# FCC 47 CFR PART 15 SUBPART E & INDUSTRY CANADA RSS-247

# TEST REPORT

## For

## Tablet Computer

## Model: A6003

## Trade Name: acer

*Issued to*

**Acer Incorporated**
**8F, 88, Sec 1, Xintai 5th Rd. Xizhi, New Taipei City 221 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.)**
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**Issued Date: June 3, 2016**

Testing Laboratory
1309

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# Revision History

| Rev. | | Issue Date | | Revisions | Effect Page | Revised By |
|---|---|---|---|---|---|---|
| 00 | | June 3, 2016 | | Initial Issue | ALL | Kelly Cheng |

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# 1. TEST RESULT CERTIFICATION

**Applicant:** Acer Incorporated
8F, 88, Sec 1, Xintai 5th Rd. Xizhi, New Taipei City 221
Taiwan, R.O.C

**Manufacturer:** Acer Incorporated
8F, 88, Sec 1, Xintai 5th Rd. Xizhi, New Taipei City 221
Taiwan, R.O.C

**Equipment Under Test:** Tablet Computer

**Model Number:** A6003

**Trade Name:** acer

**Date of Test:** June 1 ~ 2, 2016

| APPLICABLE STANDARDS | |
|---|---|
| **STANDARD** | **TEST RESULT** |
| FCC 47 CFR Part 15 Subpart E & Industry Canada RSS-247 Issue 1 | No non-compliance noted |

## We hereby certify that:

Compliance Certification Services Inc. tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

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*

Dennis Li
Engineer
Compliance Certification Services Inc.

# 2. EUT DESCRIPTION

| | |
|---|---|
| **Product** | Tablet Computer |
| **Model Number** | A6003 |
| **Trade Name** | acer |
| **Power Supply** | 1.VDC from Power Adapter<br>2. Power from Battery<br>3. Powered from host device via USB |
| **Received Date** | March 29, 2016 |
| **Frequency Range** | IEEE 802.11a/ IEEE 802.11n HT 20 MHz: 5745~5825 MHz<br>IEEE 802.11n HT 40 MHz: 5755~5795 MHz |
| **Transmit Power** | IEEE 802.11a mode: 12.34dBm<br>IEEE 802.11n HT 20 MHz mode: 12.21dBm<br>IEEE 802.11n HT 40 MHz mode: 12.34dBm |
| **Number of Channels** | IEEE 802.11a mode: 5 Channels<br>IEEE 802.11n HT 20 MHz mode: 5 Channels<br>IEEE 802.11n HT 40 MHz mode: 2 Channels |
| **Antenna Specification** | Model: A10L<br>FPC Antenna / Gain: 2.84dBi |

***Remark:*** *1. The sample selected for test was engineering sample that approximated to production product and was provided by manufacturer.*
*2. Keypast List：*

| Components | Vendor | Model Name or Key Spec. |
|---|---|---|
| EMMC(FLASH) | Hynix | H26M52103FMR (16GB) |
| CPU | MTK | MT8163V/B (64-bit Quad Cortex A53) |
| DDR3L | Hynix | H5TC4G63AFR-PBA (1GB / 256*16) |
| M/B | Sun & lynn | A10L_V1.1 (94V-0) |
| 10.1” LCD Panel | Kingdisplay | KD101N37-40NA-A10 |
| Battery | TCL | PR-279594N (1ICP3/95/94-2)<br>3.7V, 6100mAh / 22.57Wh |
| Front Camera module | microkore | W05P4021 V2 (GC2355) |
| Rear Camera module | microkore | W05P4021 V2 (OV5670) |
| Speaker left | Haosheng | XHB160903B08-08-B-RH (8Ω) |
| Speaker right | Haosheng | XHB160903B08-07-B-RH (8Ω) |
| Adapter | Delta | ADP-10HW A<br>I/P: 100-240Vac~, 0.4A, 50-60Hz<br>O/P: 5.35Vdc, 2.0A |
| | Lite-On | PA-1100-25<br>I/P: 100-240Vac~, 0.3A, 50/60Hz<br>O/P: 5.2Vdc, 2.0A |
| RF Module | MTK | MT6625LN/BT, WIFI |

# 3. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10: 2013 and FCC CFR 47 Part 15.207, 15.209, 15.407 and KDB 789033 D02 General UNII Test Procedures New Rules v01r02.

The tests documented in this report were performed in accordance with IC RSS-247, IC RSS-Gen and ANSI C63.10:2013.

This submittal(s) (test report) is intended for IC Certification with Industry Canada RSS-247.

## 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 the turntable, which is 1.5 m above the ground plane. The turntable is then rotated for 360 degrees to determine the proper orientation for the maximum emission level. The EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission level. And, each emission is to be maximized by changing the horizontal and vertical polarization of the receiving antenna. In order to find out the maximum emissions, exploratory radiated emission measurements were made according to the requirements in ANSI C63.10: 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: A6003) comes with two types of power adapter (model: PA-1100-25 / ADP-10HW A) for sale. After the preliminary test, the power adapter ADP-10HW A was found to emit the worst emissions and therefore had been tested under operating condition.

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

**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 (X 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 Date** | **Calibration Due** |
| DC Power Supplies | GW Instek | SPS-3610 | GPE880163 | 01/19/2016 | 01/18/2017 |
| Power Meter | Anritsu | ML2495A | 1012009 | 07/08/2015 | 07/07/2016 |
| Power Sensor | Anritsu | MA2411B | 917072 | 07/08/2015 | 07/07/2016 |
| Signal Analyzer | R&S | FSV 40 | 101073 | 07/20/2015 | 07/19/2016 |
| Spectrum Analyzer | Agilent | E4446A | US42510268 | 02/15/2016 | 02/14/2017 |
| Thermostatic/Hrgrosatic Chamber | TAICHY | MHG-150LF | 930619 | 10/08/2015 | 10/07/2016 |
| Vector Signal Generator | R&S | SMU 200A | 102239 | 03/10/2016 | 03/09/2017 |
| AC Power Source | EXTECH | 6205 | 1140845 | N.C.R | N.C.R |

| Wugu 966 Chamber A | | | | | |
|---|---|---|---|---|---|
| **Name of Equipment** | **Manufacturer** | **Model** | **Serial Number** | **Calibration Date** | **Calibration Due** |
| Bilog Antenna | Sunol Sciences | JB3 | A030105 | 08/06/2015 | 08/05/2016 |
| EMI Test Receiver | R&S | ESCI | 100064 | 06/05/2015 | 06/04/2016 |
| Horn Antenna | EMCO | 3117 | 55165 | 02/24/2016 | 02/23/2017 |
| Horn Antenna | EMCO | 3116 | 26370 | 01/15/2016 | 01/14/2017 |
| K Type Cable | Huber+Suhner | SUCOFLEX 102 | 29406/2 | 01/12/2016 | 01/11/2017 |
| K Type Cable | Huber+Suhner | SUCOFLEX 102 | 22470/2 | 01/12/2016 | 01/11/2017 |
| Pre-Amplifier | MITEQ | AMF-6F-260400-40-8P | 985646 | 01/14/2016 | 01/13/2017 |
| Pre-Amplifier | EMCI | EMC 012635 | 980151 | 06/05/2015 | 06/04/2016 |
| Pre-Amplifier | EMCI | EM330 | N/A | 06/05/2015 | 06/04/2016 |
| Spectrum Analyzer | Agilent | E4446A | US42510252 | 12/08/2015 | 12/07/2016 |
| Antenna Tower | CCS | CC-A-1F | N/A | N.C.R | N.C.R |
| Controller | CCS | CC-C-1F | N/A | N.C.R | N.C.R |
| Turn Table | CCS | CC-T-1F | N/A | N.C.R | N.C.R |
| Software | EZ-EMC (CCS-3A1RE) | | | | |

| Conducted Emission Room # B | | | | | |
|---|---|---|---|---|---|
| **Name of Equipment** | **Manufacturer** | **Model** | **Serial Number** | **Calibration Date** | **Calibration Due** |
| Capacitive Voltage Probe | FCC | F-CVP-1 | 100185 | 03/09/2016 | 03/08/2017 |
| EMI Test Receiver | R&S | ESCI | 101073 | 09/09/2015 | 09/08/2016 |
| LISN | SCHWARZBECK | NSLK 8127 | 8127-541 | 11/23/2015 | 11/22/2016 |
| LISN | R&S | ENV216 | 101054 | 05/11/2016 | 05/10/2017 |
| Test S/W | CCS-3A1-CE | | | | |

## 4.3 MEASUREMENT UNCERTAINTY

| PARAMETER | UNCERTAINTY |
|---|---|
| Powerline Conducted Emission | +/- 1.2575 |
| 3M Semi Anechoic Chamber / 30M~200M | +/- 4.0138 |
| 3M Semi Anechoic Chamber / 200M~1000M | +/- 3.9483 |
| 3M Semi Anechoic Chamber / 1G~8G | +/- 2.5975 |
| 3M Semi Anechoic Chamber / 8G~18G | +/- 2.6112 |
| 3M Semi Anechoic Chamber / 18G~26G | +/- 2.7389 |
| 3M Semi Anechoic Chamber / 26G~40G | +/- 2.9683 |

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

# 5 FACILITIES AND ACCREDITATIONS

## 5.1 FACILITIES

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

☐ No.199, Chunghsen Road, Hsintien City, Taipei Hsien, Taiwan, R.O.C.
Tel: 886-2-2217-0894 / Fax: 886-2-2217-1029

☒ No.11, Wugong 6th Rd., Wugu Dist., New Taipei City 248, 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.

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

## 5.2 LABORATORY ACCREDITATIONS AND LISTING

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

## 5.3 TABLE OF ACCREDITATIONS AND LISTINGS

| Country | Agency | Scope of Accreditation | Logo |
|---|---|---|---|
| USA | FCC | 3M Semi Anechoic Chamber (FCC MRA: TW1039) to perform FCC Part 15 measurements | FCC MRA: TW1039 |
| Taiwan | TAF | LP0002, RTTE01, FCC Method-47 CFR Part 15 Subpart C, D, E, RSS-247, RSS-310<br>IDA TS SRD, AS/NZS 4268, AS/NZS 4771, TS 12.1 & 12,2,<br>ETSI EN 300 440-1, ETSI EN 300 440-2, ETSI EN 300 328,<br>ETSI EN 300 220-1, ETSI EN 300 220-2, ETSI EN 301 893,<br>ETSI EN 301 489-1/3/7/17<br>FCC OET Bulletin 65 + Supplement C,<br>EN 50360, EN 50361, EN 50371, RSS 102, EN 50383, EN 50385,<br>EN 50392, IEC 62209, CNS 14958-1, CNS 14959<br>FCC Method –47 CFR Part 15 Subpart B<br>IEC / EN 61000-3-2, IEC / EN 61000-3-3,<br>IEC / EN 61000-4-2/3/4/5/6/8/11 | Testing Laboratory 1309 |
| Canada | Industry Canada | 3M Semi Anechoic Chamber (IC 2324G-1 / IC 2324G-2) to perform | IC 2324G-1<br>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 | | | | | | |

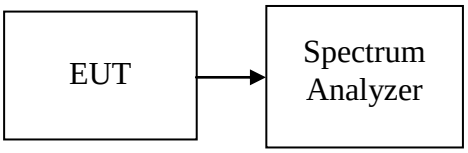
***Remark:***

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 RSS-247 REQUIREMENTS

## 7.1 99%BANDWIDTH

**Test Configuration**




## TEST PROCEDURE

The resolution bandwidth shall be set to as close to 1% of the selected span as is possible without being below 1%. The video bandwidth shall be set to 3 times the resolution bandwidth. Video averaging is not permitted. Where practical, a sampling detector shall be used since a peak or, peak hold.

## TEST RESULTS

*No non-compliance noted.*

## Test Data

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

| Channel | Frequency (MHz) | 99%Bandwidth (MHz) |
|---|---|---|
| Low | 5745 | 16.3820 |
| Mid | 5785 | 16.4399 |
| High | 5825 | 16.2080 |

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

| Channel | Frequency (MHz) | 99% Bandwidth (MHz) |
|---|---|---|
| Low | 5745 | 17.5976 |
| Mid | 5785 | 17.5976 |
| High | 5825 | 17.5976 |

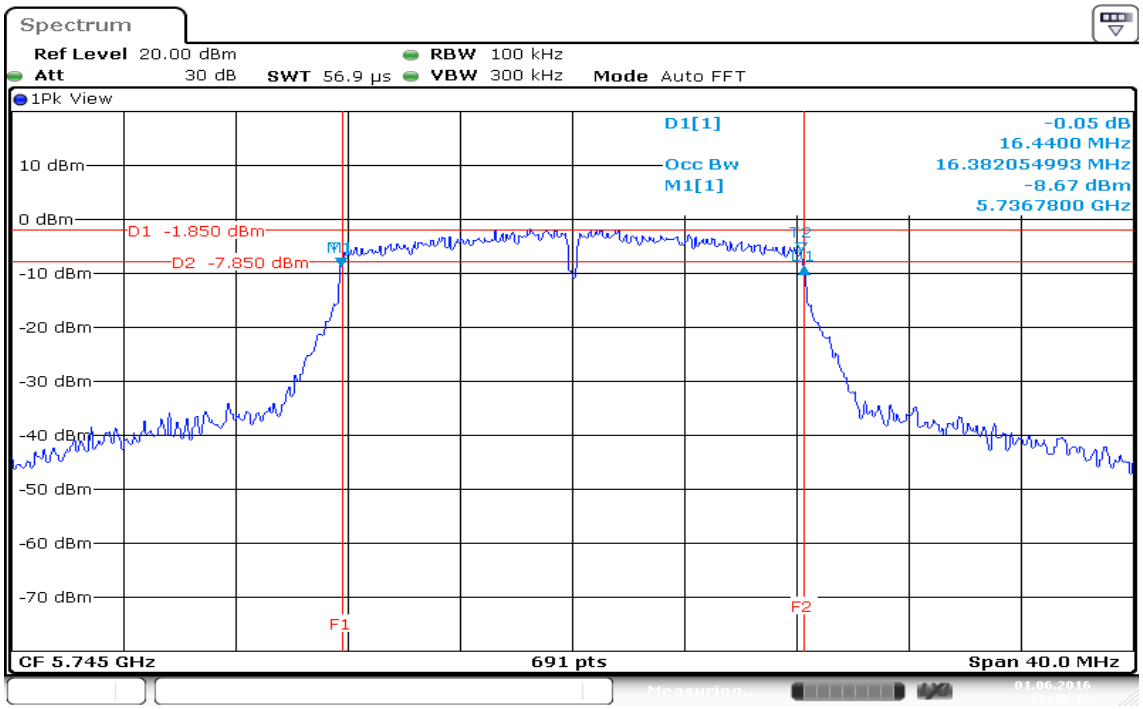
### Test mode: IEEE 802.11n HT 40 MHz mode / 5755 ~ 5815MHz

| Channel | Frequency (MHz) | 99% Bandwidth (MHz) |
|---|---|---|
| Low | 5755 | 36.1215 |
| High | 5795 | 36.1215 |

## Test Plot

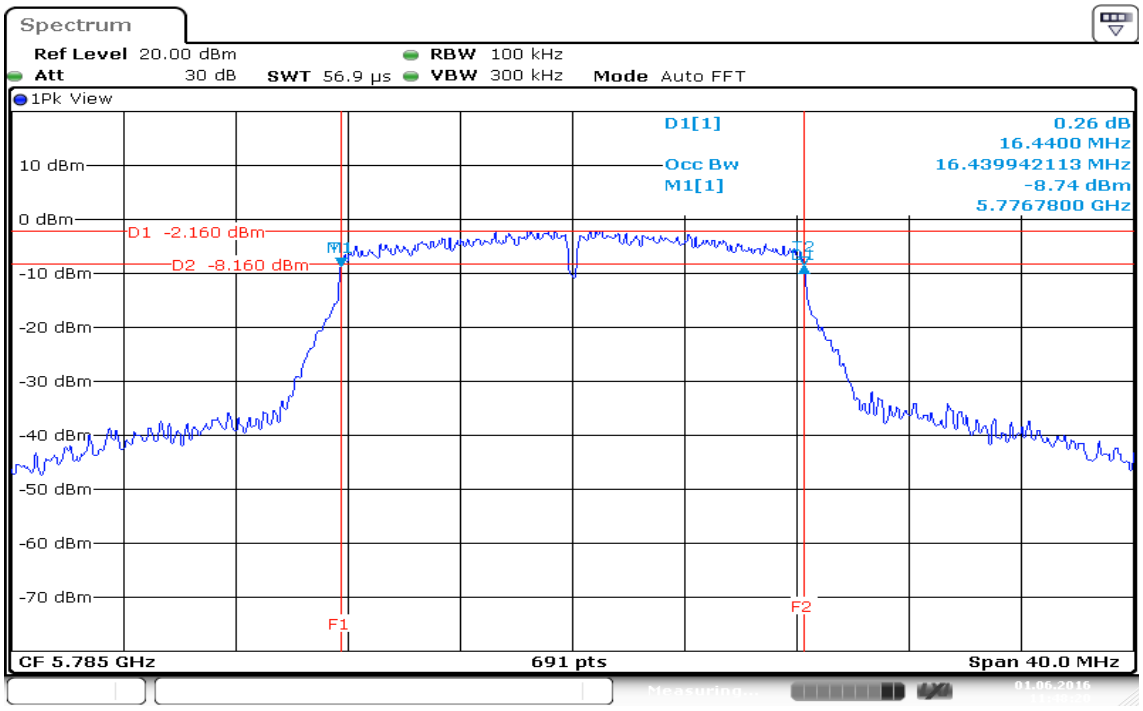
## IEEE 802.11a mode / 5745 ~ 5825MHz

### 99% Bandwidth (CH Low)



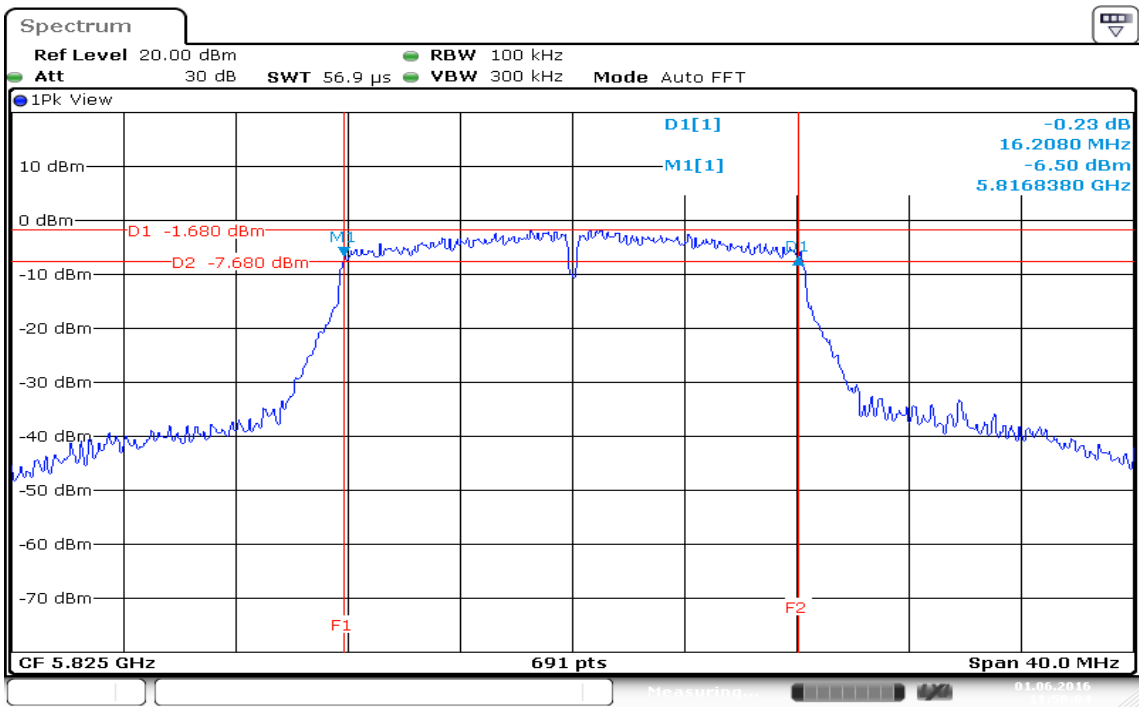

Date: 1.JUN.2016 11:46:36

### 99% Bandwidth (CH Mid)




Date: 1.JUN.2016 11:48:20

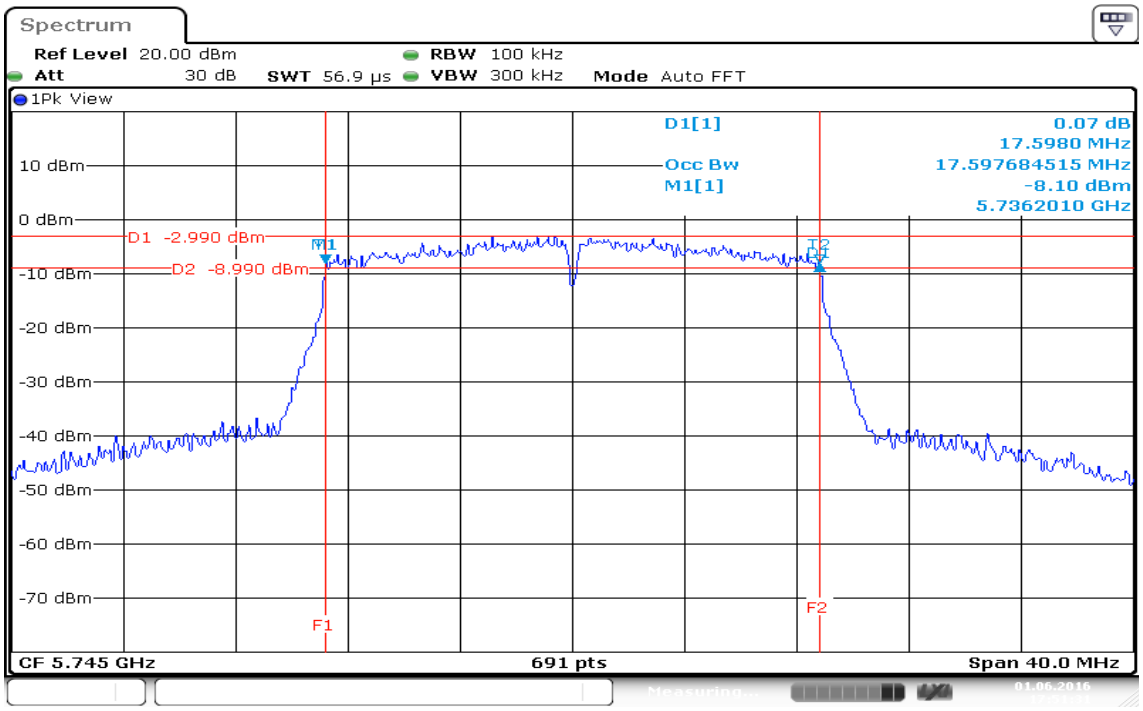
## 99% Bandwidth (CH High)




Date: 1.JUN.2016 11:50:05

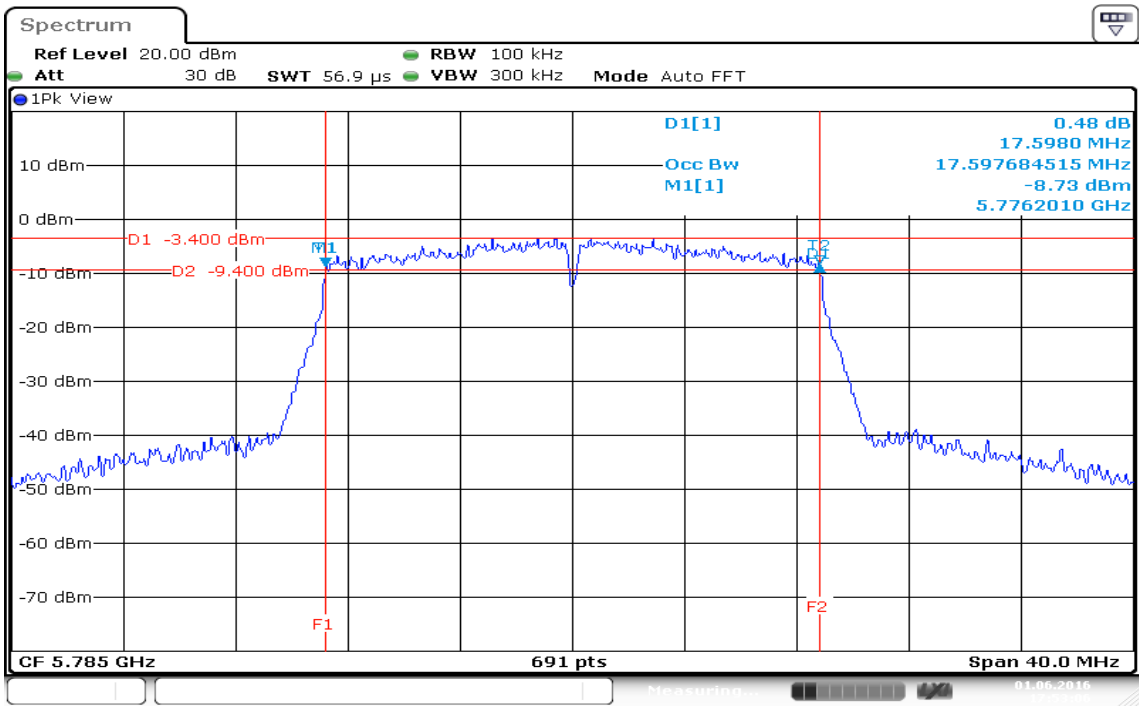
## Test mode: IEEE 802.11n HT 20 MHz mode / 5745 ~ 5825MHz

### 99% Bandwidth (CH Low)



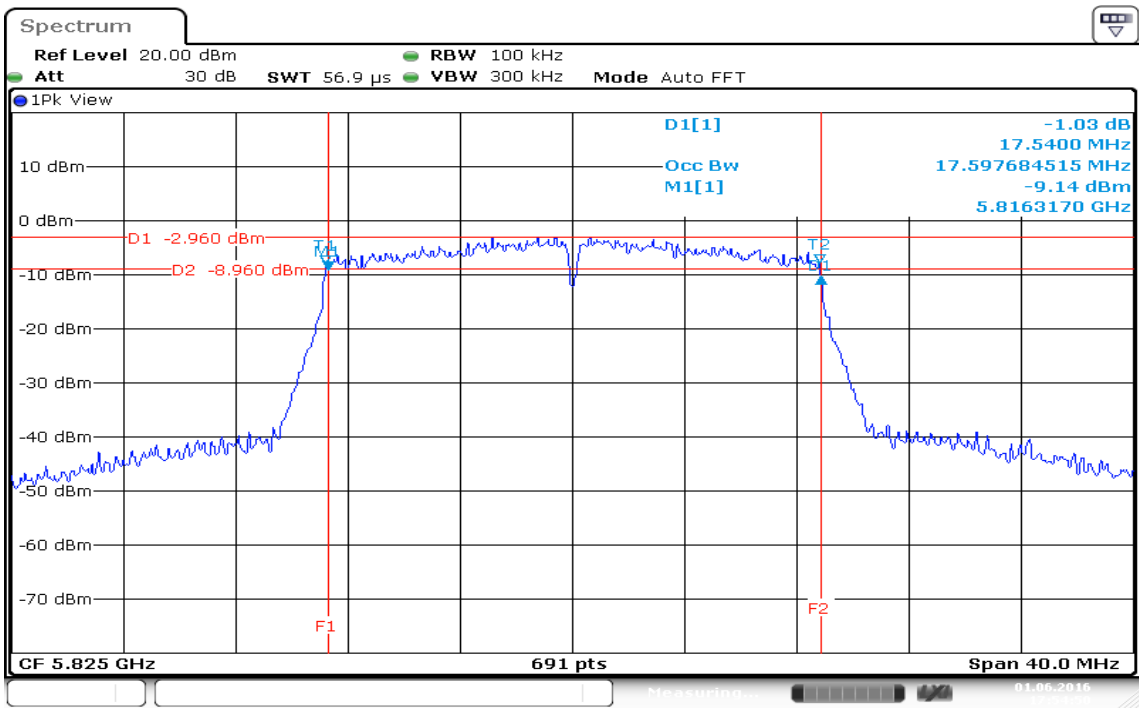

Date: 1.JUN.2016 17:51:32

### 99% Bandwidth (CH Mid)




Date: 1.JUN.2016 17:53:07

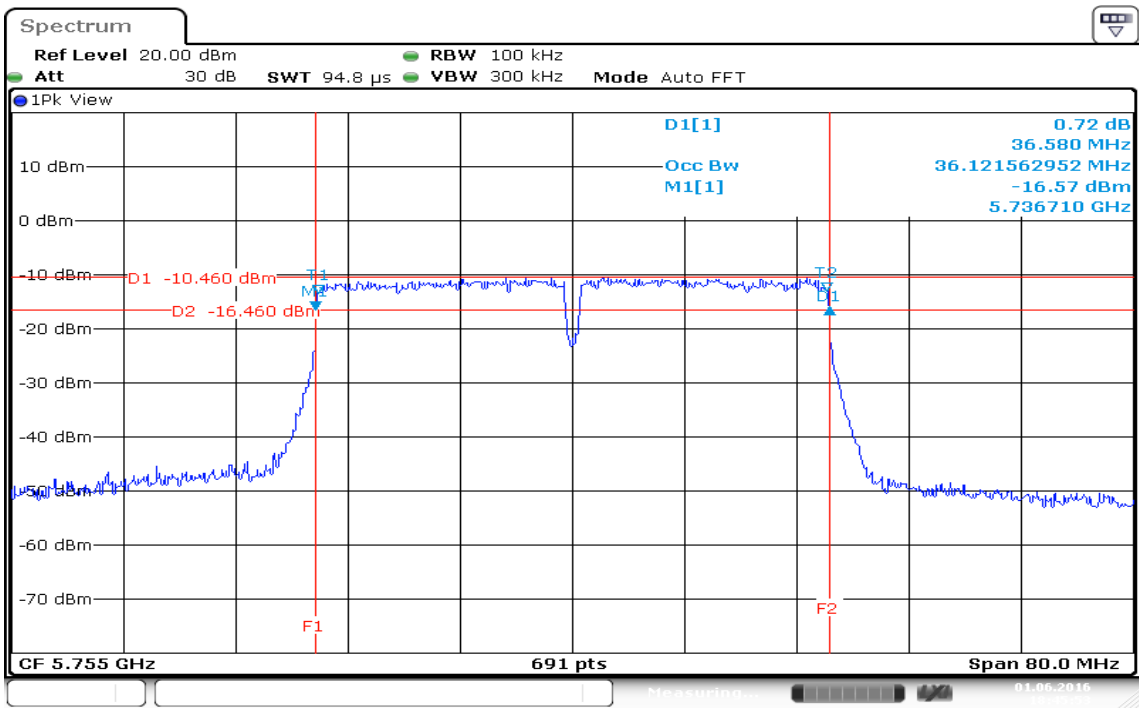
## 99% Bandwidth (CH High)




