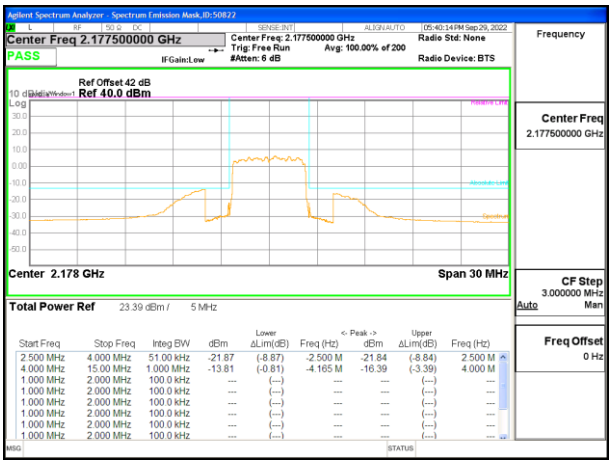
9.2.16. LTE BAND 66 EMISSION MASK

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.

LTE BAND 66 BANDEDGE

LTE B66 5MHz QPSK Low Channel



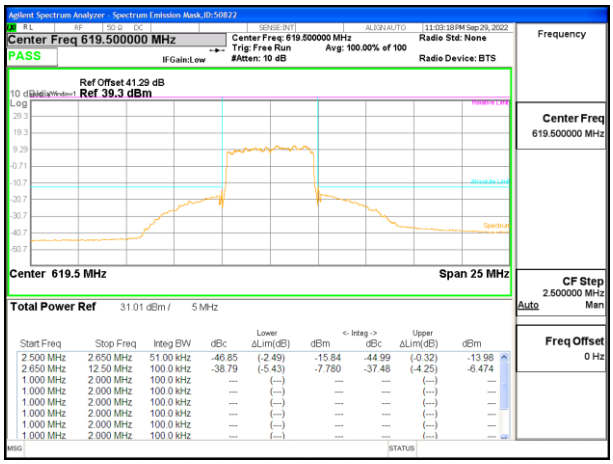
LTE B66 5MHz QPSK High Channel

9.2.17. LTE BAND 71 AND 5G NR n71 EMISSION MASK

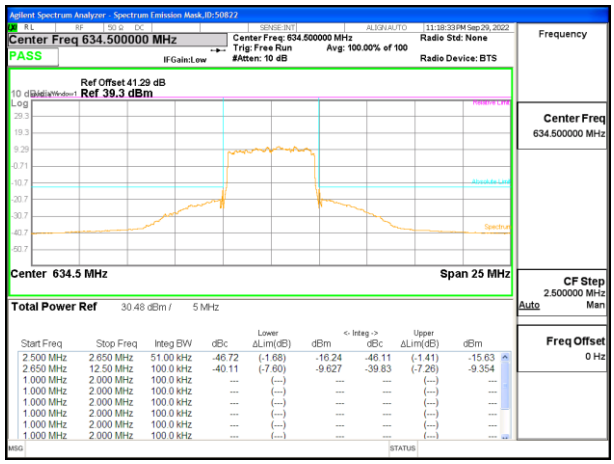
LIMITS

FCC: §27.53
(g) For operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least 43 + 10 log (P) dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

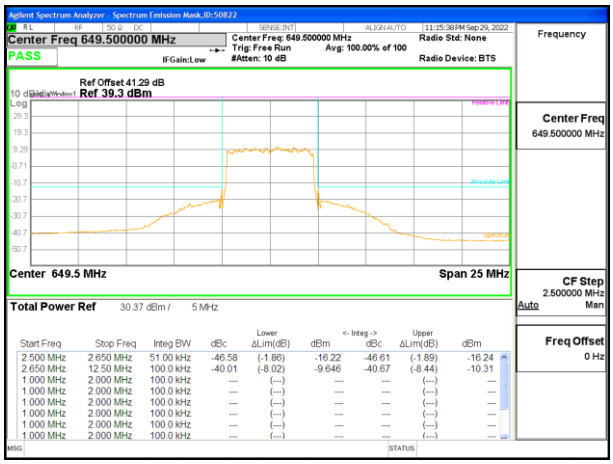
LTE BAND 71 and 5G NR n71 mask



LTE B71 5MHz QPSK Low Channel

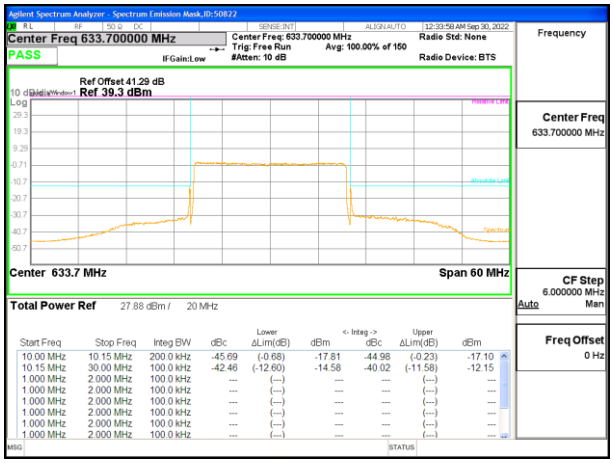


LTE B71 5MHz QPSK Middle Channel

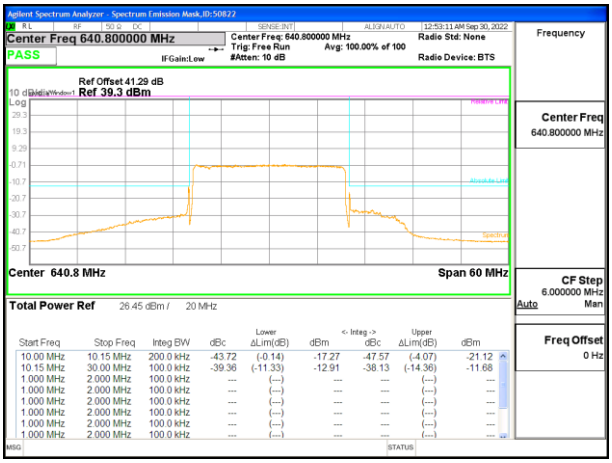


LTE B71 5MHz QPSK High Channel

5G NR n71 20MHz QPSK Low Channel



5G NR n71 20MHz QPSK Middle Channel



5G NR n71 20MHz QPSK High Channel

9.3. OUT OF BAND EMISSIONS

RULE PART(S)

FCC: §2.1051, 22.917, 24.238, 27.53, 27.53, 27.53, 90.543, 90.691

LIMITS

FCC: §2.1051, 22.917 (a), 24.238 (a), 27.53 (h), 27.53 (g), 27.53 (c) (f), 90.543 (e)(f), 90.691 (a)

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

TEST PROCEDURE

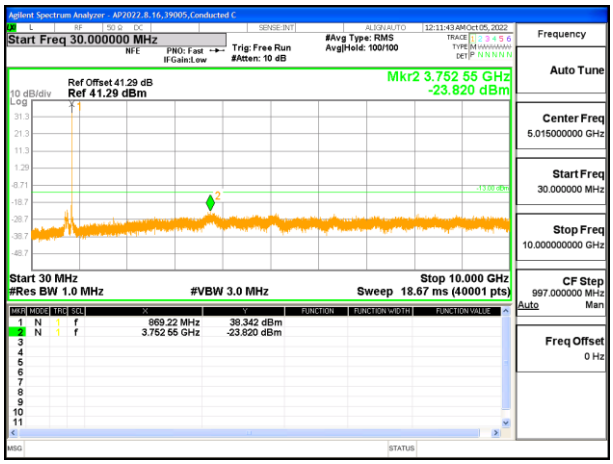
The RF output of the transmitter was connected to a spectrum analyzer through a calibrated coaxial cable. Sufficient scans were taken to show the out-of-band Emissions, if any, up to 10th harmonic. Multiple sweeps were recorded in maximum hold mode using a peak detector to ensure that the worst-case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

For each out of band emissions measurement:

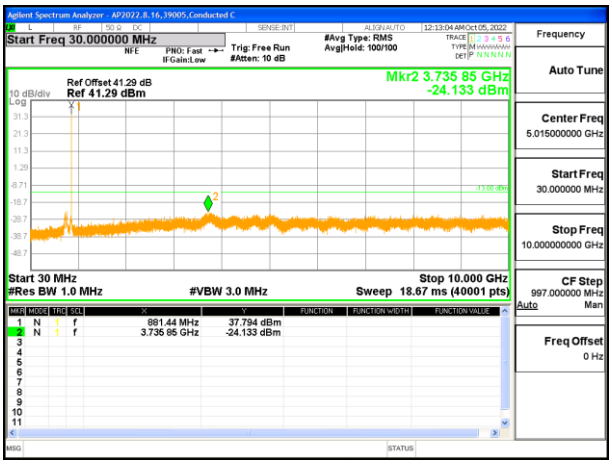
- Set display line at -13dBm according to the band limit.
- Set RBW & VBW to 100 kHz for the measurement below 1 GHz, and 1 MHz for the measurement above 1 GHz. (NOTE: Worst case set RBW/VBW to 1MHz/3MHz)

