# TEST REPORT

| | |
|---|---|
| Product Name: | Zircon |
| FCC ID: | 2BAYCNUC12ZRN |
| Trademark: | N/A |
| Model Number: | NUC12ZRN |
| Prepared For: | Simply NUC, Inc. |
| Address: | 3500 S Dupont Hwy, In the city of Dover, County of Kent, Delaware 19901 United States |
| Manufacturer: | Simply NUC, Inc. |
| Address: | 3500 S Dupont Hwy, In the city of Dover, County of Kent, Delaware 19901 United States |
| Prepared By: | Shenzhen CTB Testing Technology Co., Ltd. |
| Address: | 1&2/F., Building A, No.26, Xinhe Road, Xinqiao, Xinqiao Street, Bao'an District, Shenzhen, Guangdong, China |
| Sample Received Date: | Jun. 25, 2024 |
| Sample tested Date: | Jun. 25, 2024 to Jul. 05, 2024 |
| Issue Date: | Jul. 05, 2024 |
| Report No.: | CTB240705004RFX |
| Test Standards | FCC CFR Title 47 Part 15 Subpart E Section 15.407 |
| Test Results | PASS |
| Remark: | This is WIFI-5GHz band radio test report. |

| Compiled by: | Reviewed by: | Approved by: |
|---|---|---|
| Zhou Kui | Arron Liu | Bin Mei |
| Zhou Kui | Arron Liu | Bin Mei / Director |

Note: If there is any objection to the inspection results in this report, please submit a written report to the company within 15 days from the date of receiving the report. The test report is effective only with both signature and specialized stamp. This result(s) shown in this report refer only to the sample(s) tested. Without written approval of Shenzhen CTB Testing Technology Co., Ltd. this report can't be reproduced except in full. The tested sample(s) and the sample information are provided by the client. "*" indicates the testing items were fulfilled by subcontracted lab. "#" indicates the items are not in CNAS accreditation scope.

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*(Note: N/A means not applicable)*

## 1. VERSION

| Report No. | Issue Date | Description | Approved |
|---|---|---|---|
| CTB240705004RFX | Jul. 05, 2024 | Original | Valid |

## 2. TEST SUMMARY

The Product has been tested according to the following specifications:

| Test Item | Test Requirement | Test method | Result |
|---|---|---|---|
| **AC Power Line Conducted Emission** | 47 CFR Part 15 Subpart E Section 15.407 (b)(6) | ANSI C63.10-2013 | PASS |
| **Radiated Spurious emissions** | 47 CFR Part 15 Subpart E Section 15.205/15.407(b) | KDB789033 | PASS |
| **Band edge** | 47 CFR Part 15 Subpart E Section 15.205/15.407(b) | KDB789033 | PASS |
| **Conducted Peak Output Power** | 47 CFR Part 15 Subpart E Section 15.407 (a) | KDB789033 | PASS |
| **Emission Bandwidth & Occupied Bandwidth** | 47 CFR Part 15 Subpart E Section 15.407 (a)(e) | KDB789033 | PASS |
| **Power Spectral Density** | 47 CFR Part 15 Subpart E Section 15.407 (a) | KDB789033 | PASS |
| **Frequency stability** | 47 CFR Part 15 Subpart E Section 15.407 (g) | KDB789033 | PASS |
| **Operation in the absence of information to the transmit** | 47 CFR Part 15 Subpart E Section 15.407 (b) | 47 CFR Part 15 Subpart E | PASS |
| **Antenna Requirement** | 47 CFR Part 15 Subpart E Section 15.203 | / | PASS |

Remark:
Test according to ANSI C63.10-2013.

## 3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the Product as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

| Item | Uncertainty |
|---|---|
| Occupancy bandwidth | U=±54.3Hz |
| Adjacent channel power | U=±1.3dB |
| Conducted Adjacent channel power | U=±1.38dB |
| Conducted output power Above 1G | U=±1.0dB |
| Conducted output power below 1G | U=±0.9dB |
| Power Spectral Density , Conduction | U=±1.0dB |
| Conduction spurious emissions | U=±2.8dB |
| Out of band emission | U=±54Hz |
| 3m camber Radiated spurious emission(9KHz-30MHz) | U=±4.8dB |
| 3m camber Radiated spurious emission(30MHz-1GHz) | U=±4.3dB |
| 3m chamber Radiated spurious emission(1GHz-18GHz) | U=±4.5dB |
| 3m chamber Radiated spurious emission(18GHz-40GHz) | U=±3.4dB |
| humidity uncertainty | U=±5.3% |
| Temperature uncertainty | U=±0.59℃ |
| Supply voltages | U=±3% |
| Time | U=±5% |
| Conducted emission(150K-30MHz) | 3.2dB |

## 4. PRODUCT INFORMATION AND TEST SETUP

### 4.1 Product Information

| | |
|---|---|
| Model(s): | NUC12ZRN |
| Model Description: | N/A |
| Wi-Fi Specification: | IEEE 802.11a/n/ac |
| Hardware Version: | V1.0 |
| Software Version: | V1.0 |
| Operation Frequency: | IEEE 802.11a/n/ac(20M): 5150MHz ~5250MHz/ 4 channel<br>IEEE 802.11n/ac(40M): 5150MHz ~5250MHz/ 2 channel<br>IEEE 802.11ac(80M): 5150MHz ~5250MHz/ 1 channel<br>IEEE 802.11a/n/ac(20M): 5725MHz ~5850MHz/ 5 channel<br>IEEE 802.11n/ac(40M): 5725MHz ~5850MHz/ 2 channel<br>IEEE 802.11ac(80M): 5725MHz ~5850MHz/ 1 channel |
| Max. RF output power: | WiFi (5G): 17.156dBm |
| Type of Modulation: | WiFi: OFDM |
| Antenna installation: | WiFi: Internal antenna |
| Antenna Gain: | WiFi (5.2G):Ant1: 0.96dBi<br>Ant2: 0.96dBi<br>WiFi (5.8G):Ant1: 1.05dBi<br>Ant2: 1.05dBi |
| Ratings: | AC 100-240V~50/60Hz |

### 4.2 Test Setup Configuration

See test photographs attached in EUT TEST SETUP PHOTOGRAPHS for the actual connections between Product and support equipment.

### 4.3 Support Equipment

| Item | Equipment | Mfr/Brand | Model/Type No. | Series No. | Note |
|---|---|---|---|---|---|
| 1. | Keyboard | DELL | KB216t | N/A | N/A |
| 2 | Mouse | DELL | MS116c | N/A | N/A |
| 3 | Monitor | DELL | SE2218HV | N/A | N/A |
| 4 | Router | Huawei | AX2 Pro | / | / |

***Notes:***

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

4.4 Channel List

| For 802.11a/n/ac( 20M) Operation in the 5180MHz ~5240 MHz band | | | |
|---|---|---|---|
| Channel | Frequency | Channel | Frequency |
| 36 | 5180MHz | 44 | 5220MHz |
| 40 | 5200MHz | 48 | 5240MHz |
| For 802.11a/n/ac( 20M) Operation in the 5745MHz ~5825 MHz band | | | |
| Channel | Frequency | Channel | Frequency |
| 149 | 5745MHz | 161 | 5805MHz |
| 153 | 5765MHz | 165 | 5825MHz |
| 157 | 5785MHz | NA | NA |

| For 802.11n/ac(40M) Operation in the 5190MHz ~5230 MHz band | | | |
|---|---|---|---|
| Channel | Frequency | Channel | Frequency |
| 38 | 5190MHz | 46 | 5230MHz |
| For 802.11n/ac(40M) Operation in the 5755MHz ~5795 MHz band | | | |
| Channel | Frequency | Channel | Frequency |
| 151 | 5755MHz | 159 | 5795MHz |

| For 802.11ac(80M) Operation in the 5210 MHz band | | | |
|---|---|---|---|
| Channel | Frequency | Channel | Frequency |
| 42 | 5210MHz | NA | NA |
| For 802.11ac(80M) Operation in the 5775 MHz band | | | |
| Channel | Frequency | NA | NA |
| 155 | 5775MHz | NA | NA |

NOTE: Dutycycle>98%.

| Test mode | rate |
|---|---|
| 802.11a | 54M |
| 802.11n | 500M |
| 802.11/ac | 500M |

4.5 Test Mode

All test mode(s) and condition(s) mentioned were considered and evaluated respectively by performing full tests, the worst data were recorded and reported.

| Test Mode | Tx/Rx | RF Channel | | |
|---|---|---|---|---|
| | | Low(L) | Middle(M) | High(H) |
| 802.11a/n/ac(20M) | 5180MHz ~5240 MHz | Channel 36 | Channel 40 | Channel 48 |
| | | 5180MHz | 5200MHz | 5240MHz |
| 802.11n/ac(40M) | | Channel 38 | N/A | Channel 46 |
| | | 5190MHz | N/A | 5230MHz |
| 802.11ac(80M) | | N/A | Channel 42 | N/A |
| | | N/A | 5210MHz | N/A |
| 802.11a/n/ac(20M) | 5745MHz ~5825MHz | Channel 149 | Channel 157 | Channel 165 |
| | | 5745MHz | 5785MHz | 5825MHz |
| 802.11n/ac(40M) | | Channel 151 | N/A | Channel 159 |
| | | 5755MHz | N/A | 5795MHz |
| 802.11ac(80M) | | N/A | Channel 155 | N/A |
| | | N/A | 5775MHz | N/A |

4.6 Test Environment

| | |
|---|---|
| Humidity(%): | 54 |
| Atmospheric Pressure(kPa): | 101 |
| Normal Voltage(AC): | 120V |
| Normal Temperature(℃):NT | 23 |
| Low Temperature(℃):LT | 0 |
| High Temperature(℃):HT | 40 |

## 5. TEST FACILITY AND TEST INSTRUMENT USED

### 5.1 Test Facility

All measurement facilities used to collect the measurement data are located at 1&2F., Building A, No. 26, Xinhe Road, Xinqiao, Xinqiao Street, Bao'an District, Shenzhen, Guangdong, China. The site and apparatus are constructed in conformance with the requirements of ANSI C63.4 and CISPR 16-1-1 other equivalent standards.

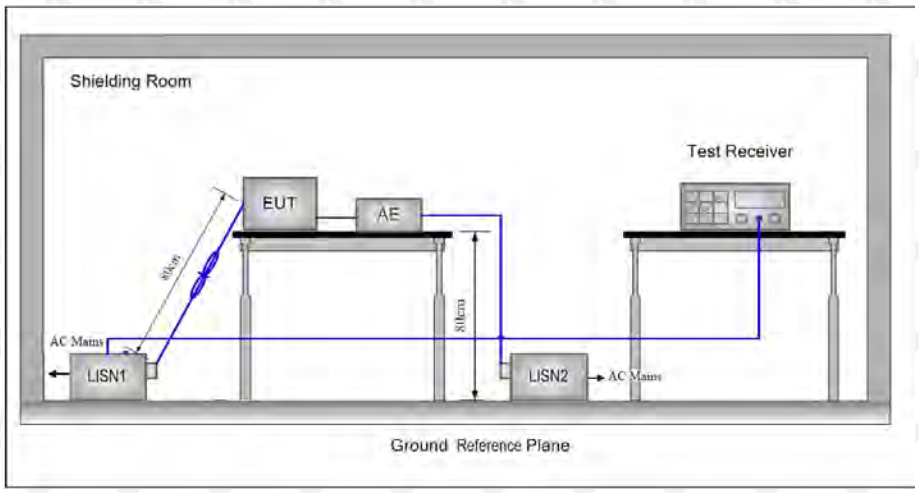
### 5.2 Test Instrument Used

| No. | Equipment | Manufacturer | Type No. | Serial No. | Firmware Version | Calibrated until |
|---|---|---|---|---|---|---|
| 1 | Spectrum Analyzer | Agilent | N9020A | MY52090073 | A.14.16 | 2024.07.05 |
| 2 | Power Sensor | Agilent | U2021XA | MY56120032 | / | 2024.07.05 |
| 3 | Power Sensor | Agilent | U2021XA | MY56120034 | / | 2024.07.05 |
| 4 | Communication test set | R&S | CMW500 | 108058 | V3.5.80 | 2024.07.05 |
| 5 | Spectrum Analyzer | KEYSIGHT | N9020A | MY51289897 | A.14.16 | 2024.07.05 |
| 6 | Signal Generator | Agilent | N5181A | MY50140365 | A.01.60 | 2024.07.05 |
| 7 | Vector signal generator | Agilent | N5182A | MY47420195 | A.01.87 | 2024.07.05 |
| 8 | Communication test set | Agilent | E5515C | MY50102567 | B.19.07 （E1962B ） | 2024.07.06 |
| 9 | 2.4 GHz Filter | Shenxiang | MSF2400-2483.5MS-1154 | 20181015001 | / | 2024.07.05 |
| 10 | 5 GHz Filter | Shenxiang | MSF5150-5850MS-1155 | 20181015001 | / | 2024.07.06 |
| 11 | Filter | Xingbo | XBLBQ-DZA120 | 190821-1-1 | / | 2024.07.06 |
| 12 | BT&WI-FI Automatic test software | Micowave | MTS8000 | Ver. 2.0.0.0 | / | / |
| 13 | Rohde & Schwarz SFU Broadcast Test System | R&S | SFU | 101017 | / | 2024.10.30 |
| 14 | Temperature humidity chamber | Hongjing | TH-80CH | DG-15174 | / | 2024.07.05 |
| 15 | 234G Automatic test software | Micowave | MTS8200 | Ver. 2.0.0.0 | / | / |
| 16 | 966 chamber | C.R.T. | 966 | / | / | 2024.08.11 |
| 17 | Receiver | R&S | ESPI | 100362 | RF_ATTEN_7 （104489/003） | 2024.07.05 |
| 18 | Amplifier | HP | 8447E | 2945A02747 | / | 2024.07.05 |
| 19 | Amplifier | Agilent | 8449B | 3008A01838 | / | 2024.07.05 |
| 20 | TRILOG Broadband Antenna | Schwarzbeck | VULB 9168 | 00869 | / | 2024.07.08 |
| 21 | Double Ridged Broadband Horn Antenna | Schwarzbeck | BBHA9120D | 01911 | / | 2024.07.08 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 22 | EMI test software | Fala | EZ-EMC | FA-03A2 RE | / | / |
| 23 | Loop Antenna | Schwarzbeck | FMZB 1519B | 1519B-224 | / | 2024.07.08 |
| 24 | loop antenna | ZHINAN | ZN30900A | GTS534 | / | / |
| 25 | 40G Horn antenna | A/H/System | SAS-574 | 588 | / | 2024.10.30 |
| 26 | Amplifier | AEROFLEX | Aeroflex | 097 | / | 2024.07.05 |

## 6. AC POWER LINE CONDUCTED EMISSION

### 6.1 Block Diagram Of Test Setup




### 6.2 Limit

**Table 4 – AC power-line conducted emissions limits**

| Frequency (MHz) | Conducted limit (dBμV) | |
|---|---|---|
| | Quasi-peak | Average |
| 0.15 - 0.5 | 66 to 56[Note 1] | 56 to 46[Note 1] |
| 0.5 – 5 | 56 | 46 |
| 5 – 30 | 60 | 50 |

**Note 1:** The level decreases linearly with the logarithm of the frequency.

* Decreasing linearly with the logarithm of the frequency

### 6.3 Test procedure

1) The mains terminal disturbance voltage test was conducted in a shielded room.

2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50Ω/50μH + 5Ω linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.

3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane,

4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0,4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0,8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane.

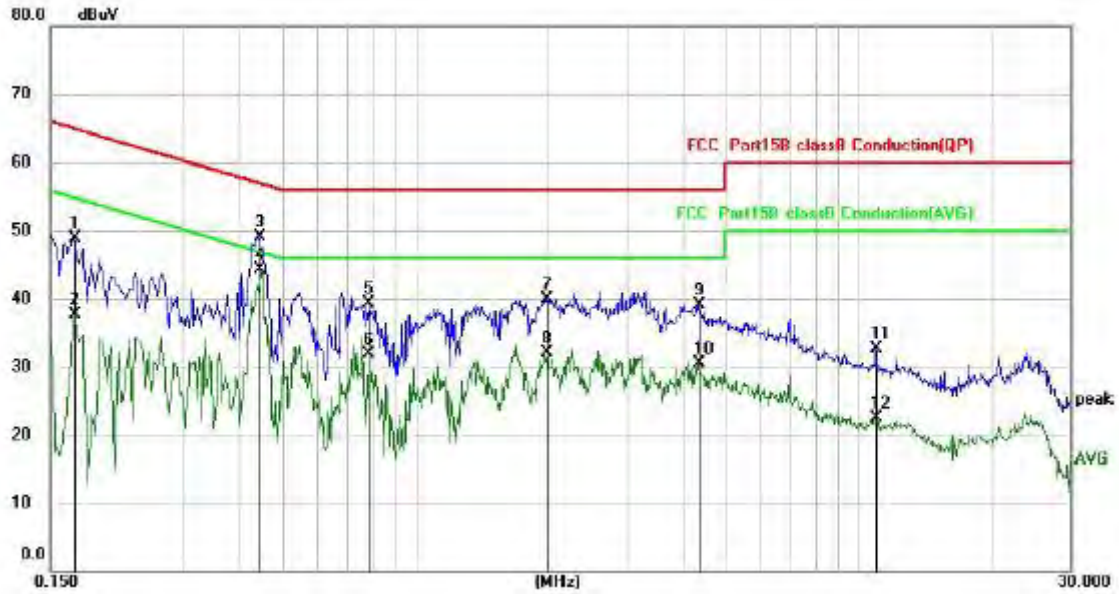
This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0,8 m from the LISN 2.

5) 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 on conducted measurement.

6.4 Test Result

Modulation : 802.11a (the worst data)

**L:**

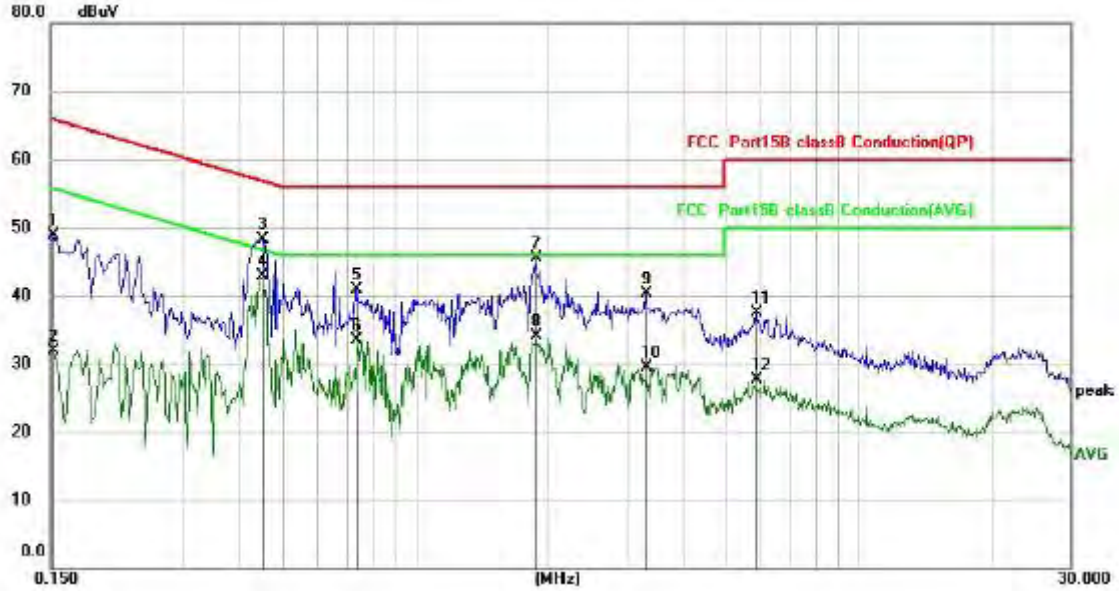



| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | |
|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV | dBuV | dB | Detector |
| 1 | | 0.1700 | 38.92 | 9.95 | 48.87 | 64.96 | -16.09 | QP |
| 2 | | 0.1700 | 27.79 | 9.95 | 37.74 | 54.96 | -17.22 | AVG |
| 3 | | 0.4460 | 39.05 | 9.98 | 49.03 | 56.95 | -7.92 | QP |
| 4 | * | 0.4460 | 34.23 | 9.98 | 44.21 | 46.95 | -2.74 | AVG |
| 5 | | 0.7860 | 29.35 | 10.02 | 39.37 | 56.00 | -16.63 | QP |
| 6 | | 0.7860 | 21.84 | 10.02 | 31.86 | 46.00 | -14.14 | AVG |
| 7 | | 1.9739 | 29.87 | 10.09 | 39.96 | 56.00 | -16.04 | QP |
| 8 | | 1.9739 | 22.11 | 10.09 | 32.20 | 46.00 | -13.80 | AVG |
| 9 | | 4.3418 | 28.69 | 10.32 | 39.01 | 56.00 | -16.99 | QP |
| 10 | | 4.3418 | 20.17 | 10.32 | 30.49 | 46.00 | -15.51 | AVG |
| 11 | | 10.9579 | 22.11 | 10.61 | 32.72 | 60.00 | -27.28 | QP |
| 12 | | 10.9579 | 11.94 | 10.61 | 22.55 | 50.00 | -27.45 | AVG |

Remark:

Factor = Cable loss + LISN factor, Margin = Measurement – Limit

**N:**




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | |
|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV | dBuV | dB | Detector |
| 1 | | 0.1524 | 39.00 | 9.95 | 48.95 | 65.87 | -16.92 | QP |
| 2 | | 0.1524 | 21.91 | 9.95 | 31.86 | 55.87 | -24.01 | AVG |
| 3 | | 0.4515 | 38.26 | 9.98 | 48.24 | 56.85 | -8.61 | QP |
| 4 | * | 0.4515 | 32.95 | 9.98 | 42.93 | 46.85 | -3.92 | AVG |
| 5 | | 0.7339 | 30.85 | 10.02 | 40.87 | 56.00 | -15.13 | QP |
| 6 | | 0.7339 | 23.55 | 10.02 | 33.57 | 46.00 | -12.43 | AVG |
| 7 | | 1.8740 | 35.38 | 10.08 | 45.46 | 56.00 | -10.54 | QP |
| 8 | | 1.8740 | 23.97 | 10.08 | 34.05 | 46.00 | -11.95 | AVG |
| 9 | | 3.3060 | 30.07 | 10.22 | 40.29 | 56.00 | -15.71 | QP |
| 10 | | 3.3060 | 19.34 | 10.22 | 29.56 | 46.00 | -16.44 | AVG |
| 11 | | 5.8539 | 27.16 | 10.44 | 37.60 | 60.00 | -22.40 | QP |
| 12 | | 5.8539 | 17.20 | 10.44 | 27.64 | 50.00 | -22.36 | AVG |

Remark:

Factor = Cable loss + LISN factor, Margin = Measurement – Limit

Remark:
1. Factor = Cable loss + LISN factor, Margin = Limit – Level
2. All modes were tested at AC 120V and 240V, only the worst result of AC 120V 60Hz was reported.
3. All the test modes completed for test. Only the worst result of was reported.

## 7. RADIATED SPURIOUS EMISSIONS

### 7.1 Block Diagram Of Test Setup

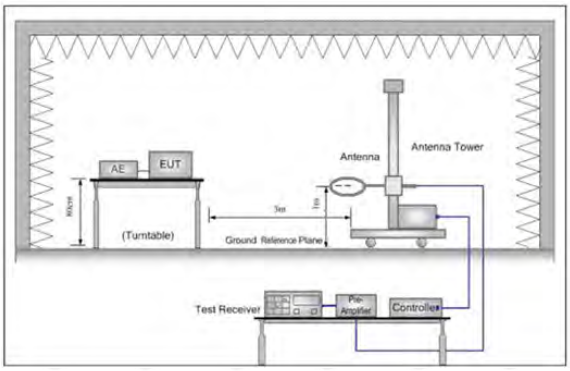



Figure 1. Below 30MHz

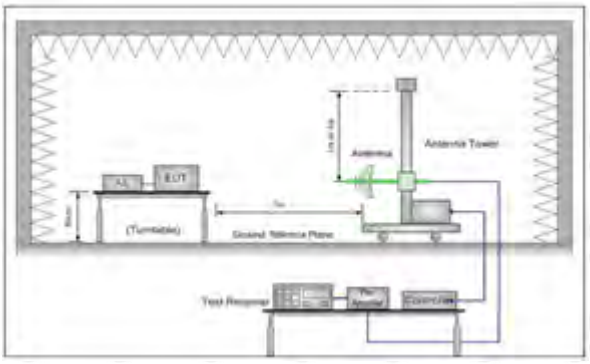


Figure 2. 30MHz to 1GHz

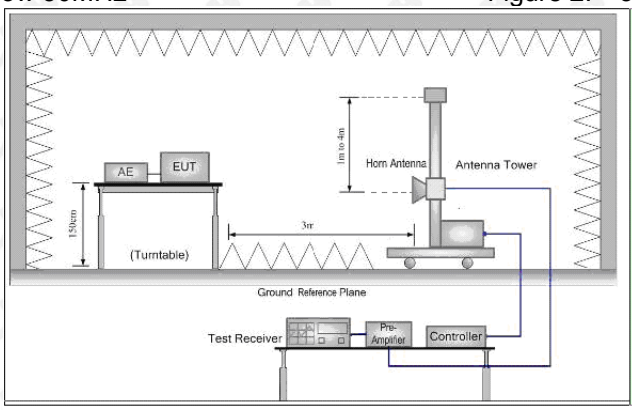



Figure 3. Above 1GHz

### 7.2 Limit

Spurious Emissions:

| Frequency | Field strength (dBμV/m) | Remark | Measurement distance (m) |
|---|---|---|---|
| 0.009MHz-0.490MHz | 20log 2400/F (kHz) + 80 | Quasi-peak | 3 |
| 0.490MHz-1.705MHz | 20log 24000/F (kHz) + 40 | Quasi-peak | 3 |
| 1.705MHz-30MHz | 20log 30 + 40 | Quasi-peak | 3 |
| 30MHz-88MHz | 40.0 | Quasi-peak | 3 |
| 88MHz-216MHz | 43.5 | Quasi-peak | 3 |
| 216MHz-960MHz | 46.0 | Quasi-peak | 3 |
| 960MHz-1GHz | 54.0 | Quasi-peak | 3 |
| Above 1GHz | 54.0 | Average | 3 |

Note: 15.35(b), Unless otherwise specified, the limit on peak radio frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total peak emission level radiated by the device.

