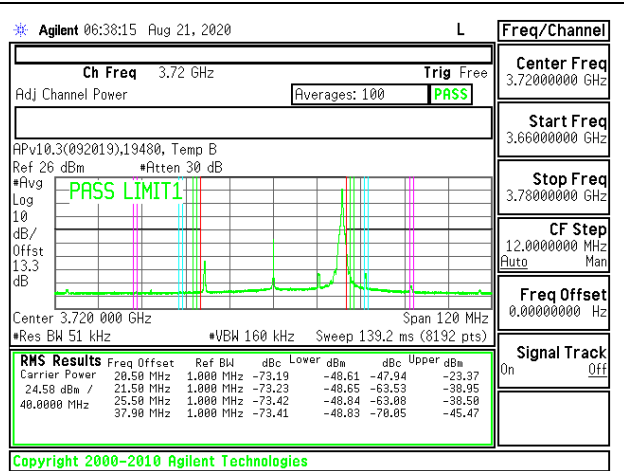
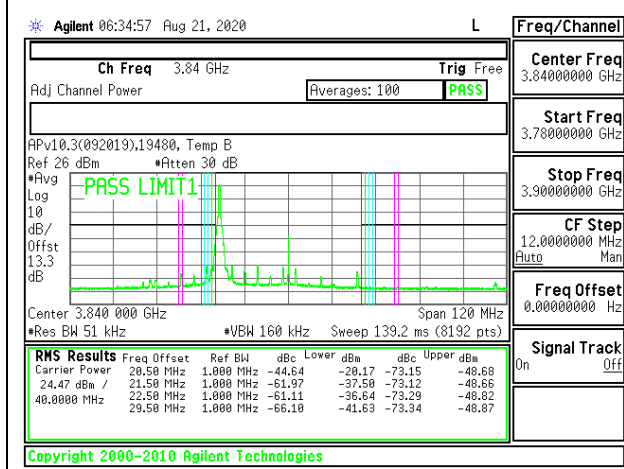


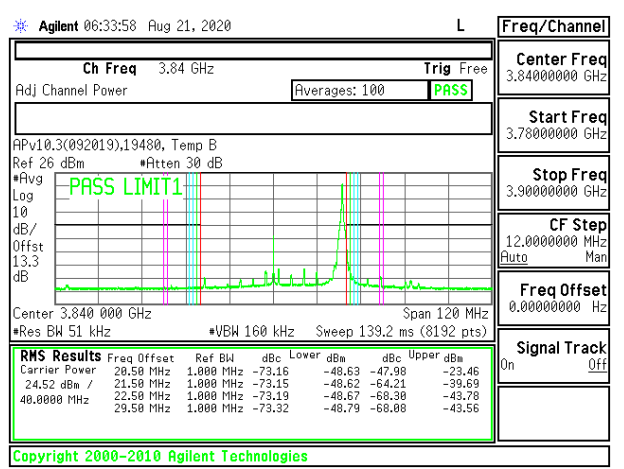
5G NR Bn77 40MHz QPSK Low Channel RB1-0



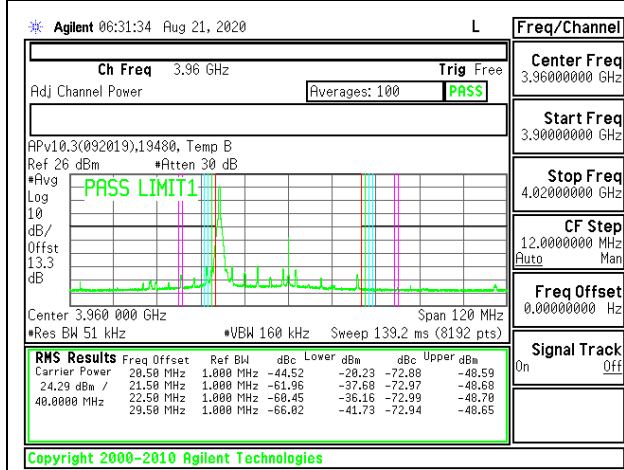
5G NR Bn77 40MHz QPSK Low Channel RB1-105



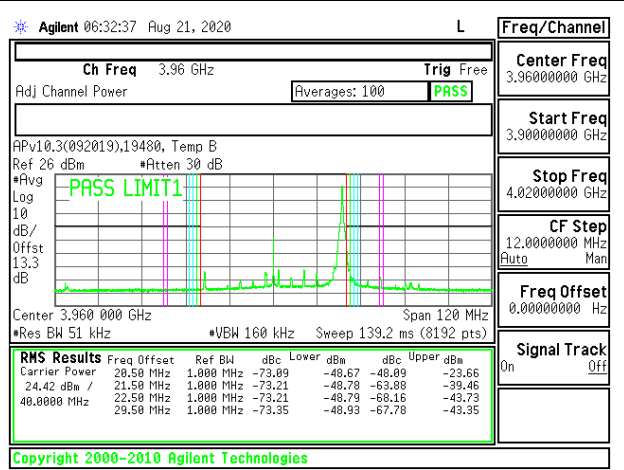
5G NR Bn77 40MHz QPSK Middle Channel RB1-0



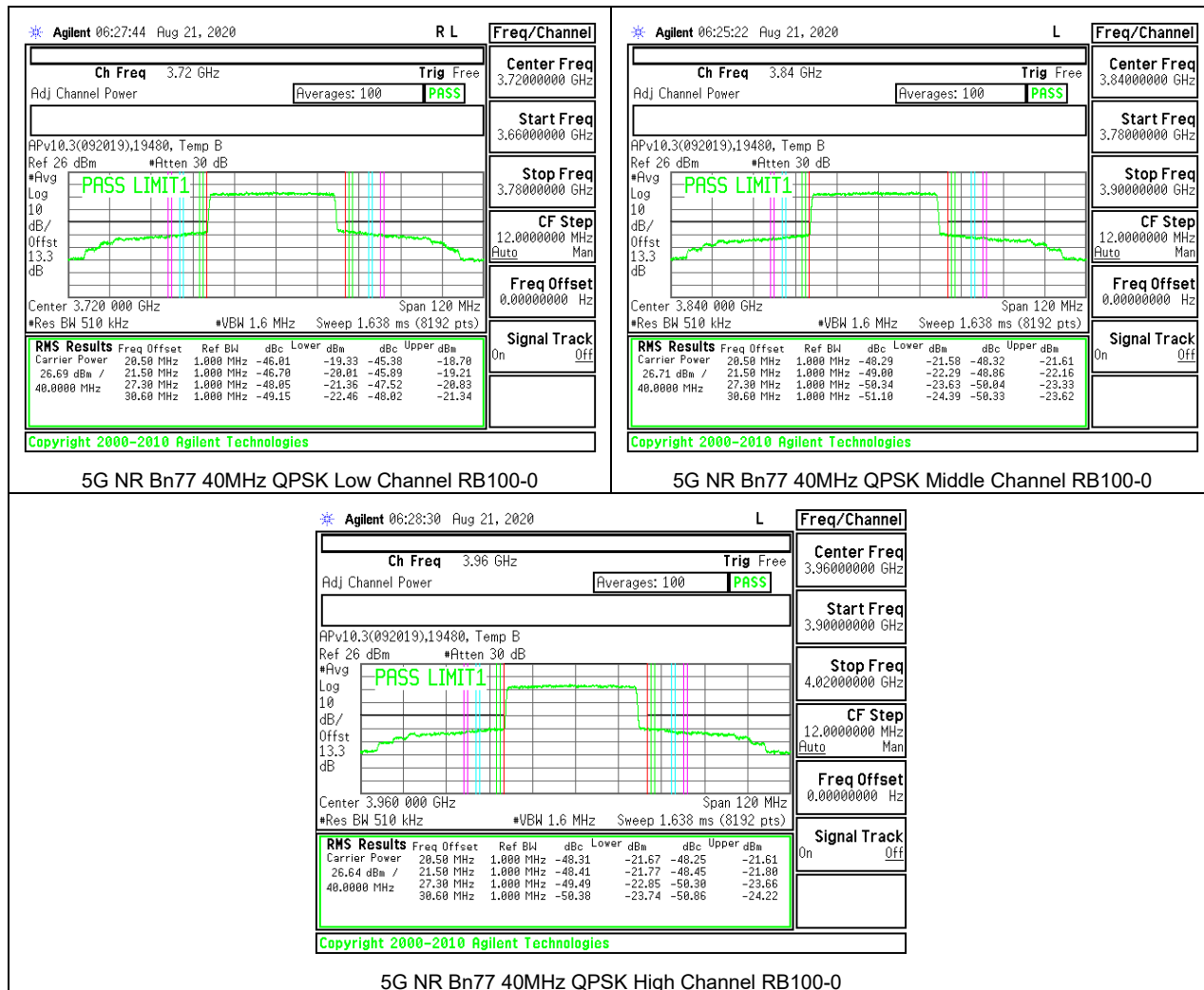
5G NR Bn77 40MHz QPSK Middle Channel RB1-105

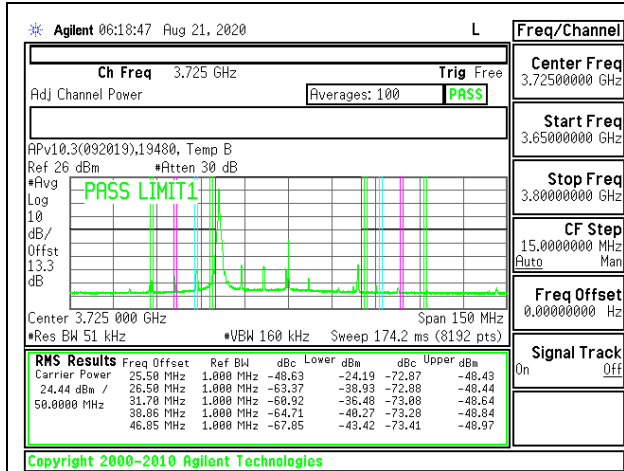


5G NR Bn77 40MHz QPSK High Channel RB1-0

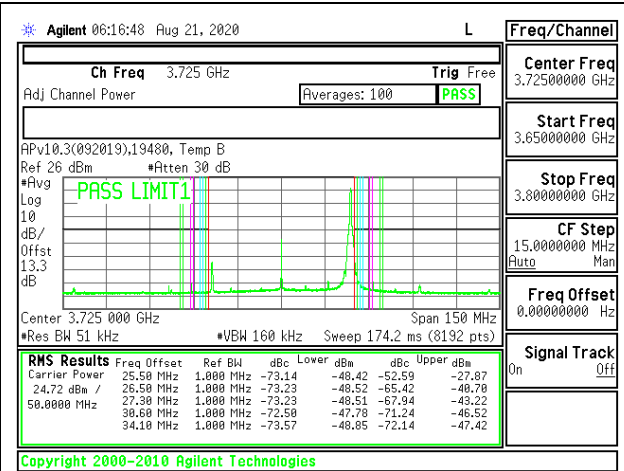


5G NR Bn77 40MHz QPSK High Channel RB1-105

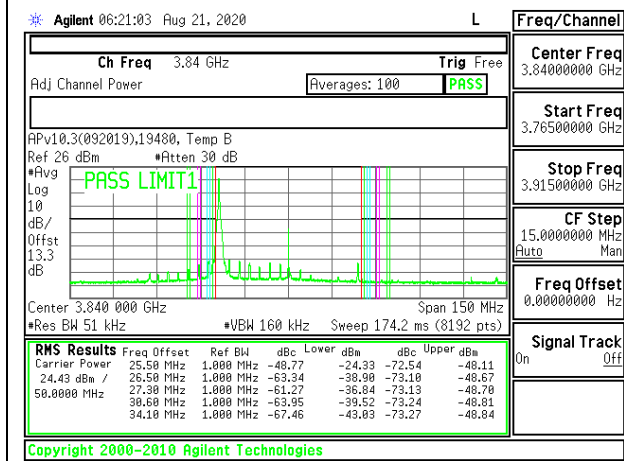




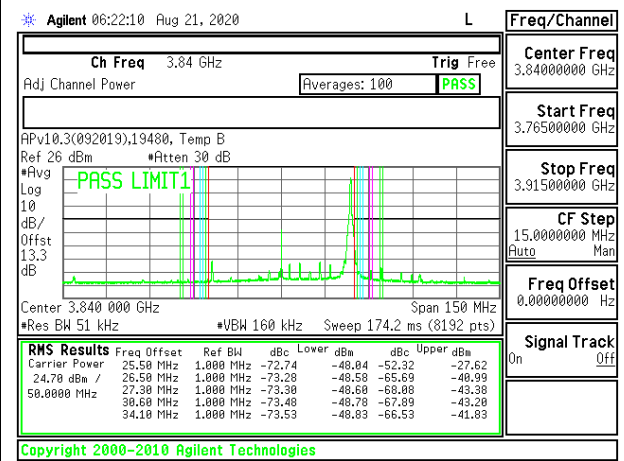
5G NR Bn77 50MHz QPSK Low Channel RB1-0



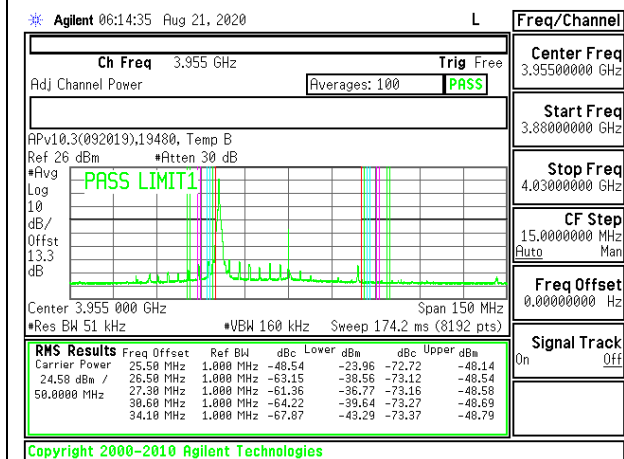
5G NR Bn77 50MHz QPSK Low Channel RB1-132



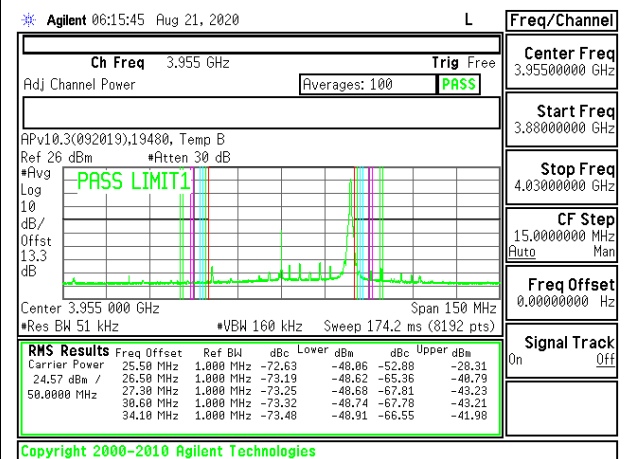
5G NR Bn77 50MHz QPSK Middle Channel RB1-0



5G NR Bn77 50MHz QPSK Middle Channel RB1-132

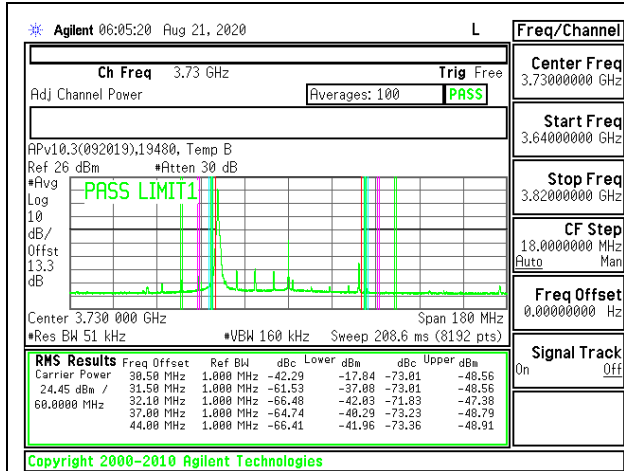


5G NR Bn77 50MHz QPSK High Channel RB1-0

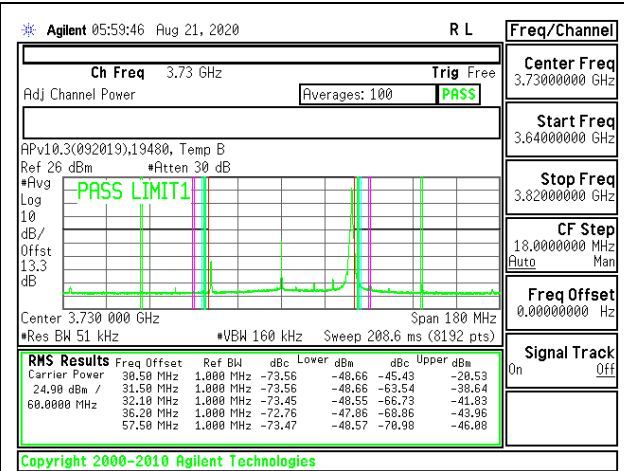


5G NR Bn77 50MHz QPSK High Channel RB1-132

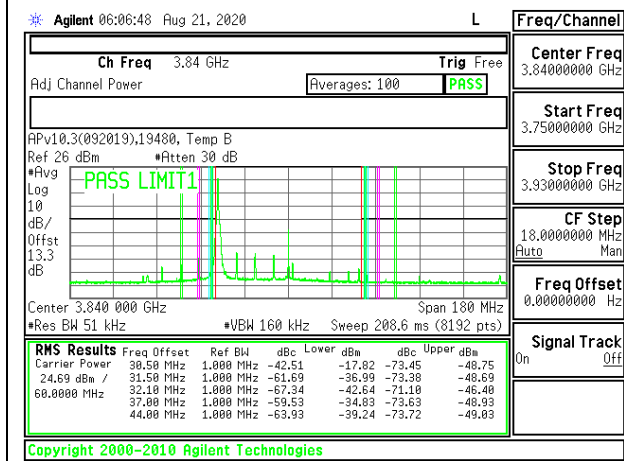




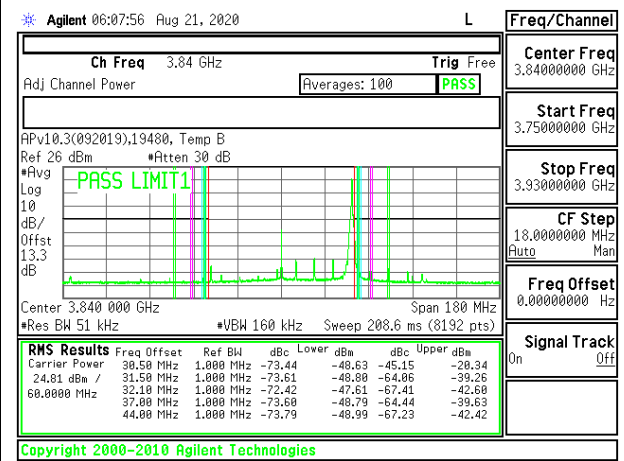
5G NR Bn77 60MHz QPSK Low Channel RB1-0



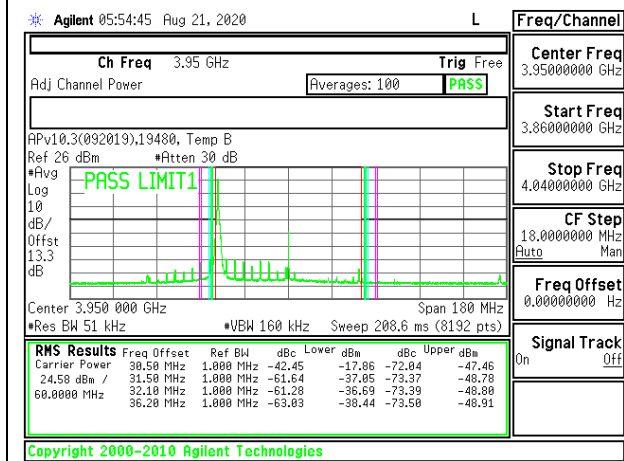
5G NR Bn77 60MHz QPSK Low Channel RB1-161



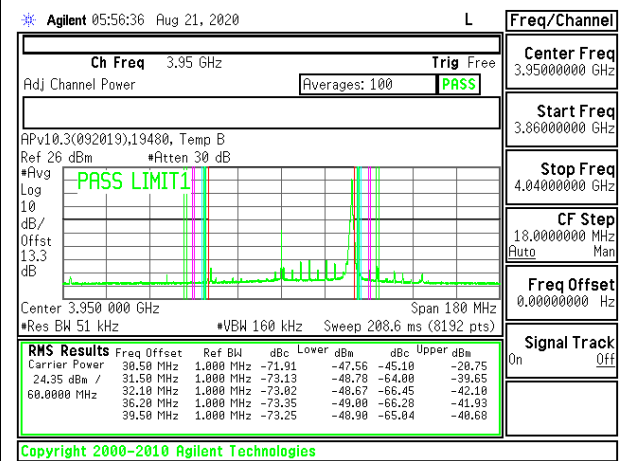
5G NR Bn77 60MHz QPSK Middle Channel RB1-0



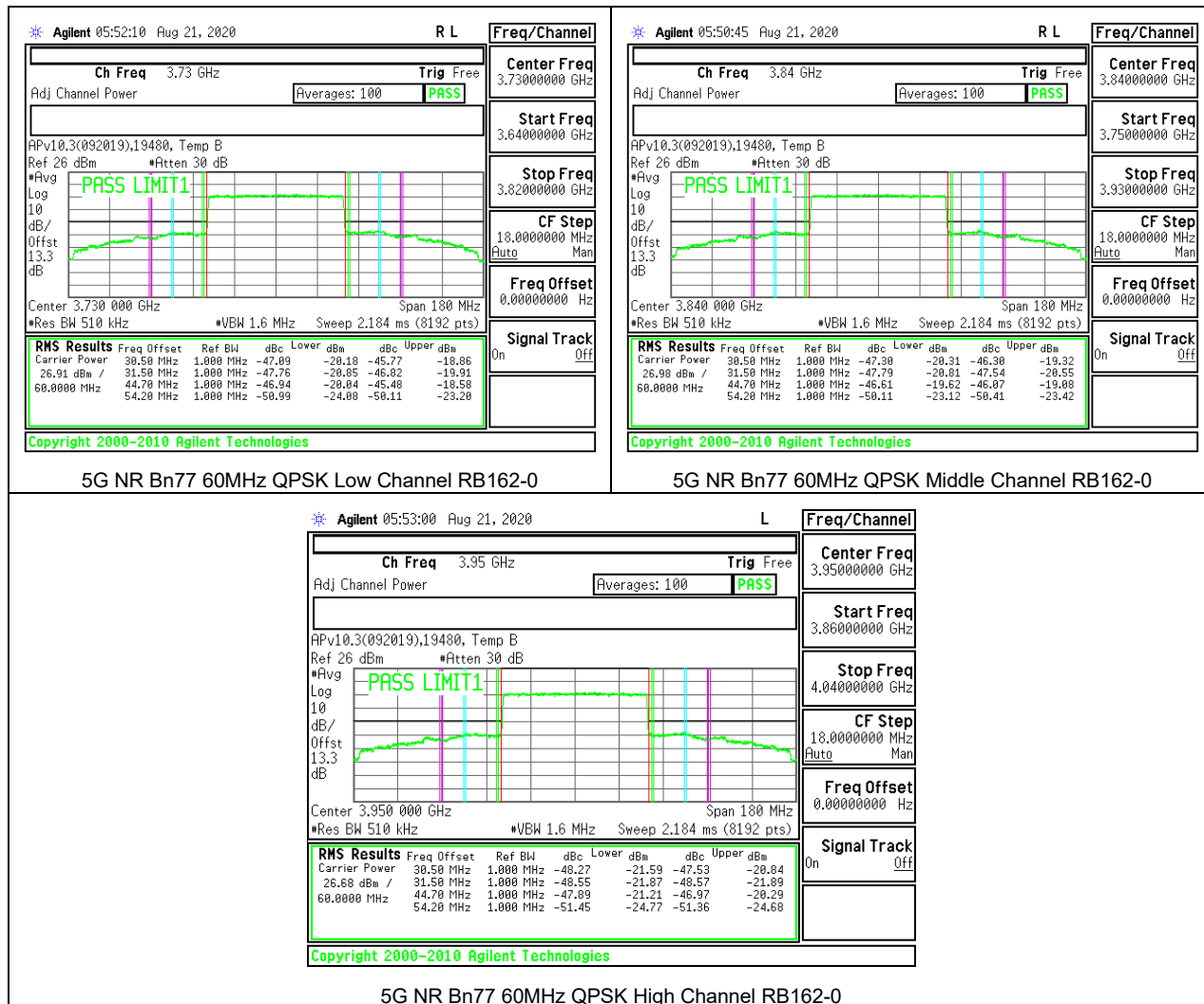
5G NR Bn77 60MHz QPSK Middle Channel RB1-161

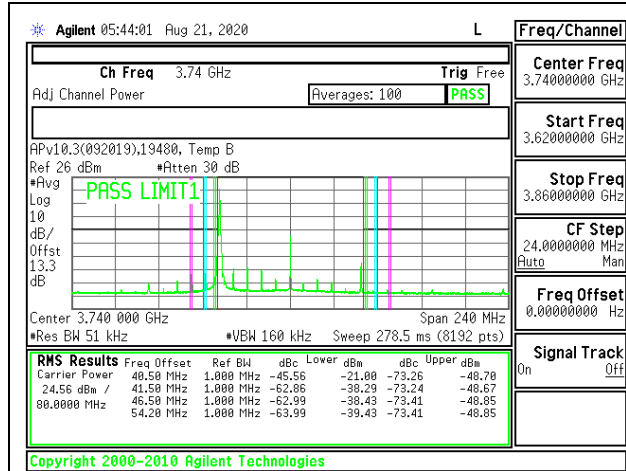


5G NR Bn77 60MHz QPSK High Channel RB1-0

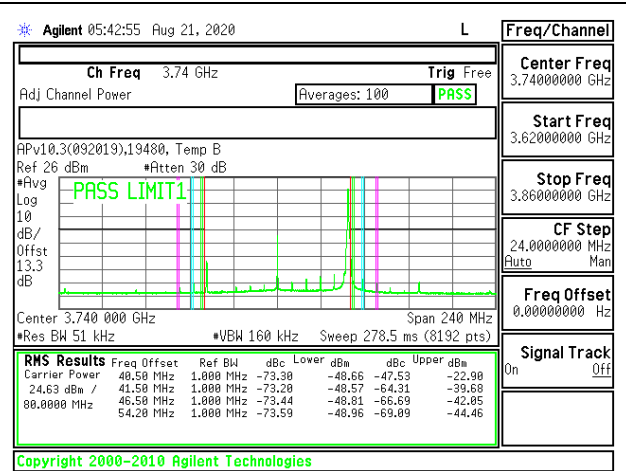


5G NR Bn77 60MHz QPSK High Channel RB1-161

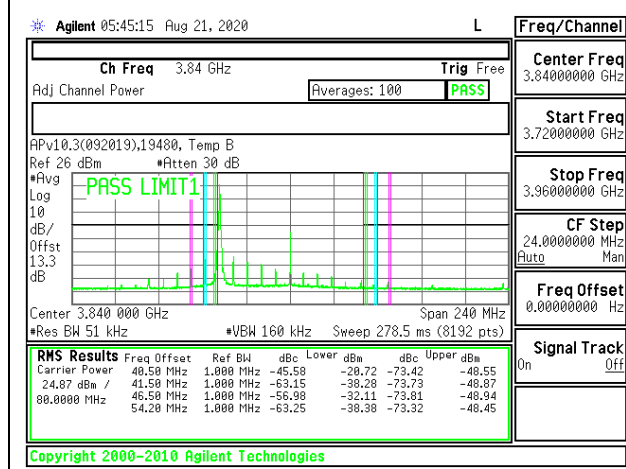




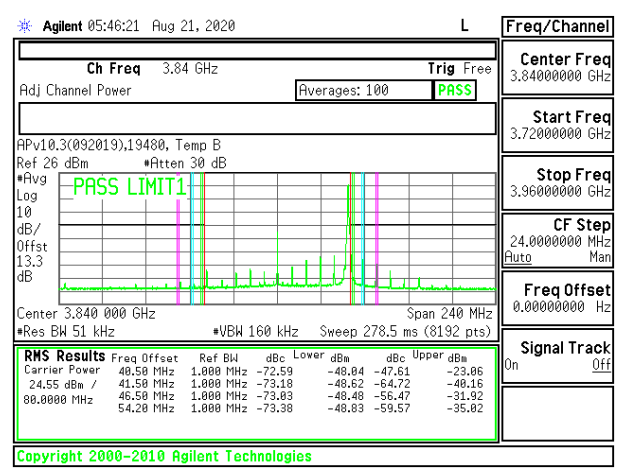
5G NR Bn77 80MHz QPSK Low Channel RB1-0



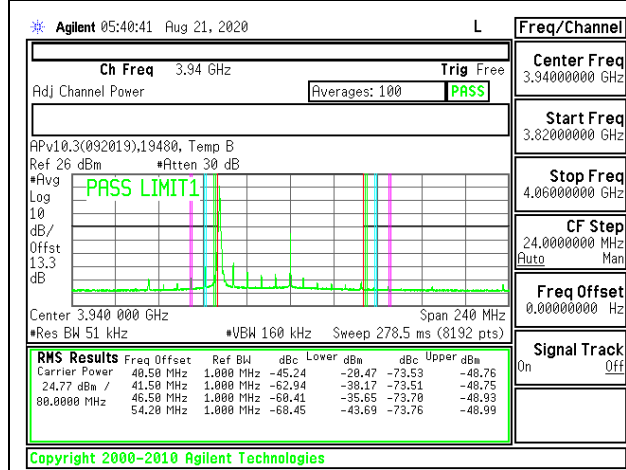
5G NR Bn77 80MHz QPSK Low Channel RB1-216



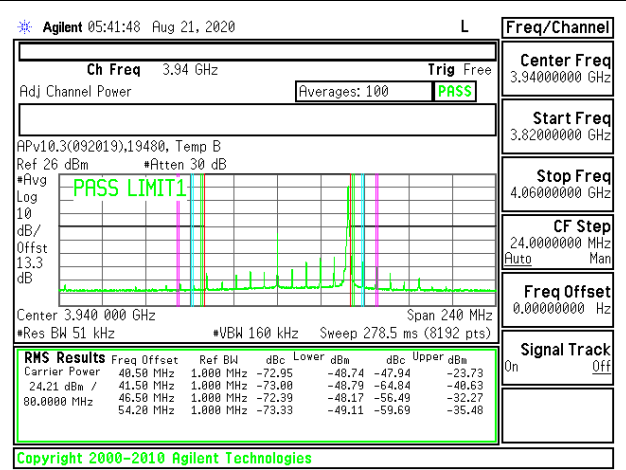
5G NR Bn77 80MHz QPSK Middle Channel RB1-0



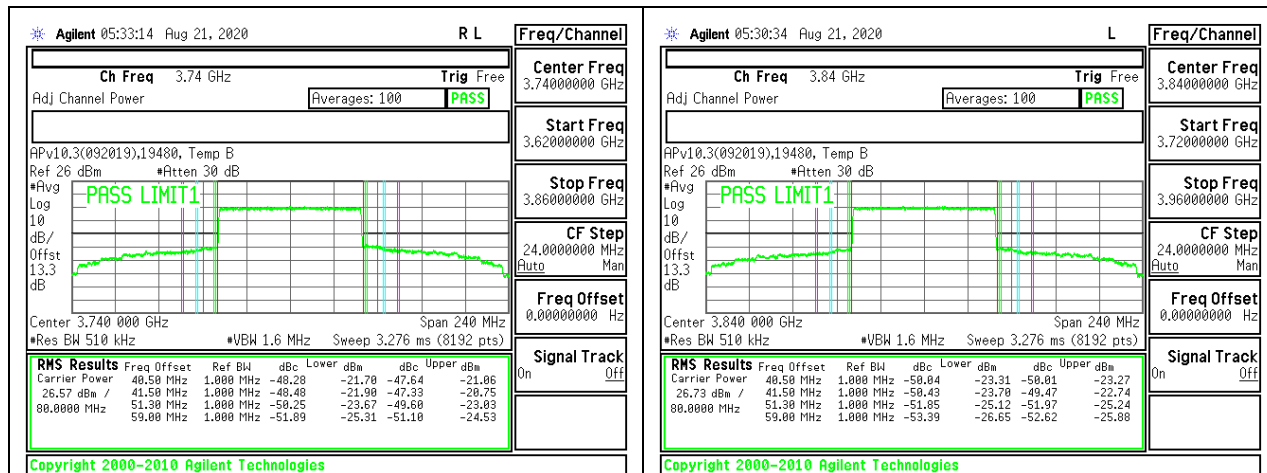
5G NR Bn77 80MHz QPSK Middle Channel RB1-216



5G NR Bn77 80MHz QPSK High Channel RB1-0

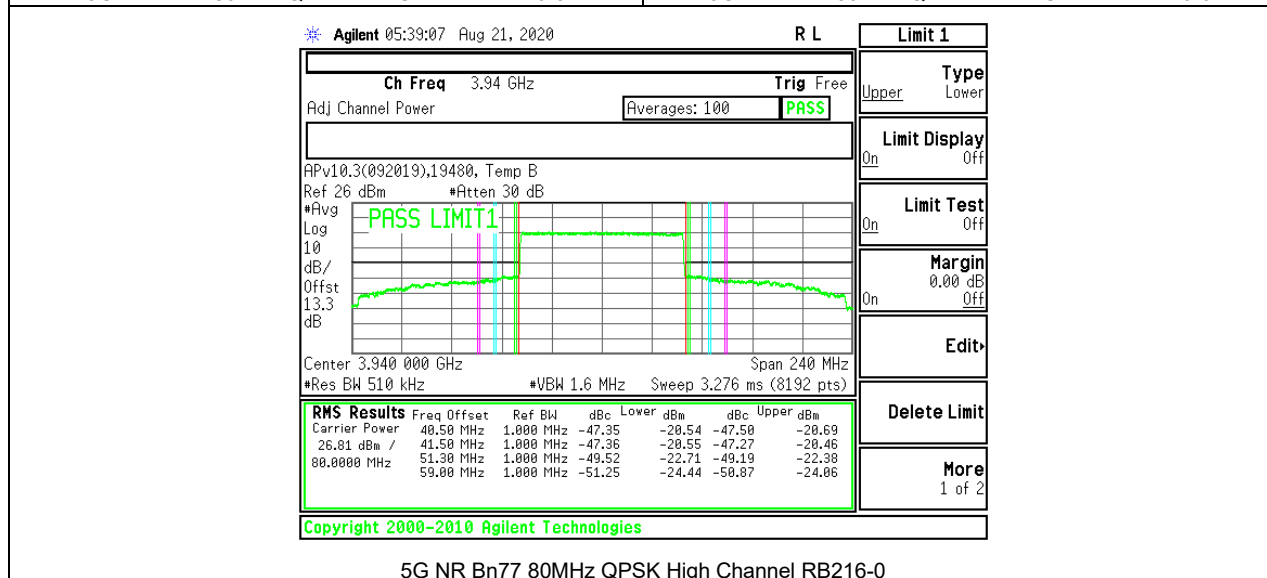


5G NR Bn77 80MHz QPSK High Channel RB1-216

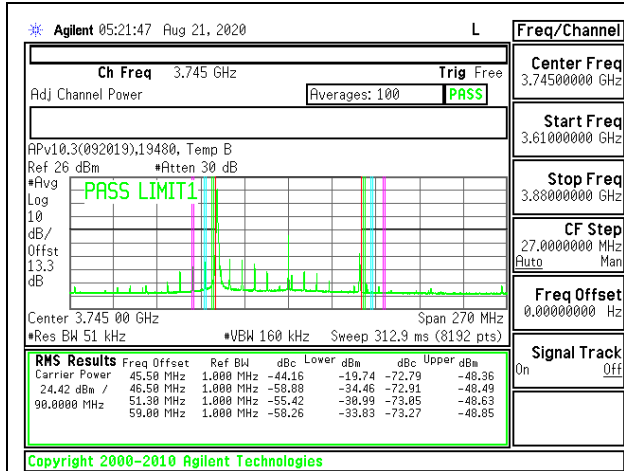


5G NR Bn77 80MHz QPSK Low Channel RB216-0

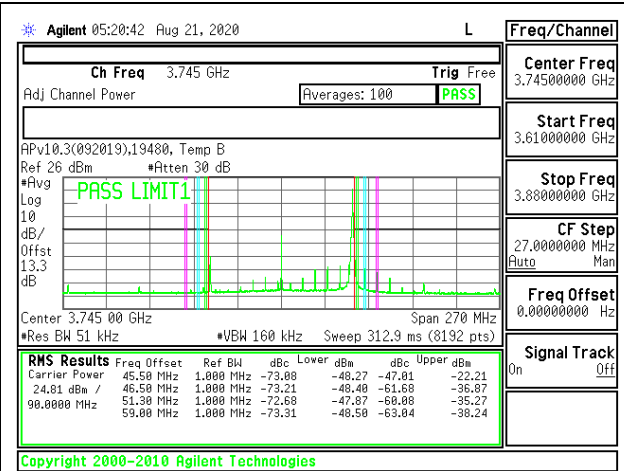
5G NR Bn77 80MHz QPSK Middle Channel RB216-0



