# TEST REPORT

| | |
|---|---|
| **Applicant:** | Shenzhen Chuangruixin Technology Co.,Ltd. |
| **Address of Applicant:** | Floor 3, Building B5, Tower Xufa Science Park, Liantang Industrial City, Gongming Town, Shenzhen |
| **Manufacturer/Factory:** | Shenzhen Chuangruixin Technology Co.,Ltd. |
| **Address of Manufacturer/Factory:** | Floor 3, Building B5, Tower Xufa Science Park, Liantang Industrial City, Gongming Town, Shenzhen |

**Equipment Under Test (EUT)**

| | |
|---|---|
| Product Name: | NOTE BOOK |
| Model No.: | R9 Pro,X15,V11,R9 air,R9 max,R9 plus,R9 mini, V14 air,V14s,R10 MAX |
| Trade Mark: | DAYSKY，DERE |
| **FCC ID:** | 2AXUH-R9 |
| **Applicable standards:** | FCC CFR Title 47 Part 15 Subpart E Section 15.407 |
| **Date of sample receipt:** | Oct.21 , 2020 |
| **Date of Test:** | Oct. 23, 2020- Nov. 05, 2020 |
| **Date of report issue:** | Nov. 05, 2020 |
| **Test Result :** | PASS * |

* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:

**Robinson Luo**

**Laboratory Manager**

# 2 Version

| Version No. | Date | Description |
|---|---|---|
| 00 | *Nov. 05, 2020* | Original |
| | | |
| | | |
| | | |
| | | |

***Prepared By:*** ***Date:*** *Nov. 05, 2020*

***Project Engineer***

***Check By:*** ***Date:*** *Nov. 05, 2020*

***Reviewer***

# 3 Contents

Page

# 4 Test Summary

| Test Item | Section in CFR 47 | Result |
|---|---|---|
| Antenna requirement | 15.203 | PASS |
| AC Power Line Conducted Emission | 15.207 | PASS |
| Peak Transmit Power | 15.407(a)(1) | PASS |
| Power Spectral Density | 15.407(a)(1) | PASS |
| Undesirable Emission | 15.407(b)(1), 15.205/15.209 | PASS |
| Radiated Emission | 15.205/15.209 | PASS |
| Band Edge | 15.407(b)(1) | PASS |
| Frequency Stability | 15.407(g) | PASS |

*Remark:*

*Pass: The EUT complies with the essential requirements in the standard.*

## 4.1 Measurement Uncertainty

| Test Item | Frequency Range | Measurement Uncertainty | Notes |
|---|---|---|---|
| Radiated Emission | 30MHz-200MHz | 3.8039dB | (1) |
| Radiated Emission | 200MHz-1GHz | 3.9679dB | (1) |
| Radiated Emission | 1GHz-18GHz | 4.29dB | (1) |
| Radiated Emission | 18GHz-40GHz | 3.30dB | (1) |
| AC Power Line Conducted Emission | 0.15MHz ~ 30MHz | 3.44dB | (1) |
| Note (1): The measurement uncertainty is for coverage factor of k=2 and a level of confidence of 95%. | | | |

# 5 General Information

## 5.1 General Description of EUT

<table>
<tr><td>Product Name:</td><td>NOTE BOOK</td></tr>
<tr><td>Model No.:</td><td>R9 Pro,X15,V11,R9 air,R9 max,R9 plus,R9 mini,V14 air,V14s,R10 MAX</td></tr>
<tr><td>Serial No.:</td><td>N/A</td></tr>
<tr><td>Hardware version:</td><td>N/A</td></tr>
<tr><td>Software version:</td><td>N/A</td></tr>
<tr><td>Test sample(s) ID:</td><td>GTS202011000005-01</td></tr>
<tr><td>Sample(s) Status:</td><td>Engineer sample</td></tr>
<tr><td>Operation Frequency:</td><td>
<table>
<tr><th>Band</th><th>Mode</th><th>Frequency Range(MHz)</th><th>Number of channels</th></tr>
<tr><td rowspan="6">U-NII Band I</td><td>IEEE 802.11a</td><td>5180-5240</td><td>4</td></tr>
<tr><td>IEEE 802.11n 20MHz</td><td>5180-5240</td><td>4</td></tr>
<tr><td>IEEE 802.11n 40MHz</td><td>5190-5230</td><td>2</td></tr>
<tr><td>IEEE 802.11ac 20MHz</td><td>5180-5240</td><td>4</td></tr>
<tr><td>IEEE 802.11ac 40MHz</td><td>5190-5230</td><td>2</td></tr>
<tr><td>IEEE 802.11ac 80MHz</td><td>5210</td><td>1</td></tr>
</table>
</td></tr>
<tr><td>Modulation technology:</td><td>OFDM with BPSK/QPSK/16QAM/64QAM/256QAM<br>for 802.11a/n/ac;</td></tr>
<tr><td>Antenna Type:</td><td>FPC Antenna</td></tr>
<tr><td>Antenna gain:</td><td>-0.5dBi(Declare by applicant)</td></tr>
<tr><td>Power supply:</td><td>DC 12V From AC adapter or 11.4Vdc From battery</td></tr>
<tr><td>Test model No.</td><td>R9 Pro</td></tr>
<tr><td colspan="2">Remark:<br>All models differences are only the model name and appearance color are different, others are the same.</td></tr>
</table>

| Channel list for 802.11a/n(HT20)/ac(HT20) | | | | | | | |
|---|---|---|---|---|---|---|---|
| Channel | Frequency | Channel | Frequency | Channel | Frequency | Channel | Frequency |
| 36 | 5180MHz | 40 | 5200MHz | 44 | 5220MHz | 48 | 5240MHz |

| Channel list for 802.11n(HT40)/ac(HT40) | | | | | | | |
|---|---|---|---|---|---|---|---|
| Channel | Frequency | Channel | Frequency | Channel | Frequency | Channel | Frequency |
| 38 | 5190MHz | 46 | 5230MHz | / | / | / | / |

| Channel list for 802.11ac(HT80) | | | | | | | |
|---|---|---|---|---|---|---|---|
| Channel | Frequency | Channel | Frequency | Channel | Frequency | Channel | Frequency |
| 42 | 5210MHz | / | / | / | / | / | / |

## 5.2 Test mode

| | |
|---|---|
| Transmitting mode | Keep the EUT in transmitting with modulation.. |

*Remark: During the test, the test voltage was tuned from 85% to 115% of the nominal rated supply voltage, and found that the worst case was under the nominal rated supply condition. So the report just shows that condition's data.*

We have verified the construction and function in typical operation. All the test modes were carried out with the EUT in transmitting operation, which was shown in this test report and defined as follows:

Pre-scan all kind of data rate in lowest channel, and found the follow list which it was worst case.

| Mode | Data rate |
|---|---|
| 802.11a/n(HT20)/ac(HT20) | 6/6.5 Mbps |
| 802.11n(HT40) /ac(HT40) | 13.5 Mbps |
| 802.11ac(HT80) | 24 Mbps |

## 5.3 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

● **FCC —Registration No.: 381383**

Global United Technology Services Co., Ltd., Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in files. Registration 381383.

● **IC —Registration No.: 9079A**

The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 9079A

● **NVLAP (LAB CODE:600179-0)**

Global United Technology Services Co., Ltd., is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP). LAB CODE:600179-0

## 5.4 Test Location

All tests were performed at:

Global United Technology Services Co., Ltd.

Address: No. 123-128, Tower A, Jinyuan Business Building, No.2, Laodong Industrial Zone, Xixiang Road, sBaoan District, Shenzhen, Guangdong, China 518102

Tel: 0755-27798480

Fax: 0755-27798960

## 5.5 Description of Support Units

None.

## 5.6 Deviation from Standards

None.

## 5.7 Abnormalities from Standard Conditions

None.

## 5.8 Additional Instructions

| | |
|---|---|
| Test Software | Special test command provided by manufacturer |
| Power level setup | Default |

# 6 Test Instruments list

**Radiated Emission:**

| Item | Test Equipment | Manufacturer | Model No. | Inventory No. | Cal.Date (mm-dd-yy) | Cal.Due date (mm-dd-yy) |
|---|---|---|---|---|---|---|
| 1 | 3m Semi- Anechoic Chamber | ZhongYu Electron | 9.2(L)*6.2(W)* 6.4(H) | GTS250 | July. 02 2020 | July. 01 2025 |
| 2 | Control Room | ZhongYu Electron | 6.2(L)*2.5(W)* 2.4(H) | GTS251 | N/A | N/A |
| 3 | EMI Test Receiver | Rohde & Schwarz | ESU26 | GTS203 | June. 25 2020 | June. 24 2021 |
| 4 | BiConiLog Antenna | SCHWARZBECK MESS-ELEKTRONIK | VULB9163 | GTS214 | June. 25 2020 | June. 24 2021 |
| 5 | Double -ridged waveguide horn | SCHWARZBECK MESS-ELEKTRONIK | BBHA 9120 D | GTS208 | June. 25 2020 | June. 24 2021 |
| 6 | Horn Antenna | ETS-LINDGREN | 3160 | GTS217 | June. 25 2020 | June. 24 2021 |
| 7 | EMI Test Software | AUDIX | E3 | N/A | N/A | N/A |
| 8 | Coaxial Cable | GTS | N/A | GTS213 | June. 25 2020 | June. 24 2021 |
| 9 | Coaxial Cable | GTS | N/A | GTS211 | June. 25 2020 | June. 24 2021 |
| 10 | Coaxial cable | GTS | N/A | GTS210 | June. 25 2020 | June. 24 2021 |
| 11 | Coaxial Cable | GTS | N/A | GTS212 | June. 25 2020 | June. 24 2021 |
| 12 | Amplifier(100kHz-3GHz) | HP | 8347A | GTS204 | June. 25 2020 | June. 24 2021 |
| 13 | Amplifier(2GHz-20GHz) | HP | 84722A | GTS206 | June. 25 2020 | June. 24 2021 |
| 14 | Amplifier (18-26GHz) | Rohde & Schwarz | AFS33-18002 650-30-8P-44 | GTS218 | June. 25 2020 | June. 24 2021 |
| 15 | Band filter | Amindeon | 82346 | GTS219 | June. 25 2020 | June. 24 2021 |
| 16 | Power Meter | Anritsu | ML2495A | GTS540 | June. 25 2020 | June. 24 2021 |
| 17 | Power Sensor | Anritsu | MA2411B | GTS541 | June. 25 2020 | June. 24 2021 |
| 18 | Wideband Radio Communication Tester | Rohde & Schwarz | CMW500 | GTS575 | June. 25 2020 | June. 24 2021 |
| 19 | Splitter | Agilent | 11636B | GTS237 | June. 25 2020 | June. 24 2021 |
| 20 | Loop Antenna | ZHINAN | ZN30900A | GTS534 | June. 25 2020 | June. 24 2021 |
| 21 | Breitband hornantenne | SCHWARZBECK | BBHA 9170 | GTS579 | Oct. 18 2020 | Oct. 17 2021 |
| 22 | Amplifier | TDK | PA-02-02 | GTS574 | Oct. 18 2020 | Oct. 17 2021 |
| 23 | Amplifier | TDK | PA-02-03 | GTS576 | Oct. 18 2020 | Oct. 17 2021 |
| 24 | PSA Series Spectrum Analyzer | Rohde & Schwarz | FSP | GTS578 | June. 25 2020 | June. 24 2021 |

| Conducted Emission | | | | | | |
|---|---|---|---|---|---|---|
| **Item** | **Test Equipment** | **Manufacturer** | **Model No.** | **Inventory No.** | **Cal.Date (mm-dd-yy)** | **Cal.Due date (mm-dd-yy)** |
| 1 | Shielding Room | ZhongYu Electron | 7.3(L)x3.1(W)x2.9(H) | GTS252 | May.15 2019 | May.14 2022 |
| 2 | EMI Test Receiver | R&S | ESCI 7 | GTS552 | June. 25 2020 | June. 24 2021 |
| 3 | Coaxial Switch | ANRITSU CORP | MP59B | GTS225 | June. 25 2020 | June. 24 2021 |
| 4 | ENV216 2-L-V-NETZNACHB.DE | ROHDE&SCHWARZ | ENV216 | GTS226 | June. 25 2020 | June. 24 2021 |
| 5 | Coaxial Cable | GTS | N/A | GTS227 | N/A | N/A |
| 6 | EMI Test Software | AUDIX | E3 | N/A | N/A | N/A |
| 7 | Thermo meter | KTJ | TA328 | GTS233 | June. 25 2020 | June. 24 2021 |
| 8 | Absorbing clamp | Elektronik-Feinmechanik | MDS21 | GTS229 | June. 25 2020 | June. 24 2021 |
| 9 | ISN | SCHWARZBECK | NTFM 8158 | GTD565 | June. 25 2020 | June. 24 2021 |

| RF Conducted Test: | | | | | | |
|---|---|---|---|---|---|---|
| **Item** | **Test Equipment** | **Manufacturer** | **Model No.** | **Serial No.** | **Cal.Date (mm-dd-yy)** | **Cal.Due date (mm-dd-yy)** |
| 1 | MXA Signal Analyzer | Agilent | N9020A | GTS566 | June. 25 2020 | June. 24 2021 |
| 2 | EMI Test Receiver | R&S | ESCI 7 | GTS552 | June. 25 2020 | June. 24 2021 |
| 3 | Spectrum Analyzer | Agilent | E4440A | GTS533 | June. 25 2020 | June. 24 2021 |
| 4 | MXG vector Signal Generator | Agilent | N5182A | GTS567 | June. 25 2020 | June. 24 2021 |
| 5 | ESG Analog Signal Generator | Agilent | E4428C | GTS568 | June. 25 2020 | June. 24 2021 |
| 6 | USB RF Power Sensor | DARE | RPR3006W | GTS569 | June. 25 2020 | June. 24 2021 |
| 7 | RF Switch Box | Shongyi | RFSW3003328 | GTS571 | June. 25 2020 | June. 24 2021 |
| 8 | Programmable Constant Temp & Humi Test Chamber | WEWON | WHTH-150L-40-880 | GTS572 | June. 25 2020 | June. 24 2021 |

