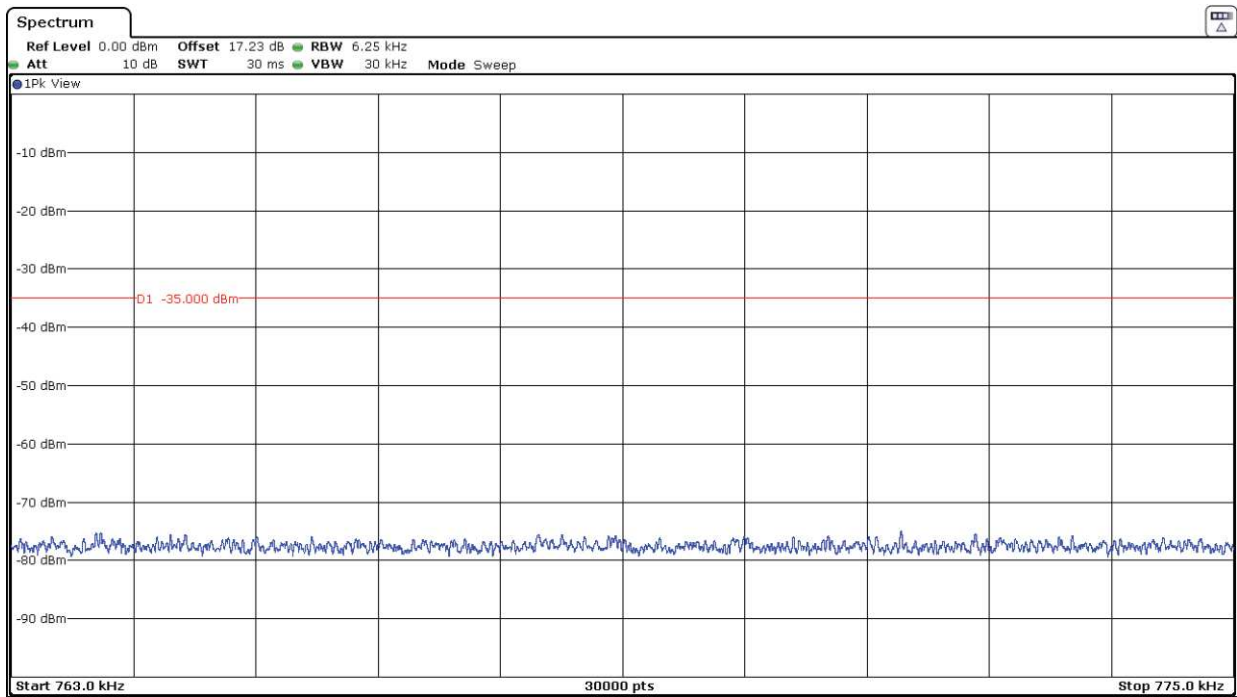
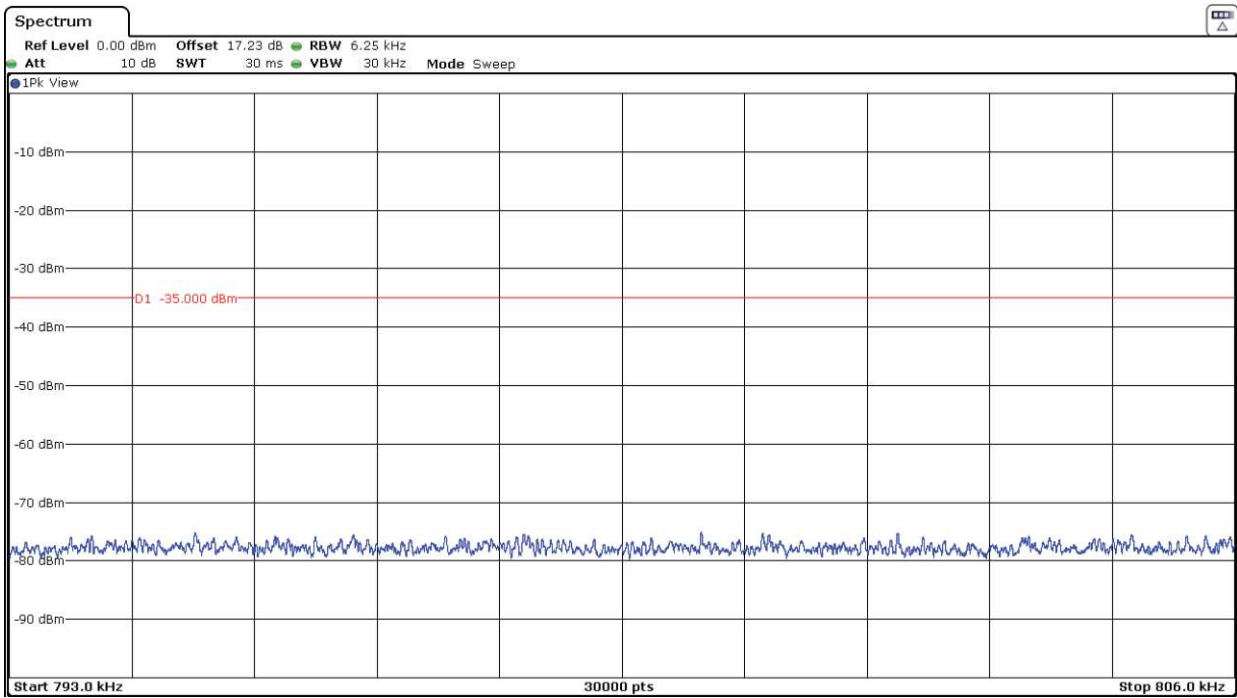


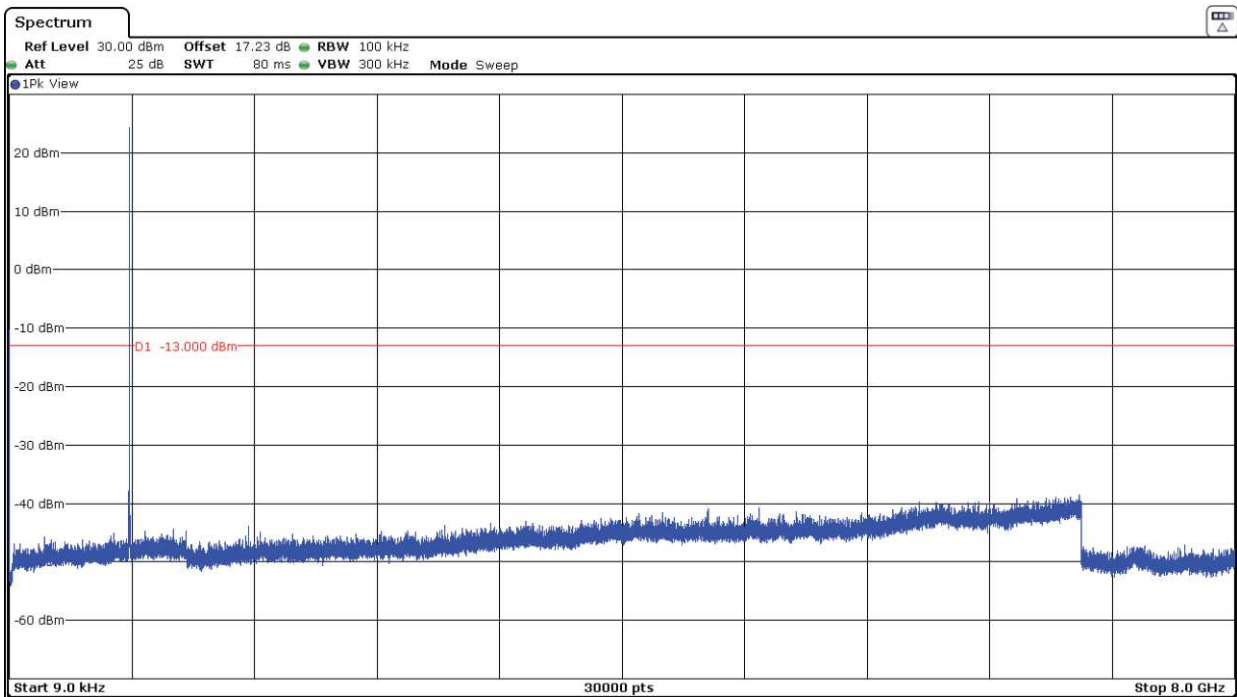
Frequency Range 763 MHz - 775 MHz



Frequency Range 793 MHz - 806 MHz

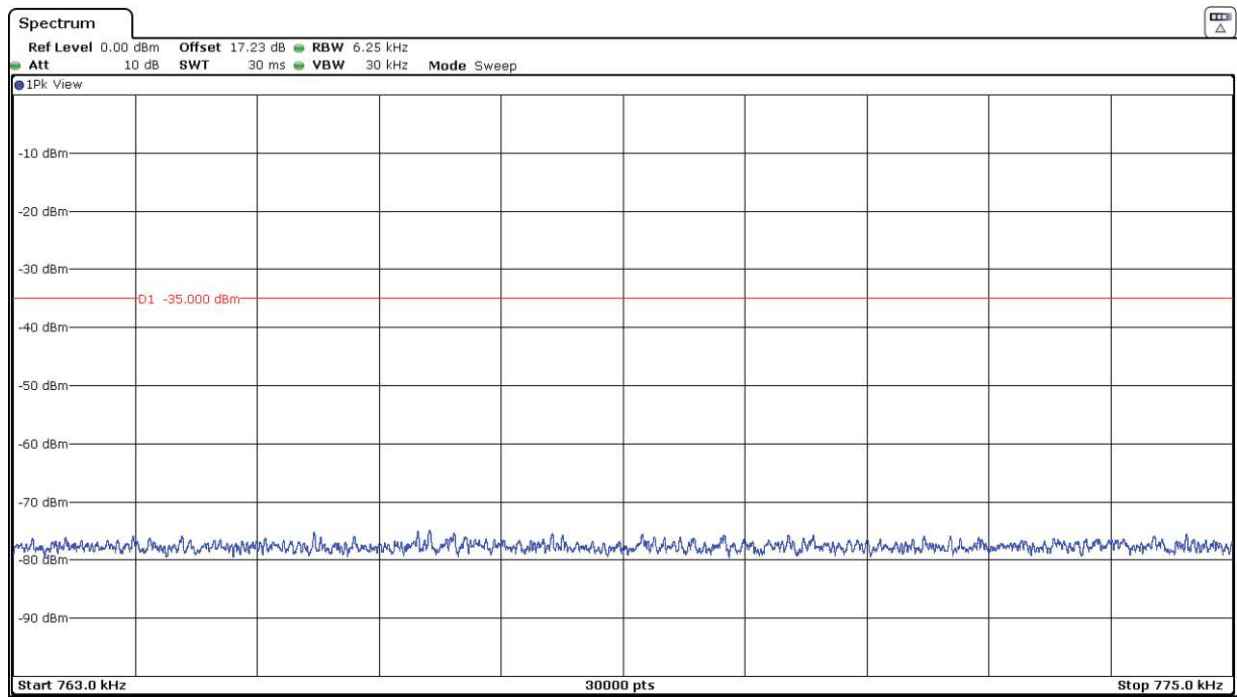


Highest Channel:

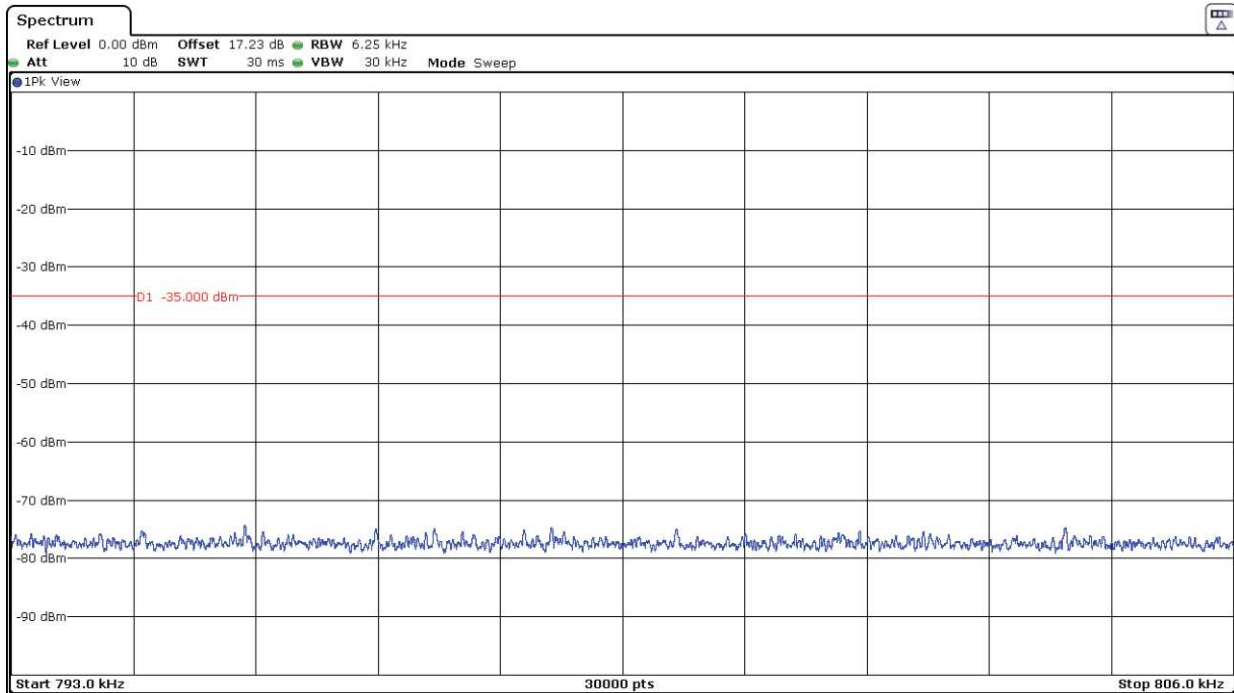


The peak above the limit is the carrier frequency.

Frequency Range 763 MHz - 775 MHz

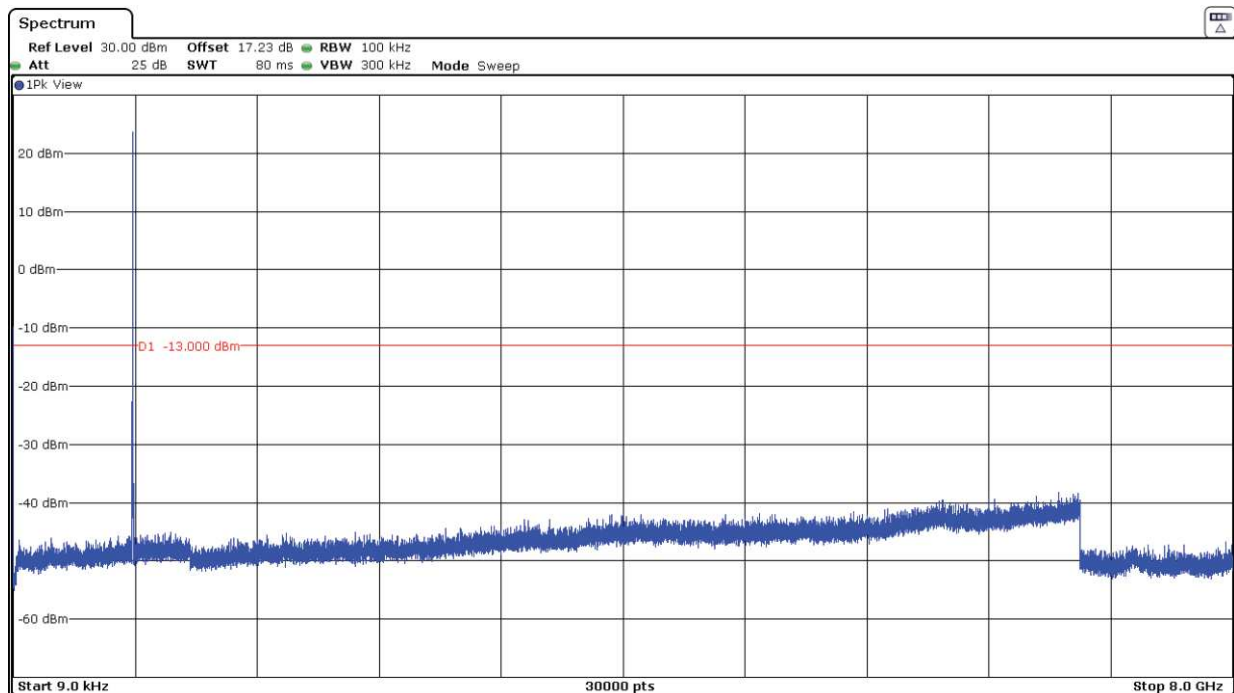


Frequency Range 793 MHz - 806 MHz



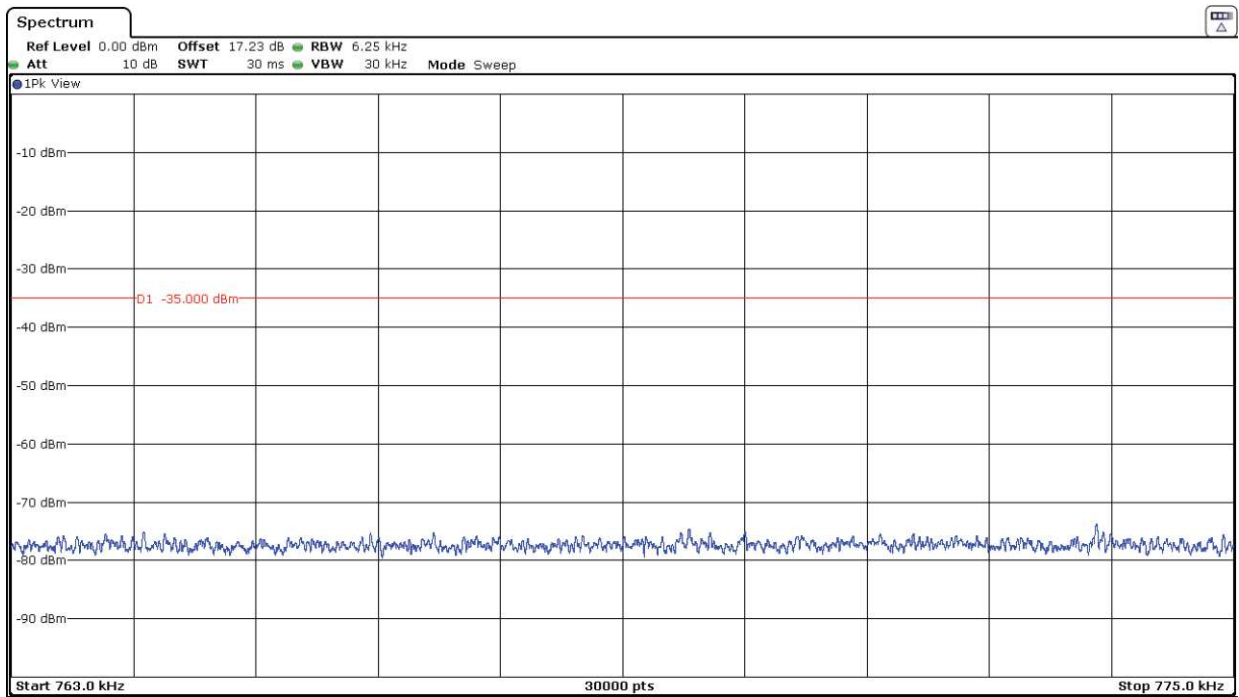
LTE Band 13. QPSK MODULATION. BW = 10 MHz.

Middle Channel:

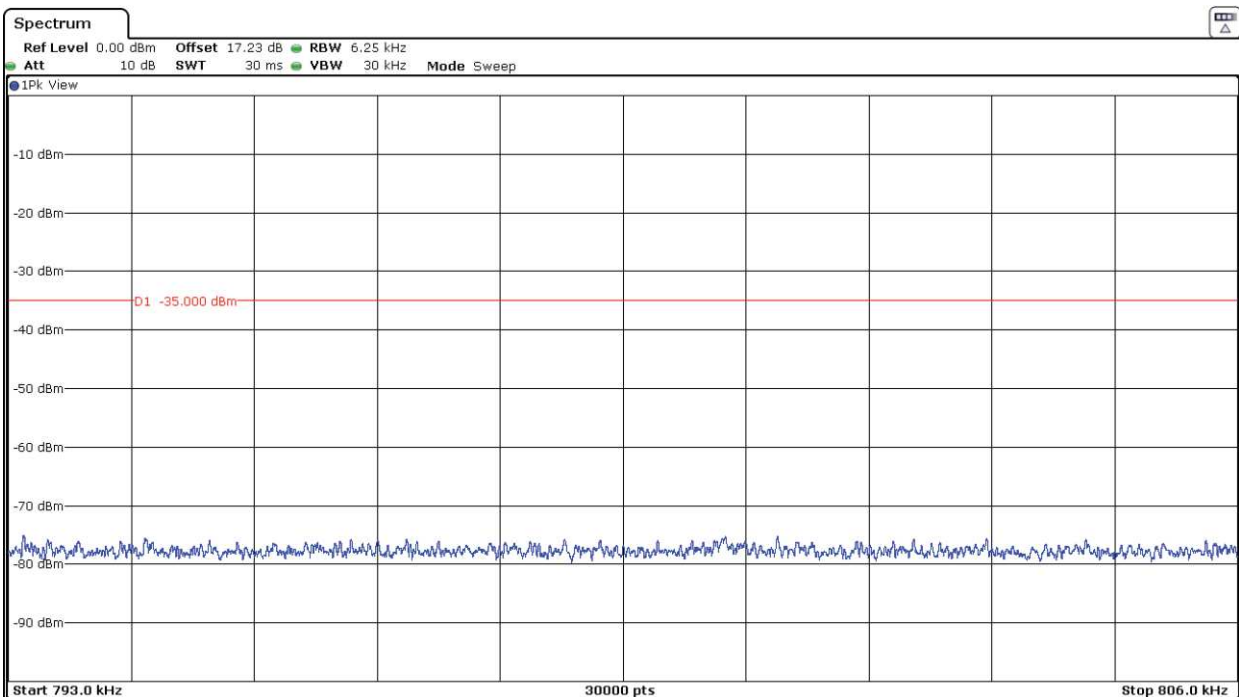


The peak above the limit is the carrier frequency.

Frequency Range 763 MHz - 775 MHz



Frequency Range 793 MHz - 806 MHz



## Spurious emissions at antenna terminals at Block Edges

### SPECIFICATION:

FCC §27.53 (c) (2) & (4):

For operations in the 746-758 MHz band and the 776-788 MHz band, the power of any emission outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, in accordance with the following:

On any frequency outside the 776-788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least  $43 + 10 \log (P)$  dB.

On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than  $65 + 10 \log (P)$  dB in a 6.25 kHz band segment, for mobile and portable stations.

FCC §27.53 (g):

For operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least  $43 + 10 \log (P)$  dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

FCC §27.53 (h):

According to specification. the power of emissions shall be attenuated below the transmitter power (P) by a factor of at least  $43 + 10 \log (P)$  dB. P in watts.

At  $P_o$  transmitting power. the specified minimum attenuation becomes  $43+10\log (P_o)$ . and the level in dBm relative  $P_o$  becomes:

$P_o$  (dBm) –  $[43 + 10 \log (P_o \text{ in mwatts}) - 30] = -13$  dBm

FCC §27.53 (m) (4) & (6):

For mobile digital stations, the attenuation factor shall be not less than  $40 + 10 \log (P)$  dB on all frequencies between the channel edge and 5 megahertz from the channel edge,  $43 + 10 \log (P)$  dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and  $55 + 10 \log (P)$  dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less than  $43 + 10 \log (P)$  dB on all frequencies between 2490.5 MHz and 2496 MHz and  $55 + 10 \log (P)$  dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

#### RSS-130 Clause 4.7:

The unwanted emissions in any 100 kHz bandwidth on any frequency outside the low frequency edge and the high frequency edge of each frequency block range(s), shall be attenuated below the transmitter power,  $P$  (dBW), by at least  $43 + 10 \log_{10} p$  (watts), dB. However, in the 100 kHz band immediately outside of the equipment's frequency block range, a resolution bandwidth of 30 kHz may be employed.

#### RSS-139 Clause 6.6:

In the first 1.0 MHz bands immediately outside and adjacent to the equipment's smallest operating frequency block, which can contain the equipment's occupied bandwidth, the emission power per any 1% of the emission bandwidth shall be attenuated below the transmitter output power  $P$  (in dBW) by at least  $43 + 10 \log_{10} p$  (watts) dB.

After the first 1.0 MHz outside the equipment's smallest operating frequency block, which can contain the equipment's occupied bandwidth, the emission power in any 1 MHz bandwidth shall be attenuated below the transmitter output power  $P$  (in dBW) by at least  $43 + 10 \log_{10} p$  (watts) dB.