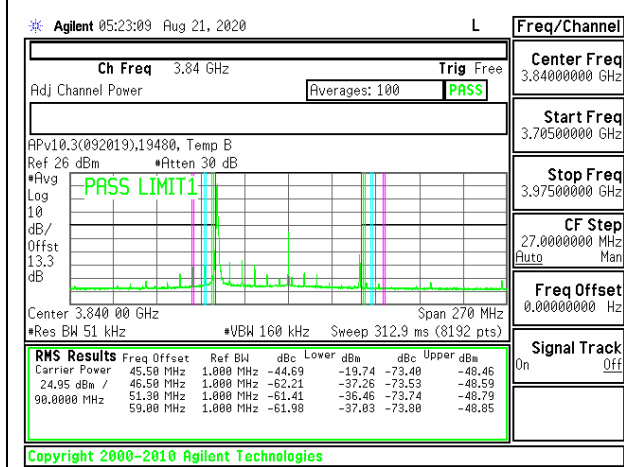
5G NR Bn77 80MHz QPSK High Channel RB216-0



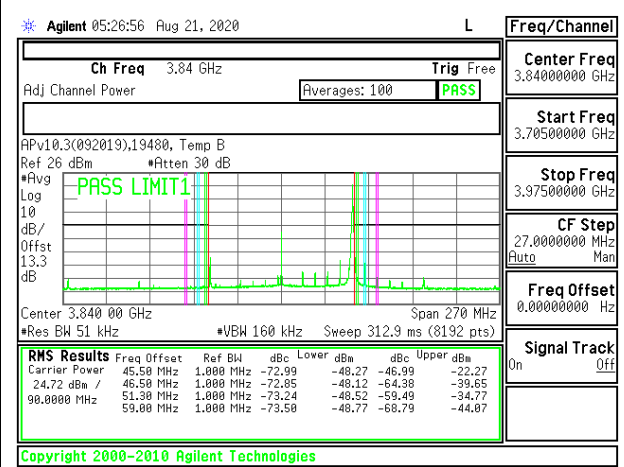
5G NR Bn77 90MHz QPSK Low Channel RB1-0



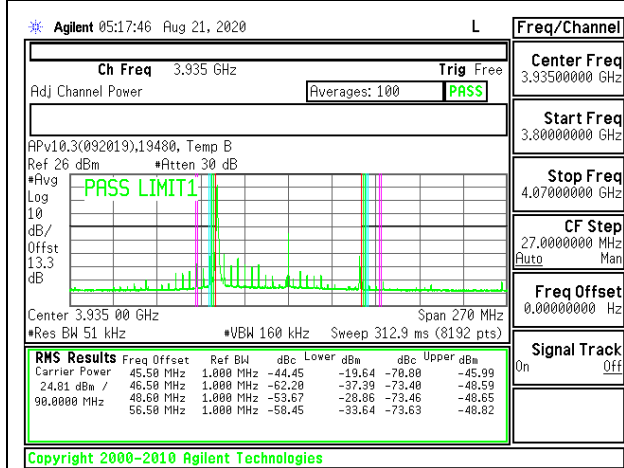
5G NR Bn77 90MHz QPSK Low Channel RB1-244



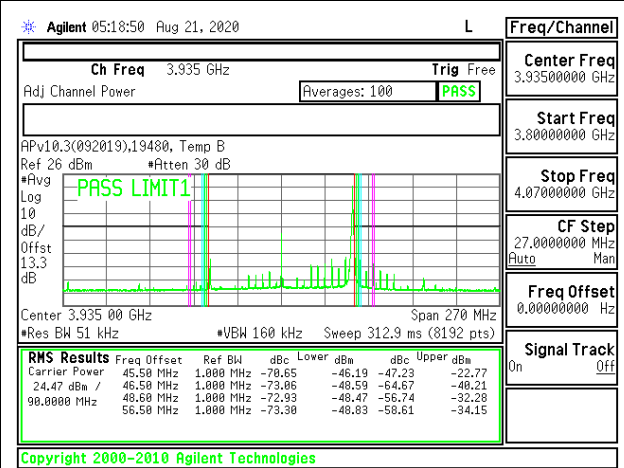
5G NR Bn77 90MHz QPSK Middle Channel RB1-0



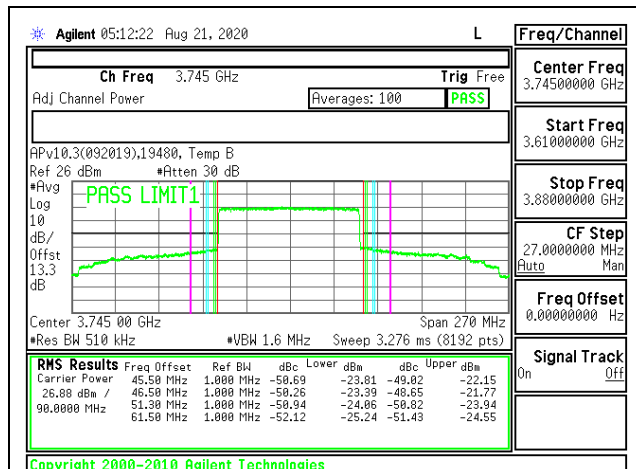
5G NR Bn77 90MHz QPSK Middle Channel RB1-244



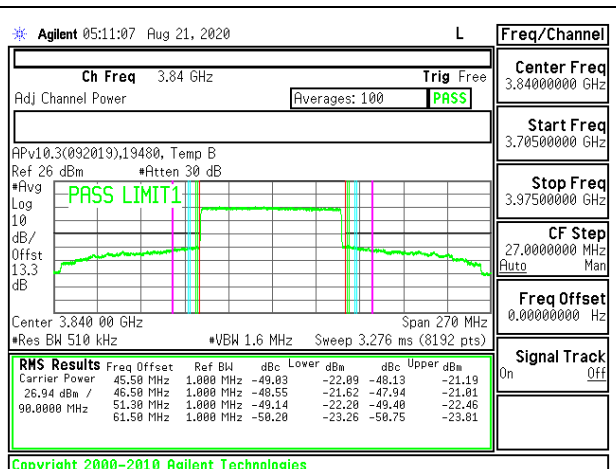
5G NR Bn77 90MHz QPSK High Channel RB1-0



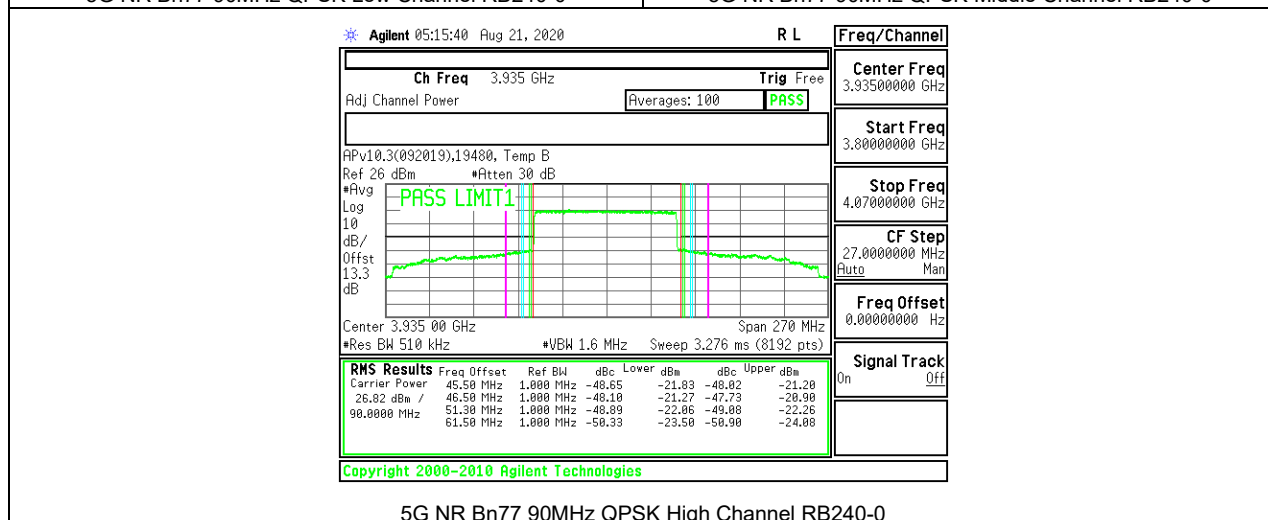
5G NR Bn77 90MHz QPSK High Channel RB1-244



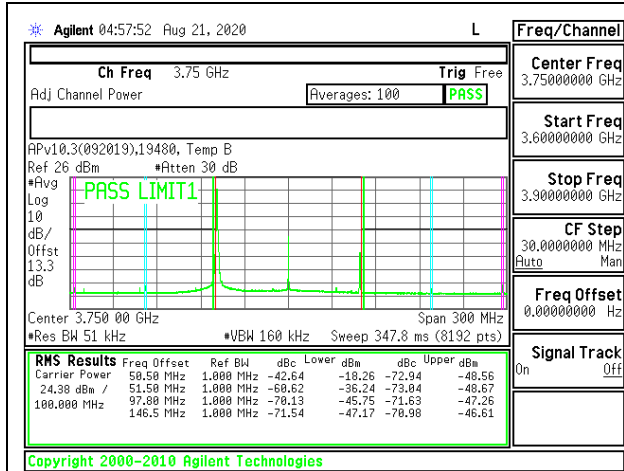
5G NR Bn77 90MHz QPSK Low Channel RB240-0



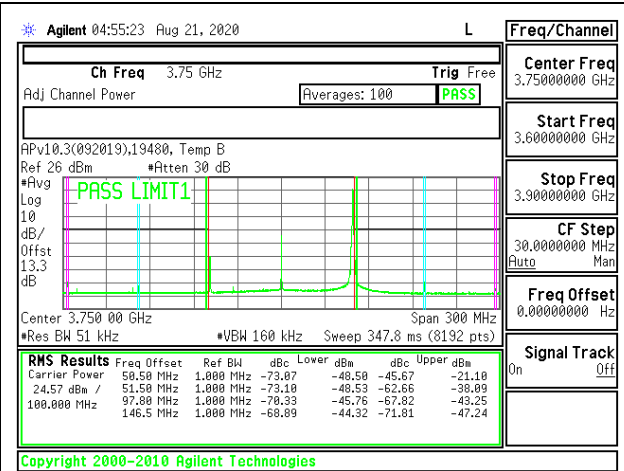
5G NR Bn77 90MHz QPSK Middle Channel RB240-0



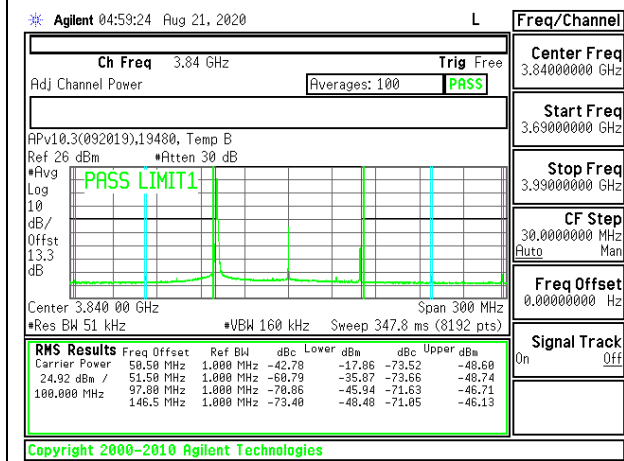
5G NR Bn77 90MHz QPSK High Channel RB240-0



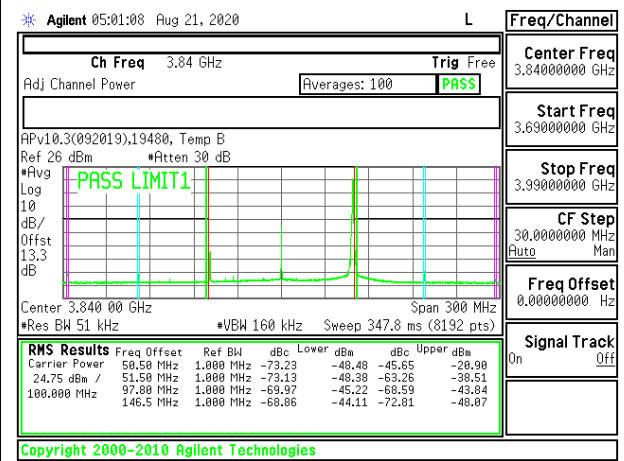
5G NR Bn77 100MHz QPSK Low Channel RB1-0



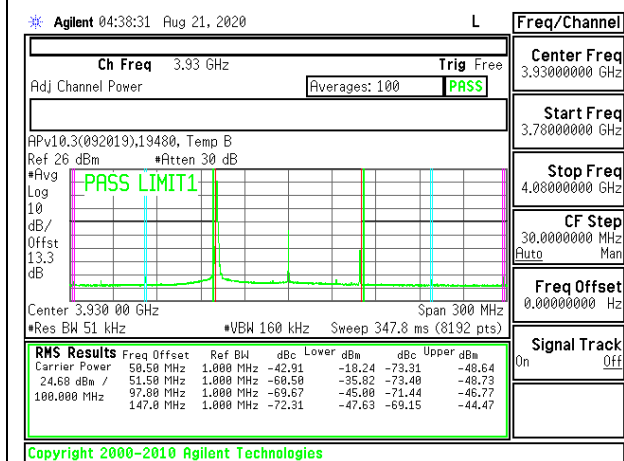
5G NR Bn77 100MHz QPSK Low Channel RB1-272



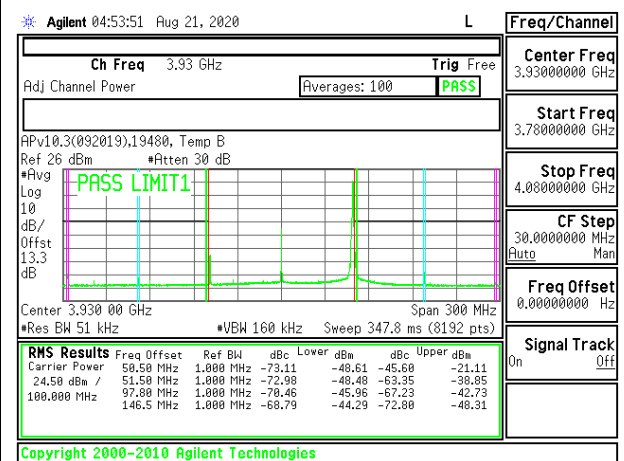
5G NR Bn77 100MHz QPSK Middle Channel RB1-0



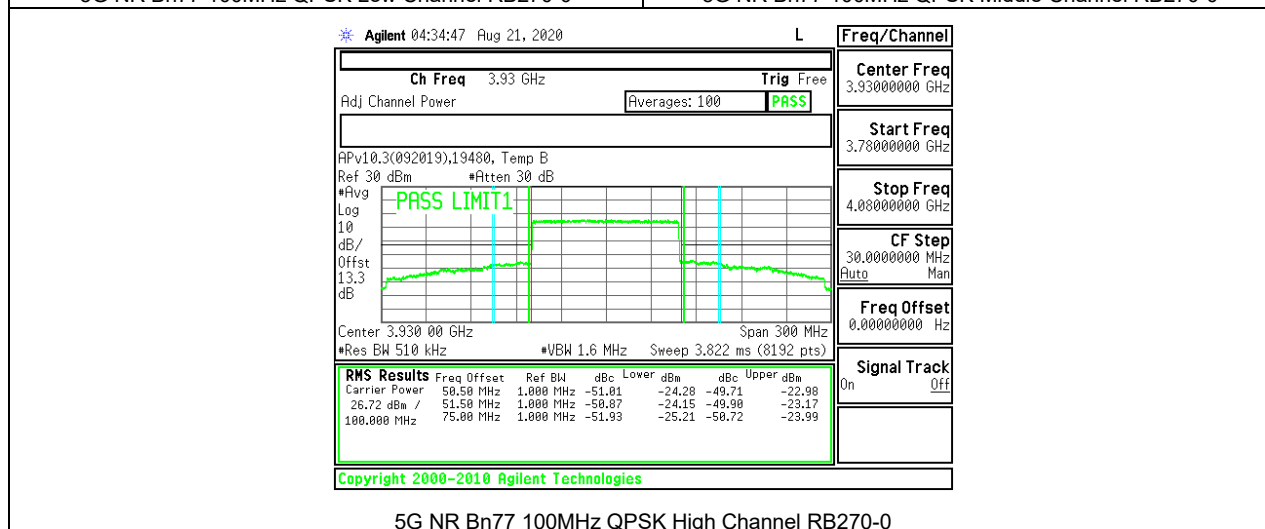
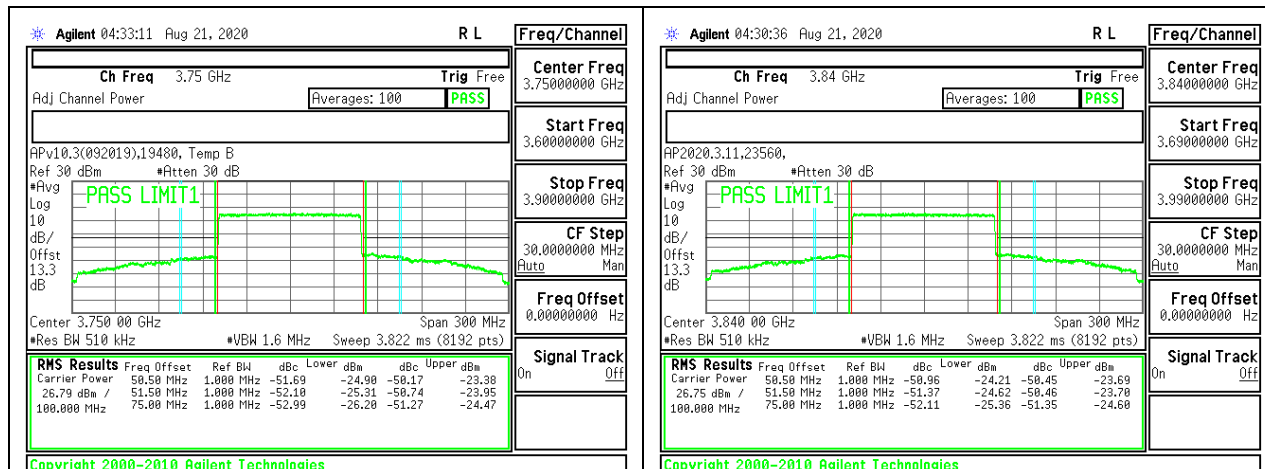
5G NR Bn77 100MHz QPSK Middle Channel RB1-272



5G NR Bn77 100MHz QPSK High Channel RB1-0



5G NR Bn77 100MHz QPSK High Channel RB1-270



8.3. OUT OF BAND EMISSIONS

TEST PROCEDURE

The RF output of the transmitter was connected to a spectrum analyzer through a calibrated coaxial cable. Sufficient scans were taken to show the out-of-band Emissions, if any, up to 10th harmonic. Multiple sweeps were recorded in maximum hold mode using a peak detector to ensure that the worst-case emissions were caught.

For each out of band emissions measurement:

- Set display line at -13 dBm, -25dBm and -40dBm according to the band Limit
- Set RBW & VBW to 100 kHz for the measurement below 1 GHz, and 1 MHz for the measurement above 1 GHz.
(NOTE: Worst case set RBW/VBW to 1MHz/3MHz)

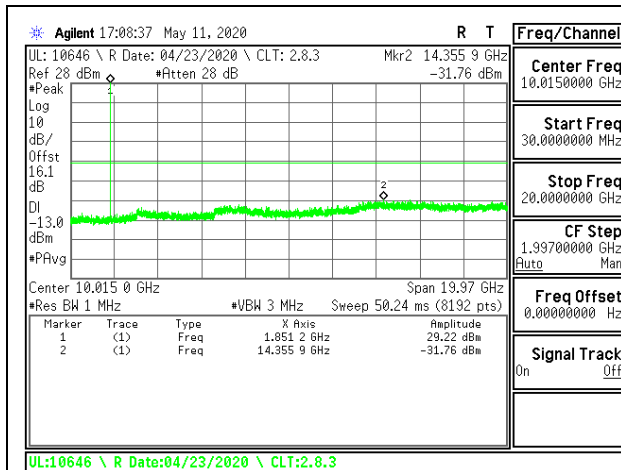
RESULTS

8.3.1. LTE BAND 2

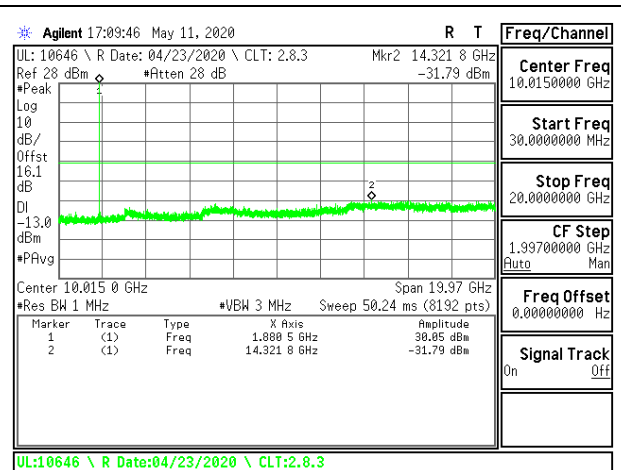
LIMITS

FCC: §24.238

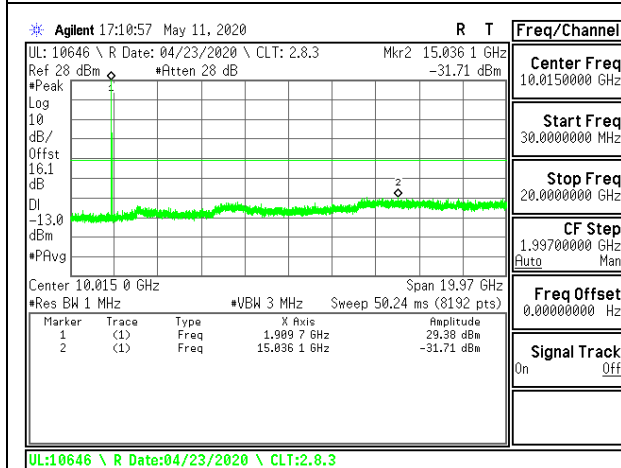
The minimum permissible attenuation level of any spurious emissions is $43 + 10 \log(P)$ dB where transmitting power (P) in Watts.



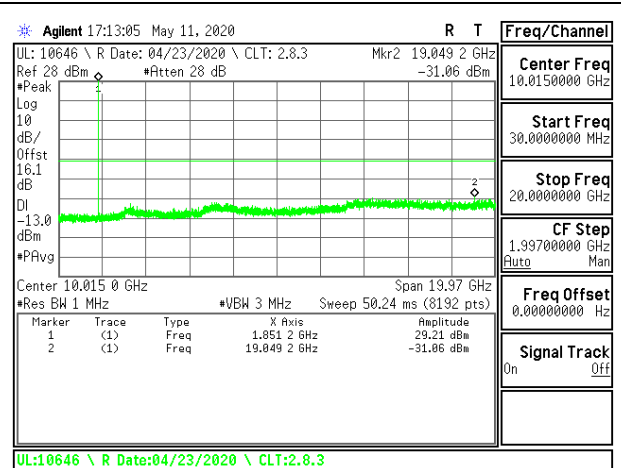
LTE B2 1.4MHz QPSK Low Channel RB1-0



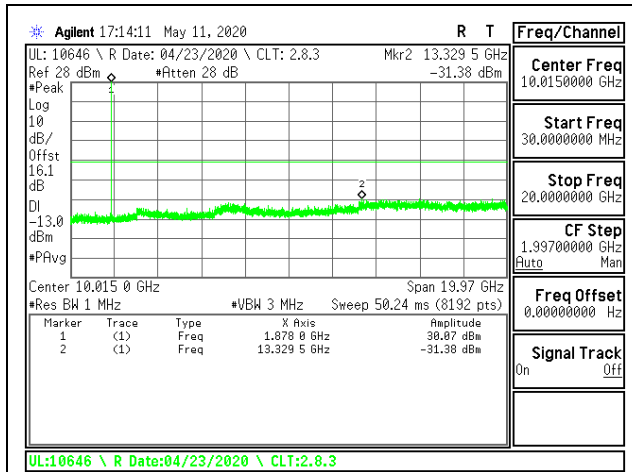
LTE B2 1.4MHz QPSK Middle Channel RB1-0



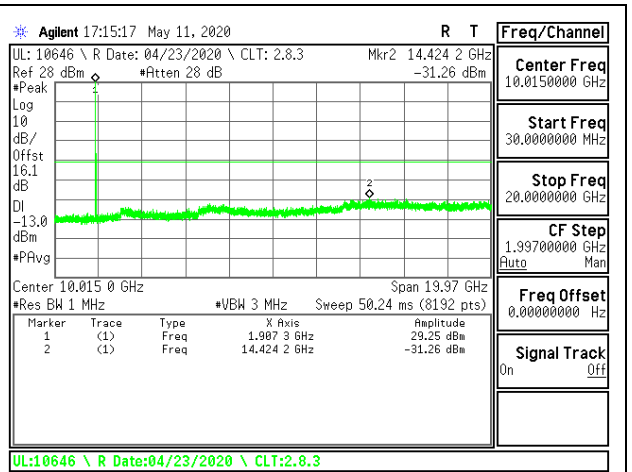
LTE B2 1.4MHz QPSK High Channel RB1-0



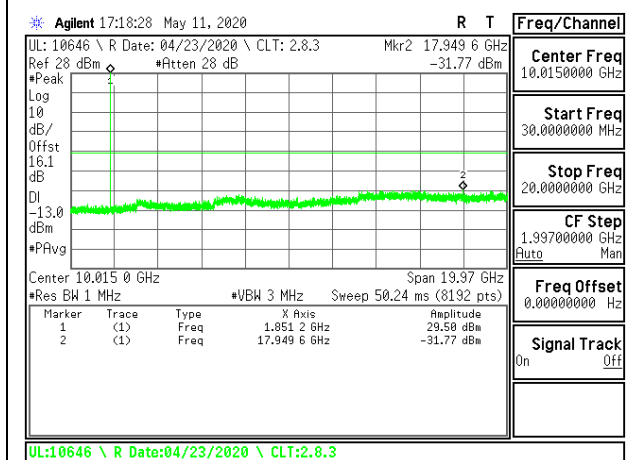
LTE B2 3MHz QPSK Low Channel RB1-0



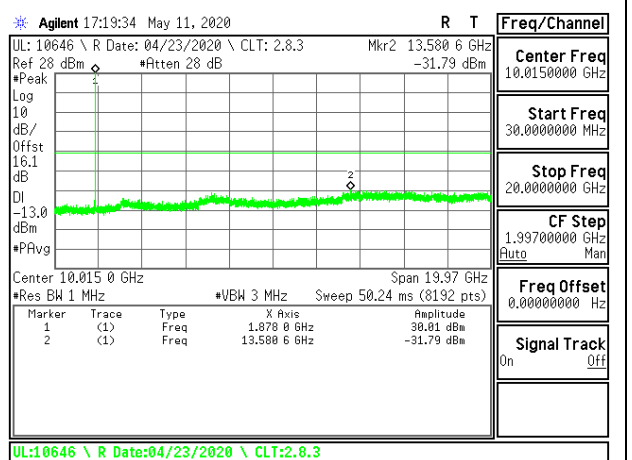
LTE B2 3MHz QPSK Middle Channel RB1-0



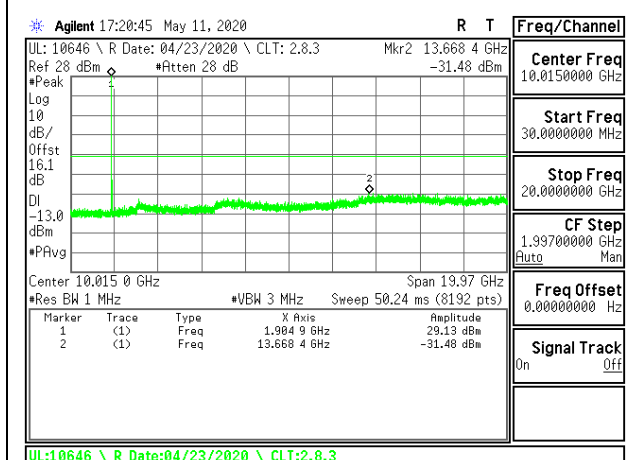
LTE B2 3MHz QPSK High Channel RB1-0



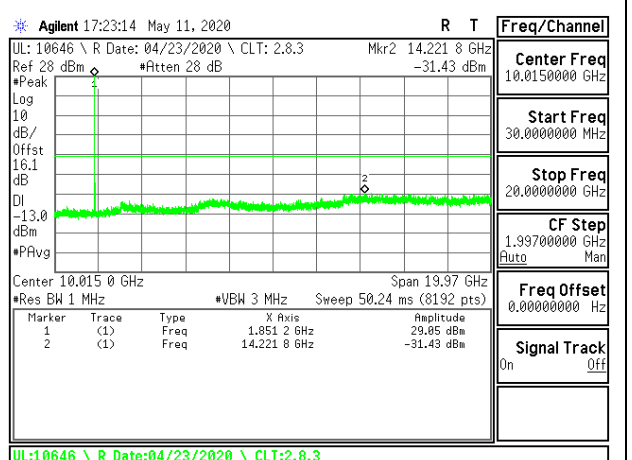
LTE B2 5MHz QPSK Low Channel RB1-0



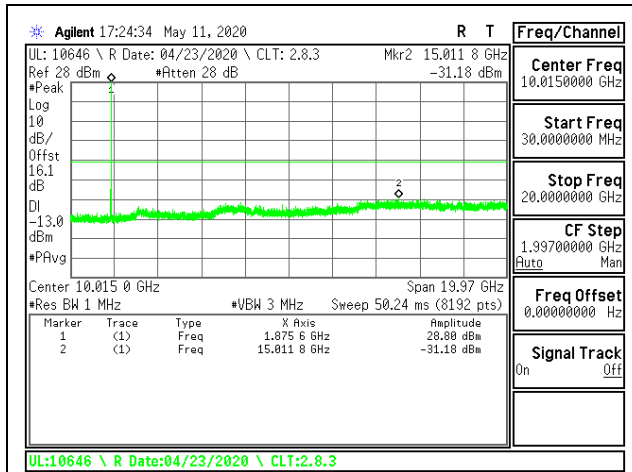
LTE B2 5MHz QPSK Middle Channel RB1-0



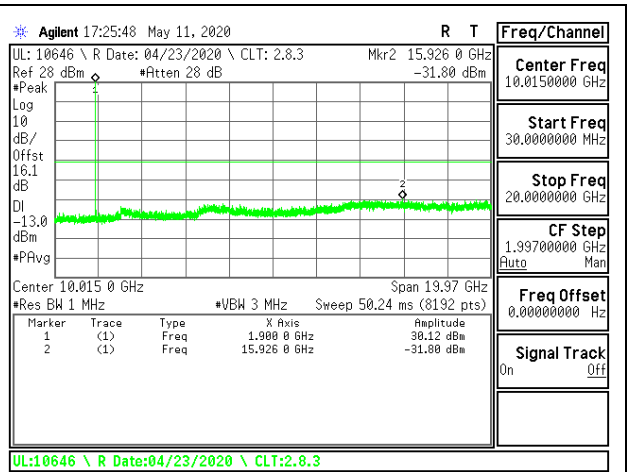
LTE B2 5MHz QPSK High Channel RB1-0



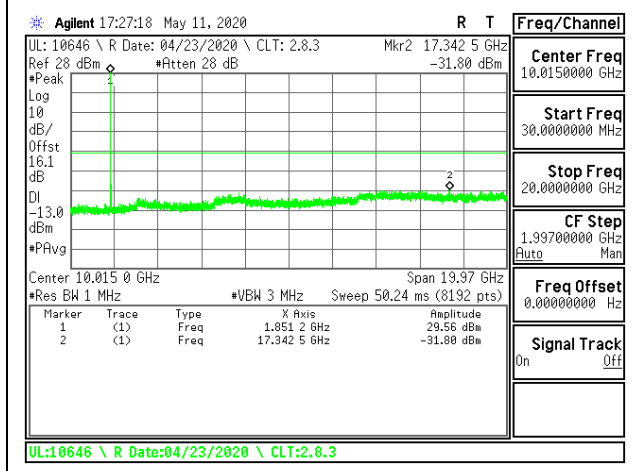
LTE B2 10MHz QPSK Low Channel RB1-0



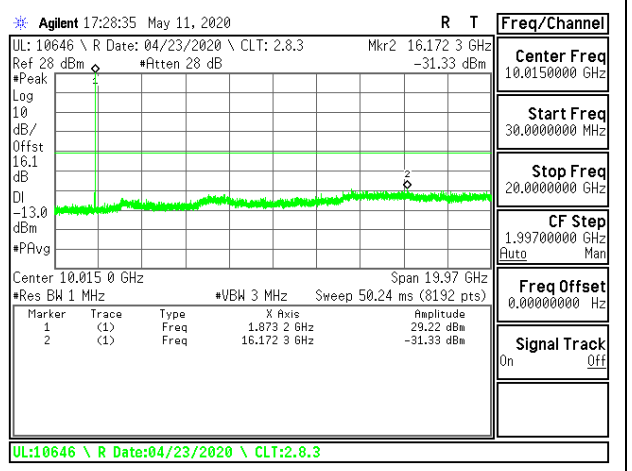
LTE B2 10MHz QPSK Middle Channel RB1-0



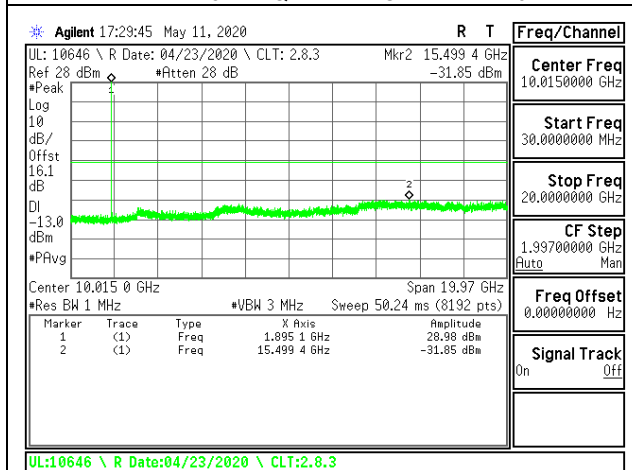
LTE B2 10MHz QPSK High Channel RB1-0



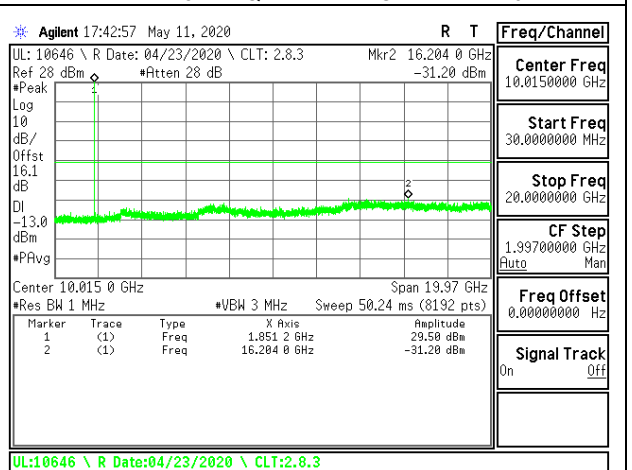
LTE B2 15MHz QPSK Low Channel RB1-0



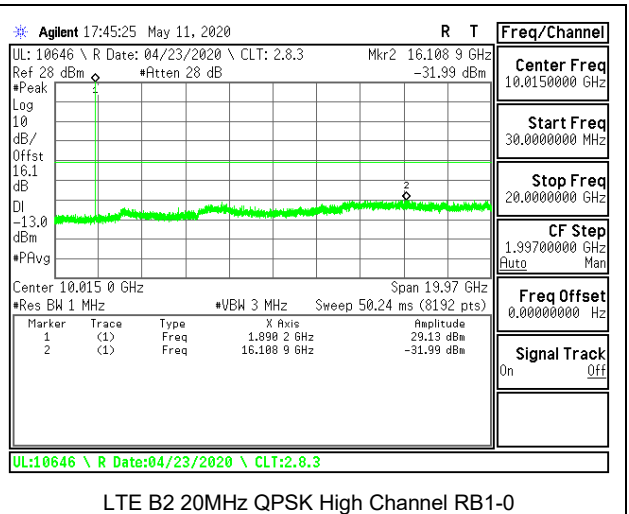
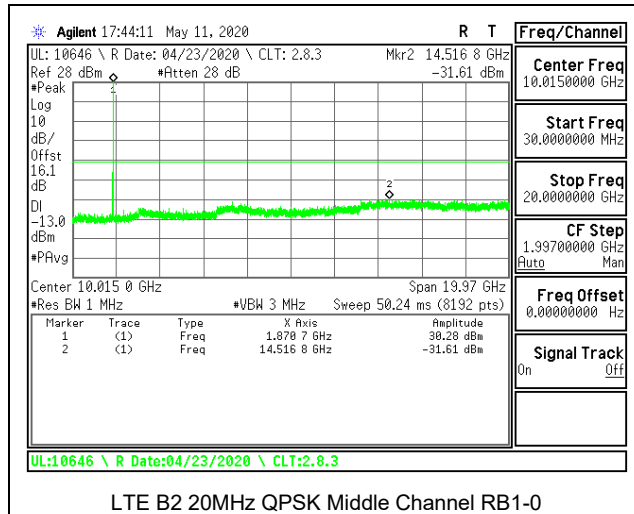
LTE B2 15MHz QPSK Middle Channel RB1-0



