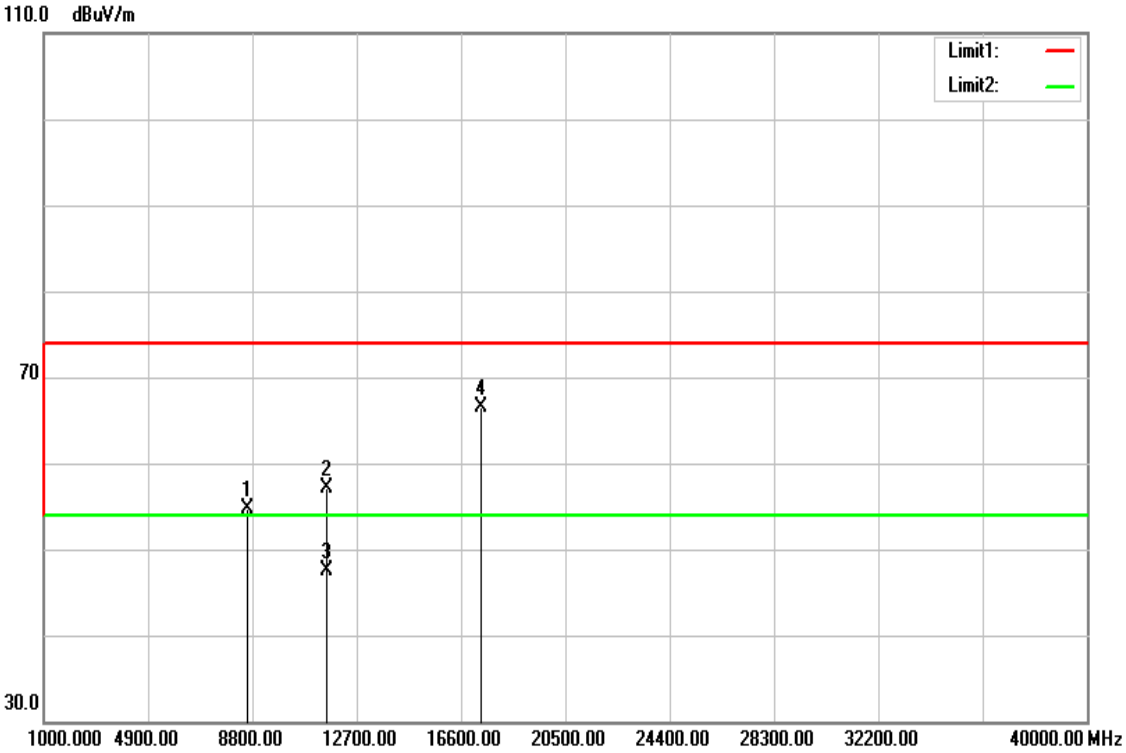
Frequency (MHz)	Reading (dBuV)	Correction (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Pol. (H/V)
8697.000	38.37	15.45	53.82	74.00	-20.18	peak	V
11490.000	37.55	18.16	55.71	74.00	-18.29	peak	V
11490.000	27.71	18.16	45.87	54.00	-8.13	AVG	V
17235.000	38.72	26.83	65.55	74.00	-8.45	peak	V
N/A							
8659.000	38.65	15.38	54.03	74.00	-19.97	peak	H
11490.000	37.57	18.16	55.73	74.00	-18.27	peak	H
11490.000	27.52	18.16	45.68	54.00	-8.32	AVG	H
17235.000	39.44	26.83	66.27	74.00	-7.73	peak	H
N/A							

Remark:

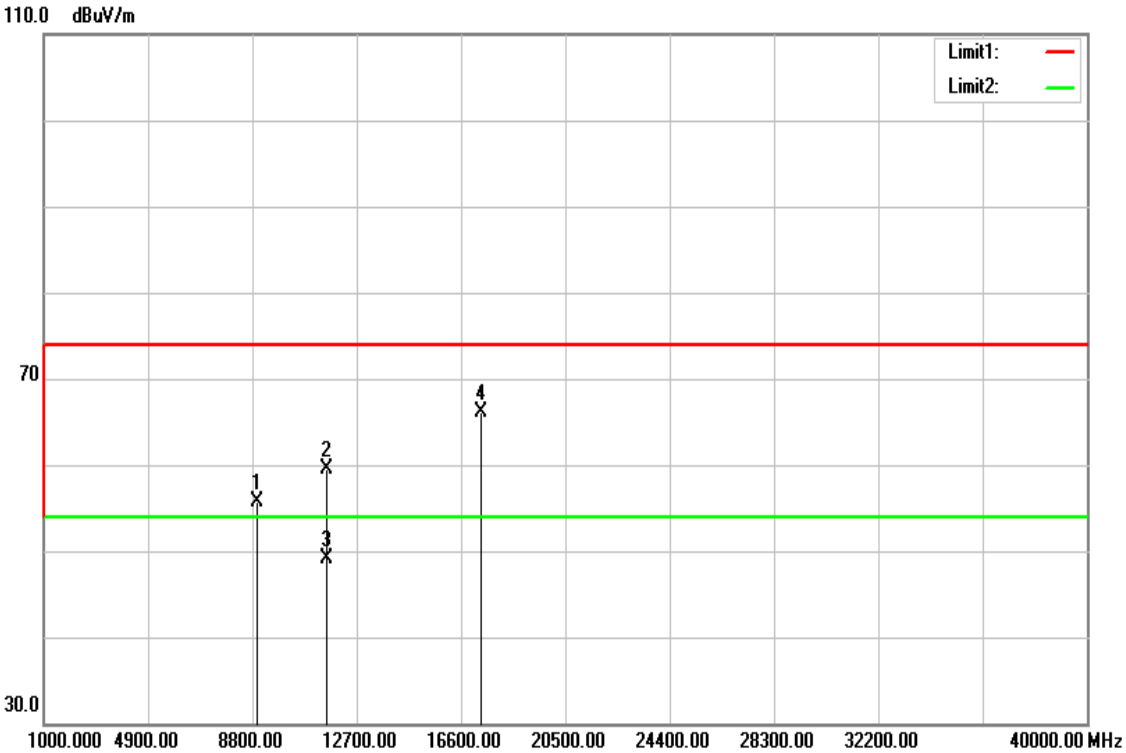
1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average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

Tx / IEEE 802.11a mode / 5745 ~ 5825MHz / CH Mid

Polarity: Vertical



Polarity: Horizontal



Operation Mode:	Tx / IEEE 802.11a mode / 5745 ~ 5825MHz / CH Mid	**Test Date:**	January 30, 2016
Temperature:	27°C	**Tested by:**	Jason Lu
Humidity:	53% RH	**Polarity:**	Ver. / Hor.

