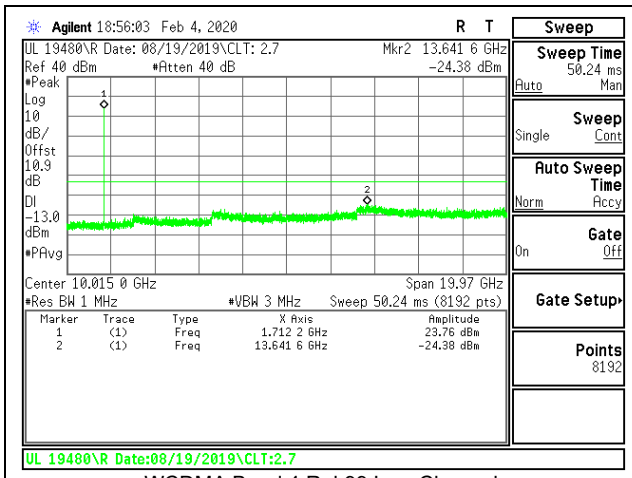
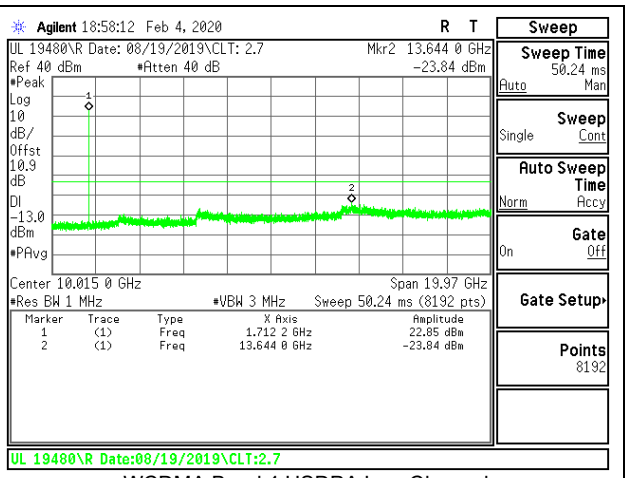
8.3.5. WCDMA BAND 4

LIMITS

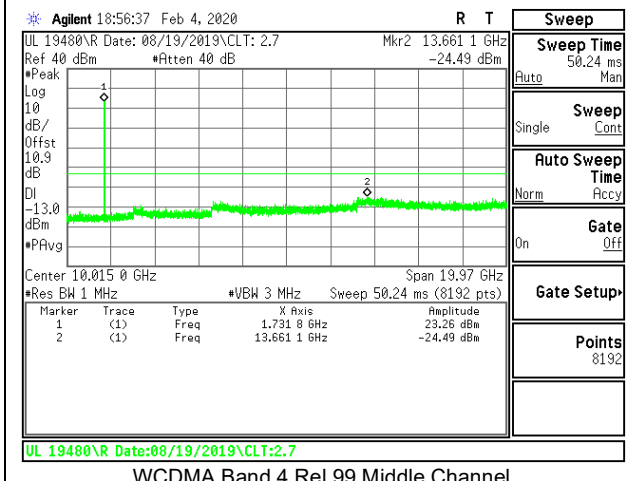
FCC: §27.53(h)
The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log (P) dB.



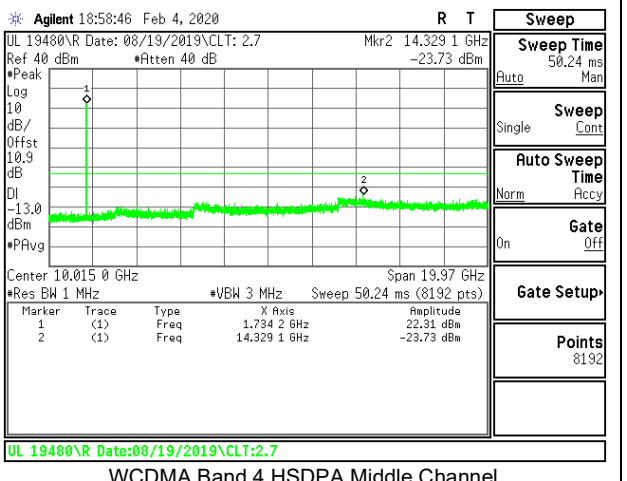
WCDMA Band 4 Rel 99 Low Channel



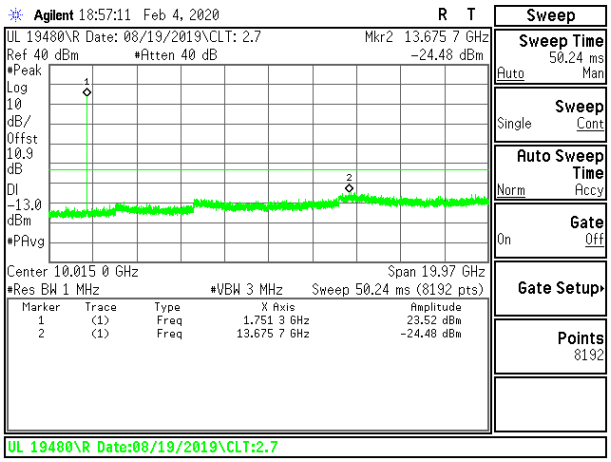
WCDMA Band 4 HSDPA Low Channel



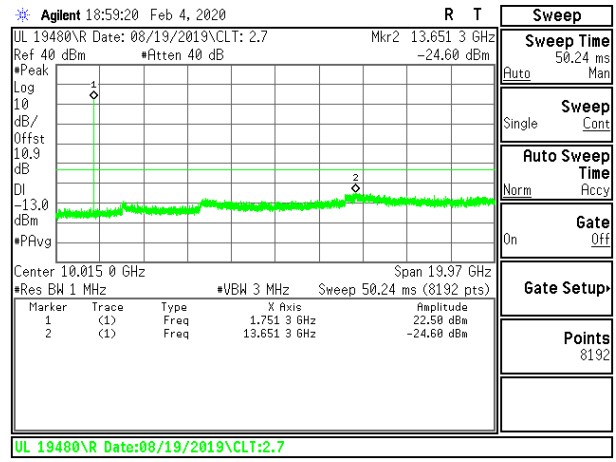
WCDMA Band 4 Rel 99 Middle Channel



WCDMA Band 4 HSDPA Middle Channel



WCDMA Band 4 Rel 99 High Channel

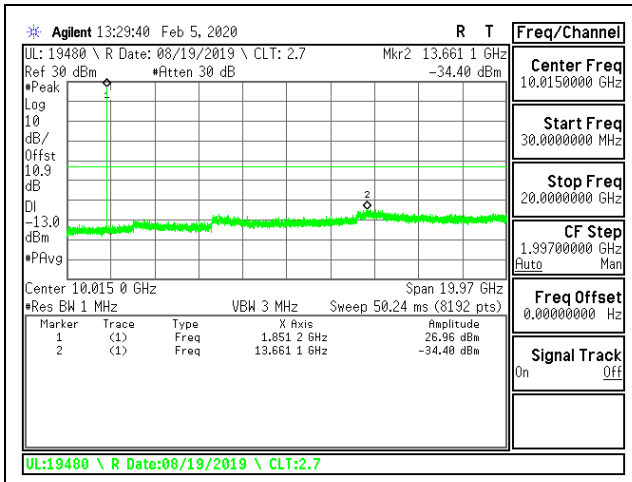


WCDMA Band 4 HSDPA High Channel

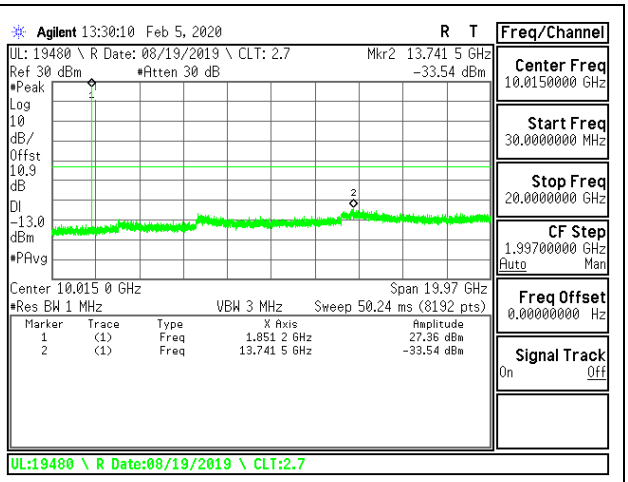
8.3.6. LTE BAND 2

LIMITS

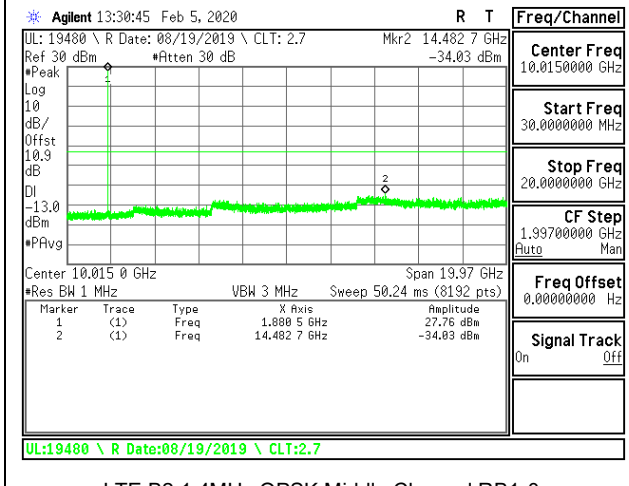
FCC: §24.238
The minimum permissible attenuation level of any spurious emissions is 43 + 10 log (P) dB where transmitting power (P) in Watts.
ISED: RSS133§6.5
The minimum permissible attenuation level of any spurious emissions is 43 + 10 log (P) dB where transmitting power (P) in Watts.



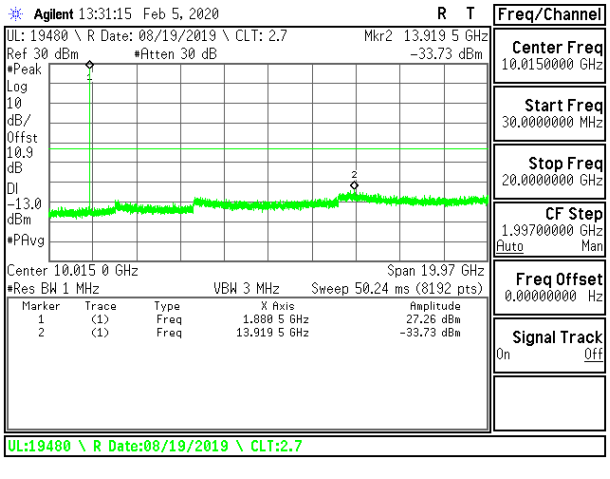
LTE B2 1.4MHz QPSK Low Channel RB1-0



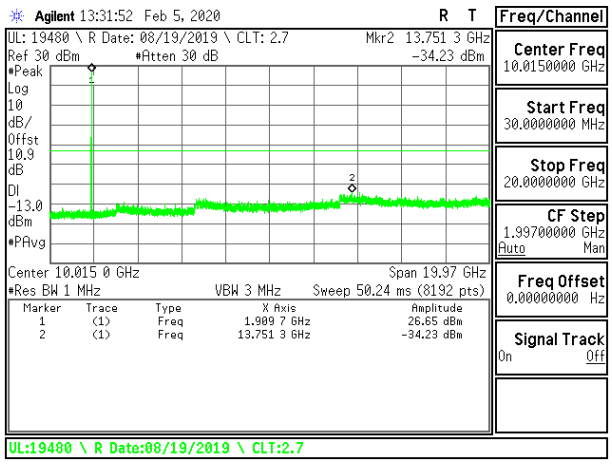
LTE B2 1.4MHz 16QAM Low Channel RB1-0



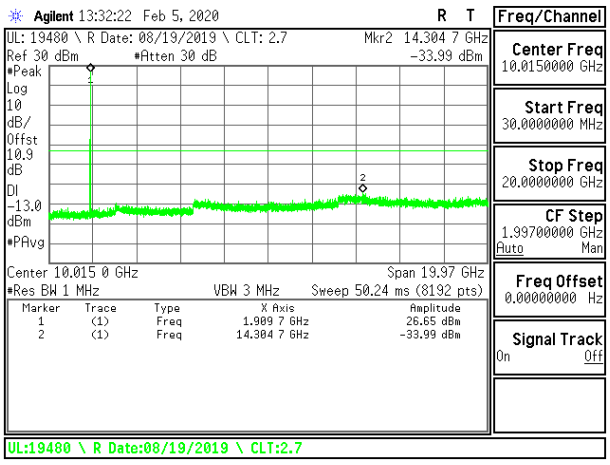
LTE B2 1.4MHz QPSK Middle Channel RB1-0



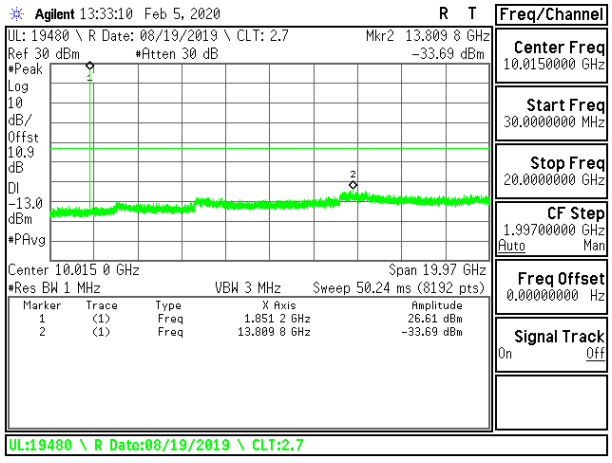
LTE B2 1.4MHz 16QAM Middle Channel RB1-0



