

## 10. BANDWIDTH TEST

### 10.1 Block Diagram Of Test Setup



### 10.2 Limit

| FCC Part15 (15.247) , Subpart C |           |                                         |                       |        |
|---------------------------------|-----------|-----------------------------------------|-----------------------|--------|
| Section                         | Test Item | Limit                                   | Frequency Range (MHz) | Result |
| 15.247(a)(2)                    | Bandwidth | $\geq 500\text{KHz}$<br>(6dB bandwidth) | 2400-2483.5           | PASS   |

### 10.3 Test procedure

1. Set RBW = 100 kHz.
2. Set the video bandwidth (VBW)  $\geq 3 \times$  RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. 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.

### 10.4 EUT operating Conditions

The EUT tested system was configured as the statements of 4.6 Unless otherwise a special operating condition is specified in the follows during the testing.

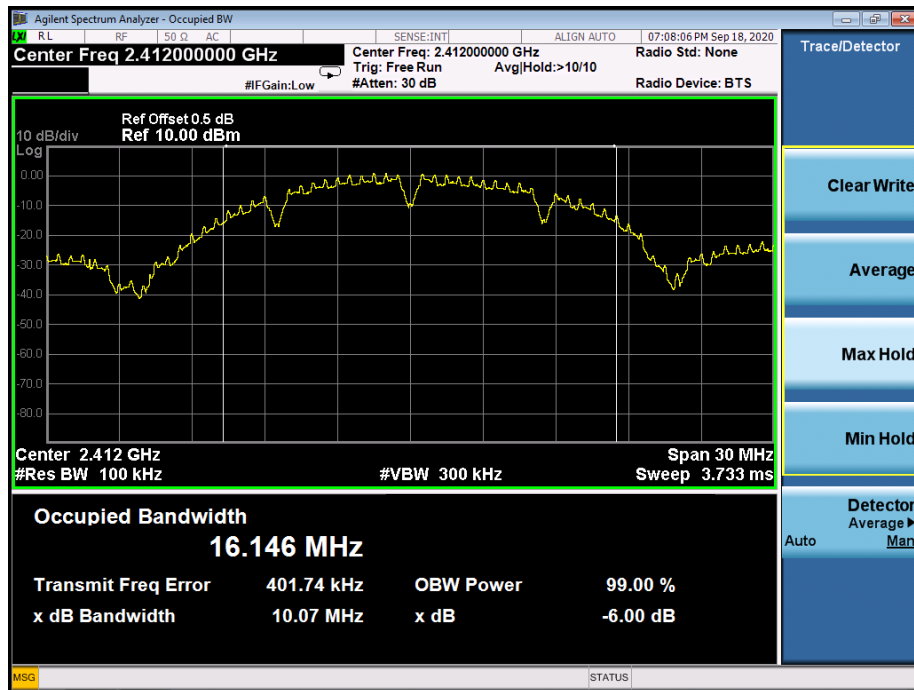
Note: Power Spectral Density(dBm)=Reading+Cable Loss

## 10.5 Test Result

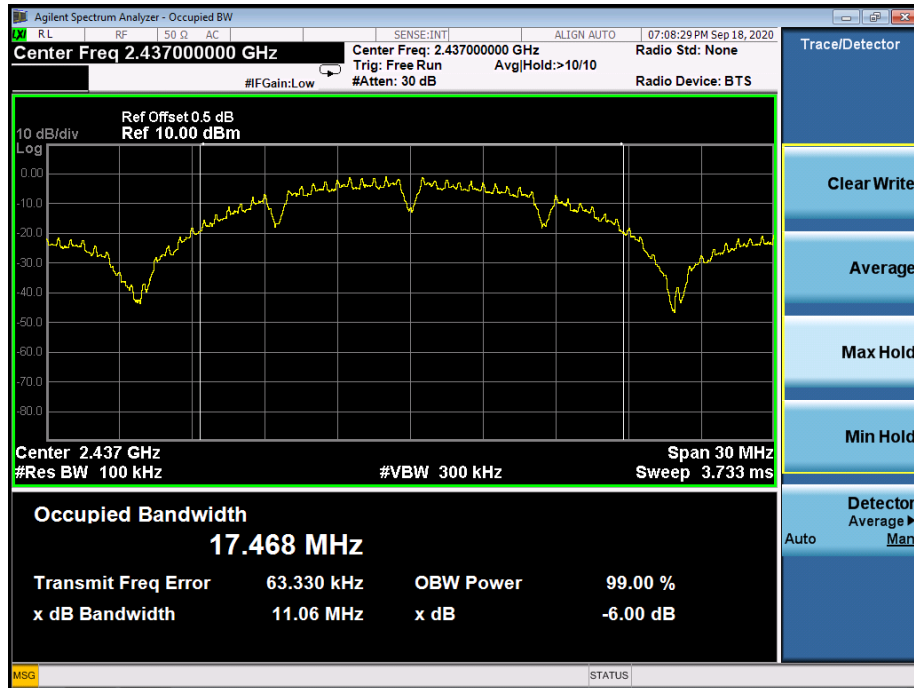
|               |           |                     |        |
|---------------|-----------|---------------------|--------|
| Temperature : | 26°C      | Relative Humidity : | 54%    |
| Pressure :    | 101kPa    | Test Voltage :      | DC 12V |
| Test Mode :   | TX b Mode |                     |        |

| Frequency (MHz) | 6dB bandwidth (MHz) | Limit (kHz) | Result |
|-----------------|---------------------|-------------|--------|
| 2412            | 10.07               | 500         | Pass   |
| 2437            | 11.06               | 500         | Pass   |
| 2462            | 11.54               | 500         | Pass   |

