# FCC 47 CFR PART 15 SUBPART C

for

**Sparx201-W**

**Model: AELEL204U2**

**Brand: NEXXT**

**Test Report Number:**
**C170612Z02-RP1**
**Issued Date: July 11, 2017**

Issued for

**NEXXT SOLUTIONS**

**3505 N.W 107TH AVE. MIAMI Florida United States 33178**

Issued by:

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# Revision History

| Rev. | Issue Date | Revisions | Effect Page | Revised By |
|---|---|---|---|---|
| 00 | July 11, 2017 | Initial Issue | ALL | Sabrina Wang |
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# 1 TEST CERTIFICATION

| | |
|---|---|
| **Product** | Sparx201-W |
| **Model** | AELEL204U2 |
| **Brand** | NEXXT |
| **Tested** | June 12~July 10, 2017 |
| **Applicant** | **NEXXT SOLUTIONS**<br>3505 N.W 107TH AVE. MIAMI Florida United States 33178 |
| **Manufacturer** | **NEXXT SOLUTIONS**<br>3505 N.W 107TH AVE. MIAMI Florida United States 33178 |

| APPLICABLE STANDARDS | | | |
|---|---|---|---|
| **Standard** | **Test Type** | **Standard** | **Test Type** |
| 15.207(a) | Power Line Conducted Emissions | 15.247(d)<br>15.209(a) | ● Spurious Emissions<br>● Conducted Measurement<br>● Radiated Emissions |
| 15.247(a)(2) | 6dB Bandwidth Measurement | 15.247(b)(3)<br>15.247(b)(4) | Peak Power Measurement |
| 15.247(d) | Band Edges Measurement | 15.247(e) | Peak Power Spectral Density |

## We hereby certify that:

The above equipment was tested by Compliance Certification Services (Shenzhen) Inc. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in **ANSI C63.10: 2013** and the energy emitted by the sample EUT tested as described in this report is in compliance with the requirements of FCC Rules Part 15.207, 15.209, 15.247.
The test results of this report relate only to the tested sample EUT identified in this report.

***Approved by:***

**Sunday Hu**
**Supervisor of EMC Dept.**
**Compliance Certification Services (Shenzhen) Inc.**

***Reviewed by:***

**Ruby Zhang**
**Supervisor of Report Dept.**
**Compliance Certification Services (Shenzhen) Inc.**


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# 2 TEST RESULT SUMMARY

| APPLICABLE STANDARDS | | | |
|---|---|---|---|
| **Standard** | **Test Type** | **Result** | **Remark** |
| 15.247(a)(2) | 6dB Bandwidth Measurement | Pass | Meet the requirement of limit. |
| 15.247(b)(3)<br>15.247(b)(4) | Peak Power Measurement | Pass | Meet the requirement of limit. |
| 15.247(d) | Band Edges Measurement | Pass | Meet the requirement of limit. |
| 15.247(e) | Peak Power Spectral Density | Pass | Meet the requirement of limit. |
| 15.247(d)<br>15.209(a) | ● Spurious Emissions<br>● Conducted Measurement<br>● Radiated Emissions | Pass | Meet the requirement of limit. |
| 15.207(a) | Power line Conducted Emissions | Pass | Meet the requirement of limit. |

Note: 1. The statements of test result on the above are decided by the request of test standard only; the measurement uncertainties are not factored into this compliance determination.
2. The information of measurement uncertainty is available upon the customer's request.


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# 3 EUT DESCRIPTION

| | |
|---|---|
| **Product** | Sparx201-W |
| **Model Number** | AELEL204U2 |
| **Brand** | NEXXT |
| **Model Discrepancy** | N/A |
| **Identify Number** | C170612Z02-RP1 |
| **Received Date** | June 12, 2017 |
| **Power Supply** | Input: AC100-240V ~ 50/60Hz, 0.2A |
| **Transmit Power** | IEEE 802.11b mode: 17.64dBm (Antenna 0)<br>IEEE 802.11b mode: 18.39dBm (Antenna 1)<br>IEEE 802.11g mode: 17.75dBm (Antenna 0)<br>IEEE 802.11g mode: 17.86dBm (Antenna 1)<br>IEEE 802.11n HT20 MHz mode: 20.14dBm(Combine with Antenna 0 and Antenna 1)<br>IEEE 802.11n HT40 MHz mode: 19.26dBm(Combine with Antenna 0 and Antenna 1) |
| **Modulation Technique** | IEEE 802.11b mode: DSSS(CCK,QPSK, BPSK)<br>IEEE 802.11g mode: OFDM (BPSK/QPSK/16QAM/64QAM)<br>IEEE 802.11n HT20 MHz mode: OFDM (BPSK/QPSK/16QAM/64QAM)<br>IEEE 802.11n HT40 MHz mode: OFDM (BPSK/QPSK/16QAM/64QAM) |
| **Transmit Data Rate** | IEEE 802.11b: 11Mbps(CCK) with fall back rates of 5.5/2/1Mbps<br>IEEE 802.11g: 54Mbps with fall back rates of 48/36/24/18/12/9 /6Mbps<br>IEEE 802.11n HT20: 130Mbps with fall back rates of 130/117/104/ 78/52/39/26/13Mbps<br>IEEE 802.11n HT40: 270Mbps with fall back rates of 270/243/216/ 162/108/81/54/27Mbps |
| **Number of Channels** | IEEE 802.11b mode: 11 Channels<br>IEEE 802.11g mode: 11 Channels<br>IEEE 802.11n HT20 MHz mode: 11 Channels<br>IEEE 802.11n HT40 MHz mode: 7 Channels |
| **Antenna Specification** | Embedded Antenna 0 with 2.35dBi gain (Max)<br>Embedded Antenna 1 with 2.25dBi gain (Max) |
| **Channels Spacing** | IEEE 802.11b/g ,802.11n HT20/HT40 : 5MHz |
| **Temperature Range** | 0°C ~ +40°C |
| **EUT Max. PLC Operating Frequency** | 28MHz |

***Note:*** *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: **X4YSPRX201W** filing to comply with Section 15.207, 15.209 and 15.247 of the FCC Part 15, Subpart C Rules.*


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# 4 TEST METHODOLOGY

## 4.1. DESCRIPTION OF TEST MODES

The EUT has been tested under operating condition.

Use MTool_2.0.1.5.exe to control the EUT for staying in continuous transmitting and receiving mode.

| Test Item | Test mode | Worse mode |
|---|---|---|
| Conducted Emission | **Mode 1:** 100Mbps 20% | ☒ |
| | **Mode 2:** Stand by | ☐ |
| Radiated Emission | **Mode 1:** Continuously Transmitting | ☒ |

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, and power line conducted emission below 30MHz, which worst case was in normal link mode.

IEEE802.11b mode: Channel Low (2412MHz), Channel Mid (2437MHz) and Channel High (2462MHz) with 1Mbps data rate were chosen for full testing.

IEEE802.11g mode: Channel Low (2412MHz), Channel Mid (2437MHz) and Channel High (2462MHz) with 6Mbps data rate were chosen for full testing.

IEEE 802.11n HT20 MHz mode: Channel Low (2412MHz), Channel Mid (2437MHz) and Channel High (2462MHz) with 13Mbps data rate were chosen for full testing.

IEEE 802.11n HT40 MHz mode: Channel Low (2422MHz), Channel Mid (2437MHz) and Channel High (2452MHz) with 27Mbps data rate were chosen for full testing.


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# 5 SETUP OF EQUIPMENT UNDER TEST

## 5.1. DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

| No. | Equipment | Model No. | Serial No. | FCC ID | Brand | Data Cable | Power Cord |
|---|---|---|---|---|---|---|---|
| 1 | Notebook 1 | Thinkpad | N/A | DoC | LENOVO | Unshielded 2.00m | Shielded 1.70m (AC Cable) Unshielded 1.80m (DC Cable) |
| 2 | Notebook 2 | Probook 5310M | N/A | DoC | HP | Unshielded 2.00m | Shielded 1.70m (AC Cable) Unshielded 1.80m (DC Cable) |
| 3 | 200M Powerline Adapter | P200 | E6242013637000096 | DoC | Tenda | Unshielded 2.00m | N/A |

**Note:**

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

## 5.2. CONFIGURATION OF SYSTEM UNDER TEST

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


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# 6 FACILITIES AND ACCREDITATIONS

## 6.1. FACILITIES

All measurement facilities used to collect the measurement data are located at **No.10-1 Mingkeda Logistics park, No.18, Huanguan South Rd., Guan Lan Town, Baoan District, Shenzhen, China**

The sites are constructed in conformance with the requirements of ANSI C63.10, ANSI C63.7 and CISPR Publication 22. All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

## 6.2. ACCREDITATIONS

Our laboratories are accredited and approved by the following accreditation body according to ISO/IEC 17025.

| | |
|---|---|
| **USA** | **A2LA** |
| **China** | **CNAS** |

The measuring facility of laboratories has been authorized or registered by the following approval agencies.

| | |
|---|---|
| **USA** | **FCC** |
| **Japan** | **VCCI (C-4815,R-4320,T-2317, G-10624)** |
| **Canada** | **INDUSTRY CANADA** |

Copies of granted accreditation certificates are available for downloading from our web site, http://www.ccssz.com

## 6.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

| Parameter | Uncertainty |
|---|---|
| Radiated Emission, 30 to 200 MHz<br>Test Site : 966(2) | +/-3.6880dB |
| Radiated Emission, 200 to 1000 MHz<br>Test Site : 966(2) | +/-3.6695dB |
| Radiated Emission, 1 to 8 GHz | +/-5.1782dB |
| Radiated Emission, 8 to 18 GHz | +/-5.2173dB |
| Conducted Emissions | +/-3.6836dB |
| Band Width | 178kHz |
| Peak Output Power MU | +/-1.906dB |
| Band Edge MU | +/-0.182dB |
| Channel Separation MU | 416.178Hz |
| Duty Cycle MU | 0.054ms |
| Frequency Stability MU | 226Hz |

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.
The measured result is above (below) the specification limit by a margin less than the measurement uncertainty; it is therefore not possible to state compliance based on the 95% level of confidence. However, the result indicates that compliance (non-compliance) is more probable than non-compliance) with the specification limit.


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# 7 FCC PART 15.247 REQUIREMENTS

## 7.1. POWER LINE CONDUCTED EMISSIONS MEASUREMENT

### 7.1.1. LIMITS OF CONDUCTED EMISSIONS MEASUREMENT

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 |

**NOTE**:
(1) The lower limit shall apply at the transition frequencies.
(2) The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.
(3) All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

### 7.1.2. TEST INSTRUMENTS

| Conducted Emission Test Site | | | | | |
|---|---|---|---|---|---|
| Name of Equipment | Manufacturer | Model Number | Serial Number | Last Calibration | Due Calibration |
| EMI TEST RECEIVER | ROHDE&SCHWARZ | ESCI | 100783 | 02/21/2017 | 02/20/2018 |
| LISN(EUT) | ROHDE&SCHWARZ | ENV216 | 101543-WX | 02/21/2017 | 02/20/2018 |
| LISN | EMCO | 3825/2 | 8901-1459 | 02/21/2017 | 02/20/2018 |
| Temp. / Humidity Meter | VICTOR | HTC-1 | N/A | 02/21/2017 | 02/20/2018 |
| Test S/W | FARAD | EZ-EMC/ CCS-3A1-CE | | | |

**NOTE:** 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. N.C.R = No Calibration Request.


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### 7.1.3. TEST PROCEDURES (please refer to measurement standard)

- The EUT and Support equipment, if needed, was placed on a non-conducted table, which is 0.8m above the ground plane and 0.4m away from the conducted wall.
- The test equipment EUT installed received AC main power, through a Line Impedance Stabilization Network (LISN), which supplied power source and was grounded to the ground plane. All support equipment power received from a second LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- The EUT test program was started. Emissions were measured on each current carrying line of the EUT using an EMI Test Receiver connected to the LISN powering the EUT.
- The frequency range from 150 kHz to 30 MHz was searched. The test data of the worst-case condition(s) was recorded. Emission levels under limit 20dB were not recorded.


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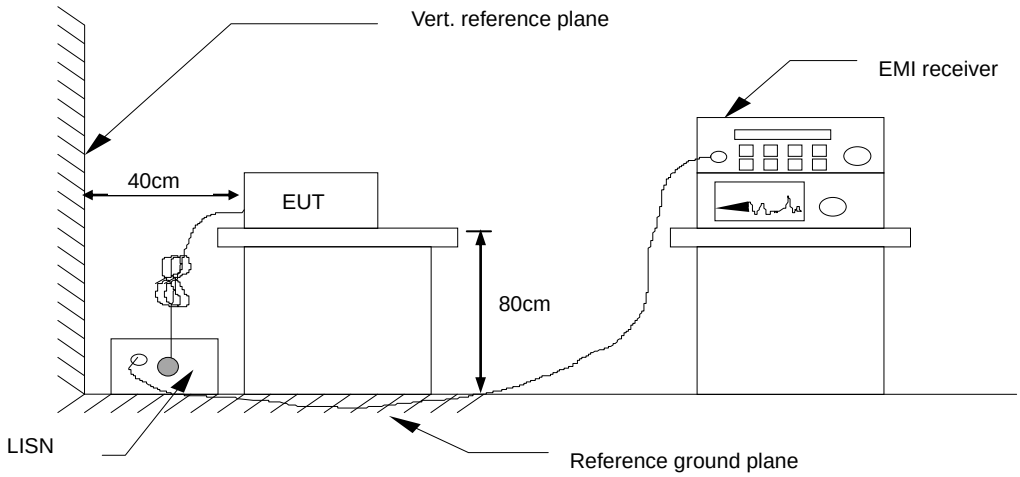
### 7.1.4. TEST SETUP




For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

### 7.1.5. DATA SAMPLE

| Frequency (MHz) | QuasiPeak Reading (dBuV) | Average Reading (dBuV) | Correction Factor (dB) | QuasiPeak Result (dBuV) | Average Result (dBuV) | QuasiPeak Limit (dBuV) | Average Limit (dBuV) | QuasiPeak Margin (dB) | Average Margin (dB) | Remark (Pass/Fail) |
|---|---|---|---|---|---|---|---|---|---|---|
| XXX.XXXX | 32.69 | 25.65 | 11.52 | 44.21 | 37.17 | 65.78 | 55.79 | -21.57 | -18.62 | Pass |

Factor = Insertion loss of LISN + Cable Loss
Result = Quasi-peak Reading/ Average Reading + Factor
Limit = Limit stated in standard
Margin = Result (dBuV) – Limit (dBuV)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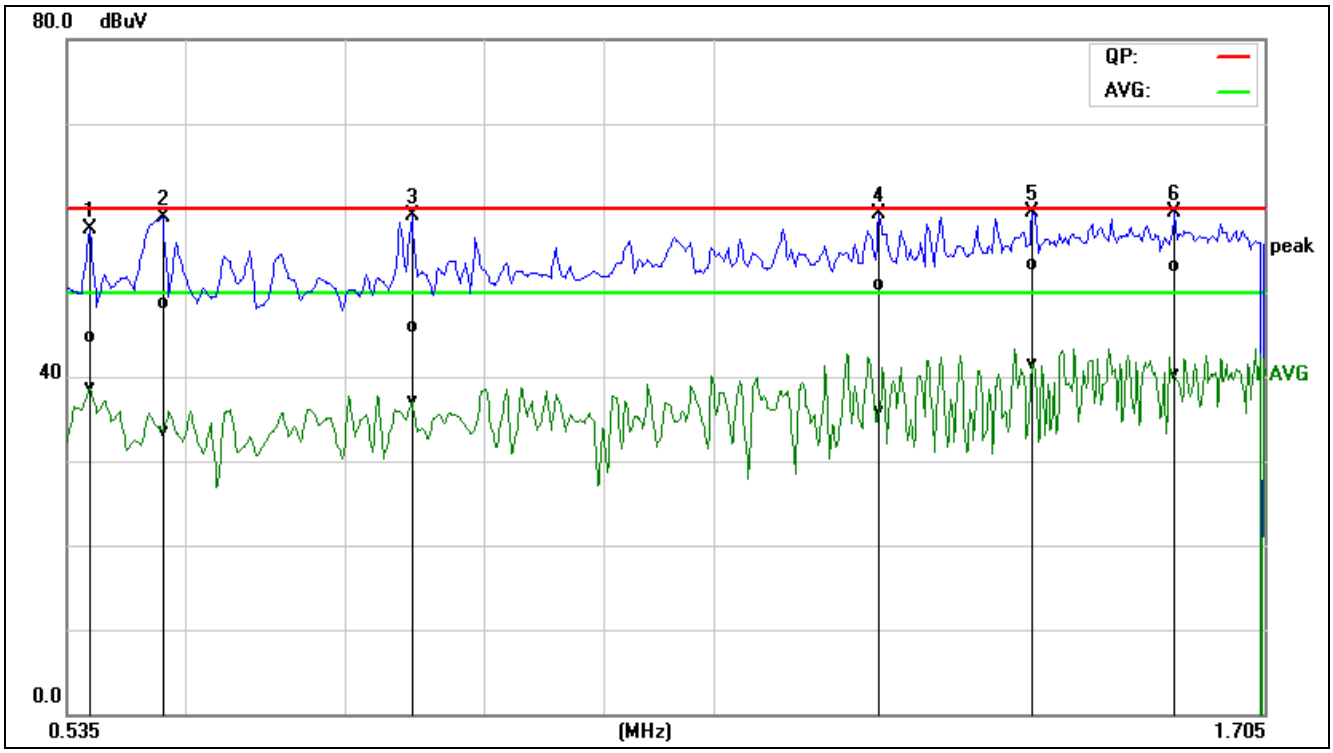
### 7.1.6. TEST RESULTS

| | | | |
|---|---|---|---|
| **Model No.** | AELEL204U2 | **RBW,VBW** | 9 kHz |
| **Environmental Conditions** | 22°C, 45% RH | **Test Mode** | Mode 1 |
| **Tested by** | Saber Huang | **Line** | L1 |
| **Test Date** | June 16, 2017 | **Test Voltage** | AC120V/60Hz |




| Frequency (MHz) | QuasiPeak Reading (dBuV) | Average Reading (dBuV) | Correction Factor (dB) | QuasiPeak Result (dBuV) | Average Result (dBuV) | QuasiPeak Limit (dBuV) | Average Limit (dBuV) | QuasiPeak Margin (dB) | Average Margin (dB) | Remark (Pass/Fail) | **Line (L1/L2)** |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.5470 | 25.15 | 19.17 | 19.55 | 44.70 | 38.72 | 60.00 | 50.00 | -15.30 | -11.28 | Pass | L1 |
| 0.5870 | 29.24 | 14.03 | 19.56 | 48.80 | 33.59 | 60.00 | 50.00 | -11.20 | -16.41 | Pass | L1 |
| 0.7470 | 26.30 | 17.58 | 19.60 | 45.90 | 37.18 | 60.00 | 50.00 | -14.10 | -12.82 | Pass | L1 |
| 1.1750 | 31.42 | 16.26 | 19.58 | 51.00 | 35.84 | 60.00 | 50.00 | -9.00 | -14.16 | Pass | L1 |
| 1.3630 | 33.68 | 21.92 | 19.62 | 53.30 | 41.54 | 60.00 | 50.00 | -6.70 | -8.46 | Pass | L1 |
| 1.5630 | 33.55 | 20.70 | 19.65 | 53.20 | 40.35 | 60.00 | 50.00 | -6.80 | -9.65 | Pass | L1 |

