

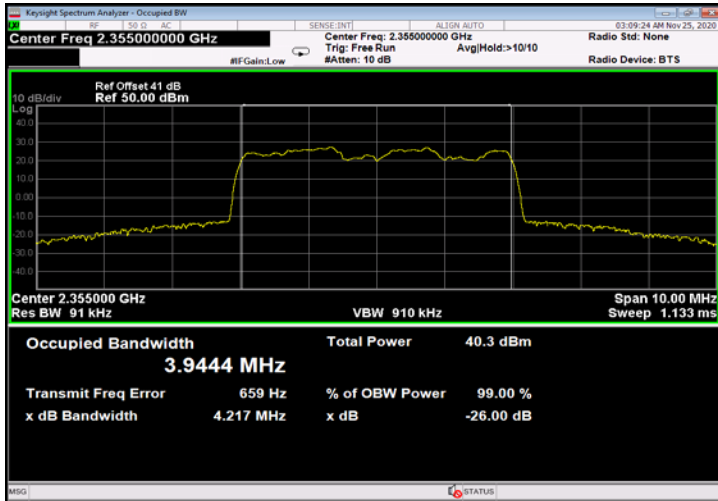


Figure 93: 64QAM 5MHz B.W.; 2355.0MHz, 30kHz - Output

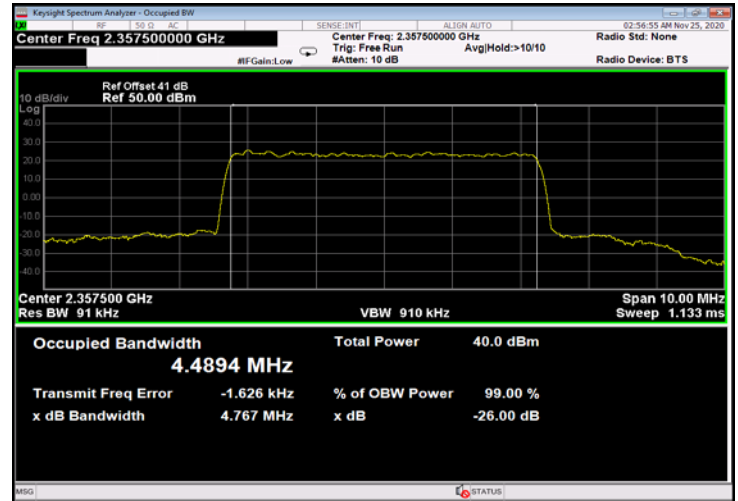


Figure 94: 64QAM 5MHz B.W.; 2357.5MHz, 15kHz - Output

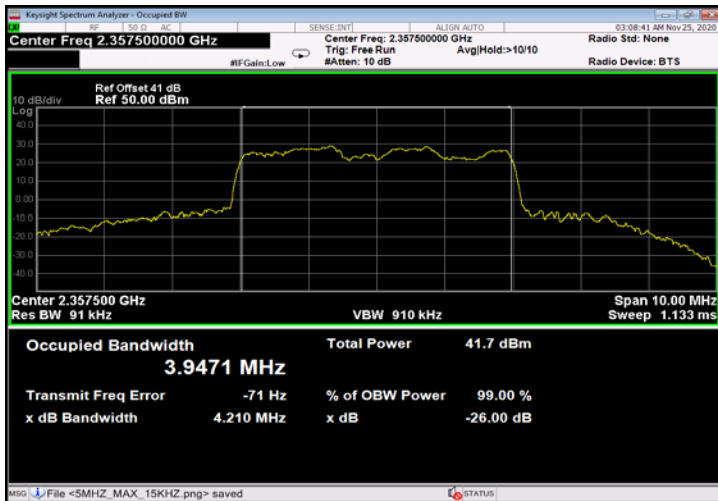


Figure 95: 64QAM 5MHz B.W.; 2357.5MHz, 30kHz - Output

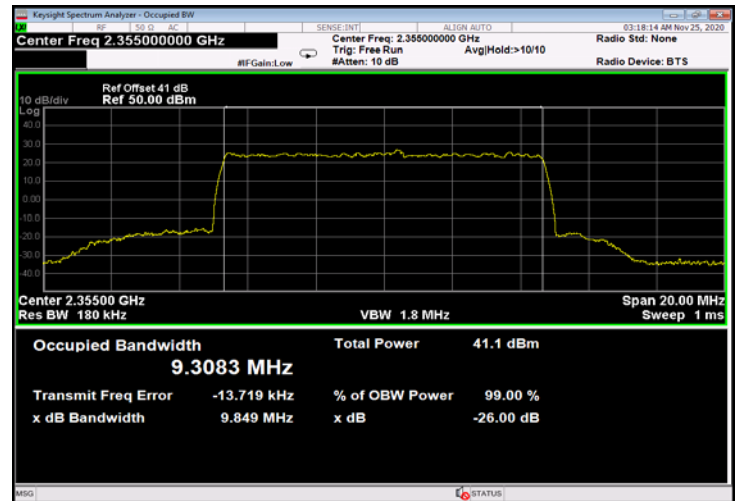


Figure 96: 64QAM 10MHz B.W.; 2355.0MHz, 15kHz - Output

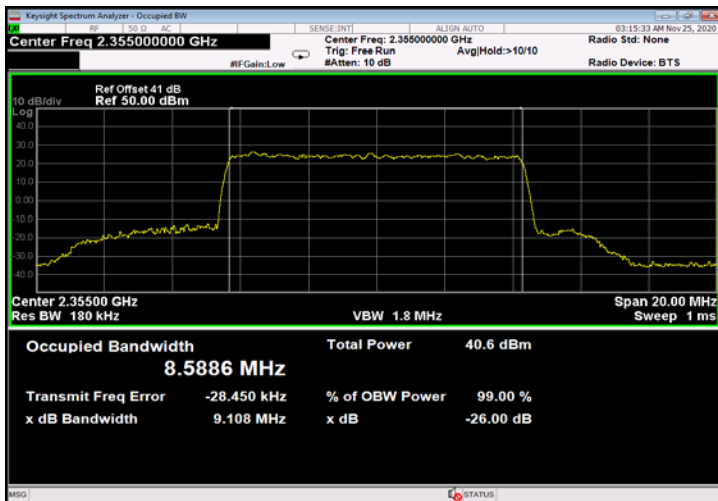


Figure 97: 64QAM 10MHz B.W.; 2355.0MHz, 30kHz - Output

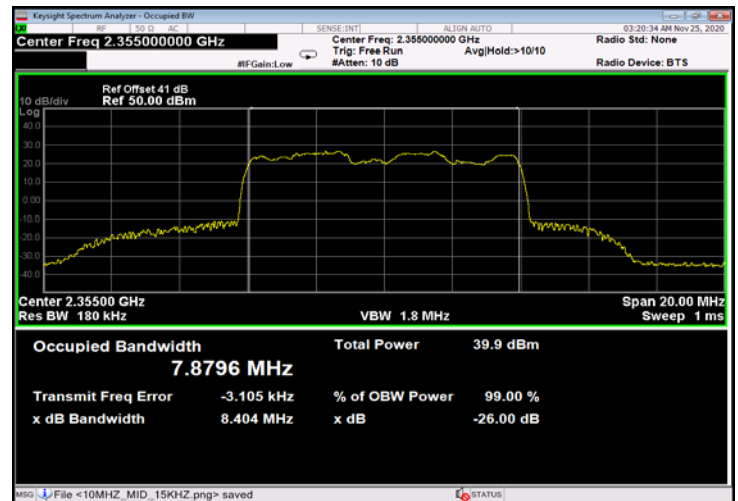


Figure 98: 64QAM 10MHz B.W.; 2355.0MHz, 60kHz - Output

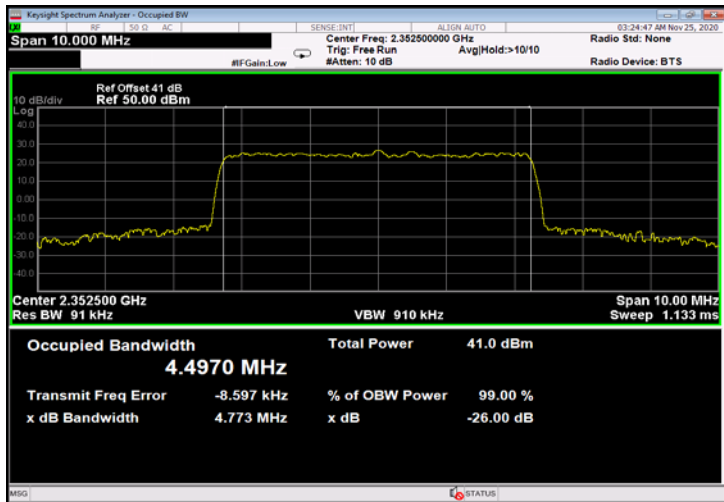


Figure 99: 256QAM 5MHz B.W.; 2352.5MHz,  
15kHz - Output

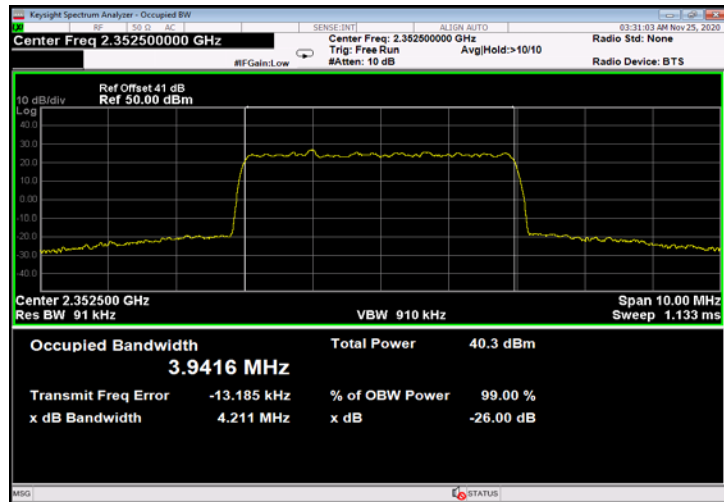


Figure 100: 256QAM 10MHz B.W.; 2352.5MHz,  
30kHz - Output

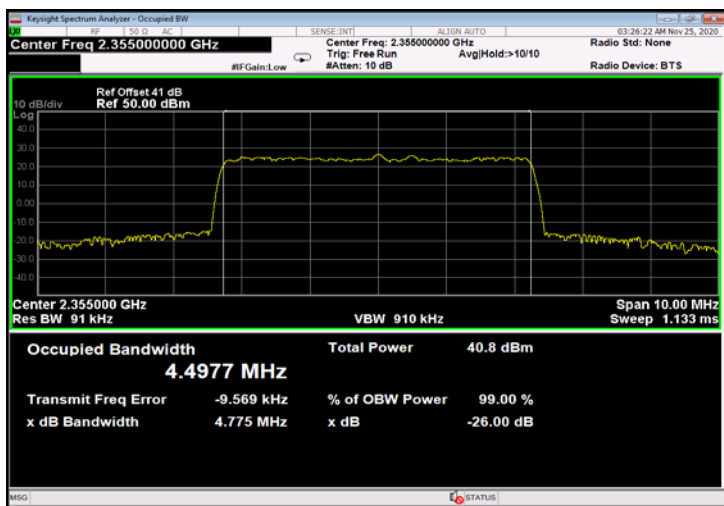


Figure 101: 256QAM 5MHz B.W.; 2355.0MHz,  
15kHz - Output

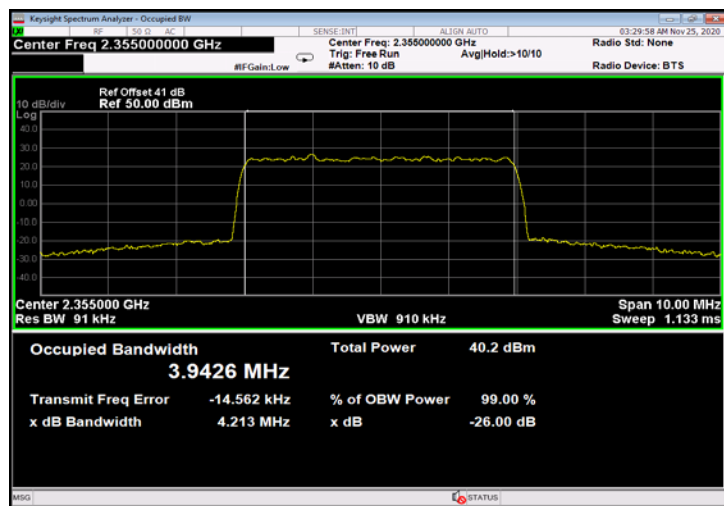


Figure 102: 256QAM 5MHz B.W.; 2355.0MHz,  
30kHz - Output

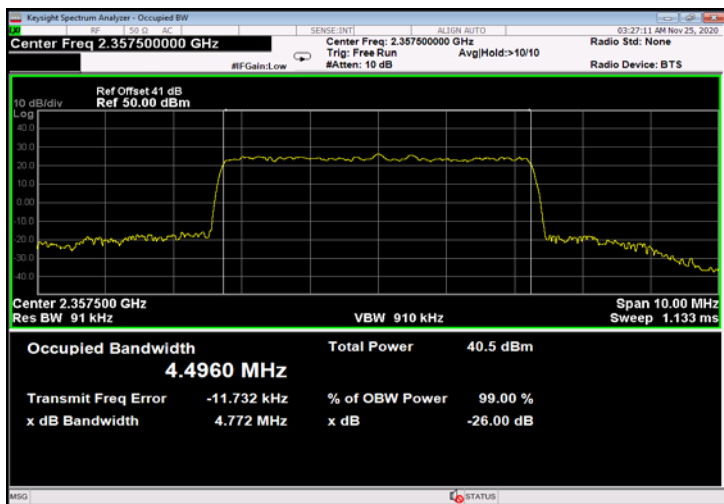


Figure 103: 256QAM 5MHz B.W.; 2357.5MHz,  
15kHz - Output

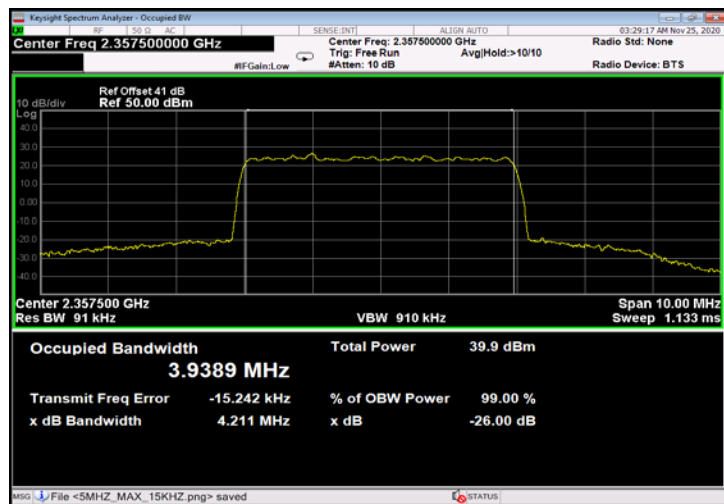


Figure 104: 256QAM 5MHz B.W.; 2357.5MHz,  
30kHz - Output

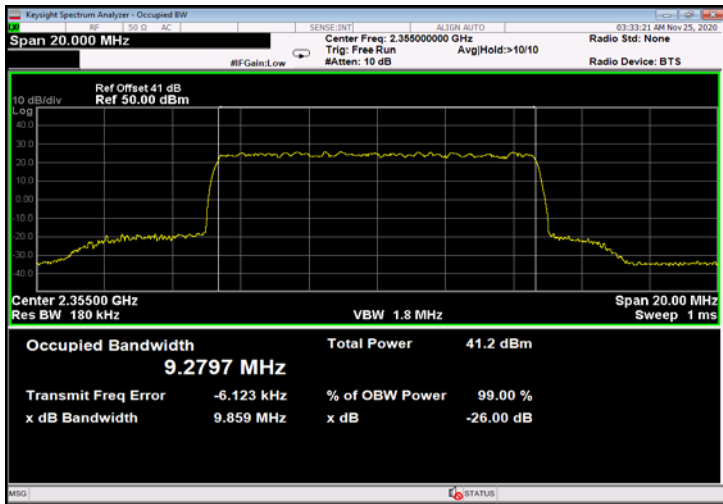


Figure 105: 256QAM 10MHz B.W.; 2355.0MHz, 15kHz - Output

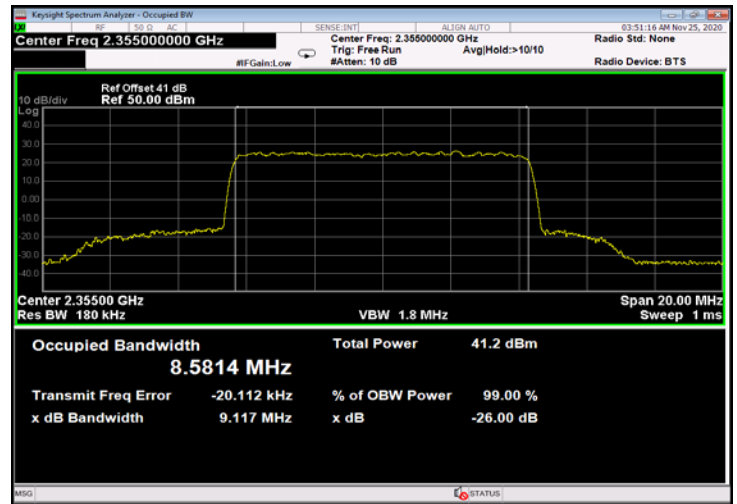


Figure 106: 256QAM 10MHz B.W.; 2355.0MHz, 30kHz - Output

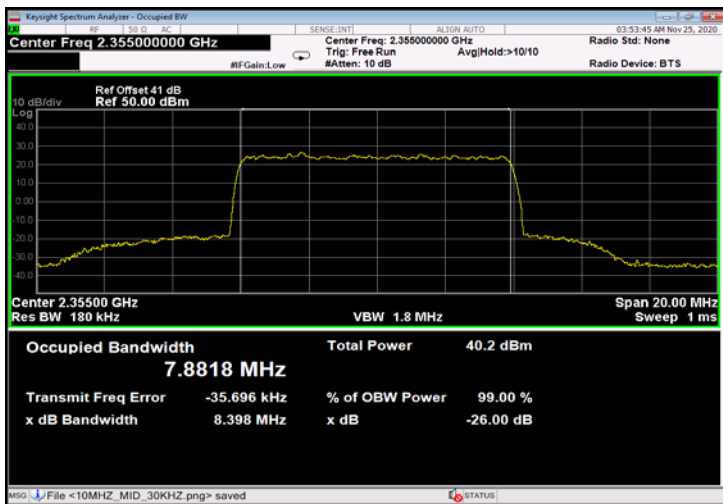


Figure 107: 256QAM 10MHz B.W.; 2355.0MHz, 60kHz - Output

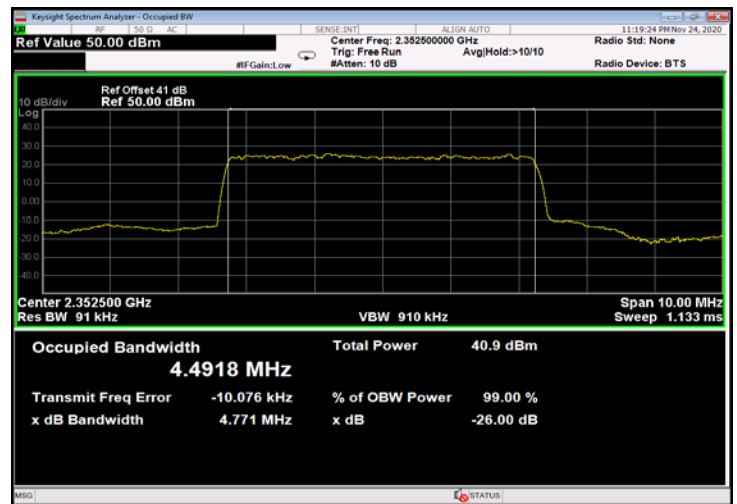


Figure 108: QPSK 5MHz B.W.; 2352.5MHz, 15kHz - Output

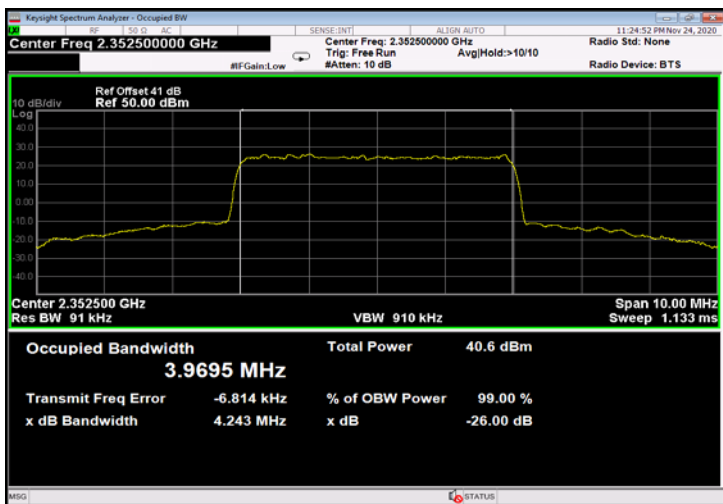


Figure 109: QPSK 5MHz B.W.; 2352.5MHz, 30kHz - Output

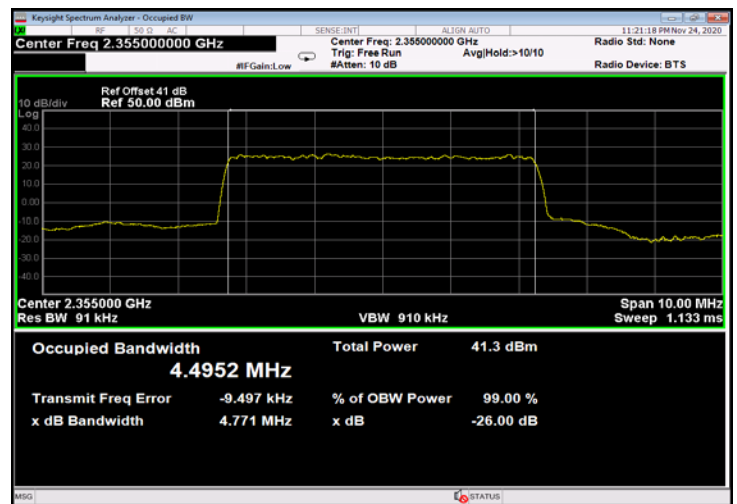


Figure 110: QPSK 5MHz B.W.; 2355.0MHz, 15kHz - Output

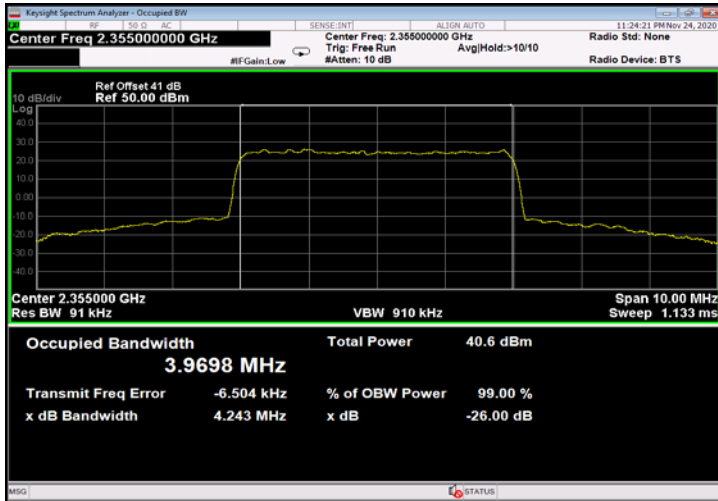


Figure 111: QPSK 5MHz B.W.; 2355.0MHz, 30kHz - Output

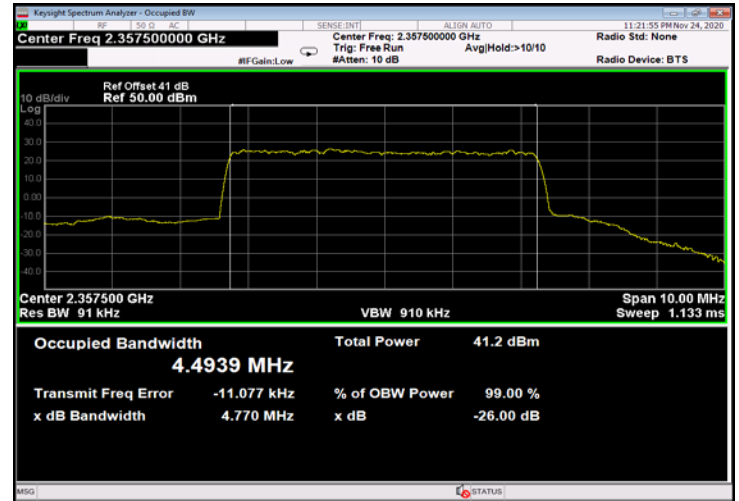


Figure 112: QPSK 5MHz B.W.; 2357.5MHz, 15kHz - Output

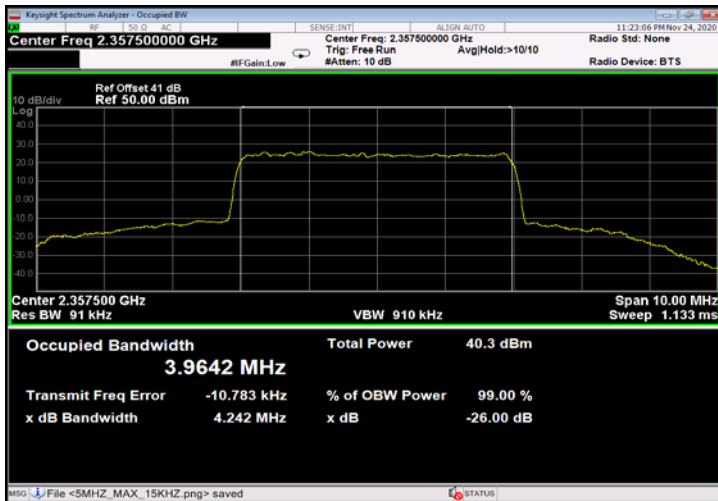


Figure 113: QPSK 5MHz B.W.; 2357.5MHz, 30kHz - Output

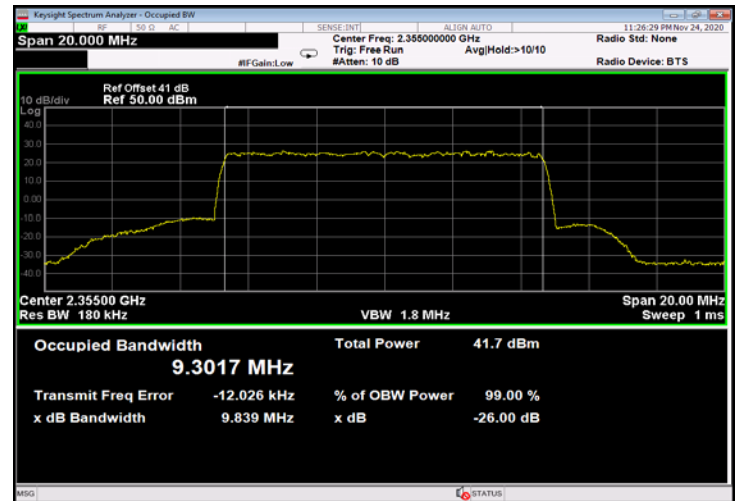


Figure 114: QPSK 10MHz B.W.; 2355.0MHz, 15kHz - Output

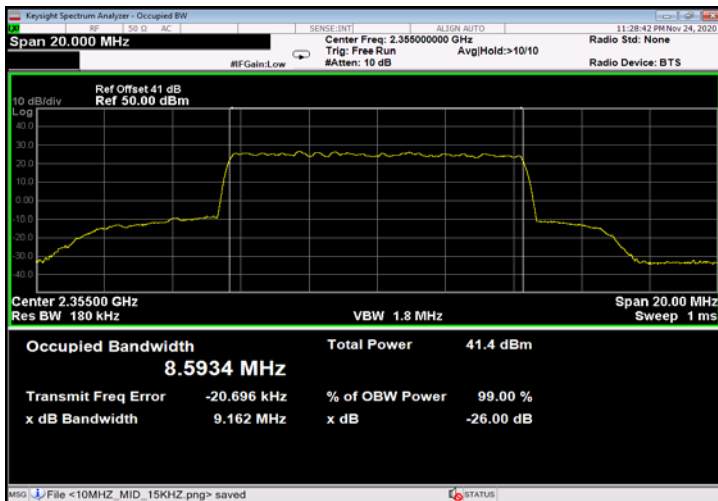


Figure 115: QPSK 10MHz B.W.; 2355.0MHz, 30kHz - Output

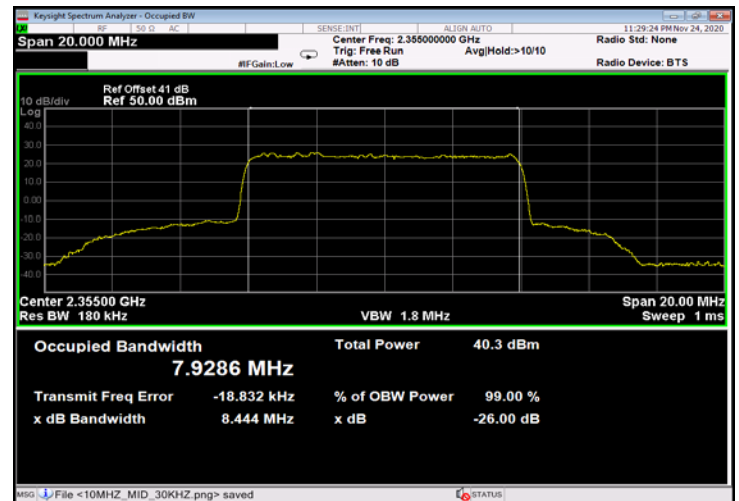


Figure 116: QPSK 10MHz B.W.; 2355.0MHz, 60kHz - Output



### 5.5 Test Equipment Used; Occupied Bandwidth

| Instrument              | Manufacturer         | Model       | Serial Number          | Calibration           |                      |
|-------------------------|----------------------|-------------|------------------------|-----------------------|----------------------|
|                         |                      |             |                        | Last Calibration Date | Next Calibration Due |
| EXA signal Analyzer     | Agilent Technologies | N9010A      | MY52220686             | November 28, 2018     | November 28, 2020    |
| Vector Signal Generator | R&S                  | SMBV100B    | 1423.1003K02-101470-XE | October 2, 2019       | October 2, 2022      |
| 40 dB Attenuator        | Weinschel            | WA 39-40-33 | A1323                  | July 7, 2020          | July 31, 2021        |
| RF Cable                | Huber Suner          | Sucofelex   | 27504/4PEA             | August 23, 2020       | August 31, 2021      |

**Table 14 Test Equipment Used**

## 6 Spurious Emissions at Antenna Terminals

### 6.1 Test Specification

FCC Part 27, Subpart C, Sections 27.53(a)(1)

### 6.2 Test Procedure

(Temperature (22°C)/ Humidity (36%RH))

The E.U.T. antenna terminal was connected to the spectrum analyzer through an external attenuator and an appropriate coaxial cable (max loss 44.0 dB).

