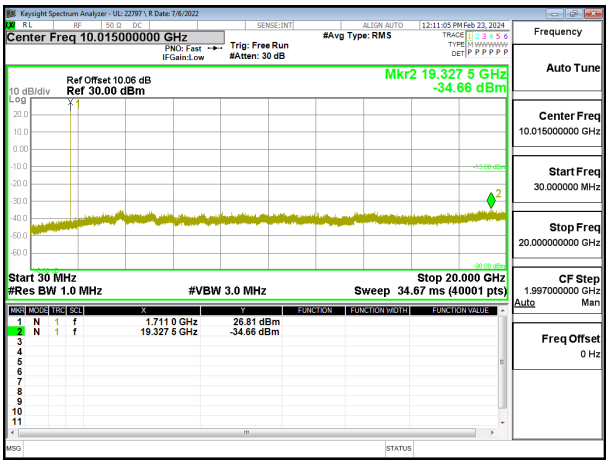
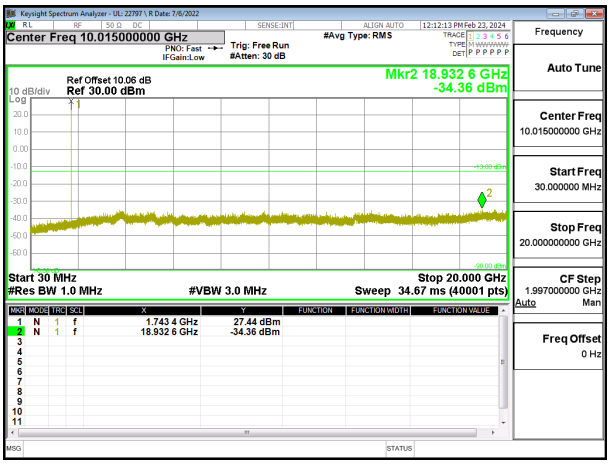
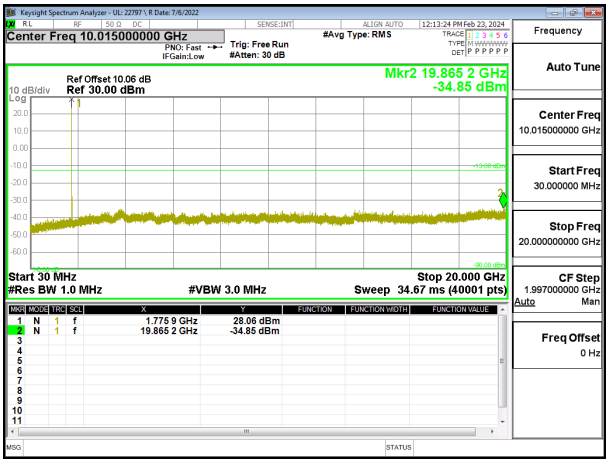
5G NR n66



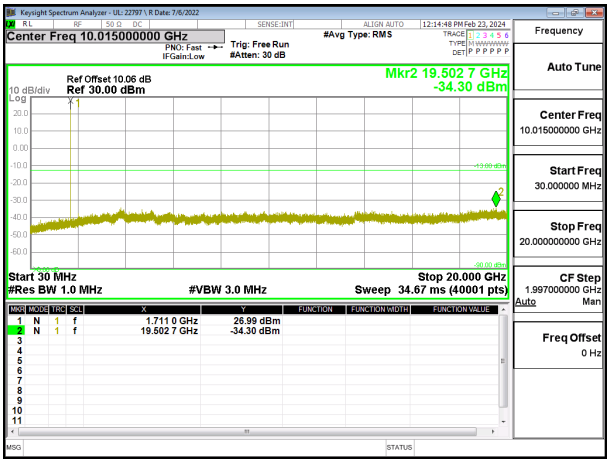
5G NR n66 5MHz QPSK Low Channel RB1-0



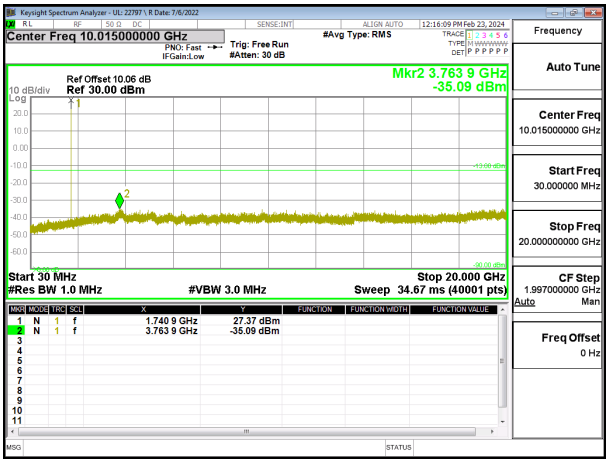
5G NR n66 5MHz QPSK Middle Channel RB1-1



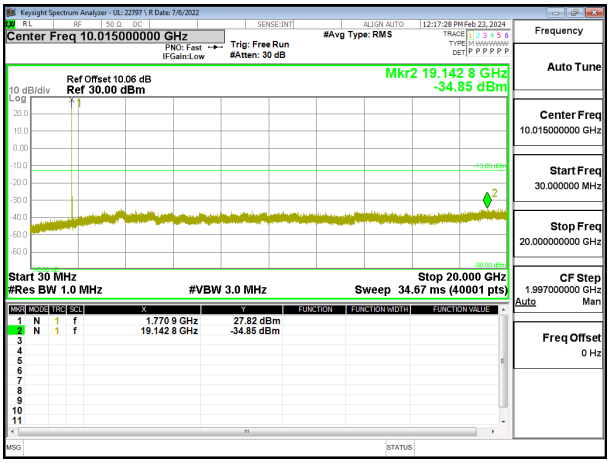
5G NR n66 5MHz QPSK High Channel RB1-24



5G NR n66 10MHz QPSK Low Channel RB1-0



5G NR n66 10MHz QPSK Middle Channel RB1-1



5G NR n66 10MHz QPSK High Channel RB1-51

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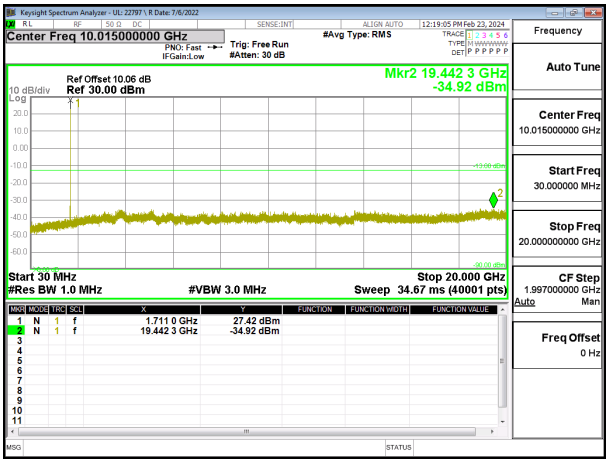
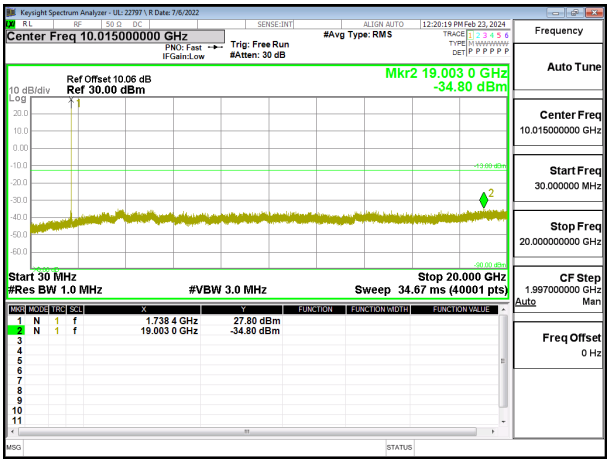
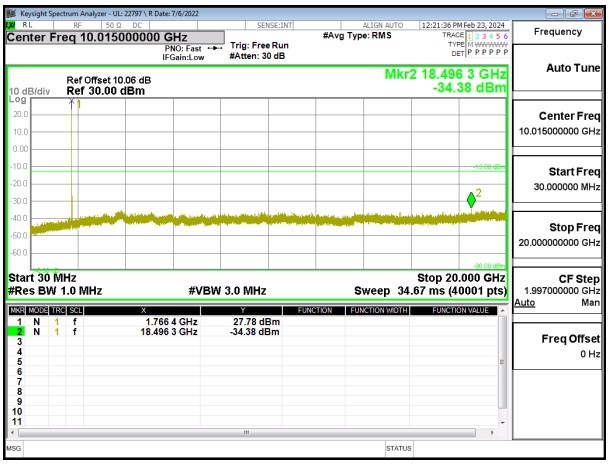


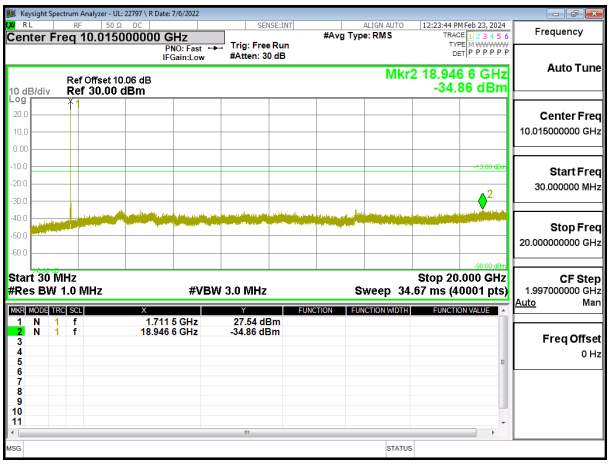
5G NR n66 15MHz QPSK Low Channel RB1-0



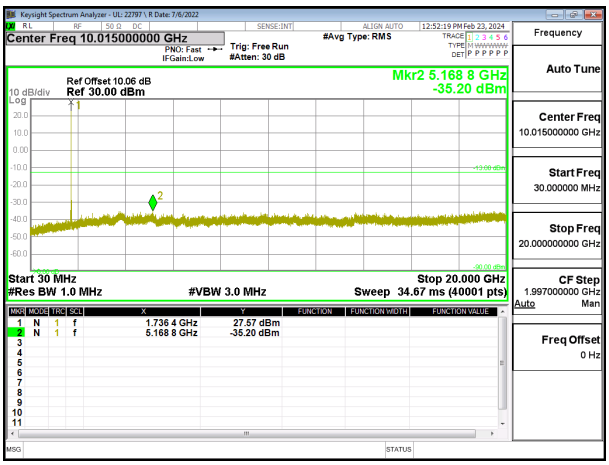
5G NR n66 15MHz QPSK Middle Channel RB1-1



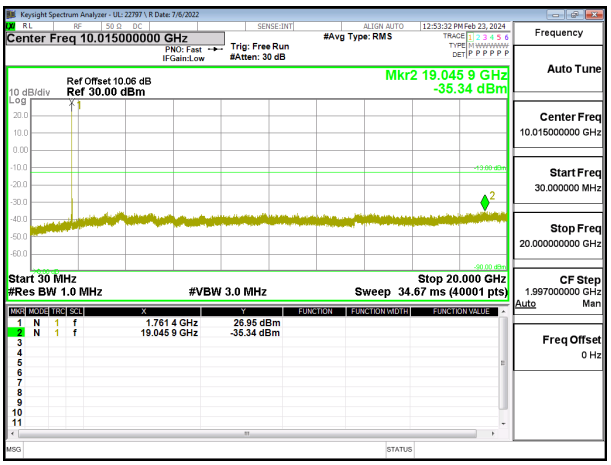
5G NR n66 15MHz QPSK High Channel RB1-78



5G NR n66 20MHz QPSK Low Channel RB1-0



5G NR n66 20MHz QPSK Middle Channel RB1-1



5G NR n66 20MHz QPSK High Channel RB1-105

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9.3.11. 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.

Test Engineer ID:	22797/85502	**Test Date:**	2024-01-22 2024-02-22	**EUT Serial Number:**	QV7700QGLA QV77005HJP

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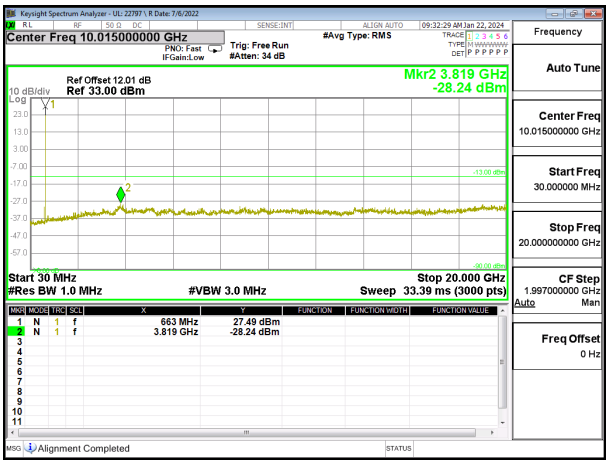
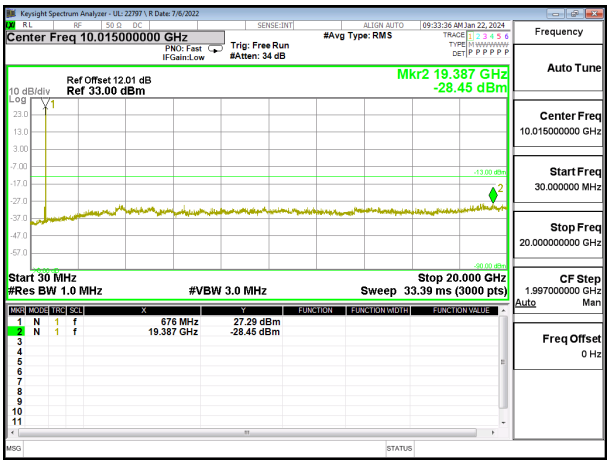
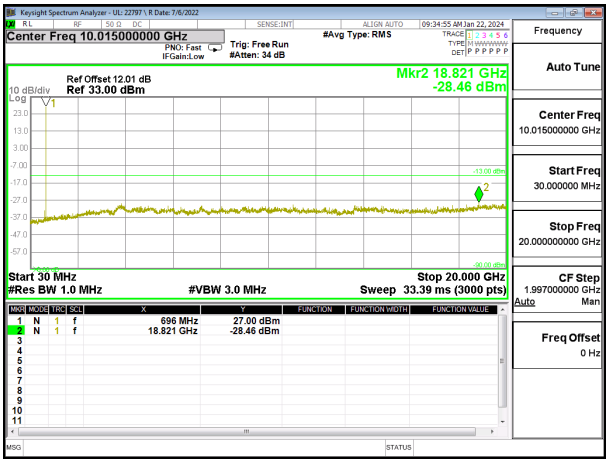
LTE BAND 71



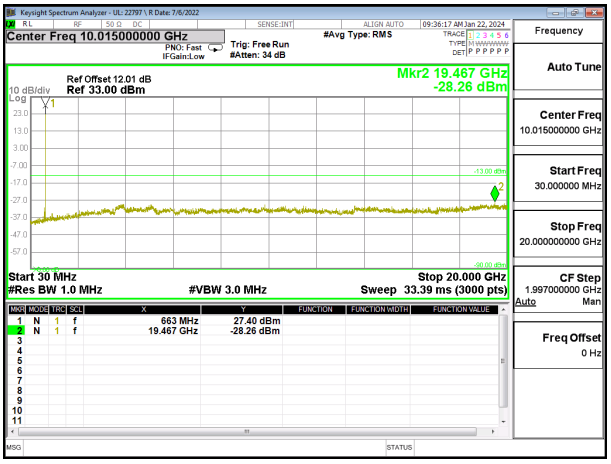
LTE B71 5MHz QPSK Low Channel RB1-0



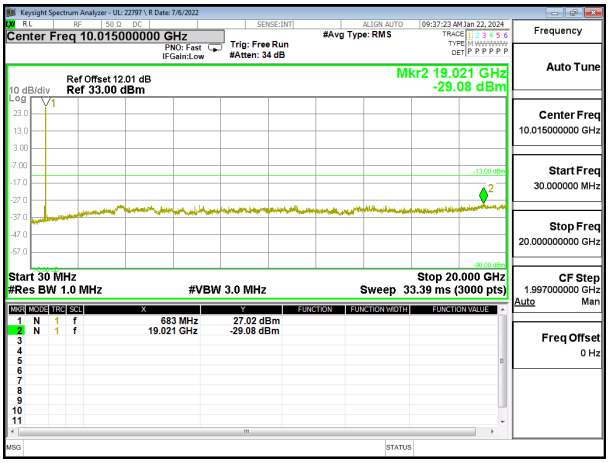
LTE B71 5MHz QPSK Middle Channel RB1-0



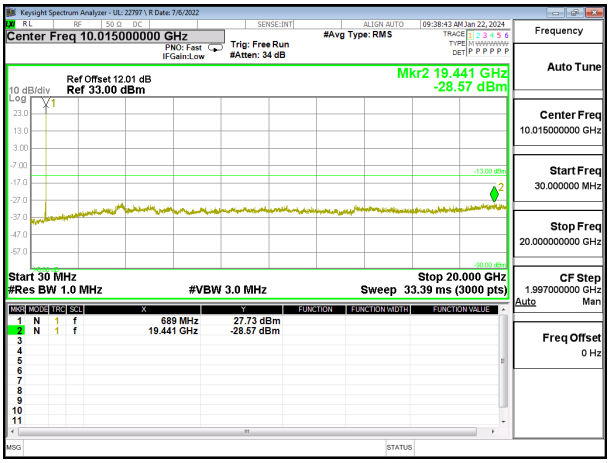
LTE B71 5MHz QPSK High Channel RB1-0



LTE B71 10MHz QPSK Low Channel RB1-0

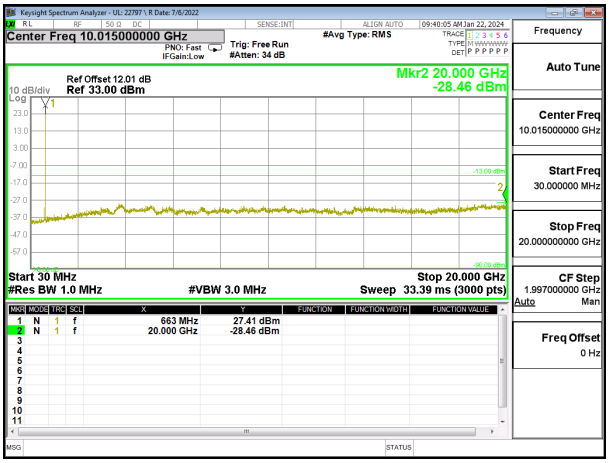


LTE B71 10MHz QPSK Middle Channel RB1-0

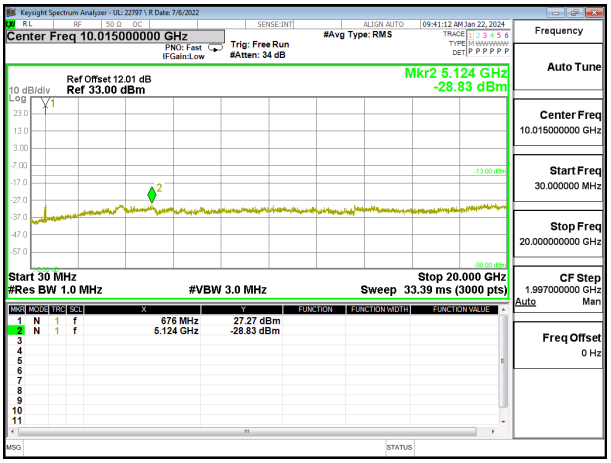


LTE 71 10MHz QPSK High Channel RB1-0

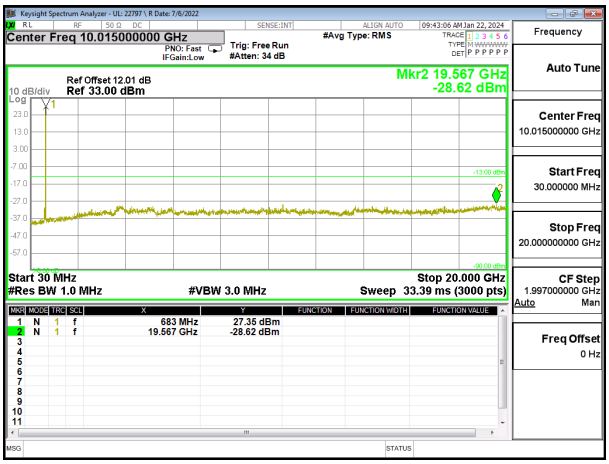
This report shall not be reproduced except in full, without the written approval of UL LLC.



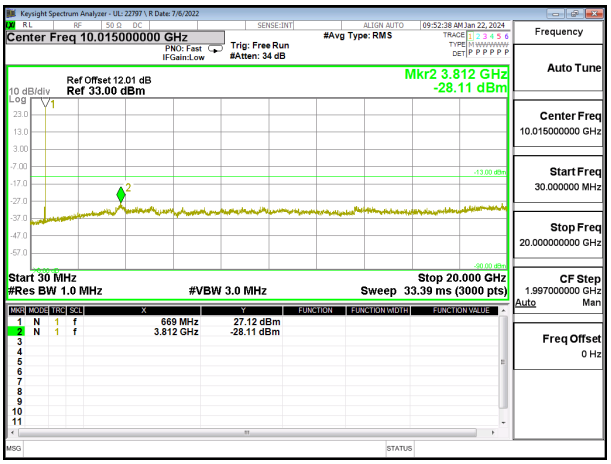
LTE B71 15MHz QPSK Low Channel RB1-0



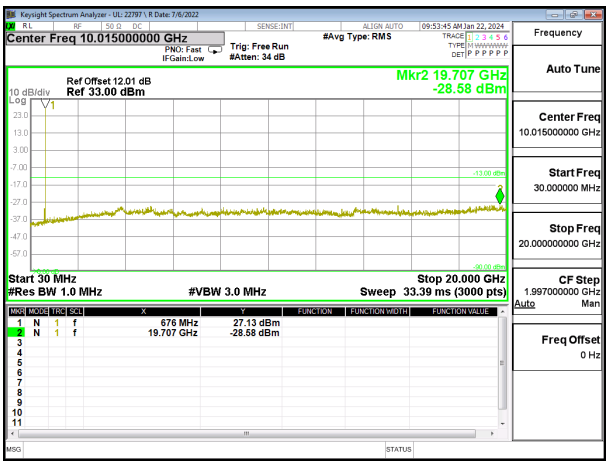
LTE B71 15MHz QPSK Middle Channel RB1-0



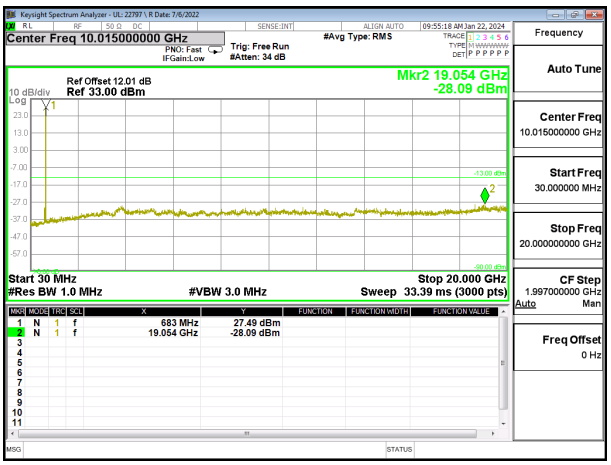
LTE B71 15MHz QPSK High Channel RB1-0



LTE B71 20MHz QPSK Low Channel RB1-0



LTE B71 20MHz QPSK Middle Channel RB1-0



LTE B71 20MHz QPSK High Channel RB1-0

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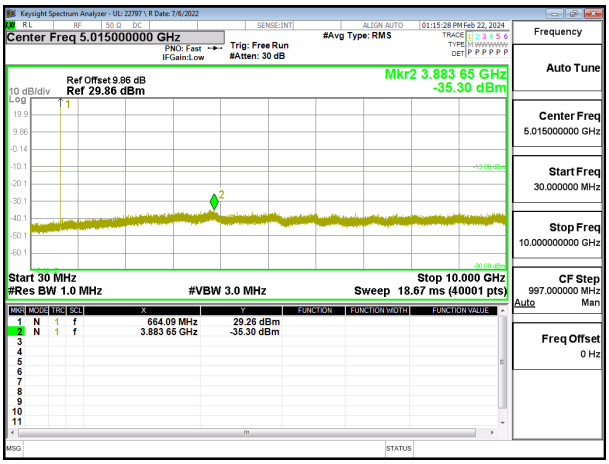
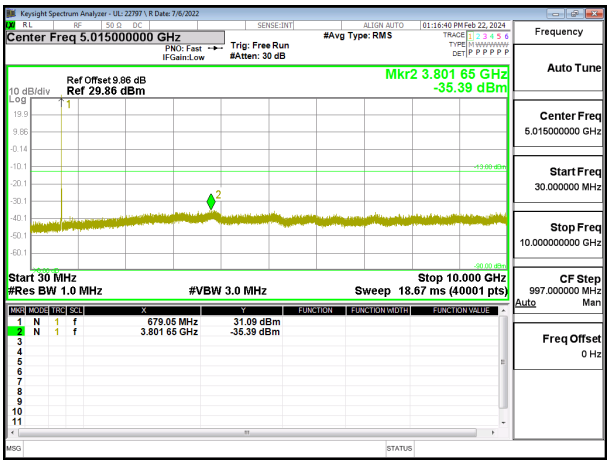
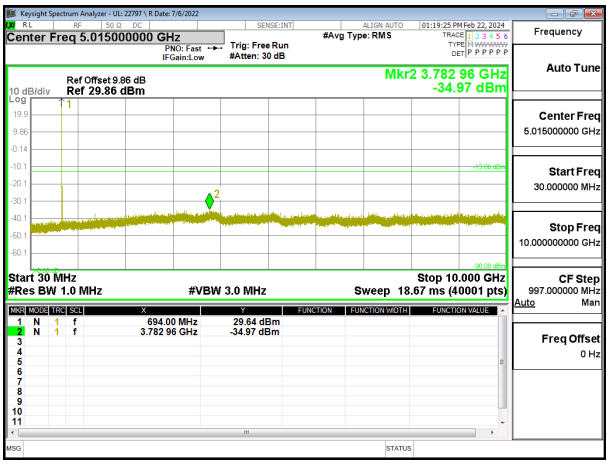
5G NR n71



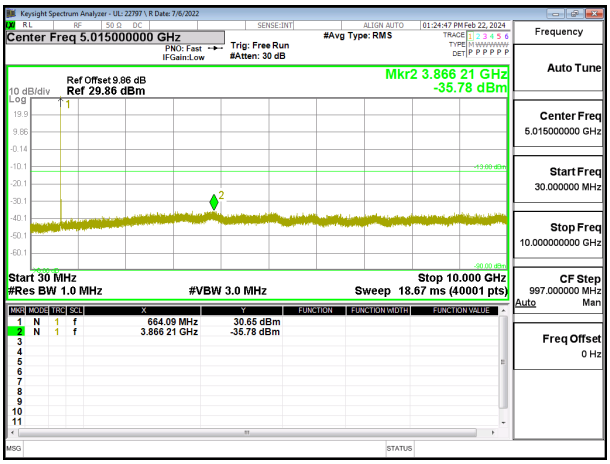
5G NR n71 5MHz QPSK Low Channel RB1-0



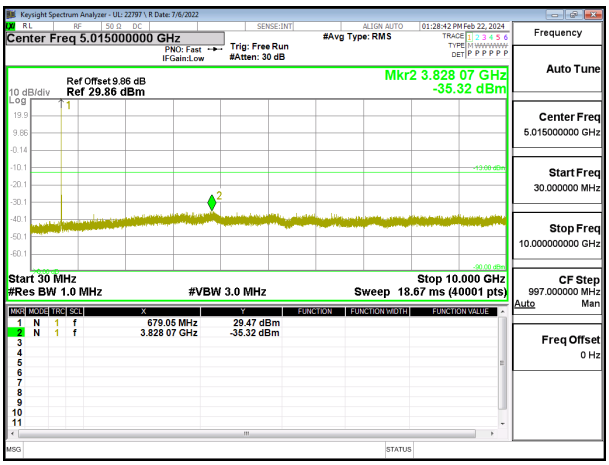
5G NR n71 5MHz QPSK Middle Channel RB1-1