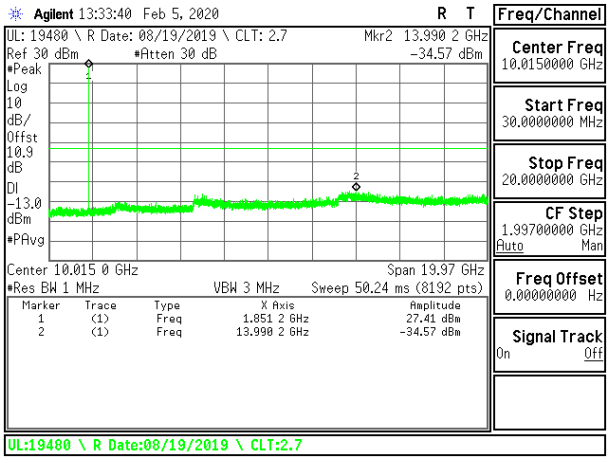
LTE B2 1.4MHz QPSK High Channel RB1-0



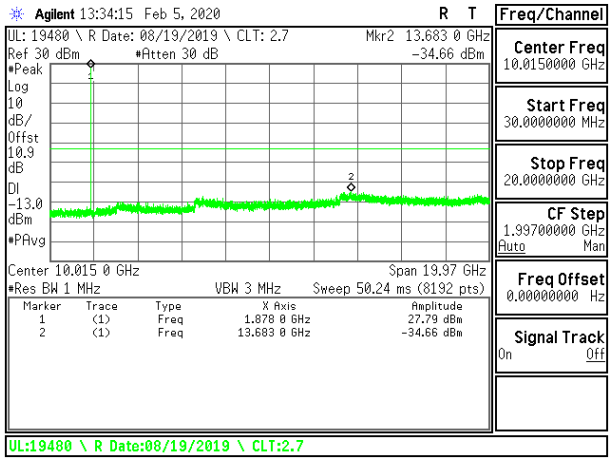
LTE B2 1.4MHz 16QAM High Channel RB1-0



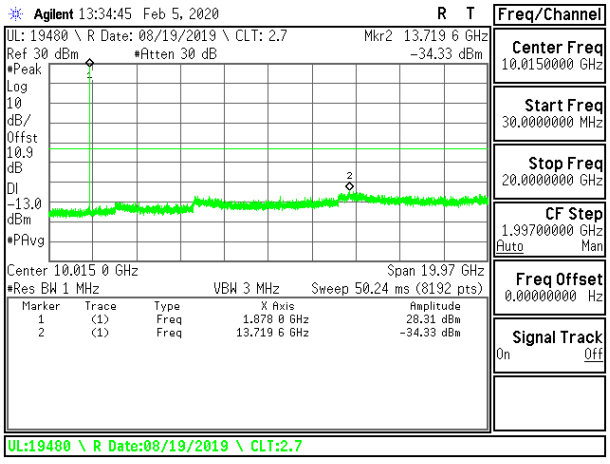
LTE B2 3MHz QPSK Low Channel RB1-0



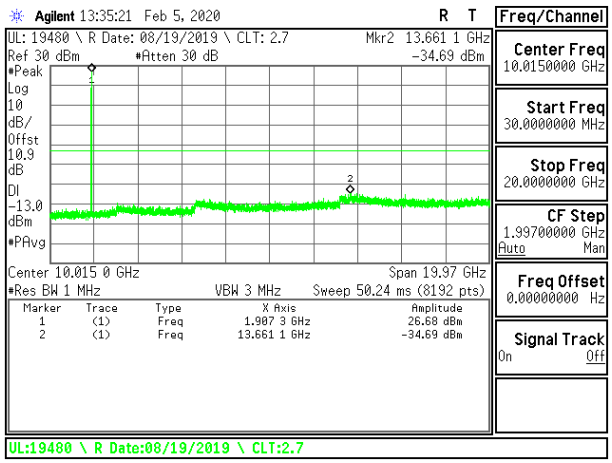
LTE B2 3MHz 16QAM Low Channel RB1-0



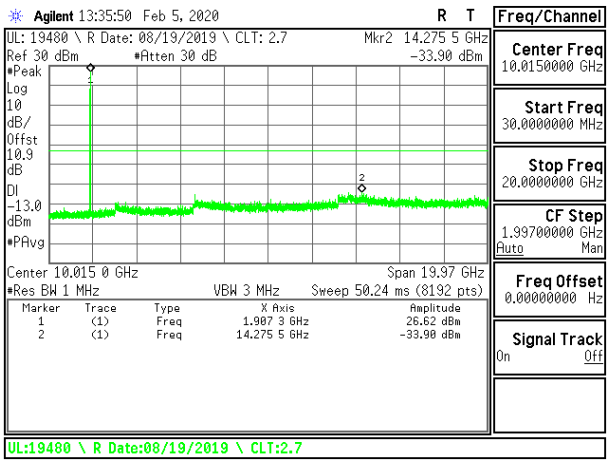
LTE B2 3MHz QPSK Middle Channel RB1-0



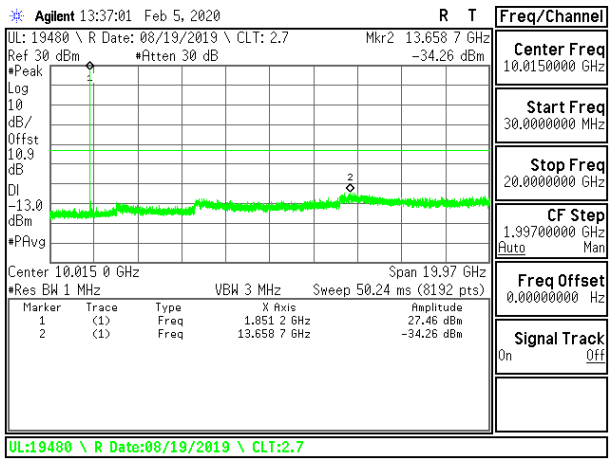
LTE B2 3MHz 16QAM Middle Channel RB1-0



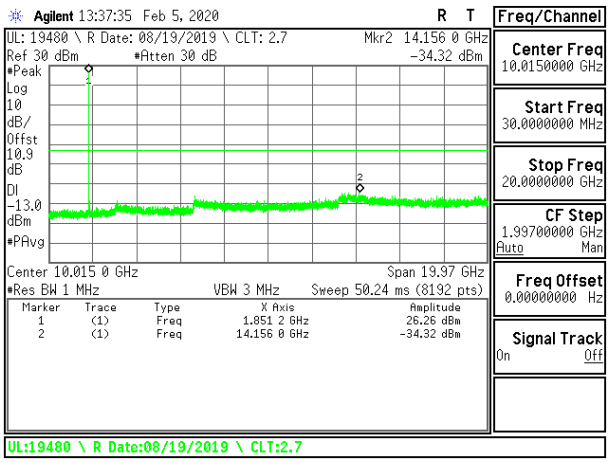
LTE B2 3MHz QPSK High Channel RB1-0



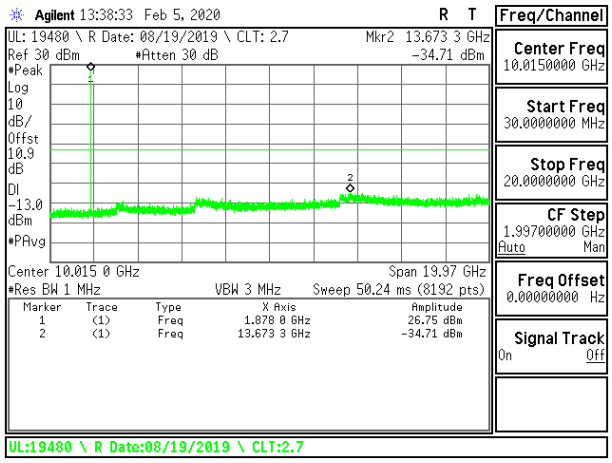
LTE B2 3MHz 16QAM High Channel RB1-0



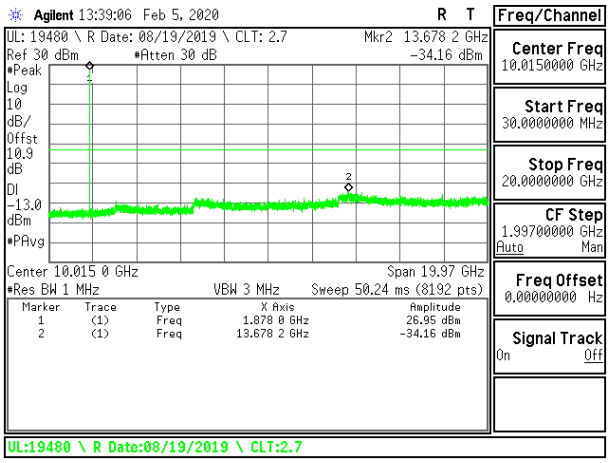
LTE B2 5MHz QPSK Low Channel RB1-0



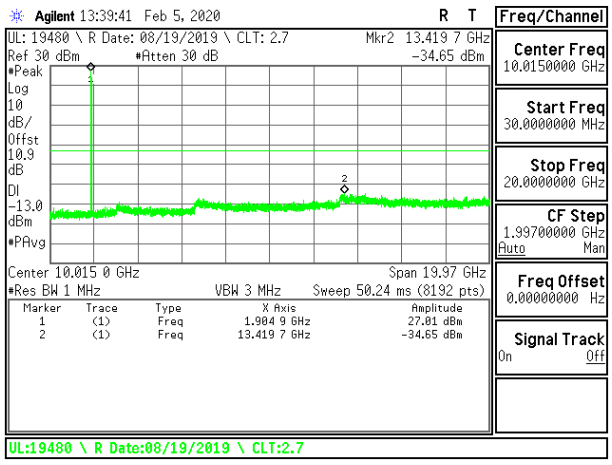
LTE B2 5MHz 16QAM Low Channel RB1-0



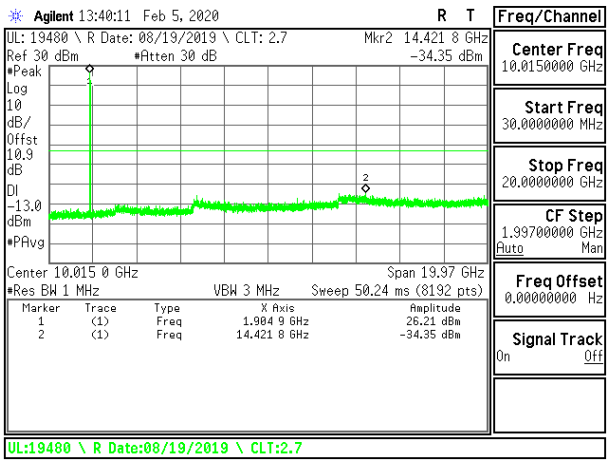
LTE B2 5MHz QPSK Middle Channel RB1-0



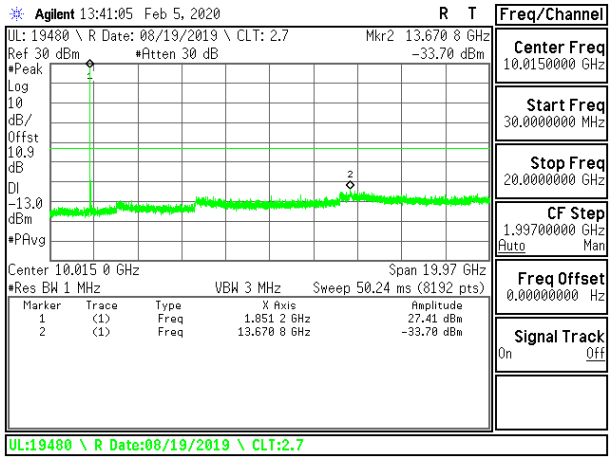
LTE B2 5MHz 16QAM Middle Channel RB1-0



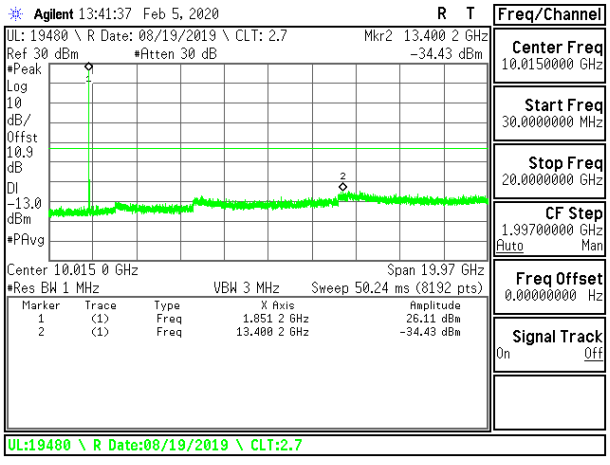
LTE B2 5MHz QPSK High Channel RB1-0



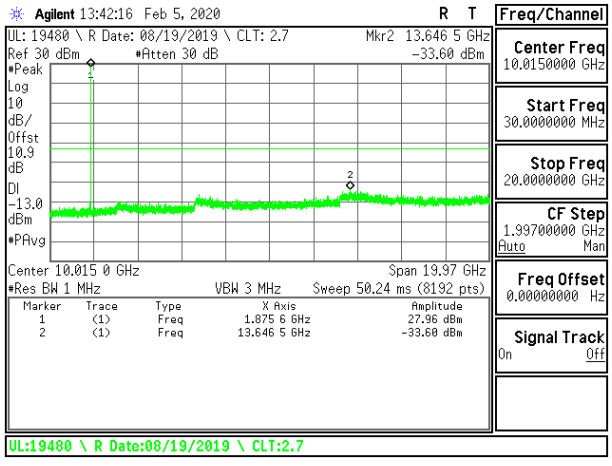
LTE B2 5MHz 16QAM High Channel RB1-0



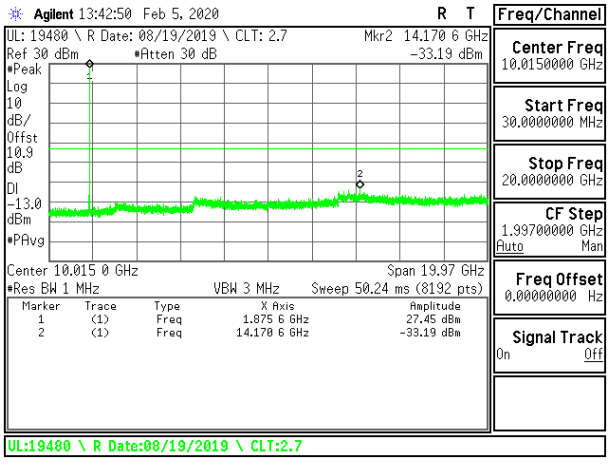
LTE B2 10MHz QPSK Low Channel RB1-0



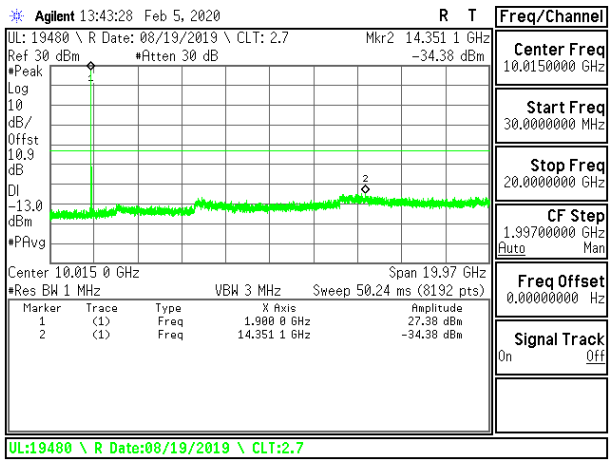
LTE B2 10MHz 16QAM Low Channel RB1-0



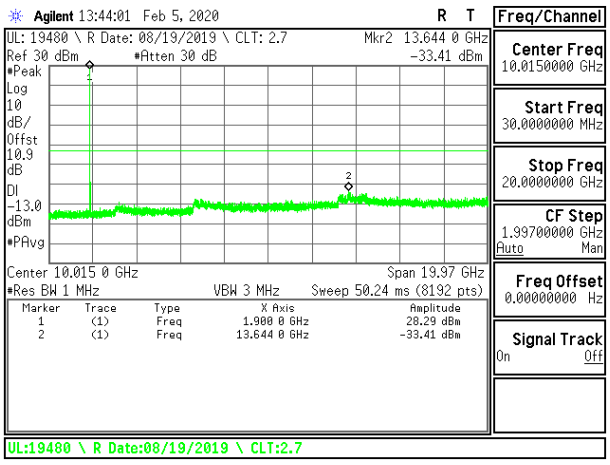
LTE B2 10MHz QPSK Middle Channel RB1-0



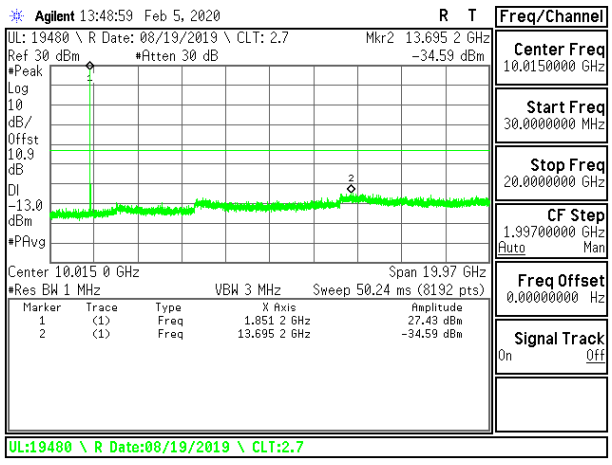
LTE B2 10MHz 16QAM Middle Channel RB1-0



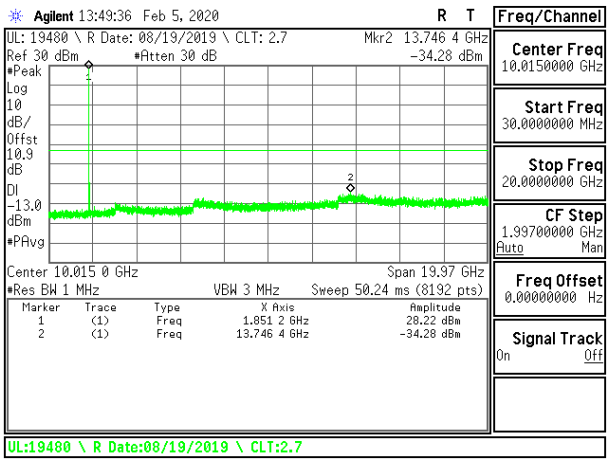
LTE B2 10MHz QPSK High Channel RB1-0



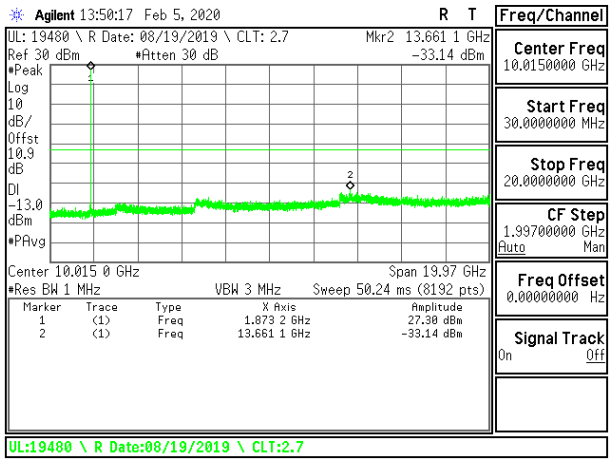
LTE B2 10MHz 16QAM High Channel RB1-0



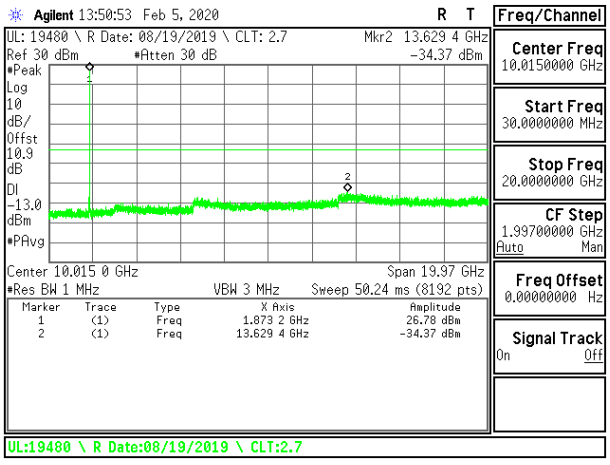
LTE B2 15MHz QPSK Low Channel RB1-0



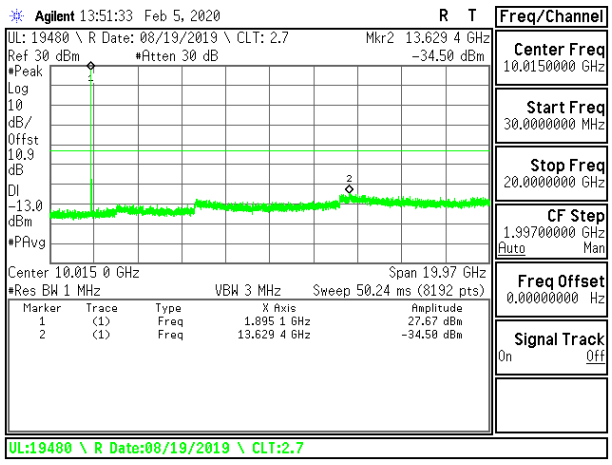
LTE B2 15MHz 16QAM Low Channel RB1-0



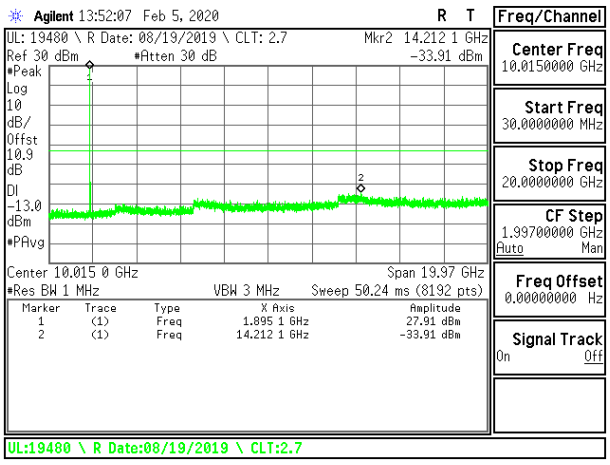
LTE B2 15MHz QPSK Middle Channel RB1-0



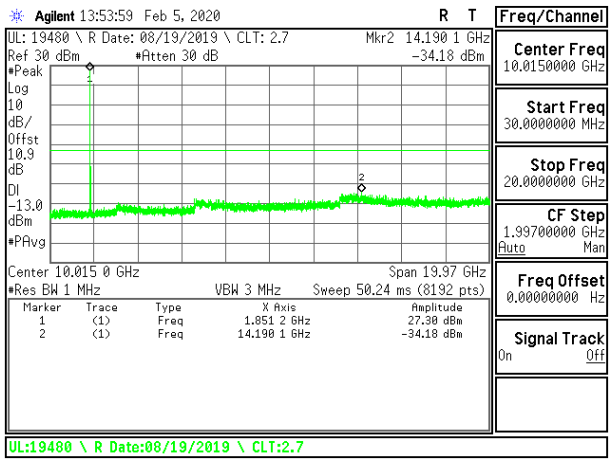
LTE B2 15MHz 16QAM Middle Channel RB1-0



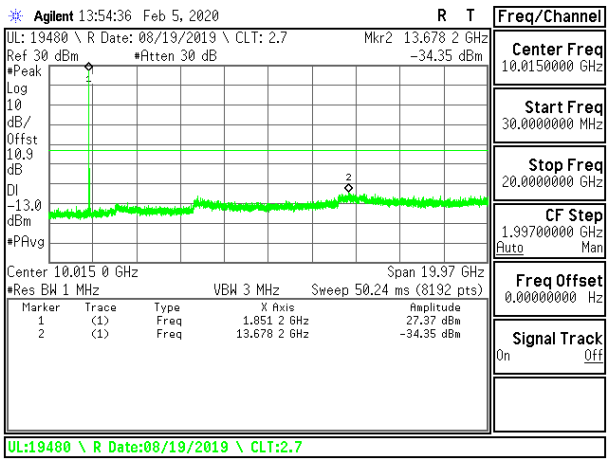
LTE B2 15MHz QPSK High Channel RB1-0



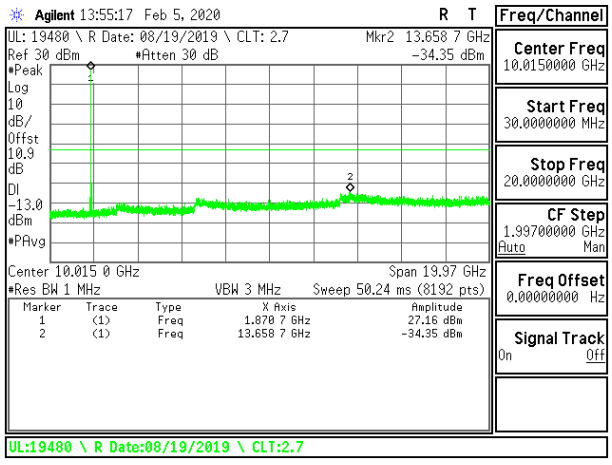
LTE B2 15MHz 16QAM High Channel RB1-0



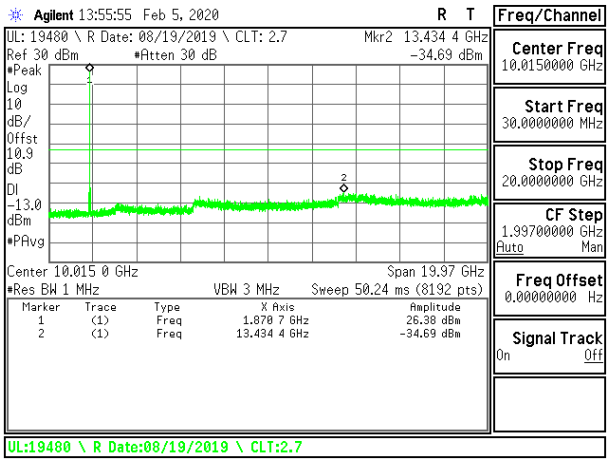
LTE B2 20MHz QPSK Low Channel RB1-0



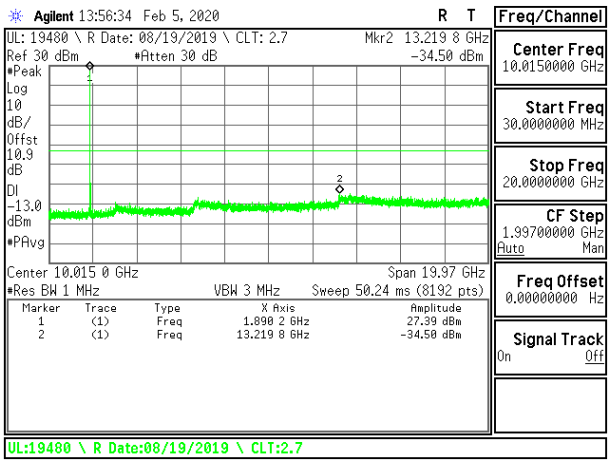
LTE B2 20MHz 16QAM Low Channel RB1-0



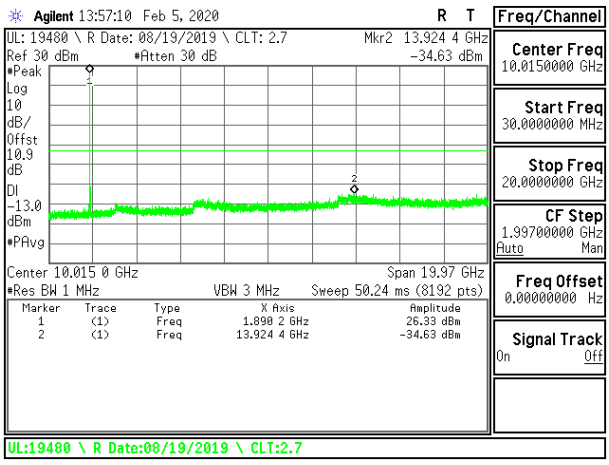
LTE B2 20MHz QPSK Middle Channel RB1-0



LTE B2 20MHz 16QAM Middle Channel RB1-0



LTE B2 20MHz QPSK High Channel RB1-0

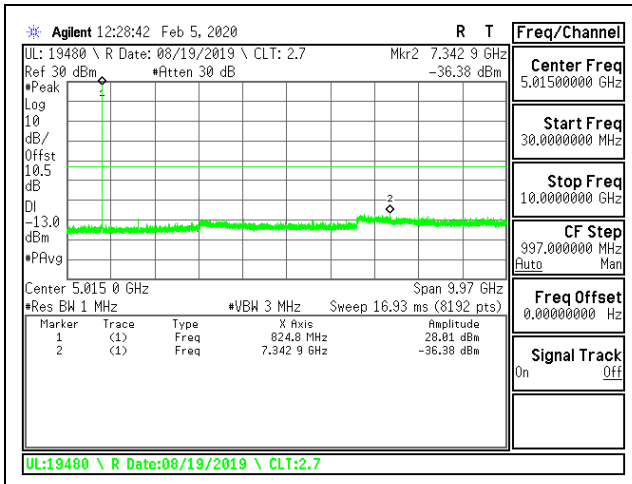


LTE B2 20MHz 16QAM High Channel RB1-0

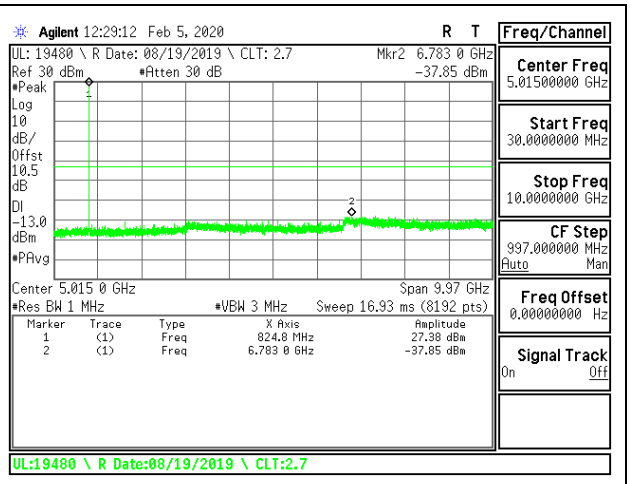
8.3.7. LTE BAND 5

LIMITS

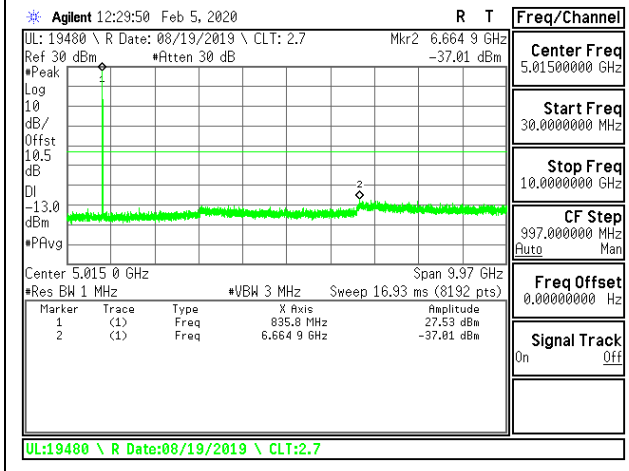
FCC: §22.917
The minimum permissible attenuation level of any spurious emissions is 43 + 10 log (P) dB where transmitting power (P) in Watts.
ISED: RSS132§5.5
The minimum permissible attenuation level of any spurious emissions is 43 + 10 log (P) dB where transmitting power (P) in Watts.



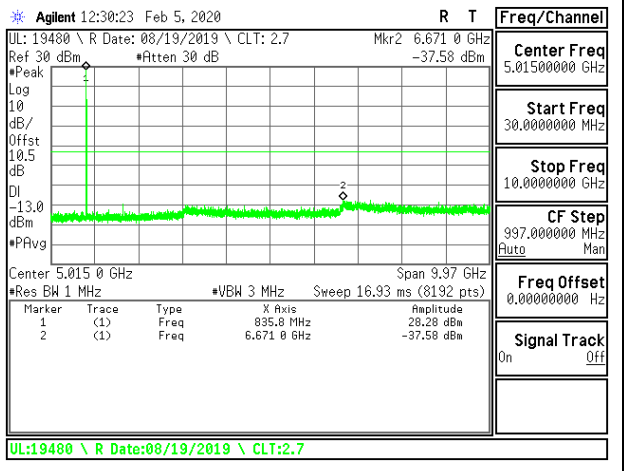
LTE B5 1.4MHz QPSK Low Channel RB1-0



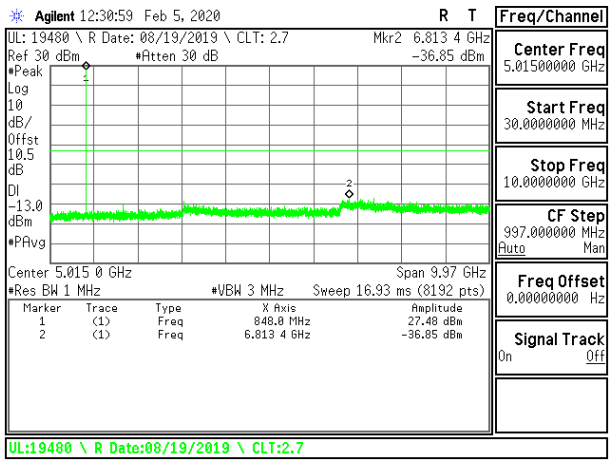
LTE B5 1.4MHz 16QAM Low Channel RB1-0



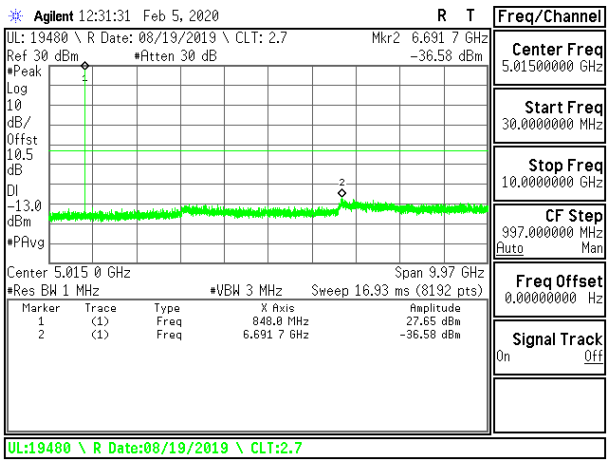
LTE B5 1.4MHz QPSK Middle Channel RB1-0



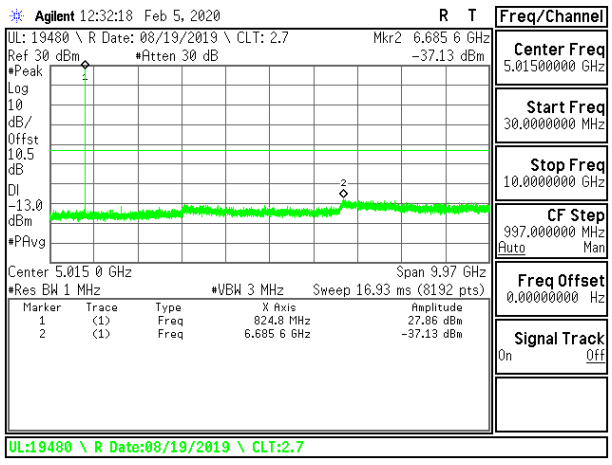
LTE B5 1.4MHz 16QAM Middle Channel RB1-0



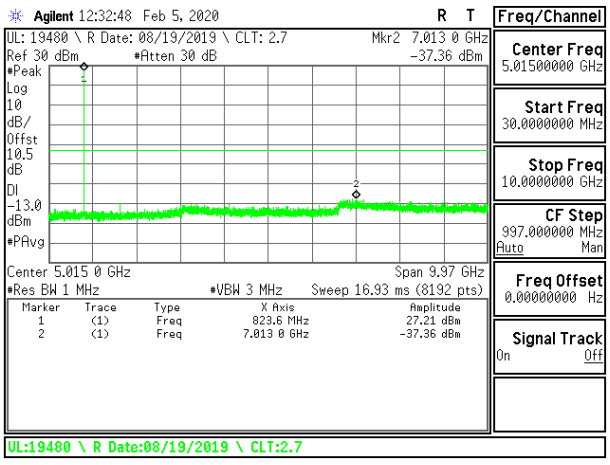
LTE B5 1.4MHz QPSK High Channel RB1-0



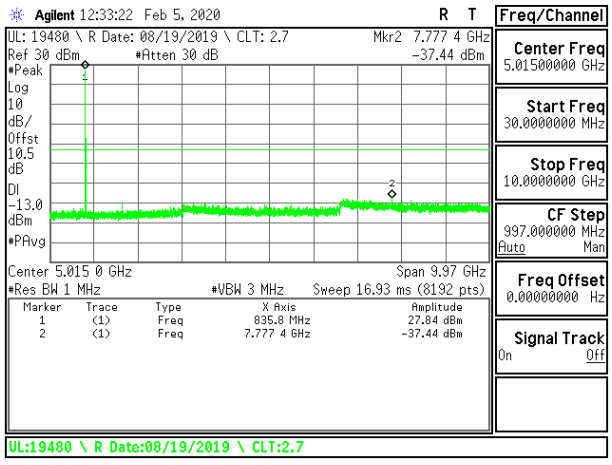
LTE B5 1.4MHz 16QAM High Channel RB1-0



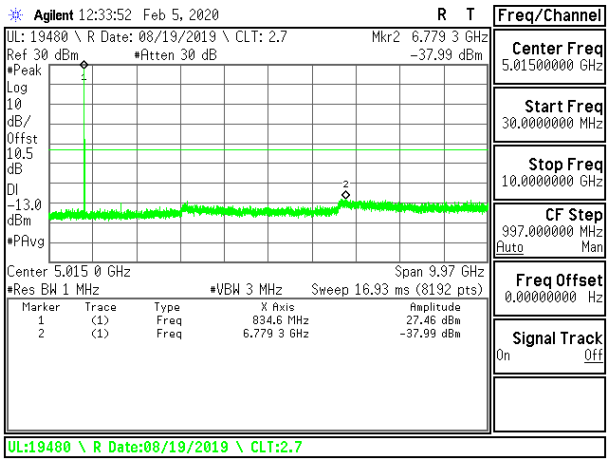
LTE B5 3MHz QPSK Low Channel RB1-0



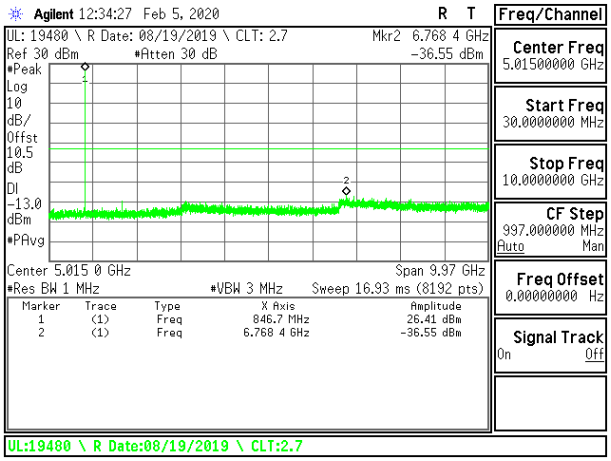
LTE B5 3MHz 16QAM Low Channel RB1-0



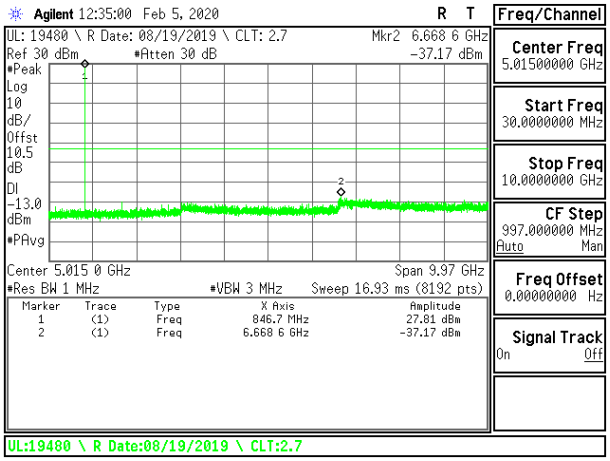
LTE B5 3MHz QPSK Middle Channel RB1-0



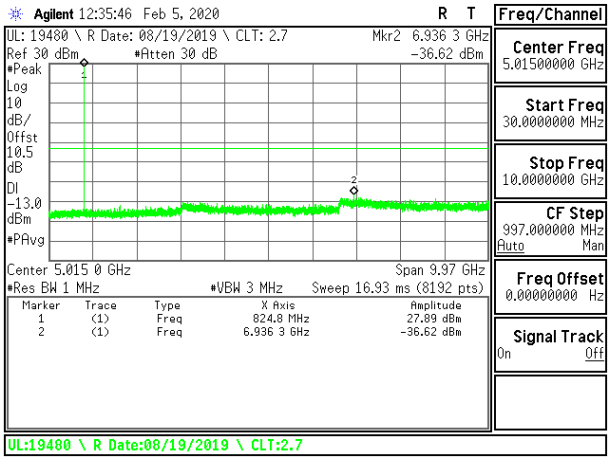
LTE B5 3MHz 16QAM Middle Channel RB1-0



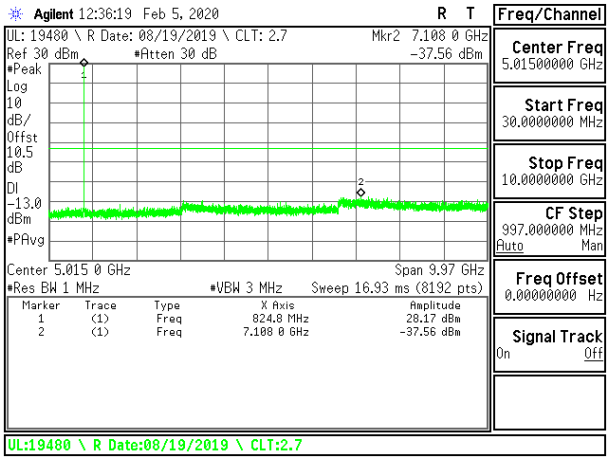
LTE B5 3MHz QPSK High Channel RB1-0



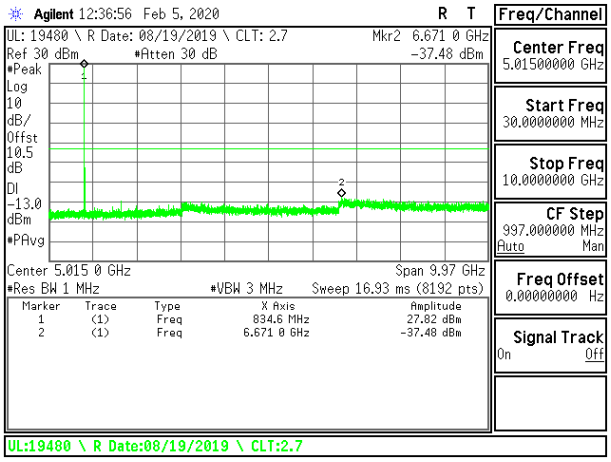
LTE B5 3MHz 16QAM High Channel RB1-0



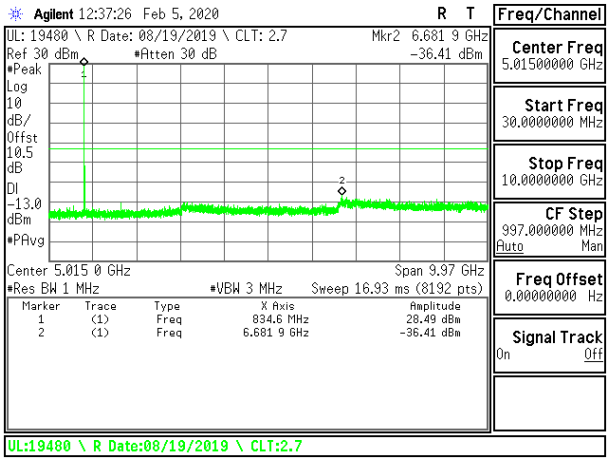
LTE B5 5MHz QPSK Low Channel RB1-0



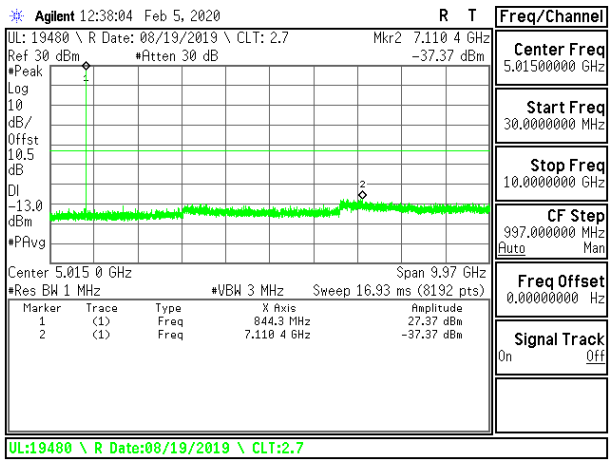
LTE B5 5MHz 16QAM Low Channel RB1-0



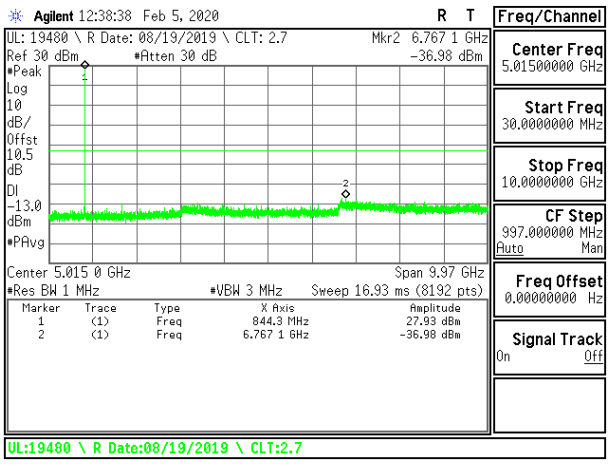
LTE B5 5MHz QPSK Middle Channel RB1-0



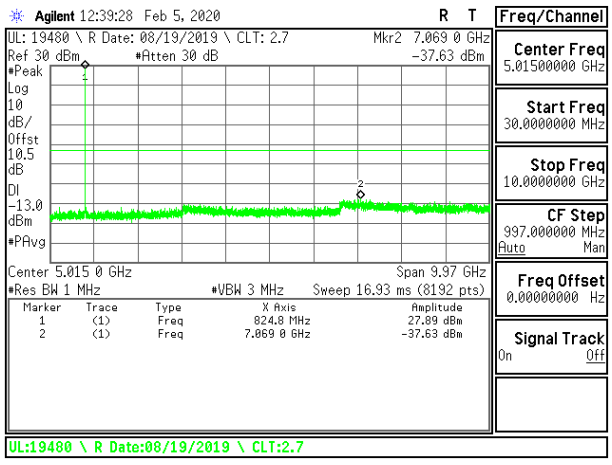
LTE B5 5MHz 16QAM Middle Channel RB1-0



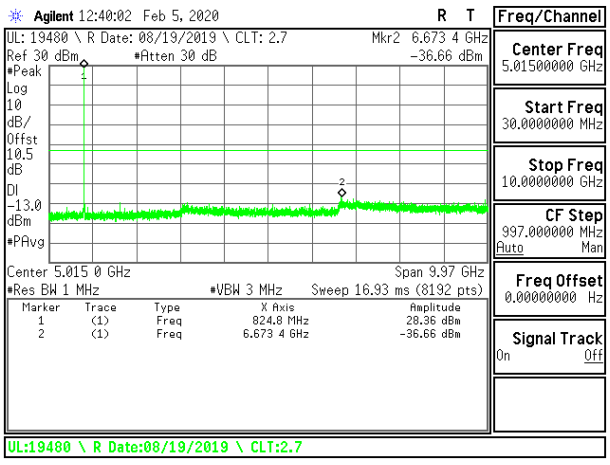
LTE B5 5MHz QPSK High Channel RB1-0



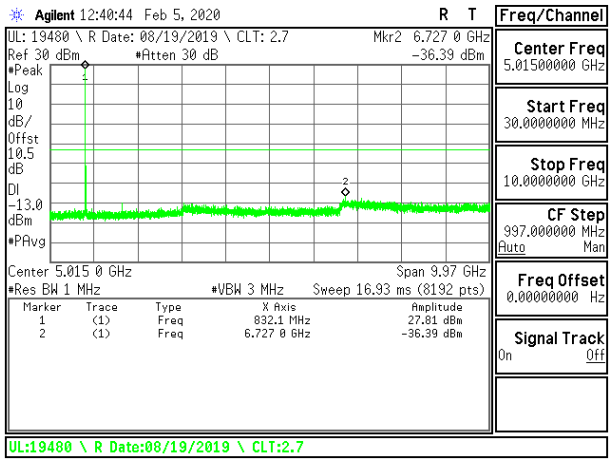
LTE B5 5MHz 16QAM High Channel RB1-0



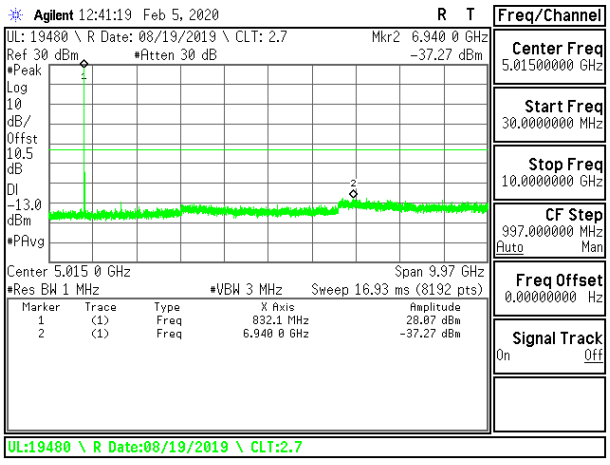
LTE B5 10MHz QPSK Low Channel RB1-0



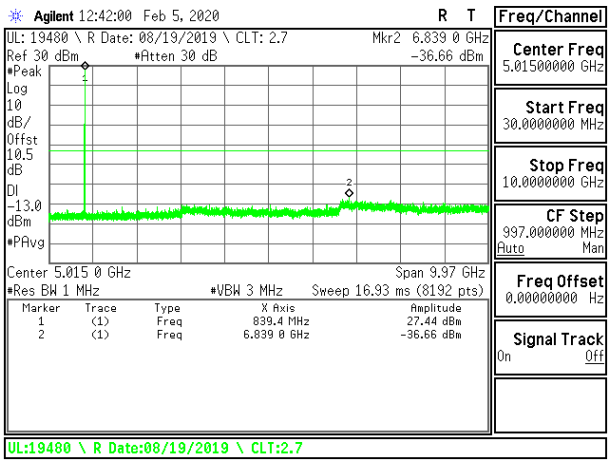
LTE B5 10MHz 16QAM Low Channel RB1-0



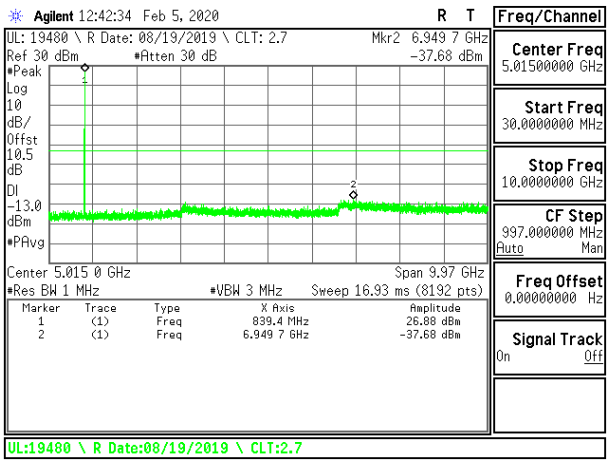
LTE B5 10MHz QPSK Middle Channel RB1-0



LTE B5 10MHz 16QAM Middle Channel RB1-0



LTE B5 10MHz QPSK High Channel RB1-0

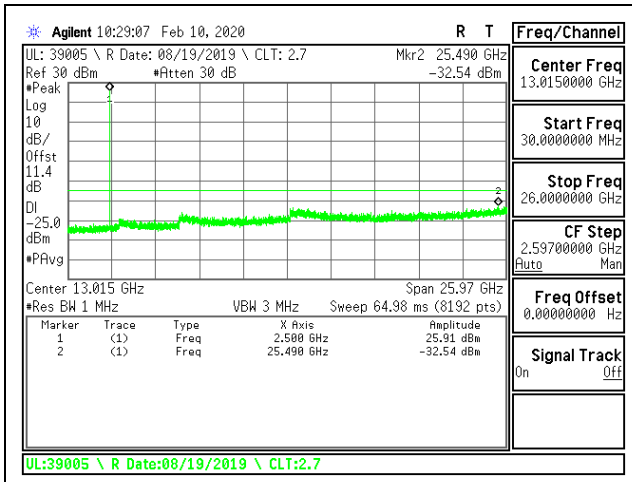


LTE B5 10MHz 16QAM High Channel RB1-0

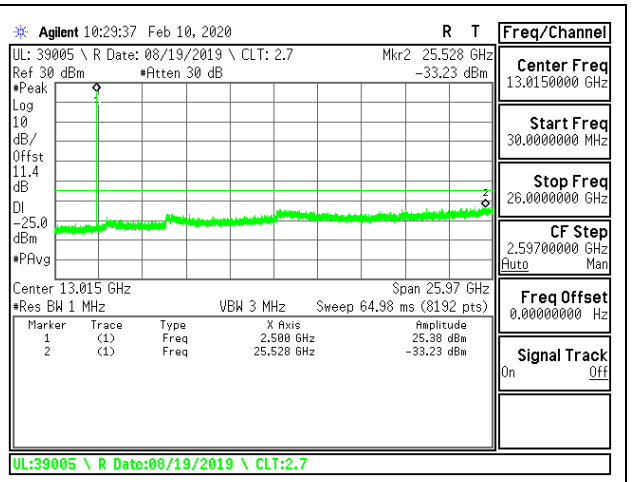
8.3.8. LTE BAND 7

LIMITS

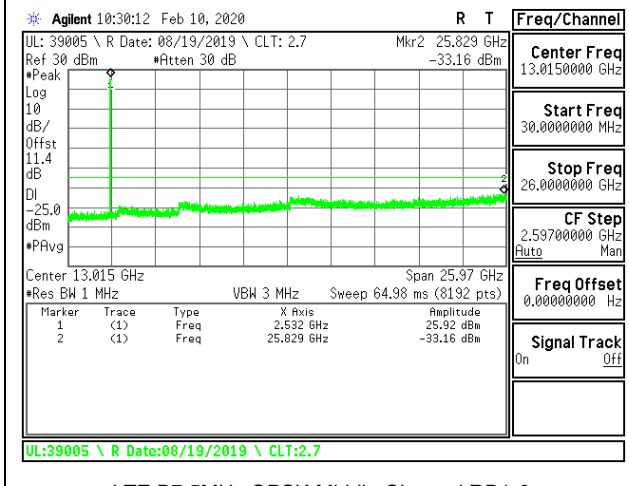
FCC: §27.53 (m)
The minimum permissible attenuation level of any spurious emissions is 55 + 10 log (P) dB where transmitting power (P) in Watts.
RSS199§4.5
The minimum permissible attenuation level of any spurious emissions is 55 + 10 log (P) dB where transmitting power (P) in Watts.



