

## 8.5 CONDUCTED BAND EDGE MEASUREMENT

### Limit

#### **FCC Part 90.691, FCC Part 90.543**

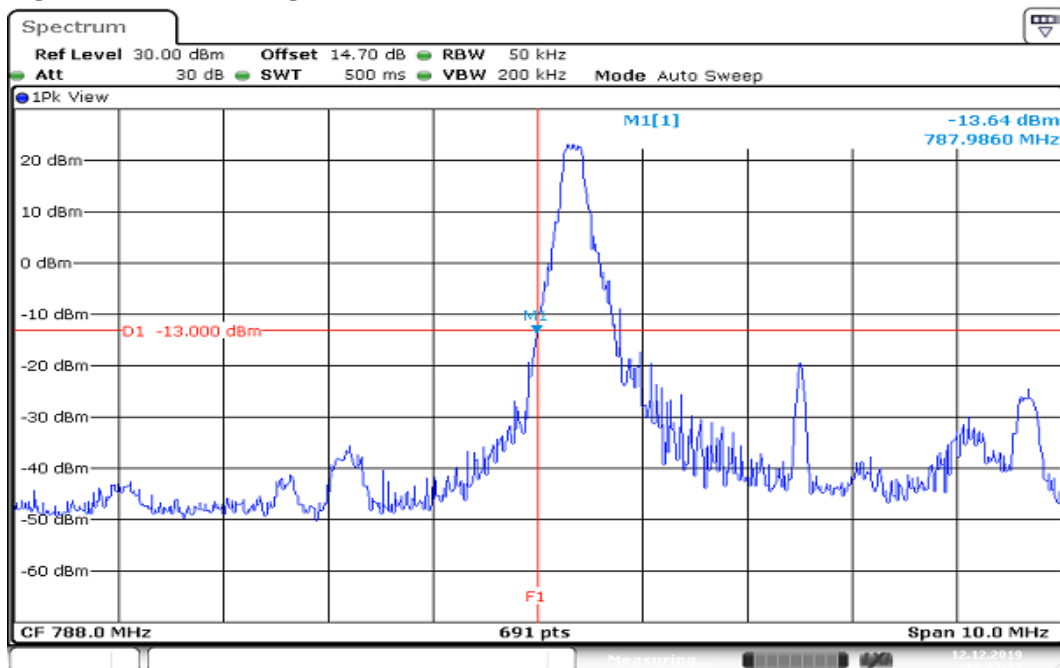
Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log(P)$  dB.

### Test Procedures

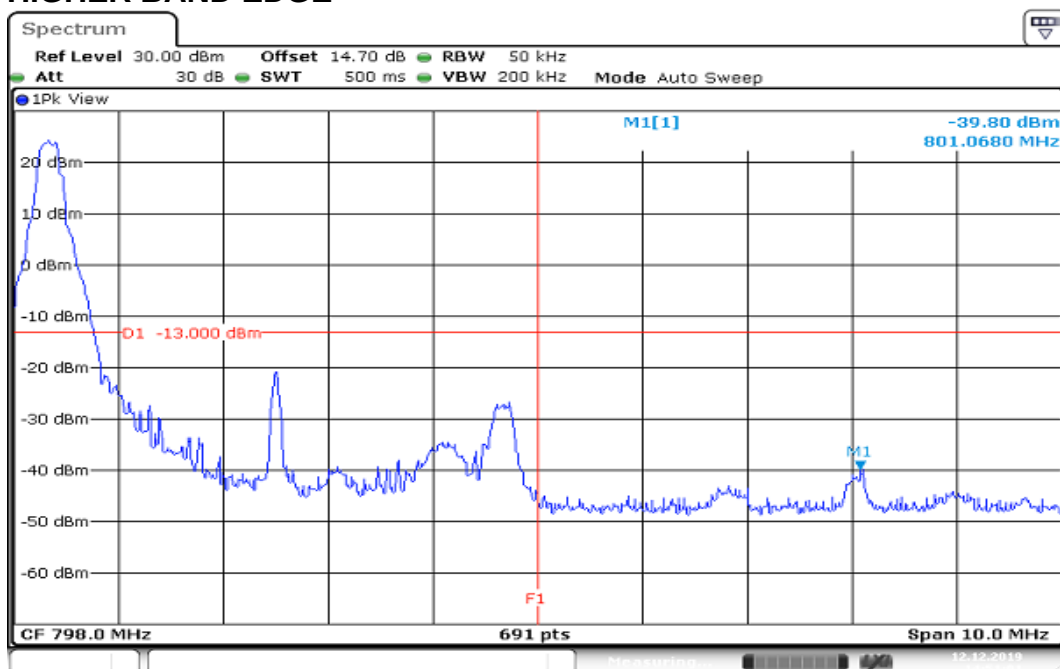
KDB 971168 D01,

1. RBW  $\geq$  1% of the emission bandwidth
2. VBW  $\geq$  3 x RBW
3. Span was set large enough so as to capture all out of emissions near the band edge.

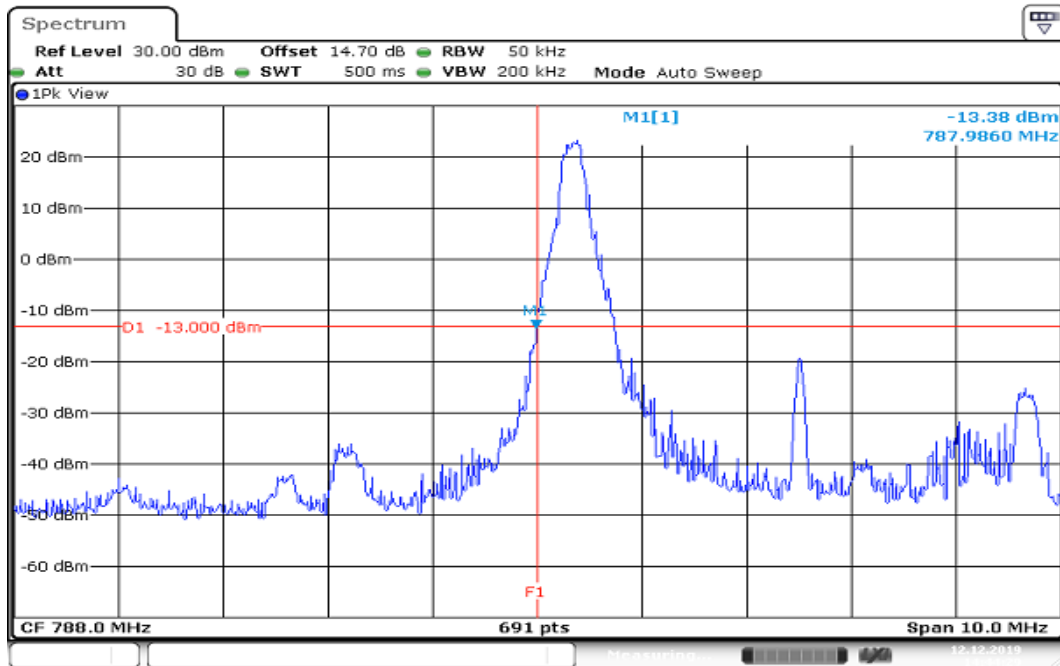
Report No.: T191105W01-RP14

**Test Results:****LTE Band 14****CHANNEL BANDWIDTH: 5MHz / QPSK / 1RB ALLOCATED****LOWER BAND EDGE**

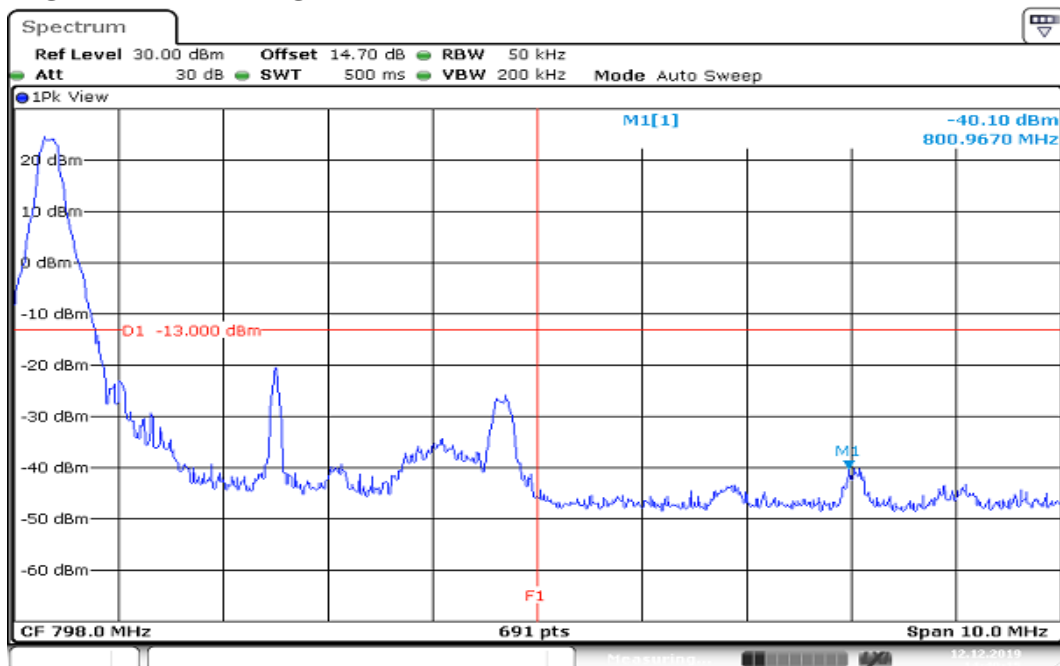
Date: 12.DEC.2019 14:43:13

**HIGHER BAND EDGE**

Date: 12.DEC.2019 14:51:01

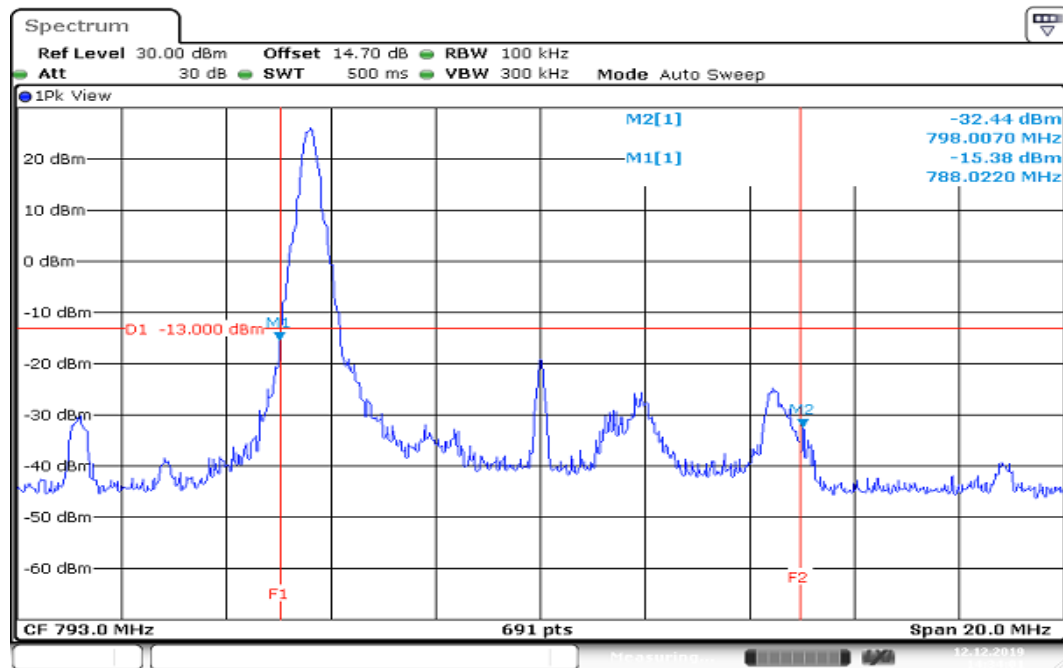
**CHANNEL BANDWIDTH: 5MHz / 16QAM / 1RB ALLOCATED  
LOWER BAND EDGE**

Date: 12.DEC.2019 14:44:30

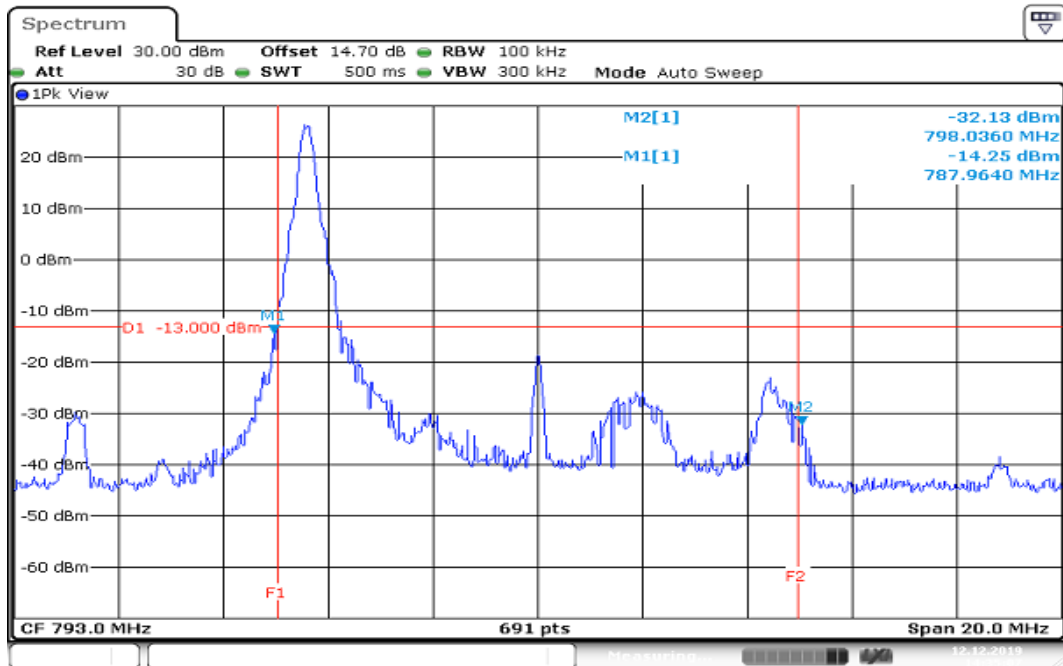
**HIGHER BAND EDGE**

Date: 12.DEC.2019 14:49:15

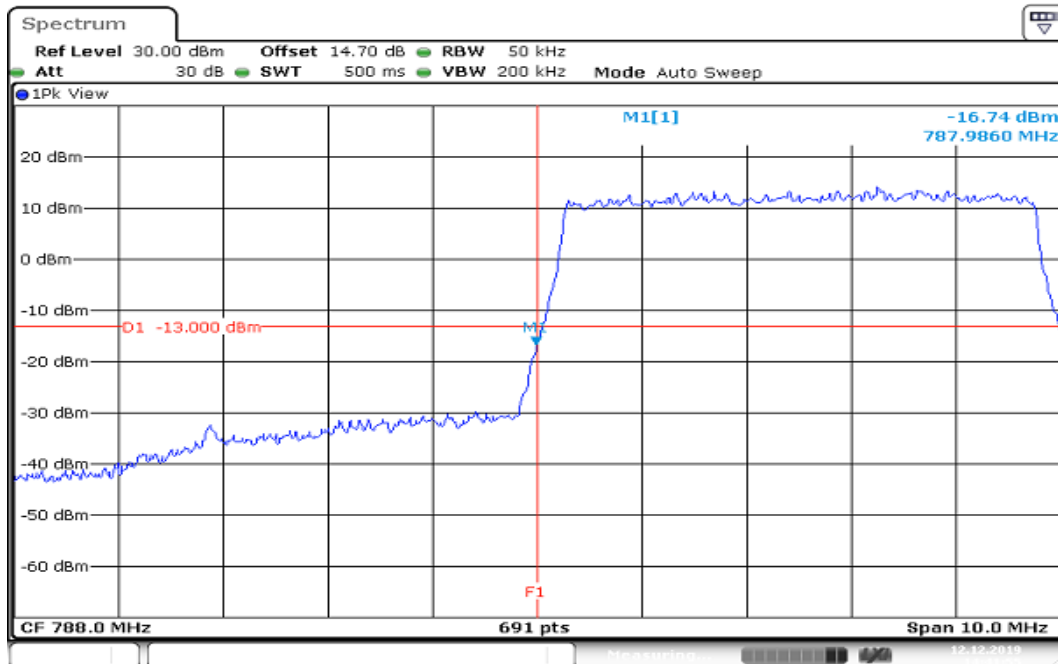
**CHANNEL BANDWIDTH: 10MHz / QPSK / 1RB ALLOCATED  
MIDDLE BAND EDGE**



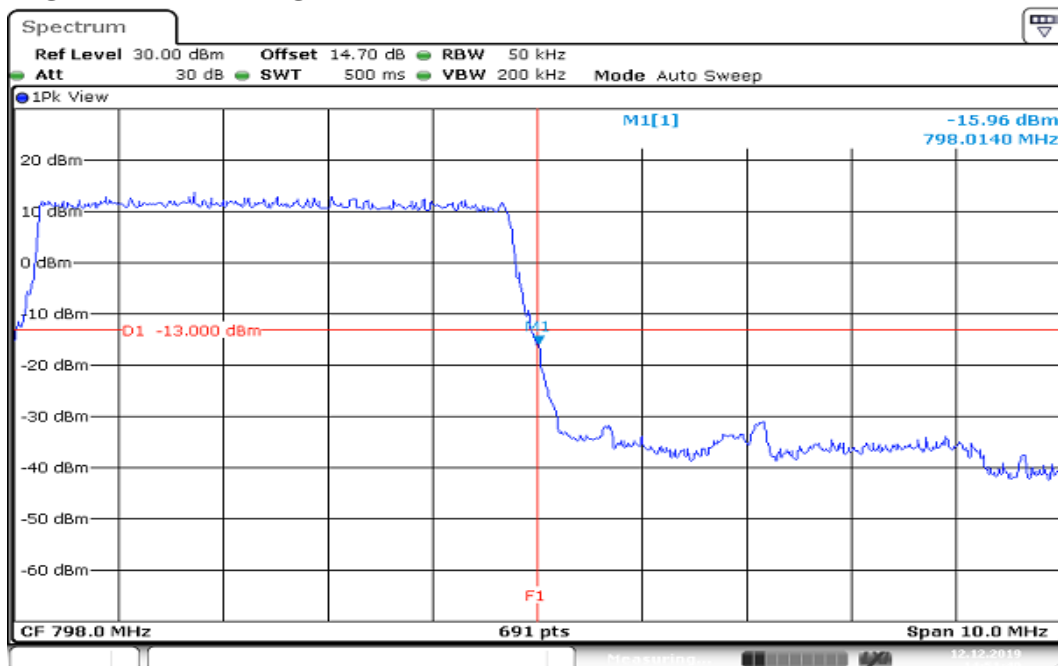
Date: 12.DEC.2019 14:34:02

**CHANNEL BANDWIDTH: 10MHz / 16QAM / 1RB ALLOCATED  
MIDDLE BAND EDGE**

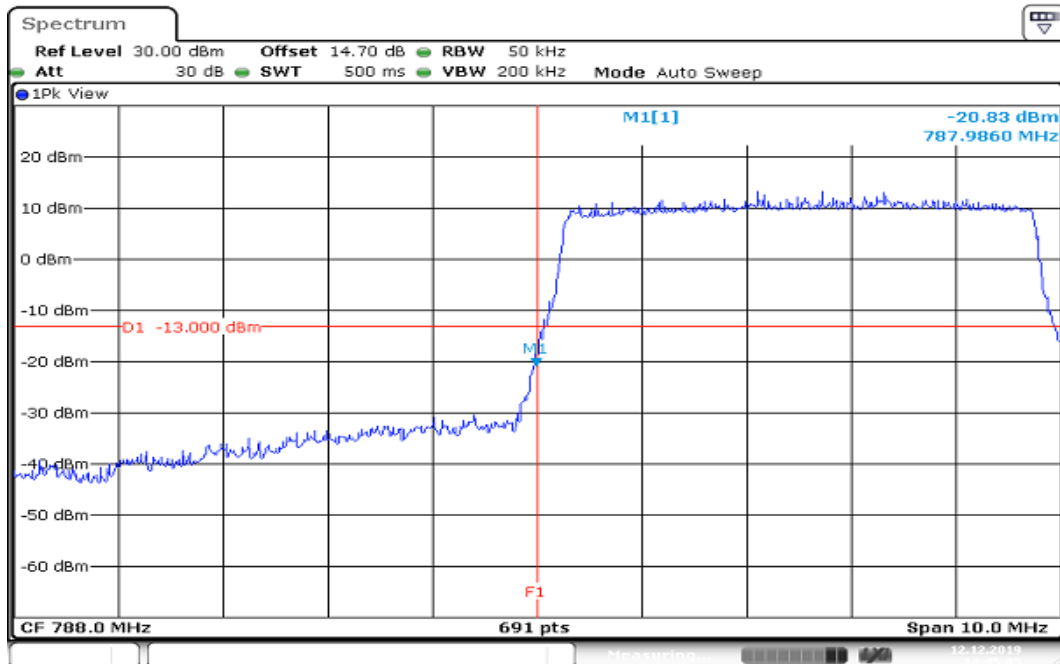
Date: 12-DEC-2019 14:35:07

**CHANNEL BANDWIDTH: 5MHz / QPSK / 100% RB ALLOCATED  
LOWER BAND EDGE**

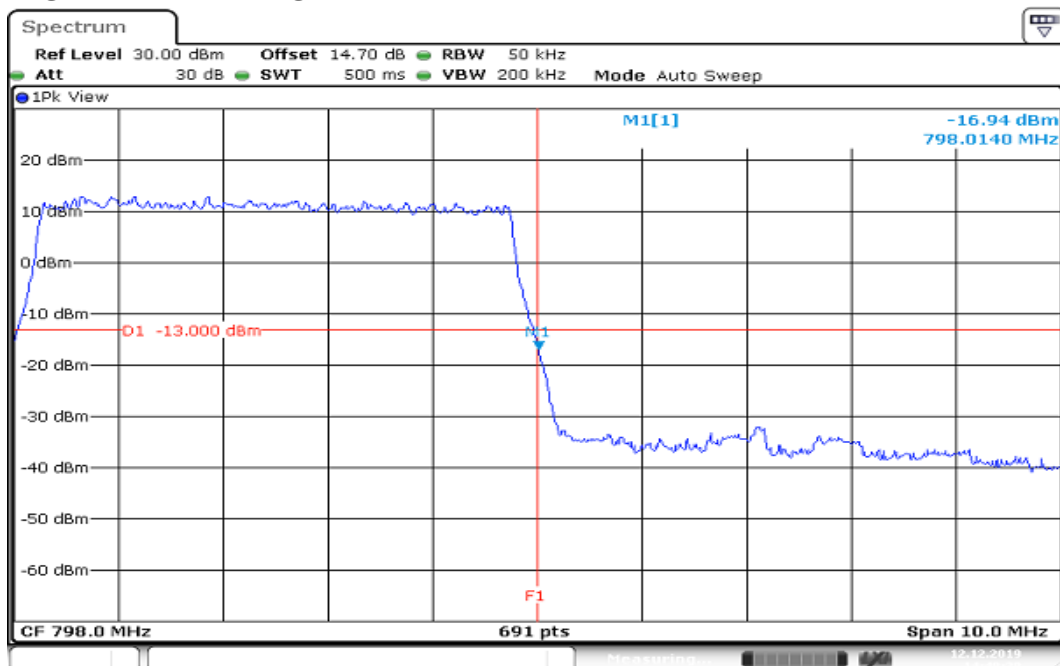
Date: 12.DEC.2019 14:41:55

**HIGHER BAND EDGE**

Date: 12.DEC.2019 14:51:40

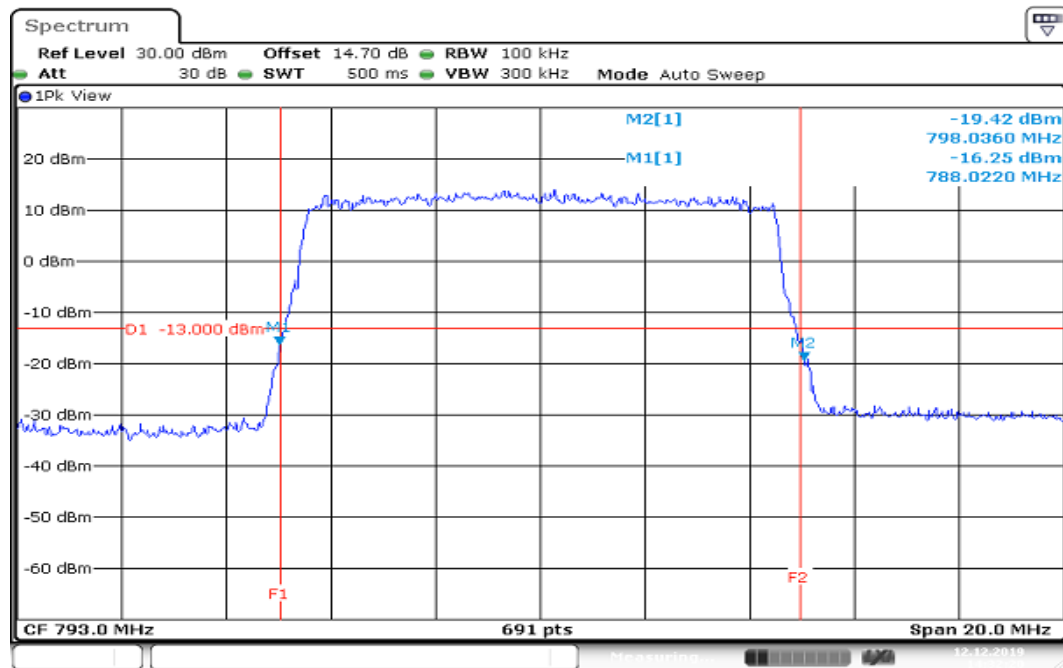
**CHANNEL BANDWIDTH: 5MHz / 16QAM / 100% RB ALLOCATED  
LOWER BAND EDGE**