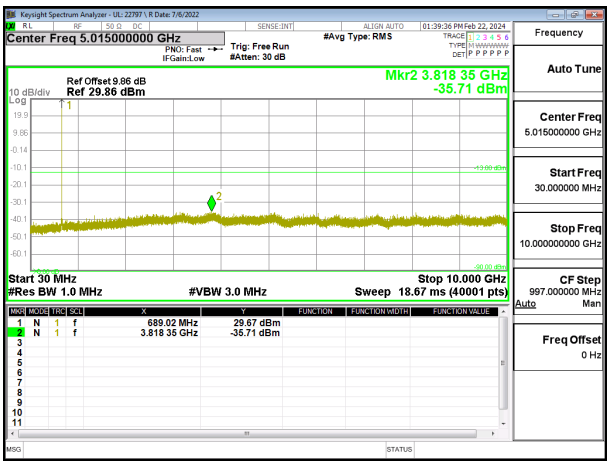
5G NR n71 5MHz QPSK High Channel RB1-24



5G NR n71 10MHz QPSK Low Channel RB1-0



5G NR n71 10MHz QPSK Middle Channel RB1-1



5G NR n71 10MHz QPSK High Channel RB1-51

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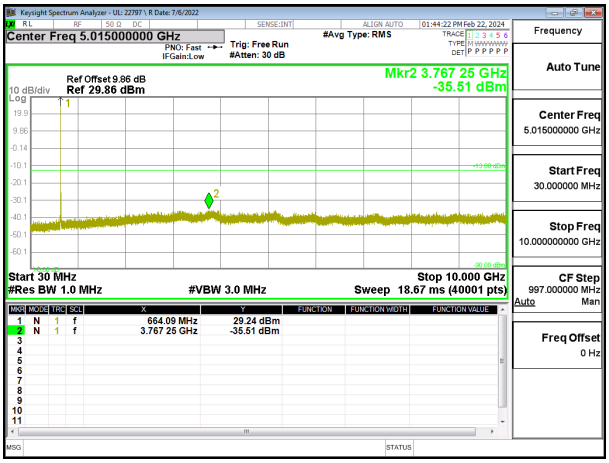
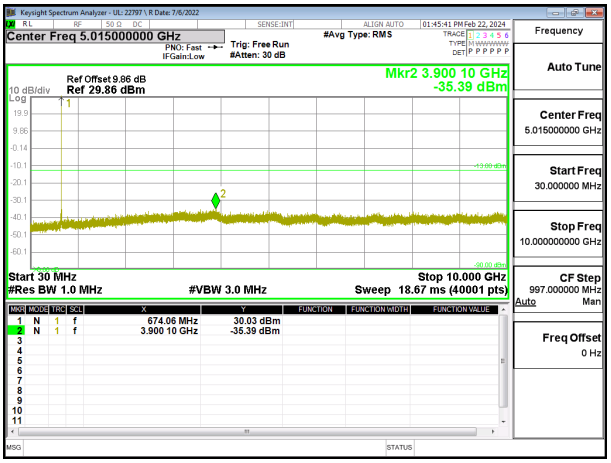
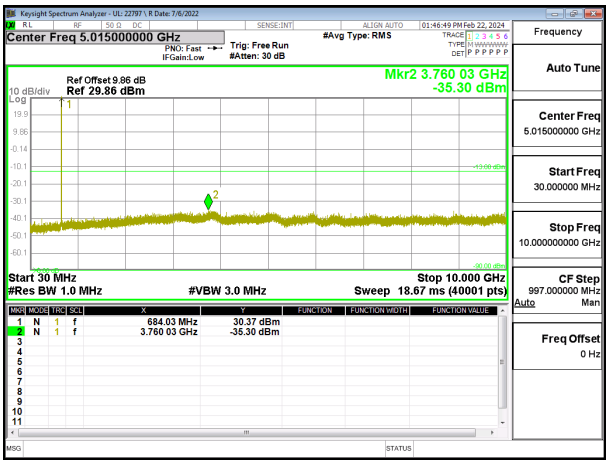


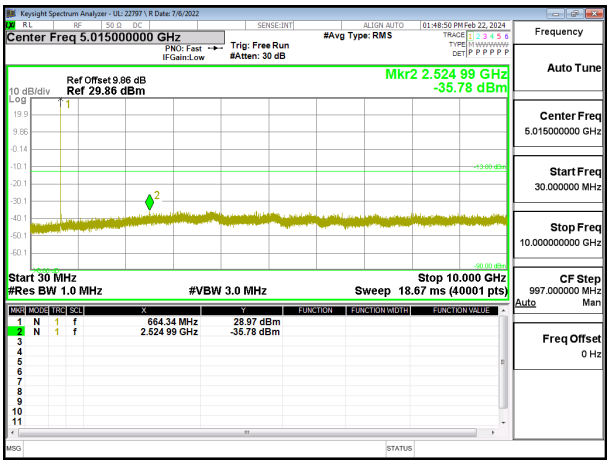
5G NR n71 15MHz QPSK Low Channel RB1-0



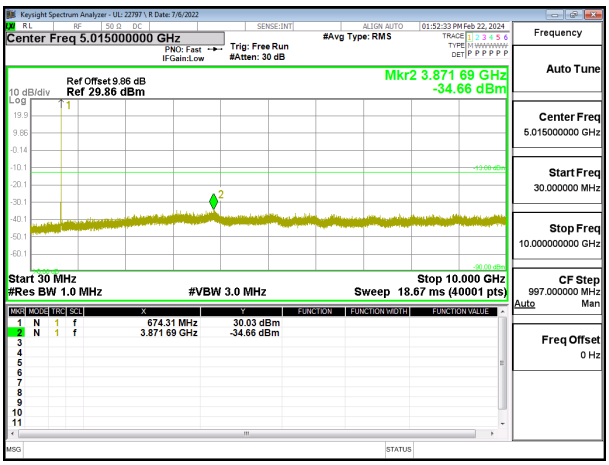
5G NR n71 15MHz QPSK Middle Channel RB1-1



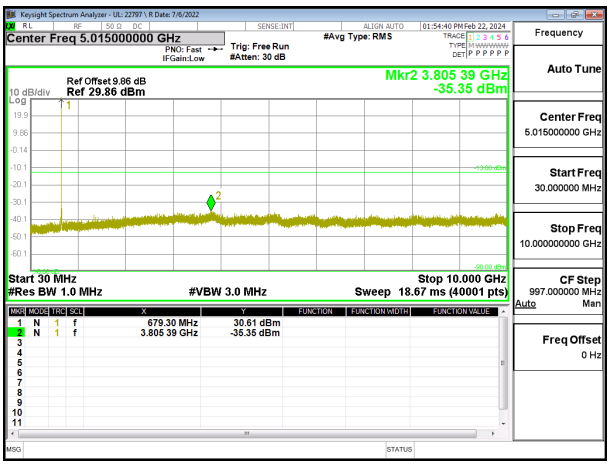
5G NR n71 15MHz QPSK High Channel RB1-78



5G NR n71 20MHz QPSK Low Channel RB1-0



5G NR n71 20MHz QPSK Middle Channel RB1-1



5G NR n71 20MHz QPSK High Channel RB1-105

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9.3.12. 5G NR n77 (FCC Part 27 3450-3550MHz)

LIMITS

FCC: §27.53
Emission limits
(n) 3.45 GHz Service. The following emission limits apply to stations transmitting in the 3450-3550 MHz band:
(2) For mobile operations in the 3450-3550 MHz band, the conducted power of any emission outside the licensee's authorized bandwidth shall not exceed −13 dBm/MHz.

Test Engineer ID:	22797/85502	Test Date:	2024-02-26	EUT Serial Number:	QV77005HJP

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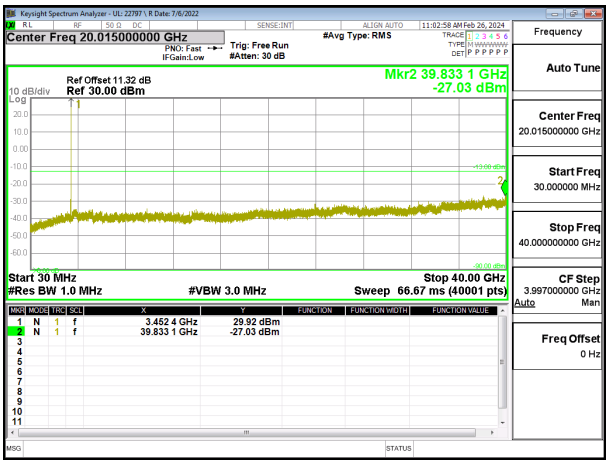
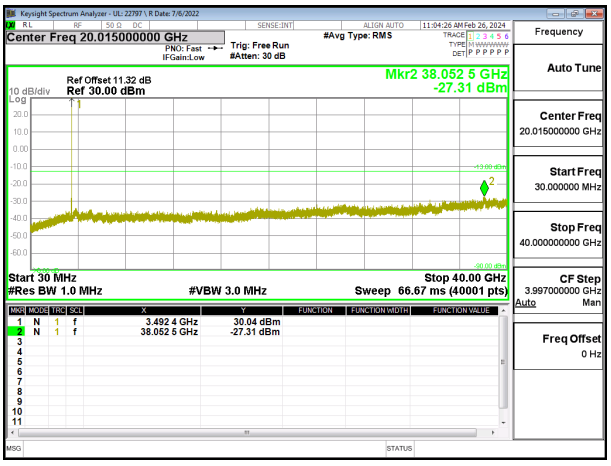
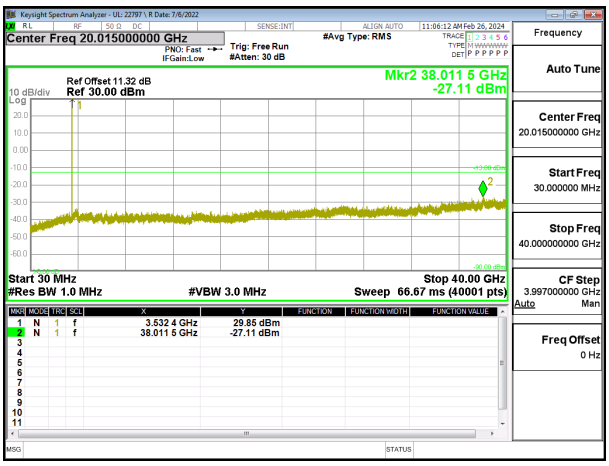
5G NR n77



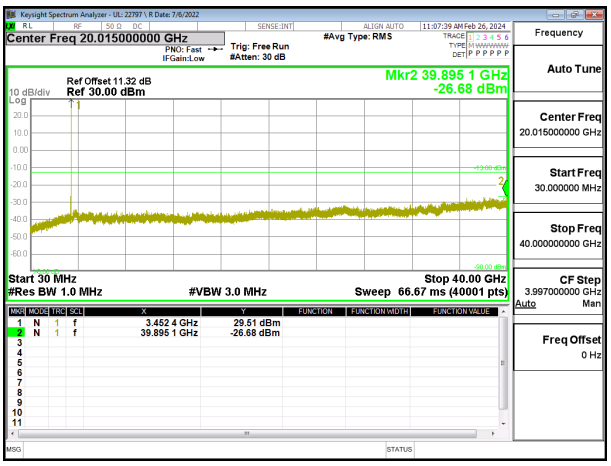
5G NR n77 20MHz QPSK Low Channel RB1-0



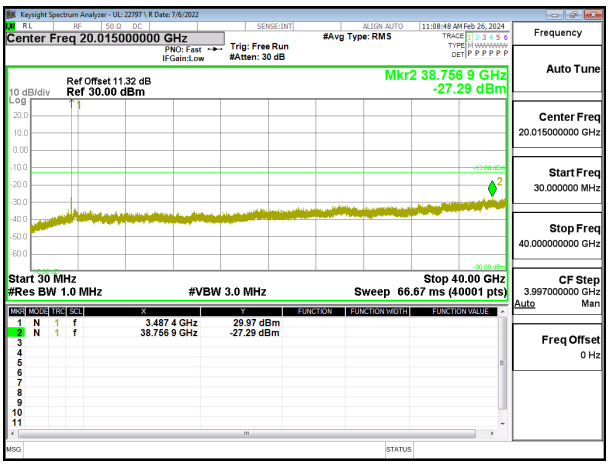
5G NR n77 20MHz QPSK Mid Channel RB1-0



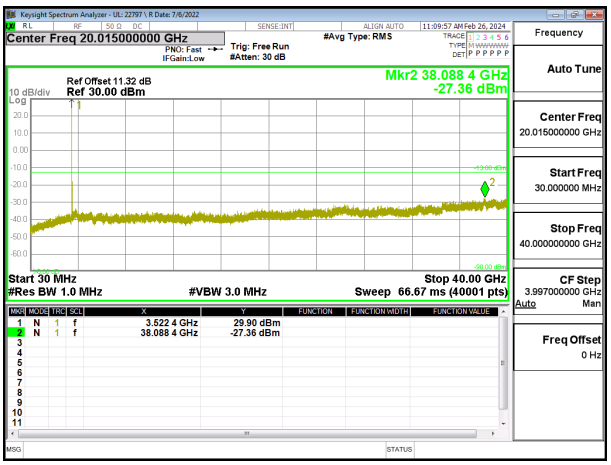
5G NR n77 20MHz QPSK High Channel RB1-1



5G NR n77 30MHz QPSK Low Channel RB1-1



5G NR n77 30MHz QPSK Mid Channel RB1-23



5G NR n77 30MHz QPSK High Channel RB1-37

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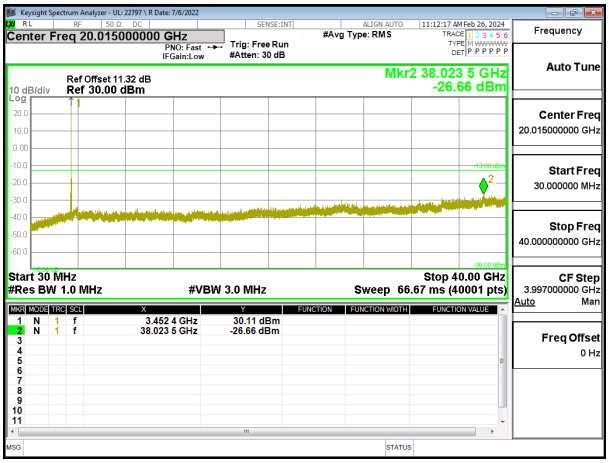
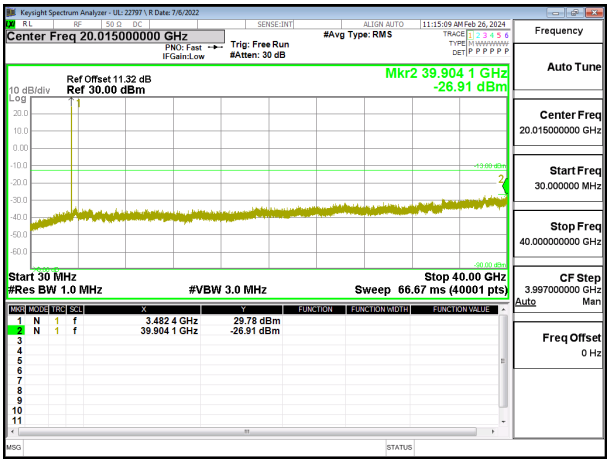
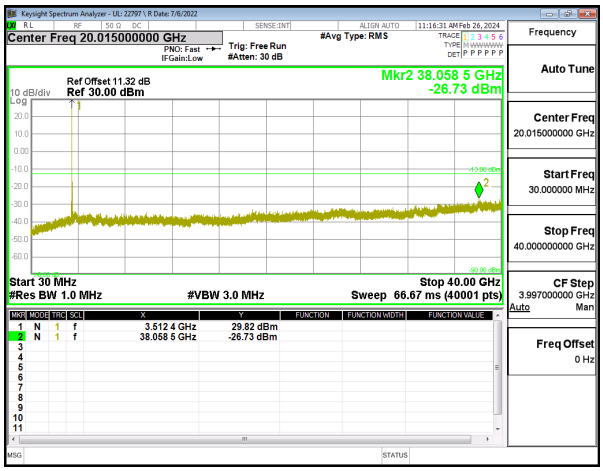


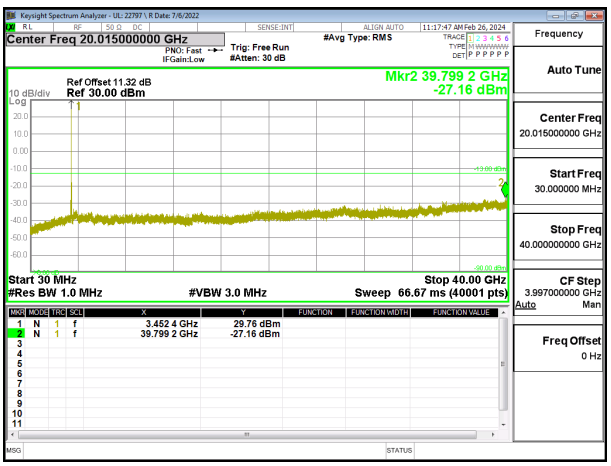
5G NR n77 40MHz QPSK Low Channel RB1-0



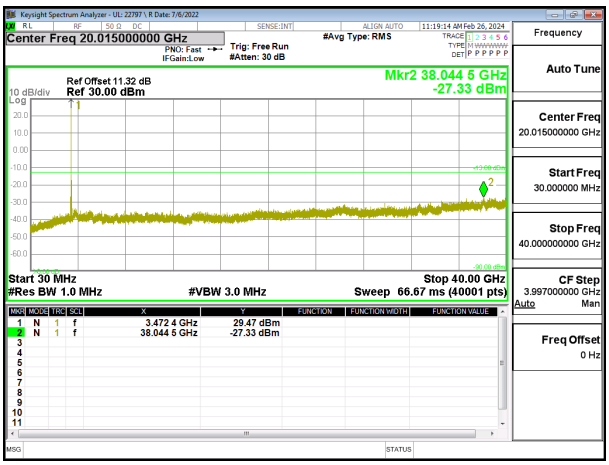
5G NR n77 40MHz QPSK Mid Channel RB1-0



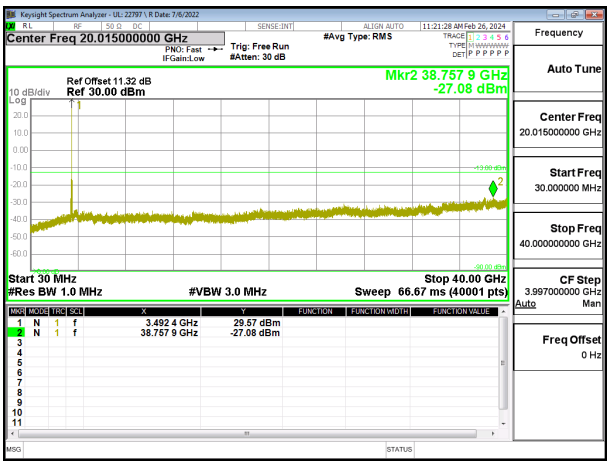
5G NR n77 40MHz QPSK High Channel RB1-1



5G NR n77 60MHz QPSK Low Channel RB1-1

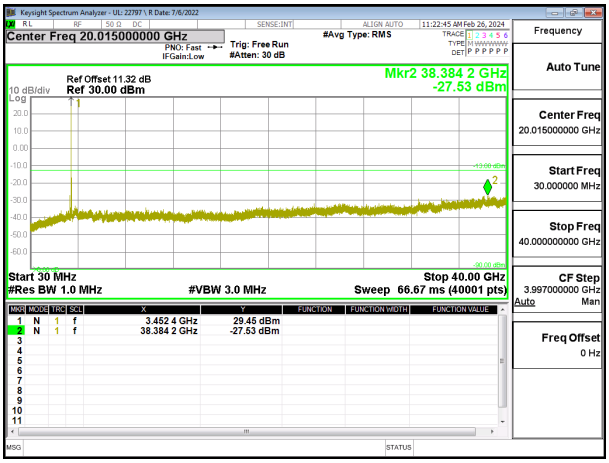


5G NR n77 60MHz QPSK Mid Channel RB1-50

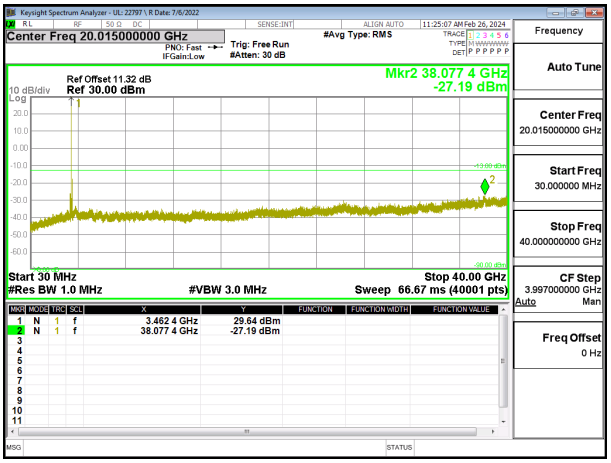


5G NR n77 60MHz QPSK High Channel RB1-77

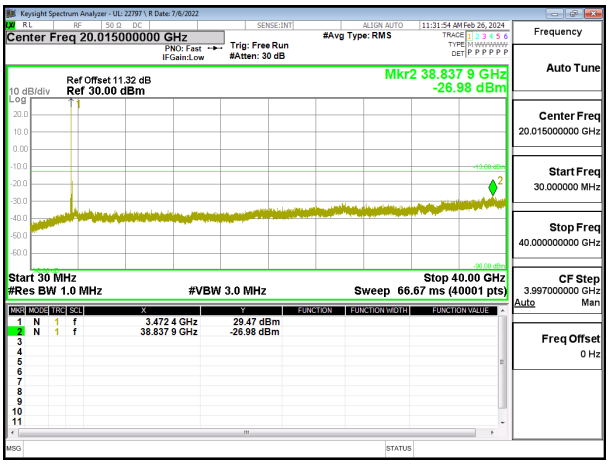
This report shall not be reproduced except in full, without the written approval of UL LLC.



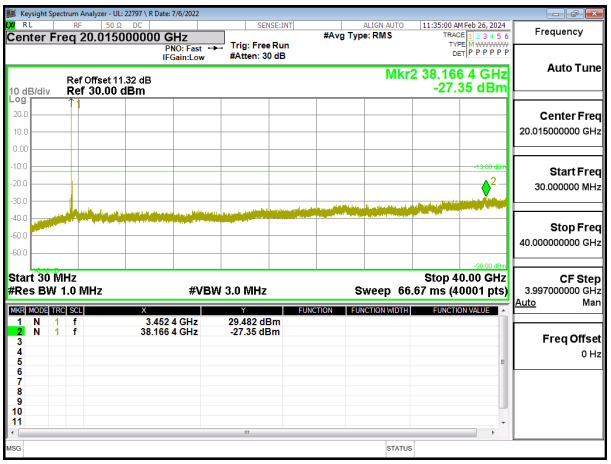
5G NR n77 80MHz QPSK Low Channel RB1-0



5G NR n77 80MHz QPSK Low Channel RB1-0



5G NR n77 80MHz QPSK High Channel RB1-1



5G NR n77 100MHz QPSK Mid Channel RB1-1

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9.3.13. 5G NR n77 (FCC Part 27 3700-3980MHz)

LIMITS

FCC: §27.53
Emission limits
(l) 3.7 GHz Service. The following emission limits apply to stations transmitting in the 3700-3980 MHz band:
(2) For mobile operations in the 3700-3980 MHz band, the conducted power of any emission outside the licensee's authorized bandwidth shall not exceed −13 dBm/MHz.