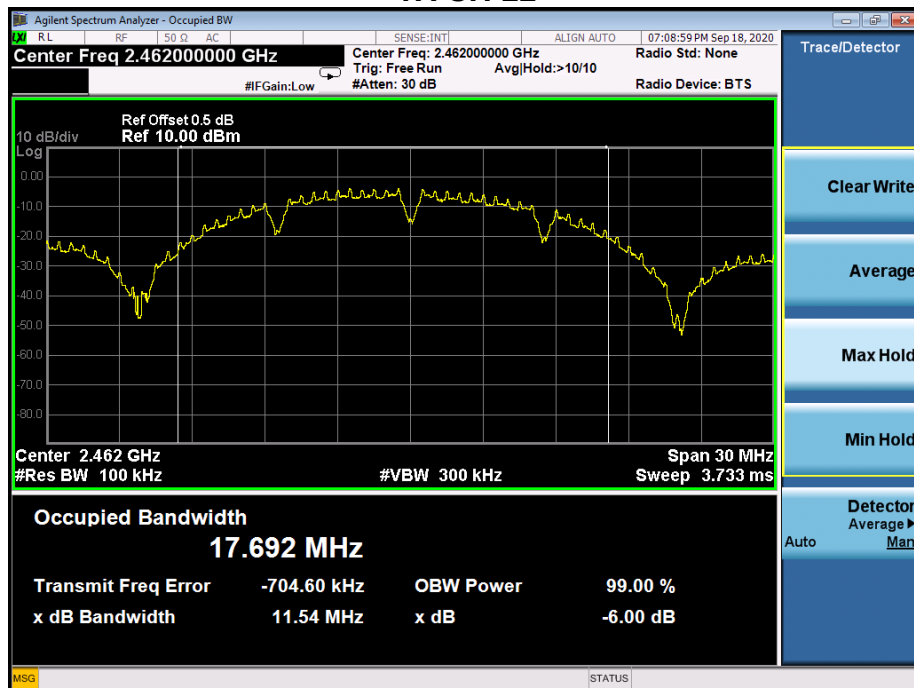
### TX CH 01



### TX CH 06



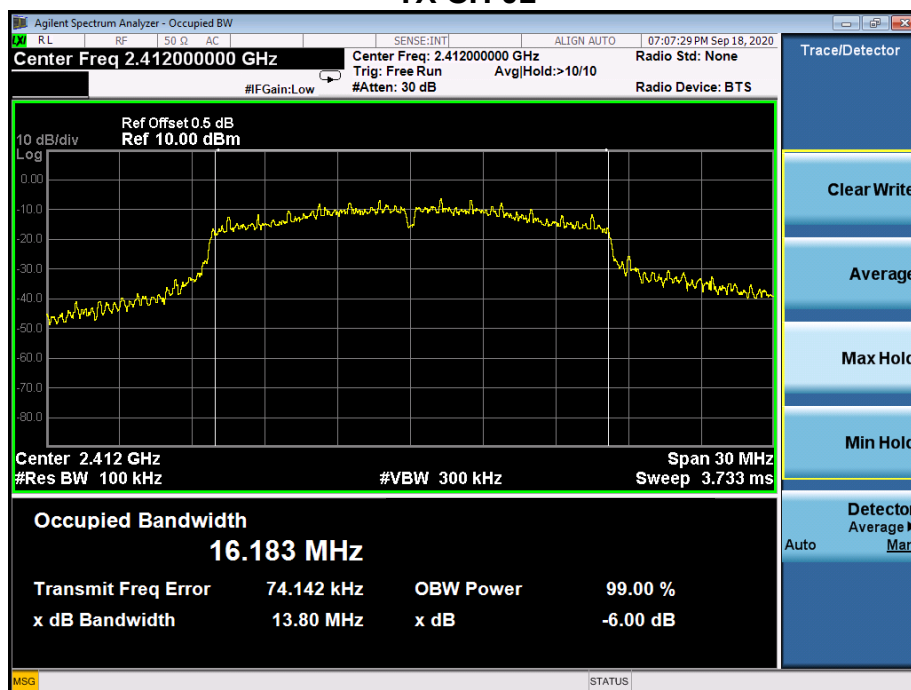
### TX CH 11



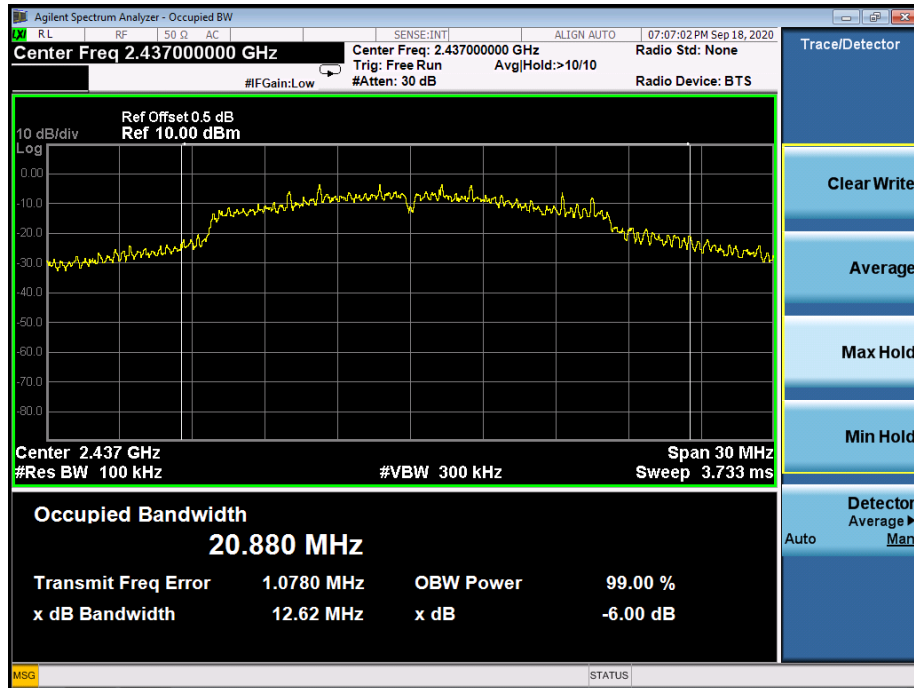
|               |           |                     |        |
|---------------|-----------|---------------------|--------|
| Temperature : | 26°C      | Relative Humidity : | 54%    |
| Pressure :    | 101kPa    | Test Voltage :      | DC 12V |
| Test Mode :   | TX g Mode |                     |        |

| Frequency (MHz) | 6dB bandwidth (MHz) | Limit (kHz) | Result |
|-----------------|---------------------|-------------|--------|
| 2412            | 13.80               | 500         | Pass   |
| 2437            | 12.62               | 500         | Pass   |
| 2462            | 15.07               | 500         | Pass   |

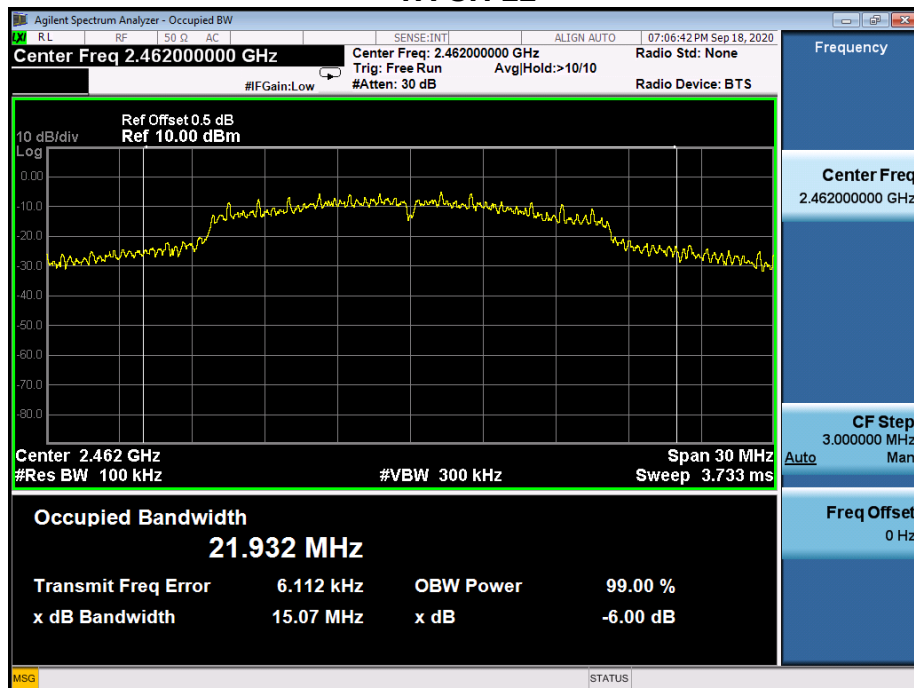
### TX CH 01



### TX CH 06



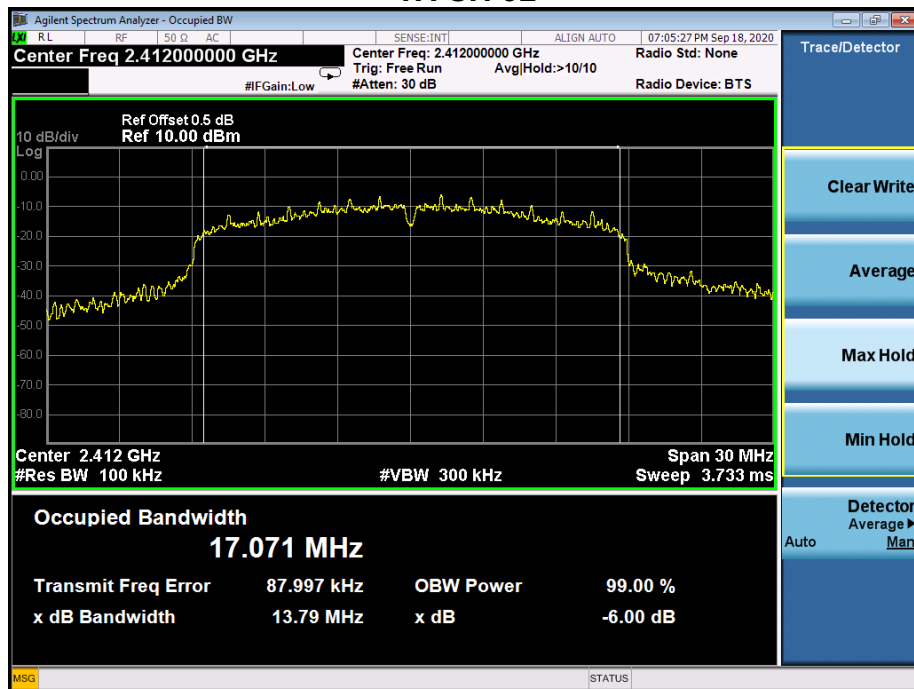
### TX CH 11



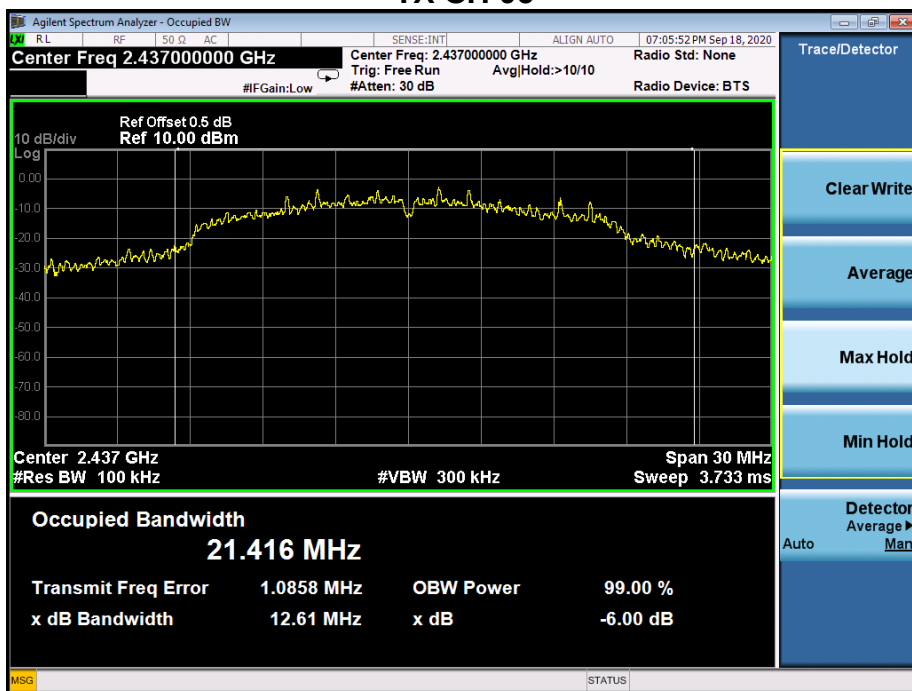
|               |                |                     |        |
|---------------|----------------|---------------------|--------|
| Temperature : | 26°C           | Relative Humidity : | 54%    |
| Pressure :    | 101kPa         | Test Voltage :      | DC 12V |
| Test Mode :   | TX n Mode(20M) |                     |        |

| Frequency (MHz) | 6dB bandwidth (MHz) | Limit (kHz) | Result |
|-----------------|---------------------|-------------|--------|
| 2412            | 13.79               | 500         | Pass   |
| 2437            | 12.61               | 500         | Pass   |
| 2462            | 15.08               | 500         | Pass   |

