



# FCC Test Report

Report No: FCS202108046W01

Issued for

|                                                                                                                                                                                                                                                                             |                                                                                            |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|
| Applicant:                                                                                                                                                                                                                                                                  | Shenzhen shentaian Digital Technology Co.Ltd                                               |
| Address:                                                                                                                                                                                                                                                                    | Fucheng Street, Longhua District, Shenzhen Room 201,<br>Building 14, No. 121, Xi Keng Road |
| Product Name:                                                                                                                                                                                                                                                               | projector                                                                                  |
| Brand Name:                                                                                                                                                                                                                                                                 | Topben WEWATCH                                                                             |
| Model Name:                                                                                                                                                                                                                                                                 | K3-1                                                                                       |
| Series Model:                                                                                                                                                                                                                                                               | K3-2,K3-3,V50,X10                                                                          |
| FCC ID:                                                                                                                                                                                                                                                                     | 2AYTD-K3-1                                                                                 |
| Issued By: Flux Compliance Service Laboratory<br>Add: Room 105 Floor Bao hao Technology Building 1 NO.15 Gong ye West Road Hi-Tech<br>Industrial, Song shan lake Dongguan<br>Tel: 769-27280901 Fax:769-27280901 <a href="http://www.FCS-lab.com">http://www.FCS-lab.com</a> |                                                                                            |

## TEST RESULT CERTIFICATION

Applicant's Name.....: Shenzhen shentaian Digital Techno logy Co.Ltd

Address.....: Fucheng Street, Longhua District, Shenzhen Room 201,  
Building 14, No. 121, Xi Keng Road

Manufacture's Name.....: Shenzhen shentaian Digital Techno logy Co.Ltd

Address.....: Fucheng Street, Longhua District, Shenzhen Room 201,  
Building 14, No. 121, Xi Keng Road

### Product Description

Product Name.....: projector

Model Name.....: Topben WEWATCH

Brand Name .....: K3-1

Series Model.....: K3-2,K3-3,V50,X10

Test Standards.....: FCC Part15.247

Test Procedure.....: ANSI C63.10-2013

This device described above has been tested by Flux Compliance Service Laboratory, the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

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### Date of Test.....:

Date (s) of performance of tests.: August 23, 2021 ~ Sep 06, 2021

Date of Issue.....: Sep 06, 2021

Test Result.....: Pass

Tested by : Scott Shen  
(Scott Shen)

Reviewed by : Duke Qian  
(Duke Qian)

Approved by : Kait Chen  
(Kait Chen)

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**Revision History**

| Rev. | Issue Date   | Effect Page | Contents      |
|------|--------------|-------------|---------------|
| 00   | Sep 06, 2021 | All         | Initial Issue |
|      |              |             |               |

## 1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:  
KDB 558074 D01 15.247 Meas Guidance v05r02

| FCC Part 15.247, Subpart C                 |                                              |          |        |
|--------------------------------------------|----------------------------------------------|----------|--------|
| Standard Section                           | Test Item                                    | Judgment | Remark |
| FCC 15.247 (a) (2)                         | 6dB Bandwidth                                | PASS     | --     |
| FCC 15.247 (b) (3)                         | Conducted Output Power                       | PASS     | --     |
| FCC 15.247 (e)                             | Power Spectral Density                       | PASS     | --     |
| FCC 15.247 (d)                             | Band-edge and Spurious Emissions (Conducted) | PASS     | --     |
| FCC 15.247 (d)<br>FCC 15.209<br>FCC 15.205 | Radiated Spurious Emissions                  | PASS     | --     |
| FCC 15.247 (d)<br>FCC 15.209<br>FCC 15.205 | Radiated Band Edge Compliance                | PASS     | --     |
| FCC 15.207                                 | Power Line Conducted Emission                | PASS     | --     |
| FCC 15.203                                 | Antenna requirement                          | PASS     | --     |
| 15.205                                     | Restricted Band Edge Emission                | PASS     | --     |

### NOTE:

- (1) "N/A" denotes test is not applicable in this Test Report
- (2) All tests are according to ANSI C63.10-2013

## 1.1 TEST FACTORY

|                                                                                                               |                                                                                                                  |
|---------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|
| Company Name:                                                                                                 | Flux Compliance Service Laboratory                                                                               |
| Address:                                                                                                      | Room 105 Floor Bao hao Technology Building 1 NO.15 Gong ye West Road Hi-Tech Industrial, Song shan lake Dongguan |
| Telephone:                                                                                                    | +86-769-27280901                                                                                                 |
| Fax:                                                                                                          | +86-769-27280901                                                                                                 |
| FCC Test Firm Registration Number: 514908<br>Designation number: CN0127<br>A2LA accreditation number: 5545.01 |                                                                                                                  |

## 1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement  $y \pm U$ , where expanded uncertainty  $U$  is based on a standard uncertainty multiplied by a coverage factor of  $k=2$ , providing a level of confidence of approximately **95** %.

| No. | Item                                        | Uncertainty    |
|-----|---------------------------------------------|----------------|
| 1   | RF output power, conducted                  | $\pm 0.71$ dB  |
| 2   | Unwanted Emissions, conducted               | $\pm 2.988$ dB |
| 3   | Conducted Emission (9KHz-150KHz)            | $\pm 4.13$ dB  |
| 4   | Conducted Emission (150KHz-30MHz)           | $\pm 4.74$ dB  |
| 5   | All emissions, radiated (<1G) 30MHz-1000MHz | $\pm 5.2$ dB   |
| 6   | All emissions, radiated 1GHz -18GHz         | $\pm 4.66$ dB  |
| 7   | All emissions, radiated 18GHz -40GHz        | $\pm 4.31$ dB  |

## 2. GENERAL INFORMATION

### 2.1 GENERAL DESCRIPTION OF THE EUT

|                         |                                                                                                                                                                                             |
|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Product Name            | projector                                                                                                                                                                                   |
| Trade Name              | Topben WEWATCH                                                                                                                                                                              |
| Model Name              | K3-1                                                                                                                                                                                        |
| Series Model            | K3-2,K3-3,V50,X10                                                                                                                                                                           |
| Model Difference        | The above product with same circuit, PCB layout, electrical parts, materials and wiring structures, Appearance shape, the materials of decorative accessories is same, only different color |
| Channel List            | Please refer to the Note 2.                                                                                                                                                                 |
| Operation frequency     | IEEE 802.11b: 2412MHz-2462MHz<br>IEEE 802.11g: 2412MHz-2462MHz<br>IEEE 802.11n HT20: 2412MHz-2462MHz<br>IEEE 802.11n HT40: 2422MHz-2452MHz                                                  |
| Modulation:             | IEEE 802.11b: DSSS (CCK, QPSK, BPSK)<br>IEEE 802.11g: OFDM (64QAM, 16QAM, QPSK, BPSK)<br>IEEE 802.11n HT20, HT40: OFDM (64QAM, 16QAM, QPSK, BPSK)                                           |
| Transmitter rate:       | IEEE 802.11b: 1, 2, 5.5, 11 Mbps<br>IEEE 802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps<br>IEEE 802.11n HT20: up to 150 Mbps, HT40: up to 300Mbps                                               |
| Power supply            | AC 100~240V/50/60Hz<br>1.5A MAX                                                                                                                                                             |
| Battery                 | NA                                                                                                                                                                                          |
| Hardware version number | V1.10                                                                                                                                                                                       |
| Software version number | V1.10                                                                                                                                                                                       |
| Connecting I/O Port(s)  | Please refer to the User's Manual                                                                                                                                                           |

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

2.

| Channel List |                 |         |                 |         |                 |
|--------------|-----------------|---------|-----------------|---------|-----------------|
| Channel      | Frequency (MHz) | Channel | Frequency (MHz) | Channel | Frequency (MHz) |
| 01           | 2412            | 05      | 2432            | 09      | 2452            |
| 02           | 2417            | 06      | 2437            | 10      | 2457            |
| 03           | 2422            | 07      | 2442            | 11      | 2462            |
| 04           | 2427            | 08      | 2447            |         |                 |

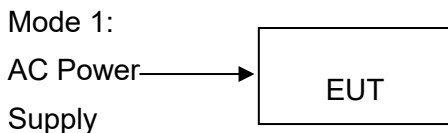
3. Table for Filed Antenna

| Ant. | Brand | Model Name | Antenna Type | Connector | Gain (dBi) | NOTE    |
|------|-------|------------|--------------|-----------|------------|---------|
| 1    | N/A   | N/A        | PIFA Antenna | N/A       | 1.5 dBi    | Antenna |

## 2.2 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

During testing channel & power controlling software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product.

Block diagram of EUT configuration for test



Test software: the UI\_mptool.exe

The test software was used to control EUT work in continuous TX mode, and select test channel, Wireless mode as below table

| Tested mode, channel, and data rate information |                  |                                |           |                 |
|-------------------------------------------------|------------------|--------------------------------|-----------|-----------------|
| Mode                                            | Setting Tx Power | data rate (Mbps)<br>(see Note) | Channel   | Frequency (MHz) |
| IEEE 802.11b                                    | 8                | 1                              | LCH: CH1  | 2412            |
|                                                 | 8                | 1                              | MCH: CH6  | 2437            |
|                                                 | 8                | 1                              | HCH: CH11 | 2462            |
| IEEE 802.11g                                    | 20               | 6                              | LCH: CH1  | 2412            |
|                                                 | 20               | 6                              | MCH: CH6  | 2437            |
|                                                 | 20               | 6                              | HCH: CH11 | 2462            |
| IEEE 802.11n HT20                               | 20               | MCS 8                          | LCH: CH1  | 2412            |
|                                                 | 20               | MCS 8                          | MCH: CH6  | 2437            |
|                                                 | 20               | MCS 8                          | HCH: CH11 | 2462            |
| IEEE 802.11n HT40                               | 20               | MCS 8                          | LCH: CH3  | 2422            |
|                                                 | 20               | MCS 8                          | MCH: CH6  | 2437            |
|                                                 | 20               | MCS 8                          | HCH: CH9  | 2452            |

Note:

(1) According exploratory test, EUT will have maximum output power in those data rate, so those data rate were used for all test,

(2) During the test, the dutycycle>98%, the test voltage was tuned from 85% to 115% of the

Nominal rate supply votage, and found that the worst case was the nominal rated supply condition, So the report just shows that condition's data

### 2.3 DESCRIPTION OF NECESSARY ACCESSORIES AND SUPPORT UNITS

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

#### Necessary accessories

| Item | Equipment | Mfr/Brand | Model/Type No. | Serial No. | Note |
|------|-----------|-----------|----------------|------------|------|
| 1    |           |           |                |            |      |
|      |           |           |                |            |      |
|      |           |           |                |            |      |
|      |           |           |                |            |      |

#### Support units

| Item | Equipment | Mfr/Brand | Model/Type No. | Serial No. | Note |
|------|-----------|-----------|----------------|------------|------|
|      |           |           |                |            |      |
|      |           |           |                |            |      |
|      |           |           |                |            |      |
|      |           |           |                |            |      |

#### Note:

- (1) The support equipment was authorized by Declaration of Confirmation.
- (2) For detachable type I/O cable should be specified the length in cm in 『Length』 column.
- (3) “YES” is means “shielded” “with core”; “NO” is means “unshielded” “without core”.