Date: 1.JUN.2016 17:54:51

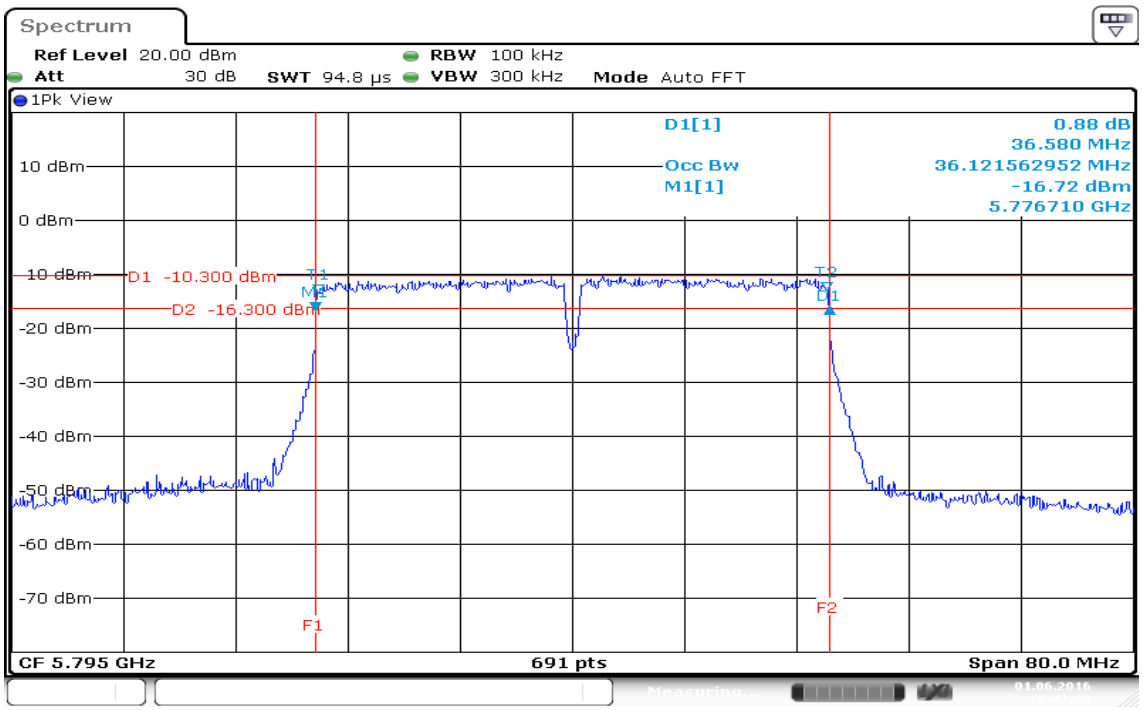
## Test mode: IEEE 802.11n HT 40 MHz mode / 5755 ~ 5795MHz

### 99% Bandwidth (CH Low)




Date: 1.JUN.2016 18:45:53

### 99% Bandwidth (CH High)



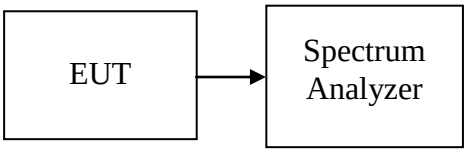

Date: 1.JUN.2016 18:42:00

## 7.2 6DB BANDWIDTH

### LIMIT

According to §15.407 & RSS-247§, systems using digital modulation techniques may operate in the 902 - 928 MHz, 2400 - 2483.5 MHz, and 5725 - 5850 MHz bands. The minimum 6dB bandwidth shall be at least 500 kHz.

**Test Configuration**




### TEST PROCEDURE

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

### TEST RESULTS

*No non-compliance noted*

## Test Data

### Test mode: IEEE 802.11a mode

| Channel | Frequency (MHz) | 6dB Bandwidth (MHz) | Limit (kHz) | Result |
|---|---|---|---|---|
| Low | 5745 | 16.4400 | >500 | PASS |
| Mid | 5785 | 16.4400 | | PASS |
| High | 5825 | 16.2080 | | PASS |

### Test mode: IEEE 802.11n HT 20 MHz mode

| Channel | Frequency (MHz) | 6dB Bandwidth (MHz) | Limit (kHz) | Result |
|---|---|---|---|---|
| Low | 5745 | 17.5980 | >500 | PASS |
| Mid | 5785 | 17.5980 | | PASS |
| High | 5825 | 17.5400 | | PASS |

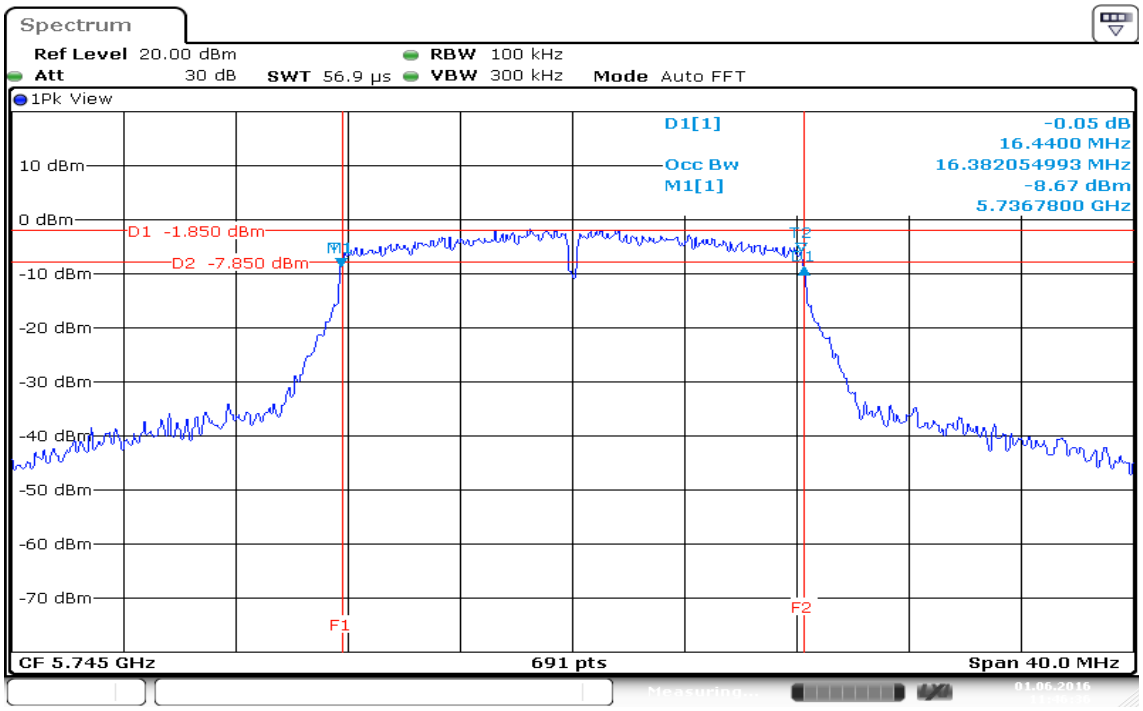
### Test mode: IEEE 802.11n HT 40 MHz mode

| Channel | Frequency (MHz) | 6dB Bandwidth (MHz) | Limit (kHz) | Result |
|---|---|---|---|---|
| Low | 5755 | 36.580 | >500 | PASS |
| High | 5795 | 36.580 | | PASS |

## Test Plot

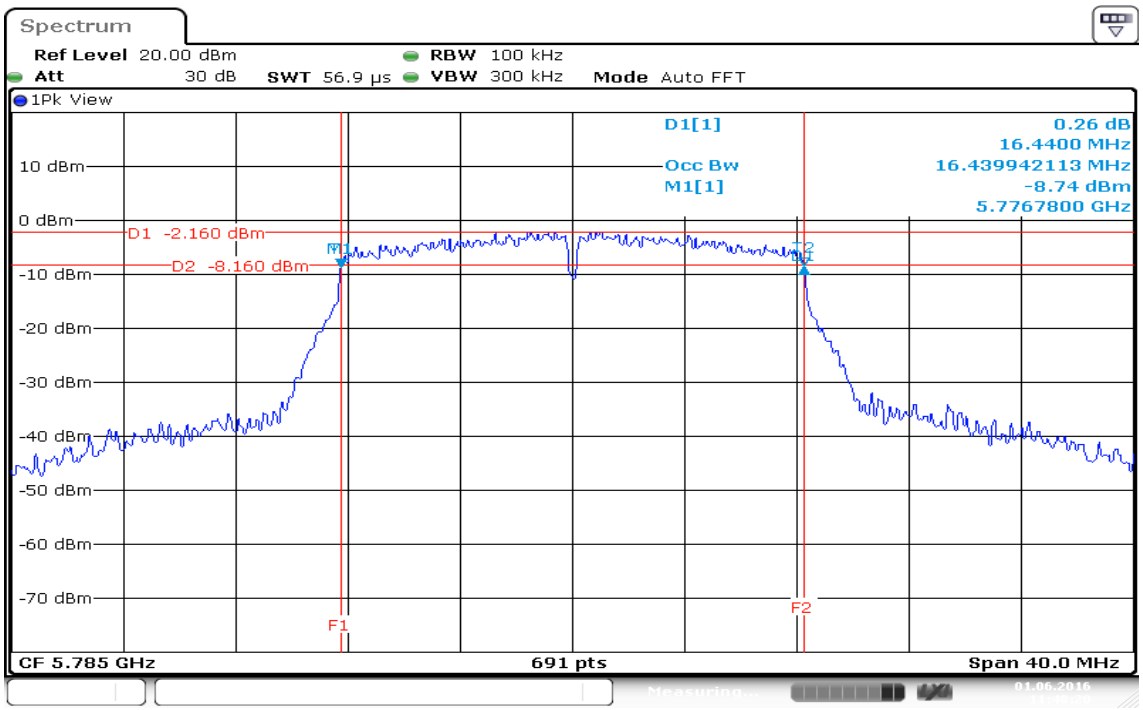
## IEEE 802.11a mode / 5745 ~ 5825MHz

### 6dB Bandwidth (CH Low)



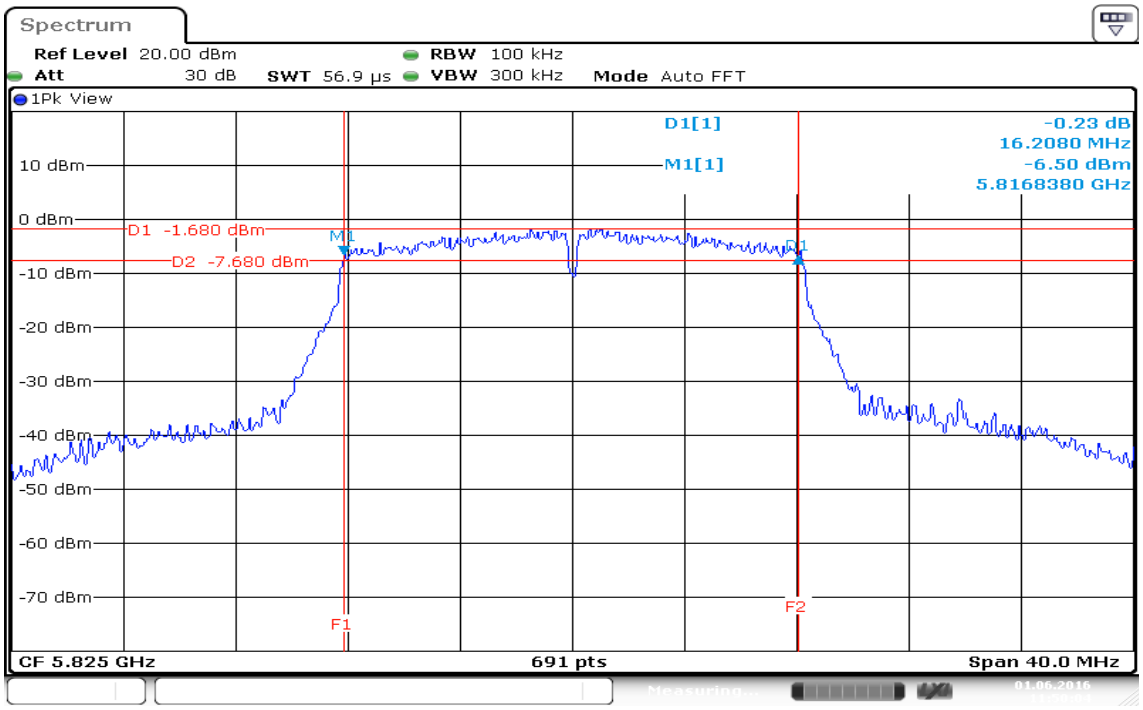

Date: 1.JUN.2016 11:46:36

### 6dB Bandwidth (CH Mid)




Date: 1.JUN.2016 11:48:20

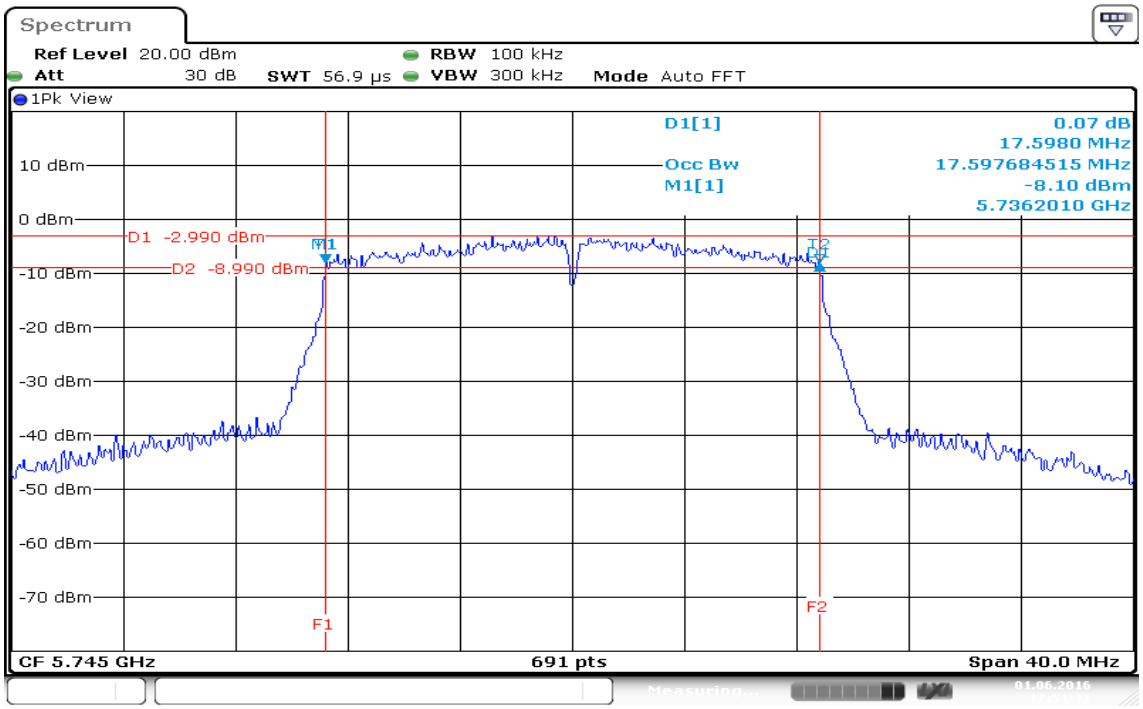
## 6dB Bandwidth (CH High)




Date: 1.JUN.2016 11:50:05

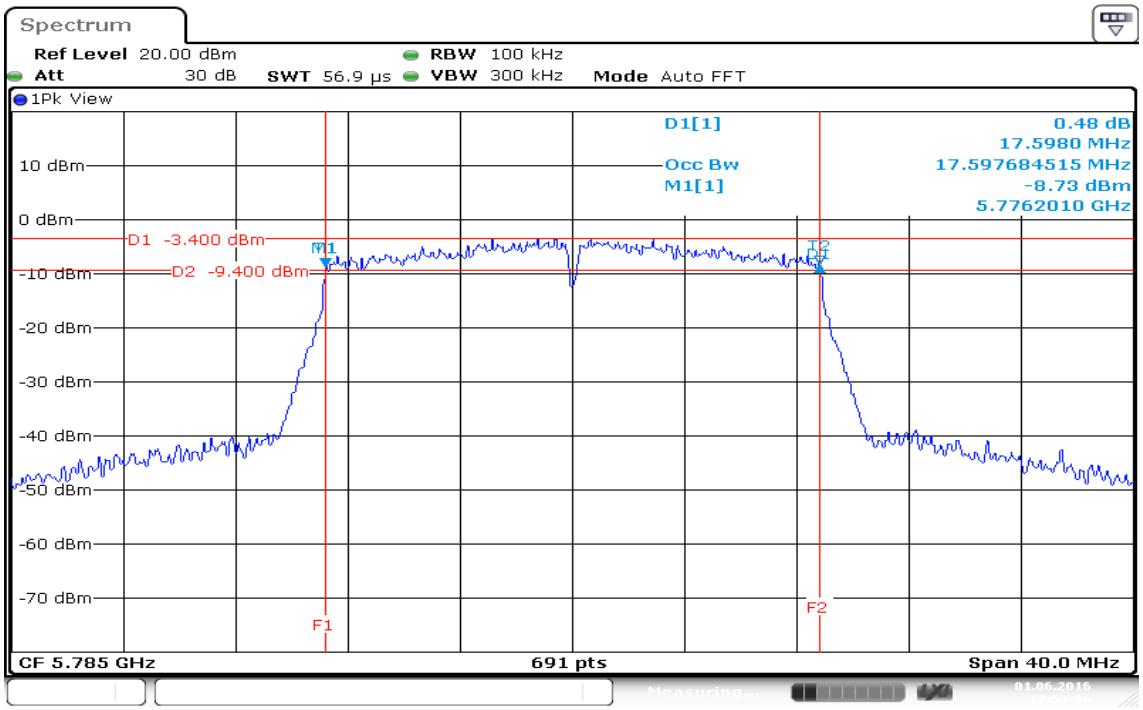
## IEEE 802.11n HT 20 MHz mode / 5745 ~ 5825MHz

### 6dB Bandwidth (CH Low)



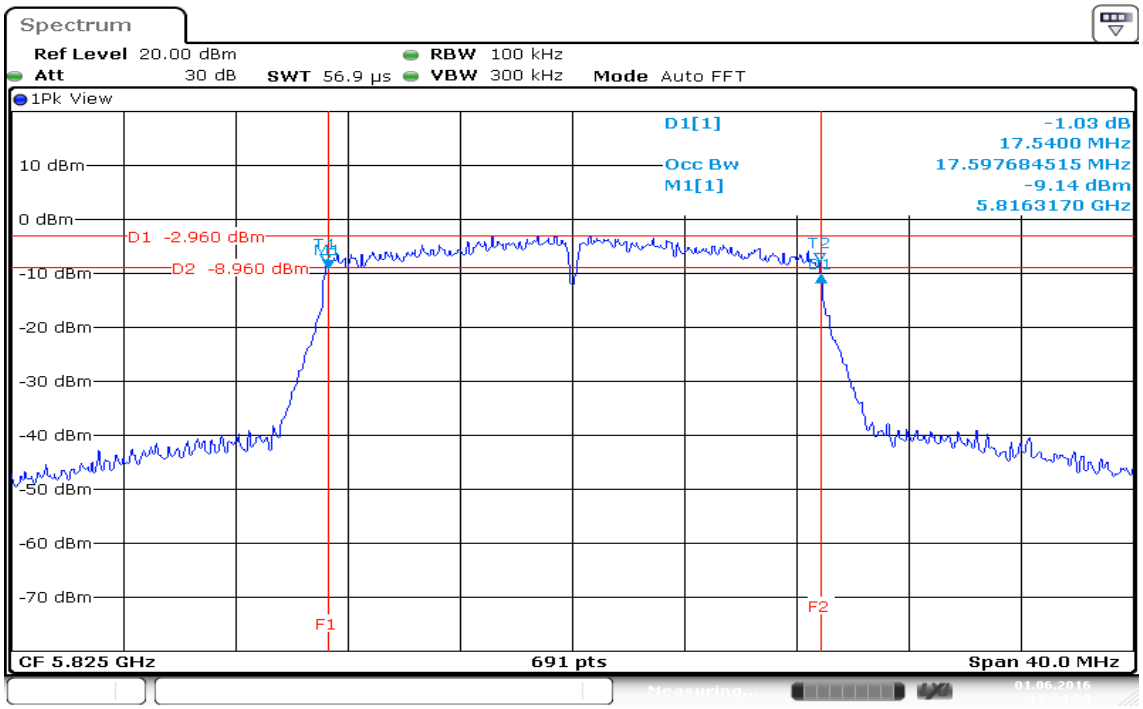

Date: 1.JUN.2016 17:51:32

### 6dB Bandwidth (CH Mid)




Date: 1.JUN.2016 17:53:07

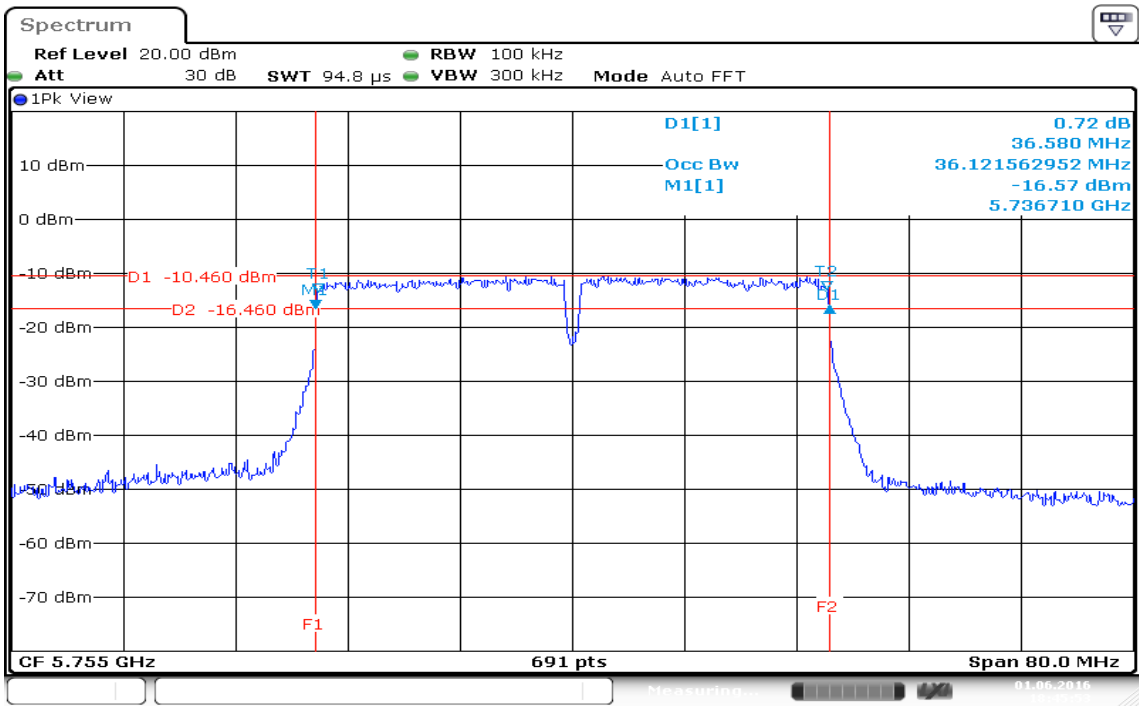
## 6dB Bandwidth (CH High)




Date: 1.JUN.2016 17:54:51

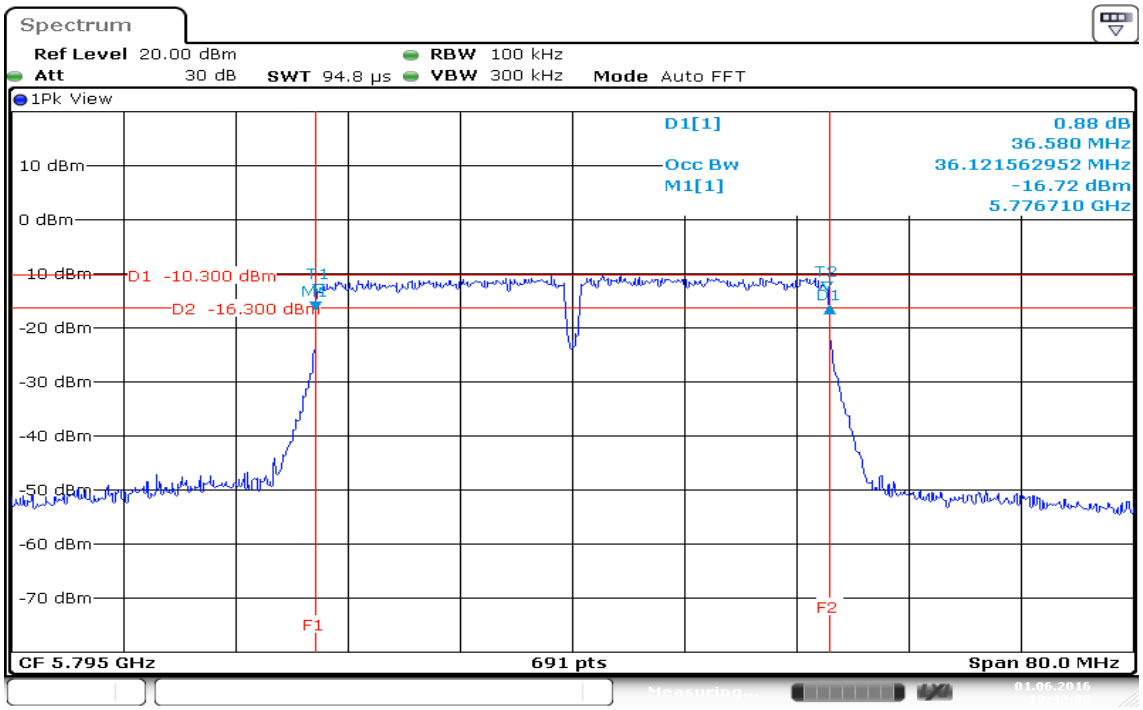
## IEEE 802.11n HT 40 MHz mode / 5755 ~ 5815MHz

### 6dB Bandwidth (CH Low)




Date: 1.JUN.2016 18:45:53

### 6dB Bandwidth (CH High)




Date: 1.JUN.2016 18:42:00

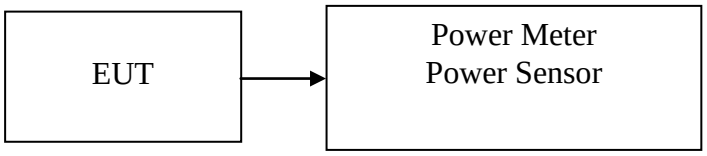
## 7.3 MAXIMUM CONDUCTED OUTPUT POWER

### LIMIT

The maximum peak output power of the intentional radiator shall not exceed the following:

1. According to §15.407, for systems using digital modulation in the bands of 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz: 1 Watt.
2. According to RSS-247 §, for systems employing digital modulation techniques operating in the bands 902-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz, the maximum peak conducted output power shall not exceed 1 W.