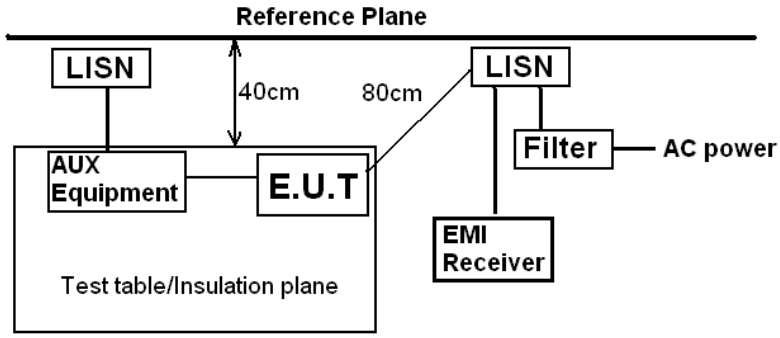
| General used equipment: | | | | | | |
|---|---|---|---|---|---|---|
| **Item** | **Test Equipment** | **Manufacturer** | **Model No.** | **Inventory No.** | **Cal.Date (mm-dd-yy)** | **Cal.Due date (mm-dd-yy)** |
| 1 | Humidity/ Temperature Indicator | KTJ | TA328 | GTS243 | June. 25 2020 | June. 24 2021 |
| 2 | Barometer | ChangChun | DYM3 | GTS255 | June. 25 2020 | June. 24 2021 |

# 7 Test results and Measurement Data

## 7.1 Antenna requirement:

| | |
|---|---|
| **Standard requirement:** | FCC Part15 C Section 15.203 |
| *15.203 requirement:*<br>*An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.* | |
| **E.U.T Antenna:** | |
| *The antennas are FPC antenna, the best case gain of the antennas are -0.5dBi, reference to the appendix II for details* | |

## 7.2 Conducted Emissions

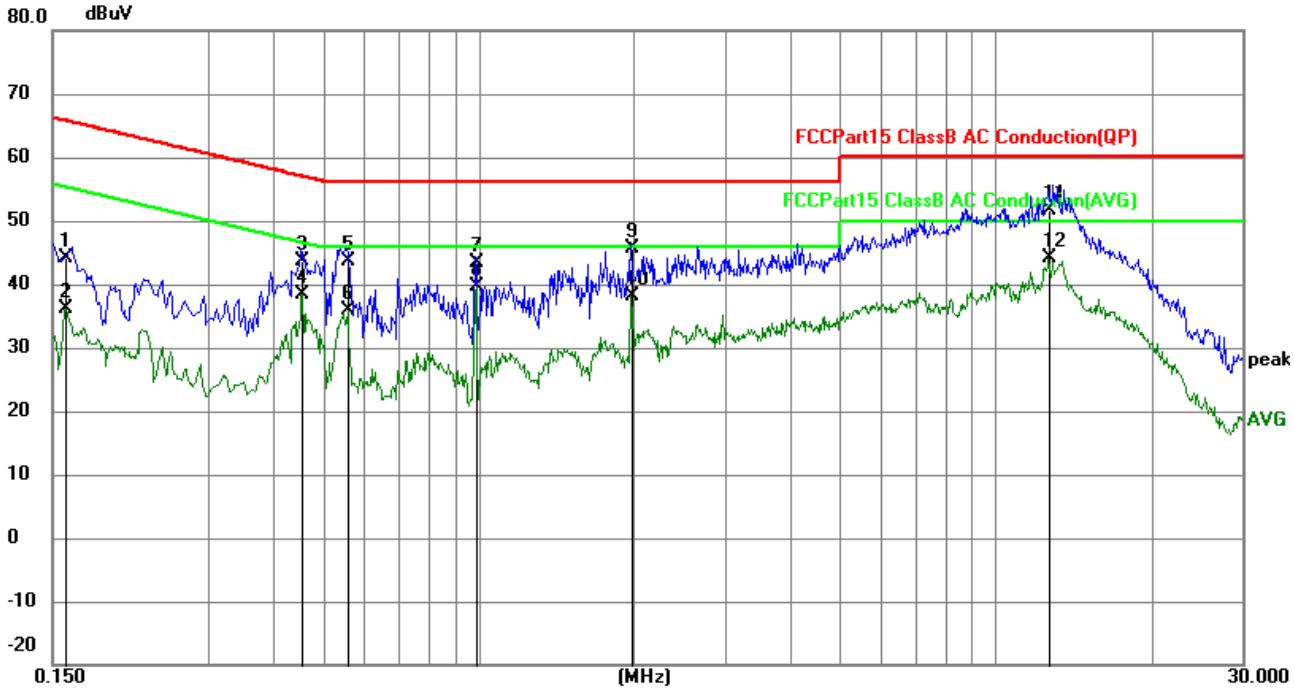
<table>
<tr><td>Test Requirement:</td><td colspan="6">FCC Part15 C Section 15.207</td></tr>
<tr><td>Test Method:</td><td colspan="6">ANSI C63.10:2013</td></tr>
<tr><td>Test Frequency Range:</td><td colspan="6">150KHz to 30MHz</td></tr>
<tr><td>Class / Severity:</td><td colspan="6">Class B</td></tr>
<tr><td>Receiver setup:</td><td colspan="6">RBW=9KHz, VBW=30KHz</td></tr>
<tr><td>Limit:</td><td colspan="6"><table><tr><td rowspan="2">Frequency range (MHz)</td><td colspan="2">Limit (dBuV)</td></tr><tr><td>Quasi-peak</td><td>Average</td></tr><tr><td>0.15-0.5</td><td>66 to 56*</td><td>56 to 46*</td></tr><tr><td>0.5-5</td><td>56</td><td>46</td></tr><tr><td>5-30</td><td>60</td><td>50</td></tr></table>* Decreases with the logarithm of the frequency.</td></tr>
<tr><td>Test procedure</td><td colspan="6">The E.U.T and simulators are connected to the main power through a line impedance stabilization network(L.I.S.N.). The provide a 50ohm/50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refers to the block diagram of the test setup and photographs). Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10:2013 on conducted measurement.</td></tr>
<tr><td>Test setup:</td><td colspan="6"> 

Remark:<br>E.U.T: Equipment Under Test<br>LISN: Line Impedence Stabilization Network<br>Test table height=0.8m</td></tr>
<tr><td>Test Instruments:</td><td colspan="6">Refer to section 5.10 for details</td></tr>
<tr><td>Test mode:</td><td colspan="6">Refer to section 5.2 for details</td></tr>
<tr><td>Test environment:</td><td>Temp.:</td><td>25 °C</td><td>Humid.:</td><td>52%</td><td>Press.:</td><td>1012mbar</td></tr>
<tr><td>Test voltage:</td><td colspan="6">AC 120V, 60Hz</td></tr>
<tr><td>Test results:</td><td colspan="6">Pass</td></tr>
</table>

Remark: Both high and low voltages have been tested to show only the worst low voltage test data.

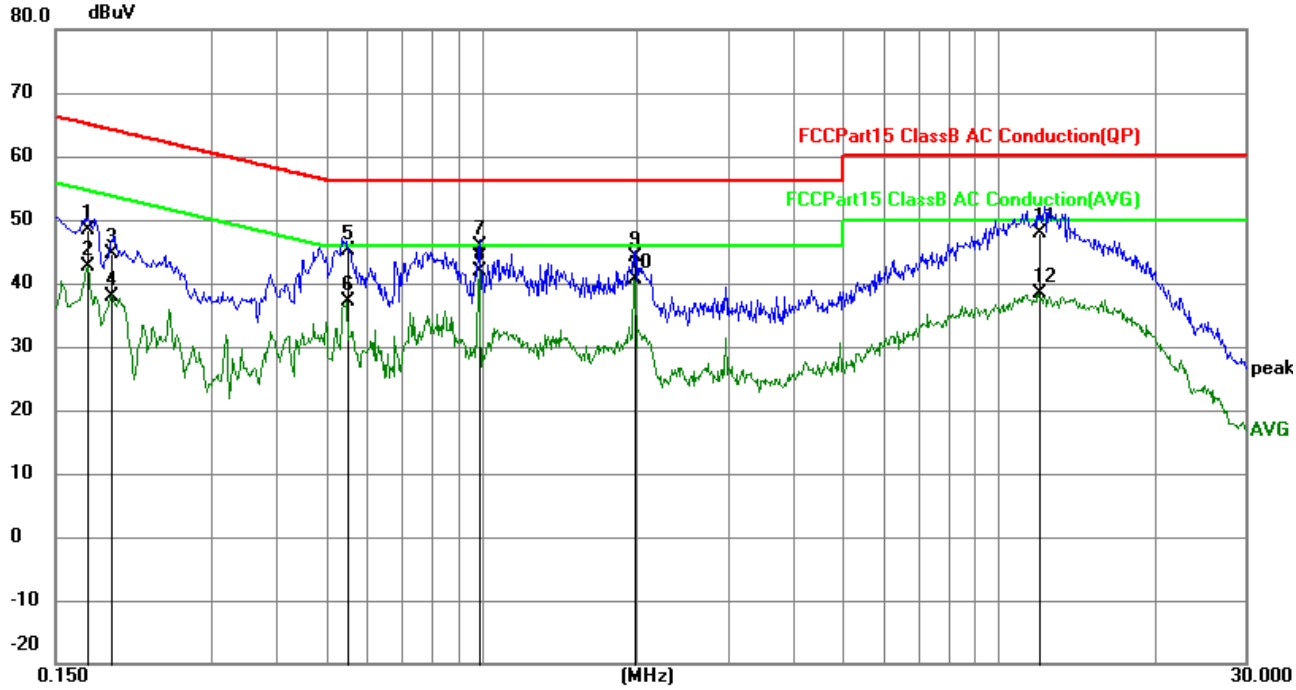
**Measurement data:**

**Line:**




| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB) | Level (dBuV) | Limit (dBuV) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|
| 1 | 0.1590 | 33.55 | 10.48 | 44.03 | 65.52 | -21.49 | QP |
| 2 | 0.1590 | 25.76 | 10.48 | 36.24 | 55.52 | -19.28 | AVG |
| 3 | 0.4561 | 33.14 | 10.37 | 43.51 | 56.76 | -13.25 | QP |
| 4 | 0.4561 | 28.10 | 10.37 | 38.47 | 46.76 | -8.29 | AVG |
| 5 | 0.5594 | 33.35 | 10.35 | 43.70 | 56.00 | -12.30 | QP |
| 6 | 0.5594 | 25.43 | 10.35 | 35.78 | 46.00 | -10.22 | AVG |
| 7 | 0.9909 | 33.20 | 10.29 | 43.49 | 56.00 | -12.51 | QP |
| 8 | 0.9909 | 29.26 | 10.29 | 39.55 | 46.00 | -6.45 | AVG |
| 9 | 1.9769 | 35.41 | 10.30 | 45.71 | 56.00 | -10.29 | QP |
| 10 | 1.9769 | 27.85 | 10.30 | 38.15 | 46.00 | -7.85 | AVG |
| 11 | 12.6645 | 41.10 | 10.41 | 51.51 | 60.00 | -8.49 | QP |
| 12 | 12.6645 | 33.60 | 10.41 | 44.01 | 50.00 | -5.99 | AVG |

**Neutral:**

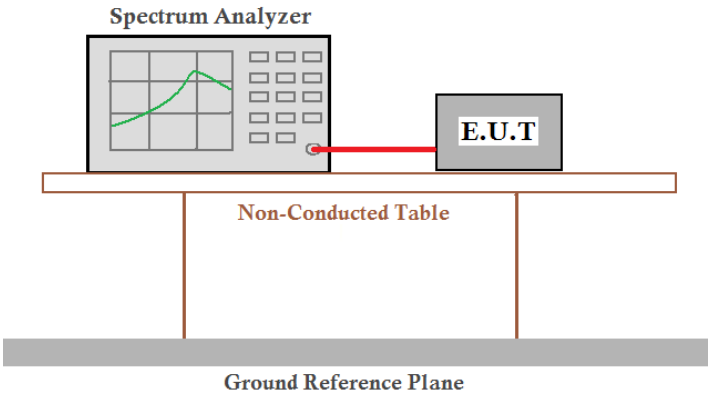



| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB) | Level (dBuV) | Limit (dBuV) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|
| 1 | 0.1728 | 37.90 | 10.47 | 48.37 | 64.82 | -16.45 | QP |
| 2 | 0.1728 | 32.09 | 10.47 | 42.56 | 54.82 | -12.26 | AVG |
| 3 | 0.1922 | 34.12 | 10.46 | 44.58 | 63.94 | -19.36 | QP |
| 4 | 0.1922 | 27.54 | 10.46 | 38.00 | 53.94 | -15.94 | AVG |
| 5 | 0.5503 | 34.74 | 10.35 | 45.09 | 56.00 | -10.91 | QP |
| 6 | 0.5503 | 26.68 | 10.35 | 37.03 | 46.00 | -8.97 | AVG |
| 7 | 0.9909 | 35.47 | 10.29 | 45.76 | 56.00 | -10.24 | QP |
| 8 | 0.9909 | 31.49 | 10.29 | 41.78 | 46.00 | -4.22 | AVG |
| 9 | 1.9769 | 33.78 | 10.30 | 44.08 | 56.00 | -11.92 | QP |
| 10 | 1.9769 | 30.26 | 10.30 | 40.56 | 46.00 | -5.44 | AVG |
| 11 | 11.9352 | 37.59 | 10.41 | 48.00 | 60.00 | -12.00 | QP |
| 12 | 11.9352 | 27.96 | 10.41 | 38.37 | 50.00 | -11.63 | AVG |

*Notes:*

1. *An initial pre-scan was performed on the line and neutral lines with peak detector.*
2. *Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.*
3. *Final Level =Receiver Read level + LISN Factor + Cable Loss*