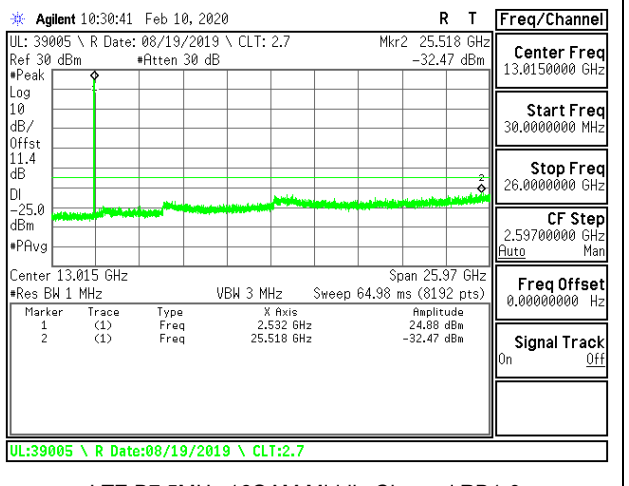
LTE B7 5MHz QPSK Low Channel RB1-0



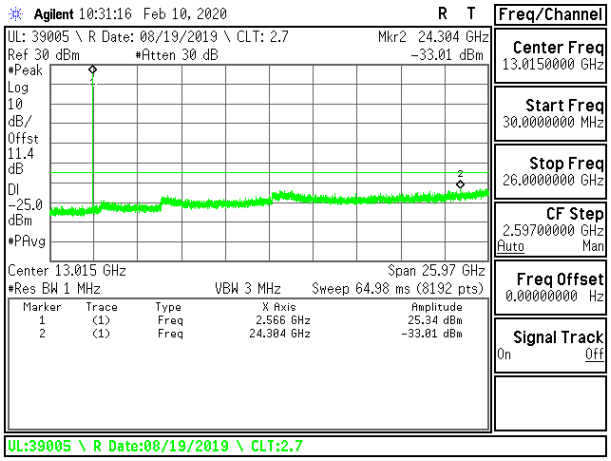
LTE B7 5MHz 16QAM Low Channel RB1-0



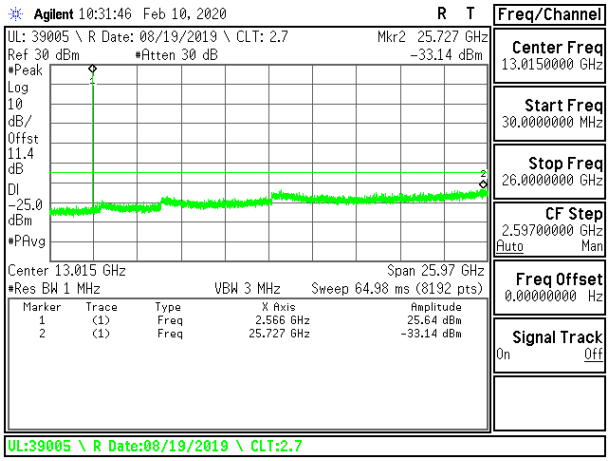
LTE B7 5MHz QPSK Middle Channel RB1-0



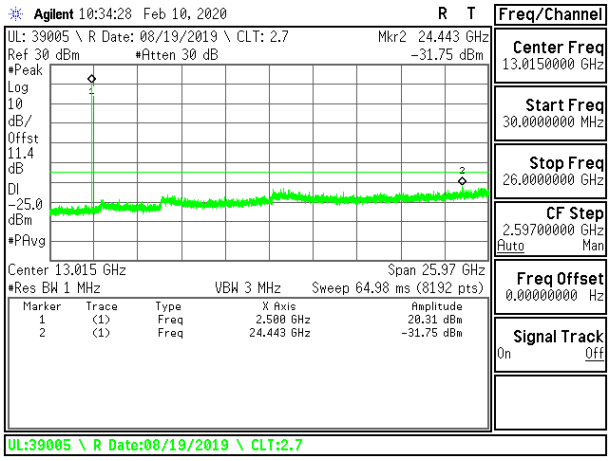
LTE B7 5MHz 16QAM Middle Channel RB1-0



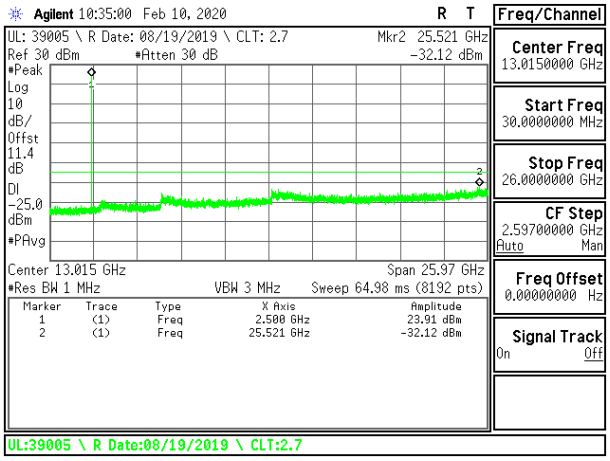
LTE B7 5MHz QPSK High Channel RB1-0



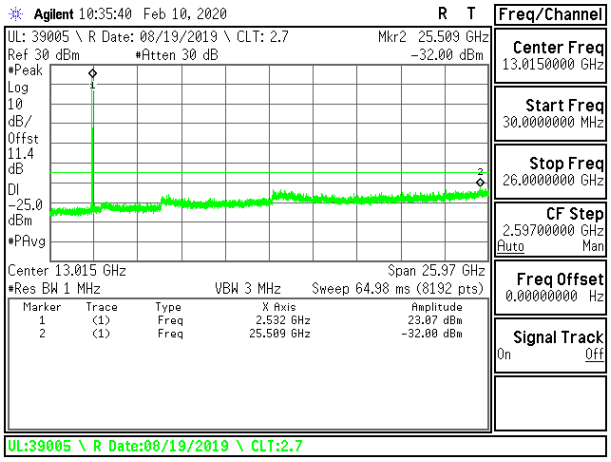
LTE B7 5MHz 16QAM High Channel RB1-0



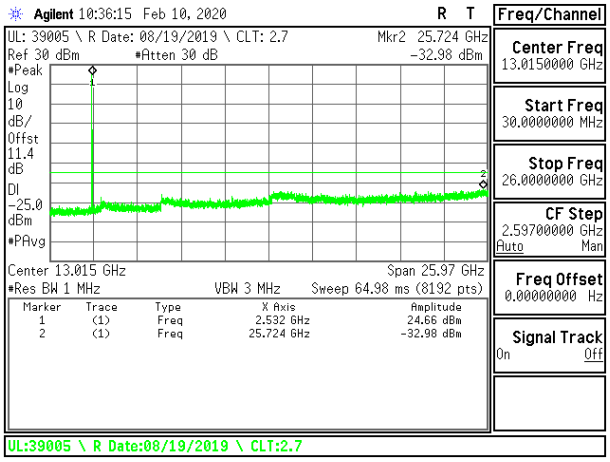
LTE B7 10MHz QPSK Low Channel RB1-0



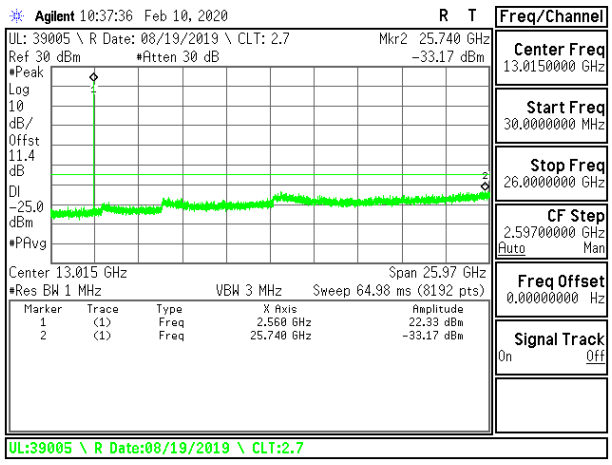
LTE B7 10MHz 16QAM Low Channel RB1-0



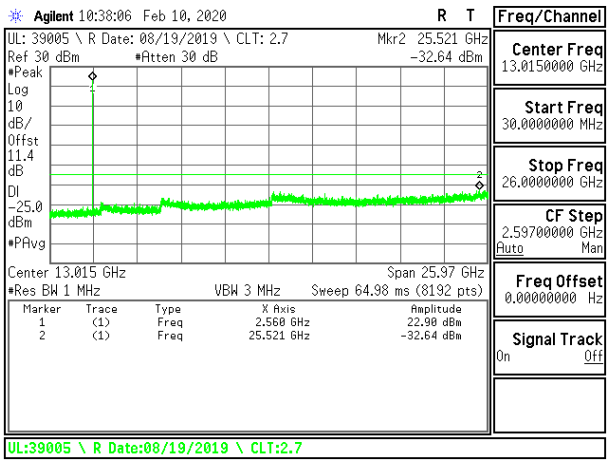
LTE B7 10MHz QPSK Middle Channel RB1-0



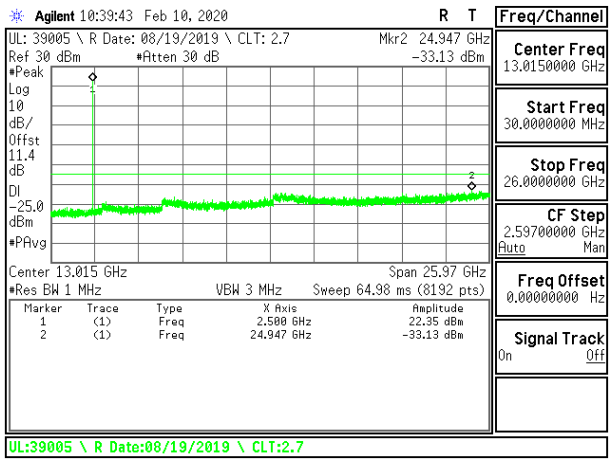
LTE B7 10MHz 16QAM Middle Channel RB1-0



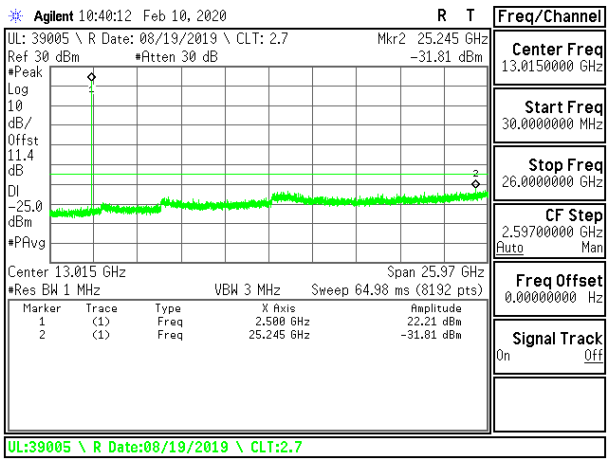
LTE B7 10MHz QPSK High Channel RB1-0



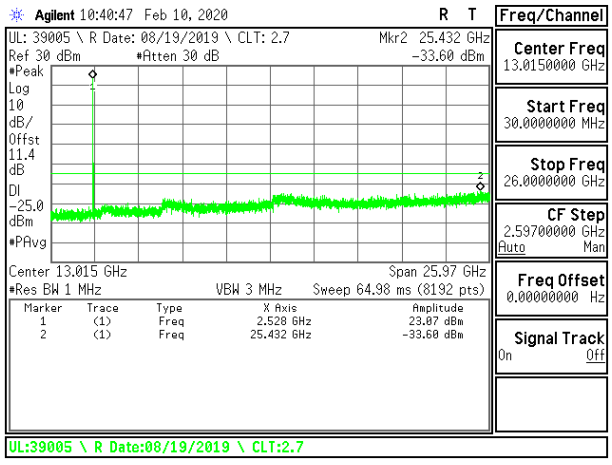
LTE B7 10MHz 16QAM High Channel RB1-0



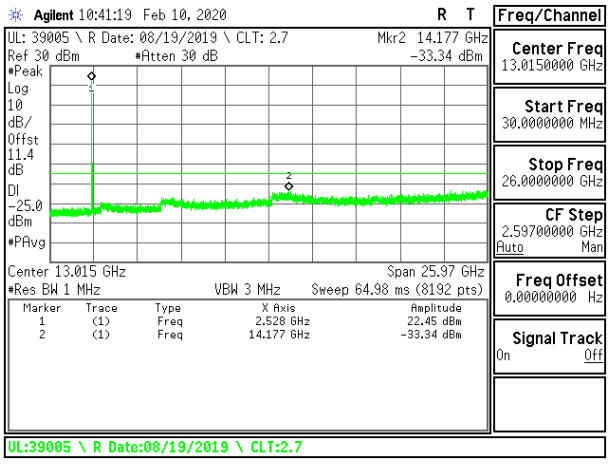
LTE B7 15MHz QPSK Low Channel RB1-0



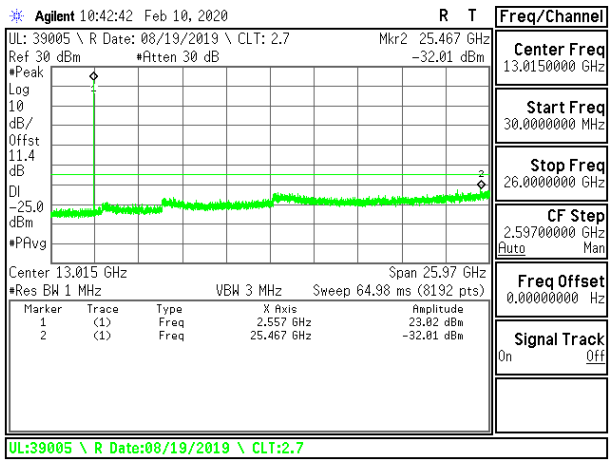
LTE B7 15MHz 16QAM Low Channel RB1-0



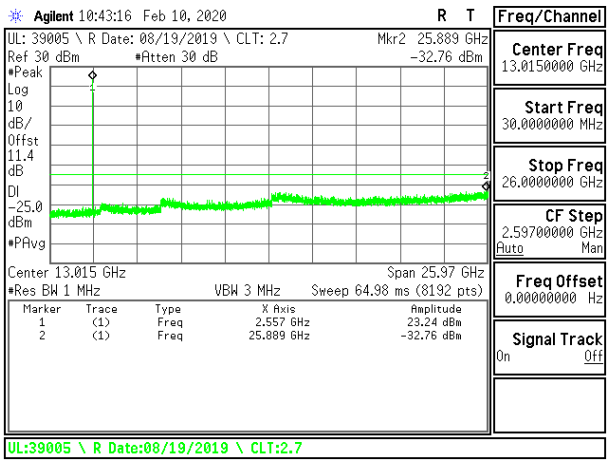
LTE B7 15MHz QPSK Middle Channel RB1-0



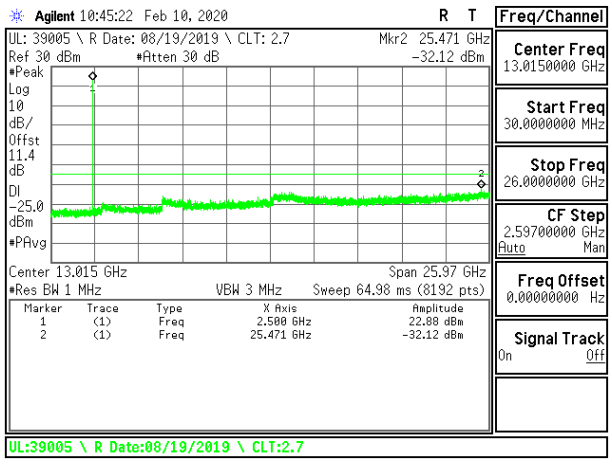
LTE B7 15MHz 16QAM Middle Channel RB1-0



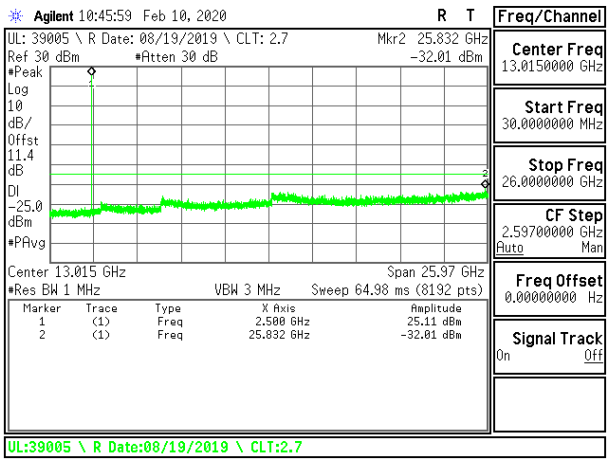
LTE B7 15MHz QPSK High Channel RB1-0



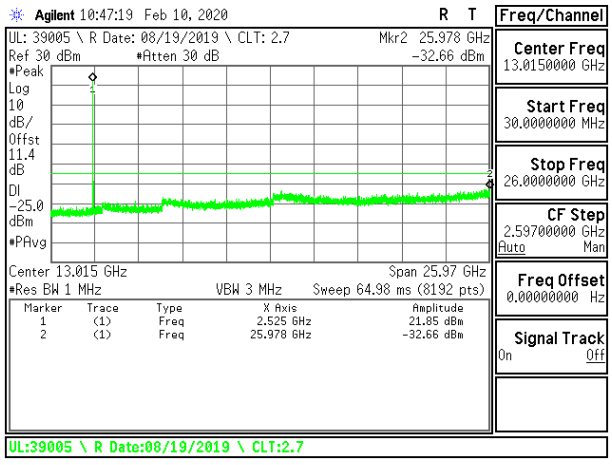
LTE B7 15MHz 16QAM High Channel RB1-0



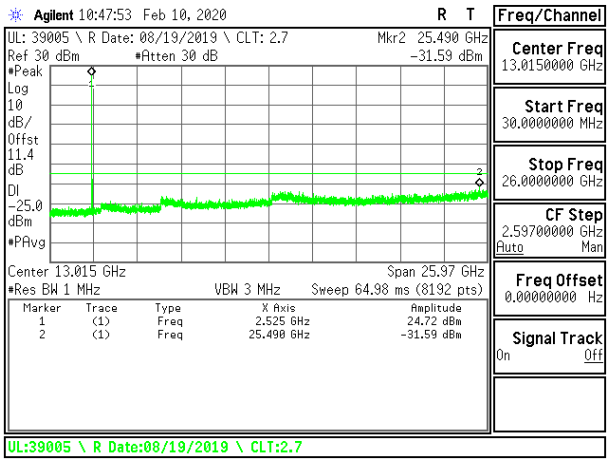
LTE B7 20MHz QPSK Low Channel RB1-0



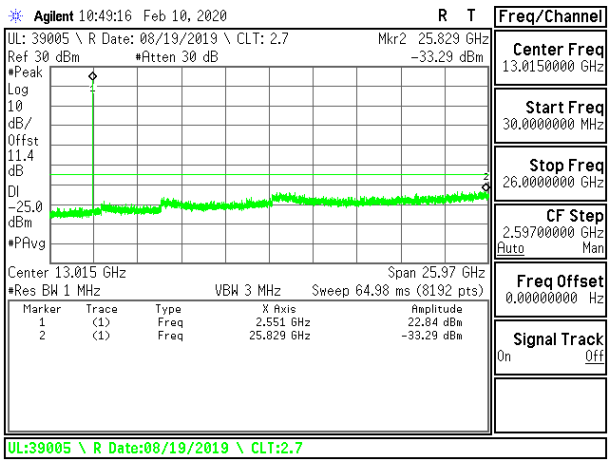
LTE B7 20MHz 16QAM Low Channel RB1-0



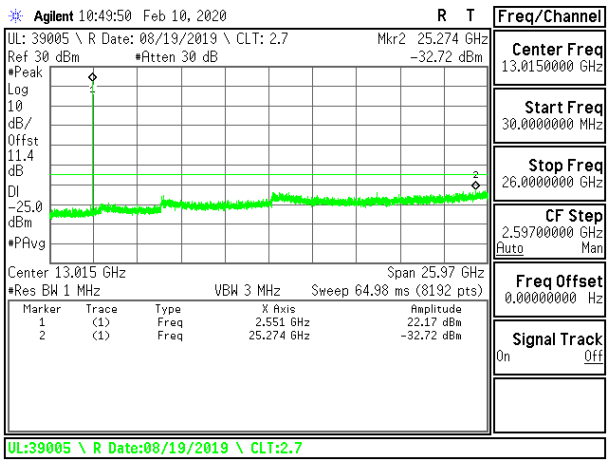
LTE B7 20MHz QPSK Middle Channel RB1-0



LTE B7 20MHz 16QAM Middle Channel RB1-0



LTE B7 20MHz QPSK High Channel RB1-0



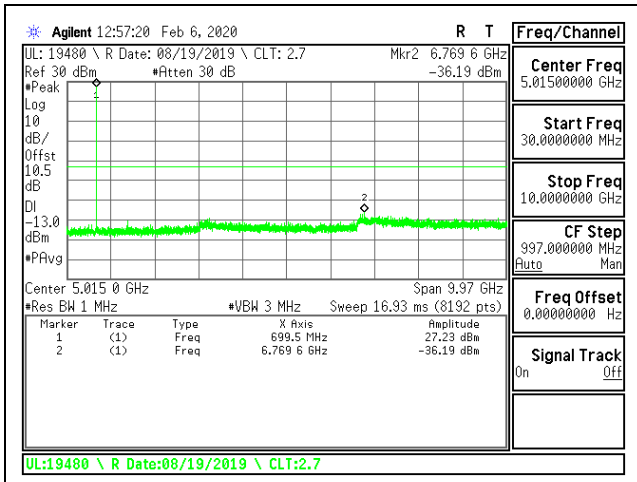
LTE B7 20MHz 16QAM High Channel RB1-0

8.3.9. LTE BAND 12

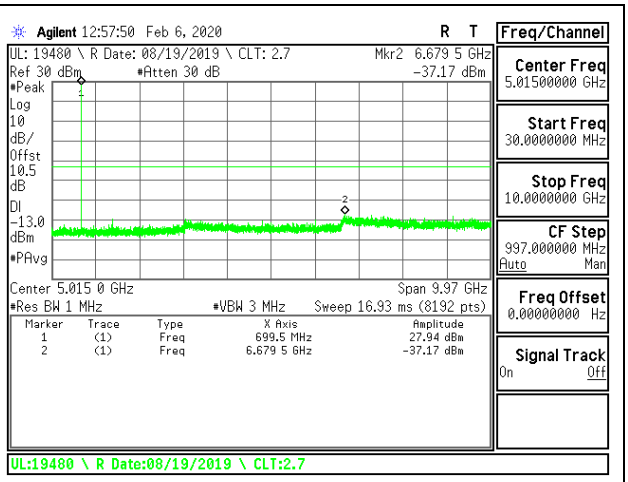
LIMITS

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.
ISED: RSS130§4.7

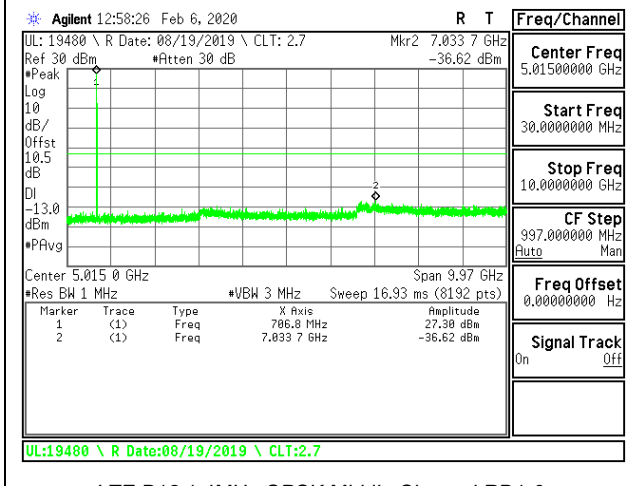
The minimum permissible attenuation level of any spurious emissions is 43 + 10 log (P) dB where transmitting power (P) in Watts.



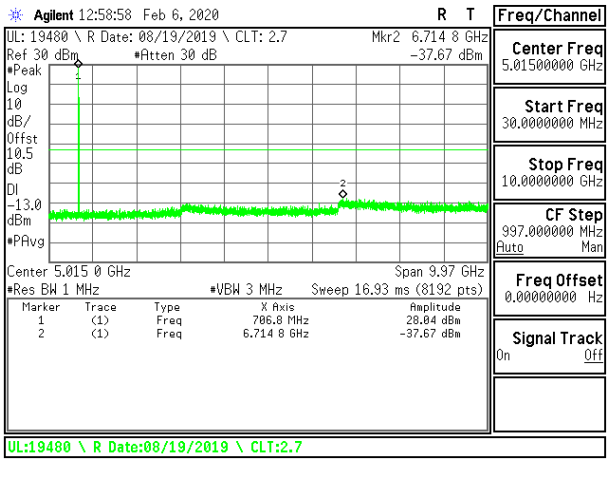
LTE B12 1.4MHz QPSK Low Channel RB1-0



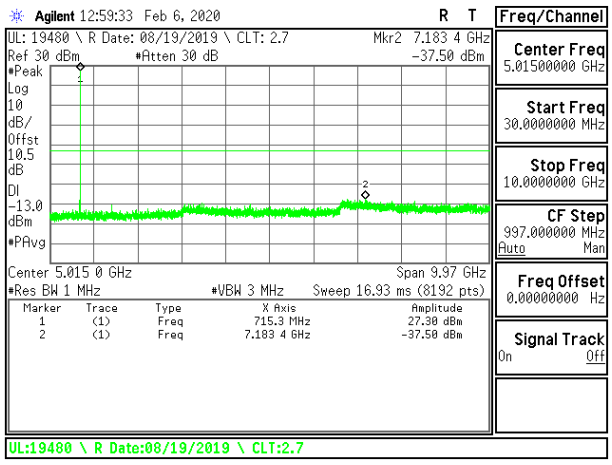
LTE B12 1.4MHz 16QAM Low Channel RB1-0



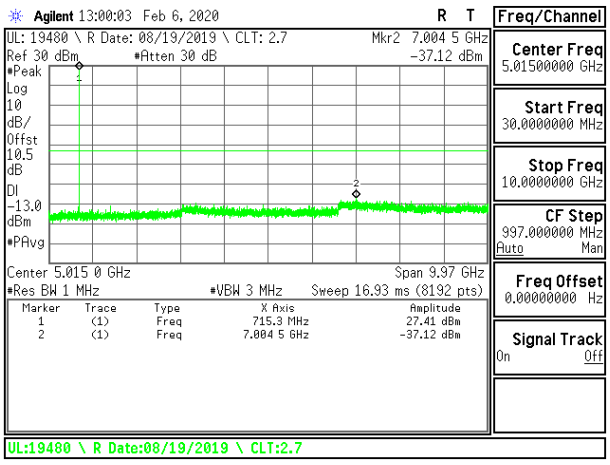
LTE B12 1.4MHz QPSK Middle Channel RB1-0



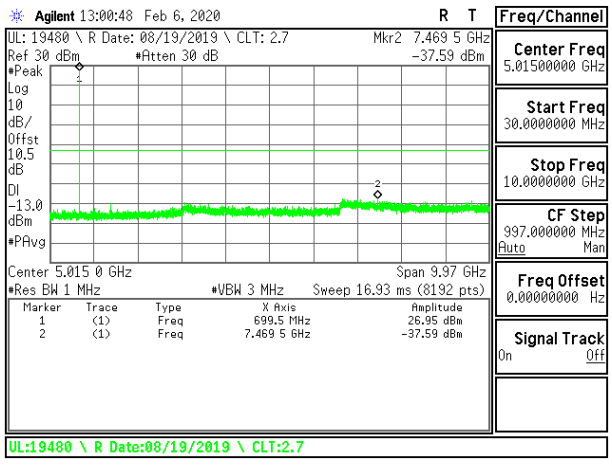
LTE B12 1.4MHz 16QAM Middle Channel RB1-0



