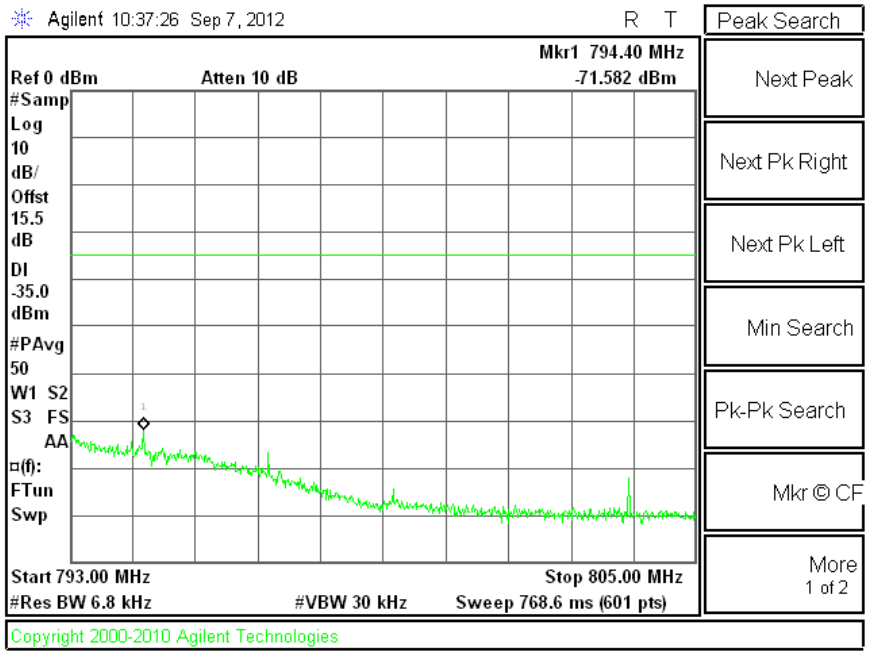
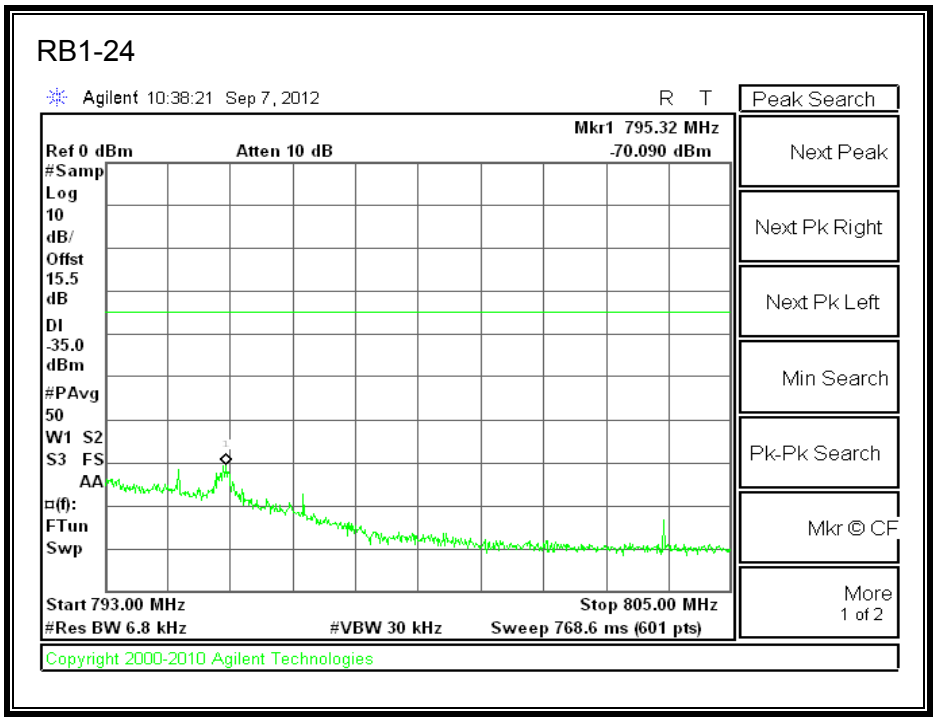
LTE 16QAM 784.5MHZ Band 13, 793 - 805MHz (5MHz Bandwidth)

