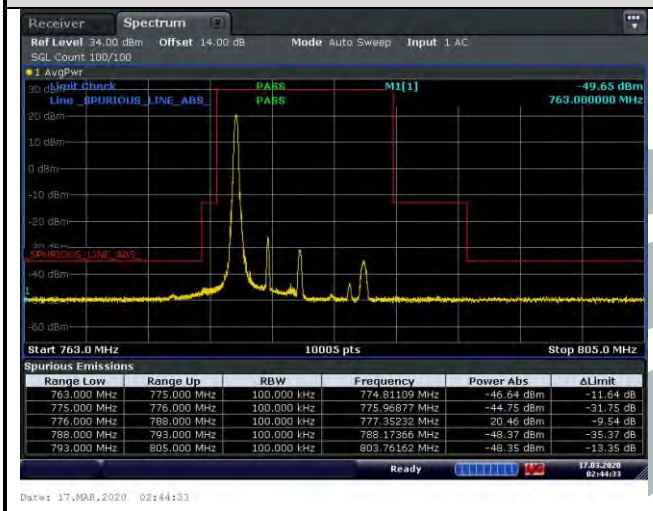
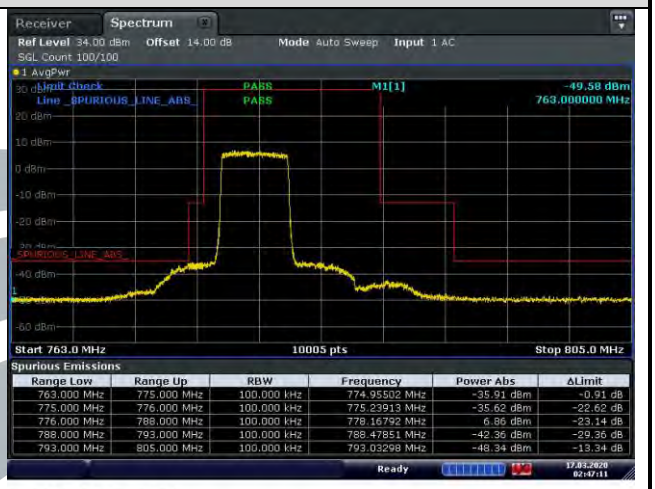
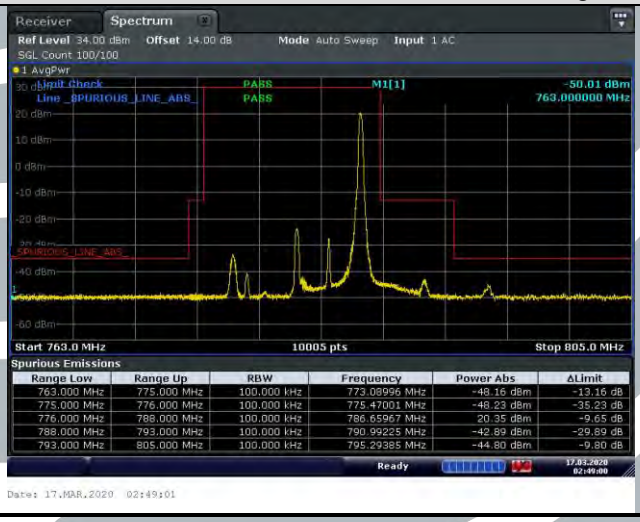
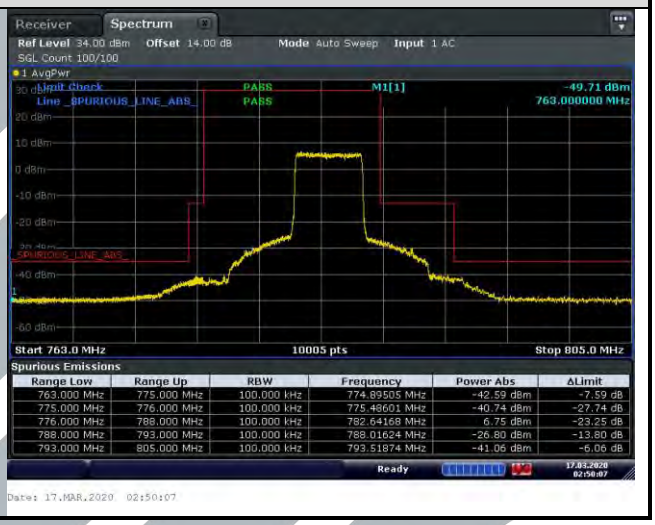
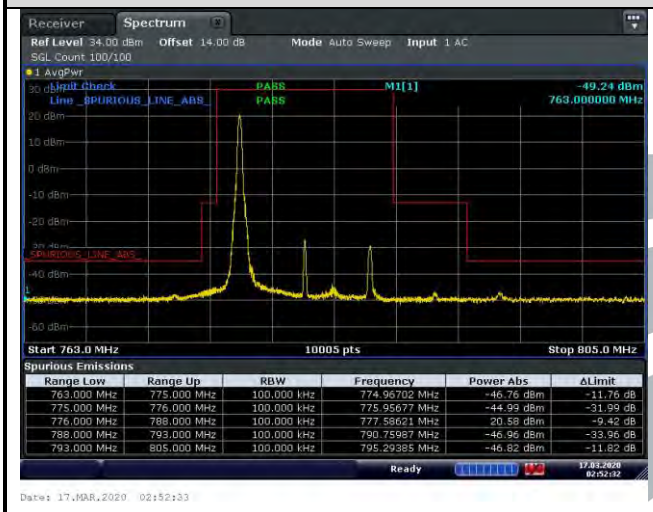
5.6.2 LTE Band 13

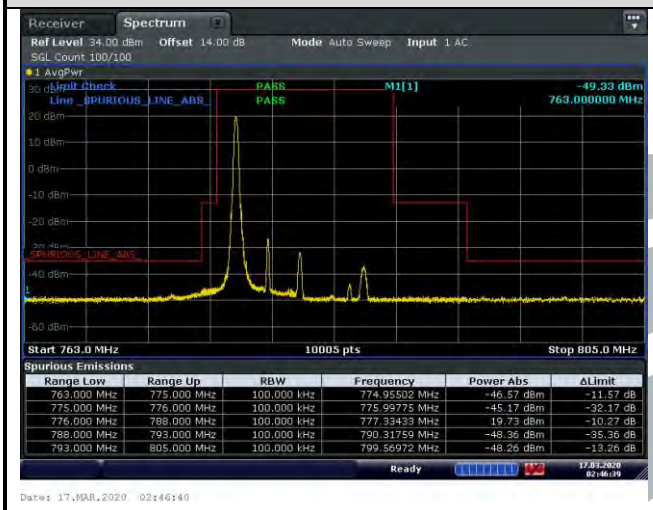
LTE Band 13 / 5 MHz / QPSK	
1 RB	Full RB
Lowest Channel	
	
