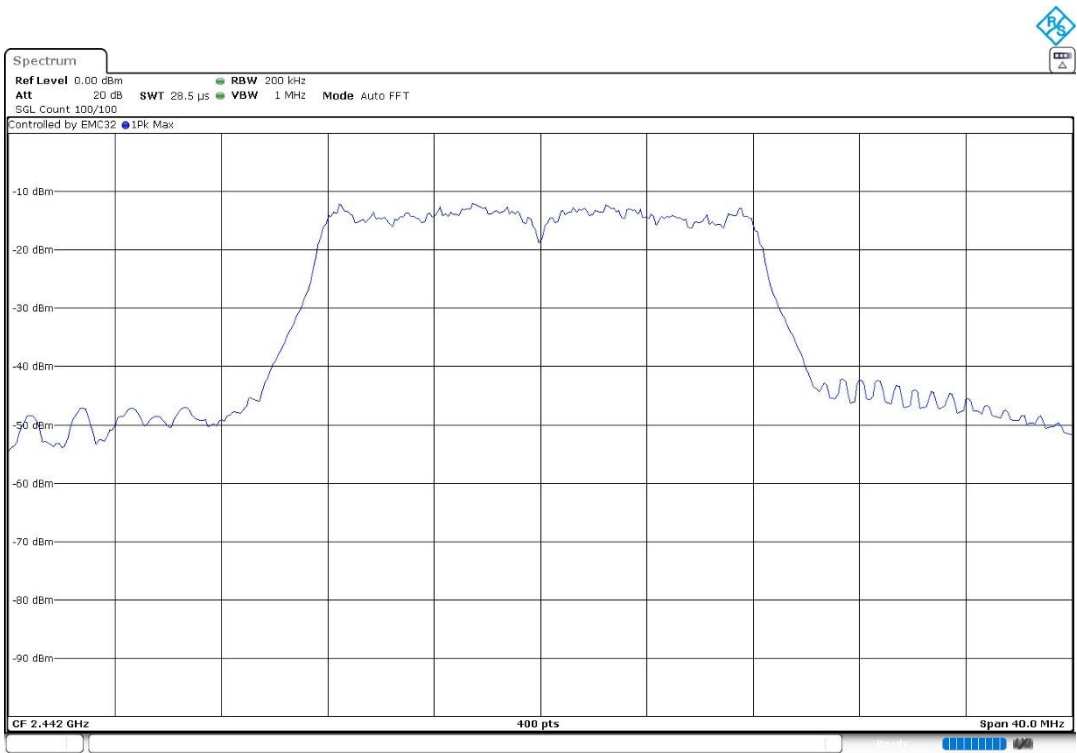
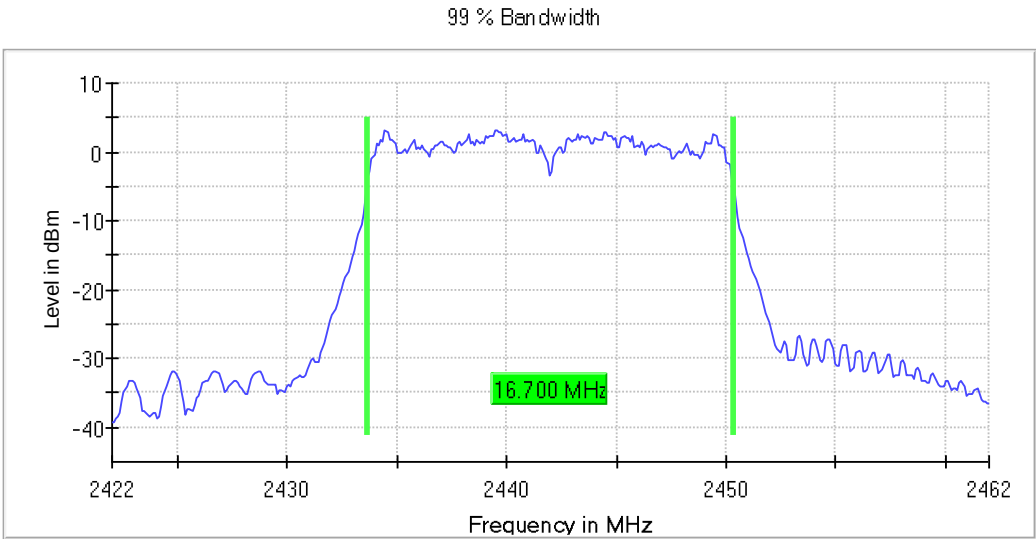


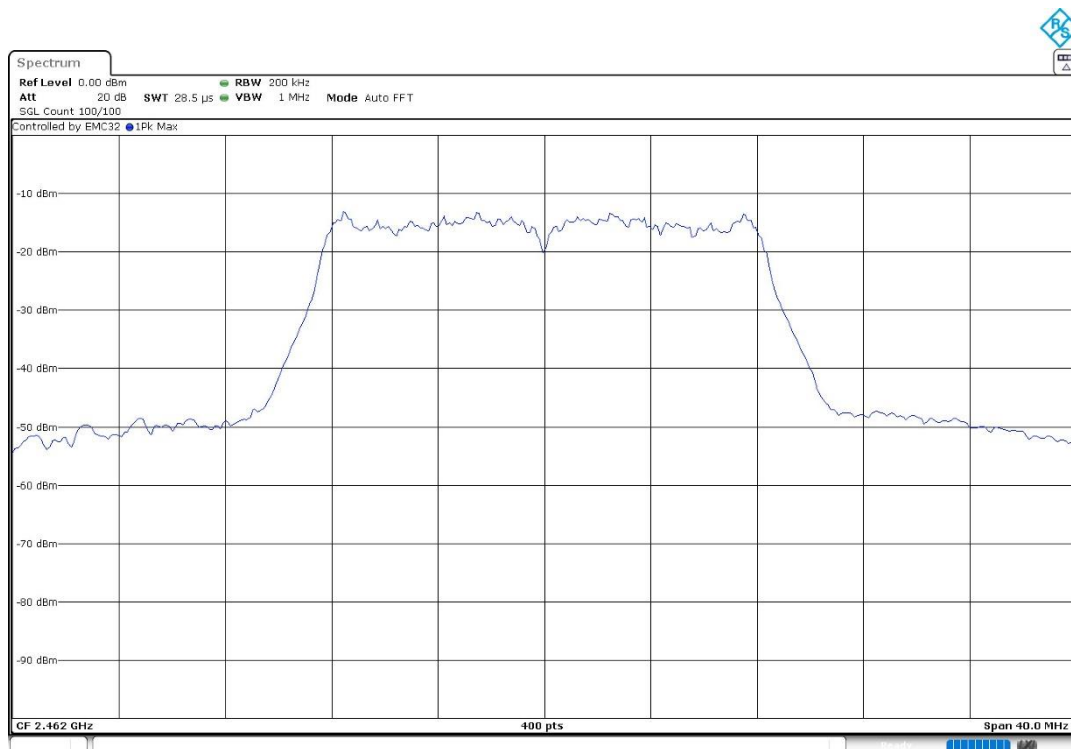
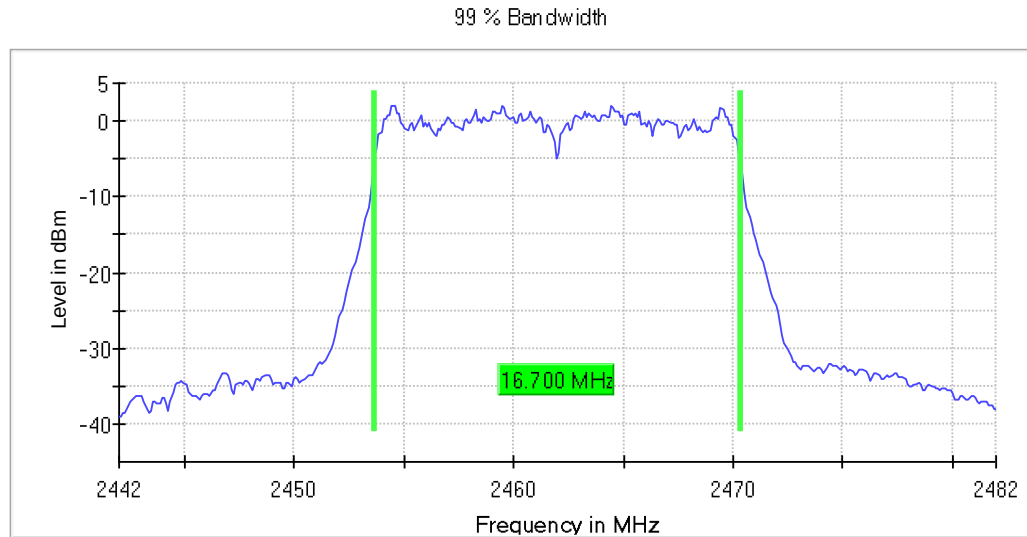
Operation Band (MHz) = [2400, 2483.5], Frequency (MHz) = 2442.00, Equipment Type: Digital Transmission System (DTS), Modulation: 802.11g (OFDM 6 Mbit/s)

Figures:



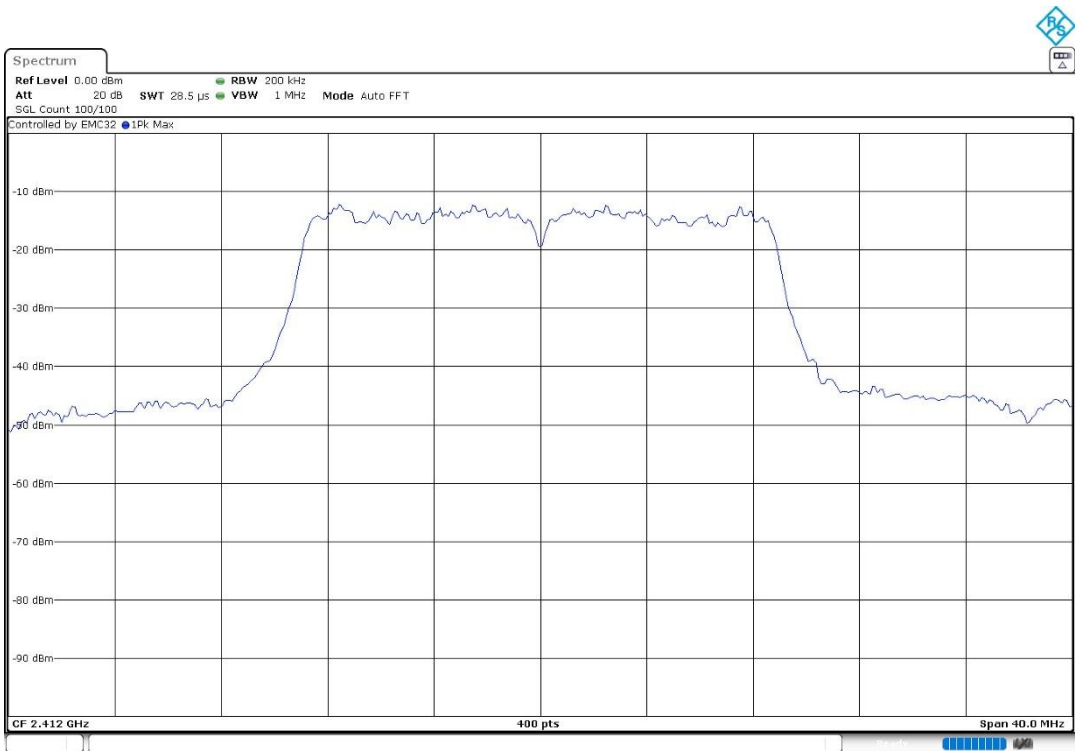
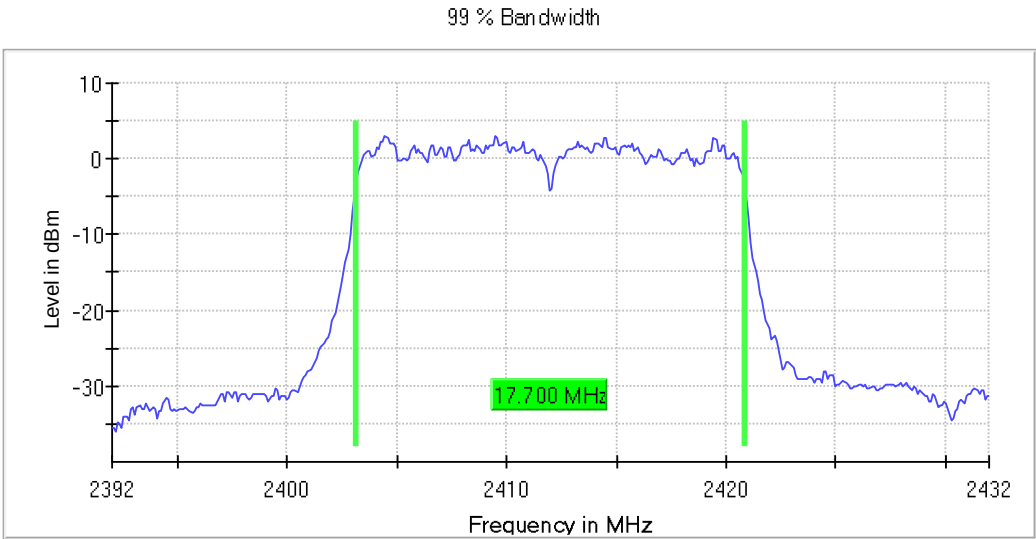
**Operation Band (MHz) = [2400, 2483.5], Frequency (MHz) = 2462.00, Equipment Type: Digital Transmission System (DTS), Modulation: 802.11g (OFDM 6 Mbit/s)**

**Figures:**



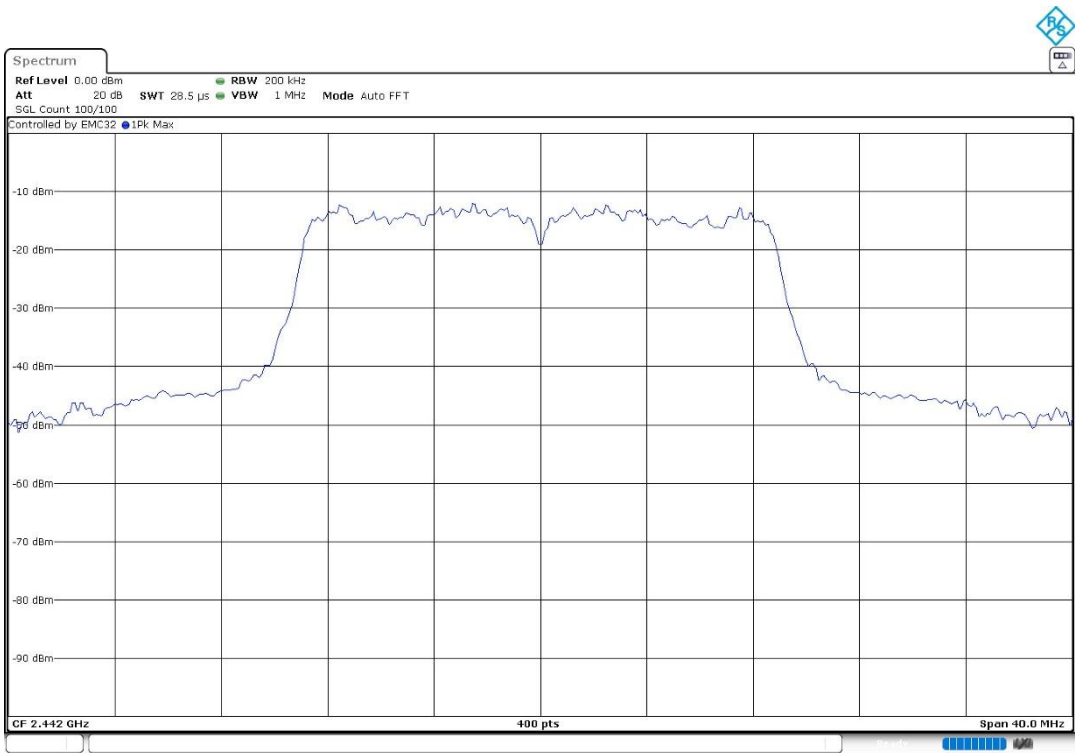
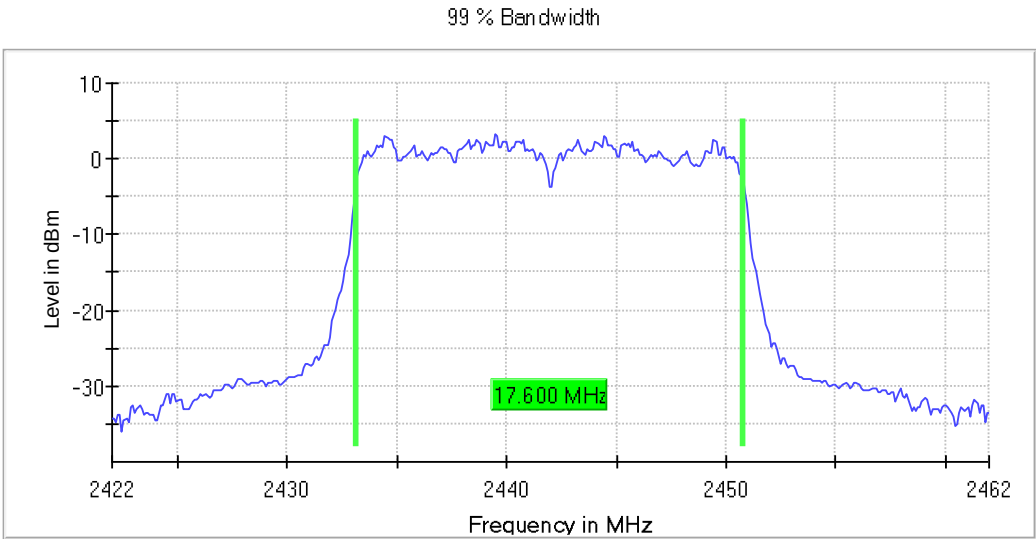
Operation Band (MHz) = [2400, 2483.5], Frequency (MHz) = 2412.00, Equipment Type: Digital Transmission System (DTS), 802.11n HT20 (OFDM MCS0 6.5 Mbit/s)

Figures:



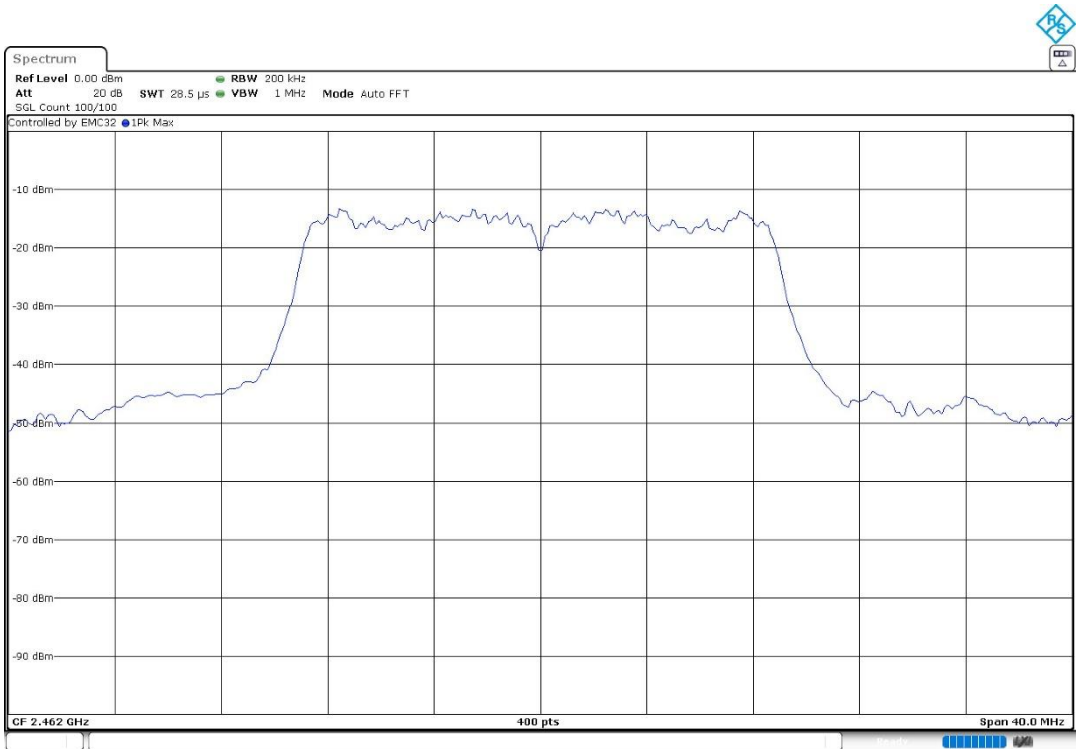
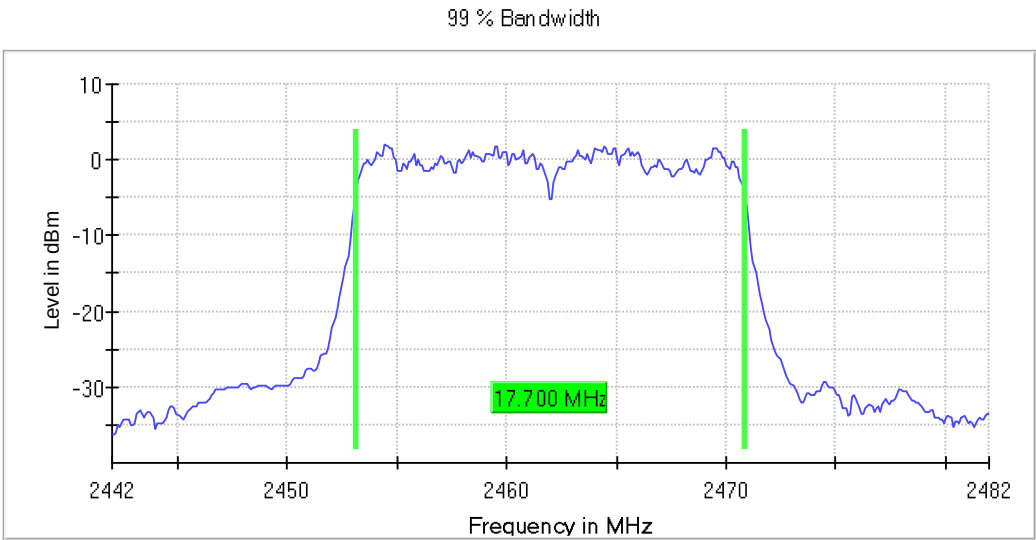
Operation Band (MHz) = [2400, 2483.5], Frequency (MHz) = 2442.00, Equipment Type: Digital Transmission System (DTS), 802.11n HT20 (OFDM MCS0 6.5 Mbit/s)

Figures:



Operation Band (MHz) = [2400, 2483.5], Frequency (MHz) = 2462.00, Equipment Type: Digital Transmission System (DTS), 802.11n HT20 (OFDM MCS0 6.5 Mbit/s)

Figures:



## FCC 15.247 (a)(2) / RSS-247 5.2 (a) 6 dB Bandwidth

### Limits

The minimum 6 dB bandwidth shall be at least 500 kHz.