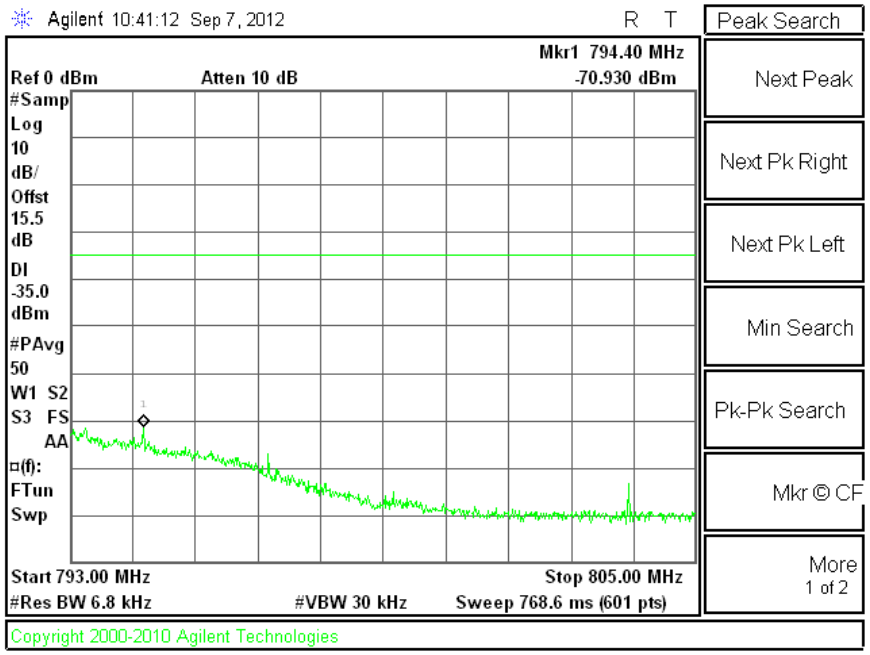
RB1-0



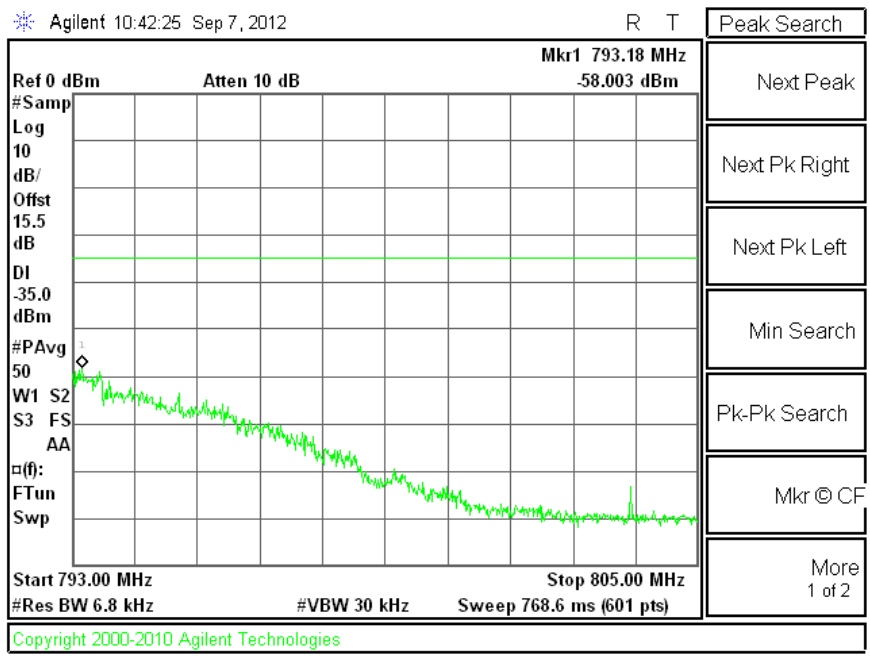
RB1-24



RB12-6

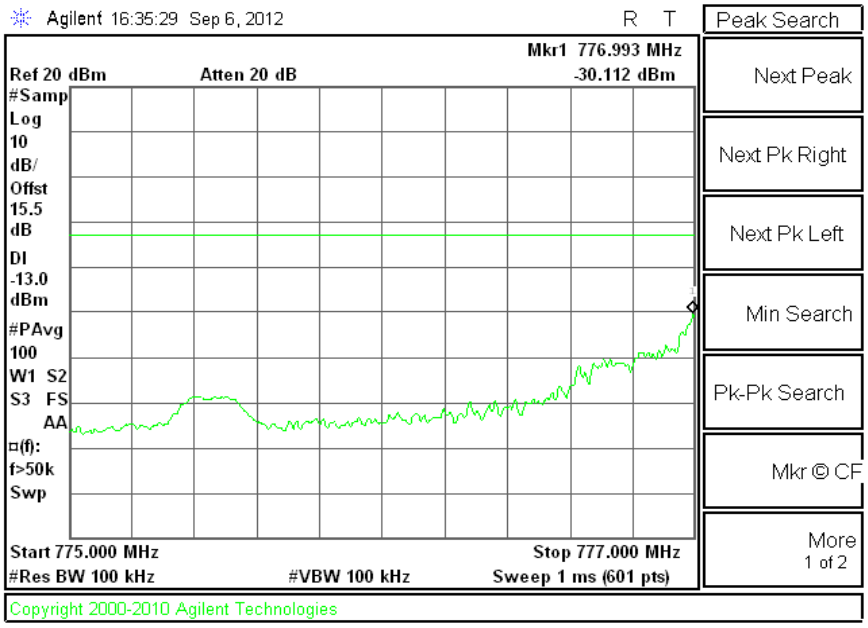


RB25-0

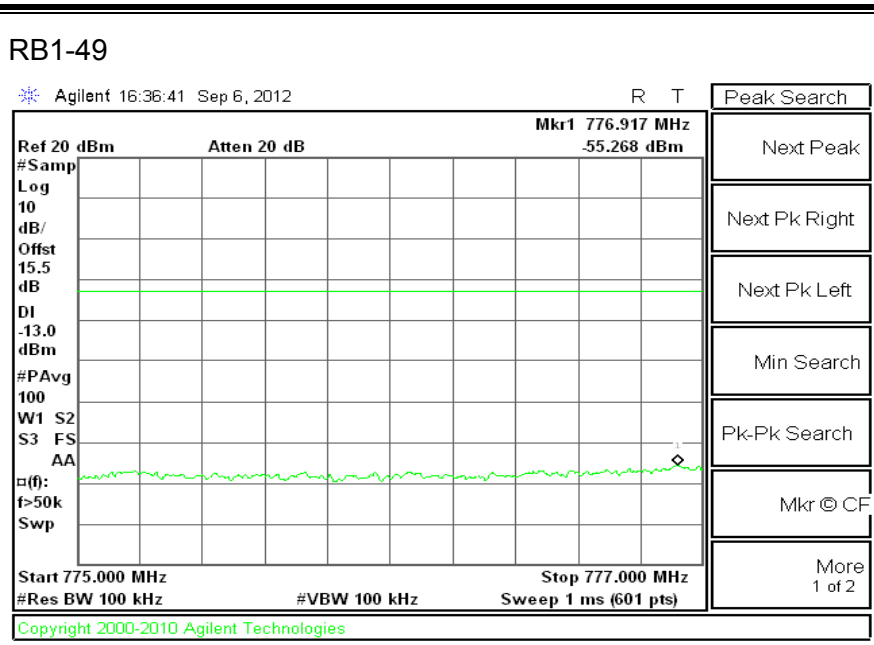


LTE **QPSK 782MHz Band 13, 775 - 777MHz (10MHz Bandwidth)**

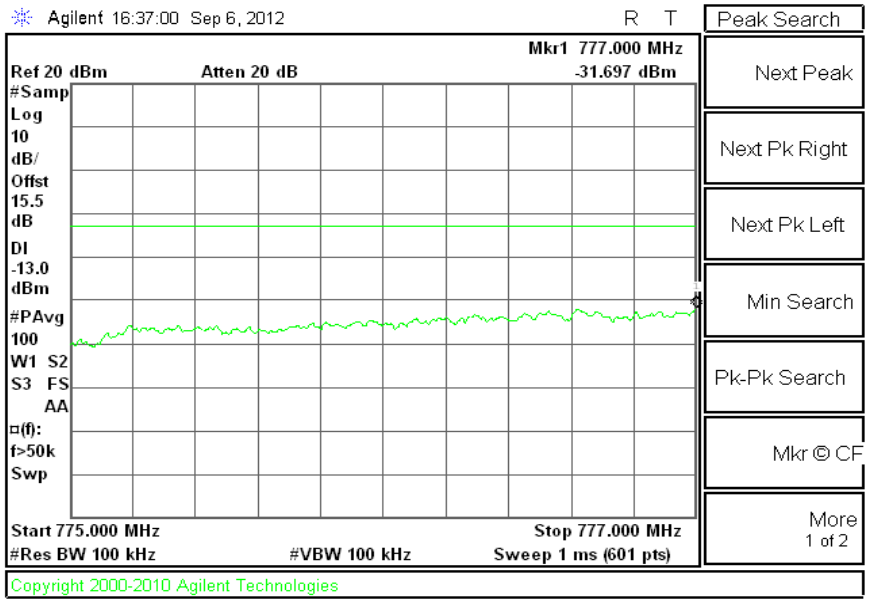
RB1-0,



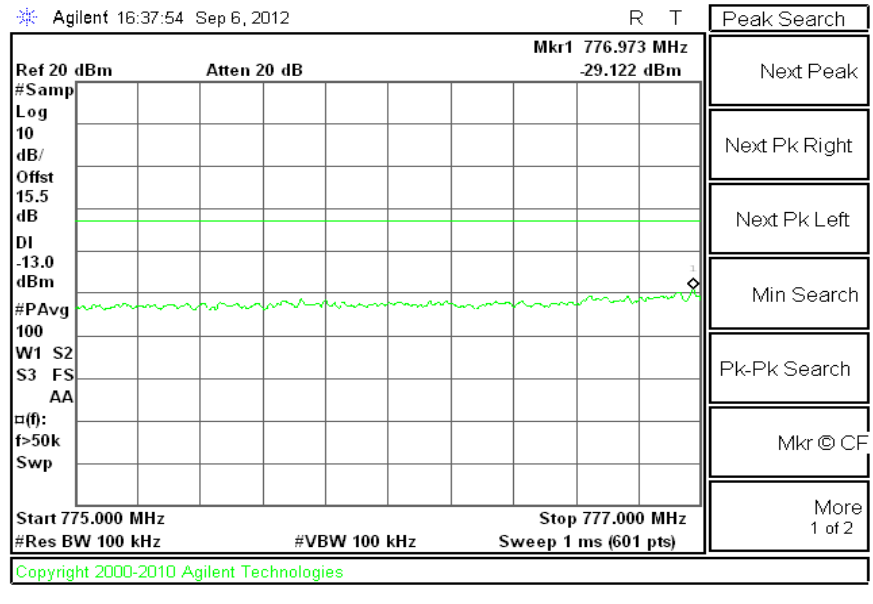
RB1-49



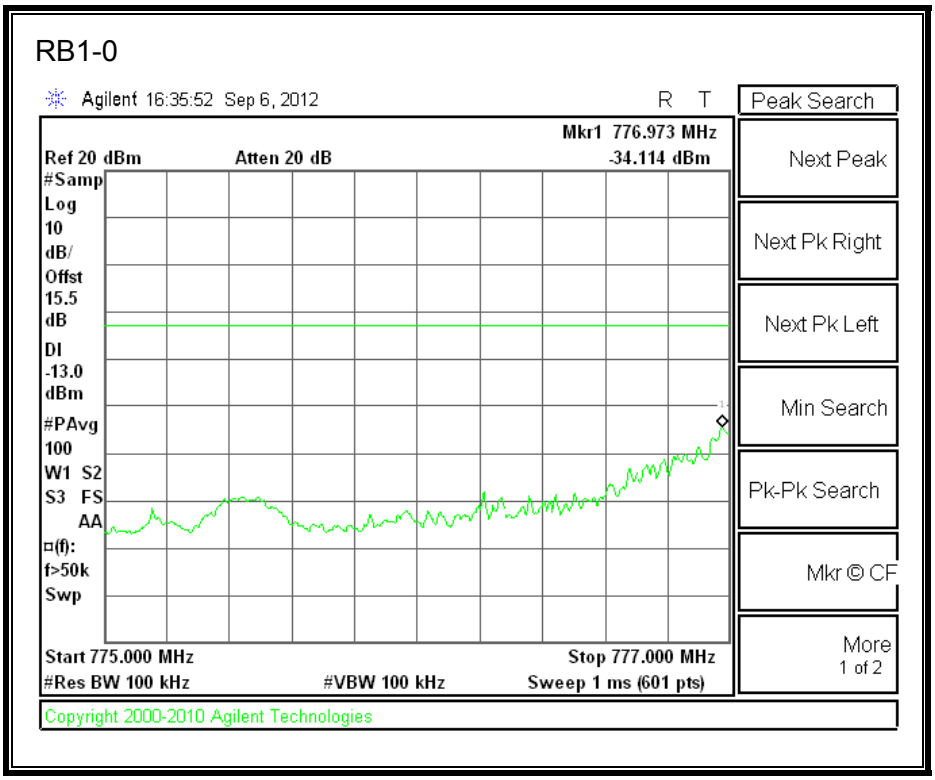
RB25-12

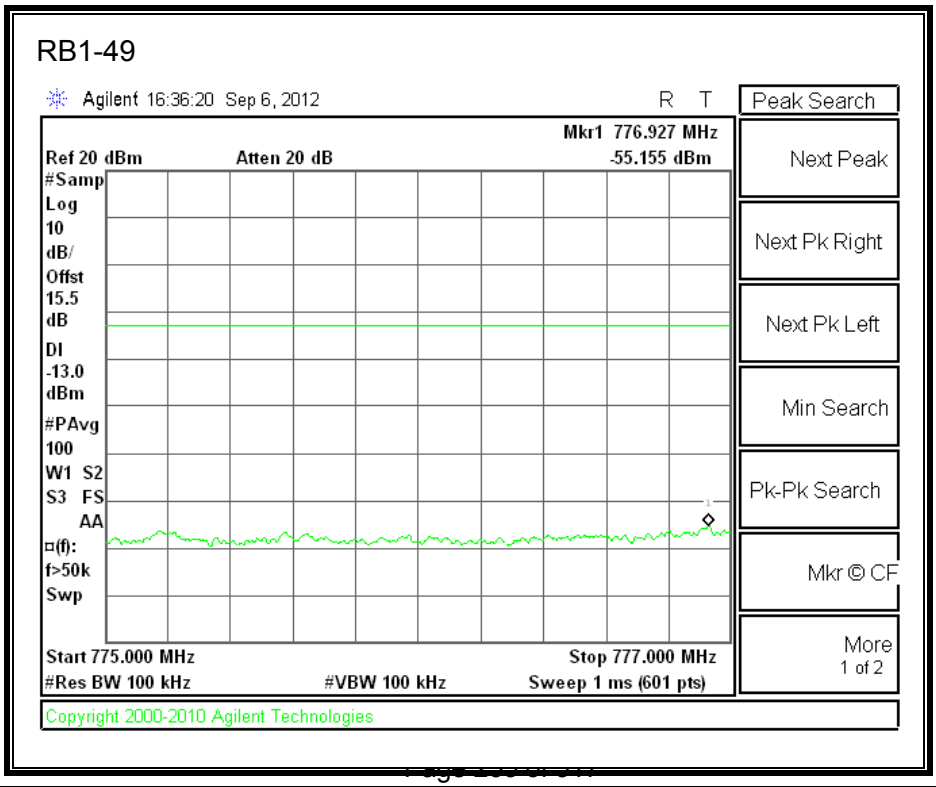


RB50-0

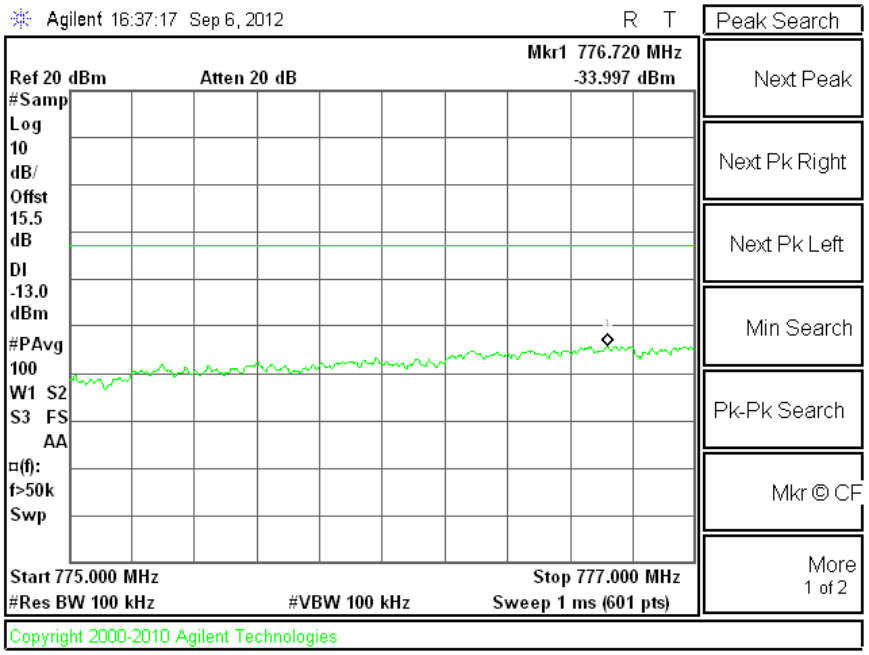


LTE 16QAM Band 13, 775 - 777MHz (10MHz Bandwidth)