The evaluation was performed in the frequency band from 9.0kHz-24.0GHz.

### 6.3 Test Limit

The power of any emission outside of the authorized operating frequency ranges (2350-2360 MHz) must be attenuated below the transmitting power (P) by a factor of at least as specified in this section.

| Frequency Band<br>(MHz)                       | Calculated Factor<br>(dBc)     | Absolute Limit<br>(dBm) |
|-----------------------------------------------|--------------------------------|-------------------------|
| $f < 2285.0$                                  | $75 + 10 \cdot \log(2) = 78.0$ | -45                     |
| $2285.0 \text{ MHz} < f < 2287.5 \text{ MHz}$ | $72 + 10 \cdot \log(2) = 75.0$ | -42                     |
| $2287.5 \text{ MHz} < f < 2300.0 \text{ MHz}$ | $70 + 10 \cdot \log(2) = 73.0$ | -40                     |
| $2300.0 \text{ MHz} < f < 2305.0 \text{ MHz}$ | $43 + 10 \cdot \log(2) = 46.0$ | -13                     |
| $2305.0 \text{ MHz} < f < 2320.0 \text{ MHz}$ | $43 + 10 \cdot \log(2) = 46.0$ | -13                     |
| $2320.0 \text{ MHz} < f < 2345.0 \text{ MHz}$ | $75 + 10 \cdot \log(2) = 78.0$ | -45                     |
| $2345.0 \text{ MHz} < f < 2360.0 \text{ MHz}$ | $43 + 10 \cdot \log(2) = 46.0$ | -13                     |
| $2360.0 \text{ MHz} < f < 2362.5 \text{ MHz}$ | $43 + 10 \cdot \log(2) = 46.0$ | -13                     |
| $2362.5 \text{ MHz} < f < 2365.0 \text{ MHz}$ | $55 + 10 \cdot \log(2) = 58.0$ | -25                     |
| $2365.0 \text{ MHz} < f < 2367.5 \text{ MHz}$ | $70 + 10 \cdot \log(2) = 60.0$ | -40                     |
| $2367.5 \text{ MHz} < f < 2370.0 \text{ MHz}$ | $72 + 10 \cdot \log(2) = 62.0$ | -42                     |
| $2370.0 < f$                                  | $75 + 10 \cdot \log(2) = 65.0$ | -45                     |

### 6.4 Test Results

JUDGEMENT: Passed

See additional information in Figure 117 to Figure 218.

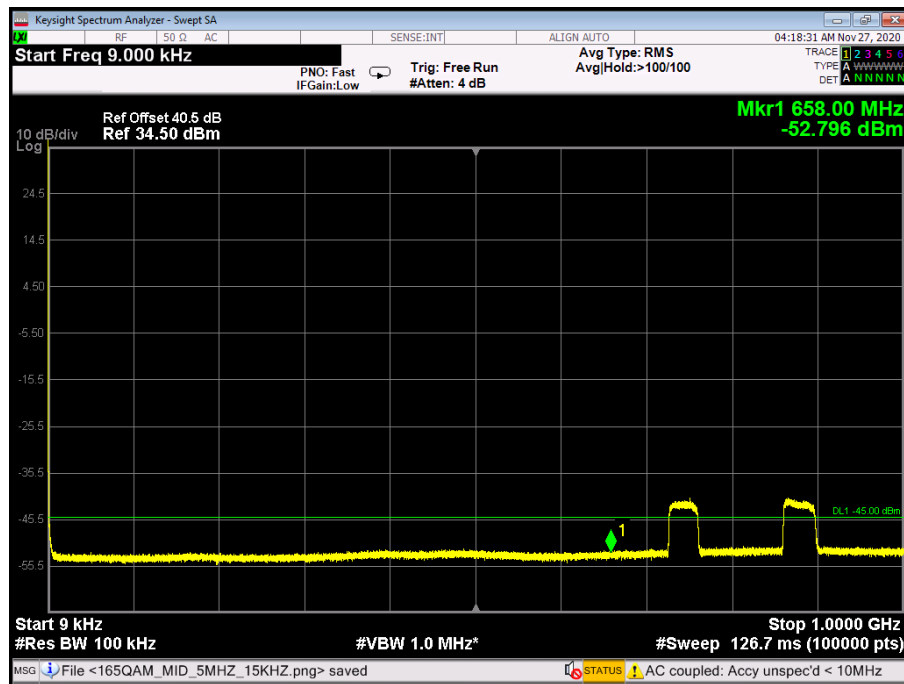


Figure 117: Spurious Emissions at Antenna Terminal 9kHz-1GHz - 16QAM 5MHz B.W.;  
Low, 15kHz

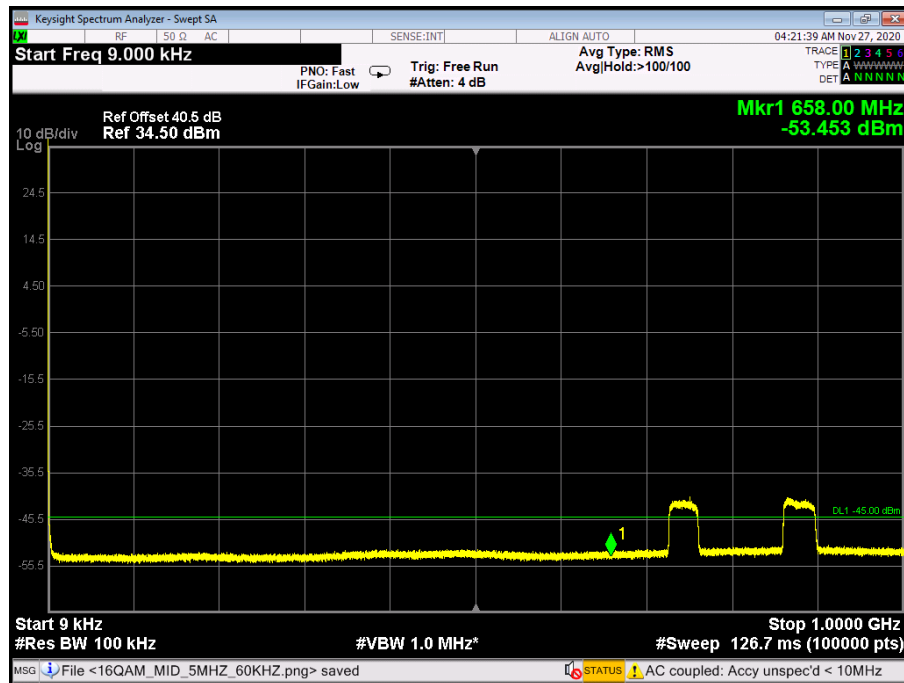


Figure 118: Spurious Emissions at Antenna Terminal 9kHz-1GHz - 16QAM 5MHz B.W.;  
Low, 30kHz



Figure 119: Spurious Emissions at Antenna Terminal 9kHz-1GHz - 16QAM 5MHz B.W.;  
Mid, 15kHz

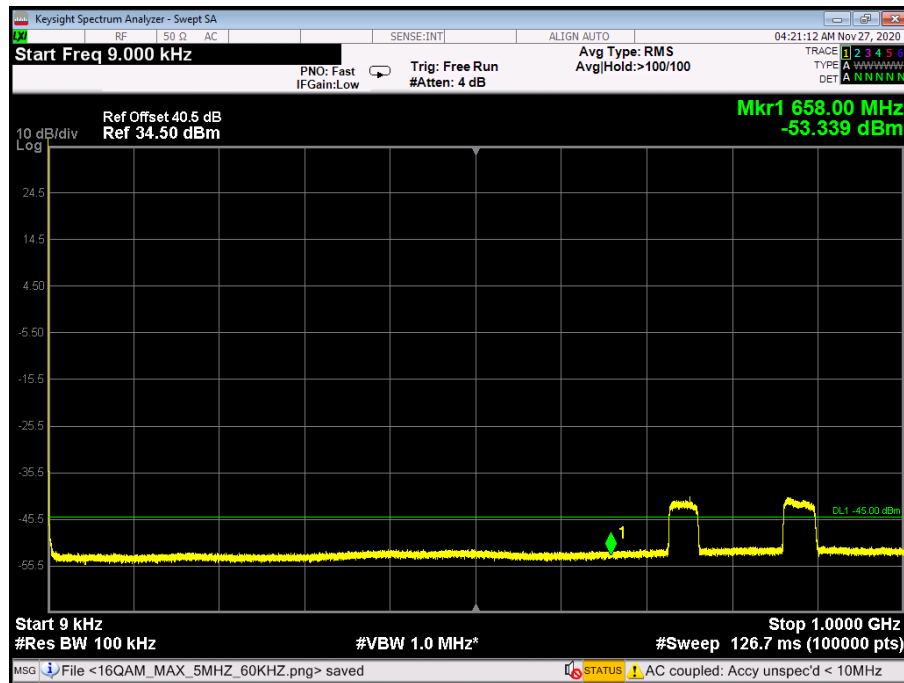


Figure 120: Spurious Emissions at Antenna Terminal 9kHz-1GHz - 16QAM 5MHz B.W.;  
Mid, 30kHz

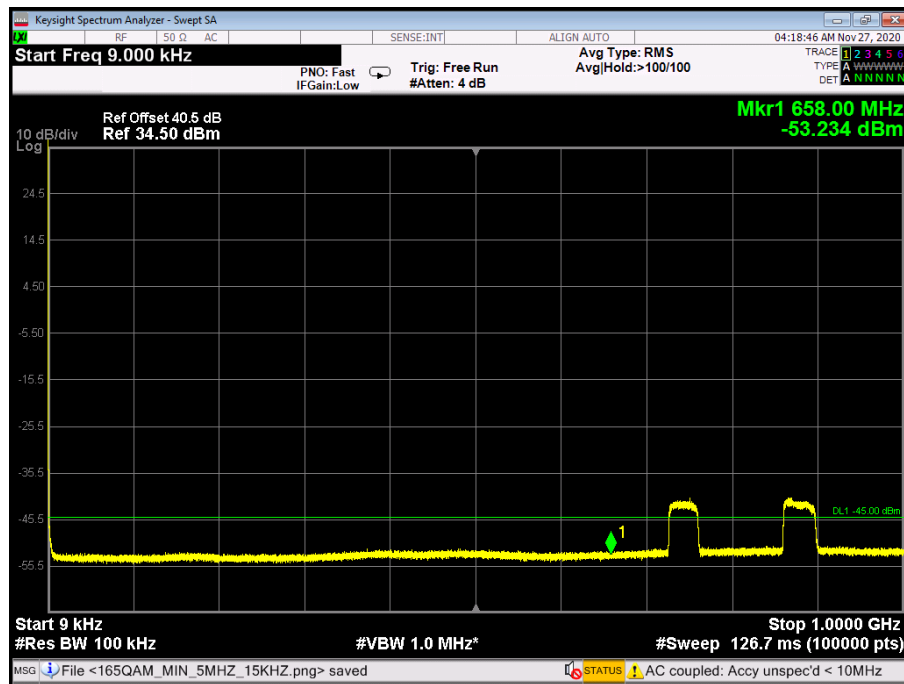


Figure 121: Spurious Emissions at Antenna Terminal 9kHz-1GHz - 16QAM 5MHz B.W.; High, 15kHz



Figure 122: Spurious Emissions at Antenna Terminal 9kHz-1GHz - 16QAM 5MHz B.W.; High, 30kHz

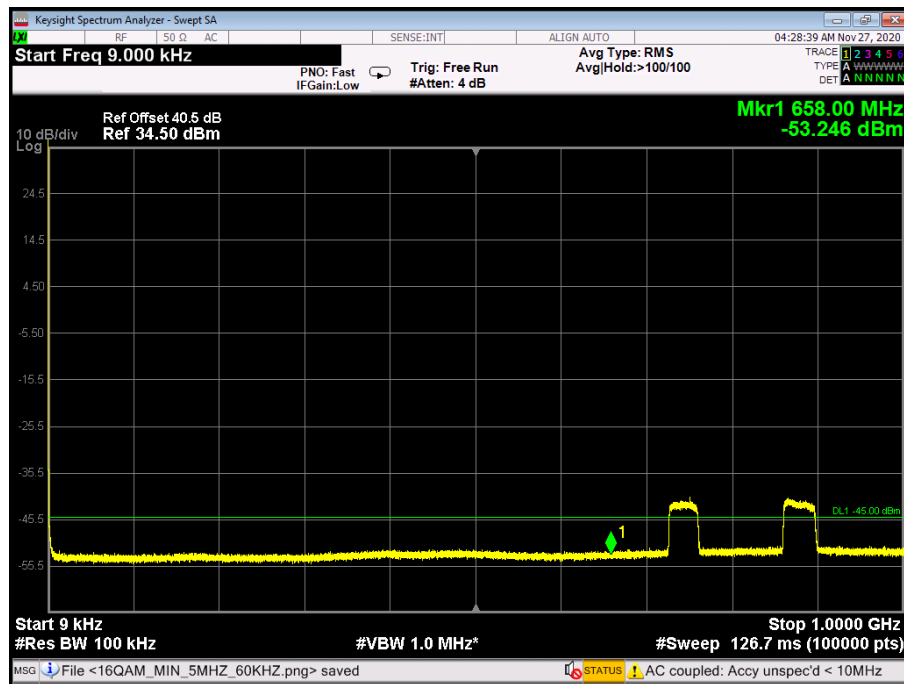


Figure 123: Spurious Emissions at Antenna Terminal 9kHz-1GHz - 64QAM 5MHz B.W.;  
Low, 15kHz

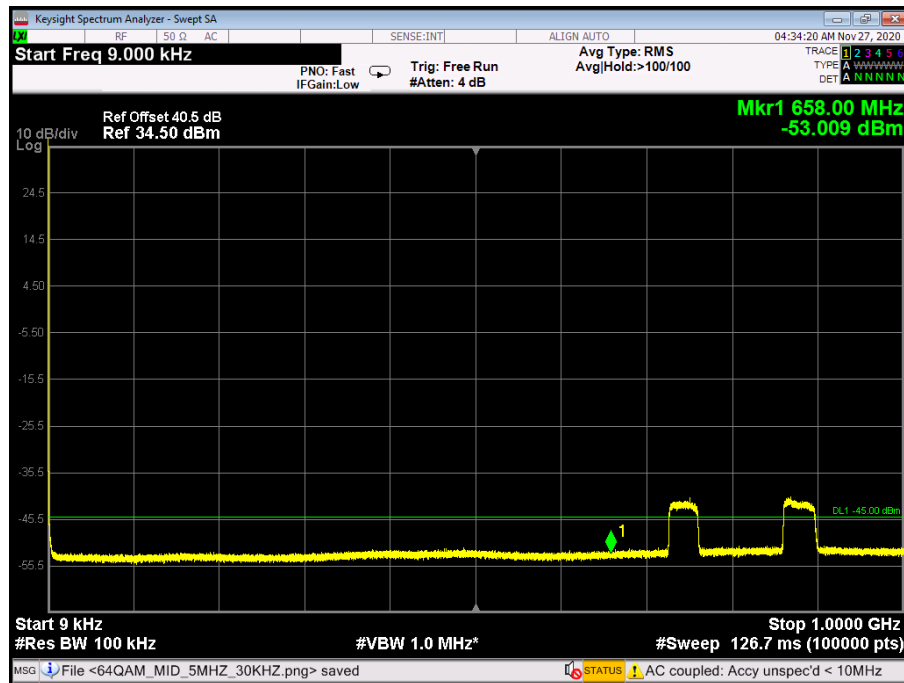


Figure 124: Spurious Emissions at Antenna Terminal 9kHz-1GHz - 64QAM 5MHz B.W.;  
Low, 30kHz

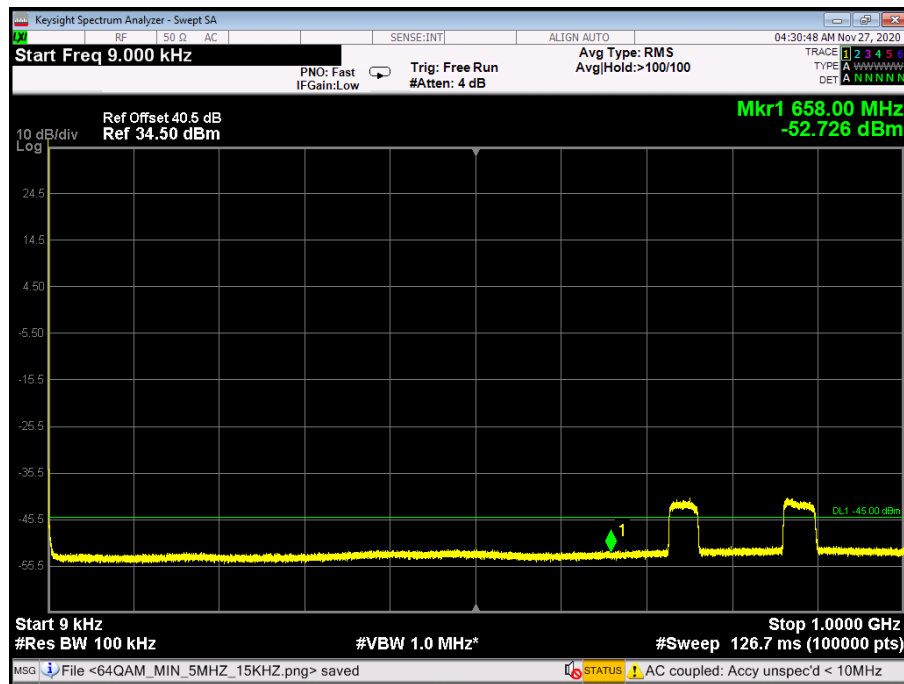


Figure 125: Spurious Emissions at Antenna Terminal 9kHz-1GHz - 64QAM 5MHz B.W.;  
Mid, 15kHz

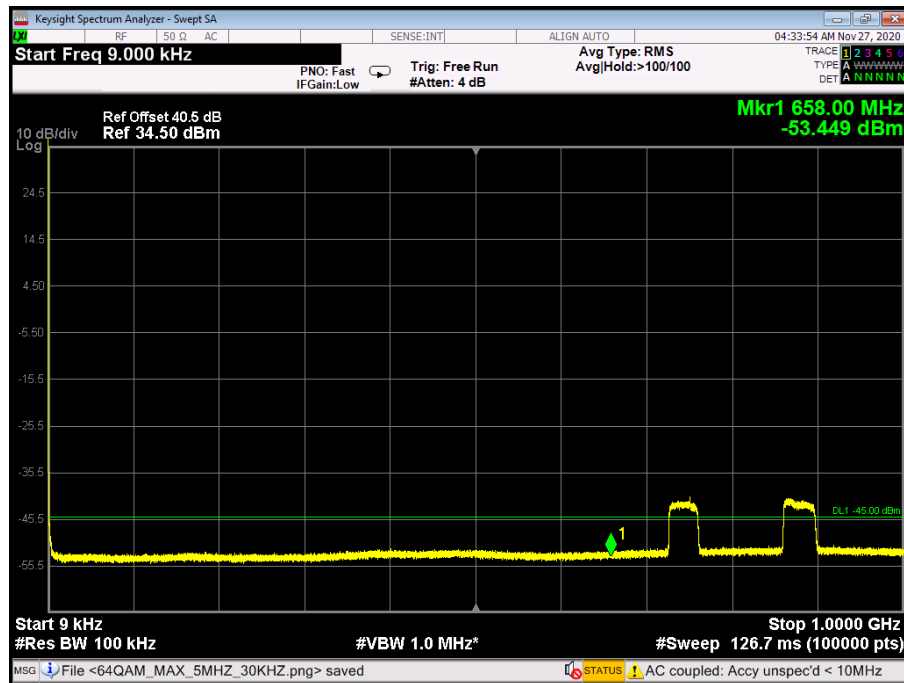


Figure 126: Spurious Emissions at Antenna Terminal 9kHz-1GHz - 64QAM 5MHz B.W.;  
Mid, 30kHz

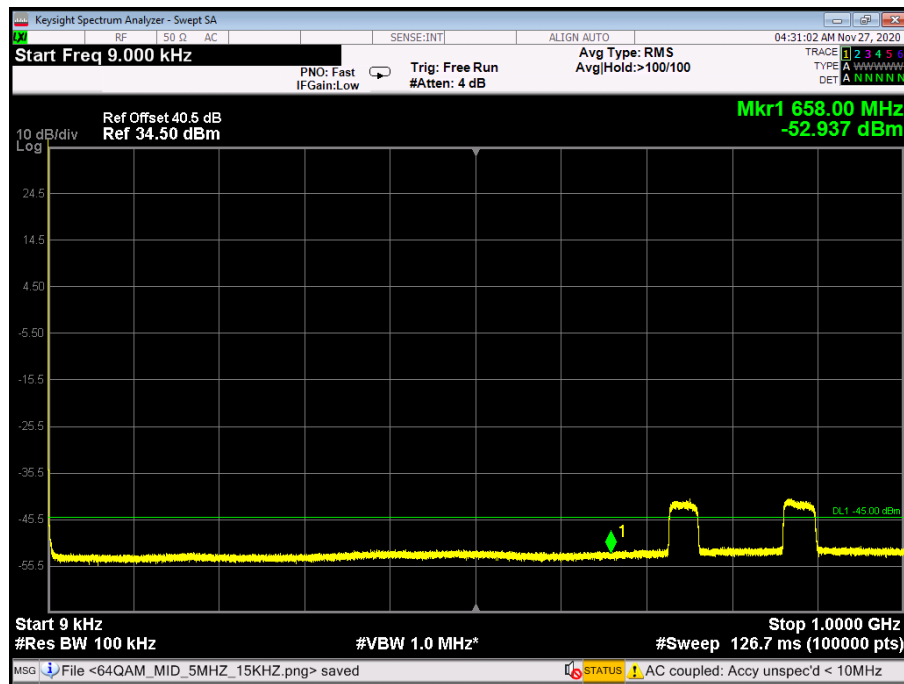


Figure 127: Spurious Emissions at Antenna Terminal 9kHz-1GHz - 64QAM 5MHz B.W.; High, 15kHz

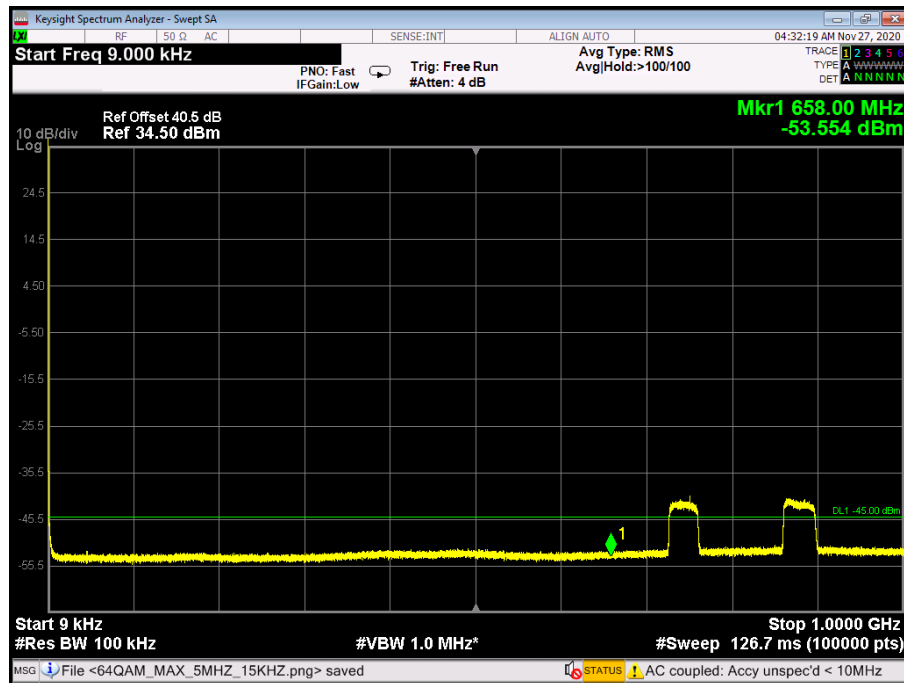


Figure 128: Spurious Emissions at Antenna Terminal 9kHz-1GHz - 64QAM 5MHz B.W.; High, 30kHz

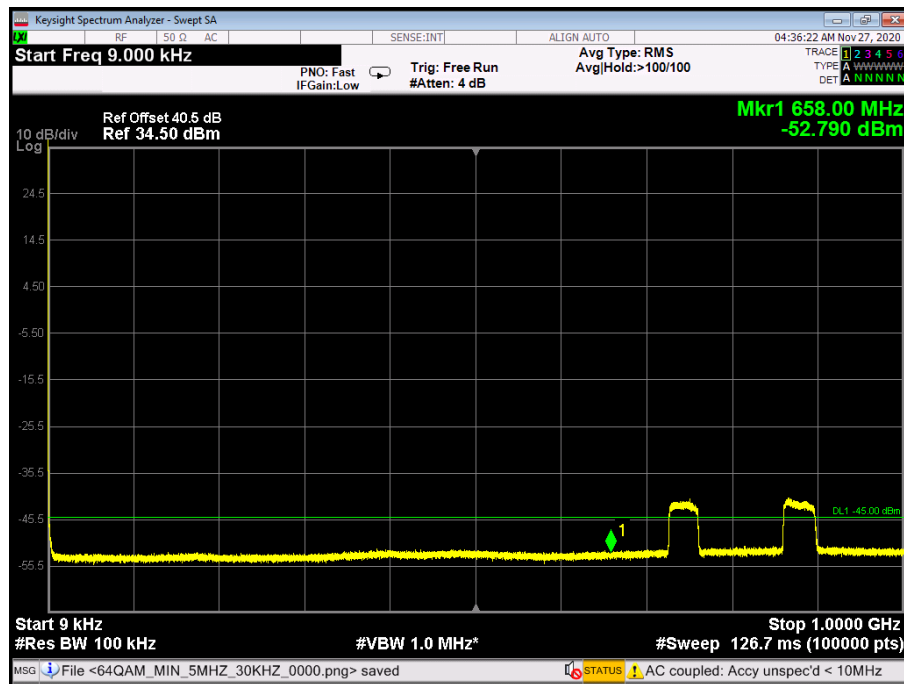


Figure 129: Spurious Emissions at Antenna Terminal 9kHz-1GHz - 64QAM 10MHz B.W.;  
Mid, 15kHz



Figure 130: Spurious Emissions at Antenna Terminal 9kHz-1GHz - 64QAM 10MHz B.W.;  
Mid, 30kHz

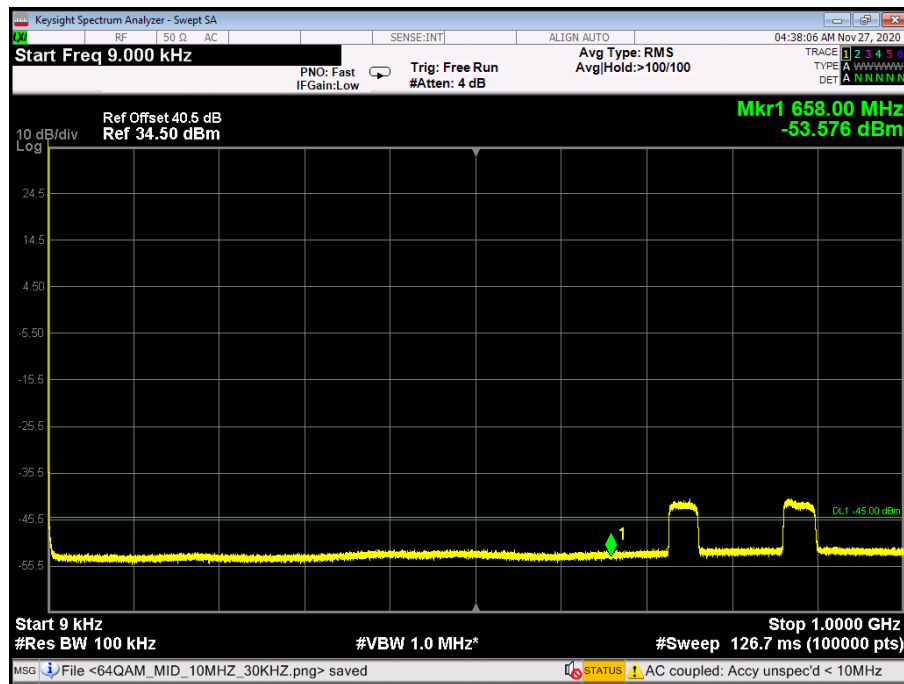


Figure 131: Spurious Emissions at Antenna Terminal 9kHz-1GHz - 64QAM 10MHz B.W.;  
Mid, 60kHz

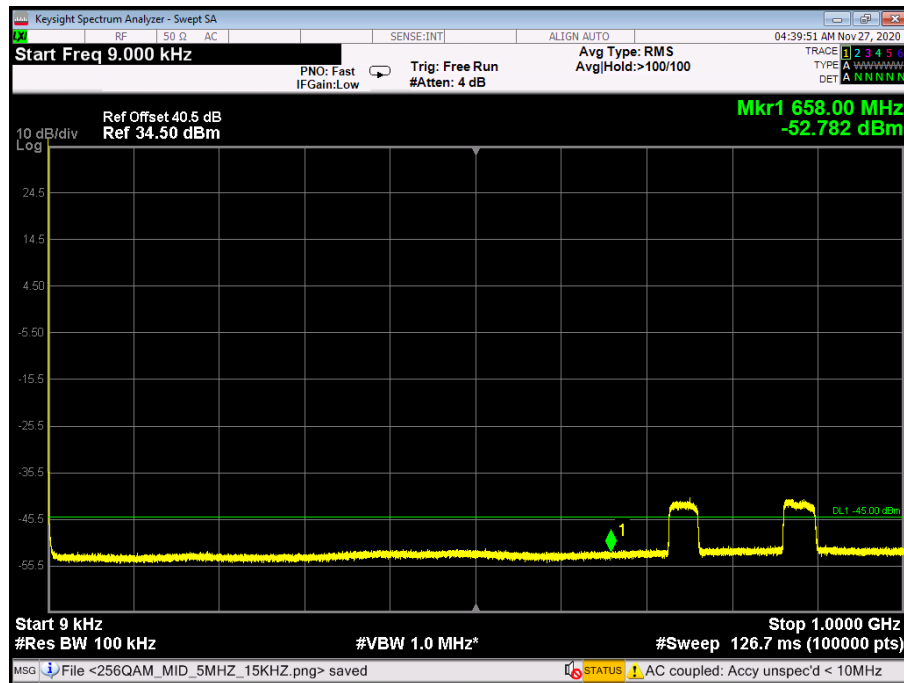


Figure 132: Spurious Emissions at Antenna Terminal 9kHz-1GHz - 256QAM 5MHz B.W.;  
Low, 15kHz