### Test Configuration




### TEST PROCEDURE

The transmitter output is connected to the Power Meter. The Power Meter is set to the peak power detection.

### 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 | ***12.34** | 0.0171 | 30.00 |
| Mid | 5785 | 11.81 | 0.0152 | 30.00 |
| High | 5825 | 11.67 | 0.0147 | 30.00 |

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

| Channel | Frequency (MHz) | Output Power (dBm) | Output Power (W) | Limit (dBm) |
|---|---|---|---|---|
| Low | 5745 | ***12.21** | 0.0166 | 30.00 |
| Mid | 5785 | 11.59 | 0.0144 | 30.00 |
| High | 5825 | 11.99 | 0.0158 | 30.00 |

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

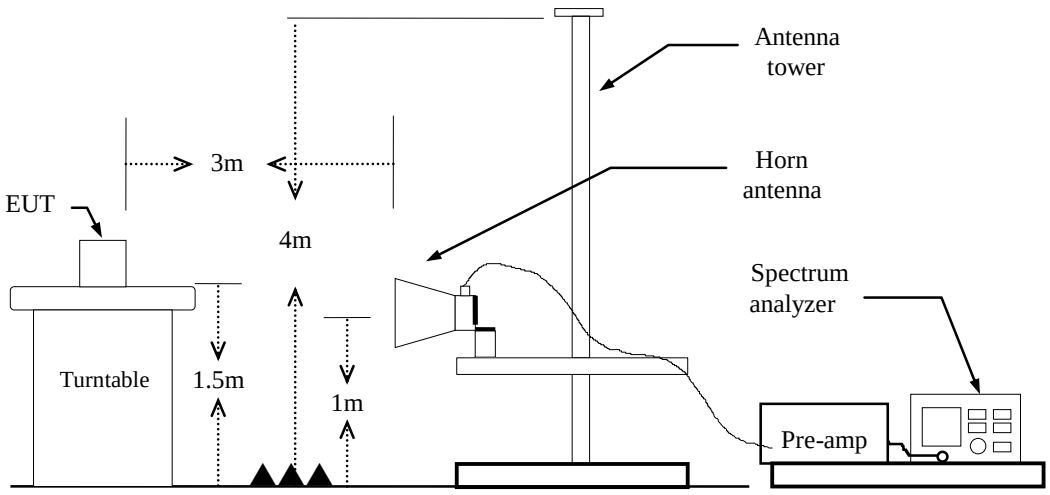
| Channel | Frequency (MHz) | Output Power (dBm) | Output Power (W) | Limit (dBm) |
|---|---|---|---|---|
| Low | 5755 | 12.09 | 0.0162 | 30.00 |
| High | 5795 | ***12.34** | 0.0171 | 30.00 |

## 7.4 BAND EDGES MEASUREMENT

### LIMIT

According to §15.407 & RSS-247 §, in any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator in operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in 15.209(a) (see Section 15.205(c)).

### Test Configuration



## 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

### For Un-restricted Band Emissions

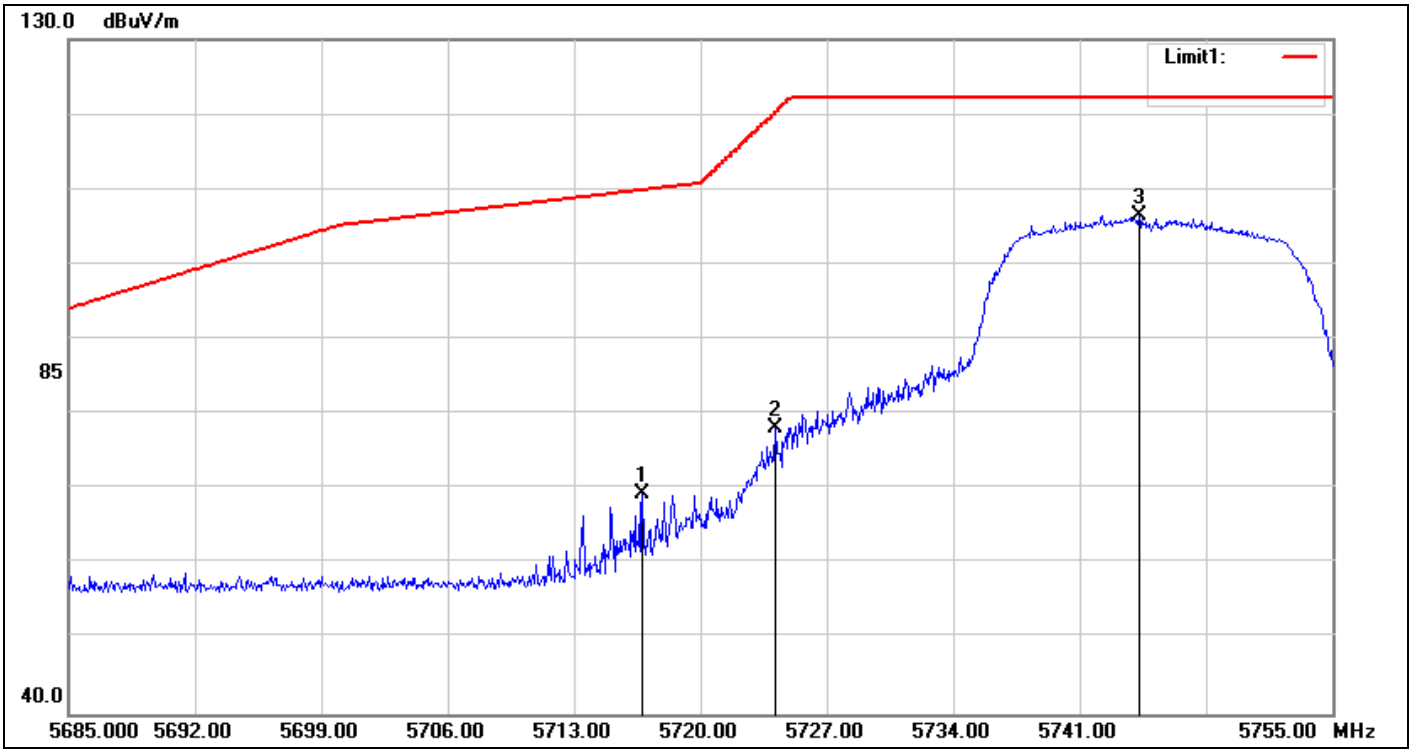
The peak output power procedure is used to measure the fundamental emission power to demonstrate compliance to requirements, then the peak conducted output power measured within any 100 kHz outside the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum measured in-band peak PSD level.

## TEST RESULTS

Refer to attach spectrum analyzer data chart.

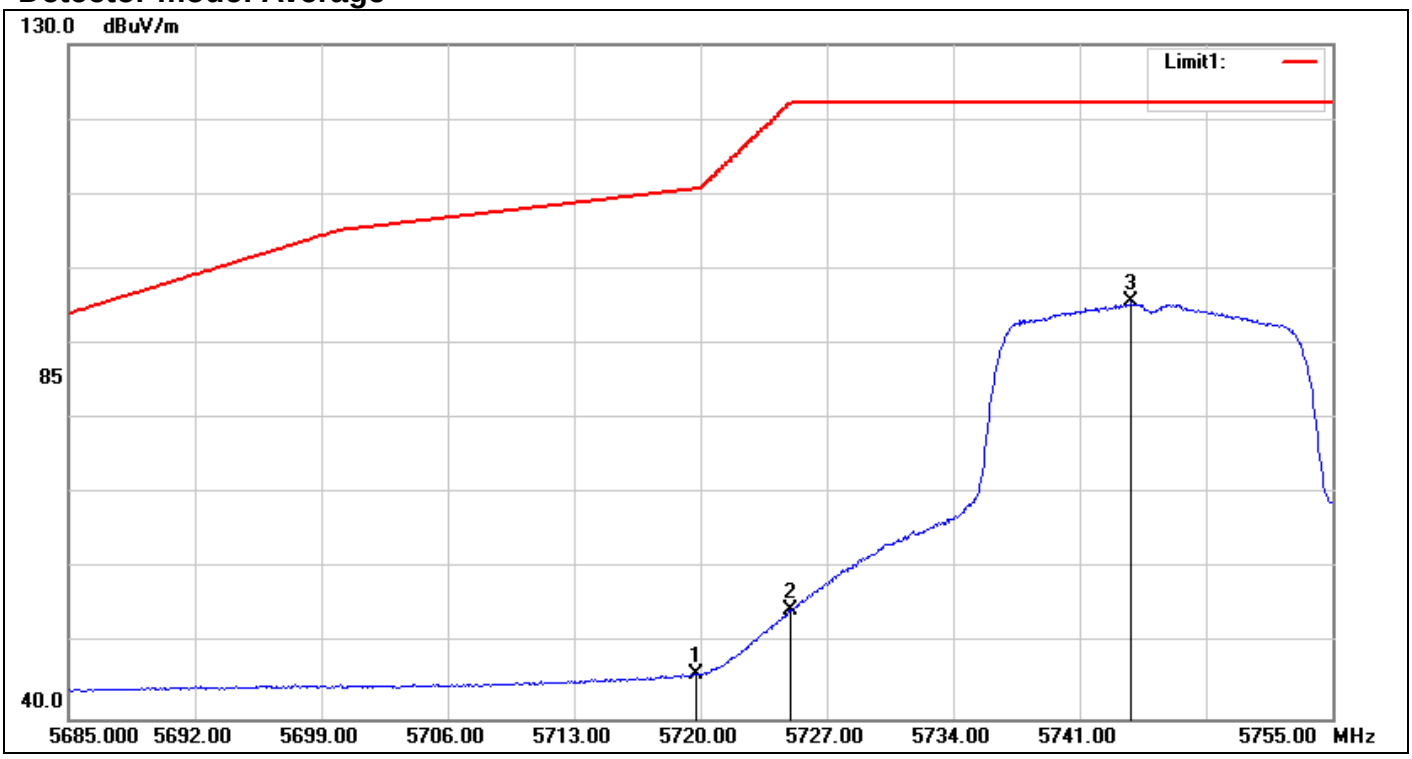
# IEEE 802.11a Mode / CH Low

## Detector mode: Peak




| No. | Frequency (MHz) | Reading (dBuV) | Correct Factor(dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|
| 1 | 5716.780 | 63.21 | 6.17 | 69.38 | 109.90 | -40.52 | peak |
| 2 | 5724.130 | 71.92 | 6.20 | 78.12 | 120.22 | -42.10 | peak |
| 3 | 5744.290 | 100.25 | 6.29 | 106.54 | 122.20 | -15.66 | peak |

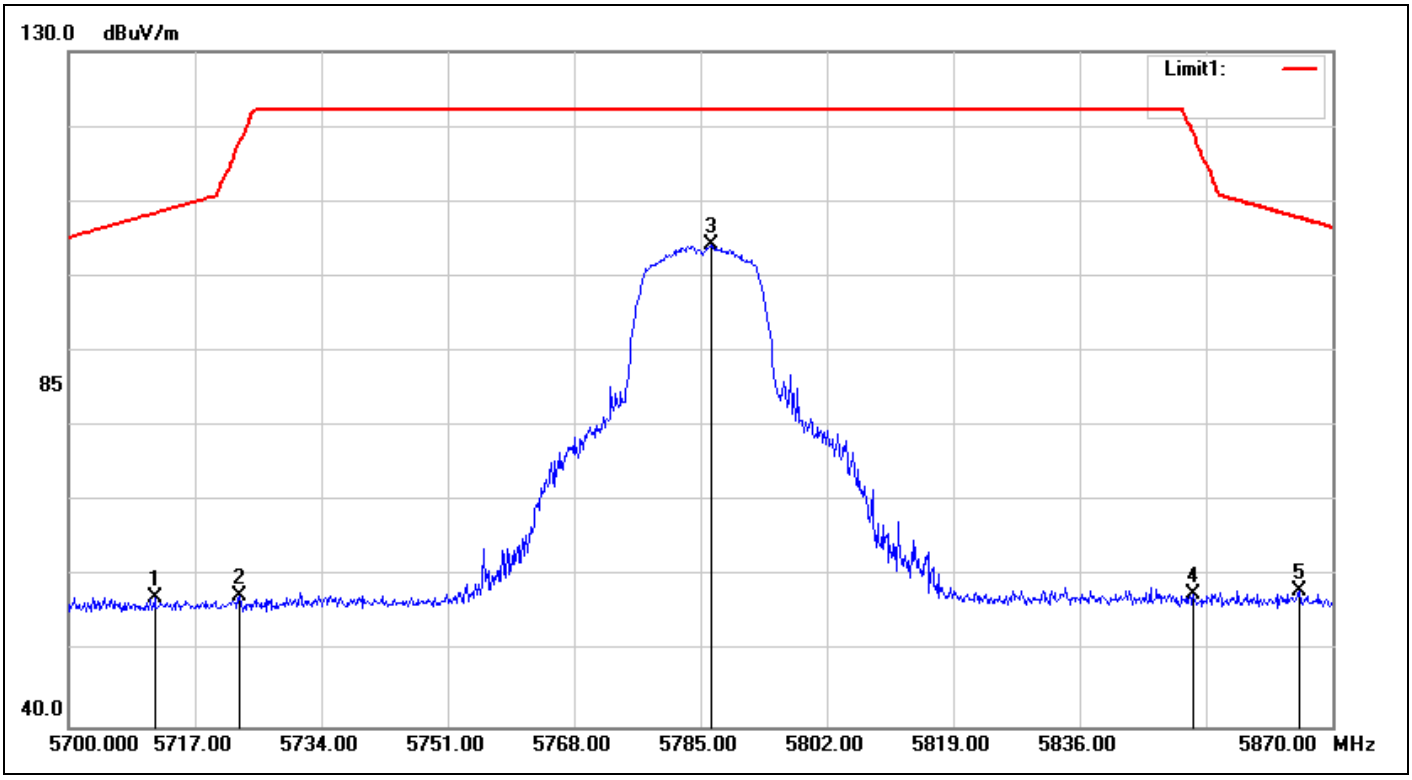
## Detector mode: Average




| No. | Frequency (MHz) | Reading (dBuV) | Correct Factor(dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|
| 1 | 5719.720 | 39.81 | 6.19 | 46.00 | 110.72 | -64.72 | AVG |
| 2 | 5724.970 | 48.37 | 6.21 | 54.58 | 122.13 | -67.55 | AVG |
| 3 | 5743.870 | 89.43 | 6.29 | 95.72 | 122.20 | -26.48 | AVG |

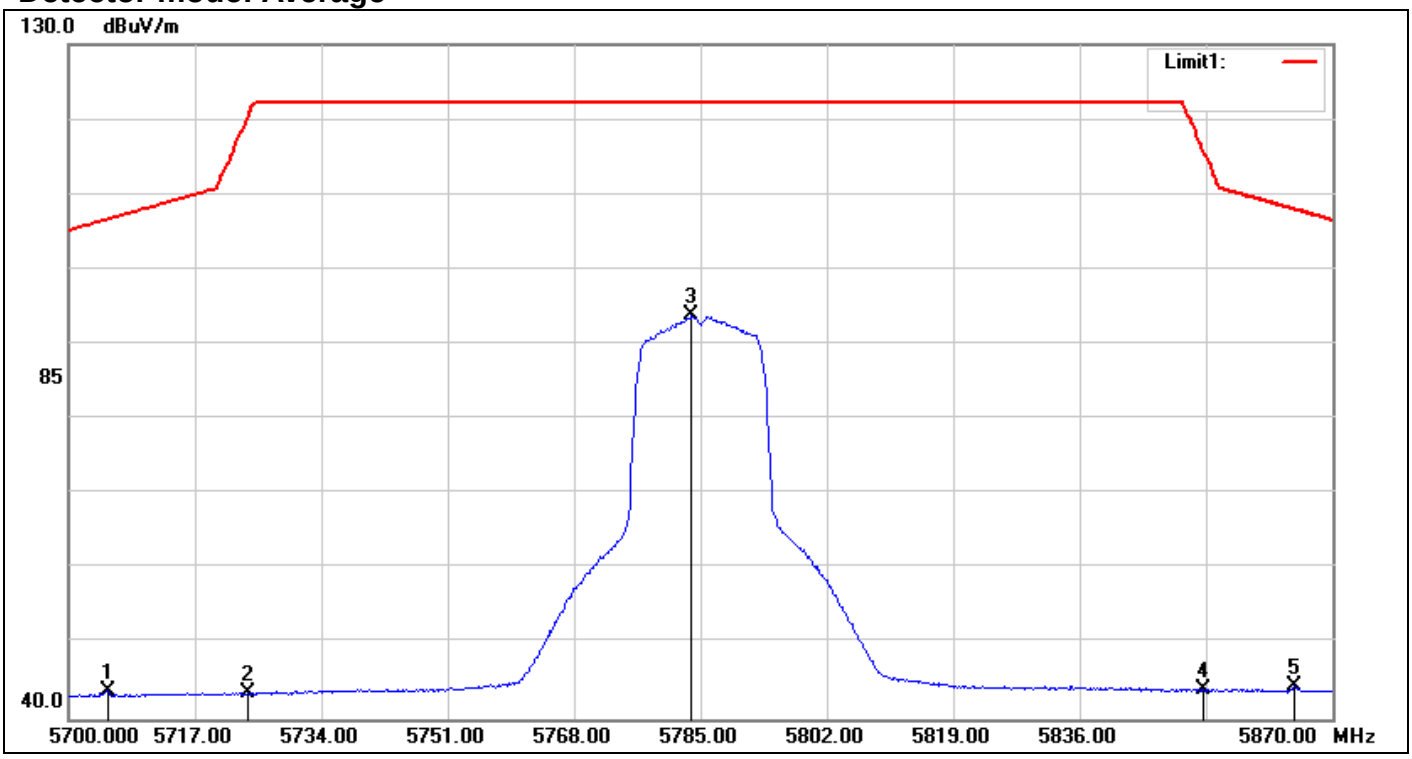
# IEEE 802.11a Mode / CH Mid

## Detector mode: Peak




| No. | Frequency | Reading | Correct | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|---|---|
| | (MHz) | (dBuV) | Factor(dB/m) | (dBuV/m) | (dBuV/m) | (dB) | |
| 1 | 5711.560 | 51.04 | 6.15 | 57.19 | 108.44 | -51.25 | peak |
| 2 | 5722.950 | 51.16 | 6.20 | 57.36 | 117.53 | -60.17 | peak |
| 3 | 5786.360 | 97.82 | 6.47 | 104.29 | 122.20 | -17.91 | peak |
| 4 | 5851.300 | 50.94 | 6.75 | 57.69 | 119.24 | -61.55 | peak |
| 5 | 5865.580 | 51.35 | 6.81 | 58.16 | 107.84 | -49.68 | peak |

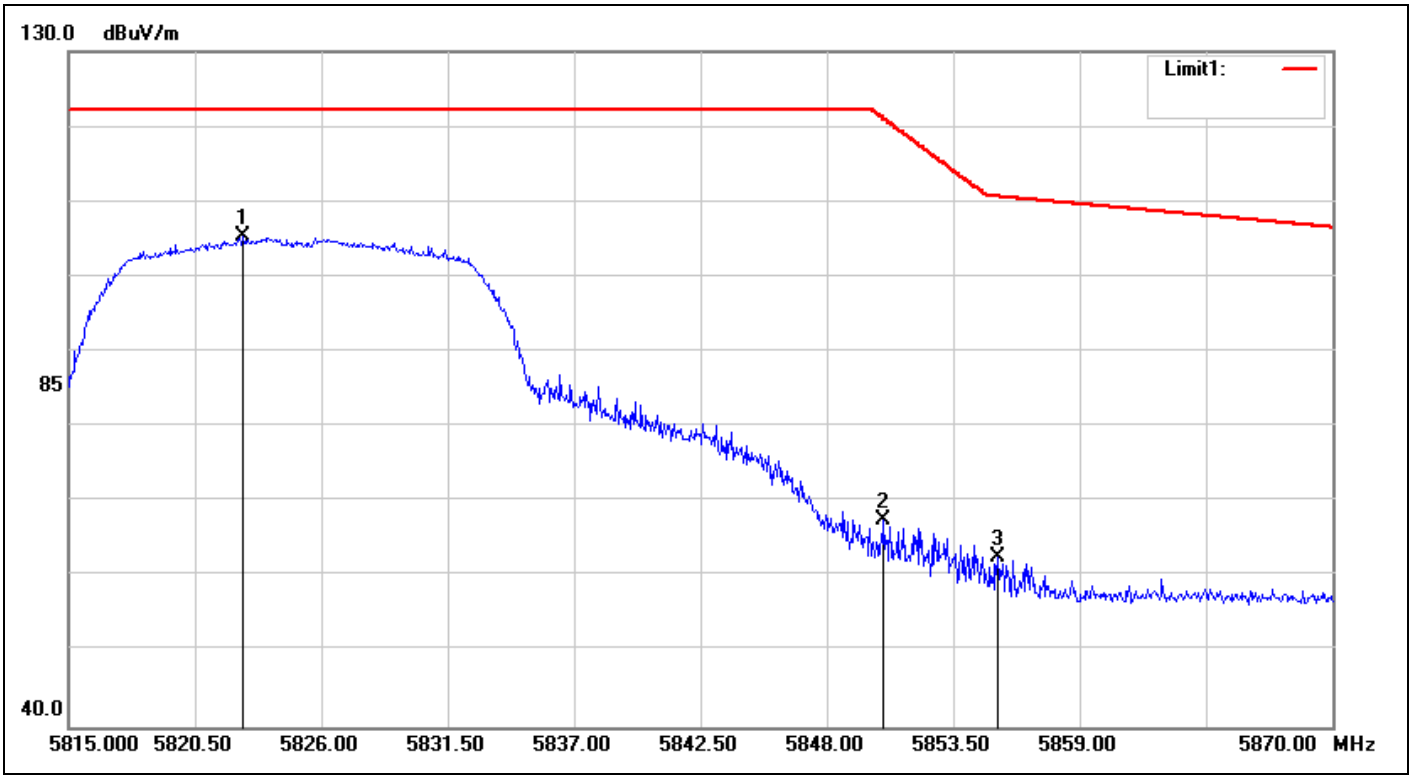
## Detector mode: Average




| No. | Frequency (MHz) | Reading (dBuV) | Correct Factor(dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|
| 1 | 5705.270 | 37.52 | 6.12 | 43.64 | 106.68 | -63.04 | AVG |
| 2 | 5724.140 | 37.37 | 6.20 | 43.57 | 120.24 | -76.67 | AVG |
| 3 | 5783.810 | 87.35 | 6.46 | 93.81 | 122.20 | -28.39 | AVG |
| 4 | 5852.660 | 37.16 | 6.75 | 43.91 | 116.14 | -72.23 | AVG |
| 5 | 5864.900 | 37.57 | 6.80 | 44.37 | 108.03 | -63.66 | AVG |

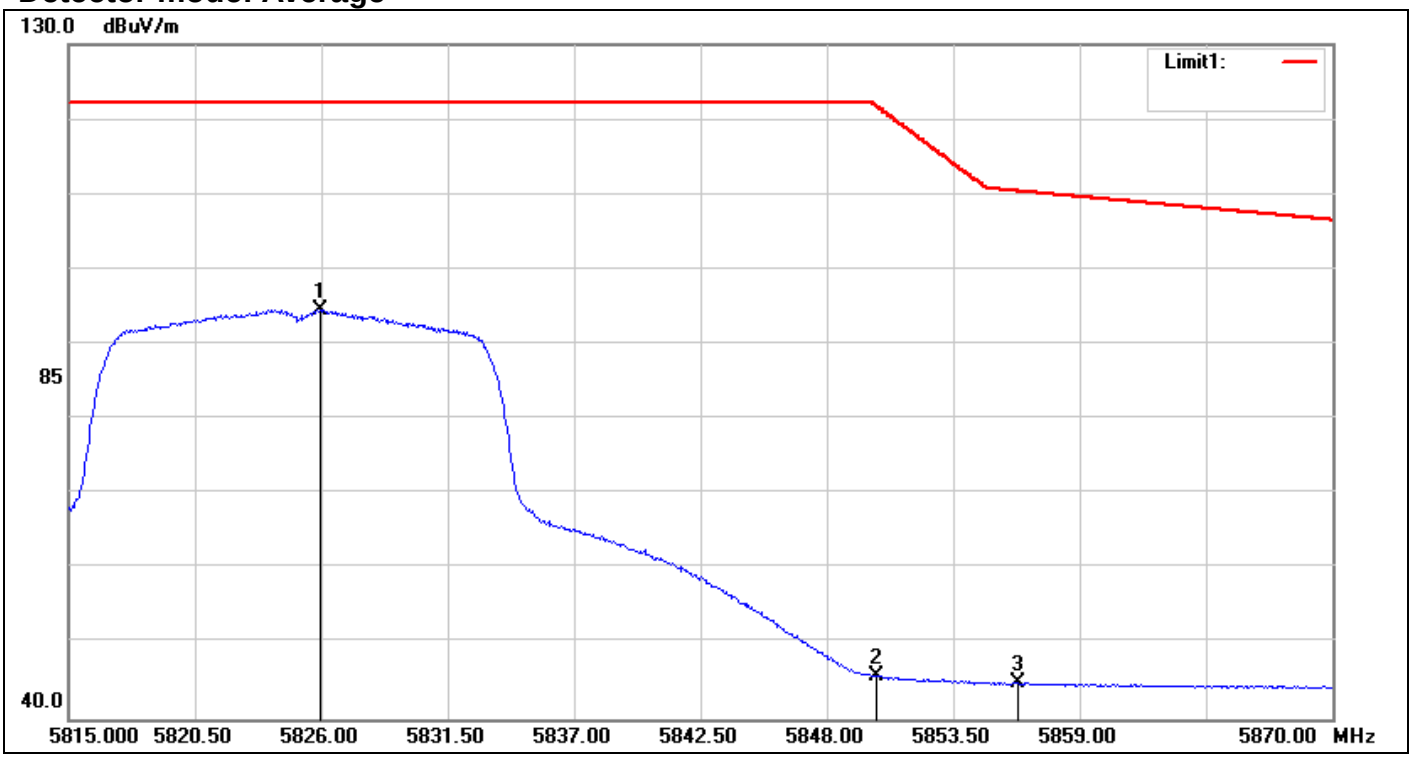
# IEEE 802.11a Mode / CH High

## Detector mode: Peak




| No. | Frequency | Reading | Correct | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|---|---|
| | (MHz) | (dBuV) | Factor(dB/m) | (dBuV/m) | (dBuV/m) | (dB) | |
| 1 | 5822.590 | 98.75 | 6.62 | 105.37 | 122.20 | -16.83 | peak |
| 2 | 5850.475 | 60.86 | 6.74 | 67.60 | 121.12 | -53.52 | peak |
| 3 | 5855.425 | 55.77 | 6.76 | 62.53 | 110.68 | -48.15 | peak |