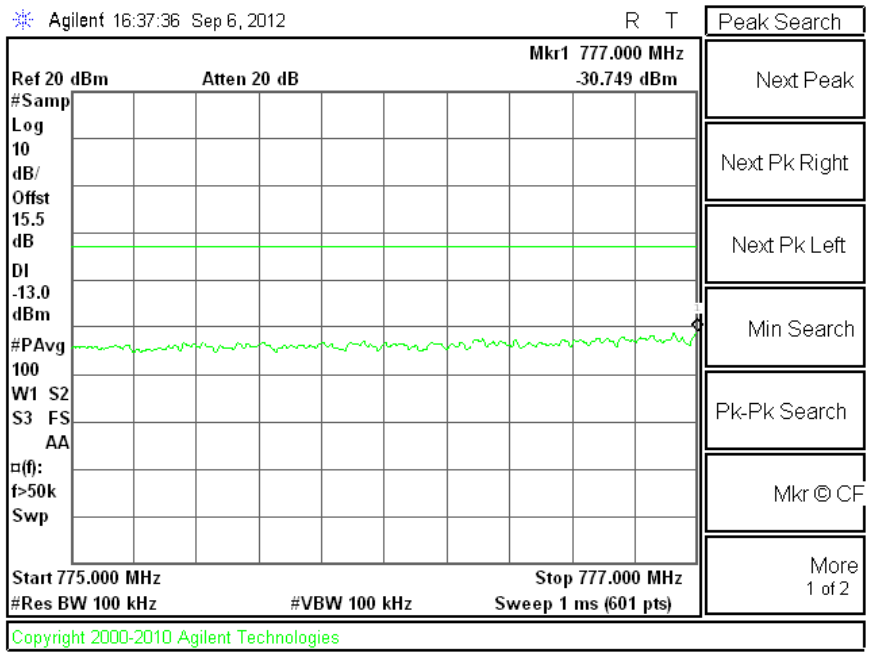




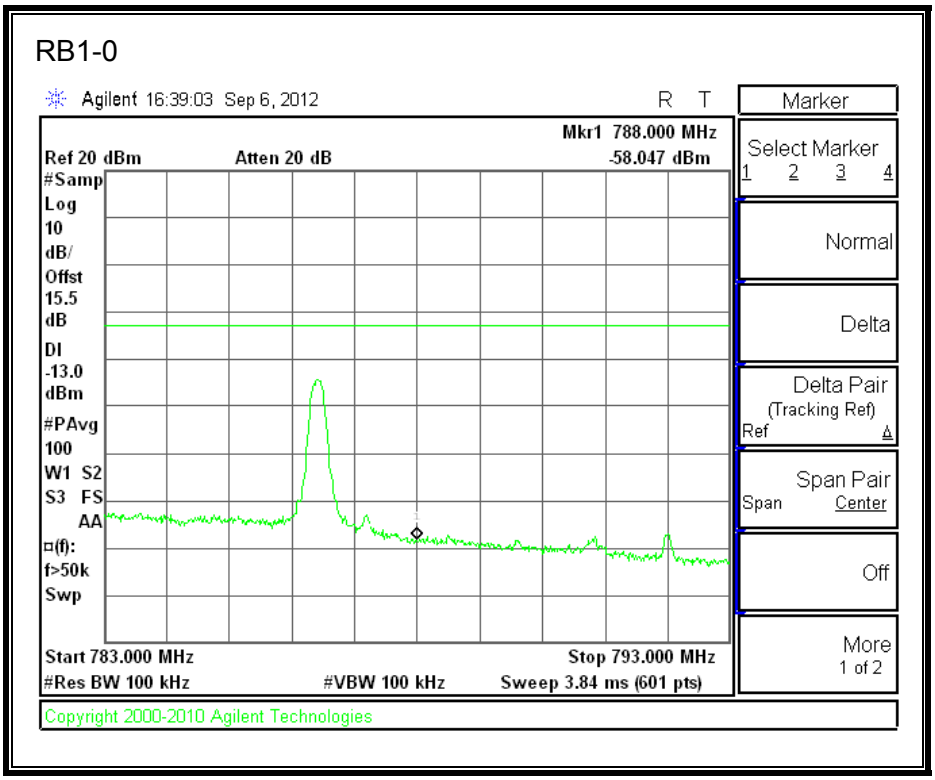
RB25-12,

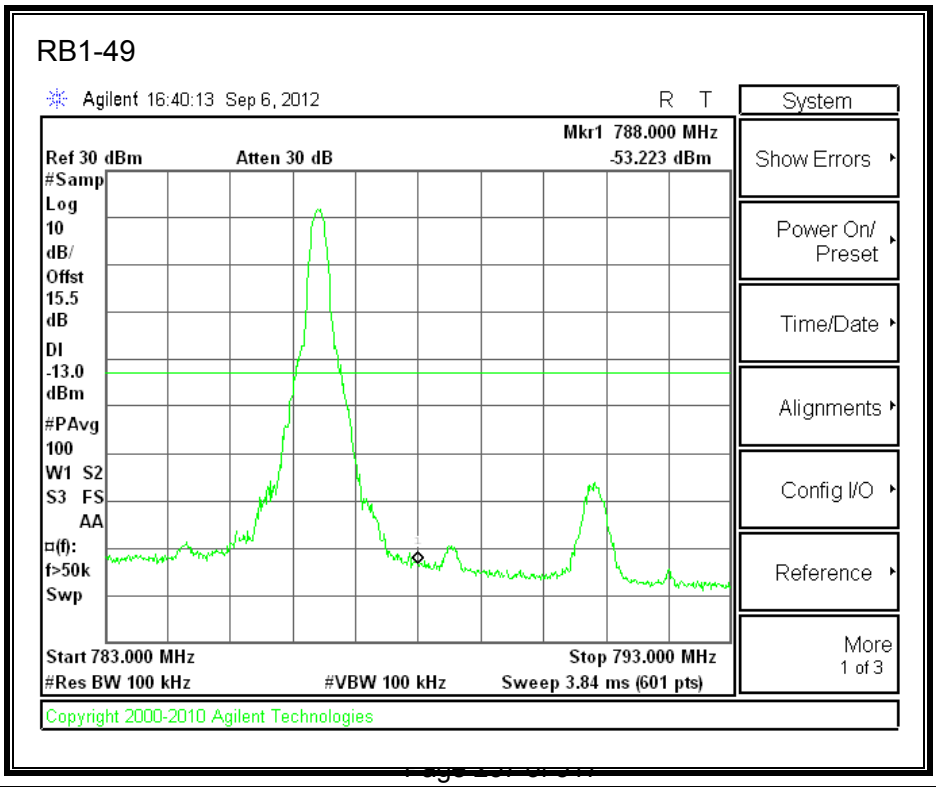


RB50-0

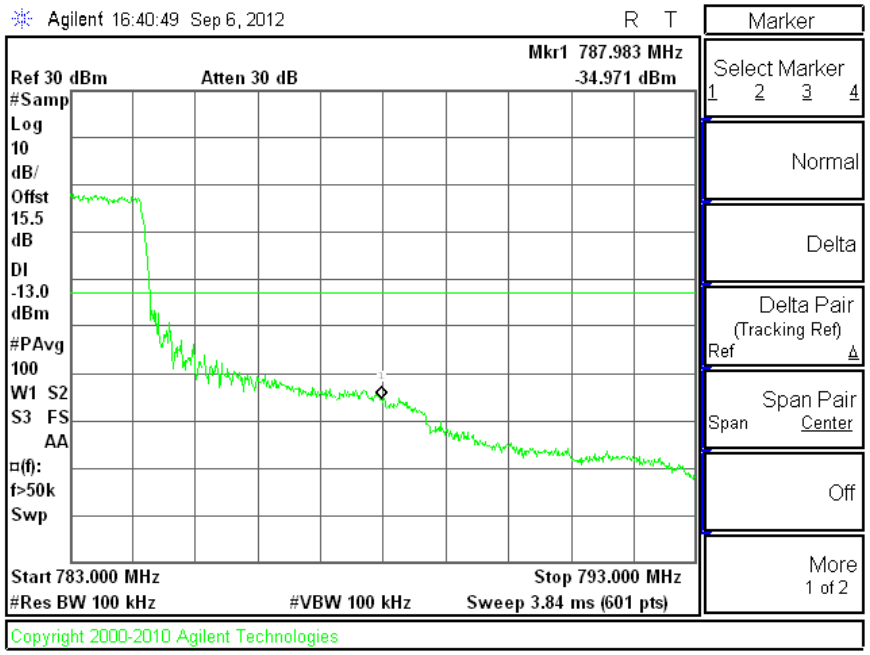


LTE QPSK 782MHz Band 13, 783 - 793MHz (10MHz Bandwidth)

