# FCC Test Report

| | | |
|---|---|---|
| **FCC ID** | : | **JVPWDC10TC** |
| **Equipment** | : | **InstaShow Button** |
| **Model No.** | : | **WDC10TC** |
| **Brand Name** | : | **BenQ** |
| **Applicant** | : | **BenQ Corporation** |
| **Address** | : | **16 Jihu Road, Neihu, Taipei 114, Taiwan** |
| **Standard** | : | **47 CFR FCC Part 15.407** |
| **Received Date** | : | **Apr. 01, 2019** |
| **Tested Date** | : | **Apr. 08 ~ Apr. 30, 2019** |

**We, International Certification Corp., would like to declare that the tested sample has been evaluated and in compliance with the requirement of the above standards. The test results contained in this report refer exclusively to the product. It may be duplicated completely for legal use with the approval of the applicant. It shall not be reproduced except in full without the written approval of our laboratory.**

**Reviewed by:** **Approved by:**

**Along Chen / Assistant Manager** **Gary Chang / Manager**

Testing Laboratory 2732

# Table of Contents

# Release Record

| Report No. | Version | Description | Issued Date |
|---|---|---|---|
| FR940101AN | Rev. 01 | Initial issue | May 07, 2019 |

# Summary of Test Results

| FCC Rules | Test Items | Measured | Result |
|---|---|---|---|
| 15.207 | Conducted Emissions | [dBuV]: 0.159MHz<br>53.67 (Margin -11.85dB) - QP | Pass |
| 15.407(b)<br>15.209 | Radiated Emissions | [dBuV/m at 3m]: 5150.00MHz<br>51.99(Margin -2.01dB) - AV | Pass |
| 15.407(a) | Emission Bandwidth | Meet the requirement of limit | Pass |
| 15.407(e) | 6dB bandwidth | Meet the requirement of limit | Pass |
| 15.407(a) | RF Output Power | Max Power [dBm]:<br>5150-5250MHz: 16.7<br>5725-5850MHz: 16.8 | Pass |
| 15.407(a) | Peak Power Spectral Density | Meet the requirement of limit | Pass |
| 15.407(g) | Frequency Stability | Meet the requirement of limit | Pass |
| 15.203 | Antenna Requirement | Meet the requirement of limit | Pass |

| **Declaration of Conformity:** |
|---|
| The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers. |
| **Comments and Explanations:** |
| The declared values of gain for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of the gain. |

# 1 General Description

## 1.1 Information

### 1.1.1 Specification of the Equipment under Test (EUT)

| RF General Information | | | | | |
|---|---|---|---|---|---|
| **Frequency Range (MHz)** | **IEEE Std. 802.11** | **Ch. Freq. (MHz)** | **Channel Number** | **Transmit Chains ($N_{TX}$)** | **Data Rate / MCS** |
| 5150-5250 | ac (VHT40) | 5190-5230 | 38-46 [2] | 2 | MCS 0-9 |
| Note 1: RF output power specifies that Maximum Conducted Output Power.<br>Note 2: 802.11ac uses a combination of OFDM-BPSK, QPSK, 16QAM, 64QAM, 256QAM modulation. | | | | | |

| RF General Information | | | | | |
|---|---|---|---|---|---|
| **Frequency Range (MHz)** | **IEEE Std. 802.11** | **Ch. Freq. (MHz)** | **Channel Number** | **Transmit Chains ($N_{TX}$)** | **Data Rate / MCS** |
| 5725-5850 | ac (VHT40) | 5755-5795 | 151-159 [2] | 2 | MCS 0-9 |
| Note 1: RF output power specifies that Maximum Conducted Output Power.<br>Note 2: 802.11ac uses a combination of OFDM-BPSK, QPSK, 16QAM, 64QAM, 256QAM modulation. | | | | | |

### 1.1.2 Antenna Details

| **Model** | **Type** | **Connector** | **Operating Frequencies (MHz) / Antenna Gain (dBi)** | |
|---|---|---|---|---|
| | | | **5150~5250** | **5725~5850** |
| 66722133B1-050 | PCB Dipole | UFL | 5.08 | 4.76 |
| F-F0010019-1 | PCB Dipole | UFL | 3.26 | 3.73 |

### 1.1.3 Power Supply Type of Equipment under Test (EUT)

| | |
|---|---|
| **Power Supply Type** | 5Vdc from host |

### 1.1.4 Accessories

| Accessories | | |
|---|---|---|
| **No.** | **Equipment** | **Description** |
| 1 | USB type-C cable | Undetachable, 5.3cm shielded without core<br>2 colors of insulating glue are used for internal connector.<br>One is black, the other is transparent. |

### 1.1.5 Channel List

| For Frequency band 5150-5250 MHz | |
|---|---|
| VHT40 | |
| Channel | Frequency(MHz) |
| 38 | 5190 |
| 46 | 5230 |

| For Frequency band 5725~5850 MHz | |
|---|---|
| VHT40 | |
| Channel | Frequency(MHz) |
| 151 | 5755 |
| 159 | 5795 |

### 1.1.6 Test Tool and Duty Cycle

| Test Tool | MT7612E_AP_QA_Tool, version: 1.0.3.11 | | |
|---|---|---|---|
| Duty Cycle and Duty Factor | Mode | Duty Cycle (%) | Duty Factor (dB) |
| | VHT40 | 90.81% | 0.42 |

### 1.1.7 Power Index of Test Tool

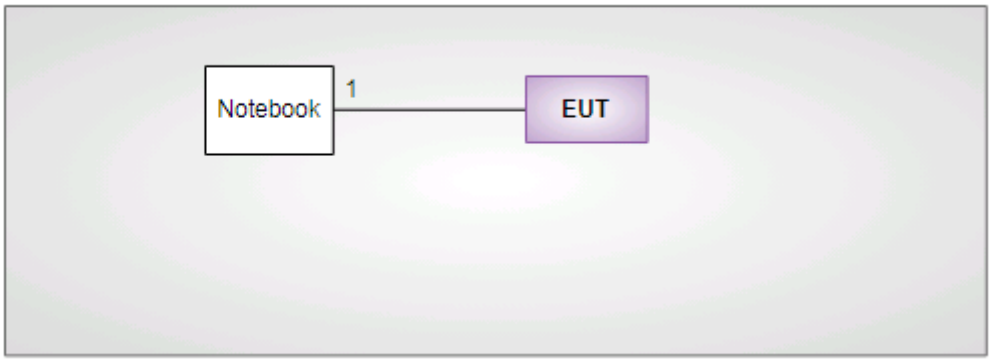
| For Frequency band 5150-5250 MHz | | |
|---|---|---|
| Modulation Mode | Test Frequency (MHz) | Power Index |
| VHT40 | 5190 | 14/13 |
| VHT40 | 5230 | 14/13 |

| For Frequency band 5725~5850 MHz | | |
|---|---|---|
| Modulation Mode | Test Frequency (MHz) | Power Index |
| VHT40 | 5755 | 15/13 |
| VHT40 | 5795 | 15/13 |

## 1.2 Local Support Equipment List

| Support Equipment List | | | | | |
|---|---|---|---|---|---|
| **No.** | **Equipment** | **Brand** | **Model** | **FCC ID** | **Remarks** |
| 1 | Notebook | DELL | Inspiron 15 5570 | DoC | --- |

## 1.3 Test Setup Chart

| Test Setup Diagram | |
|---|---|
|  | |
| **No.** | **Signal cable / Length (m)** |
| 1 | USB type-C, 5.3cm shielded. |

## 1.4 The Equipment List

| Test Item | Conducted Emission | | | | |
|---|---|---|---|---|---|
| **Test Site** | Conduction room 1 / (CO01-WS) | | | | |
| **Instrument** | **Manufacturer** | **Model No.** | **Serial No.** | **Calibration Date** | **Calibration Until** |
| Receiver | R&S | ESR3 | 101657 | Jan. 08, 2019 | Jan. 07, 2020 |
| LISN | R&S | ENV216 | 101579 | Mar. 08, 2019 | Mar. 07, 2020 |
| RF Cable-CON | Woken | CFD200-NL | CFD200-NL-001 | Oct. 23, 2018 | Oct. 22 2019 |
| Measurement Software | AUDIX | e3 | 6.120210k | NA | NA |
| Note: Calibration Interval of instruments listed above is one year. | | | | | |

| Test Item | Radiated Emission | | | | |
|---|---|---|---|---|---|
| **Test Site** | 966 chamber1 / (03CH01-WS) | | | | |
| **Instrument** | **Manufacturer** | **Model No.** | **Serial No.** | **Calibration Date** | **Calibration Until** |
| Spectrum Analyzer | R&S | FSV40 | 101498 | Dec. 27, 2018 | Dec. 26, 2019 |
| Receiver | R&S | ESR3 | 101658 | Dec. 11, 2018 | Dec. 10, 2019 |
| Bilog Antenna | SCHWARZBECK | VULB9168 | VULB9168-522 | Jul. 18, 2018 | Jul. 17, 2019 |
| Horn Antenna 1G-18G | SCHWARZBECK | BBHA 9120 D | BBHA 9120 D 1096 | Dec. 18, 2018 | Dec. 17, 2019 |
| Horn Antenna 18G-40G | SCHWARZBECK | BBHA 9170 | BBHA 9170517 | Nov. 15, 2018 | Nov. 14, 2019 |
| Loop Antenna | R&S | HFH2-Z2 | 100330 | Nov. 09, 2018 | Nov. 08, 2019 |
| Loop Antenna Cable | KOAX KABEL | 101354-BW | 101354-BW | Oct. 08, 2018 | Oct. 07, 2019 |
| Preamplifier | EMC | EMC02325 | 980225 | Jul. 20, 2018 | Jul. 19, 2019 |
| Preamplifier | Agilent | 83017A | MY39501308 | Oct. 04, 2018 | Oct. 03, 2019 |
| Preamplifier | EMC | EMC184045B | 980192 | Aug. 09, 2018 | Aug. 08, 2019 |
| RF Cable | EMC | EMC104-SM-SM-8000 | 181106 | Oct. 08, 2018 | Oct. 07, 2019 |
| RF Cable | HUBER+SUHNER | SUCOFLEX104 | MY16019/4 | Oct. 08, 2018 | Oct. 07, 2019 |
| RF Cable | HUBER+SUHNER | SUCOFLEX104 | MY16014/4 | Oct. 08, 2018 | Oct. 07, 2019 |
| LF cable 1M | EMC | EMCCFD400-NM-NM-1000 | 160502 | Oct. 08, 2018 | Oct. 07, 2019 |
| LF cable 3M | Woken | CFD400NL-LW | CFD400NL-001 | Oct. 08, 2018 | Oct. 07, 2019 |
| LF cable 10M | Woken | CFD400NL-LW | CFD400NL-002 | Oct. 08, 2018 | Oct. 07, 2019 |
| Measurement Software | AUDIX | e3 | 6.120210g | NA | NA |
| Note: Calibration Interval of instruments listed above is one year. | | | | | |

| Test Item | RF Conducted | | | | |
|---|---|---|---|---|---|
| Test Site | (TH01-WS) | | | | |
| **Instrument** | **Manufacturer** | **Model No.** | **Serial No.** | **Calibration Date** | **Calibration Until** |
| Spectrum Analyzer | R&S | FSV40 | 101499 | Jan. 07, 2019 | Jan. 06, 2020 |
| TEMP&HUMIDITY CHAMBER | GIANT FORCE | GCT-225-40-SP-SD | MAF1212-002 | Dec. 05, 2018 | Dec. 04, 2019 |
| Power Meter | Anritsu | ML2495A | 1241002 | Oct. 09, 2018 | Oct. 08, 2019 |
| Power Sensor | Anritsu | MA2411B | 1207366 | Oct. 09, 2018 | Oct. 08, 2019 |
| Measurement Software | Sporton | Sporton_1 | 1.3.30 | NA | NA |
| Note: Calibration Interval of instruments listed above is one year. | | | | | |

## 1.5 Testing Applied Standards

According to the specification of EUT, the EUT must comply with following standards and KDB documents.