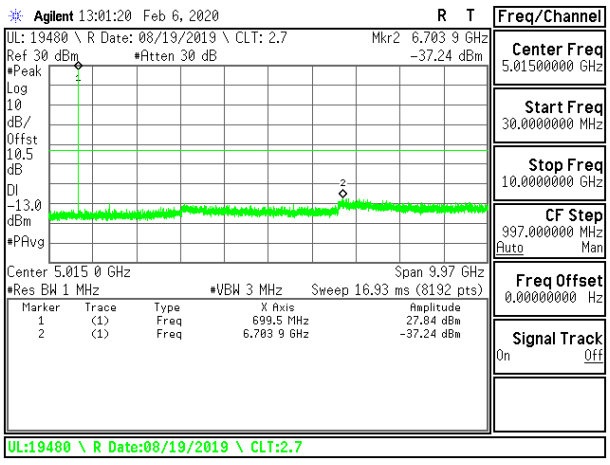
LTE B12 1.4MHz QPSK High Channel RB1-0



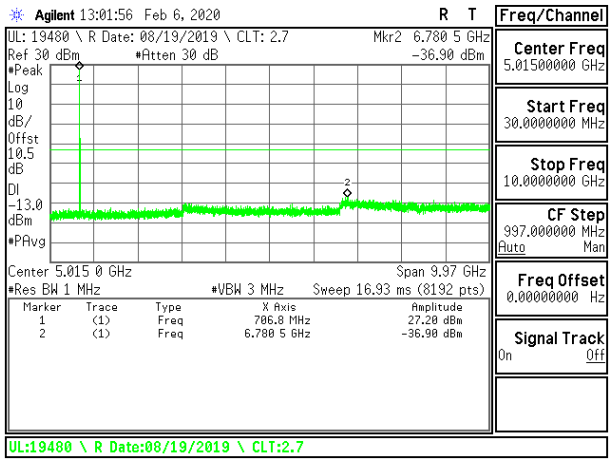
LTE B12 1.4MHz 16QAM High Channel RB1-0



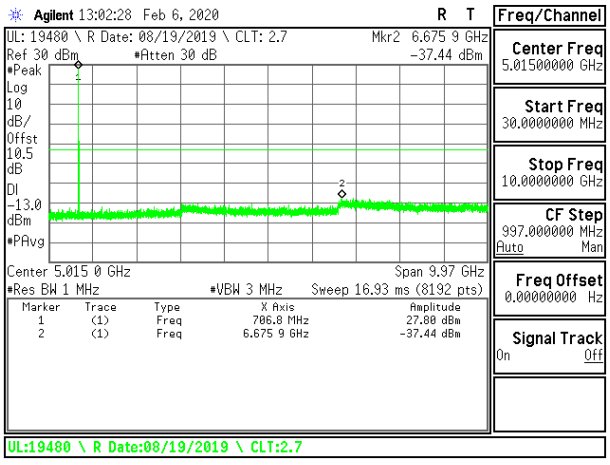
LTE B12 3MHz QPSK Low Channel RB1-0



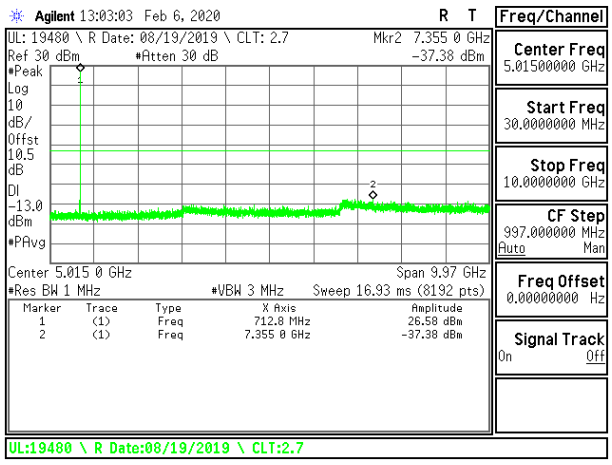
LTE B12 3MHz 16QAM Low Channel RB1-0



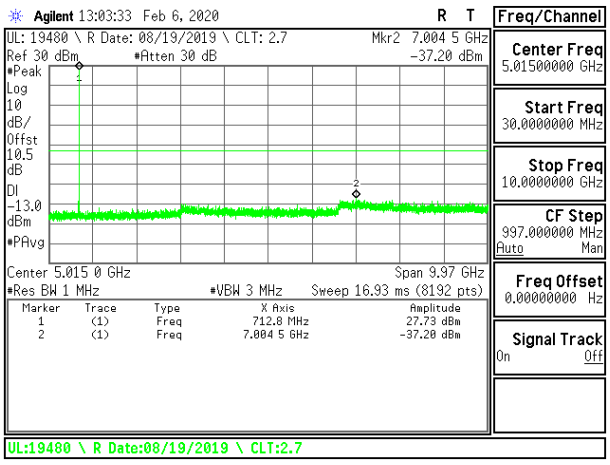
LTE B12 3MHz QPSK Middle Channel RB1-0



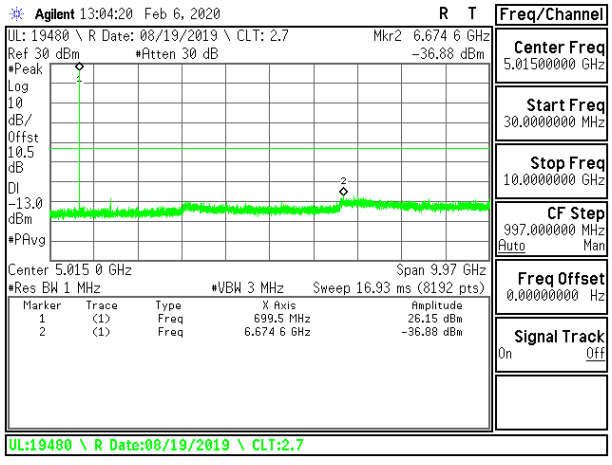
LTE B12 3MHz 16QAM Middle Channel RB1-0



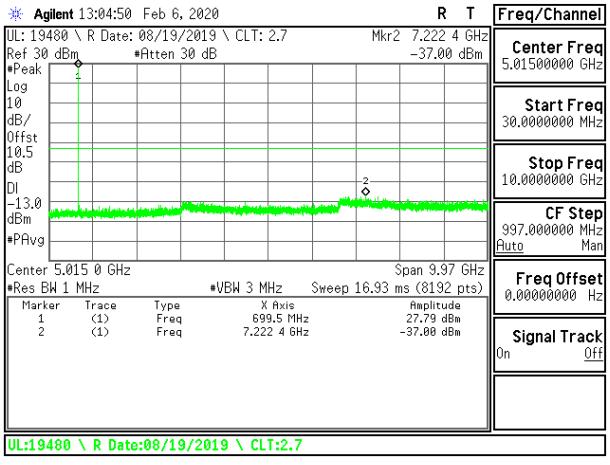
LTE B12 3MHz QPSK High Channel RB1-0



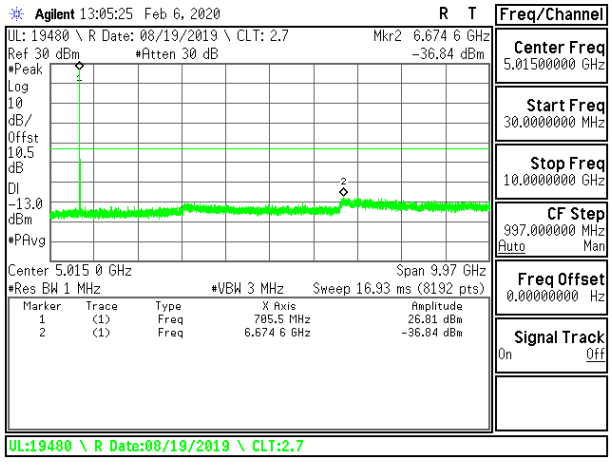
LTE B12 3MHz 16QAM High Channel RB1-0



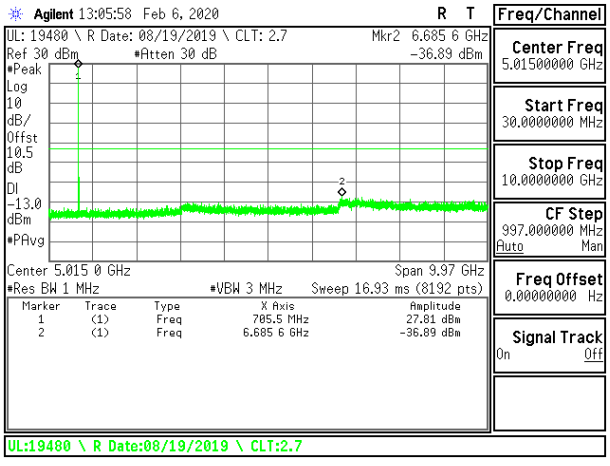
LTE B12 5MHz QPSK Low Channel RB1-0



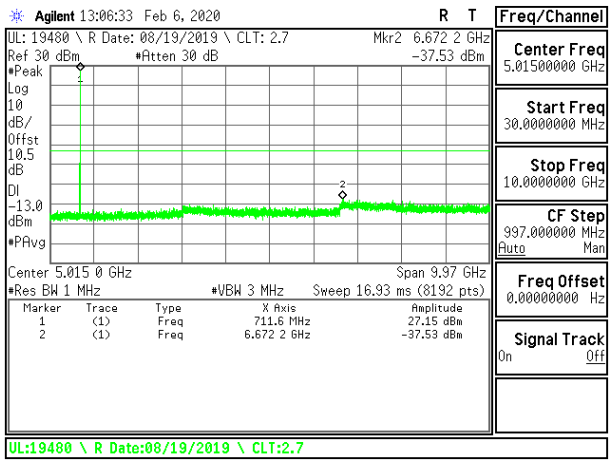
LTE B12 5MHz 16QAM Low Channel RB1-0



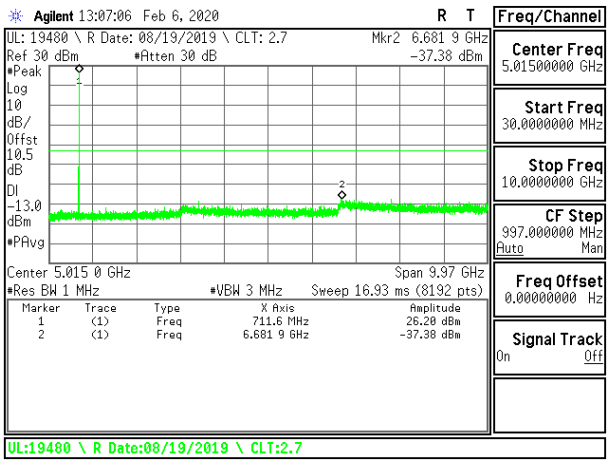
LTE B12 5MHz QPSK Middle Channel RB1-0



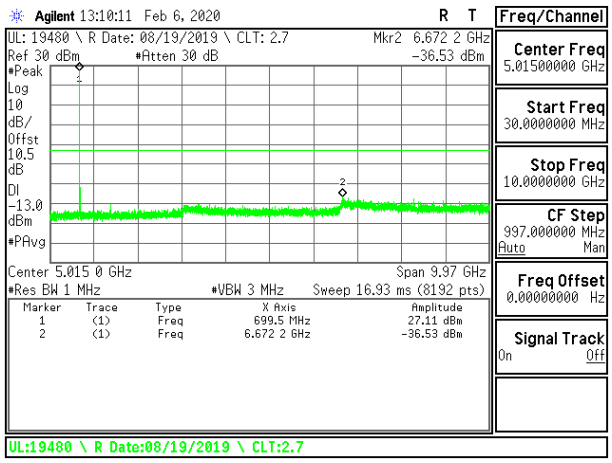
LTE B12 5MHz 16QAM Middle Channel RB1-0



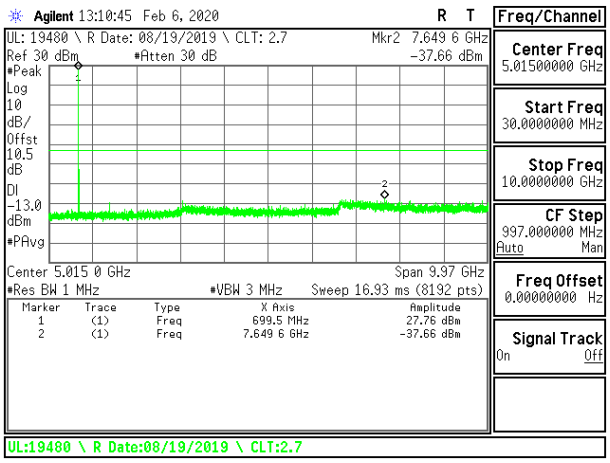
LTE B12 5MHz QPSK High Channel RB1-0



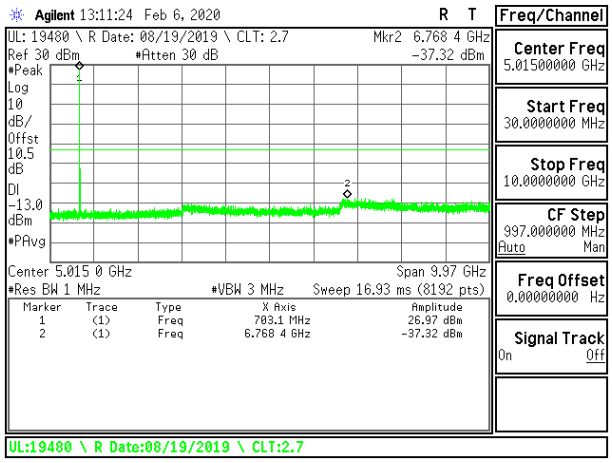
LTE B12 5MHz 16QAM High Channel RB1-0



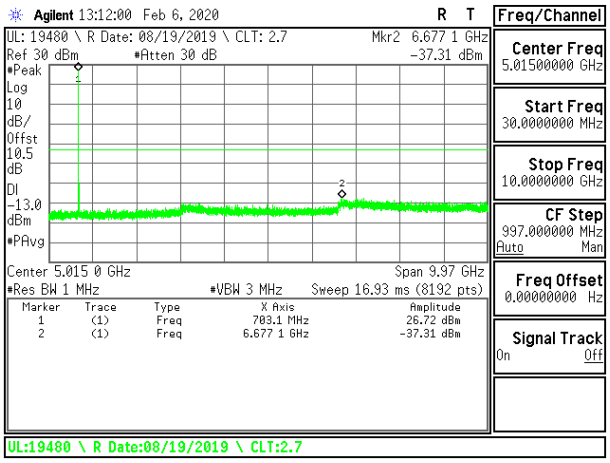
LTE B12 10MHz QPSK Low Channel RB1-0



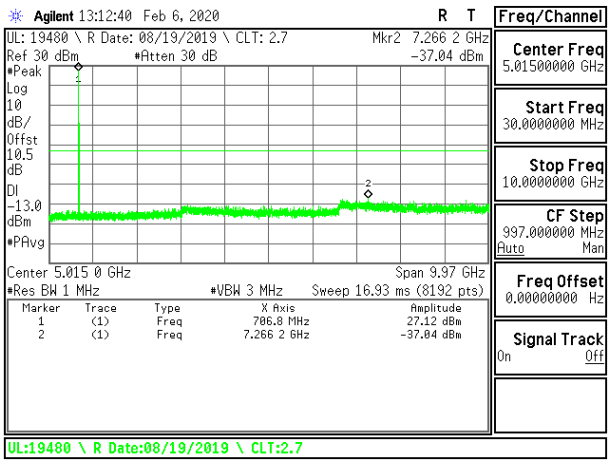
LTE B12 10MHz 16QAM Low Channel RB1-0



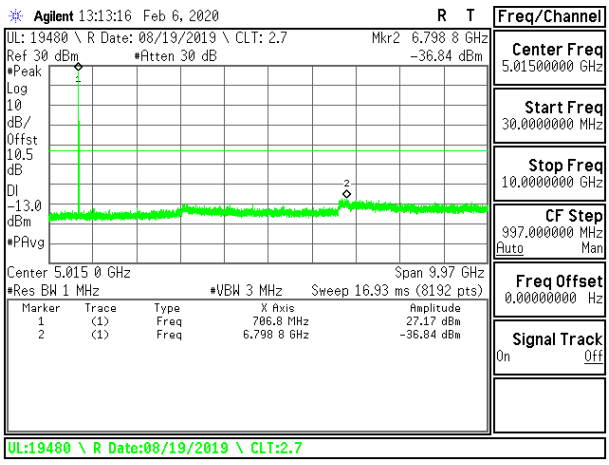
LTE B12 10MHz QPSK Middle Channel RB1-0



LTE B12 10MHz 16QAM Middle Channel RB1-0



LTE B12 10MHz QPSK High Channel RB1-0



LTE B12 10MHz 16QAM High Channel RB1-0

8.3.10. LTE BAND 13

LIMITS

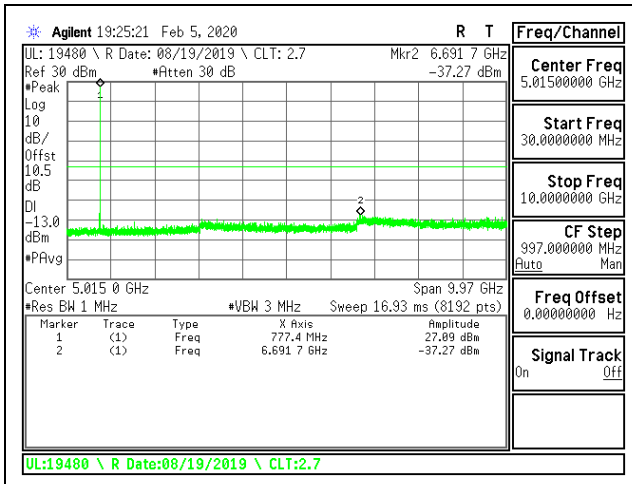
FCC: §27.53 (c), (f)
The minimum permissible attenuation level of any spurious emissions is 43 + 10 log (P) dB where transmitting power (P) in Watts. The band 1559-1610 MHz shall be limited to −70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and −80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth.

ISED: RSS130§4.7
The minimum permissible attenuation level of any spurious emissions is 43 + 10 log (P) dB where transmitting power (P) in Watts.
4.7.1 General unwanted emissions limits
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.

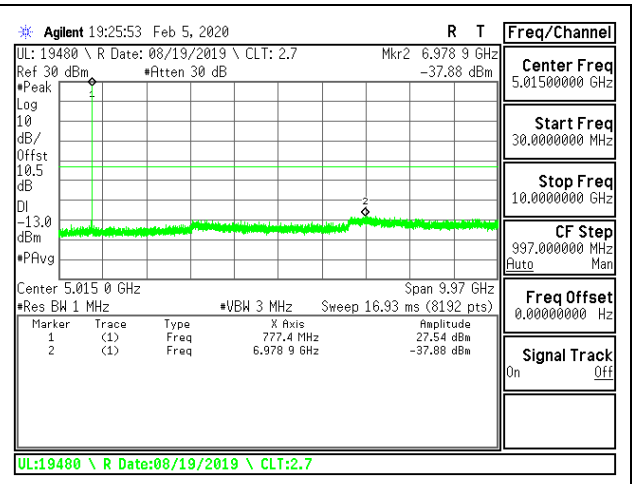
4.7.2 Additional unwanted emissions limits
In addition to the limit outlined in section 4.7.1 above, equipment operating in the frequency bands 746-756 MHz and 777-787 MHz shall also comply with the following restrictions:

(a) the power of any unwanted emissions in any 6.25 kHz bandwidth for all frequencies between 763-775 MHz and 793-806 MHz shall be attenuated below the transmitter power, P (dBW), by at least:
    i. 76 + 10 $\log_{10}$ p (watts), dB, for base and fixed equipment and
    ii. 65 + 10 $\log_{10}$ p (watts), dB, for mobile and portable equipment
(b) the e.i.r.p. in the band 1559-1610 MHz shall not exceed −70 dBW/MHz for wideband signal and −80 dBW for discrete emission with bandwidth less than 700 Hz.

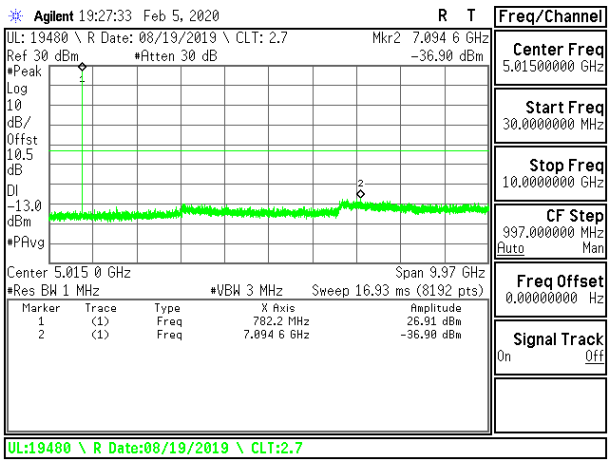
Note: Radiated data in section 9.1.6 confirms a compliance for the emissions in GPS 1559-1610 MHz band were wideband emissions therefore the -40dBm/MHz limit was used.



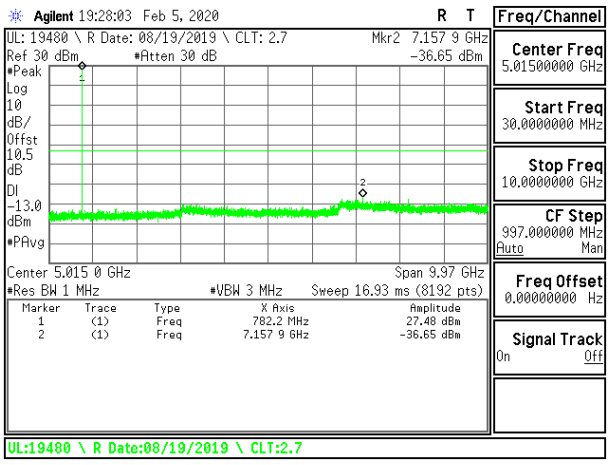
LTE B13 5MHz QPSK Low Channel RB1-0



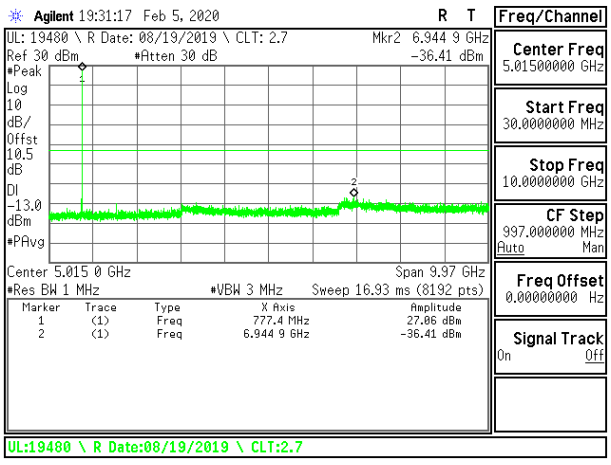
LTE B13 5MHz 16QAM Low Channel RB1-0



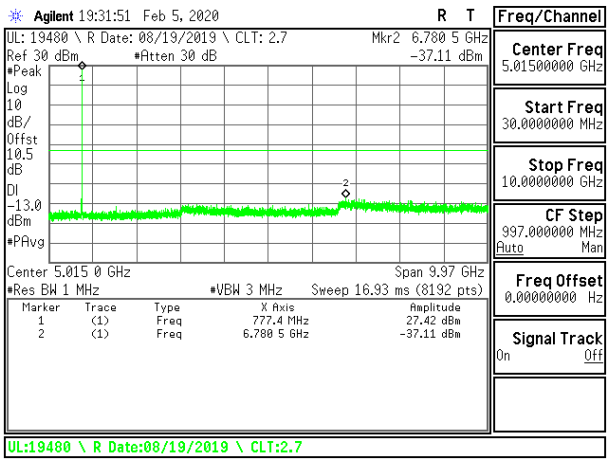
LTE B13 5MHz QPSK High Channel RB1-0



LTE B13 5MHz 16QAM High Channel RB1-0



LTE B13 10MHz QPSK Middle Channel RB1-0



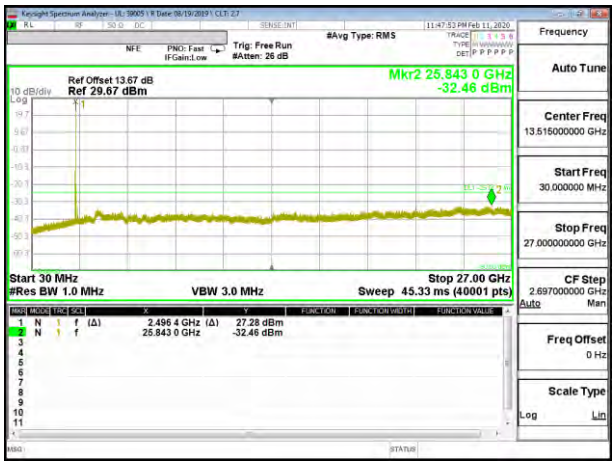
LTE B13 10MHz 16QAM Middle Channel RB1-0

Note: Radiated data in section 9.2.10 confirms a compliance with narrowband limits for GPS1559-1610 MHz band.

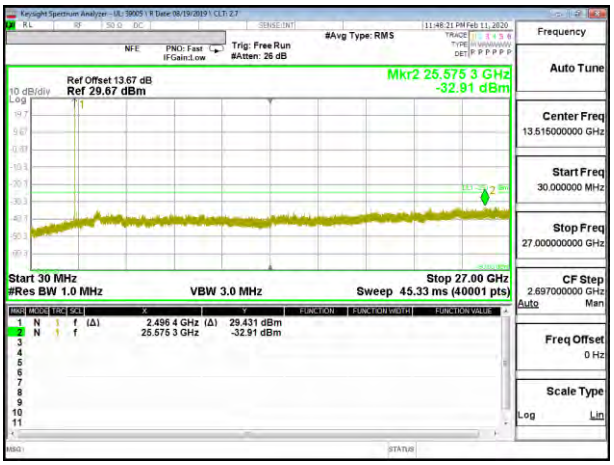
8.3.11. LTE BAND 41 (FCC)

LIMITS

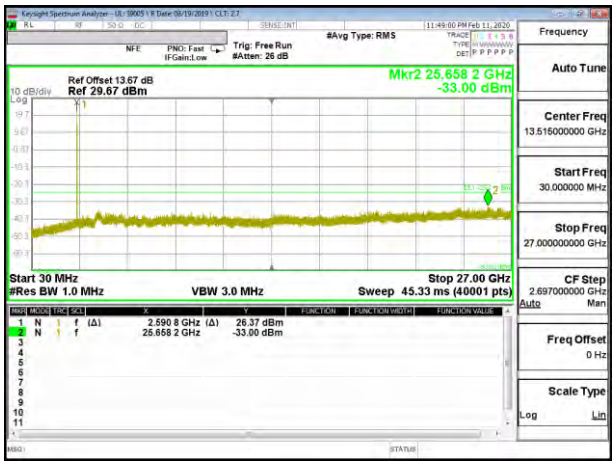
FCC: §27.53 (m)
The minimum permissible attenuation level of any spurious emissions is 55 + 10 log (P) dB where transmitting power (P) in Watts.



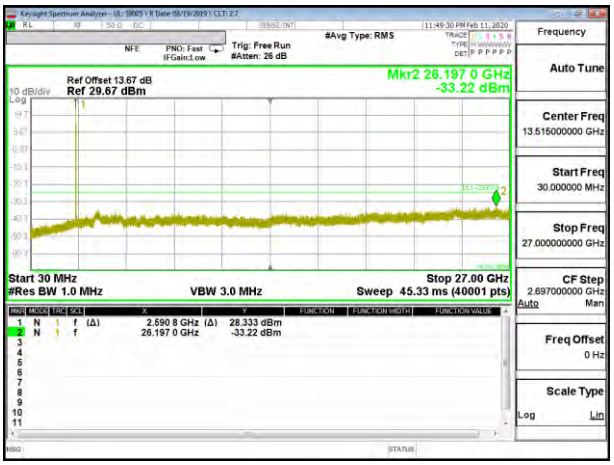
LTE B41 5MHz QPSK Low Channel RB1-0



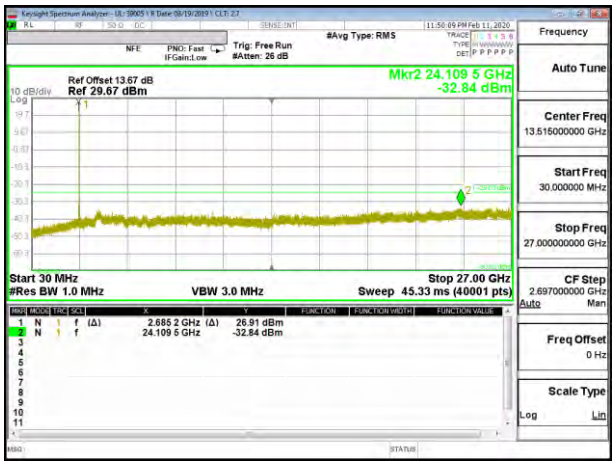
LTE B41 5MHz 16QAM Low Channel RB1-0



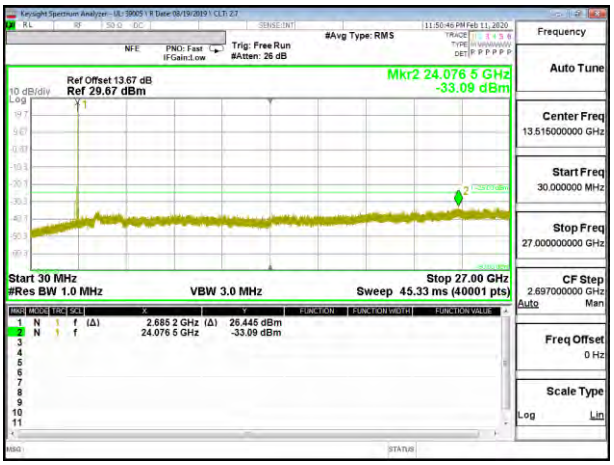
LTE B41 5MHz QPSK Middle Channel RB1-0



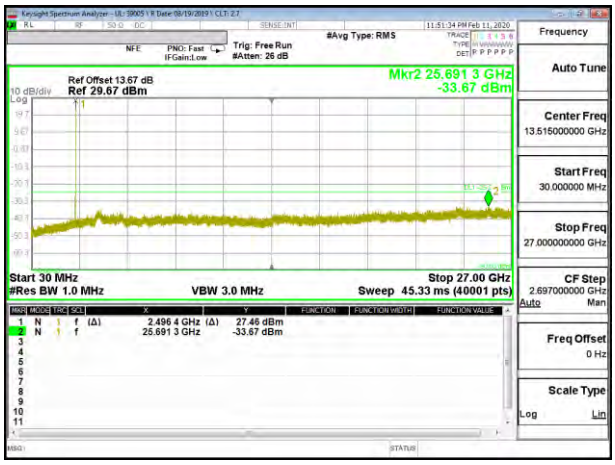
LTE B41 5MHz 16QAM Middle Channel RB1-0



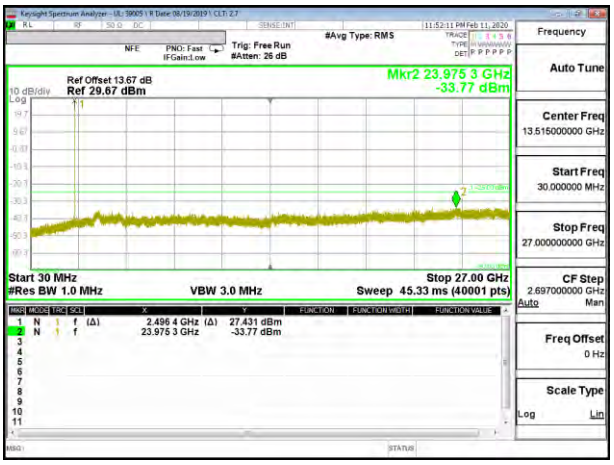
LTE B41 5MHz QPSK High Channel RB1-0



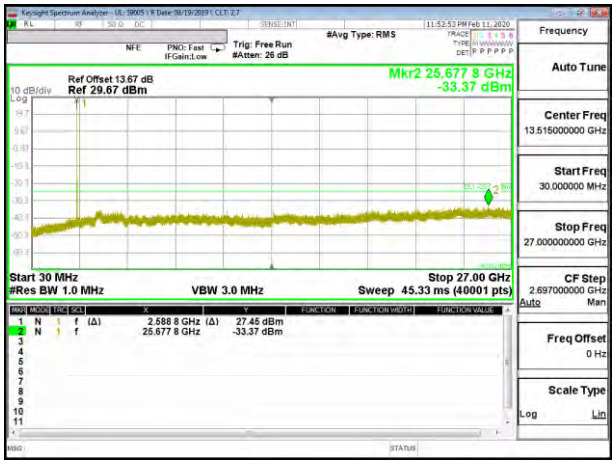
LTE B41 5MHz 16QAM High Channel RB1-0



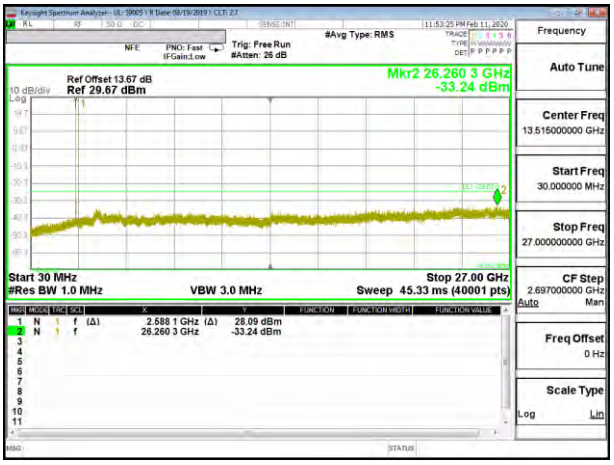
LTE B41 10MHz QPSK Low Channel RB1-0



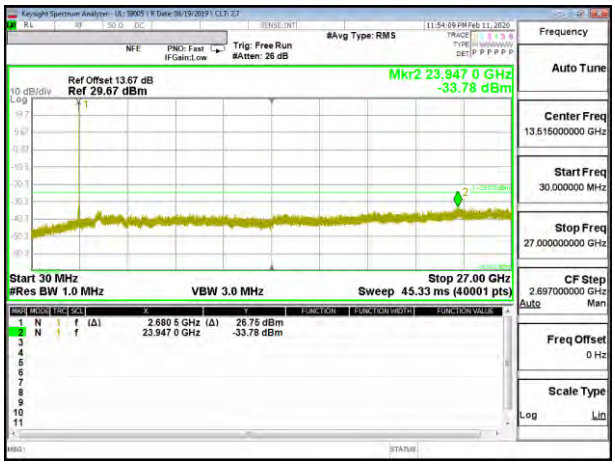
LTE B41 10MHz 16QAM Low Channel RB1-0



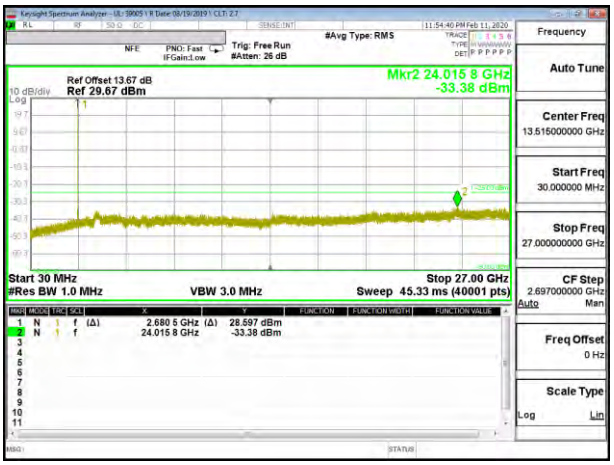
LTE B41 10MHz QPSK Middle Channel RB1-0



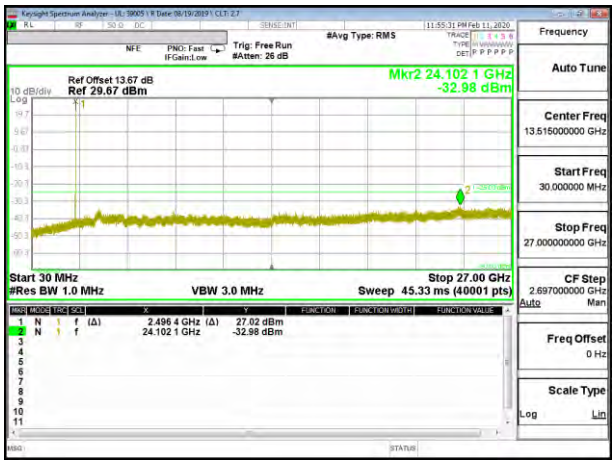
LTE B41 10MHz 16QAM Middle Channel RB1-0



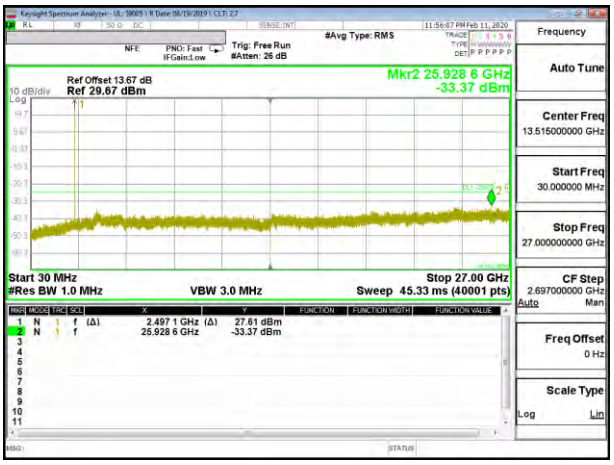
LTE B41 10MHz QPSK High Channel RB1-0



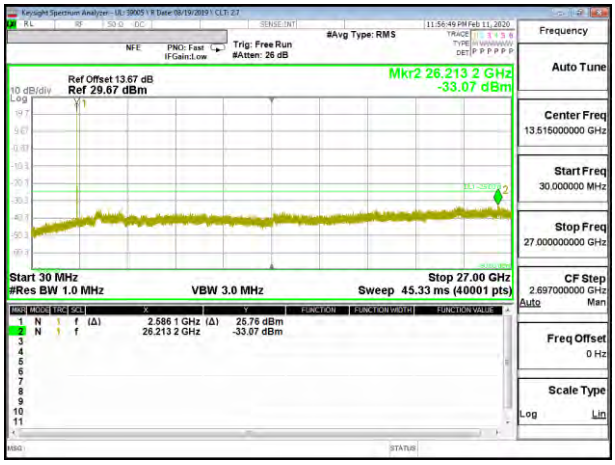
LTE B41 10MHz 16QAM High Channel RB1-0



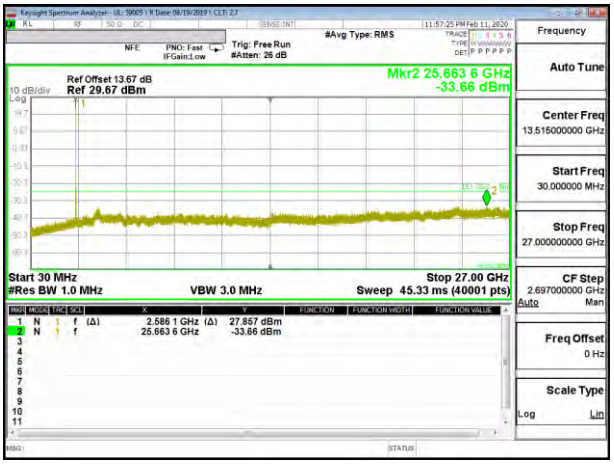
LTE B41 15MHz QPSK Low Channel RB1-0



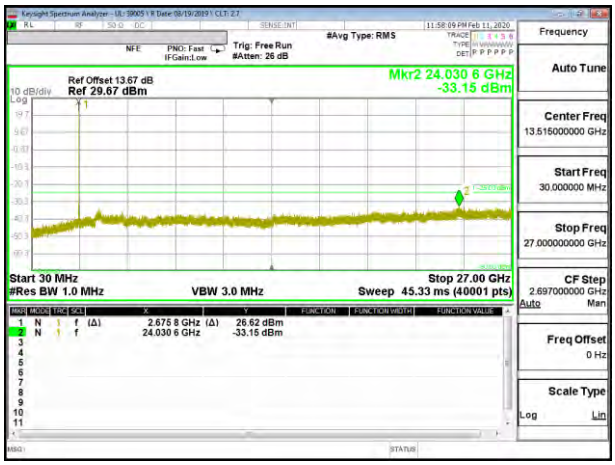
LTE B41 15MHz 16QAM Low Channel RB1-0



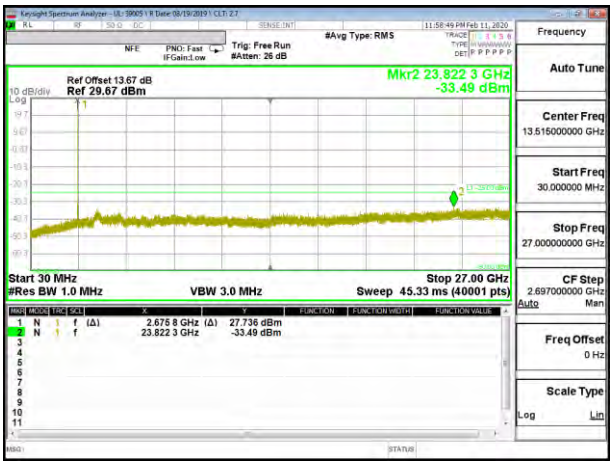
LTE B41 15MHz QPSK Middle Channel RB1-0



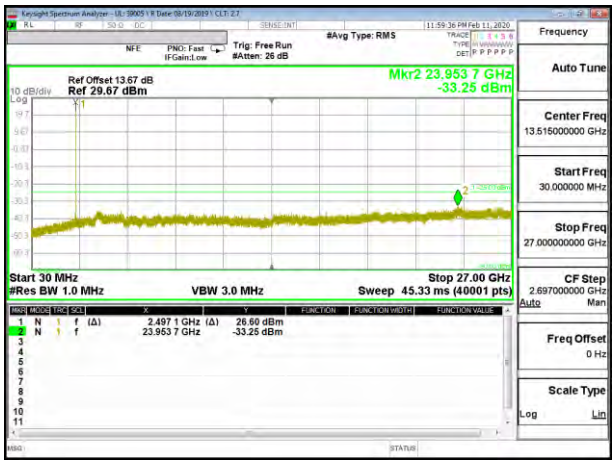
LTE B41 15MHz 16QAM Middle Channel RB1-0