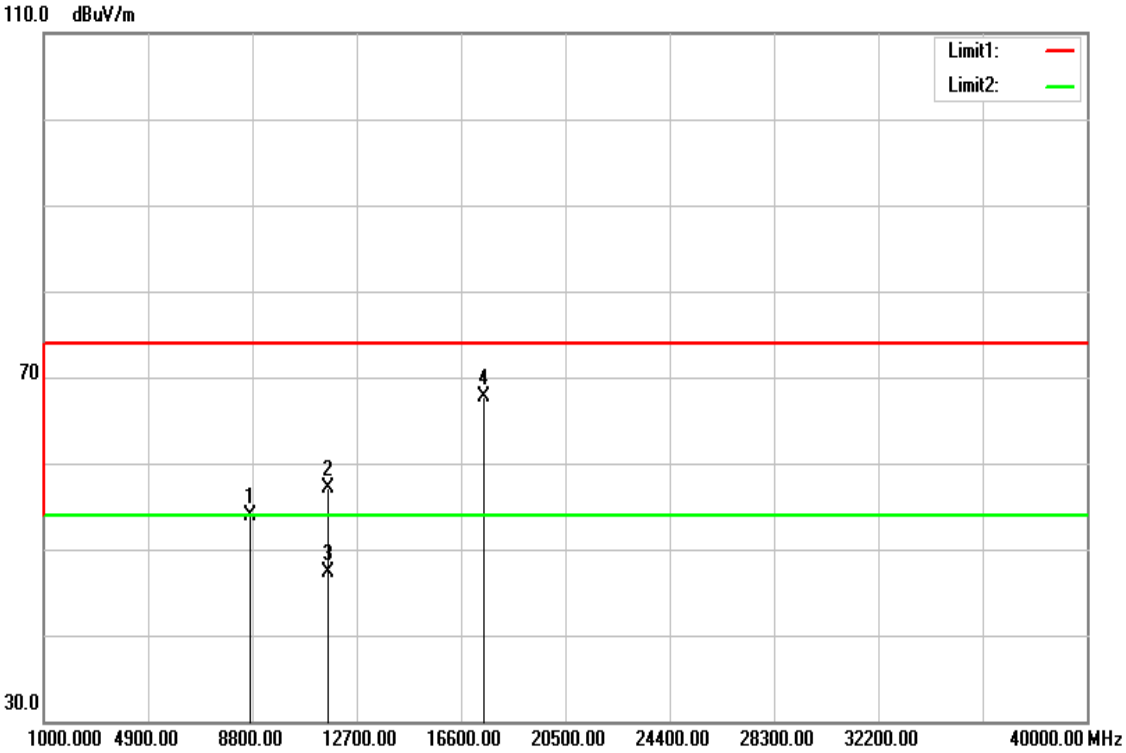
Frequency (MHz)	Reading (dBuV)	Correction (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Pol. (H/V)
8632.000	39.43	15.33	54.76	74.00	-19.24	peak	V
11570.000	38.88	18.17	57.05	74.00	-16.95	peak	V
11570.000	29.40	18.17	47.57	54.00	-6.43	AVG	V
17355.000	38.88	27.57	66.45	74.00	-7.55	peak	V
N/A							
8964.000	39.69	15.95	55.64	74.00	-18.36	peak	H
11570.000	41.41	18.17	59.58	74.00	-14.42	peak	H
11570.000	30.85	18.17	49.02	54.00	-4.98	AVG	H
17355.000	38.61	27.57	66.18	74.00	-7.82	peak	H
N/A							

Remark:

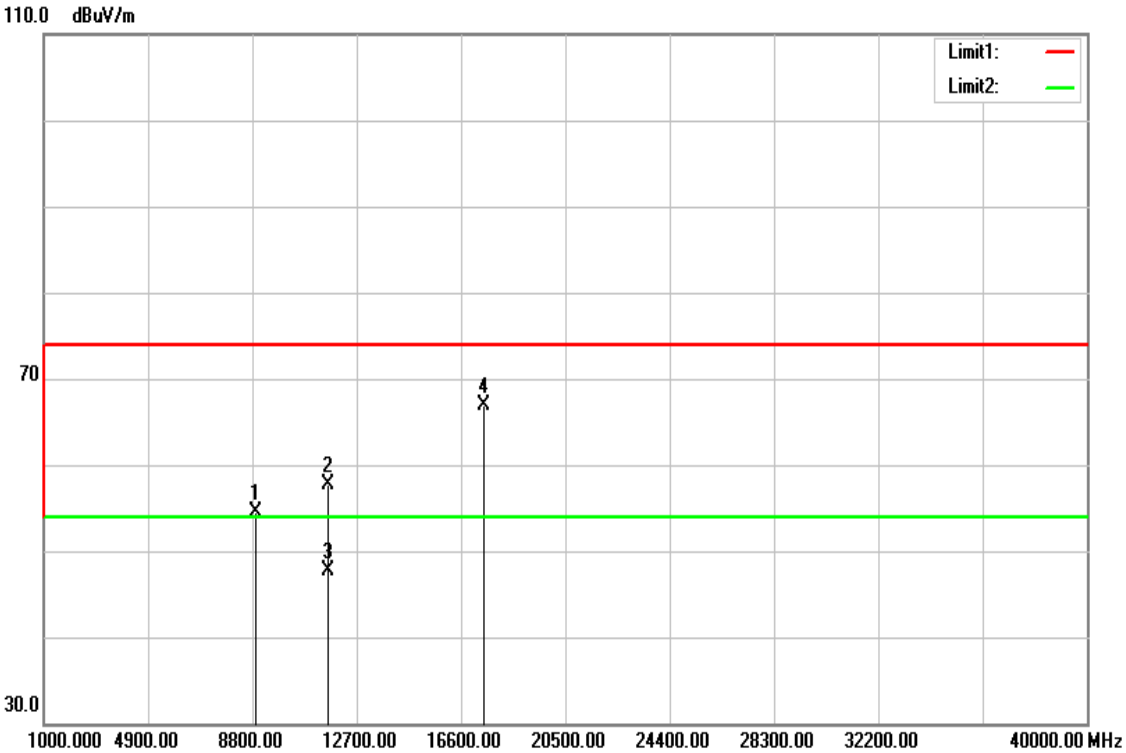
1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average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