If radiated measurements are performed, field strength is then converted to EIRP as follows:
(i) EIRP = ((E*d)^2) / 30
where:
• E is the field strength in V/m;
• d is the measurement distance in meters;
• EIRP is the equivalent isotropically radiated power in watts.
(ii) Working in dB units, the above equation is equivalent to:
EIRP[dBm] = E[dBμV/m] + 20 log(d[meters]) - 104.77
(iii) Or, if d is 3 meters:
EIRP[dBm] = E[dBμV/m] - 95.2

## 7.3 Test procedure

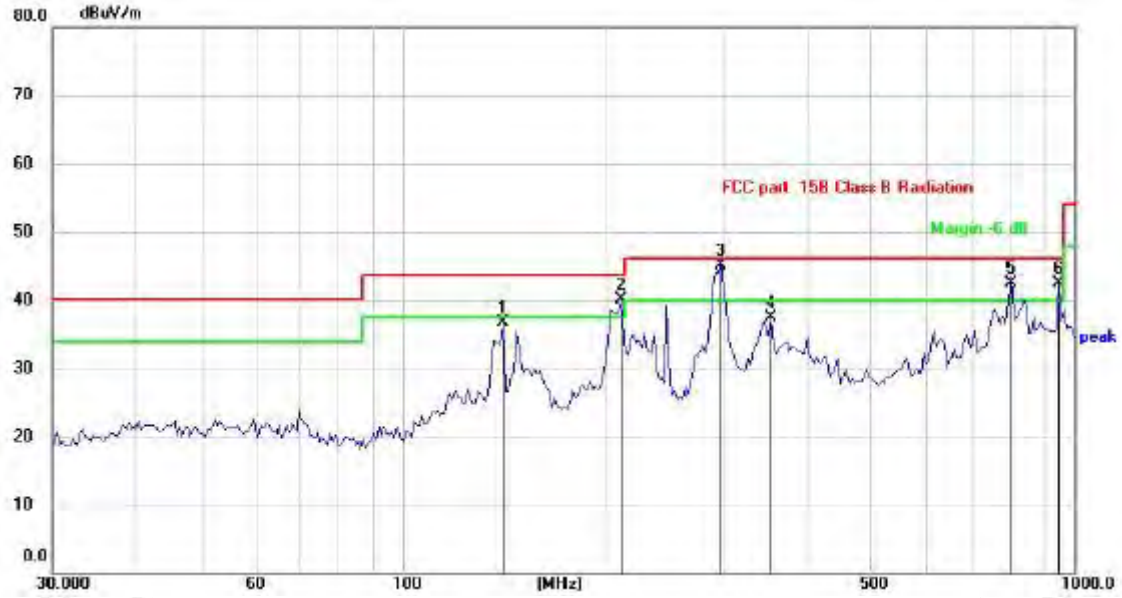
**Below 1GHz test procedure as below:**
a.The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.
b.The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
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.
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 (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rota table table was turned from 0 degrees to 360 degrees to find the maximum reading.
e.The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
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 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.
**Above 1GHz test procedure as below:**
g.Different between above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber and change form table 0.8 meter to 1.5 meter( Above 18GHz the distance is 1 meter and table is 1.5 meter).
h.Test the EUT in the lowest channel ,the middle channel ,the Highest channel
j.Repeat above procedures until all frequencies measured was complete.

Receiver set:

| Frequency | Detector | RBW | VBW | Remark |
|---|---|---|---|---|
| 0.009MHz-0.090MHz | Peak | 10kHz | 30KHz | Peak |
| 0.009MHz-0.090MHz | Average | 10kHz | 30KHz | Average |
| 0.090MHz-0.110MHz | Quasi-peak | 10kHz | 30KHz | Quasi-peak |
| 0.110MHz-0.490MHz | Peak | 10kHz | 30KHz | Peak |
| 0.110MHz-0.490MHz | Average | 10kHz | 30KHz | Average |
| 0.490MHz -30MHz | Quasi-peak | 10kHz | 30kHz | Quasi-peak |
| 30MHz-1GHz | Quasi-peak | 120 kHz | 300KHz | Quasi-peak |
| Above 1GHz | Peak | 1MHz | 3MHz | Peak |
| | Peak | 1MHz | 10Hz | Average |

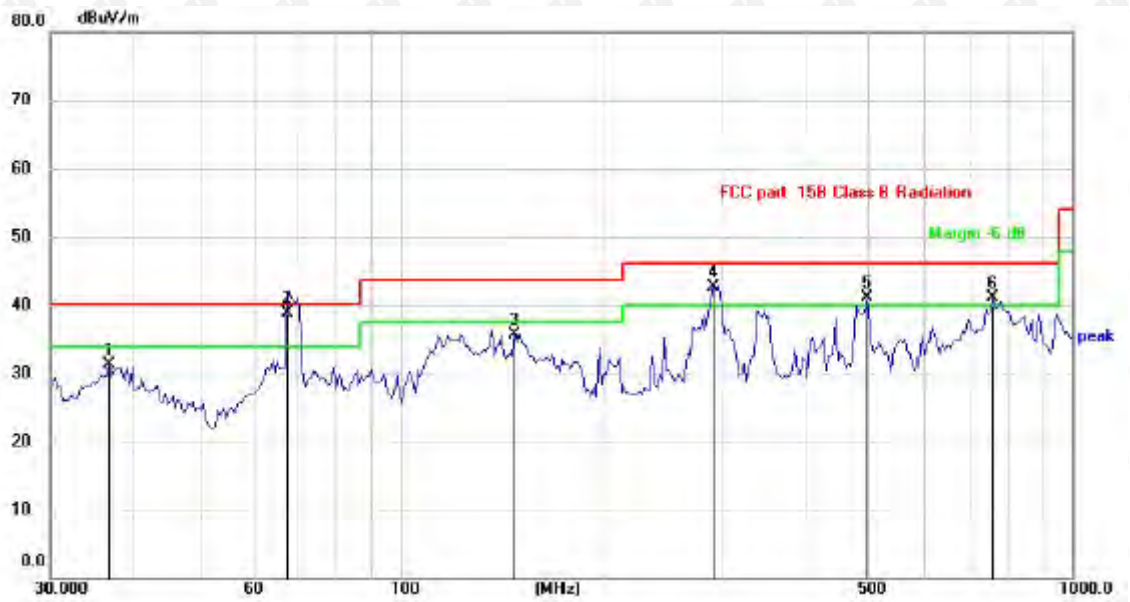
7.4 Test Result

30MHz-1GHzTest Results:
Modulation : 802.11a (the worst data)
Test Channel : 5780MHz
Antenna polarity: H




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | |
|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dB/m | dB | Detector |
| 1 | | 141.5775 | 40.95 | -4.20 | 36.75 | 43.50 | -6.75 | QP |
| 2 | ! | 211.8976 | 47.48 | -7.33 | 40.15 | 43.50 | -3.35 | QP |
| 3 | * | 298.2681 | 49.85 | -4.81 | 45.04 | 46.00 | -0.96 | QP |
| 4 | | 355.4272 | 40.88 | -3.30 | 37.58 | 46.00 | -8.42 | QP |
| 5 | ! | 803.1933 | 36.08 | 6.43 | 42.51 | 46.00 | -3.49 | QP |
| 6 | ! | 948.7608 | 35.12 | 7.36 | 42.48 | 46.00 | -3.52 | QP |

Antenna polarity: V




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | |
|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dB/m | dB | Detector |
| 1 | | 36.7017 | 36.95 | -5.65 | 31.30 | 40.00 | -8.70 | QP |
| 2 | * | 67.7938 | 46.58 | -7.76 | 38.82 | 40.00 | -1.18 | QP |
| 3 | | 147.9214 | 39.22 | -3.42 | 35.80 | 43.50 | -7.70 | QP |
| 4 | ! | 293.0842 | 47.67 | -5.04 | 42.63 | 46.00 | -3.37 | QP |
| 5 | ! | 495.9343 | 41.16 | -0.05 | 41.11 | 46.00 | -4.89 | QP |
| 6 | ! | 762.0384 | 35.45 | 5.71 | 41.16 | 46.00 | -4.84 | QP |

Remark: Factor = Cable lose + Antenna factor - Pre-amplifier; Margin = Limit – Level

Radiated Spurious Emission ( Above 1GHz):

Modulation : 802.11(a) (the worst data)

| Freq (MHz) | Rd_level (dBuV/m) | Factor (dB) | Level (dBuV/m) | Limit (dBuV/m) | Over (dB) | detector | Height | Degree | Antenna polarization |
|---|---|---|---|---|---|---|---|---|---|
| Channel:5180MHz | | | | | | | | | |
| 10360 | 39.39 | 16.39 | 55.78 | 74 | -18.22 | PK | 1.51 | 126 | H |
| 10360 | 27.43 | 16.39 | 43.82 | 54 | -10.18 | AV | 1.37 | 106 | H |
| 10360 | 39.49 | 16.39 | 55.88 | 74 | -18.12 | PK | 1.58 | 107 | V |
| 10360 | 27.31 | 16.39 | 43.70 | 54 | -10.30 | AV | 1.04 | 65 | V |
| Channel:5240MHz | | | | | | | | | |
| 10480 | 39.39 | 16.11 | 55.50 | 74 | -18.50 | PK | 1.48 | 104 | H |
| 10480 | 26.05 | 16.11 | 42.16 | 54 | -11.84 | AV | 1.05 | 186 | H |
| 10480 | 40.76 | 16.11 | 56.87 | 74 | -17.13 | PK | 1.69 | 195 | V |
| 10480 | 27.74 | 16.11 | 43.85 | 54 | -10.15 | AV | 1.42 | 47 | V |
| Channel:5745MHz | | | | | | | | | |
| 11490 | 39.57 | 17.46 | 57.03 | 74 | -16.97 | PK | 1.41 | 72 | H |
| 11490 | 27.51 | 17.46 | 44.97 | 54 | -9.03 | AV | 1.37 | 251 | H |
| 11490 | 39.00 | 17.46 | 56.46 | 74 | -17.54 | PK | 1.04 | 157 | V |
| 11490 | 26.58 | 17.46 | 44.04 | 54 | -9.96 | AV | 1.21 | 261 | V |
| Channel:5825MHz | | | | | | | | | |
| 11650 | 41.08 | 17.57 | 58.65 | 74 | -15.35 | PK | 1.49 | 330 | H |
| 11650 | 27.29 | 17.57 | 44.86 | 54 | -9.14 | AV | 1.14 | 159 | H |
| 11650 | 41.85 | 17.57 | 59.42 | 74 | -14.58 | PK | 1.53 | 15 | V |
| 11650 | 25.44 | 17.57 | 43.01 | 54 | -10.99 | AV | 1.84 | 307 | V |

Modulation : 802.11(n40) (the worst data)

| Freq (MHz) | Rd_level (dBuV/m) | Factor (dB) | Level (dBuV/m) | Limit (dBuV/m) | Over (dB) | detector | Height | Degree | Antenna polarization |
|---|---|---|---|---|---|---|---|---|---|
| Channel:5190MHz | | | | | | | | | |
| 10380 | 39.60 | 16.34 | 55.94 | 74 | -18.06 | PK | 1.37 | 117 | H |
| 10380 | 26.57 | 16.34 | 42.91 | 54 | -11.09 | AV | 1.10 | 186 | H |
| 10380 | 40.85 | 16.34 | 57.19 | 74 | -16.81 | PK | 1.08 | 211 | V |
| 10380 | 27.82 | 16.34 | 44.16 | 54 | -9.84 | AV | 1.86 | 285 | V |
| Channel:5230MHz | | | | | | | | | |
| 10460 | 40.59 | 16.15 | 56.74 | 74 | -17.26 | PK | 1.80 | 112 | H |
| 10460 | 25.90 | 16.15 | 42.05 | 54 | -11.95 | AV | 1.51 | 276 | H |
| 10460 | 39.14 | 16.15 | 55.29 | 74 | -18.71 | PK | 1.07 | 181 | V |
| 10460 | 27.82 | 16.15 | 43.97 | 54 | -10.03 | AV | 1.55 | 197 | V |
| Channel:5755MHz | | | | | | | | | |
| 11510 | 39.52 | 17.49 | 57.01 | 74 | -16.99 | PK | 1.51 | 304 | H |
| 11510 | 26.43 | 17.49 | 43.92 | 54 | -10.08 | AV | 1.41 | 248 | H |
| 11510 | 41.24 | 17.49 | 58.73 | 74 | -15.27 | PK | 1.64 | 89 | V |
| 11510 | 25.04 | 17.49 | 42.53 | 54 | -11.47 | AV | 1.14 | 46 | V |
| Channel:5795MHz | | | | | | | | | |
| 11590 | 39.74 | 17.52 | 57.26 | 74 | -17.42 | PK | 1.61 | 235 | H |
| 11590 | 27.74 | 17.52 | 45.26 | 54 | -16.74 | AV | 1.64 | 339 | H |
| 11590 | 40.35 | 17.52 | 57.87 | 74 | -16.13 | PK | 1.61 | 347 | V |
| 11590 | 26.32 | 17.52 | 43.84 | 54 | -10.16 | AV | 1.82 | 187 | V |

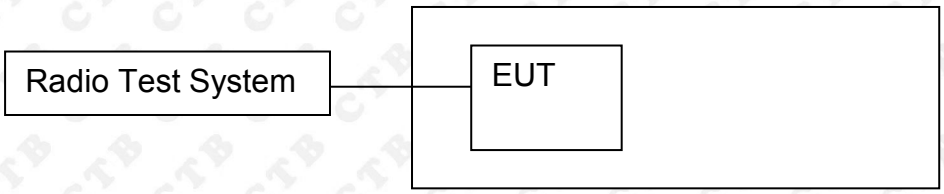
Modulation : 802.11(VH80) (the worst data)

| Freq (MHz) | Rd_level (dBuV/m) | Factor (dB) | Level (dBuV/m) | Limit (dBuV/m) | Over (dB) | detector | Height | Degree | Antenna polarization |
|---|---|---|---|---|---|---|---|---|---|
| Channel:5210MHz | | | | | | | | | |
| 10420 | 39.95 | 16.25 | 56.20 | 74 | -17.80 | PK | 1.56 | 262 | H |
| 10420 | 25.05 | 16.25 | 41.30 | 54 | -12.70 | AV | 1.61 | 250 | H |
| 10420 | 41.39 | 16.25 | 57.64 | 74 | -16.36 | PK | 1.85 | 250 | V |
| 10420 | 27.23 | 16.25 | 43.48 | 54 | -10.52 | AV | 1.42 | 83 | V |
| Channel:5775MHz | | | | | | | | | |
| 11550 | 40.59 | 17.50 | 58.09 | 74 | -15.91 | PK | 1.74 | 201 | H |
| 11550 | 26.84 | 17.50 | 44.34 | 54 | -9.66 | AV | 1.32 | 90 | H |
| 11550 | 39.41 | 17.50 | 56.91 | 74 | -17.09 | PK | 1.52 | 9 | V |
| 11550 | 27.58 | 17.50 | 45.08 | 54 | -8.92 | AV | 1.63 | 330 | V |

Remark:
1.Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Reading Result + Factor, Margin = Emission level - Limits
2.The EUT was tested in the low, high channel and the worst case position data was reported.
3.Testing is carried out with frequency rang 9kHz to the tenth harmonics, other than listed in the table above are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

## 8. BAND EDGE

### 8.1 Block Diagram Of Test Setup




### 8.2 Limit

(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 e.i.r.p. of −27 dBm/MHz.
(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 e.i.r.p. of −27 dBm/MHz.
(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 e.i.r.p. of −27 dBm/MHz.
(4) For transmitters operating in the 5.725-5.85 GHz band: All emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an e.i.r.p. of −17 dBm/MHz; for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an e.i.r.p. of −27 dBm/MHz.
(5) The emission measurements shall be performed using a minimum resolution bandwidth of 1 MHz. A lower resolution bandwidth may be employed near the band edge, when necessary, provided the measured energy is integrated to show the total power over 1 MHz.
(6) Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in §15.209. Further, any U-NII devices using an AC power line are required to comply also with the conducted limits set forth in §15.207.

### 8.3 Test procedure

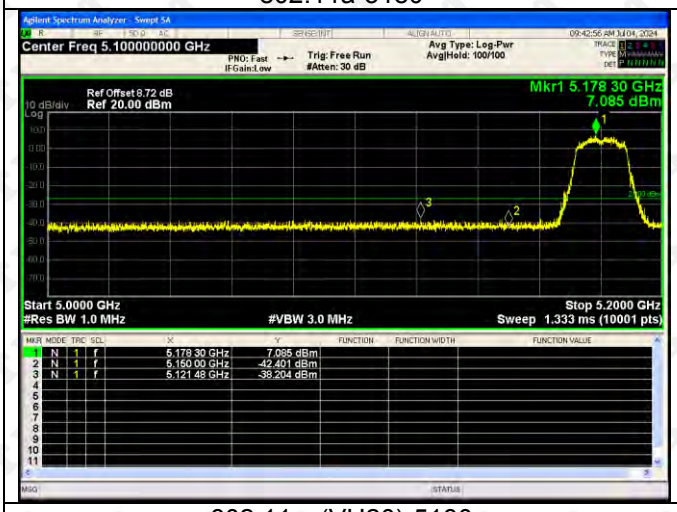
1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set RBW of spectrum analyzer to 1 MHz with a convenient frequency span.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.

## 8.4 Test Result

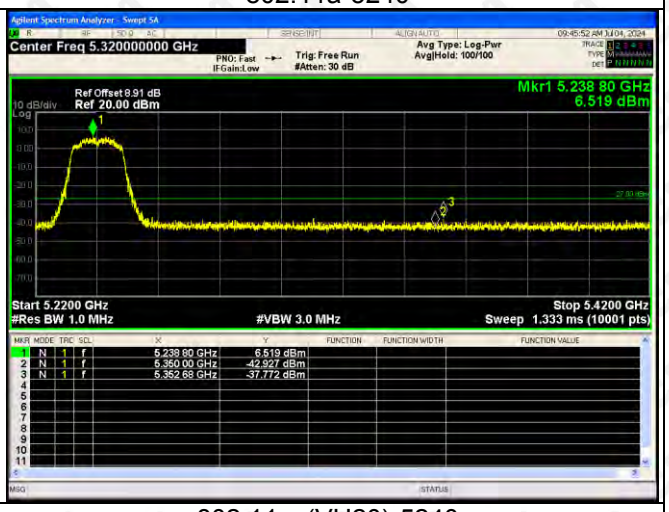
**Test Graph**

ANT 1

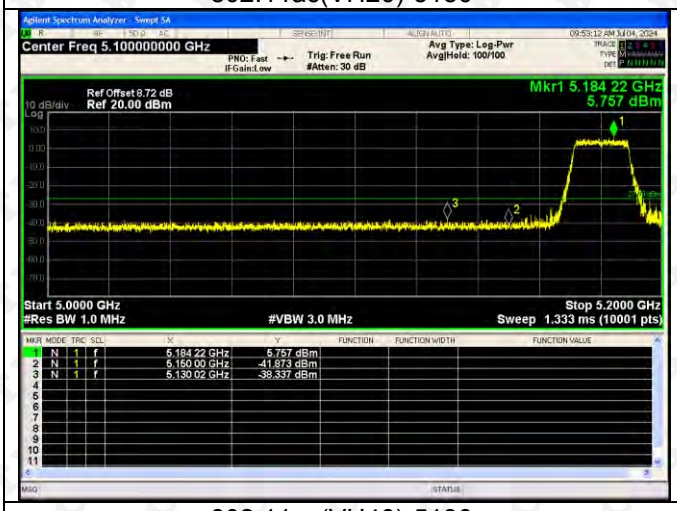
802.11a-5180




802.11a-5240




802.11ac(VH20)-5180

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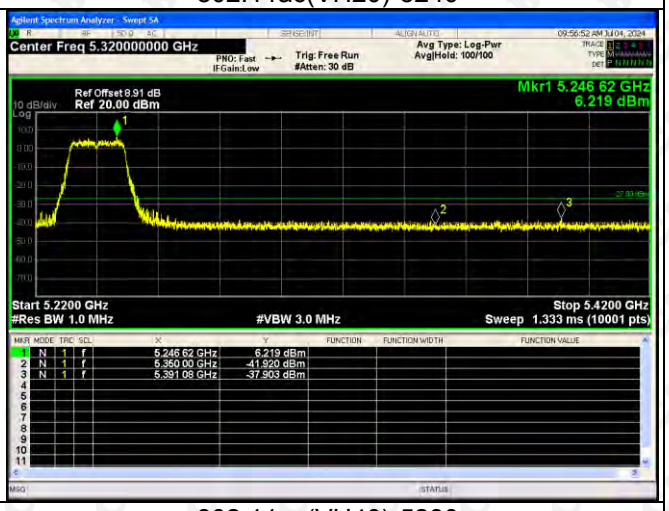
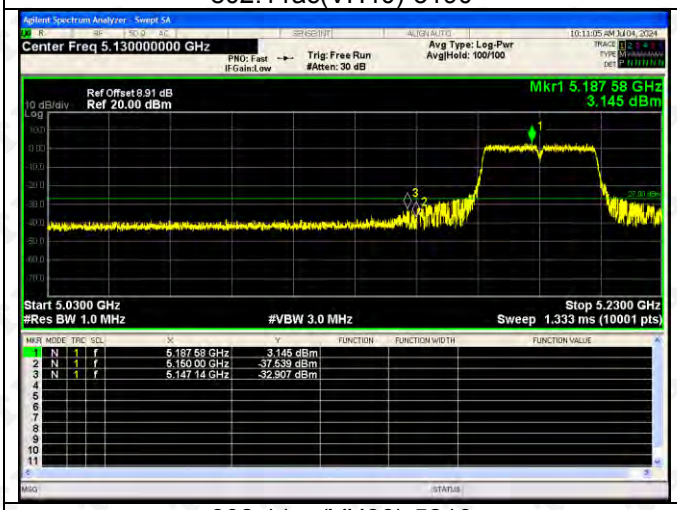
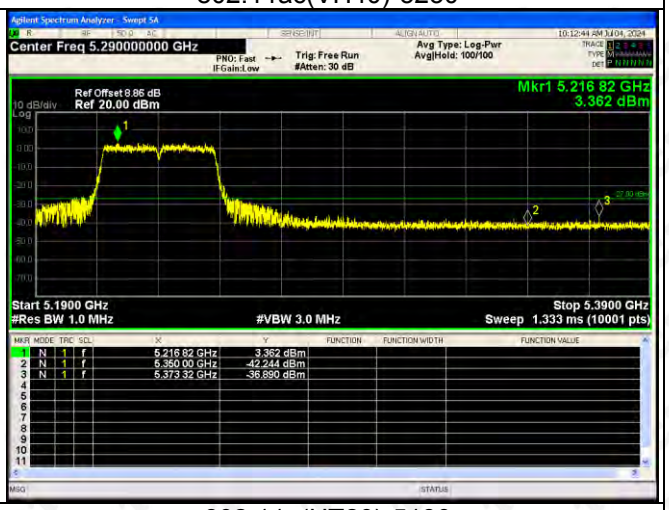