## 7.3 Emission Bandwidth and 99% Occupied Bandwidth

| | |
|---|---|
| Test Requirement: | FCC Part15 E Section 15.407(b)(1) |
| Test Method: | KDB 789033 D02 General U-NII Test Procedures New Rules v02r01 |
| Limit: | N/A |
| Test setup: |  |
| Test procedure: | According to KDB 789033 D02 General U-NII Test Procedures New Rules v02r01. |
| Test Instruments: | Refer to section 5.10 for details |
| Test mode: | Refer to section 5.2 for details |
| Test results: | Pass |

**Measurement Data:**

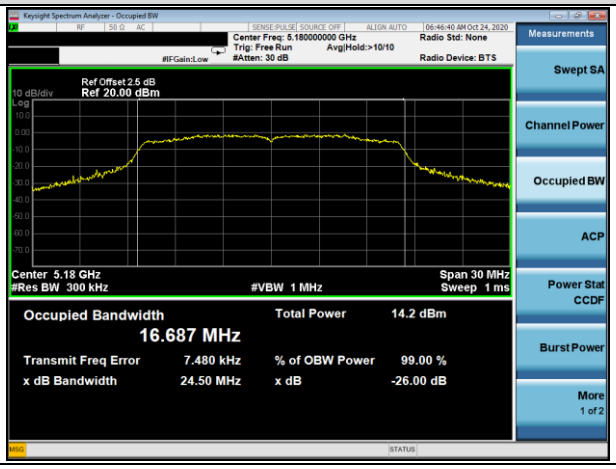
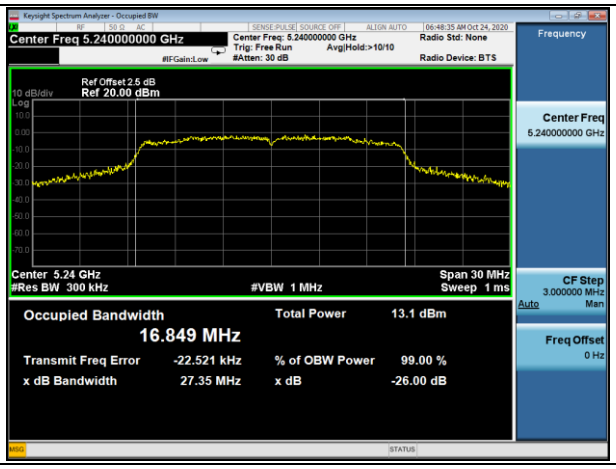
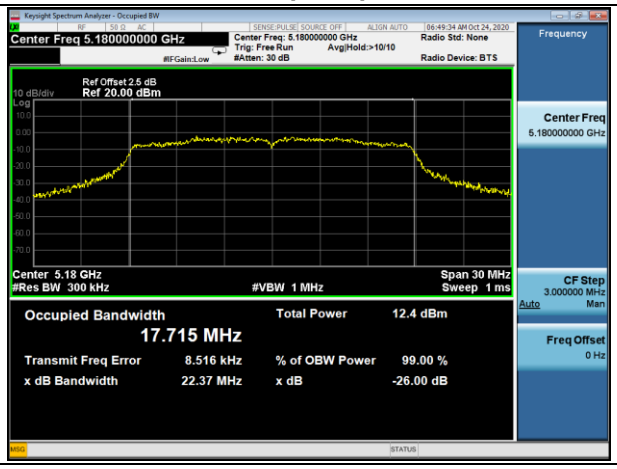
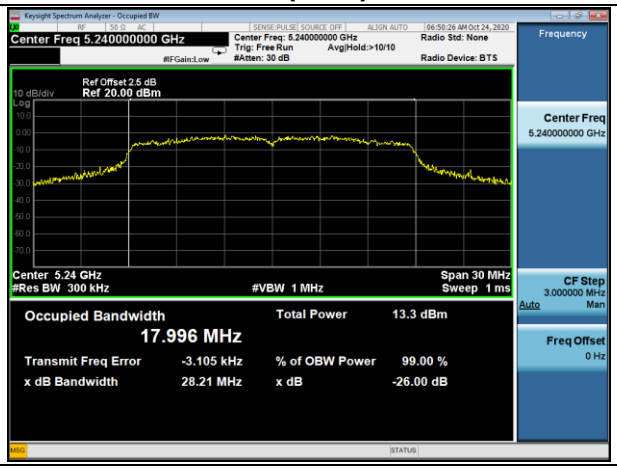
| CH. No. | Frequency (MHz) | 99% Occupied Bandwidth (MHz) | | | 26dB Occupied Bandwidth (MHz) | | |
|---|---|---|---|---|---|---|---|
| | | 802.11a | 802.11n (HT20) | 802.11ac (HT20) | 802.11a | 802.11n(HT 20) | 802.11ac (HT20) |
| 36 | 5180 | 16.687 | 17.715 | 17.697 | 24.50 | 22.37 | 22.94 |
| 40 | 5200 | 16.795 | 17.869 | 17.945 | 27.38 | 27.38 | 27.97 |
| 48 | 5240 | 16.849 | 17.996 | 18.014 | 27.35 | 28.21 | 28.80 |

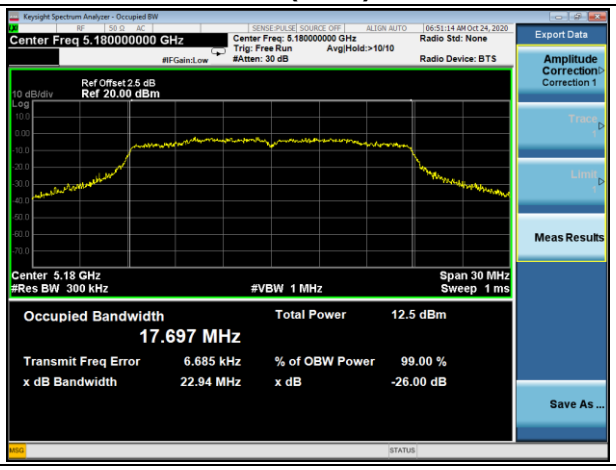
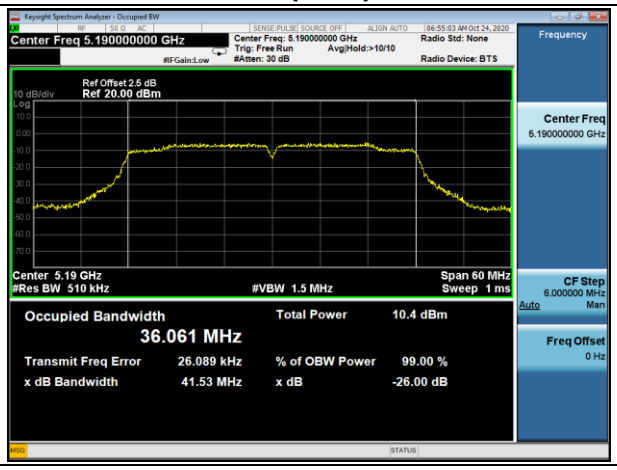
| CH. No. | Frequency (MHz) | 99% Occupied Bandwidth (MHz) | | 26dB Occupied Bandwidth (MHz) | |
|---|---|---|---|---|---|
| | | 802.11n(HT40) | 802.11ac (HT40) | 802.11n(HT40) | 802.11ac (HT40) |
| 38 | 5190 | 36.133 | 36.061 | 41.74 | 41.53 |
| 46 | 5230 | 36.486 | 36.533 | 59.34 | 58.73 |

| CH. No. | Frequency (MHz) | 99% Occupied Bandwidth (MHz) | 26dB Occupied Bandwidth (MHz) |
|---|---|---|---|
| | | 802.11ac (HT80) | 802.11ac (HT80) |
| 42 | 5210 | 75.480 | 102.80 |

**Test plots as followed:**

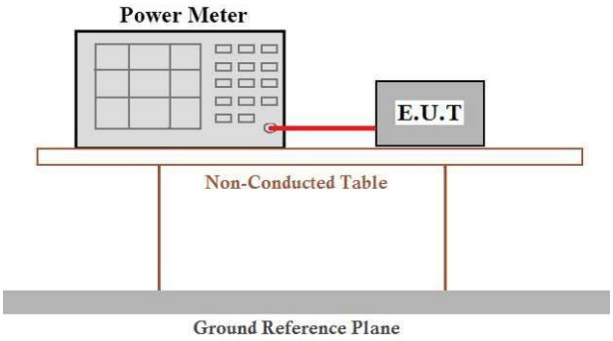
For Module1

| 802.11a 5180 | 802.11a 5200 |
|---|---|
|  |  |
| **802.11a 5240** | **802.11n (HT20) 5180** |
|  |  |
| **802.11n (HT20) 5200** | **802.11n (HT20) 5240** |
|  |  |

| 802.11n(HT40) 5190 | 802.11n(HT40) 5230 |
|---|---|
|  |  |
| **802.11ac(HT20) 5180** | **802.11ac(HT20) 5200** |
|  |  |
| **802.11ac(HT20) 5240** | **802.11ac(HT40) 5190** |
|  |  |

| 802.11ac(HT40) 5230 | 802.11ac(HT80) 5210 |
| --- | --- |
|  |  |

## 7.4 Peak Transmit Power

| | |
|---|---|
| Test Requirement: | FCC Part15 E Section 15.407 |
| Test Method: | KDB 789033 D02 General U-NII Test Procedures New Rules v02r01 |
| Limit: | <table><tr><td>Frequency band (MHz)</td><td>Limit</td></tr><tr><td rowspan="2">5150-5250</td><td>≤1W(30dBm) for master device</td></tr><tr><td>≤250mW(23.98dBm) for client device</td></tr><tr><td>5250-5350</td><td>≤250mW(23.98dBm) for client device or 11dBm+10logB*</td></tr><tr><td>5470-5725</td><td>≤250mW(23.98dBm) for client device or 11dBm+10logB*</td></tr><tr><td colspan="2">Remark: *Where B is the 26dB emission bandwidth in MHz.<br>The maximum conducted output power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage.</td></tr></table> |
| Test setup: |  |
| Test procedure: | **Measurement using an RF average power meter**<br>(i) Measurements may be performed using a wideband RF power meter with a thermocouple detector or equivalent if all of the conditions listed below are satisfied<br>a) The EUT is configured to transmit continuously or to transmit with a constant duty cycle.<br>b) At all times when the EUT is transmitting, it must be transmitting at its maximum power control level.<br>c) The integration period of the power meter exceeds the repetition period of the transmitted signal by at least a factor of five.<br>(ii) If the transmitter does not transmit continuously, measure the duty cycle, x, of the transmitter output signal as described in section B).<br>(iii) Measure the average power of the transmitter. This measurement is an average over both the on and off periods of the transmitter.<br>(iv) Adjust the measurement in dBm by adding 10 log(1/x) where x is the duty cycle (e.g., 10log(1/0.25) if the duty cycle is 25 percent). |
| Test Instruments: | Refer to section 5.10 for details |
| Test mode: | Refer to section 5.2 for details |
| Test results: | Pass |

**Measurement Data**

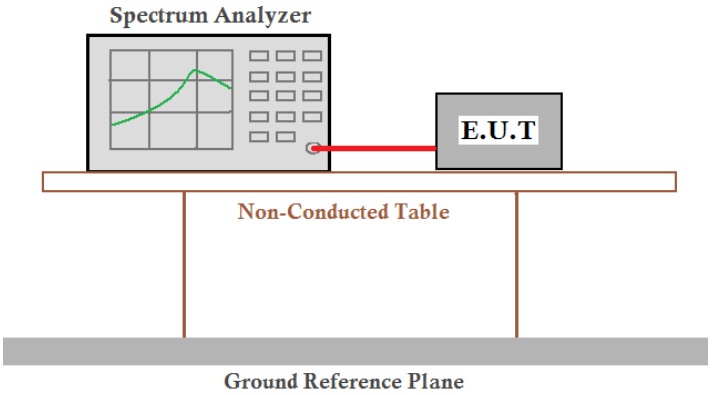
| Modulation | Duty cycle | Duty Factor |
|---|---|---|
| 802.11a | 100% | 0 |
| 802.11n(HT20) | 100% | 0 |
| 802.11n(HT40) | 100% | 0 |
| 802.11ac(HT20) | 100% | 0 |
| 802.11ac(HT40) | 100% | 0 |
| 802.11ac(HT80) | 100% | 0 |

| 802.11a mode | | | | | | |
|---|---|---|---|---|---|---|
| CH No. | Frequency (MHz) | Measured Power (dBm) | Duty Factor | Output Power (dBm) | Limit (dBm) | Result |
| 36 | 5180 | 6.12 | 0 | 6.12 | 23.98 | Pass |
| 40 | 5200 | 6.95 | 0 | 6.92 | 23.98 | Pass |
| 48 | 5240 | 6.36 | 0 | 6.36 | 23.98 | Pass |
| **802.11n(HT20) mode** | | | | | | |
| CH No. | Frequency (MHz) | Measured Power (dBm) | Duty Factor | Output Power (dBm) | Limit (dBm) | Result |
| 36 | 5180 | 5.38 | 0 | 5.38 | 23.98 | Pass |
| 40 | 5200 | 6.40 | 0 | 6.40 | 23.98 | Pass |
| 48 | 5240 | 6.27 | 0 | 6.27 | 23.98 | Pass |
| **802.11n(HT40) mode** | | | | | | |
| CH No. | Frequency (MHz) | Measured Power (dBm) | Duty Factor | Output Power (dBm) | Limit (dBm) | Result |
| 38 | 5190 | 4.45 | 0 | 4.45 | 23.98 | Pass |
| 46 | 5230 | 6.39 | 0 | 6.39 | 23.98 | Pass |
| **802.11ac(HT20) mode** | | | | | | |
| CH No. | Frequency (MHz) | Measured Power (dBm) | Duty Factor | Output Power (dBm) | Limit (dBm) | Result |
| 36 | 5180 | 5.61 | 0 | 5.61 | 23.98 | Pass |
| 40 | 5200 | 6.74 | 0 | 6.74 | 23.98 | Pass |
| 48 | 5240 | 6.24 | 0 | 6.24 | 23.98 | Pass |
| **802.11ac(HT40) mode** | | | | | | |
| CH No. | Frequency (MHz) | Measured Power (dBm) | Duty Factor | Output Power (dBm) | Limit (dBm) | Result |
| 38 | 5190 | 4.95 | 0 | 4.95 | 23.98 | Pass |
| 46 | 5230 | 6.44 | 0 | 6.44 | 23.98 | Pass |
| **802.11ac(HT80) mode** | | | | | | |
| CH No. | Frequency (MHz) | Measured Power (dBm) | Duty Factor | Output Power (dBm) | Limit (dBm) | Result |
| 42 | 5210 | 4.17 | 0 | 4.17 | 23.98 | Pass |

