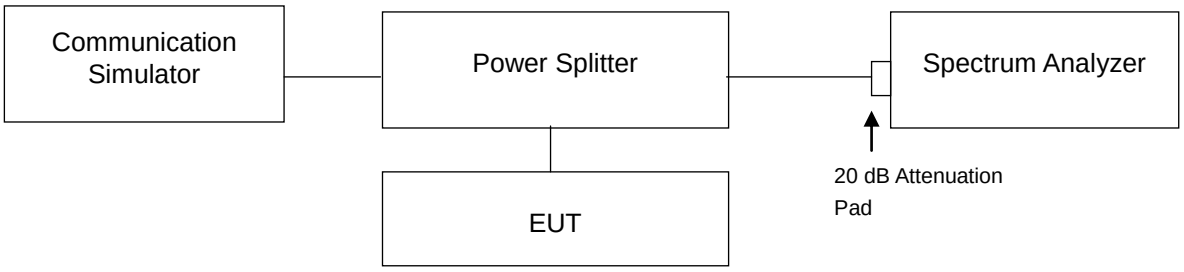
## 4.6 Conducted Spurious Emissions

### 4.6.1 Limits of Conducted Spurious Emissions Measurement

The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least 55 +10 log10(P) dB. The limit of emission is equal to -25 dBm.

### 4.6.2 Test Setup




### 4.6.3 Test Procedure

a. The EUT makes a phone call to the communication simulator. All measurements were done at low, middle and high operational frequency range.

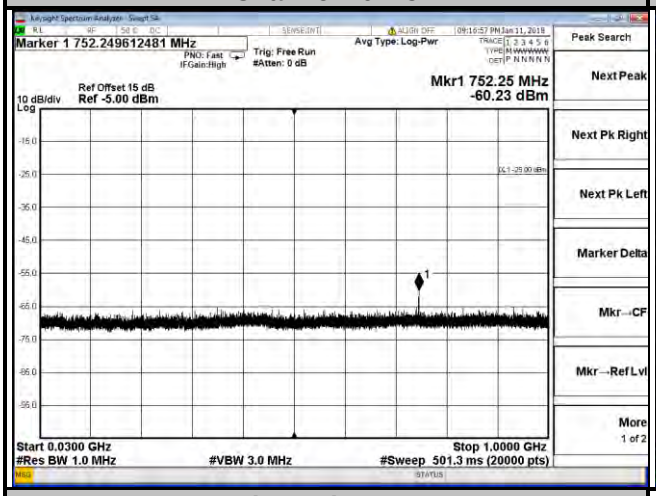
b. Measuring frequency range is from 30 MHz to 26 GHz for LTE Band 7 and from 30 MHz to 27 GHz for LTE Band 41. 10 dB attenuation pad is connected with spectrum. RBW = 100 kHz and VBW = 300 kHz are used for conducted emission measurement.

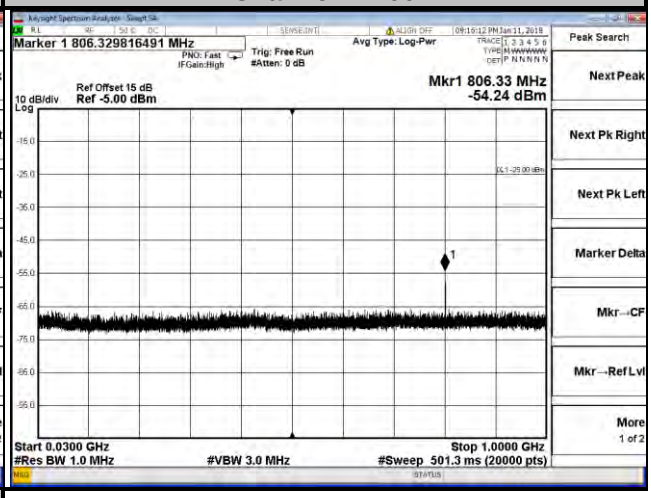
### 4.6.4 Test Results

**LTE Band 7**

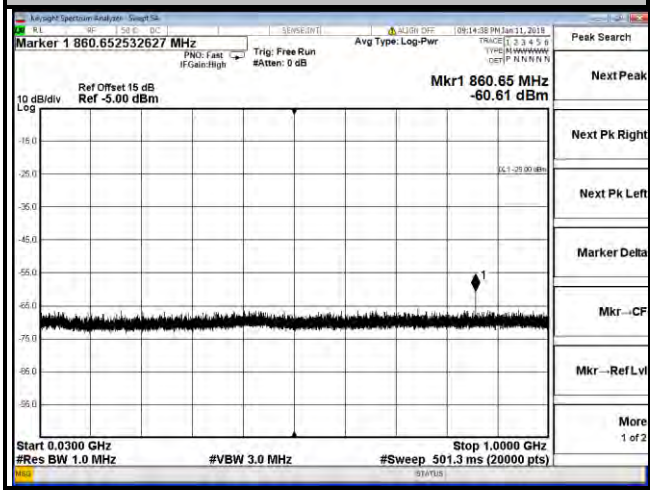
**30MHz ~ 1GHz**

| LTE Band 7 | |
|---|---|
| Channel Bandwidth: 5 MHz | |
| Channel 20775 | Channel 21100 |



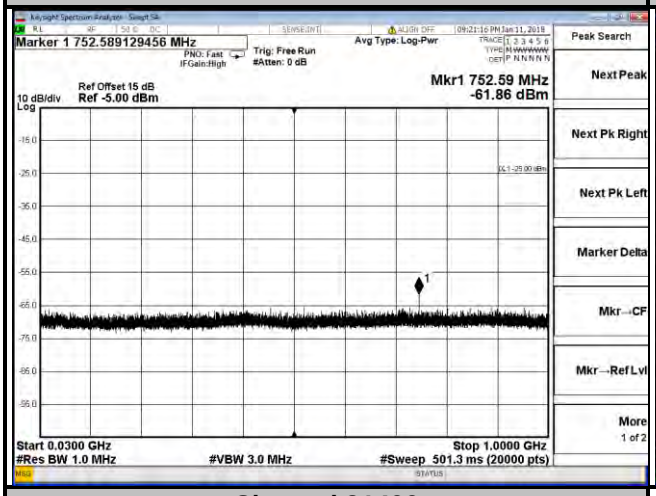

Channel 21425



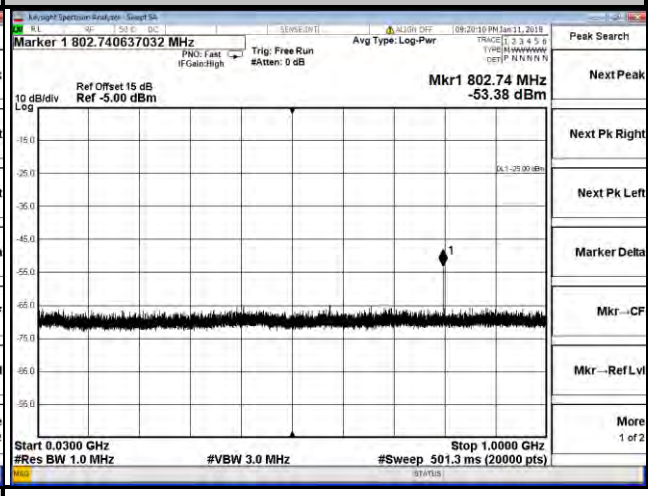
## LTE Band 7

### Channel Bandwidth: 10 MHz

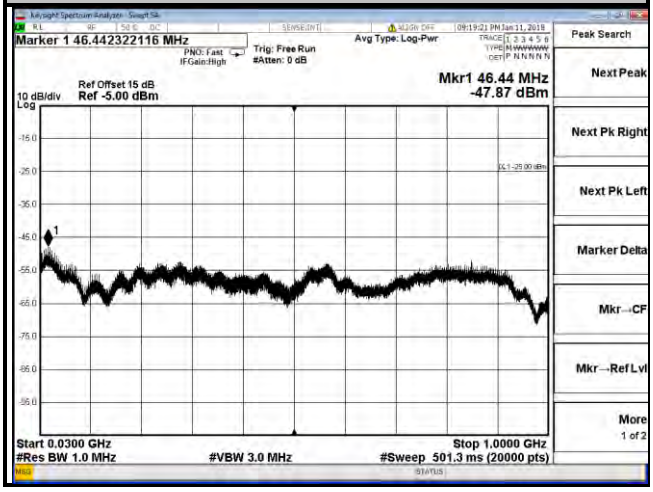
### Channel 20800




### Channel 21100



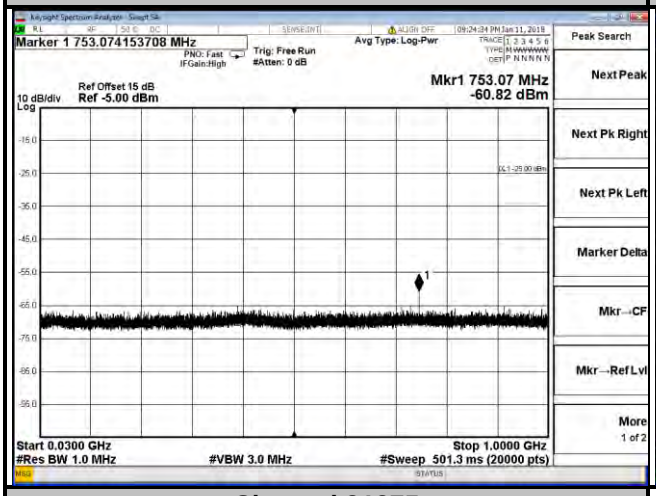

### Channel 21400



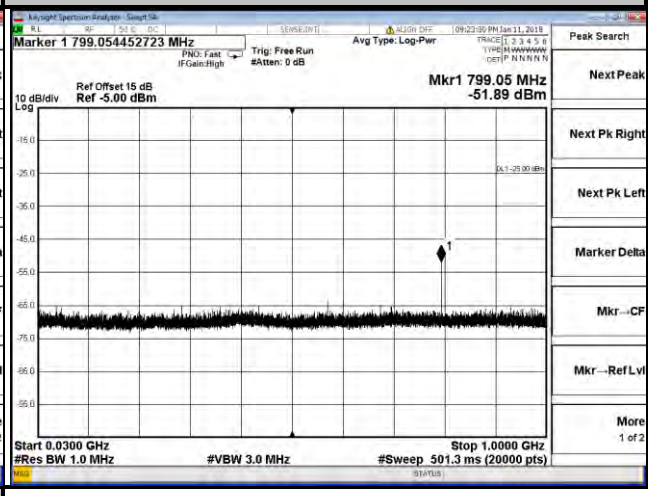
## LTE Band 7

### Channel Bandwidth: 15 MHz

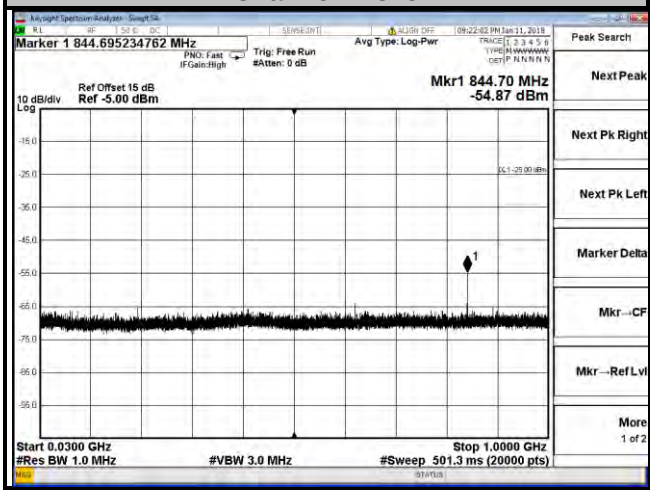
#### Channel 20825



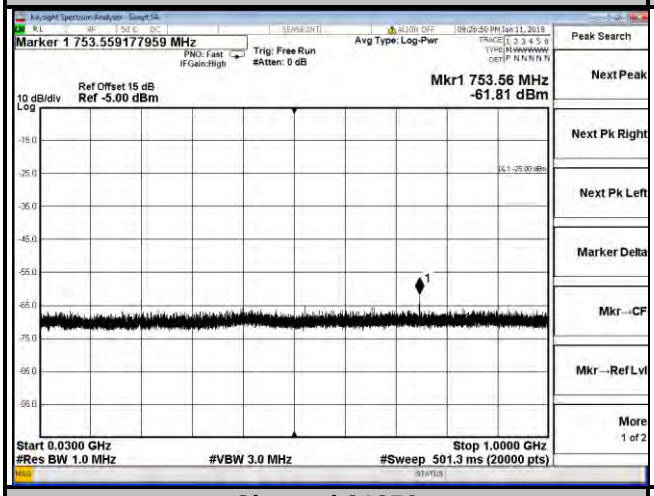

#### Channel 21100

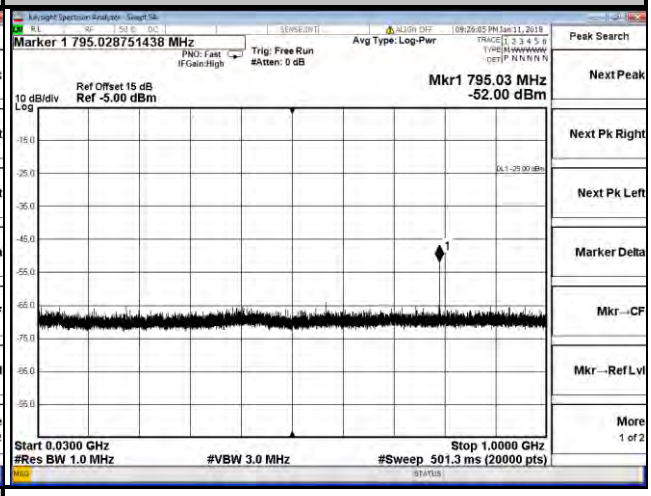



#### Channel 21375

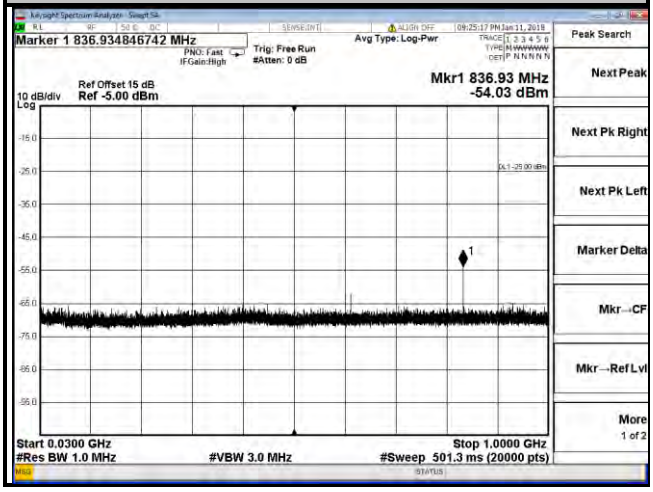


| LTE Band 7 | |
|---|---|
| Channel Bandwidth: 20 MHz | |
| Channel 20850 | Channel 21100 |



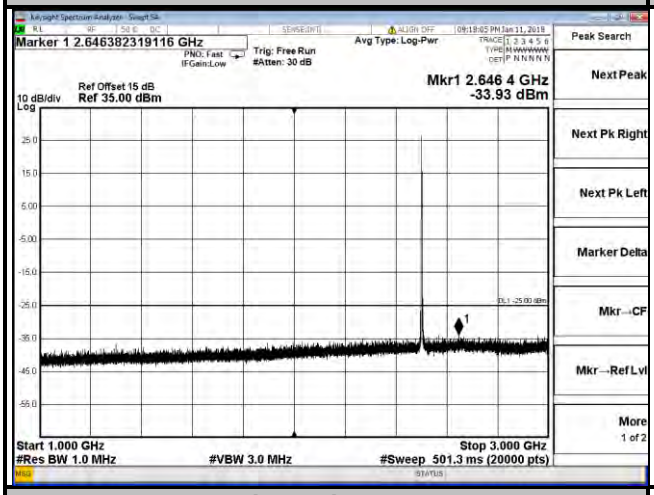



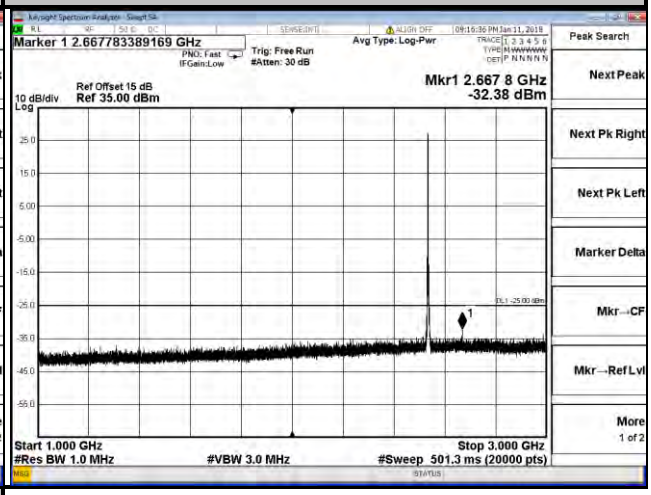

Channel 21350



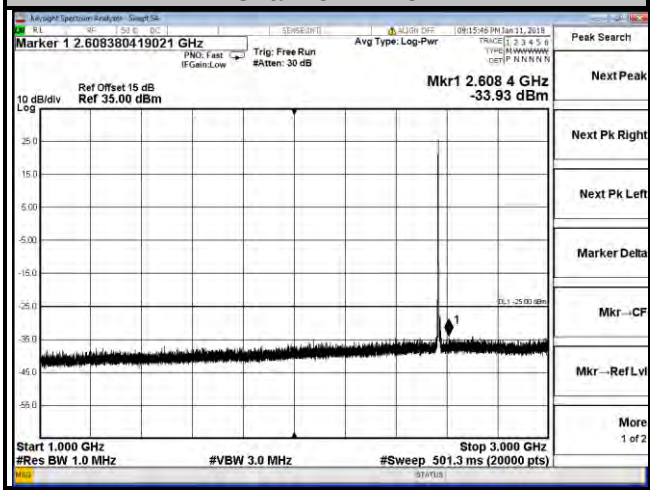
**1GHz ~ 3GHz**

| LTE Band 7 | |
|---|---|
| Channel Bandwidth: 5 MHz | |
| Channel 20775 | Channel 21100 |

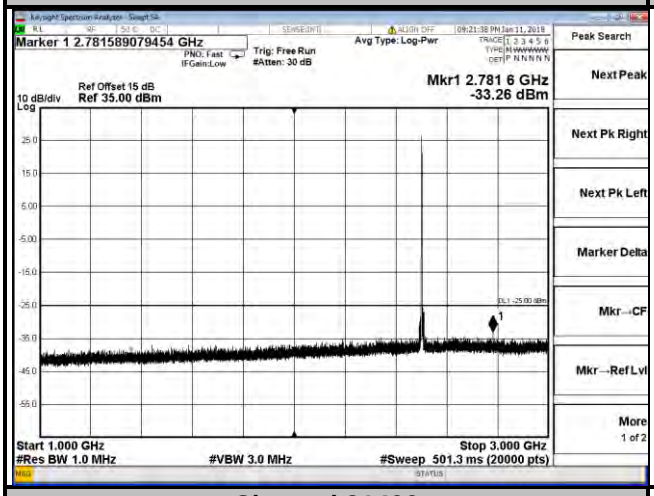


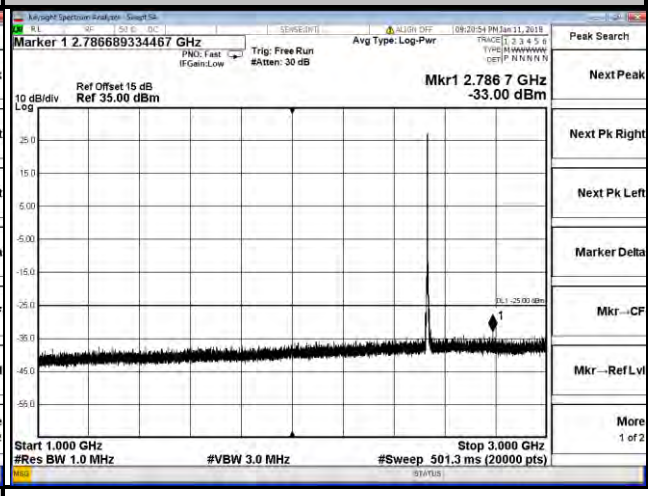




Channel 21425

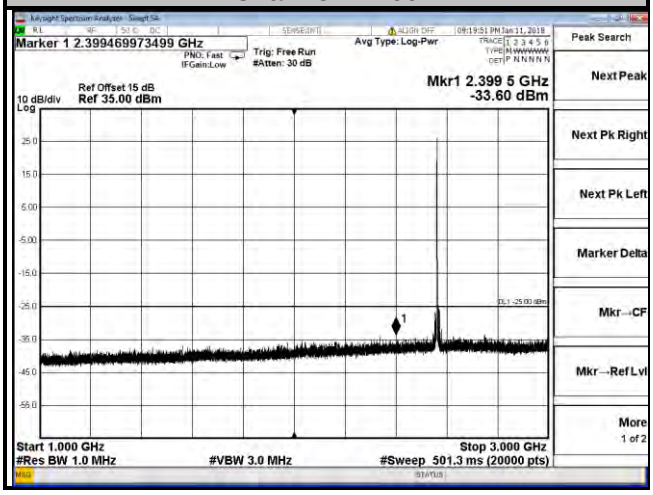


| LTE Band 7 | |
|---|---|
| Channel Bandwidth: 10 MHz | |
| Channel 20800 | Channel 21100 |

