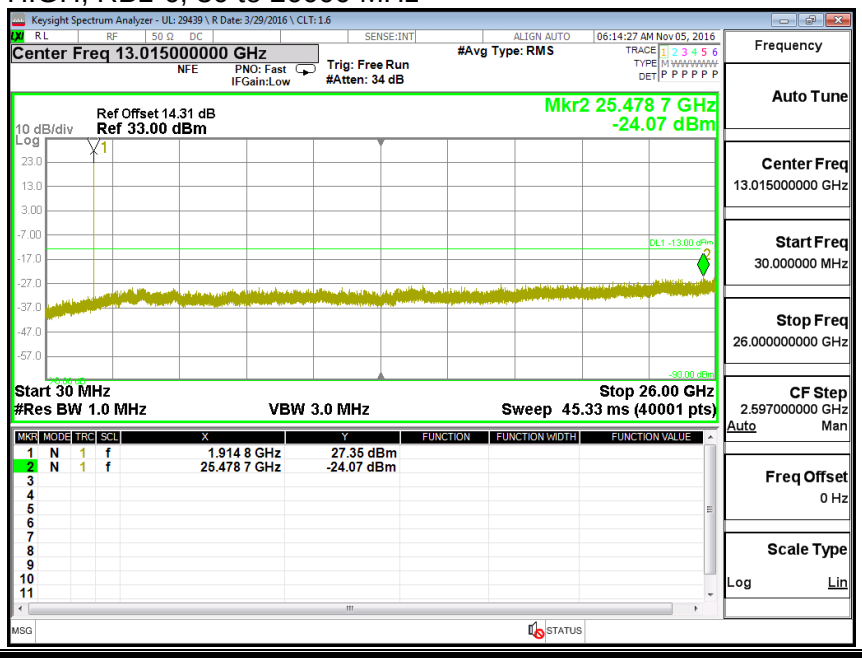
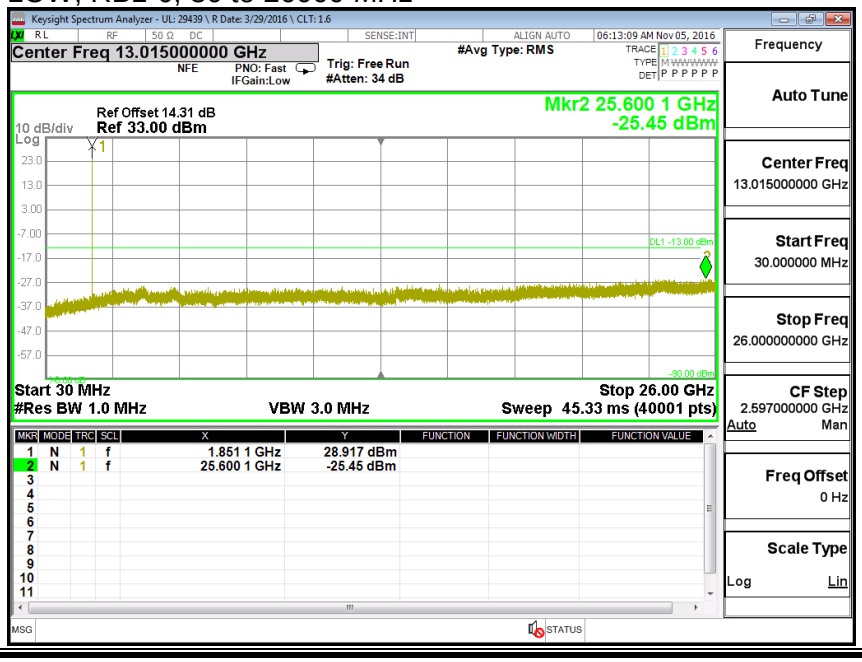
HIGH, RB1-0, 30 to 26000 MHz

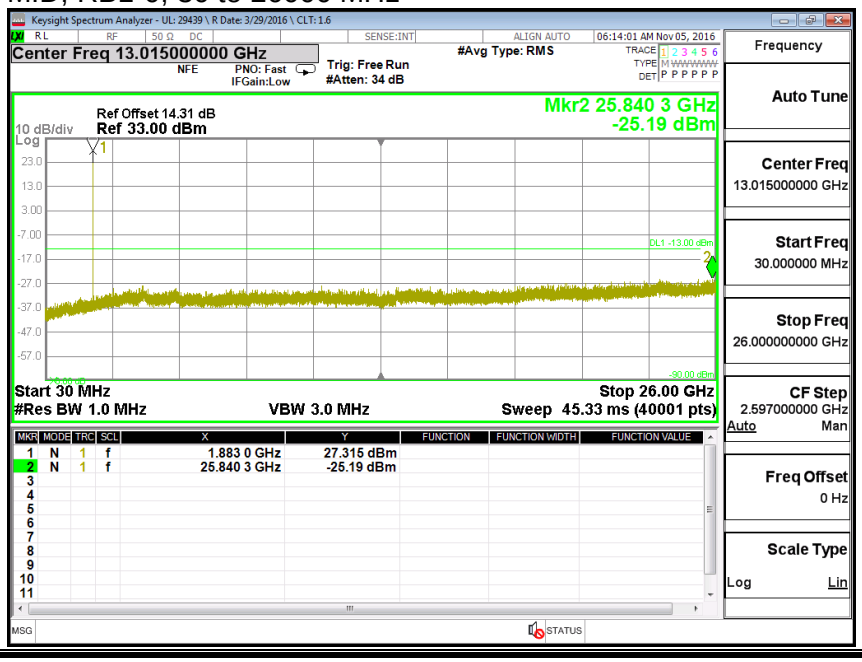


LTE BAND 25 16QAM, (1.4 MHz)

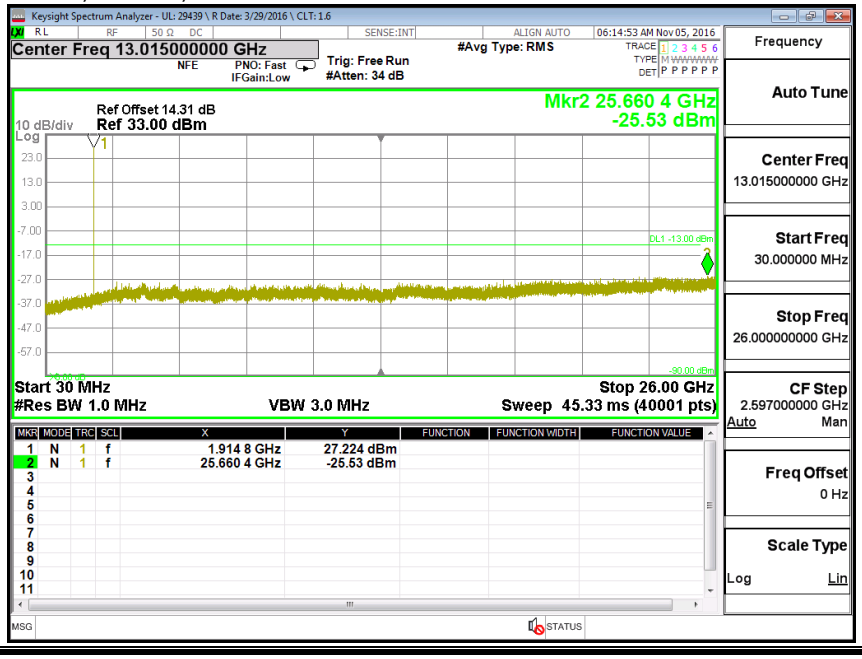
LOW, RB1-0, 30 to 26000 MHz



MID, RB1-0, 30 to 26000 MHz

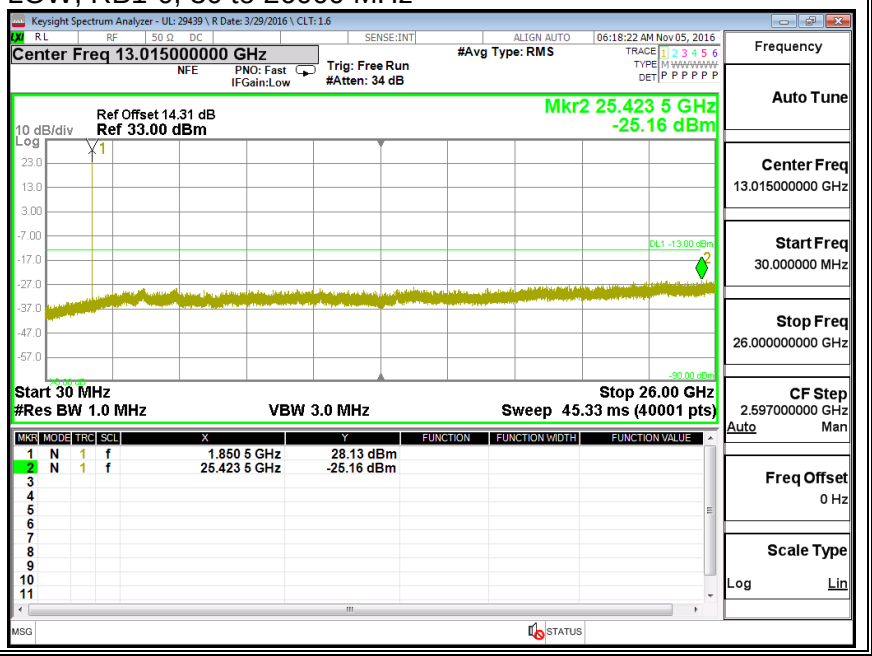


HIGH, RB1-0, 30 to 26000 MHz

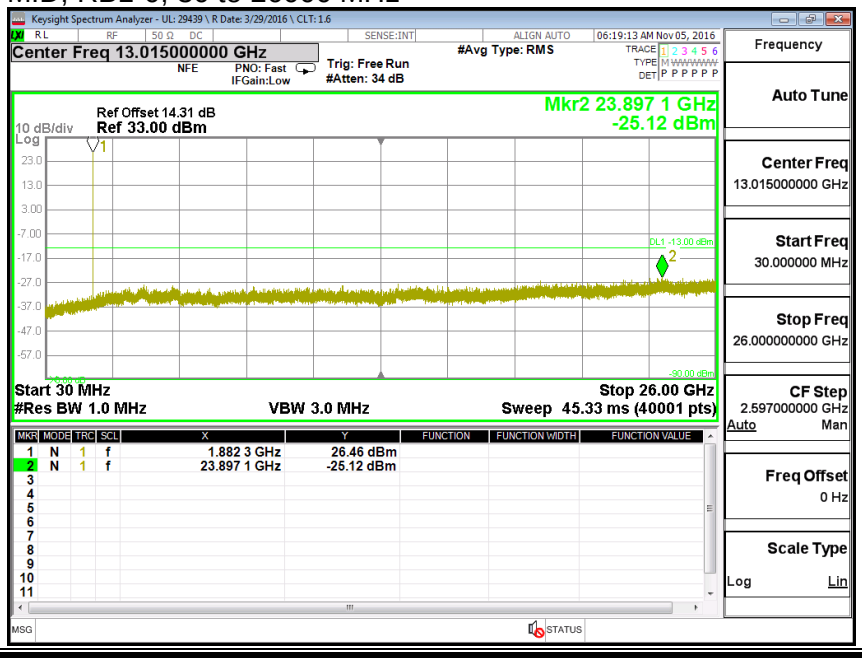


LTE BAND 25 QPSK, (3 MHz)

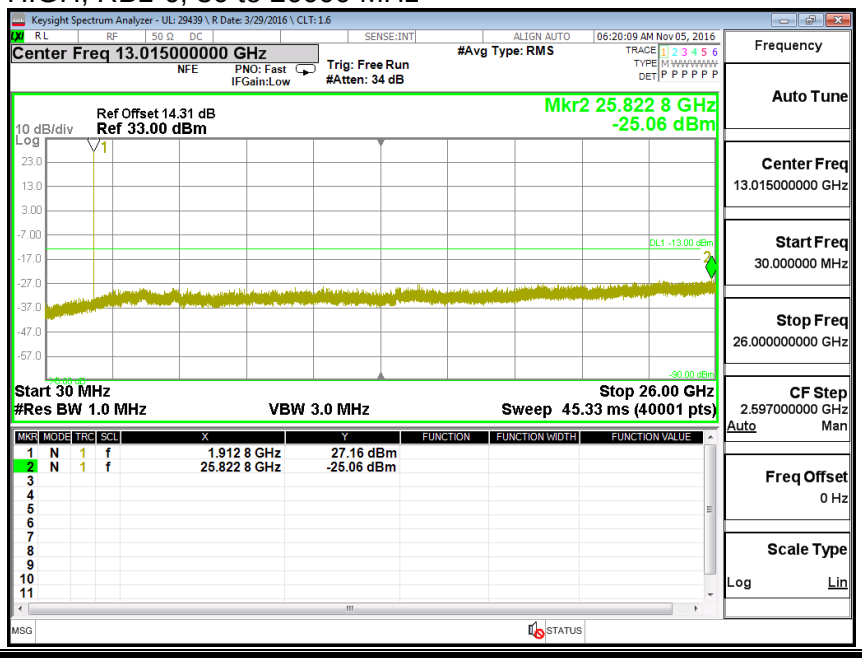
LOW, RB1-0, 30 to 26000 MHz



MID, RB1-0, 30 to 26000 MHz

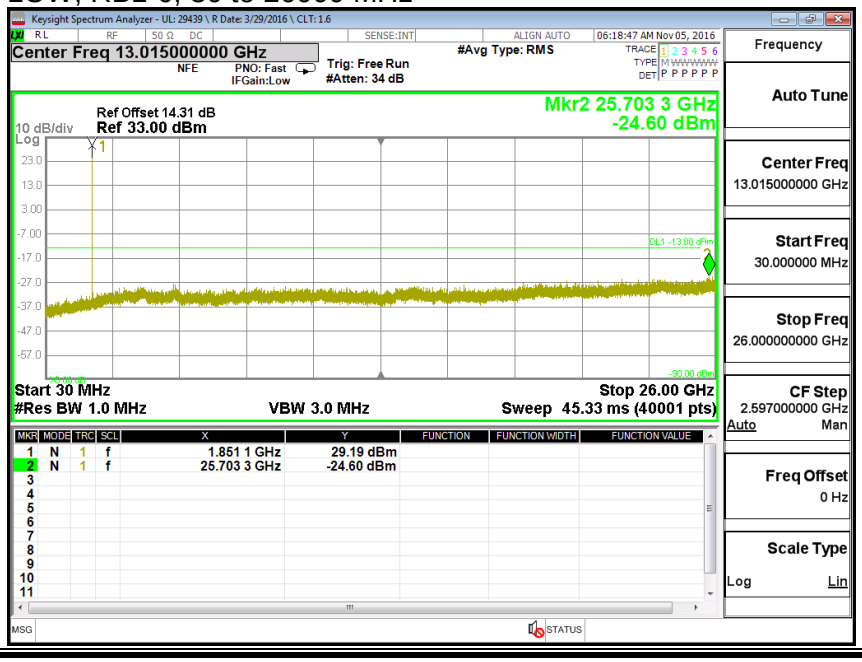


HIGH, RB1-0, 30 to 26000 MHz

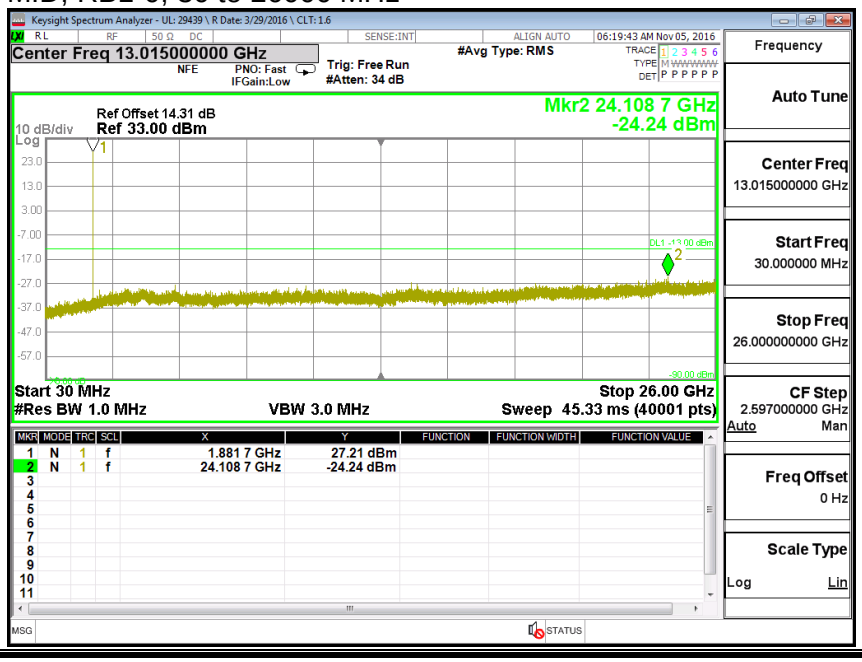


LTE BAND 25 16QAM, (3 MHz)

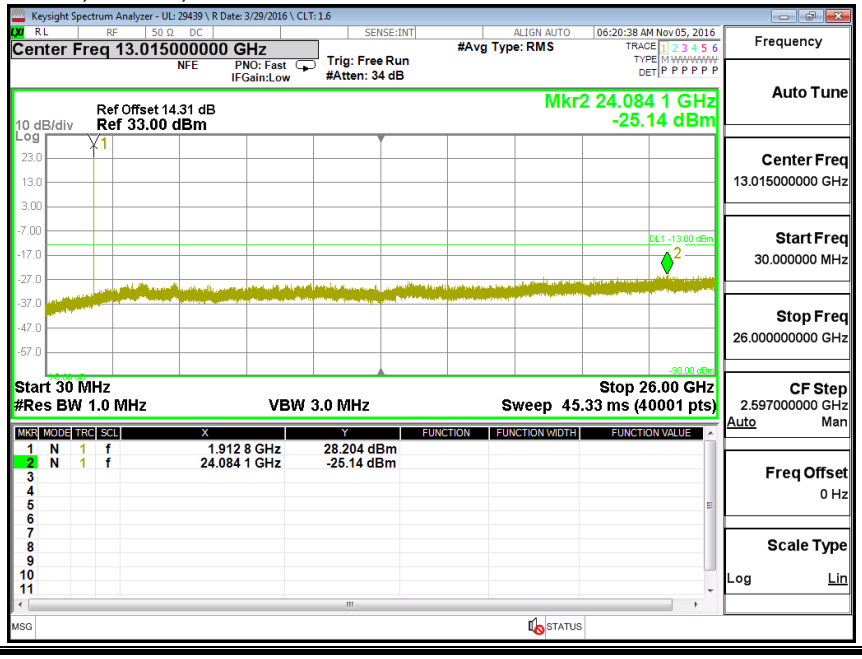
LOW, RB1-0, 30 to 26000 MHz



MID, RB1-0, 30 to 26000 MHz

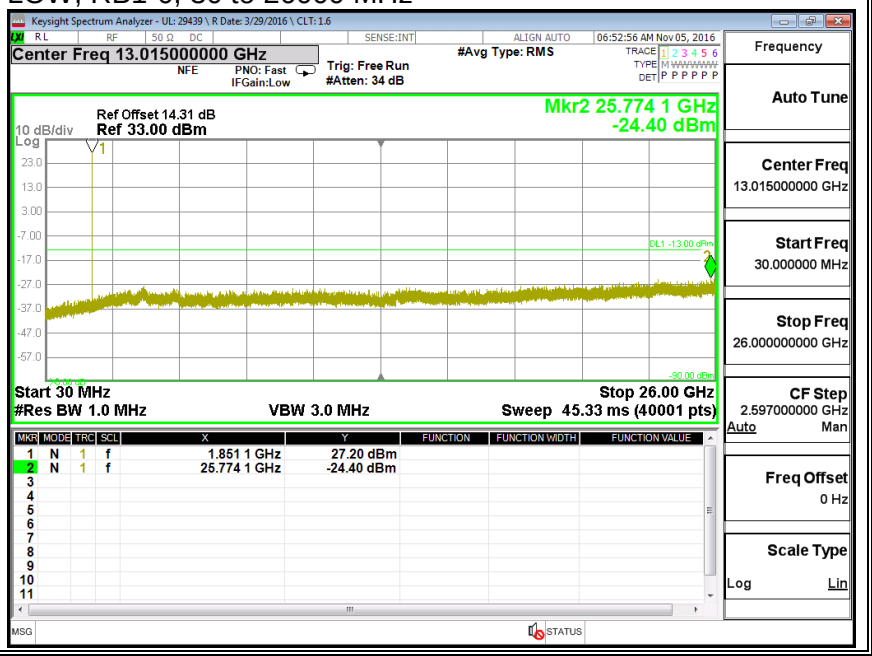


HIGH, RB1-0, 30 to 26000 MHz

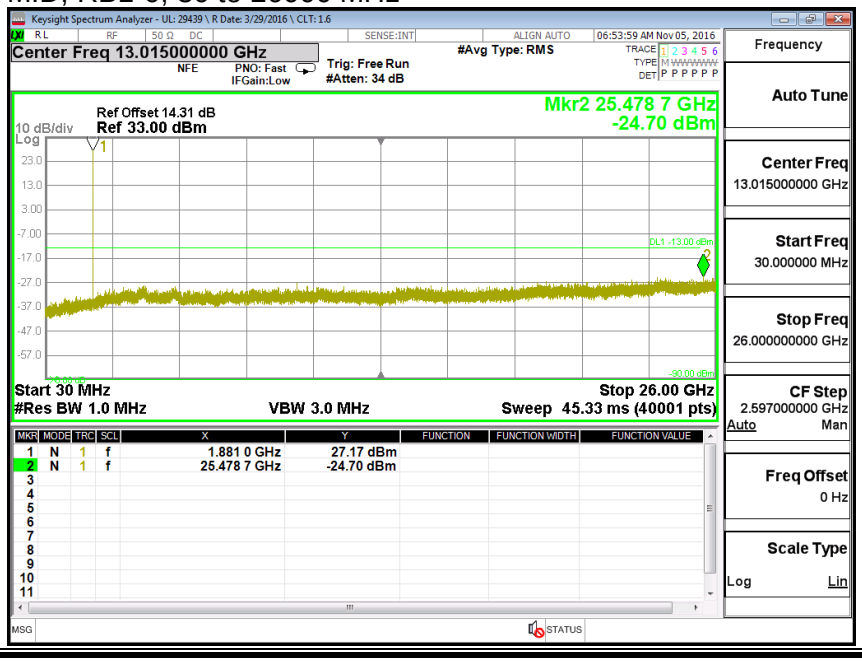


LTE BAND 25 QPSK, (5 MHz)

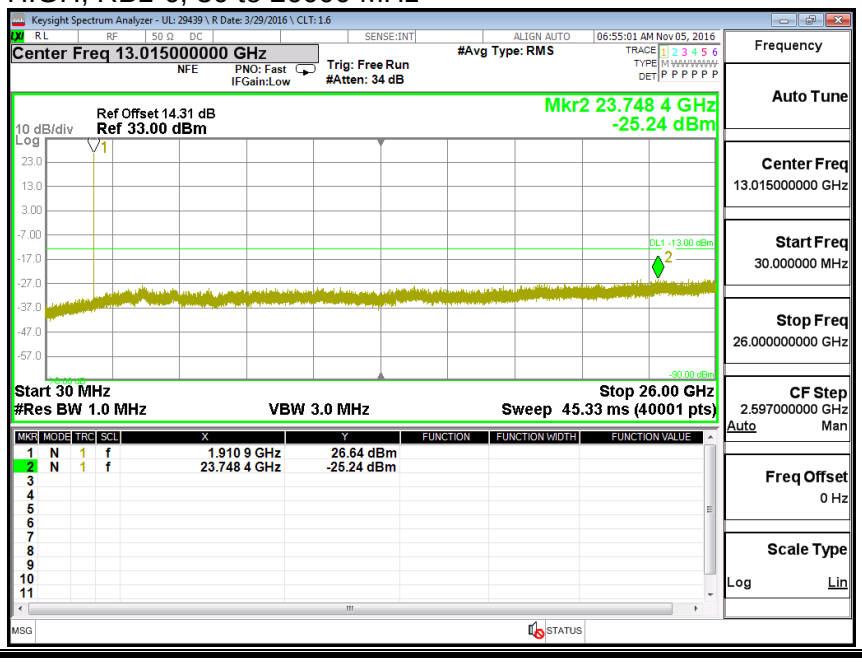
LOW, RB1-0, 30 to 26000 MHz



MID, RB1-0, 30 to 26000 MHz

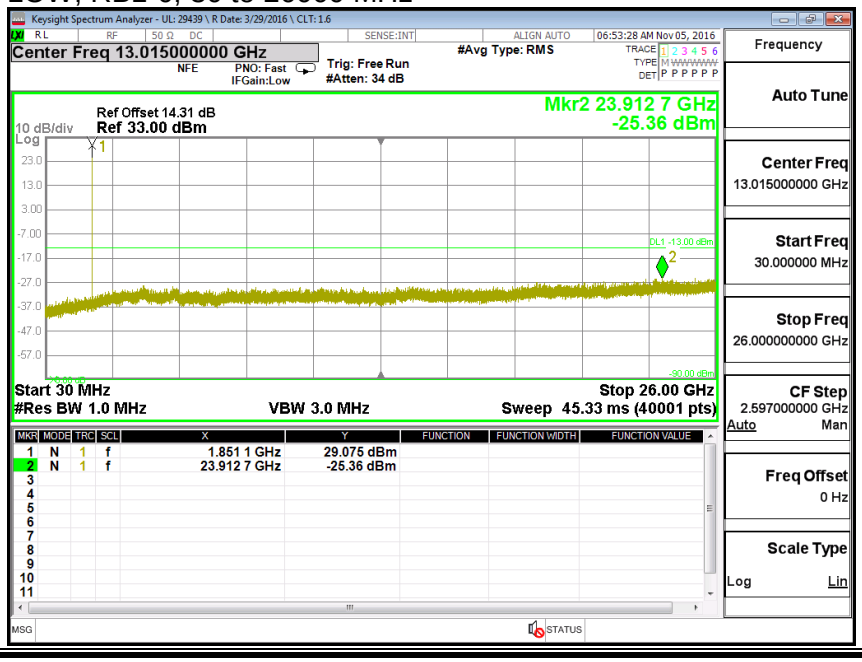


HIGH, RB1-0, 30 to 26000 MHz

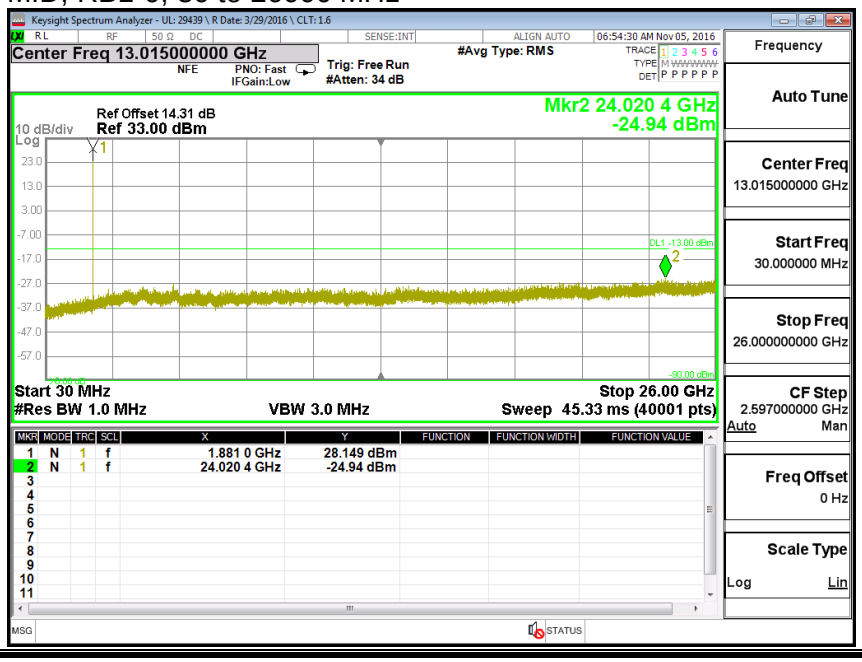


LTE BAND 25 16QAM, (5 MHz)

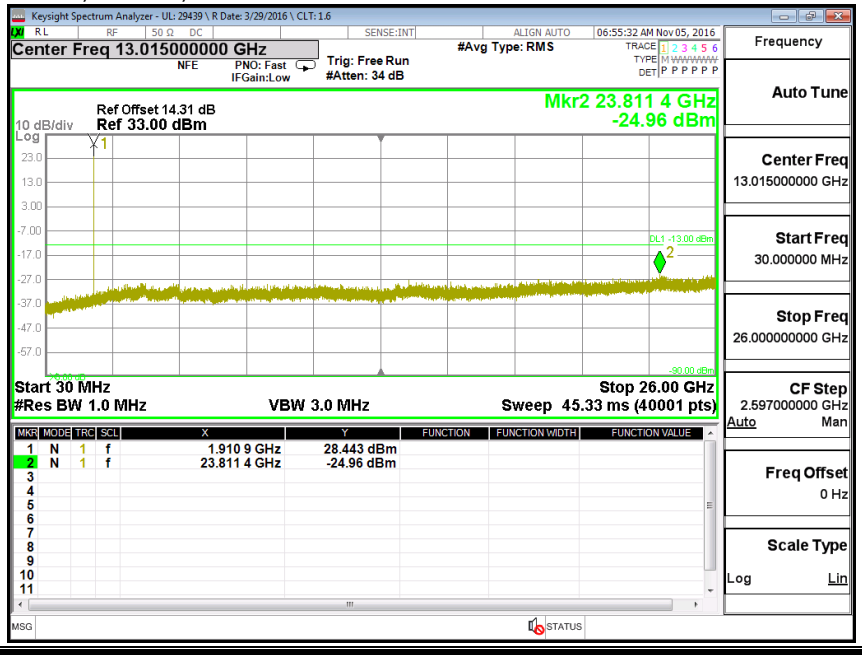
LOW, RB1-0, 30 to 26000 MHz



MID, RB1-0, 30 to 26000 MHz

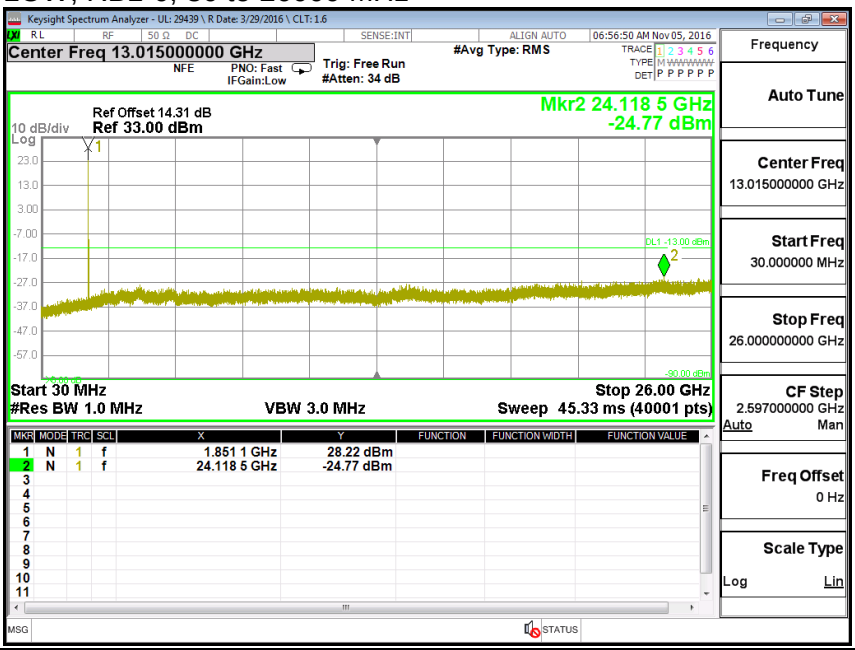


HIGH, RB1-0, 30 to 26000 MHz

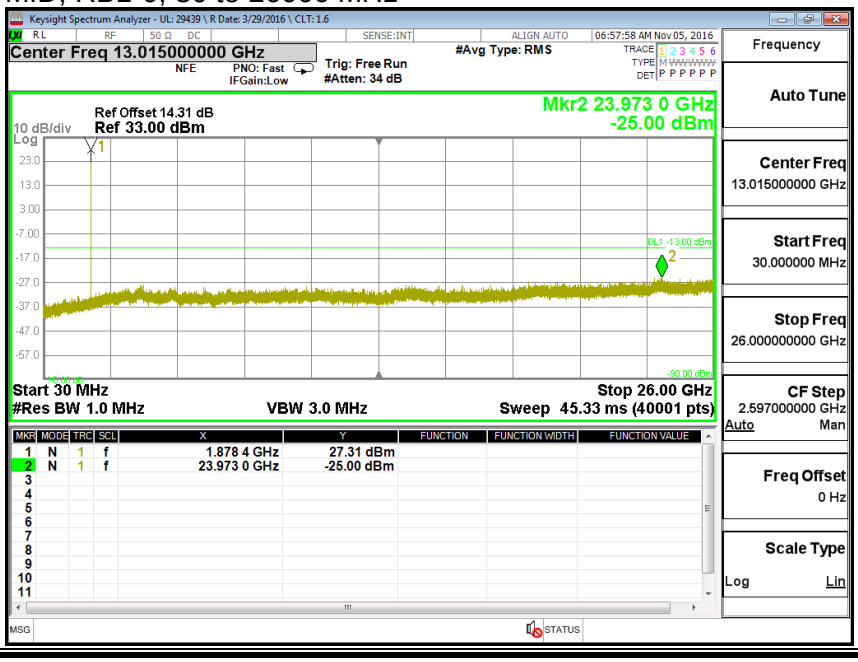


LTE BAND 25 QPSK, (10 MHz)

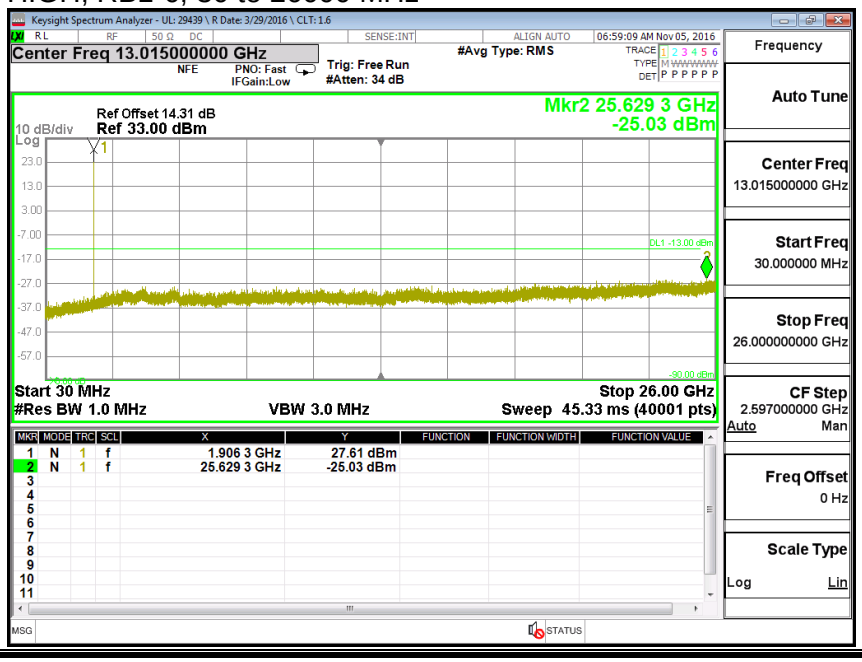
LOW, RB1-0, 30 to 26000 MHz



MID, RB1-0, 30 to 26000 MHz

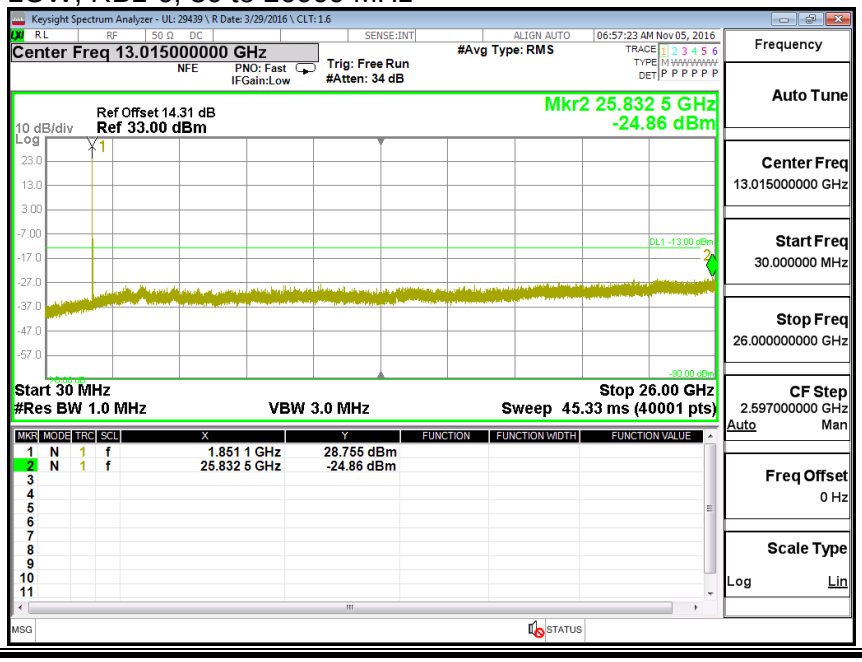


HIGH, RB1-0, 30 to 26000 MHz

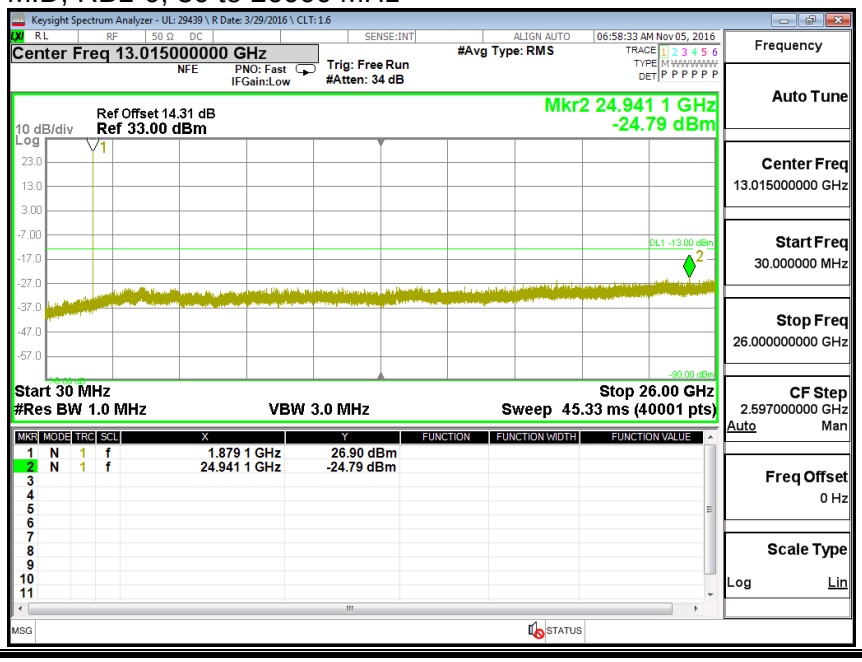


LTE BAND 25 16QAM, (10 MHz)

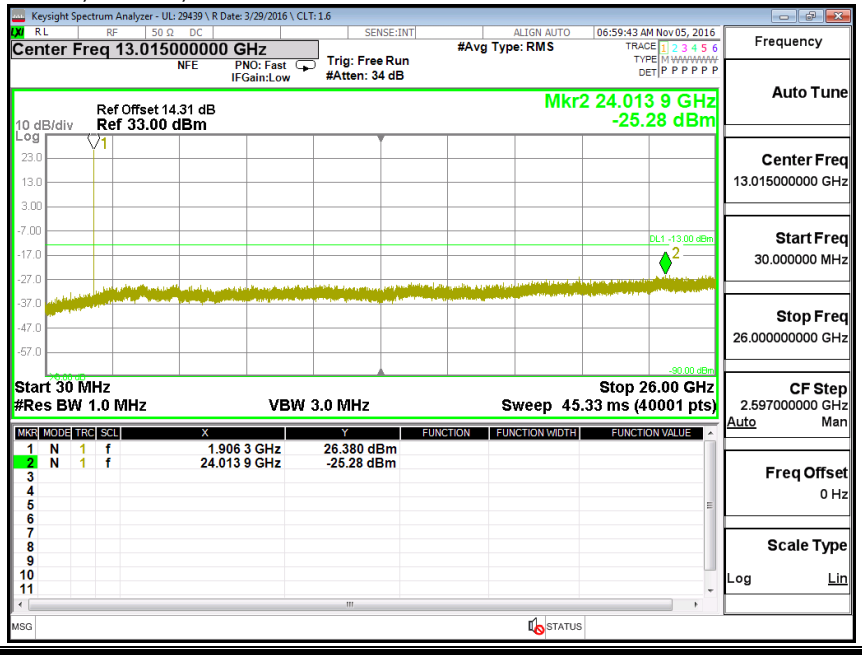
LOW, RB1-0, 30 to 26000 MHz



MID, RB1-0, 30 to 26000 MHz

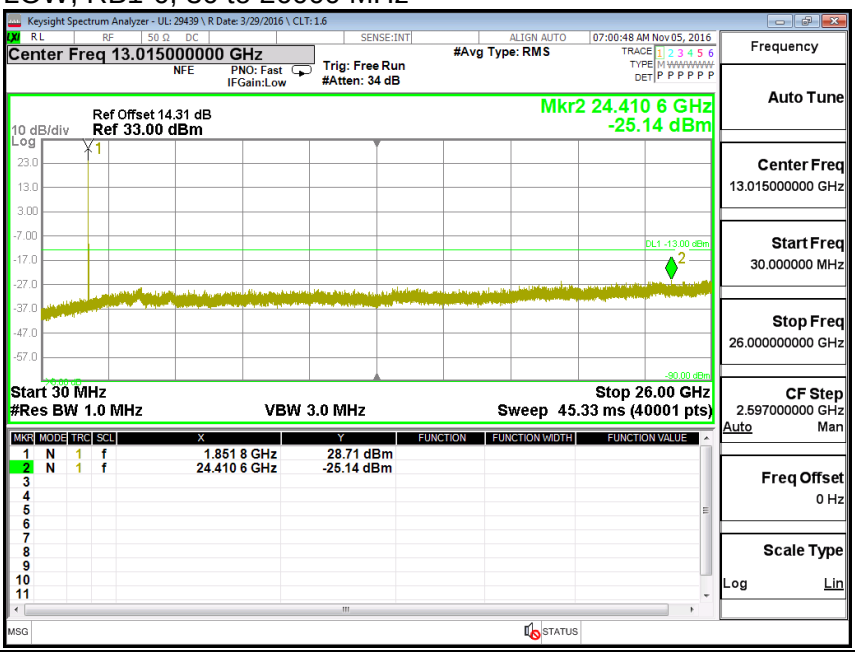


HIGH, RB1-0, 30 to 26000 MHz

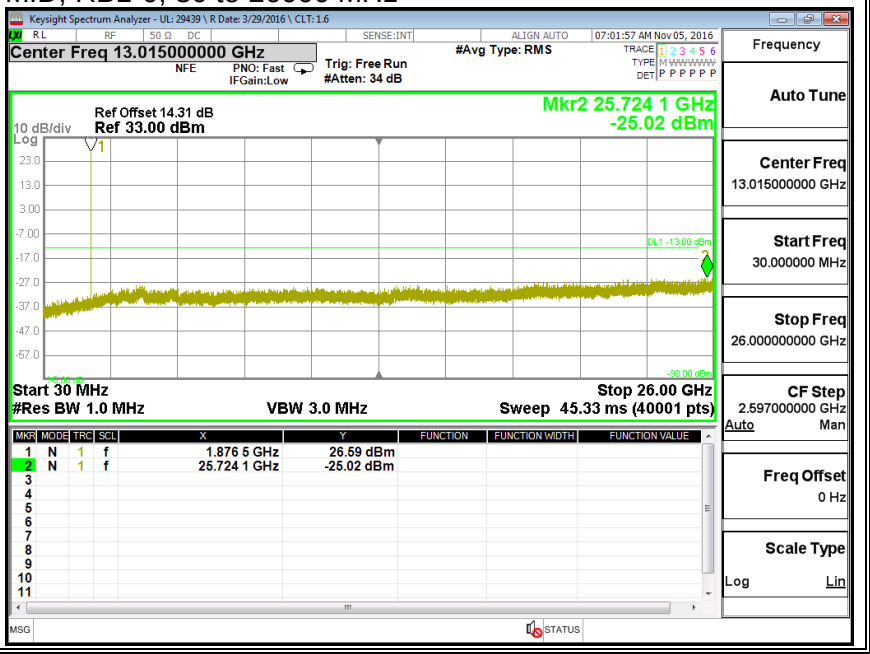


LTE BAND 25 QPSK, (15 MHz)