Note: Output Power = Measured Power + Duty Factor

Duty Factor = 10 log (1/Duty Cycle)

## 7.5 Power Spectral Density

<table>
<tr><td>Test Requirement:</td><td>FCC Part15 E Section 15.407</td></tr>
<tr><td>Test Method:</td><td>KDB 789033 D02 General U-NII Test Procedures New Rules v02r01</td></tr>
<tr><td>Limit:</td><td>
<table>
<tr><td>Frequency band (MHz)</td><td>Limit</td></tr>
<tr><td rowspan="2">5150-5250</td><td>≤17dBm in 1MHz for master device</td></tr>
<tr><td>≤11dBm in 1MHz for client device</td></tr>
<tr><td>5250-5350</td><td>≤11dBm in 1MHz for client device</td></tr>
<tr><td>5470-5725</td><td>≤11dBm in 1MHz for client device</td></tr>
<tr><td colspan="2">Remark: The maximum power spectral density is measured as a conducted emission by direct connection of a calibrated test instrument to the equipment under test.</td></tr>
</table>
</td></tr>
<tr><td>Test setup:</td><td> 
</td></tr>
<tr><td>Test procedure:</td><td>1) Create an average power spectrum for the EUT operating mode being tested by following the instructions in section E)2) for measuring maximum conducted output power using a spectrum analyzer or EMI receiver: select the appropriate test method (SA-1, SA-2, SA-3, or alternatives to each) and apply it up to, but not including, the step labeled, “Compute power…”.<br>2) Use the peak search function on the instrument to find the peak of the spectrum.<br>3) Make the following adjustments to the peak value of the spectrum, if applicable:<br>a) If Method SA-2 or SA-2 Alternative was used, add 10 log(1/x), where x is the duty cycle, to the peak of the spectrum.<br>b) If Method SA-3 Alternative was used and the linear mode was used in step E)2)g)(viii), add 1 dB to the final result to compensate for the difference between linear averaging and power averaging.<br>4) The result is the PSD.</td></tr>
<tr><td>Test Instruments:</td><td>Refer to section 5.10 for details</td></tr>
<tr><td>Test mode:</td><td>Refer to section 5.2 for details</td></tr>
<tr><td>Test results:</td><td>Pass</td></tr>
</table>

**Measurement Data**

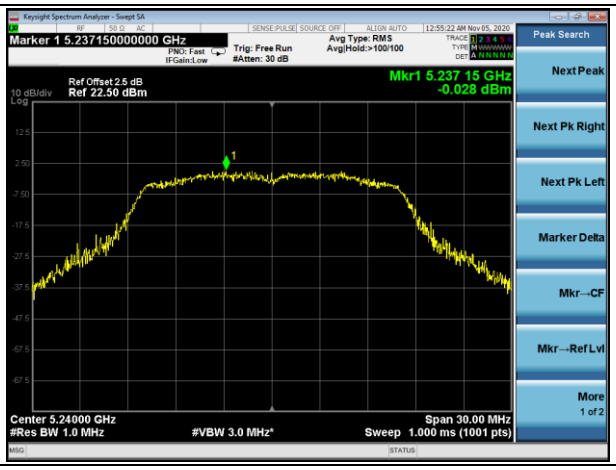
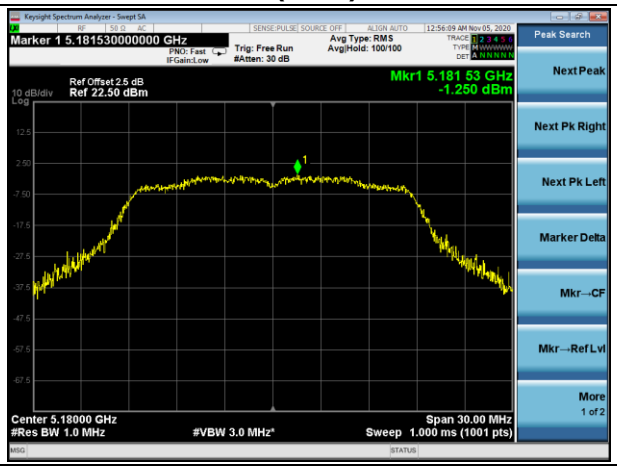
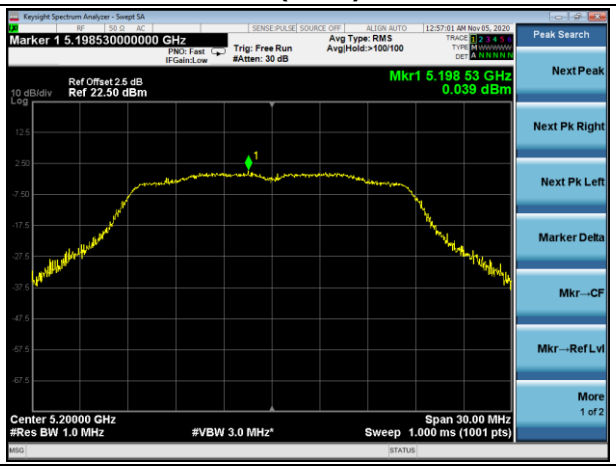
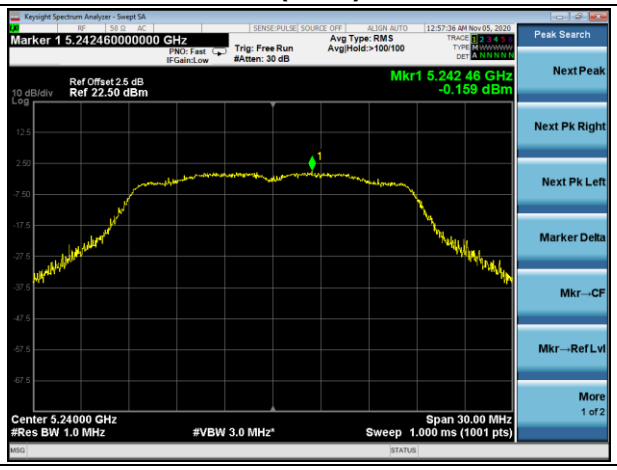
| Modulation | Duty cycle | Duty Factor |
|---|---|---|
| 802.11a | 100% | 0 |
| 802.11n(HT20) | 100% | 0 |
| 802.11n(HT40) | 100% | 0 |
| 802.11ac(HT20) | 100% | 0 |
| 802.11ac(HT40) | 100% | 0 |
| 802.11ac(HT80) | 100% | 0 |

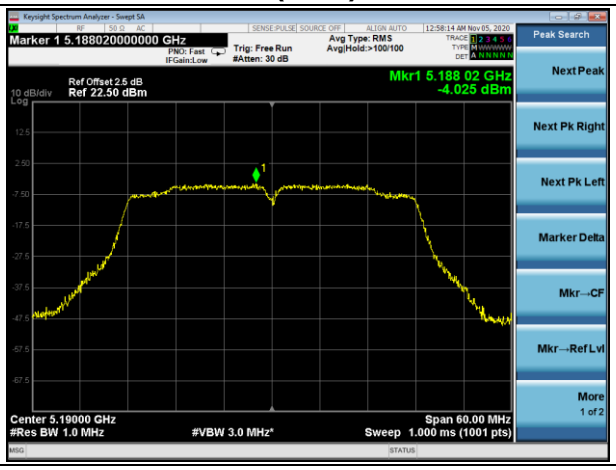
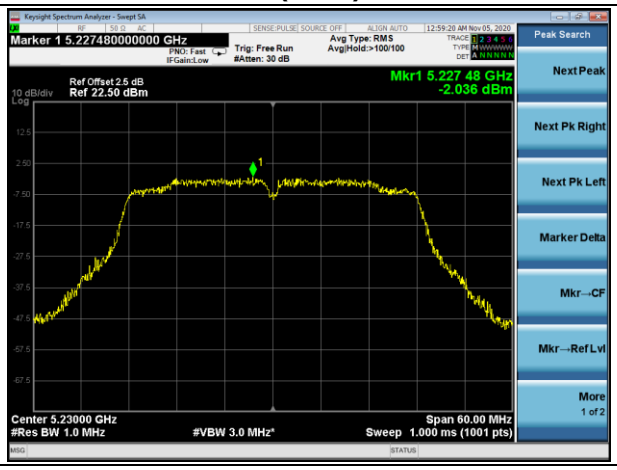
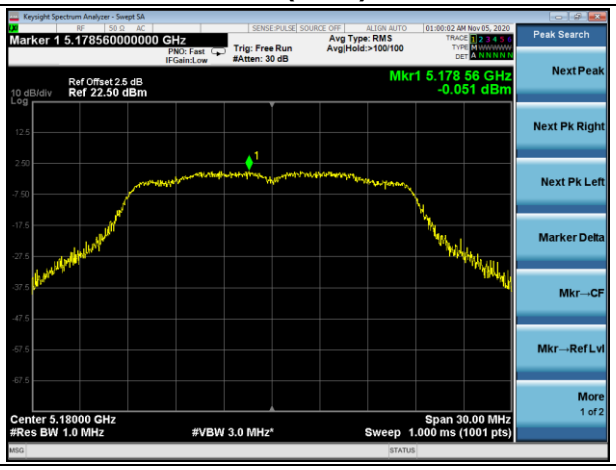
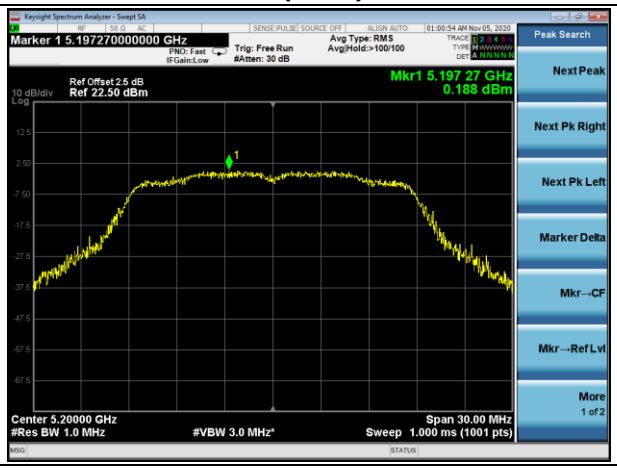
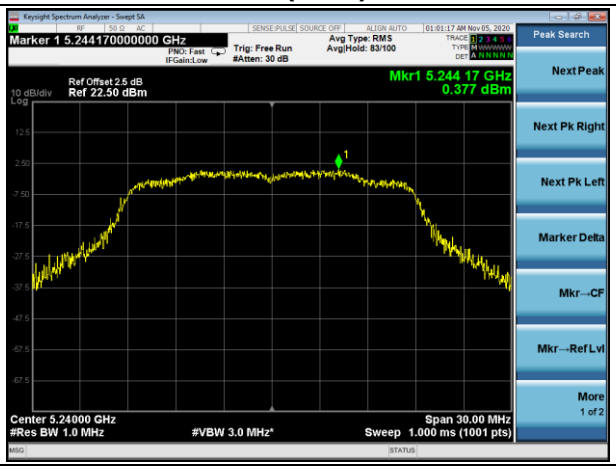
| 802.11a mode | | | | | | |
|---|---|---|---|---|---|---|
| CH No. | Frequency (MHz) | Measured PSD (dBm/MHz) | Duty Factor | Total PSD Power(dBm/MHz) | Limit (dBm/MHz) | Result |
| 36 | 5180 | -0.797 | 0 | -0.797 | 11 | Pass |
| 40 | 5200 | 0.471 | 0 | 0.471 | 11 | Pass |
| 48 | 5240 | -0.028 | 0 | -0.028 | 11 | Pass |
| **802.11n(HT20) mode** | | | | | | |
| CH No. | Frequency (MHz) | Measured PSD (dBm/MHz) | Duty Factor | Total PSD Power(dBm/MHz) | Limit (dBm/MHz) | Result |
| 36 | 5180 | -1.250 | 0 | -1.250 | 11 | Pass |
| 40 | 5200 | 0.039 | 0 | 0.039 | 11 | Pass |
| 48 | 5240 | -0.159 | 0 | -0.159 | 11 | Pass |
| **802.11n(HT40) mode** | | | | | | |
| CH No. | Frequency (MHz) | Measured PSD (dBm/MHz) | Duty Factor | Total PSD Power(dBm/MHz) | Limit (dBm/MHz) | Result |
| 38 | 5190 | -4.025 | 0 | -4.025 | 11 | Pass |
| 46 | 5230 | -2.036 | 0 | -2.036 | 11 | Pass |
| **802.11ac(HT20) mode** | | | | | | |
| CH No. | Frequency (MHz) | Measured PSD (dBm/MHz) | Duty Factor | Total PSD Power(dBm/MHz) | Limit (dBm/MHz) | Result |
| 36 | 5180 | -0.051 | 0 | -0.051 | 11 | Pass |
| 40 | 5200 | 0.188 | 0 | 0.188 | 11 | Pass |
| 48 | 5240 | 0.377 | 0 | 0.377 | 11 | Pass |
| **802.11ac(HT40) mode** | | | | | | |
| CH No. | Frequency (MHz) | Measured PSD (dBm/MHz) | Duty Factor | Total PSD Power(dBm/MHz) | Limit (dBm/MHz) | Result |
| 38 | 5190 | -5.698 | 0 | -5.698 | 11 | Pass |
| 46 | 5230 | -2.752 | 0 | -2.752 | 11 | Pass |
| **802.11ac(HT40) mode** | | | | | | |
| CH No. | Frequency (MHz) | Measured PSD (dBm/MHz) | Duty Factor | Total PSD Power(dBm/MHz) | Limit (dBm/MHz) | Result |
| 38 | 5190 | -5.475 | 0 | -5.475 | 11 | Pass |