Figure 133: Spurious Emissions at Antenna Terminal 9kHz-1GHz - 256QAM 5MHz B.W.; Low, 30kHz

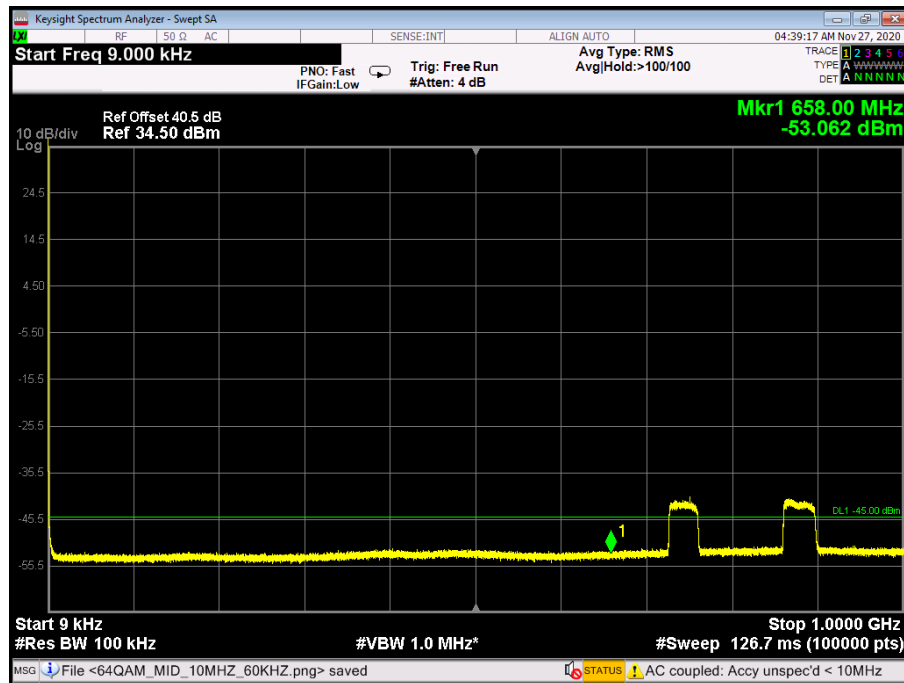


Figure 134: Spurious Emissions at Antenna Terminal 9kHz-1GHz - 256QAM 5MHz B.W.; Mid, 15kHz

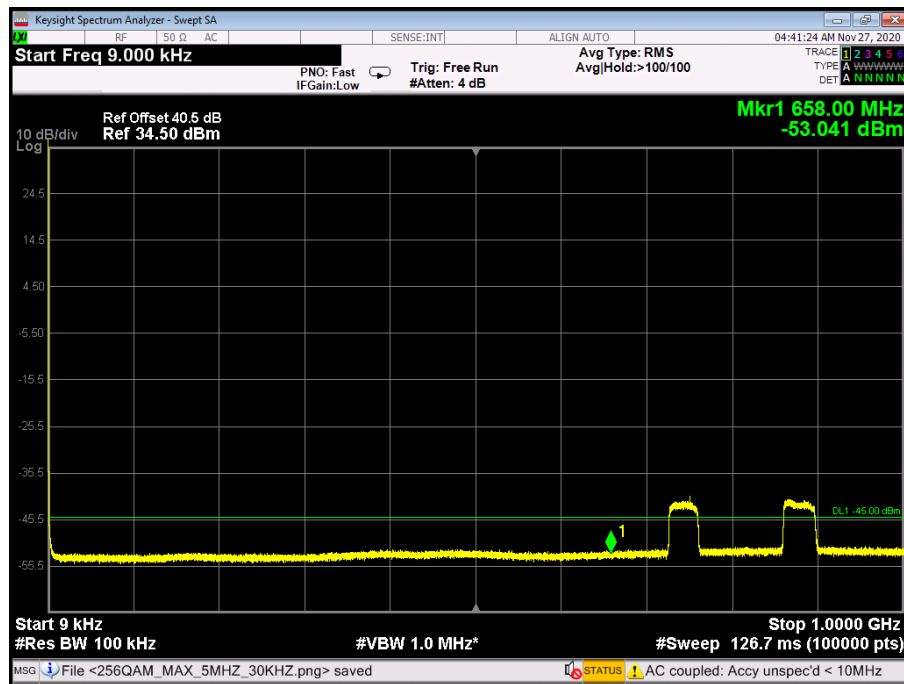


Figure 135: Spurious Emissions at Antenna Terminal 9kHz-1GHz - 256QAM 5MHz B.W.;  
Mid, 30kHz

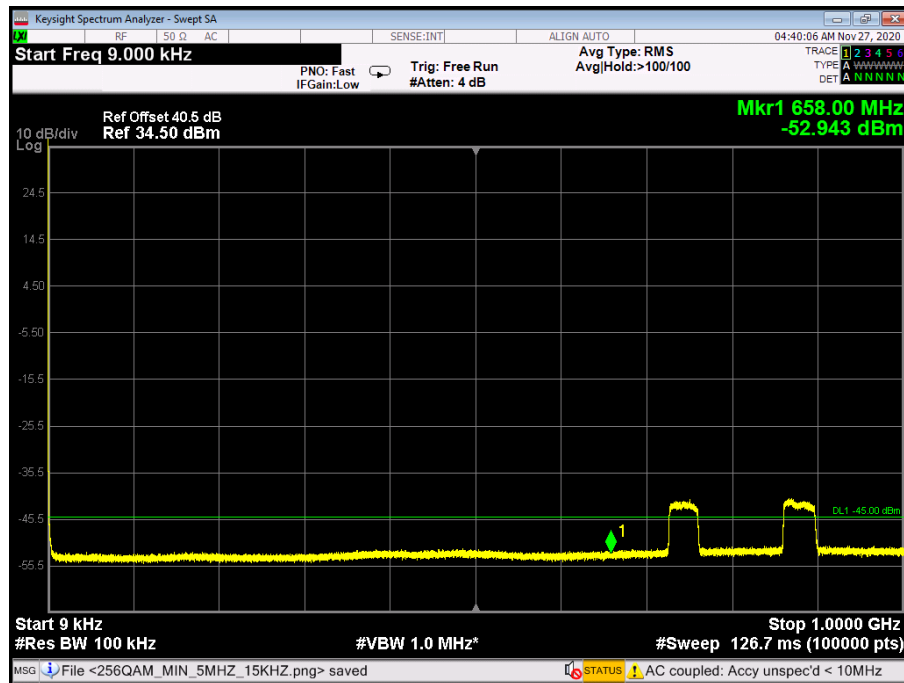


Figure 136: Spurious Emissions at Antenna Terminal 9kHz-1GHz - 256QAM 5MHz B.W.;  
High, 15kHz

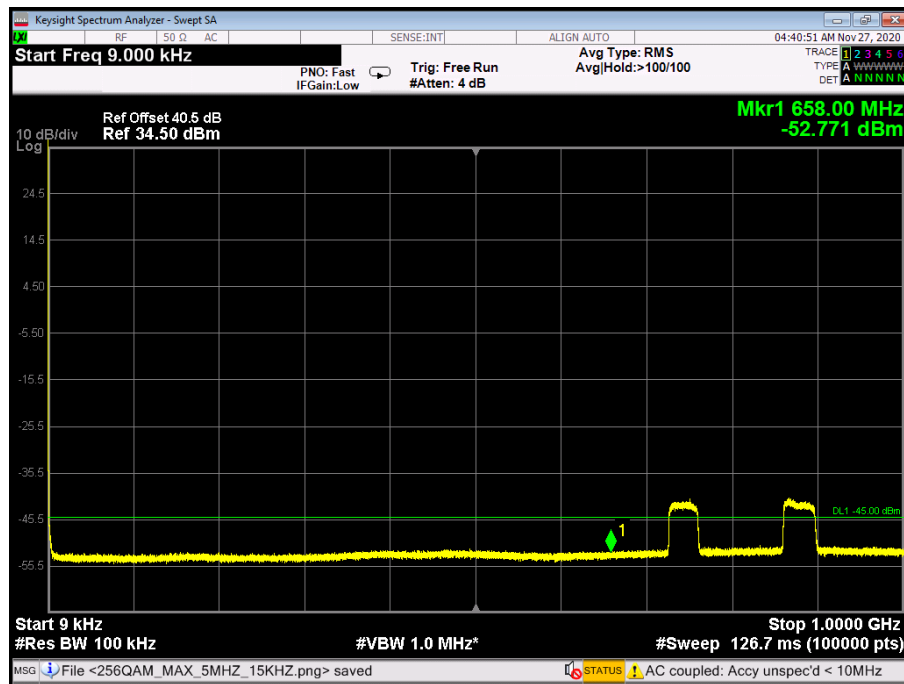


Figure 137: Spurious Emissions at Antenna Terminal 9kHz-1GHz - 256QAM 5MHz B.W.; High, 30kHz



Figure 138: Spurious Emissions at Antenna Terminal 9kHz-1GHz - 256QAM 10MHz B.W.; Mid, 15kHz

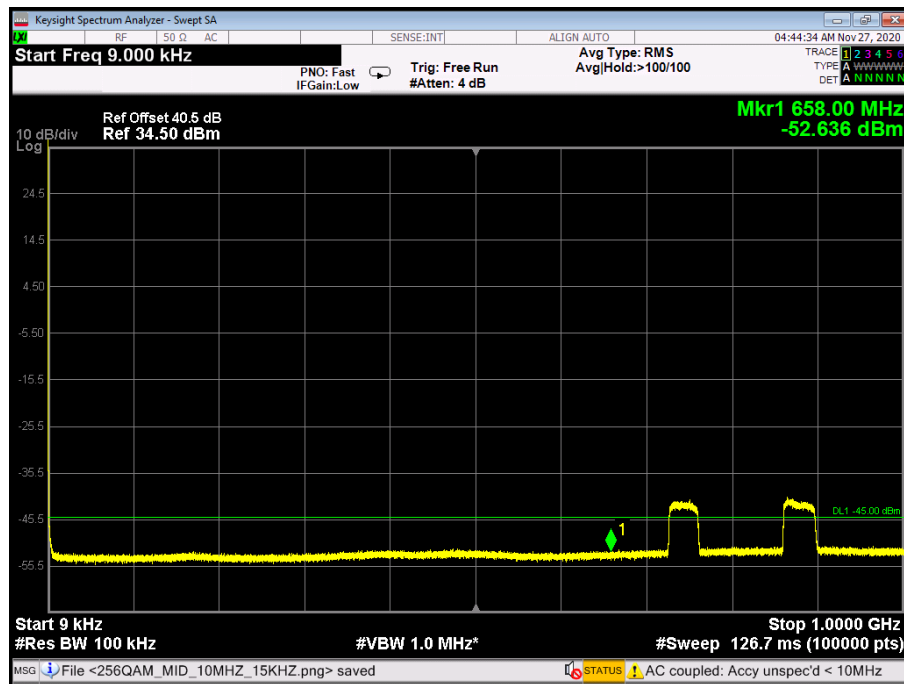


Figure 139: Spurious Emissions at Antenna Terminal 9kHz-1GHz - 256QAM 10MHz B.W.;  
Mid, 30kHz



Figure 140: Spurious Emissions at Antenna Terminal 9kHz-1GHz - 256QAM 10MHz B.W.;  
Mid, 60kHz



Figure 141: Spurious Emissions at Antenna Terminal 9kHz-1GHz - QPSK 5MHz B.W.; Low, 15kHz

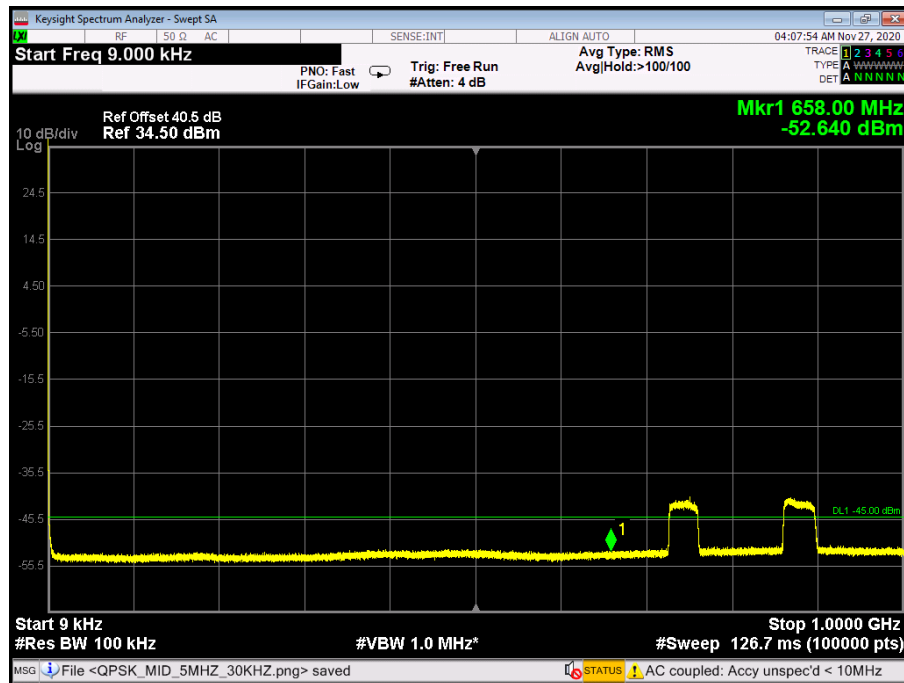


Figure 142: Spurious Emissions at Antenna Terminal 9kHz-1GHz - QPSK 5MHz B.W.; Low, 30kHz



Figure 143: Spurious Emissions at Antenna Terminal 9kHz-1GHz - QPSK 5MHz B.W.; Mid, 15kHz

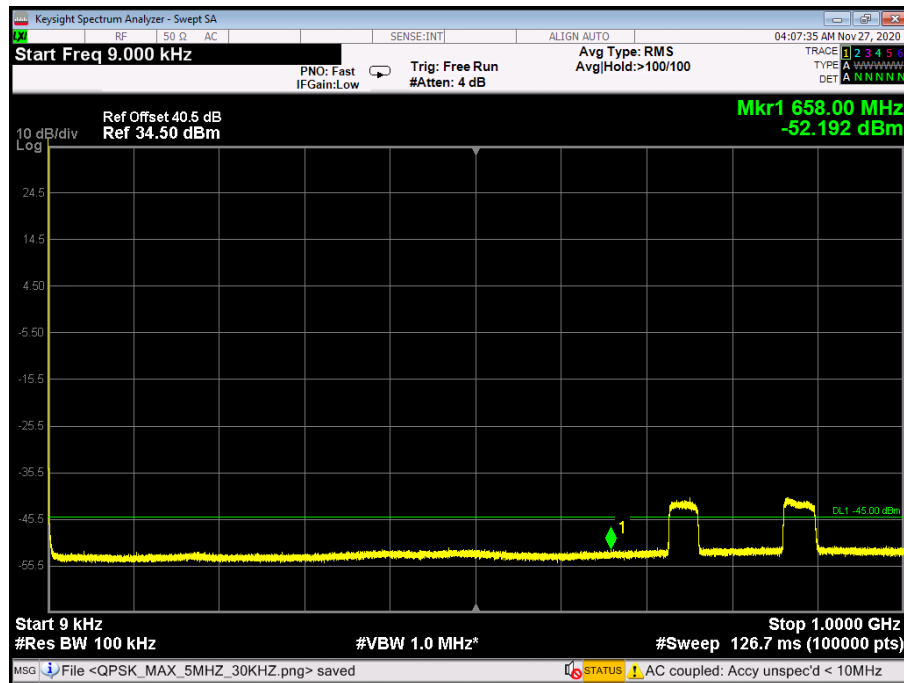


Figure 144: Spurious Emissions at Antenna Terminal 9kHz-1GHz - QPSK 5MHz B.W.; Mid, 30kHz

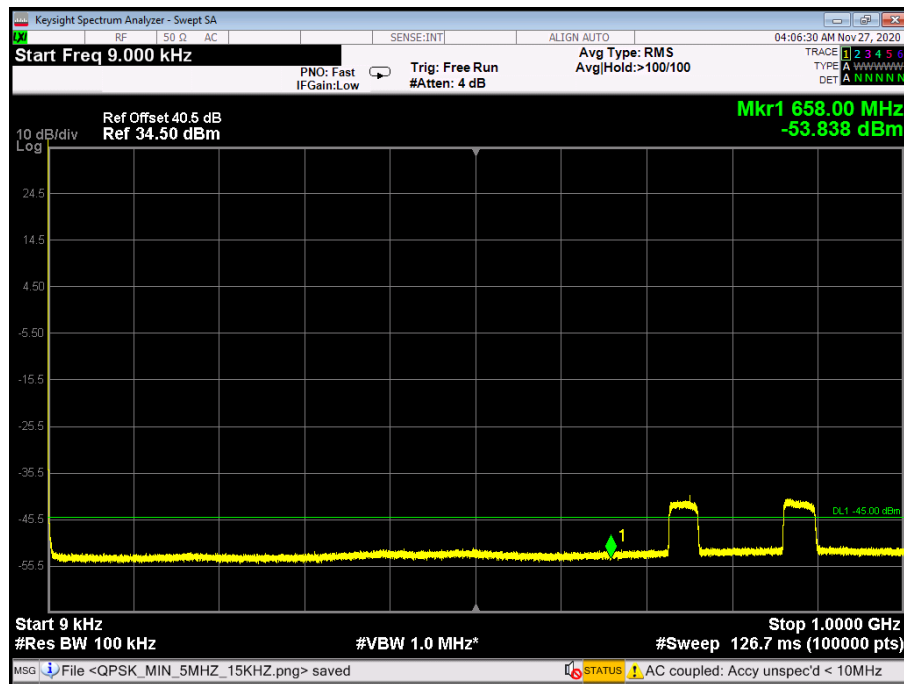


Figure 145: Spurious Emissions at Antenna Terminal 9kHz-1GHz - QPSK 5MHz B.W.; High, 15kHz

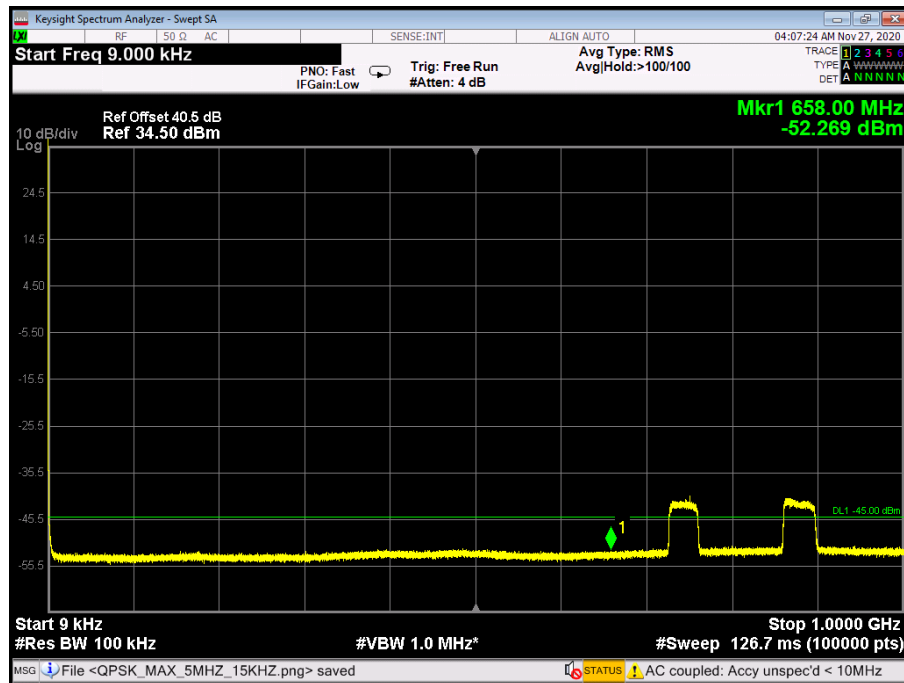


Figure 146: Spurious Emissions at Antenna Terminal 9kHz-1GHz - QPSK 5MHz B.W.; High, 30kHz



Figure 147: Spurious Emissions at Antenna Terminal 9kHz-1GHz - QPSK 10MHz B.W.;  
Mid, 15kHz

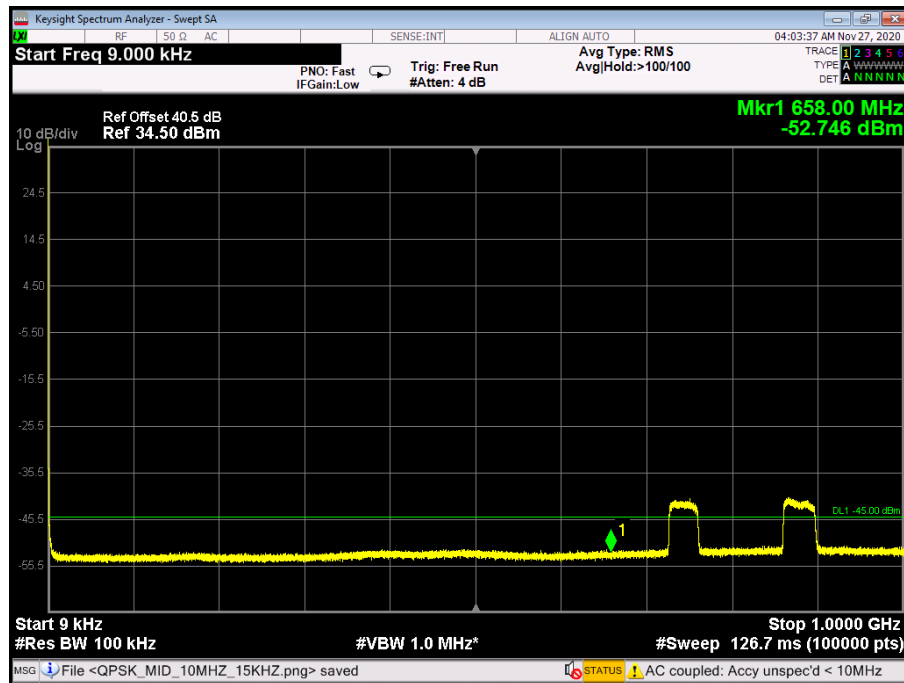


Figure 148: Spurious Emissions at Antenna Terminal 9kHz-1GHz - QPSK 10MHz B.W.;  
Mid, 30kHz

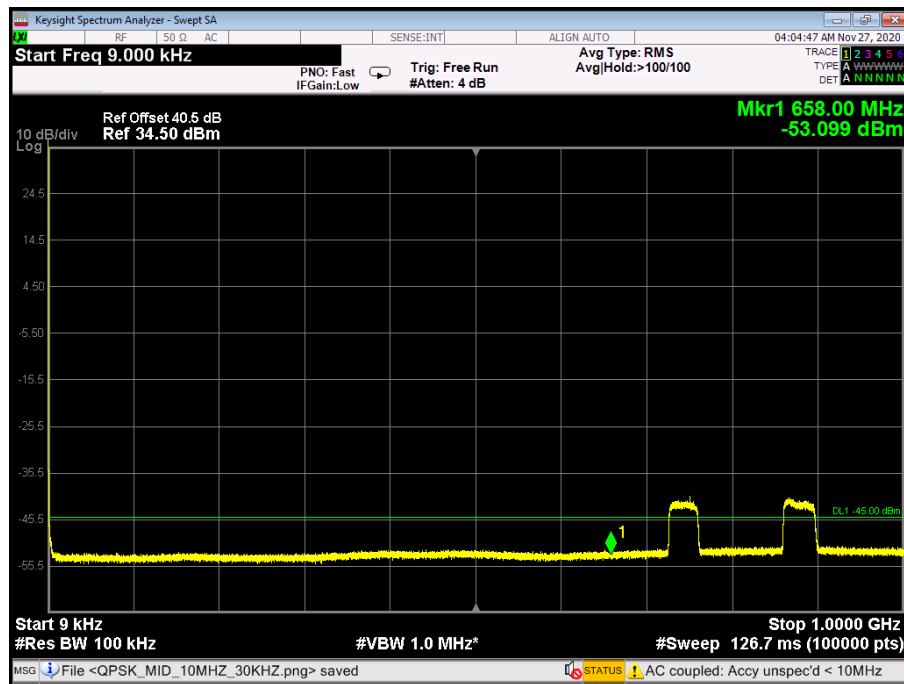


Figure 149: Spurious Emissions at Antenna Terminal 9kHz-1GHz - QPSK 10MHz B.W.; Mid, 60kHz

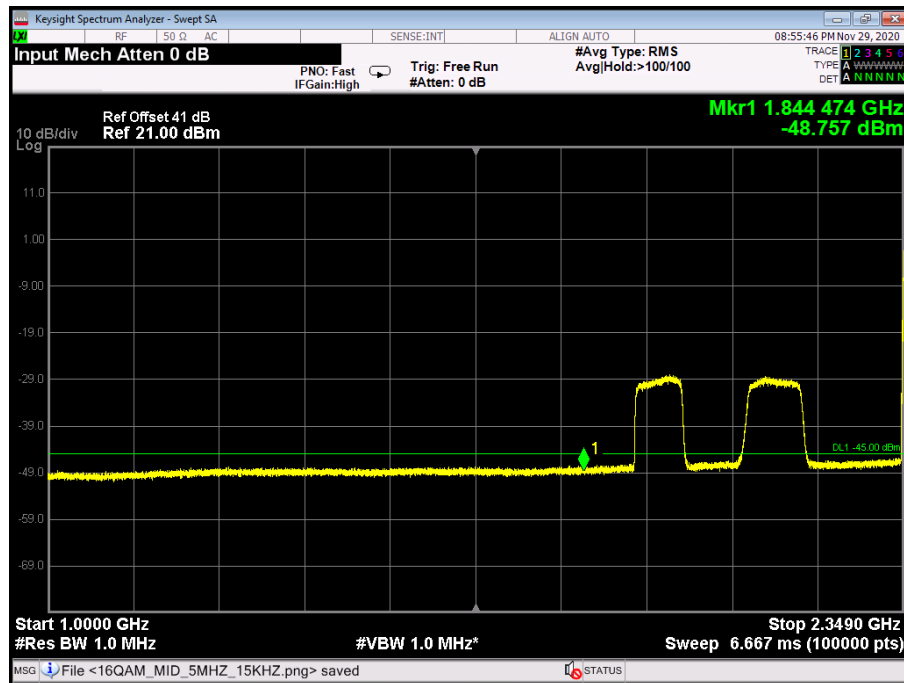
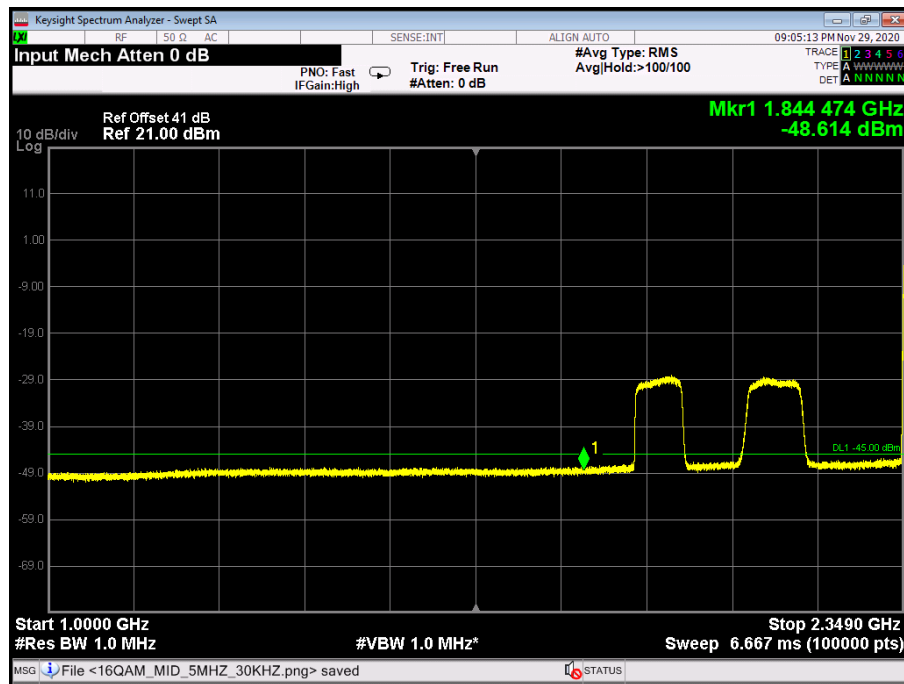
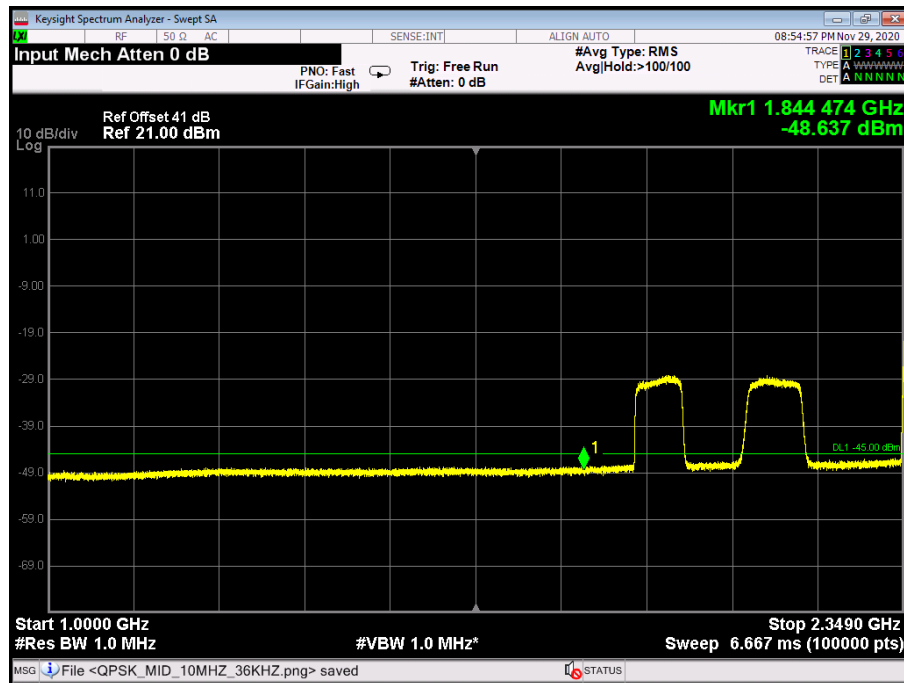