Date: 12.DEC.2019 14:45:05

**HIGHER BAND EDGE**

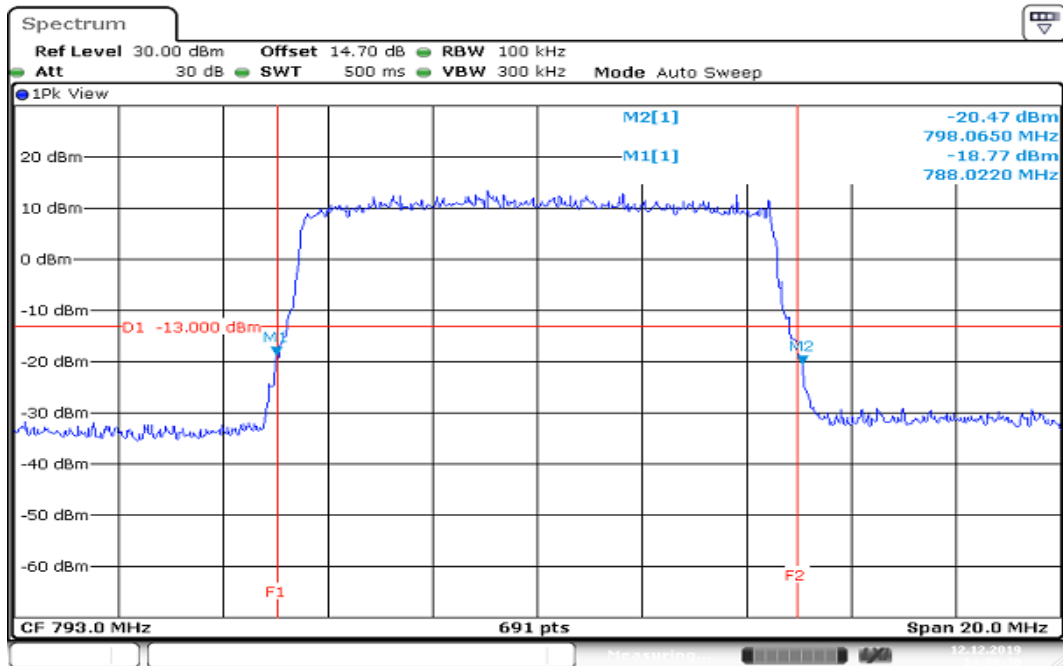
Date: 12.DEC.2019 14:48:38

**CHANNEL BANDWIDTH: 10MHz / QPSK / 100% RB ALLOCATED  
MIDDLE BAND EDGE**

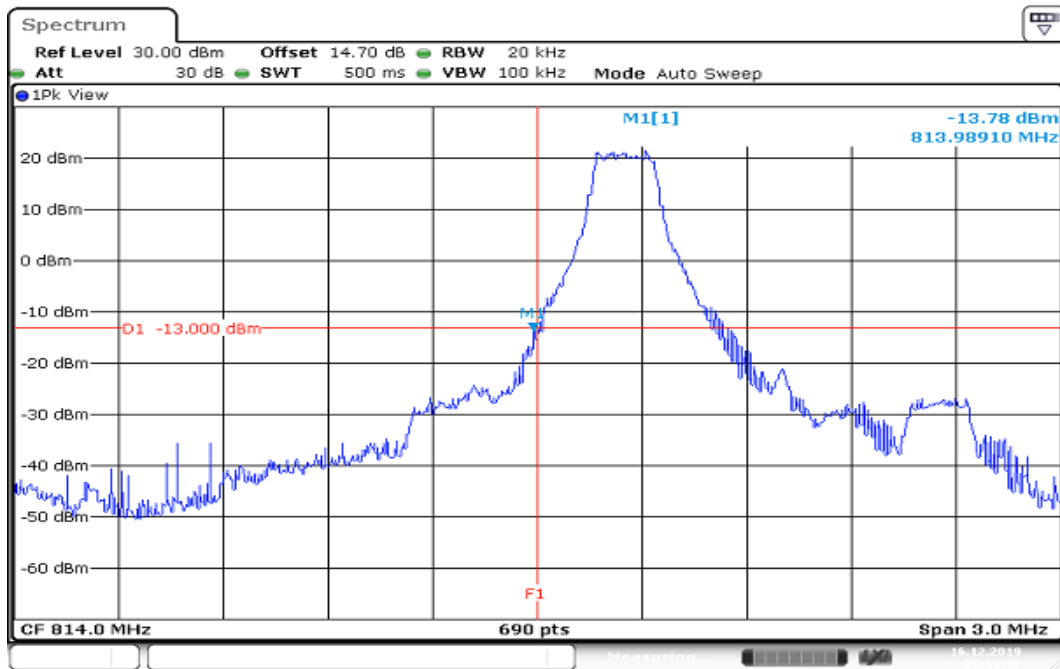


Date: 12.DEC.2019 14:32:21

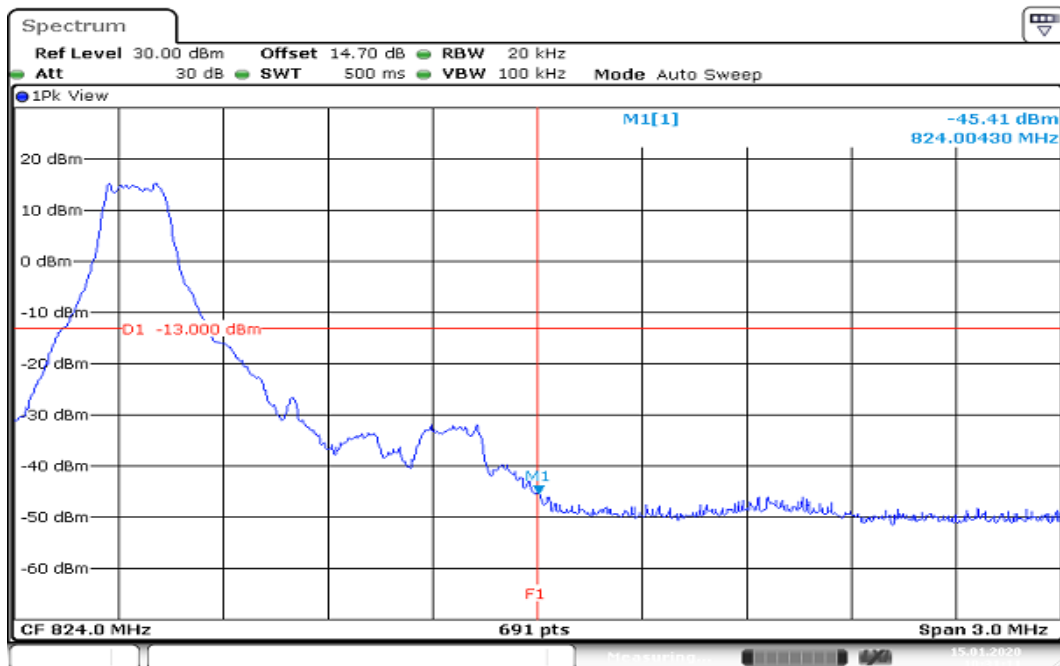


**CHANNEL BANDWIDTH: 10MHz / 16QAM / 100% RB ALLOCATED  
MIDDLE BAND EDGE**

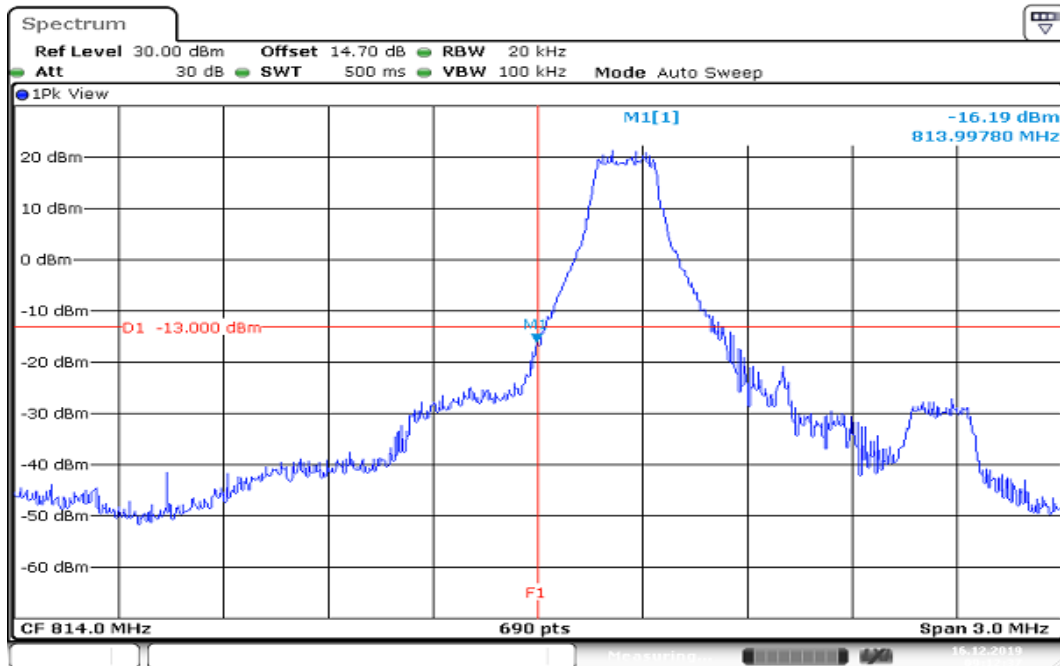
Date: 12.DEC.2019 14:38:30

**LTE Band 26****CHANNEL BANDWIDTH: 1.4MHz / QPSK / 1RB ALLOCATED****LOWER BAND EDGE**

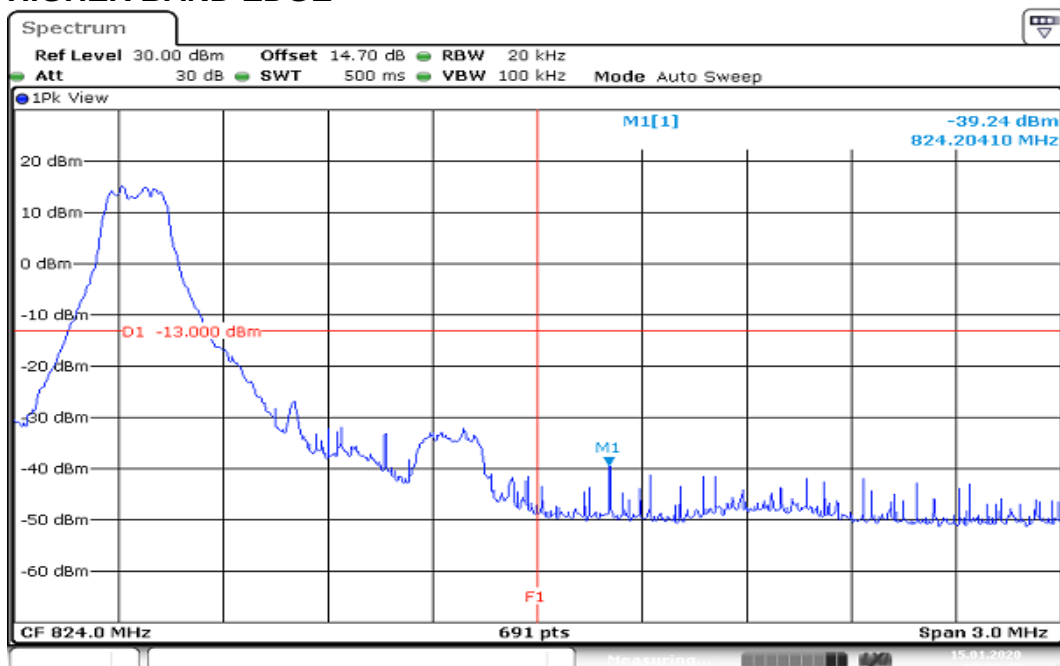
Date: 16.DEC.2019 09:11:57

**HIGHER BAND EDGE**

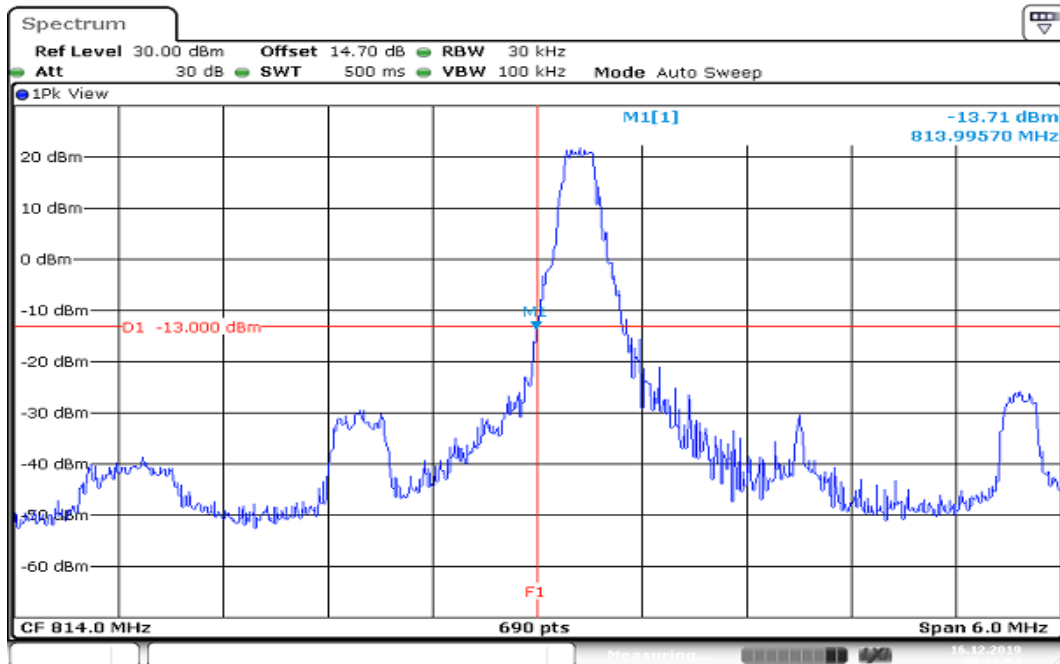
Date: 15.JAN.2020 10:31:11

**CHANNEL BANDWIDTH: 1.4MHz / 16QAM / 1RB ALLOCATED  
LOWER BAND EDGE**

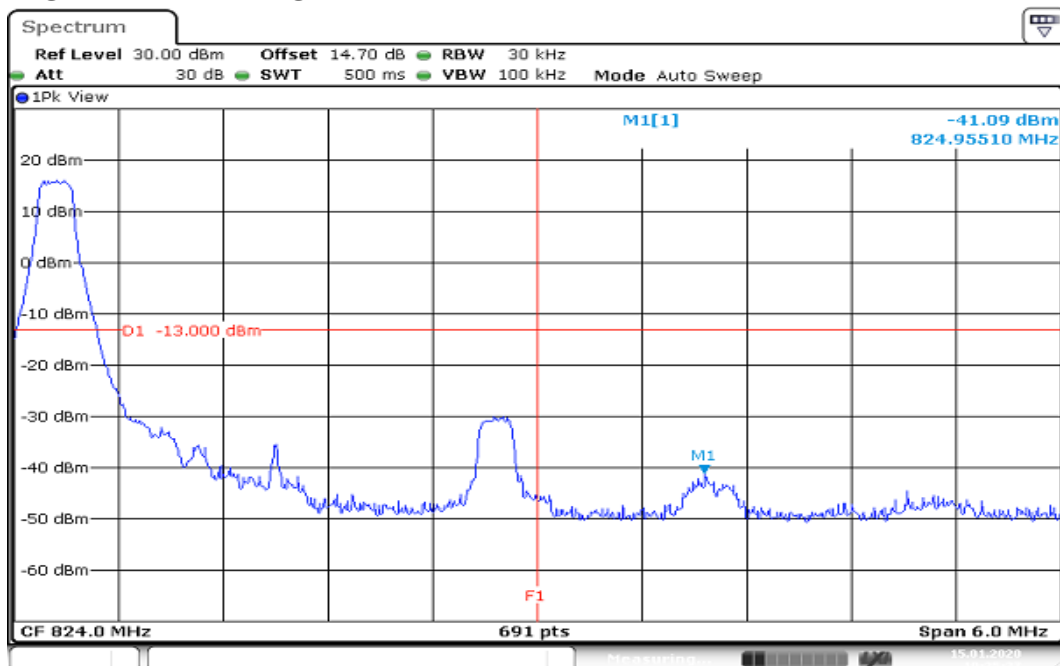
Date: 16.DEC.2019 09:12:38

**HIGHER BAND EDGE**

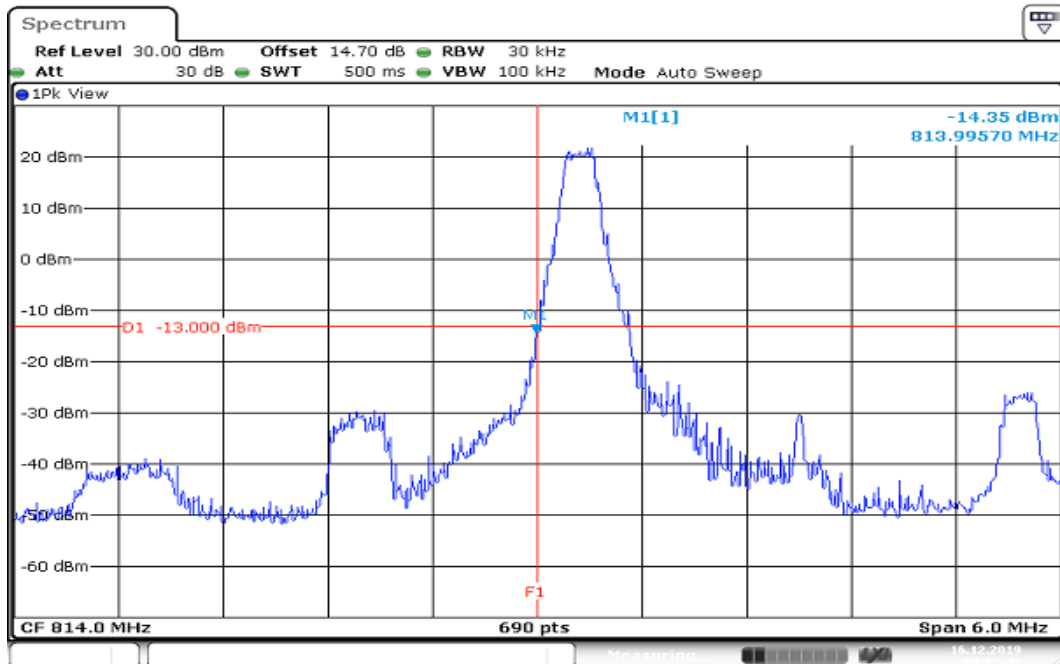
Date: 15.JAN.2020 10:33:43

**CHANNEL BANDWIDTH: 3MHz / QPSK / 1RB ALLOCATED  
LOWER BAND EDGE**

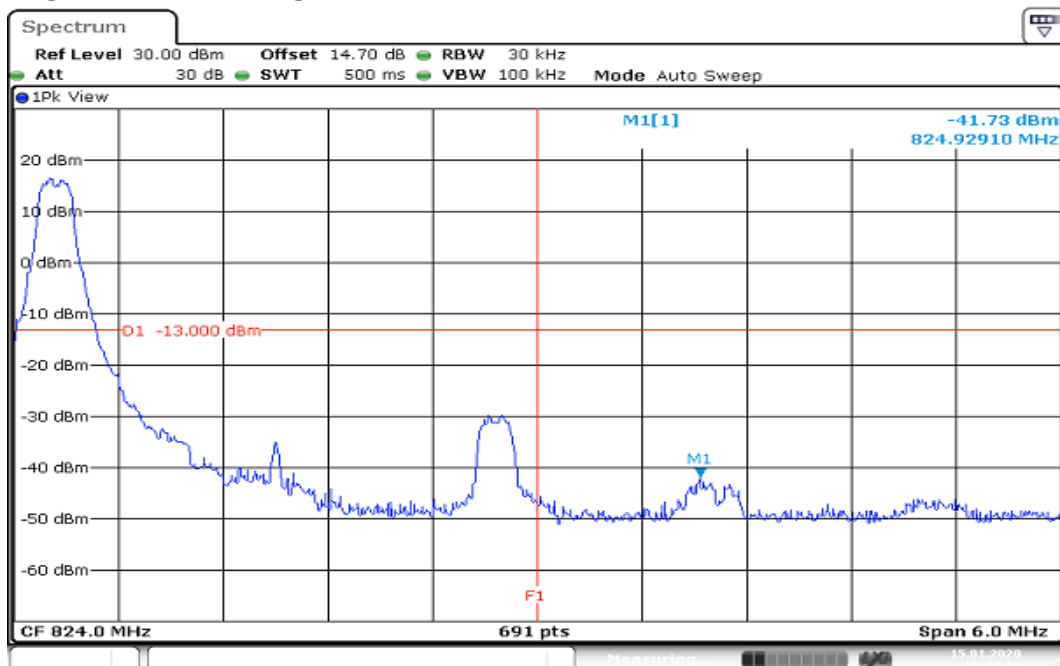
Date: 16.DEC.2019 09:21:54

**HIGHER BAND EDGE**

Date: 15.JAN.2020 10:25:37

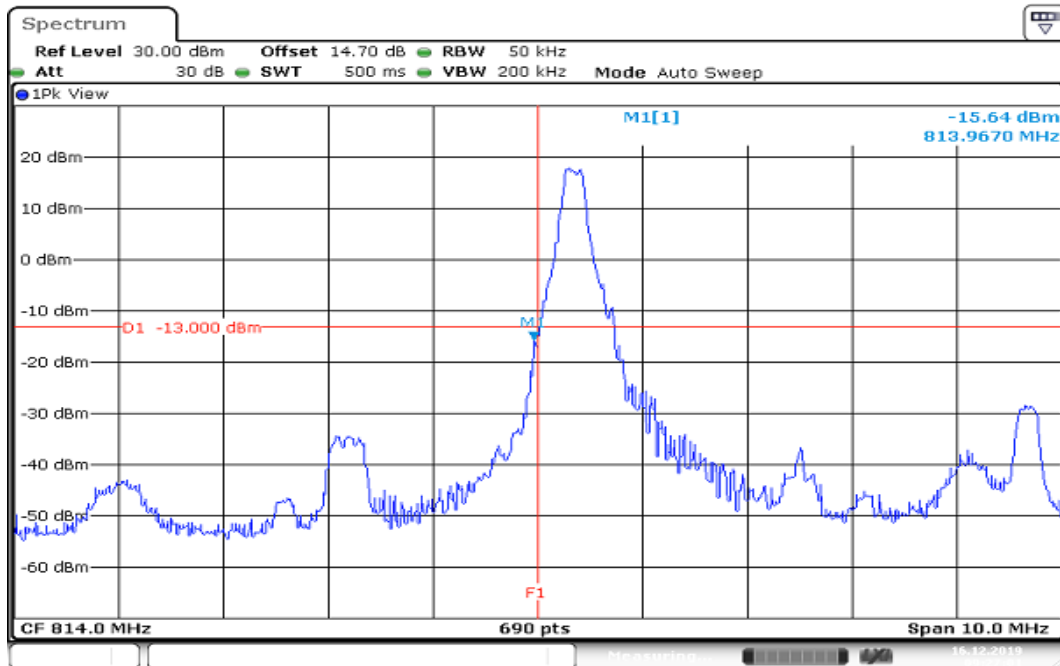
**CHANNEL BANDWIDTH: 3MHz / 16QAM / 1RB ALLOCATED  
LOWER BAND EDGE**

Date: 16.DEC.2019 09:22:42

**HIGHER BAND EDGE**

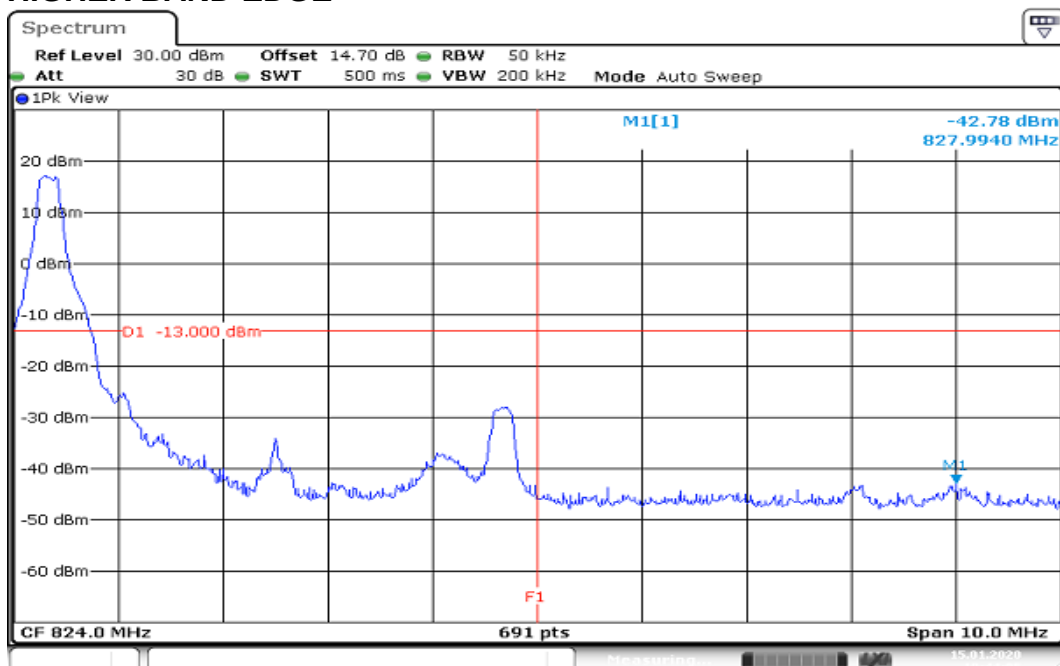
Date: 15.JAN.2020 10:24:20

## CHANNEL BANDWIDTH: 5MHz / QPSK / 1RB ALLOCATED LOWER BAND EDGE

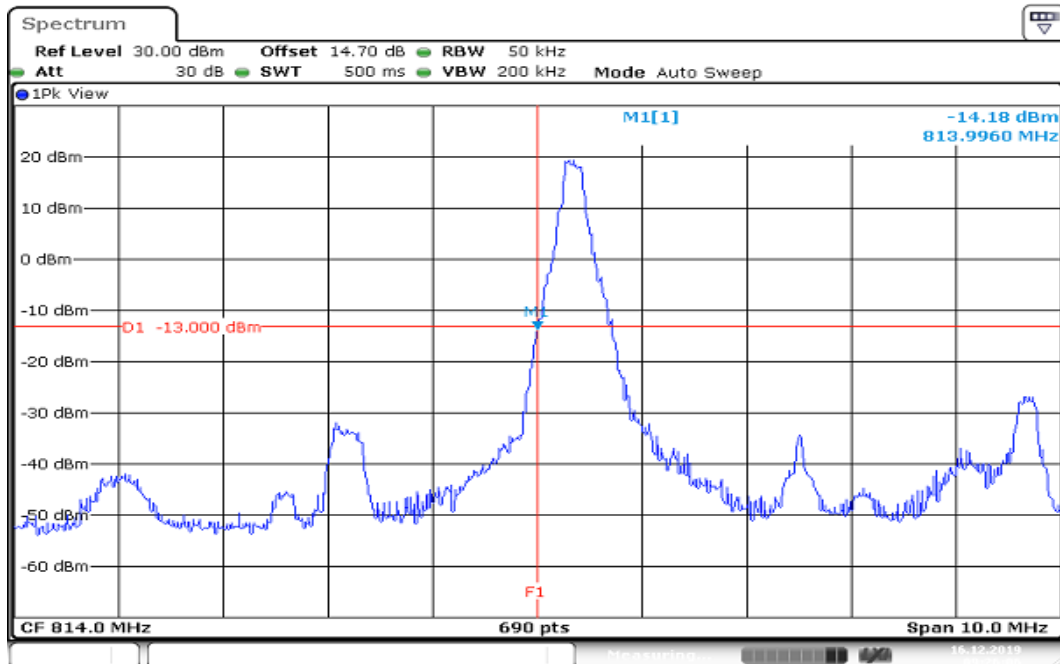


Date: 16.DEC.2019 09:27:01

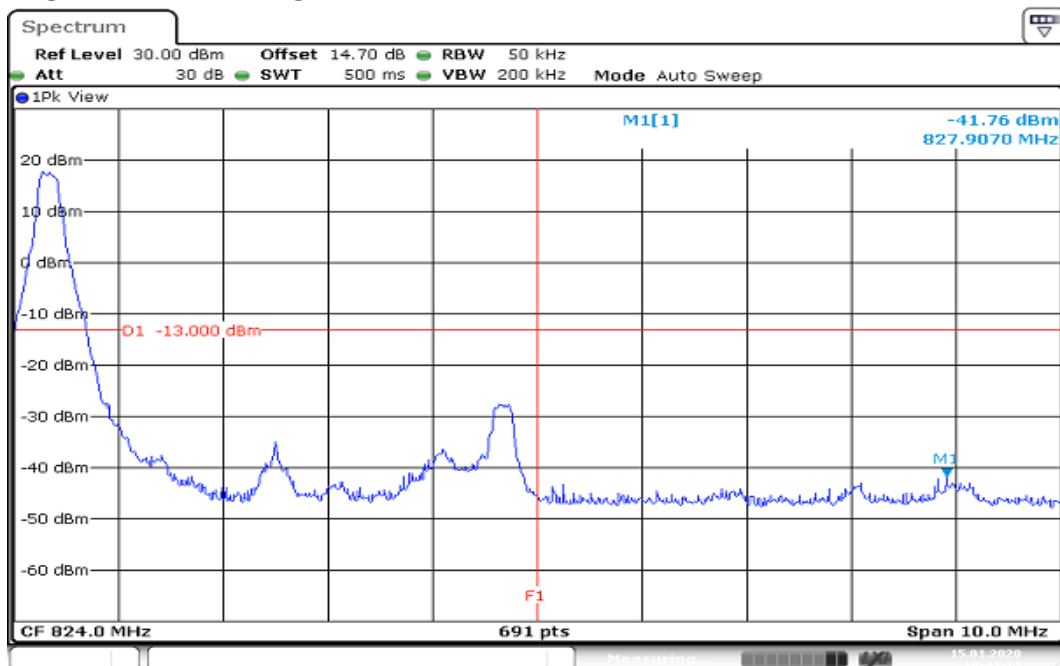
## HIGHER BAND EDGE



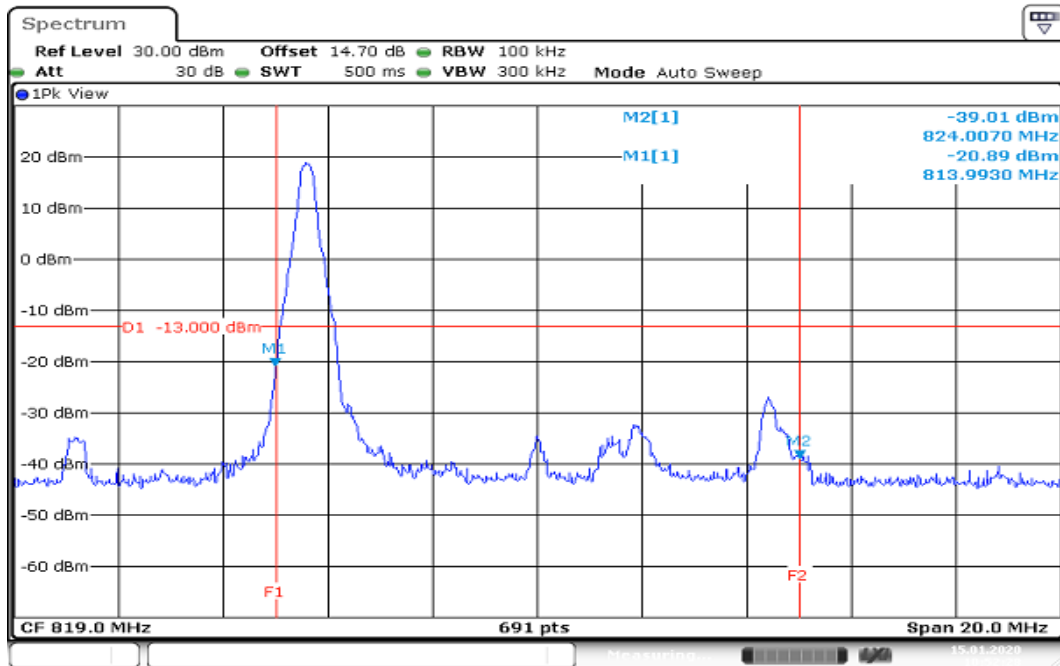
Date: 15.JAN.2020 10:44:05

**CHANNEL BANDWIDTH: 5MHz / 16QAM / 1RB ALLOCATED  
LOWER BAND EDGE**

Date: 16.DEC.2019 09:26:06

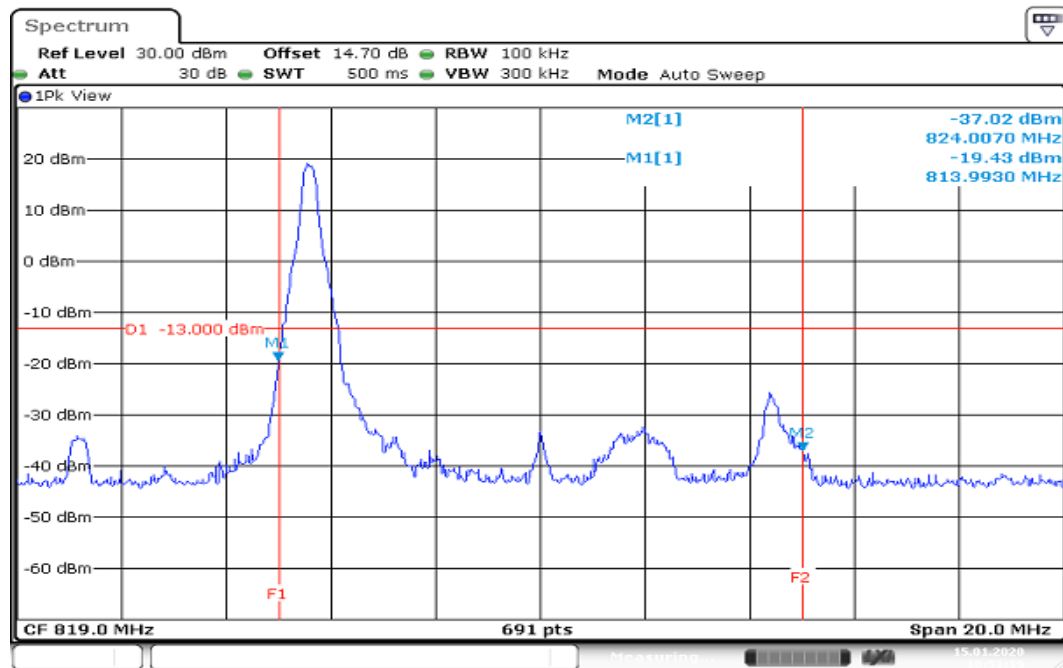
**HIGHER BAND EDGE**

Date: 15.JAN.2020 10:42:13

**CHANNEL BANDWIDTH: 10MHz / QPSK / 1RB ALLOCATED  
MIDDLE BAND EDGE**

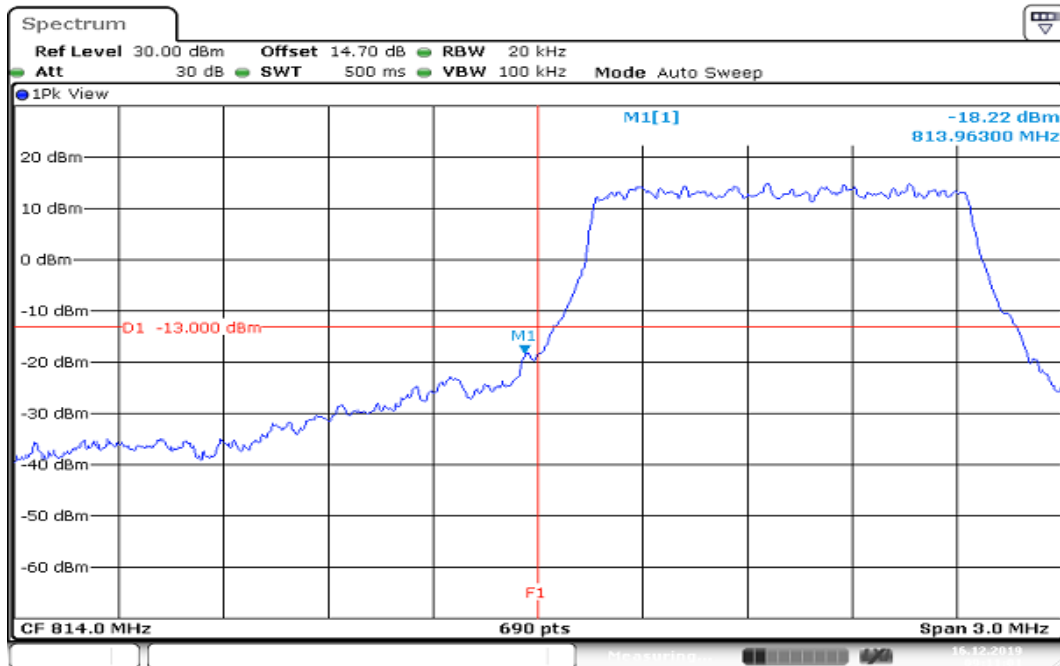
Date: 15.JAN.2020 10:52:28



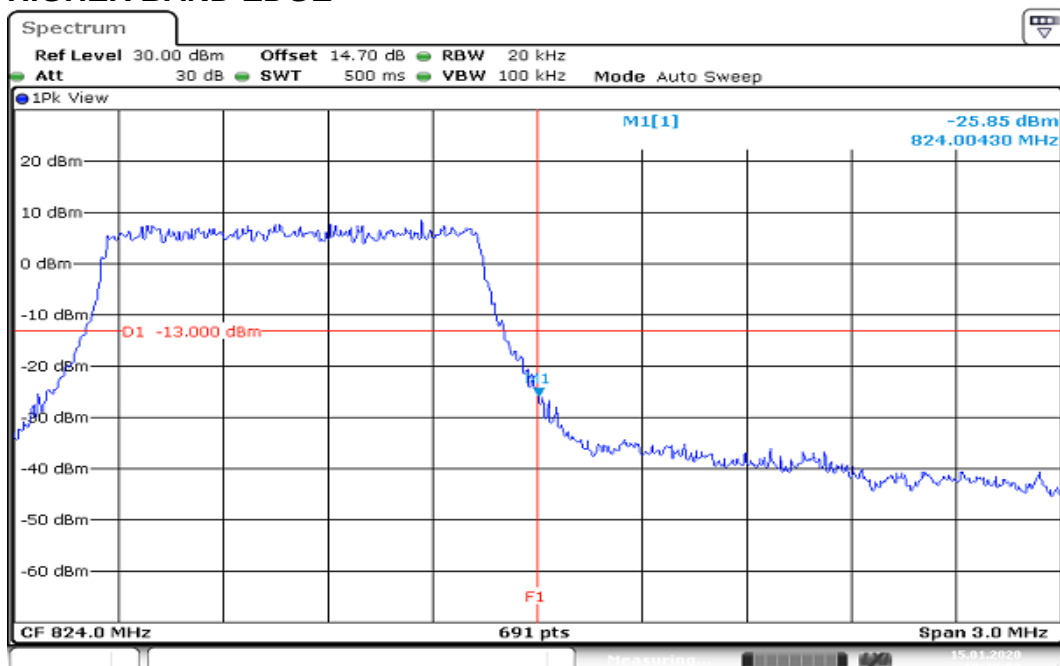
**CHANNEL BANDWIDTH: 10MHz / 16QAM / 1RB ALLOCATED  
MIDDLE BAND EDGE**