Test Engineer ID:	22797/85502	Test Date:	2024-02-29	EUT Serial Number:	QV77005HJP

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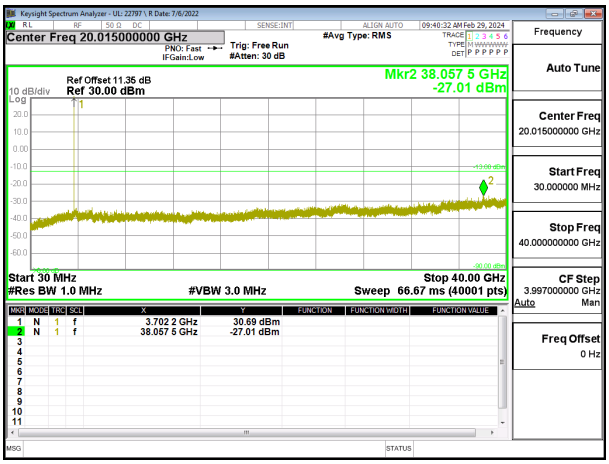
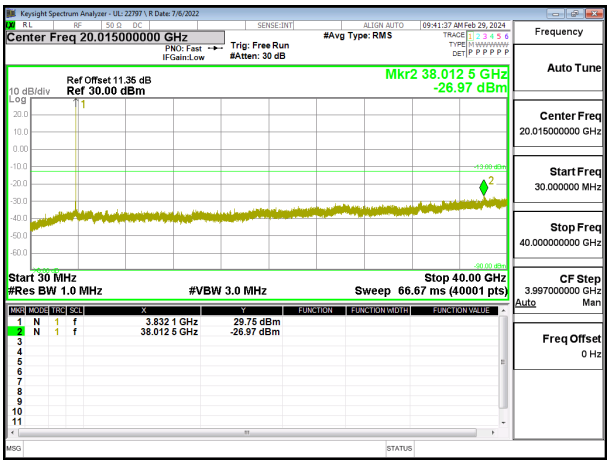
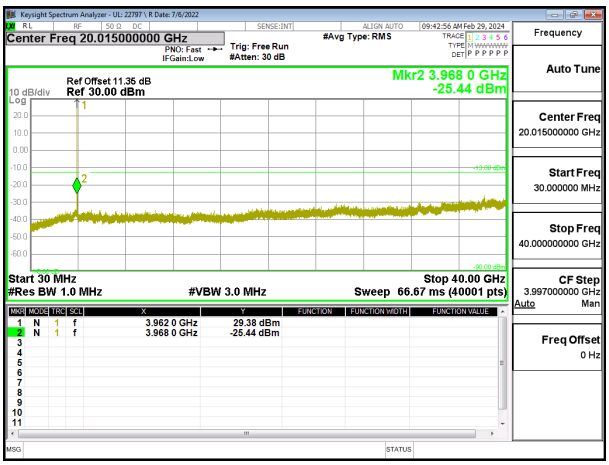
5G NR n77



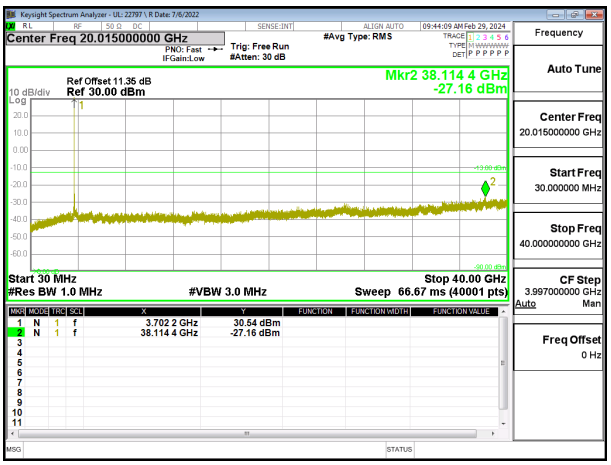
5G NR n77 20MHz QPSK Low Channel RB1-1



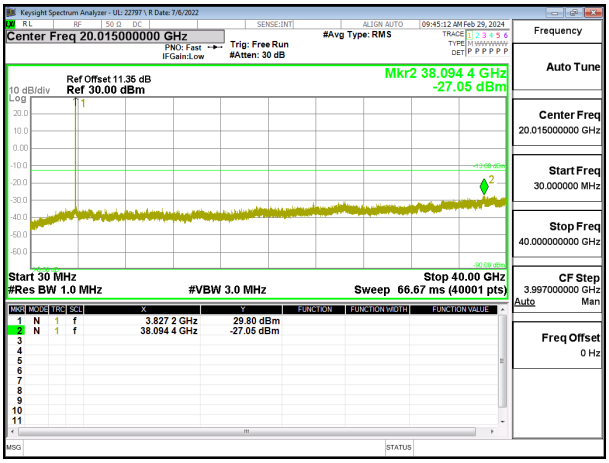
5G NR n77 20MHz QPSK Low Channel RB1-1



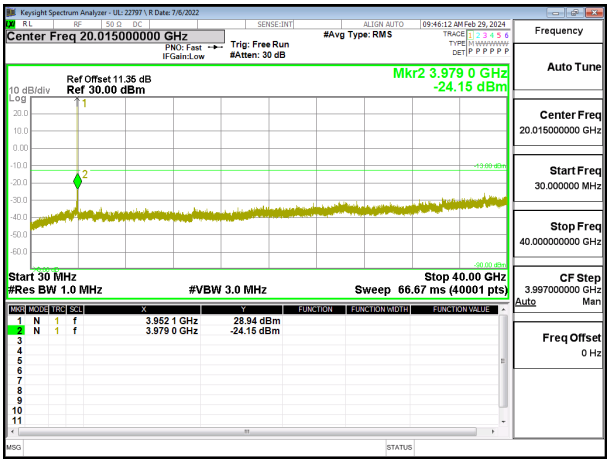
5G NR n77 20MHz QPSK Mid Channel RB1-1



5G NR n77 30MHz QPSK Mid Channel RB1-1



5G NR n77 30MHz QPSK High Channel RB1-1



5G NR n77 30MHz QPSK High Channel RB1-1

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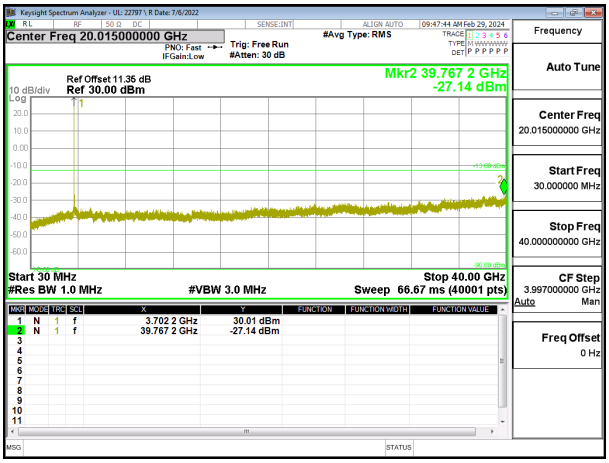
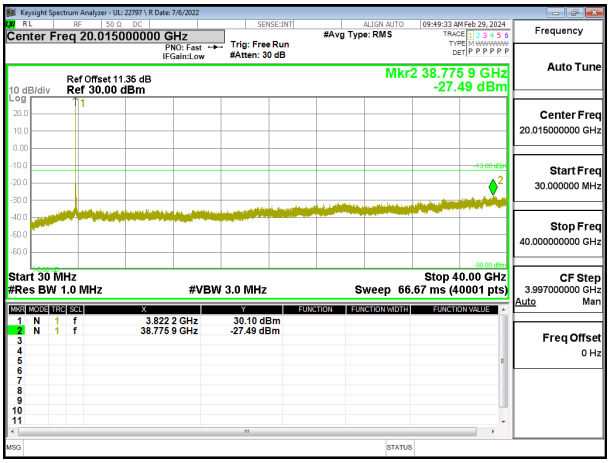
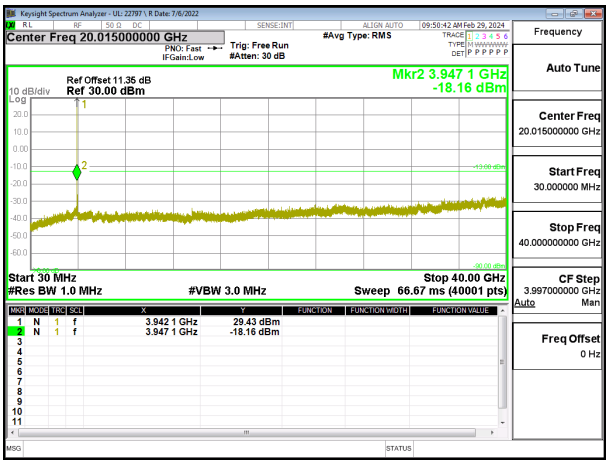


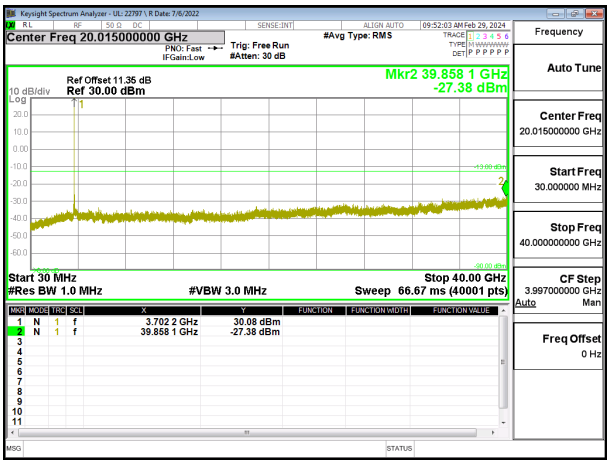
5G NR n77 40MHz QPSK Low Channel RB1-1



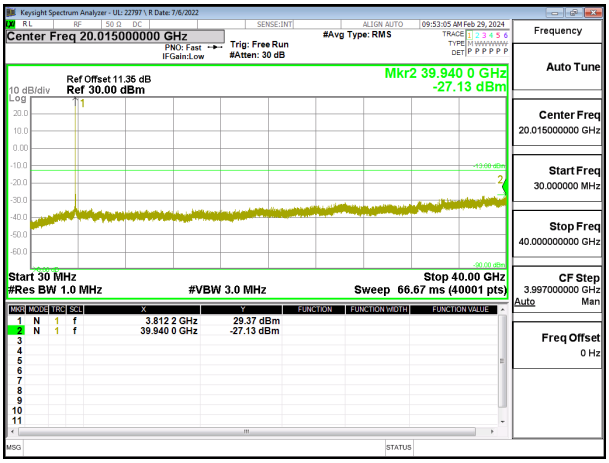
5G NR n77 40MHz QPSK Low Channel RB1-1



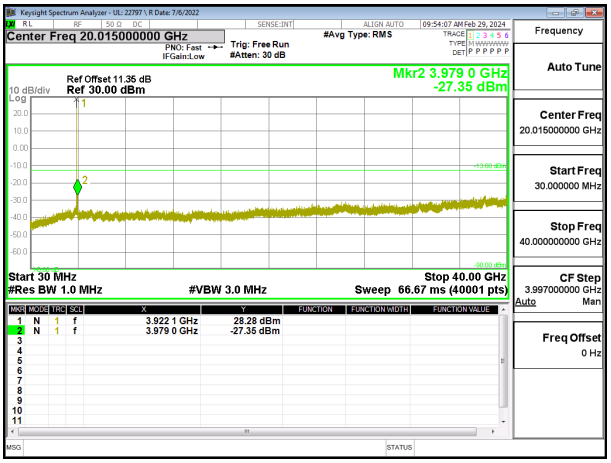
5G NR n77 40MHz QPSK Mid Channel RB1-1



5G NR n77 60MHz QPSK Mid Channel RB1-1



5G NR n77 60MHz QPSK High Channel RB1-50



5G NR n77 60MHz QPSK High Channel RB1-77

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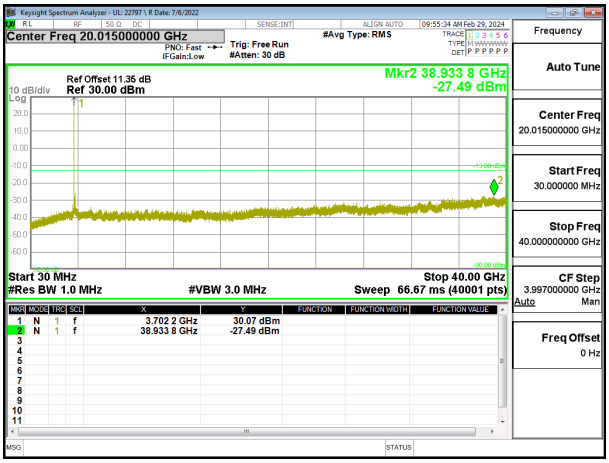
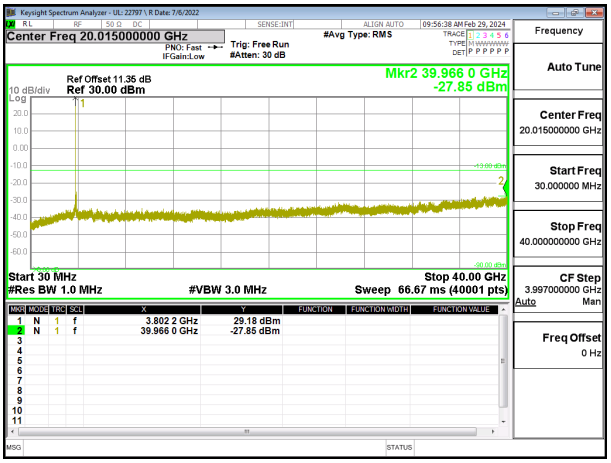
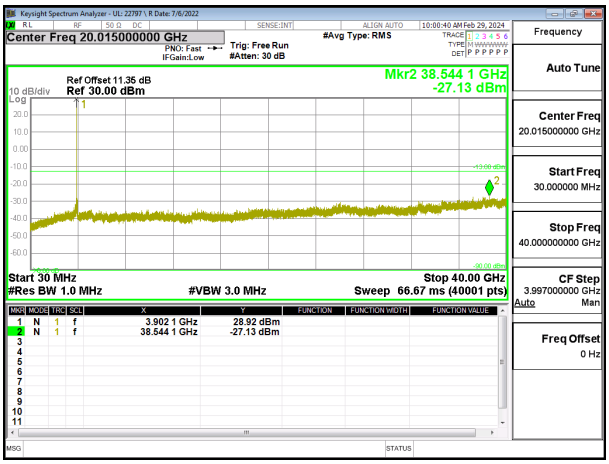


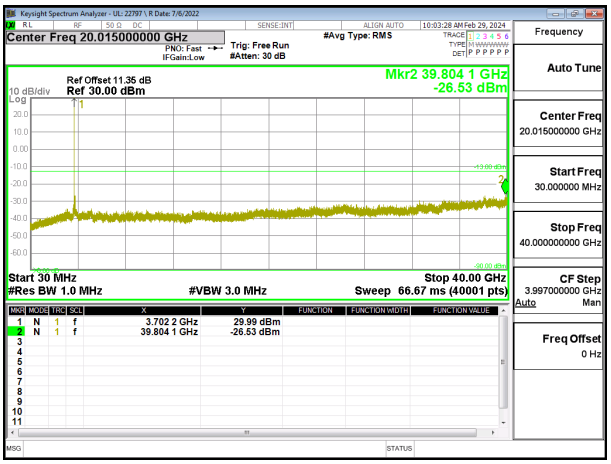
5G NR n77 80MHz QPSK Low Channel RB1-1



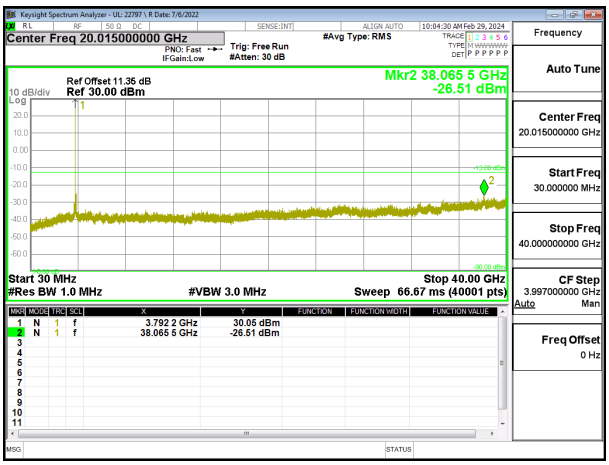
5G NR n77 80MHz QPSK Low Channel RB1-1



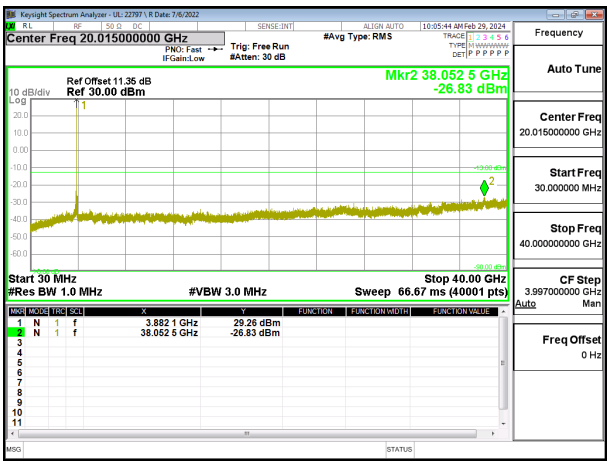
5G NR n77 80MHz QPSK Mid Channel RB1-1



5G NR n77 100MHz QPSK Mid Channel RB1-1



5G NR n77 100MHz QPSK High Channel RB1-105



5G NR n77 100MHz QPSK High Channel RB1-132

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9.4. FREQUENCY STABILITY

TEST PROCEDURE

Use CMW 500 with Frequency Error measurement capability.

- Temp. = −30°C to +50°C
- Voltage = (End Point)

  Normal, 3.89VDC
  End Point, 3.69VDC.

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.

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9.4.1. LTE BAND 2

LIMITS

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

Test Engineer ID:	22797/44389	Test Date:	2024-02-14	Sample SN:	QV7700DNJP

LTE BAND 2 QPSK (20MHz BANDWIDTH)

Band	2	Frequency Range		Frequency Error Reading (Hz)	Limit	
Condition		1850	1910		2.5	
Temperature	Voltage	Freq Reading @ Low End (MHz)	Freq Reading @ High End (MHz)		Frequency Stability (ppm)	Within Authorized Frequency Block (Hz)
Normal (20°C)	Normal	1851.09600000	1908.90700000			
Extreme (50°C)		1851.09599640	1908.90699640	-3.6	-0.002	Yes
Extreme (40°C)		1851.09599590	1908.90699590	-4.1	-0.002	Yes
Extreme (30°C)		1851.09599650	1908.90699650	-3.5	-0.002	Yes
Extreme (10°C)		1851.09599470	1908.90699470	-5.3	-0.003	Yes
Extreme (0°C)		1851.09599590	1908.90699590	-4.1	-0.002	Yes
Extreme (-10°C)		1851.09599650	1908.90699650	-3.5	-0.002	Yes
Extreme (-20°C)		1851.09599660	1908.90699660	-3.4	-0.002	Yes
Extreme (-30°C)		1851.09599570	1908.90699570	-4.3	-0.002	Yes
20°C	End Point Voltage	1851.0960	1908.9070	-4.5	-0.002	Yes

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9.4.2. LTE BAND 5 AND 5G NR n5

LIMITS

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

Test Engineer ID:	84740 33499/84740	Test Date:	2024-02-08 2024-02-16	EUT Serial Number:	QV7700QGLA QV77005HJP

LTE BAND 5 QPSK (10MHz BANDWIDTH)

Band	5	Frequency Range		Frequency Error Reading (Hz)	Limit	
Condition		824	849		2.5	
Temperature	Voltage	Freq Reading @ Low End (MHz)	Freq Reading @ High End (MHz)		Frequency Stability (ppm)	Within Authorized Frequency Block (Hz)
Normal (20°C)	Normal	829.00000338	844.00000338			
Extreme (50°C)		829.00000040	844.00000040	-2.98	-0.004	Yes
Extreme (40°C)		829.00000768	844.00000768	4.3	0.005	Yes
Extreme (30°C)		829.00000698	844.00000698	3.6	0.004	Yes
Extreme (10°C)		829.00000717	844.00000717	3.79	0.005	Yes
Extreme (0°C)		829.00000712	844.00000712	3.74	0.004	Yes
Extreme (-10°C)		829.00000773	844.00000773	4.35	0.005	Yes
Extreme (-20°C)		829.00000779	844.00000779	4.41	0.005	Yes
Extreme (-30°C)		829.00000812	844.00000812	4.74	0.006	Yes
20°C	End Point Voltage	829.00000617	844.00000617	2.79	0.003	Yes

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5G NR n5 BPSK (20MHz BANDWIDTH)

Band	5	Frequency Range		Frequency Error Reading (Hz)	Limit	
Condition		824	849		2.5	
Temperature	Voltage	Freq Reading @ Low End (MHz)	Freq Reading @ High End (MHz)		Frequency Stability (ppm)	Within Authorized Frequency Block (Hz)
Normal (20°C)	Normal	824.1630	847.7323			
Extreme (50°C)		824.1634	847.7326	370	0.442	Yes
Extreme (40°C)		824.1632	847.7324	174	0.208	Yes
Extreme (30°C)		824.1631	847.7324	114	0.136	Yes
Extreme (10°C)		824.1632	847.7325	219	0.262	Yes
Extreme (0°C)		824.1631	847.7324	128	0.153	Yes
Extreme (-10°C)		824.1633	847.7325	292	0.349	Yes
Extreme (-20°C)		824.1633	847.7326	343	0.410	Yes
Extreme (-30°C)		824.1640	847.7332	976	1.167	Yes
20°C	End Point Voltage	824.1625	847.7318	-495	-0.592	Yes

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9.4.3. 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:	84740	Test Date:	2024-02-08	EUT Serial Number:	QV7700QGLA

LTE BAND 12 QPSK (10MHz BANDWIDTH)

Band	12	Frequency Range		Frequency Error Reading (Hz)	Limit	
Condition		699	716			
		Freq Reading @ Low End (MHz)	Freq Reading @ High End (MHz)		Frequency Stability (ppm)	Within Authorized Frequency Block (Hz)
Temperature	Voltage					
Normal (20°C)	Normal	703.99999787	710.99999787			
Extreme (50°C)		703.99999523	710.99999523	-2.64	-0.004	Yes
Extreme (40°C)		703.99999515	710.99999515	-2.72	-0.004	Yes
Extreme (30°C)		704.00000065	711.00000065	2.78	0.004	Yes
Extreme (10°C)		704.00000141	711.00000141	3.54	0.005	Yes
Extreme (0°C)		703.99999330	710.99999330	-4.57	-0.006	Yes
Extreme (-10°C)		704.00000226	711.00000226	4.39	0.006	Yes
Extreme (-20°C)		704.00000175	711.00000175	3.88	0.005	Yes
Extreme (-30°C)		704.00000186	711.00000186	3.99	0.006	Yes
20°C	End Point Voltage	704.00000052	711.00000052	2.65	0.004	Yes

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9.4.4. 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:	84740	Test Date:	2024-02-08	EUT Serial Number:	QV7700QGLA

QPSK (10MHz BANDWIDTH)

Band	13	Frequency Range		Frequency Error Reading (Hz)	Limit	
Condition		777	787			
		Freq Reading @ Low End (MHz)	Freq Reading @ High End (MHz)		Frequency Stability (ppm)	Within Authorized Frequency Block (Hz)
Temperature	Voltage					
Normal (20°C)	Normal	779.50000643	784.50000643			
Extreme (50°C)		779.50001025	784.50001025	3.82	0.005	Yes
Extreme (40°C)		779.50000977	784.50000977	3.34	0.004	Yes
Extreme (30°C)		779.50001019	784.50001019	3.76	0.005	Yes
Extreme (10°C)		779.50001031	784.50001031	3.88	0.005	Yes
Extreme (0°C)		779.50001361	784.50001361	7.18	0.009	Yes
Extreme (-10°C)		779.50001290	784.50001290	6.47	0.008	Yes
Extreme (-20°C)		779.50001283	784.50001283	6.4	0.008	Yes
Extreme (-30°C)		779.50001280	784.50001280	6.37	0.008	Yes
20°C	End Point Voltage	779.50000940	784.50000940	2.97	0.004	Yes

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9.4.5. LTE BAND 25 AND 5G NR n25

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:	33499/84740	Test Date:	2024-01-22 2024-02-19	EUT Serial Number:	QV7700QGLA QV77005HJP

LTE BAND 25 QPSK (20MHz BANDWIDTH)

Band	25	Frequency Range		Frequency Error Reading (Hz)	Limit	
Condition		1850	1915		2.5	
Temperature	Voltage	Freq Reading @ Low End (MHz)	Freq Reading @ High End (MHz)		Frequency Stability (ppm)	Within Authorized Frequency Block (Hz)
Normal (20°C)	Normal	1859.99999431	1904.99999431			
Extreme (50°C)		1859.99998762	1904.99998762	-6.69	-0.004	Yes
Extreme (40°C)		1859.99998880	1904.99998880	-5.51	-0.003	Yes
Extreme (30°C)		1859.99998824	1904.99998824	-6.07	-0.003	Yes
Extreme (10°C)		1859.99998708	1904.99998708	-7.23	-0.004	Yes
Extreme (0°C)		1859.9999894	1904.9999894	-4.91	-0.003	Yes
Extreme (-10°C)		1859.99998904	1904.99998904	-5.27	-0.003	Yes
Extreme (-20°C)		1859.99998868	1904.99998868	-5.63	-0.003	Yes
Extreme (-30°C)		1859.99998790	1904.99998790	-6.41	-0.003	Yes
20°C	End Point Voltage	1859.99998971	1904.99998971	-4.6	-0.002	Yes

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5G NR n25 BPSK (20MHz BANDWIDTH)

Band	25	Frequency Range		Frequency Error Reading (Hz)	Limit	
Condition		1850	1915		2.5	
Temperature	Voltage	Freq Reading @ Low End (MHz)	Freq Reading @ High End (MHz)		Frequency Stability (ppm)	Within Authorized Frequency Block (Hz)
Normal (20°C)	Normal	1855.0021	1910.0021			
Extreme (50°C)		1855.00238	1910.00238	239	0.127	Yes
Extreme (40°C)		1855.0019	1910.0019	-253	-0.134	Yes
Extreme (30°C)		1855.0019	1910.0019	-211	-0.112	Yes
Extreme (10°C)		1855.0019	1910.0019	-203	-0.108	Yes
Extreme (0°C)		1855.0024	1910.0024	220	0.117	Yes
Extreme (-10°C)		1855.0024	1910.0024	265	0.141	Yes
Extreme (-20°C)		1855.0024	1910.0024	237	0.126	Yes
Extreme (-30°C)		1855.0041	1910.0041	1976	1.050	Yes
20°C	End Point Voltage	1855.0040	1910.0040	1889	1.003	Yes

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9.4.6. LTE BAND 30

LIMITS

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

Test Engineer ID:	22797/44389	Test Date:	2024-02-13	EUT Serial Number:	QV7700DNJP

LTE BAND 30 QPSK (10MHz BANDWIDTH)

Band	30	Frequency Range		Frequency Error Reading (Hz)	Limit	
Condition		2305	2315		N/A	
		Freq Reading @ Low End (MHz)	Freq Reading @ High End (MHz)		Frequency Stability (ppm)	Within Authorized Frequency Block (Hz)
Temperature	Voltage					
Normal (20°C)	Normal	2305.54500100	2314.46600100			
Extreme (50°C)		2305.54500490	2314.46600490	3.9	0.002	Yes
Extreme (40°C)		2305.54500420	2314.46600420	3.2	0.001	Yes
Extreme (30°C)		2305.54500530	2314.46600530	4.3	0.002	Yes
Extreme (10°C)		2305.54500500	2314.46600500	4.0	0.002	Yes
Extreme (0°C)		2305.54499730	2314.46599730	-3.7	-0.002	Yes
Extreme (-10°C)		2305.54500630	2314.46600630	5.3	0.002	Yes
Extreme (-20°C)		2305.54500480	2314.46600480	3.8	0.002	Yes
Extreme (-30°C)		2305.54499850	2314.46599850	-2.5	-0.001	Yes
20°C	End Point Voltage	2305.5450	2314.4660	5.6	0.002	Yes

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9.4.7. 5G NR n30

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:	84740	Test Date:	2024-03-13	EUT Serial Number:	QV7700DNJP

5G NR n30 QPSK (10MHz BANDWIDTH)

Band	30	Frequency Range		Frequency Error Reading (Hz)	Limit	
Condition		2305	2315			
		Freq Reading @ Low End (MHz)	Freq Reading @ High End (MHz)		Frequency Stability (ppm)	Within Authorized Frequency Block (Hz)
Temperature	Voltage					
Normal (20°C)	Normal	2307.5007	2312.5007			
Extreme (50°C)		2307.49518	2312.49518	-5508	-2.384	Yes
Extreme (40°C)		2307.4953	2312.4953	-5347	-2.315	Yes
Extreme (30°C)		2307.4973	2312.4973	-3423	-1.482	Yes
Extreme (10°C)		2307.5039	2312.5039	3181	1.377	Yes
Extreme (0°C)		2307.5115	2312.5115	10798	4.674	Yes
Extreme (-10°C)		2307.5200	2312.5200	19307	8.358	Yes
Extreme (-20°C)		2307.5245	2312.5245	23800	10.303	Yes
Extreme (-30°C)		2307.5247	2312.5247	23978	10.380	Yes
20°C	End Point Voltage	2307.5179	2312.5179	17188	7.441	Yes

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9.4.8. LTE BAND 41 AND 5G NR n41

LIMITS

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

Test Engineer ID:	84740 33499/84740	Test Date:	2024-02-08 2024-02-19	EUT Serial Number:	QV7700QGLA QV77005HJP

LTE BAND 41 QPSK (20MHz BANDWIDTH)

Band	41	Frequency Range		Frequency Error Reading (Hz)	Limit	
Condition		2500	2690			
Temperature	Voltage	Freq Reading @ Low End (MHz)	Freq Reading @ High End (MHz)		Frequency Stability (ppm)	Within Authorized Frequency Block (Hz)
Normal (20°C)	Normal	2505.99998589	2679.99998589			
Extreme (50°C)		2505.99997197	2679.99997197	-13.92	-0.005	Yes
Extreme (40°C)		2505.99997259	2679.99997259	-13.3	-0.005	Yes
Extreme (30°C)		2505.99996873	2679.99996873	-17.16	-0.007	Yes
Extreme (10°C)		2505.99997408	2679.99997408	-11.81	-0.005	Yes
Extreme (0°C)		2505.99996988	2679.99996988	-16.01	-0.006	Yes
Extreme (-10°C)		2505.99997338	2679.99997338	-12.51	-0.005	Yes
Extreme (-20°C)		2505.99997309	2679.99997309	-12.8	-0.005	Yes
Extreme (-30°C)		2505.99997357	2679.99997357	-12.32	-0.005	Yes
20°C	End Point Voltage	2505.99997565	2679.99997565	-10.24	-0.004	Yes

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5G NR n41 BPSK (100MHz BANDWIDTH)

Band	41	Frequency Range		Frequency Error Reading (Hz)	Limit	
Condition		2496	2690			
Temperature	Voltage	Freq Reading @ Low End (MHz)	Freq Reading @ High End (MHz)		Frequency Stability (ppm)	Within Authorized Frequency Block (Hz)
Normal (20°C)	Normal	2545.9793	2639.9693			
Extreme (50°C)		2545.9883	2639.9783	8958	3.455	Yes
Extreme (40°C)		2545.9885	2639.9785	9212	3.553	Yes
Extreme (30°C)		2545.9878	2639.9778	8455	3.261	Yes
Extreme (10°C)		2545.9891	2639.9791	9818	3.786	Yes
Extreme (0°C)		2545.9883	2639.9783	8983	3.464	Yes
Extreme (-10°C)		2545.9868	2639.9768	7468	2.880	Yes
Extreme (-20°C)		2545.9877	2639.9777	8410	3.243	Yes
Extreme (-30°C)		2545.9919	2639.9819	12566	4.846	Yes
20°C	End Point Voltage	2545.9634	2639.9534	-15947	-6.150	Yes

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9.4.9. LTE BAND 48 AND 5G NR n48

Test Engineer ID:	84740 33499/84740	Test Date:	2024-02-08 2024-02-19	EUT Serial Number:	QV7700QGLA QV77005HJP

LTE BAND 48 QPSK (20MHz BANDWIDTH)

Band	48	Frequency Range		Frequency Error Reading (Hz)	Limit	
Condition		3550	3700			
Temperature	Voltage	Freq Reading @ Low End (MHz)	Freq Reading @ High End (MHz)		Frequency Stability (ppm)	Within Authorized Frequency Block (Hz)
Normal (20°C)	Normal	3560.00001000	3690.00001000			
Extreme (50°C)		3560.00002120	3690.00002120	11.2	0.003	Yes
Extreme (40°C)		3560.00002060	3690.00002060	10.6	0.003	Yes
Extreme (30°C)		3560.00001906	3690.00001906	9.06	0.002	Yes
Extreme (10°C)		3559.99999906	3689.99999906	-10.94	-0.003	Yes
Extreme (0°C)		3560.00000024	3690.00000024	-9.76	-0.003	Yes
Extreme (-10°C)		3559.99999898	3689.99999898	-11.02	-0.003	Yes
Extreme (-20°C)		3560.00002330	3690.00002330	13.3	0.004	Yes
Extreme (-30°C)		3560.00002020	3690.00002020	10.2	0.003	Yes
20°C	End Point Voltage	3560.00001972	3690.00001972	9.72	0.003	Yes

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5G NR n48 BPSK (40MHz BANDWIDTH)

Band	48	Frequency Range		Frequency Error Reading (Hz)	Limit	
Condition		3550	3700			
Temperature	Voltage	Freq Reading @ Low End (MHz)	Freq Reading @ High End (MHz)		Frequency Stability (ppm)	Within Authorized Frequency Block (Hz)
Normal (20°C)	Normal	3554.2410	3699.3150			
Extreme (50°C)		3554.2333	3699.3073	-7710	-2.127	Yes
Extreme (40°C)		3554.2311	3699.3051	-9911	-2.734	Yes
Extreme (30°C)		3554.2312	3699.3052	-9850	-2.717	Yes
Extreme (10°C)		3554.2309	3699.3049	-10084	-2.782	Yes
Extreme (0°C)		3554.2354	3699.3094	-5622	-1.551	Yes
Extreme (-10°C)		3554.2378	3699.3118	-3209	-0.885	Yes
Extreme (-20°C)		3554.2453	3699.3193	4281	1.181	Yes
Extreme (-30°C)		3554.2526	3699.3266	11565	3.190	Yes
20°C	End Point Voltage	3554.2340	3699.3080	-6980	-1.926	Yes

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9.4.10. LTE BAND 66 AND 5G NR n66

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:	22797/44389 33499/84740	Test Date:	2024-02-14 2024-02-19	EUT Serial Number:	QV7700DNJP QV77005HJP

LTE BAND 66 QPSK (20MHz BANDWIDTH)

Band	66	Frequency Range		Frequency Error Reading (Hz)	Limit	
Condition		1710	1780			
Temperature	Voltage	Freq Reading @ Low End (MHz)	Freq Reading @ High End (MHz)		Frequency Stability (ppm)	Within Authorized Frequency Block (Hz)
Normal (20°C)	Normal	1719.9999967	1769.99999600			
Extreme (50°C)		1719.99999240	1769.99999170	-4.30	-0.002	Yes
Extreme (40°C)		1719.99999343	1769.99999273	-3.27	-0.002	Yes
Extreme (30°C)		1719.99999221	1769.99999151	-4.49	-0.003	Yes
Extreme (10°C)		1719.99999309	1769.99999239	-3.61	-0.002	Yes
Extreme (0°C)		1719.99999359	1769.99999289	-3.11	-0.002	Yes
Extreme (-10°C)		1719.99999088	1769.99999018	-5.82	-0.003	Yes
Extreme (-20°C)		1719.99999203	1769.99999133	-4.67	-0.003	Yes
Extreme (-30°C)		1719.99999560	1769.99999490	-1.10	-0.001	Yes
20°C	End Point Voltage	1719.99999190	1769.99999120	-4.80	-0.003	Yes

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5G NR n66 BPSK (40MHz BANDWIDTH)

Band	66	Frequency Range		Frequency Error Reading (Hz)	Limit	
Condition		1710	1780			
Temperature	Voltage	Freq Reading @ Low End (MHz)	Freq Reading @ High End (MHz)		Frequency Stability (ppm)	Within Authorized Frequency Block (Hz)
Normal (20°C)	Normal	1719.9999	1769.9999			
Extreme (50°C)		1719.9997	1769.9997	-211	-0.121	Yes
Extreme (40°C)		1719.9996	1769.9996	-243	-0.139	Yes
Extreme (30°C)		1719.9996	1769.9996	-294	-0.168	Yes
Extreme (10°C)		1720.0001	1770.0001	215	0.123	Yes
Extreme (0°C)		1720.0001	1770.0001	249	0.143	Yes
Extreme (-10°C)		1720.0002	1770.0002	284	0.163	Yes
Extreme (-20°C)		1720.0002	1770.0002	277	0.159	Yes
Extreme (-30°C)		1720.0015	1770.0015	1577	0.904	Yes
20°C	End Point Voltage	1720.0000	1770.0000	163	0.093	Yes

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9.4.11. 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:	33499/84740	Test Date:	2024-01-22 2024-02-19	EUT Serial Number:	QV7700QGLA QV77005HJP

LTE BAND 71 QPSK (20MHz BANDWIDTH)

Band	71	Frequency Range		Frequency Error Reading (Hz)	Limit	
Condition		663	698			
Temperature	Voltage	Freq Reading @ Low End (MHz)	Freq Reading @ High End (MHz)		Frequency Stability (ppm)	Within Authorized Frequency Block (Hz)
Normal (20°C)	Normal	673.00000348	688.00000348			
Extreme (50°C)		673.00000002	688.00000002	-3.46	-0.005	Yes
Extreme (40°C)		673.00000635	688.00000635	2.87	0.004	Yes
Extreme (30°C)		672.99999984	687.99999984	-3.64	-0.005	Yes
Extreme (10°C)		673.00000605	688.00000605	2.57	0.004	Yes
Extreme (0°C)		673.00000629	688.00000629	2.81	0.004	Yes
Extreme (-10°C)		673.00000692	688.00000692	3.44	0.005	Yes
Extreme (-20°C)		673.00000836	688.00000836	4.88	0.007	Yes
Extreme (-30°C)		673.00000689	688.00000689	3.41	0.005	Yes
20°C	End Point Voltage	673.00000628	688.00000628	2.8	0.004	Yes

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5G NR n71 BPSK (20MHz BANDWIDTH)

Band	71	Frequency Range		Frequency Error Reading (Hz)	Limit	
Condition		663	698			
		Freq Reading @ Low End (MHz)	Freq Reading @ High End (MHz)		Frequency Stability (ppm)	Within Authorized Frequency Block (Hz)
Temperature	Voltage					
Normal (20°C)	Normal	663.5600	697.0075			
Extreme (50°C)		663.5602	697.0077	213	0.313	Yes
Extreme (40°C)		663.5601	697.0076	85	0.125	Yes
Extreme (30°C)		663.5601	697.0076	87	0.128	Yes
Extreme (10°C)		663.5607	697.0082	716	1.052	Yes
Extreme (0°C)		663.5601	697.0076	130	0.191	Yes
Extreme (-10°C)		663.5603	697.0078	290	0.426	Yes
Extreme (-20°C)		663.5603	697.0078	298	0.438	Yes
Extreme (-30°C)		663.5608	697.0083	775	1.139	Yes
20°C	End Point Voltage	663.5600	697.0075	-22	-0.032	Yes

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9.4.12. 5G NR n77 (FCC Part 27 3450-3550MHz)

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:	33499/84740	Test Date:	2024-02-19	EUT Serial Number:	QV77005HJP

5G NR n77 BPSK (100MHz BANDWIDTH)

Band	77	Frequency Range		Frequency Error Reading (Hz)	Limit	
Condition		3450	3550			
		Freq Reading @ Low End (MHz)	Freq Reading @ High End (MHz)		Frequency Stability (ppm)	Within Authorized Frequency Block (Hz)
Temperature	Voltage					
Normal (20°C)	Normal	3489.9933	3509.9933			
Extreme (50°C)		3489.9920	3509.9920	-1360	-0.389	Yes
Extreme (40°C)		3489.9911	3509.9911	-2258	-0.645	Yes
Extreme (30°C)		3489.9871	3509.9871	-6288	-1.797	Yes
Extreme (10°C)		3489.9913	3509.9913	-2066	-0.590	Yes
Extreme (0°C)		3489.9907	3509.9907	-2612	-0.746	Yes
Extreme (-10°C)		3489.9893	3509.9893	-4086	-1.167	Yes
Extreme (-20°C)		3489.9887	3509.9887	-4645	-1.327	Yes
Extreme (-30°C)		3489.9908	3509.9908	-2549	-0.728	Yes
20°C	End Point Voltage	3489.9873	3509.9873	-6073	-1.735	Yes

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9.4.13. 5G NR n77 (FCC Part 27 3700-3980MHz)

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:	33499/84740	Test Date:	2024-02-19	EUT Serial Number:	QV77005HJP

5G NR n77 BPSK (100MHz BANDWIDTH)

Band	77	Frequency Range		Frequency Error Reading (Hz)	Limit	
Condition		3700	3980			
		Freq Reading @ Low End (MHz)	Freq Reading @ High End (MHz)		Frequency Stability (ppm)	Within Authorized Frequency Block (Hz)
Temperature	Voltage					
Normal (20°C)	Normal	3739.9970	3939.9970			
Extreme (50°C)		3739.9976	3939.9976	585	0.152	Yes
Extreme (40°C)		3739.9973	3939.9973	276	0.072	Yes
Extreme (30°C)		3739.9966	3939.9966	-450	-0.117	Yes
Extreme (10°C)		3739.9977	3939.9977	636	0.166	Yes
Extreme (0°C)		3739.9975	3939.9975	428	0.111	Yes
Extreme (-10°C)		3739.9975	3939.9975	432	0.113	Yes
Extreme (-20°C)		3739.9977	3939.9977	689	0.179	Yes
Extreme (-30°C)		3739.9996	3939.9996	2598	0.677	Yes
20°C	End Point Voltage	3739.9932	3939.9932	-3825	-0.996	Yes

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9.5. PEAK TO AVERAGE RATIO

LIMITS

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

9.5.1. 5G NR n5

Test Engineer ID:	22797/44389	Test Date:	2024-02-14 2024-02-21 2024-02-26	EUT Serial Number:	QV77005HJP

Band	Bandwidth (MHz)	Frequency (MHz)	RB Allocation	RB OffSet	Modulation	Conducted Power (dBm)		Peak-to-Average Power Ratio (dB)
						Peak	Average	
5G NR n5	5MHz	836.5	25	0	BPSK	27.82	23.5	4.32
					16QAM	28.96	22.02	6.94
	10MHz		50	0	BPSK	28.26	23.58	4.68
					16QAM	28.93	22.09	6.84
	15MHz		75	0	BPSK	28.14	23.79	4.35
					16QAM	29.29	22.3	6.99
	20MHz		100	0	BPSK	28.24	23.82	4.42
					16QAM	29.00	23.3	5.70
Duty Cycle Correction Factor (dB) =			0.00					
Peak-to-Average Power Ratio= Peak Reading - Average Reading - Duty Cycle Correction Factor								

9.5.2. LTE BAND 30

Test Engineer ID:	33499/84740	Test Date:	2024-03-19	EUT Serial Number:	QV7700DNJP

Band	Bandwidth (MHz)	Frequency (MHz)	RB Allocation	RB OffSet	Modulation	Conducted Power (dBm)		Peak-to-Average Power Ratio (dB)
						Peak	Average	
LTE Band 30	5MHz	2310.0	25	0	QPSK	26.47	21.52	4.95
					16QAM	26.57	21.57	5.00
	10MHz		50	0	QPSK	26.63	21.52	5.11
					16QAM	26.92	21.55	5.37
Duty Cycle Correction Factor (dB) =			0.00					
Peak-to-Average Power Ratio= Peak Reading - Average Reading - Duty Cycle Correction Factor								

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9.5.3. 5G NR n30

Test Engineer ID:	33499/84740	Test Date:	2024-03-19	EUT Serial Number:	QV77005HJP

Band	Bandwidth (MHz)	Frequency (MHz)	RB Allocation	RB OffSet	Modulation	Conducted Power (dBm)		Peak-to-Average Power Ratio (dB)
						Peak	Average	
5G NR n30	10MHz	2310.0	50	0	QPSK	26.21	21.626	4.58
					16QAM	26.54	21.261	5.28
Duty Cycle Correction Factor (dB) =			0.00					
Peak-to-Average Power Ratio= Peak Reading - Average Reading - Duty Cycle Correction Factor								

9.5.4. LTE BAND 48

Test Engineer ID:	28076/44389	Test Date:	2024-03-14	EUT Serial Number:	QV7700QGLA

Band	Bandwidth (MHz)	Frequency (MHz)	RB Allocation	RB OffSet	Modulation	Conducted Power (dBm)		Peak-to-Average Power Ratio (dB)
						Peak	Average	
LTE Band 48	5MHz	3620.0	25	0	QPSK	28.34	21.41	6.93
					16QAM	28.36	21.44	6.92
	10MHz		50	0	QPSK	27.94	21.35	6.59
					16QAM	28.41	21.32	7.09
	15MHz		75	0	QPSK	28.06	21.21	6.85
					16QAM	28.42	21.19	7.23
	20MHz		100	0	QPSK	27.87	21.26	6.61
					16QAM	28.04	21.23	6.81
Duty Cycle Correction Factor (dB) =			0.00					
Peak-to-Average Power Ratio= Peak Reading - Average Reading - Duty Cycle Correction Factor								

9.5.5. 5G NR n48

Test Engineer ID:	33499/84740	Test Date:	2024-03-12 2024-03-19	EUT Serial Number:	QV77005HJP

Band	Bandwidth (MHz)	Frequency (MHz)	RB Allocation	RB OffSet	Modulation	Conducted Power (dBm)		Peak-to-Average Power Ratio (dB)
						Peak	Average	
5G NR n48	20.0	3620.0	50	0	QPSK	26.67	21.01	5.66
					16QAM	27.46	21	6.46
	40.0		100	0	QPSK	26.03	20.97	5.06
					16QAM	27.06	20.96	6.10
Duty Cycle Correction Factor (dB) =			0.00					
Peak-to-Average Power Ratio= Peak Reading - Average Reading - Duty Cycle Correction Factor								

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9.5.6. LTE BAND 66

Test Engineer ID:	22797/44389	Test Date:	2024-02-14 2024-02-21 2024-02-26	EUT Serial Number:	QV77005HJP

Band	Bandwidth (MHz)	Frequency (MHz)	RB Allocation	RB OffSet	Modulation	Conducted Power (dBm)		Peak-to-Average Power Ratio (dB)
						Peak	Average	
LTE Band 66	1.4MHz	1747.5	6	0	QPSK	29.75	22.37	7.38
					16QAM	30.27	21.58	8.69
	3MHz		15	0	QPSK	29.78	22.4	7.37
					16QAM	30.19	21.5	8.69
	5MHz		25	0	QPSK	29.76	22.33	7.43
					16QAM	30.13	21.45	8.68
	10MHz		50	0	QPSK	29.87	22.29	7.58
					16QAM	30.16	21.46	8.70
	15MHz		75	0	QPSK	29.87	22.18	7.69
					16QAM	30.09	21.39	8.70
	20MHz		100	0	QPSK	29.93	22.3	7.66
					16QAM	30.24	21.34	8.90
Duty Cycle Correction Factor (dB) =			0.00					
Peak-to-Average Power Ratio= Peak Reading - Average Reading - Duty Cycle Correction Factor								

9.5.7. 5G NR n66

Test Engineer ID:	22797/44389	Test Date:	2024-02-14 2024-02-21 2024-02-26	EUT Serial Number:	QV77005HJP

Band	Bandwidth (MHz)	Frequency (MHz)	RB Allocation	RB OffSet	Modulation	Conducted Power (dBm)		Peak-to-Average Power Ratio (dB)
						Peak	Average	
LTE Band 66	5MHz	1747.5	25	0	QPSK	27.96	22.95	5.01
					16QAM	28.96	21.97	6.99
	10MHz		50	0	QPSK	27.81	22.97	4.84
					16QAM	27.80	22.01	5.79
	15MHz		75	0	QPSK	28.12	23.11	5.01
					16QAM	27.76	22.15	5.61
	20MHz		100	0	QPSK	27.94	23.0	4.91
					16QAM	28.04	22.24	5.80
Duty Cycle Correction Factor (dB) =			0.00					
Peak-to-Average Power Ratio= Peak Reading - Average Reading - Duty Cycle Correction Factor								

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9.5.8. 5G NR n77 (3450-3550)

Test Engineer ID:	33499/84740	Test Date:	2024-03-01	EUT Serial Number:	QV77005HJP

Band	Bandwidth (MHz)	Frequency (MHz)	RB Allocation	RB OffSet	Modulation	Conducted Power (dBm)		Peak-to-Average Power Ratio (dB)
						Peak	Average	
5G NR n77 (3450-3550)	20.0	3500.0	50	0	QPSK	30.18	25.01	5.17
					16QAM	30.27	24.14	6.13
	30.0		75	0	QPSK	30.11	25.93	4.18
					16QAM	30.19	25.07	5.12
	40.0		100	0	QPSK	29.93	26.04	3.89
					16QAM	30.27	25.07	5.20
	60.0		162	0	QPSK	29.60	25.8	3.80
					16QAM	29.74	24.83	4.91
	80.0		216	0	QPSK	29.00	25.01	3.99
					16QAM	29.30	24.27	5.03
	100.0		270	0	QPSK	28.74	25	3.74
					16QAM	28.87	24	4.87
Duty Cycle Correction Factor (dB) =			0.00					
Peak-to-Average Power Ratio= Peak Reading - Average Reading - Duty Cycle Correction Factor								

9.5.9. 5G NR n77 (3700-3980)

Test Engineer ID:	22797/44389	Test Date:	2024-02-14 2024-02-21 2024-02-26	EUT Serial Number:	QV77005HJP

Band	Bandwidth (MHz)	Frequency (MHz)	RB Allocation	RB OffSet	Modulation	Conducted Power (dBm)		Peak-to-Average Power Ratio (dB)
						Peak	Average	
5G NR n77 (3700-3980)	20.0	3840.0	50	0	QPSK	29.27	25.84	3.43
					16QAM	28.86	24.77	4.09
	30.0		75	0	QPSK	30.44	25.81	4.63
					16QAM	30.53	24.72	5.81
	40.0		100	0	QPSK	29.87	25.75	4.12
					16QAM	30.50	24.75	5.75
	60.0		162	0	QPSK	26.61	25.6	1.06
					16QAM	27.63	24.01	3.62
	80.0		216	0	QPSK	28.97	25.38	3.59
					16QAM	29.55	24.6	4.95
	100.0		270	0	QPSK	28.77	25.41	3.36
					16QAM	29.15	24.15	5.00
Duty Cycle Correction Factor (dB) =			0.00					
Peak-to-Average Power Ratio= Peak Reading - Average Reading - Duty Cycle Correction Factor								

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10. RADIATED TEST RESULTS

Radiated measurement using the Field Strength Method

Using the test configuration shown in Figure 6 below, We measure the radiated emissions directly from the EUT and convert the measured field strength or received power to ERP or EIRP, as required, for comparison to the applicable limits. As stated in 5.5.1 of ANSI C63.26-2015, the field strength measurement method using a test site validated to the requirements of ANSI C63.4 is an alternative to the substitution measurement method.

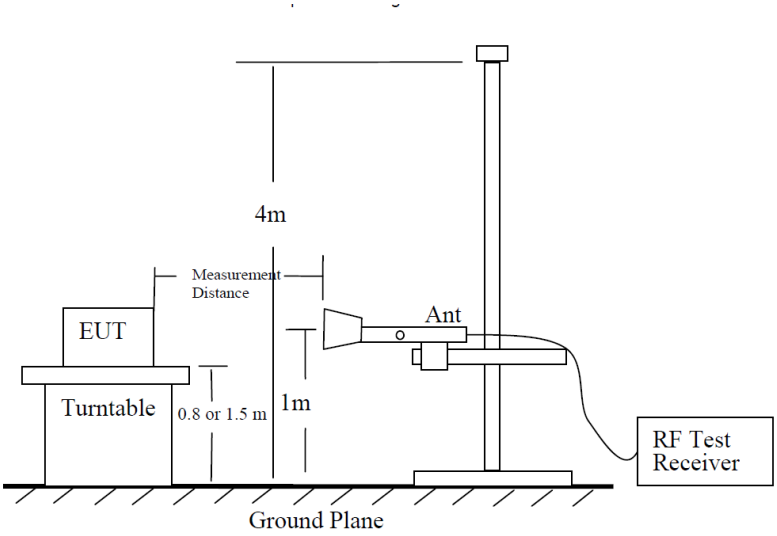

Figure 6 —Test site-up for radiated ERP and/or EIRP measurements

Radiated Power Measurement Calculation According to ANSI C63.26-2015

a) E (dBµV/m) = Measured amplitude level (dBµV) + Cable Loss (dB) + Antenna Factor (dB/m).

b) E (dBµV/m) = Measured amplitude level (dBm) + 107 + Cable Loss (dB) + Antenna Factor (dB/m).

c) E (dBµV/m) = EIRP (dBm) − 20log(D) + 104.8; where D is the measurement distance (in the far field region) in m.

d) EIRP (dBm) = E (dBµV/m) + 20log(D) − 104.8; where D is the measurement distance (in the far field region) in m.

So, from d)

The measuring distance is usually at 3m, then 20*Log(3)=9.5424

Then, EIRP (dBm) = E (dBµV/m) + 9.5424 − 104.8 = E (dBµV/m) – 95.2576

Note: Confidence check of each chamber is performed daily to see if any degradation from expected/normal reading reference data. Ambient check of each chamber is performed monthly.

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10.1. FIELD STRENGTH OF SPURIOUS RADIATION, ABOVE 1GHz

TEST PROCEDURE

KDB 971168 D01 v03r01/D02 v02/r02

All tests above 1GHz were done with a Resolution Bandwidth of 1MHz, and a Video Bandwidth of 3MHz

RESULTS

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10.1.1. 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.

EUT Serial Number: QV77008ELY

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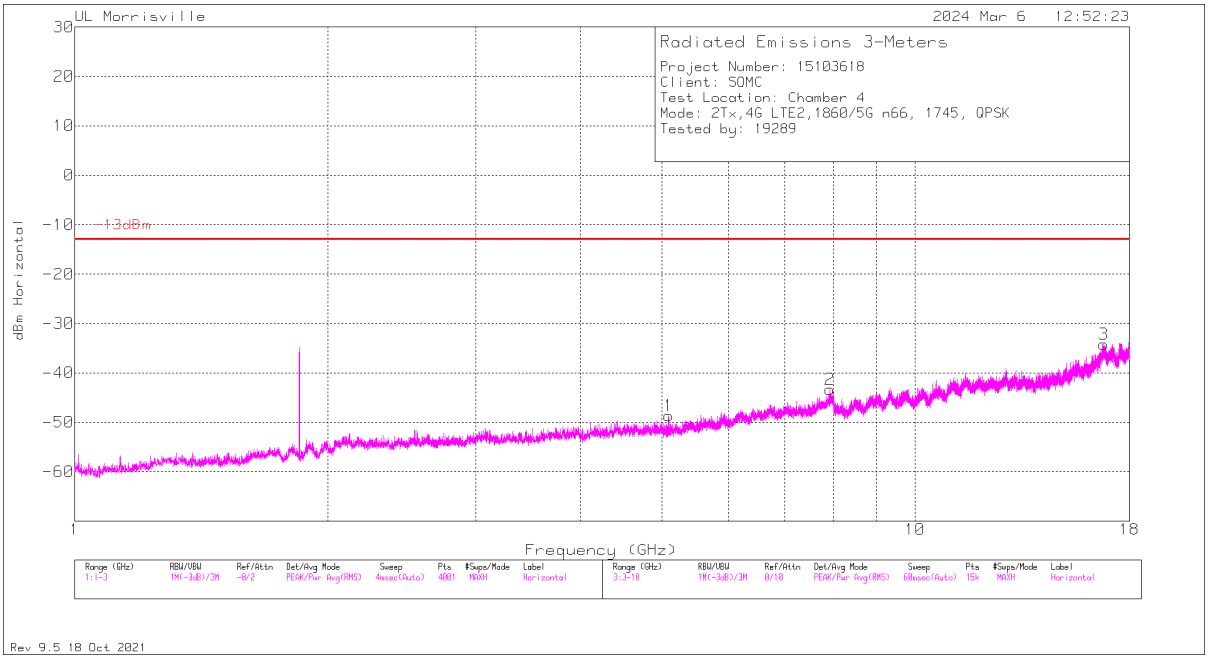
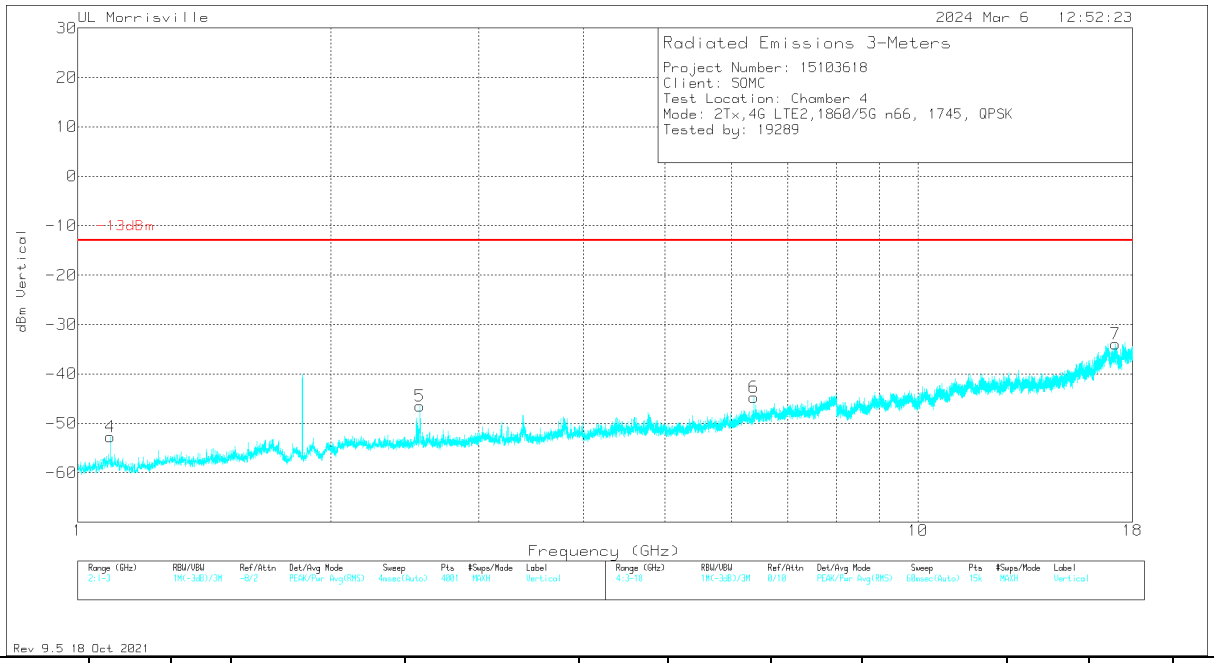
LTE BAND 2 20MHz Low Channel





Marker	Frequency (GHz)	Meter Reading (dBm)	Det	89509 ACF (dB/m)	Gain/Loss (dB)	CF (dB)	Filter (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	1.0935	-56.51	Pk	27.4	-35.7	11.8	.3	-52.71	-13	-39.71	0-360	100	V
5	2.552	-55.03	Pk	32.4	-36.3	11.8	.6	-46.53	-13	-33.53	0-360	100	V
1	5.09	-62.82	Pk	34.1	-31.8	11.8	0	-48.72	-13	-35.72	0-360	100	H
6	6.375	-62.68	Pk	35.4	-29.3	11.8	0	-44.78	-13	-31.78	0-360	200	V
2	7.917	-64.04	Pk	35.8	-26.9	11.8	0	-43.34	-13	-30.34	0-360	100	H
3	16.785	-68.28	Pk	41.9	-19.6	11.8	0	-34.18	-13	-21.18	0-360	200	H
7	17.191	-68.3	Pk	41.3	-18.7	11.8	0	-33.9	-13	-20.9	0-360	300	V

Pk - Peak detector

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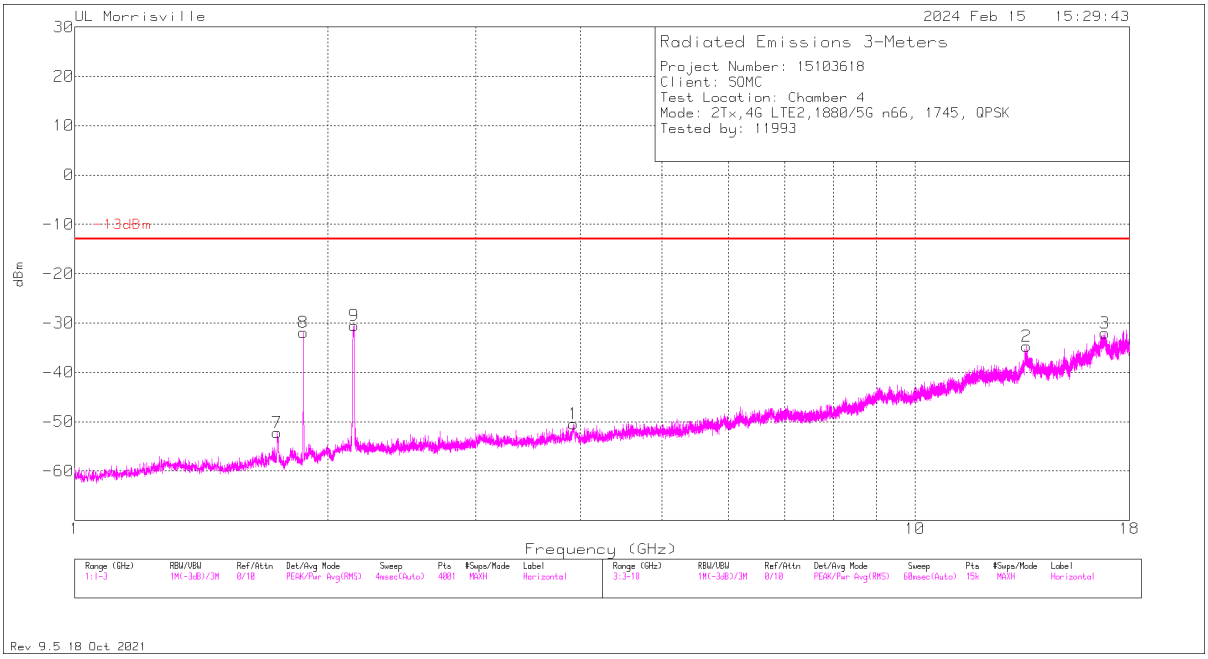
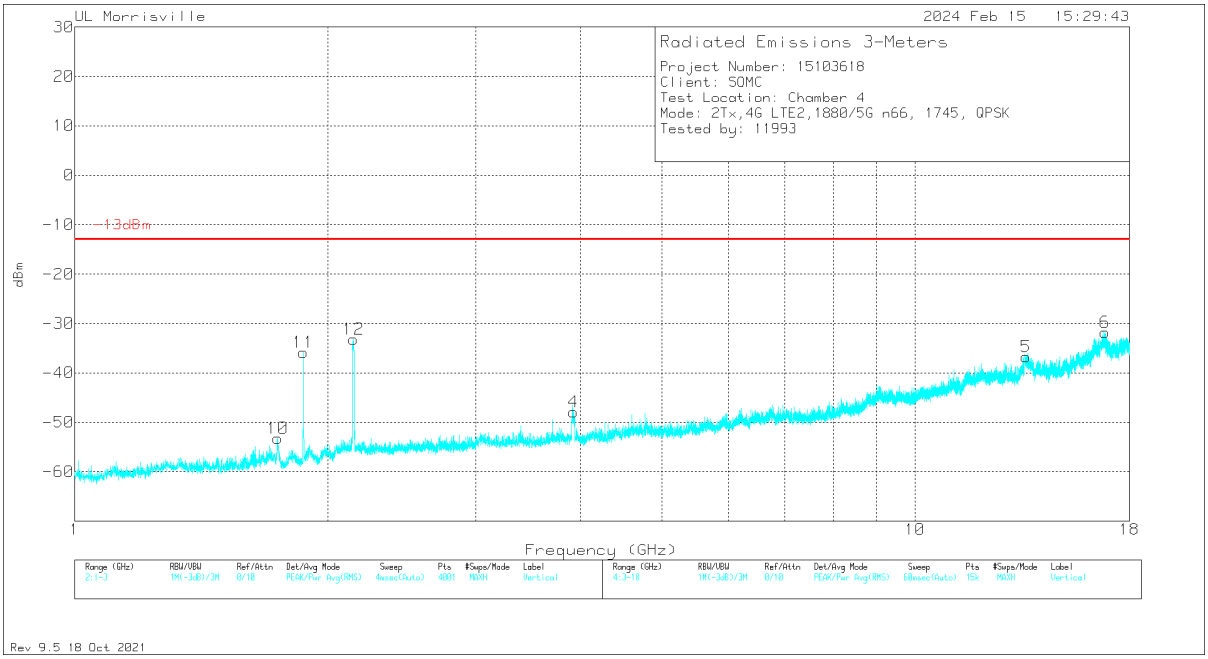
LTE BAND 2 20MHz Mid Channel





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Marker	Frequency (GHz)	Meter Reading (dBm)	Det	89509 ACF (dB/m)	Gain/Loss (dB)	CF (dB)	Filter (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	3.921	-63.25	Pk	33.3	-32.3	11.8	0	-50.45	-13	-37.45	0-360	100	H
4	3.926	-60.66	Pk	33.4	-32.4	11.8	0	-47.86	-13	-34.86	0-360	300	V
5	13.551	-65.11	Pk	38.8	-22.2	11.8	0	-36.71	-13	-23.71	0-360	300	V
2	13.58	-62.97	Pk	38.7	-22.2	11.8	0	-34.67	-13	-21.67	0-360	100	H
3	16.82	-67.21	Pk	41.9	-18.5	11.8	0	-32.01	-13	-19.01	0-360	100	H
6	16.822	-66.82	Pk	41.9	-18.7	11.8	0	-31.82	-13	-18.82	0-360	300	V
7	1.7405	-58.59	Pk	29.5	-36.1	11.8	1.2	-52.19	-	-	0-360	100	H
10	1.743	-59.59	Pk	29.6	-36.3	11.8	1.2	-53.29	-	-	0-360	300	V
11	1.871	-43.41	Pk	30.7	-36.1	11.8	1.2	-35.81	-	-	0-360	300	V
8	1.8715	-39.47	Pk	30.7	-36.1	11.8	1.2	-31.87	-	-	0-360	100	H
12	2.1475	-41.46	Pk	31.6	-36.3	11.8	1.2	-33.16	-	-	0-360	300	V
9	2.149	-38.79	Pk	31.6	-36.3	11.8	1.2	-30.49	-	-	0-360	100	H

Pk - Peak detector

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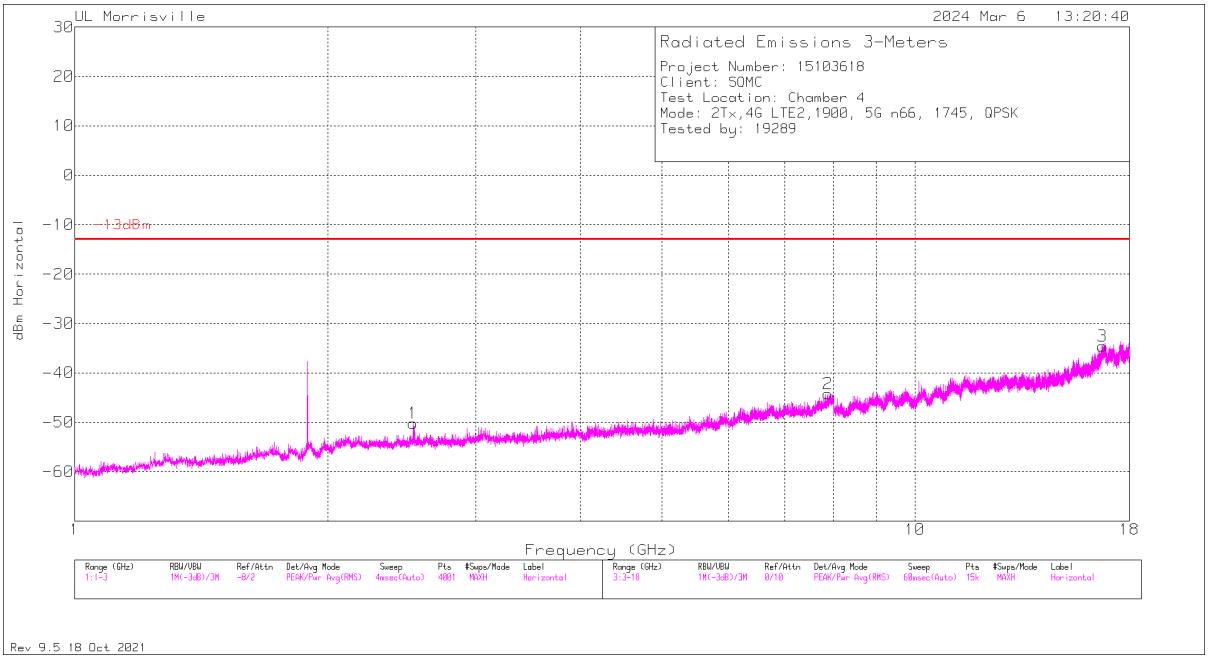
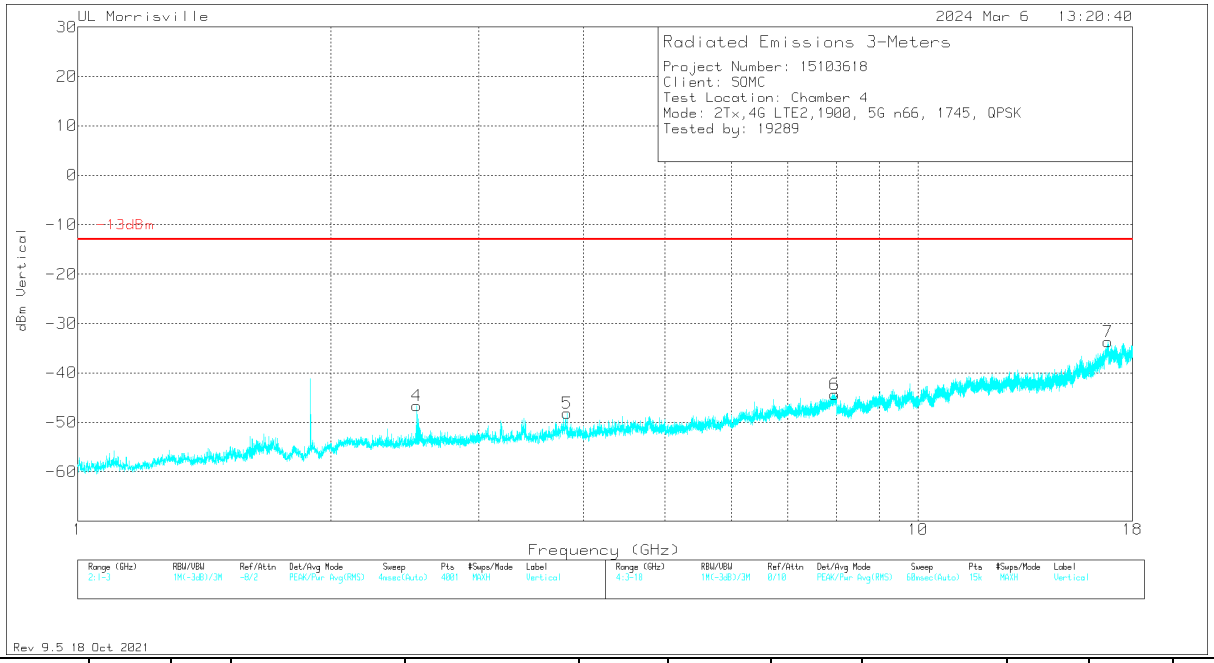
LTE BAND 2 20MHz High Channel





Marker	Frequency (GHz)	Meter Reading (dBm)	Det	89509 ACF (dB/m)	Gain/Loss (dB)	CF (dB)	Filter (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	2.5295	-58.71	Pk	32.4	-36.2	11.8	.5	-50.21	-13	-37.21	0-360	100	H
4	2.5315	-55.29	Pk	32.4	-36.1	11.8	.5	-46.69	-13	-33.69	0-360	300	V
5	3.823	-60.36	Pk	33.3	-32.9	11.8	0	-48.16	-13	-35.16	0-360	200	V
2	7.88	-64.34	Pk	35.8	-27.5	11.8	0	-44.24	-13	-31.24	0-360	200	H
6	7.955	-64.41	Pk	35.8	-27.5	11.8	0	-44.31	-13	-31.31	0-360	200	V
3	16.728	-68.33	Pk	41.9	-19.9	11.8	0	-34.53	-13	-21.53	0-360	200	H
7	16.823	-68.48	Pk	41.9	-18.9	11.8	0	-33.68	-13	-20.68	0-360	300	V

Pk - Peak detector

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10.1.2. LTE BAND 5

LIMITS

FCC: §22.917 (a)
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.

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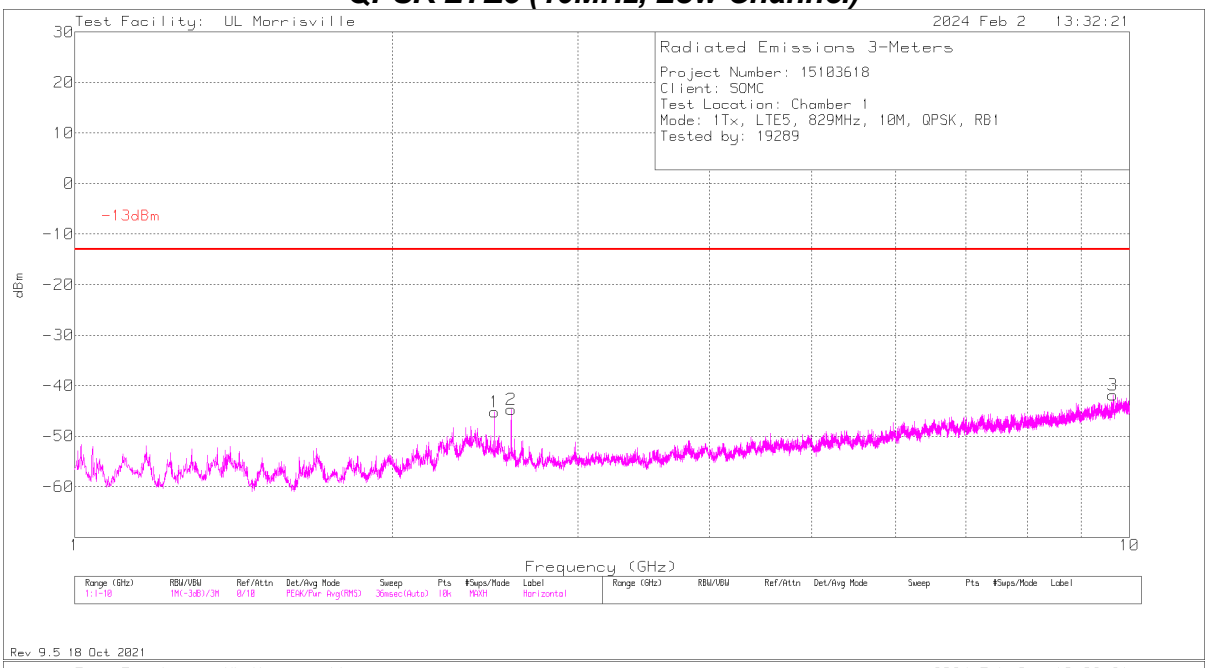
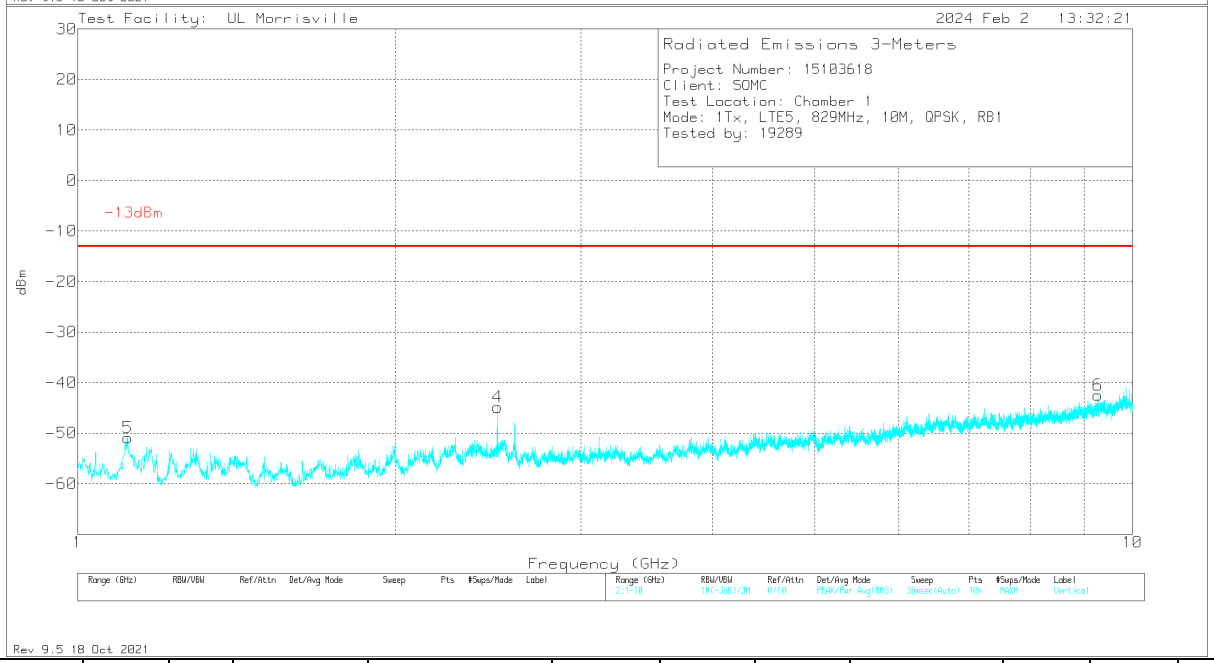
Main Antenna

EUT Serial Number: QV77006PLY

QPSK LTE5 (10MHz, Low Channel)





Marker	Frequency (GHz)	Meter Reading (dBm)	Det	206211 (dB/m)	Gain/Loss (dB)	Filter (dB)	CF (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
5	1.1161	-56.25	Pk	27.6	-35.1	1	11.8	-50.95	-13	-37.95	0-360	200	V
4	2.4994	-55.49	Pk	32.3	-33.9	.4	11.8	-44.89	-13	-31.89	0-360	300	V
1	2.5012	-55.75	Pk	32.3	-33.9	.4	11.8	-45.15	-13	-32.15	0-360	300	H
2	2.593	-55.43	Pk	32.2	-33.8	.5	11.8	-44.73	-13	-31.73	0-360	300	H
6	9.2737	-65.03	Pk	36.2	-25.8	.4	11.8	-42.43	-13	-29.43	0-360	101	V
3	9.6436	-64.81	Pk	36.7	-25.8	.3	11.8	-41.81	-13	-28.81	0-360	101	H

Pk - Peak detector

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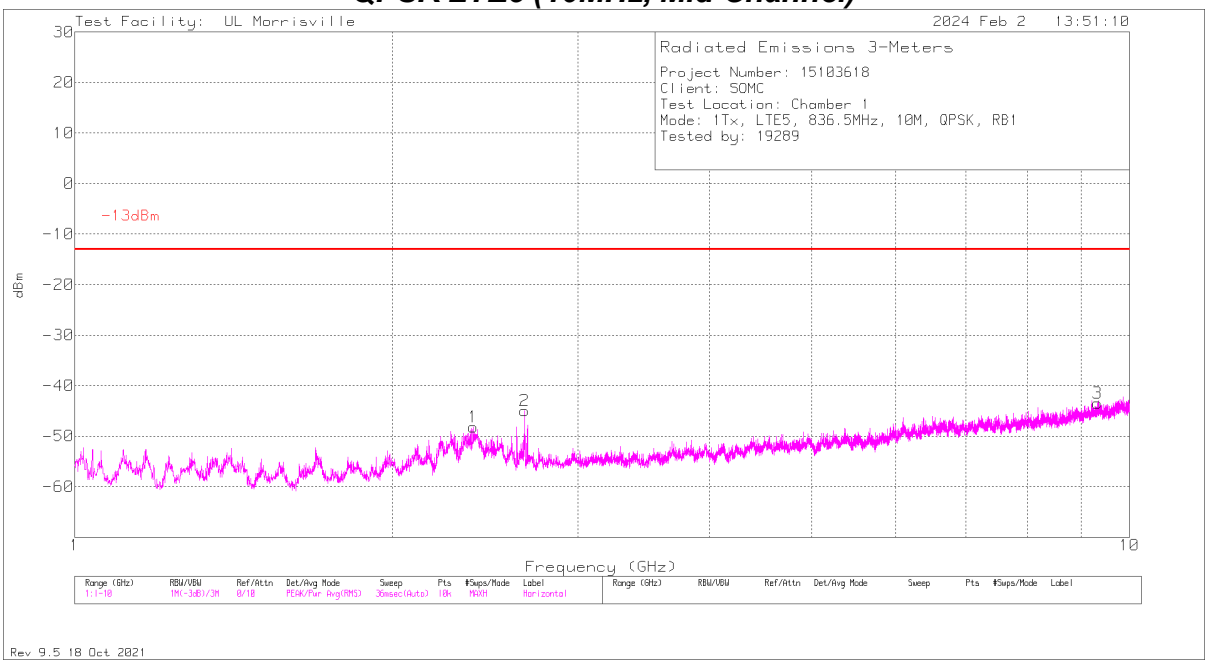
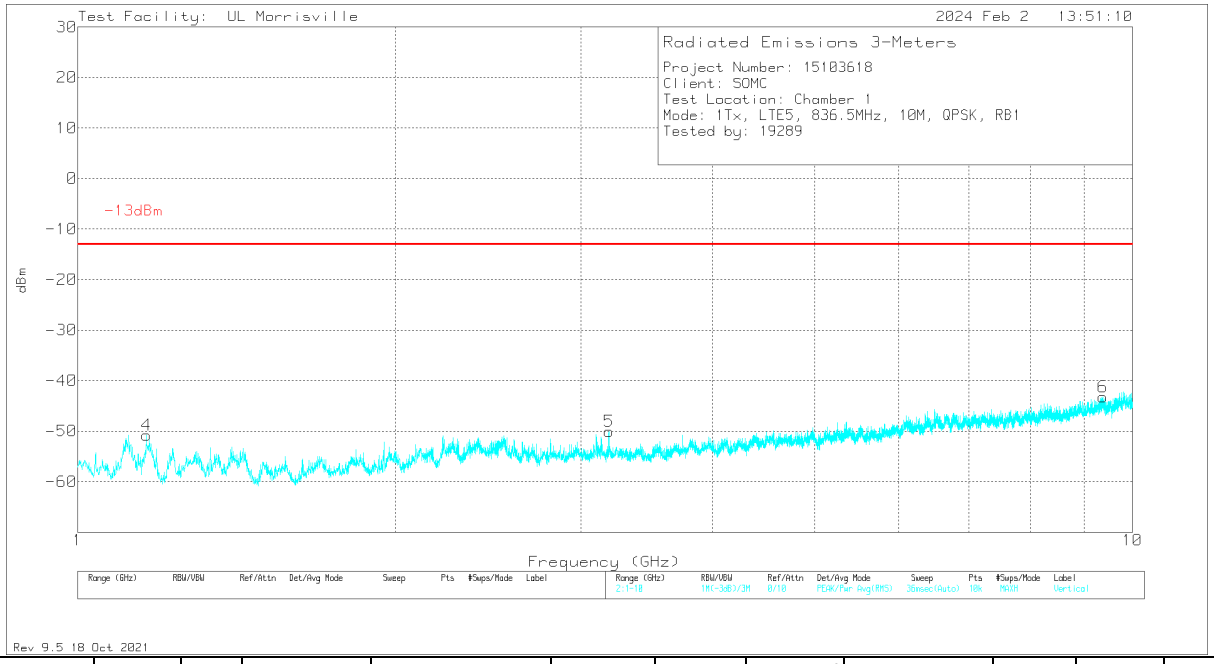
QPSK LTE5 (10MHz, Mid Channel)





Marker	Frequency (GHz)	Meter Reading (dBm)	Det	206211 (dB/m)	Gain/Loss (dB)	Filter (dB)	CF (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	1.162	-56.22	Pk	27.9	-35.2	.9	11.8	-50.82	-13	-37.82	0-360	300	V
1	2.386	-58.64	Pk	32.1	-33.9	.5	11.8	-48.14	-13	-35.14	0-360	101	H
2	2.6695	-55.41	Pk	32	-33.9	.5	11.8	-45.01	-13	-32.01	0-360	200	H
5	3.1888	-62.02	Pk	32.9	-33.2	.5	11.8	-50.02	-13	-37.02	0-360	300	V
3	9.3241	-65.95	Pk	36.3	-25.9	.3	11.8	-43.45	-13	-30.45	0-360	200	H
6	9.3754	-65.98	Pk	36.4	-25.7	.3	11.8	-43.18	-13	-30.18	0-360	101	V

Pk - Peak detector

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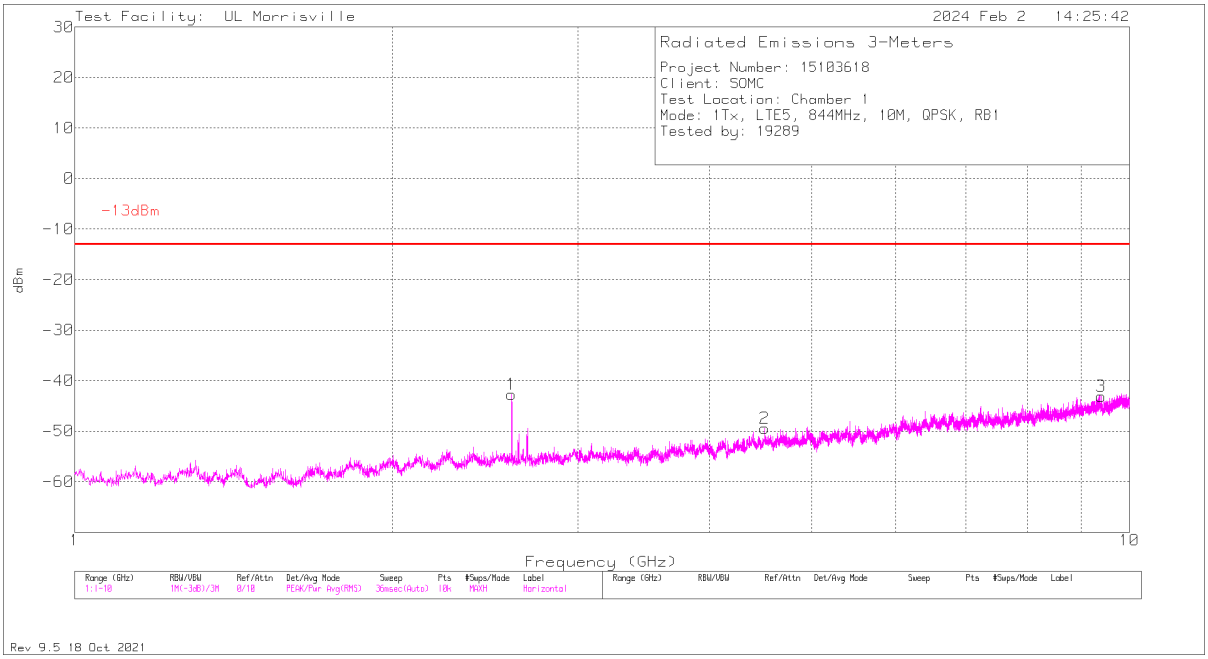
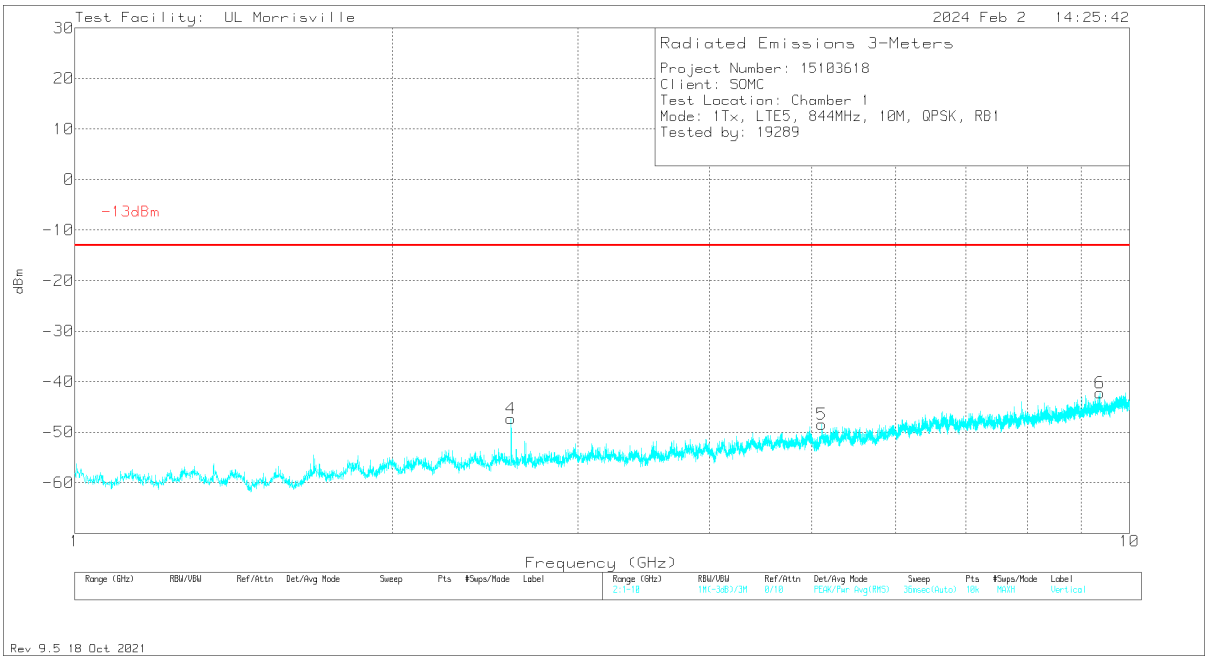
QPSK LTE5 (10MHz, High Channel)





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Marker	Frequency (GHz)	Meter Reading (dBm)	Det	206211 (dB/m)	Gain/Loss (dB)	Filter (dB)	CF (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	2.5921	-58.01	Pk	32.2	-33.8	.5	11.8	-47.31	-13	-34.31	0-360	299	V
1	2.5957	-53.28	Pk	32.2	-33.9	.5	11.8	-42.68	-13	-29.68	0-360	299	H
2	4.5127	-64.03	Pk	34	-31.6	.4	11.8	-49.43	-13	-36.43	0-360	299	H
5	5.1058	-63.83	Pk	34.2	-30.8	.2	11.8	-48.43	-13	-35.43	0-360	200	V
6	9.3736	-65.12	Pk	36.4	-25.6	.3	11.8	-42.22	-13	-29.22	0-360	200	V
3	9.3988	-65.73	Pk	36.4	-25.9	.3	11.8	-43.13	-13	-30.13	0-360	299	H

Pk - Peak detector

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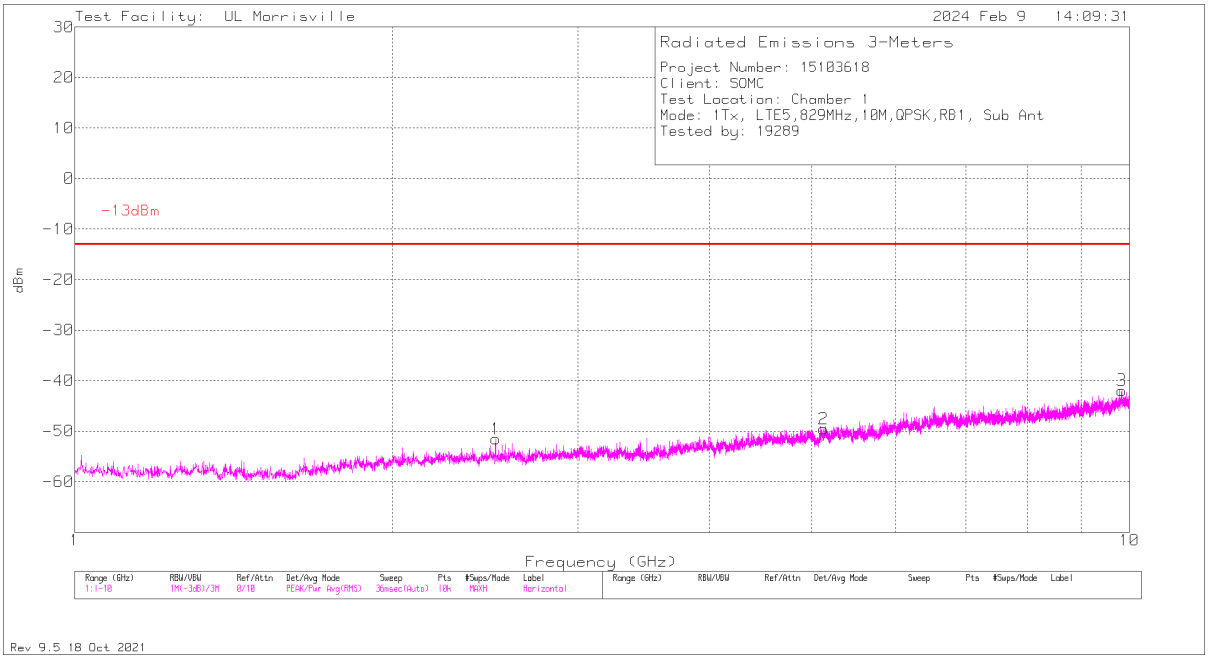
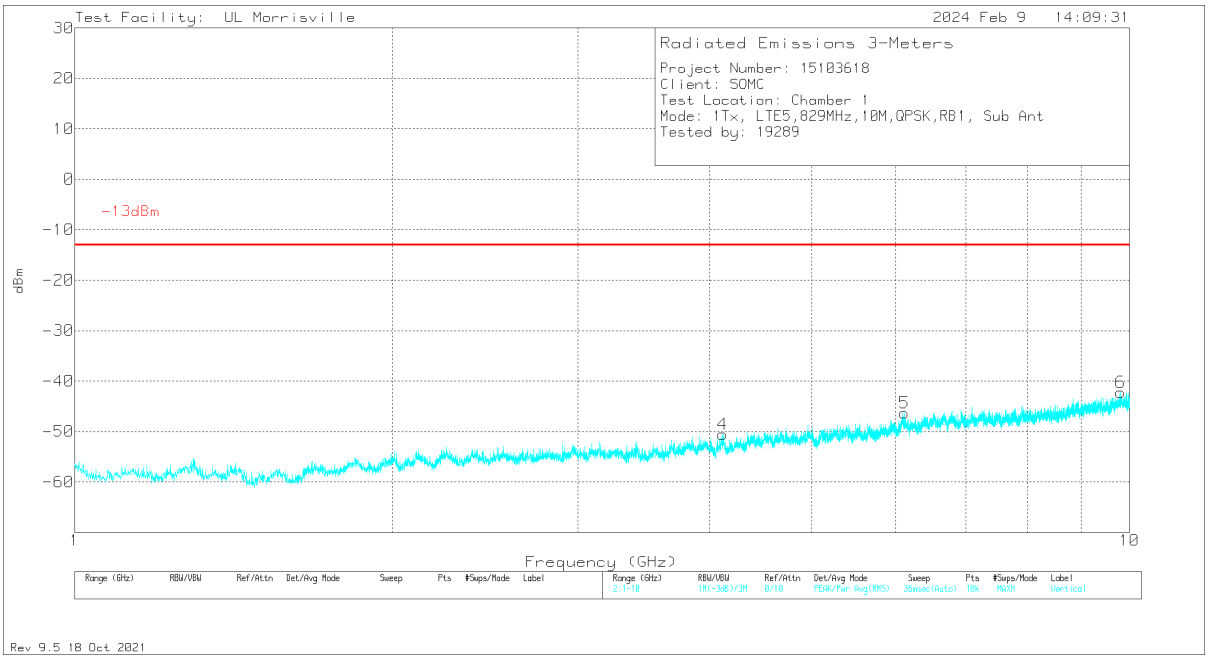
Sub Antenna

EUT Serial Number: QV77008ELY

QPSK LTE5 (10MHz, Low Channel)





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Marker	Frequency (GHz)	Meter Reading (dBm)	Det	206211 (dB/m)	Gain/Loss (dB)	Filter (dB)	CF (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	2.5066	-62.24	Pk	32.3	-33.8	.4	11.8	-51.54	-13	-38.54	0-360	299	H
4	4.114	-64.27	Pk	33.3	-31.7	.3	11.8	-50.57	-13	-37.57	0-360	201	V
2	5.1283	-64.93	Pk	34.2	-30.8	.2	11.8	-49.53	-13	-36.53	0-360	299	H
5	6.1192	-64.77	Pk	35.3	-29	.3	11.8	-46.37	-13	-33.37	0-360	101	V
6	9.8101	-66.01	Pk	37	-25.4	.4	11.8	-42.21	-13	-29.21	0-360	300	V
3	9.8317	-66.42	Pk	37.1	-24.8	.4	11.8	-41.92	-13	-28.92	0-360	299	H

Pk - Peak detector

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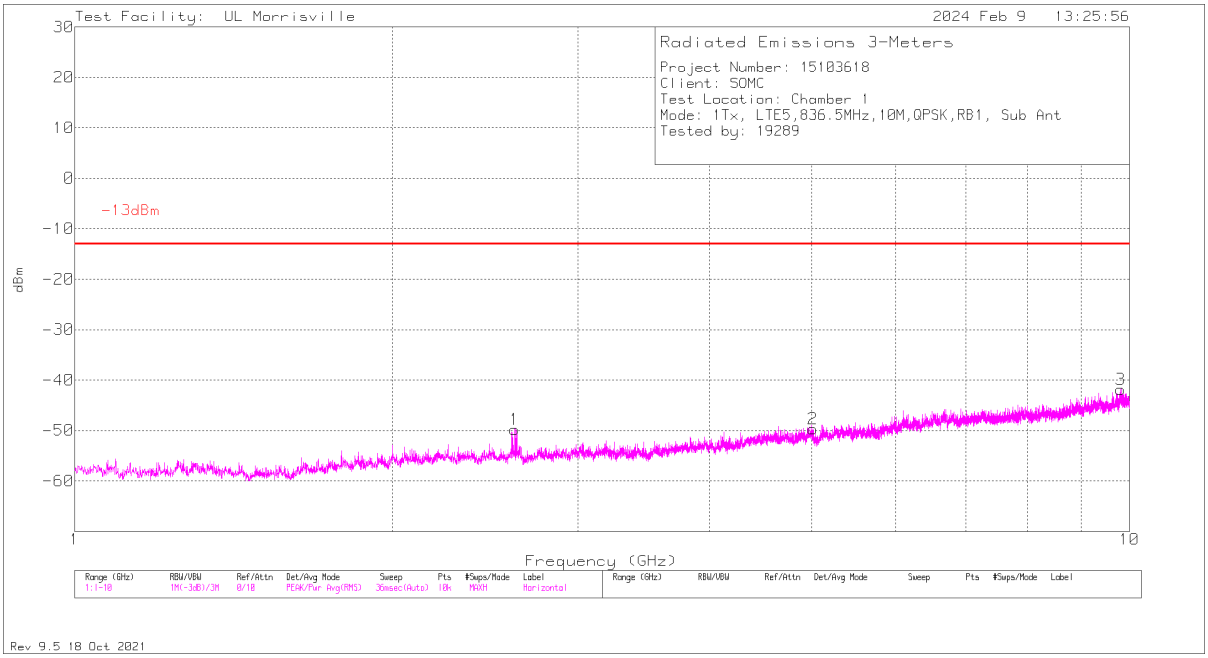
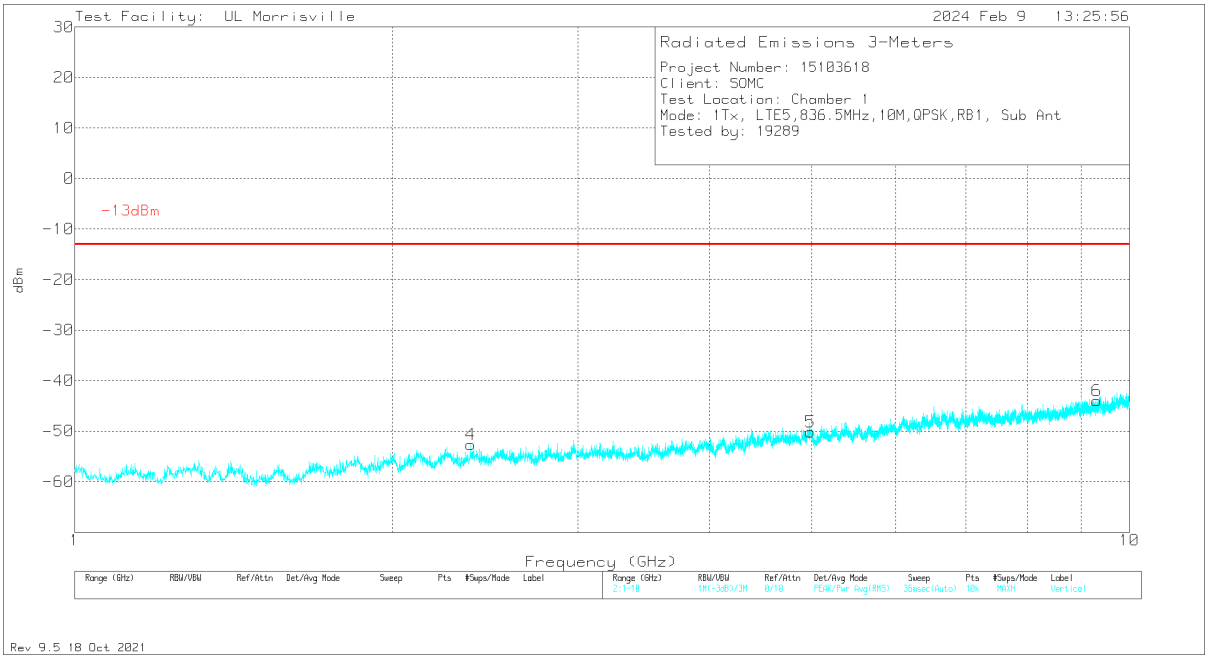
QPSK LTE5 (10MHz, Mid Channel)





Marker	Frequency (GHz)	Meter Reading (dBm)	Det	206211 (dB/m)	Gain/Loss (dB)	Filter (dB)	CF (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	2.3725	-63.16	Pk	32.1	-33.9	.5	11.8	-52.66	-13	-39.66	0-360	201	V
1	2.6137	-60.43	Pk	32.2	-33.9	.5	11.8	-49.83	-13	-36.83	0-360	100	H
5	4.9861	-65.23	Pk	34.1	-31	.2	11.8	-50.13	-13	-37.13	0-360	201	V
2	5.0104	-64.71	Pk	34.1	-31.1	.2	11.8	-49.71	-13	-36.71	0-360	200	H
6	9.3169	-66.6	Pk	36.3	-25.9	.4	11.8	-44	-13	-31	0-360	101	V
3	9.8092	-65.66	Pk	37	-25.4	.4	11.8	-41.86	-13	-28.86	0-360	300	H

Pk - Peak detector

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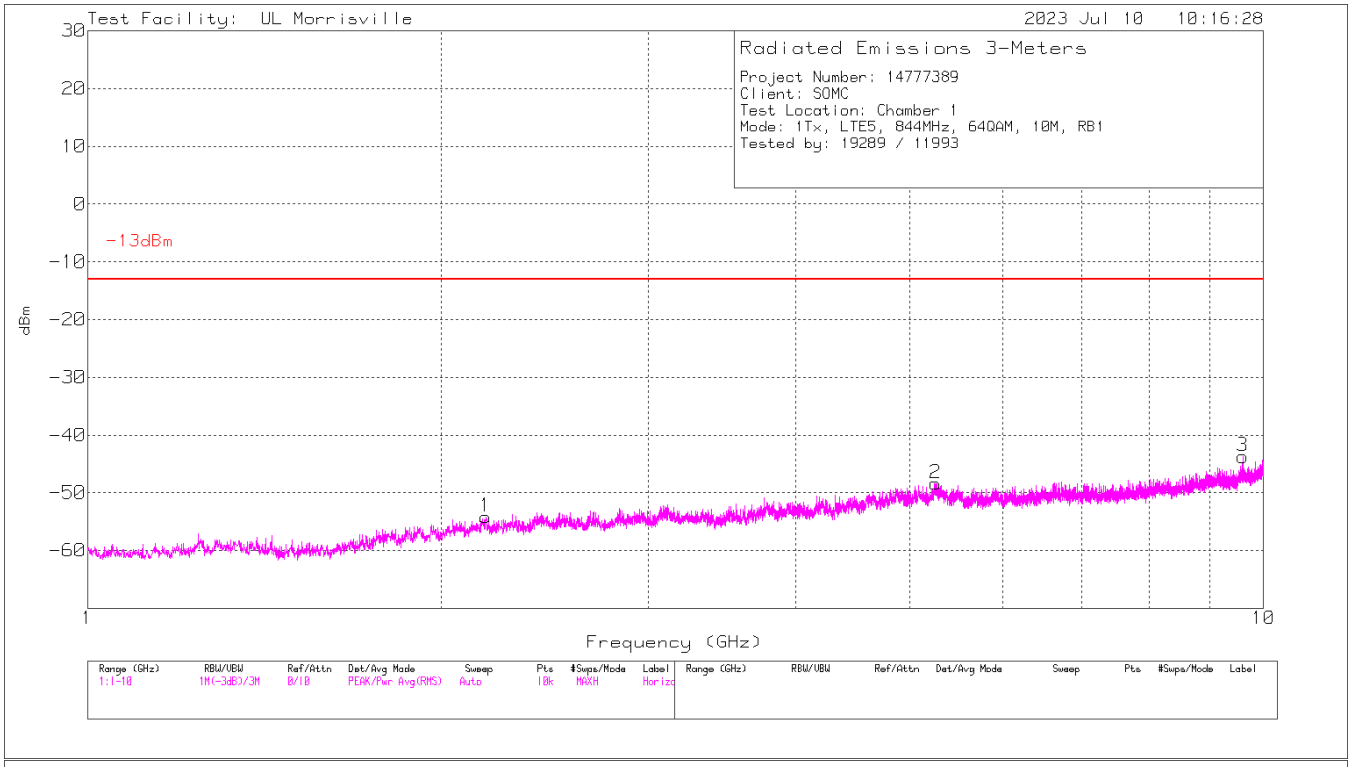
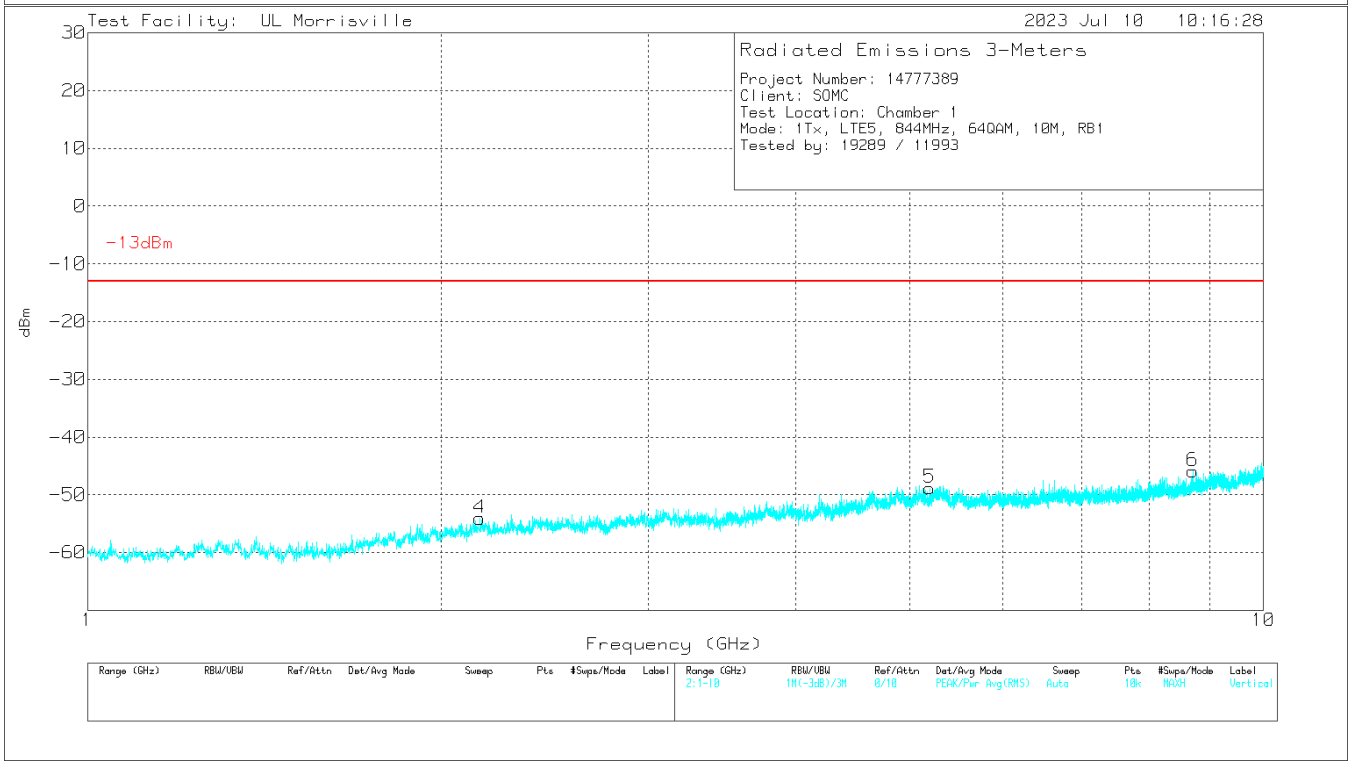
QPSK LTE5 (10MHz, High Channel)





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Marker	Frequency (GHz)	Meter Reading (dBm)	Det	206211 (dB/m)	Gain/Loss (dB)	Filter (dB)	CF (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	2.1565	-63.47	Pk	31.7	-34.8	.7	11.8	-54.07	-13	-41.07	0-360	200	V
1	2.1817	-63.86	Pk	31.7	-34.5	.7	11.8	-54.16	-13	-41.16	0-360	101	H
5	5.2021	-64.81	Pk	34.4	-30.9	.7	11.8	-48.81	-13	-35.81	0-360	101	V
2	5.2624	-64.88	Pk	34.4	-30.4	.7	11.8	-48.38	-13	-35.38	0-360	200	H
6	8.7049	-64.98	Pk	35.9	-29.1	.5	11.8	-45.88	-13	-32.88	0-360	101	V
3	9.6004	-64.72	Pk	36.6	-28.2	.8	11.8	-43.72	-13	-30.72	0-360	299	H

Pk - Peak detector

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10.1.3. 5G NR n5

LIMITS

FCC: §22.917 (a)
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.