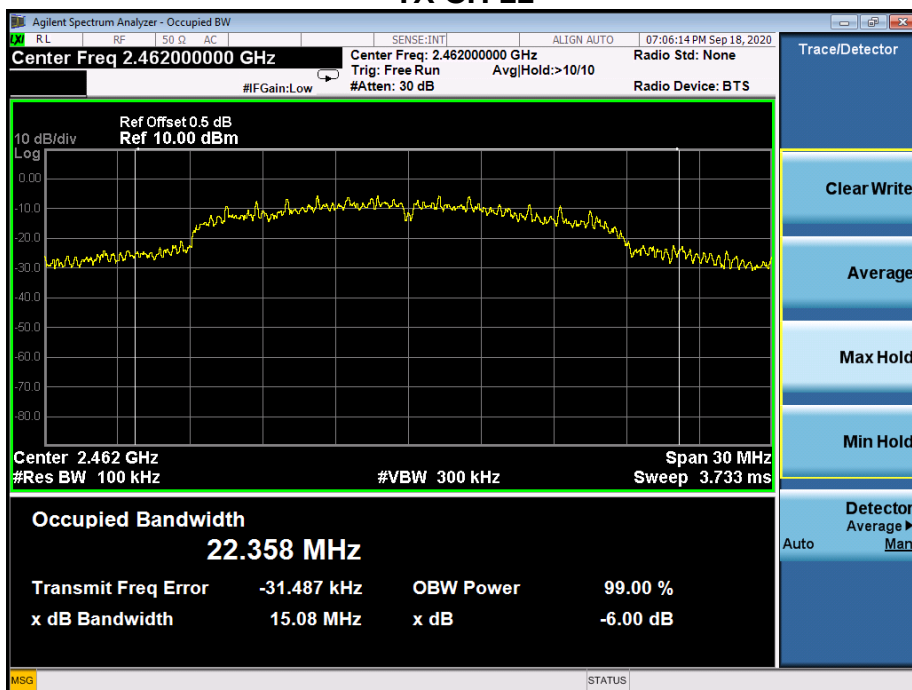
### TX CH 01



### TX CH 06



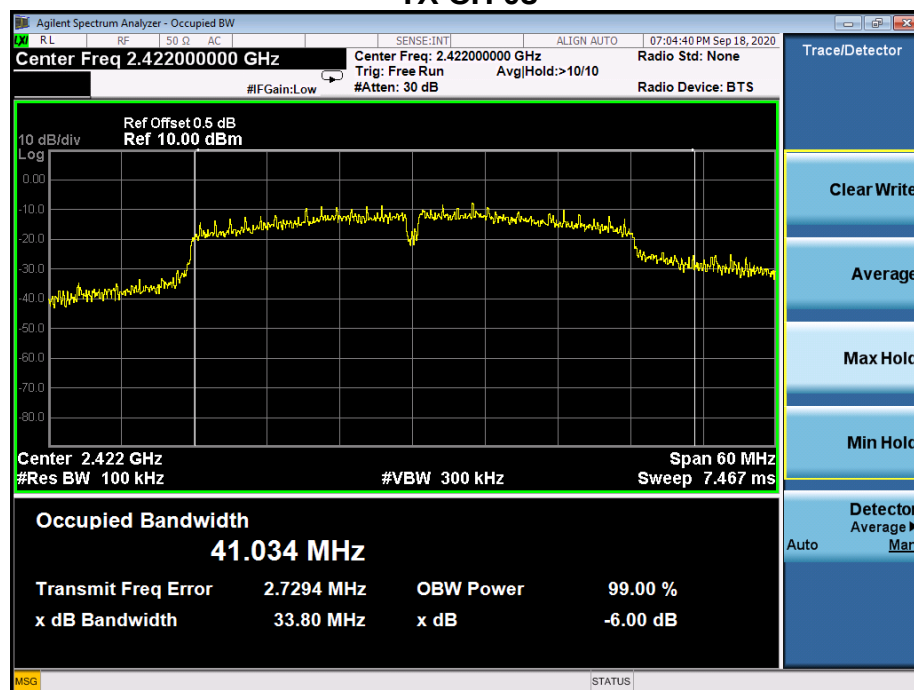
### TX CH 11



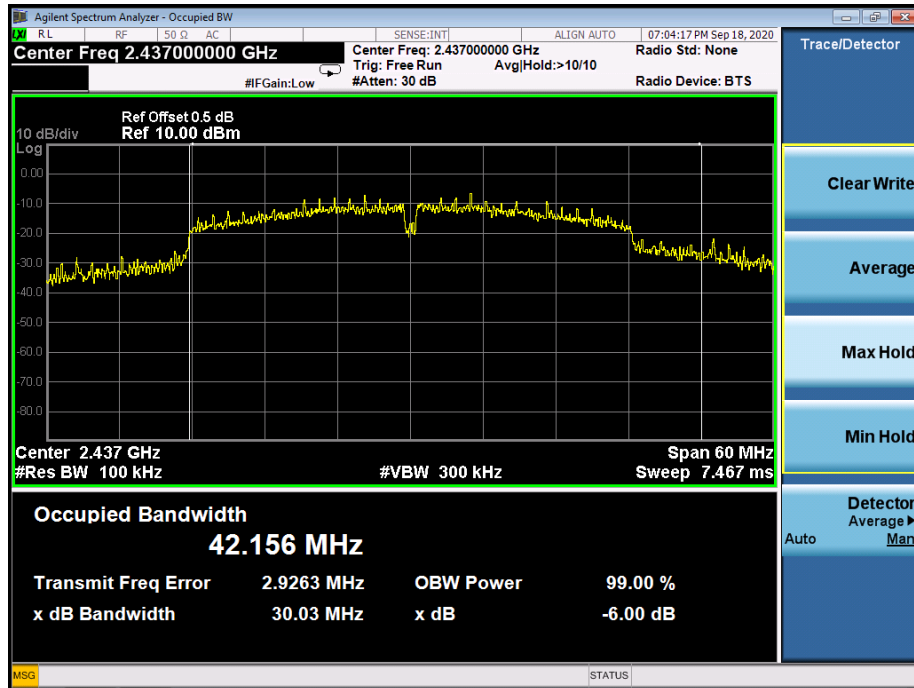
|               |                |                     |         |
|---------------|----------------|---------------------|---------|
| Temperature : | 26°C           | Relative Humidity : | 54%     |
| Pressure :    | 101kPa         | Test Voltage :      | DC 23Vz |
| Test Mode :   | TX n Mode(40M) |                     |         |

| Frequency (MHz) | 6dB bandwidth (MHz) | Limit (kHz) | Result |
|-----------------|---------------------|-------------|--------|
| 2422            | 33.80               | 500         | Pass   |
| 2437            | 30.03               | 500         | Pass   |
| 2452            | 26.38               | 500         | Pass   |

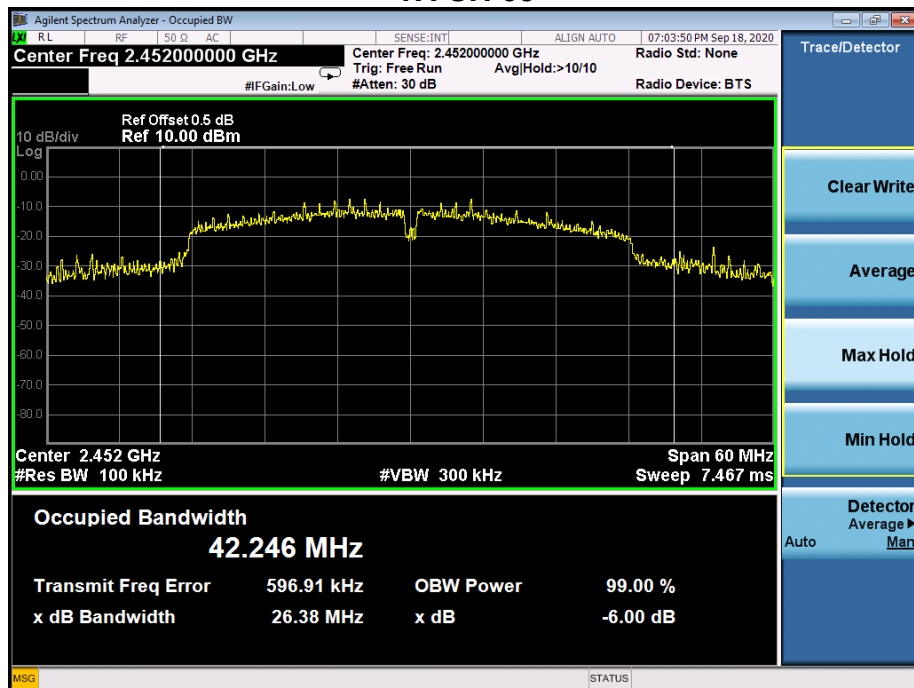
### TX CH 03



### TX CH 06



### TX CH 09



## 11. PEAK OUTPUT POWER TEST

### 11.1 Block Diagram Of Test Setup



### 11.2 Limit

| FCC Part15 (15.247) , Subpart C |                   |                 |                       |        |
|---------------------------------|-------------------|-----------------|-----------------------|--------|
| Section                         | Test Item         | Limit           | Frequency Range (MHz) | Result |
| 15.247(b)(3)                    | Peak Output Power | 1 watt or 30dBm | 2400-2483.5           | PASS   |

