



## FCC Test Report

**Report No.:** AAOG-ESH-P21031918B-2

**FCC ID:** 2ABEU-YLDP007

**Product:** Smart LED Bulb W3(Dimmable)

**Model:** YLDP007

**Received Date:** Mar.25, 2021

**Test Date:** Apr.10 to Apr.17, 2021

**Issued Date:** Apr.23.2021

**Applicant:** Qingdao Yeelink Information Technology Co., Ltd.

**Address:** 10F-B4, Building B, Qingdao International Innovation Park, No.1 Keyuan Weiyi Road, Laoshan District, Qingdao City, Shandong Province, P.R.China.

**Manufacturer:** Qingdao Yeelink Information Technology Co., Ltd.

**Address:** 10F-B4, Building B, Qingdao International Innovation Park, No.1 Keyuan Weiyi Road, Laoshan District, Qingdao City, Shandong Province, P.R.China.

**Issued By:** BUREAU VERITAS ADT (Shanghai) Corporation

**Lab Address:** No. 829, Xinzhuan Road, Shanghai, P.R.China (201612)



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### Release Control Record

| Issue No.             | Description      | Date Issued  |
|-----------------------|------------------|--------------|
| AAOG-ESH-P21031918B-2 | Original release | Apr.23, 2021 |



## 1 Certificate of Conformity

**Product:** Smart LED Bulb W3(Dimmable)

**Brand:** YEELIGHT

**Model:** YLDP007

**Applicant:** Qingdao Yeelink Information Technology Co., Ltd.

**Test Date:** Apr.10 to Apr.17, 2021

**Standards:** 47 CFR FCC Part 15, Subpart C (Section 15.247)  
ANSI C63.10:2013

The above equipment has been tested by **BUREAU VERITAS ADT (Shanghai) Corporation**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

**Prepared by :**

  
Yuan ZHANG

, **Date:** Apr.23, 2021

Project Engineer

**Approved by :**



, **Date:** Apr.23, 2021



## 2 Summary of Test Results

The EUT has been tested according to the following specifications:

| 47 CFR FCC Part 15, Subpart C (SECTION 15.247) |                                         |        |                                |
|------------------------------------------------|-----------------------------------------|--------|--------------------------------|
| FCC Clause                                     | Test Item                               | Result | Remarks                        |
| 15.203                                         | Antenna Requirement                     | PASS   | No antenna connector is used.  |
| 15.207                                         | AC Power Conducted Emission             | PASS   | Meet the requirement of limit. |
| 15.247(a)(2)                                   | Minimum 6dB Bandwidth                   | PASS   | Meet the requirement of limit. |
| 15.247(b)                                      | Conducted Output Power                  | PASS   | Meet the requirement of limit. |
| 15.247(e)                                      | Power Spectral Density                  | PASS   | Meet the requirement of limit. |
| 15.247(d)                                      | Conducted Band Edges Measurement        | PASS   | Meet the requirement of limit. |
| 15.247(d)                                      | Conducted Spurious Emissions            | PASS   | Meet the requirement of limit. |
| 15.247(d)                                      | Emissions in restricted frequency bands | PASS   | Meet the requirement of limit. |
| 15.205 /<br>15.209 /<br>15.247(d)              | Radiated Emissions Measurement          | PASS   | Meet the requirement of limit. |



## 2.1 Test Instruments

| Equipment                                   | Manufacturer | Model No.    | Serial No. | Last Cal.  | Next Cal.  |
|---------------------------------------------|--------------|--------------|------------|------------|------------|
| Double Ridged Broadband Horn (30MHz-1.5GHz) | Schwarzbeck  | VULB9168     | E1A1036    | Feb.07,21  | Feb.06,22  |
| Horn Antenna (1GHz -18GHz)                  | Schwarzbeck  | BBHA9120D    | E1A1017    | Aug.25,20  | Aug.24,22  |
| Pre-Amplifier(9kHz-1GHz)                    | SONOMA       | 310          | E1A2007    | Apr.19,21  | Apr.18,22  |
| Pre-Amplifier(1GHz-26.5GHz)                 | Agilent      | 8449B        | E1A2002    | Mar.02,21  | Mar.01,22  |
| Signal Generator                            | ANRITSU      | MG3692B      | E1S9006    | Mar.02,21  | Mar.01,22  |
| Signal Generator                            | Keysight     | N5171B       | E1S9016    | Apr.19,21  | Apr.18,22  |
| Signal Generator                            | Keysight     | N5182B       | E1S9017    | Apr.19,21  | Apr.18,22  |
| Wireless Connectivity Tester                | R&S          | CMW270       | E1S9021    | NCR        | NCR        |
| Spectrum Analyzer                           | R&S          | FSP30        | E1S1002    | Aug.02,20  | Aug.03,21  |
| Spectrum Analyzer                           | Keysight     | N9030B       | E1S1003    | Jul.23, 20 | Jul.22, 21 |
| Spectrum Analyzer                           | Keysight     | N9020A       | E1S1004    | Mar.02, 21 | Mar.01, 22 |
| RF Control Unit                             | Toscend      | JS0806-2     | E1C5003    | NCR        | NCR        |
| DC Power supply                             | Chroma       | 62024p-80-60 | S1S1009    | Mar.24,21  | Mar.23,22  |
| Humidity&Temp Programmable Tester           | ESPEC        | SE TH-Z-042U | C1TH002    | Jun.25,20  | Jun.24,21  |
| Test Software                               | Toscend      | JS1120-3     | N/A        | N/A        | N/A        |
| Test Software                               | Toscend      | JS36-RSE     | N/A        | N/A        | N/A        |

## 2.2 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT:

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of  $k=2$ .

| Measurement                        | Frequency      | Expanded Uncertainty<br>( $k=2$ ) ( $\pm$ ) |
|------------------------------------|----------------|---------------------------------------------|
| Conducted Emissions at mains ports | 150kHz ~ 30MHz | 1.83 dB                                     |
| Radiated Emissions up to 1 GHz     | 30MHz ~ 1GHz   | 5.36 dB                                     |
| Radiated Emissions above 1 GHz     | 1GHz ~ 6GHz    | 3.47 dB                                     |
|                                    | 6GHz ~ 18GHz   | 3.75 dB                                     |
|                                    | 18GHz ~ 40GHz  | 3.30 dB                                     |

## 2.3 Modification Record

There were no modifications required for compliance.

### 3 General Information

#### 3.1 General Description of EUT

|                       |                                                                 |
|-----------------------|-----------------------------------------------------------------|
| Product               | Smart LED Bulb W3(Dimmable)                                     |
| Brand                 | <b>YEELIGHT</b>                                                 |
| Test Model            | YLDP007                                                         |
| Model Difference      | --                                                              |
| Power Rating          | AC 120V, 60Hz; 8W                                               |
| Modulation Type       | CCK, DQPSK, DBPSK for DSSS<br>64QAM, 16QAM, QPSK, BPSK for OFDM |
| Modulation Technology | DSSS, OFDM                                                      |
| Operating Frequency   | 2412MHz-2462MHz                                                 |
| Number of Channel     | 802.11b, 802.11g and 802.11n (HT20):11                          |
| Antenna Type          | PCB Antenna                                                     |
| Antenna Connector     | --                                                              |
| Antenna Gain          | 2dBi                                                            |

Note:

1. For more details, please refer to the User's manual of the EUT.

| Modulation Mode | TX /RX Function |
|-----------------|-----------------|
| 802.11b         | 1TX / 1RX       |
| 802.11g         | 1TX / 1RX       |
| 802.11n (HT20)  | 1TX / 1RX       |



### 3.2 Description of Test Modes

11 channels are provided for 802.11b, 802.11g and 802.11n (HT20).

| Channel | Frequency | Channel | Frequency |
|---------|-----------|---------|-----------|
| 1       | 2412MHz   | 7       | 2442MHz   |
| 2       | 2417MHz   | 8       | 2447MHz   |
| 3       | 2422MHz   | 9       | 2452MHz   |
| 4       | 2427MHz   | 10      | 2457MHz   |
| 5       | 2432MHz   | 11      | 2462MHz   |
| 6       | 2437MHz   | -       | -         |



### 3.2.1 Test Mode Applicability:

| EUT<br>Configure<br>Mode | Applicable to |         |     |      | Description |
|--------------------------|---------------|---------|-----|------|-------------|
|                          | RE ≥ 1G       | RE < 1G | PLC | APCM |             |
| -                        | √             | √       | √   | √    | -           |

Where **RE≥1G**: Radiated Emission above 1GHz      **RE≤1G**: Radiated Emission below 1GHz  
**PLC**: Power Line Conducted Emission      **APCM**: Antenna Port Conducted Measurement

#### Radiated Emission Test (Above 1 GHz):

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.
- ☒ For different antenna gain, select high gain antenna for the final test as listed below.

| EUT<br>CONFIGURE<br>MODE | MODE           | AVAILABLE<br>CHANNEL | TESTED<br>CHANNEL | MODULATION<br>TECHNOLOGY | MODULATION<br>TYPE | DATA RATE<br>(Mbps) |
|--------------------------|----------------|----------------------|-------------------|--------------------------|--------------------|---------------------|
| -                        | 802.11b        | 1 to 11              | 1, 6, 11          | DSSS                     | DBPSK              | 1.0                 |
| -                        | 802.11g        | 1 to 11              | 1, 6, 11          | OFDM                     | BPSK               | 6.0                 |
| -                        | 802.11n (HT20) | 1 to 11              | 1, 6, 11          | OFDM                     | BPSK               | 6.5                 |