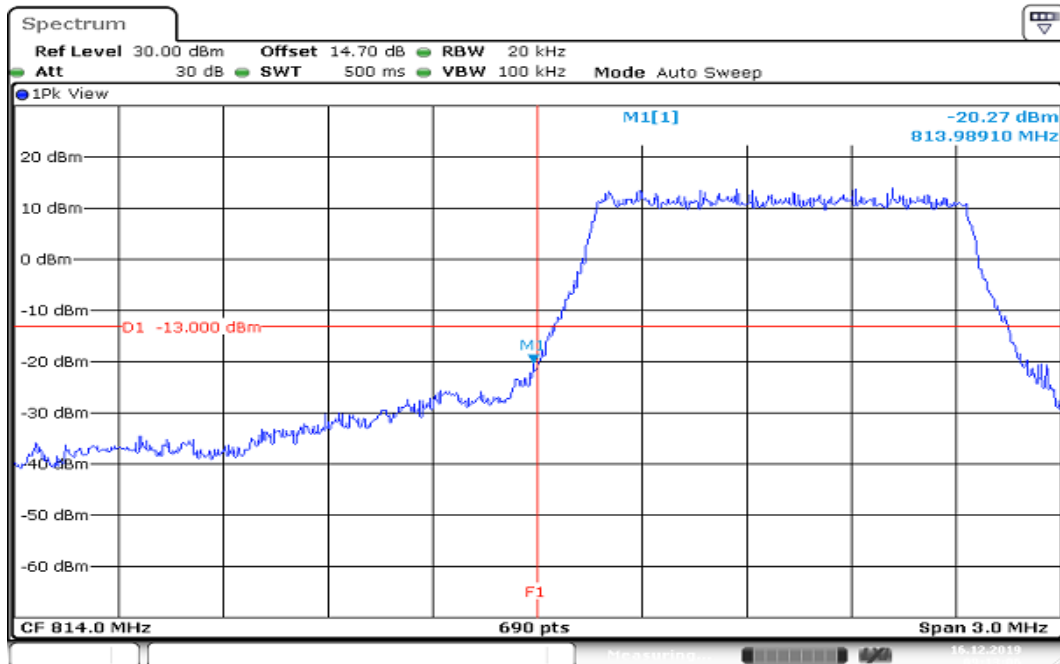
Date: 15.JAN.2020 10:51:19

## CHANNEL BANDWIDTH: 1.4MHz / QPSK / 100% RB ALLOCATED LOWER BAND EDGE

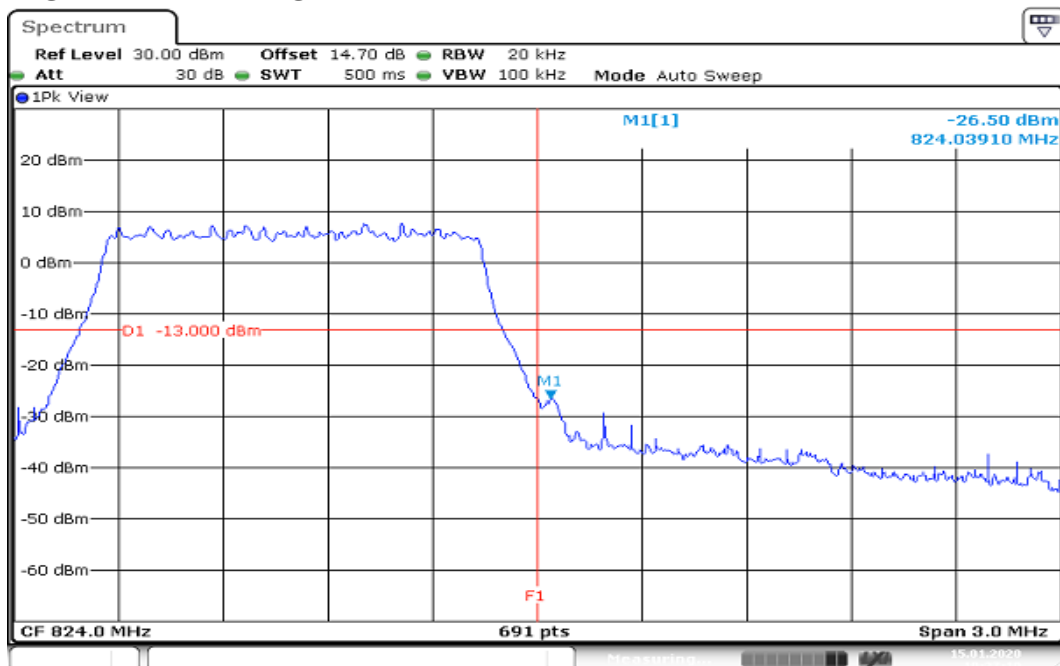


## HIGHER BAND EDGE



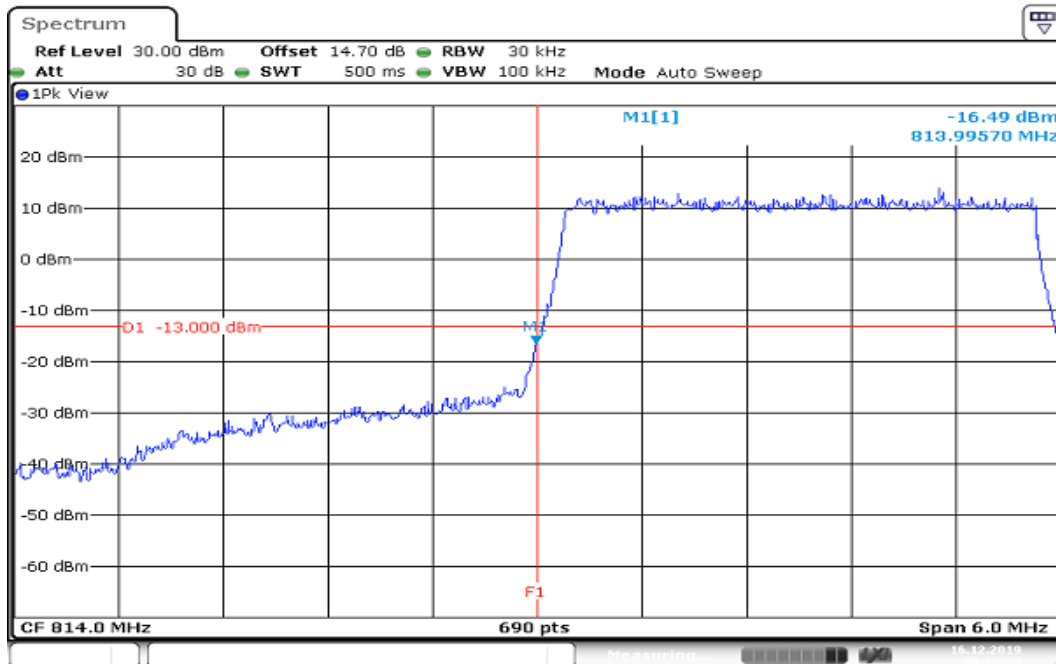
**CHANNEL BANDWIDTH: 1.4MHz / 16QAM / 100% RB ALLOCATED  
LOWER BAND EDGE**