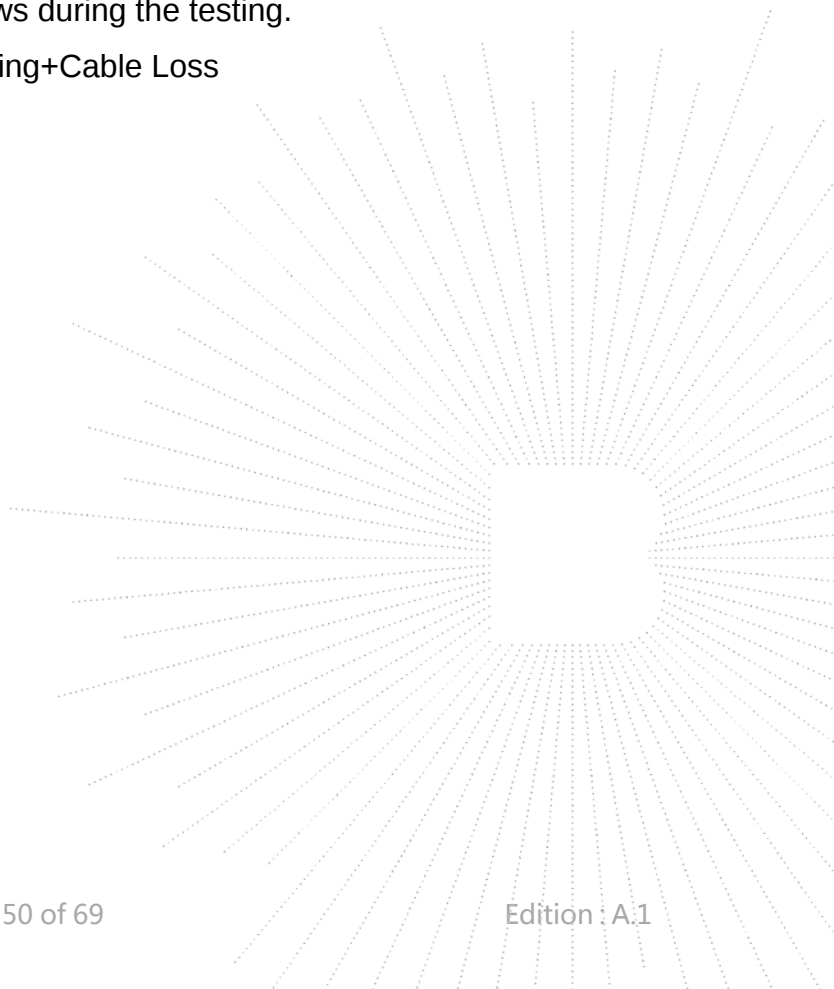
### 11.3 Test procedure

- a. The EUT was directly connected to the Power meter

### 11.4 EUT operating Conditions

The EUT tested system was configured as the statements of 4.6 Unless otherwise a special operating condition is specified in the follows during the testing.

Note: Power Spectral Density(dBm)=Reading+Cable Loss



## 11.5 Test Result

|               |        |                     |        |
|---------------|--------|---------------------|--------|
| Temperature : | 26°C   | Relative Humidity : | 54%    |
| Pressure :    | 101kPa | Test Voltage :      | DC 12V |

|           | Frequency | Maximum Conducted Output Power(PK) | LIMIT |
|-----------|-----------|------------------------------------|-------|
|           | (MHz)     | (dBm)                              | dBm   |
| 802.11b   | 2412      | 11.111                             | 30    |
|           | 2437      | 9.460                              | 30    |
|           | 2462      | 7.650                              | 30    |
| 802.11g   | 2412      | 9.964                              | 30    |
|           | 2437      | 9.294                              | 30    |
|           | 2462      | 6.597                              | 30    |
| 802.11n20 | 2412      | 8.777                              | 30    |
|           | 2437      | 8.876                              | 30    |
|           | 2462      | 6.523                              | 30    |
| 802.11n40 | 2422      | 7.536                              | 30    |
|           | 2437      | 7.476                              | 30    |
|           | 2452      | 6.427                              | 30    |

## 12. 100 KHZ BANDWIDTH OF FREQUENCY BAND EDGE

### 12.1 Block Diagram Of Test Setup



### 12.2 Limit

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.

### 12.3 Test procedure

Using the following spectrum analyzer setting:

- a) Set the RBW = 100KHz.
- b) Set the VBW = 300KHz.
- c) Sweep time = auto couple.
- d) Detector function = peak.
- e) Trace mode = max hold.
- f) Allow trace to fully stabilize..

### 12.4 EUT operating Conditions

The EUT tested system was configured as the statements of 4.6 Unless otherwise a special operating condition is specified in the follows during the testing.

Note: Power Spectral Density(dBm)=Reading+Cable Loss

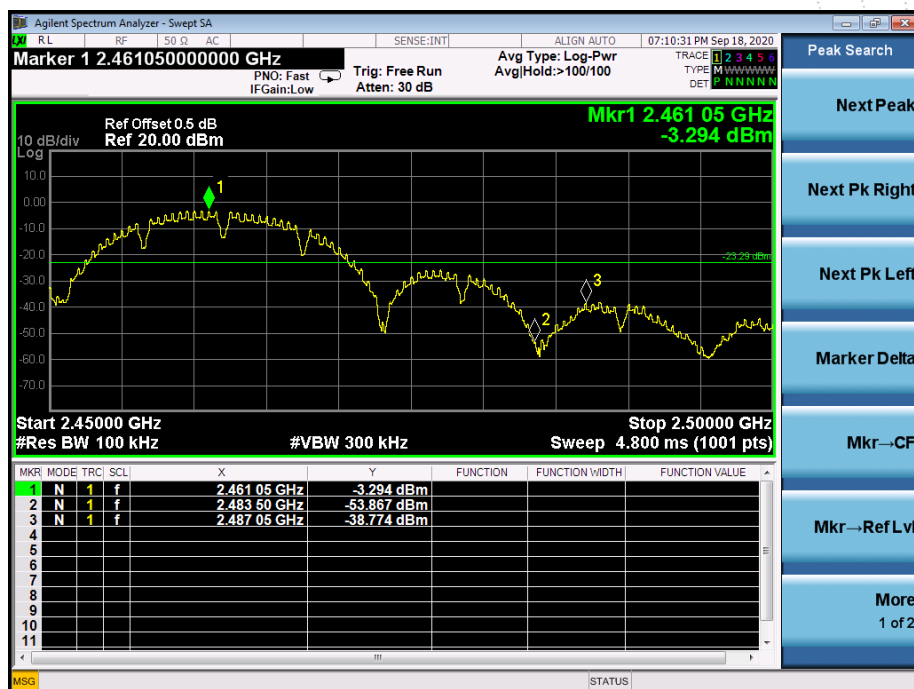
## 12.5 Test Result

|               |        |                     |        |
|---------------|--------|---------------------|--------|
| Temperature : | 26°C   | Relative Humidity : | 54%    |
| Pressure :    | 101kPa | Test Voltage :      | DC 12V |