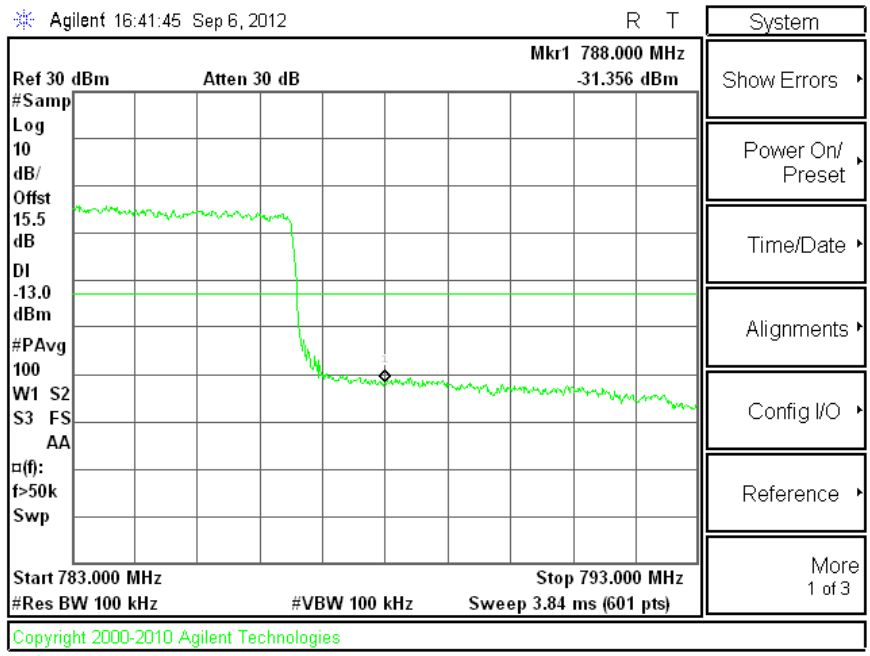




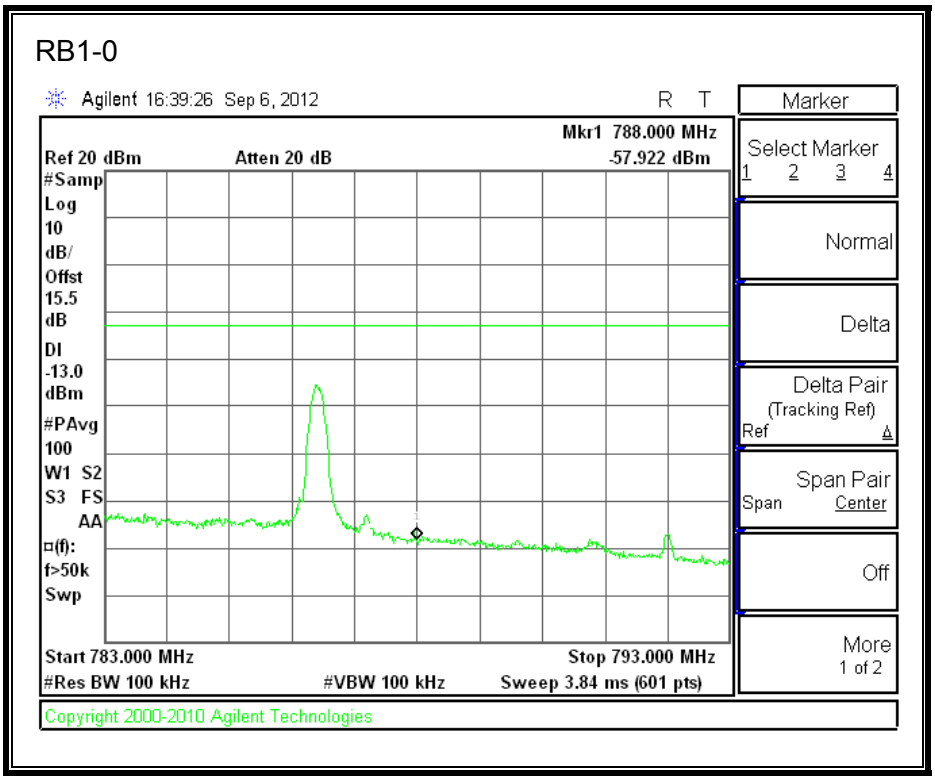
RB25-12,

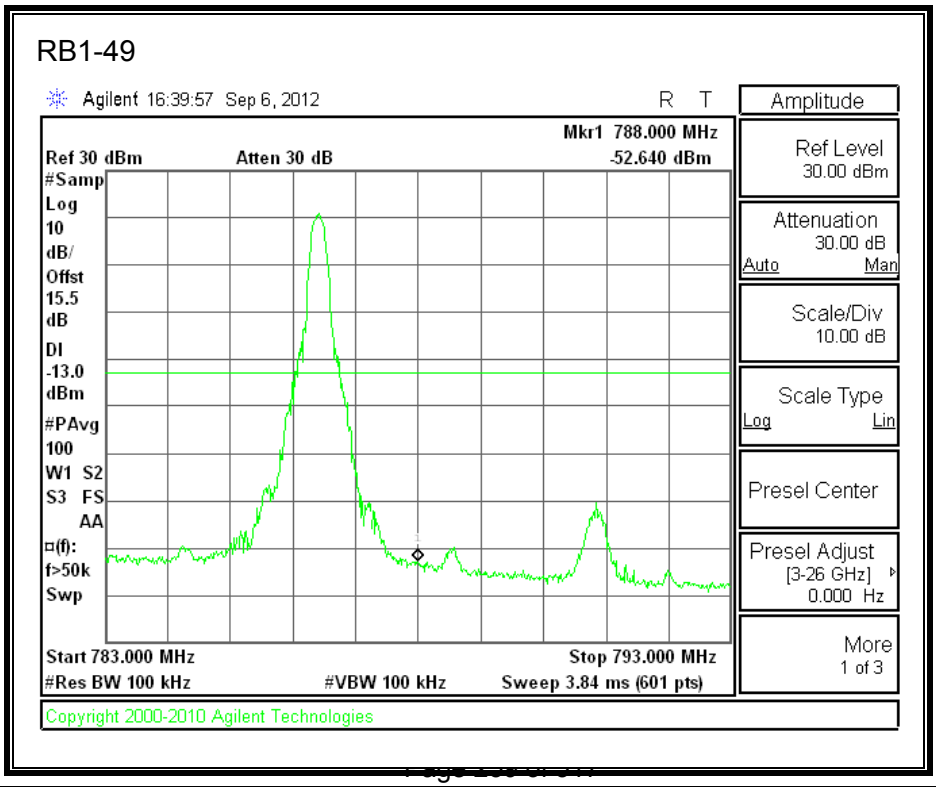


RB50-0,

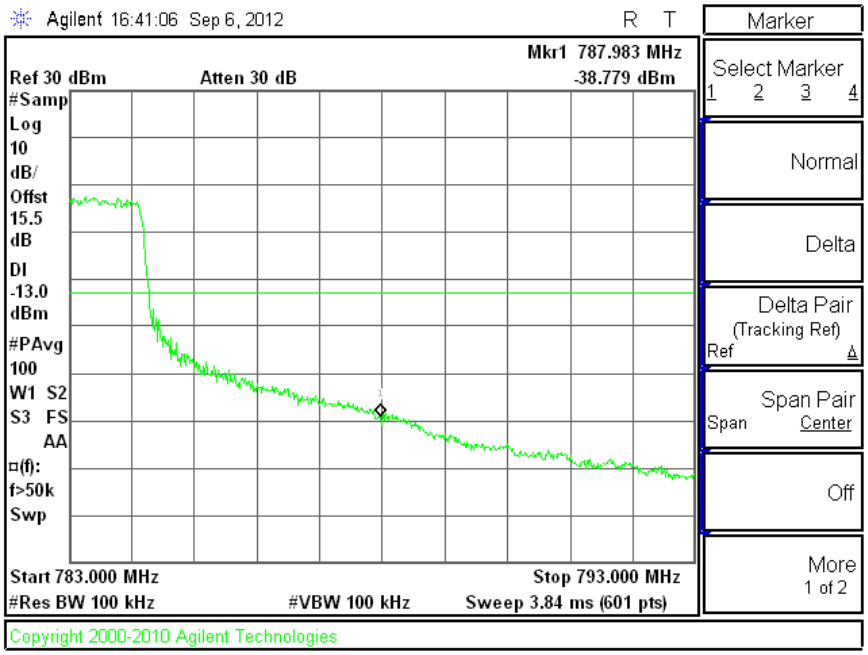


LTE 16QAM Band 13, 782MHz 783 - 793MHz (10MHz Bandwidth)