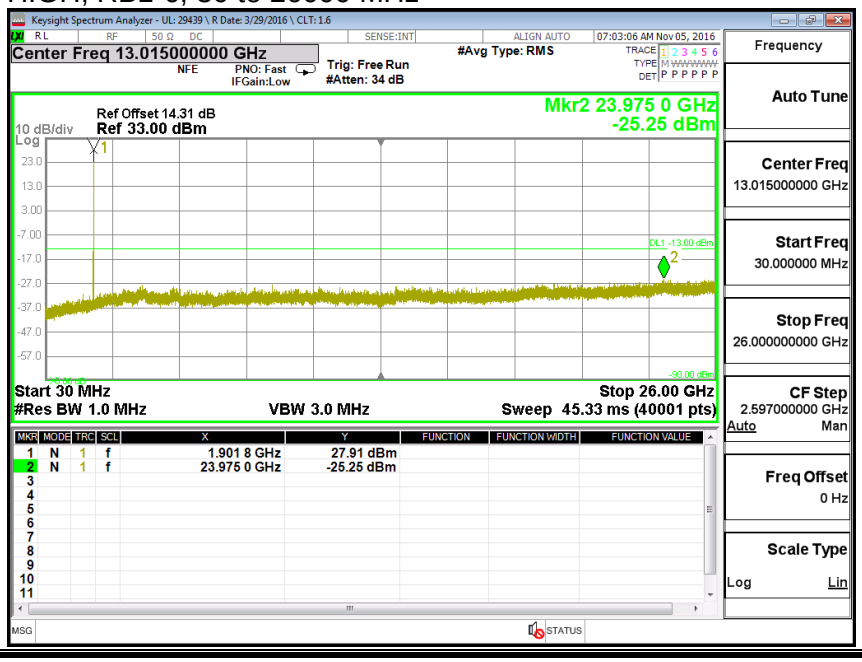
LOW, RB1-0, 30 to 26000 MHz



MID, RB1-0, 30 to 26000 MHz



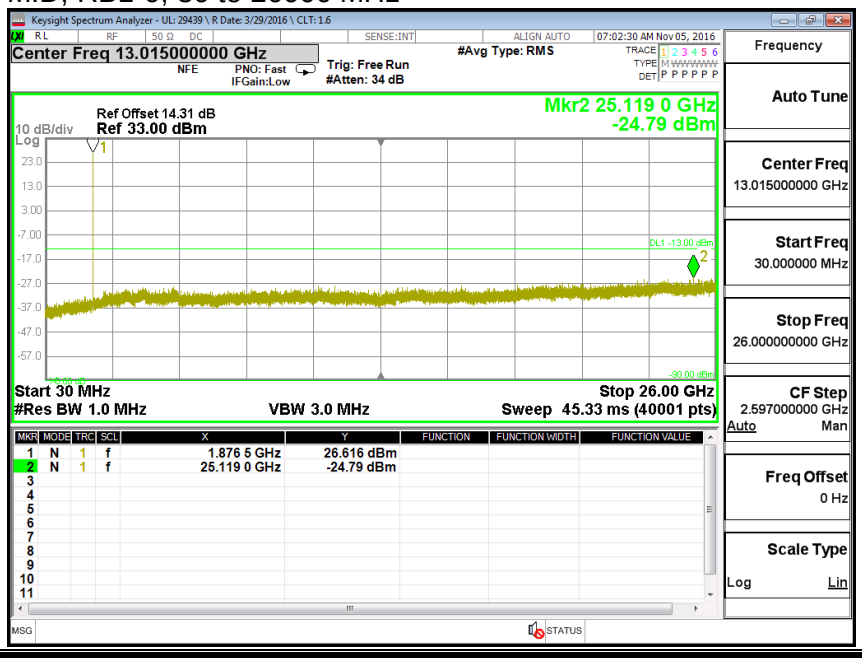
HIGH, RB1-0, 30 to 26000 MHz



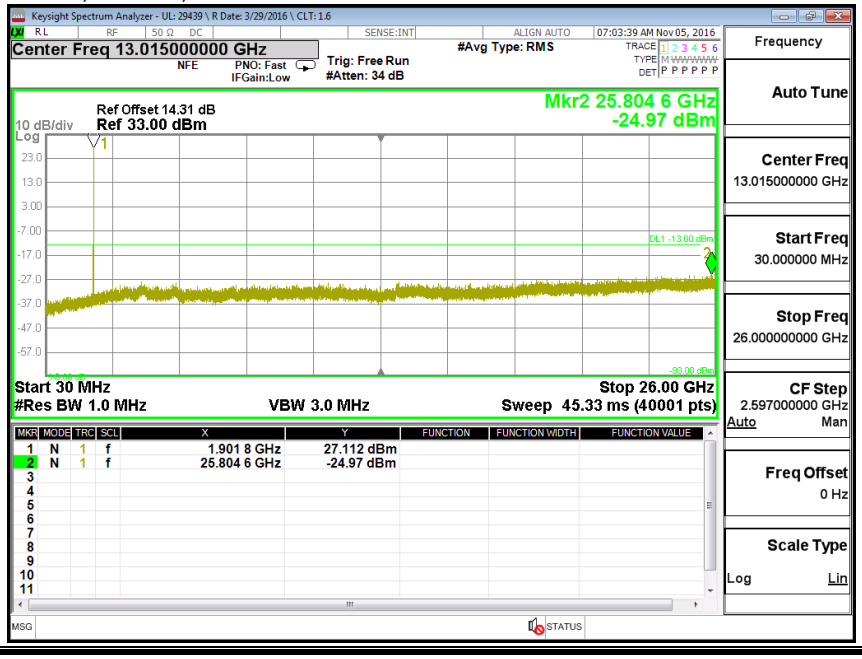
LTE BAND 25 16QAM, (15 MHz)

LOW, RB1-0, 30 to 26000 MHz

MID, RB1-0, 30 to 26000 MHz

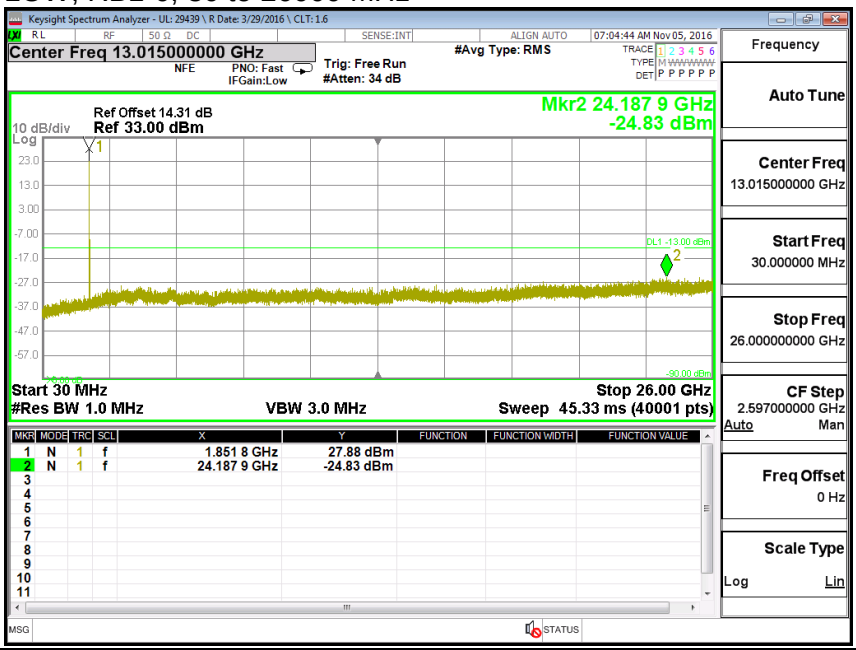


HIGH, RB1-0, 30 to 26000 MHz

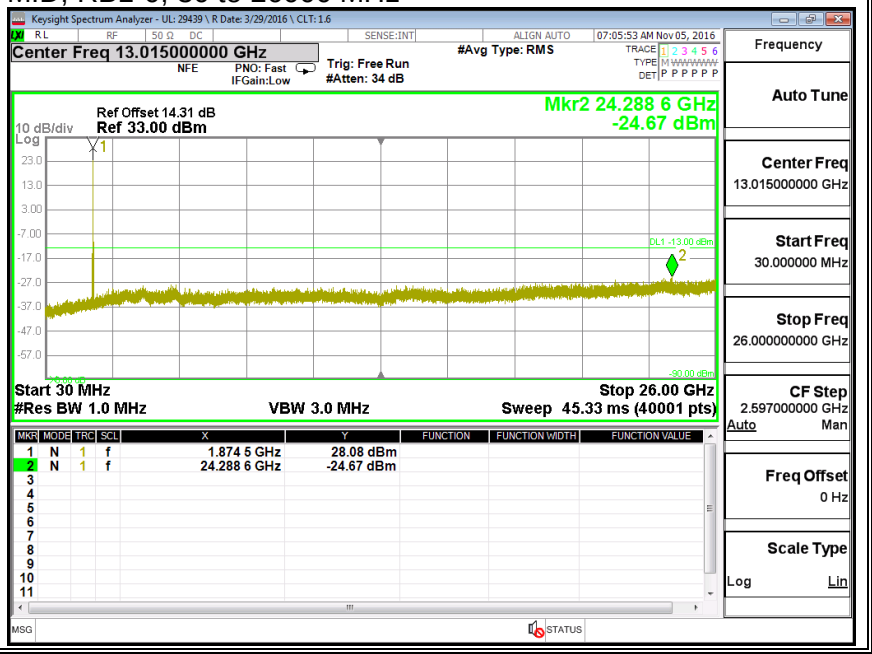


LTE BAND 25 QPSK, (20 MHz)

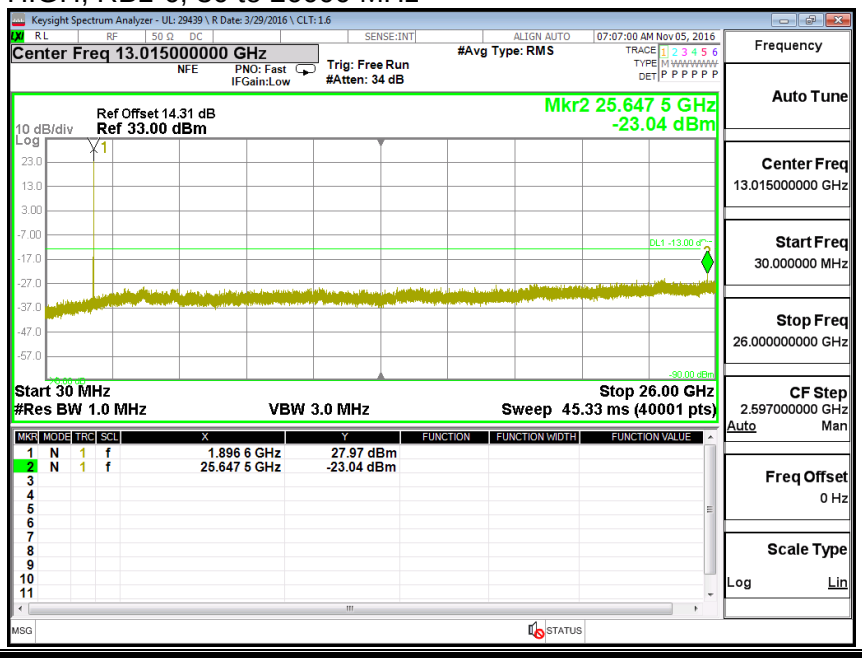
LOW, RB1-0, 30 to 26000 MHz



MID, RB1-0, 30 to 26000 MHz

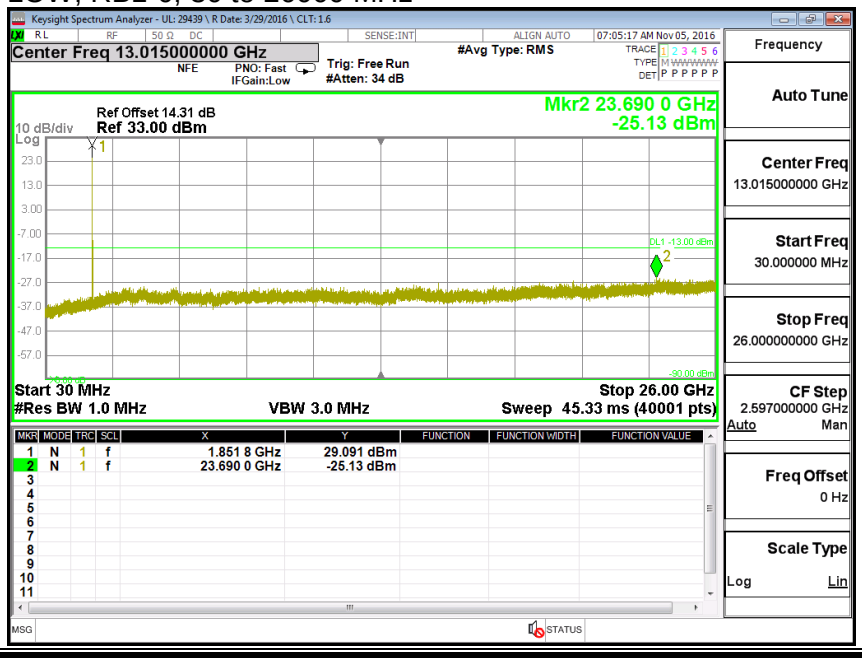


HIGH, RB1-0, 30 to 26000 MHz

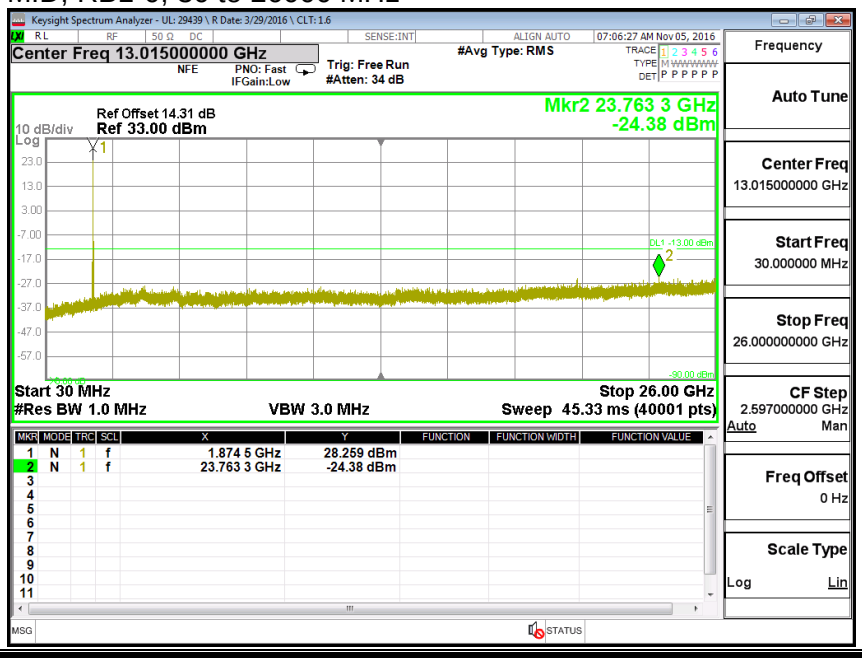


LTE BAND 25 16QAM, (20 MHz)

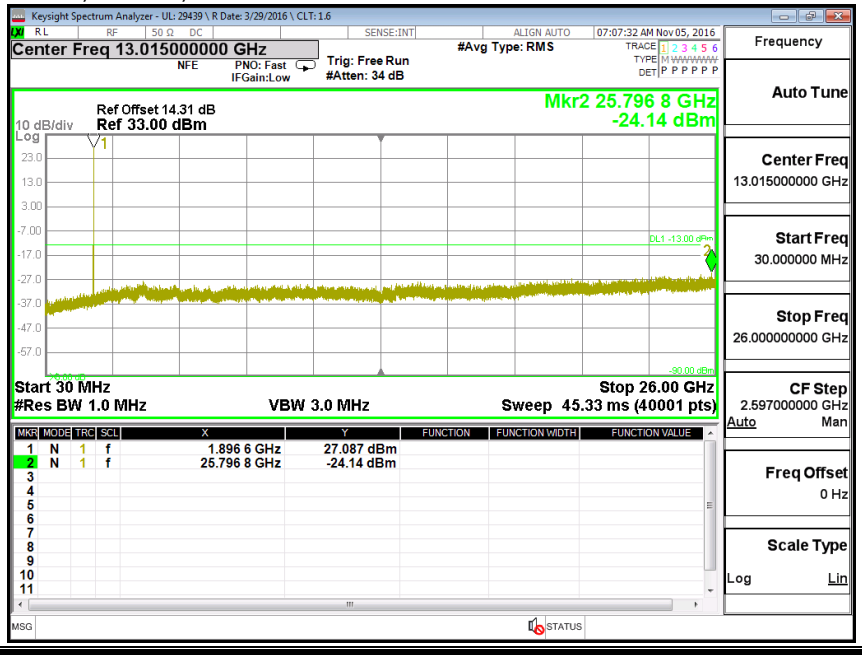
LOW, RB1-0, 30 to 26000 MHz



MID, RB1-0, 30 to 26000 MHz

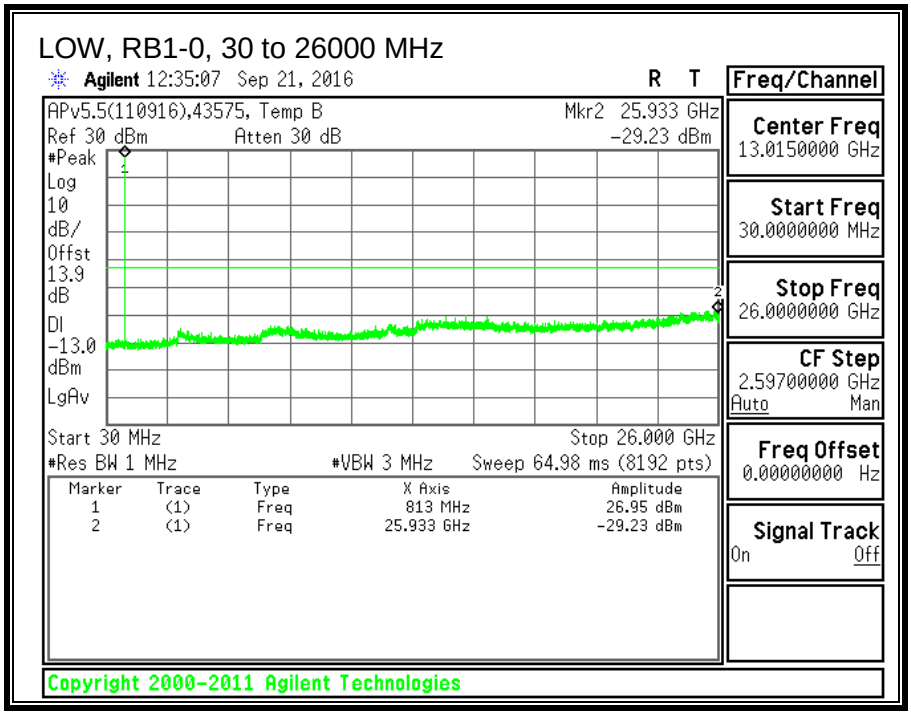


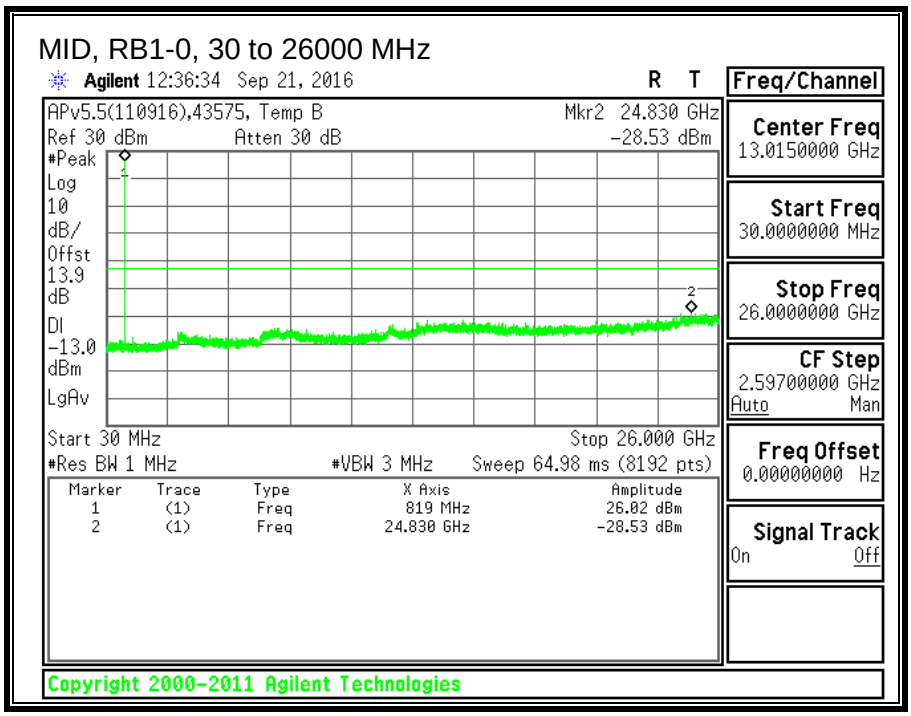
HIGH, RB1-0, 30 to 26000 MHz

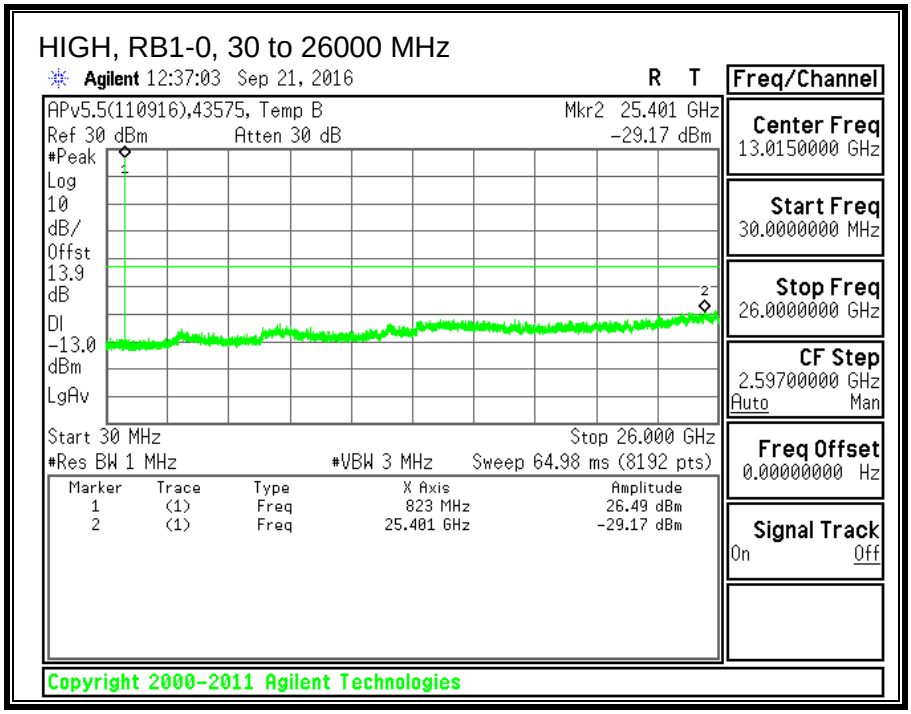


8.3.9. LTE BAND 26

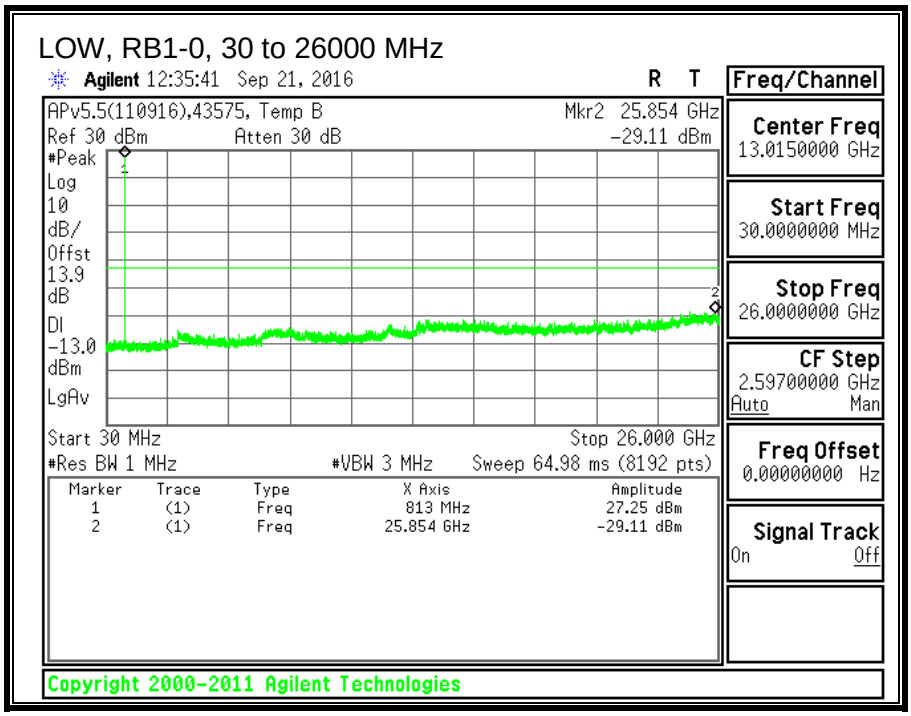
LTE BAND 26 QPSK, (1.4 MHz)



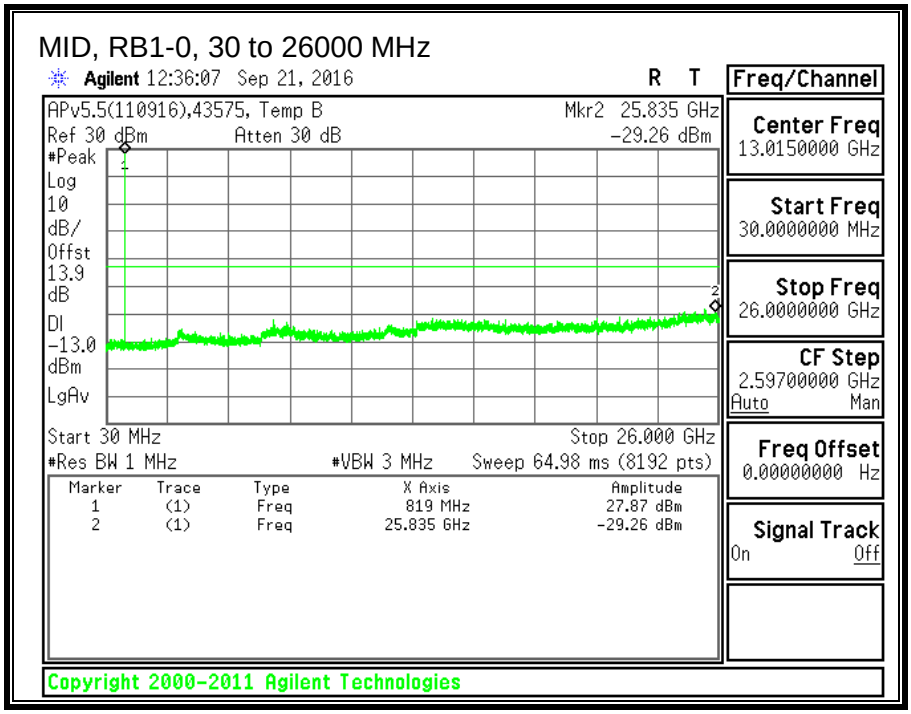




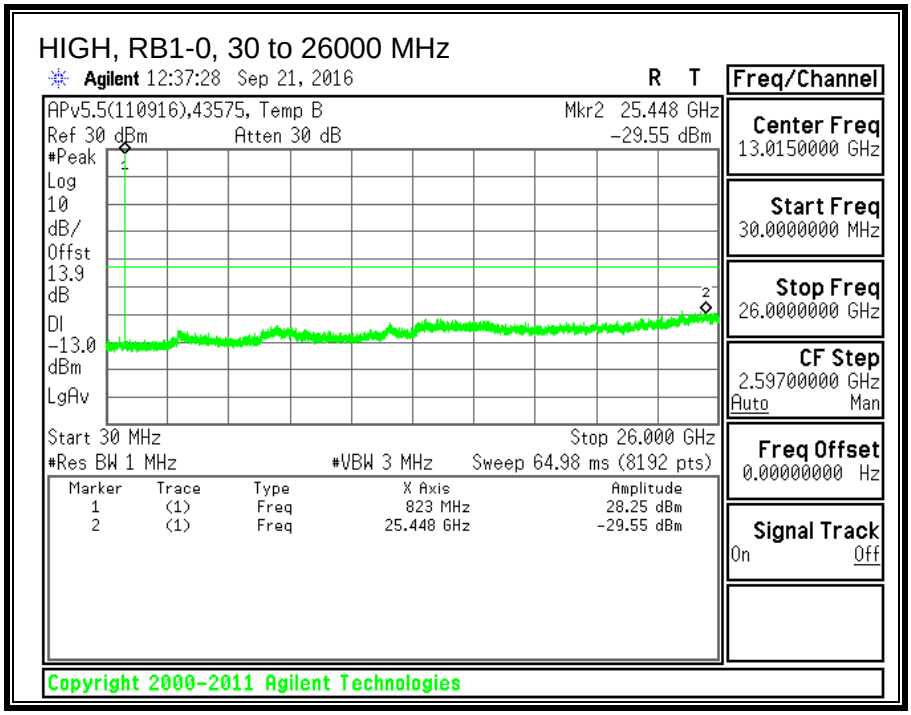
LTE BAND 26 16QAM, (1.4 MHz)



MID, RB1-0, 30 to 26000 MHz

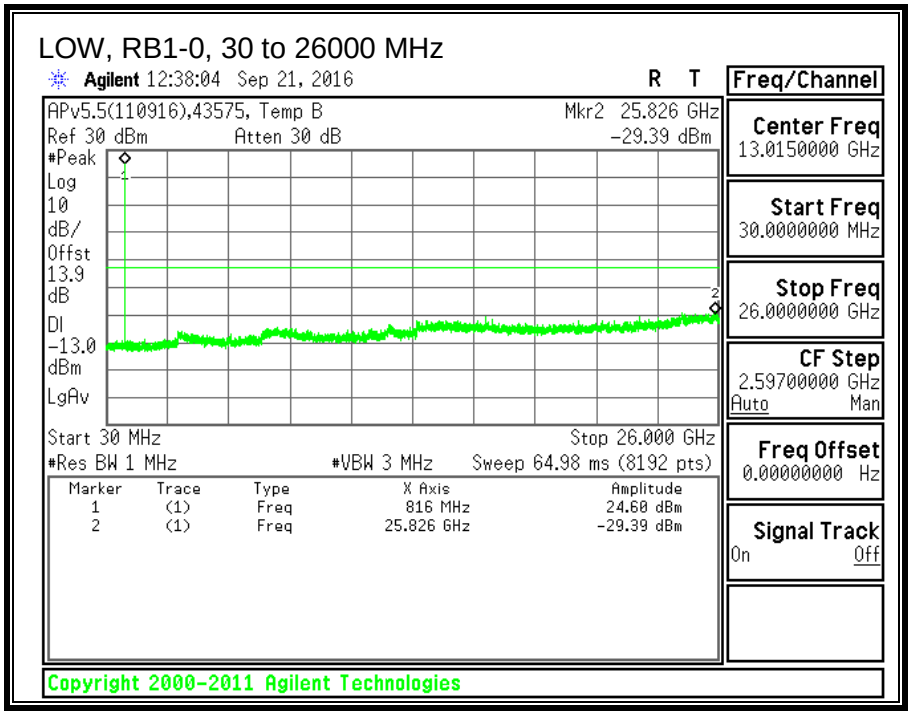


HIGH, RB1-0, 30 to 26000 MHz

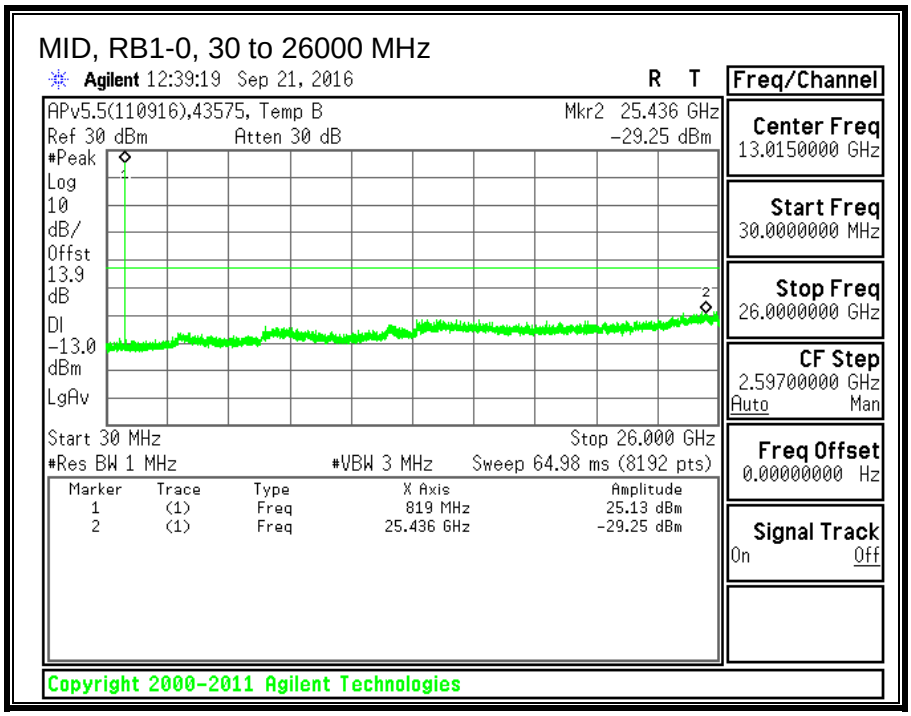


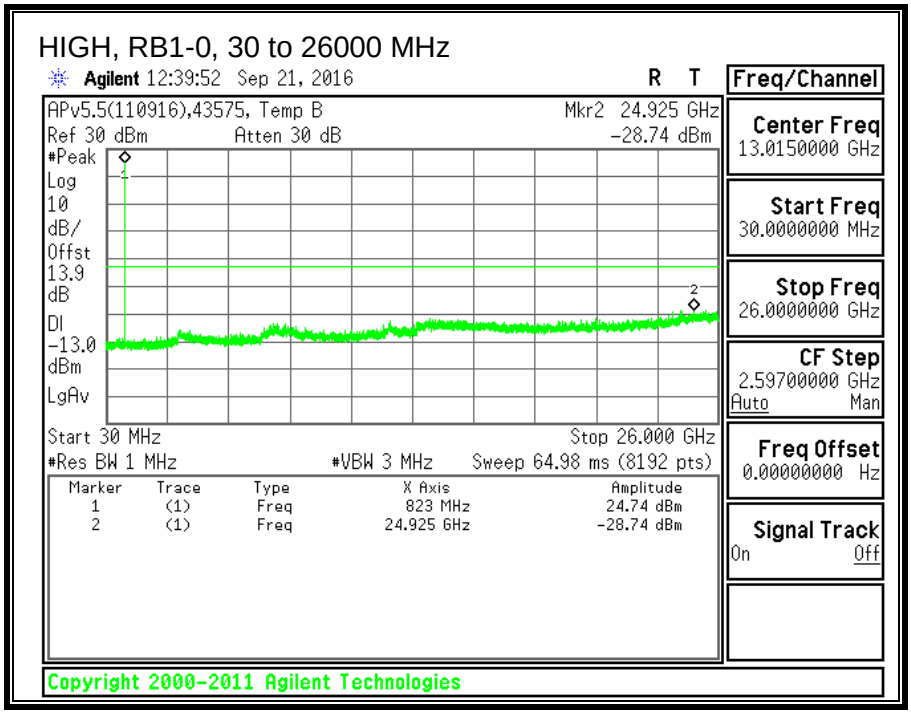
LTE BAND 26 QPSK, (3 MHz)

LOW, RB1-0, 30 to 26000 MHz

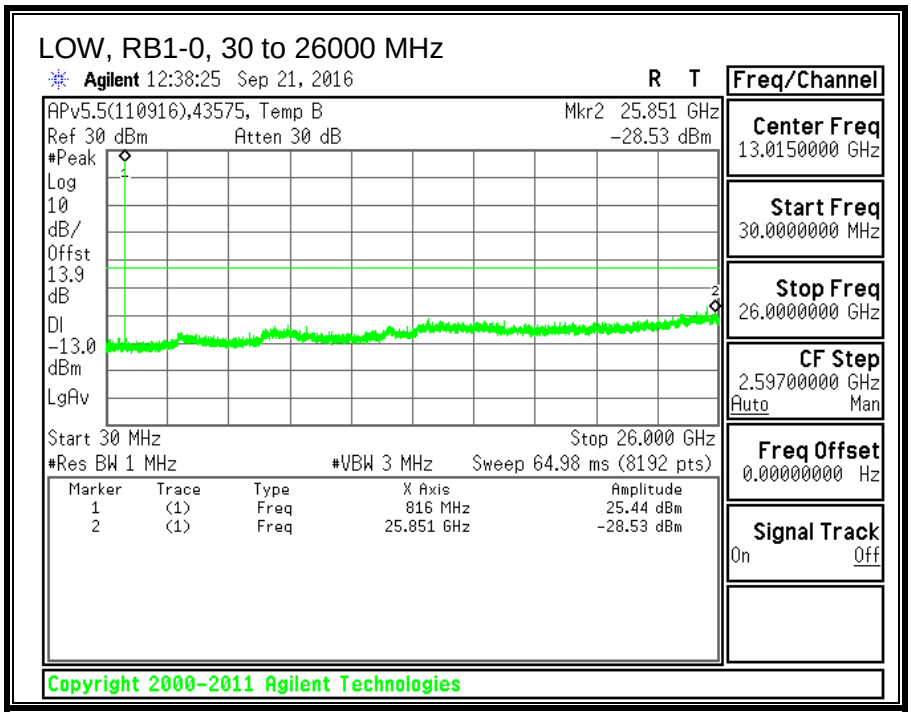


MID, RB1-0, 30 to 26000 MHz

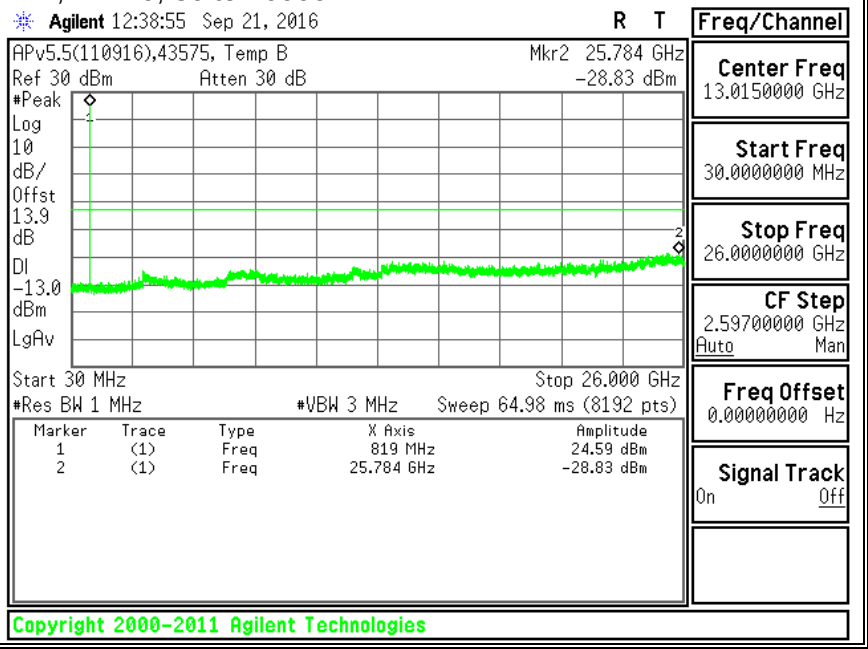




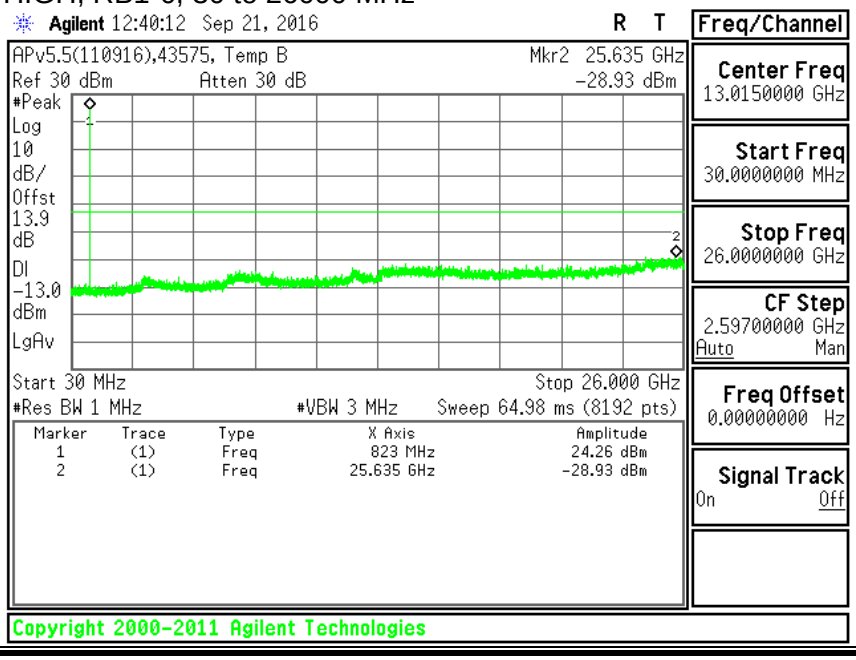
LTE BAND 26 16QAM, (3 MHz)