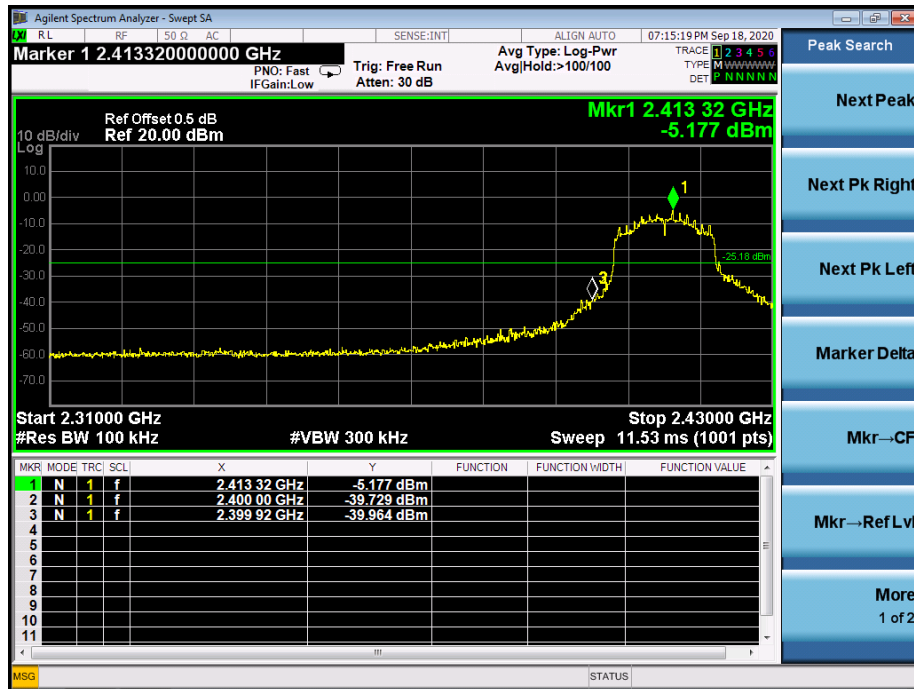
802.11b: Band Edge, Left Side



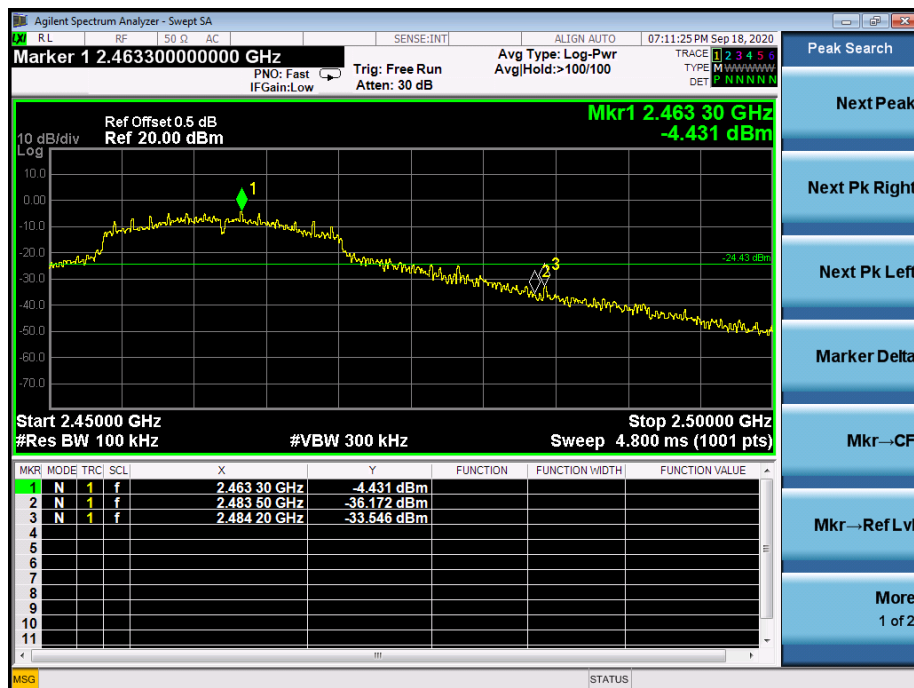
802.11b: Band Edge, Right Side



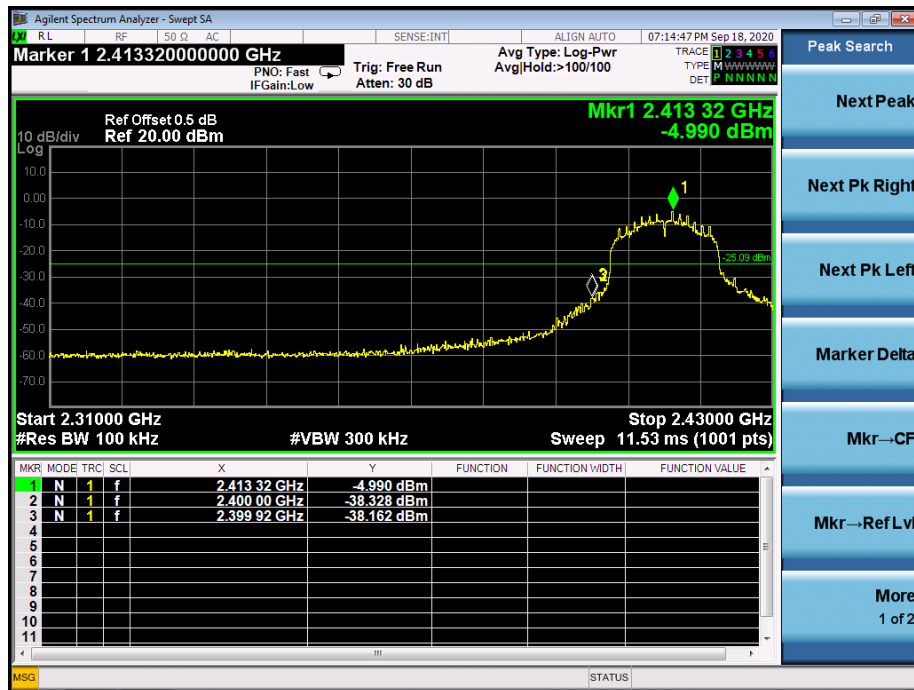
## 802.11g: Band Edge, Left Side



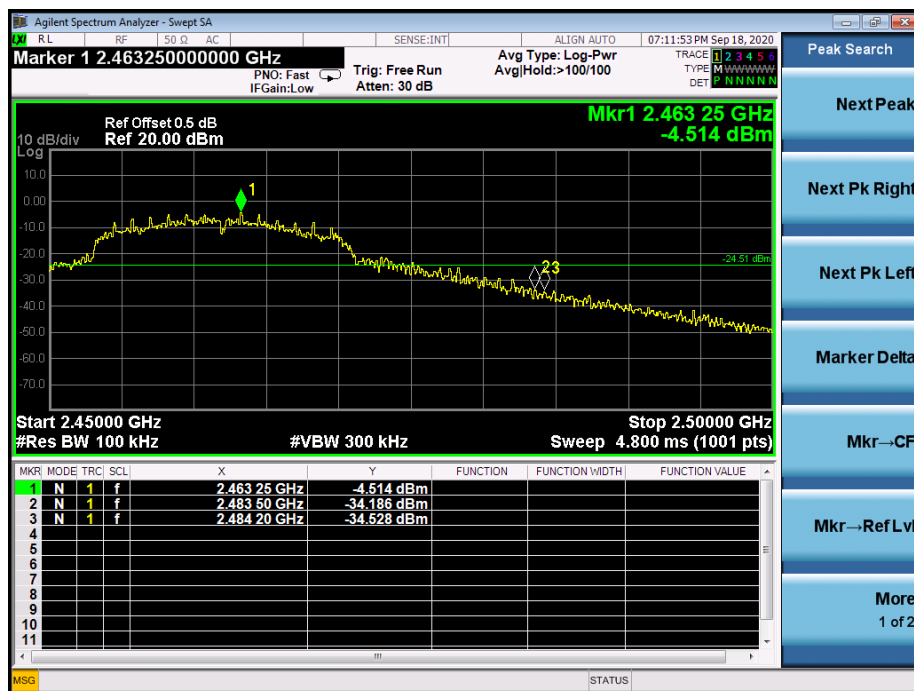
## 802.11g: Band Edge, Right Side



### 802.11n-HT20: Band Edge, Left Side



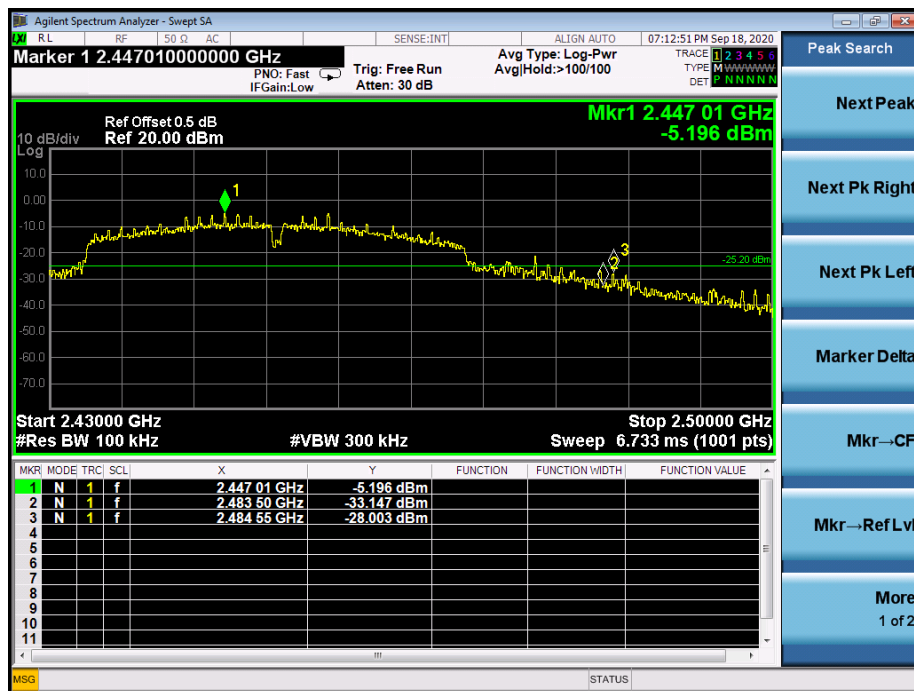
### 802.11n-HT20: Band Edge, Right Side



## 802.11n-HT40: Band Edge, Left Side



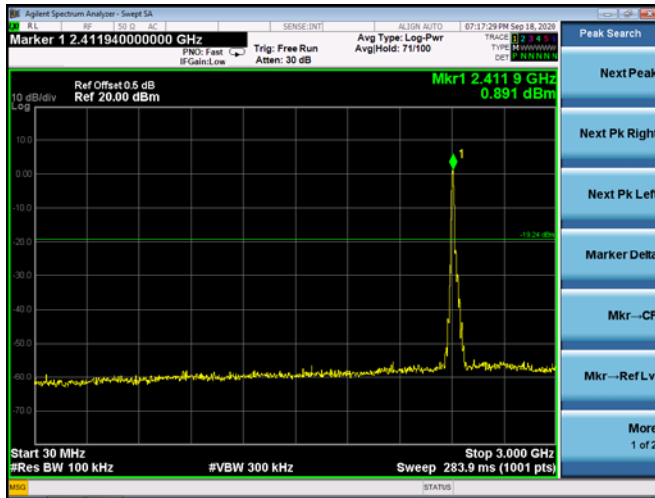
## 802.11n-HT40: Band Edge, Right Side



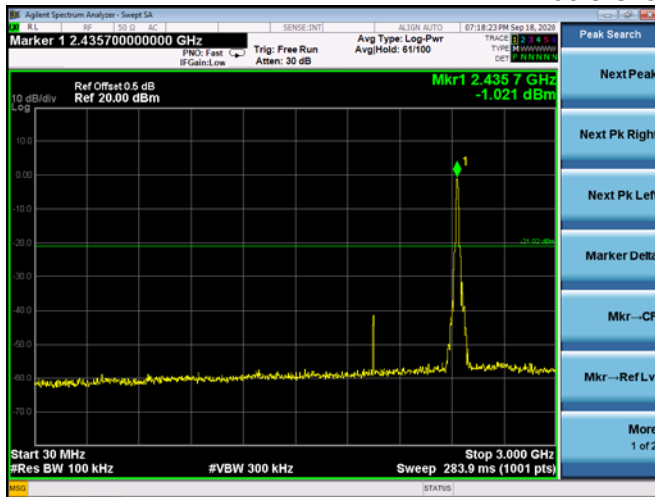
# CONDUCTED EMISSION MEASUREMENT

802.11b

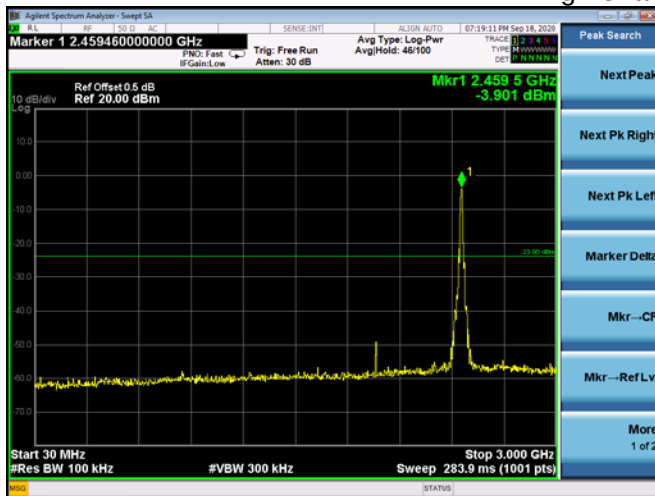
## Low Channel 2412MHz



## Middle Channel 2437MHz

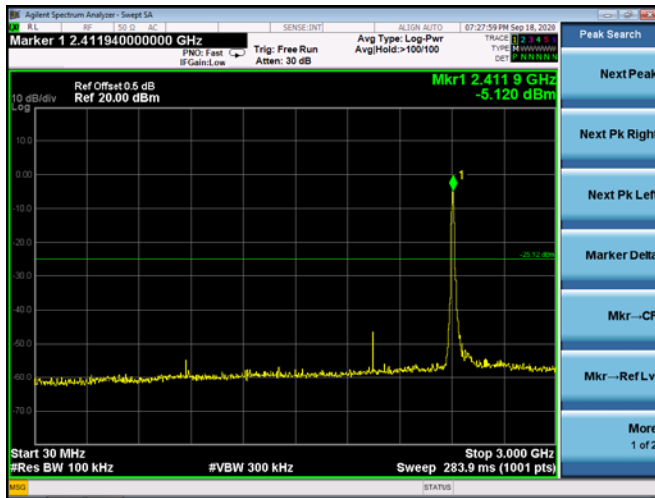


## High Channel 2462MHz

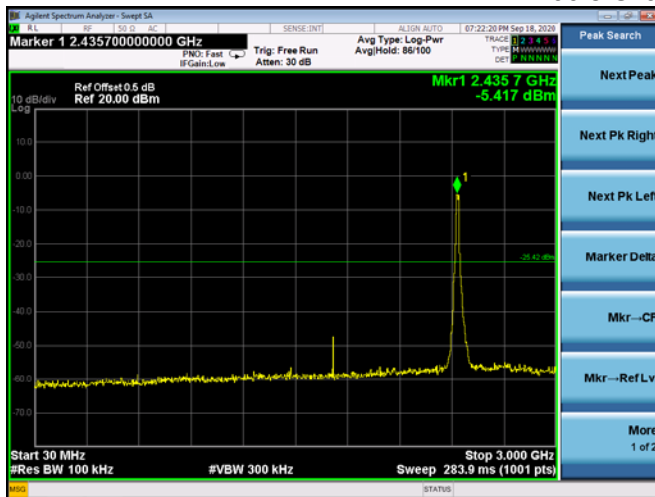