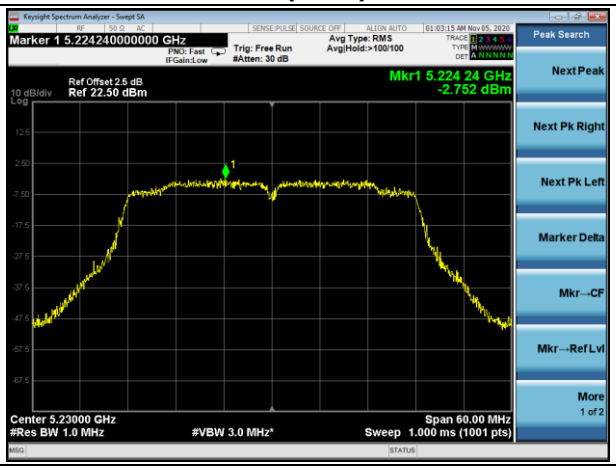
Note: Output Power = Measured Power + Duty Factor

Duty Factor = 10 log (1/Duty Cycle)

**Test plots as followed:**

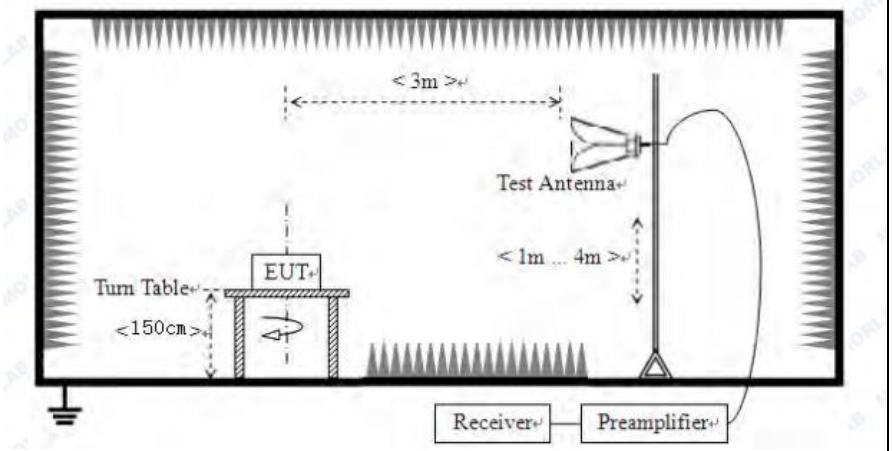
| 802.11a 5180 | 802.11a 5200 |
|---|---|
|  |  |
| **802.11a 5240** | **802.11n(HT20) 5180** |
|  |  |
| **802.11n(HT20) 5200** | **802.11n(HT20) 5240** |
|  |  |

| 802.11n(HT40) 5190 | 802.11n(HT40) 5230 |
|---|---|
|  |  |
| **802.11ac(HT20) 5180** | **802.11ac(HT20) 5200** |
|  |  |
| **802.11ac(HT20) 5240** | **802.11ac(HT40) 5190** |
|  |  |

| 802.11ac(HT40) 5230 | 802.11ac(HT80) 5210 |
|---|---|
|  |  |

## 7.6 Band Edge

<table>
<tr><td>Test Requirement:</td><td>FCC Part15 E Section 15.407 and 15.205</td></tr>
<tr><td>Test Method:</td><td>ANSI C63.10:2013</td></tr>
<tr><td>Test site:</td><td>Measurement Distance: 3m (Semi-Anechoic Chamber)</td></tr>
<tr><td>Receiver setup:</td><td>
<table>
<tr><td>Frequency</td><td>Detector</td><td>RBW</td><td>VBW</td><td>Remark</td></tr>
<tr><td>30MHz-1GHz</td><td>Quasi-peak</td><td>120KHz</td><td>300KHz</td><td>Quasi-peak Value</td></tr>
<tr><td rowspan="2">Above 1GHz</td><td>Peak</td><td>1MHz</td><td>3MHz</td><td>Peak Value</td></tr>
<tr><td>AV</td><td>1MHz</td><td>3MHz</td><td>Average Value</td></tr>
</table>
</td></tr>
<tr><td>Limit:</td><td>
<table>
<tr><td>Frequency</td><td>Limit (dBuV/m @3m)</td><td>Remark</td></tr>
<tr><td>30MHz-88MHz</td><td>40.0</td><td>Quasi-peak Value</td></tr>
<tr><td>88MHz-216MHz</td><td>43.5</td><td>Quasi-peak Value</td></tr>
<tr><td>216MHz-960MHz</td><td>46.0</td><td>Quasi-peak Value</td></tr>
<tr><td>960MHz-1GHz</td><td>54.0</td><td>Quasi-peak Value</td></tr>
<tr><td rowspan="2">Above 1GHz</td><td>54.0</td><td>Average Value</td></tr>
<tr><td>68.2</td><td>Peak Value</td></tr>
</table>
Undesirable emission limits:<br>
(1) For transmitters operating in the 5.15-5.25 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27 dBm/MHz.<br>
(2) For transmitters operating in the 5.25-5.35 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27 dBm/MHz. Devices operating in the 5.25-5.35 GHz band that generate emissions in the 5.15-5.25 GHz band must meet all applicable technical requirements for operation in the 5.15-5.25 GHz band (including indoor use) or alternatively meet an out-of-band emission EIRP limit of -27 dBm/MHz in the 5.15-5.25 GHz band.<br>
(3) For transmitters operating in the 5.47-5.725 GHz band: all emissions outside of the 5.47-5.725 GHz band shall not exceed an EIRP of −27 dBm/MHz.
</td></tr>
<tr><td>Test Procedure:</td><td>
a. The EUT was placed on the top of a rotating table 1.5 m above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.<br>
b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.<br>
c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.<br>
d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotable table was turned from 0 degrees to 360 degrees to find the maximum reading.<br>
e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.<br>
f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not
</td></tr>
</table>

| | |
|---|---|
| | have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet. |
| Test setup: | For radiated emissions above 1GHz   |
| Test Instruments: | Refer to section 5.10 for details |
| Test mode: | Refer to section 5.2 for details |
| Test results: | Pass |

*Remarks:*

1. *Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*
3. *The pre-test were performed on lowest, middle and highest frequencies, only the worst case's (lowest and highest frequencies) data was showed.*

**Measurement Data:**

| 802.11a(HT20) | | | | PK | | | | |
|---|---|---|---|---|---|---|---|---|
| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
| 5150.00 | 48.14 | 32.07 | 8.99 | 37.49 | 51.71 | 68.2 | -16.49 | Horizontal |
| 5350.00 | 47.48 | 31.75 | 9.29 | 37.20 | 51.32 | 68.2 | -16.88 | Horizontal |
| 5150.00 | 47.15 | 32.07 | 8.99 | 37.49 | 50.72 | 68.2 | -17.48 | Vertical |
| 5350.00 | 46.37 | 31.75 | 9.29 | 37.20 | 50.21 | 68.2 | -17.99 | Vertical |

| 802.11a(HT20) | | | | AV | | | | |
|---|---|---|---|---|---|---|---|---|
| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
| 5150.00 | 36.46 | 32.07 | 8.99 | 37.49 | 40.03 | 54.00 | -13.97 | Horizontal |
| 5350.00 | 35.74 | 31.75 | 9.29 | 37.20 | 39.58 | 54.00 | -14.42 | Horizontal |
| 5150.00 | 35.98 | 32.07 | 8.99 | 37.49 | 39.55 | 54.00 | -14.45 | Vertical |
| 5350.00 | 34.14 | 31.75 | 9.29 | 37.20 | 37.98 | 54.00 | -16.02 | Vertical |

| 802.11n(HT20) | | | | PK | | | | |
|---|---|---|---|---|---|---|---|---|
| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
| 5150.00 | 48.14 | 32.07 | 8.99 | 37.49 | 51.71 | 68.20 | -16.49 | Horizontal |
| 5350.00 | 47.09 | 31.75 | 9.29 | 37.20 | 50.93 | 68.20 | -17.27 | Horizontal |
| 5150.00 | 47.42 | 32.07 | 8.99 | 37.49 | 50.99 | 68.20 | -17.21 | Vertical |
| 5350.00 | 45.98 | 31.75 | 9.29 | 37.20 | 49.82 | 68.20 | -18.38 | Vertical |

| 802.11n(HT20) | | | | AV | | | | |
|---|---|---|---|---|---|---|---|---|
| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
| 5150.00 | 36.76 | 32.07 | 8.99 | 37.49 | 40.33 | 54.00 | -13.67 | Horizontal |
| 5350.00 | 35.69 | 31.75 | 9.29 | 37.20 | 39.53 | 54.00 | -14.47 | Horizontal |
| 5150.00 | 35.64 | 32.07 | 8.99 | 37.49 | 39.21 | 54.00 | -14.79 | Vertical |
| 5350.00 | 34.22 | 31.75 | 9.29 | 37.20 | 38.06 | 54.00 | -15.94 | Vertical |

| 802.11n(HT40) | | | | PK | | | | |
|---|---|---|---|---|---|---|---|---|
| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
| 5150.00 | 46.16 | 32.07 | 8.99 | 37.49 | 49.73 | 68.20 | -18.47 | Horizontal |
| 5350.00 | 45.38 | 31.75 | 9.29 | 37.20 | 49.22 | 68.20 | -18.98 | Horizontal |
| 5150.00 | 45.19 | 32.07 | 8.99 | 37.49 | 48.76 | 68.20 | -19.44 | Vertical |
| 5350.00 | 44.52 | 31.75 | 9.29 | 37.20 | 48.36 | 68.20 | -19.84 | Vertical |

| 802.11n(HT40) | | | | | AV | | | |
|---|---|---|---|---|---|---|---|---|
| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
| 5150.00 | 36.36 | 32.07 | 8.99 | 37.49 | 39.93 | 54.00 | -14.07 | Horizontal |
| 5350.00 | 35.18 | 31.75 | 9.29 | 37.20 | 39.02 | 54.00 | -14.98 | Horizontal |
| 5150.00 | 35.43 | 32.07 | 8.99 | 37.49 | 39.00 | 54.00 | -15.00 | Vertical |
| 5350.00 | 35.17 | 31.75 | 9.29 | 37.20 | 39.01 | 54.00 | -14.99 | Vertical |

| 802.11ac(HT20) | | | | | PK | | | |
|---|---|---|---|---|---|---|---|---|
| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
| 5150.00 | 47.27 | 32.07 | 8.99 | 37.49 | 50.84 | 68.20 | -17.36 | Horizontal |
| 5350.00 | 46.19 | 31.75 | 9.29 | 37.20 | 50.03 | 68.20 | -18.17 | Horizontal |
| 5150.00 | 46.32 | 32.07 | 8.99 | 37.49 | 49.89 | 68.20 | -18.31 | Vertical |
| 5350.00 | 45.56 | 31.75 | 9.29 | 37.20 | 49.40 | 68.20 | -18.80 | Vertical |

| 802.11ac(HT20) | | | | | AV | | | |
|---|---|---|---|---|---|---|---|---|
| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
| 5150.00 | 37.32 | 32.07 | 8.99 | 37.49 | 40.89 | 54.00 | -13.11 | Horizontal |
| 5350.00 | 36.38 | 31.75 | 9.29 | 37.20 | 40.22 | 54.00 | -13.78 | Horizontal |
| 5150.00 | 35.14 | 32.07 | 8.99 | 37.49 | 38.71 | 54.00 | -15.29 | Vertical |
| 5350.00 | 36.39 | 31.75 | 9.29 | 37.20 | 40.23 | 54.00 | -13.77 | Vertical |

| 802.11ac(HT40) | | | | | PK | | | |
|---|---|---|---|---|---|---|---|---|
| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
| 5150.00 | 45.48 | 32.07 | 8.99 | 37.49 | 49.05 | 68.20 | -19.15 | Horizontal |
| 5350.00 | 44.17 | 31.75 | 9.29 | 37.20 | 48.01 | 68.20 | -20.19 | Horizontal |
| 5150.00 | 44.38 | 32.07 | 8.99 | 37.49 | 47.95 | 68.20 | -20.25 | Vertical |
| 5350.00 | 42.75 | 31.75 | 9.29 | 37.20 | 46.59 | 68.20 | -21.61 | Vertical |

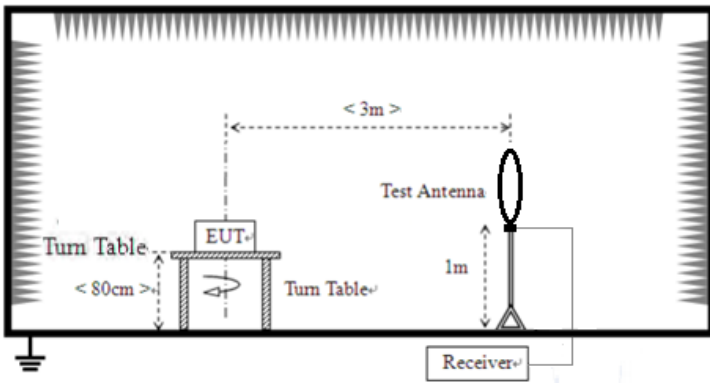
| 802.11ac(HT40) | | | | | AV | | | |
|---|---|---|---|---|---|---|---|---|
| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
| 5150.00 | 35.17 | 32.07 | 8.99 | 37.49 | 38.74 | 54.00 | -15.26 | Horizontal |
| 5350.00 | 34.09 | 31.75 | 9.29 | 37.20 | 37.93 | 54.00 | -16.07 | Horizontal |
| 5150.00 | 34.37 | 32.07 | 8.99 | 37.49 | 37.94 | 54.00 | -16.06 | Vertical |
| 5350.00 | 35.16 | 31.75 | 9.29 | 37.20 | 39.00 | 54.00 | -15.00 | Vertical |