RESULTS

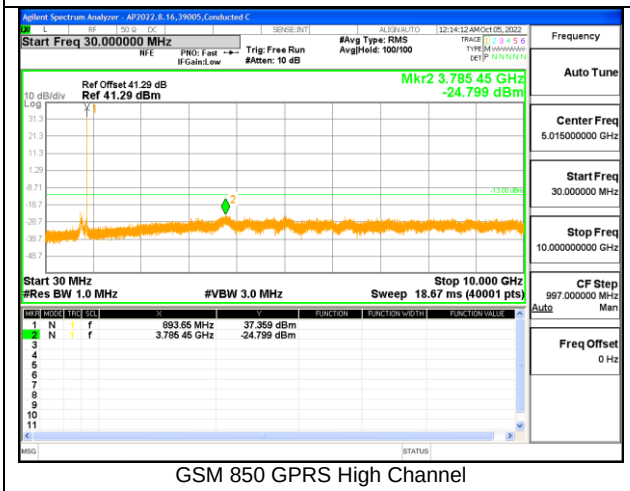
9.3.1. GSM 850



GSM 850 GPRS Low Channel

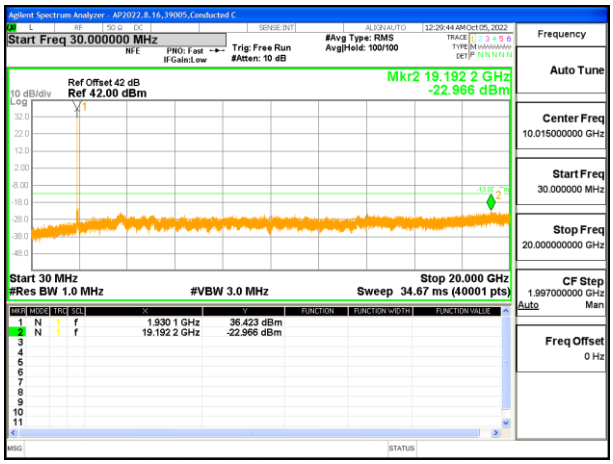


GSM 850 GPRS Middle Channel

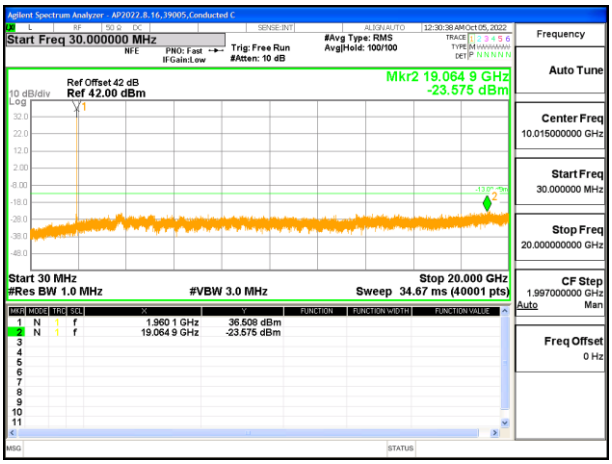


GSM 850 GPRS High Channel

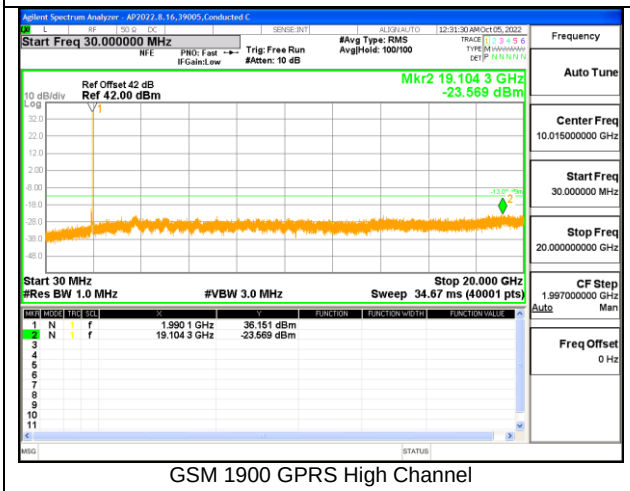
9.3.2. GSM 1900



GSM 1900 GPRS Low Channel

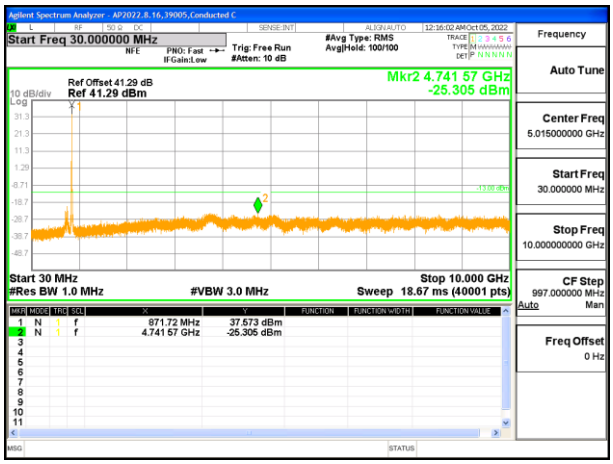


GSM 1900 GPRS Middle Channel

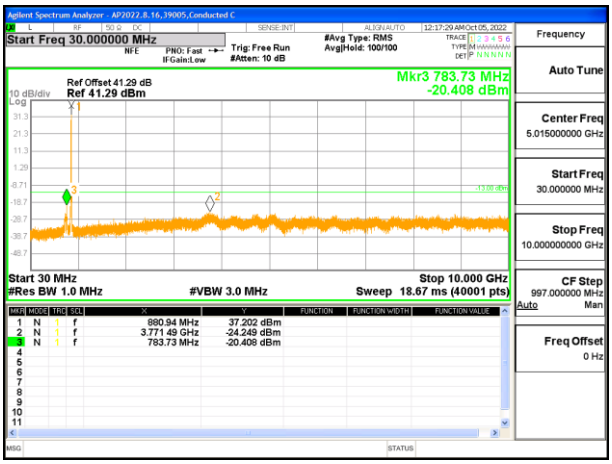


GSM 1900 GPRS High Channel

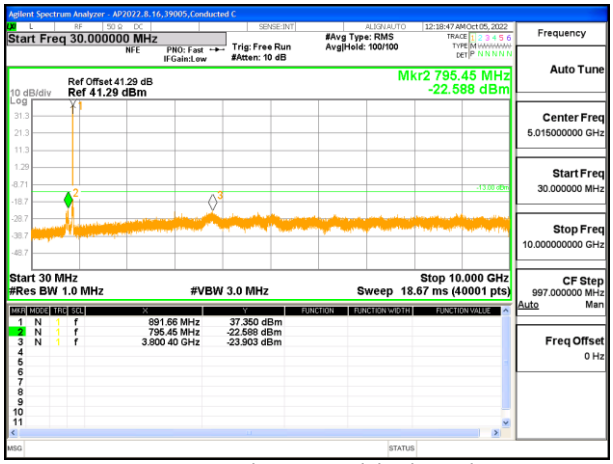
9.3.3. UMTS BAND 5



UMTS Band 5 QPSK Low Channel

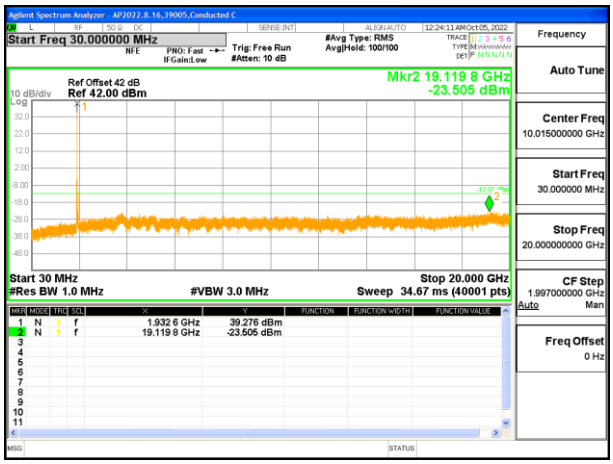


UMTS Band 5 QPSK Middle Channel

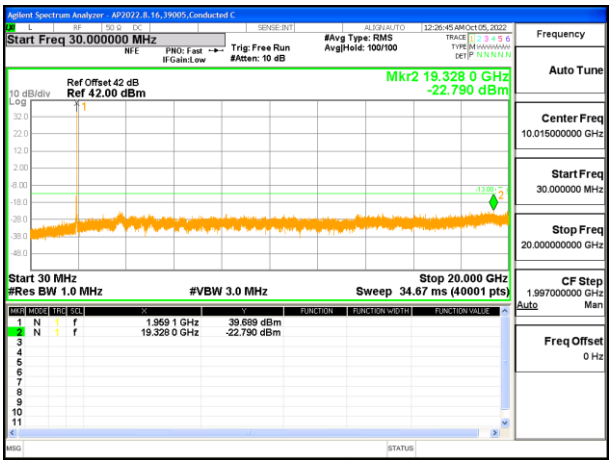


UMTS Band 5 QPSK High Channel

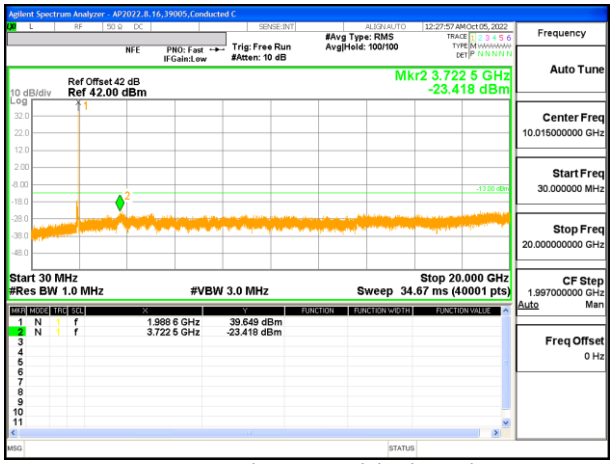
9.3.4. UMTS BAND 2



UMTS Band 2 QPSK Low Channel

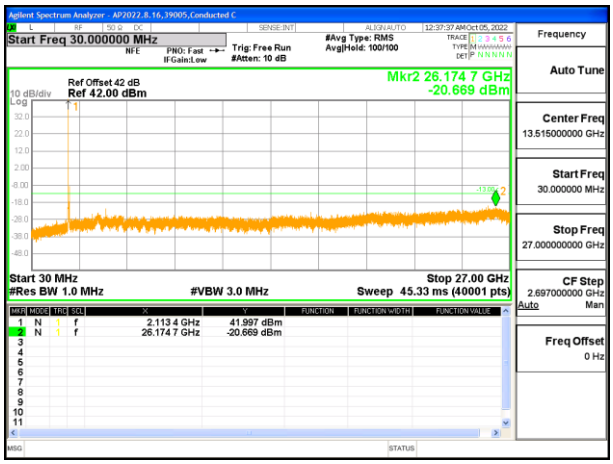


UMTS Band 2 QPSK Middle Channel

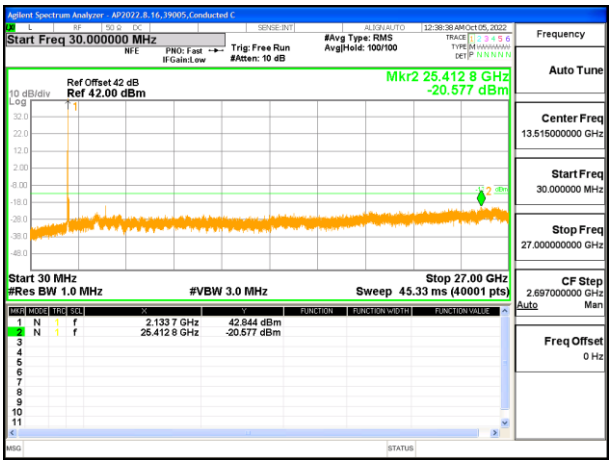


UMTS Band 2 QPSK High Channel

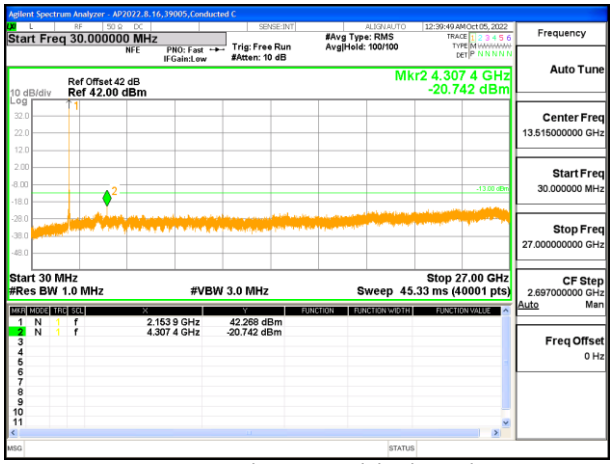
9.3.5. UMTS BAND 4



UMTS Band 4 QPSK Low Channel



UMTS Band 4 QPSK Middle Channel



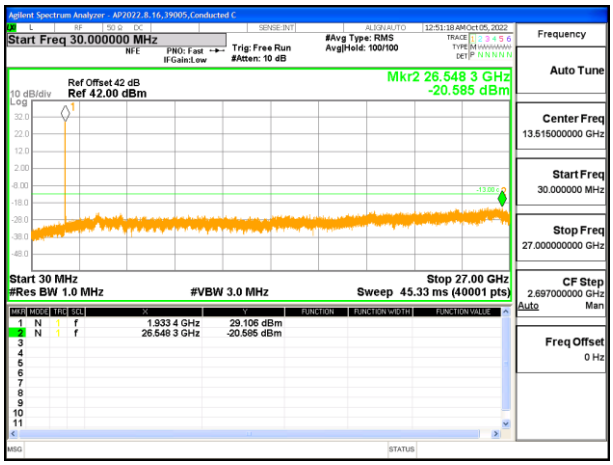
UMTS Band 4 QPSK High Channel

9.3.6. LTE BAND 2

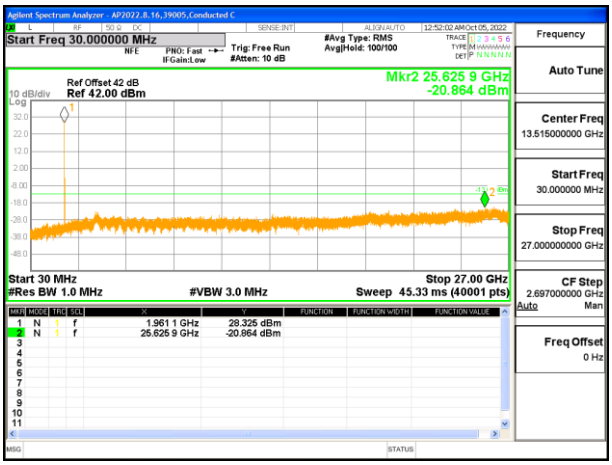
LIMITS

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

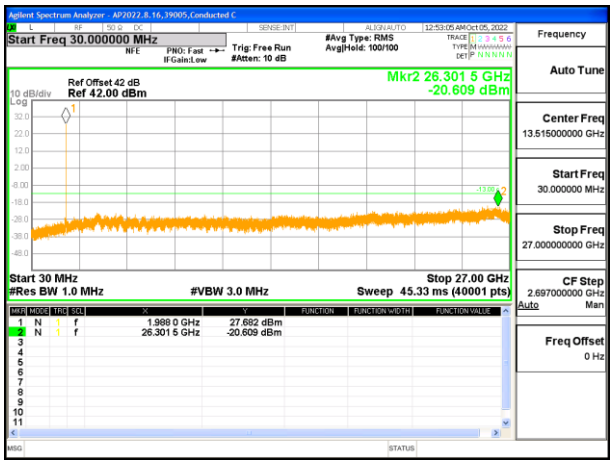
LTE BAND 2



LTE B2 5MHz QPSK Low Channel



LTE B2 5MHz QPSK Middle Channel

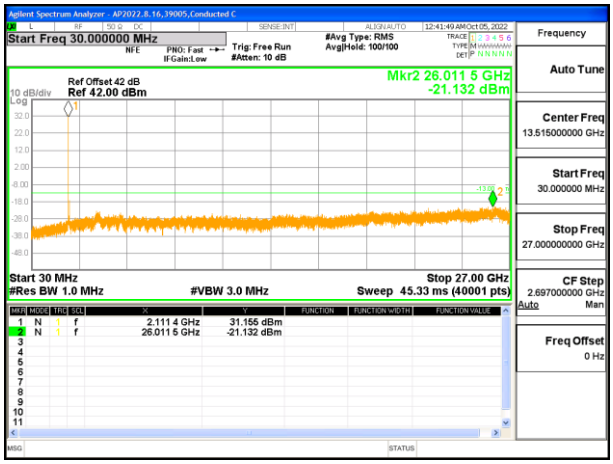


LTE B2 5MHz QPSK High Channel

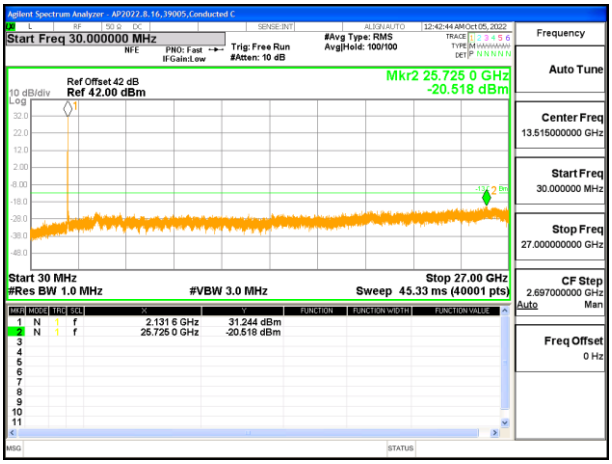
9.3.7. LTE BAND 4

LIMITS

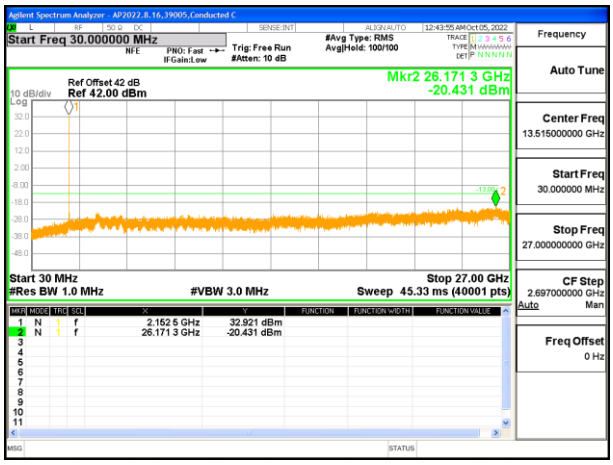
FCC: §27.53 (h)
