

## 8 6dB&99% Bandwidth Measurement

Test Requirement : FCC CFR47 Part 15 Section 15.247

Test Method : ANSI C63.10:2013

Test Limit Systems using digital modulation techniques may operate in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

### 8.1 Test Procedure

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum;
2. Set the spectrum analyzer: RBW = 100kHz, VBW = 300kHz

### 8.2 Test Result

| Test CH | -6dB Occupy Bandwidth (MHz) |         |               |               |            | Result |
|---------|-----------------------------|---------|---------------|---------------|------------|--------|
|         | 802.11b                     | 802.11g | 802.11n(HT20) | 802.11n(HT40) | Limit(KHz) |        |
| Lowest  | 9.04                        | 15.74   | 16.84         | 36.00         | >500       | Pass   |
| Middle  | 9.04                        | 16.09   | 16.86         | 35.63         |            |        |
| Highest | 8.61                        | 16.10   | 17.01         | 35.59         |            |        |

| Test CH | 99% Occupy Bandwidth (MHz) |         |               |               |            | Result |
|---------|----------------------------|---------|---------------|---------------|------------|--------|
|         | 802.11b                    | 802.11g | 802.11n(HT20) | 802.11n(HT40) | Limit(KHz) |        |
| Lowest  | 11.989                     | 17.552  | 17.777        | 36.831        | /          | Pass   |
| Middle  | 11.952                     | 18.010  | 17.993        | 36.460        |            |        |
| Highest | 12.060                     | 18.012  | 18.054        | 36.366        |            |        |

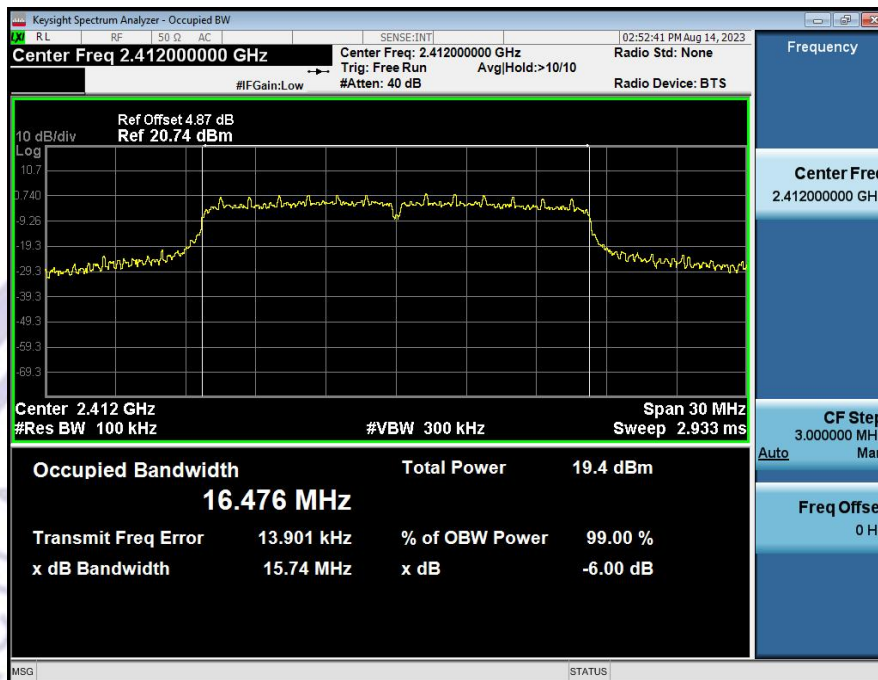
-6dB Occupy Bandwidth  
802.11b Low Channel