Figure 150: Spurious Emissions at Antenna Terminal 1GHz-2.349GHz - 16QAM 5MHz B.W.; Low, 15kHz



**Figure 151: Spurious Emissions at Antenna Terminal 1GHz-2.349GHz - 16QAM 5MHz B.W.; Low, 30kHz**



**Figure 152: Spurious Emissions at Antenna Terminal 1GHz-2.349GHz - 16QAM 5MHz B.W.; Mid, 15kHz**

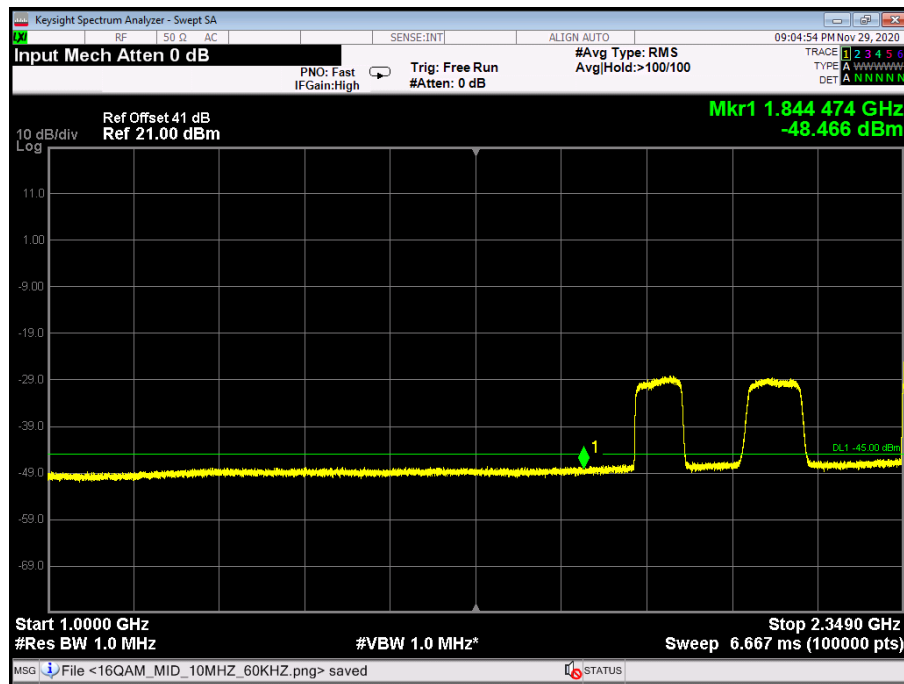


Figure 153: Spurious Emissions at Antenna Terminal 1GHz-2.349GHz - 16QAM 5MHz  
B.W.; Mid, 30kHz

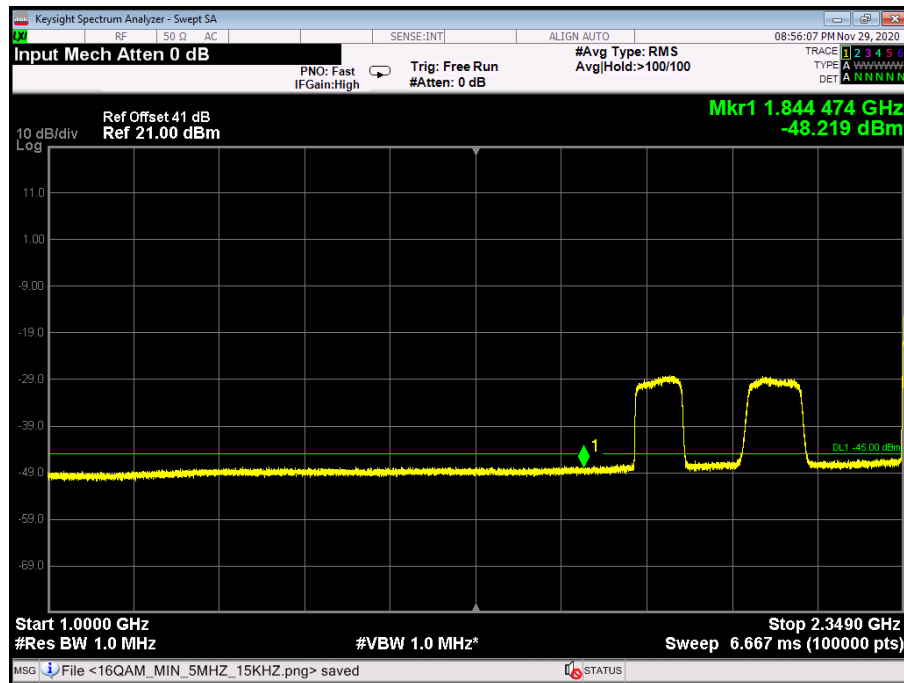


Figure 154: Spurious Emissions at Antenna Terminal 1GHz-2.349GHz - 16QAM 5MHz  
B.W.; High, 15kHz

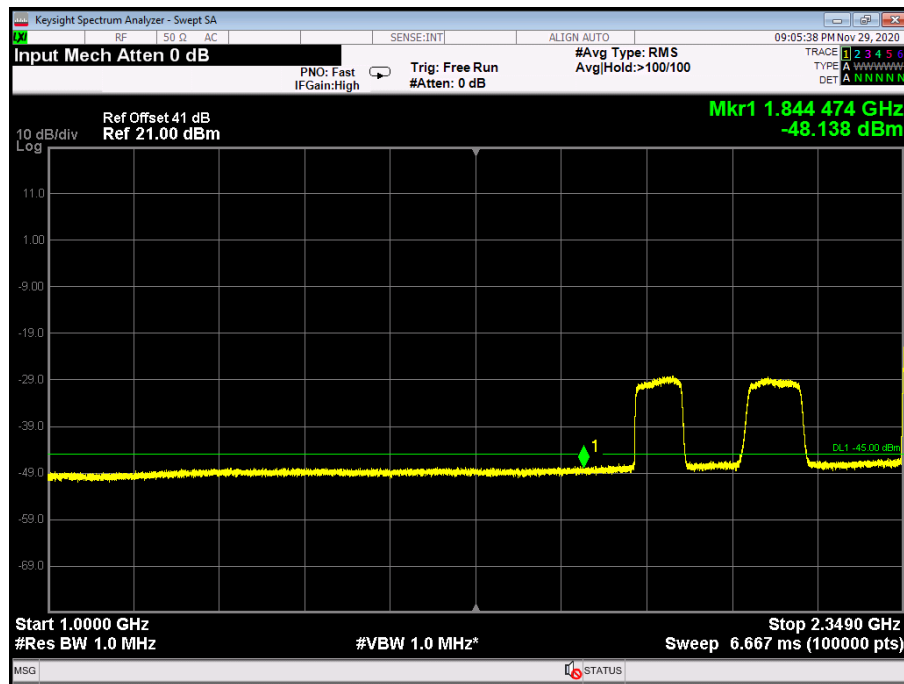


Figure 155: Spurious Emissions at Antenna Terminal 1GHz-2.349GHz - 16QAM 5MHz  
B.W.; High, 30kHz

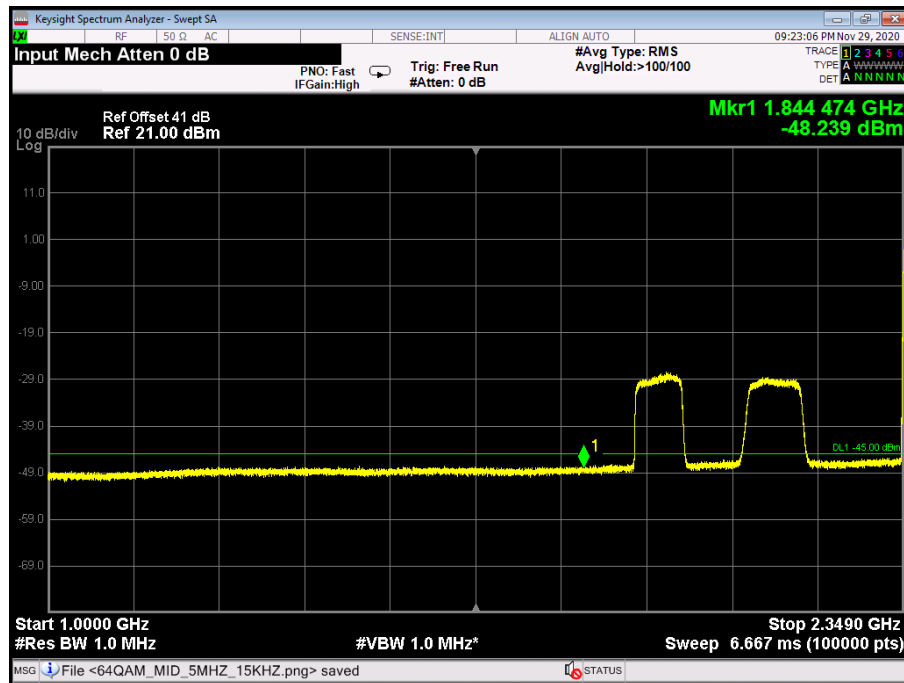


Figure 156: Spurious Emissions at Antenna Terminal 1GHz-2.349GHz - 64QAM 5MHz  
B.W.; Low, 15kHz

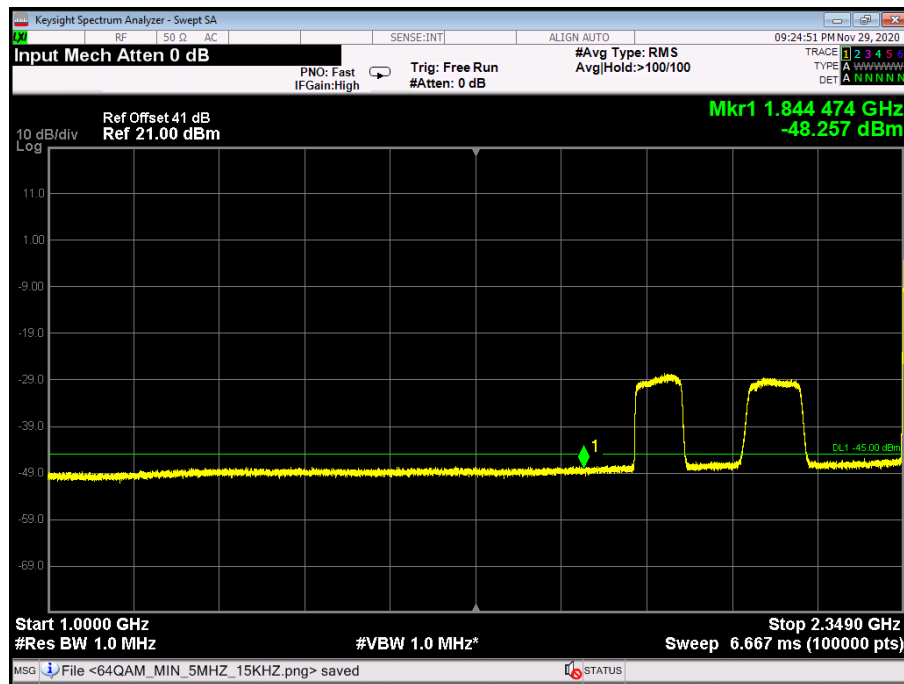


Figure 157: Spurious Emissions at Antenna Terminal 1GHz-2.349GHz - 64QAM 5MHz B.W.; Low, 30kHz

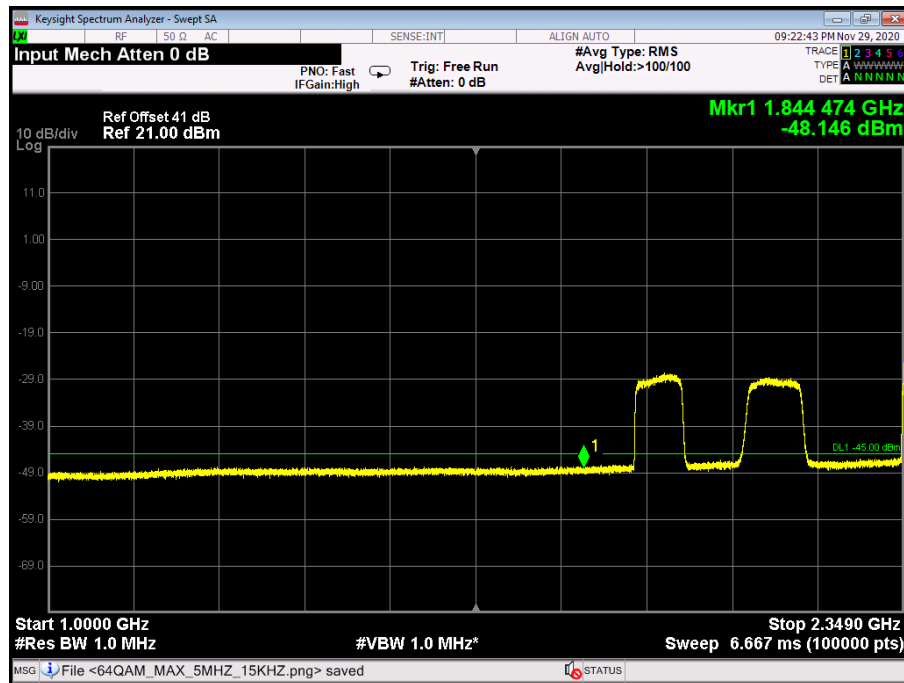
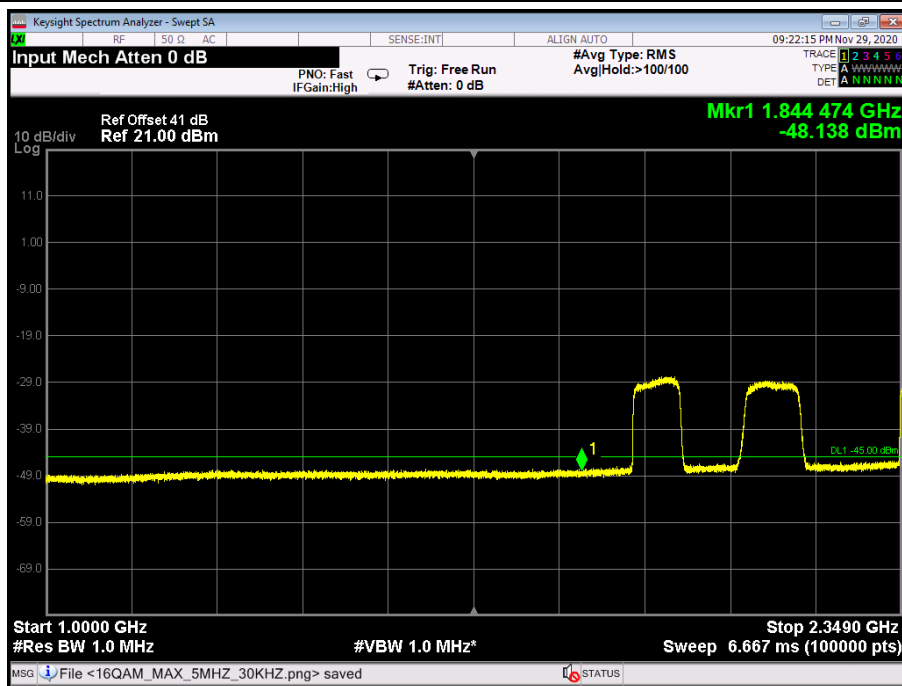


Figure 158: Spurious Emissions at Antenna Terminal 1GHz-2.349GHz - 64QAM 5MHz B.W.; Mid, 15kHz



**Figure 159: Spurious Emissions at Antenna Terminal 1GHz-2.349GHz - 64QAM 5MHz B.W.; Mid, 30kHz**



**Figure 160: Spurious Emissions at Antenna Terminal 1GHz-2.349GHz - 64QAM 5MHz B.W.; High, 15kHz**

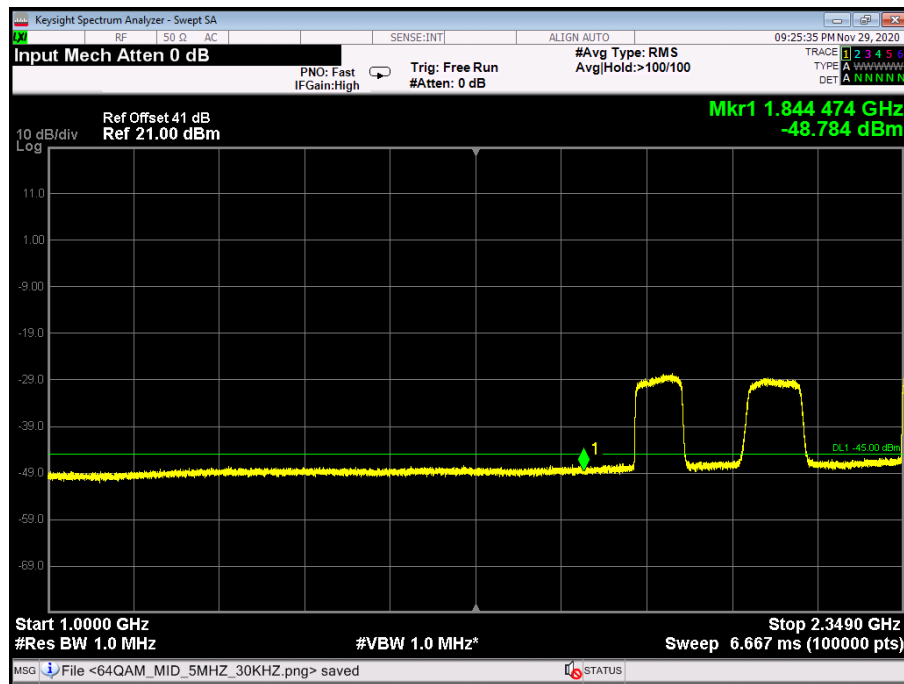


Figure 161: Spurious Emissions at Antenna Terminal 1GHz-2.349GHz - 64QAM 5MHz  
B.W.; High, 30kHz

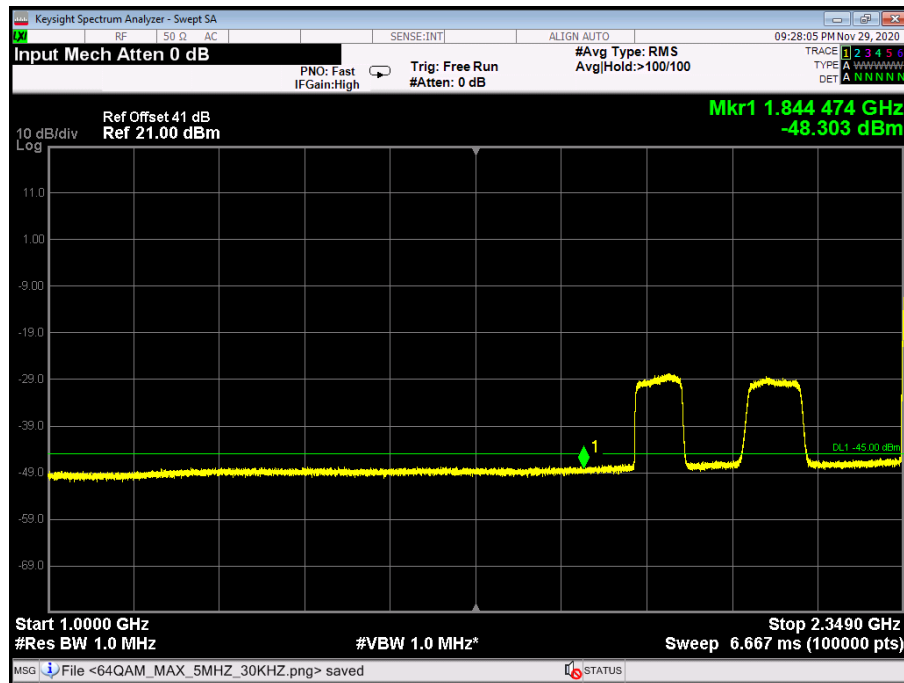


Figure 162: Spurious Emissions at Antenna Terminal 1GHz-2.349GHz - 64QAM 10MHz  
B.W.; Mid, 15kHz

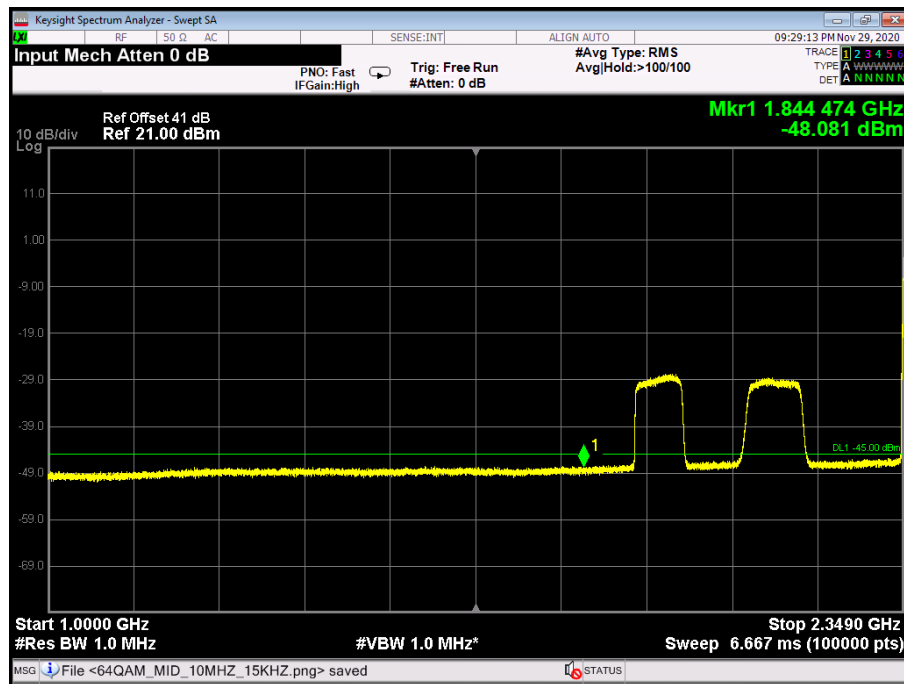


Figure 163: Spurious Emissions at Antenna Terminal 1GHz-2.349GHz - 64QAM 10MHz B.W.; Mid, 30kHz

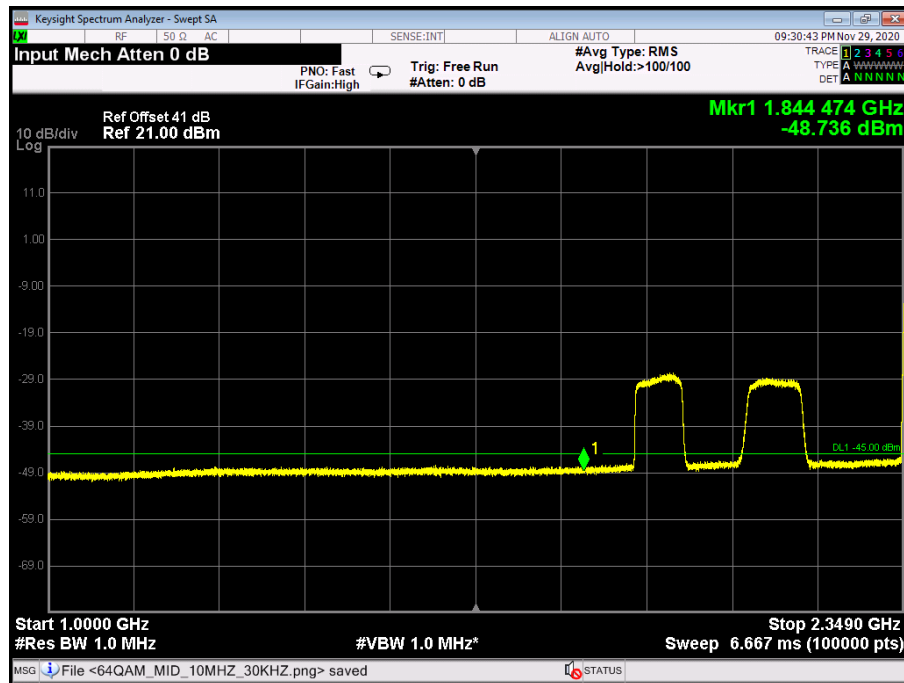


Figure 164: Spurious Emissions at Antenna Terminal 1GHz-2.349GHz - 64QAM 10MHz B.W.; Mid, 60kHz

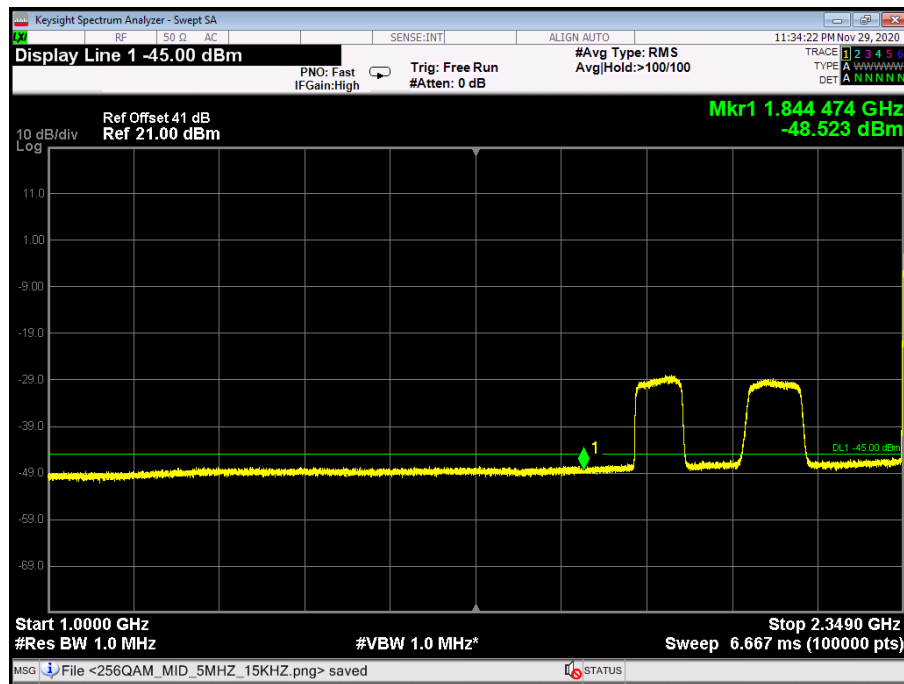


Figure 165: Spurious Emissions at Antenna Terminal 1GHz-2.349GHz - 256QAM 5MHz B.W.; Low, 15kHz

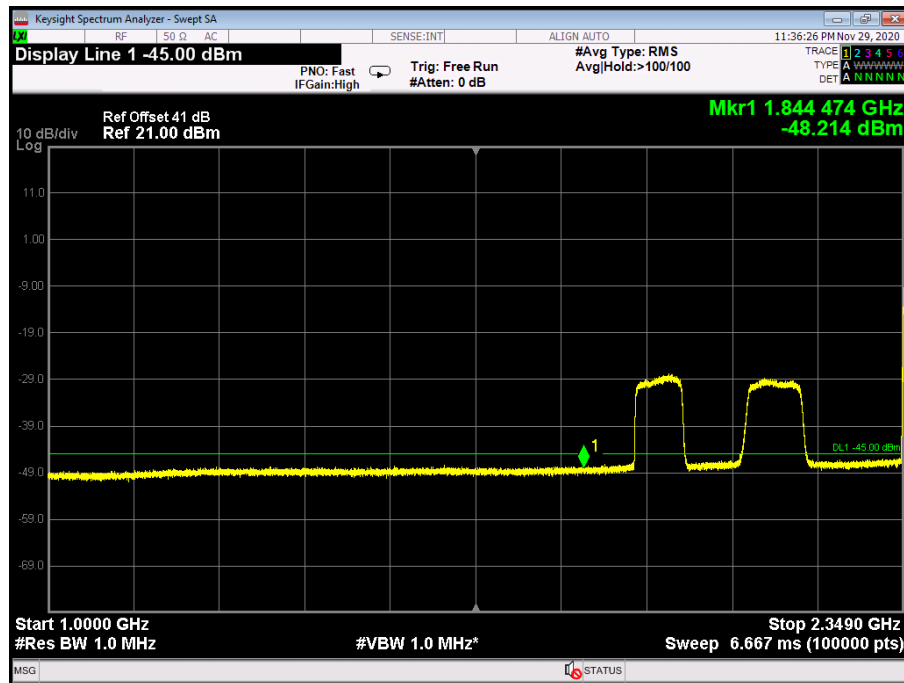


Figure 166: Spurious Emissions at Antenna Terminal 1GHz-2.349GHz - 256QAM 5MHz B.W.; Low, 30kHz

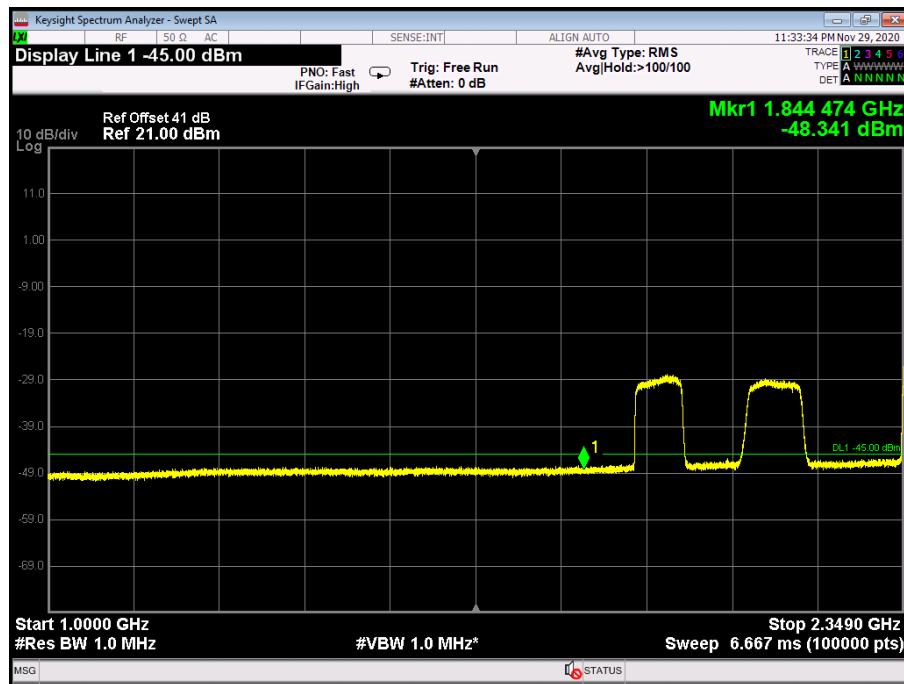


Figure 167: Spurious Emissions at Antenna Terminal 1GHz-2.349GHz - 256QAM 5MHz B.W.; Mid, 15kHz