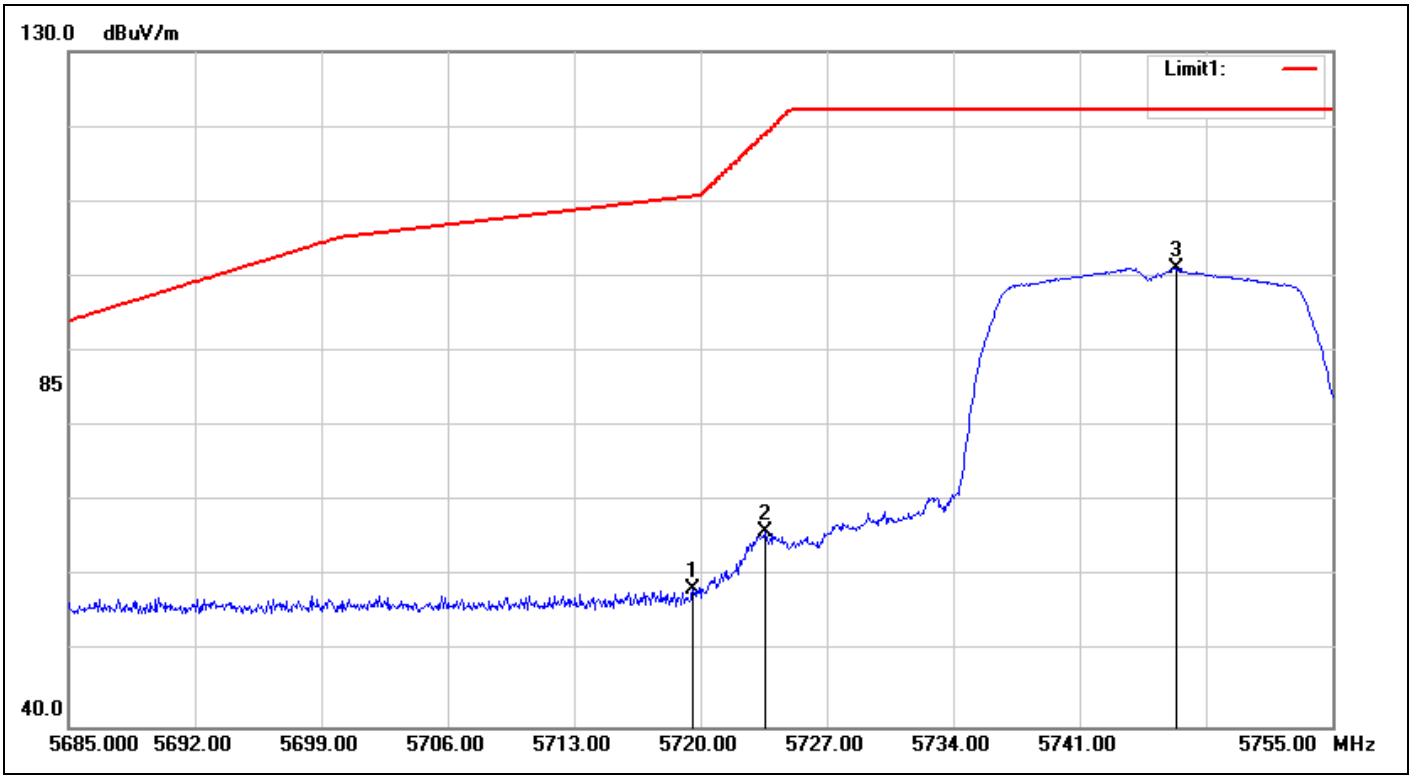
## Detector mode: Average




| No. | Frequency (MHz) | Reading (dBuV) | Correct Factor(dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|
| 1 | 5825.945 | 88.02 | 6.64 | 94.66 | 122.20 | -27.54 | AVG |
| 2 | 5850.145 | 38.98 | 6.74 | 45.72 | 121.87 | -76.15 | AVG |
| 3 | 5856.305 | 38.13 | 6.77 | 44.90 | 110.43 | -65.53 | AVG |

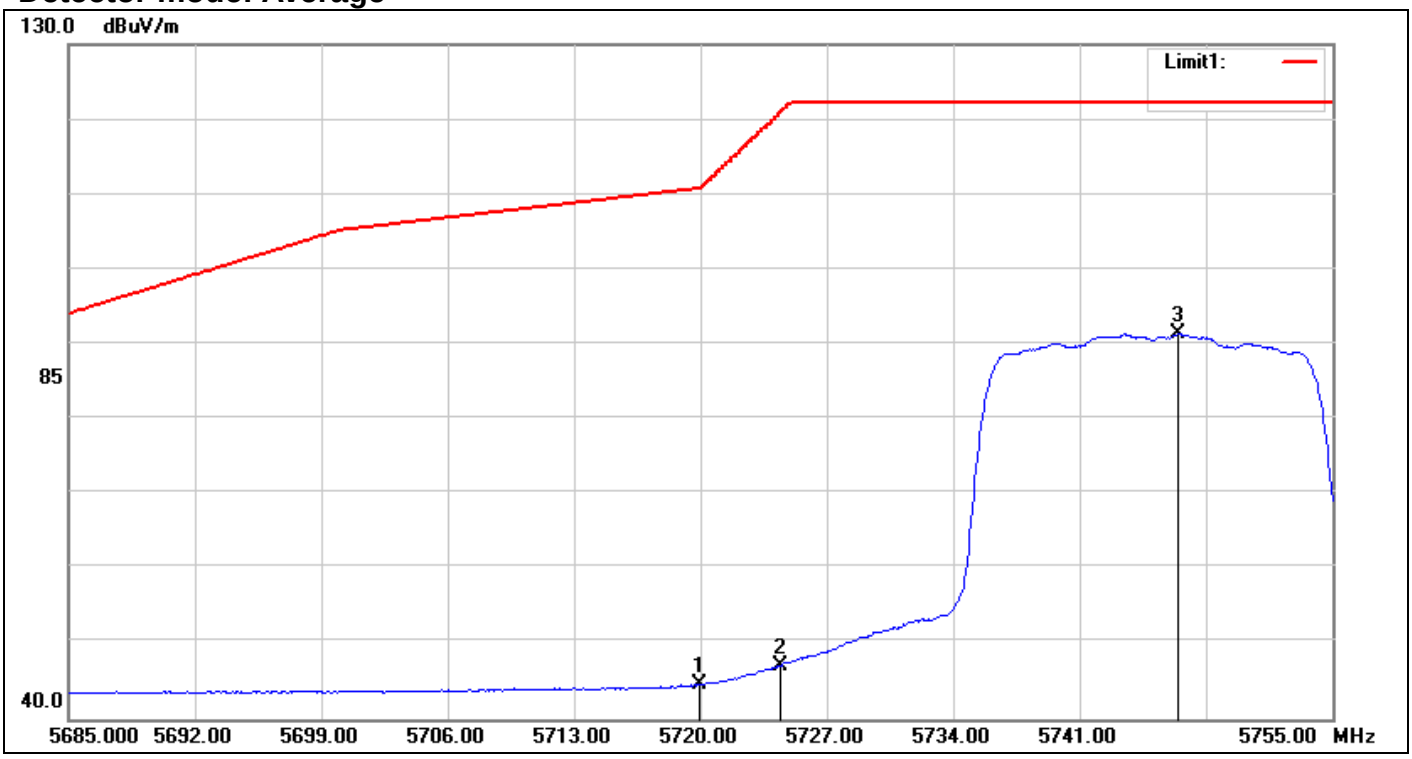
# IEEE 802.11n HT20 MHz Mode / CH Low

## Detector mode: Peak




| No. | Frequency | Reading | Correct | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|---|---|
| | (MHz) | (dBuV) | Factor(dB/m) | (dBuV/m) | (dBuV/m) | (dB) | |
| 1 | 5719.580 | 52.20 | 6.19 | 58.39 | 110.68 | -52.29 | peak |
| 2 | 5723.570 | 59.71 | 6.20 | 65.91 | 118.94 | -53.03 | peak |
| 3 | 5746.320 | 94.82 | 6.30 | 101.12 | 122.20 | -21.08 | peak |

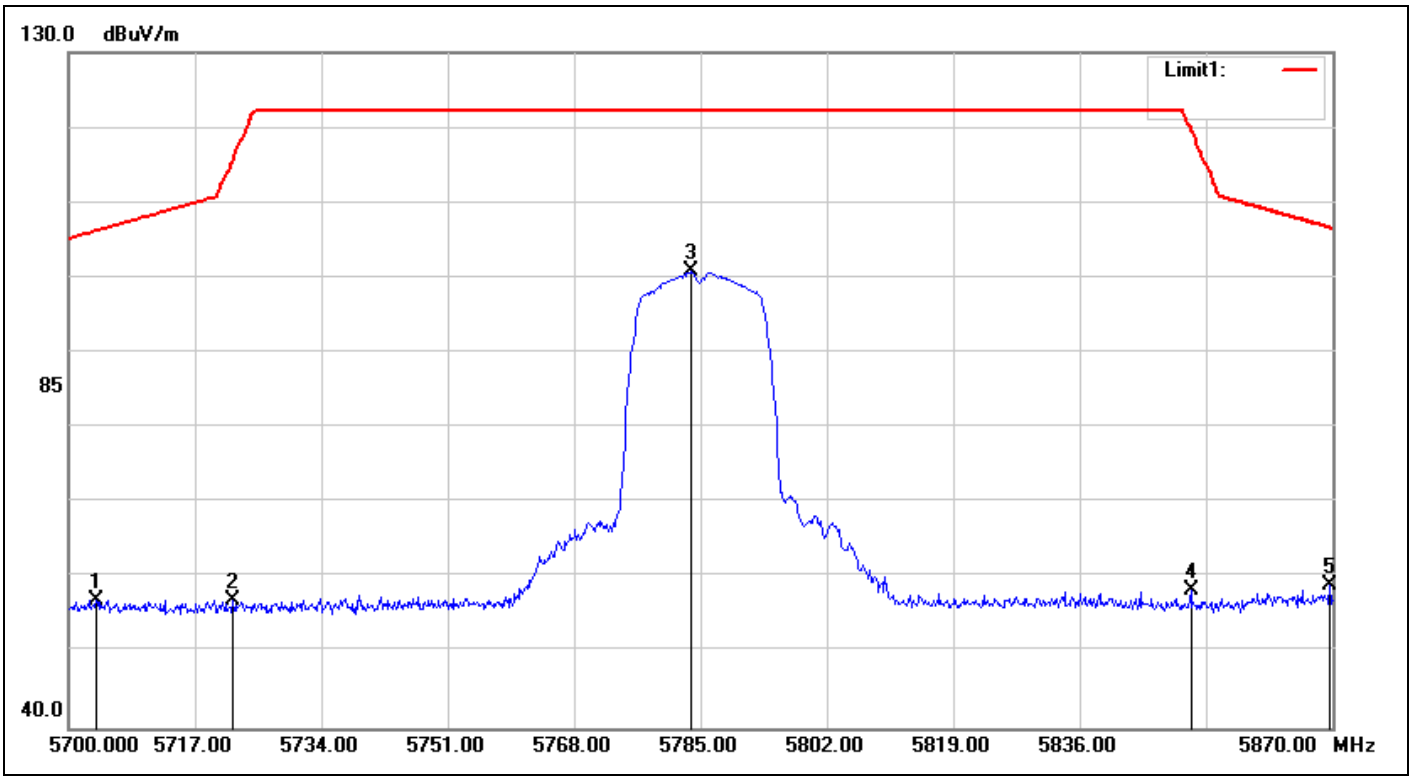
## Detector mode: Average




| No. | Frequency (MHz) | Reading (dBuV) | Correct Factor(dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|
| 1 | 5719.930 | 38.44 | 6.19 | 44.63 | 110.78 | -66.15 | AVG |
| 2 | 5724.410 | 40.87 | 6.21 | 47.08 | 120.85 | -73.77 | AVG |
| 3 | 5746.460 | 85.08 | 6.30 | 91.38 | 122.20 | -30.82 | AVG |

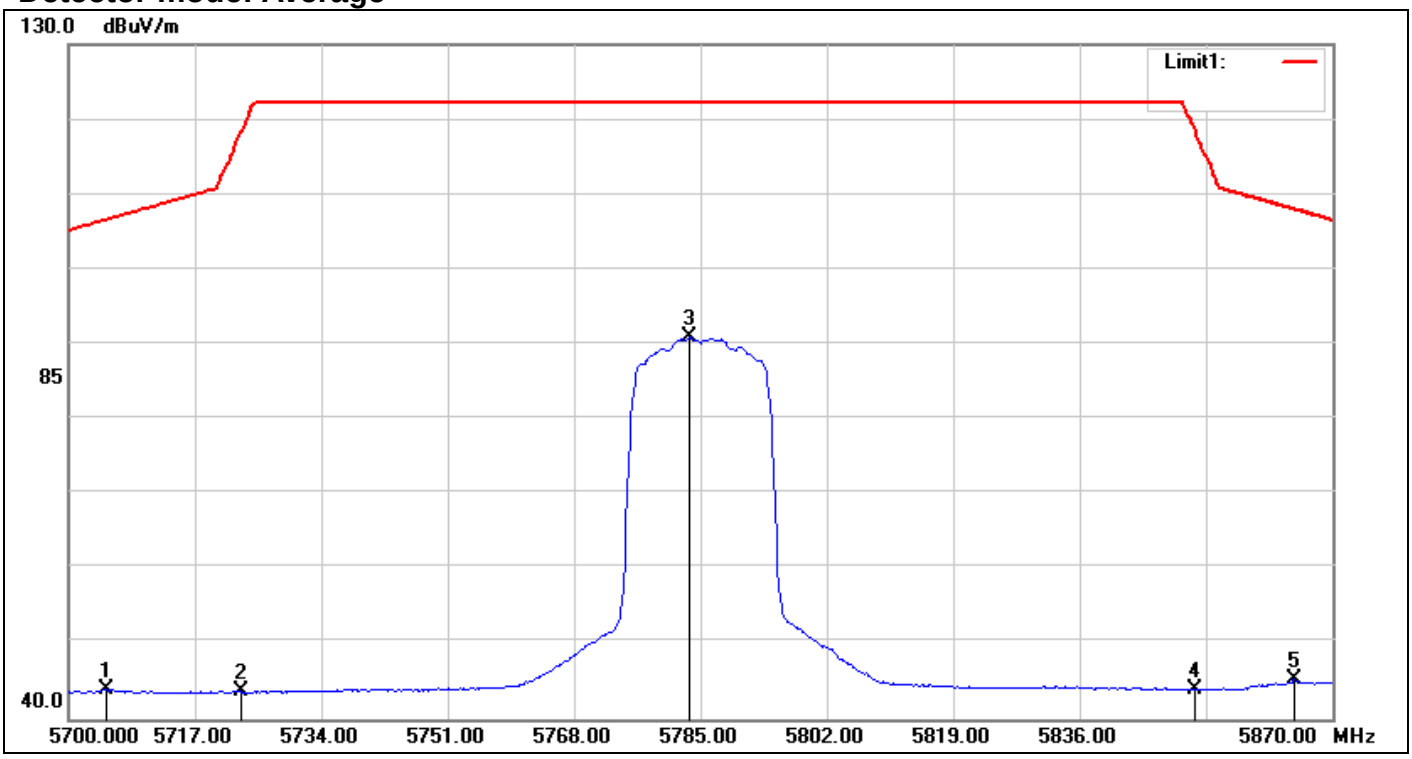
# IEEE 802.11n HT20 MHz Mode / CH Mid

## Detector mode: Peak




| No. | Frequency | Reading | Correct | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|---|---|
| | (MHz) | (dBuV) | Factor(dB/m) | (dBuV/m) | (dBuV/m) | (dB) | |
| 1 | 5703.740 | 50.91 | 6.12 | 57.03 | 106.25 | -49.22 | peak |
| 2 | 5722.100 | 50.83 | 6.20 | 57.03 | 115.59 | -58.56 | peak |
| 3 | 5783.640 | 94.30 | 6.46 | 100.76 | 122.20 | -21.44 | peak |
| 4 | 5850.960 | 51.55 | 6.75 | 58.30 | 120.01 | -61.71 | peak |
| 5 | 5869.660 | 52.14 | 6.82 | 58.96 | 106.70 | -47.74 | peak |

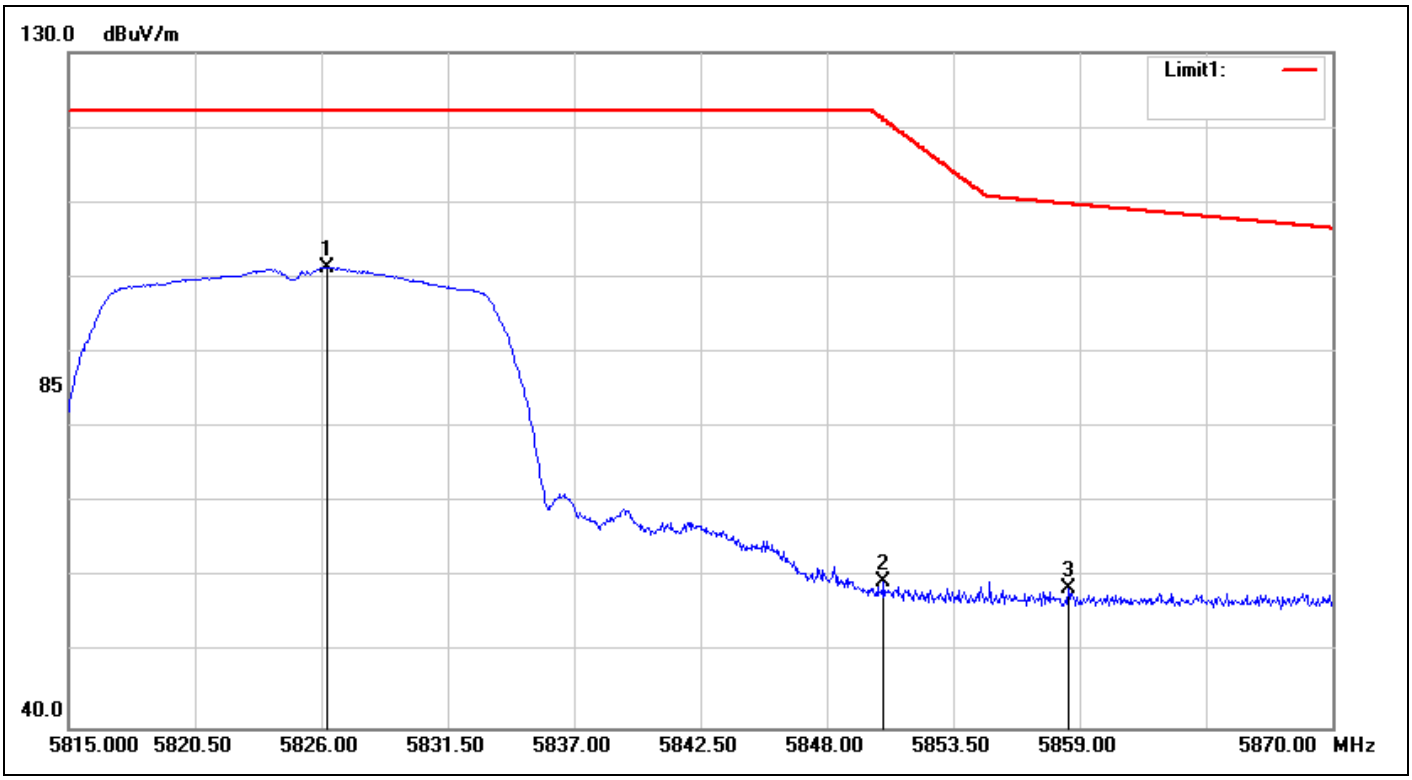
## Detector mode: Average




| No. | Frequency (MHz) | Reading (dBuV) | Correct Factor(dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|
| 1 | 5705.100 | 37.77 | 6.12 | 43.89 | 106.63 | -62.74 | AVG |
| 2 | 5723.290 | 37.53 | 6.20 | 43.73 | 118.30 | -74.57 | AVG |
| 3 | 5783.470 | 84.47 | 6.46 | 90.93 | 122.20 | -31.27 | AVG |
| 4 | 5851.470 | 37.27 | 6.75 | 44.02 | 118.85 | -74.83 | AVG |
| 5 | 5864.900 | 38.41 | 6.80 | 45.21 | 108.03 | -62.82 | AVG |

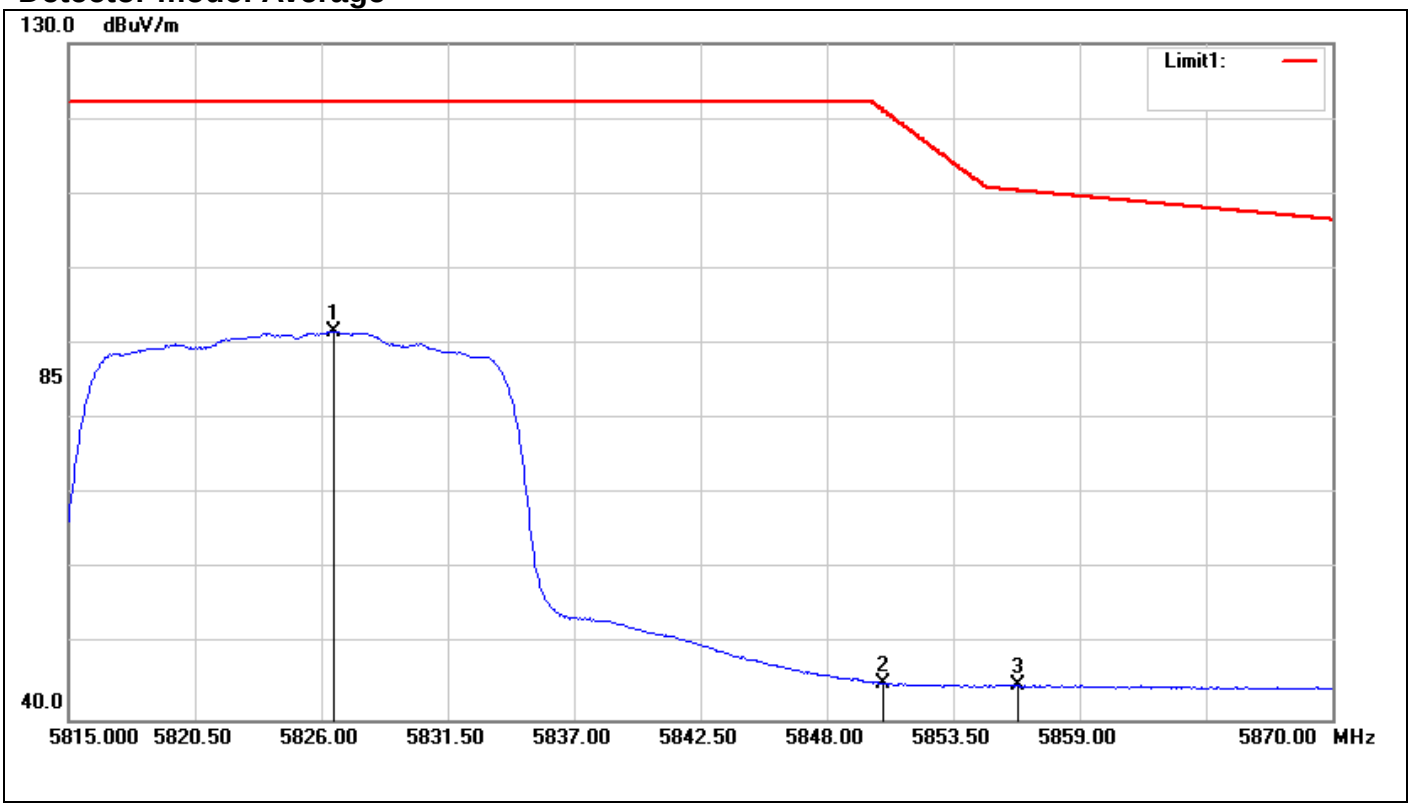
# IEEE 802.11n HT20 MHz Mode / CH High

## Detector mode: Peak




| No. | Frequency | Reading | Correct | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|---|---|
| | (MHz) | (dBuV) | Factor(dB/m) | (dBuV/m) | (dBuV/m) | (dB) | |
| 1 | 5826.275 | 94.78 | 6.64 | 101.42 | 122.20 | -20.78 | peak |
| 2 | 5850.475 | 52.73 | 6.74 | 59.47 | 121.12 | -61.65 | peak |
| 3 | 5858.505 | 51.78 | 6.78 | 58.56 | 109.82 | -51.26 | peak |

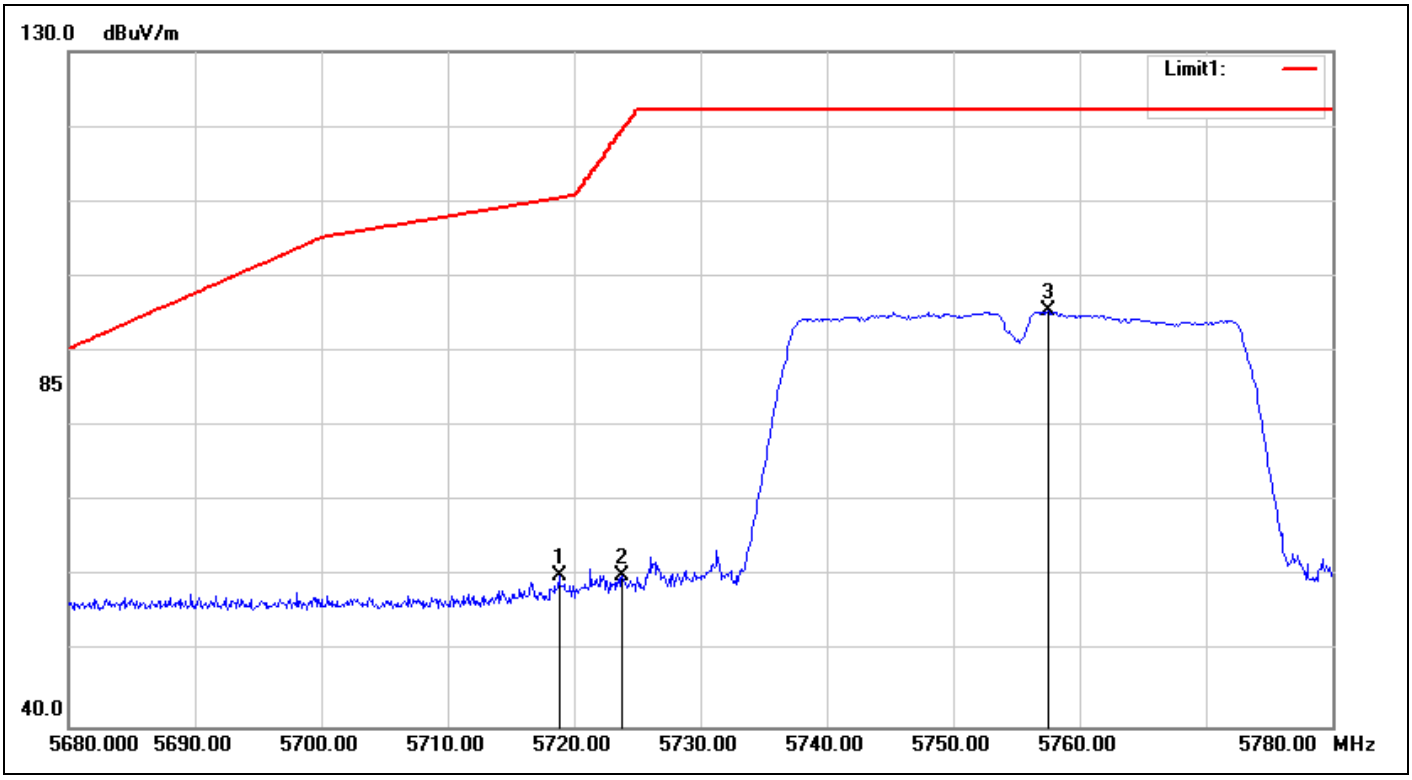
## Detector mode: Average




| No. | Frequency (MHz) | Reading (dBuV) | Correct Factor(dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|
| 1 | 5826.550 | 85.04 | 6.64 | 91.68 | 122.20 | -30.52 | AVG |
| 2 | 5850.475 | 38.14 | 6.74 | 44.88 | 121.12 | -76.24 | AVG |
| 3 | 5856.305 | 37.86 | 6.77 | 44.63 | 110.43 | -65.80 | AVG |