### Results

- Mode 802.11 b:

| Frequency (MHz) | 6 dB Bandwidth (MHz) |
|-----------------|----------------------|
| 2412.00         | 10.150               |
| 2442.00         | 10.100               |
| 2462.00         | 10.150               |

- Mode 802.11 g:

| Frequency (MHz) | 6 dB Bandwidth (MHz) |
|-----------------|----------------------|
| 2412.00         | 16.450               |
| 2442.00         | 16.450               |
| 2462.00         | 16.450               |

- Mode 802.11 n20:

| Frequency (MHz) | 6 dB Bandwidth (MHz) |
|-----------------|----------------------|
| 2412.00         | 17.650               |
| 2442.00         | 17.400               |
| 2462.00         | 17.650               |

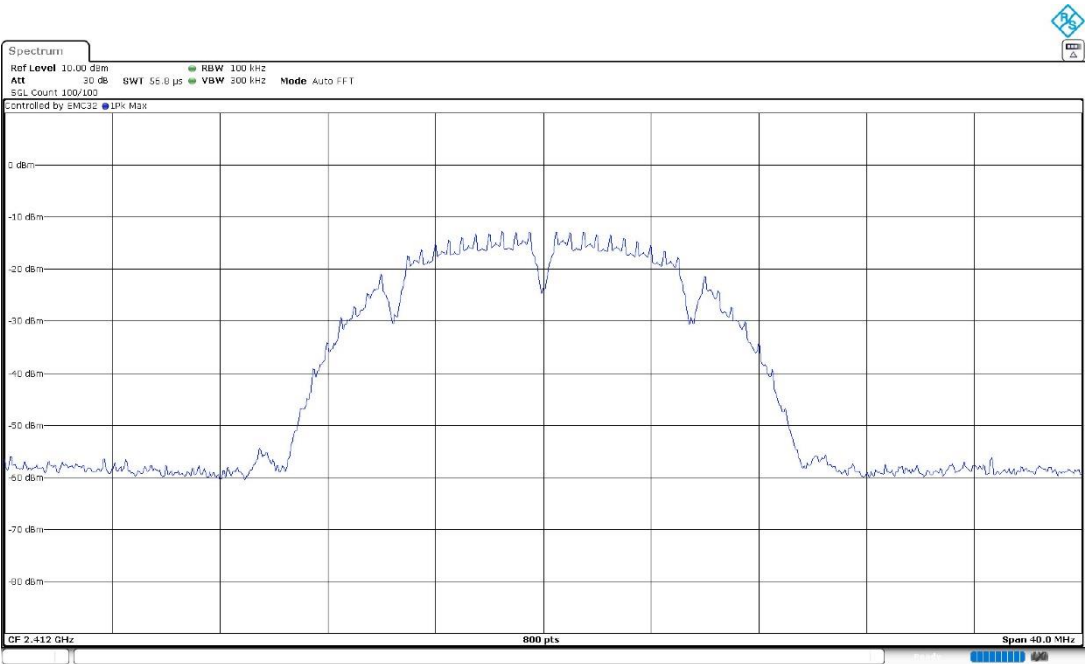
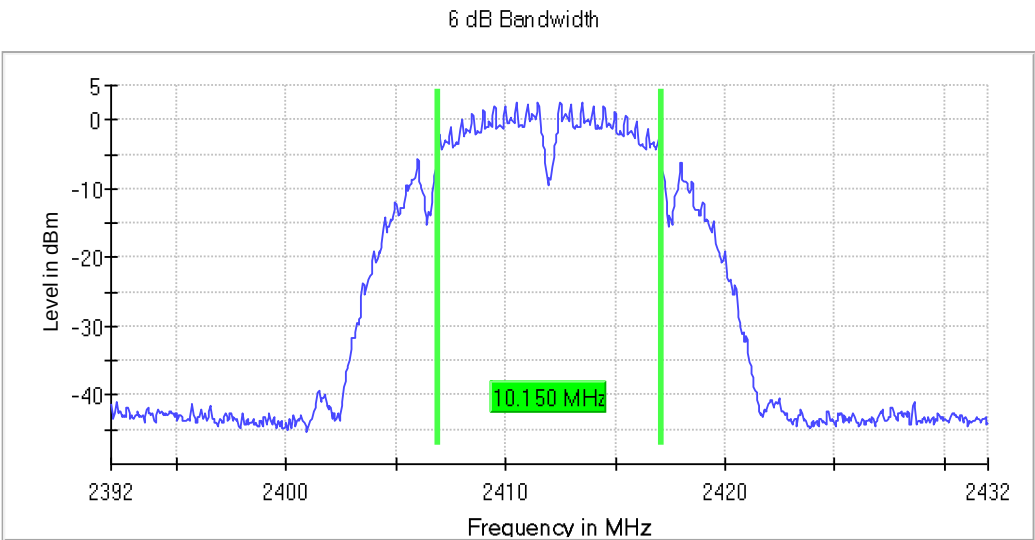
### Verdict

Pass

Attachments

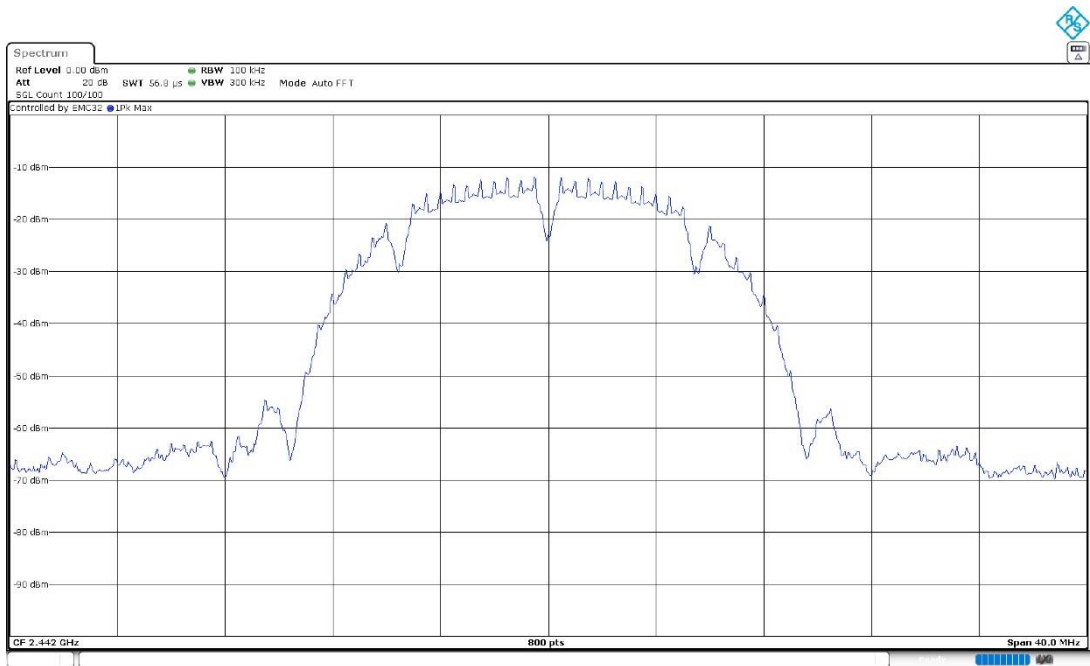
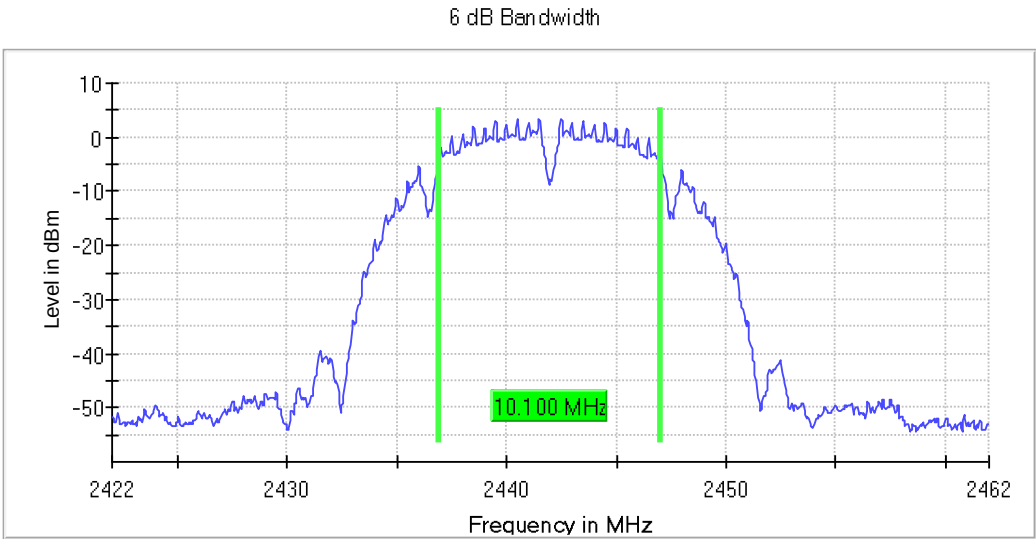
Operation Band (MHz) = [2400, 2483.5], Frequency (MHz) = 2412.00, Equipment Type: Digital Transmission System (DTS), Modulation: 802.11b (DSSS 1 Mbit/s)

Figures:



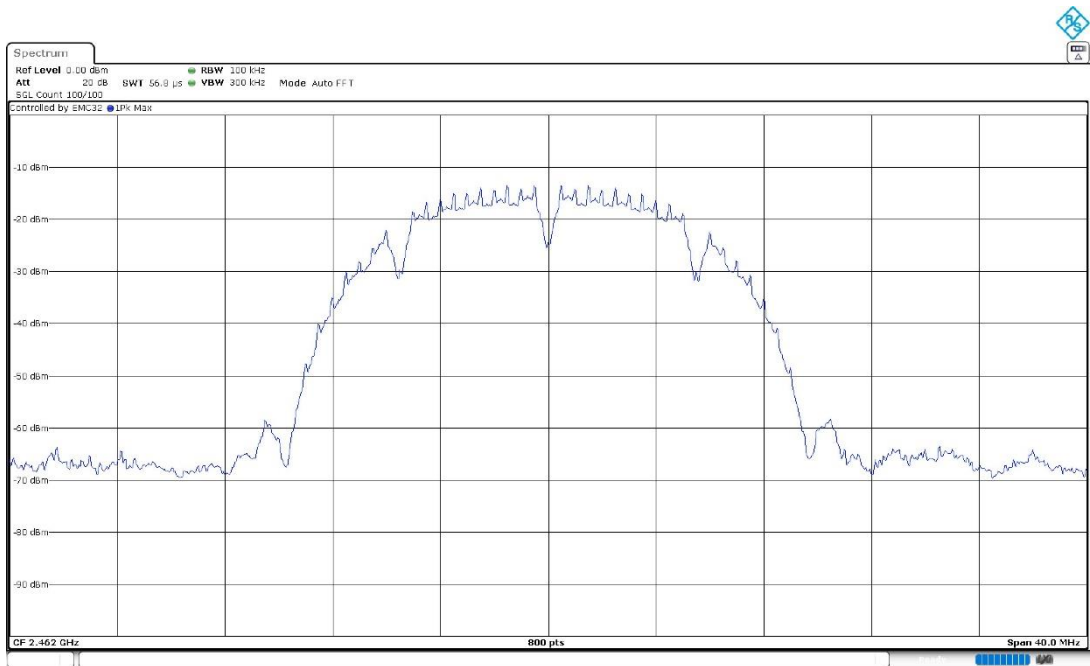
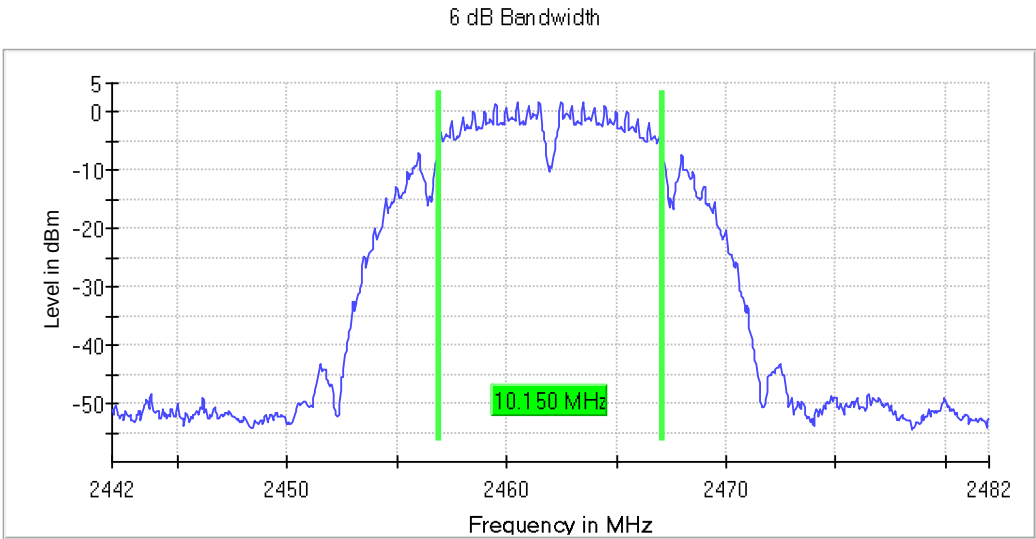
Operation Band (MHz) = [2400, 2483.5], Frequency (MHz) = 2442.00, Equipment Type: Digital Transmission System (DTS), Modulation: 802.11b (DSSS 1 Mbit/s)

Figures:



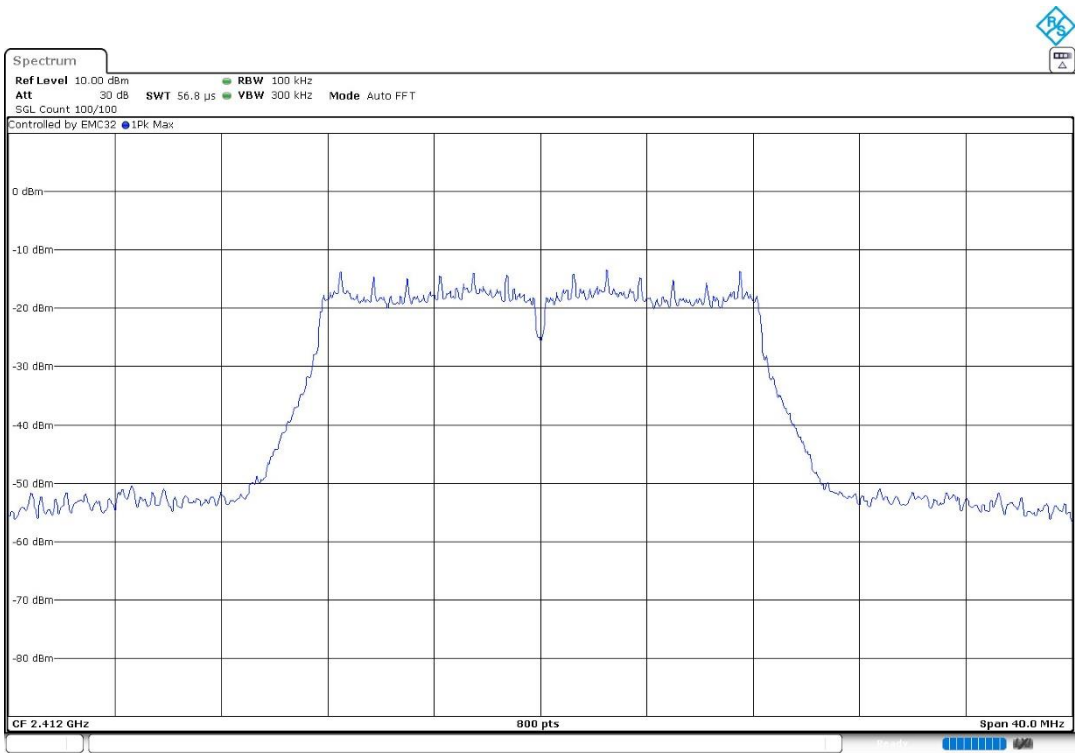
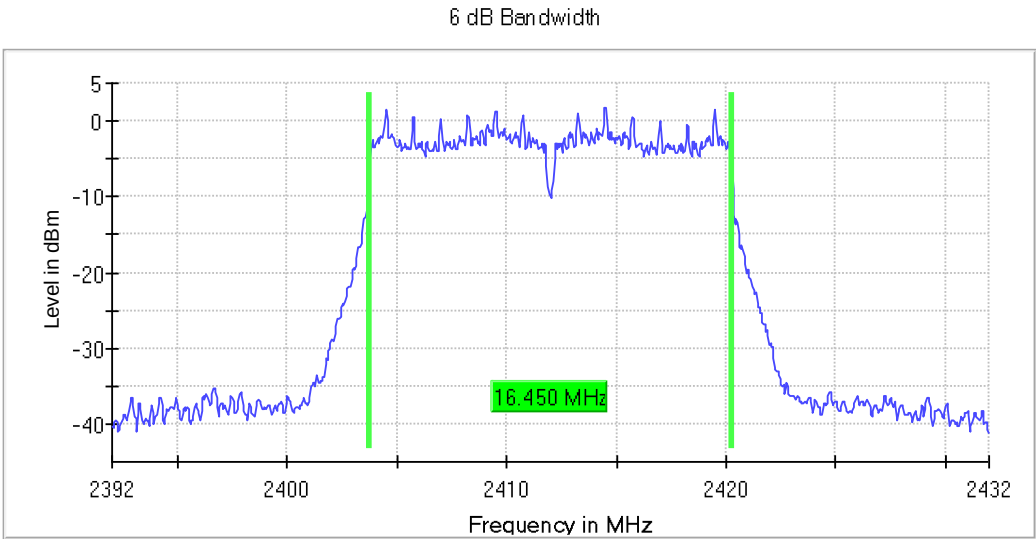
Operation Band (MHz) = [2400, 2483.5], Frequency (MHz) = 2462.00, Equipment Type: Digital Transmission System (DTS), Modulation: 802.11b (DSSS 1 Mbit/s)