***REMARKS:*** *L1 = Line One (Live Line)*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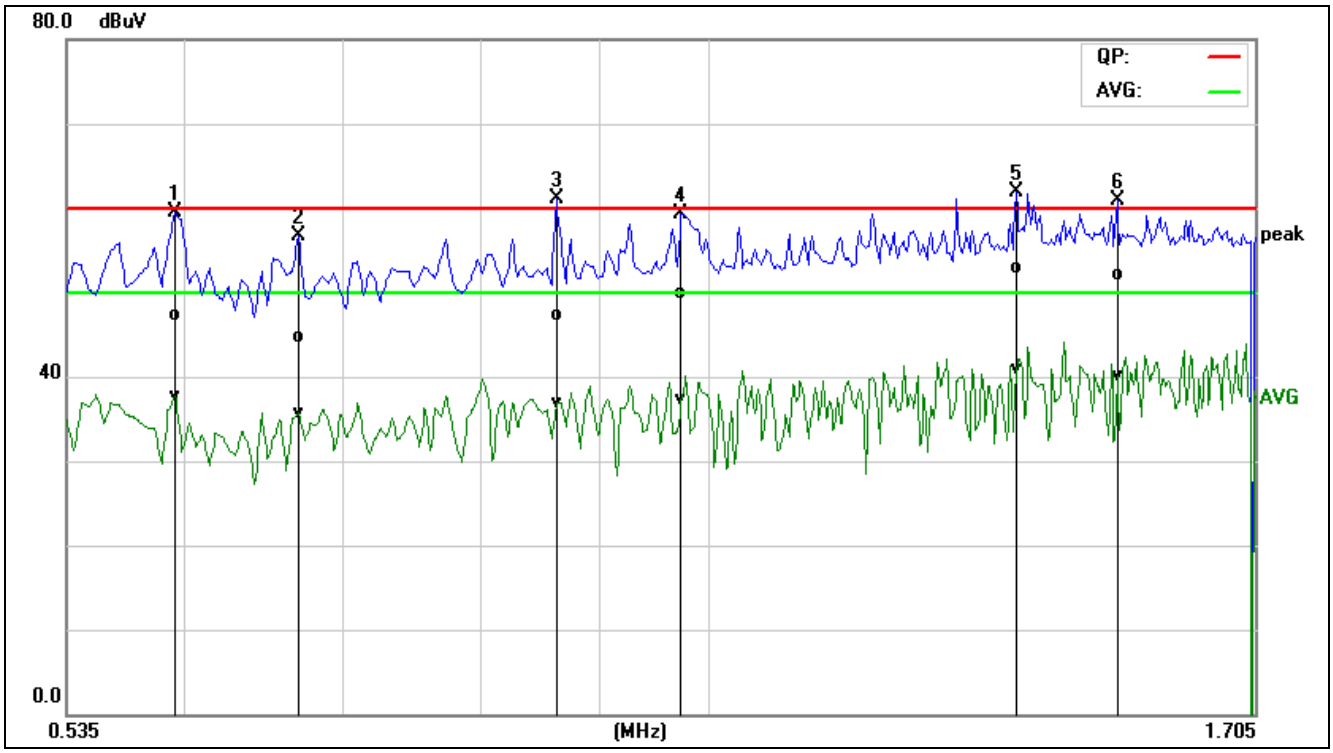
| | | | |
|---|---|---|---|
| **Model No.** | AELEL204U2 | **RBW,VBW** | 9 kHz |
| **Environmental Conditions** | 22°C, 45% RH | **Test Mode** | Mode 1 |
| **Tested by** | Saber Huang | **Line** | L2 |
| **Test Date** | June 16, 2017 | **Test Voltage** | AC120V/60Hz |




| Frequency (MHz) | QuasiPeak Reading (dBuV) | Average Reading (dBuV) | Correction Factor (dB) | QuasiPeak Result (dBuV) | Average Result (dBuV) | QuasiPeak Limit (dBuV) | Average Limit (dBuV) | QuasiPeak Margin (dB) | Average Margin (dB) | Remark (Pass/Fail) | **Line (L1/L2)** |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.5950 | 27.73 | 18.22 | 19.57 | 47.30 | 37.79 | 60.00 | 50.00 | -12.70 | -12.21 | Pass | L2 |
| 0.6710 | 25.10 | 16.07 | 19.60 | 44.70 | 35.67 | 60.00 | 50.00 | -15.30 | -14.33 | Pass | L2 |
| 0.8630 | 27.72 | 17.40 | 19.58 | 47.30 | 36.98 | 60.00 | 50.00 | -12.70 | -13.02 | Pass | L2 |
| 0.9750 | 30.45 | 17.73 | 19.55 | 50.00 | 37.28 | 60.00 | 50.00 | -10.00 | -12.72 | Pass | L2 |
| 1.3510 | 33.29 | 21.22 | 19.61 | 52.90 | 40.83 | 60.00 | 50.00 | -7.10 | -9.17 | Pass | L2 |
| 1.4910 | 32.57 | 20.39 | 19.63 | 52.20 | 40.02 | 60.00 | 50.00 | -7.80 | -9.98 | Pass | L2 |

***REMARKS:*** *L2 = Line Two (Neutral Line)*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## 7.2. SPURIOUS EMISSIONS MEASUREMENT

### 7.2.1. CONDUCTED EMISSIONS MEASUREMENT

#### 7.2.1.1. LIMITS OF CONDUCTED EMISSIONS MEASUREMENT

§15.247(d) specifies that in any 100 kHz bandwidth outside of the authorized frequency band, the power shall be attenuated according to the following conditions:
If the peak output power procedure is used to measure the fundamental emission power to demonstrate compliance to 15.247(b)(3)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.
If the average output power procedure is used to measure the fundamental emission power to demonstrate compliance to 15.247(b) (3) requirements, then the power in any 100 kHz outside of the authorized frequency band shall be attenuated by at least 30 dB relative to the maximum measured in-band average PSD level.
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)).

#### 7.2.1.2. TEST INSTRUMENTS

| Name of Equipment | Manufacturer | Model | Serial Number | Last Calibration | Due Calibration |
|---|---|---|---|---|---|
| Spectrum Analyzer | Agilent | N9010A | MY55370330 | 02/21/2017 | 02/20/2018 |

#### 7.2.1.3. TEST PROCEDURE (please refer to measurement standard)

Conducted RF measurements of the transmitter output were made to confirm that the EUT antenna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation or measurements on the radiated emissions site.
The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.
Measurements are made over the 9 kHz to 26GHz range with the transmitter set to the lowest, middle, and highest channels. No emission found between lowest internal used/generated frequency to 10MHz, it is only recorded 10MHz to 26GHz.


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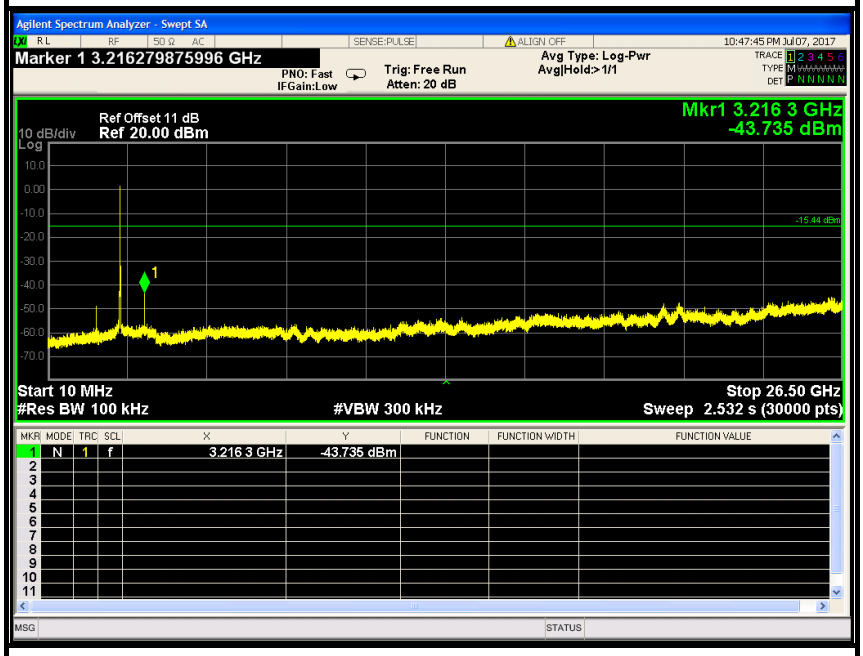
## 7.2.1.4. TEST RESULTS

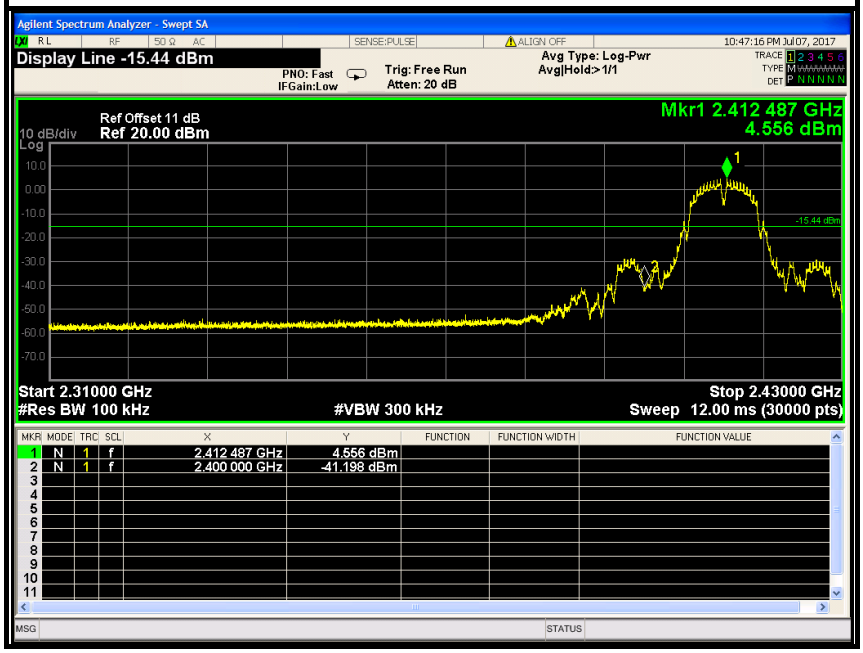
**Test Plot**

**IEEE 802.11b mode (Antenna 0)**

**CH Low (10MHz ~26.5GHz)**




**CH Low (2.31GHz ~2.43GHz)**





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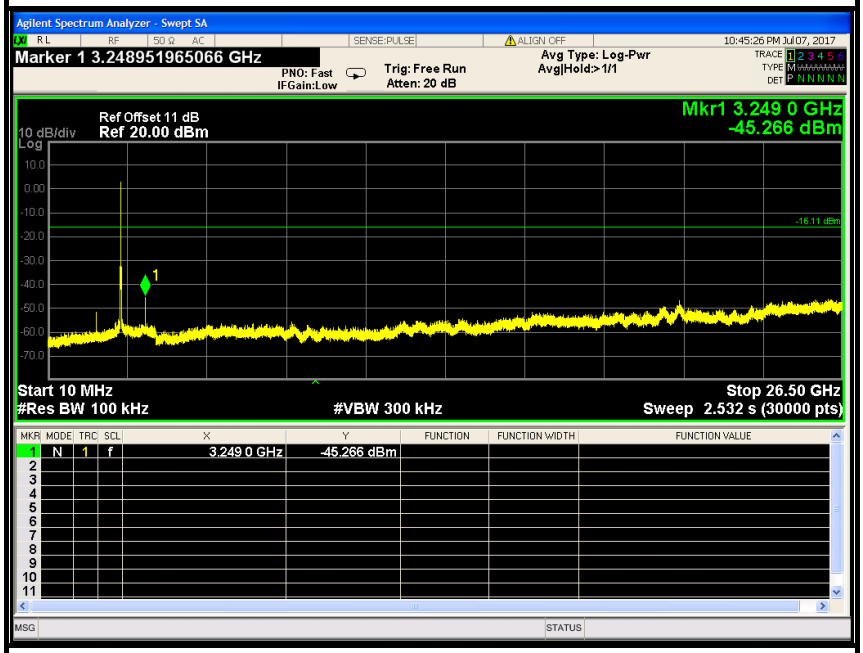
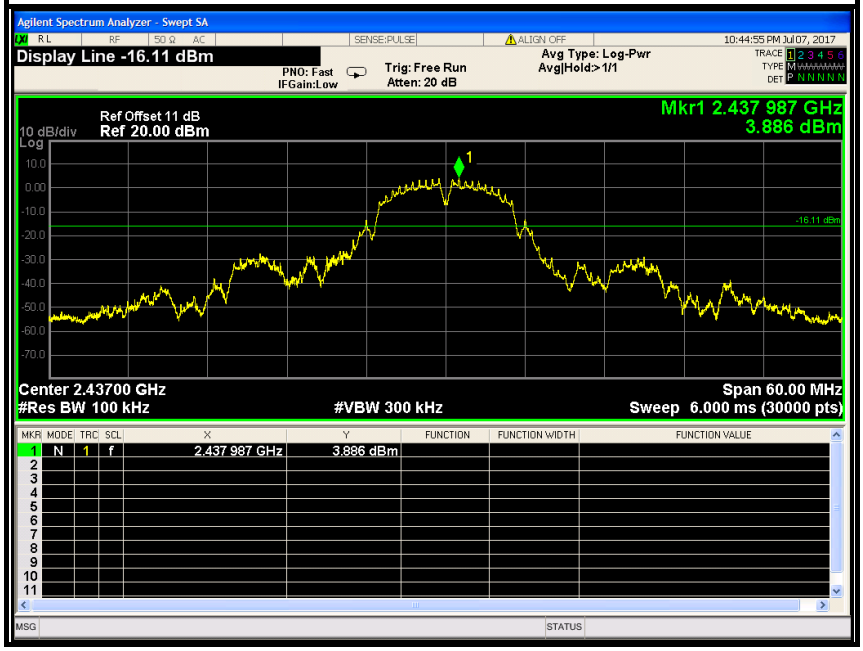
## CH Mid (10MHz ~26.5GHz)




## CH Mid





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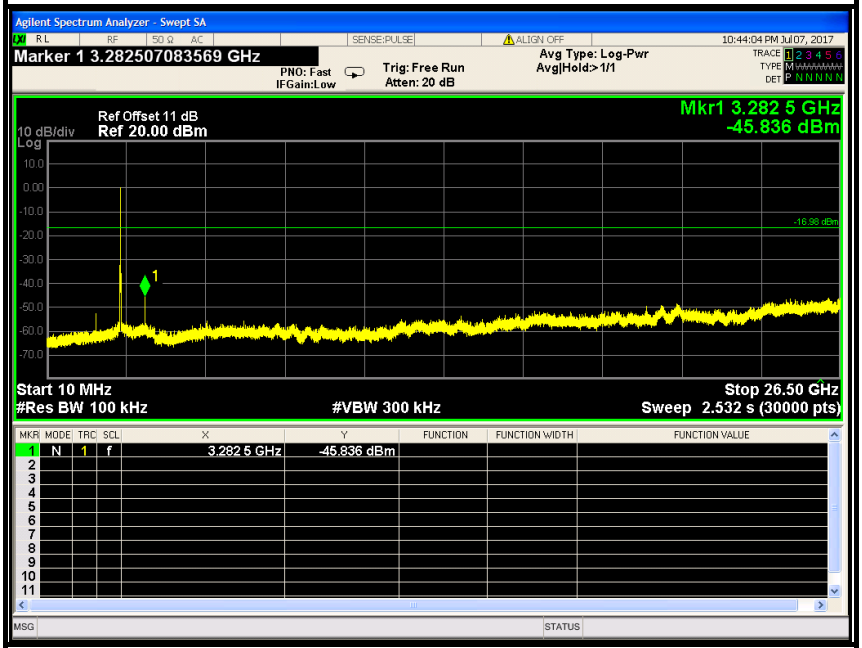
## CH High (10MHz ~26.5GHz)