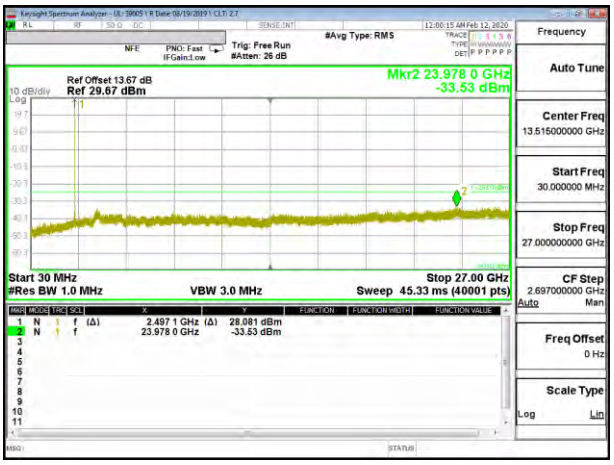
LTE B41 15MHz QPSK High Channel RB1-0



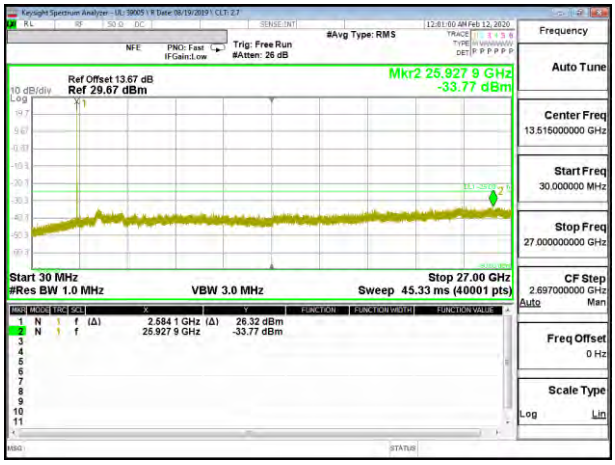
LTE B41 15MHz 16QAM High Channel RB1-0



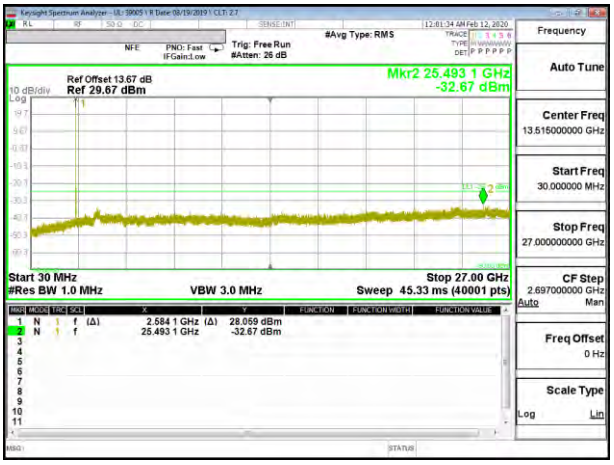
LTE B41 20MHz QPSK Low Channel RB1-0



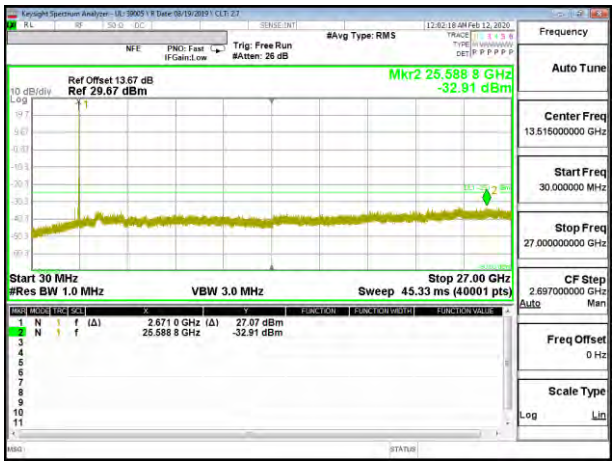
LTE B41 20MHz 16QAM Low Channel RB1-0



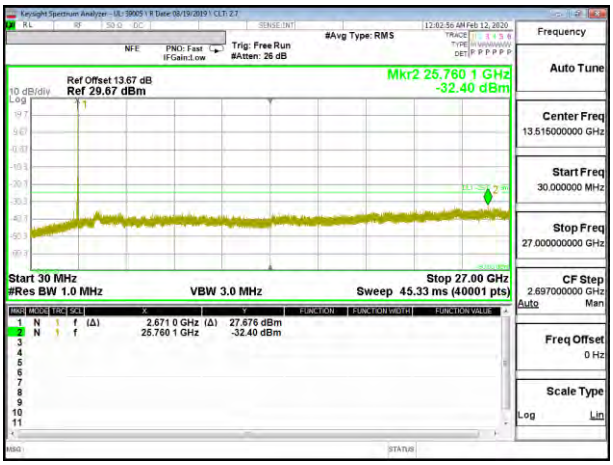
LTE B41 20MHz QPSK Middle Channel RB1-0



LTE B41 20MHz 16QAM Middle Channel RB1-0



LTE B41 20MHz QPSK High Channel RB1-0

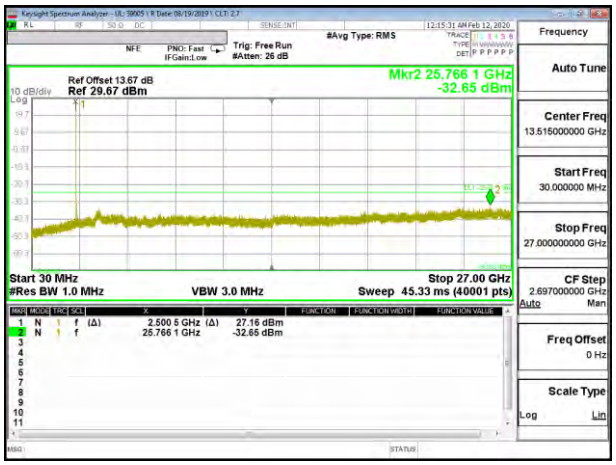


LTE B41 20MHz 16QAM High Channel RB1-0

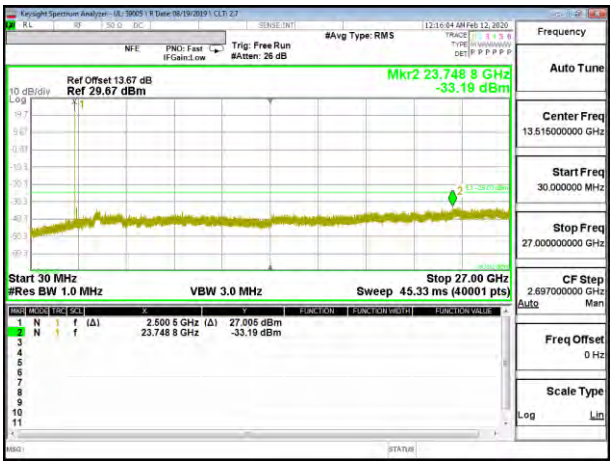
8.3.12. LTE BAND 41 (IC)

LIMITS

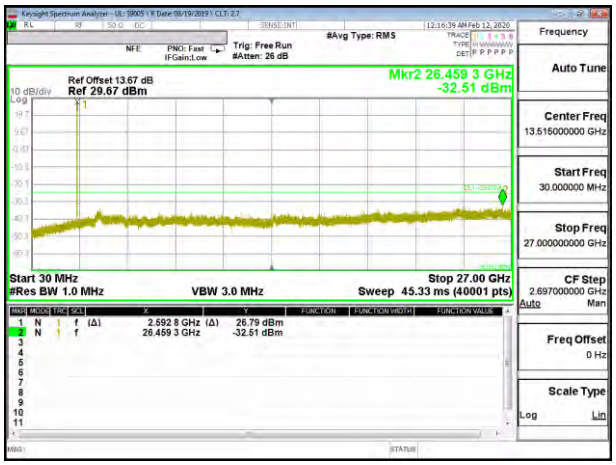
RSS199§4.5
The minimum permissible attenuation level of any spurious emissions is 55 + 10 log (P) dB where transmitting power (P) in Watts.



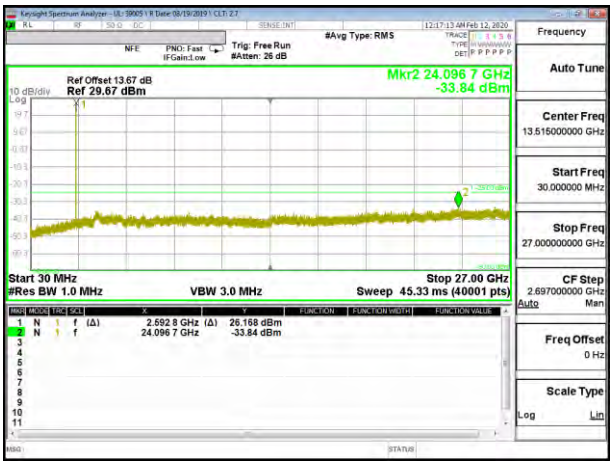
LTE B41 5MHz QPSK Low Channel RB1-0



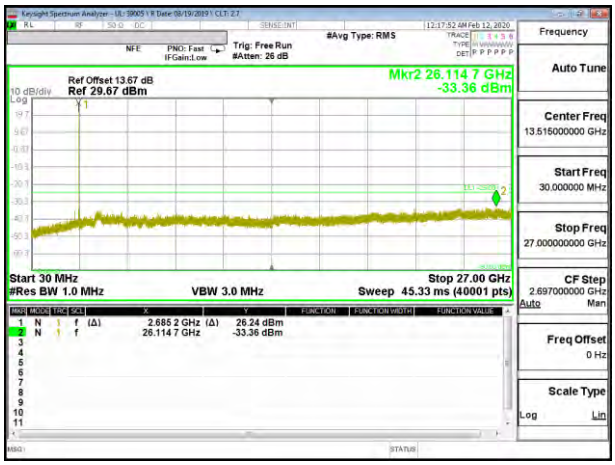
LTE B41 5MHz 16QAM Low Channel RB1-0



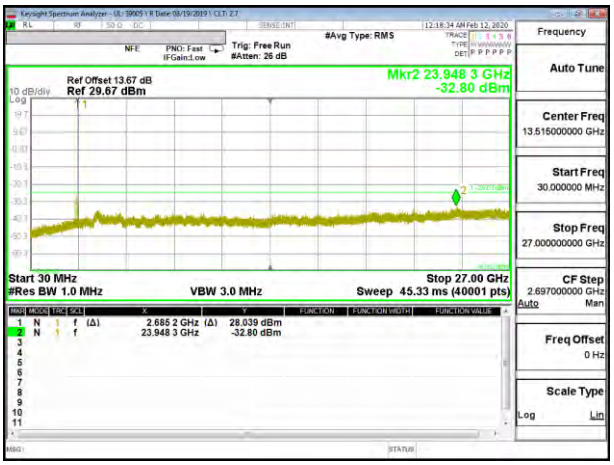
LTE B41 5MHz QPSK Middle Channel RB1-0



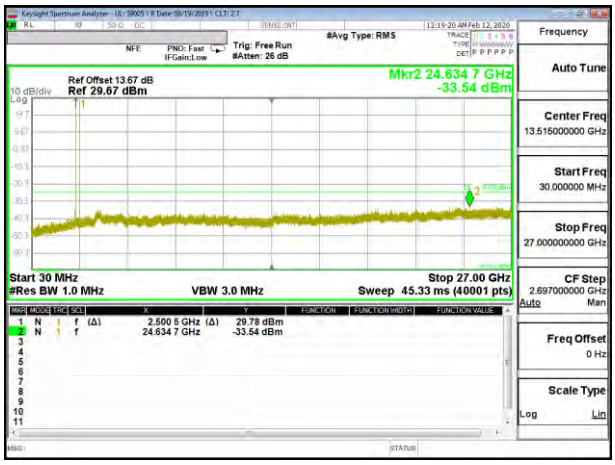
LTE B41 5MHz 16QAM Middle Channel RB1-0



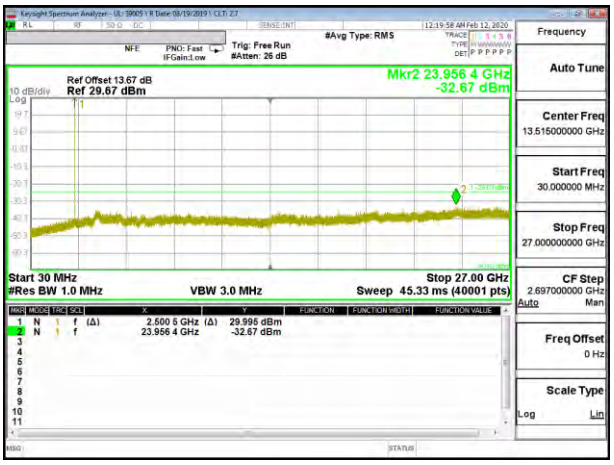
LTE B41 5MHz QPSK High Channel RB1-0



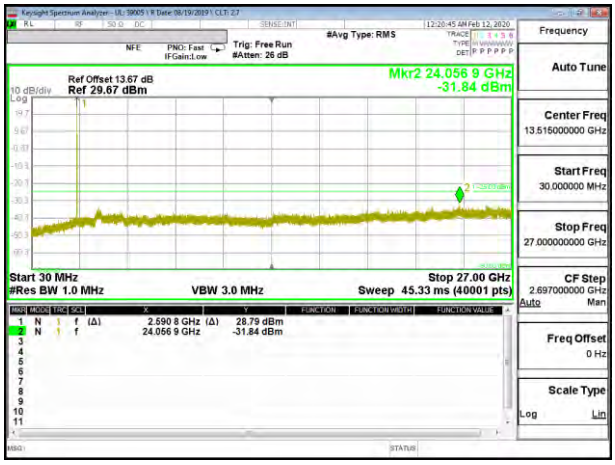
LTE B41 5MHz 16QAM High Channel RB1-0



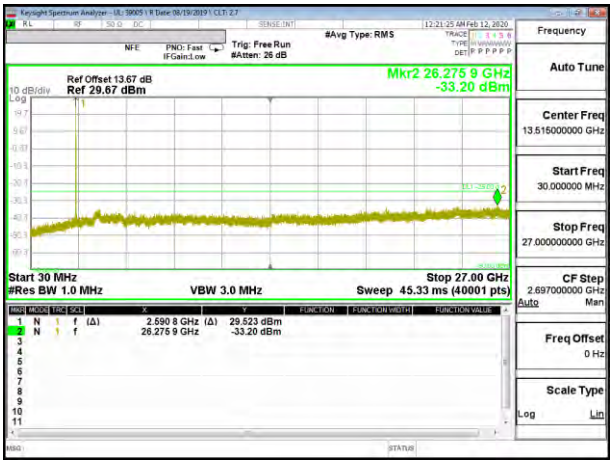
LTE B41 10MHz QPSK Low Channel RB1-0



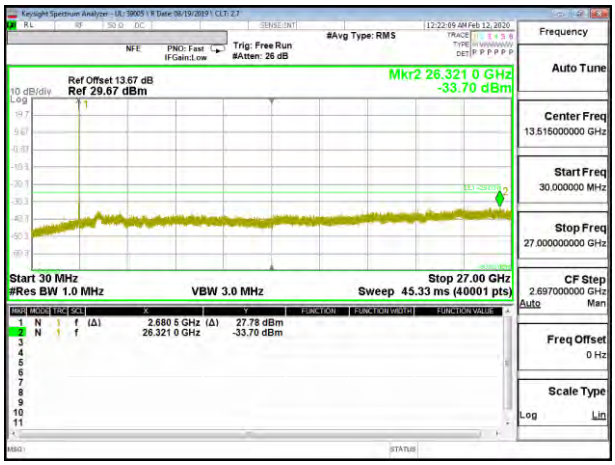
LTE B41 10MHz 16QAM Low Channel RB1-0



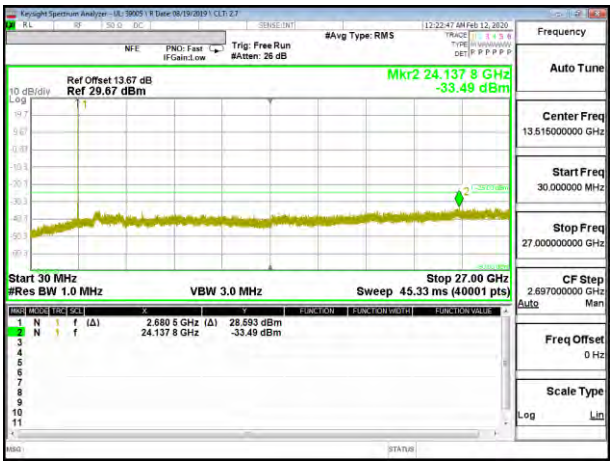
LTE B41 10MHz QPSK Middle Channel RB1-0



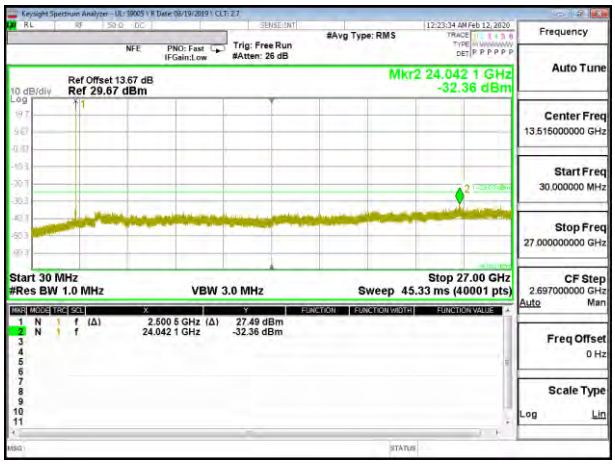
LTE B41 10MHz 16QAM Middle Channel RB1-0



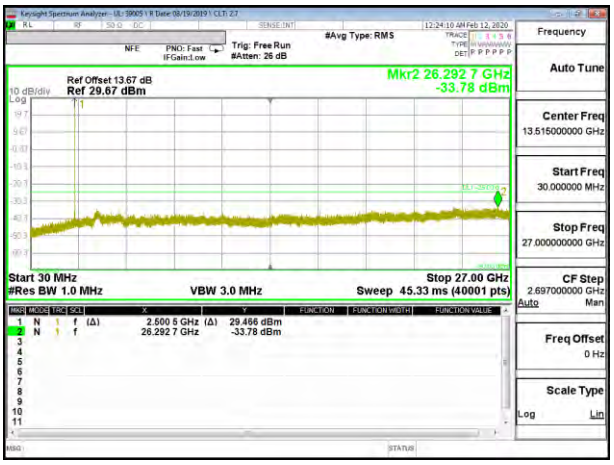
LTE B41 10MHz QPSK High Channel RB1-0



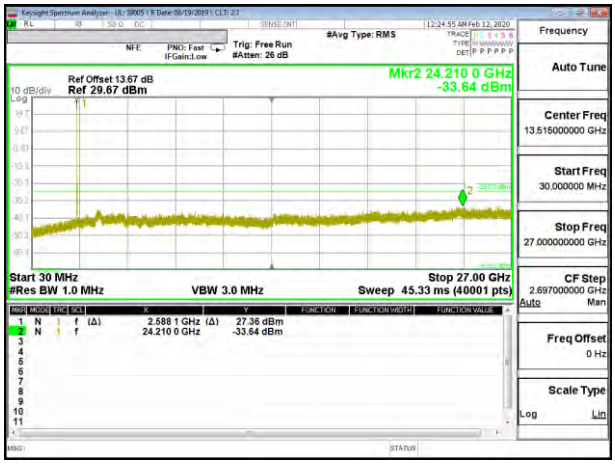
LTE B41 10MHz 16QAM High Channel RB1-0



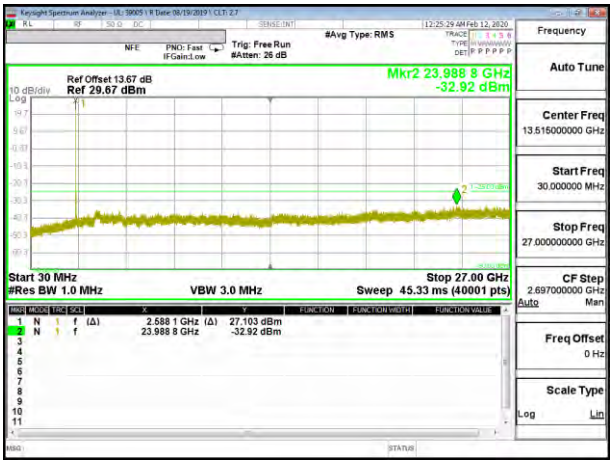
LTE B41 15MHz QPSK Low Channel RB1-0



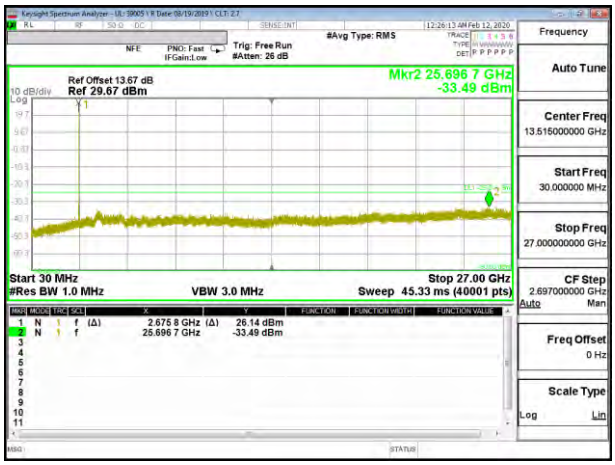
LTE B41 15MHz 16QAM Low Channel RB1-0



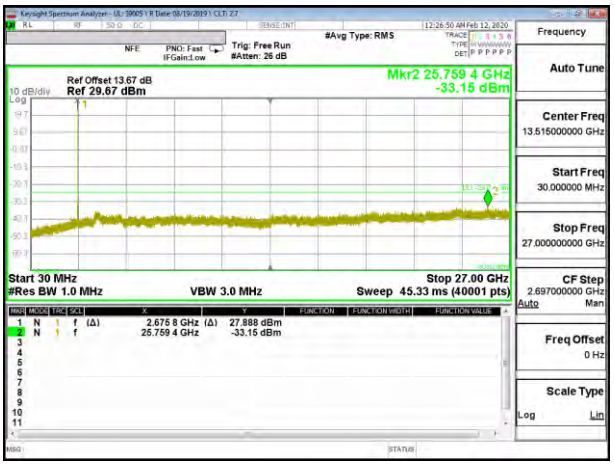
LTE B41 15MHz QPSK Middle Channel RB1-0



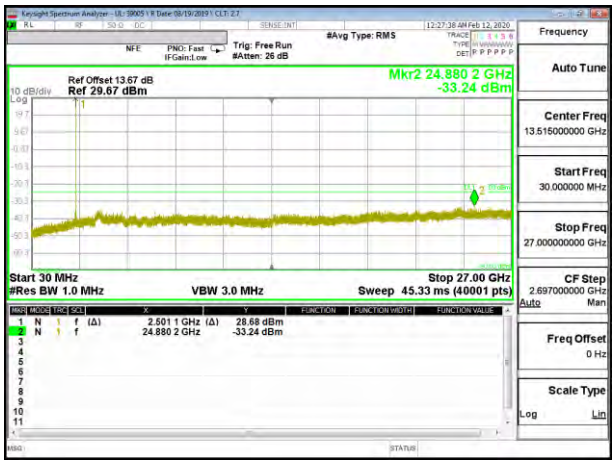
LTE B41 15MHz 16QAM Middle Channel RB1-0



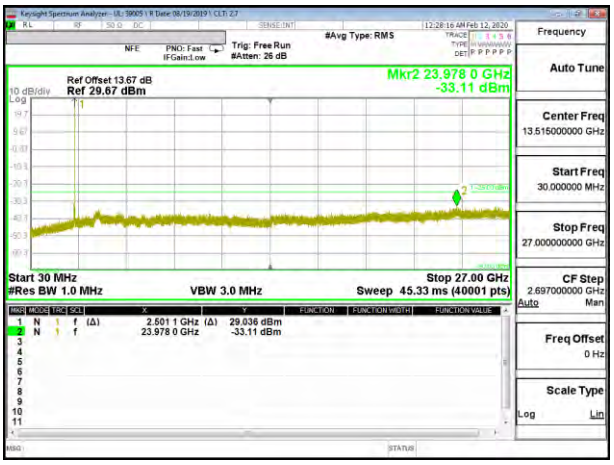
LTE B41 15MHz QPSK High Channel RB1-0



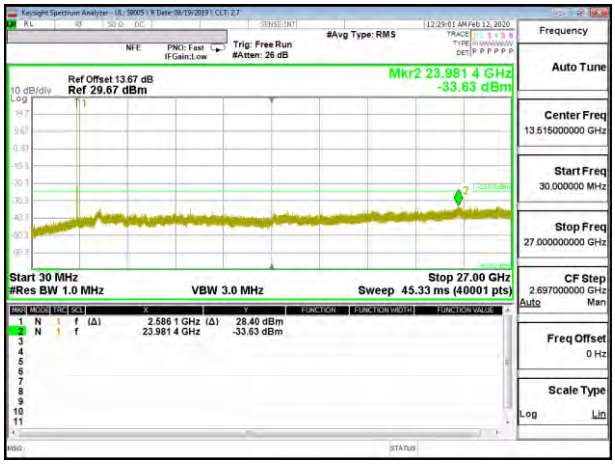
LTE B41 15MHz 16QAM High Channel RB1-0



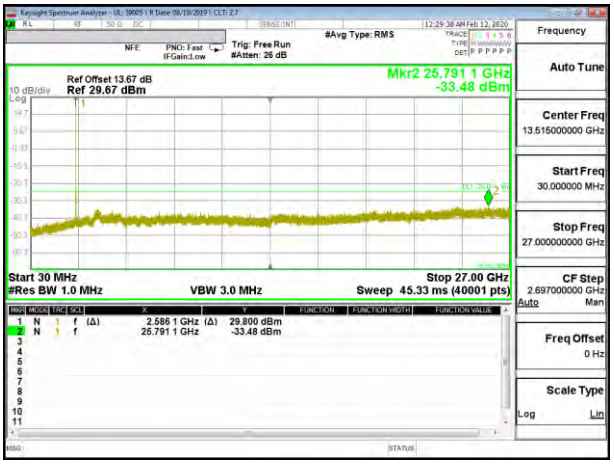
LTE B41 20MHz QPSK Low Channel RB1-0



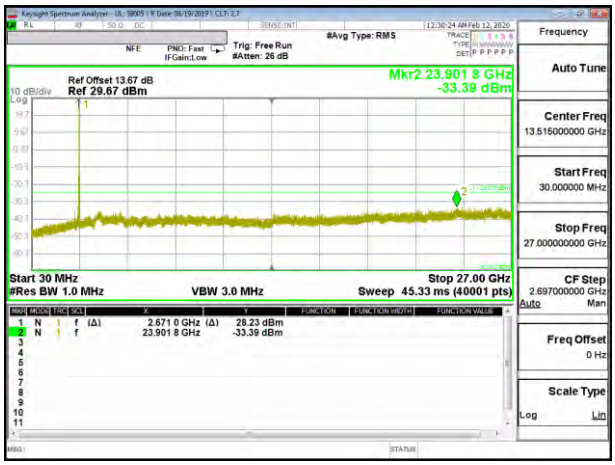
LTE B41 20MHz 16QAM Low Channel RB1-0



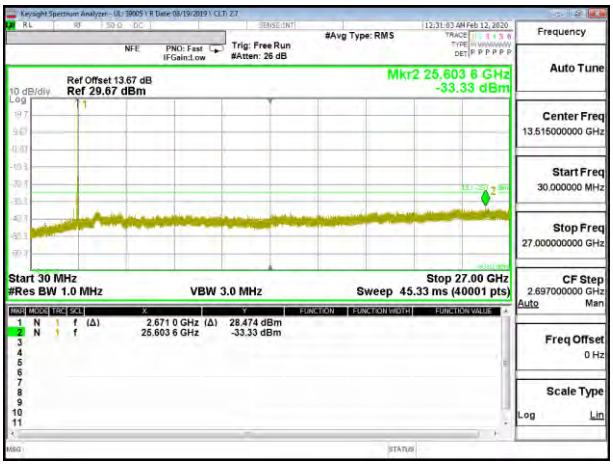
LTE B41 20MHz QPSK Middle Channel RB1-0



LTE B41 20MHz 16QAM Middle Channel RB1-0



LTE B41 20MHz QPSK High Channel RB1-0



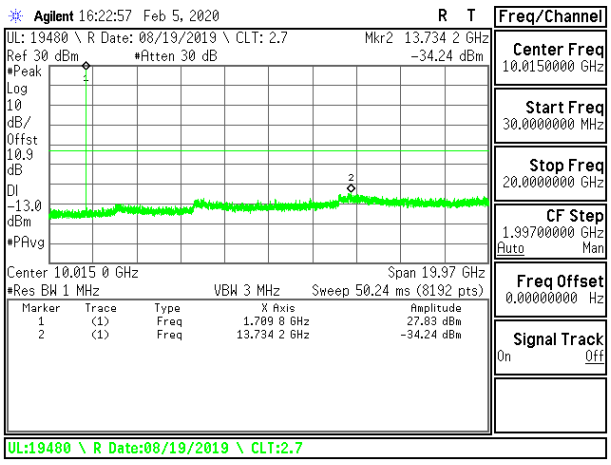
LTE B41 20MHz 16QAM High Channel RB1-0

8.3.13. LTE BAND 66

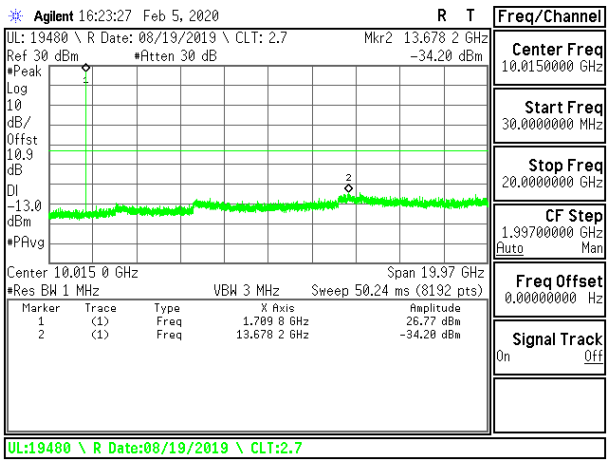
LIMITS

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.
ISED: RSS139§6.6

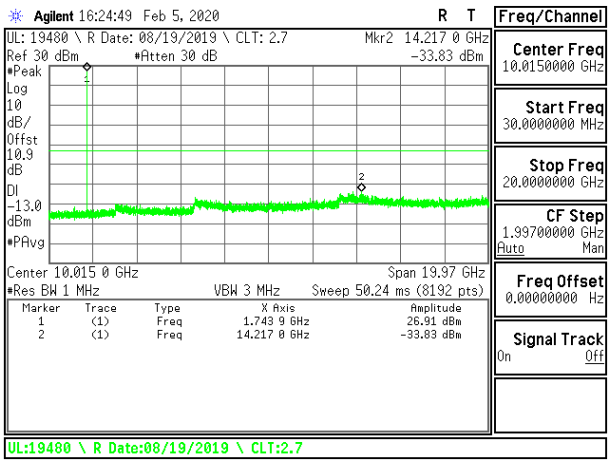
The minimum permissible attenuation level of any spurious emissions is 43 + 10 log (P) dB where transmitting power (P) in Watts.



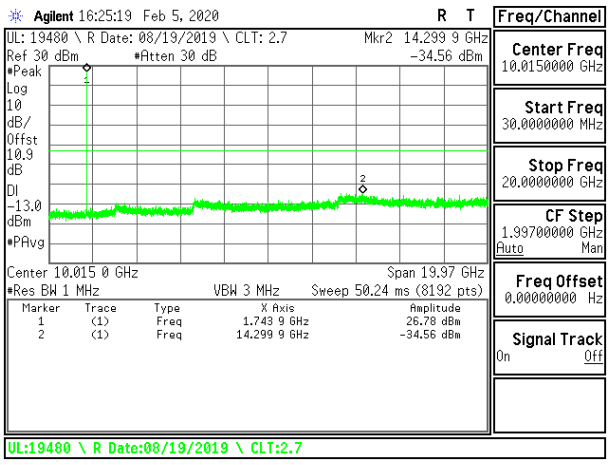
LTE B66 1.4MHz QPSK Low Channel RB1-0



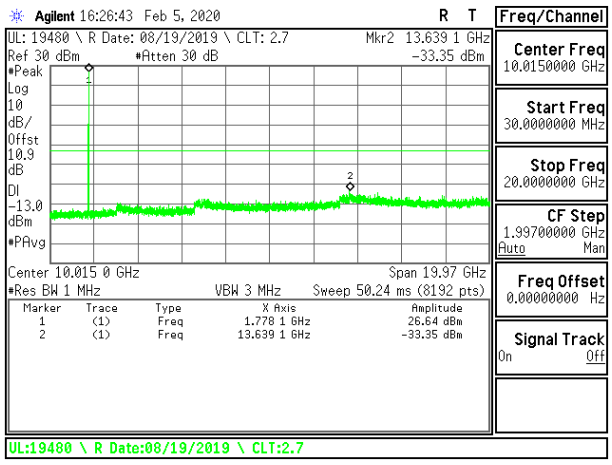
LTE B66 1.4MHz 16QAM Low Channel RB1-0



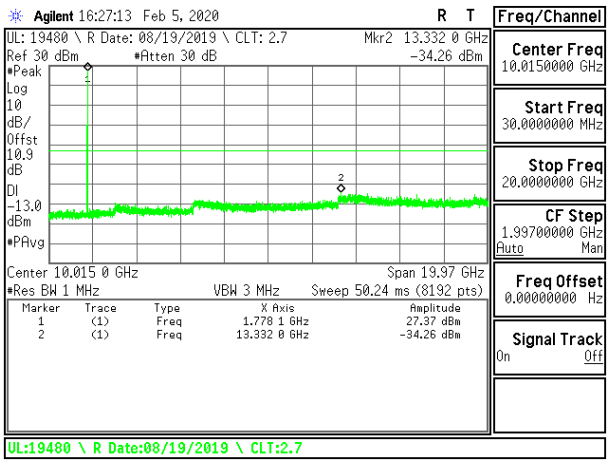
LTE B66 1.4MHz QPSK Middle Channel RB1-0



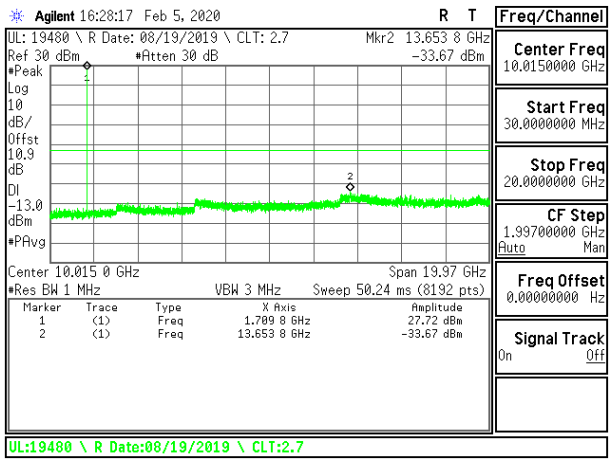
LTE B66 1.4MHz 16QAM Middle Channel RB1-0