#### Radiated Emission Test (Below 1 GHz):

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.
- ☒ For different antenna gain, select high gain antenna for the final test as listed below.

| EUT<br>CONFIGURE<br>MODE | MODE    | AVAILABLE<br>CHANNEL | TESTED<br>CHANNEL | MODULATION<br>TECHNOLOGY | MODULATION<br>TYPE | DATA RATE<br>(Mbps) |
|--------------------------|---------|----------------------|-------------------|--------------------------|--------------------|---------------------|
| -                        | 802.11b | 1 to 11              | 1                 | DSSS                     | DBPSK              | 1.0                 |



### **Power Line Conducted Emission Test:**

- ☐ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☐ Following channel(s) was (were) selected for the final test as listed below.

| EUT CONFIGURE MODE | MODE    | AVAILABLE CHANNEL | TESTED CHANNEL | MODULATION TECHNOLOGY | MODULATION TYPE | DATA RATE (Mbps) |
|--------------------|---------|-------------------|----------------|-----------------------|-----------------|------------------|
| -                  | 802.11b | 1 to 11           | 1              | DSSS                  | DBPSK           | 1.0              |

### **Antenna Port Conducted Measurement**

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

| EUT CONFIGURE MODE | MODE           | AVAILABLE CHANNEL | TESTED CHANNEL | MODULATION TECHNOLOGY | MODULATION TYPE | DATA RATE (Mbps) |
|--------------------|----------------|-------------------|----------------|-----------------------|-----------------|------------------|
| -                  | 802.11b        | 1 to 11           | 1, 6, 11       | DSSS                  | DBPSK           | 1.0              |
| -                  | 802.11g        | 1 to 11           | 1, 6, 11       | OFDM                  | BPSK            | 6.0              |
| -                  | 802.11n (HT20) | 1 to 11           | 1, 6, 11       | OFDM                  | BPSK            | 6.5              |

### **3.2.2 Test Condition:**

| Applicable to | Normal Environmental Conditions | Normal Input Power |
|---------------|---------------------------------|--------------------|
| RE ≥ 1G       | 25deg. C, 60%RH                 | AC 120V, 60Hz      |
| RE < 1G       | 25deg. C, 60%RH                 | AC 120V, 60Hz      |
| PLC           | 25deg. C, 60%RH                 | AC 120V, 60Hz      |
| APCM          | 25deg. C, 60%RH                 | AC 120V, 60Hz      |

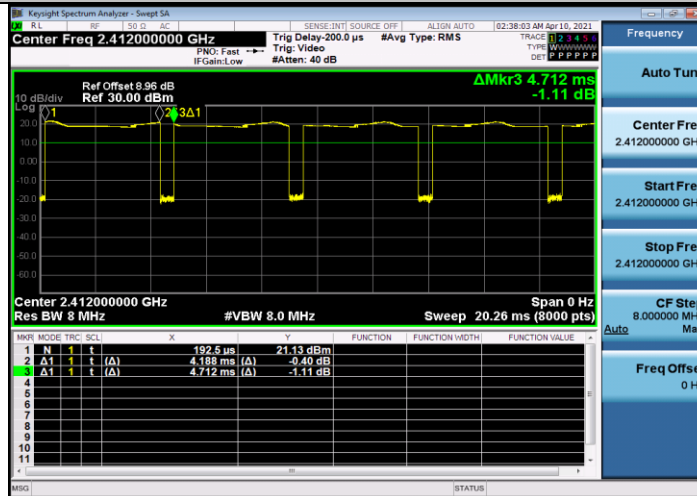


### 3.3 Duty Cycle of Test Signal

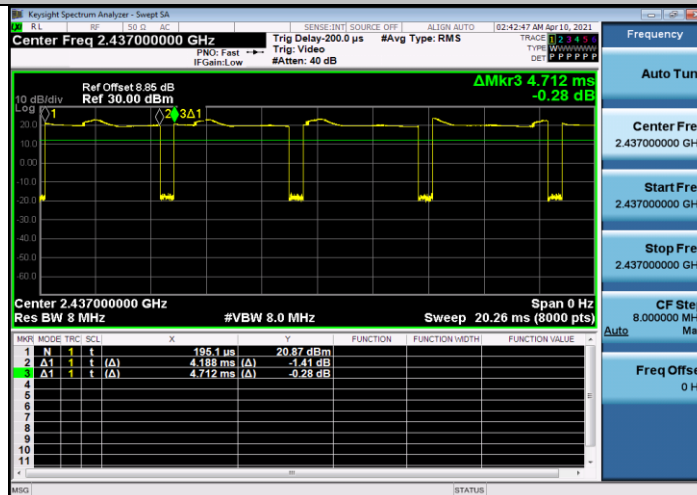
| Test Mode | Antenna | Channel [MHz] | Duty Cycle [%] | 10log(1/x) Factor[dB] |
|-----------|---------|---------------|----------------|-----------------------|
| 11B       | Ant1    | 2412          | 88.96          | 0.51                  |
|           |         | 2437          | 88.96          | 0.51                  |
|           |         | 2462          | 88.96          | 0.51                  |
| 11G       | Ant1    | 2412          | 86.25          | 0.64                  |
|           |         | 2437          | 87.34          | 0.59                  |
|           |         | 2462          | 86.25          | 0.64                  |
| 11N20SISO | Ant1    | 2412          | 85.53          | 0.68                  |
|           |         | 2437          | 85.53          | 0.68                  |
|           |         | 2462          | 85.53          | 0.68                  |