Tx / IEEE 802.11a mode / 5745 ~ 5825MHz / CH High

Polarity: Vertical



Polarity: Horizontal



Operation Mode:	Tx / IEEE 802.11a mode / 5745 ~ 5825MHz / CH High	**Test Date:**	January 30, 2016
Temperature:	27°C	**Tested by:**	Jason Lu
Humidity:	53% RH	**Polarity:**	Ver. / Hor.

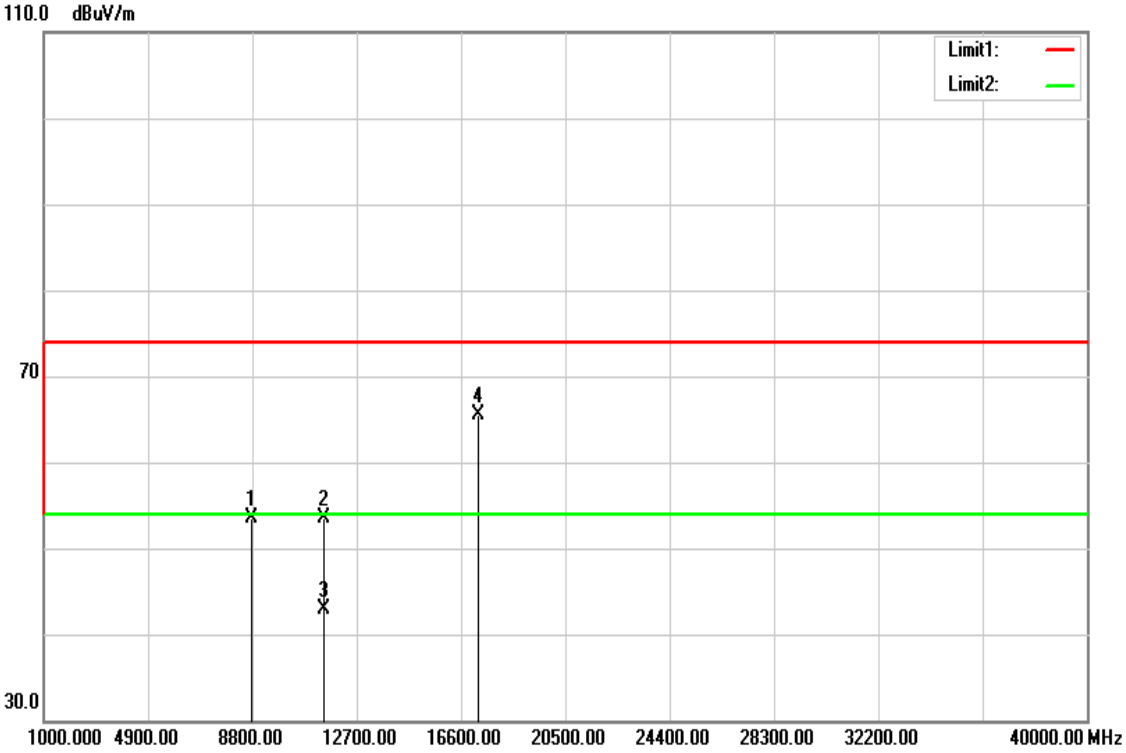
Frequency (MHz)	Reading (dBuV)	Correction (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Pol. (H/V)
8697.000	38.37	15.45	53.82	74.00	-20.18	peak	V
11650.000	38.82	18.19	57.01	74.00	-16.99	peak	V
11650.000	29.01	18.19	47.20	54.00	-6.80	AVG	V
17475.000	39.39	28.30	67.69	74.00	-6.31	peak	V
N/A							
8941.000	38.54	15.91	54.45	74.00	-19.55	peak	H
11650.000	39.54	18.19	57.73	74.00	-16.27	peak	H
11650.000	29.46	18.19	47.65	54.00	-6.35	AVG	H
17475.000	38.64	28.30	66.94	74.00	-7.06	peak	H
N/A							

Remark:

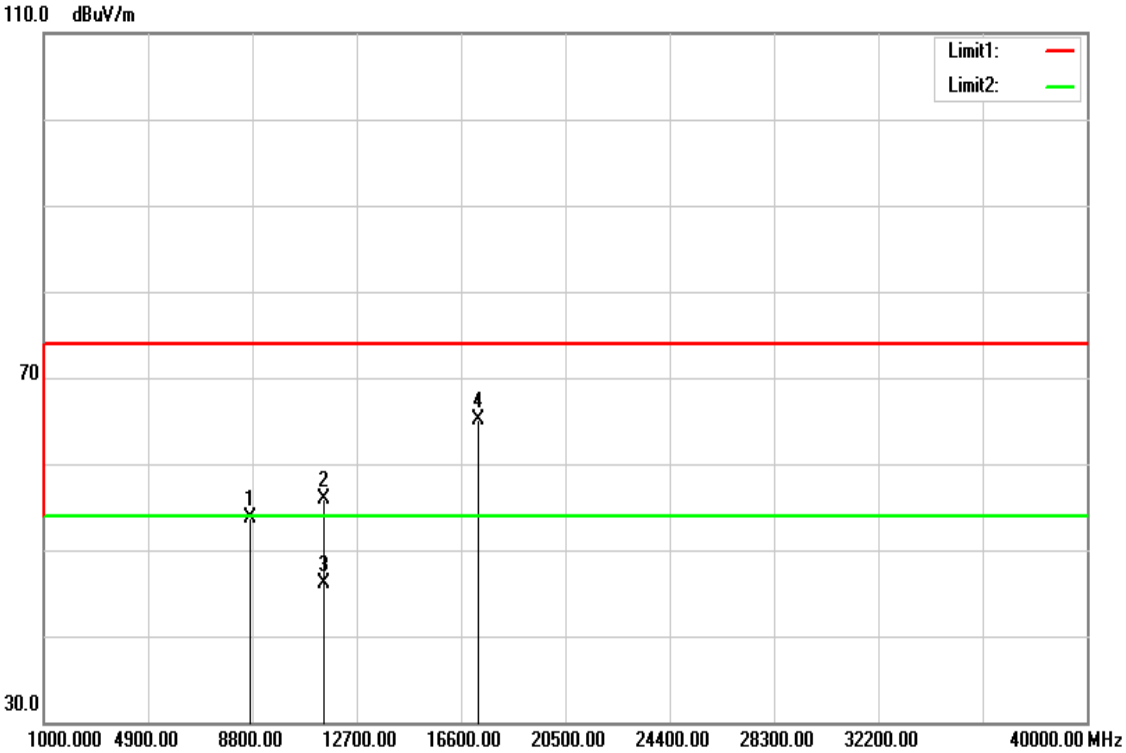
1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average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

Tx / IEEE 802.11n HT 20 MHz mode / 5745 ~ 5825MHz / CH Low

Polarity: Vertical



Polarity: Horizontal



Operation Mode:	Tx / IEEE 802.11n HT 20 MHz mode / 5745 ~ 5825MHz / CH Low	**Test Date:**	January 30, 2016
Temperature:	27°C	**Tested by:**	Jason Lu
Humidity:	53% RH	**Polarity:**	Ver. / Hor.

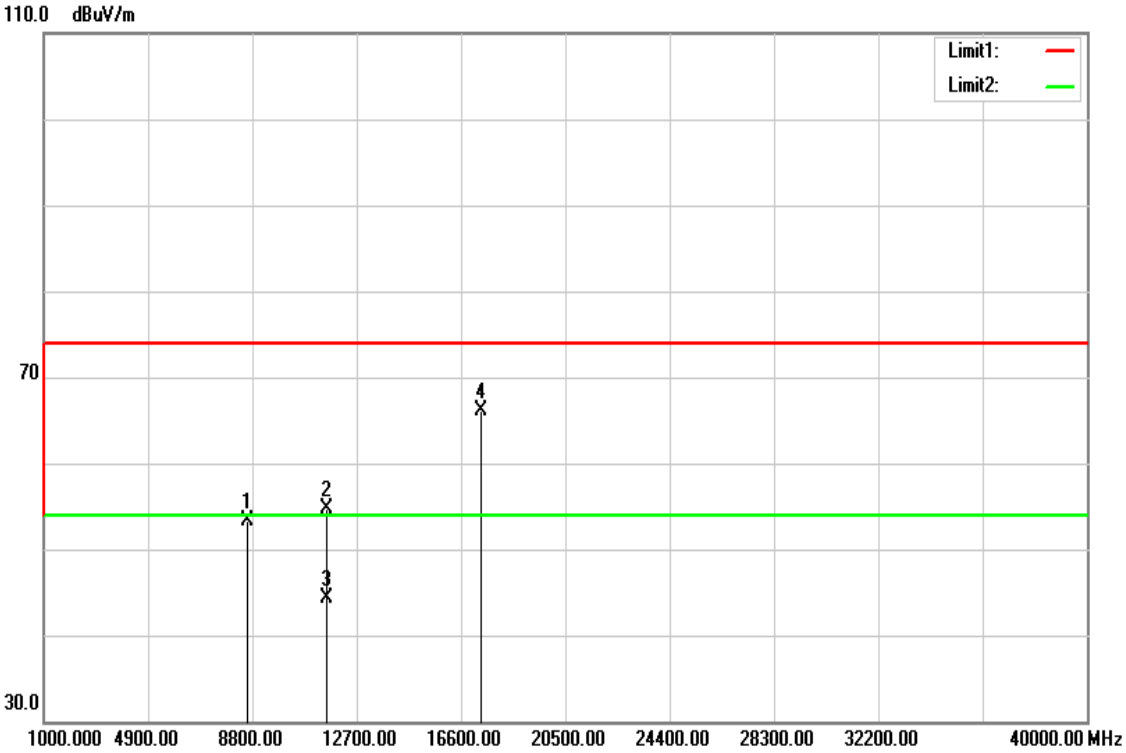
Frequency (MHz)	Reading (dBuV)	Correction (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Pol. (H/V)
8765.000	37.94	15.58	53.52	74.00	-20.48	peak	V
11490.000	35.39	18.16	53.55	74.00	-20.45	peak	V
11490.000	24.68	18.16	42.84	54.00	-11.16	AVG	V
17235.000	38.67	26.83	65.50	74.00	-8.50	peak	V
N/A							
8745.000	38.10	15.54	53.64	74.00	-20.36	peak	H
11490.000	37.82	18.16	55.98	74.00	-18.02	peak	H
11490.000	27.94	18.16	46.10	54.00	-7.90	AVG	H
17235.000	38.19	26.83	65.02	74.00	-8.98	peak	H
N/A							

Remark:

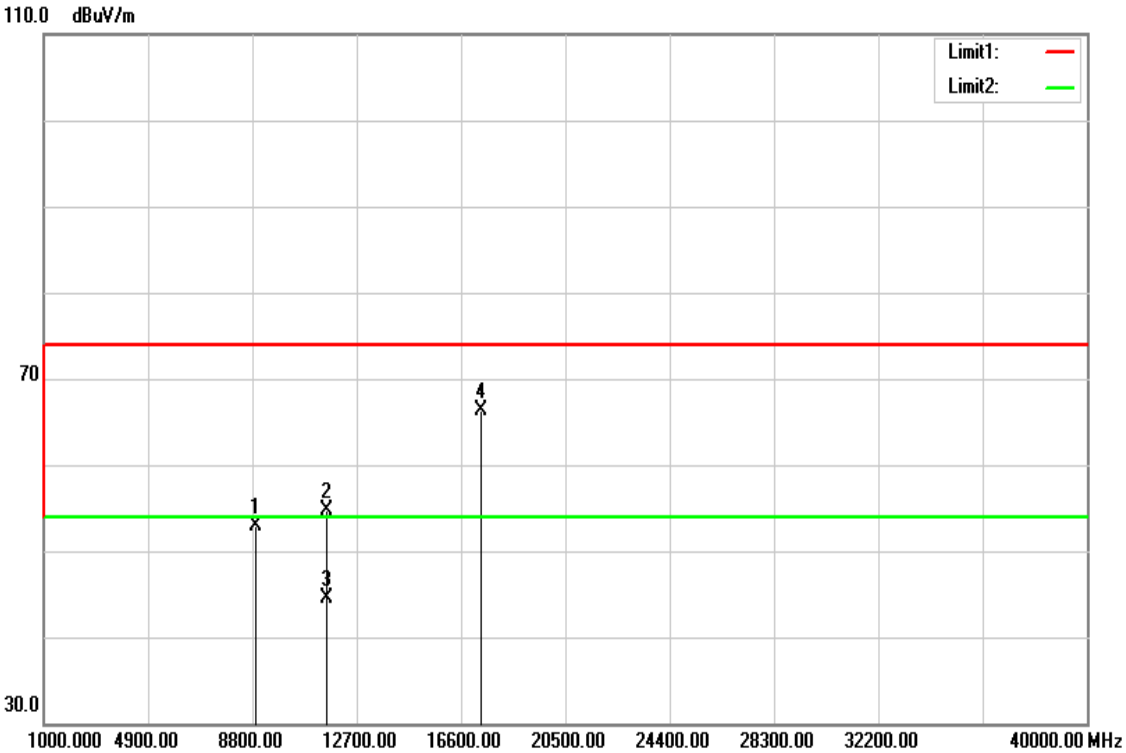
1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average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

Tx / IEEE 802.11n HT 20 MHz mode / 5745 ~ 5825MHz / CH Mid

Polarity: Vertical



Polarity: Horizontal



Operation Mode:	Tx / IEEE 802.11n HT 20 MHz mode / 5745 ~ 5825MHz / CH Mid	**Test Date:**	January 30, 2016
Temperature:	27°C	**Tested by:**	Jason Lu
Humidity:	53% RH	**Polarity:**	Ver. / Hor.

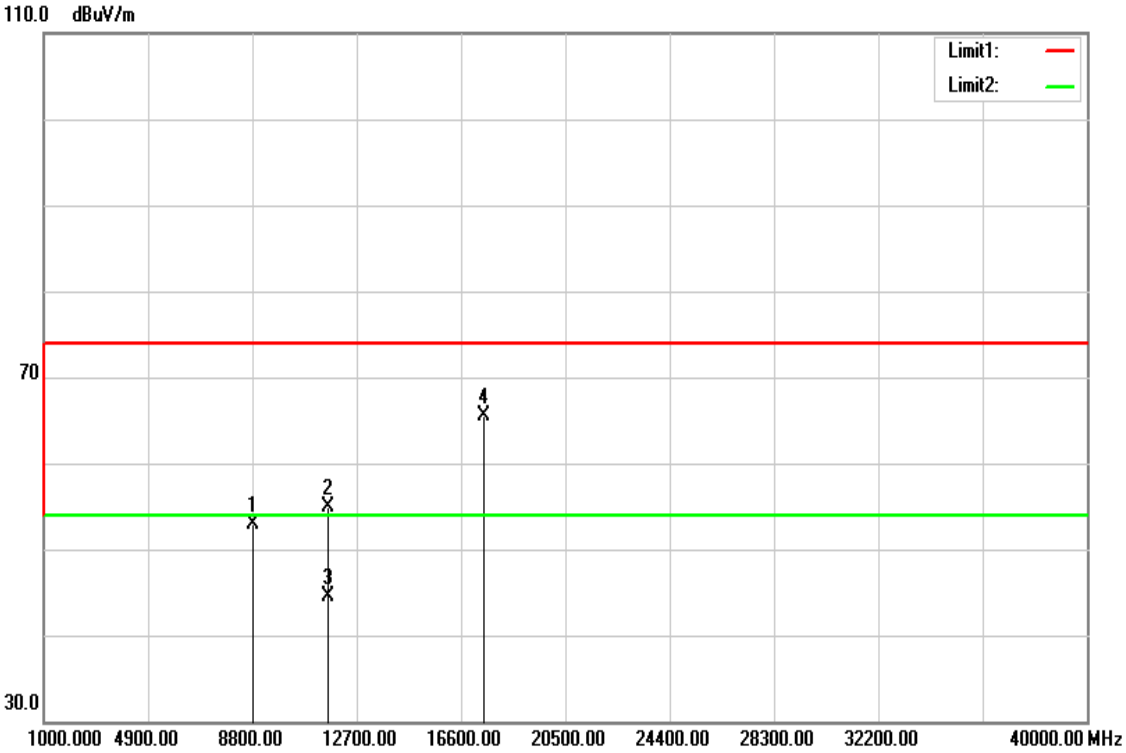
Frequency (MHz)	Reading (dBuV)	Correction (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Pol. (H/V)
8634.000	37.92	15.33	53.25	74.00	-20.75	peak	V
11570.000	36.60	18.17	54.77	74.00	-19.23	peak	V
11570.000	26.07	18.17	44.24	54.00	-9.76	AVG	V
17355.000	38.62	27.57	66.19	74.00	-7.81	peak	V
N/A							
8947.000	37.06	15.92	52.98	74.00	-21.02	peak	H
11570.000	36.60	18.17	54.77	74.00	-19.23	peak	H
11570.000	26.39	18.17	44.56	54.00	-9.44	AVG	H
17355.000	38.68	27.57	66.25	74.00	-7.75	peak	H
N/A							

