

CTC Laboratories, Inc.

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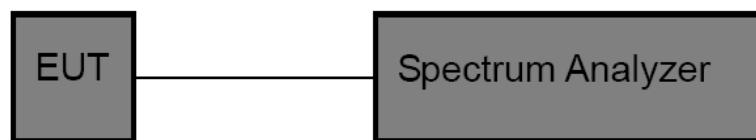
### 3.5. DTS Bandwidth

#### Limit

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (a)(2)

Test Item	Limit	Frequency Range (MHz)
DTS Bandwidth	$\geq 500$ kHz (6dB bandwidth)	2400~2483.5

#### Test Configuration



#### Test Procedure

1. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
2. DTS Spectrum Setting:
  - (1) Set RBW = 100 kHz.
  - (2) Set the video bandwidth (VBW)  $\geq 3$  RBW.
  - (3) Detector = Peak.
  - (4) Trace mode = Max hold.
  - (5) Sweep = Auto couple.OCB Spectrum Setting:
  - (1) Set RBW = 1% ~ 5% occupied bandwidth.
  - (2) Set the video bandwidth (VBW)  $\geq 3$  RBW.
  - (3) Detector = Peak.
  - (4) Trace mode = Max hold.
  - (5) Sweep = Auto couple.

NOTE: The EUT was set to continuously transmitting in each mode and low, Middle and high channel for the test.

#### Test Mode

Please refer to the clause 2.4.

**Test Result**

Test Mode	Frequency (MHz)	99% Bandwidth (MHz)	DTS Bandwidth (MHz)	Limit (MHz)	Verdict
802.11b	2412	13.976	8.120	$\geq 0.5$	Pass
	2437	14.092	8.560	$\geq 0.5$	Pass
	2462	13.827	8.040	$\geq 0.5$	Pass
802.11g	2412	17.460	11.280	$\geq 0.5$	Pass
	2437	17.286	14.520	$\geq 0.5$	Pass
	2462	17.441	15.200	$\geq 0.5$	Pass
802.11n(HT20)	2412	18.086	14.040	$\geq 0.5$	Pass
	2437	18.148	18.040	$\geq 0.5$	Pass
	2462	18.084	18.120	$\geq 0.5$	Pass

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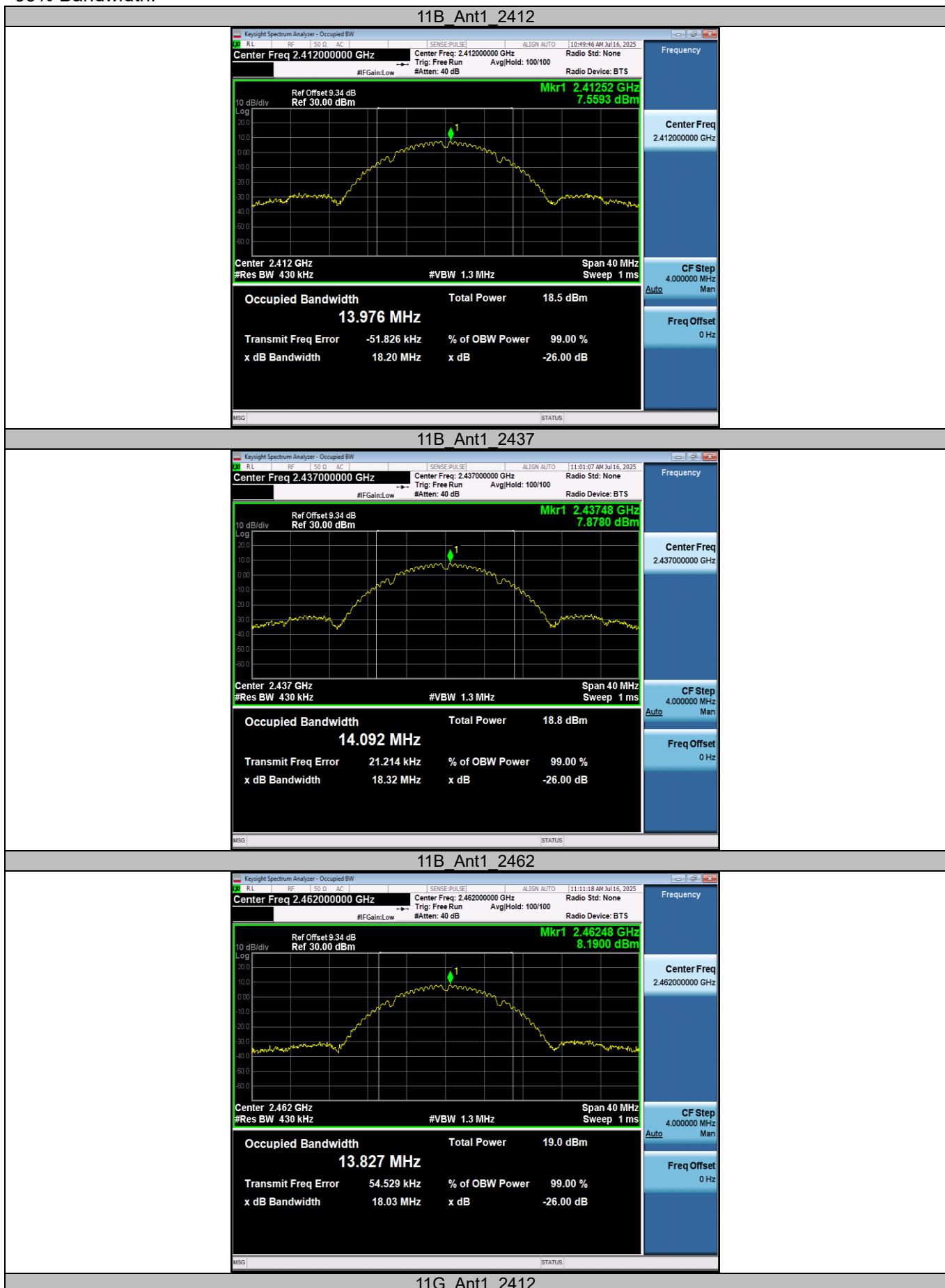
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99% Bandwidth:



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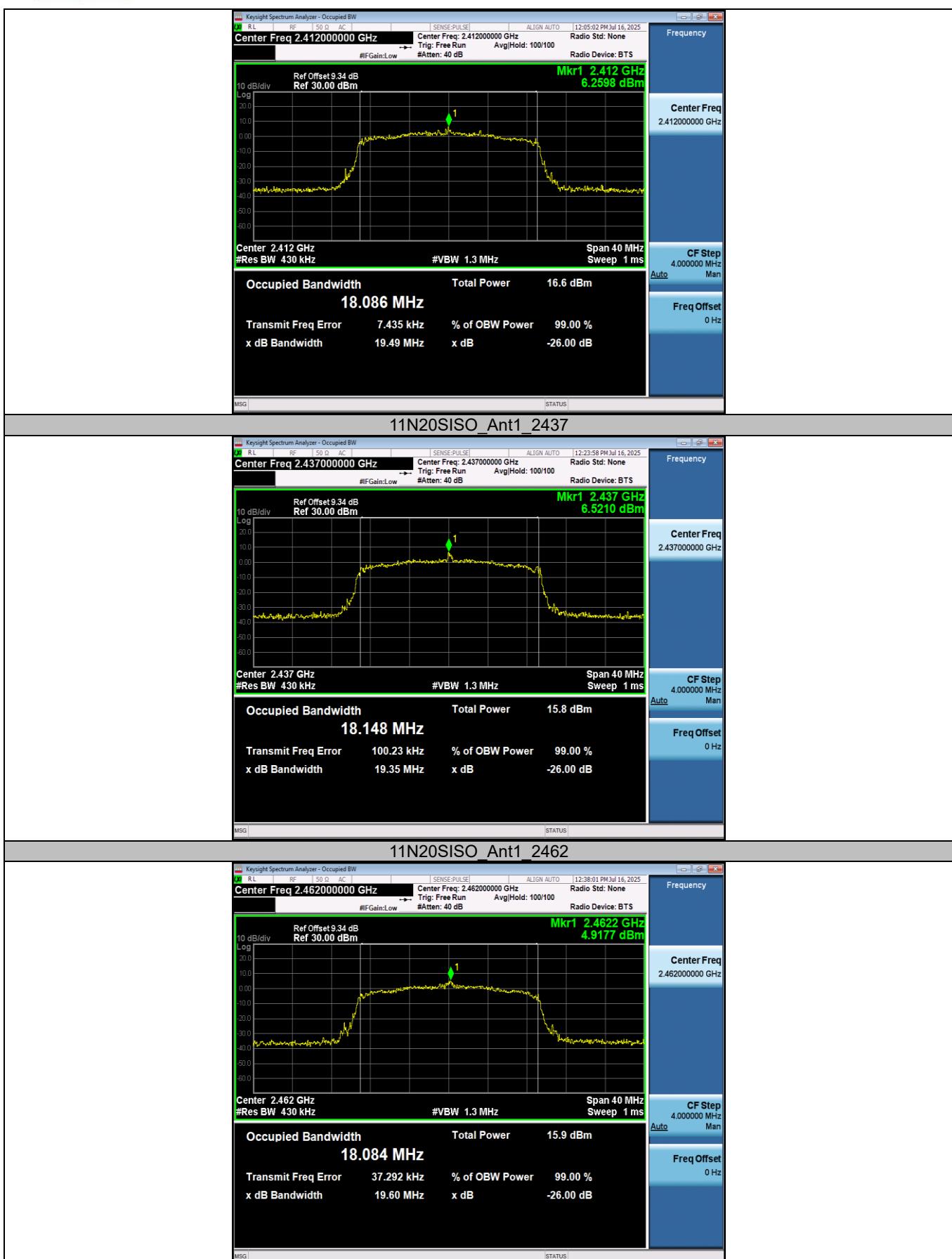
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DTS Bandwidth:

11B Ant1 2412



Frequency

Auto Tune

Center Freq

2.412000000 GHz

Start Freq

2.392000000 GHz

Stop Freq

2.432000000 GHz

CF Step

4.000000 MHz

Man

Auto

Freq Offset

0 Hz

Scale Type

Log

Lin

11B Ant1 2437



Frequency

Auto Tune

Center Freq

2.437000000 GHz

Start Freq

2.417000000 GHz

Stop Freq

2.457000000 GHz

CF Step

4.000000 MHz

Man

Auto

Freq Offset

0 Hz

Scale Type

Log

Lin

11B Ant1 2462



Frequency

Auto Tune

Center Freq

2.462000000 GHz

Start Freq

2.442000000 GHz

Stop Freq

2.482000000 GHz

CF Step

4.000000 MHz

Man

Auto

Freq Offset

0 Hz

Scale Type

Log

Lin

11G Ant1 2412

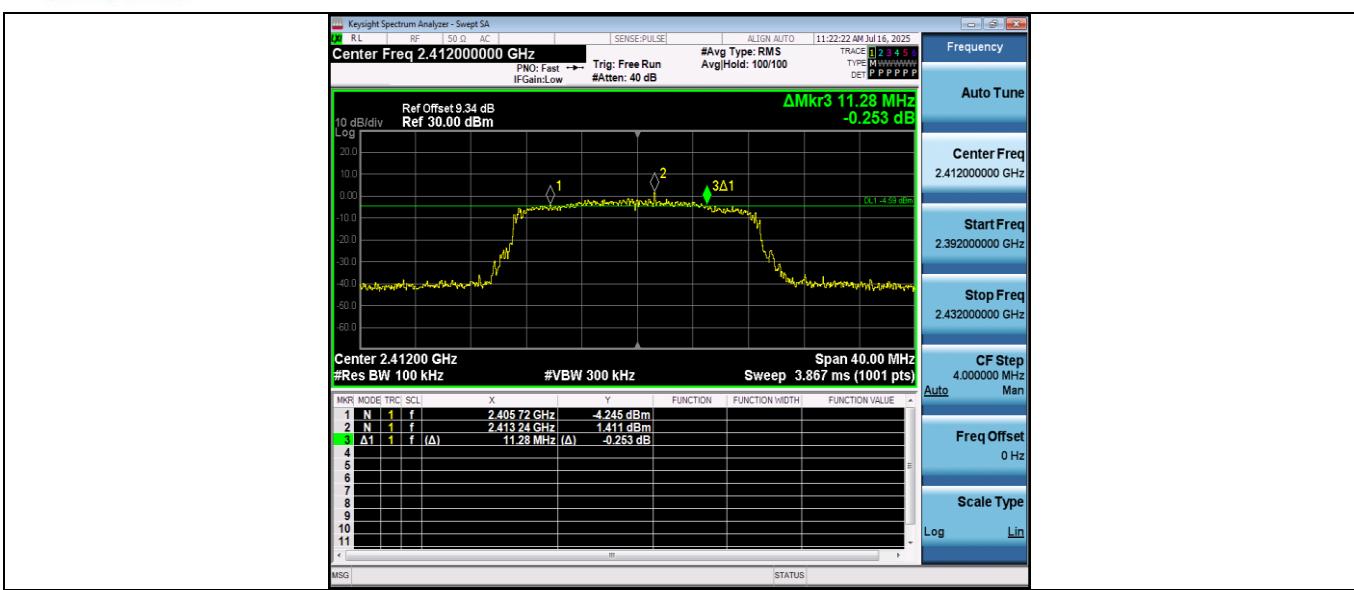
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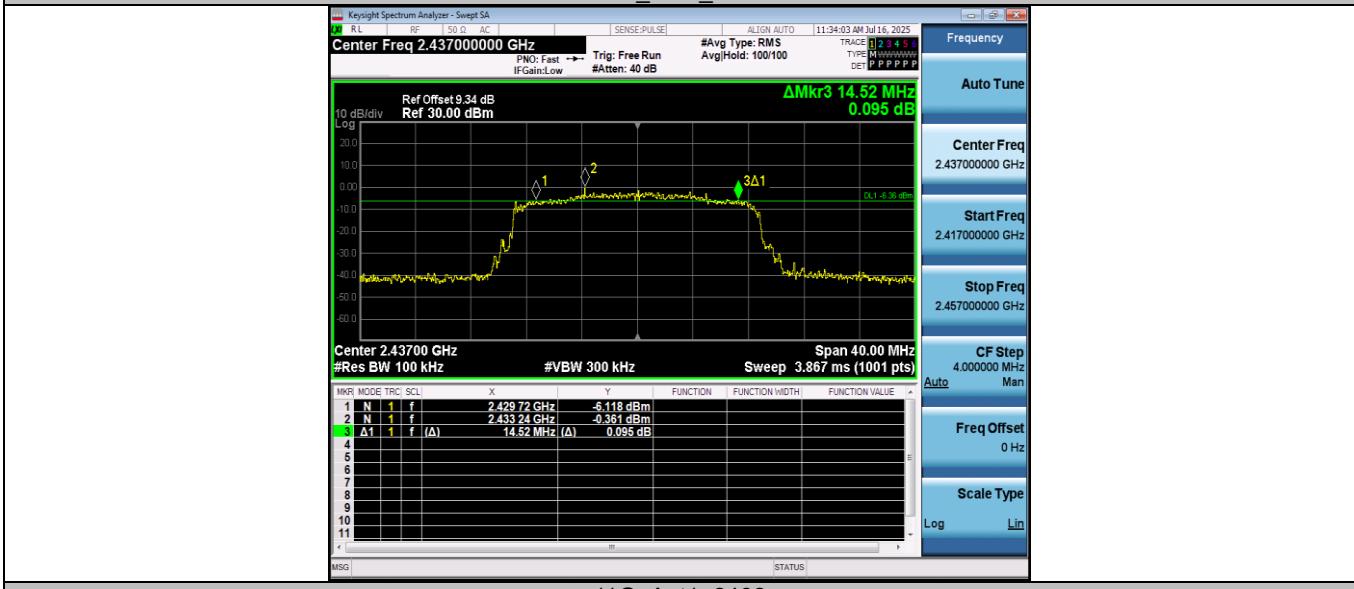
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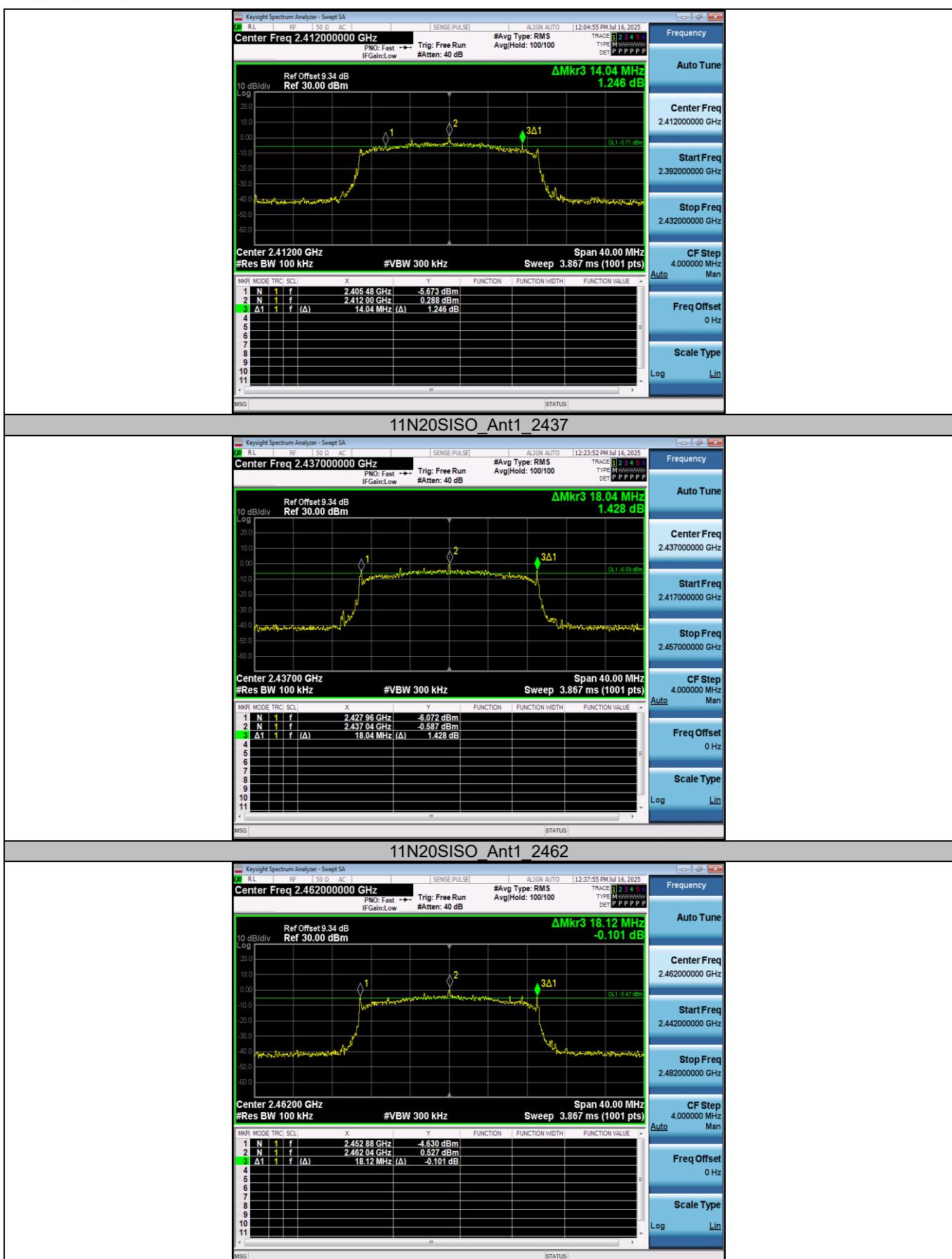
11G\_Ant1\_2437