The minimum permissible attenuation level of any spurious emissions is 43 + 10 log (P) dB where transmitting power (P) in Watts.



LTE B4 5MHz QPSK Low Channel



LTE B4 5MHz QPSK Middle Channel



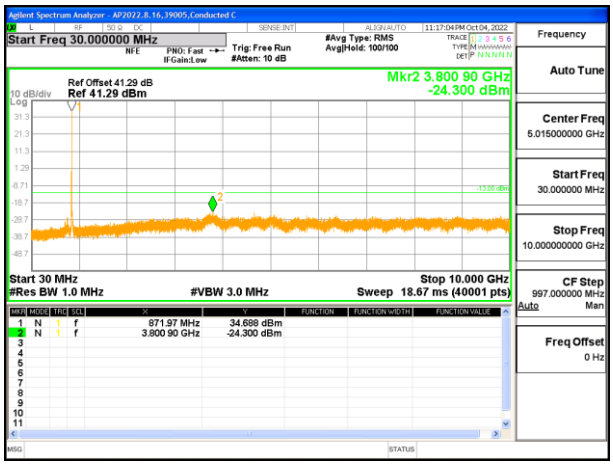
LTE B4 5MHz QPSK High Channel

9.3.8. LTE BAND 5

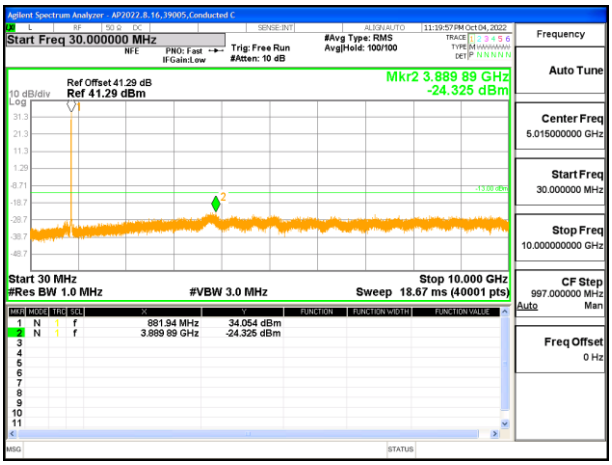
LIMITS

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

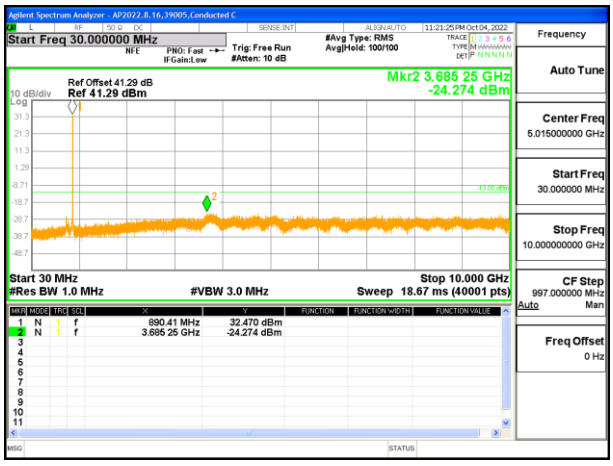
LTE BAND 5



LTE B5 5MHz QPSK Low Channel



LTE B5 5MHz QPSK Middle Channel



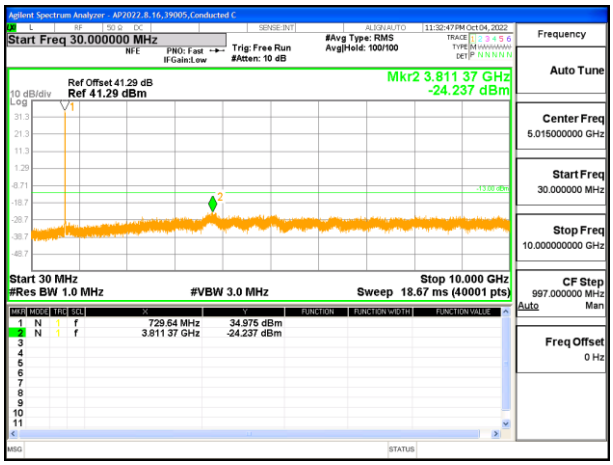
LTE B5 5MHz QPSK High Channel

9.3.9. LTE BAND 12

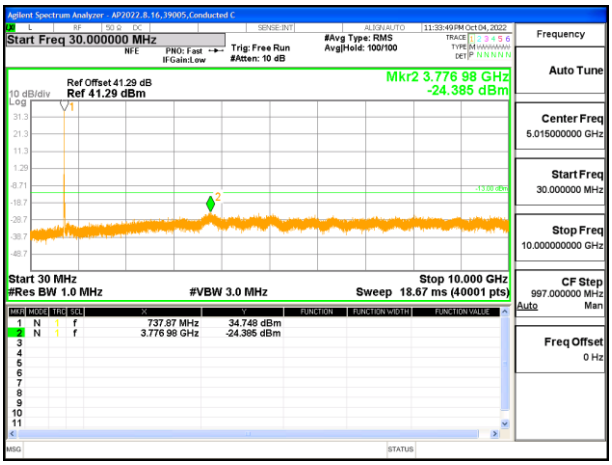
LIMITS

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.

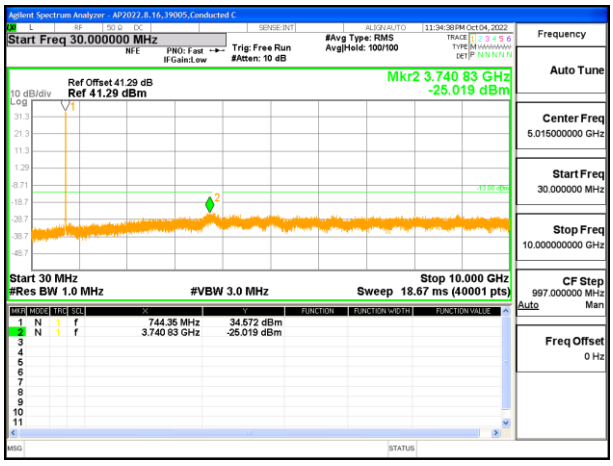
LTE BAND 12



LTE B12 5MHz QPSK Low Channel



LTE B12 5MHz QPSK Middle Channel



LTE B12 5MHz QPSK High Channel

9.3.10. LTE BAND 13

LIMITS

FCC: §27.53
(c)

(1) On any frequency outside the 746-758 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least 43 + 10 log (P) dB;

(3) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than 76 + 10 log (P) dB in a 6.25 kHz band segment, for base and fixed stations;

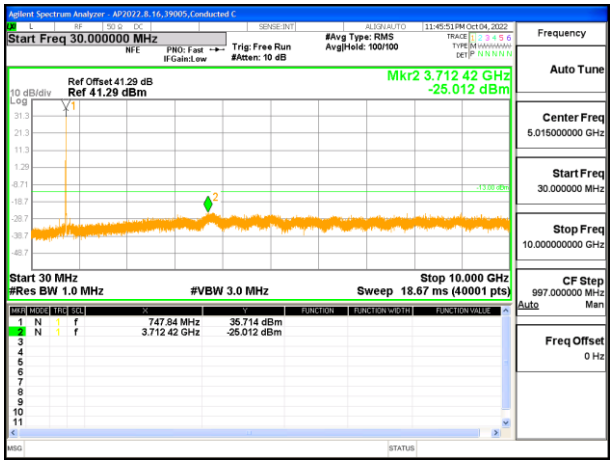
(5) Compliance with the provisions of paragraphs (c)(2) of this section is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. However, in the 100 kHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 30 kHz may be employed;

(6) Compliance with the provisions of paragraphs (c)(4) of this section is based on the use of measurement instrumentation such that the reading taken with any resolution bandwidth setting should be adjusted to indicate spectral energy in a 6.25 kHz segment.