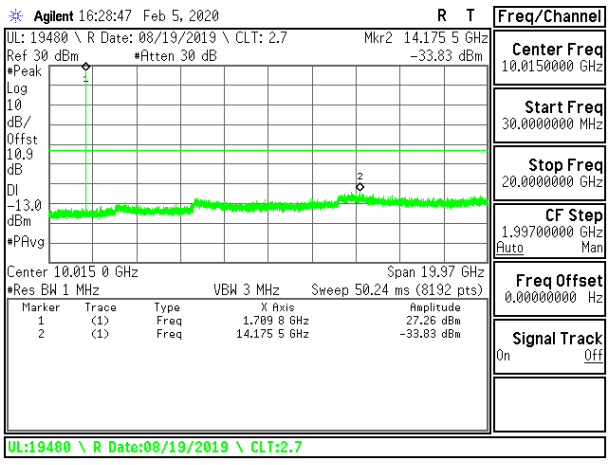
LTE B66 1.4MHz QPSK High Channel RB1-0



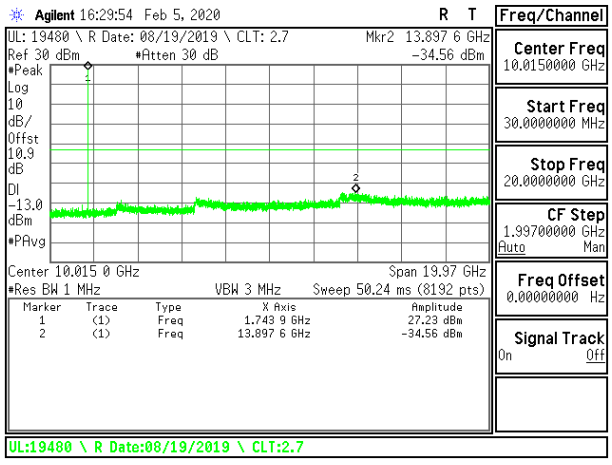
LTE B66 1.4MHz 16QAM High Channel RB1-0



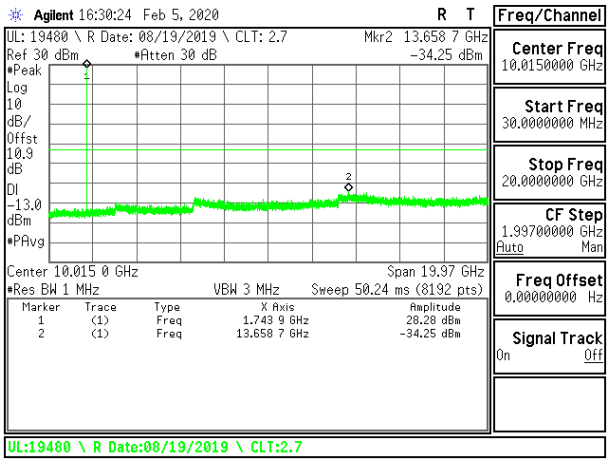
LTE B66 3MHz QPSK Low Channel RB1-0



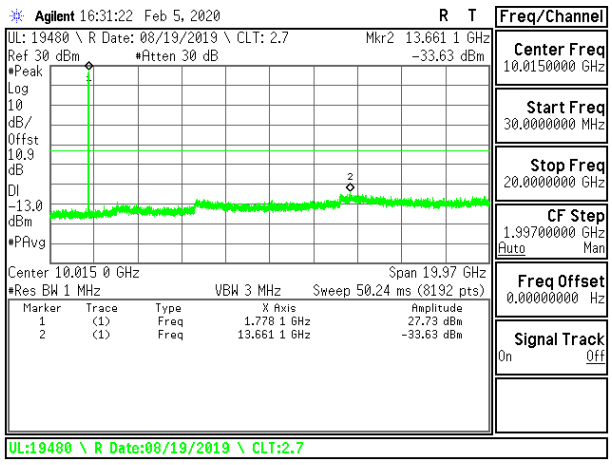
LTE B66 3MHz 16QAM Low Channel RB1-0



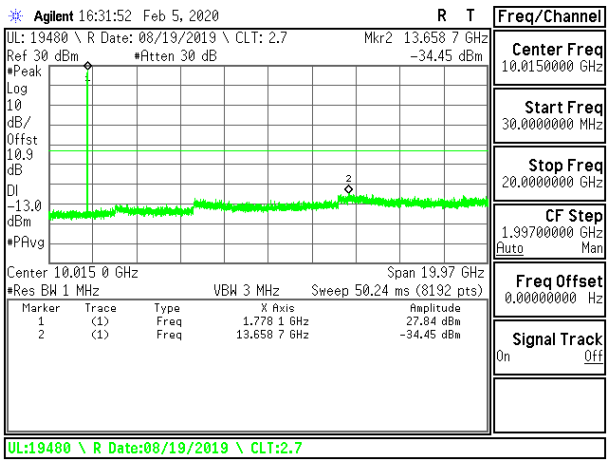
LTE B66 3MHz QPSK Middle Channel RB1-0



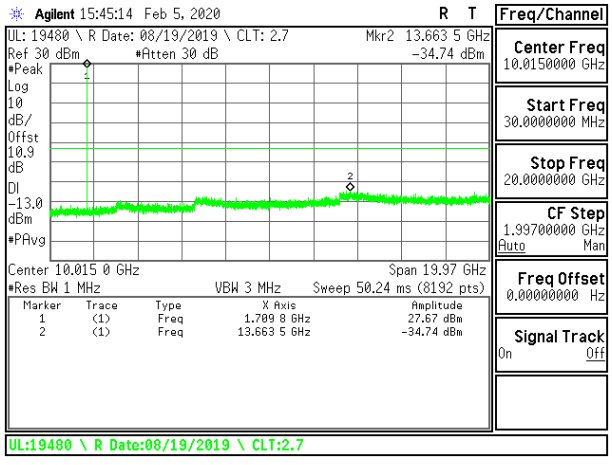
LTE B66 3MHz 16QAM Middle Channel RB1-0



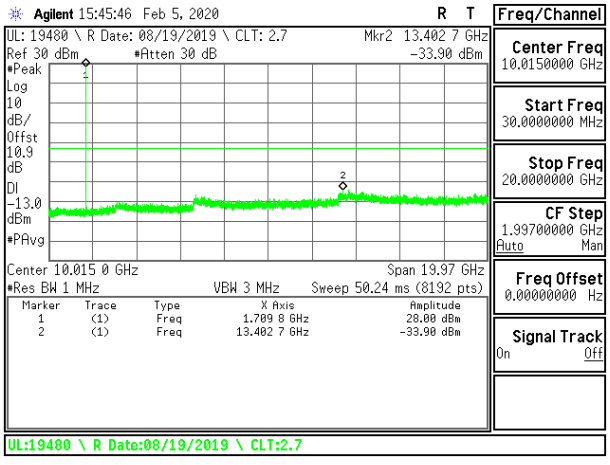
LTE B66 3MHz QPSK High Channel RB1-0



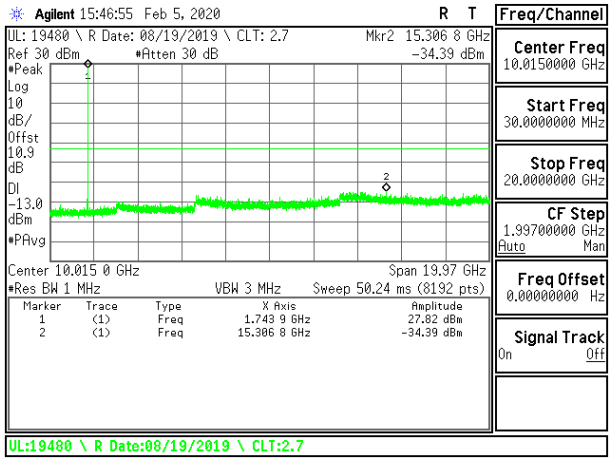
LTE B66 3MHz 16QAM High Channel RB1-0



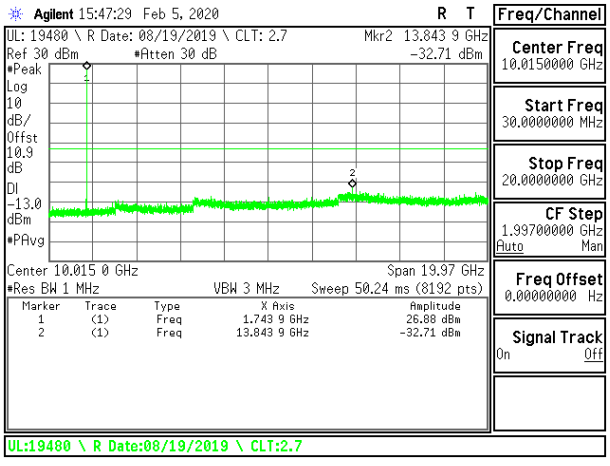
LTE B66 5MHz QPSK Low Channel RB1-0



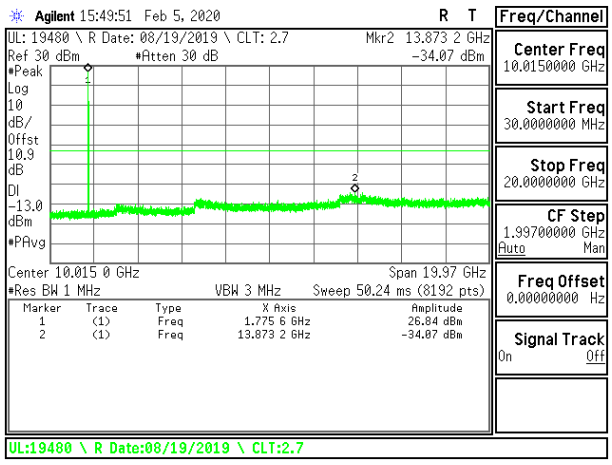
LTE B66 5MHz 16QAM Low Channel RB1-0



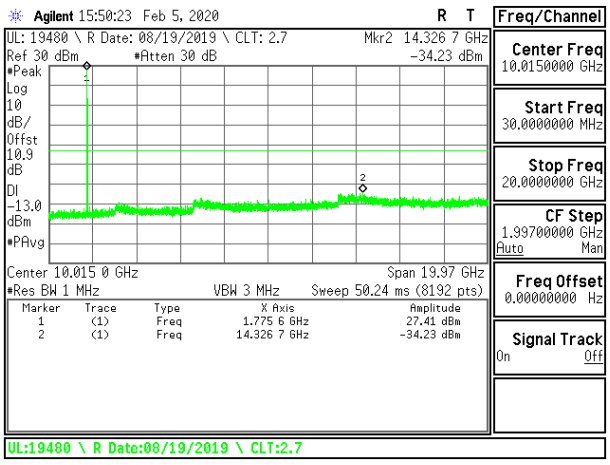
LTE B66 5MHz QPSK Middle Channel RB1-0



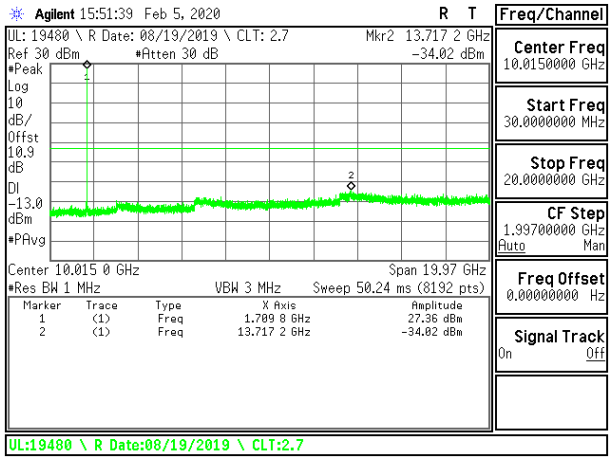
LTE B66 5MHz 16QAM Middle Channel RB1-0



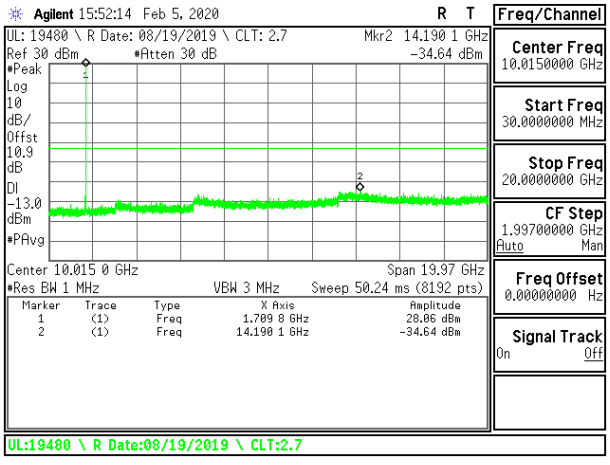
LTE B66 5MHz QPSK High Channel RB1-0



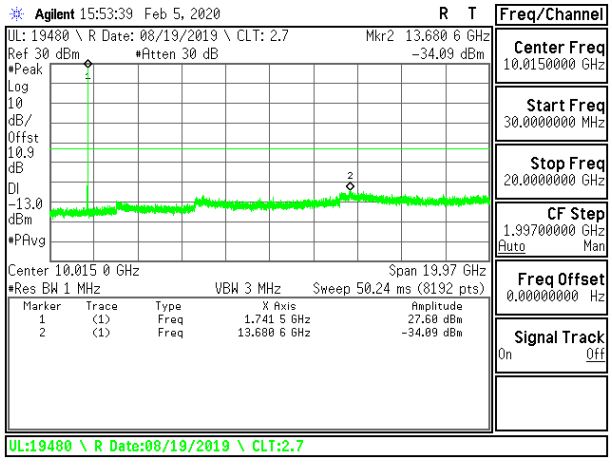
LTE B66 5MHz 16QAM High Channel RB1-0



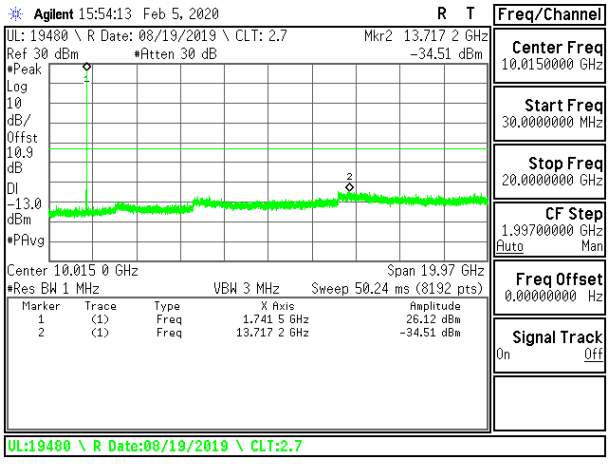
LTE B66 10MHz QPSK Low Channel RB1-0



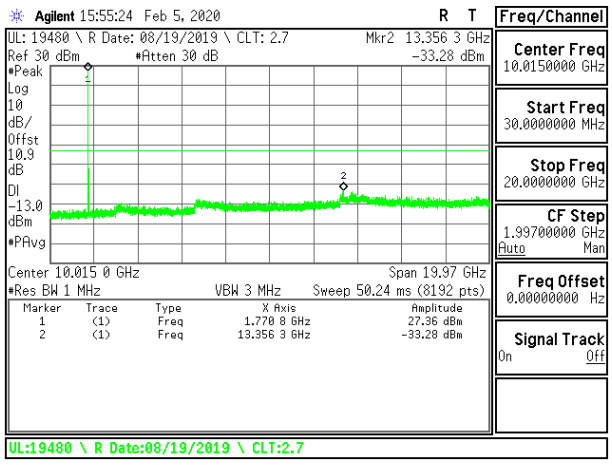
LTE B66 10MHz 16QAM Low Channel RB1-0



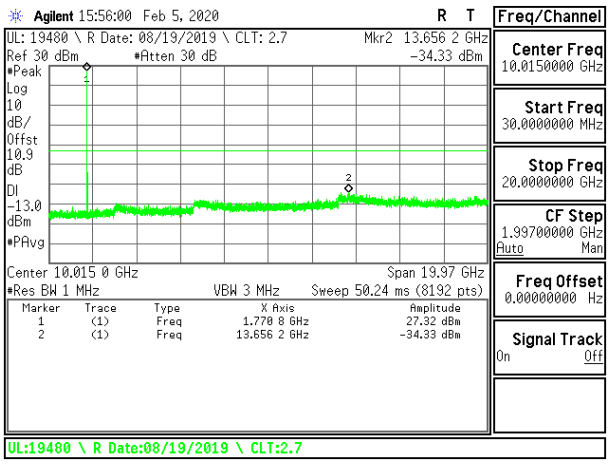
LTE B66 10MHz QPSK Middle Channel RB1-0



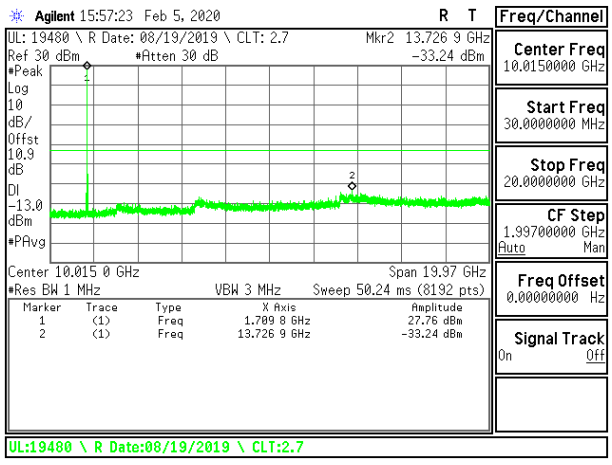
LTE B66 10MHz 16QAM Middle Channel RB1-0



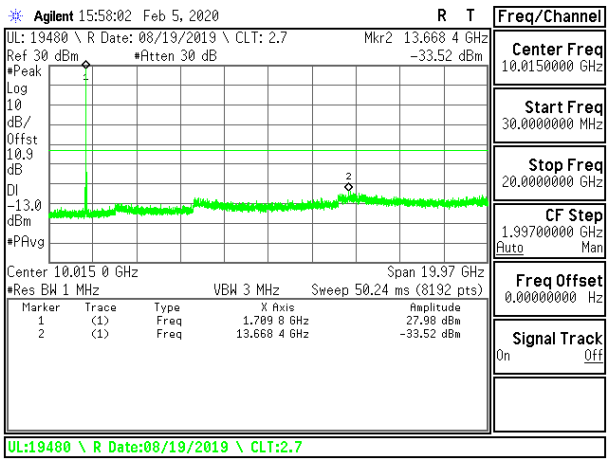
LTE B66 10MHz QPSK High Channel RB1-0



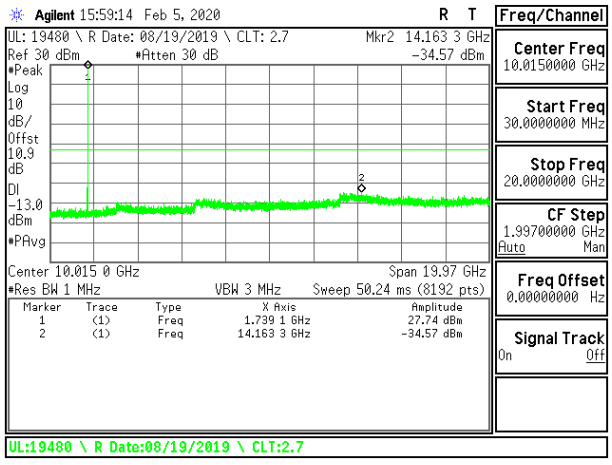
LTE B66 10MHz 16QAM High Channel RB1-0



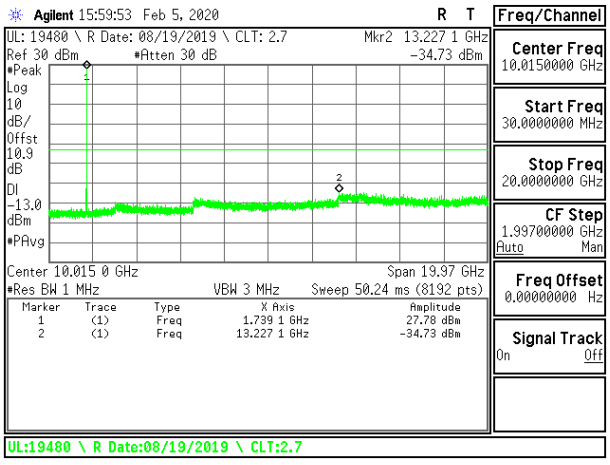
LTE B66 15MHz QPSK Low Channel RB1-0



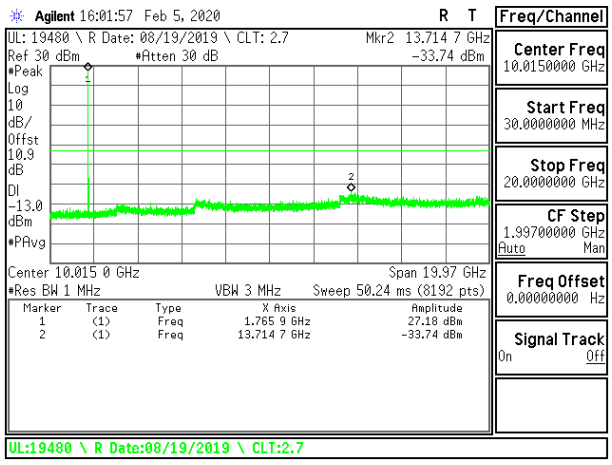
LTE B66 15MHz 16QAM Low Channel RB1-0



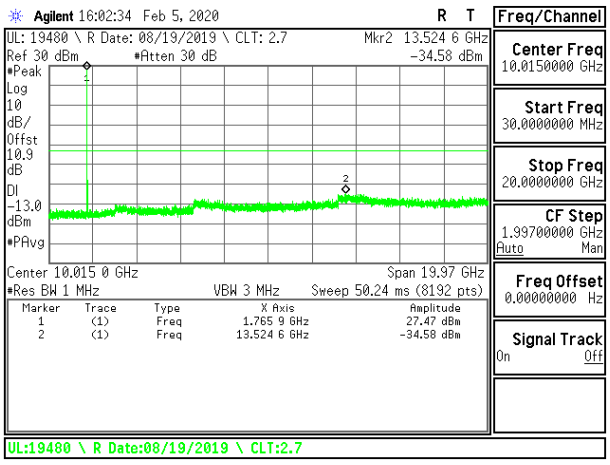
LTE B66 15MHz QPSK Middle Channel RB1-0



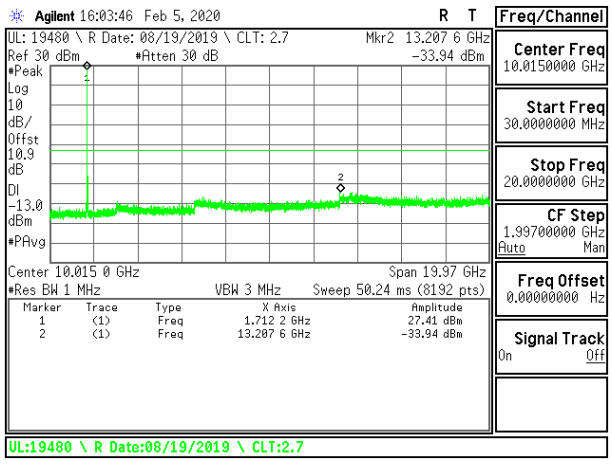
LTE B66 15MHz 16QAM Middle Channel RB1-0



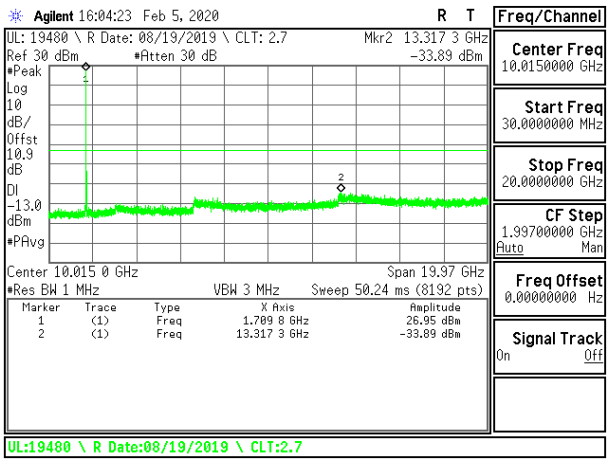
LTE B66 15MHz QPSK High Channel RB1-0



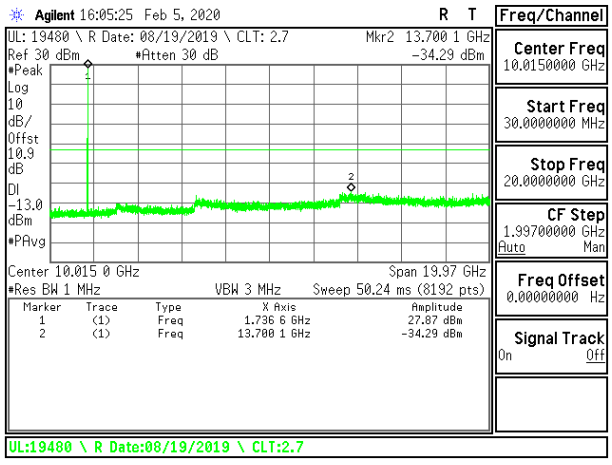
LTE B66 15MHz 16QAM High Channel RB1-0



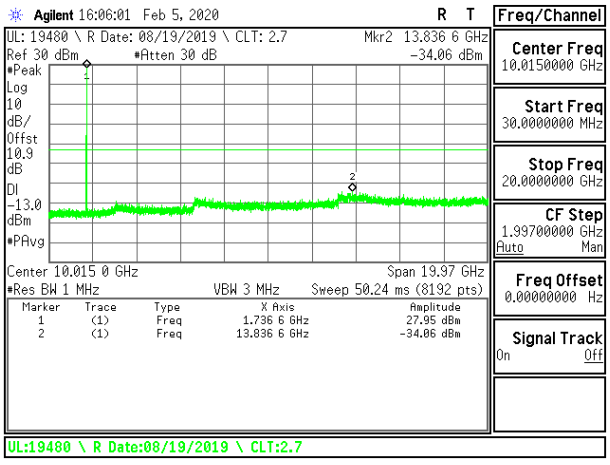
LTE B66 20MHz QPSK Low Channel RB1-0



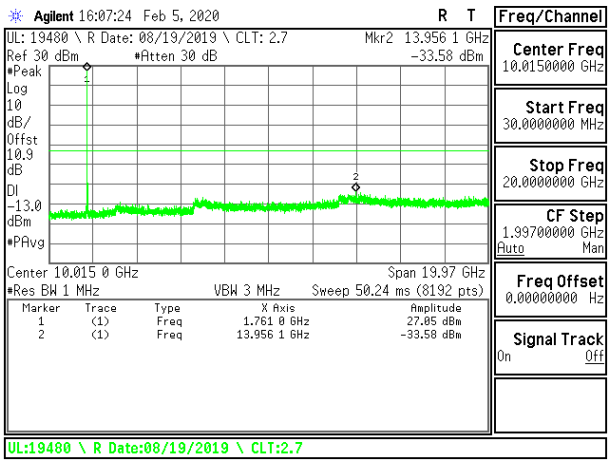
LTE B66 20MHz 16QAM Low Channel RB1-0



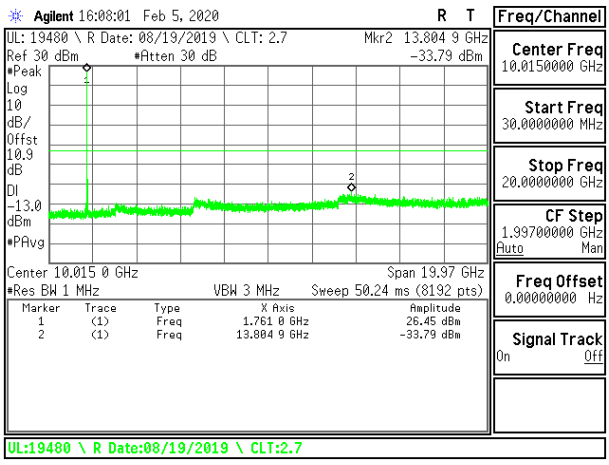
LTE B66 20MHz QPSK Middle Channel RB1-0



LTE B66 20MHz 16QAM Middle Channel RB1-0



LTE B66 20MHz QPSK High Channel RB1-0



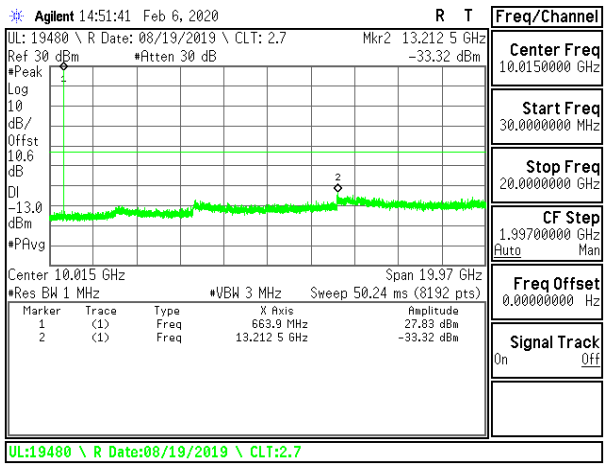
LTE B66 20MHz 16QAM High Channel RB1-0

8.3.14. LTE BAND 71

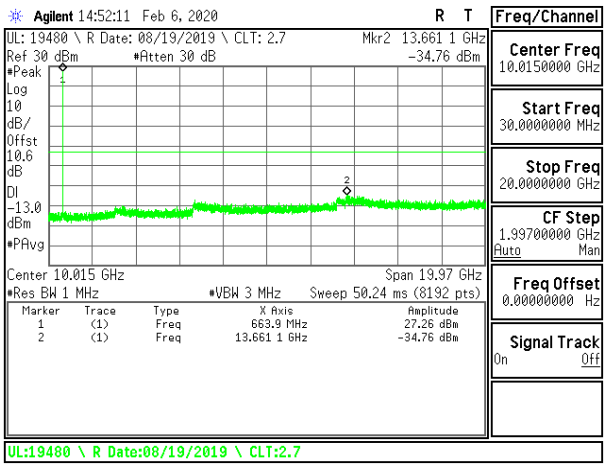
LIMITS

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.
ISED: RSS130§4.7

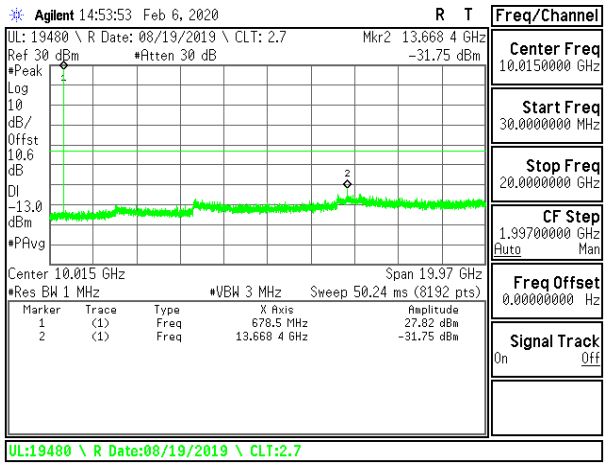
The minimum permissible attenuation level of any spurious emissions is 43 + 10 log (P) dB where transmitting power (P) in Watts.



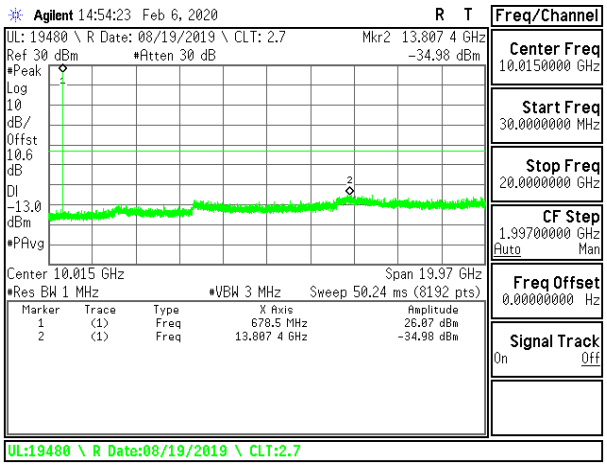
LTE B71 5MHz QPSK Low Channel RB1-0



LTE B71 5MHz 16QAM Low Channel RB1-0



LTE B71 5MHz QPSK Middle Channel RB1-0



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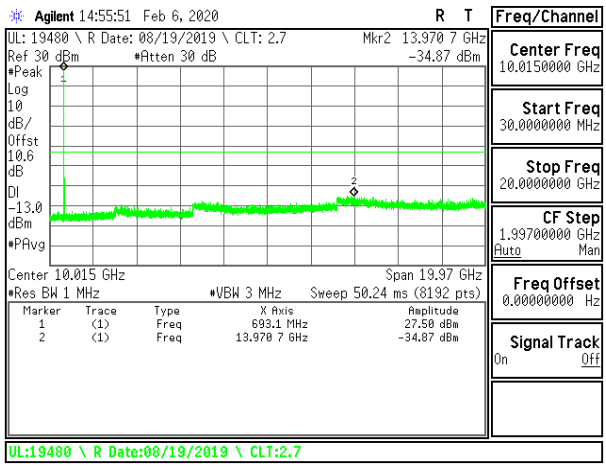

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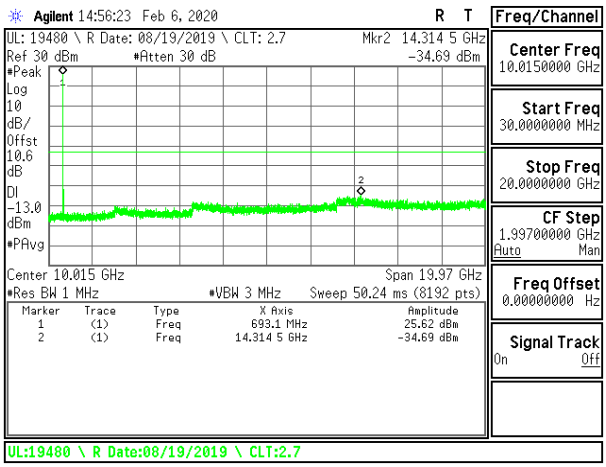

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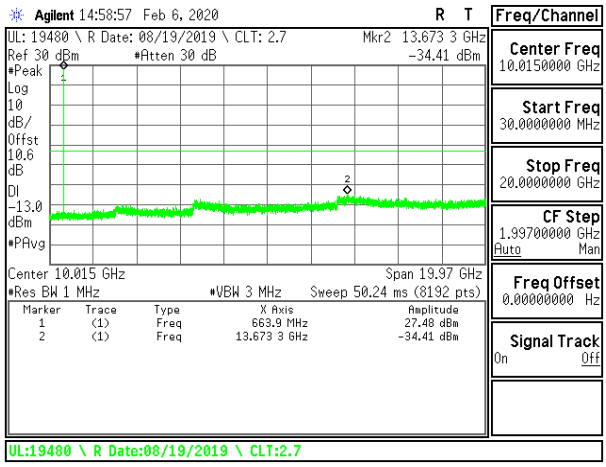
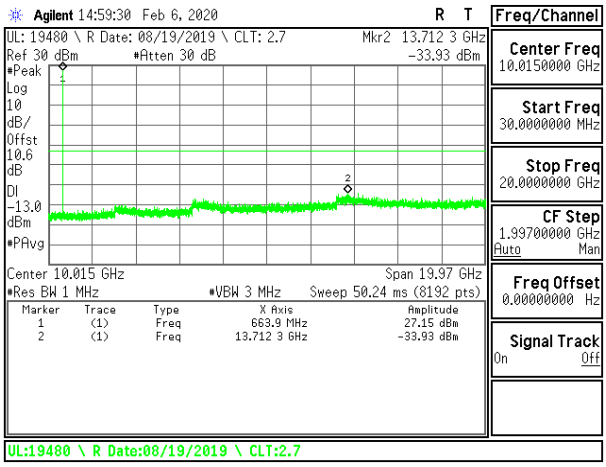


LTE B71 10MHz QPSK Low Channel RB1-0



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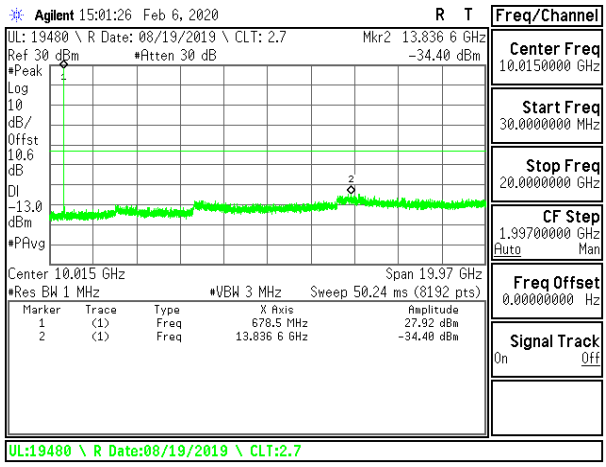
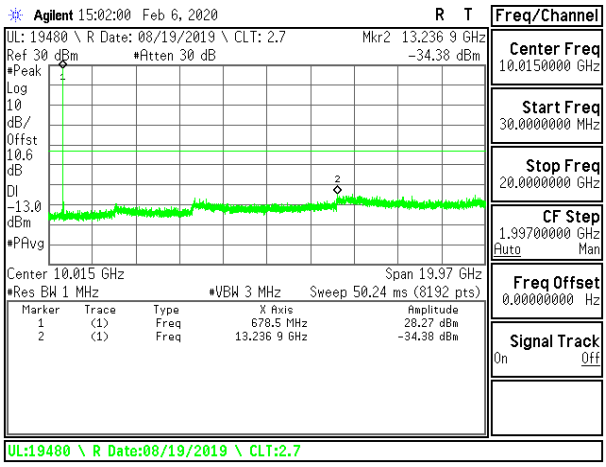
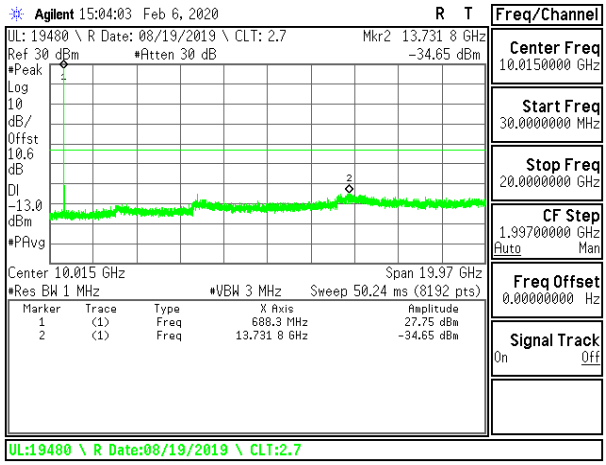