47 CFR FCC Part 15.407
ANSI C63.10-2013
FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01
FCC KDB 662911 D01 Multiple Transmitter Output v02r01
FCC KDB 412172 D01 Determining ERP and EIRP v01r01

## 1.6 Deviation from Test Standard and Measurement Procedure

None

## 1.7 Measurement Uncertainty

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2)

| Measurement Uncertainty | |
|---|---|
| **Parameters** | **Uncertainty** |
| Bandwidth | ±34.130 Hz |
| Conducted power | ±0.808 dB |
| Frequency error | $\pm 1 \times 10^{-9}$ |
| Power density | ±0.583 dB |
| Conducted emission | ±2.715 dB |
| AC conducted emission | ±2.92 dB |
| Radiated emission ≤ 1GHz | ±3.41 dB |
| Radiated emission > 1GHz | ±4.59 dB |
| Time | ±0.1% |
| Temperature | ±0.4 °C |

# 2 Test Configuration

## 2.1 Testing Condition

| Test Item | Test Site | Ambient Condition | Tested By |
|---|---|---|---|
| AC Conduction | CO01-WS | 24°C / 66% | Akun Chung |
| Radiated Emissions | 03CH01-WS | 23-26°C / 61-66% | Aska Huang\ Roger Lu |
| RF Conducted | TH01-WS | 23°C / 61% | Felix Sung |

- FCC Designation No.: TW2732
- FCC site registration No.: 181692
- ISED#: 10807A
- CAB identifier: TW2732

## 2.2 The Worst Test Modes and Channel Details

| For Frequency band 5150-5250 MHz | | | | |
|---|---|---|---|---|
| **Test item** | **Modulation Mode** | **Test Frequency (MHz)** | **Data Rate** | **Test Configuration** |
| Conducted Emissions | VHT40 | 5230 | MCS 0 | --- |
| Radiated Emissions ≤1GHz | VHT40 | 5230 | MCS 0 | --- |
| RF Output Power<br>Radiated Emissions >1GHz<br>Emission Bandwidth<br>Peak Power Spectral Density | VHT40 | 5190 / 5230 | MCS 0 | --- |
| Frequency Stability | Un-modulation | 5230 | --- | --- |

| For Frequency band 5725-5850 MHz | | | | |
|---|---|---|---|---|
| **Test item** | **Modulation Mode** | **Test Frequency (MHz)** | **Data Rate** | **Test Configuration** |
| Conducted Emissions | VHT40 | 5755 | MCS 0 | --- |
| Radiated Emissions ≤1GHz | VHT40 | 5755 | MCS 0 | --- |
| Radiated Emissions >1GHz<br>Emission Bandwidth<br>6dB bandwidth<br>Peak Power Spectral Density | VHT40 | 5755 / 5795 | MCS 0 | --- |
| Frequency Stability | Un-modulation | 5795 | --- | --- |

# 3 Transmitter Test Results

## 3.1 Conducted Emissions

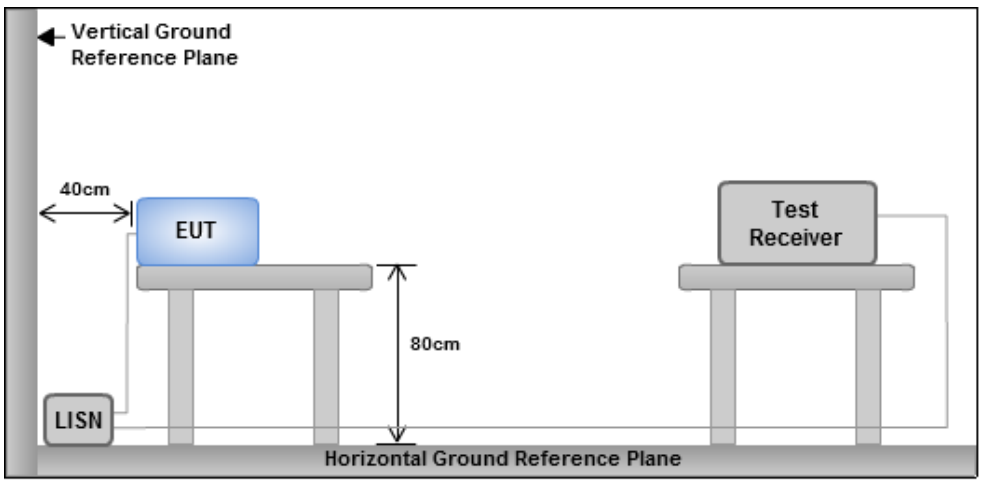
### 3.1.1 Limit of Conducted Emissions

| Conducted Emissions Limit | | |
|---|---|---|
| **Frequency Emission (MHz)** | **Quasi-Peak** | **Average** |
| 0.15-0.5 | 66 - 56 * | 56 - 46 * |
| 0.5-5 | 56 | 46 |
| 5-30 | 60 | 50 |
| Note 1: * Decreases with the logarithm of the frequency. | | |

### 3.1.2 Test Procedures

1. The device is placed on a test table, raised 80 cm above the reference ground plane. The vertical conducting plane is located 40 cm to the rear of the device.
2. The device is connected to line impedance stabilization network (LISN) and other accessories are connected to other LISN. Measured levels of AC power line conducted emission are across the 50 Ω LISN port.
3. AC conducted emission measurements is made over frequency range from 150 kHz to 30 MHz.
4. This measurement was performed with AC 120V / 60Hz.

### 3.1.3 Test Setup

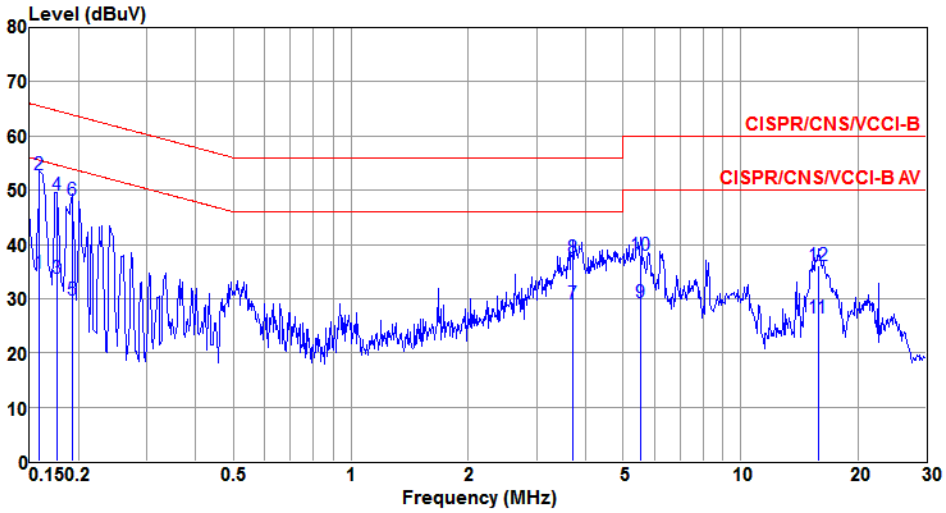



Note: 1. Support units were connected to second LISN.

2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes

## 3.1.4 Test Result of Conducted Emissions

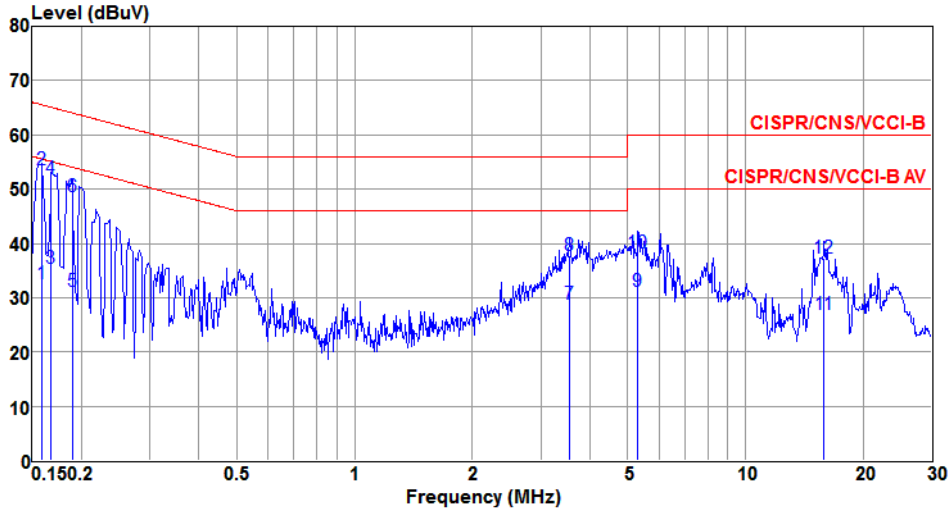
| Modulation | VHT40 | Test Freq. (MHz) | 5230 |
|---|---|---|---|
| Power Phase | Line | | |




| | Freq | Level | Limit Line | Over Limit | Read Level | LISN factor | cable loss | Remark |
|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dBuV | dB | dBuV | dB | dB | |
| 1 | 0.159 | 34.75 | 55.52 | -20.77 | 25.17 | 9.53 | 0.05 | Average |
| 2* | 0.159 | 52.95 | 65.52 | -12.57 | 43.37 | 9.53 | 0.05 | QP |
| 3 | 0.177 | 33.86 | 54.64 | -20.78 | 24.26 | 9.54 | 0.06 | Average |
| 4 | 0.177 | 49.16 | 64.64 | -15.48 | 39.56 | 9.54 | 0.06 | QP |
| 5 | 0.192 | 29.84 | 53.93 | -24.09 | 20.23 | 9.54 | 0.07 | Average |
| 6 | 0.192 | 48.14 | 63.93 | -15.79 | 38.53 | 9.54 | 0.07 | QP |
| 7 | 3.720 | 29.01 | 46.00 | -16.99 | 19.13 | 9.61 | 0.27 | Average |
| 8 | 3.720 | 37.48 | 56.00 | -18.52 | 27.60 | 9.61 | 0.27 | QP |
| 9 | 5.535 | 29.18 | 50.00 | -20.82 | 19.22 | 9.62 | 0.34 | Average |
| 10 | 5.535 | 38.08 | 60.00 | -21.92 | 28.12 | 9.62 | 0.34 | QP |
| 11 | 15.801 | 26.51 | 50.00 | -23.49 | 16.28 | 9.66 | 0.57 | Average |
| 12 | 15.801 | 36.13 | 60.00 | -23.87 | 25.90 | 9.66 | 0.57 | QP |

Note 1: Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB).
2: Over Limit (dB) = Level (dBuV) – Limit Line (dBuV).

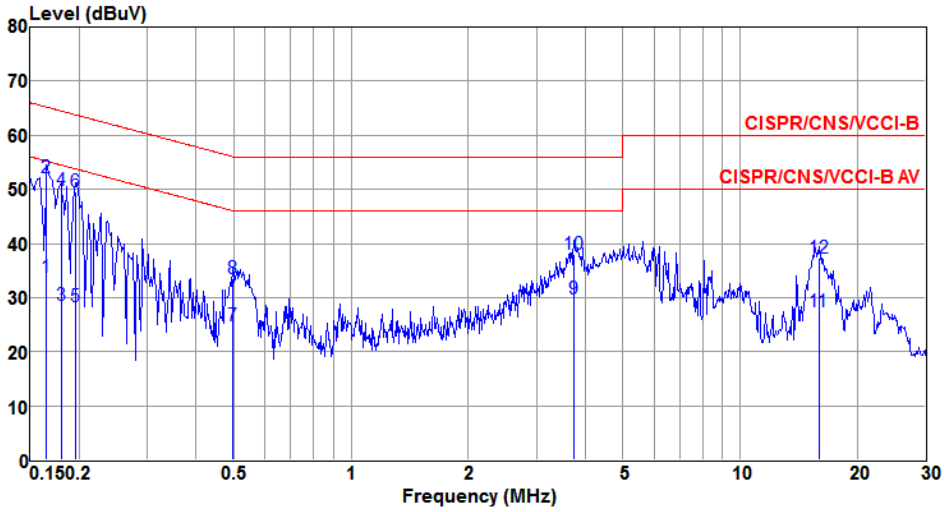
| Modulation | VHT40 | Test Freq. (MHz) | 5230 |
|---|---|---|---|
| Power Phase | Neutral | | |




| | Freq | Level | Limit Line | Over Limit | Read Level | LISN factor | cable loss | Remark |
|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dBuV | dB | dBuV | dB | dB | |
| 1 | 0.159 | 32.62 | 55.52 | -22.90 | 23.00 | 9.57 | 0.05 | Average |
| 2* | 0.159 | 53.67 | 65.52 | -11.85 | 44.05 | 9.57 | 0.05 | QP |
| 3 | 0.168 | 35.46 | 55.08 | -19.62 | 25.83 | 9.57 | 0.06 | Average |
| 4 | 0.168 | 51.97 | 65.08 | -13.11 | 42.34 | 9.57 | 0.06 | QP |
| 5 | 0.189 | 31.21 | 54.06 | -22.85 | 21.56 | 9.58 | 0.07 | Average |
| 6 | 0.189 | 48.53 | 64.06 | -15.53 | 38.88 | 9.58 | 0.07 | QP |
| 7 | 3.547 | 28.72 | 46.00 | -17.28 | 18.80 | 9.66 | 0.26 | Average |
| 8 | 3.547 | 37.81 | 56.00 | -18.19 | 27.89 | 9.66 | 0.26 | QP |
| 9 | 5.305 | 31.19 | 50.00 | -18.81 | 21.18 | 9.68 | 0.33 | Average |
| 10 | 5.305 | 38.32 | 60.00 | -21.68 | 28.31 | 9.68 | 0.33 | QP |
| 11 | 15.885 | 26.91 | 50.00 | -23.09 | 16.56 | 9.78 | 0.57 | Average |
| 12 | 15.885 | 37.32 | 60.00 | -22.68 | 26.97 | 9.78 | 0.57 | QP |

Note 1: Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB).
2: Over Limit (dB) = Level (dBuV) – Limit Line (dBuV).