11G\_Ant1\_2462



11N20SISO\_Ant1\_2412



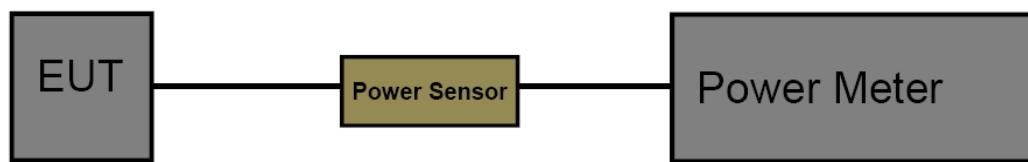
### 3.6. Maximum Conducted Output Power

#### Limit

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (b)(3)

Section	Test Item	Limit	Frequency Range (MHz)
FCC CFR 47 Part15.247 (b)(3)	Maximum Conducted Output Power	1 Watt or 30dBm	2400~2483.5

#### Test Configuration



#### Test Procedure

1. The maximum conducted output power may be measured using a broadband RF power meter.
2. Power measurements were performed only when the EUT was transmitting at its maximum power control level using a broadband power meter with a pulse sensor.
3. The power meter implemented triggering and gating capabilities which were set up such that power measurements were recorded only during the ON time of the transmitter.
4. Record the measurement data.

#### Test Mode

Please refer to the clause 2.4.

**Test Result**

Test Mode	Frequency (MHz)	Conducted Peak Power[dBm]	FCC Limit (dBm)	Verdict
802.11b	2412	17.92	≤30	Pass
	2437	18.75	≤30	Pass
	2462	18.45	≤30	Pass
802.11g	2412	17.92	≤30	Pass
	2437	17.73	≤30	Pass
	2462	17.75	≤30	Pass
802.11n(HT20)	2412	17.18	≤30	Pass
	2437	16.79	≤30	Pass
	2462	16.90	≤30	Pass

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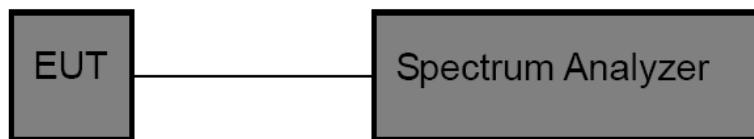
## 3.7. Power Spectral Density

### Limit

#### FCC CFR Title 47 Part 15 Subpart C Section 15.247 (e)

Test Item	Limit	Frequency Range (MHz)
Power Spectral Density	8 dBm (in any 3 kHz)	2400~2483.5

### Test Configuration



### Test Procedure

1. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
2. The EUT was directly connected to the Spectrum Analyzer and antenna output port as show in the block diagram above. The measurement according to section 10.2 of KDB 558074 D01 DTS Meas Guidance v05r02.
3. Spectrum Setting:  
Set analyzer center frequency to DTS channel center frequency.  
Set span to at least 1.5 times the OBW.  
Set RBW to:  $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$ .  
Set VBW  $\geq [3 \times \text{RBW}]$ .  
Detector = power averaging (rms) or sample detector (when rms not available).  
Ensure that the number of measurement points in the sweep  $\geq [2 \times \text{span} / \text{RBW}]$ .  
Sweep time = auto couple.  
Employ trace averaging (rms) mode over a minimum of 100 traces.  
Use the peak marker function to determine the maximum amplitude level.  
If the measured value exceeds requirement, then reduce RBW (but no less than 3 kHz) and repeat (note that this may require zooming in on the emission of interest and reducing the span to meet the minimum measurement point requirement as the RBW is reduced).

### Test Mode

Please refer to the clause 2.4.

**Test Result**

Test Mode	Frequency (MHz)	Power Spectral Density (dBm/3-100kHz)	Limit (dBm/3kHz)	Verdict
802.11b	2412	-6.85	≤8	Pass
	2437	-6.11	≤8	Pass
	2462	-6.28	≤8	Pass
802.11g	2412	-11.99	≤8	Pass
	2437	-12.97	≤8	Pass
	2462	-11.94	≤8	Pass
802.11n(HT20)	2412	-11.63	≤8	Pass
	2437	-12.42	≤8	Pass
	2462	-11.91	≤8	Pass

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## Test Graphs



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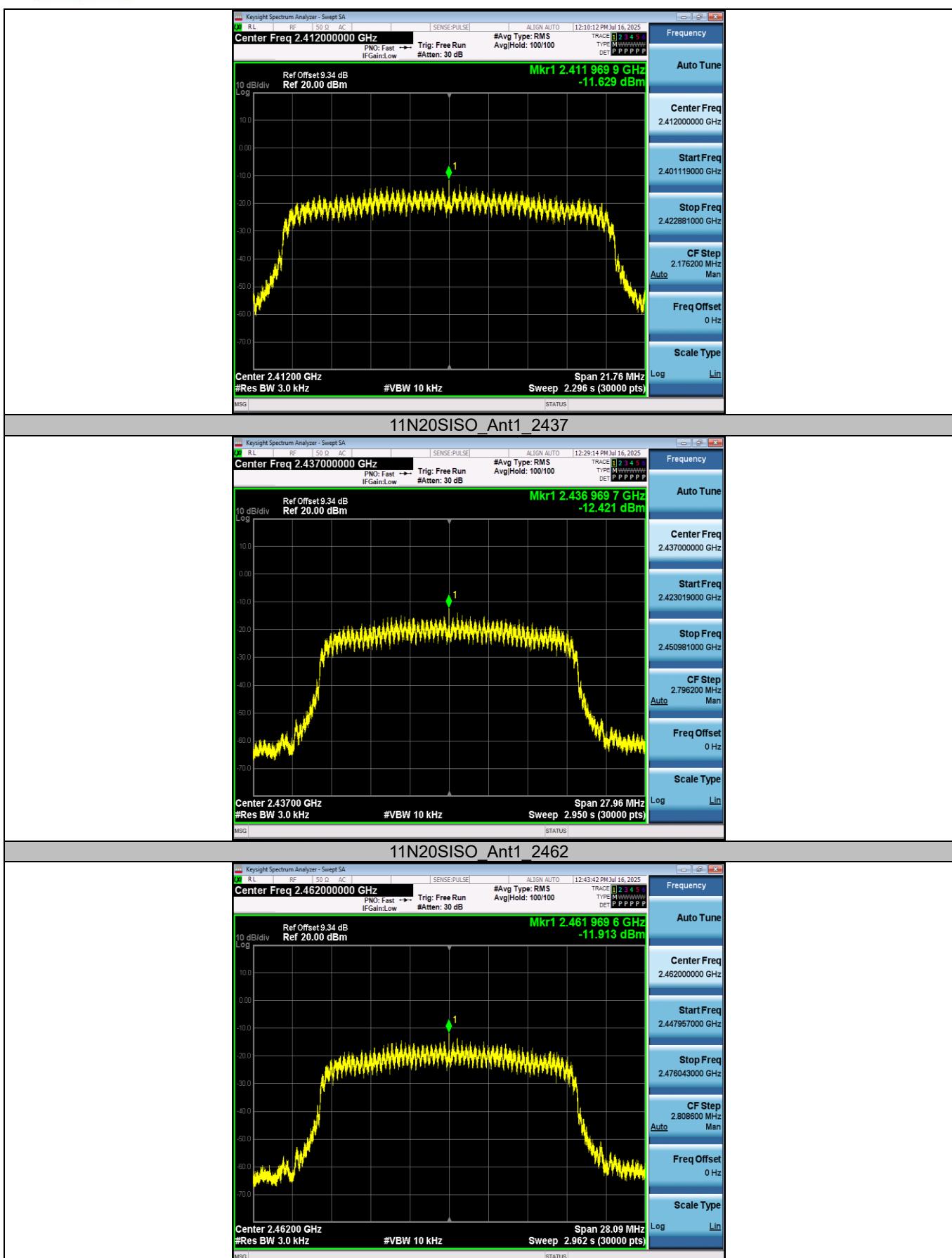
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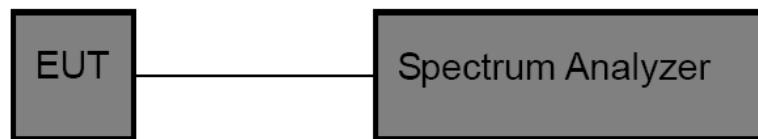