802.11b Middle Channel



## 802.11b High Channel



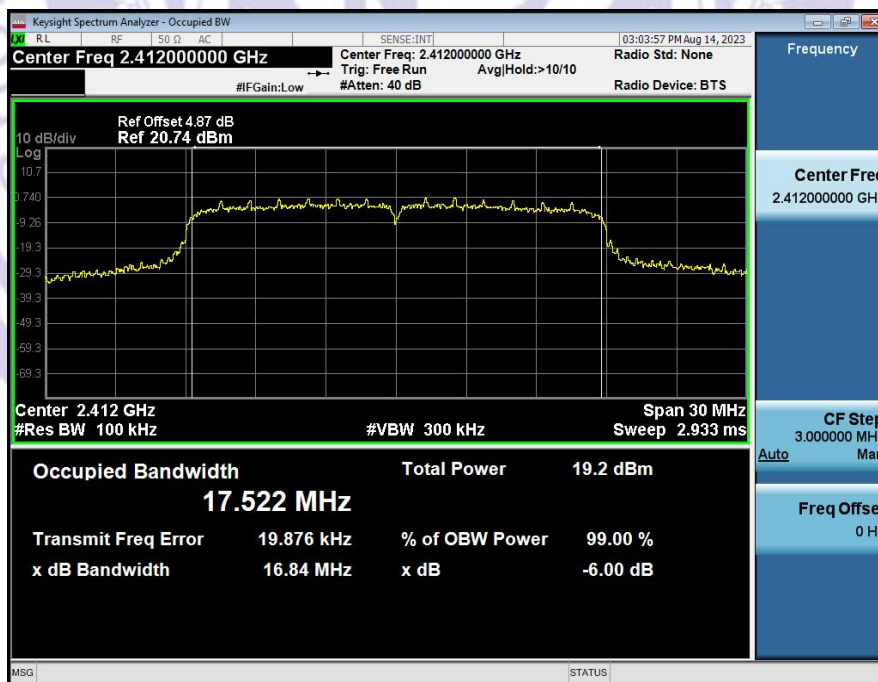
## 802.11g Low Channel



## 802.11g Middle Channel



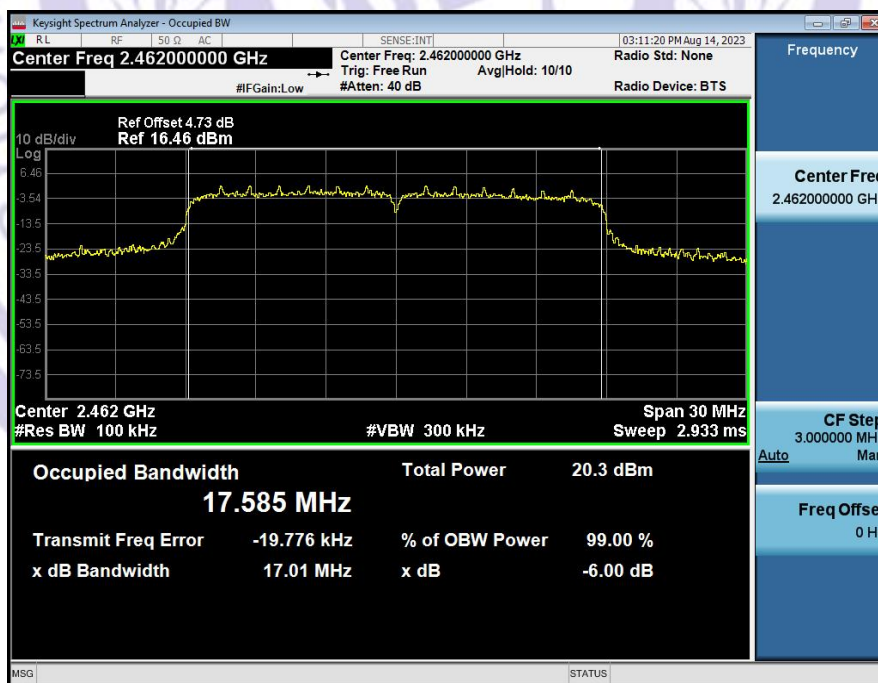
## 802.11g High Channel



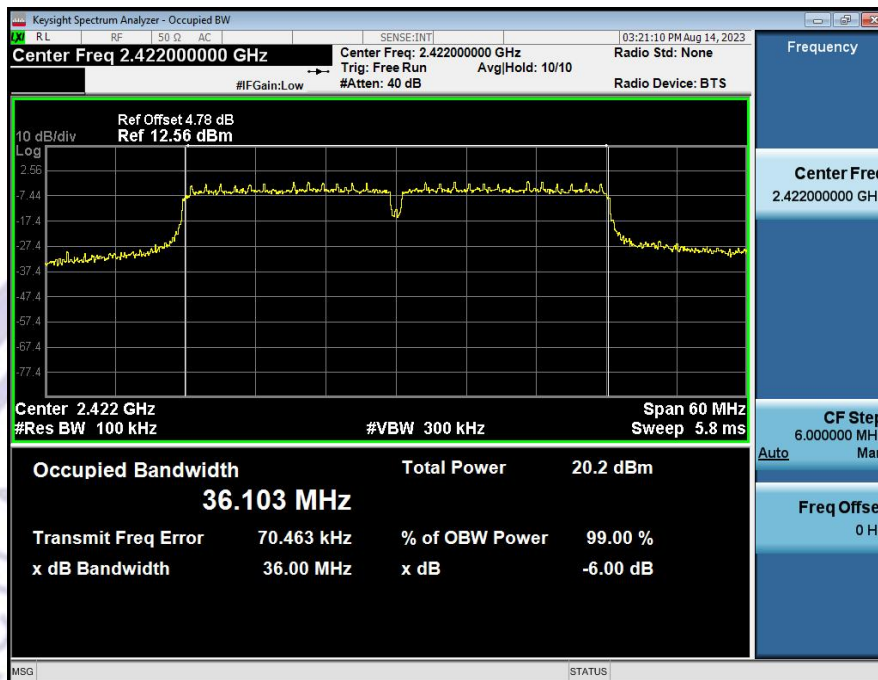
## 802.11n20 Low Channel



## 802.11n20 Middle Channel



## 802.11n20 High Channel



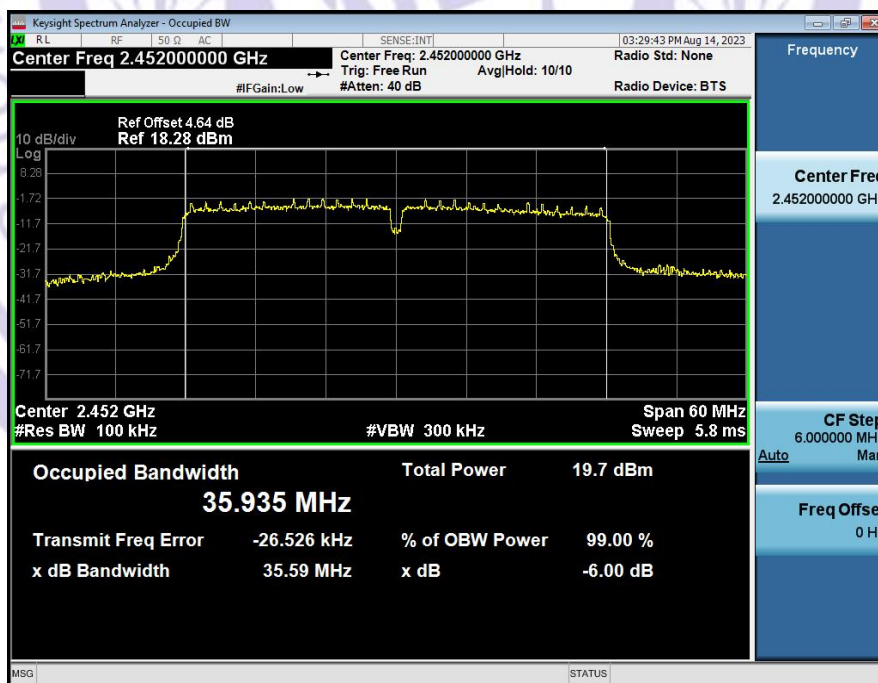
## 802.11n40 Low Channel



## 802.11n40 Middle Channel



## 802.11n40 High Channel



99% Occupy Bandwidth

802.11b Low Channel



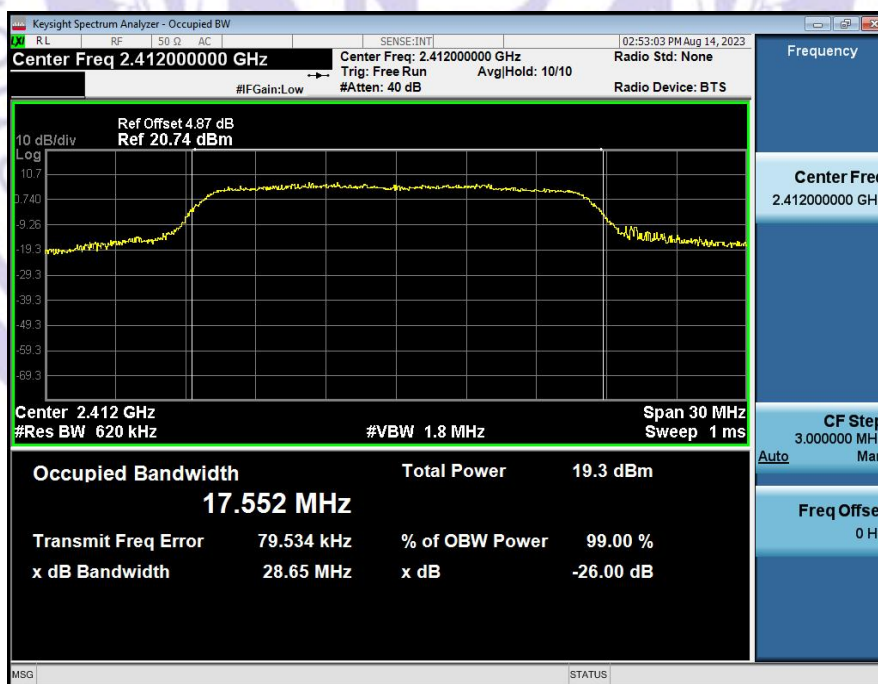