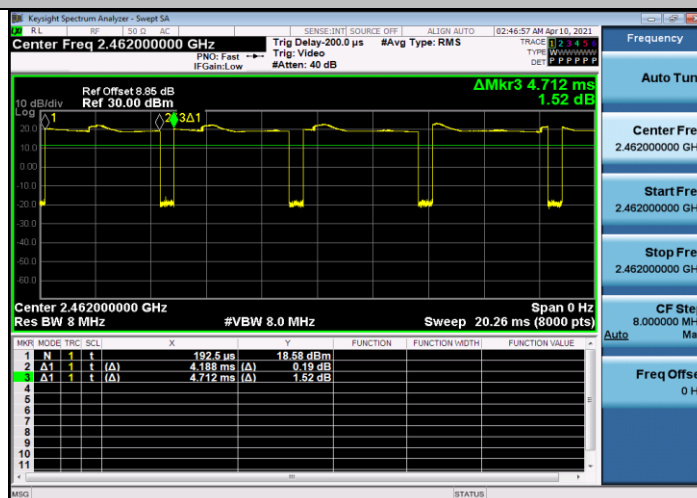
### 11B\_Ant1\_2412



### 11B\_Ant1\_2437

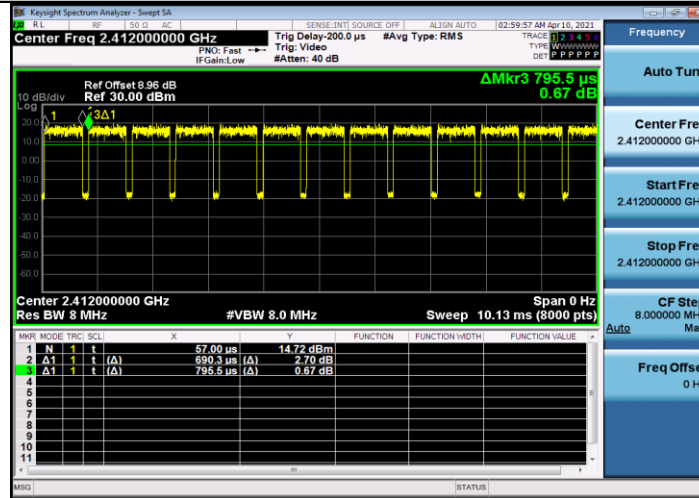


### 11B\_Ant1\_2462

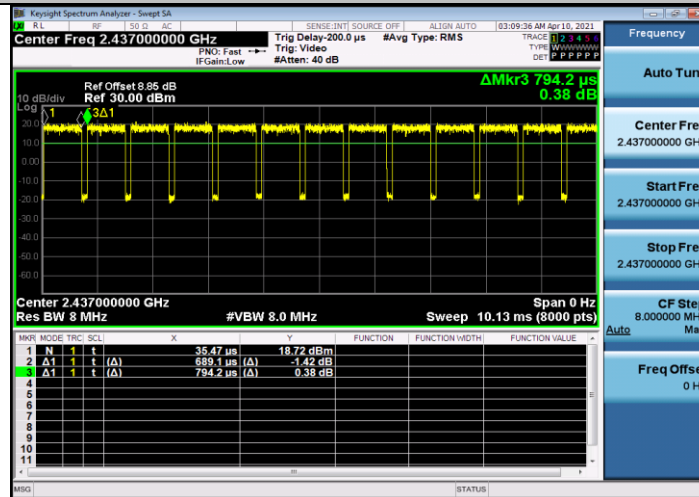




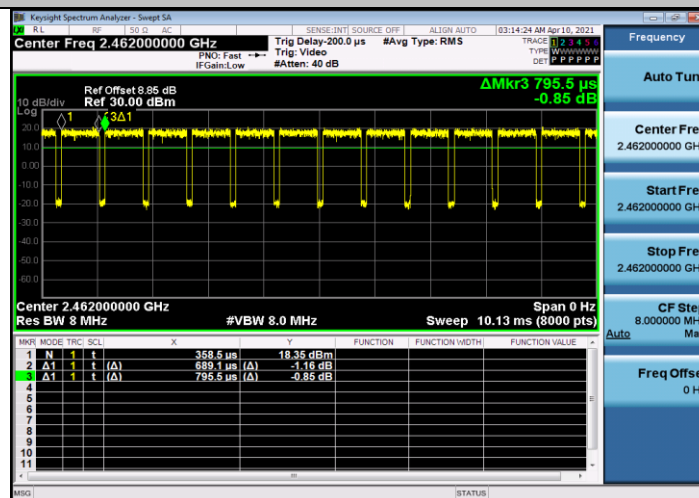
### 11G\_Ant1\_2412



### 11G\_Ant1\_2437

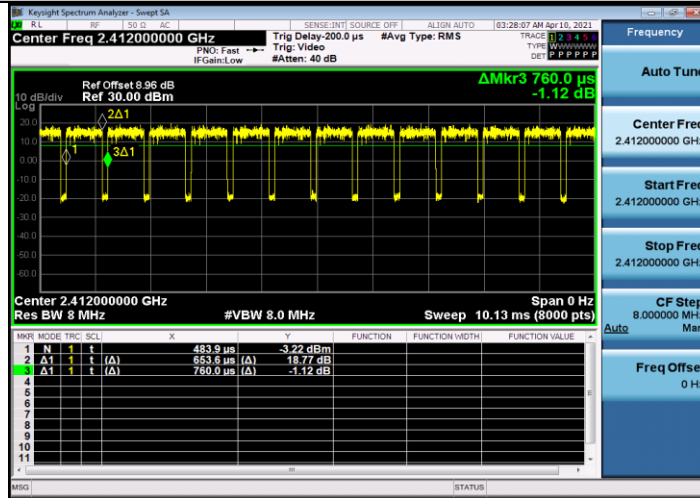


### 11G\_Ant1\_2462

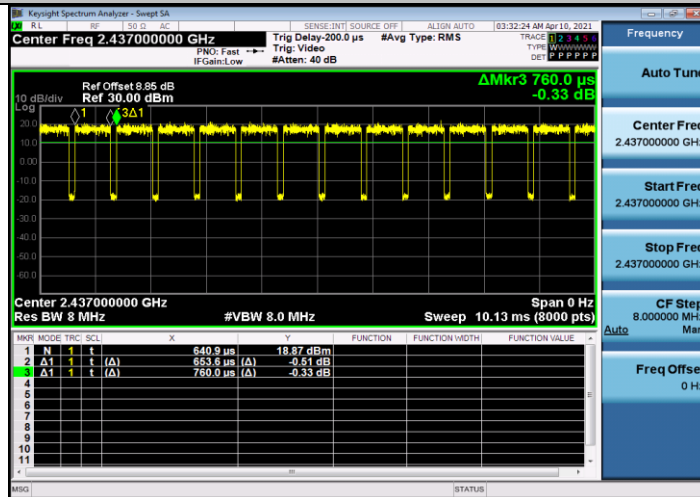




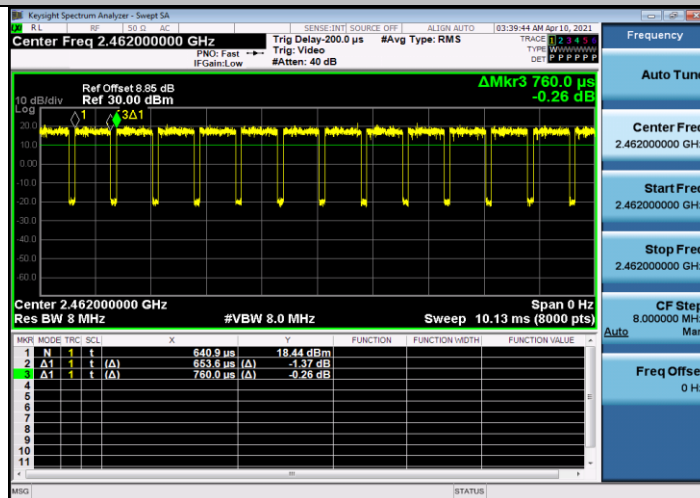
### 11N20SISO\_Ant1\_2412



### 11N20SISO\_Ant1\_2437



### 11N20SISO\_Ant1\_2462





### **3.4 Description of Support Units**

The EUT has been tested as an independent unit together with other necessary accessories or support units.

### **3.5 General Description of Applied Standards**

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standard:

**FCC Part 15, Subpart C (15.247)**

**KDB 558074 D01 DTS Meas Guidance v05r02**

**ANSI C63.10:2013**

All related test items have been performed and recorded as per the above standard.

#### 4 Test Procedure and Results

##### 4.1 AC Power Conducted Emission

###### 4.1.1 Limits

| Frequency (MHz) | Conducted Limit (dBuV) |         |
|-----------------|------------------------|---------|
|                 | Quasi-peak             | Average |
| 0.15 - 0.5      | 66 - 56                | 56 - 46 |
| 0.50 - 5.0      | 56                     | 46      |
| 5.0 - 30.0      | 60                     | 50      |

Note: 1. The lower limit shall apply at the transition frequencies.

2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

###### 4.1.2 Test Procedures

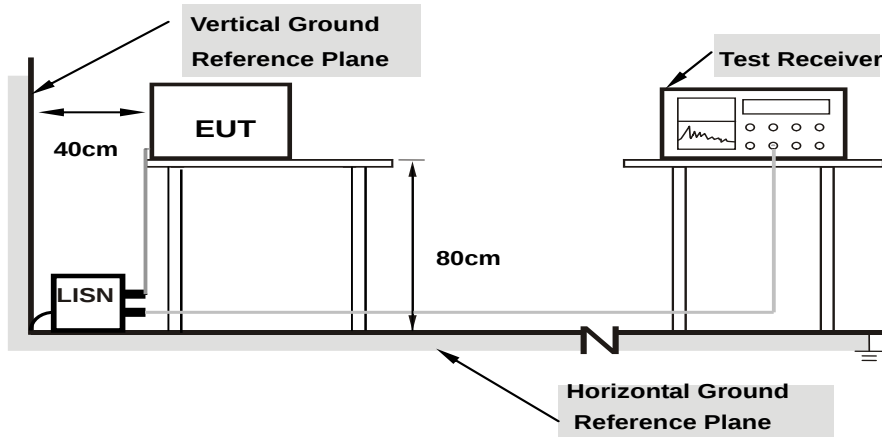
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

**NOTE:** The resolution bandwidth and video bandwidth of test receiver is 9kHz for quasi-peak detection (QP) and average detection (AV) at frequency 0.15MHz-30MHz.

###### 4.1.3 Deviation from Test Standard

No deviation.

#### 4.1.4 Test Setup



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

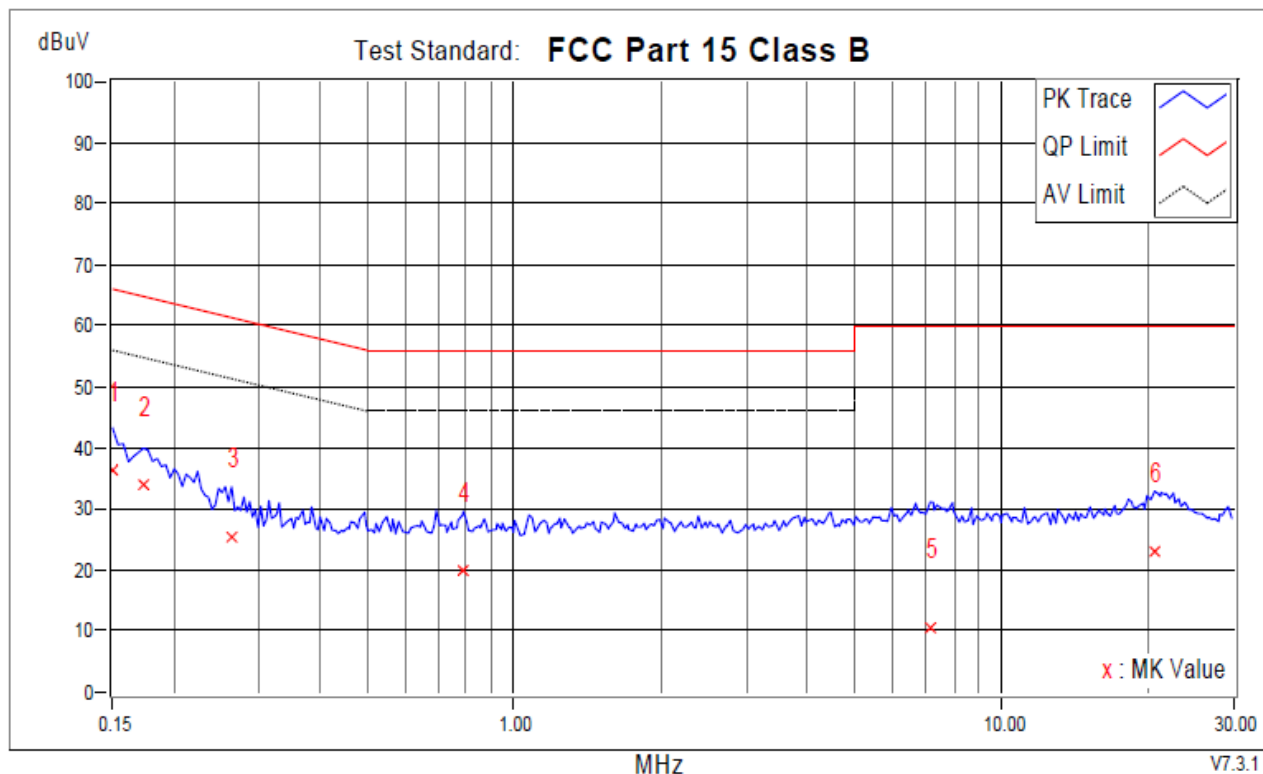
For the actual test configuration, please refer to the attached file (Test Setup Photo).