## CH High (2.45GHz ~2.5GHz)

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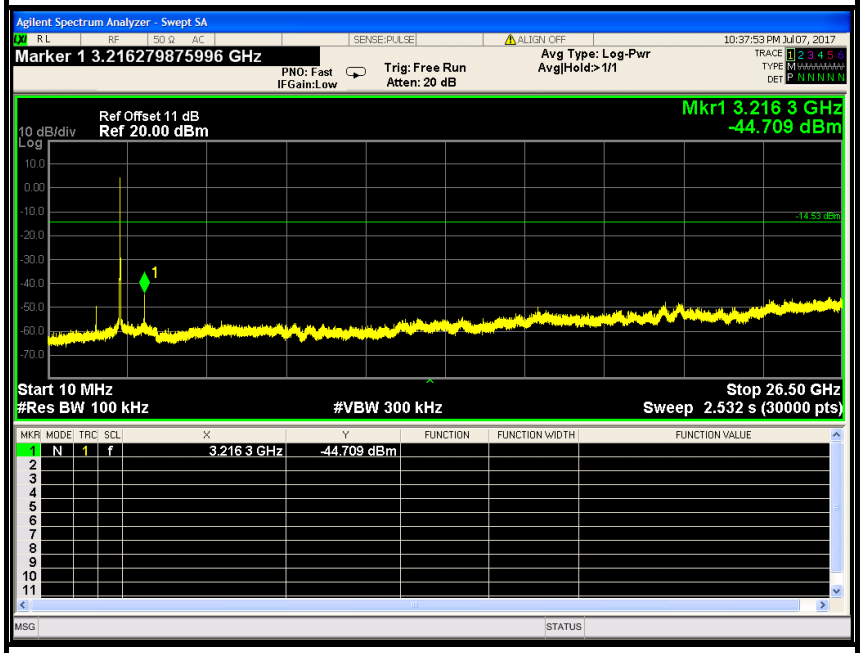
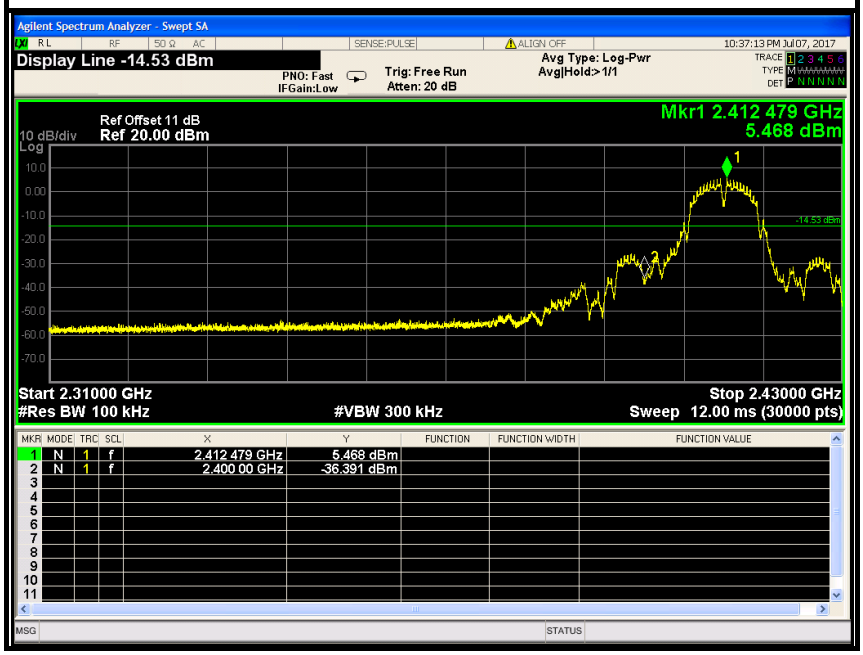
## IEEE 802.11b mode (Antenna 1)

### CH Low (10MHz ~26.5GHz)




### CH Low (2.31GHz ~2.43GHz)





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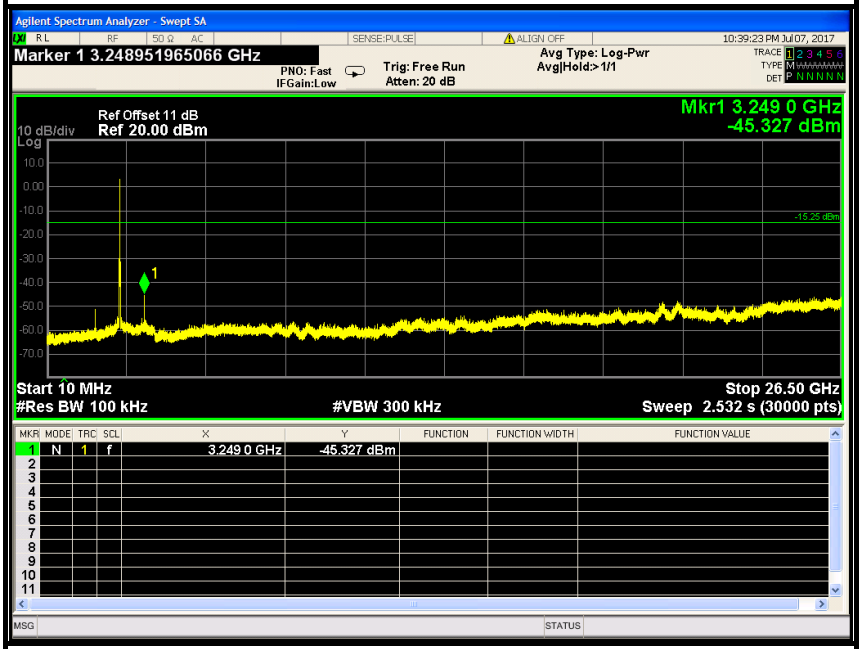
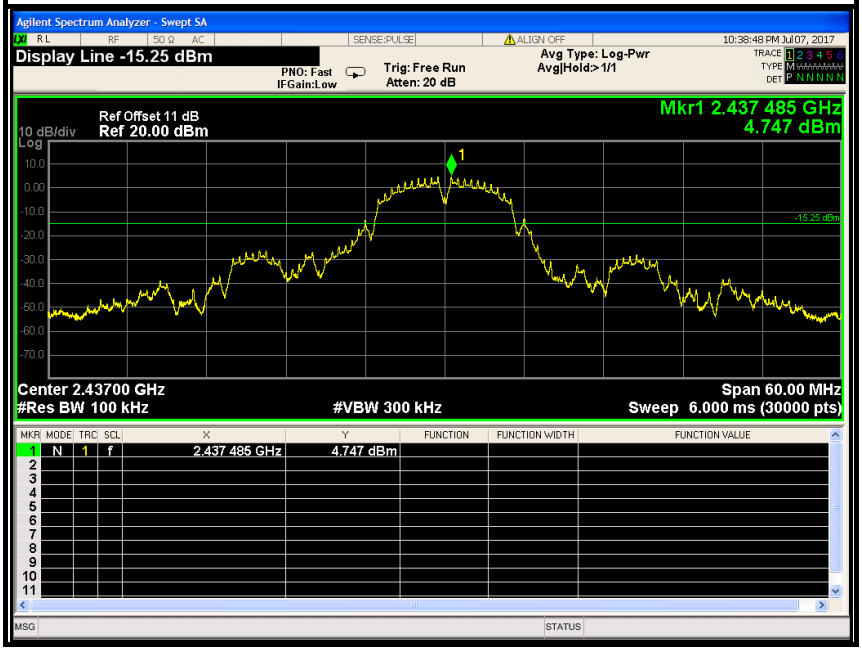
## CH Mid (10MHz ~26.5GHz)




## CH Mid





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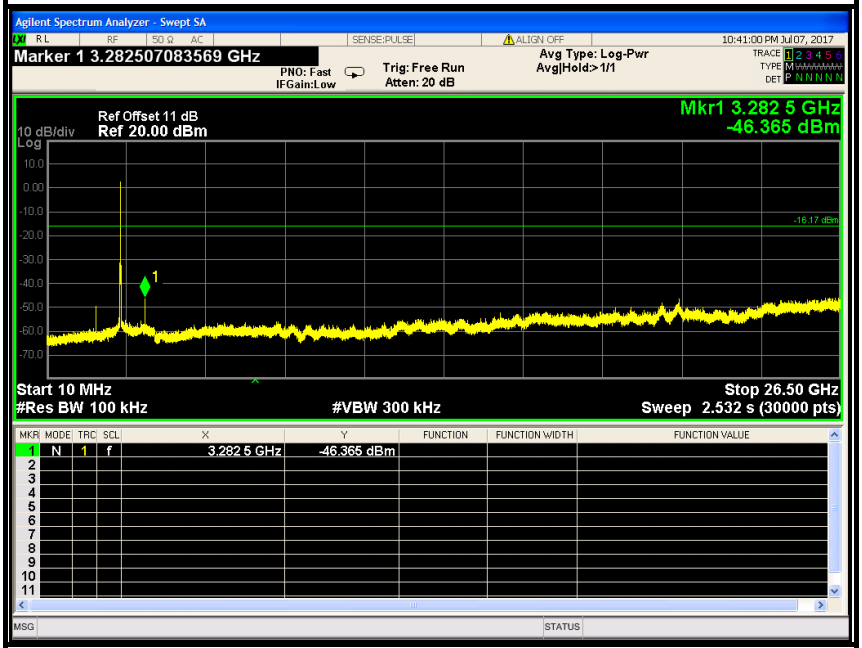
## CH High (10MHz ~26.5GHz)




## CH High (2.45GHz ~2.5GHz)

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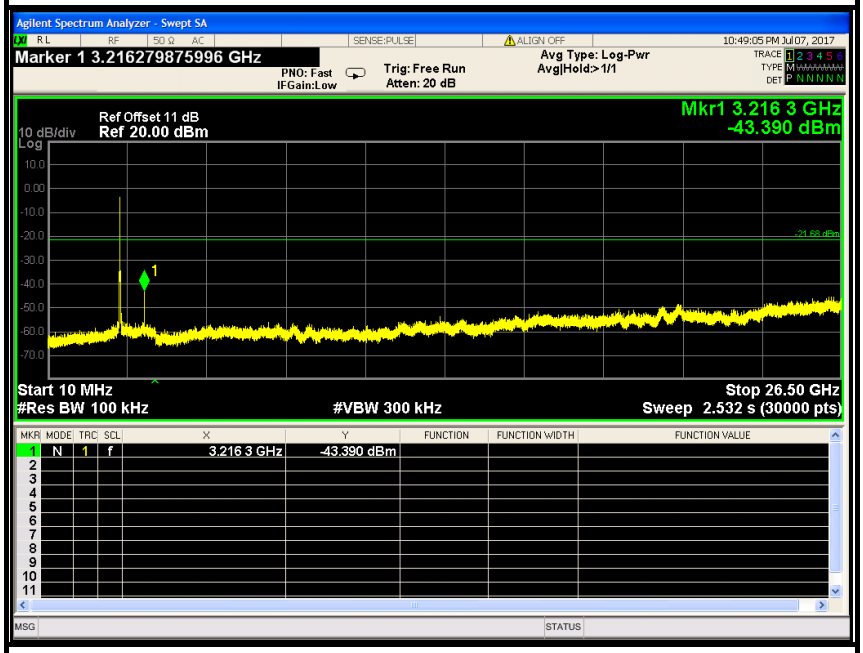
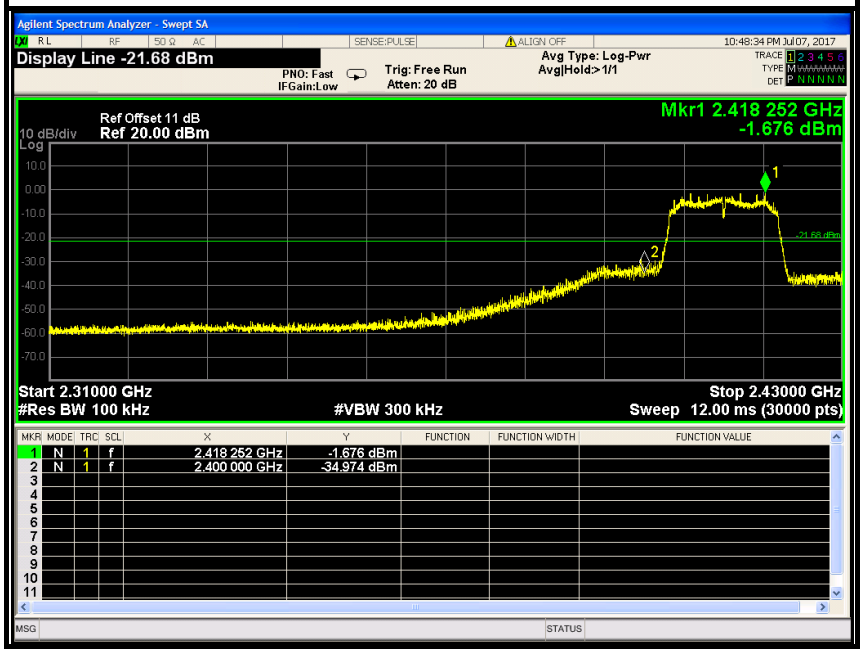
## IEEE 802.11g mode (Antenna 0)

### CH Low (10MHz ~26.5GHz)




### CH Low (2.31GHz ~2.43GHz)





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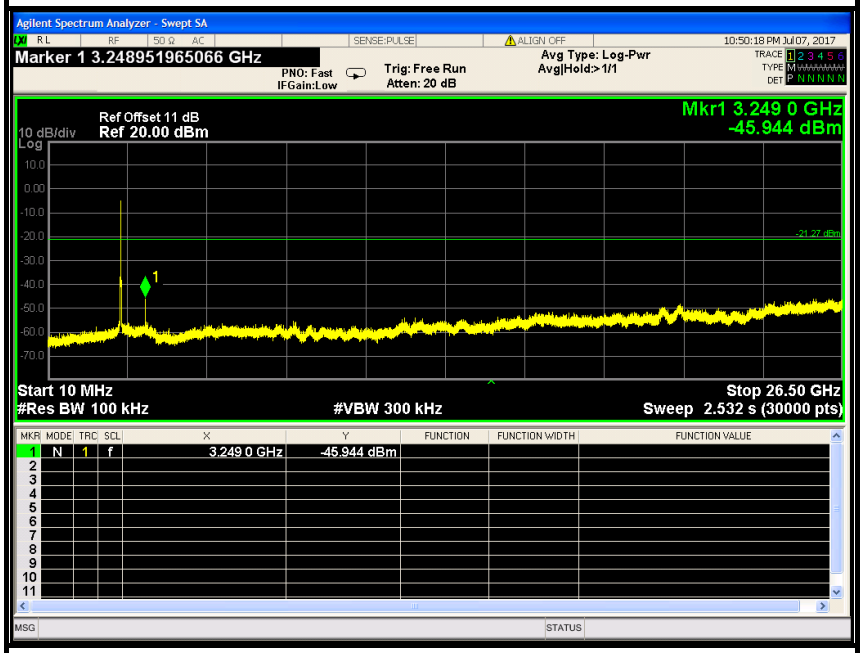
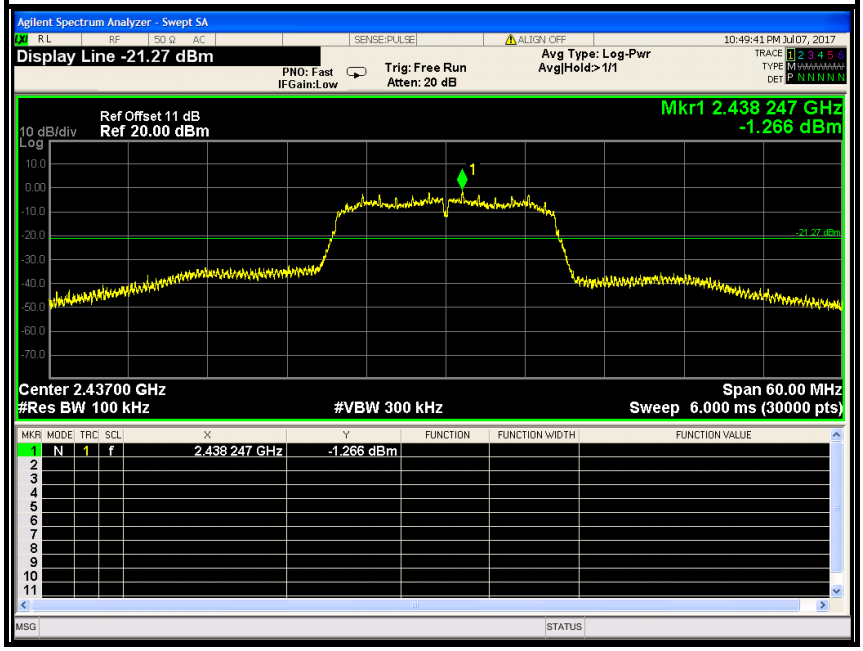
## CH Mid (10MHz ~26.5GHz)




## CH Mid





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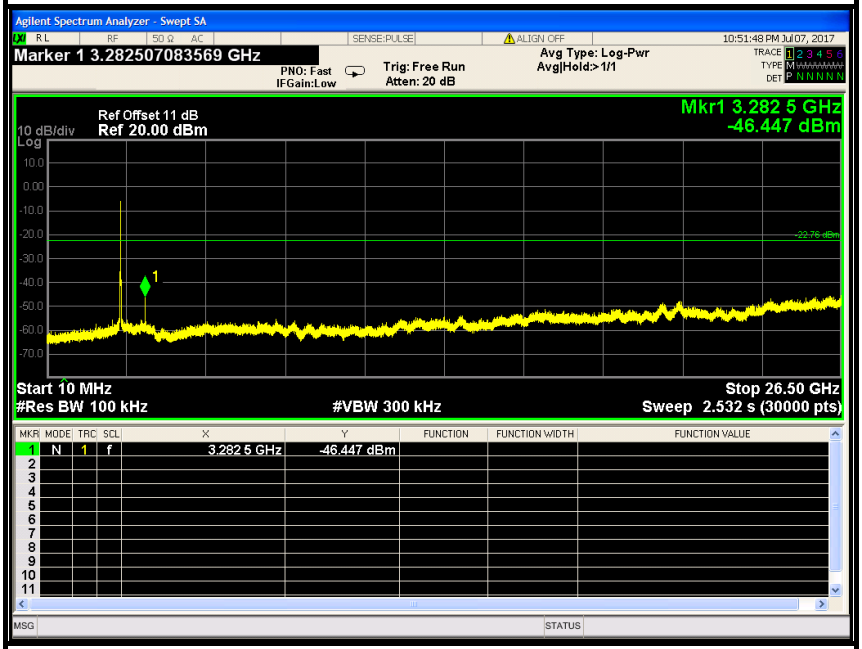
## CH High (10MHz ~26.5GHz)