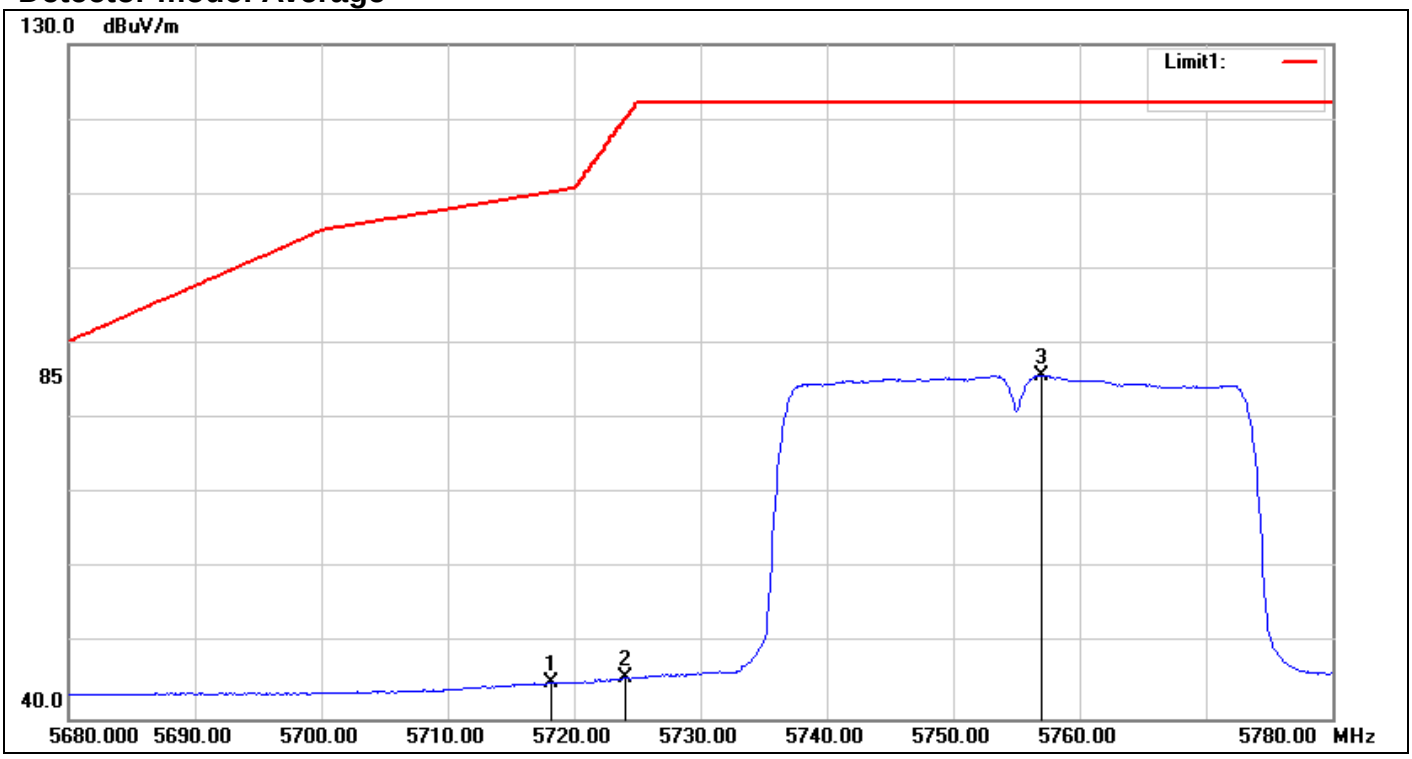
# IEEE 802.11n HT40 MHz Mode / CH Low

## Detector mode: Peak




| No. | Frequency | Reading | Correct | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|---|---|
| | (MHz) | (dBuV) | Factor(dB/m) | (dBuV/m) | (dBuV/m) | (dB) | |
| 1 | 5718.800 | 53.85 | 6.18 | 60.03 | 110.46 | -50.43 | peak |
| 2 | 5723.800 | 54.03 | 6.20 | 60.23 | 119.46 | -59.23 | peak |
| 3 | 5757.500 | 89.01 | 6.35 | 95.36 | 122.20 | -26.84 | peak |

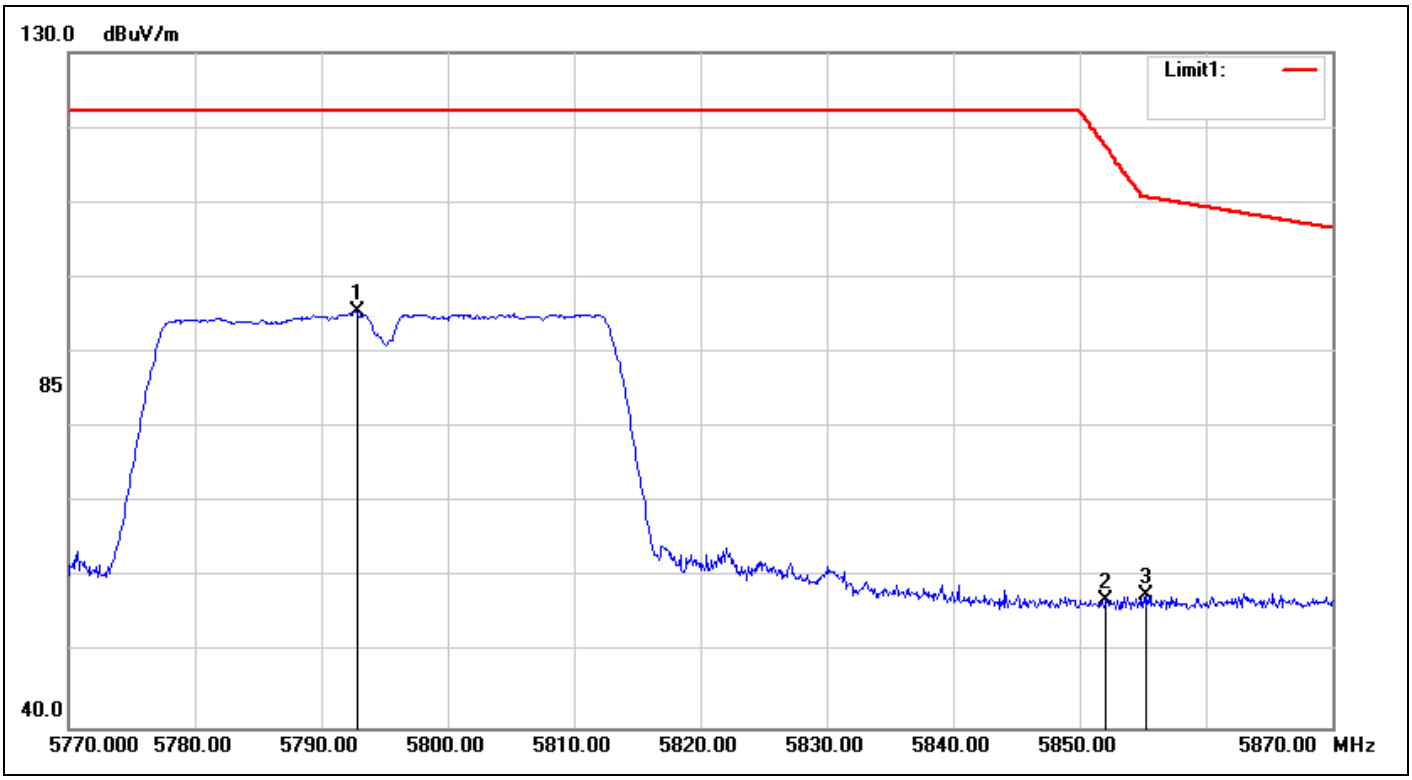
## Detector mode: Average




| No. | Frequency (MHz) | Reading (dBuV) | Correct Factor(dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|
| 1 | 5718.200 | 38.71 | 6.18 | 44.89 | 110.30 | -65.41 | AVG |
| 2 | 5724.000 | 39.35 | 6.20 | 45.55 | 119.92 | -74.37 | AVG |
| 3 | 5757.000 | 79.49 | 6.34 | 85.83 | 122.20 | -36.37 | AVG |

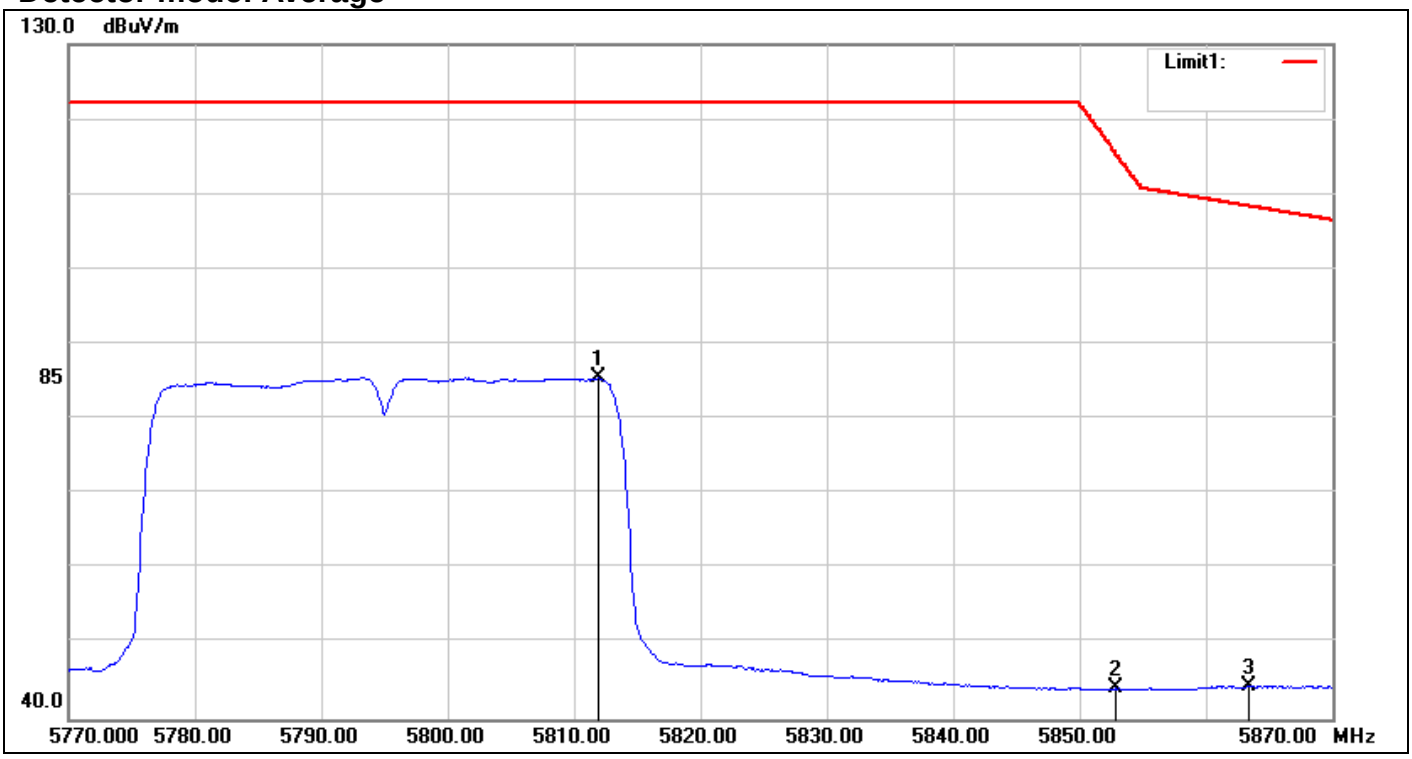
# IEEE 802.11n HT40 MHz Mode / CH High

## Detector mode: Peak




| No. | Frequency | Reading | Correct | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|---|---|
| | (MHz) | (dBuV) | Factor(dB/m) | (dBuV/m) | (dBuV/m) | (dB) | |
| 1 | 5792.800 | 88.97 | 6.50 | 95.47 | 122.20 | -26.73 | peak |
| 2 | 5852.100 | 50.34 | 6.75 | 57.09 | 117.41 | -60.32 | peak |
| 3 | 5855.300 | 50.83 | 6.76 | 57.59 | 110.72 | -53.13 | peak |

## Detector mode: Average



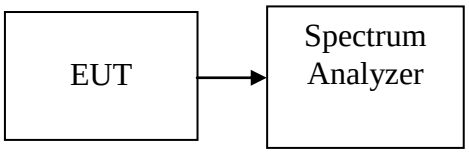

| No. | Frequency (MHz) | Reading (dBuV) | Correct Factor(dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|
| 1 | 5811.900 | 78.95 | 6.58 | 85.53 | 122.20 | -36.67 | AVG |
| 2 | 5852.900 | 37.35 | 6.75 | 44.10 | 115.59 | -71.49 | AVG |
| 3 | 5863.400 | 37.64 | 6.80 | 44.44 | 108.45 | -64.01 | AVG |

## 7.5 PEAK POWER SPECTRAL DENSITY

### LIMIT

1. According to §15.407 & RSS-247 §, for digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 30 dBm in any 500 kHz band during any time interval of continuous transmission.

**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 = 500kHz, VBW = 2MHz, 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 | 7.22 | 30.00 | PASS |
| Mid | 5785 | 7.20 | | PASS |
| High | 5825 | 7.63 | | PASS |

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

| Channel | Frequency (MHz) | PPSD (dBm) | Limit (dBm) | Result |
|---|---|---|---|---|
| Low | 5745 | 6.20 | 30.00 | PASS |
| Mid | 5785 | 5.52 | | PASS |
| High | 5825 | 6.29 | | PASS |

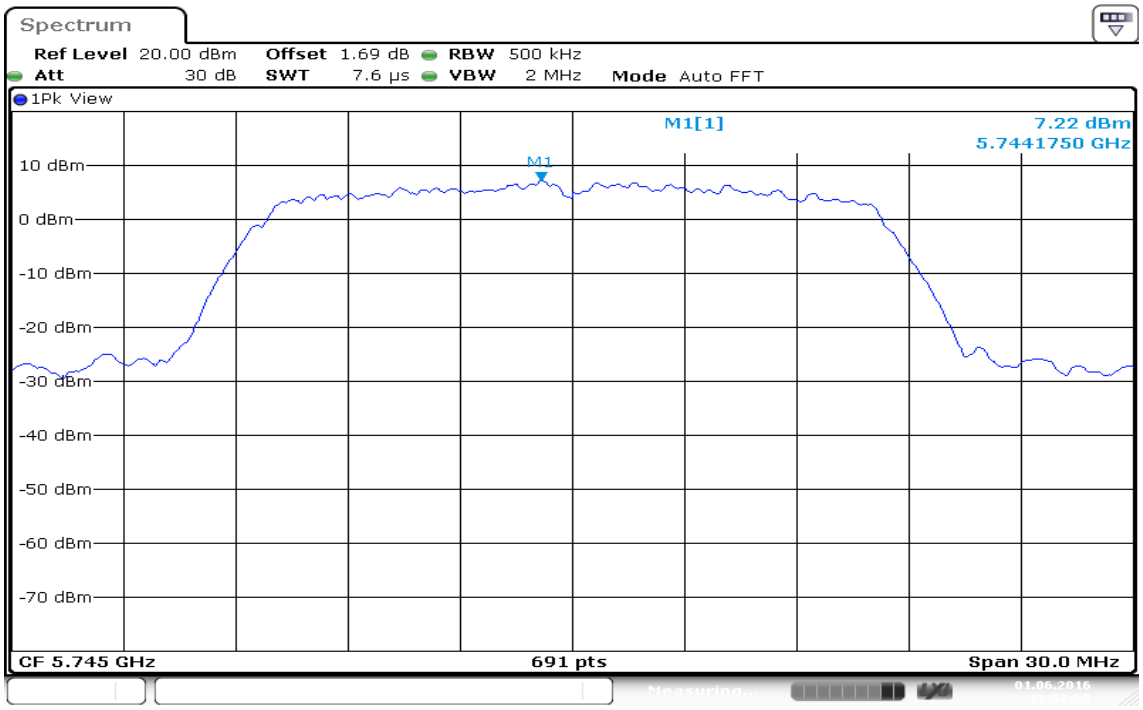
### Test mode: IEEE 802.11n HT 40 MHz mode / 5755 ~ 5795MHz

| Channel | Frequency (MHz) | PPSD (dBm) | Limit (dBm) | Result |
|---|---|---|---|---|
| Low | 5755 | -0.63 | 30.00 | PASS |
| High | 5795 | -0.83 | | PASS |

## Test Plot

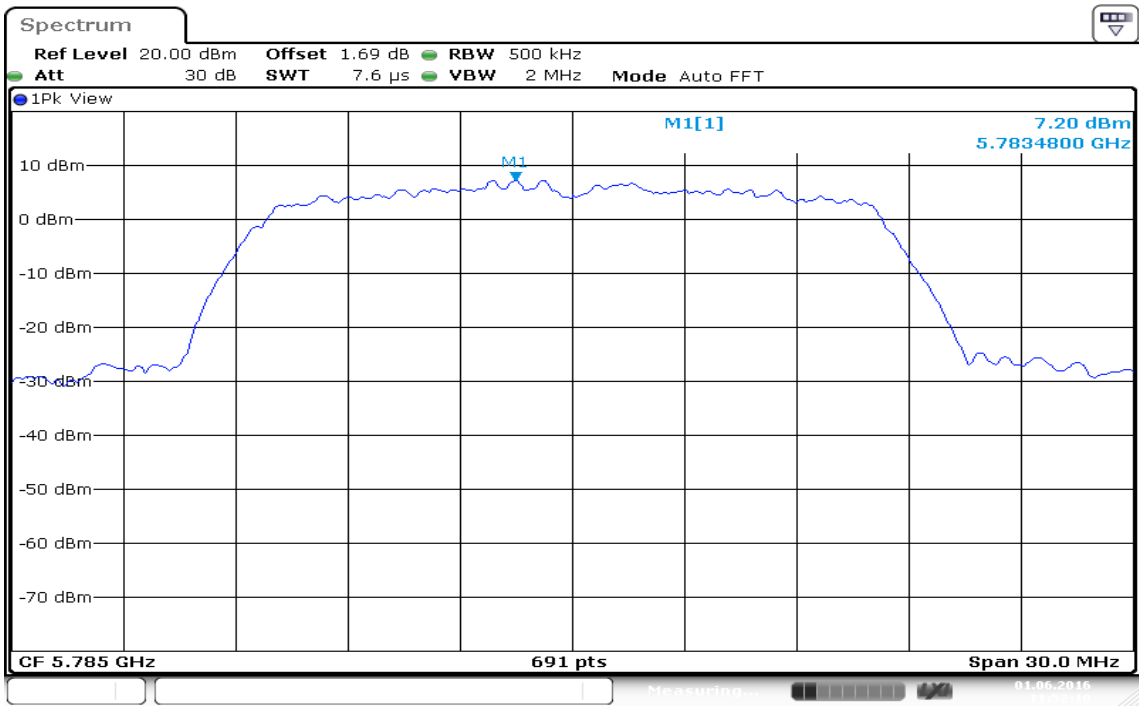
## IEEE 802.11a MHz mode / 5745 ~ 5825MHz

### PPSD (CH Low)



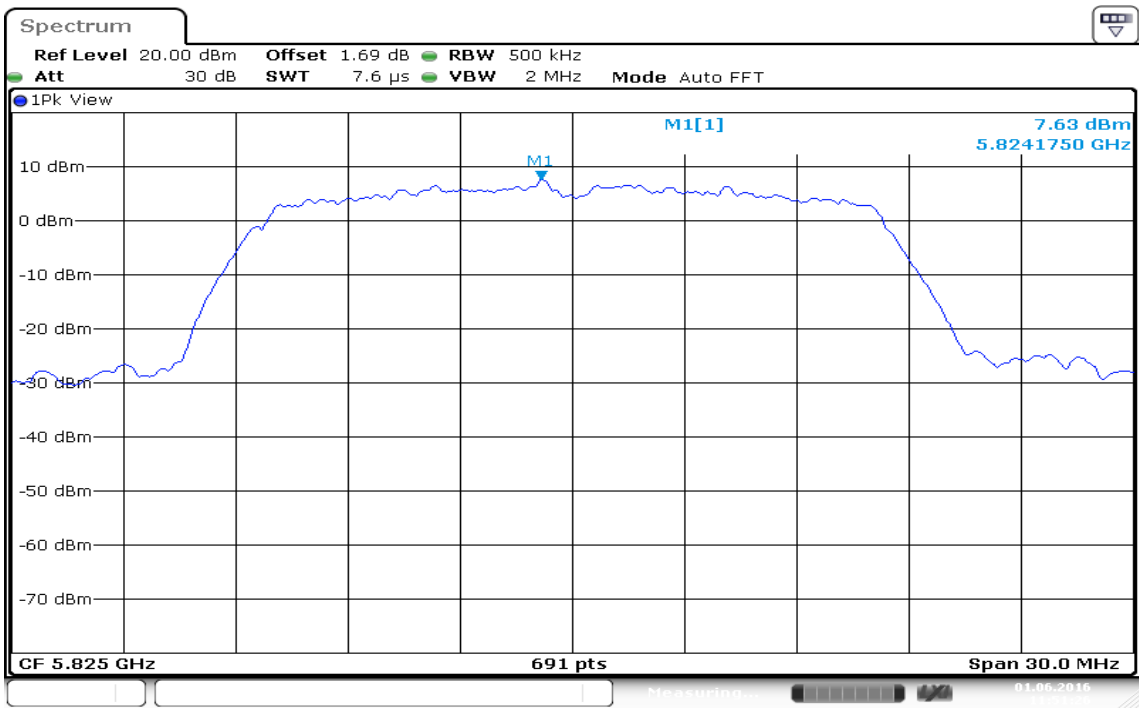

Date: 1.JUN.2016 11:52:58

### PPSD (CH Mid)




Date: 1.JUN.2016 11:52:10

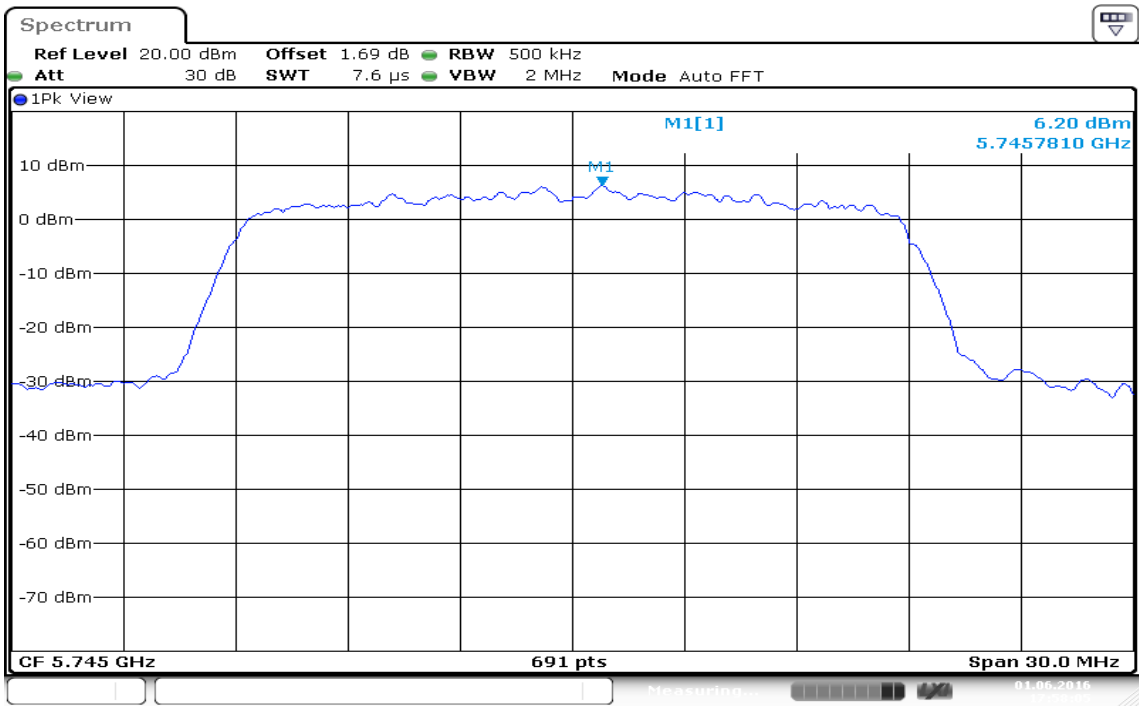
## PPSD (CH High)




Date: 1.JUN.2016 11:51:26

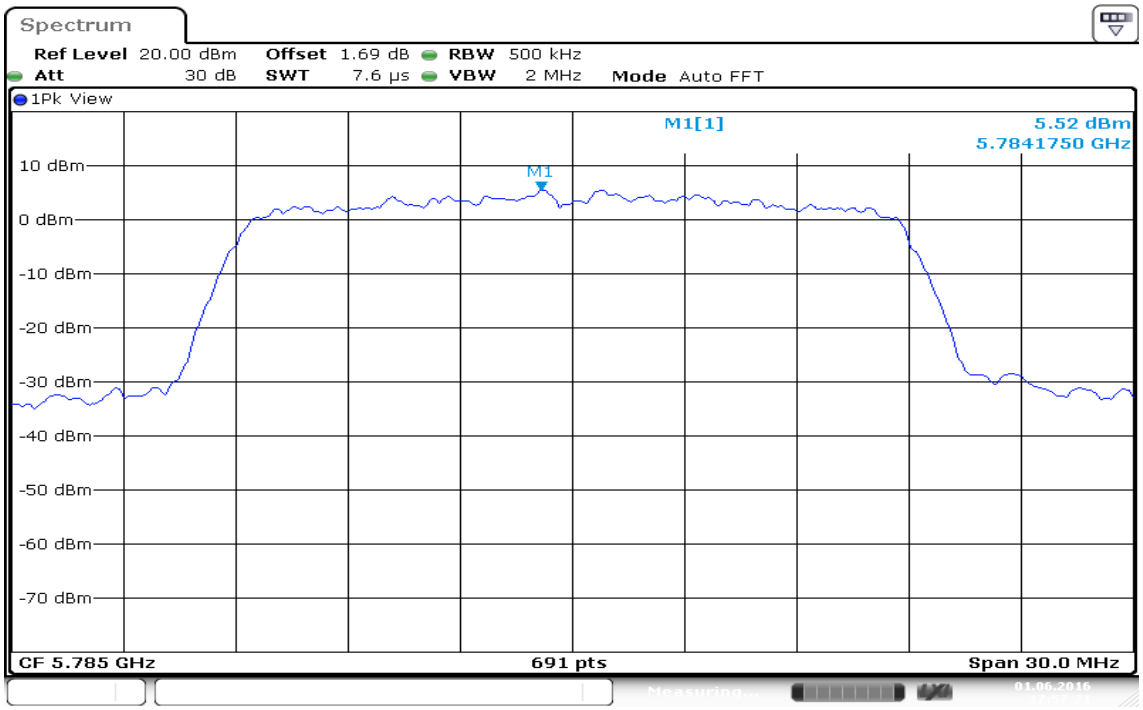
## IEEE 802.11n HT 20 MHz mode / 5745 ~ 5825MHz