802.11ac(VH40)-5190

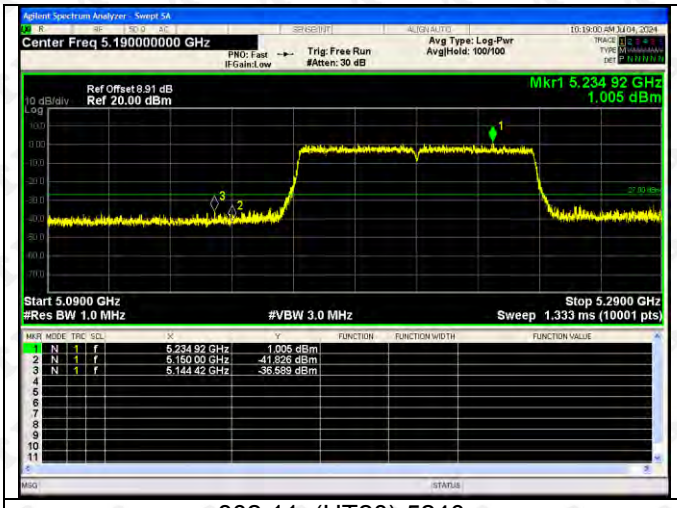



802.11ac(VH40)-5230

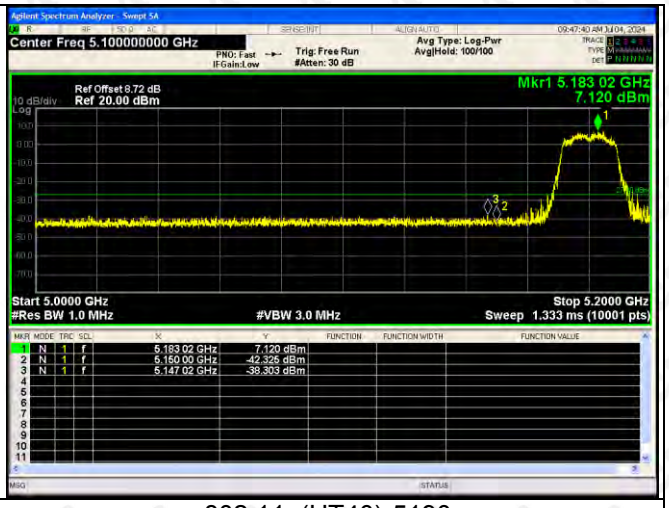



802.11ac(VH80)-5210

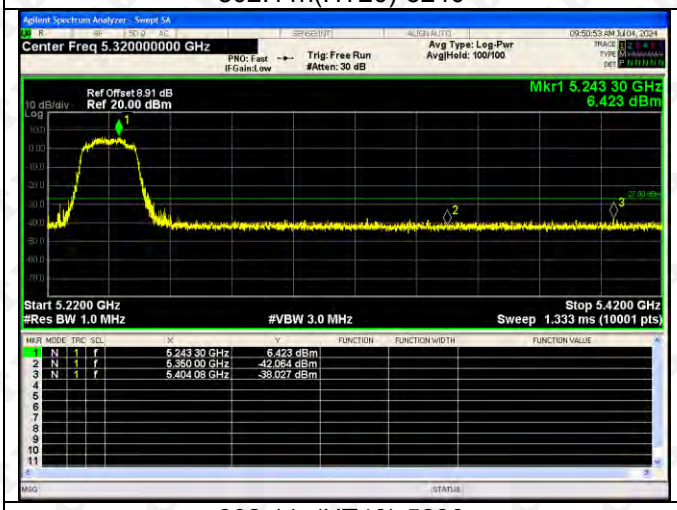
802.11n(HT20)-5180




802.11n(HT20)-5240




802.11n(HT40)-5190

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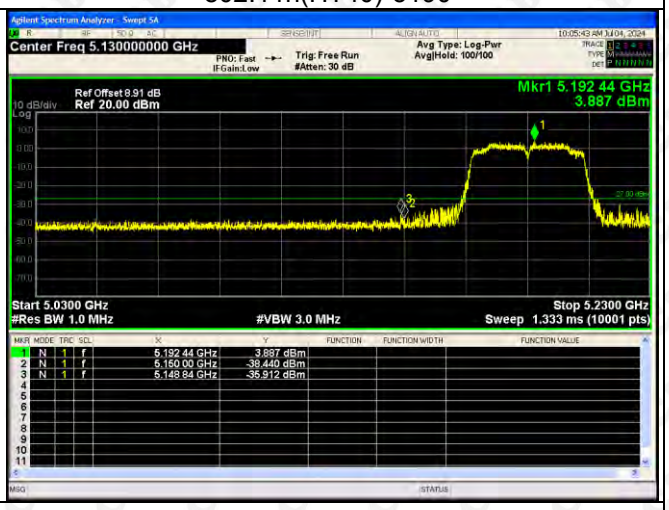
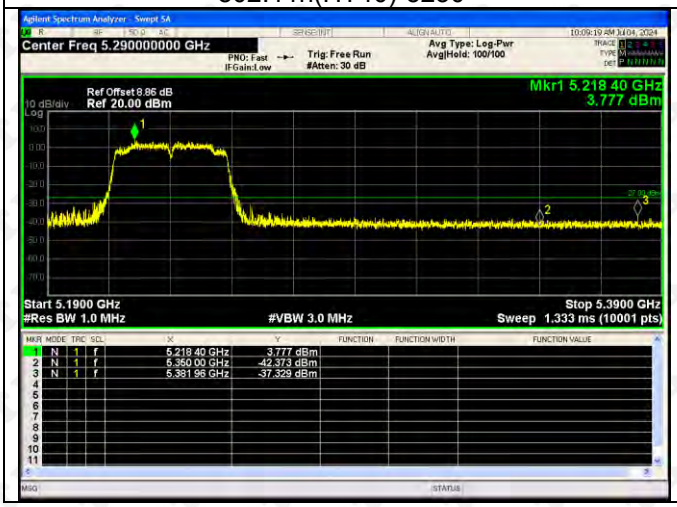
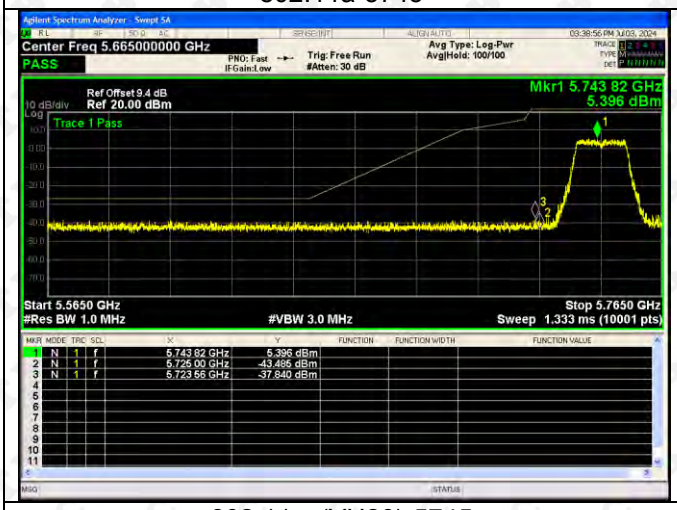


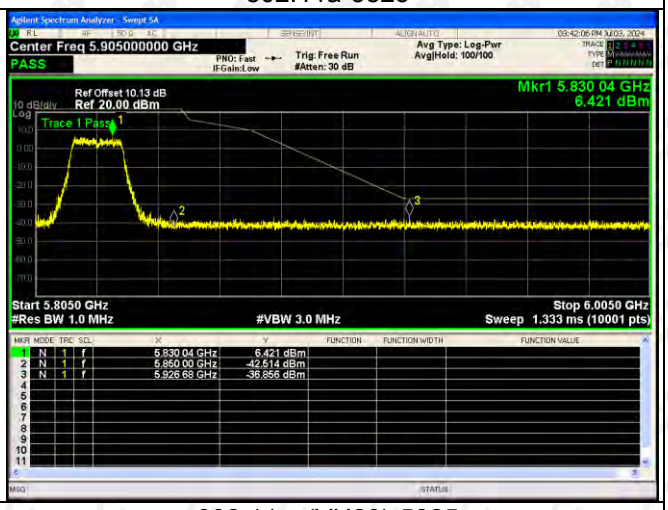



ANT1:

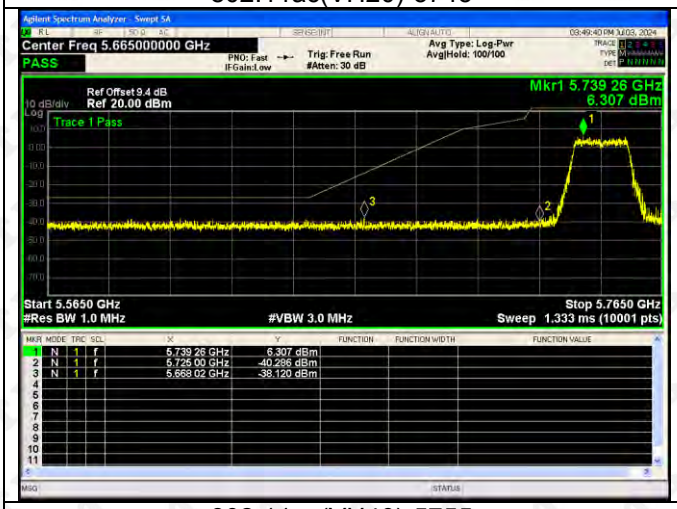
802.11a-5745



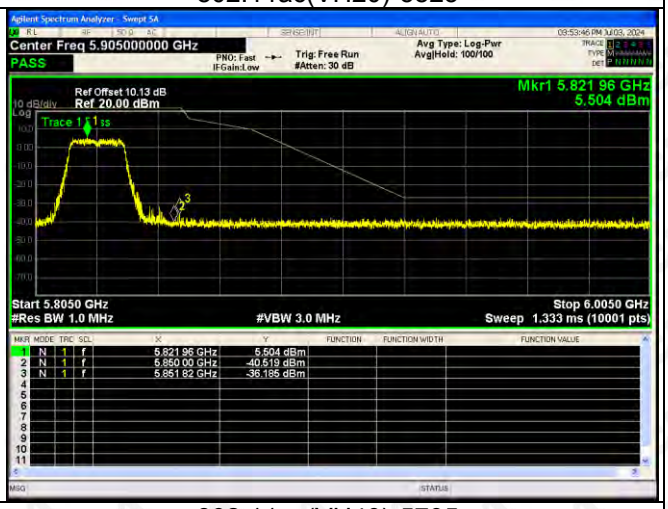

802.11a-5825




802.11ac(VH20)-5745

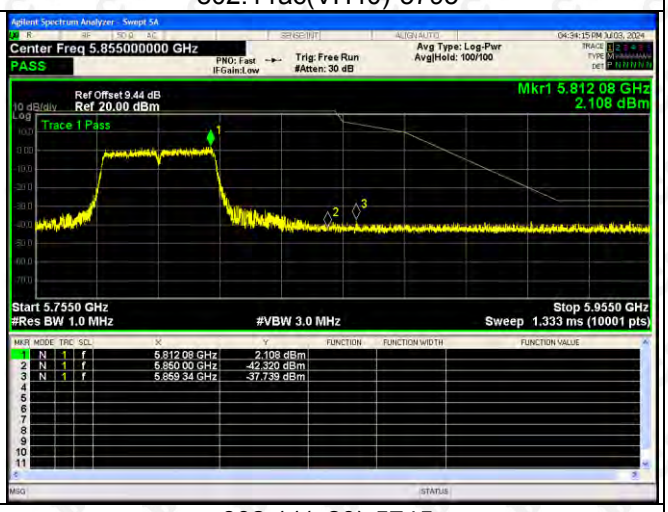



802.11ac(VH20)-5825




802.11ac(VH40)-5755

802.11ac(VH40)-5795

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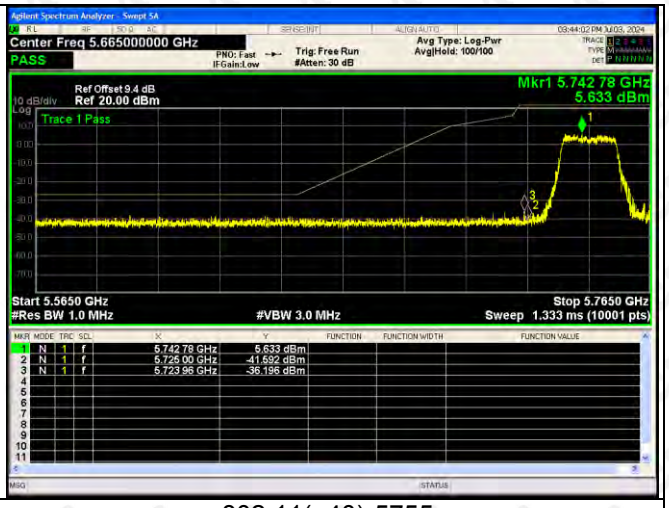
802.11(n20)-5745

802.11(n20)-5825

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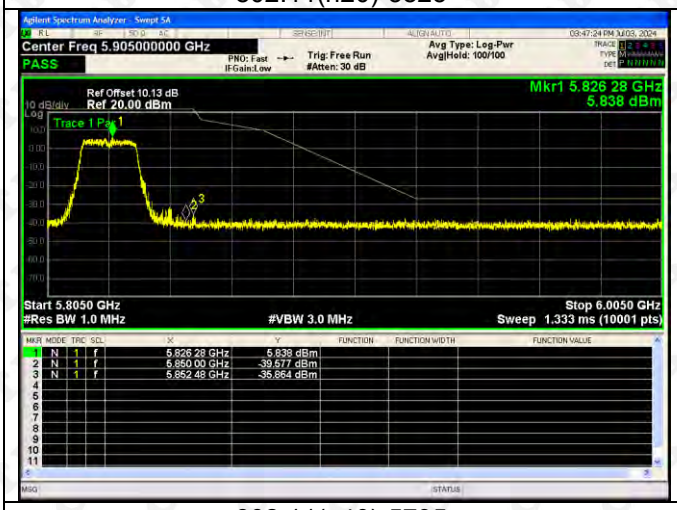
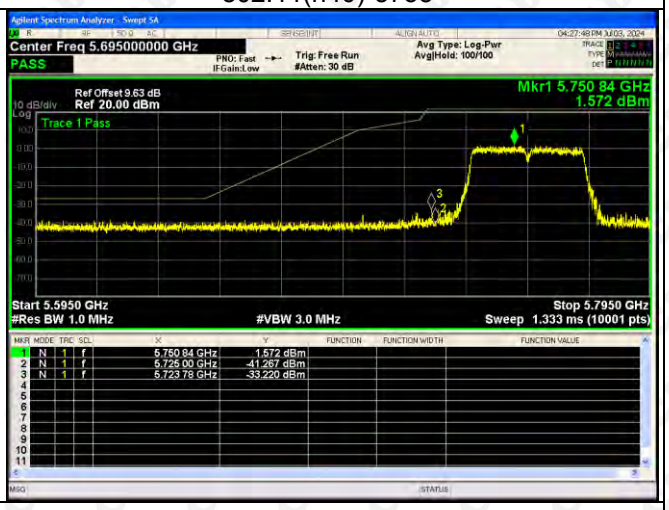
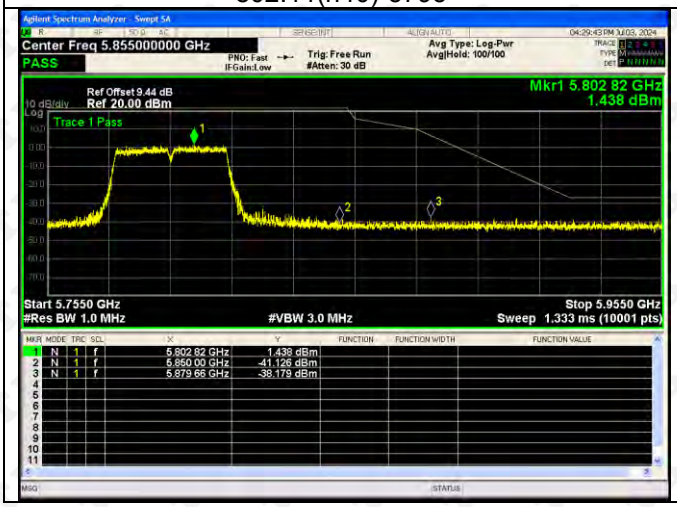


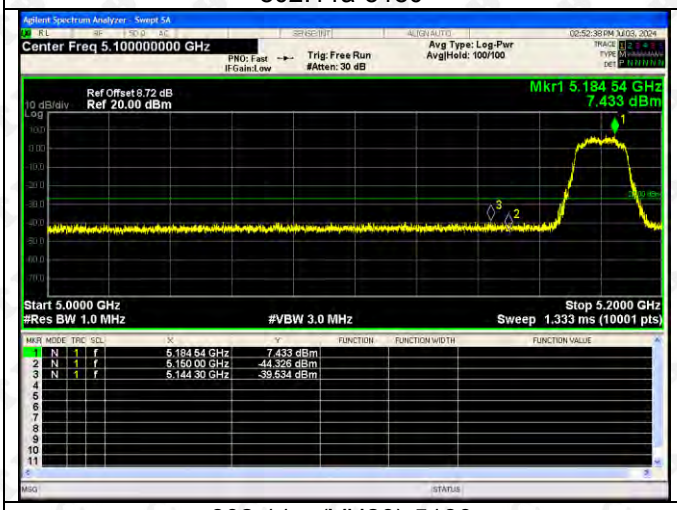

802.11(n40)-5795



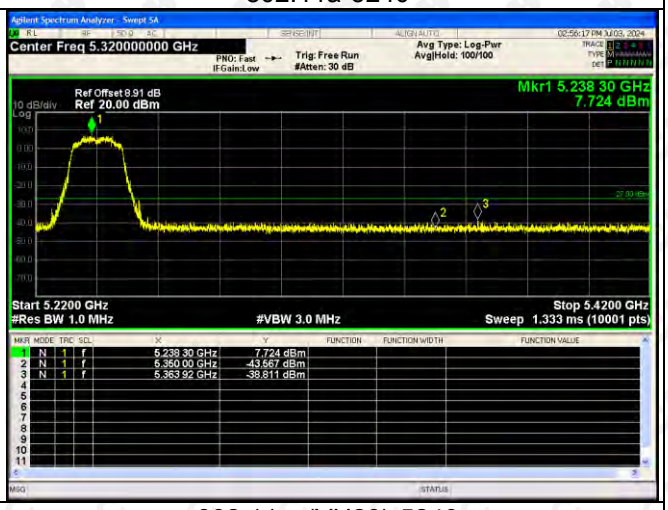



ANT 2

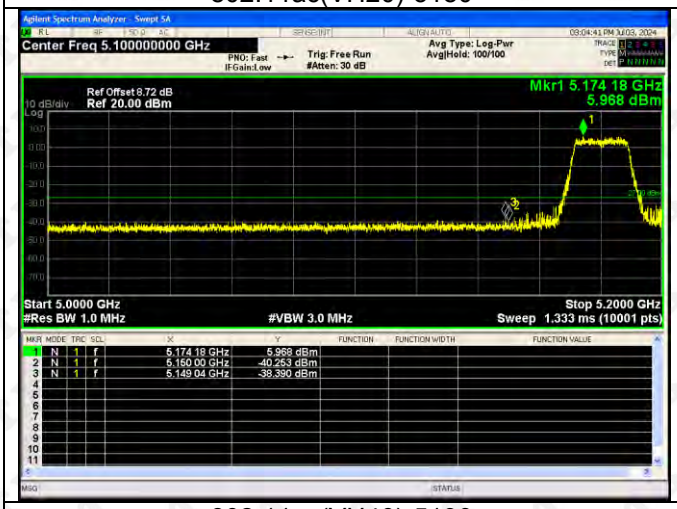
802.11a-5180




802.11a-5240




802.11ac(VH20)-5180

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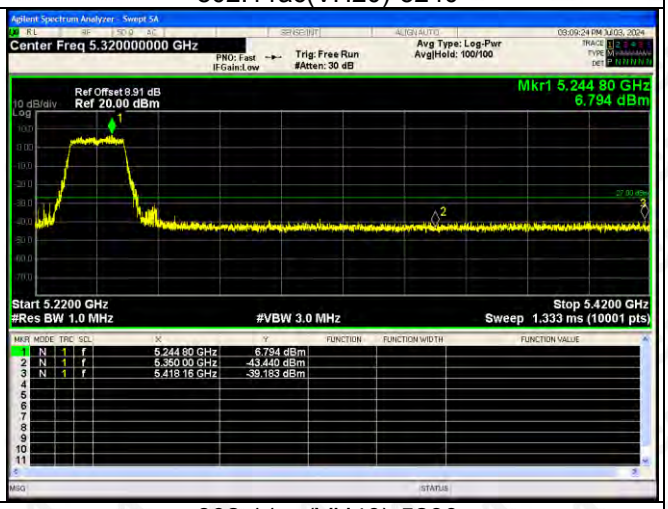
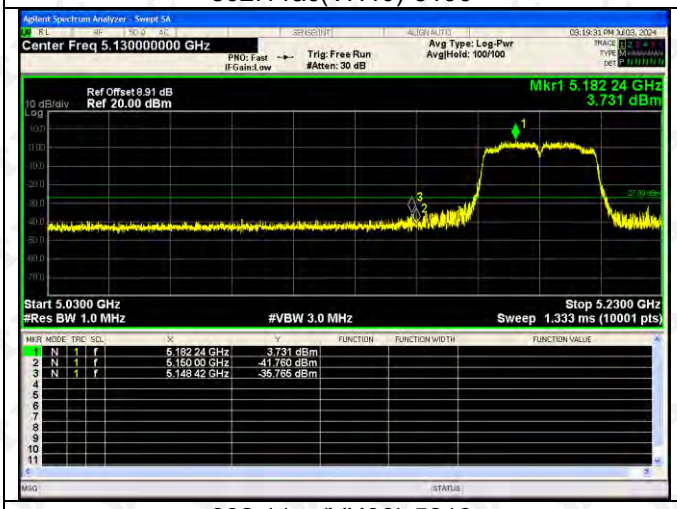
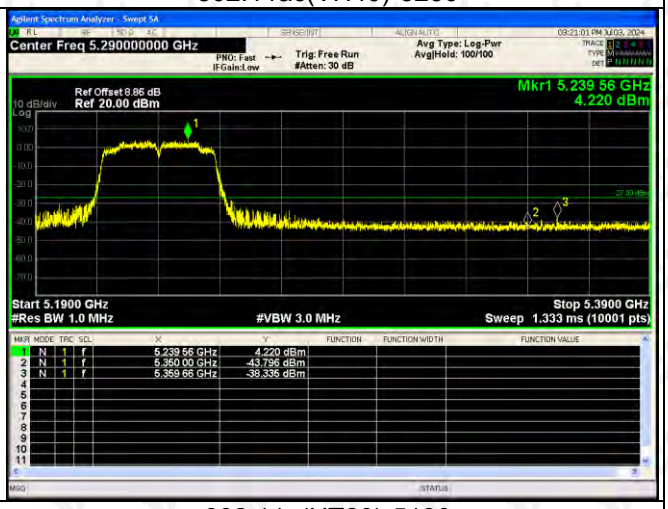



802.11ac(VH40)-5190

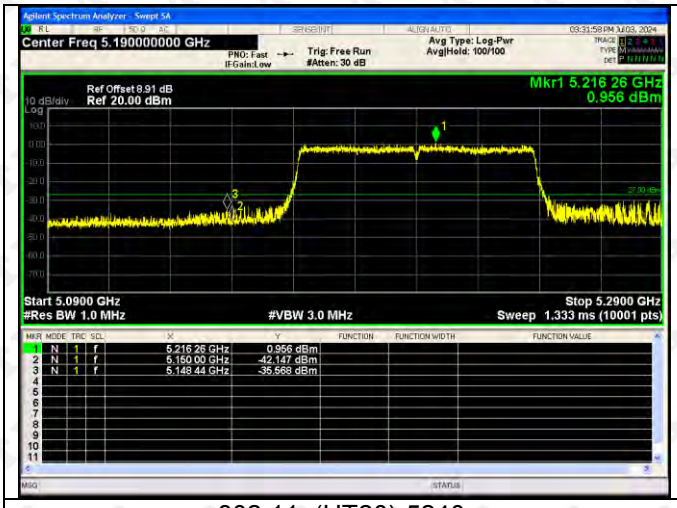
802.11ac(VH40)-5230



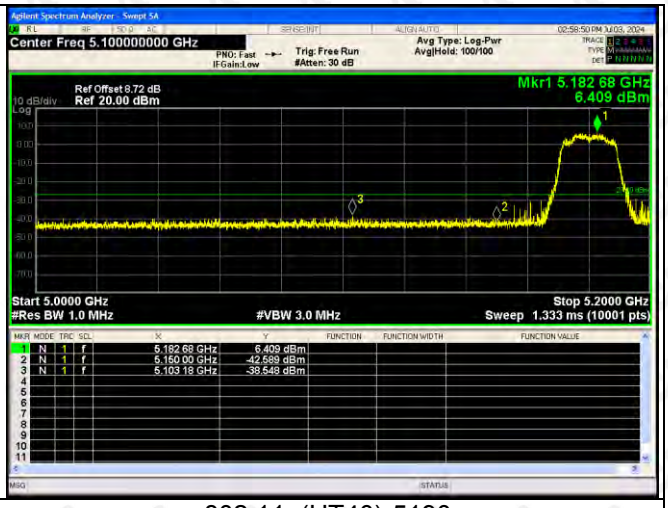




802.11ac(VH80)-5210

802.11n(HT20)-5180




802.11n(HT20)-5240

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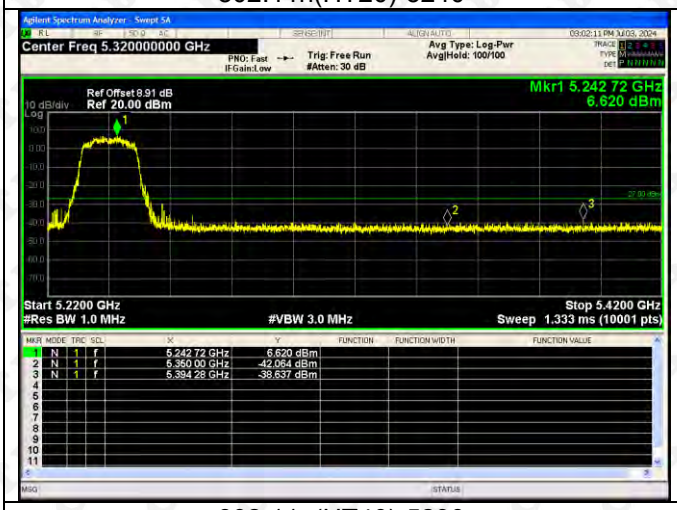