LTE B2 15MHz QPSK High Channel RB1-0



LTE B2 20MHz QPSK Low Channel RB1-0



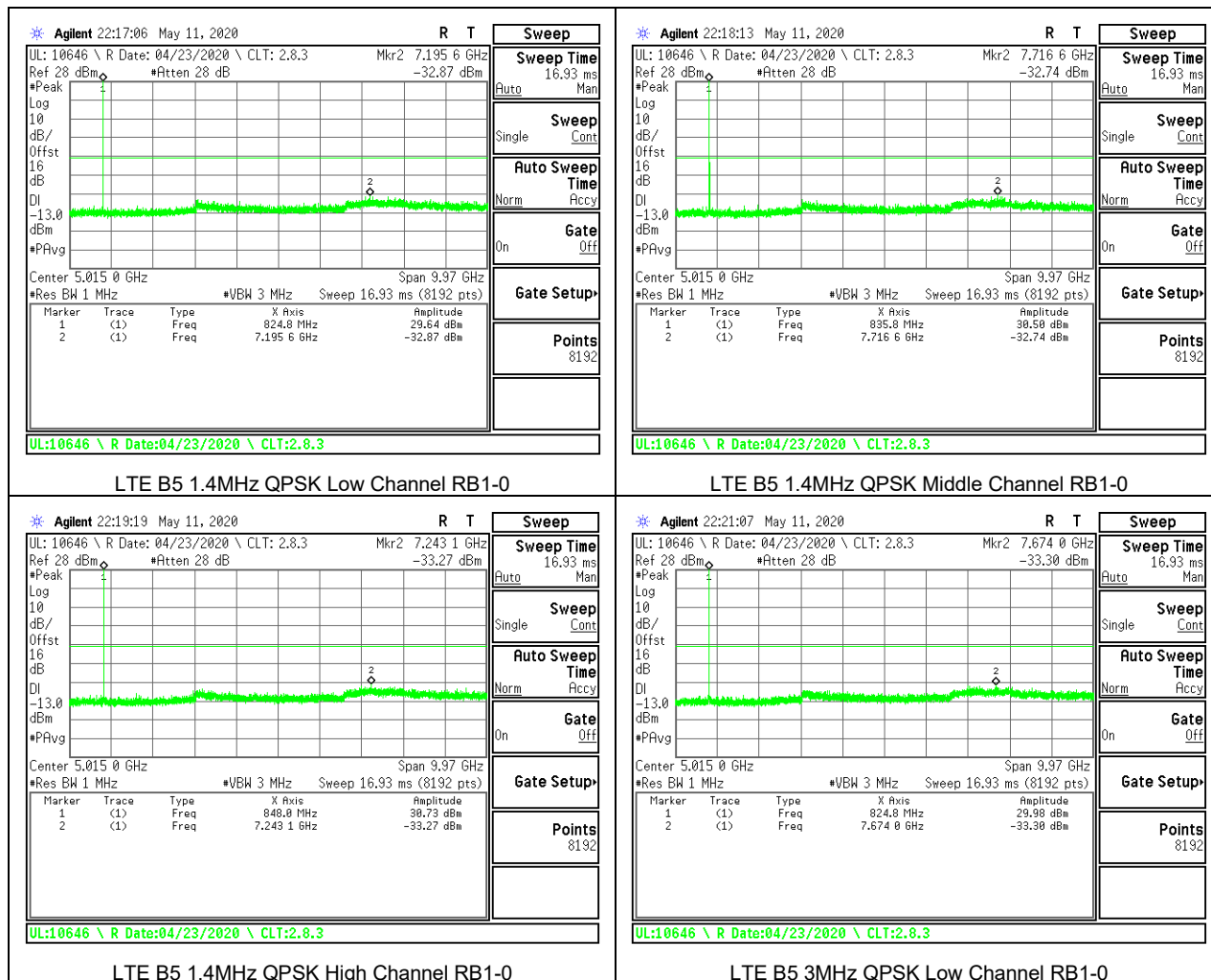
8.3.2. LTE BAND 5 AND 5G NR BAND n5

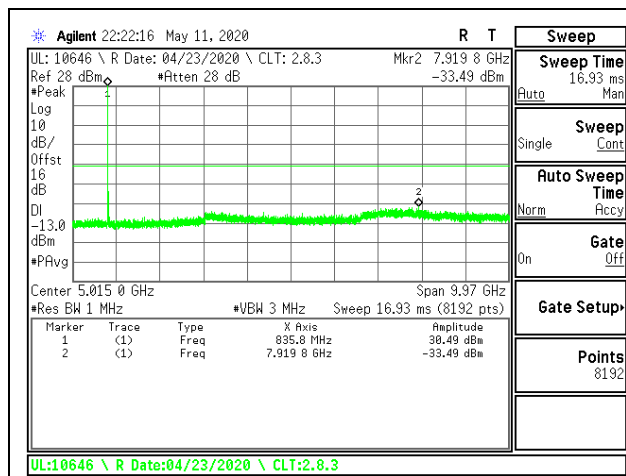
LIMITS

FCC: §22.917

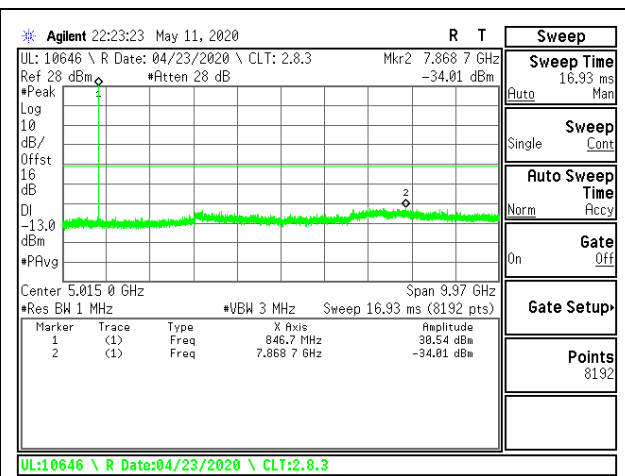
The minimum permissible attenuation level of any spurious emissions is 43 + 10 log (P) dB where transmitting power (P) in Watts.

LTE BAND 5

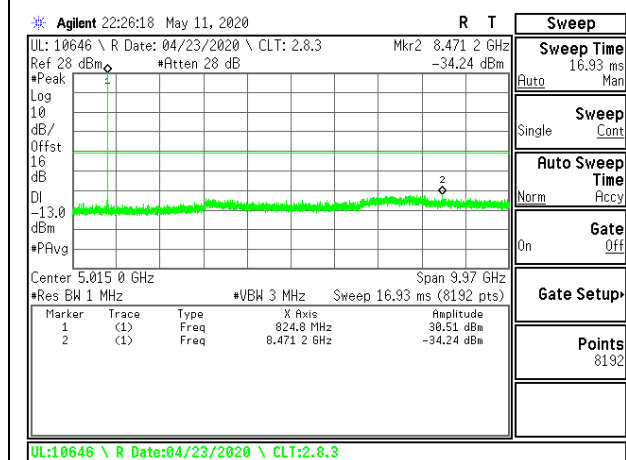




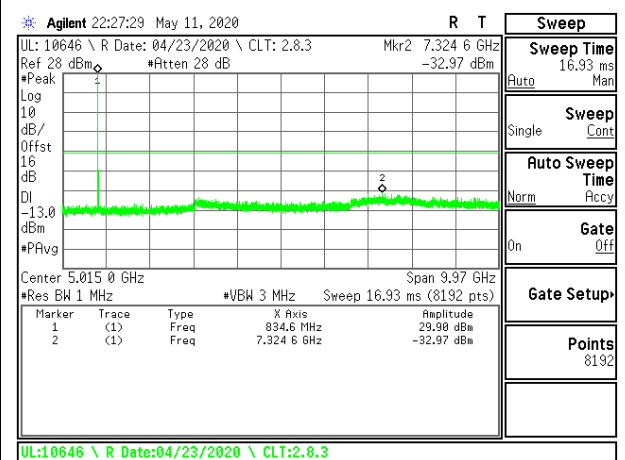
LTE B5 3MHz QPSK Middle Channel RB1-0



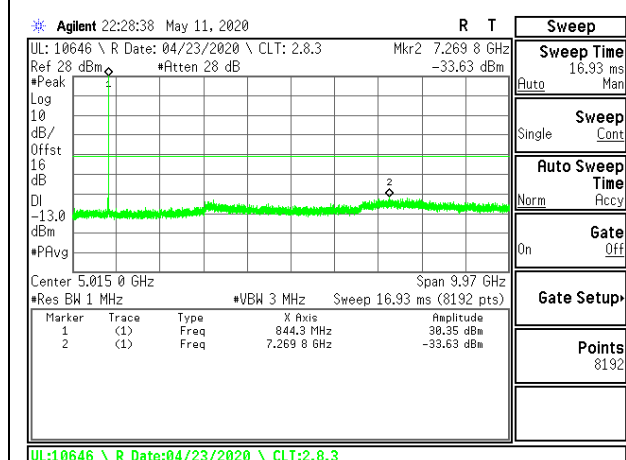
LTE B5 3MHz QPSK High Channel RB1-0



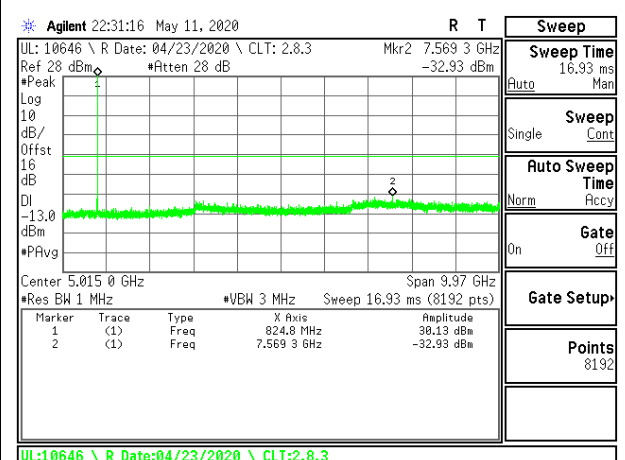
LTE B5 5MHz QPSK Low Channel RB1-0



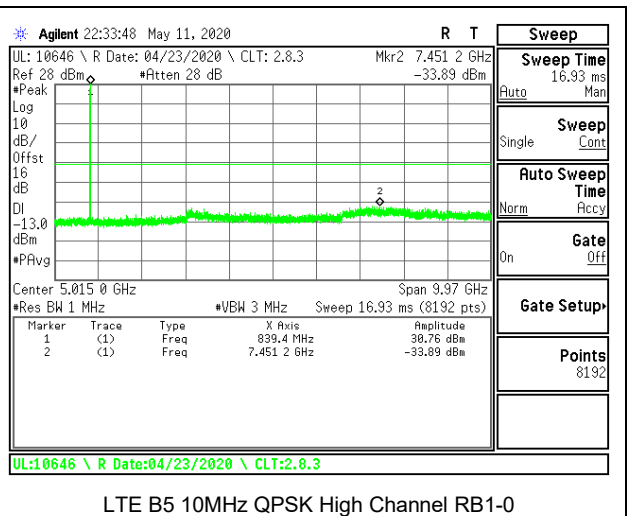
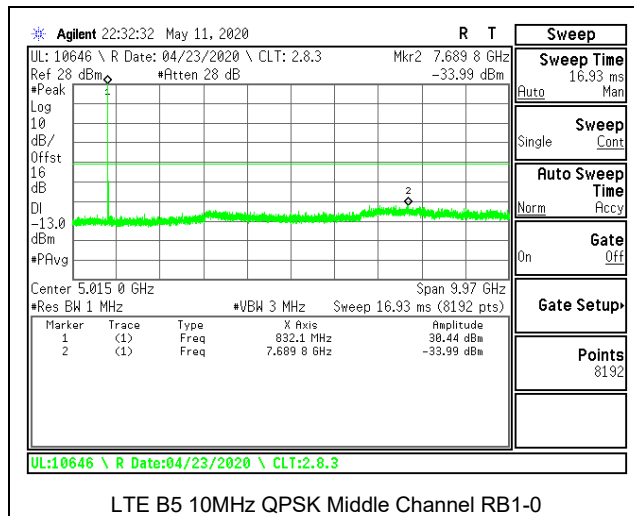
LTE B5 5MHz QPSK Middle Channel RB1-0



LTE B5 5MHz QPSK High Channel RB1-0



LTE B5 10MHz QPSK Low Channel RB1-0



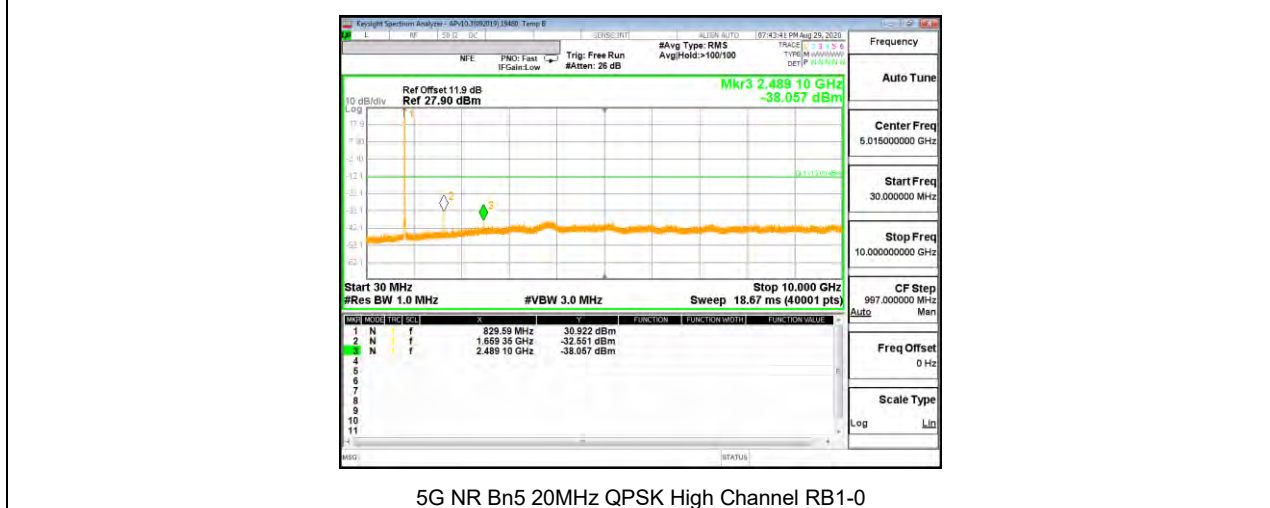
5G NR BAND n5



5G NR Bn5 20MHz QPSK Low Channel RB1-0



5G NR Bn5 20MHz QPSK Middle Channel RB1-0



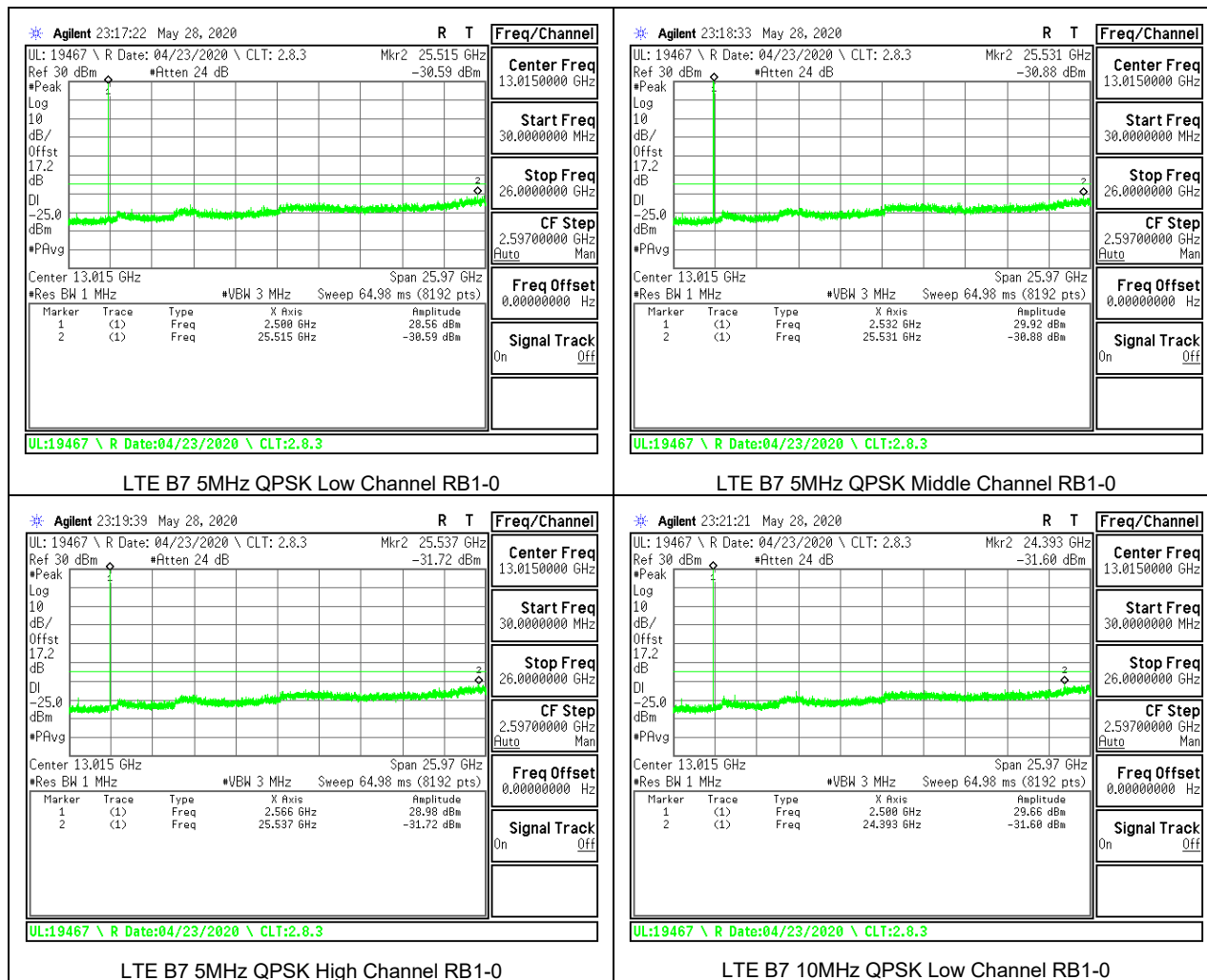
5G NR Bn5 20MHz QPSK High Channel RB1-0

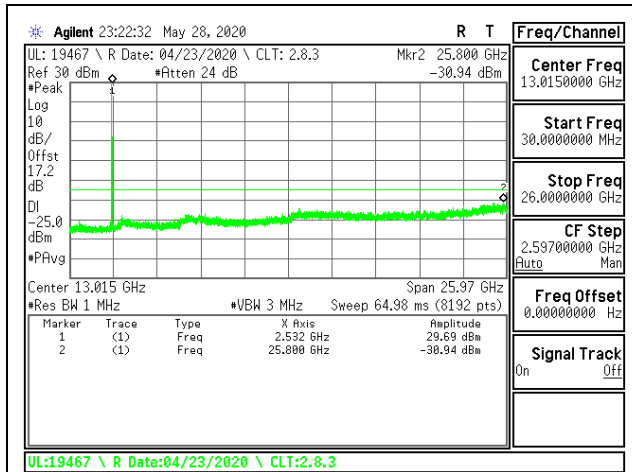
8.3.3. LTE BAND 7

LIMITS

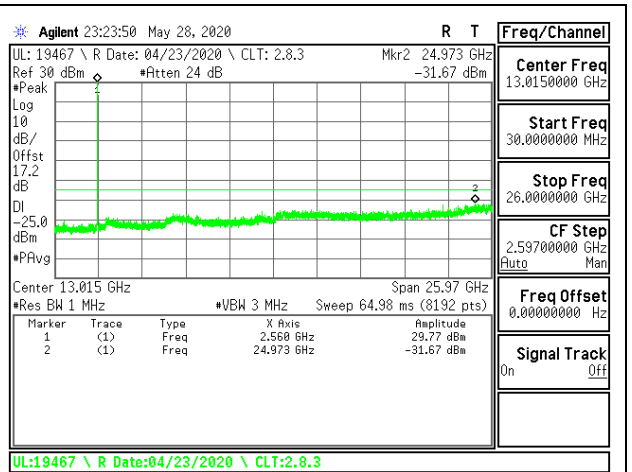
FCC: §27.53 (m)

The minimum permissible attenuation level of any spurious emissions is $55 + 10 \log (P)$ dB where transmitting power (P) in Watts.

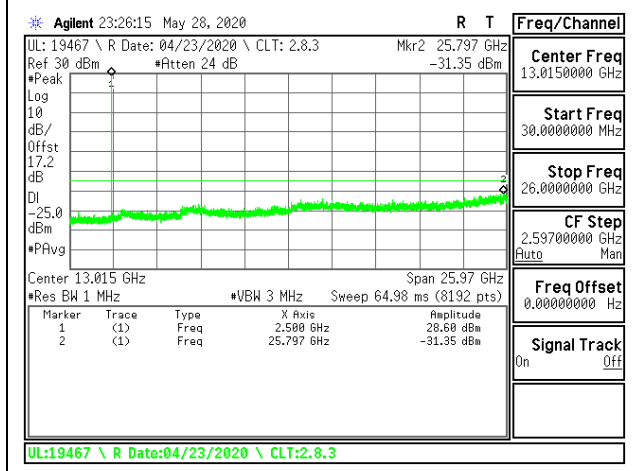




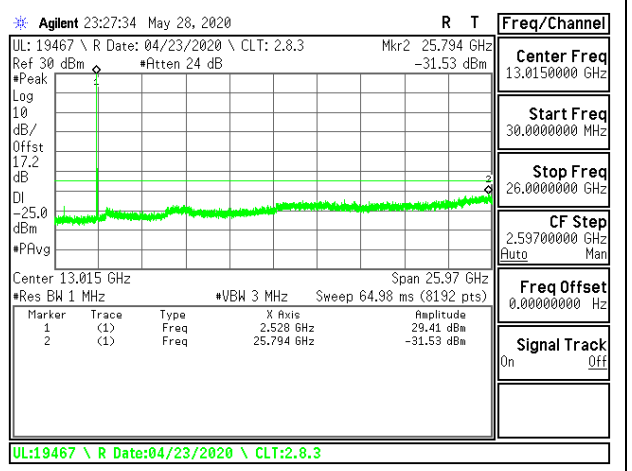
LTE B7 10MHz QPSK Middle Channel RB1-0



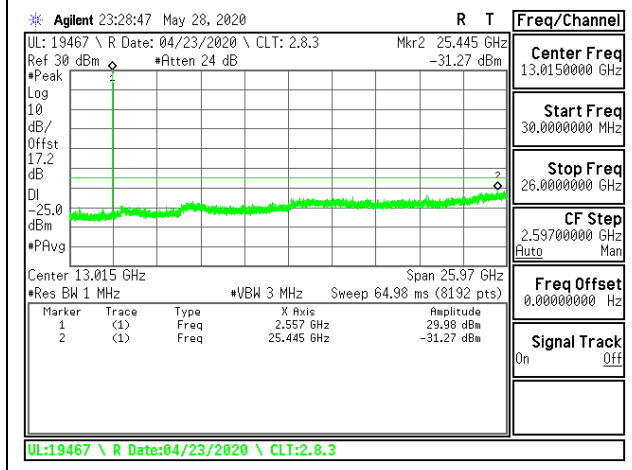
LTE B7 10MHz QPSK High Channel RB1-0



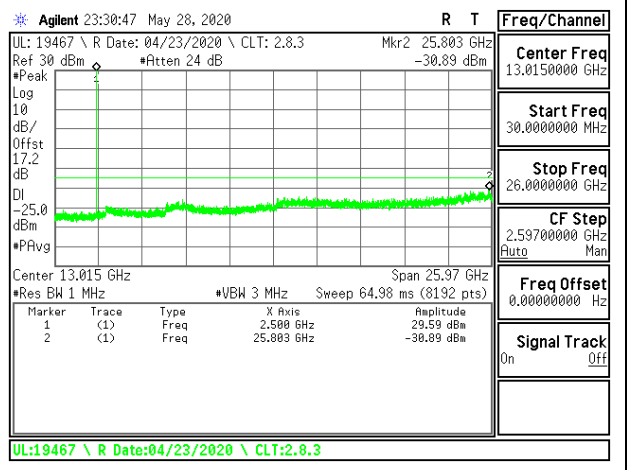
LTE B7 15MHz QPSK Low Channel RB1-0



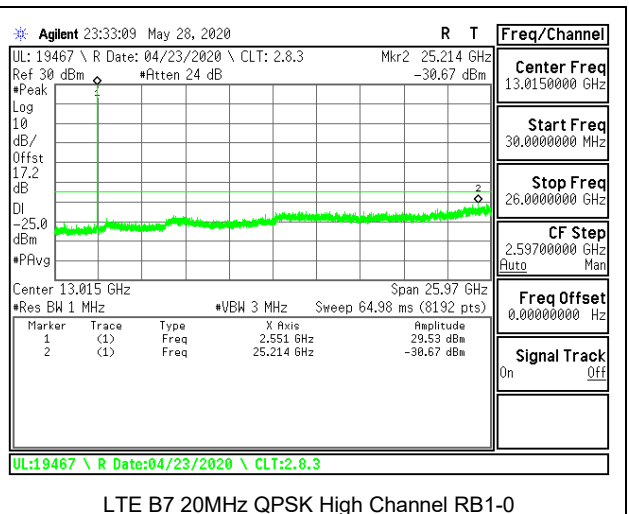
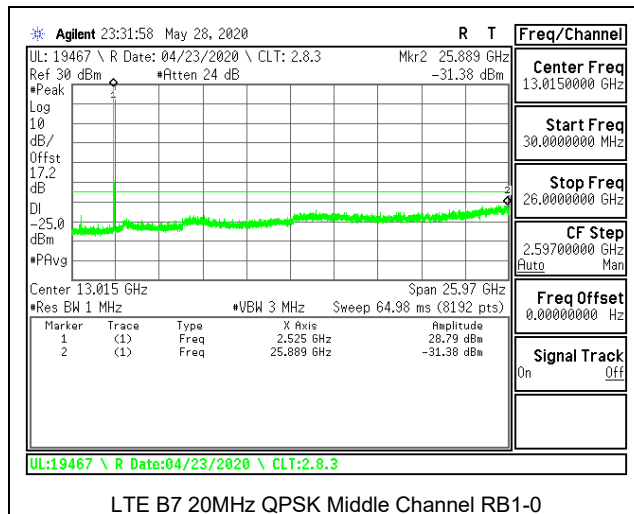
LTE B7 15MHz QPSK Middle Channel RB1-0



LTE B7 15MHz QPSK High Channel RB1-0



LTE B7 20MHz QPSK Low Channel RB1-0



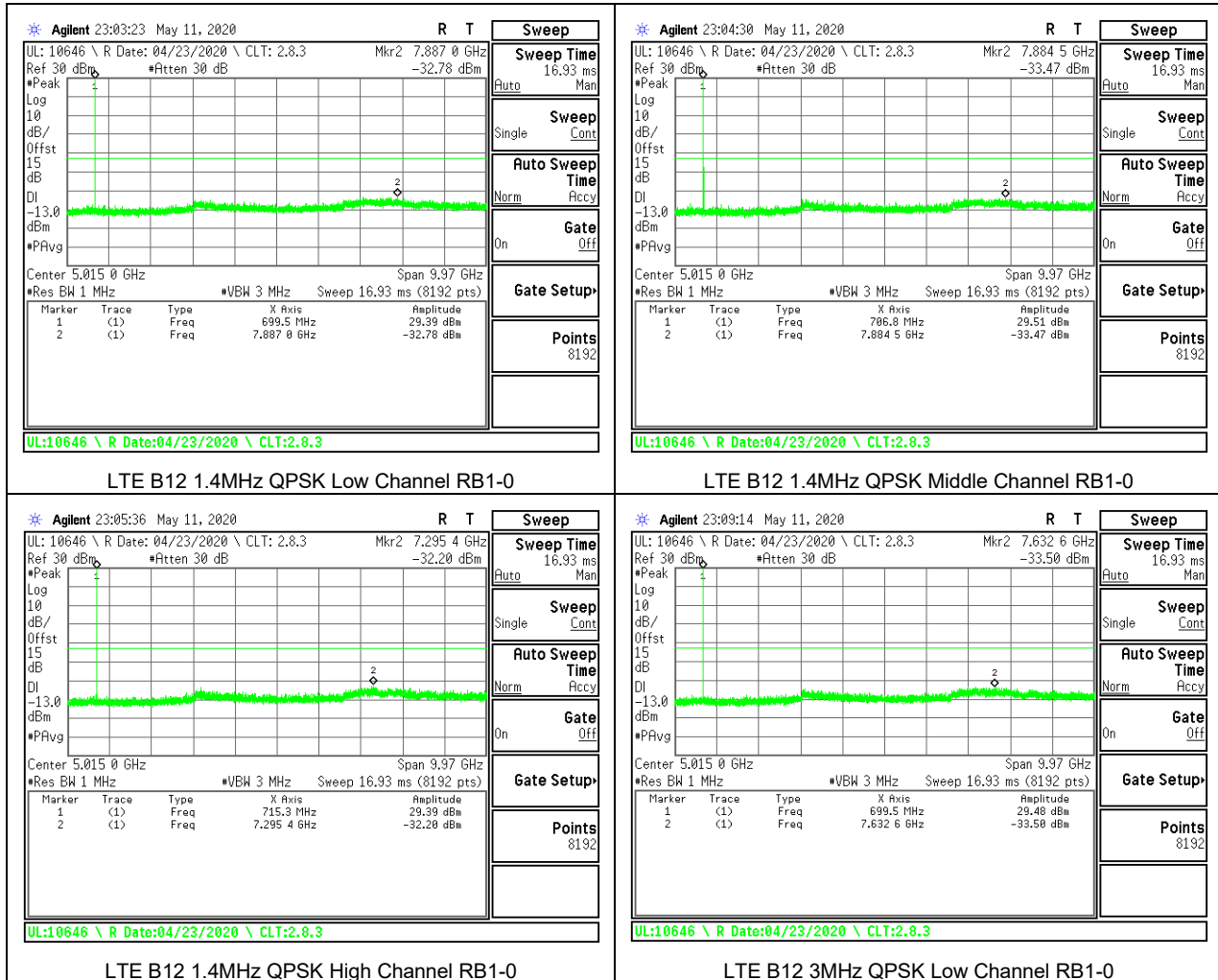
8.3.4. LTE BAND 12 AND 5G NR BAND n12

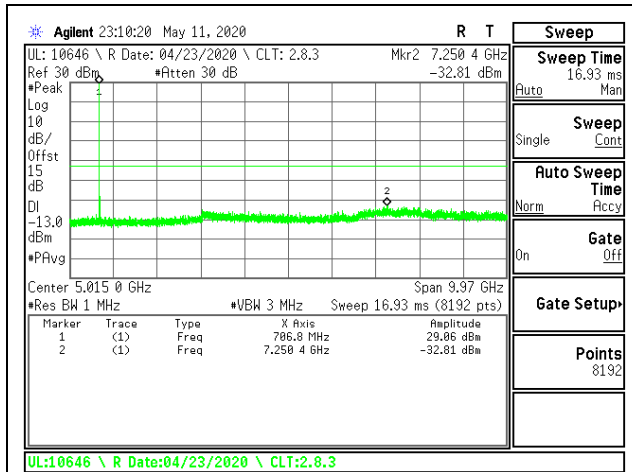
LIMITS

FCC: §27.53 (g)

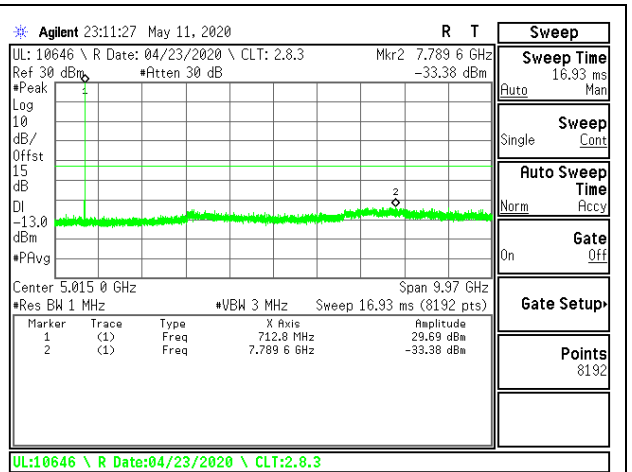
The minimum permissible attenuation level of any spurious emissions is 43 + 10 log (P) dB where transmitting power (P) in Watts.