## PPSD (CH Low)



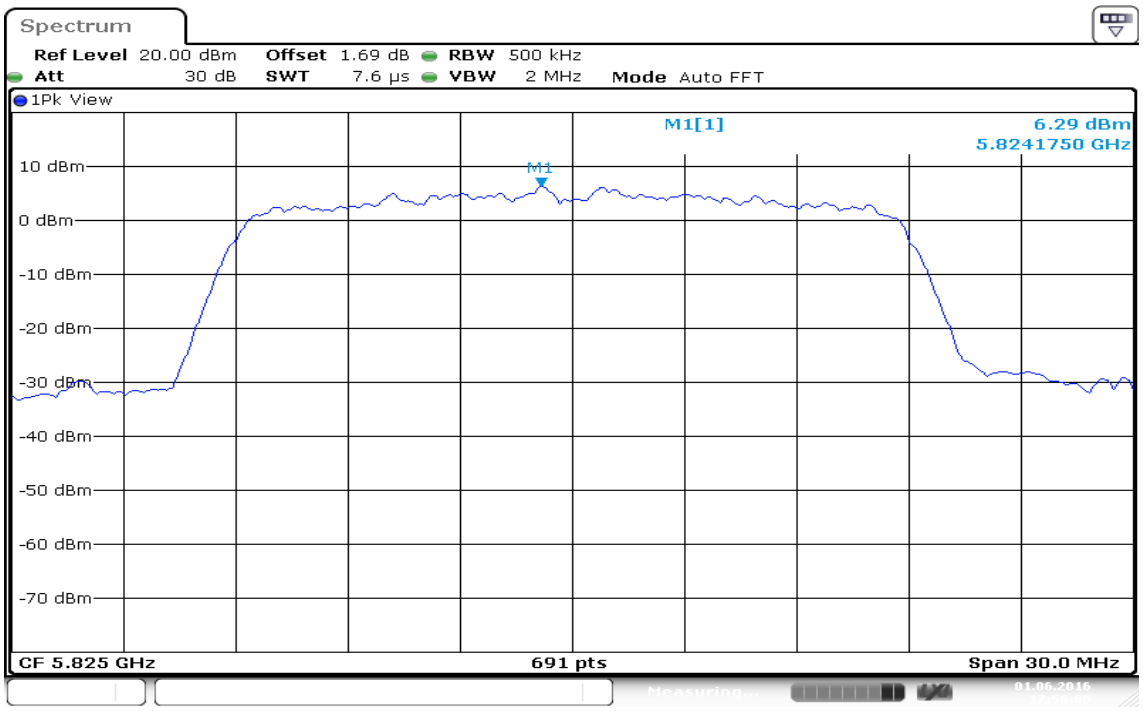

Date: 1.JUN.2016 17:58:05

## PPSD (CH Mid)




Date: 1.JUN.2016 17:57:21

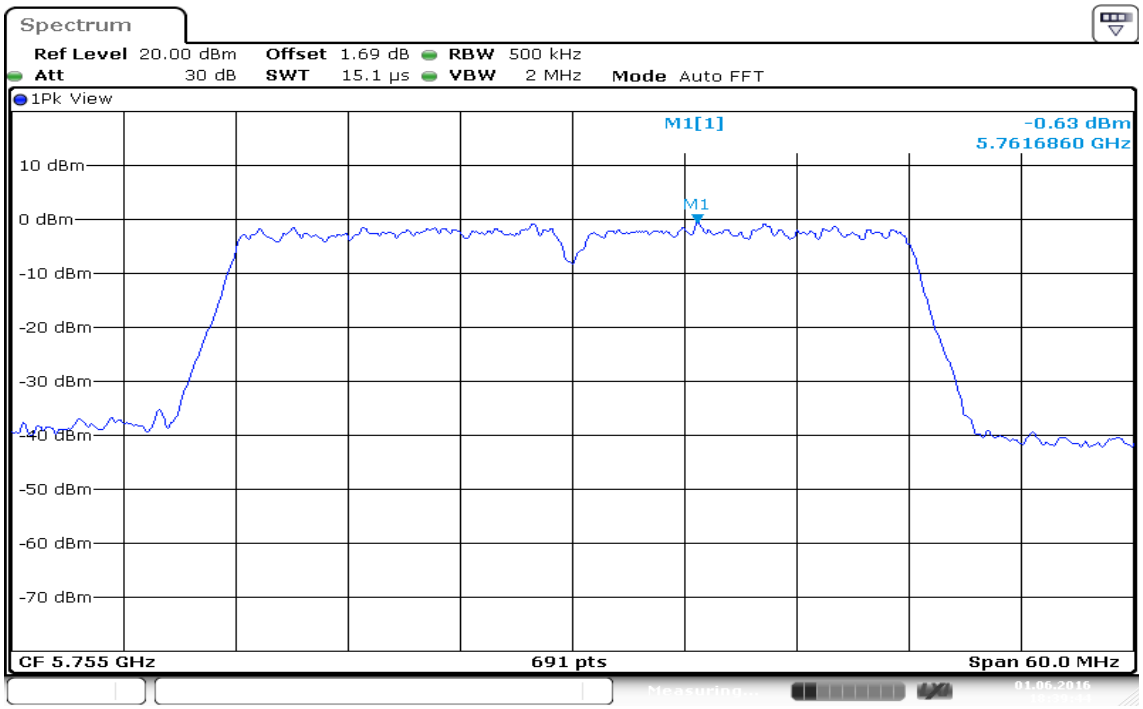
## PPSD (CH High)




Date: 1.JUN.2016 17:56:00

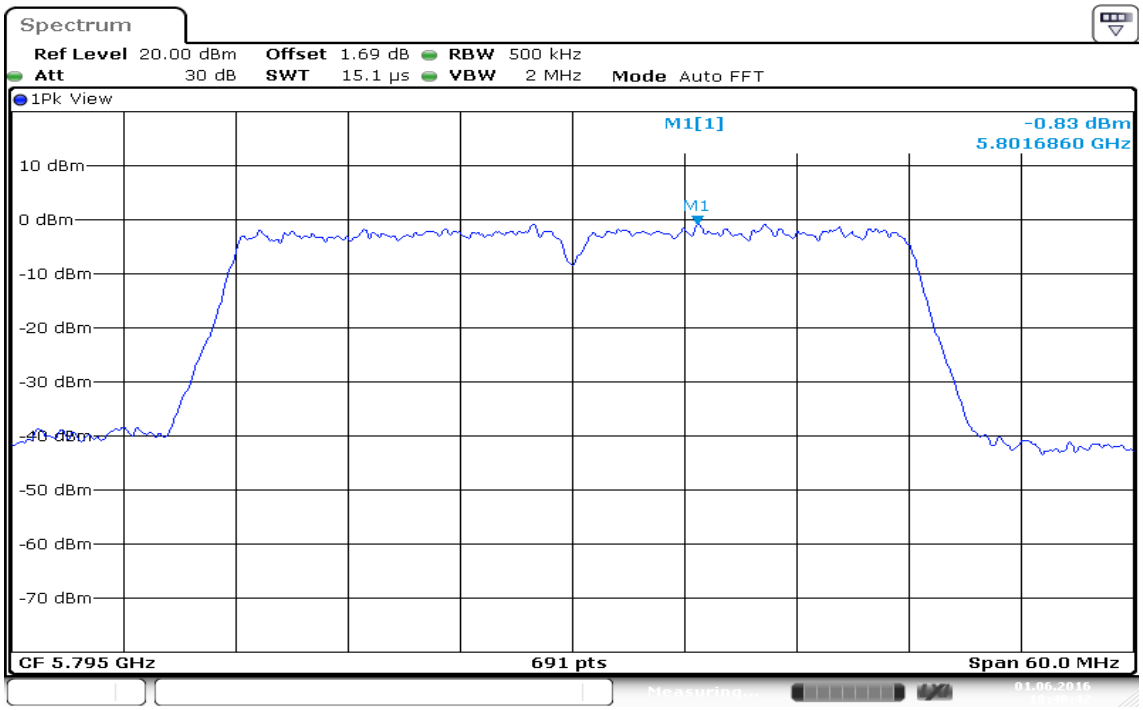
## IEEE 802.11n HT 40 MHz mode / 5755 ~ 5795MHz

## PPSD (CH Low)




Date: 1.JUN.2016 18:39:44

## PPSD (CH High)




Date: 1.JUN.2016 18:40:43

## 7.6 RADIATED EMISSIONS

**LIMIT**

All spurious emissions shall comply with the limits of §15.209(a) and RSS-Gen Table 2 & Table 5.

**RSS-Gen Table 2 & Table 5: General Field Strength Limits for Transmitters and Receivers at Frequencies Above 30 MHz** (Note)

| Frequency (MHz) | Field Strength microvolts/m at 3 metres (watts, e.i.r.p.) | |
|---|---|---|
| | Transmitters | Receivers |
| 30-88 | 100 (3 nW) | 100 (3 nW) |
| 88-216 | 150 (6.8 nW) | 150 (6.8 nW) |
| 216-960 | 200 (12 nW) | 200 (12 nW) |
| Above 960 | 500 (75 nW) | 500 (75 nW) |

***Note:*** *Measurements for compliance with limits in the above table may be performed at distances other than 3 metres, in accordance with Section 7.2.7.
Transmitting devices are not permitted in Table 1 bands or, unless stated otherwise, in TV bands (54-72 MHz, 76-88 MHz, 174-216 MHz, 470-608 MHz and 614-806 MHz).

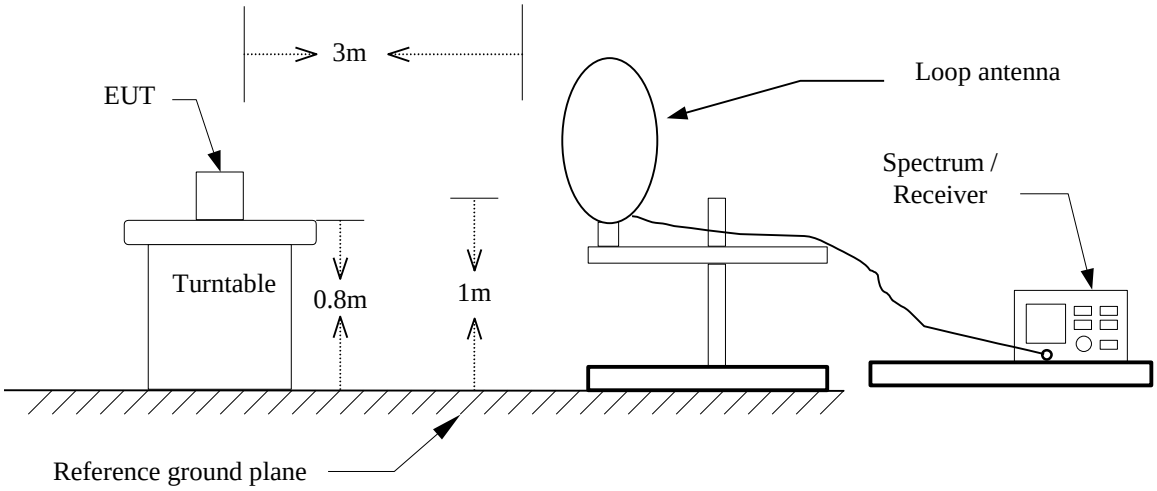
**RSS-Gen Table 6: General Field Strength Limits for Transmitters at Frequencies Below 30 MHz (Transmit)**

| Frequency | Field Strength (microvolts/m) | Magnetic H-Field (microamperes/m) | Measurement Distance (metres) |
|---|---|---|---|
| 9-490 kHz | 2,400/F (F in kHz) | 2,400/377F (F in kHz) | 3000 |
| 490-1,705 kHz | 24,000/F (F in kHz) | 24,000/377F (F in kHz) | 30 |
| 1.705-30 MHz | 30 | N/A | 30 |

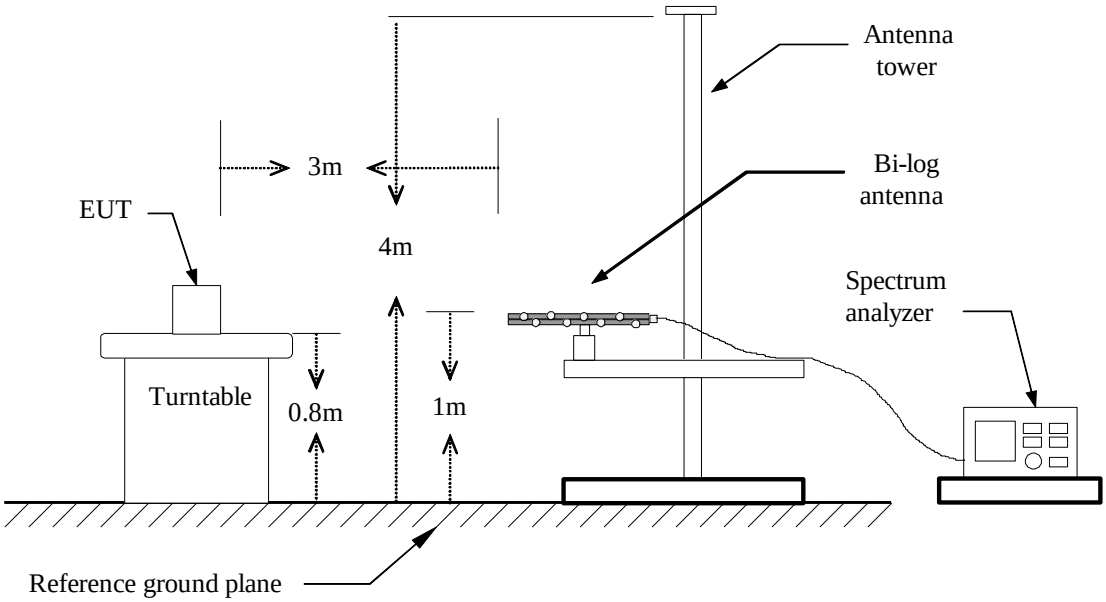
***Note:*** The emission limits for the bands 9-90 kHz and 110-490 kHz are based on measurements
employing an average detector.

## Test Configuration

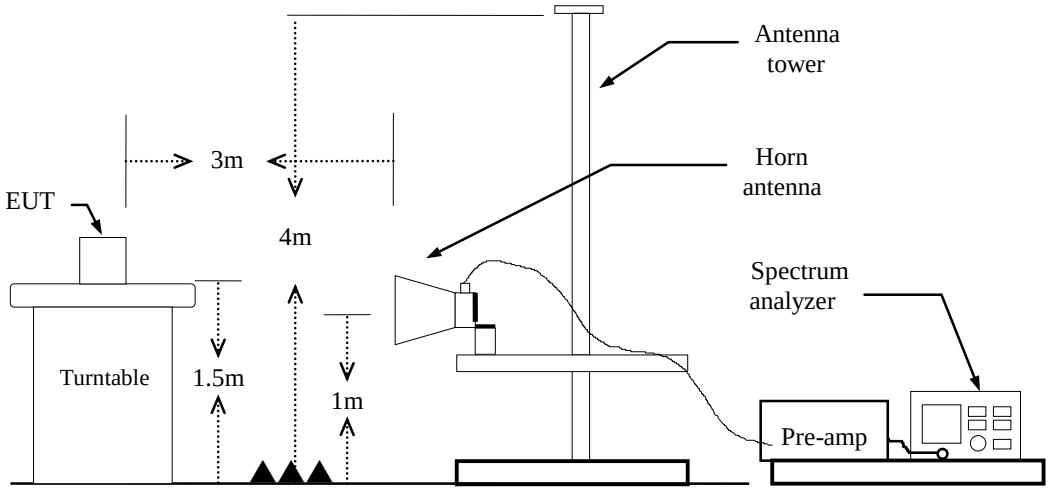
### 9kHz ~ 30MHz




### 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=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

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

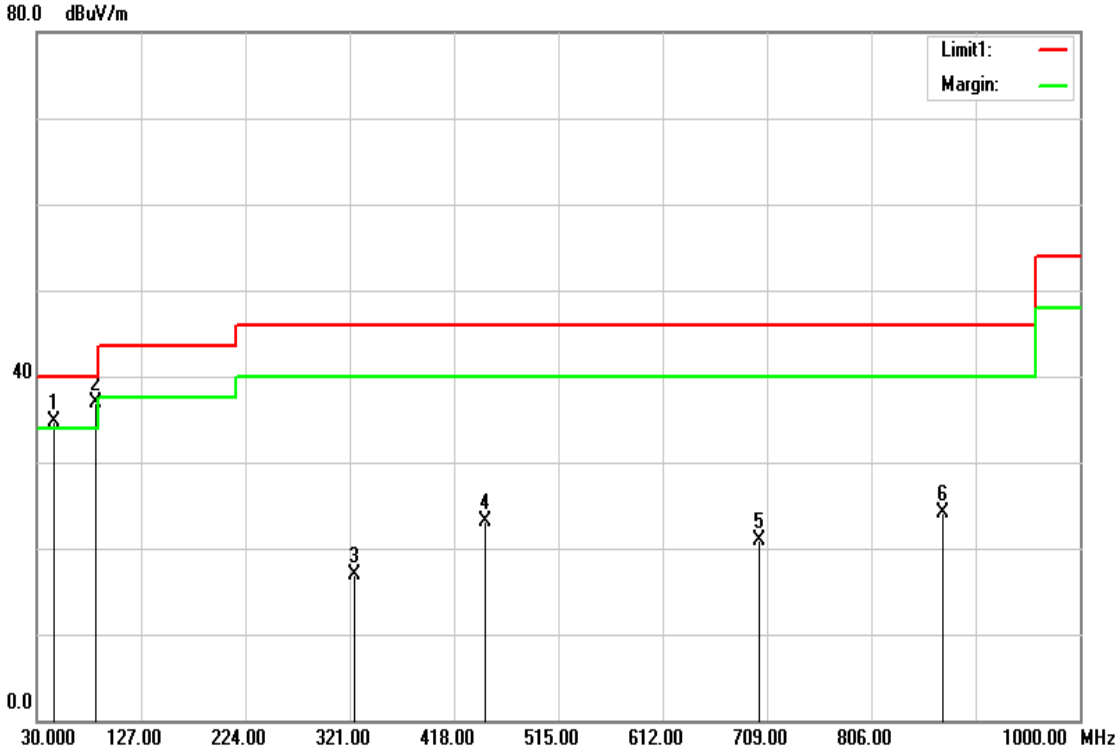
**Note:** We checked every harmonics frequencies from Fundamental frequencies with reduced VBW, and we mark a point to prove pass or not if we find any emission. For this case, there are no emissions hidden in the noise floor.

## Below 1 GHz

**Operation Mode:** Normal Link **Test Date:** June 2, 2016

**Temperature:** 27°C **Tested by:** Dennis Li

**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) |
|---|---|---|---|---|---|---|---|
| 46.4900 | 53.77 | -19.06 | 34.71 | 40.00 | -5.29 | peak | V |
| 85.2900 | 58.29 | -21.38 | 36.91 | 40.00 | -3.09 | peak | V |
| 324.8800 | 30.40 | -13.57 | 16.83 | 46.00 | -29.17 | peak | V |
| 447.1000 | 33.41 | -10.28 | 23.13 | 46.00 | -22.87 | peak | V |
| 701.2400 | 27.00 | -6.04 | 20.96 | 46.00 | -25.04 | peak | V |
| 872.9300 | 27.57 | -3.51 | 24.06 | 46.00 | -21.94 | peak | V |

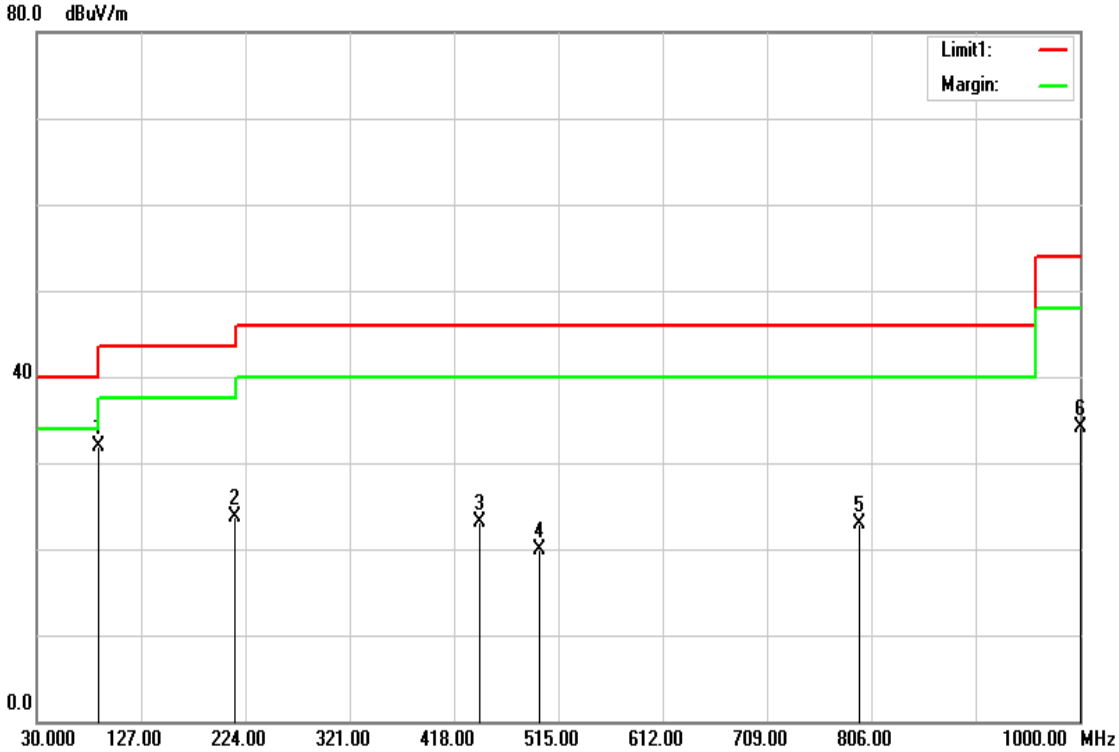
***Remark:***

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) = Remark result (dBuV/m) – Quasi-peak limit (dBuV/m).*

**Operation Mode:** Normal Link **Test Date:** June 2, 2016

**Temperature:** 27°C **Tested by:** Dennis Li

**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) |
|---|---|---|---|---|---|---|---|
| 87.2300 | 53.42 | -21.43 | 31.99 | 40.00 | -8.01 | peak | H |
| 214.3000 | 40.29 | -16.56 | 23.73 | 43.50 | -19.77 | peak | H |
| 442.2500 | 33.54 | -10.42 | 23.12 | 46.00 | -22.88 | peak | H |
| 497.5400 | 29.28 | -9.29 | 19.99 | 46.00 | -26.01 | peak | H |
| 795.3300 | 27.50 | -4.54 | 22.96 | 46.00 | -23.04 | peak | H |
| 1000.0000 | 35.68 | -1.58 | 34.10 | 54.00 | -19.90 | peak | H |

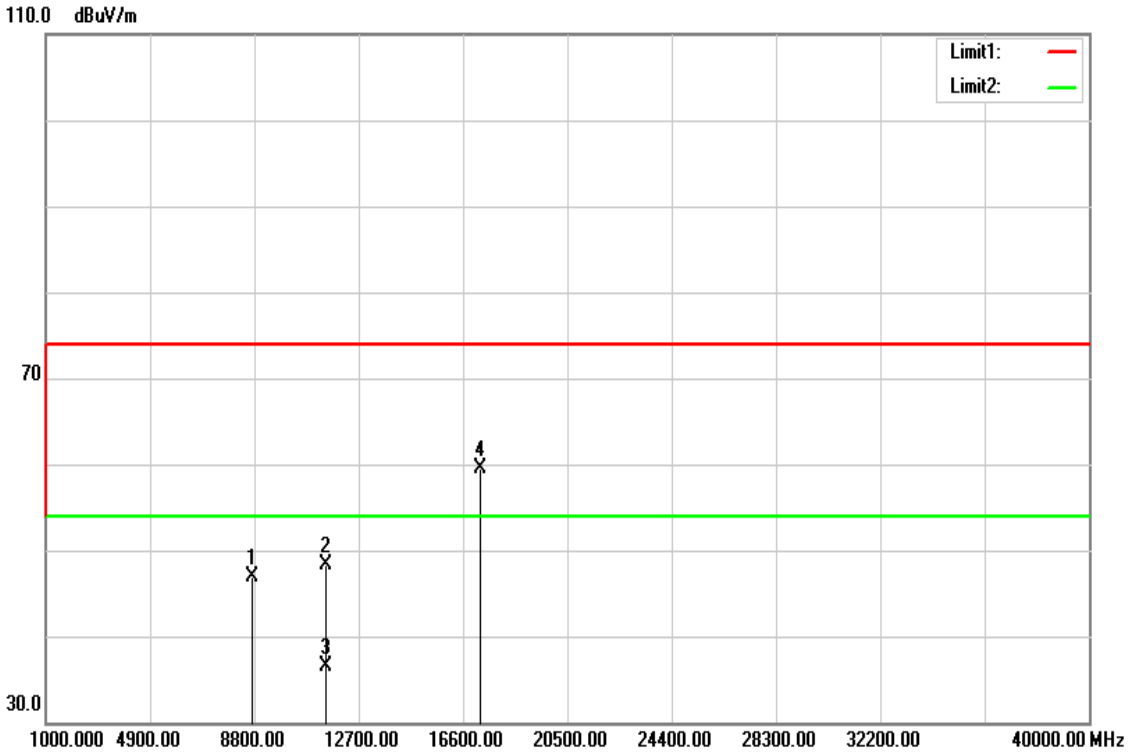
***Remark:***

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) = Remark result (dBuV/m) – Quasi-peak limit (dBuV/m).*

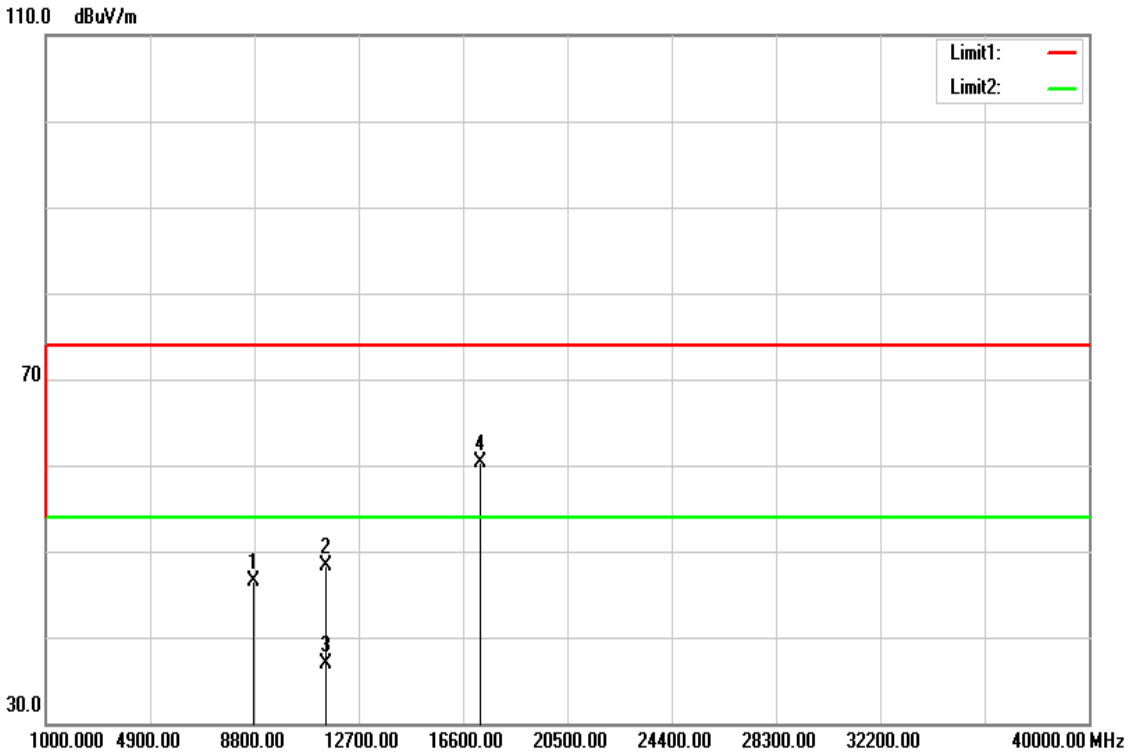
## Above 1 GHz

## TX / IEEE 802.11a mode / CH Low

### Polarity: Vertical




### Polarity: Horizontal



| | | | |
|---|---|---|---|
| **Operation Mode:** | TX / IEEE 802.11a mode / CH Low | **Test Date:** | June 1, 2016 |
| **Temperature:** | 27°C | **Tested by:** | Dennis Li |
| **Humidity:** | 53% RH | **Polarity:** | Ver. / Hor. |

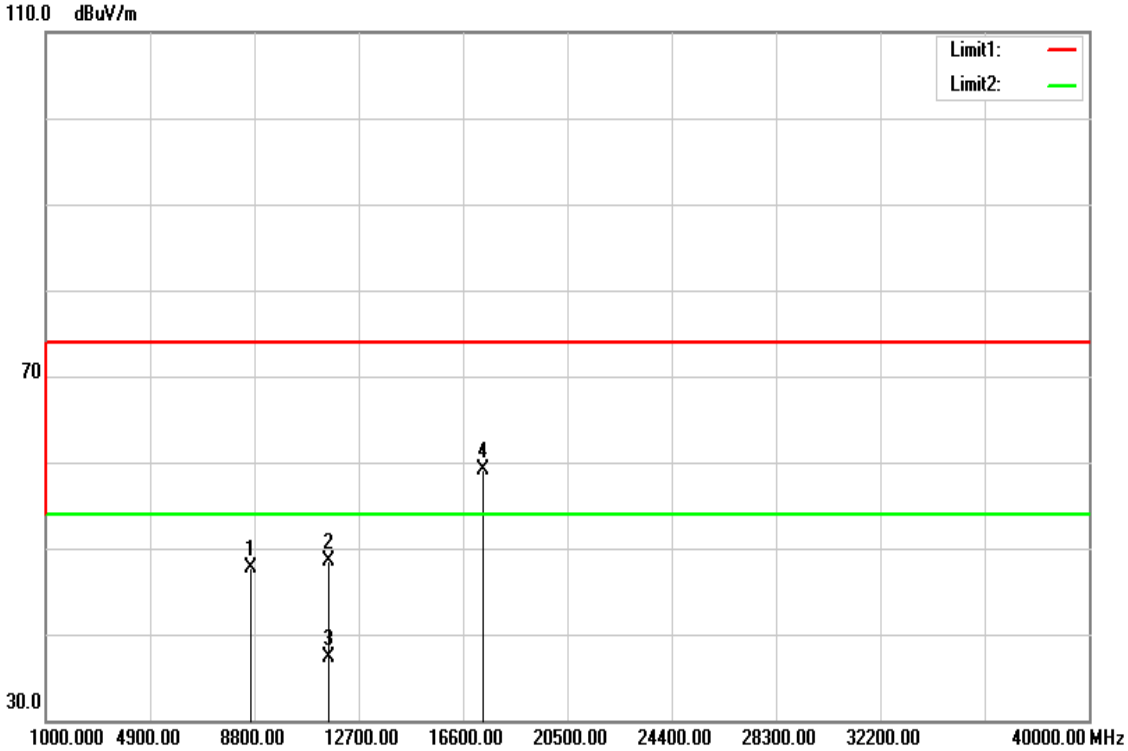
| Frequency (MHz) | Reading (dBuV) | Correction (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark | Ant.Pol. (H/V) |
|---|---|---|---|---|---|---|---|
| 8744.000 | 33.21 | 13.75 | 46.96 | 74.00 | -27.04 | peak | V |
| 11490.000 | 31.46 | 16.78 | 48.24 | 74.00 | -25.76 | peak | V |
| 11490.000 | 19.77 | 16.78 | 36.55 | 54.00 | -17.45 | AVG | V |
| 17235.000 | 34.29 | 25.28 | 59.57 | 74.00 | -14.43 | peak | V |
| N/A | | | | | | | |
| | | | | | | | |
| 8768.000 | 32.73 | 13.76 | 46.49 | 74.00 | -27.51 | peak | H |
| 11490.000 | 31.54 | 16.78 | 48.32 | 74.00 | -25.68 | peak | H |
| 11490.000 | 20.06 | 16.78 | 36.84 | 54.00 | -17.16 | AVG | H |
| 17235.000 | 35.03 | 25.28 | 60.31 | 74.00 | -13.69 | peak | H |
| N/A | | | | | | | |
| | | | | | | | |