## 2.4 EQUIPMENTS LIST

### Radiation Test equipment

| Kind of Equipment                | Manufacturer | Type No.     | Company No. | Last calibration | Calibrated until |
|----------------------------------|--------------|--------------|-------------|------------------|------------------|
| EMI Test Receiver                | R&S          | ESRP 3       | FCS-E001    | 2021. 01.28      | 2022. 01.27      |
| Signal Analyzer                  | R&S          | FSV40-N      | FCS-E012    | 2021. 01.28      | 2022. 01.27      |
| Active loop Antenna              | ZHINAN       | ZN30900C     | FCS-E013    | 2021. 01.28      | 2022. 01.27      |
| Bilog Antenna                    | SCHWARZBECK  | VULB 9168    | FCS-E002    | 2021. 01.28      | 2022. 01.27      |
| Horn Antenna                     | SCHWARZBECK  | BBHA 9120D   | FCS-E003    | 2021. 01.28      | 2022. 01.27      |
| SHF-EHF Horn Antenna (18G-40GHz) | A-INFO       | LB-180400-KF | FCS-E018    | 2021. 01.28      | 2022. 01.27      |
| Pre-Amplifier(0.1M-3G Hz)        | EMCI         | EM330N       | FCS-E004    | 2021. 01.28      | 2022. 01.27      |
| Pre-Amplifier (1G-18GHz)         | N/A          | TSAMP-0518SE | FCS-E014    | 2021. 01.28      | 2022. 01.27      |
| Pre-Amplifier (18G-40GHz)        | TERA-MW      | TRLA-0400    | FCS-E019    | 2021. 01.28      | 2022. 01.27      |
| Temperature & Humidity           | HTC-1        | victor       | FCS-E005    | 2021. 01.28      | 2022. 01.27      |

### Conduction Test equipment

| Kind of Equipment      | Manufacturer | Type No. | Company No. | Last calibration | Calibrated until |
|------------------------|--------------|----------|-------------|------------------|------------------|
| EMI Test Receiver      | R&S          | ESPI     | FCS-E020    | 2021. 01.28      | 2022. 01.27      |
| LISN                   | R&S          | ENV216   | FCS-E007    | 2021. 01.28      | 2022. 01.27      |
| LISN                   | ETS          | 3810/2NM | FCS-E009    | 2021. 01.28      | 2022. 01.27      |
| Temperature & Humidity | HTC-1        | victor   | FCS-E008    | 2021. 01.28      | 2022. 01.27      |

### RF Connected Test

| Kind of Equipment   | Manufacturer | Type No. | Company No. | Last calibration | Calibrated until |
|---------------------|--------------|----------|-------------|------------------|------------------|
| MXA SIGNAL Analyzer | Keysight     | N9020A   | FCS-E015    | 2021. 01.28      | 2022. 01.27      |
| Spectrum Analyzer   | Agilent      | E4447A   | MY50180039  | 2021. 01.28      | 2022. 01.27      |
| Spectrum Analyzer   | R&S          | FSV-40   | 101499      | 2021. 01.28      | 2022. 01.27      |
| Power Sensor        | Agilent      | UX2021XA | FCS-E021    | 2021. 01.28      | 2022. 01.27      |

### 3. 6DB BANDWIDTH

#### 3.1 Limit

For direct sequence systems, the minimum 6dB bandwidth shall be at least 500 kHz

#### 3.2 Test Procedure

(1) Connect EUT's antenna output to spectrum analyzer by RF cable.

(2) Set the spectrum analyzer as follows

RBW: 100kHz

VBW: 300Hz

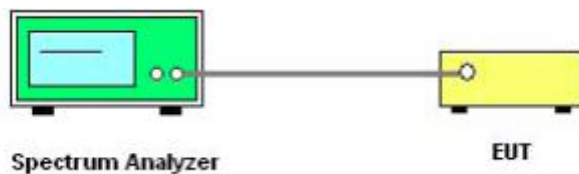
Detector Mode: Peak

Sweep time: auto

Trace mode Max hold

(3) Allow the trace to stabilize, measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission

#### 3.3 Test setup



### 3.4 Test results

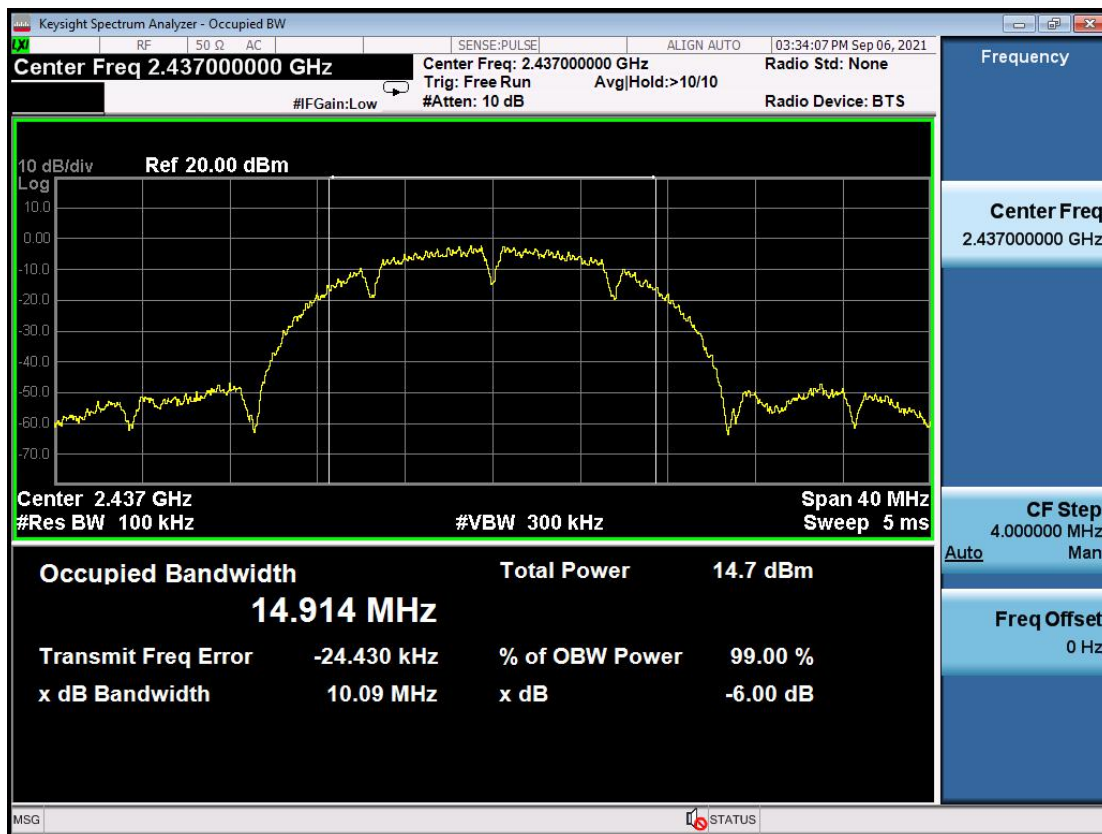
| TestMode   | Channel (MHz) | 6dB Bandwidth (MHz) | Limit [MHz] | Verdict |
|------------|---------------|---------------------|-------------|---------|
| 802.11b    | 2412MHz       | 10.11               | 0.5         | Pass    |
| 802.11b    | 2437MHz       | 10.09               | 0.5         | Pass    |
| 802.11b    | 2462MHz       | 10.11               | 0.5         | Pass    |
| 802.11g    | 2412MHz       | 16.50               | 0.5         | Pass    |
| 802.11g    | 2437MHz       | 16.51               | 0.5         | Pass    |
| 802.11g    | 2462MHz       | 16.53               | 0.5         | Pass    |
| 802.11n 20 | 2412MHz       | 17.72               | 0.5         | Pass    |
| 802.11n 20 | 2437MHz       | 17.67               | 0.5         | Pass    |
| 802.11n 20 | 2462MHz       | 17.72               | 0.5         | Pass    |
| 802.11n 40 | 2422MHz       | 36.40               | 0.5         | Pass    |
| 802.11n 40 | 2437MHz       | 36.43               | 0.5         | Pass    |
| 802.11n 40 | 2452MHz       | 35.41               | 0.5         | Pass    |