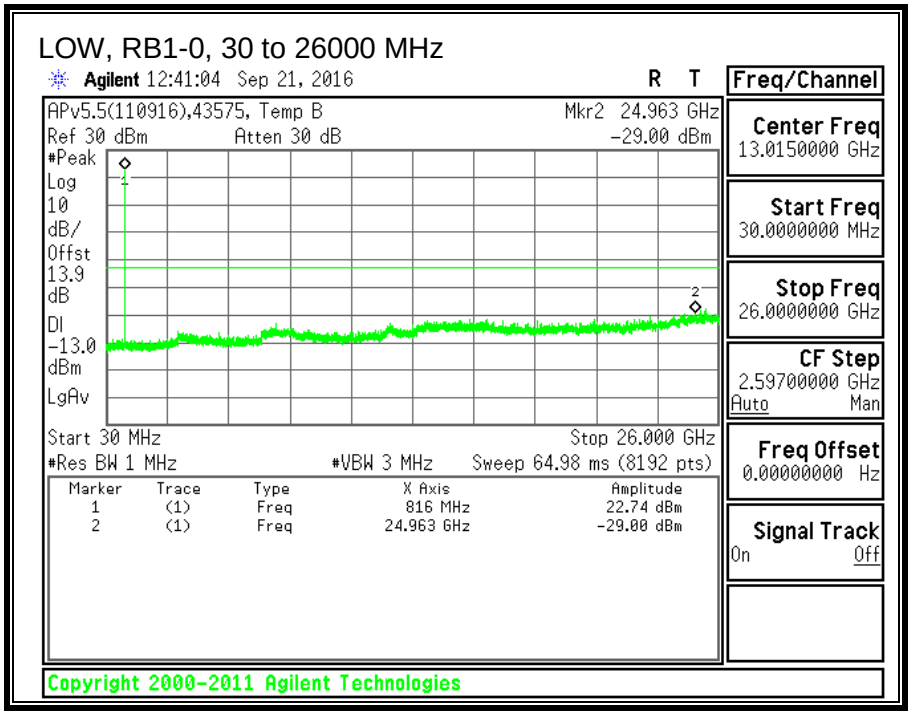
MID, RB1-0, 30 to 26000 MHz

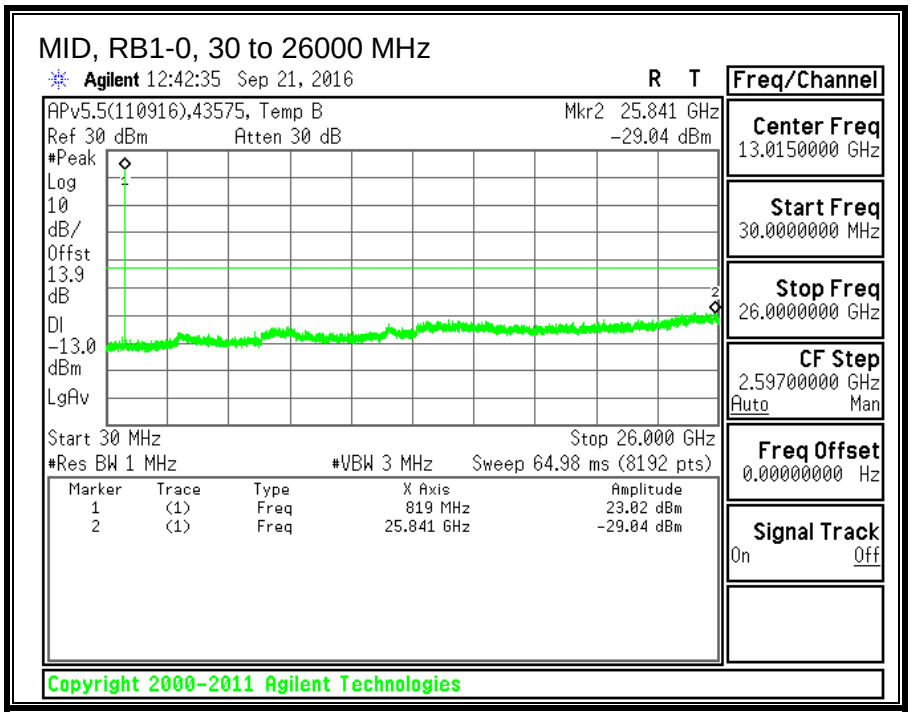


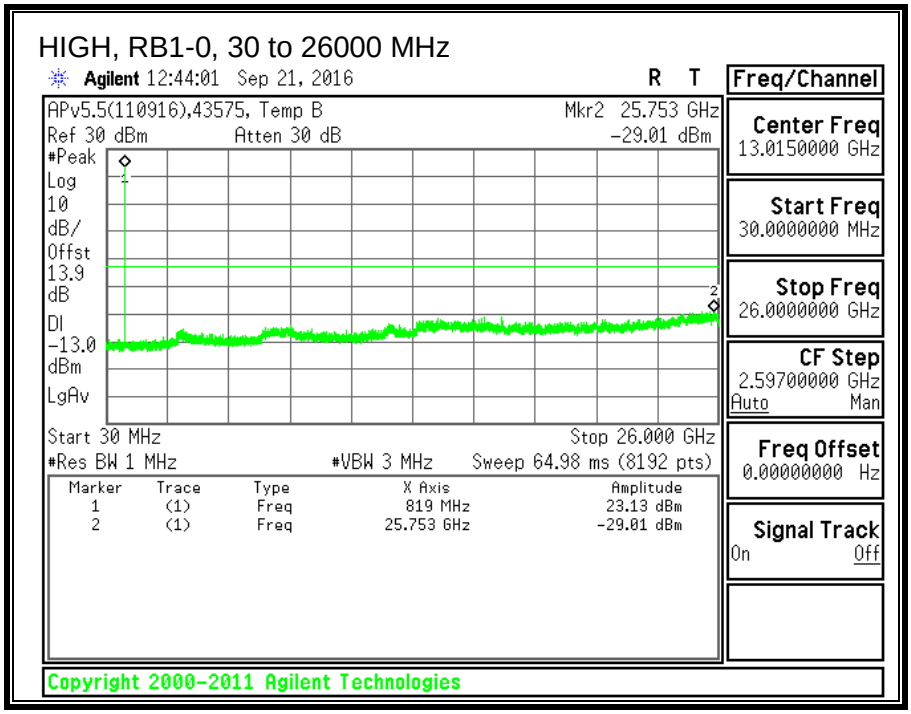
HIGH, RB1-0, 30 to 26000 MHz



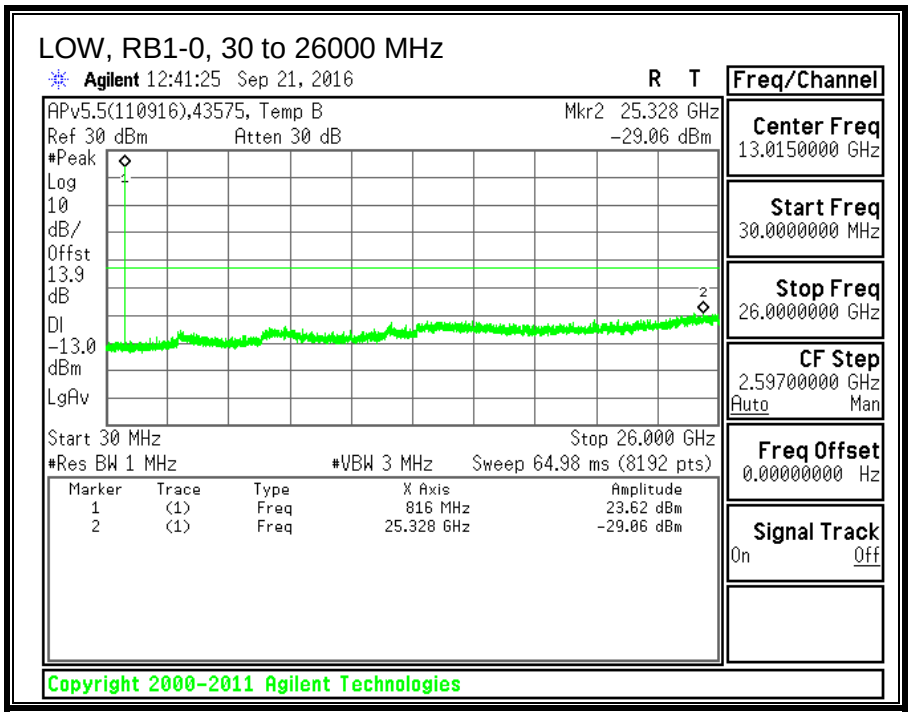
LTE BAND 26 QPSK, (5 MHz)



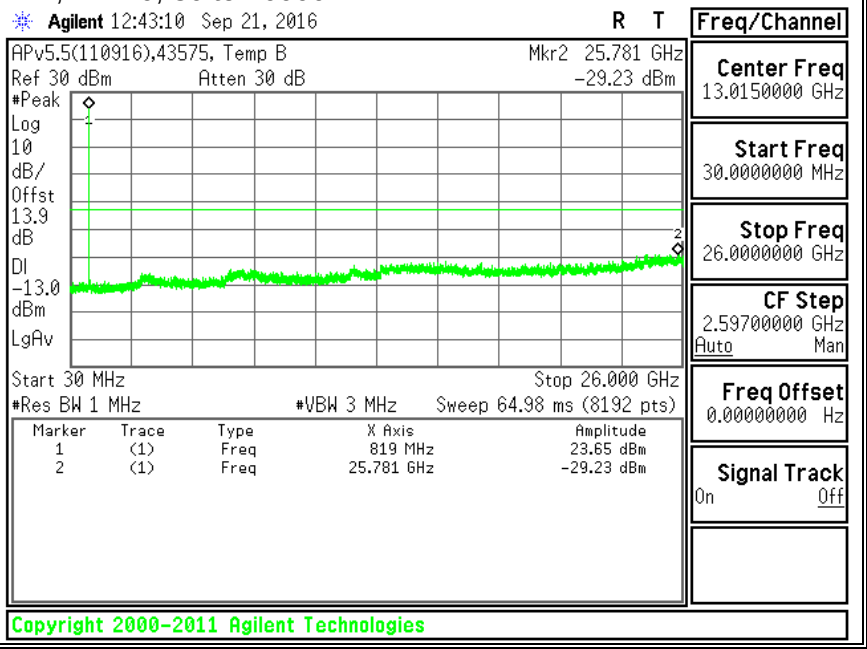




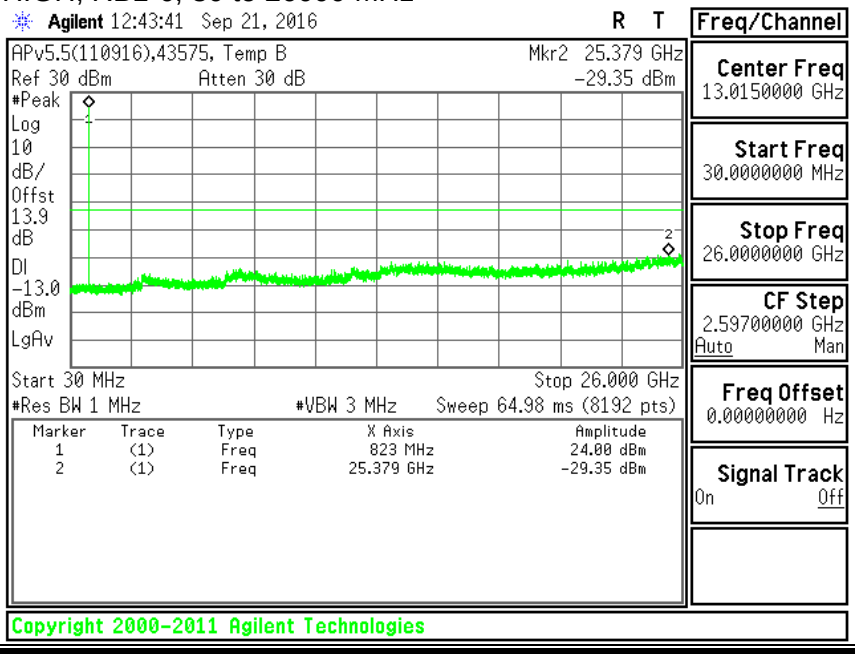
LTE BAND 26 16QAM, (5 MHz)



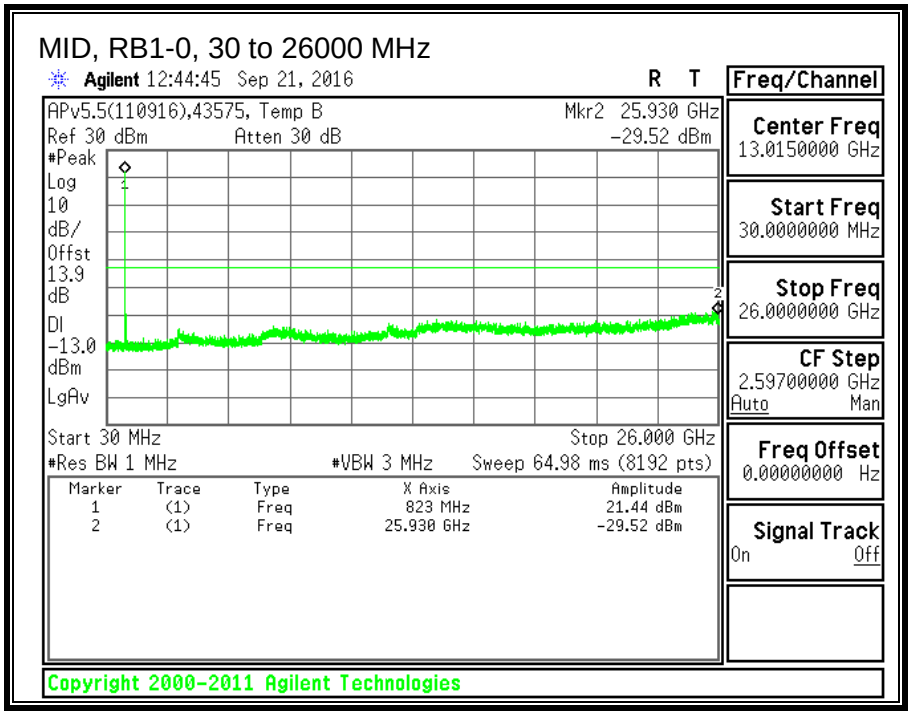
MID, RB1-0, 30 to 26000 MHz



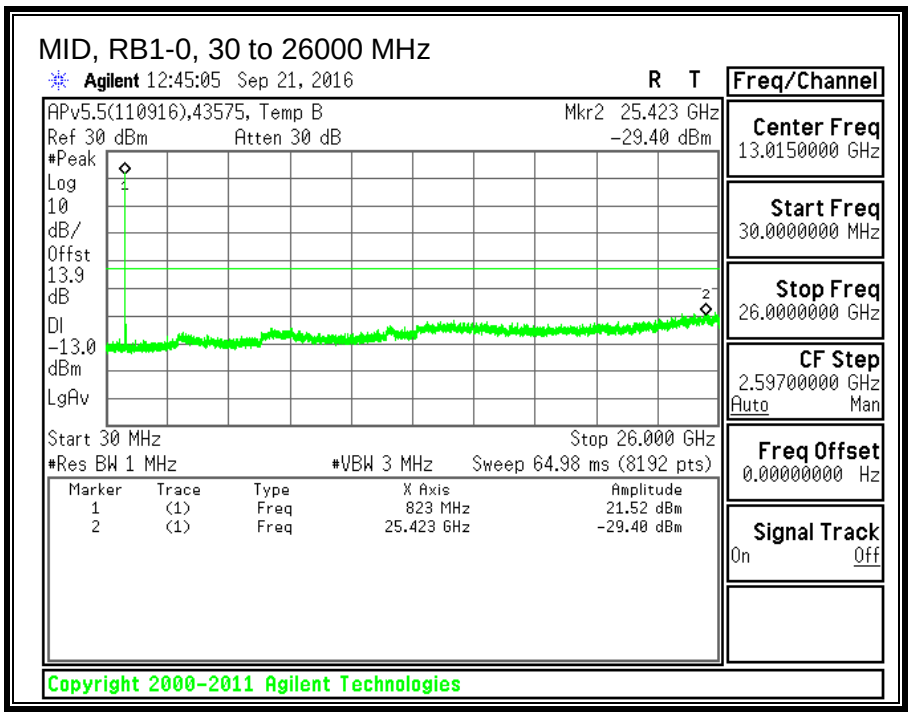
HIGH, RB1-0, 30 to 26000 MHz



LTE BAND 26 QPSK, (10 MHz)



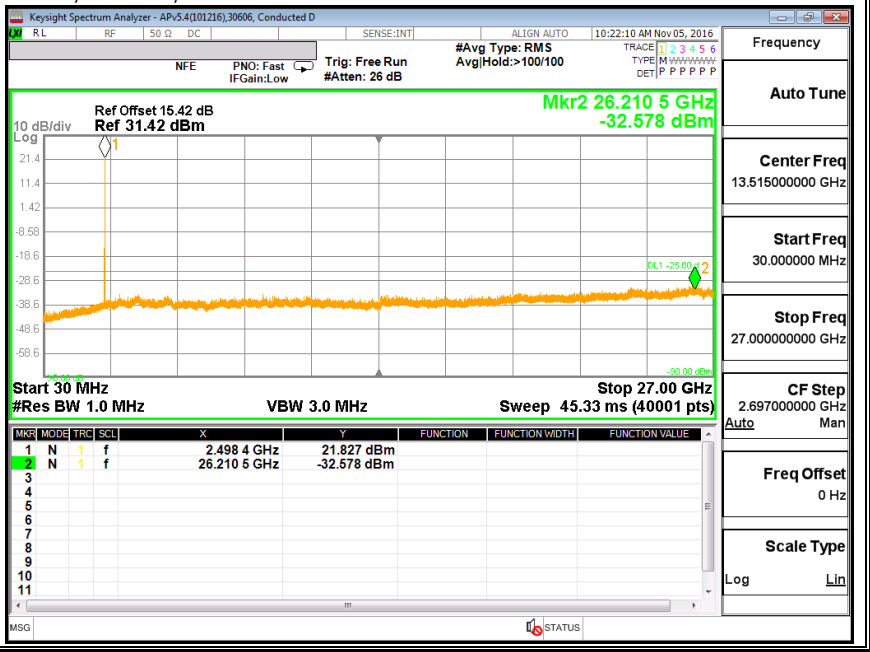
LTE BAND 26 16QAM, (10 MHz)



8.3.10. LTE BAND 41

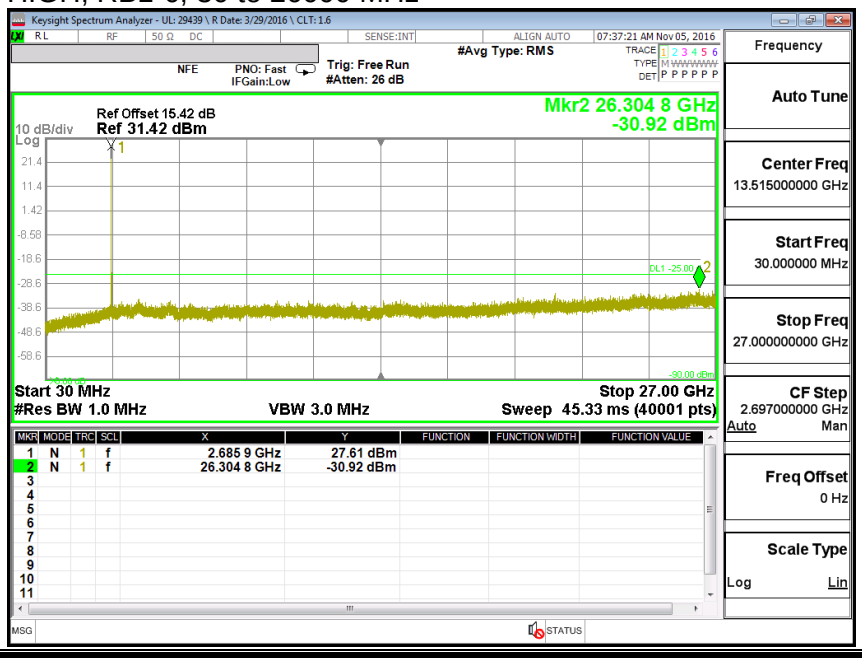
LTE BAND 41 QPSK, (5 MHz)

LOW, RB1-0, 30 to 26000 MHz



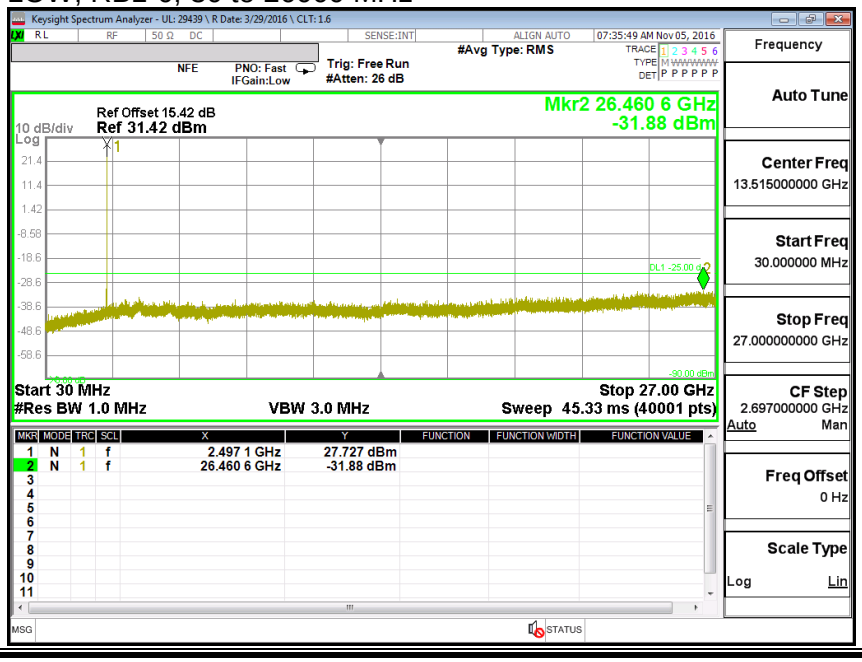
MID, RB1-0, 30 to 26000 MHz

HIGH, RB1-0, 30 to 26000 MHz

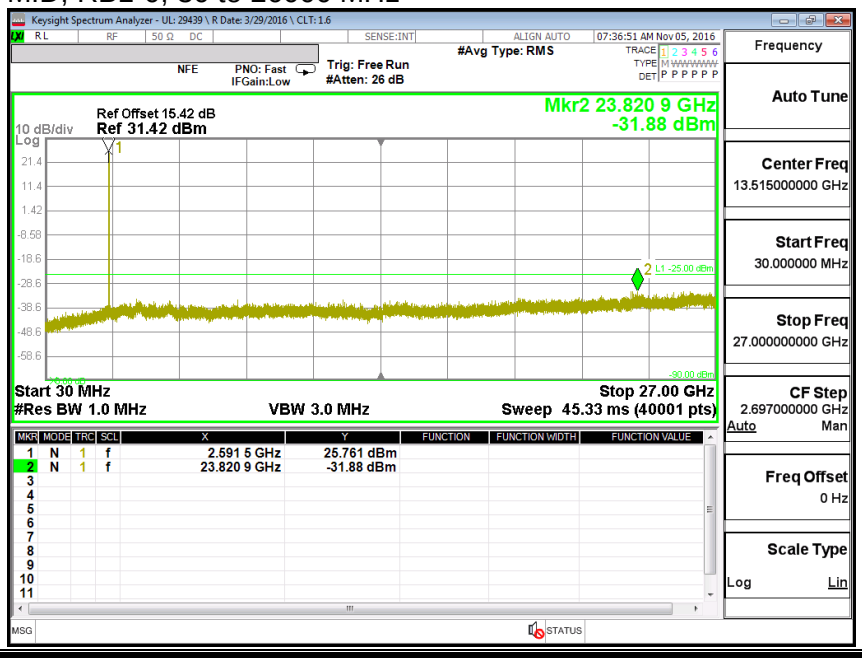


LTE BAND 41 16QAM, (5 MHz)

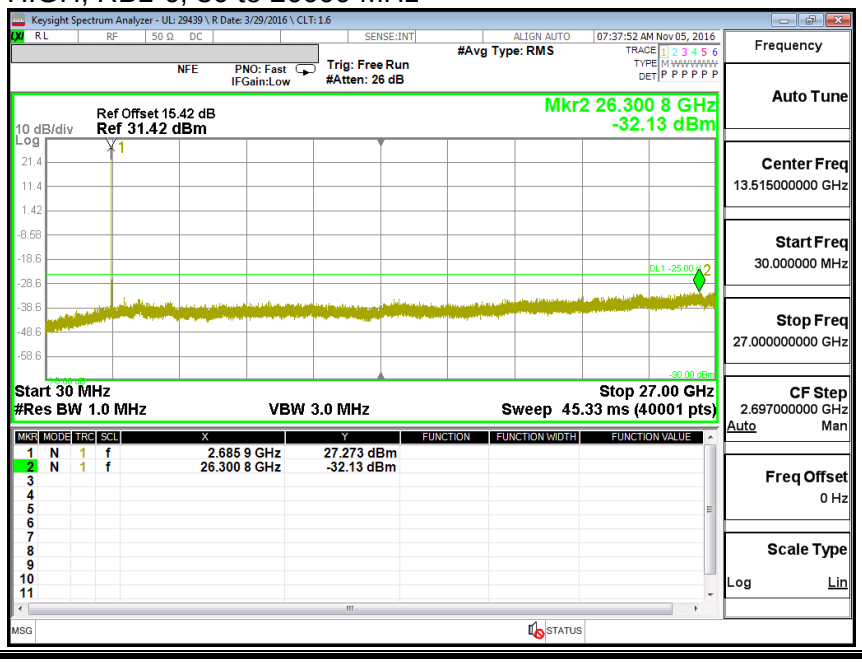
LOW, RB1-0, 30 to 26000 MHz



MID, RB1-0, 30 to 26000 MHz

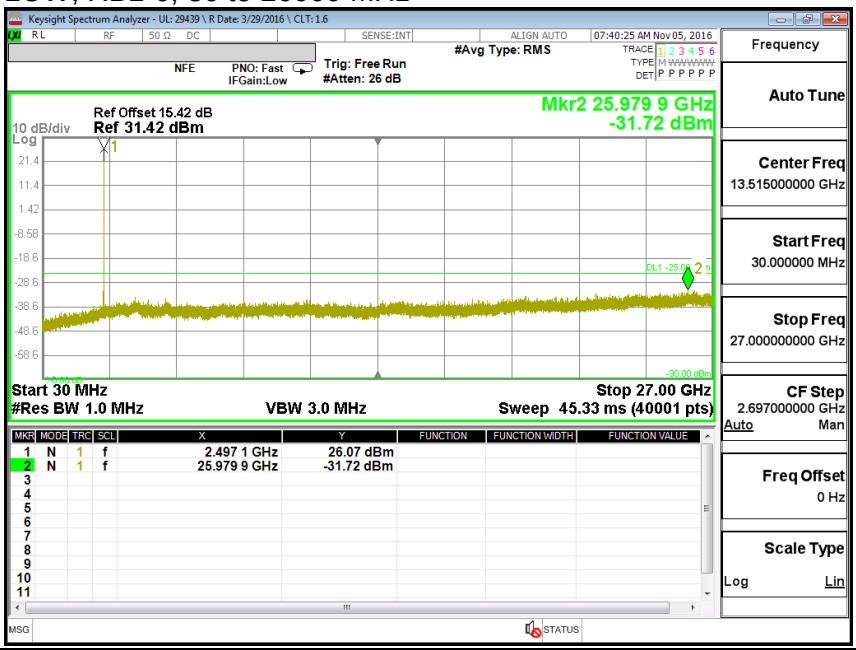


HIGH, RB1-0, 30 to 26000 MHz

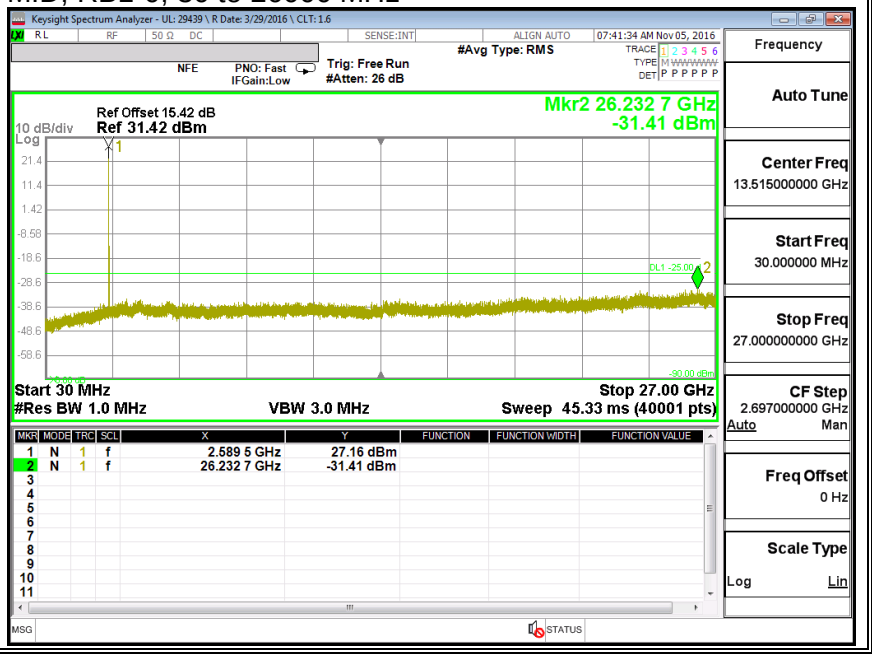


LTE BAND 41 QPSK, (10 MHz)

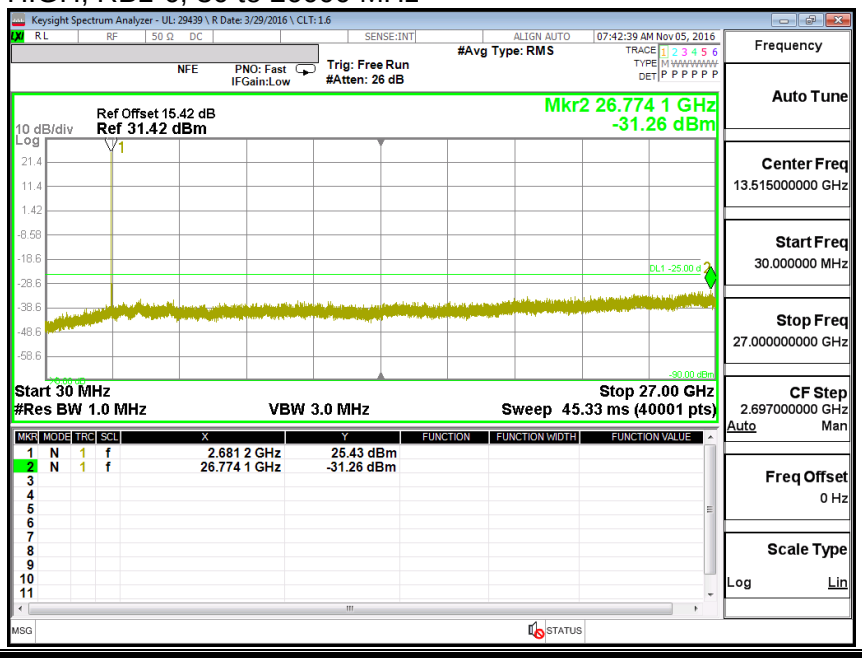
LOW, RB1-0, 30 to 26000 MHz



MID, RB1-0, 30 to 26000 MHz

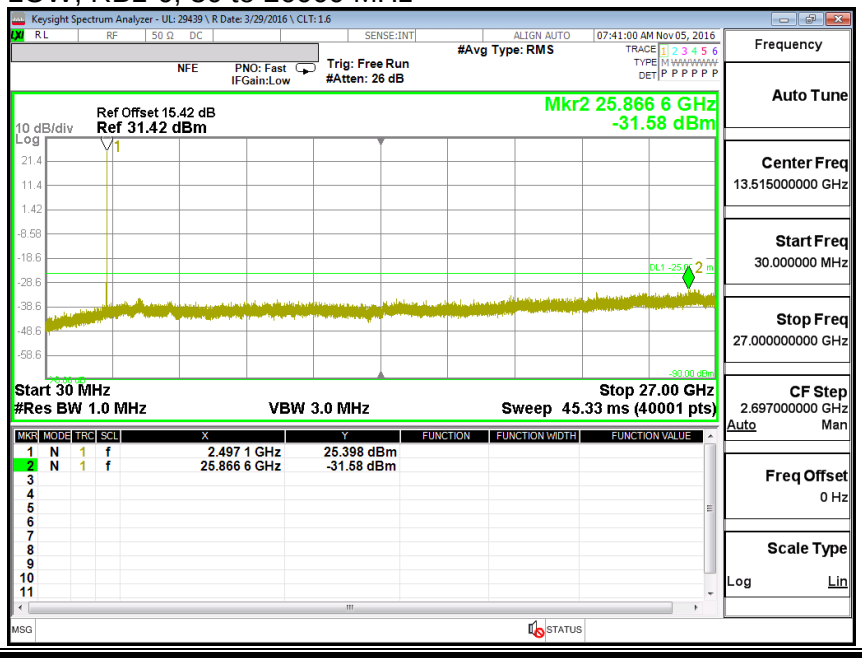


HIGH, RB1-0, 30 to 26000 MHz

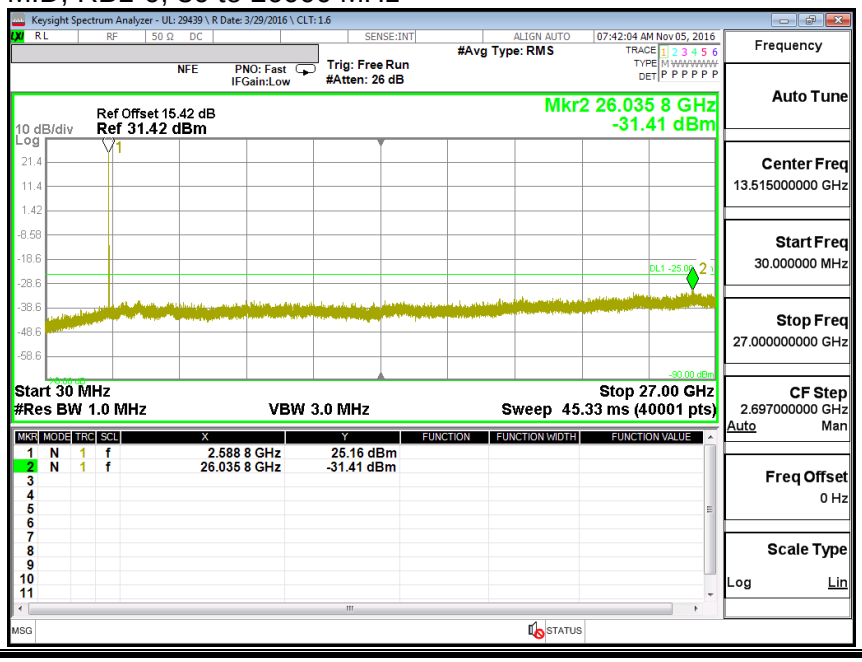


LTE BAND 41 16QAM, (10 MHz)

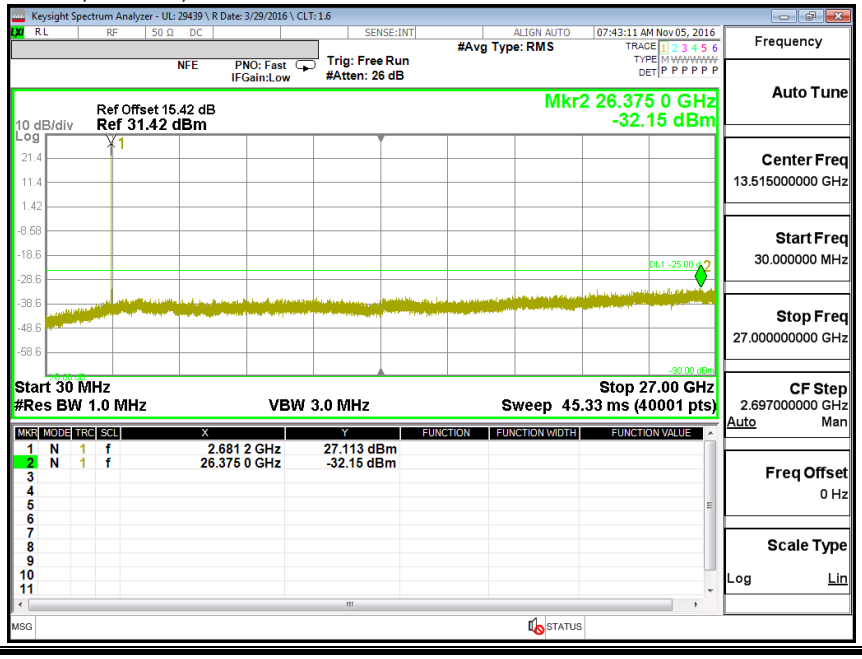
LOW, RB1-0, 30 to 26000 MHz



MID, RB1-0, 30 to 26000 MHz

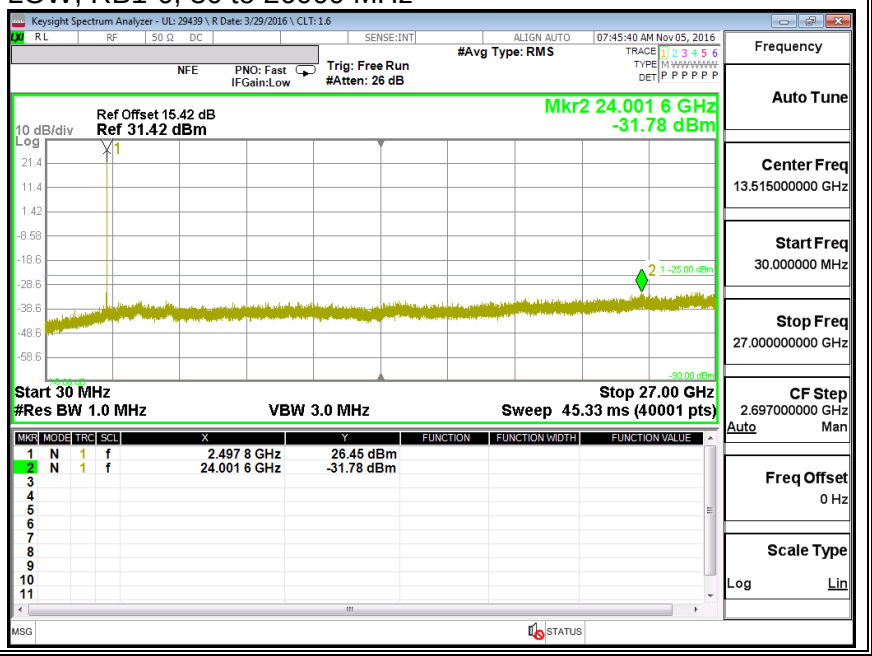


HIGH, RB1-0, 30 to 26000 MHz

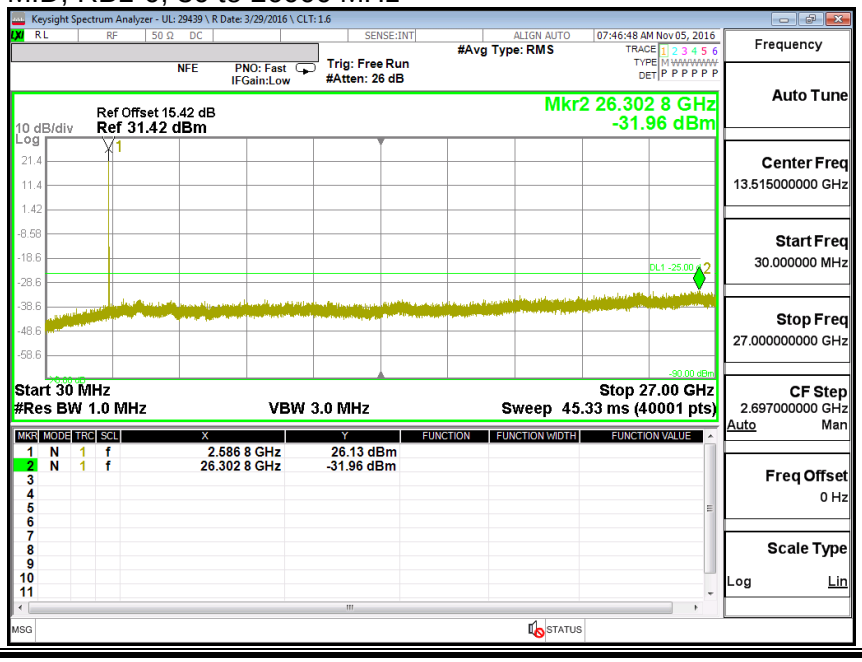


LTE BAND 41 QPSK, (15 MHz)

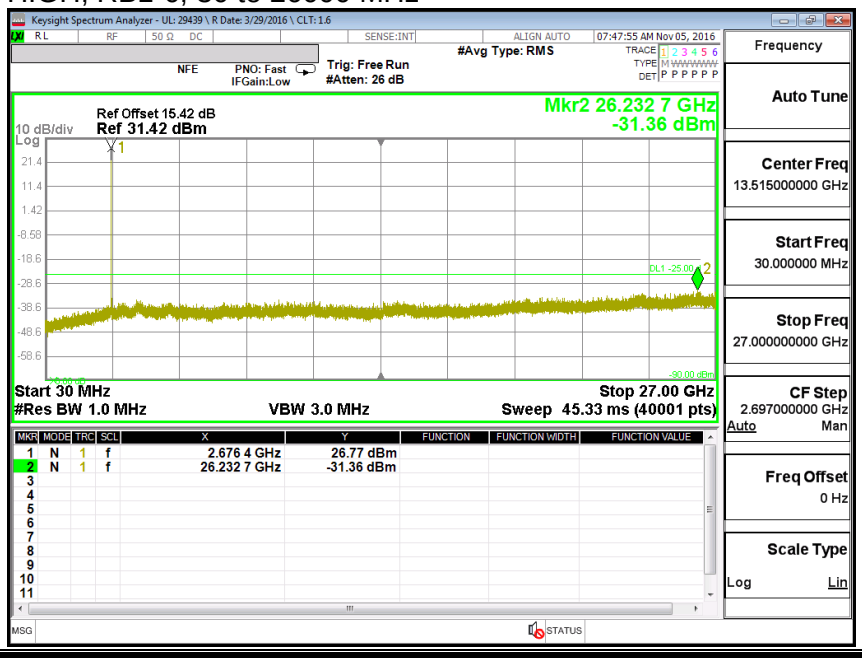
LOW, RB1-0, 30 to 26000 MHz



MID, RB1-0, 30 to 26000 MHz

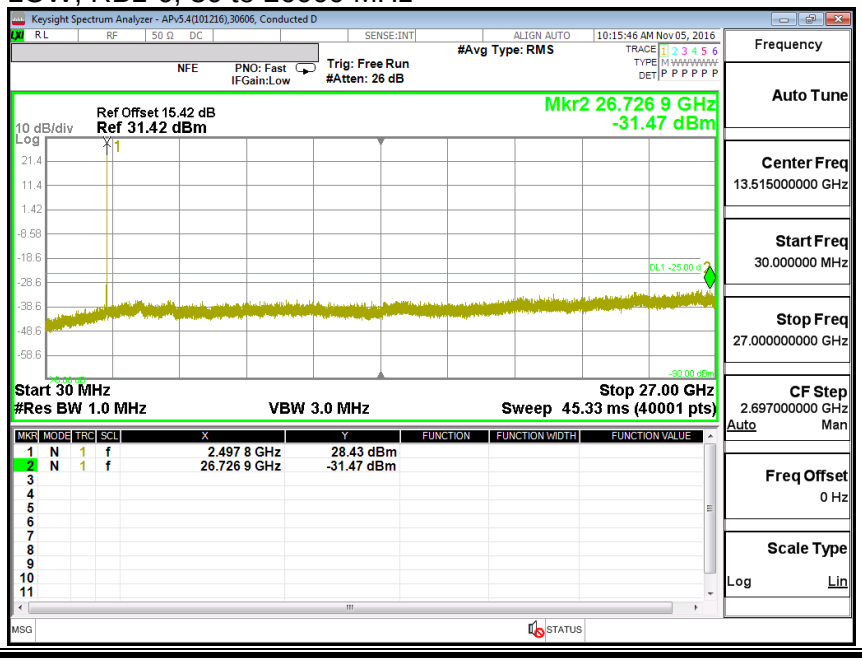


HIGH, RB1-0, 30 to 26000 MHz

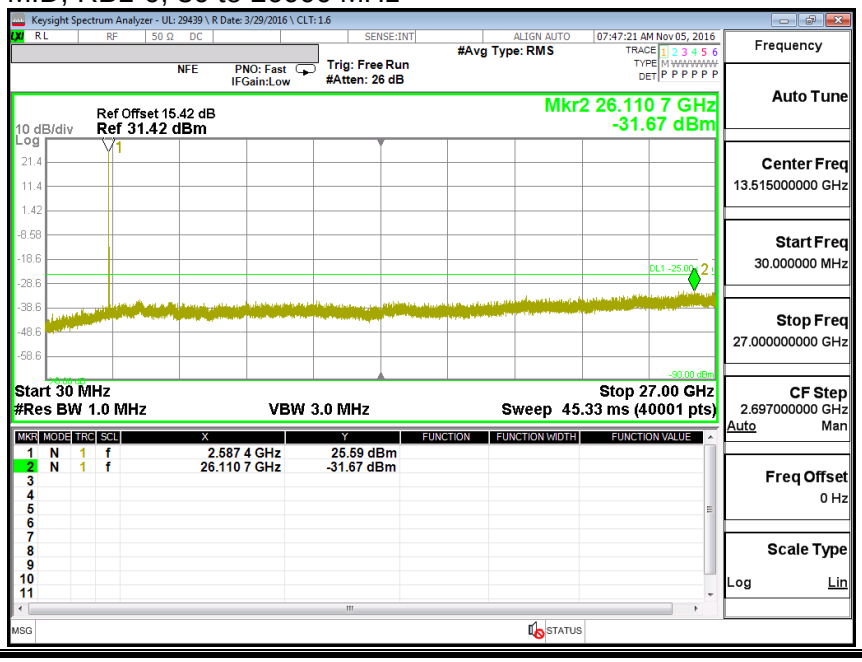


LTE BAND 41 16QAM, (15 MHz)