#### RSS-199 Clause 4.5:

In the 1 MHz band immediately outside and adjacent to the channel edge, the unwanted emission power shall be measured with a resolution bandwidth of at least 1% of the occupied bandwidth for base station and fixed subscriber equipment, and 2% for mobile subscriber equipment. Beyond the 1 MHz band, a resolution bandwidth of 1 MHz shall be used. A narrower resolution bandwidth can be used, provided that the measured power is integrated over the full required measurement bandwidth of 1 MHz, or 1% or 2% of the occupied bandwidth, as applicable.

Equipment shall comply with the following unwanted emission limits:

- a. for base station and fixed subscriber equipment, the power of any unwanted emissions measured as above shall be attenuated (in dB) below the transmitter power,  $P$  (dBW), by at least  $43 + 10 \log_{10} p$
- b. for mobile subscriber equipment, the power of any unwanted emissions measured as above shall be attenuated (in dB) below the transmitter power,  $P$  (dBW), by at least:
  - i.  $40 + 10 \log_{10} p$  from the channel edges to 5 MHz away
  - ii.  $43 + 10 \log_{10} p$  between 5 MHz and  $X$  MHz from the channel edges, and
  - iii.  $55 + 10 \log_{10} p$  at  $X$  MHz and beyond from the channel edges

In addition, the attenuation shall not be less than  $43 + 10 \log_{10} p$  on all frequencies between 2490.5 MHz and 2496 MHz, and  $55 + 10 \log_{10} p$  at or below 2490.5 MHz.

In (a) and (b),  $p$  is the transmitter power measured in watts and  $X$  is 6 MHz or the equipment occupied bandwidth, whichever is greater.

#### METHOD:

The EUT RF output connector was connected to a spectrum analyser and to the Universal Radio Communication tester R&S CMW500 (selecting maximum transmission power of the EUT and different modes of modulation) using a 50 Ohm attenuator and a power splitter.

The reading of the spectrum analyser is corrected with the attenuation loss of connection between output terminal of EUT and input of the spectrum analyser.

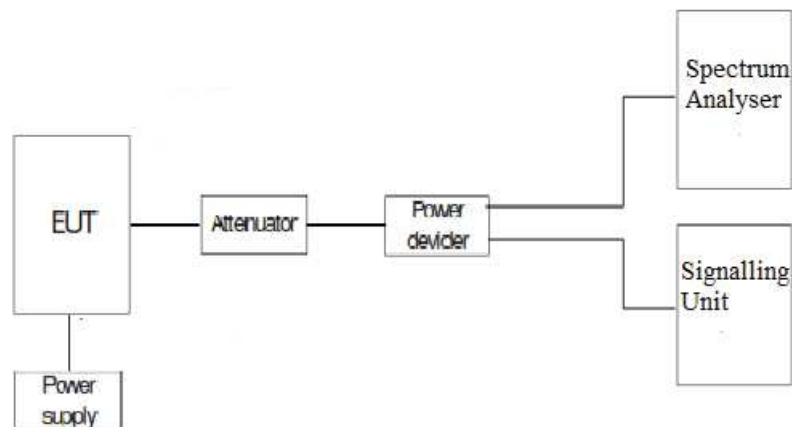
The configuration of modulation which is the worst case for conducted power was used.

For WCDMA IV and LTE Band 4, as indicated in FCC part 27.53 (h) (5) /RSS-139 Clause 6.6., in the 1 MHz bands immediately outside and adjacent to the licensee's frequency block, a resolution bandwidth of at least one percent of the emission bandwidth/occupied bandwidth of the fundamental emission of the transmitter may be employed.

For LTE Band 12 and LTE 13, as indicated in FCC part 27.53 (c) (5) and FCC part 27.53 (g) /RSS-130 Clause 4.6., in the 100 kHz bands immediately outside and adjacent to the licensee's frequency block or band, a resolution bandwidth of 30 kHz may be employed.

For LTE Band 7, as indicated in FCC part 27.53 (m) (4) (6) /RSS-199 Clause 4.5, in the mask as defined on the FCC and RSS standard, a resolution bandwidth of 1MHz may be employed.

#### TEST SETUP:



## RESULTS:

### 3G Band IV. WCDMA and HSUPA MODULATIONS.

| MODULATION:                                                              | WCDMA  | HSUPA  |
|--------------------------------------------------------------------------|--------|--------|
| Maximum measured level at <u>Lowest</u> Block Edge at antenna port (dBm) | -30.47 | -31.27 |

| MODULATION:                                                               | WCDMA  | HSUPA  |
|---------------------------------------------------------------------------|--------|--------|
| Maximum measured level at <u>Highest</u> Block Edge at antenna port (dBm) | -29.28 | -31.68 |

### LTE Band 4.

| LTE QPSK MODULATION:                                                     | RB=1,<br>Offset=0,<br>BW=1.4 MHz | RB=1,<br>Offset=0,<br>BW=3 MHz | RB=1,<br>Offset=0,<br>BW=5 MHz | RB=1,<br>Offset =0,<br>BW = 10 MHz | RB=1,<br>Offset=0,<br>BW=15 MHz | RB=1 ,<br>Offset =0,<br>BW = 20 MHz |
|--------------------------------------------------------------------------|----------------------------------|--------------------------------|--------------------------------|------------------------------------|---------------------------------|-------------------------------------|
| Maximum measured level at <u>Lowest Block Edge</u> at antenna port (dBm) | -25.20                           | -21.78                         | -23.41                         | -33.25                             | -32.49                          | -37.50                              |

| LTE QPSK MODULATION:                                                     | RB=All,<br>Offset=0,<br>BW=1.4 MHz | RB=All,<br>Offset=0,<br>BW=3 MHz | RB=All,<br>Offset=0,<br>BW=5 MHz | RB=All,<br>Offset =0,<br>BW = 10 MHz | RB=All,<br>Offset=0,<br>BW=15 MHz | RB=All,<br>Offset =0,<br>BW = 20 MHz |
|--------------------------------------------------------------------------|------------------------------------|----------------------------------|----------------------------------|--------------------------------------|-----------------------------------|--------------------------------------|
| Maximum measured level at <u>Lowest Block Edge</u> at antenna port (dBm) | -31.08                             | -29.27                           | -29.02                           | -32.42                               | -35.22                            | -37.59                               |

| LTE QPSK MODULATION:                                                      | RB=1,<br>Offset=Max,<br>BW=1.4 MHz | RB=1,<br>Offset=Max,<br>BW=3 MHz | RB=1,<br>Offset=Max,<br>BW=5 MHz | RB=1,<br>Offset =Max,<br>BW = 10 MHz | RB=1,<br>Offset=Max,<br>BW=15 MHz | RB=1 ,<br>Offset =Max,<br>BW = 20 MHz |
|---------------------------------------------------------------------------|------------------------------------|----------------------------------|----------------------------------|--------------------------------------|-----------------------------------|---------------------------------------|
| Maximum measured level at <u>Highest Block Edge</u> at antenna port (dBm) | -25.82                             | -21.37                           | -22.36                           | -32.59                               | -30.62                            | -34.58                                |

| LTE QPSK MODULATION:                                                      | RB=All,<br>Offset=0,<br>BW=1.4 MHz | RB=All,<br>Offset=0,<br>BW=3 MHz | RB=All,<br>Offset=0,<br>BW=5 MHz | RB=All,<br>Offset =0,<br>BW = 10 MHz | RB=All,<br>Offset=0,<br>BW=15 MHz | RB=All,<br>Offset =0,<br>BW = 20 MHz |
|---------------------------------------------------------------------------|------------------------------------|----------------------------------|----------------------------------|--------------------------------------|-----------------------------------|--------------------------------------|
| Maximum measured level at <u>Highest Block Edge</u> at antenna port (dBm) | -29.53                             | -28.01                           | -29.04                           | -33.05                               | -36.19                            | -38.55                               |

## LTE Band 7.

| LTE QPSK<br>MODULATION:                                                          | RB=1,<br>Offset=0,<br>BW=5 MHz | RB=1 ,<br>Offset =0,<br>BW = 10 MHz | RB=1,<br>Offset=0,<br>BW=15 MHz | RB=1 ,<br>Offset =0,<br>BW = 20 MHz |
|----------------------------------------------------------------------------------|--------------------------------|-------------------------------------|---------------------------------|-------------------------------------|
| Maximum measured level<br>at <u>Lowest Channel Edge</u><br>at antenna port (dBm) | -24.23                         | -32.50                              | -32.50                          | -32.50                              |

| LTE QPSK<br>MODULATION:                                                          | RB=All,<br>Offset=0,<br>BW=5 MHz | RB=All,<br>Offset=0,<br>BW = 10 MHz | RB=All,<br>Offset=0,<br>BW=15 MHz | RB=All,<br>Offset=0,<br>BW = 20 MHz |
|----------------------------------------------------------------------------------|----------------------------------|-------------------------------------|-----------------------------------|-------------------------------------|
| Maximum measured level<br>at <u>Lowest Channel Edge</u><br>at antenna port (dBm) | -30.03                           | -31.27                              | -31.04                            | -31.67                              |

| LTE QPSK<br>MODULATION:                                                           | RB=1,<br>Offset=Max,<br>BW=5 MHz | RB=1 ,<br>Offset =Max,<br>BW = 10 MHz | RB=1,<br>Offset =Max,<br>BW=15 MHz | RB=1 ,<br>Offset =Max,<br>BW = 20 MHz |
|-----------------------------------------------------------------------------------|----------------------------------|---------------------------------------|------------------------------------|---------------------------------------|
| Maximum measured level<br>at <u>Highest Channel Edge</u><br>at antenna port (dBm) | -23.29                           | -31.27                                | -31.04                             | -31.67                                |

| LTE QPSK<br>MODULATION:                                                           | RB=All,<br>Offset=0,<br>BW=5 MHz | RB=All,<br>Offset=0,<br>BW = 10 MHz | RB=All,<br>Offset=0,<br>BW=15 MHz | RB=All,<br>Offset=0,<br>BW = 20 MHz |
|-----------------------------------------------------------------------------------|----------------------------------|-------------------------------------|-----------------------------------|-------------------------------------|
| Maximum measured level<br>at <u>Highest Channel Edge</u><br>at antenna port (dBm) | -31.52                           | -33.63                              | -33.26                            | -32.71                              |

## LTE Band 12.

| LTE QPSK<br>MODULATION:                                                        | RB=1,<br>Offset=0,<br>BW=1.4 MHz | RB=1 ,<br>Offset =0,<br>BW = 3 MHz | RB=1,<br>Offset=0,<br>BW=5 MHz | RB=1 ,<br>Offset =0,<br>BW = 10 MHz |
|--------------------------------------------------------------------------------|----------------------------------|------------------------------------|--------------------------------|-------------------------------------|
| Maximum measured level<br>at <u>Lowest Block Edge</u> at<br>antenna port (dBm) | -22.60                           | -21.83                             | -21.50                         | -34.47                              |

| LTE QPSK<br>MODULATION:                                                        | RB=All,<br>Offset=0,<br>BW=1.4 MHz | RB=All,<br>Offset=0,<br>BW = 3 MHz | RB=All,<br>Offset=0,<br>BW=5 MHz | RB=All,<br>Offset=0,<br>BW = 10 MHz |
|--------------------------------------------------------------------------------|------------------------------------|------------------------------------|----------------------------------|-------------------------------------|
| Maximum measured level<br>at <u>Lowest Block Edge</u> at<br>antenna port (dBm) | -23.97                             | -24.44                             | -26.66                           | -32.28                              |

| LTE QPSK<br>MODULATION:                                                         | RB=1,<br>Offset=Max,<br>BW=1.4 MHz | RB=1 ,<br>Offset =Max,<br>BW = 3 MHz | RB=1,<br>Offset =Max,<br>BW=5 MHz | RB=1 ,<br>Offset =Max,<br>BW = 10 MHz |
|---------------------------------------------------------------------------------|------------------------------------|--------------------------------------|-----------------------------------|---------------------------------------|
| Maximum measured level<br>at <u>Highest Block Edge</u> at<br>antenna port (dBm) | -22.49                             | -22.62                               | -21.04                            | -34.44                                |

| LTE QPSK<br>MODULATION:                                                         | RB=All,<br>Offset=0,<br>BW=1.4 MHz | RB=All,<br>Offset=0,<br>BW = 3 MHz | RB=All,<br>Offset=0,<br>BW=5 MHz | RB=All,<br>Offset=0,<br>BW = 10 MHz |
|---------------------------------------------------------------------------------|------------------------------------|------------------------------------|----------------------------------|-------------------------------------|
| Maximum measured level<br>at <u>Highest Block Edge</u> at<br>antenna port (dBm) | -21.60                             | -23.83                             | -26.98                           | -32.02                              |

# LTE Band 13.

|                                                                                |                                |                                     |
|--------------------------------------------------------------------------------|--------------------------------|-------------------------------------|
| LTE QPSK<br>MODULATION:                                                        | RB=1,<br>Offset=0,<br>BW=5 MHz | RB=1 ,<br>Offset =0,<br>BW = 10 MHz |
| Maximum measured level<br>at <u>Lowest Block Edge</u> at<br>antenna port (dBm) | -23.30                         | -37.57                              |

|                                                                                |                                  |                                     |
|--------------------------------------------------------------------------------|----------------------------------|-------------------------------------|
| LTE QPSK<br>MODULATION:                                                        | RB=All,<br>Offset=0,<br>BW=5 MHz | RB=All,<br>Offset=0,<br>BW = 10 MHz |
| Maximum measured level<br>at <u>Lowest Block Edge</u> at<br>antenna port (dBm) | -30.43                           | -33.98                              |

|                                                                                 |                                   |                                       |
|---------------------------------------------------------------------------------|-----------------------------------|---------------------------------------|
| LTE QPSK<br>MODULATION:                                                         | RB=1,<br>Offset =Max,<br>BW=5 MHz | RB=1 ,<br>Offset =Max,<br>BW = 10 MHz |
| Maximum measured level<br>at <u>Highest Block Edge</u> at<br>antenna port (dBm) | -22.35                            | -36.59                                |

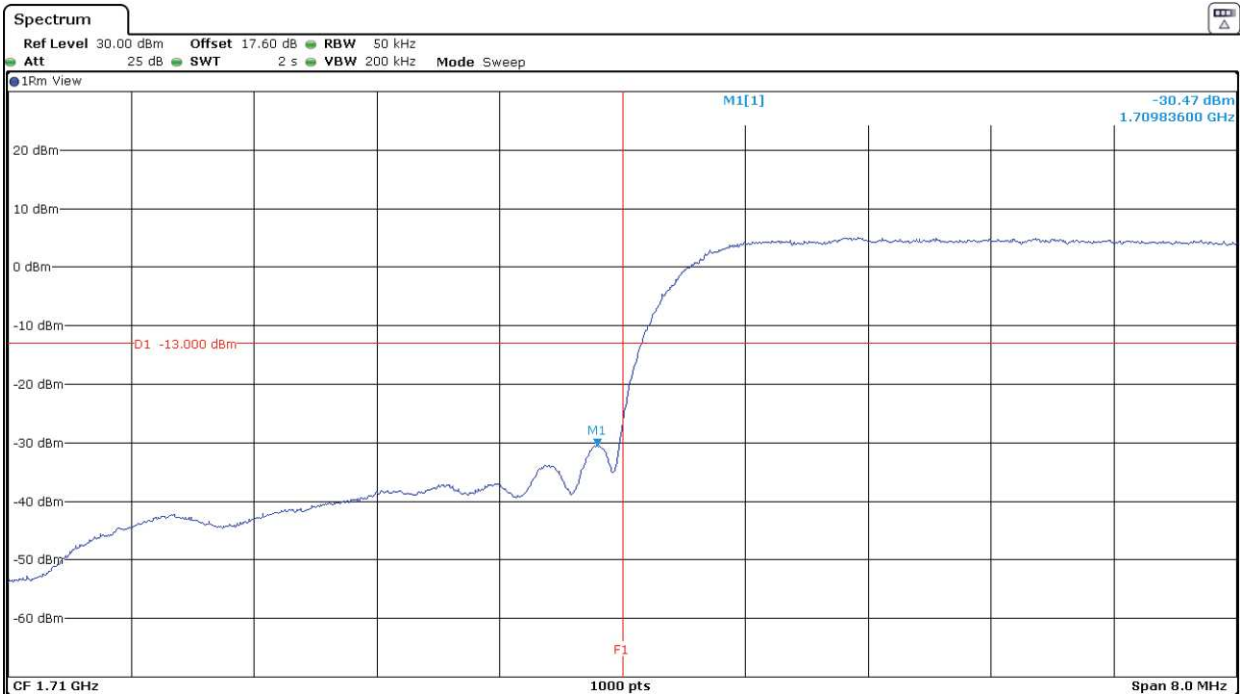
|                                                                                 |                                  |                                     |
|---------------------------------------------------------------------------------|----------------------------------|-------------------------------------|
| LTE QPSK<br>MODULATION:                                                         | RB=All,<br>Offset=0,<br>BW=5 MHz | RB=All,<br>Offset=0,<br>BW = 10 MHz |
| Maximum measured level<br>at <u>Highest Block Edge</u> at<br>antenna port (dBm) | -27.91                           | -30.81                              |

Measurement uncertainty:  $\leq \pm 2.03$  dB

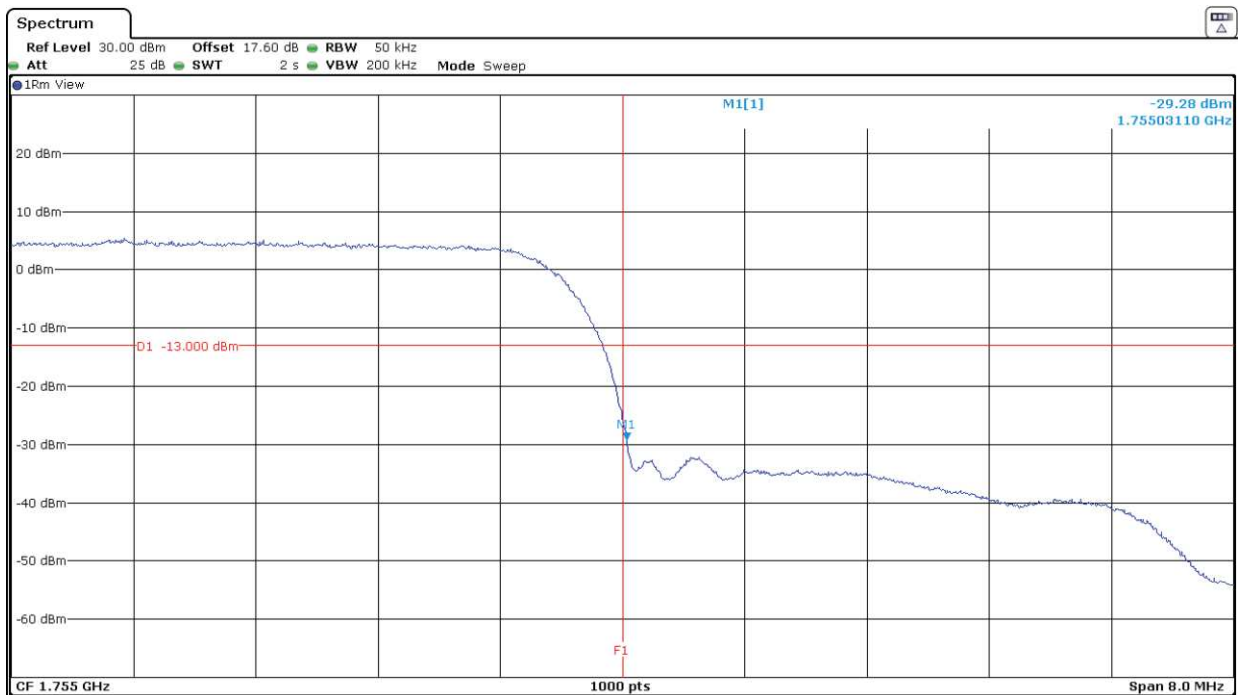
Verdict: PASS

3G Band IV. WCDMA MODULATION.

Lowest Channel:

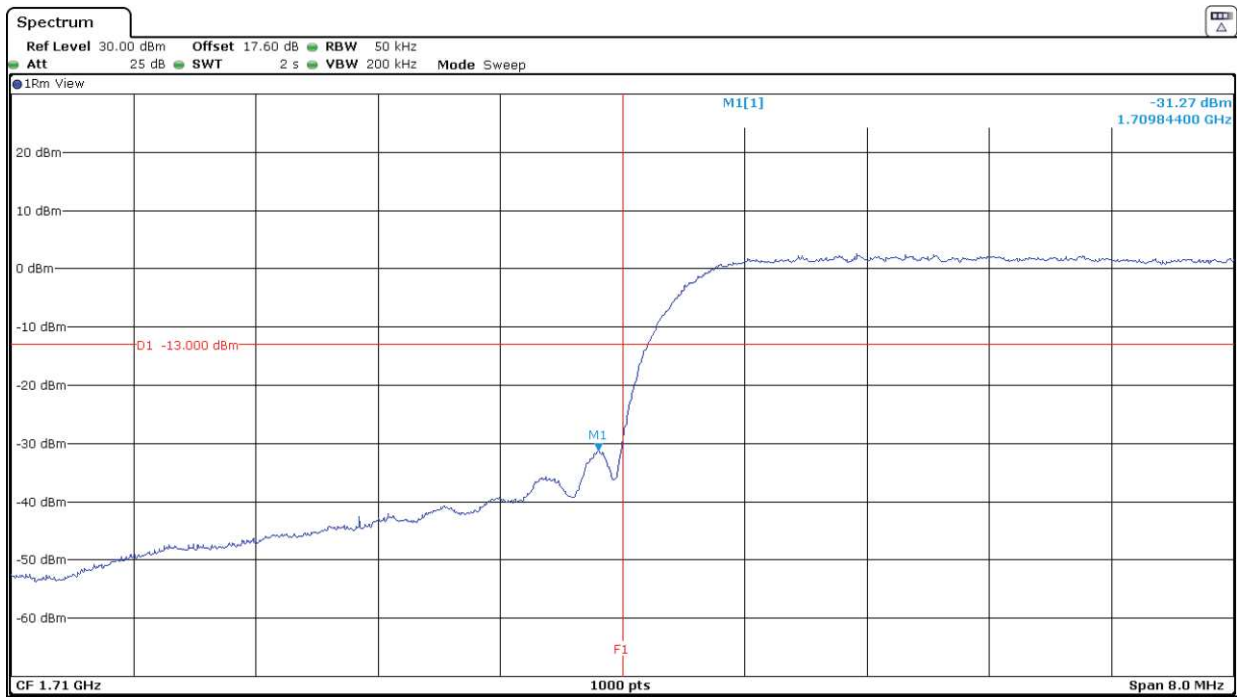


Highest Channel:

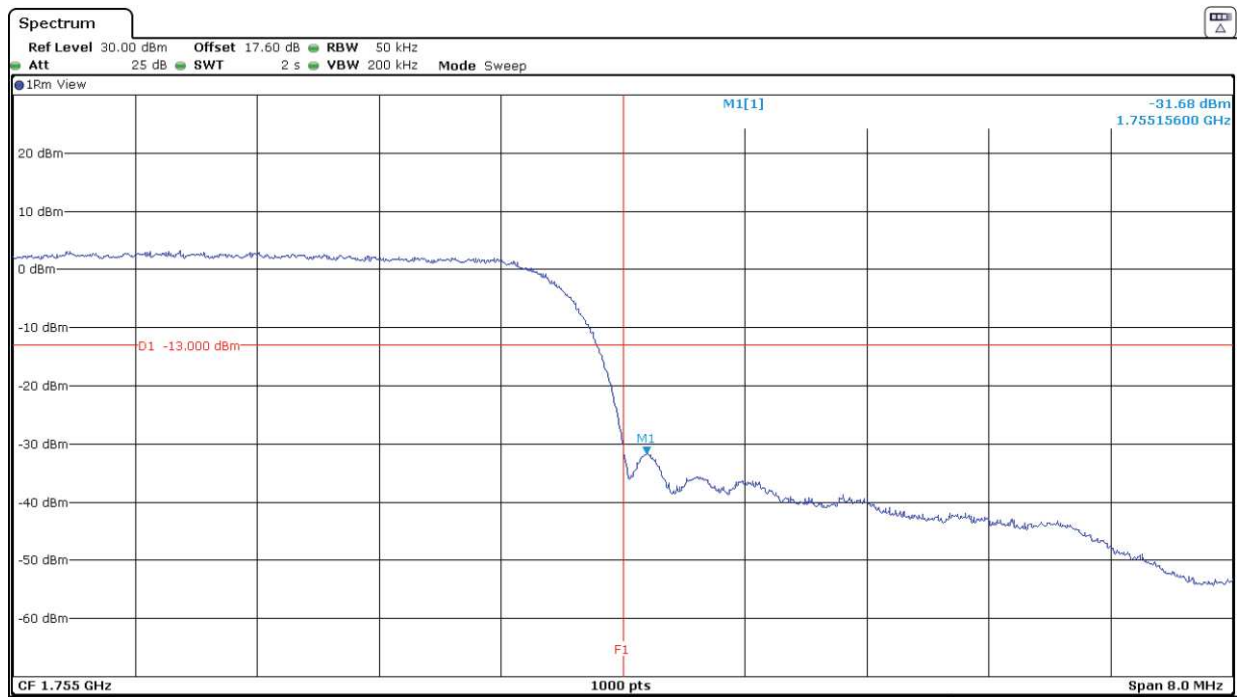


3G Band IV. HSUPA MODULATION.