Highest Channel	
	

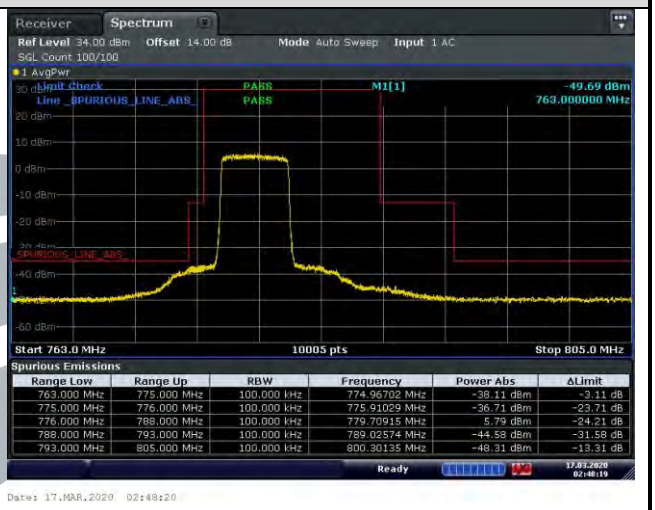
LTE Band 13 / 10 MHz / QPSK	
1 RB	**Full RB**
Lowest Channel	
	

LTE Band 13 / 5 MHz / 16QAM

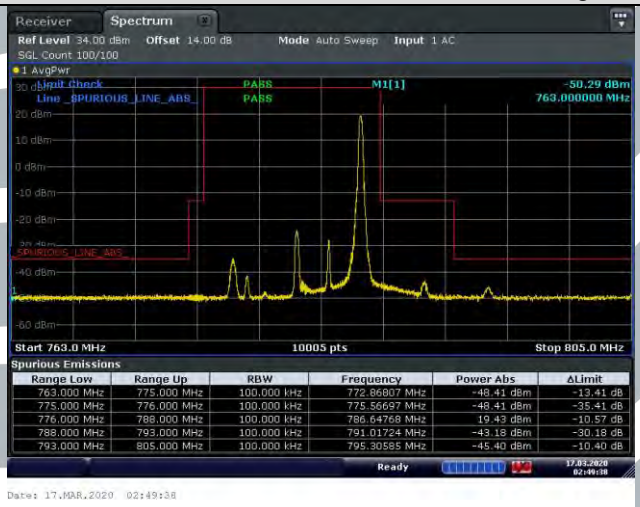
1 RB	Full RB

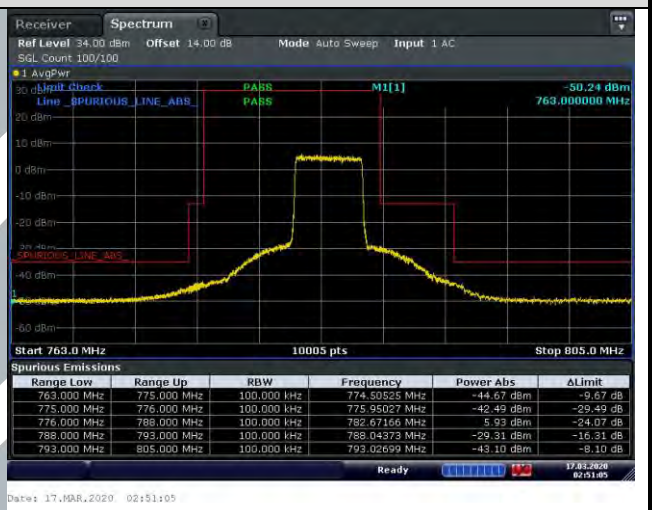
Lowest Channel



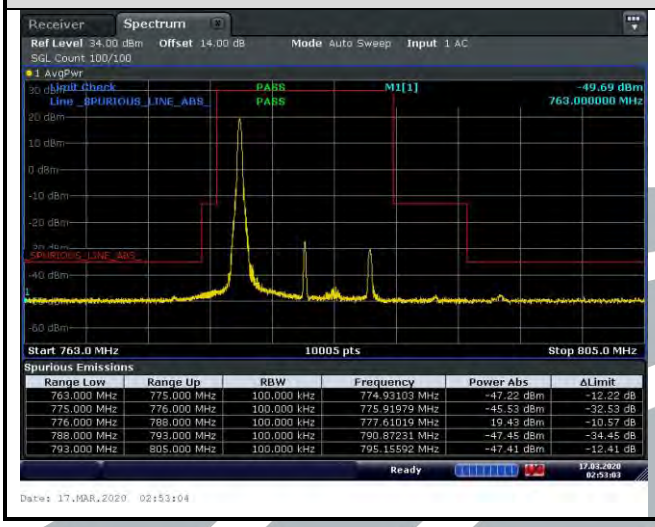


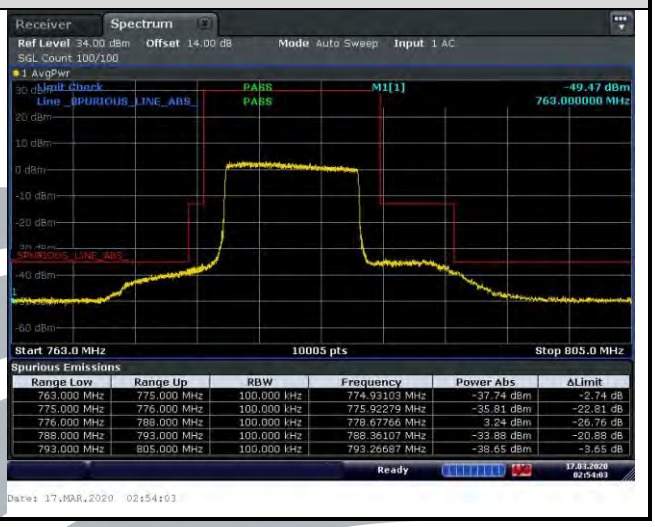
Highest Channel





LTE Band 13 / 10 MHz / 16QAM	
1 RB	Full RB
Lowest Channel	





5.7 SPURIOUS EMISSIONS AT ANTENNA TERMINALS

Test Requirement: **LTE Band 4:** FCC 47 CFR Part 27.53(h)
LTE Band 13: FCC 47 CFR Part 27.53

Test Method: ANSI C63.26-2015 & KDB 971168 D01v03r01

Limit:

FCC 47 CFR Part 27.53(h)(1), 27.53(c)(2):

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. The emission limit equal to -13 dBm.

Test Procedure:

The EUT makes a phone call to the communication simulator. All measurements were done at low, middle and high operational frequency range. b. Measuring frequency range is from 30 MHz to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower. Set RBW & VBW to 100 kHz for the measurement below 1 GHz, and 1 MHz for the measurement above 1 GHz.