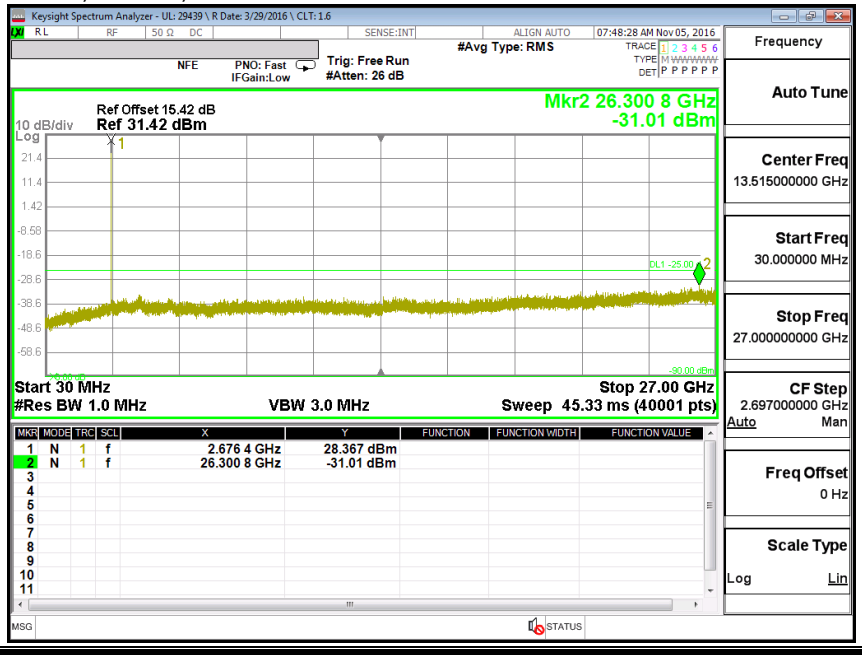
LOW, RB1-0, 30 to 26000 MHz



MID, RB1-0, 30 to 26000 MHz

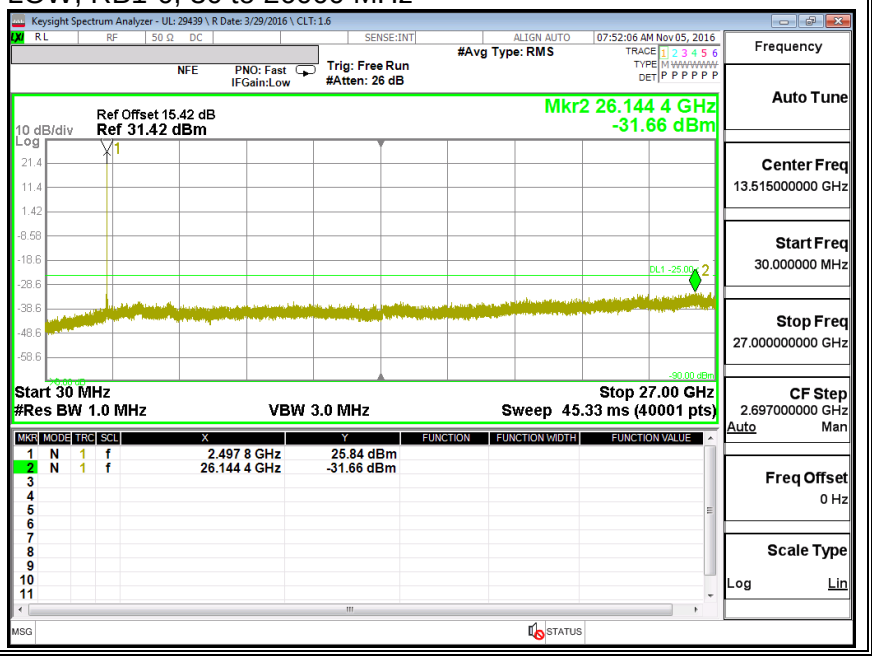


HIGH, RB1-0, 30 to 26000 MHz

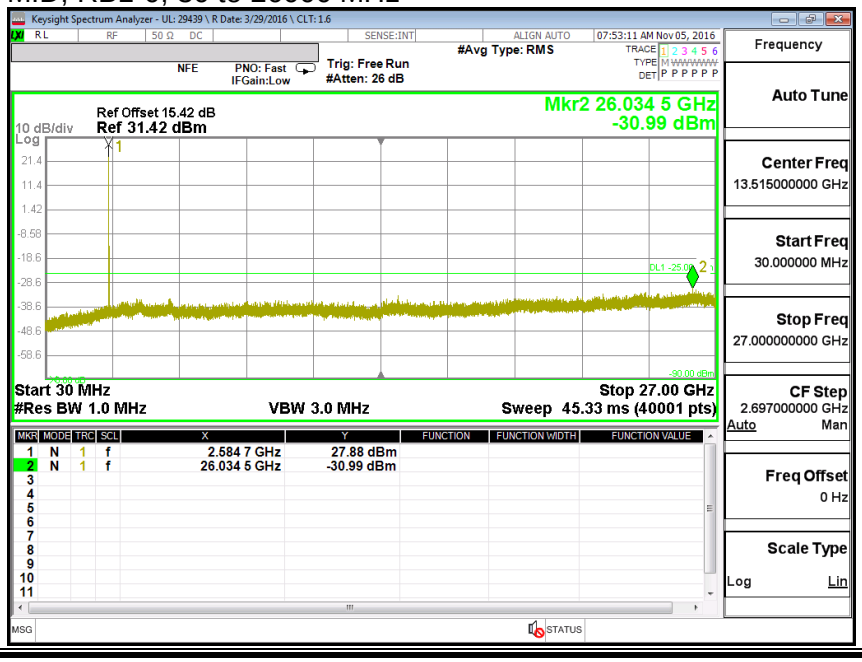


LTE BAND 41 QPSK, (20 MHz)

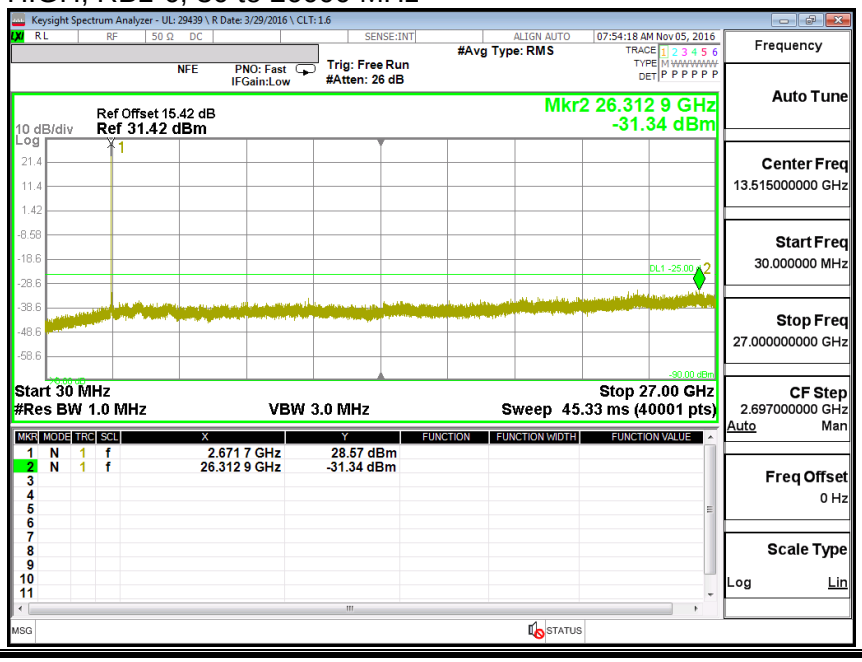
LOW, RB1-0, 30 to 26000 MHz



MID, RB1-0, 30 to 26000 MHz

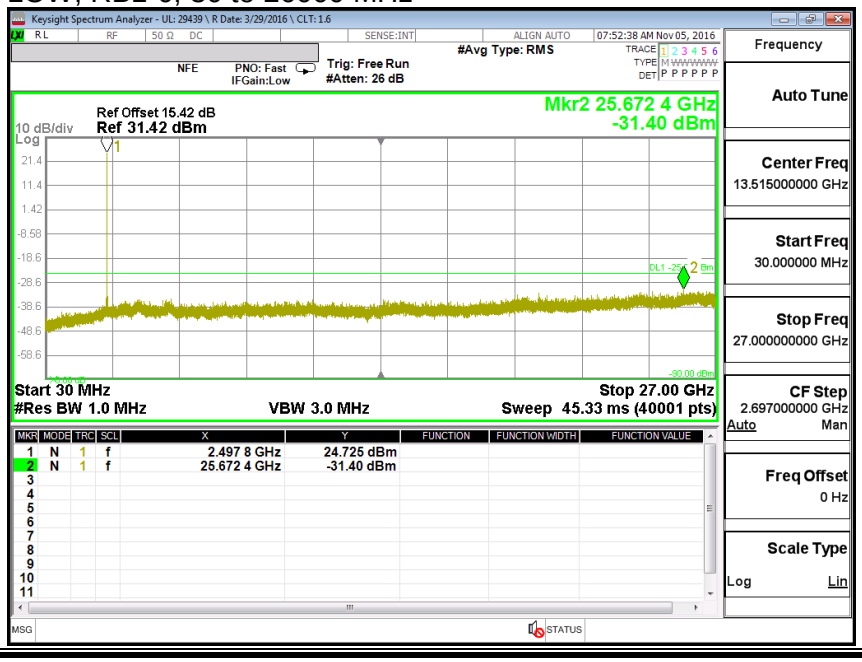


HIGH, RB1-0, 30 to 26000 MHz

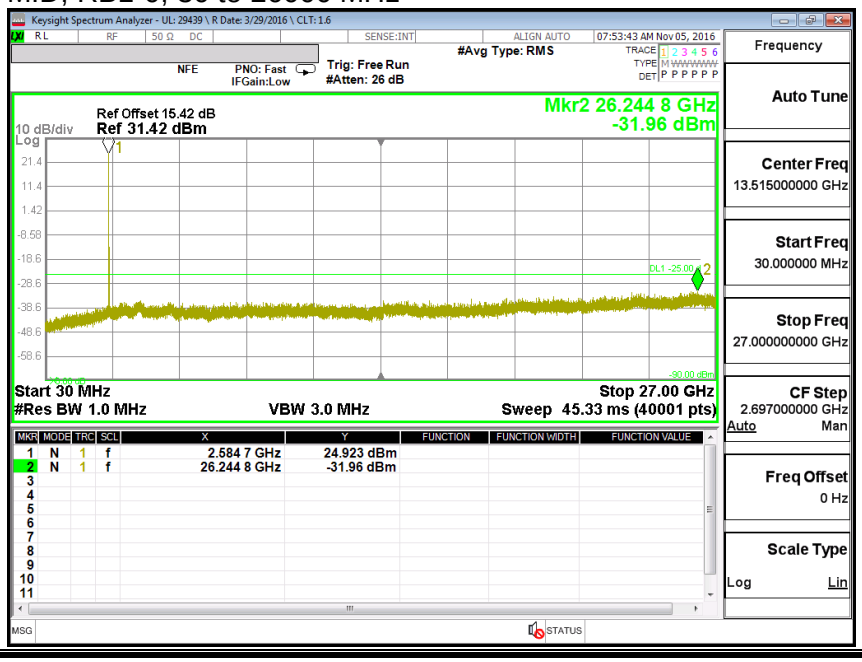


LTE BAND 41 16QAM, (20 MHz)

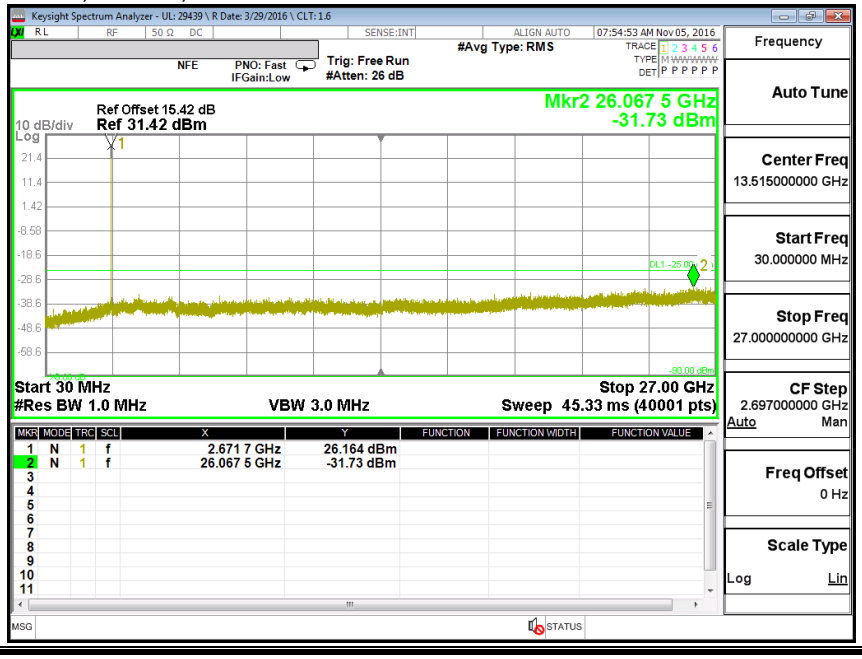
LOW, RB1-0, 30 to 26000 MHz



MID, RB1-0, 30 to 26000 MHz



HIGH, RB1-0, 30 to 26000 MHz



9. FREQUENCY STABILITY

RULE PART(S)

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

LIMITS

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

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

§90.213
The carrier frequency shall not depart from the reference frequency in excess of ±2.5 ppm for mobile stations

TEST PROCEDURE

Use CMW 500 with Frequency Error measurement capability.

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

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

Frequency Stability vs Temperature:
The EUT is 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).

MODES TESTED

- LTE Band 2
- LTE Band 4
- LTE Band 5
- LTE Band 7
- LTE Band 12
- LTE Band 13
- LTE Band 17
- LTE Band 25
- LTE Band 26
- LTE Band 41

RESULTS

9.1. LTE BAND 2

QPSK, (20MHz BANDWIDTH

Limit		1850	1910	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm	F high @ -13dBm		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	1851.0681	1908.9268		
Extreme (50C)		1851.0681	1908.9268	-11.60	-0.006
Extreme (40C)		1851.0681	1908.9268	-11.50	-0.006
Extreme (30C)		1851.0681	1908.9268	-13.40	-0.007
Extreme (10C)		1851.0681	1908.9268	-10.44	-0.006
Extreme (0C)		1851.0681	1908.9268	-6.02	-0.003
Extreme (-10C)		1851.0681	1908.9268	-5.33	-0.003
Extreme (-20C)		1851.0681	1908.9268	-3.33	-0.002
Extreme (-30C)		1851.0681	1908.9268	-2.12	-0.001
20C	15%	1851.0681	1908.9268	-9.38	-0.005
	-15%	1851.0681	1908.9268	-9.68	-0.005
	End Point	1851.0681	1908.9268	-9.47	-0.005

16QAM, (20MHz BANDWIDTH

Limit		1850	1910	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm	F high @ -13dBm		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	1851.0671	1908.9271		
Extreme (50C)		1851.0671	1908.9271	-11.13	-0.006
Extreme (40C)		1851.0671	1908.9271	-8.71	-0.005
Extreme (30C)		1851.0671	1908.9271	-10.17	-0.005
Extreme (10C)		1851.0671	1908.9271	-8.44	-0.004
Extreme (0C)		1851.0671	1908.9271	-5.44	-0.003
Extreme (-10C)		1851.0671	1908.9271	-5.21	-0.003
Extreme (-20C)		1851.0671	1908.9271	-3.05	-0.002
Extreme (-30C)		1851.0671	1908.9271	-2.12	-0.001
20C	15%	1851.0671	1908.9271	-8.14	-0.004
	-15%	1851.0671	1908.9271	-8.97	-0.005
	End Point	1851.0671	1908.9271	-8.33	-0.004

9.2. LTE BAND 4

QPSK, (20MHz BANDWIDTH

Limit		1710	1755	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm	F high @ -13dBm		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	1711.0899	1753.9270		
Extreme (50C)		1711.0899	1753.9270	-12.32	-0.007
Extreme (40C)		1711.0899	1753.9270	-9.46	-0.005
Extreme (30C)		1711.0899	1753.9270	-8.33	-0.005
Extreme (10C)		1711.0899	1753.9270	-7.88	-0.005
Extreme (0C)		1711.0899	1753.9270	-5.44	-0.003
Extreme (-10C)		1711.0899	1753.9270	-2.25	-0.001
Extreme (-20C)		1711.0899	1753.9270	-2.05	-0.001
Extreme (-30C)		1711.0899	1753.9270	-1.25	-0.001
20C	15%	1711.0899	1753.9270	-7.68	-0.004
	-15%	1711.0899	1753.9270	-8.70	-0.005
	End Point	1711.0899	1753.9270	-8.44	-0.005

16QAM, (20MHz BANDWIDTH)

Limit		1710	1755	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm	F high @ -13dBm		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	1711.0685	1753.9175		
Extreme (50C)		1711.0685	1753.9175	-9.94	-0.006
Extreme (40C)		1711.0685	1753.9175	-8.17	-0.005
Extreme (30C)		1711.0685	1753.9175	-10.07	-0.006
Extreme (10C)		1711.0685	1753.9175	-8.13	-0.005
Extreme (0C)		1711.0685	1753.9175	-1.75	-0.001
Extreme (-10C)		1711.0685	1753.9175	-1.15	-0.001
Extreme (-20C)		1711.0685	1753.9175	-2.00	-0.001
Extreme (-30C)		1711.0685	1753.9175	-1.12	-0.001
20C	15%	1711.0685	1753.9175	-7.47	-0.004
	-15%	1711.0685	1753.9175	-7.84	-0.005
	End Point	1711.0685	1753.9175	-8.02	-0.005

9.3. LTE BAND 5

QPSK, (10MHz BANDWIDTH)

Limit		824	849	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm	F high @ -13dBm		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	824.5280	848.4697		
Extreme (50C)		824.5280	848.4697	-5.42	-0.006
Extreme (40C)		824.5280	848.4697	-6.02	-0.007
Extreme (30C)		824.5280	848.4697	-4.55	-0.005
Extreme (10C)		824.5280	848.4697	-3.78	-0.005
Extreme (0C)		824.5280	848.4697	-2.16	-0.003
Extreme (-10C)		824.5280	848.4697	-2.00	-0.002
Extreme (-20C)		824.5280	848.4697	-1.77	-0.002
Extreme (-30C)		824.5280	848.4697	-1.34	-0.002
20C	15%	824.5280	848.4697	-4.85	-0.006
	-15%	824.5280	848.4697	-2.89	-0.003
	End Point	824.5280	848.4697	-3.11	-0.004

16QAM, (10MHz BANDWIDTH)

Limit		824	849	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm	F high @ -13dBm		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	824.5312	848.4612		
Extreme (50C)		824.5312	848.4612	-5.32	-0.006
Extreme (40C)		824.5312	848.4612	-4.84	-0.006
Extreme (30C)		824.5312	848.4612	-4.11	-0.005
Extreme (10C)		824.5312	848.4612	-4.66	-0.006
Extreme (0C)		824.5312	848.4612	-3.12	-0.004
Extreme (-10C)		824.5312	848.4612	-2.74	-0.003
Extreme (-20C)		824.5312	848.4612	-1.54	-0.002
Extreme (-30C)		824.5312	848.4612	-1.32	-0.002
20C	15%	824.5312	848.4612	-4.72	-0.006
	-15%	824.5312	848.4612	-5.02	-0.006
	End Point	824.5312	848.4612	-4.47	-0.005

9.4. LTE BAND 7

QPSK, (20MHz BANDWIDTH)

Limit		2500	2570	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm	F high @ -13dBm		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	2501.07200	2568.92300		
Extreme (50C)		2501.07199	2568.92299	-11.92	-0.005
Extreme (40C)		2501.07201	2568.92301	12.30	0.005
Extreme (30C)		2501.07202	2568.92302	24.93	0.010
Extreme (10C)		2501.07200	2568.92300	3.25	0.001
Extreme (0C)		2501.07200	2568.92300	1.28	0.001
Extreme (-10C)		2501.07199	2568.92299	-5.34	-0.002
Extreme (-20C)		2501.07200	2568.92300	-4.25	-0.002
Extreme (-30C)		2501.07200	2568.92300	-2.15	-0.001
20C	15%	2501.0720	2568.9230	13.15	0.005
	-15%	2501.0720	2568.9230	26.34	0.010
	End Point	2501.0720	2568.9230	24.37	0.010

16QAM, (20MHz BANDWIDTH)

Limit		2500	2570	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm	F high @ -13dBm		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	2501.0876	2568.9141		
Extreme (50C)		2501.0876	2568.9141	-19.86	-0.008
Extreme (40C)		2501.0876	2568.9141	11.23	0.004
Extreme (30C)		2501.0876	2568.9141	12.30	0.005
Extreme (10C)		2501.0876	2568.9141	-4.12	-0.002
Extreme (0C)		2501.0876	2568.9141	-3.27	-0.001
Extreme (-10C)		2501.0876	2568.9141	-1.32	-0.001
Extreme (-20C)		2501.0876	2568.9141	-1.44	-0.001
Extreme (-30C)		2501.0876	2568.9141	12.55	0.005
20C	15%	2501.0876	2568.9141	16.45	0.006
	-15%	2501.0876	2568.9141	27.62	0.011
	End Point	2501.0876	2568.9141	15.45	0.006

9.5. LTE BAND 12

QPSK, (10MHz BANDWIDTH)

Limit		699	716	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm	F high @ -13dBm		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	699.5193	715.4713		
Extreme (50C)		699.5193	715.4713	-4.43	-0.01
Extreme (40C)		699.5193	715.4713	-4.81	-0.01
Extreme (30C)		699.5193	715.4713	-4.09	-0.01
Extreme (10C)		699.5193	715.4713	-4.94	-0.01
Extreme (0C)		699.5193	715.4713	-1.87	0.00
Extreme (-10C)		699.5193	715.4713	-0.08	0.00
Extreme (-20C)		699.5193	715.4713	1.05	0.00
Extreme (-30C)		699.5193	715.4713	1.77	0.00
20C	15%	699.5193	715.4713	-5.26	-0.01
	-15%	699.5193	715.4713	-3.55	-0.01
	End Point	699.5193	715.4713	-4.12	-0.01

16QAM, (10MHz BANDWIDTH)

Limit		699	716	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm	F high @ -13dBm		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	699.5280	715.4720		
Extreme (50C)		699.5280	715.4720	-6.08	-0.01
Extreme (40C)		699.5280	715.4720	-5.15	-0.01
Extreme (30C)		699.5280	715.4720	-5.52	-0.01
Extreme (10C)		699.5280	715.4720	3.32	0.00
Extreme (0C)		699.5280	715.4720	-1.05	0.00
Extreme (-10C)		699.5280	715.4720	-0.54	0.00
Extreme (-20C)		699.5280	715.4720	1.11	0.00
Extreme (-30C)		699.5280	715.4720	1.54	0.00
20C	15%	699.5280	715.4720	-3.48	0.00
	-15%	699.5280	715.4720	-4.21	-0.01
	End Point	699.5280	715.4720	-4.56	-0.01

9.6. LTE BAND 13

QPSK, (10MHz BANDWIDTH)

Limit		777	787		
Condition		F low @ -13dBm	F high @ -13dBm	Delta (Hz)	Frequency Stability (ppm)
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	777.5369	786.4692		
Extreme (50C)		777.5369	786.4692	-6.69	-0.009
Extreme (40C)		777.5369	786.4692	-4.98	-0.006
Extreme (30C)		777.5369	786.4692	-5.55	-0.007
Extreme (10C)		777.5369	786.4692	-4.09	-0.005
Extreme (0C)		777.5369	786.4692	-1.55	-0.002
Extreme (-10C)		777.5369	786.4692	-0.65	-0.001
Extreme (-20C)		777.5369	786.4692	1.42	0.002
Extreme (-30C)		777.5369	786.4692	1.98	0.003
20C	15%	777.5369	786.4692	-4.94	-0.006
	-15%	777.5369	786.4692	-3.81	-0.005
	End Point	777.5369	786.4692	-3.98	-0.005

16QAM, (10MHz BANDWIDTH)

Limit		777	787		
Condition		F low @ -13dBm	F high @ -13dBm	Delta (Hz)	Frequency Stability (ppm)
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	777.5342	786.4725		
Extreme (50C)		777.5342	786.4725	-5.58	-0.007
Extreme (40C)		777.5342	786.4725	-4.33	-0.006
Extreme (30C)		777.5342	786.4725	-5.16	-0.007
Extreme (10C)		777.5342	786.4725	-5.04	-0.006
Extreme (0C)		777.5342	786.4725	-1.02	-0.001
Extreme (-10C)		777.5342	786.4725	-0.21	0.000
Extreme (-20C)		777.5342	786.4725	1.24	0.002
Extreme (-30C)		777.5342	786.4725	1.92	0.002
20C	15%	777.5342	786.4725	-4.56	-0.006
	-15%	777.5342	786.4725	-4.86	-0.006
	End Point	777.5342	786.4725	-4.25	-0.005

9.7. LTE BAND 17

QPSK, (10MHz BANDWIDTH)

Limit		704	716	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm	F high @ -13dBm		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	704.5294	715.4677		
Extreme (50C)		704.5294	715.4677	3.23	0.005
Extreme (40C)		704.5294	715.4677	-4.33	-0.006
Extreme (30C)		704.5294	715.4677	-3.62	-0.005
Extreme (10C)		704.5294	715.4677	3.76	0.005
Extreme (0C)		704.5294	715.4677	1.34	0.002
Extreme (-10C)		704.5294	715.4677	0.22	0.000
Extreme (-20C)		704.5294	715.4677	-1.32	-0.002
Extreme (-30C)		704.5294	715.4677	-2.14	-0.003
20C	15%	704.5294	715.4677	-3.52	-0.005
	-15%	704.5294	715.4677	-3.86	-0.005
	End Point	704.5294	715.4677	-3.55	-0.005

16QAM, (10MHz BANDWIDTH)

Limit		704	716	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm	F high @ -13dBm		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	704.5143	715.4784		
Extreme (50C)		704.5143	715.4784	3.73	0.005
Extreme (40C)		704.5143	715.4784	4.46	0.006
Extreme (30C)		704.5143	715.4784	4.43	0.006
Extreme (10C)		704.5143	715.4784	3.75	0.005
Extreme (0C)		704.5143	715.4784	2.12	0.003
Extreme (-10C)		704.5143	715.4784	0.55	0.001
Extreme (-20C)		704.5143	715.4784	-1.14	-0.002
Extreme (-30C)		704.5143	715.4784	-2.25	-0.003
20C	15%	704.5143	715.4784	-3.92	-0.006
	-15%	704.5143	715.4784	-3.98	-0.006
	End Point	704.5143	715.4784	-4.11	-0.006

9.8. LTE BAND 25

QPSK, (20MHz BANDWIDTH)

Limit		1850	1915	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm	F high @ -13dBm		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	1851.0910	1913.9193		
Extreme (50C)		1851.0910	1913.9193	11.13	0.006
Extreme (40C)		1851.0910	1913.9193	10.10	0.005
Extreme (30C)		1851.0910	1913.9193	11.44	0.006
Extreme (10C)		1851.0910	1913.9193	11.84	0.006
Extreme (0C)		1851.0910	1913.9193	7.15	0.004
Extreme (-10C)		1851.0910	1913.9193	5.44	0.003
Extreme (-20C)		1851.0910	1913.9193	3.45	0.002
Extreme (-30C)		1851.0910	1913.9193	2.17	0.001
20C	15%	1851.0910	1913.9193	9.80	0.005
	-15%	1851.0910	1913.9193	7.40	0.004
	End Point	1851.0910	1913.9193	8.41	0.004

16QAM, (20MHz BANDWIDTH)

Limit		1850	1915	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm	F high @ -13dBm		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	1851.0953	1913.9223		
Extreme (50C)		1851.0953	1913.9223	12.63	0.007
Extreme (40C)		1851.0953	1913.9223	10.40	0.006
Extreme (30C)		1851.0953	1913.9223	9.74	0.005
Extreme (10C)		1851.0953	1913.9223	12.29	0.007
Extreme (0C)		1851.0953	1913.9223	8.26	0.004
Extreme (-10C)		1851.0953	1913.9223	5.21	0.003
Extreme (-20C)		1851.0953	1913.9223	3.05	0.002
Extreme (-30C)		1851.0953	1913.9223	2.21	0.001
20C	15%	1851.0953	1913.9223	9.07	0.005
	-15%	1851.0953	1913.9223	9.43	0.005
	End Point	1851.0953	1913.9223	9.25	0.005

9.9. LTE BAND 26

QPSK, (10MHz BANDWIDTH)

Limit		814	824	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm	F high @ -13dBm		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	814.257223	823.748432		
Extreme (50C)		814.257220	823.748429	-3.05	-0.004
Extreme (40C)		814.257220	823.748429	-2.98	-0.004
Extreme (30C)		814.257220	823.748429	-2.95	-0.004
Extreme (10C)		814.257220	823.748429	-2.78	-0.003
Extreme (0C)		814.257221	823.748430	-2.34	-0.003
Extreme (-10C)		814.257221	823.748430	-2.11	-0.003
Extreme (-20C)		814.257221	823.748430	-1.95	-0.002
Extreme (-30C)		814.257221	823.748430	-1.56	-0.002
20C	15%	814.257220	823.748429	-2.59	-0.003
	-15%	814.257220	823.748429	-2.63	-0.003
	End Point	814.257220	823.748429	-3.17	-0.004

16QAM, (10MHz BANDWIDTH)

Limit		814	824	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm	F high @ -13dBm		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	814.261534	823.740292		
Extreme (50C)		814.261530	823.740288	-4.12	-0.005
Extreme (40C)		814.261530	823.740288	-3.78	-0.005
Extreme (30C)		814.261530	823.740288	-3.55	-0.004
Extreme (10C)		814.261530	823.740288	-3.58	-0.004
Extreme (0C)		814.261532	823.740290	-2.31	-0.003
Extreme (-10C)		814.261532	823.740290	-2.18	-0.003
Extreme (-20C)		814.261532	823.740290	-2.05	-0.003
Extreme (-30C)		814.261532	823.740290	-1.98	-0.002
20C	15%	814.261531	823.740289	-3.15	-0.004
	-15%	814.261531	823.740289	-3.34	-0.004
	End Point	814.261531	823.740289	-3.10	-0.004

9.10. LTE BAND 41

QPSK, (20MHz BANDWIDTH)

Limit		2496	2690	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm	F high @ -13dBm		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	2497.0858	2688.9692		
Extreme (50C)		2497.0858	2688.9692	-10.06	-0.004
Extreme (40C)		2497.0858	2688.9692	-15.32	-0.006
Extreme (30C)		2497.0858	2688.9692	-17.15	-0.007
Extreme (10C)		2497.0858	2688.9692	-9.51	-0.004
Extreme (0C)		2497.0858	2688.9692	-5.44	-0.002
Extreme (-10C)		2497.0858	2688.9692	-2.32	-0.001
Extreme (-20C)		2497.0858	2688.9692	-1.32	-0.001
Extreme (-30C)		2497.0858	2688.9692	1.08	0.000
20C	15%	2497.0858	2688.9692	14.69	0.006
	-15%	2497.0858	2688.9692	-7.32	-0.003
	End Point	2497.0858	2688.9692	-9.38	-0.004

16QAM, (20MHz BANDWIDTH)

Limit		2496	2690	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm	F high @ -13dBm		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	2497.0701	2688.9635		
Extreme (50C)		2497.0701	2688.9635	-19.94	-0.008
Extreme (40C)		2497.0701	2688.9635	17.64	0.007
Extreme (30C)		2497.0701	2688.9635	16.39	0.006
Extreme (10C)		2497.0701	2688.9635	-16.54	-0.006
Extreme (0C)		2497.0701	2688.9635	-10.14	-0.004
Extreme (-10C)		2497.0701	2688.9635	-7.44	-0.003
Extreme (-20C)		2497.0701	2688.9635	-2.04	-0.001
Extreme (-30C)		2497.0701	2688.9635	1.12	0.000
20C	15%	2497.0701	2688.9635	17.01	0.007
	-15%	2497.0701	2688.9635	-9.37	-0.004
	End Point	2497.0701	2688.9635	-10.23	-0.004

10. PEAK-TO-AVERAGE RATIO

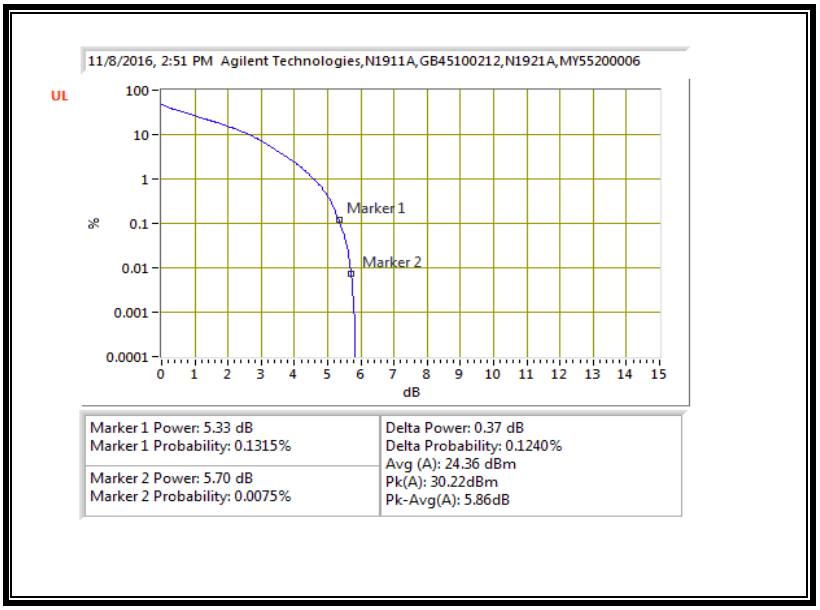
In addition, when the transmitter power is measured in terms of average value, the peak-to-average ratio of the power shall not exceed 13 dB

RESULT

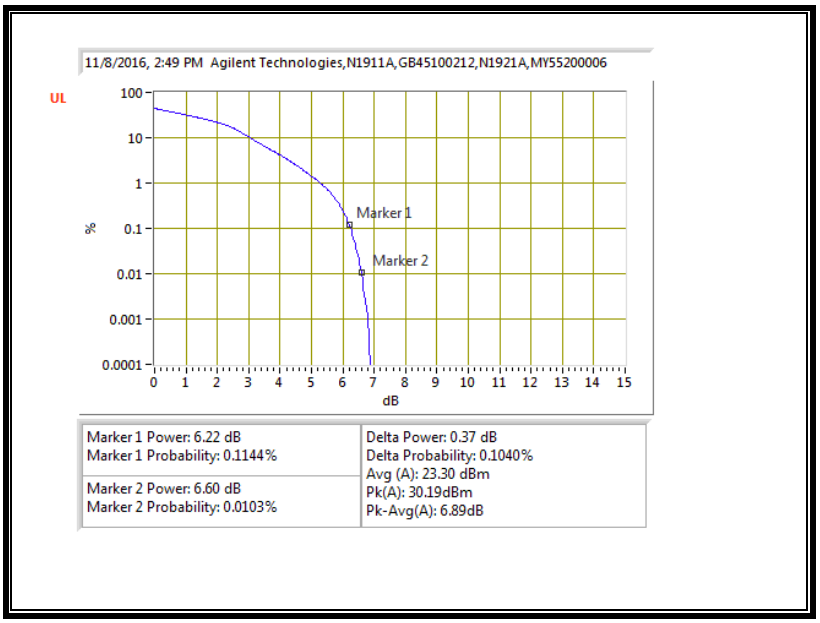
The results from all CCDF plots are passed with 13dB peak-to-average ratio criteria.

10.1.1. LTE BAND 2

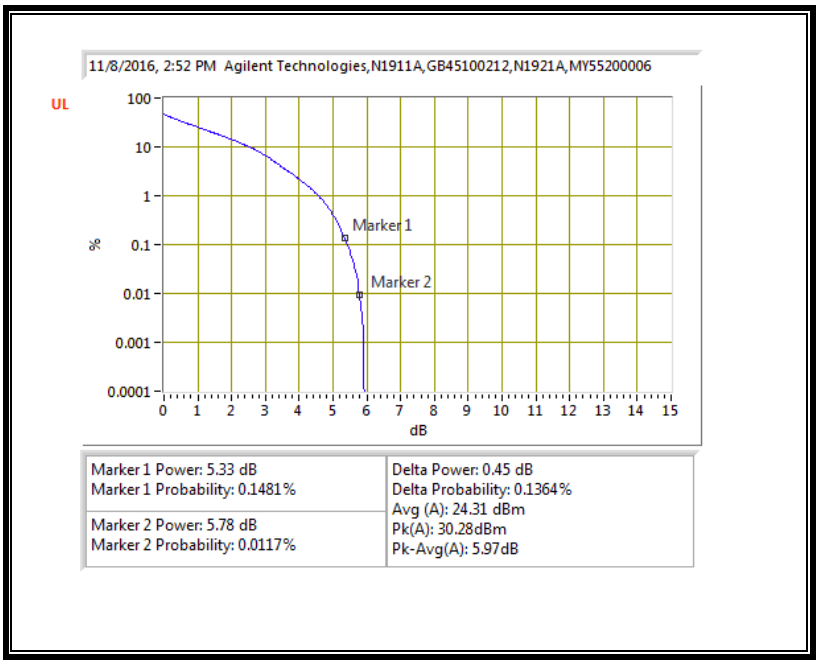
LTE BAND 2 QPSK, (1.4 MHz)



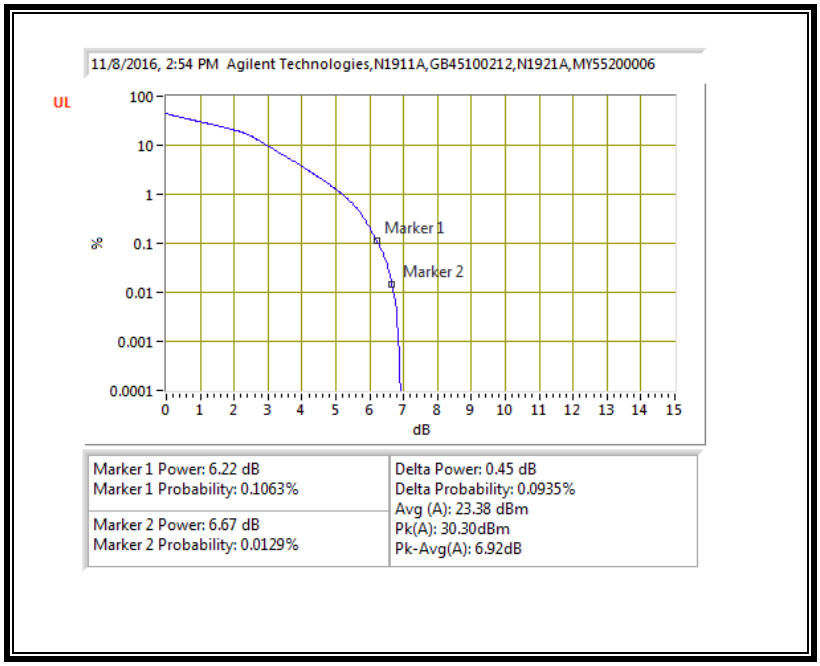
LTE BAND 2 16QAM, (1.4 MHz)



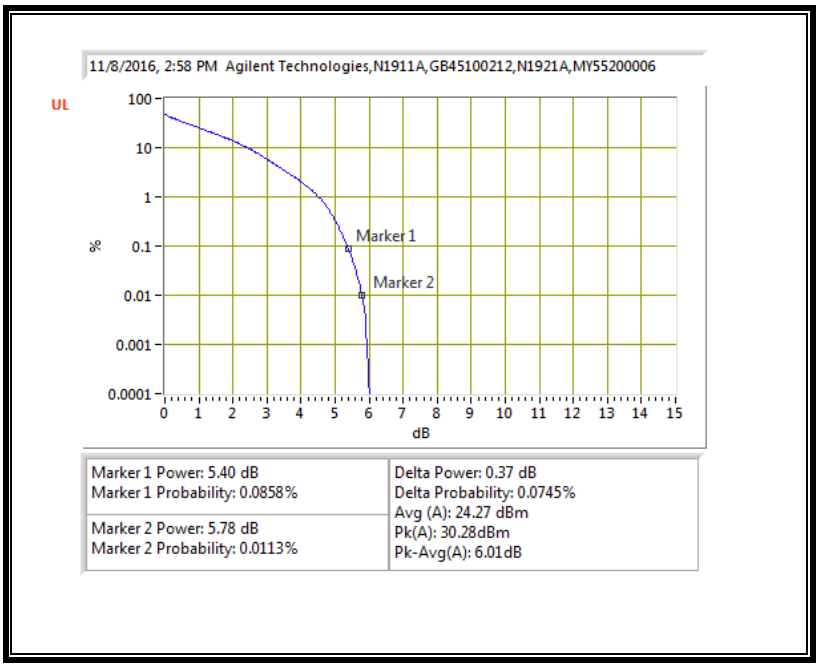
LTE BAND 2 QPSK, (3 MHz)



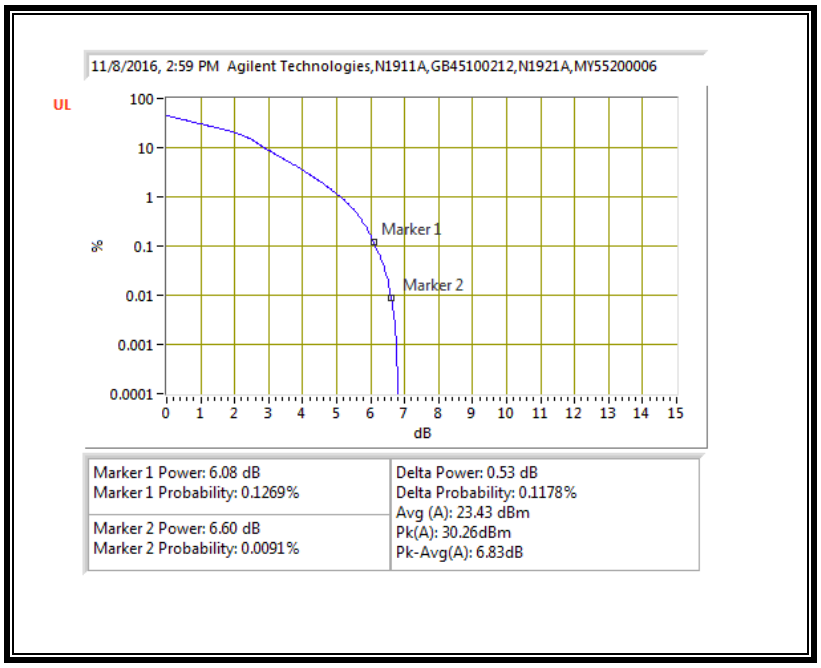
LTE BAND 2 16QAM, (3 MHz)



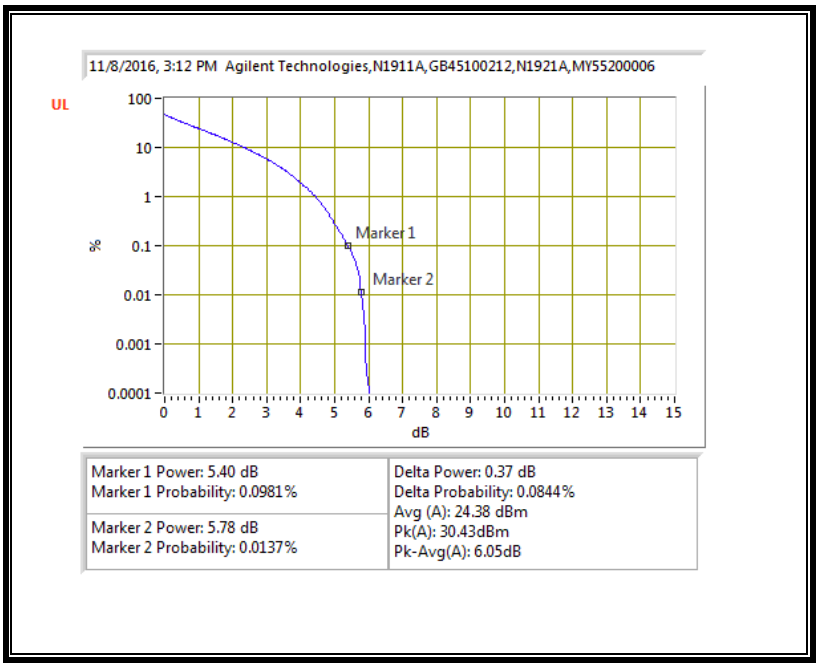
LTE BAND 2 QPSK, (5 MHz)