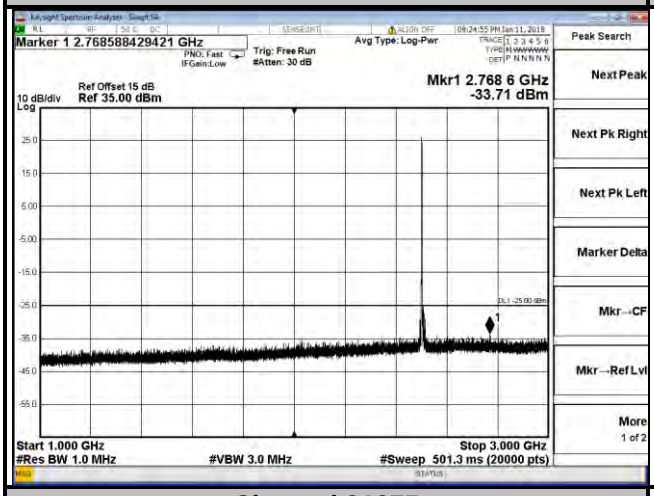


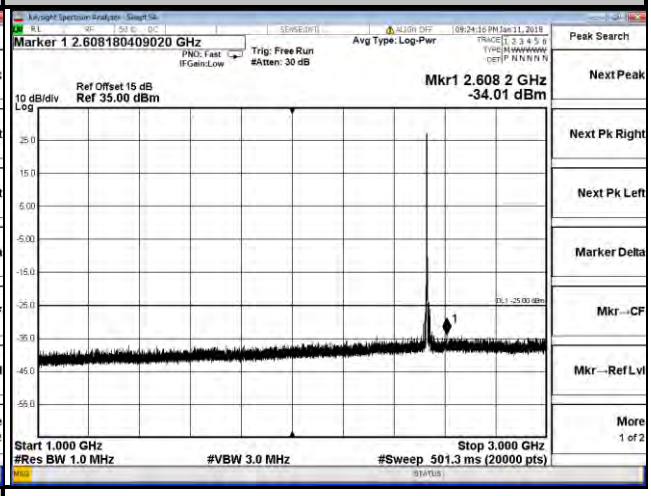




Channel 21400

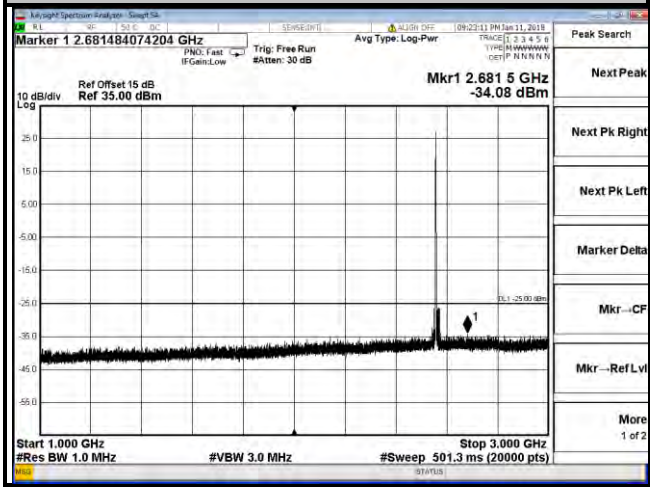


| LTE Band 7 | |
|---|---|
| Channel Bandwidth: 15 MHz | |
| Channel 20825 | Channel 21100 |

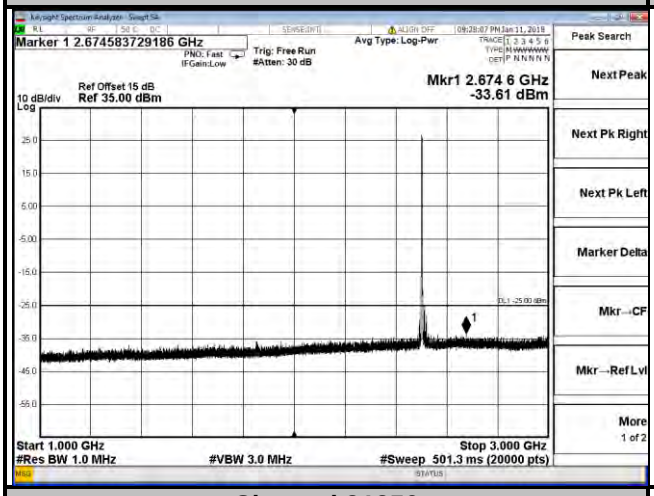


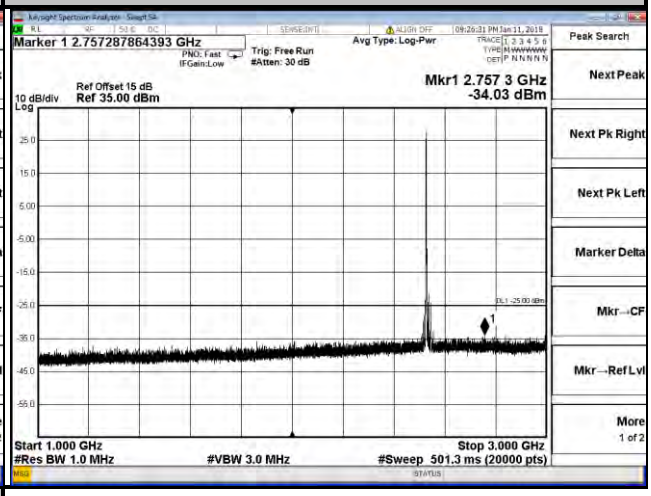




Channel 21375

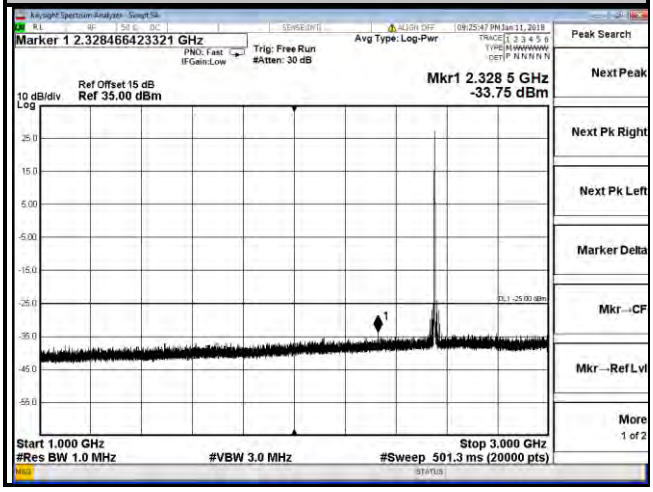


| LTE Band 7 | |
|---|---|
| Channel Bandwidth: 20 MHz | |
| Channel 20850 | Channel 21100 |



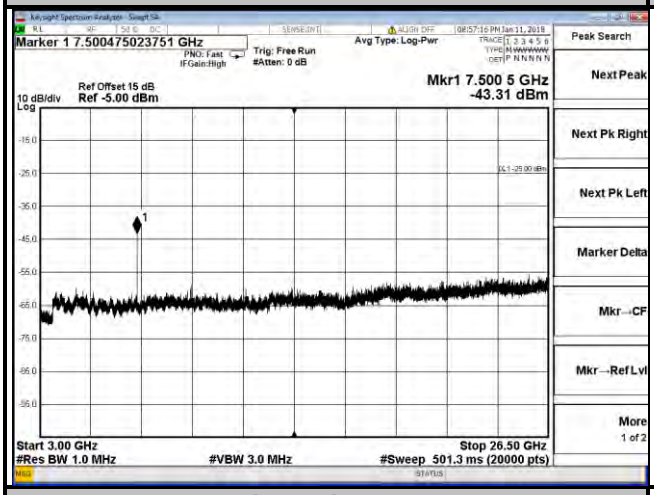



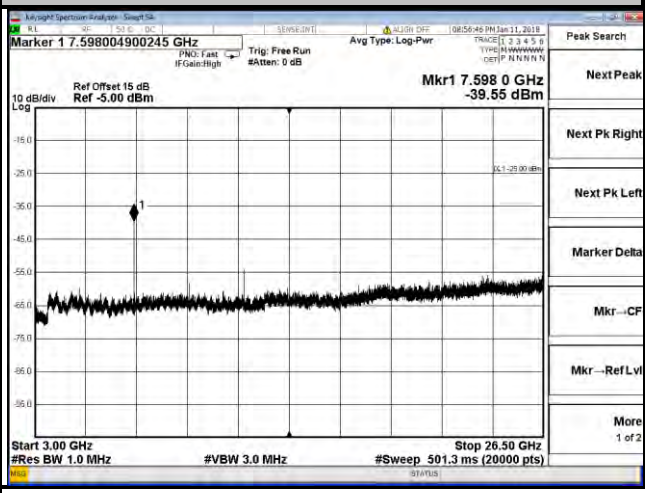

Channel 21350



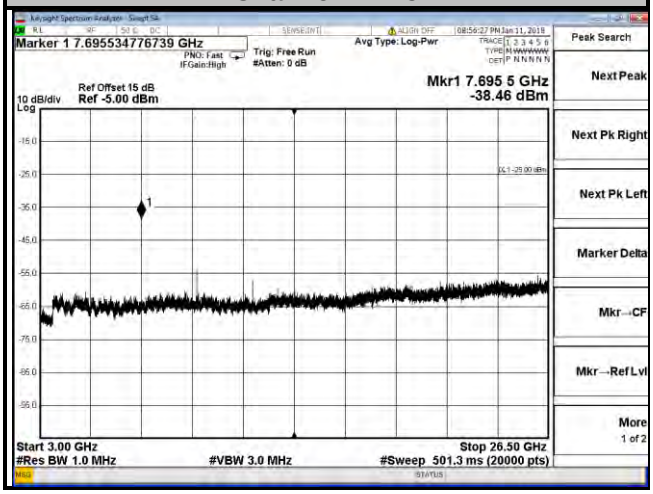
**3GHz ~ 26GHz**

| LTE Band 7 | |
|---|---|
| Channel Bandwidth: 5 MHz | |
| Channel 20775 | Channel 21100 |



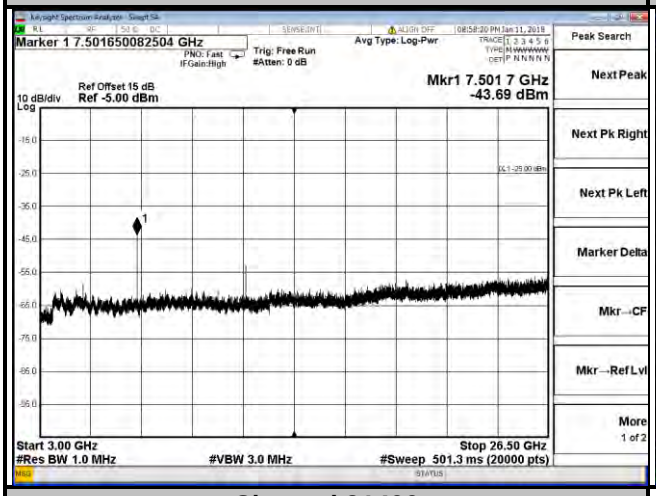

Channel 21425



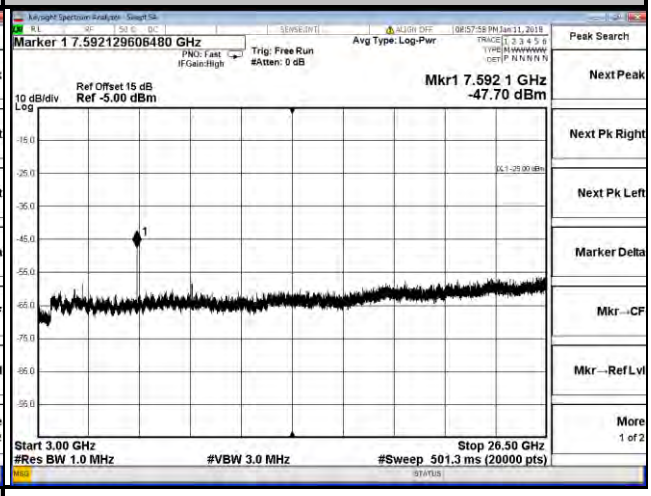
## LTE Band 7

### Channel Bandwidth: 10 MHz

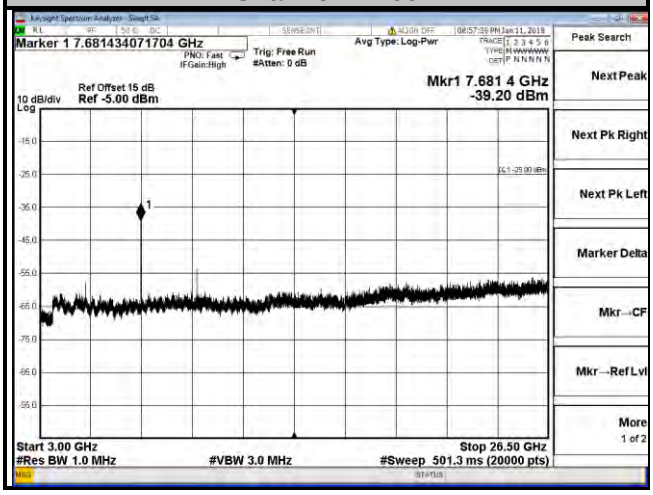
### Channel 20800



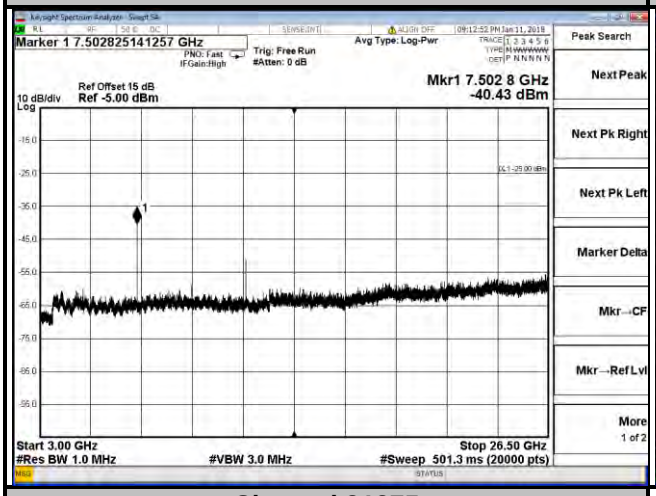

### Channel 21100

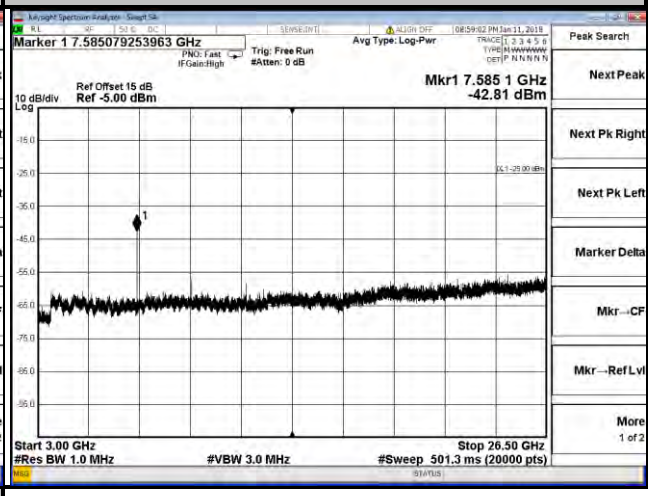



### Channel 21400

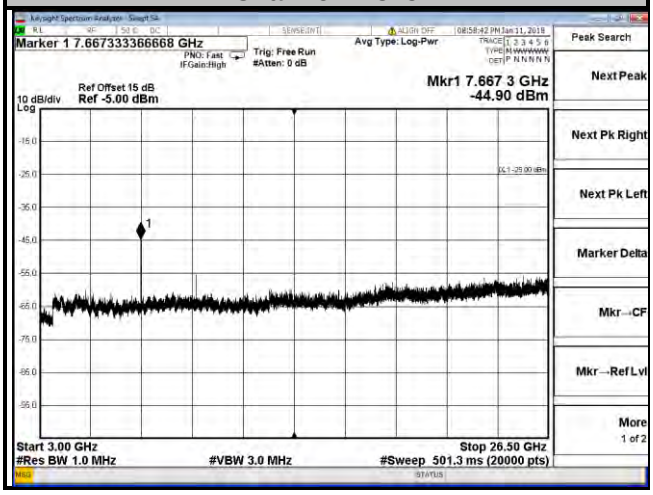


| LTE Band 7 | |
|---|---|
| Channel Bandwidth: 15 MHz | |
| Channel 20825 | Channel 21100 |

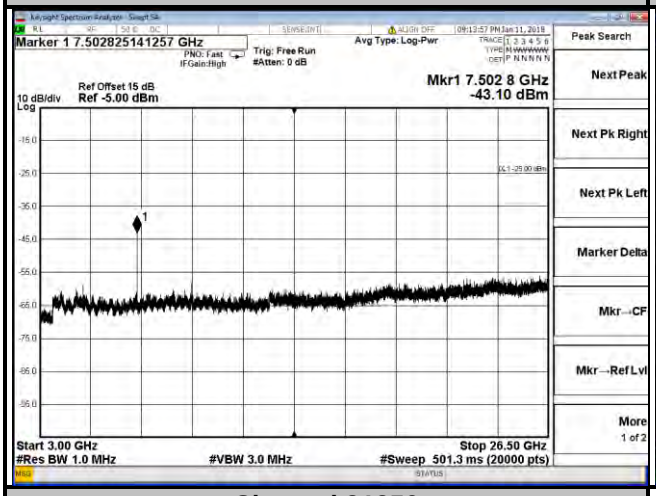


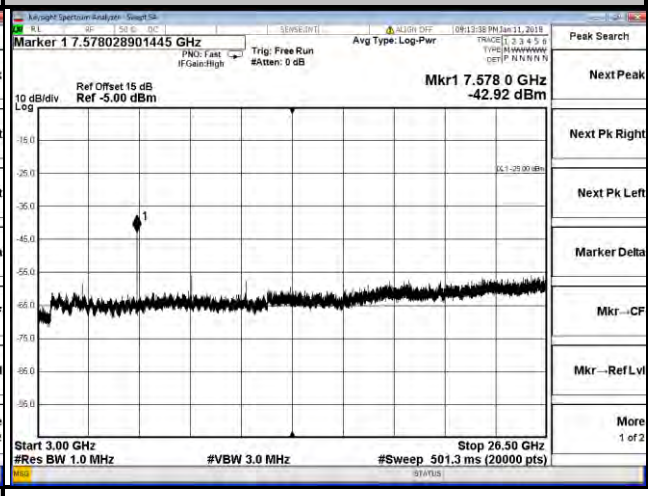




Channel 21375

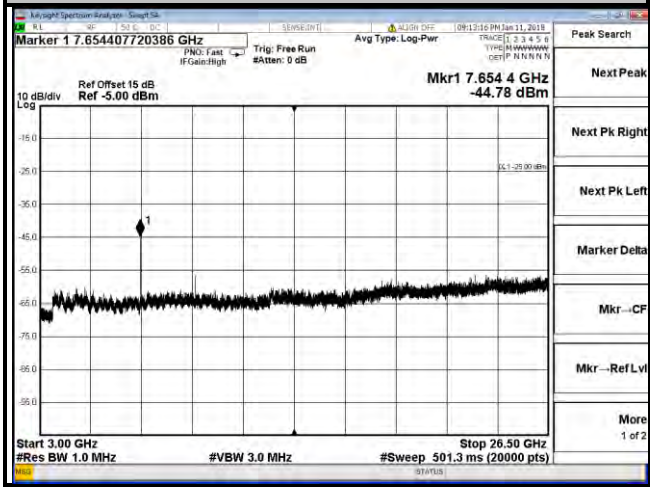


| LTE Band 7 | |
|---|---|
| Channel Bandwidth: 20 MHz | |
| Channel 20850 | Channel 21100 |