Note: The cable loss and attenuator loss were offset into measure device as an amplitude offset.

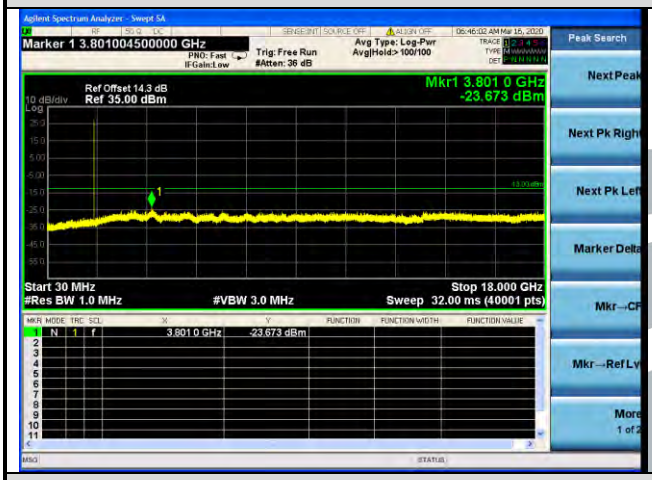
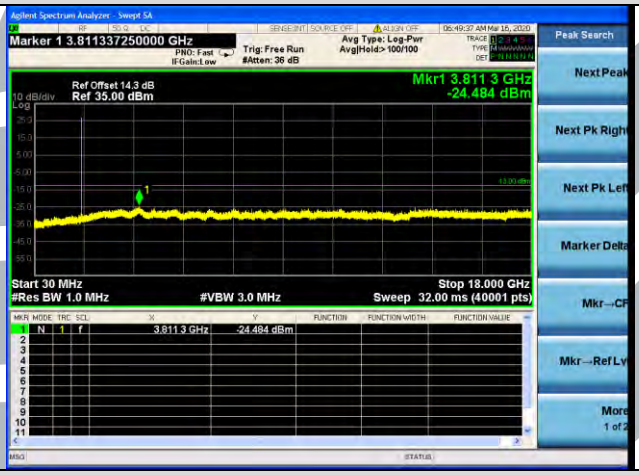
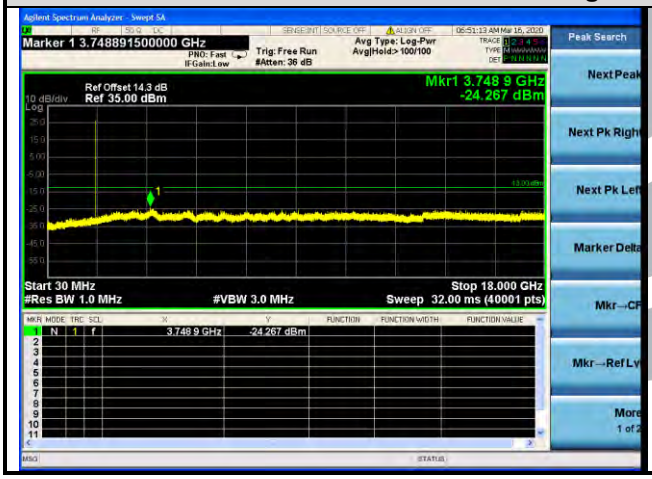
Test Setup: Refer to section 4.2.2 for details.

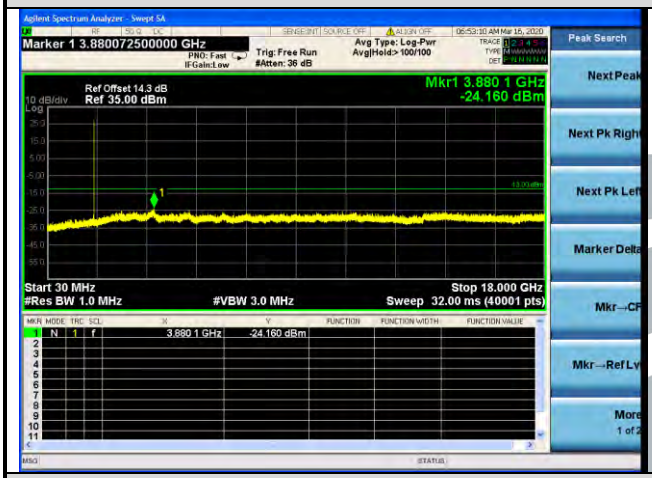
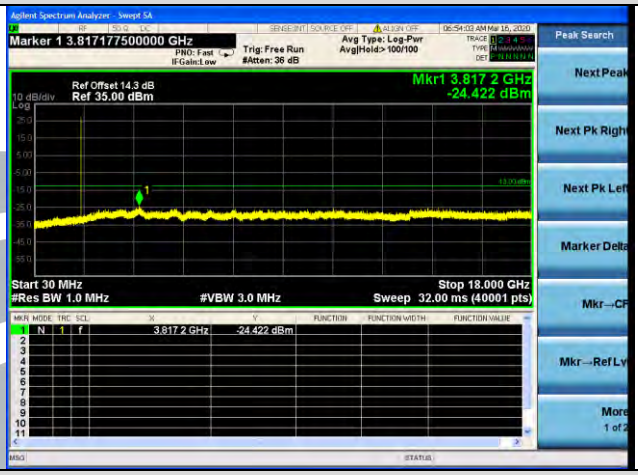
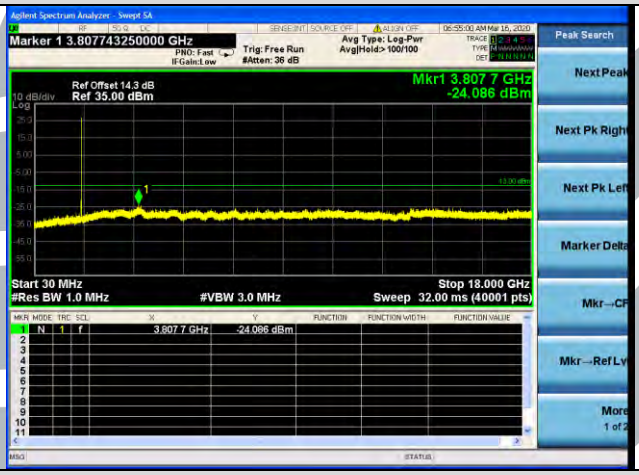
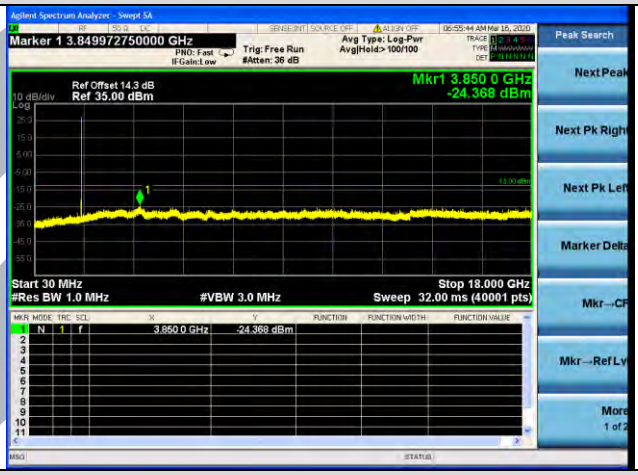
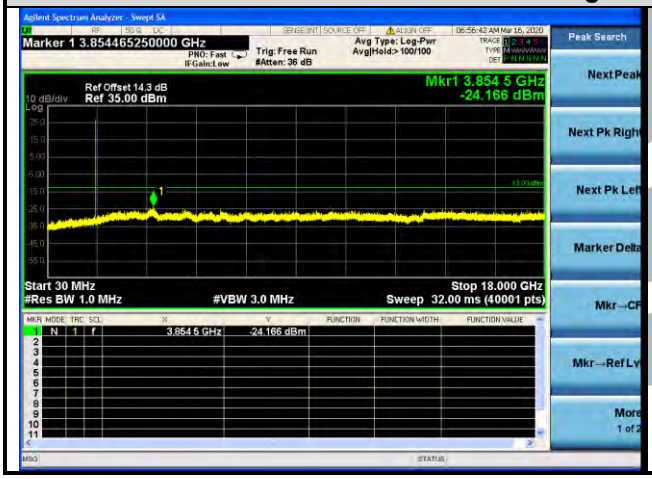
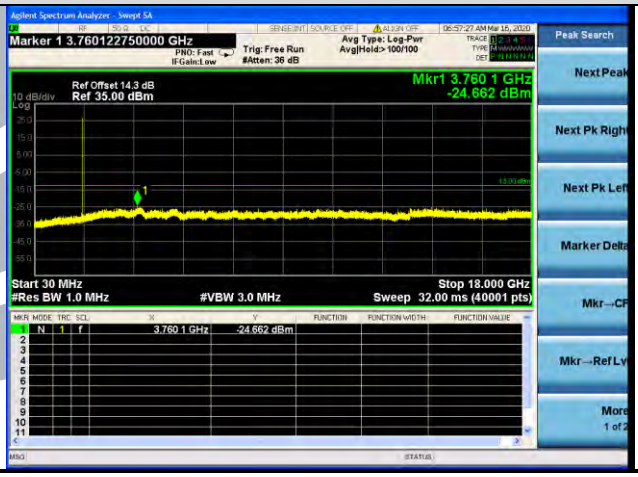
Instruments Used: Refer to section 3 for details