Figures:



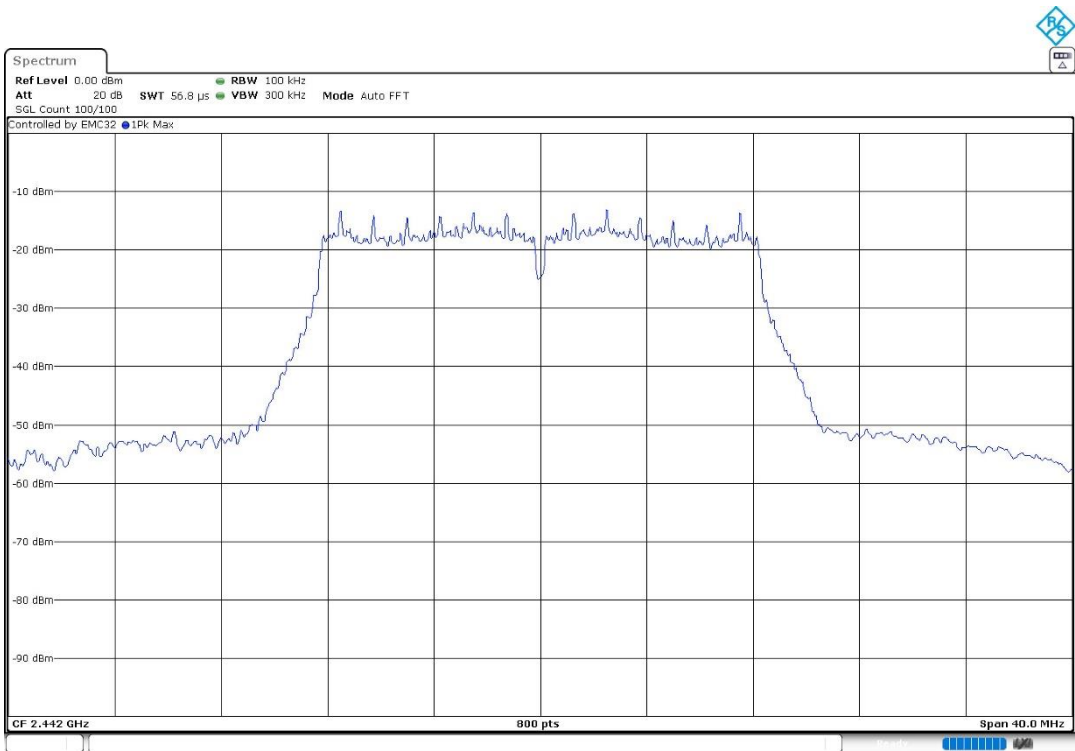
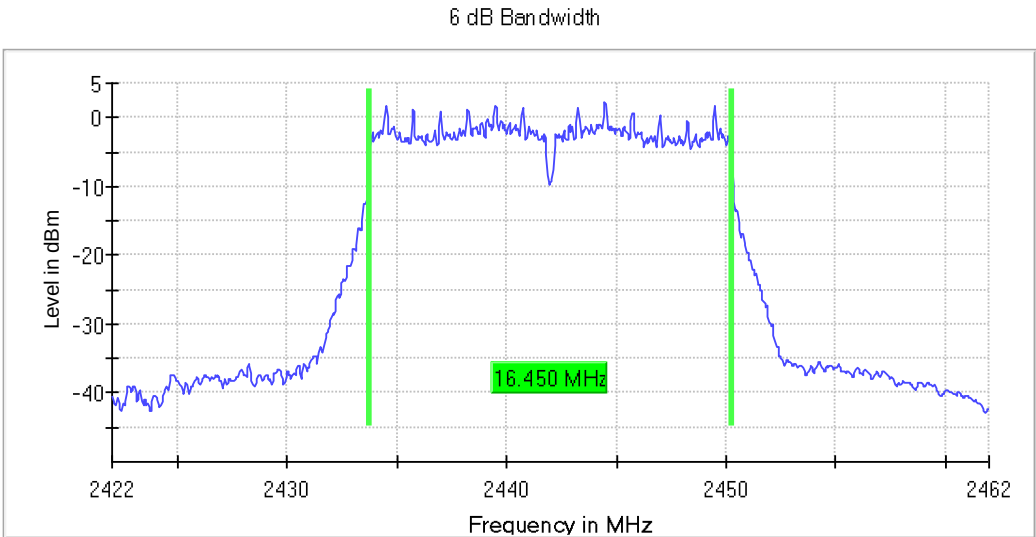
Operation Band (MHz) = [2400, 2483.5], Frequency (MHz) = 2412.00, Equipment Type: Digital Transmission System (DTS), Modulation: 802.11g (OFDM 6 Mbit/s)

Figures:



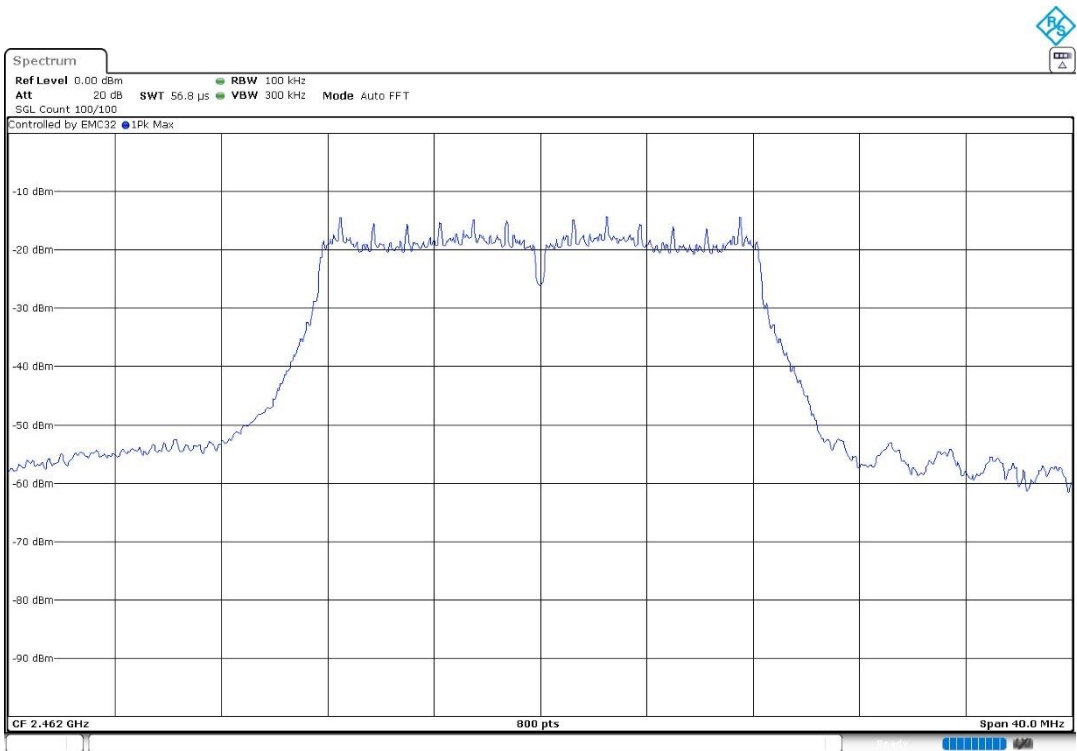
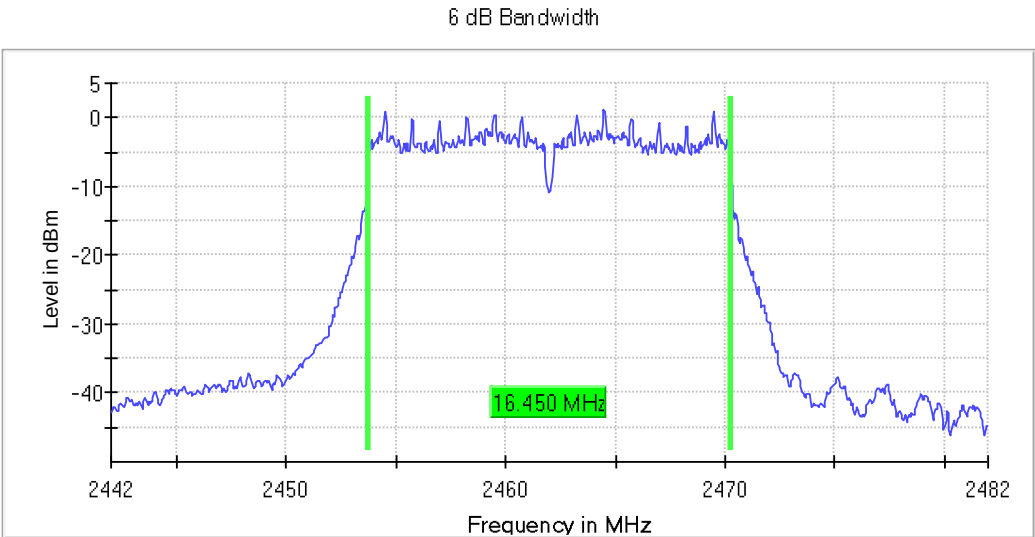
Operation Band (MHz) = [2400, 2483.5], Frequency (MHz) = 2442.00, Equipment Type: Digital Transmission System (DTS), Modulation: 802.11g (OFDM 6 Mbit/s)

Figures:



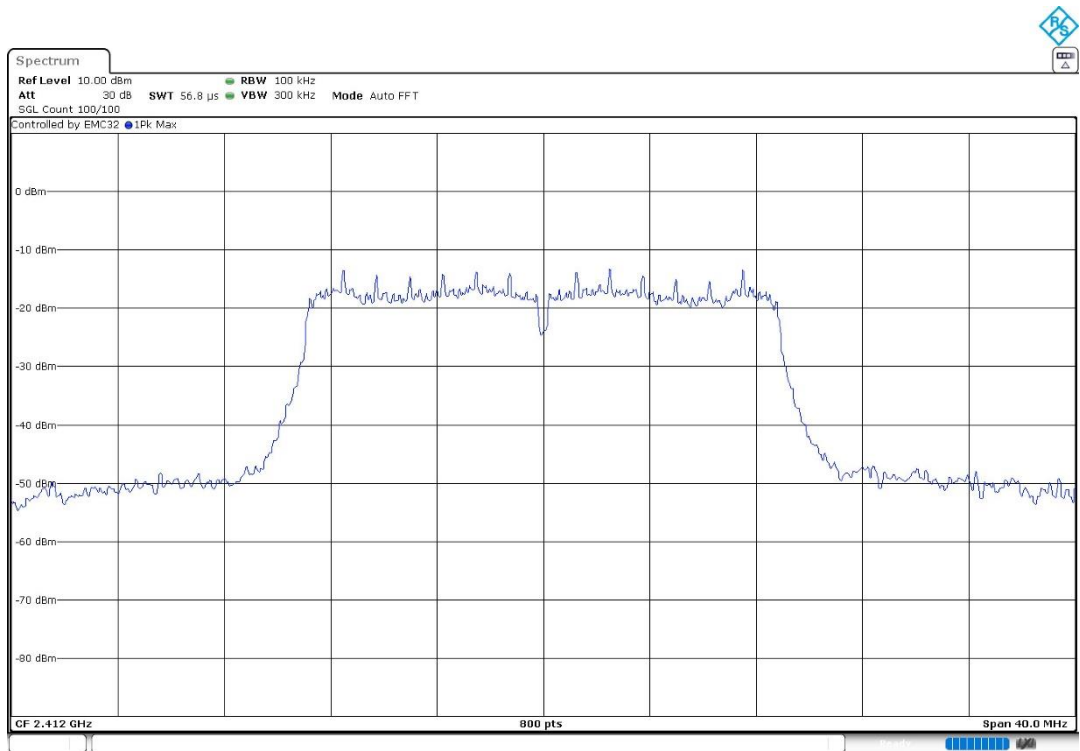
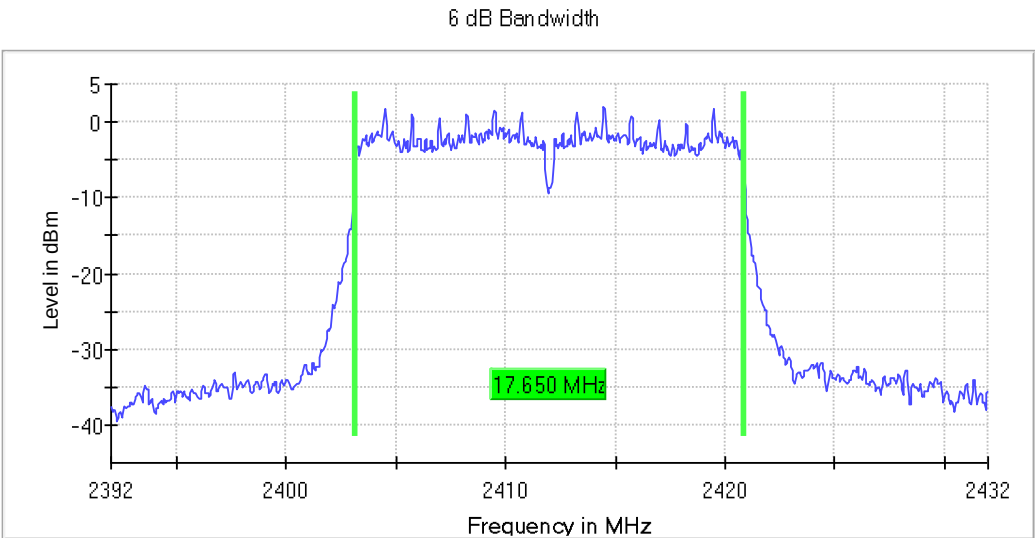
Operation Band (MHz) = [2400, 2483.5], Frequency (MHz) = 2462.00, Equipment Type: Digital Transmission System (DTS), Modulation: 802.11g (OFDM 6 Mbit/s)

Figures:



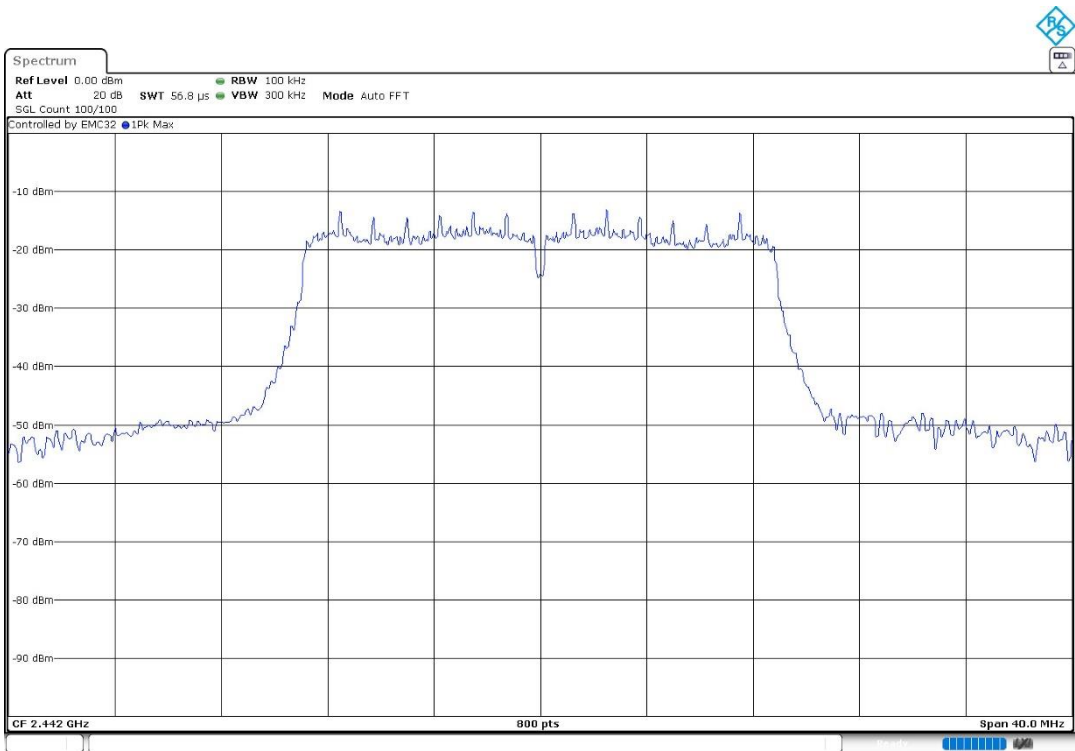
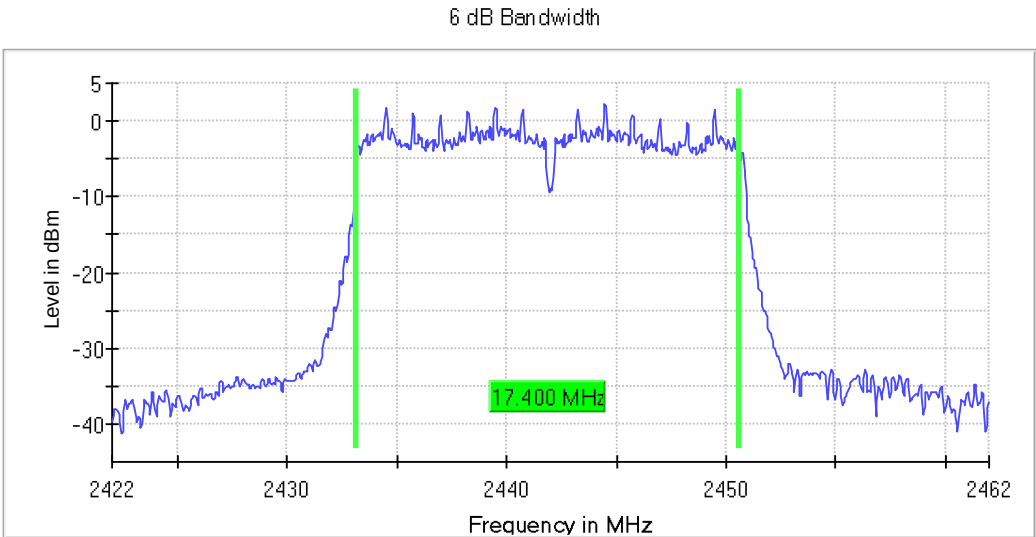
Operation Band (MHz) = [2400, 2483.5], Frequency (MHz) = 2412.00, Equipment Type: Digital Transmission System (DTS), 802.11n HT20 (OFDM MCS0 6.5 Mbit/s)

Figures:



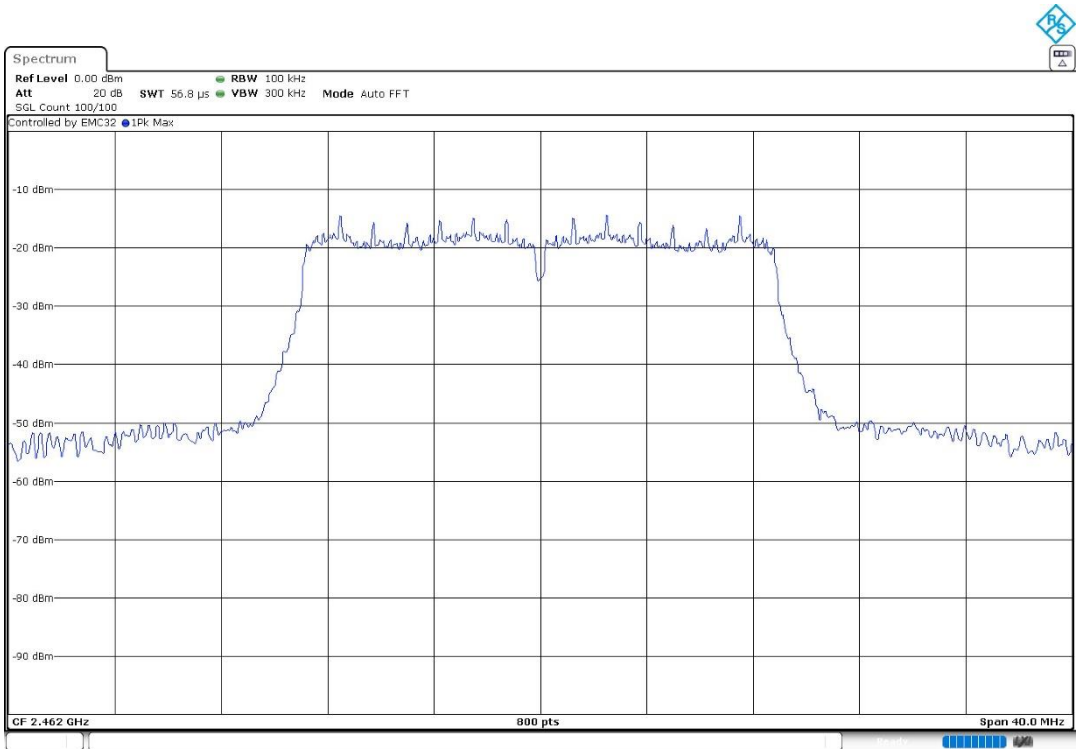
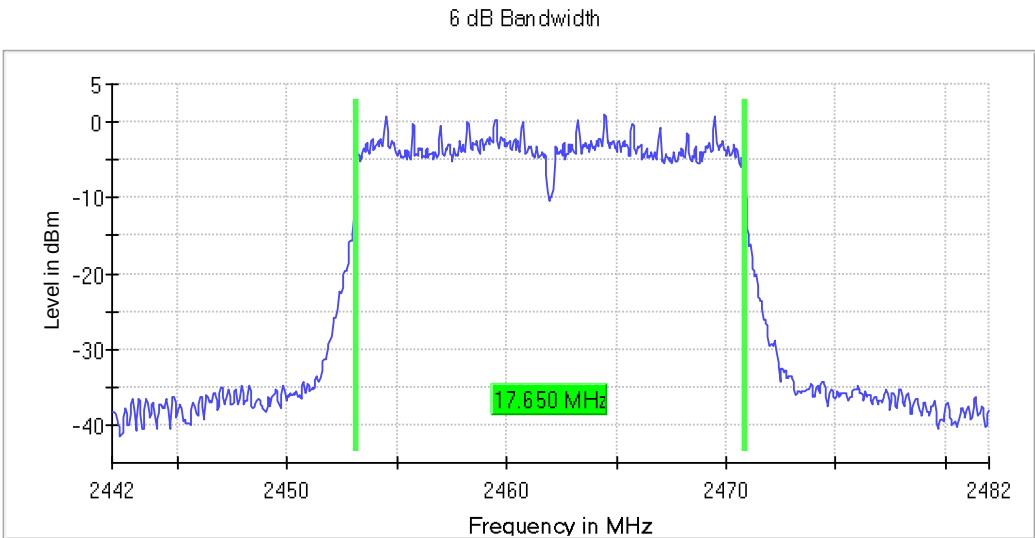
Operation Band (MHz) = [2400, 2483.5], Frequency (MHz) = 2442.00, Equipment Type: Digital Transmission System (DTS), 802.11n HT20 (OFDM MCS0 6.5 Mbit/s)

Figures:



Operation Band (MHz) = [2400, 2483.5], Frequency (MHz) = 2462.00, Equipment Type: Digital Transmission System (DTS), 802.11n HT20 (OFDM MCS0 6.5 Mbit/s)

Figures:



## FCC 15.247 (b) / RSS-247 5.4 (d) Maximum output power and antenna gain

### Limits

For systems using digital modulation in the 2400-2483.5 MHz band: 1 watt (30 dBm).

RSS-247:

The e.i.r.p. shall not exceed 4 W.

### Results

The maximum conducted output power level of the fundamental emission was measured according to clause 11.9.2.3.2 "Method AVGPM-G" of ANSI C63.10-2013.

The EIRP power (dBm) is calculated by adding the maximum declared antenna gain to the measured conducted power.

Maximum Declared Antenna Gain: +0.11 dBi

The maximum directional gain of the antenna is less than 6 dBi and therefore the maximum output power is not required to be reduced from the stated values.

- **Mode 802.11 b:**

|                                       | Low Channel<br>2412 MHz | Middle Channel<br>2442 MHz | High Channel<br>2462 MHz |
|---------------------------------------|-------------------------|----------------------------|--------------------------|
| Maximum Average Conducted Power (dBm) | 12.697                  | 13.055                     | 11.530                   |
| Maximum EIRP Power (dBm)              | 12.807                  | 13.165                     | 11.640                   |

- **Mode 802.11 g:**

|                                       | Low Channel<br>2412 MHz | Middle Channel<br>2442 MHz | High Channel<br>2462 MHz |
|---------------------------------------|-------------------------|----------------------------|--------------------------|
| Maximum Average Conducted Power (dBm) | 13.409                  | 13.691                     | 12.482                   |
| Maximum EIRP Power (dBm)              | 13.519                  | 13.801                     | 12.592                   |

- **Mode 802.11 n20:**

|                                       | Low Channel<br>2412 MHz | Middle Channel<br>2442 MHz | High Channel<br>2462 MHz |
|---------------------------------------|-------------------------|----------------------------|--------------------------|
| Maximum Average Conducted Power (dBm) | 13.758                  | 13.764                     | 12.519                   |
| Maximum EIRP Power (dBm)              | 13.868                  | 13.874                     | 12.629                   |

### Verdict

Pass

## FCC 15.247 (e) / RSS-247 5.2 (b) Power spectral density

### Limits

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

### Results

The power spectral density was measured according to clause 11.10.3 "Method AVGPS-1" of ANSI C63.10-2013.

- **Mode 802.11 b:**

|                                      | Low Channel<br>2412 MHz | Middle Channel<br>2442 MHz | High Channel<br>2462 MHz |
|--------------------------------------|-------------------------|----------------------------|--------------------------|
| Average Power Spectral Density (dBm) | -5.579                  | -5.039                     | -6.457                   |

- **Mode 802.11 g:**

|                                      | Low Channel<br>2412 MHz | Middle Channel<br>2442 MHz | High Channel<br>2462 MHz |
|--------------------------------------|-------------------------|----------------------------|--------------------------|
| Average Power Spectral Density (dBm) | -7.053                  | -6.935                     | -7.981                   |

- **Mode 802.11 n20:**

|                                      | Low Channel<br>2412 MHz | Middle Channel<br>2442 MHz | High Channel<br>2462 MHz |
|--------------------------------------|-------------------------|----------------------------|--------------------------|
| Average Power Spectral Density (dBm) | -7.195                  | -7.005                     | -8.327                   |

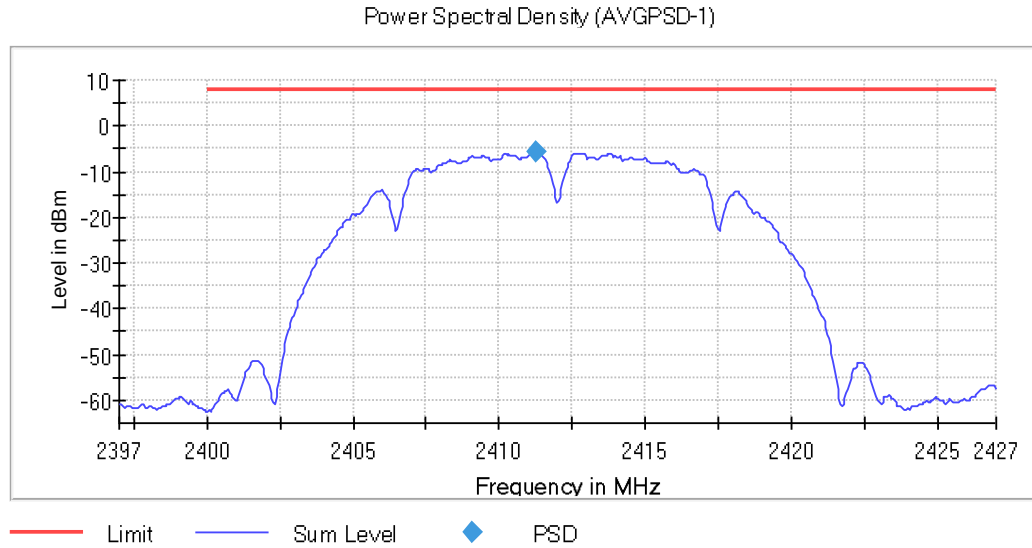
### Verdict

Pass

## Attachments

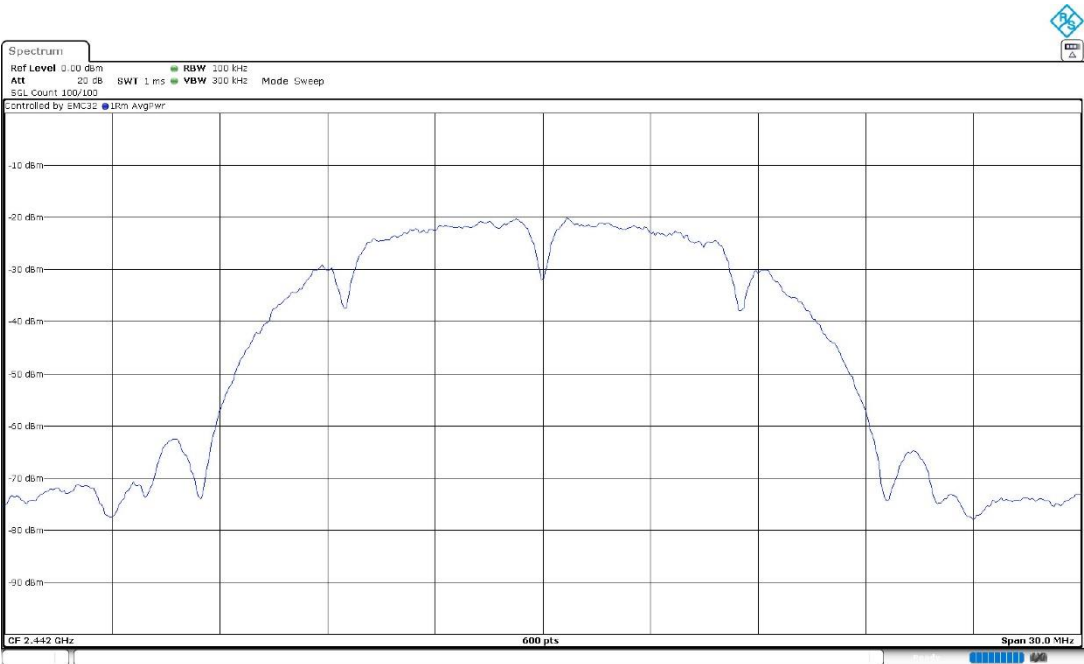
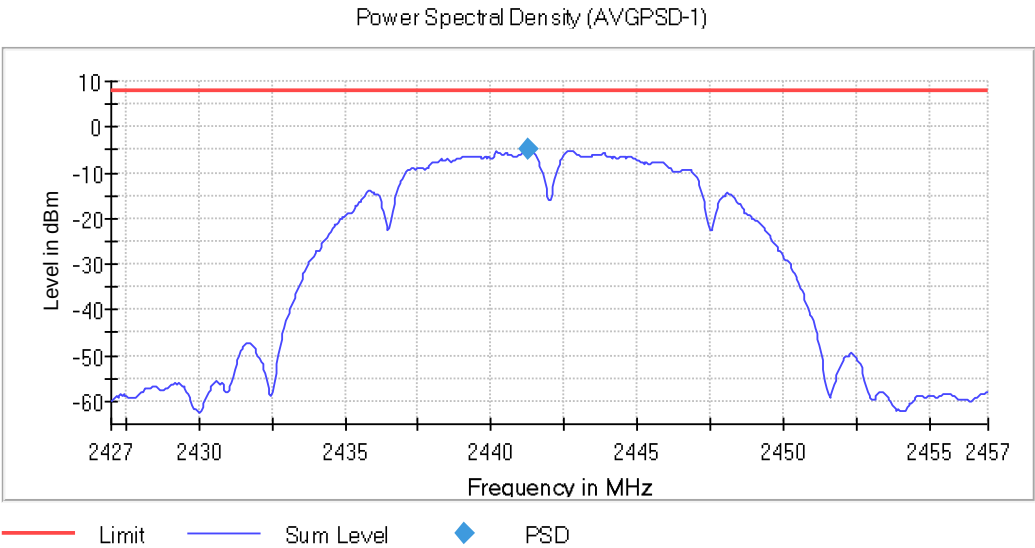
**Operation Band (MHz) = [2400, 2483.5], Frequency (MHz) = 2412.00, Equipment Type: Digital Transmission System (DTS), Modulation: 802.11b (DSSS 1 Mbit/s)**

**Figures:**



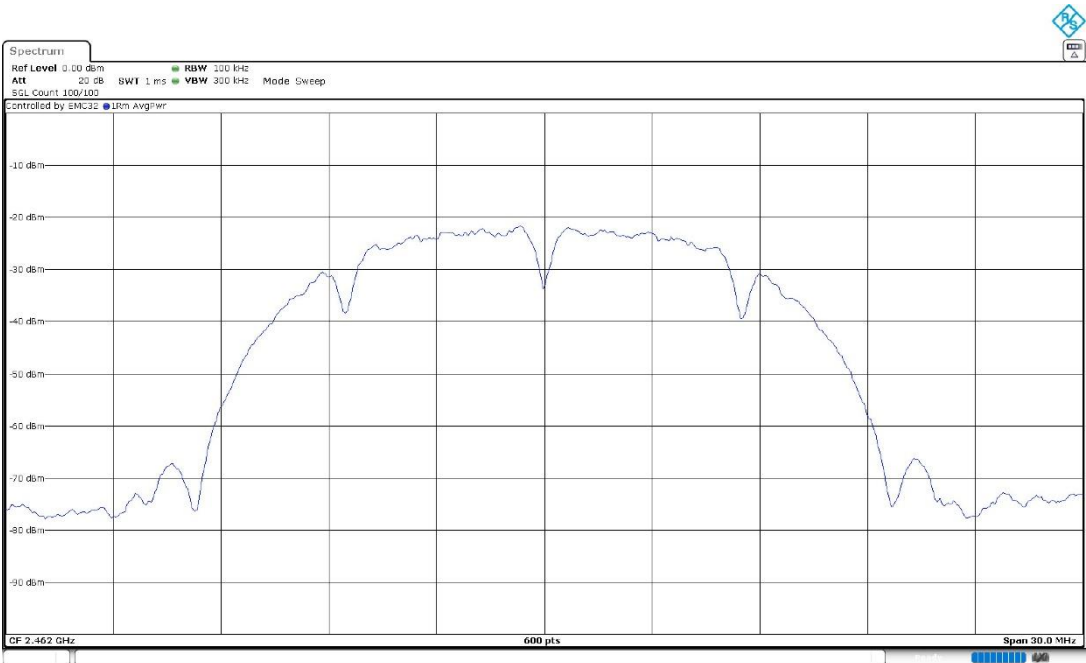
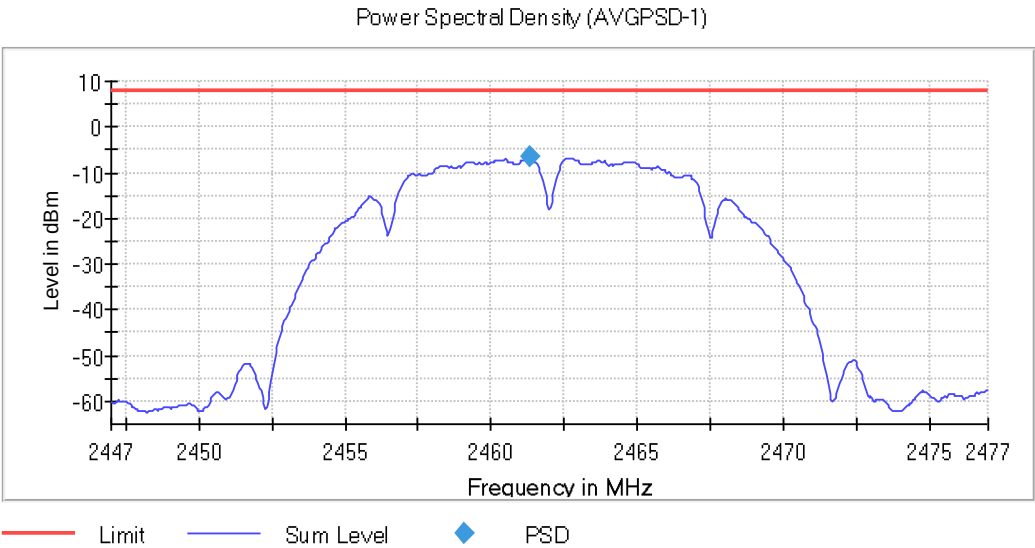
Operation Band (MHz) = [2400, 2483.5], Frequency (MHz) = 2442.00, Equipment Type: Digital Transmission System (DTS), Modulation: 802.11b (DSSS 1 Mbit/s)

Figures:



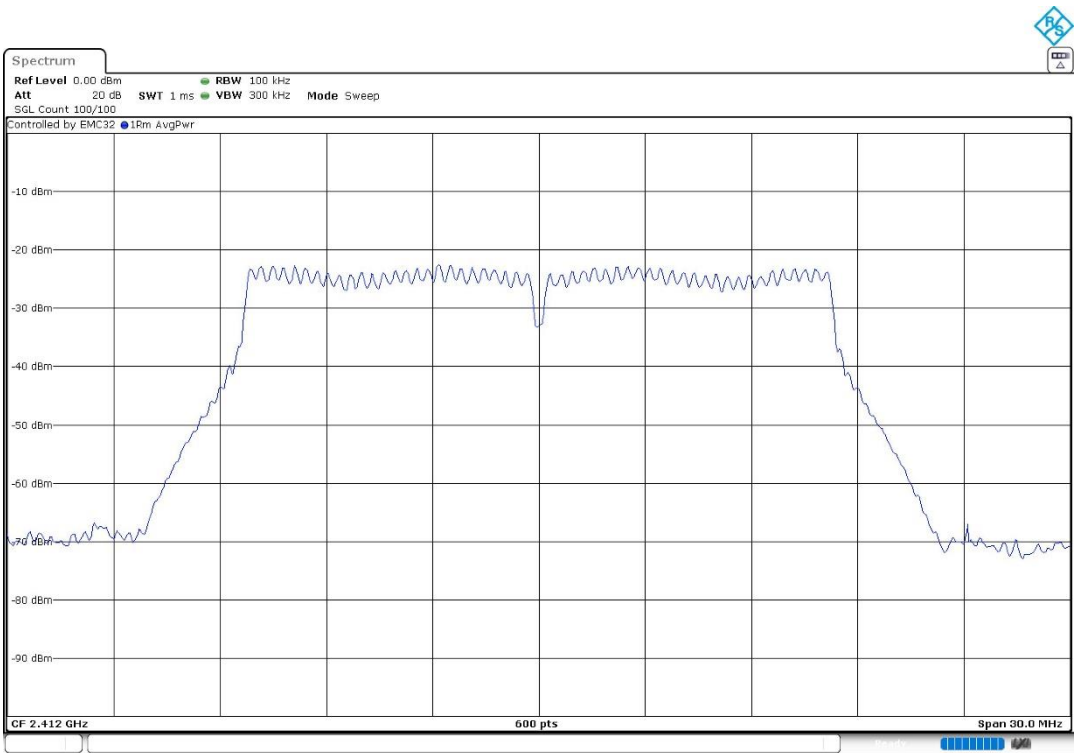
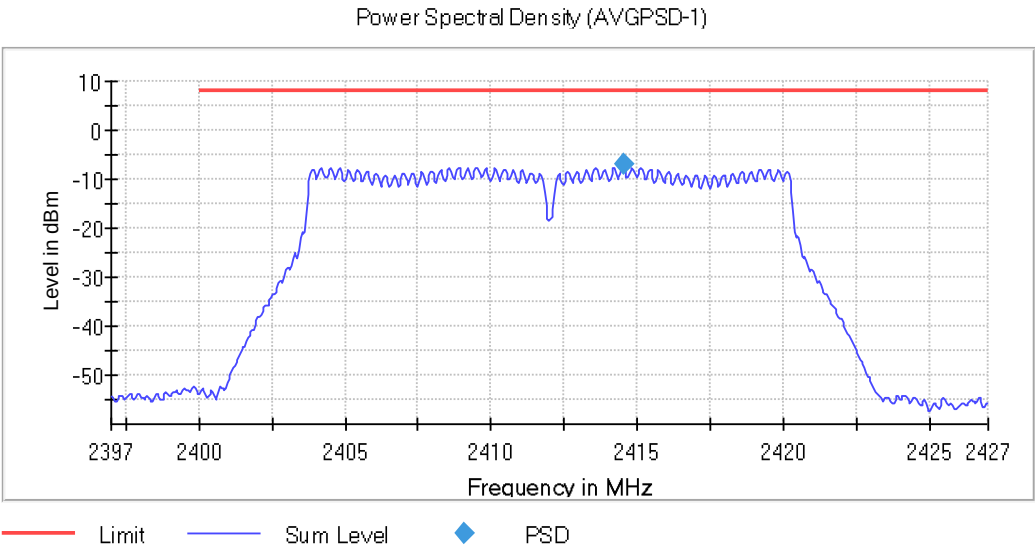
Operation Band (MHz) = [2400, 2483.5], Frequency (MHz) = 2462.00, Equipment Type: Digital Transmission System (DTS), Modulation: 802.11b (DSSS 1 Mbit/s)