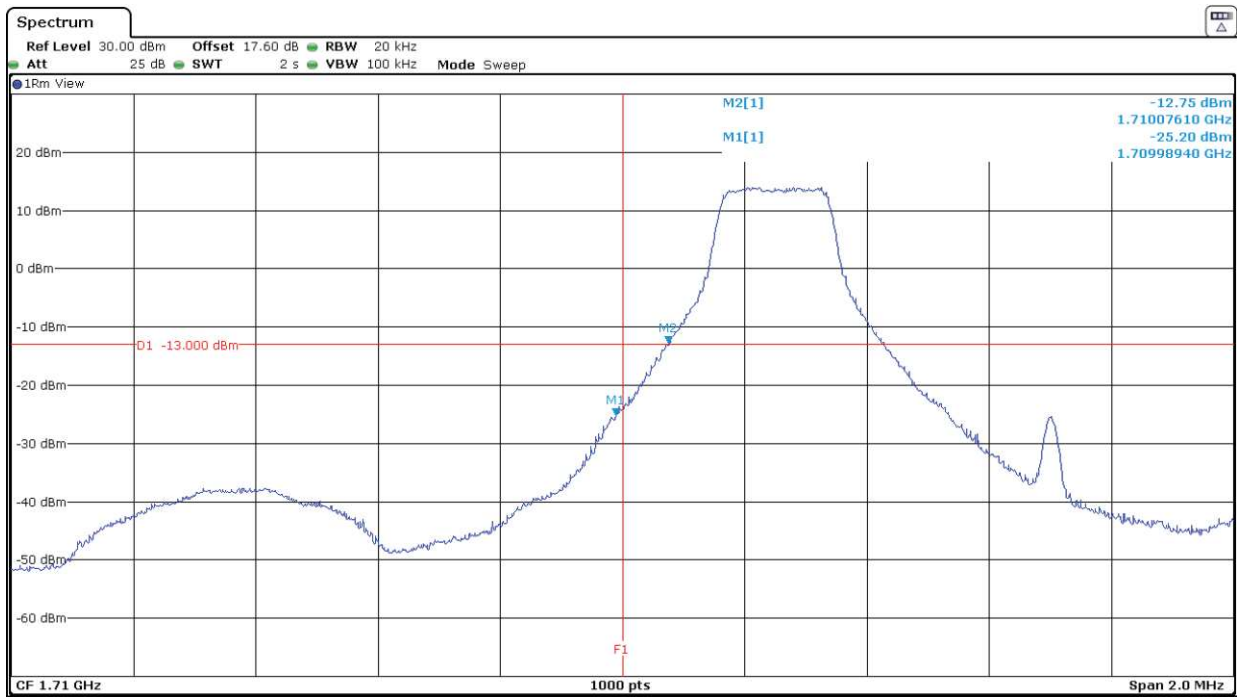
Lowest Channel:



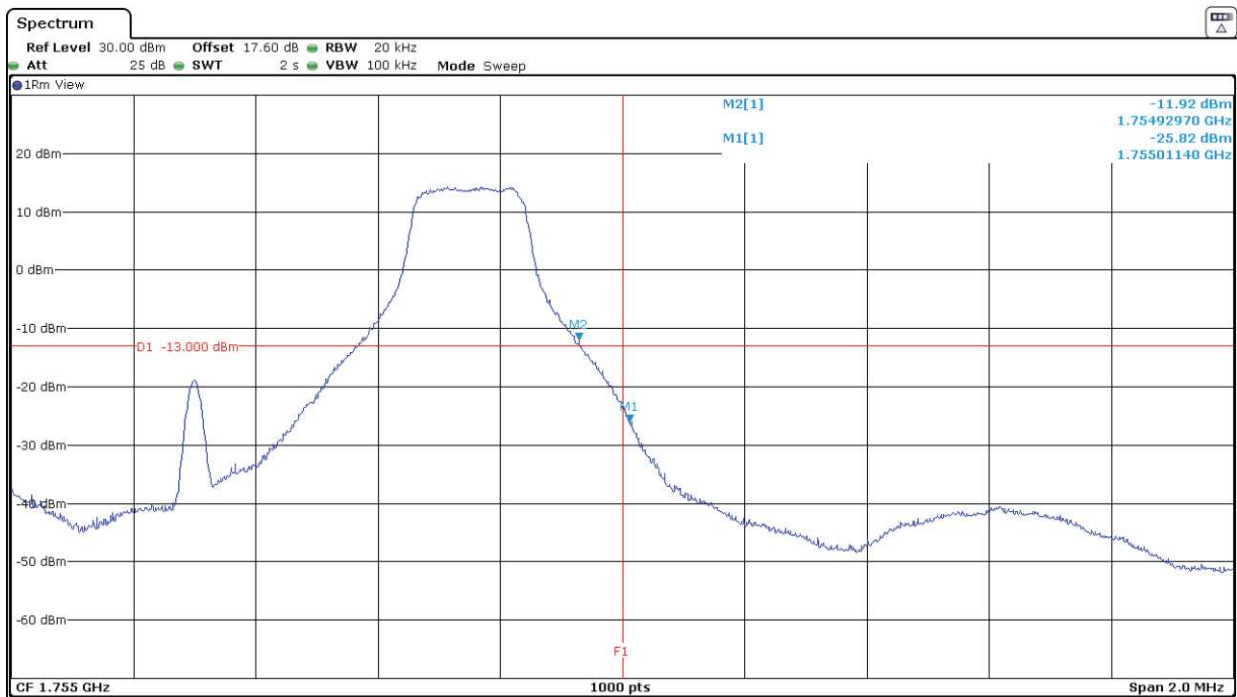
Highest Channel:



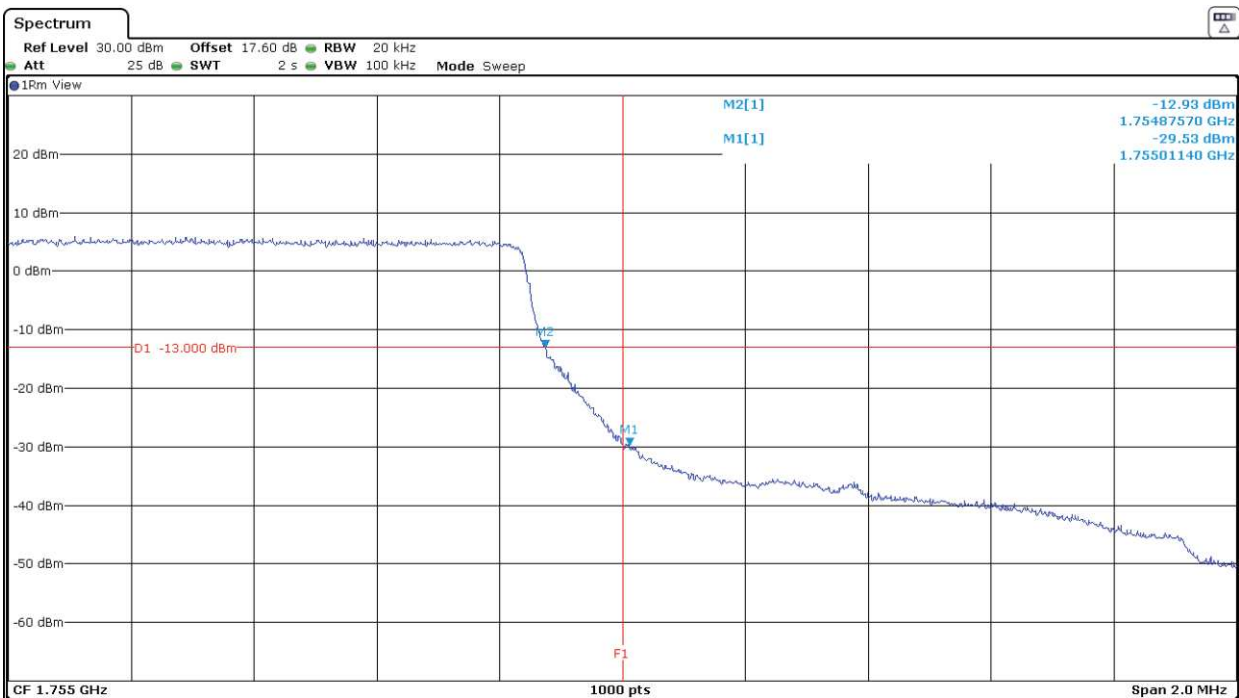
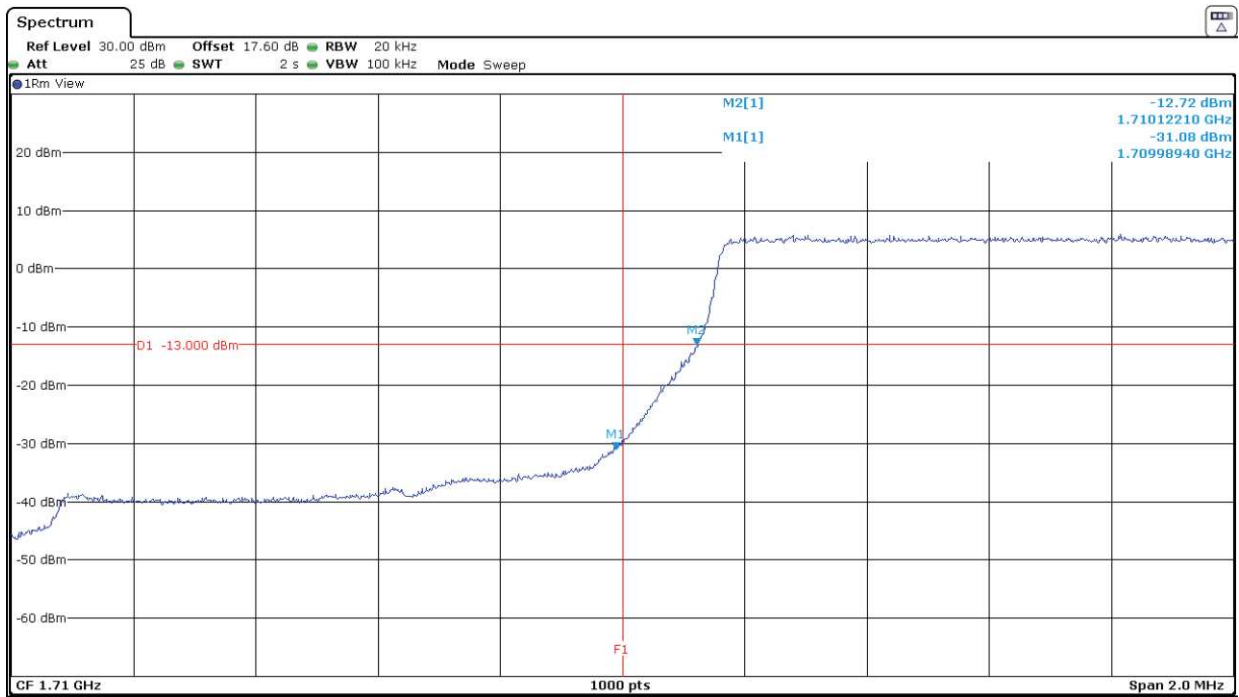
LTE Band 4. QPSK MODULATION. BW=1.4 MHz. RB=1. Offset=0. Lowest Block Edge:



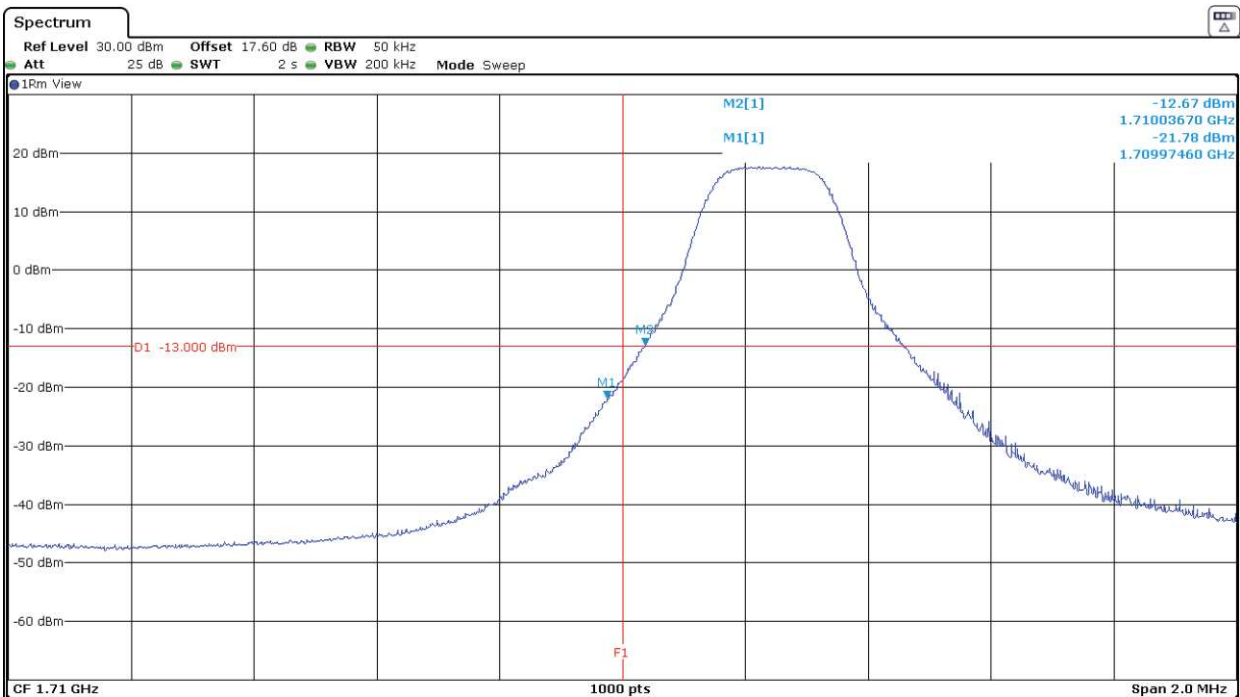
LTE Band 4. QPSK MODULATION. BW=1.4 MHz. RB=1. Offset=Max. Highest Block Edge:



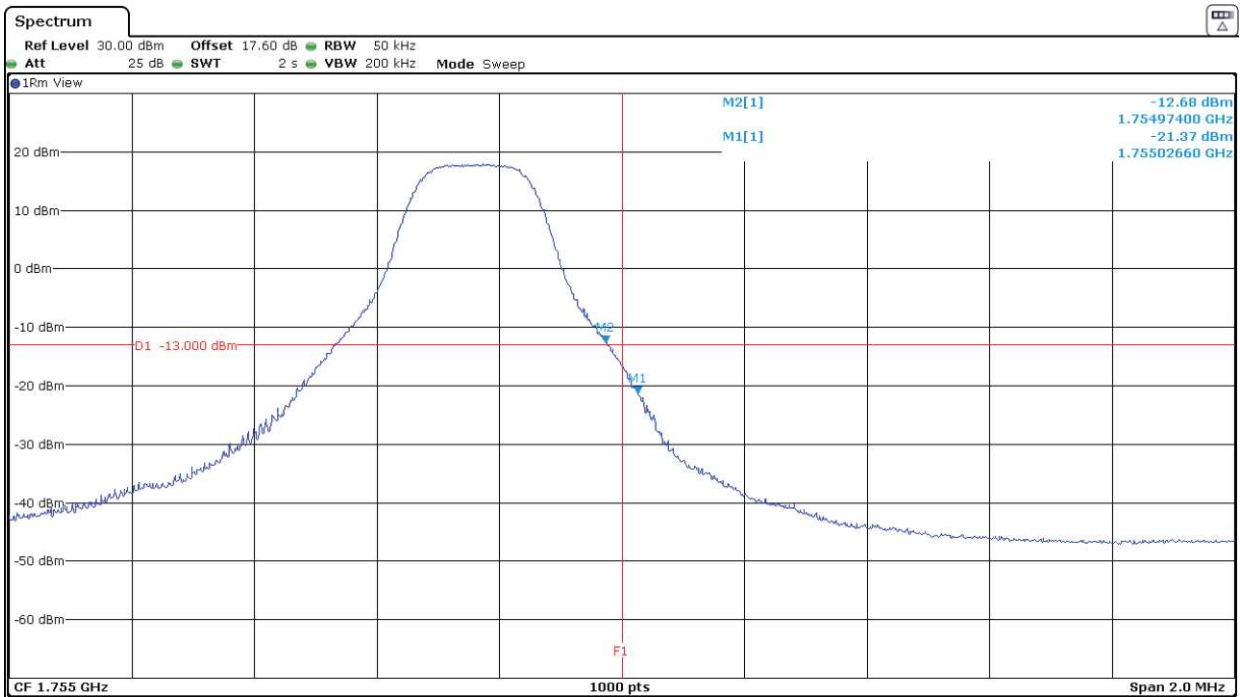
LTE Band 4. QPSK MODULATION. BW=1.4 MHz. RB=All. Offset=0. Lowest and Highest Block Edges:



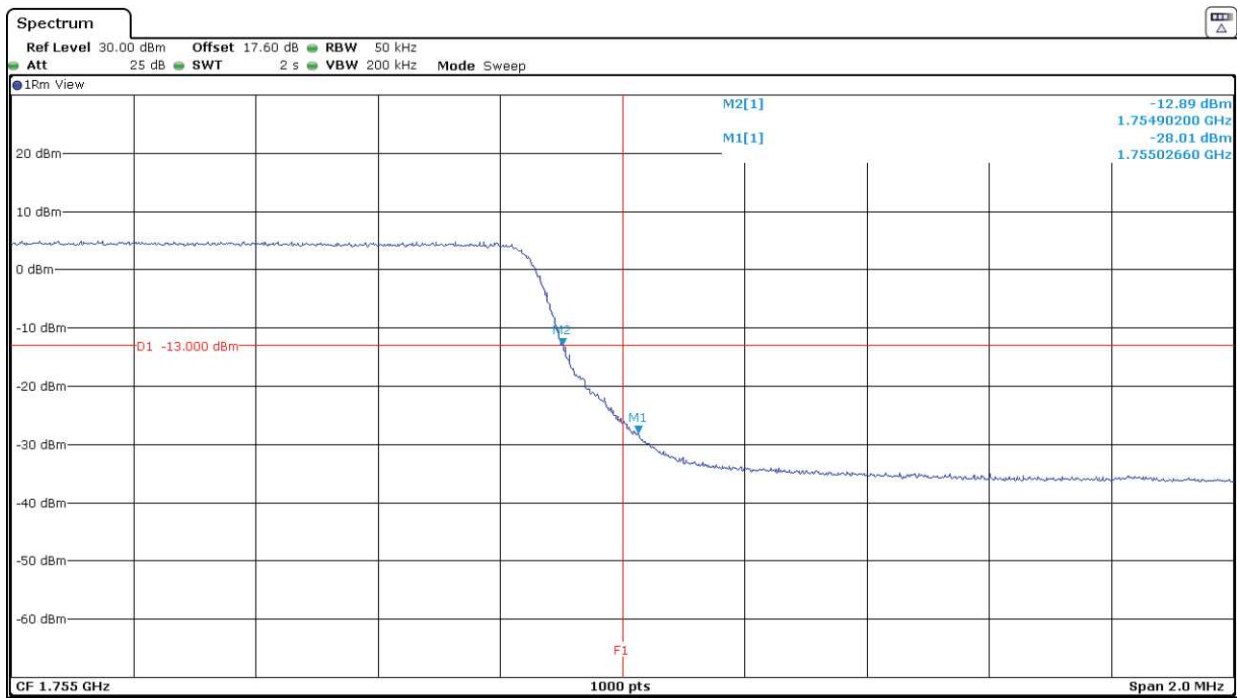
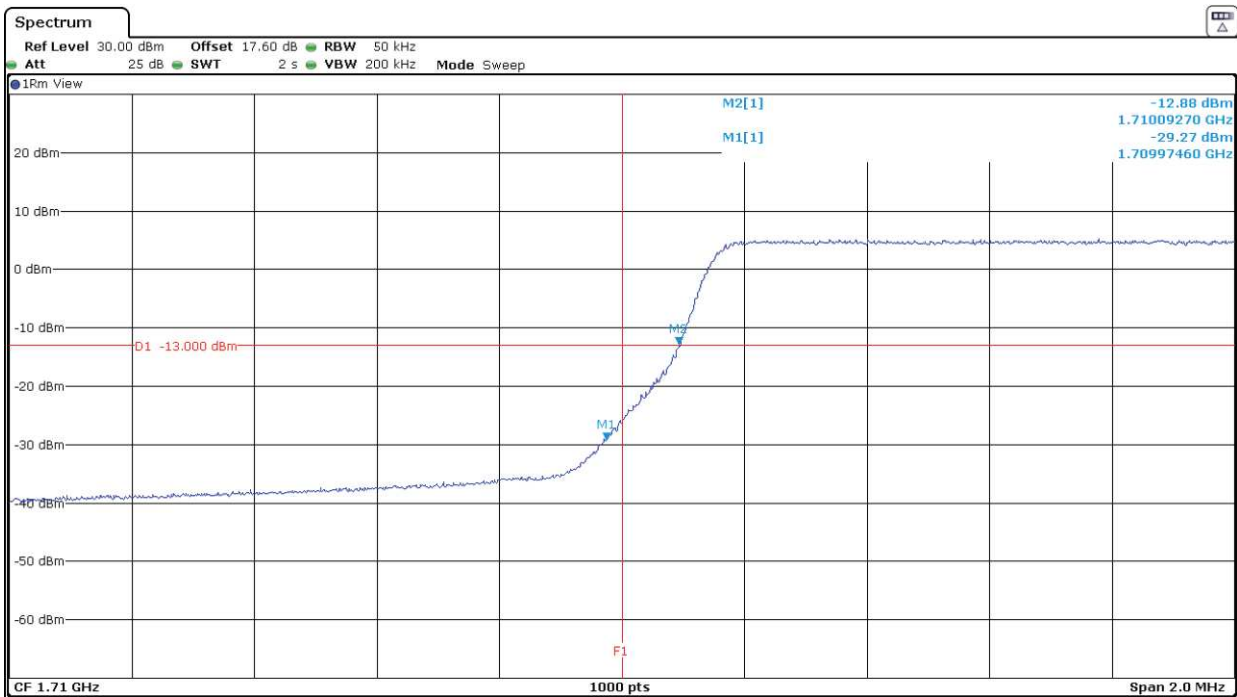
LTE Band 4. QPSK MODULATION. BW=3 MHz. RB=1. Offset=0. Lowest Block Edge:



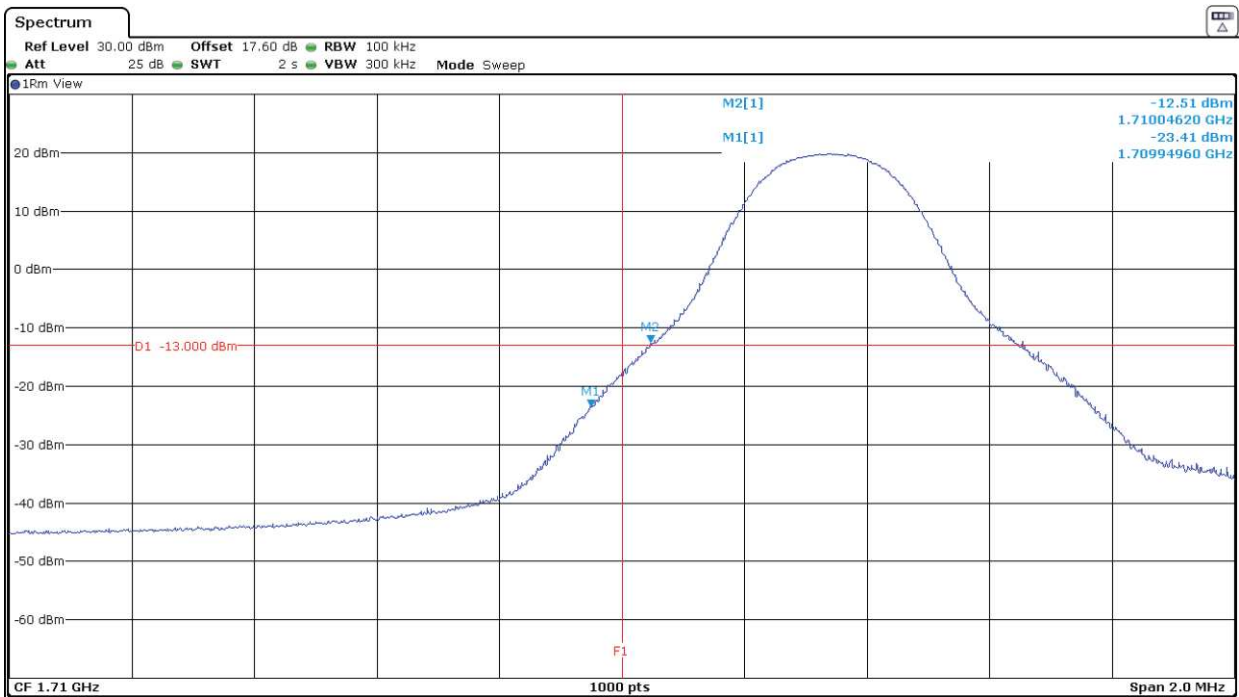
LTE Band 4. QPSK MODULATION. BW=3 MHz. RB=1. Offset=Max. Highest Block Edge:



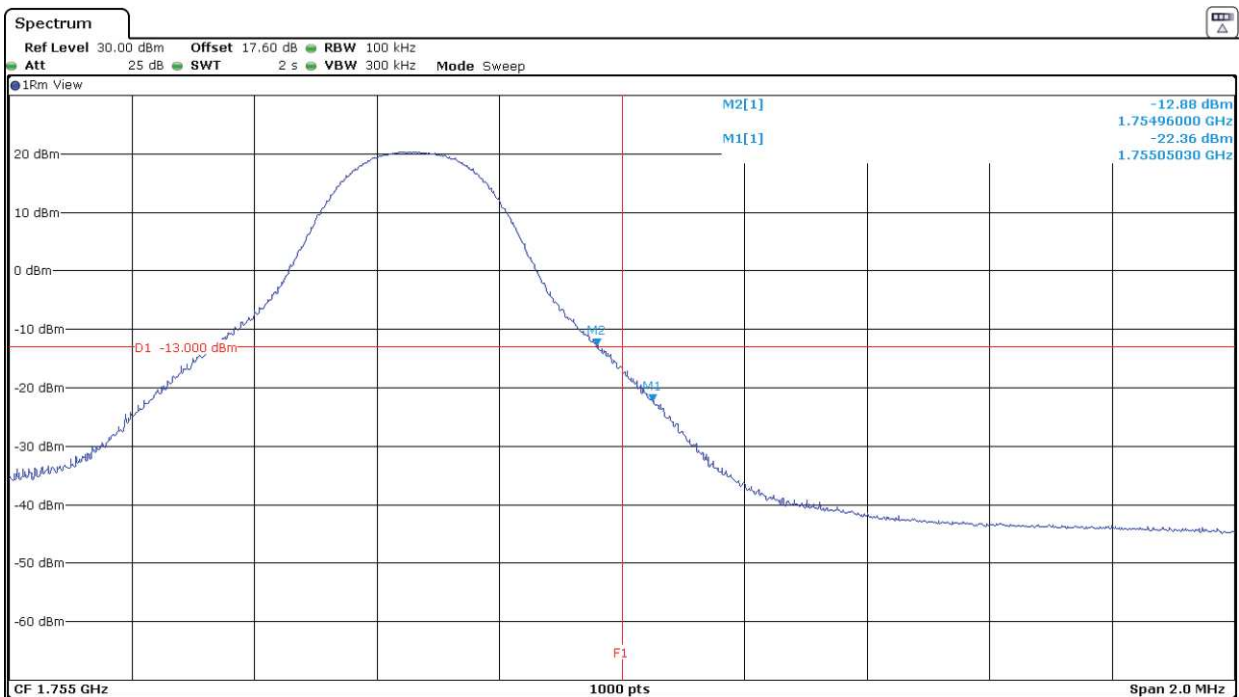
LTE Band 4. QPSK MODULATION. BW=3 MHz. RB=All. Offset=0. Lowest and Highest Block Edges:



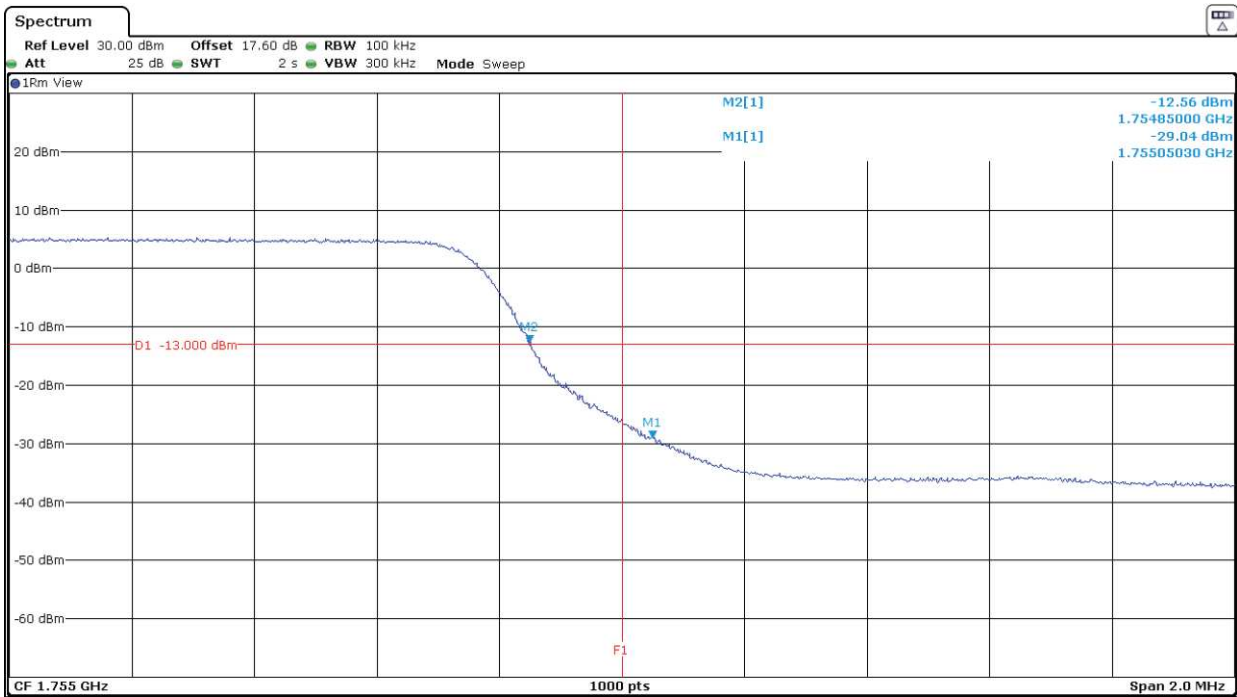
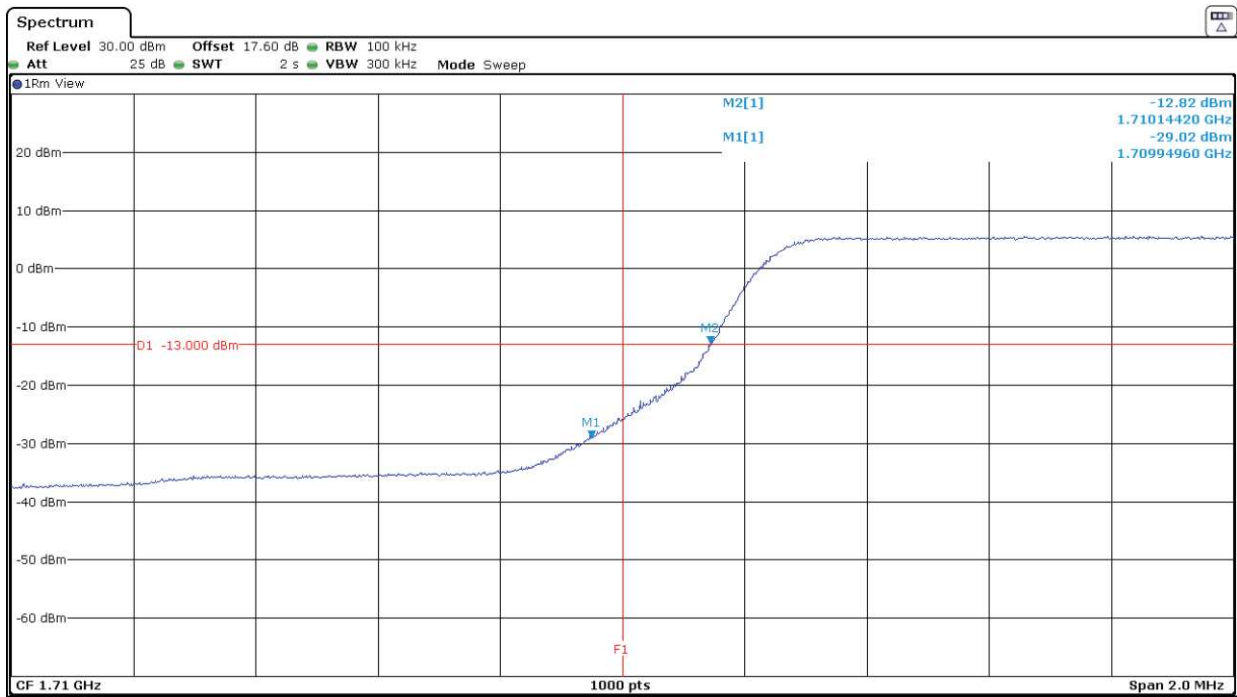
LTE Band 4. QPSK MODULATION. BW=5 MHz. RB=1. Offset=0. Lowest Block Edge:



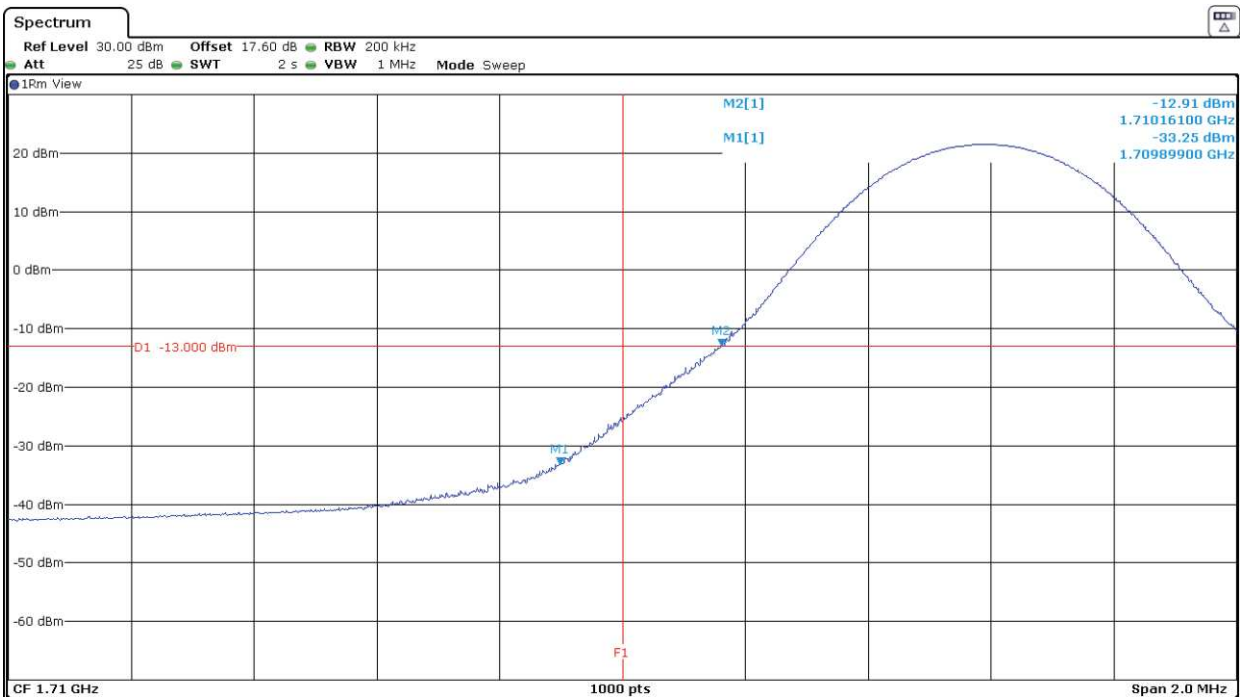
LTE Band 4. QPSK MODULATION. BW=5 MHz. RB=1. Offset=Max. Highest Block Edge:



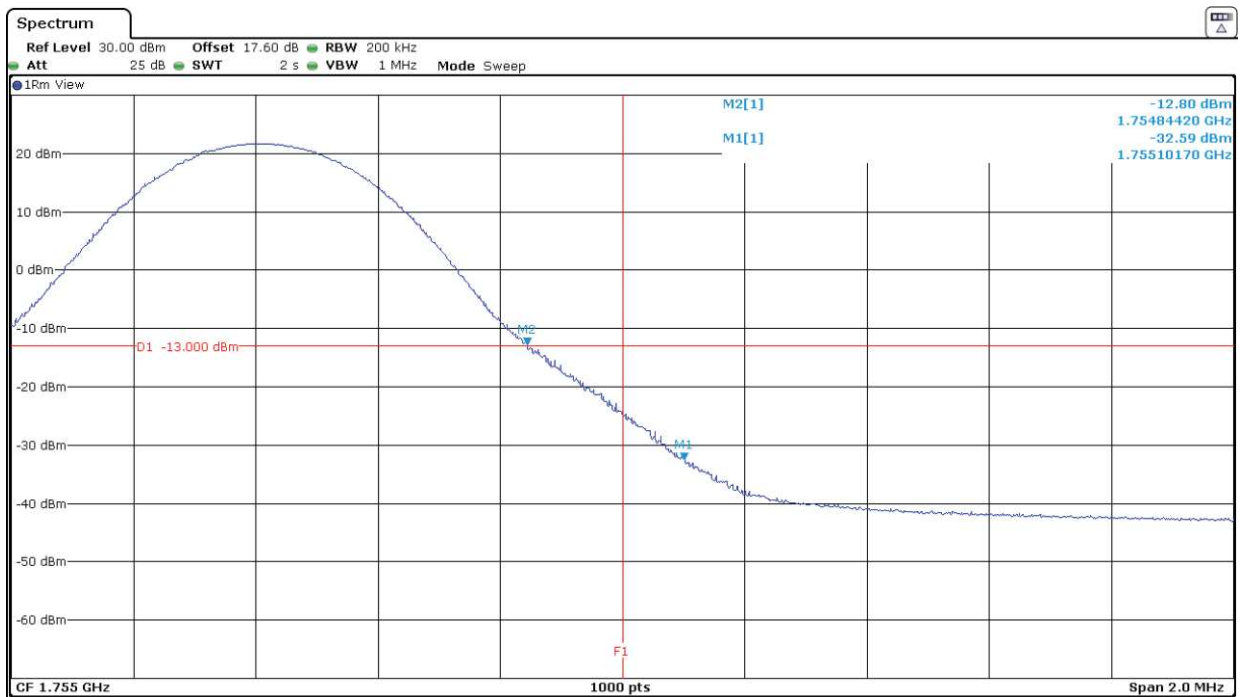
LTE Band 4. QPSK MODULATION. BW=5 MHz. RB=All. Offset=0. Lowest and Highest Block Edges:



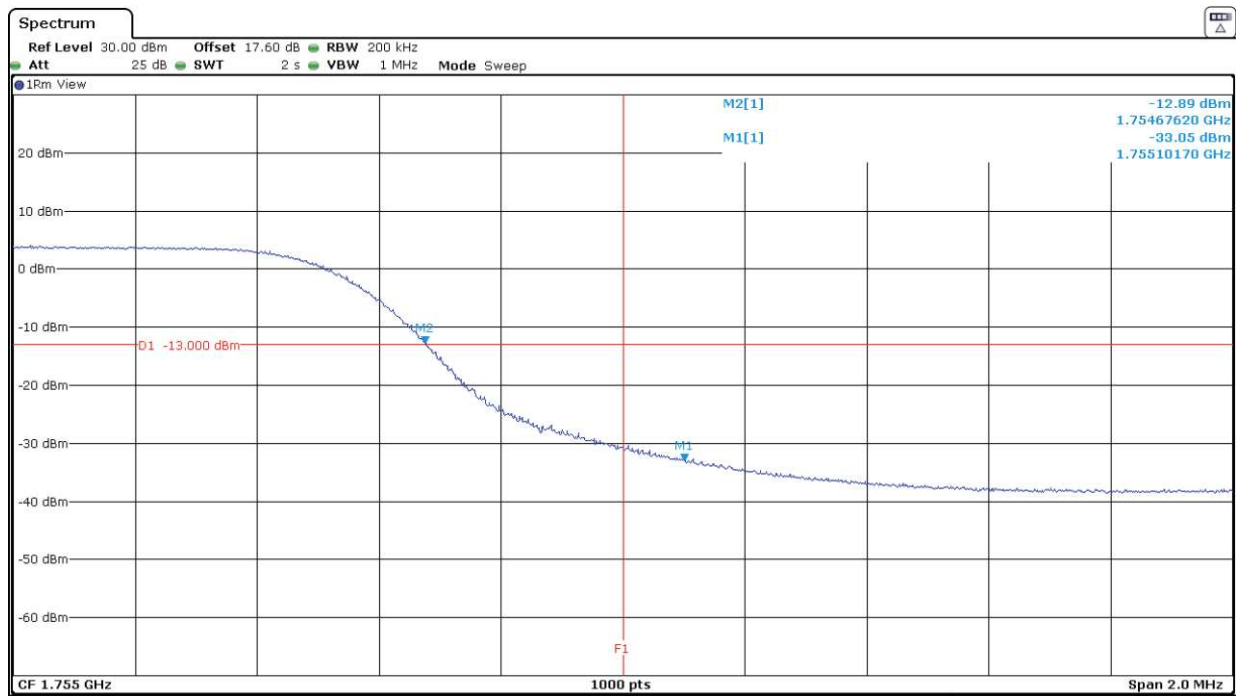
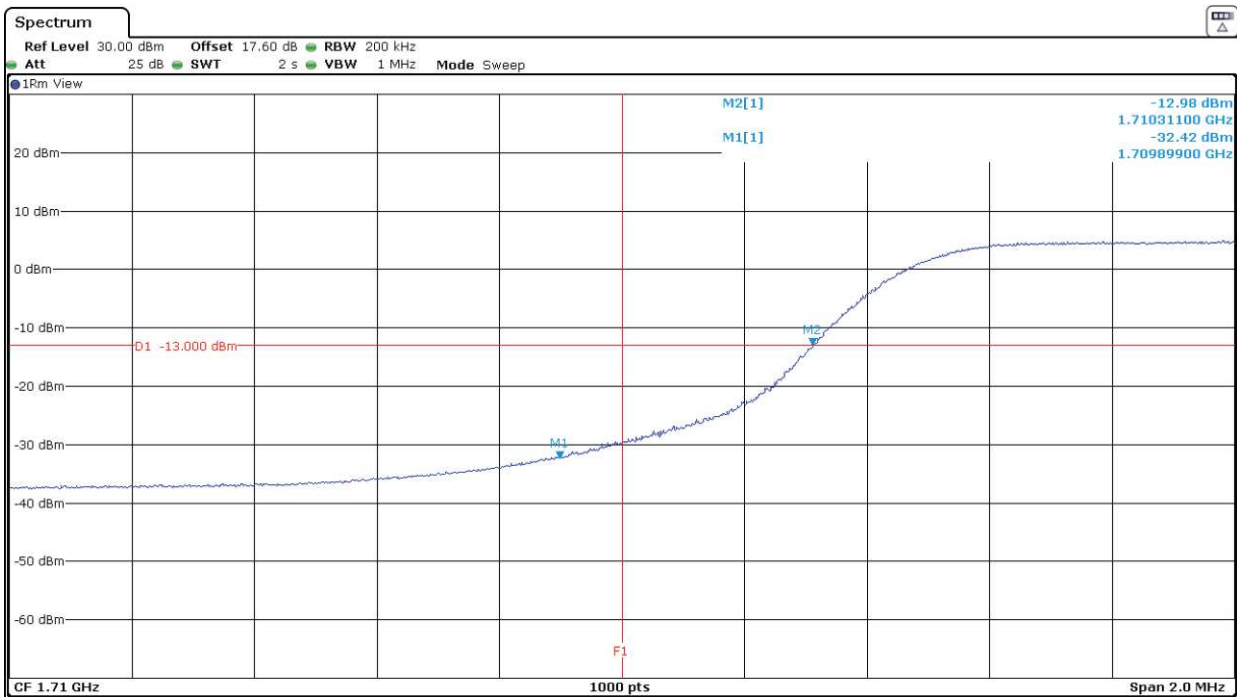
LTE Band 4. QPSK MODULATION. BW=10 MHz. RB=1. Offset=0. Lowest Block Edge:



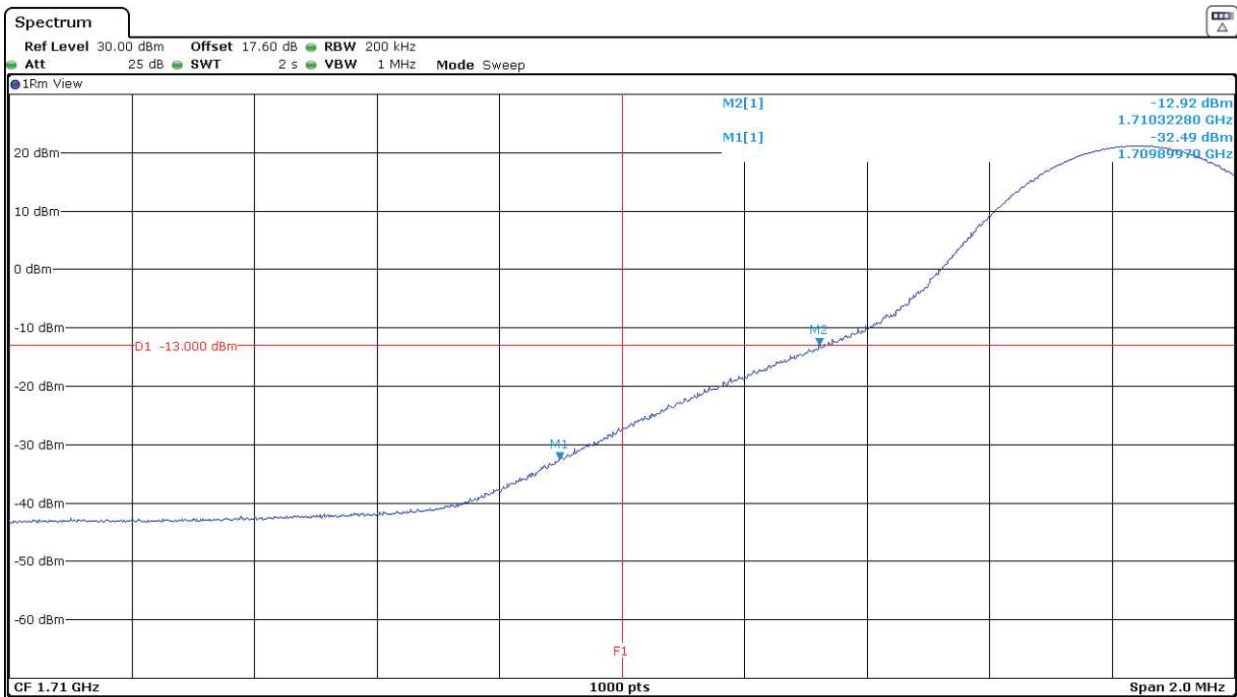
LTE Band 4. QPSK MODULATION. BW=10 MHz. RB=1. Offset=Max. Highest Block Edge:



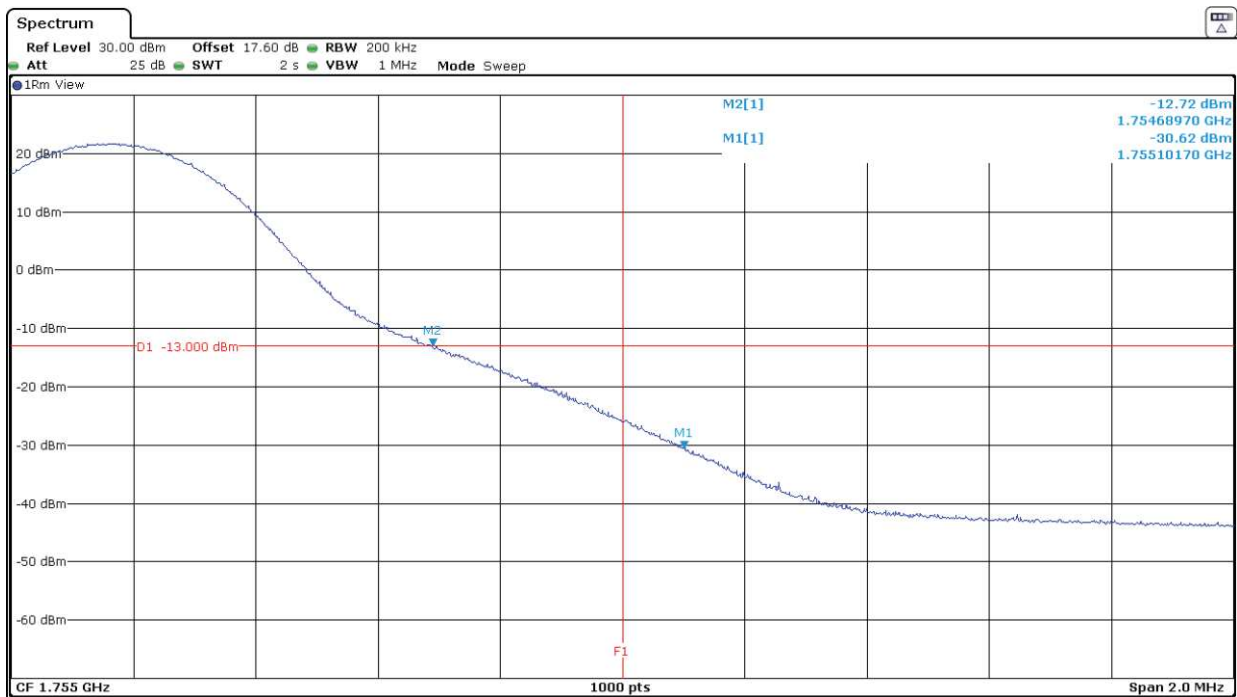
LTE Band 4. QPSK MODULATION. BW=10 MHz. RB=All. Offset=0. Lowest and Highest Block Edges:



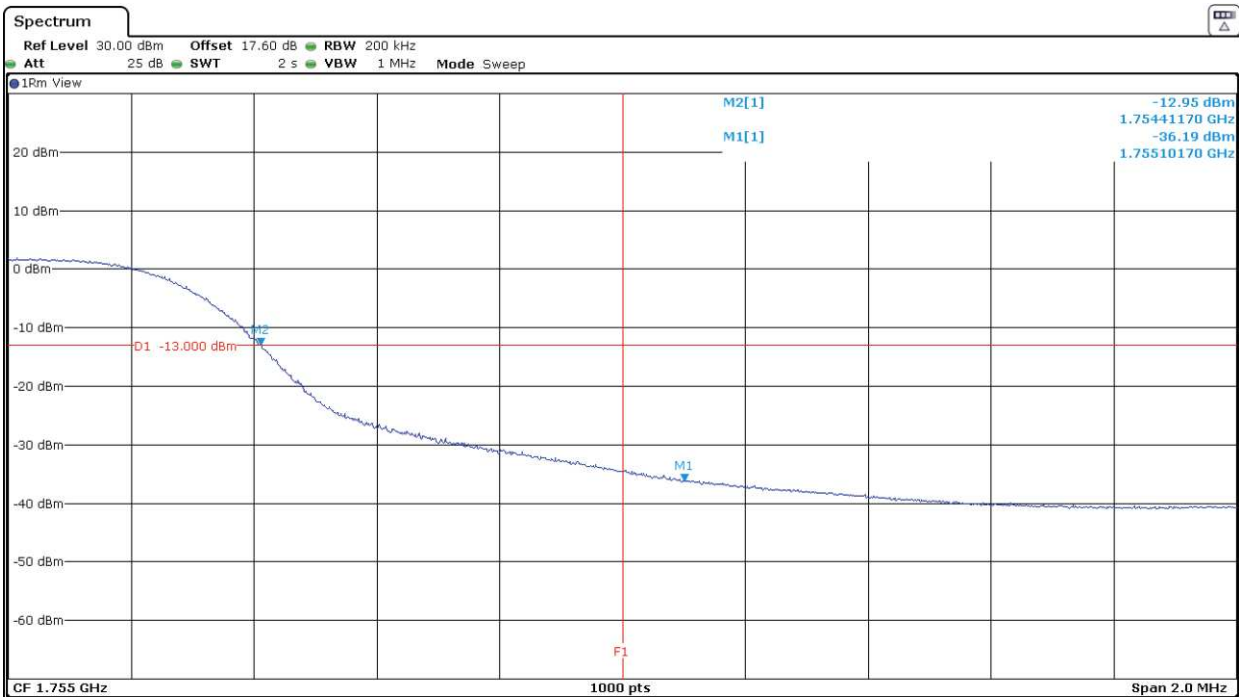
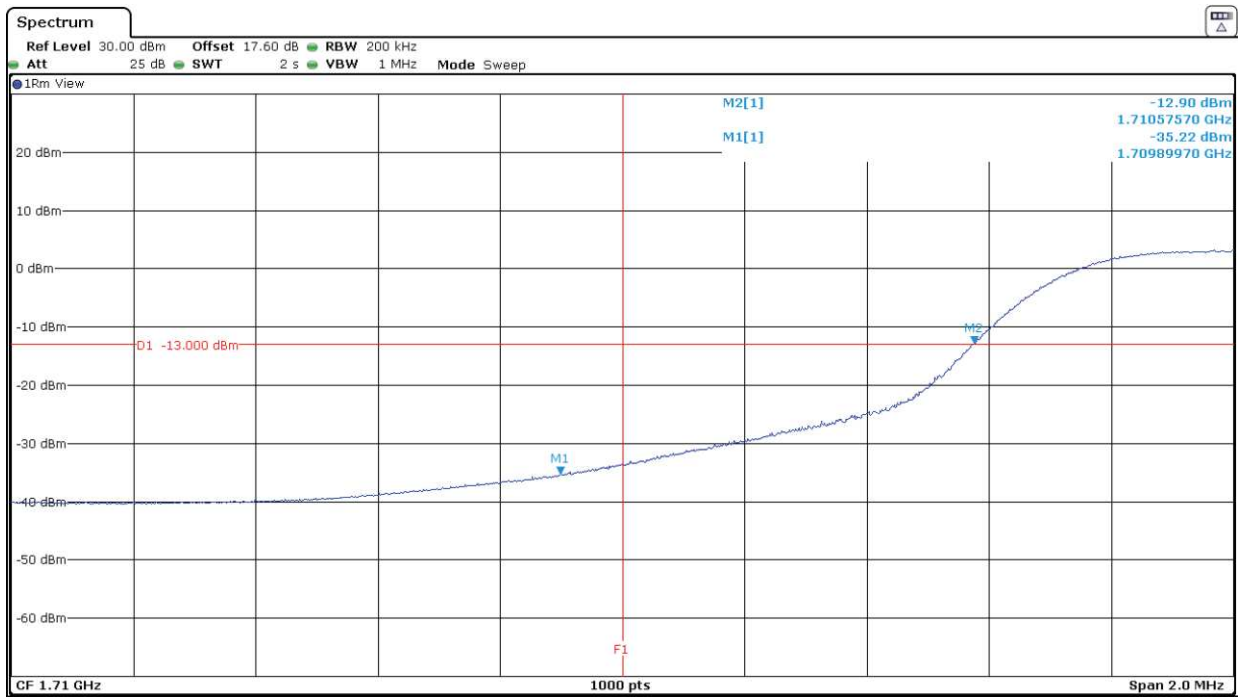
LTE Band 4.    QPSK MODULATION. BW=15 MHz. RB=1. Offset=0. Lowest Block Edge:



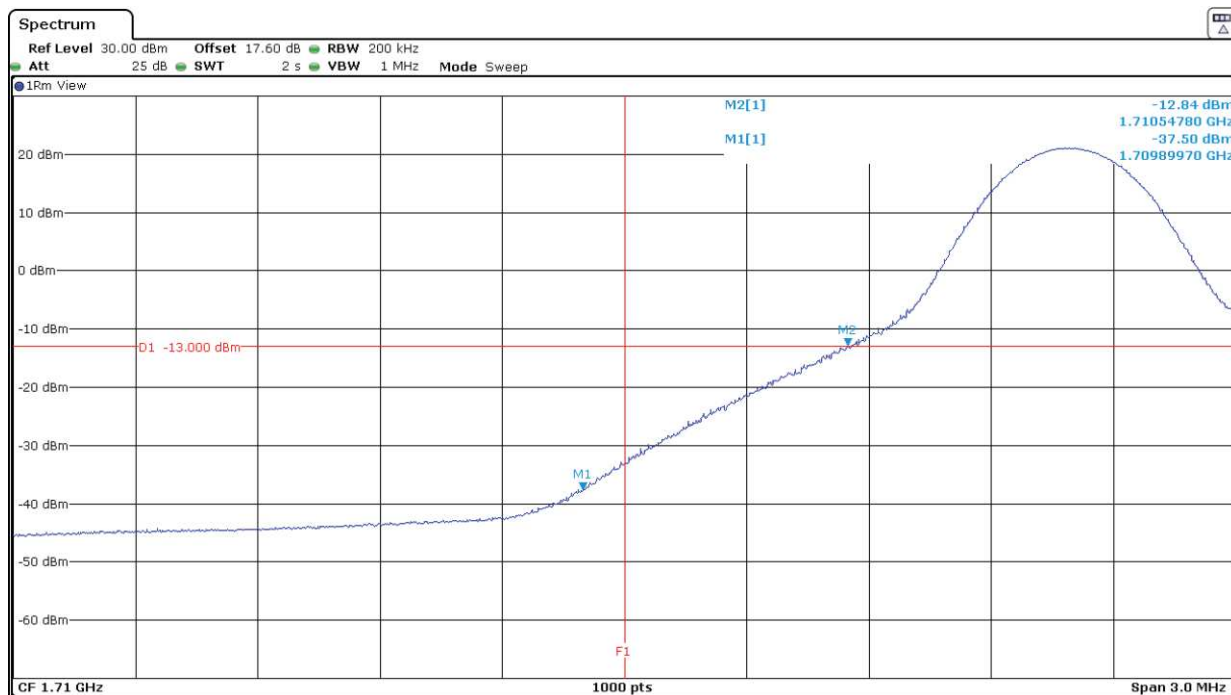
LTE Band 4.    QPSK MODULATION. BW=15 MHz. RB=1. Offset=Max. Highest Block Edge:



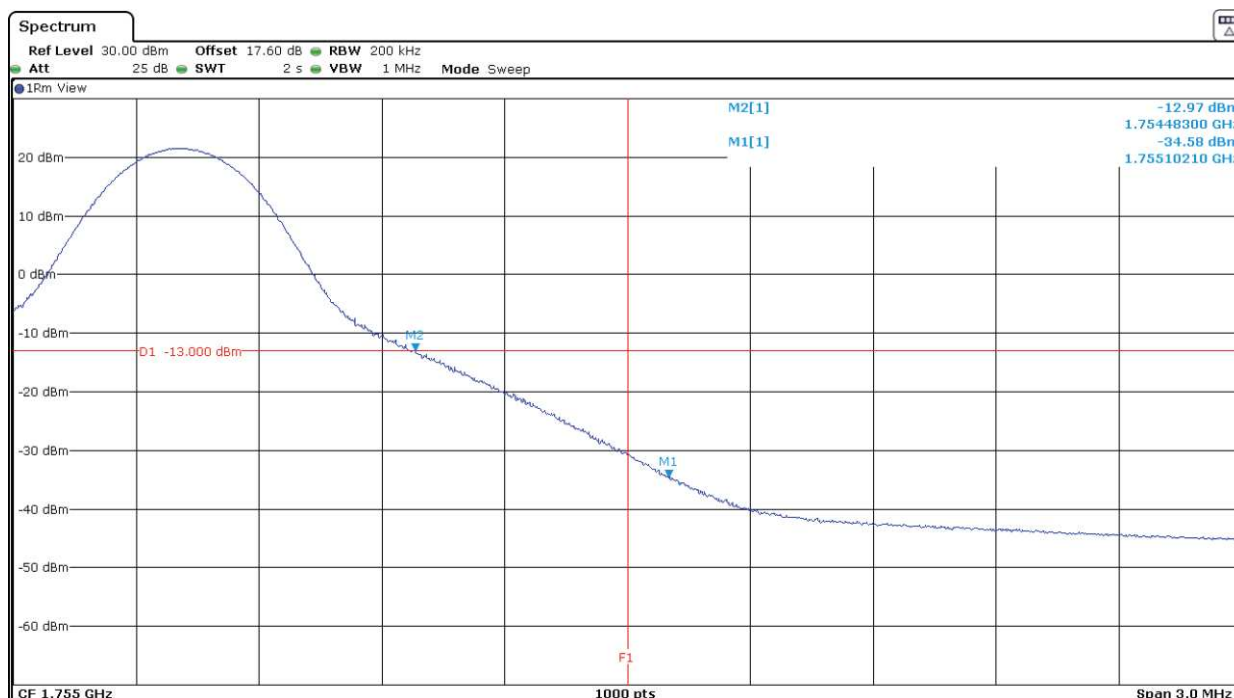
LTE Band 4. QPSK MODULATION. BW=15 MHz. RB=All. Offset=0. Lowest and Highest Block Edges:



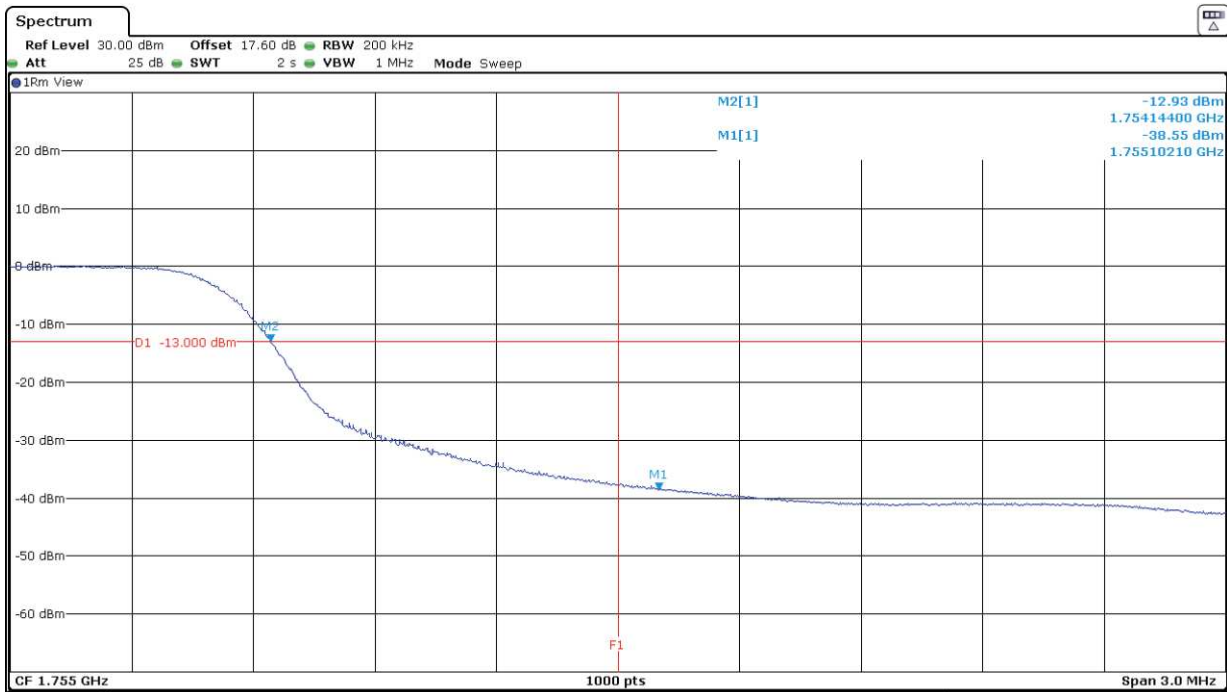
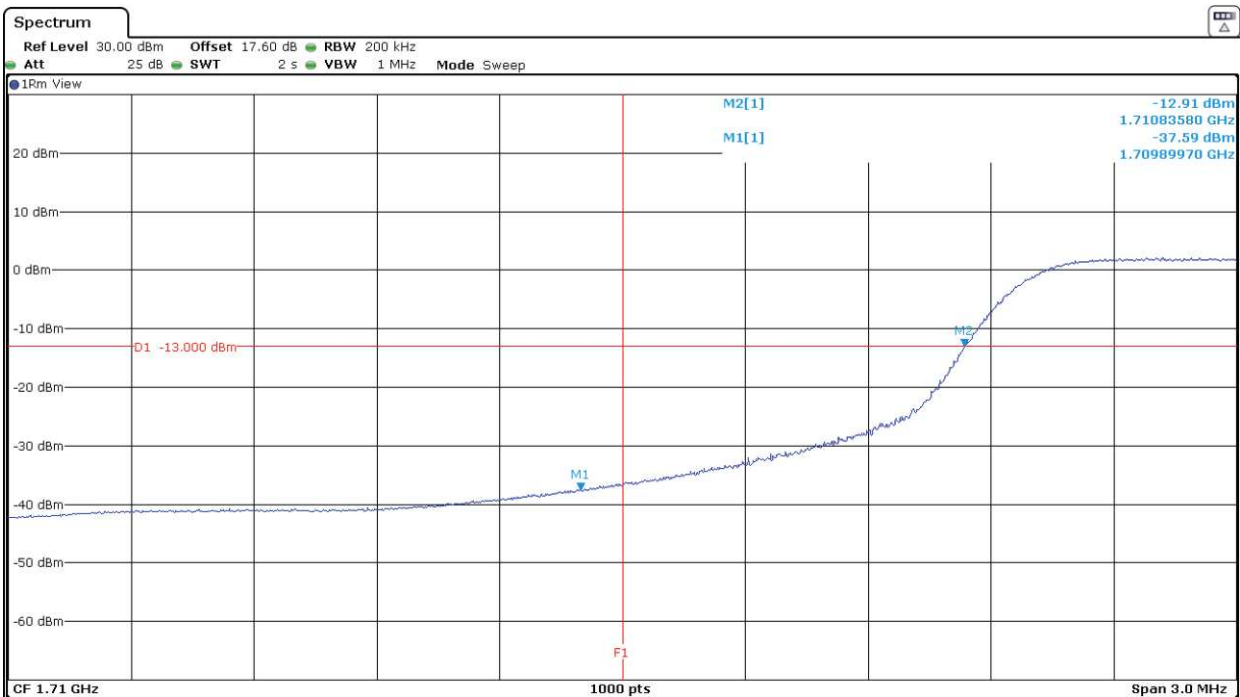
LTE Band 4. QPSK MODULATION. BW=20 MHz. RB=1. Offset=0. Lowest Block Edge:



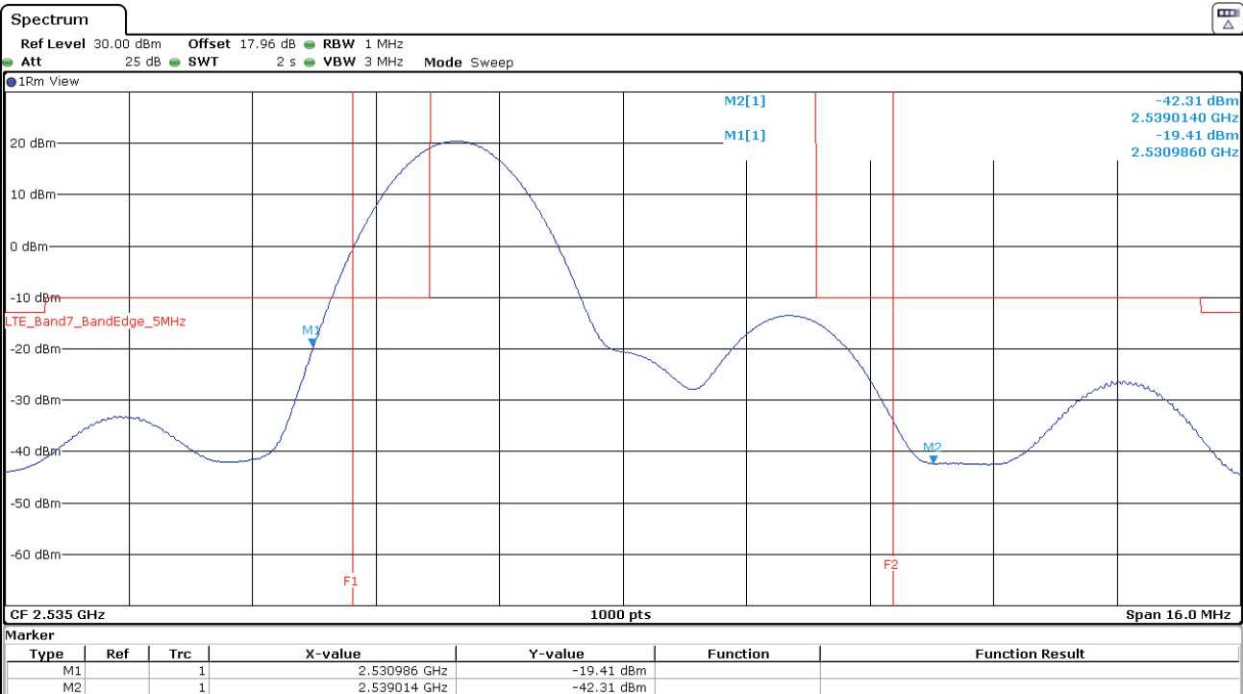
LTE Band 4. QPSK MODULATION. BW=20 MHz. RB=1. Offset=Max. Highest Block Edge:



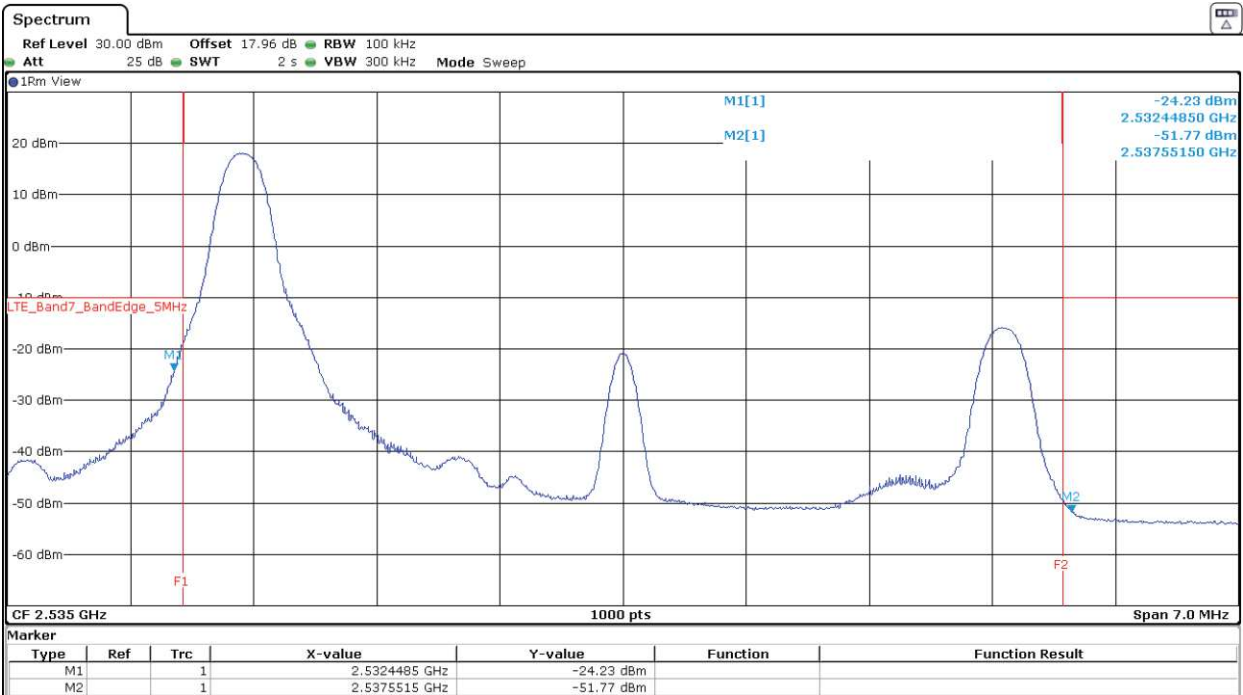
LTE Band 4. QPSK MODULATION. BW=20 MHz. RB=All. Offset=0. Lowest and Highest Block Edges:



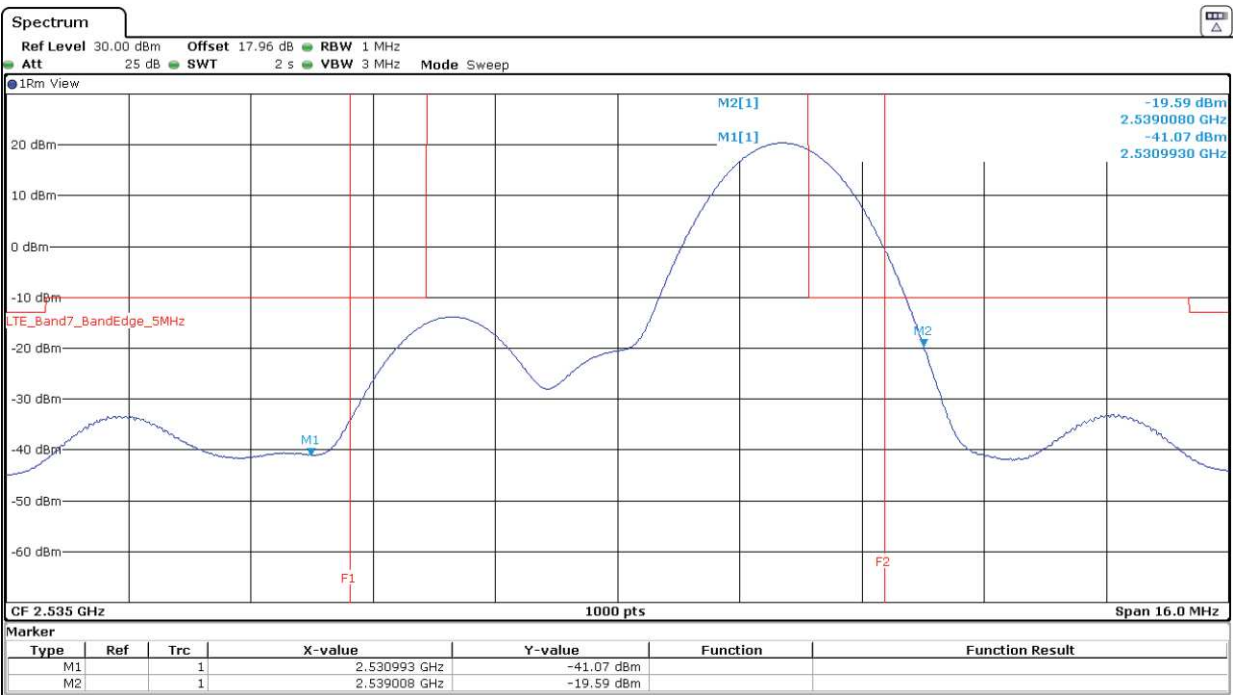
LTE Band 7. QPSK MODULATION. BW=5 MHz. RB=1. Offset=0. Lowest Block Edge:



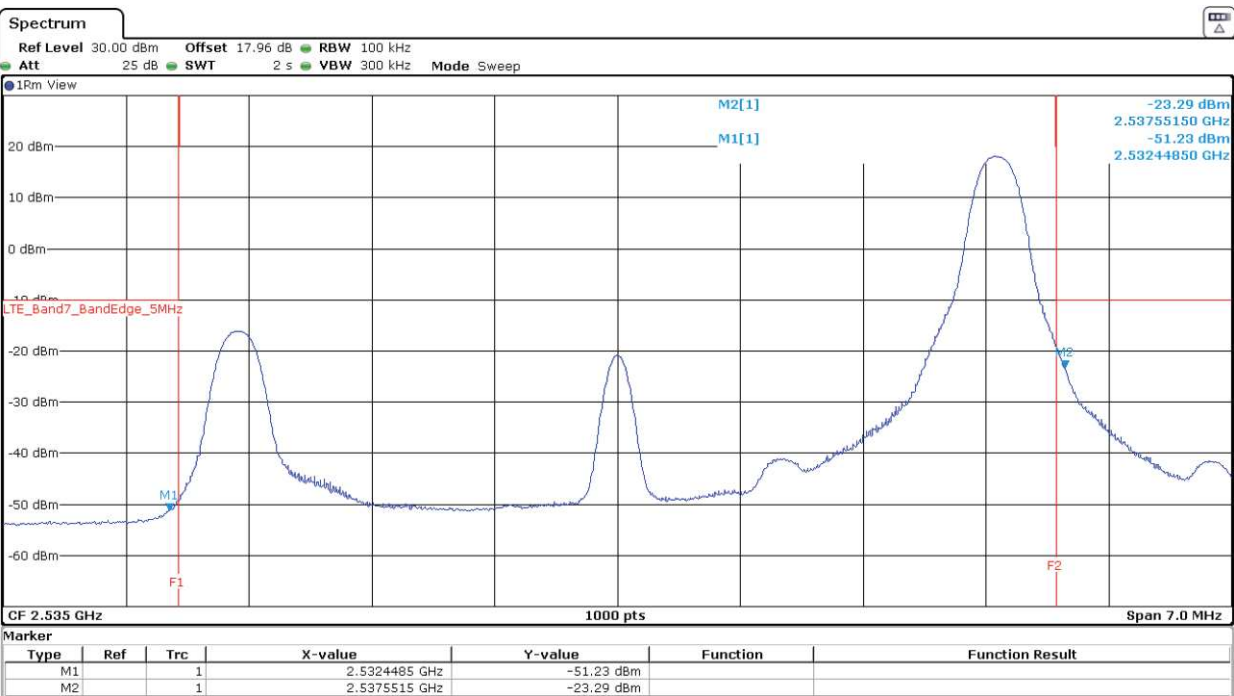
Additional zoom:



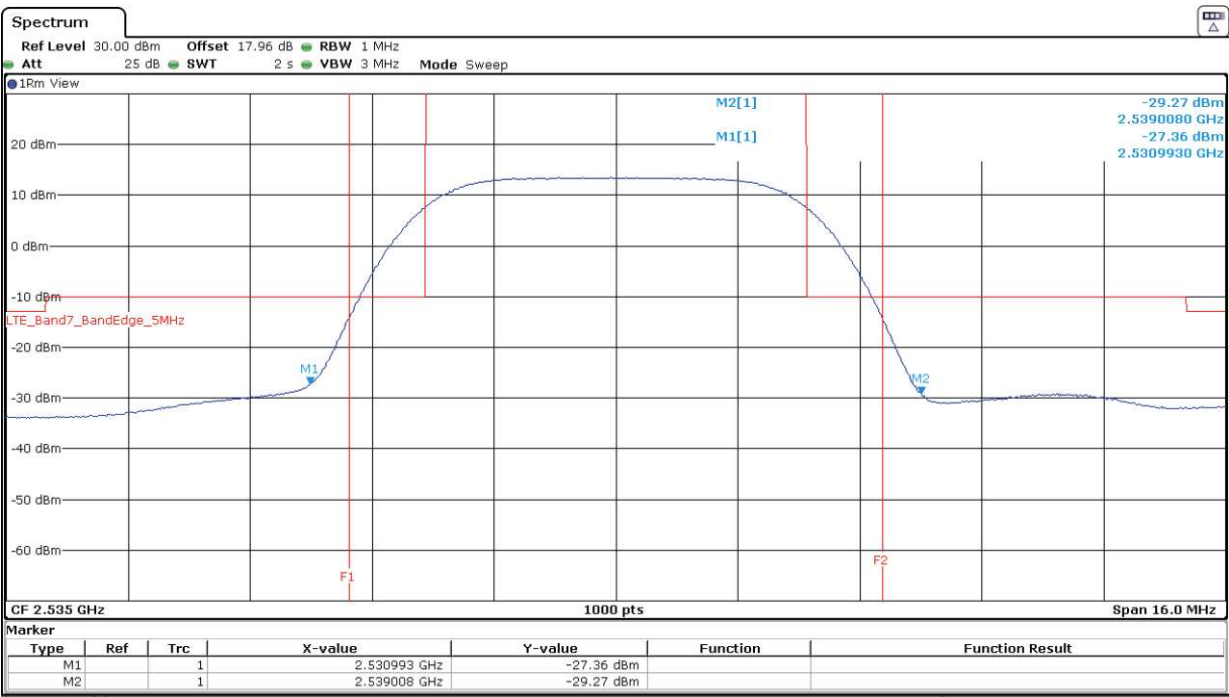
LTE Band 7. QPSK MODULATION. BW=5 MHz. RB=1. Offset=Max. Highest Block Edge:



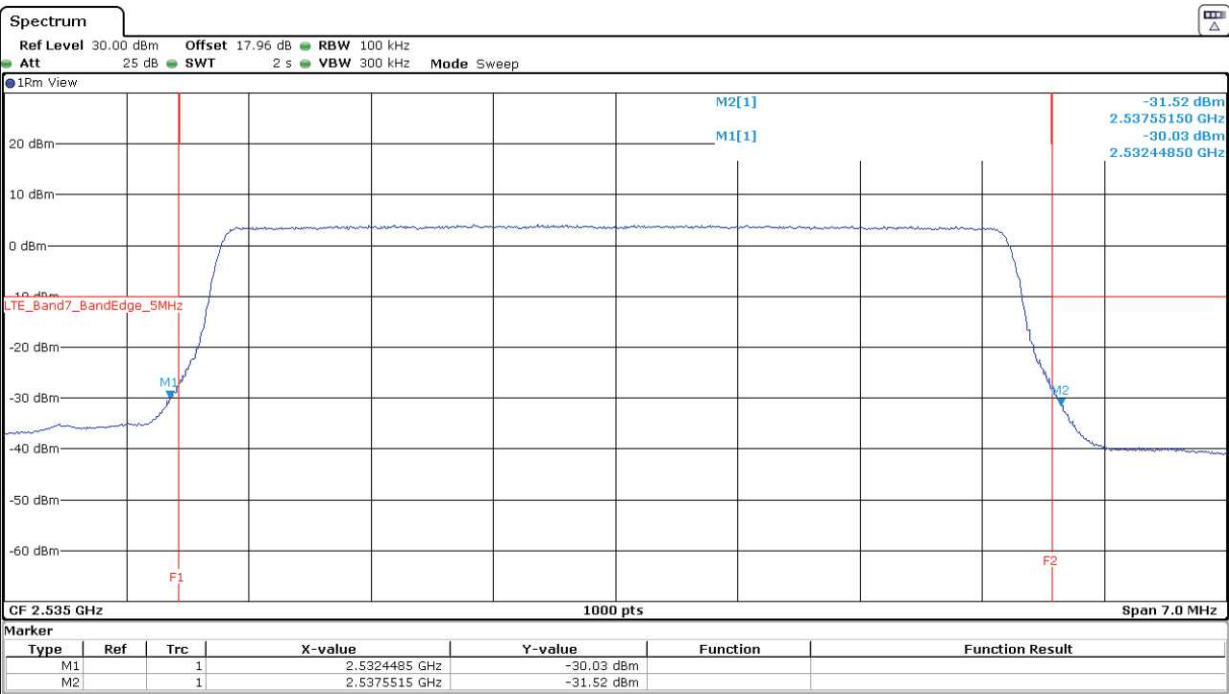
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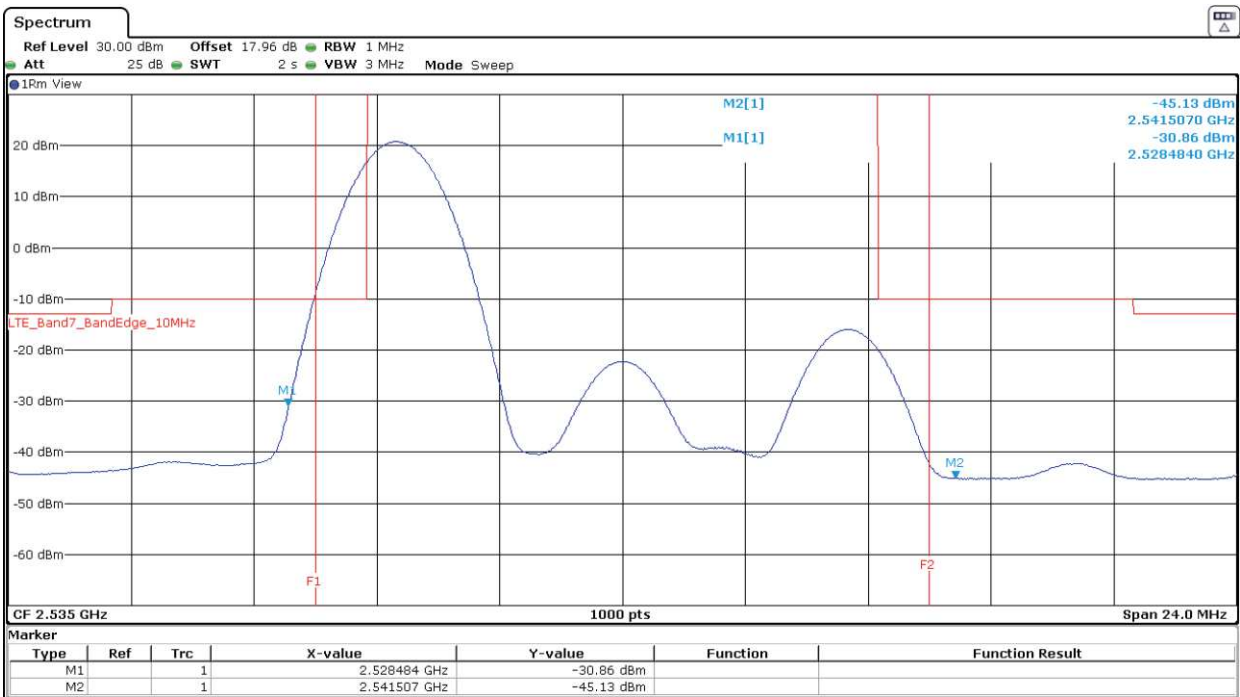
LTE Band 7. QPSK MODULATION. BW=5 MHz. RB=All. Offset=0. Lowest and Highest Block Edges:



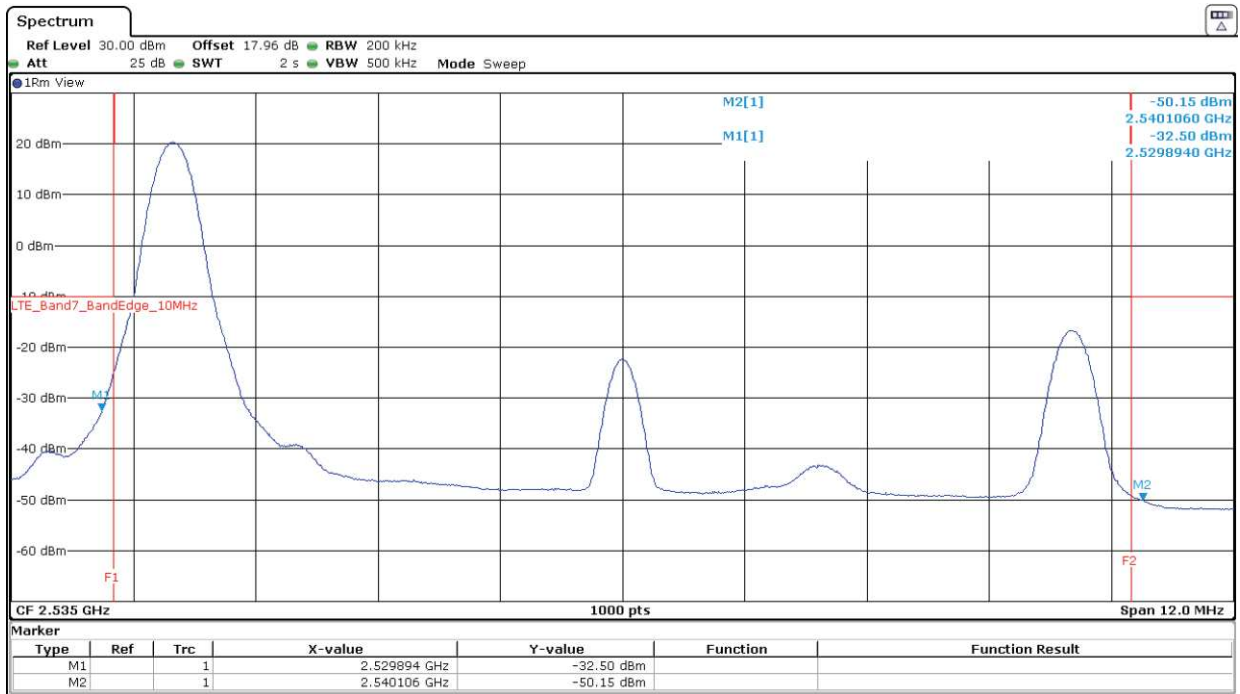
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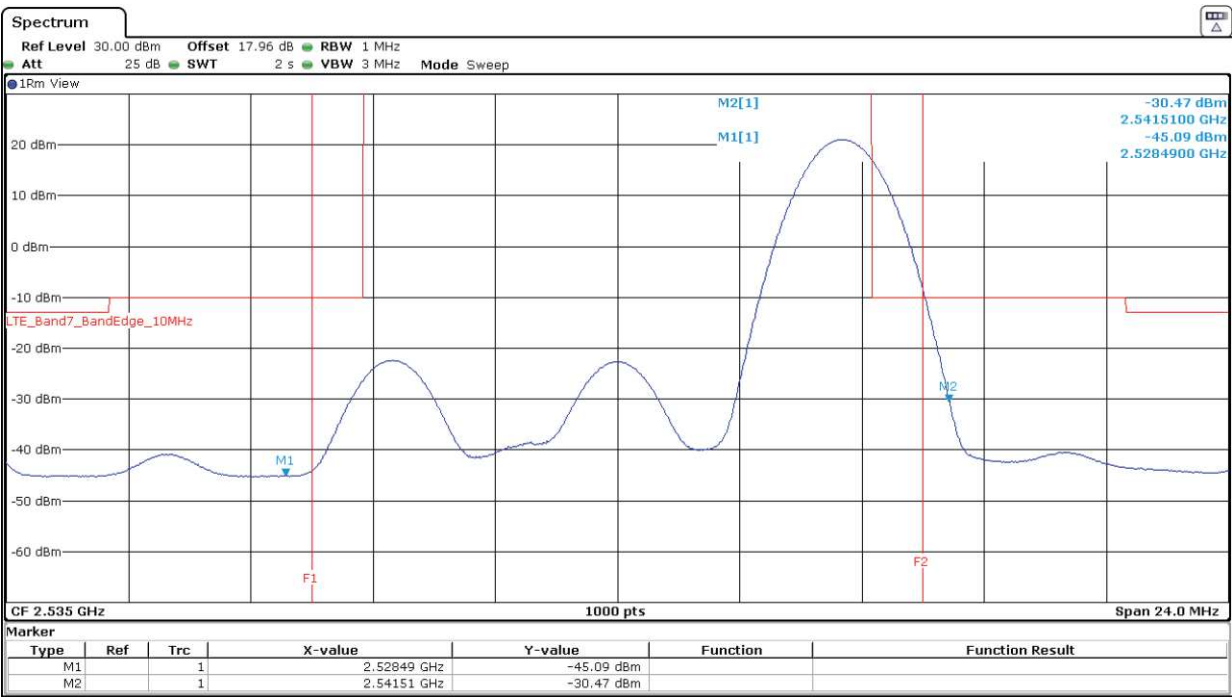
LTE Band 7. QPSK MODULATION. BW=10 MHz. RB=1. Offset=0. Lowest Block Edge:



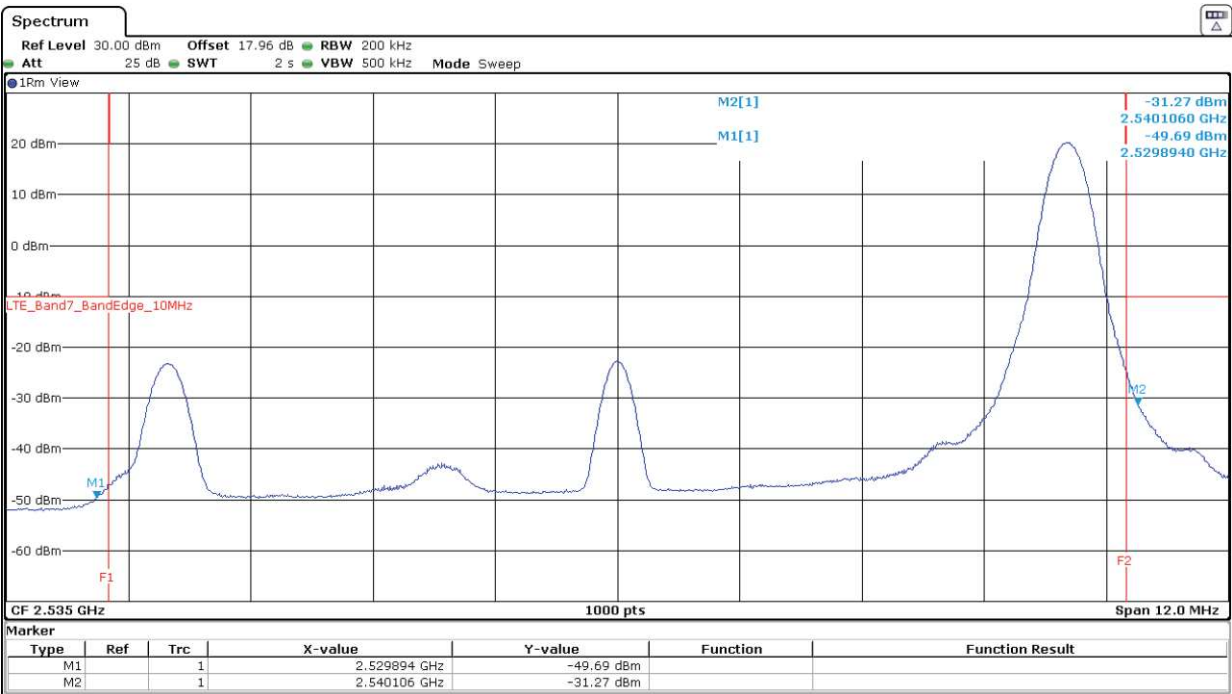
Additional zoom:



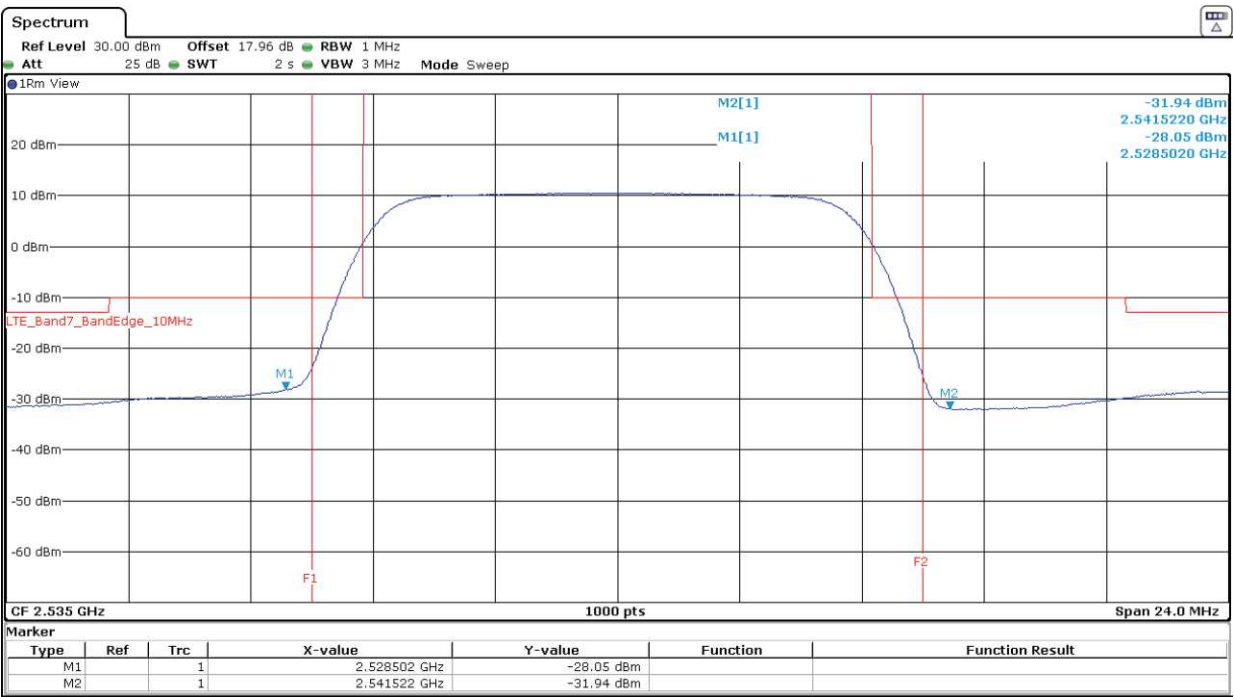
LTE Band 7. QPSK MODULATION. BW=10 MHz. RB=1. Offset=Max. Highest Block Edge:



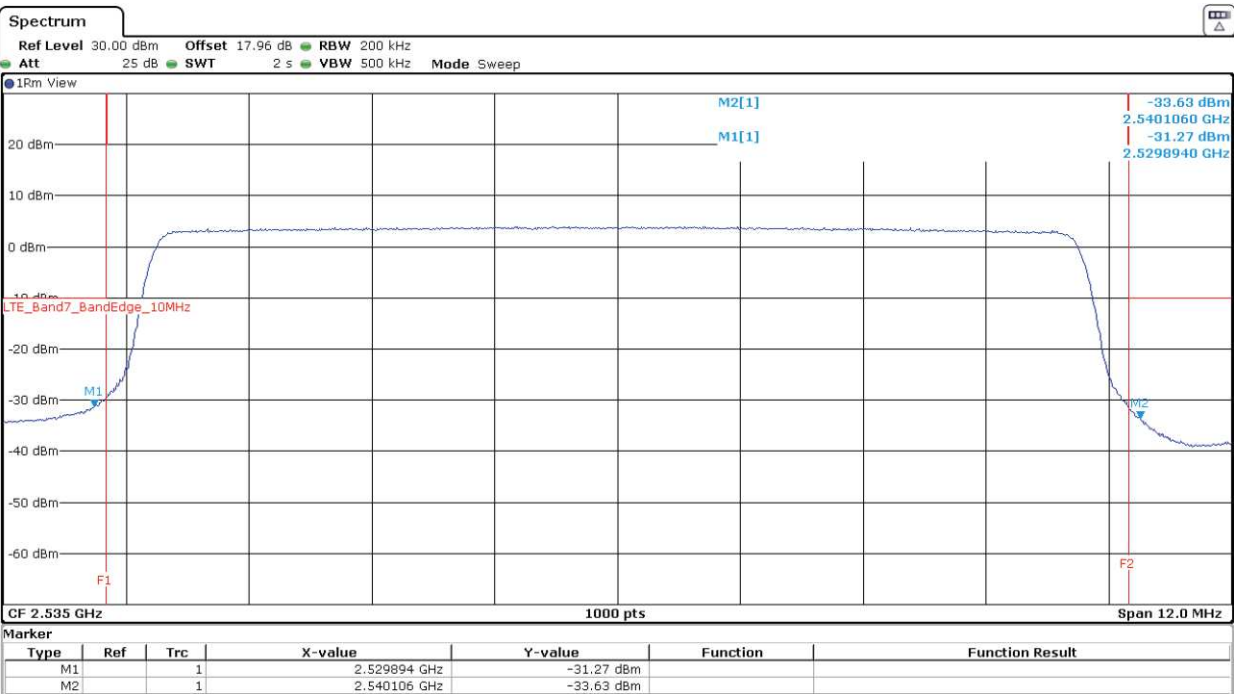
Additional zoom:



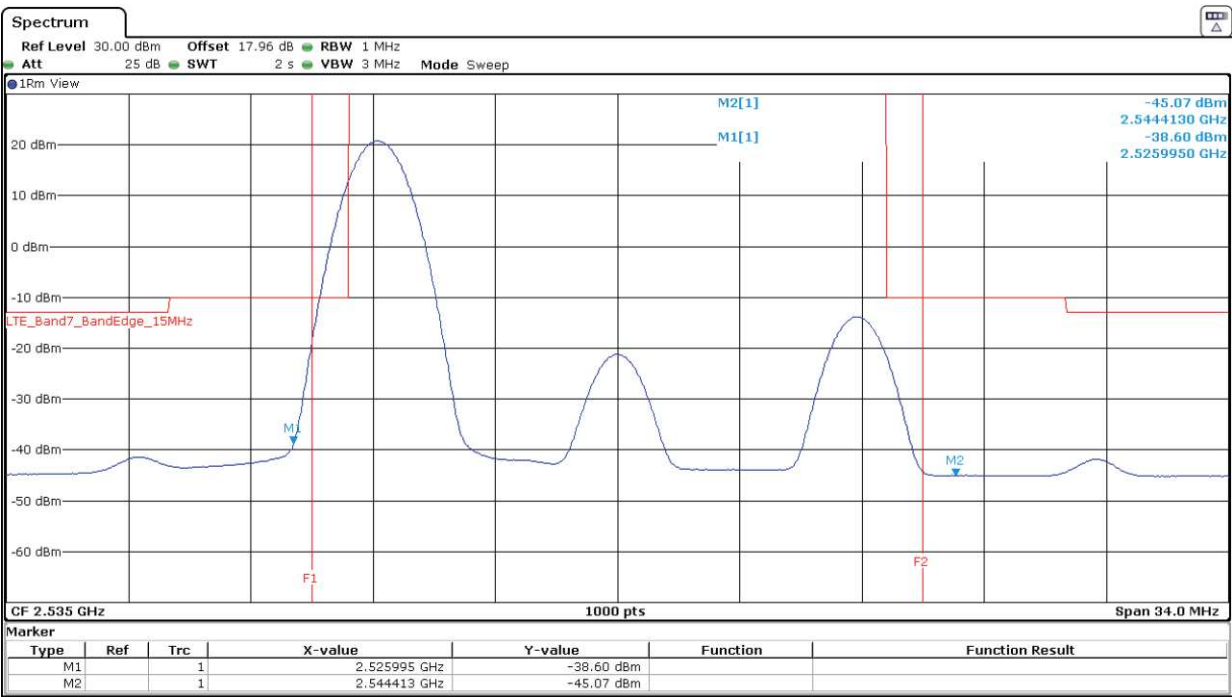
LTE Band 7. QPSK MODULATION. BW=10 MHz. RB=All. Offset=0. Lowest and Highest Block Edges:



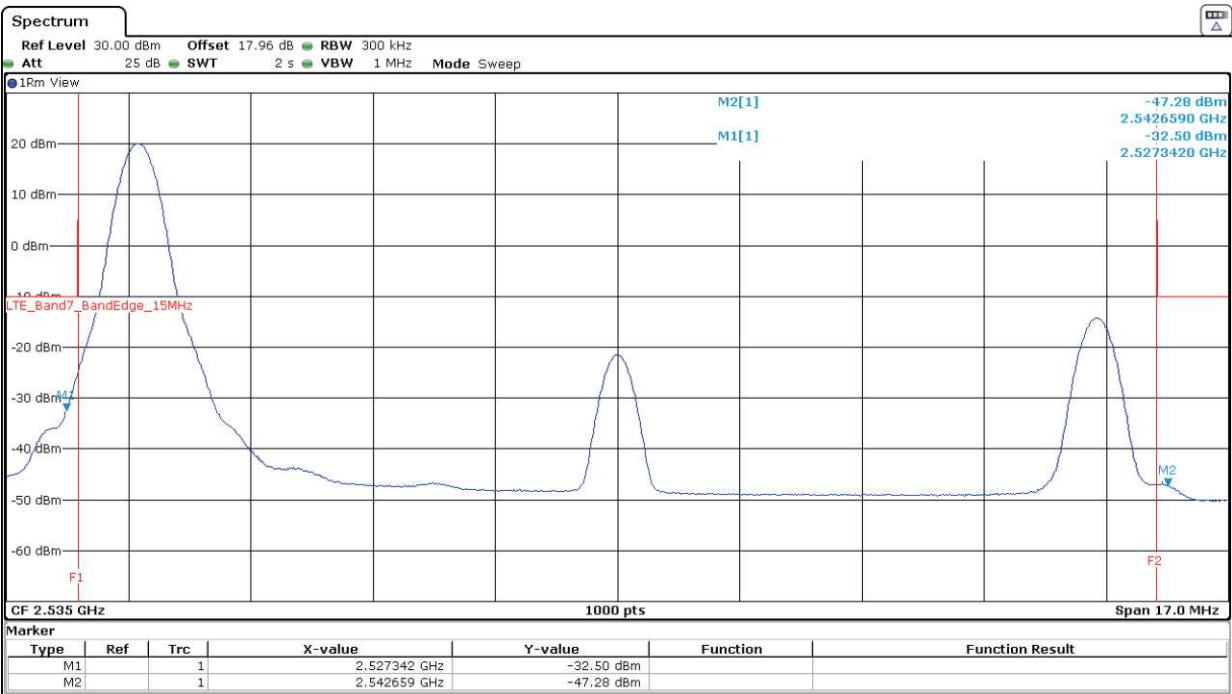
Additional zoom:



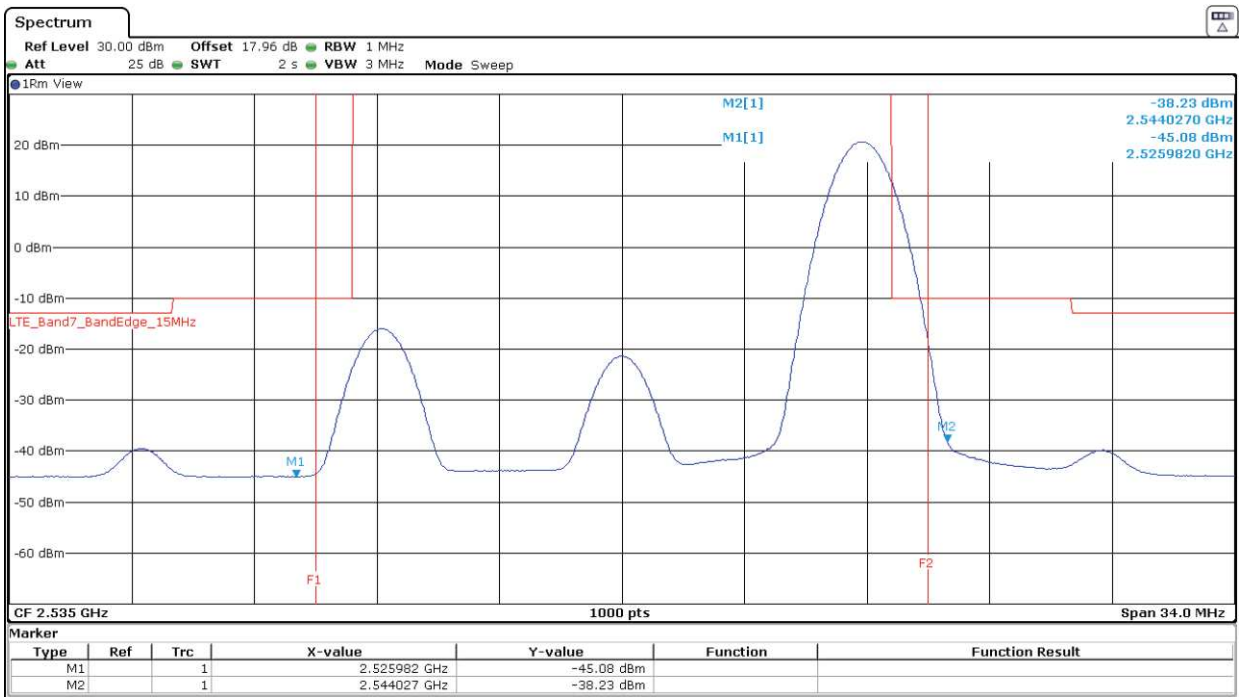
LTE Band 7. QPSK MODULATION. BW=15 MHz. RB=1. Offset=0. Lowest Block Edge:



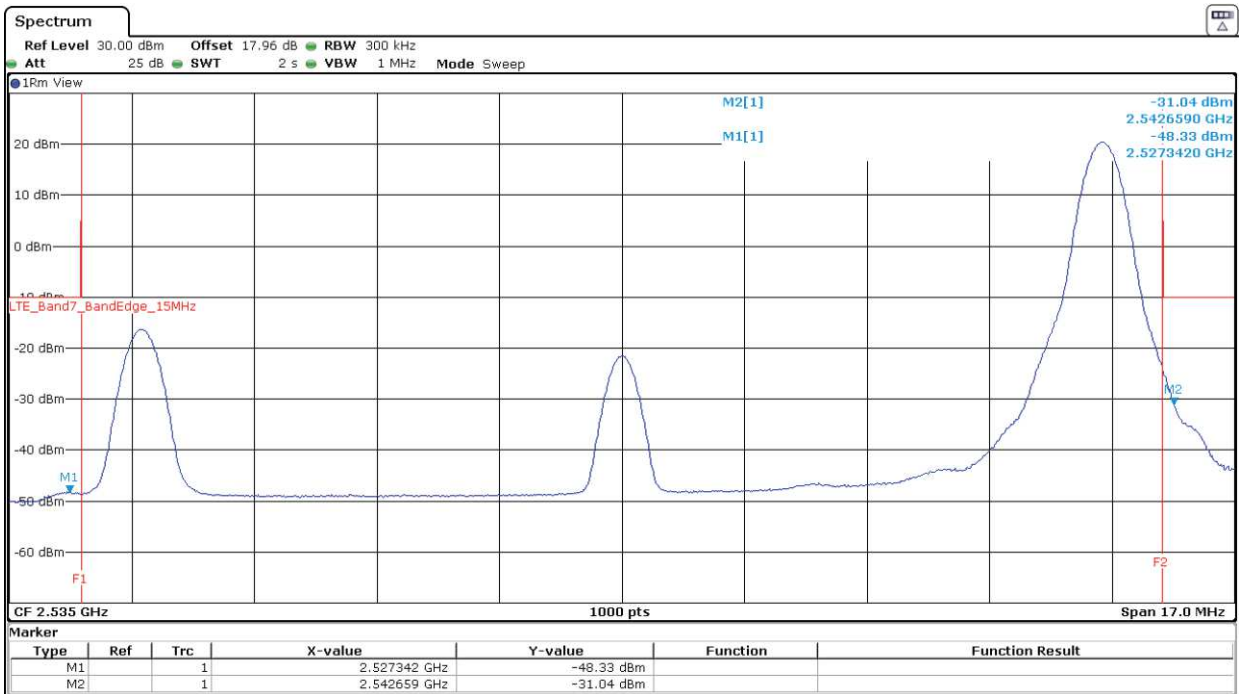
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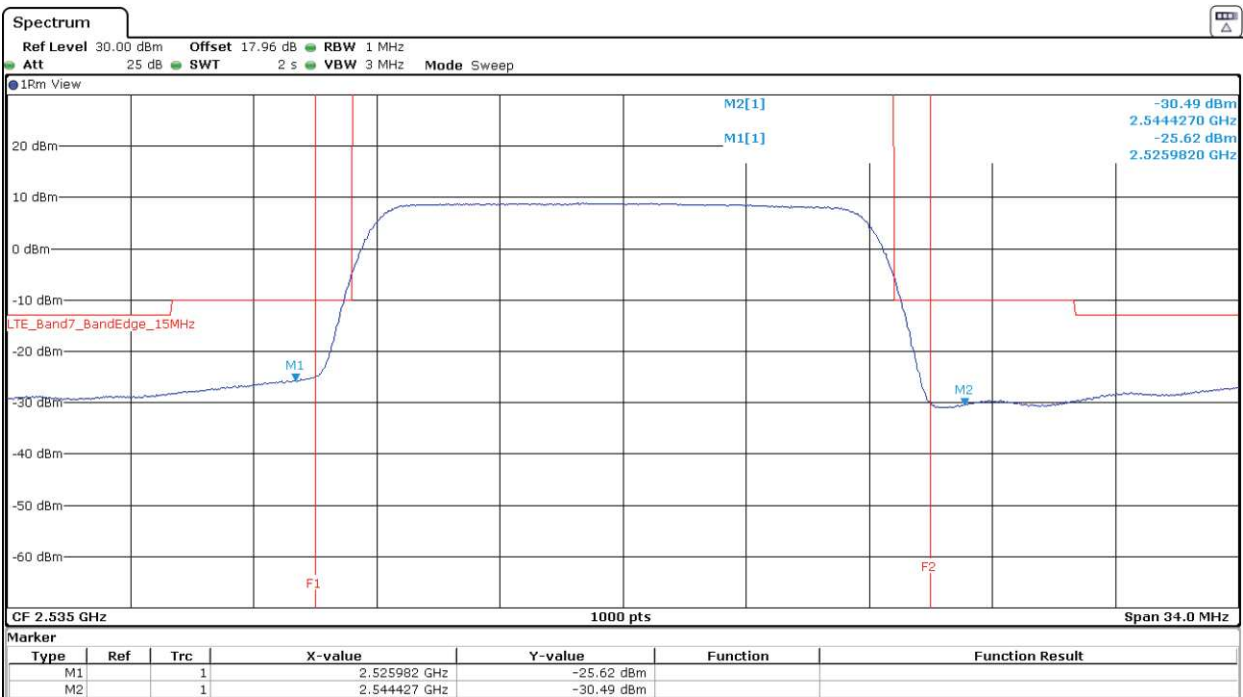
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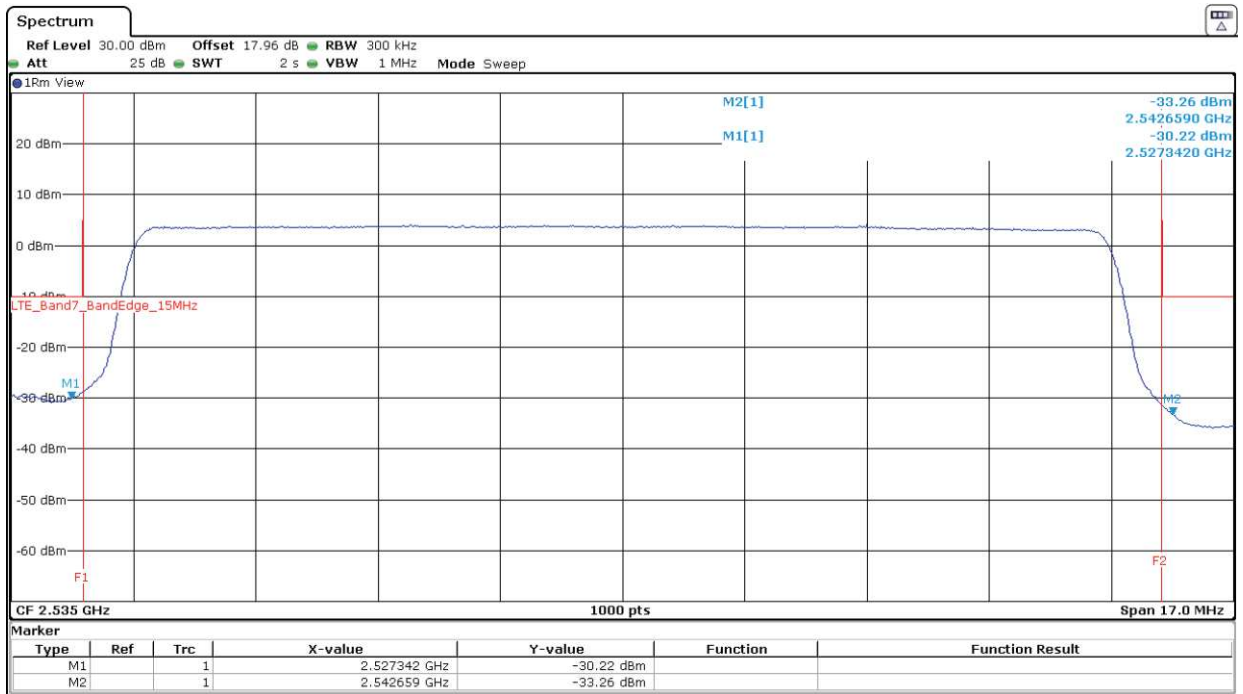
Additional zoom:



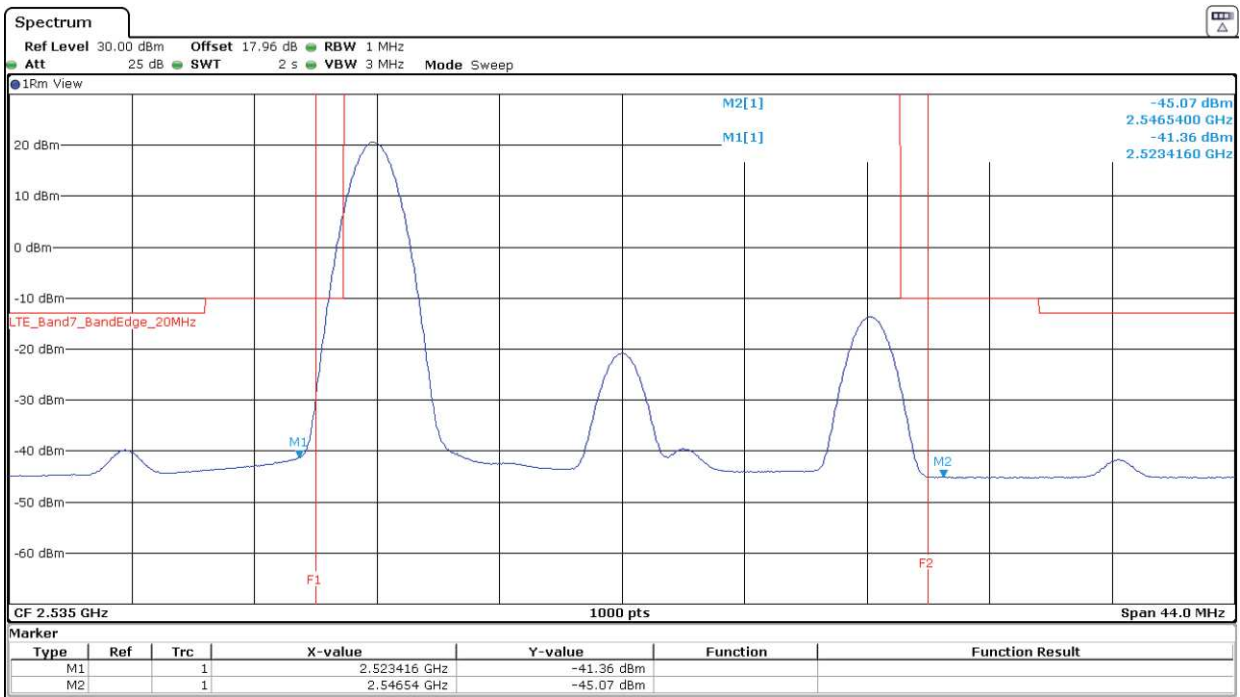
LTE Band 7. QPSK MODULATION. BW=15 MHz. RB=All. Offset=0. Lowest and Highest Block Edges:



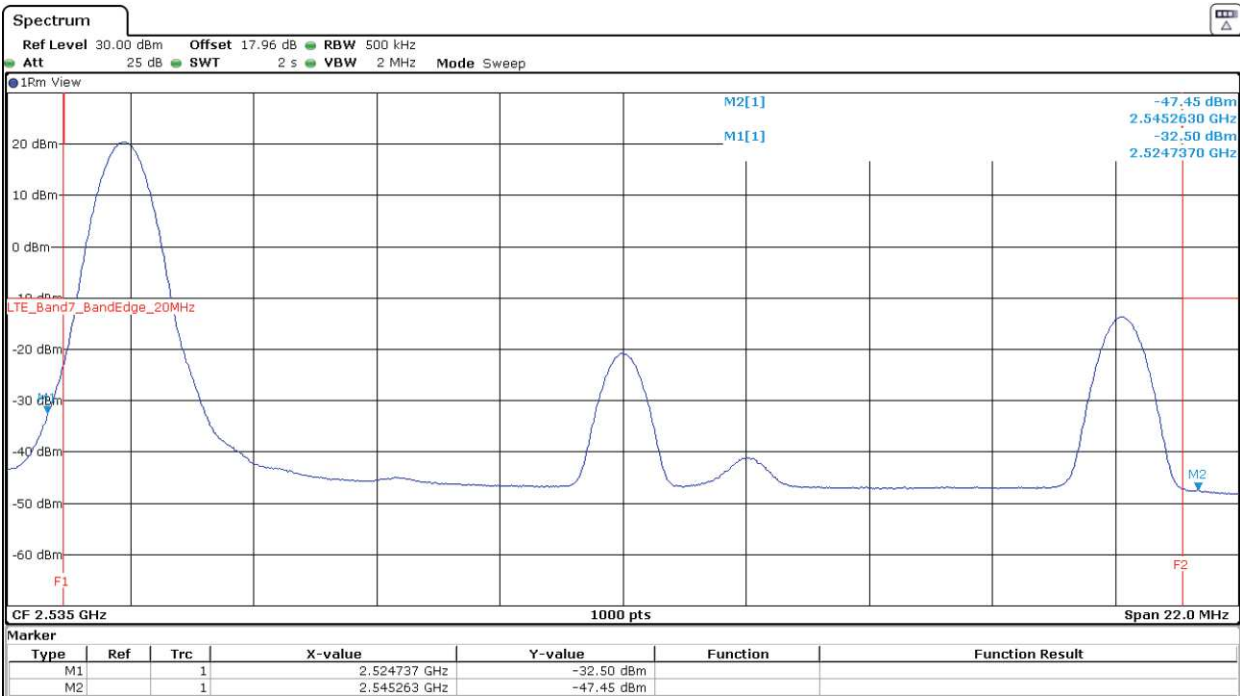
Additional zoom:



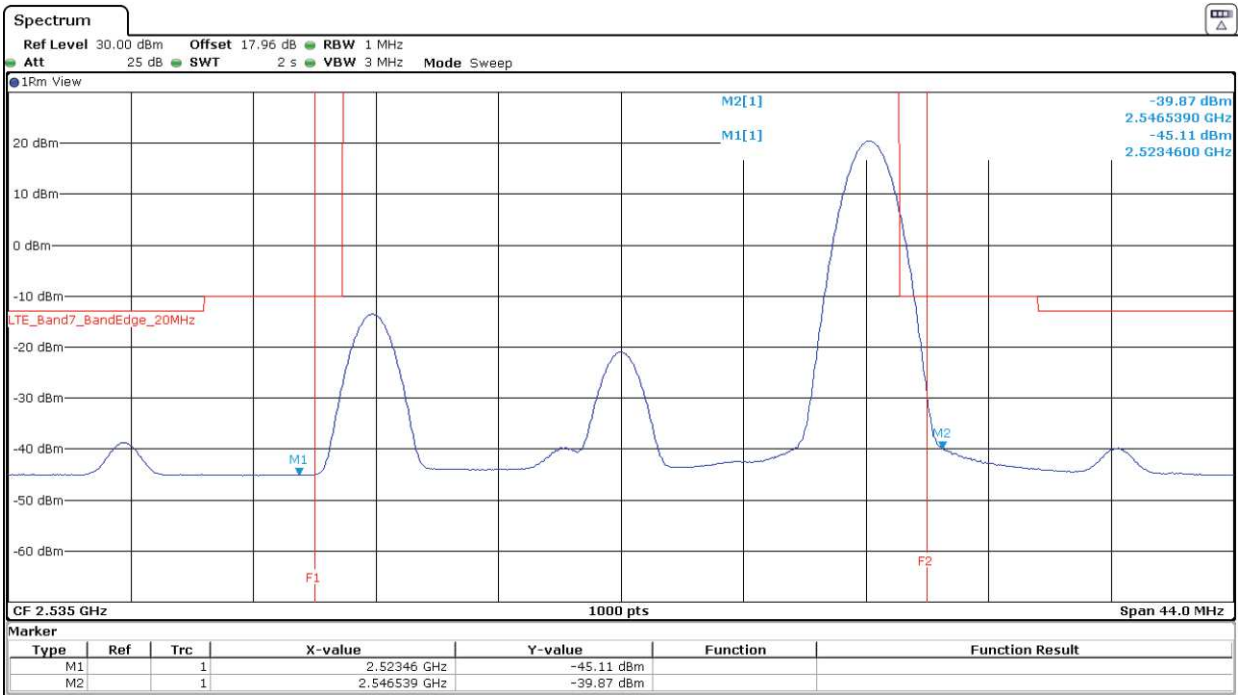
LTE Band 7. QPSK MODULATION. BW=20 MHz. RB=1. Offset=0. Lowest Block Edge:



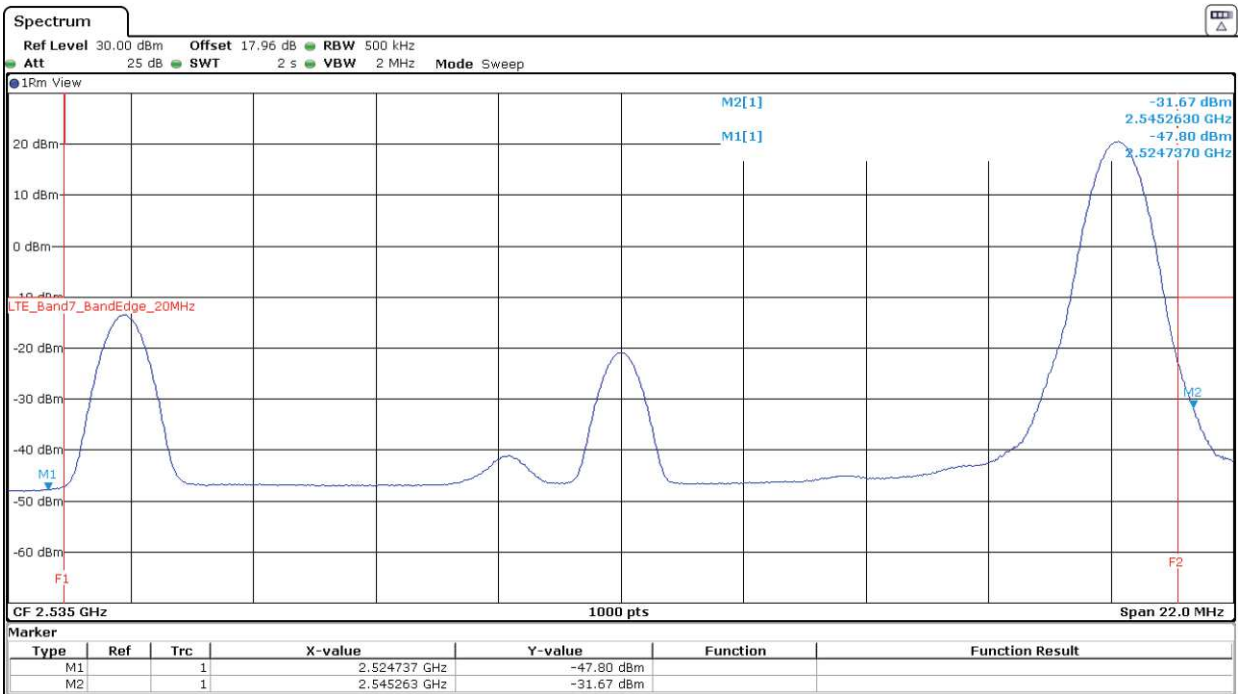
Additional zoom:



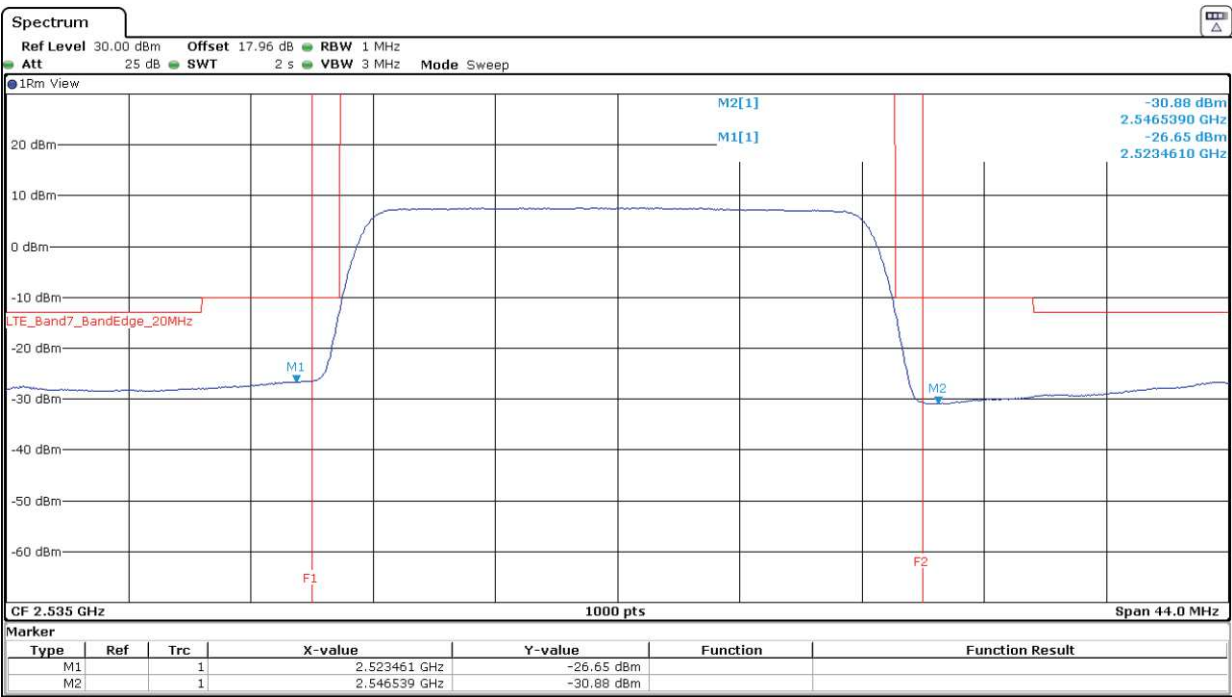
LTE Band 7. QPSK MODULATION. BW=20 MHz. RB=1. Offset=Max. Highest Block Edge:



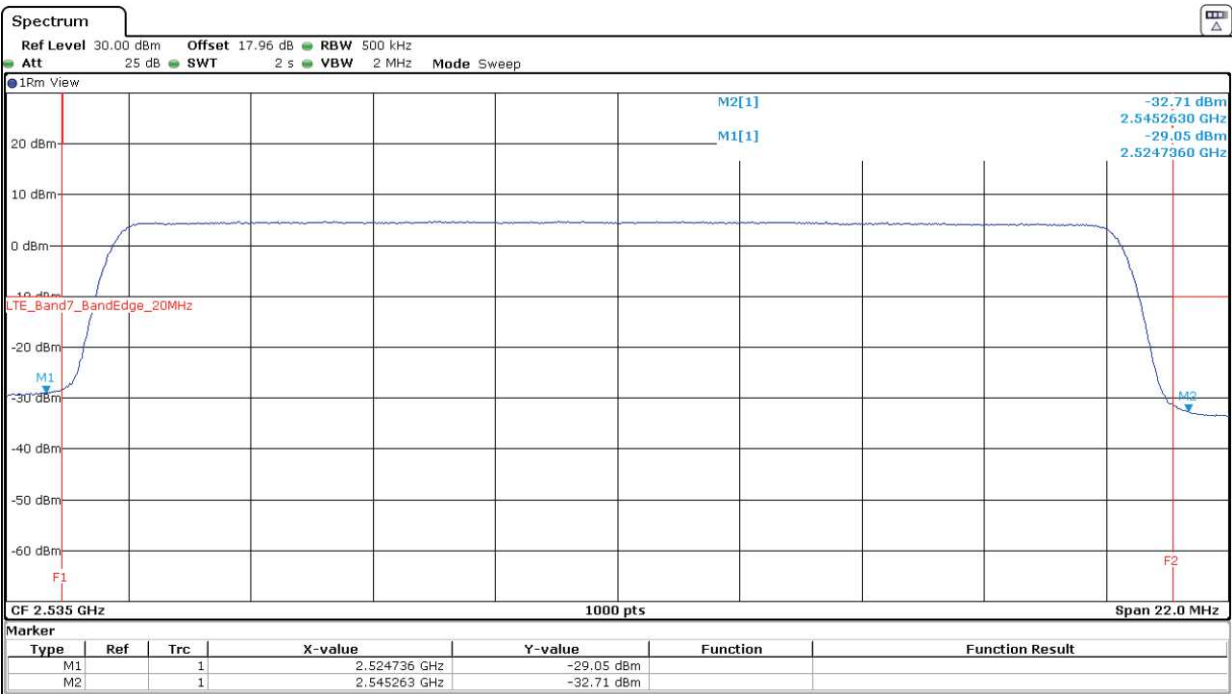
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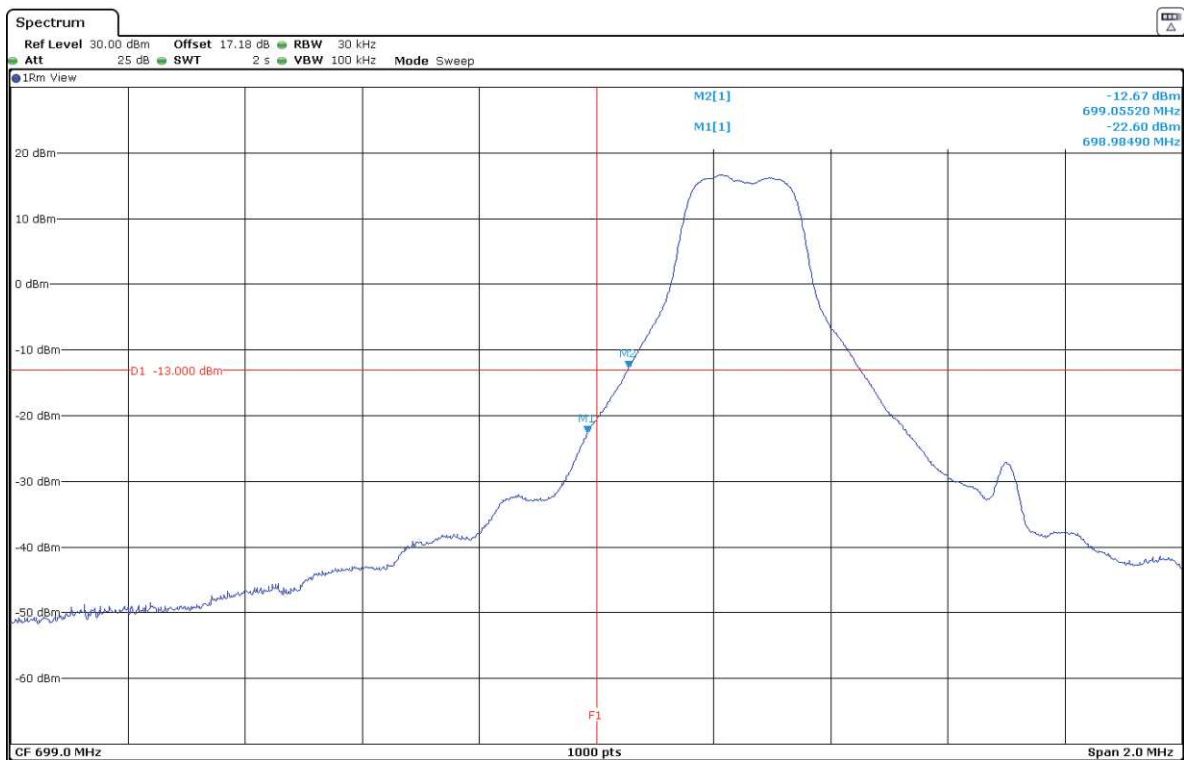
LTE Band 7. QPSK MODULATION. BW=20 MHz. RB=All. Offset=0. Lowest and Highest Block Edges:



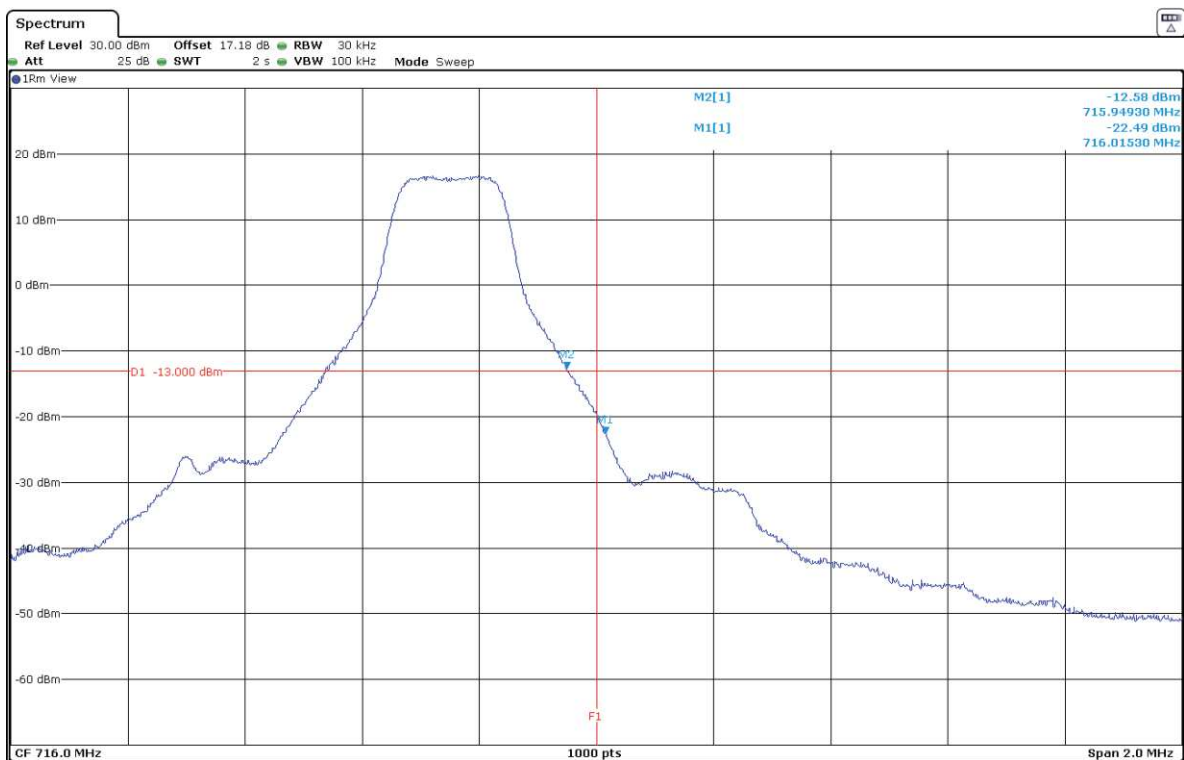
Additional zoom:



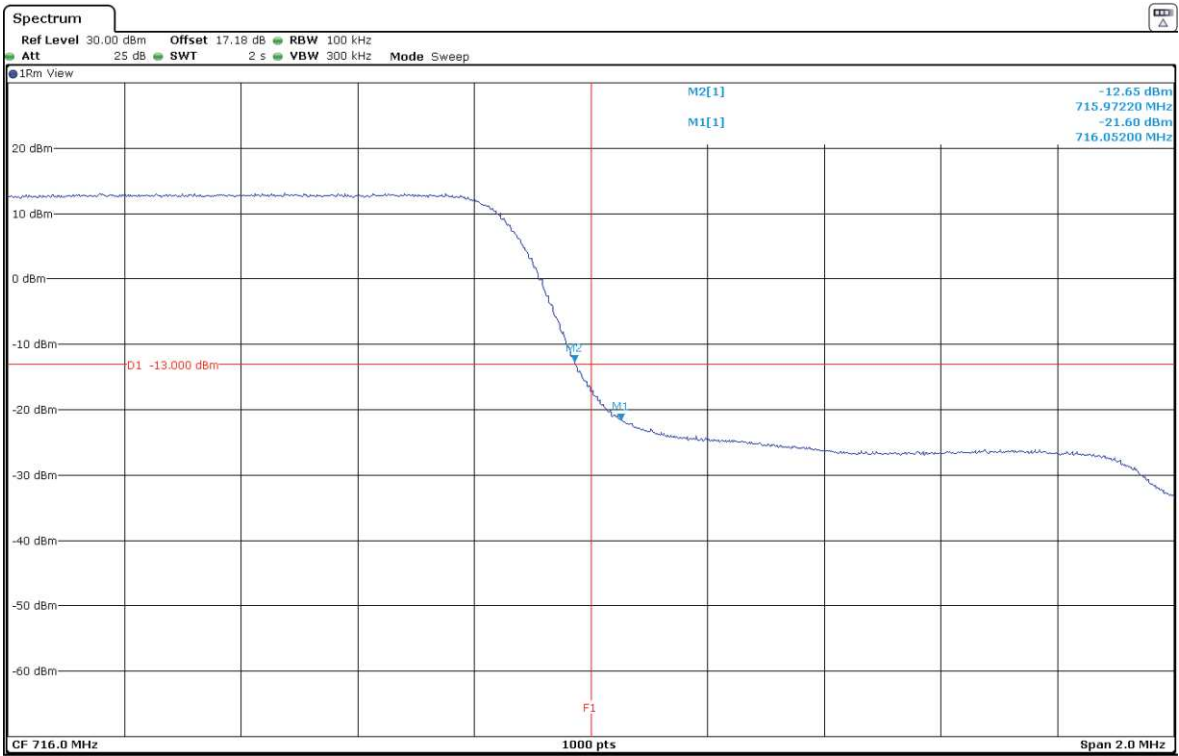
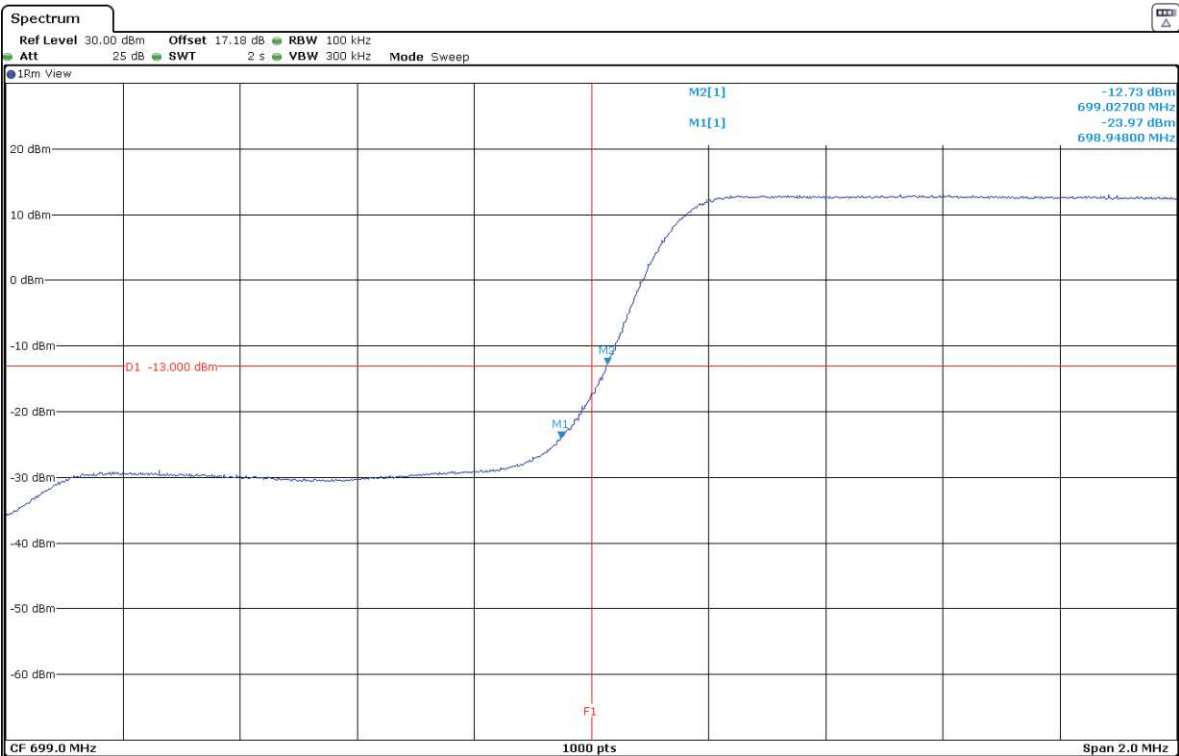
LTE Band 12. QPSK MODULATION. BW=1.4 MHz. RB=1. Offset=0. Lowest Block Edge:



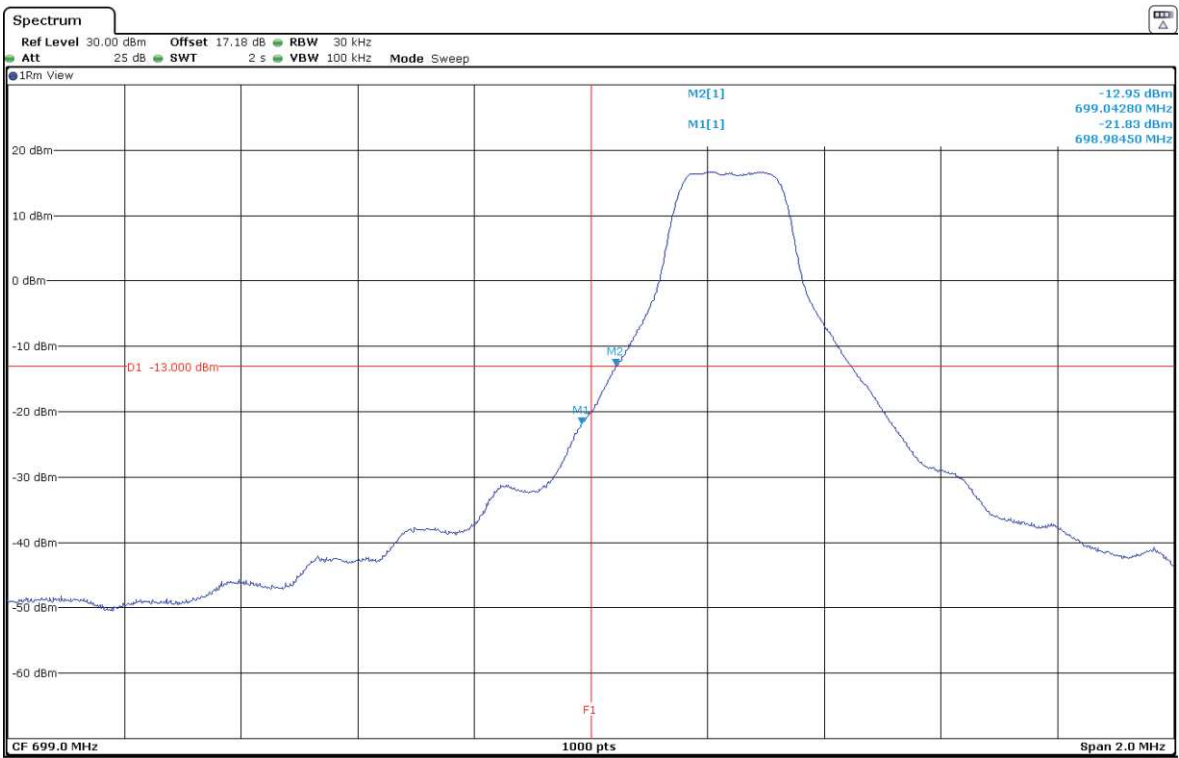
LTE Band 12. QPSK MODULATION. BW=1.4 MHz. RB=1. Offset=Max. Highest Block Edge:



LTE Band 12. QPSK MODULATION. BW=1.4 MHz. RB=All. Offset=0. Lowest and Highest Block Edges:



LTE Band 12. QPSK MODULATION. BW=3 MHz. RB=1. Offset=0. Lowest Block Edge:



LTE Band 12. QPSK MODULATION. BW=3 MHz. RB=1. Offset=Max. Highest Block Edge:

