

UAT 16QAM EIRP POWER FOR LTE BAND 26 (3.0MHZ BANDWIDTH)

High Frequency Substitution Measurement UL Fremont Radiated Chamber E											
Company:		Apple									
Project #:		14U17673									
Date:		6/17/2014									
Test Engineer:		T Wang									
Configuration:		EUT Only									
Mode:		LTE Band 26 16QAM 3MHz BW									
Test Equipment:											
Receiving: Sunol T408, and Chamber E Cable											
Substitution: Dipole S/N: 00022117, and 8ft SMA Cable											
f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	ERP (dBm)	EIRP (dBm)	ERP Limit (dBm)	EIRP Limit (dBm)	Margin (dB)	Notes	
Low Ch											
820.30	9.98	V	0.62	0.0	9.36	11.51	38.45	40.60	-29.1		
820.30	15.77	H	0.62	0.0	15.15	17.30	38.45	40.60	-23.3		
Mid Ch											
821.30	8.98	V	0.62	0.0	8.36	10.51	38.45	40.60	-30.1		
821.30	16.04	H	0.62	0.0	15.42	17.57	38.45	40.60	-23.0		
High Ch											
822.30	9.12	V	0.62	0.0	8.50	10.65	38.45	40.60	-30.0		
822.30	16.17	H	0.62	0.0	15.55	17.70	38.45	40.60	-22.9		
Rev. 10.24.13											

UAT QPSK EIRP POWER FOR LTE BAND 26 (5.0MHZ BANDWIDTH)

High Frequency Substitution Measurement UL Fremont Radiated Chamber E										
Company:		Apple								
Project #:		14U17673								
Date:		6/17/2014								
Test Engineer:		T Wang								
Configuration:		EUT Only								
Mode:		LTE Band 26 QPSK 5MHz BW								
Test Equipment:										
Receiving: Sunol T408, and Chamber E Cable										
Substitution: Dipole S/N: 00022117, and 8ft SMA Cable										
f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	ERP (dBm)	EIRP (dBm)	ERP Limit (dBm)	EIRP Limit (dBm)	Margin (dB)	Notes
Mid Ch										
821.30	9.98	V	0.62	0.0	9.36	11.51	38.45	40.60	-29.1	
821.30	16.74	H	0.62	0.0	16.12	18.27	38.45	40.60	-22.3	
Rev. 10.24.13										

UAT 16QAM EIRP POWER FOR LTE BAND 26 (5.0MHZ BANDWIDTH)

High Frequency Substitution Measurement UL Fremont Radiated Chamber E										
Company:		Apple								
Project #:		14U17673								
Date:		6/17/2014								
Test Engineer:		T Wang								
Configuration:		EUT Only								
Mode:		LTE Band 26 16QAM 5MHz BW								
Test Equipment:										
Receiving: Sunoi T408, and Chamber E Cable										
Substitution: Dipole S/N: 00022117, and 8ft SMA Cable										
f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	ERP (dBm)	EIRP (dBm)	ERP Limit (dBm)	EIRP Limit (dBm)	Margin (dB)	Notes
Mid Ch										
821.30	8.88	V	0.62	0.0	8.26	10.41	38.45	40.60	-30.2	
821.30	15.64	H	0.62	0.0	15.02	17.17	38.45	40.60	-23.4	
Rev. 10.24.13										

UAT QPSK EIRP POWER FOR LTE BAND 26 (10.0MHZ BANDWIDTH)

High Frequency Substitution Measurement UL Fremont Radiated Chamber E											
Project #:		14U17673									
Date:		6/20/2014									
Test Engineer:		Macie									
Configuration:		EUT Only									
Mode:		LTE Band 26 QPSK 10MHz BW									
Test Equipment:											
Receiving: Sunol T408, and Chamber E Cable											
Substitution: Dipole S/N: 00022117, 4ft SMA Cable (s/n 245182-003; SUCOFLEX 104PEA)											
f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	ERP (dBm)	EIRP (dBm)	ERP Limit (dBm)	EIRP Limit (dBm)	Margin (dB)	EIRP (dB)	Notes
Mid Ch											
819.00	10.80	V	0.62	0.0	10.18	12.33	38.45	40.60	-28.3		
819.00	16.64	H	0.62	0.0	16.02	18.17	38.45	40.60	-22.4		
Rev. 10.24.13											

UAT 16QAM EIRP POWER FOR LTE BAND 26 (10.0MHZ BANDWIDTH)

High Frequency Substitution Measurement UL Fremont Radiated Chamber E										
Project #:		14U17673								
Date:		6/20/2014								
Test Engineer:		Macie								
Configuration:		EUT Only								
Mode:		LTE Band 26 16QAM 10MHz BW								
Test Equipment:										
Receiving: Sunol T408, and Chamber E Cable										
Substitution: Dipole S/N: 00022117, 4ft SMA Cable (s/n 245182-003; SUCOFLEX 104PEA)										
f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	ERP (dBm)	EIRP (dBm)	ERP Limit (dBm)	EIRP Limit (dBm)	Margin (dB)	Notes
Low Ch										
819.00	9.49	V	0.62	0.0	8.87	11.02	38.45	40.60	-29.6	
819.00	15.74	H	0.62	0.0	15.12	17.27	38.45	40.60	-23.3	
Rev. 10.24.13										

9.2. 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.

9.2.1. LTE BAND 2

Mode	Channel Band-width (MHZ)	Modulation	f (MHz)	Couducted Power (dBm)		Peak-to-Average Ratio (PAR)
				*Peak	Average	
QPSK	1.4	RB1-0	1880	28.03	23.16	4.87

Mode	Channel Band-width	Ch. No.	f (MHz)	Couducted Power (dBm)		Peak-to-Average Ratio
				*Peak	Average	
16QAM	1.4	RB1-0	1880	28.07	22.24	5.83

*Peak Reading = Average Reading + Peak-to-Average Ratio

Mode	Channel Band-width (MHZ)	Modulation	f (MHz)	Couducted Power (dBm)		Peak-to-Average Ratio (PAR)
				*Peak	Average	
QPSK	3.0	RB1-0	1880	28.01	23.26	4.75

Mode	Channel Band-width	Ch. No.	f (MHz)	Couducted Power (dBm)		Peak-to-Average Ratio
				*Peak	Average	
16QAM	3.0	RB1-0	1880	28	22.27	5.73

*Peak Reading = Average Reading + Peak-to-Average Ratio

Mode	Channel Band-width (MHZ)	Modulation	f (MHz)	Couducted Power (dBm)		Peak-to-Average Ratio (PAR)
				*Peak	Average	
QPSK	5.0	RB1-0	1880	27.99	23.16	4.83

Mode	Channel Band-width	Ch. No.	f (MHz)	Couducted Power (dBm)		Peak-to-Average Ratio
				*Peak	Average	
16QAM	5.0	RB1-0	1880	26.55	22.02	4.53

*Peak Reading = Average Reading + Peak-to-Average Ratio

Mode	Channel Band-width (MHZ)	Modulation	f (MHz)	Couducted Power (dBm)		Peak-to-Average Ratio (PAR)
				*Peak	Average	
QPSK	10.0	RB1-0	1880	27.87	23.22	4.65

Mode	Channel Band-width	Ch. No.	f (MHz)	Couducted Power (dBm)		Peak-to-Average Ratio
				*Peak	Average	
16QAM	10.0	RB1-0	1880	27.84	22.27	5.57

*Peak Reading = Average Reading + Peak-to-Average Ratio

Mode	Channel Band-width (MHZ)	Modulation	f (MHz)	Couducted Power (dBm)		Peak-to-Average Ratio (PAR)
				*Peak	Average	
QPSK	15.0	RB1-0	1880	27.86	23.22	4.64

Mode	Channel Band-width	Ch. No.	f (MHz)	Couducted Power (dBm)		Peak-to-Average Ratio
				*Peak	Average	
16QAM	15.0	RB1-0	1880	27.77	22.27	5.50

*Peak Reading = Average Reading + Peak-to-Average Ratio

Mode	Channel Band-width (MHZ)	Modulation	f (MHz)	Couducted Power (dBm)		Peak-to-Average Ratio (PAR)
				*Peak	Average	
QPSK	20.0	RB1-0	1880	27.69	22.98	4.71

Mode	Channel Band-width	Ch. No.	f (MHz)	Couducted Power (dBm)		Peak-to-Average Ratio
				*Peak	Average	
16QAM	20.0	RB1-0	1880	26.21	21.94	4.27

*Peak Reading = Average Reading + Peak-to-Average Ratio

9.2.2. LTE BAND 4

Mode	Channel Band-width (MHZ)	Modulation	f (MHz)	Couducted Power (dBm)		Peak-to-Average Ratio (PAR)
				*Peak	Average	
QPSK	1.4	RB1-0	1732.5	28.09	23.23	4.86
*Peak Reading = Average Reading + Peak-to-Average Ratio						

Mode	Channel Band-width	Ch. No.	f (MHz)	Couducted Power (dBm)		Peak-to-Average Ratio
				*Peak	Average	
16QAM	1.4	RB1-0	1732.5	28.29	22.38	5.91

Mode	Channel Band-width (MHZ)	Modulation	f (MHz)	Couducted Power (dBm)		Peak-to-Average Ratio (PAR)
				*Peak	Average	
QPSK	3.0	RB1-0	1732.5	28.36	23.38	4.98
*Peak Reading = Average Reading + Peak-to-Average Ratio						

Mode	Channel Band-width	Ch. No.	f (MHz)	Couducted Power (dBm)		Peak-to-Average Ratio
				*Peak	Average	
16QAM	3.0	RB1-0	1732.5	28	22.39	5.61

Mode	Channel Band-width (MHZ)	Modulation	f (MHz)	Couducted Power (dBm)		Peak-to-Average Ratio (PAR)
				*Peak	Average	
QPSK	5.0	RB1-0	1732.5	28.08	23.26	4.82
*Peak Reading = Average Reading + Peak-to-Average Ratio						

Mode	Channel Band-width	Ch. No.	f (MHz)	Couducted Power (dBm)		Peak-to-Average Ratio
				*Peak	Average	
16QAM	5.0	RB1-0	1732.5	27.88	22.17	5.71

Mode	Channel Band-width (MHZ)	Modulation	f (MHz)	Couducted Power (dBm)		Peak-to-Average Ratio (PAR)
				*Peak	Average	
QPSK	10.0	RB1-0	1732.5	28.08	23.31	4.77

Mode	Channel Band-width	Ch. No.	f (MHz)	Couducted Power (dBm)		Peak-to-Average Ratio
				*Peak	Average	
16QAM	10.0	RB1-0	1732.5	27.9	22.37	5.53

*Peak Reading = Average Reading + Peak-to-Average Ratio

Mode	Channel Band-width (MHZ)	Modulation	f (MHz)	Couducted Power (dBm)		Peak-to-Average Ratio (PAR)
				*Peak	Average	
QPSK	15.0	RB1-0	1732.5	28.15	23.39	4.76

Mode	Channel Band-width	Ch. No.	f (MHz)	Couducted Power (dBm)		Peak-to-Average Ratio
				*Peak	Average	
16QAM	15.0	RB1-0	1732.5	27.95	22.38	5.57

*Peak Reading = Average Reading + Peak-to-Average Ratio

Mode	Channel Band-width (MHZ)	Modulation	f (MHz)	Couducted Power (dBm)		Peak-to-Average Ratio (PAR)
				*Peak	Average	
QPSK	20.0	RB1-0	1732.5	28.02	23.17	4.85

Mode	Channel Band-width	Ch. No.	f (MHz)	Couducted Power (dBm)		Peak-to-Average Ratio
				*Peak	Average	
16QAM	20.0	RB1-0	1732.5	27.76	22.22	5.54

*Peak Reading = Average Reading + Peak-to-Average Ratio

9.2.3. LTE BAND 5

Mode	Channel Band-width (MHZ)	Modulation	f (MHz)	Couducted Power (dBm)		Peak-to-Average Ratio (PAR)
				*Peak	Average	
QPSK	1.4	RB1-0	836.5	27.9	23.15	4.75
*Peak Reading = Average Reading + Peak-to-Average Ratio						
Mode	Channel Band-width	Ch. No.	f (MHz)	Couducted Power (dBm)		Peak-to-Average Ratio
				*Peak	Average	
16QAM	1.4	RB1-0	836.5	28.09	22.32	5.77

Mode	Channel Band-width (MHZ)	Modulation	f (MHz)	Couducted Power (dBm)		Peak-to-Average Ratio (PAR)
				*Peak	Average	
QPSK	3.0	RB1-0	836.5	28.12	23.26	4.86
*Peak Reading = Average Reading + Peak-to-Average Ratio						
Mode	Channel Band-width	Ch. No.	f (MHz)	Couducted Power (dBm)		Peak-to-Average Ratio
				*Peak	Average	
16QAM	3.0	RB1-0	836.5	27.95	22.31	5.64

Mode	Channel Band-width (MHZ)	Modulation	f (MHz)	Couducted Power (dBm)		Peak-to-Average Ratio (PAR)
				*Peak	Average	
QPSK	5.0	RB1-0	836.5	28.02	23.19	4.83
*Peak Reading = Average Reading + Peak-to-Average Ratio						
Mode	Channel Band-width	Ch. No.	f (MHz)	Couducted Power (dBm)		Peak-to-Average Ratio
				*Peak	Average	
16QAM	5.0	RB1-0	836.5	27.91	22.13	5.78

Mode	Channel Band-width (MHZ)	Modulation	f (MHz)	Conducted Power (dBm)		Peak-to-Average Ratio (PAR)
				*Peak	Average	
QPSK	10.0	RB1-0	836.5	27.69	23.21	4.48

Mode	Channel Band-width	Ch. No.	f (MHz)	Conducted Power (dBm)		Peak-to-Average Ratio
				*Peak	Average	
16QAM	10.0	RB1-0	836.5	27.52	22.30	5.22

*Peak Reading = Average Reading + Peak-to-Average Ratio

9.2.4. LTE BAND 13

Mode	Channel Band-width (MHZ)	Modulation	f (MHz)	Conducted Power (dBm)		Peak-to-Average Ratio (PAR)
				*Peak	Average	
QPSK	5.0	RB1-0	782	28.27	23.25	5.02

Mode	Channel Band-width	Ch. No.	f (MHz)	Conducted Power (dBm)		Peak-to-Average Ratio
				*Peak	Average	
16QAM	5.0	RB1-0	782	28.08	22.15	5.93

*Peak Reading = Average Reading + Peak-to-Average Ratio

Mode	Channel Band-width (MHZ)	Modulation	f (MHz)	Conducted Power (dBm)		Peak-to-Average Ratio (PAR)
				*Peak	Average	
QPSK	10.0	RB1-0	782	28.18	23.34	4.84

Mode	Channel Band-width	Ch. No.	f (MHz)	Conducted Power (dBm)		Peak-to-Average Ratio
				*Peak	Average	
16QAM	10.0	RB1-0	782	28.21	22.43	5.78

*Peak Reading = Average Reading + Peak-to-Average Ratio

9.2.5. LTE BAND 17

Mode	Channel Band-width (MHZ)	Modulation	f (MHz)	Couducted Power (dBm)		Peak-to-Average Ratio (PAR)
				*Peak	Average	
QPSK	5.0	RB1-0	710.0	28.3	23.35	4.95

Mode	Channel Band-width	Ch. No.	f (MHz)	Couducted Power (dBm)		Peak-to-Average Ratio
				*Peak	Average	
16QAM	5.0	RB1-0	710.0	28.2	22.29	5.91

*Peak Reading = Average Reading + Peak-to-Average Ratio

Mode	Channel Band-width (MHZ)	Modulation	f (MHz)	Couducted Power (dBm)		Peak-to-Average Ratio (PAR)
				*Peak	Average	
QPSK	10.0	RB1-0	710.0	28.06	23.47	4.59

Mode	Channel Band-width	Ch. No.	f (MHz)	Couducted Power (dBm)		Peak-to-Average Ratio
				*Peak	Average	
16QAM	10.0	RB1-0	710.0	27.91	22.55	5.37

*Peak Reading = Average Reading + Peak-to-Average Ratio

9.2.6. LTE BAND 25

Mode	Channel Band-width (MHZ)	Modulation	f (MHz)	Couducted Power (dBm)		Peak-to-Average Ratio (PAR)
				*Peak	Average	
QPSK	1.4	RB1-0	1880	26.77	23.11	3.66
*Peak Reading = Average Reading + Peak-to-Average Ratio						

Mode	Channel Band-width	Ch. No.	f (MHz)	Couducted Power (dBm)		Peak-to-Average Ratio
				*Peak	Average	
16QAM	1.4	RB1-0	1880	28.17	22.29	5.88

Mode	Channel Band-width (MHZ)	Modulation	f (MHz)	Couducted Power (dBm)		Peak-to-Average Ratio (PAR)
				*Peak	Average	
QPSK	3.0	RB1-0	1880	28.11	23.22	4.89
*Peak Reading = Average Reading + Peak-to-Average Ratio						

Mode	Channel Band-width	Ch. No.	f (MHz)	Couducted Power (dBm)		Peak-to-Average Ratio
				*Peak	Average	
16QAM	3.0	RB1-0	1880	26.69	22.32	4.37

Mode	Channel Band-width (MHZ)	Modulation	f (MHz)	Couducted Power (dBm)		Peak-to-Average Ratio (PAR)
				*Peak	Average	
QPSK	5.0	RB1-0	1880	26.65	23.13	3.52
*Peak Reading = Average Reading + Peak-to-Average Ratio						

Mode	Channel Band-width	Ch. No.	f (MHz)	Couducted Power (dBm)		Peak-to-Average Ratio
				*Peak	Average	
16QAM	5.0	RB1-0	1880	26.66	22.07	4.59

Mode	Channel Band-width (MHZ)	Modulation	f (MHz)	Couducted Power (dBm)		Peak-to-Average Ratio (PAR)
				*Peak	Average	
QPSK	10.0	RB1-0	1880	26.62	23.16	3.46

Mode	Channel Band-width	Ch. No.	f (MHz)	Couducted Power (dBm)		Peak-to-Average Ratio
				*Peak	Average	
16QAM	10.0	RB1-0	1880	26.62	22.31	4.31

*Peak Reading = Average Reading + Peak-to-Average Ratio

Mode	Channel Band-width (MHZ)	Modulation	f (MHz)	Couducted Power (dBm)		Peak-to-Average Ratio (PAR)
				*Peak	Average	
QPSK	15.0	RB1-0	1880	27.84	23.05	4.79

Mode	Channel Band-width	Ch. No.	f (MHz)	Couducted Power (dBm)		Peak-to-Average Ratio
				*Peak	Average	
16QAM	15.0	RB1-0	1880	27.83	22.21	5.62

*Peak Reading = Average Reading + Peak-to-Average Ratio

Mode	Channel Band-width (MHZ)	Modulation	f (MHz)	Couducted Power (dBm)		Peak-to-Average Ratio (PAR)
				*Peak	Average	
QPSK	20.0	RB1-0	1880	27.75	22.89	4.86

Mode	Channel Band-width	Ch. No.	f (MHz)	Couducted Power (dBm)		Peak-to-Average Ratio
				*Peak	Average	
16QAM	20.0	RB1-0	1880	26.34	21.99	4.35

*Peak Reading = Average Reading + Peak-to-Average Ratio

9.2.7. LTE BAND 26

Mode	Channel Band-width (MHZ)	Modulation	f (MHz)	Couducted Power (dBm)		Peak-to-Average Ratio (PAR)
				*Peak	Average	
QPSK	3.0	RB1-0	821.3	28.13	23.32	4.81

Mode	Channel Band-width	Ch. No.	f (MHz)	Couducted Power (dBm)		Peak-to-Average Ratio
				*Peak	Average	
16QAM	3.0	RB1-0	821.3	28.13	22.40	5.73

*Peak Reading = Average Reading + Peak-to-Average Ratio

Mode	Channel Band-width (MHZ)	Modulation	f (MHz)	Couducted Power (dBm)		Peak-to-Average Ratio (PAR)
				*Peak	Average	
QPSK	5.0	RB1-0	821.3	27.86	23.32	4.54

Mode	Channel Band-width	Ch. No.	f (MHz)	Couducted Power (dBm)		Peak-to-Average Ratio
				*Peak	Average	
16QAM	5.0	RB1-0	821.3	27.88	22.23	5.65

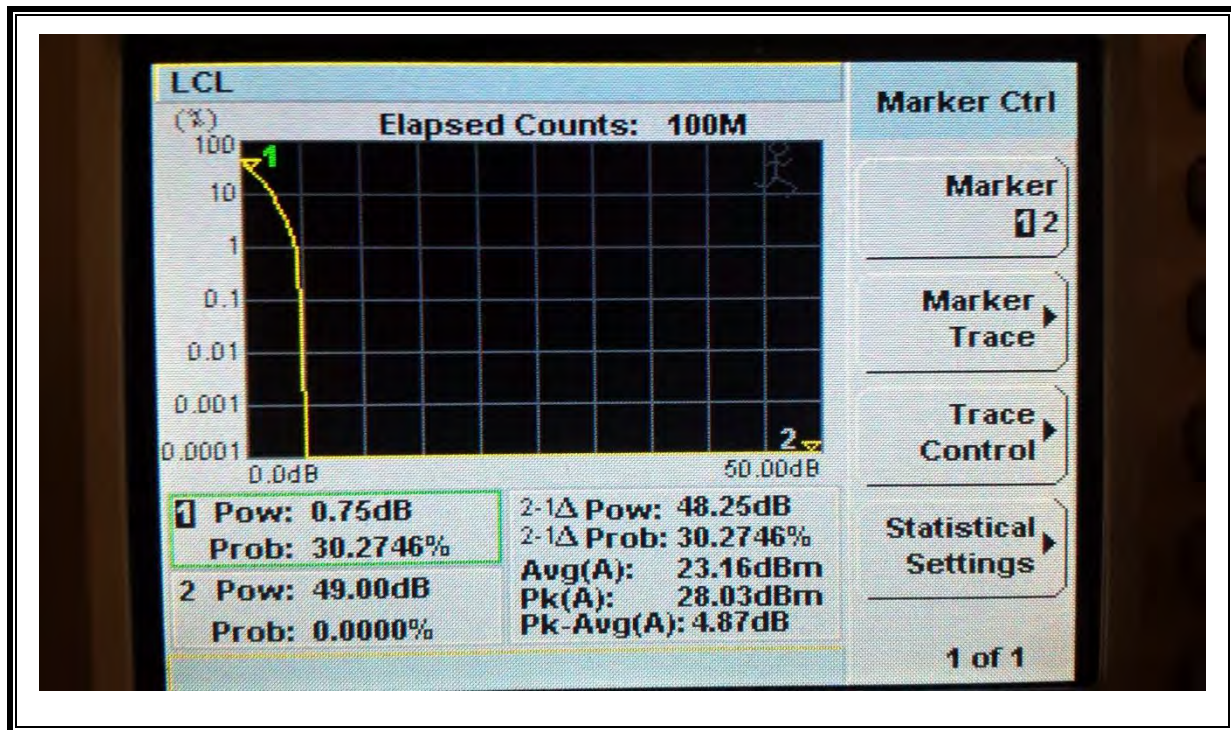
*Peak Reading = Average Reading + Peak-to-Average Ratio

Mode	Channel Band-width (MHZ)	Modulation	f (MHz)	Couducted Power (dBm)		Peak-to-Average Ratio (PAR)
				*Peak	Average	
QPSK	10.0	RB1-0	819.0	27.64	23.01	4.63

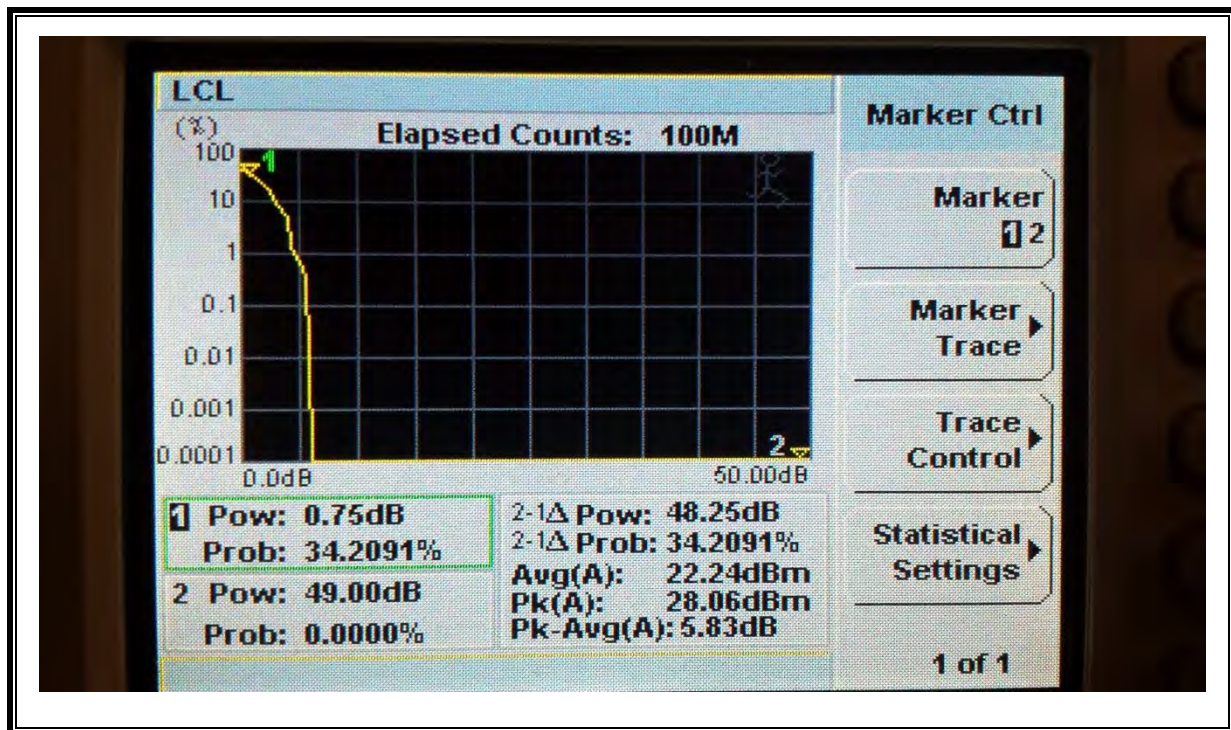
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				*Peak	Average	
16QAM	10.0	RB1-0	819.0	27.46	22.09	5.37

*Peak Reading = Average Reading + Peak-to-Average Ratio

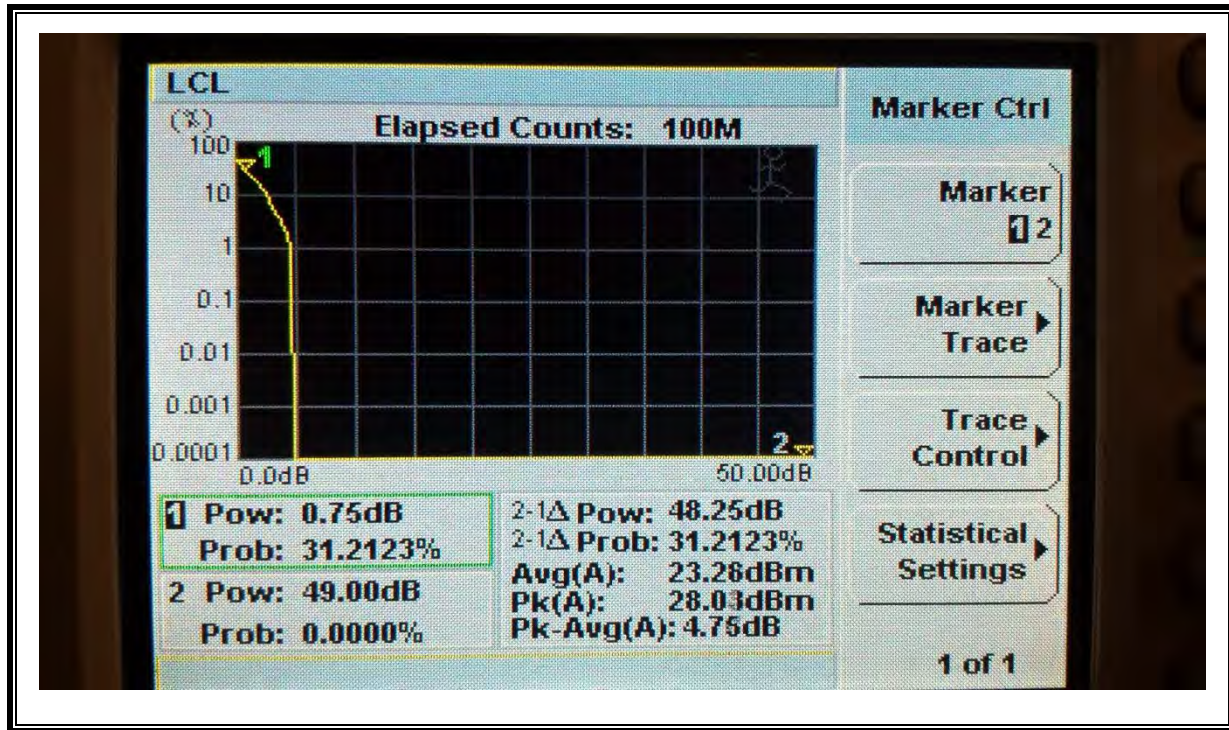
QPSK Band 2 (1.4 MHz BAND WIDTH)



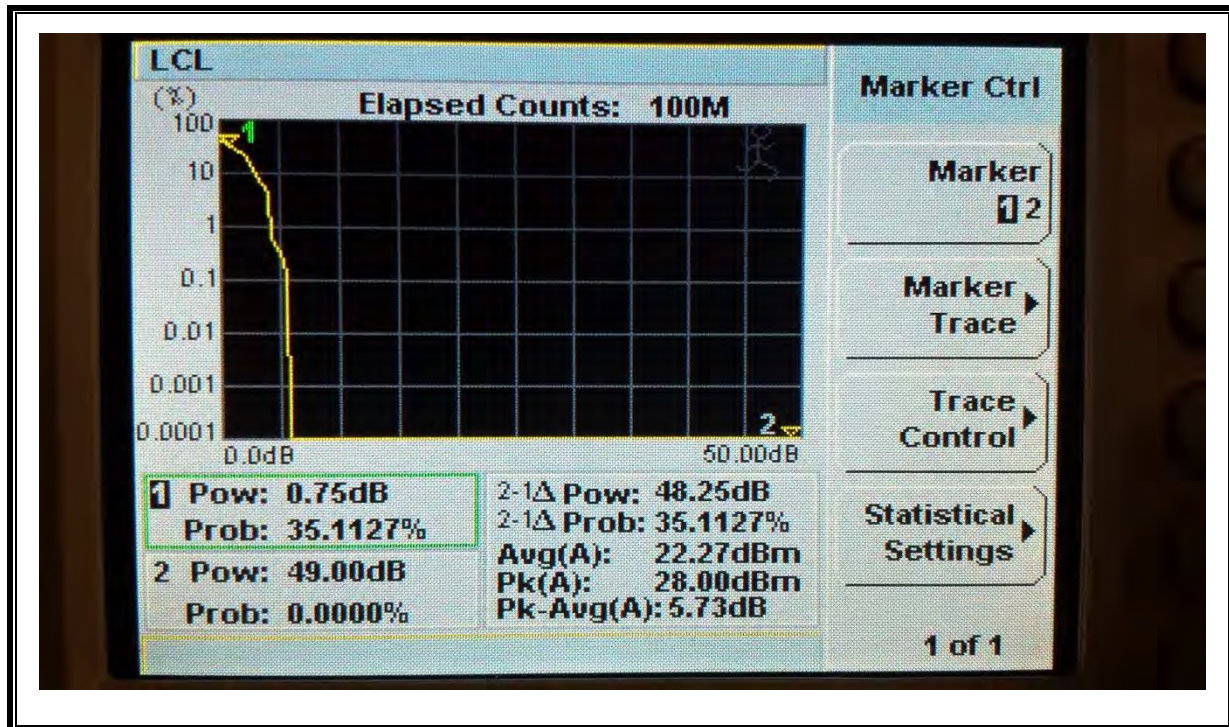
16QAM Band 2 (1.4 MHz BAND WIDTH)



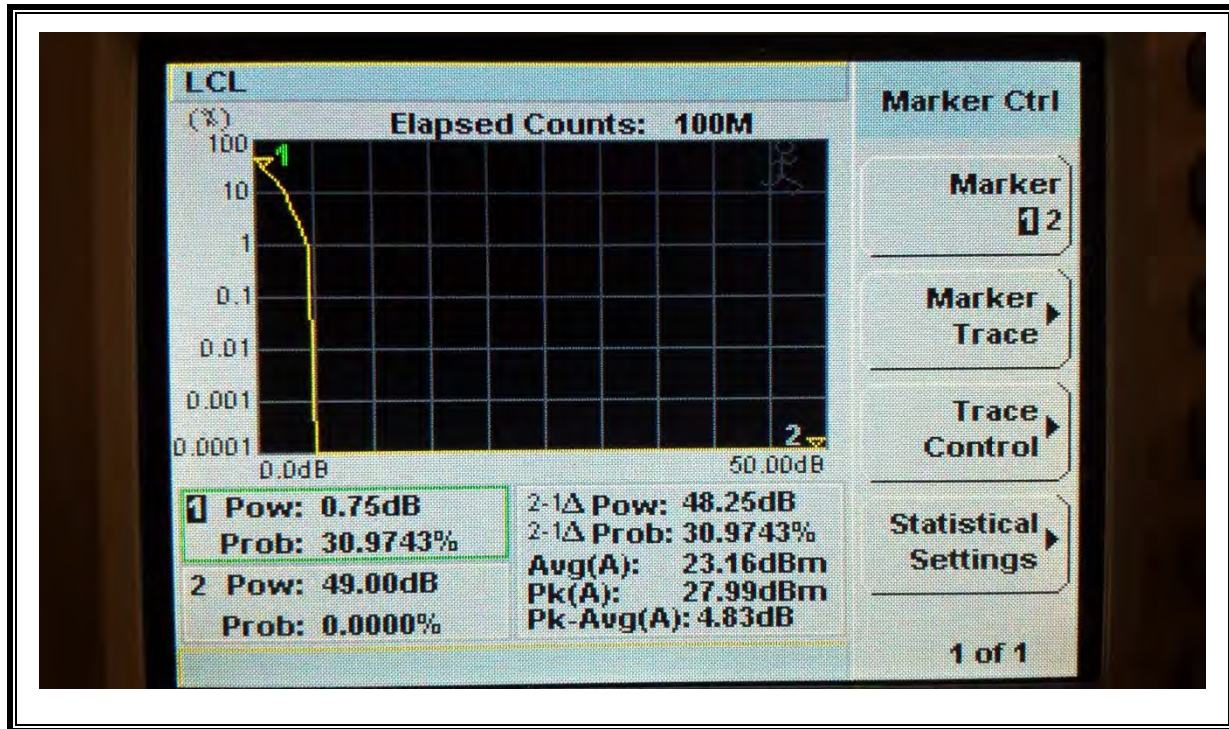
LTE QPSK Band 2 (3 MHz BAND WIDTH)



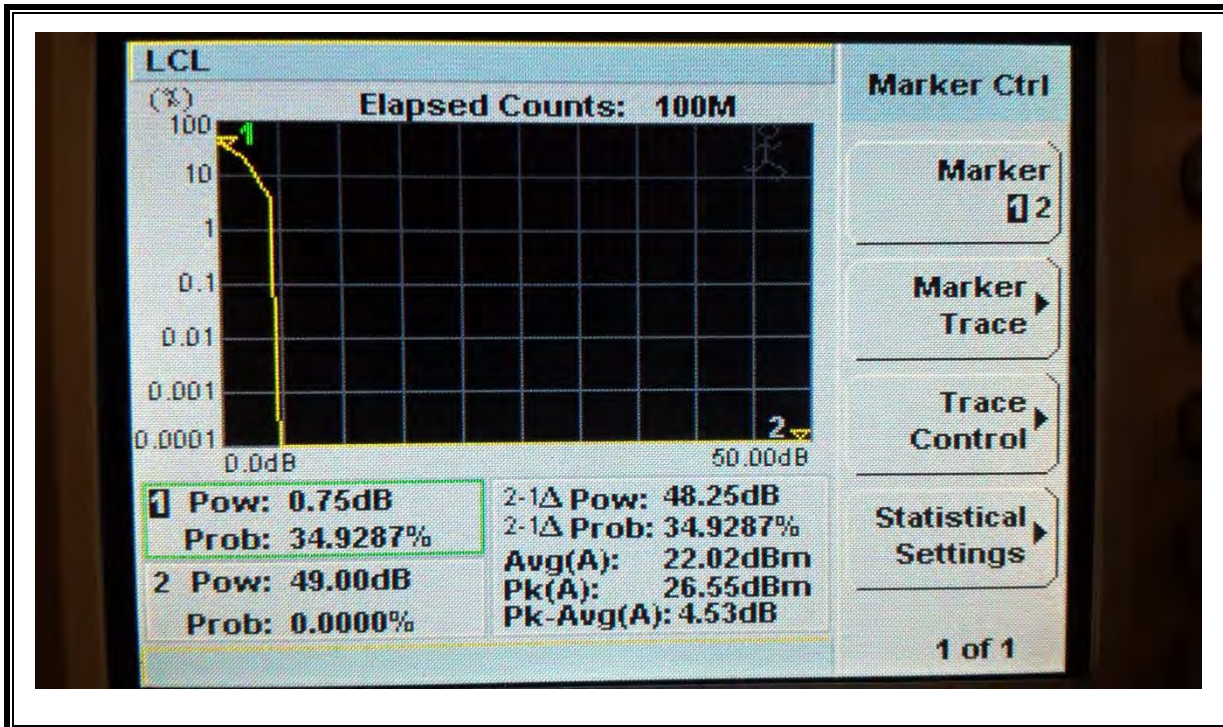
LTE 16QAM Band 2 (3 MHz BAND WIDTH)



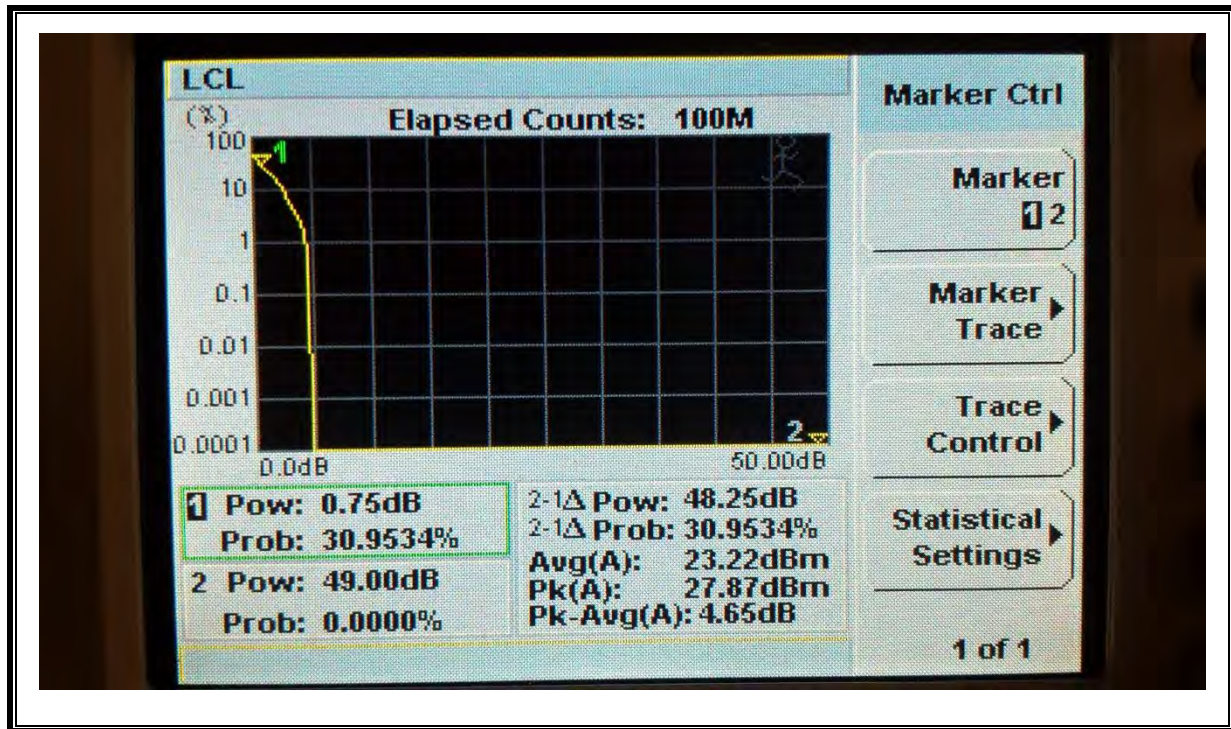
LTE QPSK Band 2 (5 MHz BAND WIDTH)



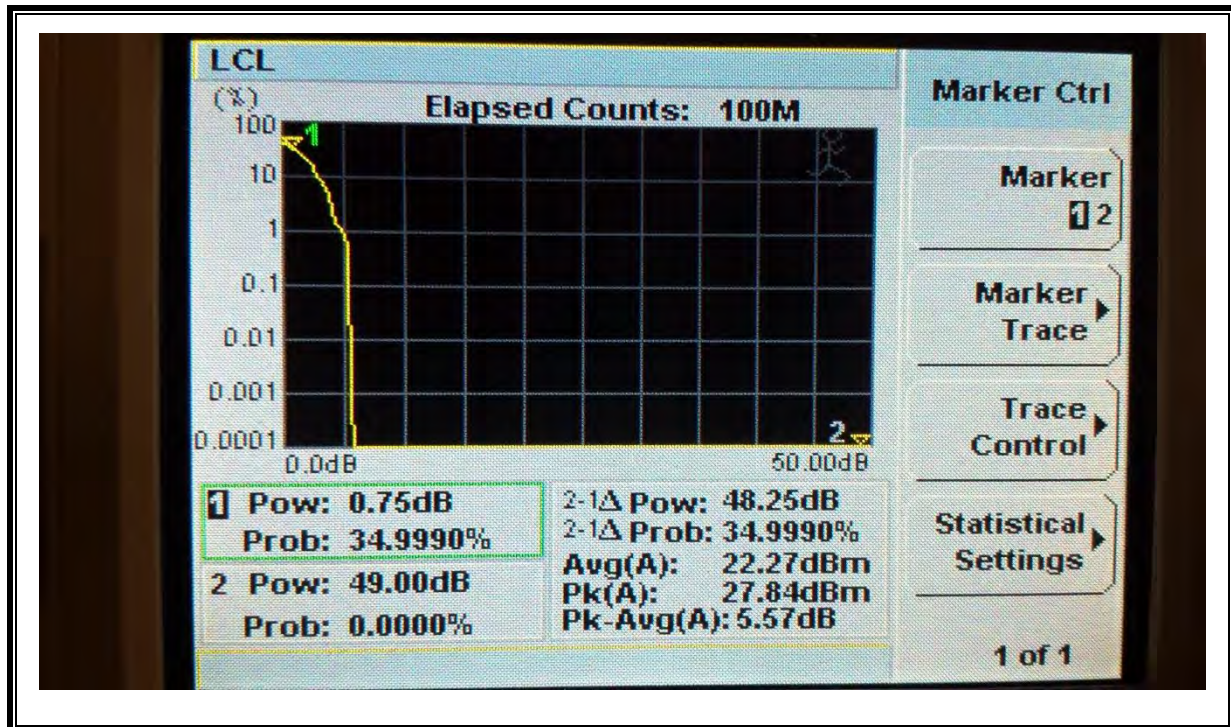
LTE 16QAM Band 2 (5 MHz BAND WIDTH)



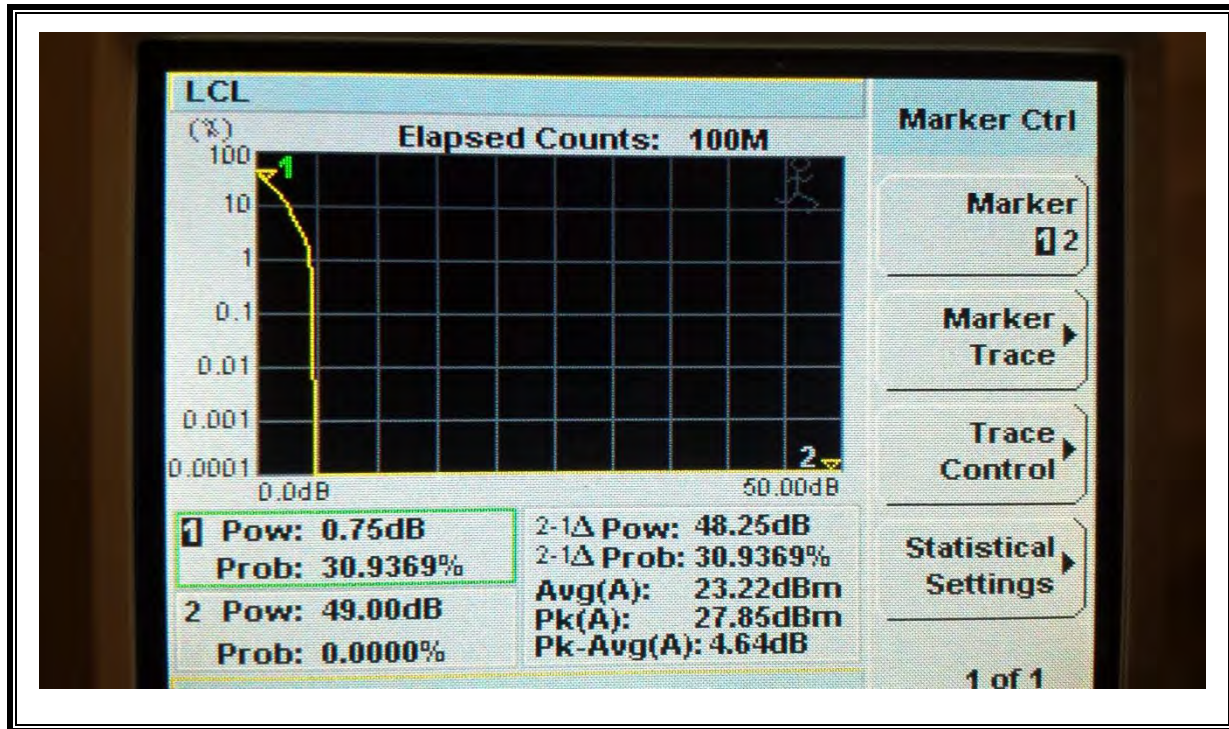
LTE QPSK Band 2 (10 MHz BAND WIDTH)



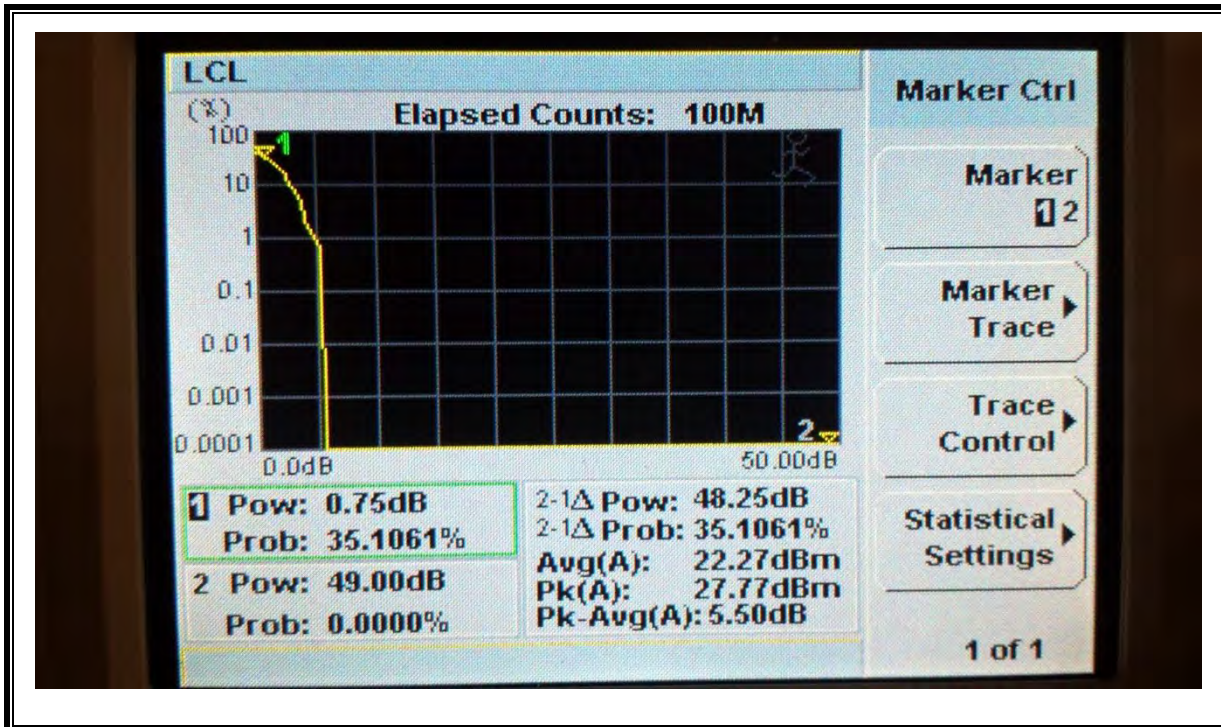
LTE 16QAM Band 2 (10 MHz BAND WIDTH)



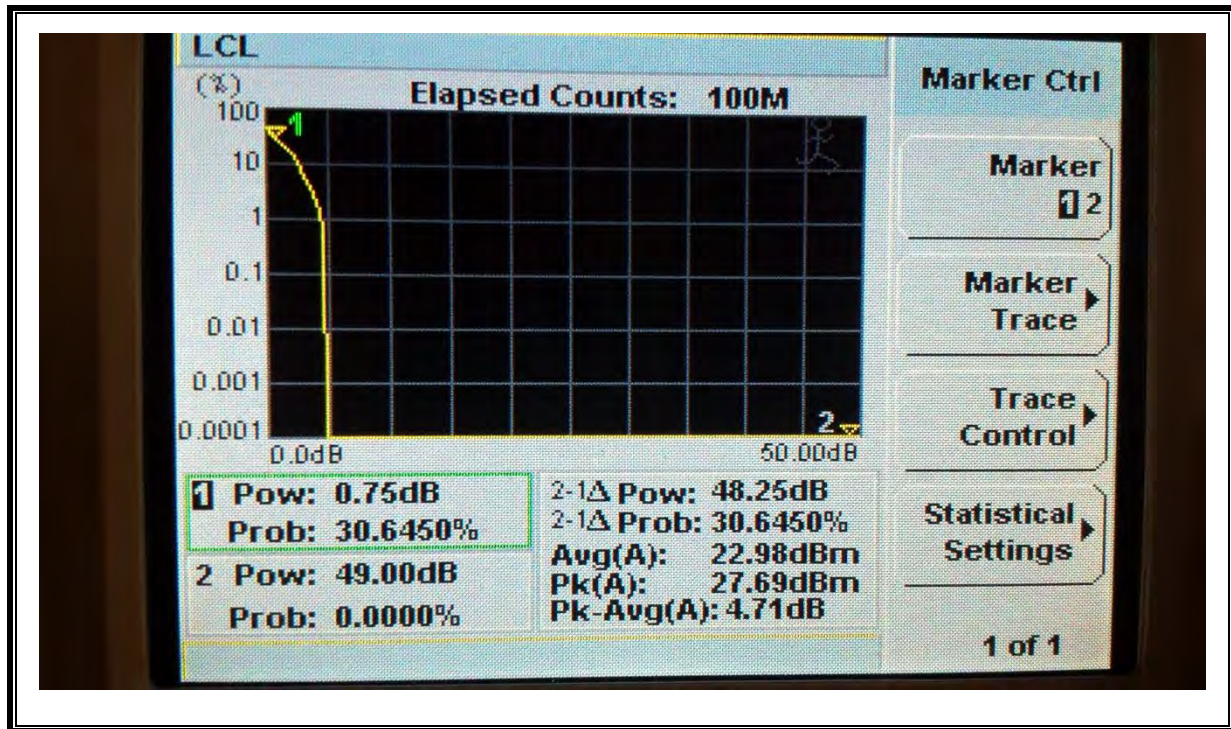
LTE QPSK Band 2 (15 MHz BAND WIDTH)



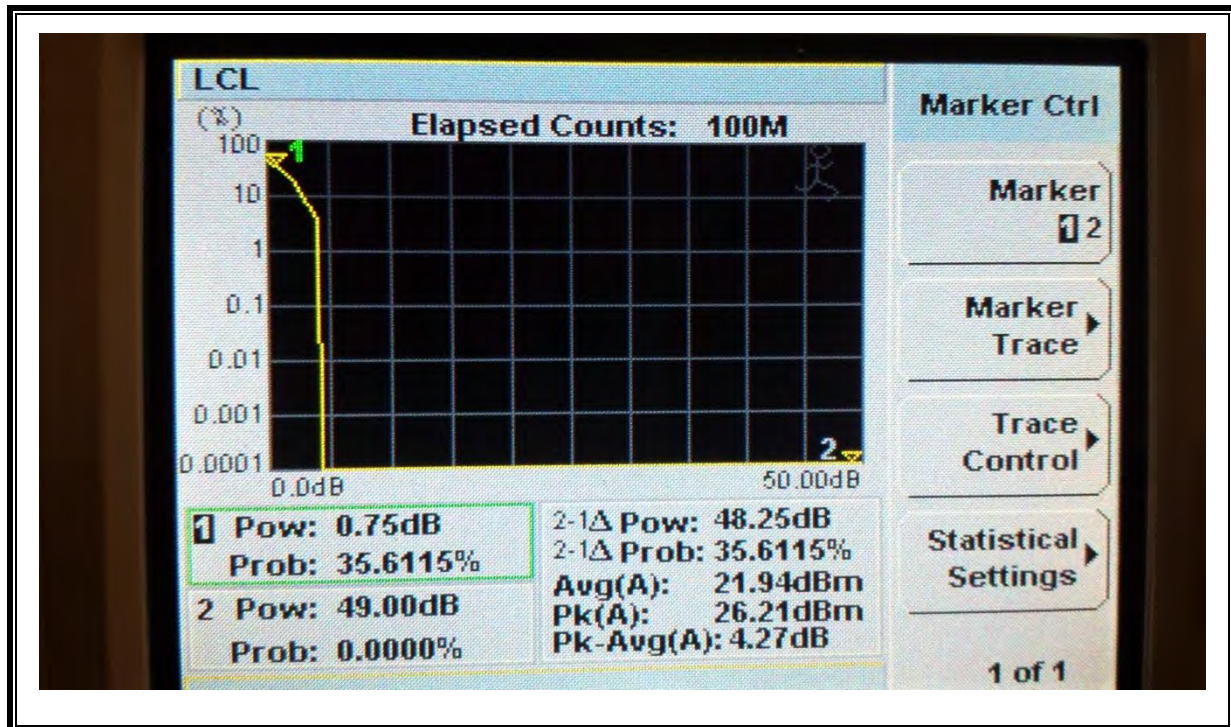
LTE 16QAM Band 2 (15 MHz BAND WIDTH)



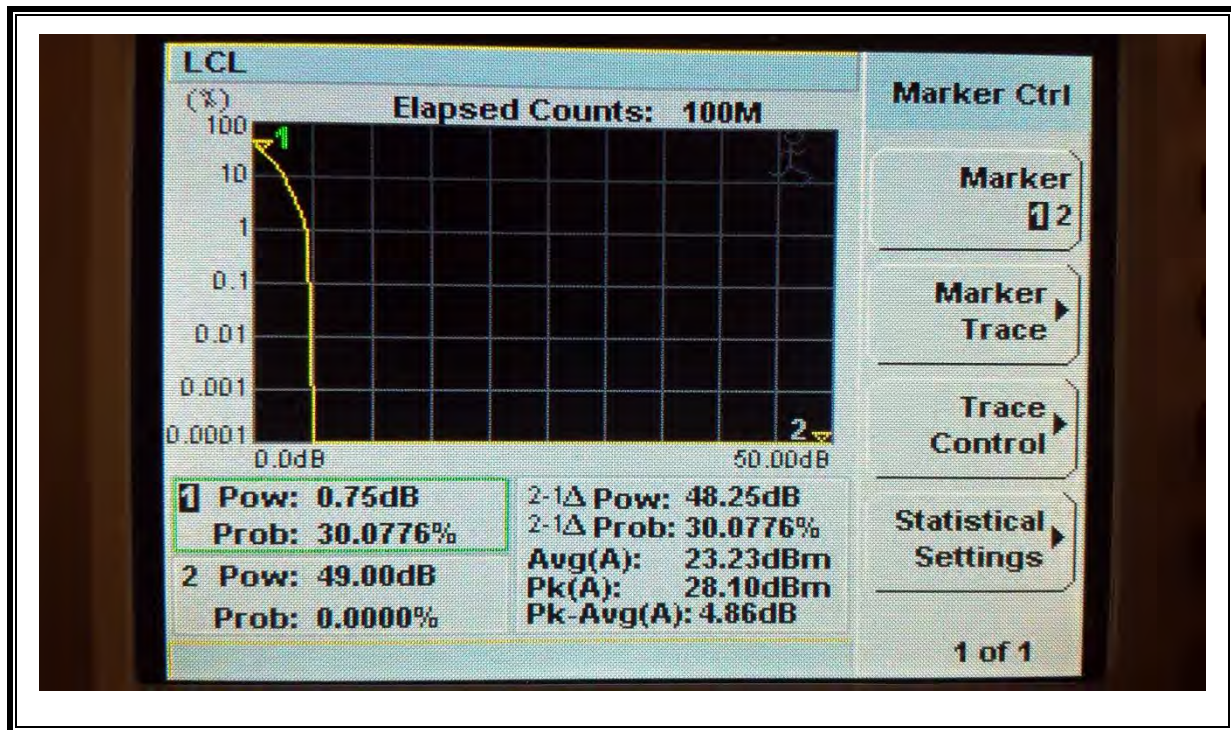
LTE QPSK Band 2 (20 MHz BAND WIDTH)



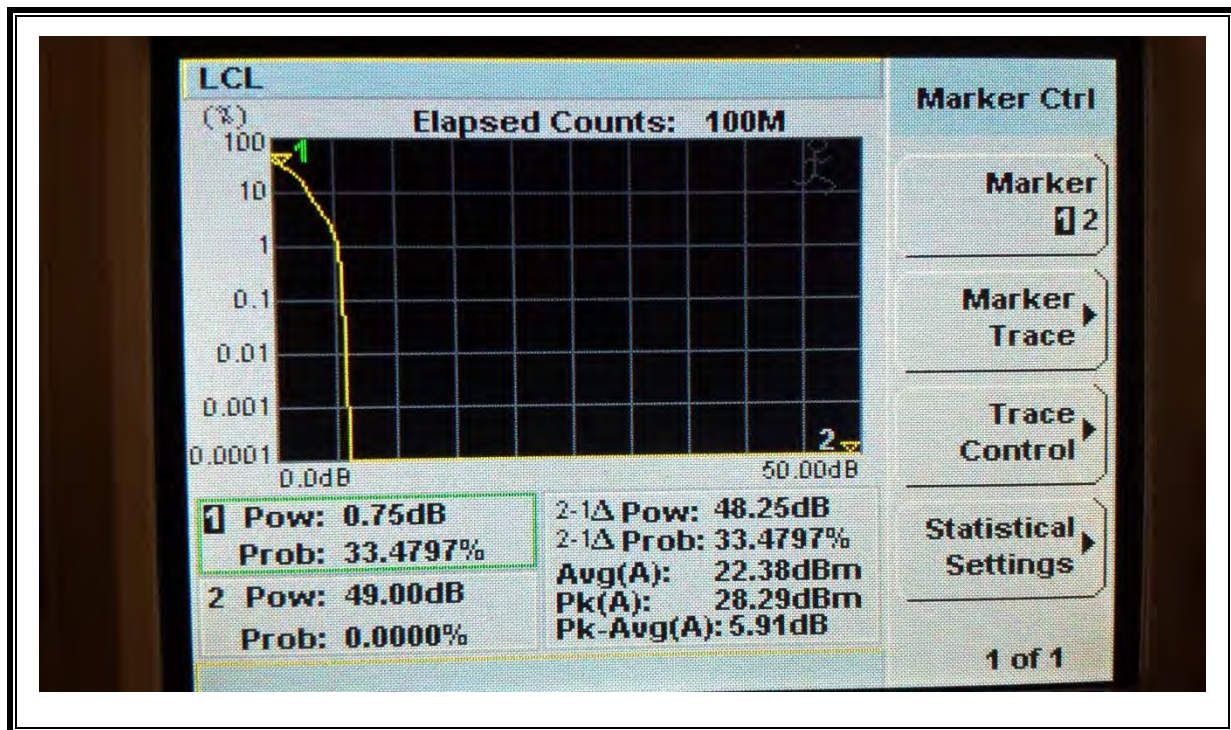
LTE 16QAM Band 2 (20 MHz BAND WIDTH)



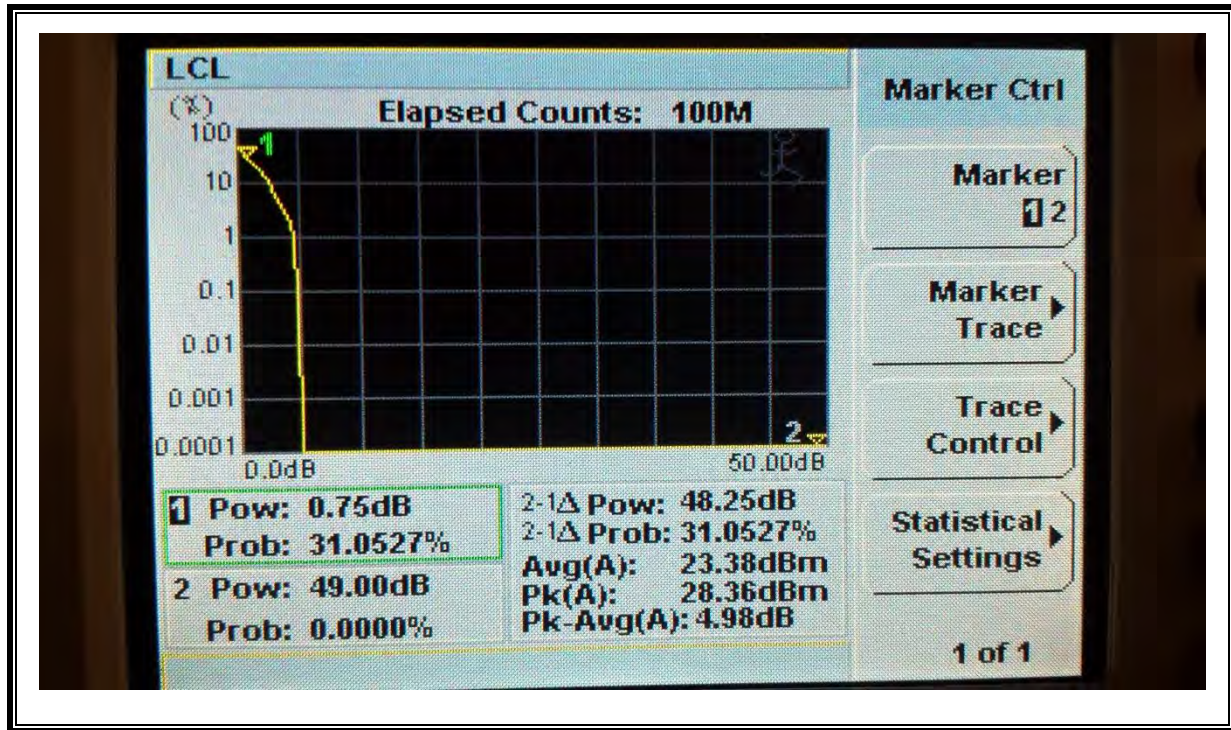
QPSK Band 4 (1.4 MHz BAND WIDTH)



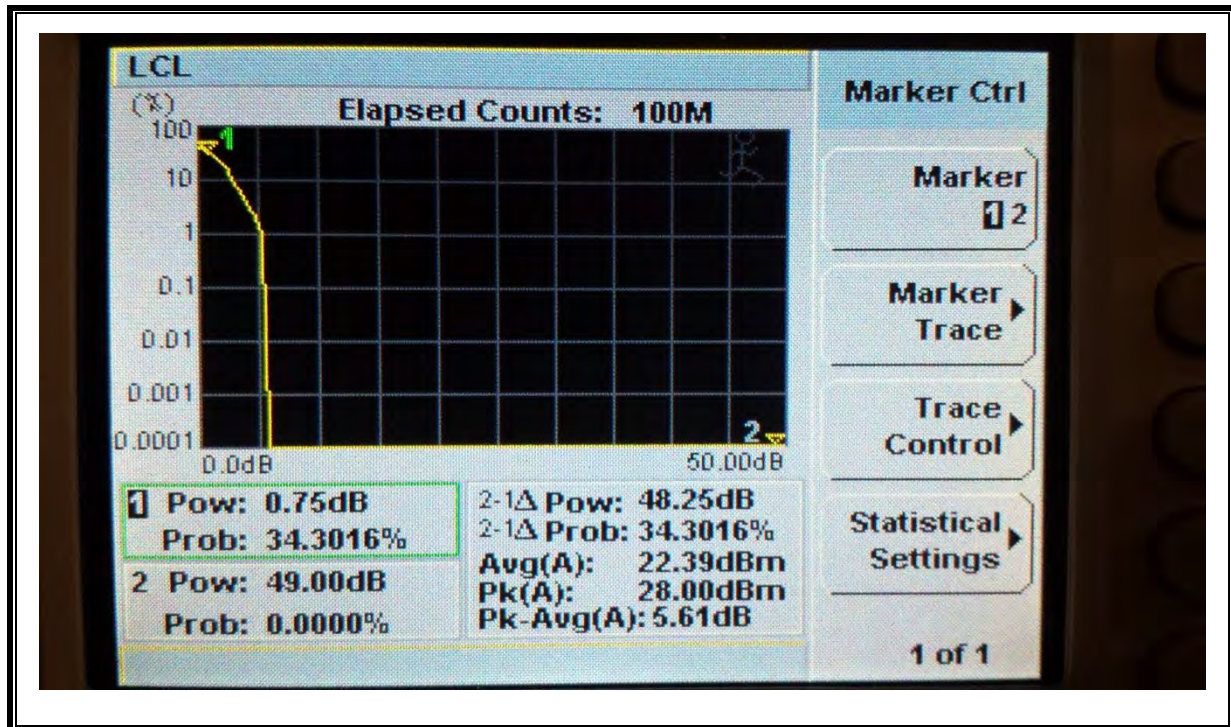
16QAM Band 4 (1.4 MHz BAND WIDTH)



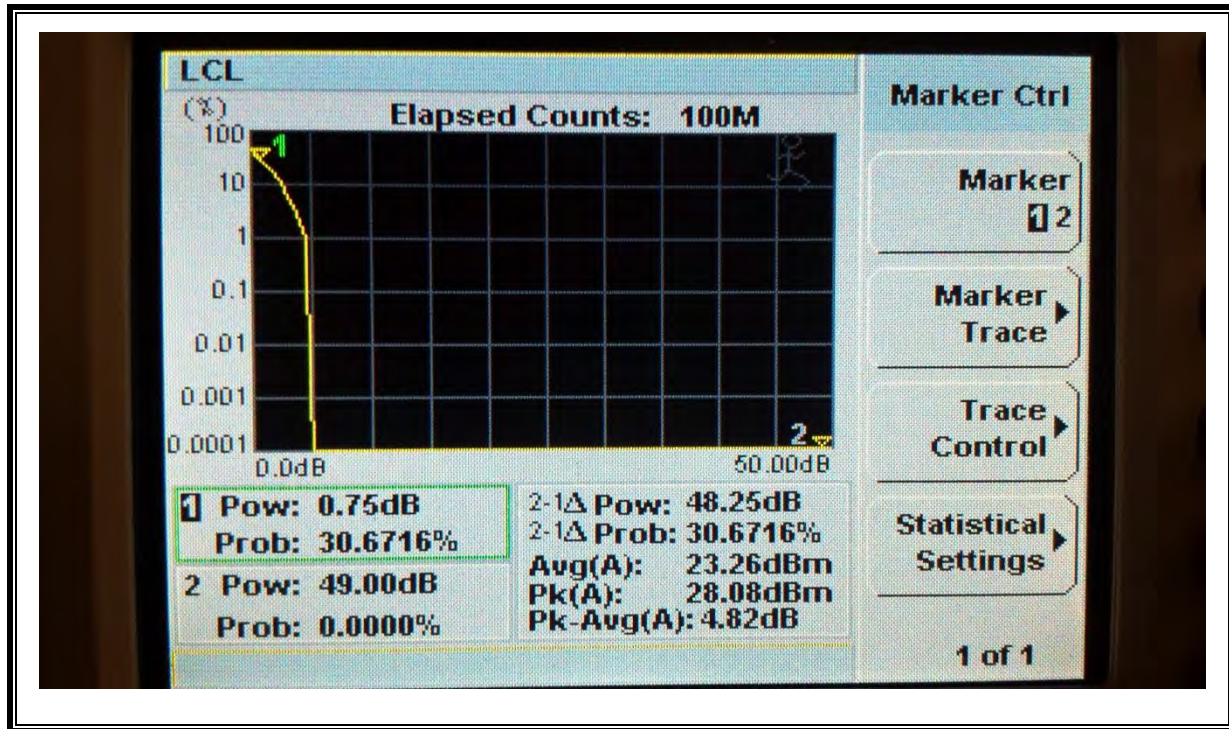
LTE QPSK Band 4 (3 MHz BAND WIDTH)



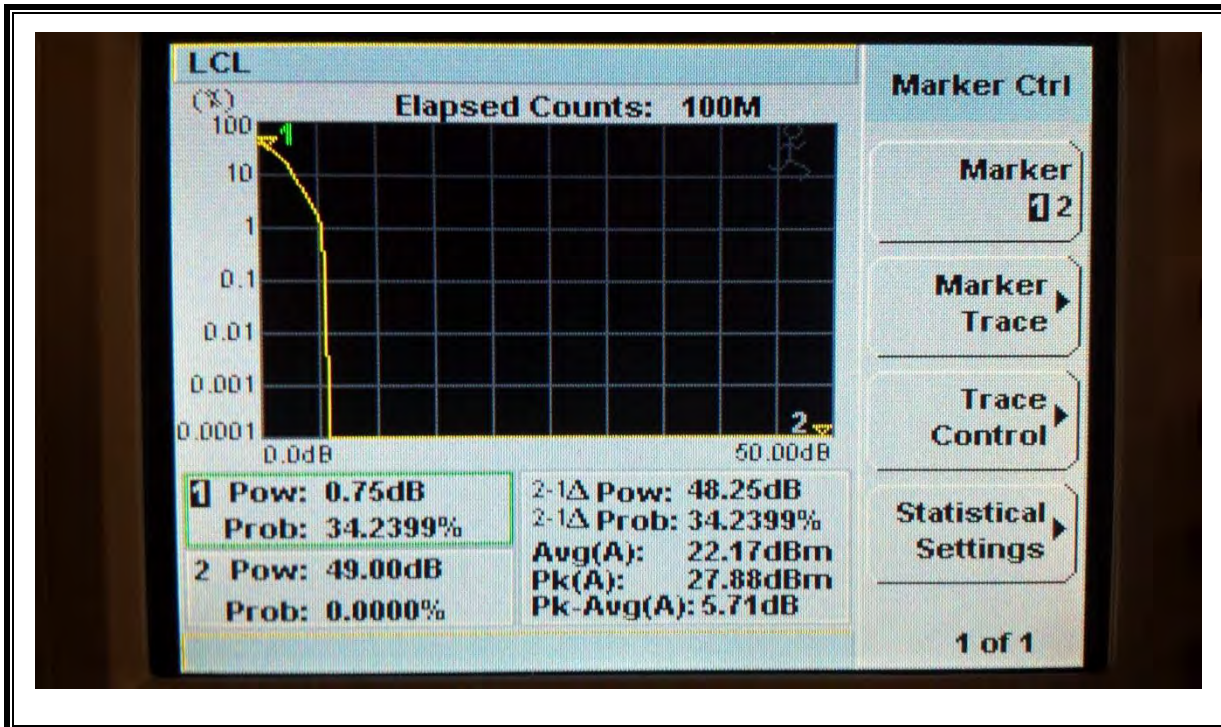
LTE 16QAM Band 4 (3 MHz BAND WIDTH)



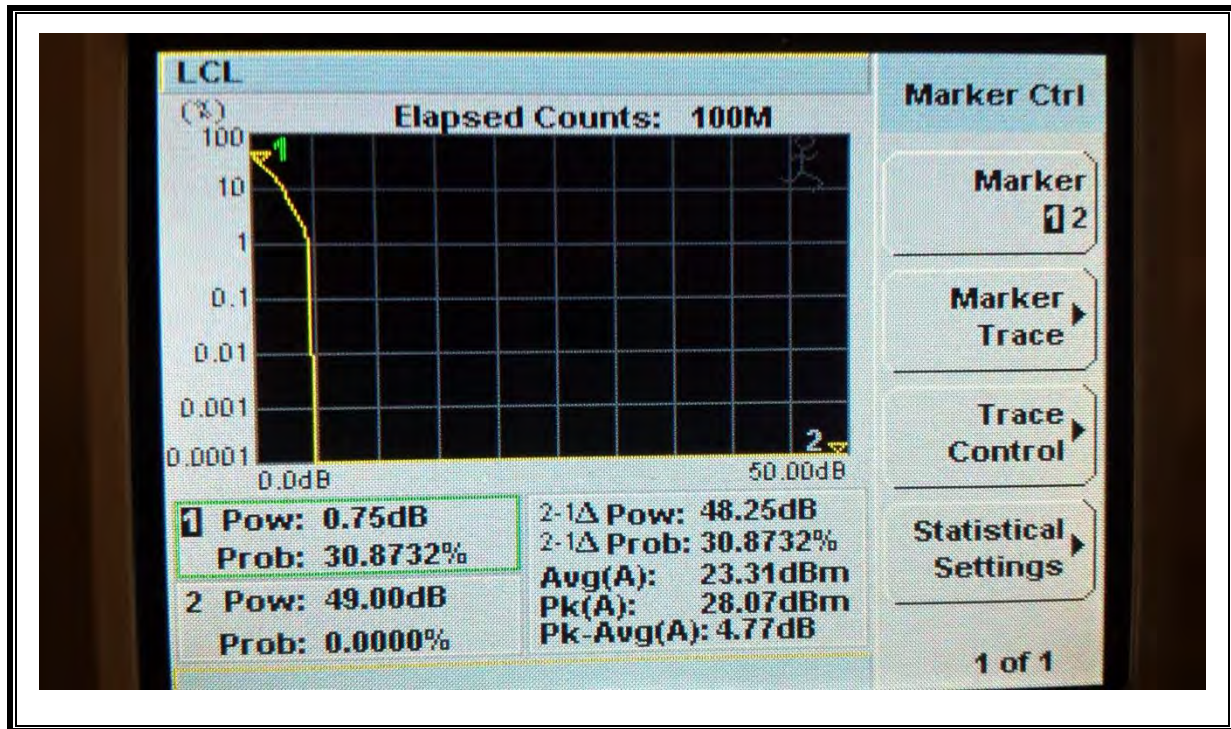
LTE QPSK Band 4 (5 MHz BAND WIDTH)



LTE 16QAM Band 4 (5 MHz BAND WIDTH)



LTE QPSK Band 4 (10 MHz BAND WIDTH)



LTE 16QAM Band 4 (10 MHz BAND WIDTH)