### 3.5 Original Test Data

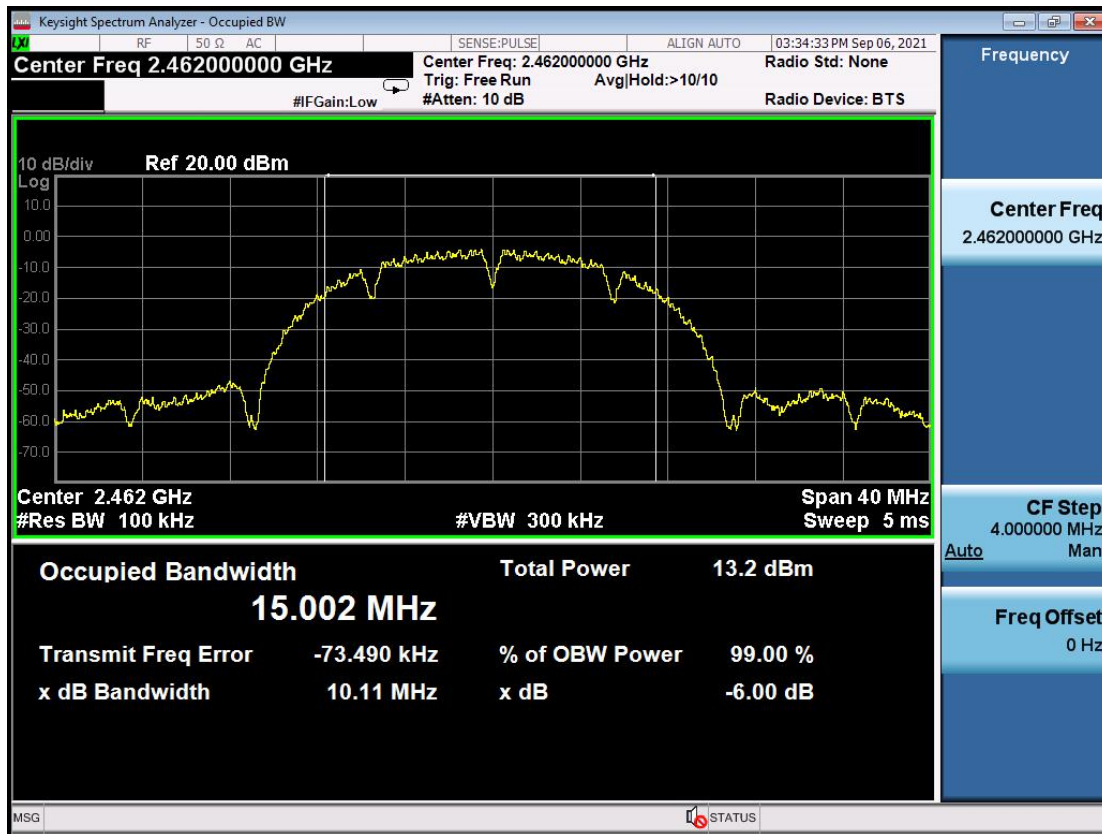
#### 802.11b-CH2412MHZ



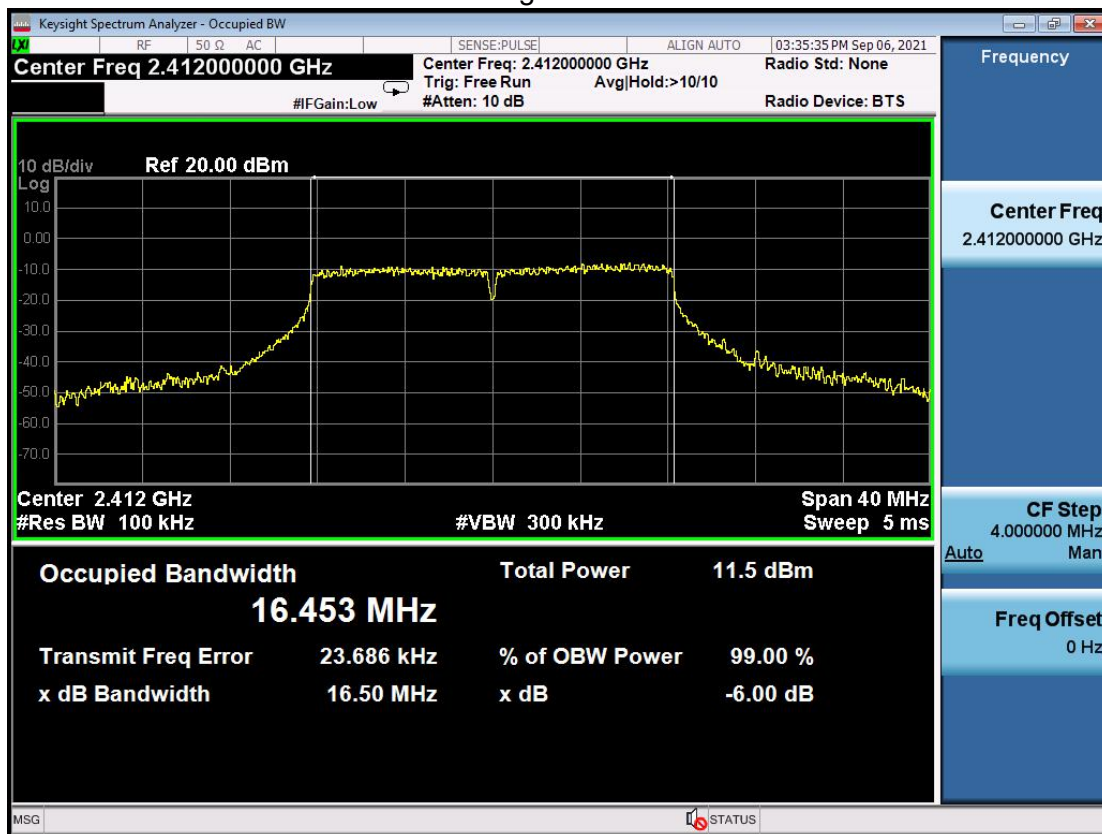
## 802.11b-CH237MHZ



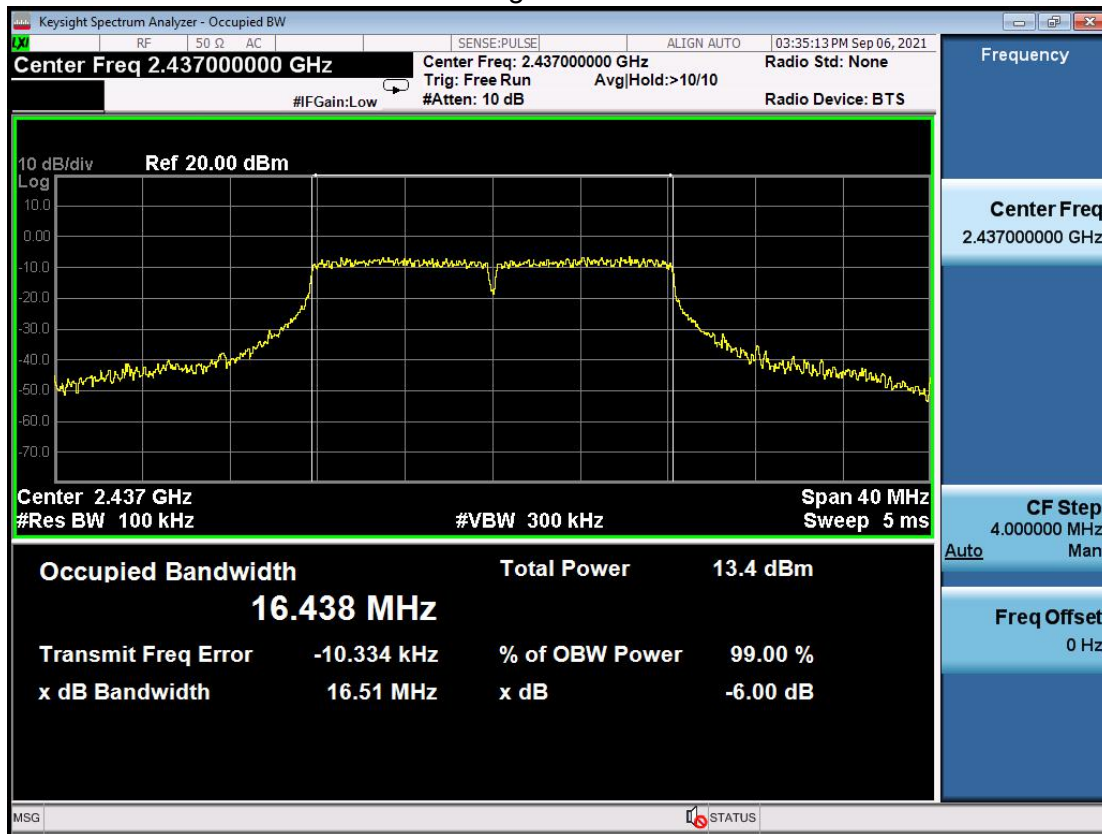
## 802.11b-CH2462MHZ



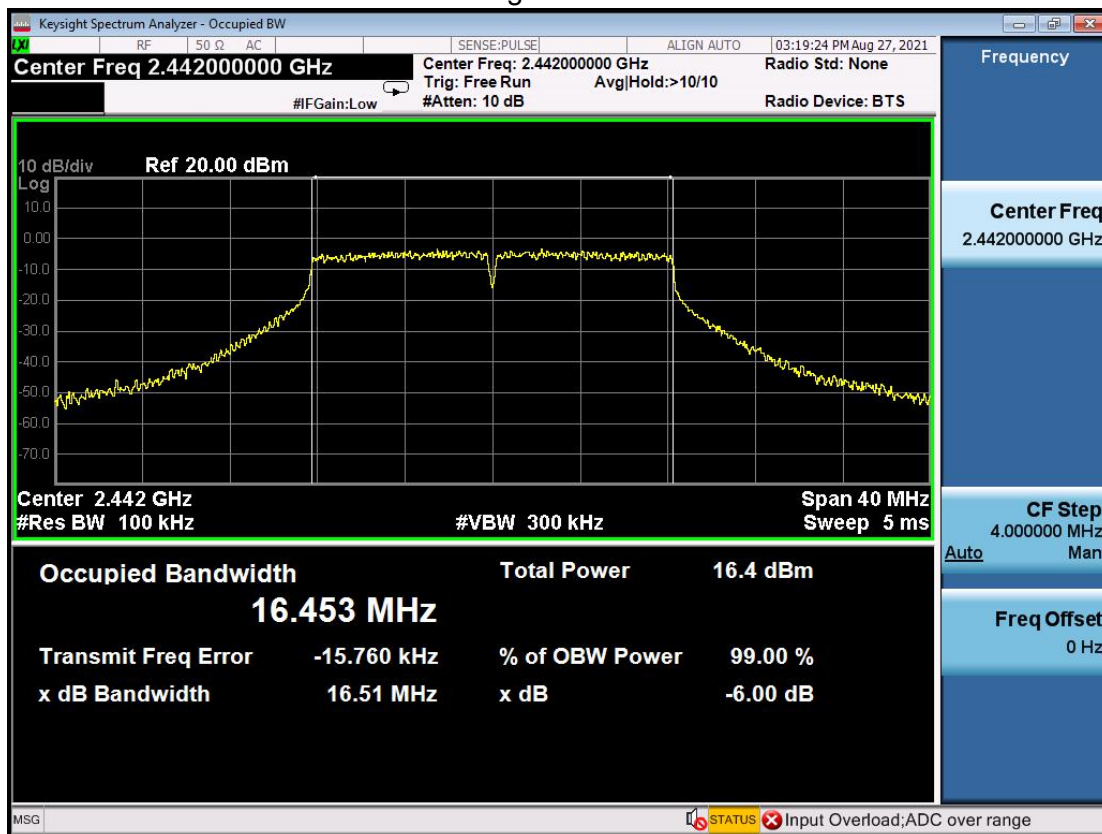
## 802.11g H2412MHz



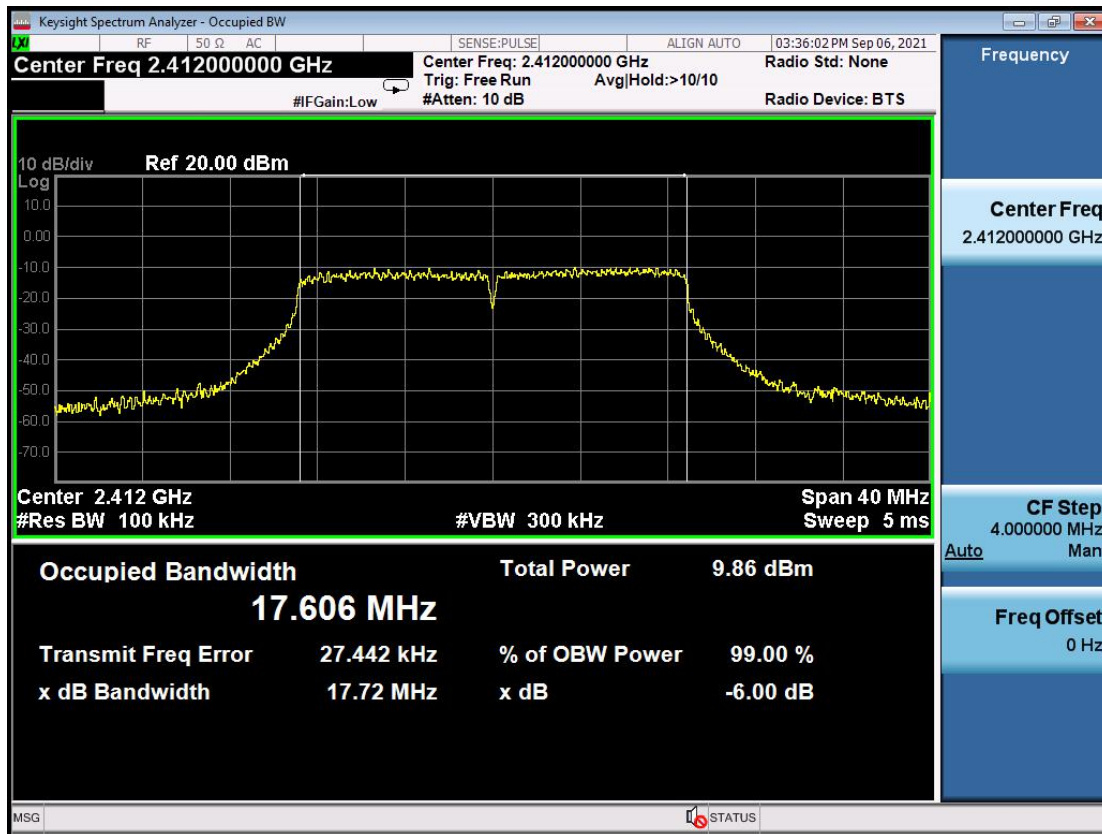
## 802.11g CH2437MHz



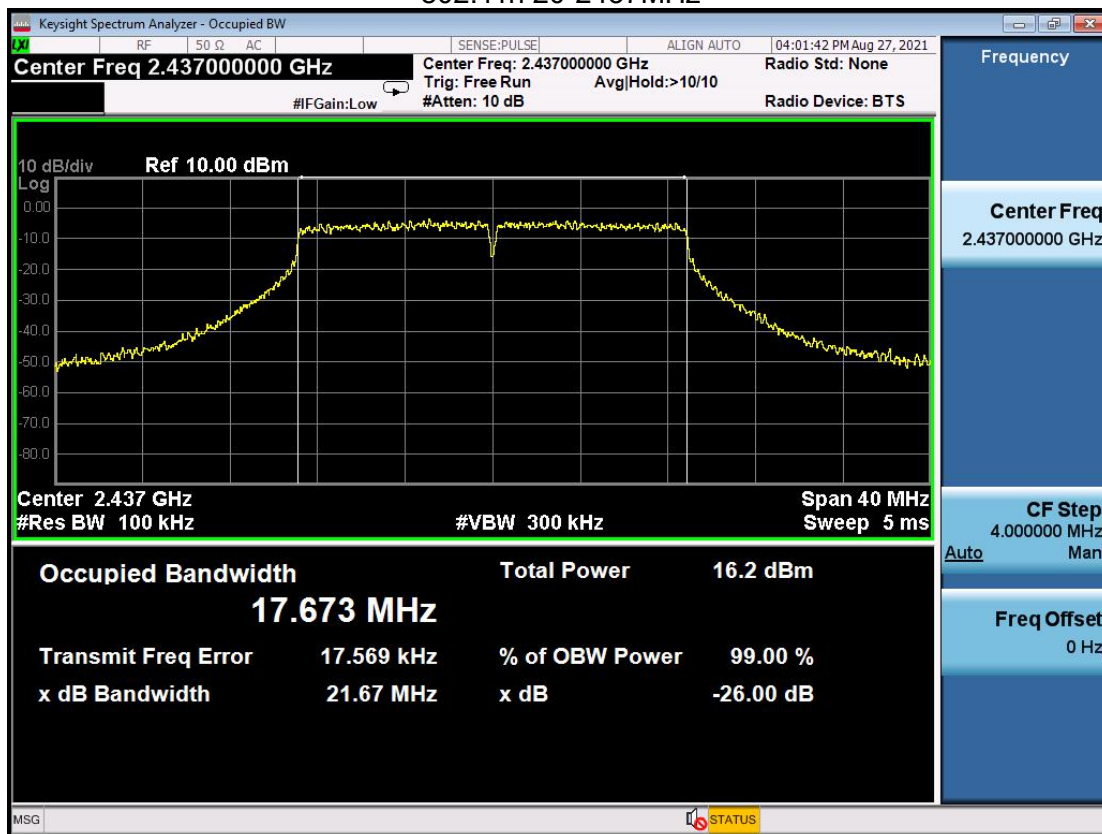
## 802.11g CH2462MHZ



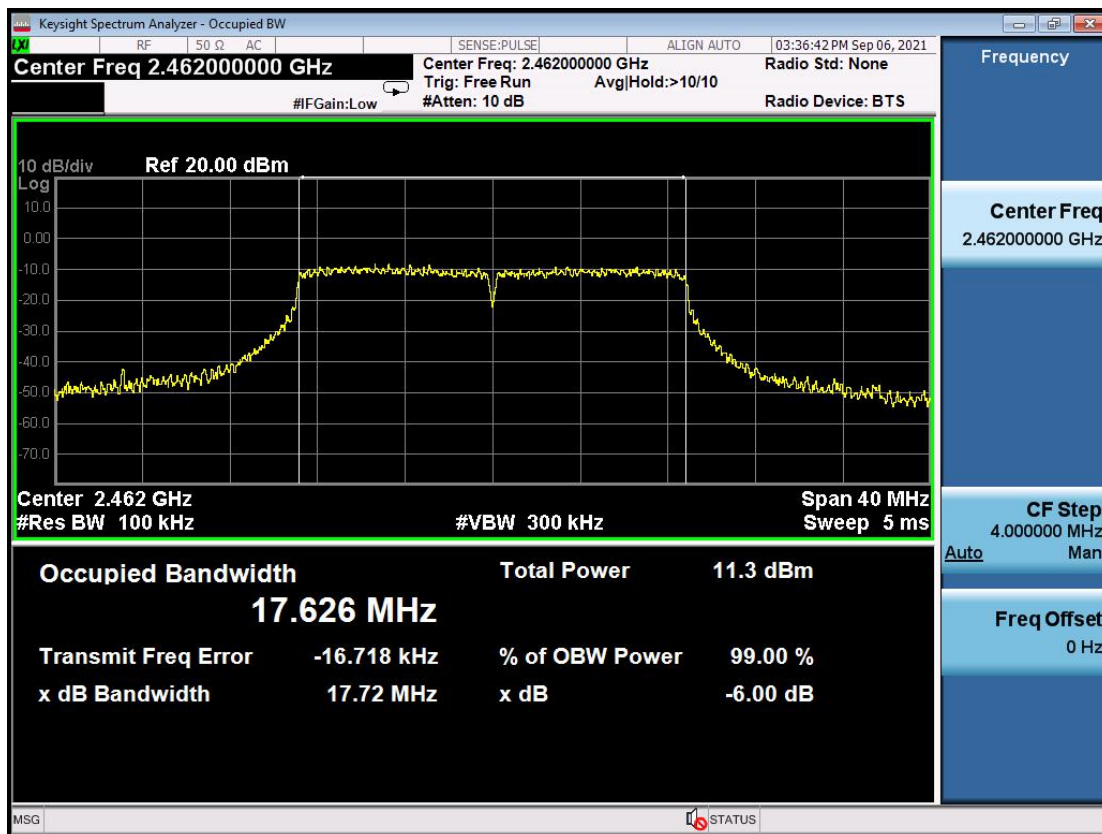
## 802.11n 20-2412MHz



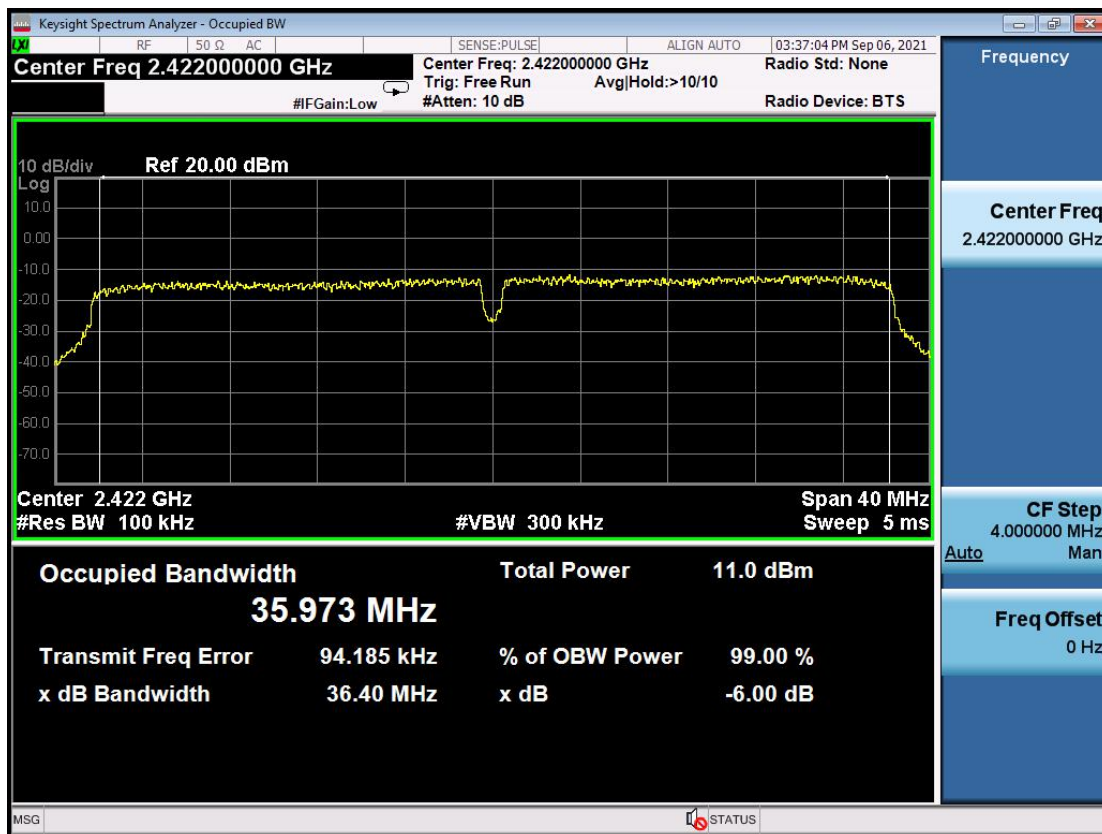
## 802.11n 20-2437MHz



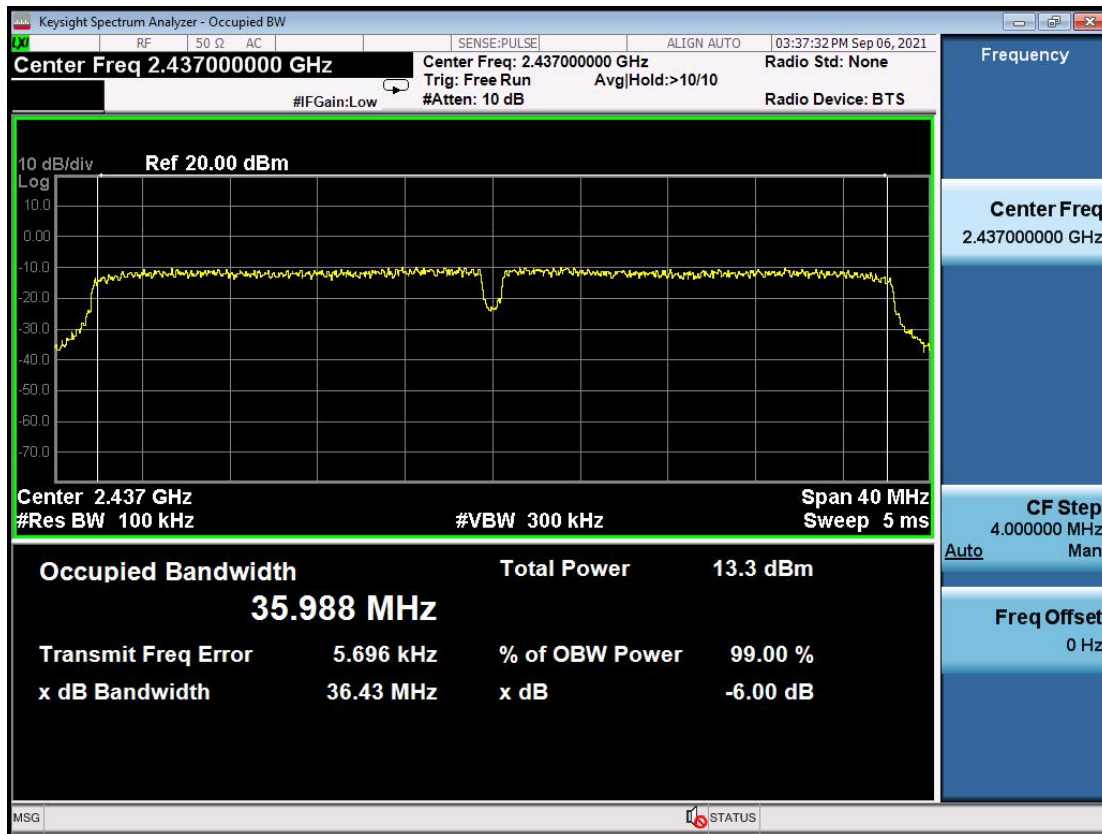
## 802.11n 20-2462MHz



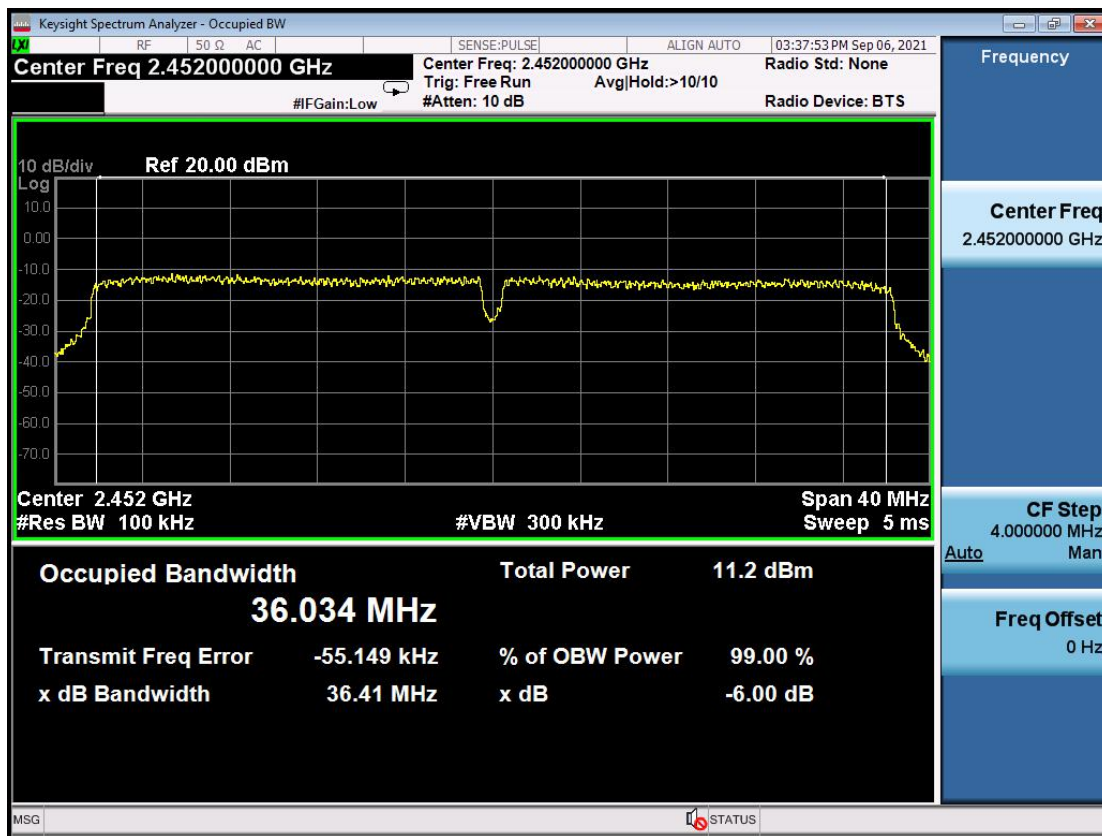
## 802.11n 40-2422MHz



## 802.11n 40-2437MHz



## 802.11n 40-2452MHz



## 4 CONDUCTED OUTPUT POWER

### 4.1 limit

For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