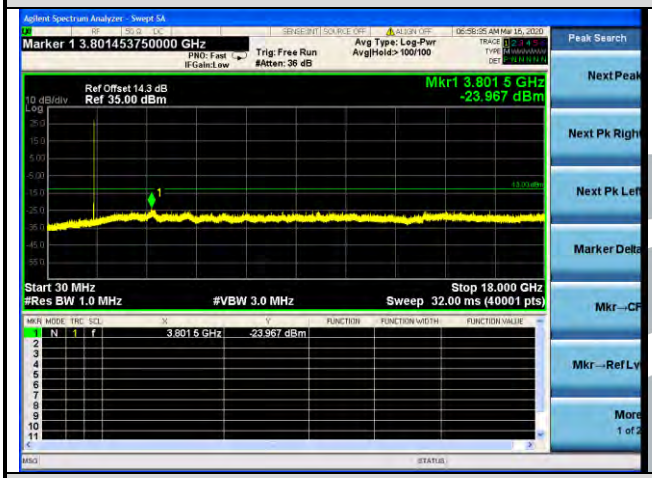
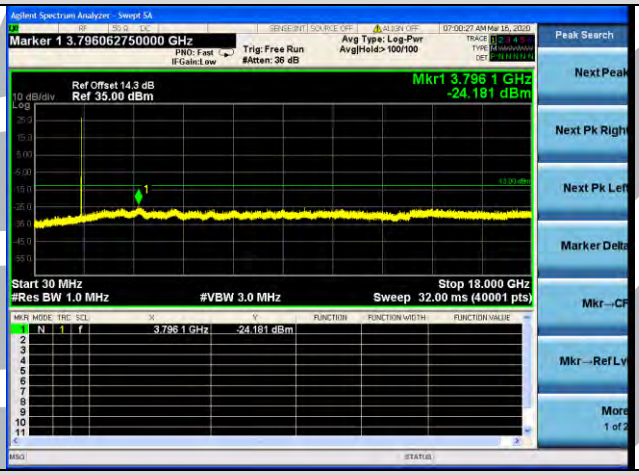
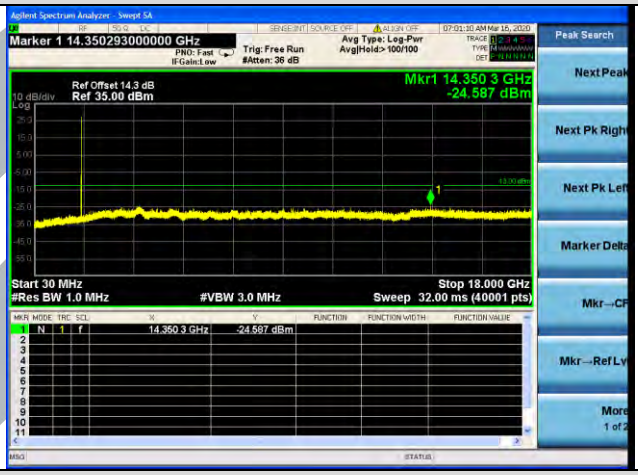
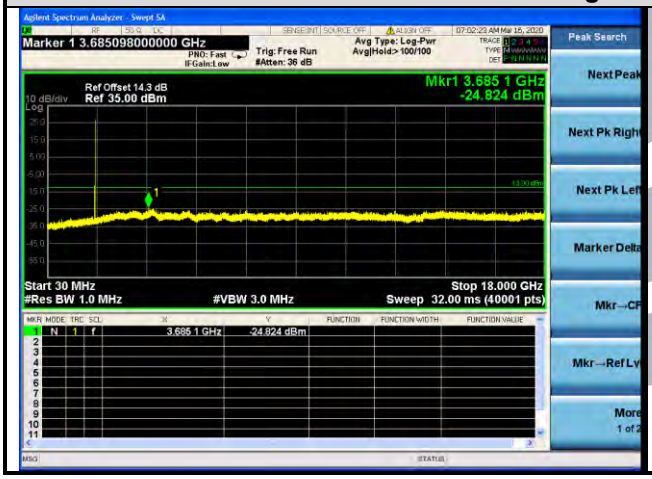
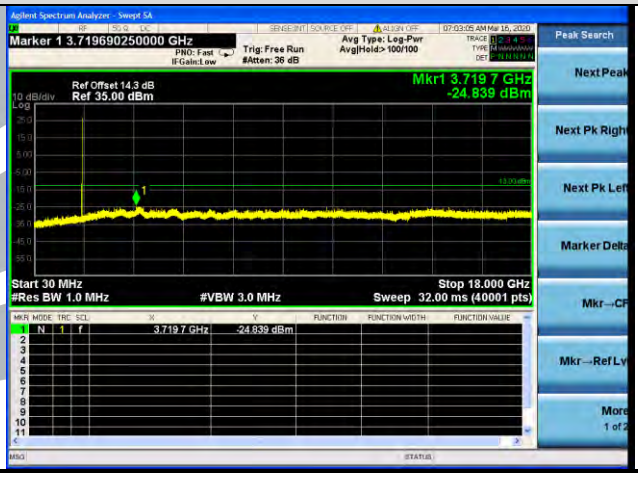
Test Mode: Link mode

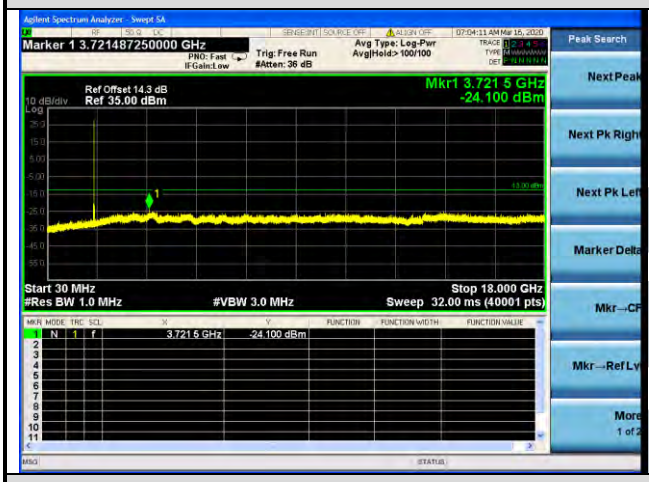
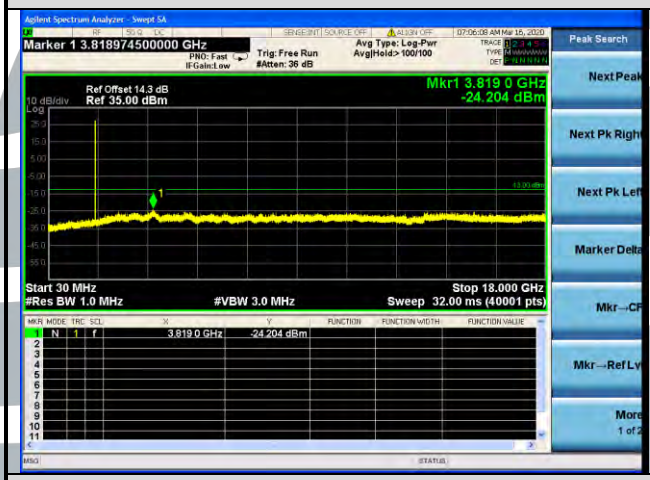
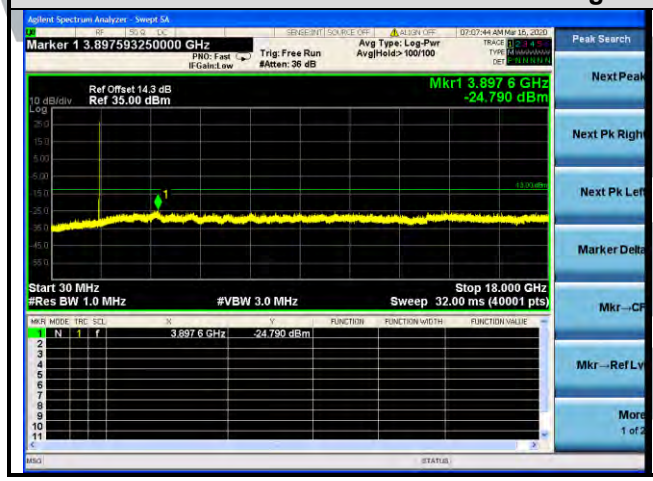
Test Results: Pass