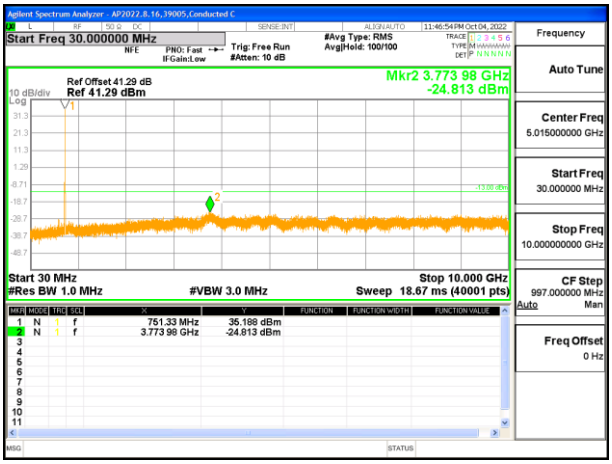
(f) or operations in the 746-758 MHz, 775-788 MHz, and 805-806 MHz bands, emissions in the band 1559-1610 MHz shall be limited to −70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals. (-70 dBW/MHz = -40dBm/MHz

Note: Radiated data in section 10.1.10 confirms a compliance for the emissions in GPS 1559-1610 MHz band were wideband emissions therefore the -40dBm/MHz limit was used.

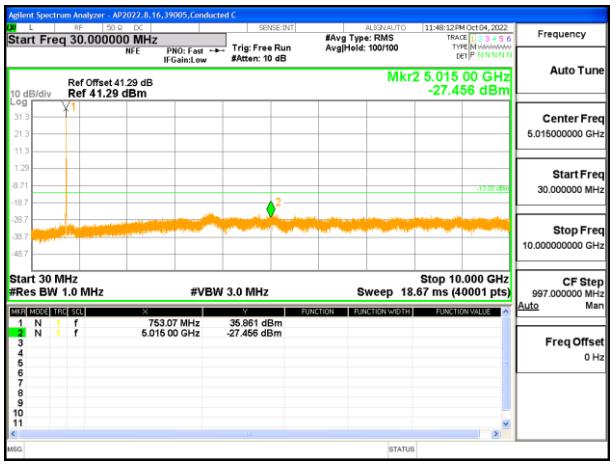
LTE BAND 13



LTE B13 5MHz QPSK Low Channel



LTE B13 5MHz QPSK Middle Channel



LTE B13 5MHz QPSK High Channel

Note: Radiated data in section 10.1.10 confirms a compliance with narrowband limits for GPS1559-1610 MHz band.

9.3.11. LTE BAND 14

LIMITS

FCC: §90.543 (e)

(1) On all frequencies between 769-775 MHz and 799-805 MHz, by a factor not less than 76 + 10 log (P) dB in a 6.25 kHz band segment, for base and fixed stations.

(3) On any frequency between 775-788 MHz, above 805 MHz, and below 758 MHz, by at least 43 + 10 log (P) dB.

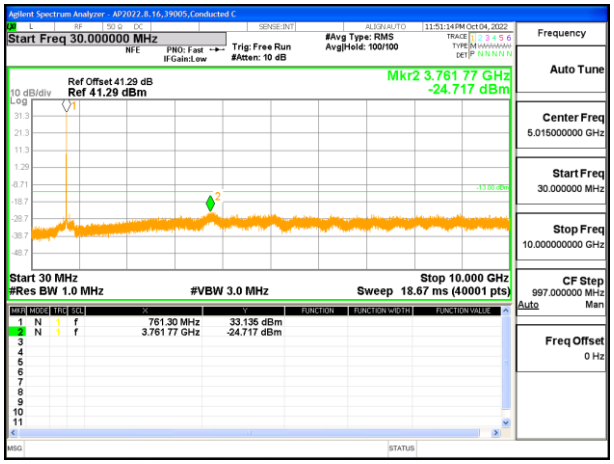
(4) Compliance with the provisions of paragraphs (e)(1) and (2) of this section is based on the use of measurement instrumentation such that the reading taken with any resolution bandwidth setting should be adjusted to indicate spectral energy in a 6.25 kHz segment.

(5) Compliance with the provisions of paragraph (e)(3) of this section is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. However, in the 100 kHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of 30 kHz may be employed.

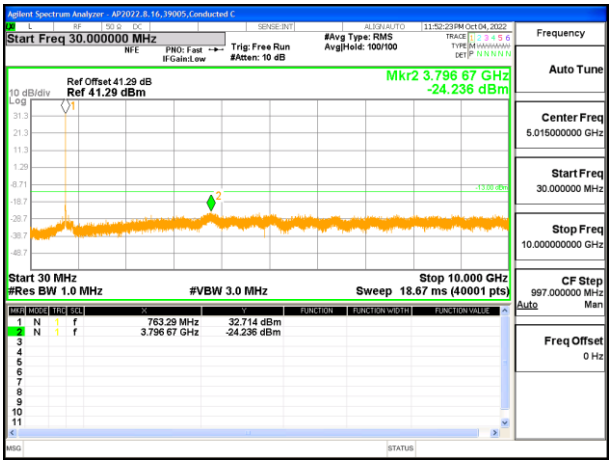
(f) For operations in the 758-775 MHz and 788-805 MHz bands, all emissions including harmonics in the band 1559-1610 MHz shall be limited to −70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and −80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth. For the purpose of equipment authorization, a transmitter shall be tested with an antenna that is representative of the type that will be used with the equipment in normal operation.

Note: Radiated data in section 10.1.11 confirms a compliance for the emissions in GPS 1559-1610 MHz band were wideband emissions therefore the -40dBm/MHz limit was used.

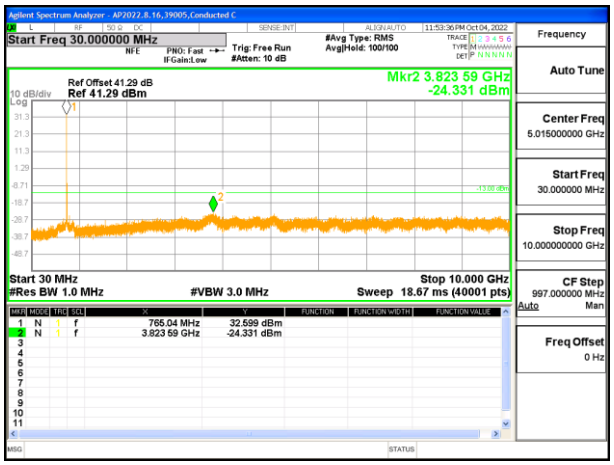
LTE BAND 14



LTE B14 5MHz QPSK Low Channel



LTE B14 5MHz QPSK Middle Channel



LTE B14 5MHz QPSK High Channel

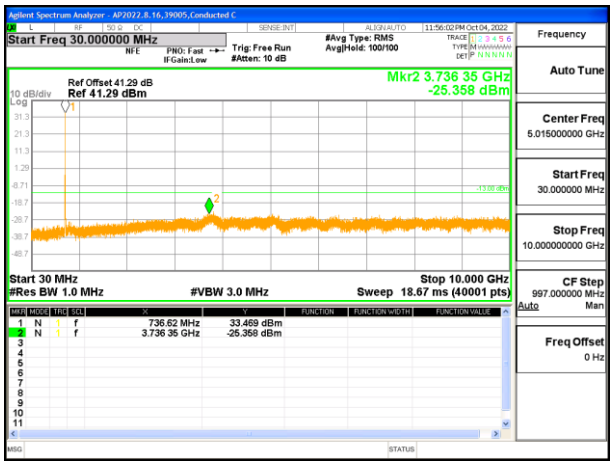
Note: Radiated data in section 10.1.11 confirms a compliance with narrowband limits for GPS1559-1610 MHz band.

9.3.12. LTE BAND 17

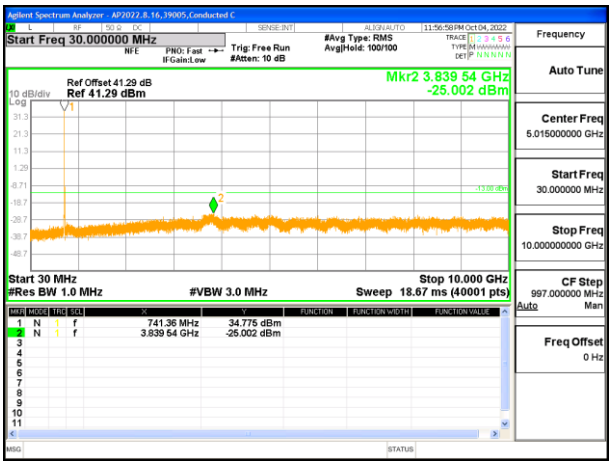
LIMITS

FCC: §27.53 (g)
The minimum permissible attenuation level of any spurious emissions is 43 + 10 log (P) dB where transmitting power (P) in Watts.