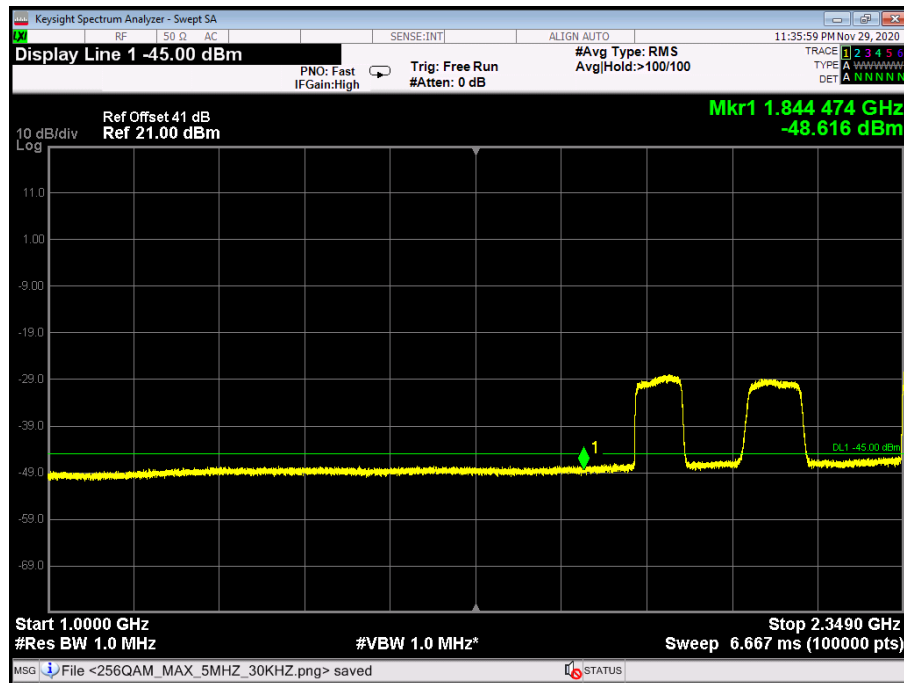
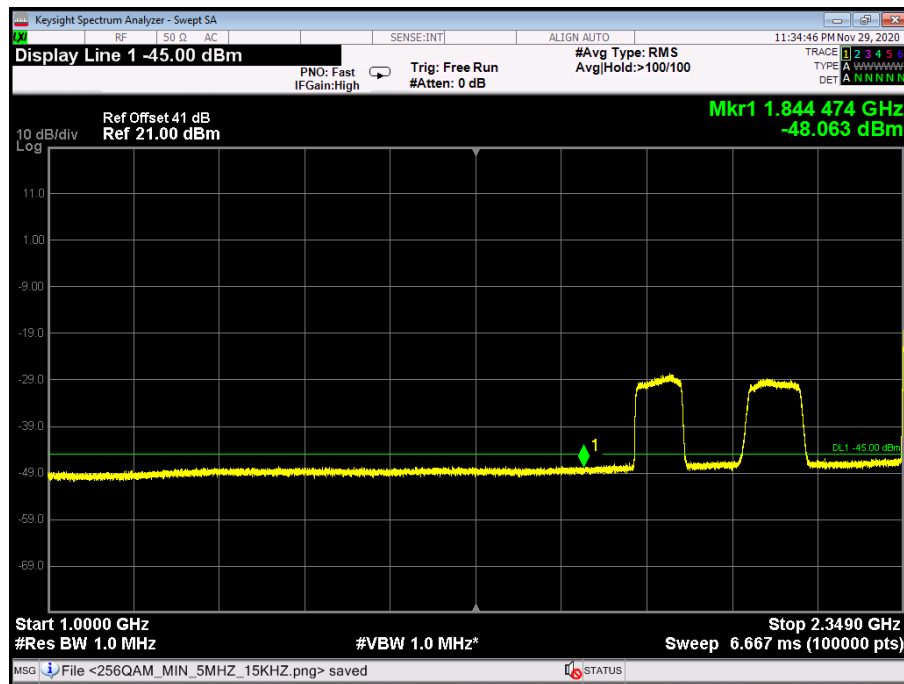
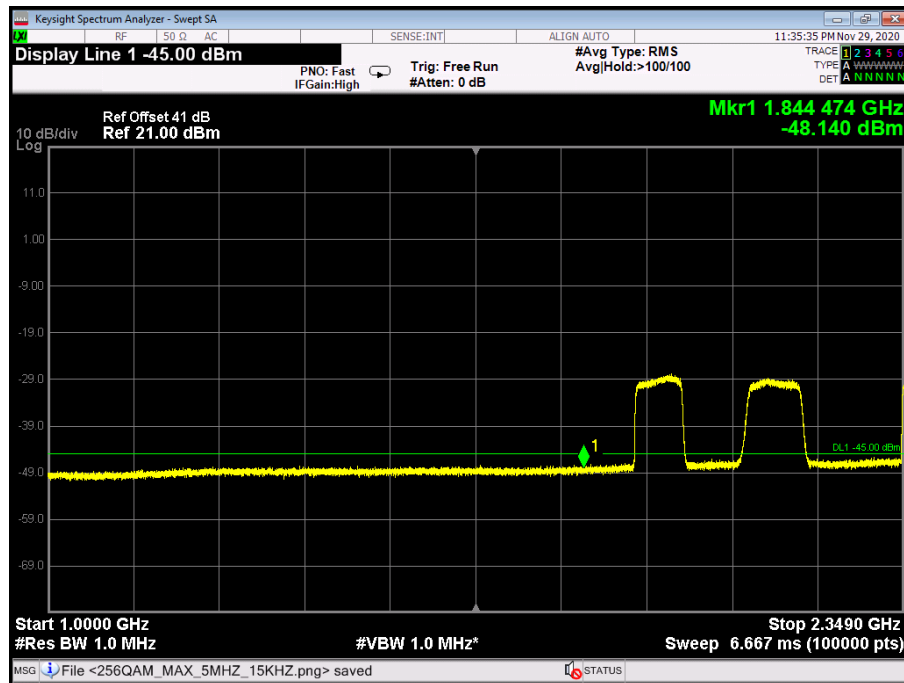


Figure 168: Spurious Emissions at Antenna Terminal 1GHz-2.349GHz - 256QAM 5MHz B.W.; Mid, 30kHz



**Figure 169: Spurious Emissions at Antenna Terminal 1GHz-2.349GHz - 256QAM 5MHz B.W.; High, 15kHz**



**Figure 170: Spurious Emissions at Antenna Terminal 1GHz-2.349GHz - 256QAM 5MHz B.W.; High, 30kHz**

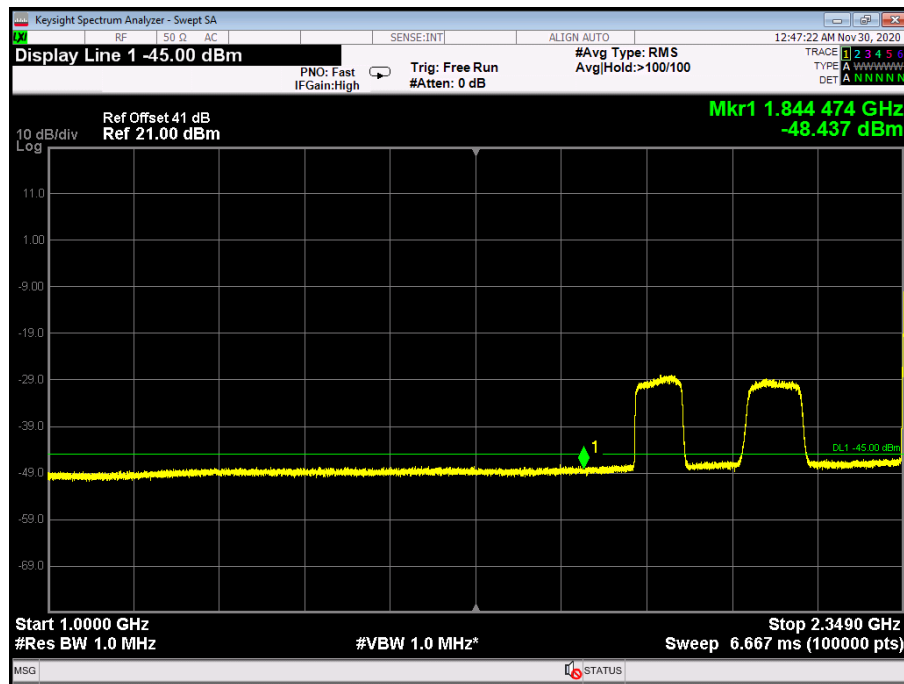


Figure 171: Spurious Emissions at Antenna Terminal 1GHz-2.349GHz - 256QAM 10MHz B.W.; Mid, 15kHz

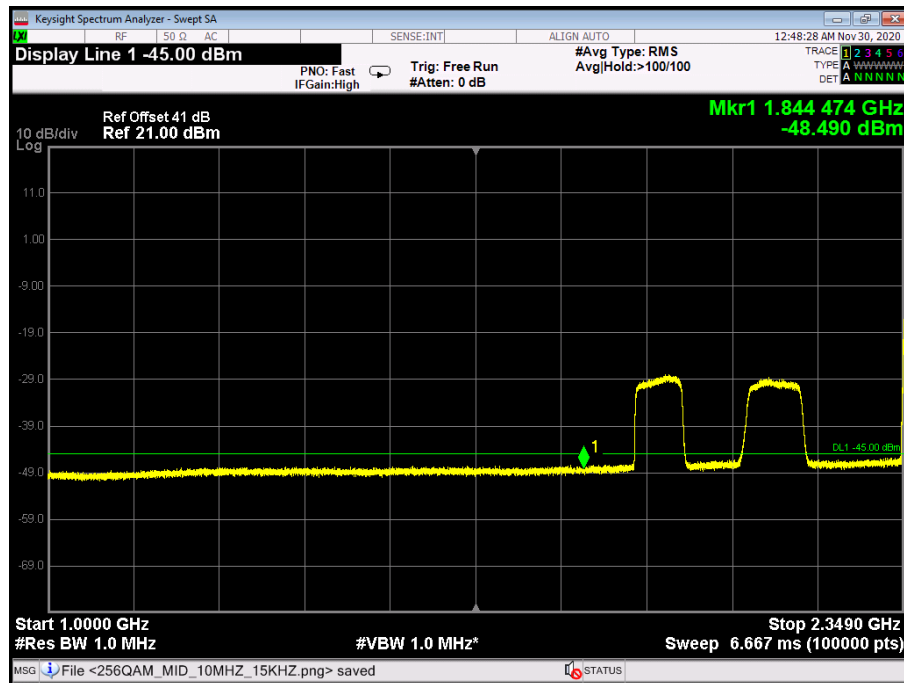


Figure 172: Spurious Emissions at Antenna Terminal 1GHz-2.349GHz - 256QAM 10MHz B.W.; Mid, 30kHz

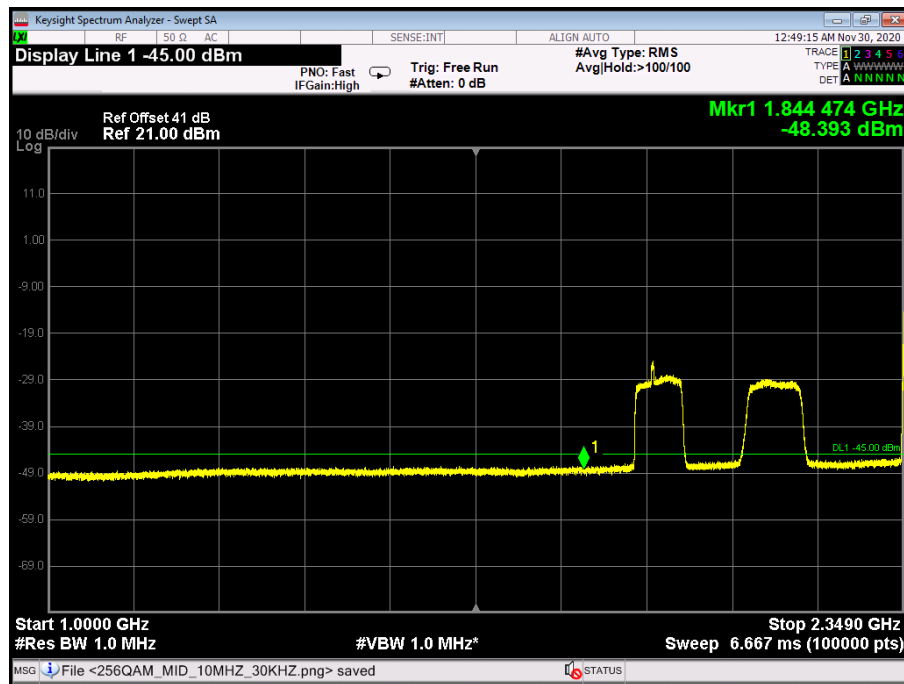


Figure 173: Spurious Emissions at Antenna Terminal 1GHz-2.349GHz - 256QAM 10MHz B.W.; Mid, 60kHz

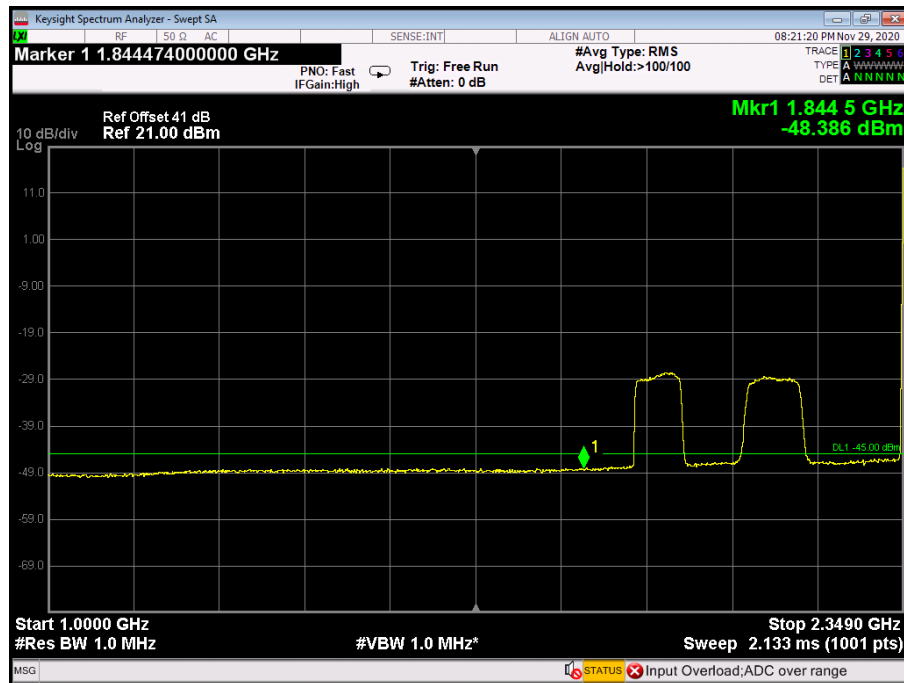


Figure 174: Spurious Emissions at Antenna Terminal 1GHz-2.349GHz - QPSK 5MHz B.W.; Low, 15kHz

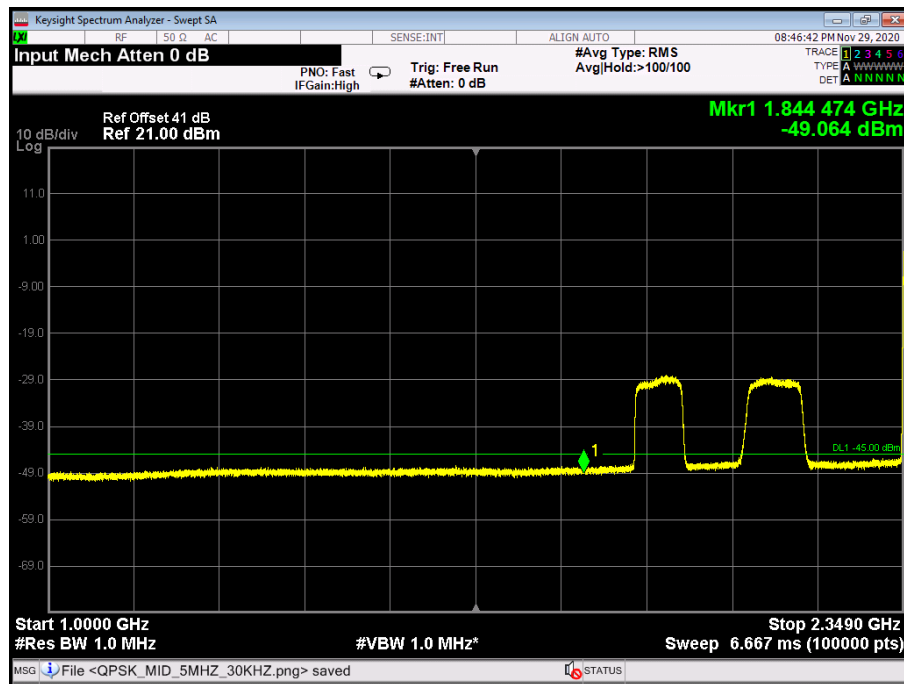


Figure 175: Spurious Emissions at Antenna Terminal 1GHz-2.349GHz - QPSK 5MHz B.W.; Low, 30kHz

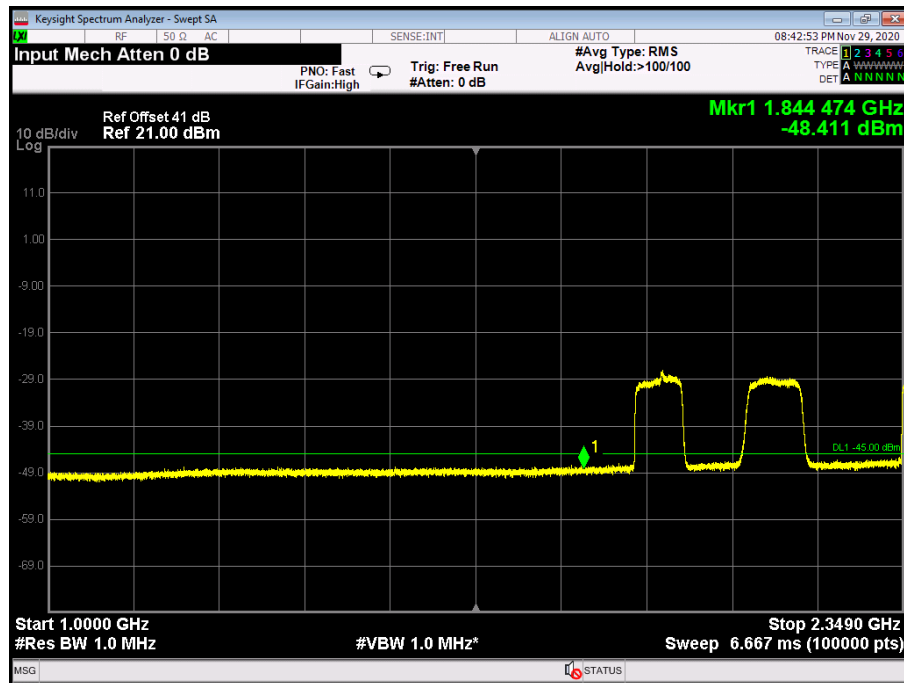


Figure 176: Spurious Emissions at Antenna Terminal 1GHz-2.349GHz - QPSK 5MHz B.W.; Mid, 15kHz

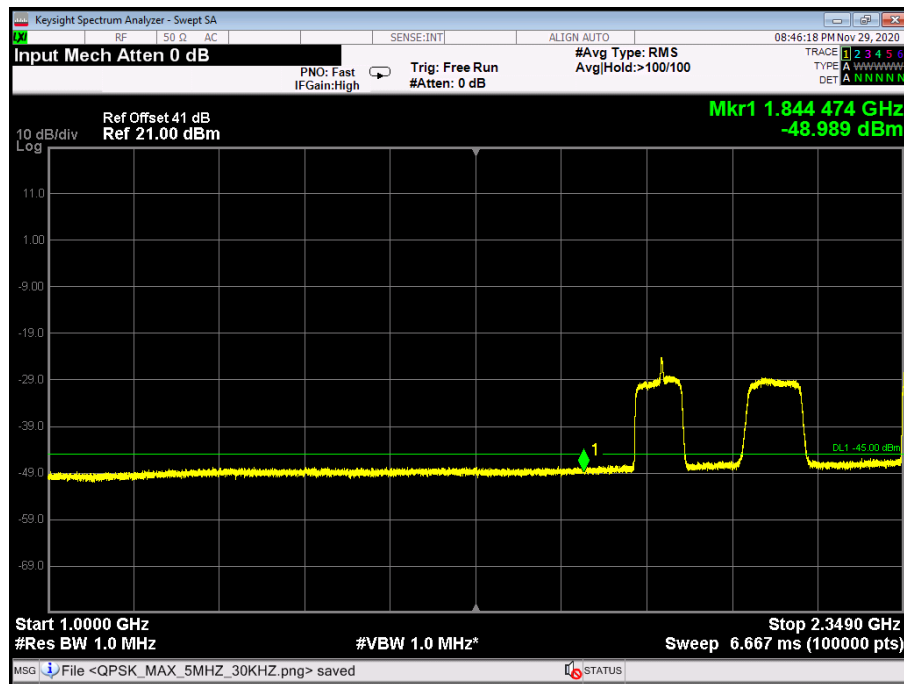


Figure 177: Spurious Emissions at Antenna Terminal 1GHz-2.349GHz - QPSK 5MHz B.W.;  
Mid, 30kHz

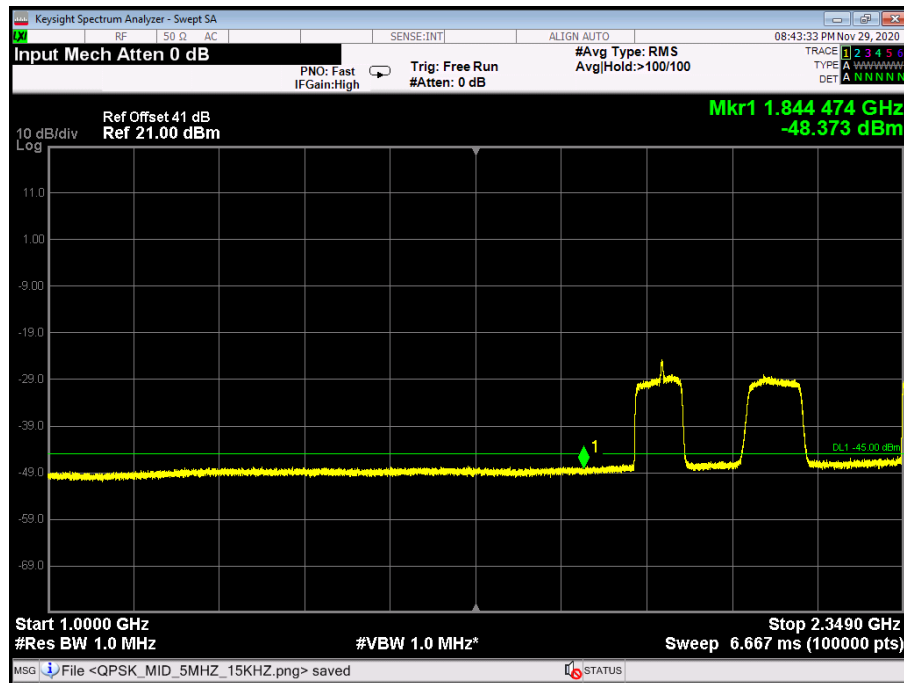


Figure 178: Spurious Emissions at Antenna Terminal 1GHz-2.349GHz - QPSK 5MHz B.W.;  
High, 15kHz

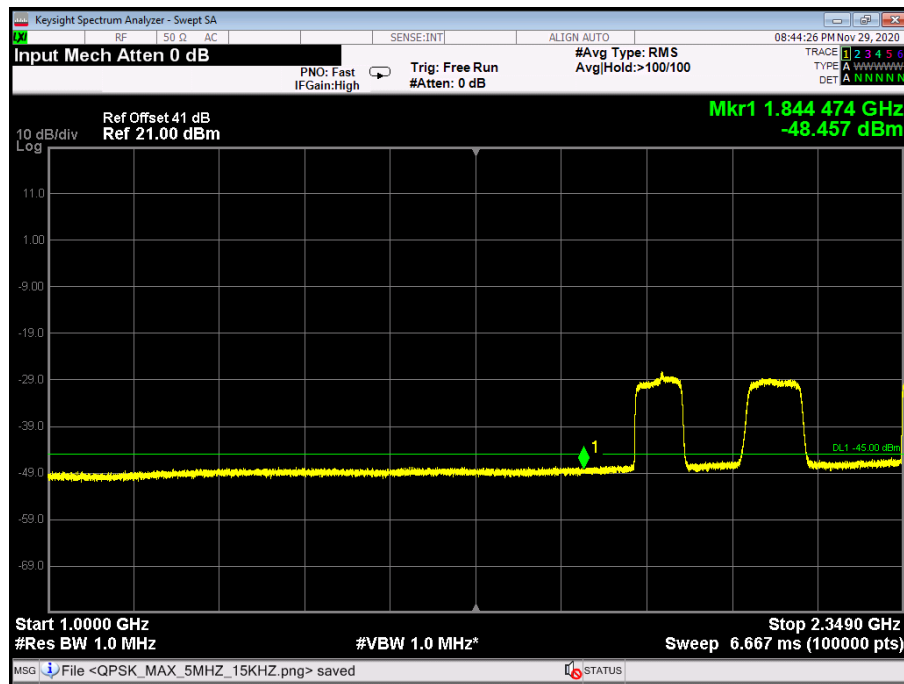


Figure 179: Spurious Emissions at Antenna Terminal 1GHz-2.349GHz - QPSK 5MHz B.W.; High, 30kHz

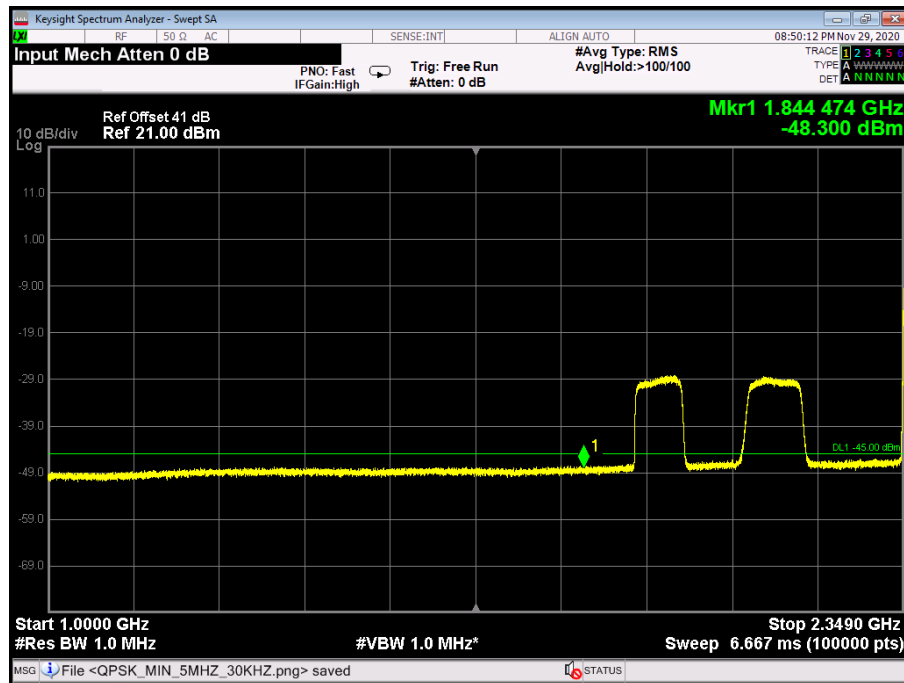


Figure 180: Spurious Emissions at Antenna Terminal 1GHz-2.349GHz - QPSK 10MHz B.W.; Mid, 15kHz

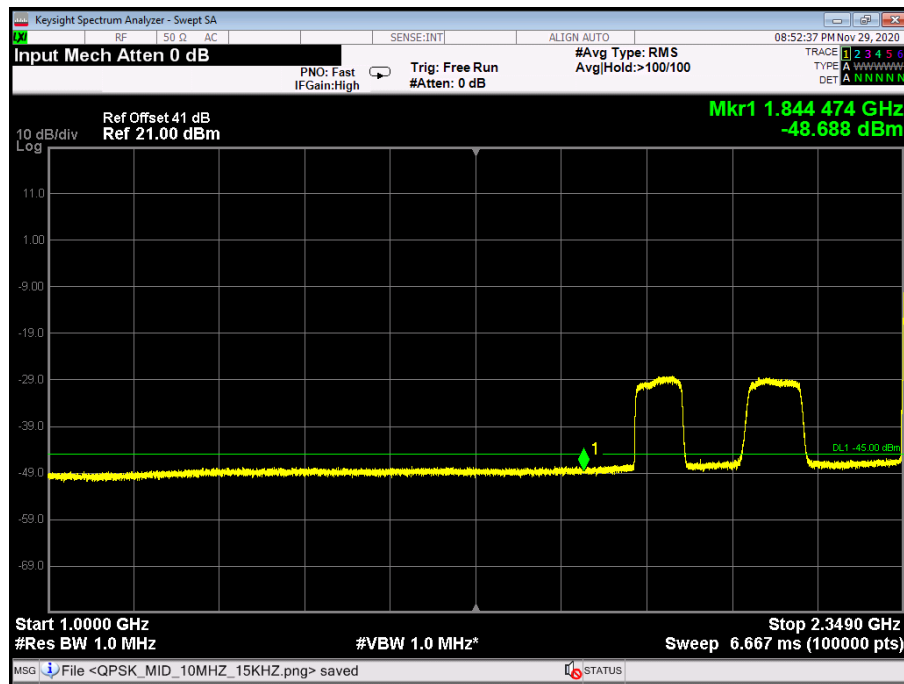


Figure 181: Spurious Emissions at Antenna Terminal 1GHz-2.349GHz - QPSK 10MHz B.W.; Mid, 30kHz