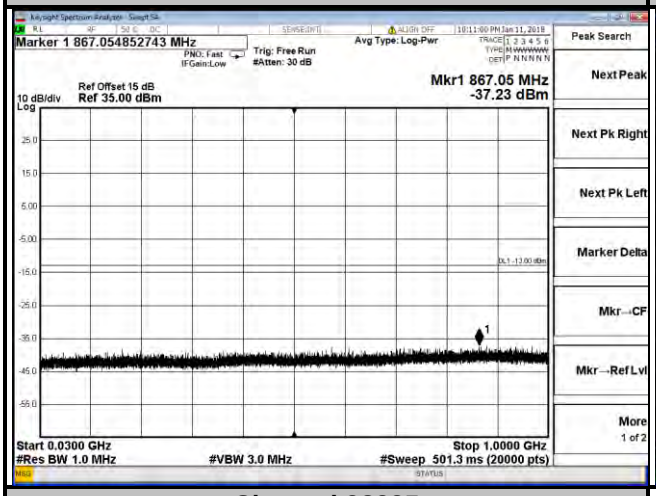

Channel 21350

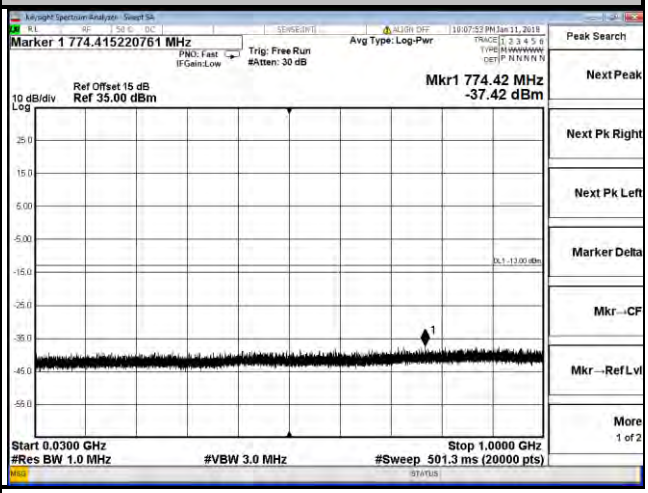


## LTE Band 38

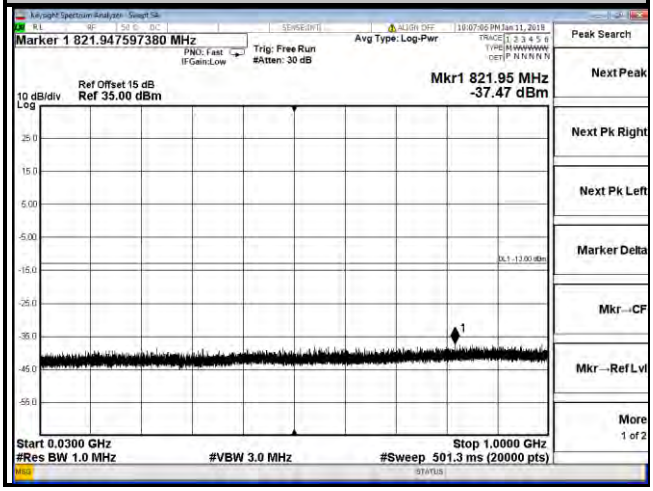
**30MHz ~ 1GHz**

| LTE Band 38 | |
|---|---|
| Channel Bandwidth: 5 MHz | |
| Channel 37775 | Channel 38000 |

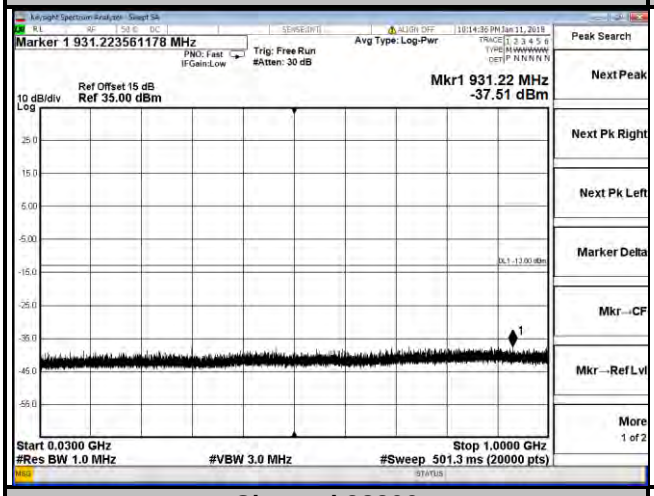


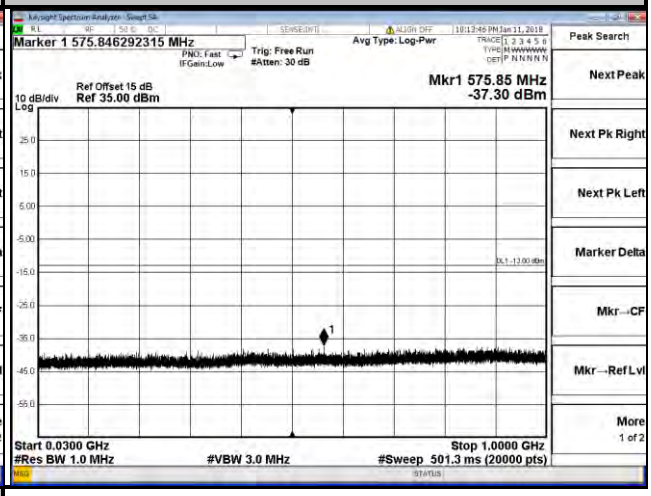




Channel 38225

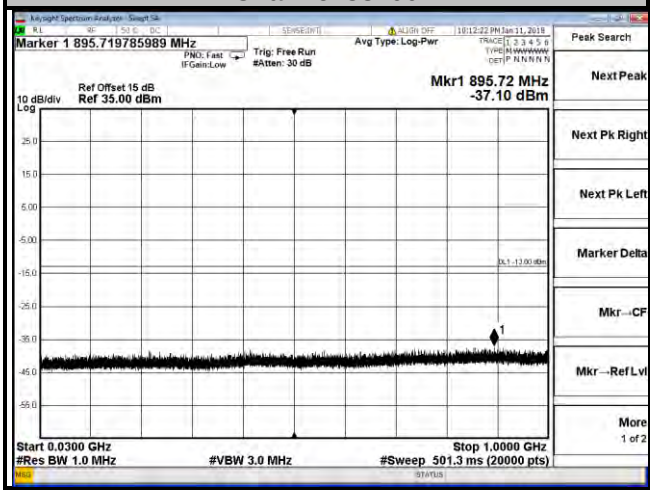


| LTE Band 38 | |
|---|---|
| Channel Bandwidth: 10 MHz | |
| Channel 37800 | Channel 38000 |

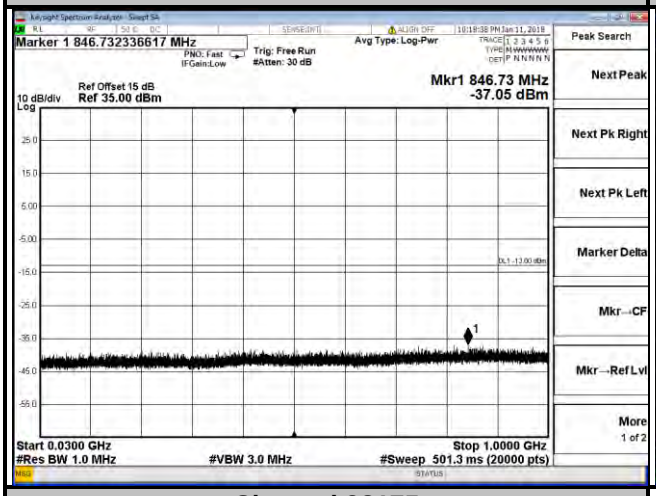


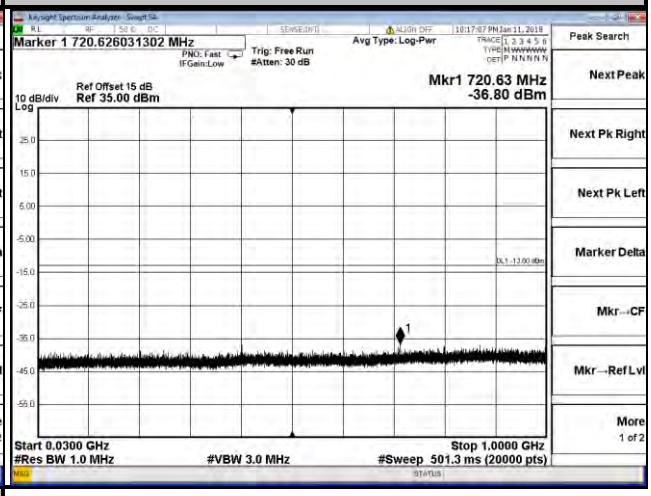




Channel 38200

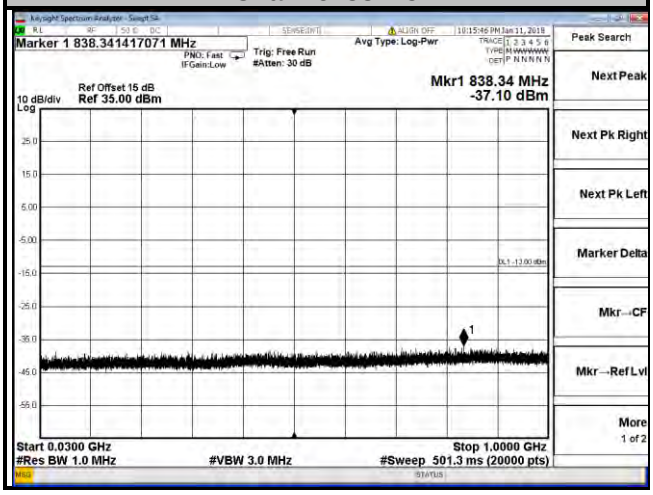


| LTE Band 38 | |
|---|---|
| Channel Bandwidth: 15 MHz | |
| Channel 37825 | Channel 38000 |

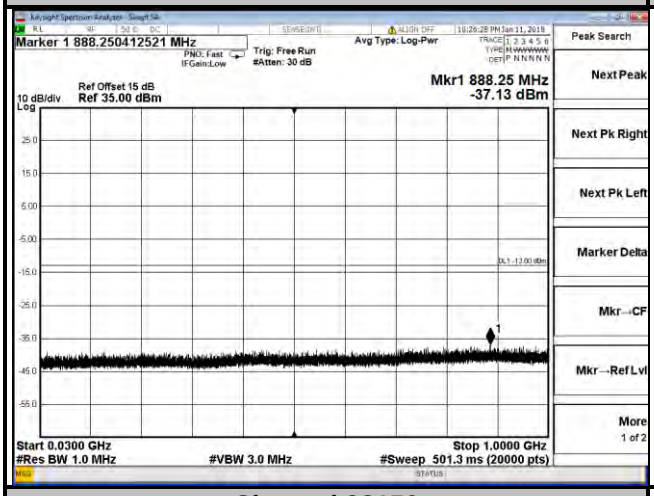


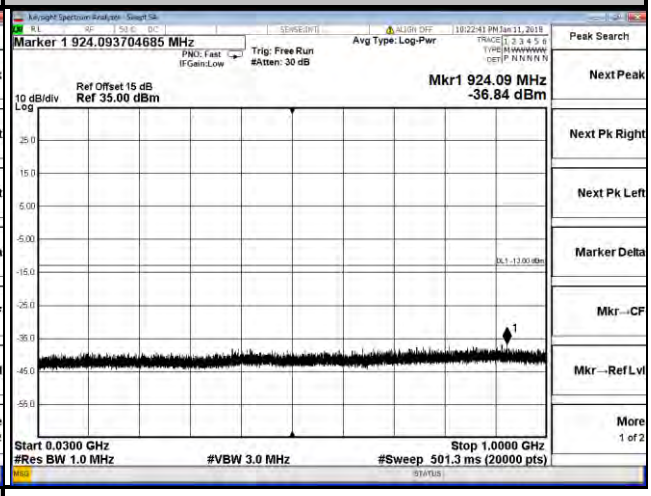




Channel 38175

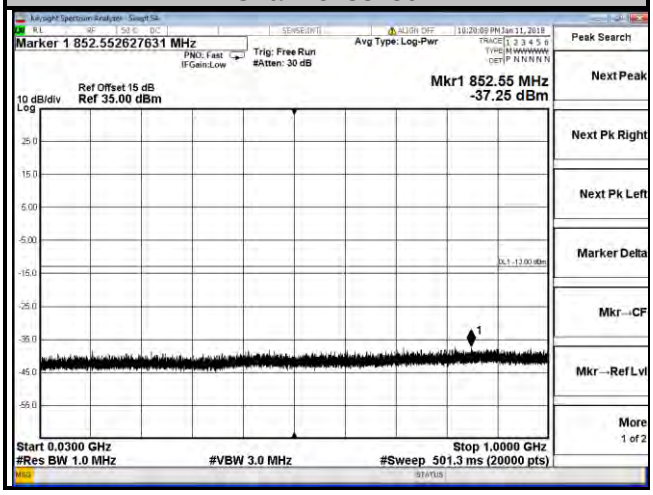


| LTE Band 38 | |
|---|---|
| Channel Bandwidth: 20 MHz | |
| Channel 37850 | Channel 38000 |



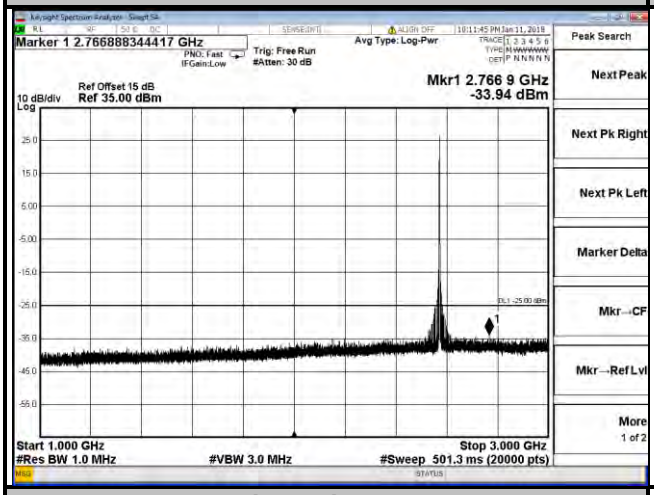



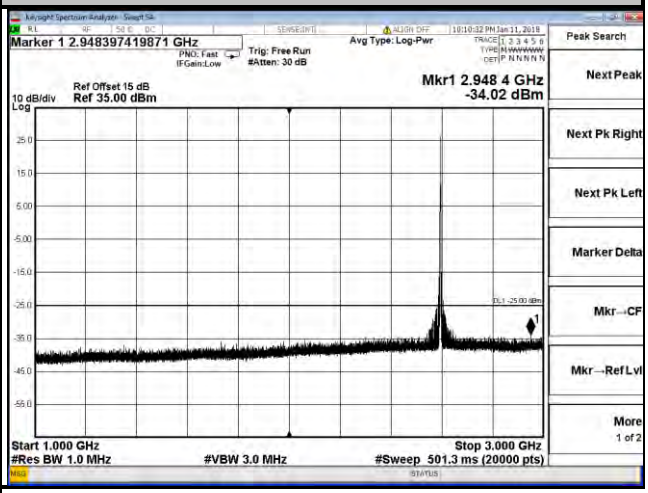

## Channel 38150



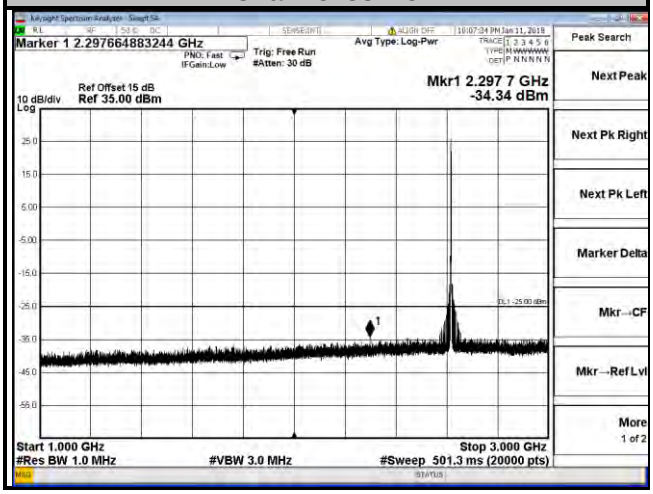
**1GHz ~ 3GHz**

| LTE Band 38 | |
|---|---|
| Channel Bandwidth: 5 MHz | |
| Channel 37775 | Channel 38000 |

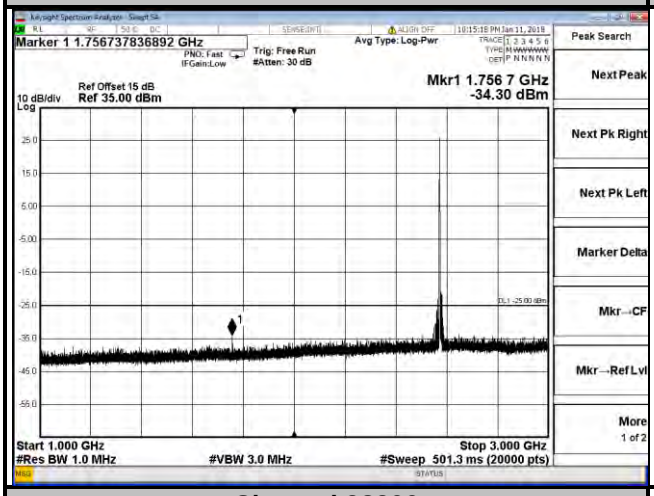


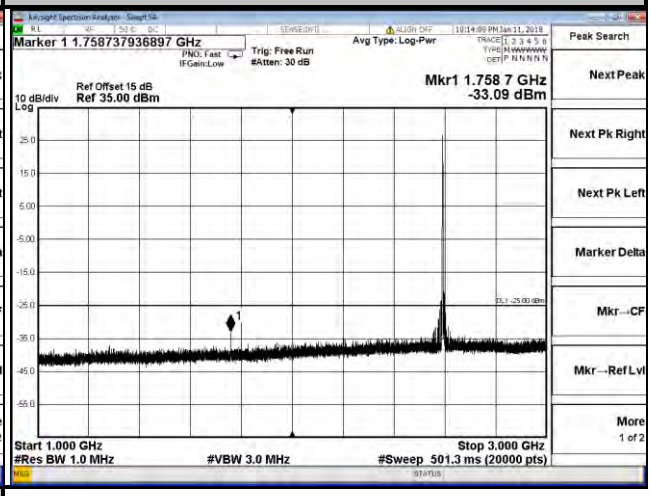




Channel 38225

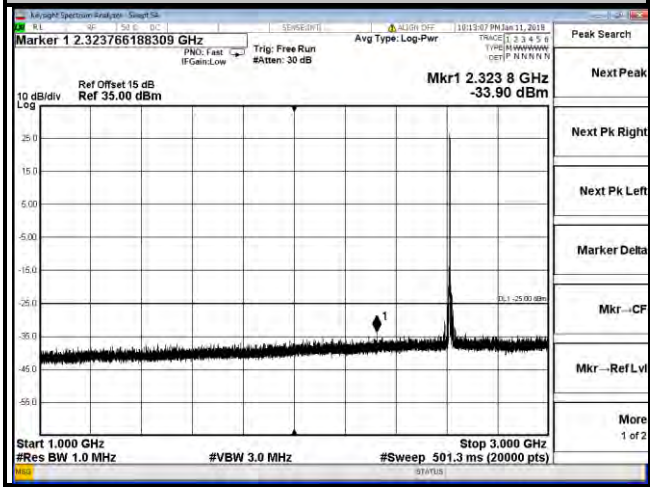


| LTE Band 38 | |
|---|---|
| Channel Bandwidth: 10 MHz | |
| Channel 37800 | Channel 38000 |

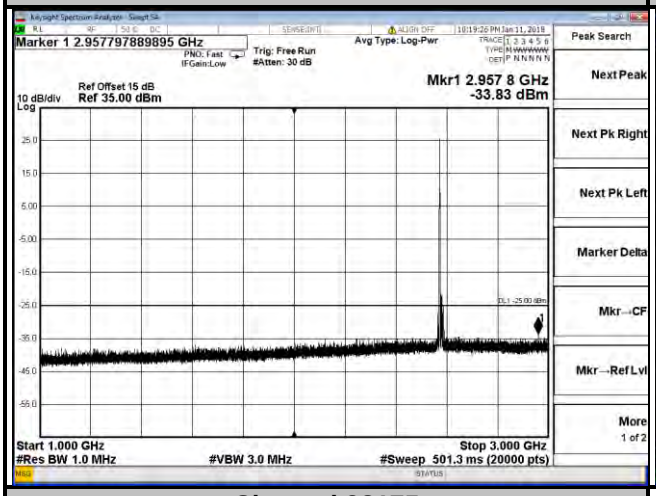


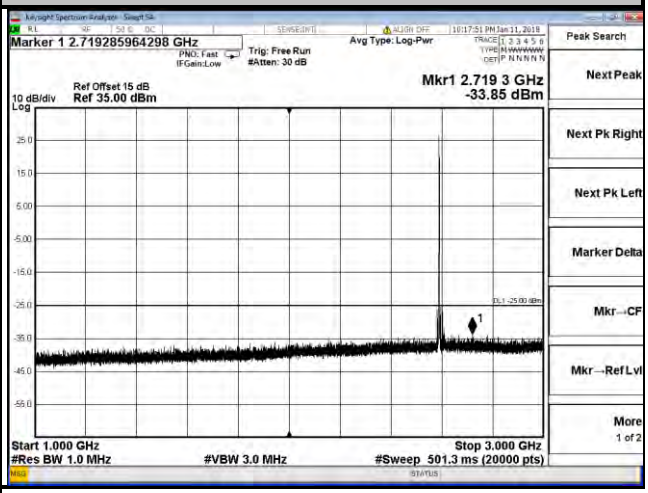




Channel 38200

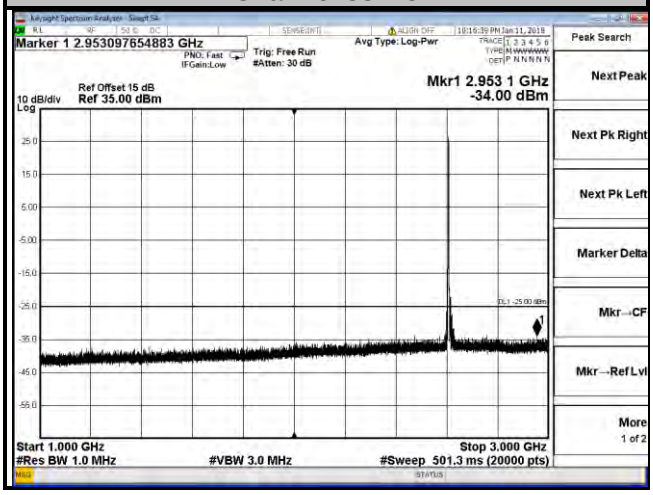


| LTE Band 38 | |
|---|---|
| Channel Bandwidth: 15 MHz | |
| Channel 37825 | Channel 38000 |