Remark:

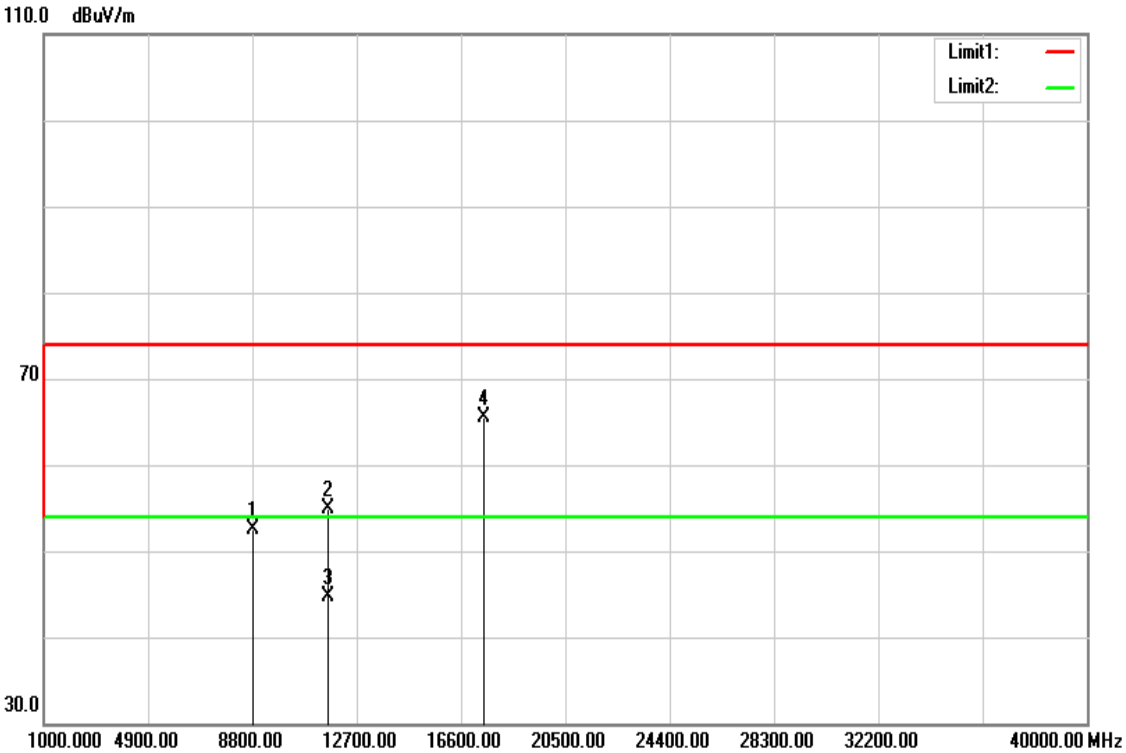
1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average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

Tx / IEEE 802.11n HT 20 MHz mode / 5745 ~ 5825MHz / CH High

Polarity: Vertical



Polarity: Horizontal



Operation Mode:	Tx / IEEE 802.11n HT 20 MHz mode / 5745 ~ 5825MHz / CH High	**Test Date:**	January 30, 2016
Temperature:	27°C	**Tested by:**	Jason Lu
Humidity:	53% RH	**Polarity:**	Ver. / Hor.

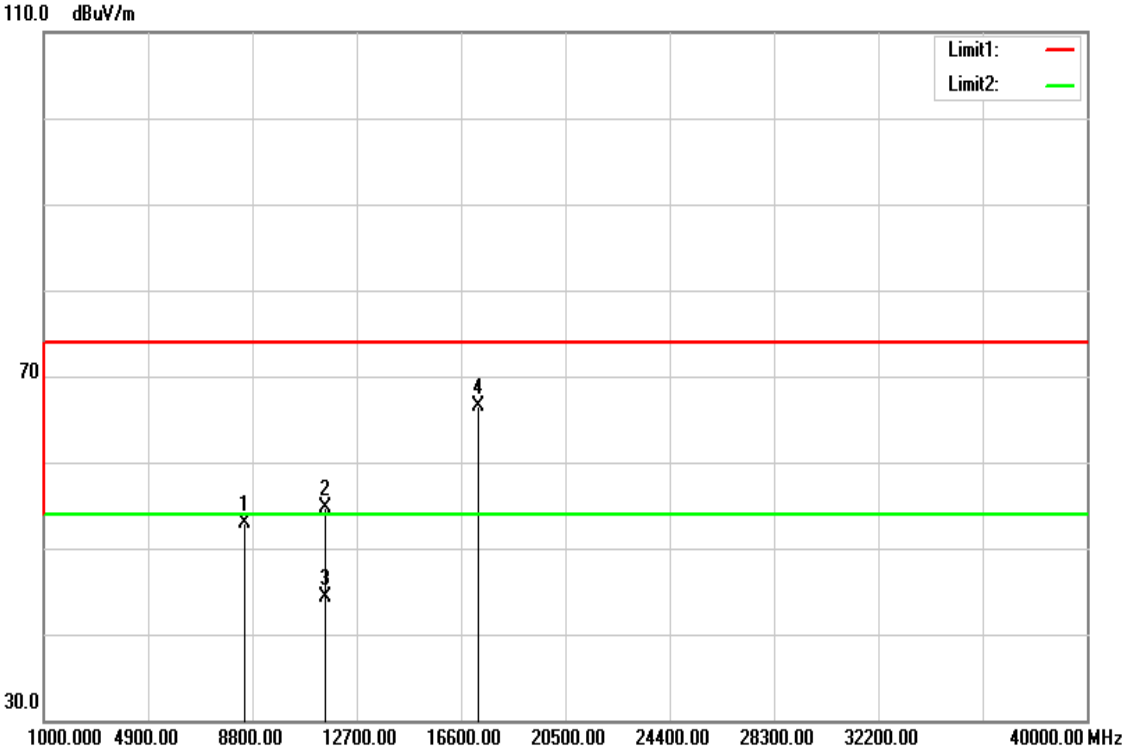
Frequency (MHz)	Reading (dBuV)	Correction (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Pol. (H/V)
8815.000	37.18	15.67	52.85	74.00	-21.15	peak	V
11650.000	36.64	18.19	54.83	74.00	-19.17	peak	V
11650.000	26.40	18.19	44.59	54.00	-9.41	AVG	V
17475.000	37.14	28.30	65.44	74.00	-8.56	peak	V
N/A							
8839.000	36.74	15.72	52.46	74.00	-21.54	peak	H
11650.000	36.64	18.19	54.83	74.00	-19.17	peak	H
11650.000	26.56	18.19	44.75	54.00	-9.25	AVG	H
17475.000	37.18	28.30	65.48	74.00	-8.52	peak	H
N/A							