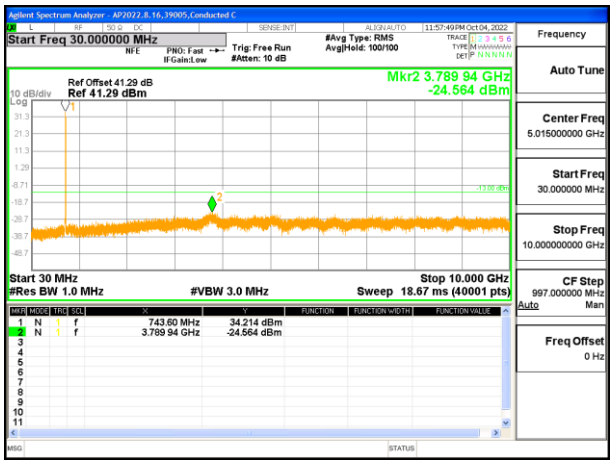
LTE BAND 17



LTE B17 5MHz QPSK Low Channel



LTE B17 5MHz QPSK Middle Channel



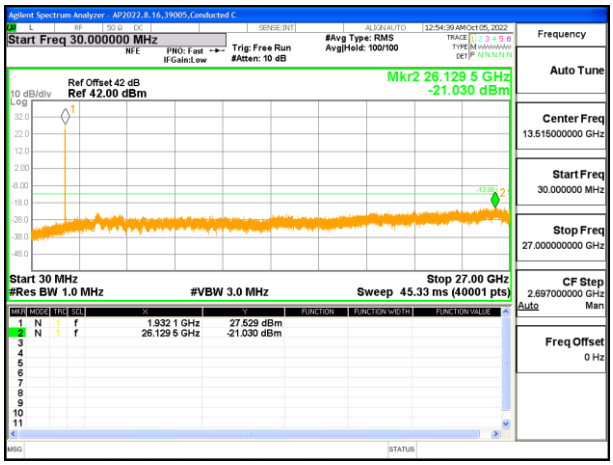
LTE B17 5MHz QPSK High Channel

9.3.13. LTE BAND 25

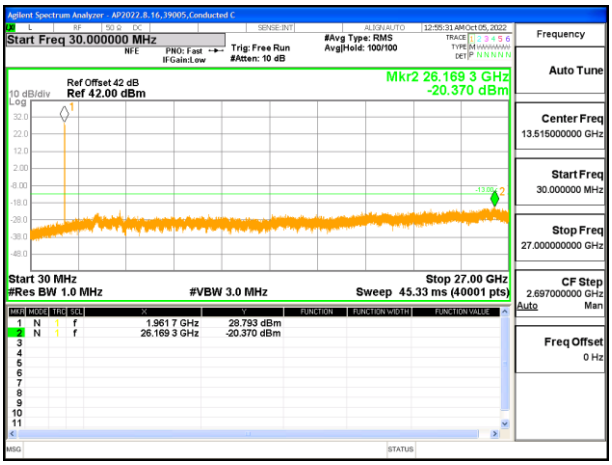
LIMITS

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

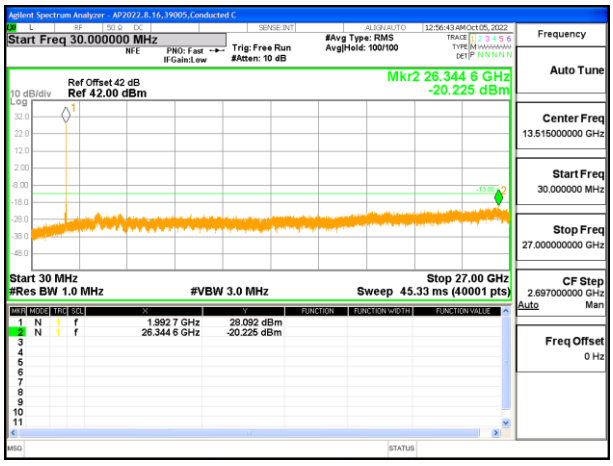
LTE BAND 25



LTE B25 5MHz QPSK Low Channel



LTE B25 5MHz QPSK Middle Channel



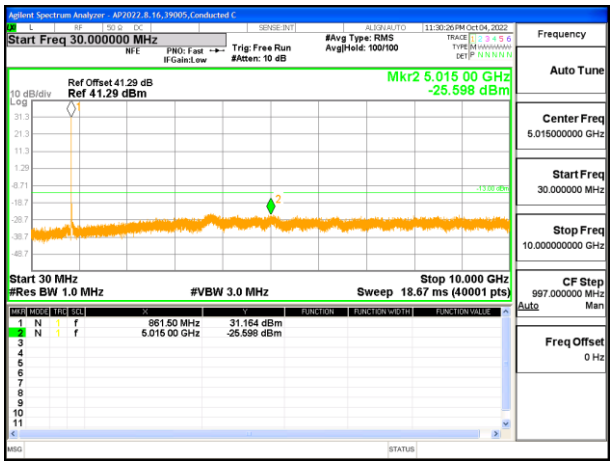
LTE B25 5MHz QPSK High Channel

9.3.14. LTE BAND 26 (FCC PART 90S)

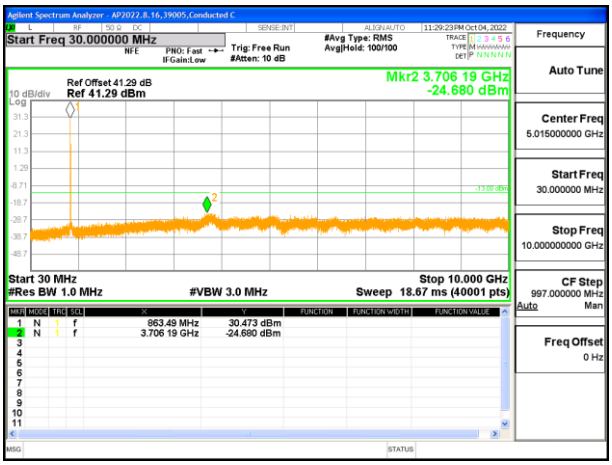
LIMITS

FCC: §90.691(a)
The minimum permissible attenuation level of any spurious emissions is 43 + 10 log (P) dB where transmitting power (P) in Watts.

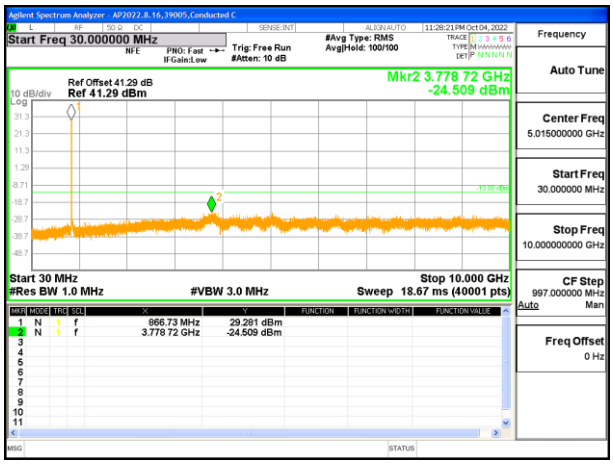
LTE BAND 26



LTE B26 5MHz QPSK Low Channel



LTE B26 5MHz QPSK Middle Channel



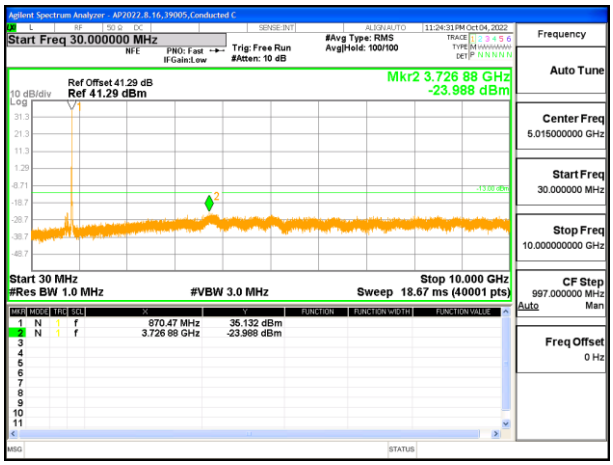
LTE B26 5MHz QPSK High Channel

9.3.15. LTE BAND 26 (FCC PART 22)

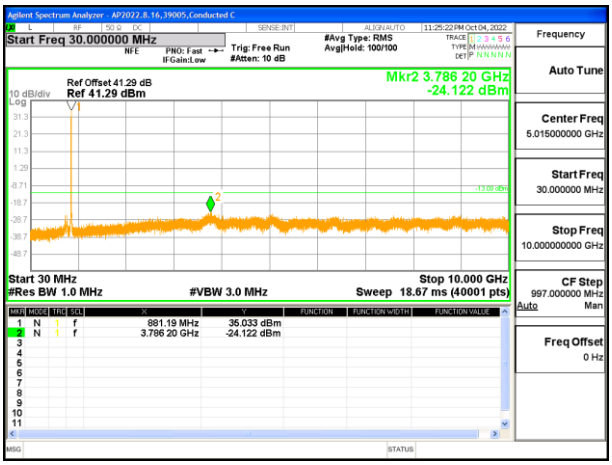
LIMITS

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

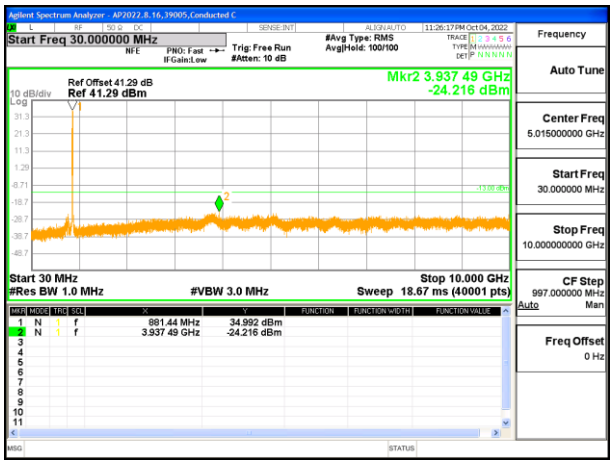
LTE BAND 26



LTE B26 5MHz QPSK Low Channel



LTE B26 5MHz QPSK Middle Channel



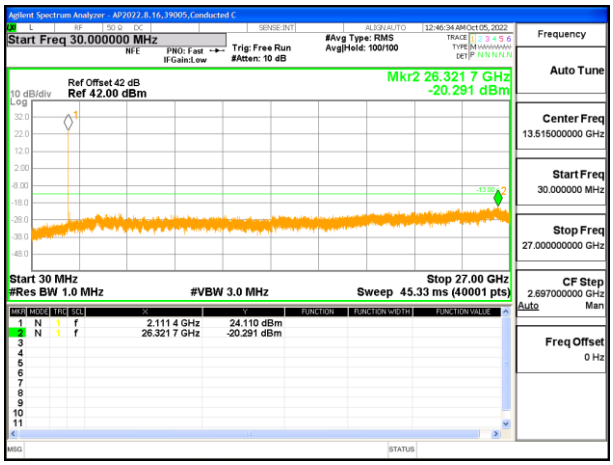
LTE B26 5MHz QPSK High Channel

9.3.16. LTE BAND 66

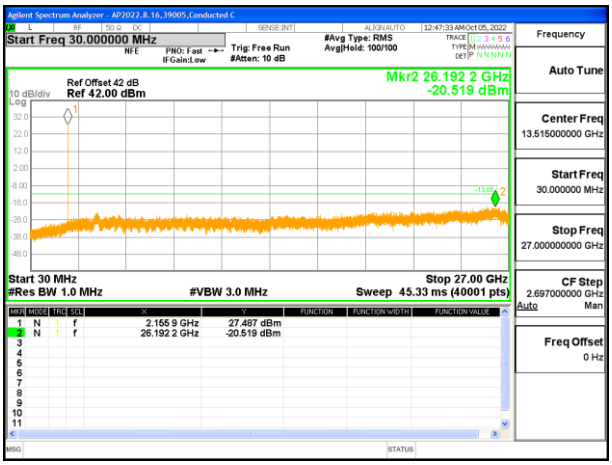
LIMITS

FCC: §27.53 (h)
The minimum permissible attenuation level of any spurious emissions is 43 + 10 log (P) dB where transmitting power (P) in Watts.

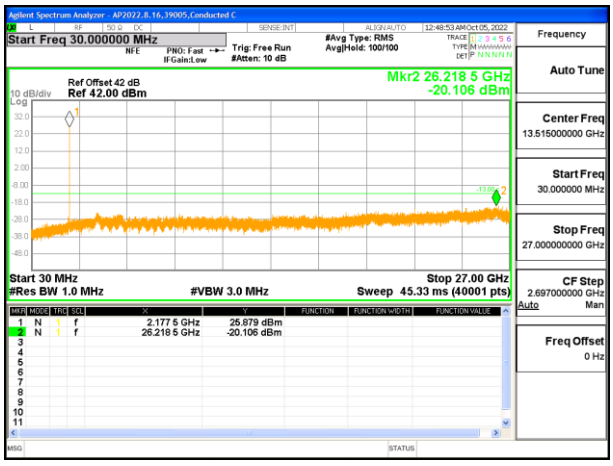
LTE BAND 66



LTE B66 5MHz QPSK Low Channel



LTE B66 5MHz QPSK Middle Channel



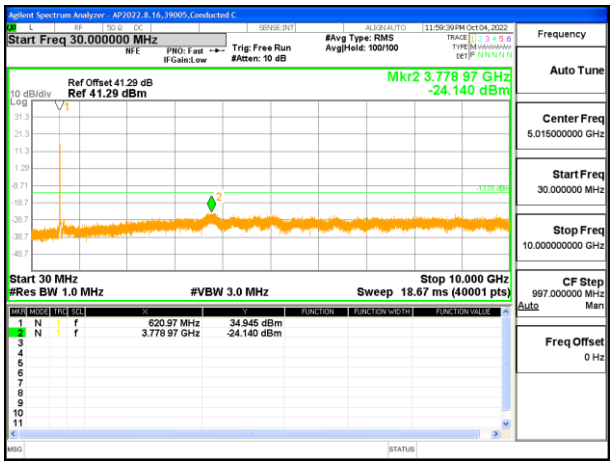
LTE B66 5MHz QPSK High Channel

9.3.17. LTE BAND 71 AND 5G NR n71

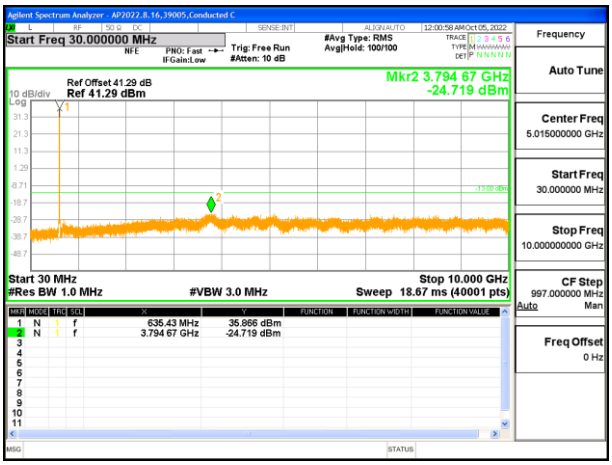
LIMITS

FCC: §27.53 (g)
The minimum permissible attenuation level of any spurious emissions is 43 + 10 log (P) dB where transmitting power (P) in Watts.