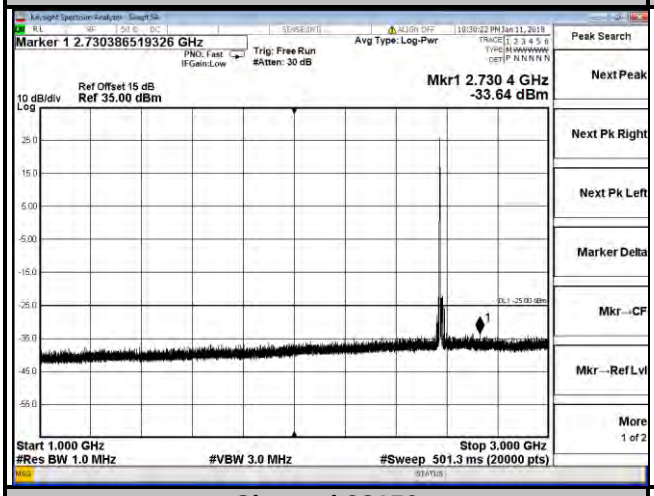


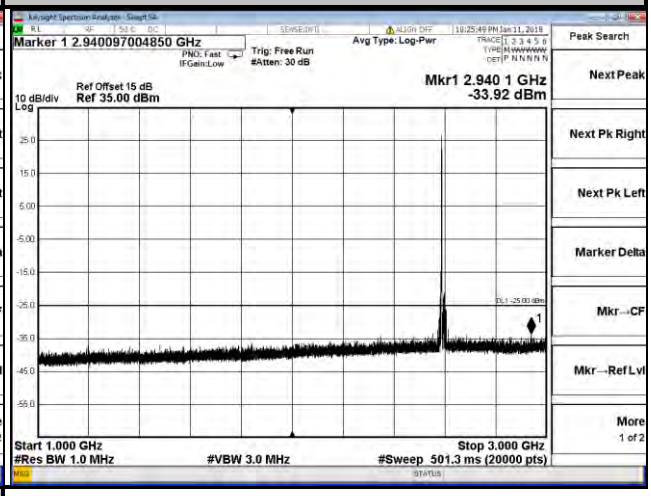




| Channel 38175 |
|---|

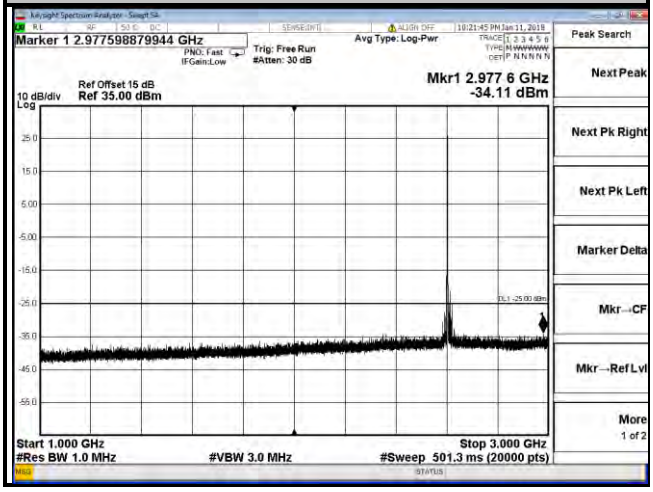


| LTE Band 38 | |
|---|---|
| Channel Bandwidth: 20 MHz | |
| Channel 37850 | Channel 38000 |



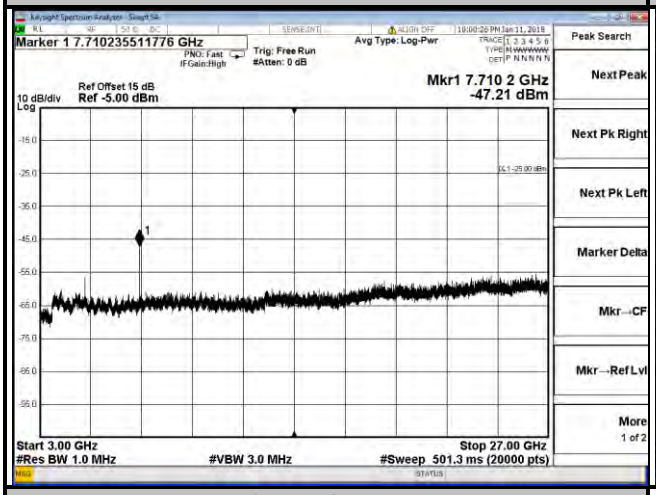



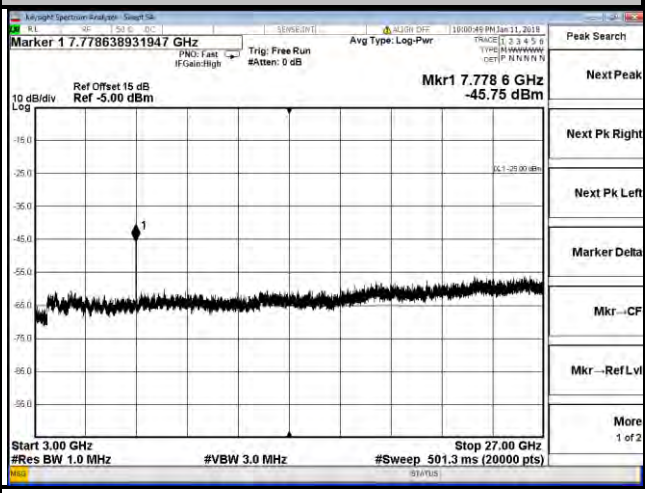

Channel 38150



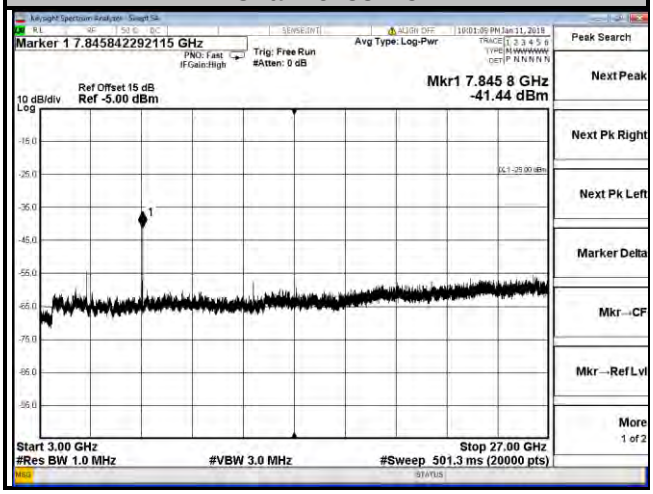
**3GHz ~ 27GHz**

| LTE Band 38 | |
|---|---|
| Channel Bandwidth: 5 MHz | |
| Channel 37775 | Channel 38000 |



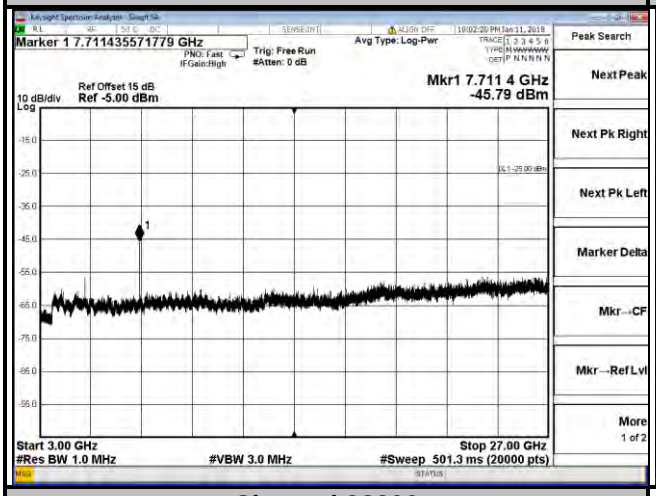

Channel 38225



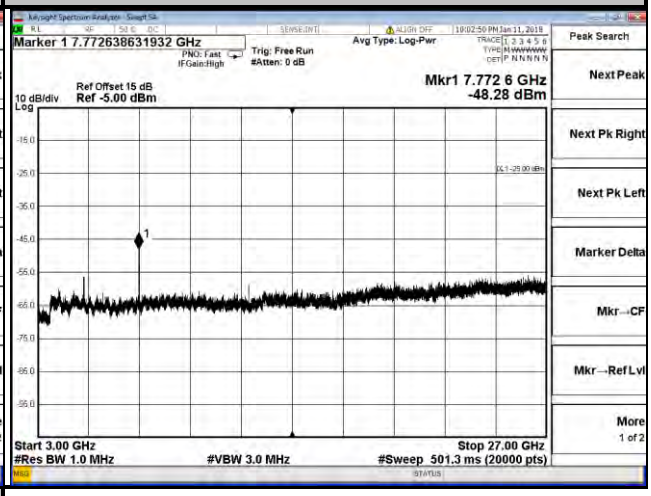
## LTE Band 38

### Channel Bandwidth: 10 MHz

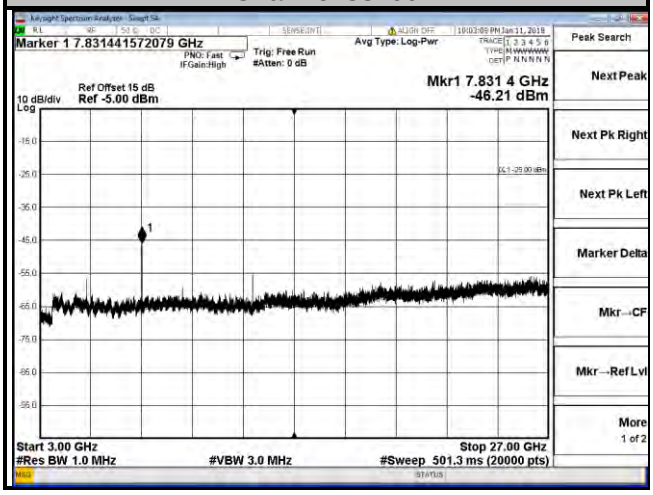
### Channel 37800



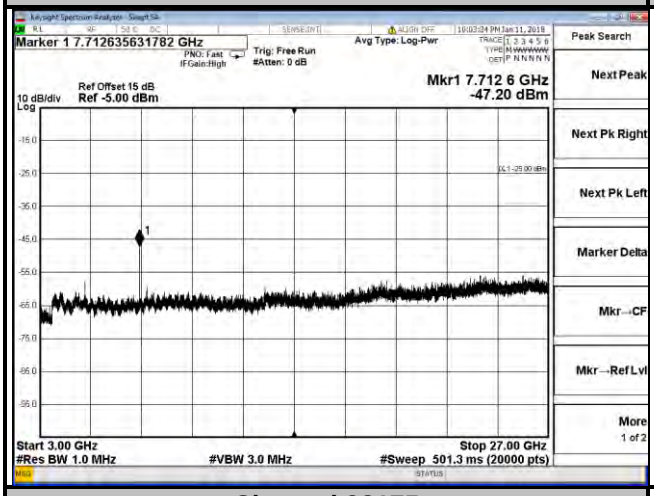

### Channel 38000

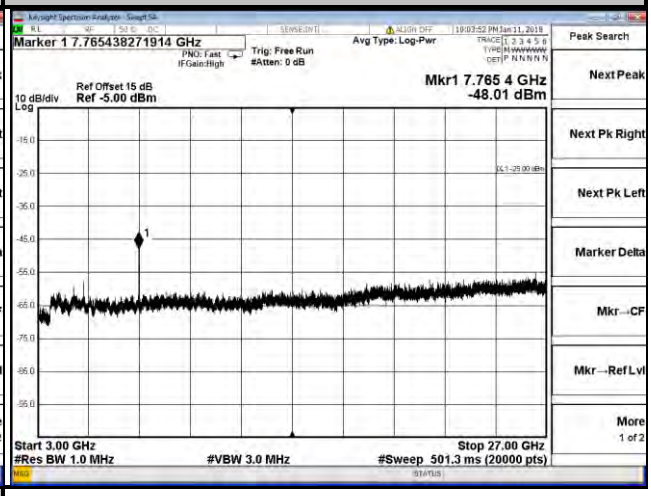



### Channel 38200

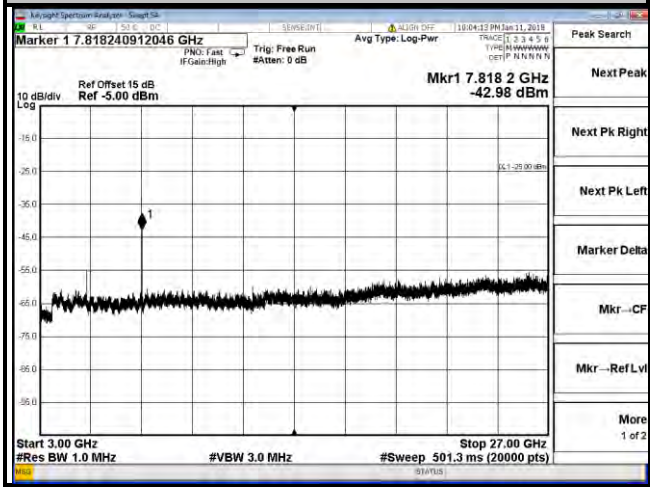


| LTE Band 38 | |
|---|---|
| Channel Bandwidth: 15 MHz | |
| Channel 37825 | Channel 38000 |

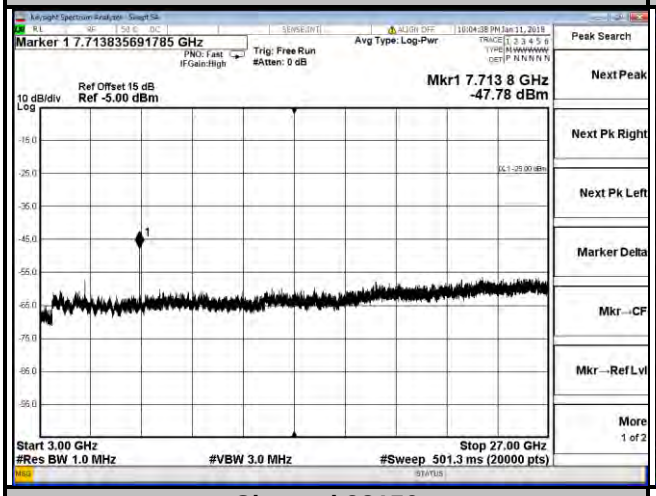


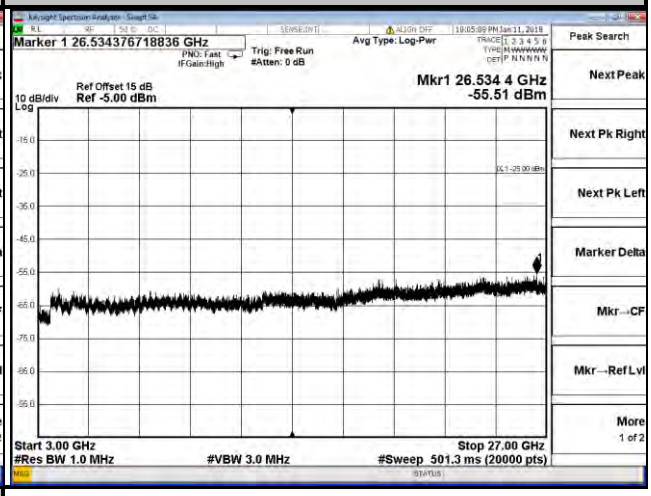




Channel 38175

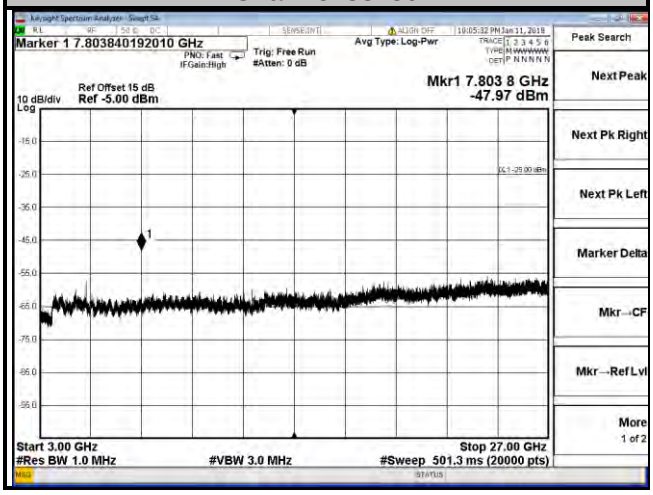


| LTE Band 38 | |
|---|---|
| Channel Bandwidth: 20 MHz | |
| Channel 37850 | Channel 38000 |



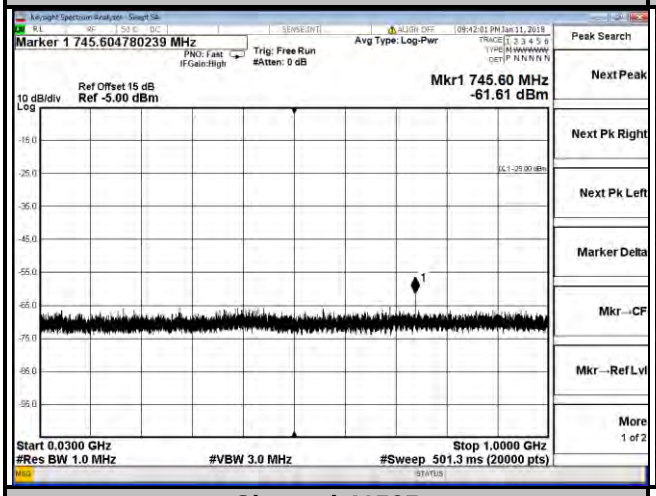

Channel 38150

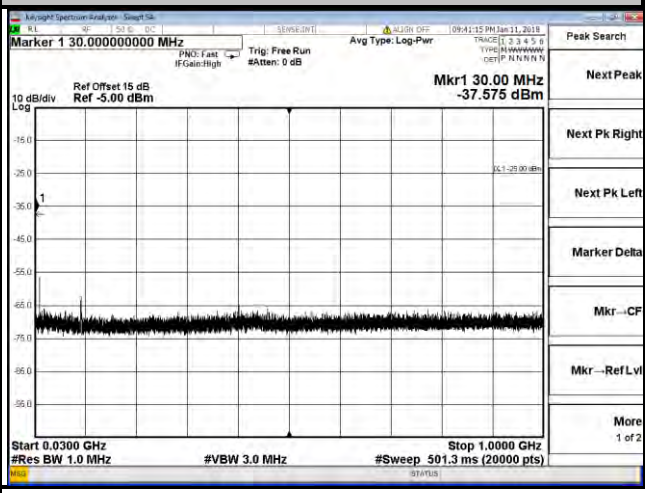


## LTE Band 41

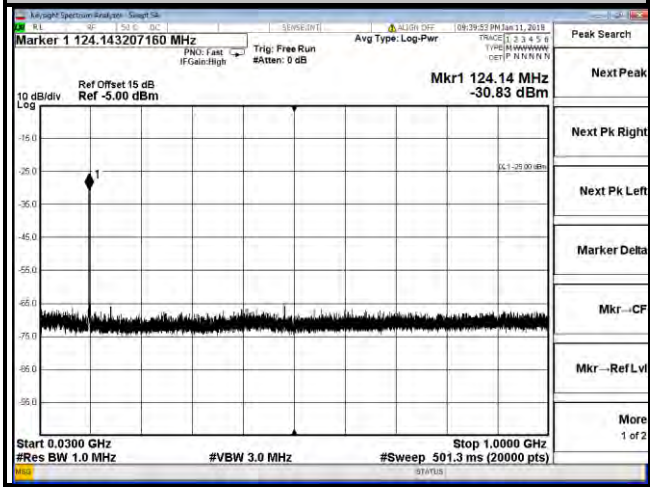
**30MHz ~ 1GHz**

| LTE Band 41 | |
|---|---|
| Channel Bandwidth: 5 MHz | |
| Channel 39675 | Channel 40620 |