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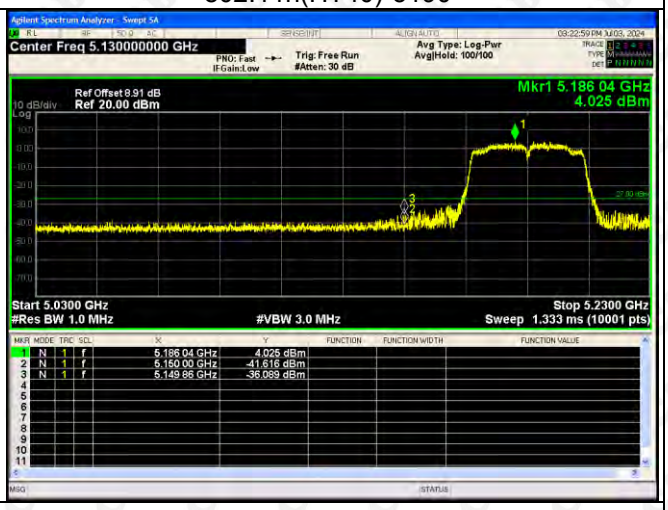
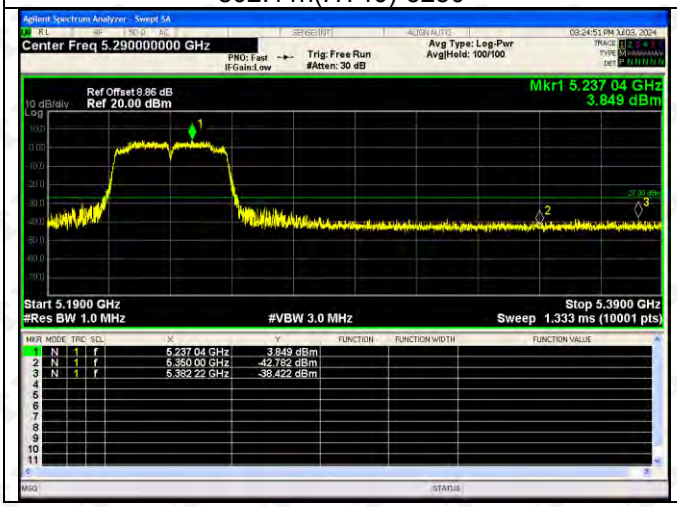
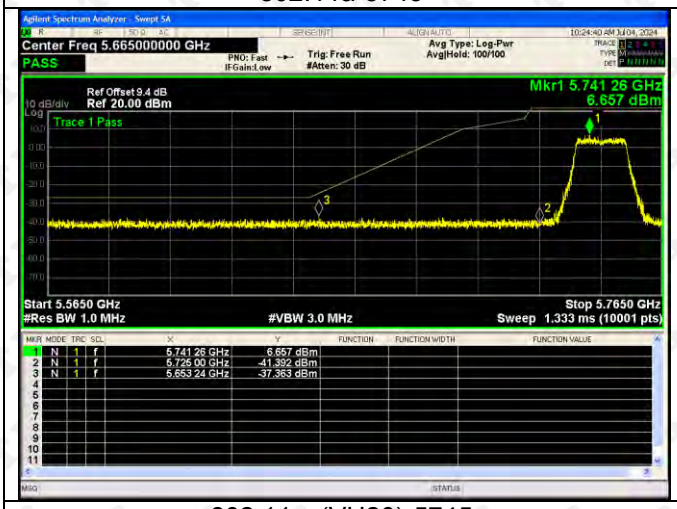


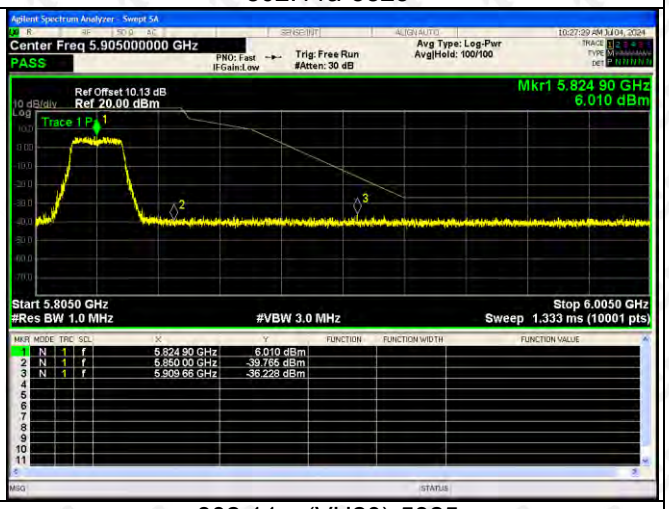



ANT2:

802.11a-5745




802.11a-5825

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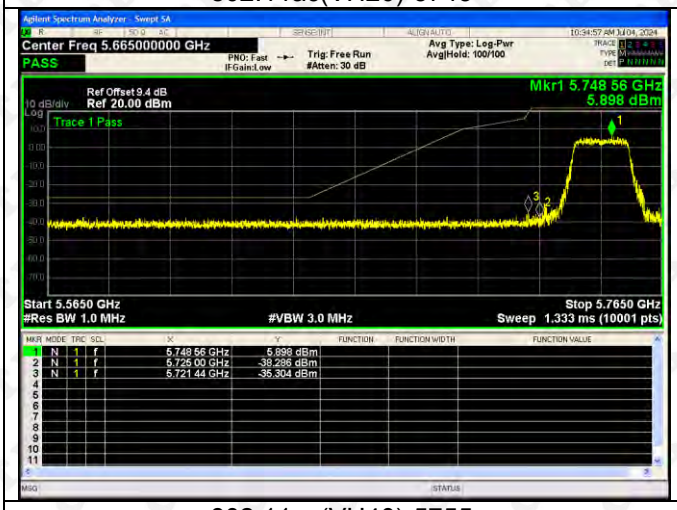


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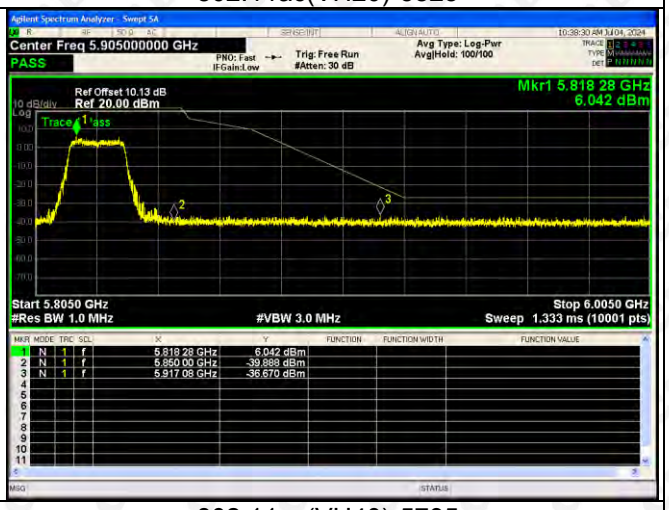


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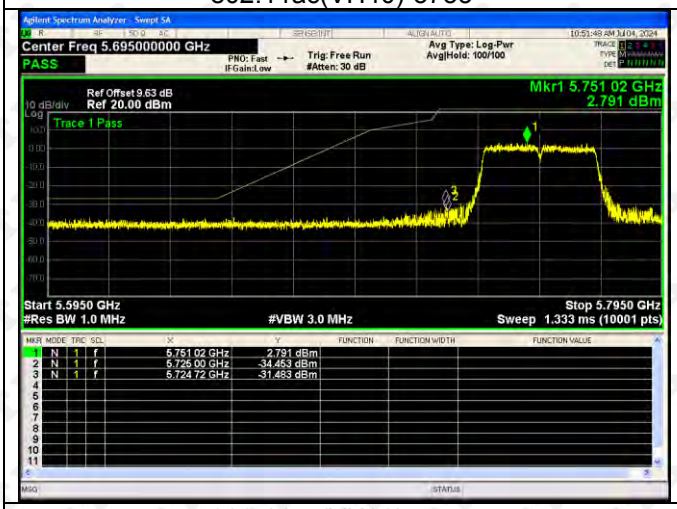
802.11ac(VH40)-5795

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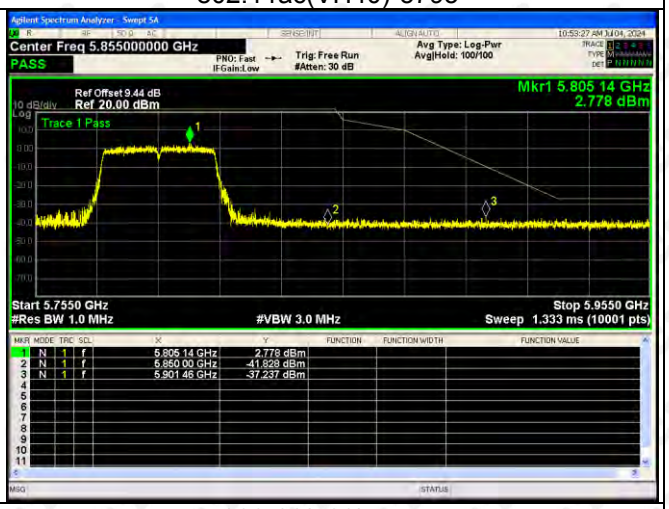
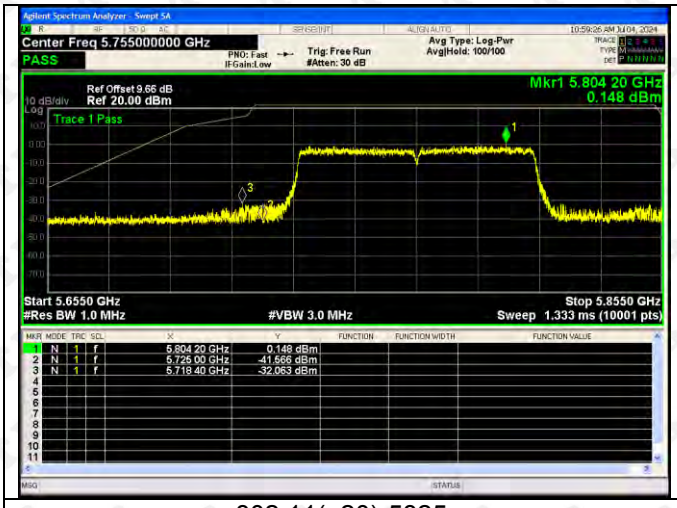



802.11(n20)-5745

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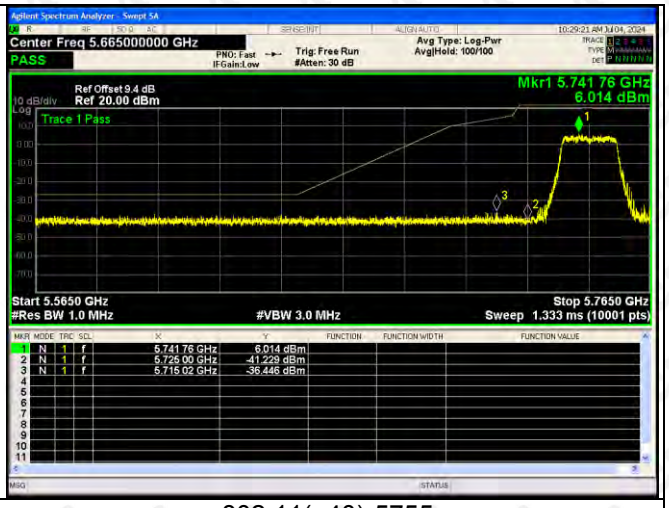


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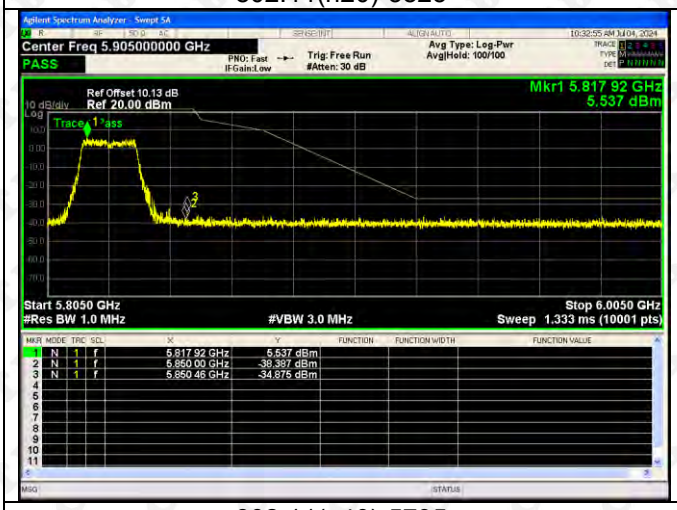


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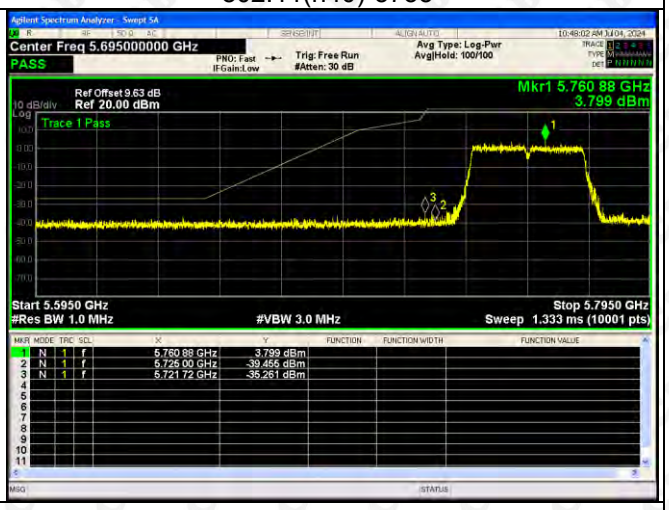
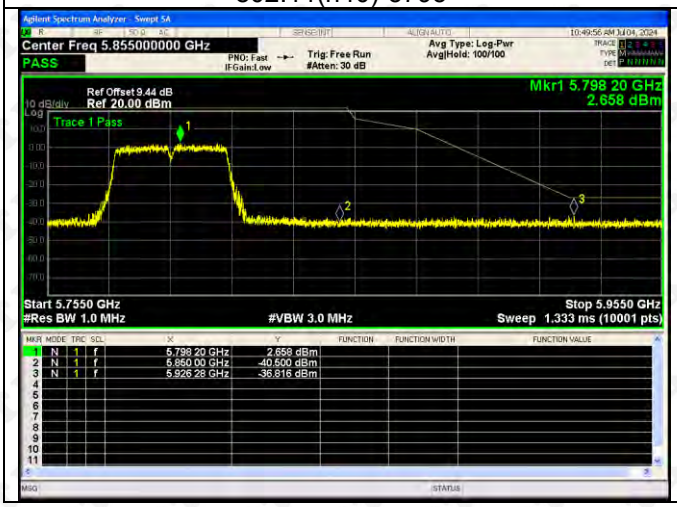
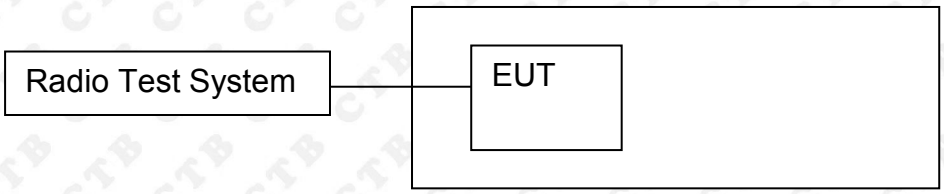


## 9. CONDUCTED OUTPUT POWER

9.1 Block Diagram Of Test Setup




9.2 Limit

(1) For the band 5.15-5.25 GHz.
(i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. 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).
(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition,the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.
(iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.
(iv) For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.
(2) For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.
(4) The maximum conducted output power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage.
(5) The maximum power spectral density is measured as a conducted emission by direct connection of a calibrated test instrument to the equipment under test. If the device cannot be connected directly, alternative techniques acceptable to the Commission may be used. Measurements in the 5.725-5.85 GHz band are made over a reference bandwidth of 500 kHz or the 26 dB emission bandwidth of the device, whichever is less. Measurements in the 5.15-5.25 GHz, 5.25-5.35 GHz, and the 5.47-5.725 GHz bands are made over a bandwidth of 1 MHz or the 26 dB emission bandwidth of the device, whichever is less. A narrower resolution bandwidth can be used, provided that the measured power is integrated over the full reference bandwidth.

(h) Transmit Power Control (TPC) and Dynamic Frequency Selection (DFS).
(1) Transmit power control (TPC). U-NII devices operating in the 5.25-5.35 GHz band and the 5.47-5.725 GHz band shall employ a TPC mechanism. The U-NII device is required to have the capability to operate at least 6 dB below the mean EIRP value of 30 dBm. A TPC mechanism is not required for systems with an e.i.r.p. of less than 500 mW.

## 9.3 Test procedure

According to KDB789033 D02v02r01 sectionE, the following is the measurement procedure.

(i) Set span to encompass the entire emission bandwidth (EBW) (or, alternatively, the entire 99% occupied bandwidth) of the signal.

(ii) Set RBW = 1 MHz.

(iii) Set VBW ≥ 3 MHz.

(iv) Number of points in sweep ≥ 2 × span / RBW. (This ensures that bin-to-bin spacing is ≤ RBW/2, so that narrowband signals are not lost between frequency bins.)

(v) Sweep time = auto.

(vi) Detector = power averaging (rms), if available. Otherwise, use sample detector mode.

(vii) If transmit duty cycle < 98%, use a video trigger with the trigger level set to enable triggering only on full power pulses. Transmitter must operate at maximum power control level for the entire duration of every sweep. If the EUT transmits continuously (i.e., with no off intervals) or at duty cycle ≥ 98%, and if each transmission is entirely at the maximum power control level, then the trigger shall be set to “free run.”

(viii) Trace average at least 100 traces in power averaging (rms) mode.

(ix) Compute power by integrating the spectrum across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal using the instrument’s band power measurement function with band limits set equal to the EBW (or occupied bandwidth) band edges. If the instrument does not have a band power function, sum the spectrum levels (in power units) at 1 MHz intervals extending across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the spectrum.

9.4 Test Result

ANT 1+ANT 2

| Test mode1 | Test Channel (MHz) | Output Power dBm ANT1 | Output Power dBm ANT2 | Output Power dBm Total | Limit dBm |
|---|---|---|---|---|---|
| 802.11a | 5180 | 13.696 | 13.411 | / | 23.98 |
| | 5200 | 13.919 | 13.851 | / | 23.98 |
| | 5240 | 13.536 | 14.135 | / | 23.98 |
| 802.11ac20 | 5180 | 13.694 | 13.544 | 16.630 | 23.98 |
| | 5200 | 13.972 | 13.892 | 16.942 | 23.98 |
| | 5240 | 13.553 | 14.105 | 16.848 | 23.98 |
| 802.11ac40 | 5190 | 14.013 | 13.827 | 16.931 | 23.98 |
| | 5230 | 13.849 | 14.273 | 17.076 | 23.98 |
| 802.11ac80 | 5210 | 14.068 | 14.222 | 17.156 | 23.98 |
| 802.11n(HT20) | 5180 | 13.609 | 13.436 | 16.534 | 23.98 |
| | 5200 | 13.878 | 13.813 | 16.856 | 23.98 |
| | 5240 | 13.495 | 14.123 | 16.831 | 23.98 |
| 802.11n(HT40) | 5190 | 13.932 | 13.851 | 16.902 | 23.98 |
| | 5230 | 13.872 | 14.18 | 17.039 | 23.98 |

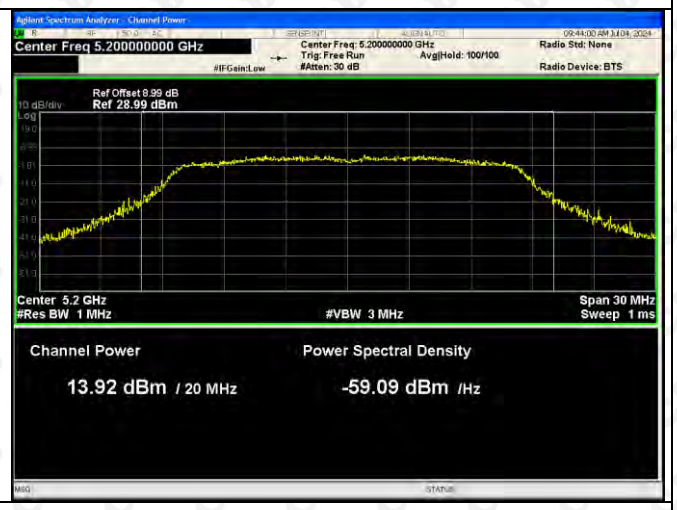
ANT 1+ANT 2

| Test mode1 | Test Channel (MHz) | Output Power dBm ANT1 | Output Power dBm ANT2 | Output Power dBm Total | Limit dBm |
|---|---|---|---|---|---|
| 802.11a | 5745 | 13.168 | 13.696 | / | 30 |
| | 5785 | 12.982 | 13.358 | / | 30 |
| | 5825 | 13.754 | 14.1 | / | 30 |
| 802.11ac20 | 5745 | 13.645 | 13.645 | 16.655 | 30 |
| | 5785 | 12.954 | 13.323 | 16.153 | 30 |
| | 5825 | 13.734 | 14.107 | 16.935 | 30 |
| 802.11ac40 | 5755 | 12.765 | 13.691 | 16.263 | 30 |
| | 5795 | 12.398 | 13.378 | 15.926 | 30 |
| 802.11ac80 | 5775 | 12.961 | 13.682 | 16.347 | 30 |
| 802.11n(HT20) | 5745 | 13.179 | 13.648 | 16.430 | 30 |
| | 5785 | 13.033 | 13.316 | 16.187 | 30 |
| | 5825 | 13.75 | 14.198 | 16.990 | 30 |
| 802.11n(HT40) | 5755 | 13.748 | 13.748 | 16.758 | 30 |
| | 5795 | 12.2 | 13.27 | 15.778 | 30 |

ANT 1

802.11a-5180

802.11a-5200




802.11a-5240

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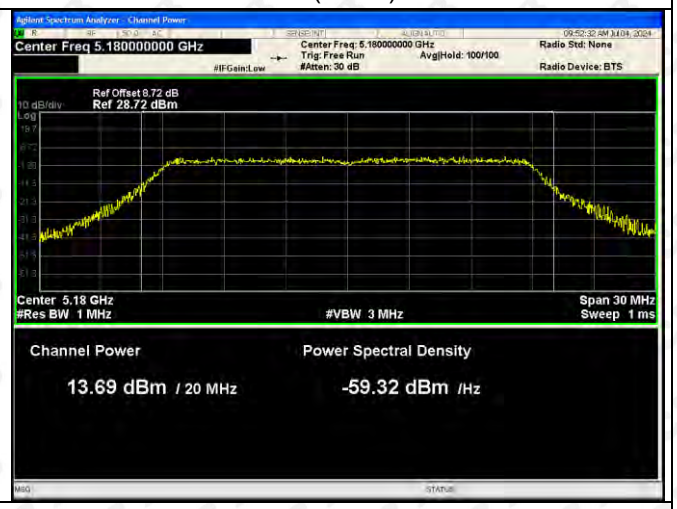