Date: 16.DEC.2019 09:13:06

**HIGHER BAND EDGE**

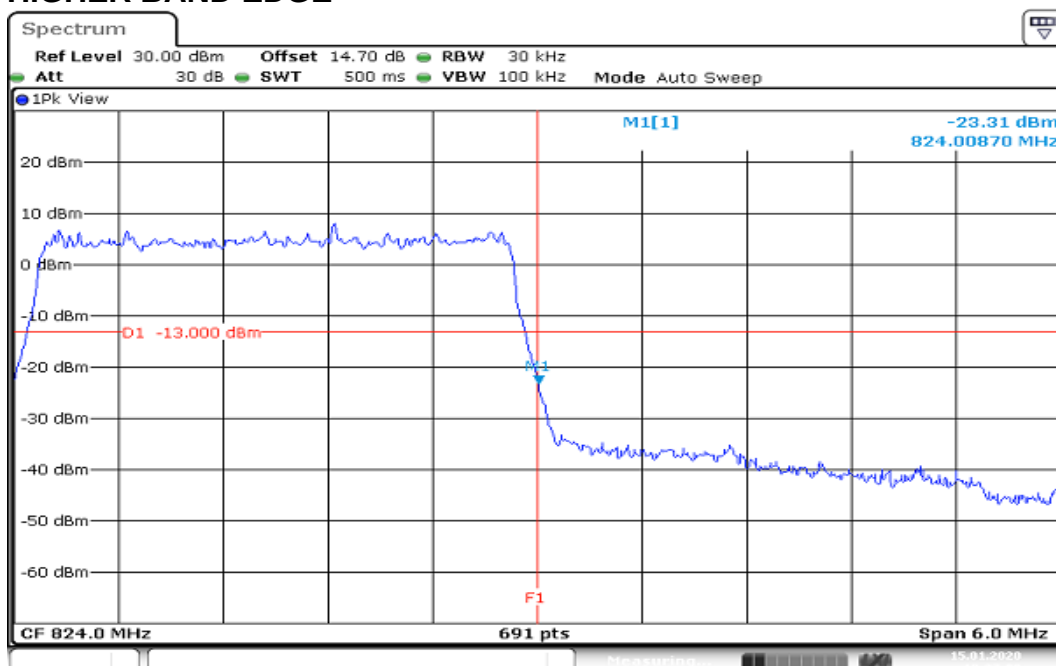
Date: 15.JAN.2020 10:37:19

## CHANNEL BANDWIDTH: 3MHz / QPSK / 100% RB ALLOCATED LOWER BAND EDGE

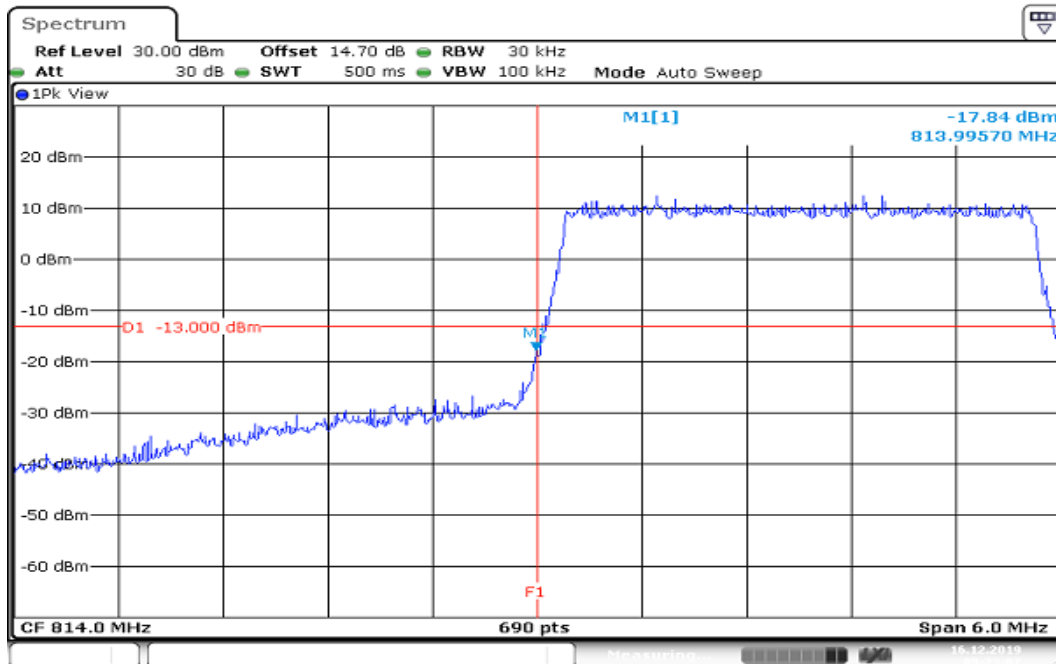


Date: 16.DEC.2019 09:23:31

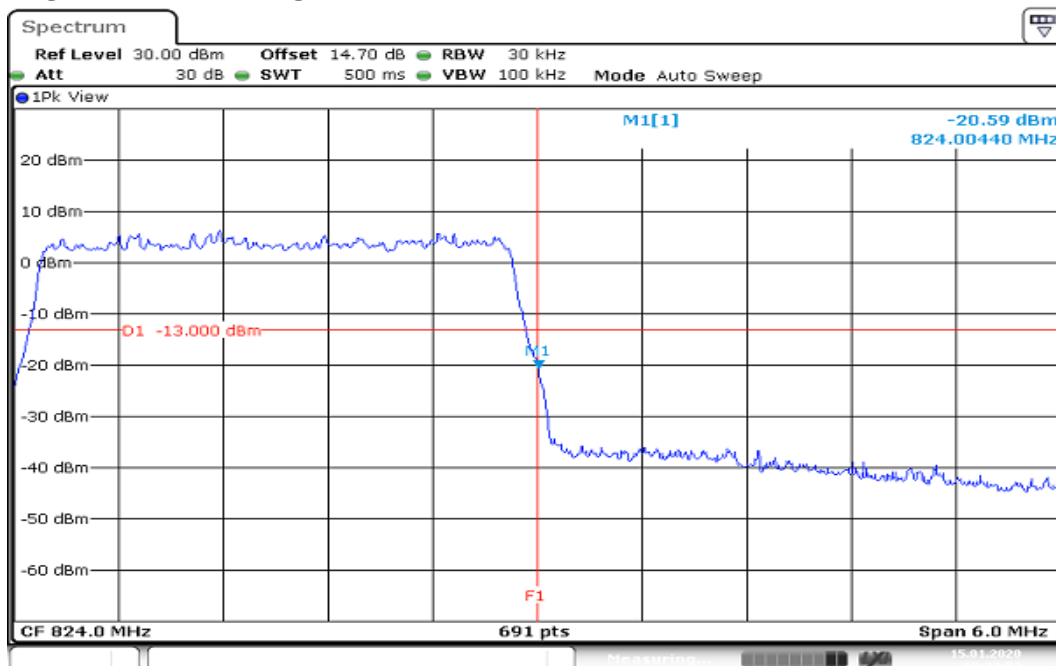
## HIGHER BAND EDGE



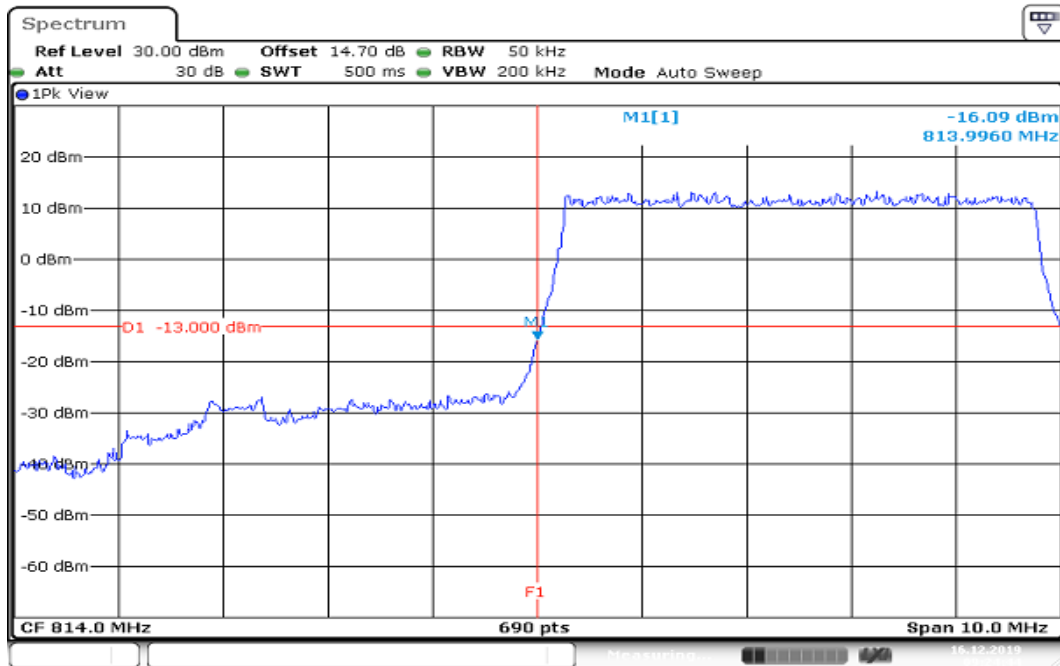
Date: 15.JAN.2020 10:27:00

**CHANNEL BANDWIDTH: 3MHz / 16QAM / 100% RB ALLOCATED  
LOWER BAND EDGE**

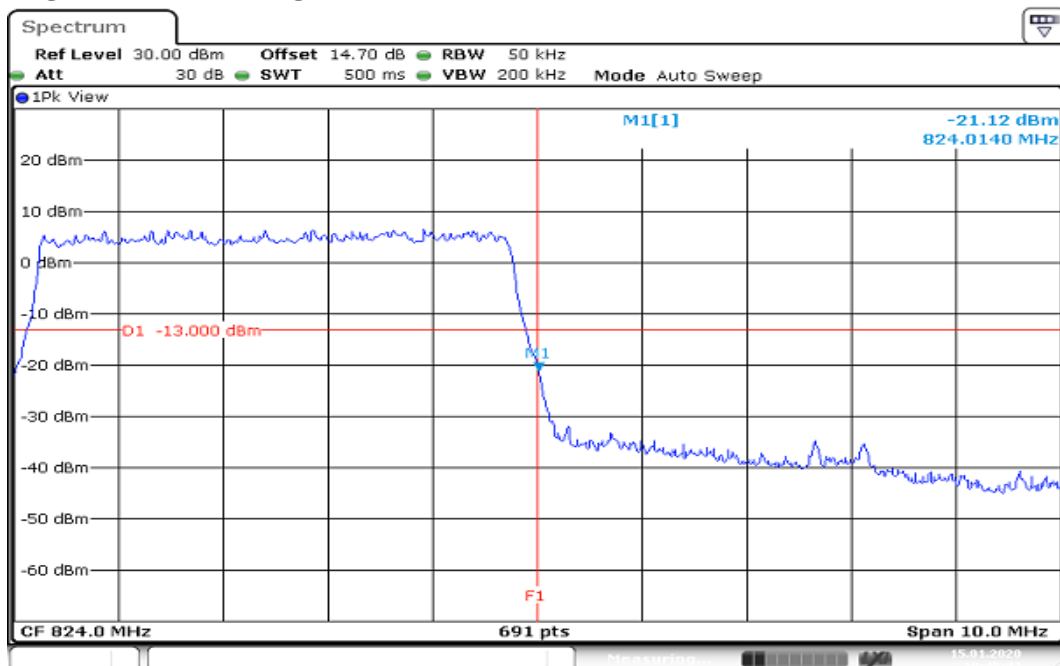
Date: 16.DEC.2019 09:23:07

**HIGHER BAND EDGE**

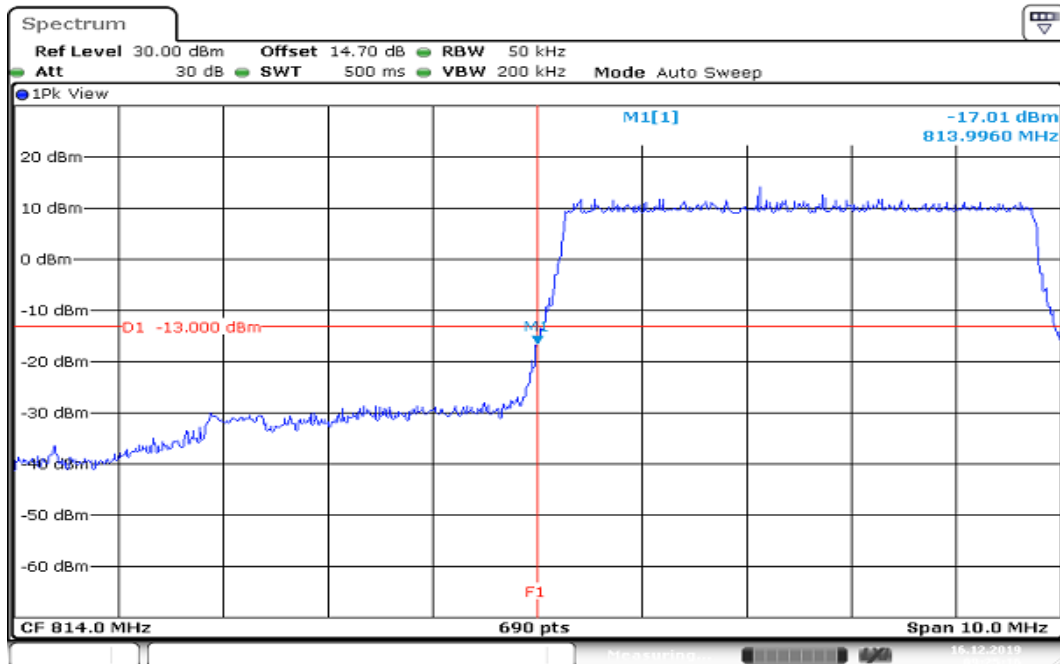
Date: 15.JAN.2020 10:22:52

**CHANNEL BANDWIDTH: 5MHz / QPSK / 100% RB ALLOCATED  
LOWER BAND EDGE**

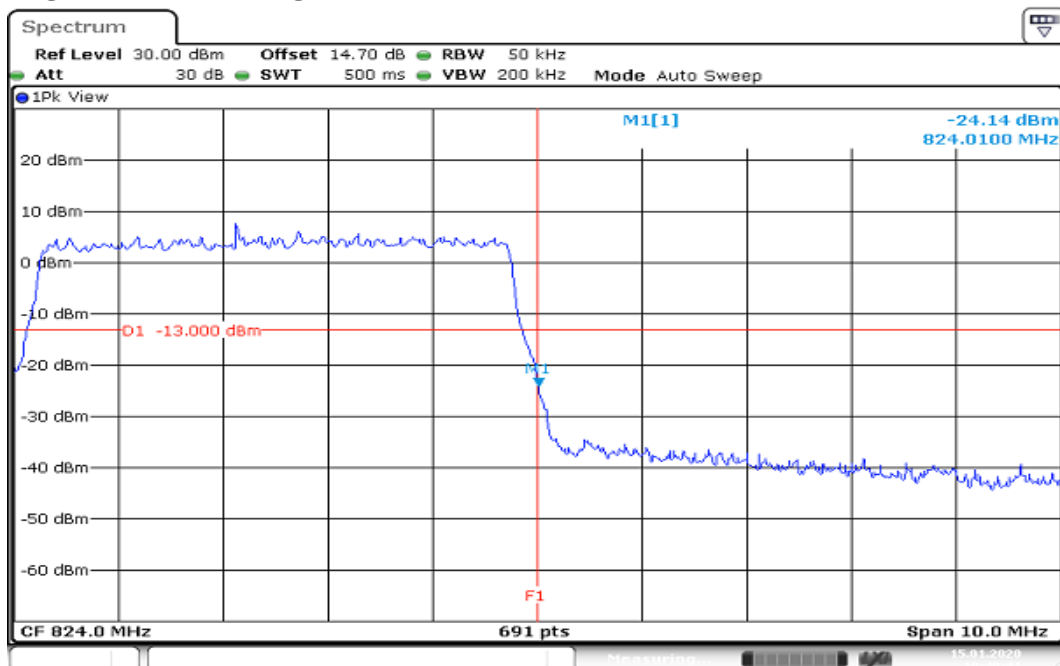
Date: 16.DEC.2019 09:24:45

**HIGHER BAND EDGE**

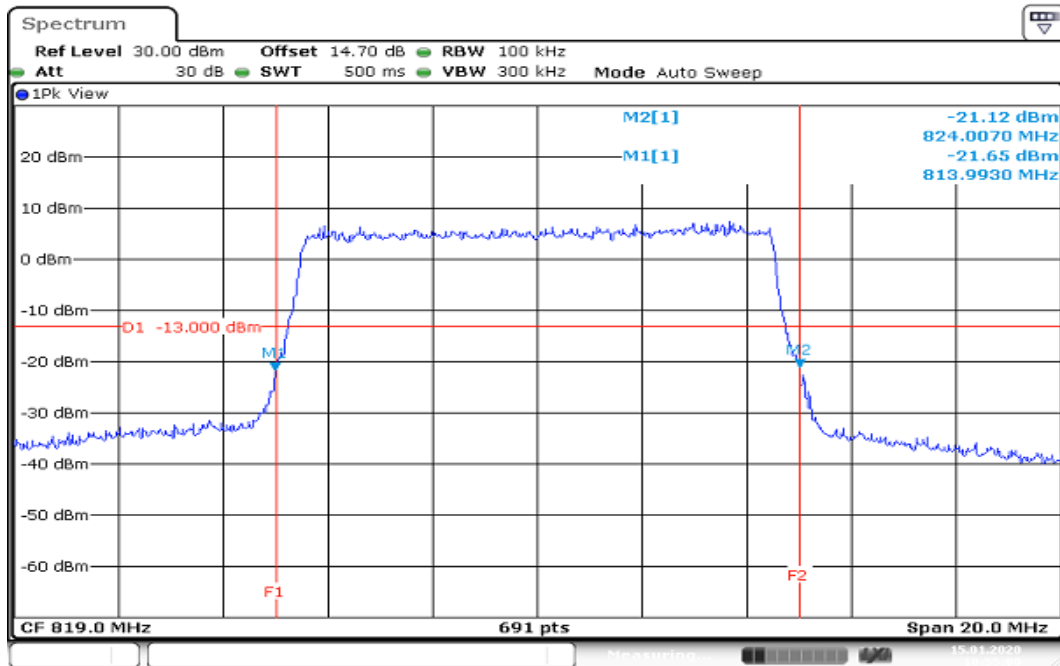
Date: 15.JAN.2020 10:45:43

**CHANNEL BANDWIDTH: 5MHz / 16QAM / 100% RB ALLOCATED  
LOWER BAND EDGE**

Date: 16.DEC.2019 09:25:16

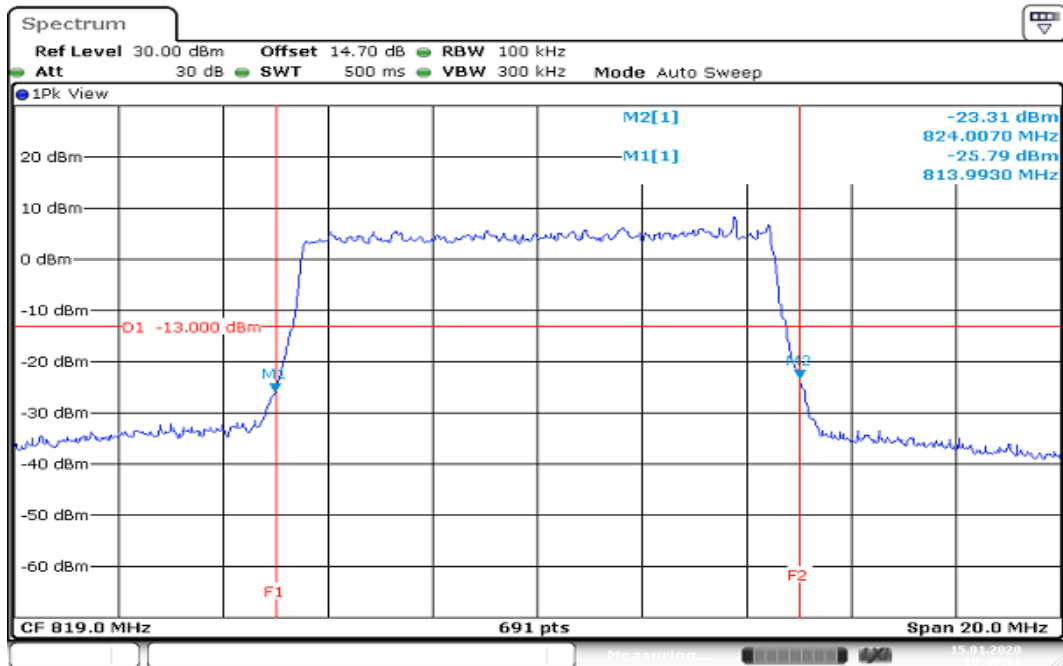
**HIGHER BAND EDGE**

Date: 15.JAN.2020 10:40:41

**CHANNEL BANDWIDTH: 10MHz / QPSK / 100% RB ALLOCATED  
MIDDLE BAND EDGE**

Date: 15.JAN.2020 10:55:00



**CHANNEL BANDWIDTH: 10MHz / 16QAM / 100% RB ALLOCATED  
MIDDLE BAND EDGE**

Date: 15.JAN.2020 10:49:11

## 8.6 CONDUCTED SPURIOUS EMISSIONS

### Limits

The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least  $43 + 10 \log_{10}(P)$  dB. The limit of emission equal to  $-13\text{dBm}$