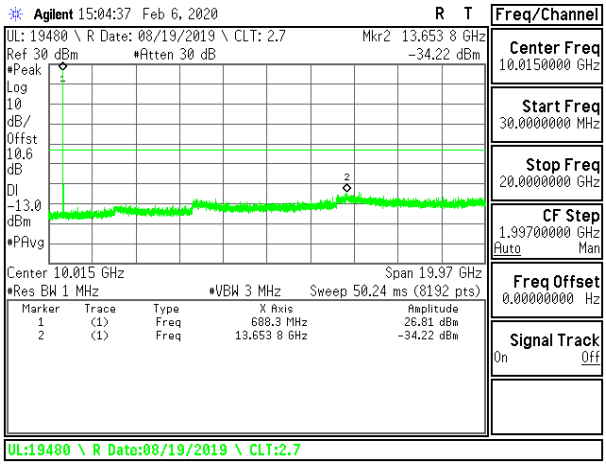
LTE B71 10MHz QPSK Middle Channel RB1-0



LTE B71 10MHz 16QAM Middle Channel RB1-0



LTE 71 10MHz QPSK High Channel RB1-0



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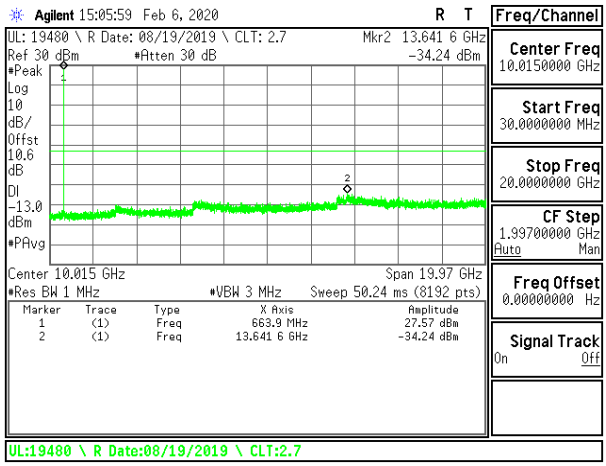
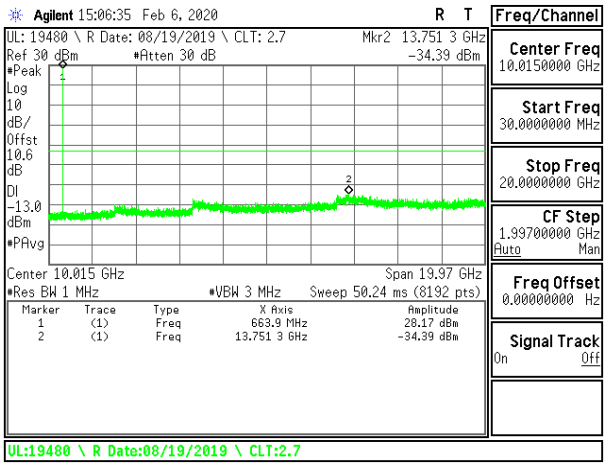
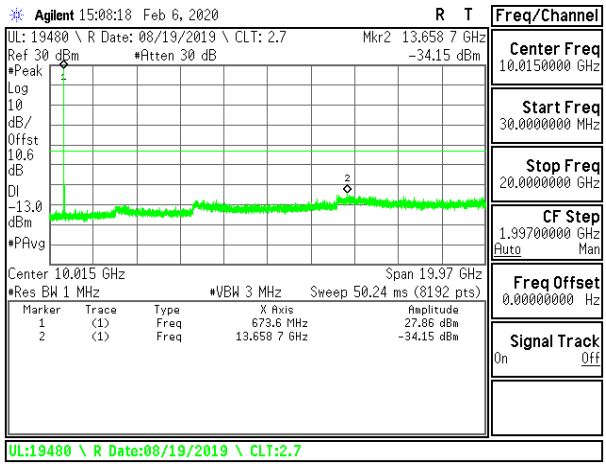


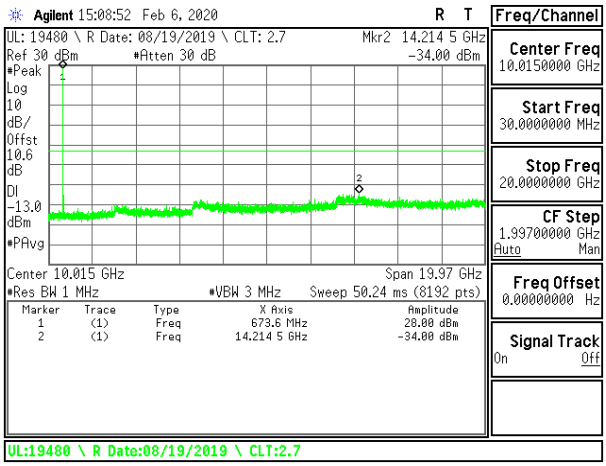
LTE B71 15MHz QPSK Low Channel RB1-0



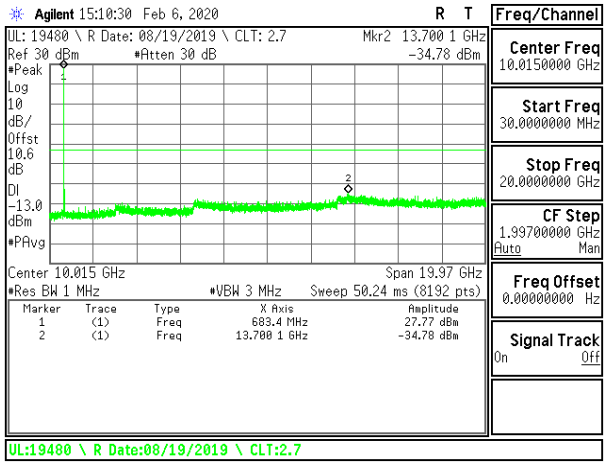
LTE B71 15MHz 16QAM Low Channel RB1-0



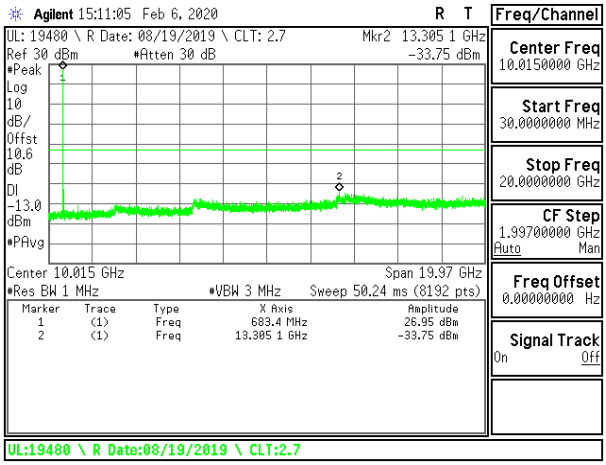
LTE B71 15MHz QPSK Middle Channel RB1-0



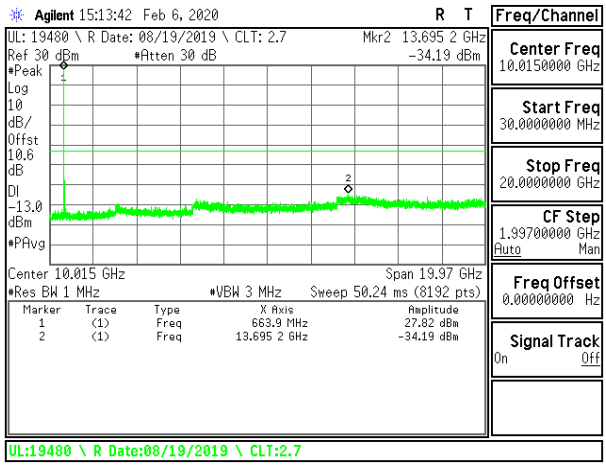
LTE B71 15MHz 16QAM Middle Channel RB1-0



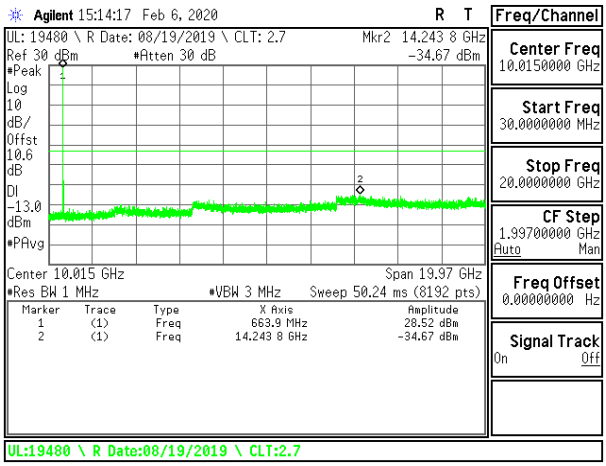
LTE B71 15MHz QPSK High Channel RB1-0



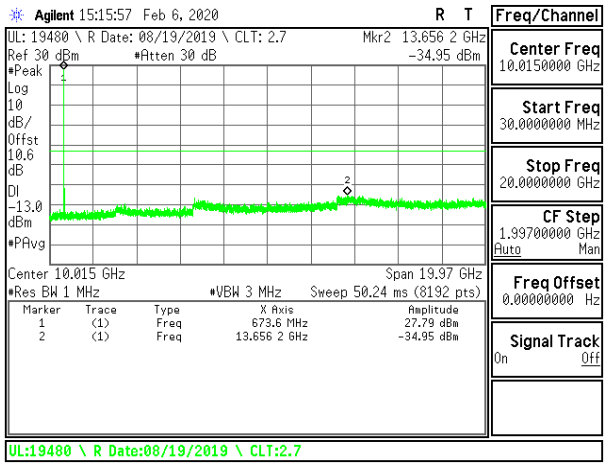
LTE B71 15MHz 16QAM High Channel RB1-0



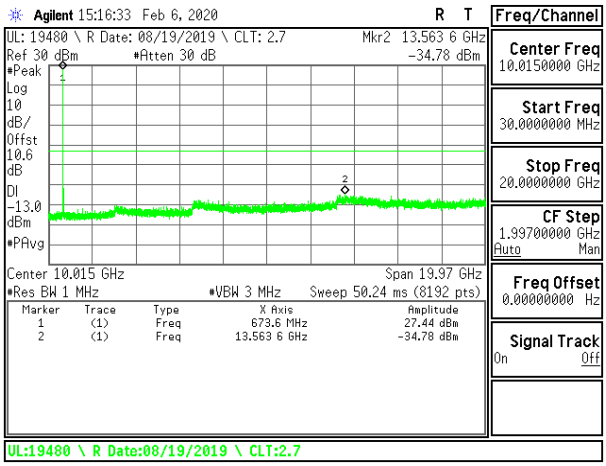
LTE B71 20MHz QPSK Low Channel RB1-0



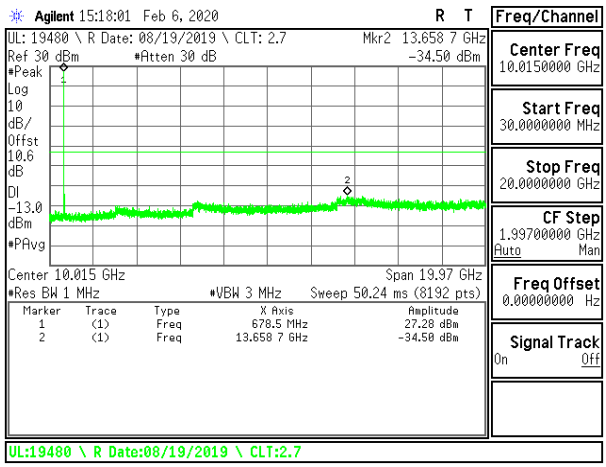
LTE B71 20MHz 16QAM Low Channel RB1-0



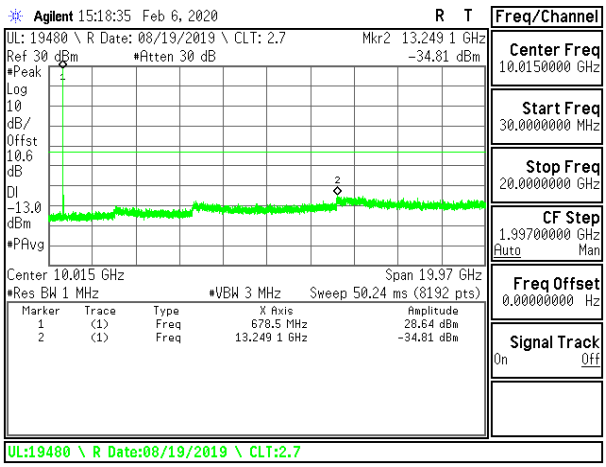
LTE B71 20MHz QPSK Middle Channel RB1-0



LTE B71 20MHz 16QAM Middle Channel RB1-0



LTE B71 20MHz QPSK High Channel RB1-0



LTE B71 20MHz 16QAM High Channel RB1-0

8.4. FREQUENCY STABILITY

RULE PART(S)

FCC: §2.1055, §22.355, §24.235, and §27.54
ISED: RSS130§4.5, RSS132§5.3; RSS133§6.3, RSS139§6.4, RSS199§4.3.

LIMITS

FCC: §22.355
The carrier frequency shall not depart from the reference frequency in excess of ±2.5 ppm for mobile stations.

FCC: §24.235 & §27.54
The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

RSS130§4.5
For equipment that is capable of transmitting numerous channels simultaneously for different applications (e.g. LTE and narrowband – Internet of Things (IoT)), the occupied bandwidth shall be the bandwidth representing the sum of the occupied bandwidths of these channels.

The frequency stability shall be sufficient to ensure that the occupied bandwidth remains within each frequency block range when tested at the temperature and supply voltage variations specified in RSS-Gen.

RSS132§5.3
The carrier frequency shall not depart from the reference frequency in excess of ±2.5 SRSP for mobile stations and±1.5 ppm for base stations.
In lieu of meeting the above stability values, the test report may show that the frequency stability is sufficient to ensure that the occupied bandwidth stays within each of the sub-bands (see Section 5.1) when tested to the temperature and supply voltage variations specified in RSS-Gen.

RSS133§6.3
The carrier frequency shall not depart from the reference frequency, in excess of ±2.5 ppm for mobile stations and ±1.0 ppm for base stations.
In lieu of meeting the above stability values, the test report may show that the frequency stability is sufficient to ensure that the emission bandwidth stays within the operating frequency block when tested to the temperature and supply voltage variations specified in RSS-Gen.

RSS139§6.4, RSS140§4.2
The frequency stability shall be sufficient to ensure that the occupied bandwidth stays within the operating frequency block when tested to the temperature and supply voltage variations specified in RSS-Gen.

RSS199§4.3
Transmitter Frequency Stability

a. The transmitter frequency stability limit shall be determined as follows:

The frequency offset shall be measured according to the procedure described in RSS-Gen and recorded;

b. Using a resolution bandwidth equal to that permitted within the 1 MHz band immediately outside the channel edge, as found in clause 4.6, reference points will be selected at the unwanted emission levels which comply with the attenuation specified in 4.6, for the type of device under test, on the emission mask of the lowest and highest channels, and the frequency at these points shall be recorded as fL and fH respectively.

The applicant shall ensure frequency stability by showing that fL minus the frequency offset and fH plus the frequency offset shall be within the frequency range that the equipment is designed to operate.

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, 2.8VDC.

Frequency Stability vs Temperature:
The EUT is place inside a temperature chamber. The temperature is set to 20ºC 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 +50ºC is reached.

Frequency Stability vs Voltage:
The peak frequency error is recorded (worst-case).

RESULTS

See the following pages.

8.4.1. GSM

LIMITS

FCC §22.355
The carrier frequency shall not depart from the reference frequency in excess of ±2.5 ppm for mobile stations.

FCC §24.235
The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

FCC §27.54
The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

Test Engineer ID:	43575	Test Date:	2/20/2020

GPRS 850

Limit		824	849	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm	F high @ -13dBm		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	824.0183	848.9815		
Extreme (50C)		824.0183	848.9815	20.0	0.024
Extreme (40C)		824.0183	848.9815	18.3	0.022
Extreme (30C)		824.0183	848.9815	33.0	0.039
Extreme (10C)		824.0183	848.9815	23.0	0.027
Extreme (0C)		824.0183	848.9815	21.5	0.026
Extreme (-10C)		824.0183	848.9815	20.9	0.025
Extreme (-20C)		824.0183	848.9815	13.0	0.015
Extreme (-30C)		824.0183	848.9815	15.2	0.018
20C	15%	824.0183	848.9815	24.1	0.029
	-15%	824.0183	848.9815	21.3	0.025
	End Point	824.0183	848.9815	24.9	0.030

GPRS 1900

Limit		1850	1910	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm	F high @ -13dBm		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)		1850.0237	1909.9734		
Extreme (50C)		1850.0237	1909.9734	5.6	0.003
Extreme (40C)		1850.0237	1909.9734	15.4	0.008
Extreme (30C)		1850.0237	1909.9734	23.6	0.013
Extreme (10C)	Normal	1850.0237	1909.9734	32.7	0.017
Extreme (0C)		1850.0237	1909.9734	31.1	0.017
Extreme (-10C)		1850.0237	1909.9734	25.3	0.013
Extreme (-20C)		1850.0237	1909.9734	25.3	0.013
Extreme (-30C)		1850.0237	1909.9734	18.0	0.010
20C	15%	1850.0237	1909.9734	28.9	0.015
	-15%	1850.0237	1909.9734	27.4	0.015
	End Point	1850.0237	1909.9734	26.8	0.014

8.4.2. WCDMA

LIMITS

FCC §22.355
The carrier frequency shall not depart from the reference frequency in excess of ±2.5 ppm for mobile stations.

FCC §24.235
The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

FCC §27.54
The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

Test Engineer ID:	43575	Test Date:	2/20/2020

WCDMA REL 99 BAND 5

Limit		824	849	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm	F high @ -13dBm		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	824.1103	848.8950		
Extreme (50C)		824.1103	848.8950	-2.8	-0.0033
Extreme (40C)		824.1103	848.8950	2.0	0.0024
Extreme (30C)		824.1103	848.8950	-21.4	-0.0256
Extreme (10C)		824.1103	848.8950	-6.9	-0.0083
Extreme (0C)		824.1103	848.8950	-4.4	-0.0052
Extreme (-10C)		824.1103	848.8950	-13.7	-0.0163
Extreme (-20C)		824.1103	848.8950	8.8	0.0105
Extreme (-30C)		824.1103	848.8950	9.1	0.0108
20C	15%	824.1103	848.8950	-10.0	-0.0120
	-15%	824.1103	848.8950	-9.1	-0.0109
	End Point	824.1103	848.8950	-8.1	-0.0097

WCDMA REL 99 BAND 2

Limit		1850	1910	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm	F high @ -13dBm		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	1850.1161	1909.8745		
Extreme (50C)		1850.1161	1909.8745	19.3	0.0103
Extreme (40C)		1850.1161	1909.8745	18.8	0.0100
Extreme (30C)		1850.1161	1909.8745	17.7	0.0094
Extreme (10C)		1850.1161	1909.8745	16.5	0.0088
Extreme (0C)		1850.1161	1909.8745	18.0	0.0096
Extreme (-10C)		1850.1161	1909.8745	20.0	0.0106
Extreme (-20C)		1850.1161	1909.8745	19.6	0.0104
Extreme (-30C)		1850.1161	1909.8745	17.9	0.0095
20C	15%	1850.1161	1909.8745	17.2	0.0092
	-15%	1850.1161	1909.8745	17.0	0.0090
	End Point	1850.1161	1909.8745	17.3	0.0092

WCDMA REL 99 BAND 4

Limit		1710	1755	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm	F high @ -13dBm		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	1710.1049	1754.8943		
Extreme (50C)		1710.1049	1754.8943	22.1	0.0128
Extreme (40C)		1710.1049	1754.8943	20.7	0.0119
Extreme (30C)		1710.1049	1754.8943	15.9	0.0092
Extreme (10C)		1710.1049	1754.8943	18.3	0.0106
Extreme (0C)		1710.1049	1754.8943	17.5	0.0101
Extreme (-10C)		1710.1049	1754.8943	16.6	0.0096
Extreme (-20C)		1710.1049	1754.8943	18.4	0.0106
Extreme (-30C)		1710.1049	1754.8943	19.0	0.0110
20C	15%	1710.1049	1754.8943	14.7	0.0085
	-15%	1710.1049	1754.8943	14.9	0.0086
	End Point	1710.1049	1754.8943	13.8	0.0080

8.4.3. 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.
ISED: RSS133§6.3
The carrier frequency shall not depart from the reference frequency, in excess of ±2.5 ppm for mobile stations and ±1.0 ppm for base stations.
In lieu of meeting the above stability values, the test report may show that the frequency stability is sufficient to ensure that the emission bandwidth stays within the operating frequency block when tested to the temperature and supply voltage variations specified in RSS-Gen.

Test Engineer ID:	50820	Test Date:	2/21/2020

QPSK, (20MHz BANDWIDTH)

Limit		1850	1910	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm	F high @ -13dBm		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	1851.0132	1909.0011		
Extreme (50C)		1851.0132	1909.0011	13.8	0.007
Extreme (40C)		1851.0132	1909.0011	14.1	0.008
Extreme (30C)		1851.0132	1909.0011	12.5	0.007
Extreme (10C)		1851.0132	1909.0011	13.4	0.007
Extreme (0C)		1851.0132	1909.0011	12.5	0.007
Extreme (-10C)		1851.0132	1909.0011	13.4	0.007
Extreme (-20C)		1851.0132	1909.0011	11.9	0.006
Extreme (-30C)		1851.0132	1909.0011	12.6	0.007
20C	15%	1851.0132	1909.0011	11.0	0.006
	-15%	1851.0132	1909.0011	12.0	0.006
	End Point	1851.0132	1909.0011	14.5	0.008

8.4.4. LTE BAND 5

LIMITS

FCC: §22.355
The carrier frequency shall not depart from the reference frequency in excess of ±2.5 ppm for mobile stations.
ISED: RSS132§5.3
The carrier frequency shall not depart from the reference frequency in excess of ±2.5 SRSP for mobile stations and±1.5 ppm for base stations.
In lieu of meeting the above stability values, the test report may show that the frequency stability is sufficient to ensure that the occupied bandwidth stays within each of the sub-bands (see Section 5.1) when tested to the temperature and supply voltage variations specified in RSS-Gen.

Test Engineer ID:	39005	Test Date:	2/21/2020

QPSK, (10MHz BANDWIDTH)

Limit		824	849	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm	F high @ -13dBm		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	824.4628	848.5296		
Extreme (50C)		824.4628	848.5296	-8.4	-0.010
Extreme (40C)		824.4628	848.5296	-8.3	-0.010
Extreme (30C)		824.4628	848.5296	-8.3	-0.010
Extreme (10C)		824.4628	848.5296	-9.2	-0.011
Extreme (0C)		824.4628	848.5296	-7.1	-0.009
Extreme (-10C)		824.4628	848.5296	-6.4	-0.008
Extreme (-20C)		824.4628	848.5296	-6.1	-0.007
Extreme (-30C)		824.4628	848.5296	-5.9	-0.007
20C	15%	824.4628	848.5296	-4.6	-0.005
	-15%	824.4628	848.5296	-8.3	-0.010
	End Point	824.4628	848.5296	-6.8	-0.008

8.4.5. 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.
ISED: RSS199§4.3
Transmitter Frequency Stability

a. The transmitter frequency stability limit shall be determined as follows:

The frequency offset shall be measured according to the procedure described in RSS-Gen and recorded;

b. Using a resolution bandwidth equal to that permitted within the 1 MHz band immediately outside the channel edge, as found in clause 4.6, reference points will be selected at the unwanted emission levels which comply with the attenuation specified in 4.6, for the type of device under test, on the emission mask of the lowest and highest channels, and the frequency at these points shall be recorded as fL and fH respectively.

The applicant shall ensure frequency stability by showing that fL minus the frequency offset and fH plus the frequency offset shall be within the frequency range that the equipment is designed to operate.

Test Engineer ID:	39005	Test Date:	2/21/2020

QPSK, (20MHz BANDWIDTH)

Limit		2500	2570	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm	F high @ -13dBm		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	2501.0141	2568.9954		
Extreme (50C)		2501.0141	2568.9954	10.6	0.004
Extreme (40C)		2501.0141	2568.9954	10.4	0.004
Extreme (30C)		2501.0141	2568.9954	9.5	0.004
Extreme (10C)		2501.0141	2568.9954	9.0	0.004
Extreme (0C)		2501.0141	2568.9954	11.2	0.004
Extreme (-10C)		2501.0141	2568.9954	10.9	0.004
Extreme (-20C)		2501.0141	2568.9954	11.5	0.005
Extreme (-30C)		2501.0141	2568.9954	12.3	0.005
20C	15%	2501.0141	2568.9954	10.6	0.004
	-15%	2501.0141	2568.9954	11.6	0.005
	End Point	2501.0141	2568.9954	11.3	0.004

8.4.6. LTE BAND 12

LIMITS

FCC: §27.54
The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.
ISED: RSS130§4.5
For equipment that is capable of transmitting numerous channels simultaneously for different applications (e.g. LTE and narrowband – Internet of Things (IoT)), the occupied bandwidth shall be the bandwidth representing the sum of the occupied bandwidths of these channels.

The frequency stability shall be sufficient to ensure that the occupied bandwidth remains within each frequency block range when tested at the temperature and supply voltage variations specified in RSS-Gen.

Test Engineer ID:	50820	Test Date:	2/21/2020

QPSK, (10MHz BANDWIDTH)

Limit		699	716	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm	F high @ -13dBm		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	699.4999	715.5205		
Extreme (50C)		699.4999	715.5205	-7.5	-0.011
Extreme (40C)		699.4999	715.5205	-6.8	-0.010
Extreme (30C)		699.4999	715.5205	-5.5	-0.008
Extreme (10C)		699.4999	715.5205	-6.1	-0.009
Extreme (0C)		699.4999	715.5205	-8.2	-0.012
Extreme (-10C)		699.4999	715.5205	-5.8	-0.008
Extreme (-20C)		699.4999	715.5205	-5.0	-0.007
Extreme (-30C)		699.4999	715.5205	-6.6	-0.009
20C	15%	699.4999	715.5205	-5.8	-0.008
	-15%	699.4999	715.5205	-7.3	-0.010
	End Point	699.4999	715.5205	-5.5	-0.008

8.4.7. 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.
ISED: RSS130§4.5
For equipment that is capable of transmitting numerous channels simultaneously for different applications (e.g. LTE and narrowband – Internet of Things (IoT)), the occupied bandwidth shall be the bandwidth representing the sum of the occupied bandwidths of these channels.

The frequency stability shall be sufficient to ensure that the occupied bandwidth remains within each frequency block range when tested at the temperature and supply voltage variations specified in RSS-Gen.

Test Engineer ID:	39005	Test Date:	2/21/2020

QPSK, (10MHz BANDWIDTH)

Limit		777	787	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm	F high @ -13dBm		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	777.4945	786.5080		
Extreme (50C)		777.4945	786.5080	-5.2	-0.007
Extreme (40C)		777.4945	786.5080	-5.2	-0.007
Extreme (30C)		777.4945	786.5080	-4.3	-0.005
Extreme (10C)		777.4945	786.5080	-5.0	-0.006
Extreme (0C)		777.4945	786.5080	-5.7	-0.007
Extreme (-10C)		777.4945	786.5080	-6.0	-0.008
Extreme (-20C)		777.4945	786.5080	-4.4	-0.006
Extreme (-30C)		777.4945	786.5080	-5.0	-0.006
20C	15%	777.4945	786.5080	-6.7	-0.009
	-15%	777.4945	786.5080	-5.8	-0.007
	End Point	777.4945	786.5080	-6.5	-0.008

8.4.8. LTE BAND 41 (FCC)

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:	39005	Test Date:	2/21/2020

QPSK, (20MHz BANDWIDTH)

Limit		2496	2690	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm	F high @ -13dBm		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	2496.9451	2689.0546		
Extreme (50C)		2496.9451	2689.0546	11.2	0.004
Extreme (40C)		2496.9451	2689.0546	10.2	0.004
Extreme (30C)		2496.9451	2689.0546	10.1	0.004
Extreme (10C)		2496.9451	2689.0546	9.9	0.004
Extreme (0C)		2496.9451	2689.0546	13.3	0.005
Extreme (-10C)		2496.9451	2689.0546	13.6	0.005
Extreme (-20C)		2496.9451	2689.0546	13.0	0.005
Extreme (-30C)		2496.9451	2689.0546	14.2	0.005
20C	15%	2496.9451	2689.0546	12.5	0.005
	-15%	2496.9451	2689.0546	13.1	0.005
	End Point	2496.9451	2689.0546	10.6	0.004

8.4.9. LTE BAND 41 (IC)

LIMITS

ISED: RSS199§4.3
Transmitter Frequency Stability

a. The transmitter frequency stability limit shall be determined as follows:

The frequency offset shall be measured according to the procedure described in RSS-Gen and recorded;

b. Using a resolution bandwidth equal to that permitted within the 1 MHz band immediately outside the channel edge, as found in clause 4.6, reference points will be selected at the unwanted emission levels which comply with the attenuation specified in 4.6, for the type of device under test, on the emission mask of the lowest and highest channels, and the frequency at these points shall be recorded as fL and fH respectively.

The applicant shall ensure frequency stability by showing that fL minus the frequency offset and fH plus the frequency offset shall be within the frequency range that the equipment is designed to operate.

Test Engineer ID:	50820	Test Date:	2/21/2020

QPSK, (20MHz BANDWIDTH)

Limit		2500	2690	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm	F high @ -13dBm		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	2500.9535	2689.0534		
Extreme (50C)		2500.9535	2689.0534	11.0	0.004
Extreme (40C)		2500.9535	2689.0534	10.3	0.004
Extreme (30C)		2500.9535	2689.0534	10.2	0.004
Extreme (10C)		2500.9535	2689.0534	10.3	0.004
Extreme (0C)		2500.9535	2689.0534	14.2	0.005
Extreme (-10C)		2500.9535	2689.0534	13.8	0.005
Extreme (-20C)		2500.9535	2689.0534	12.9	0.005
Extreme (-30C)		2500.9535	2689.0534	13.6	0.005
20C	15%	2500.9535	2689.0534	11.0	0.004
	-15%	2500.9535	2689.0534	10.6	0.004
	End Point	2500.9535	2689.0534	10.8	0.004

8.4.10. 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.
ISED: RSS139§6.4
The frequency stability shall be sufficient to ensure that the occupied bandwidth stays within the operating frequency block when tested to the temperature and supply voltage variations specified in RSS-Gen.

Test Engineer ID:	39005	Test Date:	2/21/2020

QPSK, (20MHz BANDWIDTH)

Limit		1710	1780	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm	F high @ -13dBm		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	1711.0007	1779.0128		
Extreme (50C)		1711.0007	1779.0128	9.5	0.005
Extreme (40C)		1711.0007	1779.0128	9.0	0.005
Extreme (30C)		1711.0007	1779.0128	8.0	0.005
Extreme (10C)		1711.0007	1779.0128	10.0	0.006
Extreme (0C)		1711.0007	1779.0128	8.9	0.005
Extreme (-10C)		1711.0007	1779.0128	8.9	0.005
Extreme (-20C)		1711.0007	1779.0128	9.8	0.006
Extreme (-30C)		1711.0007	1779.0128	9.7	0.006
20C	15%	1711.0007	1779.0128	8.6	0.005
	-15%	1711.0007	1779.0128	9.0	0.005
	End Point	1711.0007	1779.0128	7.9	0.005

8.4.11. 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.
ISED: RSS130§4.5
For equipment that is capable of transmitting numerous channels simultaneously for different applications (e.g. LTE and narrowband – Internet of Things (IoT)), the occupied bandwidth shall be the bandwidth representing the sum of the occupied bandwidths of these channels.

The frequency stability shall be sufficient to ensure that the occupied bandwidth remains within each frequency block range when tested at the temperature and supply voltage variations specified in RSS-Gen.

Test Engineer ID:	50820	Test Date:	2/21/2020

QPSK, (20MHz BANDWIDTH)

Limit		663	698	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm	F high @ -13dBm		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	664.0027	697.0603		
Extreme (50C)		664.0027	697.0603	4.0	0.006
Extreme (40C)		664.0027	697.0603	6.0	0.009
Extreme (30C)		664.0027	697.0603	4.8	0.007
Extreme (10C)		664.0027	697.0603	7.0	0.010
Extreme (0C)		664.0027	697.0603	3.5	0.005
Extreme (-10C)		664.0027	697.0603	3.9	0.006
Extreme (-20C)		664.0027	697.0603	5.7	0.008
Extreme (-30C)		664.0027	697.0603	4.5	0.007
20C	15%	664.0027	697.0603	6.3	0.009
	-15%	664.0027	697.0603	5.3	0.008
	End Point	664.0027	697.0603	8.6	0.013

8.5. PEAK-TO-AVERAGE POWER RATIO

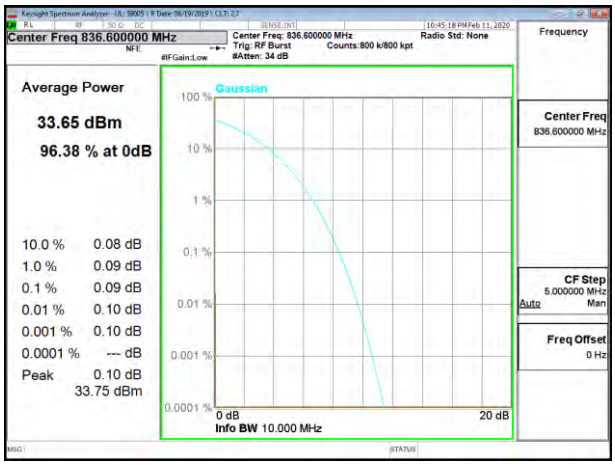
LIMIT

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.

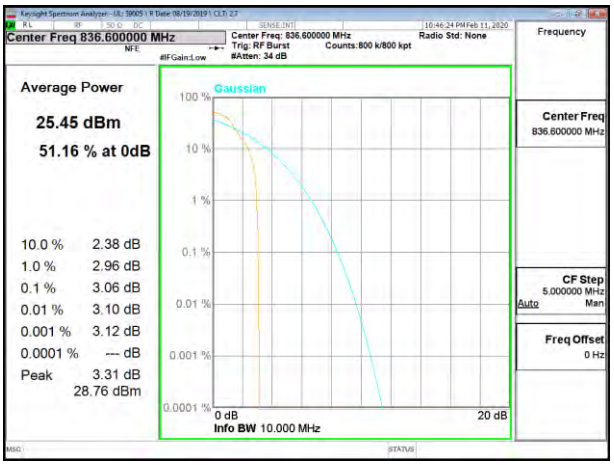
RESULT

The results from all CCDF measurements are passed with 13dB peak-to-average power ratio criteria.