Figures:



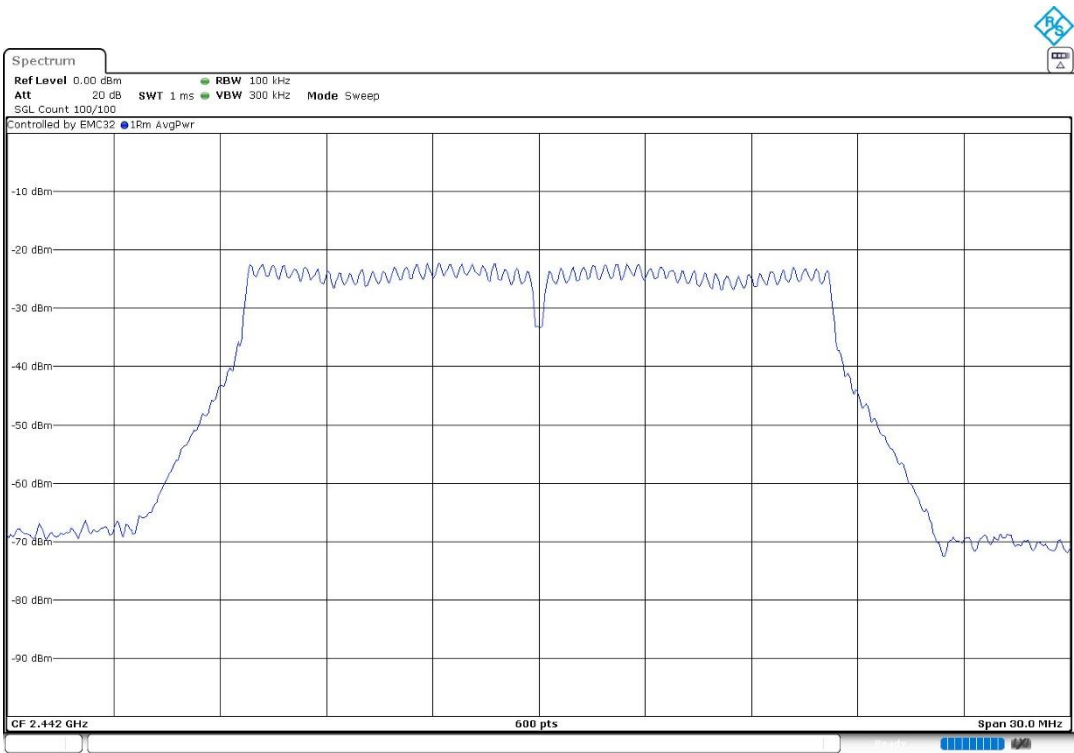
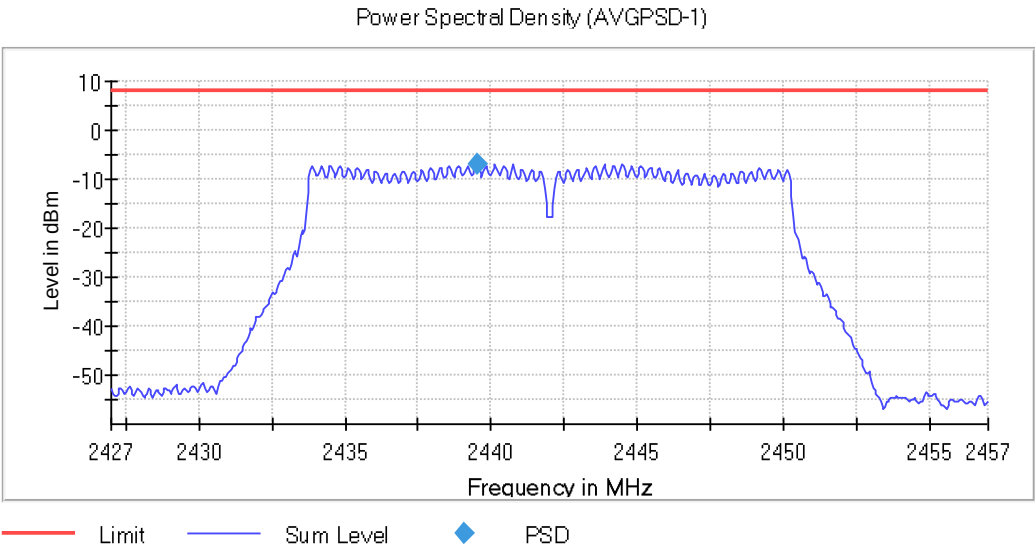
Operation Band (MHz) = [2400, 2483.5], Frequency (MHz) = 2412.00, Equipment Type: Digital Transmission System (DTS), Modulation: 802.11g (OFDM 6 Mbit/s)

Figures:



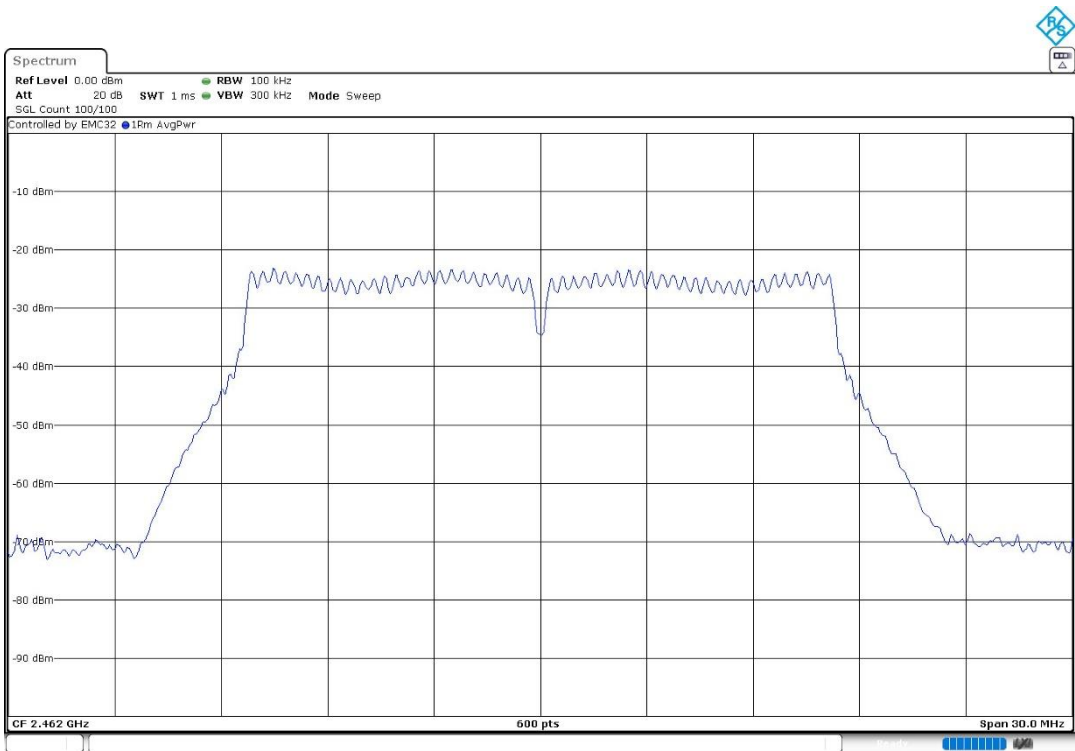
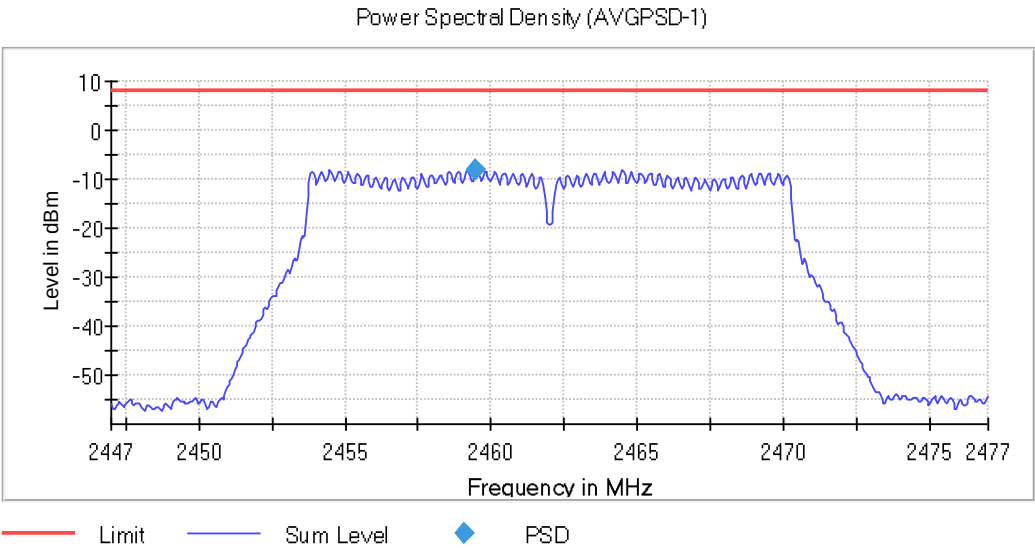
Operation Band (MHz) = [2400, 2483.5], Frequency (MHz) = 2442.00, Equipment Type: Digital Transmission System (DTS), Modulation: 802.11g (OFDM 6 Mbit/s)

Figures:



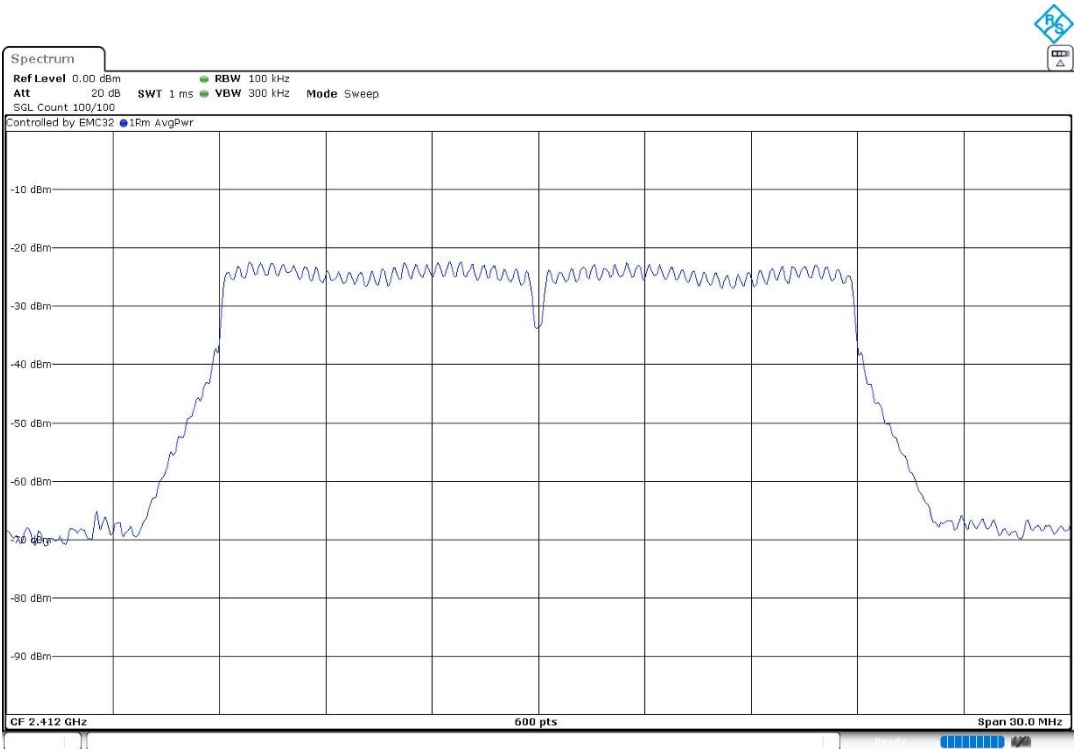
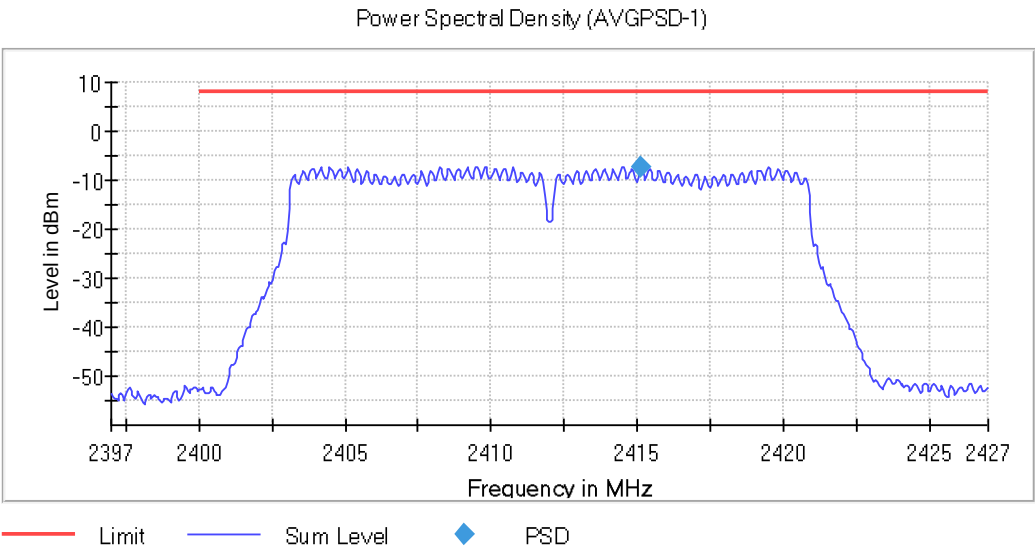
Operation Band (MHz) = [2400, 2483.5], Frequency (MHz) = 2462.00, Equipment Type: Digital Transmission System (DTS), Modulation: 802.11g (OFDM 6 Mbit/s)

Figures:



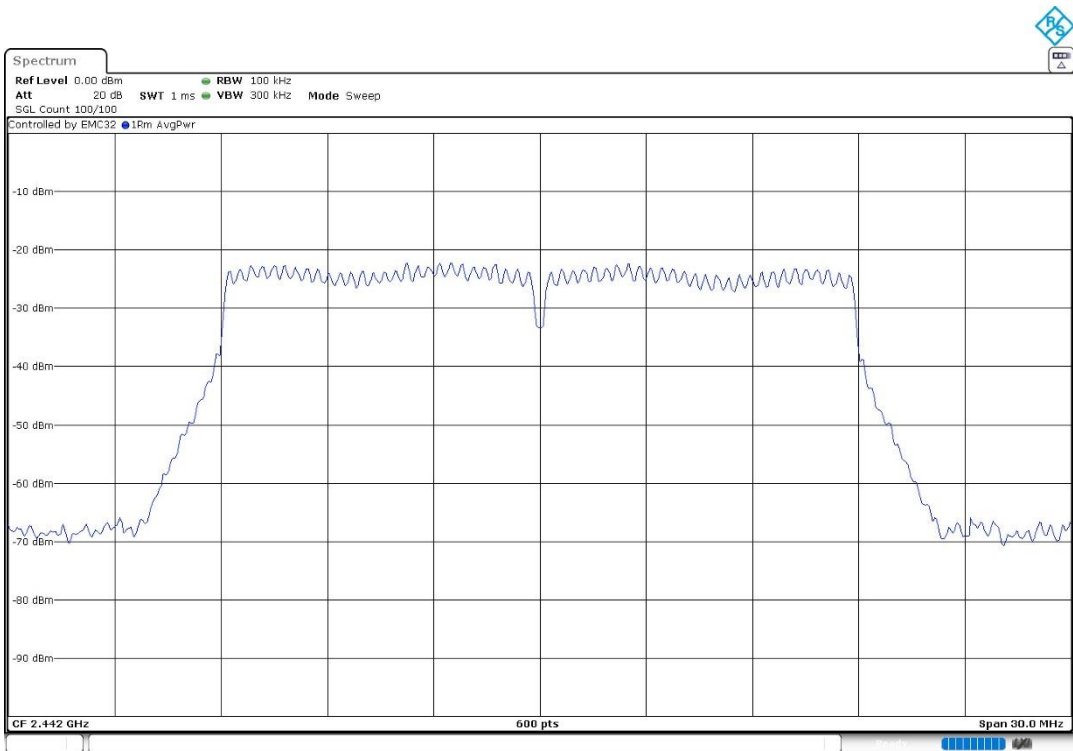
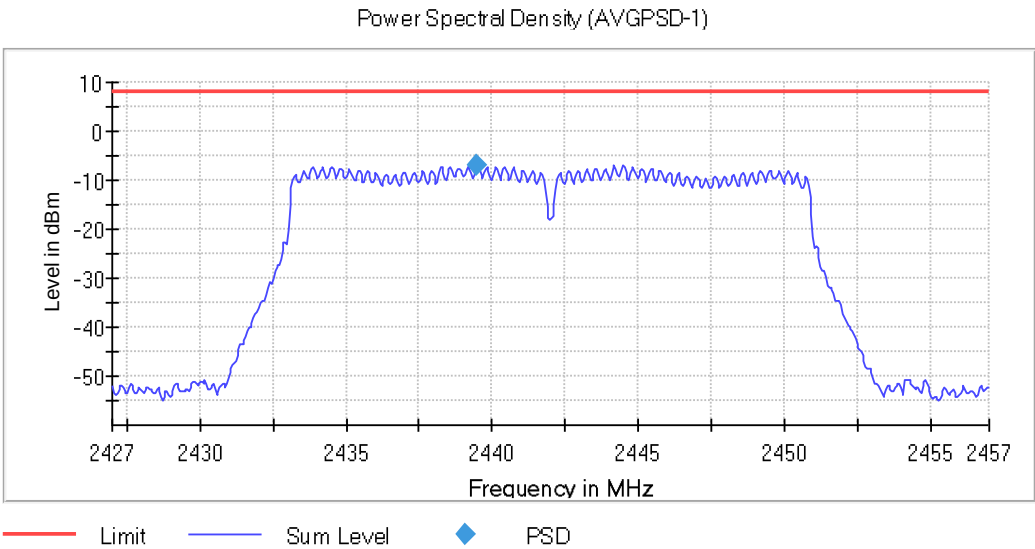
Operation Band (MHz) = [2400, 2483.5], Frequency (MHz) = 2412.00, Equipment Type: Digital Transmission System (DTS), 802.11n HT20 (OFDM MCS0 6.5 Mbit/s)

Figures:



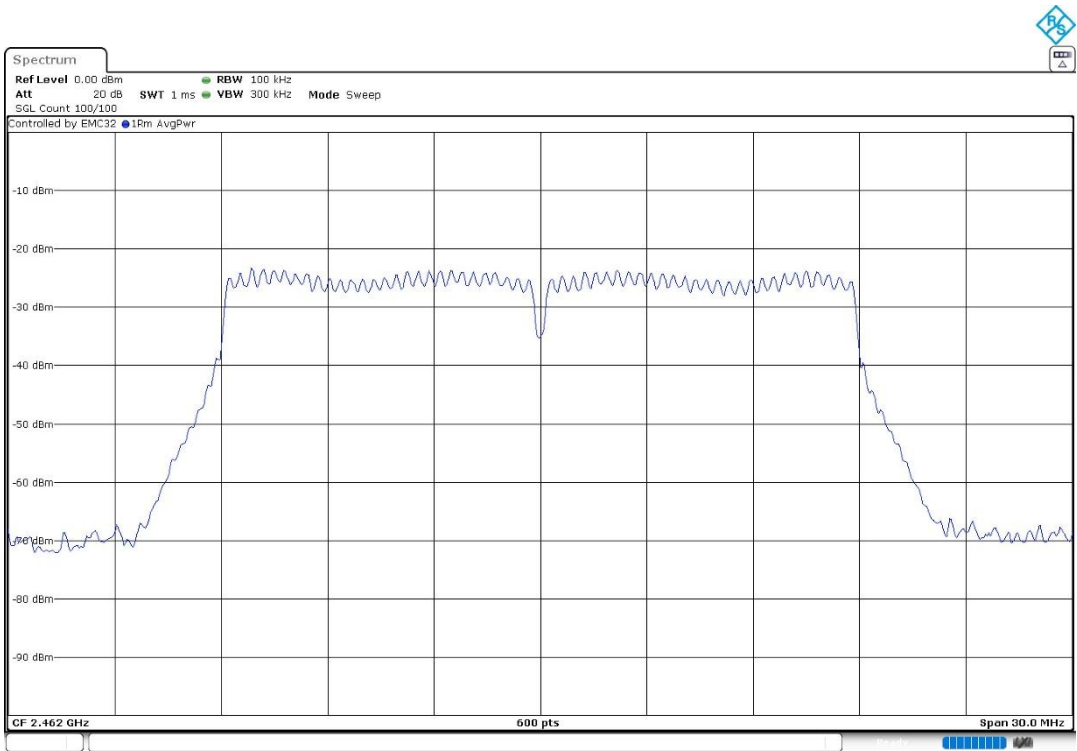
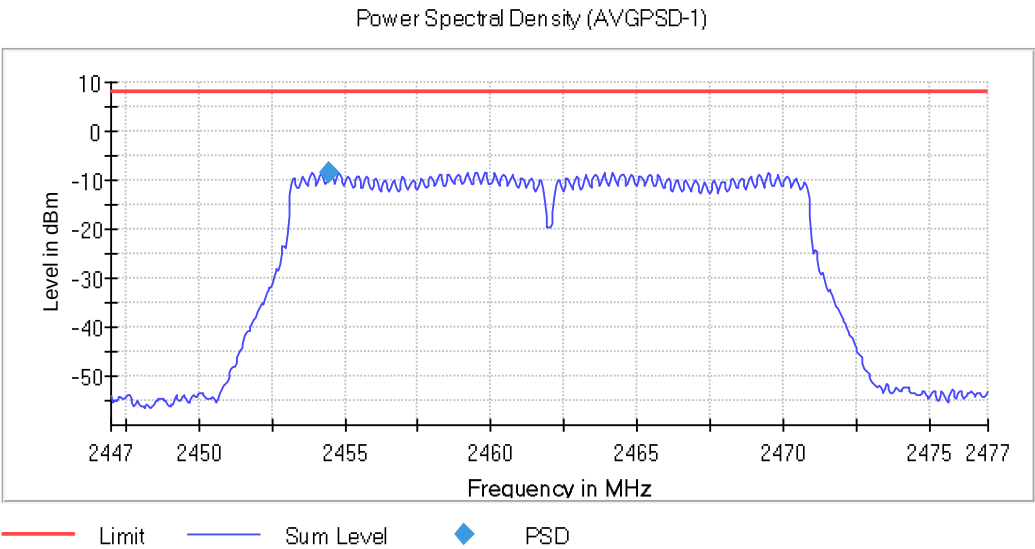
Operation Band (MHz) = [2400, 2483.5], Frequency (MHz) = 2442.00, Equipment Type: Digital Transmission System (DTS), 802.11n HT20 (OFDM MCS0 6.5 Mbit/s)

Figures:



Operation Band (MHz) = [2400, 2483.5], Frequency (MHz) = 2462.00, Equipment Type: Digital Transmission System (DTS), 802.11n HT20 (OFDM MCS0 6.5 Mbit/s)

Figures:



## FCC 15.247 (d) / RSS-247 5.5 Band-edge emissions compliance (Transmitter)

### **Limits**

In any 100 kHz bandwidths outside the frequency band in which the 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, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

### **Results**

Radiated measurements were used to show compliance with the limits in the restricted bands 2.31-2.39 GHz and 2.4835-2.5 GHz.

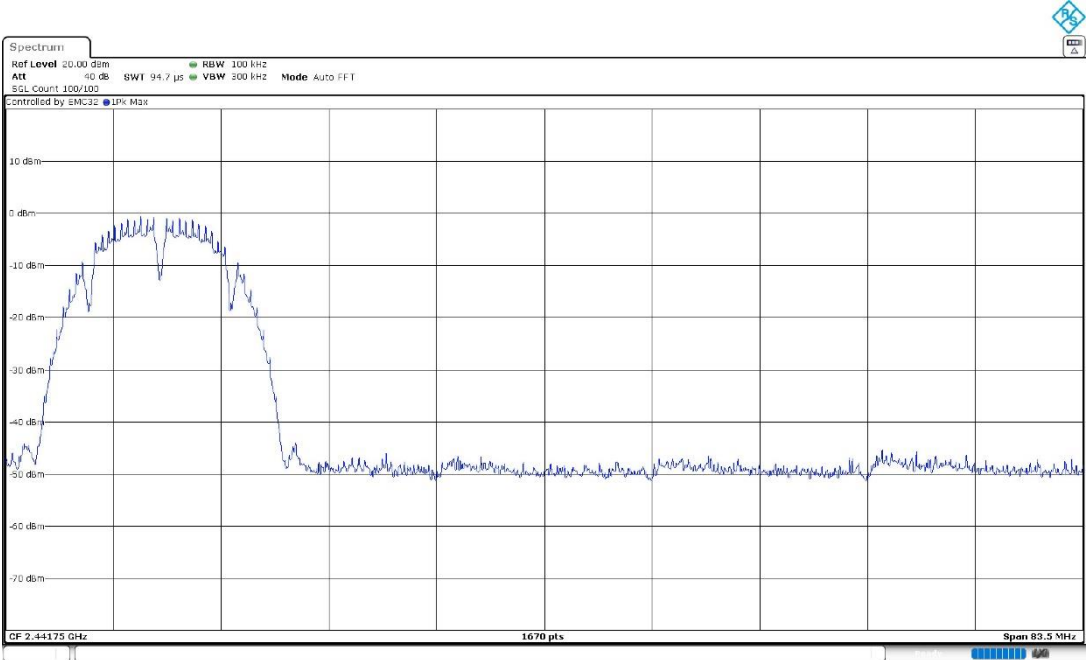
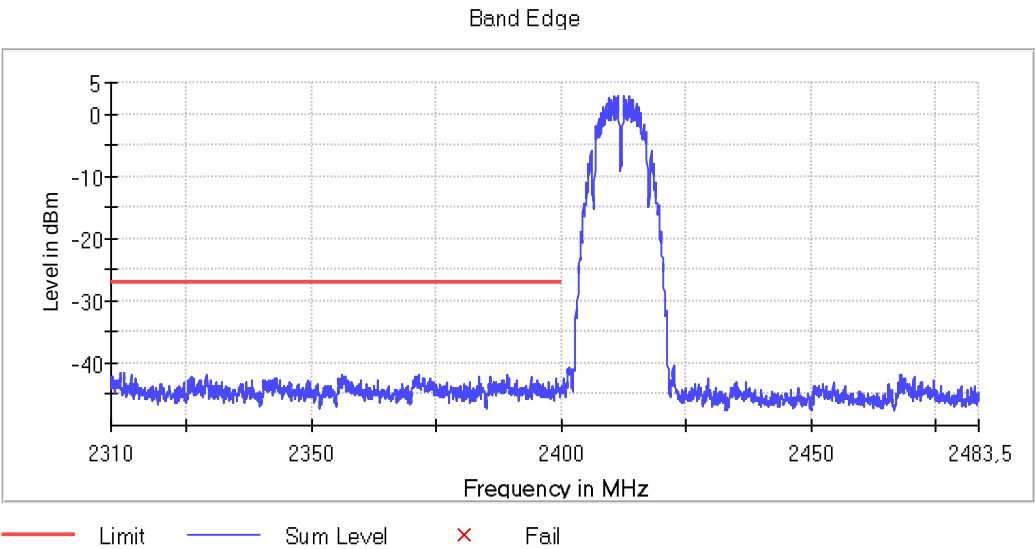
### **Verdict**

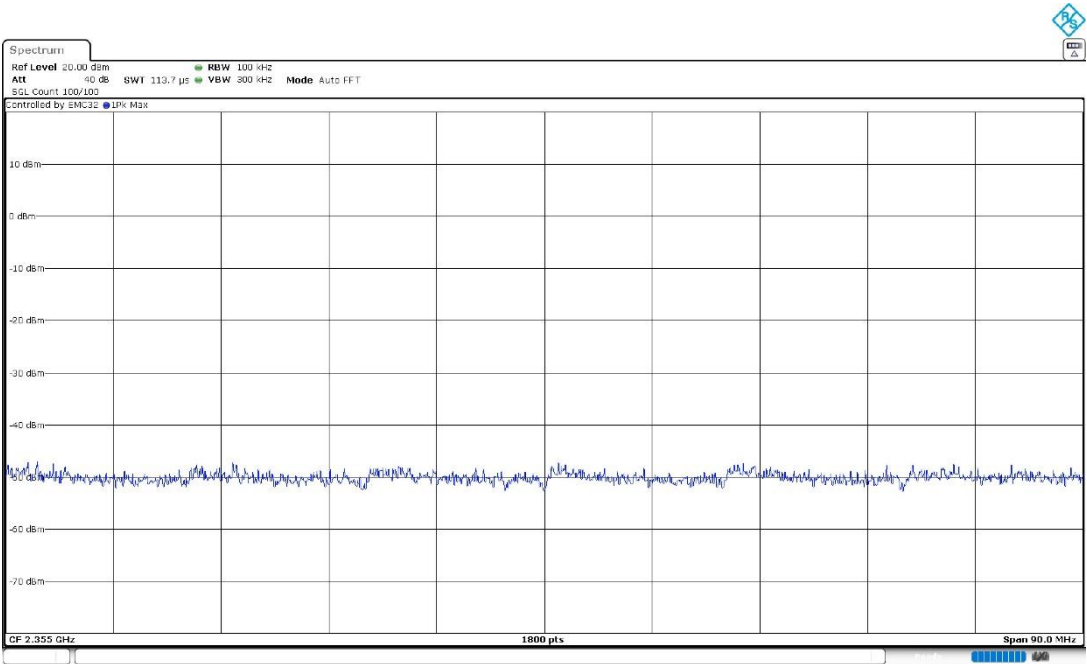
Pass

Attachments

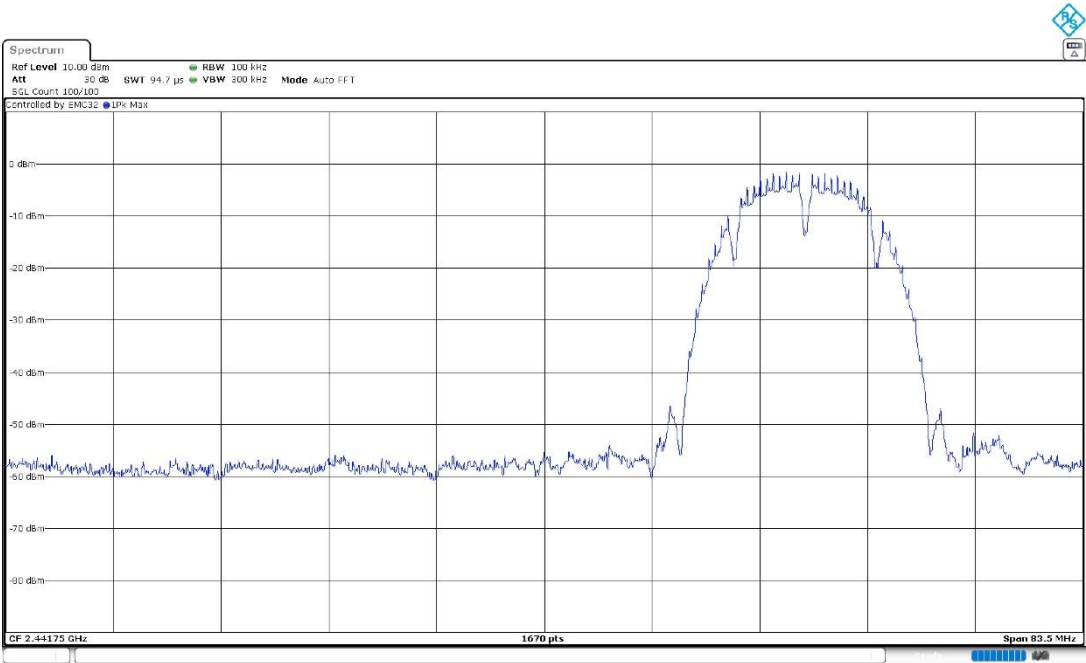
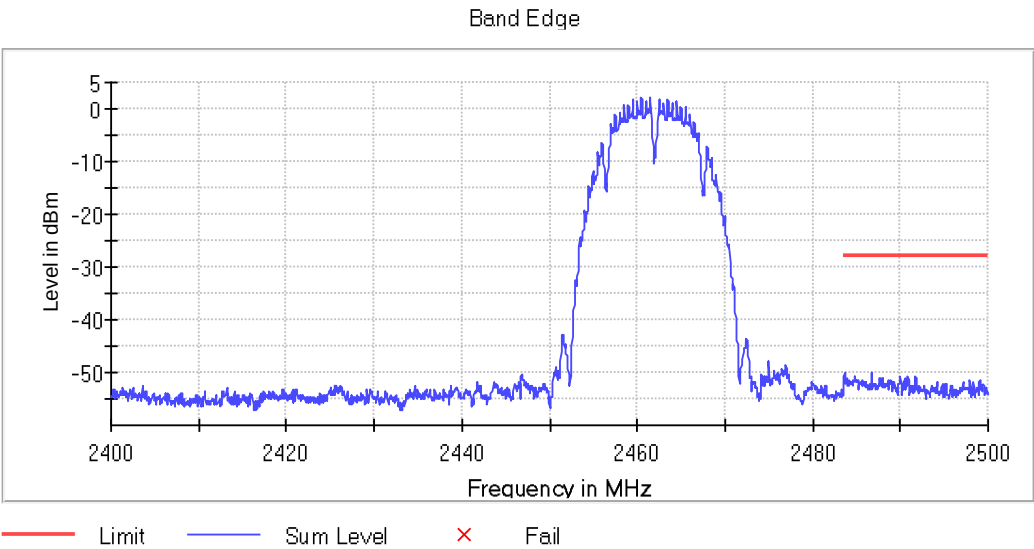
Mode 802.11 b – Band-edge emissions

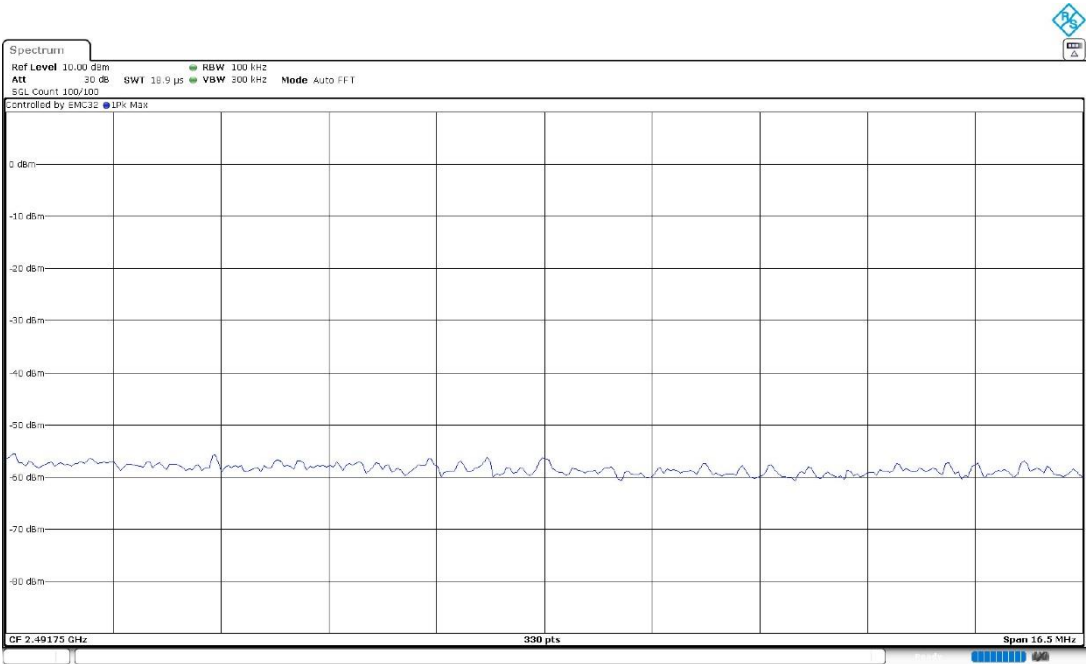
- Low Channel:





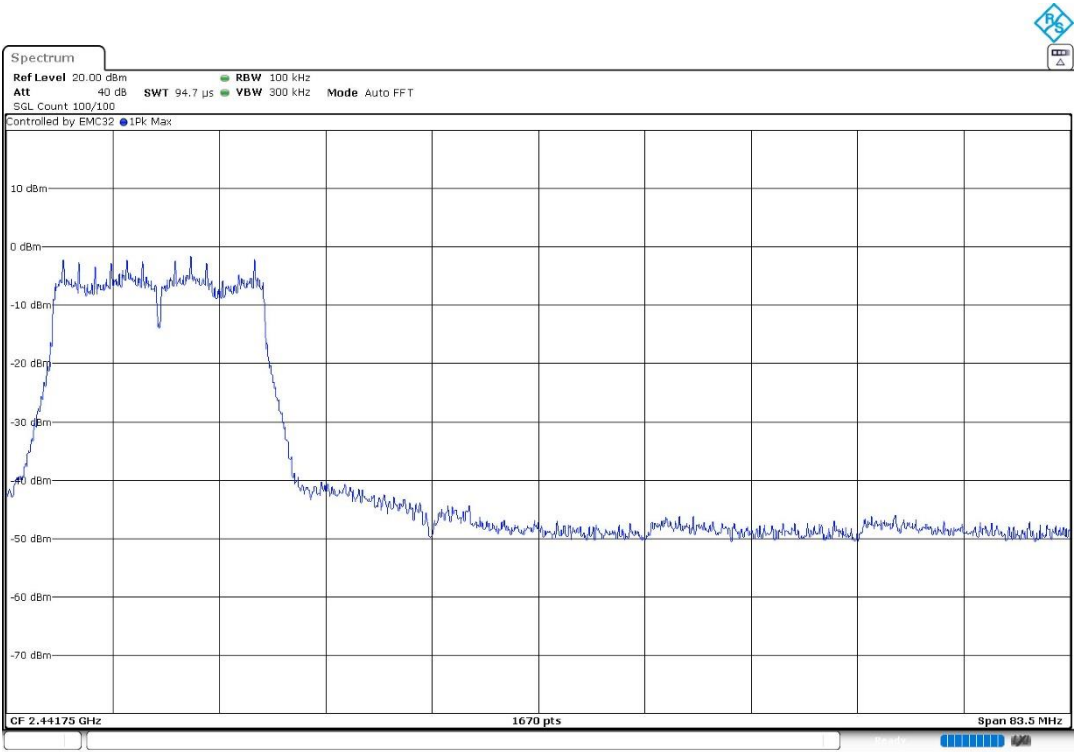
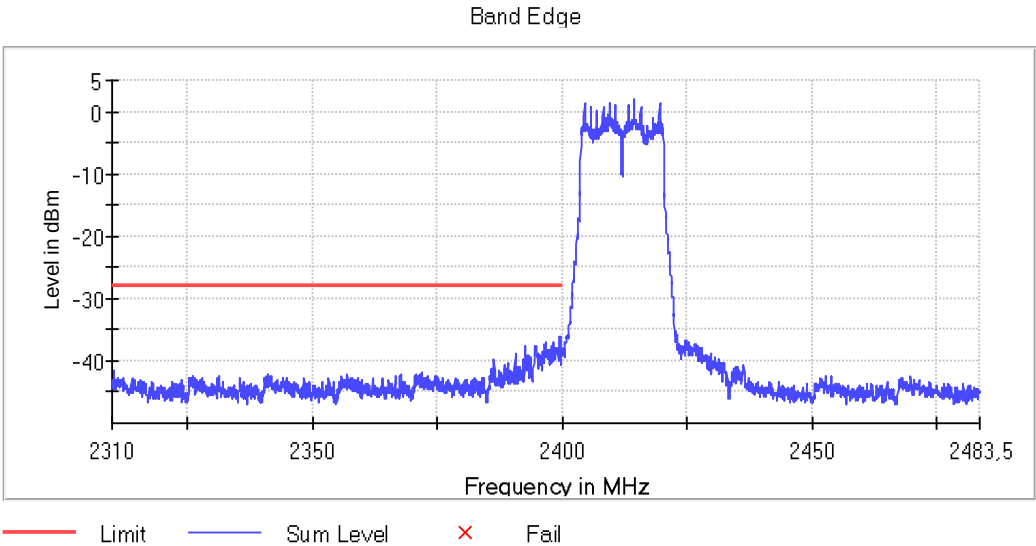
- High Channel:

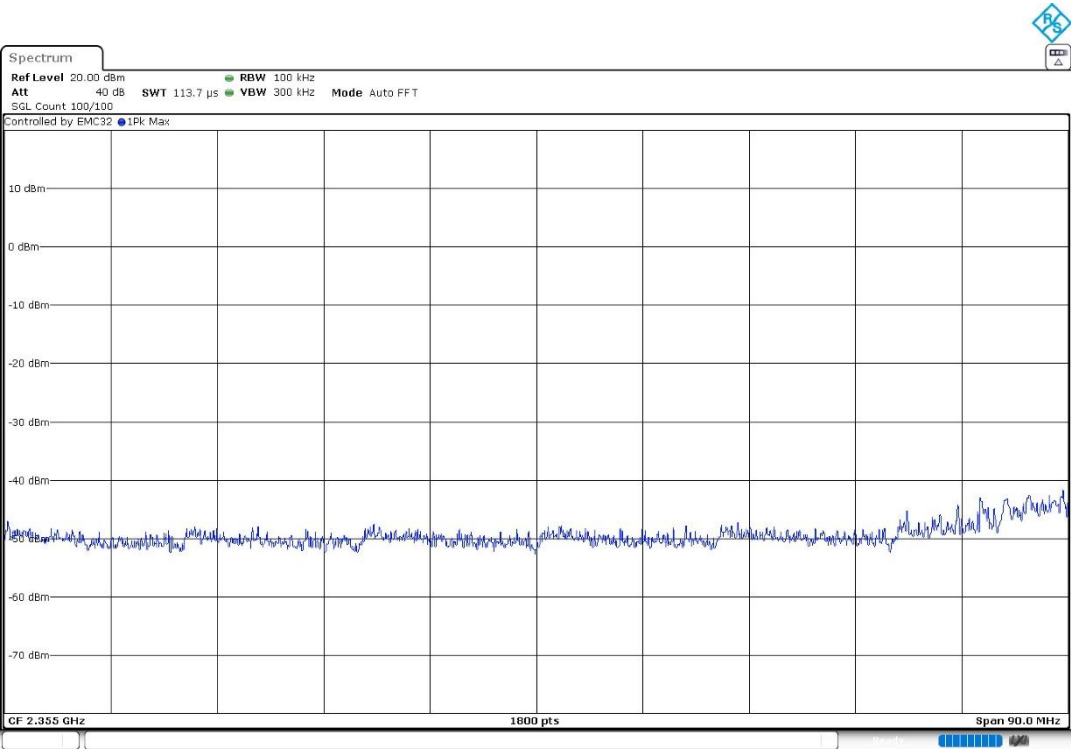




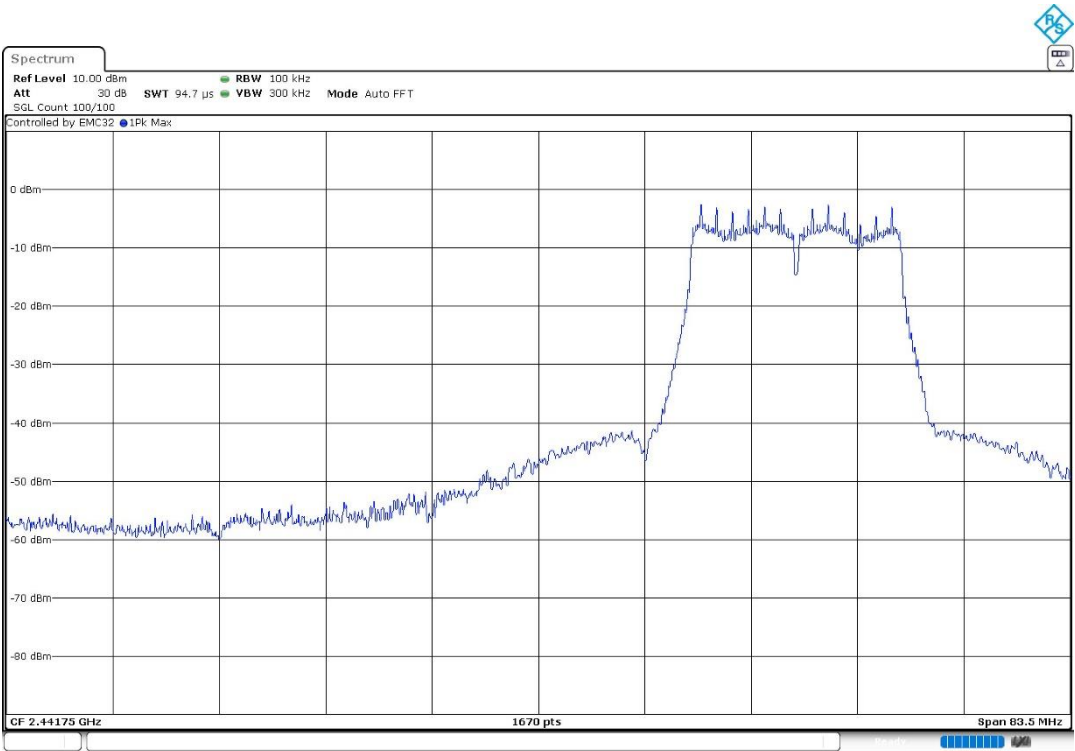
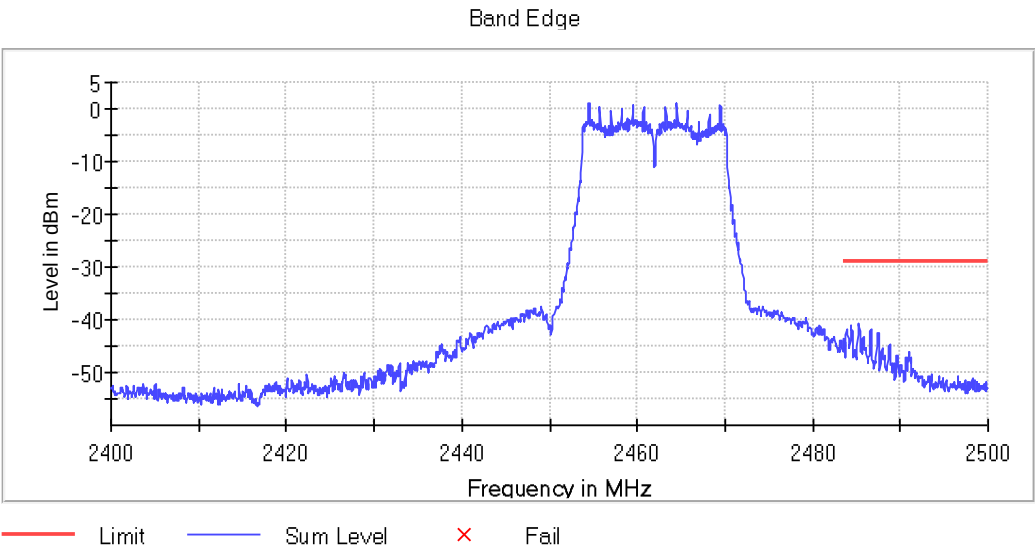
Mode 802.11 g – Band-edge emissions

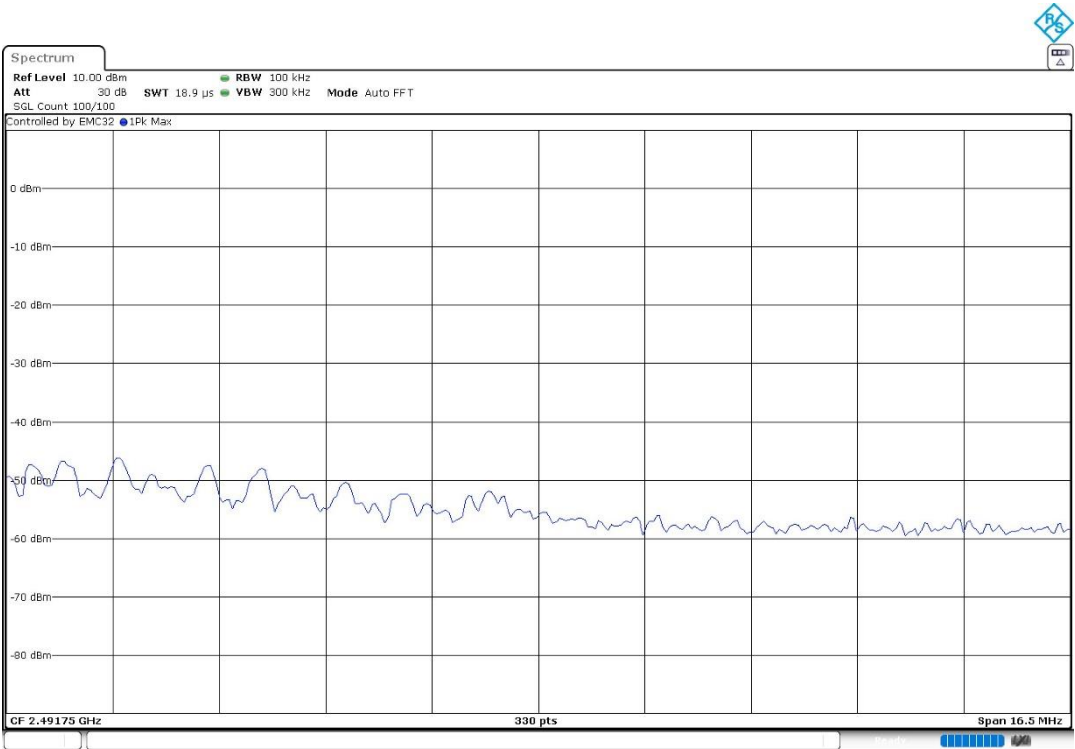
- Low Channel:





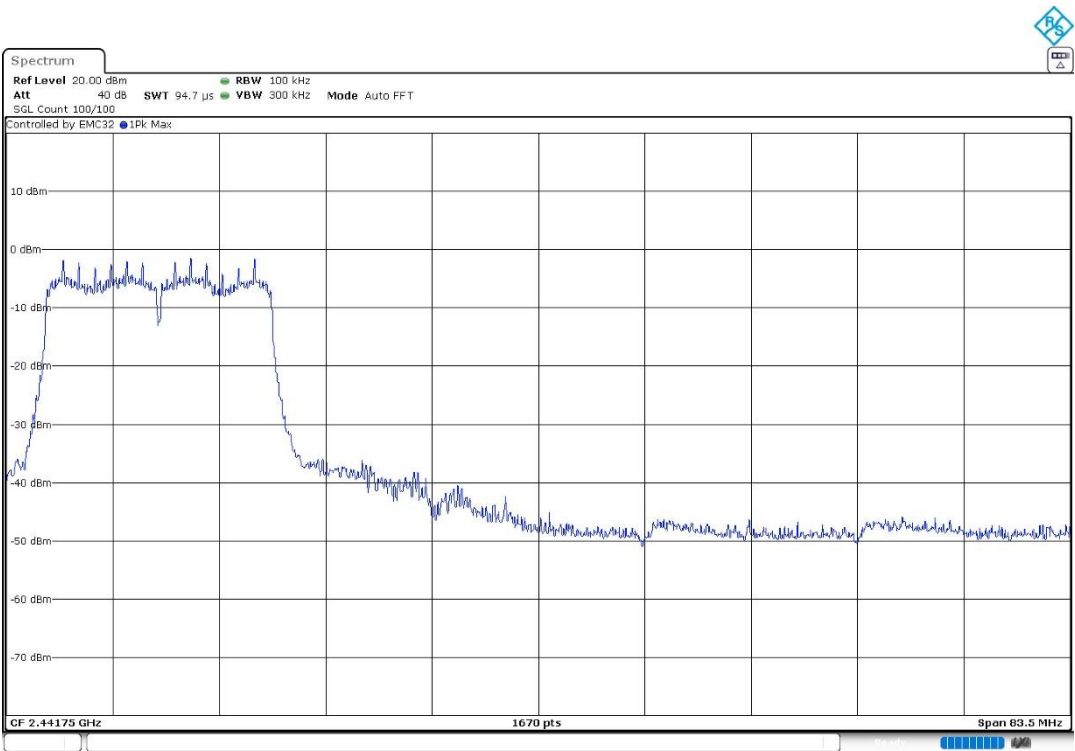
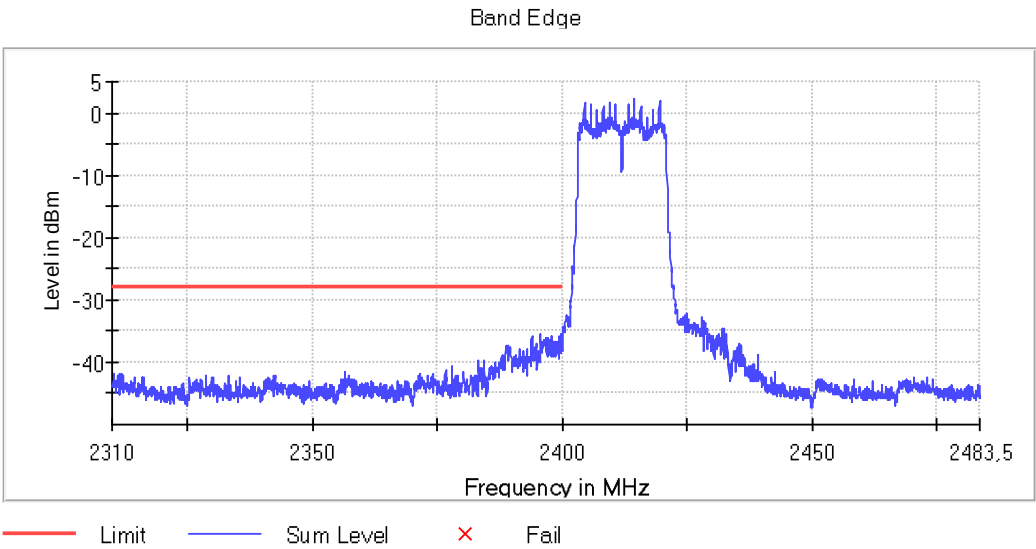
- High Channel:

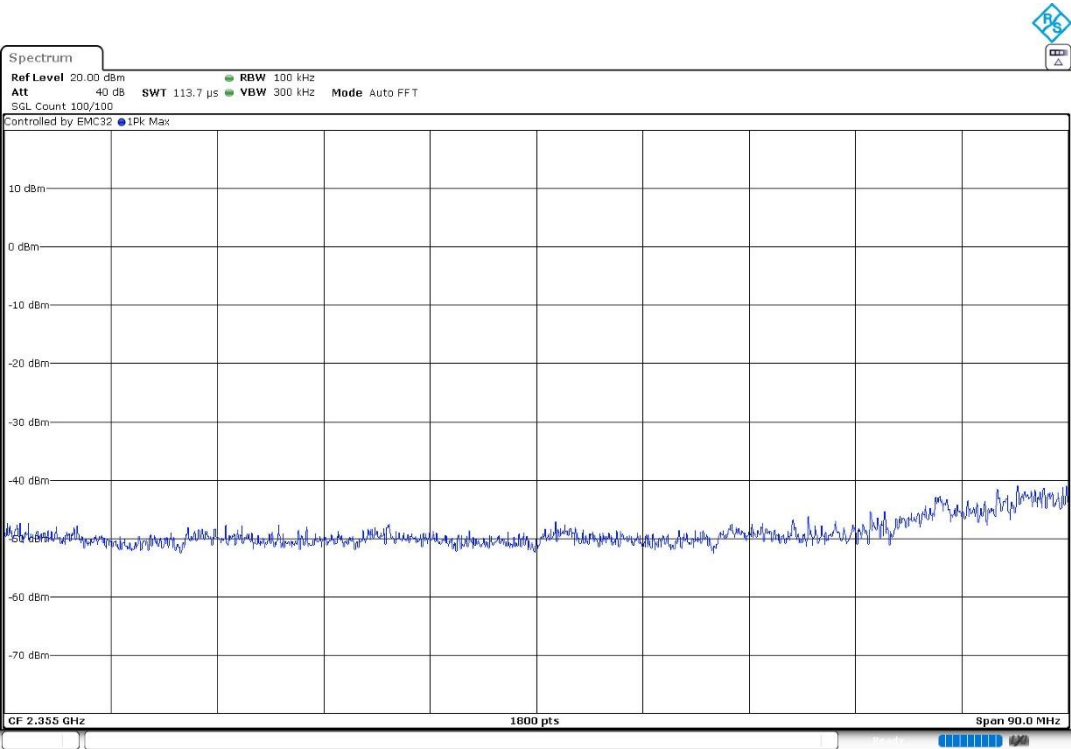




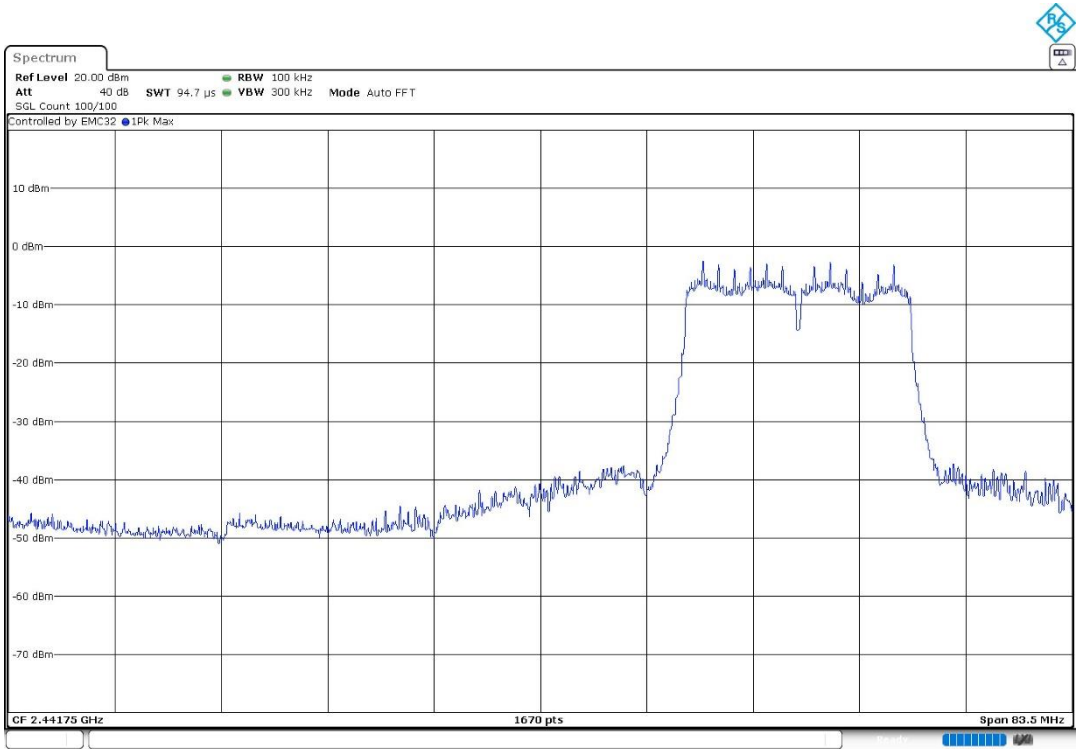
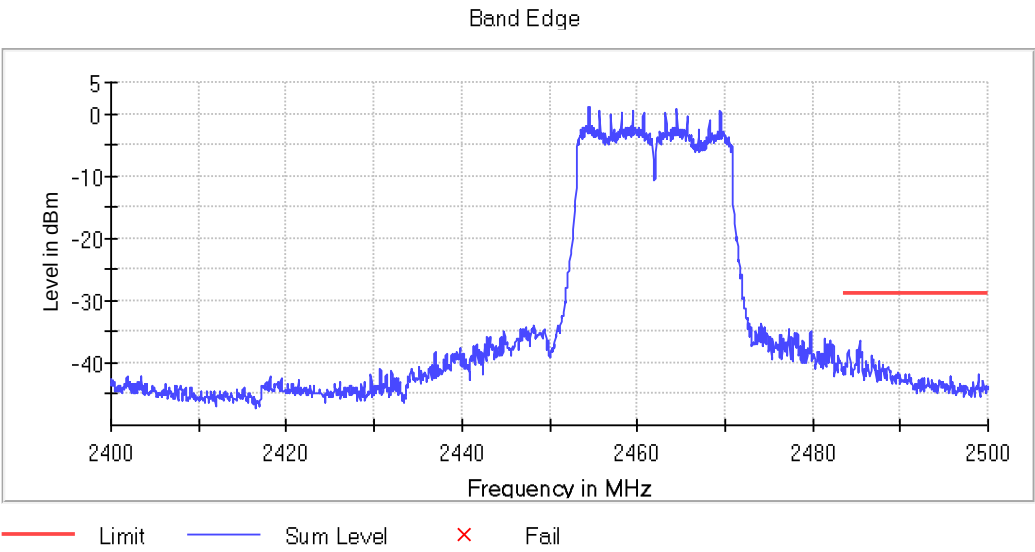
Mode 802.11 n20 – Band-edge emissions