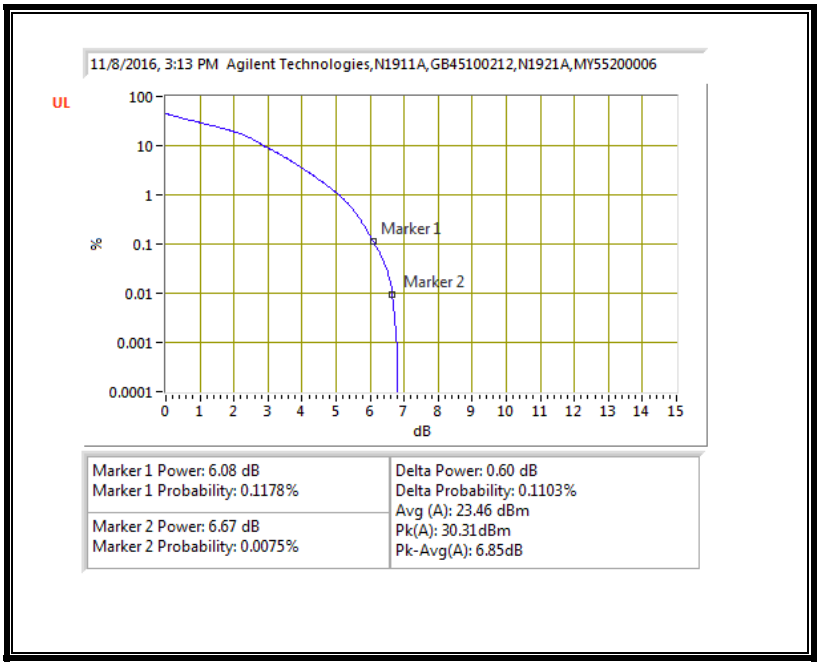
LTE BAND 2 16QAM, (5 MHz)



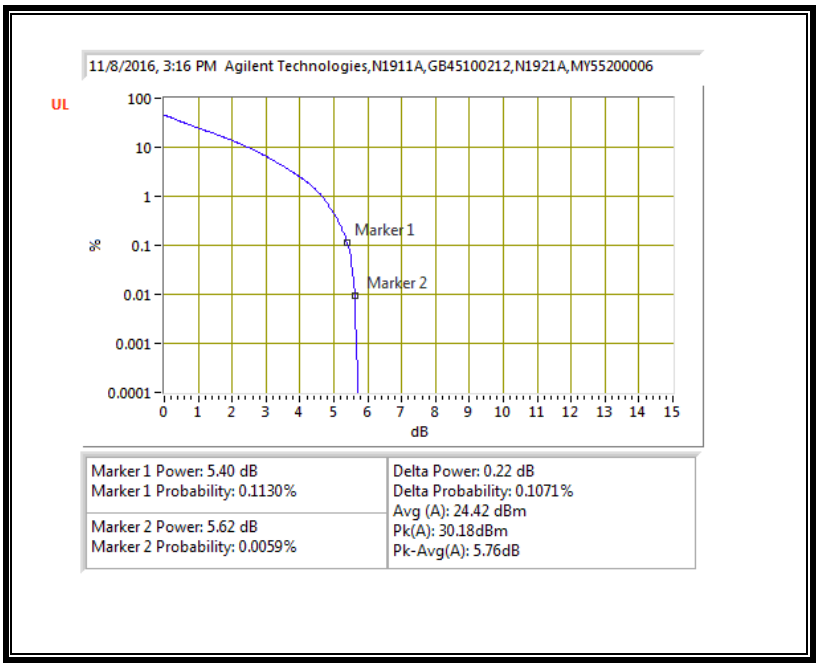
LTE BAND 2 QPSK, (10 MHz)



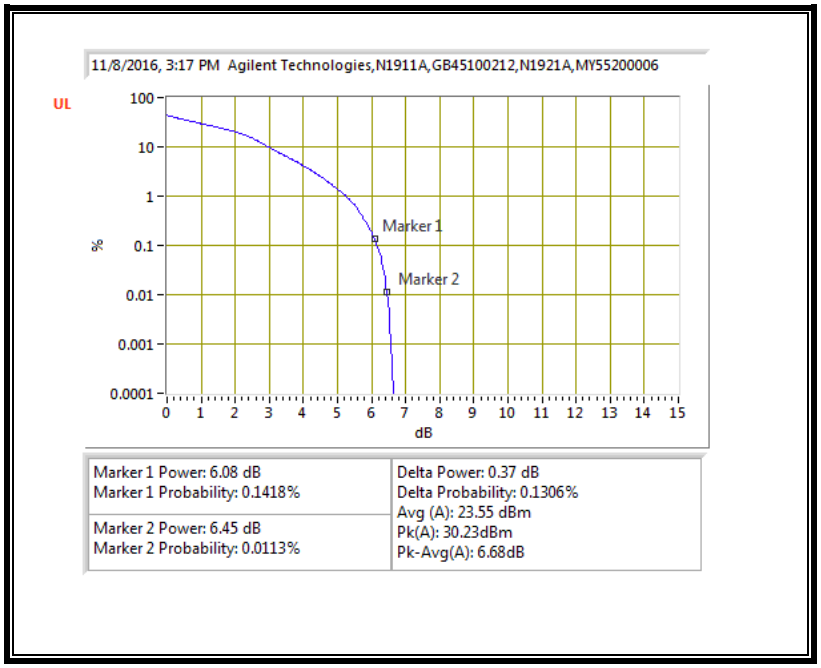
LTE BAND 2 16QAM, (10 MHz)



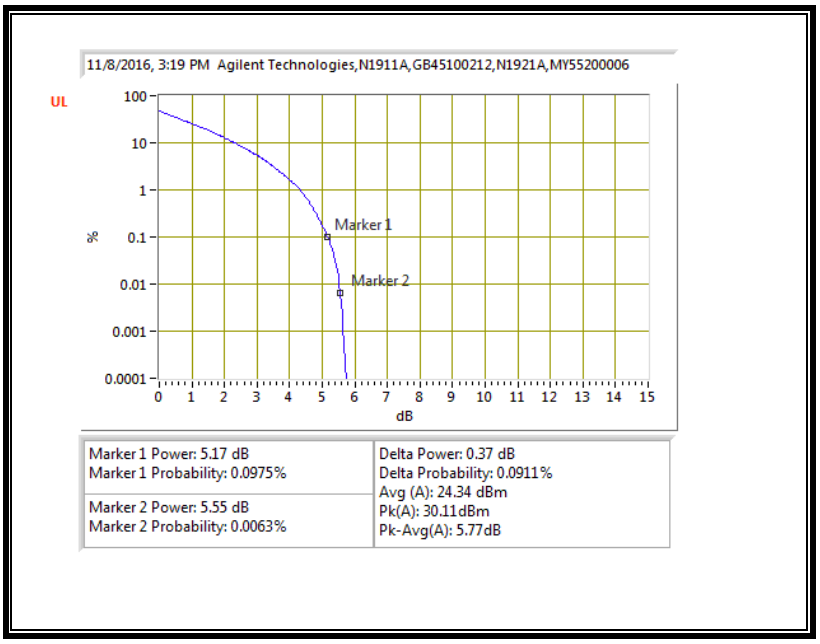
LTE BAND 2 QPSK, (15 MHz)



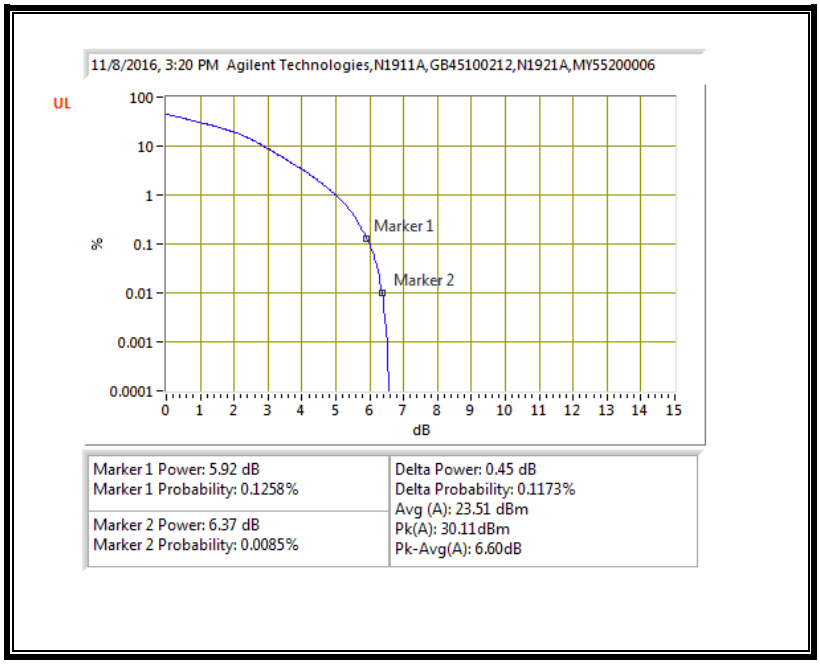
LTE BAND 2 16QAM, (15 MHz)



LTE BAND 2 QPSK, (20 MHz)

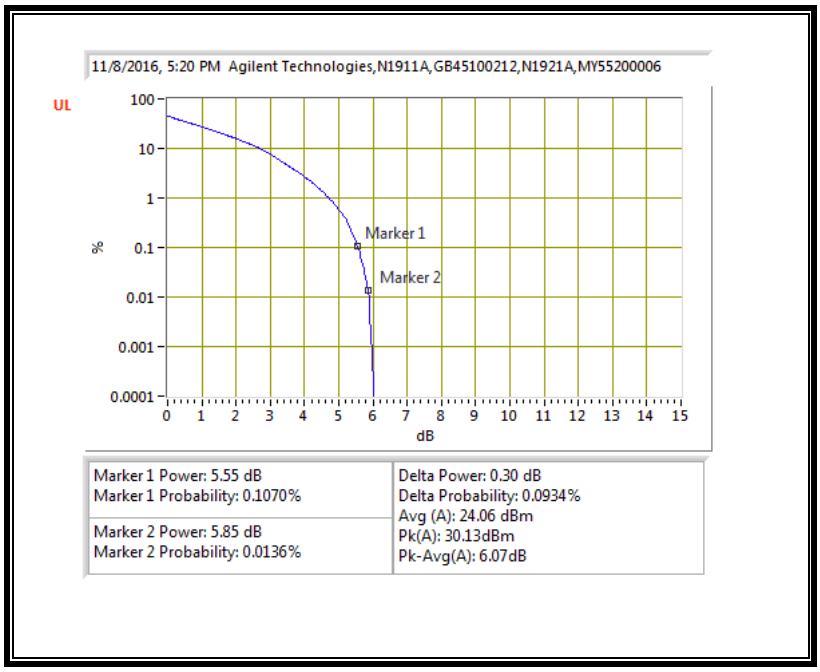


LTE BAND 2 16QAM, (20 MHz)

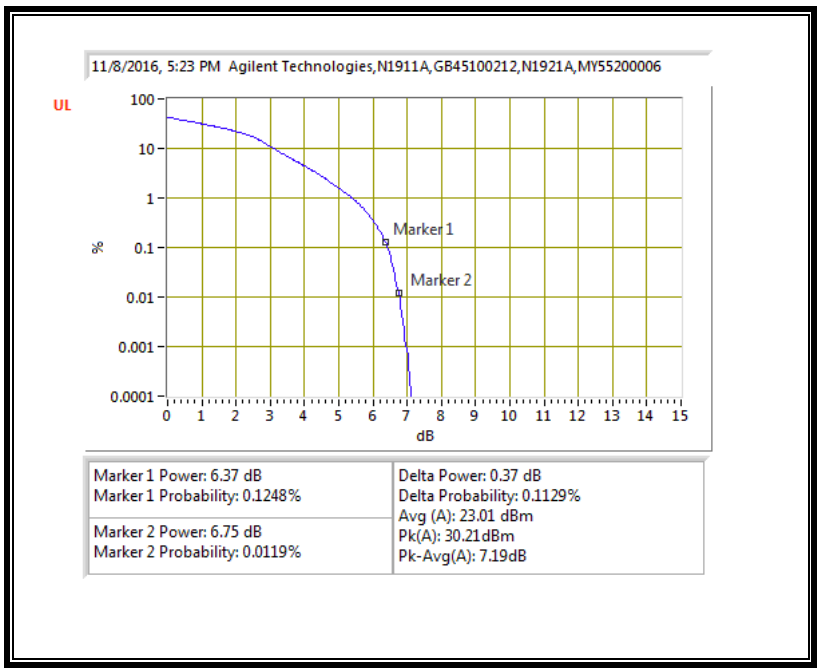


10.1.2. LTE BAND 4

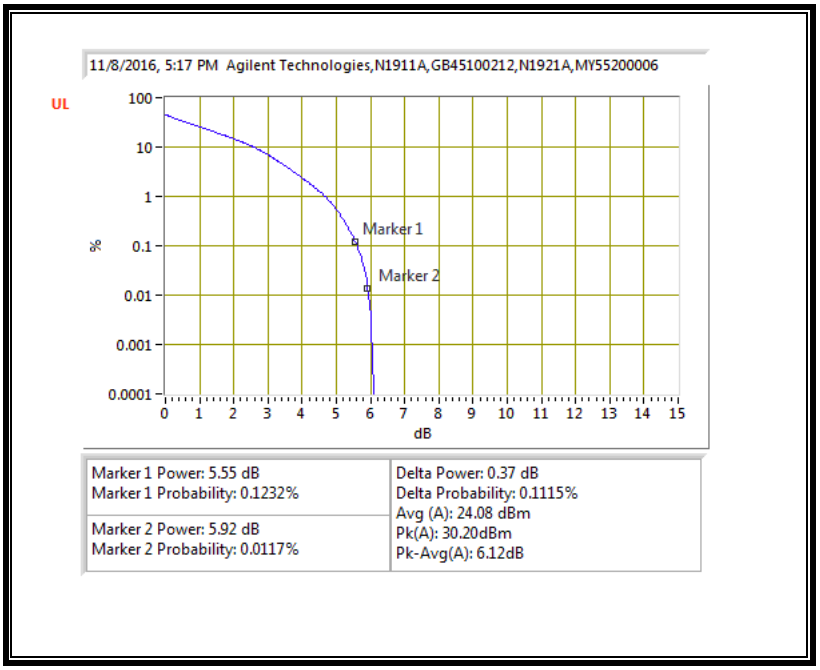
LTE BAND 4 QPSK, (1.4 MHz)



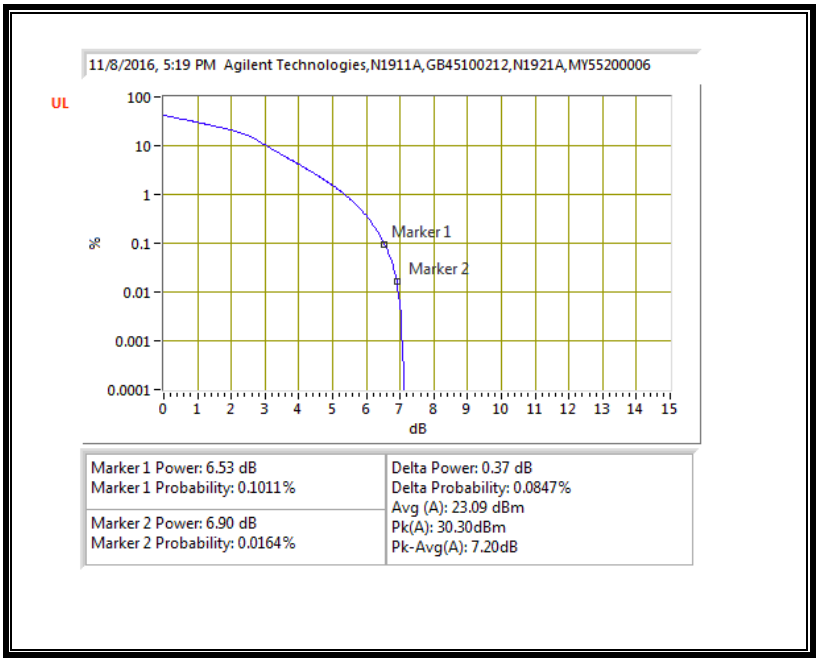
LTE BAND 4 16QAM, (1.4 MHz)



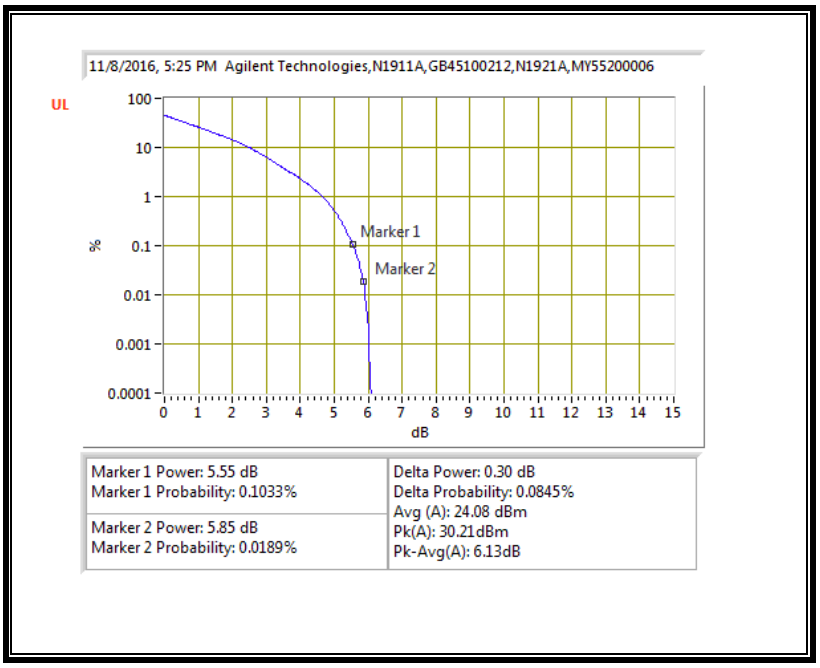
LTE BAND 4 QPSK, (3 MHz)



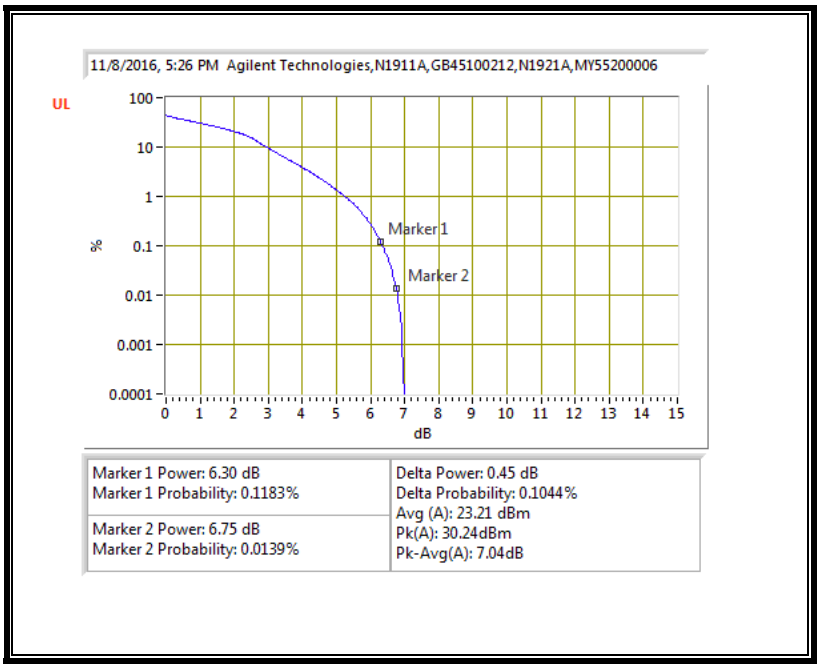
LTE BAND 4 16QAM, (3 MHz)



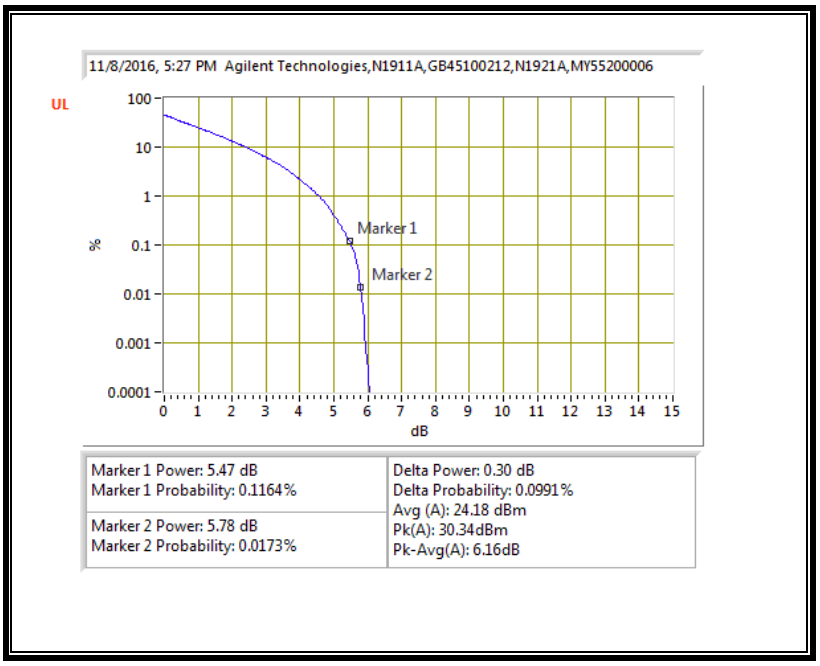
LTE BAND 4 QPSK, (5 MHz)



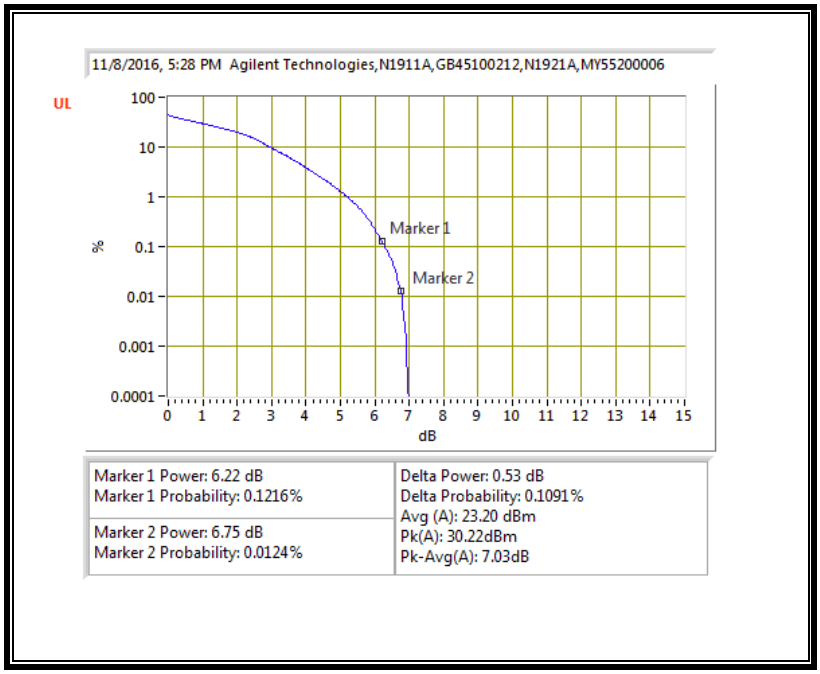
LTE BAND 4 16QAM, (5 MHz)



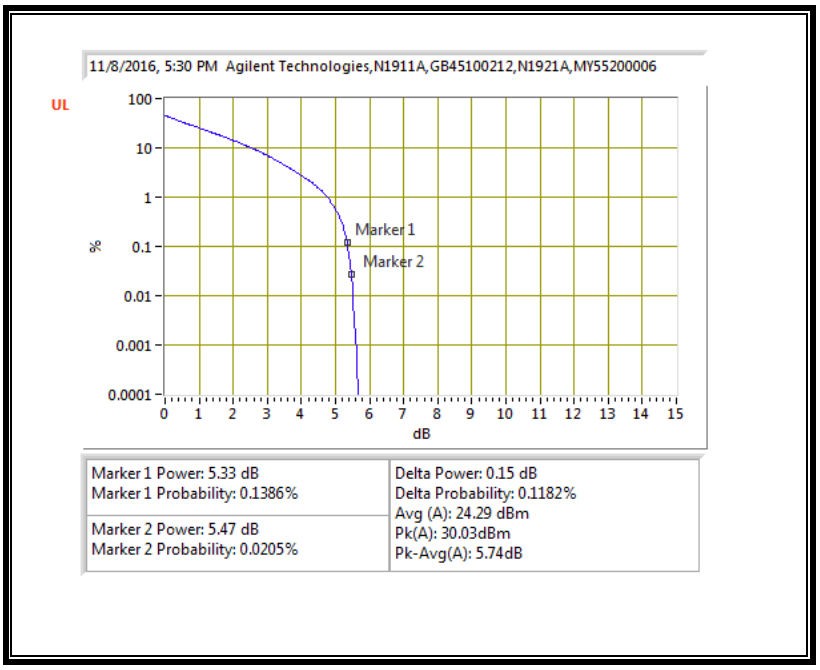
LTE BAND 4 QPSK, (10 MHz)



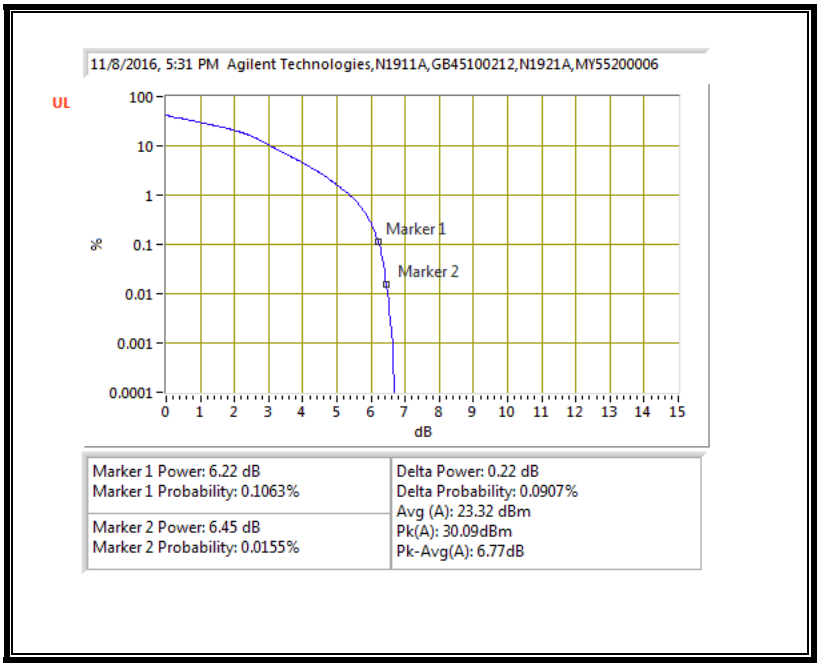
LTE BAND 4 16QAM, (10 MHz)



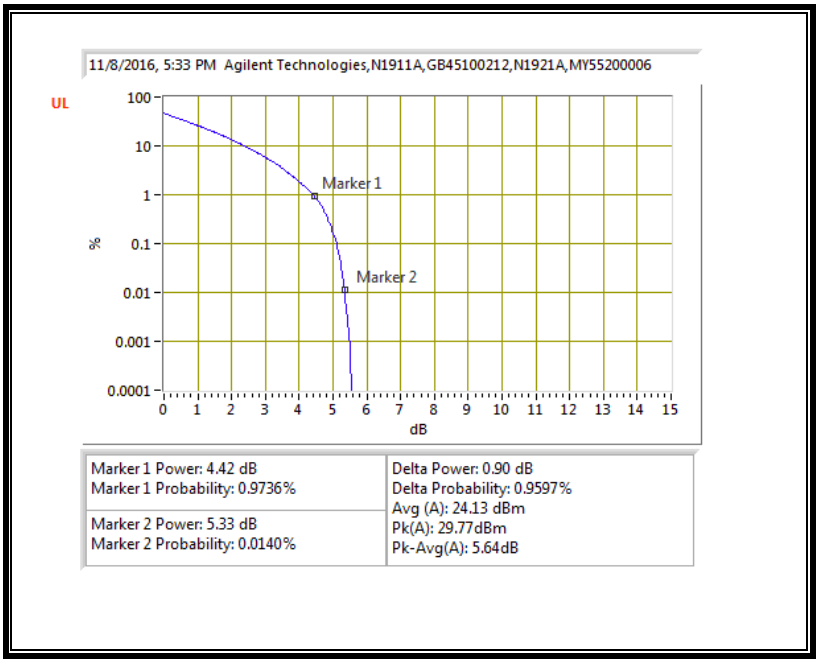
LTE BAND 4 QPSK, (15 MHz)



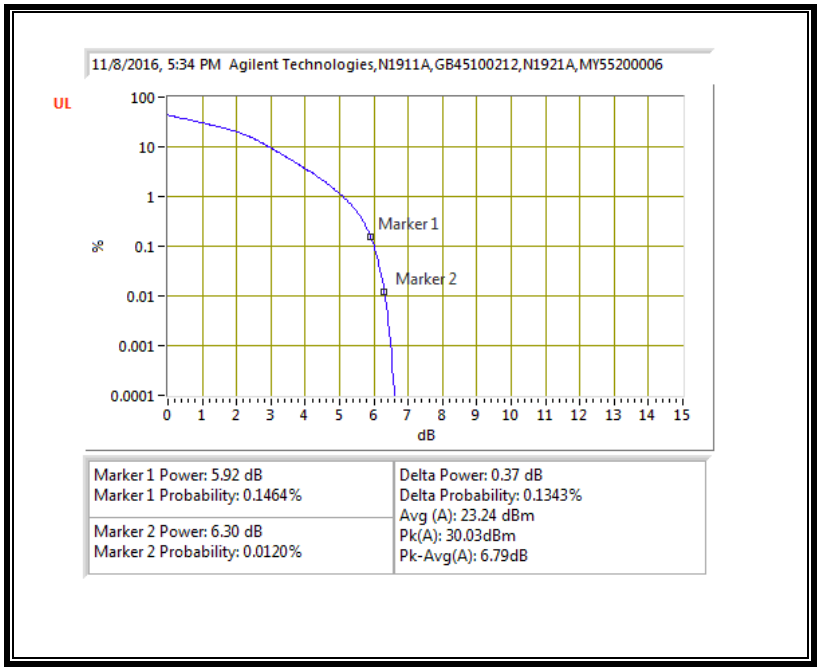
LTE BAND 4 16QAM, (15 MHz)



LTE BAND 4 QPSK, (20 MHz)

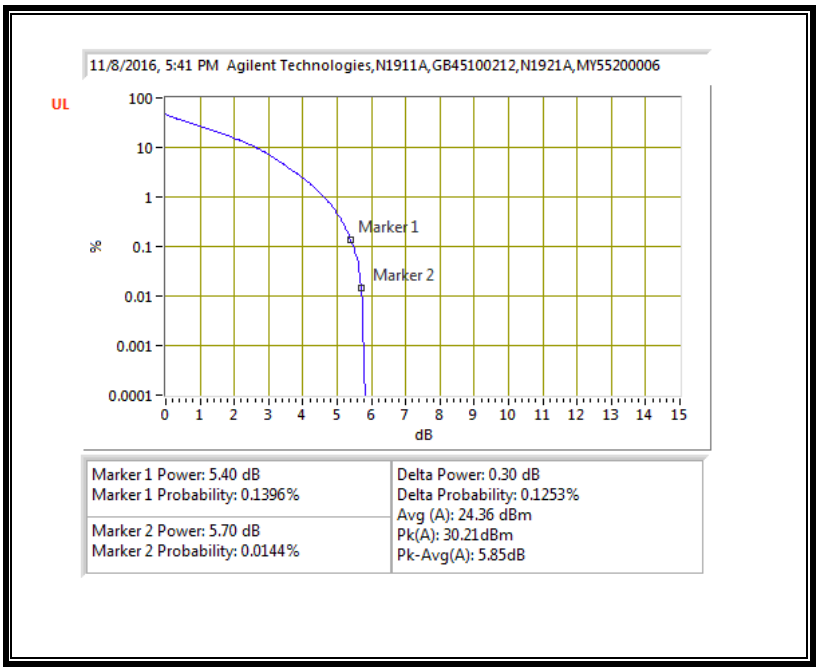


LTE BAND 4 16QAM, (20 MHz)

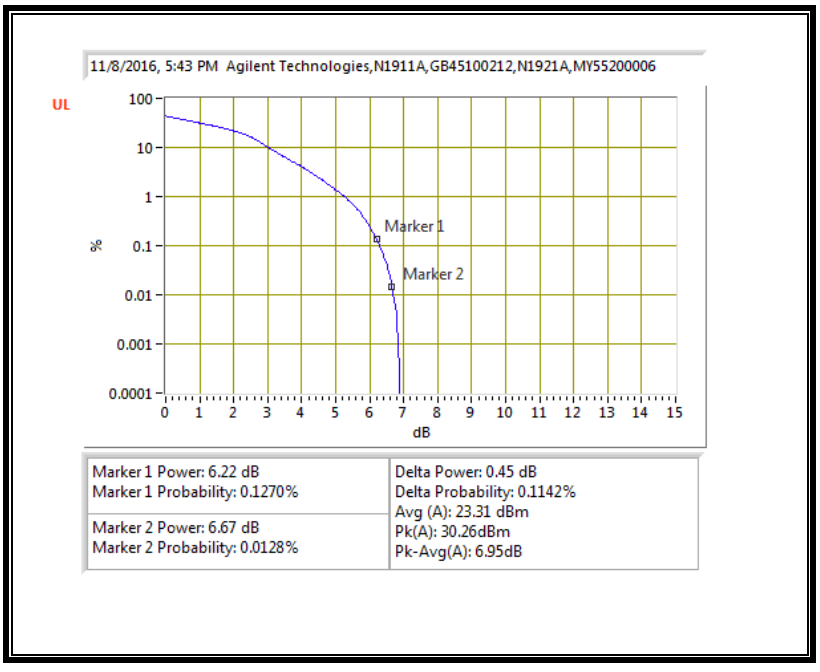


10.1.3. LTE BAND 5

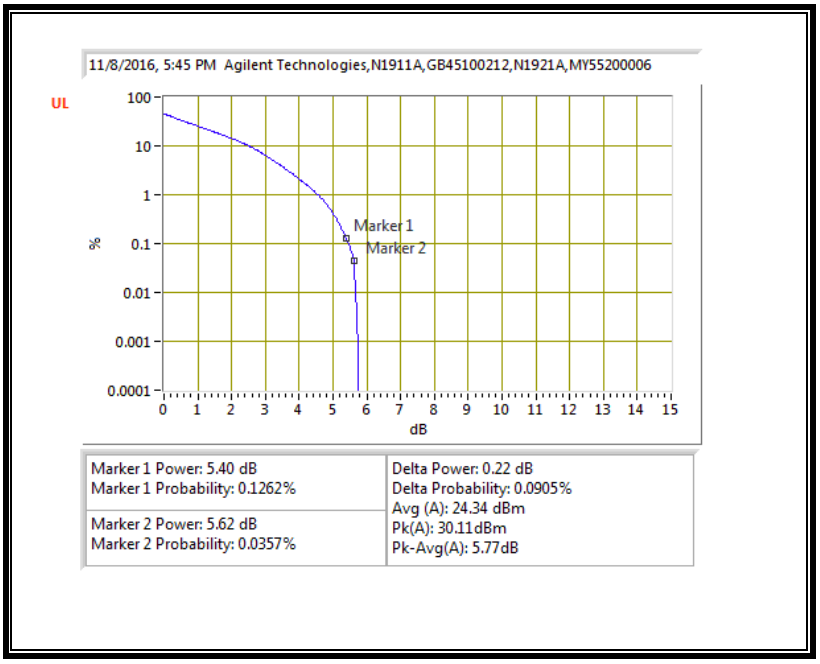
LTE BAND 5 QPSK, (1.4 MHz)



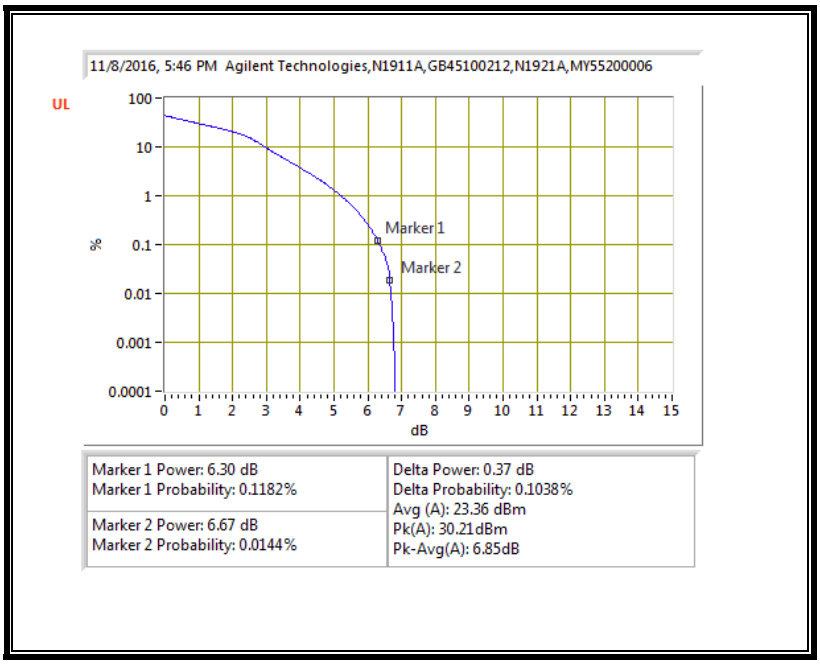
LTE BAND 5 16QAM, (1.4 MHz)



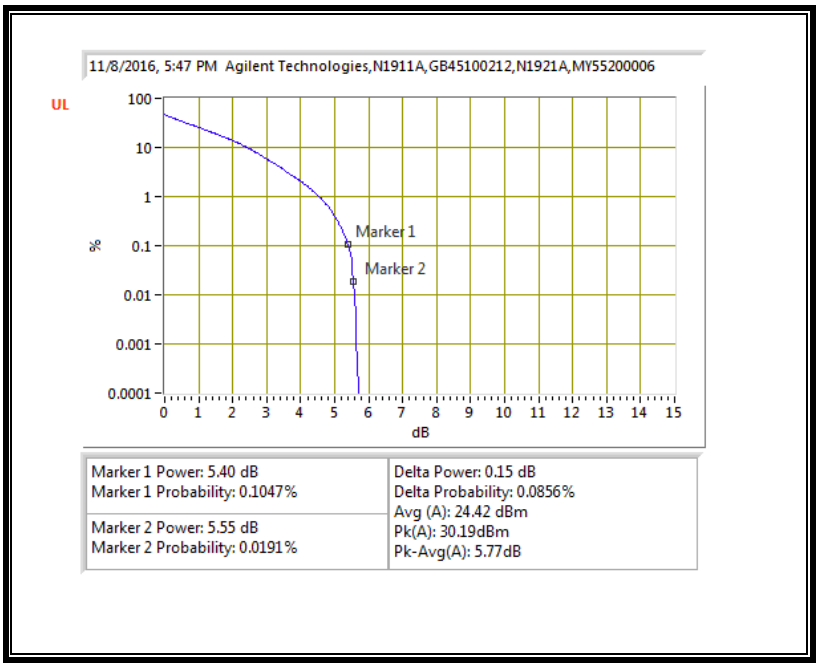
LTE BAND 5 QPSK, (3 MHz)



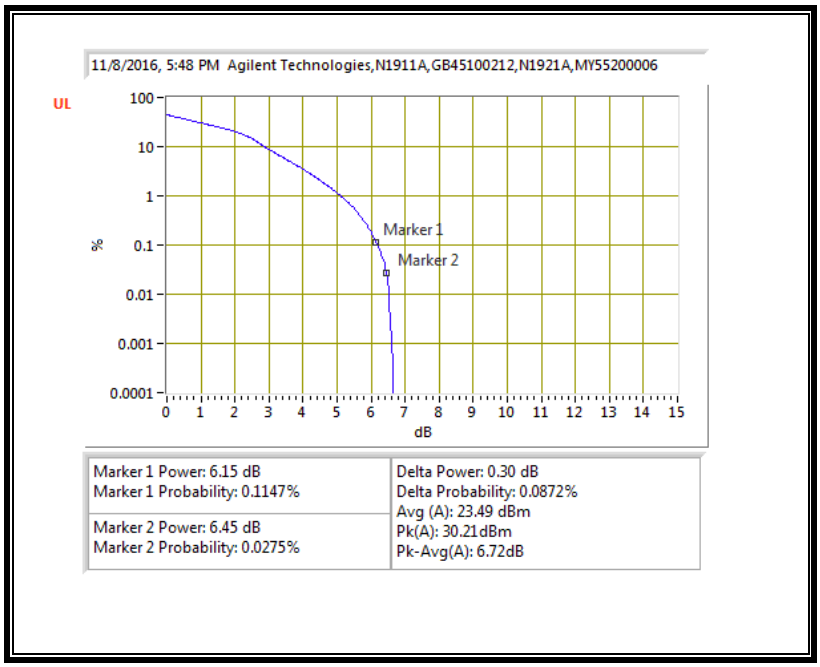
LTE BAND 5 16QAM, (3 MHz)



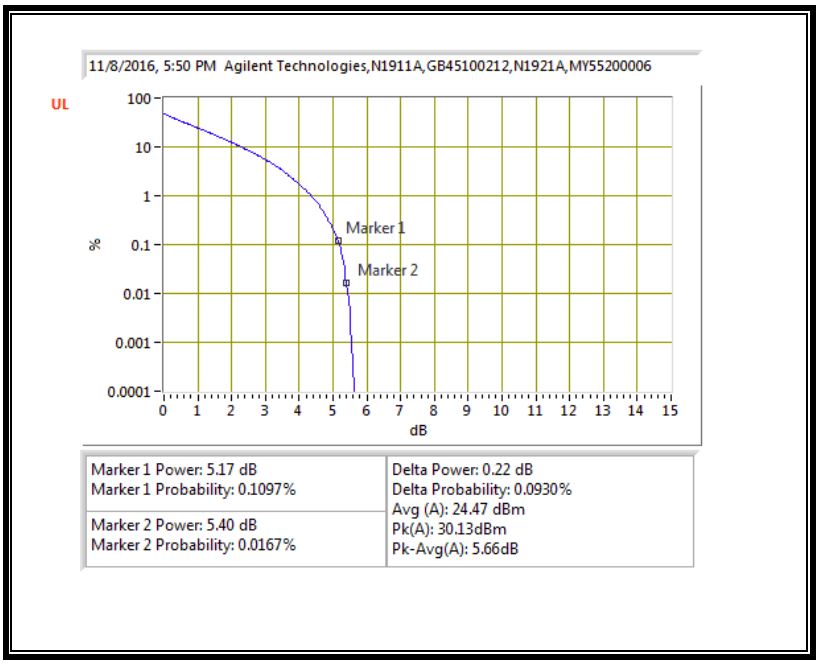
LTE BAND 5 QPSK, (5 MHz)



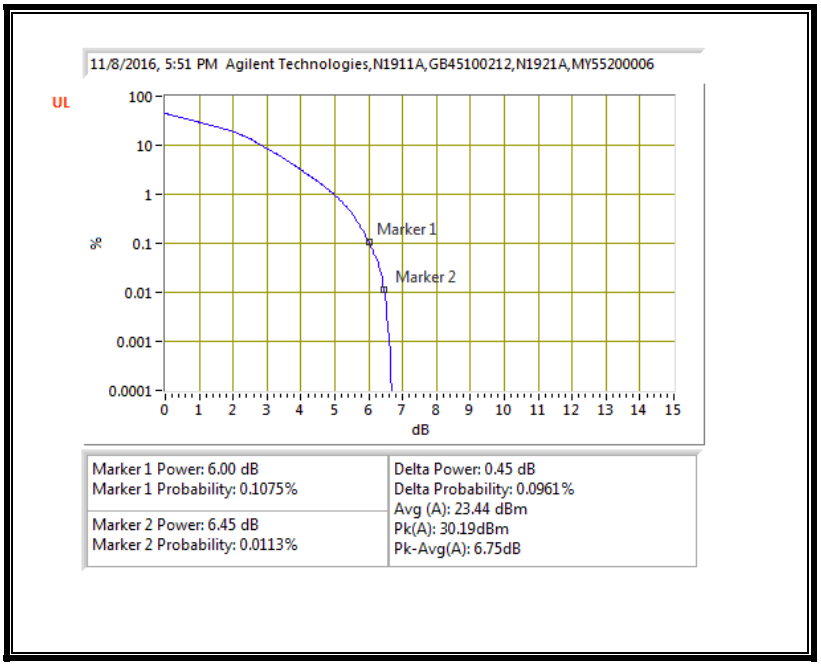
LTE BAND 5 16QAM, (5 MHz)



LTE BAND 5 QPSK, (10 MHz)