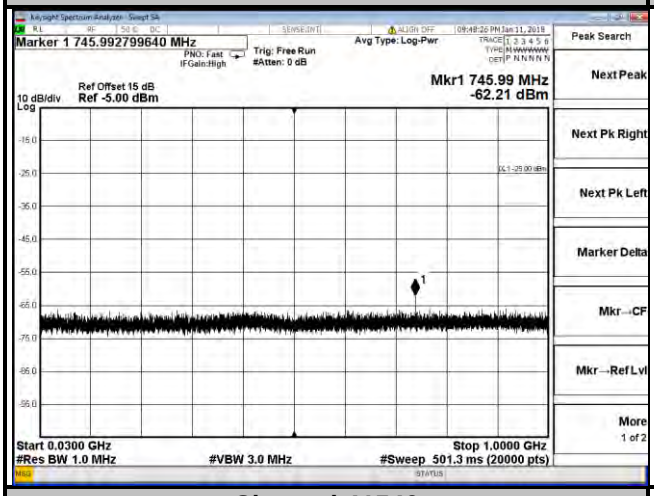


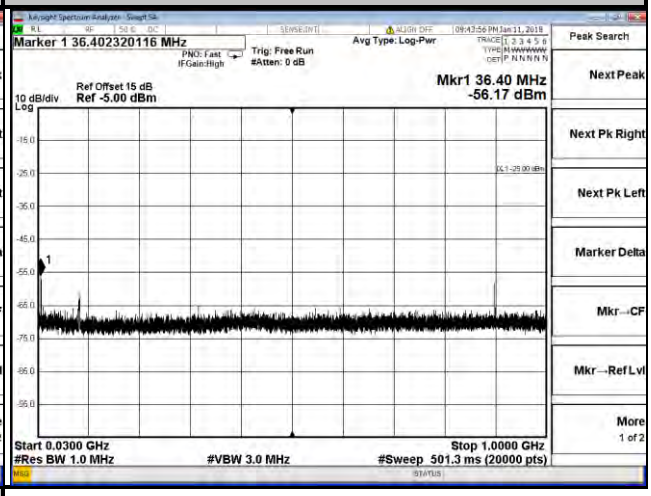




Channel 41565

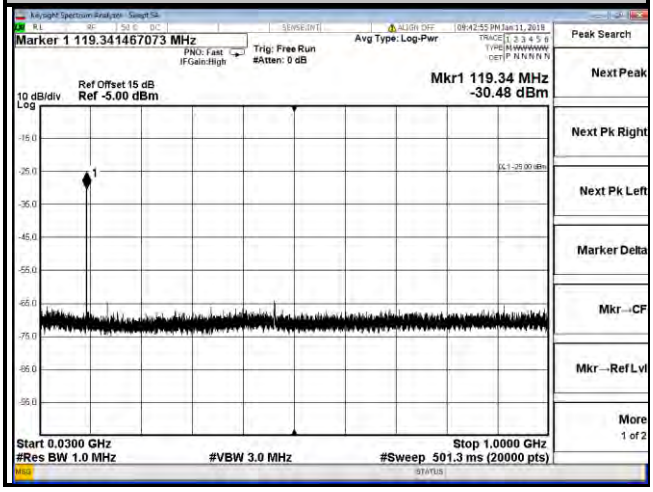


| LTE Band 41 | |
|---|---|
| Channel Bandwidth: 10 MHz | |
| Channel 39700 | Channel 40620 |

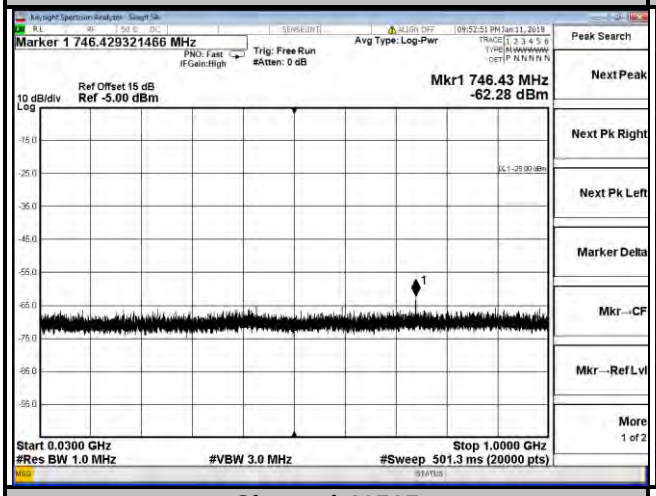


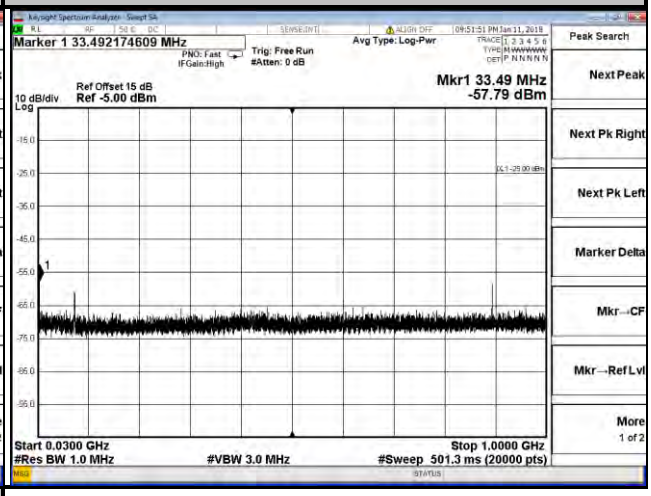




Channel 41540

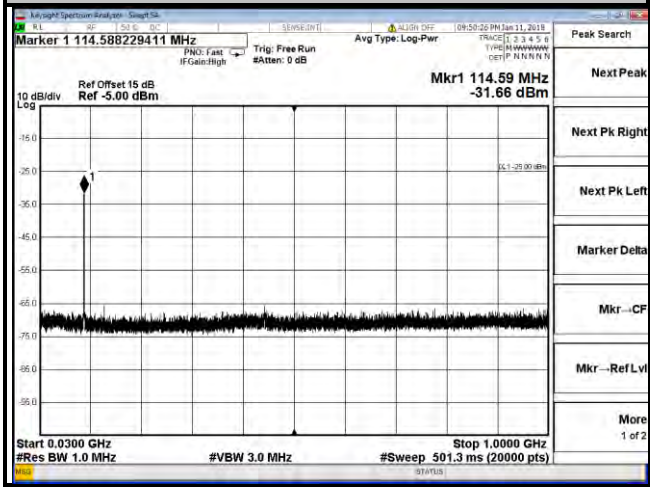


| LTE Band 41 | |
|---|---|
| Channel Bandwidth: 15 MHz | |
| Channel 39725 | Channel 40620 |

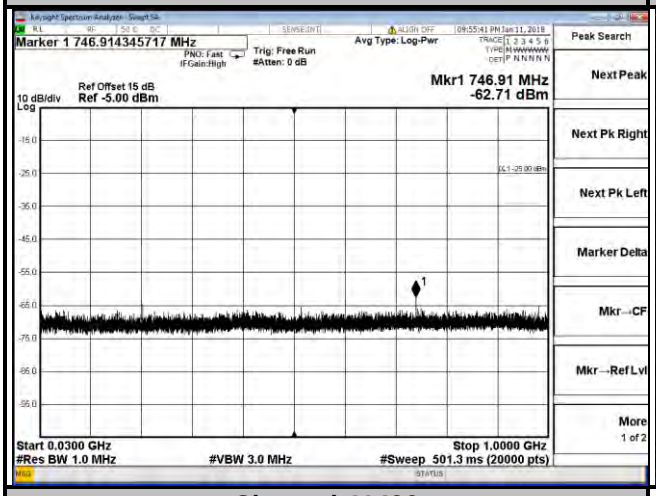


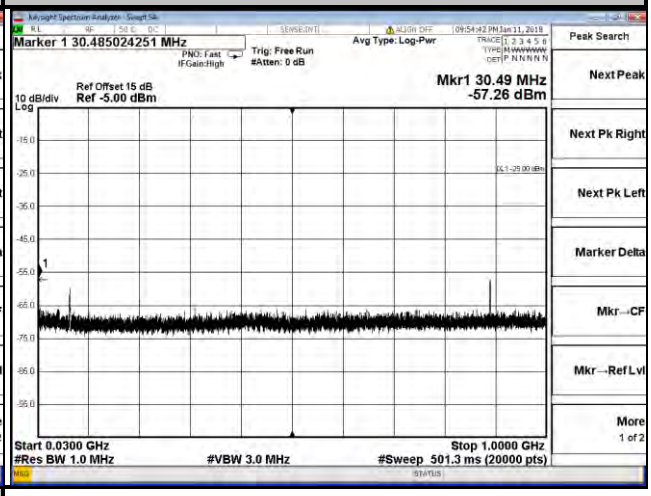




Channel 41515

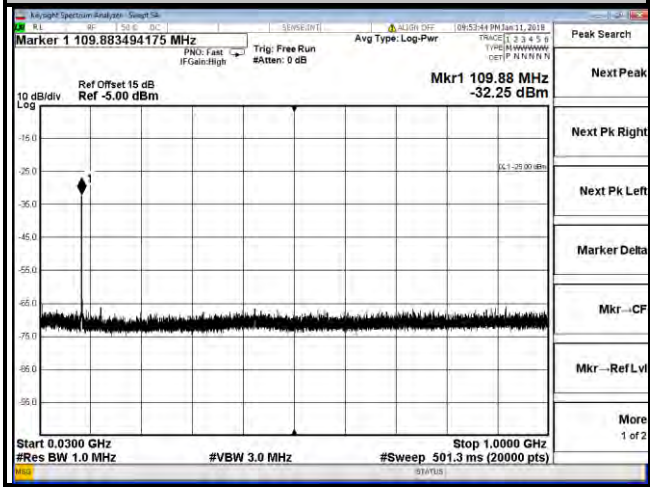


| LTE Band 41 | |
|---|---|
| Channel Bandwidth: 20 MHz | |
| Channel 39750 | Channel 40620 |



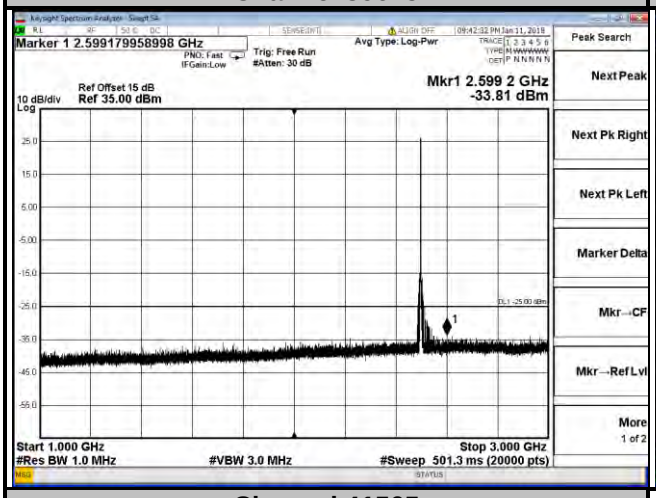



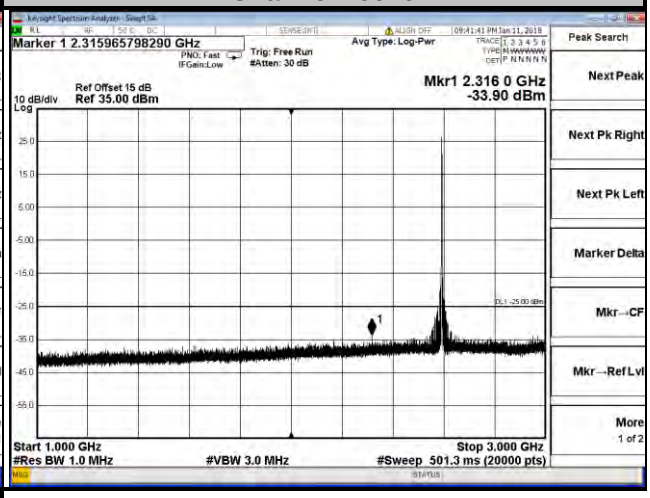

Channel 41490



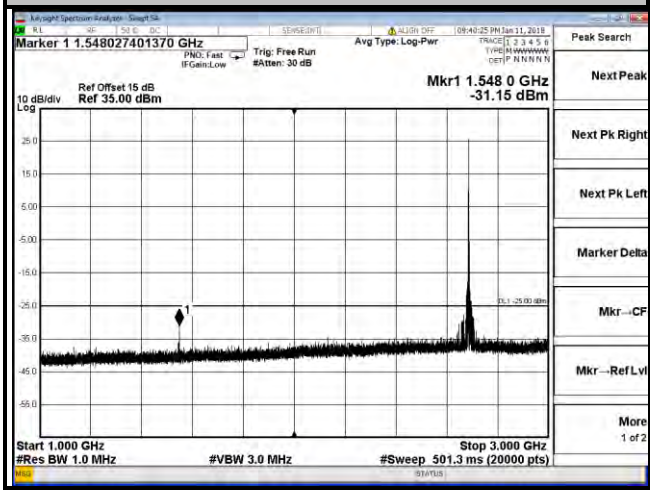
**1GHz ~ 3GHz**

| LTE Band 41 | |
|---|---|
| Channel Bandwidth: 5 MHz | |
| Channel 39675 | Channel 40620 |

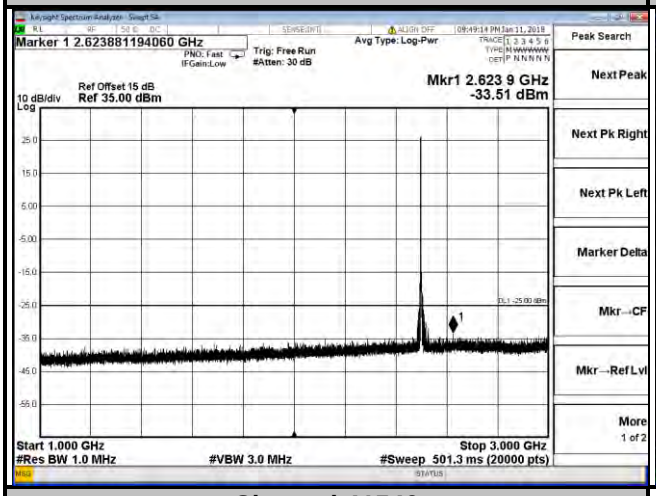


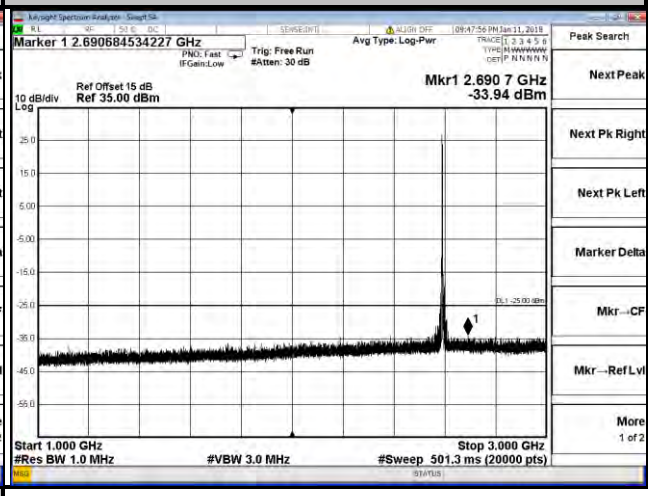




Channel 41565

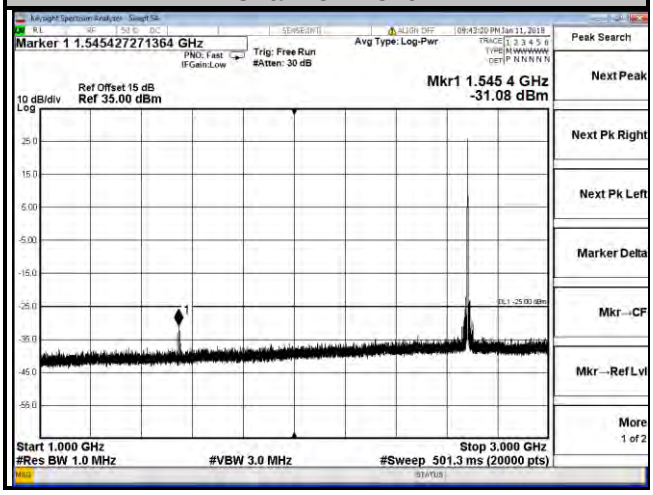


| LTE Band 41 | |
|---|---|
| Channel Bandwidth: 10 MHz | |
| Channel 39700 | Channel 40620 |



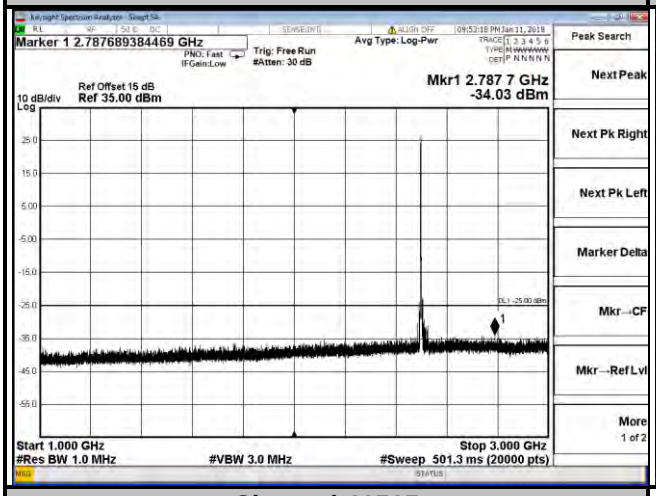

Channel 41540



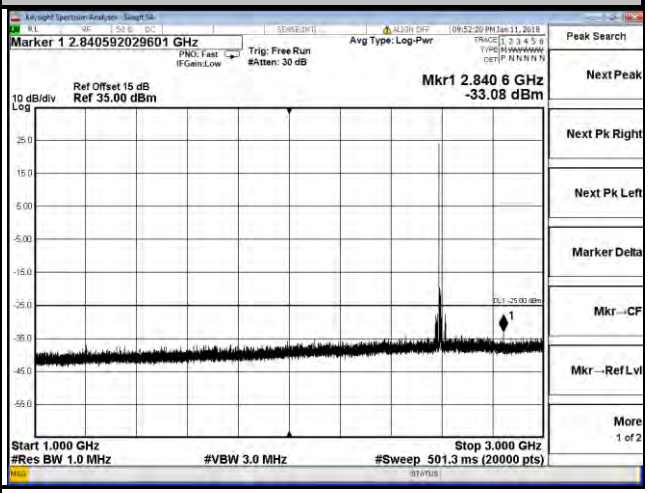
## LTE Band 41

### Channel Bandwidth: 15 MHz

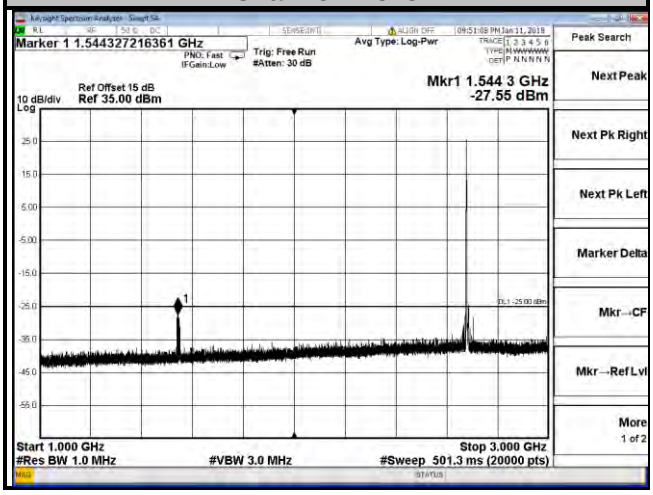
### Channel 39725



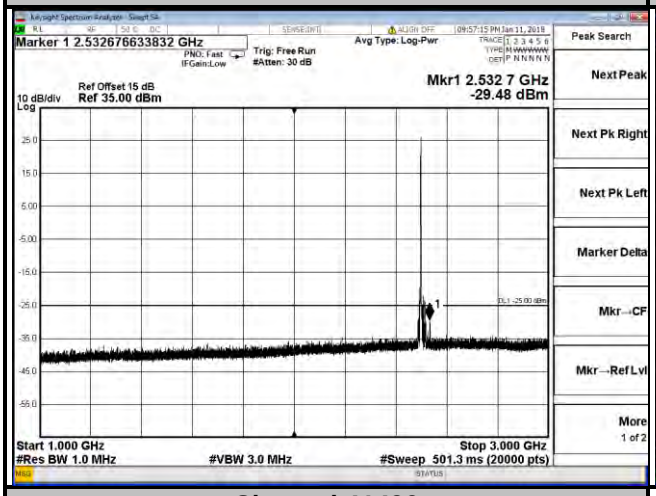

### Channel 40620

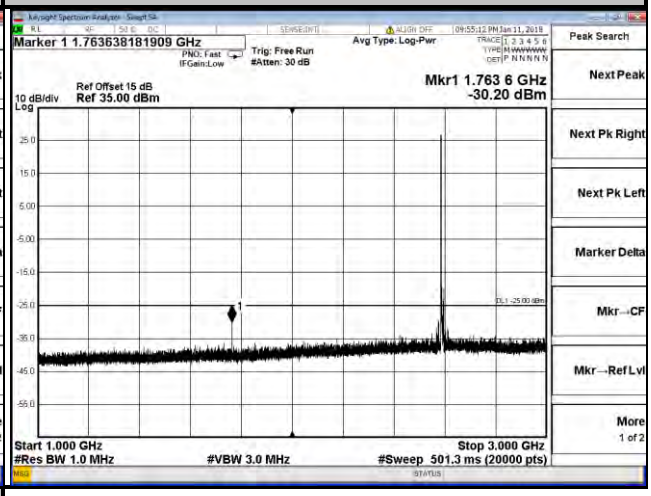



### Channel 41515

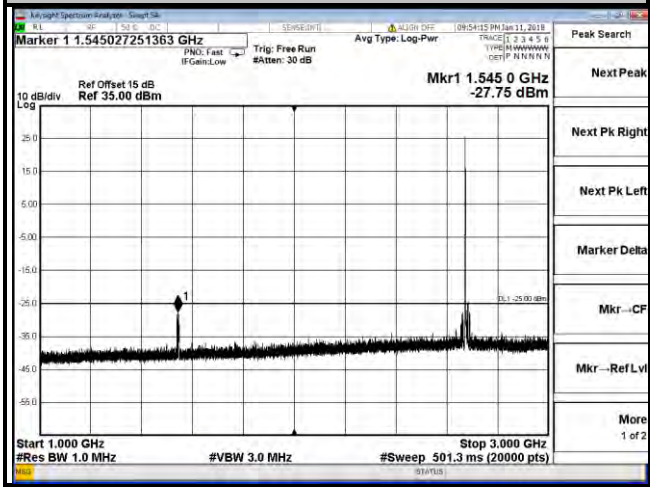


| LTE Band 41 | |
|---|---|
| Channel Bandwidth: 20 MHz | |
| Channel 39750 | Channel 40620 |