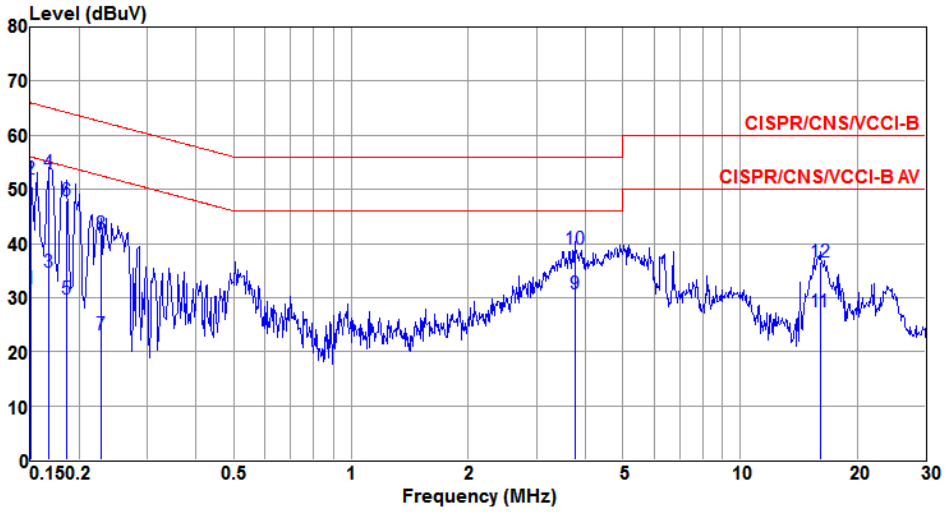
| Modulation | VHT40 | Test Freq. (MHz) | 5755 |
|---|---|---|---|
| Power Phase | Line | | |




| | Freq | Level | Limit Line | Over Limit | Read Level | LISN factor | cable loss | Remark |
|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dBuV | dB | dBuV | dB | dB | |
| 1 | 0.165 | 33.87 | 55.21 | -21.34 | 24.28 | 9.53 | 0.06 | Average |
| 2* | 0.165 | 52.25 | 65.21 | -12.96 | 42.66 | 9.53 | 0.06 | QP |
| 3 | 0.180 | 28.59 | 54.50 | -25.91 | 18.99 | 9.54 | 0.06 | Average |
| 4 | 0.180 | 49.74 | 64.50 | -14.76 | 40.14 | 9.54 | 0.06 | QP |
| 5 | 0.195 | 28.31 | 53.80 | -25.49 | 18.70 | 9.54 | 0.07 | Average |
| 6 | 0.195 | 49.54 | 63.80 | -14.26 | 39.93 | 9.54 | 0.07 | QP |
| 7 | 0.497 | 24.67 | 46.05 | -21.38 | 15.01 | 9.58 | 0.08 | Average |
| 8 | 0.497 | 33.42 | 56.05 | -22.63 | 23.76 | 9.58 | 0.08 | QP |
| 9 | 3.740 | 29.67 | 46.00 | -16.33 | 19.79 | 9.61 | 0.27 | Average |
| 10 | 3.740 | 38.00 | 56.00 | -18.00 | 28.12 | 9.61 | 0.27 | QP |
| 11 | 15.970 | 27.27 | 50.00 | -22.73 | 17.04 | 9.66 | 0.57 | Average |
| 12 | 15.970 | 37.35 | 60.00 | -22.65 | 27.12 | 9.66 | 0.57 | QP |

Note 1: Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB).
2: Over Limit (dB) = Level (dBuV) – Limit Line (dBuV).

| Modulation | VHT40 | Test Freq. (MHz) | 5755 |
|---|---|---|---|
| Power Phase | Neutral | | |




| | Freq | Level | Limit Line | Over Limit | Read Level | LISN factor | cable loss | Remark |
|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dBuV | dB | dBuV | dB | dB | |
| 1 | 0.150 | 31.57 | 56.00 | -24.43 | 21.95 | 9.57 | 0.05 | Average |
| 2 | 0.150 | 52.04 | 66.00 | -13.96 | 42.42 | 9.57 | 0.05 | QP |
| 3 | 0.168 | 34.80 | 55.08 | -20.28 | 25.17 | 9.57 | 0.06 | Average |
| 4* | 0.168 | 53.06 | 65.08 | -12.02 | 43.43 | 9.57 | 0.06 | QP |
| 5 | 0.186 | 29.82 | 54.20 | -24.38 | 20.17 | 9.58 | 0.07 | Average |
| 6 | 0.186 | 48.01 | 64.20 | -16.19 | 38.36 | 9.58 | 0.07 | QP |
| 7 | 0.228 | 23.18 | 52.52 | -29.34 | 13.52 | 9.59 | 0.07 | Average |
| 8 | 0.228 | 41.82 | 62.52 | -20.70 | 32.16 | 9.59 | 0.07 | QP |
| 9 | 3.759 | 30.60 | 46.00 | -15.40 | 20.67 | 9.66 | 0.27 | Average |
| 10 | 3.759 | 39.01 | 56.00 | -16.99 | 29.08 | 9.66 | 0.27 | QP |
| 11 | 16.055 | 27.28 | 50.00 | -22.72 | 16.93 | 9.78 | 0.57 | Average |
| 12 | 16.055 | 36.69 | 60.00 | -23.31 | 26.34 | 9.78 | 0.57 | QP |

Note 1: Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB).
2: Over Limit (dB) = Level (dBuV) – Limit Line (dBuV).

# 3.2 Emission Bandwidth

## 3.2.1 Limit of Emission bandwidth

Within the 5.725-5.85 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

## 3.2.2 Test Procedures

**26dB Bandwidth**

1. Set RBW = approximately 1% of the emission bandwidth.
2. Set the VBW > RBW, Detector = Peak.
3. Trace mode = max hold.
4. Measure the maximum width of the emission that is 26 dB down from the peak of the emission.

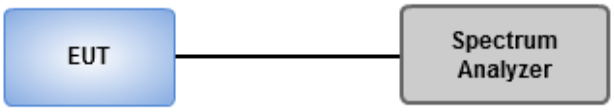
**Occupied Bandwidth**

1. Set RBW = 1 % to 5 % of the OBW.
2. Set VBW ≥ 3 RBW.
3. Sample detection and single sweep mode shall be used.
4. Use the 99 % power bandwidth function of the instrument.

**6dB Bandwidth**

1. Set RBW = 100kHz, VBW = 300kHz.
2. Detector = Peak,Trace mode = max hold.
3. Allow the trace to stabilize.
4. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

## 3.2.3 Test Setup



### 3.2.4 Test Result of Emission Bandwidth

**Summary**

| Mode | Max-N dB (Hz) | Max-OBW (Hz) | ITU-Code | Min-N dB (Hz) | Min-OBW (Hz) |
|---|---|---|---|---|---|
| 5.15-5.25GHz | - | - | - | - | - |
| 802.11ac VHT40_Nss1,(MCS0)_2TX | 46.377M | 36.207M | 36M2D1D | 40.145M | 36.016M |
| 5.725-5.85GHz | - | - | - | - | - |
| 802.11ac VHT40_Nss1,(MCS0)_2TX | 35.072M | 36.102M | 36M1D1D | 35.072M | 36.022M |

**Max-N dB** = Maximum 6dB down bandwidth for 5.725-5.85GHz band / Maximum 26dB down bandwidth for other band;
**Max-OBW** = Maximum 99% occupied bandwidth;
**Min-N dB** = Minimum 6dB down bandwidth for 5.725-5.85GHz band / Maximum 26dB down bandwidth for other band;
**Min-OBW** = Minimum 99% occupied bandwidth;

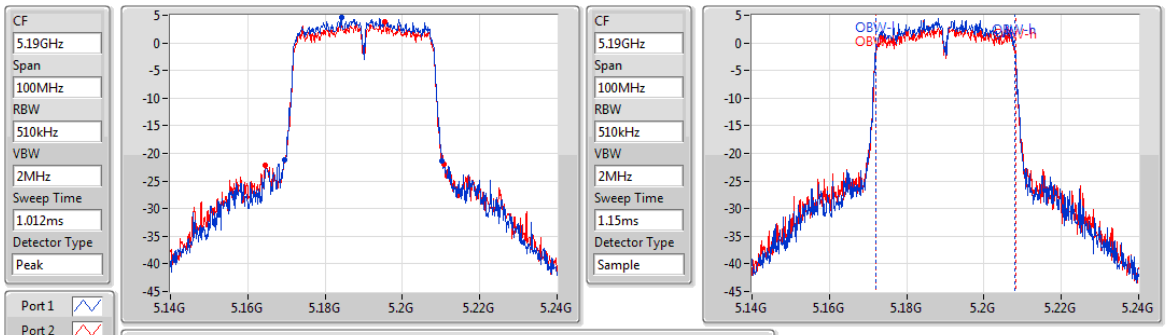
**Result**

| Mode | Result | Limit (Hz) | Port 1-N dB (Hz) | Port 1-OBW (Hz) | Port 2-N dB (Hz) | Port 2-OBW (Hz) |
|---|---|---|---|---|---|---|
| 802.11ac VHT40_Nss1,(MCS0)_2TX | - | - | - | - | - | - |
| 5190MHz | Pass | Inf | 40.87M | 36.102M | 46.377M | 36.199M |
| 5230MHz | Pass | Inf | 40.145M | 36.016M | 41.014M | 36.207M |
| 5755MHz | Pass | 500k | 35.072M | 36.022M | 35.072M | 36.102M |
| 5795MHz | Pass | 500k | 35.072M | 36.098M | 35.072M | 36.076M |

**Port X-N dB** = Port **X** 6dB down bandwidth for 5.725-5.85GHz band / 26dB down bandwidth for other band
**Port X-OBW** = Port **X** 99% occupied bandwidth;

**802.11ac VHT40_Nss1,(MCS0)_2TX** **EBW**

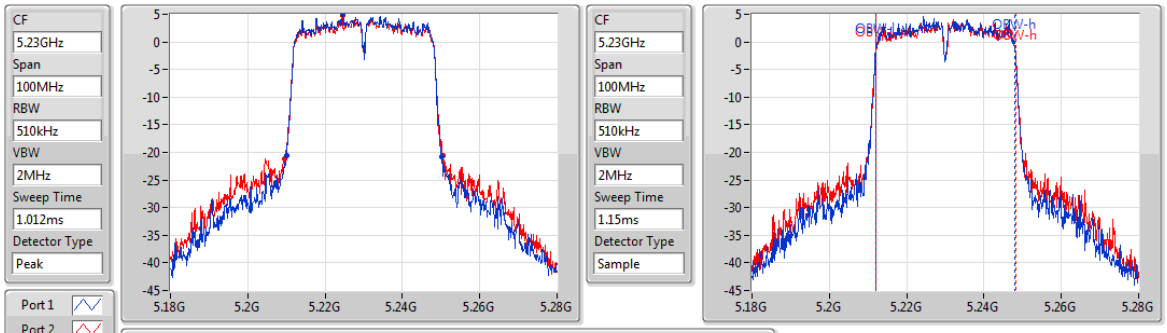
**5190MHz**




| 26dB(Hz) | Fl-26dB(Hz) | Fh-26dB(Hz) | OBW(Hz) | Fl-OBW(Hz) | Fh-OBW(Hz) | Limit(Hz) | Port |
|---|---|---|---|---|---|---|---|
| 40.87M | 5.16942G | 5.21029G | 36.102M | 5.171977G | 5.208079G | Inf | 1 |
| 46.377M | 5.164493G | 5.21087G | 36.199M | 5.171932G | 5.208132G | Inf | 2 |