LTE BAND 12

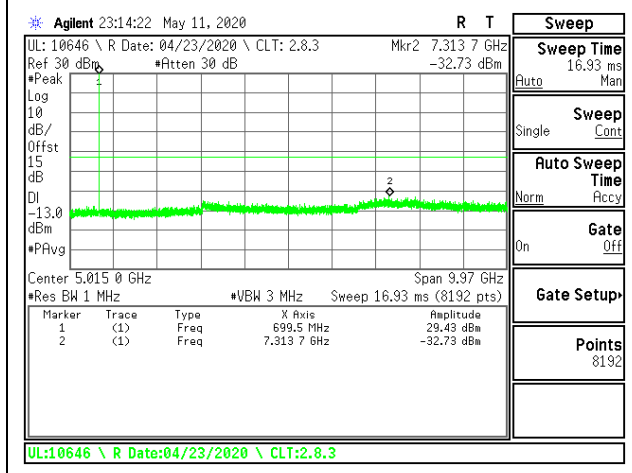




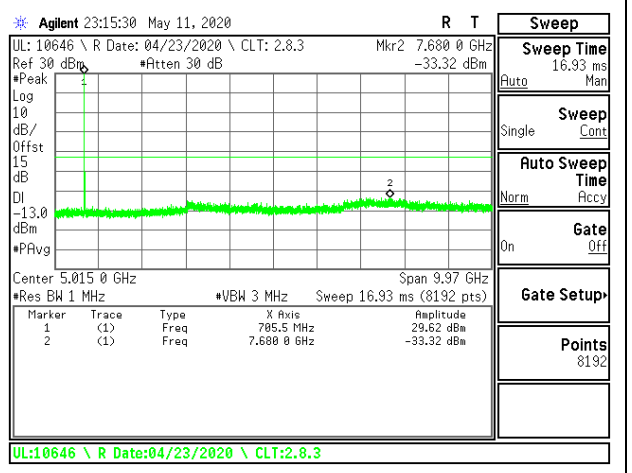
LTE B12 3MHz QPSK Middle Channel RB1-0



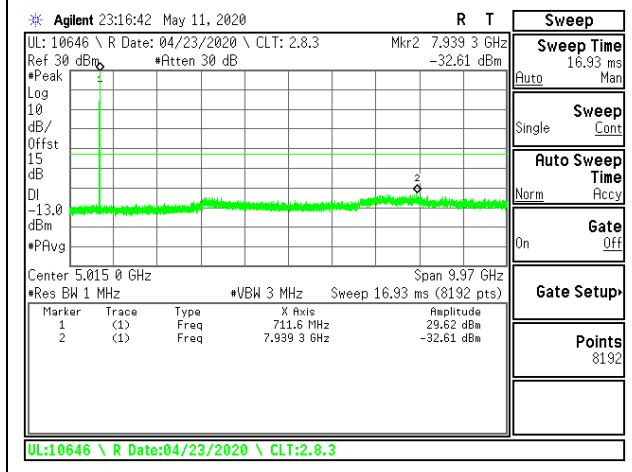
LTE B12 3MHz QPSK High Channel RB1-0



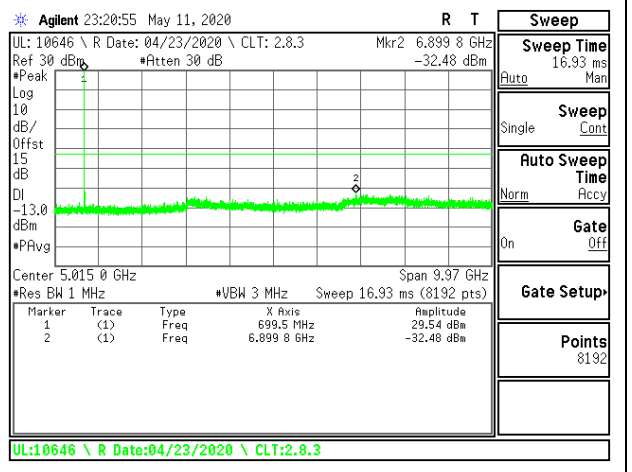
LTE B12 5MHz QPSK Low Channel RB1-0



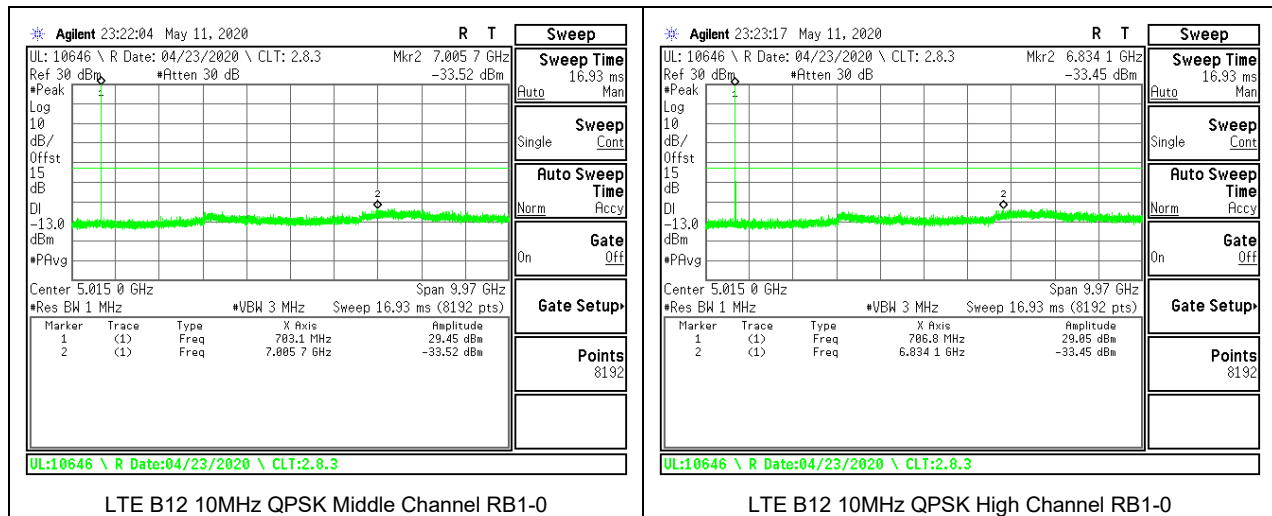
LTE B12 5MHz QPSK Middle Channel RB1-0



LTE B12 5MHz QPSK High Channel RB1-0



LTE B12 10MHz QPSK Low Channel RB1-0



5G NR BAND n12



5G NR Bn12 15MHz QPSK Low Channel RB1-0



5G NR Bn12 15MHz QPSK Middle Channel RB1-0



5G NR Bn12 15MHz QPSK High Channel RB1-0

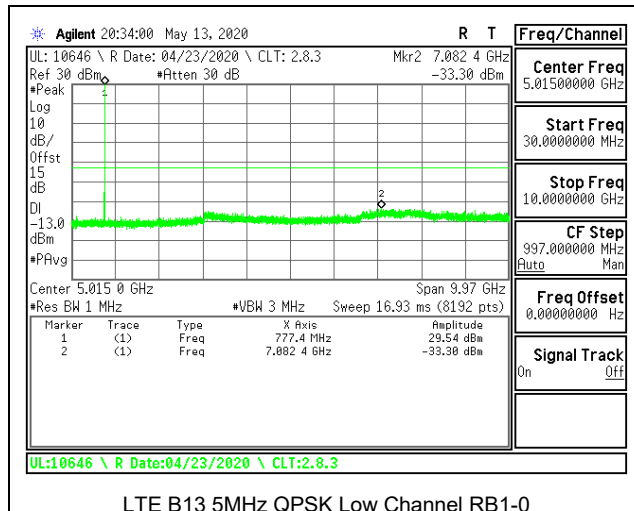
8.3.5. LTE BAND 13

LIMITS

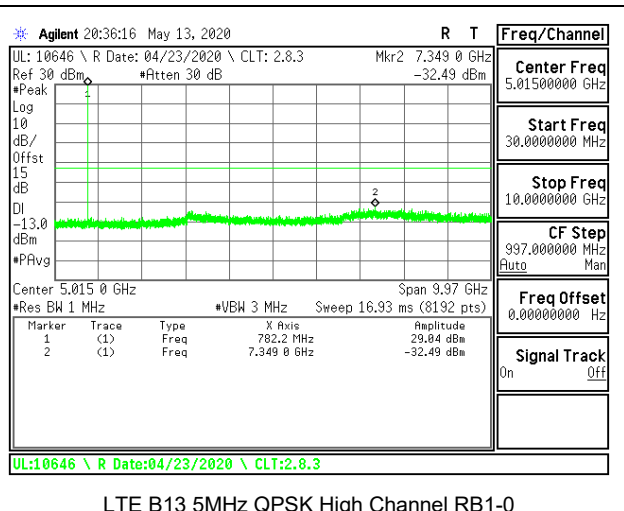
FCC: §27.53 (c), (f)

The minimum permissible attenuation level of any spurious emissions is $43 + 10 \log (P)$ dB where transmitting power (P) in Watts. The band 1559-1610 MHz shall be limited to -70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and -80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth.

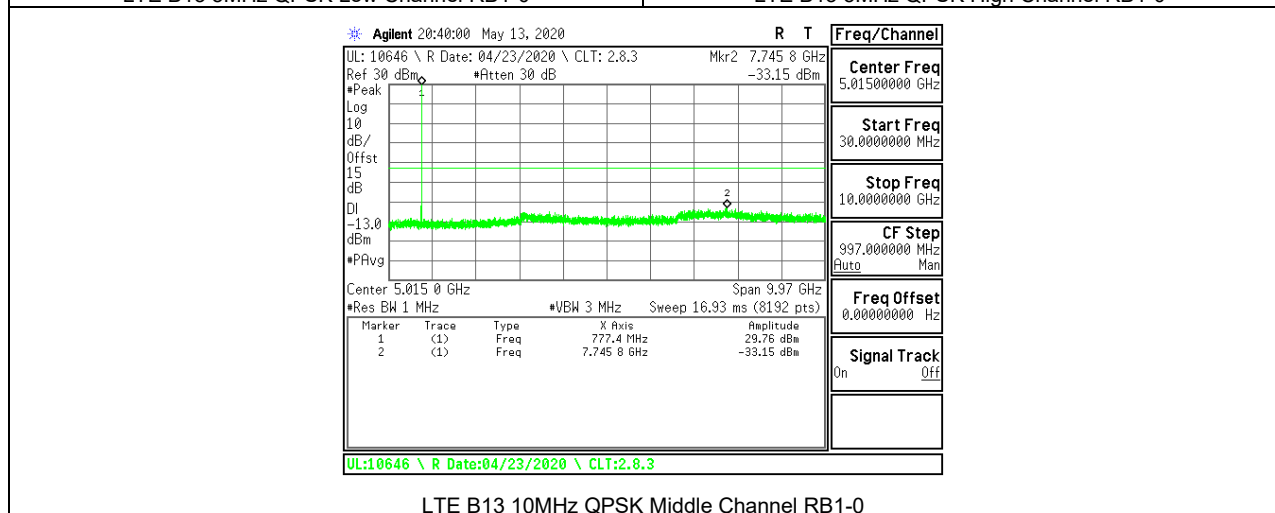
Note: Radiated data in section 9.1.6 confirms a compliance for the emissions in GPS 1559-1610 MHz band were wideband emissions therefore the -40 dBm/MHz limit was used.



LTE B13 5MHz QPSK Low Channel RB1-0



LTE B13 5MHz QPSK High Channel RB1-0



LTE B13 10MHz QPSK Middle Channel RB1-0

Note: Radiated data in section 9.1.6 confirms a compliance with narrowband limits for GPS1559-1610 MHz band.

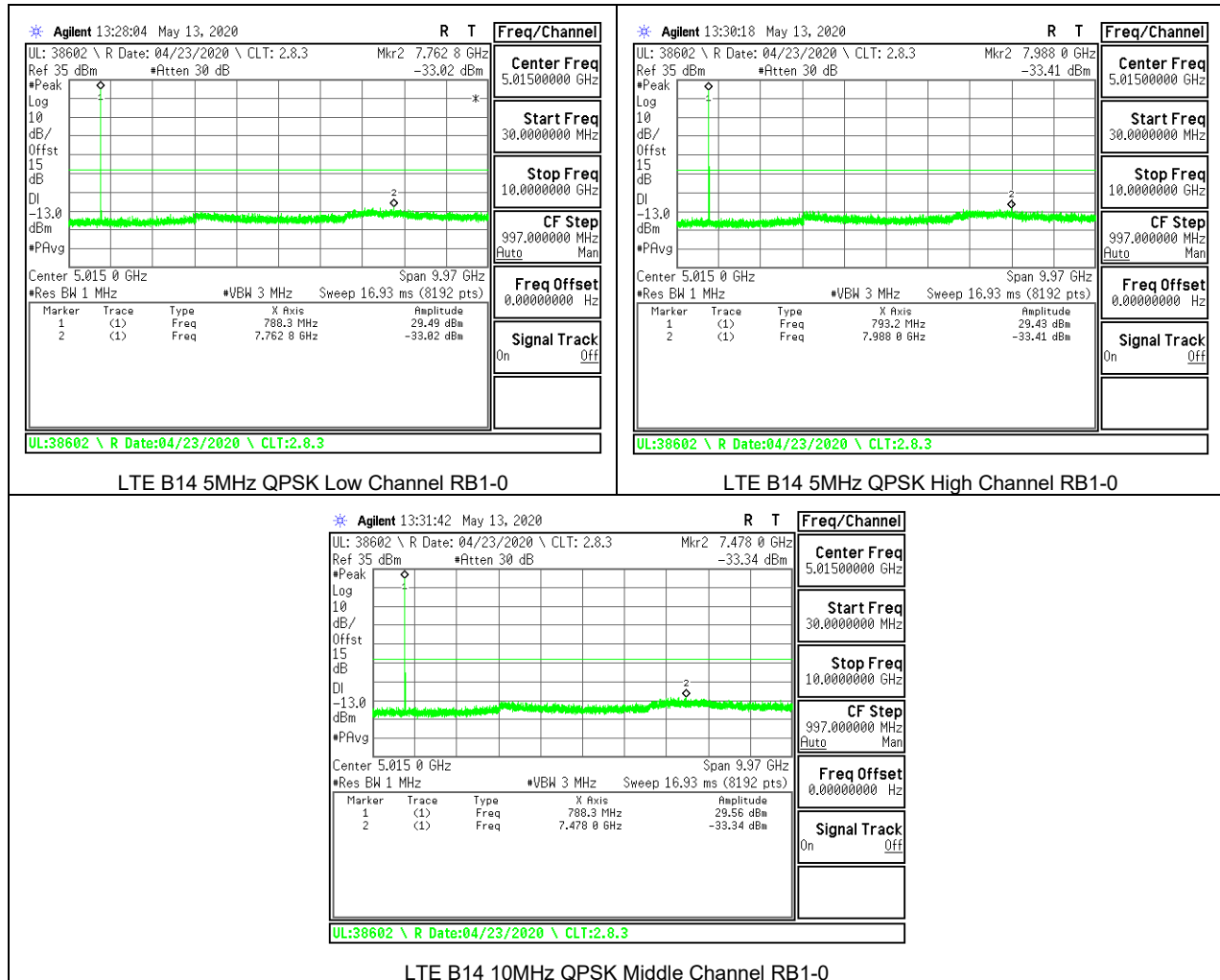
8.3.6. LTE BAND 14

LIMITS

FCC: §90.543 (e), (f)

The minimum permissible attenuation level of any spurious emissions is $43 + 10 \log (P)$ dB where transmitting power (P) in Watts. The band 1559-1610 MHz shall be limited to -70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and -80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth.

Note: Radiated data in section 9.1.7 confirms a compliance for the emissions in GPS 1559-1610 MHz band were wideband emissions therefore the -40 dBm/MHz limit was used.



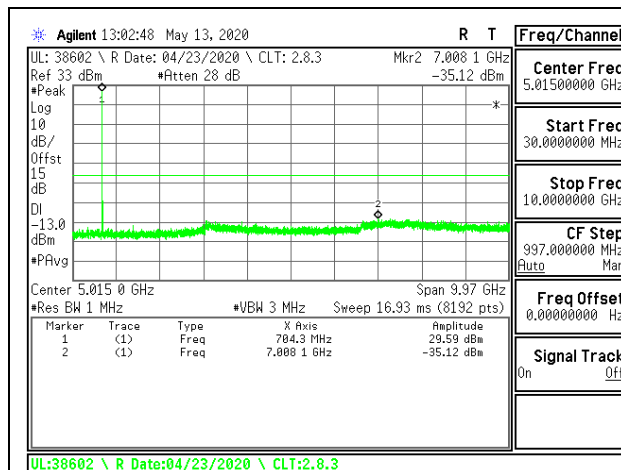
Note: Radiated data in section 9.1.7 confirms a compliance with narrowband limits for GPS1559-1610 MHz band.

8.3.7. LTE BAND 17

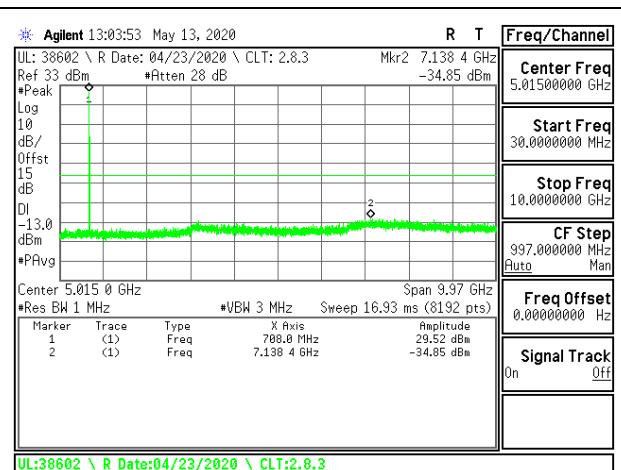
LIMITS

FCC: §27.53 (g)

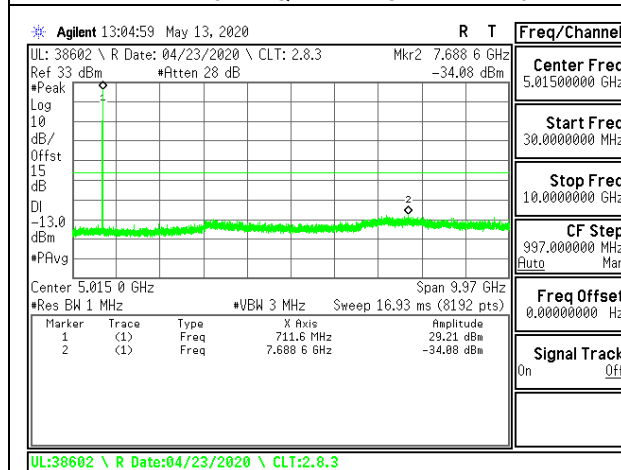
The minimum permissible attenuation level of any spurious emissions is $43 + 10 \log(P)$ dB where transmitting power (P) in Watts.



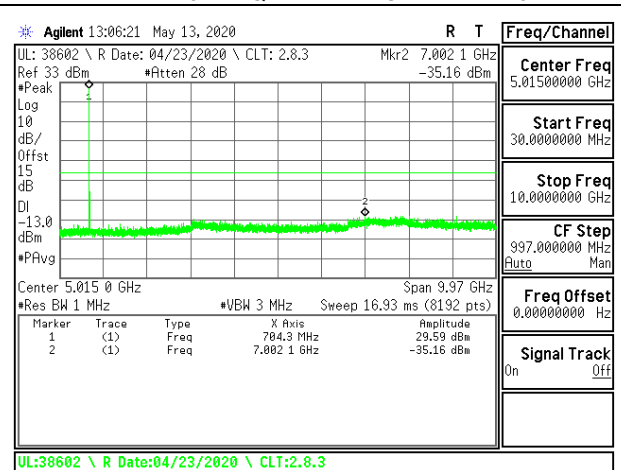
LTE B17 5MHz QPSK Low Channel RB1-0



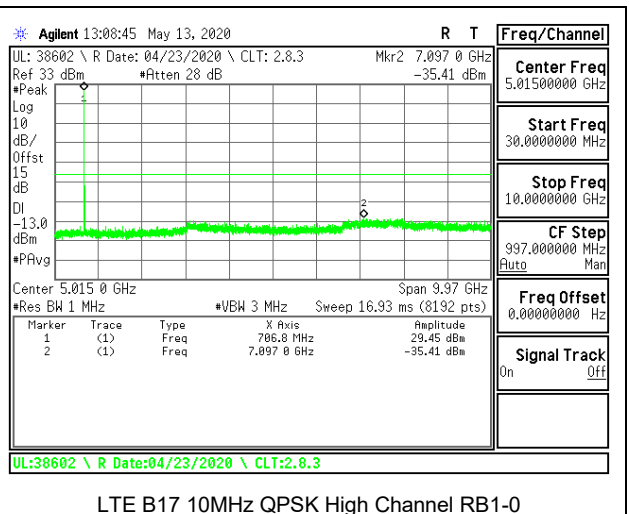
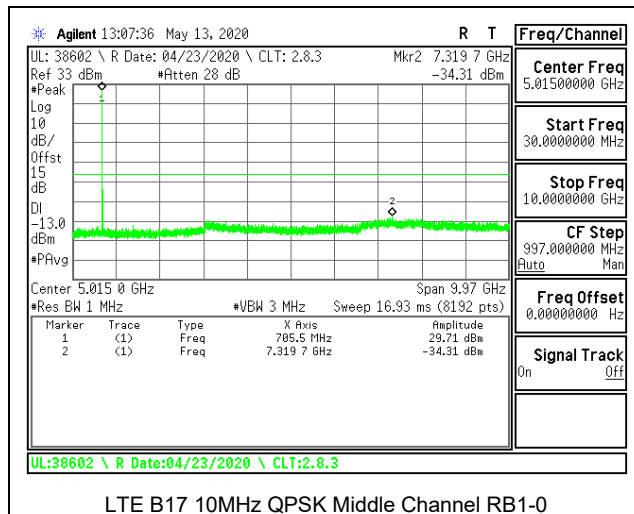
LTE B17 5MHz QPSK Middle Channel RB1-0



LTE B17 5MHz QPSK High Channel RB1-0



LTE B17 10MHz QPSK Low Channel RB1-0

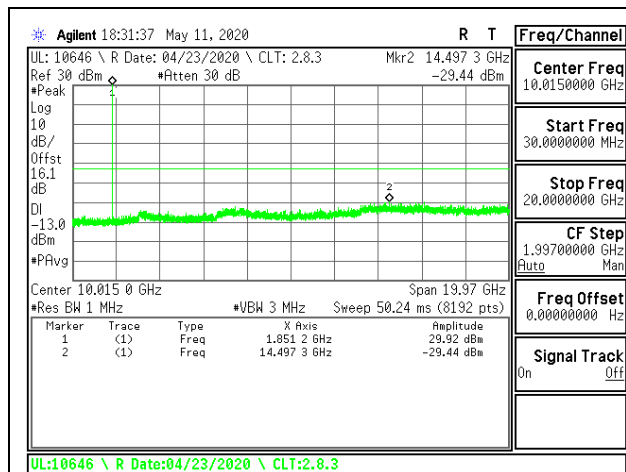


8.3.8. LTE BAND 25

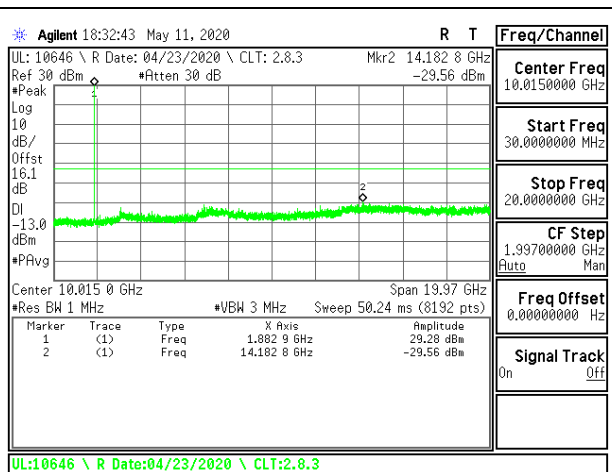
LIMITS

FCC: §24.238

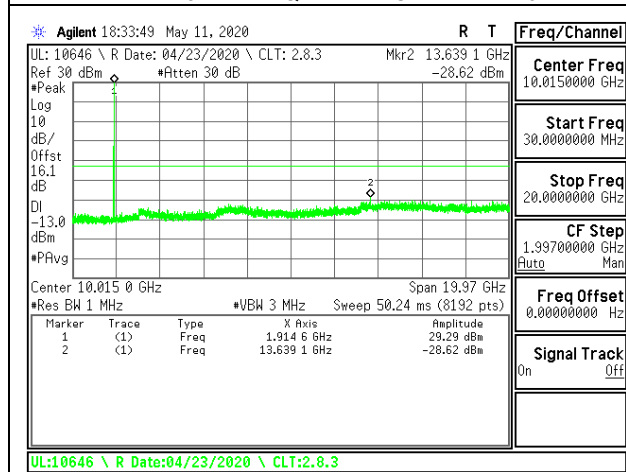
The minimum permissible attenuation level of any spurious emissions is $43 + 10 \log(P)$ dB where transmitting power (P) in Watts.



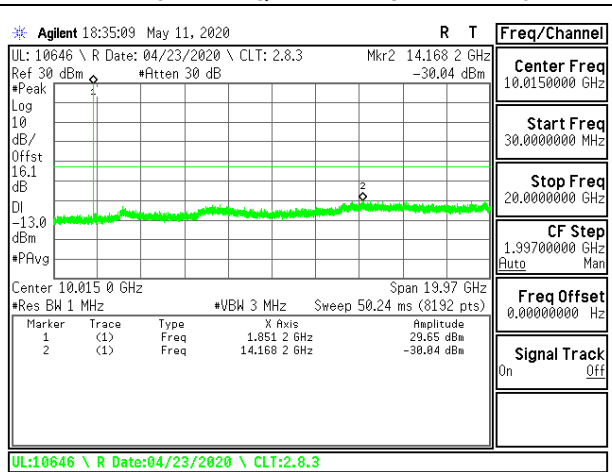
LTE B25 1.4MHz QPSK Low Channel RB1-0



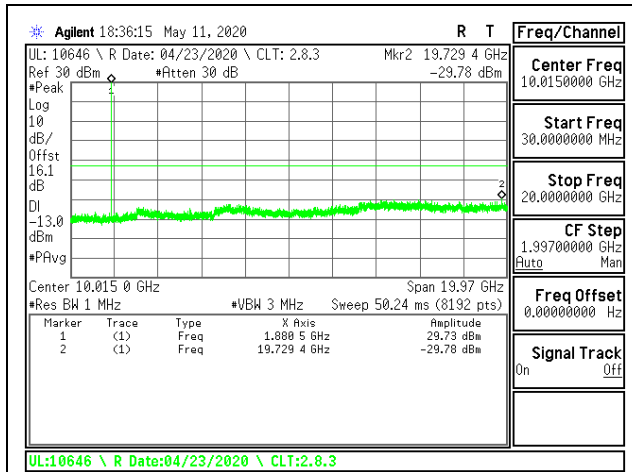
LTE B25 1.4MHz QPSK Middle Channel RB1-0



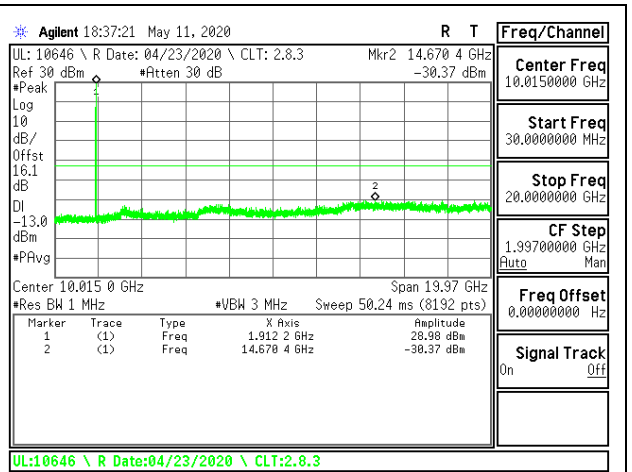
LTE B25 1.4MHz QPSK High Channel RB1-0



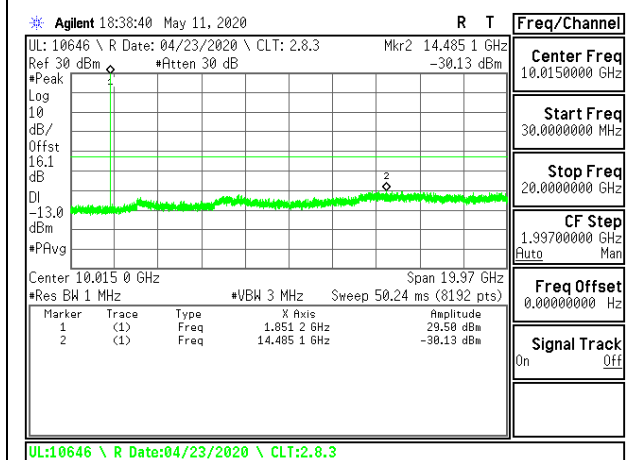
LTE B25 3MHz QPSK Low Channel RB1-0



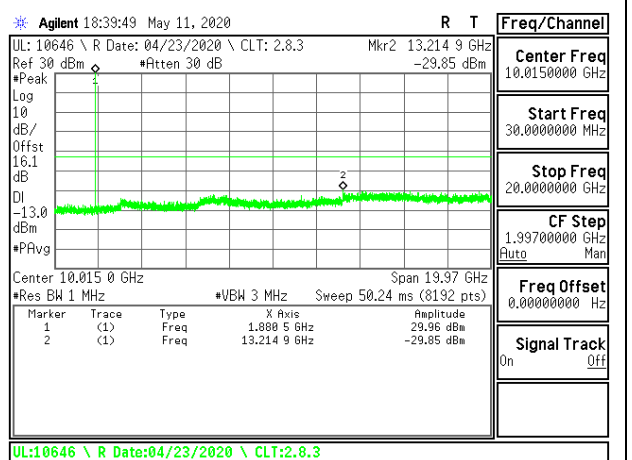
LTE B25 3MHz QPSK Middle Channel RB1-0



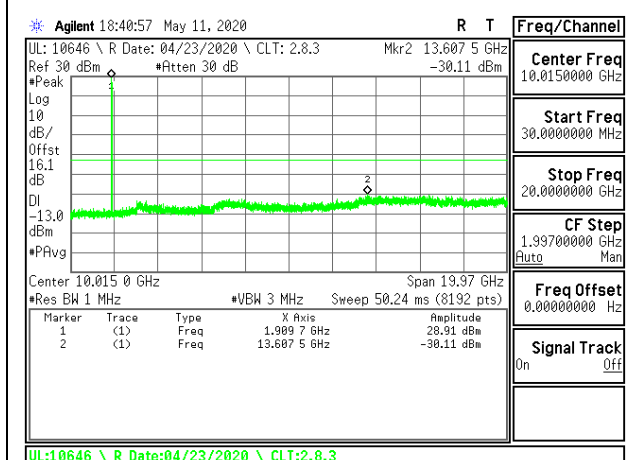
LTE B25 3MHz QPSK High Channel RB1-0



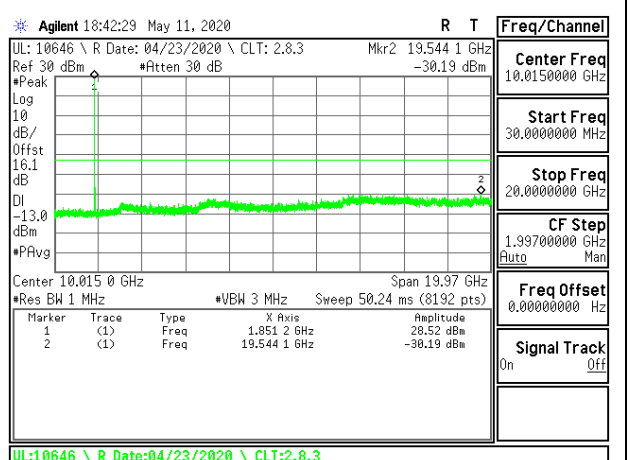
LTE B25 5MHz QPSK Low Channel RB1-0



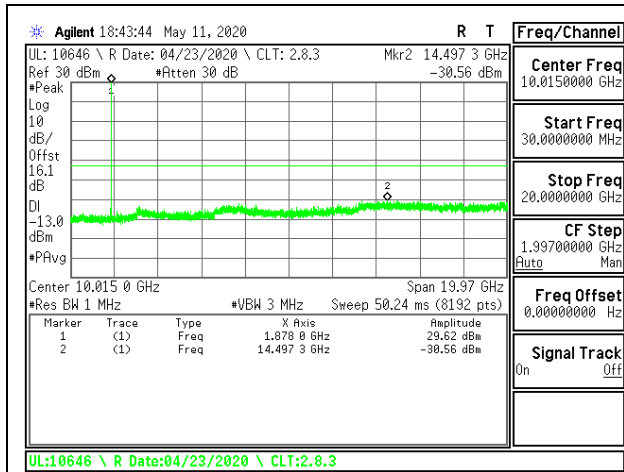
LTE B25 5MHz QPSK Middle Channel RB1-0



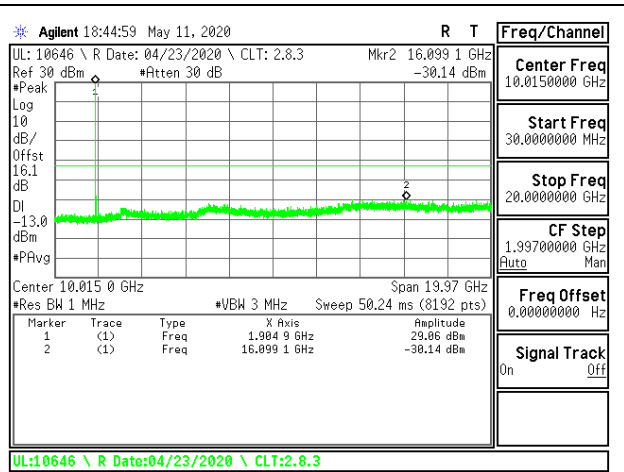
LTE B25 5MHz QPSK High Channel RB1-0



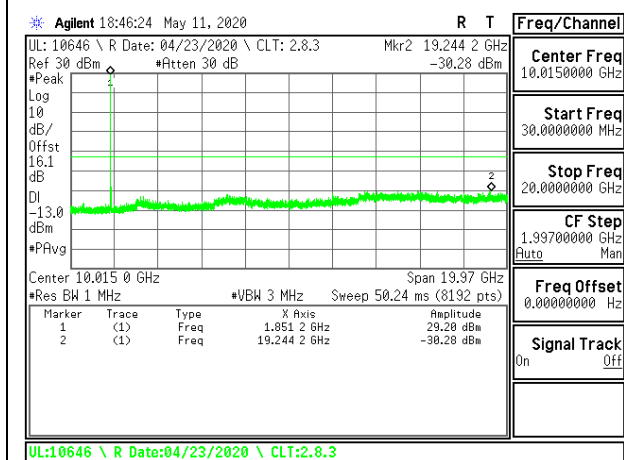
LTE B25 10MHz QPSK Low Channel RB1-0



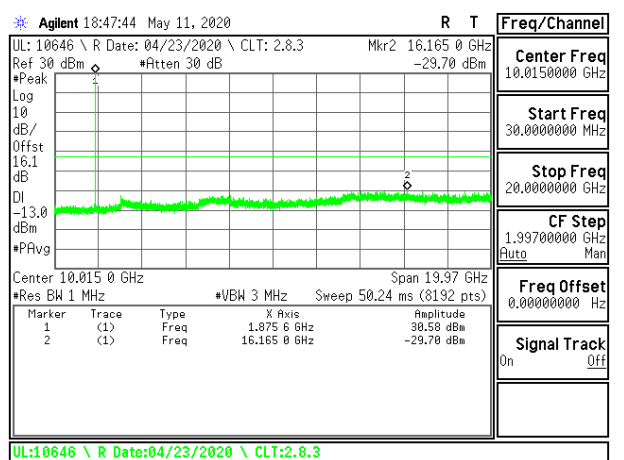
LTE B25 10MHz QPSK Middle Channel RB1-0



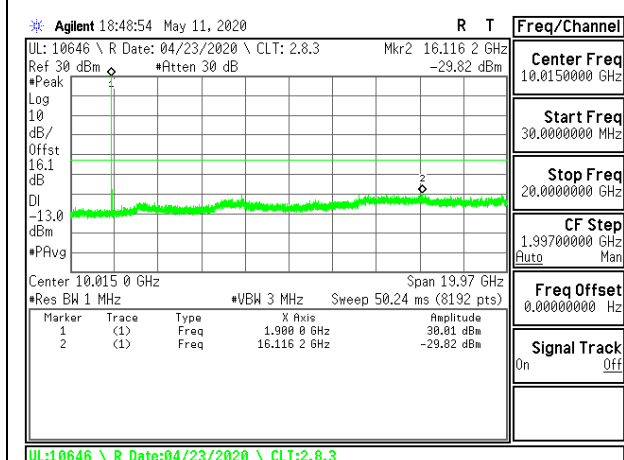
LTE B25 10MHz QPSK High Channel RB1-0



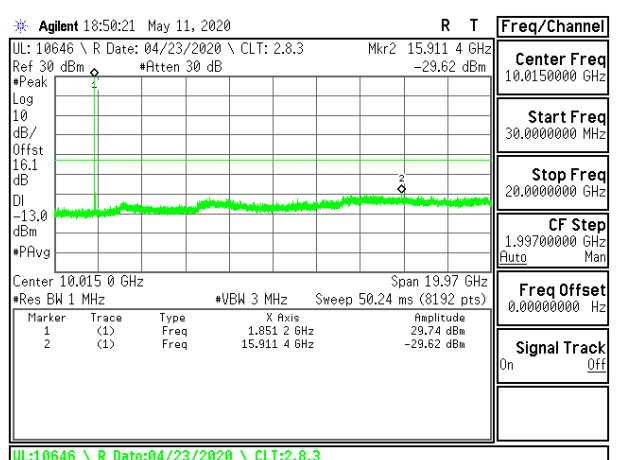
LTE B25 15MHz QPSK Low Channel RB1-0



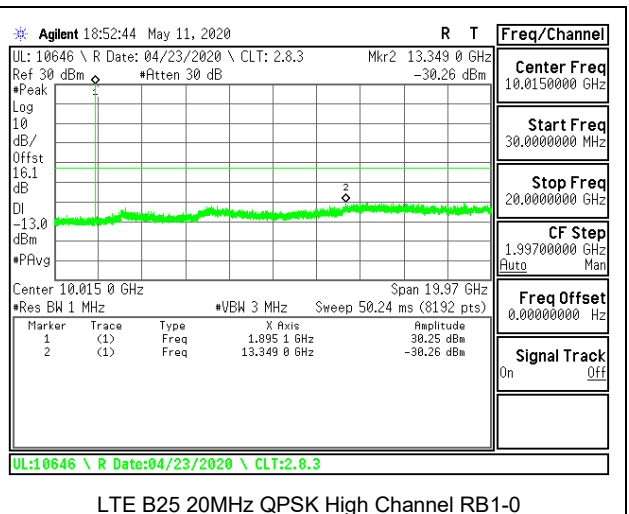
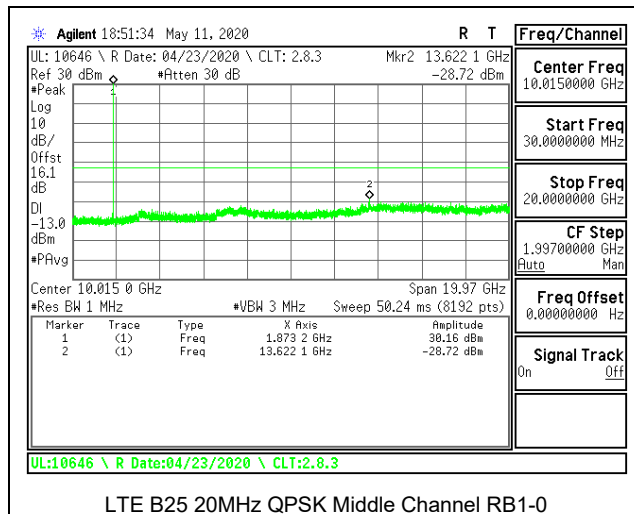
LTE B25 15MHz QPSK Middle Channel RB1-0