802.11b Middle Channel



## 802.11b High Channel



## 802.11g Low Channel



## 802.11g Middle Channel



## 802.11g High Channel



## 802.11n20 Low Channel



## 802.11n20 Middle Channel



## 802.11n20 High Channel



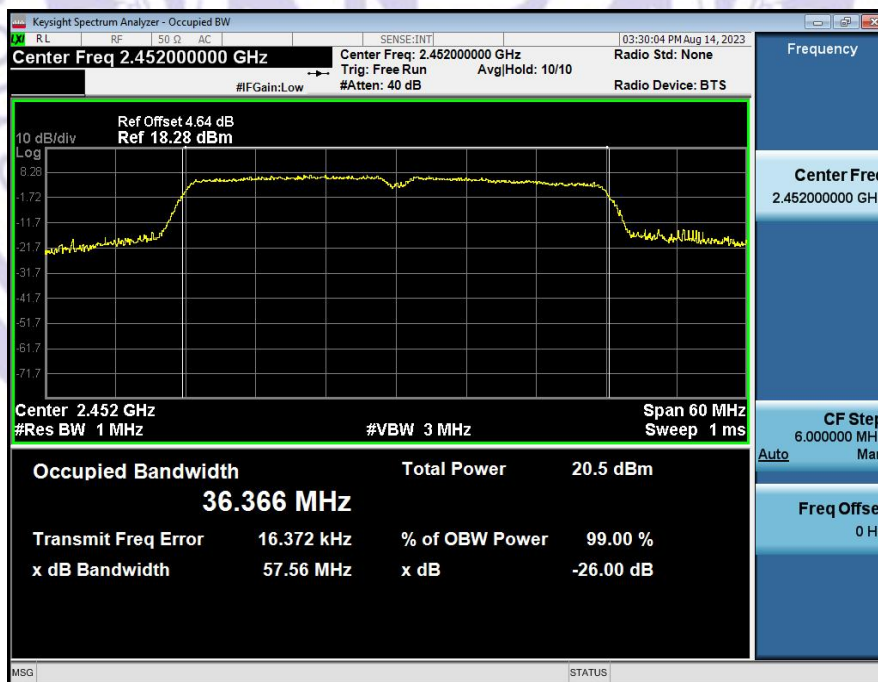
## 802.11n40 Low Channel



## 802.11n40 Middle Channel



## 802.11n40 High Channel



## 9 Maximum Peak Output Power

Test Requirement : FCC CFR47 Part 15 Section 15.247

Test Method : ANSI C63.10:2013

Test Limit : Regulation 15.247 (b)(3), For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power.