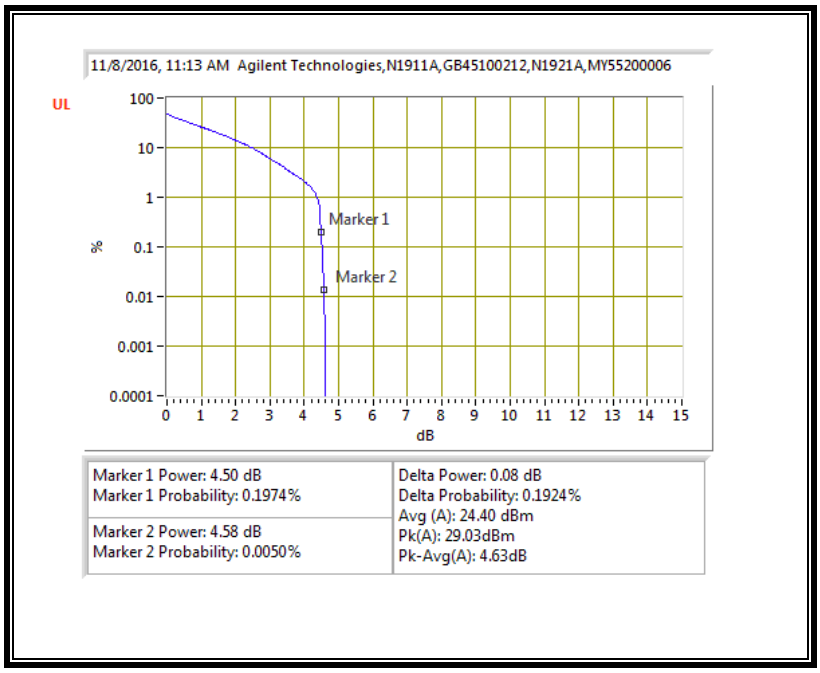


LTE BAND 5 16QAM, (10 MHz)

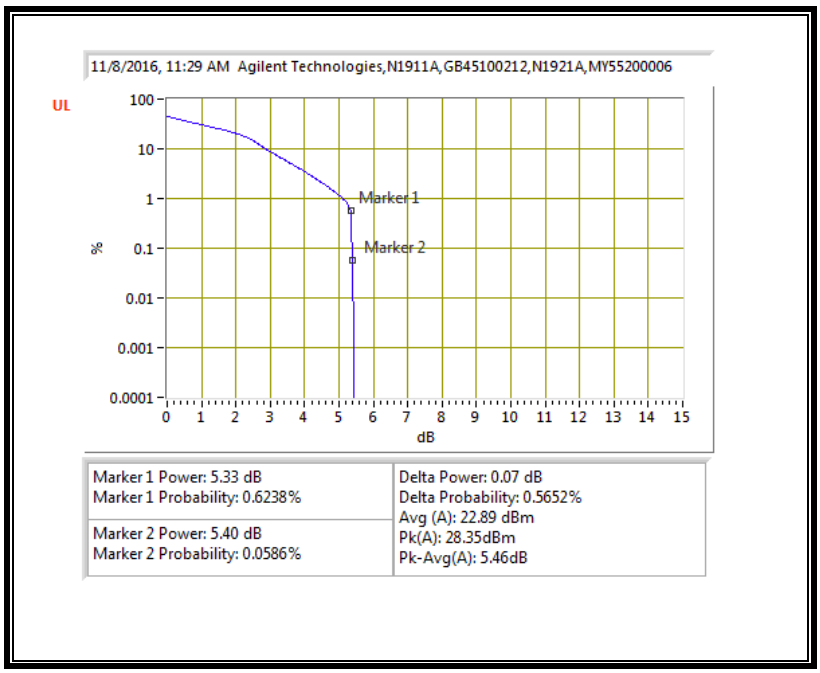


10.1.4. LTE BAND 7

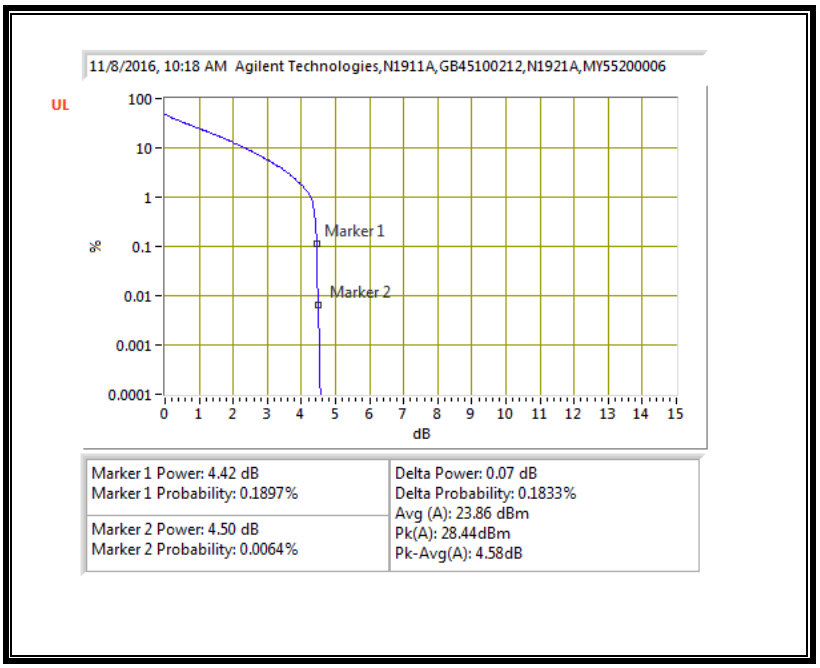
LTE BAND 7 QPSK, (5 MHz)



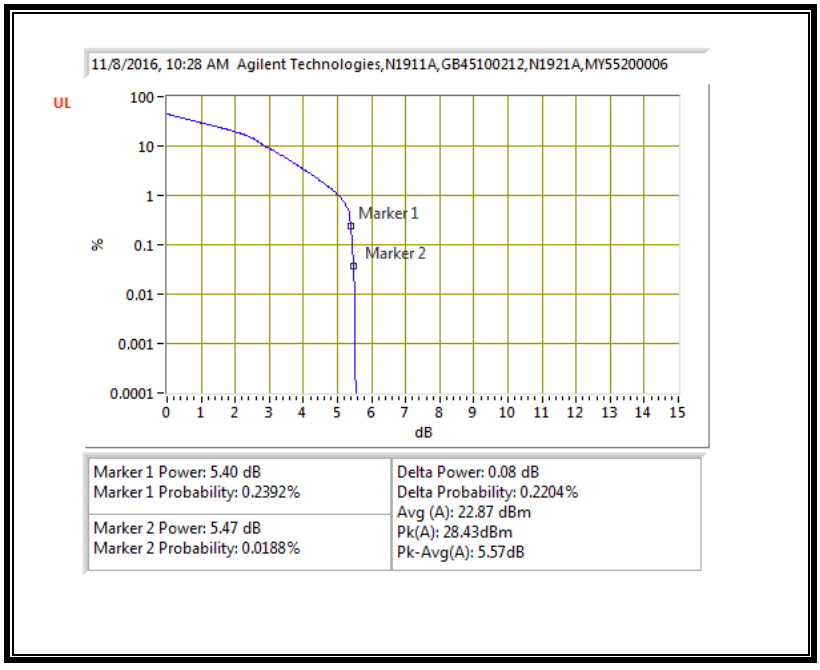
LTE BAND 7 16QAM, (5 MHz)



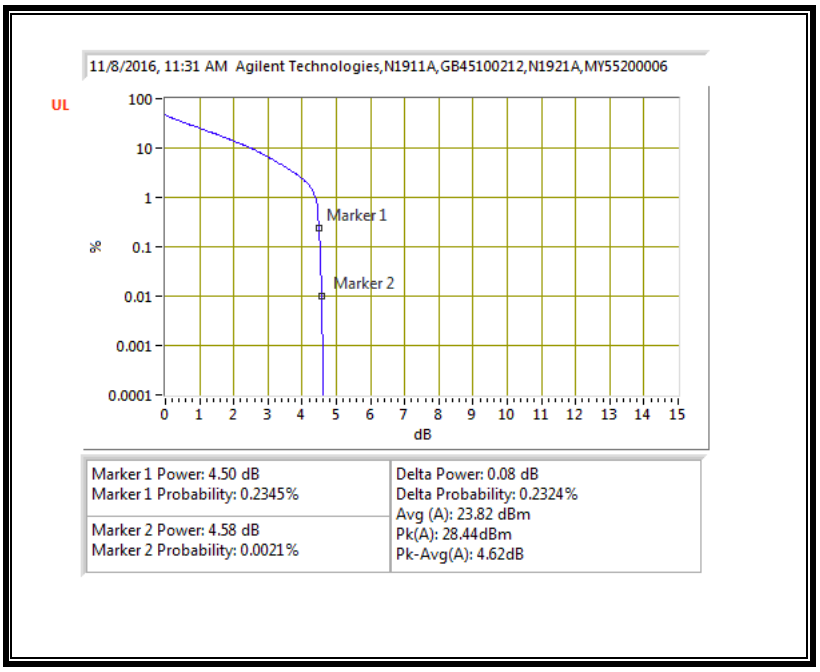
LTE BAND 7 QPSK, (10 MHz)



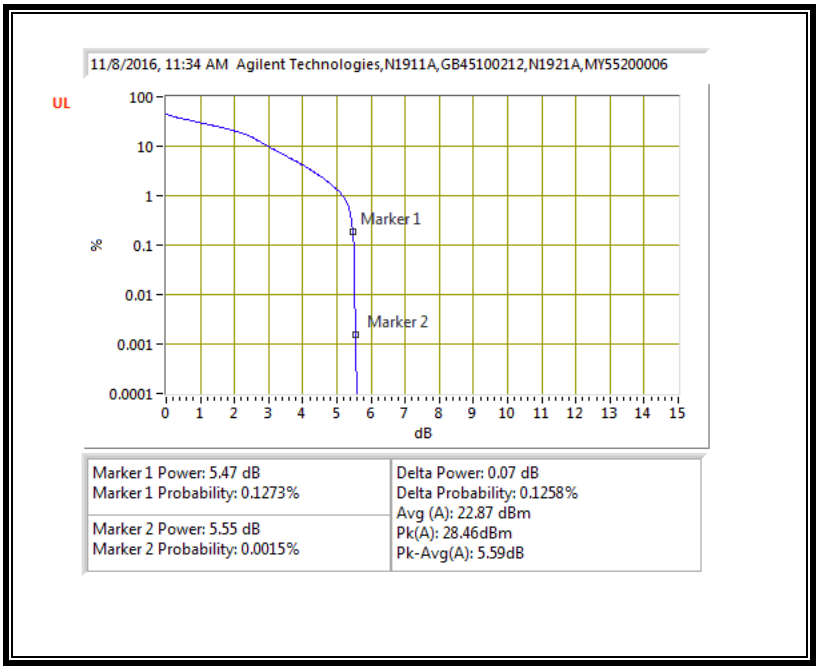
LTE BAND 7 16QAM, (10 MHz)



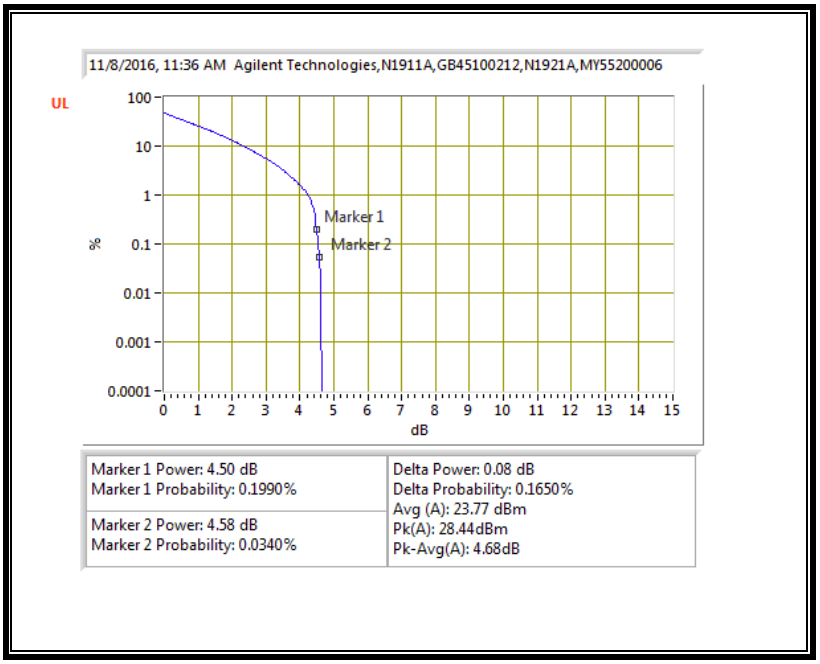
LTE BAND 7 QPSK, (15 MHz)



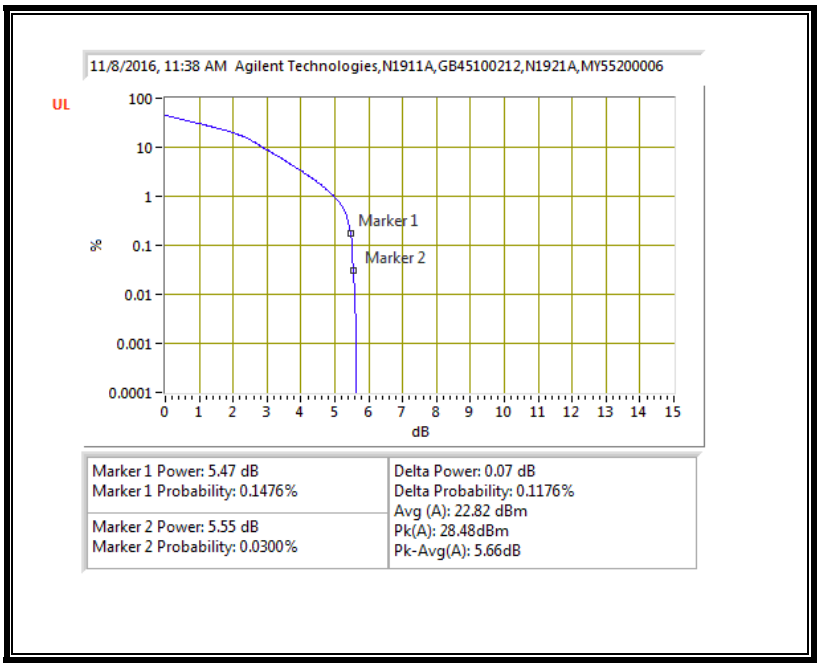
LTE BAND 7 16QAM, (15 MHz)



LTE BAND 7 QPSK, (20 MHz)

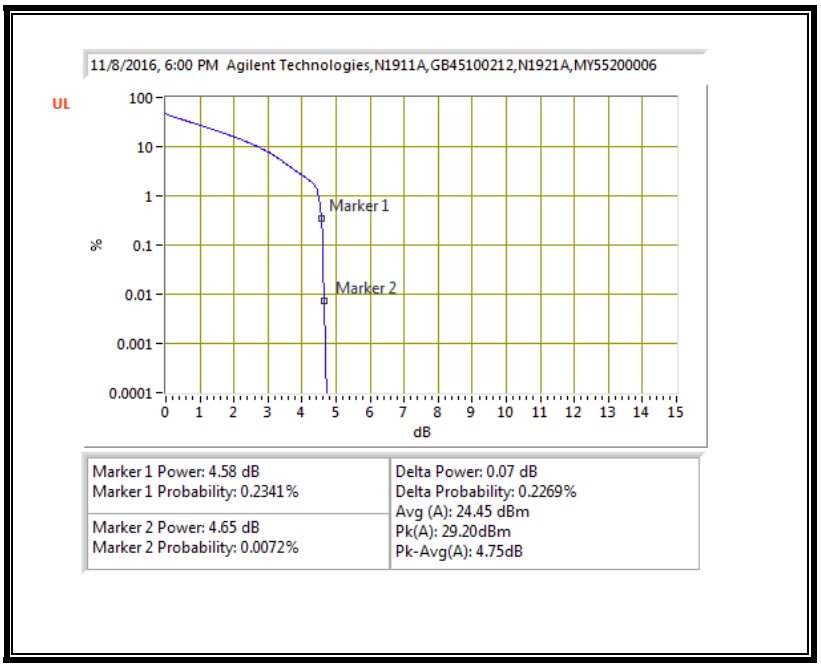


LTE BAND 7 16QAM, (20 MHz)

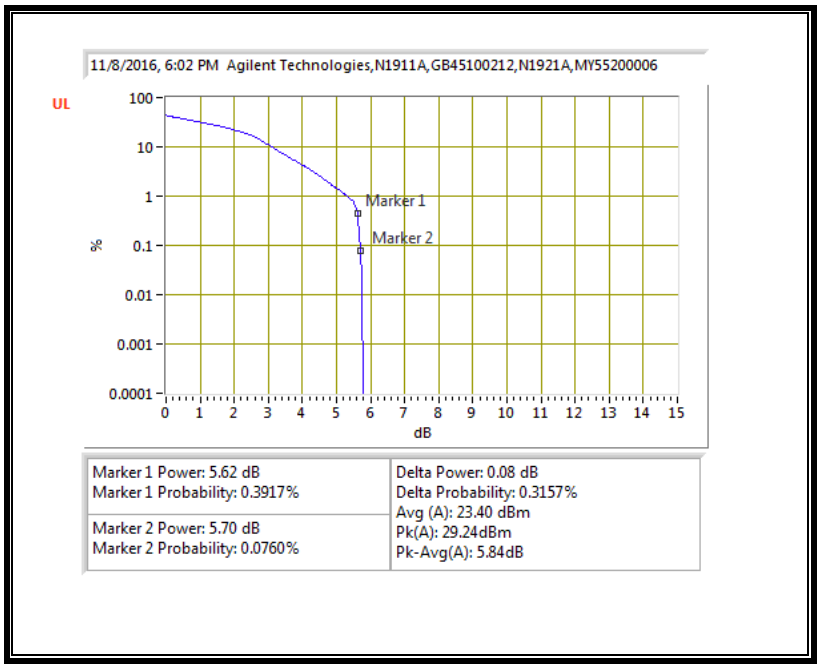


10.1.5. LTE BAND 12

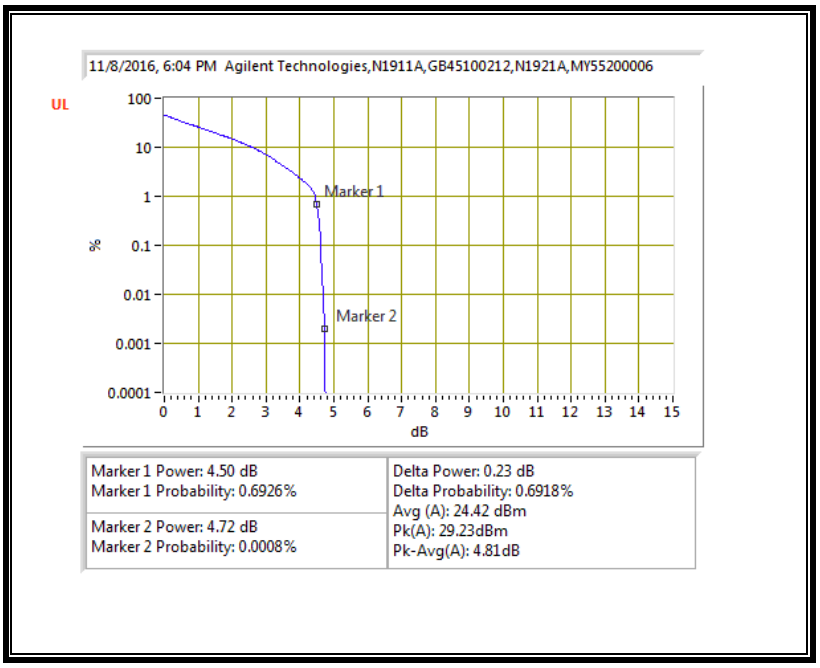
LTE BAND 12 QPSK, (1.4 MHz)



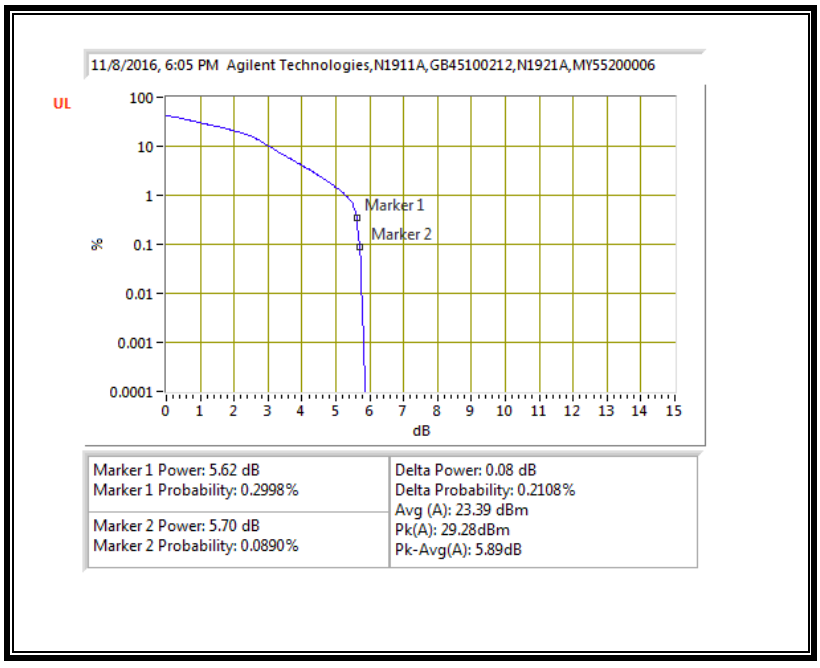
LTE BAND 12 16QAM, (1.4 MHz)



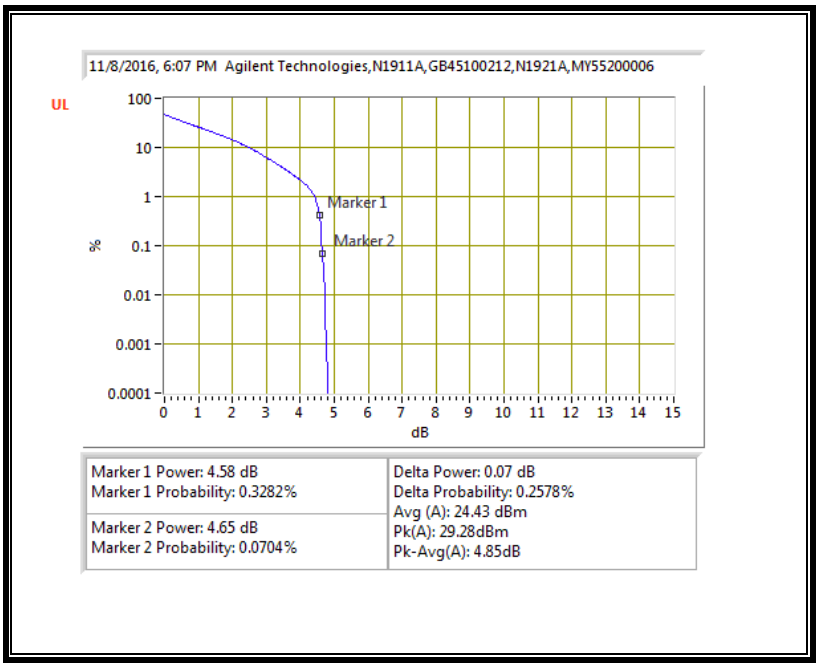
LTE BAND 12 QPSK, (3 MHz)



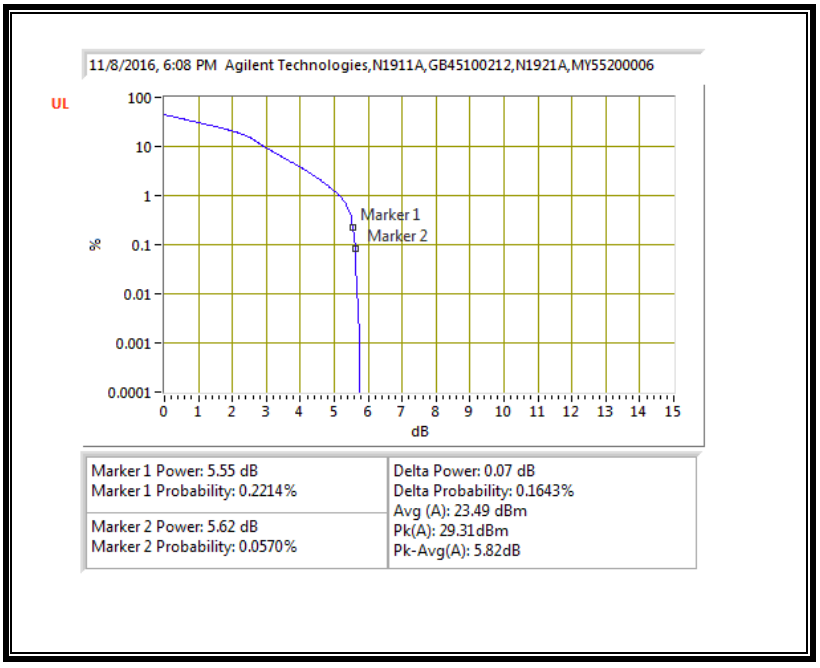
LTE BAND 12 16QAM, (3 MHz)



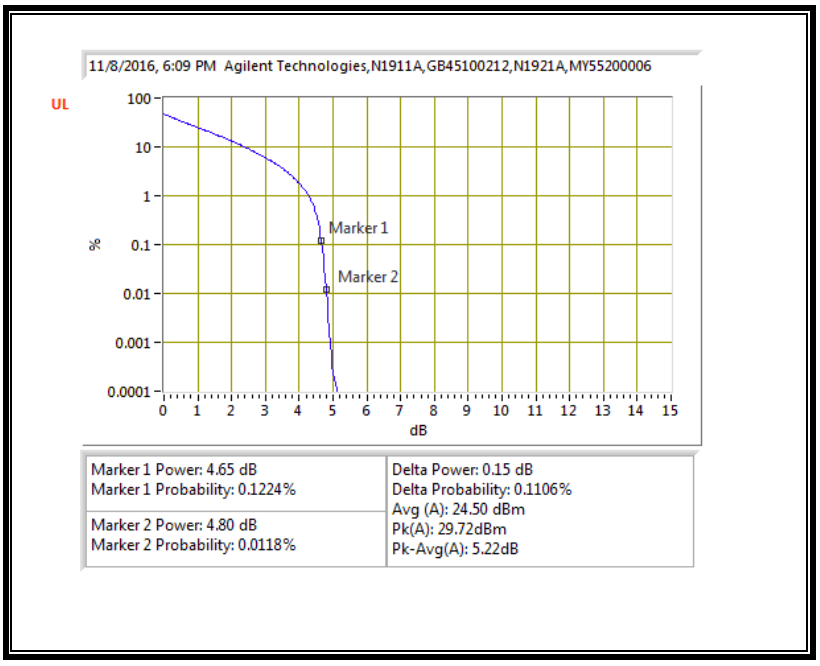
LTE BAND 12 QPSK, (5 MHz)



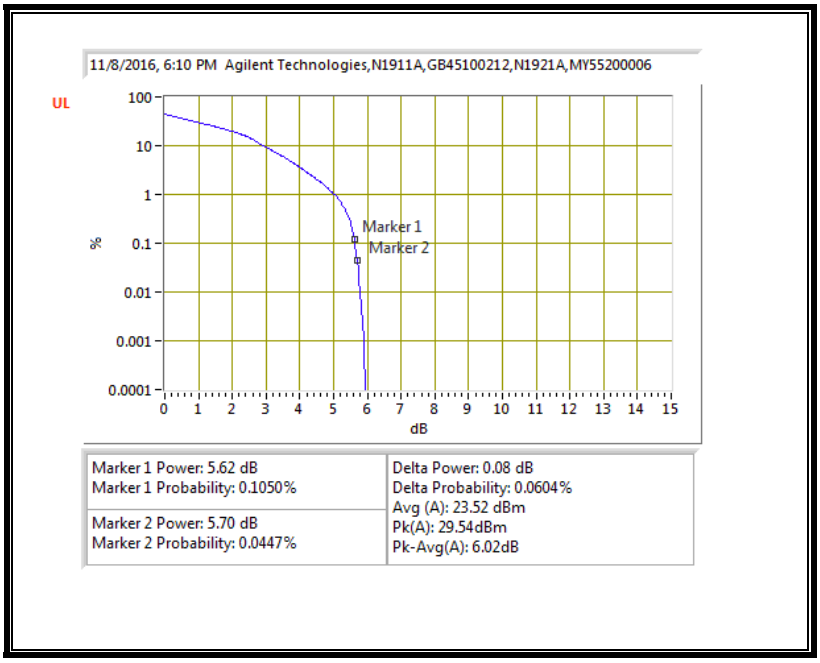
LTE BAND 12 16QAM, (5 MHz)



LTE BAND 12 QPSK, (10 MHz)

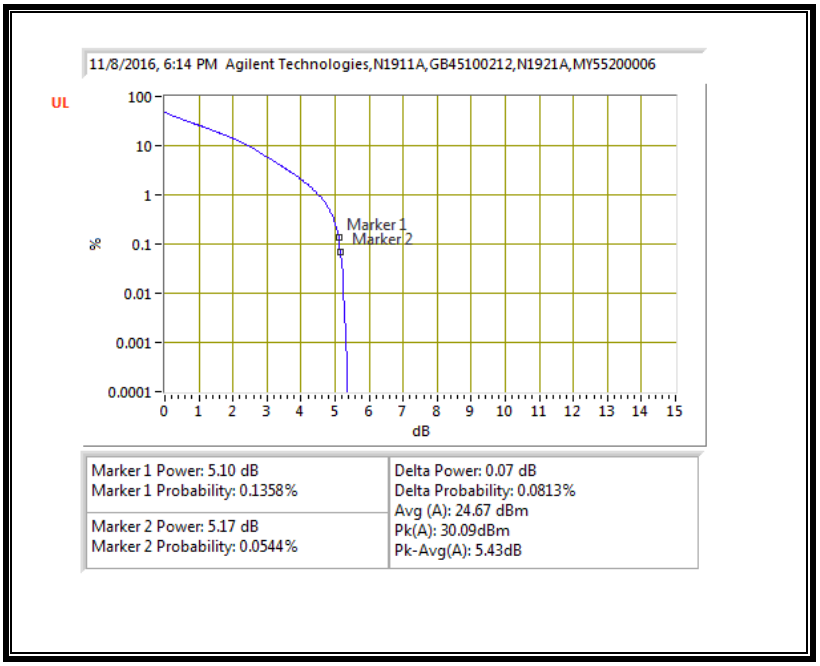


LTE BAND 12 16QAM, (10 MHz)

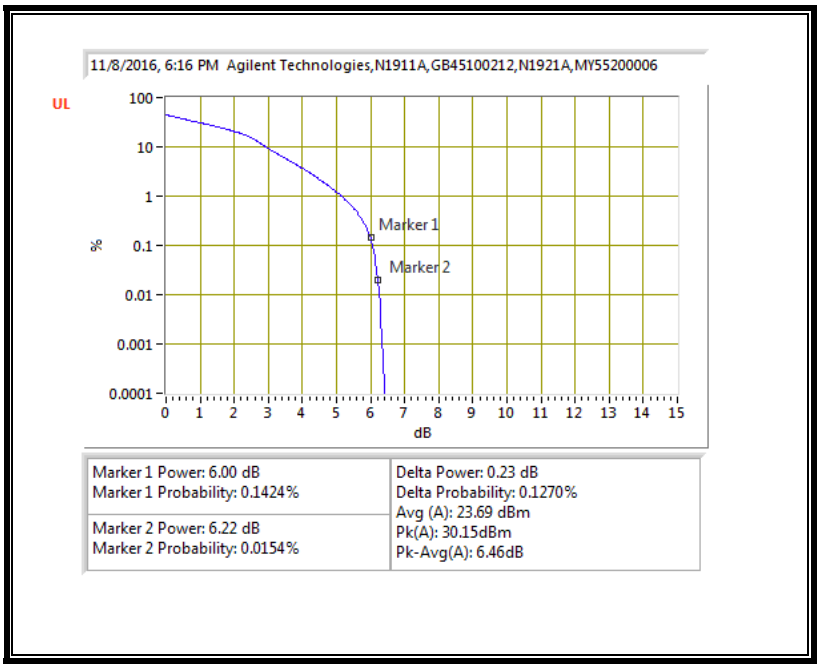


10.1.6. LTE BAND 13

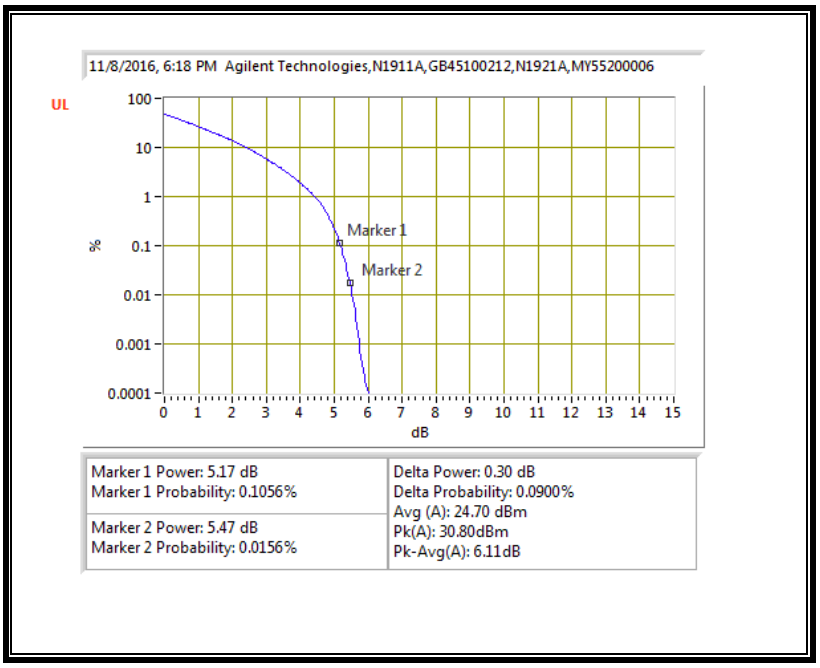
LTE BAND 13 QPSK, (5 MHz)



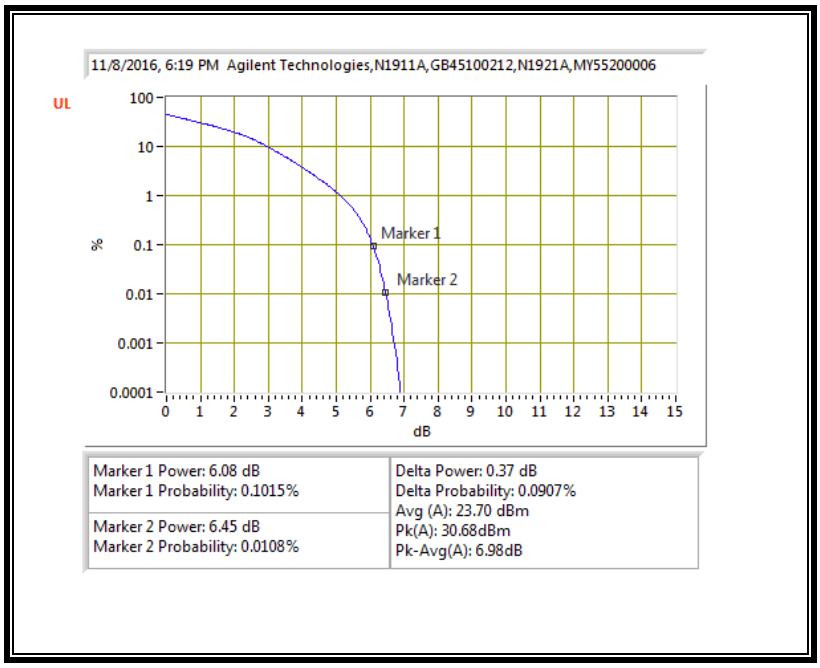
LTE BAND 13 16QAM, (5 MHz)



LTE BAND 13 QPSK, (10 MHz)

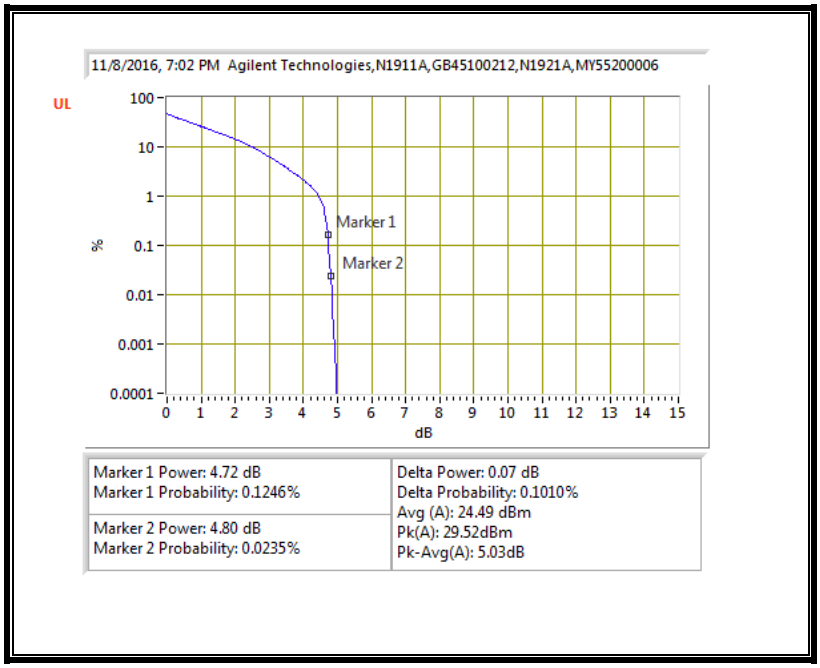


LTE BAND 13 16QAM, (10 MHz)

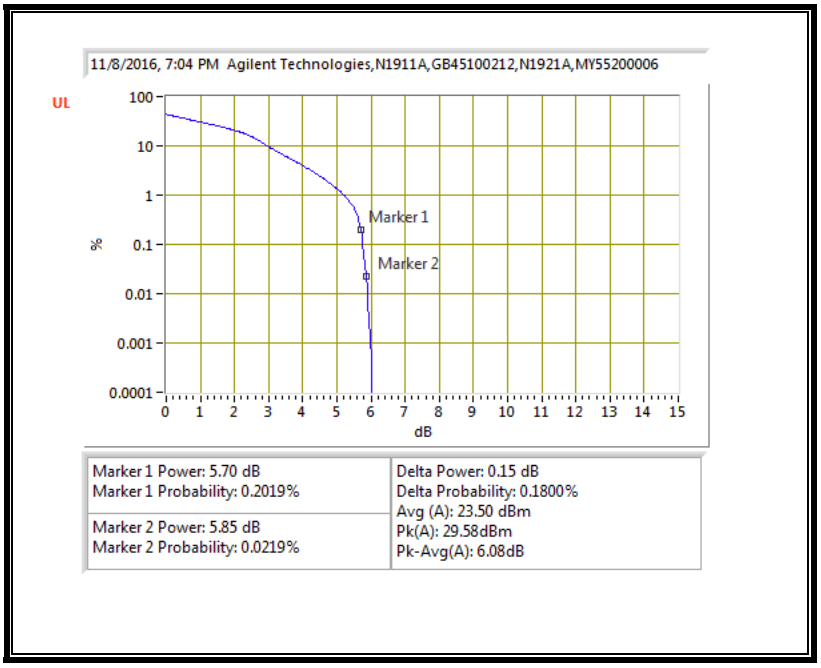


10.1.7. LTE BAND 17

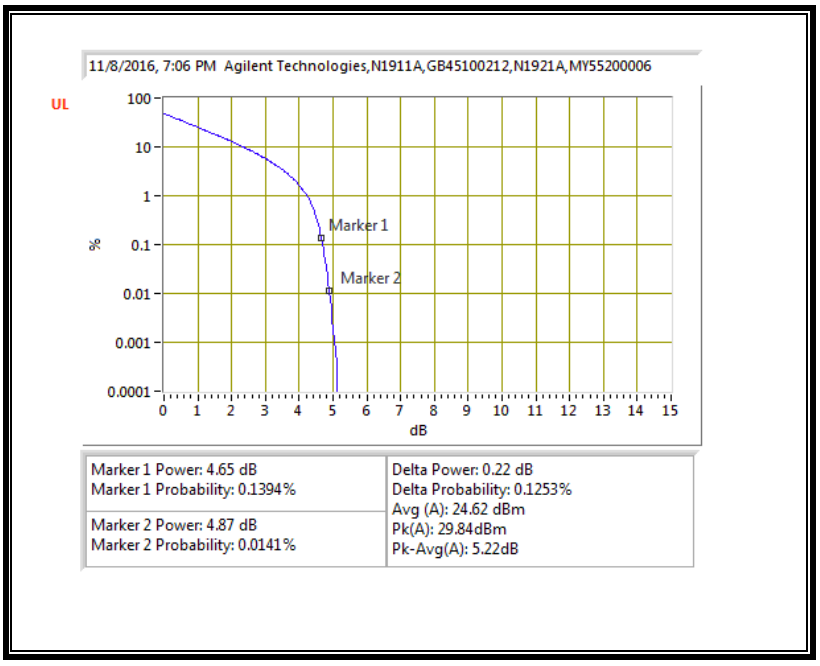
LTE BAND 17 QPSK, (5 MHz)



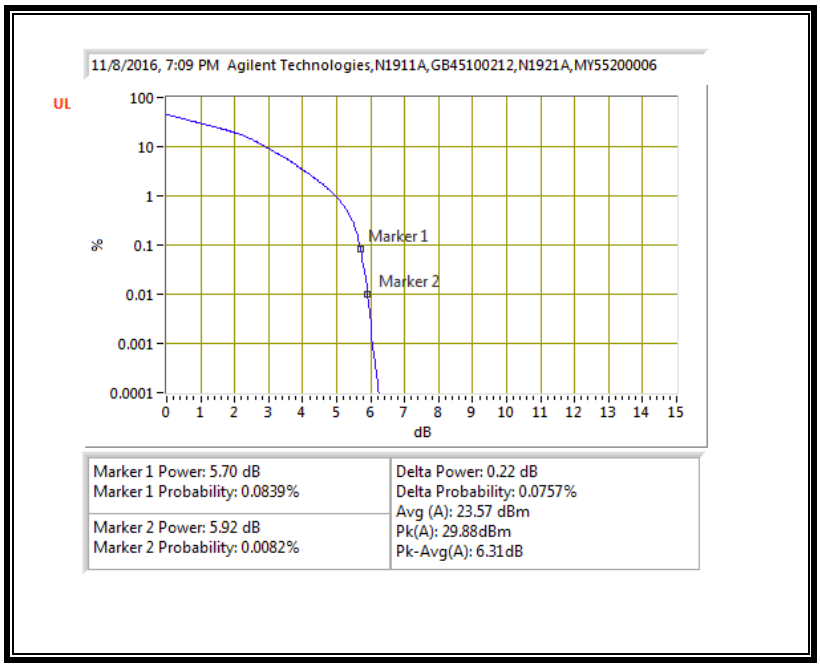
LTE BAND 17 16QAM, (5 MHz)



LTE BAND 17 QPSK, (10 MHz)

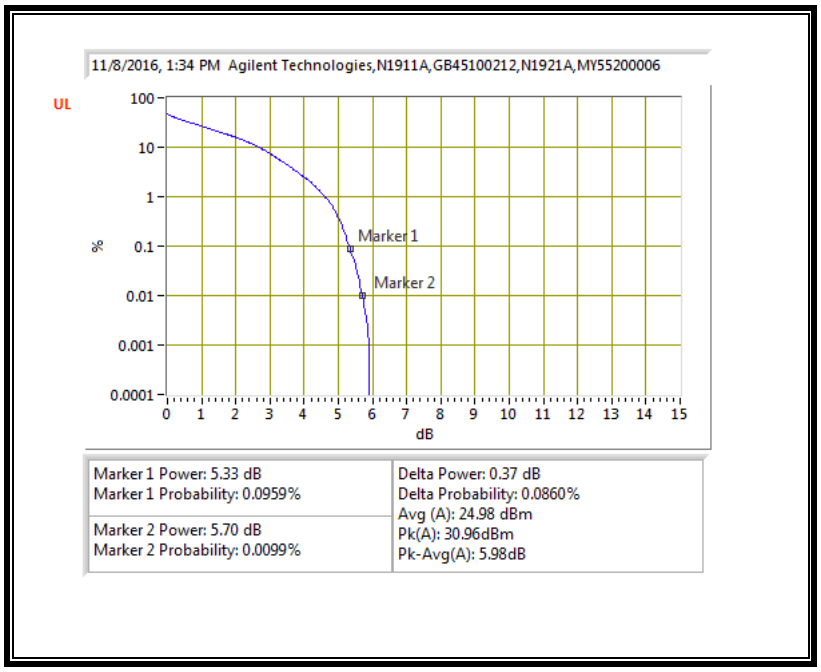


LTE BAND 17 16QAM, (10 MHz)

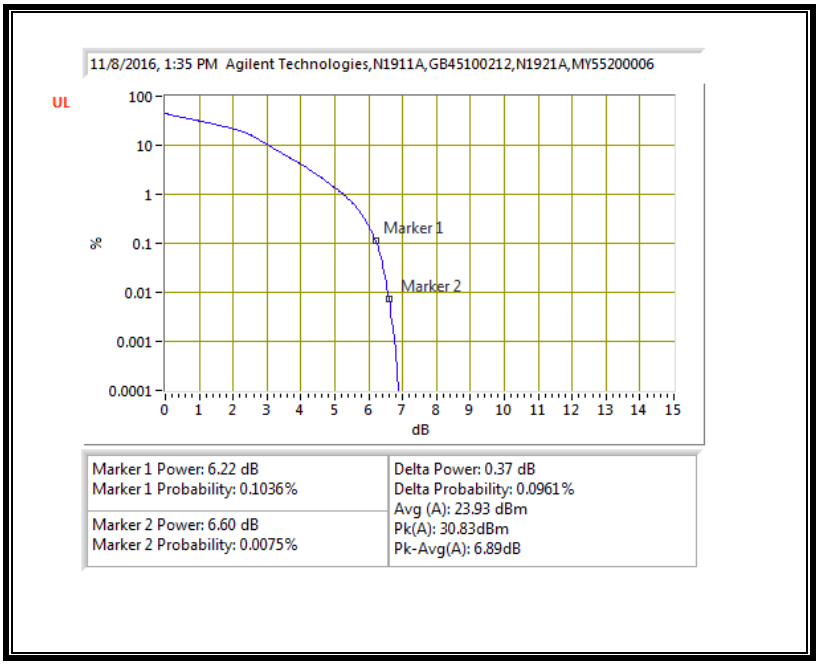


10.1.8. LTE BAND 25

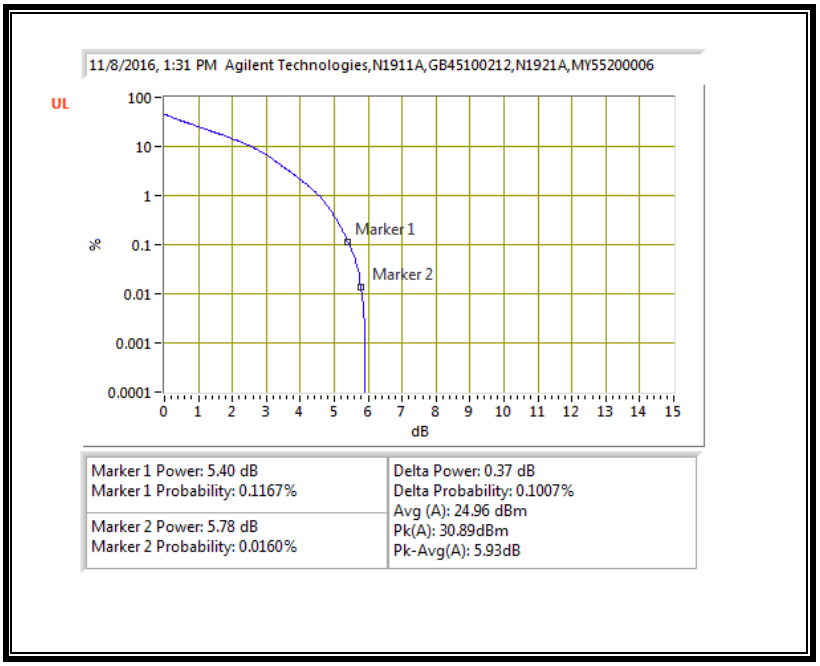
LTE BAND 25 QPSK, (1.4 MHz)



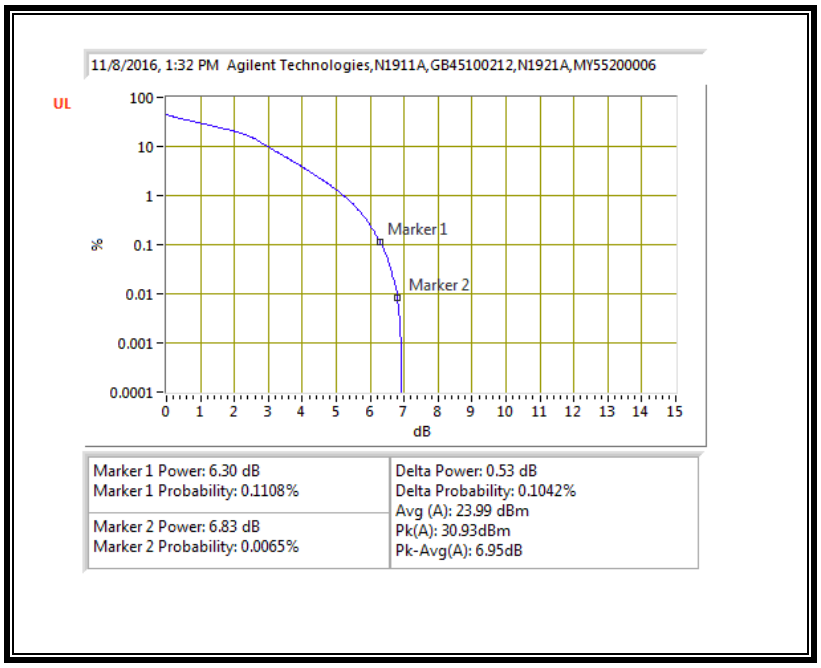
LTE BAND 25 16QAM, (1.4 MHz)



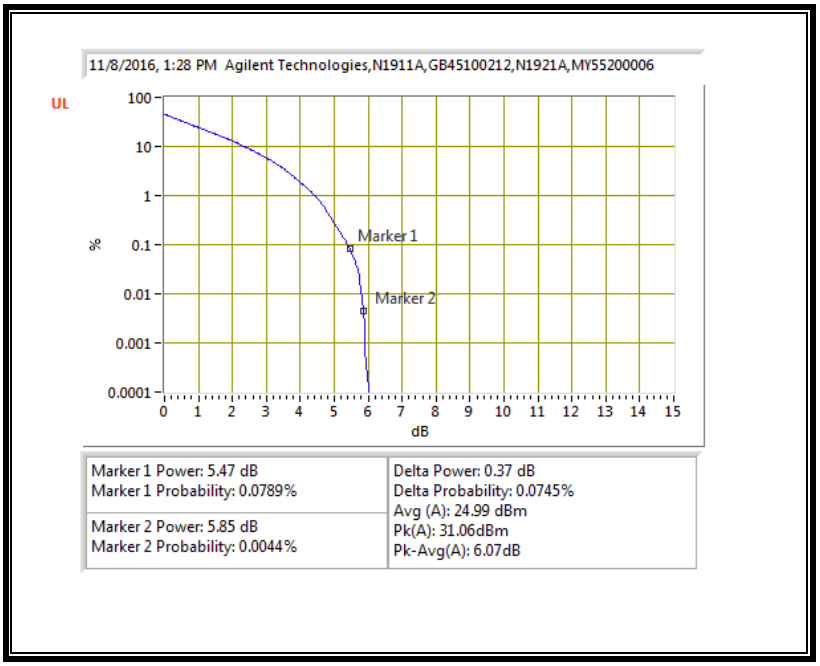
LTE BAND 25 QPSK, (3 MHz)



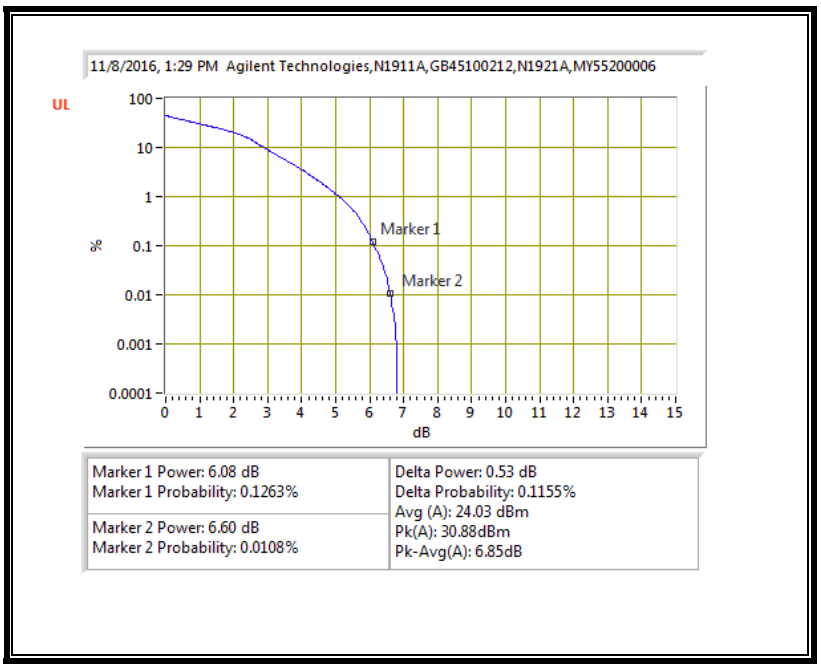
LTE BAND 25 16QAM, (3 MHz)



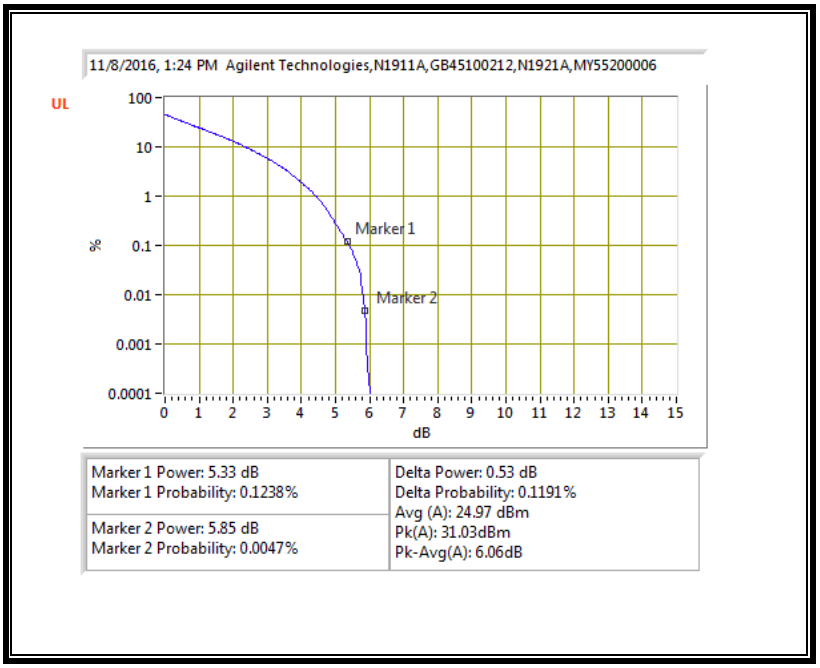
LTE BAND 25 QPSK, (5 MHz)



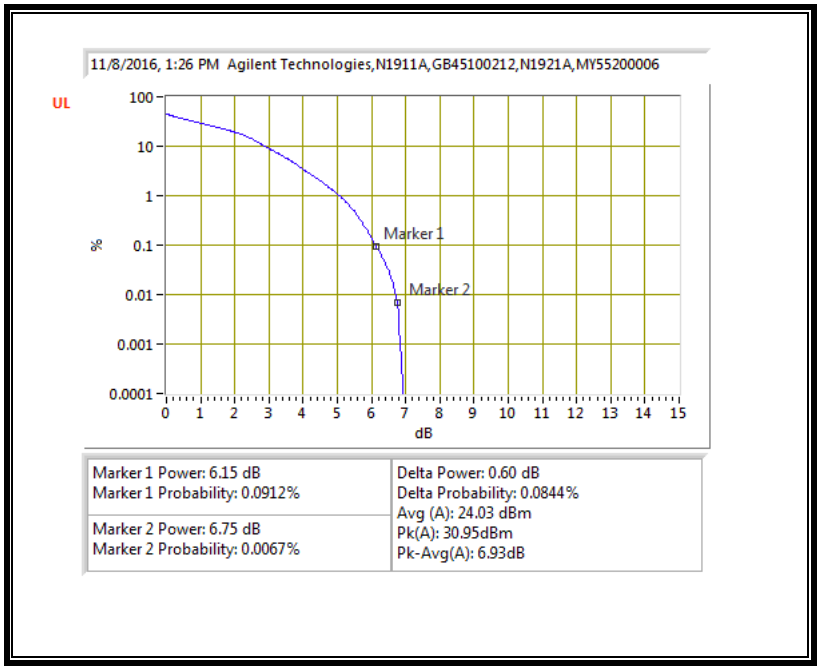
LTE BAND 25 16QAM, (5 MHz)



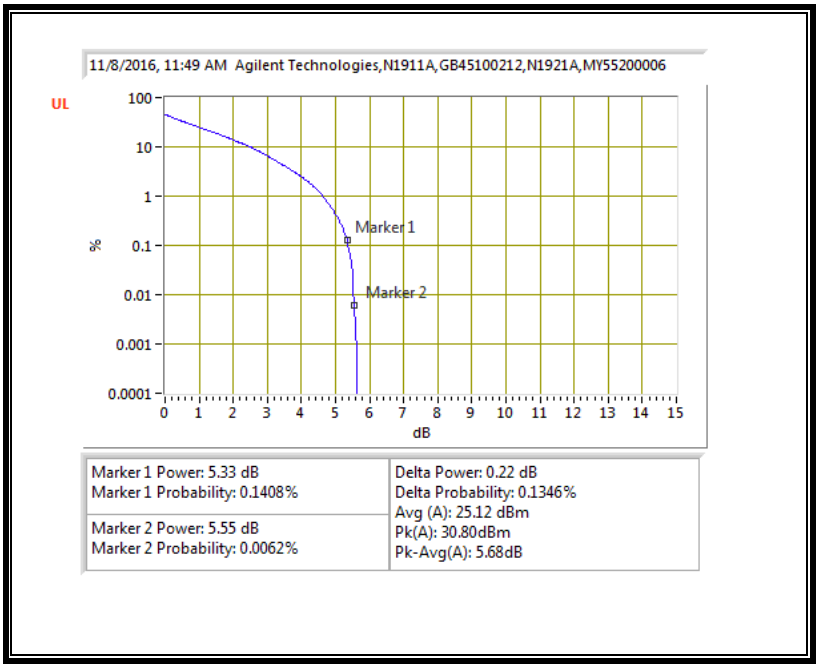
LTE BAND 25 QPSK, (10 MHz)



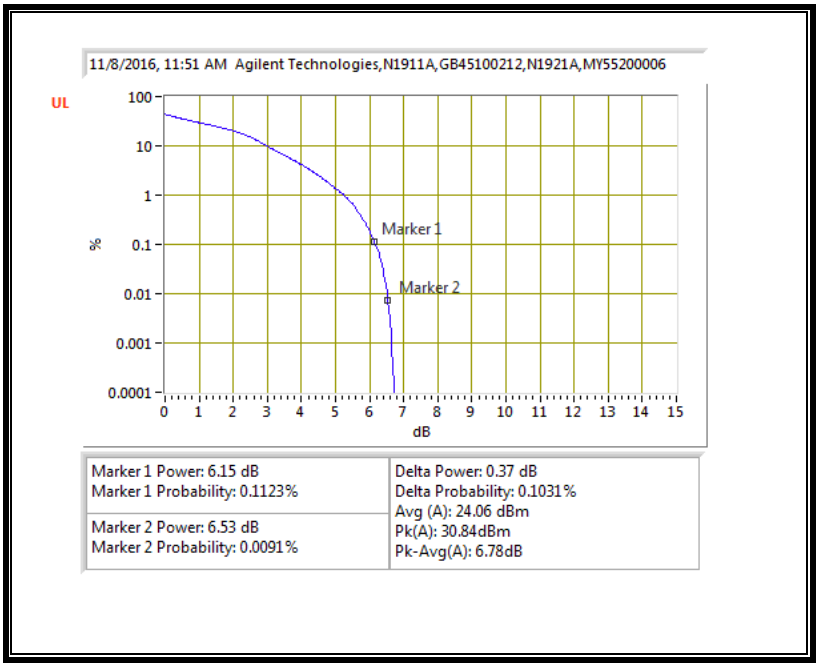
LTE BAND 25 16QAM, (10 MHz)



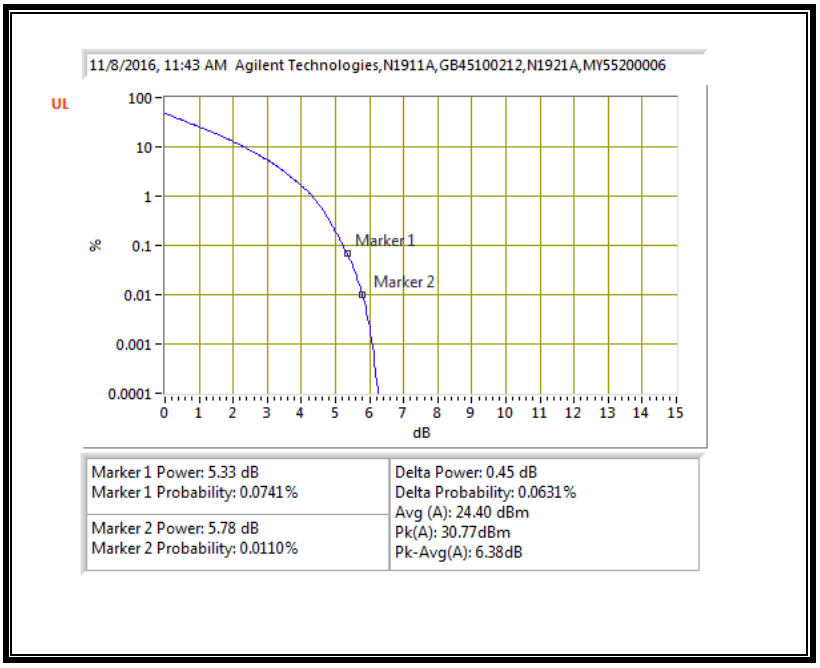
LTE BAND 25 QPSK, (15 MHz)



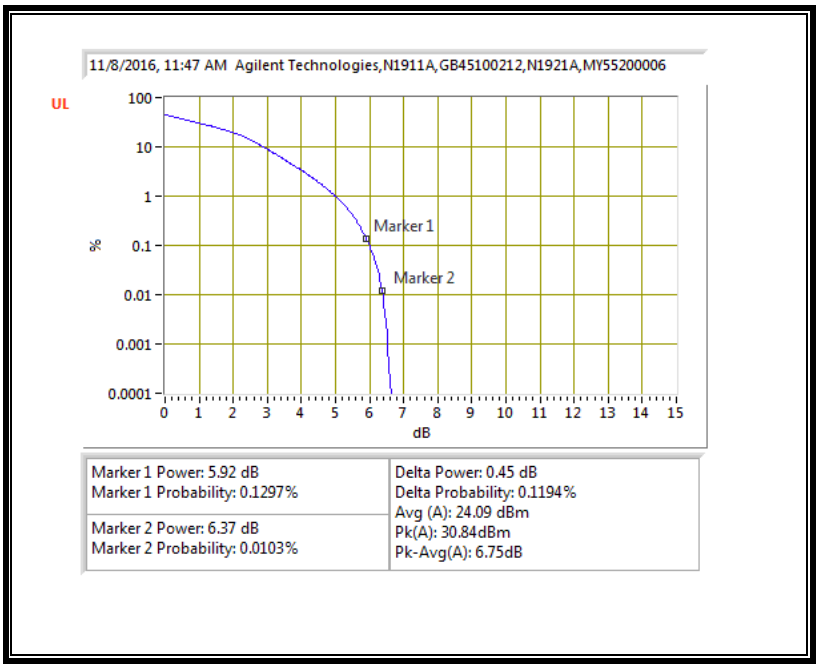
LTE BAND 25 16QAM, (15 MHz)



LTE BAND 25 QPSK, (20 MHz)

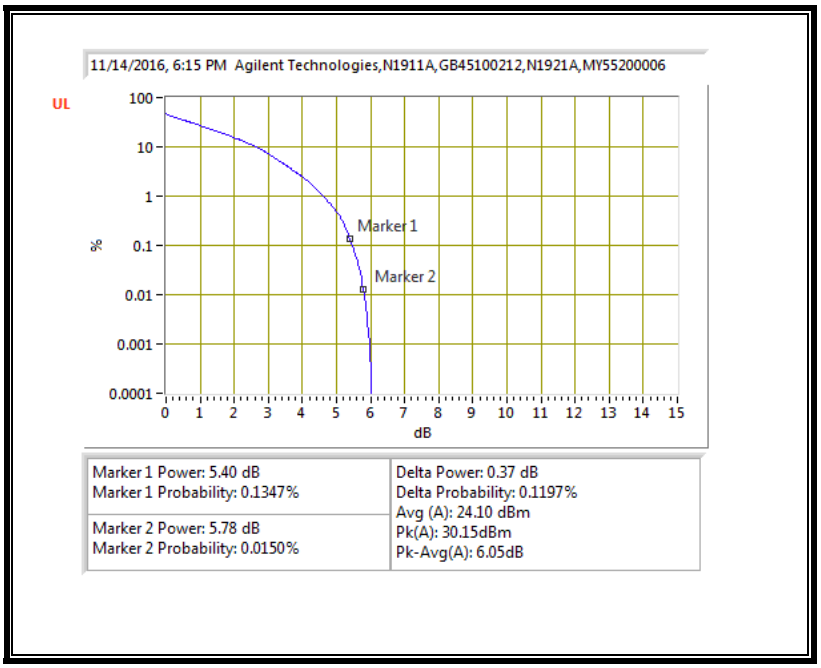


LTE BAND 25 16QAM, (20 MHz)

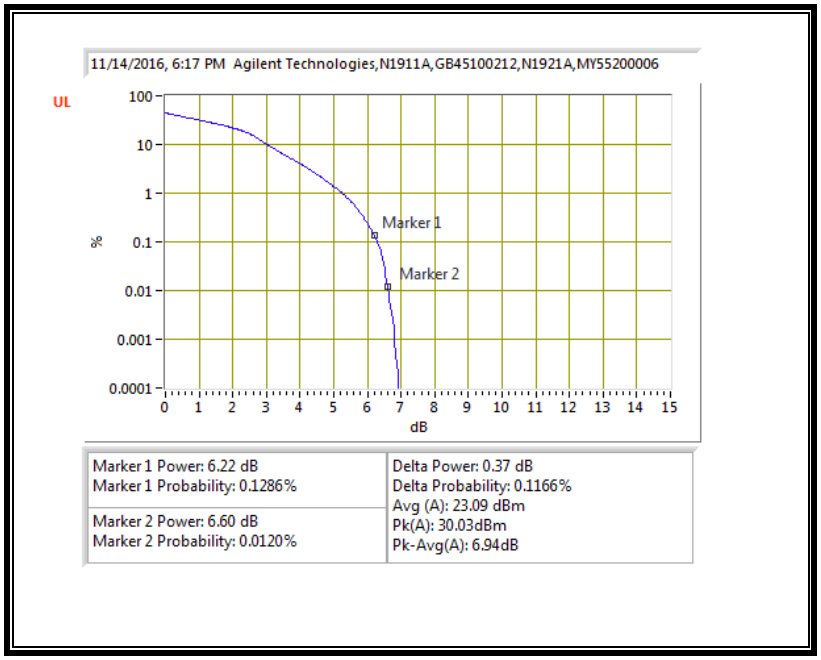


10.1.9. LTE BAND 26

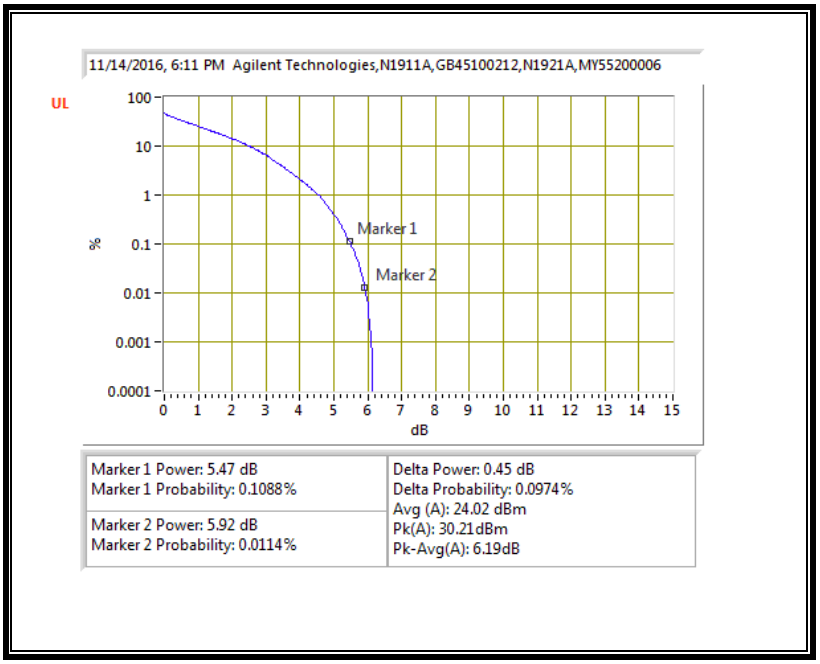
LTE BAND 26 QPSK, (1.4 MHz)



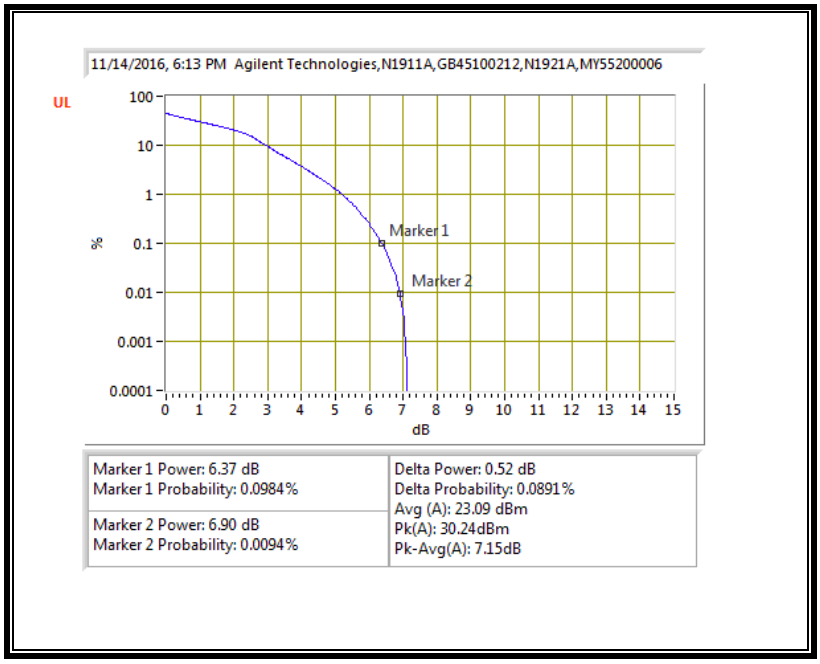
LTE BAND 26 16QAM, (1.4 MHz)



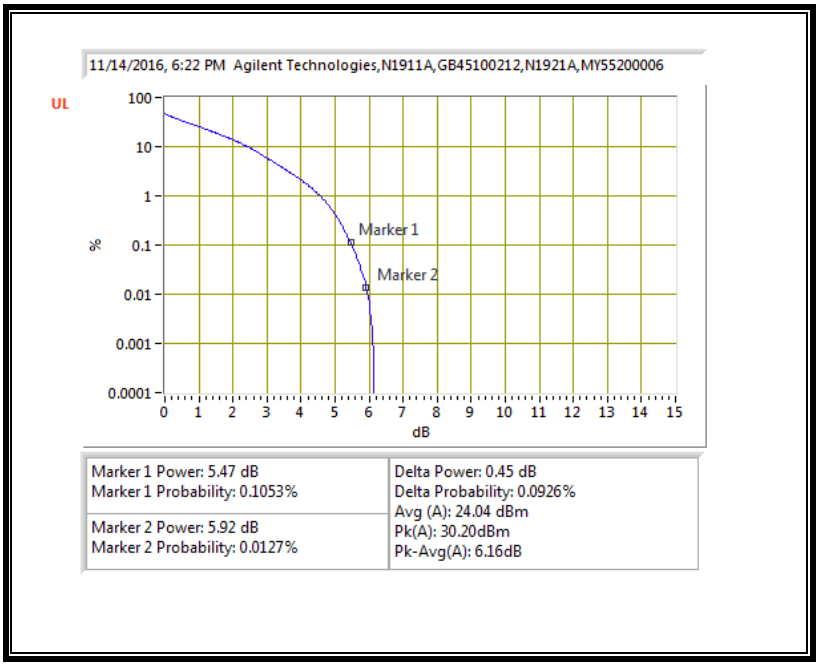
LTE BAND 26 QPSK, (3 MHz)



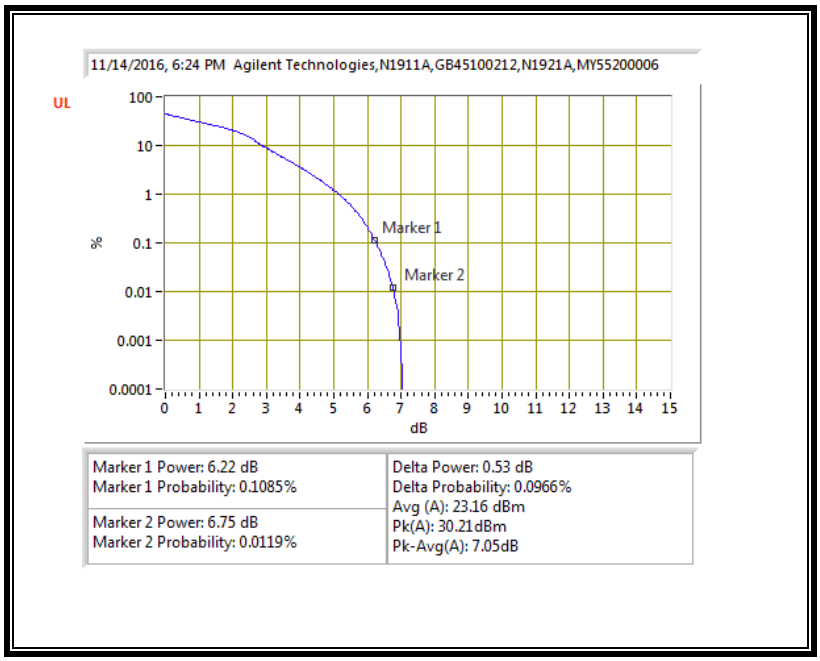
LTE BAND 26 16QAM, (3 MHz)



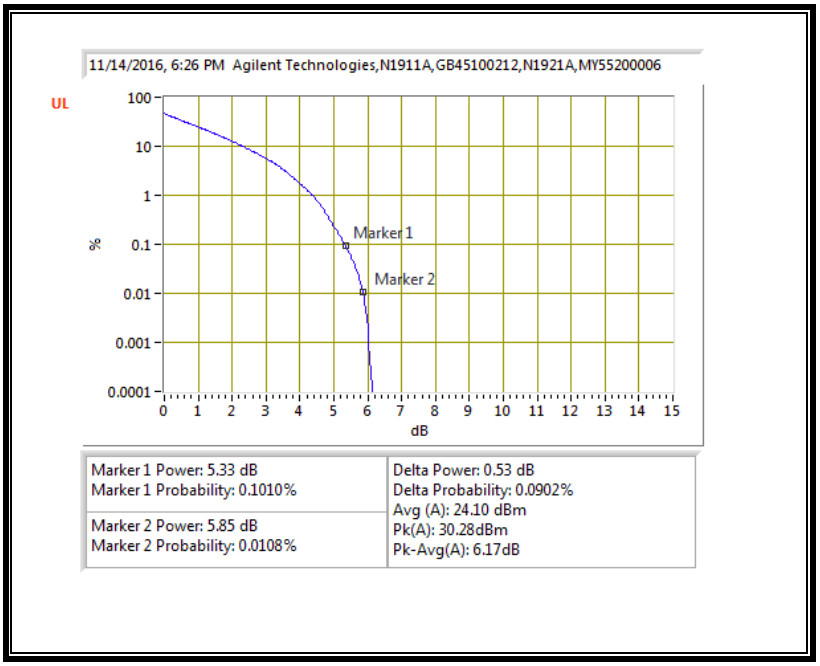
LTE BAND 26 QPSK, (5 MHz)



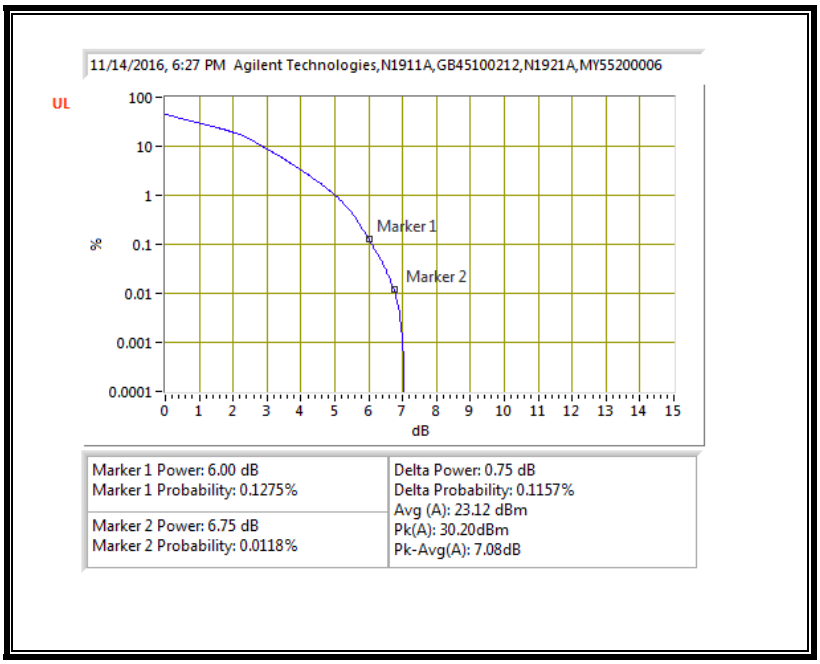
LTE BAND 26 16QAM, (5 MHz)



LTE BAND 26 QPSK, (10 MHz)

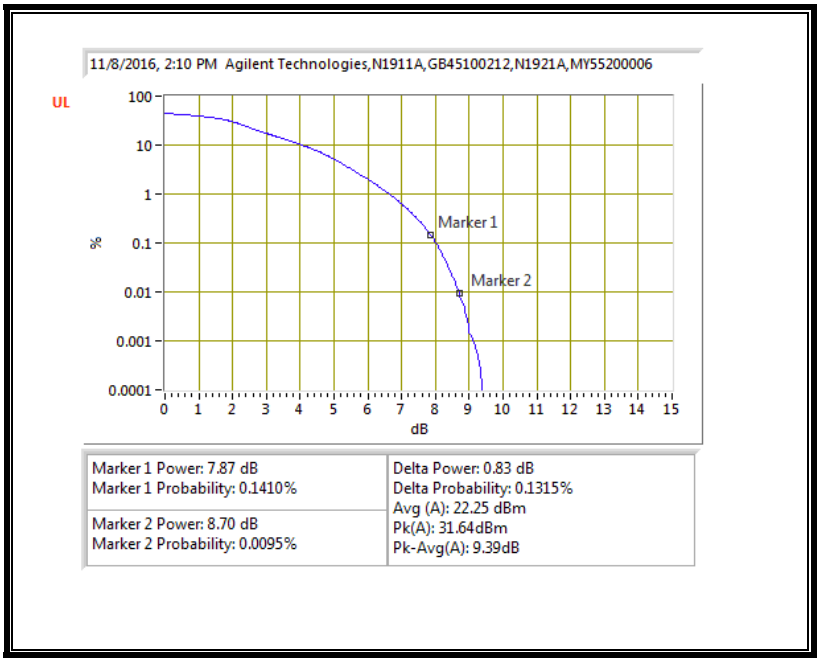


LTE BAND 26 16QAM, (10 MHz)

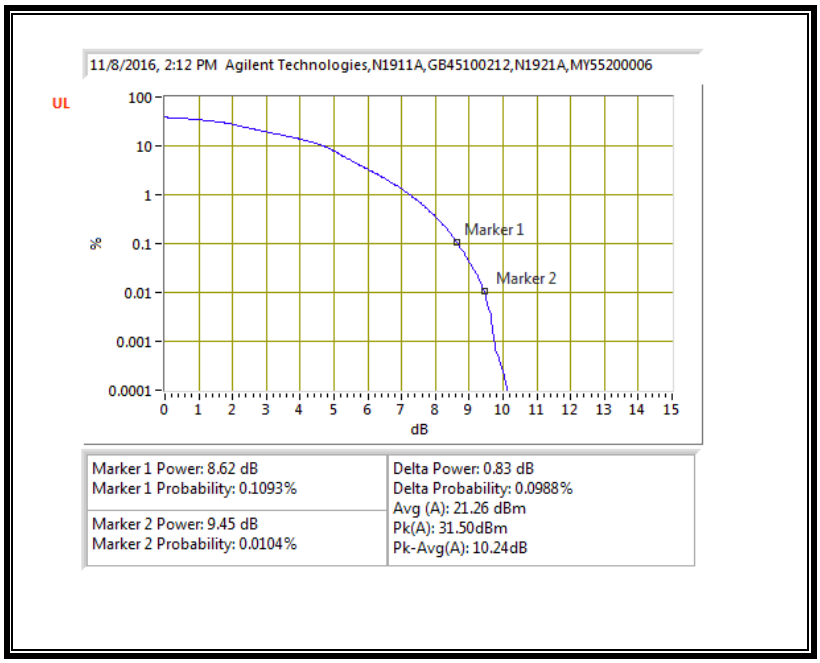


10.1.10. LTE BAND 41

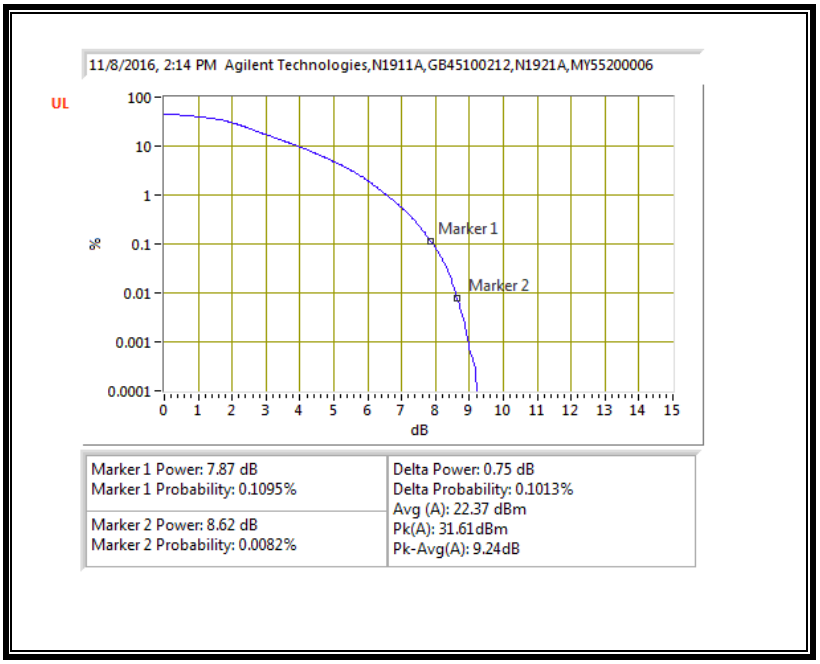
LTE BAND 41 QPSK, (5 MHz)



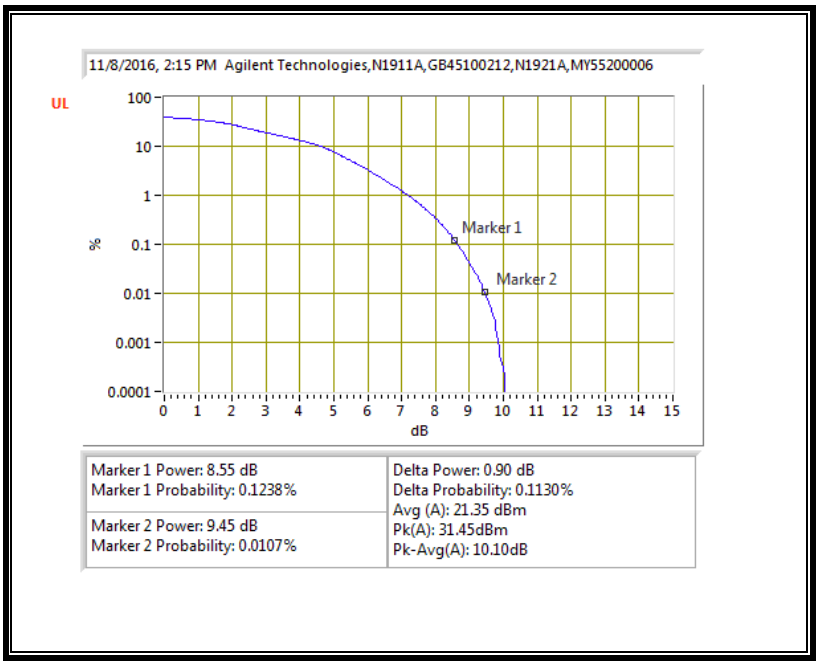
LTE BAND 41 16QAM, (5 MHz)



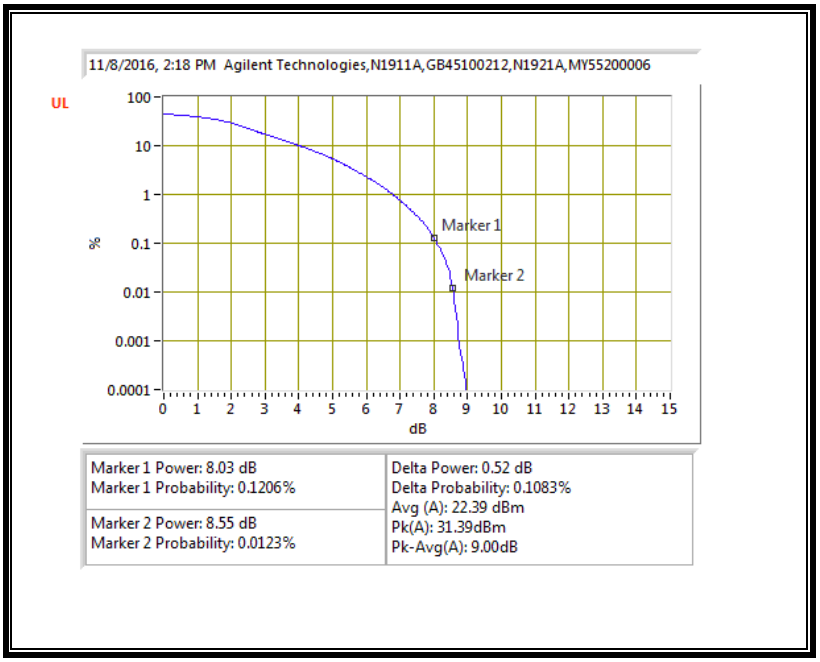
LTE BAND 41 QPSK, (10 MHz)



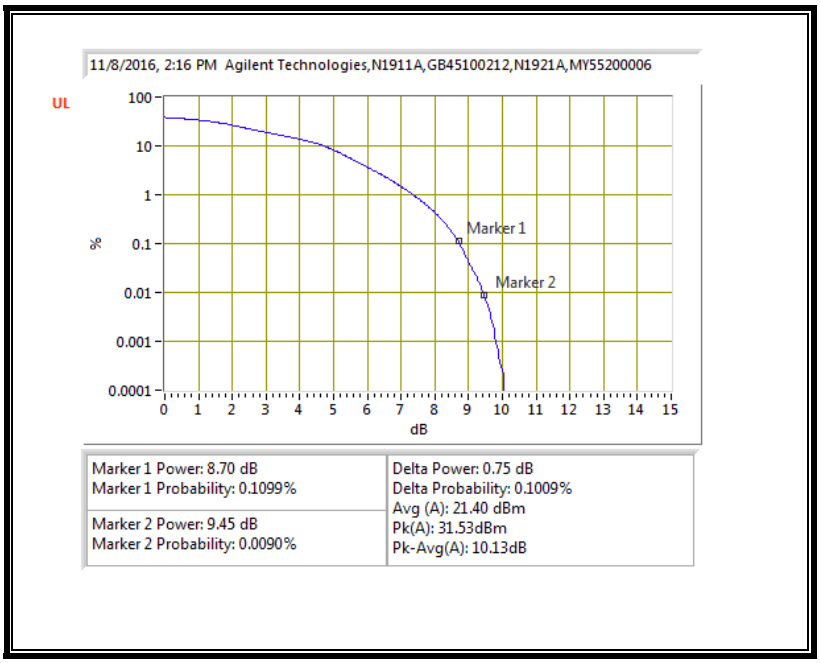
LTE BAND 41 16QAM, (10 MHz)



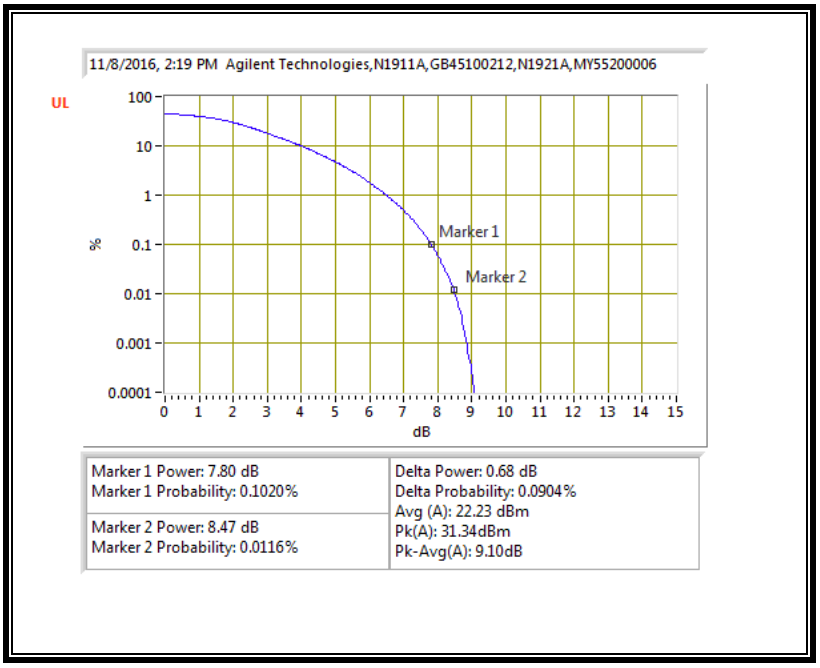
LTE BAND 41 QPSK, (15 MHz)



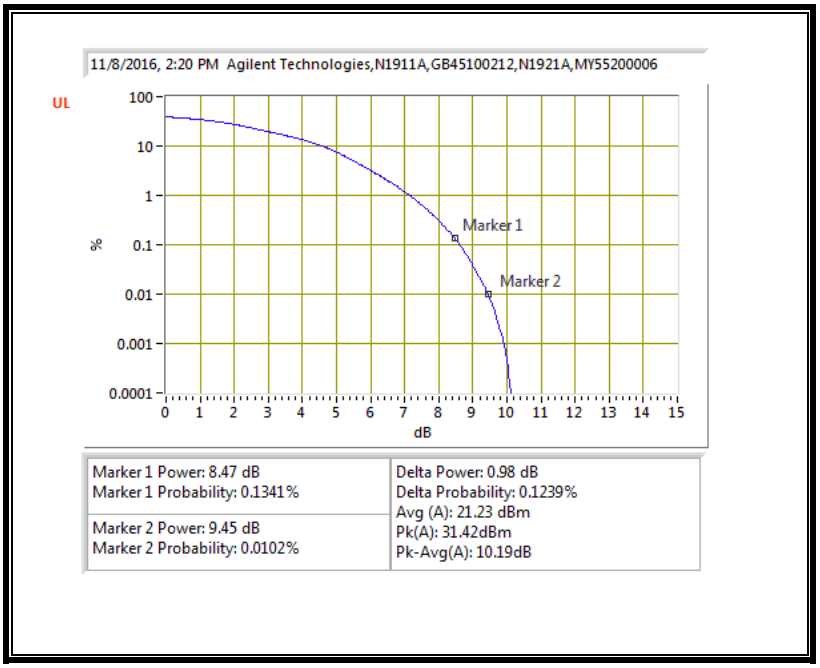
LTE BAND 41 16QAM, (15 MHz)



LTE BAND 41 QPSK, (20 MHz)



LTE BAND 41 16QAM, (20 MHz)



11. RADIATED TEST RESULTS

11.1. FIELD STRENGTH OF SPURIOUS RADIATION

RULE PART(S)

FCC: §2.1053, §22.917, §24.238,§27.53 and §90.691

LIMIT

§22.917 (e) and §24.238 (a): Out of band emissions. 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.