### 4.2 test procedure

- Connect each EUT's antenna output to power sensor by RF cable and attenuator
- Measure the PK output power of each antenna port by power sensor.

### 4.3 TEST SETUP



### 4.5 test results

| TestMode   | Channel (MHz) | Result (dBm) | Limit (dBm) | Verdict |
|------------|---------------|--------------|-------------|---------|
| 802.11b    | 2412MHz       | 8.41         | 30          | Pass    |
| 802.11b    | 2437MHz       | 8.52         | 30          | Pass    |
| 802.11b    | 2462MHz       | 9.32         | 30          | Pass    |
| 802.11g    | 2412MHz       | 9.28         | 30          | Pass    |
| 802.11g    | 2437MHz       | 9.36         | 30          | Pass    |
| 802.11g    | 2462MHz       | 9.45         | 30          | Pass    |
| 802.11n 20 | 2412MHz       | 8.65         | 30          | Pass    |
| 802.11n 20 | 2437MHz       | 8.77         | 30          | Pass    |
| 802.11n 20 | 2462MHz       | 8.81         | 30          | Pass    |
| 802.11n 40 | 2422MHz       | 8.89         | 30          | Pass    |
| 802.11n 40 | 2437MHz       | 9.90         | 30          | Pass    |
| 802.11n 40 | 2452MHz       | 9.68         | 30          | Pass    |

## 5. POWER SPECTRAL DENSITY

### 5.1 LIMIT

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3 kHz band during any time interval of continuous transmission.

### 5.2 TEST PROCEDURE

(1) Connect EUT's antenna output to spectrum analyzer by RF cable.