### 9.1 Test Procedure

The maximum peak conducted output power may be measured using a broadband peak RF power meter. The power meter shall have a video bandwidth that is greater than or equal to the DTS bandwidth and shall utilize a fast-responding diode detector.

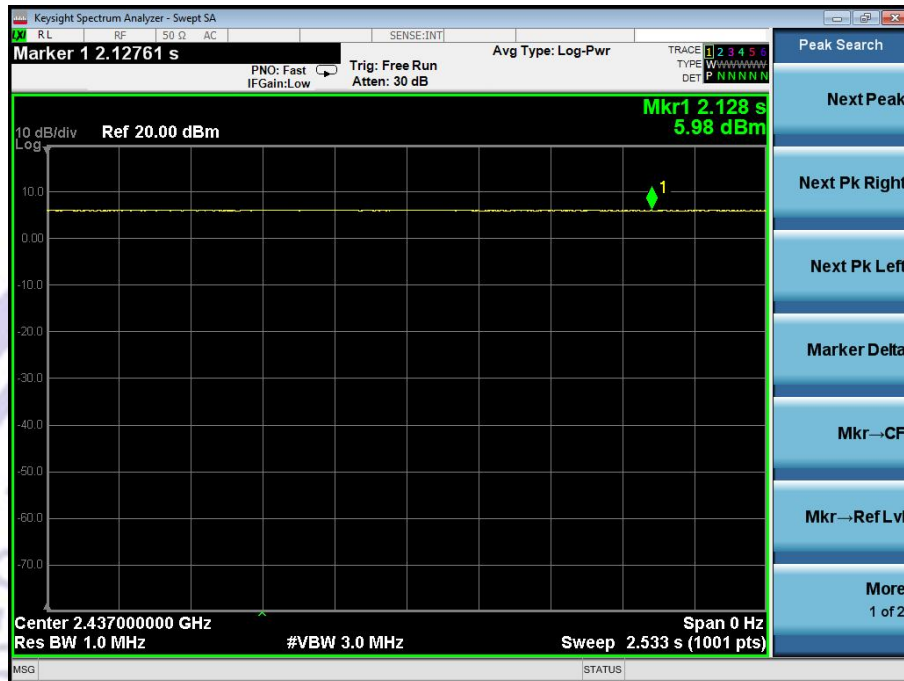
### 9.2 Test Result

|                | Maximum Peak Output Power (dBm) |         |           |           | Limit     |
|----------------|---------------------------------|---------|-----------|-----------|-----------|
|                | 802.11b                         | 802.11g | 802.11n20 | 802.11n40 |           |
| Low Channel    | 18.15                           | 17.12   | 17.07     | 16.87     | 1W(30dBm) |
| Middle Channel | 18.39                           | 17.58   | 17.55     | 16.71     | 1W(30dBm) |
| High Channel   | 18.98                           | 17.91   | 17.11     | 16.47     | 1W(30dBm) |

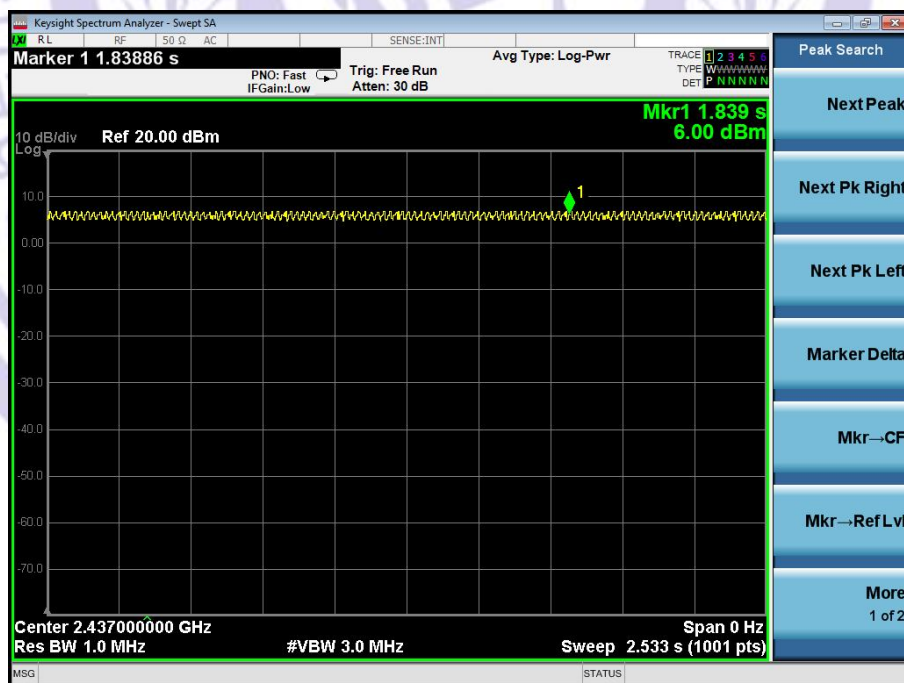
Note:

1. For power test the duty cycle is 100% in continuous transmitting mode;
2. TX means Transmit, RX means Receive.

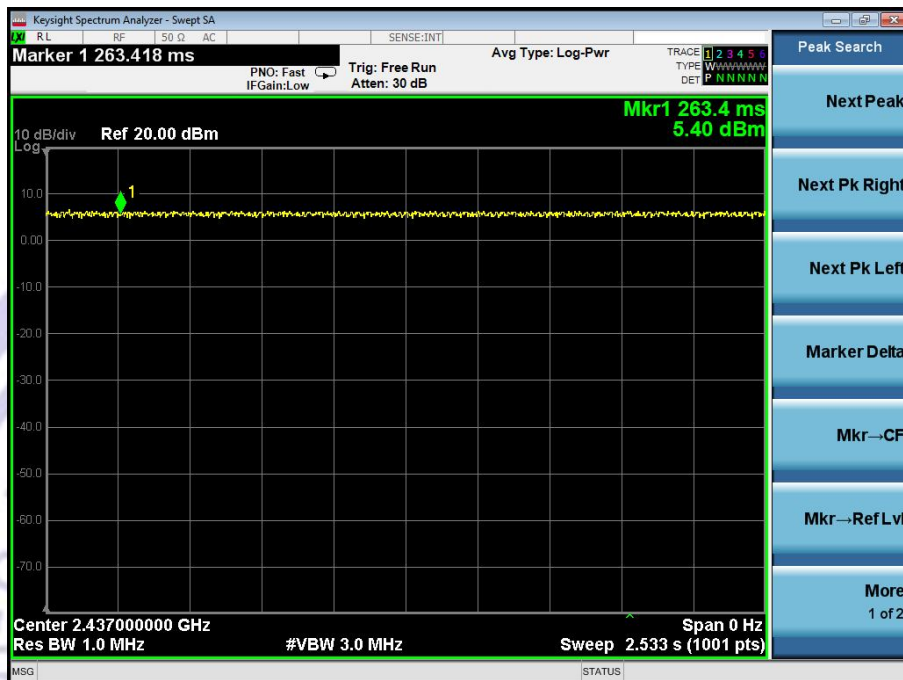
802.11 b



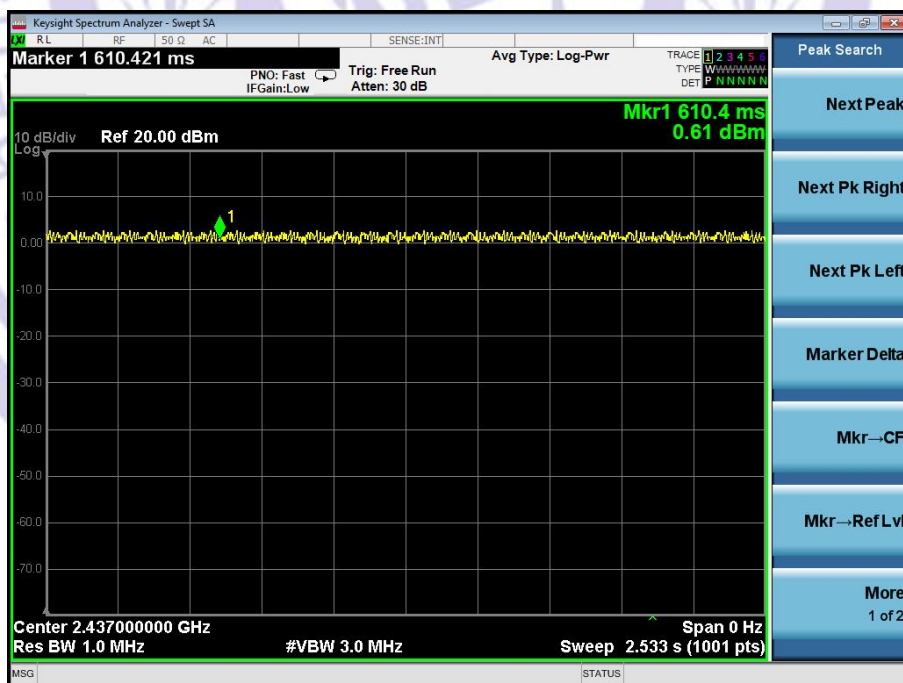
802.11 g



802.11 n20



802.11 n40



## 10 Power Spectral density

|                  |                                                                                                                                                                                                                                                                                                                                |
|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Requirement | : FCC CFR47 Part 15 Section 15.247                                                                                                                                                                                                                                                                                             |
| Test Method      | : ANSI C63.10:2013                                                                                                                                                                                                                                                                                                             |
| Test Limit       | : Regulation 15.247(f) The power spectral density conducted from the intentional radiator to the antenna due to the digital modulation operation of the hybrid system, with the frequency hopping operation turned off, shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. |

### 10.1 Test Procedure

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
2. Set the spectrum analyzer: RBW = 3kHz. VBW = 10kHz, Span = 1.5 times the DTS channel bandwidth(6 dB bandwidth). Sweep = auto; Detector Function = Peak. Trace = Max hold.
3. Allow the trace to stabilize. Use the marker-delta function to determine the separation between the peaks of the adjacent channels. The limit is specified in one of the subparagraphs of this Section Submit this plot.

### 10.2 Test Result

|                | Power Spectral density (dBm/3kHz) |         |           |           | Limit     |
|----------------|-----------------------------------|---------|-----------|-----------|-----------|
|                | 802.11b                           | 802.11g | 802.11n20 | 802.11n40 |           |
| Low Channel    | -14.239                           | -18.890 | -19.723   | -19.843   | 8dBm/3kHz |
| Middle Channel | -14.080                           | -19.156 | -20.058   | -20.834   | 8dBm/3kHz |
| High Channel   | -14.753                           | -17.856 | -19.249   | -20.734   | 8dBm/3kHz |

## 802.11b Low Channel



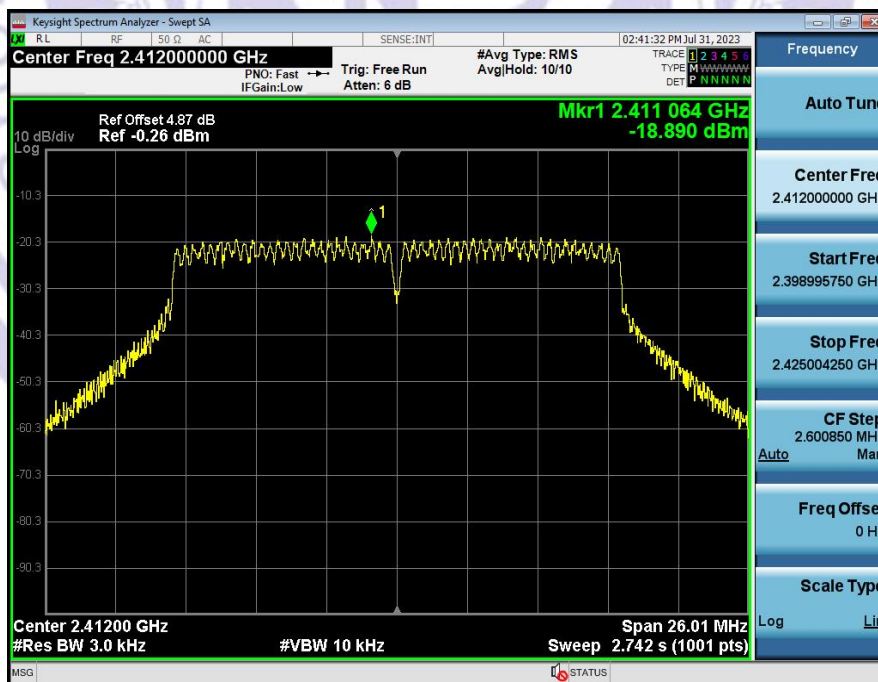
## 802.11b Middle Channel



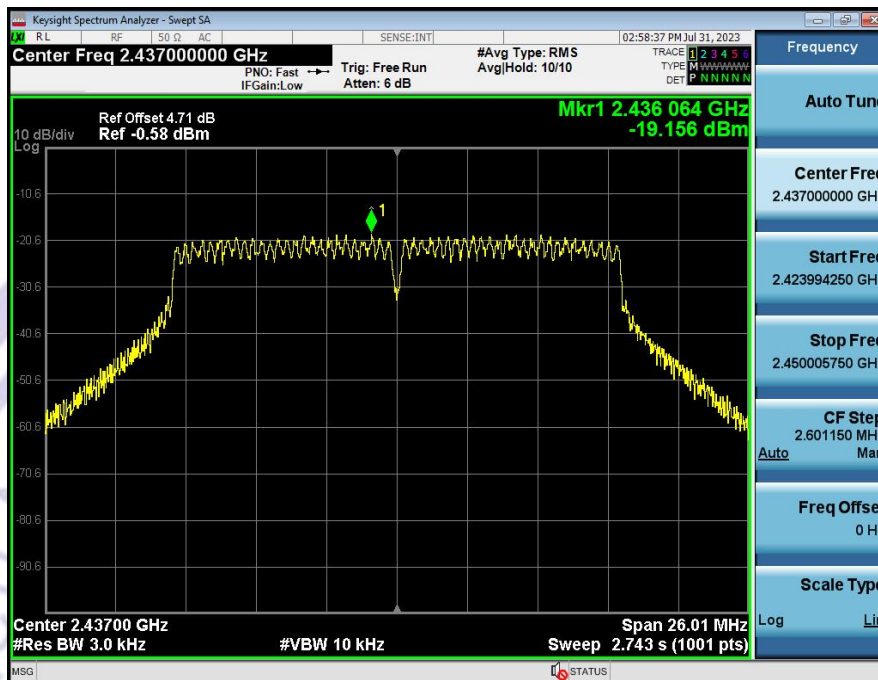
## 802.11b High Channel



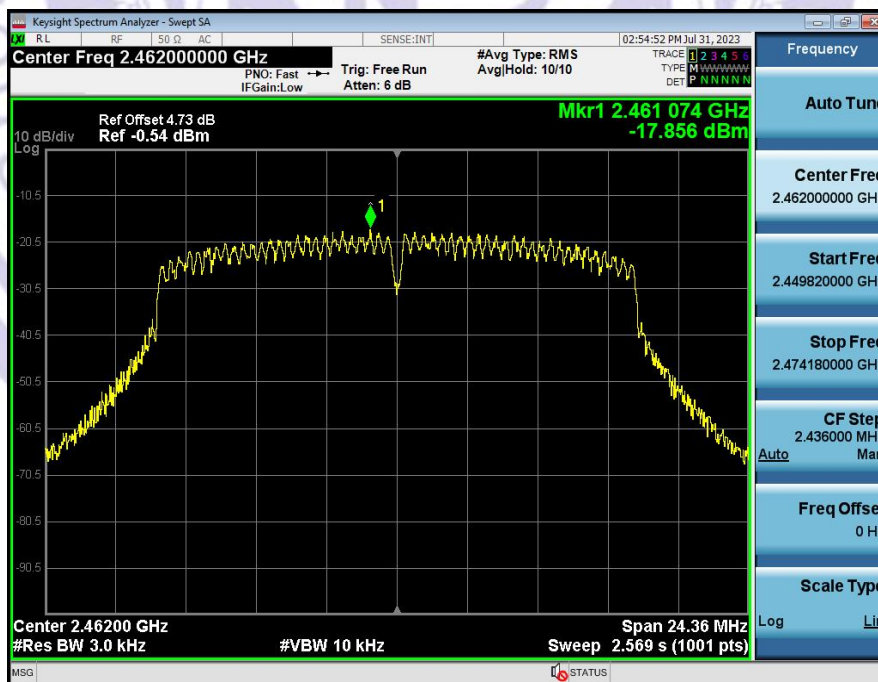
## 802.11g Low Channel



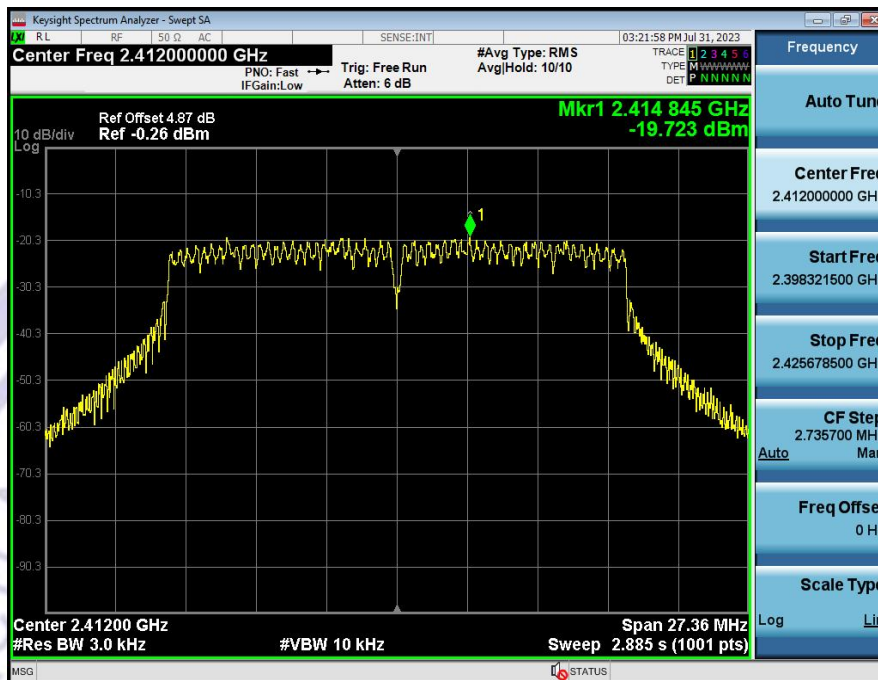
## 802.11g Middle Channel



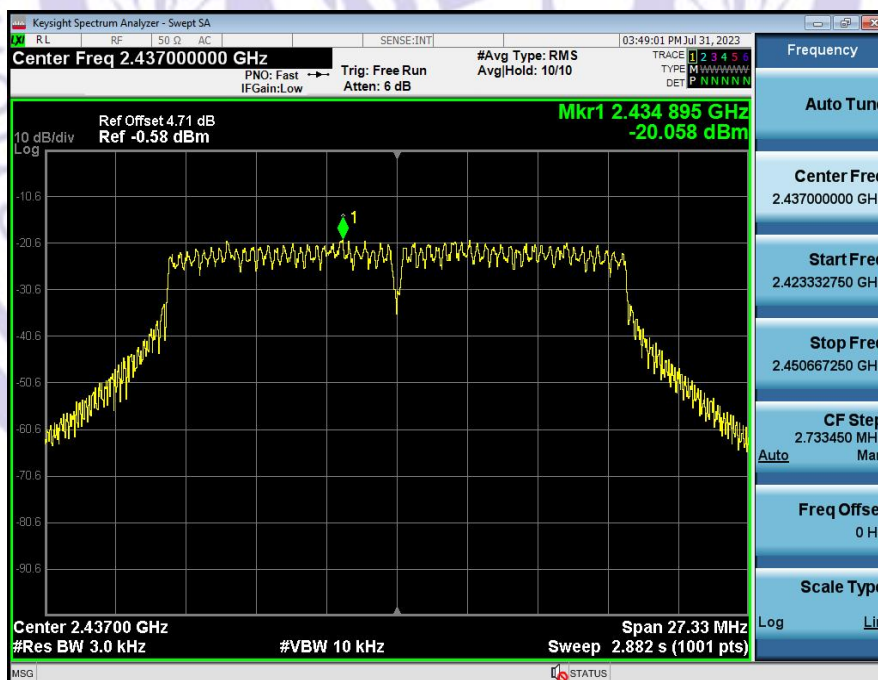
## 802.11g High Channel



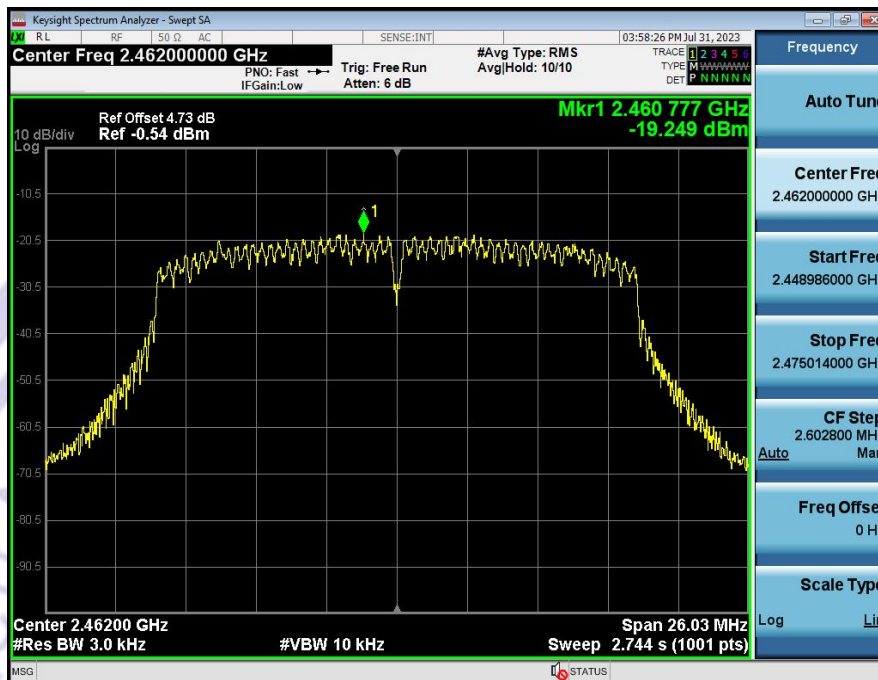
## 802.11n20 Low Channel



## 802.11n20 Middle Channel



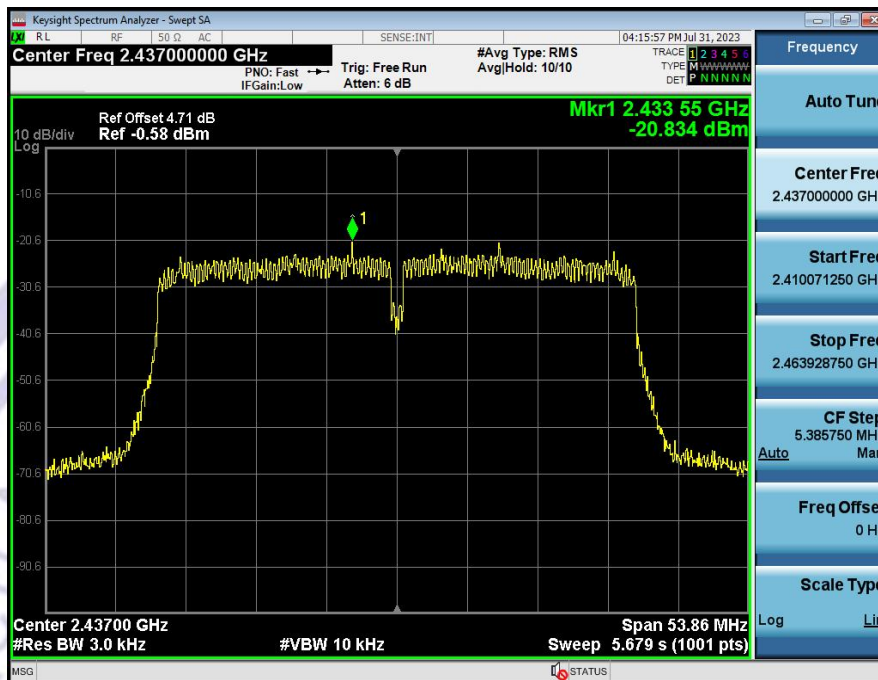
## 802.11n20 High Channel



## 802.11n40 Low Channel



## 802.11n40 Middle Channel



## 802.11n40 High Channel



## **11 Antenna Application**

### **11.1 Antenna Requirement**

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

### **11.2 Result**

The EUT'S antenna, permanent attached antenna, is External antenna. The antenna's gain is 5.42 dBi and meets the requirement.

## 12 Test Setup and EUT Photos

Reference to the attachment for details.

\*\*\*\*\*THE END REPORT\*\*\*\*\*