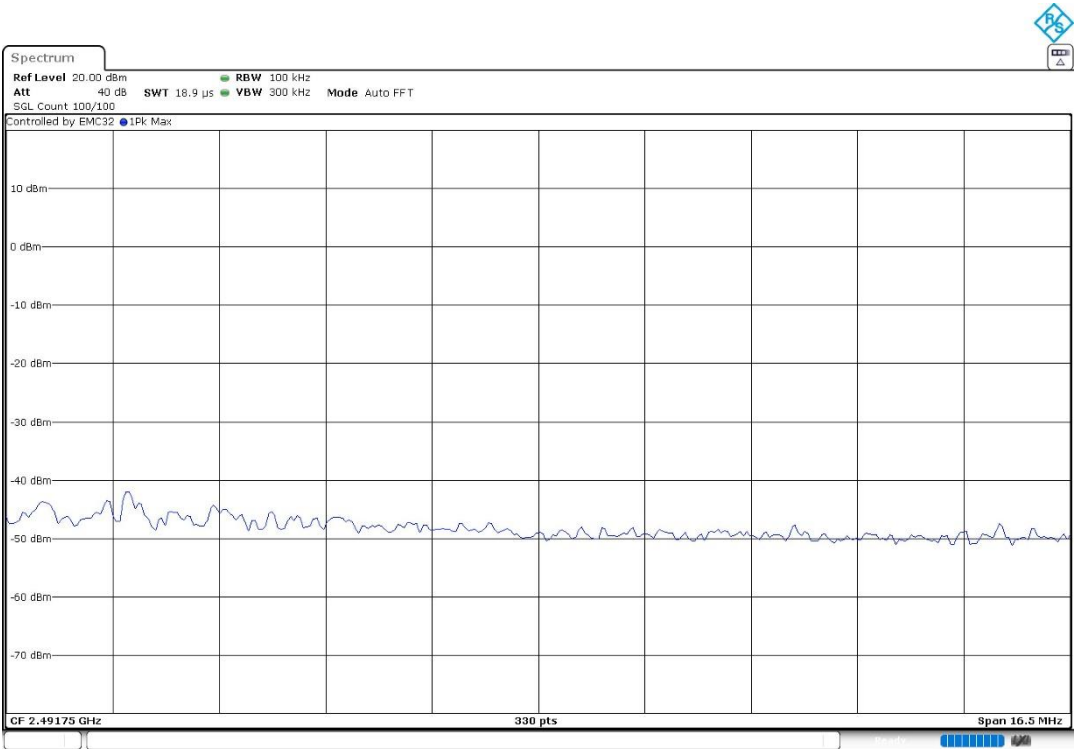
- Low Channel:





- High Channel:





## FCC 15.247 (d) / RSS-247 5.5 Emission limitations radiated (Transmitter)

### Limits

Radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c) / RSS-Gen):

| Frequency Range (MHz) | Field strength (µV/m) | Field strength (dBµV/m) | Measurement distance (m) |
|-----------------------|-----------------------|-------------------------|--------------------------|
| 0.009 - 0.490         | 2400/F(kHz)           | -                       | 300                      |
| 0.490 - 1.705         | 24000/F(kHz)          | -                       | 30                       |
| 1.705 - 30.0          | 30                    | -                       | 30                       |
| 30 - 88               | 100                   | 40                      | 3                        |
| 88 - 216              | 150                   | 43.5                    | 3                        |
| 216 - 960             | 200                   | 46                      | 3                        |
| Above 960             | 500                   | 54                      | 3                        |

The emission limits shown in the above table are based on measurements employing CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

For average radiated emission measurements above 1000 MHz, there is also a limit corresponding to 20 dB above the indicated values in the table, specified when measuring with peak detector function.

RSS-247:

Attenuation below the general field strength limits specified in RSS-Gen is not required.

### Results

The field strength is calculated by adding a correction factor to the measured level from the spectrum analyzer. This correction factor includes antenna factor, cable loss, pre-amplifiers gain and the distance correction factor for measurements above 17 GHz performed at 1.5-meter distance.

### Frequency range 30 MHz - 1 GHz:

The spurious frequencies detected below 1 GHz do not depend on either the operating channel or the modulation mode selected in the EUT.

Spurious frequencies at less than 20 dB below the limit:

| Spurious frequency (MHz) | Emission Level (dBµV/m) | Polarization | Detector   |
|--------------------------|-------------------------|--------------|------------|
| 32.788750                | 27.11                   | V            | Quasi-peak |
| 349.978750               | 27.63                   | H            | Quasi-peak |
| 374.986563               | 27.29                   | H            | Quasi-peak |

## Frequency range 1 - 26 GHz:

The results below show the maximum measured levels in the 1-26 GHz range including the restricted bands 2.31-2.39 GHz and 2.4835-2.5 GHz.

Spurious frequencies with peak levels above the average limit (54 dB $\mu$ V/m at 3 m) are measured with average detector for checking compliance with the average limit.

- **Mode 802.11 b:**

- Low Channel.

Spurious frequencies at less than 20 dB below the limit:

| Spurious frequency (MHz) | Emission Level (dB $\mu$ V/m) | Polarization | Detector |
|--------------------------|-------------------------------|--------------|----------|
| 4986.880000              | 53.11                         | H            | Peak     |
| 7481.540000              | 53.11                         | H            | Peak     |

- Middle Channel.

Spurious frequencies at less than 20 dB below the limit:

| Spurious frequency (MHz) | Emission Level (dB $\mu$ V/m) | Polarization | Detector |
|--------------------------|-------------------------------|--------------|----------|
| 12075.080000             | 51.60                         | H            | Peak     |

- High Channel.

Spurious frequencies at less than 20 dB below the limit:

| Spurious frequency (MHz) | Emission Level (dB $\mu$ V/m) | Polarization | Detector |
|--------------------------|-------------------------------|--------------|----------|
| 7304.440000              | 47.11                         | V            | Peak     |

## Verdict

Pass

## OFDM modes:

For spurious emissions in the range 30 MHz - 26 GHz (except field strength at the band edges that was tested for all modes) a preliminary scan was performed to determine the OFDM worst-case mode in terms of spurious emissions.

Spurious emissions in the Restricted Bands 2.31-2.39 GHz and 2.4835-2.5 GHz are measured for all modes.

- **Worst case OFDM mode: 802.11 g**
  - **Mode 802.11 g (OFDM worst case):**

- Low Channel.

Spurious frequencies at less than 20 dB below the limit:

| Spurious frequency (MHz) | Emission Level (dBμV/m) | Polarization | Detector |
|--------------------------|-------------------------|--------------|----------|
| 2385.400000              | 62.67                   | H            | Peak     |
|                          | 50.52                   |              | Average  |
| 2388.861539              | 65.76                   | H            | Peak     |
|                          | 50.36                   |              | Average  |
| 2485.938462              | 60.97                   | V            | Peak     |
|                          | 49.18                   |              | Average  |
| 2495.107692              | 60.12                   | H            | Peak     |
|                          | 49.39                   |              | Average  |
| 4990.940000              | 45.56                   | H            | Peak     |

- Middle Channel.

Spurious frequencies at less than 20 dB below the limit:

| Spurious frequency (MHz) | Emission Level (dBμV/m) | Polarization | Detector |
|--------------------------|-------------------------|--------------|----------|
| 2484.369231              | 60.10                   | H            | Peak     |
|                          | 50.18                   |              | Average  |
| 2494.615385              | 60.32                   | H            | Peak     |
|                          | 49.75                   |              | Average  |

- High Channel.

Spurious frequencies at less than 20 dB below the limit:

| Spurious frequency (MHz) | Emission Level (dBμV/m) | Polarization | Detector |
|--------------------------|-------------------------|--------------|----------|
| 2483.846154              | 62.99                   | H            | Peak     |
|                          | 49.84                   |              | Average  |
| 4991.780000              | 52.21                   | V            | Peak     |
| 7526.060000              | 50.01                   | H            | Peak     |

## Verdict

Pass

- **Mode 802.11 n20:**

- Low Channel. Restricted Bands 2.31-2.39 GHz and 2.4835-2.5 GHz.

Spurious frequencies at less than 20 dB below the limit:

| Spurious frequency (MHz) | Emission Level (dBμV/m) | Polarization | Detector |
|--------------------------|-------------------------|--------------|----------|
| 2384.276923              | 61.77                   | H            | Peak     |
|                          | 50.11                   |              | Average  |
| 2388.707692              | 61.02                   | H            | Peak     |
|                          | 49.38                   |              | Average  |
| 2494.123077              | 60.79                   | H            | Peak     |
|                          | 49.39                   |              | Average  |

- Middle Channel. Restricted Bands 2.31-2.39 GHz and 2.4835-2.5 GHz.

No spurious frequencies found close to the limit.

- High Channel. Restricted Bands 2.31-2.39 GHz and 2.4835-2.5 GHz.

Spurious frequencies at less than 20 dB below the limit:

| Spurious frequency (MHz) | Emission Level (dBμV/m) | Polarization | Detector |
|--------------------------|-------------------------|--------------|----------|
| 2484.984615              | 64.93                   | H            | Peak     |
|                          | 49.36                   |              | Average  |

## Verdict

Pass

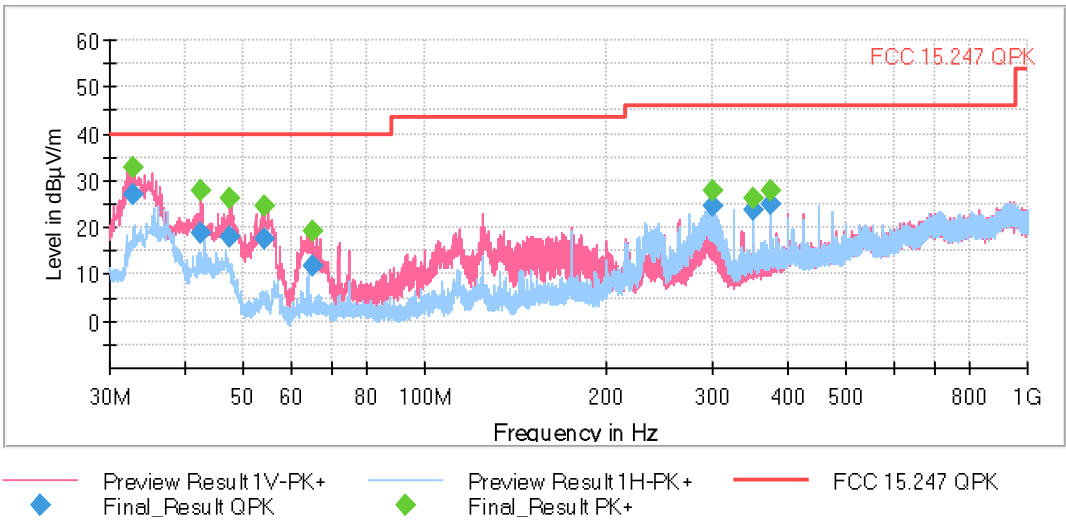
Attachments

Measurement settings:

| Subrange                              | Step Size  | Detectors | Bandwidth | Sweep Time | Preamp |
|---------------------------------------|------------|-----------|-----------|------------|--------|
| Receiver: [ESR 7]<br>30 MHz - 1 GHz   | 30,312 kHz | PK+       | 100 kHz   | 1 s        | 0 dB   |
| Receiver: [FSW 50]<br>1 GHz - 3 GHz   | 30,769 kHz | PK+ ; AVG | 1 MHz     | 1 s        | 0 dB   |
| Receiver: [FSW 50]<br>3 GHz - 17 GHz  | 140 kHz    | PK+ ; AVG | 1 MHz     | 1 s        | 0 dB   |
| Receiver: [FSW 50]<br>17 GHz - 26 GHz | 300 kHz    | PK+ ; AVG | 1 MHz     | 1 s        | 0 dB   |

FREQUENCY RANGE 30 MHz - 1 GHz

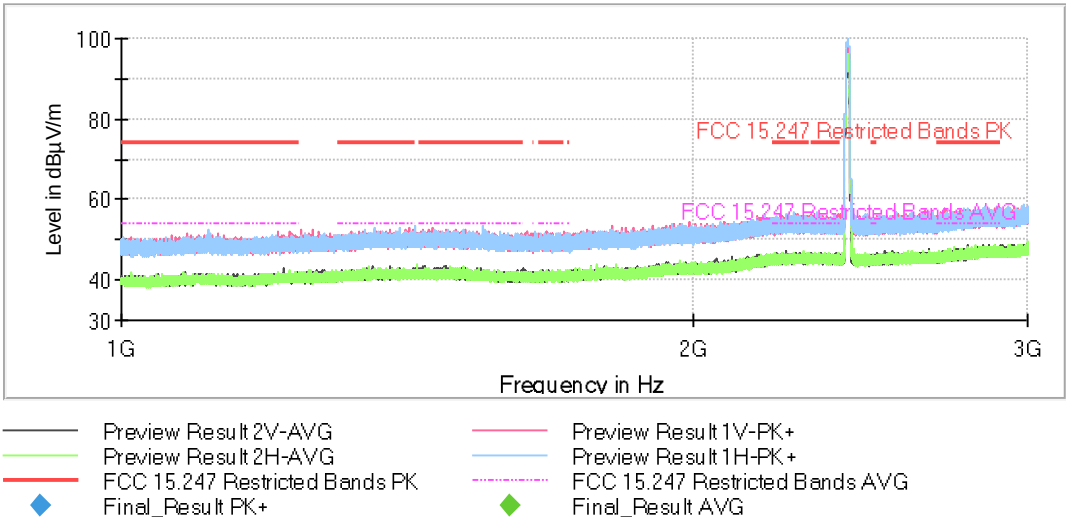
This plot is valid for Low, Middle and High Channels and all modulations.



FREQUENCY RANGE 1 - 3 GHz

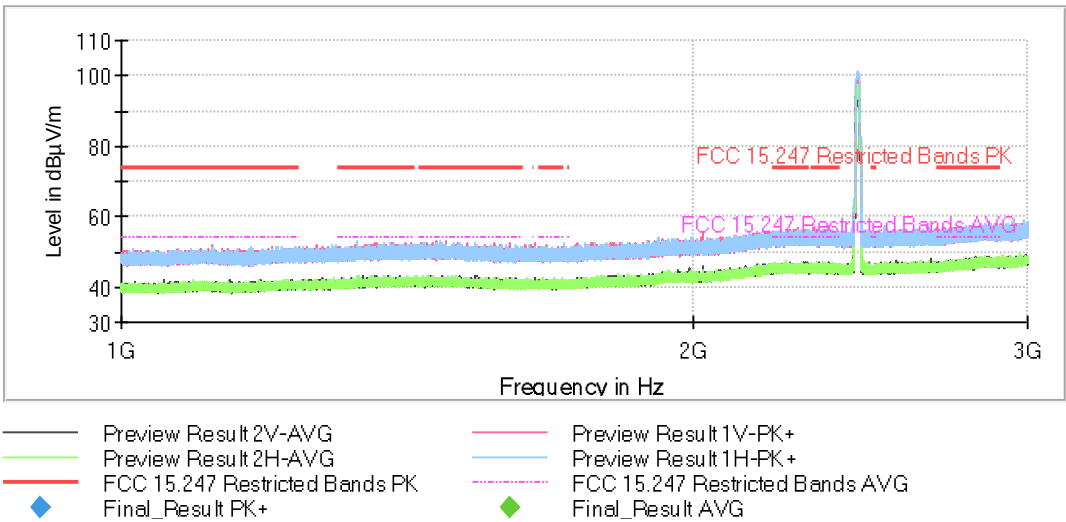
- Mode 802.11 b:

- Low Channel:



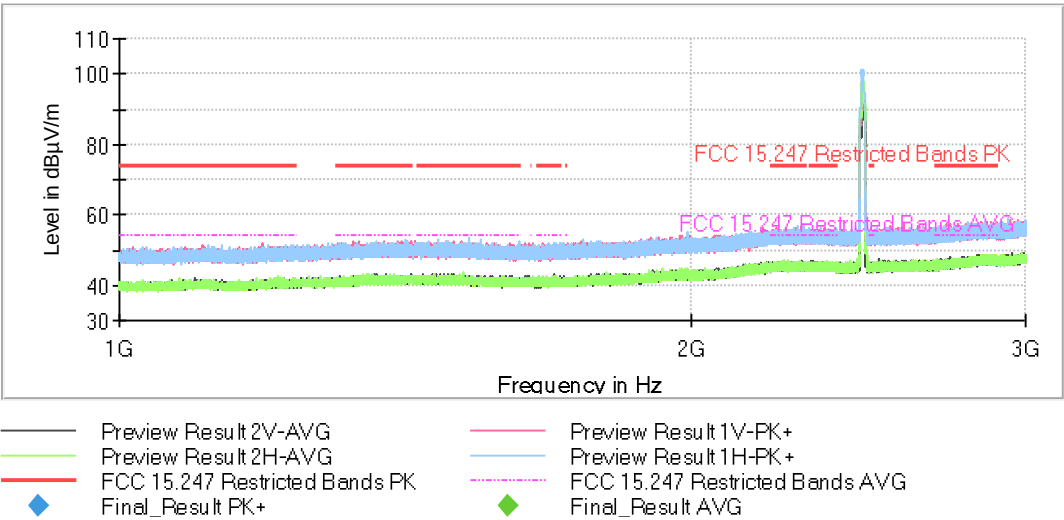
The peak above the limit is the carrier frequency.

- Middle Channel:



The peak above the limit is the carrier frequency.

- High Channel:



The peak above the limit is the carrier frequency.