### Test Procedures

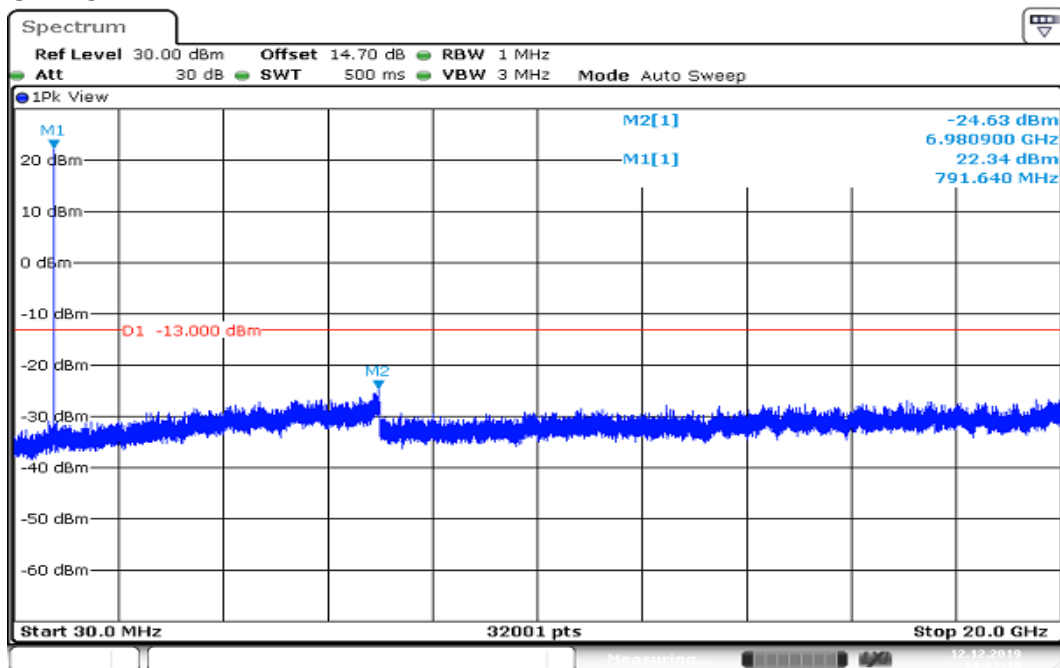
1. According to KDB 971168 D01,
2. The EUT was connect to spectrum analyzer and call box.
3. The RF output of EUT was connected to the spectrum analyzer.
4. Set the spectrum analyzer , RBW=1MHz, VBW=3MHz.
5. Record the maximum spurious emission.
6. The fundamental frequency should be excluded against the limit in operating band.

## Test Results

### LTE Band 14

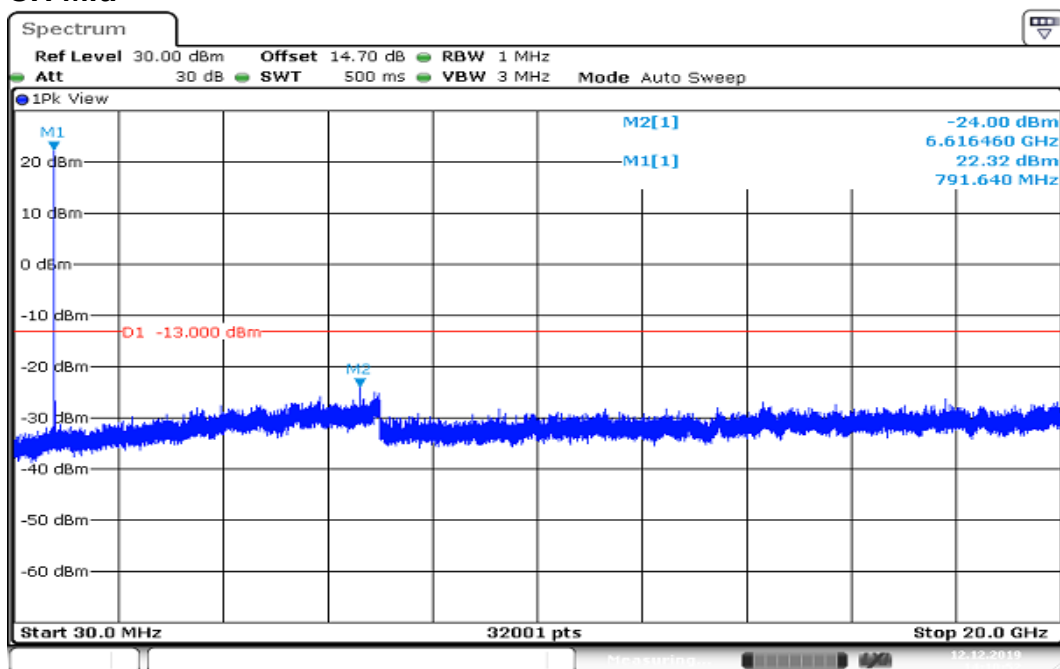
CHANNEL BANDWIDTH: 5MHz / QPSK

#### CH Low



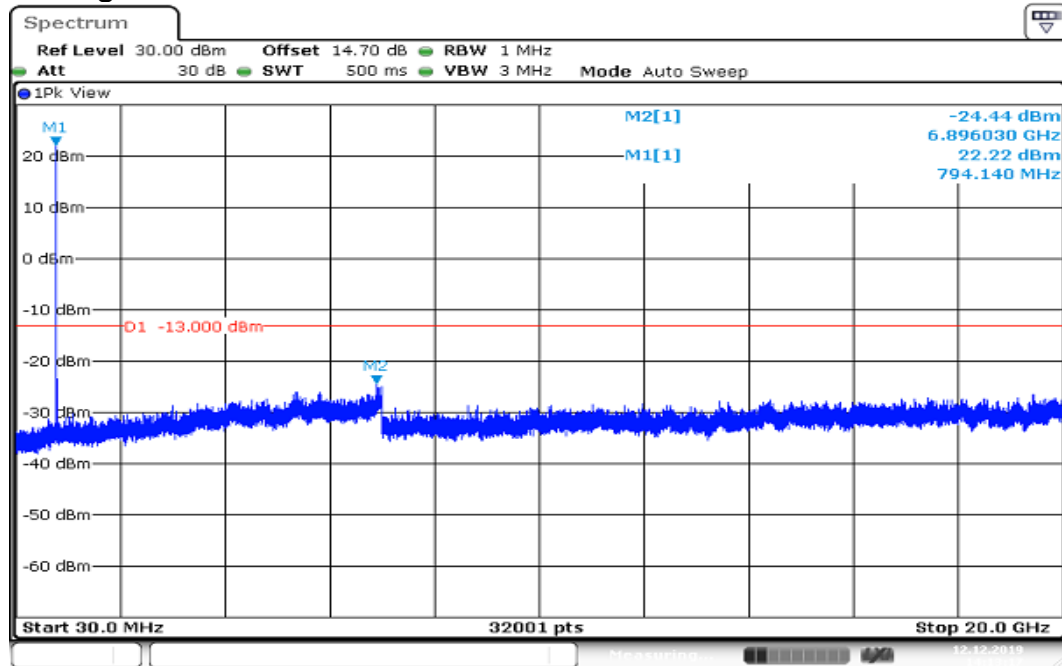
Date: 12.DEC.2019 14:12:38

#### CH Mid



Date: 12.DEC.2019 14:10:52

## CH High



Date: 12.DEC.2019 14:13:17

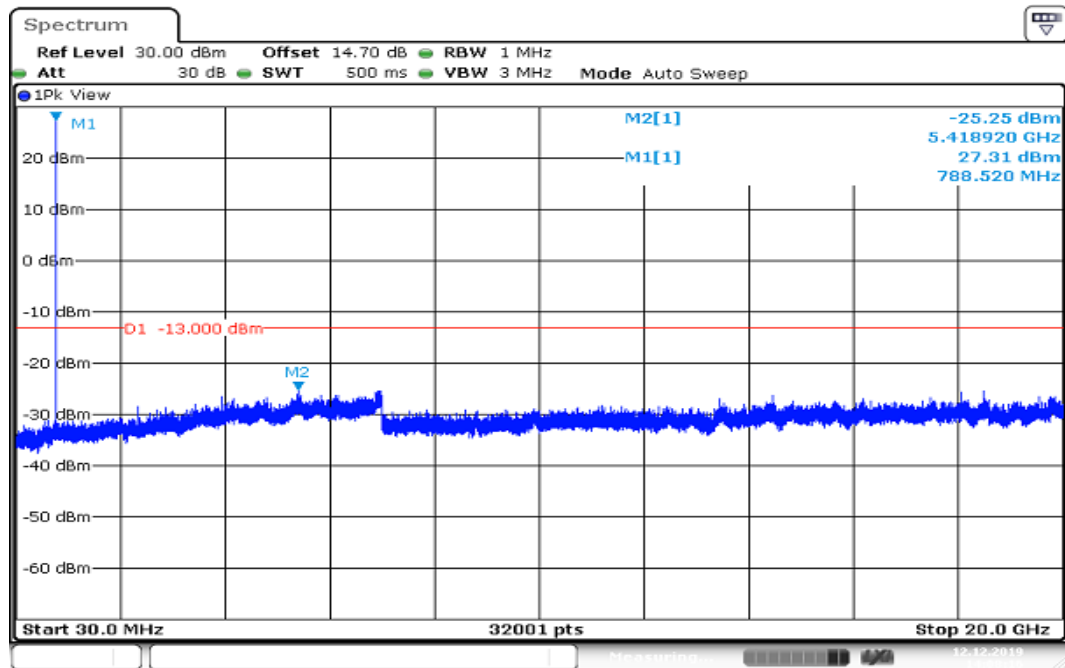


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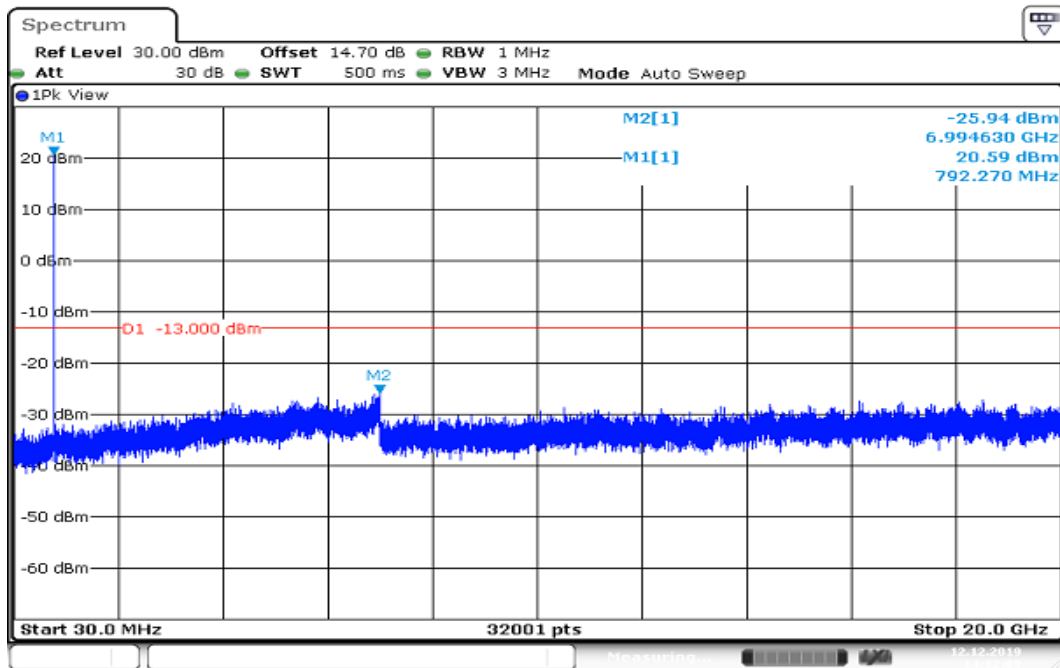
Rev.: 00

## CHANNEL BANDWIDTH: 10MHz / QPSK CH Mid

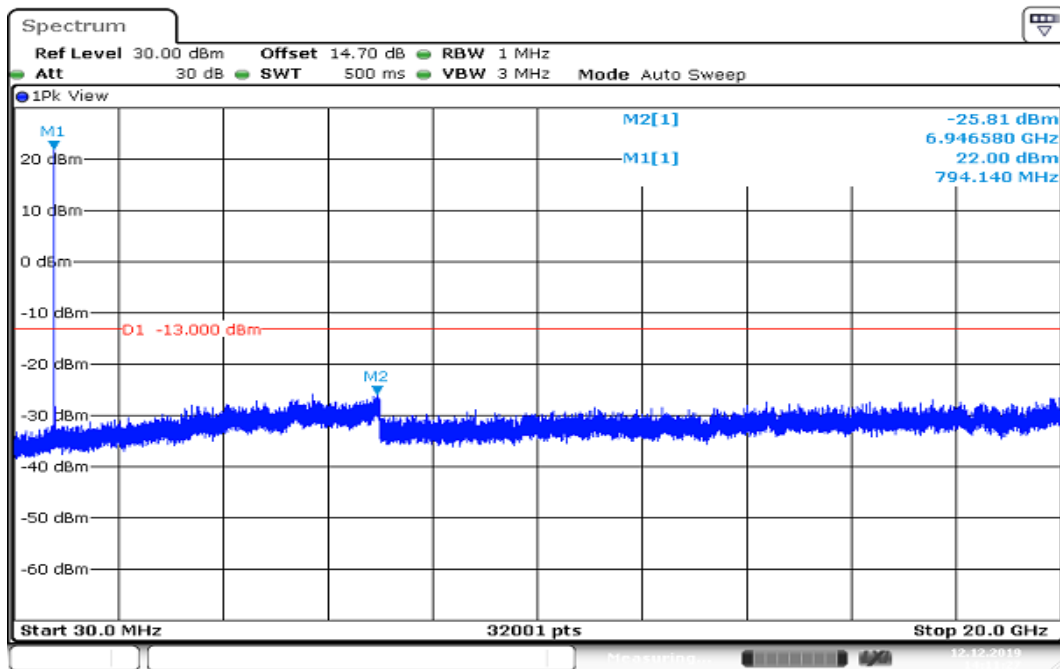


Date: 12.DEC.2019 14:08:17

Report No.: T191105W01-RP14

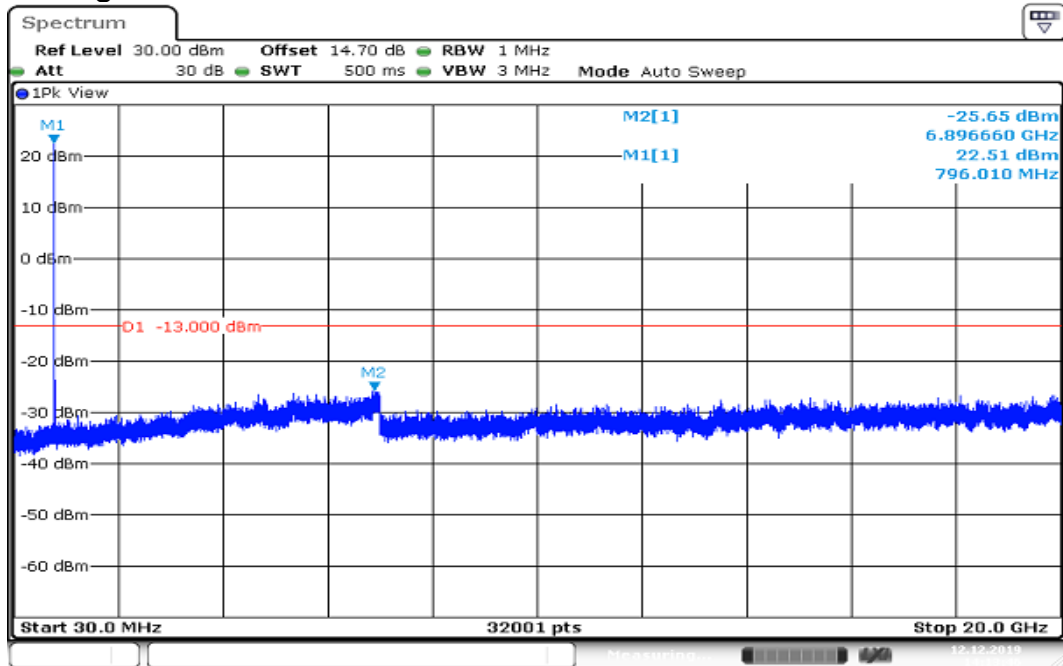
**CHANNEL BANDWIDTH: 5MHz / 16QAM****CH Low**

Date: 12.DEC.2019 14:12:08

**CH Mid**

Date: 12.DEC.2019 14:11:28

## CH High



Date: 12.DEC.2019 14:13:46

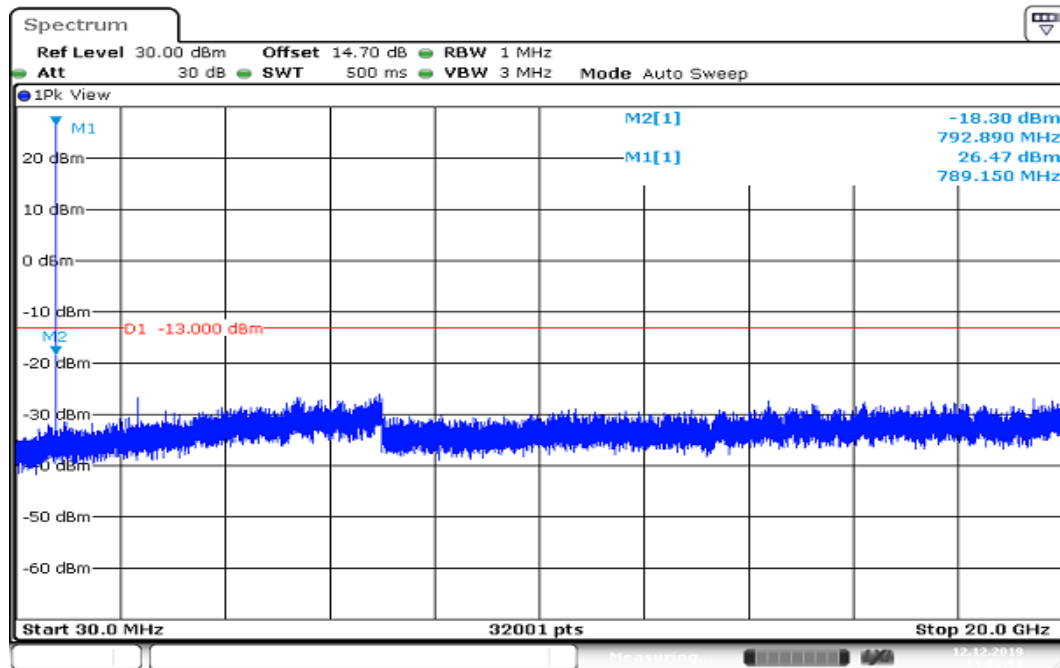


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Rev.: 00

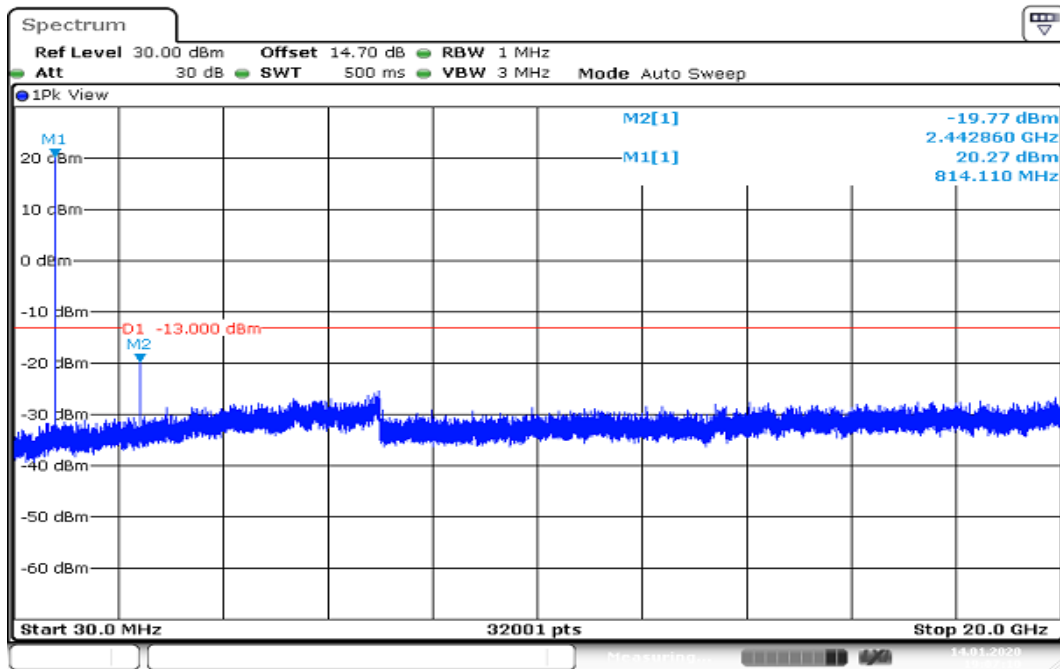
## CHANNEL BANDWIDTH: 10MHz / 16QAM CH Mid