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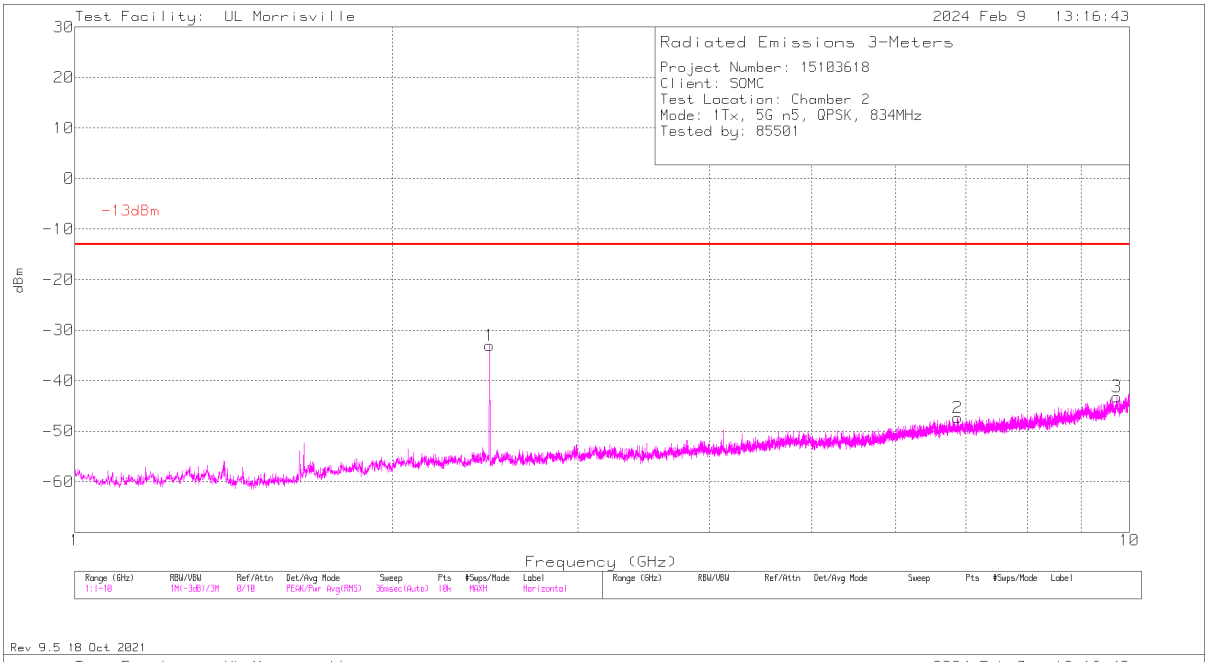
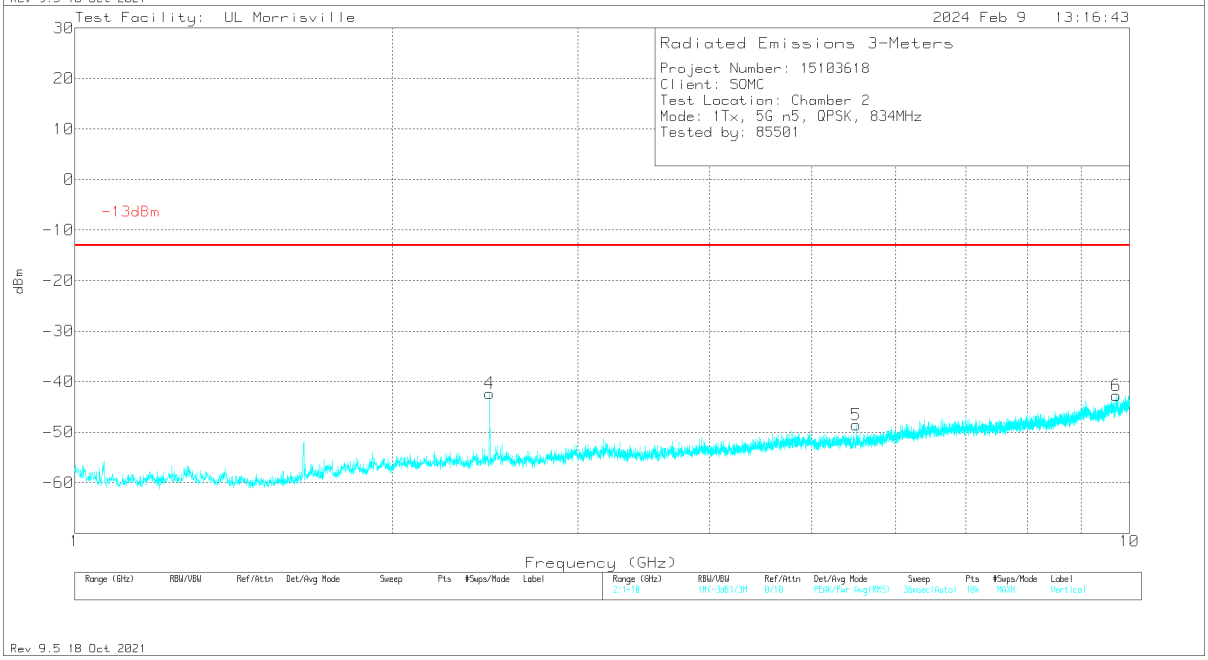
Main Antenna

EUT Serial Number: QV77006PLY

BPSK 5G NR N5 (20MHz, Low Channel)





Marker	Frequency (GHz)	Meter Reading (dBm)	Det	86408 (dB/m)	Gain/Loss (dB)	Filter (dB)	CF (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	2.4733	-43.49	Pk	32.4	-34.1	.3	11.8	-33.09	-13	-20.09	0-360	101	H
4	2.4733	-52.69	Pk	32.4	-34.1	.3	11.8	-42.29	-13	-29.29	0-360	101	V
5	5.5063	-64.86	Pk	34.5	-30.3	.3	11.8	-48.56	-13	-35.56	0-360	101	V
2	6.8689	-67.3	Pk	35.7	-27.9	.4	11.8	-47.3	-13	-34.3	0-360	101	H
6	9.7183	-66.87	Pk	36.7	-25.1	.8	11.8	-42.67	-13	-29.67	0-360	299	V
3	9.7327	-67.46	Pk	36.8	-25.2	.9	11.8	-43.16	-13	-30.16	0-360	200	H

Pk - Peak detector

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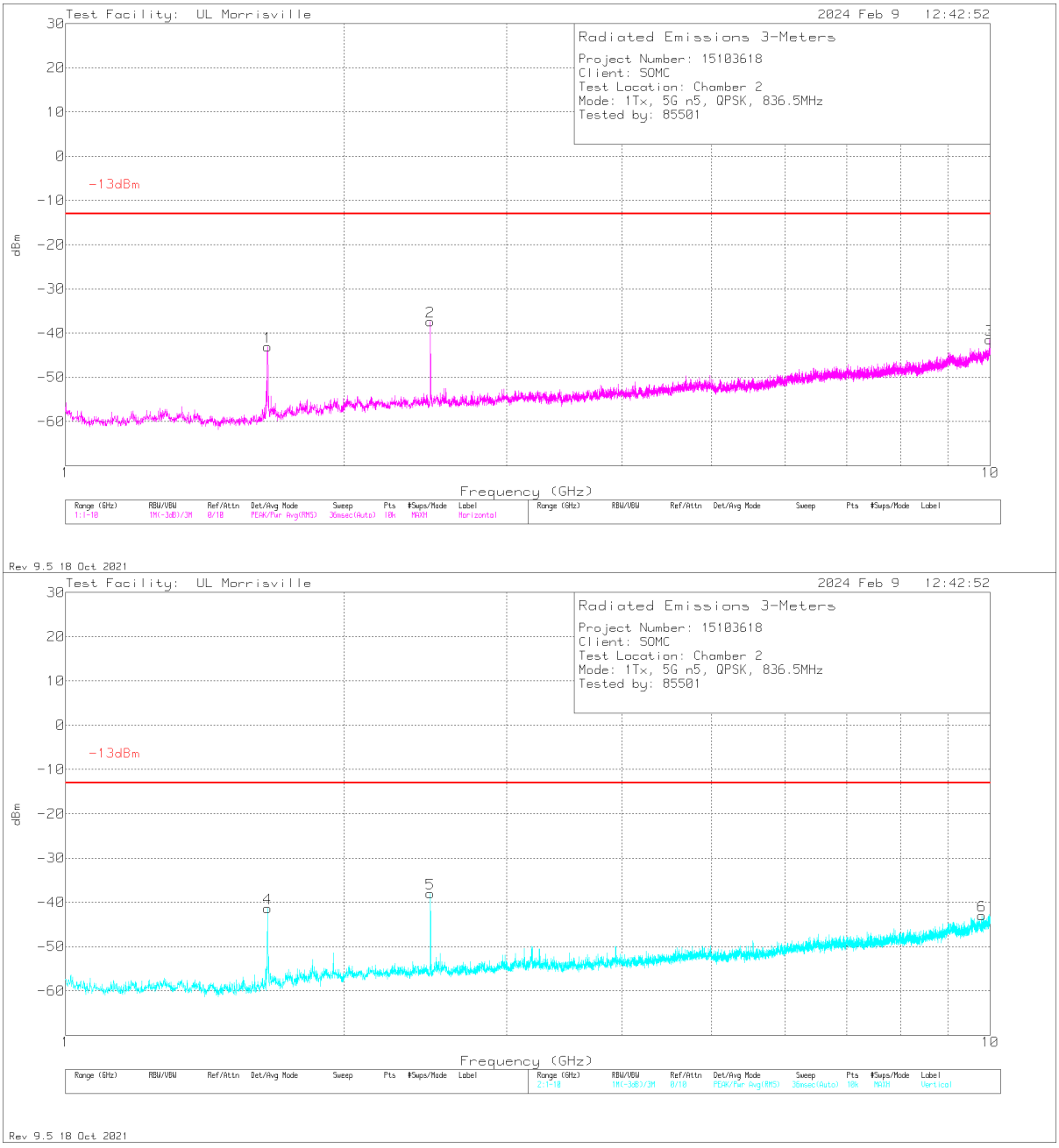
BPSK 5G NR N5 (20MHz, Mid Channel)



Marker	Frequency (GHz)	Meter Reading (dBm)	Det	86408 (dB/m)	Gain/Loss (dB)	Filter (dB)	CF (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	1.6534	-49.97	Pk	29	-34.4	.5	11.8	-43.07	-13	-30.07	0-360	299	H
4	1.6543	-48.12	Pk	29	-34.4	.4	11.8	-41.32	-13	-28.32	0-360	101	V
2	2.4805	-48.04	Pk	32.5	-33.9	.3	11.8	-37.34	-13	-24.34	0-360	199	H
5	2.4814	-48.67	Pk	32.5	-33.9	.3	11.8	-37.97	-13	-24.97	0-360	101	V
6	9.7912	-67.1	Pk	36.9	-25.1	.5	11.8	-43	-13	-30	0-360	200	V
3	9.9802	-66.49	Pk	37.2	-24.9	.9	11.8	-41.49	-13	-28.49	0-360	101	H

Pk - Peak detector

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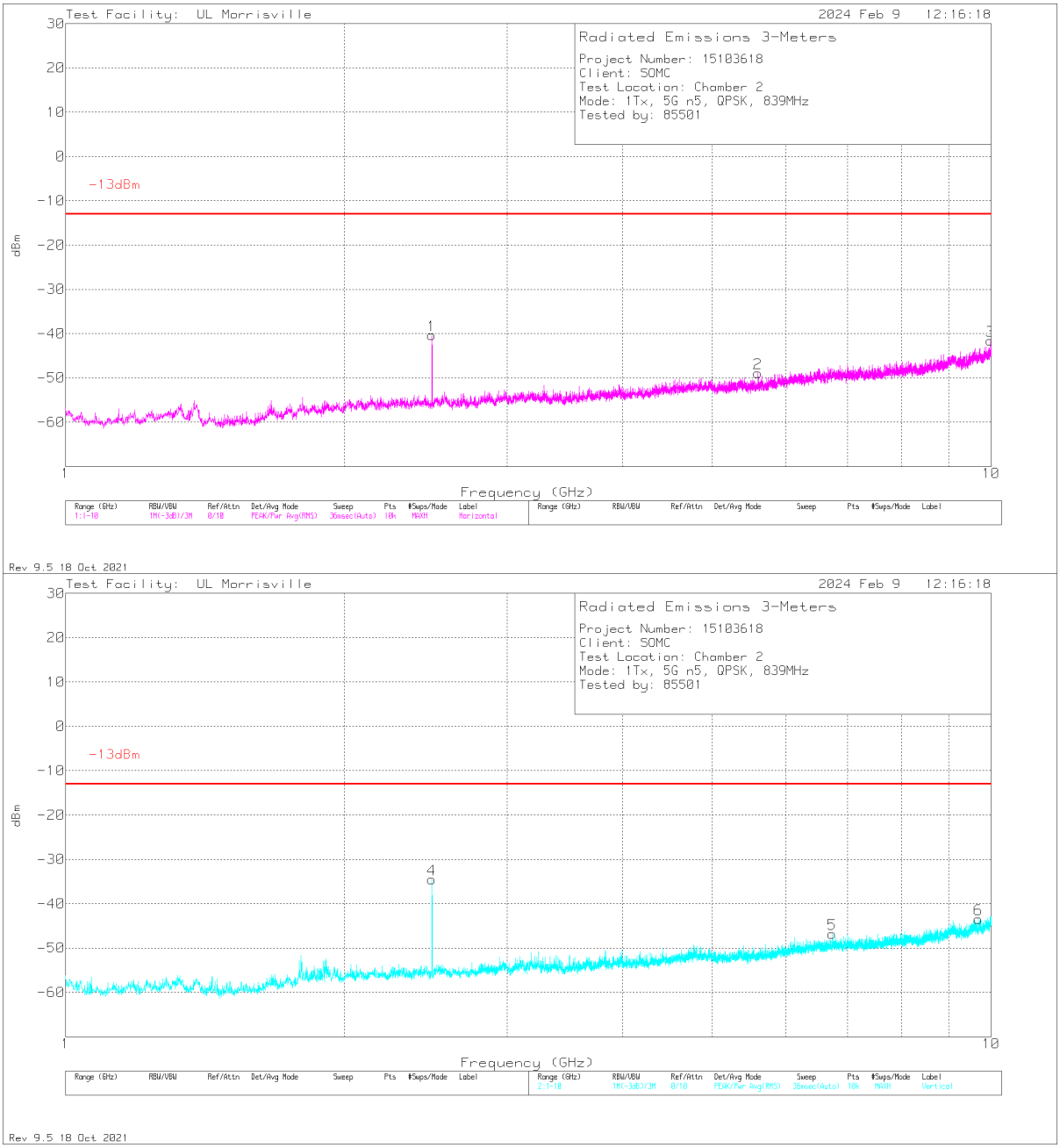
BPSK 5G NR N5 (20MHz, High Channel)



Marker	Frequency (GHz)	Meter Reading (dBm)	Det	86408 (dB/m)	Gain/Loss (dB)	Filter (dB)	CF (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	2.4886	-50.98	Pk	32.5	-34	.3	11.8	-40.38	-13	-27.38	0-360	101	H
4	2.4886	-45.1	Pk	32.5	-34	.3	11.8	-34.5	-13	-21.5	0-360	101	V
2	5.6017	-65.58	Pk	34.6	-30.2	.4	11.8	-48.98	-13	-35.98	0-360	199	H
5	6.7348	-65.99	Pk	35.7	-28.7	.4	11.8	-46.79	-13	-33.79	0-360	101	V
6	9.6949	-67.05	Pk	36.7	-25.5	.6	11.8	-43.45	-13	-30.45	0-360	299	V
3	9.9892	-66.02	Pk	37.2	-25.6	1	11.8	-41.62	-13	-28.62	0-360	299	H

Pk - Peak detector

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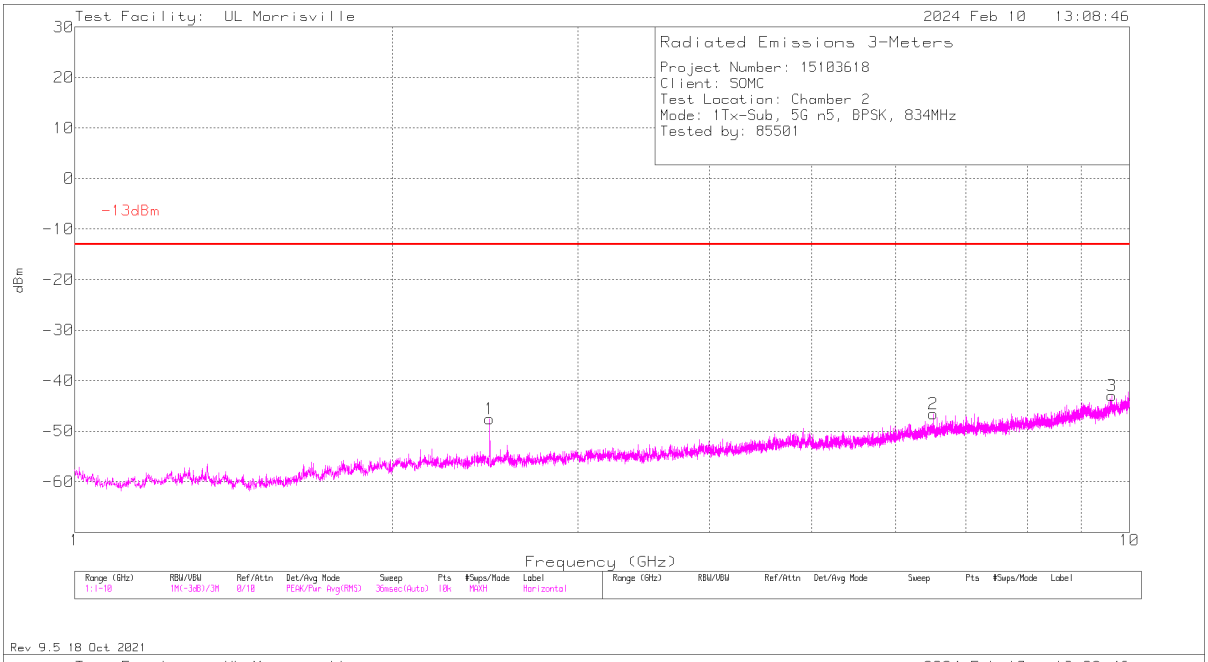
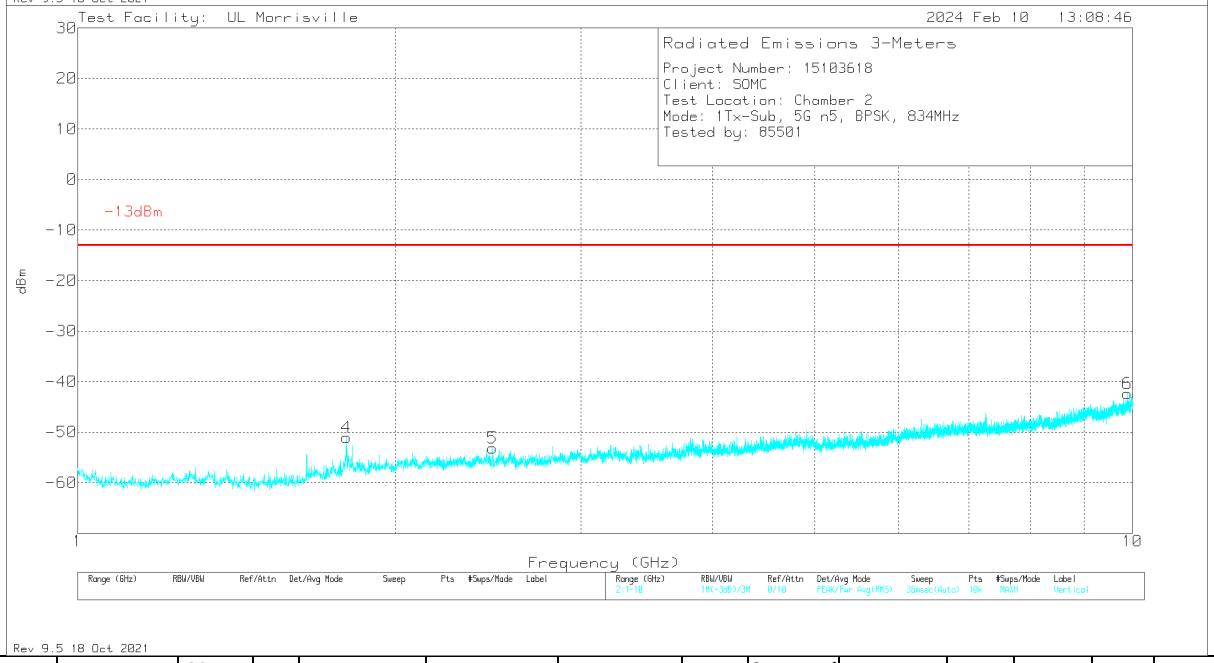
Sub Antenna

EUT Serial Number: QV77006PLY

BPSK 5G NR N5 (20MHz, Low Channel)





Marker	Frequency (GHz)	Meter Reading (dBm)	Det	86408 (dB/m)	Gain/Loss (dB)	Filter (dB)	CF (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	1.7974	-59.29	Pk	30.5	-34.4	.4	11.8	-50.99	-13	-37.99	0-360	101	V
5	2.4724	-63.55	Pk	32.4	-34.1	.3	11.8	-53.15	-13	-40.15	0-360	200	V
1	2.4742	-58	Pk	32.4	-34.1	.3	11.8	-47.6	-13	-34.6	0-360	101	H
2	6.5134	-66.01	Pk	35.6	-28.5	.5	11.8	-46.61	-13	-33.61	0-360	101	H
3	9.6256	-66.45	Pk	36.6	-25.7	.8	11.8	-42.95	-13	-29.95	0-360	299	H
6	9.8929	-66.42	Pk	37.1	-25.7	.9	11.8	-42.32	-13	-29.32	0-360	200	V

Pk - Peak detector

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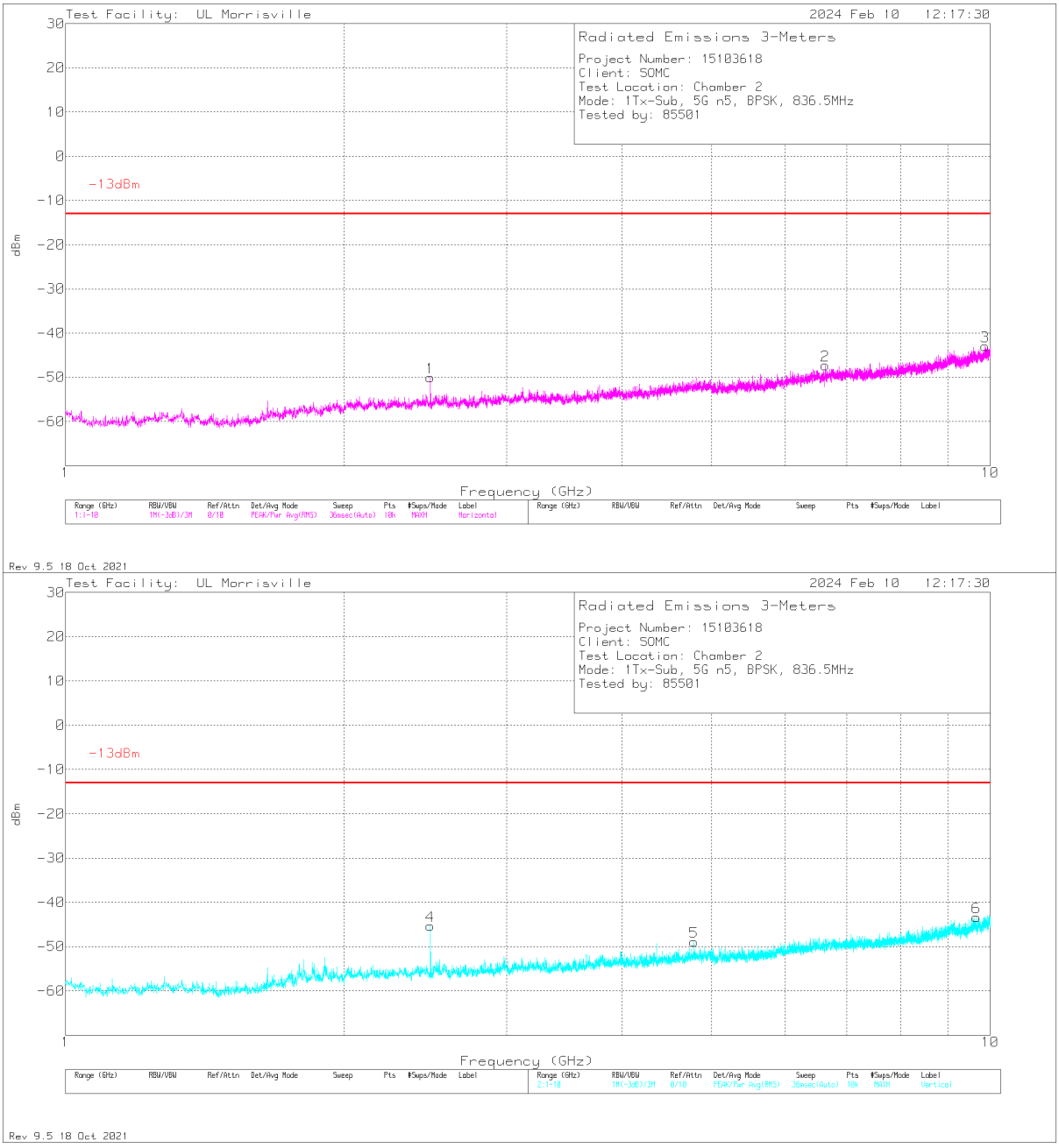
BPSK 5G NR N5 (20MHz, Mid Channel)



Marker	Frequency (GHz)	Meter Reading (dBm)	Det	86408 (dB/m)	Gain/Loss (dB)	Filter (dB)	CF (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	2.4805	-60.79	Pk	32.5	-33.9	.3	11.8	-50.09	-13	-37.09	0-360	200	H
4	2.4814	-56.01	Pk	32.5	-33.9	.3	11.8	-45.31	-13	-32.31	0-360	200	V
5	4.7809	-64.04	Pk	34.2	-31.1	.2	11.8	-48.94	-13	-35.94	0-360	200	V
2	6.6304	-66.45	Pk	35.6	-28.7	.4	11.8	-47.35	-13	-34.35	0-360	299	H
6	9.658	-66.49	Pk	36.6	-25.6	.4	11.8	-43.29	-13	-30.29	0-360	299	V
3	9.8803	-67.41	Pk	37.1	-25.5	1	11.8	-43.01	-13	-30.01	0-360	101	H

Pk - Peak detector

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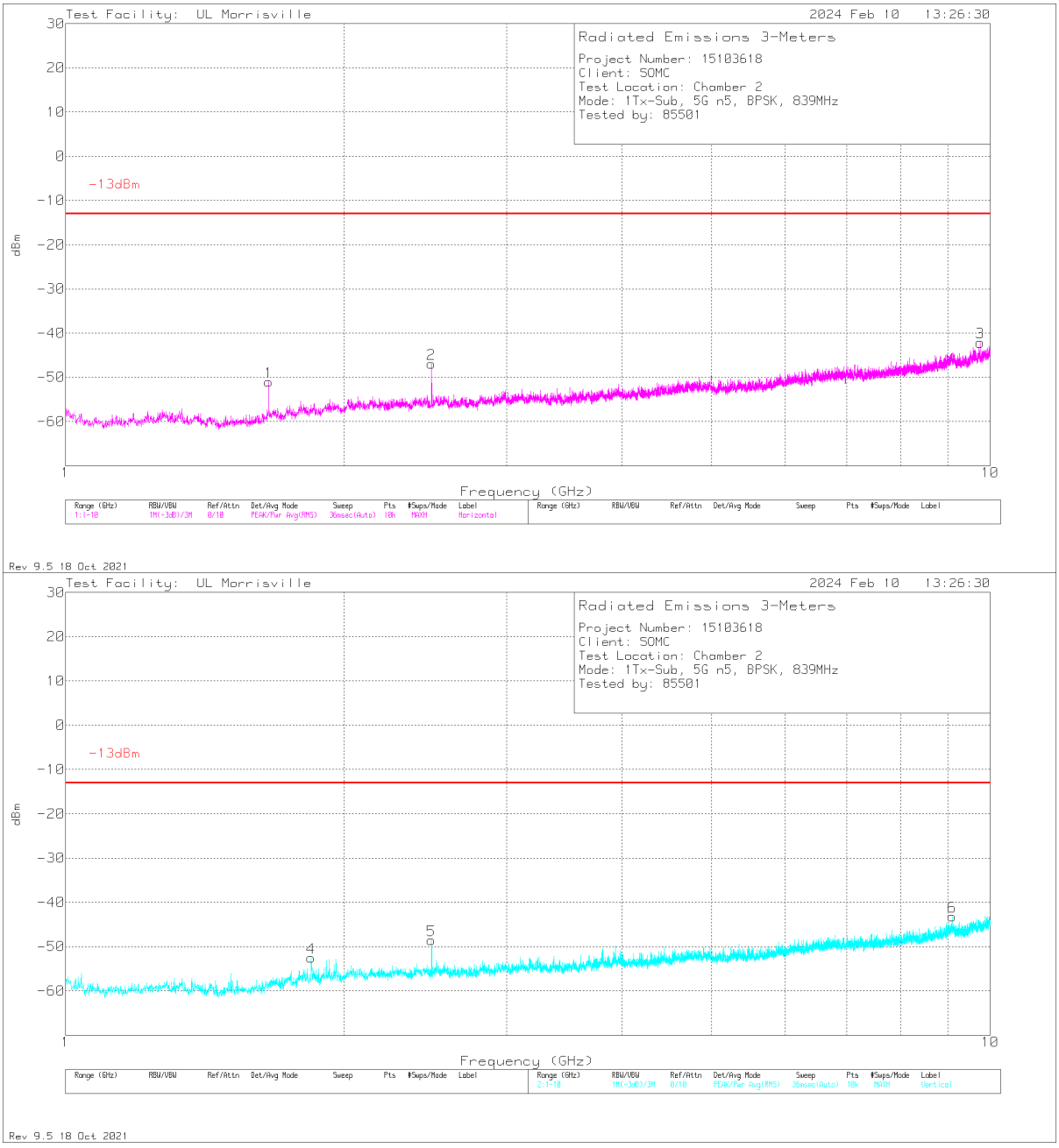
BPSK 5G NR N5 (20MHz, High Channel)



Marker	Frequency (GHz)	Meter Reading (dBm)	Det	86408 (dB/m)	Gain/Loss (dB)	Filter (dB)	CF (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	1.6588	-57.89	Pk	29.1	-34.4	.4	11.8	-50.99	-13	-37.99	0-360	299	H
4	1.8433	-60.92	Pk	30.7	-34.5	.4	11.8	-52.52	-13	-39.52	0-360	101	V
2	2.4877	-57.6	Pk	32.5	-33.9	.3	11.8	-46.9	-13	-33.9	0-360	299	H
5	2.4886	-59.13	Pk	32.5	-34	.3	11.8	-48.53	-13	-35.53	0-360	200	V
6	9.1018	-65.03	Pk	35.9	-26.4	.5	11.8	-43.23	-13	-30.23	0-360	101	V
3	9.7552	-66.06	Pk	36.8	-25.6	.9	11.8	-42.16	-13	-29.16	0-360	199	H

Pk - Peak detector

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10.1.4. LTE BAND 12

LIMITS

FCC: §27.53 (g)
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.