#### 4.1.5 EUT Operating Conditions

Same as 4.1.6.

#### 4.1.6 Test Results

Phase : LINE

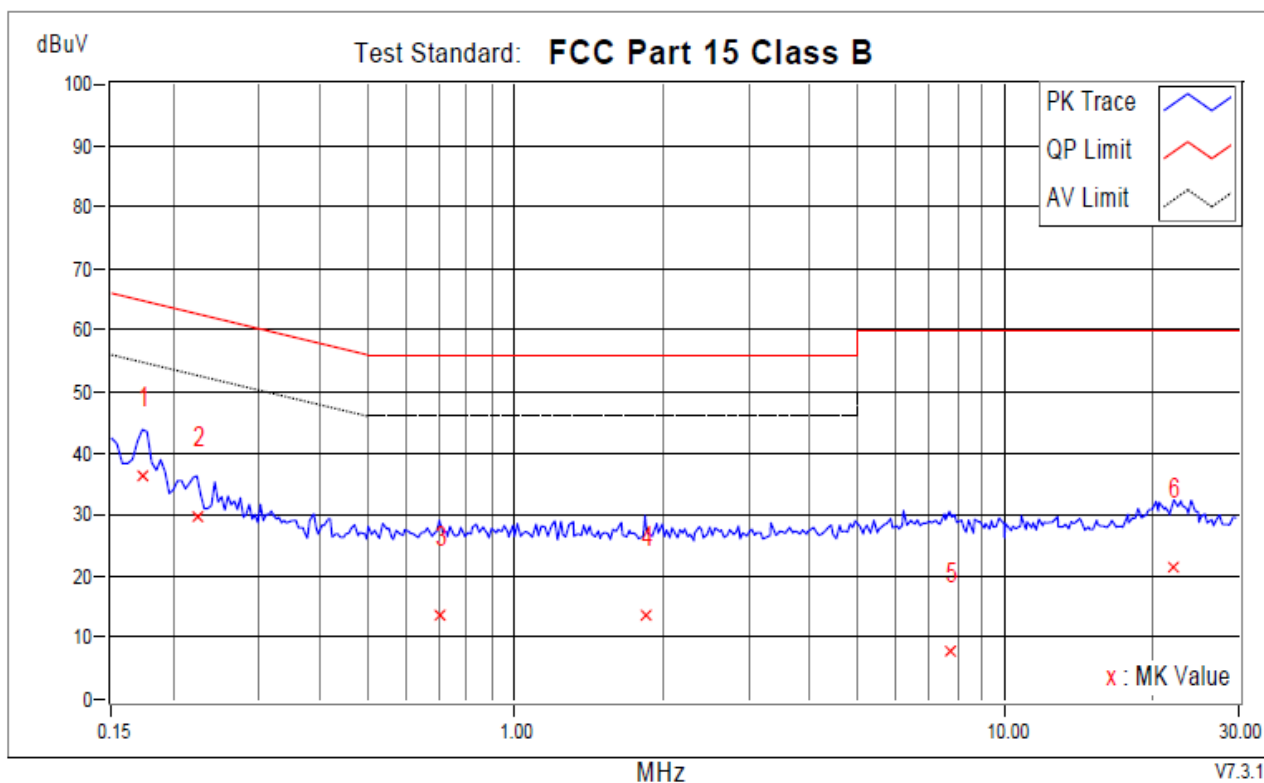


|     | Frequency | Corr. Factor | Reading dBuV |       | Emission dBuV |       | Limit dBuV |       | Margins dB |        | Notes |
|-----|-----------|--------------|--------------|-------|---------------|-------|------------|-------|------------|--------|-------|
| No. | MHz       | dB           | QP           | AV    | QP            | AV    | QP         | AV    | QP         | AV     |       |
| +1  | 0.15000   | 9.86         | 26.60        | 11.09 | 36.46         | 20.95 | 66.00      | 56.00 | -29.54     | -35.05 |       |
| 2   | 0.17346   | 9.87         | 24.13        | 9.08  | 34.00         | 18.95 | 64.79      | 54.79 | -30.79     | -35.84 |       |
| 3   | 0.26339   | 9.78         | 15.67        | -0.26 | 25.45         | 9.52  | 61.32      | 51.32 | -35.88     | -41.81 |       |
| 4   | 0.78733   | 9.60         | 10.42        | -1.61 | 20.02         | 7.99  | 56.00      | 46.00 | -35.98     | -38.01 |       |
| 5   | 7.15825   | 9.92         | 0.63         | -7.53 | 10.55         | 2.39  | 60.00      | 50.00 | -49.45     | -47.61 |       |
| 6   | 20.67821  | 10.06        | 13.10        | 5.52  | 23.16         | 15.58 | 60.00      | 50.00 | -36.84     | -34.42 |       |

#### REMARKS:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.

Phase : NEUTRAL



| No. | Frequency<br>MHz | Corr.<br>Factor<br>dB | Reading<br>dBuV |       | Emission<br>dBuV |       | Limit<br>dBuV |       | Margins<br>dB |        | Notes |
|-----|------------------|-----------------------|-----------------|-------|------------------|-------|---------------|-------|---------------|--------|-------|
|     |                  |                       | QP              | AV    | QP               | AV    | QP            | AV    | QP            | AV     |       |
| +1  | 0.17346          | 9.85                  | 26.54           | 10.36 | 36.39            | 20.21 | 64.79         | 54.79 | -28.41        | -34.59 |       |
| 2   | 0.22429          | 9.84                  | 19.66           | 4.92  | 29.50            | 14.76 | 62.66         | 52.66 | -33.16        | -37.90 |       |
| 3   | 0.70131          | 9.82                  | 3.75            | -5.80 | 13.57            | 4.02  | 56.00         | 46.00 | -42.43        | -41.98 |       |
| 4   | 1.84456          | 9.93                  | 3.72            | -6.03 | 13.65            | 3.90  | 56.00         | 46.00 | -42.35        | -42.10 |       |
| 5   | 7.71738          | 9.92                  | -2.18           | -7.69 | 7.74             | 2.23  | 60.00         | 50.00 | -52.26        | -47.77 |       |
| 6   | 22.17574         | 10.23                 | 11.40           | 5.51  | 21.63            | 15.74 | 60.00         | 50.00 | -38.37        | -34.26 |       |

**REMARKS:**

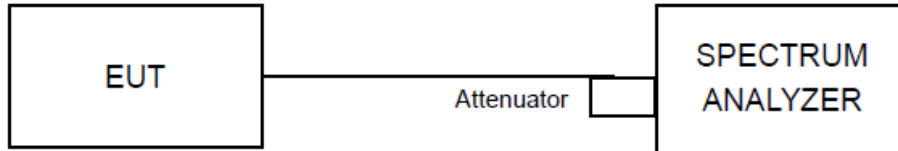
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.

## 4.2 Minimum 6dB Bandwidth

### 4.2.1 Limit

For digital modulation systems, the minimum 6dB bandwidth shall be at least 500 kHz

### 4.2.2 Test Setup



### 4.2.3 Test Procedures

The EUT was tested according to DTS test procedure of “KDB558074 D01 DTS Meas Guidance” for compliance to FCC 47CFR 15.247 requirements (clause 8.2).

The automatic bandwidth measurement capability of an instrument may be employed using the X dB bandwidth mode with X set to 6 dB, if the functionality described above (i.e.,  $RBW = 100 \text{ kHz}$ ,  $VBW \geq 3 \cdot RBW$ , peak detector with maximum hold) is implemented by the instrumentation function.

### 4.2.4 Deviation of Test Standard

No deviation.



#### 4.2.5 Test Results

| Test Mode | Antenna | Channel [MHz] | DTS BW [MHz] | FL[MHz]  | FH[MHz]  | Limit[MHz] | Verdict |
|-----------|---------|---------------|--------------|----------|----------|------------|---------|
| 11B       | Ant1    | 2412          | 8.160        | 2407.920 | 2416.080 | $\geq 0.5$ | PASS    |
|           |         | 2437          | 9.640        | 2431.920 | 2441.560 | $\geq 0.5$ | PASS    |
|           |         | 2462          | 9.680        | 2456.920 | 2466.600 | $\geq 0.5$ | PASS    |
| 11G       | Ant1    | 2412          | 16.400       | 2403.800 | 2420.200 | $\geq 0.5$ | PASS    |
|           |         | 2437          | 16.160       | 2429.040 | 2445.200 | $\geq 0.5$ | PASS    |
|           |         | 2462          | 16.400       | 2453.800 | 2470.200 | $\geq 0.5$ | PASS    |
| 11N20SISO | Ant1    | 2412          | 17.600       | 2403.200 | 2420.800 | $\geq 0.5$ | PASS    |
|           |         | 2437          | 16.840       | 2428.600 | 2445.440 | $\geq 0.5$ | PASS    |
|           |         | 2462          | 16.640       | 2453.560 | 2470.200 | $\geq 0.5$ | PASS    |