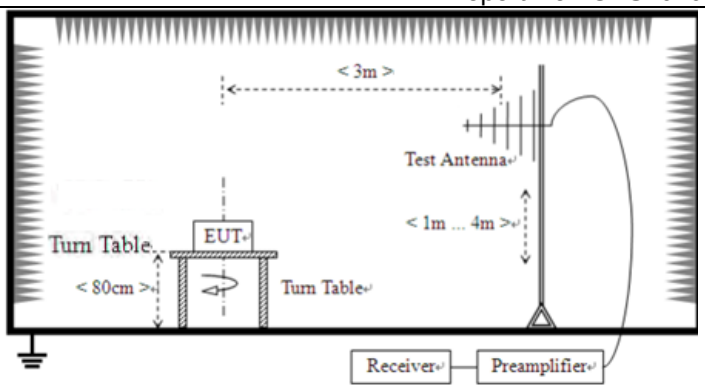
| 802.11ac(HT80) | | | | | PK | | | |
|---|---|---|---|---|---|---|---|---|
| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
| 5150.00 | 44.17 | 32.07 | 8.99 | 37.49 | 47.74 | 68.20 | -20.46 | Horizontal |
| 5350.00 | 43.35 | 31.75 | 9.29 | 37.20 | 47.19 | 68.20 | -21.01 | Horizontal |
| 5150.00 | 42.26 | 32.07 | 8.99 | 37.49 | 45.83 | 68.20 | -22.37 | Vertical |
| 5350.00 | 42.09 | 31.75 | 9.29 | 37.20 | 45.93 | 68.20 | -22.27 | Vertical |

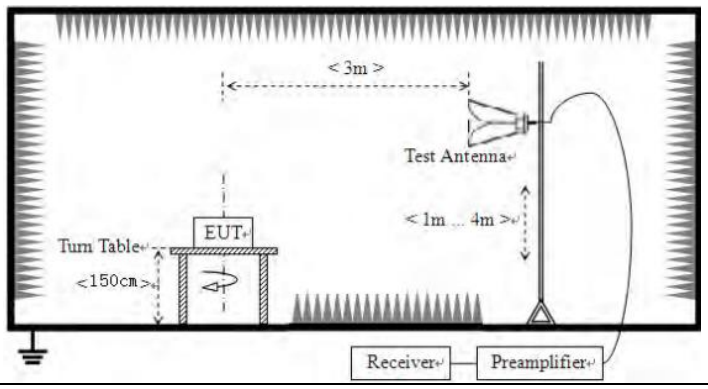
| 802.11ac(HT80) | | | | | AV | | | |
|---|---|---|---|---|---|---|---|---|
| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
| 5150.00 | 33.81 | 32.07 | 8.99 | 37.49 | 37.38 | 54.00 | -16.62 | Horizontal |
| 5350.00 | 32.26 | 31.75 | 9.29 | 37.20 | 36.10 | 54.00 | -17.90 | Horizontal |
| 5150.00 | 31.45 | 32.07 | 8.99 | 37.49 | 35.02 | 54.00 | -18.98 | Vertical |
| 5350.00 | 32.16 | 31.75 | 9.29 | 37.20 | 36.16 | 54.00 | -17.84 | Vertical |

## 7.7 Radiated Emission

<table>
<tr><td>Test Requirement:</td><td>FCC Part15 C Section 15.209 and 15.205</td></tr>
<tr><td>Test Method:</td><td>ANSI C63.10:2013</td></tr>
<tr><td>Test Frequency Range:</td><td>9kHz to 40GHz</td></tr>
<tr><td>Test site:</td><td>Measurement Distance: 3m (Semi-Anechoic Chamber)</td></tr>
<tr><td>Receiver setup:</td><td>
<table>
<tr><th>Frequency</th><th>Detector</th><th>RBW</th><th>VBW</th><th>Value</th></tr>
<tr><td>9kHz-150KHz</td><td>Quasi-peak</td><td>200Hz</td><td>1kHz</td><td>Quasi-peak Value</td></tr>
<tr><td>150kHz-30MHz</td><td>Quasi-peak</td><td>9kHz</td><td>30kHz</td><td>Quasi-peak Value</td></tr>
<tr><td>30MHz-1GHz</td><td>Quasi-peak</td><td>120KHz</td><td>300KHz</td><td>Quasi-peak Value</td></tr>
<tr><td rowspan="2">Above 1GHz</td><td>Peak</td><td>1MHz</td><td>3MHz</td><td>Peak Value</td></tr>
<tr><td>AV</td><td>1MHz</td><td>3MHz</td><td>Average Value</td></tr>
</table>
</td></tr>
<tr><td>Limit:</td><td>
<table>
<tr><th>Frequency</th><th>Limit (uV/m)</th><th>Value</th><th>Measurement Distance</th></tr>
<tr><td>0.009MHz-0.490MHz</td><td>2400/F(KHz)</td><td>QP</td><td>300m</td></tr>
<tr><td>0.490MHz-1.705MHz</td><td>24000/F(KHz)</td><td>QP</td><td>300m</td></tr>
<tr><td>1.705MHz-30MHz</td><td>30</td><td>QP</td><td>30m</td></tr>
<tr><td>30MHz-88MHz</td><td>100</td><td>QP</td><td rowspan="6">3m</td></tr>
<tr><td>88MHz-216MHz</td><td>150</td><td>QP</td></tr>
<tr><td>216MHz-960MHz</td><td>200</td><td>QP</td></tr>
<tr><td>960MHz-1GHz</td><td>500</td><td>QP</td></tr>
<tr><td rowspan="2">Above 1GHz</td><td>500</td><td>Average</td></tr>
<tr><td>5000</td><td>Peak</td></tr>
</table>
</td></tr>
<tr><td>Test Procedure:</td><td>Substitution method was performed to determine the actual ERP emission levels of the EUT.<br>The following test procedure as below:<br>1>.Below 1GHz test procedure:<br>1. The EUT was placed on the top of a rotating table (0.8m for below 1GHz and 1.5 meters for above 1GHz) above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.<br>2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.<br>3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.<br>4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotable table was turned from 0 degrees to 360 degrees to find the maximum reading.<br>5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.<br>6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.<br>2>.Above 1GHz test procedure:</td></tr>
</table>

| | |
|---|---|
| | 1. On the test site as test setup graph above,the EUT shall be placed at the 0.8m support on the turntable and in the position closest to normal use as declared by the provider.<br>2. The test antenna shall be oriented initially for vertical polarization and shall be chosen to correspond to the frequency of the transmitter.The output of the test antenna shall be connected to the measuring receiver.<br>3. The transmitter shall be switched on, if possible, without modulation and the measuring receiver shall be tuned to the frequency of the transmitter under test.<br>4. The test antenna shall be raised and lowered from 1m to 4m until a maximum signal level is detected by the measuring receiver. Then the turntable should be rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver.<br>5. Repeat step 4 for test frequency with the test antenna polarized horizontally.<br>6. Remove the transmitter and replace it with a substitution antenna<br>7. Feed the substitution antenna at the transmitter end with a signal generator connected to the antenna by means of a nonradiating cable. With the antennas at both ends vertically polarized, and with the signal generator tuned to a particular test frequency, raise and lower the test antenna to obtain a maximum reading at the spectrum analyzer. Adjust the level of the signal generator output until the previously recorded maximum reading for this set of conditions is obtained. This should be done carefully repeating the adjustment of the test antenna and generator output.<br>8. Repeat step 7 with both antennas horizontally polarized for each test frequency.<br>9. Calculate power in dBm into a reference ideal half-wave dipole antenna by reducing the readings obtained in steps 7 and 8 by the power loss in the cable between the generator and the antenna, and further corrected for the gain of the substitution antenna used relative to an ideal half-wave dipole antenna by the following formula:<br>EIRP(dBm) = Pg(dBm) – cable loss (dB) + antenna gain (dBi)<br>where:<br>Pg is the generator output power into the substitution antenna. |
| Test setup: | For radiated emissions from 9kHz to 30MHz<br>  <br><br>For radiated emissions from 30MHz to1GHz |

<table>
<tr><td></td><td colspan="6"> 

For radiated emissions above 1GHz

</td></tr>
<tr><td>Test Instruments:</td><td colspan="6">Refer to section 5.10 for details</td></tr>
<tr><td>Test mode:</td><td colspan="6">Refer to section 5.2 for details</td></tr>
<tr><td>Test environment:</td><td>Temp.:</td><td>25 °C</td><td>Humid.:</td><td>52%</td><td>Press.:</td><td>1012mbar</td></tr>
<tr><td>Test voltage:</td><td colspan="6">AC 120V, 60Hz</td></tr>
<tr><td>Test results:</td><td colspan="6">Pass</td></tr>
</table>

*Remarks:*

*1. Pre-scan all kind of the place mode (X-axis, Y-axis, Z-axis), and found the Y-axis which it is worse case.*

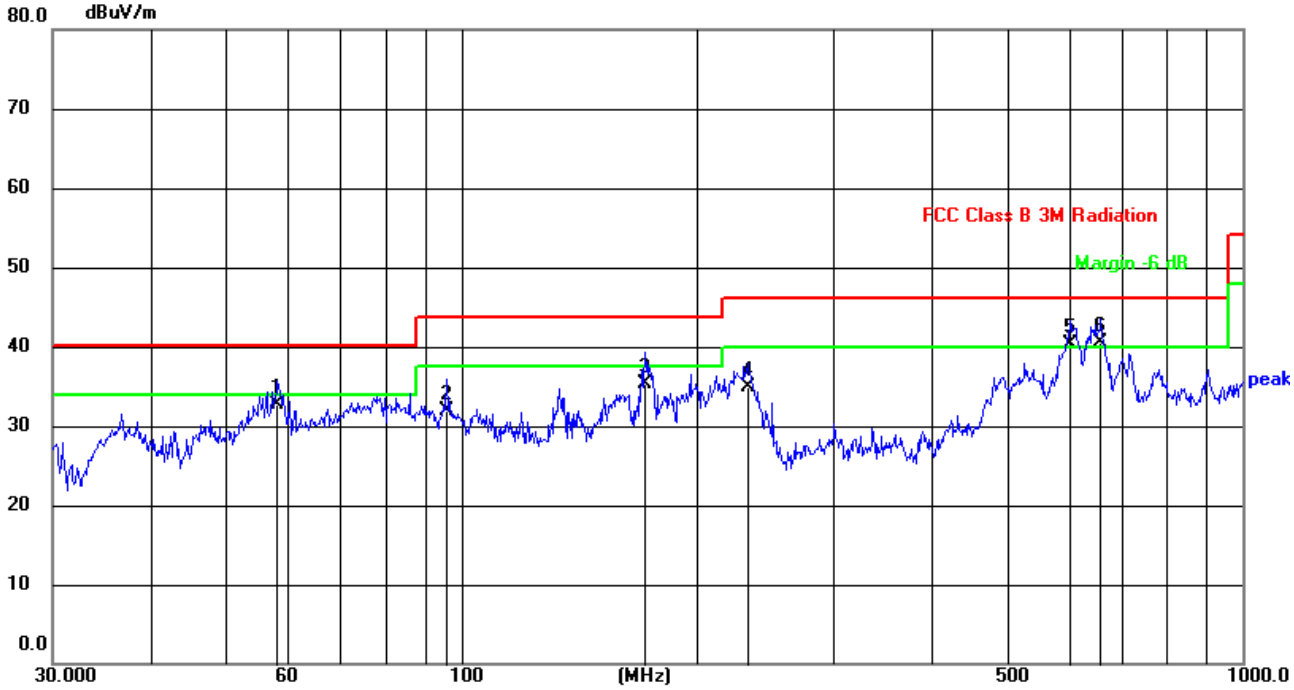
**Measurement Data:**

**9 kHz ~ 30 MHz**

The low frequency, which started from 9 kHz to 30 MHz, was pre-scanned and the result which was 20 dB lower than the limit line per 15.31(o) was not reported.