802.11g

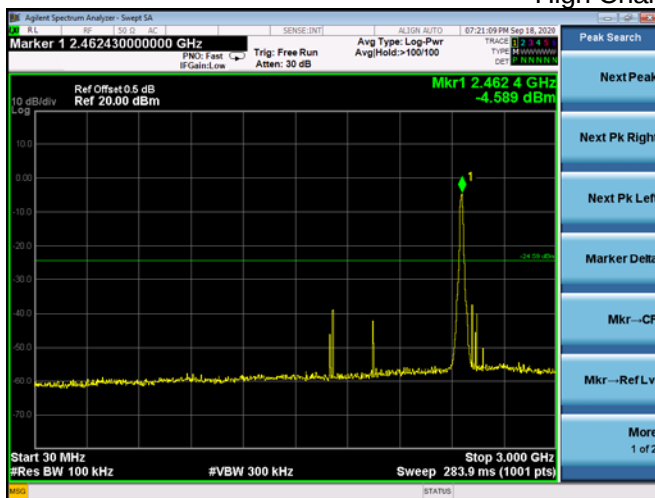
### Low Channel 2412MHz



### Middle Channel 2437MHz

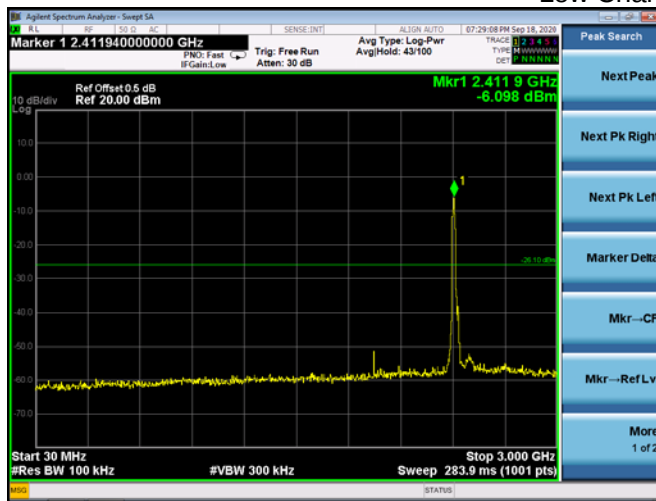


### High Channel 2462MHz

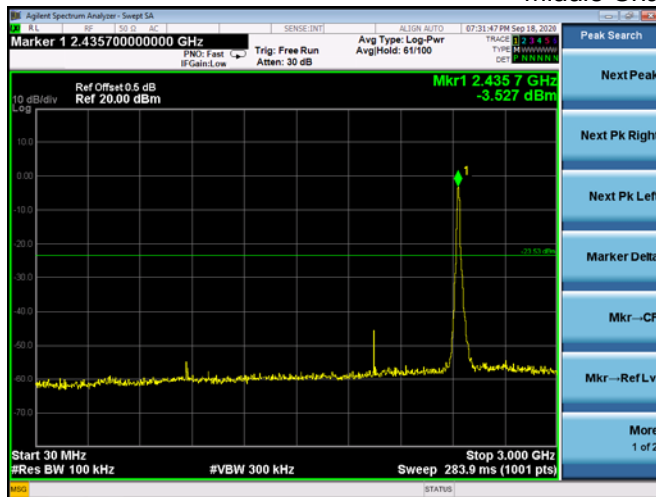


802.11n20

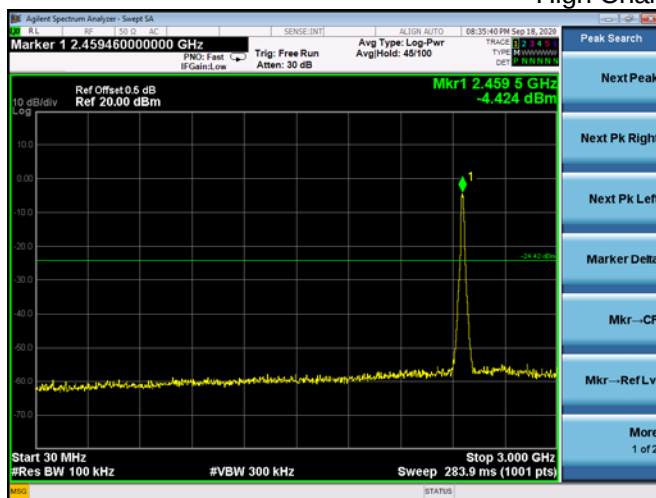
### Low Channel 2412MHz



### Middle Channel 2437MHz

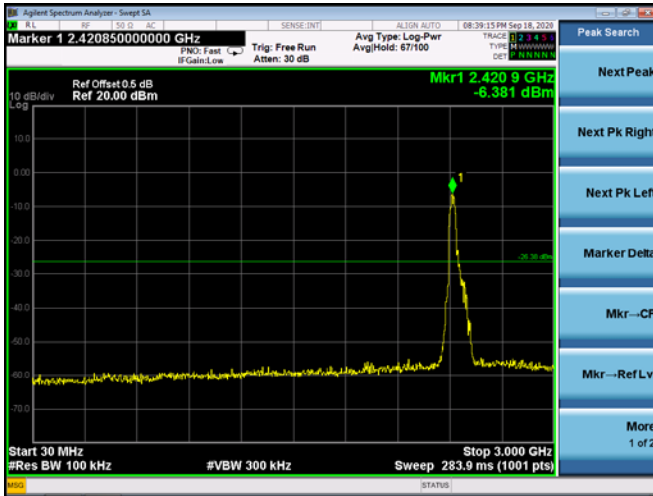


### High Channel 2462MHz

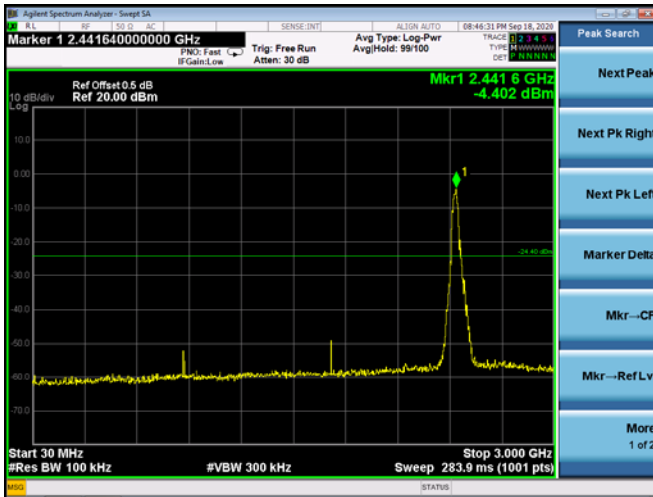


802.11n40

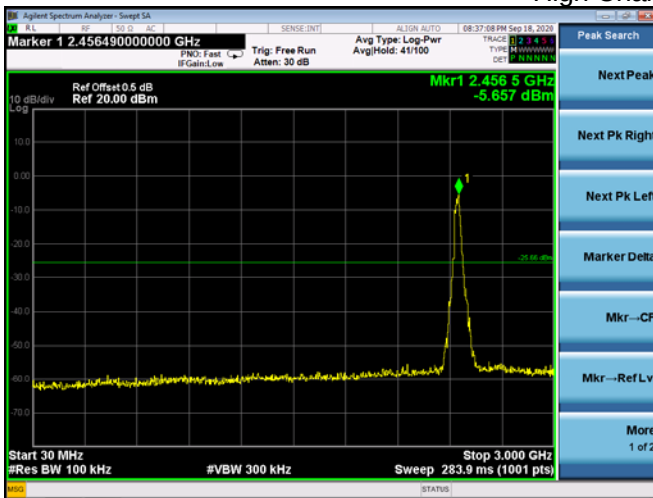
### Low Channel 2422MHz



### Middle Channel 2437MHz



### High Channel 2452MHz



## 13. DUTY CYCLE OF TEST SIGNAL

### 13.1 Standard requirement

Pre-analysis Check: While conducting average power measurement, duty cycle of each mode shall be checked to ensure its duty cycle in order to compensate for the loss due to insufficient ratio of duty cycle.