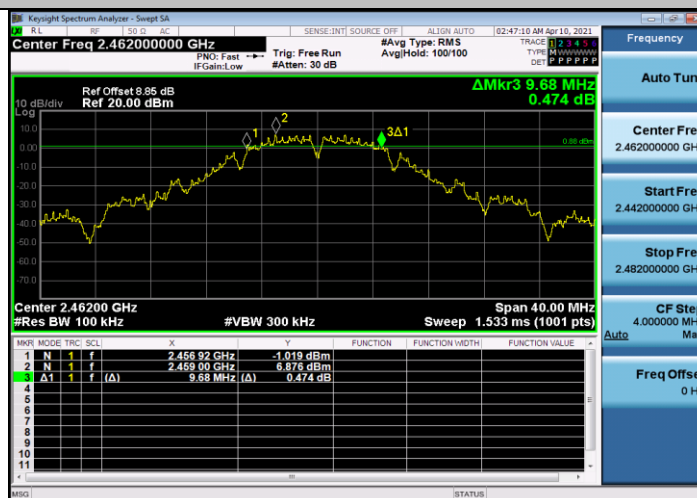
### 11B\_Ant1\_2412



### 11B\_Ant1\_2437

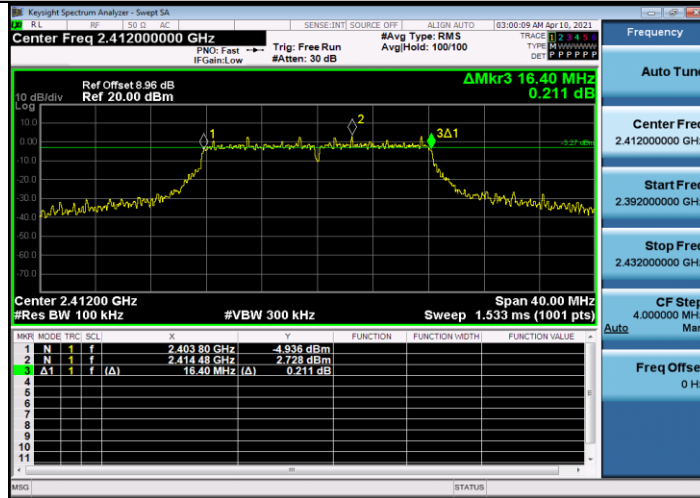


### 11B\_Ant1\_2462

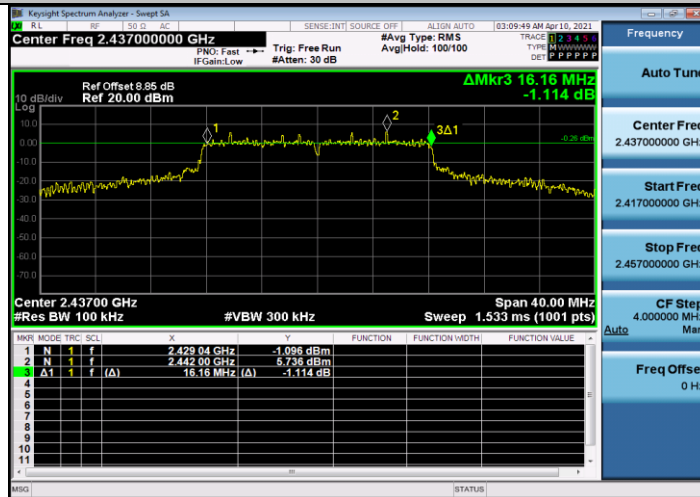




### 11G\_Ant1\_2412



### 11G\_Ant1\_2437



### 11G\_Ant1\_2462

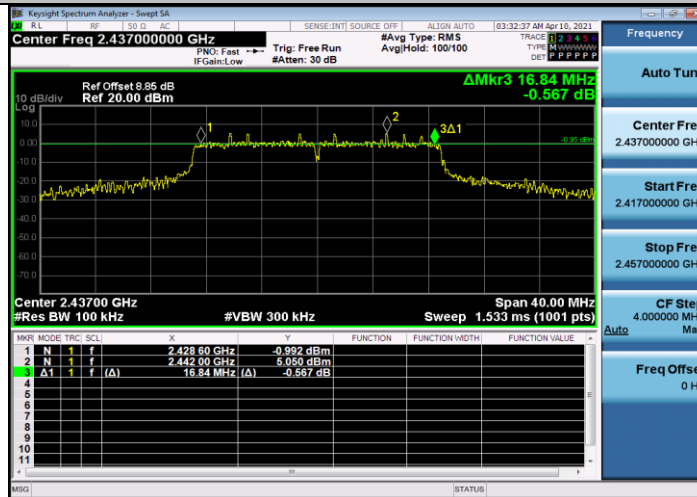




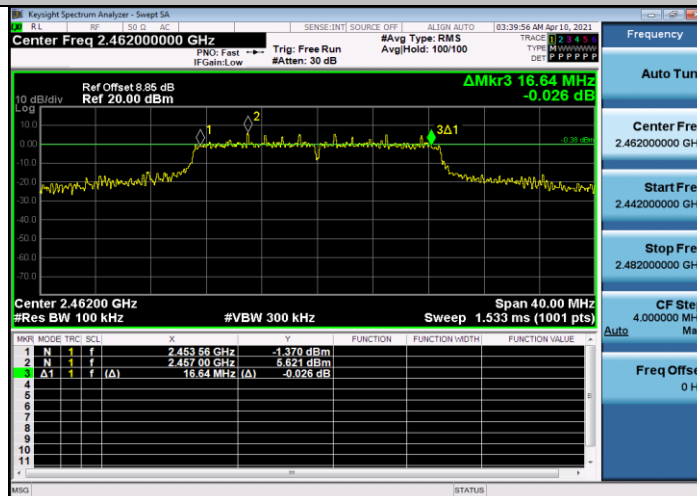
## 11N20SISO\_Ant1\_2412



## 11N20SISO\_Ant1\_2437

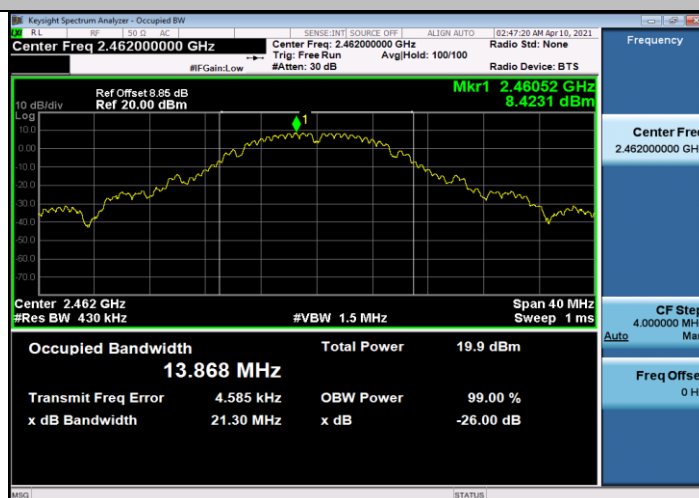
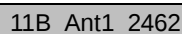
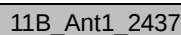
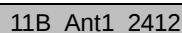


## 11N20SISO\_Ant1\_2462



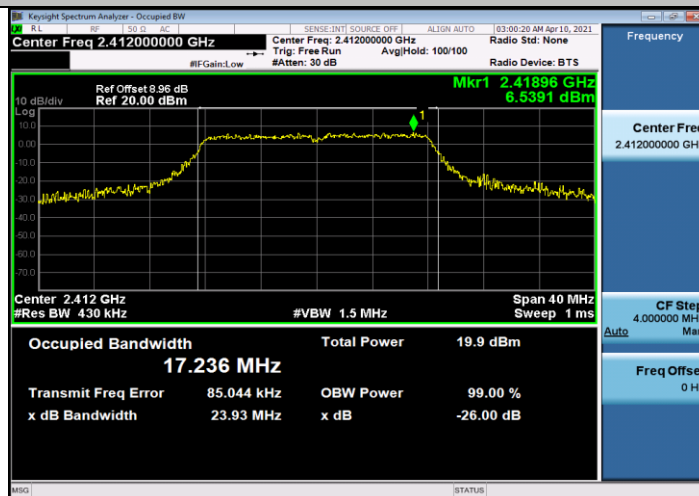
**99%Occupied Channel Bandwidth**

| Test Mode | Antenna | Channel [MHz] | OCB [MHz] | FL[MHz]  | FH[MHz]  | Limit[MHz] | Verdict |
|-----------|---------|---------------|-----------|----------|----------|------------|---------|
| 11B       | Ant1    | 2412          | 11.723    | 2406.176 | 2417.899 | ---        | PASS    |
|           |         | 2437          | 13.362    | 2430.341 | 2443.703 | ---        | PASS    |
|           |         | 2462          | 13.868    | 2455.071 | 2468.939 | ---        | PASS    |
| 11G       | Ant1    | 2412          | 17.236    | 2403.467 | 2420.703 | ---        | PASS    |
|           |         | 2437          | 21.006    | 2426.592 | 2447.598 | ---        | PASS    |
|           |         | 2462          | 23.151    | 2450.091 | 2473.242 | ---        | PASS    |
| 11N20SISO | Ant1    | 2412          | 18.178    | 2402.956 | 2421.134 | ---        | PASS    |
|           |         | 2437          | 19.790    | 2427.201 | 2446.991 | ---        | PASS    |
|           |         | 2462          | 22.343    | 2450.940 | 2473.283 | ---        | PASS    |