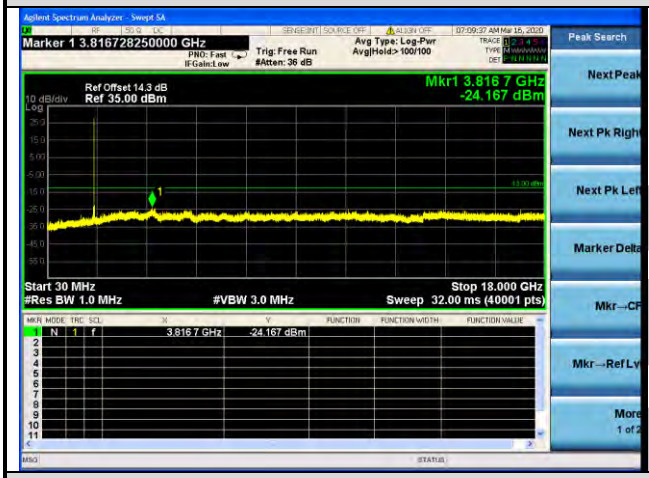
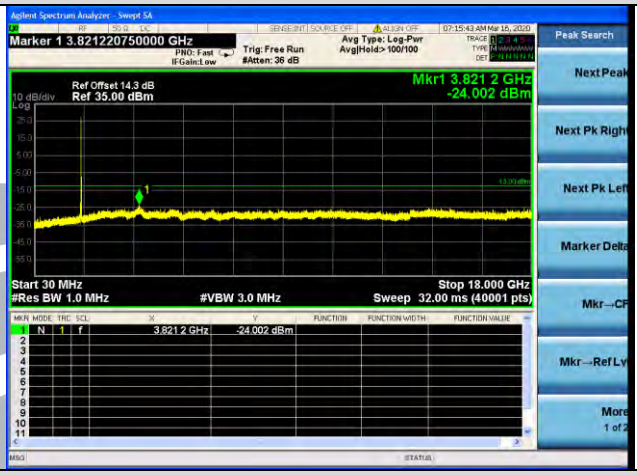
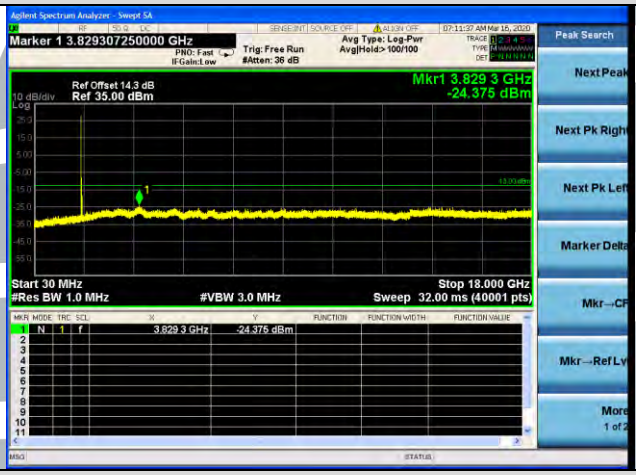
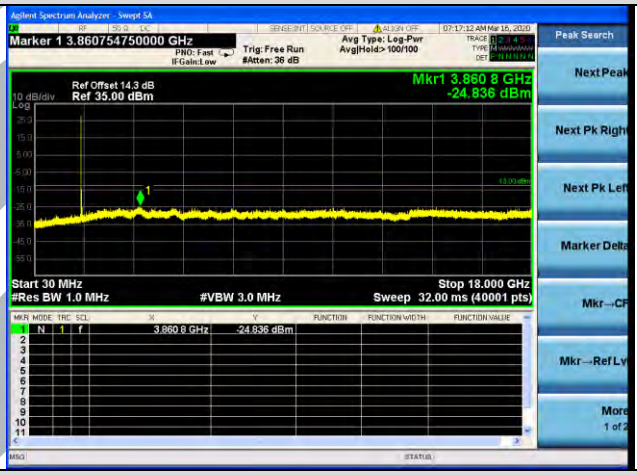
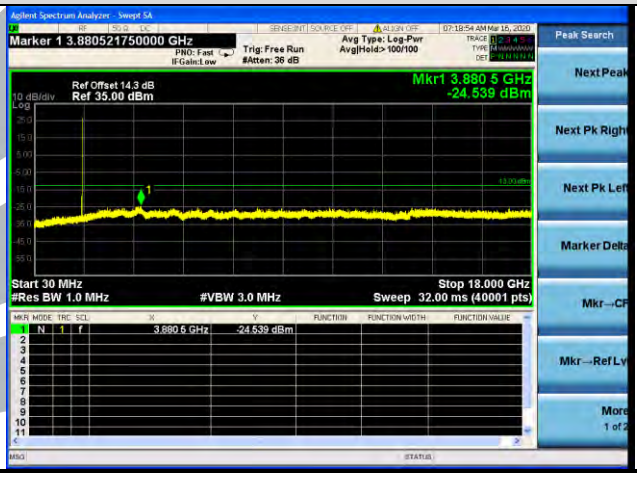
5.7.1 LTE Band 4

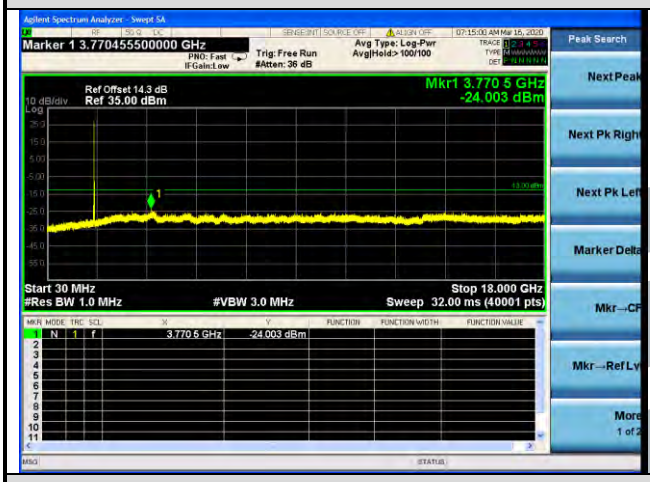
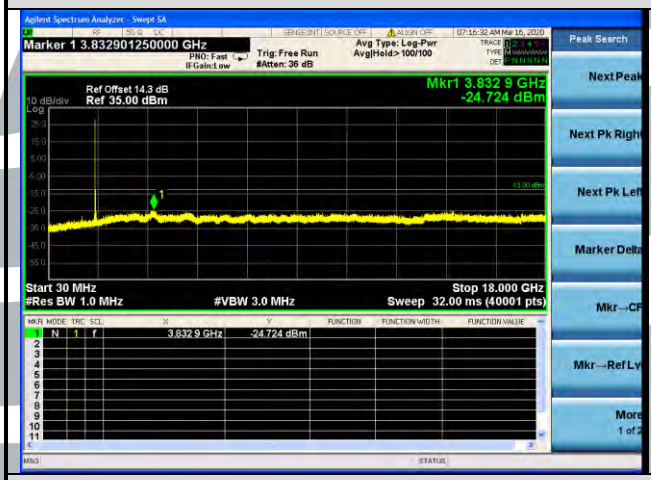
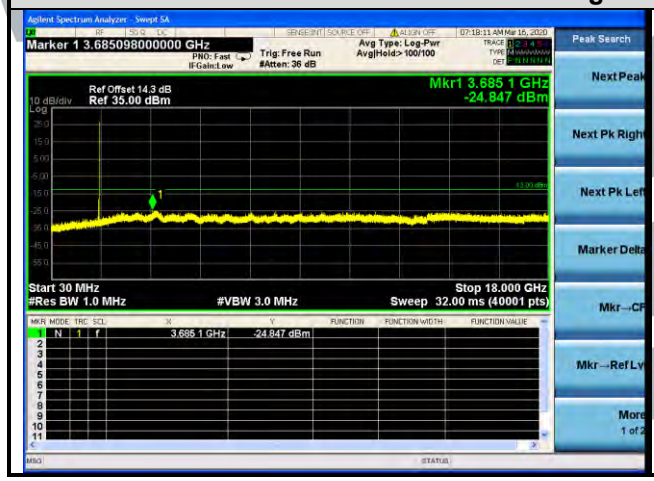
LTE Band 4_ Channel Bandwidth: 1.4 MHz	
QPSK	16QAM
Lowest Channel	
	
Middle Channel	
	
Highest Channel	
	

LTE Band 4_ Channel Bandwidth: 3 MHz	
QPSK	16QAM
Lowest Channel	
	
Middle Channel	
	
Highest Channel	
	

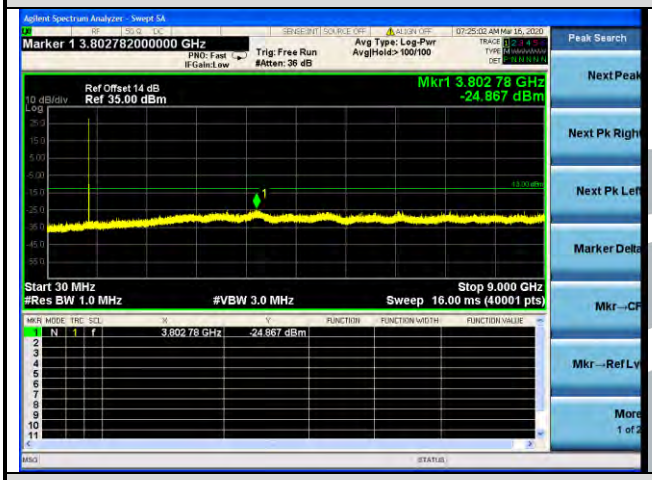
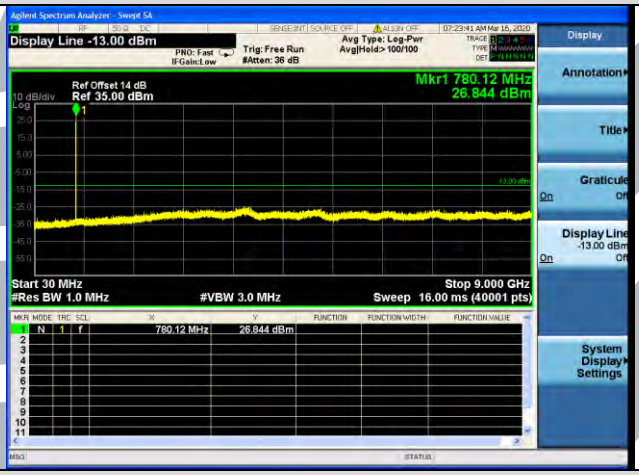
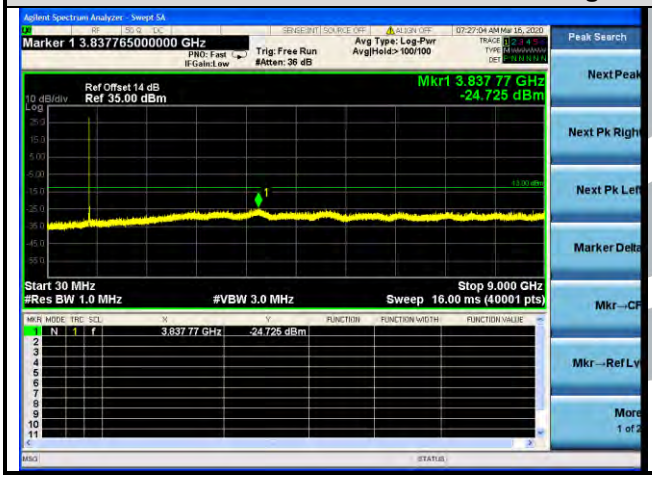
LTE Band 4_ Channel Bandwidth: 5 MHz	
QPSK	16QAM
Lowest Channel	
	
Middle Channel	
	
Highest Channel	
	

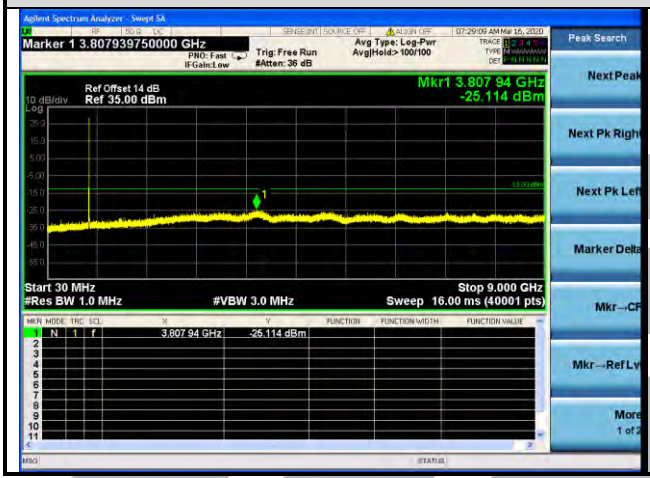
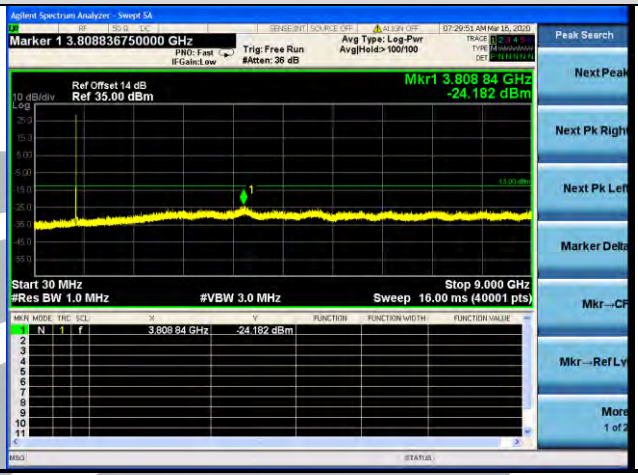
LTE Band 4_ Channel Bandwidth: 10 MHz	
QPSK	16QAM
Lowest Channel	
	
Middle Channel	
	
Highest Channel	
	

LTE Band 4_ Channel Bandwidth: 15 MHz	
QPSK	16QAM
Lowest Channel	
	
Middle Channel	
	
Highest Channel	
	

LTE Band 4_ Channel Bandwidth: 20 MHz	
QPSK	16QAM
Lowest Channel	
	
Middle Channel	
	
Highest Channel	
	

5.7.2 LTE Band 13

LTE Band 13_ Channel Bandwidth: 5 MHz	
QPSK	16QAM
Lowest Channel	
	
Middle Channel	
	
Highest Channel	
	

LTE Band 13_ Channel Bandwidth: 10 MHz	
QPSK	16QAM
Lowest Channel	
	

5.8 FIELD STRENGTH OF SPURIOUS RADIATION

Test Requirement: **LTE Band 4:** FCC 47 CFR Part 27.53(h)
LTE Band 13: FCC 47 CFR Part 27.53

Test Method: ANSI C63.26-2015 & KDB 971168 D01v03r01

Receiver Setup:

Frequency	Detector	RBW	VBW	Remark
0.009 MHz-30 MHz	Peak	10 kHz	30 KHz	Peak
30 MHz-1 GHz	Quasi-peak	100 kHz	300 KHz	Peak
Above 1 GHz	Peak	1 MHz	3 MHz	Peak

Limits:

FCC 47 CFR Part 27.53(h)(1), 27.53(c)(2) :

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. The emission limit equal to -13 dBm.

Test Setup: Refer to section 4.2.1 for details.

Test Procedures: KDB 971168 D01v03r01 Section 7

Equipment Used: Refer to section 3 for details.