## CH High (2.45GHz ~2.5GHz)

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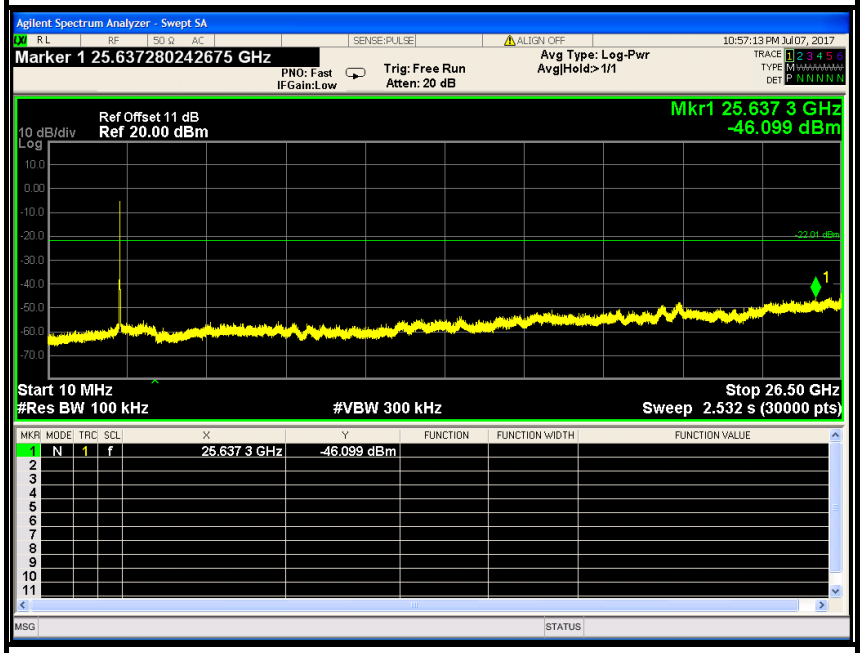
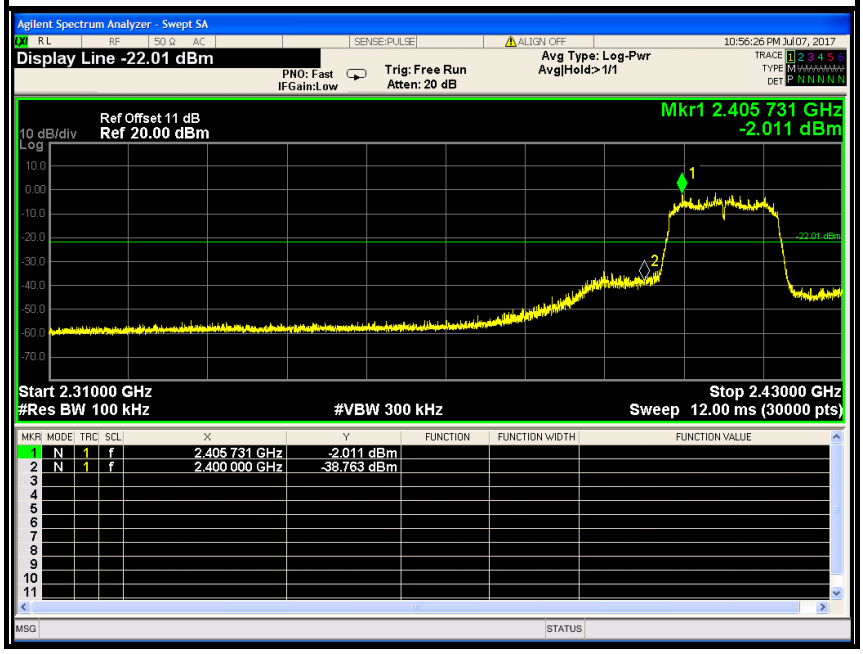
## IEEE 802.11g mode (Antenna 1)

### CH Low (10MHz ~26.5GHz)




### CH Low (2.31GHz ~2.43GHz)





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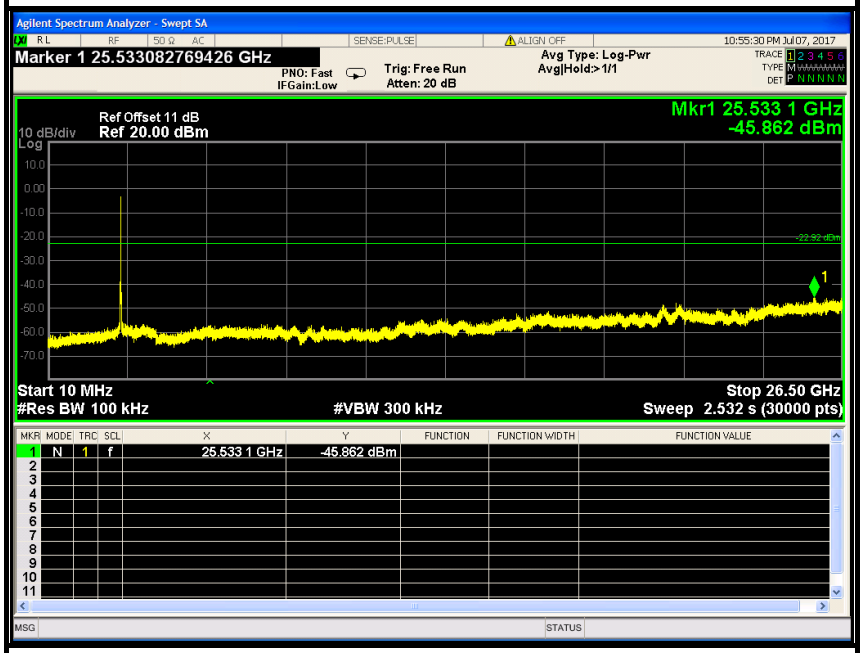
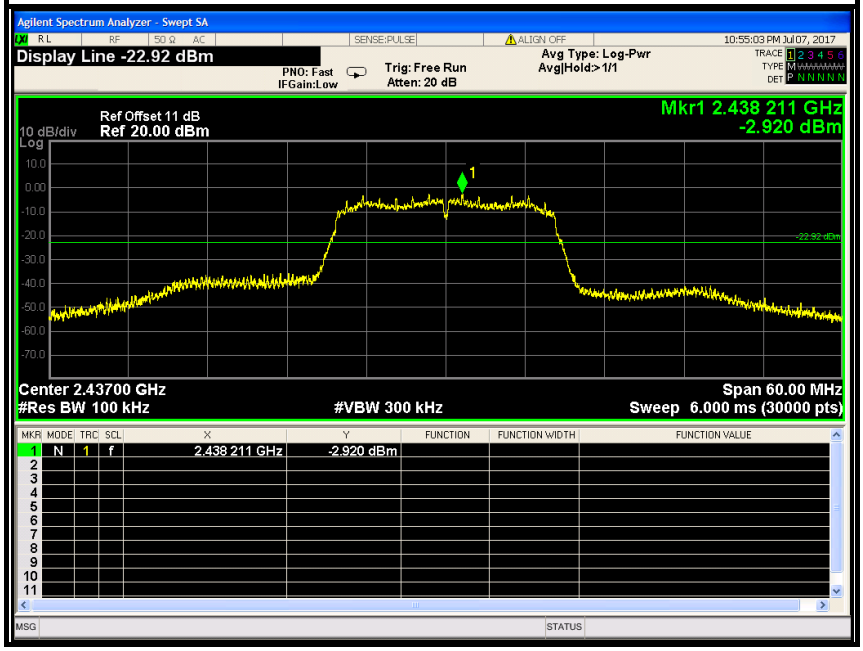
## CH Mid (10MHz ~26.5GHz)




## CH Mid





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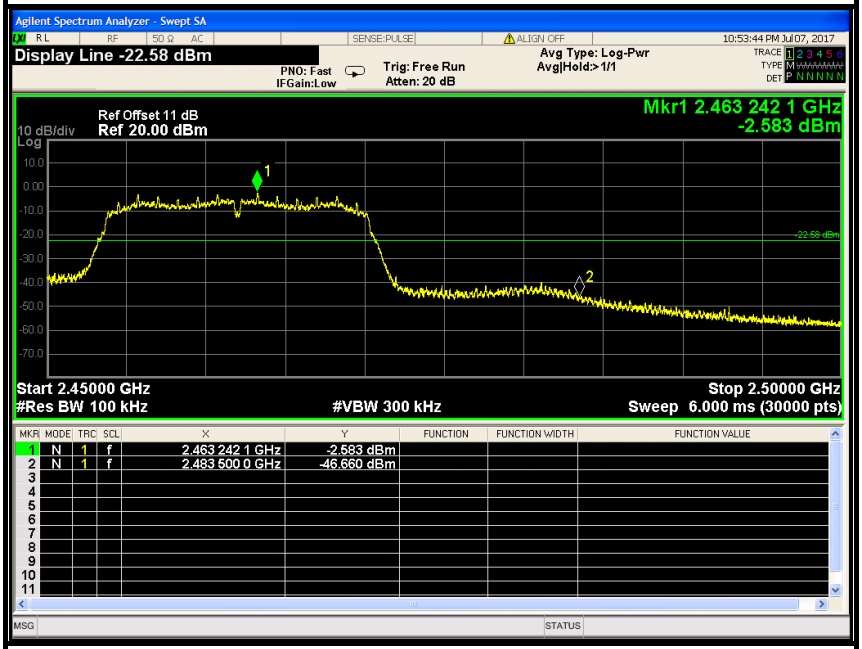
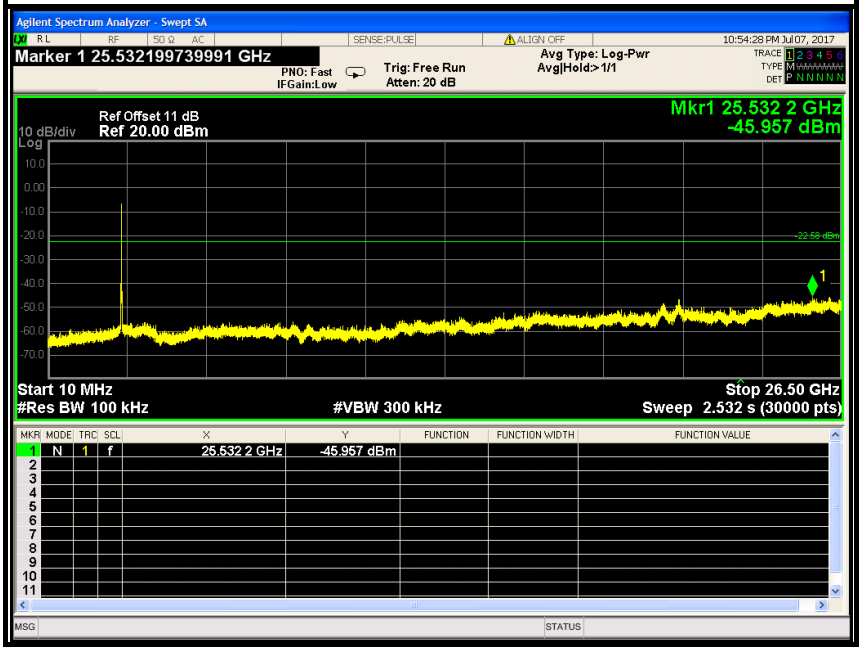
## CH High (10MHz ~26.5GHz)




## CH High (2.45GHz ~2.5GHz)





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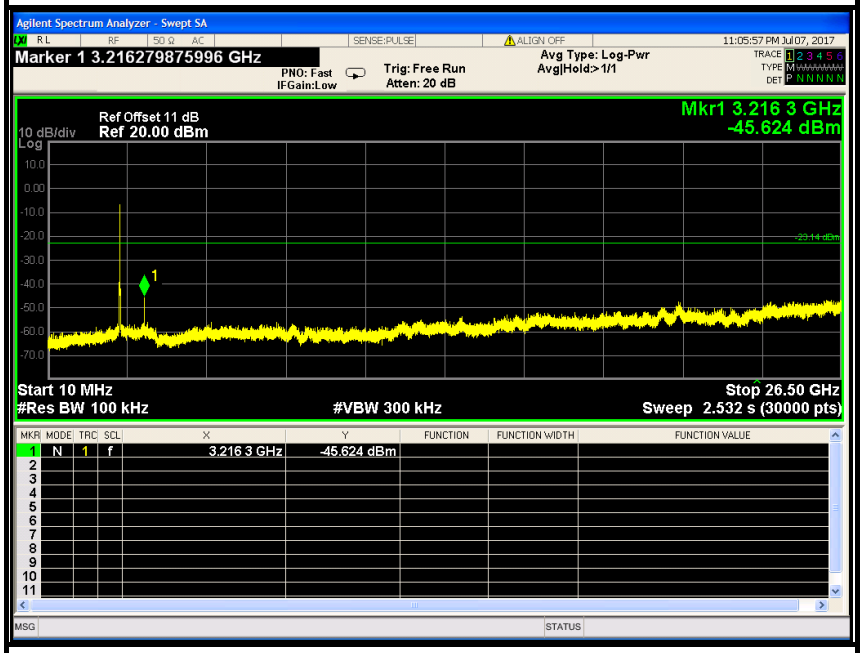
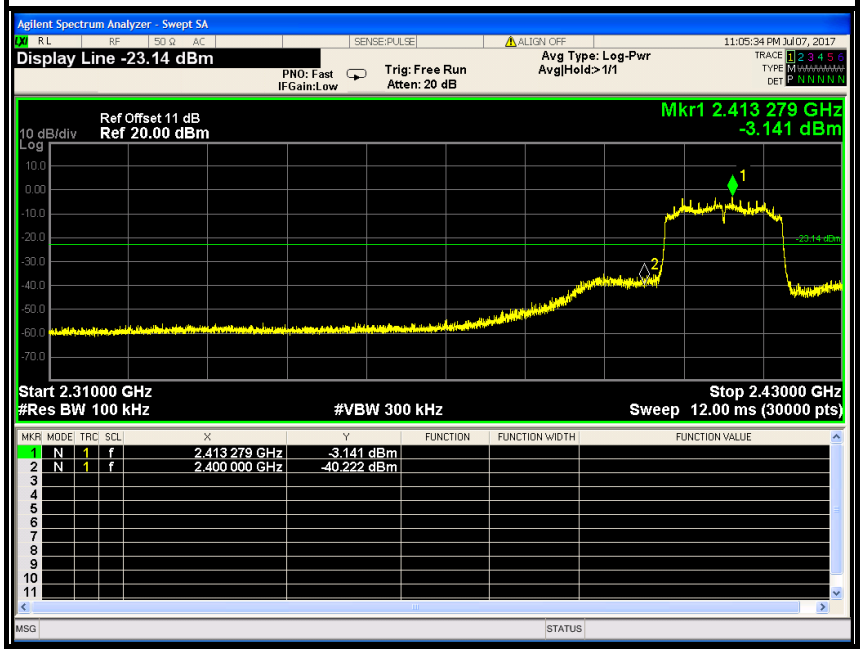
## IEEE 802.11n HT20 MHz mode (Antenna 0)

### CH Low (10MHz ~26.5GHz)




### CH Low (2.31GHz ~2.43GHz)





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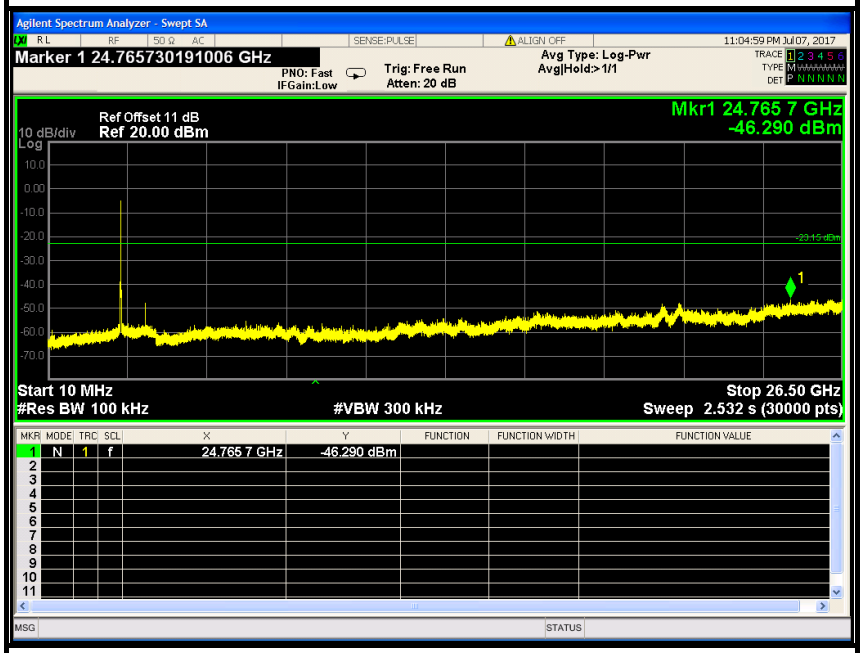
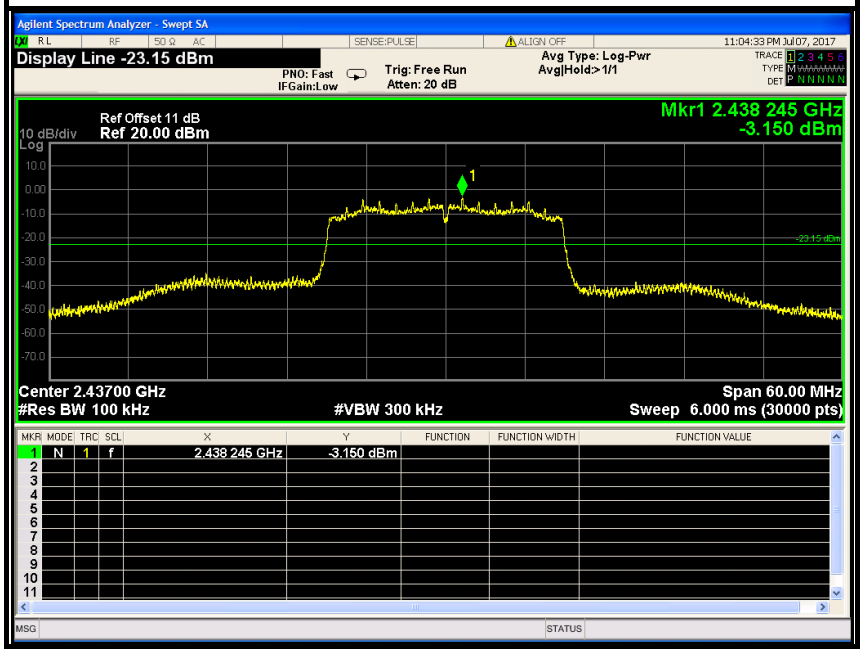
## CH Mid (10MHz ~26.5GHz)