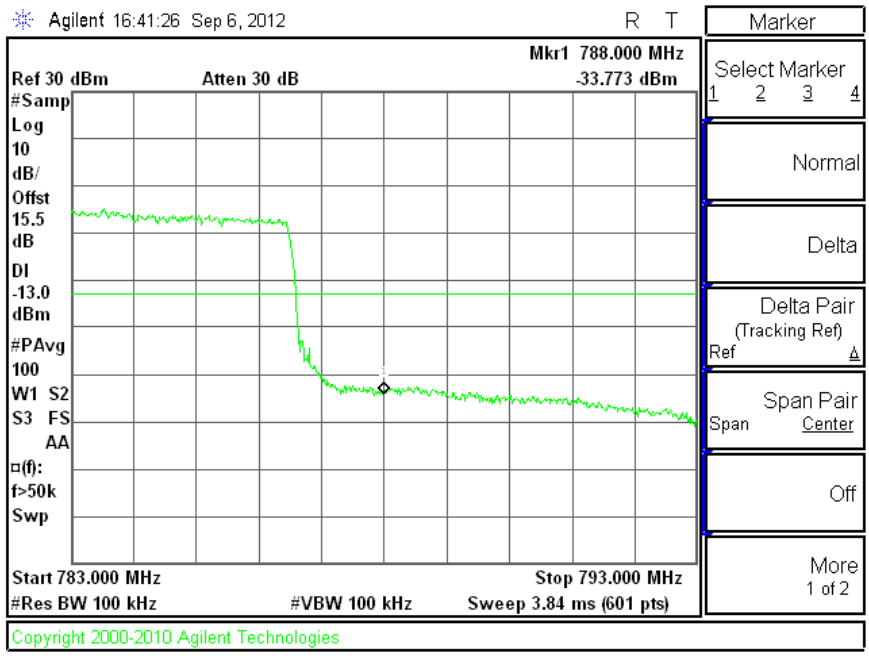




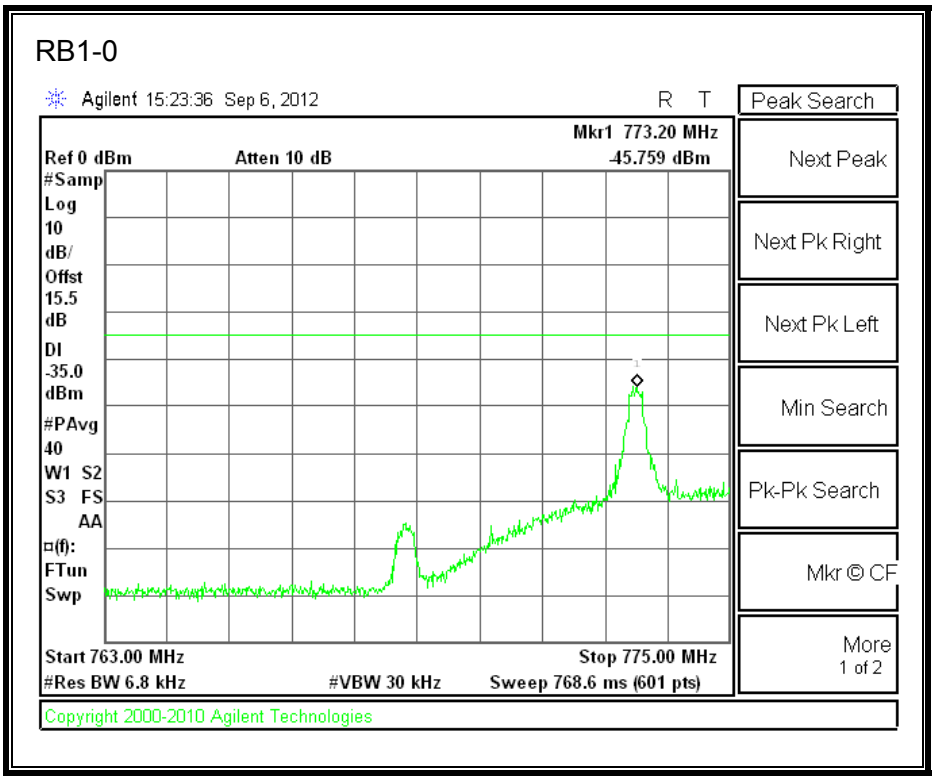
RB25-12

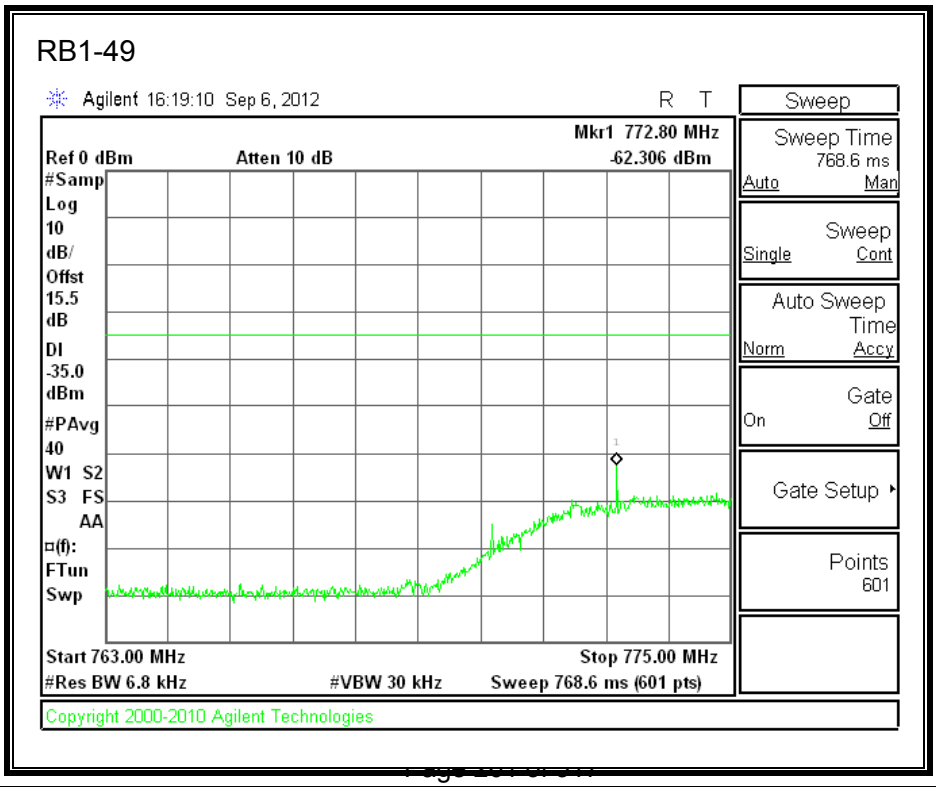


RB50-0

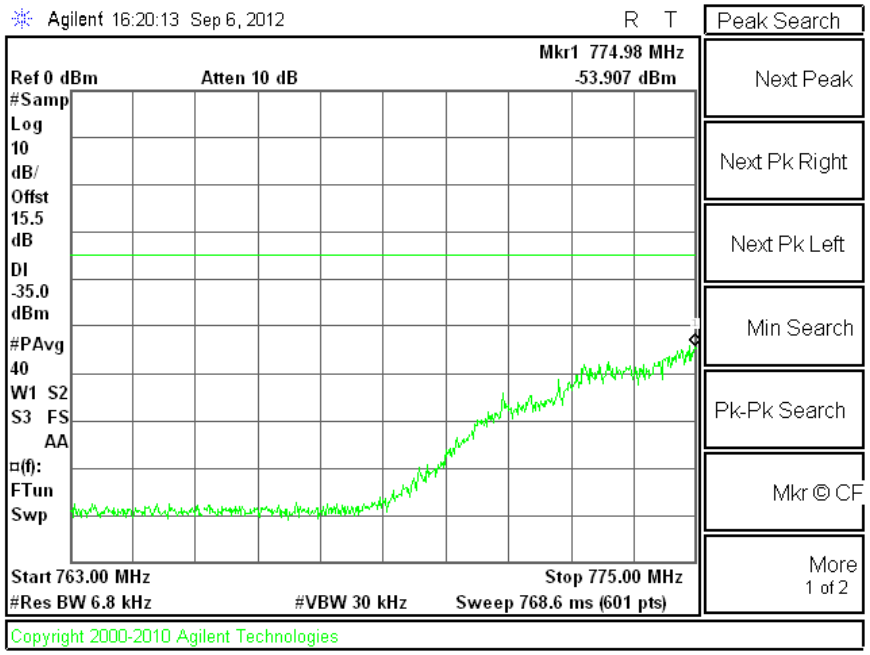


LTE QPSK 782MHz Band 13, 763 - 775MHz (10MHz Bandwidth)

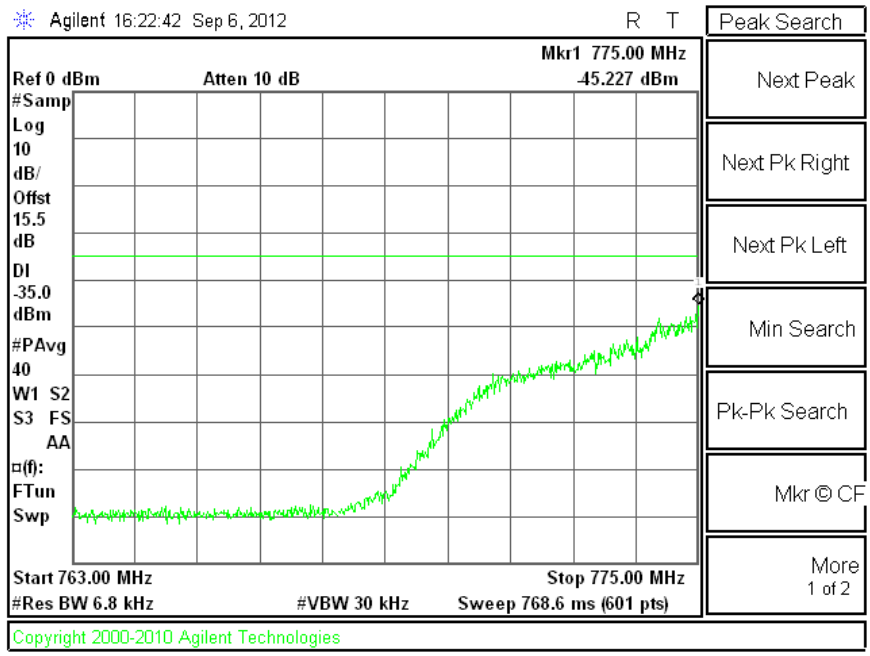




RB25-12

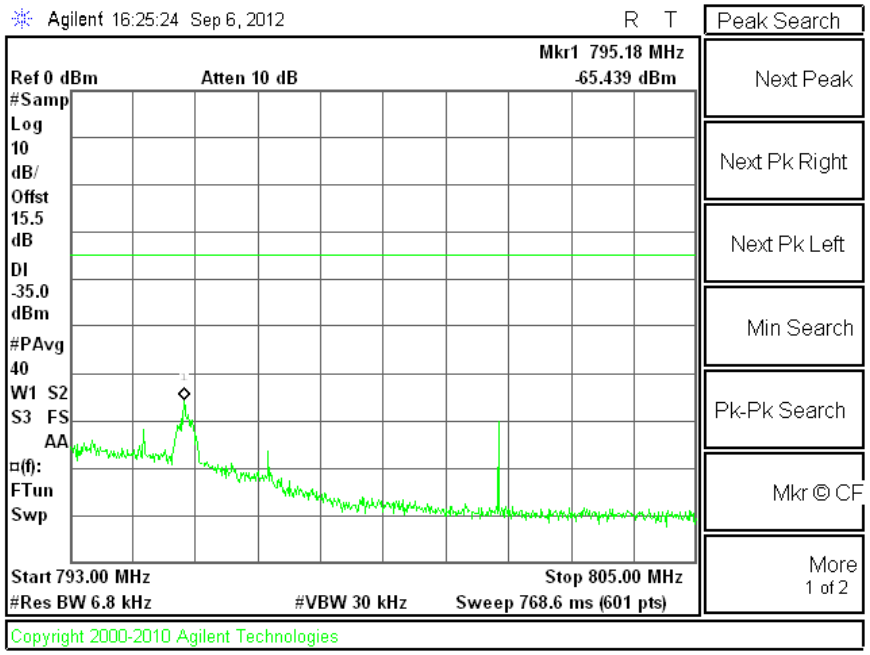


RB50-0

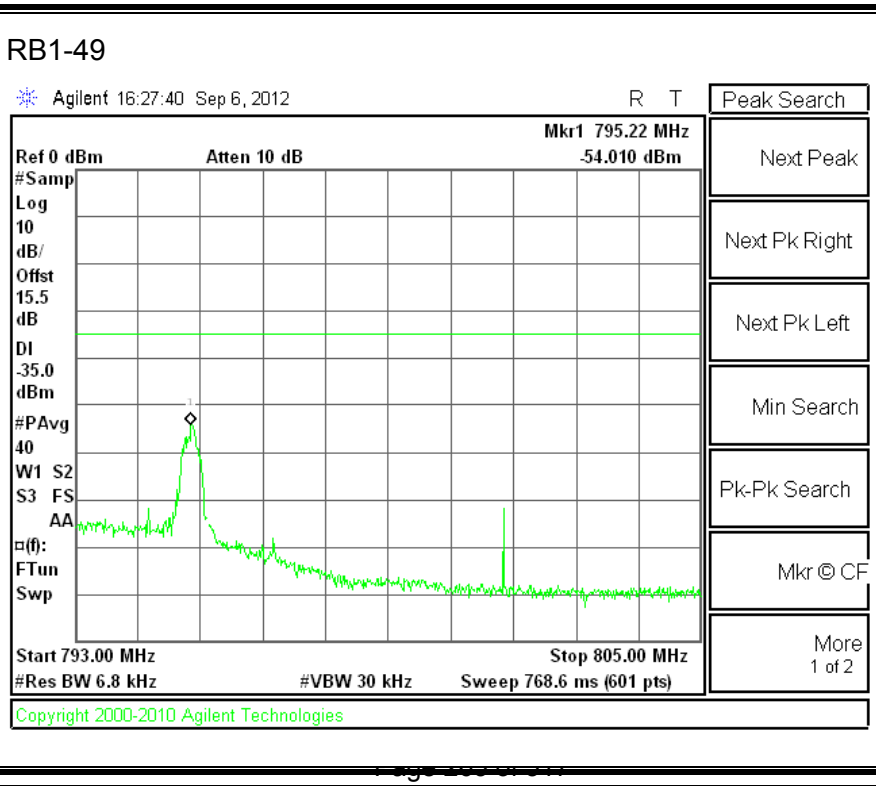


LTE QPSK Band 13, 793 - 805MHz (10MHz Bandwidth)