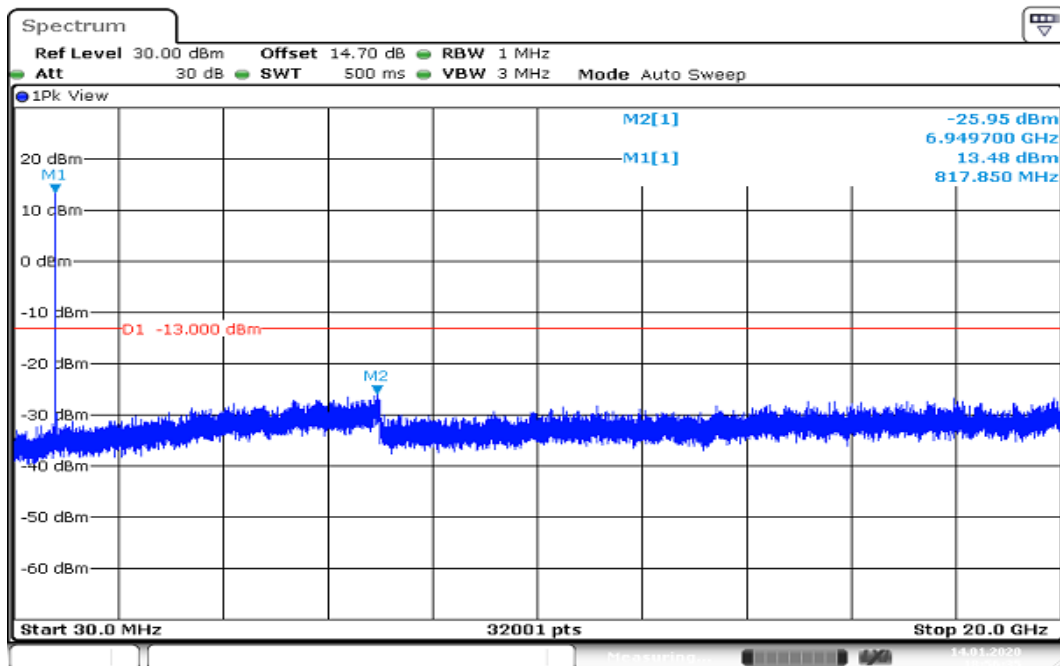
Date: 12.DEC.2019 14:08:51



Report No.: T191105W01-RP14

**LTE Band 26****CHANNEL BANDWIDTH: 1.4MHz / QPSK****CH Low**

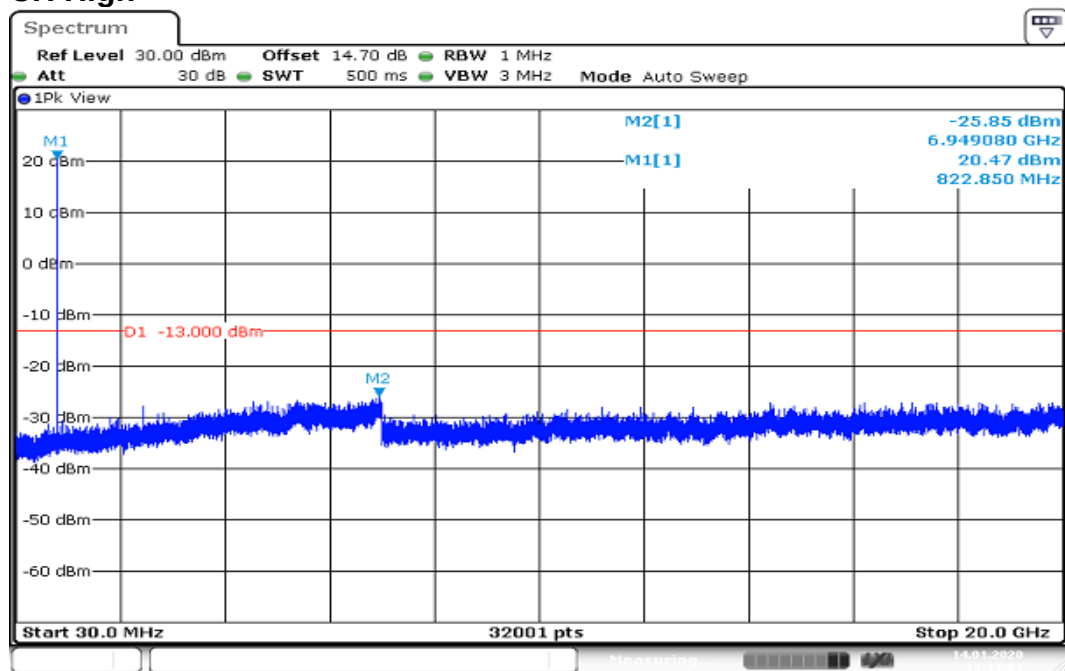
Date: 14.JAN.2020 19:07:10

**CH Mid**

Date: 14.JAN.2020 18:56:35

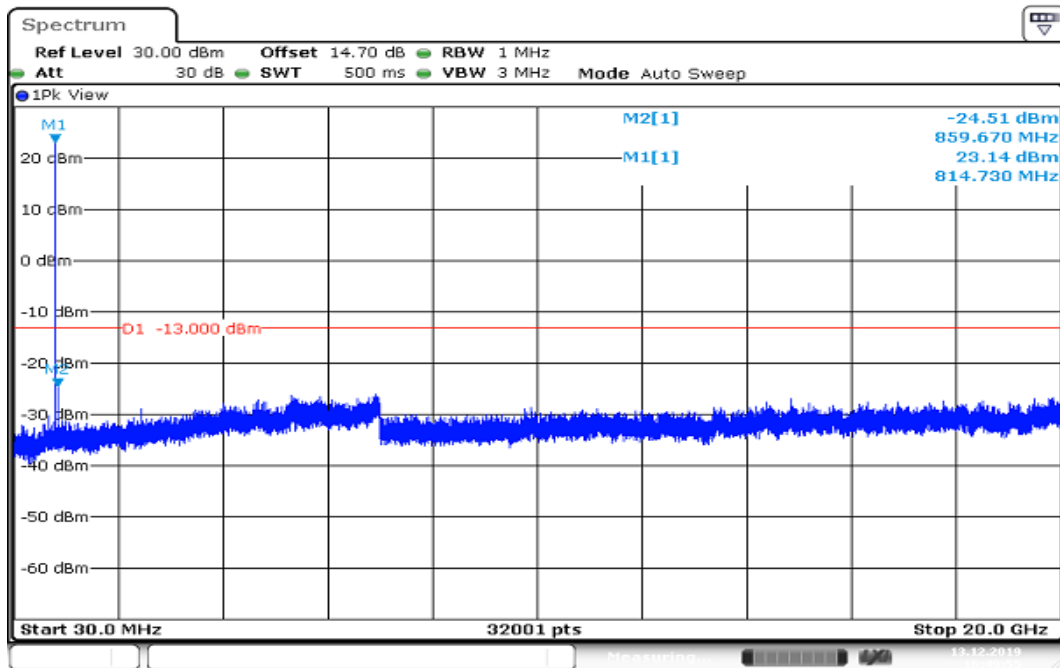
Report No.: T191105W01-RP14

## CH High

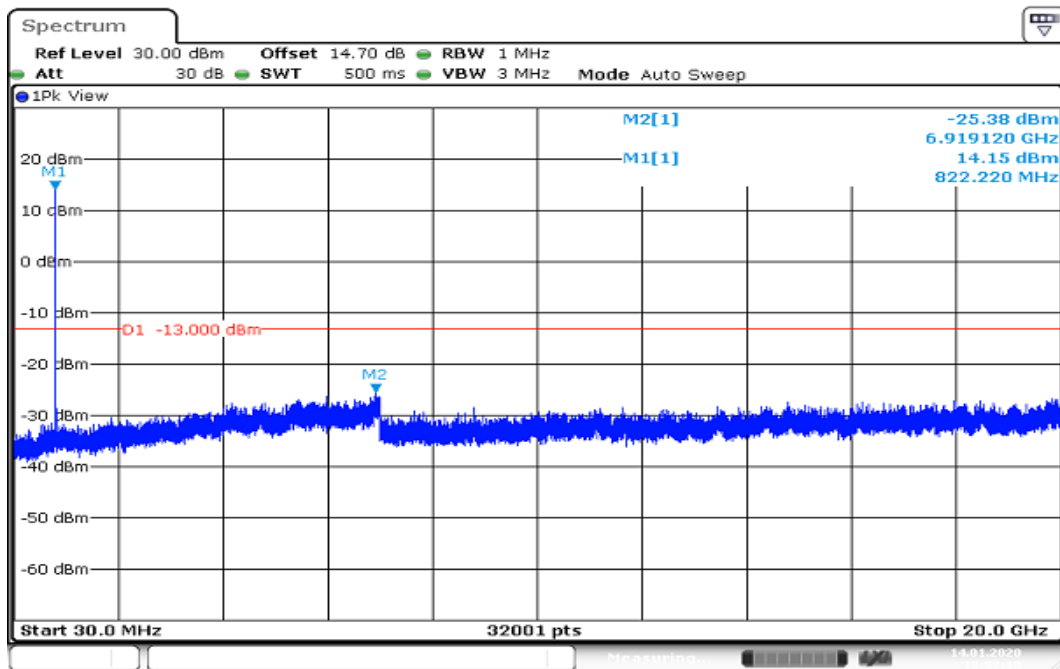


Date: 14.JAN.2020 19:11:01

Report No.: T191105W01-RP14

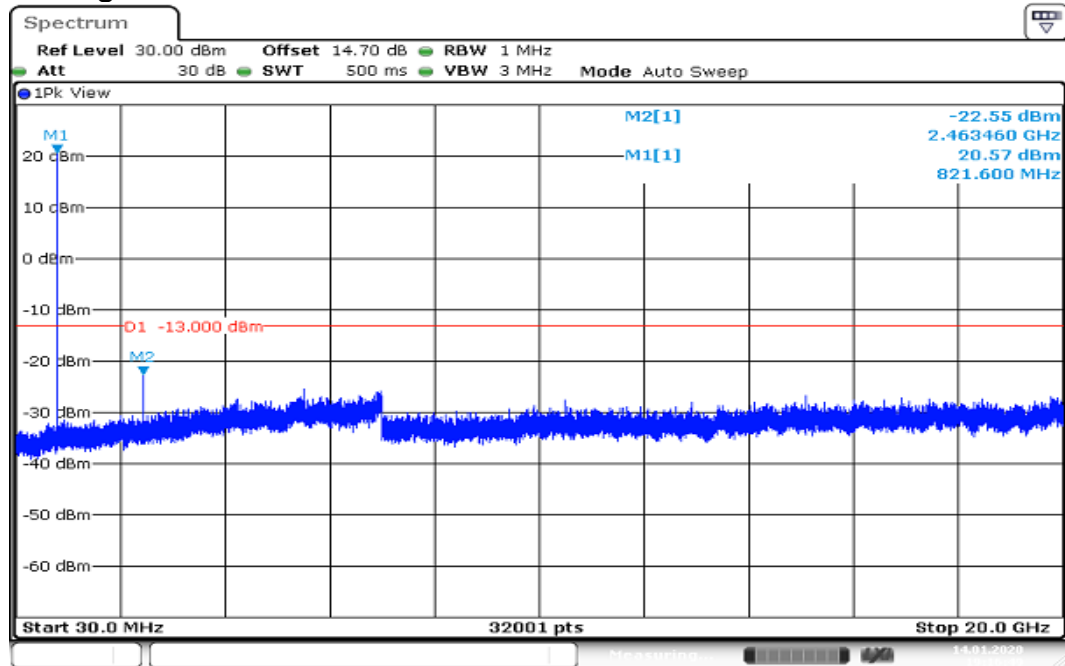
**CHANNEL BANDWIDTH: 3MHz / QPSK****CH Low**

Date: 13.DEC.2019 16:49:55

**CH Mid**

Date: 14.JAN.2020 18:57:10

## CH High

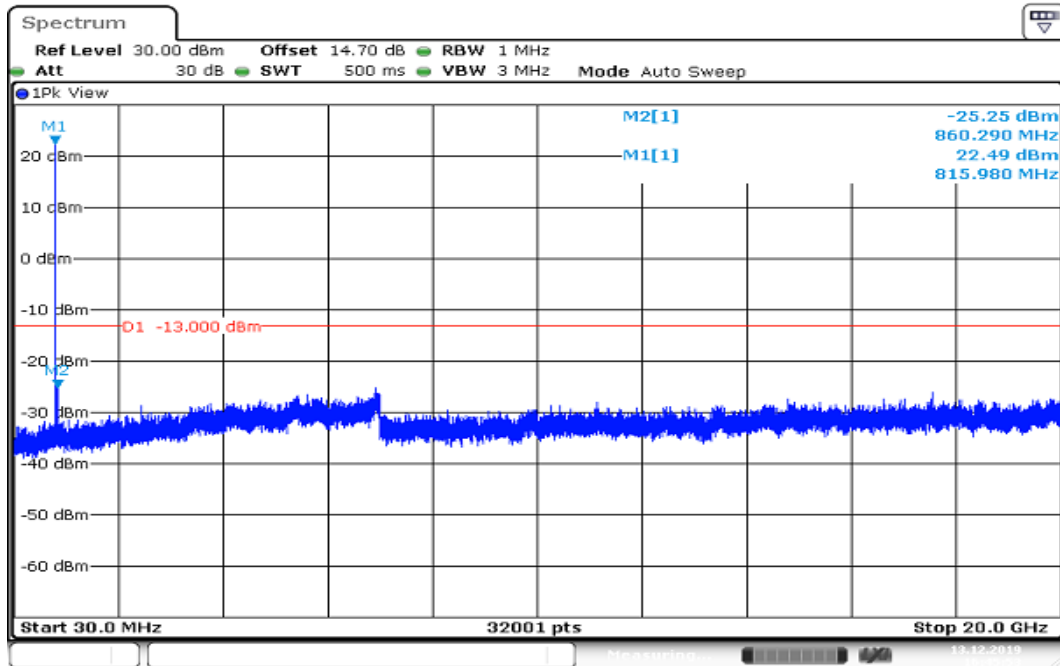


Date: 14.JAN.2020 19:16:49

Report No.: T191105W01-RP14

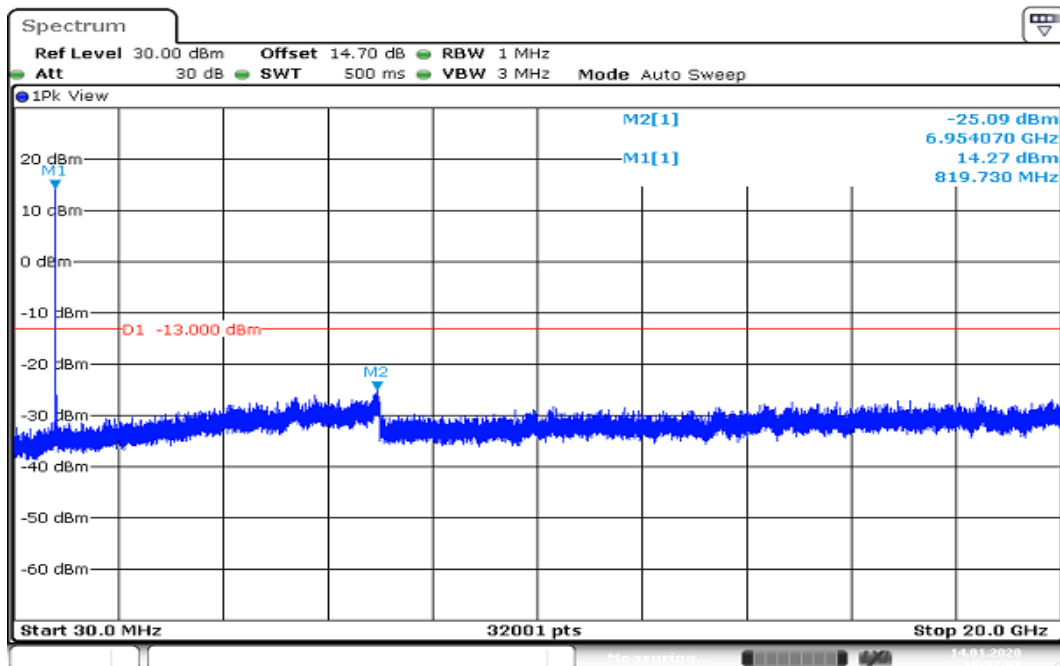
## CHANNEL BANDWIDTH: 5MHz / QPSK

## CH Low



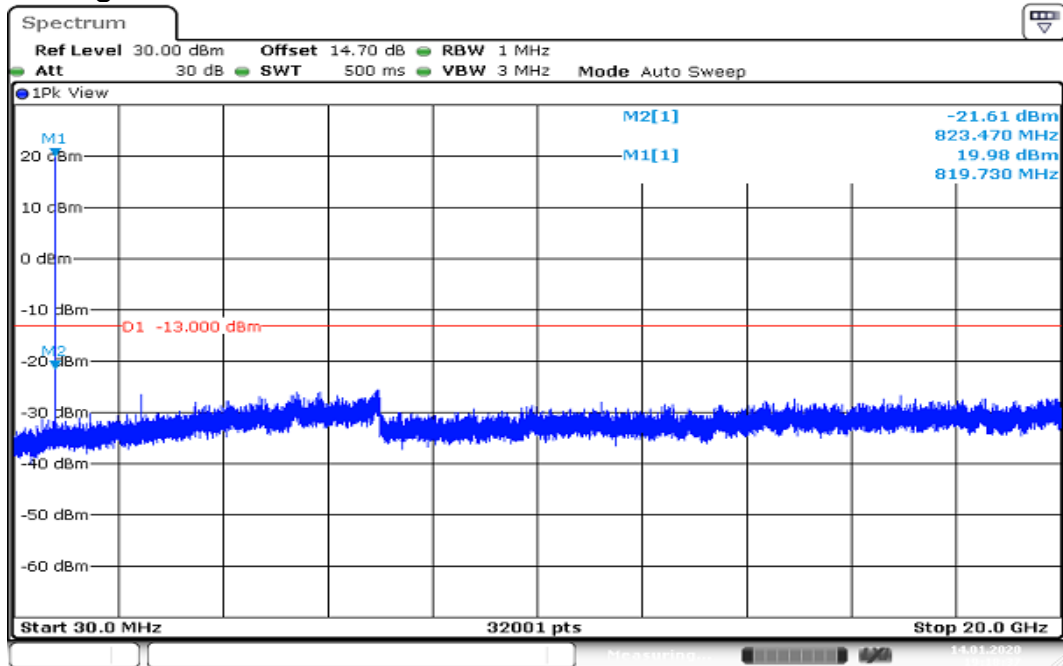
Date: 13.DEC.2019 16:45:54

## CH Mid



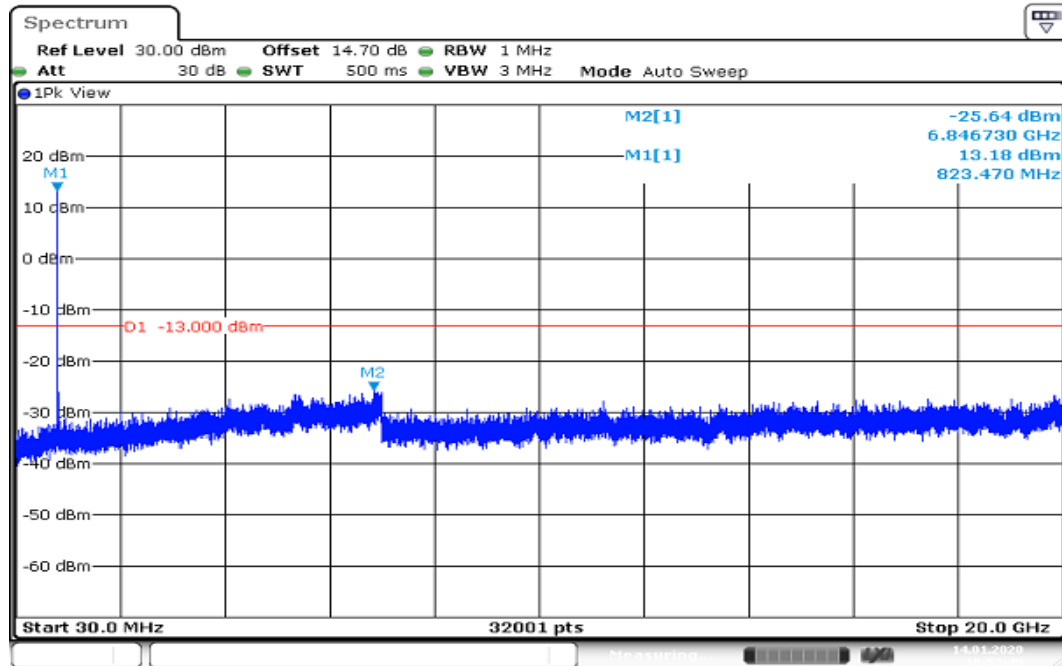
Date: 14.JAN.2020 18:57:41

## CH High



Date: 14.JAN.2020 19:18:37

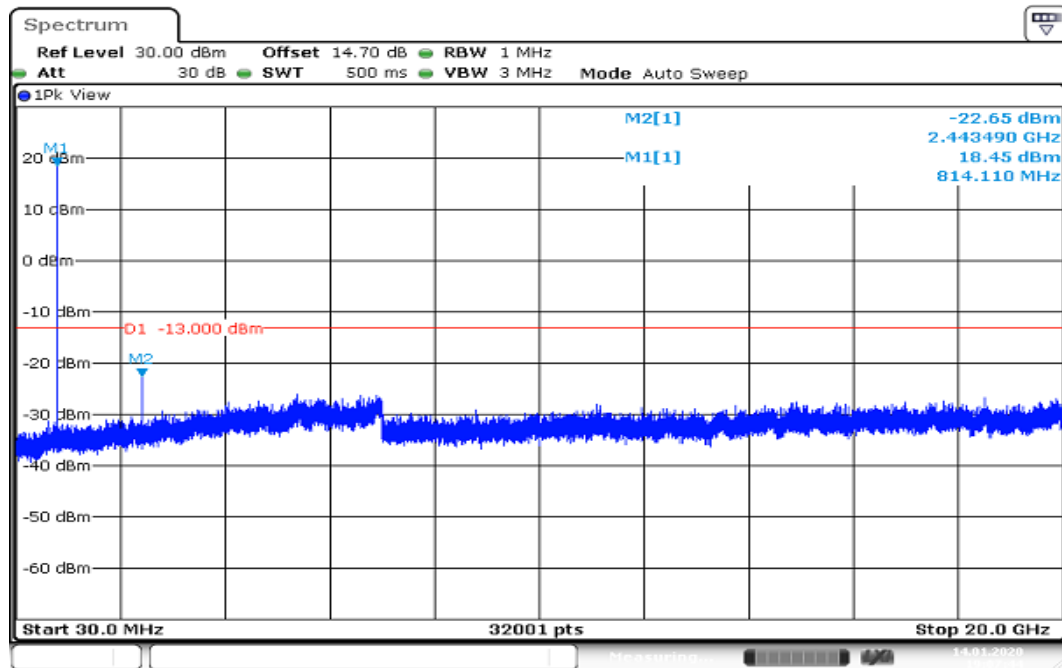
# CHANNEL BANDWIDTH: 10MHz / QPSK CH Mid