## CH Mid





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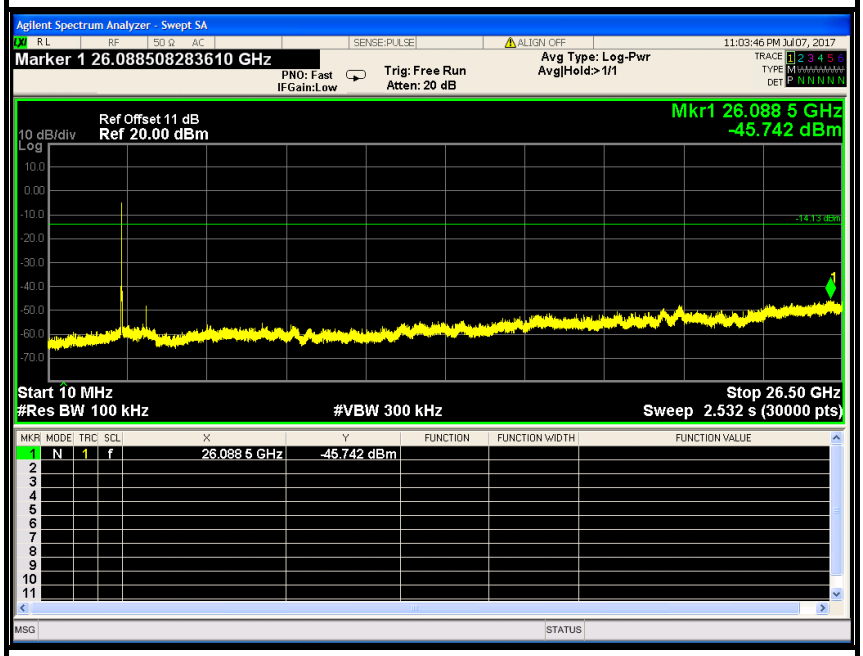
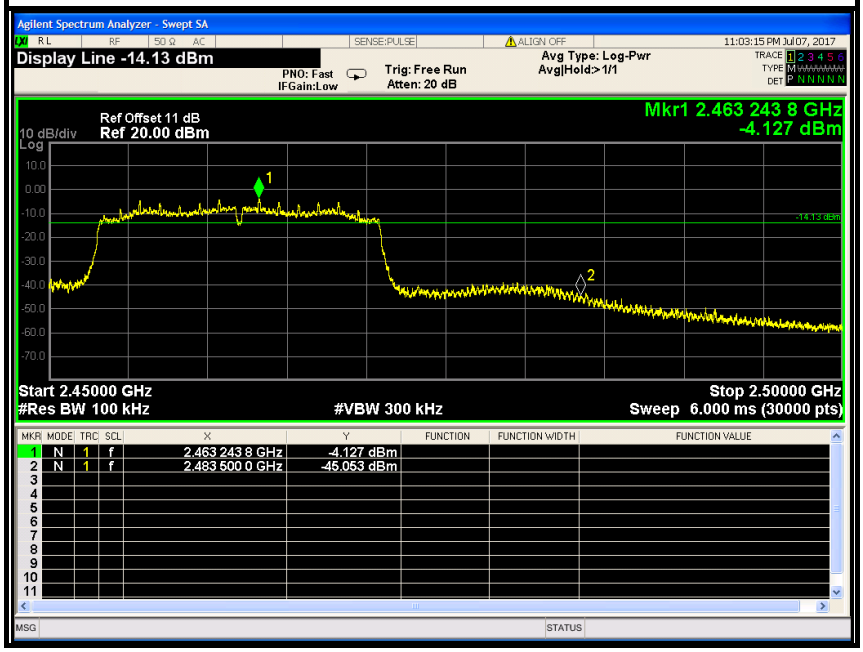
## CH High (10MHz ~26.5GHz)




## CH High (2.45GHz ~2.5GHz)





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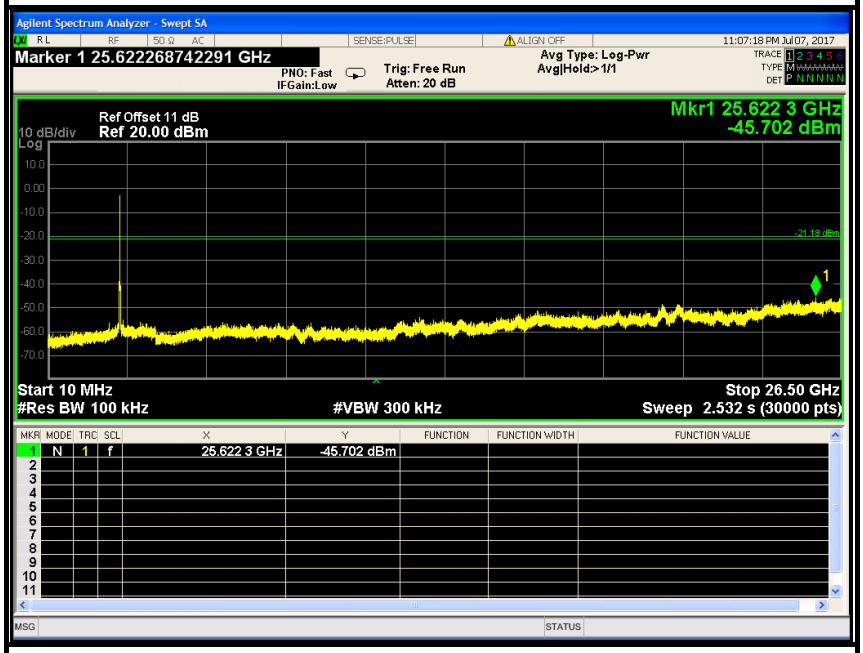
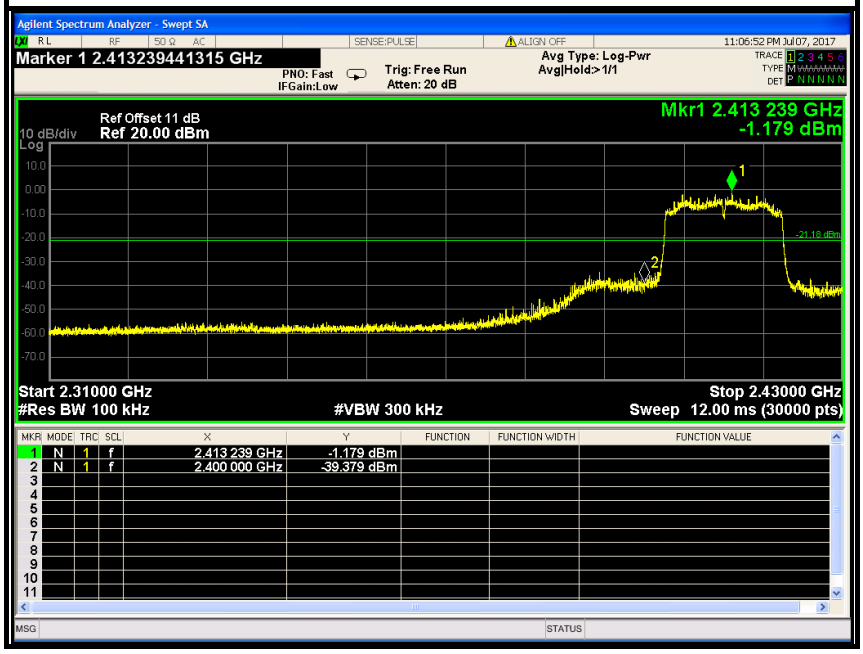
## IEEE 802.11n HT20 MHz mode (Antenna 1)

### CH Low (10MHz ~26.5GHz)




### CH Low (2.31GHz ~2.43GHz)





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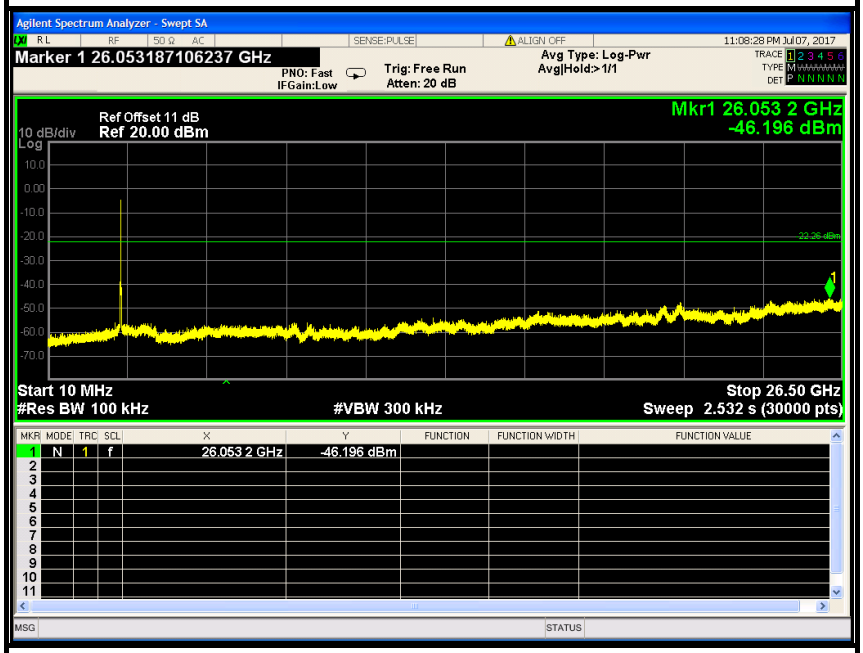
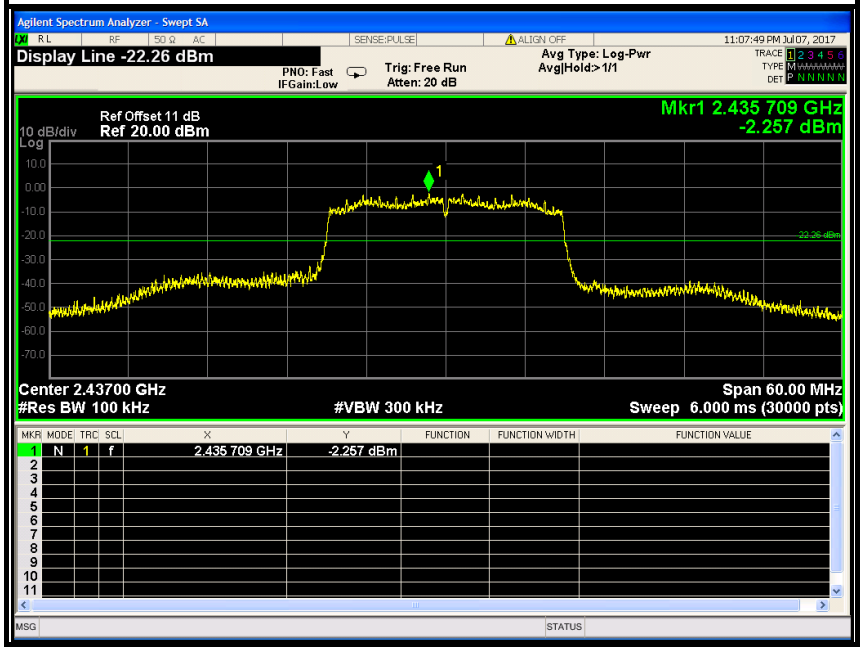
## CH Mid (10MHz ~26.5GHz)




## CH Mid





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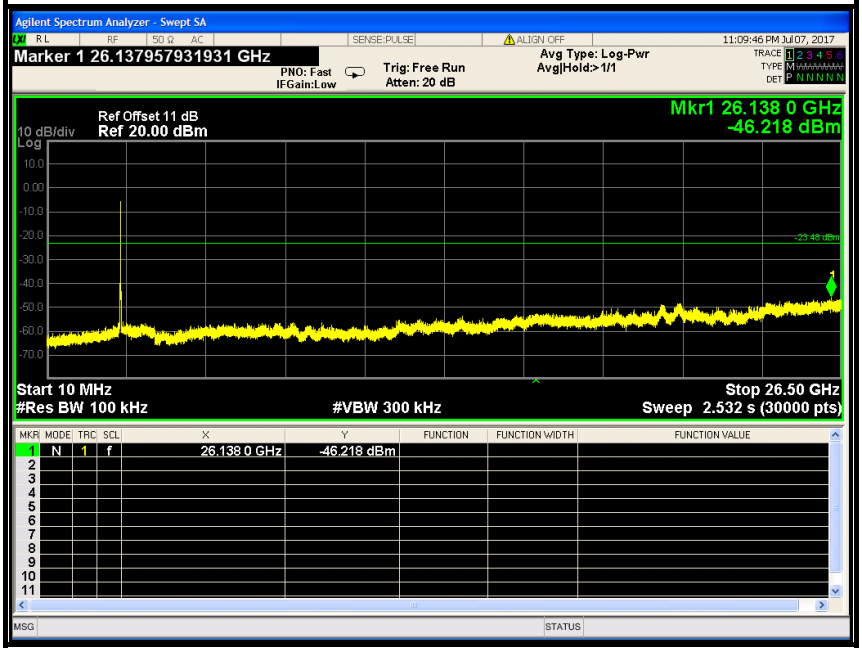
## CH High (10MHz ~26.5GHz)




## CH High (2.45GHz ~2.5GHz)

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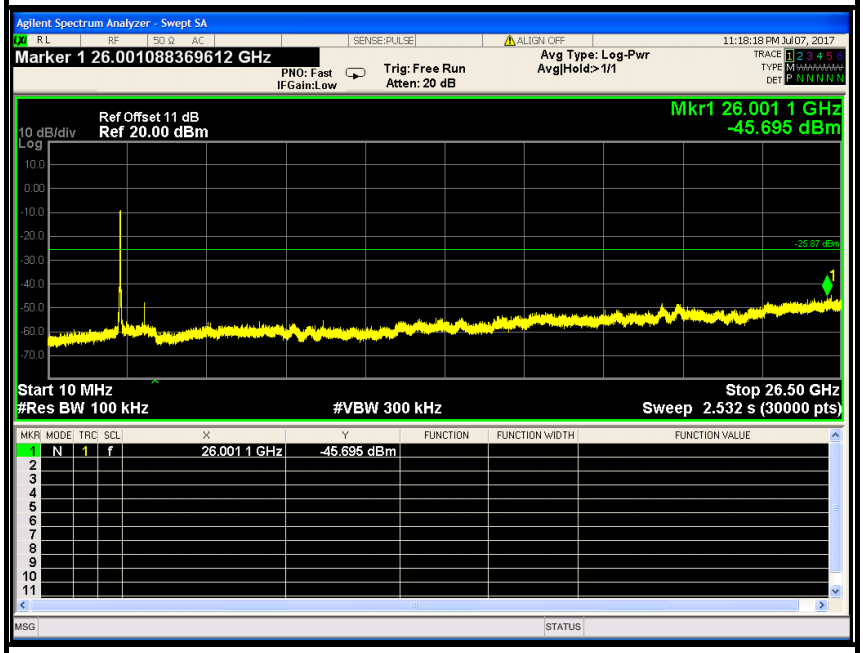
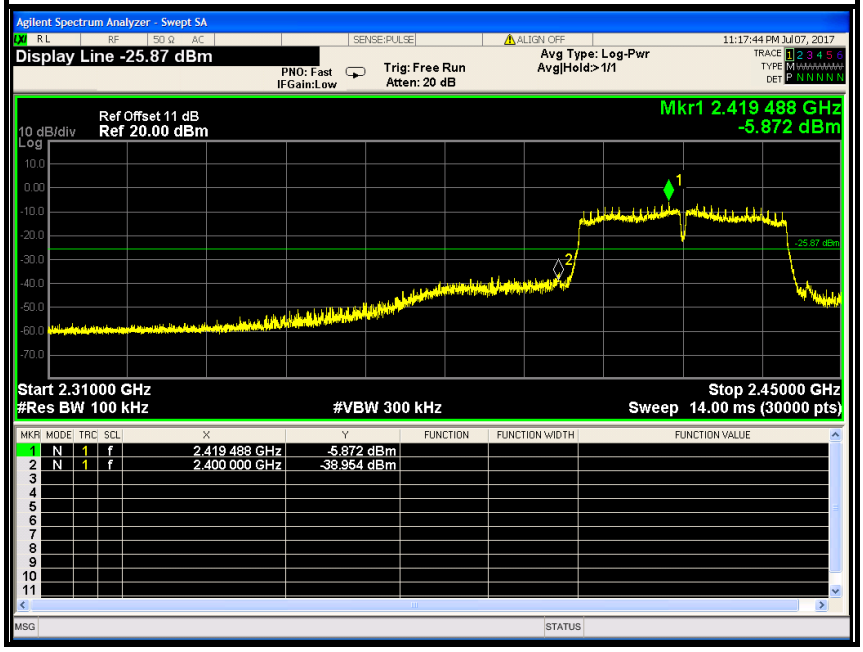
## IEEE 802.11n HT40 MHz mode (Antenna 0)

### CH Low (10MHz ~26.5GHz)




### CH Low (2.31GHz ~2.45GHz)





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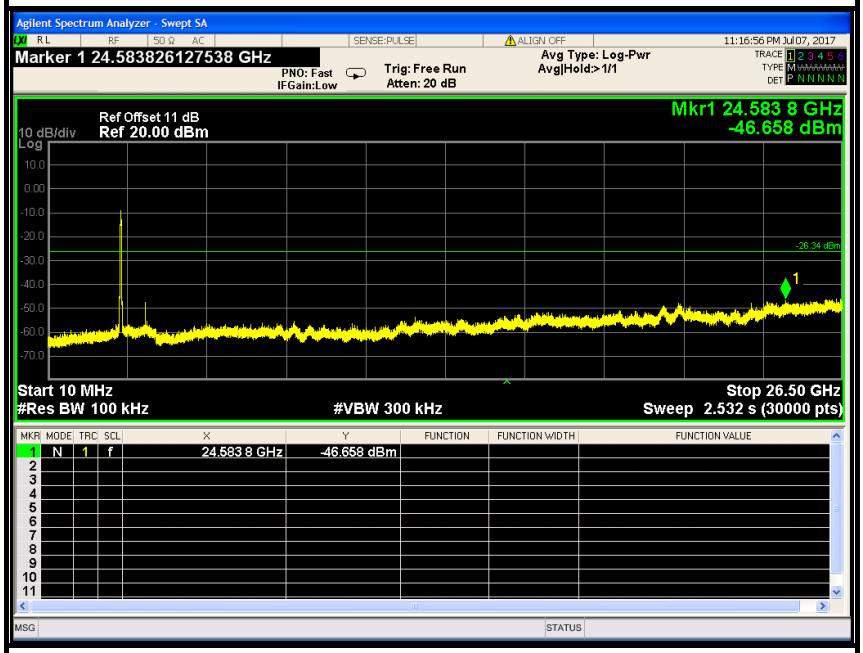
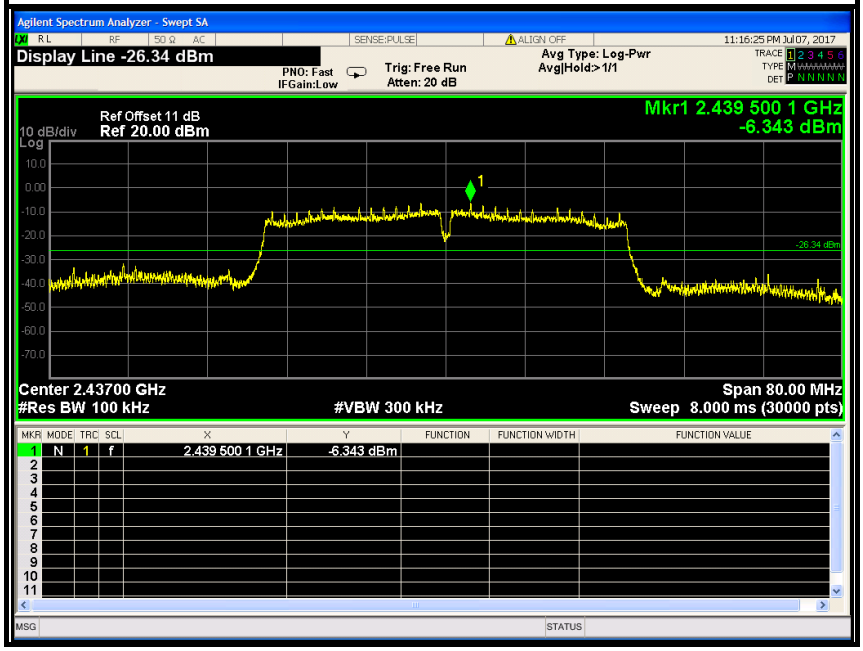
## CH Mid (10MHz ~26.5GHz)