**802.11ac VHT40_Nss1,(MCS0)_2TX** **EBW**

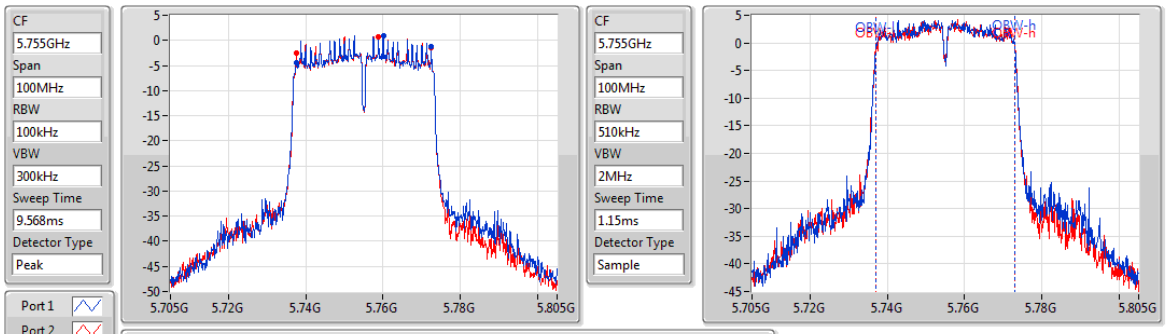
**5230MHz**




| 26dB(Hz) | Fl-26dB(Hz) | Fh-26dB(Hz) | OBW(Hz) | Fl-OBW(Hz) | Fh-OBW(Hz) | Limit(Hz) | Port |
|---|---|---|---|---|---|---|---|
| 40.145M | 5.21G | 5.250145G | 36.016M | 5.212025G | 5.248041G | Inf | 1 |
| 41.014M | 5.20942G | 5.250435G | 36.207M | 5.211935G | 5.248142G | Inf | 2 |

**802.11ac VHT40_Nss1,(MCS0)_2TX** **EBW**

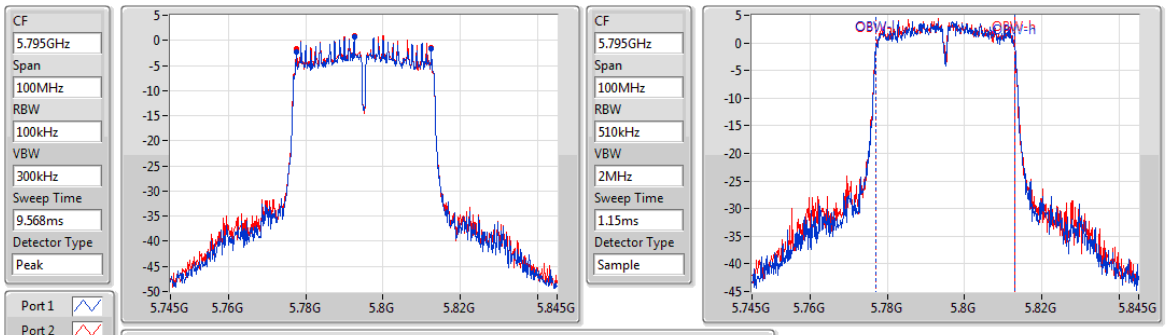
**5755MHz**




| 6dB(Hz) | Fl-6dB(Hz) | Fh-6dB(Hz) | OBW(Hz) | Fl-OBW(Hz) | Fh-OBW(Hz) | Limit(Hz) | Port |
|---|---|---|---|---|---|---|---|
| 35.072M | 5.737464G | 5.772536G | 36.022M | 5.736992G | 5.773014G | 500k | 1 |
| 35.072M | 5.737464G | 5.772536G | 36.102M | 5.73695G | 5.773052G | 500k | 2 |

**802.11ac VHT40_Nss1,(MCS0)_2TX** **EBW**

**5795MHz**




| 6dB(Hz) | Fl-6dB(Hz) | Fh-6dB(Hz) | OBW(Hz) | Fl-OBW(Hz) | Fh-OBW(Hz) | Limit(Hz) | Port |
|---|---|---|---|---|---|---|---|
| 35.072M | 5.777464G | 5.812536G | 36.098M | 5.77699G | 5.813088G | 500k | 1 |
| 35.072M | 5.777464G | 5.812536G | 36.076M | 5.77696G | 5.813036G | 500k | 2 |

## 3.3 RF Output Power

### 3.3.1 Limit of RF Output Power

| Frequency band 5150-5250 MHz | | |
|---|---|---|
| **Operating Mode** | | **Limit** |
| ☐ | Outdoor access point | Conducted Power: 1 W<br>The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm) |
| ☐ | Indoor access point | Conducted Power: 1 W |
| ☐ | Fixed point-to-point access points | Conducted Power: 1 W |
| ☒ | Client devices | Conducted Power: 250 mW |

| **Frequency Band (MHz)** | | **Limit** |
|---|---|---|
| ☒ | 5725 ~ 5850 | Conducted Power: 1 W |

### 3.3.2 Test Procedures

**Method PM-G (Measurement using a gated RF average power meter)**

Measurements is performed using a wideband gated RF power meter provided that the gate parameters are adjusted such that the power is measured only when the EUT is transmitting at its maximum power control level. Since the measurement is made only during the ON time of the transmitter, no duty cycle correction factor is required.

### 3.3.3 Test Setup

### 3.3.4 Test Result of Maximum Conducted Output Power

**Summary**

| Mode | Total Power (dBm) | Total Power (W) | EIRP (dBm) | EIRP (W) |
|---|---|---|---|---|
| 5.15-5.25GHz | - | - | - | - |
| 802.11ac VHT40_Nss1,(MCS0)_2TX | 16.70 | 0.04677 | 21.78 | 0.15066 |
| 5.725-5.85GHz | - | - | - | - |
| 802.11ac VHT40_Nss1,(MCS0)_2TX | 16.80 | 0.04786 | 21.56 | 0.14322 |

**Result**

| Mode | Result | DG (dBi) | Port 1 (dBm) | Port 2 (dBm) | Total Power (dBm) | Power Limit (dBm) | EIRP (dBm) | EIRP Limit (dBm) |
|---|---|---|---|---|---|---|---|---|
| 802.11ac VHT40_Nss1,(MCS0)_2TX | - | - | - | - | - | - | - | - |
| 5190MHz | Pass | 5.08 | 13.51 | 13.67 | 16.60 | 24.00 | 21.68 | 30.00 |
| 5230MHz | Pass | 5.08 | 13.63 | 13.74 | 16.70 | 24.00 | 21.78 | 30.00 |
| 5755MHz | Pass | 4.76 | 13.74 | 13.84 | 16.80 | 30.00 | 21.56 | 36.00 |
| 5795MHz | Pass | 4.76 | 13.68 | 13.79 | 16.75 | 30.00 | 21.51 | 36.00 |

**DG** = Directional Gain;**Port X** = Port X output power

## 3.4 Peak Power Spectral Density

### 3.4.1 Limit of Peak Power Spectral Density

| Frequency band 5150-5250 MHz | | |
|---|---|---|
| **Operating Mode** | | **Limit** |
| ☐ | Outdoor access point | 17 dBm / MHz |
| ☐ | Indoor access point | 17 dBm / MHz |
| ☐ | Fixed point-to-point access points | 17 dBm / MHz |
| ☒ | Client devices | 11 dBm / MHz |

| **Frequency Band (MHz)** | | **Limit** |
|---|---|---|
| ☒ | 5725 ~ 5850 | 30 dBm /500 kHz |

### 3.4.2 Test Procedures

**For 5150 ~ 5250 MHz**

Duty cycle < 98 %

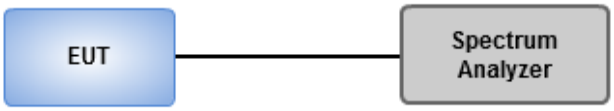
1. Set RBW = 1 MHz, VBW = 3 MHz, Detector = RMS.
2. Set sweep time ≥ 10 * (number of points in sweep) * (total on/off period of the transmitted signal).
3. Perform a single sweep.
4. Use the peak marker function to determine the maximum amplitude level.
5. Add 10 log(1/x), where x is the duty cycle.

**For 5725 ~ 5850 MHz**

Duty cycle < 98 %

1. Set RBW = 500 kHz, VBW = 3 MHz, Detector = RMS.
2. Set sweep time ≥ 10 * (number of points in sweep) * (total on/off period of the transmitted signal).
3. Perform a single sweep.
4. Use the peak marker function to determine the maximum amplitude level.
5. Add 10 log(1/x), where x is the duty cycle.

### 3.4.3 Test Setup



### 3.4.4 Test Result of Peak Power Spectral Density

**Summary**

| Mode | PD (dBm/RBW) | EIRP PD (dBm/RBW) |
|---|---|---|
| 5.15-5.25GHz | - | - |
| 802.11ac VHT40_Nss1,(MCS0)_2TX | 0.35 | 8.44 |
| 5.725-5.85GHz | - | - |
| 802.11ac VHT40_Nss1,(MCS0)_2TX | -1.13 | 6.64 |

RBW = 500kHz for 5.725-5.85GHz band / 1MHz for other band;

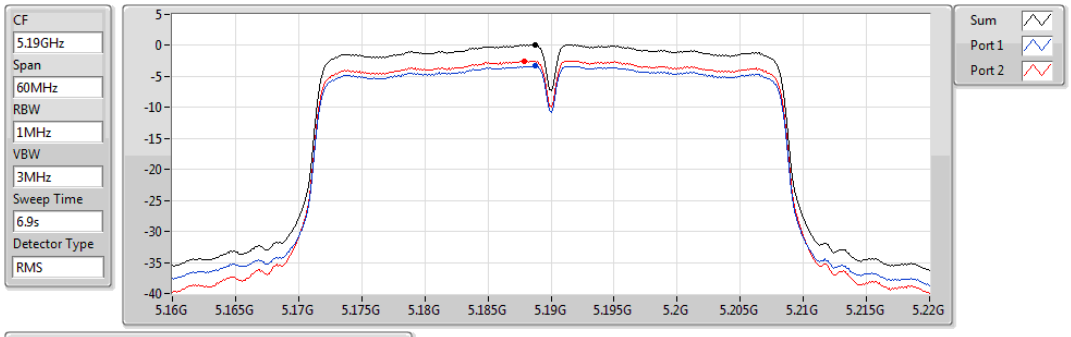
**Result**

| Mode | Result | DG (dBi) | Port 1 (dBm/ RBW) | Port 2 (dBm/ RBW) | PD (dBm/ RBW) | PD Limit (dBm/ RBW) | EIRP PD (dBm/ RBW) | EIRP PD Limit (dBm/ RBW) |
|---|---|---|---|---|---|---|---|---|
| 802.11ac VHT40_Nss1,(MCS0)_2TX | - | - | - | - | - | - | - | - |
| 5190MHz | Pass | 8.09 | -3.31 | -2.50 | 0.10 | 8.91 | 8.19 | 17.00 |
| 5230MHz | Pass | 8.09 | -2.87 | -2.35 | 0.35 | 8.91 | 8.44 | 17.00 |
| 5755MHz | Pass | 7.77 | -4.40 | -4.09 | -1.26 | 28.23 | 6.51 | 36.00 |
| 5795MHz | Pass | 7.77 | -4.11 | -4.10 | -1.13 | 28.23 | 6.64 | 36.00 |

RBW = 500kHz for 5.725-5.85GHz band / 1MHz for other band;
PD = trace bin-by-bin of each transmits port summing can be performed maximum power density; Port X = Port Xpower density;
DG = Directional Gain
For 5.15 ~ 5.25 GHz
Directional Gain= 5.08 + 10*log(2/1) = 8.09 dBi > 6dBi
Limit shall be reduced to 11 dBm – ( 8.09 dBi – 6dBi) = 8.91 dBm
For 5.725 ~ 5.85 GHz
Directional Gain= 4.76 + 10*log(2/1) = 7.77 dBi > 6dBi
Limit shall be reduced to 30 dBm – ( 7.77 dBi – 6dBi) = 28.23 dBm

**802.11ac VHT40_Nss1,(MCS0)_2TX** **PSD**

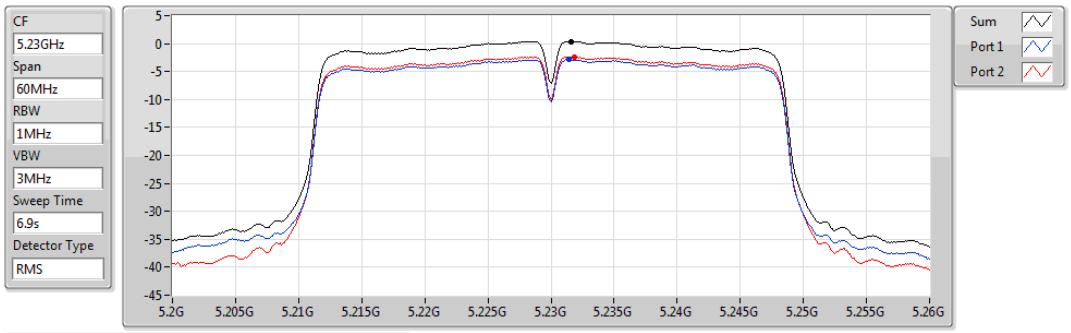
**5190MHz**




| Sum | PD | Port 1 | Port 2 |
|---|---|---|---|
| (dBm/RBW) | (dBm/RBW) | (dBm/RBW) | (dBm/RBW) |
| 0.10 | 0.10 | -3.31 | -2.50 |