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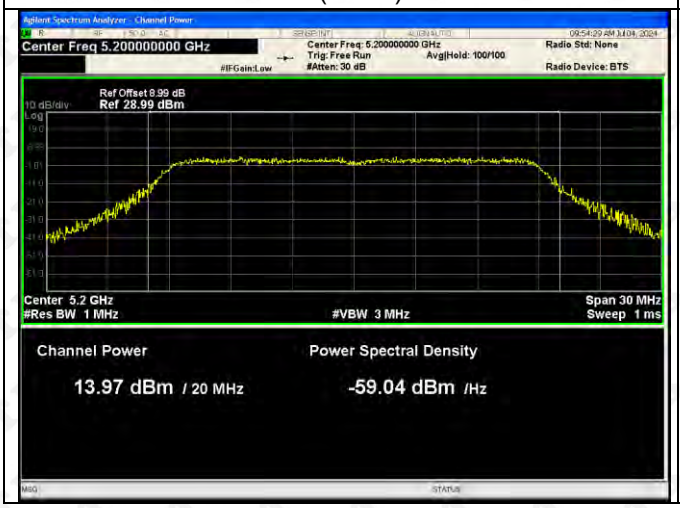


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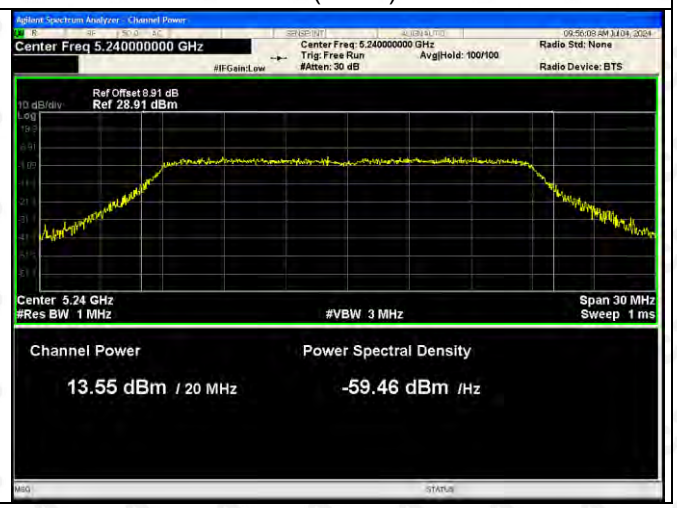

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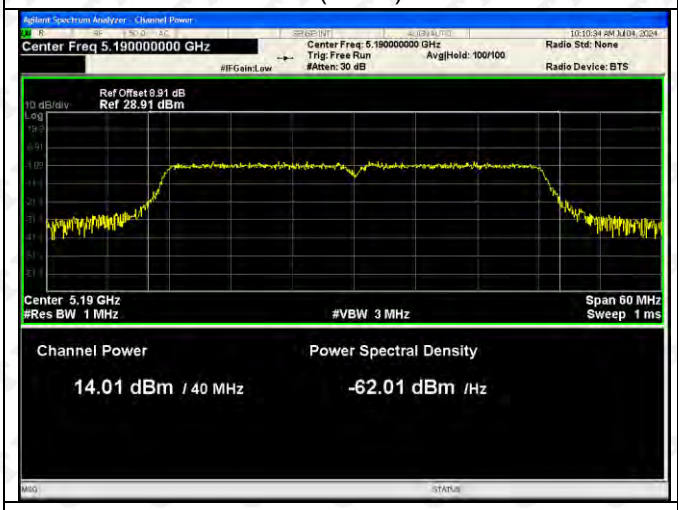


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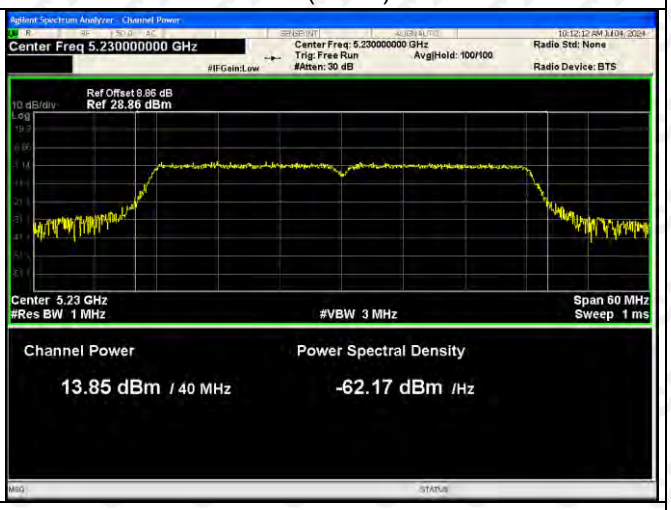


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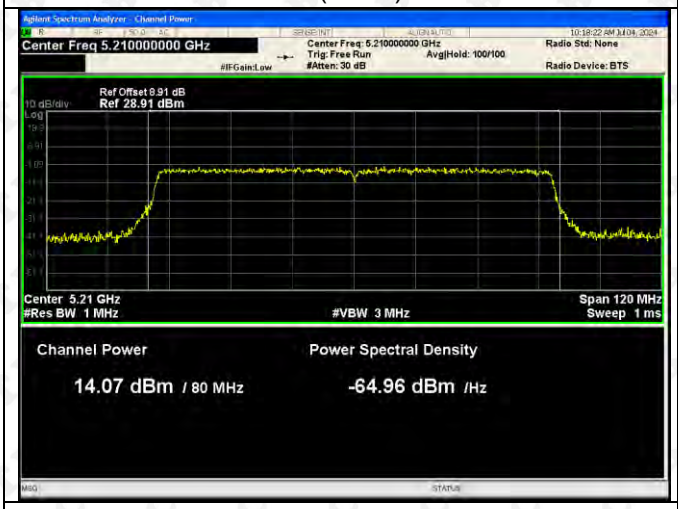


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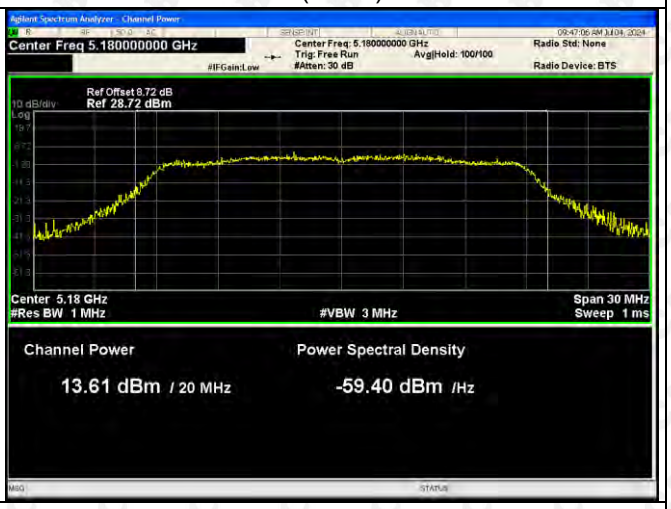


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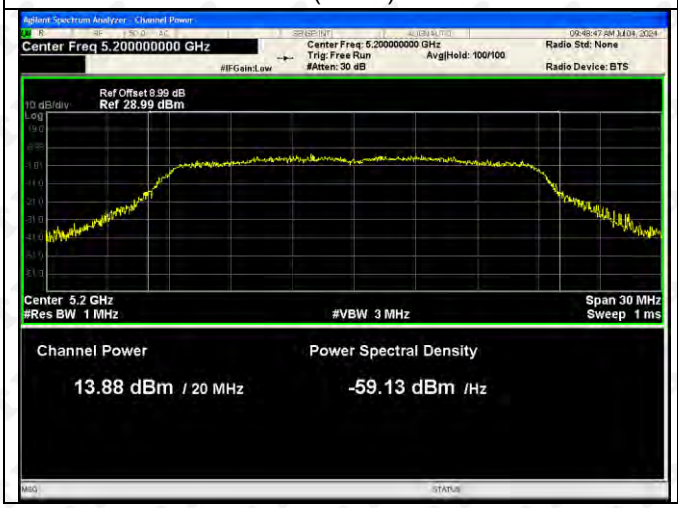


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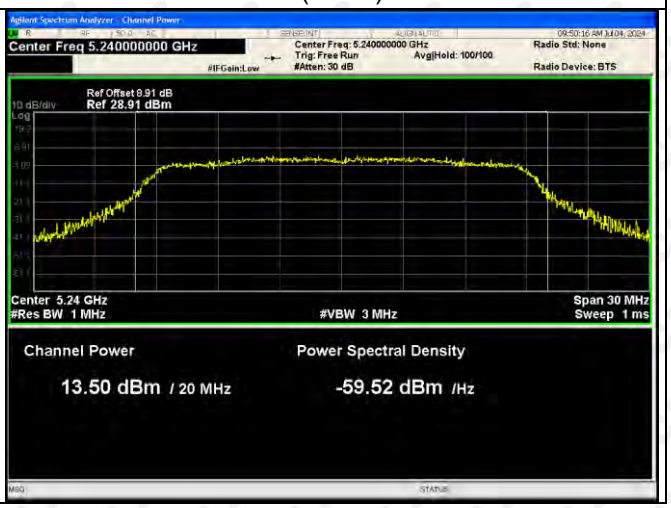

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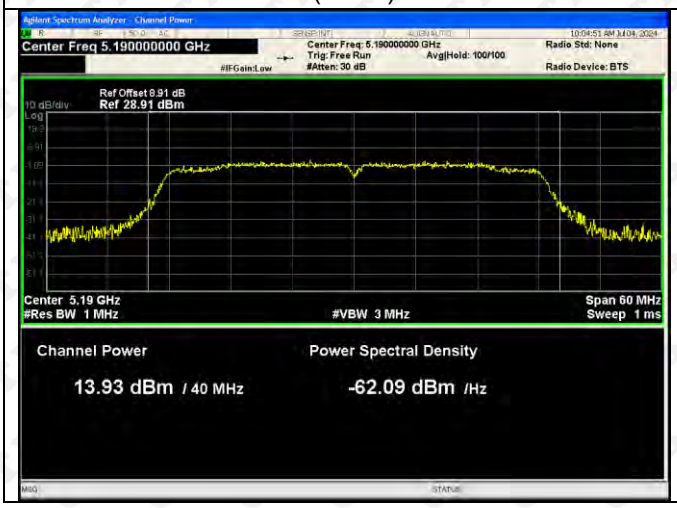


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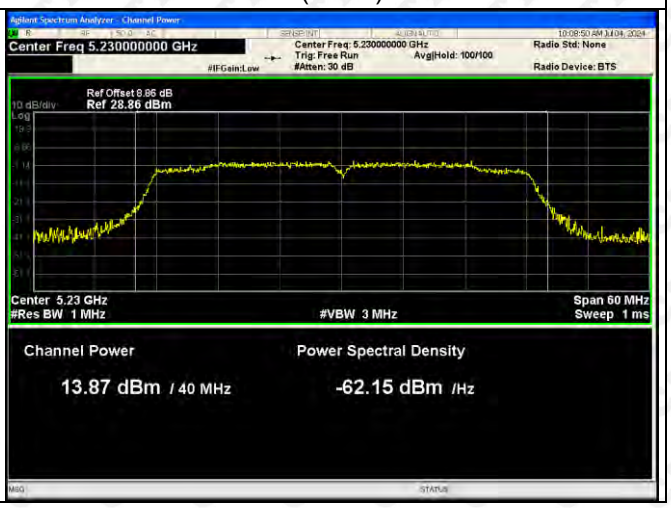
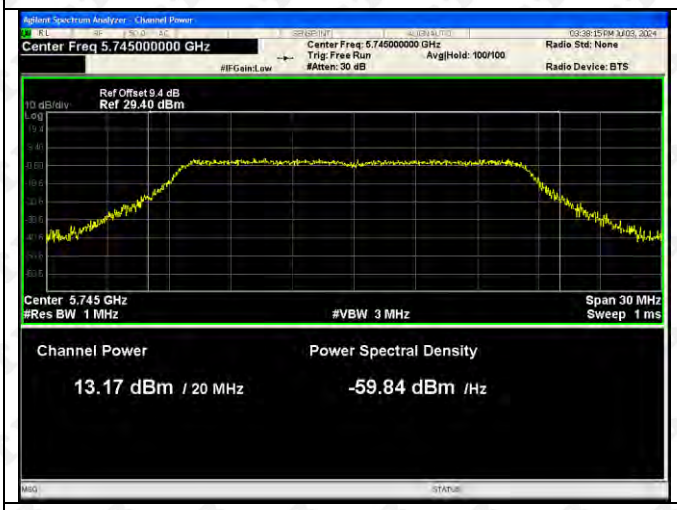



ANT1:

802.11a-5745

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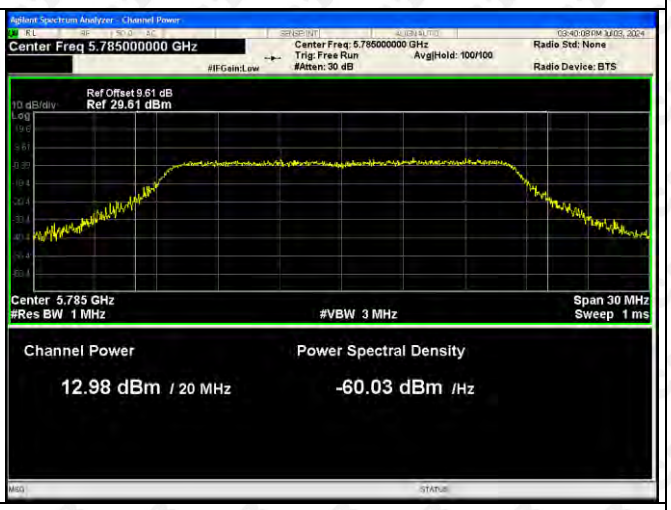
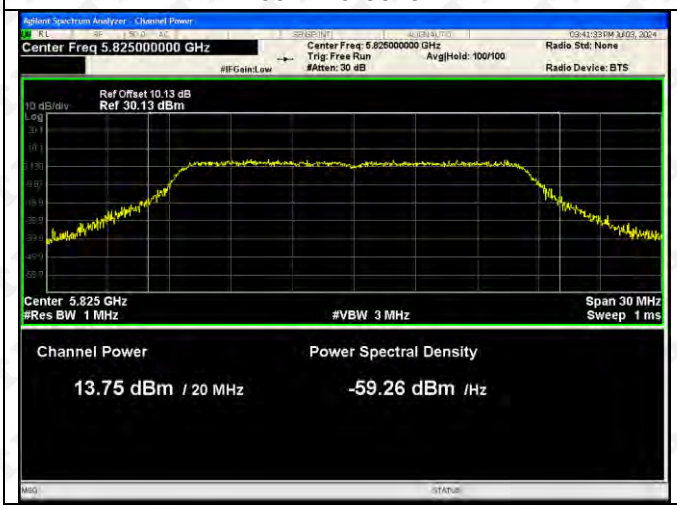



802.11a-5825

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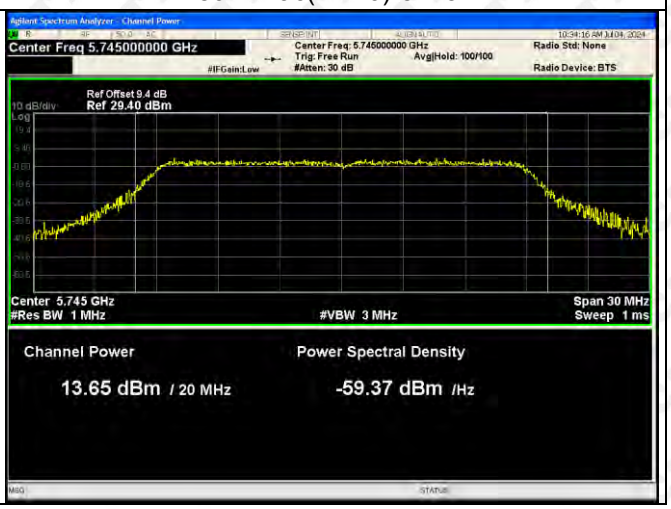

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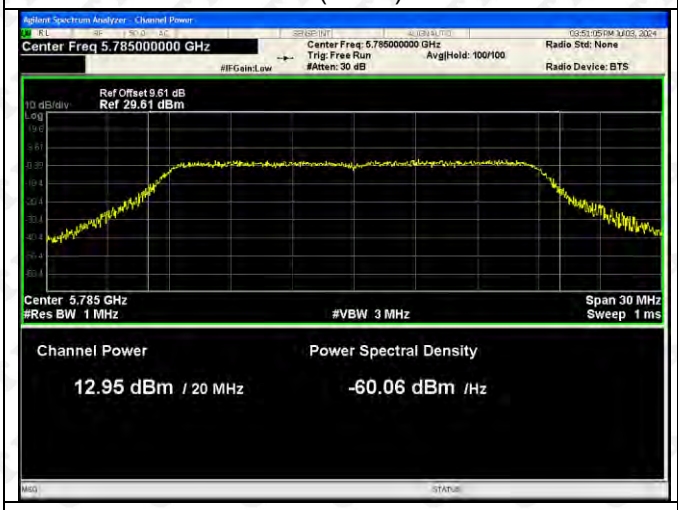


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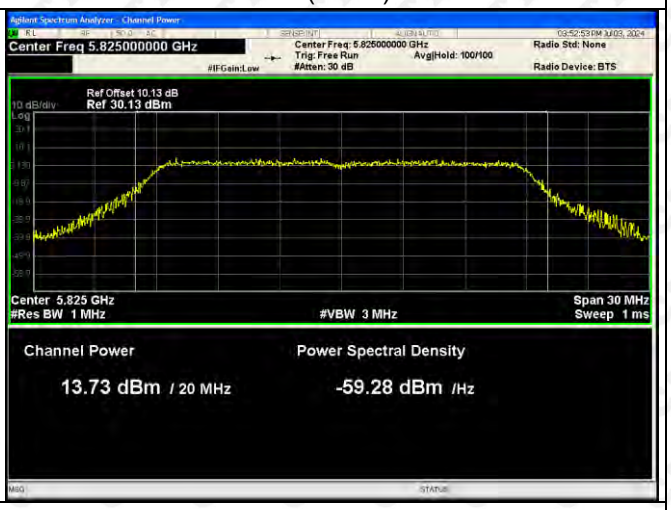


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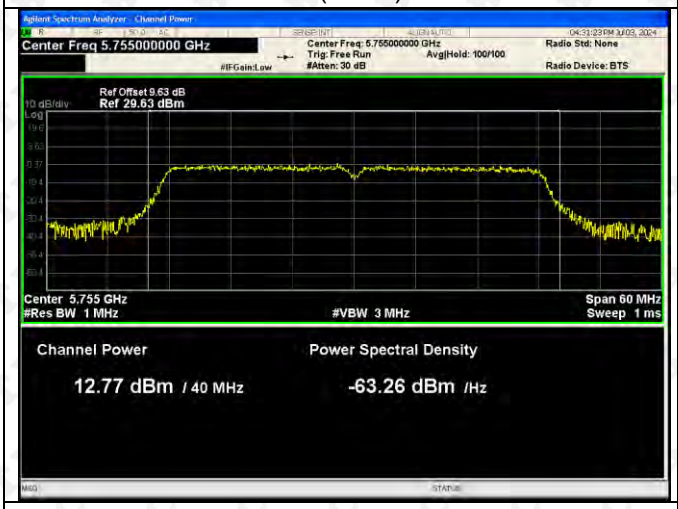


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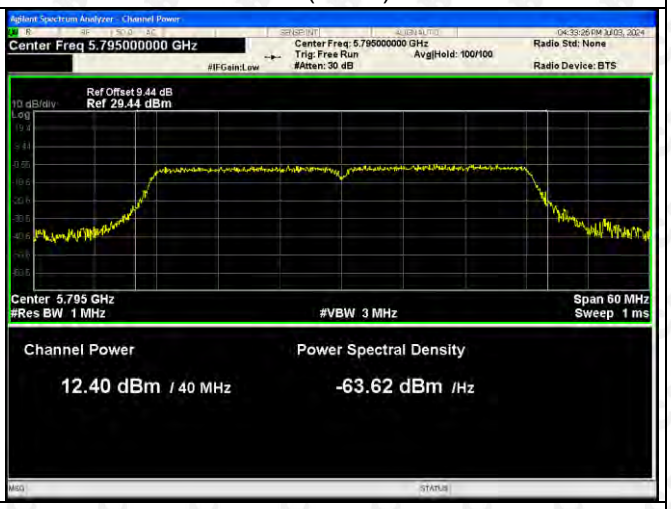


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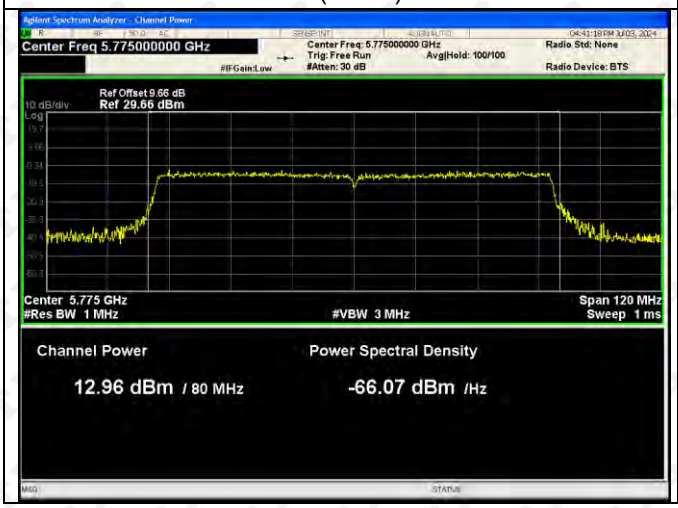
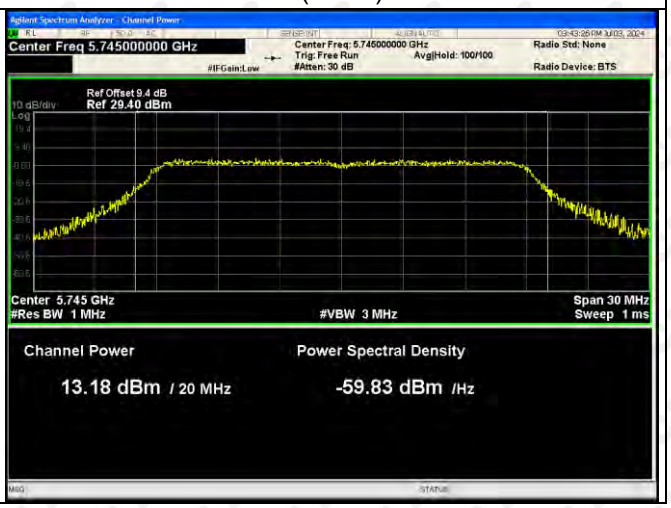
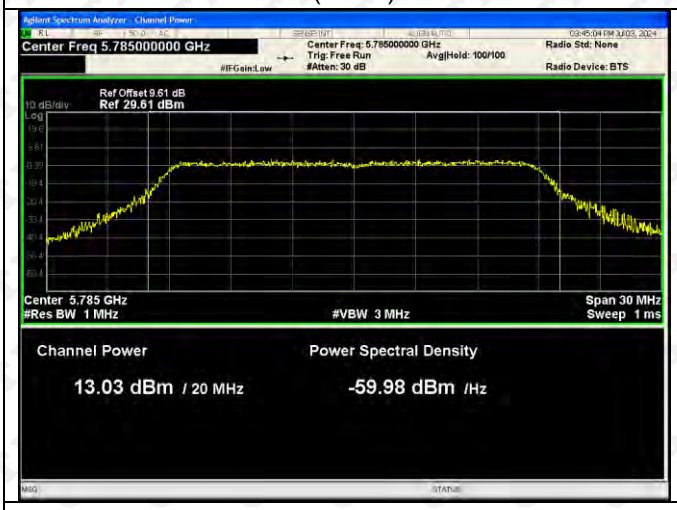


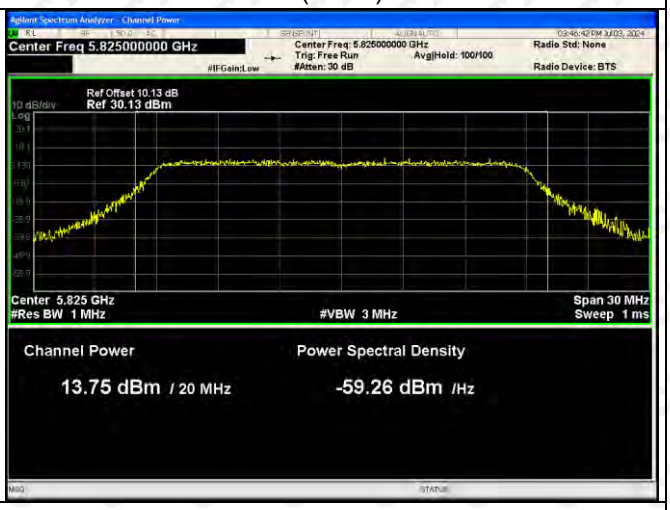

802.11n(HT20)-5745



802.11n(HT20)-5785




802.11n(HT20)-5825

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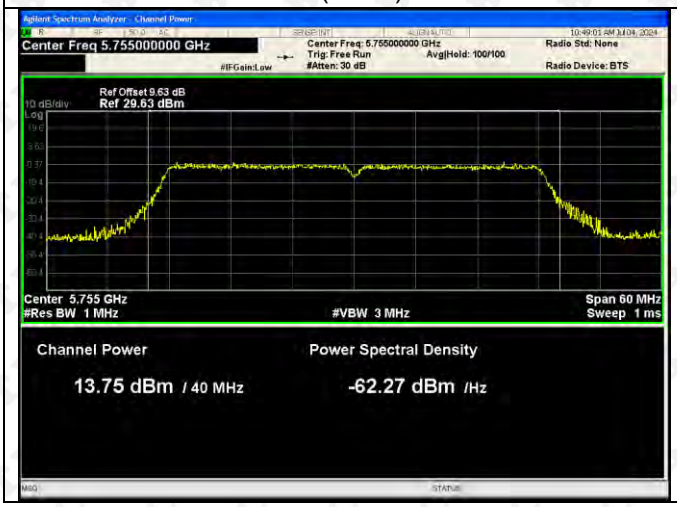