Date: 14 JAN 2020 18:53:40

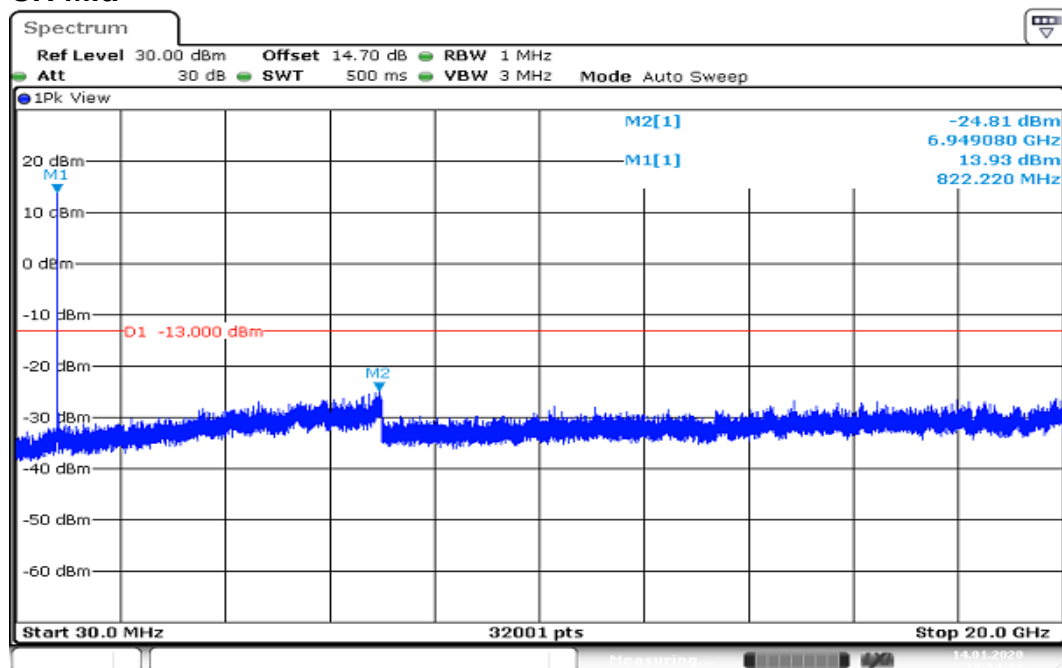
## CHANNEL BANDWIDTH: 1.4MHz / 16QAM

## CH Low



Date: 14.JAN.2020 19:07:44

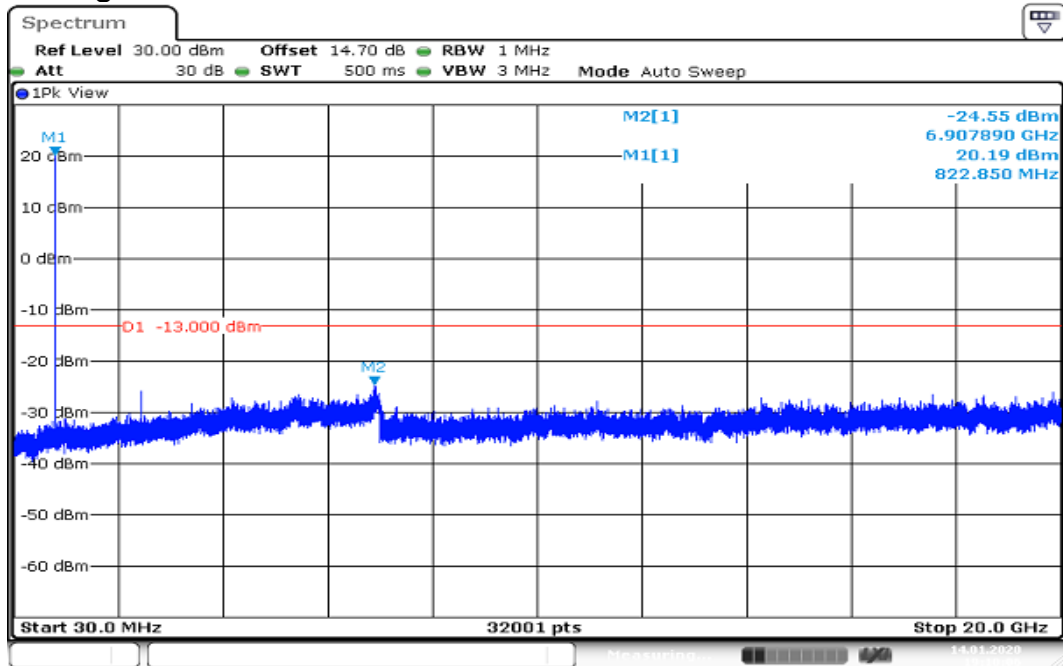
## CH Mid



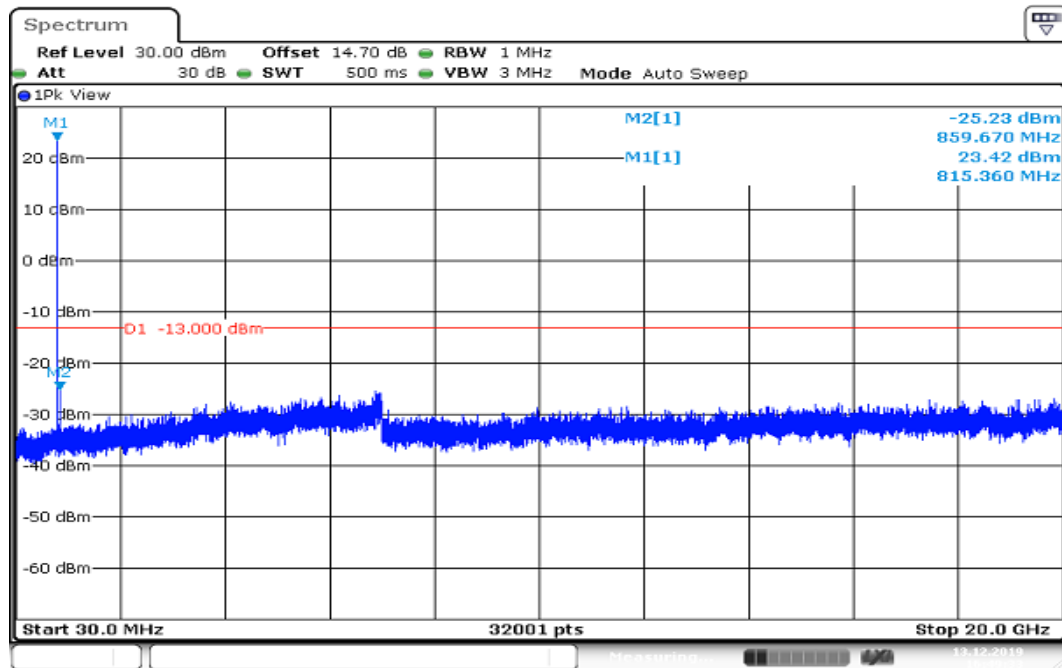
Date: 14.JAN.2020 18:54:23



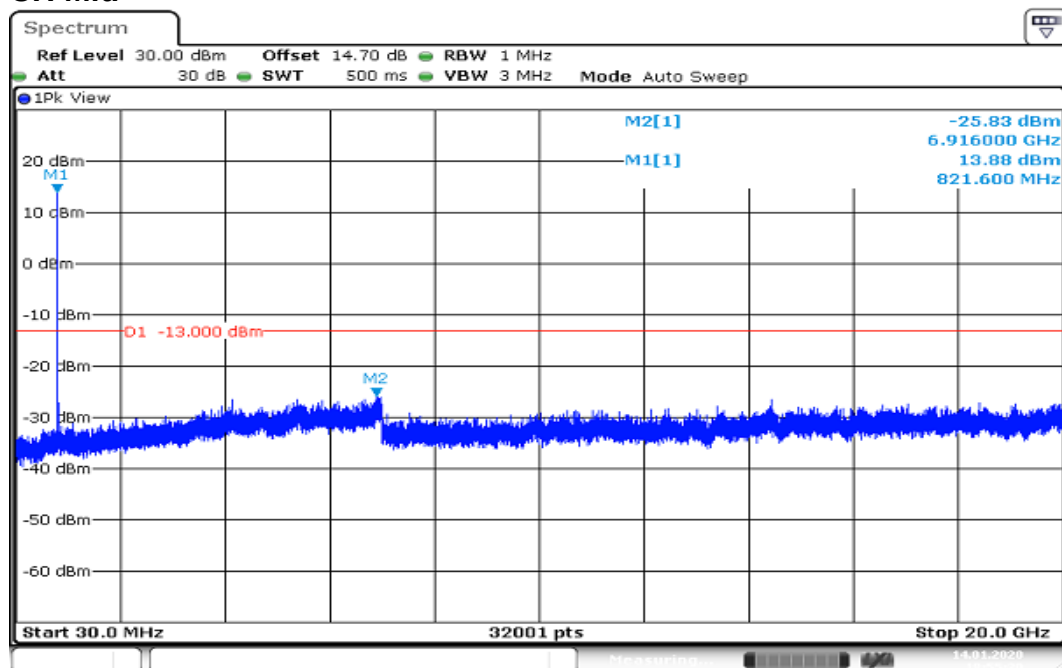
## CH High



Date: 14 JAN 2020 19:10:06

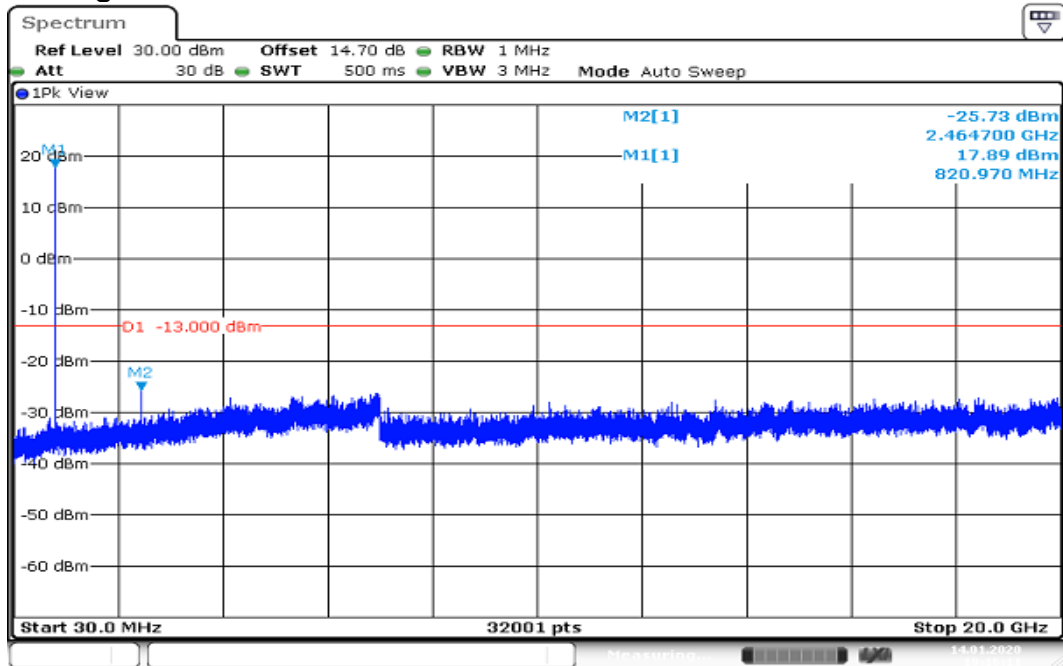
**CHANNEL BANDWIDTH: 3MHz / 16QAM****CH Low**