***Remark:***

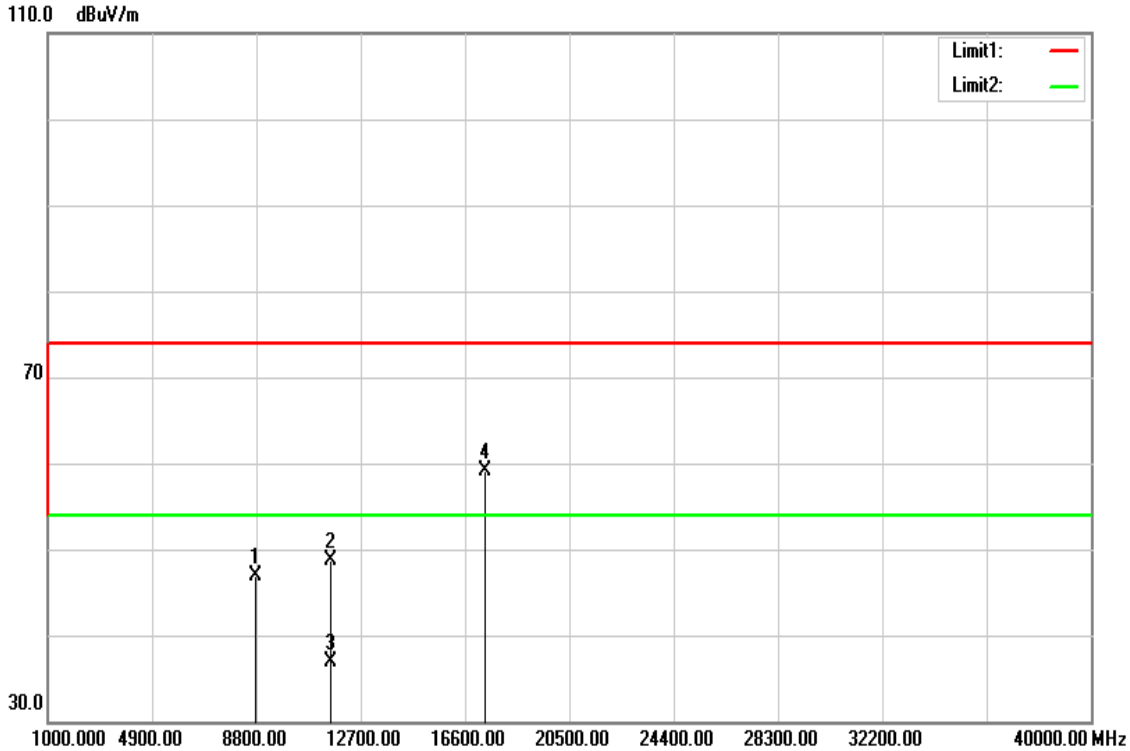
1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average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

## TX / IEEE 802.11a mode / CH Mid

### Polarity: Vertical




### Polarity: Horizontal



| | | | |
|---|---|---|---|
| **Operation Mode:** | TX / IEEE 802.11a mode / CH Mid | **Test Date:** | June 1, 2016 |
| **Temperature:** | 27°C | **Tested by:** | Dennis Li |
| **Humidity:** | 53% RH | **Polarity:** | Ver. / Hor. |

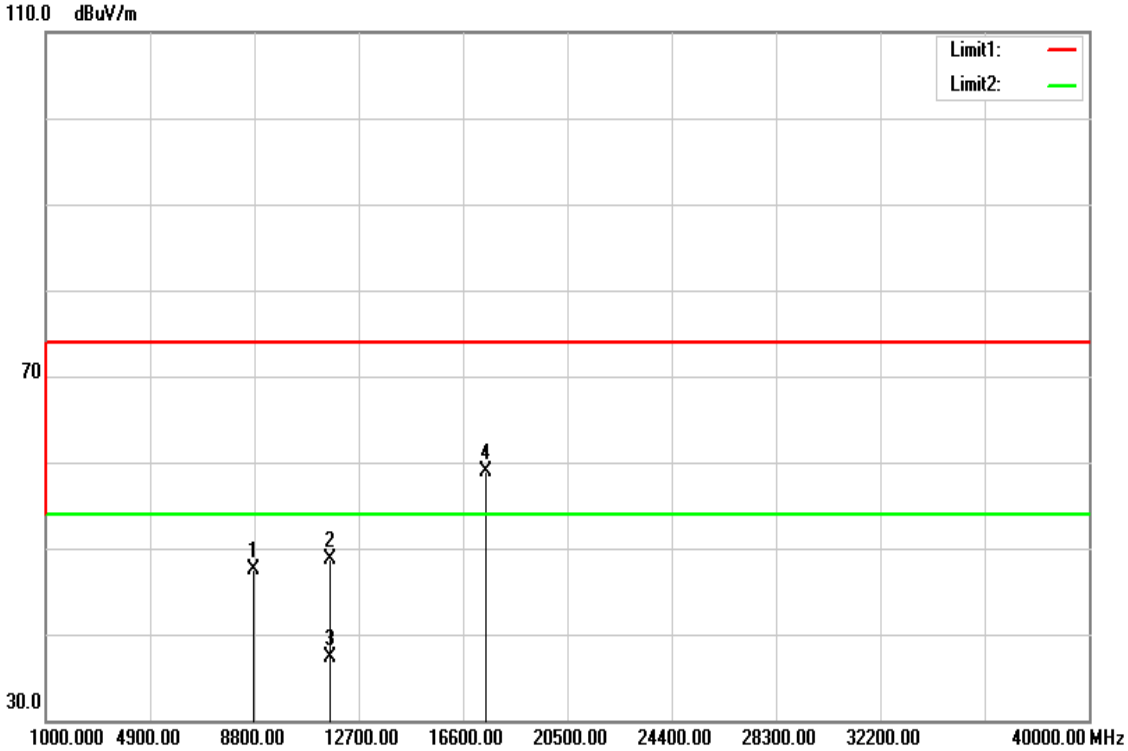
| Frequency (MHz) | Reading (dBuV) | Correction (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark | Ant.Pol. (H/V) |
|---|---|---|---|---|---|---|---|
| 8684.000 | 34.01 | 13.72 | 47.73 | 74.00 | -26.27 | peak | V |
| 11570.000 | 31.74 | 16.84 | 48.58 | 74.00 | -25.42 | peak | V |
| 11570.000 | 20.41 | 16.84 | 37.25 | 54.00 | -16.75 | AVG | V |
| 17355.000 | 33.30 | 25.75 | 59.05 | 74.00 | -14.95 | peak | V |
| N/A | | | | | | | |
| | | | | | | | |
| 8759.000 | 33.11 | 13.76 | 46.87 | 74.00 | -27.13 | peak | H |
| 11570.000 | 31.96 | 16.84 | 48.80 | 74.00 | -25.20 | peak | H |
| 11570.000 | 20.08 | 16.84 | 36.92 | 54.00 | -17.08 | AVG | H |
| 17355.000 | 33.31 | 25.75 | 59.06 | 74.00 | -14.94 | peak | H |
| N/A | | | | | | | |
| | | | | | | | |

***Remark:***

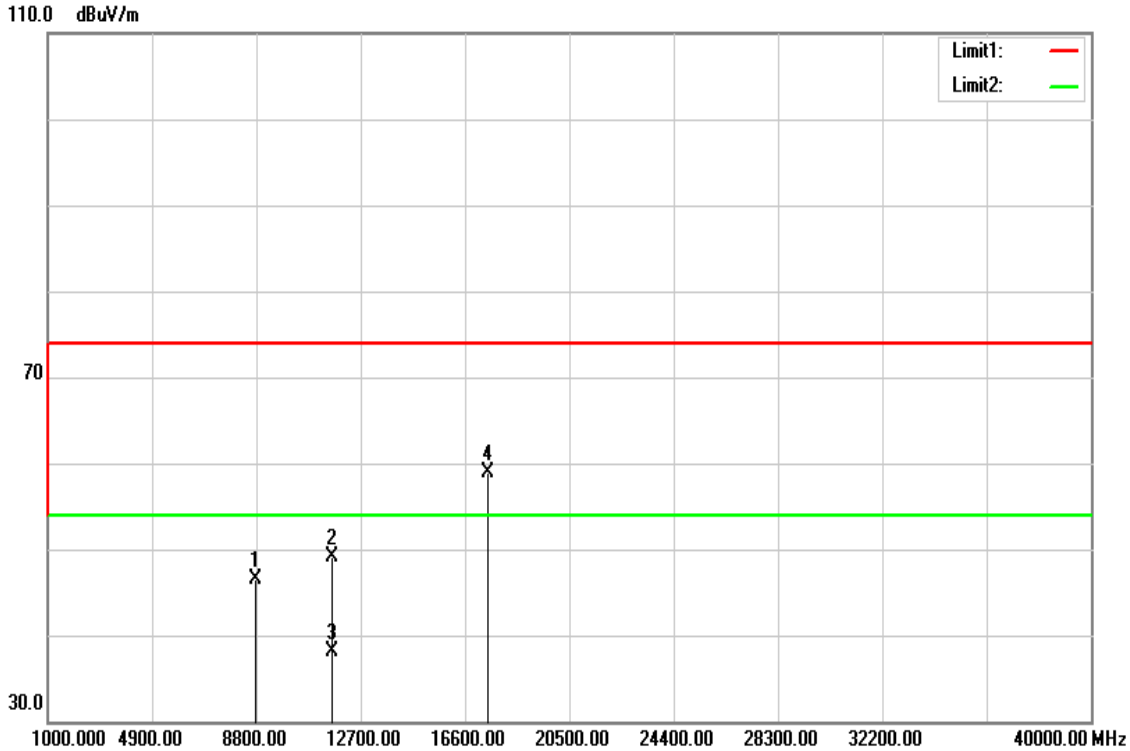
1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average 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 / CH High

### Polarity: Vertical




### Polarity: Horizontal



| | | | |
|---|---|---|---|
| **Operation Mode:** | TX / IEEE 802.11a mode / CH High | **Test Date:** | June 1, 2016 |
| **Temperature:** | 27°C | **Tested by:** | Dennis Li |
| **Humidity:** | 53% RH | **Polarity:** | Ver. / Hor. |

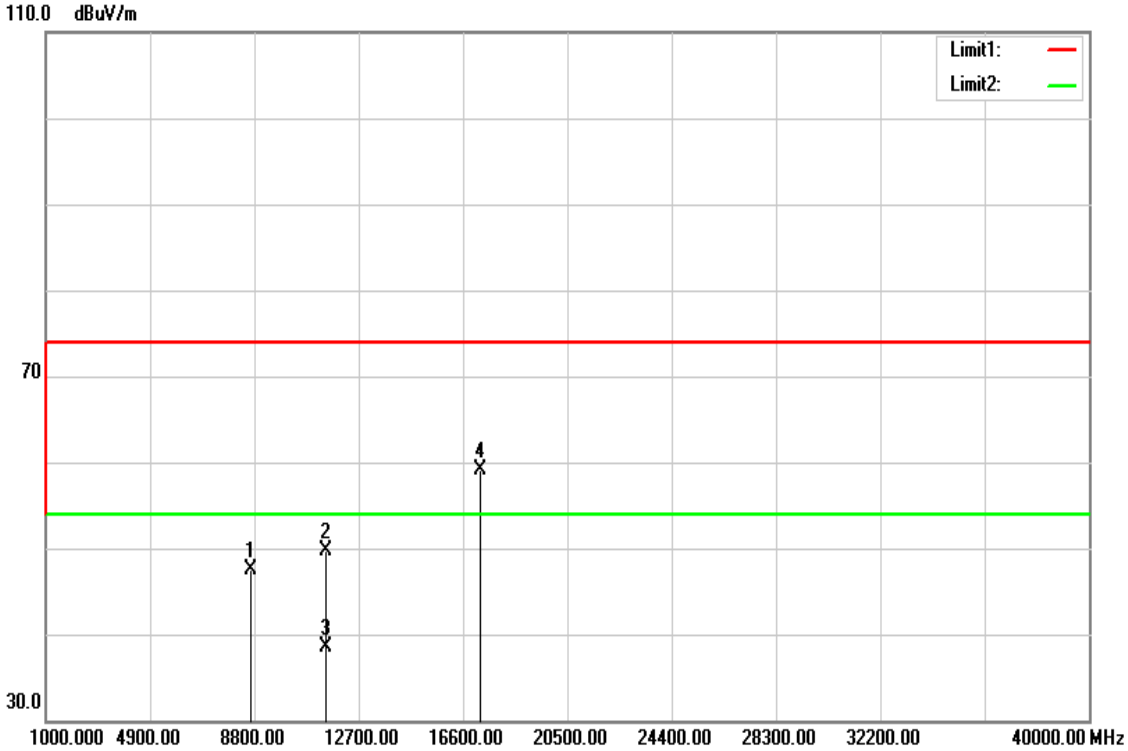
| Frequency (MHz) | Reading (dBuV) | Correction (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark | Ant.Pol. (H/V) |
|---|---|---|---|---|---|---|---|
| 8759.000 | 33.65 | 13.76 | 47.41 | 74.00 | -26.59 | peak | V |
| 11650.000 | 31.86 | 16.91 | 48.77 | 74.00 | -25.23 | peak | V |
| 11650.000 | 20.31 | 16.91 | 37.22 | 54.00 | -16.78 | AVG | V |
| 17475.000 | 32.61 | 26.22 | 58.83 | 74.00 | -15.17 | peak | V |
| N/A | | | | | | | |
| | | | | | | | |
| 8766.000 | 32.75 | 13.76 | 46.51 | 74.00 | -27.49 | peak | H |
| 11650.000 | 32.10 | 16.91 | 49.01 | 74.00 | -24.99 | peak | H |
| 11650.000 | 21.14 | 16.91 | 38.05 | 54.00 | -15.95 | AVG | H |
| 17475.000 | 32.72 | 26.22 | 58.94 | 74.00 | -15.06 | peak | H |
| N/A | | | | | | | |
| | | | | | | | |

***Remark:***

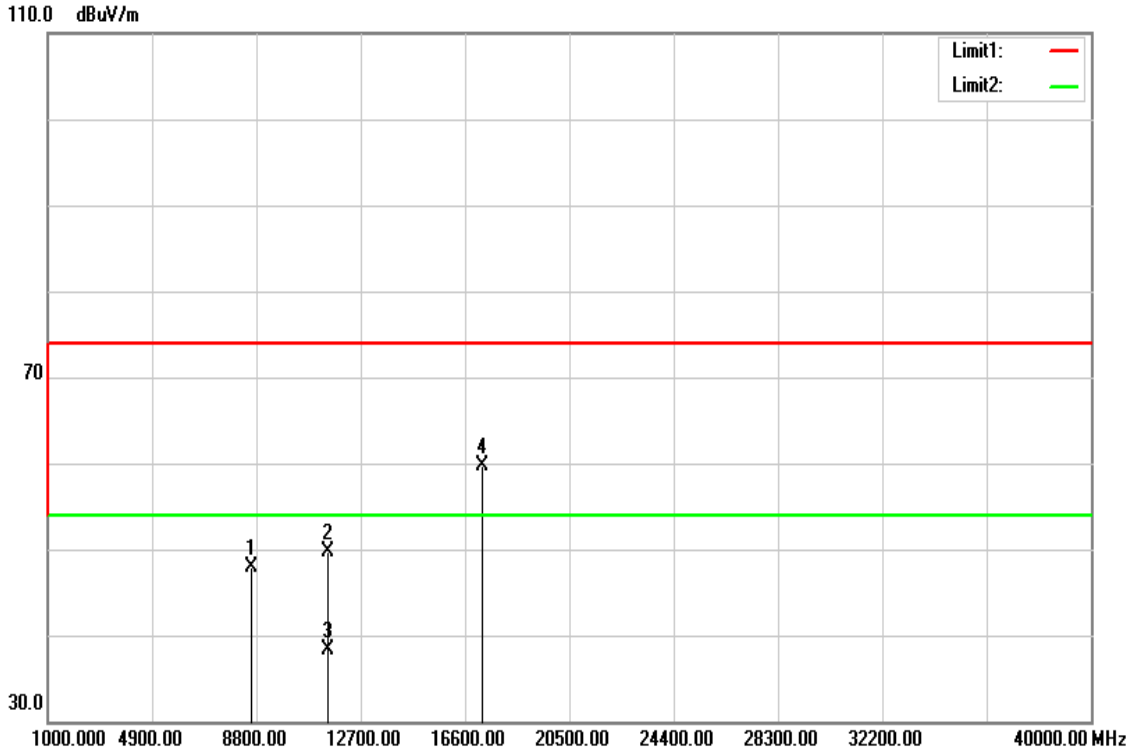
1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average 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 / CH Low

### Polarity: Vertical




### Polarity: Horizontal



| | | | |
|---|---|---|---|
| **Operation Mode:** | TX / IEEE 802.11n HT 20 MHz mode / CH Low | **Test Date:** | June 1, 2016 |
| **Temperature:** | 27°C | **Tested by:** | Dennis Li |
| **Humidity:** | 53% RH | **Polarity:** | Ver. / Hor. |

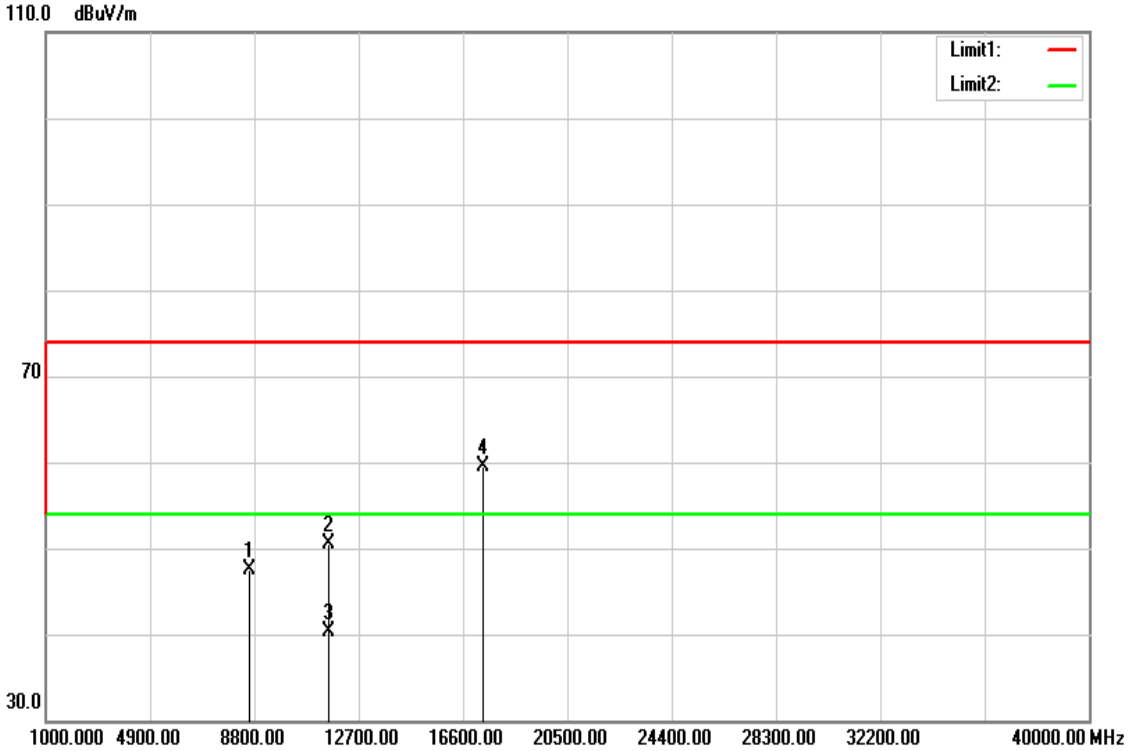
| Frequency (MHz) | Reading (dBuV) | Correction (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark | Ant.Pol. (H/V) |
|---|---|---|---|---|---|---|---|
| 8658.000 | 33.82 | 13.71 | 47.53 | 74.00 | -26.47 | peak | V |
| 11490.000 | 32.83 | 16.78 | 49.61 | 74.00 | -24.39 | peak | V |
| 11490.000 | 21.71 | 16.78 | 38.49 | 54.00 | -15.51 | AVG | V |
| 17235.000 | 33.80 | 25.28 | 59.08 | 74.00 | -14.92 | peak | V |
| N/A | | | | | | | |
| | | | | | | | |
| 8643.000 | 34.11 | 13.71 | 47.82 | 74.00 | -26.18 | peak | H |
| 11490.000 | 32.94 | 16.78 | 49.72 | 74.00 | -24.28 | peak | H |
| 11490.000 | 21.46 | 16.78 | 38.24 | 54.00 | -15.76 | AVG | H |
| 17235.000 | 34.36 | 25.28 | 59.64 | 74.00 | -14.36 | peak | H |
| N/A | | | | | | | |
| | | | | | | | |

***Remark:***

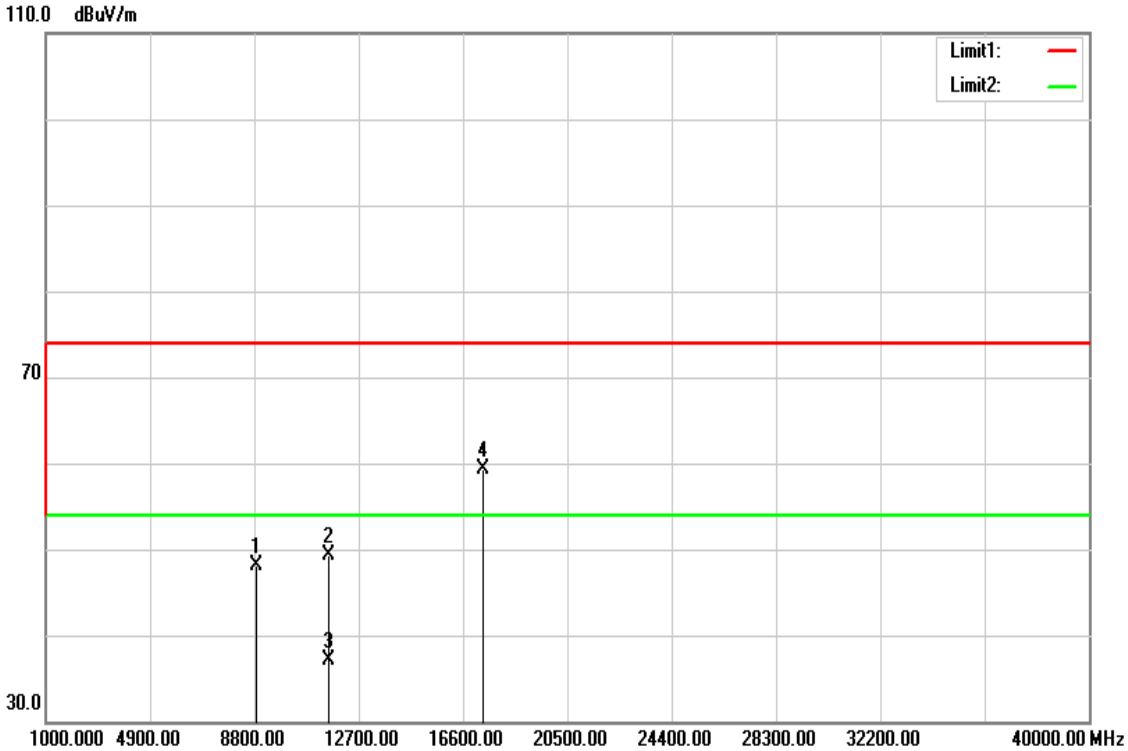
1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average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

## TX / IEEE 802.11n HT 20 MHz mode / CH Mid

### Polarity: Vertical




### Polarity: Horizontal



| | | | |
|---|---|---|---|
| **Operation Mode:** | TX / IEEE 802.11n HT 20 MHz mode / CH Mid | **Test Date:** | June 1, 2016 |
| **Temperature:** | 27°C | **Tested by:** | Dennis Li |
| **Humidity:** | 53% RH | **Polarity:** | Ver. / Hor. |

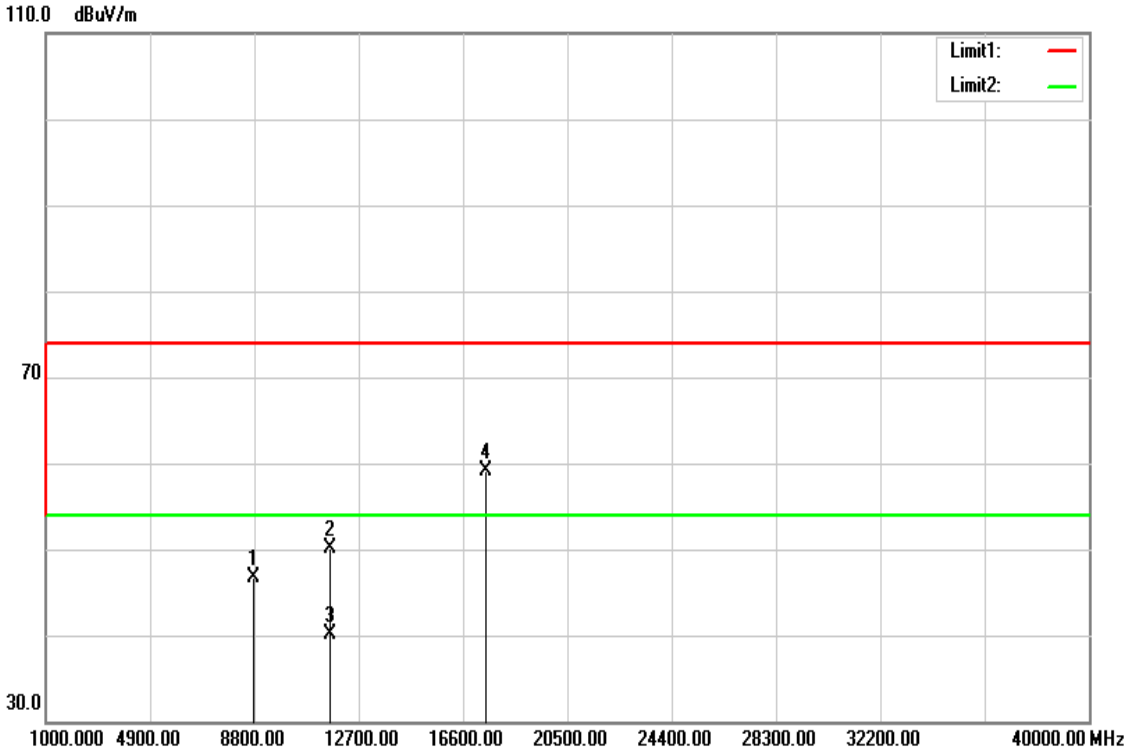
| Frequency (MHz) | Reading (dBuV) | Correction (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark | Ant.Pol. (H/V) |
|---|---|---|---|---|---|---|---|
| 8622.000 | 33.75 | 13.70 | 47.45 | 74.00 | -26.55 | peak | V |
| 11570.000 | 33.71 | 16.84 | 50.55 | 74.00 | -23.45 | peak | V |
| 11570.000 | 23.41 | 16.84 | 40.25 | 54.00 | -13.75 | AVG | V |
| 17355.000 | 33.72 | 25.75 | 59.47 | 74.00 | -14.53 | peak | V |
| N/A | | | | | | | |
| | | | | | | | |
| 8869.000 | 34.20 | 13.81 | 48.01 | 74.00 | -25.99 | peak | H |
| 11570.000 | 32.56 | 16.84 | 49.40 | 74.00 | -24.60 | peak | H |
| 11570.000 | 20.32 | 16.84 | 37.16 | 54.00 | -16.84 | AVG | H |
| 17355.000 | 33.63 | 25.75 | 59.38 | 74.00 | -14.62 | peak | H |
| N/A | | | | | | | |
| | | | | | | | |