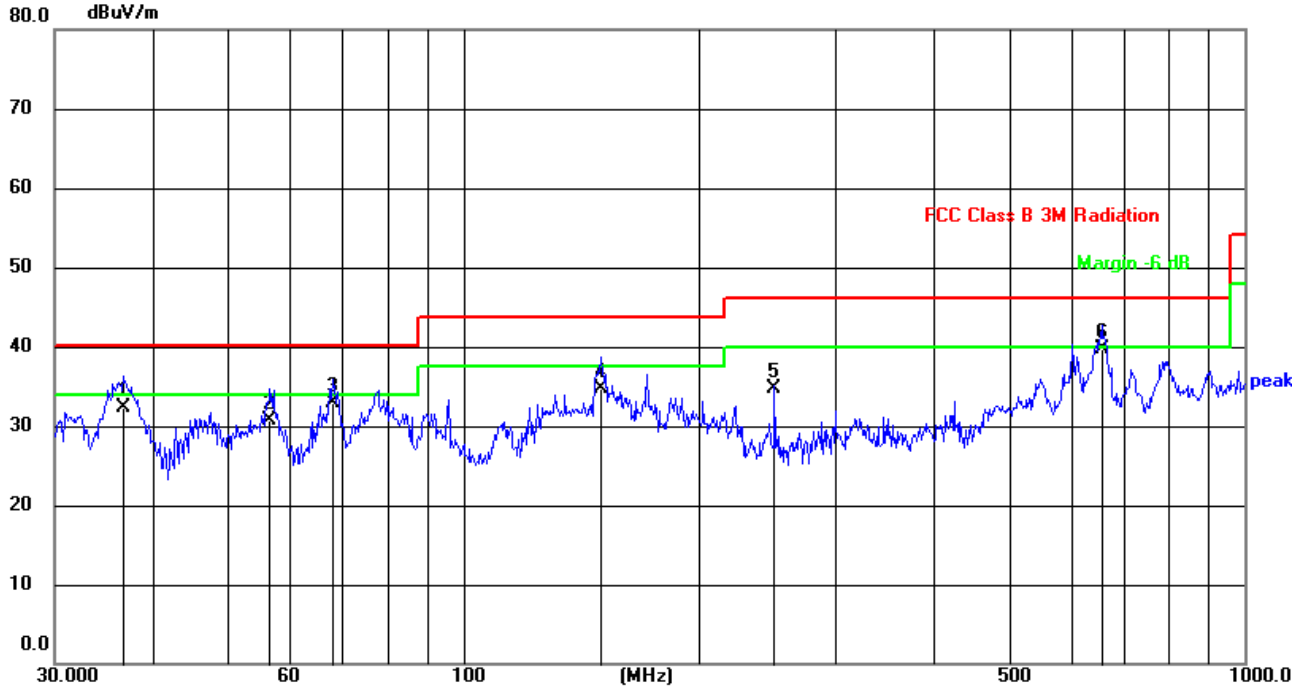
**30MHz~ 1GHz**

**Horizontal:**




| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|
| 1 | 58.2028 | 53.39 | -20.77 | 32.62 | 40.00 | -7.38 | QP |
| 2 | 95.7622 | 51.87 | -20.01 | 31.86 | 43.50 | -11.64 | QP |
| 3 | 171.9944 | 53.86 | -18.50 | 35.36 | 43.50 | -8.14 | QP |
| 4 | 232.5318 | 53.11 | -18.29 | 34.82 | 46.00 | -11.18 | QP |
| 5 | 601.4265 | 51.45 | -11.15 | 40.30 | 46.00 | -5.70 | QP |
| 6 | 658.8360 | 50.19 | -9.76 | 40.43 | 46.00 | -5.57 | QP |

**Vertical:**




| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|
| 1 | 36.7661 | 53.40 | -21.05 | 32.35 | 40.00 | -7.65 | QP |
| 2 | 56.5929 | 51.58 | -20.81 | 30.77 | 40.00 | -9.23 | QP |
| 3 | 68.1512 | 53.42 | -20.58 | 32.84 | 40.00 | -7.16 | QP |
| 4 | 150.0107 | 53.67 | -18.95 | 34.72 | 43.50 | -8.78 | QP |
| 5 | 250.3009 | 52.89 | -18.20 | 34.69 | 46.00 | -11.31 | QP |
| 6 | 656.5300 | 49.53 | -9.80 | 39.73 | 46.00 | -6.27 | QP |

**Above 1GHz:**

**802.11a(HT20) 5180MHz**

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
|---|---|---|---|---|---|---|---|---|
| 10360.00 | 39.34 | 39.67 | 14.62 | 32.65 | 60.98 | 74.00 | -13.02 | Vertical |
| 15540.00 | 38.87 | 38.60 | 17.66 | 34.46 | 60.67 | 74.00 | -13.33 | Vertical |
| 10360.00 | 38.65 | 39.67 | 14.62 | 32.65 | 60.29 | 74.00 | -13.71 | Horizontal |
| 15540.00 | 37.21 | 38.60 | 17.66 | 34.46 | 59.01 | 74.00 | -14.99 | Horizontal |

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
|---|---|---|---|---|---|---|---|---|
| 10360.00 | 26.63 | 39.67 | 14.62 | 32.65 | 48.27 | 54.00 | -5.73 | Vertical |
| 15540.00 | 27.25 | 38.60 | 17.66 | 34.46 | 49.05 | 54.00 | -4.95 | Vertical |
| 10360.00 | 23.47 | 39.67 | 14.62 | 32.65 | 45.11 | 54.00 | -8.89 | Horizontal |
| 15540.00 | 25.17 | 38.60 | 17.66 | 34.46 | 46.97 | 54.00 | -7.03 | Horizontal |

**802.11a(HT20) 5200MHz**

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
|---|---|---|---|---|---|---|---|---|
| 10400.00 | 38.51 | 39.75 | 14.63 | 32.71 | 60.18 | 74.00 | -13.82 | Vertical |
| 15600.00 | 39.88 | 38.33 | 17.67 | 34.17 | 61.71 | 74.00 | -12.29 | Vertical |
| 10400.00 | 35.16 | 39.75 | 14.63 | 32.71 | 56.83 | 74.00 | -17.17 | Horizontal |
| 15600.00 | 39.37 | 38.33 | 17.67 | 34.17 | 61.20 | 74.00 | -12.80 | Horizontal |

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
|---|---|---|---|---|---|---|---|---|
| 10400.00 | 26.83 | 39.75 | 14.63 | 32.71 | 48.50 | 54.00 | -5.50 | Vertical |
| 15600.00 | 25.15 | 38.33 | 17.67 | 34.17 | 46.98 | 54.00 | -7.02 | Vertical |
| 10400.00 | 25.07 | 39.75 | 14.63 | 32.71 | 46.74 | 54.00 | -7.26 | Horizontal |
| 15600.00 | 26.27 | 38.33 | 17.67 | 34.17 | 48.10 | 54.00 | -5.90 | Horizontal |

**802.11a(HT20) 5240MHz**

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
|---|---|---|---|---|---|---|---|---|
| 10480.00 | 39.15 | 39.82 | 14.68 | 32.86 | 60.79 | 74.00 | -13.21 | Vertical |
| 15720.00 | 39.41 | 38.09 | 17.73 | 33.66 | 61.57 | 74.00 | -12.43 | Vertical |
| 10480.00 | 40.26 | 39.82 | 14.68 | 32.86 | 61.90 | 74.00 | -12.10 | Horizontal |
| 15720.00 | 41.09 | 38.09 | 17.73 | 33.66 | 63.25 | 74.00 | -10.75 | Horizontal |

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
|---|---|---|---|---|---|---|---|---|
| 10480.00 | 25.32 | 39.82 | 14.68 | 32.86 | 46.96 | 54.00 | -7.04 | Vertical |
| 15720.00 | 25.27 | 38.09 | 17.73 | 33.66 | 47.43 | 54.00 | -6.57 | Vertical |
| 10480.00 | 24.62 | 39.82 | 14.68 | 32.86 | 46.26 | 54.00 | -7.74 | Horizontal |
| 15720.00 | 24.21 | 38.09 | 17.73 | 33.66 | 46.37 | 54.00 | -7.63 | Horizontal |

**802.11n(HT20) 5180MHz**

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
|---|---|---|---|---|---|---|---|---|
| 10360.00 | 40.13 | 39.67 | 14.62 | 32.65 | 61.77 | 74.00 | -12.23 | Vertical |
| 15540.00 | 39.22 | 38.60 | 17.66 | 34.46 | 61.02 | 74.00 | -12.98 | Vertical |
| 10360.00 | 38.69 | 39.67 | 14.62 | 32.65 | 60.33 | 74.00 | -13.67 | Horizontal |
| 15540.00 | 35.14 | 38.60 | 17.66 | 34.46 | 56.94 | 74.00 | -17.06 | Horizontal |

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
|---|---|---|---|---|---|---|---|---|
| 10360.00 | 26.42 | 39.67 | 14.62 | 32.65 | 48.06 | 54.00 | -5.94 | Vertical |
| 15540.00 | 27.09 | 38.60 | 17.66 | 34.46 | 48.89 | 54.00 | -5.11 | Vertical |
| 10360.00 | 25.57 | 39.67 | 14.62 | 32.65 | 47.21 | 54.00 | -6.79 | Horizontal |
| 15540.00 | 24.26 | 38.60 | 17.66 | 34.46 | 46.06 | 54.00 | -7.94 | Horizontal |

**802.11n(HT20) 5200MHz**

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
|---|---|---|---|---|---|---|---|---|
| 10400.00 | 40.32 | 39.75 | 14.63 | 32.71 | 61.99 | 74.00 | -12.01 | Vertical |
| 15600.00 | 39.13 | 38.33 | 17.67 | 34.17 | 60.96 | 74.00 | -13.04 | Vertical |
| 10400.00 | 35.76 | 39.75 | 14.63 | 32.71 | 57.43 | 74.00 | -16.57 | Horizontal |
| 15600.00 | 35.12 | 38.33 | 17.67 | 34.17 | 56.95 | 74.00 | -17.05 | Horizontal |

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
|---|---|---|---|---|---|---|---|---|
| 10400.00 | 26.32 | 39.75 | 14.63 | 32.71 | 47.99 | 54.00 | -6.01 | Vertical |
| 15600.00 | 25.91 | 38.33 | 17.67 | 34.17 | 47.74 | 54.00 | -6.26 | Vertical |
| 10400.00 | 24.27 | 39.75 | 14.63 | 32.71 | 45.94 | 54.00 | -8.06 | Horizontal |
| 15600.00 | 24.18 | 38.33 | 17.67 | 34.17 | 46.01 | 54.00 | -7.99 | Horizontal |

**802.11n(HT20) 5240MHz**

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
|---|---|---|---|---|---|---|---|---|
| 10480.00 | 39.11 | 39.82 | 14.68 | 32.86 | 60.75 | 74.00 | -13.25 | Vertical |
| 15720.00 | 39.59 | 38.09 | 17.73 | 33.66 | 61.75 | 74.00 | -12.25 | Vertical |
| 10480.00 | 34.32 | 39.82 | 14.68 | 32.86 | 55.96 | 74.00 | -18.04 | Horizontal |
| 15720.00 | 35.17 | 38.09 | 17.73 | 33.66 | 57.33 | 74.00 | -16.67 | Horizontal |

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
|---|---|---|---|---|---|---|---|---|
| 10480.00 | 23.12 | 39.82 | 14.68 | 32.86 | 44.76 | 54.00 | -9.24 | Vertical |
| 15720.00 | 22.83 | 38.09 | 17.73 | 33.66 | 44.99 | 54.00 | -9.01 | Vertical |
| 10480.00 | 21.26 | 39.82 | 14.68 | 32.86 | 42.90 | 54.00 | -11.10 | Horizontal |
| 15720.00 | 23.19 | 38.09 | 17.73 | 33.66 | 45.35 | 54.00 | -8.65 | Horizontal |

**802.11n(HT40) 5190MHz**

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
|---|---|---|---|---|---|---|---|---|
| 10380.00 | 32.13 | 39.71 | 14.63 | 32.68 | 53.79 | 74.00 | -20.21 | Vertical |
| 15570.00 | 35.44 | 38.46 | 17.67 | 34.32 | 57.25 | 74.00 | -16.75 | Vertical |
| 10380.00 | 32.14 | 39.71 | 14.63 | 32.68 | 53.80 | 74.00 | -20.20 | Horizontal |
| 15570.00 | 32.09 | 38.46 | 17.67 | 34.32 | 53.90 | 74.00 | -20.10 | Horizontal |

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
|---|---|---|---|---|---|---|---|---|
| 10380.00 | 22.03 | 39.71 | 14.63 | 32.68 | 43.69 | 54.00 | -10.31 | Vertical |
| 15570.00 | 21.44 | 38.46 | 17.67 | 34.32 | 43.25 | 54.00 | -10.75 | Vertical |
| 10380.00 | 20.69 | 39.71 | 14.63 | 32.68 | 42.35 | 54.00 | -11.65 | Horizontal |
| 15570.00 | 21.52 | 38.46 | 17.67 | 34.32 | 43.33 | 54.00 | -10.67 | Horizontal |

**802.11n(HT40) 5230MHz**

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
|---|---|---|---|---|---|---|---|---|
| 10460.00 | 37.21 | 39.75 | 14.65 | 32.74 | 58.87 | 74.00 | -15.13 | Vertical |
| 15690.00 | 35.76 | 38.33 | 17.69 | 34.03 | 57.75 | 74.00 | -16.25 | Vertical |
| 10460.00 | 35.15 | 39.75 | 14.65 | 32.74 | 56.81 | 74.00 | -17.19 | Horizontal |
| 15690.00 | 37.59 | 38.33 | 17.69 | 34.03 | 59.58 | 74.00 | -14.42 | Horizontal |

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
|---|---|---|---|---|---|---|---|---|
| 10460.00 | 26.32 | 39.75 | 14.65 | 32.74 | 47.98 | 54.00 | -6.02 | Vertical |
| 15690.00 | 25.14 | 38.33 | 17.69 | 34.03 | 47.13 | 54.00 | -6.87 | Vertical |
| 10460.00 | 24.69 | 39.75 | 14.65 | 32.74 | 46.35 | 54.00 | -7.65 | Horizontal |
| 15690.00 | 23.24 | 38.33 | 17.69 | 34.03 | 45.23 | 54.00 | -8.77 | Horizontal |

**802.11ac(HT20) 5180MHz**

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
|---|---|---|---|---|---|---|---|---|
| 10360.00 | 34.12 | 39.67 | 14.62 | 32.65 | 55.76 | 74.00 | -18.24 | Vertical |
| 15540.00 | 35.34 | 38.60 | 17.66 | 34.46 | 57.14 | 74.00 | -16.86 | Vertical |
| 10360.00 | 34.16 | 39.67 | 14.62 | 32.65 | 55.80 | 74.00 | -18.20 | Horizontal |
| 15540.00 | 32.32 | 38.60 | 17.66 | 34.46 | 54.12 | 74.00 | -19.88 | Horizontal |

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
|---|---|---|---|---|---|---|---|---|
| 10360.00 | 23.34 | 39.67 | 14.62 | 32.65 | 44.98 | 54.00 | -9.02 | Vertical |
| 15540.00 | 24.12 | 38.60 | 17.66 | 34.46 | 45.92 | 54.00 | -8.08 | Vertical |
| 10360.00 | 24.02 | 39.67 | 14.62 | 32.65 | 45.66 | 54.00 | -8.34 | Horizontal |
| 15540.00 | 22.11 | 38.60 | 17.66 | 34.46 | 43.91 | 54.00 | -10.09 | Horizontal |