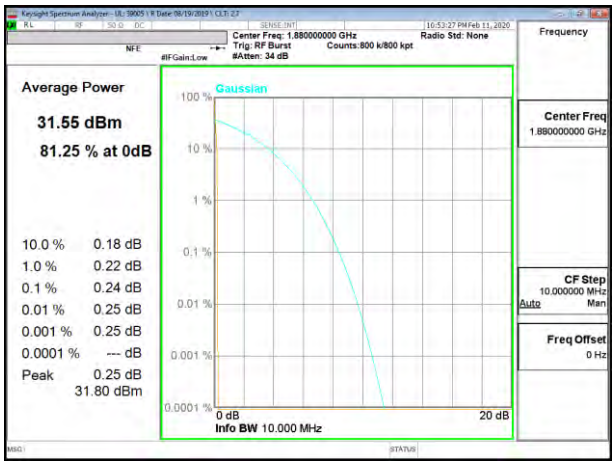
8.5.1. GSM



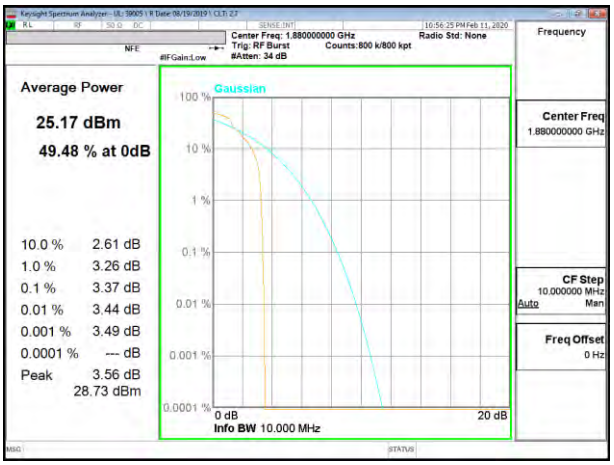
GSM 850 GPRS Middle Channel



GSM 850 EGPRS Middle Channel

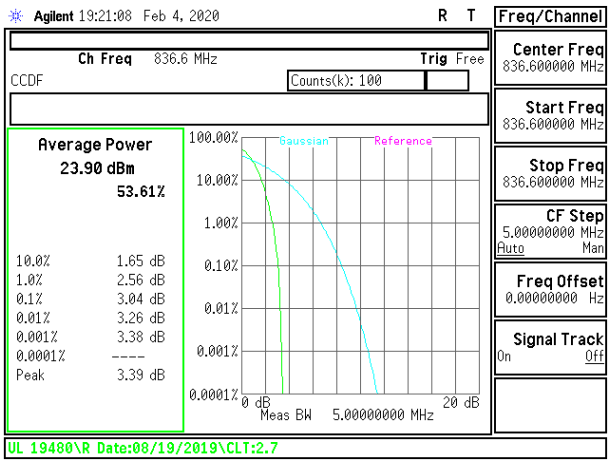


GSM 1900 GPRS Middle Channel

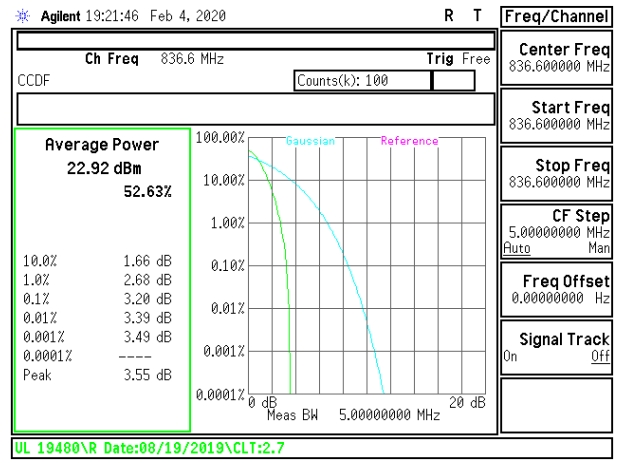


GSM 1900 EGPRS Middle Channel

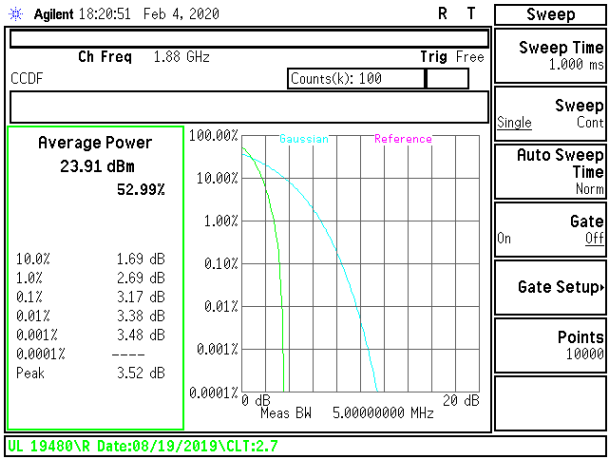
8.5.2. WCDMA



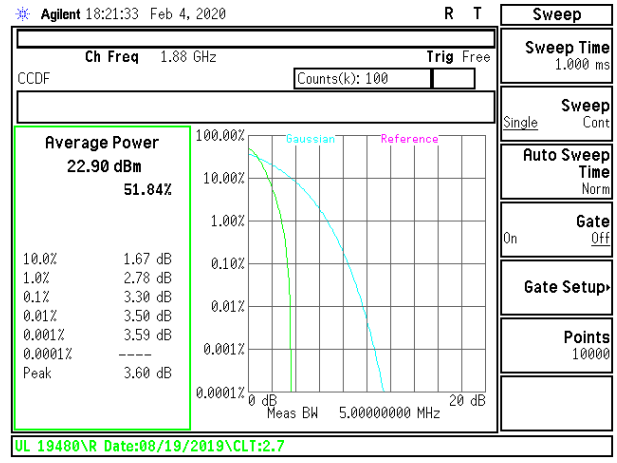
WCDMA Band 5 Rel 99 Middle Channel



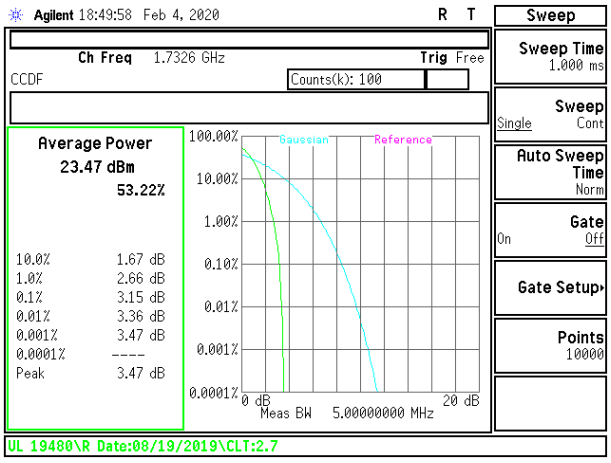
WCDMA Band 5 HSDPA Middle Channel



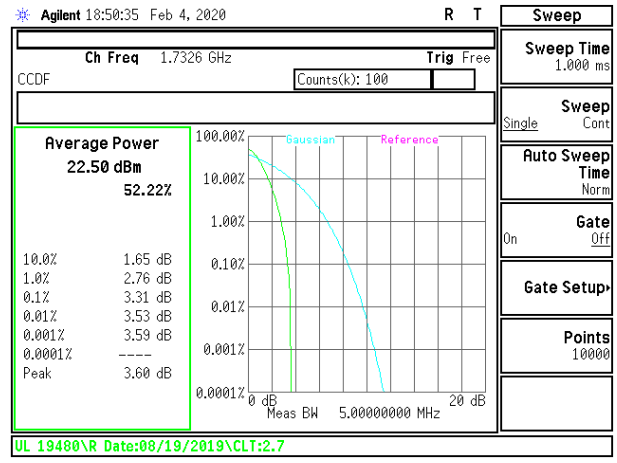
WCDMA Band 2 Rel 99 Middle Channel



WCDMA Band 2 HSDPA Middle Channel

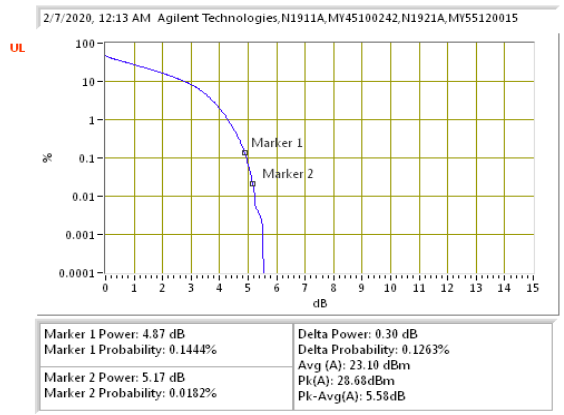


WCDMA Band 4 Rel 99 Middle Channel

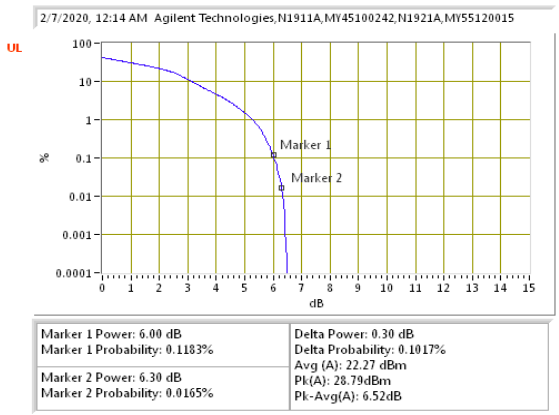


WCDMA Band 4 HSDPA Middle Channel

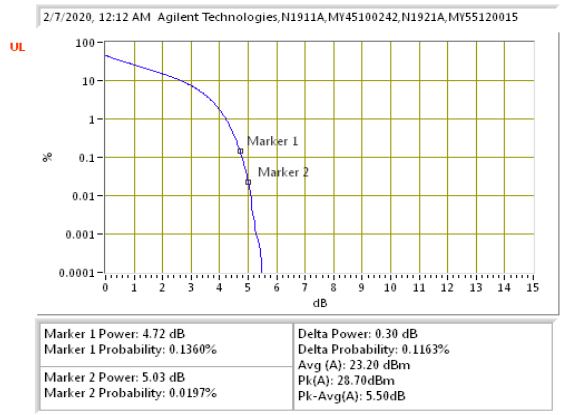
8.5.3. LTE BAND 2



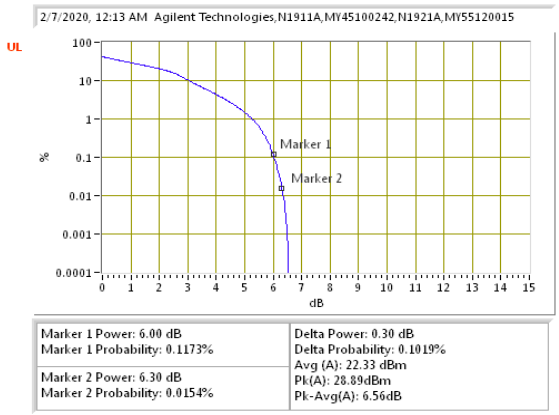
LTE B2 1.4MHz QPSK Middle Channel



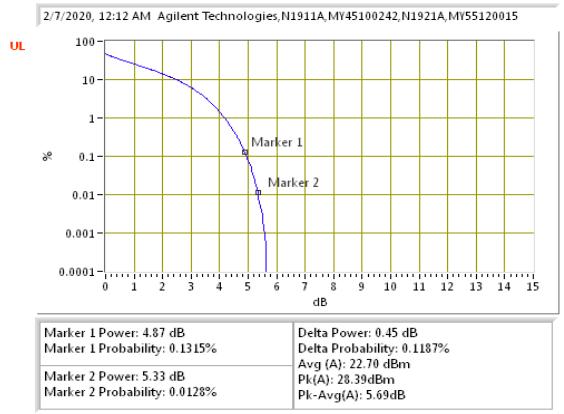
LTE B2 1.4MHz 16QAM Middle Channel



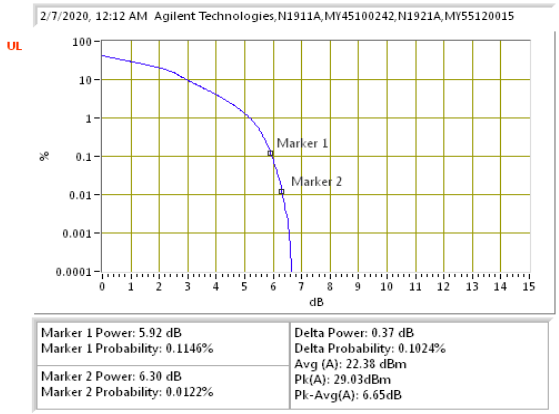
LTE B2 3MHz QPSK Middle Channel



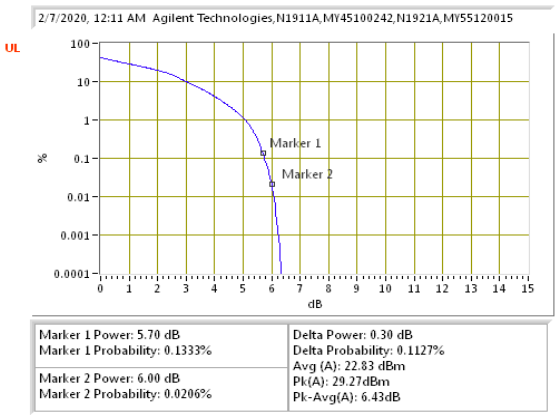
LTE B2 3MHz 16QAM Middle Channel



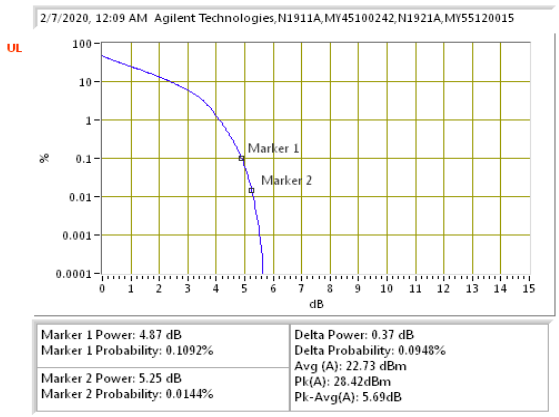
LTE B2 5MHz QPSK Middle Channel



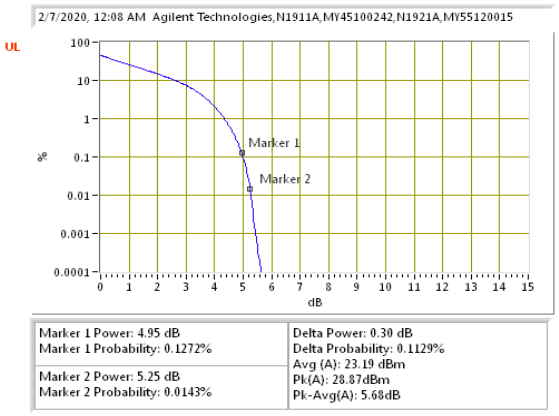
LTE B2 5MHz 16QAM Middle Channel



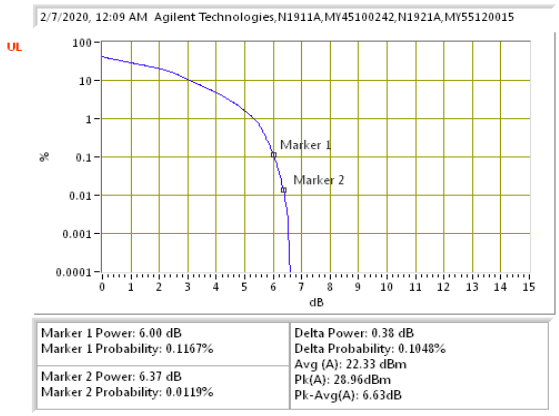
LTE B2 10MHz QPSK Middle Channel



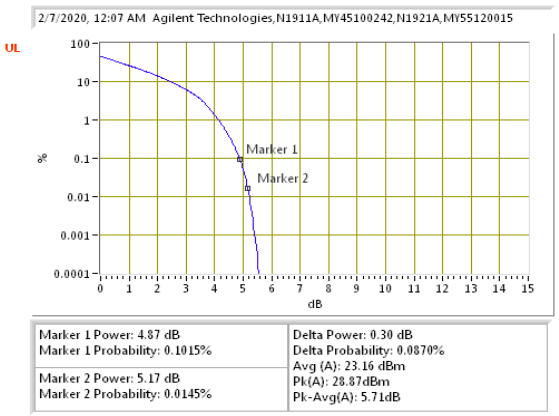
LTE B2 10MHz 16QAM Middle Channel



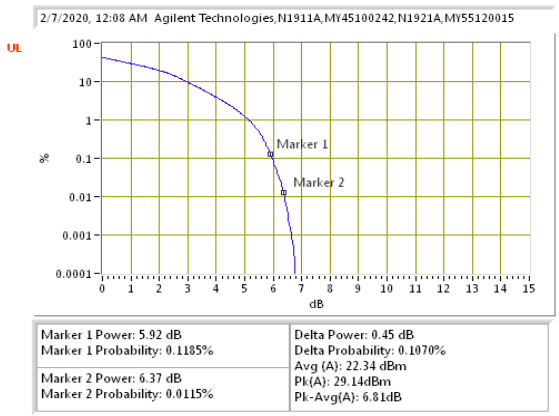
LTE B2 15MHz QPSK Middle Channel



LTE B2 15MHz 16QAM Middle Channel

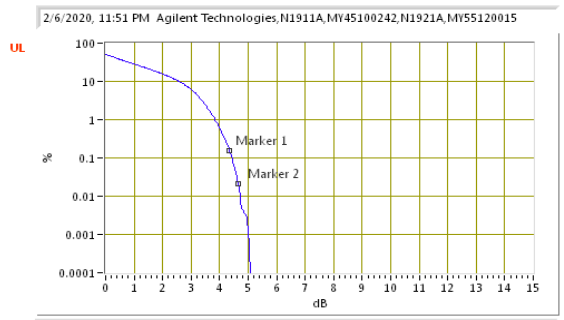


LTE B2 20MHz QPSK Middle Channel

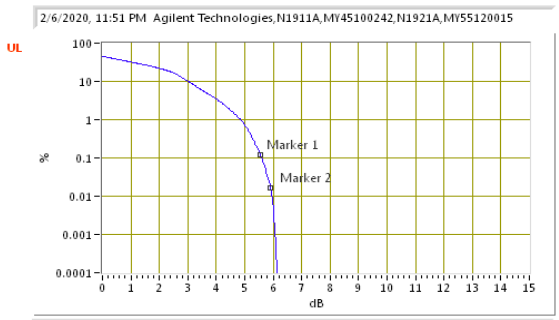


LTE B2 20MHz 16QAM Middle Channel

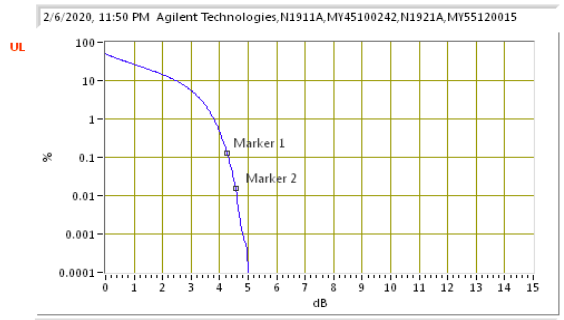
8.5.4. LTE BAND 5



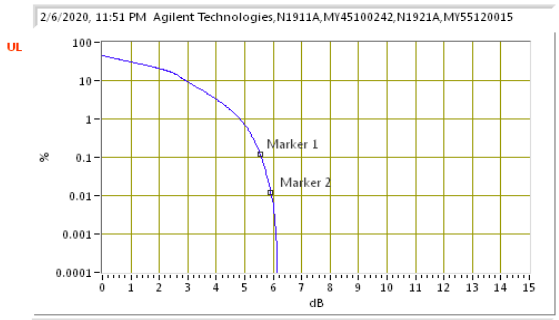
LTE B5 1.4MHz QPSK Middle Channel



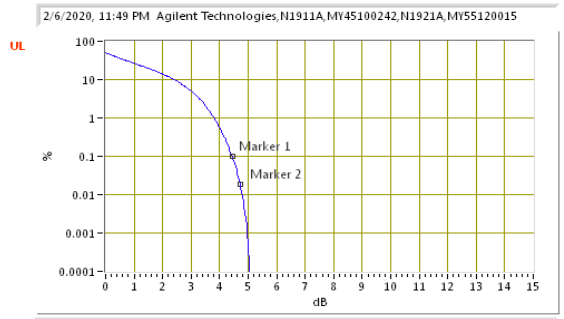
LTE B5 1.4MHz 16QAM Middle Channel



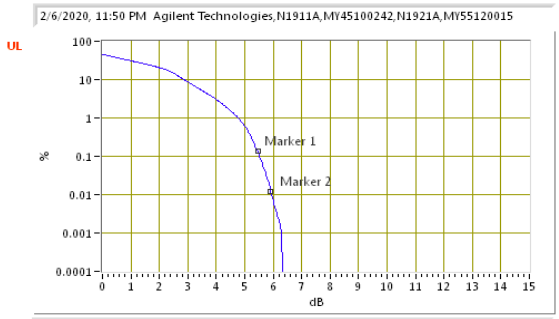
LTE B5 3MHz QPSK Middle Channel



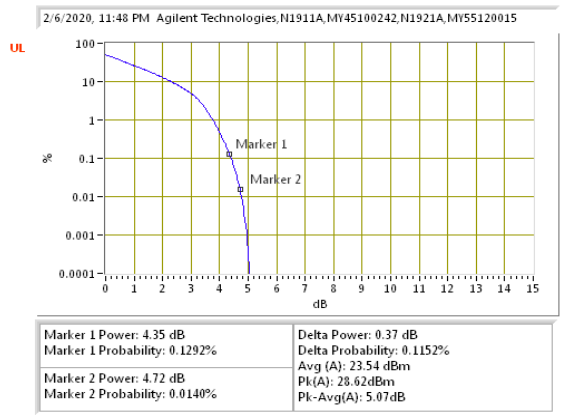
LTE B5 3MHz 16QAM Middle Channel



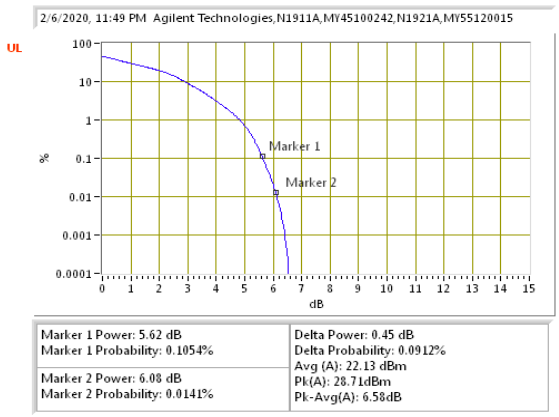
LTE B5 5MHz QPSK Middle Channel



LTE B5 5MHz 16QAM Middle Channel

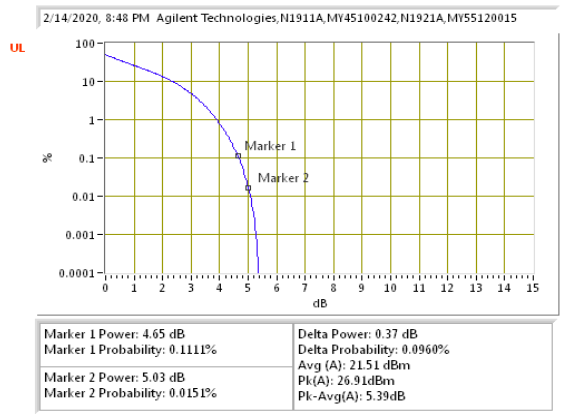


LTE B5 10MHz QPSK Middle Channel

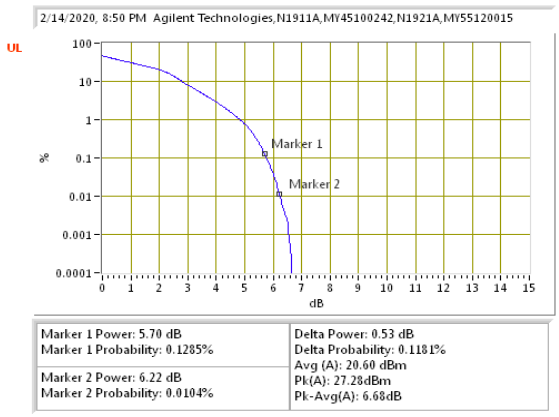


LTE B5 10MHz 16QAM Middle Channel

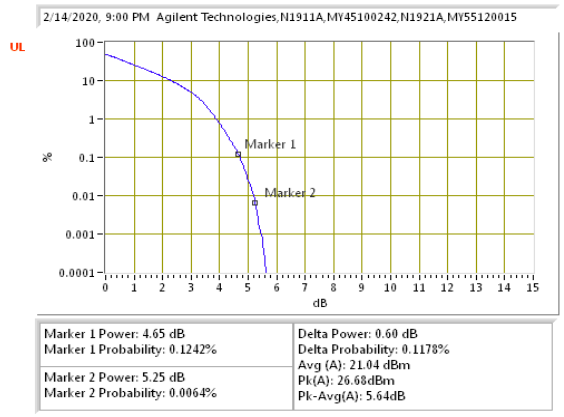
8.5.5. LTE BAND 7



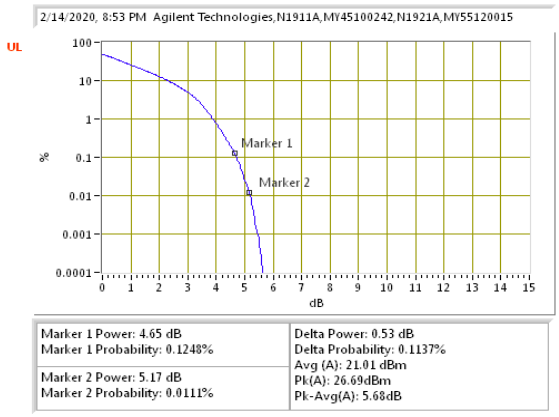
LTE B7 5MHz QPSK Middle Channel



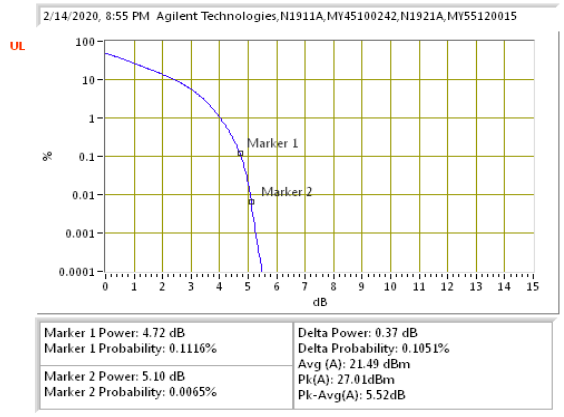
LTE B7 5MHz 16QAM Middle Channel



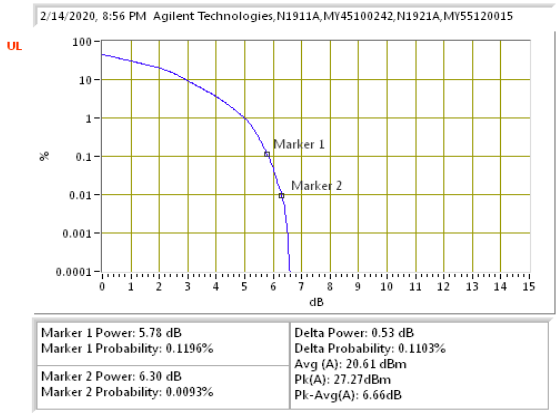
LTE B7 10MHz QPSK Middle Channel



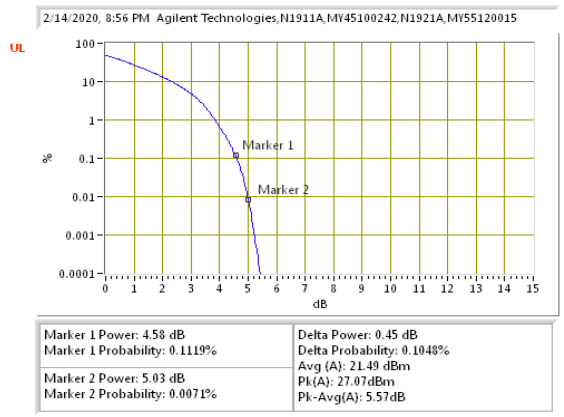
LTE B7 10MHz 16QAM Middle Channel



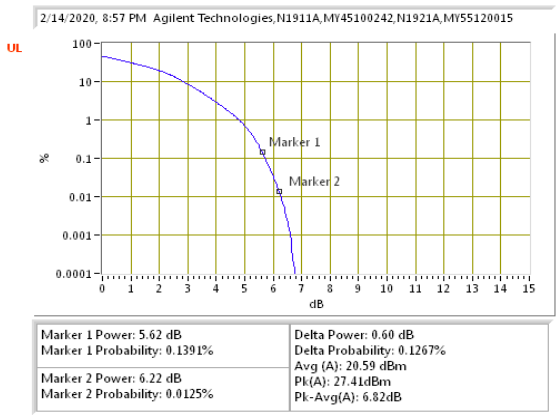
LTE B7 15MHz QPSK Middle Channel



LTE B7 15MHz 16QAM Middle Channel

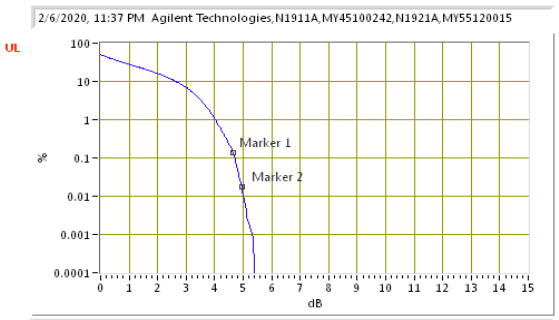


LTE B7 20MHz QPSK Middle Channel

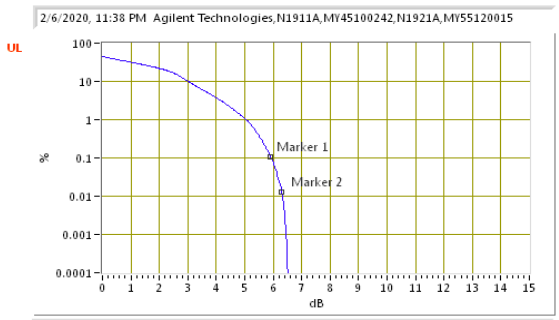


LTE B7 20MHz 16QAM Middle Channel

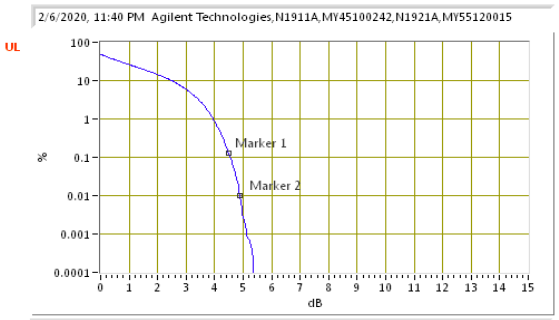
8.5.6. LTE BAND 12



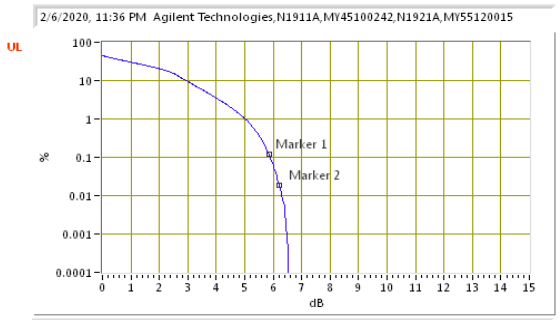
LTE B12 1.4MHz QPSK Middle Channel



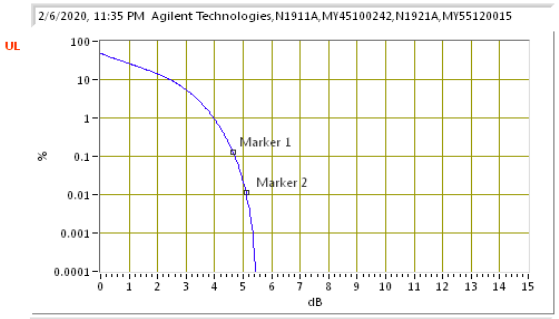
LTE B12 1.4MHz 16QAM Middle Channel



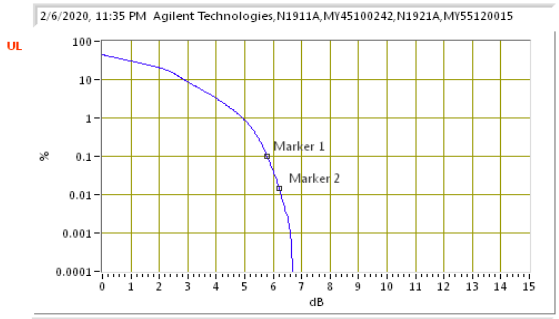
LTE B12 3MHz QPSK Middle Channel



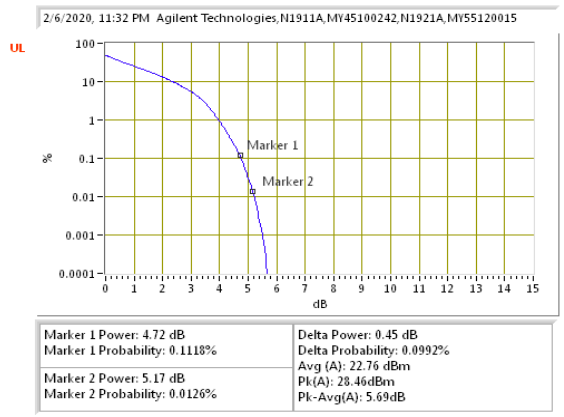
LTE B12 3MHz 16QAM Middle Channel



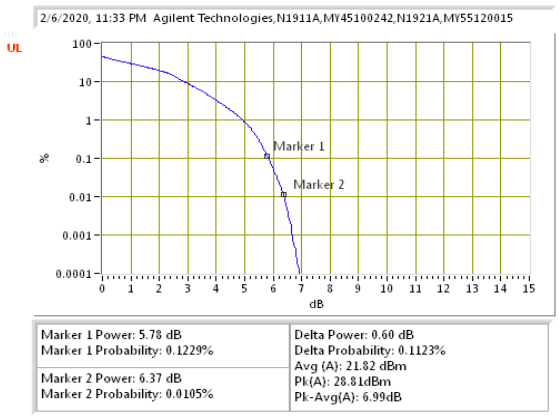
LTE B12 5MHz QPSK Middle Channel



LTE B12 5MHz 16QAM Middle Channel



LTE B12 10MHz QPSK Middle Channel



LTE B12 10MHz 16QAM Middle Channel