LTE B25 15MHz QPSK High Channel RB1-0



LTE B25 20MHz QPSK Low Channel RB1-0

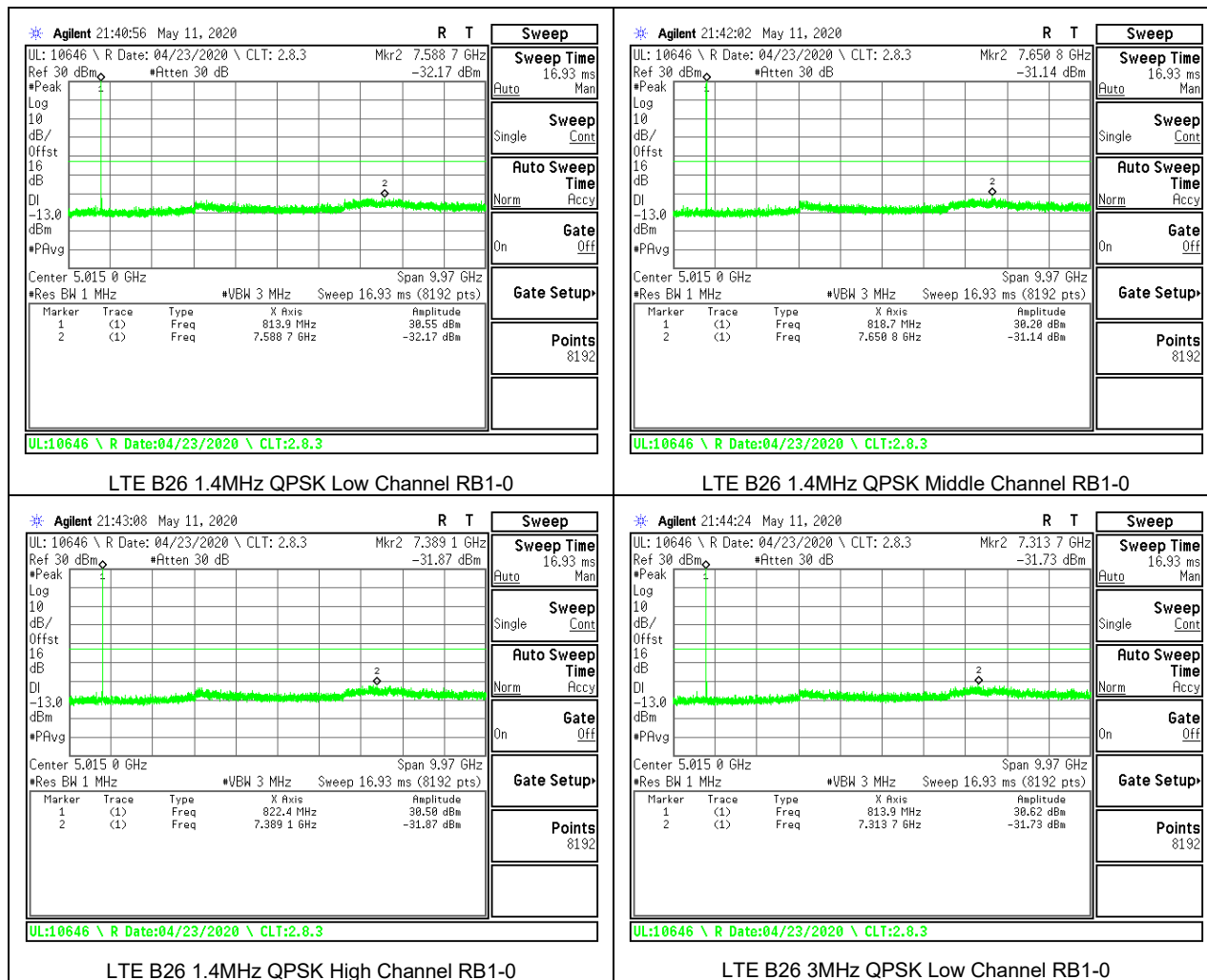


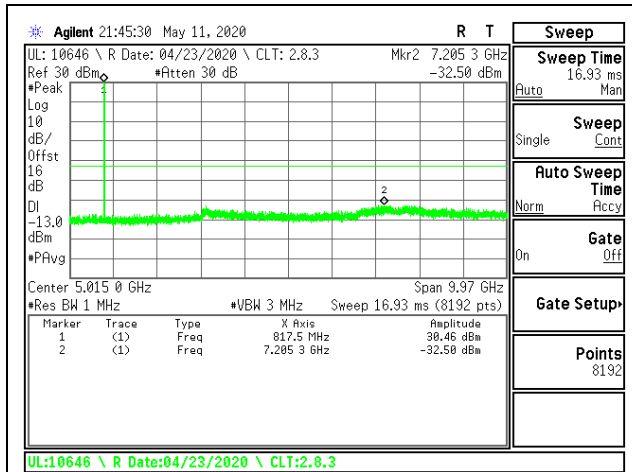
8.3.9. LTE BAND 26 (FCC PART 90S)

LIMITS

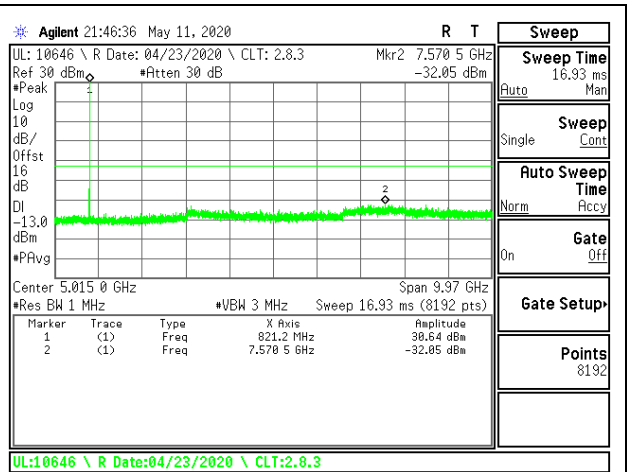
FCC: §90.691

The minimum permissible attenuation level of any spurious emissions is $43 + 10 \log(P)$ dB where transmitting power (P) in Watts.

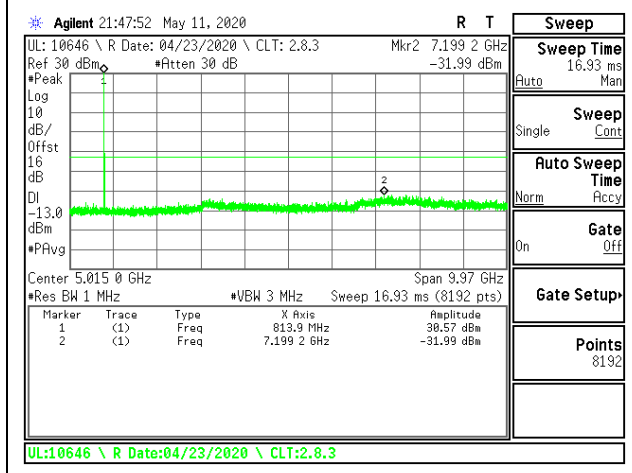




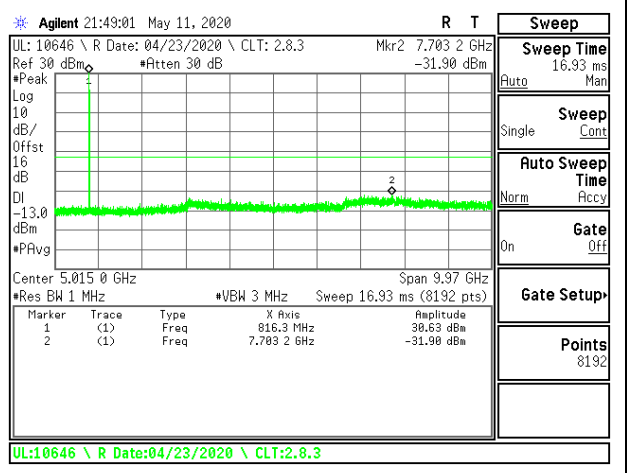
LTE B26 3MHz QPSK Middle Channel RB1-0



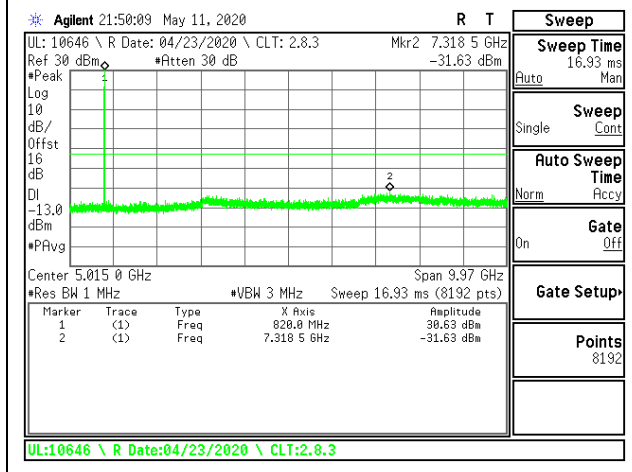
LTE B26 3MHz QPSK High Channel RB1-0



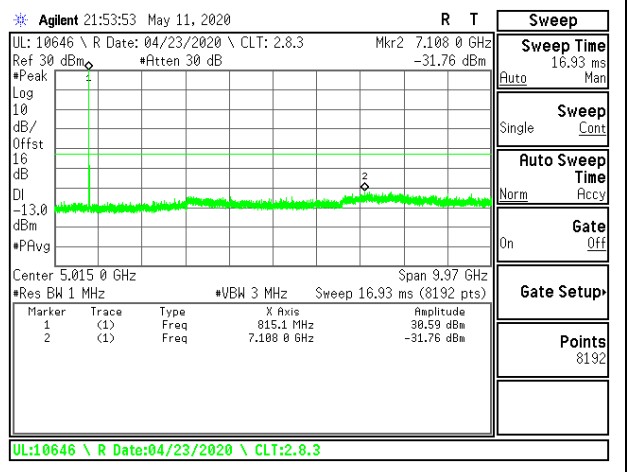
LTE B26 5MHz QPSK Low Channel RB1-0



LTE B26 5MHz QPSK Middle Channel RB1-0



LTE B26 5MHz QPSK High Channel RB1-0



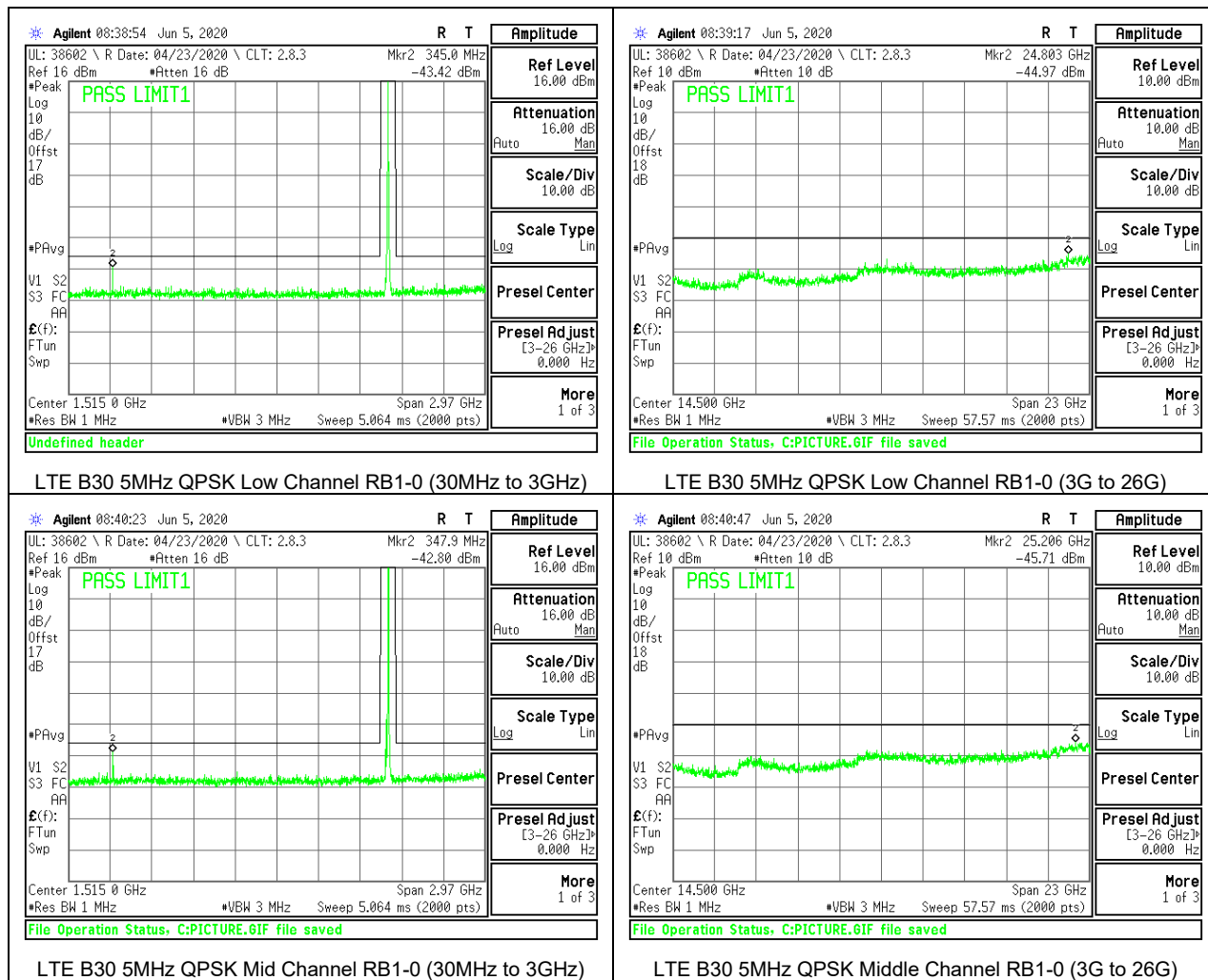
LTE B26 10MHz QPSK Middle Channel RB1-0

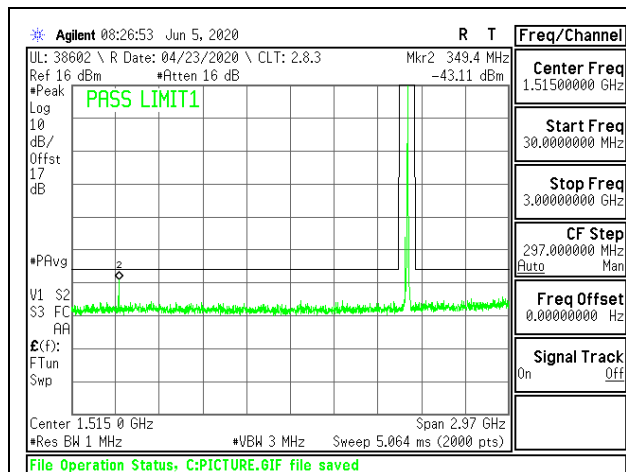
8.3.10. LTE BAND 30

LIMITS

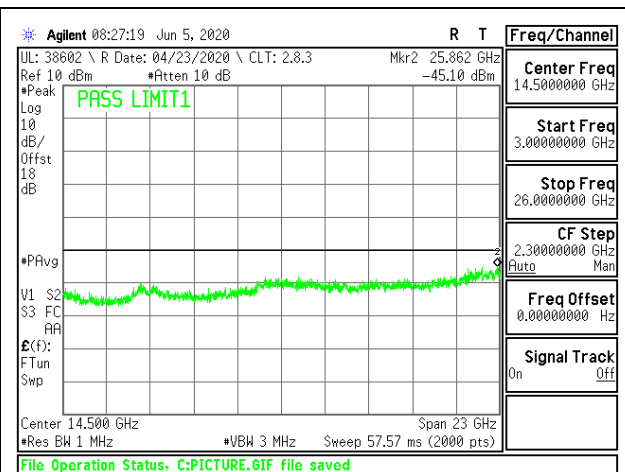
FCC: §27.53 (a)

The minimum permissible attenuation level of any spurious emissions is $70 + 10 \log(P)$ dB where transmitting power (P) in Watts.

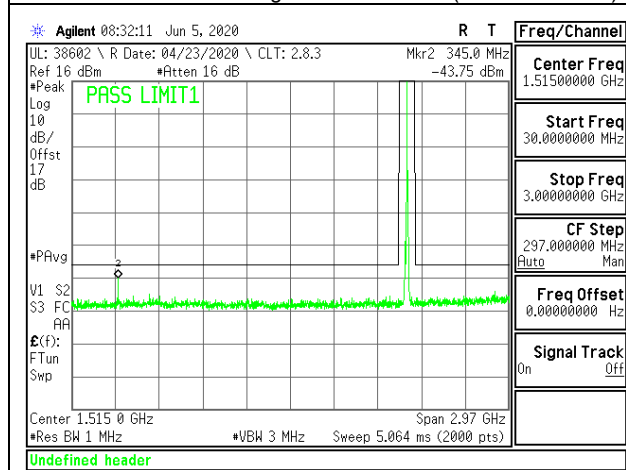




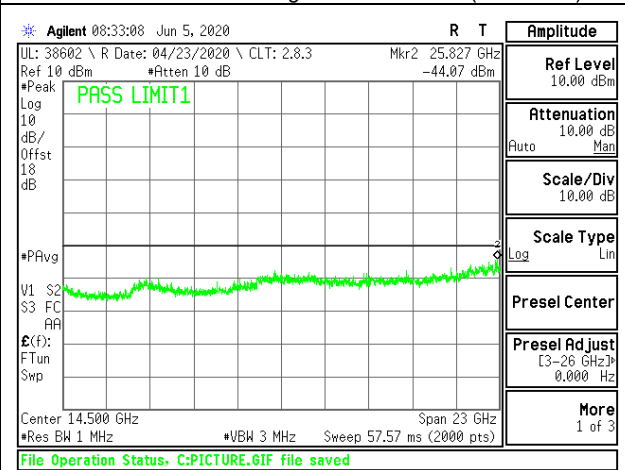
LTE B30 5MHz QPSK High Channel RB1-0 (30MHz to 3GHz)



LTE B30 5MHz QPSK High Channel RB1-0 (3G to 26G)



LTE B30 10MHz QPSK Mid Channel RB1-0 (30MHz to 3GHz)



LTE B30 10MHz QPSK Middle Channel RB1-0 (3G to 26G)

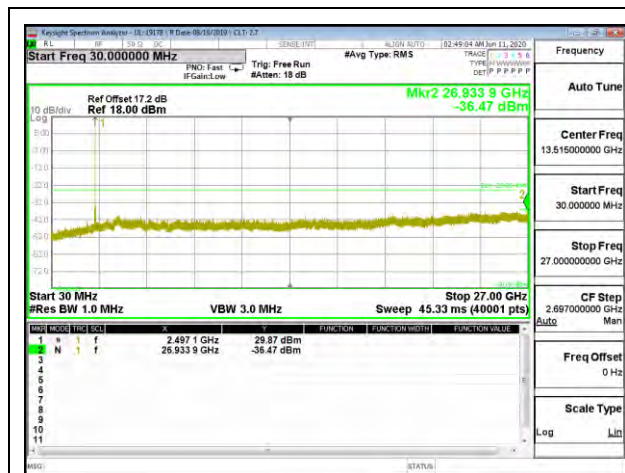
8.3.11. LTE BAND 41 AND 5G NR BAND n41

LIMITS

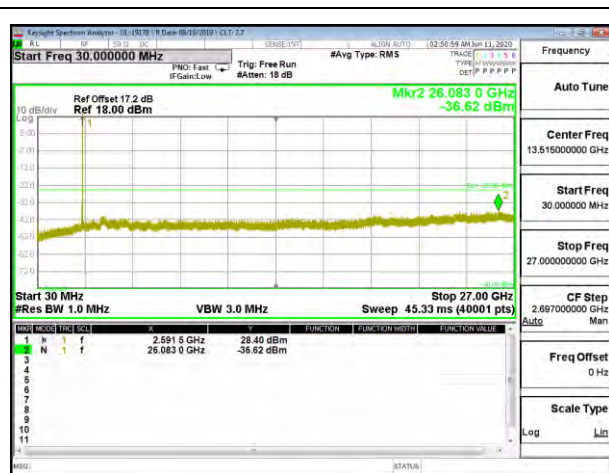
FCC: §27.53 (m)

The minimum permissible attenuation level of any spurious emissions is $55 + 10 \log(P)$ dB where transmitting power (P) in Watts.

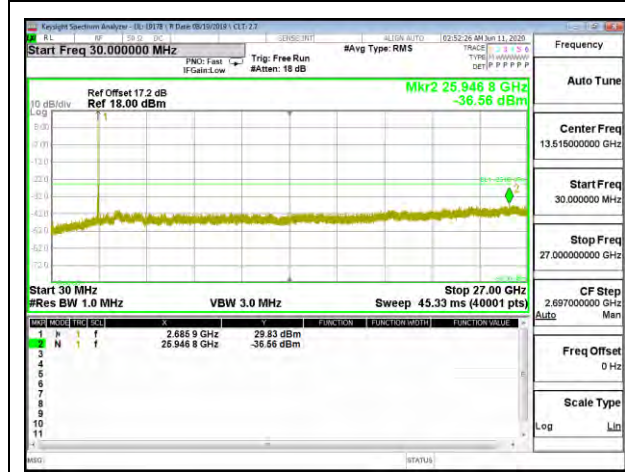
LTE BAND 41



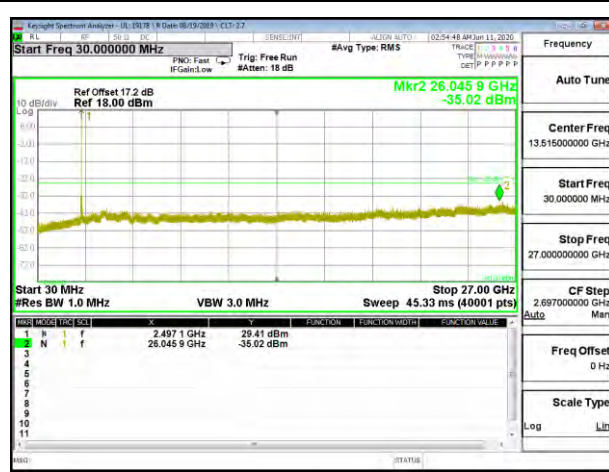
LTE B41 5MHz QPSK Low Channel RB1-0



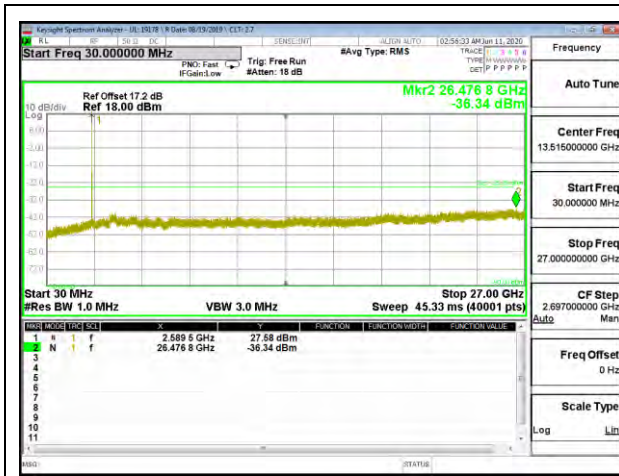
LTE B41 5MHz QPSK Middle Channel RB1-0



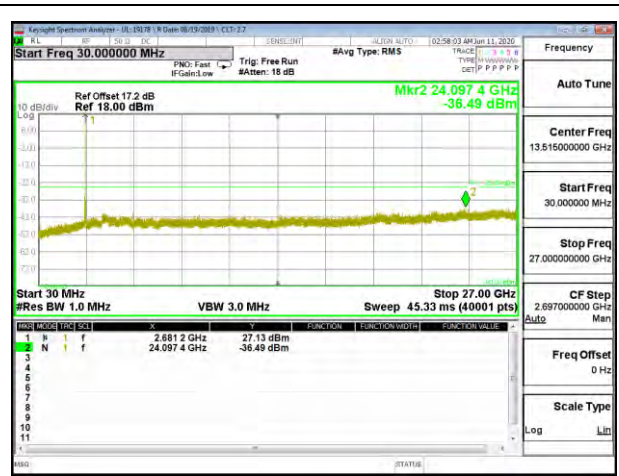
LTE B41 5MHz QPSK High Channel RB1-0



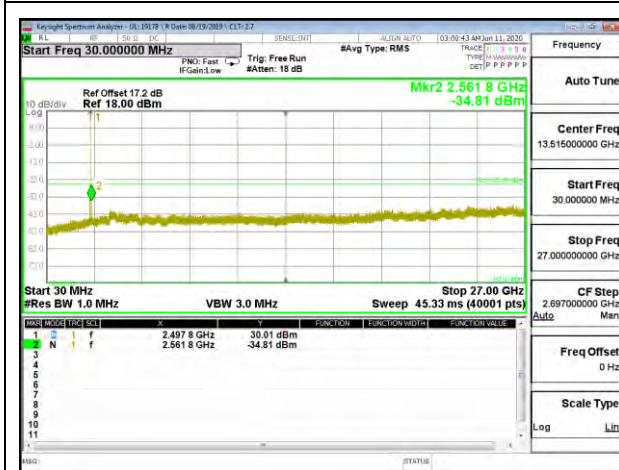
LTE B41 10MHz QPSK Low Channel RB1-0



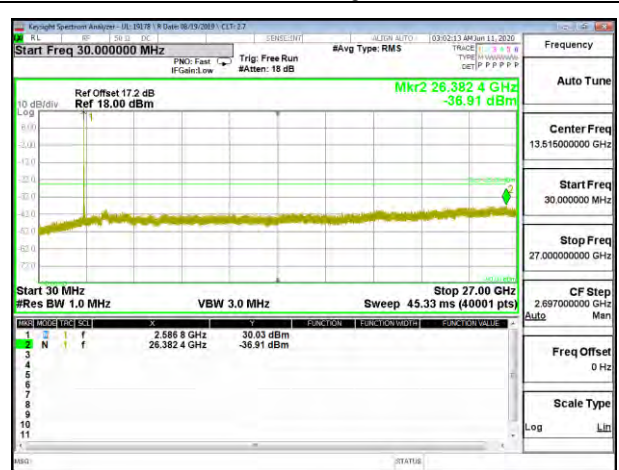
LTE B41 10MHz QPSK Middle Channel RB1-0



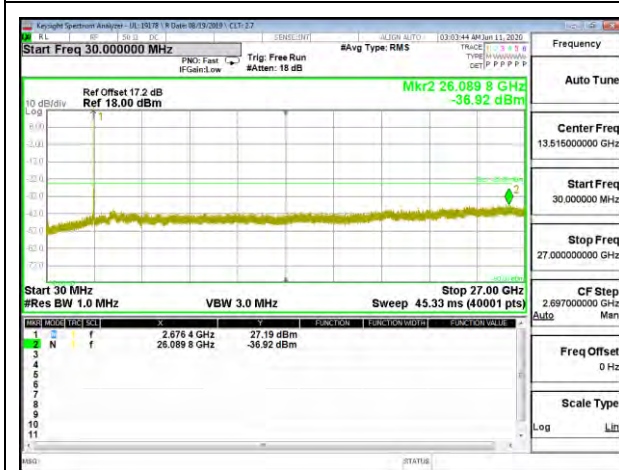
LTE B41 10MHz QPSK High Channel RB1-0



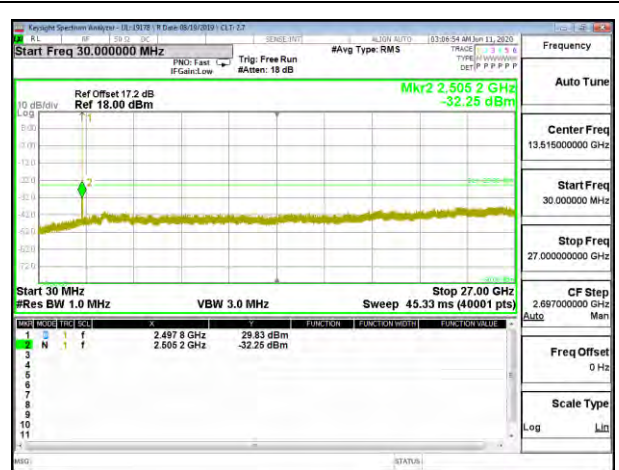
LTE B41 15MHz QPSK Low Channel RB1-0



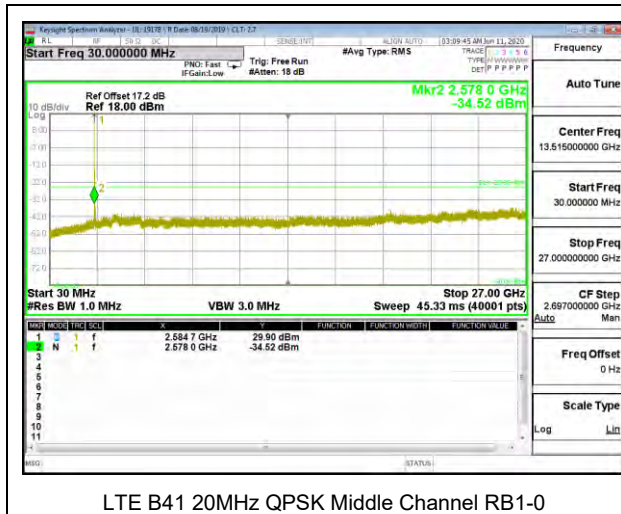
LTE B41 15MHz QPSK Middle Channel RB1-0



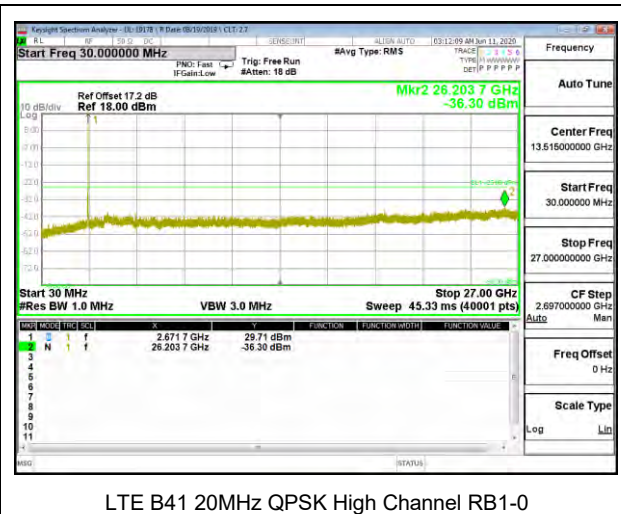
LTE B41 15MHz QPSK High Channel RB1-0



LTE B41 20MHz QPSK Low Channel RB1-0

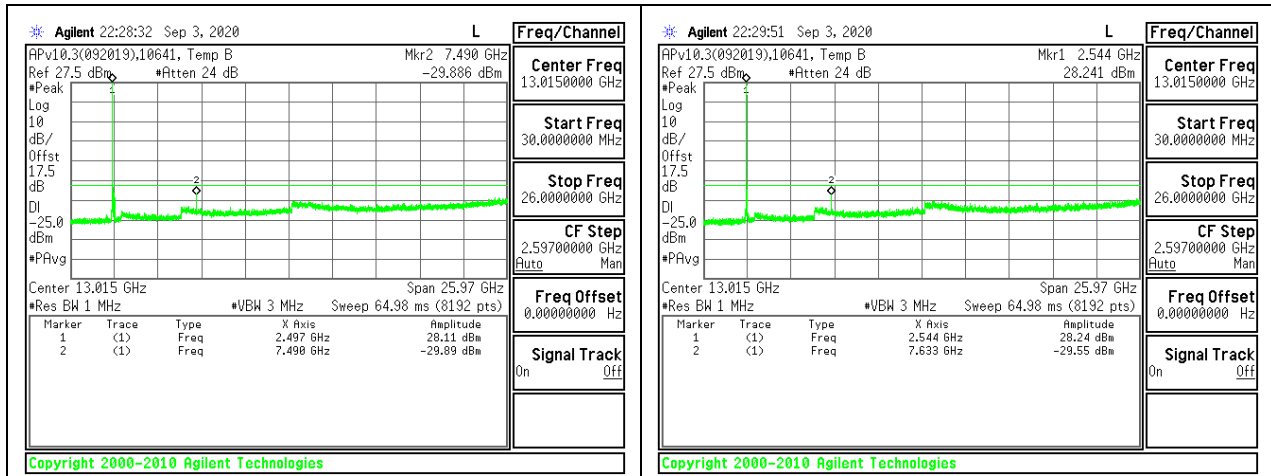


LTE B41 20MHz QPSK Middle Channel RB1-0



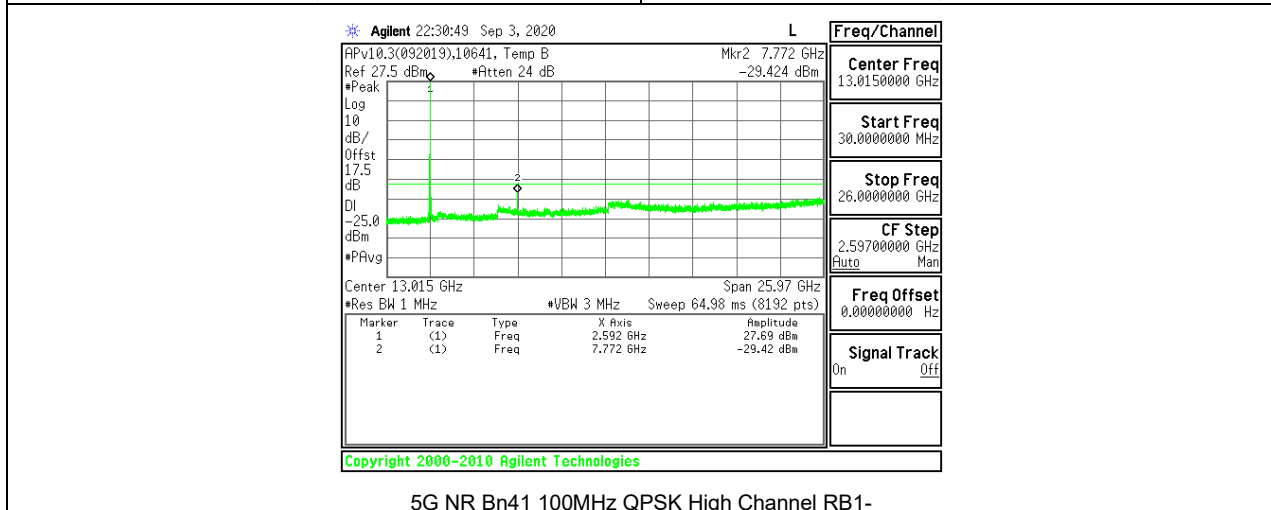
LTE B41 20MHz QPSK High Channel RB1-0

5G NR BAND n41



5G NR Bn41 100MHz QPSK Low Channel RB1-0

5G NR Bn41 100MHz QPSK Middle Channel RB1-0



5G NR Bn41 100MHz QPSK High Channel RB1-

8.3.12. LTE BAND 48

LIMITS

FCC: §96.41

(e) 3.5 GHz Emissions and Interference Limits—

(2) Additional protection levels. Notwithstanding paragraph (e)(1) of this section, for CBSDs and End User Devices, the conducted power of emissions below 3540 MHz or above 3710 MHz shall not exceed -25 dBm/MHz, and the conducted power of emissions below 3530 MHz or above 3720 MHz shall not exceed -40dBm/MHz.