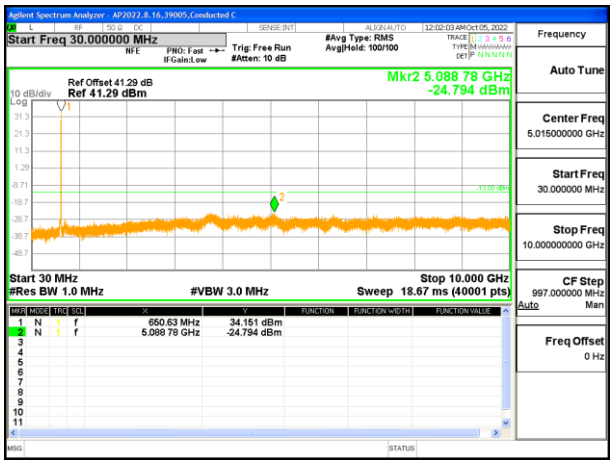
LTE BAND 71 and 5G NR n71



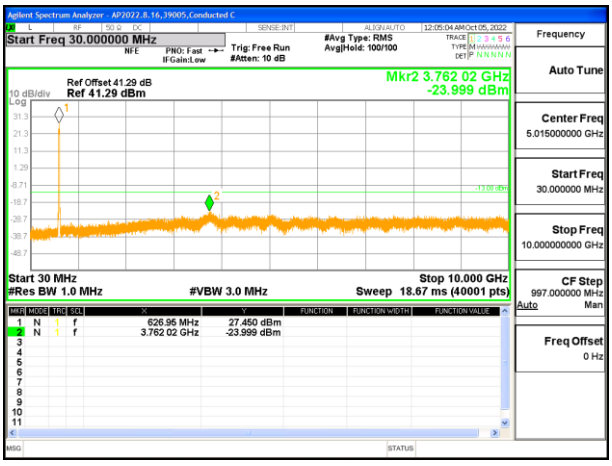
LTE B71 5MHz QPSK Low Channel



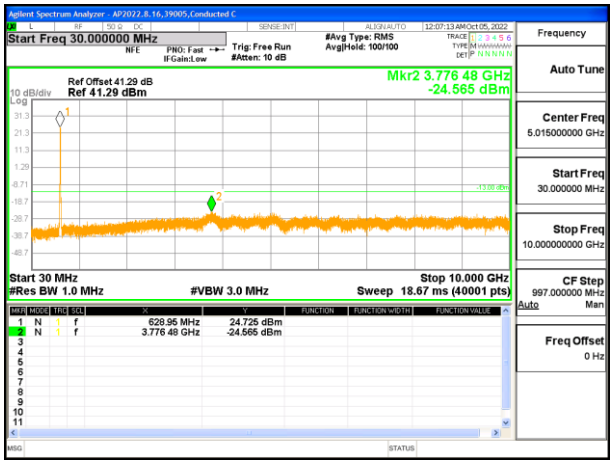
LTE B71 5MHz QPSK Middle Channel



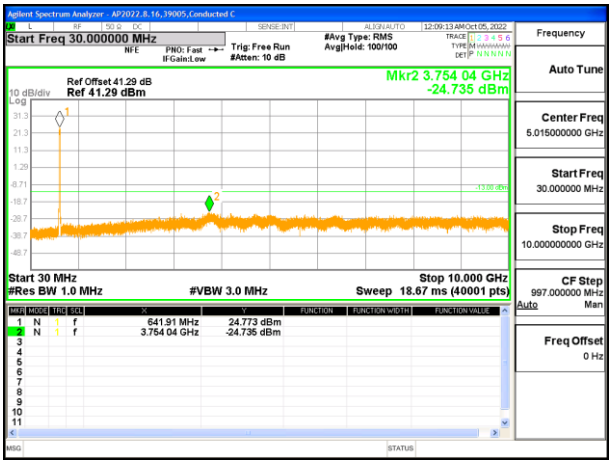
LTE B71 5MHz QPSK High Channel



5G NR n71 20MHz QPSK Low Channel



5G NR n71 20MHz QPSK Middle Channel



5G NR n71 20MHz QPSK High Channel

9.4. FREQUENCY STABILITY

RULE PART(S)

FCC: §2.1055, 22.355, 24.235, 27.54, 90.539, 90.213

LIMITS

FCC §90.213

The carrier frequency shall not depart from the reference frequency in excess of ±1.5 ppm for Base, fixed.

FCC: §90.539
(d) The frequency stability of base transmitters operating in the wideband segment must be 1 part per million or better.
(e) The frequency stability of mobile, portable and control transmitters operating in the wideband segment must be 1.25 parts per million or better when AFC is locked to a base station, and 5 parts per million or better when AFC is not locked.

FCC §§2.1055, 22.355, 24.235, 27.54, 90.539, 90.213

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

TEST PROCEDURE

- Temp. = 0°C to +50°C

  Low voltage, -15% of normal volt, Normal, 120VAC and High voltage, +15% of normal volt.

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.

9.4.1. GSM

Test Engineer ID:	39005	Test Date:	10/5/2022

GPRS 850

Band	5	Frequency Range		Frequency Error Reading (Hz)	Limit	
Condition		869	894		1.5	
		Freq Reading @ Low End (MHz)	Freq Reading @ High End (MHz)		Frequency Stability (ppm)	Within Authorized Frequency Block (Hz)
Temperature	Voltage					
Normal (20°C)	Normal	869.0249	893.9735			
Extreme (50°C)		869.0249	893.9735	-0.3	0.000	Yes
Extreme (40°C)		869.0249	893.9735	0.5	0.001	Yes
Extreme (30°C)		869.0249	893.9735	0.13	0.000	Yes
Extreme (10°C)		869.0249	893.9735	-0.05	0.000	Yes
Extreme (0°C)		869.0249	893.9735	-0.03	0.000	Yes
20°C	15%	869.0249	893.9735	0.02	0.000	Yes
	-15%	869.0249	893.9735	-0.03	0.000	Yes

GPRS 1900

Band	2	Frequency Range		Delta	Limit	
Condition		1930	1990		NA	
Temperature	Voltage	Freq Reading @ Low End (MHz)	Freq Reading @ High End (MHz)		Frequency Stability (ppm)	Within Authorized Frequency Block (Hz)
Normal (20°C)	Normal	1930.0251	1989.9734			
Extreme (50°C)		1930.0250	1989.9735	0.0000	NA	Yes
Extreme (40°C)		1930.0251	1989.9737	0.0002	NA	Yes
Extreme (30°C)		1930.0251	1989.9736	0.0001	NA	Yes
Extreme (10°C)		1930.0251	1989.9742	0.0004	NA	Yes
Extreme (0°C)		1930.0251	1989.9737	0.0002	NA	Yes
20°C	15%	1930.0251	1989.9741	0.0004	NA	Yes
	-15%	1930.0254	1989.9732	0.0000	NA	Yes

9.4.2. WCDMA

Test Engineer ID:	39005	Test Date:	10/5/2022

WCDMA QPSK BAND 5

Band	5	Frequency Range		Frequency Error Reading (Hz)	Limit	
Condition		869	894		1.5	
		Freq Reading @ Low End (MHz)	Freq Reading @ High End (MHz)		Frequency Stability (ppm)	Within Authorized Frequency Block (Hz)
Temperature	Voltage					
Normal (20°C)	Normal	869.0549	893.9437			
Extreme (50°C)		869.0549	893.9437	-0.1	0.000	Yes
Extreme (40°C)		869.0549	893.9437	0.46	0.001	Yes
Extreme (30°C)		869.0549	893.9437	0.65	0.001	Yes
Extreme (10°C)		869.0549	893.9437	-0.14	0.000	Yes
Extreme (0°C)		869.0549	893.9437	-0.03	0.000	Yes
20°C	15%	869.0549	893.9437	0.15	0.000	Yes
	-15%	869.0549	893.9437	0.19	0.000	Yes

WCDMA QPSK BAND 2

Band	2	Frequency Range		Delta	Limit	
Condition		1930	1990		NA	
Temperature	Voltage	Freq Reading @ Low End (MHz)	Freq Reading @ High End (MHz)		Frequency Stability (ppm)	Within Authorized Frequency Block (Hz)
Normal (20°C)	Normal	1930.0470	1989.9688			
Extreme (50°C)		1930.0585	1989.9537	-0.0018	NA	Yes
Extreme (40°C)		1930.0312	1989.9605	-0.0121	NA	Yes
Extreme (30°C)		1930.0523	1989.9636	0.0001	NA	Yes
Extreme (10°C)		1930.0424	1989.9526	-0.0104	NA	Yes
Extreme (0°C)		1930.0453	1989.9683	-0.0011	NA	Yes
20°C	15%	1930.0466	1989.9687	-0.0003	NA	Yes
	-15%	1930.0466	1989.9688	-0.0002	NA	Yes

WCDMA QPSK BAND 4

Band	4	Frequency Range		Delta	Limit	
Condition		2110	2155		NA	
Temperature	Voltage	Freq Reading @ Low End (MHz)	Freq Reading @ High End (MHz)		Frequency Stability (ppm)	Within Authorized Frequency Block (Hz)
Normal (20°C)	Normal	2110.0492	2154.9670			
Extreme (50°C)		2110.0450	2154.9728	0.0008	NA	Yes
Extreme (40°C)		2110.0592	2154.9564	-0.0003	NA	Yes
Extreme (30°C)		2110.0588	2154.9628	0.0027	NA	Yes
Extreme (10°C)		2110.0586	2154.9660	0.0042	NA	Yes
Extreme (0°C)		2110.0421	2154.9503	-0.0119	NA	Yes
20°C	15%	2110.0491	2154.9668	-0.0001	NA	Yes
	-15%	2110.0490	2154.9668	-0.0002	NA	Yes

9.4.3. 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.

Test Engineer ID:	39005	Test Date:	10/13/2022

LTE BAND 2 QPSK (5MHz BANDWIDTH)

Band	2	Frequency Range		Delta	Limit	
Condition		1930	1990		NA	
Temperature	Voltage	Freq Reading @ Low End (MHz)	Freq Reading @ High End (MHz)		Frequency Stability (ppm)	Within Authorized Frequency Block (Hz)
Normal (20°C)	Normal	1930.2356	1989.7586			
Extreme (50°C)		1930.2447	1989.7505	0.0005	NA	Yes
Extreme (40°C)		1930.2431	1989.7523	0.0006	NA	Yes
Extreme (30°C)		1930.2360	1989.7610	0.0014	NA	Yes
Extreme (10°C)		1930.2414	1989.8131	0.0302	NA	Yes
Extreme (0°C)		1930.0985	1989.8540	-0.0208	NA	Yes
20°C	15%	1930.2356	1989.7586	0.0000	NA	Yes
	-15%	1930.2356	1989.7584	-0.0001	NA	Yes

9.4.4. LTE BAND 4

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:	10/13/2022

LTE BAND 4 QPSK (5MHz BANDWIDTH)

Band	4	Frequency Range		Delta	Limit	
Condition		2110	2155		NA	
Temperature	Voltage	Freq Reading @ Low End (MHz)	Freq Reading @ High End (MHz)		Frequency Stability (ppm)	Within Authorized Frequency Block (Hz)
Normal (20°C)	Normal	2110.0774	2154.8892			
Extreme (50°C)		2110.1000	2154.7957	-0.0354	NA	Yes
Extreme (40°C)		2110.2106	2154.8331	0.0386	NA	Yes
Extreme (30°C)		2110.0948	2154.8729	0.0005	NA	Yes
Extreme (10°C)		2110.1709	2154.7874	-0.0041	NA	Yes
Extreme (0°C)		2110.0816	2154.8828	-0.0011	NA	Yes
20°C	15%	2110.0773	2154.8892	0.0000	NA	Yes
	-15%	2110.0773	2154.8892	0.0000	NA	Yes

9.4.5. LTE BAND 5

LIMITS

FCC: §22.355
The carrier frequency shall not depart from the reference frequency in excess of ±1.5 ppm for Base, fixed.