All duty cycle is pre-scanned, and result as obtained below shows only the most representative ones where duty cycle is conducted as the given transmission with given virtual operation that expresses the percentage.

### 13.2 Formula

Duty Cycle =  $T_{on} / (T_{on} + T_{off})$

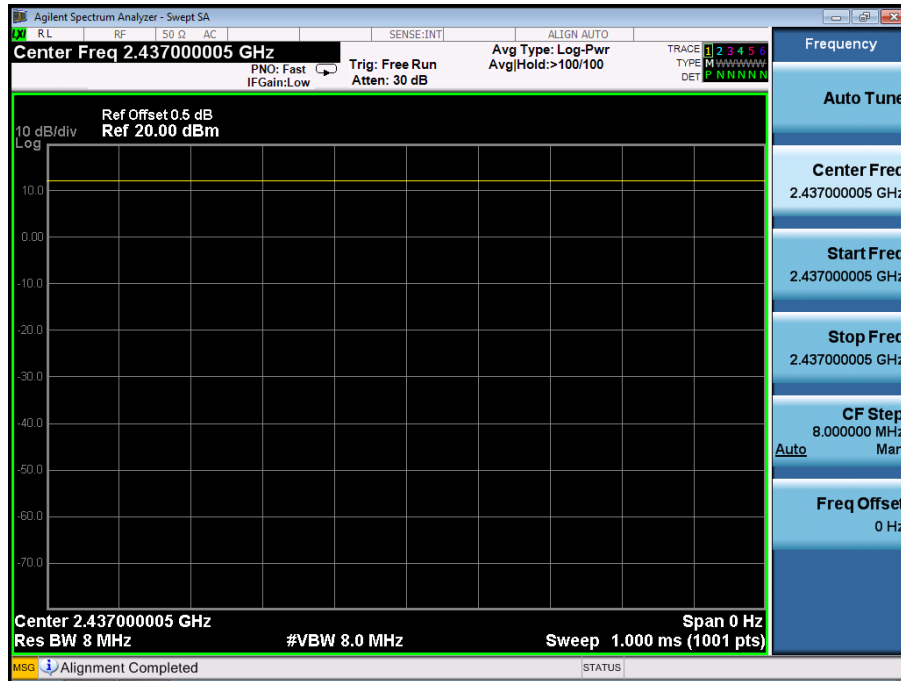
### 13.3 Test procedure

1. Set span = Zero
2. RBW = 8MHz
3. VBW = 8MHz,
4. Detector = Peak

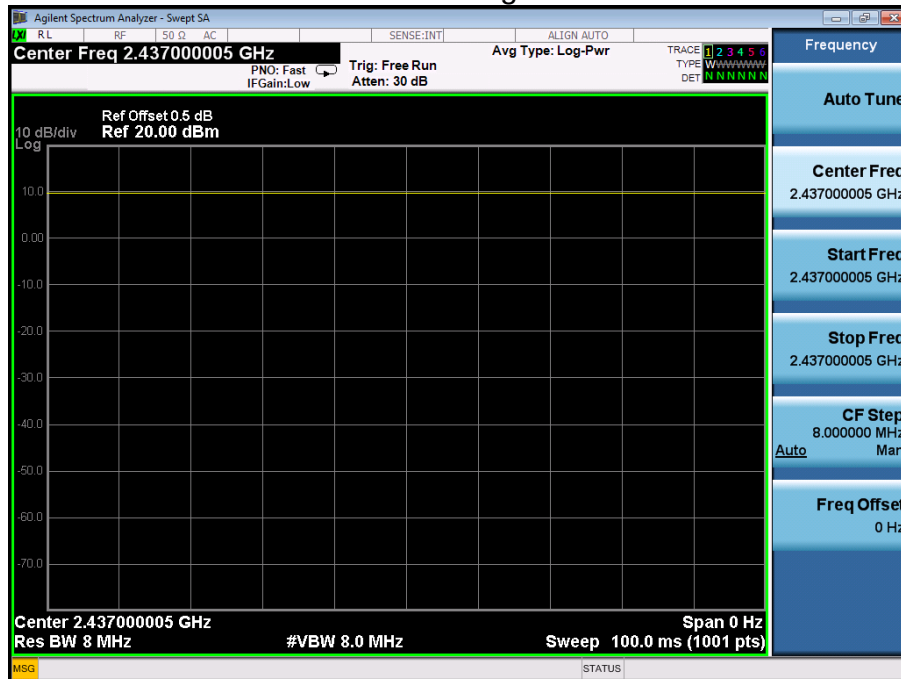
### 13.4 Test Result

|               | Duty Cycle | Duty Fator<br>(dB) |
|---------------|------------|--------------------|
| 802.11b       | 1          | 0                  |
| 802.11g       | 1          | 0                  |
| 802.11n(HT20) | 1          | 0                  |
| 802.11n(HT40) | 1          | 0                  |