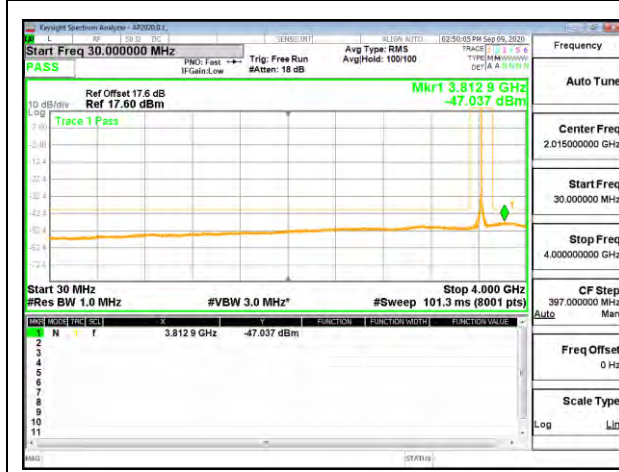
| | | | |
|-------------------|-------|------------|----------|
| Test Engineer ID: | 52275 | Test Date: | 9/9/2020 |
|-------------------|-------|------------|----------|



LTE B48 5MHz QPSK Low Channel RB1-0 (30MHz to 4GHz)



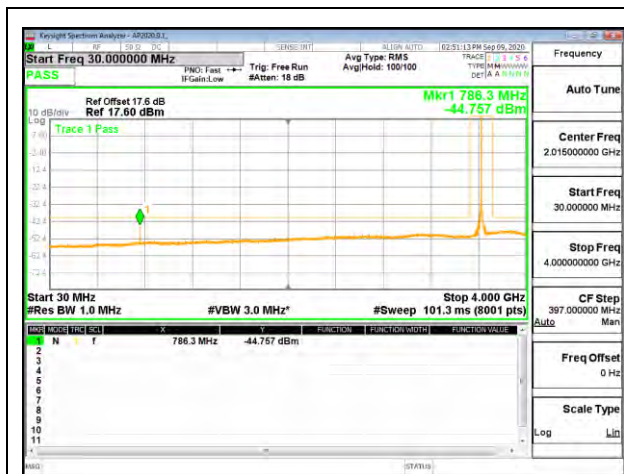
LTE B48 5MHz QPSK Low Channel RB1-0 (4G to 40G)



LTE B48 5MHz QPSK Mid Channel RB1-0 (30MHz to 4GHz)



LTE B48 5MHz QPSK Middle Channel RB1-0 (4G to 40G)



LTE B48 5MHz QPSK High Channel RB1-0 (30MHz to 4GHz)



LTE B48 5MHz QPSK High Channel RB1-0 (4G to 40G)



LTE B48 10MHz QPSK Low Channel RB1-0 (30MHz to 4GHz)



LTE B48 10MHz QPSK Low Channel RB1-0 (4G to 40G)



LTE B48 10MHz QPSK Mid Channel RB1-0 (30MHz to 4GHz)



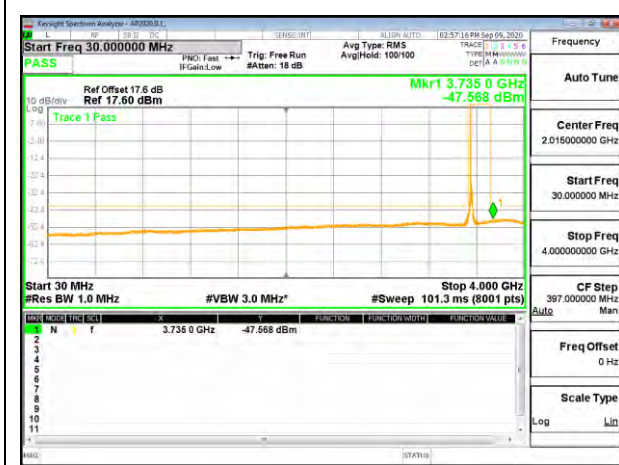
LTE B48 10MHz QPSK Middle Channel RB1-0 (4G to 40G)



LTE B48 10MHz QPSK High Channel RB1-0 (30MHz to 4GHz)



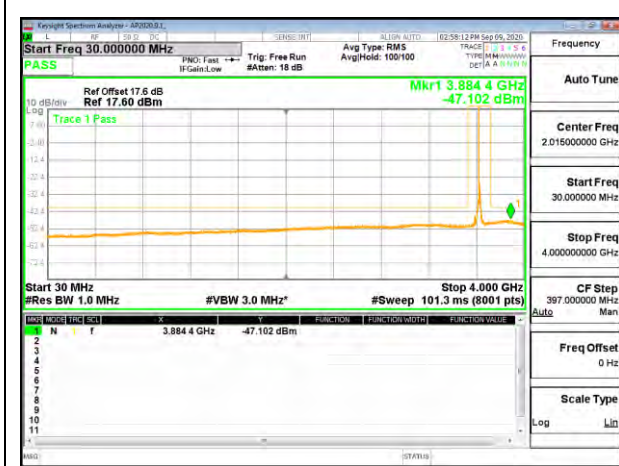
LTE B48 10MHz QPSK High Channel RB1-0 (4G to 40G)



LTE B48 15MHz QPSK Low Channel RB1-0 (30MHz to 4GHz)



LTE B48 15MHz QPSK Low Channel RB1-0 (4G to 40G)



LTE B48 15MHz QPSK Mid Channel RB1-0 (30MHz to 4GHz)



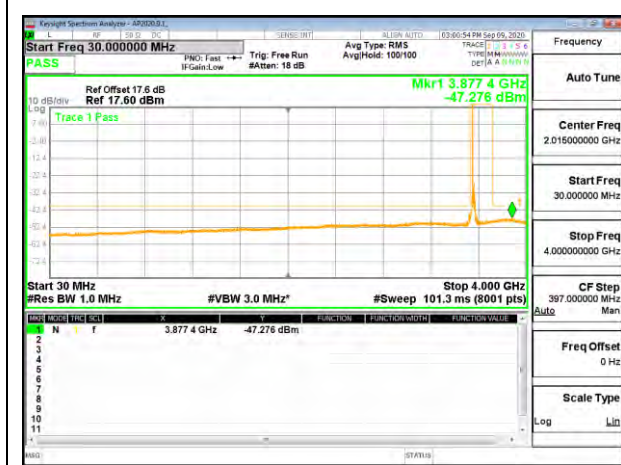
LTE B48 15MHz QPSK Middle Channel RB1-0 (4G to 40G)



LTE B48 15MHz QPSK High Channel RB1-0 (30MHz to 4GHz)



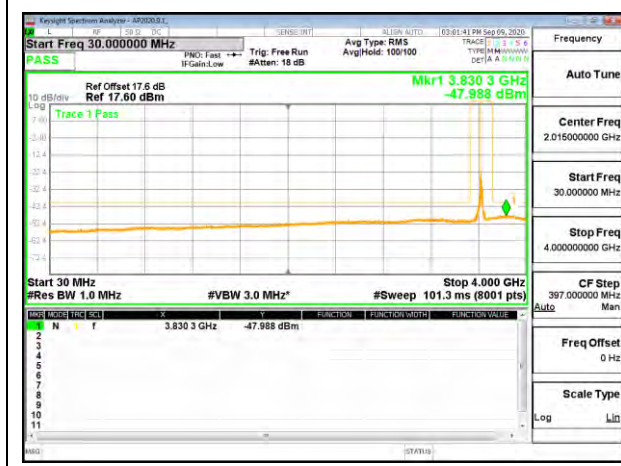
LTE B48 15MHz QPSK High Channel RB1-0 (4G to 40G)



LTE B48 20MHz QPSK Low Channel RB1-0 (30MHz to 4GHz)



LTE B48 20MHz QPSK Low Channel RB1-0 (4G to 40G)



LTE B48 20MHz QPSK Mid Channel RB1-0 (30MHz to 4GHz)



LTE B48 20MHz QPSK Middle Channel RB1-0 (4G to 40G)



LTE B48 20MHz QPSK High Channel RB1-0 (30MHz to 4GHz)



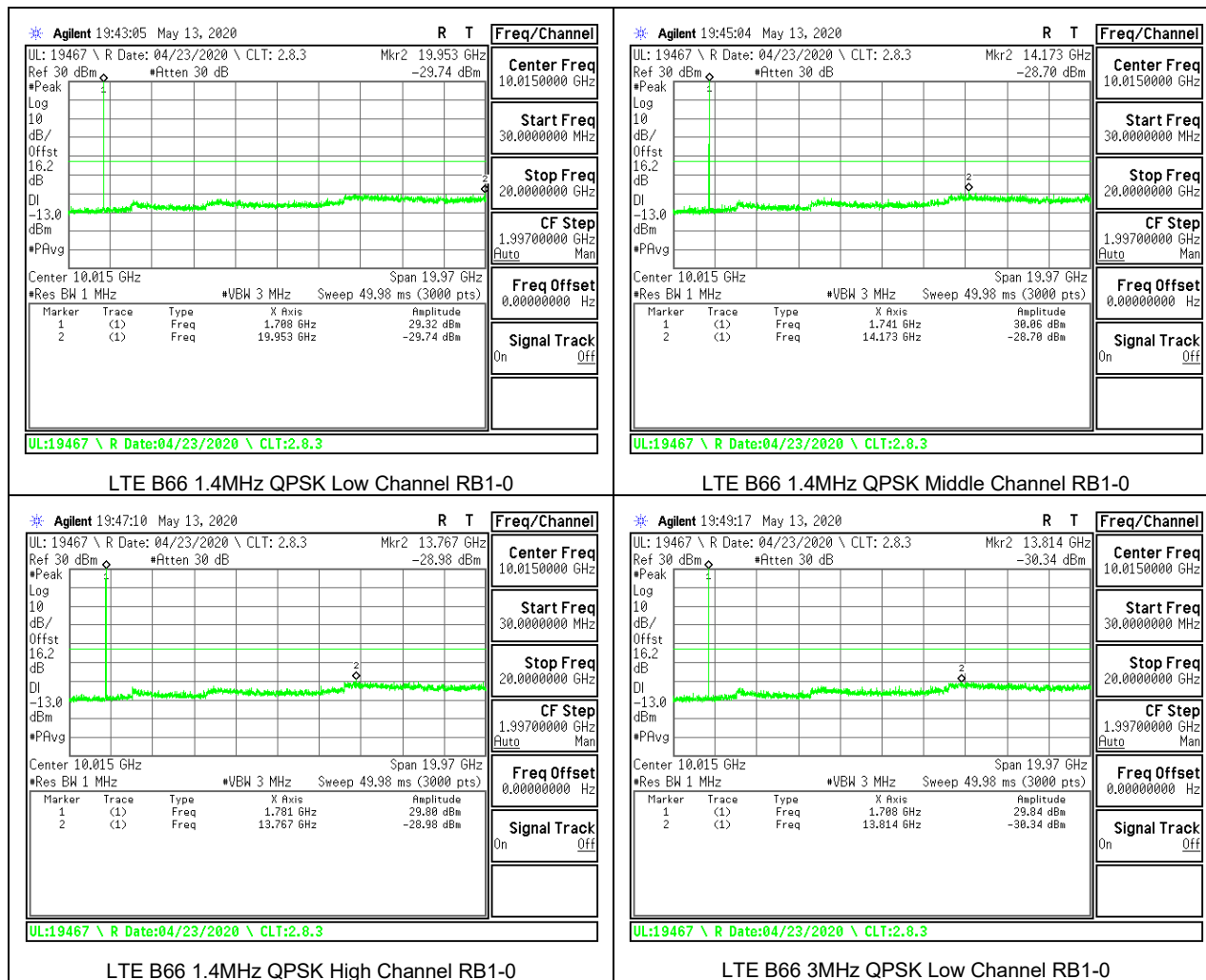
LTE B48 20MHz QPSK High Channel RB1-0 (4G to 40G)

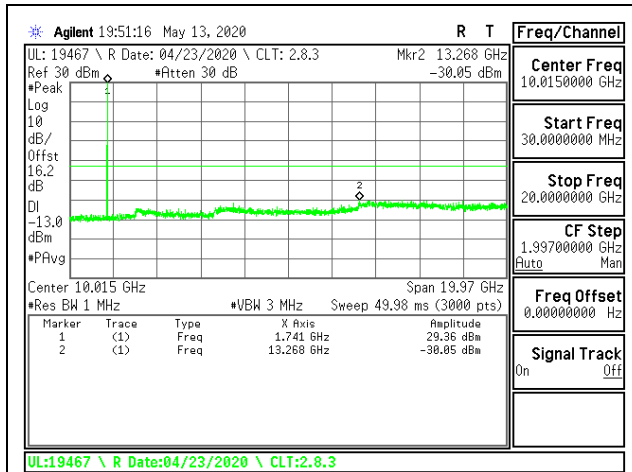
8.3.13. LTE BAND 66

LIMITS

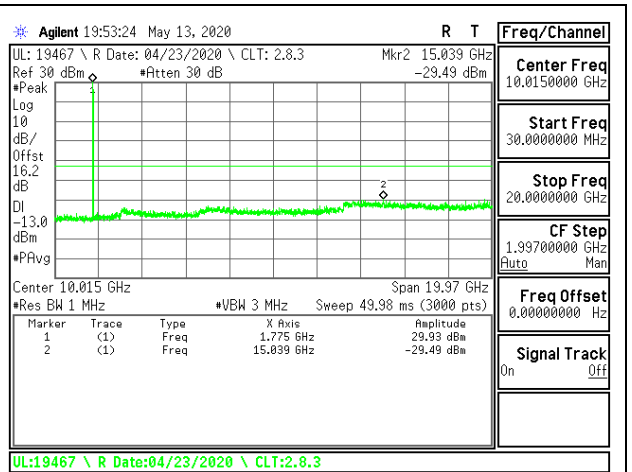
FCC: §27.53 (h)

The minimum permissible attenuation level of any spurious emissions is $43 + 10 \log(P)$ dB where transmitting power (P) in Watts.

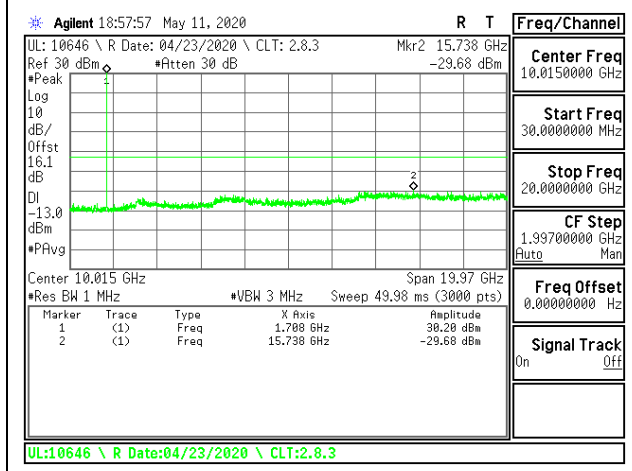




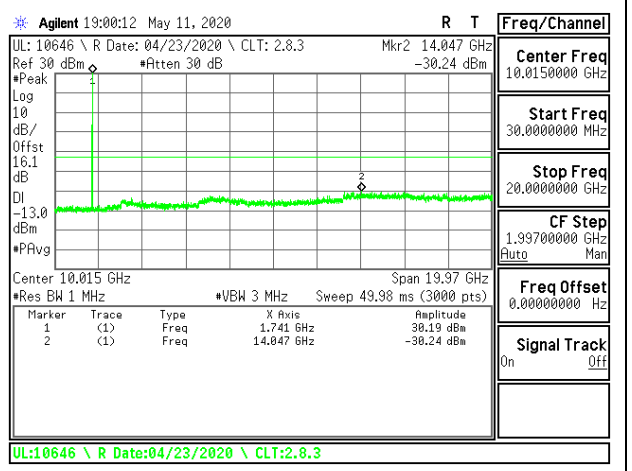
LTE B66 3MHz QPSK Middle Channel RB1-0



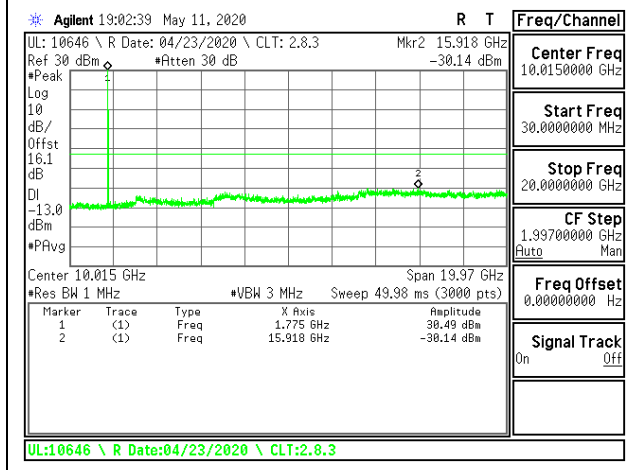
LTE B66 3MHz QPSK High Channel RB1-0



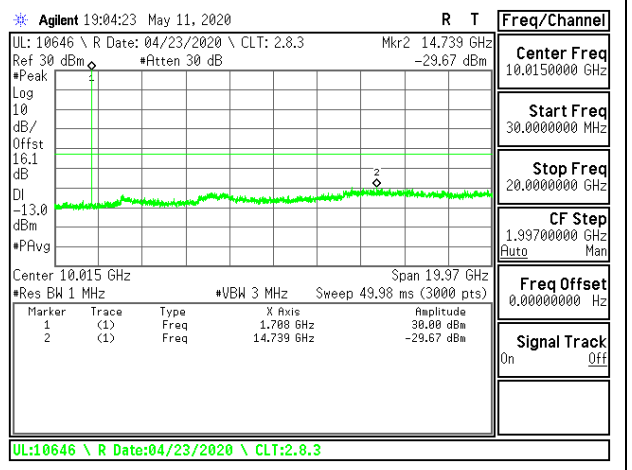
LTE B66 5MHz QPSK Low Channel RB1-0



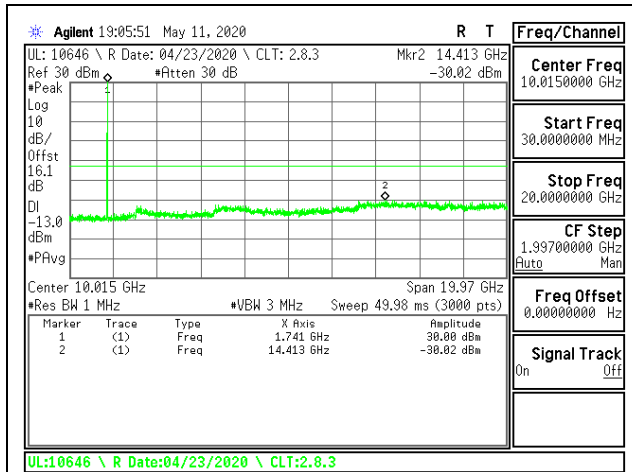
LTE B66 5MHz QPSK Middle Channel RB1-0



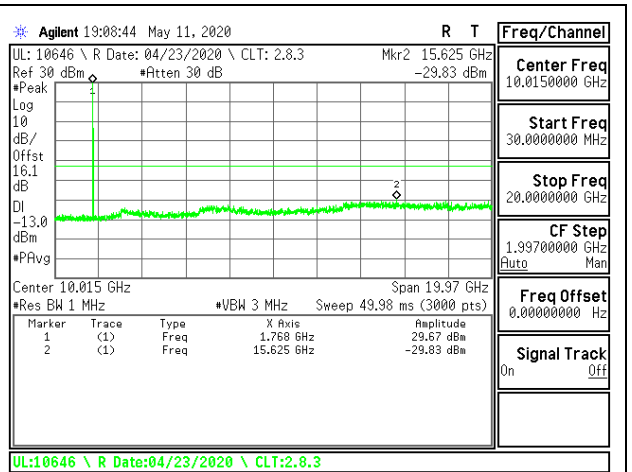
LTE B66 5MHz QPSK High Channel RB1-0



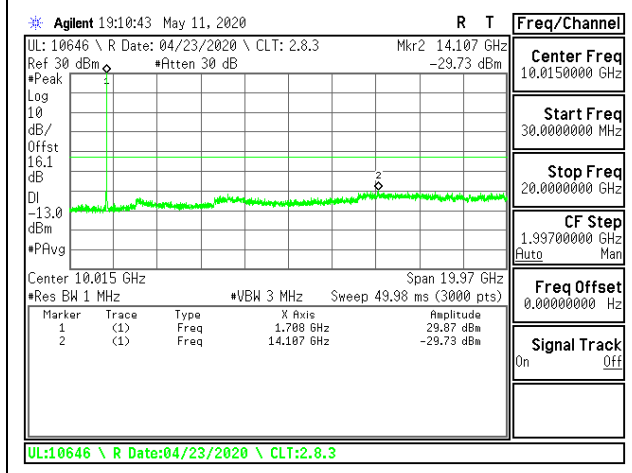
LTE B66 10MHz QPSK Low Channel RB1-0



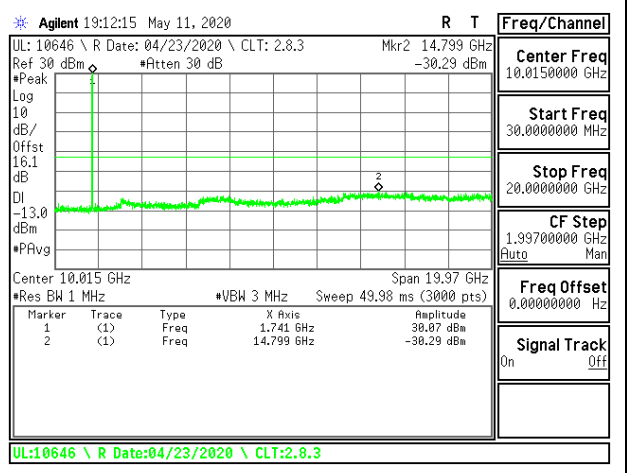
LTE B66 10MHz QPSK Middle Channel RB1-0



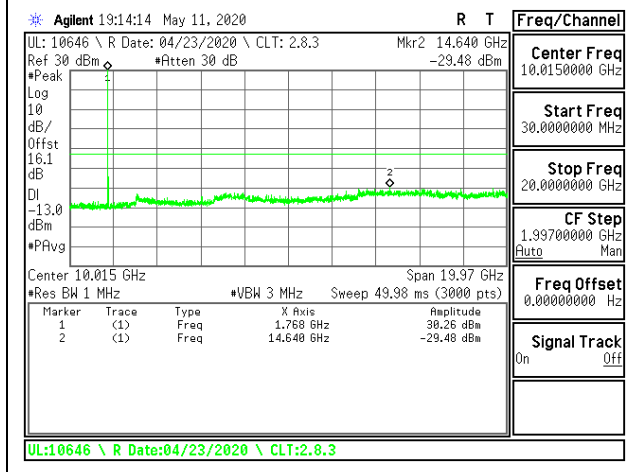
LTE B66 10MHz QPSK High Channel RB1-0



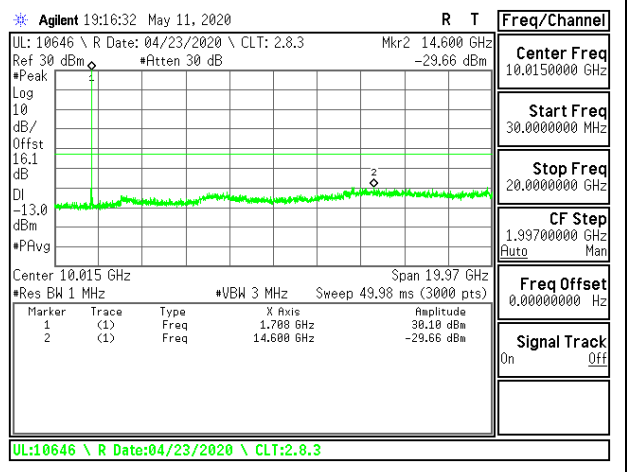
LTE B66 15MHz QPSK Low Channel RB1-0



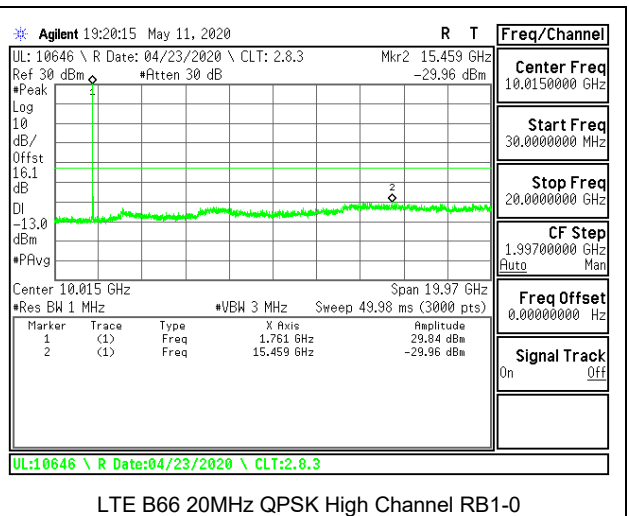
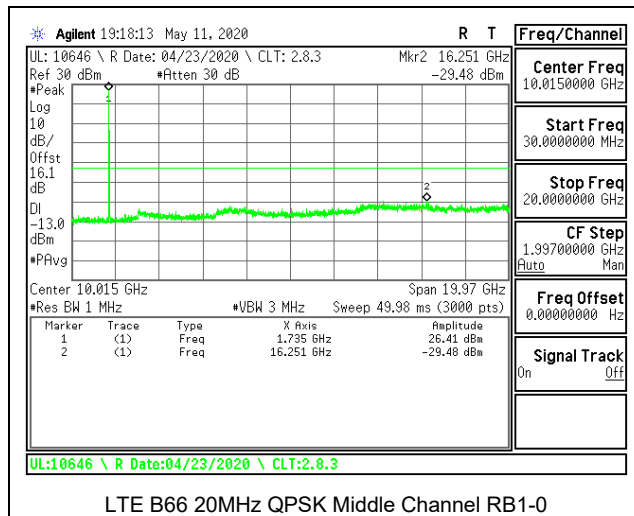
LTE B66 15MHz QPSK Middle Channel RB1-0



LTE B66 15MHz QPSK High Channel RB1-0



LTE B66 20MHz QPSK Low Channel RB1-0

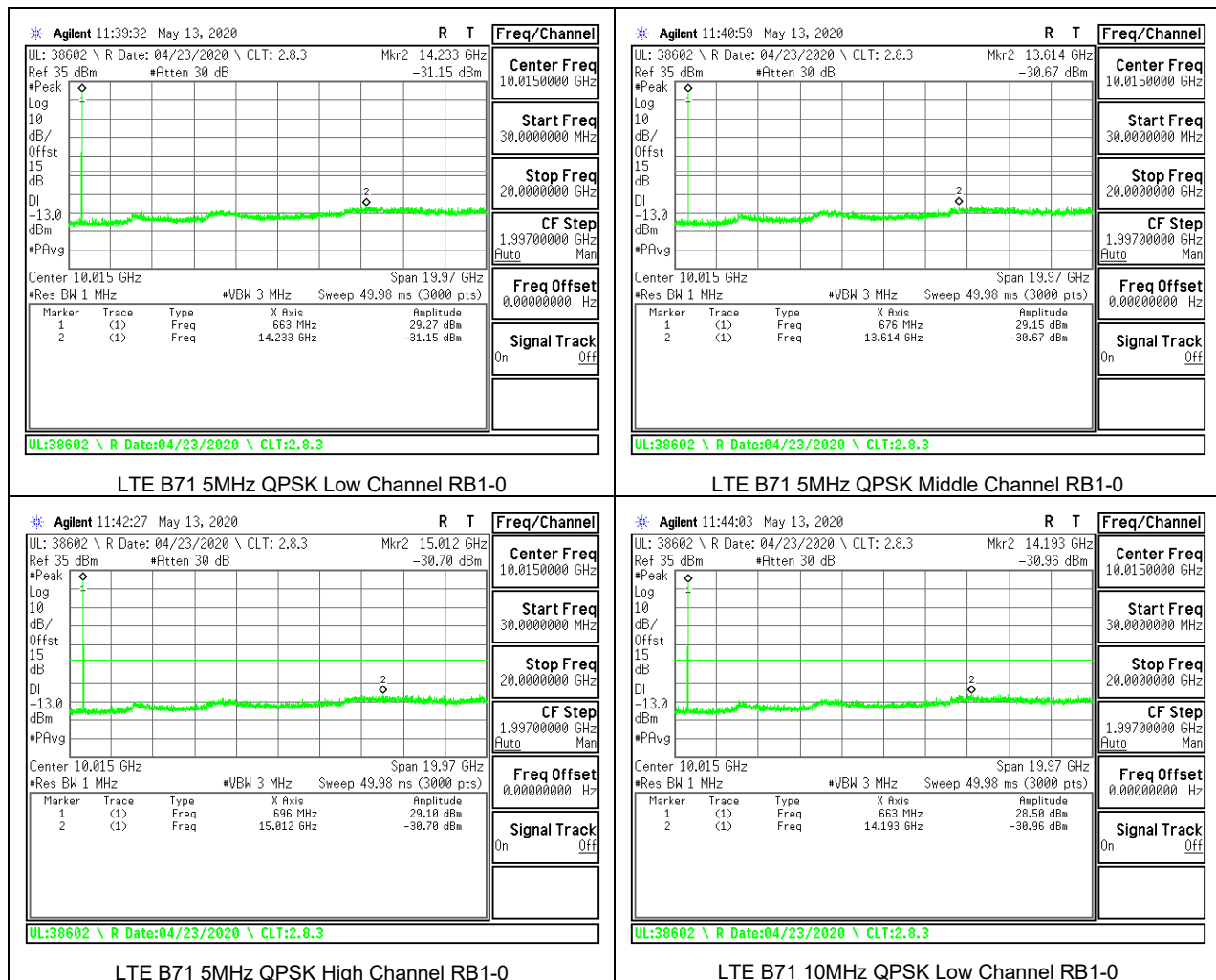


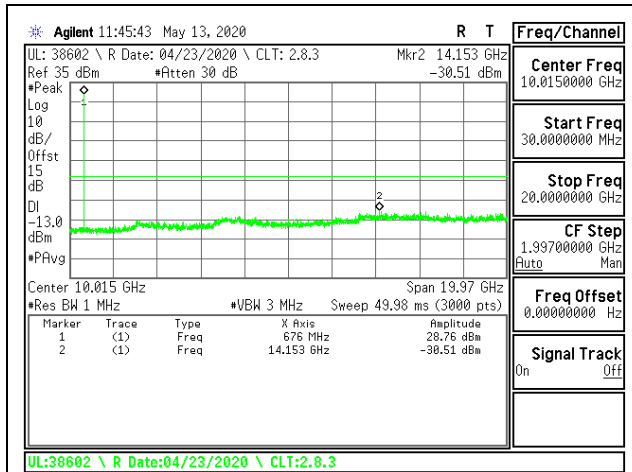
8.3.14. LTE BAND 71

LIMITS

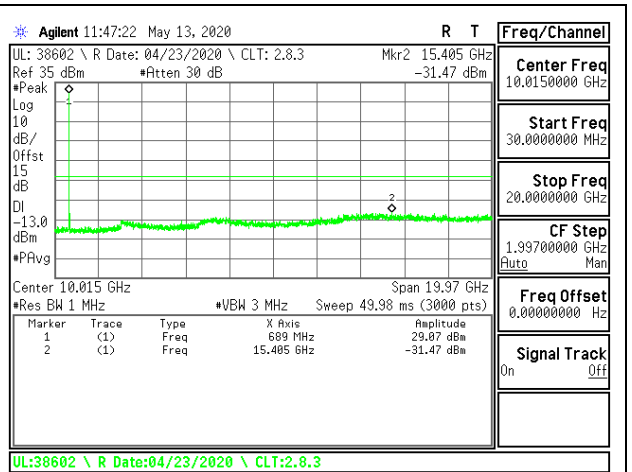
FCC: §27.53 (g)

The minimum permissible attenuation level of any spurious emissions is $43 + 10 \log(P)$ dB where transmitting power (P) in Watts.

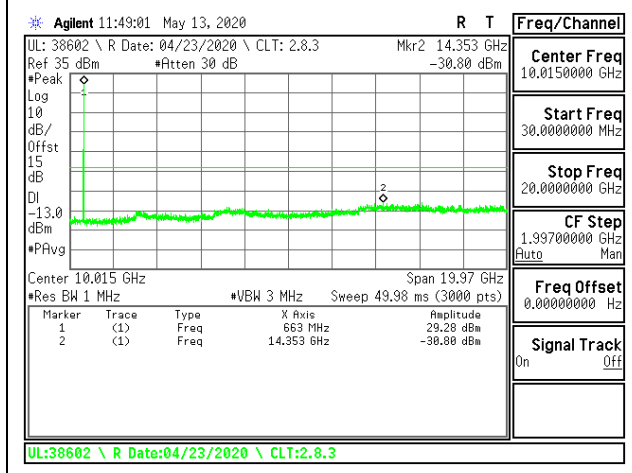




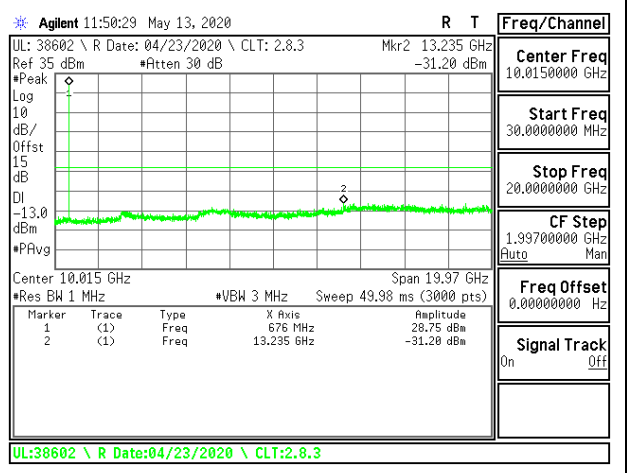
LTE B71 10MHz QPSK Middle Channel RB1-0



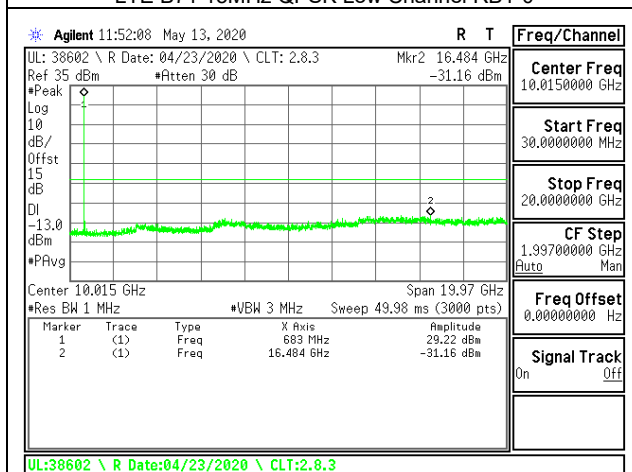
LTE 71 10MHz QPSK High Channel RB1-0



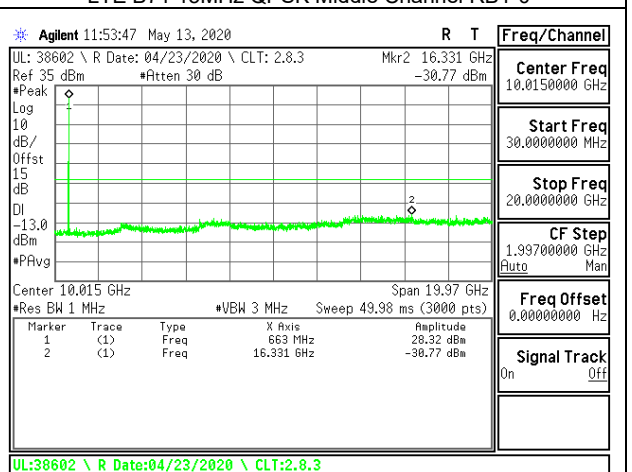
LTE B71 15MHz QPSK Low Channel RB1-0



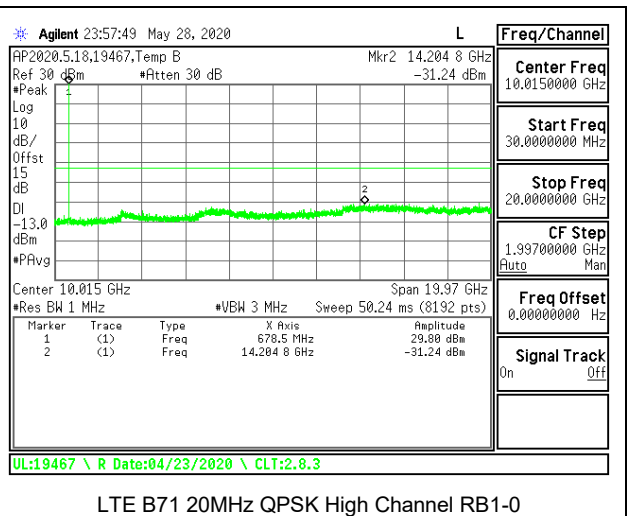
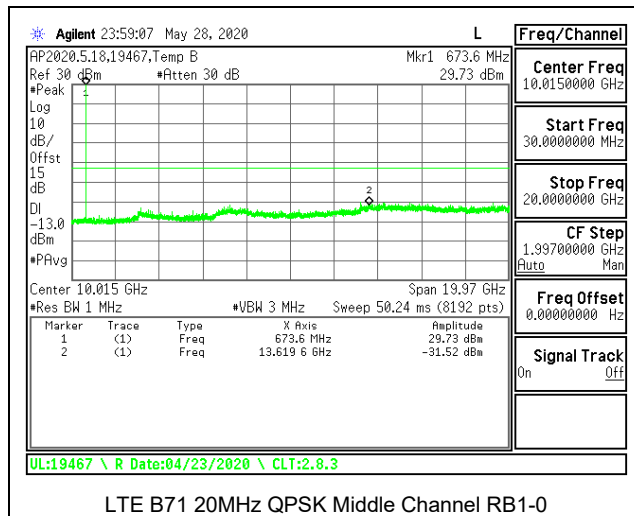
LTE B71 15MHz QPSK Middle Channel RB1-0



LTE B71 15MHz QPSK High Channel RB1-0



LTE B71 20MHz QPSK Low Channel RB1-0



8.3.15. 5G NR BAND n77

LIMITS

FCC: §27.53

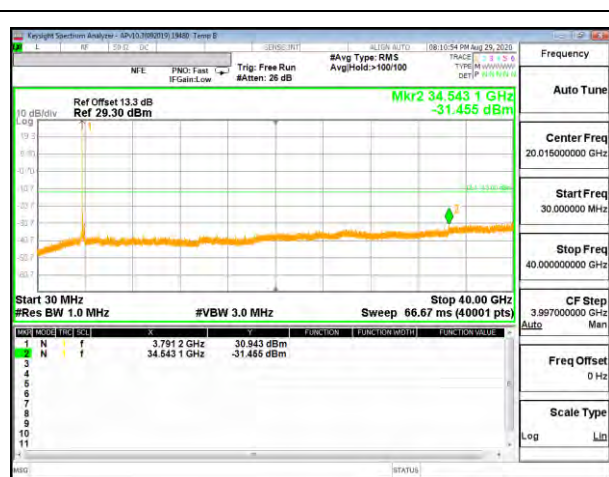
Emission limits

(1) 3.7 GHz Service. The following emission limits apply to stations transmitting in the 3700-3980 MHz band:

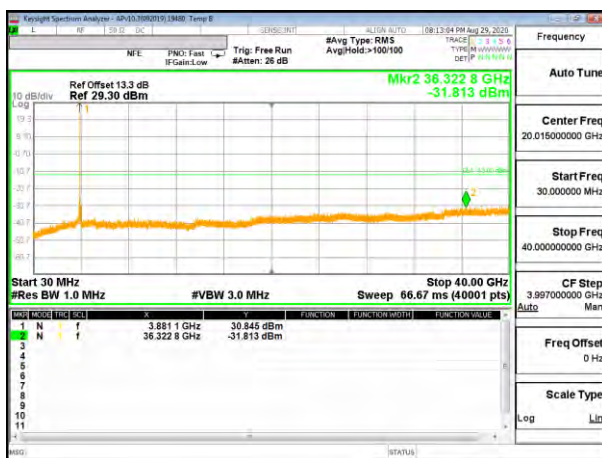
(2) For mobile operations in the 3700-3980 MHz band, the conducted power of any emission outside the licensee's authorized bandwidth shall not exceed -13 dBm/MHz.



5G NR Bn77 100MHz QPSK Low Channel RB1-0



5G NR Bn77 100MHz QPSK Mid Channel RB1-0



5G NR Bn77 100MHz QPSK High Channel RB1-0

8.4. FREQUENCY STABILITY

TEST PROCEDURE

Use CMW 500 with Frequency Error measurement capability.

- Temp. = -30°C to +50°C
- Voltage = (85% - 115%)

Low voltage, 3.23VDC, Normal, 3.8VDC and High voltage, 4.37VDC.
End Voltage, 3.2VDC.

Frequency Stability vs Temperature:

The EUT is placed inside a temperature chamber. The temperature is set to 20°C and allowed to stabilize. After sufficient soak time, the transmitting frequency error is measured. The temperature is increased by 10 degrees, allowed to stabilize and soak, and then the measurement is repeated. This is repeated until +50°C is reached.

Frequency Stability vs Voltage:

The peak frequency error is recorded (worst-case).

RESULTS

See the following pages.

8.4.1. LTE BAND 2

LIMITS

FCC: §24.235

The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

| | | | |
|--------------------------|-------|-------------------|-----------|
| Test Engineer ID: | 19177 | Test Date: | 6/30/2020 |
|--------------------------|-------|-------------------|-----------|

QPSK (20MHz BANDWIDTH)

| Limit | | 1850 | 1910 | Delta (Hz) | Frequency Stability (ppm) |
|----------------|-----------|----------------------|-----------------------|------------|---------------------------|
| Condition | | F low @ -13dBm (MHz) | F high @ -13dBm (MHz) | | |
| Temperature | Voltage | | | | |
| Normal (20C) | Normal | 1850.9881 | 1909.0383 | | |
| Extreme (50C) | | 1850.9881 | 1909.0383 | -12.3 | -0.007 |
| Extreme (40C) | | 1850.9881 | 1909.0383 | -11.5 | -0.006 |
| Extreme (30C) | | 1850.9881 | 1909.0383 | -13.8 | -0.007 |
| Extreme (10C) | | 1850.9881 | 1909.0383 | -13.7 | -0.007 |
| Extreme (0C) | | 1850.9881 | 1909.0383 | 11.9 | 0.006 |
| Extreme (-10C) | | 1850.9881 | 1909.0383 | 11.9 | 0.006 |
| Extreme (-20C) | | 1850.9881 | 1909.0383 | -10.7 | -0.006 |
| Extreme (-30C) | | 1850.9881 | 1909.0383 | 8.9 | 0.005 |
| | | | | | |
| 20C | 15% | 1850.9881 | 1909.0383 | -12.2 | -0.006 |
| | -15% | 1850.9881 | 1909.0383 | -12.7 | -0.007 |
| | End Point | 1850.9881 | 1909.0383 | -12.1 | -0.006 |

8.4.2. LTE BAND 5 AND 5G NR BAND n5

LIMITS

FCC: §22.355

The carrier frequency shall not depart from the reference frequency in excess of ± 2.5 ppm for mobile stations.

| | | | |
|--------------------------|-------|-------------------|-----------|
| Test Engineer ID: | 19178 | Test Date: | 6/20/2020 |
|--------------------------|-------|-------------------|-----------|

LTE BAND 5 QPSK (10MHz BANDWIDTH)

| Limit | | 824 | 849 | Delta (Hz) | Frequency Stability (ppm) |
|----------------|-----------|----------------------|-----------------------|------------|---------------------------|
| Condition | | F low @ -13dBm (MHz) | F high @ -13dBm (MHz) | | |
| Temperature | Voltage | | | | |
| Normal (20C) | Normal | 824.4917 | 848.5578 | | |
| Extreme (50C) | | 824.4917 | 848.5578 | -6.1 | -0.007 |
| Extreme (40C) | | 824.4917 | 848.5578 | -5.6 | -0.007 |
| Extreme (30C) | | 824.4917 | 848.5578 | 4.0 | 0.005 |
| Extreme (10C) | | 824.4917 | 848.5578 | -5.5 | -0.007 |
| Extreme (0C) | | 824.4917 | 848.5578 | 5.8 | 0.007 |
| Extreme (-10C) | | 824.4917 | 848.5578 | -5.7 | -0.007 |
| Extreme (-20C) | | 824.4917 | 848.5578 | -3.5 | -0.004 |
| Extreme (-30C) | | 824.4917 | 848.5578 | 5.1 | 0.006 |
| | | | | | |
| 20C | 15% | 824.4917 | 848.5578 | -7.5 | -0.009 |
| | -15% | 824.4917 | 848.5578 | -7.2 | -0.009 |
| | End Point | 824.4917 | 848.5578 | 5.9 | 0.007 |

5G NR BAND n5 QPSK (20MHz BANDWIDTH)

| Limit | | 824 | 849 | Delta (Hz) | Frequency Stability (ppm) |
|----------------|-----------|----------------------|-----------------------|------------|---------------------------|
| Condition | | F low @ -13dBm (MHz) | F high @ -13dBm (MHz) | | |
| Temperature | Voltage | | | | |
| Normal (20C) | Normal | 824.4688 | 847.4390 | | |
| Extreme (50C) | | 824.4688 | 847.4390 | -17.1 | -0.020 |
| Extreme (40C) | | 824.4688 | 847.4390 | -11.5 | -0.014 |
| Extreme (30C) | | 824.4688 | 847.4390 | -13.5 | -0.016 |
| Extreme (10C) | | 824.4688 | 847.4390 | -13.5 | -0.016 |
| Extreme (0C) | | 824.4688 | 847.4390 | -11.8 | -0.014 |
| Extreme (-10C) | | 824.4688 | 847.4390 | -10.7 | -0.013 |
| Extreme (-20C) | | 824.4688 | 847.4390 | -11.7 | -0.014 |
| Extreme (-30C) | | 824.4688 | 847.4390 | -10.7 | -0.013 |
| | | | | | |
| 20C | 15% | 824.4688 | 847.4390 | -10.0 | -0.012 |
| | -15% | 824.4688 | 847.4390 | -11.0 | -0.013 |
| | End Point | 824.4688 | 847.4390 | -14.1 | -0.017 |

8.4.3. LTE BAND 7

LIMITS

FCC: §27.54

The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

| | | | |
|--------------------------|-------|-------------------|-----------|
| Test Engineer ID: | 19177 | Test Date: | 6/30/2020 |
|--------------------------|-------|-------------------|-----------|

QPSK (20MHz BANDWIDTH)

| Limit | | 2500 | 2570 | Delta (Hz) | Frequency Stability (ppm) |
|----------------|-----------|----------------------|-----------------------|------------|---------------------------|
| Condition | | F low @ -13dBm (MHz) | F high @ -13dBm (MHz) | | |
| Temperature | Voltage | | | | |
| Normal (20C) | Normal | 2500.3192 | 2569.6289 | | |
| Extreme (50C) | | 2500.3192 | 2569.6289 | -12.1 | -0.005 |
| Extreme (40C) | | 2500.3192 | 2569.6289 | 16.3 | 0.006 |
| Extreme (30C) | | 2500.3192 | 2569.6289 | -13.2 | -0.005 |
| Extreme (10C) | | 2500.3192 | 2569.6289 | -15.4 | -0.006 |
| Extreme (0C) | | 2500.3192 | 2569.6289 | -13.5 | -0.005 |
| Extreme (-10C) | | 2500.3192 | 2569.6289 | -13.9 | -0.005 |
| Extreme (-20C) | | 2500.3192 | 2569.6289 | 14.2 | 0.006 |
| Extreme (-30C) | | 2500.3192 | 2569.6289 | -14.9 | -0.006 |
| | | | | | |
| 20C | 15% | 2500.3192 | 2569.6289 | -13.7 | -0.005 |
| | -15% | 2500.3192 | 2569.6289 | -14.0 | -0.006 |
| | End Point | 2500.3192 | 2569.6289 | -15.1 | -0.006 |

8.4.4. LTE BAND 12 AND 5G NR BAND n12

LIMITS

FCC: §27.54

The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

| | | | |
|--------------------------|-------|-------------------|-----------|
| Test Engineer ID: | 19177 | Test Date: | 6/30/2020 |
|--------------------------|-------|-------------------|-----------|

QPSK (10MHz BANDWIDTH)

| Limit | | 699 | 716 | Delta (Hz) | Frequency Stability (ppm) |
|----------------|-----------|----------------------|-----------------------|------------|---------------------------|
| Condition | | F low @ -13dBm (MHz) | F high @ -13dBm (MHz) | | |
| Temperature | Voltage | | | | |
| Normal (20C) | Normal | 699.4827 | 715.5095 | | |
| Extreme (50C) | | 699.4827 | 715.5095 | -7.0 | -0.010 |
| Extreme (40C) | | 699.4827 | 715.5095 | -6.7 | -0.009 |
| Extreme (30C) | | 699.4827 | 715.5095 | -8.4 | -0.012 |
| Extreme (10C) | | 699.4827 | 715.5095 | 5.6 | 0.008 |
| Extreme (0C) | | 699.4827 | 715.5095 | 5.9 | 0.008 |
| Extreme (-10C) | | 699.4827 | 715.5095 | -7.4 | -0.010 |
| Extreme (-20C) | | 699.4827 | 715.5095 | -7.7 | -0.011 |
| Extreme (-30C) | | 699.4827 | 715.5095 | 8.0 | 0.011 |
| | | | | | |
| 20C | 15% | 699.4827 | 715.5095 | -8.3 | -0.012 |
| | -15% | 699.4827 | 715.5095 | -9.1 | -0.013 |
| | End Point | 699.4827 | 715.5095 | -8.3 | -0.012 |

5G NR BAND n12 QPSK (15MHz BANDWIDTH)

| Limit | | 699 | 716 | Delta (Hz) | Frequency Stability (ppm) |
|----------------|-----------|----------------------|-----------------------|------------|---------------------------|
| Condition | | F low @ -13dBm (MHz) | F high @ -13dBm (MHz) | | |
| Temperature | Voltage | | | | |
| Normal (20C) | Normal | 699.3861 | 714.8681 | | |
| Extreme (50C) | | 699.3861 | 714.8681 | 14.4 | 0.020 |
| Extreme (40C) | | 699.3861 | 714.8681 | -13.5 | -0.019 |
| Extreme (30C) | | 699.3861 | 714.8681 | -13.3 | -0.019 |
| Extreme (10C) | | 699.3861 | 714.8681 | -13.5 | -0.019 |
| Extreme (0C) | | 699.3861 | 714.8681 | -14.3 | -0.020 |
| Extreme (-10C) | | 699.3861 | 714.8681 | -14.1 | -0.020 |
| Extreme (-20C) | | 699.3861 | 714.8681 | -14.7 | -0.021 |
| Extreme (-30C) | | 699.3861 | 714.8681 | -12.4 | -0.018 |
| | | | | | |
| 20C | 15% | 699.3861 | 714.8681 | -13.8 | -0.019 |
| | -15% | 699.3861 | 714.8681 | -13.9 | -0.020 |
| | End Point | 699.3861 | 714.8681 | -12.9 | -0.018 |

8.4.5. LTE BAND 13

LIMITS

FCC: §27.54

The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

| | | | |
|--------------------------|-------|-------------------|-----------|
| Test Engineer ID: | 19177 | Test Date: | 6/30/2020 |
|--------------------------|-------|-------------------|-----------|

QPSK (10MHZ BANDWIDTH)

| Limit | | 777 | 787 | Delta (Hz) | Frequency Stability (ppm) |
|----------------|-----------|----------------------|-----------------------|------------|---------------------------|
| Condition | | F low @ -13dBm (MHz) | F high @ -13dBm (MHz) | | |
| Temperature | Voltage | | | | |
| Normal (20C) | Normal | 777.4821 | 786.5223 | | |
| Extreme (50C) | | 777.4821 | 786.5223 | -5.6 | -0.007 |
| Extreme (40C) | | 777.4821 | 786.5223 | -8.3 | -0.011 |
| Extreme (30C) | | 777.4821 | 786.5223 | -6.8 | -0.009 |
| Extreme (10C) | | 777.4821 | 786.5223 | -6.2 | -0.008 |
| Extreme (0C) | | 777.4821 | 786.5223 | 7.2 | 0.009 |
| Extreme (-10C) | | 777.4821 | 786.5223 | 6.0 | 0.008 |
| Extreme (-20C) | | 777.4821 | 786.5223 | -2.4 | -0.003 |
| Extreme (-30C) | | 777.4821 | 786.5223 | 4.6 | 0.006 |
| | | | | | |
| 20C | 15% | 777.4821 | 786.5223 | 5.0 | 0.006 |
| | -15% | 777.4821 | 786.5223 | 6.9 | 0.009 |
| | End Point | 777.4821 | 786.5223 | -6.1 | -0.008 |

8.4.6. LTE BAND 14

LIMITS

FCC: §90.539

(e) The frequency stability of mobile, portable and control transmitters operating in the wideband segment must be 1.25 ppm or better when AFC is locked to a base station, and 5 ppm or better when AFC is not locked.

| | | | |
|--------------------------|-------|-------------------|-----------|
| Test Engineer ID: | 19178 | Test Date: | 6/19/2020 |
|--------------------------|-------|-------------------|-----------|

QPSK (10MHz BANDWIDTH)

| Limit | | 788 | 798 | Delta (Hz) | Frequency Stability (ppm) |
|----------------|-----------|----------------------|-----------------------|------------|---------------------------|
| Condition | | F low @ -13dBm (MHz) | F high @ -13dBm (MHz) | | |
| Temperature | Voltage | | | | |
| Normal (20C) | Normal | 788.2415 | 797.7962 | | |
| Extreme (50C) | | 788.2415 | 797.7962 | -6.2 | -0.008 |
| Extreme (40C) | | 788.2415 | 797.7962 | -4.7 | -0.006 |
| Extreme (30C) | | 788.2415 | 797.7962 | -4.0 | -0.005 |
| Extreme (10C) | | 788.2415 | 797.7962 | -3.6 | -0.005 |
| Extreme (0C) | | 788.2415 | 797.7962 | 3.7 | 0.005 |
| Extreme (-10C) | | 788.2415 | 797.7962 | -3.5 | -0.004 |
| Extreme (-20C) | | 788.2415 | 797.7962 | -4.4 | -0.006 |
| Extreme (-30C) | | 788.2415 | 797.7962 | -4.5 | -0.006 |
| | | | | | |
| 20C | 15% | 788.2415 | 797.7962 | -3.3 | -0.004 |
| | -15% | 788.2415 | 797.7962 | 4.2 | 0.005 |
| | End Point | 788.2415 | 797.7962 | -4.1 | -0.005 |

8.4.7. LTE BAND 17

LIMITS

FCC: §27.54

The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

| | | | |
|--------------------------|-------|-------------------|-----------|
| Test Engineer ID: | 19177 | Test Date: | 6/30/2020 |
|--------------------------|-------|-------------------|-----------|

QPSK (10MHz BANDWIDTH)

| Limit | | 704 | 716 | Delta (Hz) | Frequency Stability (ppm) |
|----------------|-----------|----------------------|-----------------------|------------|---------------------------|
| Condition | | F low @ -13dBm (MHz) | F high @ -13dBm (MHz) | | |
| Temperature | Voltage | | | | |
| Normal (20C) | Normal | 704.4843 | 715.5021 | | |
| Extreme (50C) | | 704.4843 | 715.5021 | -7.3 | -0.010 |
| Extreme (40C) | | 704.4843 | 715.5021 | -7.3 | -0.010 |
| Extreme (30C) | | 704.4843 | 715.5021 | -8.0 | -0.011 |
| Extreme (10C) | | 704.4843 | 715.5021 | -8.6 | -0.012 |
| Extreme (0C) | | 704.4843 | 715.5021 | 7.8 | 0.011 |
| Extreme (-10C) | | 704.4843 | 715.5021 | 6.9 | 0.010 |
| Extreme (-20C) | | 704.4843 | 715.5021 | -10.4 | -0.015 |
| Extreme (-30C) | | 704.4843 | 715.5021 | 4.5 | 0.006 |
| | | | | | |
| 20C | 15% | 704.4843 | 715.5021 | -7.6 | -0.011 |
| | -15% | 704.4843 | 715.5021 | -9.2 | -0.013 |
| | End Point | 704.4843 | 715.5021 | -9.0 | -0.013 |

8.4.8. LTE BAND 25

LIMITS

FCC: §24.235

The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

| | | | |
|--------------------------|-------|-------------------|-----------|
| Test Engineer ID: | 19177 | Test Date: | 6/30/2020 |
|--------------------------|-------|-------------------|-----------|

QPSK (20MHz BANDWIDTH)

| Limit | | 1850 | 1915 | Delta (Hz) | Frequency Stability (ppm) |
|----------------|-----------|----------------|-----------------|------------|---------------------------|
| Condition | | F low @ -13dBm | F high @ -13dBm | | |
| Temperature | Voltage | (MHz) | (MHz) | | |
| Normal (20C) | Normal | 1850.9779 | 1914.0159 | | |
| Extreme (50C) | | 1850.9779 | 1914.0159 | -13.7 | -0.007 |
| Extreme (40C) | | 1850.9779 | 1914.0159 | -14.4 | -0.008 |
| Extreme (30C) | | 1850.9779 | 1914.0159 | -15.4 | -0.008 |
| Extreme (10C) | | 1850.9779 | 1914.0159 | -13.9 | -0.007 |
| Extreme (0C) | | 1850.9779 | 1914.0159 | -12.9 | -0.007 |
| Extreme (-10C) | | 1850.9779 | 1914.0159 | -13.6 | -0.007 |
| Extreme (-20C) | | 1850.9779 | 1914.0159 | -13.6 | -0.007 |
| Extreme (-30C) | | 1850.9779 | 1914.0159 | -11.7 | -0.006 |
| | | | | | |
| 20C | 15% | 1850.9779 | 1914.0159 | -16.2 | -0.009 |
| | -15% | 1850.9779 | 1914.0159 | -15.8 | -0.008 |
| | End Point | 1850.9779 | 1914.0159 | -14.4 | -0.008 |

8.4.9. LTE BAND 26 (PART 90S)

LIMITS

FCC: §90.213

The carrier frequency shall not depart from the reference frequency in excess of ± 2.5 ppm for mobile stations.

| | | | |
|--------------------------|-------|-------------------|-----------|
| Test Engineer ID: | 19177 | Test Date: | 6/30/2020 |
|--------------------------|-------|-------------------|-----------|

QPSK (10MHz BANDWIDTH)

| Limit | | 814 | 824 | Delta (Hz) | Frequency Stability (ppm) |
|----------------|-----------|----------------------|-----------------------|------------|---------------------------|
| Condition | | F low @ -13dBm (MHz) | F high @ -13dBm (MHz) | | |
| Temperature | Voltage | | | | |
| Normal (20C) | Normal | 814.4918 | 823.5327 | | |
| Extreme (50C) | | 814.4918 | 823.5327 | -8.9 | -0.011 |
| Extreme (40C) | | 814.4918 | 823.5327 | -9.5 | -0.012 |
| Extreme (30C) | | 814.4918 | 823.5327 | -4.0 | -0.005 |
| Extreme (10C) | | 814.4918 | 823.5327 | -10.0 | -0.012 |
| Extreme (0C) | | 814.4918 | 823.5327 | -7.5 | -0.009 |
| Extreme (-10C) | | 814.4918 | 823.5327 | -8.0 | -0.010 |
| Extreme (-20C) | | 814.4918 | 823.5327 | -8.6 | -0.010 |
| Extreme (-30C) | | 814.4918 | 823.5327 | -8.4 | -0.010 |
| | | | | | |
| 20C | 15% | 814.4918 | 823.5327 | -11.0 | -0.013 |
| | -15% | 814.4918 | 823.5327 | -10.0 | -0.012 |
| | End Point | 814.4918 | 823.5327 | -10.3 | -0.013 |

8.4.10. LTE BAND 30

LIMITS

FCC: §27.54

The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

| | | | |
|--------------------------|-------|-------------------|-----------|
| Test Engineer ID: | 19177 | Test Date: | 6/30/2020 |
|--------------------------|-------|-------------------|-----------|

QPSK (10MHz BANDWIDTH)

| Limit | | 2305 | 2315 | Delta (Hz) | Frequency Stability (ppm) |
|----------------|-----------|----------------------|-----------------------|------------|---------------------------|
| Condition | | F low @ -13dBm (MHz) | F high @ -13dBm (MHz) | | |
| Temperature | Voltage | | | | |
| Normal (20C) | Normal | 2305.4526 | 2314.5362 | | |
| Extreme (50C) | | 2305.4526 | 2314.5362 | -14.0 | -0.006 |
| Extreme (40C) | | 2305.4526 | 2314.5362 | -13.3 | -0.006 |
| Extreme (30C) | | 2305.4526 | 2314.5362 | -17.9 | -0.008 |
| Extreme (10C) | | 2305.4526 | 2314.5362 | -13.1 | -0.006 |
| Extreme (0C) | | 2305.4526 | 2314.5362 | 14.2 | 0.006 |
| Extreme (-10C) | | 2305.4526 | 2314.5362 | -13.3 | -0.006 |
| Extreme (-20C) | | 2305.4526 | 2314.5362 | 13.2 | 0.006 |
| Extreme (-30C) | | 2305.4526 | 2314.5362 | 16.3 | 0.007 |
| | | | | | |
| 20C | 15% | 2305.4526 | 2314.5362 | -14.1 | -0.006 |
| | -15% | 2305.4526 | 2314.5362 | -12.9 | -0.006 |
| | End Point | 2305.4526 | 2314.5362 | -13.5 | -0.006 |

8.4.11. LTE BAND 41 AND 5G NR BAND n41

LIMITS

FCC: §27.54

The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

| | | | |
|--------------------------|-------|-------------------|-----------|
| Test Engineer ID: | 19177 | Test Date: | 6/30/2020 |
|--------------------------|-------|-------------------|-----------|

LTE BAND 41 QPSK (20MHz BANDWIDTH)

| Limit | | 2496 | 2690 | Delta (Hz) | Frequency Stability (ppm) |
|----------------|-----------|----------------------|-----------------------|------------|---------------------------|
| Condition | | F low @ -13dBm (MHz) | F high @ -13dBm (MHz) | | |
| Temperature | Voltage | | | | |
| Normal (20C) | Normal | 2496.8999 | 2689.1023 | | |
| Extreme (50C) | | 2496.8999 | 2689.1023 | -22.0 | -0.008 |
| Extreme (40C) | | 2496.8999 | 2689.1023 | -22.9 | -0.009 |
| Extreme (30C) | | 2496.8999 | 2689.1023 | -20.9 | -0.008 |
| Extreme (10C) | | 2496.8999 | 2689.1023 | -26.1 | -0.010 |
| Extreme (0C) | | 2496.8999 | 2689.1023 | -11.4 | -0.004 |
| Extreme (-10C) | | 2496.8999 | 2689.1023 | -24.8 | -0.010 |
| Extreme (-20C) | | 2496.8999 | 2689.1023 | -22.7 | -0.009 |
| Extreme (-30C) | | 2496.8999 | 2689.1023 | -21.4 | -0.008 |
| | | | | | |
| 20C | 15% | 2496.8999 | 2689.1023 | -23.1 | -0.009 |
| | -15% | 2496.8999 | 2689.1023 | -20.0 | -0.008 |
| | End Point | 2496.8999 | 2689.1023 | -21.3 | -0.008 |

5G NR BAND n41 QPSK (100MHz BANDWIDTH)

| Limit | | 2496 | 2690 | Delta (Hz) | Frequency Stability (ppm) |
|----------------|-----------|----------------------|-----------------------|------------|---------------------------|
| Condition | | F low @ -13dBm (MHz) | F high @ -13dBm (MHz) | | |
| Temperature | Voltage | | | | |
| Normal (20C) | Normal | 2497.0086 | 2687.9440 | | |
| Extreme (50C) | | 2497.0086 | 2687.9440 | -34.0 | -0.013 |
| Extreme (40C) | | 2497.0086 | 2687.9440 | 32.2 | 0.012 |
| Extreme (30C) | | 2497.0086 | 2687.9440 | -30.5 | -0.012 |
| Extreme (10C) | | 2497.0086 | 2687.9440 | -39.9 | -0.015 |
| Extreme (0C) | | 2497.0086 | 2687.9440 | 38.6 | 0.015 |
| Extreme (-10C) | | 2497.0086 | 2687.9440 | -27.9 | -0.011 |
| Extreme (-20C) | | 2497.0086 | 2687.9440 | -28.6 | -0.011 |
| Extreme (-30C) | | 2497.0086 | 2687.9440 | -30.0 | -0.012 |
| | | | | | |
| 20C | 15% | 2497.0086 | 2687.9440 | -36.5 | -0.014 |
| | -15% | 2497.0086 | 2687.9440 | -34.9 | -0.013 |
| | End Point | 2497.0086 | 2687.9440 | -40.0 | -0.015 |

8.4.12. LTE BAND 48

| | | | |
|--------------------------|-------|-------------------|-----------|
| Test Engineer ID: | 19177 | Test Date: | 6/30/2020 |
|--------------------------|-------|-------------------|-----------|

QPSK (20MHz BANDWIDTH)

| Limit | | 3550 | 3700 | Delta (Hz) | Frequency Stability (ppm) |
|----------------|-----------|----------------------|-----------------------|------------|---------------------------|
| Condition | | F low @ -13dBm (MHz) | F high @ -13dBm (MHz) | | |
| Temperature | Voltage | | | | |
| Normal (20C) | Normal | 3550.7904 | 3699.0067 | | |
| Extreme (50C) | | 3550.7904 | 3699.0067 | 11.3 | 0.003 |
| Extreme (40C) | | 3550.7904 | 3699.0067 | 8.5 | 0.002 |
| Extreme (30C) | | 3550.7904 | 3699.0067 | 9.1 | 0.003 |
| Extreme (10C) | | 3550.7904 | 3699.0067 | 9.4 | 0.003 |
| Extreme (0C) | | 3550.7904 | 3699.0067 | 8.6 | 0.002 |
| Extreme (-10C) | | 3550.7904 | 3699.0067 | 10.7 | 0.003 |
| Extreme (-20C) | | 3550.7904 | 3699.0067 | 9.4 | 0.003 |
| Extreme (-30C) | | 3550.7904 | 3699.0067 | 10.8 | 0.003 |
| | | | | | |
| 20C | 15% | 3550.7904 | 3699.0067 | 11.2 | 0.003 |
| | -15% | 3550.7904 | 3699.0067 | 8.9 | 0.002 |
| | End Point | 3550.7904 | 3699.0067 | 10.5 | 0.003 |

8.4.13. LTE BAND 66

LIMITS

FCC: §27.54

The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

| | | | |
|--------------------------|-------|-------------------|-----------|
| Test Engineer ID: | 19177 | Test Date: | 6/30/2020 |
|--------------------------|-------|-------------------|-----------|