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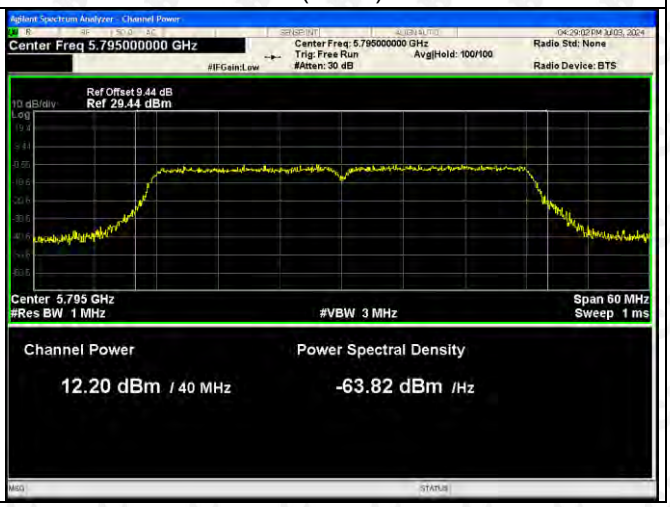
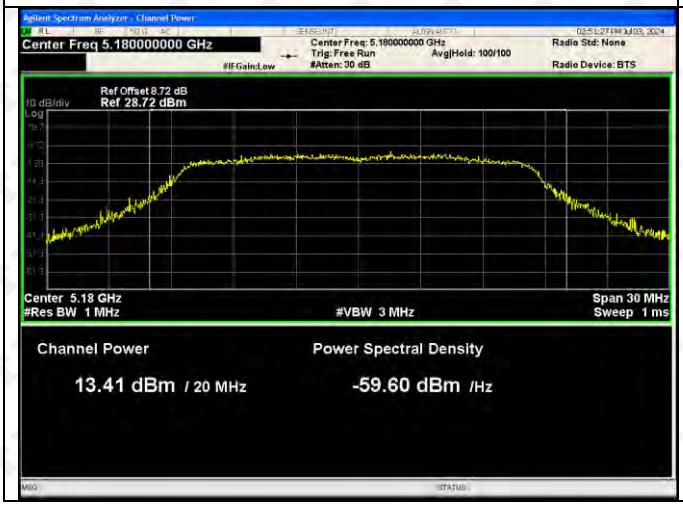
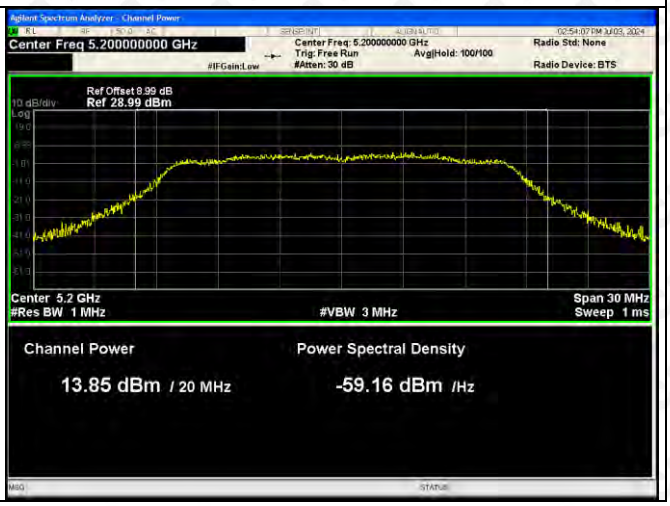



ANT 2

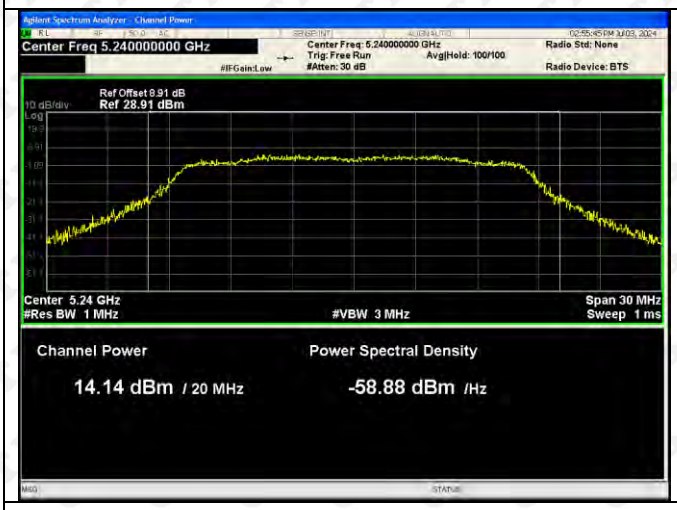
802.11a-5180



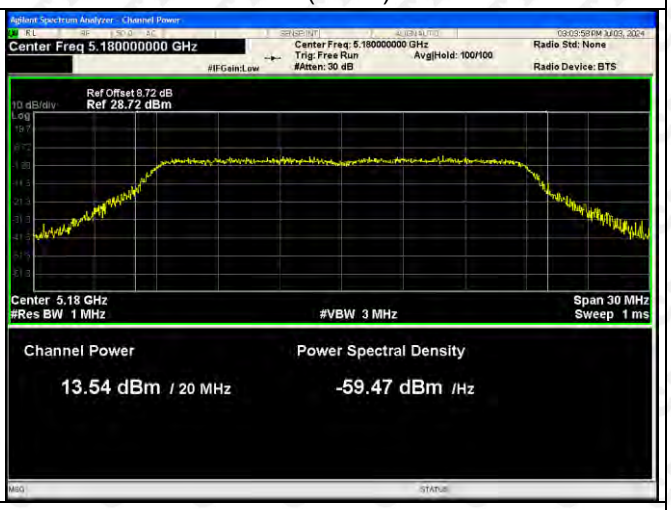

802.11a-5200



802.11a-5240




802.11ac(VH20)-5180

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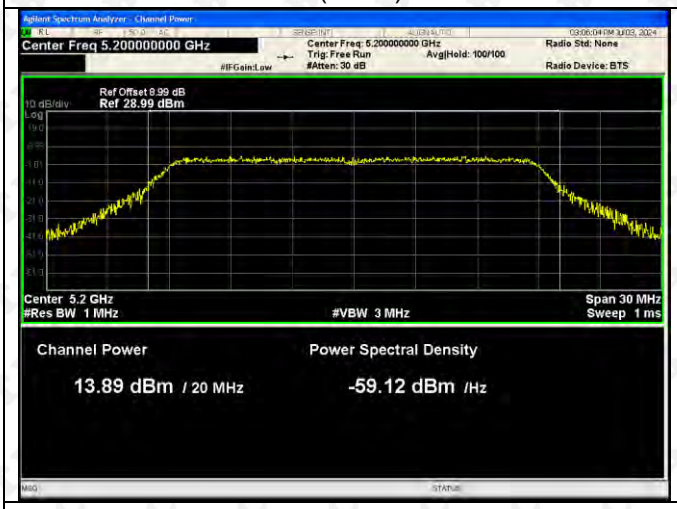


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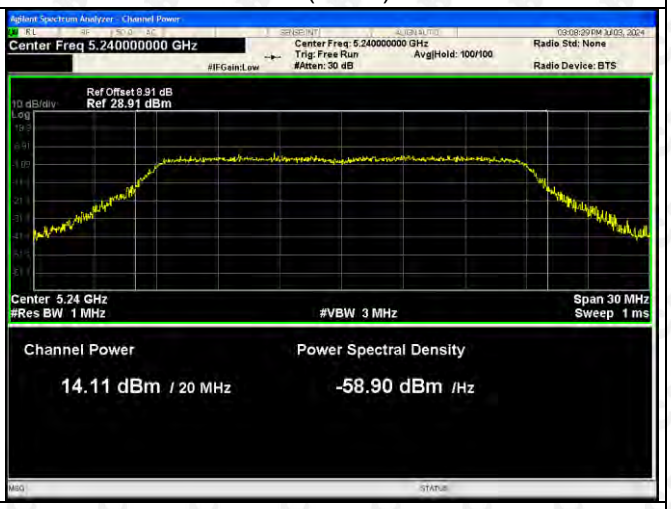
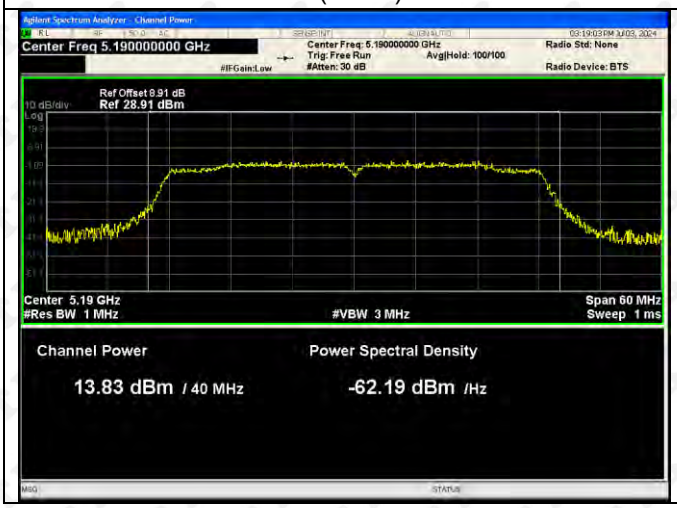



802.11ac(VH40)-5190

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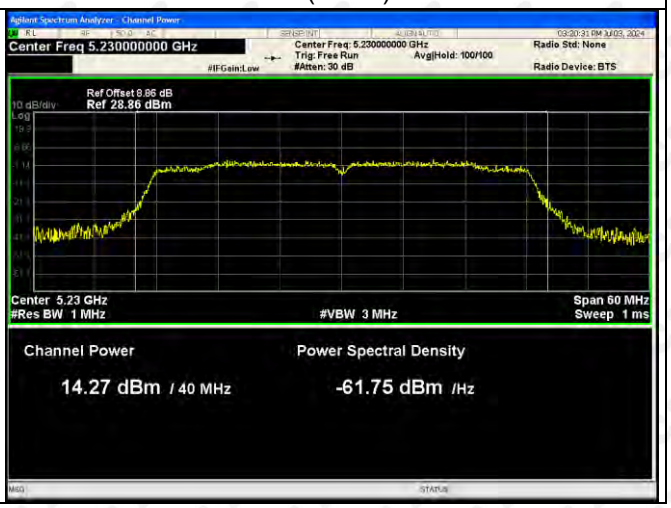

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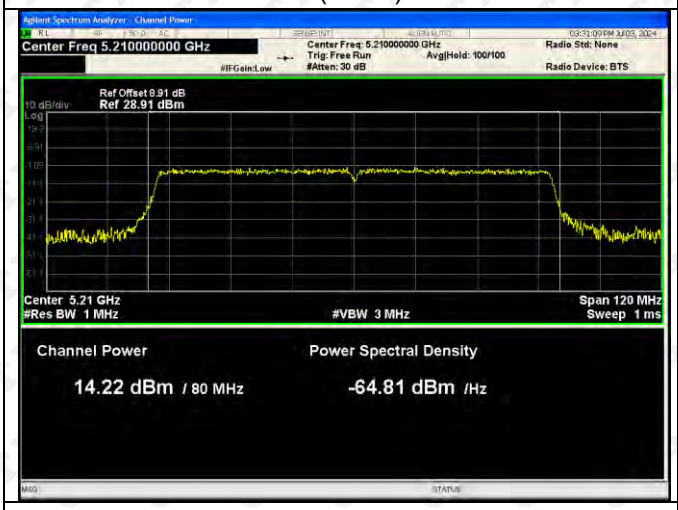


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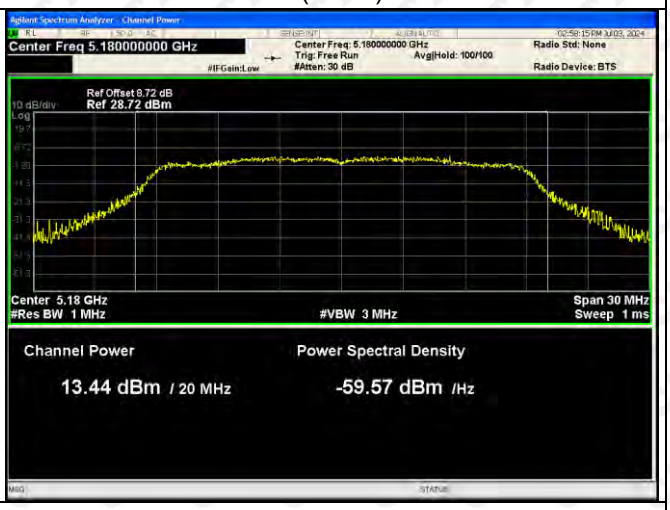


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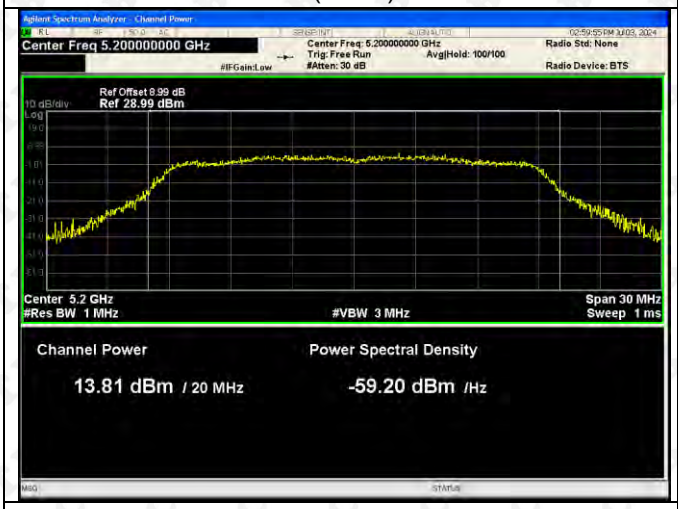


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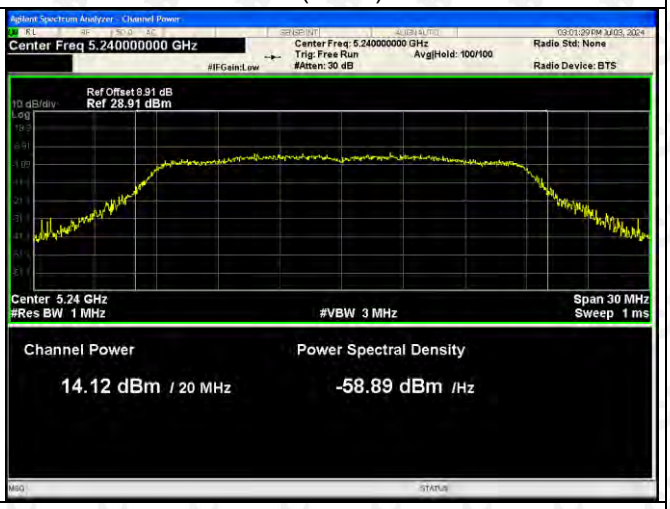


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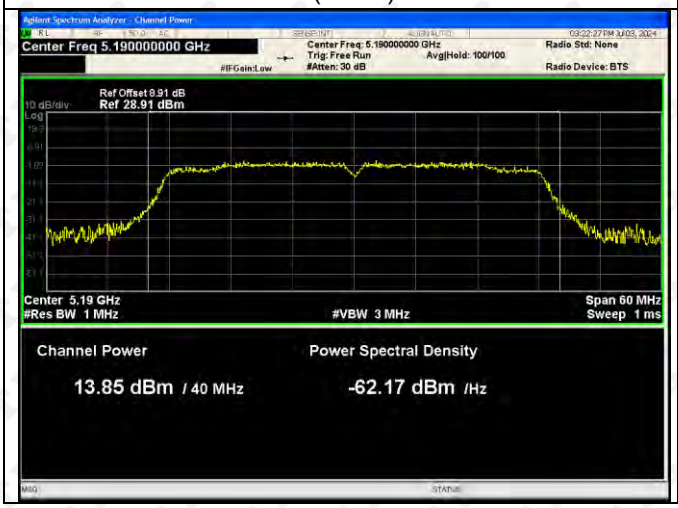


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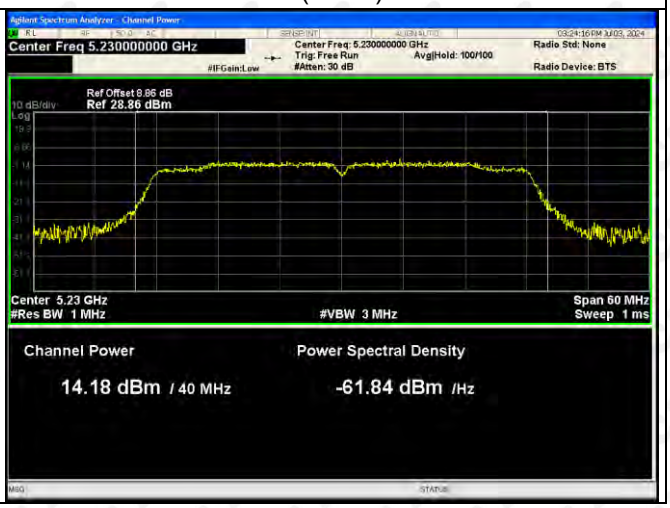
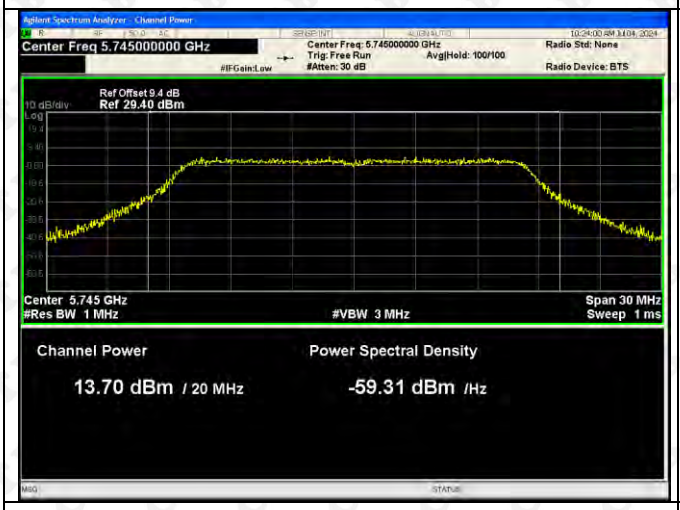
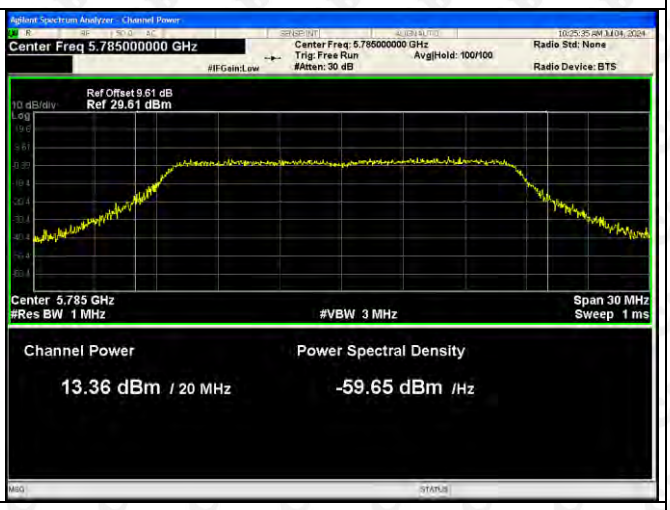


ANT2:

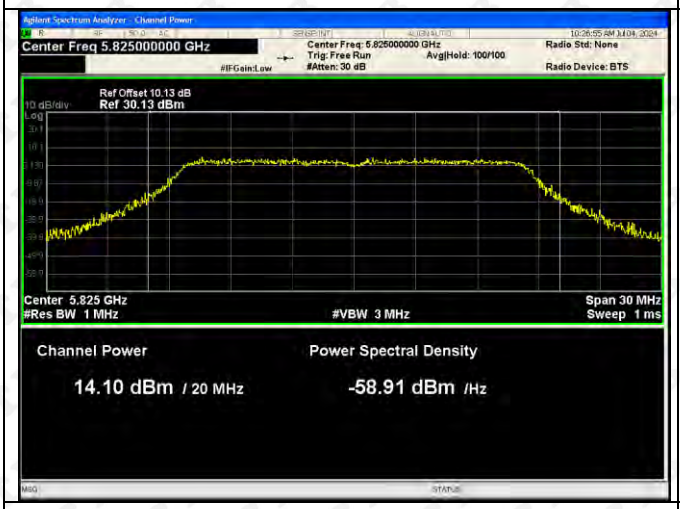
802.11a-5745




802.11a-5785




802.11a-5825

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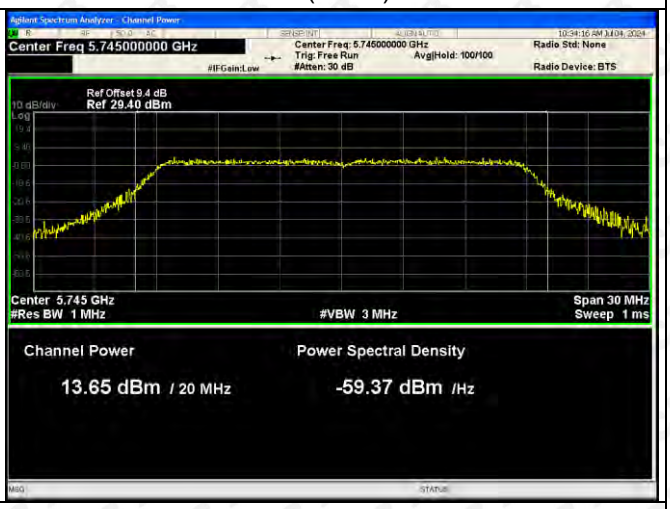


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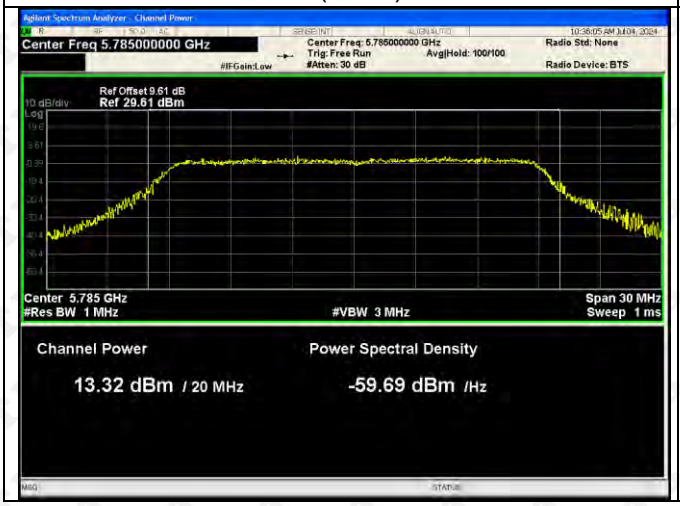


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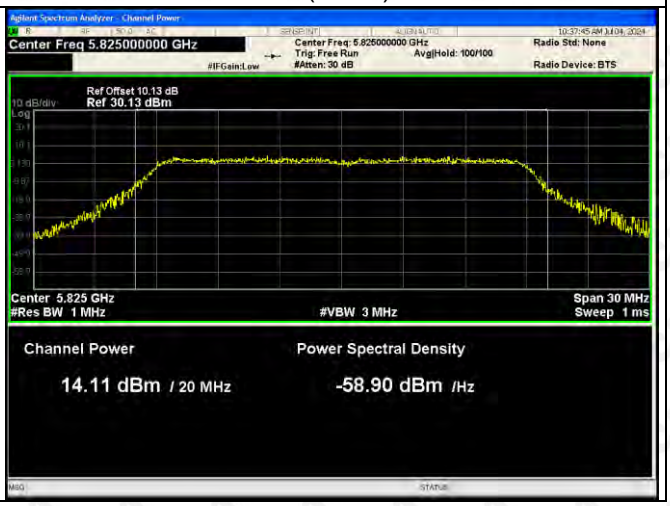

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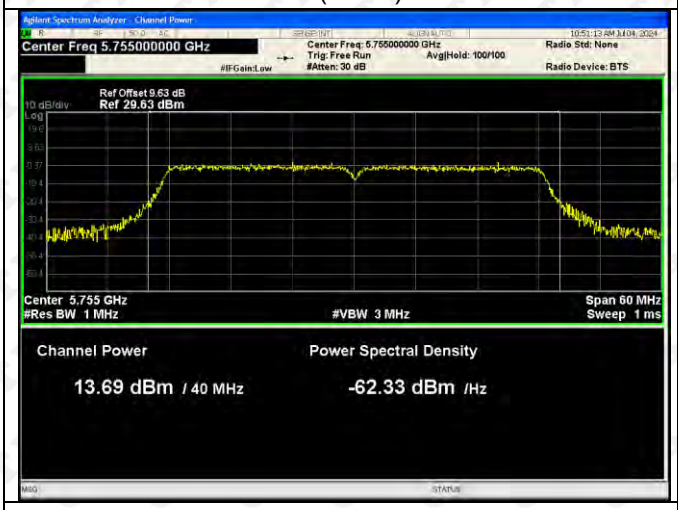


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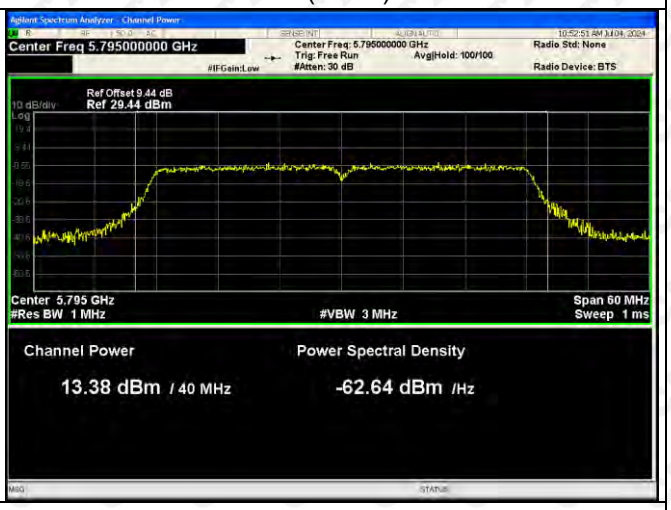


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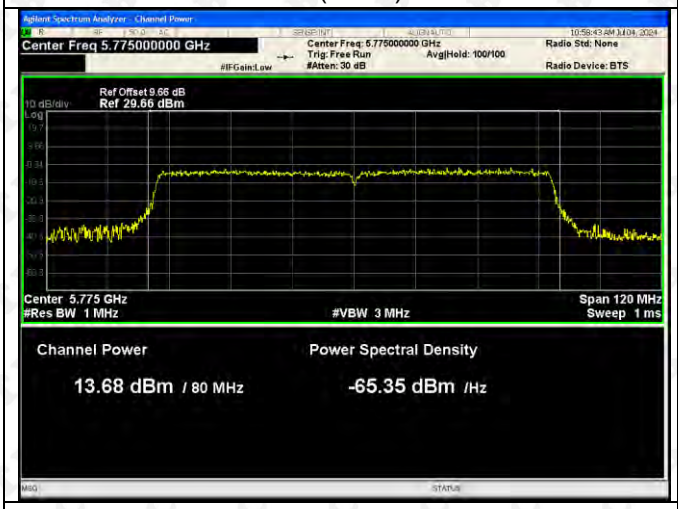
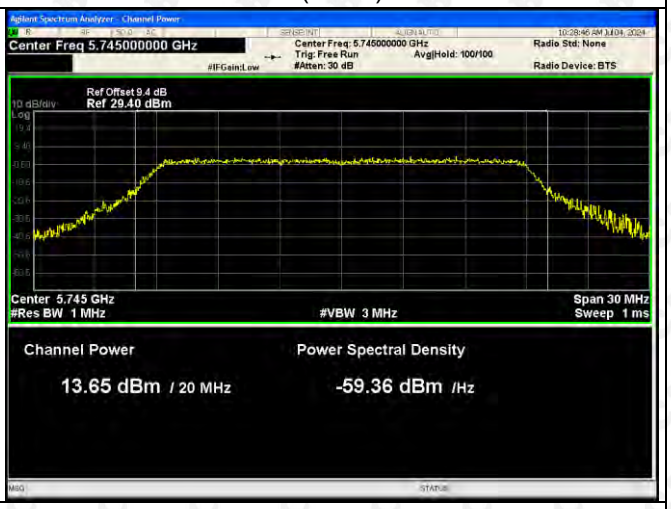



802.11n(HT20)-5745

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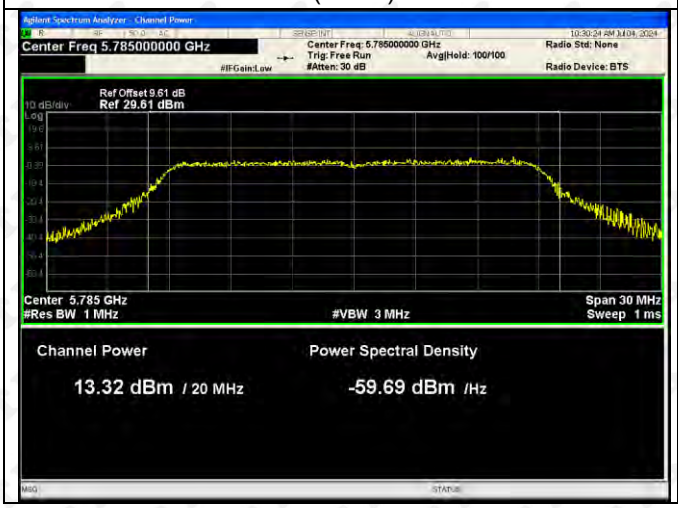
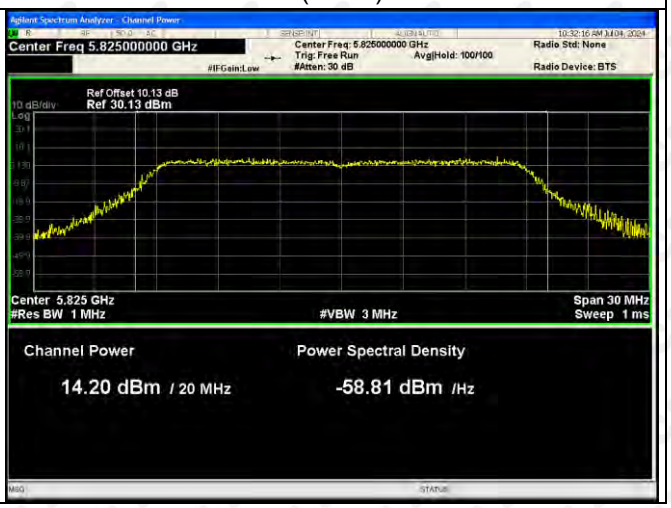



802.11n(HT20)-5825



| 802.11n(HT40)-5755 | 802.11n(HT40)-5795 |
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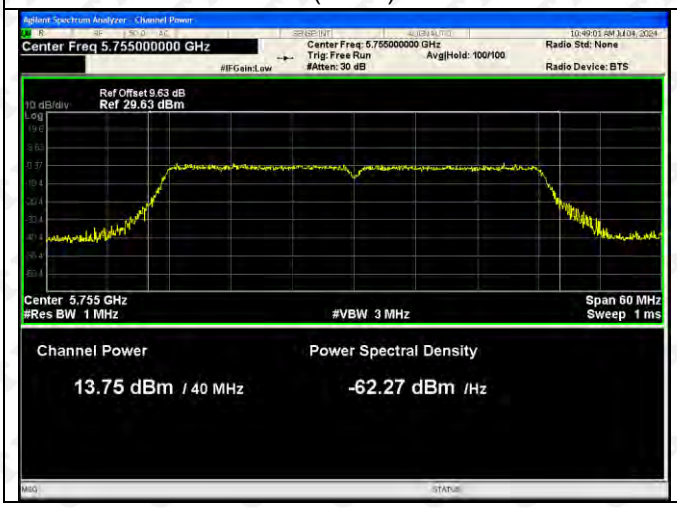
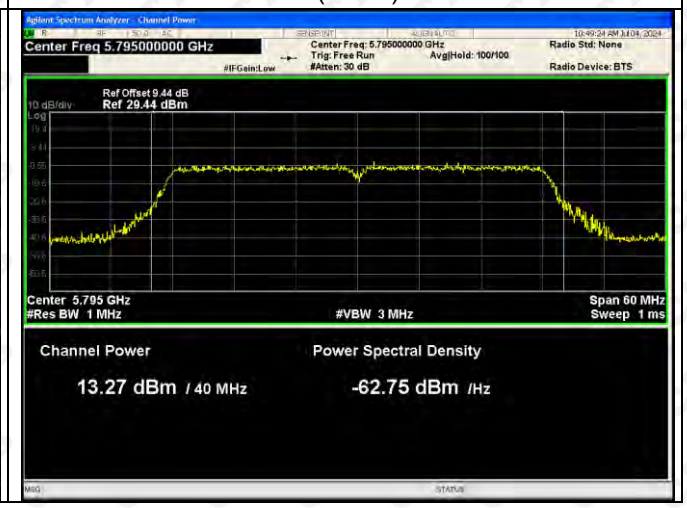
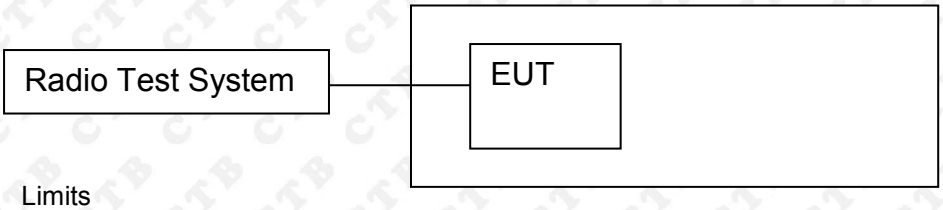
|  |  |

## 10. EMISSION BANDWIDTH& OCCUPIED BANDWIDTH

10.1 Block Diagram Of Test Setup




10.2 Limits

(1) For the band 5.15-5.25 GHz.

(iv) For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.
(2) For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(3) For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.
(e) Within the 5.725-5.85 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

10.3 Test Procedure

According to KDB789033 D02v02r01 sectionE, the following is the measurement procedure.

**1. Emission Bandwidth (EBW)**
a) Set RBW = approximately 1% of the emission bandwidth.
b) Set the VBW > RBW.
c) Detector = Peak.
d) Trace mode = max hold.
e) Measure the maximum width of the emission that is 26 dB down from the maximum of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.
**2. Minimum Emission Bandwidth for the band 5.725−5.85 GHz**
Section 15.407(e) specifies the minimum 6 dB emission bandwidth of at least 500 kHz for the band 5.725−5.85 GHz. The following procedure shall be used for measuring this bandwidth:
a) Set RBW = 100 kHz.
b) Set the video bandwidth (VBW) ≥ 3 * RBW.
c) Detector = Peak.
d) Trace mode = max hold.

e) Sweep = auto couple.
f) Allow the trace to stabilize.
g) 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.
Note: The automatic bandwidth measurement capability of a spectrum analyzer or EMI receiver may be employed if it implements the functionality described in this section. For devices that use channel aggregation refer to III.A and III.C for determining emission bandwidth.

**D. 99% Occupied Bandwidth**

The 99% occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers are each equal to 0.5% of the total mean power of the given emission. Measurement of the 99% occupied bandwidth is *required* only as a condition for using the optional band-edge measurement techniques described in II.G.3.d). Measurements of 99% occupied bandwidth may also optionally be used in lieu of the EBW to define the minimum frequency range over which the 789033 D02 General UNII Test Procedures New Rules v02r01 Page 4 spectrum is integrated when measuring maximum conducted output power as described in II.E. However, the EBW must be measured to determine bandwidth dependent limits on maximum conducted output power in accordance with Section 15.407(a).
The following procedure shall be used for measuring (99%) power bandwidth:

1. Set center frequency to the nominal EUT channel center frequency.

2. Set span = 1.5 times to 5.0 times the OBW.

3. Set RBW = 1% to 5% of the OBW

4. Set VBW ≥ 3 * RBW

5. Video averaging is not permitted. Where practical, a sample detection and single sweep mode shall be used. Otherwise, peak detection and max hold mode (until the trace stabilizes) shall be used.

6. Use the 99% power bandwidth function of the instrument (if available).

7. If the instrument does not have a 99% power bandwidth function, the trace data points are recovered and directly summed in power units. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5% of the total is reached; that frequency is recorded as the lower frequency. The process is repeated until 99.5% of the total is reached; that frequency is recorded as the upper frequency. The 99% occupied bandwidth is the difference between these two frequencies.

10.4 Test Results

| Test mode Ant 1 | Test Channel (MHz) | 26dB Bandwidth (MHz) |
|---|---|---|
| 802.11a | 5180 | 19.152 |
| | 5200 | 19.485 |
| | 5240 | 19.142 |
| 802.11ac20 | 5180 | 21.54 |
| | 5200 | 21.248 |
| | 5240 | 21.38 |
| 802.11ac40 | 5190 | 41.006 |
| | 5230 | 40.163 |
| 802.11ac80 | 5210 | 80.889 |
| 802.11n(HT20) | 5180 | 20.701 |
| | 5200 | 20.518 |
| | 5240 | 20.677 |
| 802.11n(HT40) | 5190 | 39.049 |
| | 5230 | 39.353 |

| Test mode Ant 2 | Test Channel (MHz) | 26dB Bandwidth (MHz) |
|---|---|---|
| 802.11a | 5180 | 19.734 |
| | 5200 | 20.169 |
| | 5240 | 19.779 |
| 802.11ac20 | 5180 | 21.785 |
| | 5200 | 21.586 |
| | 5240 | 21.559 |
| 802.11ac40 | 5190 | 39.162 |
| | 5230 | 39.341 |
| 802.11ac80 | 5210 | 80.553 |
| 802.11n(HT20) | 5180 | 20.753 |
| | 5200 | 20.941 |
| | 5240 | 21.129 |
| 802.11n(HT40) | 5190 | 39.54 |
| | 5230 | 38.857 |

5725-5850 MHz

| Test mode Ant 1 | Test Channel (MHz) | 6dB Bandwidth (MHz) | Result |
|---|---|---|---|
| 802.11a | 5745 | 16.521 | Pass |
| | 5785 | 16.458 | Pass |
| | 5825 | 16.501 | Pass |
| 802.11ac20 | 5745 | 17.688 | Pass |
| | 5785 | 17.755 | Pass |
| | 5825 | 17.714 | Pass |
| 802.11ac40 | 5755 | 36.492 | Pass |
| | 5795 | 36.449 | Pass |
| 802.11ac80 | 5775 | 76.52 | Pass |
| 802.11n(HT20) | 5745 | 17.694 | Pass |
| | 5785 | 17.747 | Pass |
| | 5825 | 17.732 | Pass |
| 802.11n(HT40) | 5755 | 36.39 | Pass |
| | 5795 | 36.386 | Pass |

| Test mode Ant 2 | Test Channel (MHz) | 6dB Bandwidth (MHz) | Result |
|---|---|---|---|
| 802.11a | 5745 | 16.513 | Pass |
| | 5785 | 16.511 | Pass |
| | 5825 | 16.487 | Pass |
| 802.11ac20 | 5745 | 17.728 | Pass |
| | 5785 | 17.685 | Pass |
| | 5825 | 17.726 | Pass |
| 802.11ac40 | 5755 | 36.478 | Pass |
| | 5795 | 36.437 | Pass |
| 802.11ac80 | 5775 | 76.517 | Pass |
| 802.11n(HT20) | 5745 | 17.701 | Pass |
| | 5785 | 17.739 | Pass |
| | 5825 | 17.754 | Pass |
| 802.11n(HT40) | 5755 | 36.501 | Pass |
| | 5795 | 36.485 | Pass |

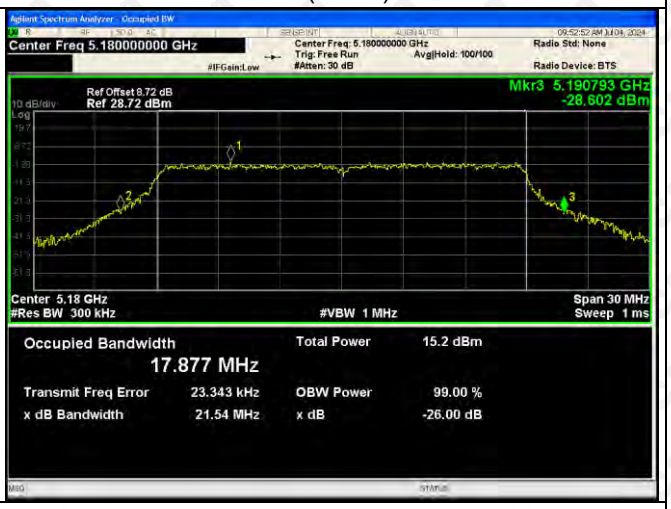
**Test Graph ANT 1**

802.11a-5180

802.11a-5200

802.11a-5240

802.11ac(VH20)-5180

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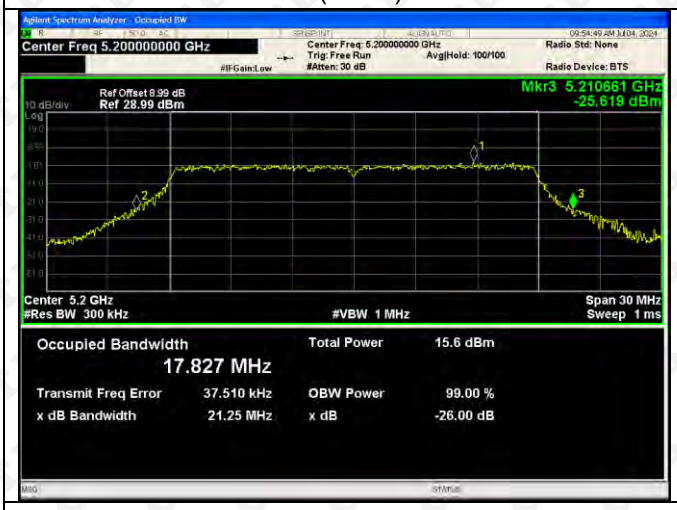


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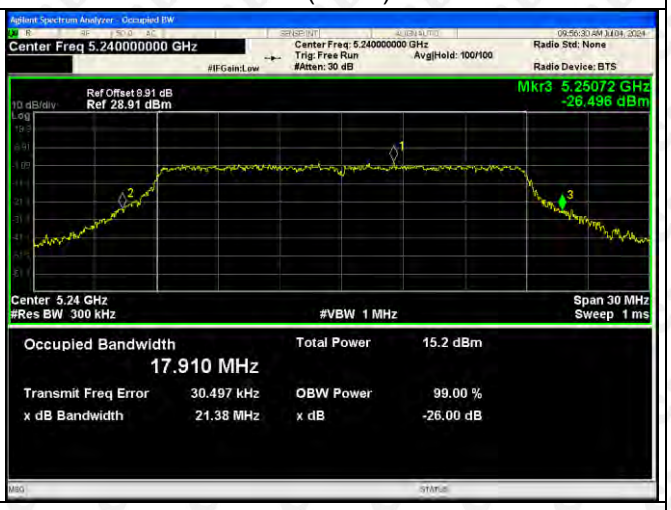
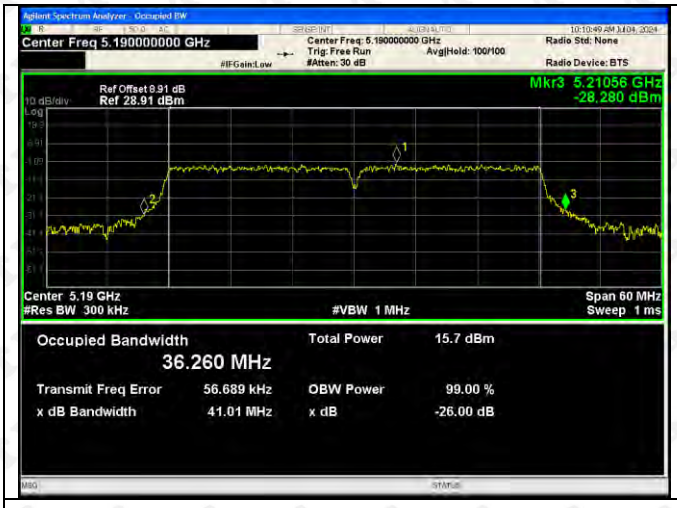


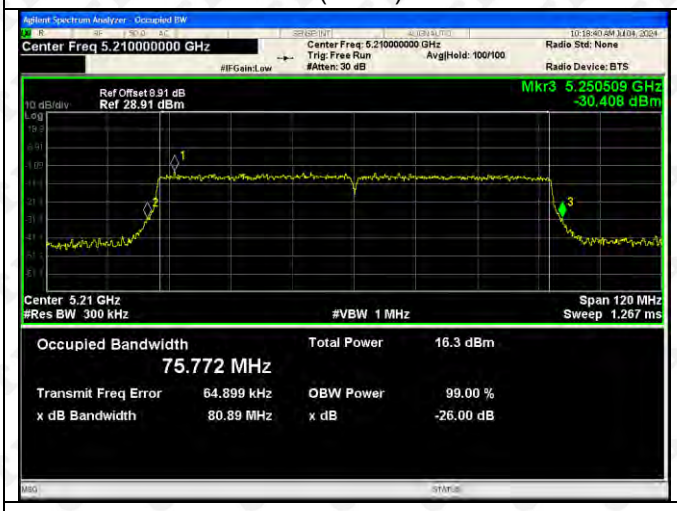

802.11ac(VH40)-5190

802.11ac(VH40)-5230




802.11ac(VH80)-5210

802.11n(HT20)-5180



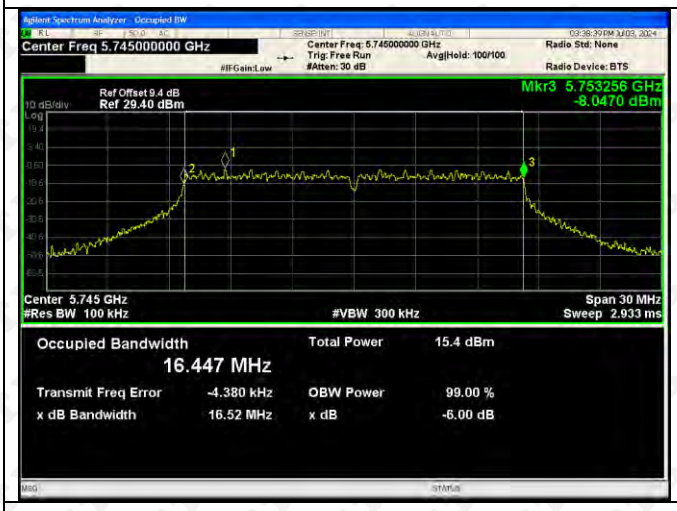
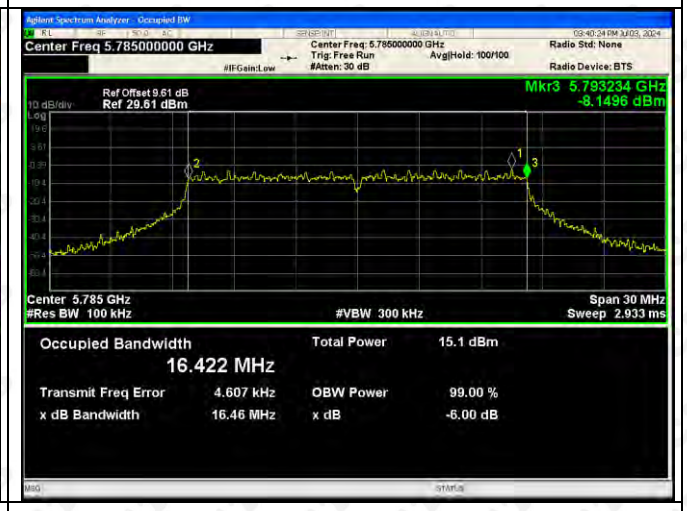
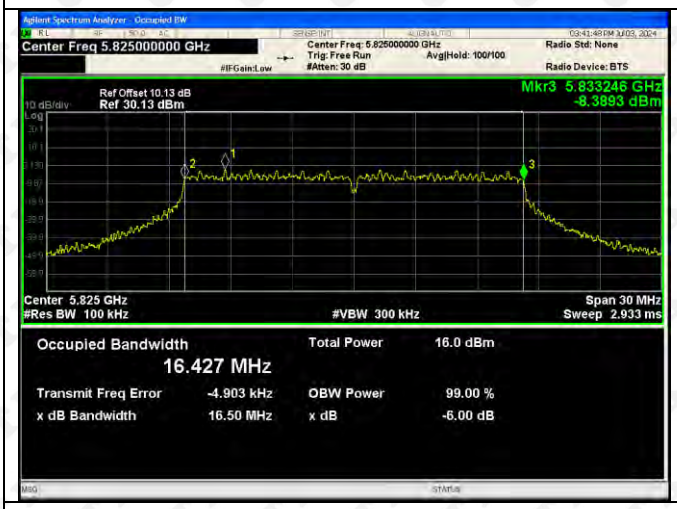
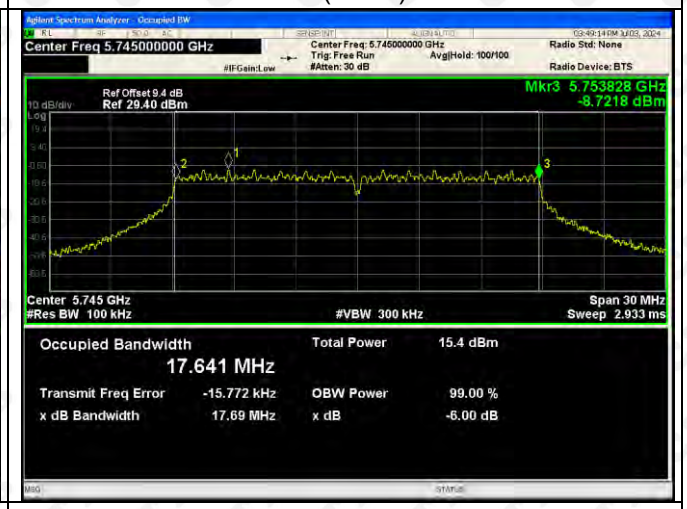