(2) Set the spectrum analyzer as follows:

|                  |                                                      |
|------------------|------------------------------------------------------|
| Center frequency | DTS Channel center frequency                         |
| RBW:             | $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$ |
| VBW:             | $\geq 3\text{RBW}$                                   |
| Span             | 1.5 times the DTS bandwidth                          |
| Detector Mode:   | Peak                                                 |
| Sweep time:      | auto                                                 |
| Trace mode       | Max hold                                             |

(3) Allow the trace to stabilize, use the peak marker function to determine the maximum amplitude level within the RBW

(4) If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

### 5.3 TEST SETUP

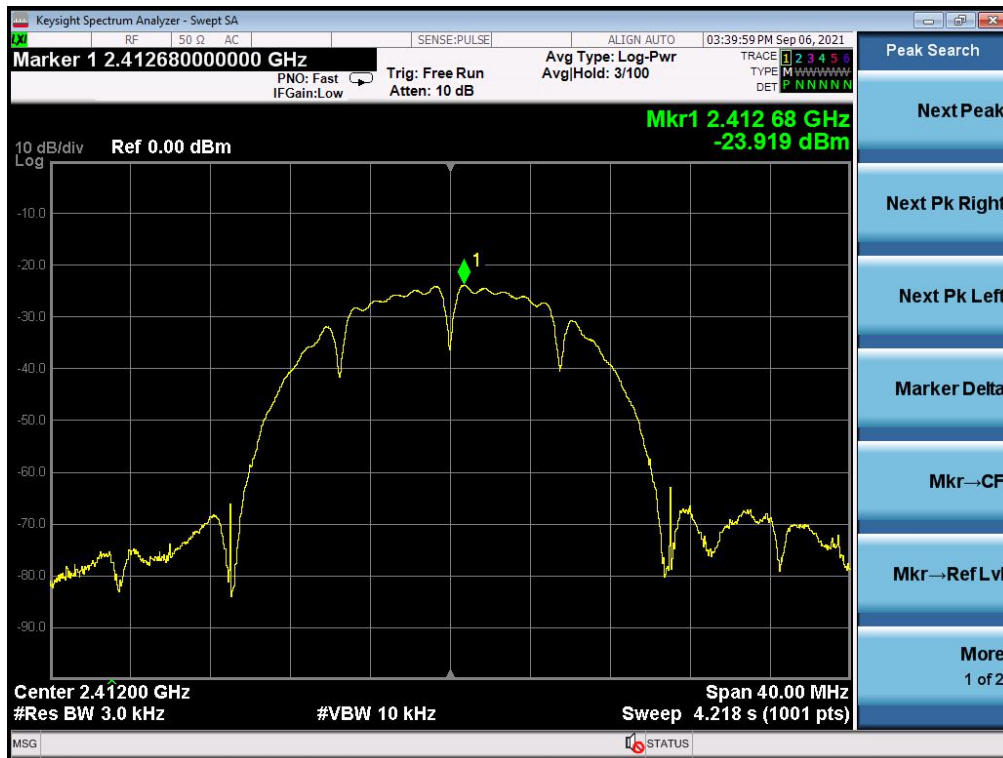


## 5.4 TEST RESULTS

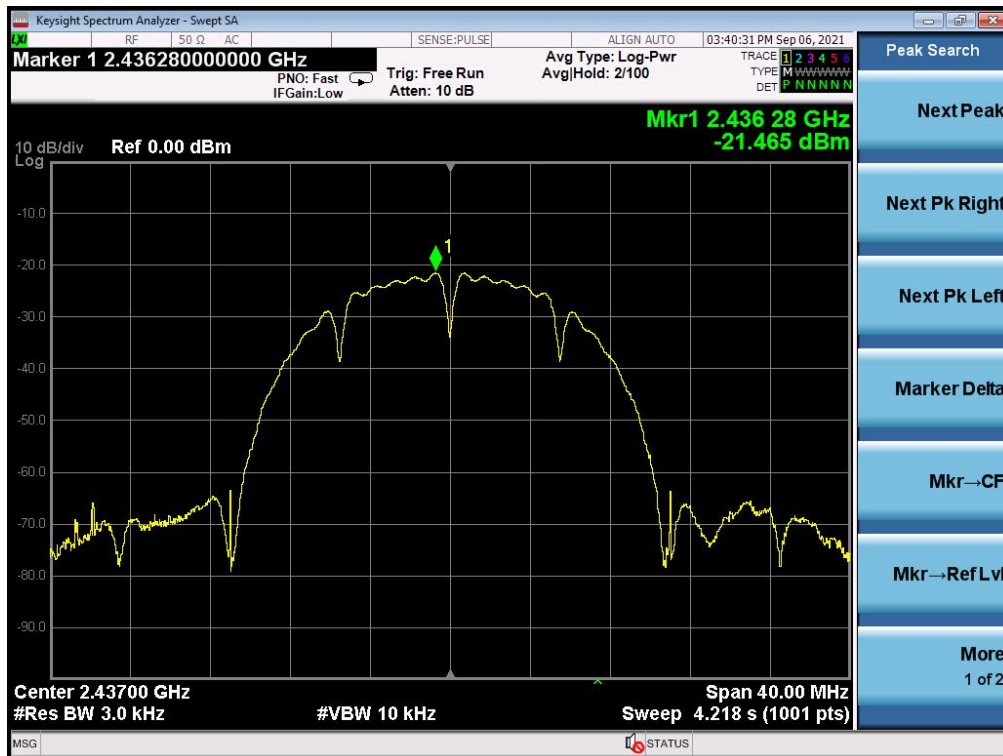
| TestMode   | Channel (MHz) | Result<br>(dBm/3KHz) | Limit<br>(dBm/3KHz) | Verdict |
|------------|---------------|----------------------|---------------------|---------|
| 802.11b    | 2412MHz       | -23.919              | 8                   | Pass    |
| 802.11b    | 2437MHz       | -21.465              | 8                   | Pass    |
| 802.11b    | 2462MHz       | -22.804              | 8                   | Pass    |
| 802.11g    | 2412MHz       | -25.513              | 8                   | Pass    |
| 802.11g    | 2437MHz       | -21.340              | 8                   | Pass    |
| 802.11g    | 2462MHz       | -23.086              | 8                   | Pass    |
| 802.11n 20 | 2412MHz       | -24.870              | 8                   | Pass    |
| 802.11n 20 | 2437MHz       | -21.057              | 8                   | Pass    |
| 802.11n 20 | 2462MHz       | -23.012              | 8                   | Pass    |
| 802.11n 40 | 2422MHz       | -24.434              | 8                   | Pass    |
| 802.11n 40 | 2437MHz       | -21.251              | 8                   | Pass    |
| 802.11n 40 | 2452MHz       | -24.171              | 8                   | Pass    |