***Remark:***

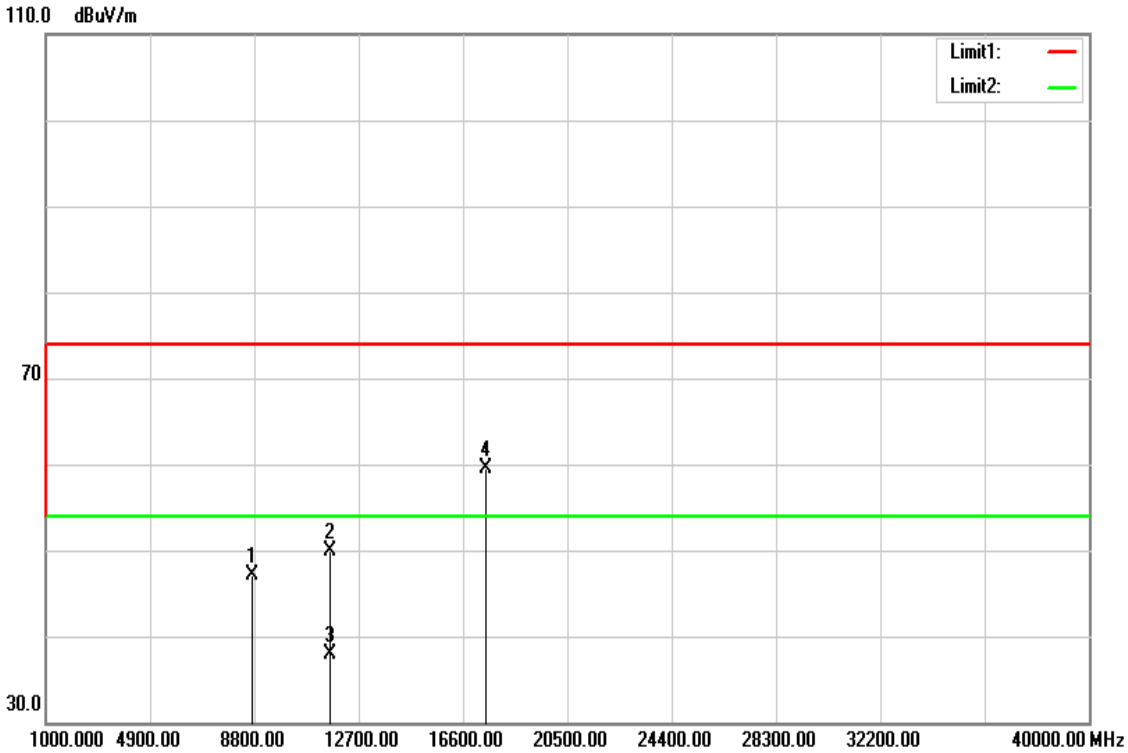
1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average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

## TX / IEEE 802.11n HT 20 MHz mode / CH High

### Polarity: Vertical




### Polarity: Horizontal



| | | | |
|---|---|---|---|
| **Operation Mode:** | TX / IEEE 802.11n HT 20 MHz mode / CH High | **Test Date:** | June 1, 2016 |
| **Temperature:** | 27°C | **Tested by:** | Dennis Li |
| **Humidity:** | 53% RH | **Polarity:** | Ver. / Hor. |

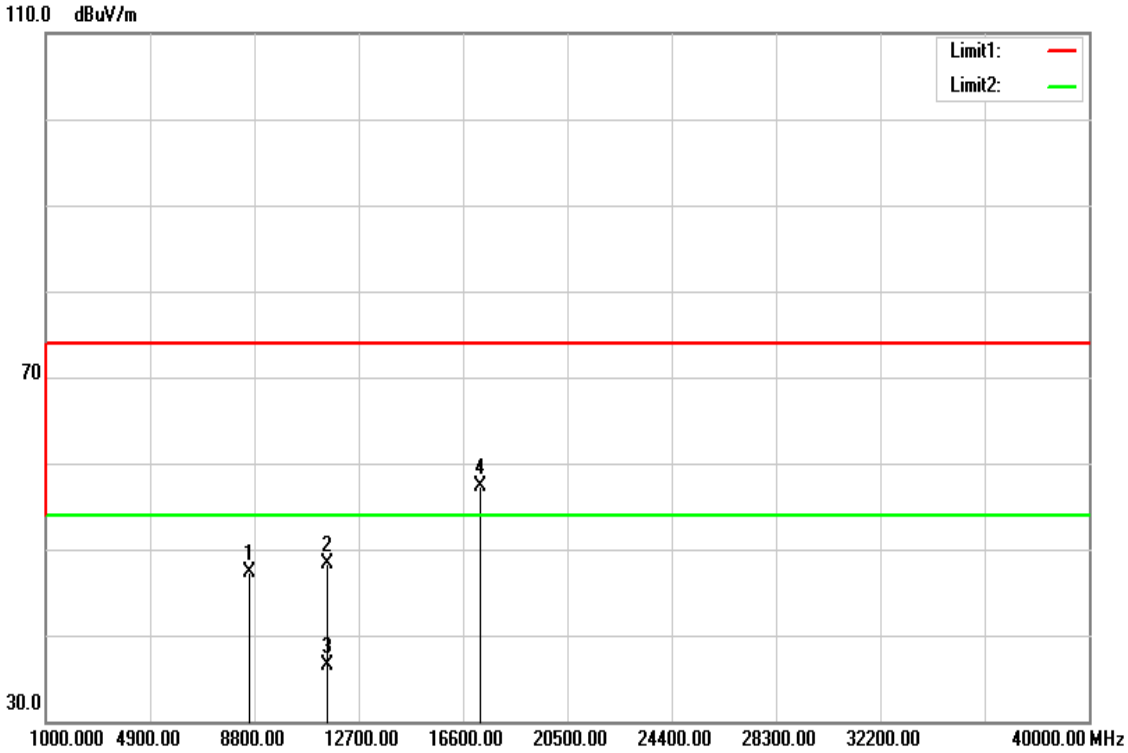
| Frequency (MHz) | Reading (dBuV) | Correction (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark | Ant.Pol. (H/V) |
|---|---|---|---|---|---|---|---|
| 8789.000 | 33.02 | 13.77 | 46.79 | 74.00 | -27.21 | peak | V |
| 11650.000 | 33.27 | 16.91 | 50.18 | 74.00 | -23.82 | peak | V |
| 11650.000 | 23.16 | 16.91 | 40.07 | 54.00 | -13.93 | AVG | V |
| 17475.000 | 32.89 | 26.22 | 59.11 | 74.00 | -14.89 | peak | V |
| N/A | | | | | | | |
| | | | | | | | |
| 8724.000 | 33.41 | 13.74 | 47.15 | 74.00 | -26.85 | peak | H |
| 11650.000 | 33.04 | 16.91 | 49.95 | 74.00 | -24.05 | peak | H |
| 11650.000 | 20.96 | 16.91 | 37.87 | 54.00 | -16.13 | AVG | H |
| 17475.000 | 33.27 | 26.22 | 59.49 | 74.00 | -14.51 | peak | H |
| N/A | | | | | | | |
| | | | | | | | |

***Remark:***

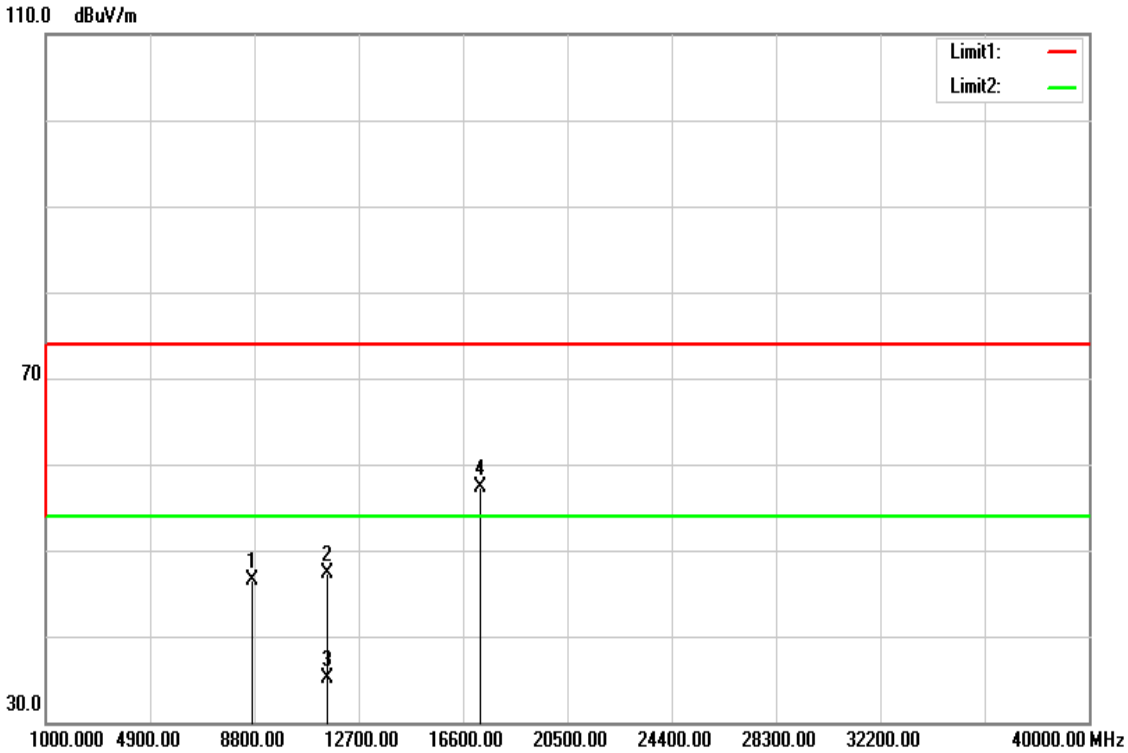
1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average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

## TX / IEEE 802.11n HT 40 MHz mode / CH Low

### Polarity: Vertical




### Polarity: Horizontal



**Operation Mode:** TX / IEEE 802.11n HT 40 MHz mode / CH Low **Test Date:** June 1, 2016

**Temperature:** 27°C **Tested by:** Dennis Li

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

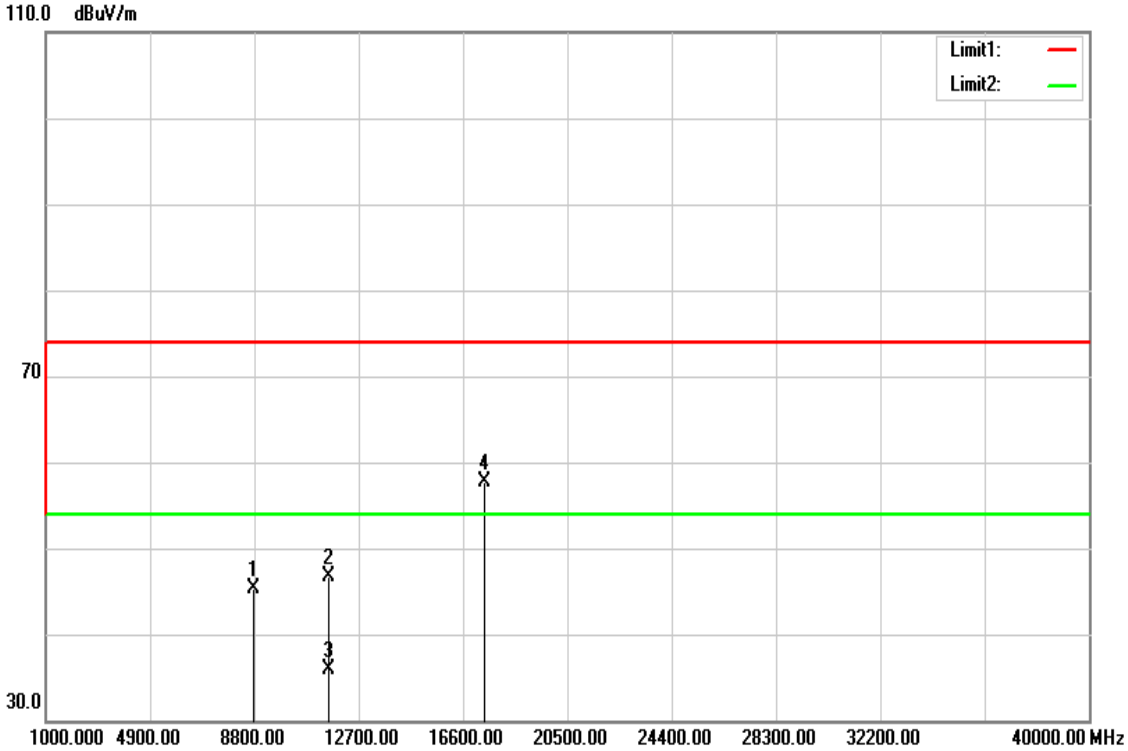
| Frequency (MHz) | Reading (dBuV) | Correction (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark | Ant.Pol. (H/V) |
|---|---|---|---|---|---|---|---|
| 8632.000 | 33.65 | 13.70 | 47.35 | 74.00 | -26.65 | peak | V |
| 11510.000 | 31.48 | 16.79 | 48.27 | 74.00 | -25.73 | peak | V |
| 11510.000 | 19.78 | 16.79 | 36.57 | 54.00 | -17.43 | AVG | V |
| 17265.000 | 31.86 | 25.40 | 57.26 | 74.00 | -16.74 | peak | V |
| N/A | | | | | | | |
| | | | | | | | |
| 8736.000 | 32.85 | 13.75 | 46.60 | 74.00 | -27.40 | peak | H |
| 11510.000 | 30.56 | 16.79 | 47.35 | 74.00 | -26.65 | peak | H |
| 11510.000 | 18.35 | 16.79 | 35.14 | 54.00 | -18.86 | AVG | H |
| 17265.000 | 31.97 | 25.40 | 57.37 | 74.00 | -16.63 | peak | H |
| N/A | | | | | | | |
| | | | | | | | |

***Remark:***

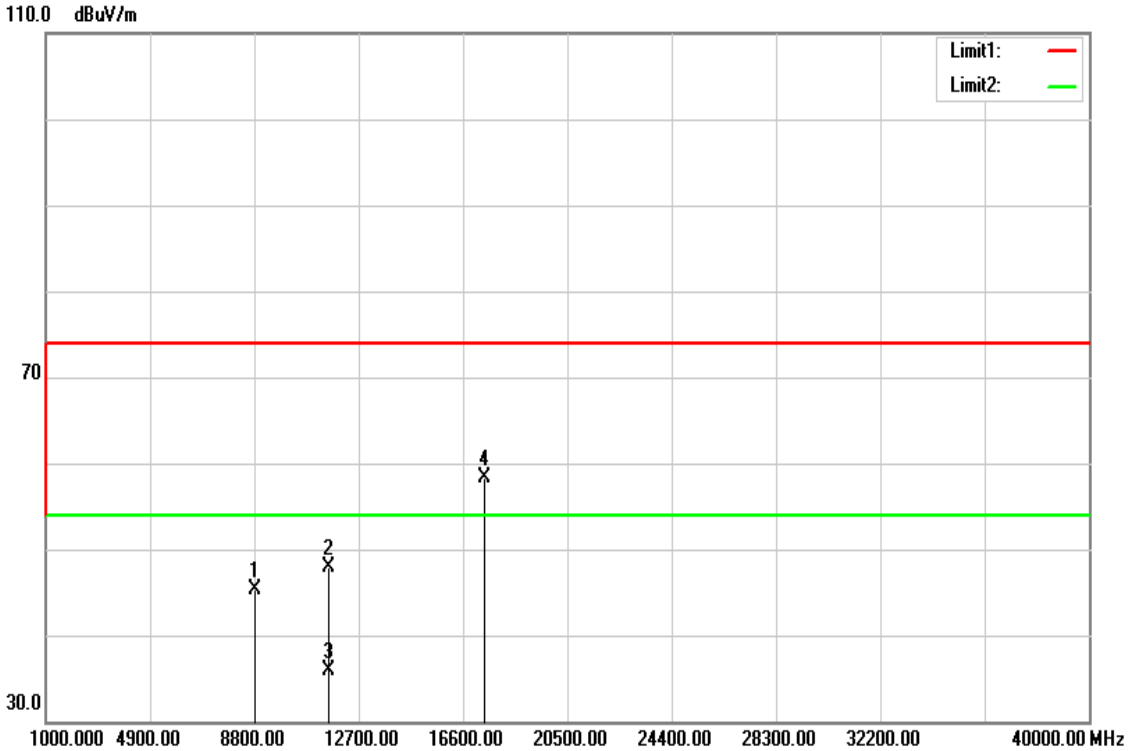
1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average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

## TX / IEEE 802.11n HT 40 MHz mode / CH High

### Polarity: Vertical




### Polarity: Horizontal



| | | | |
|---|---|---|---|
| **Operation Mode:** | TX / IEEE 802.11n HT 40 MHz mode / CH High | **Test Date:** | June 1, 2016 |
| **Temperature:** | 27°C | **Tested by:** | Dennis Li |
| **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) |
|---|---|---|---|---|---|---|---|
| 8794.000 | 31.44 | 13.78 | 45.22 | 74.00 | -28.78 | peak | V |
| 11590.000 | 29.80 | 16.86 | 46.66 | 74.00 | -27.34 | peak | V |
| 11590.000 | 19.12 | 16.86 | 35.98 | 54.00 | -18.02 | AVG | V |
| 17385.000 | 31.81 | 25.87 | 57.68 | 74.00 | -16.32 | peak | V |
| N/A | | | | | | | |
| | | | | | | | |
| 8811.000 | 31.43 | 13.78 | 45.21 | 74.00 | -28.79 | peak | H |
| 11590.000 | 30.98 | 16.86 | 47.84 | 74.00 | -26.16 | peak | H |
| 11590.000 | 19.01 | 16.86 | 35.87 | 54.00 | -18.13 | AVG | H |
| 17385.000 | 32.51 | 25.87 | 58.38 | 74.00 | -15.62 | peak | H |
| N/A | | | | | | | |
| | | | | | | | |

***Remark:***

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

## 7.7 POWERLINE CONDUCTED EMISSIONS

**LIMIT**

According to §15.207(a) & RSS-Gen §7.2.4, except when the requirements applicable to a given device state otherwise, for any licence-exempt radiocommunication device equipped to operate from the public utility AC power supply, either directly or indirectly, the radio frequency voltage that is conducted back onto the AC power lines in the frequency range of 0.15 MHz to 30 MHz shall not exceed the limits shown in Table 2. The tighter limit applies at the frequency range boundaries.
The conducted emissions shall be measured with a 50 ohm/50 microhenry line impedance stabilization network.

**RSS-Gen Table 2 – AC Power Lines Conducted Emission Limits**

| Frequency Range (MHz) | Conducted limit (dBμV) | |
|---|---|---|
| | Quasi-peak | Average |
| 0.15 to 0.5 | 66 to 56* | 56 to 46* |
| 0.5 to 5 | 56 | 46 |
| 5 to 30 | 60 | 50 |

**Decreases with the logarithm of the frequency*

**Test Configuration**

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

## TEST PROCEDURE

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

# TEST RESULTS

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

## Test Data

| | | | |
|---|---|---|---|
| **Operation Mode:** | Normal Link | **Test Date:** | June 2, 2016 |
| **Temperature:** | 24°C | **Tested by:** | Dennis Li |
| **Humidity:** | 50% RH | | |

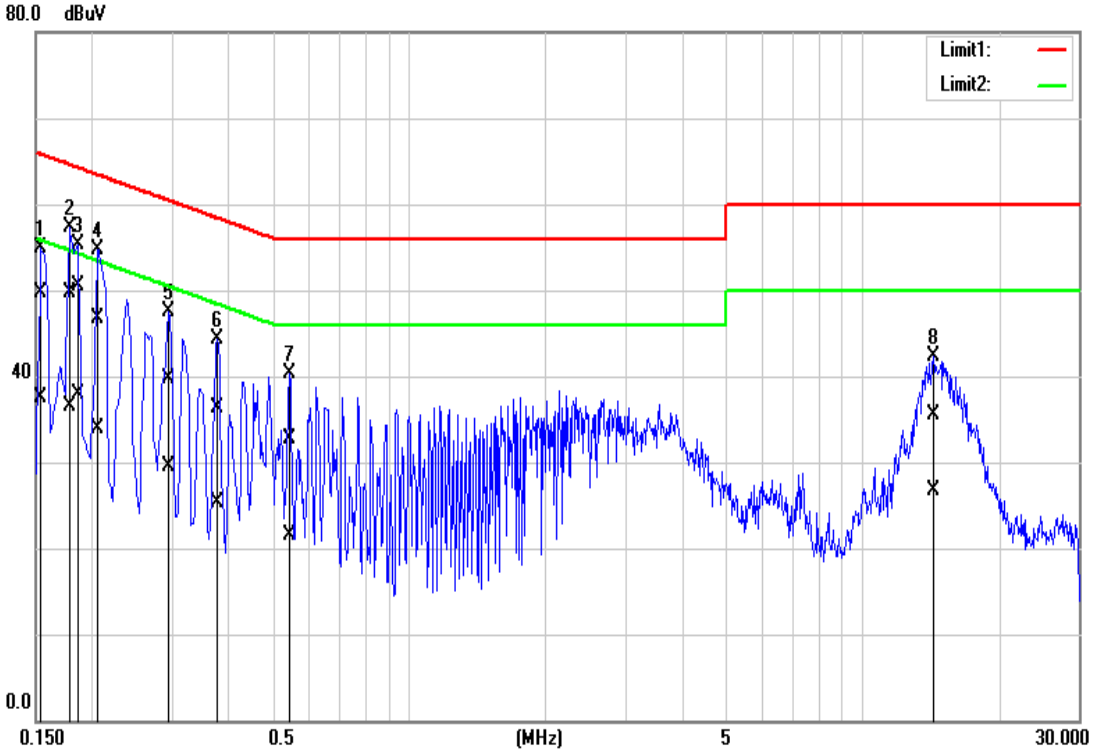
| Freq. (MHz) | QP Reading (dBuV) | AV Reading (dBuV) | Corr. factor (dB/m) | QP Result (dBuV/m) | AV Result (dBuV/m) | QP Limit (dBuV) | AV Limit (dBuV) | QP Margin (dB) | AV Margin (dB) | Note |
|---|---|---|---|---|---|---|---|---|---|---|
| 0.1539 | 39.96 | 27.77 | 9.81 | 49.77 | 37.58 | 65.78 | 55.79 | -16.01 | -18.21 | L1 |
| 0.1780 | 39.87 | 26.78 | 9.82 | 49.69 | 36.60 | 64.57 | 54.58 | -14.88 | -17.98 | L1 |
| 0.1860 | 40.78 | 28.17 | 9.82 | 50.60 | 37.99 | 64.21 | 54.21 | -13.61 | -16.22 | L1 |
| 0.2060 | 36.88 | 24.11 | 9.83 | 46.71 | 33.94 | 63.36 | 53.37 | -16.65 | -19.43 | L1 |
| 0.2940 | 29.82 | 19.59 | 9.82 | 39.64 | 29.41 | 60.41 | 50.41 | -20.77 | -21.00 | L1 |
| 0.3780 | 26.44 | 15.54 | 9.81 | 36.25 | 25.35 | 58.32 | 48.32 | -22.07 | -22.97 | L1 |
| 0.5460 | 22.82 | 11.76 | 9.81 | 32.63 | 21.57 | 56.00 | 46.00 | -23.37 | -24.43 | L1 |
| 14.3220 | 25.29 | 16.49 | 10.25 | 35.54 | 26.74 | 60.00 | 50.00 | -24.46 | -23.26 | L1 |
| | | | | | | | | | | |
| 0.1700 | 44.26 | 31.49 | 9.89 | 54.15 | 41.38 | 64.96 | 54.96 | -10.81 | -13.58 | L2 |
| 0.1980 | 43.34 | 29.91 | 9.90 | 53.24 | 39.81 | 63.69 | 53.69 | -10.45 | -13.88 | L2 |
| 0.2220 | 38.31 | 24.96 | 9.90 | 48.21 | 34.86 | 62.74 | 52.74 | -14.53 | -17.88 | L2 |
| 0.2580 | 35.65 | 22.41 | 9.89 | 45.54 | 32.30 | 61.50 | 51.50 | -15.96 | -19.20 | L2 |
| 0.4780 | 29.09 | 16.17 | 9.87 | 38.96 | 26.04 | 56.37 | 46.37 | -17.41 | -20.33 | L2 |
| 0.5940 | 26.78 | 11.67 | 9.87 | 36.65 | 21.54 | 56.00 | 46.00 | -19.35 | -24.46 | L2 |
| 14.8260 | 22.76 | 15.64 | 10.57 | 33.33 | 26.21 | 60.00 | 50.00 | -26.67 | -23.79 | L2 |

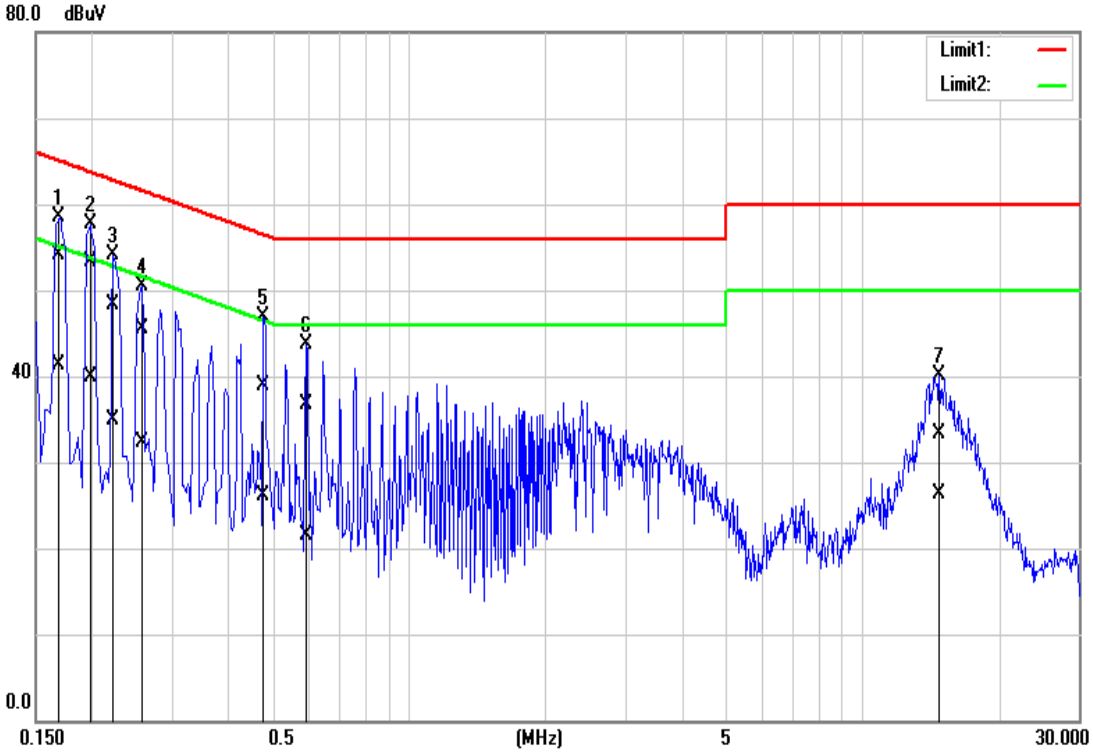
***Remark:***

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

## Test Plots

### *Conducted emissions (Line 1)*




### *Conducted emissions (Line 2)*