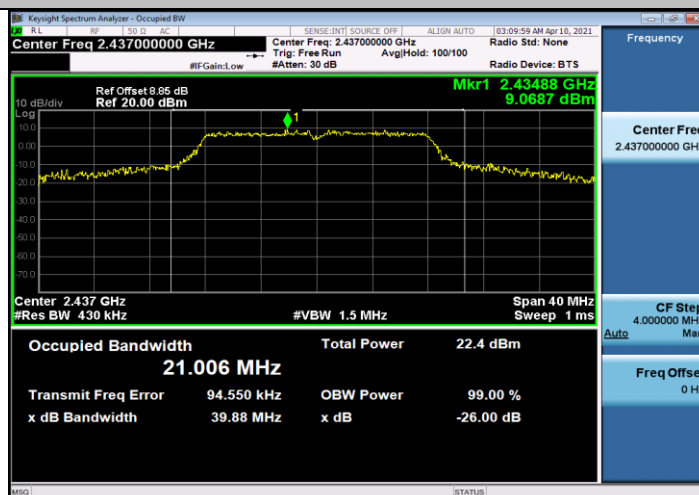




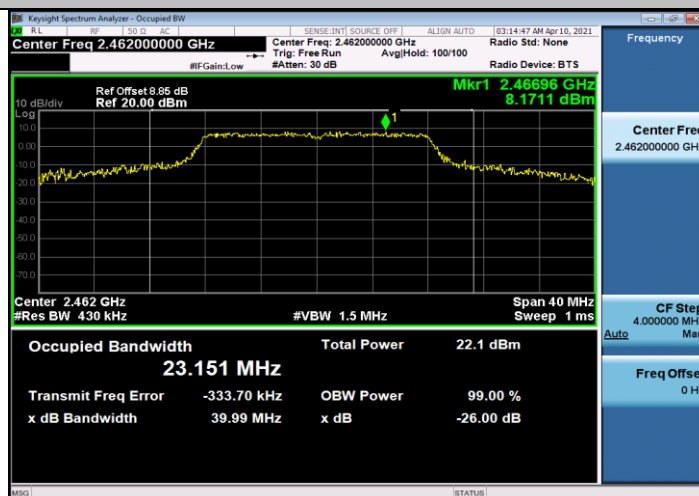
### 11G\_Ant1\_2412



### 11G\_Ant1\_2437

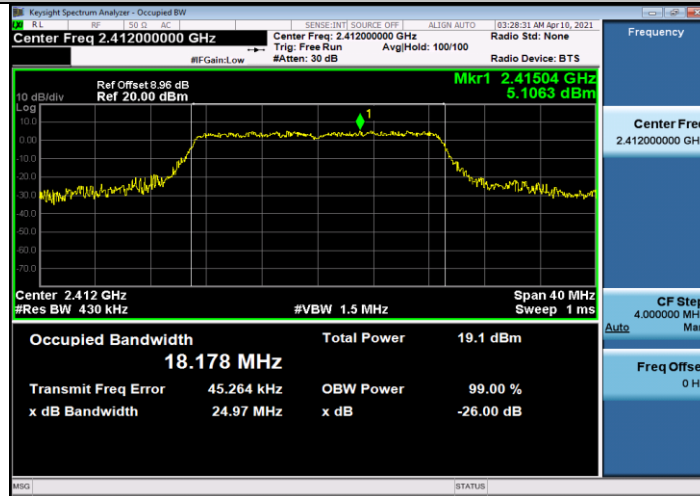


### 11G\_Ant1\_2462

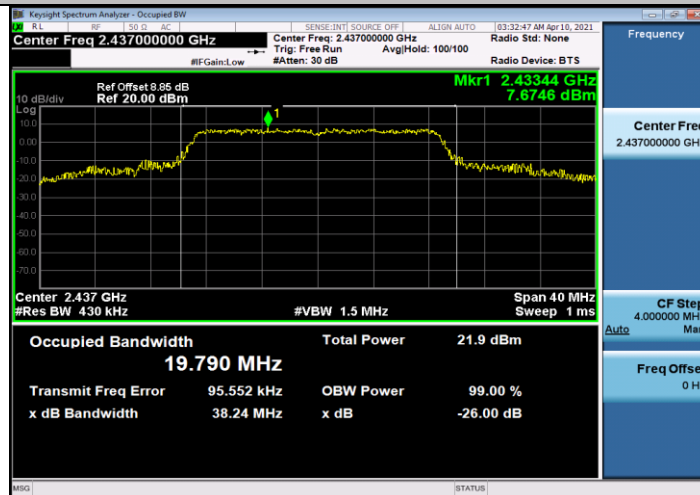




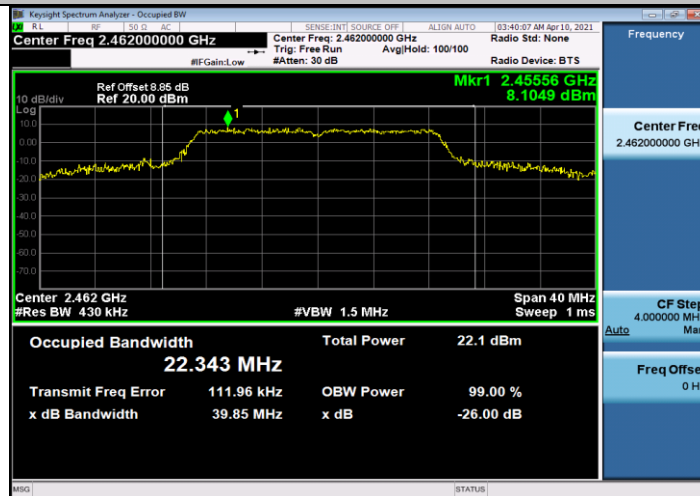
### 11N20SISO\_Ant1\_2412



### 11N20SISO\_Ant1\_2437



### 11N20SISO\_Ant1\_2462

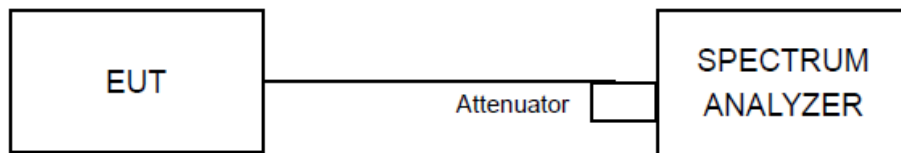


### 4.3 Conducted Output Power

#### 4.3.1 Limit

For systems using digital modulation in the 2400 – 2483.5 MHz bands: 1 Watt (30 dBm)

#### 4.3.2 Test Setup



#### 4.3.3 Test Procedures

The EUT was tested according to DTS test procedure of “KDB558074 D01 DTS Meas Guidance” for compliance to FCC 47CFR 15.247 requirements (clause 9.2.2.4).

- a) Measure the duty cycle,  $x$ , of the transmitter output signal as described in Section 6.0.
- b) Set span to at least 1.5 OBW.
- c) Set RBW = 1 % to 5 % of the OBW, not to exceed 1 MHz.
- d) Set VBW  $\geq$  3 RBW.
- e) Number of points in sweep  $\geq$  2 span / RBW. (This gives bin-to-bin spacing  $\leq$  RBW/2, so that narrowband signals are not lost between frequency bins.)
- f) Sweep time = auto.
- g) Detector = RMS (i.e., power averaging), if available. Otherwise, use sample detector mode.
- h) Do not use sweep triggering. Allow the sweep to “free run”.
- i) Trace average at least 100 traces in power averaging (i.e., RMS) mode; however, the number of traces to be averaged shall be increased above 100 as needed such that the average accurately represents the true average over the on and off periods of the transmitter.
- j) Compute power by integrating the spectrum across the OBW of the signal using the instrument’s band power measurement function with band limits set equal to the OBW band edges. If the instrument does not have a band power function, sum the spectrum levels (in power units) at intervals equal to the RBW extending across the entire OBW of the spectrum.
- k) Add  $10 \log (1/x)$ , where  $x$  is the duty cycle, to the measured power in order to compute the average power during the actual transmission times (because the measurement represents an average over both the on- and off-times of the transmission). For example, add  $10 \log (1/0.25) = 6$  dB if the duty cycle is 25 %.

#### 4.3.4 Deviation of Test Standard

No deviation.