§27.53 (g) For operations in the 698–746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least 43 + 10 log (P) dB.

§27.53 (h) For operations in the 1710–1755 MHz and 2110–2155 MHz bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least 43 + 10 log10(P) dB.

§90.691 Emission mask requirements for EA-based systems.

(a) Out-of-band emission requirement shall apply only to the “outer” channels included in an EA license and to spectrum adjacent to interior channels used by incumbent licensees. The emission limits are as follows:

(1) For any frequency removed from the EA licensee's frequency block by up to and including 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least 116 Log10 (f/6.1) decibels or 50 + 10 Log10 (P) decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 12.5 kHz.

(2) For any frequency removed from the EA licensee's frequency block greater than 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least 43 + 10Log10 (P) decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 37.5 kHz.

(b) When an emission outside of the authorized bandwidth causes harmful interference, the Commission may, at its discretion, require greater attenuation than specified in this section.

TEST PROCEDURE

For Cellular equipment - Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 100 kHz or 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

For PCS equipment - Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 1 MHz or 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

The unwanted emission power shall be measured with a resolution bandwidth of at least 1% of the occupied bandwidth in the 1 MHz band immediately outside and adjacent to the channel edge of the equipment. Beyond the 1 MHz band immediately outside the channel edge of the equipment, a resolution bandwidth of 1 MHz shall be employed. A narrower resolution bandwidth is allowed to be used provided that the measured power is integrated over the full required measurement bandwidth of 1 MHz or 1% of the occupied bandwidth as applicable.

The power of any unwanted emissions measured from the channel edge of the equipment shall be attenuated below the transmitter power, P (dBW), as follows:

a. for base station and subscriber equipment, other than mobile subscriber equipment, the attenuation shall not be less than 43 + 10 Log10 (p), dB; and

b. for mobile subscriber equipment, the attenuation shall not be less than 43 + 10 Log10 (p), dB at the channel edges and 55 + 10 Log10 (p) at 5.5 MHz away and beyond the channel edges where p in (a) and (b) is the transmitter power measured in watts.

MODES TESTED

- LTE Band 2
- LTE Band 4
- LTE Band 5
- LTE Band 7
- LTE Band 12
- LTE Band 13
- LTE Band 17
- LTE Band 25
- LTE Band 26
- LTE Band 41

RESULTS

11.1.1. LTE BAND 2

LTE BAND 2 QPSK, (20 MHz)

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #: 16U23814
Date: 11/11/16
Test Engineer: 45250
Configuration: EUT only
Mode: LTE Band 2, 20MHz QPSK

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber H	3m Chamber H	Filter	EIRP

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (1860MHz)										
3.72	-59.7	H	3.0	-11.7	37.4	1.0	-48.1	-13.0	-35.1	
5.58	-62.3	H	3.0	-11.3	36.7	1.0	-47.1	-13.0	-34.1	
7.44	-65.0	H	3.0	-11.2	36.0	1.0	-46.2	-13.0	-33.2	
3.72	-60.6	V	3.0	-12.9	37.4	1.0	-49.3	-13.0	-36.3	
5.58	-62.2	V	3.0	-11.1	36.7	1.0	-46.8	-13.0	-33.8	
7.44	-64.3	V	3.0	-10.7	36.0	1.0	-45.7	-13.0	-32.7	
Mid Channel (1880MHz)										
3.76	-60.8	H	3.0	-12.8	37.4	1.0	-49.2	-13.0	-36.2	
5.64	-62.4	H	3.0	-11.3	36.7	1.0	-47.0	-13.0	-34.0	
7.52	-64.3	H	3.0	-10.5	35.9	1.0	-45.4	-13.0	-32.4	
3.76	-61.3	V	3.0	-13.4	37.4	1.0	-49.8	-13.0	-36.8	
5.64	-62.8	V	3.0	-11.7	36.7	1.0	-47.4	-13.0	-34.4	
7.52	-64.6	V	3.0	-11.0	35.9	1.0	-45.9	-13.0	-32.9	
High Channel (1900MHz)										
3.80	-61.1	H	3.0	-13.1	37.3	1.0	-49.4	-13.0	-36.4	
5.70	-62.7	H	3.0	-11.5	36.7	1.0	-47.2	-13.0	-34.2	
7.60	-64.3	H	3.0	-10.4	35.8	1.0	-45.2	-13.0	-32.2	
3.80	-60.9	V	3.0	-13.0	37.3	1.0	-49.3	-13.0	-36.3	
5.70	-62.9	V	3.0	-11.7	36.7	1.0	-47.4	-13.0	-34.4	
7.60	-64.8	V	3.0	-11.1	35.8	1.0	-45.9	-13.0	-32.9	

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LTE BAND 2 16QAM, (20 MHz)

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #: 16U23814
Date: 11/11/16
Test Engineer: 45250
Configuration: EUT only
Mode: LTE Band 2, 20MHz 16QAM

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber H	3m Chamber H	Filter	EIRP

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (1860MHz)										
3.72	-60.8	H	3.0	-12.9	37.4	1.0	-49.3	-13.0	-36.3	
5.58	-61.1	H	3.0	-10.1	36.7	1.0	-45.8	-13.0	-32.8	
7.44	-64.5	H	3.0	-10.7	36.0	1.0	-45.7	-13.0	-32.7	
3.72	-60.8	V	3.0	-13.0	37.4	1.0	-49.4	-13.0	-36.4	
5.58	-63.0	V	3.0	-11.9	36.7	1.0	-47.6	-13.0	-34.6	
7.44	-64.9	V	3.0	-11.4	36.0	1.0	-46.4	-13.0	-33.4	
Mid Channel (1880MHz)										
3.76	-60.3	H	3.0	-12.3	37.4	1.0	-48.6	-13.0	-35.6	
5.64	-63.0	H	3.0	-11.9	36.7	1.0	-47.7	-13.0	-34.7	
7.52	-64.2	H	3.0	-10.4	35.9	1.0	-45.3	-13.0	-32.3	
3.76	-60.9	V	3.0	-13.1	37.4	1.0	-49.4	-13.0	-36.4	
5.64	-62.8	V	3.0	-11.6	36.7	1.0	-47.4	-13.0	-34.4	
7.52	-64.2	V	3.0	-10.5	35.9	1.0	-45.5	-13.0	-32.5	
High Channel (1900MHz)										
3.80	-60.4	H	3.0	-12.4	37.3	1.0	-48.7	-13.0	-35.7	
5.70	-62.9	H	3.0	-11.7	36.7	1.0	-47.4	-13.0	-34.4	
7.60	-64.7	H	3.0	-10.8	35.8	1.0	-45.6	-13.0	-32.6	
3.80	-60.6	V	3.0	-12.7	37.3	1.0	-49.0	-13.0	-36.0	
5.70	-62.5	V	3.0	-11.3	36.7	1.0	-47.0	-13.0	-34.0	
7.60	-64.0	V	3.0	-10.3	35.8	1.0	-45.2	-13.0	-32.2	

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11.1.2. LTE BAND 4

LTE BAND 4 QPSK, (20 MHz)

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #: 16U23814
Date: 11/11/16
Test Engineer: 45250
Configuration: EUT only
Mode: LTE Band 4, 20MHz QPSK

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber H	3m Chamber H	Filter	EIRP

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (1720MHz)										
3.44	-60.4	H	3.0	-12.6	37.7	1.0	-49.3	-13.0	-36.3	
5.16	-61.6	H	3.0	-11.3	36.8	1.0	-47.1	-13.0	-34.1	
6.88	-65.0	H	3.0	-12.0	36.4	1.0	-47.4	-13.0	-34.4	
3.44	-60.1	V	3.0	-13.0	37.7	1.0	-49.7	-13.0	-36.7	
5.16	-61.1	V	3.0	-10.7	36.8	1.0	-46.5	-13.0	-33.5	
6.88	-64.3	V	3.0	-11.4	36.4	1.0	-46.8	-13.0	-33.8	
Mid Channel (1732.5MHz)										
3.47	-60.9	H	3.0	-13.0	37.7	1.0	-49.7	-13.0	-36.7	
5.20	-62.7	H	3.0	-12.4	36.8	1.0	-48.2	-13.0	-35.2	
6.93	-63.8	H	3.0	-10.6	36.4	1.0	-46.1	-13.0	-33.1	
3.47	-60.0	V	3.0	-12.9	37.7	1.0	-49.5	-13.0	-36.5	
5.20	-61.8	V	3.0	-11.2	36.8	1.0	-47.0	-13.0	-34.0	
6.93	-64.3	V	3.0	-11.3	36.4	1.0	-46.7	-13.0	-33.7	
High Channel (1745MHz)										
3.49	-60.4	H	3.0	-12.5	37.6	1.0	-49.2	-13.0	-36.2	
5.24	-62.2	H	3.0	-11.7	36.8	1.0	-47.6	-13.0	-34.6	
6.98	-64.2	H	3.0	-11.0	36.4	1.0	-46.4	-13.0	-33.4	
3.49	-60.6	V	3.0	-13.4	37.6	1.0	-50.0	-13.0	-37.0	
5.24	-62.4	V	3.0	-11.7	36.8	1.0	-47.6	-13.0	-34.6	
6.98	-64.4	V	3.0	-11.4	36.4	1.0	-46.7	-13.0	-33.7	

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LTE BAND 4 16QAM, (20 MHz)

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #: 16U23814
Date: 11/11/16
Test Engineer: 45250
Configuration: EUT only
Mode: LTE Band 4, 20MHz 16QAM

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber H	3m Chamber H	Filter	EIRP

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (1720MHz)										
3.44	-60.5	H	3.0	-12.6	37.7	1.0	-49.3	-13.0	-36.3	
5.16	-62.1	H	3.0	-11.8	36.8	1.0	-47.7	-13.0	-34.7	
6.88	-64.9	H	3.0	-11.8	36.4	1.0	-47.2	-13.0	-34.2	
3.44	-60.6	V	3.0	-13.5	37.7	1.0	-50.2	-13.0	-37.2	
5.16	-62.4	V	3.0	-11.9	36.8	1.0	-47.8	-13.0	-34.8	
6.88	-65.1	V	3.0	-12.2	36.4	1.0	-47.6	-13.0	-34.6	
Mid Channel (1732.5MHz)										
3.47	-60.1	H	3.0	-12.3	37.7	1.0	-49.0	-13.0	-36.0	
5.20	-62.5	H	3.0	-12.2	36.8	1.0	-48.0	-13.0	-35.0	
6.93	-65.1	H	3.0	-11.9	36.4	1.0	-47.3	-13.0	-34.3	
3.47	-60.7	V	3.0	-13.6	37.7	1.0	-50.2	-13.0	-37.2	
5.20	-62.5	V	3.0	-12.0	36.8	1.0	-47.8	-13.0	-34.8	
6.93	-64.7	V	3.0	-11.7	36.4	1.0	-47.1	-13.0	-34.1	
High Channel (1745MHz)										
3.49	-60.5	H	3.0	-12.6	37.6	1.0	-49.3	-13.0	-36.3	
5.24	-62.8	H	3.0	-12.3	36.8	1.0	-48.2	-13.0	-35.2	
6.98	-65.6	H	3.0	-12.3	36.4	1.0	-47.7	-13.0	-34.7	
3.49	-60.8	V	3.0	-13.5	37.6	1.0	-50.2	-13.0	-37.2	
5.24	-62.6	V	3.0	-12.0	36.8	1.0	-47.8	-13.0	-34.8	
6.98	-64.9	V	3.0	-11.9	36.4	1.0	-47.3	-13.0	-34.3	

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11.1.3. LTE BAND 5

LTE BAND 5 QPSK, (10 MHz)

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #: 16U23814
Date: 11/14/16
Test Engineer: 40802
Configuration: EUT Only
Mode: LTE Band 5, 10MHz QPSK

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber F	3m Chamber F	Filter	EIRP

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (829MHz)										
1.66	-74.8	H	3.0	-33.6	33.7	1.0	-66.3	-13.0	-53.3	
2.49	-76.0	H	3.0	-31.9	34.1	1.0	-65.0	-13.0	-52.0	
3.32	-75.5	H	3.0	-27.2	34.6	1.0	-60.8	-13.0	-47.8	
1.66	-76.0	V	3.0	-32.6	33.7	1.0	-65.3	-13.0	-52.3	
2.49	-76.6	V	3.0	-31.8	34.1	1.0	-64.9	-13.0	-51.9	
3.32	-77.4	V	3.0	-28.8	34.6	1.0	-62.5	-13.0	-49.5	
Mid Channel (836.5MHz)										
1.67	-76.1	H	3.0	-34.8	33.7	1.0	-67.5	-13.0	-54.5	
2.51	-75.4	H	3.0	-31.2	34.1	1.0	-64.3	-13.0	-51.3	
3.35	-74.9	H	3.0	-26.5	34.6	1.0	-60.1	-13.0	-47.1	
1.67	-75.5	V	3.0	-32.1	33.7	1.0	-64.7	-13.0	-51.7	
2.51	-74.9	V	3.0	-30.1	34.1	1.0	-63.2	-13.0	-50.2	
3.35	-75.2	V	3.0	-26.6	34.6	1.0	-60.2	-13.0	-47.2	
High Channel (844MHz)										
1.69	-74.6	H	3.0	-33.2	33.7	1.0	-65.9	-13.0	-52.9	
2.53	-75.3	H	3.0	-30.9	34.1	1.0	-64.1	-13.0	-51.1	
3.38	-74.8	H	3.0	-26.3	34.6	1.0	-59.9	-13.0	-46.9	
1.69	-74.2	V	3.0	-30.8	33.7	1.0	-63.5	-13.0	-50.5	
2.53	-74.5	V	3.0	-29.6	34.1	1.0	-62.7	-13.0	-49.7	
3.38	-75.3	V	3.0	-26.5	34.6	1.0	-60.1	-13.0	-47.1	

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LTE BAND 5 16QAM, (10 MHz)

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #: 16U23814
Date: 11/14/16
Test Engineer: 40802
Configuration: EUT Only
Mode: LTE Band 5, 10MHz 16QAM

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber F	3m Chamber F	Filter	EIRP

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (829MHz)										
1.66	-74.8	H	3.0	-33.4	33.7	1.0	-66.1	-13.0	-53.1	
2.49	-75.9	H	3.0	-32.7	34.1	1.0	-65.8	-13.0	-52.8	
3.32	-75.6	H	3.0	-29.6	34.6	1.0	-63.3	-13.0	-50.3	
1.66	-75.1	V	3.0	-33.3	33.7	1.0	-66.0	-13.0	-53.0	
2.49	-75.8	V	3.0	-31.7	34.1	1.0	-64.8	-13.0	-51.8	
3.32	-74.3	V	3.0	-28.3	34.6	1.0	-62.0	-13.0	-49.0	
Mid Channel (836.5MHz)										
1.67	-76.1	H	3.0	-34.6	33.7	1.0	-67.3	-13.0	-54.3	
2.51	-75.3	H	3.0	-32.1	34.1	1.0	-65.2	-13.0	-52.2	
3.35	-74.8	H	3.0	-28.8	34.6	1.0	-62.4	-13.0	-49.4	
1.67	-75.2	V	3.0	-33.4	33.7	1.0	-66.1	-13.0	-53.1	
2.51	-74.9	V	3.0	-30.7	34.1	1.0	-63.8	-13.0	-50.8	
3.35	-74.8	V	3.0	-28.8	34.6	1.0	-62.4	-13.0	-49.4	
High Channel (844MHz)										
1.69	-74.5	H	3.0	-33.0	33.7	1.0	-65.7	-13.0	-52.7	
2.53	-75.1	H	3.0	-31.8	34.1	1.0	-64.9	-13.0	-51.9	
3.38	-74.8	H	3.0	-28.7	34.6	1.0	-62.3	-13.0	-49.3	
1.69	-74.7	V	3.0	-32.9	33.7	1.0	-65.6	-13.0	-52.6	
2.53	-74.5	V	3.0	-30.2	34.1	1.0	-63.4	-13.0	-50.4	
3.38	-75.6	V	3.0	-29.5	34.6	1.0	-63.1	-13.0	-50.1	

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11.1.4. LTE BAND 7

LTE BAND 7 QPSK, (20 MHz)

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #: 16U23814
Date: 11/14/16
Test Engineer: 40802
Configuration: EUT only
Mode: LTE Band 7, 20MHz QPSK

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber F	3m Chamber F	Filter	LTE B7

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (2510MHz)										
5.02	-67.2	H	3.0	-14.6	34.2	1.0	-47.8	-25.0	-22.8	
7.53	-69.3	H	3.0	-12.8	33.5	1.0	-45.3	-25.0	-20.3	
10.04	-72.8	H	3.0	-13.0	31.7	1.0	-43.6	-25.0	-18.6	
5.02	-67.9	V	3.0	-15.1	34.2	1.0	-48.3	-25.0	-23.3	
7.53	-70.1	V	3.0	-13.8	33.5	1.0	-46.3	-25.0	-21.3	
10.04	-71.8	V	3.0	-12.0	31.7	1.0	-42.7	-25.0	-17.7	
Mid Channel (2535MHz)										
5.07	-67.2	H	3.0	-14.5	34.2	1.0	-47.7	-25.0	-22.7	
7.61	-69.9	H	3.0	-13.3	33.5	1.0	-45.8	-25.0	-20.8	
10.14	-71.1	H	3.0	-11.2	31.7	1.0	-41.9	-25.0	-16.9	
5.07	-67.9	V	3.0	-14.9	34.2	1.0	-48.1	-25.0	-23.1	
7.61	-69.1	V	3.0	-12.7	33.5	1.0	-45.2	-25.0	-20.2	
10.14	-70.6	V	3.0	-10.8	31.7	1.0	-41.5	-25.0	-16.5	
High Channel (2560MHz)										
5.12	-69.4	H	3.0	-16.7	34.2	1.0	-49.8	-25.0	-24.8	
7.68	-70.4	H	3.0	-13.7	33.4	1.0	-46.1	-25.0	-21.1	
10.24	-72.5	H	3.0	-12.5	31.8	1.0	-43.3	-25.0	-18.3	
5.12	-67.4	V	3.0	-14.4	34.2	1.0	-47.6	-25.0	-22.6	
7.68	-69.9	V	3.0	-13.4	33.4	1.0	-45.8	-25.0	-20.8	
10.24	-72.3	V	3.0	-12.4	31.8	1.0	-43.2	-25.0	-18.2	

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LTE BAND 7 16QAM, (20 MHz)

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #: 16U23814
Date: 11/14/16
Test Engineer: 40802
Configuration: EUT only
Mode: LTE Band 7, 20MHz 16QAM

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber F	3m Chamber F	Filter	LTE B7

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (2510MHz)										
5.02	-69.08	H	3.0	-16.5	34.2	1.0	-49.7	-25.0	-24.7	
7.53	-68.25	H	3.0	-11.8	33.5	1.0	-44.3	-25.0	-19.3	
10.04	-68.45	H	3.0	-8.6	31.7	1.0	-39.3	-25.0	-14.3	
5.02	-66.59	V	3.0	-13.8	34.2	1.0	-47.0	-25.0	-22.0	
7.53	-67.45	V	3.0	-11.1	33.5	1.0	-43.7	-25.0	-18.7	
10.04	-68.26	V	3.0	-8.5	31.7	1.0	-39.2	-25.0	-14.2	
Mid Channel (2535MHz)										
5.07	-65.83	H	3.0	-13.2	34.2	1.0	-46.4	-25.0	-21.4	
7.61	-66.98	H	3.0	-10.4	33.5	1.0	-42.8	-25.0	-17.8	
10.14	-67.75	H	3.0	-7.9	31.7	1.0	-38.6	-25.0	-13.6	
5.07	-65.78	V	3.0	-12.9	34.2	1.0	-46.1	-25.0	-21.1	
7.61	-67.05	V	3.0	-10.6	33.5	1.0	-43.1	-25.0	-18.1	
10.14	-68.17	V	3.0	-8.3	31.7	1.0	-39.1	-25.0	-14.1	
High Channel (2560MHz)										
5.12	-65.67	H	3.0	-12.9	34.2	1.0	-46.1	-25.0	-21.1	
7.68	-66.25	H	3.0	-9.6	33.4	1.0	-42.0	-25.0	-17.0	
10.24	-67.60	H	3.0	-7.6	31.8	1.0	-38.5	-25.0	-13.5	
5.12	-65.52	V	3.0	-12.5	34.2	1.0	-45.7	-25.0	-20.7	
7.68	-66.81	V	3.0	-10.3	33.4	1.0	-42.7	-25.0	-17.7	
10.24	-67.56	V	3.0	-7.6	31.8	1.0	-38.4	-25.0	-13.4	

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11.1.5. LTE BAND 12

LTE BAND 12 QPSK, (10 MHz)

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #: 16U23814
Date: 11/15/16
Test Engineer: 40802
Configuration: EUT only
Mode: LTE Band 12, 10MHz QPSK

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber F	3m Chamber F	Filter	EIRP

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (704MHz)										
1.41	-65.62	H	3.0	-25.9	34.0	1.0	-58.9	-13.0	-45.9	
2.11	-65.21	H	3.0	-21.6	33.7	1.0	-54.2	-13.0	-41.2	
2.82	-65.85	H	3.0	-19.8	34.5	1.0	-53.4	-13.0	-40.4	
1.41	-65.94	V	3.0	-23.5	34.0	1.0	-56.5	-13.0	-43.5	
2.11	-66.21	V	3.0	-22.3	33.7	1.0	-55.0	-13.0	-42.0	
2.82	-66.17	V	3.0	-19.7	34.5	1.0	-53.3	-13.0	-40.3	
Mid Channel (707.5MHz)										
1.42	-65.56	H	3.0	-25.8	34.0	1.0	-58.8	-13.0	-45.8	
2.12	-65.49	H	3.0	-21.8	33.7	1.0	-54.5	-13.0	-41.5	
2.83	-65.82	H	3.0	-19.7	34.6	1.0	-53.3	-13.0	-40.3	
1.42	-66.42	V	3.0	-23.9	34.0	1.0	-56.9	-13.0	-43.9	
2.12	-65.76	V	3.0	-21.9	33.7	1.0	-54.5	-13.0	-41.5	
2.83	-66.38	V	3.0	-19.8	34.6	1.0	-53.4	-13.0	-40.4	
High Channel (711MHz)										
1.42	-65.98	H	3.0	-26.2	34.0	1.0	-59.2	-13.0	-46.2	
2.13	-66.15	H	3.0	-22.5	33.7	1.0	-55.2	-13.0	-42.2	
2.84	-64.92	H	3.0	-18.7	34.6	1.0	-52.3	-13.0	-39.3	
1.42	-66.54	V	3.0	-23.9	34.0	1.0	-56.9	-13.0	-43.9	
2.13	-66.61	V	3.0	-22.7	33.7	1.0	-55.4	-13.0	-42.4	
2.84	-66.55	V	3.0	-19.9	34.6	1.0	-53.5	-13.0	-40.5	

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LTE BAND 12 16QAM, (10 MHz)

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #: 16U23814
Date: 11/15/16
Test Engineer: 40802
Configuration: EUT only
Mode: LTE Band 12, 10MHz 16QAM

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber F	3m Chamber F	Filter	EIRP

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (704MHz)										
1.41	-65.38	H	3.0	-25.7	34.0	1.0	-58.7	-13.0	-45.7	
2.11	-65.73	H	3.0	-22.1	33.7	1.0	-54.8	-13.0	-41.8	
2.82	-65.19	H	3.0	-19.2	34.5	1.0	-52.7	-13.0	-39.7	
1.41	-66.14	V	3.0	-23.7	34.0	1.0	-56.7	-13.0	-43.7	
2.11	-66.03	V	3.0	-22.2	33.7	1.0	-54.8	-13.0	-41.8	
2.82	-65.97	V	3.0	-19.5	34.5	1.0	-53.1	-13.0	-40.1	
Mid Channel (707.5MHz)										
1.42	-65.83	H	3.0	-26.1	34.0	1.0	-59.1	-13.0	-46.1	
2.12	-65.26	H	3.0	-21.6	33.7	1.0	-54.3	-13.0	-41.3	
2.83	-65.92	H	3.0	-19.8	34.6	1.0	-53.4	-13.0	-40.4	
1.42	-66.07	V	3.0	-23.5	34.0	1.0	-56.6	-13.0	-43.6	
2.12	-65.92	V	3.0	-22.0	33.7	1.0	-54.7	-13.0	-41.7	
2.83	-65.97	V	3.0	-19.4	34.6	1.0	-53.0	-13.0	-40.0	
High Channel (711MHz)										
1.42	-66.18	H	3.0	-26.4	34.0	1.0	-59.4	-13.0	-46.4	
2.13	-65.95	H	3.0	-22.3	33.7	1.0	-55.0	-13.0	-42.0	
2.84	-65.12	H	3.0	-18.9	34.6	1.0	-52.5	-13.0	-39.5	
1.42	-65.98	V	3.0	-23.4	34.0	1.0	-56.4	-13.0	-43.4	
2.13	-66.37	V	3.0	-22.4	33.7	1.0	-55.1	-13.0	-42.1	
2.84	-66.12	V	3.0	-19.5	34.6	1.0	-53.1	-13.0	-40.1	

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11.1.6. LTE BAND 13

LTE BAND 13 QPSK, (10 MHz)

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #: 16U23814
Date: 11/15/16
Test Engineer: 40802
Configuration: EUT only
Mode: LTE Band 13, 10MHz QPSK

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber F	3m Chamber F	Filter	LTE B13

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Mid Channel (782MHz)										
1.56	-65.31	H	3.0	-24.7	33.8	1.0	-57.5	-40.0	-17.5	
2.35	-65.73	H	3.0	-21.8	34.1	1.0	-54.9	-13.0	-41.9	
3.13	-66.12	H	3.0	-18.5	34.8	1.0	-52.3	-13.0	-39.3	
1.56	-65.78	V	3.0	-22.4	33.8	1.0	-55.2	-40.0	-15.2	
2.35	-66.67	V	3.0	-22.1	34.1	1.0	-55.2	-13.0	-42.2	
3.13	-65.34	V	3.0	-17.4	34.8	1.0	-51.2	-13.0	-38.2	

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LTE BAND 13 16QAM, (10 MHz)

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #: 16U23814
Date: 11/15/16
Test Engineer: 40802
Configuration: EUT only
Mode: LTE Band 13, 10MHz 16QAM

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber F	3m Chamber F	Filter	LTE B13

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Mid Channel (782MHz)										
1.56	-66.07	H	3.0	-25.5	33.8	1.0	-58.2	-40.0	-18.2	
2.35	-65.82	H	3.0	-21.9	34.1	1.0	-55.0	-13.0	-42.0	
3.13	-66.47	H	3.0	-18.9	34.8	1.0	-52.6	-13.0	-39.6	
1.56	-66.18	V	3.0	-22.8	33.8	1.0	-55.6	-40.0	-15.6	
2.35	-65.07	V	3.0	-20.5	34.1	1.0	-53.6	-13.0	-40.6	
3.13	-66.14	V	3.0	-18.2	34.8	1.0	-52.0	-13.0	-39.0	

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11.1.7. LTE BAND 17

LTE BAND 17 QPSK, (10 MHz)

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #: 16U23814
Date: 11/15/16
Test Engineer: 40802
Configuration: EUT only
Mode: LTE Band 17, 10MHz QPSK

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber F	3m Chamber F	Filter	EIRP

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Mid Channel (710MHz)										
1.42	-66.08	H	3.0	-26.3	34.0	1.0	-59.3	-13.0	-46.3	
2.13	-66.23	H	3.0	-22.6	33.7	1.0	-55.3	-13.0	-42.3	
2.84	-66.71	H	3.0	-20.5	34.6	1.0	-54.1	-13.0	-41.1	
1.42	-65.73	V	3.0	-23.2	34.0	1.0	-56.2	-13.0	-43.2	
2.13	-65.84	V	3.0	-21.9	33.7	1.0	-54.6	-13.0	-41.6	
2.84	-66.29	V	3.0	-19.7	34.6	1.0	-53.3	-13.0	-40.3	

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LTE BAND 17 16QAM, (10 MHz)

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #: 16U23814
Date: 11/15/16
Test Engineer: 40802
Configuration: EUT only
Mode: LTE Band 17, 10MHz 16QAM

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber F	3m Chamber F	Filter	EIRP

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Mid Channel (710MHz)										
1.42	-65.99	H	3.0	-26.2	34.0	1.0	-59.2	-13.0	-46.2	
2.13	-66.44	H	3.0	-22.8	33.7	1.0	-55.5	-13.0	-42.5	
2.84	-66.24	H	3.0	-20.1	34.6	1.0	-53.7	-13.0	-40.7	
1.42	-65.69	V	3.0	-23.1	34.0	1.0	-56.1	-13.0	-43.1	
2.13	-65.33	V	3.0	-21.4	33.7	1.0	-54.1	-13.0	-41.1	
2.84	-66.52	V	3.0	-19.9	34.6	1.0	-53.5	-13.0	-40.5	

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11.1.8. LTE BAND 25

LTE BAND 25 QPSK, (20 MHz)

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #: 16U23814
Date: 11/16/16
Test Engineer: 37290
Configuration: EUT only
Mode: LTE Band 25, 20MHz QPSK

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber H	3m Chamber H	Filter	EIRP

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (1860MHz)										
3.72	-63.00	H	3.0	-15.0	37.4	1.0	-51.4	-13.0	-38.4	
5.58	-62.30	H	3.0	-11.3	36.7	1.0	-47.0	-13.0	-34.0	
7.44	-63.73	H	3.0	-10.0	36.0	1.0	-45.0	-13.0	-32.0	
3.72	-60.41	V	3.0	-12.7	37.4	1.0	-49.1	-13.0	-36.1	
5.58	-63.10	V	3.0	-12.0	36.7	1.0	-47.8	-13.0	-34.8	
7.44	-63.67	V	3.0	-10.1	36.0	1.0	-45.1	-13.0	-32.1	
Mid Channel (1882.5MHz)										
3.77	-60.87	H	3.0	-12.9	37.3	1.0	-49.2	-13.0	-36.2	
5.65	-62.75	H	3.0	-11.7	36.7	1.0	-47.4	-13.0	-34.4	
7.53	-63.70	H	3.0	-9.8	35.9	1.0	-44.8	-13.0	-31.8	
3.77	-61.38	V	3.0	-13.6	37.3	1.0	-49.9	-13.0	-36.9	
5.65	-62.60	V	3.0	-11.4	36.7	1.0	-47.1	-13.0	-34.1	
7.53	-64.40	V	3.0	-10.8	35.9	1.0	-45.7	-13.0	-32.7	
High Channel (1905MHz)										
3.81	-60.20	H	3.0	-12.2	37.3	1.0	-48.5	-13.0	-35.5	
5.72	-62.70	H	3.0	-11.5	36.7	1.0	-47.2	-13.0	-34.2	
7.62	-64.60	H	3.0	-10.6	35.8	1.0	-45.5	-13.0	-32.5	
3.81	-60.65	V	3.0	-12.7	37.3	1.0	-49.0	-13.0	-36.0	
5.72	-63.10	V	3.0	-11.8	36.7	1.0	-47.5	-13.0	-34.5	
7.62	-63.53	V	3.0	-9.8	35.8	1.0	-44.6	-13.0	-31.6	

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LTE BAND 25 16QAM, (20 MHz)

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #: 16U23814
Date: 11/16/16
Test Engineer: 37290
Configuration: EUT only
Mode: LTE Band 25, 20MHz 16QAM

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber H	3m Chamber H	Filter	EIRP

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (1860MHz)										
3.72	-63.6	H	3.0	-15.7	37.4	1.0	-52.1	-13.0	-39.1	
5.58	-62.9	H	3.0	-12.0	36.7	1.0	-47.7	-13.0	-34.7	
7.44	-64.4	H	3.0	-10.6	36.0	1.0	-45.6	-13.0	-32.6	
3.72	-61.0	V	3.0	-13.3	37.4	1.0	-49.7	-13.0	-36.7	
5.58	-63.5	V	3.0	-12.4	36.7	1.0	-48.2	-13.0	-35.2	
7.44	-64.2	V	3.0	-10.7	36.0	1.0	-45.7	-13.0	-32.7	
Mid Channel (1882.5MHz)										
3.77	-61.2	H	3.0	-13.2	37.3	1.0	-49.6	-13.0	-36.6	
5.65	-63.1	H	3.0	-12.0	36.7	1.0	-47.7	-13.0	-34.7	
7.53	-64.1	H	3.0	-10.2	35.9	1.0	-45.2	-13.0	-32.2	
3.77	-62.0	V	3.0	-14.2	37.3	1.0	-50.5	-13.0	-37.5	
5.65	-63.0	V	3.0	-11.8	36.7	1.0	-47.5	-13.0	-34.5	
7.53	-63.8	V	3.0	-10.2	35.9	1.0	-45.1	-13.0	-32.1	
High Channel (1905MHz)										
3.81	-61.2	H	3.0	-13.2	37.3	1.0	-49.5	-13.0	-36.5	
5.72	-63.3	H	3.0	-12.1	36.7	1.0	-47.8	-13.0	-34.8	
7.62	-63.8	H	3.0	-9.8	35.8	1.0	-44.7	-13.0	-31.7	
3.81	-61.4	V	3.0	-13.5	37.3	1.0	-49.8	-13.0	-36.8	
5.72	-63.5	V	3.0	-12.2	36.7	1.0	-47.9	-13.0	-34.9	
7.62	-64.0	V	3.0	-10.3	35.8	1.0	-45.1	-13.0	-32.1	

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11.1.9. LTE BAND 26

LTE BAND 26 QPSK, (10 MHz)

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #: 16U23814
Date: 11/16/16
Test Engineer: 37290
Configuration: EUT only
Mode: LTE Band 26 (90S), 10MHz QPSK

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber H	3m Chamber H	Filter	EIRP

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Mid Channel (819MHz)										
1.64	-48.0	H	3.0	-7.7	37.7	1.0	-44.4	-13.0	-31.4	
2.46	-57.4	H	3.0	-13.4	37.0	1.0	-49.5	-13.0	-36.5	
3.28	-59.6	H	3.0	-11.9	37.9	1.0	-48.7	-13.0	-35.7	
1.64	-44.7	V	3.0	-4.1	37.7	1.0	-40.8	-13.0	-27.8	
2.46	-59.0	V	3.0	-14.9	37.0	1.0	-50.9	-13.0	-37.9	
3.28	-60.3	V	3.0	-13.6	37.9	1.0	-50.5	-13.0	-37.5	

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LTE BAND 26 16QAM, (10 MHz)

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #: 16U23814
Date: 11/16/16
Test Engineer: 37290
Configuration: EUT only
Mode: LTE Band 26 (90S), 10MHz 16QAM

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber H	3m Chamber H	Filter	EIRP

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Mid Channel (819MHz)										
1.64	-48.7	H	3.0	-8.3	37.7	1.0	-45.1	-13.0	-32.1	
2.46	-57.9	H	3.0	-13.9	37.0	1.0	-50.0	-13.0	-37.0	
3.28	-60.8	H	3.0	-13.0	37.9	1.0	-49.9	-13.0	-36.9	
1.64	-43.5	V	3.0	-2.9	37.7	1.0	-39.7	-13.0	-26.7	
2.46	-58.8	V	3.0	-14.7	37.0	1.0	-50.7	-13.0	-37.7	
3.28	-60.2	V	3.0	-13.4	37.9	1.0	-50.3	-13.0	-37.3	

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11.1.10. LTE BAND 41

LTE BAND 41 QPSK, (20 MHz)

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #: 16U23814
Date: 11/16/16
Test Engineer: 37290
Configuration: EUT only
Mode: LTE Band 41, 20MHz QPSK

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber H	3m Chamber H	Filter	LTE B41

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (2506MHz)										
5.01	-61.9	H	3.0	-11.9	36.9	1.0	-47.8	-25.0	-22.8	
7.52	-64.0	H	3.0	-10.2	35.9	1.0	-45.1	-25.0	-20.1	
10.02	-65.3	H	3.0	-8.8	33.7	1.0	-41.4	-25.0	-16.4	
5.01	-62.3	V	3.0	-12.1	36.9	1.0	-47.9	-25.0	-22.9	
7.52	-64.3	V	3.0	-10.7	35.9	1.0	-45.6	-25.0	-20.6	
10.02	-65.7	V	3.0	-9.5	33.7	1.0	-42.2	-25.0	-17.2	
Mid Channel (2593MHz)										
5.19	-62.0	H	3.0	-11.6	36.8	1.0	-47.4	-25.0	-22.4	
7.78	-64.3	H	3.0	-10.2	35.7	1.0	-44.9	-25.0	-19.9	
10.37	-65.7	H	3.0	-8.9	33.7	1.0	-41.6	-25.0	-16.6	
5.19	-62.2	V	3.0	-11.7	36.8	1.0	-47.5	-25.0	-22.5	
7.78	-63.5	V	3.0	-9.6	35.7	1.0	-44.3	-25.0	-19.3	
10.37	-65.3	V	3.0	-9.0	33.7	1.0	-41.7	-25.0	-16.7	
High Channel (2680MHz)										
5.36	-63.1	H	3.0	-12.4	36.8	1.0	-48.2	-25.0	-23.2	
8.04	-64.3	H	3.0	-9.9	35.4	1.0	-44.3	-25.0	-19.3	
10.72	-66.2	H	3.0	-9.3	33.7	1.0	-42.0	-25.0	-17.0	
5.36	-61.3	V	3.0	-10.6	36.8	1.0	-46.3	-25.0	-21.3	
8.04	-65.2	V	3.0	-11.0	35.4	1.0	-45.5	-25.0	-20.5	
10.72	-65.0	V	3.0	-8.6	33.7	1.0	-41.3	-25.0	-16.3	

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LTE BAND 41 16QAM, (20 MHz)

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #: 16U23814
Date: 11/16/16
Test Engineer: 37290
Configuration: EUT only
Mode: LTE Band 41, 20MHz 16QAM

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber H	3m Chamber H	Filter	LTE B41

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (2506MHz)										
5.01	-62.3	H	3.0	-12.3	36.9	1.0	-48.2	-25.0	-23.2	
7.52	-65.0	H	3.0	-11.2	35.9	1.0	-46.1	-25.0	-21.1	
10.02	-65.5	H	3.0	-9.0	33.7	1.0	-41.6	-25.0	-16.6	
5.01	-62.7	V	3.0	-12.5	36.9	1.0	-48.4	-25.0	-23.4	
7.52	-64.6	V	3.0	-11.0	35.9	1.0	-45.9	-25.0	-20.9	
10.02	-64.8	V	3.0	-8.6	33.7	1.0	-41.3	-25.0	-16.3	
Mid Channel (2593MHz)										
5.19	-62.8	H	3.0	-12.4	36.8	1.0	-48.2	-25.0	-23.2	
7.78	-64.0	H	3.0	-9.9	35.7	1.0	-44.6	-25.0	-19.6	
10.37	-65.0	H	3.0	-8.3	33.7	1.0	-41.0	-25.0	-16.0	
5.19	-62.4	V	3.0	-11.9	36.8	1.0	-47.7	-25.0	-22.7	
7.78	-64.0	V	3.0	-10.1	35.7	1.0	-44.8	-25.0	-19.8	
10.37	-65.2	V	3.0	-8.9	33.7	1.0	-41.6	-25.0	-16.6	
High Channel (2680MHz)										
5.36	-61.7	H	3.0	-11.1	36.8	1.0	-46.9	-25.0	-21.9	
8.04	-65.5	H	3.0	-11.1	35.4	1.0	-45.5	-25.0	-20.5	
10.72	-65.6	H	3.0	-8.7	33.7	1.0	-41.4	-25.0	-16.4	
5.36	-62.4	V	3.0	-11.6	36.8	1.0	-47.4	-25.0	-22.4	
8.04	-64.7	V	3.0	-10.5	35.4	1.0	-45.0	-25.0	-20.0	
10.72	-65.0	V	3.0	-8.6	33.7	1.0	-41.3	-25.0	-16.3	

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