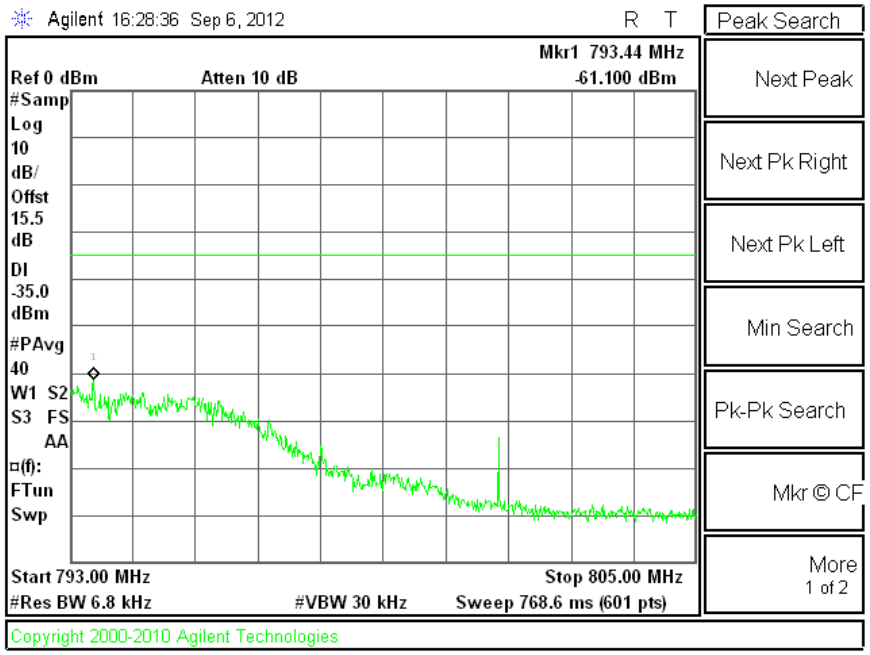
RB1-0



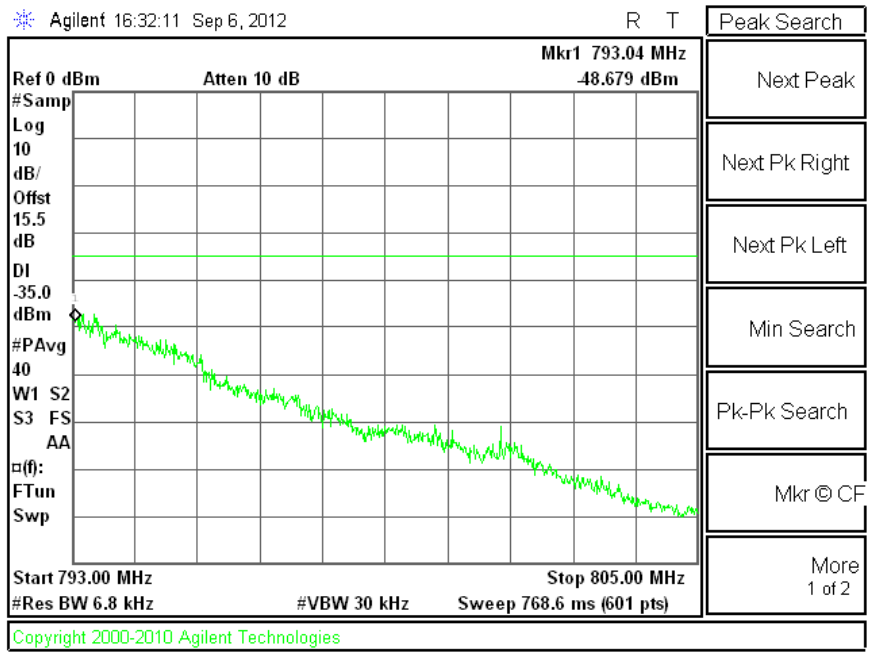
RB1-49



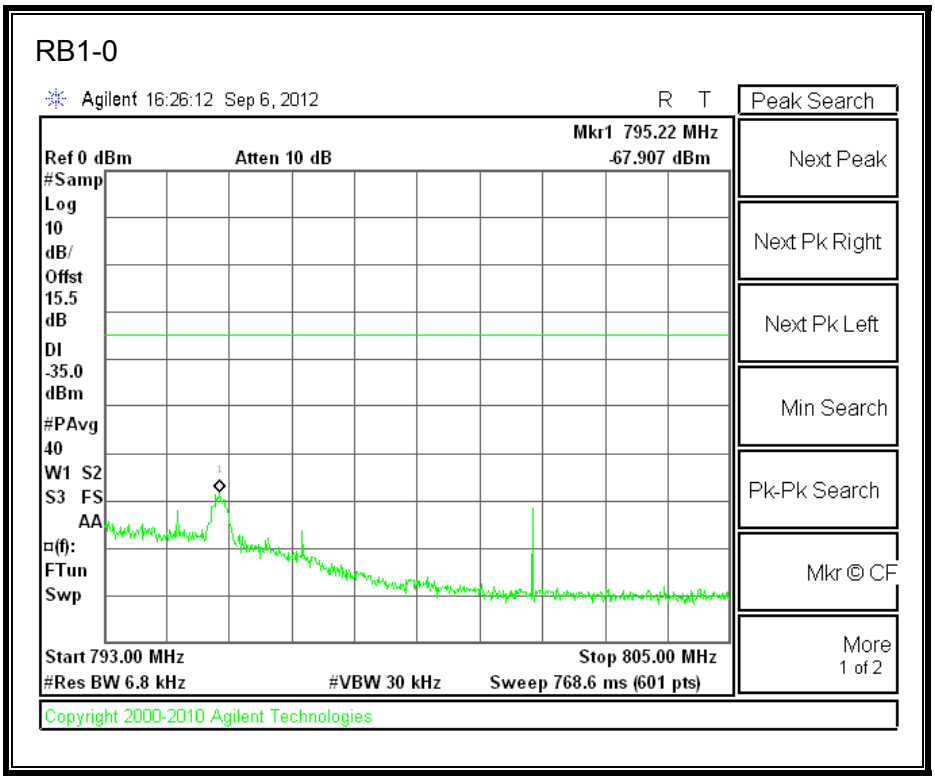
RB25-12

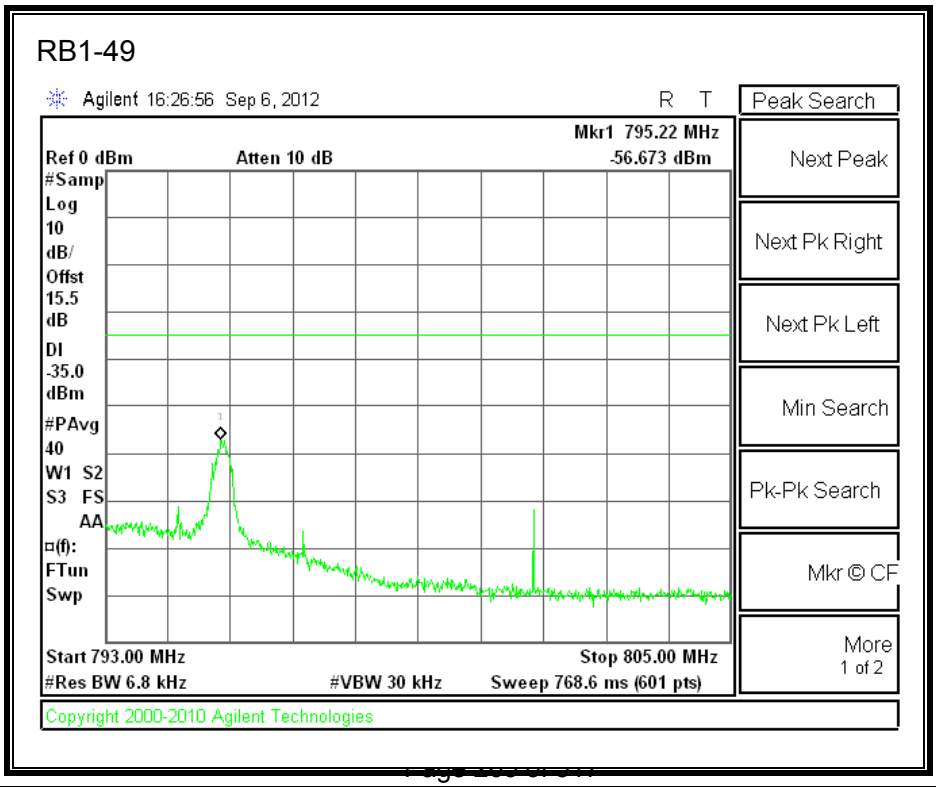


RB50-0

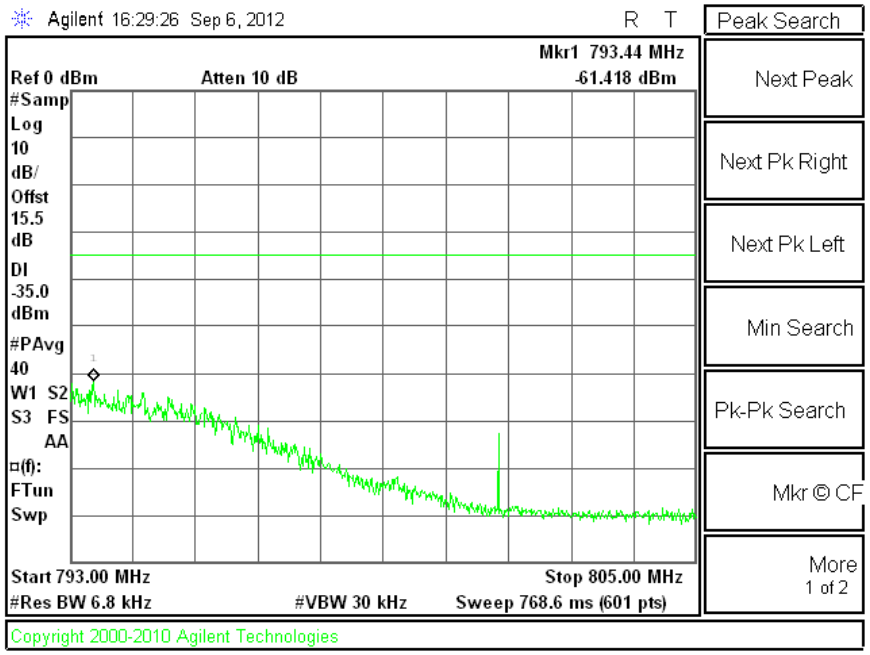


LTE 16QAM Band 13, 793 - 805MHz (10MHz Bandwidth)