Date: 13.DEC.2019 16:49:34

**CH Mid**

Date: 14.JAN.2020 18:55:30

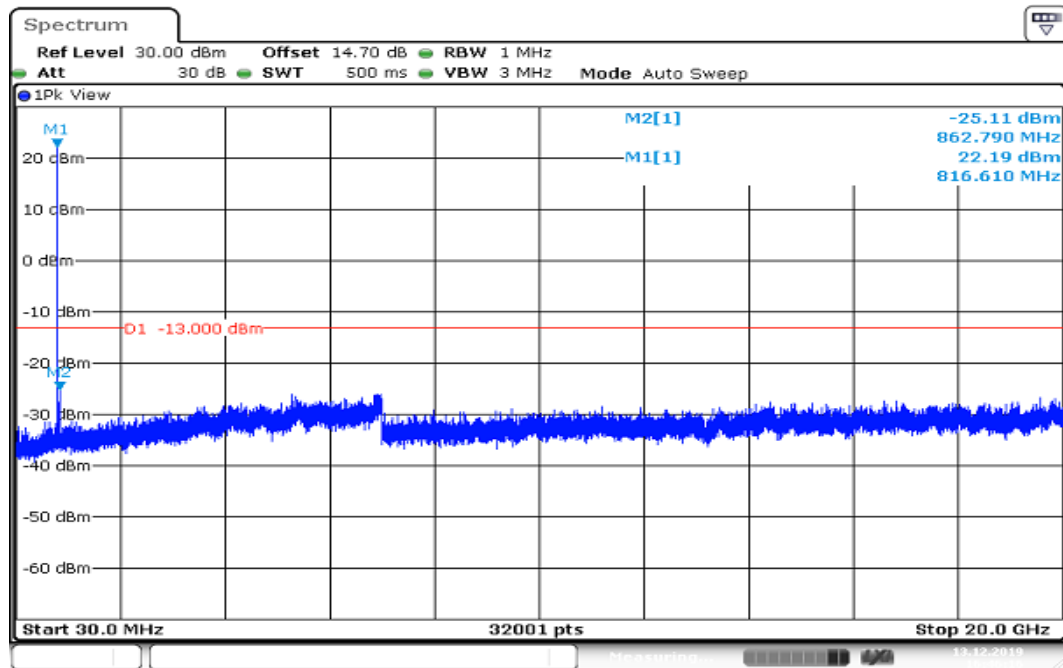
## CH High



Date: 14.JAN.2020 19:16:11

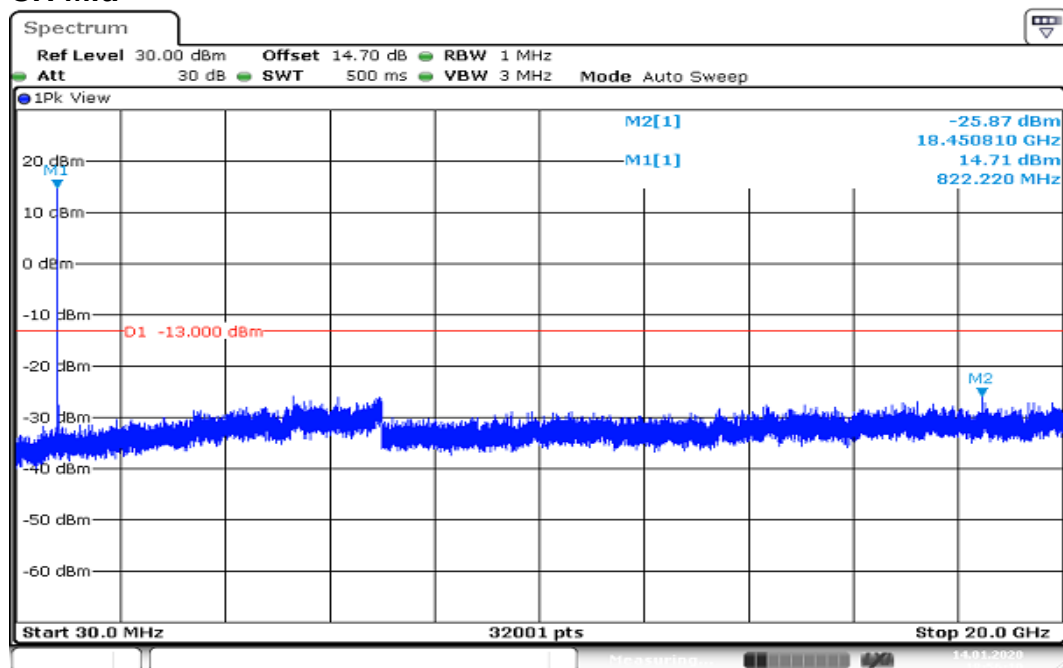
## CHANNEL BANDWIDTH: 5MHz / 16QAM

## CH Low



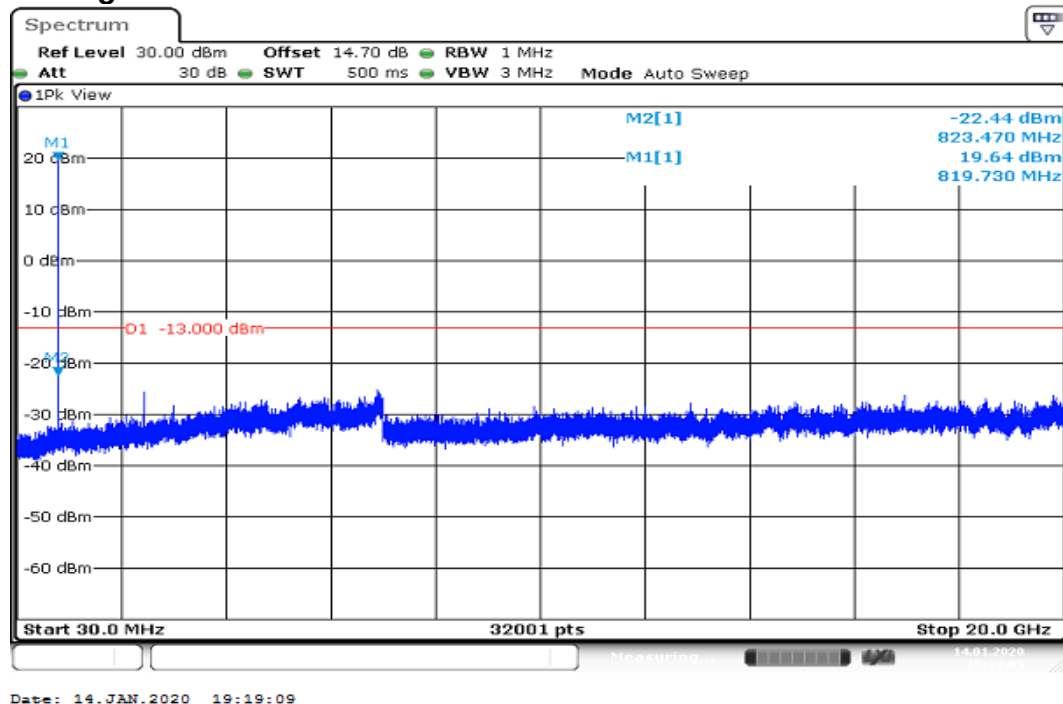
Date: 13.DEC.2019 16:46:17

## CH Mid



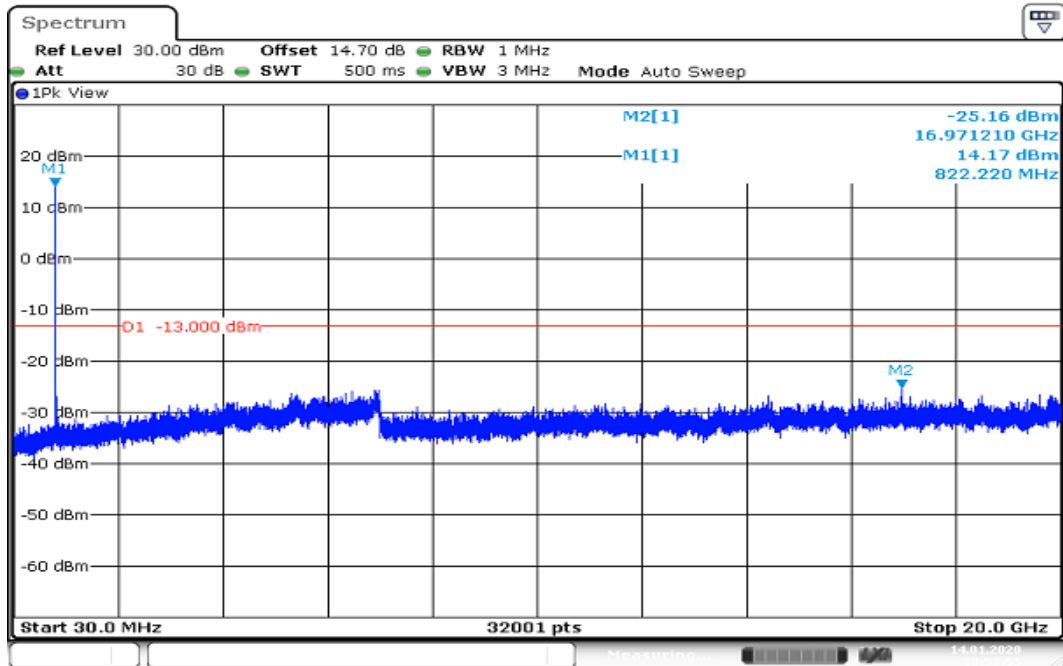
Date: 14.JAN.2020 18:56:10

## CH High



## CHANNEL BANDWIDTH: 10MHz / 16QAM

## CH Mid



Date: 14.JAN.2020 18:52:55

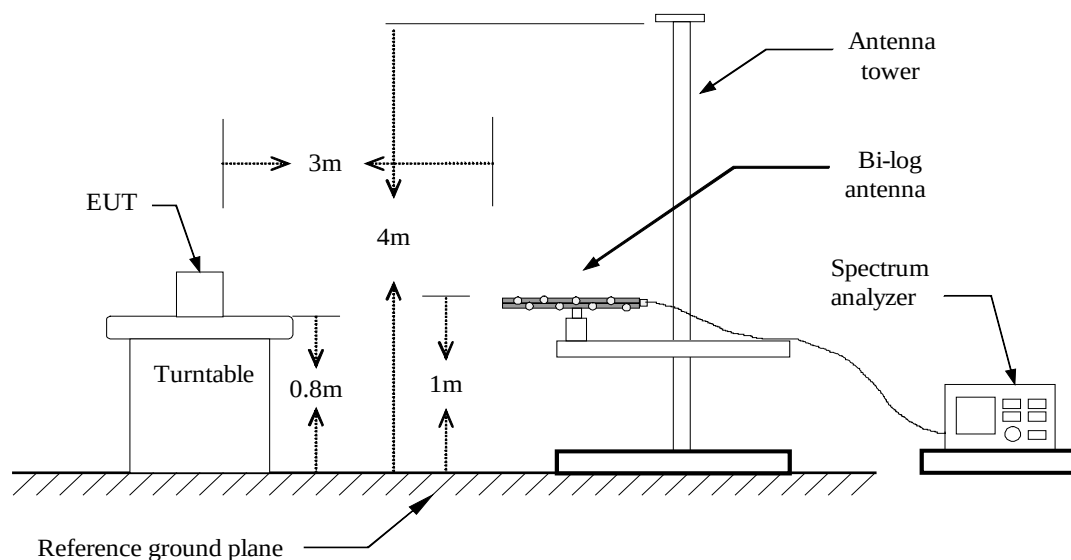
## 8.7 SPURIOUS RADIATION MEASUREMENT

### LIMIT

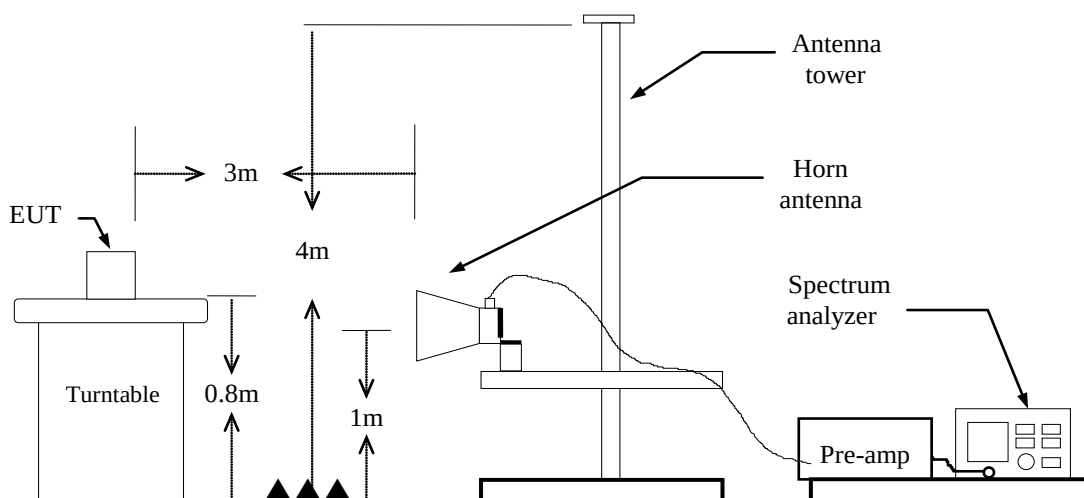
The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least  $43 + 10 \log_{10}(P)$  dB. The limit of emission equal to  $-13\text{dBm}$

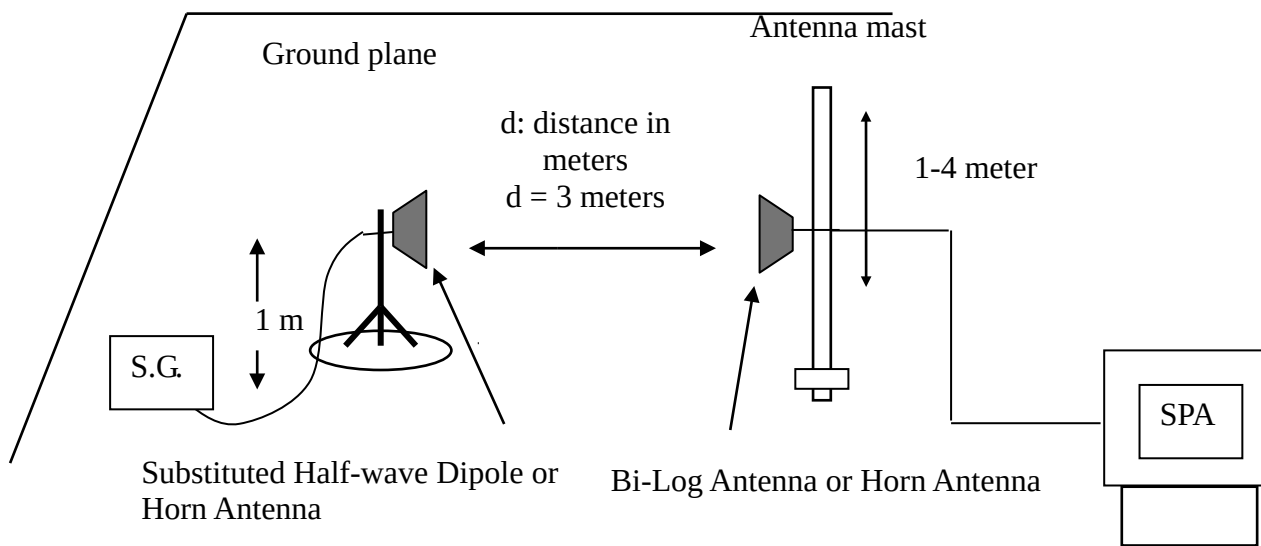
### Test Configuration

#### Below 1 GHz



#### Above 1 GHz



**Substituted Method Test Set-up****TEST PROCEDURE**

1. According to KDB 971168 D01 Power Meas License Digital Systems and TIA-603-E Section 2.2.12.
2. The EUT was placed on a turntable
  - (1) Below 1G : 0.8m
  - (2) Above 1G : 0.8m
  - (3) EUT set 3m from the receiving antenna
  - (4) The table was rotated 360 degrees of the highest spurious emission to determine the position.
3. Set the spectrum analyzer , RBW=1MHz, VBW=3MHz.
4. A horn antenna was driven by a signal generator.
5. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission

$$\text{ERP} = \text{S.G. output (dBm)} + \text{Antenna Gain (dBi)} - \text{Cable (dB)} - 2.15$$

$$\text{EIRP} = \text{S.G. output (dBm)} + \text{Antenna Gain (dBi)} - \text{Cable (dB)}$$

**TEST RESULTS**

*Refer to the attached tabular data sheets.*

**Remark: Above 1GHz**

*Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*



Report No.: T191105W01-RP14

**Test Results****LTE Band 14 / BW: 10MHz / QPSK / RB =1, RB Offset = 0****Operation Mode:** Tx / Low CH**Test Date:**

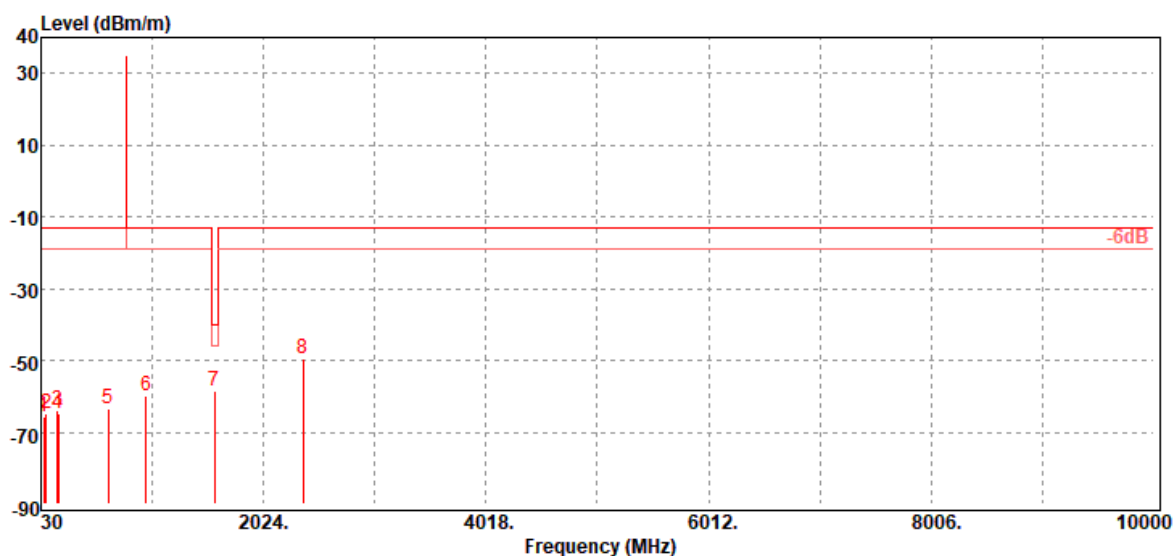
December 18, 2019

**Temperature:** 18.6°C**Tested by:**

Jerry Chang

**Humidity:** 59% RH**Polarity:**

Ver.



| Freq.<br>(MHz) | ERP/EIRP<br>(dBm) | SG<br>Output Level<br>(dBm) | Antenna<br>Gain<br>(dBd/dBi) | Cable<br>Loss<br>(dB) | Limit<br>(dBm) | Margin<br>(dB) | Antenna<br>Polarization<br>(V/H) |
|----------------|-------------------|-----------------------------|------------------------------|-----------------------|----------------|----------------|----------------------------------|
| 56.19          | -65.55            | -54.44                      | -10.50                       | -0.61                 | -13.00         | -52.55         | V                                |
| 78.50          | -64.66            | -55.38                      | -8.55                        | -0.73                 | -13.00         | -51.66         | V                                |
| 175.50         | -64.06            | -58.12                      | -4.85                        | -1.09                 | -13.00         | -51.06         | V                                |
| 185.20         | -64.94            | -59.74                      | -4.08                        | -1.12                 | -13.00         | -51.94         | V                                |
| 633.34         | -63.57            | -59.82                      | -1.63                        | -2.12                 | -13.00         | -50.57         | V                                |
| 973.81         | -59.76            | -55.74                      | -1.38                        | -2.64                 | -13.00         | -46.76         | V                                |
| 1586.00        | -58.39            | -64.44                      | 9.52                         | -3.47                 | -40.00         | -18.39         | V                                |
| 2379.00        | -49.30            | -55                         | 10.13                        | -4.43                 | -13.00         | -36.30         | V                                |

Operation Mode: Tx / Low CH

Test Date:

December 18, 2019

Temperature: 18.6°C

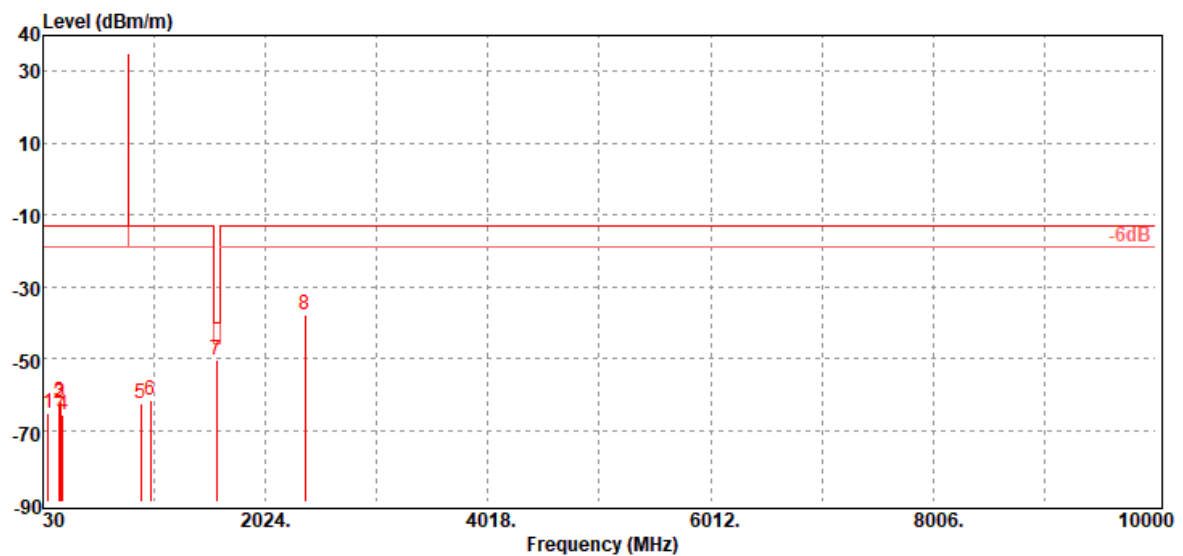
Tested by:

Jerry Chang

Humidity: 59% RH

Polarity:

Hor.



| Freq.<br>(MHz) | ERP/EIRP<br>(dBm) | SG<br>Output Level<br>(dBm) | Antenna<br>Gain<br>(dBd/dBi) | Cable<br>Loss<br>(dB) | Limit<br>(dBm) | Margin<br>(dB) | Antenna<br>Polarization<br>(V/H) |
|----------------|-------------------|-----------------------------|------------------------------|-----------------------|----------------|----------------|----------------------------------|
| 80.44          | -65.11            | -55.92                      | -8.46                        | -0.73                 | -13.00         | -52.11         | H                                |
| 175.50         | -62.34            | -56.4                       | -4.85                        | -1.09                 | -13.00         | -49.34         | H                                |
| 185.20         | -62.03            | -56.83                      | -4.08                        | -1.12                 | -13.00         | -49.03         | H                                |
| 204.60         | -65.51            | -61.37                      | -2.96                        | -1.18                 | -13.00         | -52.51         | H                                |
| 904.94         | -62.53            | -58.68                      | -1.30                        | -2.55                 | -13.00         | -49.53         | H                                |
| 992.24         | -61.69            | -57.62                      | -1.40                        | -2.67                 | -13.00         | -48.69         | H                                |
| 1586.00        | -50.46            | -56.51                      | 9.52                         | -3.47                 | -40.00         | -10.46         | H                                |
| 2379.00        | -37.88            | -43.58                      | 10.13                        | -4.43                 | -13.00         | -24.88         | H                                |

Report No.: T191105W01-RP14

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Rev.: 00

**LTE Band 26 / BW: 10MHz / QPSK / RB =1, RB Offset = 0**

**Operation Mode:** Tx / Mid CH

**Test Date:**

December 18, 2019

**Temperature:** 18.6°C

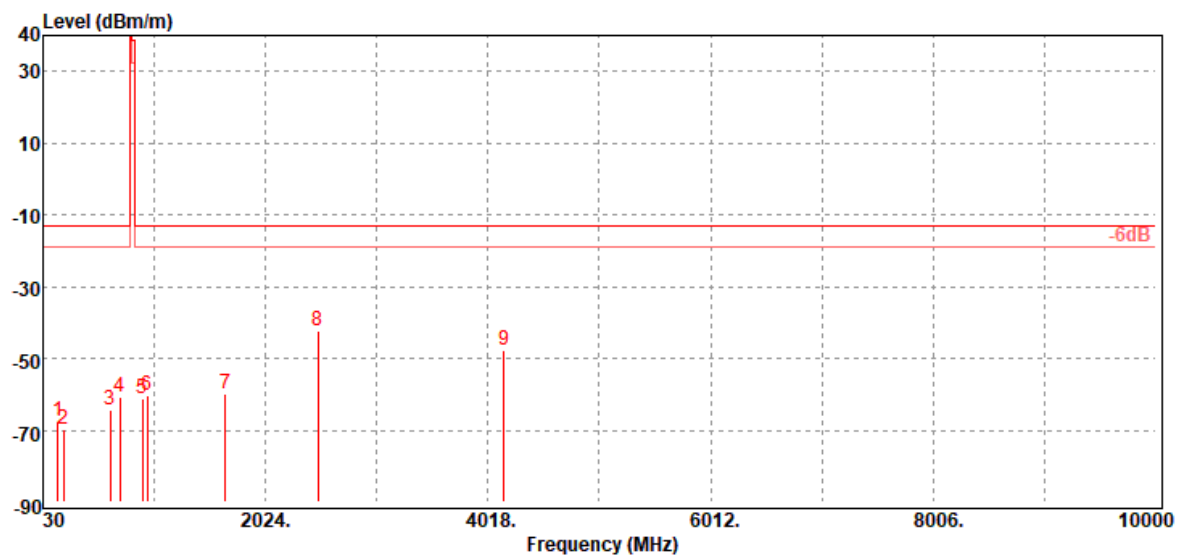
**Tested by:**

Jerry Chang

**Humidity:** 59% RH

**Polarity:**

Ver.



| Freq.<br>(MHz) | ERP/EIRP<br>(dBm) | SG<br>Output Level<br>(dBm) | Antenna<br>Gain<br>(dBd/dBi) | Cable<br>Loss<br>(dB) | Limit<br>(dBm) | Margin<br>(dB) | Antenna<br>Polarization<br>(V/H) |
|----------------|-------------------|-----------------------------|------------------------------|-----------------------|----------------|----------------|----------------------------------|
| 160.95         | -67.48            | -60.33                      | -6.11                        | -1.04                 | -13.00         | -54.48         | V                                |
| 216.24         | -69.56            | -66.27                      | -2.08                        | -1.21                 | -13.00         | -56.56         | V                                |
| 633.34         | -64.53            | -60.78                      | -1.63                        | -2.12                 | -13.00         | -51.53         | V                                |
| 720.64         | -60.73            | -57.07                      | -1.40                        | -2.26                 | -13.00         | -47.73         | V                                |
| 919.49         | -61.02            | -57.15                      | -1.30                        | -2.57                 | -13.00         | -48.02         | V                                |
| 963.14         | -60.35            | -56.42                      | -1.30                        | -2.63                 | -13.00         | -47.35         | V                                |
| 1663.00        | -59.91            | -66.12                      | 9.78                         | -3.57                 | -13.00         | -46.91         | V                                |
| 2494.50        | -42.43            | -48.64                      | 10.78                        | -4.57                 | -13.00         | -29.43         | V                                |
| 4157.50        | -47.81            | -54.65                      | 12.90                        | -6.06                 | -13.00         | -34.81         | V                                |

Operation Mode: Tx / Mid CH

Test Date:

December 18, 2019

Temperature: 18.6°C

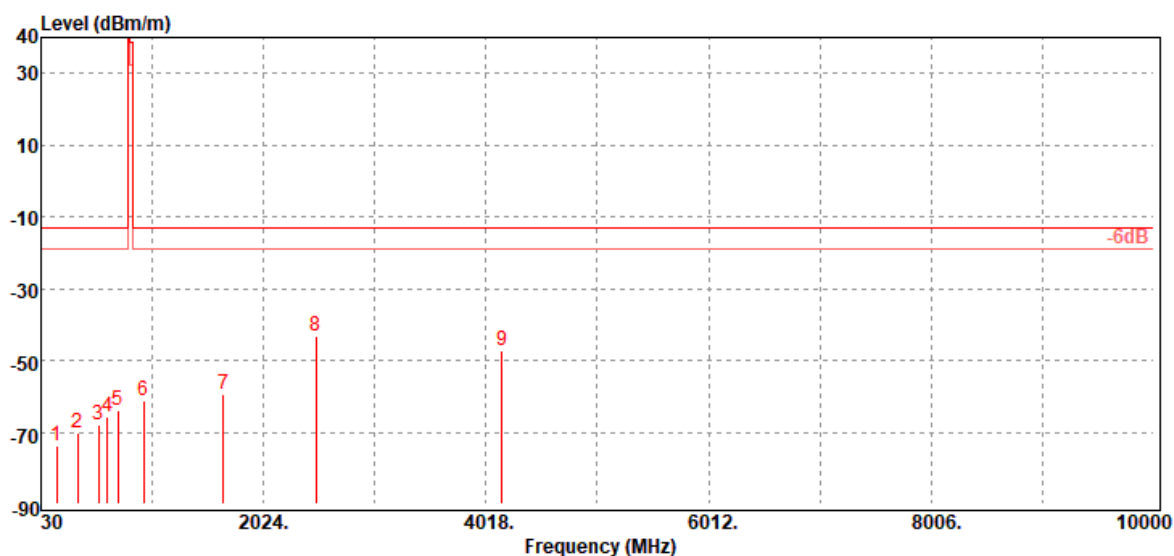
Tested by:

Jerry Chang

Humidity: 59% RH

Polarity:

Hor.



| Freq.<br>(MHz) | ERP/EIRP<br>(dBm) | SG<br>Output Level<br>(dBm) | Antenna<br>Gain<br>(dBd/dBi) | Cable<br>Loss<br>(dB) | Limit<br>(dBm) | Margin<br>(dB) | Antenna<br>Polarization<br>(V/H) |
|----------------|-------------------|-----------------------------|------------------------------|-----------------------|----------------|----------------|----------------------------------|
| 172.59         | -73.67            | -67.45                      | -5.14                        | -1.08                 | -13.00         | -60.67         | H                                |
| 357.86         | -70.27            | -67.07                      | -1.63                        | -1.57                 | -13.00         | -57.27         | H                                |
| 547.01         | -68.15            | -65.01                      | -1.20                        | -1.94                 | -13.00         | -55.15         | H                                |
| 628.49         | -65.70            | -62.12                      | -1.47                        | -2.11                 | -13.00         | -52.70         | H                                |
| 721.61         | -64.06            | -60.4                       | -1.40                        | -2.26                 | -13.00         | -51.06         | H                                |
| 951.50         | -61.22            | -57.4                       | -1.20                        | -2.62                 | -13.00         | -48.22         | H                                |
| 1663.00        | -59.62            | -65.83                      | 9.78                         | -3.57                 | -13.00         | -46.62         | H                                |
| 2494.50        | -43.15            | -49.36                      | 10.78                        | -4.57                 | -13.00         | -30.15         | H                                |
| 4157.50        | -47.30            | -54.14                      | 12.90                        | -6.06                 | -13.00         | -34.30         | H                                |

- End of Test Report -