## CH Mid





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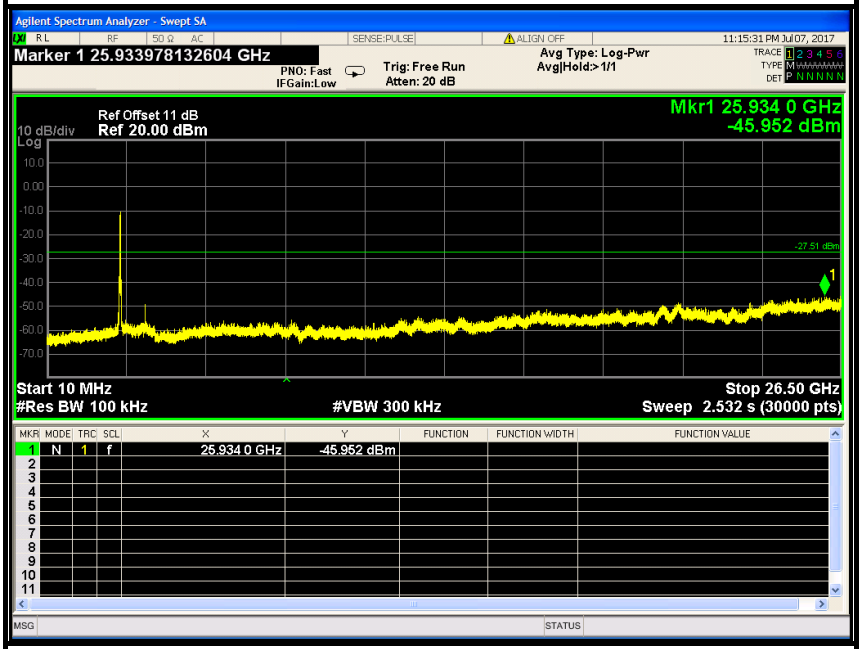
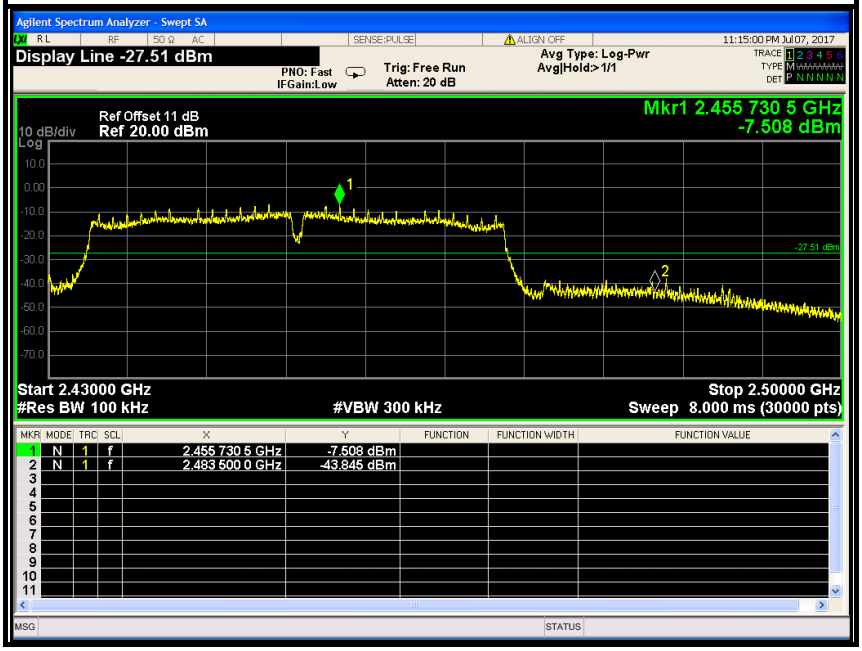
## CH High (10MHz ~26.5GHz)




## CH High (2.43GHz ~2.5GHz)





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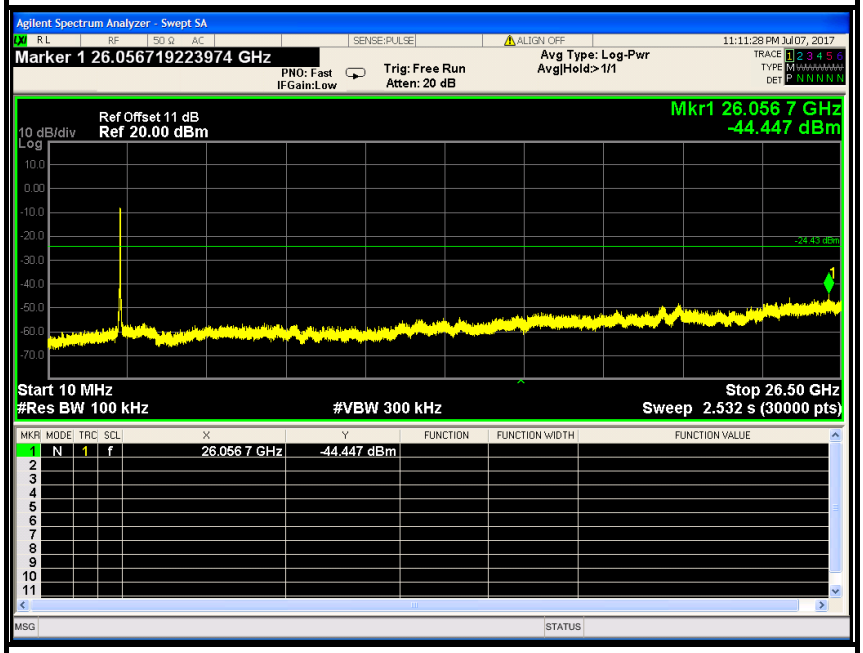
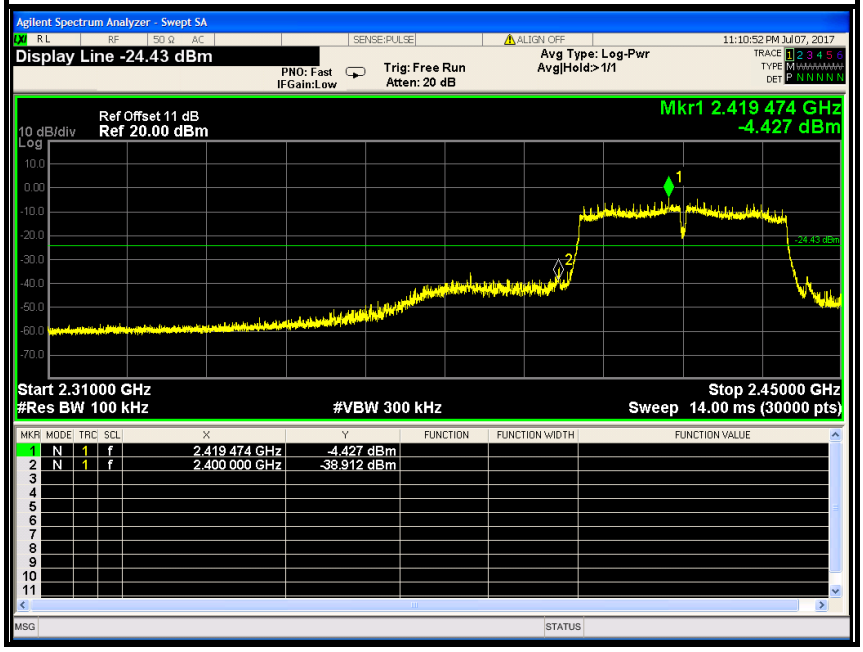
## IEEE 802.11n HT40 MHz mode (Antenna 1)

### CH Low (10MHz ~26.5GHz)




### CH Low (2.31GHz ~2.45GHz)





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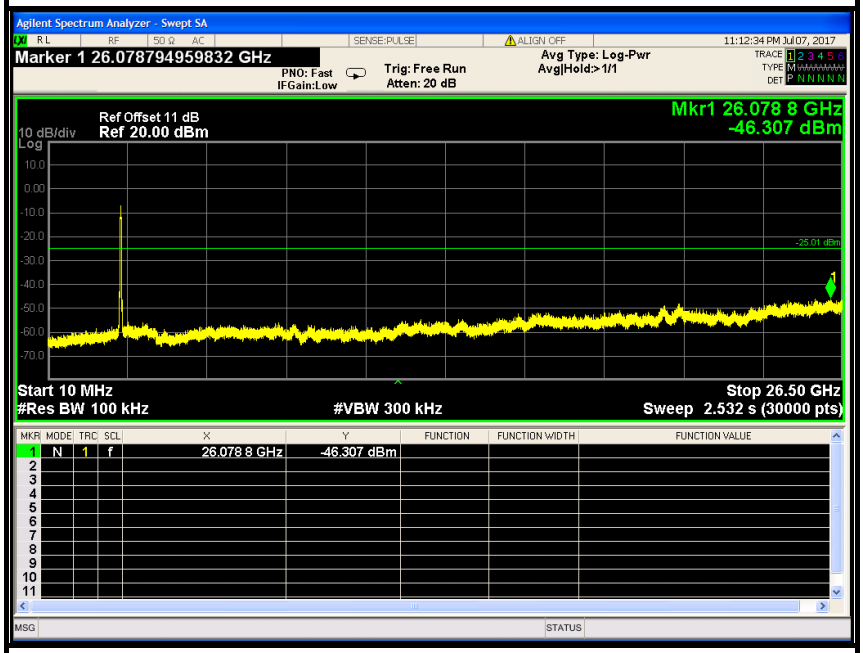
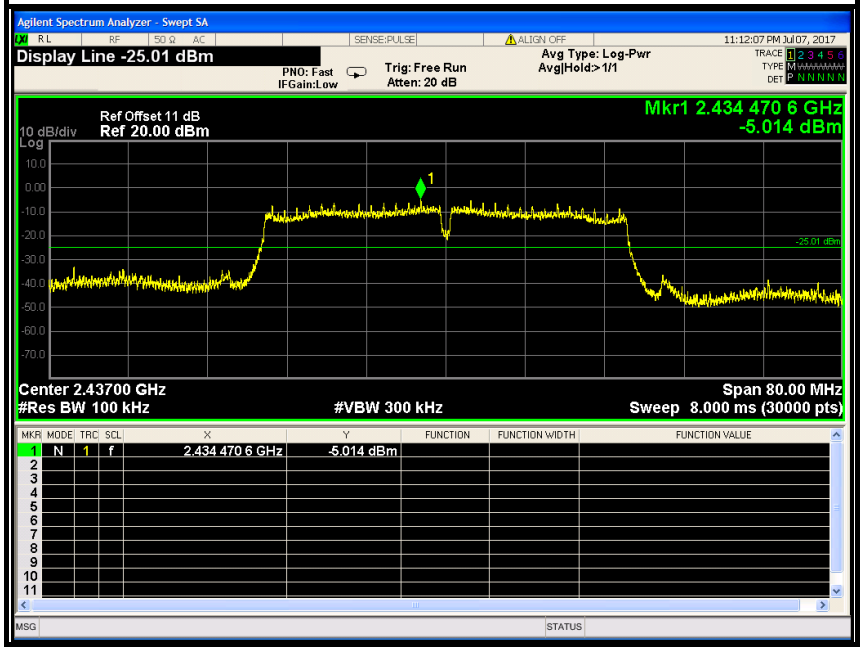
## CH Mid (10MHz ~26.5GHz)




## CH Mid





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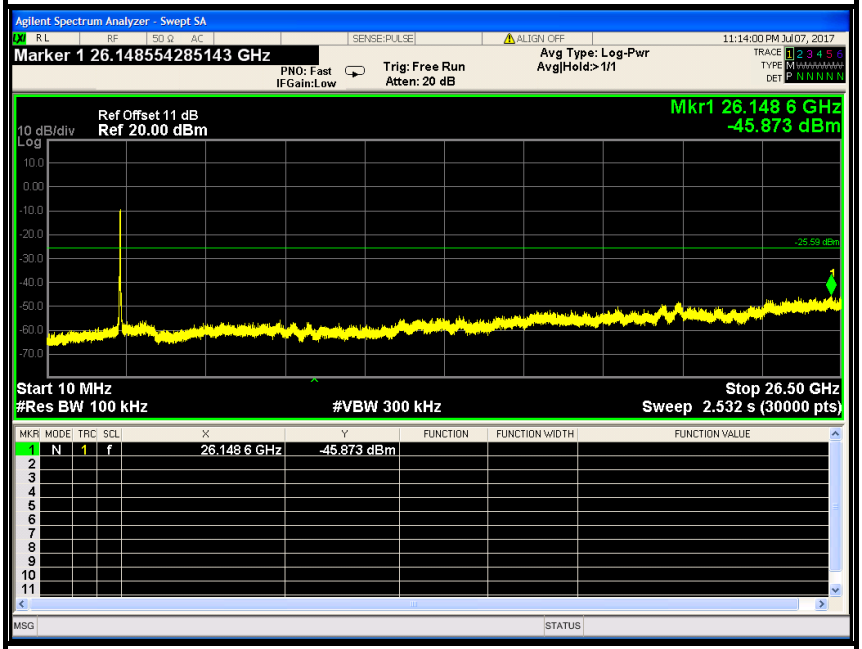
## CH High (10MHz ~26.5GHz)




## CH High (2.43GHz ~2.5GHz)

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### 7.2.2. RADIATED EMISSIONS MEASUREMENT

#### 7.2.2.1. LIMITS OF RADIATED EMISSIONS MEASUREMENT

**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 (mV/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.

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

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

**NOTE**: (1) The lower limit shall apply at the transition frequencies.
(2) Emission level (dBuV/m) = 20 log Emission level (uV/m).


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### 7.2.2.2. TEST INSTRUMENTS

| Radiated Emission Test Site 966（2） | | | | | |
|---|---|---|---|---|---|
| **Name of Equipment** | **Manufacturer** | **Model Number** | **Serial Number** | **Last Calibration** | **Due Calibration** |
| PSA Series Spectrum Analyzer | Agilent | N9010A | MY52221469 | 02/21/2017 | 02/20/2018 |
| EMI TEST RECEIVER | ROHDE&SCHWARZ | ESCI | 100783 | 02/21/2017 | 02/20/2018 |
| Amplifier | EMEC | EM330 | 060661 | 03/18/2017 | 03/17/2018 |
| High Noise Amplifier | Agilent | 8449B | 3008A01838 | 02/21/2017 | 02/20/2018 |
| Loop Antenna | COM-POWER | AL-130 | 121044 | 09/25/2016 | 09/24/2017 |
| Bilog Antenna | SCHAFFNER | CBL6143 | 5082 | 02/21/2017 | 02/20/2018 |
| Horn Antenna | SCHWARZBECK | BBHA9120 | D286 | 02/27/2018 | 02/27/2018 |
| Board-Band Horn Antenna | Schwarzbeck | BBHA 9170 | 9170-497 | 02/27/2018 | 02/27/2018 |
| Turn Table | N/A | N/A | N/A | N.C.R | N.C.R |
| Antenna Tower | SUNOL | TLT2 | N/A | N.C.R | N.C.R |
| Controller | Sunol Sciences | SC104V | 022310-1 | N.C.R | N.C.R |
| Controller | CT | N/A | N/A | N.C.R | N.C.R |
| Temp. / Humidity Meter | Anymetre | JR913 | N/A | 02/21/2017 | 02/20/2018 |
| Test S/W | FARAD | LZ-RF / CCS-SZ-3A2 | | | |

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

2. The FCC Site Registration number is 101879.

3. N.C.R = No Calibration Required.


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### 7.2.2.3. Measuring Instruments and Setting

The following table is the setting of spectrum analyzer and receiver.

| Spectrum Parameter | Setting |
|---|---|
| Attenuation | Auto |
| Start Frequency | 1000 MHz |
| Stop Frequency | 10th carrier harmonic |
| RB / VB (Emission in restricted band) | 1MHz / 1MHz for Peak, 1 MHz / 10Hz for Average |
| RB / VB (Emission in non-restricted band) | 1MHz / 1MHz for Peak, 1 MHz / 10Hz for Average |

| Receiver Parameter | Setting |
|---|---|
| Attenuation | Auto |
| Start ~ Stop Frequency | 9kHz~150kHz / RB 200Hz for QP/AVG |
| Start ~ Stop Frequency | 150kHz~30MHz / RB 9kHz for QP/AVG |
| Start ~ Stop Frequency | 30MHz~1000MHz / RB 100kHz for QP |

### 7.2.2.4. TEST PROCEDURE (please refer to measurement standard)

**1) Sequence of testing 9 kHz to 30 MHz**

**Setup:**

--- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.

--- If the EUT is a tabletop system, a rotatable table with 0.8 m height is used.

--- If the EUT is a floor standing device, it is placed on the ground.

--- Auxiliary equipment and cables were positioned to simulate normal operation conditions.

--- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.

--- The measurement distance is 3 meter.

--- The EUT was set into operation.

**Pre measurement:**

--- The turntable rotates from 0° to 315° using 45° steps.

--- The antenna height is 0.8 meter.

--- At each turntable position the analyzer sweeps with peak detection to find the maximum of all emissions


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**Final measurement:**

--- Identified emissions during the pre measurement the software maximizes by rotating the turntable position (0° to 360°) and by rotating the elevation axes (0° to 360°).

--- The final measurement will be done in the position (turntable and elevation) causing the highest emissions with QPK detector.

--- The final levels, frequency, measuring time, bandwidth, turntable position, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the pre measurement and the limit will be stored.

**2) Sequence of testing 30 MHz to 1 GHz**

**Setup:**

--- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.

--- If the EUT is a tabletop system, a table with 0.8 m height is used, which is placed on the ground plane.

--- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.

--- Auxiliary equipment and cables were positioned to simulate normal operation conditions

--- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.

--- The measurement distance is 3 meter.

--- The EUT was set into operation.

**Pre measurement:**

--- The turntable rotates from 0° to 315° using 45° steps.

--- The antenna is polarized vertical and horizontal.

--- The antenna height changes from 1 to 3 meter.

--- At each turntable position, antenna polarization and height the analyzer sweeps three times in peak to find the maximum of all emissions.


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**Final measurement:**

--- The final measurement will be performed with minimum the six highest peaks.

--- According to the maximum antenna and turntable positions of premeasurement the software maximize the peaks by changing turntable position (± 45°) and antenna movement between 1 and 4 meter.

--- The final measurement will be done with QP detector with an EMI receiver.

--- The final levels, frequency, measuring time, bandwidth, antenna height, antenna polarization, turntable angle, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement with marked maximum final measurements and the limit will be stored.

**3) Sequence of testing 1 GHz to 18 GHz**

**Setup:**

--- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.

--- If the EUT is a tabletop system, a rotatable table with 1.5 m height is used.

--- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.

--- Auxiliary equipment and cables were positioned to simulate normal operation conditions

--- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.

--- The measurement distance is 3 meter.

--- The EUT was set into operation.

**Pre measurement:**

--- The turntable rotates from 0° to 315° using 45° steps.

--- The antenna is polarized vertical and horizontal.

--- The antenna height scan range is 1 meter to 2.5 meter.

--- At each turntable position and antenna polarization the analyzer sweeps with peak detection to find the maximum of all emissions.


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**Final measurement:**

--- The final measurement will be performed with minimum the six highest peaks.

--- According to the maximum antenna and turntable positions of premeasurement the software maximize the peaks by changing turntable position (± 45°) and antenna movement between 1 and 4 meter. This procedure is repeated for both antenna polarizations.

--- The final measurement will be done in the position (turntable, EUT-table and antenna polarization) causing the highest emissions with Peak and Average detector.
--- The final levels, frequency, measuring time, bandwidth, turntable position, EUT-table position, antenna polarization, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the pre measurement with marked maximum final measurements and the limit will be stored.

**4) Sequence of testing above 18 GHz**
**Setup:**

--- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.

--- If the EUT is a tabletop system, a rotatable table with 1.5 m height is used.

--- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.

--- Auxiliary equipment and cables were positioned to simulate normal operation conditions

--- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.

--- The measurement distance is 1 meter.

--- The EUT was set into operation.

**Pre measurement:**

--- The antenna is moved spherical over the EUT in different polarisations of the antenna.

**Final measurement:**

--- The final measurement will be performed at the position and antenna orientation for all detected emissions that were found during the premeasurements with Peak and Average detector.
--- The final levels, frequency, measuring time, bandwidth, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement and the limit will be stored.


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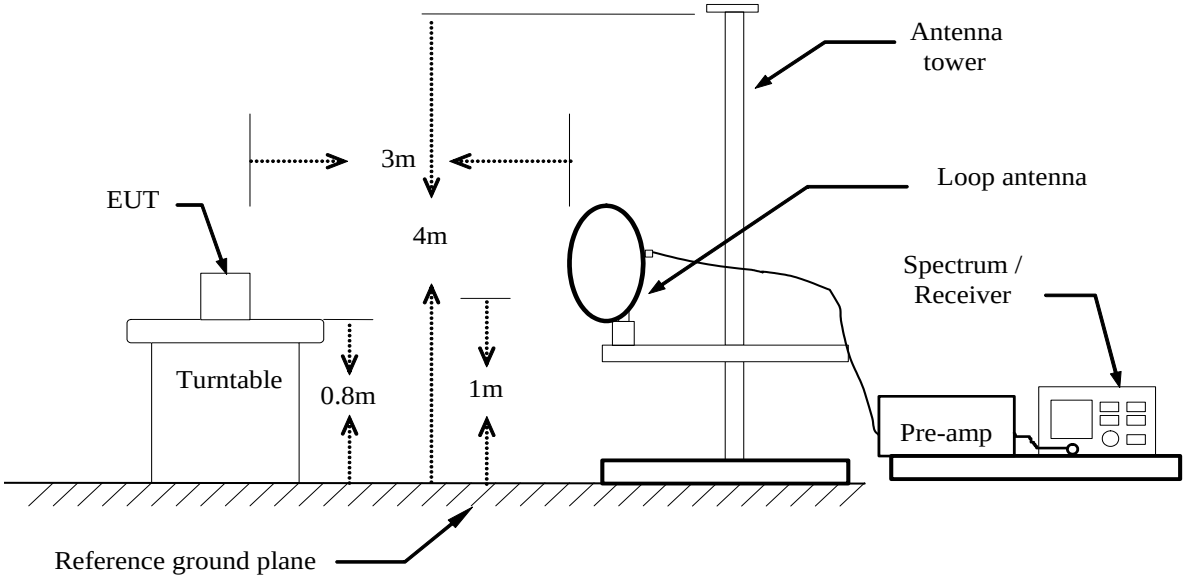
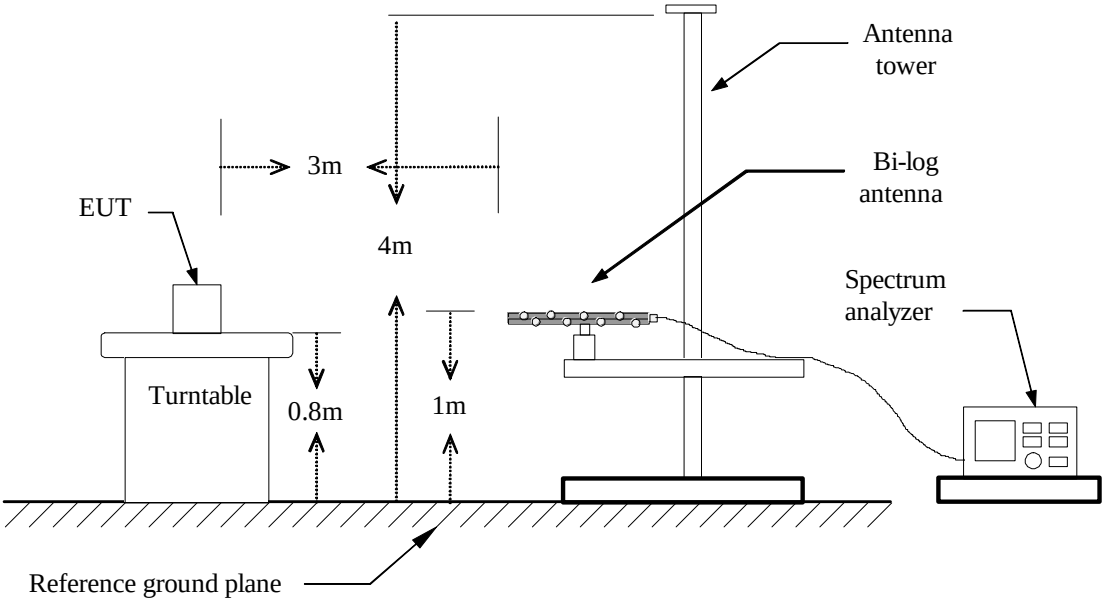
### 7.2.2.5. TEST SETUP

**Below 30MHz**




**Below 1 GHz**





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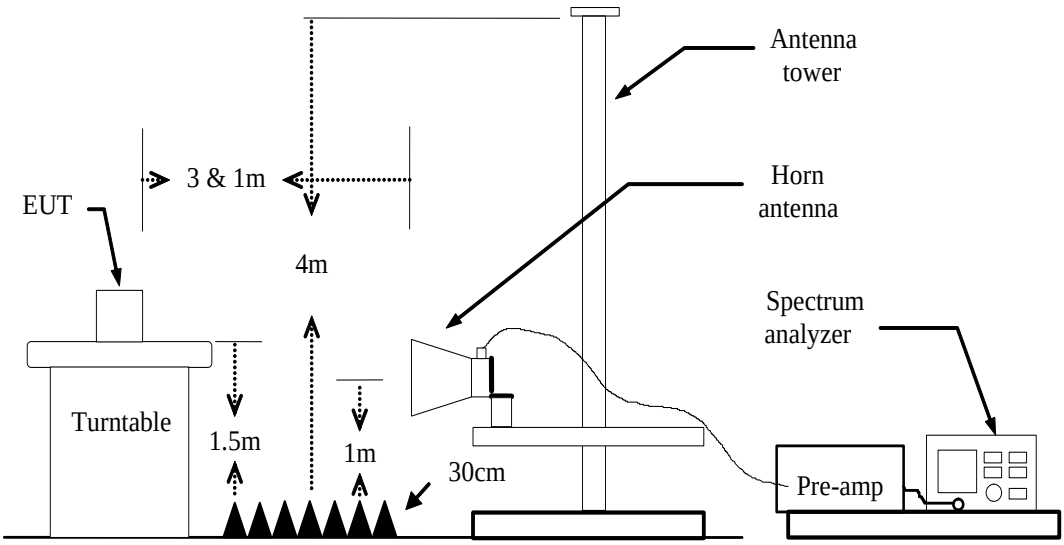
**Above 1 GHz**




For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.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### 7.2.2.6. DATA SAPLE

**Below 1GHz**

| Frequency (MHz) | Reading (dBuV) | Correct Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Pole (V/H) | Remark |
|---|---|---|---|---|---|---|---|
| XXXX | 36.37 | -12.20 | 24.17 | 40.00 | -15.83 | V | QP |

Frequency (MHz) = Emission frequency in MHz
Reading (dBuV) = Uncorrected Analyzer / Receiver reading
Correct Factor (dB/m) = Antenna factor + Cable loss – Amplifier gain
Result (dBuV/m) = Reading (dBuV) + Corr. Factor (dB/m)
Limit (dBuV/m) = Limit stated in standard
Margin (dB) = Result (dBuV/m) – Limit (dBuV/m)
Q.P. = Quasi-peak Reading

**Above 1GHz**

| Frequency (MHz) | Reading (dBuV) | Correction Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Pole (V/H) | Remark |
|---|---|---|---|---|---|---|---|
| XXXX | 62.09 | -11.42 | 50.67 | 74.00 | -23.33 | V | Peak |
| XXXX | 49.78 | -11.42 | 38.36 | 54.00 | -15.64 | V | AVG |

Frequency (MHz) = Emission frequency in MHz
Reading (dBuV) = Uncorrected Analyzer / Receiver reading
Correction Factor (dB/m) = Antenna factor + Cable loss – Amplifier gain
Result (dBuV/m) = Reading (dBuV) + Corr. Factor (dB/m)
Limit (dBuV/m) = Limit stated in standard
Margin (dB) = Result (dBuV/m) – Limit (dBuV/m)
Peak = Peak Reading
AVG = Average Reading

**Calculation Formula**

Margin (dB) = Result (dBuV/m) – Limits (dBuV/m)
Result (dBuV/m) = Reading (dBuV) + Correction Factor


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### 7.2.2.7. TEST RESULTS

**Below 1 GHz**

**Test Mode:** TX / IEEE 802.11b(CH Low) **Tested by:** Saber Huang

**Ambient temperature:** 24°C **Relative humidity:** 52% RH **Date:** July 1, 2017

| Frequency (MHz) | Reading (dBuV) | Correction Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Pole (V/H) | Remark |
|---|---|---|---|---|---|---|---|
| 104.6900 | 53.06 | -14.94 | 38.12 | 43.50 | -5.38 | V | QP |
| 250.1900 | 51.09 | -9.09 | 42.00 | 46.00 | -4.00 | V | QP |
| 277.3500 | 47.73 | -8.60 | 39.13 | 46.00 | -6.87 | V | QP |
| 300.6300 | 47.14 | -8.20 | 38.94 | 46.00 | -7.06 | V | QP |
| 500.4500 | 43.51 | -6.10 | 37.41 | 46.00 | -8.59 | V | QP |
| 900.0900 | 36.05 | -1.64 | 34.41 | 46.00 | -11.59 | V | QP |
| | | | | | | | |
| 191.9900 | 50.84 | -10.46 | 40.38 | 43.50 | -3.12 | H | QP |
| 250.1900 | 52.81 | -9.09 | 43.72 | 46.00 | -2.28 | H | QP |
| 264.7400 | 47.64 | -8.83 | 38.81 | 46.00 | -7.19 | H | QP |
| 544.1000 | 43.23 | -5.25 | 37.98 | 46.00 | -8.02 | H | QP |
| 600.3600 | 44.35 | -4.01 | 40.34 | 46.00 | -5.66 | H | QP |
| 676.9900 | 43.27 | -2.71 | 40.56 | 46.00 | -5.44 | H | QP |

***Notes:***

1. No emission found between lowest internal used/generated frequency to 30MHz.
2. Pre-scan all mode and recorded the worst case results in this report (802.11b (Low Channel)

***Remark:***

1. adiated emissions measured in frequency range from 9 kHz to 1GHz were made with an instrument using Quasi-peak detector mode.
2. 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.
3. The IF bandwidth of Receiver between 30MHz to 1GHz was 120 kHz.
4. Frequency (MHz). = Emission frequency in MHz
   Reading (dBµV/m) = Receiver reading
   Correction Factor (dB) = Antenna factor + Cable loss – Amplifier gain
   Limit (dBµV/m) = Limit stated in standard
   Margin (dB) = Measured (dBµV/m) – Limits (dBµV/m)
   Antenna Pol e (H/V) = Current carrying line of reading


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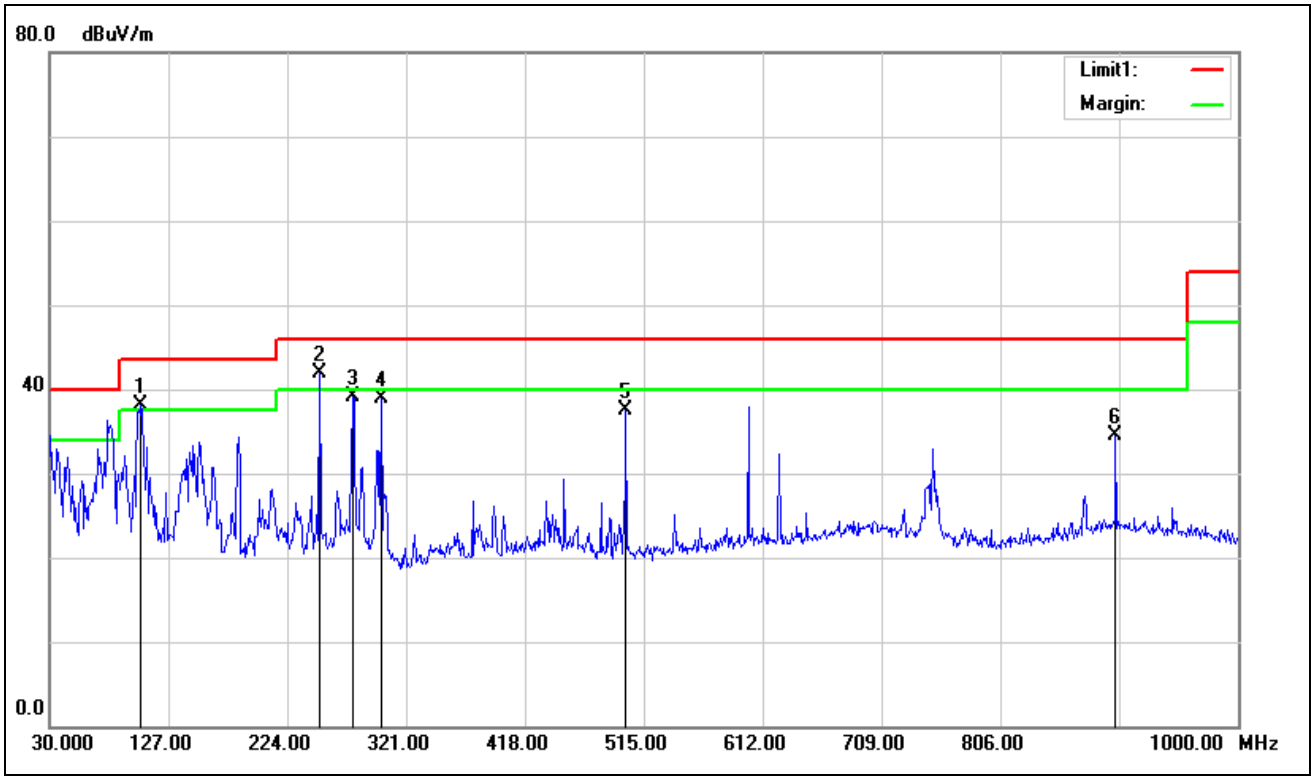
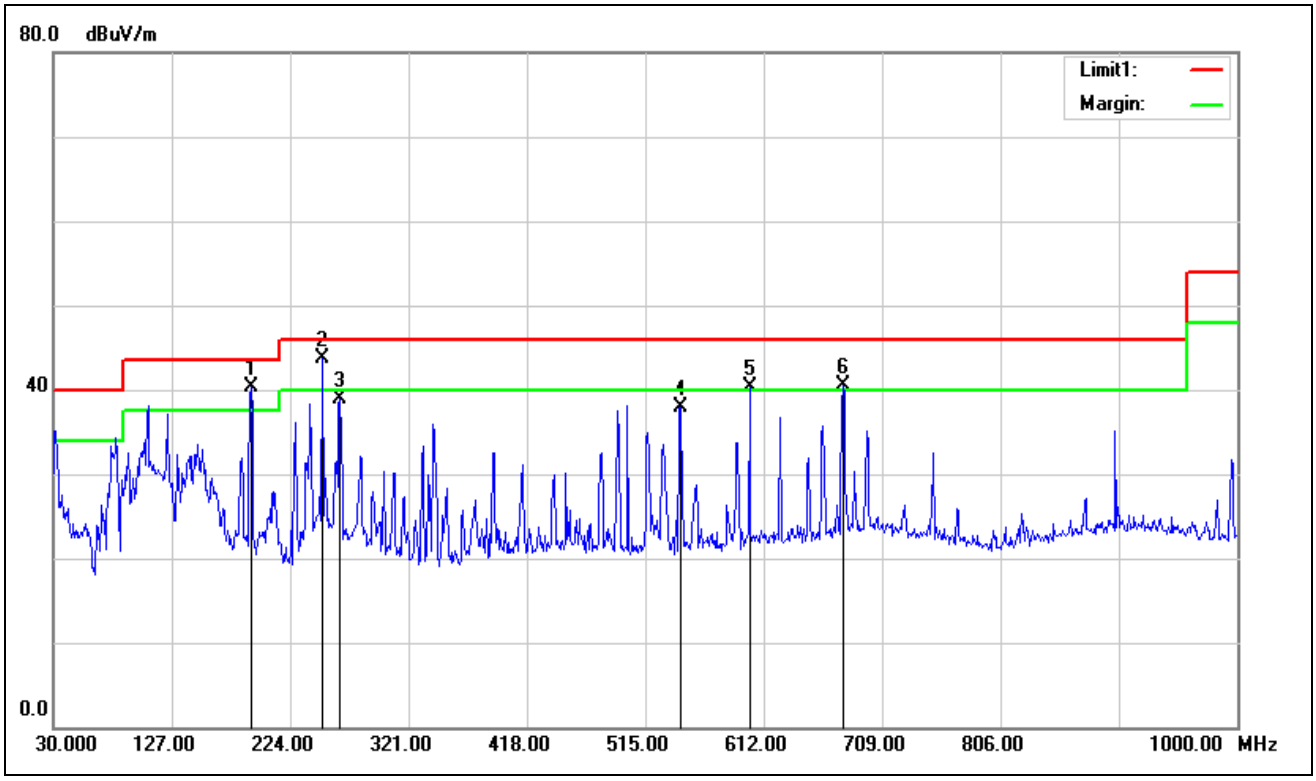
**Vertical**