## 5.5 original test data

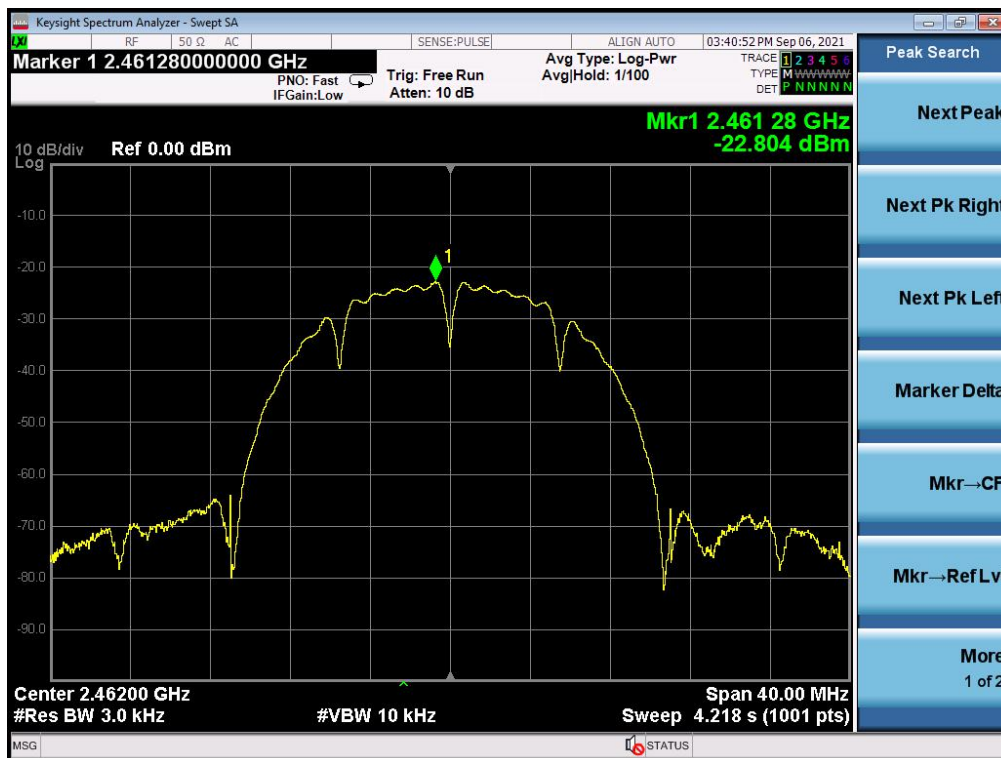
### 802.11b-2412MHz



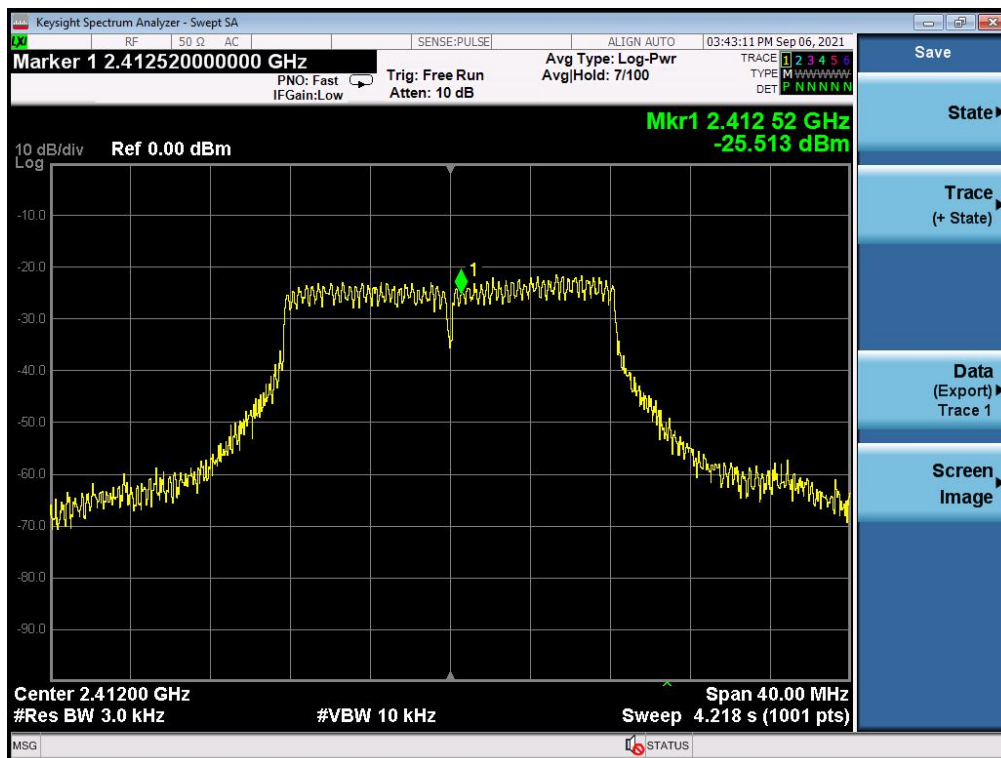
### 802.11b-2437MHz



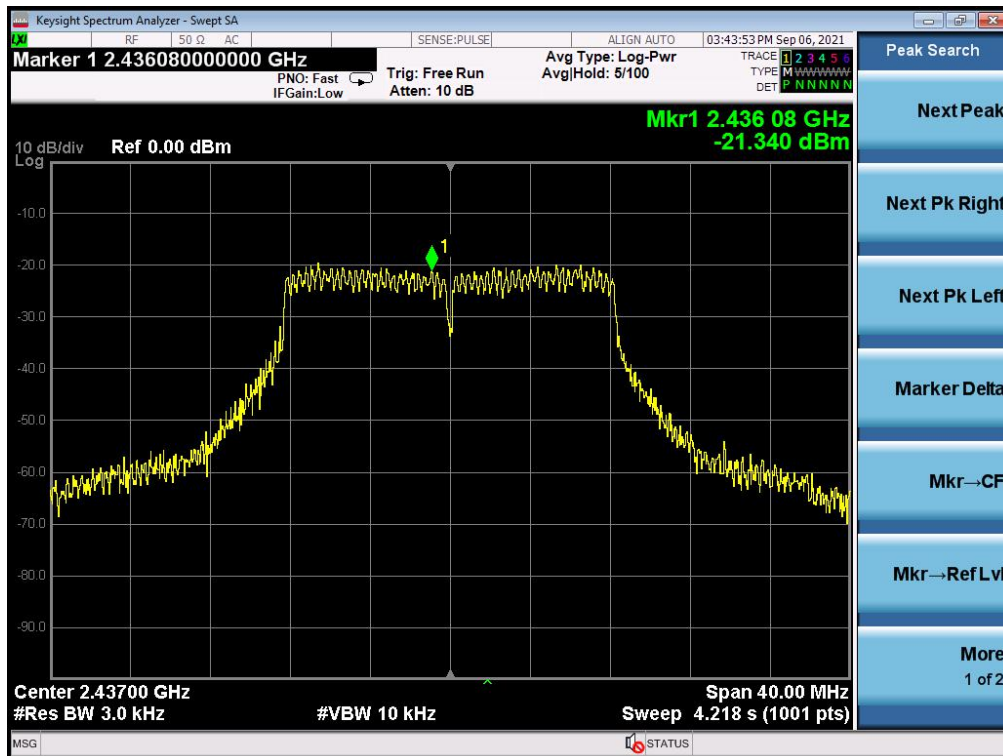
## 802.11b-2462MHz



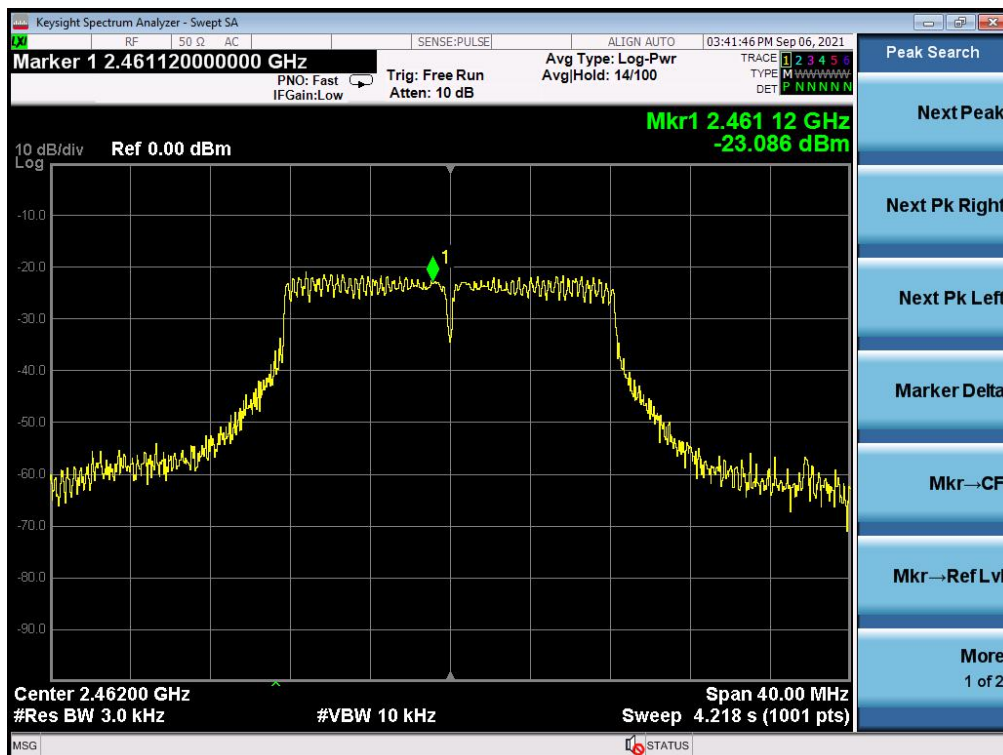
## 802.11g-2412MHz



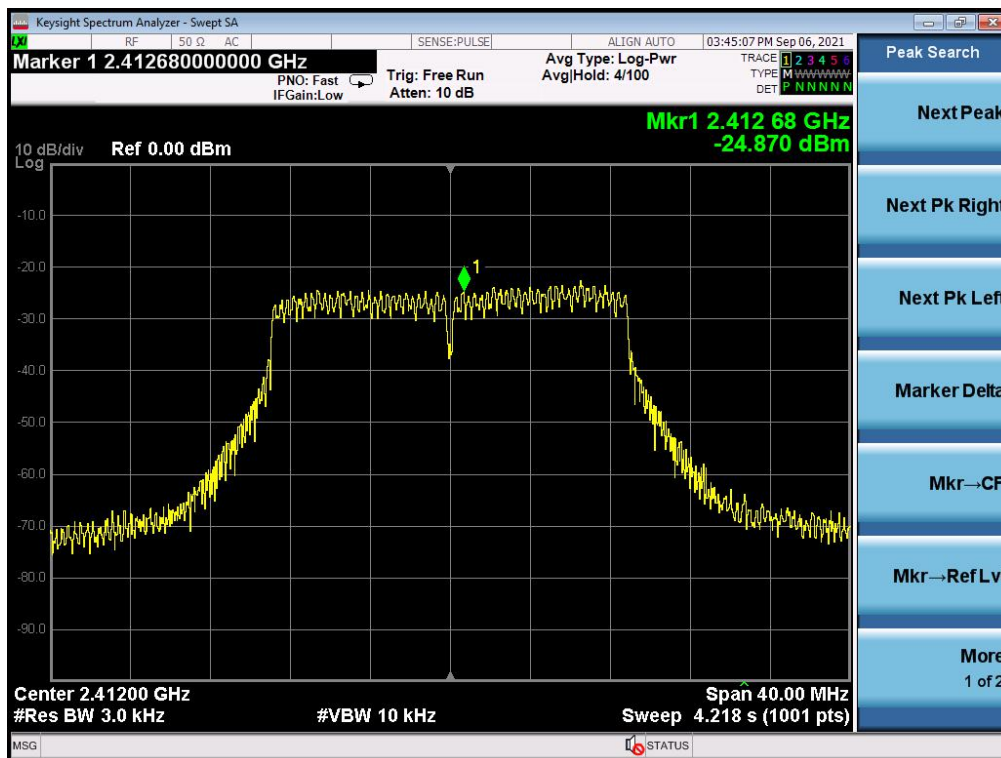
## 802.11g-2437MHz



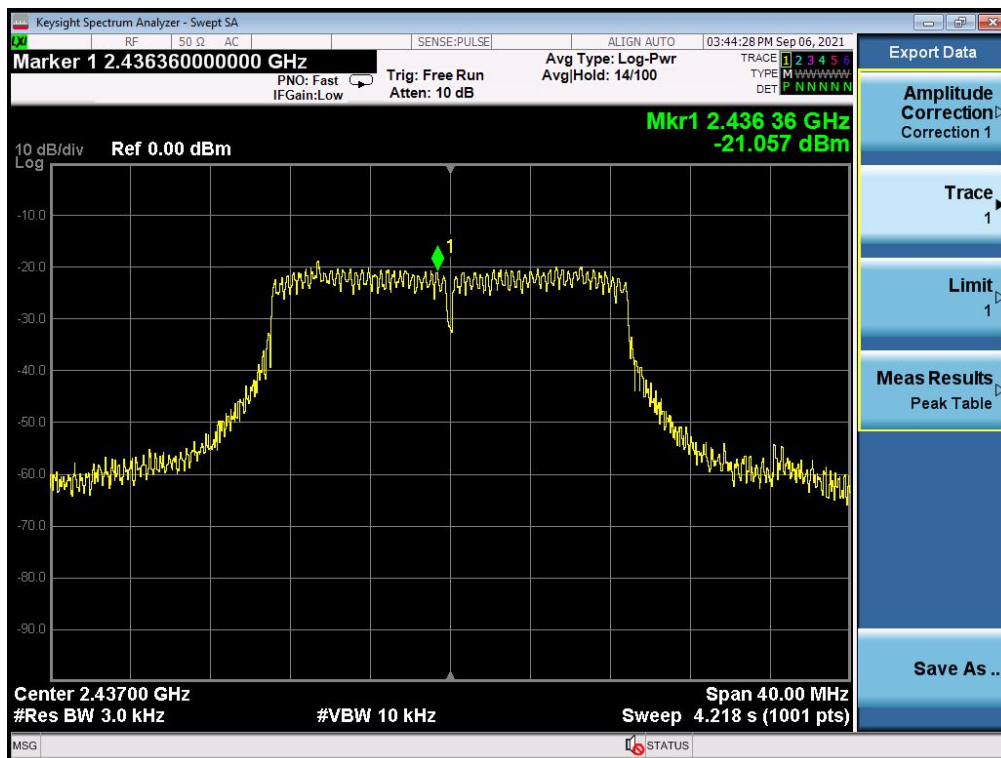
## 802.11g-2462MHz



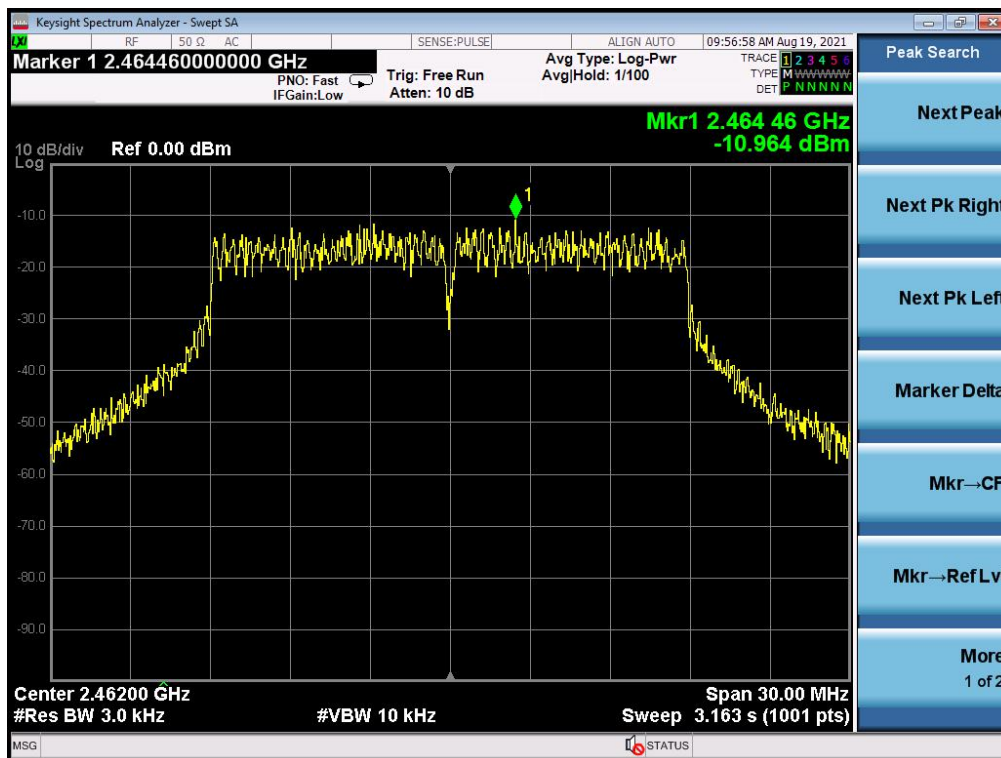
## 802.11n 20-2412MHz



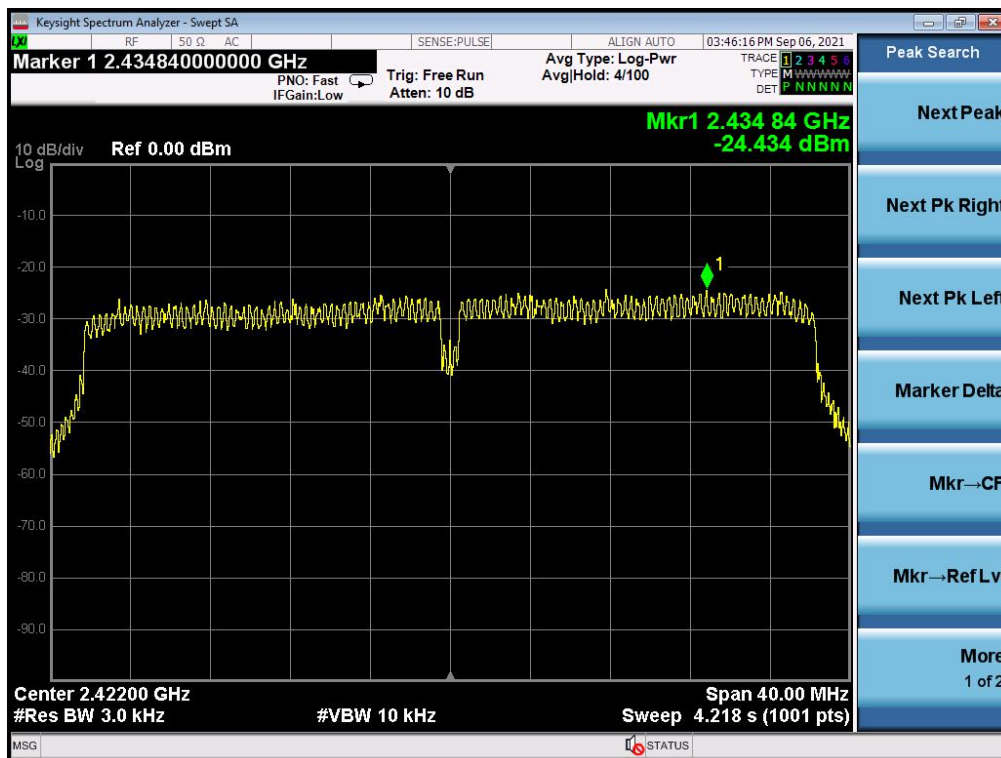
## 802.11n 20-2437MHz



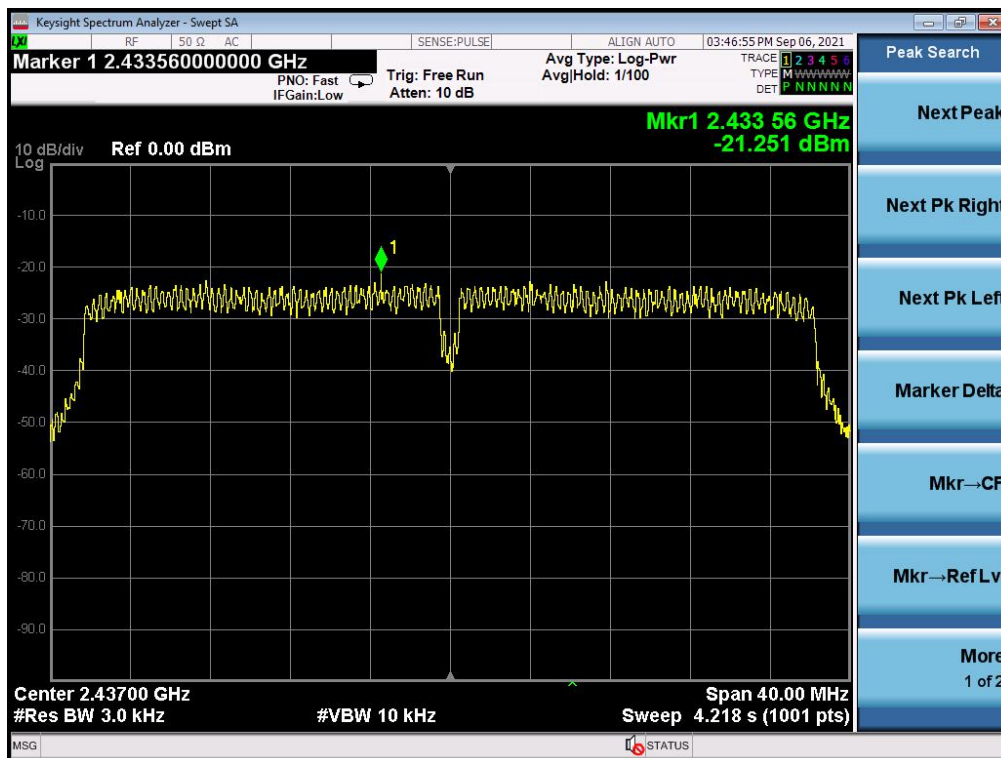
## 802.11n 20-2462MHz



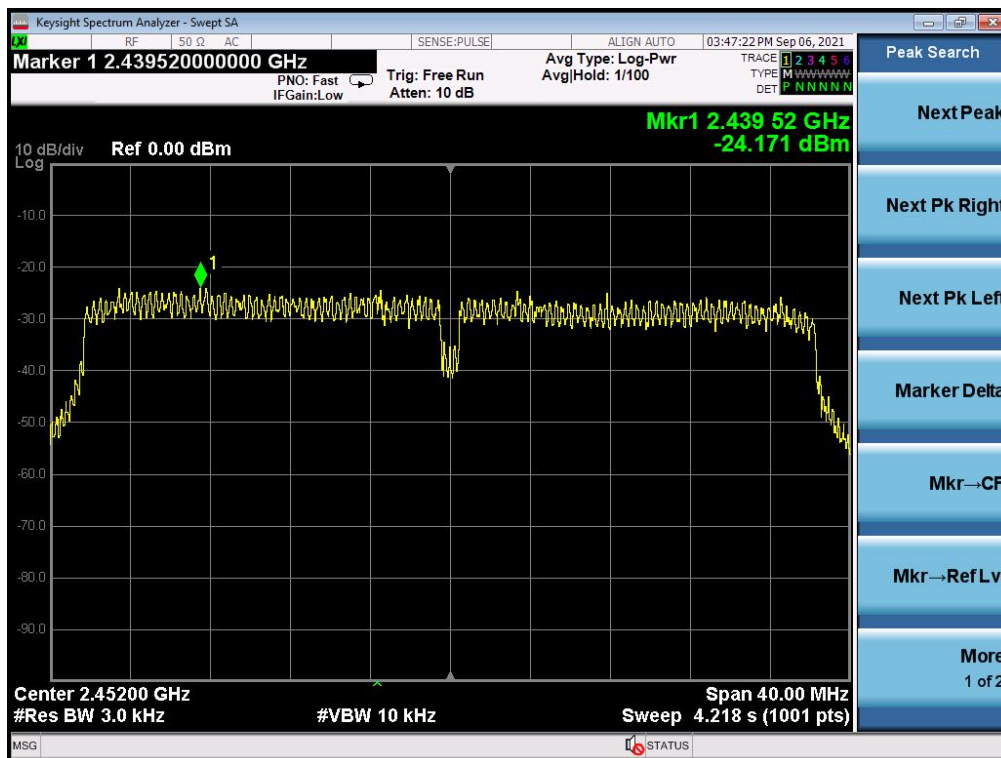
## 802.11n 40-2422MHz



## 802.11n 40-2437MHz



## 802.11n 40-2452MHz



## 6. Band edge and spurious(conducted)

### 6.1 LIMIT

In any 100kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 30dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power.

### 6.2 TEST PROCEDURE

(1) Connect EUT's antenna output to spectrum analyzer by RF cable.

(2) Establish a reference level by using the following procedure:

|                  |                              |
|------------------|------------------------------|
| Center frequency | DTS Channel center frequency |
| RBW:             | 100kHz                       |
| VBW:             | 300kHz                       |
| Span             | 1.5times the DTS bandwidth   |
| Detector Mode:   | Avg                          |
| Sweep time:      | auto                         |
| Trace mode       | Max hold                     |

(3) Establish Allow the trace to stabilize, use the peak marker function to determine the maximum peak power level to establish the reference level.

(4) Set the spectrum analyzer as follows:

|                              |                                          |
|------------------------------|------------------------------------------|
| RBW:                         | 100kHz                                   |
| VBW:                         | 300kHz                                   |
| Span                         | Encompass frequency range to be measured |
| Number of measurement points | $\geq \text{span}/\text{RBW}$            |
| Detector Mode:               | Avg                                      |
| Sweep time:                  | auto                                     |
| Trace mode                   | Max hold                                 |

(5) Allow the trace to stabilize, use the peak marker function to determine the maximum amplitude of all unwanted emissions outside of the authorized frequency band

### 6.3 TEST SETUP