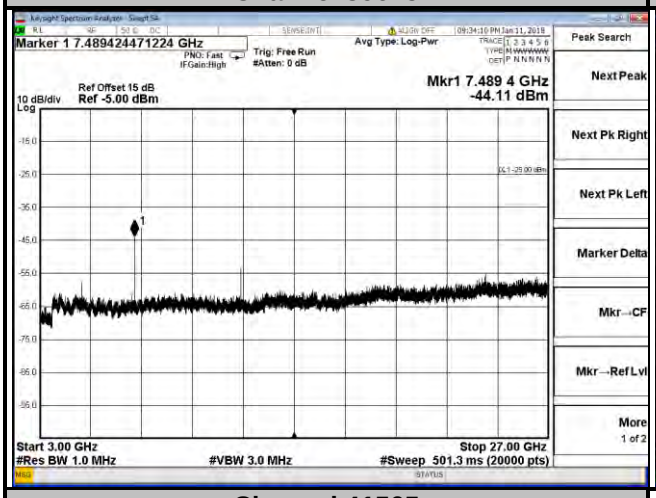



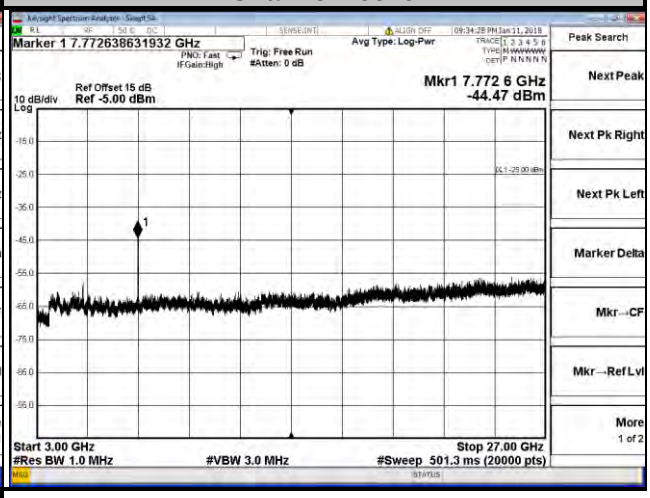

Channel 41490



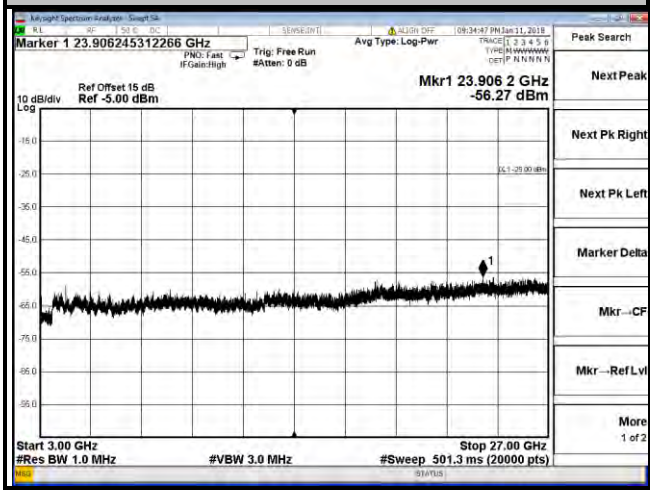
**3GHz ~ 27GHz**

| LTE Band 41 | |
|---|---|
| Channel Bandwidth: 5 MHz | |
| Channel 39675 | Channel 40620 |

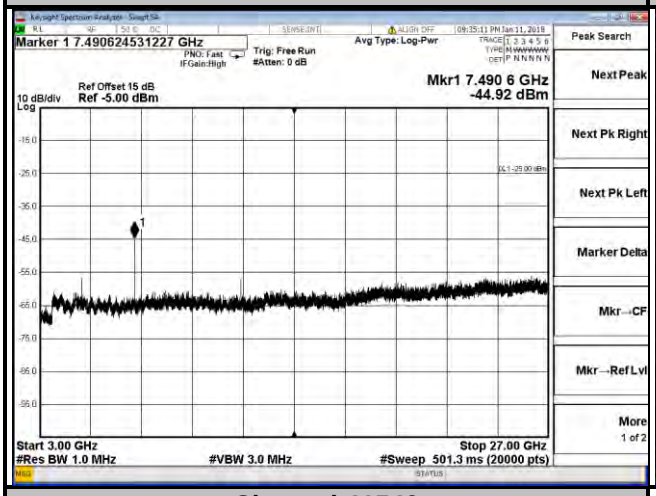


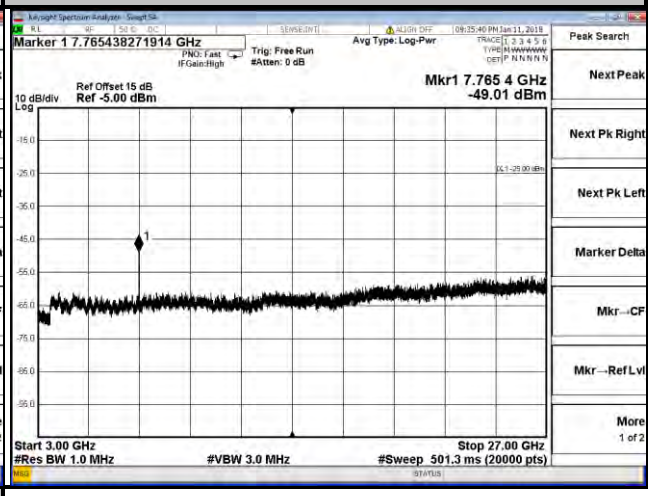




Channel 41565

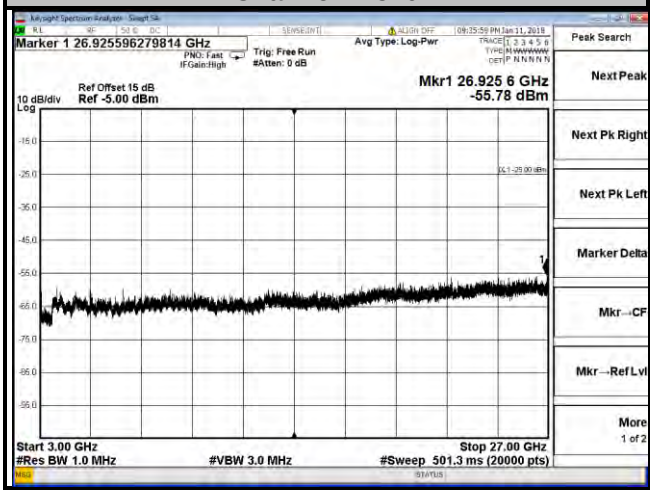


| LTE Band 41 | |
|---|---|
| Channel Bandwidth: 10 MHz | |
| Channel 39700 | Channel 40620 |

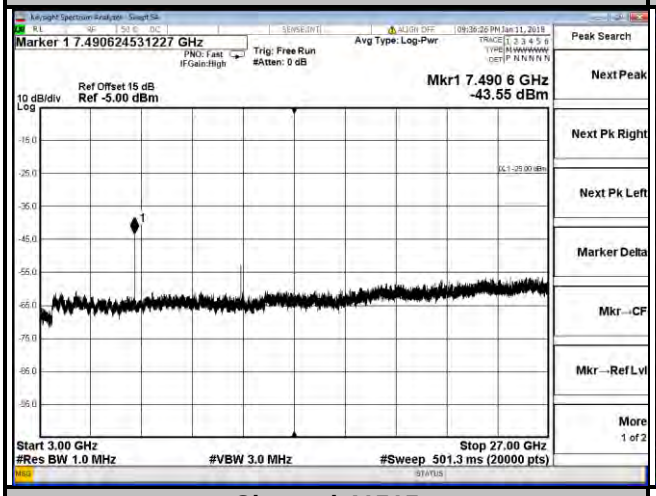


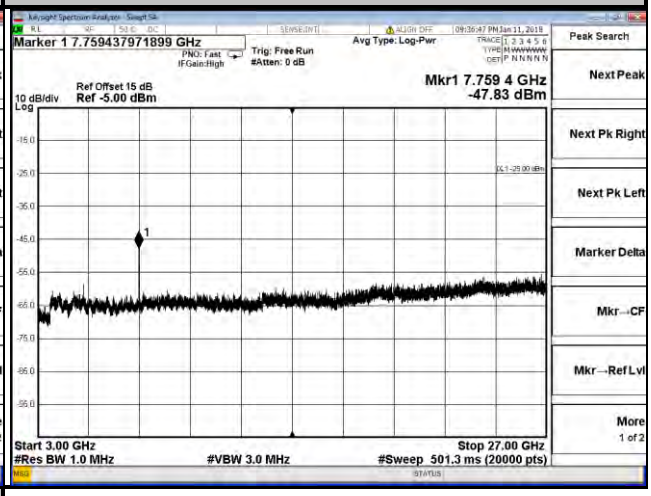




Channel 41540

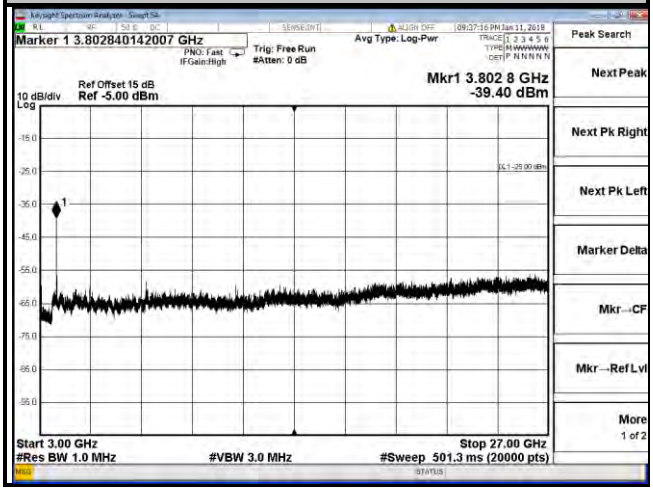


| LTE Band 41 | |
|---|---|
| Channel Bandwidth: 15 MHz | |
| Channel 39725 | Channel 40620 |

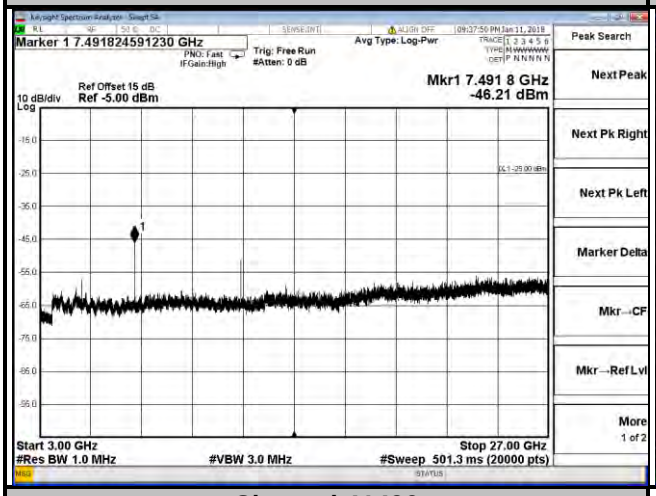


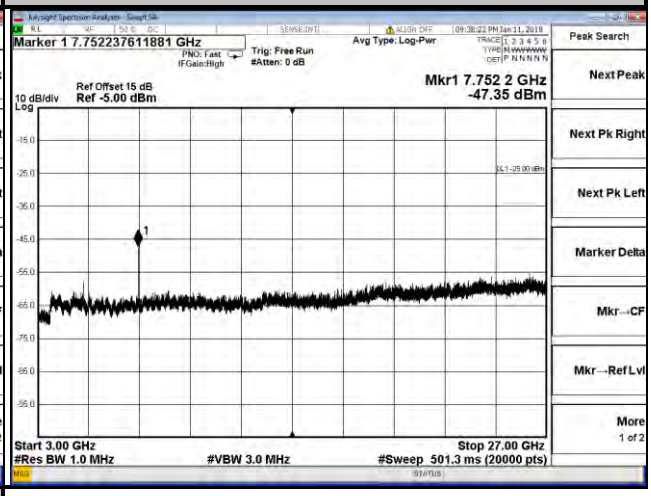




Channel 41515

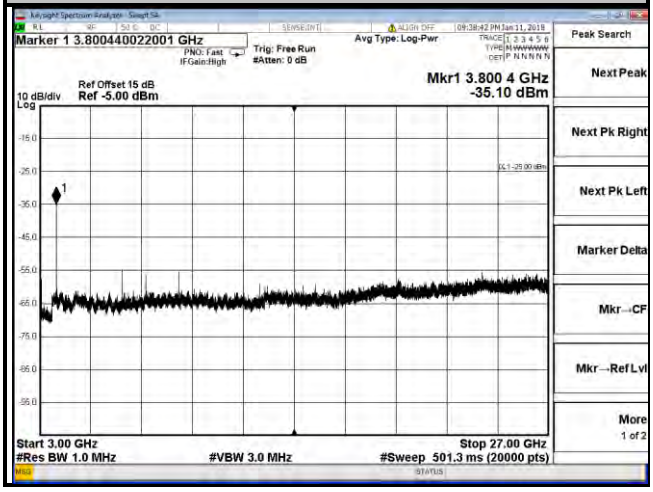


| LTE Band 41 | |
|---|---|
| Channel Bandwidth: 20 MHz | |
| Channel 39750 | Channel 40620 |




Channel 41490



## 4.7 Radiated Emission Measurement

### 4.7.1 Limits of Radiated Emission Measurement

The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least 55 +10 log10(P) dB. The limit of emission is equal to -25 dBm.

### 4.7.2 Test Procedure

a. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8 m (below or equal 1 GHz) and/or 1.5 m (above 1 GHz) height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1 m to 4 m to find the maximum polar radiated power. The “Read Value” is the spectrum reading the maximum power value.
b. The substitution horn antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a TX cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to “Read Value” of step a. Record the power level of S.G.
c. EIRP = Output power level of S.G – TX cable loss + Antenna gain of substitution horn.
d. E.R.P power can be calculated form E.I.R.P power by subtracting the gain of dipole, E.R.P power = E.I.P.R power - 2.15 dBi.

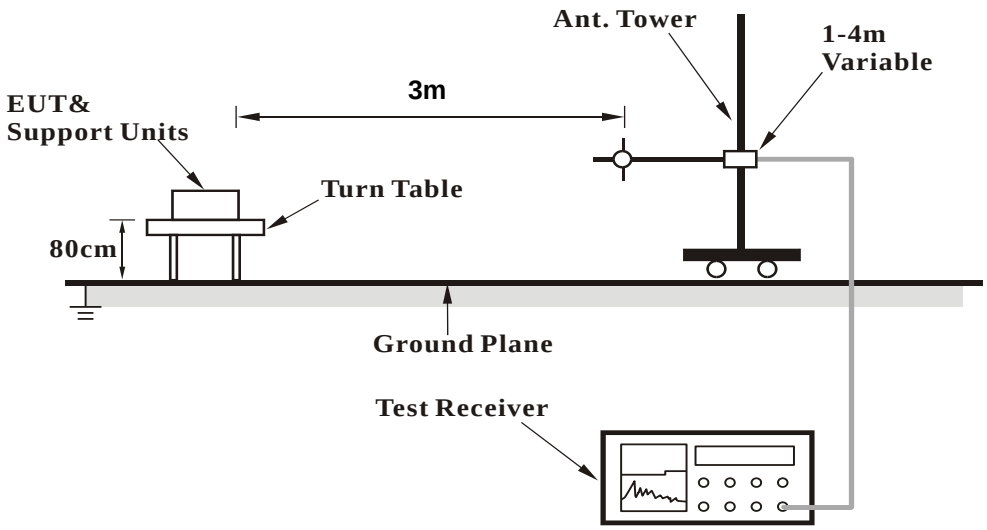
**NOTE:** The resolution bandwidth of spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz.

### 4.7.3 Deviation from Test Standard

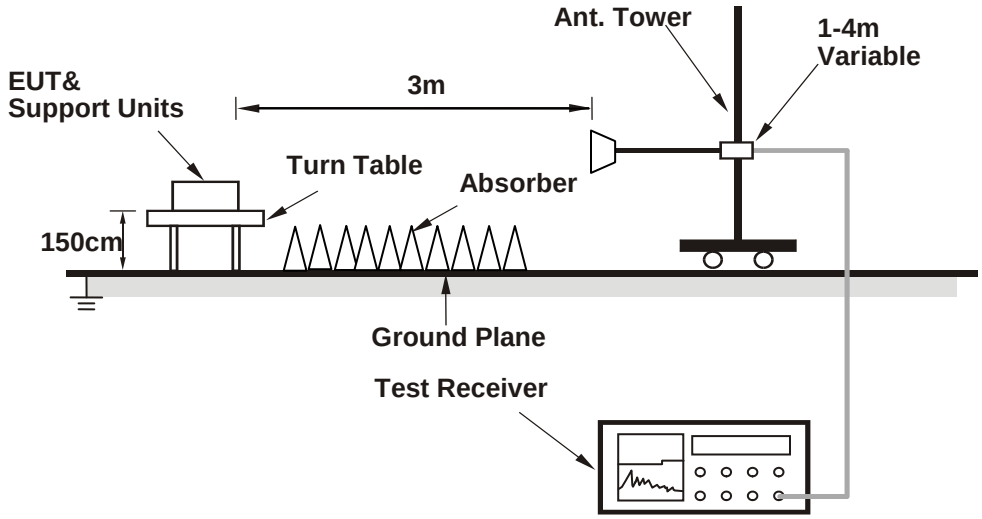
No deviation.

4.7.4 Test Setup

**<Radiated Emission below or equal 1 GHz>**




**<Radiated Emission above 1 GHz>**




For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.7.5 Test Results

**LTE Band 7**

**Channel Bandwidth: 20 MHz / QPSK**

**Low Channel**

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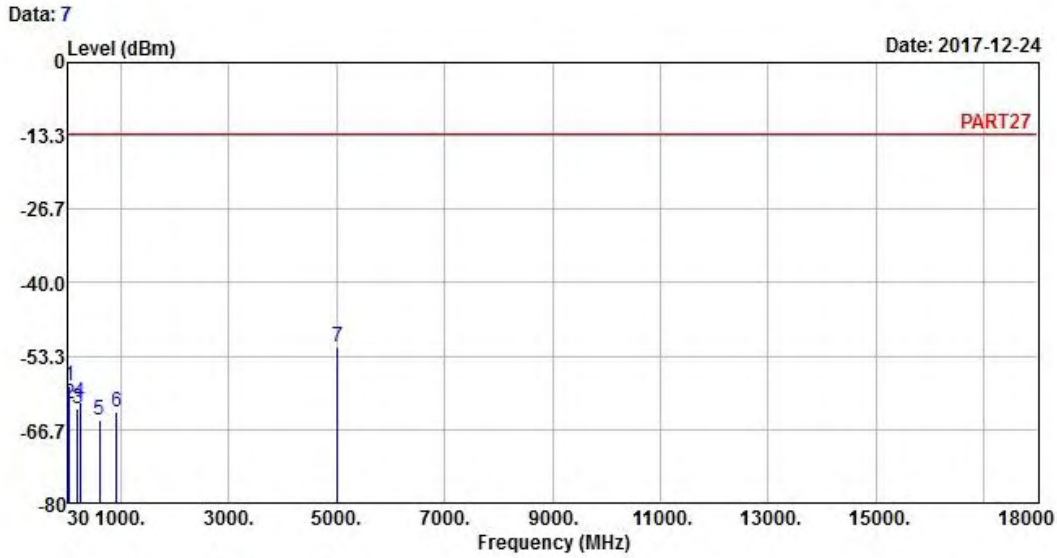


Site : 966 Chamber 5
Condition: PART27 HORIZONTAL
Remak : LTE Band 7 QPSK_20M Link-L
Tested by: Jisyong Wang

| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dBm | dB | dB | |
| 1 | 42.61 | -58.60 | -57.66 | -13.00 | -45.60 | -0.94 | Peak |
| 2 | 53.28 | -62.08 | -56.27 | -13.00 | -49.08 | -5.81 | Peak |
| 3 | 195.87 | -62.99 | -55.34 | -13.00 | -49.99 | -7.65 | Peak |
| 4 | 247.28 | -61.77 | -55.66 | -13.00 | -48.77 | -6.11 | Peak |
| 5 | 600.36 | -64.89 | -64.14 | -13.00 | -51.89 | -0.75 | Peak |
| 6 | 927.25 | -63.40 | -64.65 | -13.00 | -50.40 | 1.25 | Peak |
| 7 pp | 5020.00 | -51.75 | -48.52 | -25.00 | -26.75 | -3.23 | Peak |

Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch

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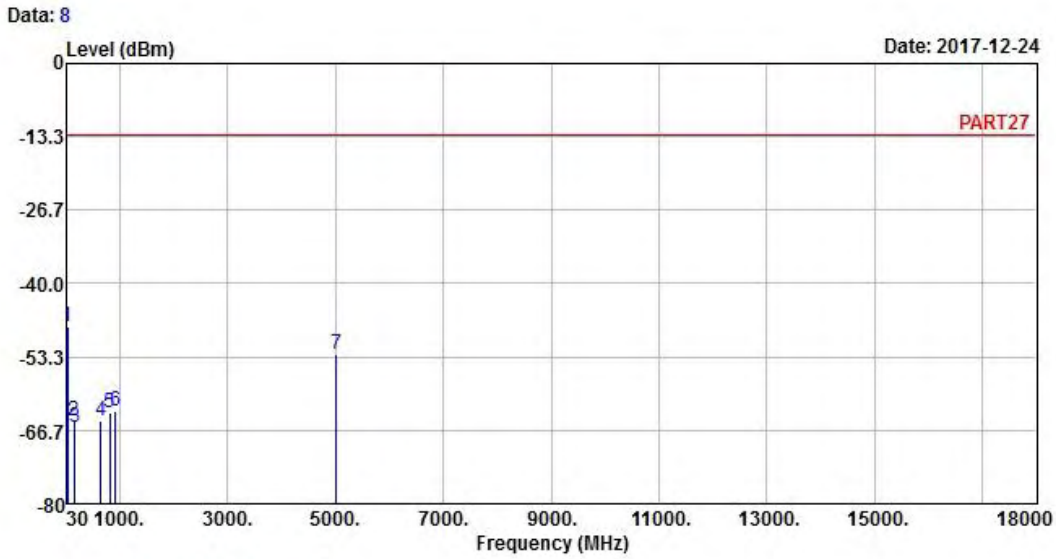


Site : 966 Chamber 5
Condition: PART27 VERTICAL
Remak : LTE Band 7 QPSK_20M Link-L
Tested by: Jisyong Wang

| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dBm | dB | dB | |
| 1 | 41.64 | -47.82 | -47.41 | -13.00 | -34.82 | -0.41 | Peak |
| 2 | 161.92 | -64.88 | -59.90 | -13.00 | -51.88 | -4.98 | Peak |
| 3 | 167.74 | -66.05 | -60.66 | -13.00 | -53.05 | -5.39 | Peak |
| 4 | 644.98 | -65.06 | -64.19 | -13.00 | -52.06 | -0.87 | Peak |
| 5 | 821.52 | -63.55 | -64.09 | -13.00 | -50.55 | 0.54 | Peak |
| 6 | 930.16 | -63.30 | -64.62 | -13.00 | -50.30 | 1.32 | Peak |
| 7 pp | 5020.00 | -52.84 | -49.61 | -25.00 | -27.84 | -3.23 | Peak |

## Middle Channel

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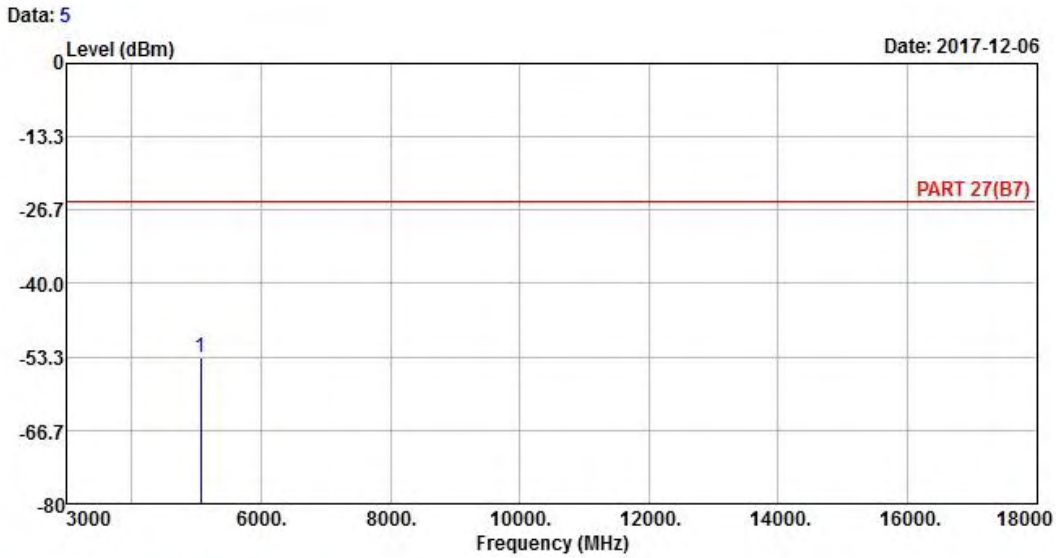


Site : 966 Chamber 5
Condition: PART 27(B7) HORIZONTAL
Remak : LTE Band 7 QPSK_20M Link-M
Tested by: Jisyong Wang

| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dBm | dB | dB | |
| 1 pp | 5070.00 | -53.35 | -50.23 | -25.00 | -28.35 | -3.12 | Peak |

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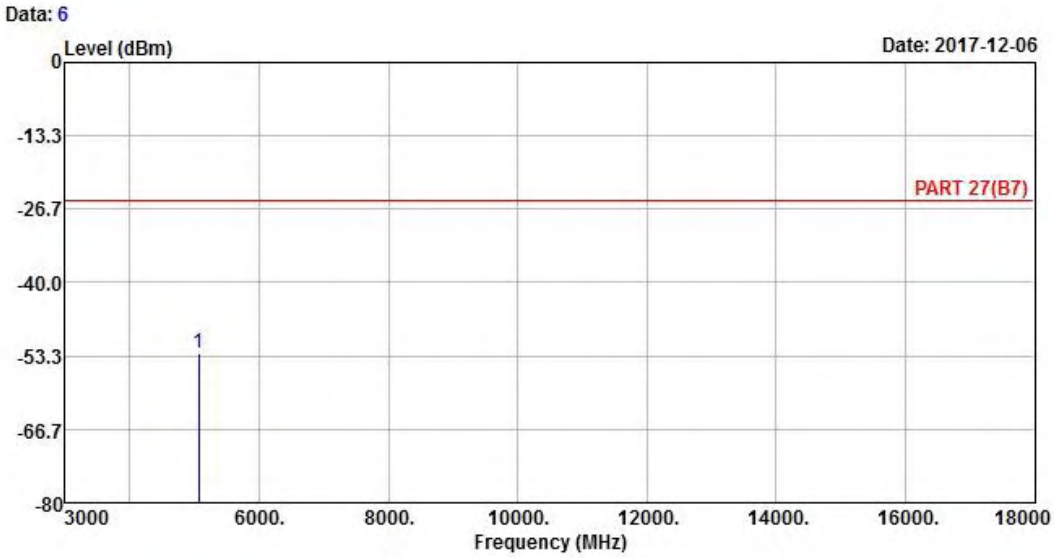
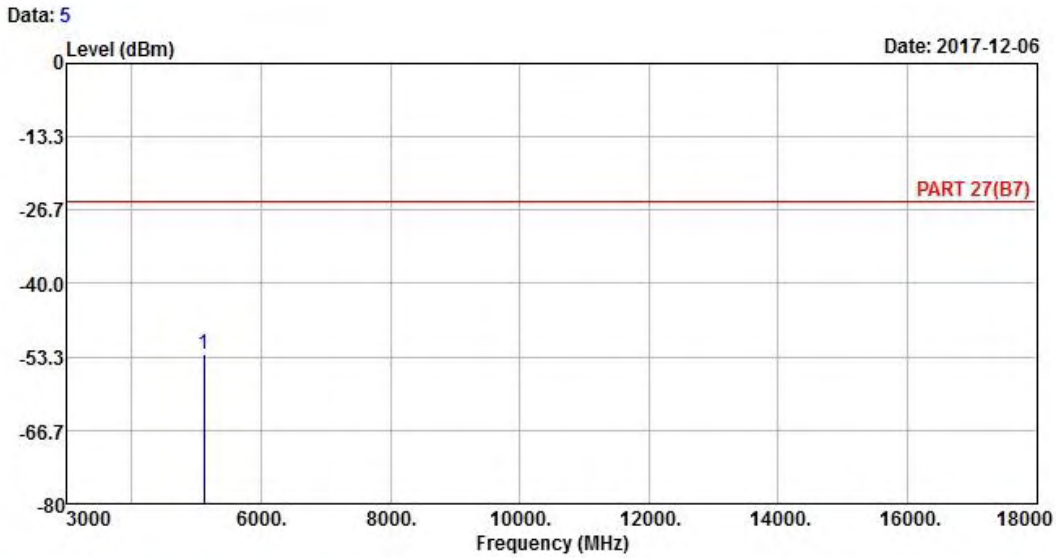



Site : 966 Chamber 5
Condition: PART 27(B7) VERTICAL
Remak : LTE Band 7 QPSK_20M Link-M
Tested by: Jisyong Wang

| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dBm | dB | dB | |
| 1 pp | 5070.00 | -52.70 | -49.58 | -25.00 | -27.70 | -3.12 | Peak |

## High Channel

Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch




Site : 966 Chamber 5
Condition: PART 27(B7) HORIZONTAL
Remak : LTE Band 7 QPSK_20M Link-H
Tested by: Jisyong Wang

| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dBm | dB | dB | |
| 1 pp | 5120.00 | -52.76 | -49.75 | -25.00 | -27.76 | -3.01 | Peak |

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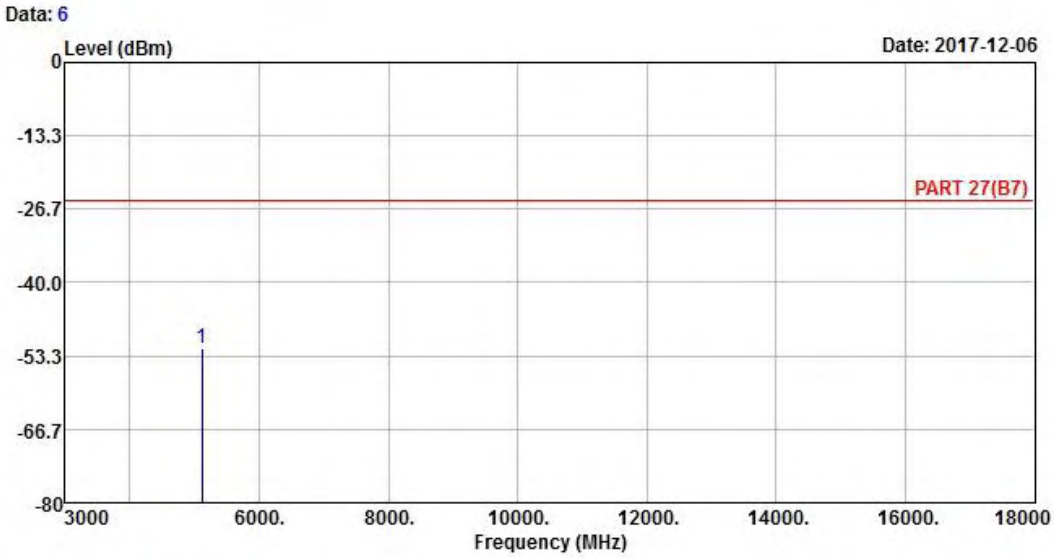



Site : 966 Chamber 5
Condition: PART 27(B7) VERTICAL
Remak : LTE Band 7 QPSK_20M Link-H
Tested by: Jisyong Wang

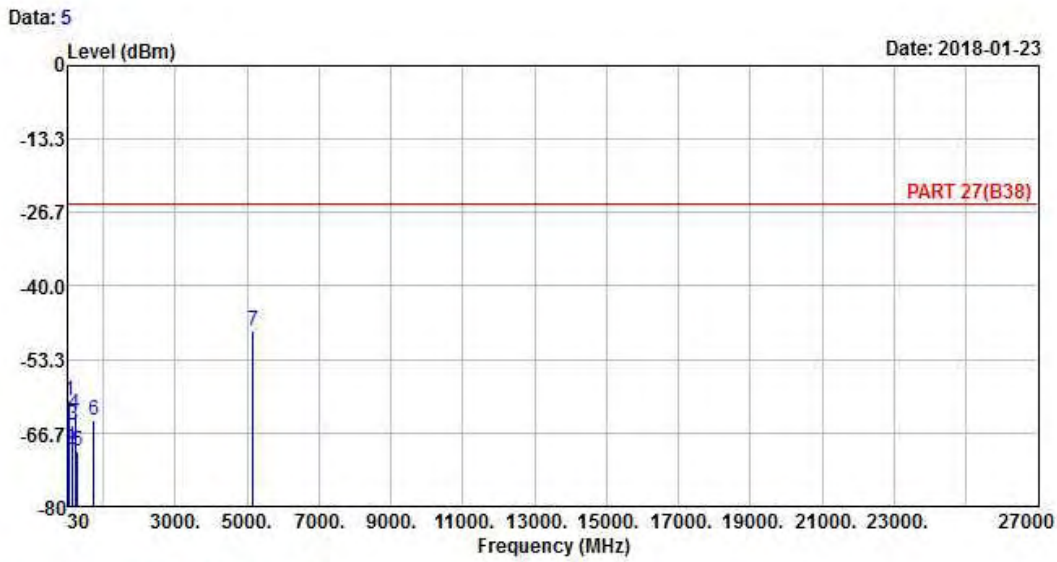
| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dBm | dB | dB | |
| 1 pp | 5120.00 | -51.90 | -48.89 | -25.00 | -26.90 | -3.01 | Peak |

**LTE Band 38**

**Channel Bandwidth: 20 MHz / QPSK**

**Low Channel**

Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch




Site : 966 Chamber 5
Condition: PART 27(B38) HORIZONTAL
Remak : LTE Band 38 QPSK_20M Link_L-CH
Tested by: Getaz Yang

| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dBm | dB | dB | |
| 1 | 53.28 | -60.93 | -55.12 | -13.00 | -47.93 | -5.81 | Peak |
| 2 | 56.19 | -69.60 | -63.00 | -13.00 | -56.60 | -6.60 | Peak |
| 3 | 154.16 | -65.37 | -58.89 | -13.00 | -52.37 | -6.48 | Peak |
| 4 | 227.88 | -63.04 | -56.15 | -13.00 | -50.04 | -6.89 | Peak |
| 5 | 282.20 | -70.08 | -63.43 | -13.00 | -57.08 | -6.65 | Peak |
| 6 | 727.43 | -64.29 | -64.73 | -13.00 | -51.29 | 0.44 | Peak |
| 7 pp | 5160.00 | -48.25 | -45.32 | -25.00 | -23.25 | -2.93 | Peak |

Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch

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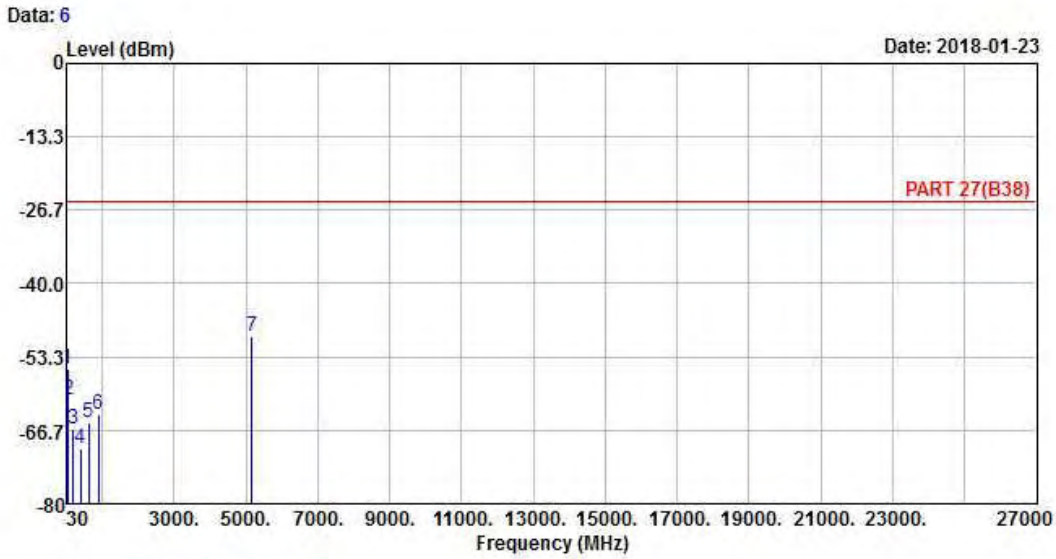


Site : 966 Chamber 5
Condition: PART 27(B38) VERTICAL
Remak : LTE Band 38 QPSK_20M Link_L-CH
Tested by: Getaz Yang

| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dBm | dB | dB | |
| 1 | 46.49 | -55.37 | -52.37 | -13.00 | -42.37 | -3.00 | Peak |
| 2 | 64.92 | -61.17 | -53.14 | -13.00 | -48.17 | -8.03 | Peak |
| 3 | 199.75 | -66.27 | -58.25 | -13.00 | -53.27 | -8.02 | Peak |
| 4 | 389.87 | -70.06 | -64.06 | -13.00 | -57.06 | -6.00 | Peak |
| 5 | 613.94 | -65.20 | -64.41 | -13.00 | -52.20 | -0.79 | Peak |
| 6 | 892.33 | -63.90 | -64.43 | -13.00 | -50.90 | 0.53 | Peak |
| 7 pp | 5160.00 | -49.55 | -46.62 | -25.00 | -24.55 | -2.93 | Peak |

## Middle Channel

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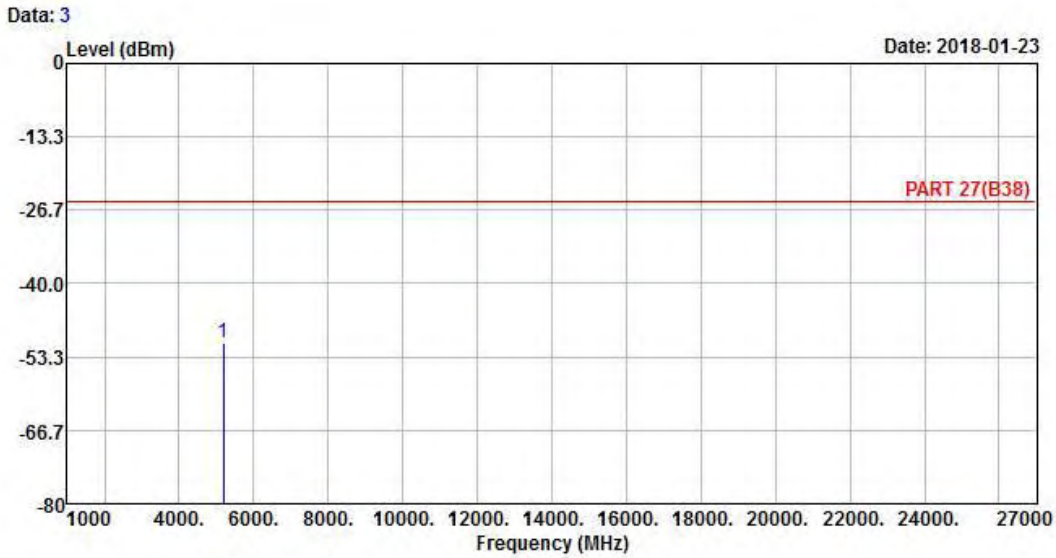


Site : 966 Chamber 5
Condition: PART 27(B38) HORIZONTAL
Remak : LTE Band 38 QPSK_20M Link_M-CH
Tested by: Getaz Yang

| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dBm | dB | dB | |
| 1 pp | 5190.00 | -50.75 | -47.89 | -25.00 | -25.75 | -2.86 | Peak |