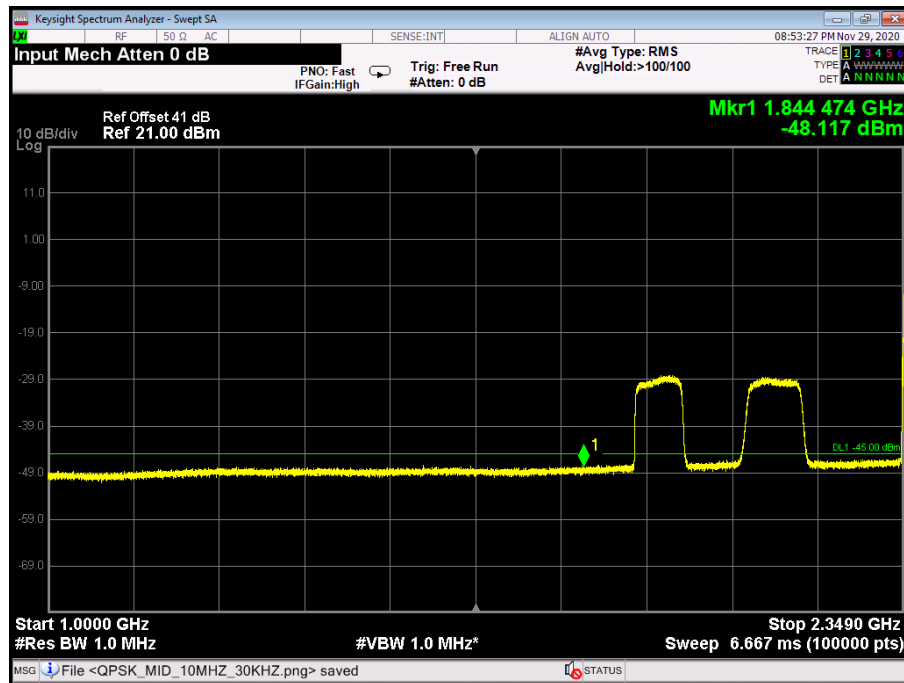


Figure 182: Spurious Emissions at Antenna Terminal 1GHz-2.349GHz - QPSK 10MHz B.W.; Mid, 60kHz

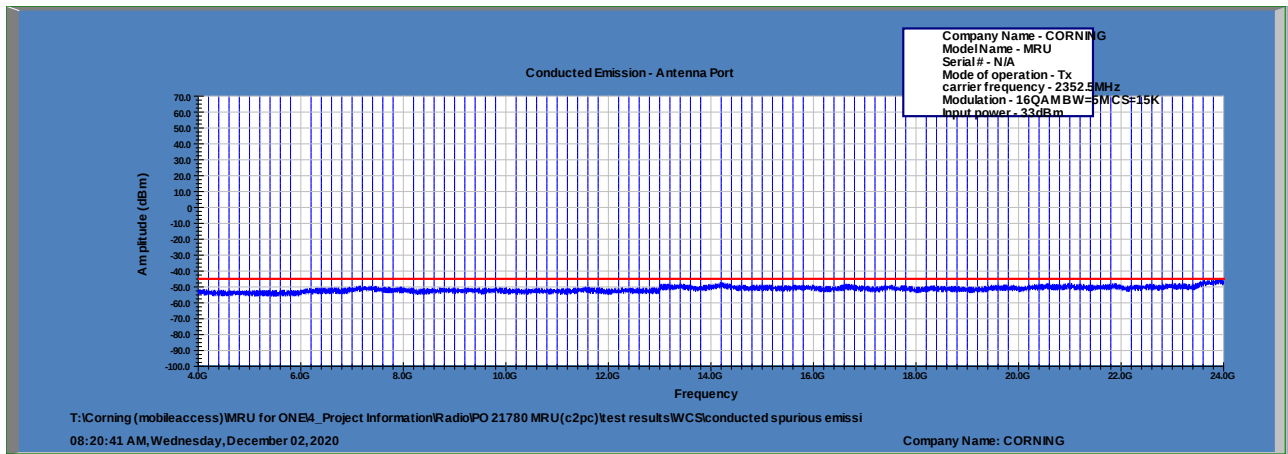


Figure 183: Spurious Emissions at Antenna Terminal 4GHz-24GHz - 16QAM 5MHz B.W.; Low, 15kHz

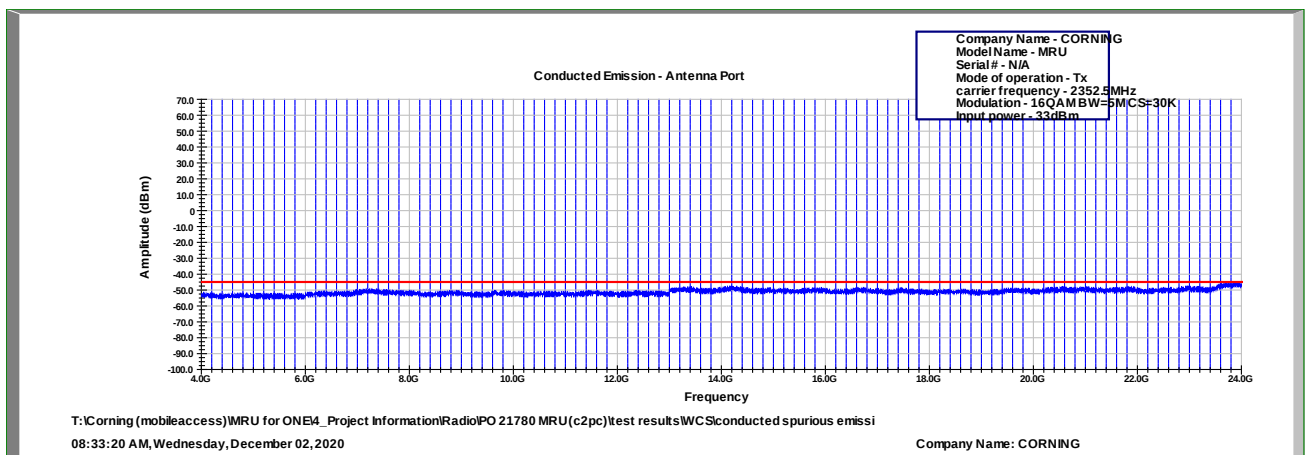


Figure 184: Spurious Emissions at Antenna Terminal 4GHz-24GHz - 16QAM 5MHz B.W.; Low, 30kHz

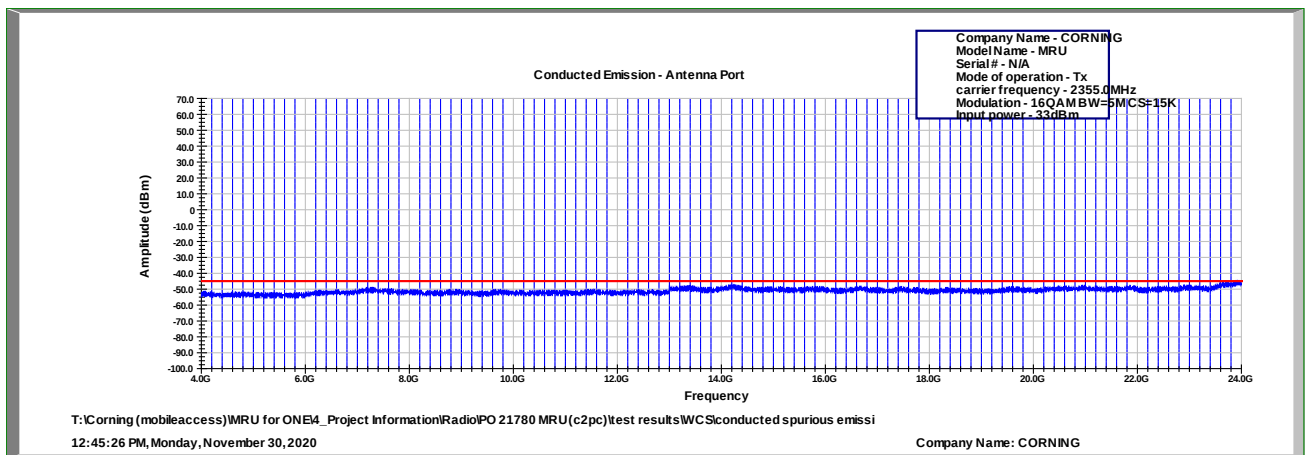
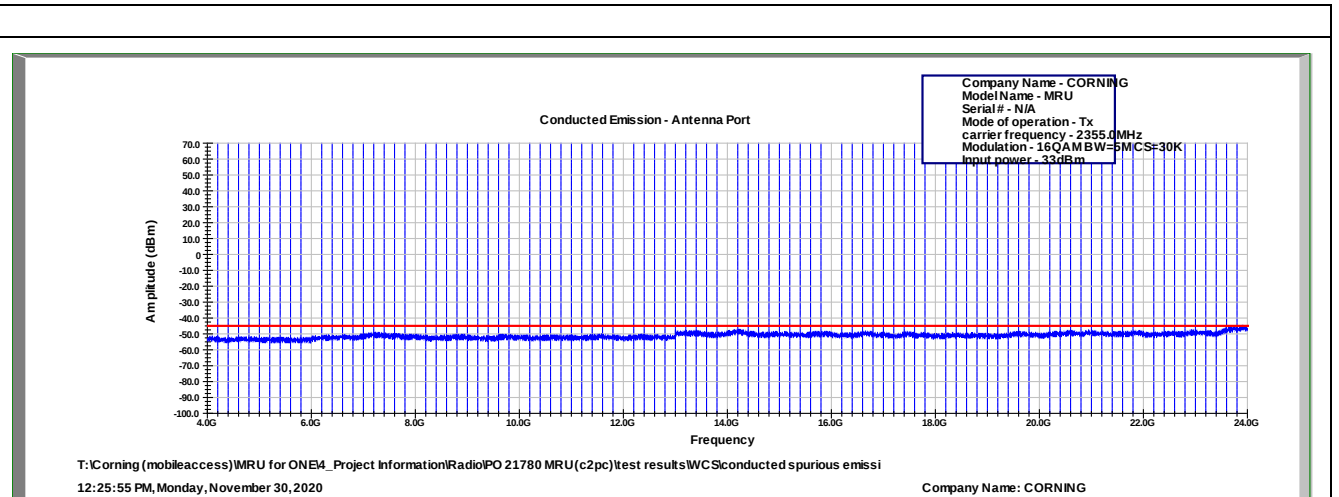
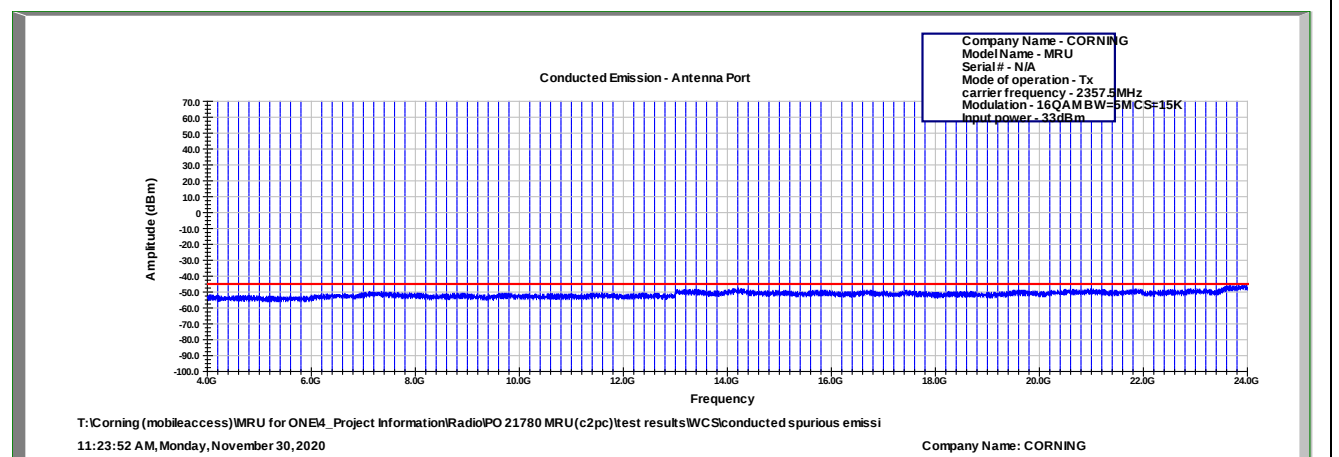


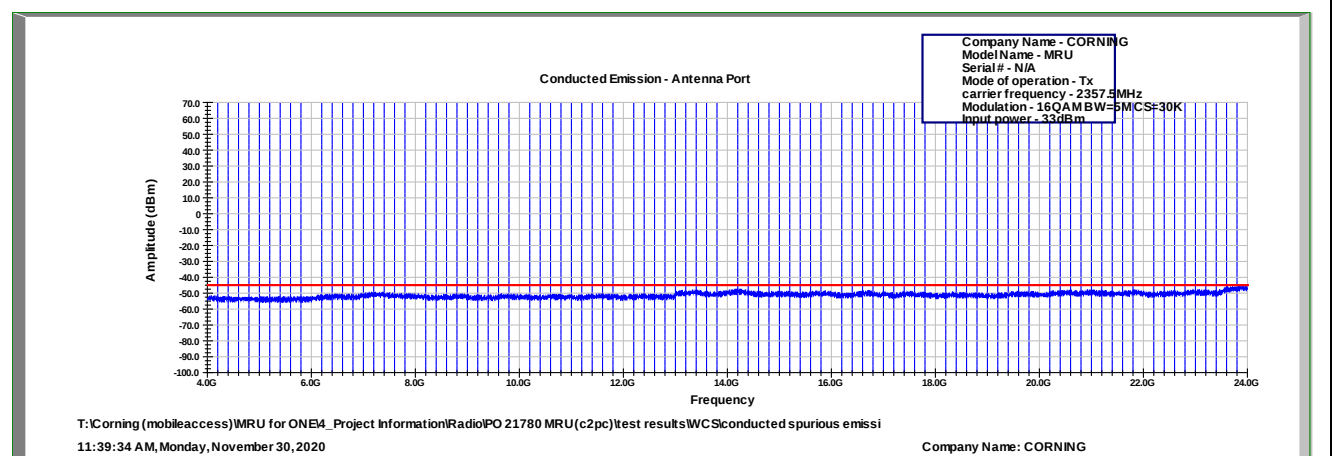
Figure 185: Spurious Emissions at Antenna Terminal 4GHz-24GHz - 16QAM 5MHz B.W.; Mid, 15kHz



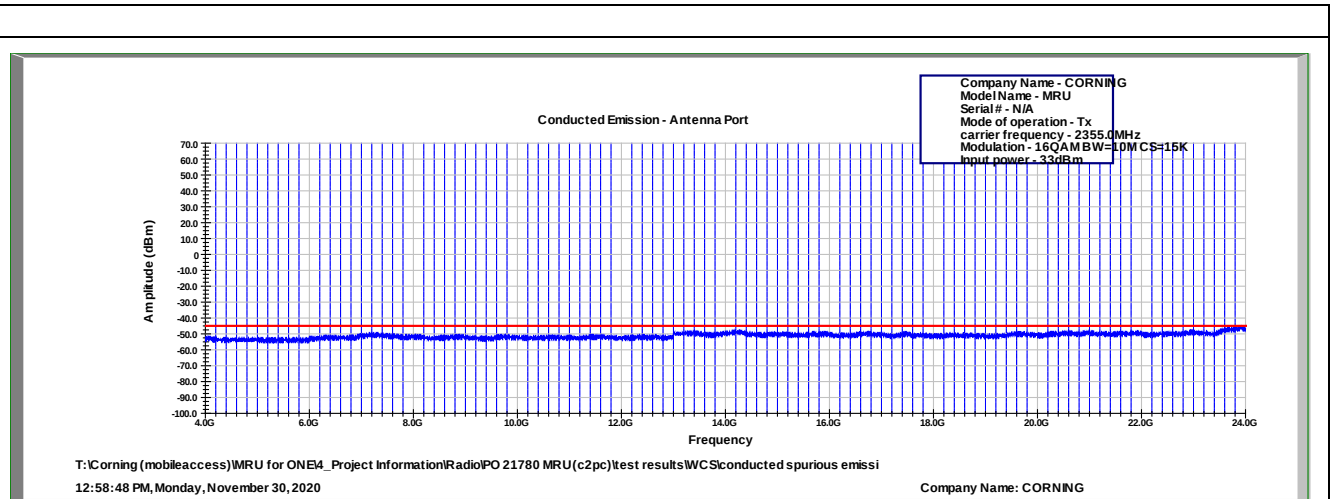
**Figure 186: Spurious Emissions at Antenna Terminal 4GHz-24GHz - 16QAM 5MHz B.W.; Mid, 30kHz**



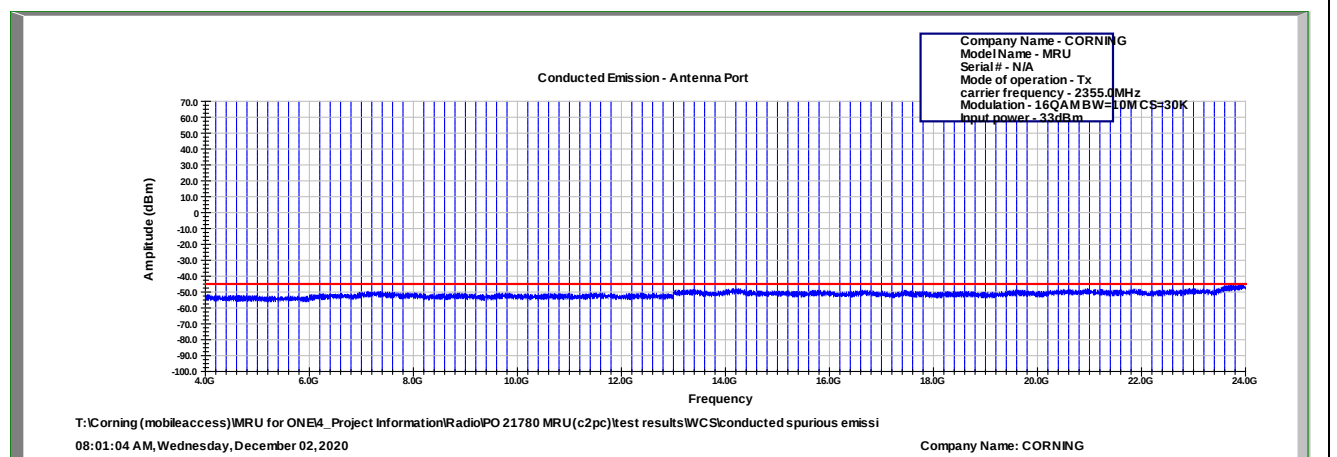
**Figure 187: Spurious Emissions at Antenna Terminal 4GHz-24GHz - 16QAM 5MHz B.W.; High, 15kHz**



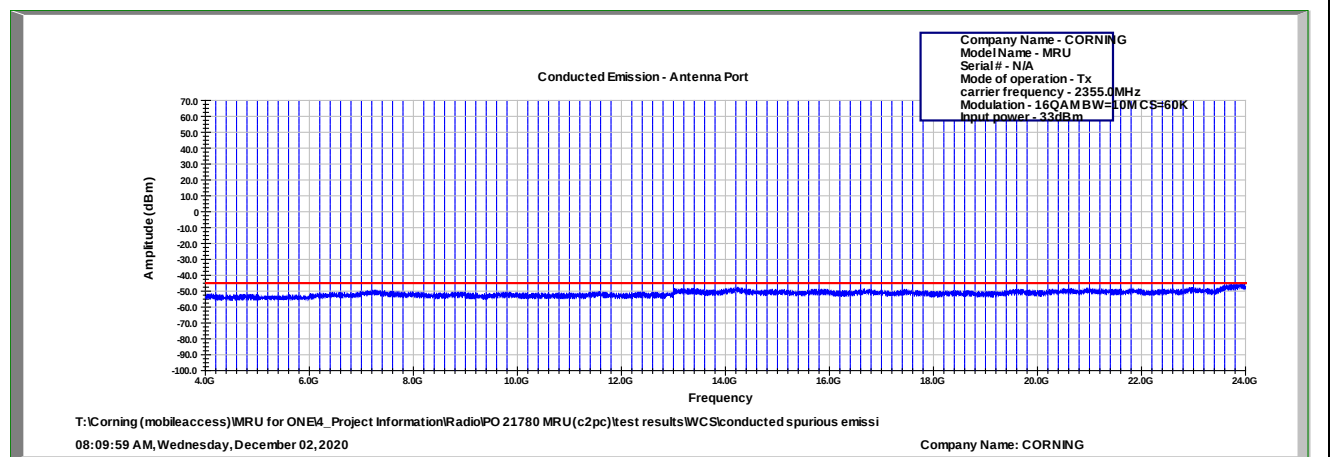
**Figure 188: Spurious Emissions at Antenna Terminal 4GHz-24GHz - 16QAM 5MHz B.W.; High, 30kHz**



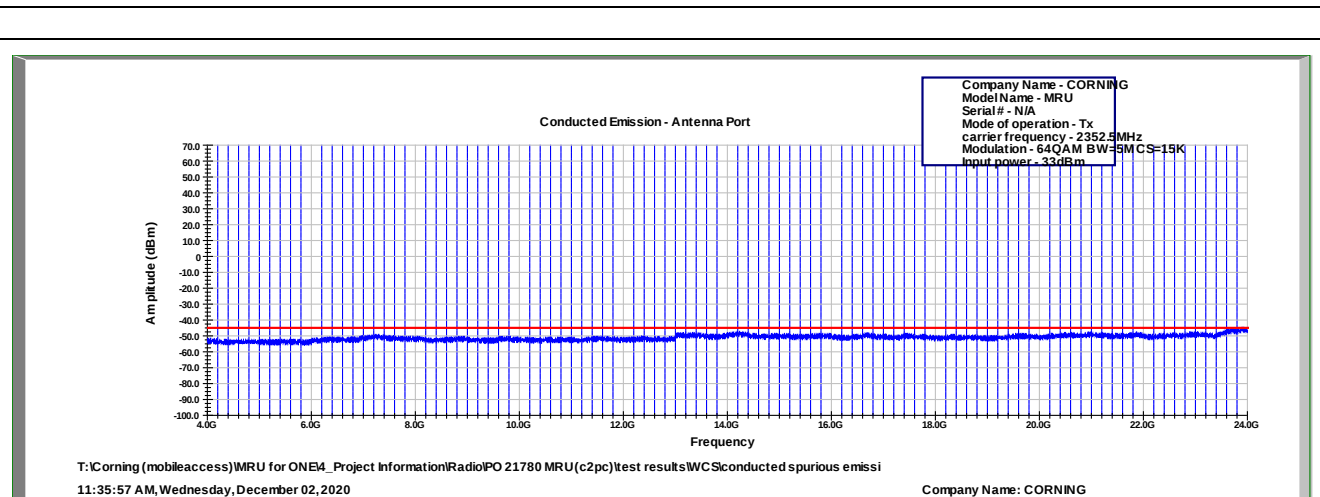
**Figure 189: Spurious Emissions at Antenna Terminal 4GHz-24GHz - 16QAM 10MHz B.W.; Mid, 15kHz**



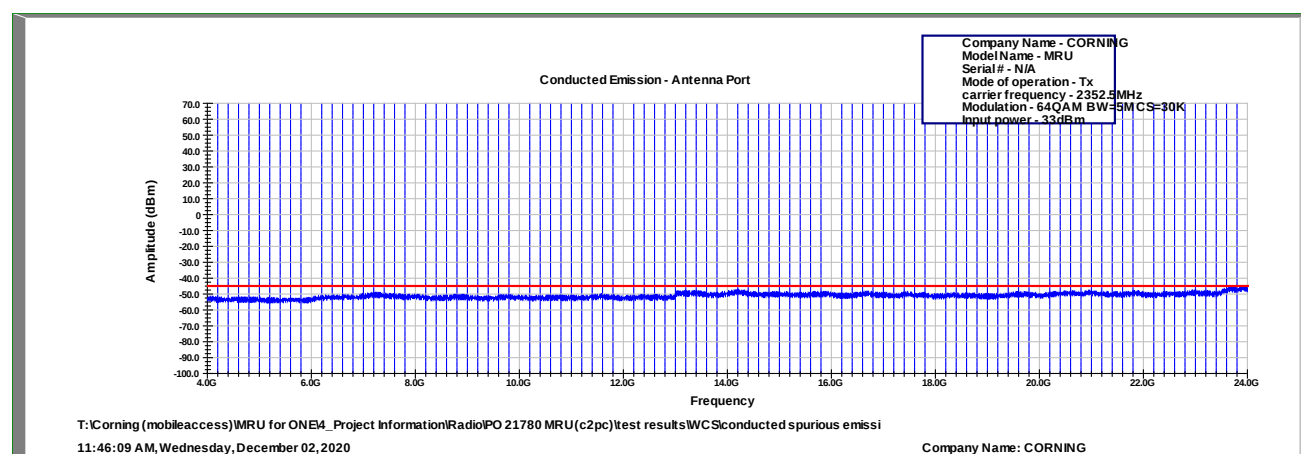
**Figure 190: Spurious Emissions at Antenna Terminal 4GHz-24GHz - 16QAM 10MHz B.W.; Mid, 30kHz**



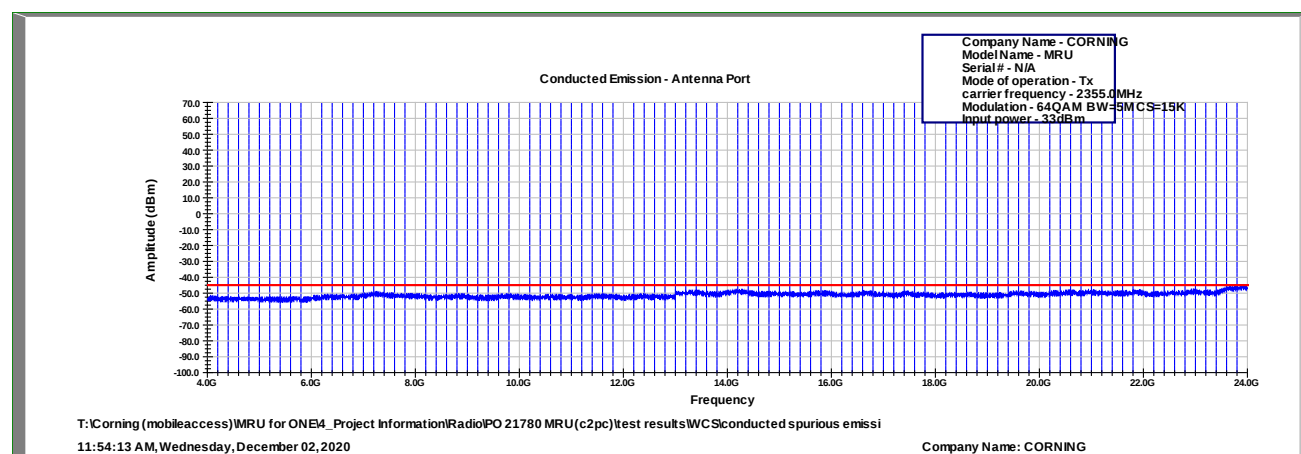
**Figure 191: Spurious Emissions at Antenna Terminal 4GHz-24GHz - 16QAM 10MHz B.W.; Mid, 60kHz**



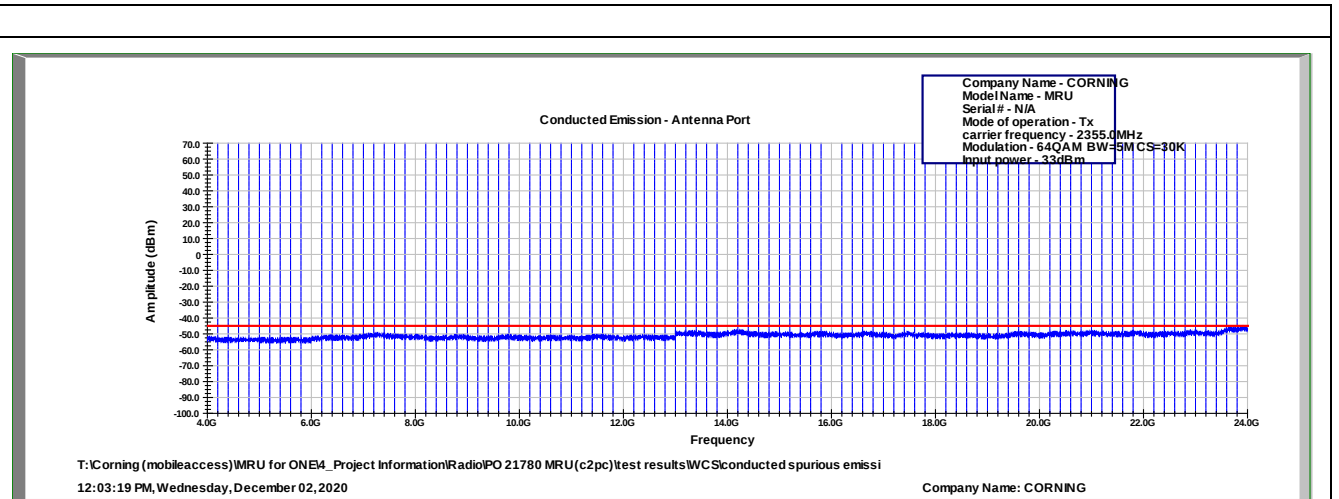
**Figure 192: Spurious Emissions at Antenna Terminal 4GHz-24GHz - 64QAM 5MHz B.W.; Low, 15kHz**



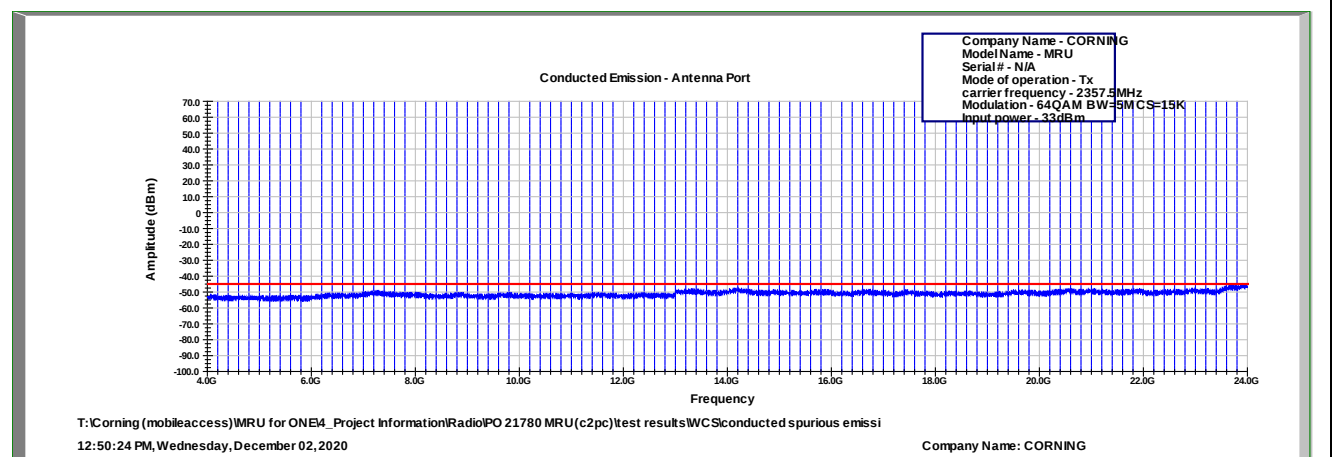
**Figure 193: Spurious Emissions at Antenna Terminal 4GHz-24GHz - 64QAM 5MHz B.W.; Low, 30kHz**