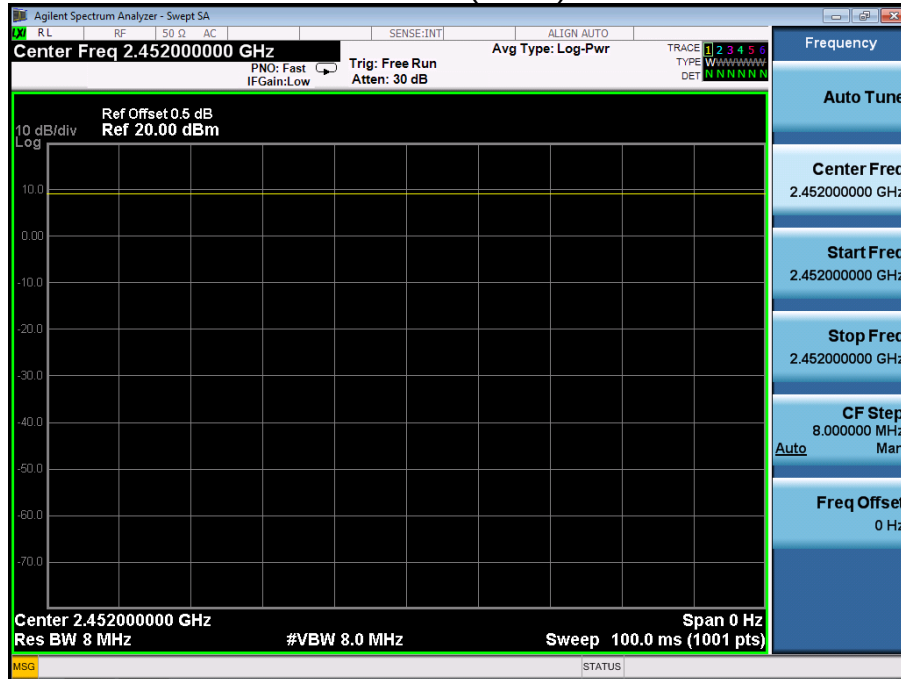
### 802.11b



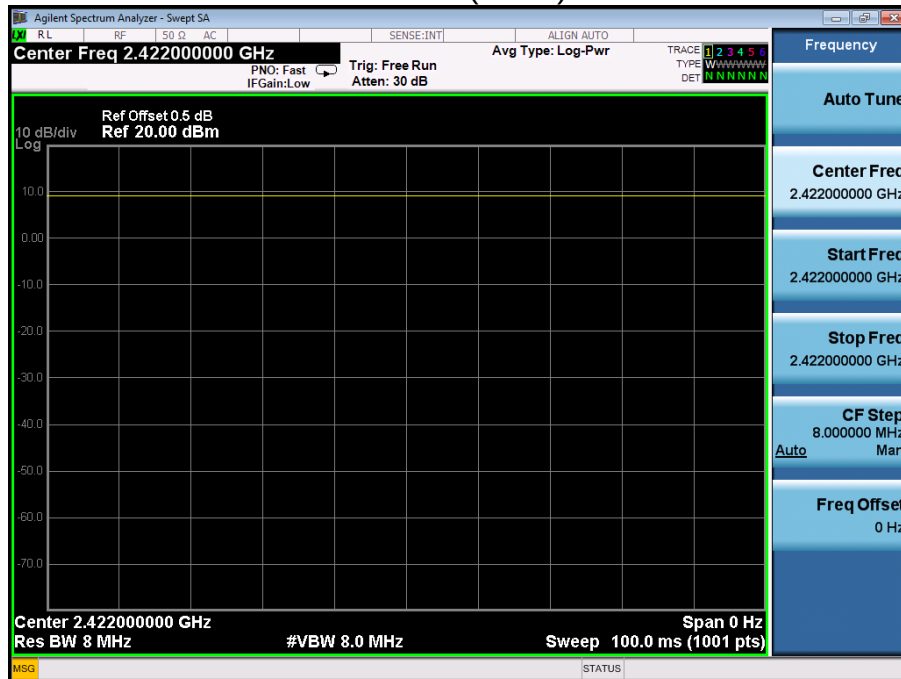
### 802.11g



### 802.11n(HT20)



### 802.11n(HT40)



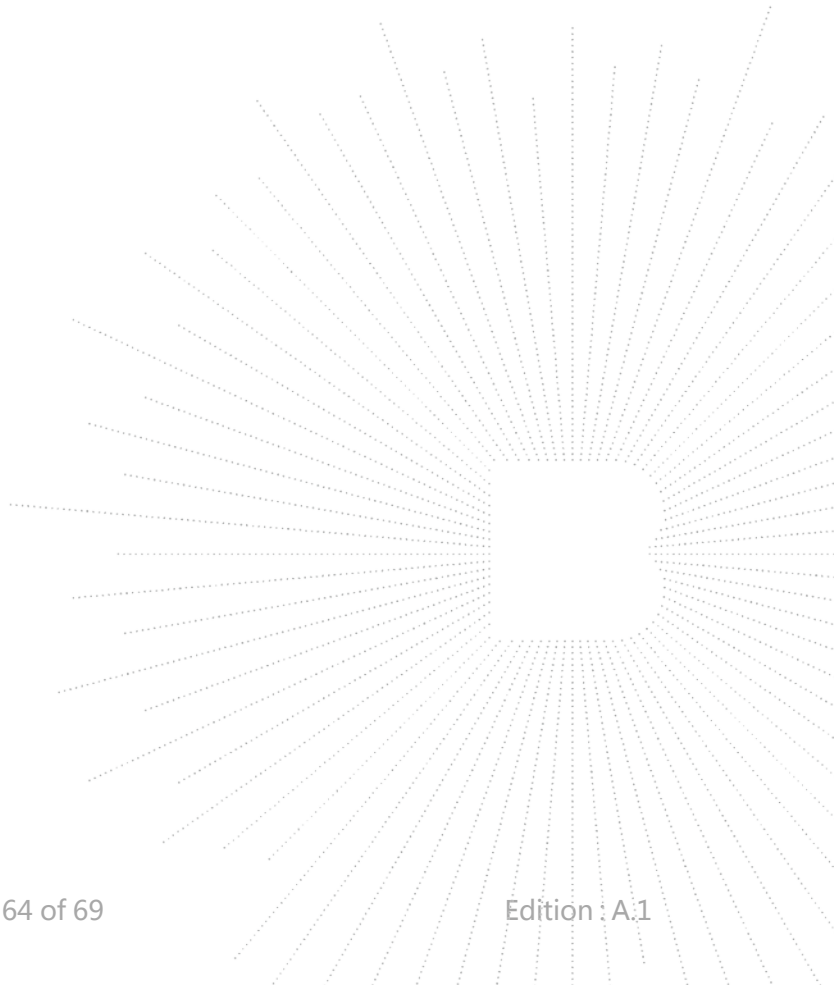
## 14. ANTENNA REQUIREMENT

### 14.1 Limit

15.203 requirement: For intentional device, according to 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.

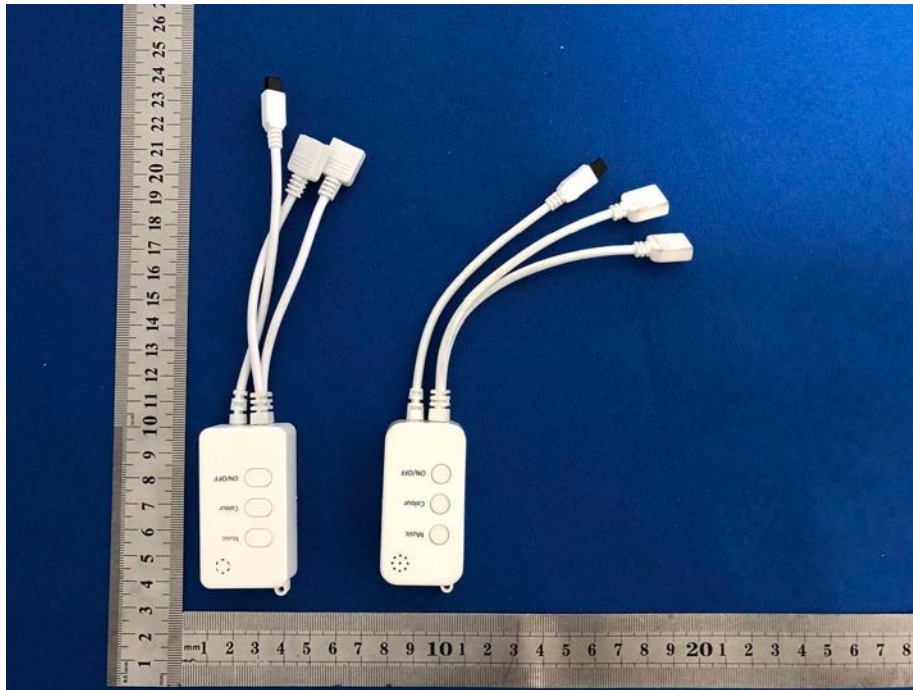
### 14.1 Test Result

The EUT antenna is PCB antenna, fulfill the requirement of this section.



## 15. EUT PHOTOGRAPHS

EUT Photo 1



EUT Photo 2



**EUT Photo 3**



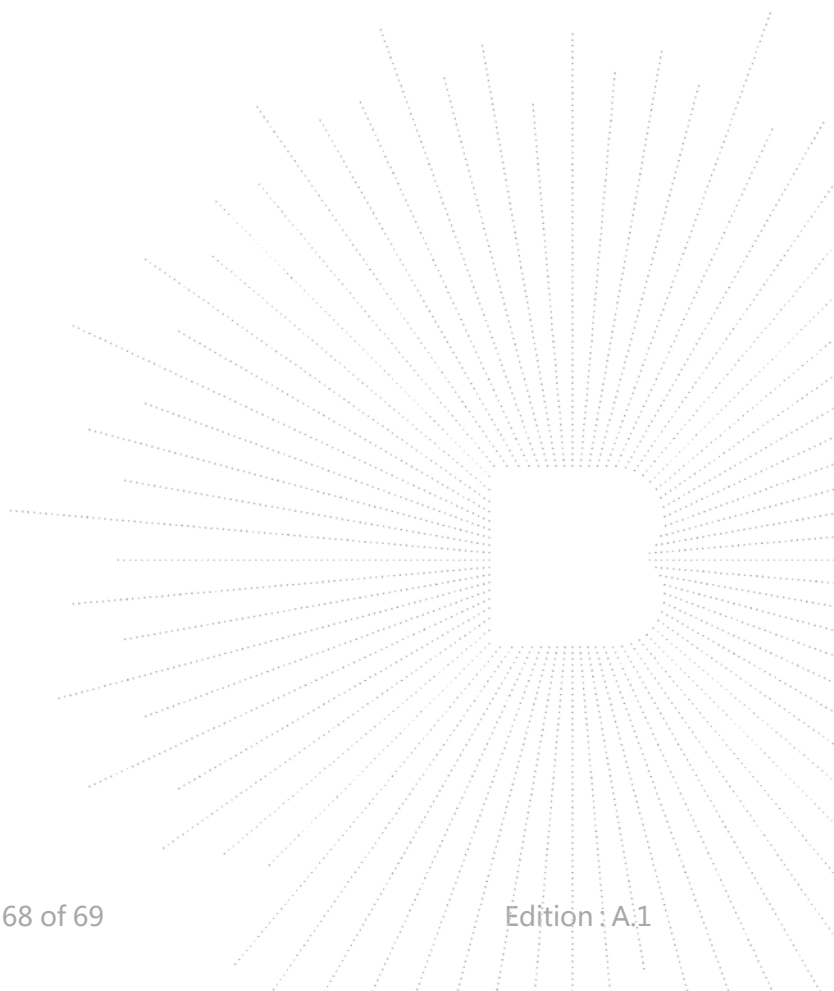
## 16. EUT TEST SETUP PHOTOGRAPHS

Conducted Measurement Photos



Radiated Measurement Photos





## STATEMENT

- 1.The equipment lists are traceable to the national reference standards.
- 2.The test report can not be partially copied unless prior written approval is issued from our lab.
- 3.The test report is invalid without stamp of laboratory.
- 4.The test report is invalid without signature of person(s) testing and authorizing.
- 5.The test process and test result is only related to the Unit Under Test.
- 6.The quality system of our laboratory is in accordance with ISO/IEC17025.
- 7.If there is any objection to report, the client should inform issuing laboratory within 15 days from the date of receiving test report.

Address:

1-2F, East of B Building, Pengzhou Industrial Park, Fuyuan 1st Road, Qiaotou, Fuyong Street, Bao'an District, Shenzhen, Guangdong, China

TEL : 400-788-9558

P.C.: 518103

FAX : 0755-33229357

Website : <http://www.bctc-lab.com>

E-Mail : [bctc@bctc-lab.com.cn](mailto:bctc@bctc-lab.com.cn)

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