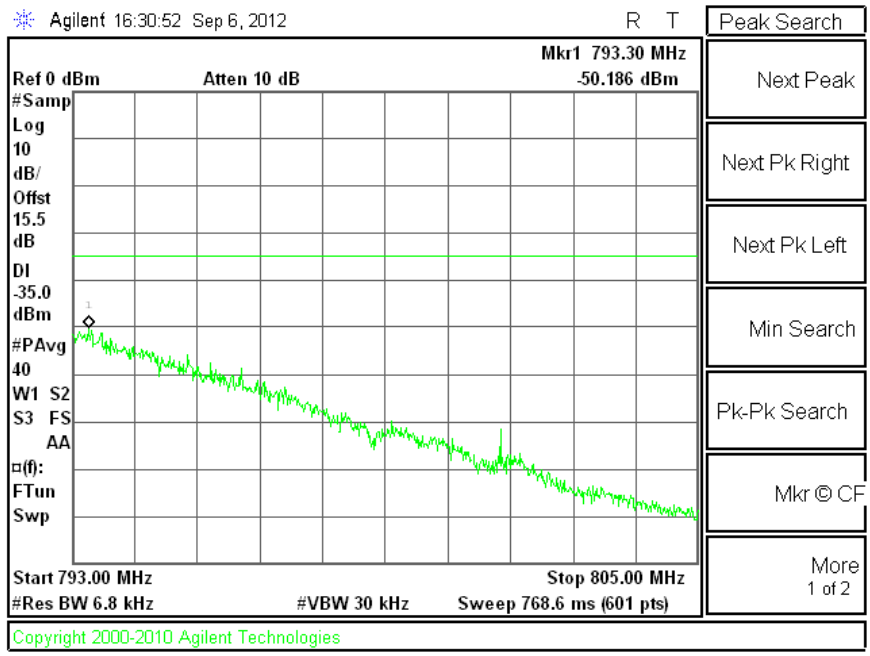




RB25-12

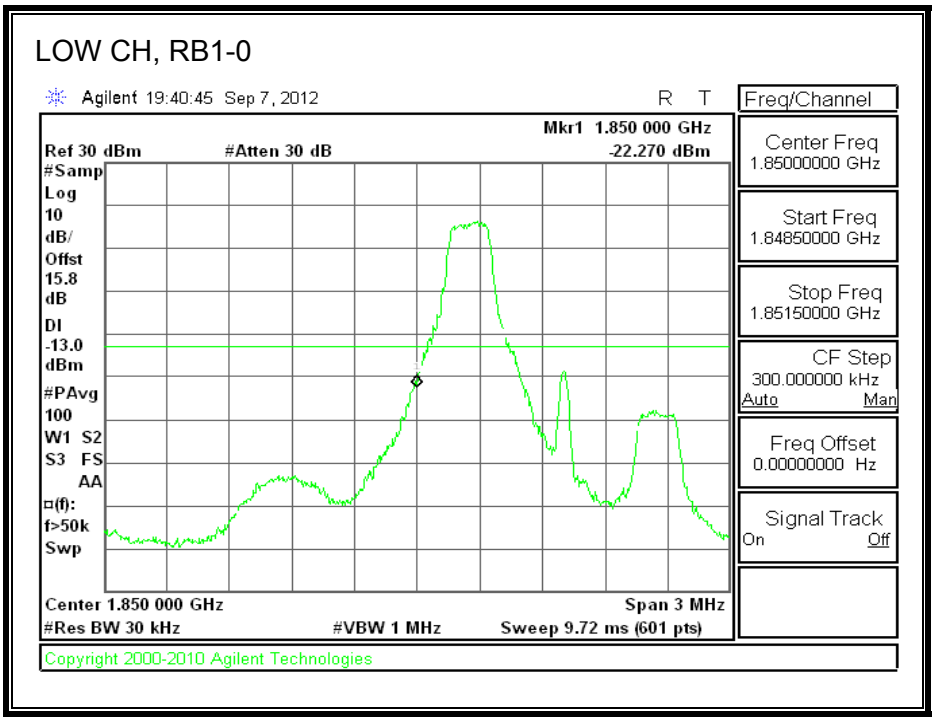


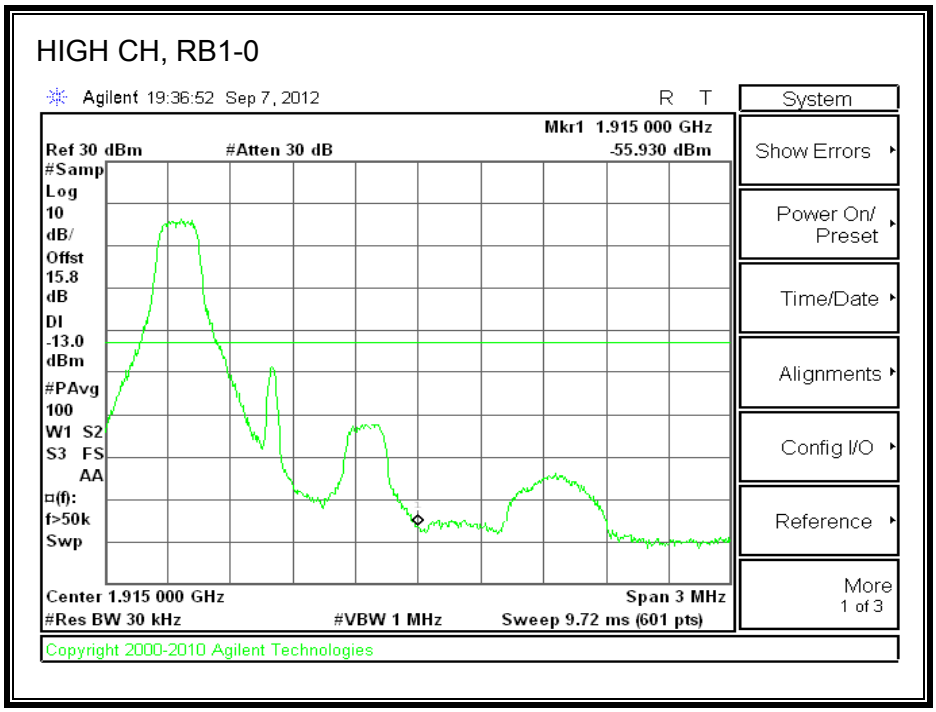
RB50-0



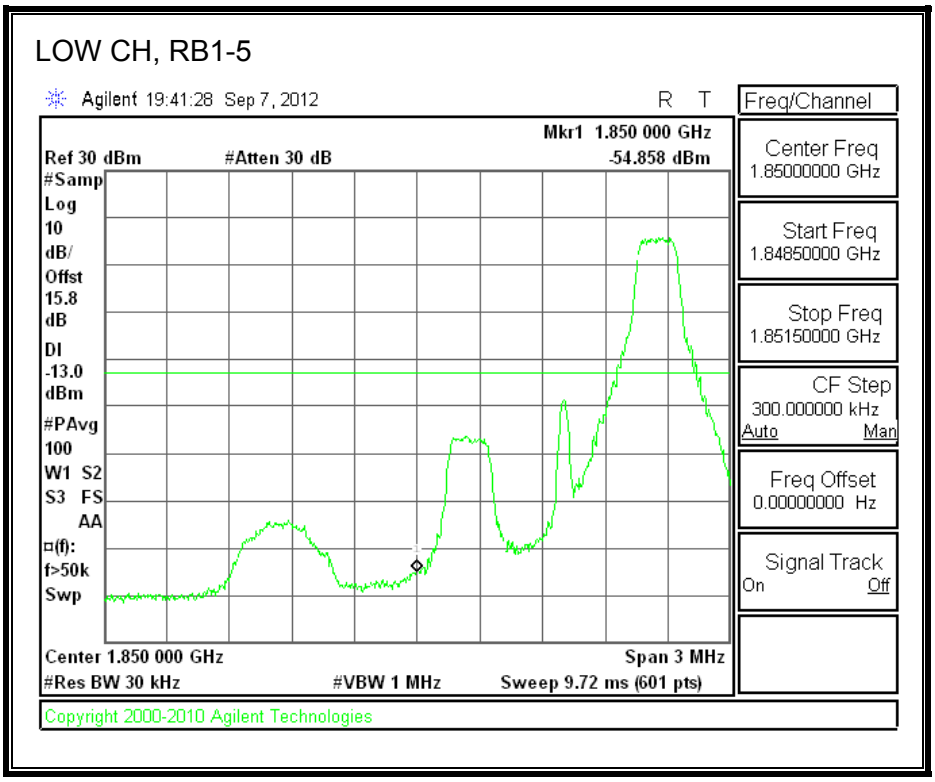
8.2.7. LTE BAND 25

QPSK Band 25 (1.4 MHz BAND WIDTH)