Test Engineer ID:	39005	Test Date:	10/5/2022

LTE BAND 5 QPSK (5MHz BANDWIDTH)

Band	5	Frequency Range		Frequency Error Reading (Hz)	Limit	
Condition		869	894		1.5	
Temperature	Voltage	Freq Reading @ Low End (MHz)	Freq Reading @ High End (MHz)		Frequency Stability (ppm)	Within Authorized Frequency Block (Hz)
Normal (20°C)	Normal	869.1803	893.9086			
Extreme (50°C)		869.1802	893.9085	-52	-0.059	Yes
Extreme (40°C)		869.1803	893.9086	-45	-0.051	Yes
Extreme (30°C)		869.1803	893.9086	-45.06	-0.051	Yes
Extreme (10°C)		869.1803	893.9086	-46.21	-0.052	Yes
Extreme (0°C)		869.1802	893.9085	-53	-0.060	Yes
20°C	15%	869.1802	893.9085	-51	-0.058	Yes
	-15%	869.1802	893.9085	-54	-0.061	Yes

9.4.6. 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.

Test Engineer ID:	39005	Test Date:	10/5/2022

LTE BAND 12 QPSK (5MHz BANDWIDTH)

Band	12	Frequency Range		Delta	Limit	
Condition		729	746		NA	
		Freq Reading @ Low End (MHz)	Freq Reading @ High End (MHz)		Frequency Stability (ppm)	Within Authorized Frequency Block (Hz)
Temperature	Voltage					
Normal (20°C)	Normal	729.0786	745.8277			
Extreme (50°C)		729.1170	745.9000	0.0553	NA	Yes
Extreme (40°C)		729.1923	745.9433	0.1146	NA	Yes
Extreme (30°C)		729.0776	745.8943	0.0328	NA	Yes
Extreme (10°C)		729.1230	745.9078	0.0622	NA	Yes
Extreme (0°C)		729.1877	745.9082	0.0948	NA	Yes
20°C	15%	729.0786	745.8278	0.0000	NA	Yes
	-15%	729.0786	745.8277	0.0000	NA	Yes

9.4.7. 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.

Test Engineer ID:	39005	Test Date:	10/5/2022

LTE BAND 13 QPSK (5MHz BANDWIDTH)

Band	13	Frequency Range		Delta	Limit	
Condition		746	756		NA	
		Freq Reading @ Low End (MHz)	Freq Reading @ High End (MHz)		Frequency Stability (ppm)	Within Authorized Frequency Block (Hz)
Temperature	Voltage					
Normal (20°C)	Normal	746.1368	755.8006			
Extreme (50°C)		746.1001	755.9000	0.0313	NA	Yes
Extreme (40°C)		746.0771	755.9293	0.0345	NA	Yes
Extreme (30°C)		746.0605	755.9070	0.0151	NA	Yes
Extreme (10°C)		746.1050	755.8509	0.0092	NA	Yes
Extreme (0°C)		746.0646	755.9178	0.0225	NA	Yes
20°C	15%	746.1368	755.8004	-0.0001	NA	Yes
	-15%	746.1369	755.8003	-0.0001	NA	Yes

9.4.8. LTE BAND 14

LIMITS

FCC: §90.539
(d) The frequency stability of base transmitters operating in the wideband segment must be 1 part per million or better.
(e) The frequency stability of mobile, portable and control transmitters operating in the wideband segment must be 1.25 parts per million or better when AFC is locked to a base station, and 5 parts per million or better when AFC is not locked.

Test Engineer ID:	39005	Test Date:	10/5/2022

LTE BAND 14 QPSK (5MHz BANDWIDTH)

Band	14	Frequency Range		Frequency Error Reading (Hz)	Limit	
Condition		758	768		1	
		Freq Reading @ Low End (MHz)	Freq Reading @ High End (MHz)		Frequency Stability (ppm)	Within Authorized Frequency Block (Hz)
Temperature	Voltage					
Normal (20°C)	Normal	758.1931	767.7948			
Extreme (50°C)		758.1931	767.7948	22	0.029	Yes
Extreme (40°C)		758.1931	767.7948	19	0.025	Yes
Extreme (30°C)		758.1931	767.7948	23	0.030	Yes
Extreme (10°C)		758.1931	767.7948	-31	-0.041	Yes
Extreme (0°C)		758.1931	767.7948	-28.56	-0.037	Yes
20°C	15%	758.1931	767.7948	21	0.028	Yes
	-15%	758.1931	767.7948	24	0.031	Yes

9.4.9. LTE BAND 17

LIMITS

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

Test Engineer ID:	39005	Test Date:	10/5/2022

LTE BAND 17 QPSK (5MHz BANDWIDTH)

Band	17	Frequency Range		Delta	Limit	
Condition		734	746		NA	
Temperature	Voltage	Freq Reading @ Low End (MHz)	Freq Reading @ High End (MHz)		Frequency Stability (ppm)	Within Authorized Frequency Block (Hz)
Normal (20°C)	Normal	734.0953	745.8128			
Extreme (50°C)		734.0671	745.9170	0.0380	NA	Yes
Extreme (40°C)		734.0776	745.7830	-0.0238	NA	Yes
Extreme (30°C)		734.1255	745.9358	0.0766	NA	Yes
Extreme (10°C)		734.1949	745.9085	0.0976	NA	Yes
Extreme (0°C)		734.1895	745.8372	0.0593	NA	Yes
20°C	15%	734.0953	745.8128	0.0000	NA	Yes
	-15%	734.0953	745.8128	0.0000	NA	Yes

9.4.10. LTE BAND 25

LIMITS

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

Test Engineer ID:	39005	Test Date:	10/13/2022

LTE BAND 25 QPSK (5MHz BANDWIDTH)

Band	25	Frequency Range		Delta	Limit	
Condition		1930	1995		NA	
		Freq Reading @ Low End (MHz)	Freq Reading @ High End (MHz)		Frequency Stability (ppm)	Within Authorized Frequency Block (Hz)
Temperature	Voltage					
Normal (20°C)	Normal	1930.2318	1994.7614			
Extreme (50°C)		1930.2432	1994.7508	0.0004	NA	Yes
Extreme (40°C)		1930.2431	1994.7585	0.0042	NA	Yes
Extreme (30°C)		1930.2381	1994.7610	0.0030	NA	Yes
Extreme (10°C)		1930.2397	1994.7657	0.0061	NA	Yes
Extreme (0°C)		1930.2396	1994.8229	0.0347	NA	Yes
20°C	15%	1930.2317	1994.7612	-0.0001	NA	Yes
	-15%	1930.2317	1994.7622	0.0004	NA	Yes

9.4.11. LTE BAND 26(FCC PART 90S)

LIMITS

FCC: §90.213
The carrier frequency shall not depart from the reference frequency in excess of ±1.5 ppm for Fixed and Base Stations.

Test Engineer ID:	39005	Test Date:	10/5/2022

LTE BAND 26 QPSK (5MHz BANDWIDTH)

Band	26	Frequency Range		Frequency Error Reading (Hz)	Limit	
Condition		859	869		1.5	
		Freq Reading @ Low End (MHz)	Freq Reading @ High End (MHz)		Frequency Stability (ppm)	Within Authorized Frequency Block (Hz)
Temperature	Voltage					
Normal (20°C)	Normal	859.1316	868.9374			
Extreme (50°C)		859.1316	868.9374	-10.12	-0.012	Yes
Extreme (40°C)		859.1316	868.9374	-22.4	-0.026	Yes
Extreme (30°C)		859.1316	868.9374	-21.11	-0.024	Yes
Extreme (10°C)		859.1316	868.9374	39	0.045	Yes
Extreme (0°C)		859.1316	868.9374	20	0.023	Yes
20°C	15%	859.1316	868.9374	-10.15	-0.012	Yes
	-15%	859.1316	868.9374	-15	-0.017	Yes

9.4.12. LTE BAND 26(FCC PART 22)

LIMITS

FCC: §22.355

The carrier frequency shall not depart from the reference frequency in excess of ±1.5 ppm for Base, fixed

Test Engineer ID:	39005	**Test Date:**	10/5/2022

LTE BAND 26 QPSK (5MHz BANDWIDTH)

Band	**26**	**Frequency Range**		**Frequency Error Reading (Hz)**	**Limit**	
Condition		**869**	**894**		**1.5**	
		Freq Reading @ Low End (MHz)	**Freq Reading @ High End (MHz)**		**Frequency Stability (ppm)**	**Within Authorized Frequency Block (Hz)**
Temperature	**Voltage**					
Normal (20°C)	**Normal**	869.1070	893.9220			
Extreme (50°C)		869.1070	893.9220	-11	-0.012	Yes
Extreme (40°C)		869.1070	893.9220	-18	-0.020	Yes
Extreme (30°C)		869.1070	893.9220	-20	-0.023	Yes
Extreme (10°C)		869.1070	893.9220	21	0.024	Yes
Extreme (0°C)		869.1070	893.9220	17	0.019	Yes
20°C	**15%**	869.1070	893.9220	-10.21	-0.012	Yes
	-15%	869.1070	893.9220	-14	-0.016	Yes

9.4.13. LTE BAND 66

LIMITS

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

Test Engineer ID:	39005	Test Date:	10/13/2022

LTE BAND 66 QPSK (5MHz BANDWIDTH)

Band	66	Frequency Range		Delta	Limit	
Condition		2110	2200		NA	
Temperature	Voltage	Freq Reading @ Low End (MHz)	Freq Reading @ High End (MHz)		Frequency Stability (ppm)	Within Authorized Frequency Block (Hz)
Normal (20°C)	Normal	2110.2292	2179.8669			
Extreme (50°C)		2110.2242	2179.8053	-0.0333	NA	Yes
Extreme (40°C)		2110.1853	2179.7954	-0.0577	NA	Yes
Extreme (30°C)		2110.2167	2179.8004	-0.0395	NA	Yes
Extreme (10°C)		2110.2021	2179.9072	0.0066	NA	Yes
Extreme (0°C)		2110.2092	2179.8623	-0.0123	NA	Yes
20°C	15%	2110.2293	2179.8668	0.0000	NA	Yes
	-15%	2110.2290	2179.8669	-0.0001	NA	Yes

9.4.14. LTE BAND 71 AND 5G NR n71

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:	10/5/2022

LTE BAND 71 QPSK (5MHz BANDWIDTH)

Band	71	Frequency Range		Delta	Limit	
Condition		617	652		NA	
Temperature	Voltage	Freq Reading @ Low End (MHz)	Freq Reading @ High End (MHz)		Frequency Stability (ppm)	Within Authorized Frequency Block (Hz)
Normal (20°C)	Normal	617.0861	651.8593			
Extreme (50°C)		617.1230	651.9000	0.0388	NA	Yes
Extreme (40°C)		617.1948	651.9037	0.0765	NA	Yes
Extreme (30°C)		617.1616	651.9147	0.0655	NA	Yes
Extreme (10°C)		617.2189	651.7931	0.0333	NA	Yes
Extreme (0°C)		617.2180	651.9146	0.0936	NA	Yes
20°C	15%	617.0860	651.8591	-0.0002	NA	Yes
	-15%	617.0861	651.8600	0.0004	NA	Yes

5G NR n71 BPSK (20MHz BANDWIDTH)