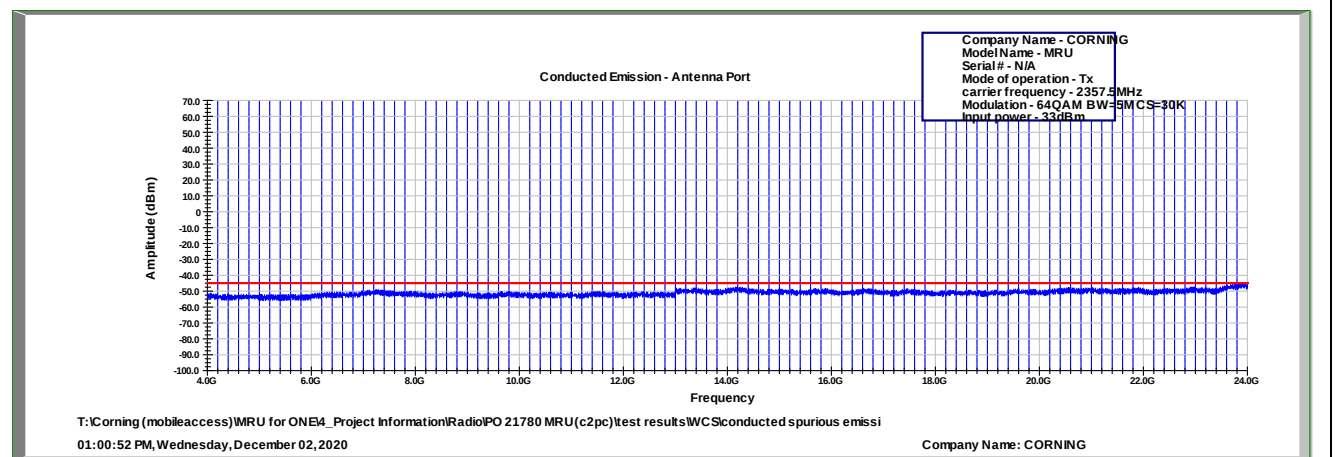
**Figure 194: Spurious Emissions at Antenna Terminal 4GHz-24GHz - 64QAM 5MHz B.W.; Mid, 15kHz**



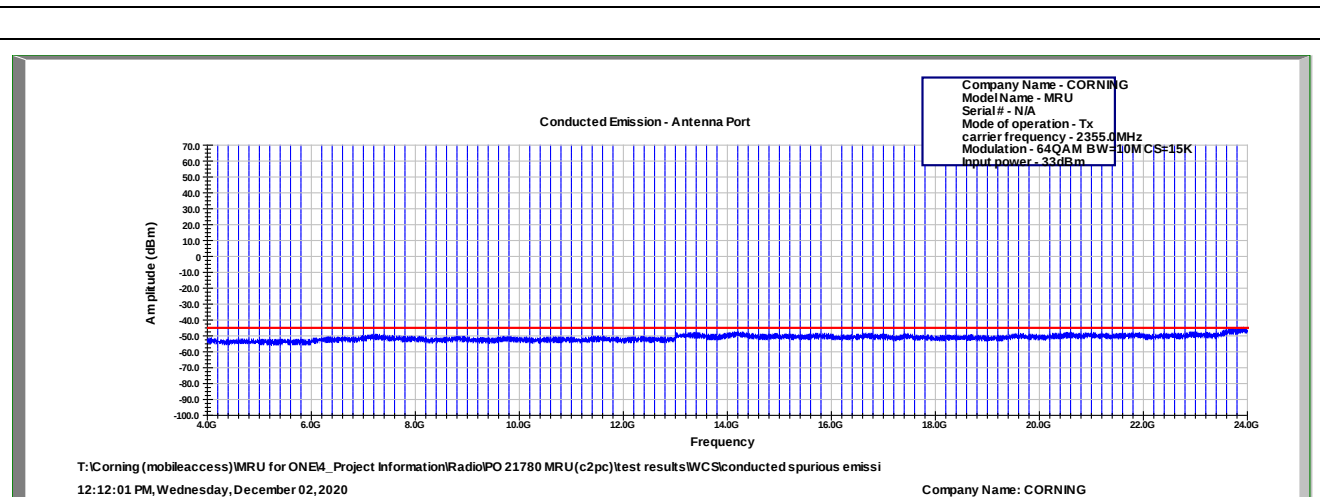
**Figure 195: Spurious Emissions at Antenna Terminal 4GHz-24GHz - 64QAM 5MHz B.W.; Mid, 30kHz**



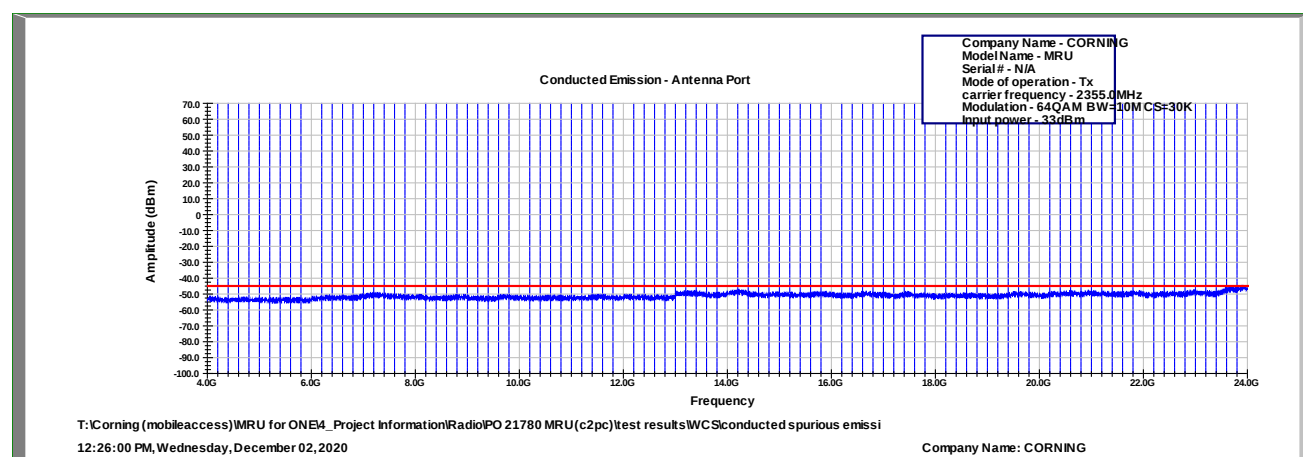
**Figure 196: Spurious Emissions at Antenna Terminal 4GHz-24GHz - 64QAM 5MHz B.W.; High, 15kHz**



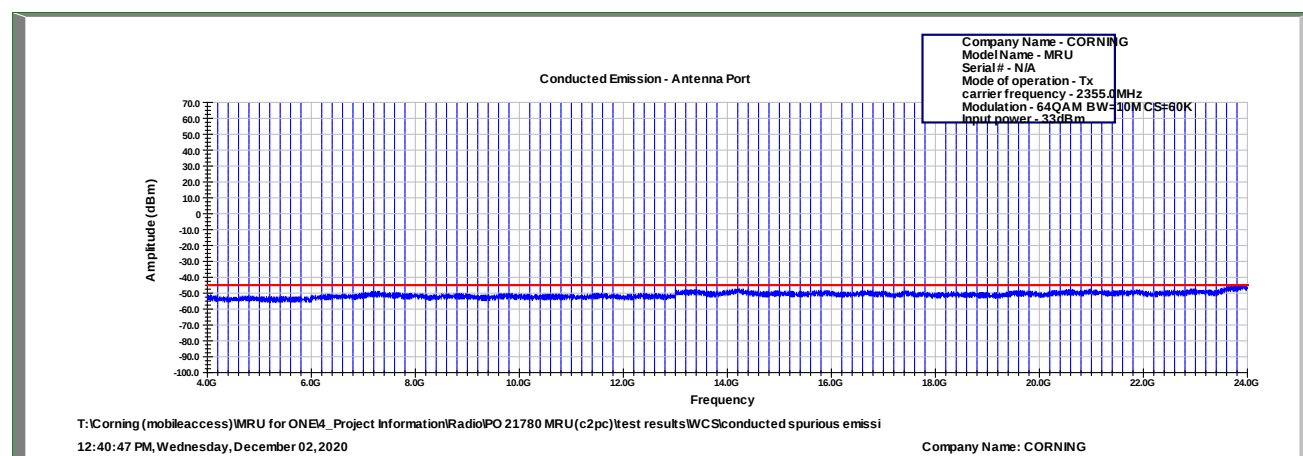
**Figure 197: Spurious Emissions at Antenna Terminal 4GHz-24GHz - 64QAM 5MHz B.W.; High, 30kHz**



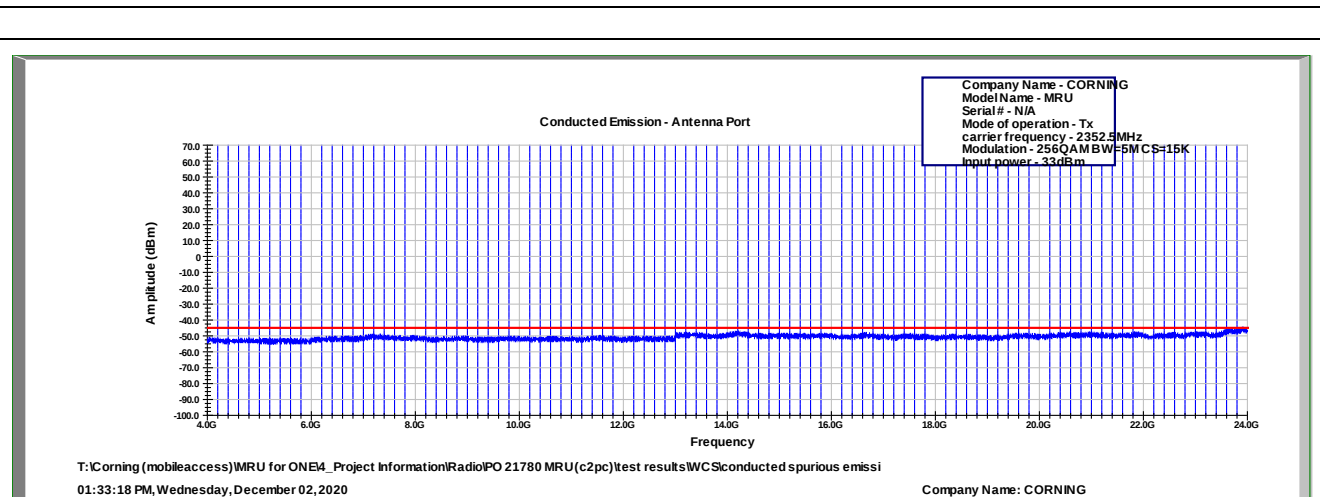
**Figure 198: Spurious Emissions at Antenna Terminal 4GHz-24GHz - 64QAM 10MHz B.W.; Mid, 15kHz**



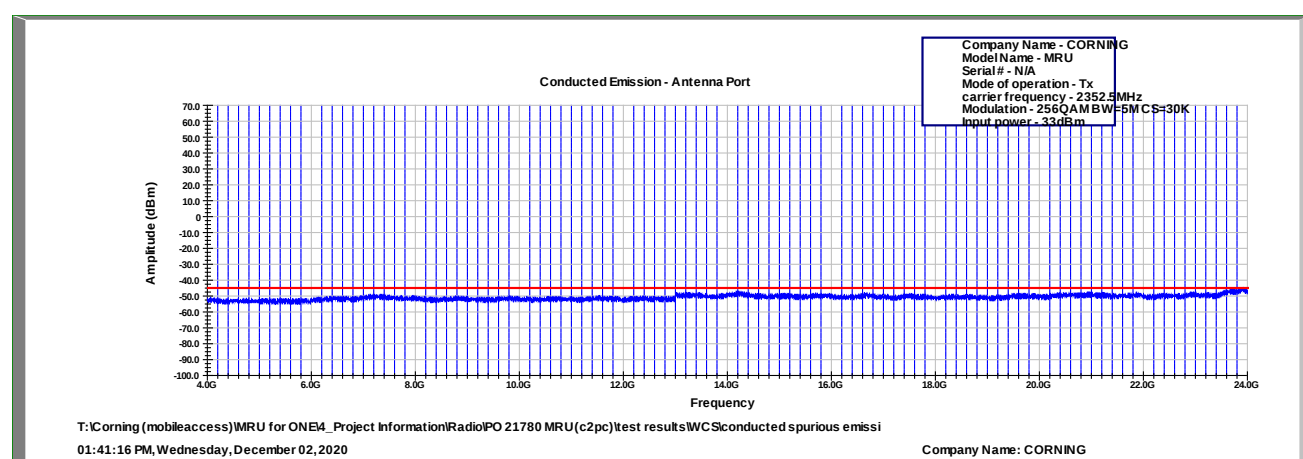
**Figure 199: Spurious Emissions at Antenna Terminal 4GHz-24GHz - 64QAM 10MHz B.W.; Mid, 30kHz**



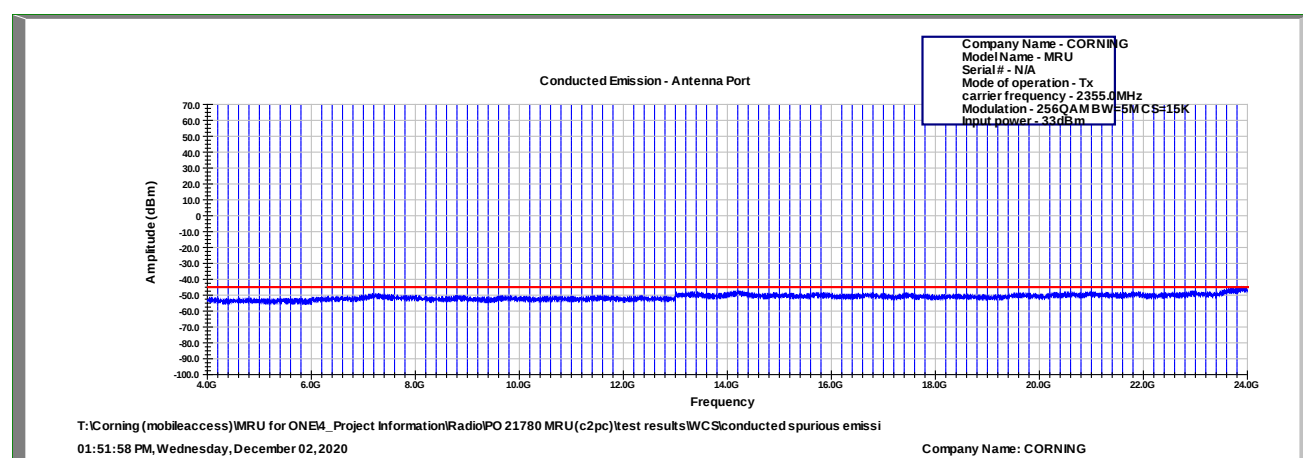
**Figure 200: Spurious Emissions at Antenna Terminal 4GHz-24GHz - 64QAM 10MHz B.W.; Mid, 60kHz**



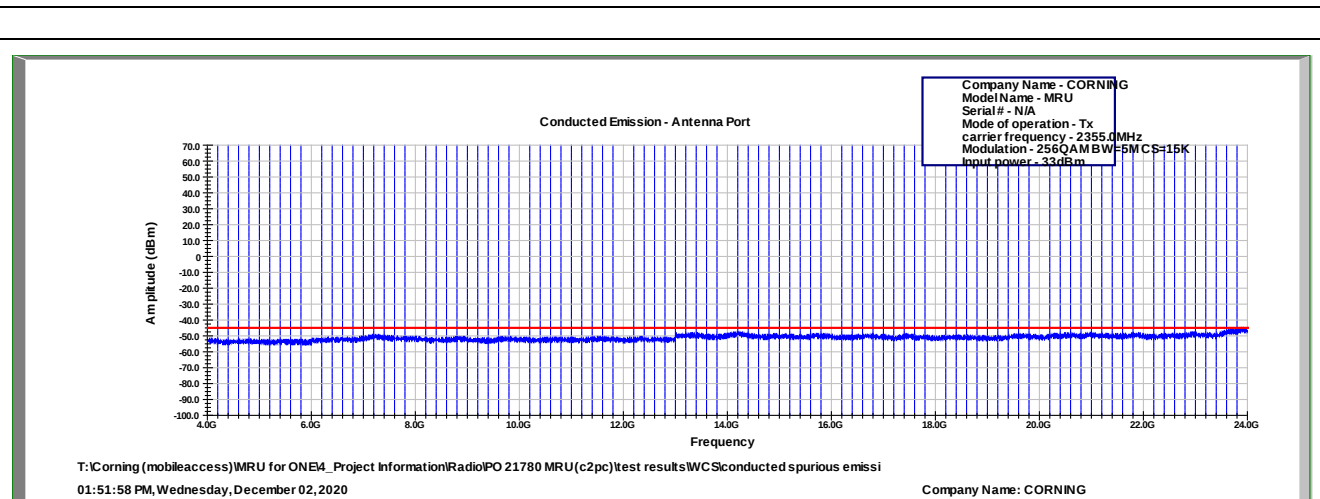
**Figure 201: Spurious Emissions at Antenna Terminal 4GHz-24GHz - 256QAM 5MHz B.W.; Low, 15kHz**



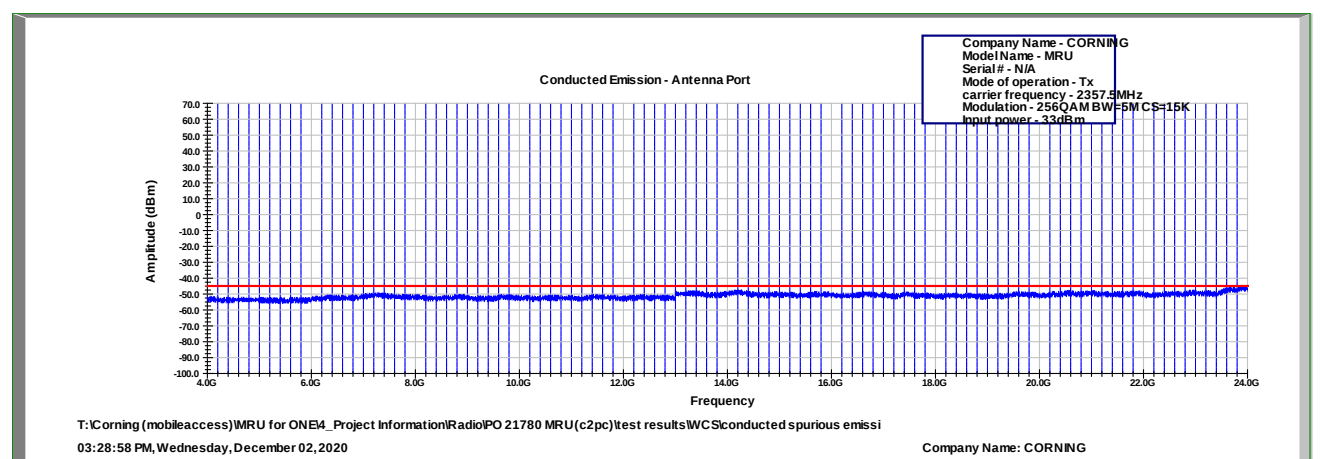
**Figure 202: Spurious Emissions at Antenna Terminal 4GHz-24GHz - 256QAM 5MHz B.W.; Low, 30kHz**



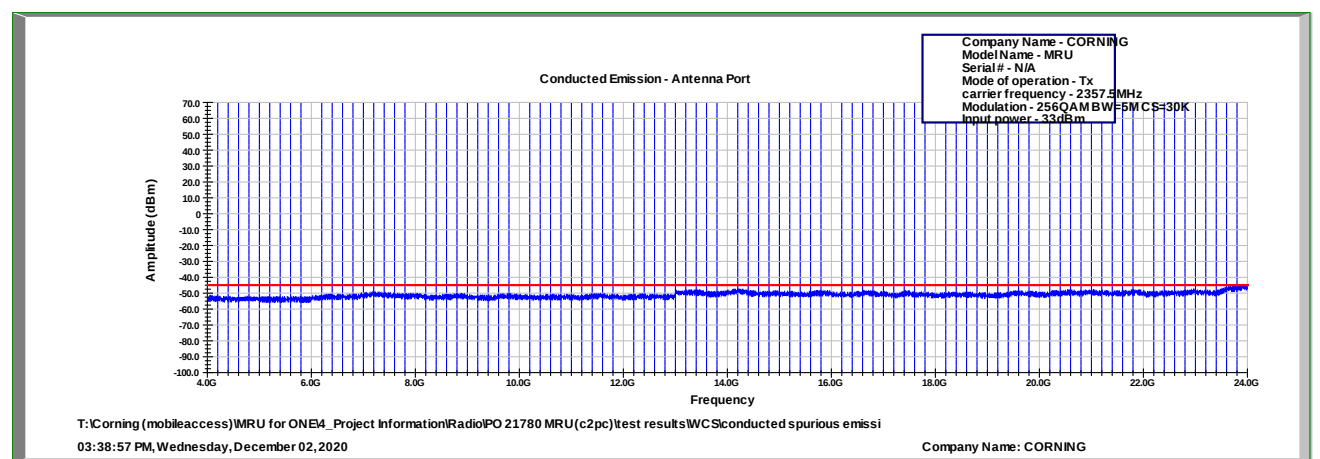
**Figure 203: Spurious Emissions at Antenna Terminal 4GHz-24GHz - 256QAM 5MHz B.W.; Mid, 15kHz**



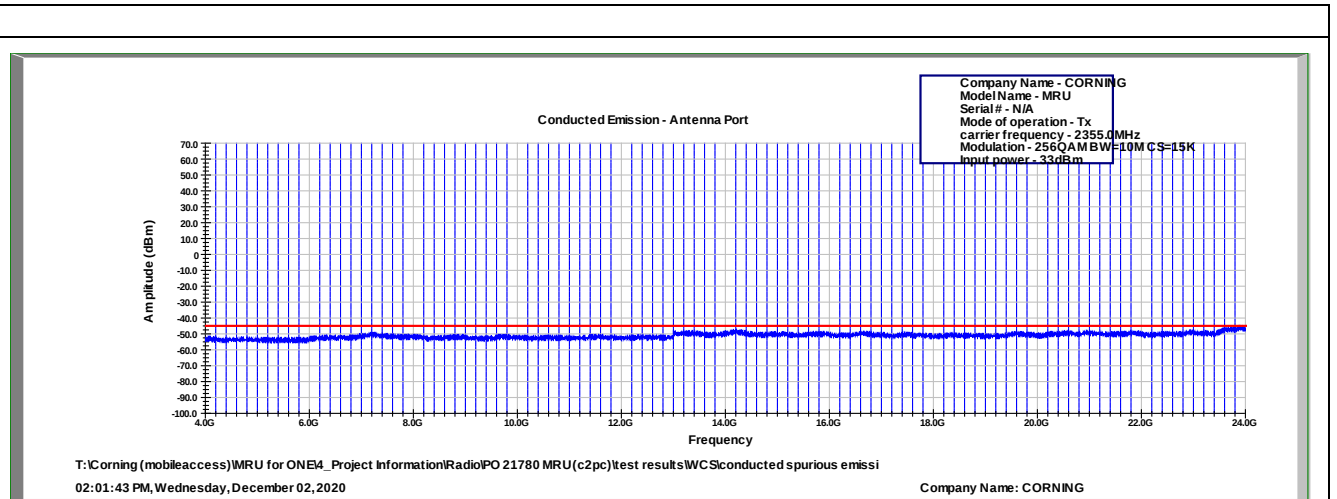
**Figure 204: Spurious Emissions at Antenna Terminal 4GHz-24GHz - 256QAM 5MHz B.W.; Mid, 30kHz**



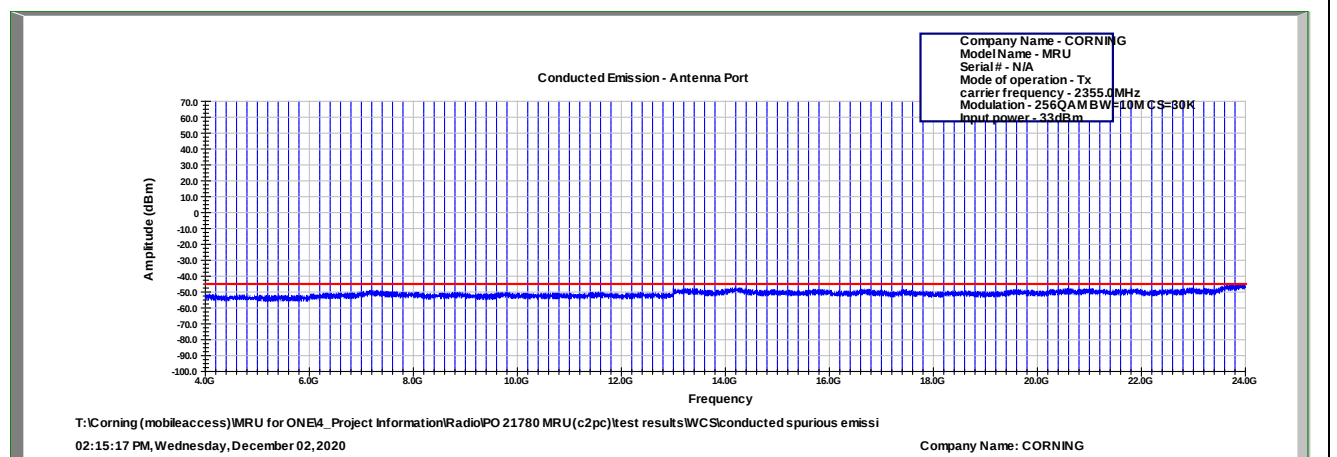
**Figure 205: Spurious Emissions at Antenna Terminal 4GHz-24GHz - 256QAM 5MHz B.W.; High, 15kHz**



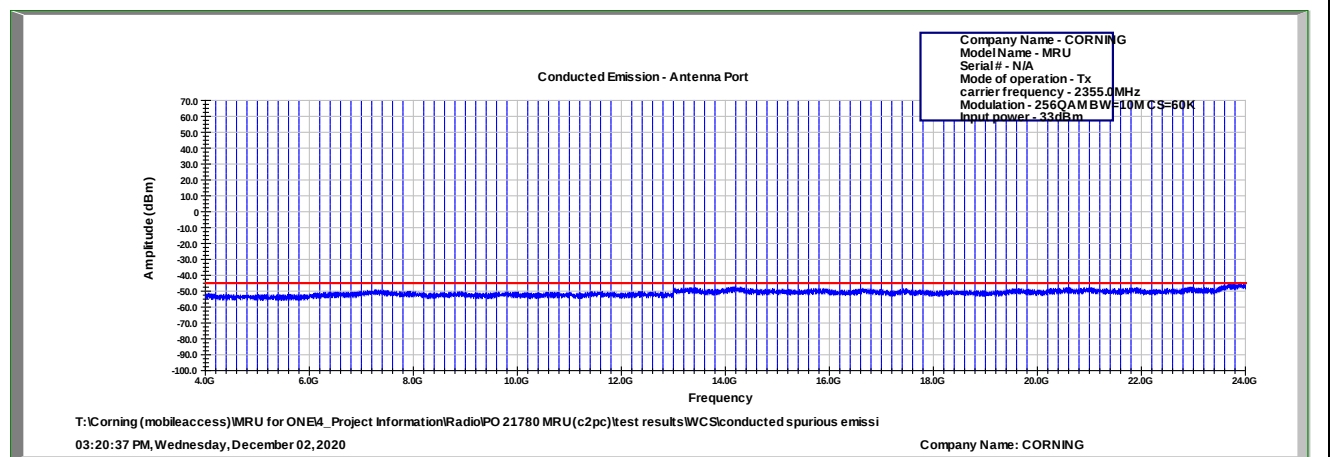
**Figure 206: Spurious Emissions at Antenna Terminal 4GHz-24GHz - 256QAM 5MHz B.W.; High, 30kHz**



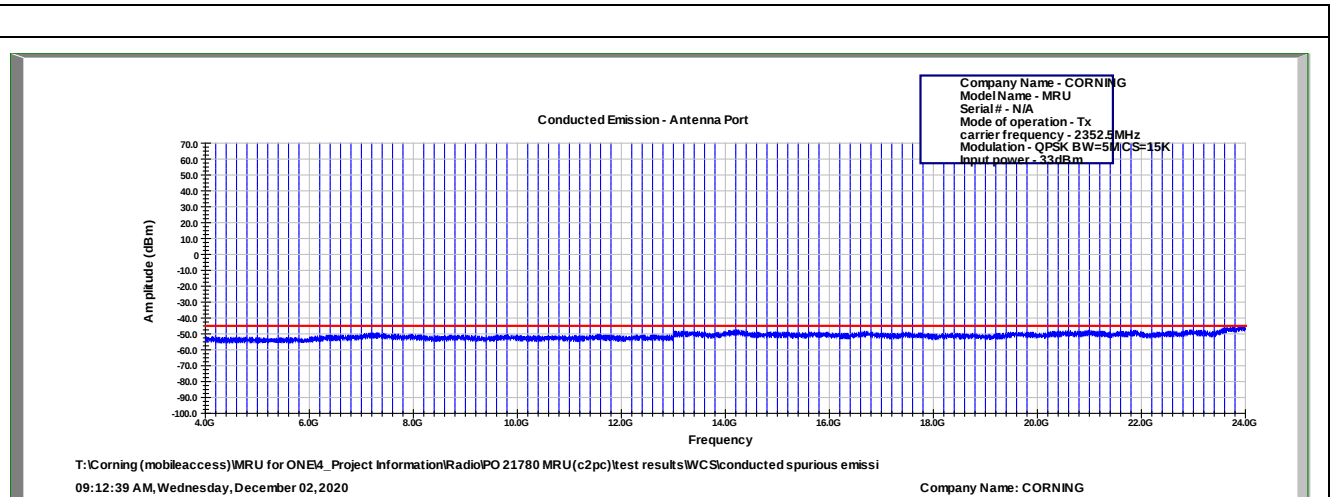
**Figure 207: Spurious Emissions at Antenna Terminal 4GHz-24GHz - 256QAM 10MHz B.W.; Mid, 15kHz**