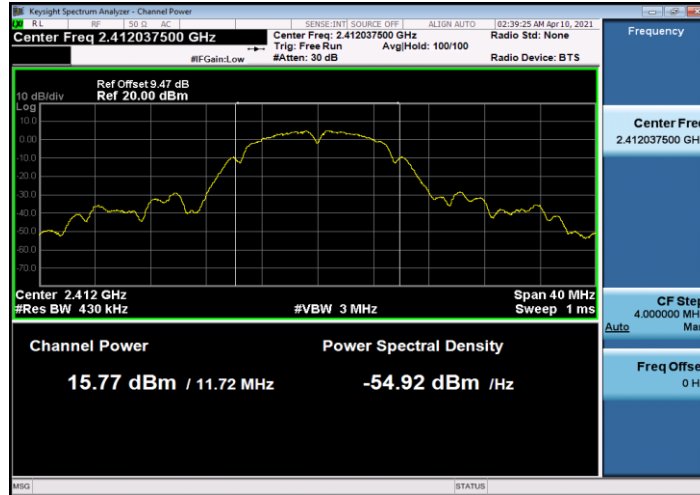


#### 4.3.5 Test Results

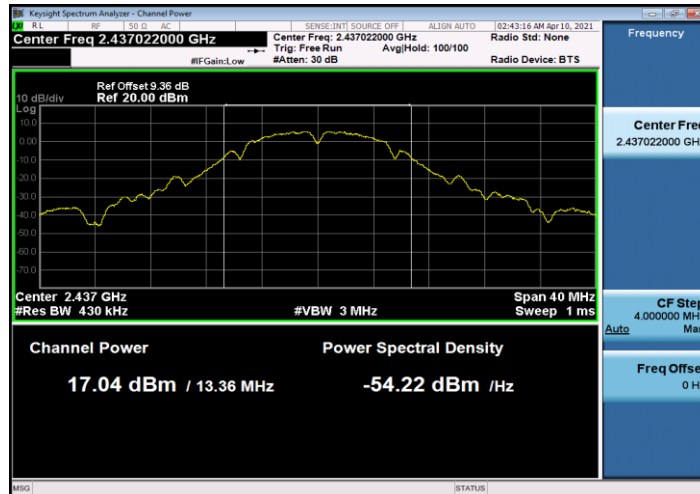
| Test Mode | Antenna | Channel [MHz] | Level [dBm] | 10log(1/x) Factor[dB] | Power [dBm] | Limit [dBm] | Verdict |
|-----------|---------|---------------|-------------|-----------------------|-------------|-------------|---------|
| 11B       | Ant1    | 2412          | 15.77       | 0.51                  | 16.28       | <=30        | PASS    |
|           |         | 2437          | 17.04       | 0.51                  | 17.55       | <=30        | PASS    |
|           |         | 2462          | 16.64       | 0.51                  | 17.15       | <=30        | PASS    |
| 11G       | Ant1    | 2412          | 13.95       | 0.64                  | 14.59       | <=30        | PASS    |
|           |         | 2437          | 16.32       | 0.59                  | 16.91       | <=30        | PASS    |
|           |         | 2462          | 15.98       | 0.64                  | 16.62       | <=30        | PASS    |
| 11N20SISO | Ant1    | 2412          | 13.27       | 0.68                  | 13.95       | <=30        | PASS    |
|           |         | 2437          | 15.84       | 0.68                  | 16.52       | <=30        | PASS    |
|           |         | 2462          | 15.88       | 0.68                  | 16.56       | <=30        | PASS    |



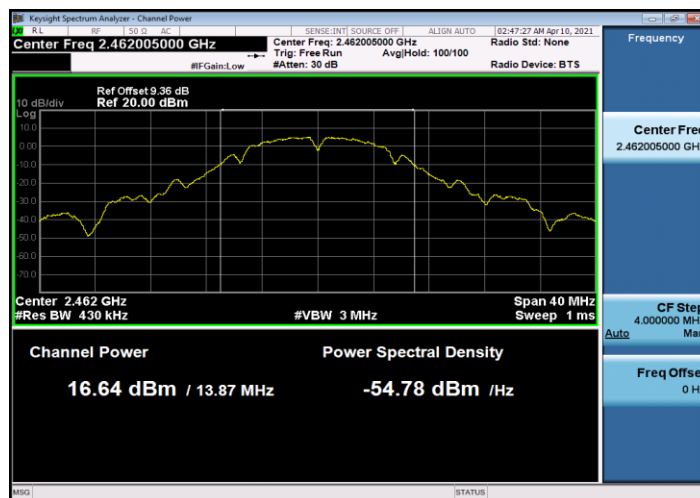
### 11B\_Ant1\_2412



### 11B\_Ant1\_2437

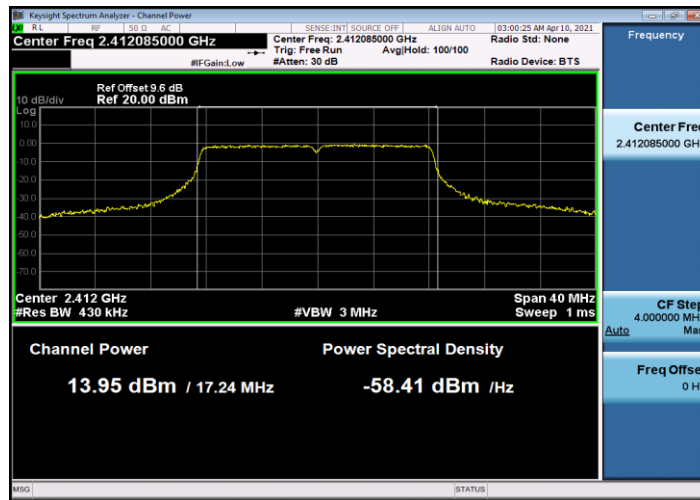


### 11B\_Ant1\_2462

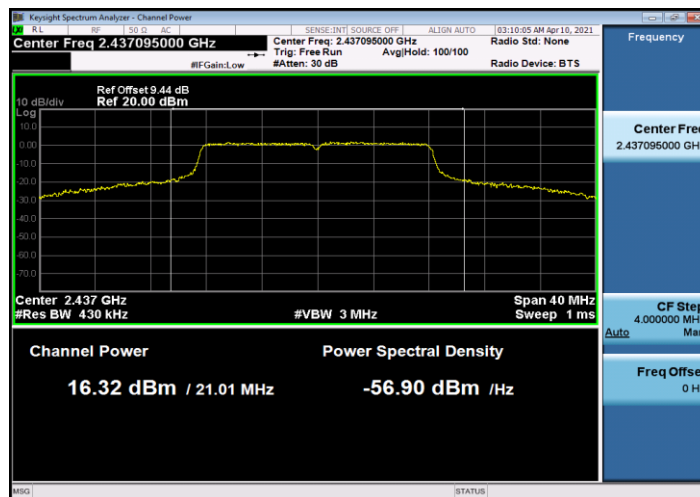




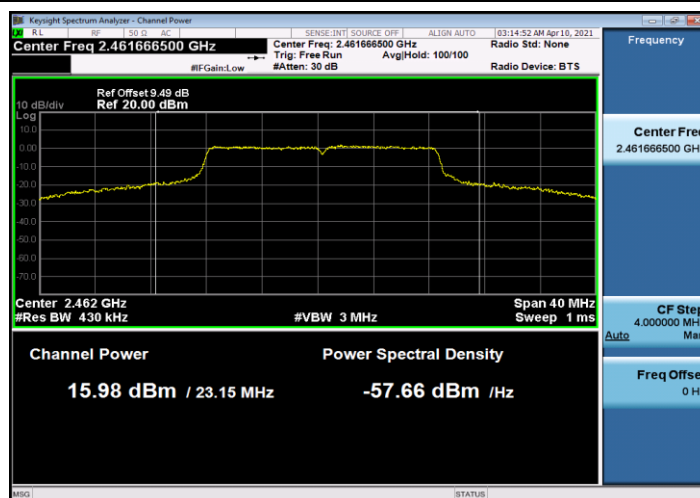
## 11G\_Ant1\_2412



## 11G\_Ant1\_2437

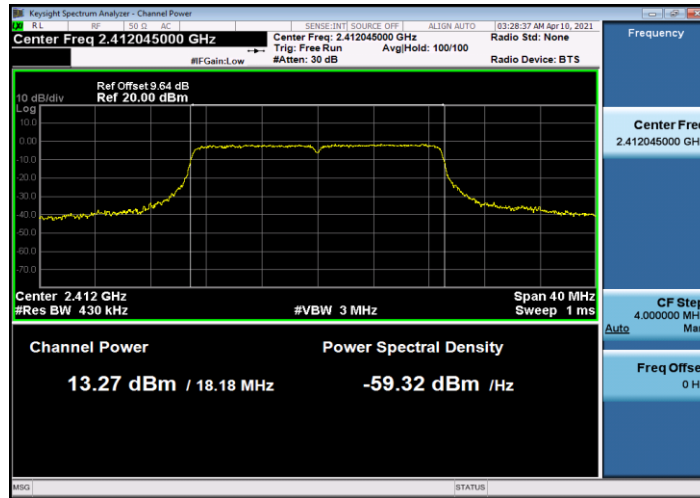


## 11G\_Ant1\_2462

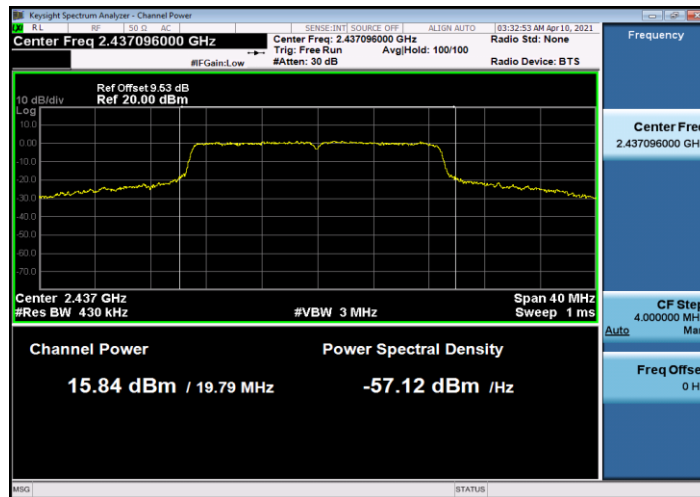




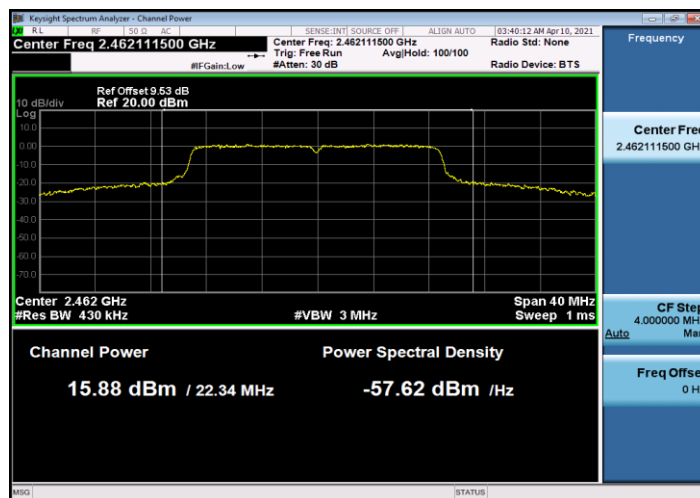
### 11N20SISO\_Ant1\_2412



### 11N20SISO\_Ant1\_2437



### 11N20SISO\_Ant1\_2462

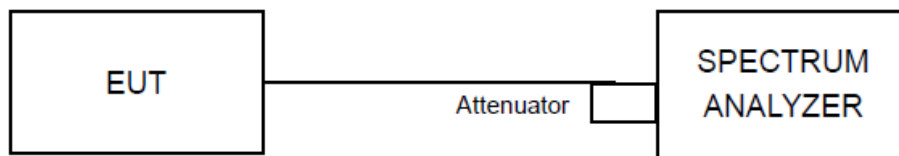


## 4.4 Power Spectral Density

### 4.4.1 Limit

The Maximum of Power Spectral Density Measurement is 8 dBm in any 3 kHz band.