## 3.8. Duty Cycle

### Limit

None, for report purposes only.

### Test Configuration



### Test Procedure

1. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
2. The EUT was directly connected to the Spectrum Analyzer and antenna output port as show in the block diagram above. The measurement according to section 10.2 of KDB 558074 D01 DTS Meas Guidance v05r02.
3. Spectrum Setting:  
Set analyzer center frequency to test channel center frequency.  
Set the span to 0Hz.  
Set the RBW to 10MHz.  
Set the VBW to 10MHz.  
Detector: Peak.  
Sweep time: Auto.  
Allow trace to fully stabilize. Then use the peak marker function to determine the maximum amplitude level.

### Test Mode

Please refer to the clause 2.4.

**Test Result**

Test Mode	Frequency (MHz)	Transmission Duration (ms)	Transmission Period (ms)	Duty Cycle (%)	1/T Minimum VBW (kHz)	Final Setting for VBW (kHz)
802.11b	2412	8.39	8.48	98.94	1.01	1
	2437	8.38	8.47	98.94	1.01	1
	2462	8.39	8.48	98.94	1.01	1
802.11g	2412	5.48	5.54	98.92	1.01	1
	2437	5.48	5.54	98.92	1.01	1
	2462	5.48	5.54	98.92	1.01	1
802.11n(HT20)	2412	5.08	5.13	99.03	1.01	1
	2437	5.08	5.14	98.83	1.01	1
	2462	5.08	5.14	98.83	1.01	1

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## 3.9. Antenna Requirement

### Requirement

#### **FCC CFR Title 47 Part 15 Subpart C 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. The use of a permanently attached antenna or of antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

#### **FCC CFR Title 47 Part 15 Subpart C Section 15.247(c) (1)(i)**

(i) Systems operating in the 2400~2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi.

### Test Result

The directional gain of the antenna is less than 6dBi, please refer to the EUT internal photographs antenna photo.

### Result

PASS.

The EUT has 1 antenna: a PCB Antenna for WIFI.

Note:  Antenna use a permanently attached antenna which is not replaceable.

Not using a standard antenna jack or electrical connector for antenna replacement.

The antenna has to be professionally installed (please provide method of installation).

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