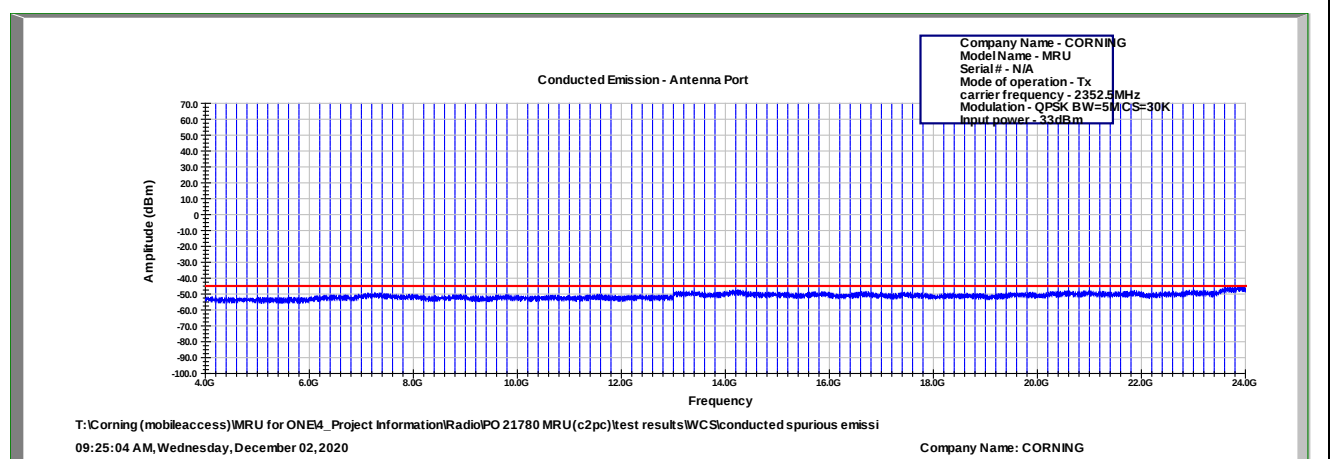
**Figure 208: Spurious Emissions at Antenna Terminal 4GHz-24GHz - 256QAM 10MHz B.W.; Mid, 30kHz**



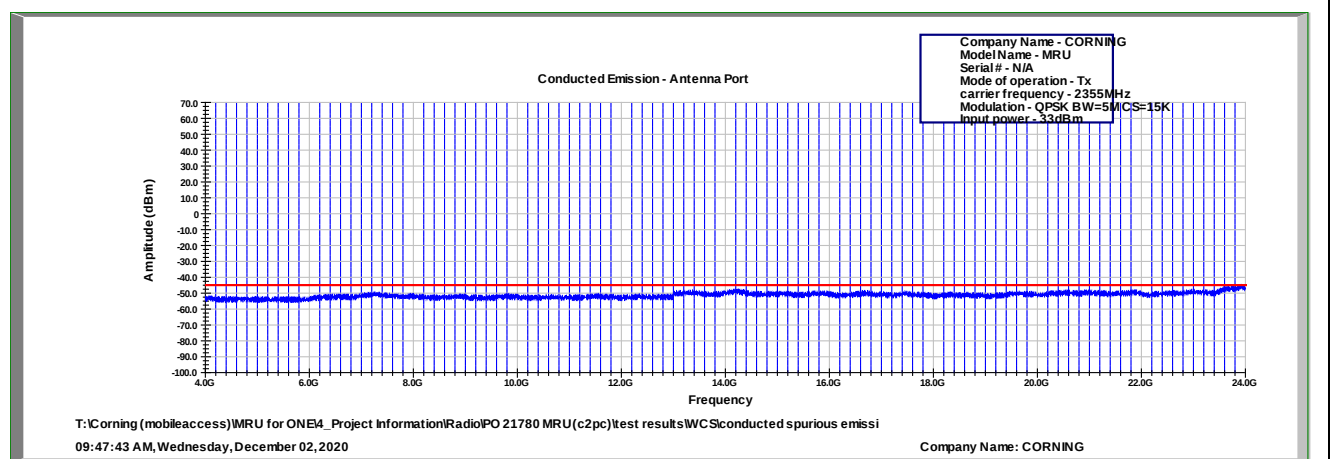
**Figure 209: Spurious Emissions at Antenna Terminal 4GHz-24GHz - 256QAM 10MHz B.W.; Mid, 60kHz**



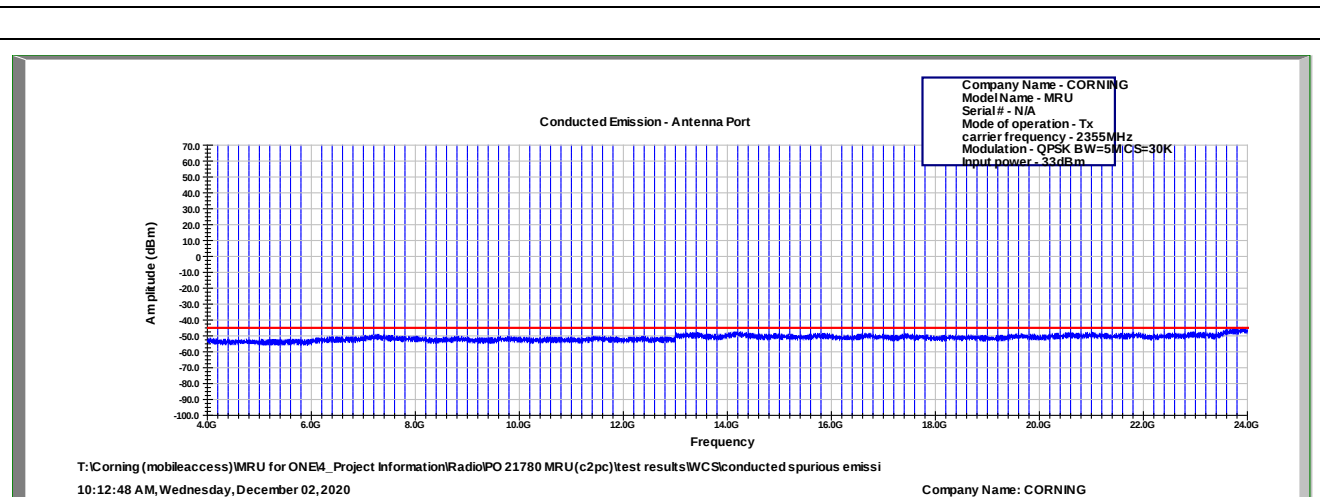
**Figure 210: Spurious Emissions at Antenna Terminal 4GHz-24GHz - QPSK 5MHz B.W.; Low, 15kHz**



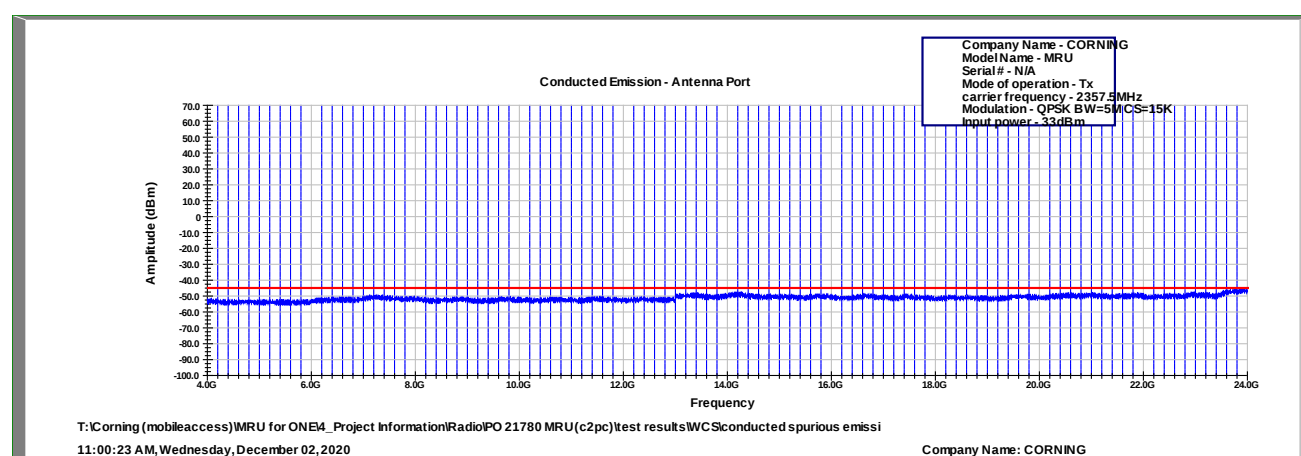
**Figure 211: Spurious Emissions at Antenna Terminal 4GHz-24GHz - QPSK 5MHz B.W.; Low, 30kHz**



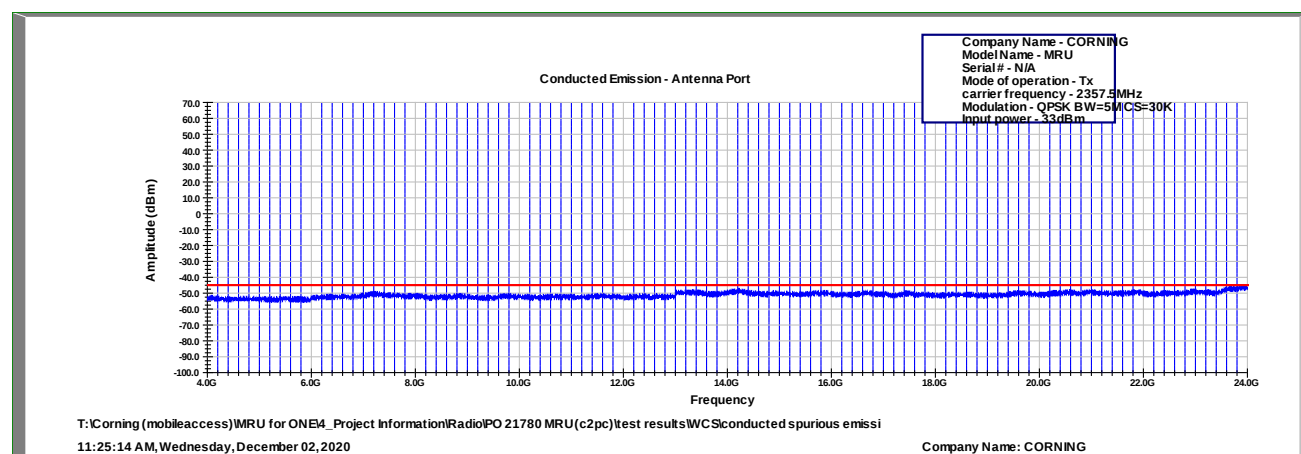
**Figure 212: Spurious Emissions at Antenna Terminal 4GHz-24GHz - QPSK 5MHz B.W.; Mid, 15kHz**



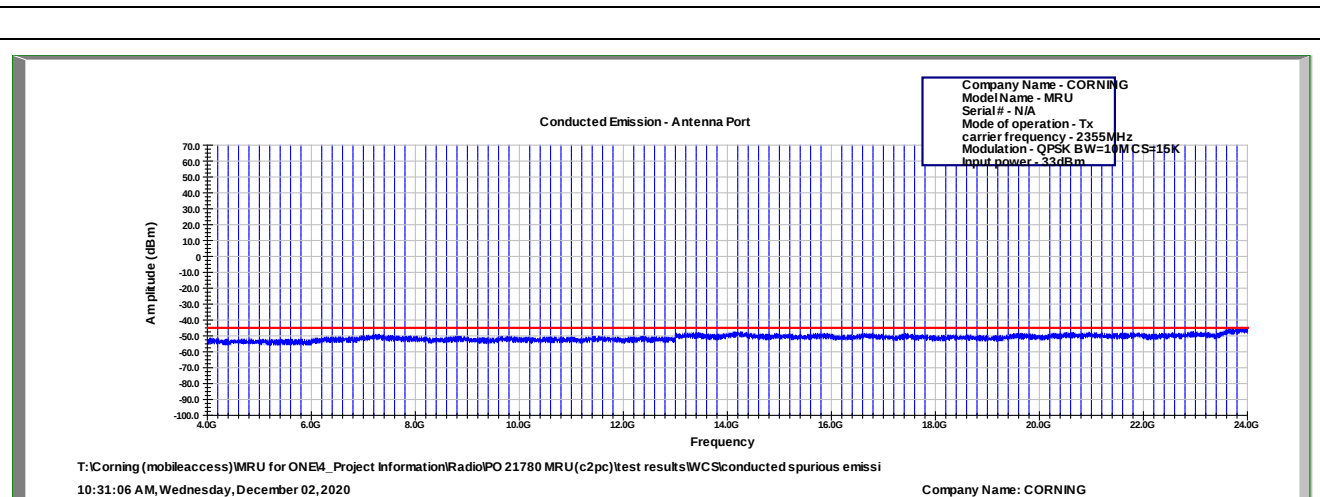
**Figure 213: Spurious Emissions at Antenna Terminal 4GHz-24GHz - QPSK 5MHz B.W.; Mid, 30kHz**



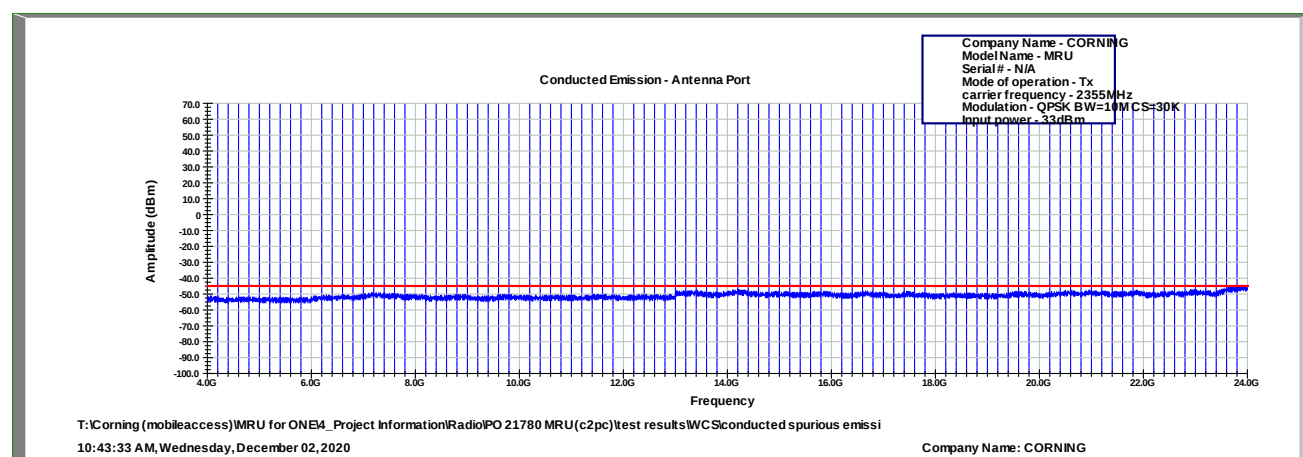
**Figure 214: Spurious Emissions at Antenna Terminal 4GHz-24GHz - QPSK 5MHz B.W.; High, 15kHz**



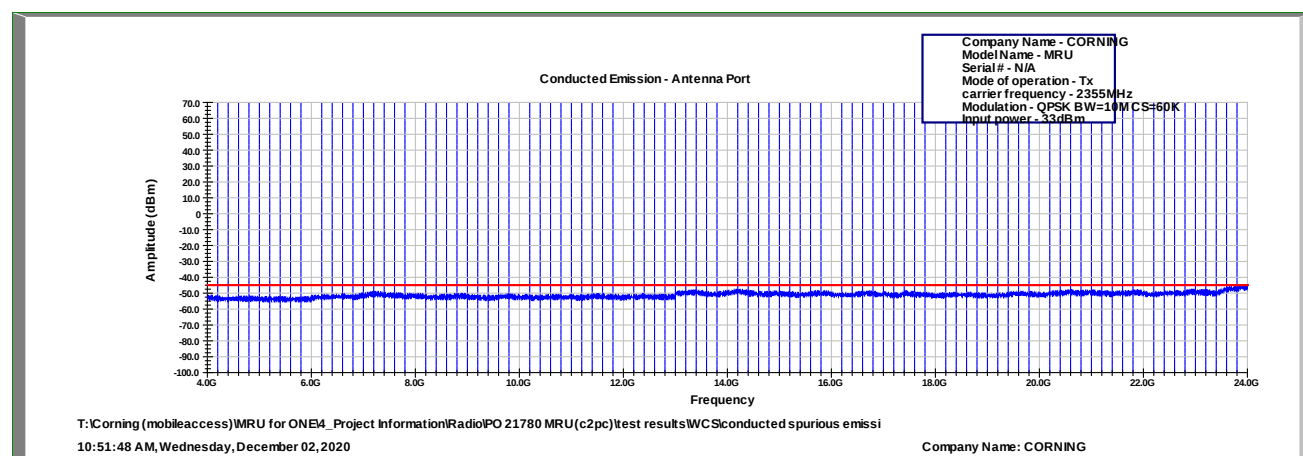
**Figure 215: Spurious Emissions at Antenna Terminal 4GHz-24GHz - QPSK 5MHz B.W.; High, 30kHz**



**Figure 216: Spurious Emissions at Antenna Terminal 4GHz-24GHz - QPSK 10MHz B.W.; Mid, 15kHz**



**Figure 217: Spurious Emissions at Antenna Terminal 4GHz-24GHz - QPSK 10MHz B.W.; Mid, 30kHz**



**Figure 218: Spurious Emissions at Antenna Terminal 4GHz-24GHz - QPSK 10MHz B.W.; Mid, 60kHz**



**6.5 Test Equipment Used; Spurious Emissions at Antenna Terminals**

| Instrument              | Manufacturer         | Model       | Serial Number          | Calibration           |                      |
|-------------------------|----------------------|-------------|------------------------|-----------------------|----------------------|
|                         |                      |             |                        | Last Calibration Date | Next Calibration Due |
| EXA signal Analyzer     | Agilent Technologies | N9010A      | MY52220686             | November 28, 2018     | November 28, 2020    |
| Vector Signal Generator | R&S                  | SMBV100B    | 1423.1003K02-101470-XE | October 2, 2019       | October 2, 2022      |
| 40 dB Attenuator        | Weinschel            | WA 39-40-33 | A1323                  | July 7, 2020          | July 31, 2021        |
| RF Cable                | Huber Suner          | Sucofelex   | 27504/4PEA             | August 23, 2020       | August 31, 2021      |

**Table 15 Test Equipment Used**

## 7 Spurious Radiated Emission

### 7.1 Test Specification

FCC, Part 27, Subpart C, Section 27.53 (a)(1)

### 7.2 Test Procedure

(Temperature (23°C)/ Humidity (47%RH))

The test method was based on ANSI/TIA-603-D: 2010, Section 2.2.12 Unwanted Emissions: Radiated Spurious.

#### **For measurements between 0.009MHz-30MHz:**

The E.U.T was tested inside the shielded room at a distance of 3 meters and the E.U.T was placed on a non-metallic table, 1.5 meters above the ground. The frequency range 0.009MHz-30MHz was scanned. The readings were maximized by the turntable azimuth between 0-360°, and the antenna polarization.

The emissions were measured at a distance of 3 meters.

#### **For measurements between 30.0MHz-1.0GHz:**

A preliminary measurement to characterize the E.U.T was performed inside the shielded room at a distance of 3 meters, using peak detection mode and broadband antennas. The preliminary measurements produced a list of the highest emissions. The E.U.T was then transferred to the open site, and placed on a remote-controlled turntable. The E.U.T was placed on a non-metallic table, 0.8 meters above the ground. The frequency range 30.0MHz -1.0GHz was scanned and the list of the highest emissions was verified and updated accordingly.

The readings were maximized by adjusting the antenna height between 1-4 meters, the turntable azimuth between 0-360°, and the antenna polarization.

The emissions were measured at a distance of 3 meters.

#### **For measurements between 1.0GHz-24.0GHz:**

The E.U.T was tested inside the shielded room at a distance of 3 meters and the E.U.T was placed on a non-metallic table, 1.5 meters above the ground. The frequency range 1.0GHz -24.0GHz was scanned. The readings were maximized by the turntable azimuth between 0-360°, and the antenna polarization.

The emissions were measured at a distance of 3 meters.

The E.U.T. was replaced by a substitution antenna (dipole 30MHz-1GHz, Horn Antenna above 1GHz) driven by a signal generator.

The height was readjusted for maximum reading. The signal generator level was adjusted to obtain the same reading on the EMI receiver as in step (a).

The signals observed in step (a) were converted to radiated power using:

$$P_d(\text{dBm}) = P_g(\text{dBm}) - \text{Cable Loss (dB)} + \text{Substitution Antenna Gain (dBd)}$$

$P_d$  = Dipole equivalent power (result).

$P_g$  = Signal generator output level.

A Peak detector was used for this test.

Testing was performed when the RF port was connected to 50  $\Omega$  termination.

Evaluation was performed for all possible modulations, bandwidths, and sub carriers.

### 7.3 Test Limit

The power of any emission outside of the authorized operating frequency ranges(2350.0-2360.0MHz) must be attenuated below the transmitting power (P) by a factor of at least  $43 + \log(P)$  dB, yielding -13dBm.

| Frequency Band (MHz)                      | Calculated Factor (dBc)        | Absolute Limit (dBm) |
|-------------------------------------------|--------------------------------|----------------------|
| $f < 2285.0$                              | $75 + 10 \cdot \log(2) = 78.0$ | -45                  |
| $2285.0\text{MHz} < f < 2287.5\text{MHz}$ | $72 + 10 \cdot \log(2) = 75.0$ | -42                  |
| $2287.5\text{MHz} < f < 2300.0\text{MHz}$ | $70 + 10 \cdot \log(2) = 73.0$ | -40                  |
| $2300.0\text{MHz} < f < 2305.0\text{MHz}$ | $43 + 10 \cdot \log(2) = 46.0$ | -13                  |
| $2305.0\text{MHz} < f < 2320.0\text{MHz}$ | $43 + 10 \cdot \log(2) = 46.0$ | -13                  |
| $2320.0\text{MHz} < f < 2345.0\text{MHz}$ | $75 + 10 \cdot \log(2) = 78.0$ | -45                  |
| $2345.0\text{MHz} < f < 2360.0\text{MHz}$ | $43 + 10 \cdot \log(2) = 46.0$ | -13                  |
| $2360.0\text{MHz} < f < 2362.5\text{MHz}$ | $43 + 10 \cdot \log(2) = 46.0$ | -13                  |
| $2362.5\text{MHz} < f < 2365.0\text{MHz}$ | $55 + 10 \cdot \log(2) = 58.0$ | -25                  |
| $2365.0\text{MHz} < f < 2367.5\text{MHz}$ | $70 + 10 \cdot \log(2) = 60.0$ | -40                  |
| $2367.5\text{MHz} < f < 2370.0\text{MHz}$ | $72 + 10 \cdot \log(2) = 62.0$ | -42                  |
| $2370.0 < f$                              | $75 + 10 \cdot \log(2) = 65.0$ | -45                  |

Figure 219 Mask Limit Table

### 7.4 Test Results

JUDGEMENT: Passed

No emissions were detected above the EMI receiver noise level which is at least 6 dB margin below the lowest limit(-45dBm) and 20dB margin below the highest limit(-13dBm)



## 7.5 Test Instrumentation Used; Radiated Measurements

| Instrument                  | Manufacturer    | Model            | Serial Number  | Calibration           |                      |
|-----------------------------|-----------------|------------------|----------------|-----------------------|----------------------|
|                             |                 |                  |                | Last Calibration Date | Next Calibration Due |
| EMI Receiver                | HP              | 8542E            | 3906A00276     | March 03, 2020        | March 03, 2021       |
| RF Filter Section           | HP              | 85420E           | 3705A00248     | March 03, 2020        | March 03, 2021       |
| Spectrum Analyzer           | HP              | 8593EM           | 3536A00120ADI  | March 10, 2020        | March 10, 2021       |
| Active Loop Antenna         | EMCO            | 6502             | 9506-2950      | February 5, 2019      | February 28, 2021    |
| Antenna Biconical           | EMCO            | 3110B            | 9912-3337      | May 21, 2019          | May 31, 2021         |
| Antenna Log Periodic        | EMCO            | 3146             | 9505-4081      | May 31, 2018          | May 31, 2021         |
| Horn Antenna 1G-18G         | ETS             | 3115             | 29845          | May 31, 2018          | May 31, 2021         |
| Horn Antenna 18G-26.5G      | ARA             | SWH-28           | 1007           | December 13, 2017     | December 31, 2020    |
| Low Noise Amplifier         | Narda           | LNA-DBS-0411N313 | 013            | December 24, 2019     | December 31, 2020    |
| Low Noise Amplifier         | Sophia Wireless | LNA 28-B         | 232            | December 24, 2019     | December 31, 2020    |
| Vector Signal Generator     | VIAVI           | MTS 5800         | WMNK0071690263 | July 1, 2018          | July 1, 2021         |
| Semi Anechoic Civil Chamber | ETS             | S81              | SL 11643       | NCR                   | NCR                  |
| Antenna Mast                | ETS             | 2070-2           | -              | NCR                   | NCR                  |
| Turntable                   | ETS             | 2087             | -              | NCR                   | NCR                  |
| Mast & Table Controller     | ETS/EMCO        | 2090             | 9608-1456      | NCR                   | NCR                  |

Table 16 Test Equipment Used

## 8 APPENDIX A - CORRECTION FACTORS

### 8.1 Correction factors for RF OATS Cable 35m

**ITL #1784**

| Frequency ( MHz) | Cable loss (dB) |
|------------------|-----------------|
| 10.0             | 0.3             |
| 20.0             | 0.2             |
| 50.0             | -0.1            |
| 100.0            | -0.6            |
| 200.0            | -1.2            |
| 500.0            | -2.3            |
| 1000.0           | -3.6            |



**8.2 Correction factors for RF OATS Cable 10m**  
**ITL #1794**

| Frequency(MHz) | Cable loss(dB) |
|----------------|----------------|
| 10.0           | -0.3           |
| 20.0           | -0.3           |
| 50.0           | -0.5           |
| 100.0          | -0.7           |
| 200.0          | -1.1           |
| 500.0          | -1.8           |
| 1000.0         | -2.7           |

### 8.3 Correction factors for

### Horn Antenna

**Model: SWH-28  
at 1 meter range.**

| <b>FREQUENCY</b><br>(GHz) | <b>AFE</b><br>(dB /m) | <b>Gain</b><br>(dB1) |
|---------------------------|-----------------------|----------------------|
| 18.0                      | 40.3                  | 16.1                 |
| 19.0                      | 40.3                  | 16.3                 |
| 20.0                      | 40.3                  | 16.1                 |
| 21.0                      | 40.3                  | 16.3                 |
| 22.0                      | 40.4                  | 16.8                 |
| 23.0                      | 40.5                  | 16.4                 |
| 24.0                      | 40.5                  | 16.6                 |
| 25.0                      | 40.5                  | 16.7                 |
| 26.0                      | 40.6                  | 16.4                 |

#### 8.4 Correction factors for Horn Antenna

**Model: 3115**

**Antenna serial number: 29845**

**3 meter range**

| f(GHz) | AF(dB/m) | GA(dB) |
|--------|----------|--------|
| 0.75   | 25       | 3      |
| 1G     | 23.5     | 7      |
| 1.5G   | 26       | 8      |
| 2G     | 29       | 7      |
| 2.5G   | 27.5     | 10     |
| 3G     | 30       | 10     |
| 3.5G   | 31.5     | 10     |
| 4G     | 32.5     | 9.5    |
| 4.5G   | 32.5     | 10.5   |
| 5G     | 33       | 10.5   |
| 5.5G   | 35       | 10.5   |
| 6G     | 36.5     | 9.5    |
| 6.5G   | 36.5     | 10     |
| 7G     | 37.5     | 10     |
| 7.5G   | 37.5     | 10     |
| 8G     | 37.5     | 11     |
| 8.5G   | 38       | 11     |
| 9G     | 37.5     | 11.5   |
| 9.5G   | 38       | 11.5   |
| 10G    | 38.5     | 11.5   |
| 10.5G  | 38.5     | 12     |
| 11G    | 38.5     | 12.5   |
| 11.5G  | 38.5     | 13     |
| 12G    | 38       | 13.5   |
| 12.5G  | 38.5     | 13     |
| 13G    | 40       | 12     |
| 13.5G  | 41       | 12     |
| 14G    | 40       | 13     |
| 14.5G  | 39       | 14     |
| 15G    | 38       | 15.5   |
| 15.5G  | 37.5     | 16     |
| 16G    | 37.5     | 16     |
| 16.5G  | 39       | 15     |
| 17G    | 40       | 15     |
| 17.5G  | 42       | 13.5   |
| 18G    | 42.5     | 13     |



**8.5      Correction factors for    Log Periodic Antenna**  
**EMCO, Model 3146,**  
**Serial #9505-4081**

| Frequency [MHz] | AF<br>[dB/m] |
|-----------------|--------------|
| 200.0           | 11.47        |
| 250.0           | 12.06        |
| 300.0           | 14.77        |
| 400.0           | 15.77        |
| 500.0           | 18.01        |
| 600.0           | 18.84        |
| 700.0           | 20.93        |
| 800.0           | 21.27        |
| 900.0           | 22.44        |
| 1000.0          | 24.10        |



**8.6 Correction factors for Biconical Antenna**  
**EMCO, Model 3110B,**  
**Serial #9912-3337**

| Frequency [MHz] | AF [dB/m] |
|-----------------|-----------|
| 30.0            | 14.18     |
| 35.0            | 13.95     |
| 40.0            | 12.84     |
| 45.0            | 11.23     |
| 50.0            | 11.10     |
| 60.0            | 10.39     |
| 70.0            | 9.34      |
| 80.0            | 9.02      |
| 90.0            | 9.31      |
| 100.0           | 8.95      |
| 120.0           | 11.53     |
| 140.0           | 12.20     |
| 160.0           | 12.56     |
| 180.0           | 13.49     |
| 200.0           | 15.27     |



## 8.7 Correction factors for ACTIVE LOOP ANTENNA

Model 6502

S/N 9506-2950

| f(MHz) | MAF(dBs/m) | AF(dB/m) |
|--------|------------|----------|
| 0.01   | -33.1      | 18.4     |
| 0.02   | -37.2      | 14.3     |
| 0.03   | -38.2      | 13.3     |
| 0.05   | -39.8      | 11.7     |
| 0.1    | -40.1      | 11.4     |
| 0.2    | -40.3      | 11.2     |
| 0.3    | -40.3      | 11.2     |
| 0.5    | -40.3      | 11.2     |
| 0.7    | -40.3      | 11.2     |
| 1      | -40.1      | 11.4     |
| 2      | -40        | 11.5     |
| 3      | -40        | 11.5     |
| 4      | -40.1      | 11.4     |
| 5      | -40.2      | 11.3     |
| 6      | -40.4      | 11.1     |
| 7      | -40.4      | 11.1     |
| 8      | -40.4      | 11.1     |
| 9      | -40.5      | 11       |
| 10     | -40.5      | 11       |
| 20     | -41.5      | 10       |
| 30     | -43.5      | 8        |