Remark:

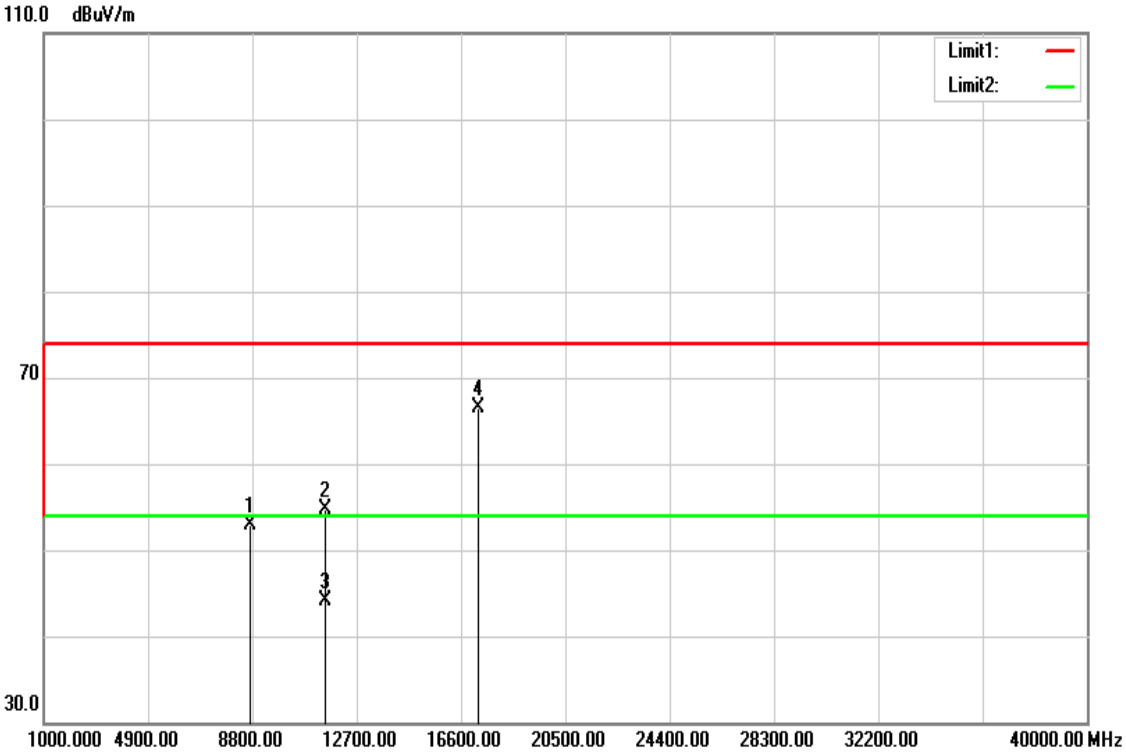
1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average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

Tx / IEEE 802.11n HT 40 MHz mode / 5755 ~ 5795MHz / CH Low

Polarity: Vertical



Polarity: Horizontal



Operation Mode:	Tx / IEEE 802.11n HT 40 MHz mode / 5755 ~ 5795MHz / CH Low	**Test Date:**	January 30, 2016
Temperature:	27°C	**Tested by:**	Jason Lu
Humidity:	53% RH	**Polarity:**	Ver. / Hor.

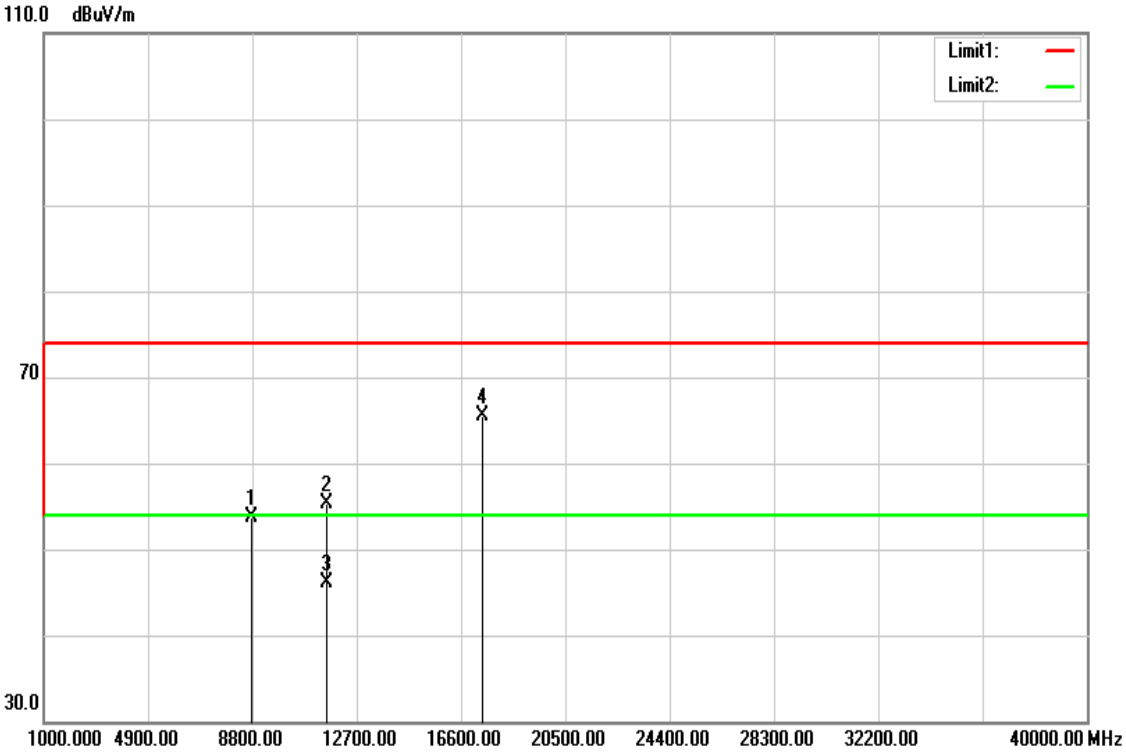
Frequency (MHz)	Reading (dBuV)	Correction (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Pol. (H/V)
8522.000	37.88	15.12	53.00	74.00	-21.00	peak	V
11510.000	36.55	18.16	54.71	74.00	-19.29	peak	V
11510.000	26.09	18.16	44.25	54.00	-9.75	AVG	V
17265.000	39.42	27.02	66.44	74.00	-7.56	peak	V
N/A							
8743.000	37.37	15.54	52.91	74.00	-21.09	peak	H
11510.000	36.55	18.16	54.71	74.00	-19.29	peak	H
11510.000	25.99	18.16	44.15	54.00	-9.85	AVG	H
17265.000	39.46	27.02	66.48	74.00	-7.52	peak	H
N/A							