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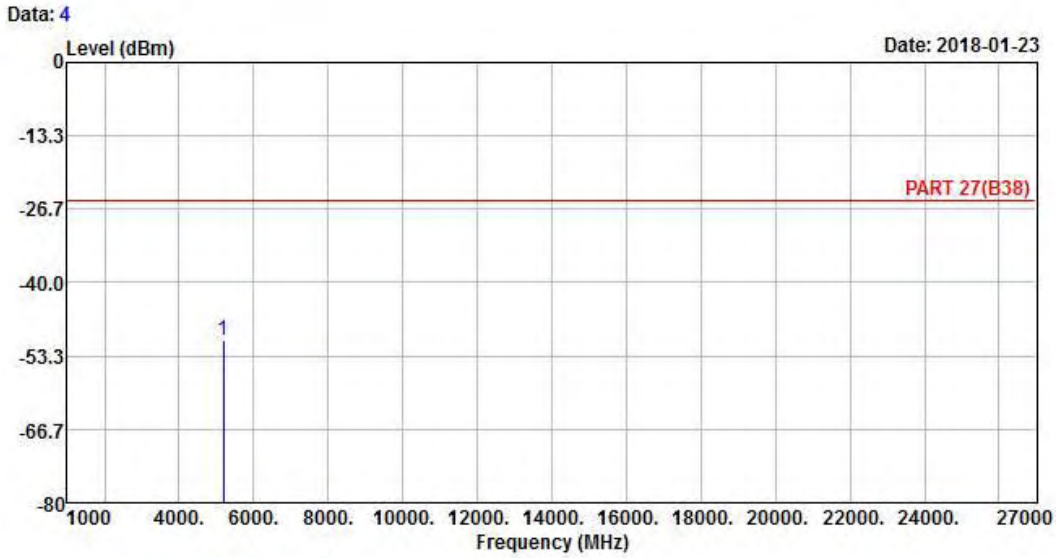
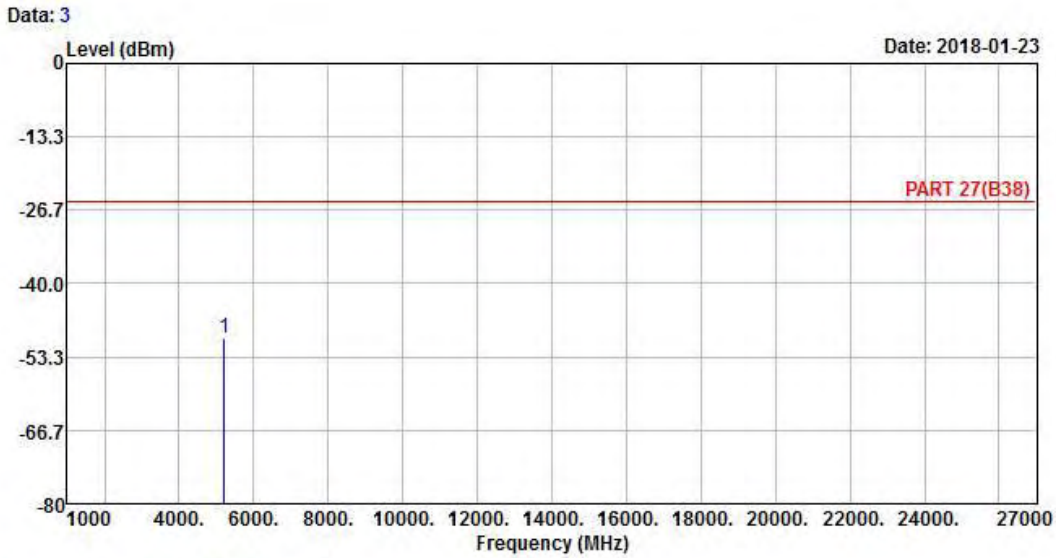



Site : 966 Chamber 5
Condition: PART 27(B38) VERTICAL
Remak : LTE Band 38 QPSK_20M Link_M-CH
Tested by: Getaz Yang

| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dBm | dB | dB | |
| 1 pp | 5190.00 | -50.62 | -47.76 | -25.00 | -25.62 | -2.86 | Peak |

## High Channel

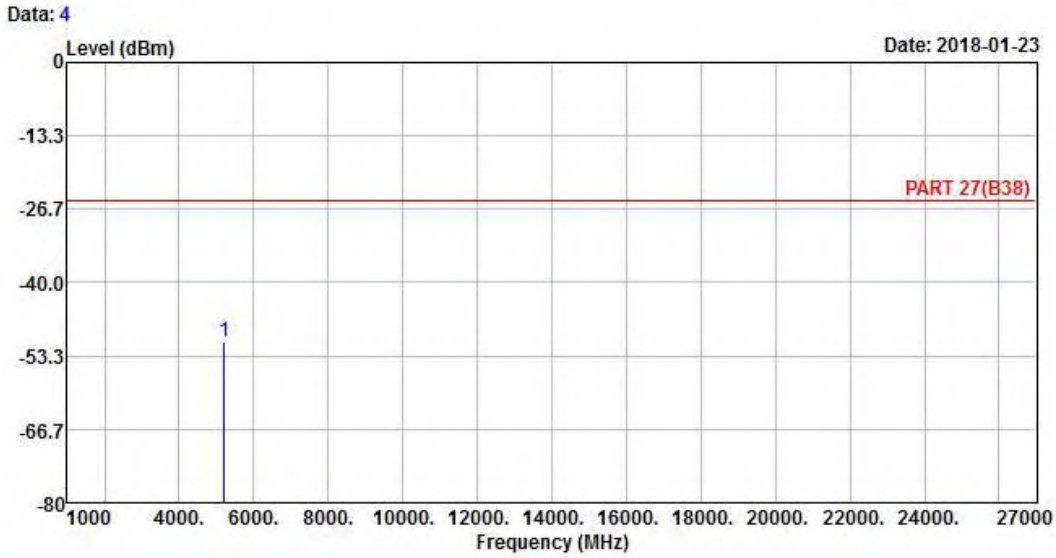
Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch




Site : 966 Chamber 5
Condition: PART 27(B38) HORIZONTAL
Remak : LTE Band 38 QPSK_20M Link_H-CH
Tested by: Getaz Yang

| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dBm | dB | dB | |
| 1 pp | 5220.00 | -49.79 | -47.03 | -25.00 | -24.79 | -2.76 | Peak |

Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch




Site : 966 Chamber 5
Condition: PART 27(B38) VERTICAL
Remak : LTE Band 38 QPSK_20M Link_H-CH
Tested by: Getaz Yang

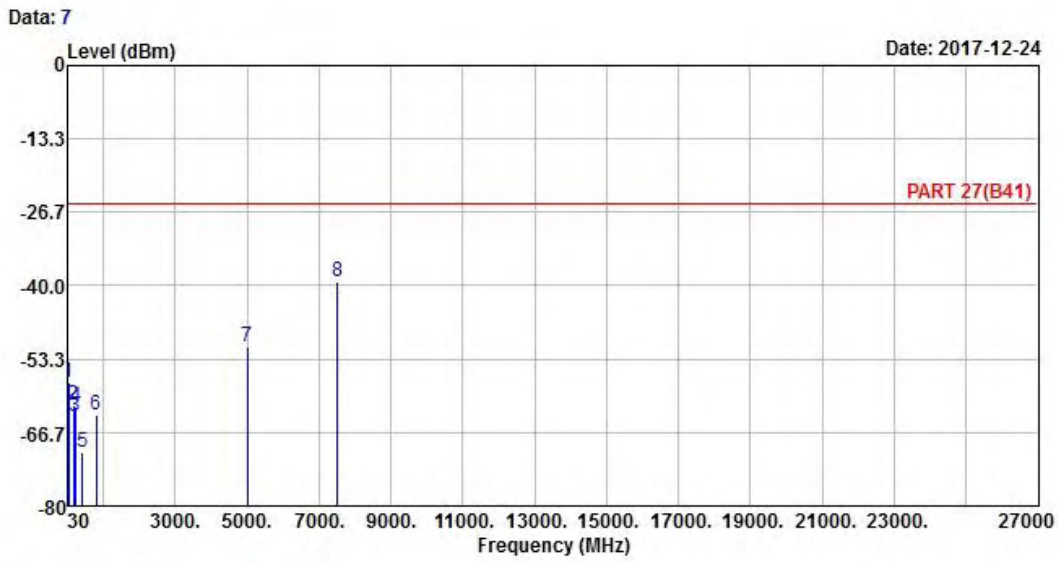
| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dBm | dB | dB | |
| 1 pp | 5220.00 | -50.86 | -48.10 | -25.00 | -25.86 | -2.76 | Peak |

**LTE Band 41**

**Channel Bandwidth: 20 MHz / QPSK**

**Low Channel**

Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch




Site : 966 Chamber 5
Condition: PART 27(B41) HORIZONTAL
Remak : LTE Band 41 QPSK_20M _L-CH
Tested by: Jisyong Wang

| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dBm | dB | dB | |
| 1 | 42.42 | -57.58 | -56.64 | -25.00 | -32.58 | -0.94 | Peak |
| 2 | 170.13 | -61.59 | -56.06 | -25.00 | -36.59 | -5.53 | Peak |
| 3 | 207.12 | -63.77 | -56.06 | -25.00 | -38.77 | -7.71 | Peak |
| 4 | 247.89 | -62.06 | -55.99 | -25.00 | -37.06 | -6.07 | Peak |
| 5 | 426.70 | -70.30 | -64.57 | -25.00 | -45.30 | -5.73 | Peak |
| 6 | 797.70 | -63.43 | -64.17 | -25.00 | -38.43 | 0.74 | Peak |
| 7 | 5012.00 | -51.10 | -47.87 | -25.00 | -26.10 | -3.23 | Peak |
| 8 pp | 7518.00 | -39.28 | -44.87 | -25.00 | -14.28 | 5.59 | Peak |

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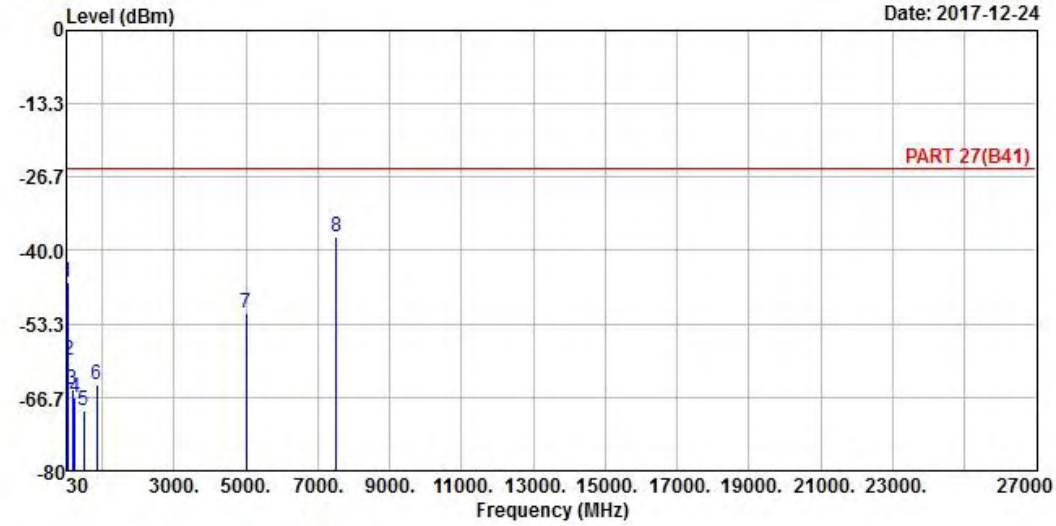
Data: 8

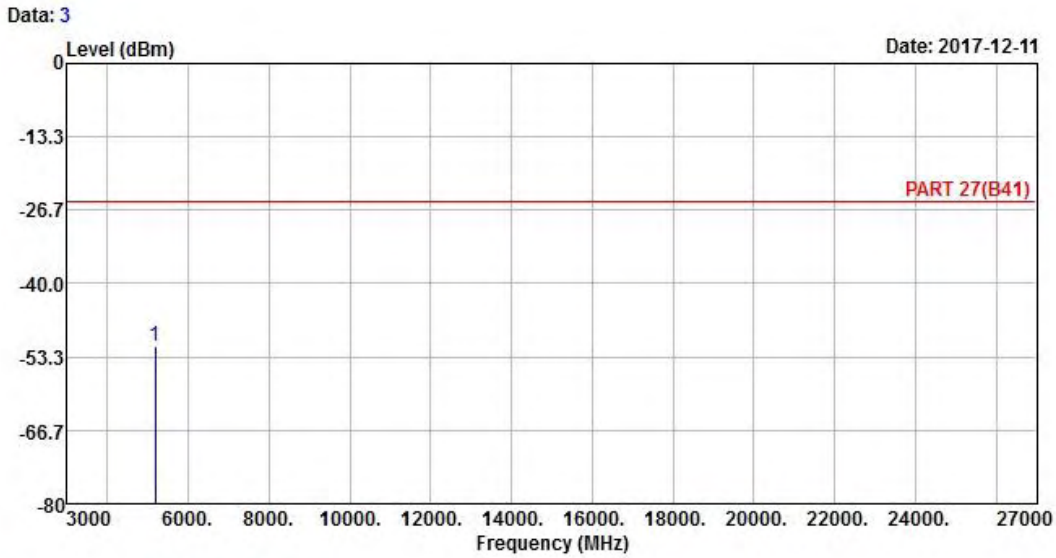



Site : 966 Chamber 5
Condition: PART 27(B41) VERTICAL
Remak : LTE Band 41 QPSK_20M _L-CH
Tested by: Jisyong Wang

| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dBm | dB | dB | |
| 1 | 41.34 | -45.66 | -45.25 | -25.00 | -20.66 | -0.41 | Peak |
| 2 | 67.80 | -60.02 | -51.77 | -25.00 | -35.02 | -8.25 | Peak |
| 3 | 161.22 | -65.20 | -60.29 | -25.00 | -40.20 | -4.91 | Peak |
| 4 | 237.63 | -66.65 | -60.15 | -25.00 | -41.65 | -6.50 | Peak |
| 5 | 499.50 | -69.04 | -64.41 | -25.00 | -44.04 | -4.63 | Peak |
| 6 | 843.90 | -64.21 | -64.55 | -25.00 | -39.21 | 0.34 | Peak |
| 7 | 5012.00 | -51.25 | -48.02 | -25.00 | -26.25 | -3.23 | Peak |
| 8 pp | 7518.00 | -37.37 | -42.96 | -25.00 | -12.37 | 5.59 | Peak |

## Middle Channel

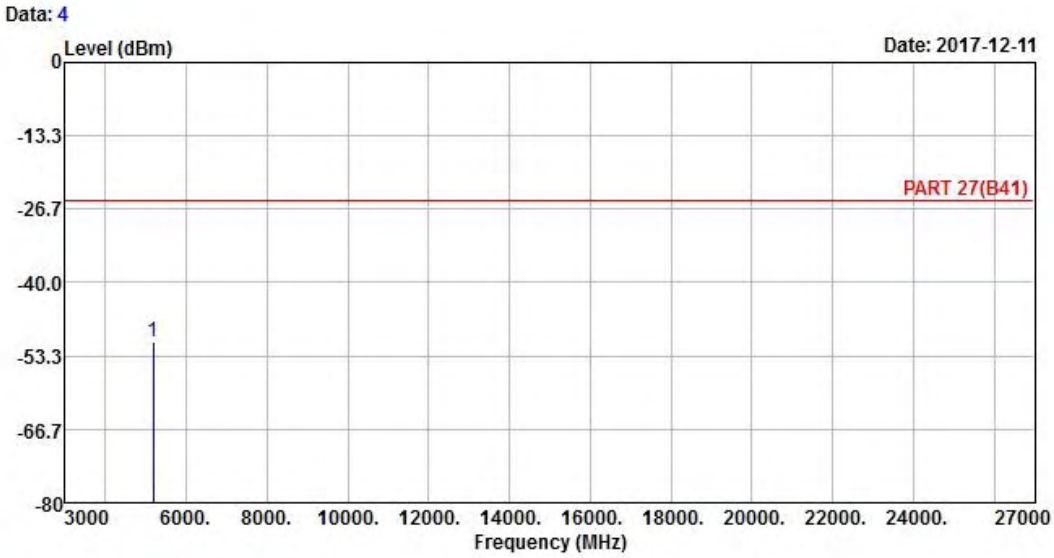
Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch




Site : 966 Chamber 5
Condition: PART 27(B41) HORIZONTAL
Remak : LTE Band 41 QPSK_20M _M-CH
Tested by: Jisyong Wang

| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dBm | dB | dB | |
| 1 pp | 5186.00 | -51.27 | -48.41 | -25.00 | -26.27 | -2.86 | Peak |

Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch

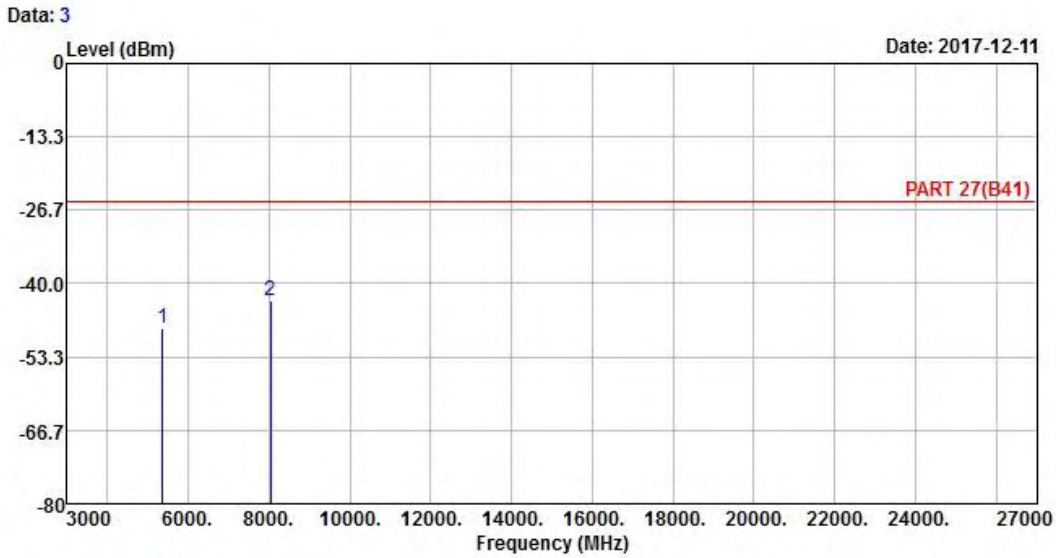



Site : 966 Chamber 5
Condition: PART 27(B41) VERTICAL
Remak : LTE Band 41 QPSK_20M _M-CH
Tested by: Jisyong Wang

| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dBm | dB | dB | |
| 1 pp | 5186.00 | -50.86 | -48.00 | -25.00 | -25.86 | -2.86 | Peak |

## High Channel

Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch




Site : 966 Chamber 5
Condition: PART 27(B41) HORIZONTAL
Remak : LTE Band 41 QPSK_20M _H-CH
Tested by: Jisyong Wang

| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dBm | dB | dB | |
| 1 | 5360.00 | -48.16 | -46.16 | -25.00 | -23.16 | -2.00 | Peak |
| 2 pp | 8040.00 | -43.06 | -48.96 | -25.00 | -18.06 | 5.90 | Peak |

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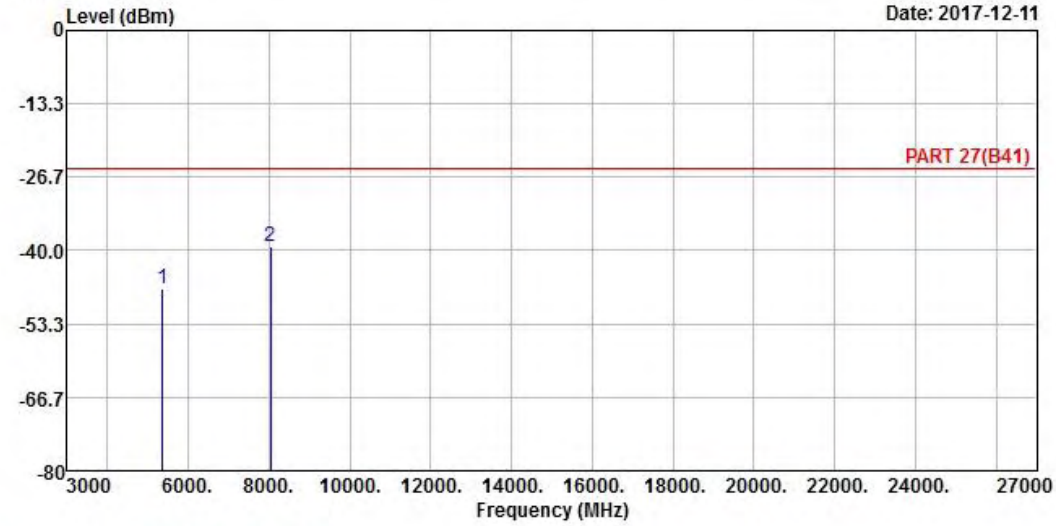
Data: 4




Site : 966 Chamber 5
Condition: PART 27(B41) VERTICAL
Remak : LTE Band 41 QPSK_20M _H-CH
Tested by: Jisyong Wang

| | Freq | Level | Read Level | Limit Line | Over Limit | Factor | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dBm | dBm | dBm | dB | dB | |
| 1 | 5360.00 | -46.98 | -44.98 | -25.00 | -21.98 | -2.00 | Peak |
| 2 pp | 8040.00 | -39.22 | -45.12 | -25.00 | -14.22 | 5.90 | Peak |

## 5 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo).

## Appendix – Information on the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are FCC recognized accredited test firms and accredited according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following: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Fax: 886-2-26051924

**Hsin Chu EMC/RF/Telecom Lab**
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The address and road map of all our labs can be found in our web site also.

**--- END ---**