**802.11ac(HT20) 5200MHz**

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
|---|---|---|---|---|---|---|---|---|
| 10400.00 | 39.16 | 39.75 | 14.63 | 32.71 | 60.83 | 74.00 | -13.17 | Vertical |
| 15600.00 | 38.98 | 38.33 | 17.67 | 34.17 | 60.81 | 74.00 | -13.19 | Vertical |
| 10400.00 | 38.21 | 39.75 | 14.63 | 32.71 | 59.88 | 74.00 | -14.12 | Horizontal |
| 15600.00 | 35.19 | 38.33 | 17.67 | 34.17 | 57.02 | 74.00 | -16.98 | Horizontal |

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
|---|---|---|---|---|---|---|---|---|
| 10400.00 | 26.14 | 39.75 | 14.63 | 32.71 | 47.81 | 54.00 | -6.19 | Vertical |
| 15600.00 | 25.09 | 38.33 | 17.67 | 34.17 | 46.92 | 54.00 | -7.08 | Vertical |
| 10400.00 | 25.18 | 39.75 | 14.63 | 32.71 | 46.85 | 54.00 | -7.15 | Horizontal |
| 15600.00 | 24.65 | 38.33 | 17.67 | 34.17 | 46.48 | 54.00 | -7.52 | Horizontal |

**802.11ac(HT20) 5240MHz**

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
|---|---|---|---|---|---|---|---|---|
| 10480.00 | 38.15 | 39.82 | 14.68 | 32.86 | 59.79 | 74.00 | -14.21 | Vertical |
| 15720.00 | 37.66 | 38.09 | 17.73 | 33.66 | 59.82 | 74.00 | -14.18 | Vertical |
| 10480.00 | 35.24 | 39.82 | 14.68 | 32.86 | 56.88 | 74.00 | -17.12 | Horizontal |
| 15720.00 | 34.29 | 38.09 | 17.73 | 33.66 | 56.45 | 74.00 | -17.55 | Horizontal |

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
|---|---|---|---|---|---|---|---|---|
| 10480.00 | 26.24 | 39.82 | 14.68 | 32.86 | 47.88 | 54.00 | -6.12 | Vertical |
| 15720.00 | 22.19 | 38.09 | 17.73 | 33.66 | 44.35 | 54.00 | -9.65 | Vertical |
| 10480.00 | 24.33 | 39.82 | 14.68 | 32.86 | 45.97 | 54.00 | -8.03 | Horizontal |
| 15720.00 | 22.12 | 38.09 | 17.73 | 33.66 | 44.28 | 54.00 | -9.72 | Horizontal |

**802.11acHT40) 5190MHz**

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
|---|---|---|---|---|---|---|---|---|
| 10380.00 | 34.16 | 39.71 | 14.63 | 32.68 | 55.82 | 74.00 | -18.18 | Vertical |
| 15570.00 | 33.25 | 38.46 | 17.67 | 34.32 | 55.06 | 74.00 | -18.94 | Vertical |
| 10380.00 | 33.06 | 39.71 | 14.63 | 32.68 | 54.72 | 74.00 | -19.28 | Horizontal |
| 15570.00 | 32.18 | 38.46 | 17.67 | 34.32 | 53.99 | 74.00 | -20.01 | Horizontal |

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
|---|---|---|---|---|---|---|---|---|
| 10380.00 | 21.09 | 39.71 | 14.63 | 32.68 | 42.75 | 54.00 | -11.25 | Vertical |
| 15570.00 | 22.38 | 38.46 | 17.67 | 34.32 | 44.19 | 54.00 | -9.81 | Vertical |
| 10380.00 | 20.11 | 39.71 | 14.63 | 32.68 | 41.77 | 54.00 | -12.23 | Horizontal |
| 15570.00 | 21.27 | 38.46 | 17.67 | 34.32 | 43.08 | 54.00 | -10.92 | Horizontal |

**802.11ac(HT40) 5230MHz**

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
|---|---|---|---|---|---|---|---|---|
| 10460.00 | 36.47 | 39.75 | 14.65 | 32.74 | 58.13 | 74.00 | -15.87 | Vertical |
| 15690.00 | 35.16 | 38.33 | 17.69 | 34.03 | 57.15 | 74.00 | -16.85 | Vertical |
| 10460.00 | 39.83 | 39.75 | 14.65 | 32.74 | 61.49 | 74.00 | -12.51 | Horizontal |
| 15690.00 | 34.25 | 38.33 | 17.69 | 34.03 | 56.24 | 74.00 | -17.76 | Horizontal |

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
|---|---|---|---|---|---|---|---|---|
| 10460.00 | 23.14 | 39.75 | 14.65 | 32.74 | 44.80 | 54.00 | -9.20 | Vertical |
| 15690.00 | 21.33 | 38.33 | 17.69 | 34.03 | 43.32 | 54.00 | -10.68 | Vertical |
| 10460.00 | 20.28 | 39.75 | 14.65 | 32.74 | 41.94 | 54.00 | -12.06 | Horizontal |
| 15690.00 | 22.01 | 38.33 | 17.69 | 34.03 | 44.00 | 54.00 | -10.00 | Horizontal |

**802.11ac(HT80) 5210MHz**

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
|---|---|---|---|---|---|---|---|---|
| 10460.00 | 33.25 | 39.75 | 14.65 | 32.74 | 54.91 | 74.00 | -19.09 | Vertical |
| 15690.00 | 32.16 | 38.33 | 17.69 | 34.03 | 54.15 | 74.00 | -19.85 | Vertical |
| 10460.00 | 33.28 | 39.75 | 14.65 | 32.74 | 54.94 | 74.00 | -19.06 | Horizontal |
| 15690.00 | 32.13 | 38.33 | 17.69 | 34.03 | 54.12 | 74.00 | -19.88 | Horizontal |

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
|---|---|---|---|---|---|---|---|---|
| 10460.00 | 20.18 | 39.75 | 14.65 | 32.74 | 41.84 | 54.00 | -12.16 | Vertical |
| 15690.00 | 21.27 | 38.33 | 17.69 | 34.03 | 43.26 | 54.00 | -10.74 | Vertical |
| 10460.00 | 20.25 | 39.75 | 14.65 | 32.74 | 41.91 | 54.00 | -12.09 | Horizontal |
| 15690.00 | 19.59 | 38.33 | 17.69 | 34.03 | 41.58 | 54.00 | -12.42 | Horizontal |

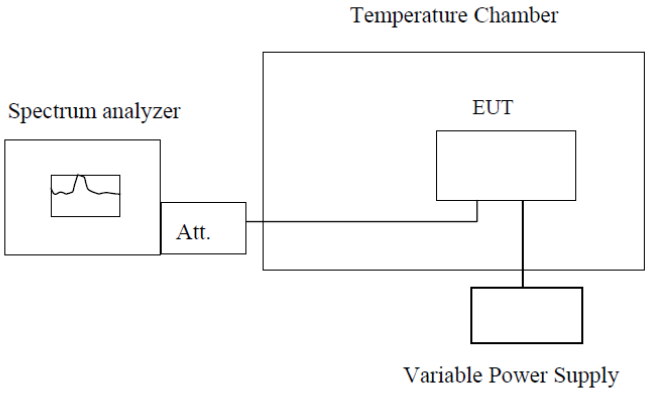
Notes:

1. Level = Read Level + Antenna Factor+ Cable loss- Preamp Factor.

2. The test trace is same as the ambient noise (the test frequency range: 18GHz~40GHz), therefore no data appear in the report.

3. This limit applies for using average detector, if the test result on peak is lower than average limit, then average measurement needn't be performed.

## 7.8 Frequency stability

| | |
|---|---|
| Test Requirement: | FCC Part15 C Section 15.407(g) |
| Test Method: | ANSI C63.10:2013, FCC Part 2.1055 |
| Limit: | Manufactures of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified |
| Test Procedure: | The EUT was setup to ANSI C63.4, 2003; tested to 2.1055 for compliance to FCC Part 15.407(g) requirements. |
| Test setup: |  <br>**Note :** Measurement setup for testing on Antenna connector |
| Test Instruments: | Refer to section 5.10 for details |
| Test mode: | Refer to section 5.2 for details |
| Test results: | Pass |

Remark: 1.Set the EUT transmits at un-modulation mode to test frequency stability.

**Measurement data:**

| Frequency stability versus Temp. | | | | | |
|---|---|---|---|---|---|
| Power Supply: AC 120V | | | | | |
| Temp. (°C) | Operating Frequency (MHz) | 0 minute | 2 minute | 5 minute | 10 minute |
| | | Measured Frequency (MHz) | Measured Frequency (MHz) | Measured Frequency (MHz) | Measured Frequency (MHz) |
| -30 | 5180 | 5179.6732 | 5180.7892 | 5180.1982 | 5179.9851 |
| | 5200 | 5199.7639 | 5200.5673 | 5200.3346 | 5199.8431 |
| | 5220 | 5219.5426 | 5220.1318 | 5220.2218 | 5219.9652 |
| | 5240 | 5239.5699 | 5240.4254 | 5240.0953 | 5239.8764 |
| -20 | 5180 | 5179.8741 | 5180.2563 | 5180.1983 | 5179.7892 |
| | 5200 | 5199.6982 | 5200.2985 | 5200.2001 | 5199.8753 |
| | 5220 | 5219.7753 | 5220.4362 | 5220.2065 | 5219.9818 |
| | 5240 | 5239.7960 | 5240.1782 | 5240.1873 | 5239.7609 |
| -10 | 5180 | 5179.2985 | 5180.7365 | 5180.9314 | 5179.2127 |
| | 5200 | 5199.4642 | 5200.5791 | 5200.6362 | 5199.6338 |
| | 5220 | 5219.3894 | 5220.9757 | 5220.0219 | 5219.9776 |
| | 5240 | 5239.5898 | 5240.1617 | 5240.4773 | 5239.1120 |
| 0 | 5180 | 5179.3127 | 5180.5156 | 5180.7214 | 5179.5914 |
| | 5200 | 5199.0516 | 5200.5672 | 5200.6808 | 5199.8178 |
| | 5220 | 5219.1821 | 5220.2112 | 5220.8516 | 5219.6536 |
| | 5240 | 5239.9524 | 5240.6132 | 5240.7362 | 5239.2479 |
| 10 | 5180 | 5179.0470 | 5180.9718 | 5180.4616 | 5179.7544 |
| | 5200 | 5199.1365 | 5200.8113 | 5200.0724 | 5199.2912 |
| | 5220 | 5219.8543 | 5220.0916 | 5220.3614 | 5219.6017 |
| | 5240 | 5239.8857 | 5240.0265 | 5240.6528 | 5239.6465 |
| 20 | 5180 | 5179.4268 | 5180.7723 | 5180.1946 | 5179.0756 |
| | 5200 | 5199.5770 | 5200.7426 | 5200.0338 | 5199.6732 |
| | 5220 | 5219.5415 | 5220.7806 | 5220.0021 | 5219.7299 |
| | 5240 | 5239.8627 | 5240.1015 | 5240.8865 | 5239.3487 |
| 30 | 5180 | 5179.6788 | 5180.3910 | 5180.8016 | 5179.1114 |
| | 5200 | 5199.8446 | 5200.7619 | 5200.3914 | 5199.1208 |
| | 5220 | 5219.9273 | 5220.1762 | 5220.8728 | 5219.4516 |
| | 5240 | 5239.1735 | 5240.1711 | 5240.7286 | 5239.5818 |
| 40 | 5180 | 5179.2845 | 5180.2616 | 5180.4752 | 5179.5169 |
| | 5200 | 5199.0187 | 5200.5426 | 5200.2314 | 5199.6913 |
| | 5220 | 5219.7035 | 5220.6012 | 5220.4187 | 5219.7224 |
| | 5240 | 5239.8354 | 5240.1911 | 5240.9219 | 5239.6672 |
| 50 | 5180 | 5179.8741 | 5180.3432 | 5180.1942 | 5179.3919 |
| | 5200 | 5199.3112 | 5200.0409 | 5200.3115 | 5199.9042 |
| | 5220 | 5219.5122 | 5220.0824 | 5220.0118 | 5219.4031 |
| | 5240 | 5239.7614 | 5240.6630 | 5240.1802 | 5239.9347 |

| Frequency stability versus Voltage | | | | | |
|---|---|---|---|---|---|
| **Temperature: 25°C** | | | | | |
| Power Supply (VAC) | Operating Frequency (MHz) | 0 minute | 2 minute | 5 minute | 10 minute |
| | | Measured Frequency (MHz) | Measured Frequency (MHz) | Measured Frequency (MHz) | Measured Frequency (MHz) |
| 108 | 5180 | 5180.5335 | 5180.9542 | 5179.6625 | 5179.1112 |
| | 5200 | 5200.2112 | 5200.5332 | 5199.2472 | 5199.9354 |
| | 5220 | 5220.33321 | 5220.1715 | 5219.7915 | 5219.1621 |
| | 5240 | 5240.1356 | 5240.7621 | 5239.4706 | 5239.69466 |
| 120 | 5180 | 5180.3812 | 5180.7045 | 5179.4056 | 5179.1501 |
| | 5200 | 5200.6545 | 5200.2634 | 5199.8412 | 5199.5154 |
| | 5220 | 5220.2045 | 5220.5355 | 5219.3518 | 5219.7121 |
| | 5240 | 5240.7561 | 5240.6821 | 5239.4734 | 5239.8556 |
| 132 | 5180 | 5180.9147 | 5180.3696 | 5179.3749 | 5179.7921 |
| | 5200 | 5200.0729 | 5200.6377 | 5199.9816 | 5199.9724 |
| | 5220 | 5220.6304 | 5220.0353 | 5219.2728 | 5219.2956 |
| | 5240 | 5240.8636 | 5240.3037 | 5239.87518 | 5239.6987 |

# 8 Test Setup Photo

Reference to the **appendix I** for details.

# 9 EUT Constructional Details

Reference to the **appendix II** for details.

---END---