Remark:

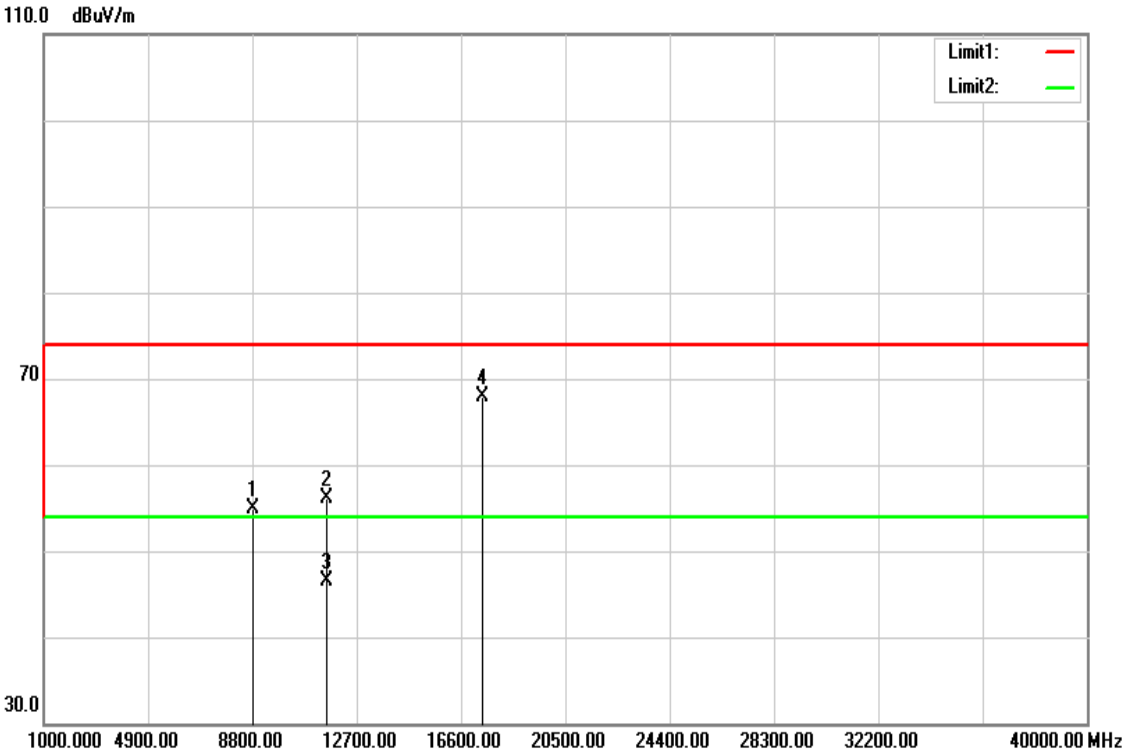
1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average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

Tx / IEEE 802.11n HT 40 MHz mode / 5755 ~ 5795MHz / CH High

Polarity: Vertical



Polarity: Horizontal



Operation Mode:	Tx / IEEE 802.11n HT 40 MHz mode / 5755 ~ 5795MHz / CH High	**Test Date:**	January 30, 2016
Temperature:	27°C	**Tested by:**	Jason Lu
Humidity:	53% RH	**Polarity:**	Ver. / Hor.

Frequency (MHz)	Reading (dBuV)	Correction (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Pol. (H/V)
8796.000	38.05	15.64	53.69	74.00	-20.31	peak	V
11590.000	37.02	18.18	55.20	74.00	-18.80	peak	V
11590.000	27.85	18.18	46.03	54.00	-7.97	AVG	V
17385.000	37.76	27.75	65.51	74.00	-8.49	peak	V
N/A							
8810.000	39.18	15.66	54.84	74.00	-19.16	peak	H
11590.000	37.98	18.18	56.16	74.00	-17.84	peak	H
11590.000	28.33	18.18	46.51	54.00	-7.49	AVG	H
17385.000	40.13	27.75	67.88	74.00	-6.12	peak	H
N/A							

Remark:

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

7.6 POWERLINE CONDUCTED EMISSIONS

LIMIT

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

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

** Decreases with the logarithm of the frequency.*

TEST CONFIGURATION

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

TEST PROCEDURE

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

TEST RESULTS

Not applicable, because EUT not connect to AC Main Source direct.