QPSK (20MHz BANDWIDTH)

| Limit | | 1710 | 1780 | Delta (Hz) | Frequency Stability (ppm) |
|----------------|-----------|----------------------|-----------------------|------------|---------------------------|
| Condition | | F low @ -13dBm (MHz) | F high @ -13dBm (MHz) | | |
| Temperature | Voltage | | | | |
| Normal (20C) | Normal | 1710.9674 | 1779.0774 | | |
| Extreme (50C) | | 1710.9674 | 1779.0774 | 11.7 | 0.007 |
| Extreme (40C) | | 1710.9674 | 1779.0774 | -13.7 | -0.008 |
| Extreme (30C) | | 1710.9674 | 1779.0774 | -11.9 | -0.007 |
| Extreme (10C) | | 1710.9674 | 1779.0774 | -11.4 | -0.007 |
| Extreme (0C) | | 1710.9674 | 1779.0774 | 11.5 | 0.007 |
| Extreme (-10C) | | 1710.9674 | 1779.0774 | -10.4 | -0.006 |
| Extreme (-20C) | | 1710.9674 | 1779.0774 | 13.3 | 0.008 |
| Extreme (-30C) | | 1710.9674 | 1779.0774 | -11.9 | -0.007 |
| | | | | | |
| 20C | 15% | 1710.9674 | 1779.0774 | -12.4 | -0.007 |
| | -15% | 1710.9674 | 1779.0774 | -11.7 | -0.007 |
| | End Point | 1710.9674 | 1779.0774 | -13.8 | -0.008 |

8.4.14. LTE BAND 71

LIMITS

FCC: §27.54

The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

| | | | |
|--------------------------|-------|-------------------|-----------|
| Test Engineer ID: | 19177 | Test Date: | 6/30/2020 |
|--------------------------|-------|-------------------|-----------|

QPSK (20MHz BANDWIDTH)

| Limit | | 663 | 698 | Delta (Hz) | Frequency Stability (ppm) |
|----------------|-----------|----------------------|-----------------------|------------|---------------------------|
| Condition | | F low @ -13dBm (MHz) | F high @ -13dBm (MHz) | | |
| Temperature | Voltage | | | | |
| Normal (20C) | Normal | 664.0057 | 696.9919 | | |
| Extreme (50C) | | 664.0057 | 696.9919 | 3.3 | 0.005 |
| Extreme (40C) | | 664.0057 | 696.9919 | -4.8 | -0.007 |
| Extreme (30C) | | 664.0057 | 696.9919 | -3.6 | -0.005 |
| Extreme (10C) | | 664.0057 | 696.9919 | -5.1 | -0.007 |
| Extreme (0C) | | 664.0057 | 696.9919 | 3.9 | 0.006 |
| Extreme (-10C) | | 664.0057 | 696.9919 | 5.3 | 0.008 |
| Extreme (-20C) | | 664.0057 | 696.9919 | 4.6 | 0.007 |
| Extreme (-30C) | | 664.0057 | 696.9919 | -5.5 | -0.008 |
| | | | | | |
| 20C | 15% | 664.0057 | 696.9919 | 5.4 | 0.008 |
| | -15% | 664.0057 | 696.9919 | 5.4 | 0.008 |
| | End Point | 664.0057 | 696.9919 | 6.2 | 0.009 |

8.4.15. 5G NR BAND n77

LIMITS

FCC: §27.54

The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

| | | | |
|--------------------------|-------|-------------------|----------|
| Test Engineer ID: | 19480 | Test Date: | 8/4/2020 |
|--------------------------|-------|-------------------|----------|

5G NR BAND n77 QPSK (100MHz BANDWIDTH)

| Limit | | 3700 | 3980 | Delta (Hz) | Frequency Stability (ppm) |
|----------------|-----------|----------------------|-----------------------|------------|---------------------------|
| Condition | | F low @ -13dBm (MHz) | F high @ -13dBm (MHz) | | |
| Temperature | Voltage | | | | |
| Normal (20C) | Normal | 3700.9198 | 3977.9617 | | |
| Extreme (50C) | | 3700.9197 | 3977.9616 | -53.3 | -0.014 |
| Extreme (40C) | | 3700.9198 | 3977.9617 | -33.2 | -0.009 |
| Extreme (30C) | | 3700.9198 | 3977.9617 | 34.7 | 0.009 |
| Extreme (10C) | | 3700.9198 | 3977.9617 | 27.5 | 0.007 |
| Extreme (0C) | | 3700.9198 | 3977.9617 | -32.7 | -0.009 |
| Extreme (-10C) | | 3700.9198 | 3977.9617 | -34.4 | -0.009 |
| Extreme (-20C) | | 3700.9198 | 3977.9617 | -41.3 | -0.011 |
| Extreme (-30C) | | 3700.9198 | 3977.9617 | -44.9 | -0.012 |
| 20C | | 15% | 3700.9198 | 3977.9617 | -30.0 |
| | -15% | 3700.9198 | 3977.9617 | -31.6 | -0.008 |
| | End Point | 3700.9198 | 3977.9617 | -30.2 | -0.008 |

8.5. PEAK-TO-AVERAGE POWER RATIO

LIMIT

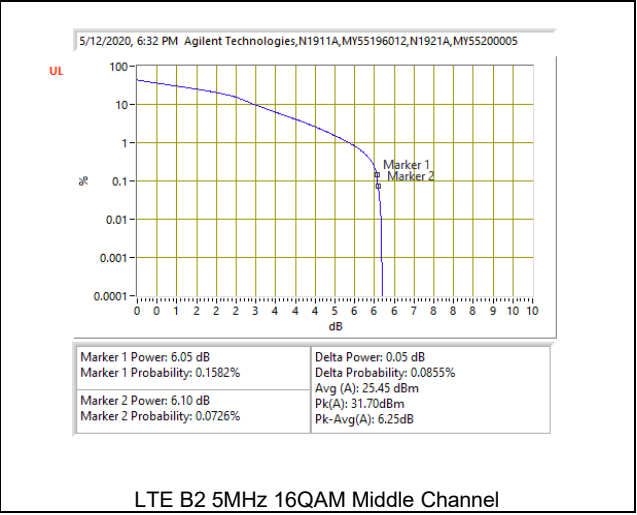
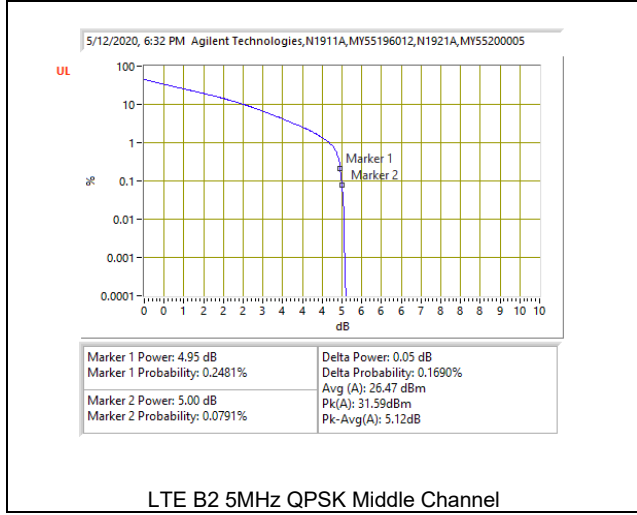
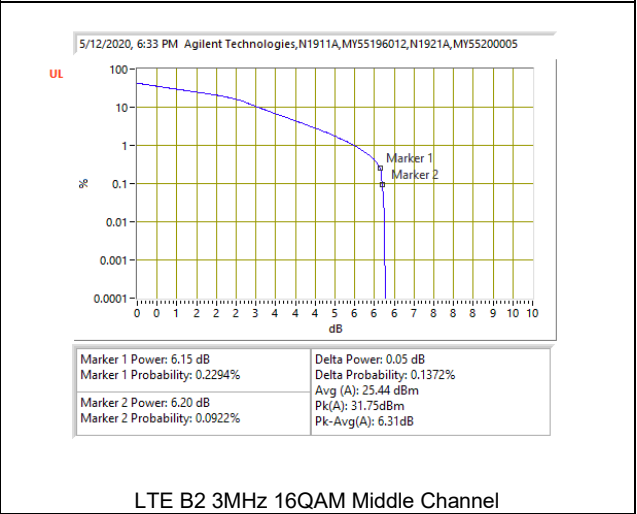
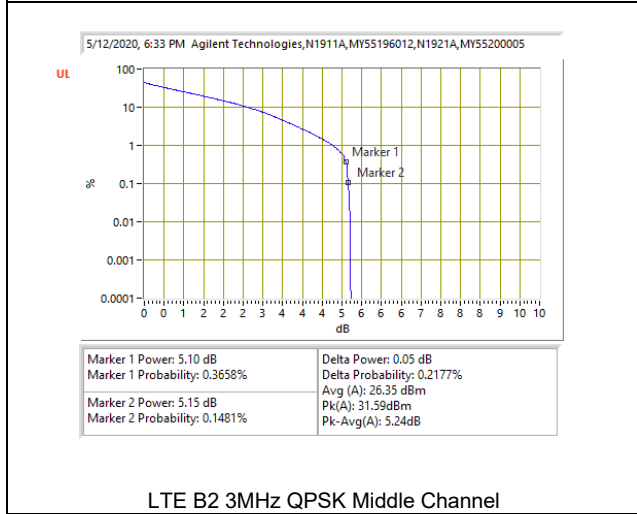
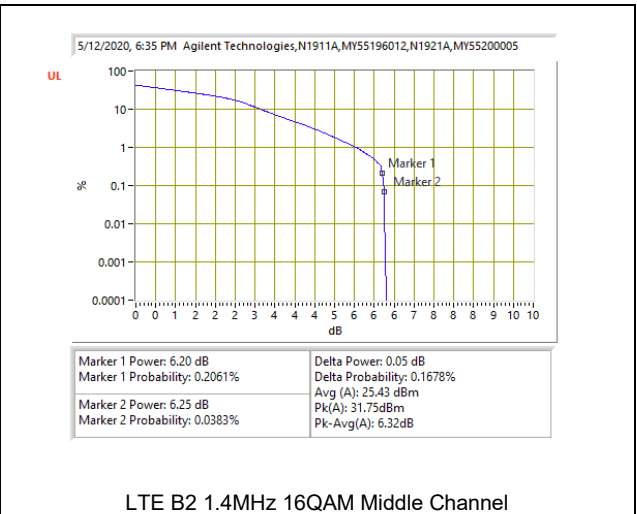
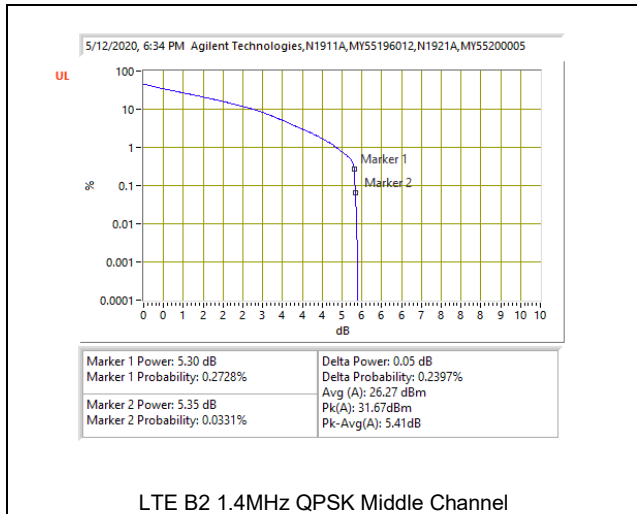
In addition, the peak-to-average power ratio (PAPR) of the transmitter shall not exceed 13 dB for more than 0.1% of the time and shall use a signal corresponding to the highest PAPR during periods of continuous transmission.

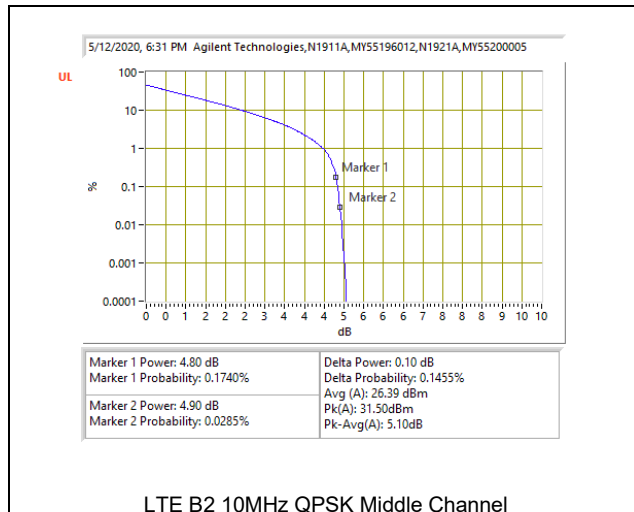
RESULT

The highest output power antenna port used to measure as the worst case; full resource block (FRB) for each bandwidth was used to measure as the worst case. The results from all CCDF measurements are passed with 13dB peak-to-average power ratio criteria.

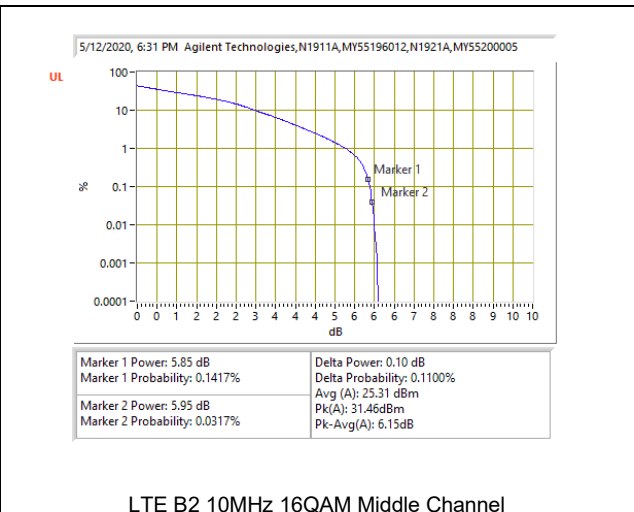
8.5.1. LTE BAND 2

| | | | |
|--------------------------|-------|-------------------|-----------|
| Test Engineer ID: | 10646 | Test Date: | 5/12/2020 |
|--------------------------|-------|-------------------|-----------|

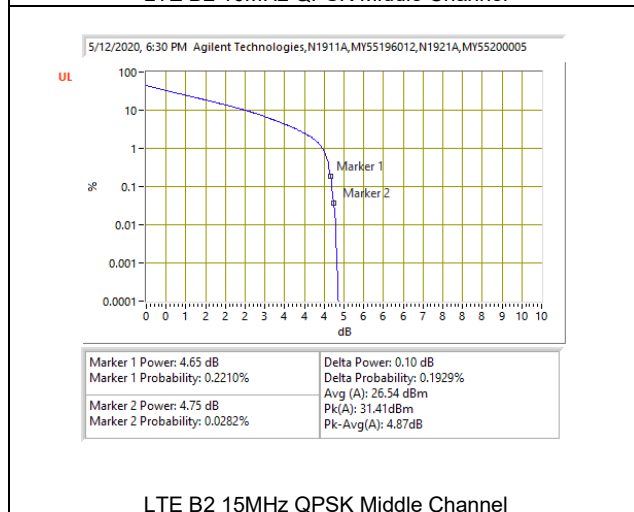




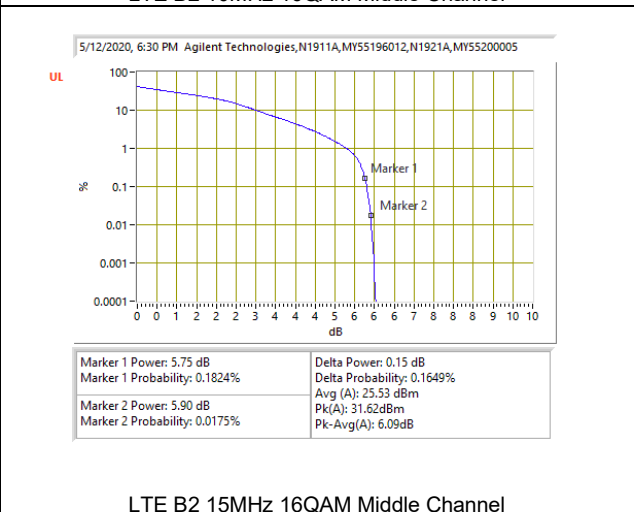
LTE B2 10MHz QPSK Middle Channel



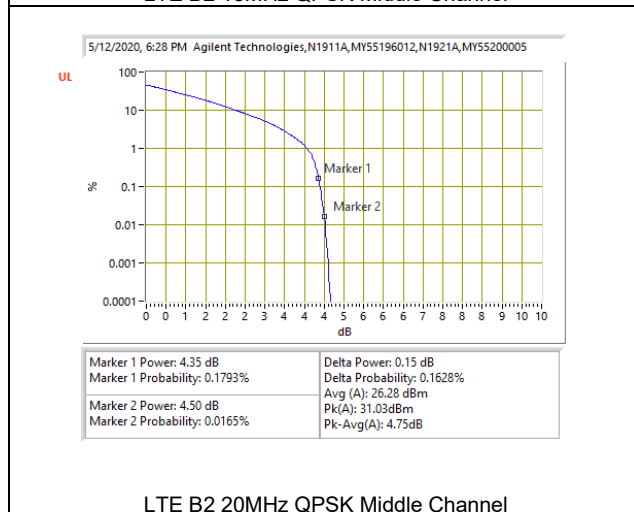
LTE B2 10MHz 16QAM Middle Channel



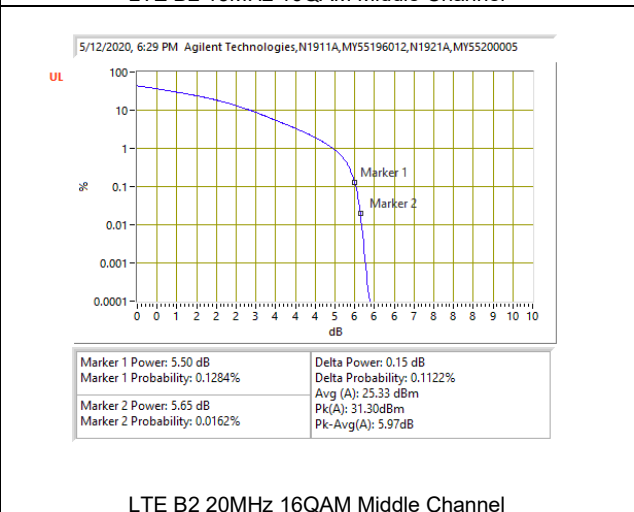
LTE B2 15MHz QPSK Middle Channel



LTE B2 15MHz 16QAM Middle Channel



LTE B2 20MHz QPSK Middle Channel

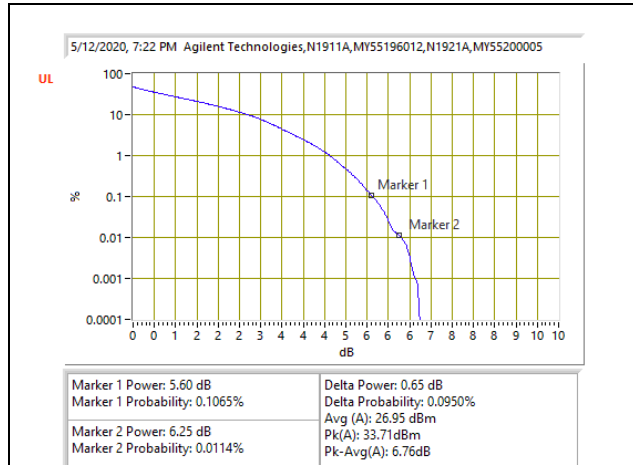


LTE B2 20MHz 16QAM Middle Channel

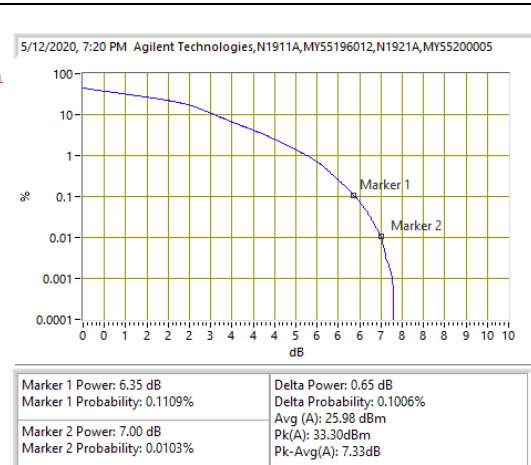
8.5.2. LTE BAND 5 AND 5G NR BAND n5

LTE BAND 5

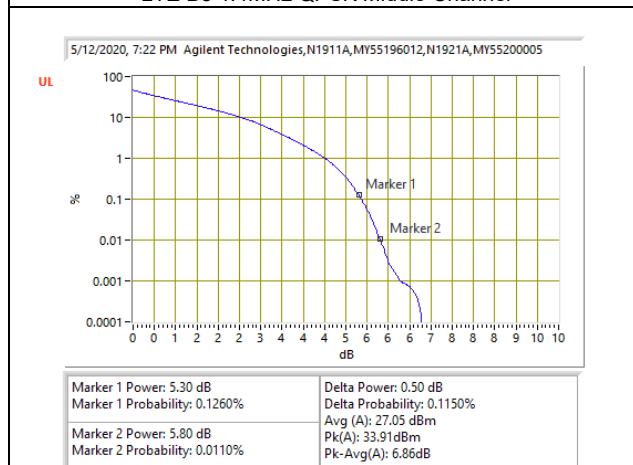
| | | | |
|--------------------------|-------|-------------------|-----------|
| Test Engineer ID: | 10646 | Test Date: | 5/12/2020 |
|--------------------------|-------|-------------------|-----------|



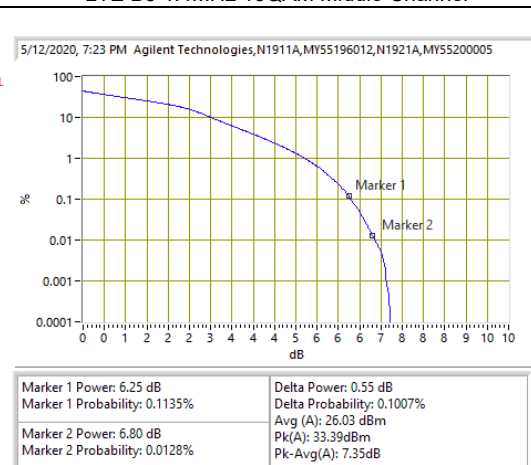
LTE B5 1.4MHz QPSK Middle Channel



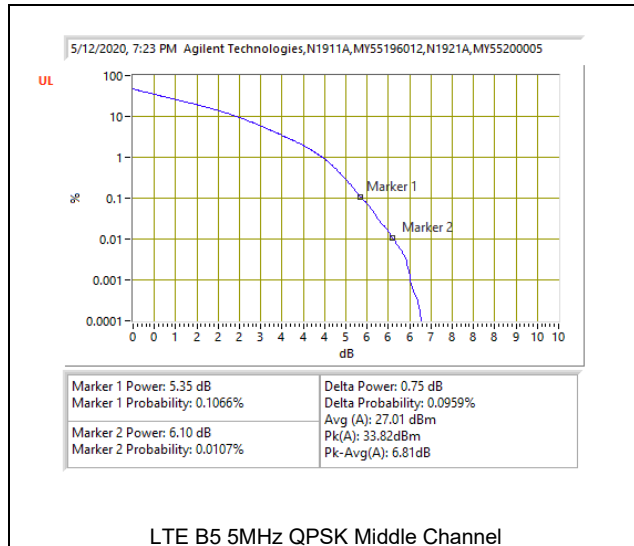
LTE B5 1.4MHz 16QAM Middle Channel



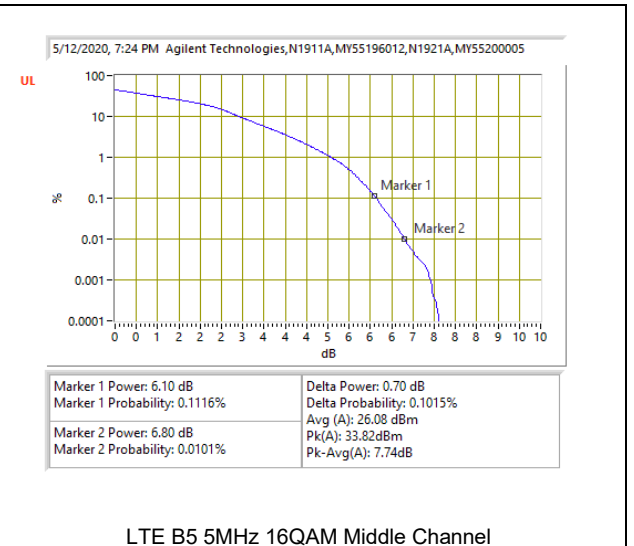
LTE B5 3MHz QPSK Middle Channel



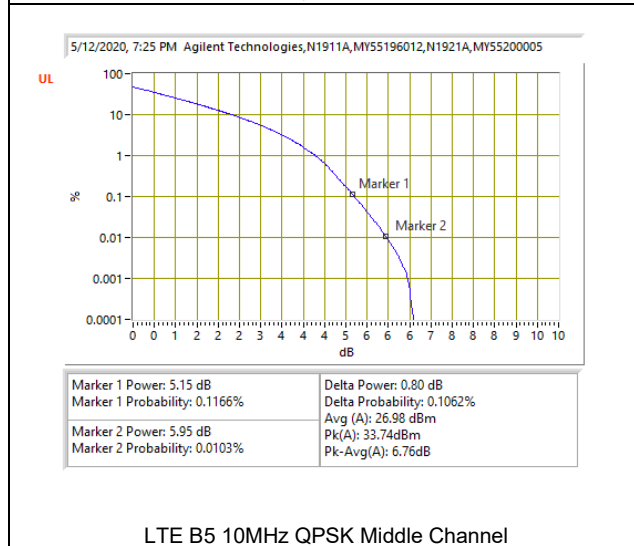
LTE B5 3MHz 16QAM Middle Channel



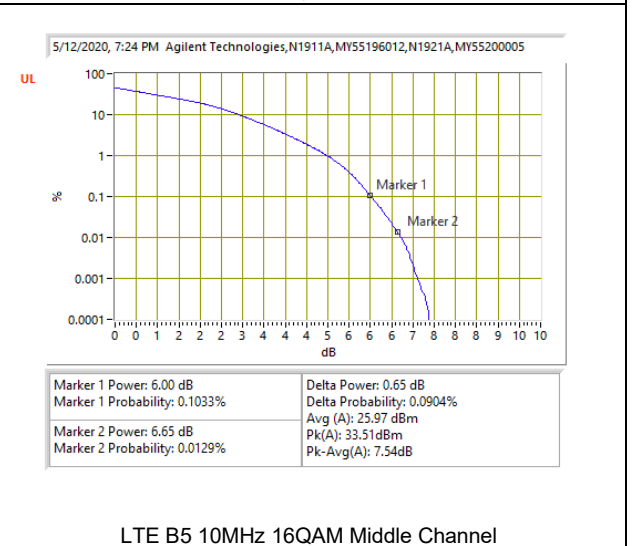
LTE B5 5MHz QPSK Middle Channel



LTE B5 5MHz 16QAM Middle Channel



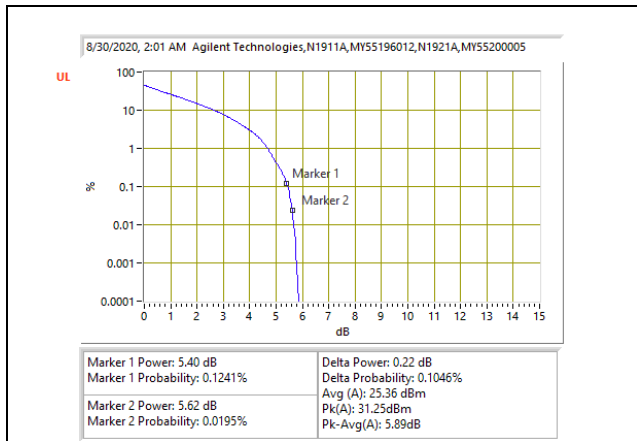
LTE B5 10MHz QPSK Middle Channel



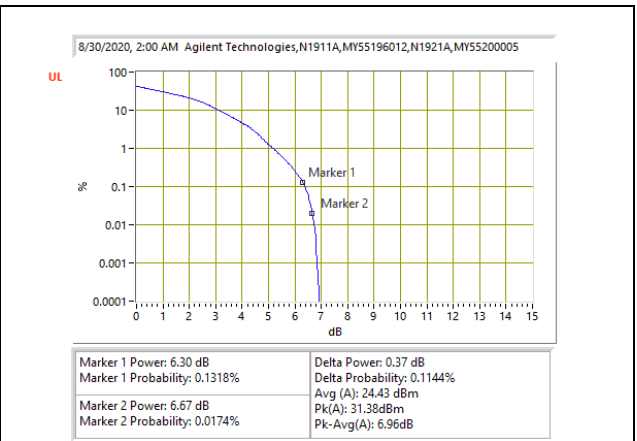
LTE B5 10MHz 16QAM Middle Channel

5G NR BAND n5

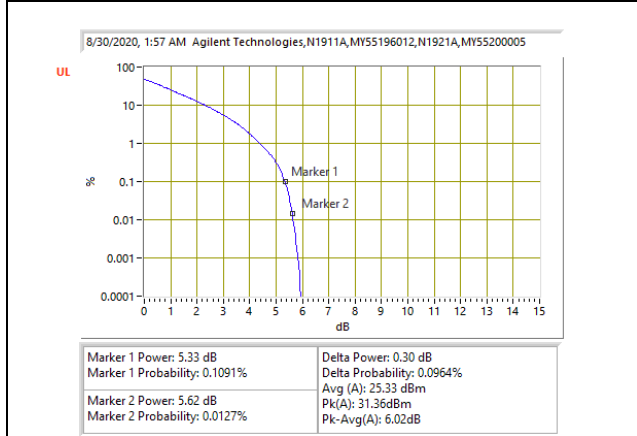
| | | | |
|--------------------------|-------|-------------------|-----------|
| Test Engineer ID: | 10646 | Test Date: | 8/30/2020 |
|--------------------------|-------|-------------------|-----------|



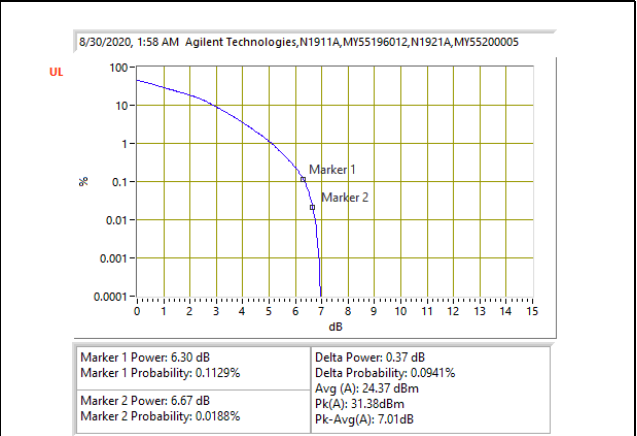
5G NR Bn5 15MHz QPSK Middle Channel



5G NR Bn5 15MHz 16QAM Middle Channel



5G NR Bn5 20MHz QPSK Middle Channel

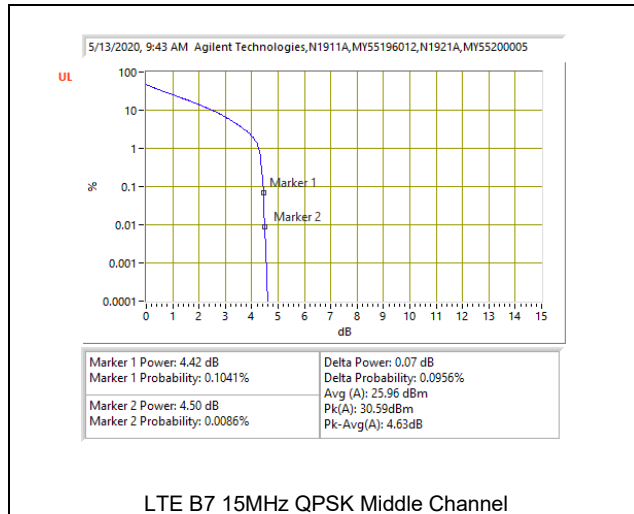


5G NR Bn5 20MHz 16QAM Middle Channel

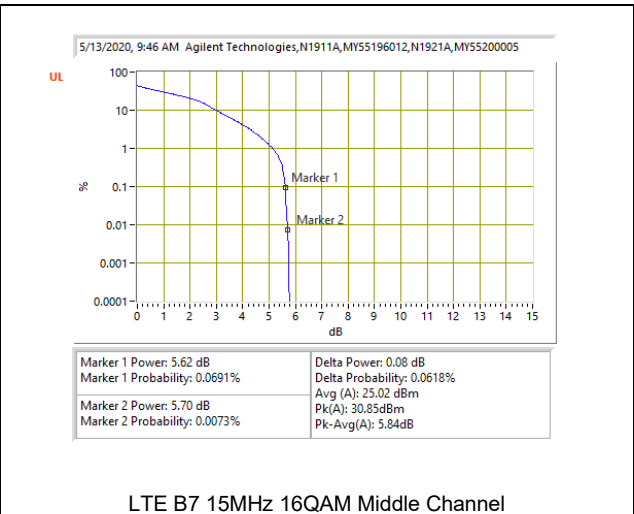
8.5.3. LTE BAND 7

| | | | |
|--------------------------|-------|-------------------|-----------|
| Test Engineer ID: | 39004 | Test Date: | 5/13/2020 |
|--------------------------|-------|-------------------|-----------|

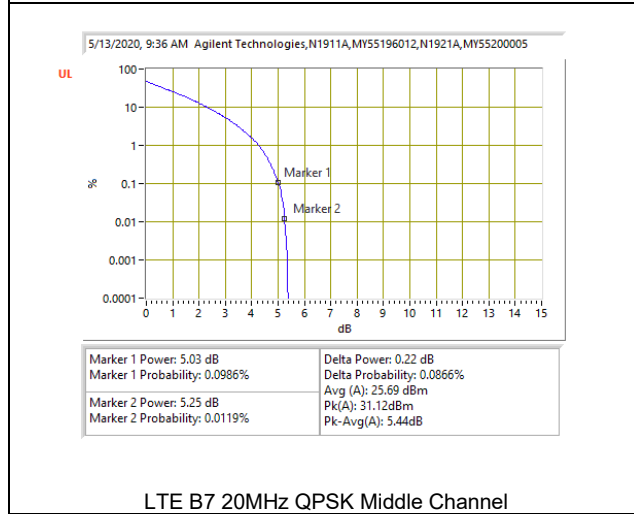




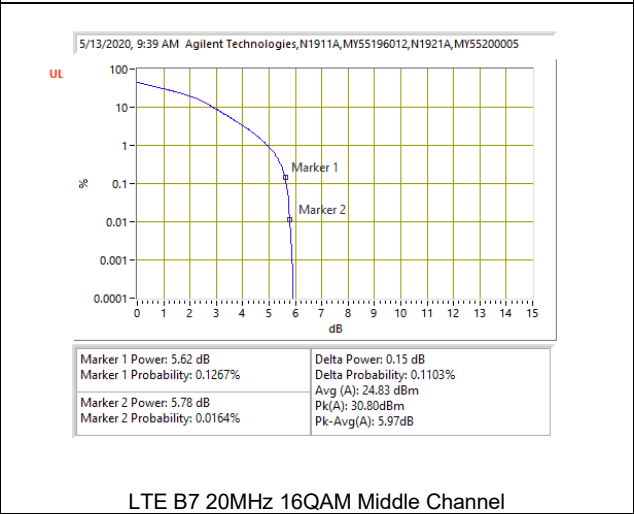
LTE B7 15MHz QPSK Middle Channel



LTE B7 15MHz 16QAM Middle Channel



LTE B7 20MHz QPSK Middle Channel



LTE B7 20MHz 16QAM Middle Channel