**802.11ac VHT40_Nss1,(MCS0)_2TX** **PSD**

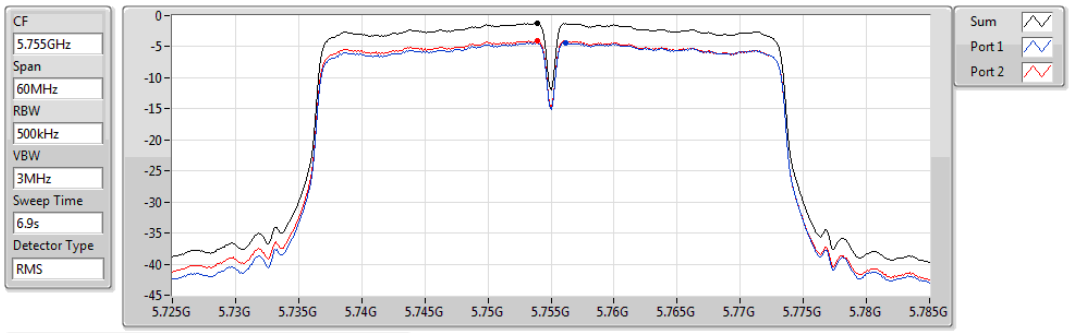
**5230MHz**




| Sum | PD | Port 1 | Port 2 |
|---|---|---|---|
| (dBm/RBW) | (dBm/RBW) | (dBm/RBW) | (dBm/RBW) |
| 0.35 | 0.35 | -2.87 | -2.35 |

**802.11ac VHT40_Nss1,(MCS0)_2TX** **PSD**

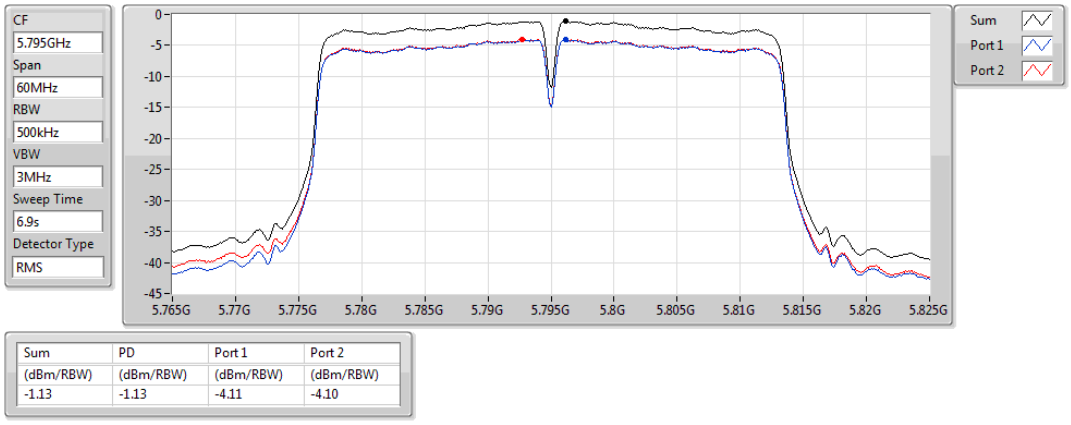
**5755MHz**




| Sum | PD | Port 1 | Port 2 |
|---|---|---|---|
| (dBm/RBW) | (dBm/RBW) | (dBm/RBW) | (dBm/RBW) |
| -1.26 | -1.26 | -4.40 | -4.09 |

**802.11ac VHT40_Nss1,(MCS0)_2TX** **PSD**

**5795MHz**




| Sum | PD | Port 1 | Port 2 |
|---|---|---|---|
| (dBm/RBW) | (dBm/RBW) | (dBm/RBW) | (dBm/RBW) |
| -1.13 | -1.13 | -4.11 | -4.10 |

## 3.5 Transmitter Radiated and Band Edge Emissions

### 3.5.1 Limit of Transmitter Radiated and Band Edge Emissions

| Restricted Band Emissions Limit | | | |
|---|---|---|---|
| **Frequency Range (MHz)** | **Field Strength (uV/m)** | **Field Strength (dBuV/m)** | **Measure Distance (m)** |
| 0.009~0.490 | 2400/F(kHz) | 48.5 - 13.8 | 300 |
| 0.490~1.705 | 24000/F(kHz) | 33.8 - 23 | 30 |
| 1.705~30.0 | 30 | 29 | 30 |
| 30~88 | 100 | 40 | 3 |
| 88~216 | 150 | 43.5 | 3 |
| 216~960 | 200 | 46 | 3 |
| Above 960 | 500 | 54 | 3 |

**Note 1:**
Qusai-Peak value is measured for frequency below 1GHz except for 9–90 kHz, 110–490 kHz frequency band. Peak and average value are measured for frequency above 1GHz. The limit on average radio frequency emission is as above table. The limit on peak radio frequency emissions is 20 dB above the maximum permitted average emission limit
**Note 2:**
Measurements may be performed at a distance other than what is specified provided. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor as below, Frequency at or above 30 MHz: 20 dB/decade Frequency below 30 MHz: 40 dB/decade.

| Un-restricted band emissions above 1GHz Limit | |
|---|---|
| **Operating Band** | **Limit** |
| 5.15 - 5.25 GHz | e.i.r.p. -27 dBm [68.2 dBuV/m@3m] |
| 5.725 - 5.850 GHz | All emissions shall be limited to a level of −27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge. |

Note 1: Measurements may be performed at a distance other than the limit distance provided they are not performed in the near field and the emissions to be measured can be detected by the measurement equipment. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse of linear distance for field-strength measurements, inverse of linear distance-squared for power-density measurements).

### 3.5.2 Test Procedures

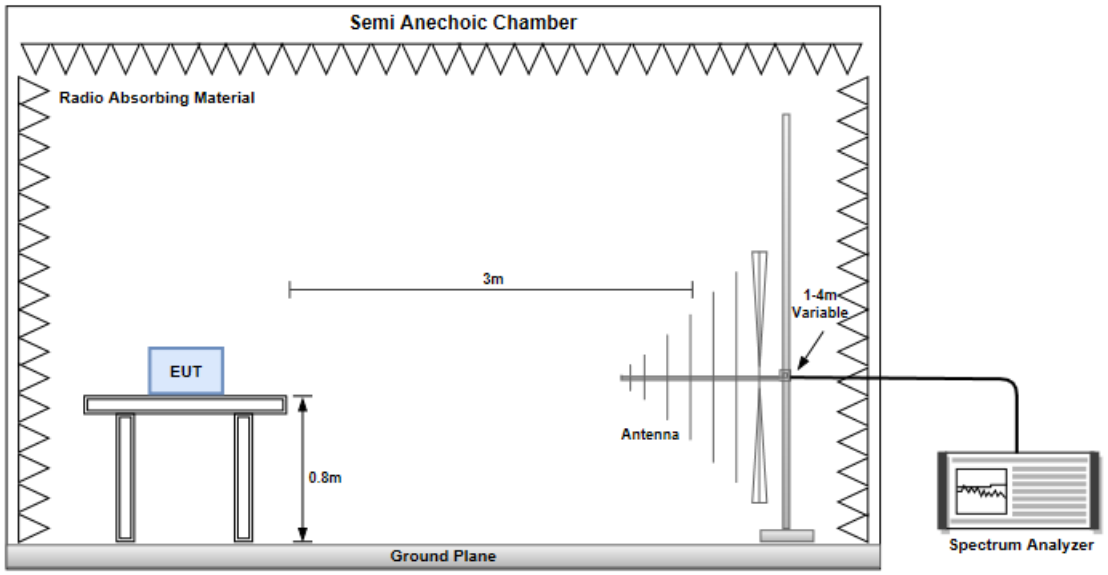
1. Measurement is made at a semi-anechoic chamber that incorporates a turntable allowing a EUT rotation of 360°. A continuously-rotating, remotely-controlled turntable is installed at the test site to support the EUT and facilitate determination of the direction of maximum radiation for each EUT emission frequency. The EUT is placed at test table. For emissions testing at or below 1 GHz, the table height is 80 cm above the reference ground plane. For emission measurements above 1 GHz, the table height is 1.5 m
2. Measurement is made with the antenna positioned in both the horizontal and vertical planes of polarization. The measurement antenna is varied in height (1m ~ 4m) above the reference ground plane to obtain the maximum signal strength. Distance between EUT and antenna is 3 m.
3. This investigation is performed with the EUT rotated 360°, the antenna height scanned between 1 m and 4 m, and the antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations.

Note:

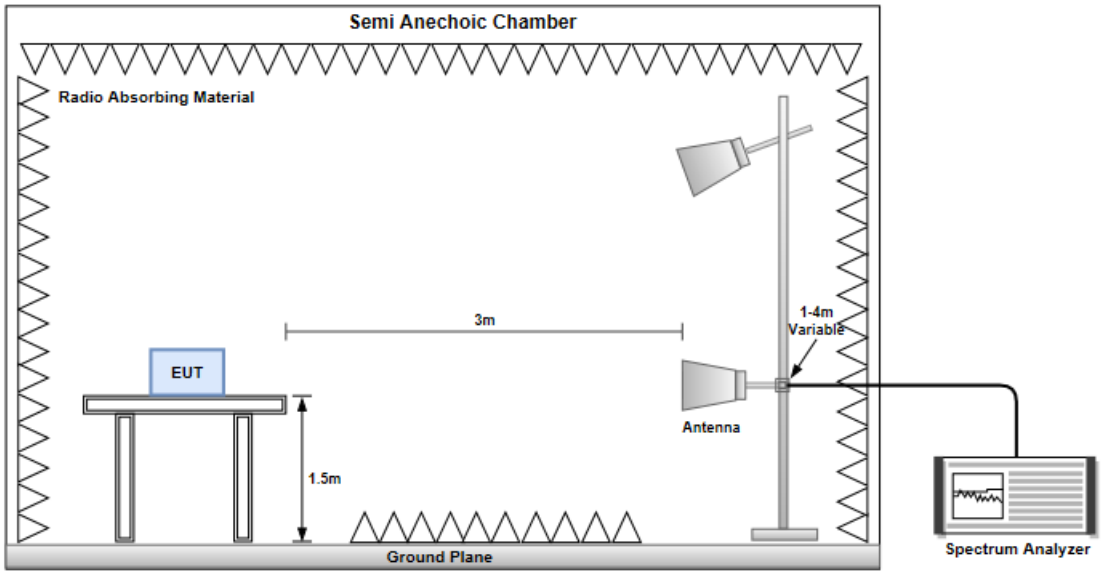
1. 120kHz measurement bandwidth of test receiver and Quasi-peak detector is for radiated emission below 1GHz.
2. RBW=1MHz, VBW=3MHz and Peak detector is for peak measured value of radiated emission above 1GHz.
3. RBW=1MHz, VBW=1/T and Peak detector is for average measured value of radiated emission above 1GHz.

### 3.5.3 Test Setup

**Radiated Emissions below 1 GHz**

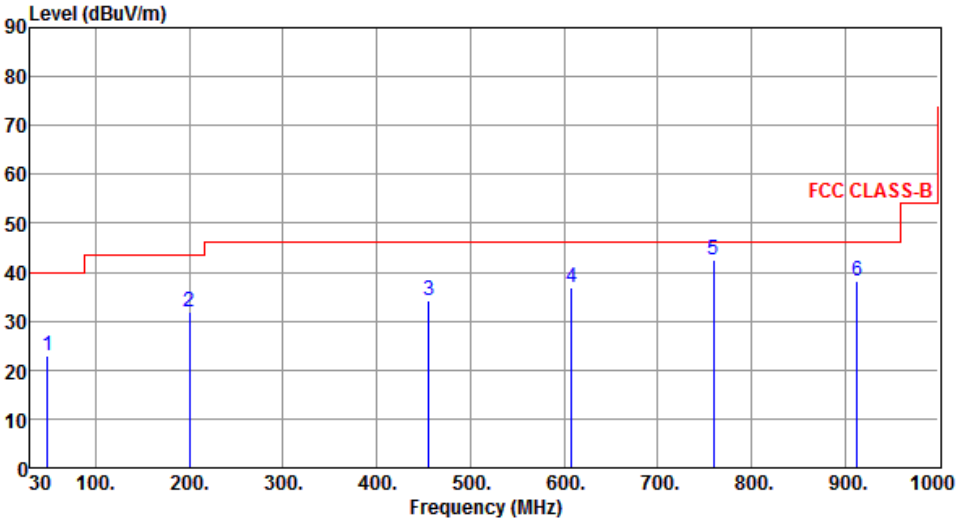



**Radiated Emissions above 1 GHz**



## 3.5.4 Transmitter Radiated Unwanted Emissions (Below 1GHz)

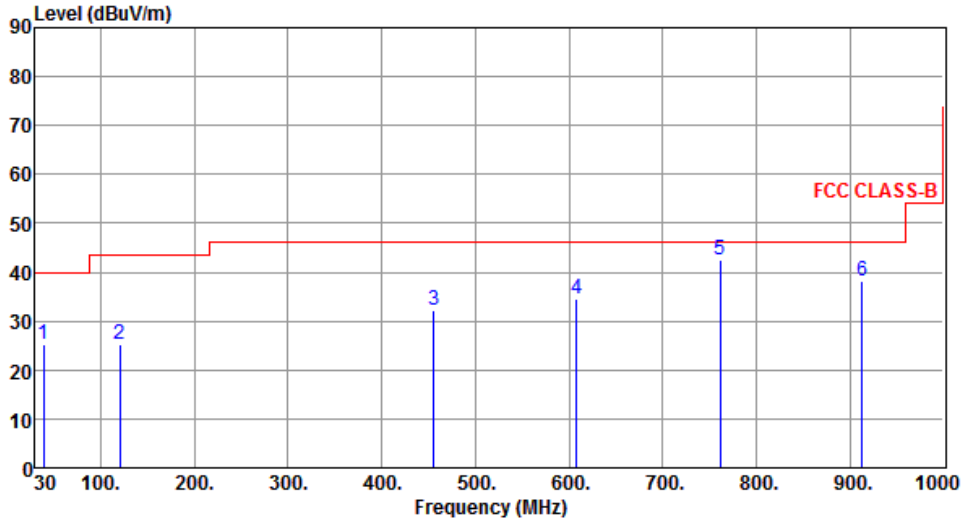
| **Modulation** | VHT40 | **Test Freq. (MHz)** | 5230 |
|---|---|---|---|
| **Polarization** | Horizontal | | |




| | Freq. MHz | Emission level dBuV/m | Limit dBuV/m | Margin dB | SA reading dBuV | Factor dB | Remark | ANT High cm | Turn Table deg |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 48.43 | 22.96 | 40.00 | -17.04 | 30.73 | -7.77 | Peak | --- | --- |
| 2 | 199.75 | 31.90 | 43.50 | -11.60 | 42.79 | -10.89 | Peak | --- | --- |
| 3 | 455.83 | 34.26 | 46.00 | -11.74 | 38.03 | -3.77 | Peak | --- | --- |
| 4 | 608.12 | 36.73 | 46.00 | -9.27 | 37.23 | -0.50 | Peak | --- | --- |
| 5 | 759.99 | 42.58 | 46.00 | -3.42 | 40.70 | 1.88 | Average | 100 | 103 |
| 6 | 912.70 | 38.16 | 46.00 | -7.84 | 34.35 | 3.81 | Peak | --- | --- |

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).
Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.

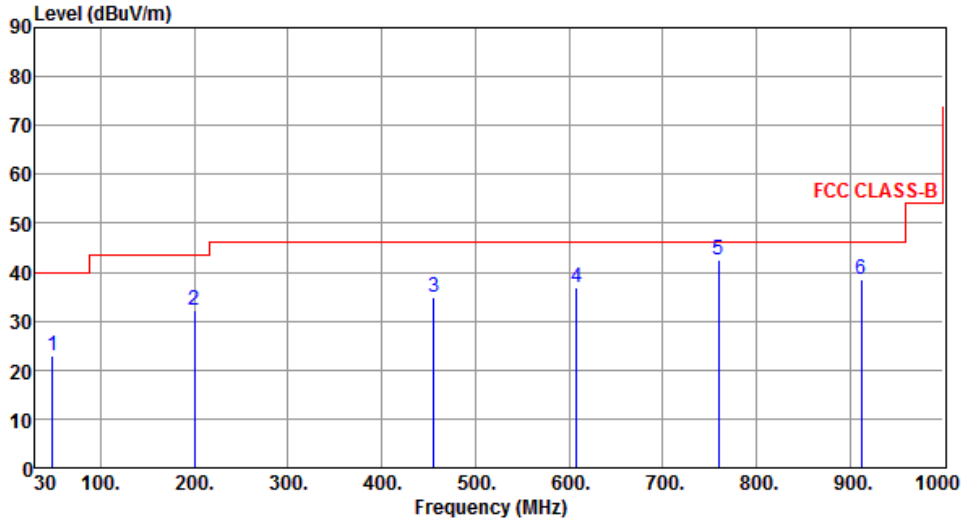
| Modulation | VHT40 | Test Freq. (MHz) | 5230 |
|---|---|---|---|
| Polarization | Vertical | | |




| | Freq. MHz | Emission level dBuV/m | Limit dBuV/m | Margin dB | SA reading dBuV | Factor dB | Remark | ANT High cm | Turn Table deg |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 38.73 | 25.10 | 40.00 | -14.90 | 33.36 | -8.26 | Peak | --- | --- |
| 2 | 120.21 | 25.10 | 43.50 | -18.40 | 35.70 | -10.60 | Peak | --- | --- |
| 3 | 455.83 | 32.08 | 46.00 | -13.92 | 35.85 | -3.77 | Peak | --- | --- |
| 4 | 608.12 | 34.62 | 46.00 | -11.38 | 35.12 | -0.50 | Peak | --- | --- |
| 5 | 761.38 | 42.36 | 46.00 | -3.64 | 40.48 | 1.88 | Peak | --- | --- |
| 6 | 912.70 | 38.17 | 46.00 | -7.83 | 34.36 | 3.81 | Peak | --- | --- |

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).
Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.

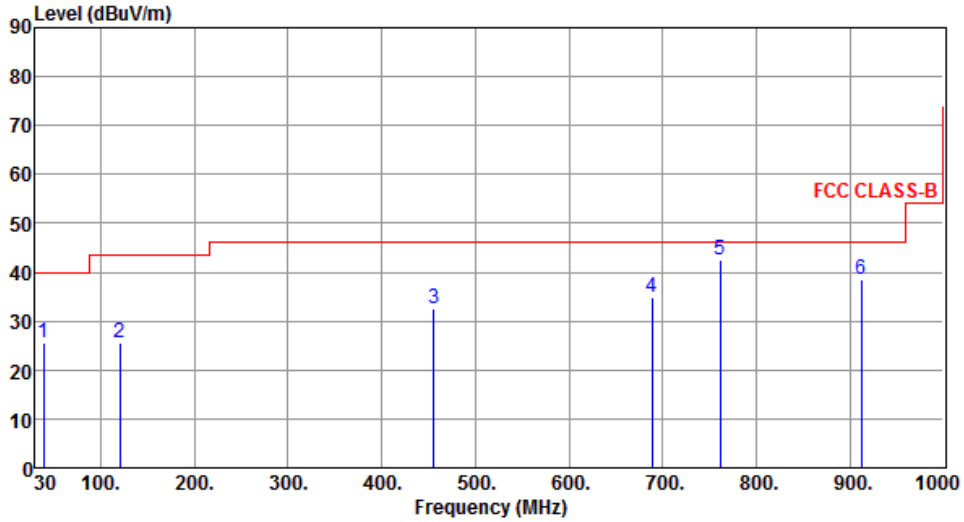
| Modulation | VHT40 | Test Freq. (MHz) | 5755 |
|---|---|---|---|
| Polarization | Horizontal | | |




| | Freq. MHz | Emission level dBuV/m | Limit dBuV/m | Margin dB | SA reading dBuV | Factor dB | Remark | ANT High cm | Turn Table deg |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 48.56 | 22.93 | 40.00 | -17.07 | 30.72 | -7.79 | Peak | --- | --- |
| 2 | 199.82 | 32.13 | 43.50 | -11.37 | 43.03 | -10.90 | Peak | --- | --- |
| 3 | 455.63 | 34.75 | 46.00 | -11.25 | 38.53 | -3.78 | Peak | --- | --- |
| 4 | 608.45 | 36.92 | 46.00 | -9.08 | 37.40 | -0.48 | Peak | --- | --- |
| 5 | 759.99 | 42.63 | 46.00 | -3.37 | 40.75 | 1.88 | Average | 100 | 102 |
| 6 | 912.56 | 38.44 | 46.00 | -7.56 | 34.63 | 3.81 | Peak | --- | --- |

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).
Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.

| Modulation | VHT40 | Test Freq. (MHz) | 5755 |
|---|---|---|---|
| Polarization | Vertical | | |

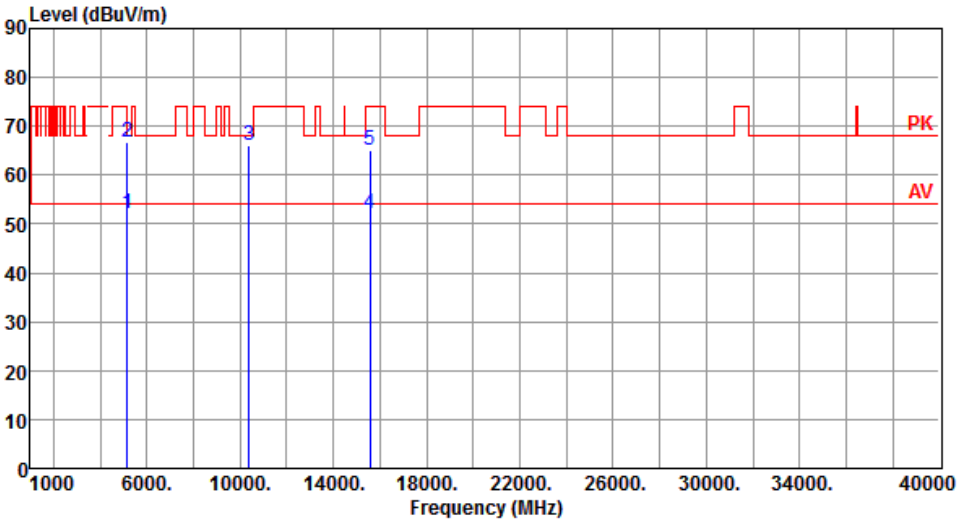



| | Freq. MHz | Emission level dBuV/m | Limit dBuV/m | Margin dB | SA reading dBuV | Factor dB | Remark | ANT High cm | Turn Table deg |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 38.68 | 25.63 | 40.00 | -14.37 | 33.89 | -8.26 | Peak | --- | --- |
| 2 | 120.28 | 25.44 | 43.50 | -18.06 | 36.03 | -10.59 | Peak | --- | --- |
| 3 | 455.93 | 32.42 | 46.00 | -13.58 | 36.19 | -3.77 | Peak | --- | --- |
| 4 | 688.35 | 34.75 | 46.00 | -11.25 | 34.01 | 0.74 | Peak | --- | --- |
| 5 | 761.45 | 42.44 | 46.00 | -3.56 | 40.56 | 1.88 | Peak | --- | --- |
| 6 | 912.48 | 38.63 | 46.00 | -7.37 | 34.82 | 3.81 | Peak | --- | --- |

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).
Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.

### 3.5.5 Transmitter Radiated Unwanted Emissions (Above 1GHz) for VHT40

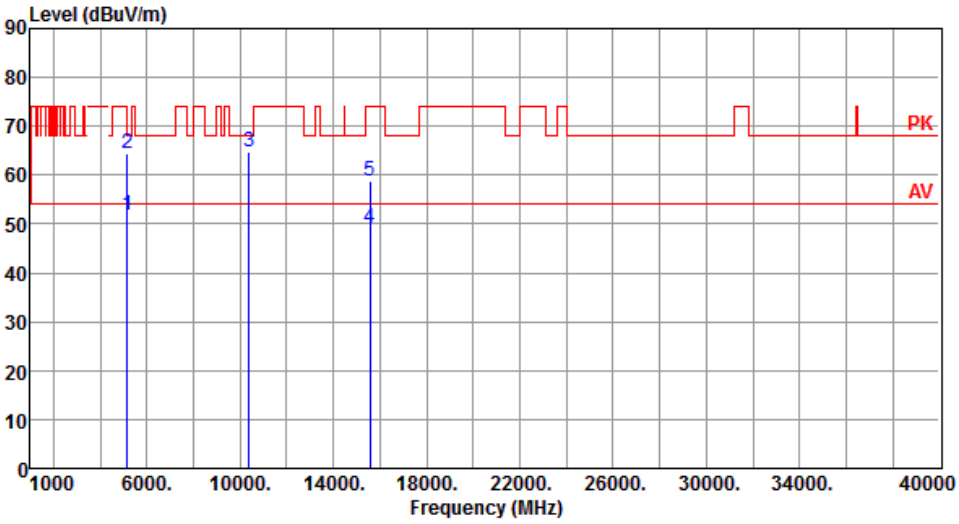
| Modulation | VHT40 | Test Freq. (MHz) | 5190 |
|---|---|---|---|
| Polarization | Horizontal | | |




| | Freq. MHz | Emission level dBuV/m | Limit dBuV/m | Margin dB | SA reading dBuV | Factor dB | Remark | ANT High cm | Turn Table deg |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 5150.00 | 51.99 | 54.00 | -2.01 | 47.45 | 4.54 | Average | 340 | 85 |
| 2 | 5150.00 | 66.72 | 74.00 | -7.28 | 62.18 | 4.54 | Peak | 340 | 85 |
| 3 | 10380.00 | 66.16 | 68.20 | -2.04 | 52.32 | 13.84 | Peak | 190 | 170 |
| 4 | 15570.00 | 51.98 | 54.00 | -2.02 | 37.79 | 14.19 | Average | 100 | 305 |
| 5 | 15570.00 | 65.16 | 74.00 | -8.84 | 50.97 | 14.19 | Peak | 100 | 305 |

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

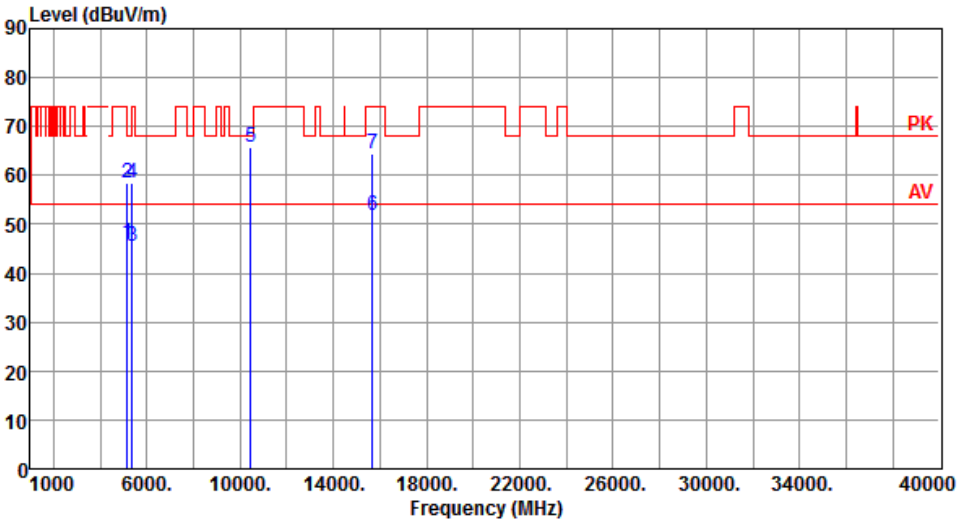
| Modulation | VHT40 | Test Freq. (MHz) | 5190 |
|---|---|---|---|
| Polarization | Vertical | | |




| | Freq. MHz | Emission level dBuV/m | Limit dBuV/m | Margin dB | SA reading dBuV | Factor dB | Remark | ANT High cm | Turn Table deg |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 5150.00 | 51.73 | 54.00 | -2.27 | 47.19 | 4.54 | Average | 313 | 155 |
| 2 | 5150.00 | 64.56 | 74.00 | -9.44 | 60.02 | 4.54 | Peak | 313 | 155 |
| 3 | 10380.00 | 64.66 | 68.20 | -3.54 | 50.82 | 13.84 | Peak | 185 | 162 |
| 4 | 15570.00 | 48.99 | 54.00 | -5.01 | 34.80 | 14.19 | Average | 100 | 287 |
| 5 | 15570.00 | 58.62 | 74.00 | -15.38 | 44.43 | 14.19 | Peak | 100 | 287 |

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

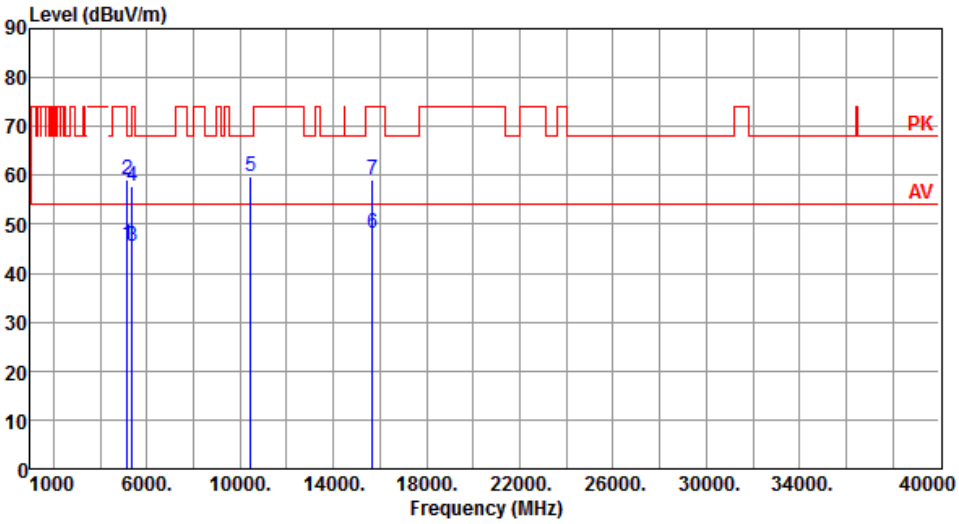
| Modulation | VHT40 | Test Freq. (MHz) | 5230 |
|---|---|---|---|
| Polarization | Horizontal | | |




| | Freq. MHz | Emission level dBuV/m | Limit dBuV/m | Margin dB | SA reading dBuV | Factor dB | Remark | ANT High cm | Turn Table deg |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 5150.00 | 46.03 | 54.00 | -7.97 | 41.49 | 4.54 | Average | 339 | 95 |
| 2 | 5150.00 | 58.55 | 74.00 | -15.45 | 54.01 | 4.54 | Peak | 339 | 95 |
| 3 | 5350.00 | 45.44 | 54.00 | -8.56 | 41.31 | 4.13 | Average | 339 | 95 |
| 4 | 5350.00 | 58.55 | 74.00 | -15.45 | 54.42 | 4.13 | Peak | 339 | 95 |
| 5 | 10460.00 | 65.88 | 68.20 | -2.32 | 51.99 | 13.89 | Peak | 195 | 165 |
| 6 | 15690.00 | 51.79 | 54.00 | -2.21 | 37.86 | 13.93 | Average | 100 | 301 |
| 7 | 15690.00 | 64.55 | 74.00 | -9.45 | 50.62 | 13.93 | Peak | 100 | 301 |

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

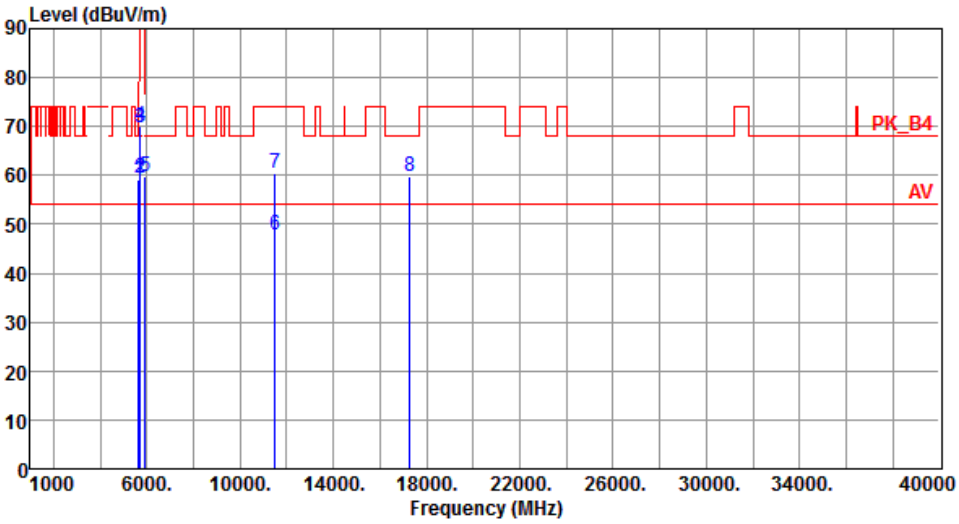
| | | | |
|---|---|---|---|
| **Modulation** | VHT40 | **Test Freq. (MHz)** | 5230 |
| **Polarization** | Vertical | | |




| | Freq. MHz | Emission level dBuV/m | Limit dBuV/m | Margin dB | SA reading dBuV | Factor dB | Remark | ANT High cm | Turn Table deg |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 5150.00 | 45.88 | 54.00 | -8.12 | 41.34 | 4.54 | Average | 260 | 181 |
| 2 | 5150.00 | 58.98 | 74.00 | -15.02 | 54.44 | 4.54 | Peak | 260 | 181 |
| 3 | 5350.00 | 45.55 | 54.00 | -8.45 | 41.42 | 4.13 | Average | 260 | 181 |
| 4 | 5350.00 | 57.85 | 74.00 | -16.15 | 53.72 | 4.13 | Peak | 260 | 181 |
| 5 | 10460.00 | 59.66 | 68.20 | -8.54 | 45.77 | 13.89 | Peak | 112 | 150 |
| 6 | 15690.00 | 48.15 | 54.00 | -5.85 | 34.22 | 13.93 | Average | 100 | 284 |
| 7 | 15690.00 | 59.21 | 74.00 | -14.79 | 45.28 | 13.93 | Peak | 100 | 284 |

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

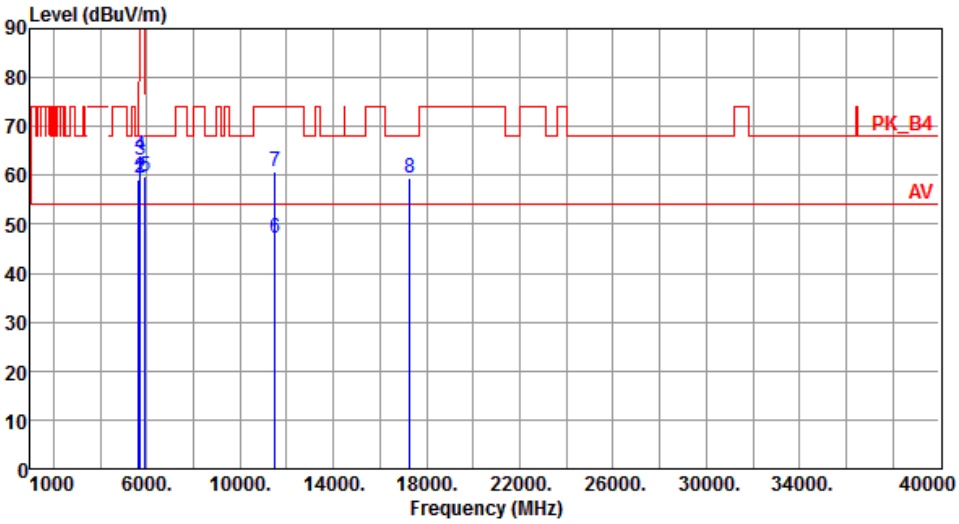
| Modulation | VHT40 | Test Freq. (MHz) | 5755 |
|---|---|---|---|
| Polarization | Horizontal | | |




| | Freq. MHz | Emission level dBuV/m | Limit dBuV/m | Margin dB | SA reading dBuV | Factor dB | Remark | ANT High cm | Turn Table deg |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 5650.00 | 59.11 | 68.20 | -9.09 | 54.14 | 4.97 | Peak | 349 | 286 |
| 2 | 5700.00 | 59.55 | 105.20 | -45.65 | 54.39 | 5.16 | Peak | 349 | 286 |
| 3 | 5720.00 | 69.62 | 110.80 | -41.18 | 64.39 | 5.23 | Peak | 349 | 286 |
| 4 | 5725.00 | 70.06 | 122.20 | -52.14 | 64.81 | 5.25 | Peak | 349 | 286 |
| 5 | 5925.00 | 59.85 | 68.20 | -8.35 | 53.76 | 6.09 | Peak | 349 | 286 |
| 6 | 11510.00 | 47.66 | 54.00 | -6.34 | 33.55 | 14.11 | Average | 100 | 5 |
| 7 | 11510.00 | 60.35 | 74.00 | -13.65 | 46.24 | 14.11 | Peak | 100 | 5 |
| 8 | 17265.00 | 59.73 | 68.20 | -8.47 | 42.42 | 17.31 | Peak | 100 | 10 |

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

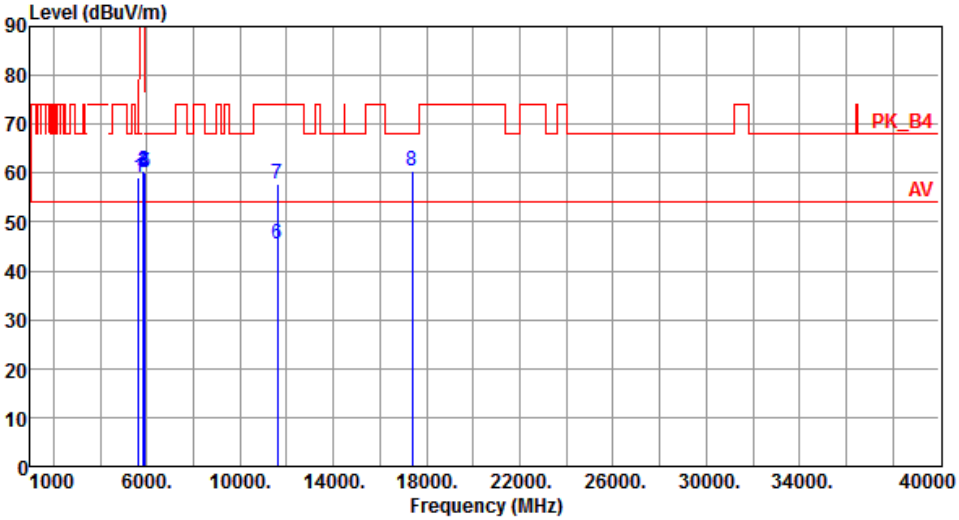
| Modulation | VHT40 | Test Freq. (MHz) | 5755 |
|---|---|---|---|
| Polarization | Vertical | | |




| | Freq. MHz | Emission level dBuV/m | Limit dBuV/m | Margin dB | SA reading dBuV | Factor dB | Remark | ANT High cm | Turn Table deg |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 5650.00 | 59.16 | 68.20 | -9.04 | 54.19 | 4.97 | Peak | 100 | 8 |
| 2 | 5700.00 | 59.55 | 105.20 | -45.65 | 54.39 | 5.16 | Peak | 100 | 8 |
| 3 | 5720.00 | 63.16 | 110.80 | -47.64 | 57.93 | 5.23 | Peak | 100 | 8 |
| 4 | 5725.00 | 63.99 | 122.20 | -58.21 | 58.74 | 5.25 | Peak | 100 | 8 |
| 5 | 5925.00 | 59.88 | 68.20 | -8.32 | 53.79 | 6.09 | Peak | 100 | 8 |
| 6 | 11510.00 | 47.25 | 54.00 | -6.75 | 33.14 | 14.11 | Average | 236 | 139 |
| 7 | 11510.00 | 60.85 | 74.00 | -13.15 | 46.74 | 14.11 | Peak | 236 | 139 |
| 8 | 17265.00 | 59.35 | 68.20 | -8.85 | 42.04 | 17.31 | Peak | 100 | 315 |

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

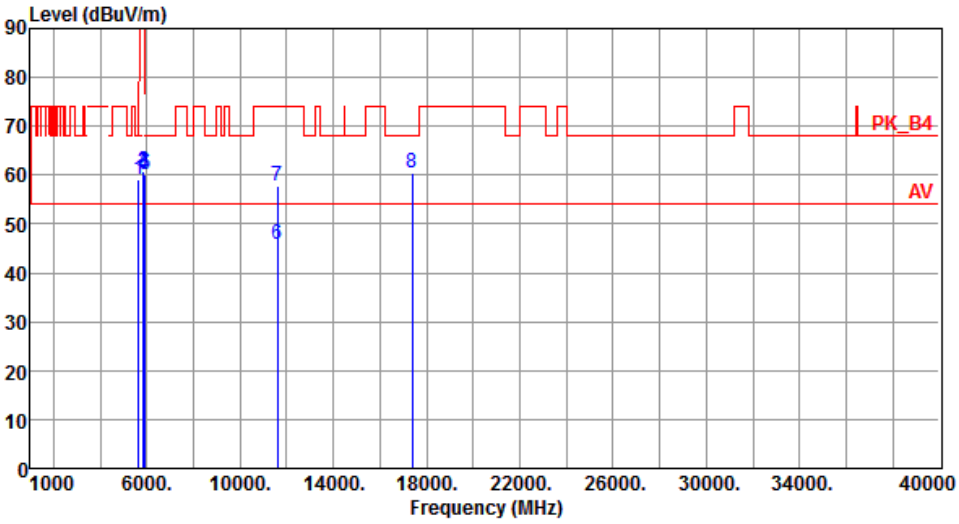
| | | | |
|---|---|---|---|
| **Modulation** | VHT40 | **Test Freq. (MHz)** | 5795 |
| **Polarization** | Horizontal | | |




| | Freq. MHz | Emission level dBuV/m | Limit dBuV/m | Margin dB | SA reading dBuV | Factor dB | Remark | ANT High cm | Turn Table deg |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 5650.00 | 59.11 | 68.20 | -9.09 | 54.14 | 4.97 | Peak | 325 | 316 |
| 2 | 5850.00 | 60.43 | 122.20 | -61.77 | 54.62 | 5.81 | Peak | 325 | 316 |
| 3 | 5855.00 | 60.11 | 110.80 | -50.69 | 54.28 | 5.83 | Peak | 325 | 316 |
| 4 | 5875.00 | 60.05 | 105.20 | -45.15 | 54.15 | 5.90 | Peak | 325 | 316 |
| 5 | 5925.00 | 60.00 | 68.20 | -8.20 | 53.91 | 6.09 | Peak | 325 | 316 |
| 6 | 11590.00 | 45.65 | 54.00 | -8.35 | 31.76 | 13.89 | Average | 100 | 10 |
| 7 | 11590.00 | 57.95 | 74.00 | -16.05 | 44.06 | 13.89 | Peak | 100 | 10 |
| 8 | 17385.00 | 60.55 | 68.20 | -7.65 | 42.80 | 17.75 | Peak | 100 | 20 |

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

| Modulation | VHT40 | Test Freq. (MHz) | 5795 |
|---|---|---|---|
| Polarization | Vertical | | |




| | Freq. MHz | Emission level dBuV/m | Limit dBuV/m | Margin dB | SA reading dBuV | Factor dB | Remark | ANT High cm | Turn Table deg |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 5650.00 | 59.15 | 68.20 | -9.05 | 54.18 | 4.97 | Peak | 100 | 5 |
| 2 | 5850.00 | 60.73 | 122.20 | -61.47 | 54.92 | 5.81 | Peak | 100 | 5 |
| 3 | 5855.00 | 60.52 | 110.80 | -50.28 | 54.69 | 5.83 | Peak | 100 | 5 |
| 4 | 5875.00 | 60.23 | 105.20 | -44.97 | 54.33 | 5.90 | Peak | 100 | 5 |
| 5 | 5925.00 | 60.11 | 68.20 | -8.09 | 54.02 | 6.09 | Peak | 100 | 5 |
| 6 | 11590.00 | 45.95 | 54.00 | -8.05 | 32.06 | 13.89 | Average | 241 | 140 |
| 7 | 11590.00 | 57.75 | 74.00 | -16.25 | 43.86 | 13.89 | Peak | 241 | 140 |
| 8 | 17385.00 | 60.55 | 68.20 | -7.65 | 42.80 | 17.75 | Peak | 100 | 320 |

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

# 3.6 Frequency Stability

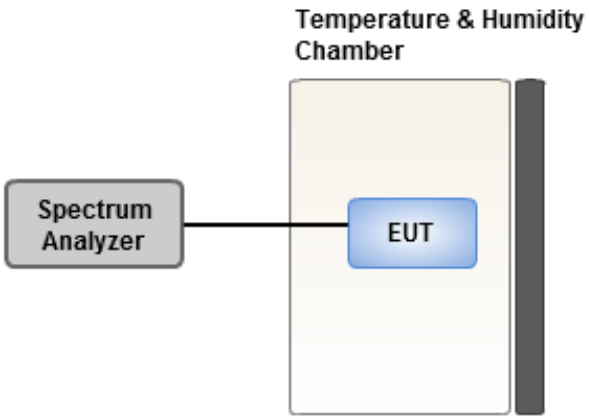
## 3.6.1 Limit of Frequency Stability

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

## 3.6.2 Test Procedures

1. The EUT is installed in an environment test chamber with external power source.
2. Set the chamber to operate at 20 centigrade and external power source to output at nominal voltage of EUT.
3. A sufficient stabilization period at each temperature is used prior to each frequency measurement.
4. When temperature is stabled, measure the frequency stability.
5. The test shall be performed under normal and extreme condition for temperature and voltage.

## 3.6.3 Test Setup



### 3.6.4 Test Result of Frequency Stability

| Frequency: 5230 MHz | Frequency Drift (ppm) | | | |
|---|---|---|---|---|
| Temperature (°C) | 0 minute | 2 minutes | 5 minutes | 10 minutes |
| T20°CVmax | 6.76 | 5.80 | 6.65 | 6.10 |
| T20°CVmin | 4.37 | 4.06 | 4.12 | 4.28 |
| T50°CVnom | 3.60 | 3.20 | 4.04 | 3.40 |
| T40°CVnom | 3.57 | 3.73 | 3.74 | 3.42 |
| T30°CVnom | 3.11 | 2.90 | 2.83 | 3.09 |
| T20°CVnom | 4.26 | 3.63 | 3.57 | 3.58 |
| T10°CVnom | 3.49 | 3.55 | 3.51 | 3.11 |
| T0°CVnom | 4.26 | 3.50 | 4.88 | 4.40 |
| T-10°CVnom | 3.32 | 2.79 | 3.19 | 3.18 |
| T-20°CVnom | 1.37 | 1.59 | 1.54 | 1.43 |
| T-30°CVnom | 1.06 | 1.16 | 1.14 | 1.51 |
| Vnom [Vac]: 120 | | Vmax [Vac]: 138 | | Vmin [Vac]: 102 |
| Tnom [°C]: 20 | | Tmax [°C]: 50 | | Tmin [°C]: -30 |

| Frequency: 5795 MHz | Frequency Drift (ppm) | | | |
|---|---|---|---|---|
| Temperature (°C) | 0 minute | 2 minutes | 5 minutes | 10 minutes |
| T20°CVmax | 6.66 | 6.54 | 6.61 | 7.19 |
| T20°CVmin | 4.55 | 4.12 | 3.97 | 4.46 |
| T50°CVnom | 3.02 | 3.41 | 3.31 | 3.17 |
| T40°CVnom | 3.50 | 3.42 | 3.37 | 2.99 |
| T30°CVnom | 3.48 | 3.38 | 3.53 | 3.51 |
| T20°CVnom | 4.80 | 4.26 | 4.34 | 4.08 |
| T10°CVnom | 2.80 | 3.30 | 3.62 | 3.64 |
| T0°CVnom | 4.36 | 4.36 | 3.88 | 4.26 |
| T-10°CVnom | 3.83 | 3.30 | 3.69 | 3.52 |
| T-20°CVnom | 1.81 | 2.23 | 2.19 | 1.77 |
| T-30°CVnom | 1.30 | 1.02 | 1.26 | 1.34 |
| Vnom [Vac]: 120 | | Vmax [Vac]: 138 | | Vmin [Vac]: 102 |
| Tnom [°C]: 20 | | Tmax [°C]: 50 | | Tmin [°C]: -30 |

# 4 Test laboratory information

Established in 2012, ICC provides foremost EMC & RF Testing and advisory consultation services by our skilled engineers and technicians. Our services employ a wide variety of advanced edge test equipment and one of the widest certification extents in the business.

International Certification Corp (EMC and Wireless Communication Laboratory), it is our definitive objective is to institute long term, trust-based associations with our clients. The expectation we set up with our clients is based on outstanding service, practical expertise and devotion to a certified value structure. Our passion is to grant our clients with best EMC / RF services by oriented knowledgeable and accommodating staff.

Our Test sites are located at Linkou District and Kwei Shan District. Location map can be found on our website http://www.icertifi.com.tw.

| **Linkou** | **Kwei Shan** | **Kwei Shan Site II** |
|---|---|---|
| Tel: 886-2-2601-1640 | Tel: 886-3-271-8666 | Tel: 886-3-271-8640 |
| No. 30-2, Ding Fwu Tsuen, Lin Kou District, New Taipei City, Taiwan, R.O.C. | No. 3-1, Lane 6, Wen San 3rd St., Kwei Shan District, Tao Yuan City 333, Taiwan, R.O.C. | No. 14-1, Lane 19, Wen San 3rd St., Kwei Shan District, Tao Yuan City 333, Taiwan, R.O.C. |

If you have any suggestion, please feel free to contact us as below information.

Tel: 886-3-271-8666
Fax: 886-3-318-0155
Email: ICC_Service@icertifi.com.tw

**==END==**