Band	n71	Frequency Range		Delta	Limit	
Condition		617	652		NA	
Temperature	Voltage	Freq Reading @ Low End (MHz)	Freq Reading @ High End (MHz)		Frequency Stability (ppm)	Within Authorized Frequency Block (Hz)
Normal (20°C)	Normal	618.1505	650.3868			
Extreme (50°C)		617.8612	650.6500	-0.0131	NA	Yes
Extreme (40°C)		617.9574	650.3273	-0.1263	NA	Yes
Extreme (30°C)		618.1320	650.3334	-0.0359	NA	Yes
Extreme (10°C)		617.8877	650.3551	-0.1472	NA	Yes
Extreme (0°C)		617.5620	650.3263	-0.3245	NA	Yes
20°C	15%	618.1503	650.3866	-0.0002	NA	Yes
	-15%	618.1505	650.3871	0.0002	NA	Yes

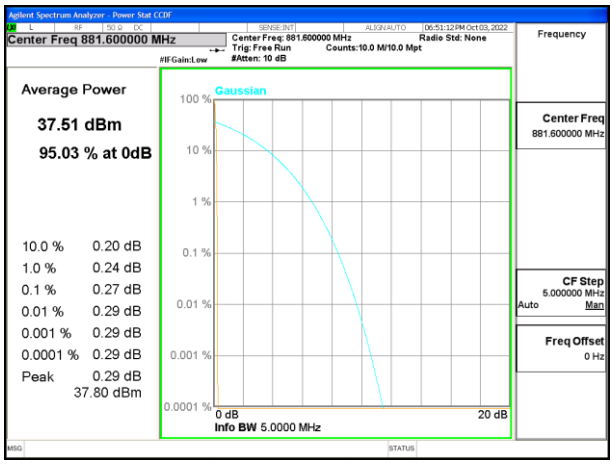
9.5. PEAK-TO-AVERAGE POWER RATIO

LIMIT

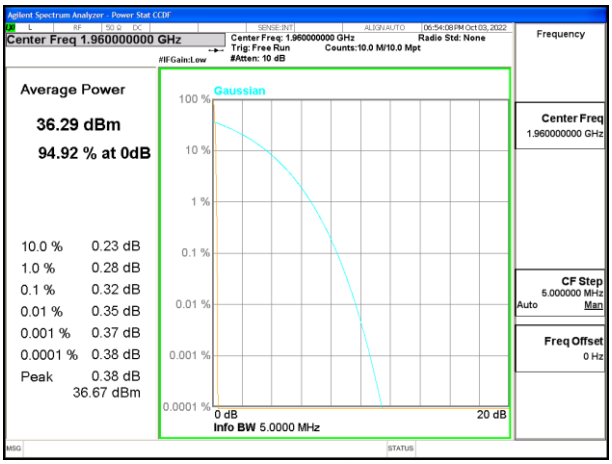
In addition, the peak-to-average power ratio (PAPR) of the transmitter shall not exceed 13 dB for more than 0.1% of the time and shall use a signal corresponding to the highest PAPR during periods of continuous transmission.

RESULT

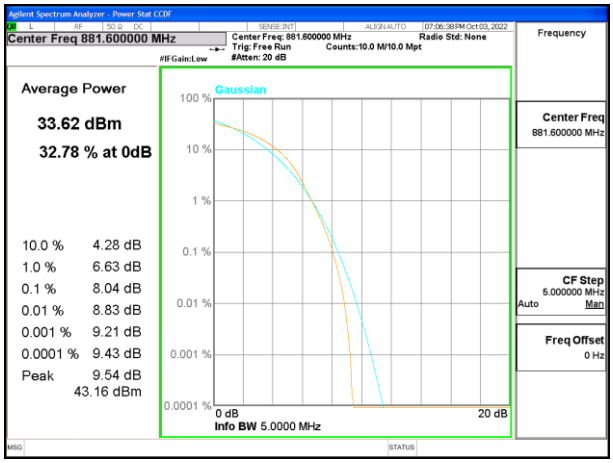
The results from all CCDF measurements are passed with 13dB peak-to-average power ratio criteria.



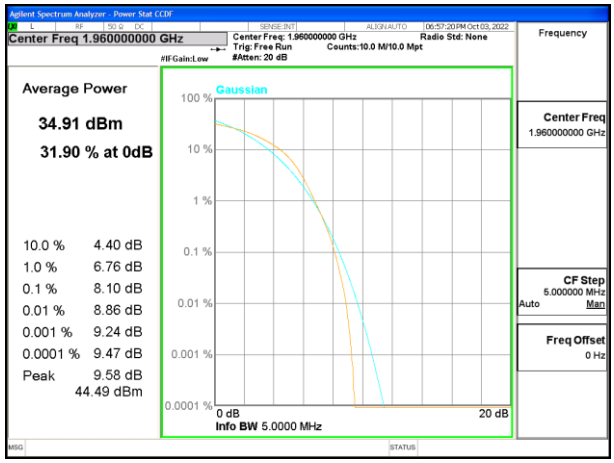
GSM 850 GPRS Middle Channel



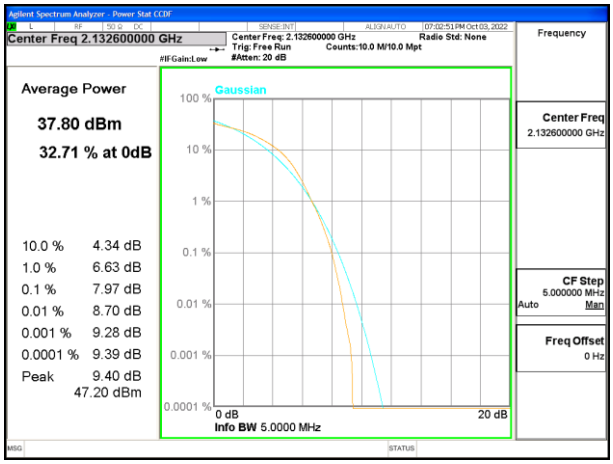
GSM 1900 GPRS Middle Channel



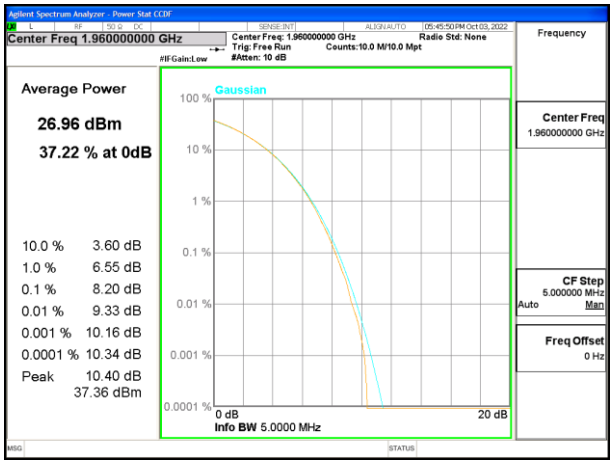
UMTS Band 5 QPSK Middle Channel



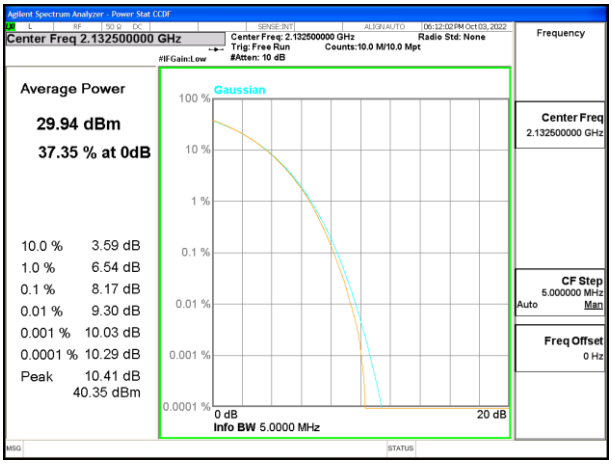
UMTS Band 2 QPSK Middle Channel



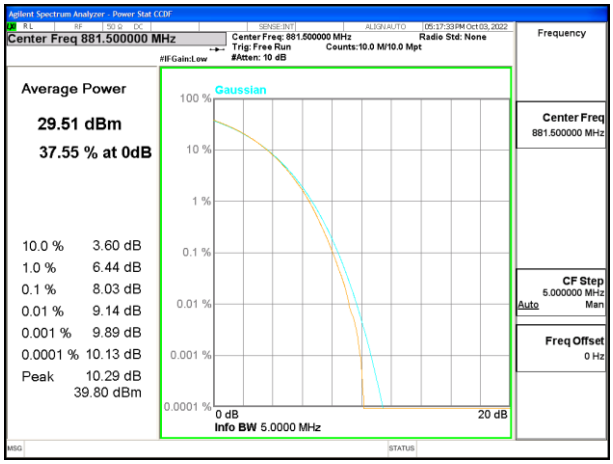
UMTS Band 4 QPSK Middle Channel



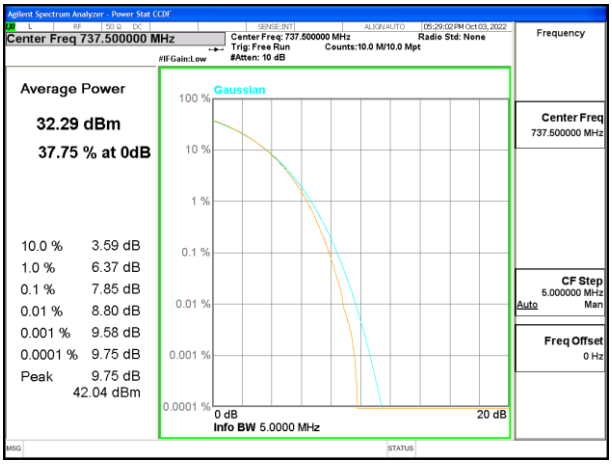
LTE B2 5MHz QPSK Middle Channel



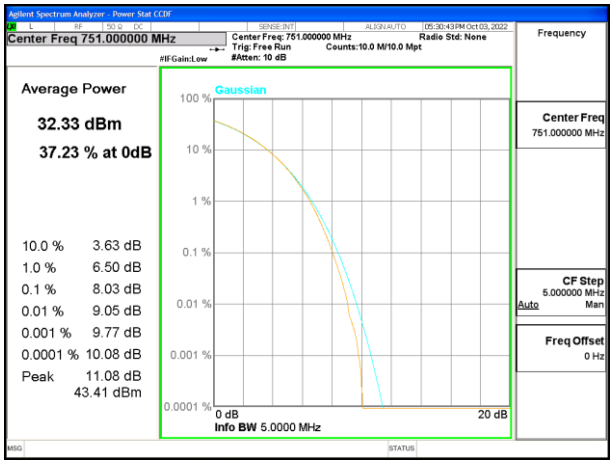
LTE B4 5MHz QPSK Middle Channel



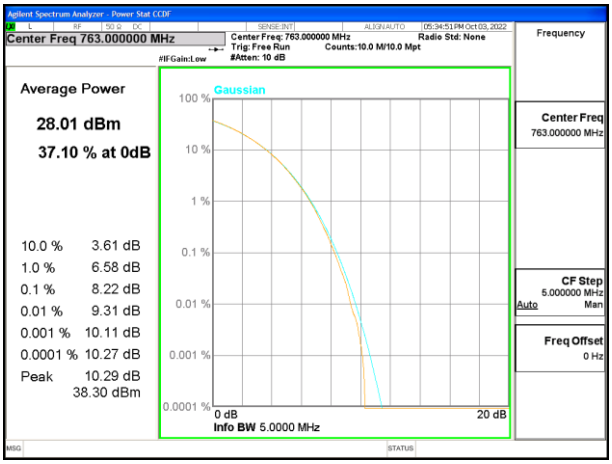
LTE B5 5MHz QPSK Middle Channel



LTE B12 5MHz QPSK Middle Channel



LTE B13 5MHz QPSK Middle Channel



LTE B14 5MHz QPSK Middle Channel