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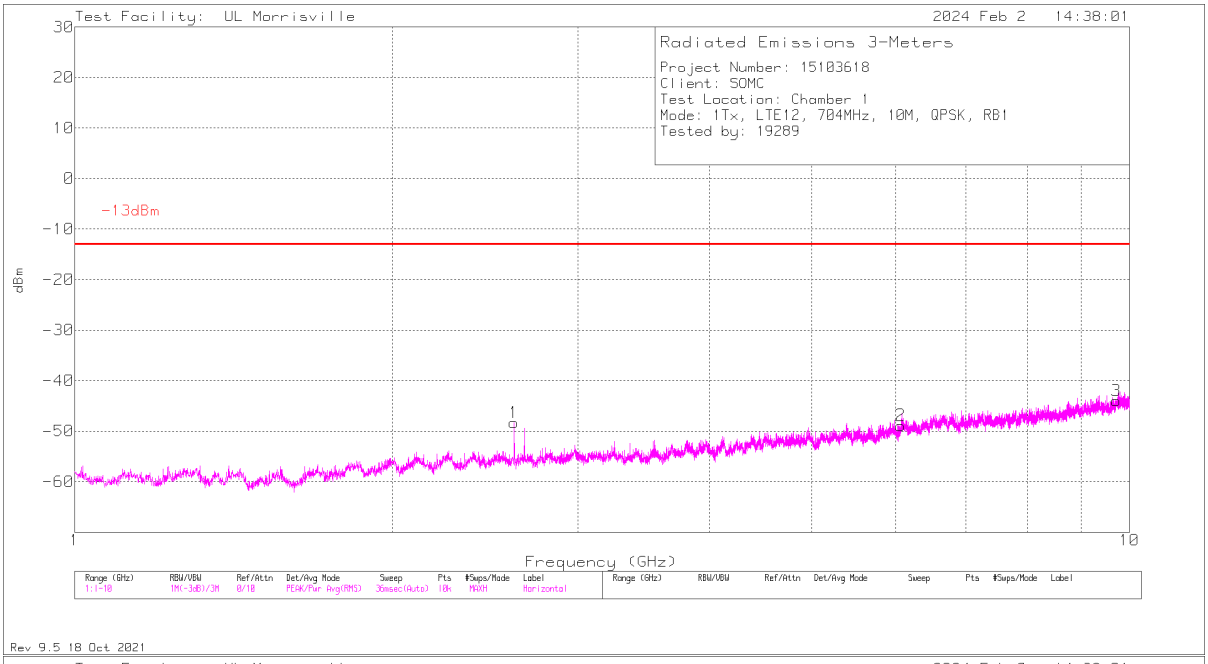
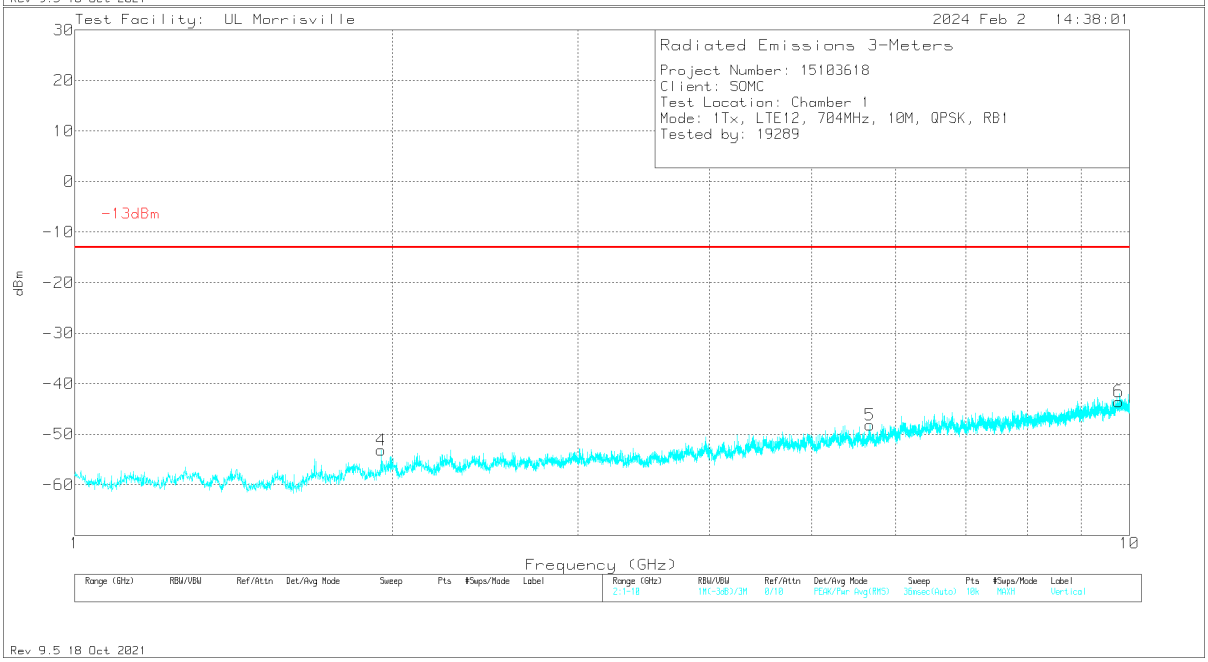
Main Antenna

EUT Serial Number: QV77008ELY

QPSK LTE BAND 12 (10MHz, Low Channel)





Marker	Frequency (GHz)	Meter Reading (dBm)	Det	206211 (dB/m)	Gain/Loss (dB)	Filter (dB)	CF (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	1.9531	-61.98	Pk	30.9	-34.2	.3	11.8	-53.18	-13	-40.18	0-360	101	V
1	2.6092	-58.94	Pk	32.2	-33.9	.5	11.8	-48.34	-13	-35.34	0-360	100	H
5	5.6719	-64.54	Pk	34.4	-30.2	.3	11.8	-48.24	-13	-35.24	0-360	101	V
2	6.067	-67.07	Pk	35.3	-29.2	.3	11.8	-48.87	-13	-35.87	0-360	299	H
3	9.721	-67.99	Pk	36.8	-25	.4	11.8	-43.99	-13	-30.99	0-360	299	H
6	9.7705	-67.03	Pk	36.9	-25.6	.4	11.8	-43.53	-13	-30.53	0-360	200	V

Pk - Peak detector

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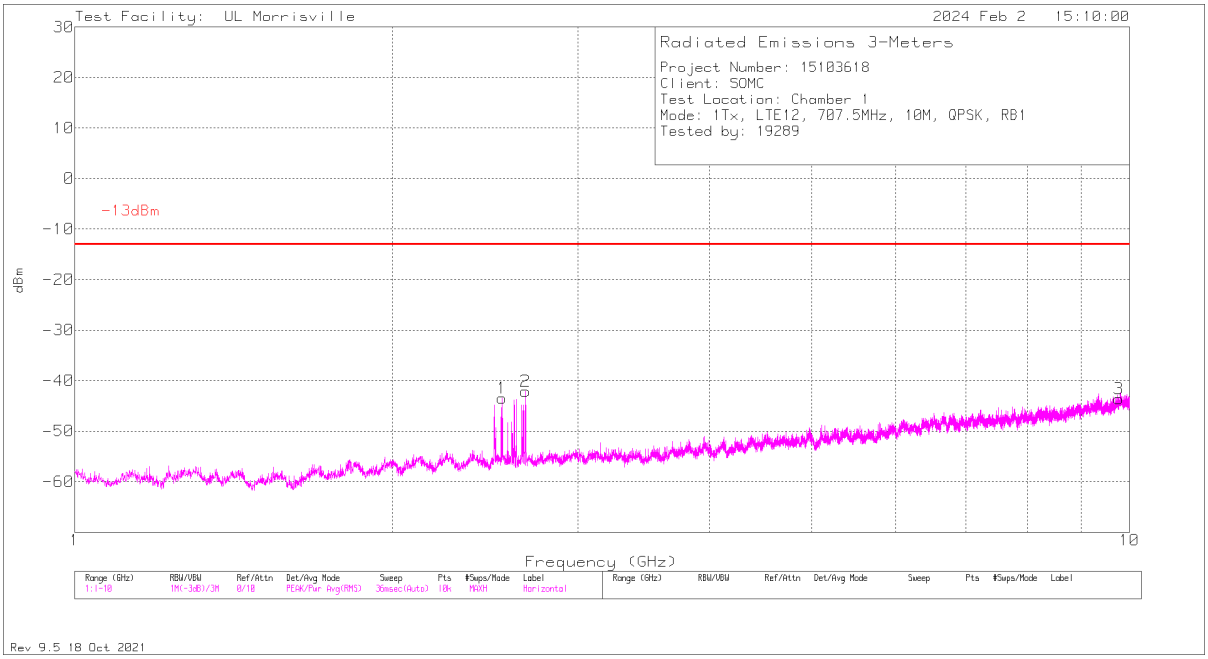
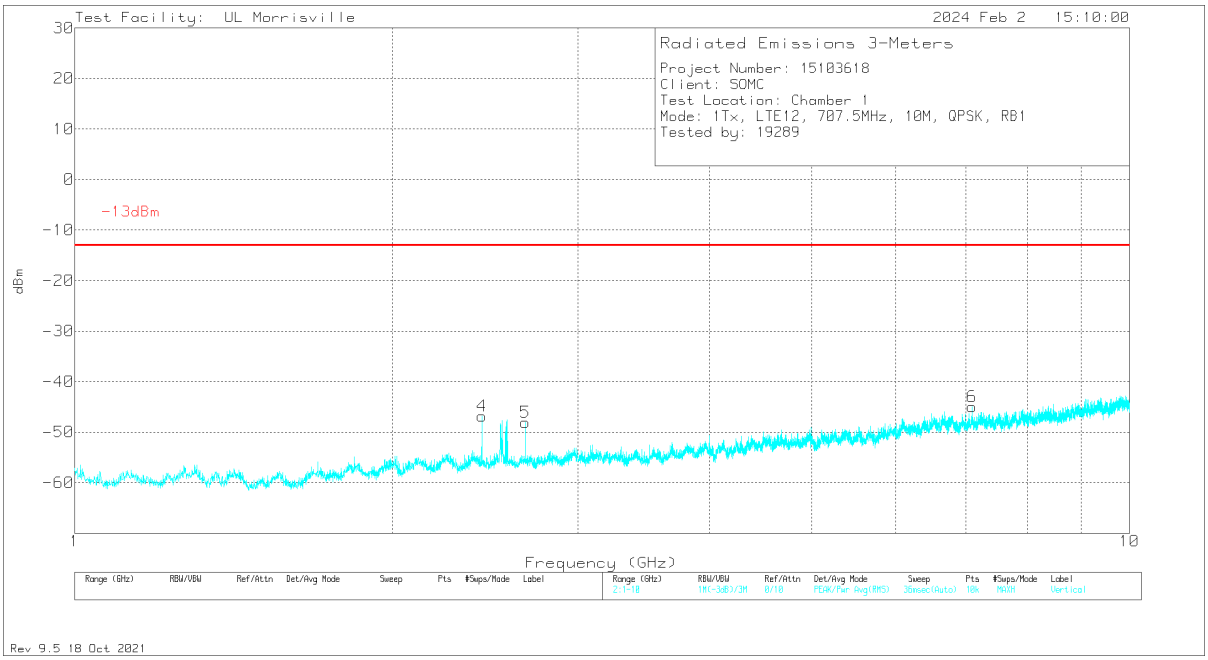
QPSK LTE BAND 12 (10MHz, Mid Channel)





Marker	Frequency (GHz)	Meter Reading (dBm)	Det	206211 (dB/m)	Gain/Loss (dB)	Filter (dB)	CF (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	2.4328	-57.01	Pk	32.2	-34.1	.3	11.8	-46.81	-13	-33.81	0-360	101	V
1	2.5435	-54.04	Pk	32.3	-33.9	.4	11.8	-43.44	-13	-30.44	0-360	199	H
5	2.674	-58.51	Pk	32	-33.9	.5	11.8	-48.11	-13	-35.11	0-360	200	V
2	2.6758	-52.52	Pk	32	-33.9	.5	11.8	-42.12	-13	-29.12	0-360	199	H
6	7.0903	-65.15	Pk	35.6	-27.7	.5	11.8	-44.95	-13	-31.95	0-360	200	V
3	9.7741	-66.95	Pk	37	-25.8	.4	11.8	-43.55	-13	-30.55	0-360	300	H

Pk - Peak detector

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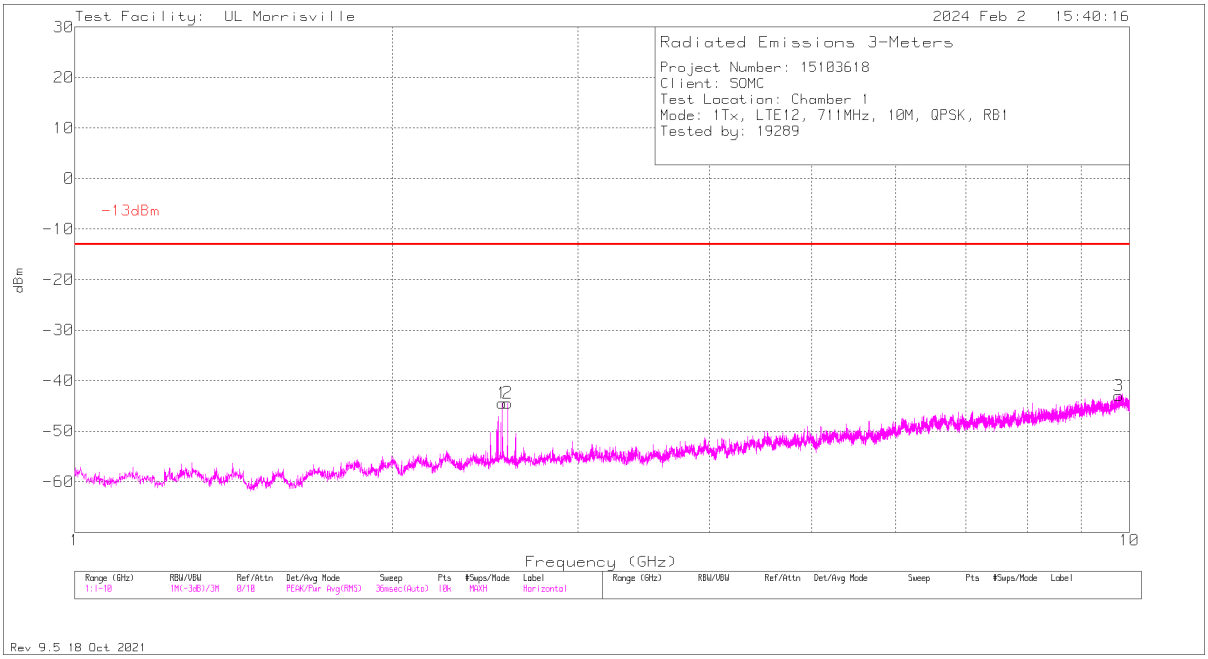
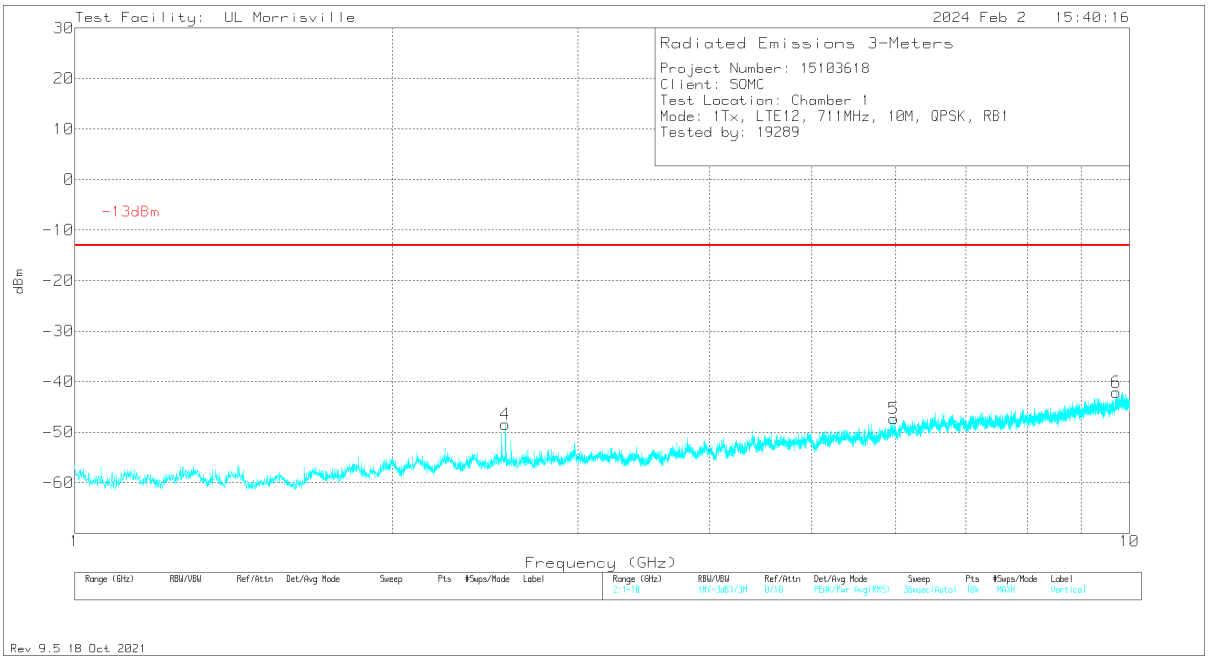
QPSK LTE BAND 12 (10MHz, High Channel)





Marker	Frequency (GHz)	Meter Reading (dBm)	Det	206211 (dB/m)	Gain/Loss (dB)	Filter (dB)	CF (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	2.5426	-55.03	Pk	32.3	-33.9	.4	11.8	-44.43	-13	-31.43	0-360	300	H
4	2.5606	-59.11	Pk	32.3	-33.8	.4	11.8	-48.41	-13	-35.41	0-360	300	V
2	2.5732	-55.2	Pk	32.3	-33.7	.4	11.8	-44.4	-13	-31.4	0-360	101	H
5	5.977	-64.79	Pk	35.2	-29.7	.2	11.8	-47.29	-13	-34.29	0-360	300	V
6	9.7219	-66.06	Pk	36.8	-25	.4	11.8	-42.06	-13	-29.06	0-360	101	V
3	9.7687	-66.52	Pk	36.9	-25.6	.4	11.8	-43.02	-13	-30.02	0-360	101	H

Pk - Peak detector

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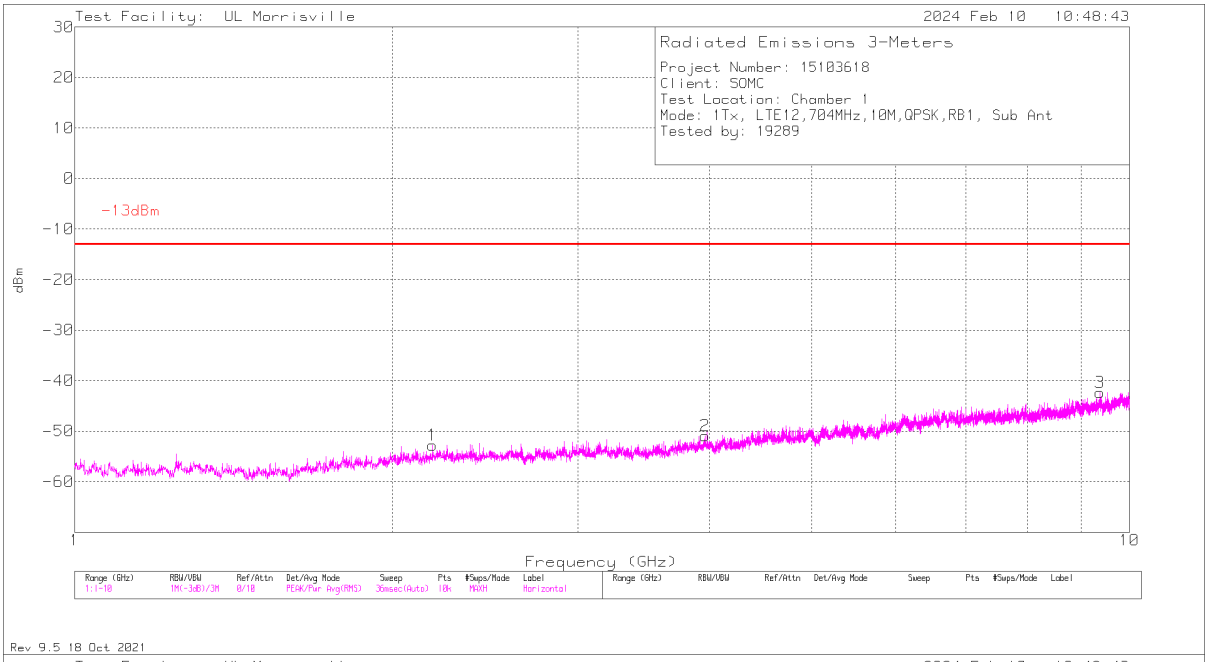
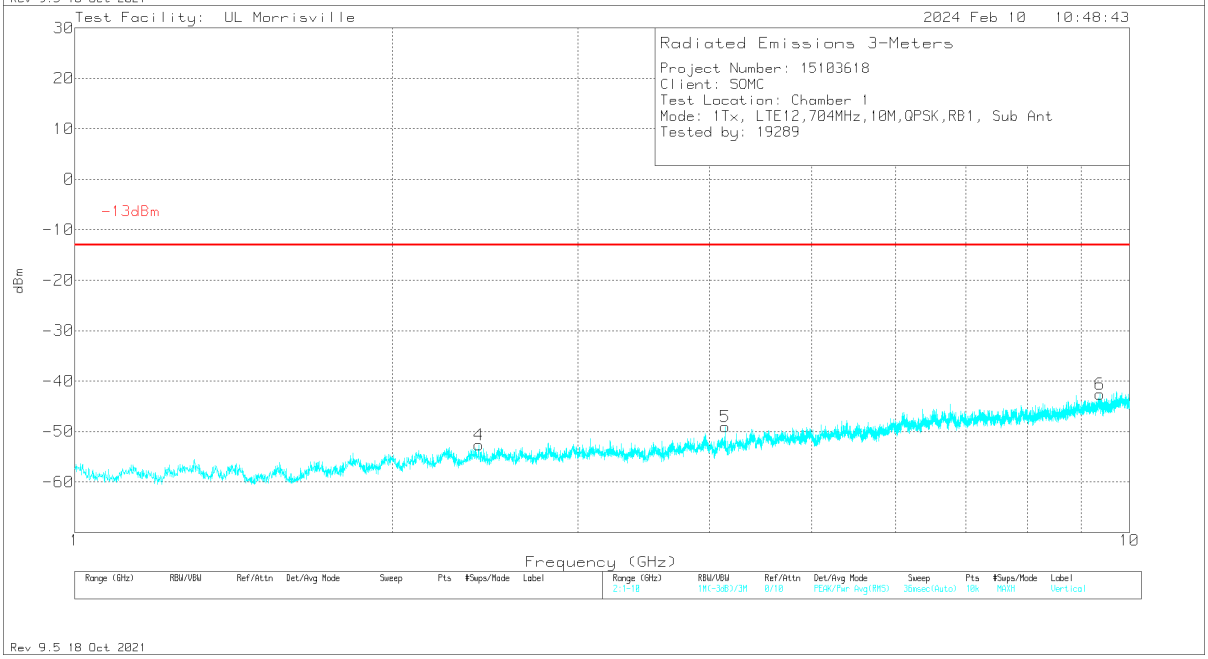
Sub Antenna

EUT Serial Number: QV77008ELY

QPSK LTE BAND 12 (10MHz, Low Channel)





Marker	Frequency (GHz)	Meter Reading (dBm)	Det	206211 (dB/m)	Gain/Loss (dB)	Filter (dB)	CF (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	2.1844	-62.37	Pk	31.7	-34.4	.5	11.8	-52.77	-13	-39.77	0-360	200	H
4	2.4157	-62.84	Pk	32.1	-34	.3	11.8	-52.64	-13	-39.64	0-360	200	V
2	3.961	-64.47	Pk	33.4	-31.7	.1	11.8	-50.87	-13	-37.87	0-360	101	H
5	4.1347	-62.76	Pk	33.3	-31.7	.3	11.8	-49.06	-13	-36.06	0-360	200	V
6	9.3763	-65.41	Pk	36.4	-25.7	.3	11.8	-42.61	-13	-29.61	0-360	300	V
3	9.3826	-64.87	Pk	36.4	-26	.3	11.8	-42.37	-13	-29.37	0-360	300	H

Pk - Peak detector

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