**Horizontal**





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**Above 1 GHz**
**Antenna 0**
**Test Mode:** TX / IEEE 802.11b(CH Low) **Tested by:** Saber Huang
**Ambient temperature:** 24°C **Relative humidity:** 52% RH **Date:** July 1, 2017

| Frequency (MHz) | Reading (dBuV) | Correction Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Pole (V/H) | Remark |
|---|---|---|---|---|---|---|---|
| 1954.000 | 43.44 | -5.29 | 38.15 | 74.00 | -35.85 | V | peak |
| 3304.000 | 42.24 | -0.85 | 41.39 | 74.00 | -32.61 | V | peak |
| 4204.000 | 40.04 | 2.31 | 42.35 | 74.00 | -31.65 | V | peak |
| 5248.000 | 39.29 | 5.42 | 44.71 | 74.00 | -29.29 | V | peak |
| 5698.000 | 39.66 | 5.95 | 45.61 | 74.00 | -28.39 | V | peak |
| 6508.000 | 39.33 | 6.90 | 46.23 | 74.00 | -27.77 | V | peak |
| | | | | | | | |
| 3106.000 | 41.35 | -1.18 | 40.17 | 74.00 | -33.83 | H | Peak |
| 3547.000 | 40.01 | -0.32 | 39.69 | 74.00 | -34.31 | H | Peak |
| 4249.000 | 40.84 | 2.47 | 43.31 | 74.00 | -30.69 | H | Peak |
| 4879.000 | 39.89 | 4.59 | 44.48 | 74.00 | -29.52 | H | peak |
| 5464.000 | 39.36 | 5.81 | 45.17 | 74.00 | -28.83 | H | peak |
| 5878.000 | 39.66 | 6.03 | 45.69 | 74.00 | -28.31 | H | Peak |

***Remark:***

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


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**Test Mode:** TX / IEEE 802.11b (CH Mid) **Tested by:** Saber Huang

**Ambient temperature:** 24°C **Relative humidity:** 52% RH **Date:** July 1, 2017

| Frequency (MHz) | Reading (dBuV) | Correction Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Pole (V/H) | Remark |
|---|---|---|---|---|---|---|---|
| 2602.000 | 43.65 | -2.08 | 41.57 | 74.00 | -32.43 | V | Peak |
| 4141.000 | 39.72 | 2.09 | 41.81 | 74.00 | -32.19 | V | Peak |
| 4384.000 | 41.48 | 2.94 | 44.42 | 74.00 | -29.58 | V | Peak |
| 4798.000 | 40.34 | 4.32 | 44.66 | 74.00 | -29.34 | V | Peak |
| 5509.000 | 39.78 | 5.87 | 45.65 | 74.00 | -28.35 | V | Peak |
| 6274.000 | 39.82 | 6.52 | 46.34 | 74.00 | -27.66 | V | Peak |
| | | | | | | | |
| 3214.000 | 42.69 | -1.00 | 41.69 | 74.00 | -32.31 | H | Peak |
| 3817.000 | 40.34 | 0.82 | 41.16 | 74.00 | -32.84 | H | Peak |
| 4402.000 | 39.64 | 3.01 | 42.65 | 74.00 | -31.35 | H | Peak |
| 4825.000 | 40.86 | 4.41 | 45.27 | 74.00 | -28.73 | H | Peak |
| 5293.000 | 39.39 | 5.50 | 44.89 | 74.00 | -29.11 | H | Peak |
| 5446.000 | 39.47 | 5.77 | 45.24 | 74.00 | -28.76 | H | Peak |

***Remark:***

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


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**Test Mode:** TX / IEEE 802.11b (CH High) **Tested by:** Saber Huang

**Ambient temperature:** 24°C **Relative humidity:** 52% RH **Date:** July 1, 2017

| Frequency (MHz) | Reading (dBuV) | Correction Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Pole (V/H) | Remark |
|---|---|---|---|---|---|---|---|
| 3214.000 | 43.33 | -1.00 | 42.33 | 74.00 | -31.67 | V | Peak |
| 3844.000 | 40.53 | 0.93 | 41.46 | 74.00 | -32.54 | V | Peak |
| 4654.000 | 39.54 | 3.85 | 43.39 | 74.00 | -30.61 | V | Peak |
| 5266.000 | 39.29 | 5.45 | 44.74 | 74.00 | -29.26 | V | Peak |
| 5545.000 | 39.81 | 5.89 | 45.70 | 74.00 | -28.30 | V | Peak |
| 6481.000 | 39.35 | 6.86 | 46.21 | 74.00 | -27.79 | V | Peak |
| | | | | | | | |
| 3223.000 | 42.38 | -0.99 | 41.39 | 74.00 | -32.61 | H | Peak |
| 3925.000 | 41.14 | 1.27 | 42.41 | 74.00 | -31.59 | H | Peak |
| 4312.000 | 40.39 | 2.69 | 43.08 | 74.00 | -30.92 | H | Peak |
| 4573.000 | 40.58 | 3.59 | 44.17 | 74.00 | -29.83 | H | Peak |
| 5401.000 | 39.26 | 5.69 | 44.95 | 74.00 | -29.05 | H | Peak |
| 5950.000 | 39.27 | 6.06 | 45.33 | 74.00 | -28.67 | H | Peak |

***Remark:***

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


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**Antenna 1**

**Test Mode:** TX / IEEE 802.11b(CH Low) **Tested by:** Saber Huang

**Ambient temperature:** 24°C **Relative humidity:** 52% RH **Date:** July 1, 2017

| Frequency (MHz) | Reading (dBuV) | Correction Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Pole (V/H) | Remark |
|---|---|---|---|---|---|---|---|
| 3295.000 | 42.43 | -0.86 | 41.57 | 74.00 | -32.43 | V | peak |
| 4186.000 | 39.90 | 2.24 | 42.14 | 74.00 | -31.86 | V | peak |
| 4537.000 | 39.57 | 3.47 | 43.04 | 74.00 | -30.96 | V | peak |
| 5320.000 | 39.24 | 5.55 | 44.79 | 74.00 | -29.21 | V | peak |
| 5734.000 | 39.64 | 5.97 | 45.61 | 74.00 | -28.39 | V | peak |
| 6256.000 | 39.84 | 6.49 | 46.33 | 74.00 | -27.67 | V | peak |
| | | | | | | | |
| 3331.000 | 42.07 | -0.80 | 41.27 | 74.00 | -32.73 | H | Peak |
| 4033.000 | 39.81 | 1.71 | 41.52 | 74.00 | -32.48 | H | Peak |
| 4825.000 | 40.12 | 4.41 | 44.53 | 74.00 | -29.47 | H | Peak |
| 5581.000 | 39.42 | 5.90 | 45.32 | 74.00 | -28.68 | H | peak |
| 6391.000 | 39.41 | 6.71 | 46.12 | 74.00 | -27.88 | H | peak |
| 7282.000 | 39.95 | 8.25 | 48.20 | 74.00 | -25.80 | H | peak |

***Remark:***

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


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**Test Mode:** TX / IEEE 802.11b (CH Mid) **Tested by:** Saber Huang

**Ambient temperature:** 24°C **Relative humidity:** 52% RH **Date:** July 1, 2017

| Frequency (MHz) | Reading (dBuV) | Correction Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Pole (V/H) | Remark |
|---|---|---|---|---|---|---|---|
| 2845.000 | 42.57 | -1.64 | 40.93 | 74.00 | -33.07 | V | Peak |
| 3835.000 | 39.99 | 0.89 | 40.88 | 74.00 | -33.12 | V | Peak |
| 4402.000 | 39.32 | 3.01 | 42.33 | 74.00 | -31.67 | V | Peak |
| 4987.000 | 39.30 | 4.94 | 44.24 | 74.00 | -29.76 | V | Peak |
| 5392.000 | 38.89 | 5.68 | 44.57 | 74.00 | -29.43 | V | Peak |
| 5995.000 | 39.19 | 6.08 | 45.27 | 74.00 | -28.73 | V | Peak |
| | | | | | | | |
| 3214.000 | 42.48 | -1.00 | 41.48 | 74.00 | -32.52 | H | Peak |
| 4240.000 | 39.42 | 2.43 | 41.85 | 74.00 | -32.15 | H | Peak |
| 4960.000 | 39.13 | 4.85 | 43.98 | 74.00 | -30.02 | H | Peak |
| 5428.000 | 38.67 | 5.74 | 44.41 | 74.00 | -29.59 | H | Peak |
| 5833.000 | 39.77 | 6.01 | 45.78 | 74.00 | -28.22 | H | Peak |
| 6535.000 | 39.47 | 6.95 | 46.42 | 74.00 | -27.58 | H | Peak |

***Remark:***

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


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**Test Mode:** TX / IEEE 802.11b (CH High) **Tested by:** Saber Huang

**Ambient temperature:** 24°C **Relative humidity:** 52% RH **Date:** July 1, 2017

| Frequency (MHz) | Reading (dBuV) | Correction Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Pole (V/H) | Remark |
|---|---|---|---|---|---|---|---|
| 3493.000 | 41.96 | -0.53 | 41.43 | 74.00 | -32.57 | V | Peak |
| 4312.000 | 39.28 | 2.69 | 41.97 | 74.00 | -32.03 | V | Peak |
| 4960.000 | 38.91 | 4.85 | 43.76 | 74.00 | -30.24 | V | Peak |
| 5491.000 | 39.60 | 5.85 | 45.45 | 74.00 | -28.55 | V | Peak |
| 5914.000 | 39.95 | 6.04 | 45.99 | 74.00 | -28.01 | V | Peak |
| 6499.000 | 39.02 | 6.89 | 45.91 | 74.00 | -28.09 | V | Peak |
| | | | | | | | |
| 3205.000 | 42.49 | -1.02 | 41.47 | 74.00 | -32.53 | H | Peak |
| 3907.000 | 39.68 | 1.20 | 40.88 | 74.00 | -33.12 | H | Peak |
| 4285.000 | 38.95 | 2.59 | 41.54 | 74.00 | -32.46 | H | Peak |
| 4879.000 | 40.40 | 4.59 | 44.99 | 74.00 | -29.01 | H | Peak |
| 5347.000 | 39.56 | 5.60 | 45.16 | 74.00 | -28.84 | H | Peak |
| 5644.000 | 39.46 | 5.93 | 45.39 | 74.00 | -28.61 | H | Peak |

***Remark:***

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


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**Antenna 0**

**Test Mode:** TX / IEEE 802.11g(CH Low) **Tested by:** Saber Huang

**Ambient temperature:** 24°C **Relative humidity:** 52% RH **Date:** July 1, 2017

| Frequency (MHz) | Reading (dBuV) | Correction Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Pole (V/H) | Remark |
|---|---|---|---|---|---|---|---|
| 3331.000 | 41.63 | -0.80 | 40.83 | 74.00 | -33.17 | V | Peak |
| 3790.000 | 39.91 | 0.70 | 40.61 | 74.00 | -33.39 | V | Peak |
| 4123.000 | 39.10 | 2.02 | 41.12 | 74.00 | -32.88 | V | Peak |
| 4555.000 | 39.39 | 3.53 | 42.92 | 74.00 | -31.08 | V | Peak |
| 4960.000 | 39.05 | 4.85 | 43.90 | 74.00 | -30.10 | V | Peak |
| 5329.000 | 39.16 | 5.57 | 44.73 | 74.00 | -29.27 | V | Peak |
| | | | | | | | |
| 3025.000 | 42.25 | -1.32 | 40.93 | 74.00 | -33.07 | H | Peak |
| 3538.000 | 41.77 | -0.36 | 41.41 | 74.00 | -32.59 | H | Peak |
| 4294.000 | 39.44 | 2.62 | 42.06 | 74.00 | -31.94 | H | Peak |
| 4564.000 | 39.38 | 3.56 | 42.94 | 74.00 | -31.06 | H | Peak |
| 5104.000 | 39.07 | 5.17 | 44.24 | 74.00 | -29.76 | H | Peak |
| 5545.000 | 38.48 | 5.89 | 44.37 | 74.00 | -29.63 | H | Peak |

***Remark:***

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


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**Test Mode:** TX / IEEE 802.11g (CH Mid) **Tested by:** Saber Huang

**Ambient temperature:** 24°C **Relative humidity:** 52% RH **Date:** July 1, 2017

| Frequency (MHz) | Reading (dBuV) | Correction Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Pole (V/H) | Remark |
|---|---|---|---|---|---|---|---|
| 2566.000 | 44.31 | -2.14 | 42.17 | 74.00 | -31.83 | V | Peak |
| 2845.000 | 42.37 | -1.64 | 40.73 | 74.00 | -33.27 | V | Peak |
| 3295.000 | 42.41 | -0.86 | 41.55 | 74.00 | -32.45 | V | Peak |
| 4546.000 | 39.40 | 3.50 | 42.90 | 74.00 | -31.10 | V | Peak |
| 5104.000 | 38.56 | 5.17 | 43.73 | 74.00 | -30.27 | V | Peak |
| 5725.000 | 40.26 | 5.96 | 46.22 | 74.00 | -27.78 | V | Peak |
| | | | | | | | |
| 3214.000 | 43.02 | -1.00 | 42.02 | 74.00 | -31.98 | H | Peak |
| 3943.000 | 39.74 | 1.35 | 41.09 | 74.00 | -32.91 | H | Peak |
| 4366.000 | 39.28 | 2.88 | 42.16 | 74.00 | -31.84 | H | Peak |
| 4825.000 | 40.04 | 4.41 | 44.45 | 74.00 | -29.55 | H | Peak |
| 5302.000 | 38.97 | 5.52 | 44.49 | 74.00 | -29.51 | H | Peak |
| 5815.000 | 39.06 | 6.00 | 45.06 | 74.00 | -28.94 | H | Peak |

***Remark:***

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


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**Test Mode:** TX / IEEE 802.11g (CH High) **Tested by:** Saber Huang

**Ambient temperature:** 24°C **Relative humidity:** 52% RH **Date:** July 1, 2017

| Frequency (MHz) | Reading (dBuV) | Correction Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Pole (V/H) | Remark |
|---|---|---|---|---|---|---|---|
| 1909.000 | 44.29 | -5.58 | 38.71 | 74.00 | -35.29 | V | Peak |
| 4060.000 | 39.69 | 1.80 | 41.49 | 74.00 | -32.51 | V | Peak |
| 4303.000 | 40.42 | 2.66 | 43.08 | 74.00 | -30.92 | V | Peak |
| 4591.000 | 40.11 | 3.65 | 43.76 | 74.00 | -30.24 | V | Peak |
| 5617.000 | 39.33 | 5.92 | 45.25 | 74.00 | -28.75 | V | Peak |
| 5914.000 | 40.95 | 6.04 | 46.99 | 74.00 | -27.01 | V | Peak |
| | | | | | | | |
| 1198.000 | 47.46 | -7.80 | 39.66 | 74.00 | -34.34 | H | Peak |
| 3115.000 | 43.34 | -1.17 | 42.17 | 74.00 | -31.83 | H | Peak |
| 4393.000 | 42.22 | 2.97 | 45.19 | 74.00 | -28.81 | H | Peak |
| 5356.000 | 39.59 | 5.61 | 45.20 | 74.00 | -28.80 | H | Peak |
| 5770.000 | 39.60 | 5.98 | 45.58 | 74.00 | -28.42 | H | Peak |
| 6571.000 | 39.15 | 7.01 | 46.16 | 74.00 | -27.84 | H | Peak |

***Remark:***

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


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**Antenna 1**

**Test Mode:** TX / IEEE 802.11g(CH Low) **Tested by:** Saber Huang

**Ambient temperature:** 24°C **Relative humidity:** 52% RH **Date:** July 1, 2017

| Frequency (MHz) | Reading (dBuV) | Correction Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Pole (V/H) | Remark |
|---|---|---|---|---|---|---|---|
| 2836.000 | 43.49 | -1.66 | 41.83 | 74.00 | -32.17 | V | Peak |
| 3997.000 | 39.85 | 1.58 | 41.43 | 74.00 | -32.57 | V | Peak |
| 4366.000 | 39.75 | 2.88 | 42.63 | 74.00 | -31.37 | V | Peak |
| 5032.000 | 39.32 | 5.04 | 44.36 | 74.00 | -29.64 | V | Peak |
| 5338.000 | 40.03 | 5.58 | 45.61 | 74.00 | -28.39 | V | Peak |
| 6211.000 | 39.36 | 6.42 | 45.78 | 74.00 | -28.22 | V | Peak |
| | | | | | | | |
| 2818.000 | 43.76 | -1.69 | 42.07 | 74.00 | -31.93 | H | Peak |
| 3214.000 | 43.35 | -1.00 | 42.35 | 74.00 | -31.65 | H | Peak |
| 3592.000 | 41.72 | -0.13 | 41.59 | 74.00 | -32.41 | H | Peak |
| 4546.000 | 39.68 | 3.50 | 43.18 | 74.00 | -30.82 | H | Peak |
| 4924.000 | 39.77 | 4.73 | 44.50 | 74.00 | -29.50 | H | Peak |
| 5536.000 | 39.19 | 5.89 | 45.08 | 74.00 | -28.92 | H | Peak |

***Remark:***

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


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