### 4.4.2 Test Setup



### 4.4.3 Test Procedures

The power output per FCC § 15.247(e) was tested according to DTS test procedure of “KDB558074 D01 DTS Meas Guidance” (clause 10.5) for compliance to FCC 47CFR 15.247 requirements.

- Measure the duty cycle (x) of the transmitter output signal.
- Set instrument center frequency to DTS channel center frequency.
- Set span to at least 1.5 OBW.
- Set RBW to:  $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$ .
- Set VBW  $\geq 3 \text{ RBW}$ .
- Detector = power averaging (RMS) or sample detector (when RMS not available).
- Ensure that the number of measurement points in the sweep  $\geq 2 \text{ span/RBW}$ .
- Sweep time = auto couple.
- Do not use sweep triggering. Allow sweep to “free run”.
- Employ trace averaging (RMS) mode over a minimum of 100 traces.
- Use the peak marker function to determine the maximum amplitude level.
- Add  $10 \log (1/x)$ , where x is the duty cycle measured in step (a), to the measured PSD to compute the average PSD during the actual transmission time.
- If resultant value exceeds the limit, then reduce RBW (no less than 3 kHz) and repeat (note that this may require zooming in on the emission of interest and reducing the span in order to meet the minimum measurement point requirement as the RBW is reduced).

### 4.4.4 Deviation of Test Standard

No deviation.



#### 4.4.5 Test Results

| Test Mode     | Antenna | Channel [MHz] | Level [dBm] | 10log(1/x) Factor[dB] | PSD [dBm/3kHz] | Limit [dBm/3kHz] | Verdict |
|---------------|---------|---------------|-------------|-----------------------|----------------|------------------|---------|
| 11B           | Ant1    | 2412          | -16.2       | 0.51                  | -15.69         | <=8              | PASS    |
|               |         | 2437          | -15.59      | 0.51                  | -15.08         | <=8              | PASS    |
|               |         | 2462          | -16.3       | 0.51                  | -15.79         | <=8              | PASS    |
| 11G           | Ant1    | 2412          | -20.38      | 0.64                  | -19.74         | <=8              | PASS    |
|               |         | 2437          | -18.09      | 0.59                  | -17.5          | <=8              | PASS    |
|               |         | 2462          | -18.04      | 0.64                  | -17.4          | <=8              | PASS    |
| 11N20SI<br>SO | Ant1    | 2412          | -20.94      | 0.68                  | -20.26         | <=8              | PASS    |
|               |         | 2437          | -18.31      | 0.68                  | -17.63         | <=8              | PASS    |
|               |         | 2462          | -18.09      | 0.68                  | -17.41         | <=8              | PASS    |



### 11B\_Ant1\_2412



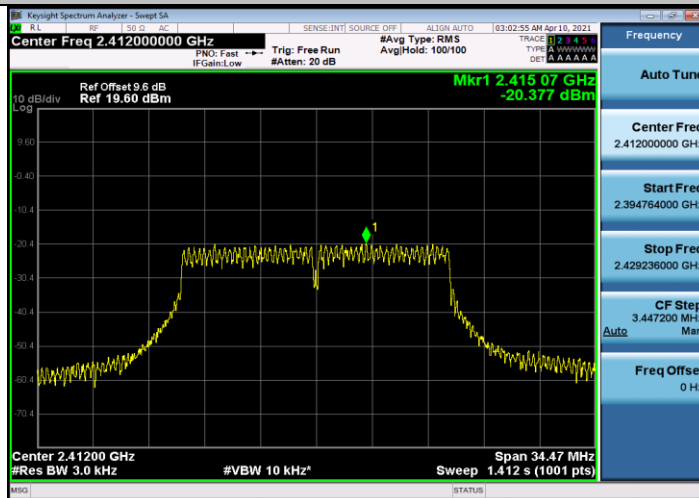
### 11B\_Ant1\_2437



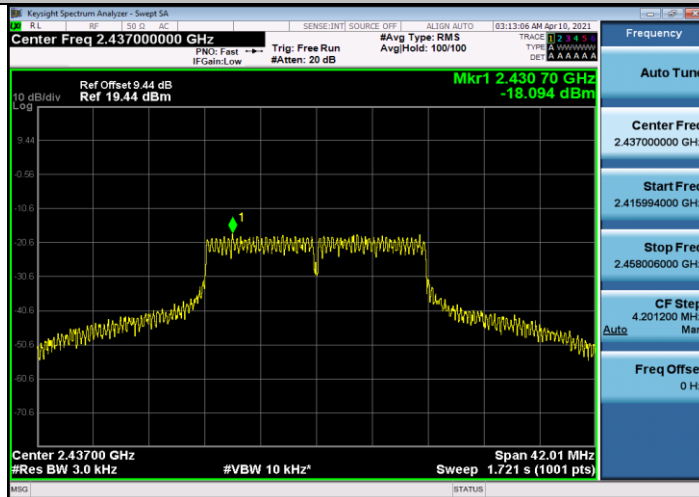
### 11B\_Ant1\_2462



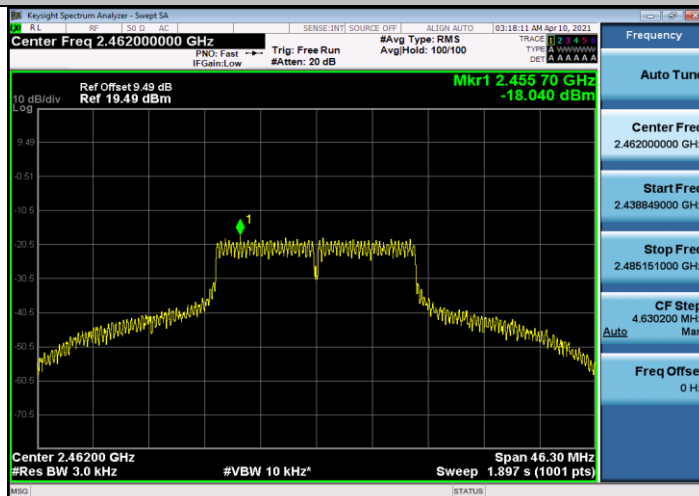
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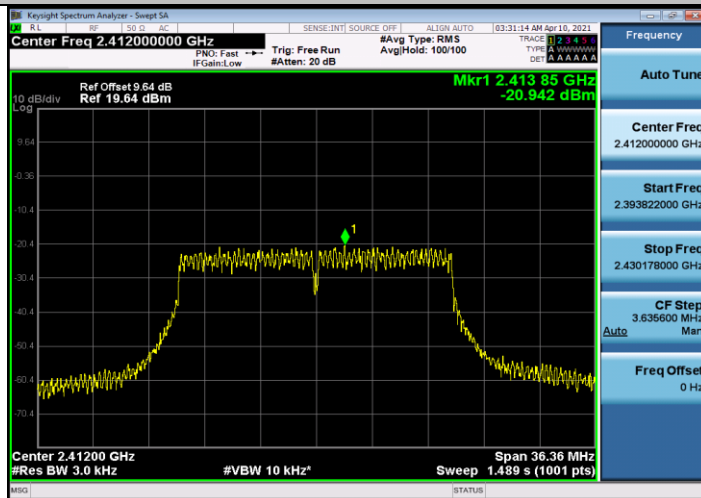
### 11G\_Ant1\_2437



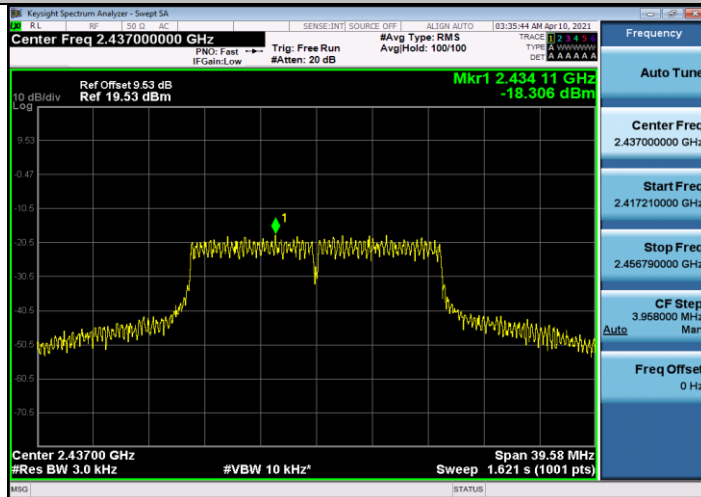
### 11G\_Ant1\_2462



11N20SISO\_Ant1\_2412



11N20SISO\_Ant1\_2437



11N20SISO\_Ant1\_2462