802.11n(HT20)-5200

802.11n(HT20)-5240

802.11n(HT40)-5190

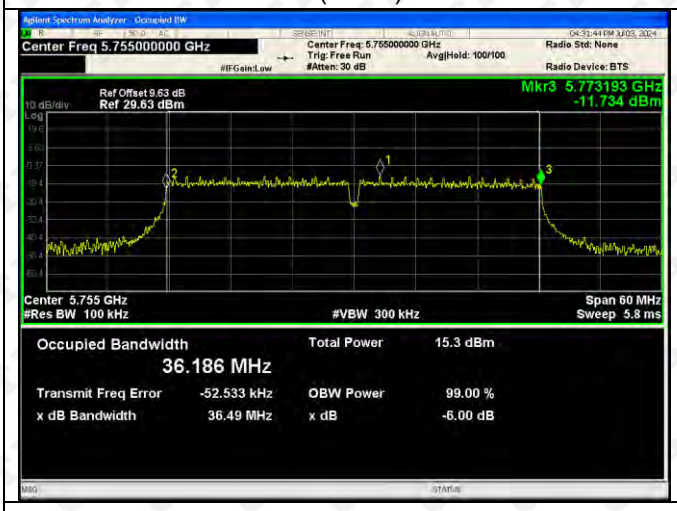
802.11n(HT40)-5230

**ANT1:**
**5725-5850MHz**

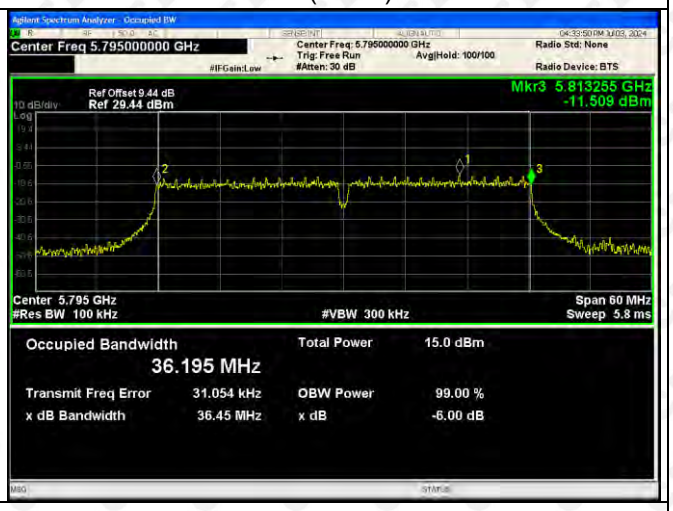
| 802.11a-5745 | 802.11a-5785 |
|---|---|
|  |  |
| 802.11a-5825 | 802.11ac(VH20)-5745 |
|  |  |
| 802.11ac(VH20)-5785 | 802.11ac(VH20)-5825 |

802.11ac(VH40)-5755

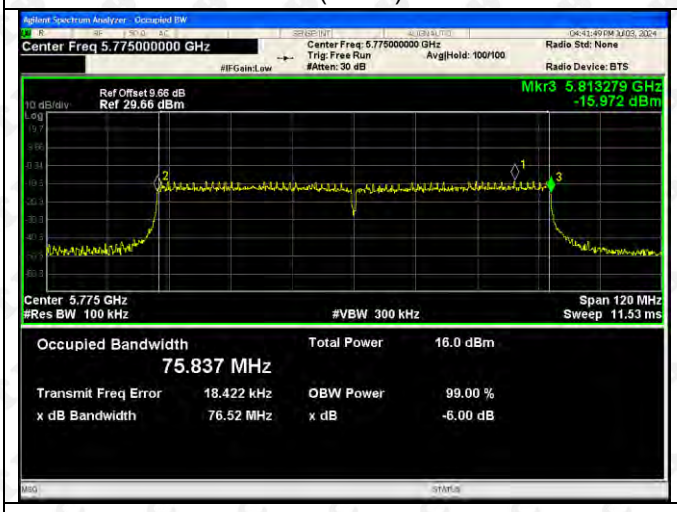
802.11ac(VH40)-5795




802.11ac(VH80)-5775




802.11n(HT20)-5745

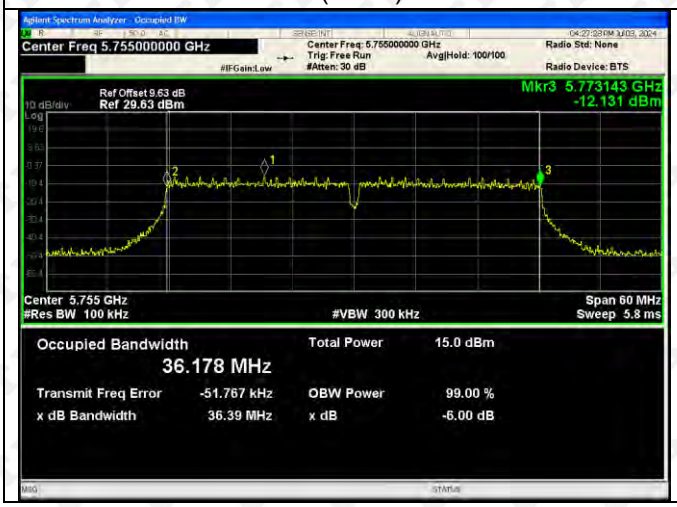


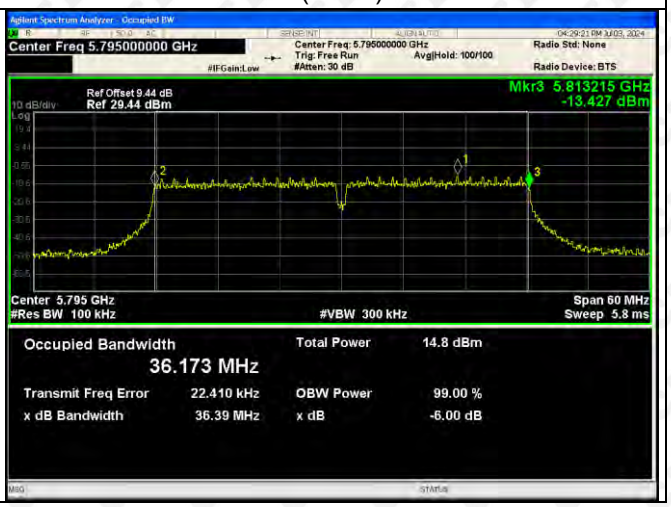

802.11n(HT20)-5785

802.11n(HT20)-5825

5802.11n(HT40)-5755

802.11n(HT40)-5795




**Test Graph**
**ANT 2**

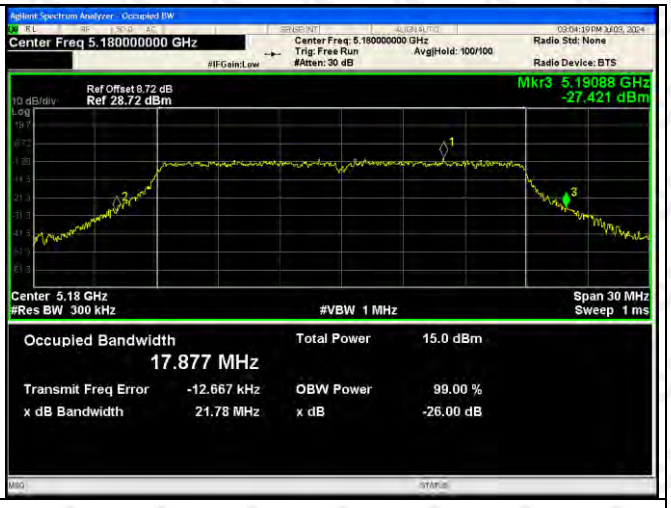
802.11a-5180

802.11a-5200

802.11a-5240

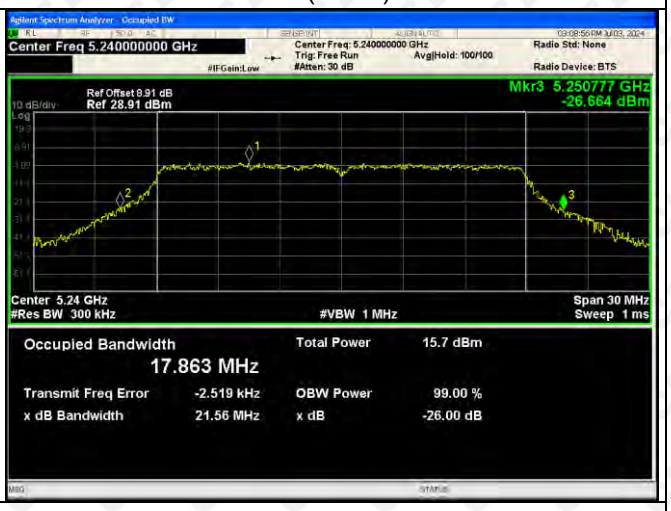
802.11ac(VH20)-5180

802.11ac(VH20)-5200



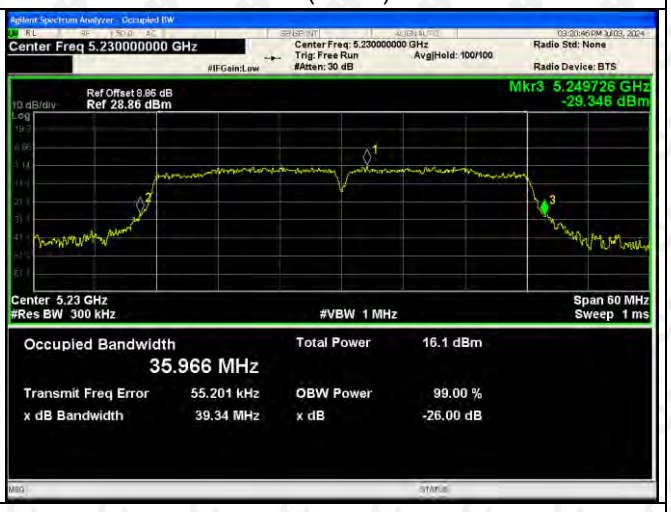

802.11ac(VH20)-5240

802.11ac(VH40)-5190




802.11ac(VH40)-5230

802.11ac(VH80)-5210




802.11n(HT20)-5180

802.11n(HT20)-5200

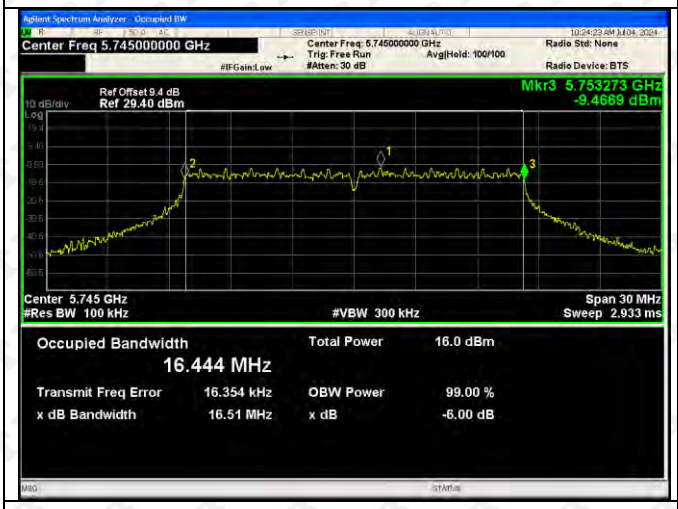
802.11n(HT20)-5240

802.11n(HT40)-5190

802.11n(HT40)-5230

**ANT2:**
**5725-5850MHz**

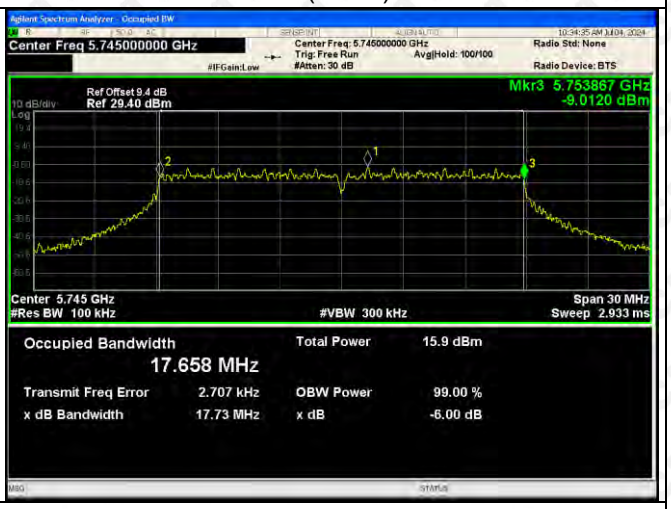
802.11a-5745



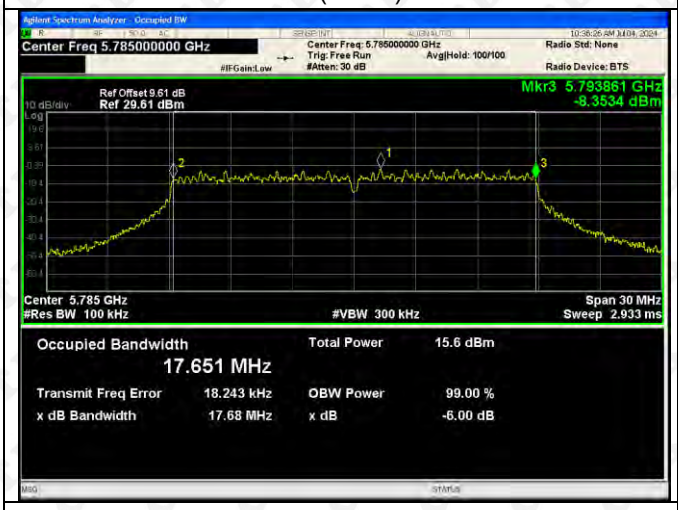

802.11a-5785

802.11a-5825

802.11ac(VH20)-5745



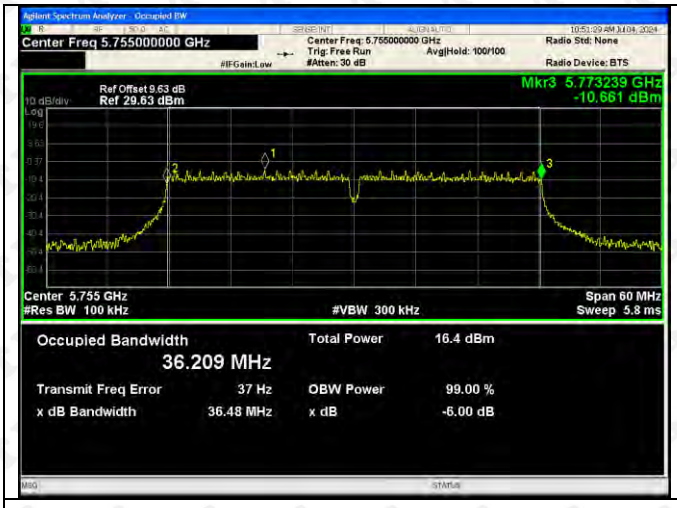

802.11ac(VH20)-5785



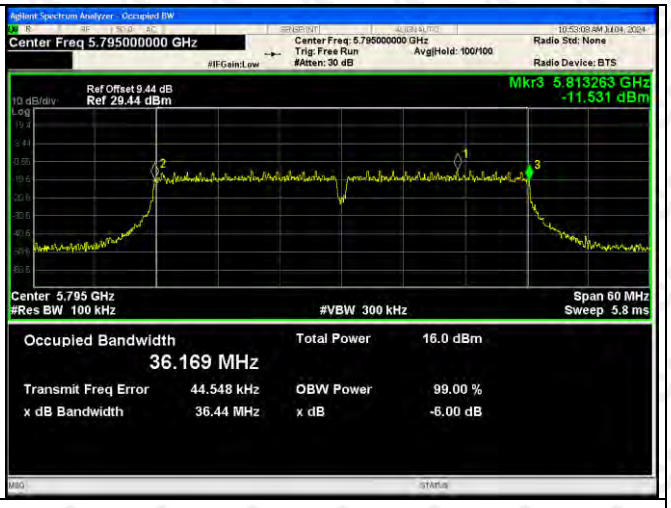

802.11ac(VH20)-5825

802.11ac(VH40)-5755

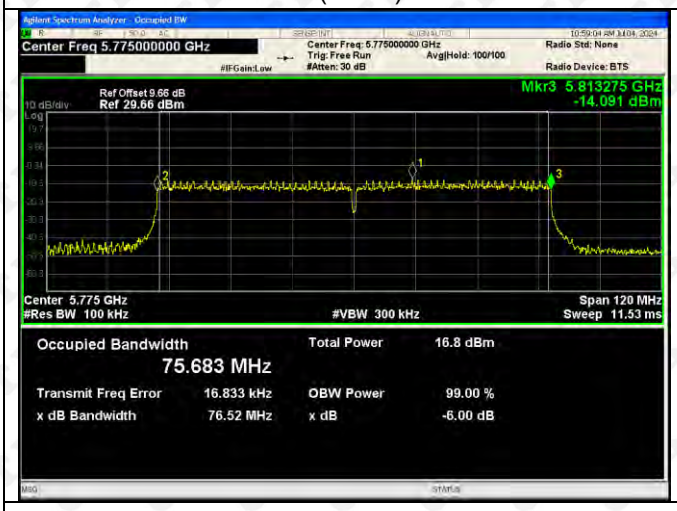
802.11ac(VH40)-5795



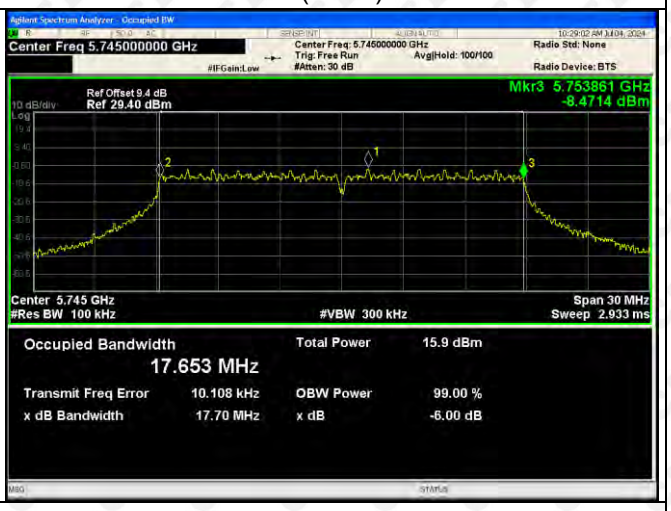

802.11ac(VH80)-5775




802.11n(HT20)-5745

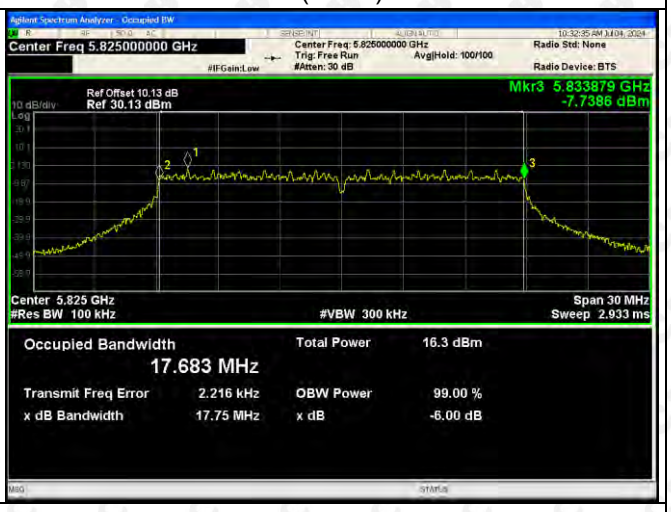



802.11n(HT20)-5785

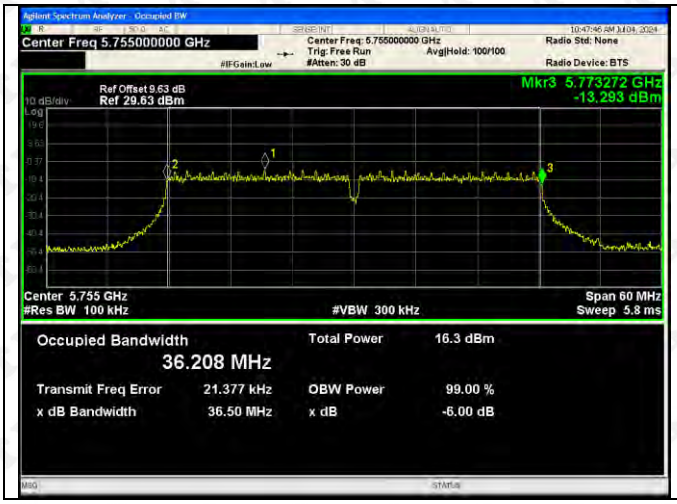


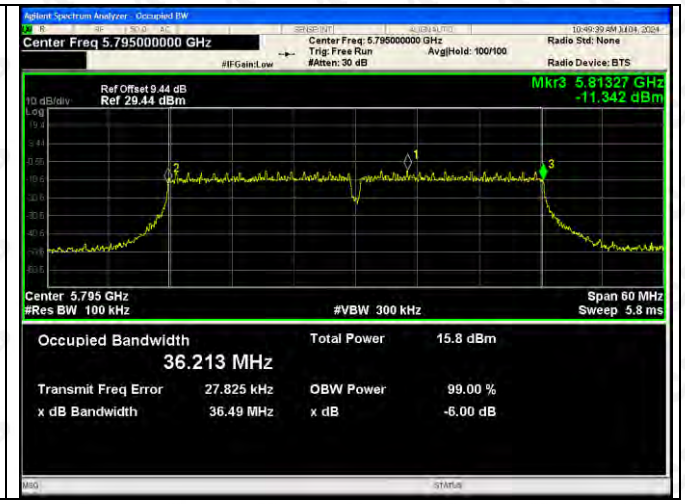

802.11n(HT20)-5825

5802.11n(HT40)-5755




802.11n(HT40)-5795


Agilent Spectrum Analyzer - Occupied BW
Center Freq 5.755000000 GHz
Center Freq: 5.755000000 GHz
Trig: Free Run
Avg|Hold: 100/100
#Atten: 30 dB
Radio Std: None
Radio Device: BTS
Ref Offset 9.63 dB
10 dB/div Ref 29.63 dBm
Mkr3 5.773272 GHz
-13.293 dBm
Center 5.755 GHz
#Res BW 100 kHz
#VBW 300 kHz
Span 60 MHz
Sweep 5.8 ms
Occupied Bandwidth
36.208 MHz
Total Power 16.3 dBm
Transmit Freq Error 21.377 kHz
OBW Power 99.00 %
x dB Bandwidth 36.50 MHz
x dB -6.00 dB


Agilent Spectrum Analyzer - Occupied BW
Center Freq 5.795000000 GHz
Center Freq: 5.795000000 GHz
Trig: Free Run
Avg|Hold: 100/100
#Atten: 30 dB
Radio Std: None
Radio Device: BTS
Ref Offset 9.44 dB
10 dB/div Ref 29.44 dBm
Mkr3 5.81327 GHz
-11.342 dBm
Center 5.795 GHz
#Res BW 100 kHz
#VBW 300 kHz
Span 60 MHz
Sweep 5.8 ms
Occupied Bandwidth
36.213 MHz
Total Power 15.8 dBm
Transmit Freq Error 27.825 kHz
OBW Power 99.00 %
x dB Bandwidth 36.49 MHz
x dB -6.00 dB