Test Result: Pass

The measurement data as follows:

5.8.1 LTE Band 4

LTE Band 4_ 20 MHz_ QPSK							
No.	Frequency (MHz)	SA Reading (dBm)	Correction factor (dB/m)	EIRP Result (dBm)	Limit (dBm)	Margin (dB)	Ant. Pol.
Lowest Channel							
1	290.317	-70.11	3.24	-66.87	-13.00	-53.87	Horizontal
2	350.972	-67.59	5.27	-62.32	-13.00	-49.32	Horizontal
3	952.000	-81.62	17.06	-64.56	-13.00	-51.56	Horizontal
4	3440.000	-73.91	14.13	-59.78	-13.00	-46.78	Horizontal
5	5160.000	-66.08	17.57	-48.51	-13.00	-35.51	Horizontal
6	290.317	-70.46	3.24	-67.22	-13.00	-54.22	Vertical
7	350.972	-68.21	5.27	-62.94	-13.00	-49.94	Vertical
8	919.132	-81.53	14.70	-66.83	-13.00	-53.83	Vertical
9	3440.000	-70.96	13.83	-57.13	-13.00	-44.13	Vertical
10	5160.000	-61.60	17.24	-44.36	-13.00	-31.36	Vertical
Middle Channel							
1	227.016	-72.68	0.88	-71.80	-13.00	-58.80	Horizontal
2	290.317	-68.90	3.24	-65.66	-13.00	-52.66	Horizontal
3	350.972	-67.84	5.27	-62.57	-13.00	-49.57	Horizontal
4	3465.000	-72.73	14.29	-58.44	-13.00	-45.44	Horizontal
5	5197.500	-65.72	17.65	-48.07	-13.00	-35.07	Horizontal
6	290.317	-71.97	3.24	-68.73	-13.00	-55.73	Vertical
7	350.972	-68.22	5.27	-62.95	-13.00	-49.95	Vertical
8	992.997	-81.26	16.89	-64.37	-13.00	-51.37	Vertical
9	3465.000	-74.98	13.99	-60.99	-13.00	-47.99	Vertical
10	5197.500	-62.43	17.33	-45.10	-13.00	-32.10	Vertical
Highest Channel							
1	290.317	-71.39	3.24	-68.15	-13.00	-55.15	Horizontal
2	350.972	-67.87	5.27	-62.60	-13.00	-49.60	Horizontal
3	979.139	-82.84	17.32	-65.52	-13.00	-52.52	Horizontal
4	3490.000	-74.11	14.44	-59.67	-13.00	-46.67	Horizontal
5	5235.000	-64.86	17.65	-47.21	-13.00	-34.21	Horizontal
6	290.317	-65.49	3.24	-62.25	-13.00	-49.25	Vertical
7	360.977	-68.33	5.16	-63.17	-13.00	-50.17	Vertical
8	945.334	-81.28	15.43	-65.85	-13.00	-52.85	Vertical
9	3490.000	-73.35	14.14	-59.21	-13.00	-46.21	Vertical
10	5235.000	-58.12	17.35	-40.77	-13.00	-27.77	Vertical

5.8.2 LTE Band 13

LTE Band 13_ 10 MHz_ QPSK							
No.	Frequency (MHz)	SA Reading (dBm)	Correction factor (dB/m)	EIRP Result (dBm)	Limit (dBm)	Margin (dB)	Ant. Pol.
Middle Channel							
1	403.934	-88.52	35.68	-52.84	-13.00	-39.84	Horizontal
2	520.208	-88.27	38.07	-50.20	-13.00	-37.20	Horizontal
3	693.910	-88.65	41.79	-46.86	-13.00	-33.86	Horizontal
4	1564.000	-65.75	3.09	-62.66	-13.00	-49.66	Horizontal
5	2346.000	-75.24	11.32	-63.92	-13.00	-50.92	Horizontal
6	366.087	-88.70	33.66	-55.04	-13.00	-42.04	Vertical
7	531.291	-87.07	38.36	-48.71	-13.00	-35.71	Vertical
8	703.731	-88.09	40.79	-47.30	-13.00	-34.30	Vertical
9	1564.000	-67.15	3.24	-63.91	-13.00	-50.91	Vertical
10	2346.000	-73.53	11.12	-62.41	-13.00	-49.41	Vertical

Remark:

1. Correct Factor = Antenna Factor + Cable Loss - Amplifier Gain, the value was added to Original Receiver Reading by the software automatically.
2. Result = Reading + Correct Factor.
3. Margin = Result – Limit

5.9 FREQUENCY STABILITY

Test Requirement: FCC 47 CFR Part 2.1055 &
FCC 47 CFR Part 22.355 &
FCC 47 CFR Part 24.235 &
FCC 47 CFR Part 27.54,

Test Method: ANSI C63.26-2015 & KDB 971168 D01v03r01

Limits:

FCC 47 CFR Part 22.355, FCC 47 CFR Par 90.213

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

FCC 47 CFR Part 24.235, FCC 47 CFR Part 27.54

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

Test Setup: Refer to section 4.2.2 for details.

Test Procedures:

1) Use CMW 500 or CMU 200 with Frequency Error measurement capability.
   a) Temp. = −30° to + 50°C
   b) Voltage =low voltage, 3.5 Vdc, Normal, 3.8 Vdc and High voltage, 4.35 Vdc.
2) 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.

3) Frequency Stability vs Voltage:

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

Equipment Used: Refer to section 3 for details.

Test Result: Pass

5.9.1 LTE Band 4

Modulation	Channel/ Frequency (MHz)	Voltage (Vdc)	Temperature (℃)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Pass/ Fail
LTE Band 4 / 20MHz / Full RB							
QPSK	20175 / 1732.5	VL	TN	5	0.0029	N/A	Pass
		VN		11	0.0063		Pass
		VH		-8	-0.0046		Pass
		VN	50	9	0.0052		Pass
			40	5	0.0029		Pass
			30	3	0.0017		Pass
			20	3	0.0017		Pass
			10	-4	-0.0023		Pass
			0	-7	-0.0040		Pass
			-10	-10	-0.0058		Pass
			-20	-9	-0.0052		Pass
			-30	13	0.0075		Pass

5.9.2 LTE Band 13

Modulation	Channel/ Frequency (MHz)	Voltage (Vdc)	Temperature (℃)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Result
LTE Band 13 / 10MHz / Full RB							
QPSK	23230 / 782	VL	TN	-9	-0.0115	N/A	Pass
		VN		8	0.0102		Pass
		VH		12	0.0153		Pass
		VN	50	8	0.0102		Pass
			40	13	0.0166		Pass
			30	7	0.0090		Pass
			20	-9	-0.0115		Pass
			10	-12	-0.0153		Pass
			0	-15	-0.0192		Pass
			-10	-8	-0.0102		Pass
			-20	7	0.0090		Pass
			-30	17	0.0217		Pass

APPENDIX 1 PHOTOS OF TEST SETUP

See test photos attached in Appendix 1 for the actual connections between Product and support equipment.

APPENDIX 2 PHOTOS OF EUT CONSTRUCTIONAL DETAILS

Refer to Appendix 2 for EUT external and internal photos.

*** End of Report ***

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