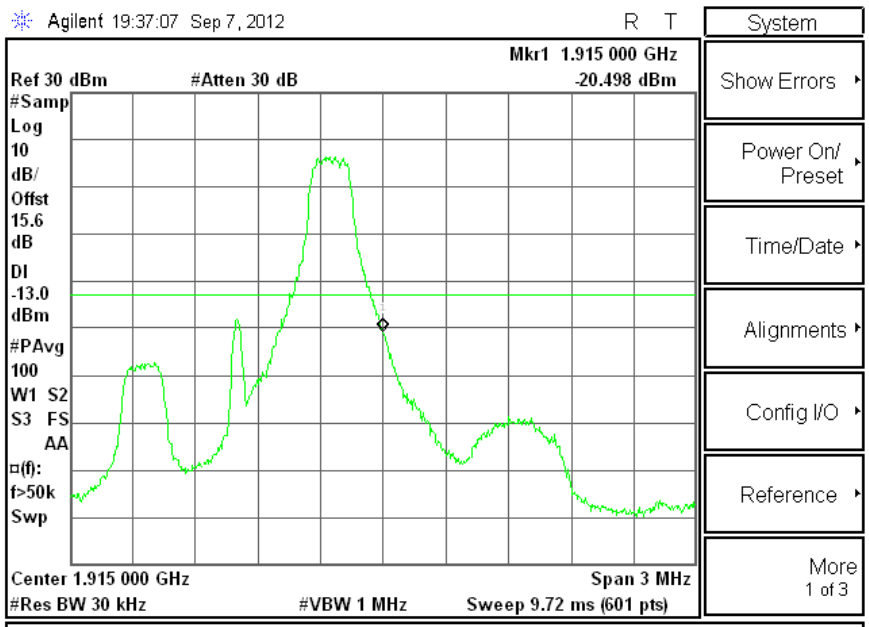




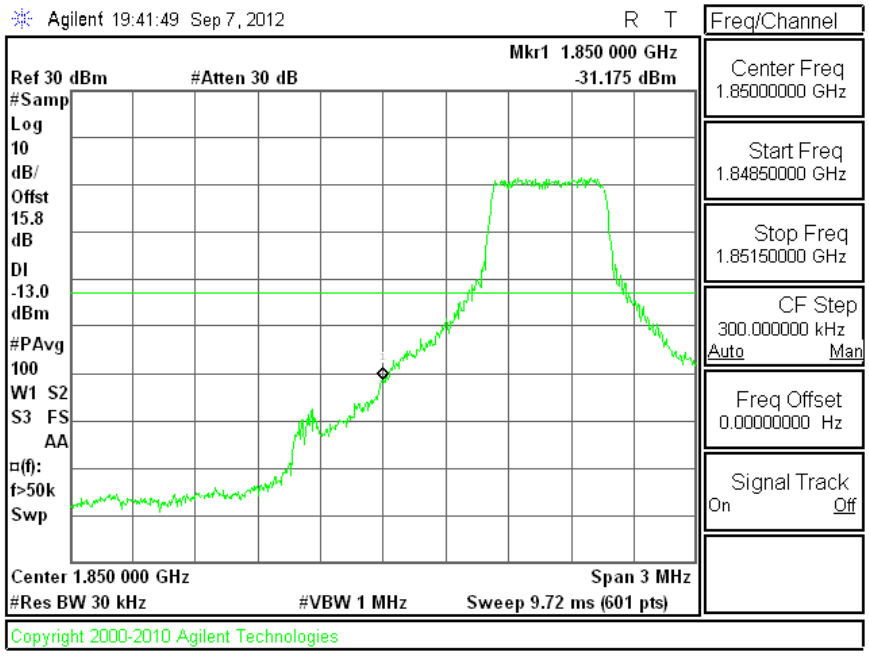
LOW CH, RB1-5



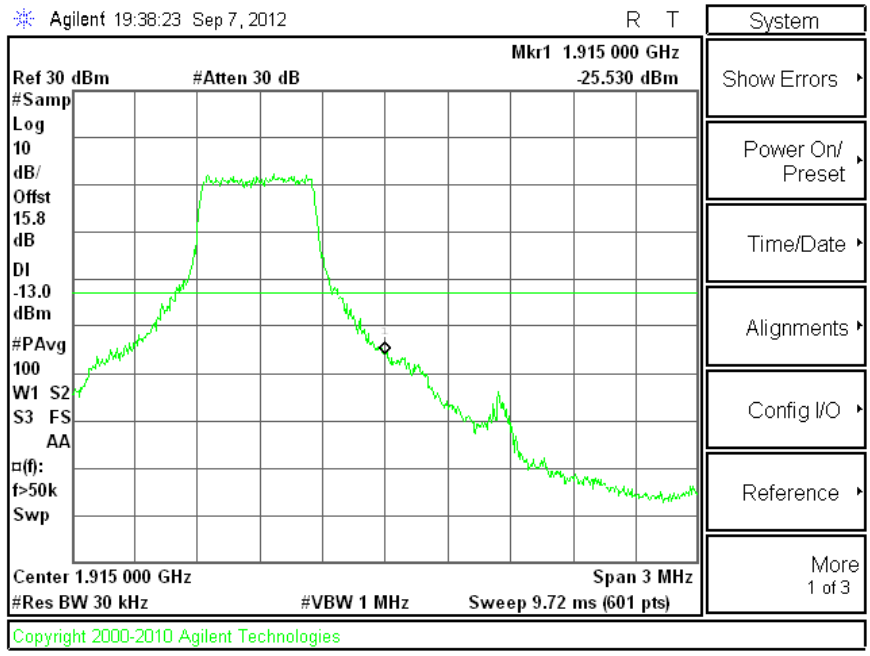
HIGH CH, RB1-5



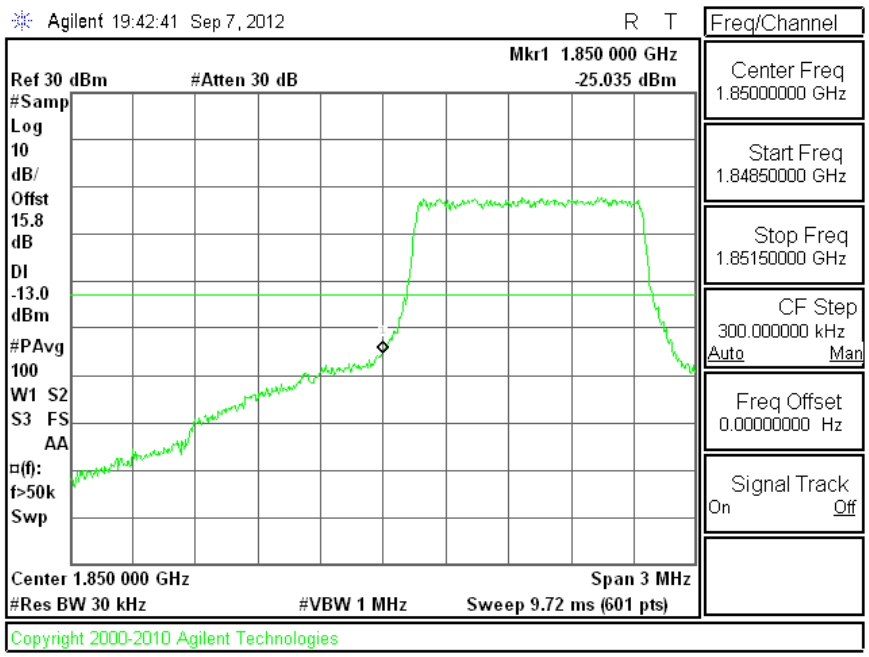
LOW CH, RB3-2



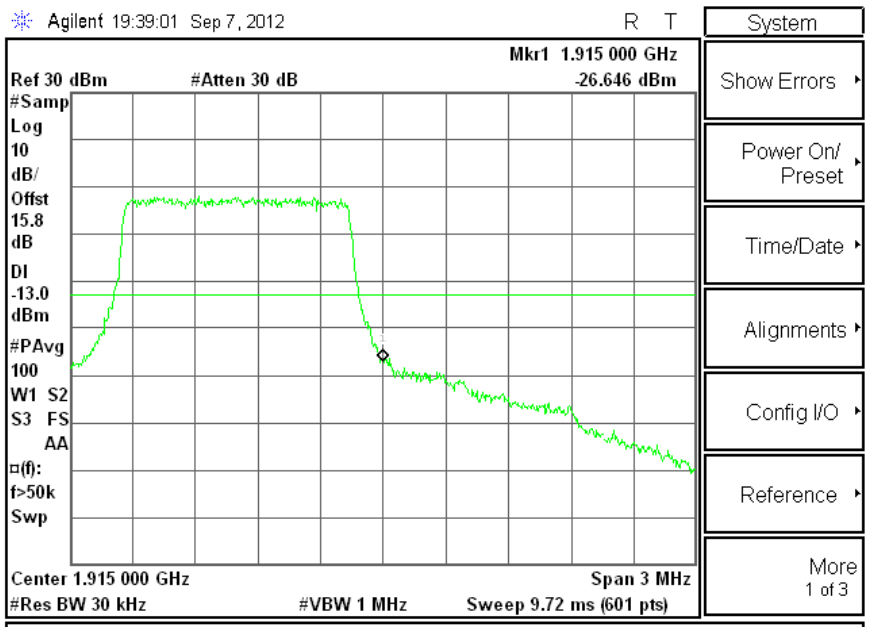
HIGH CH, RB3-2



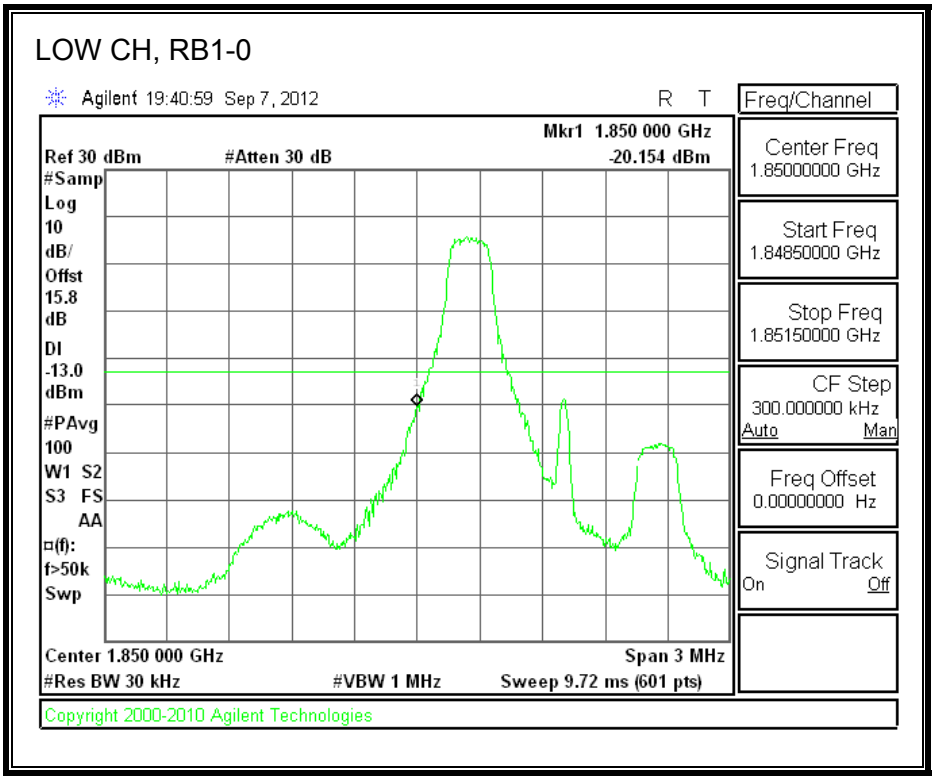
LOW CH, RB6-0

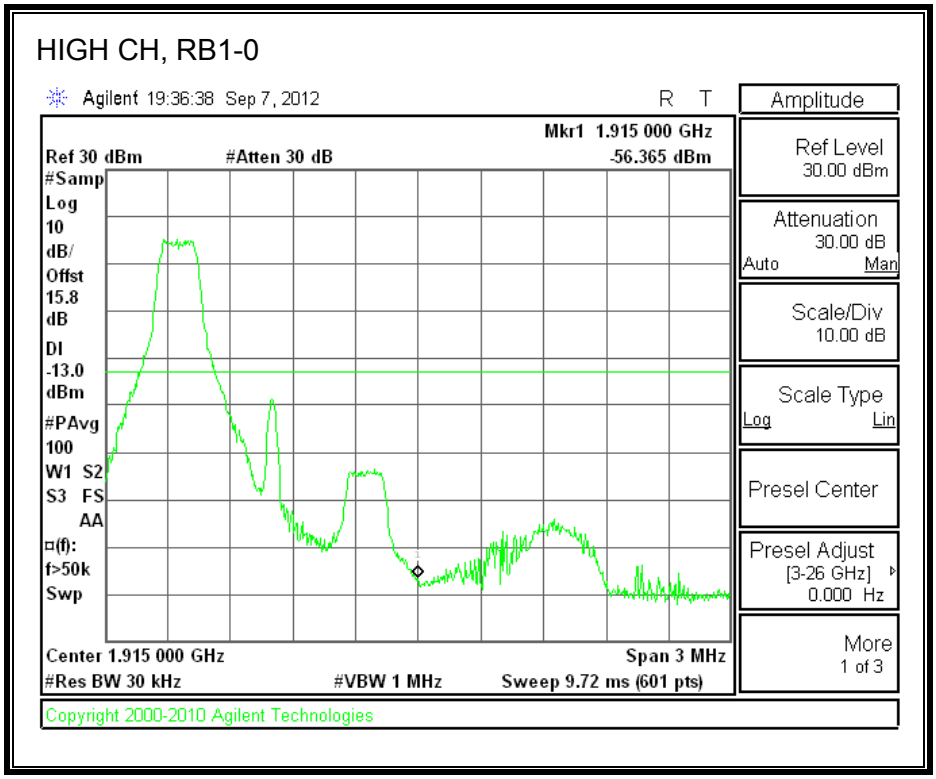


HIGH CH, RB6-0

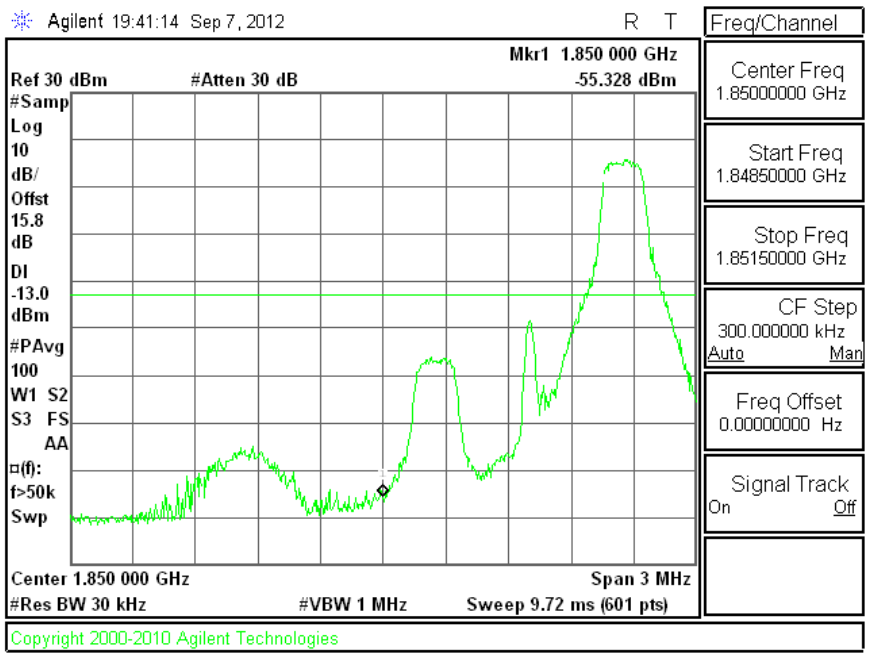


16QAM Band 25 (1.4 MHz BAND WIDTH)

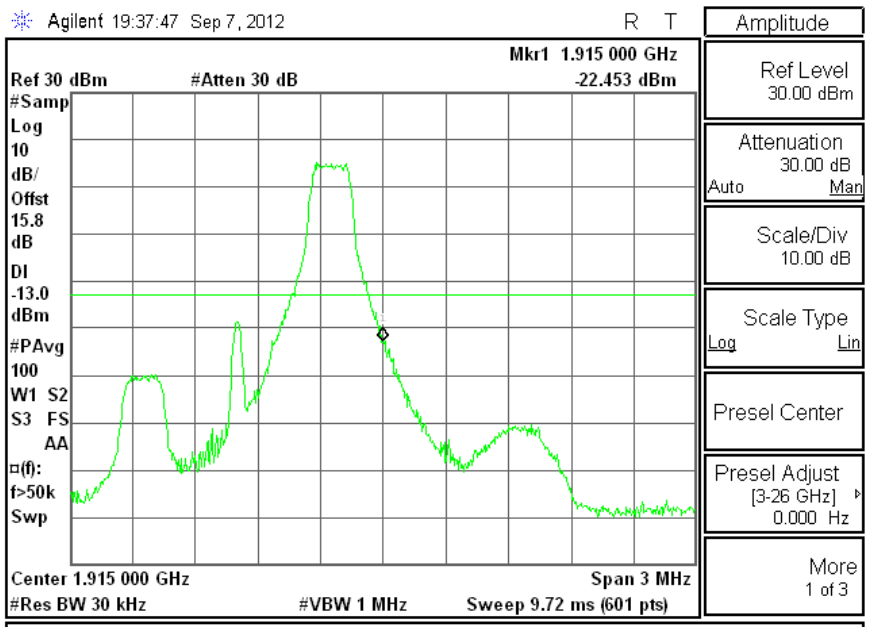




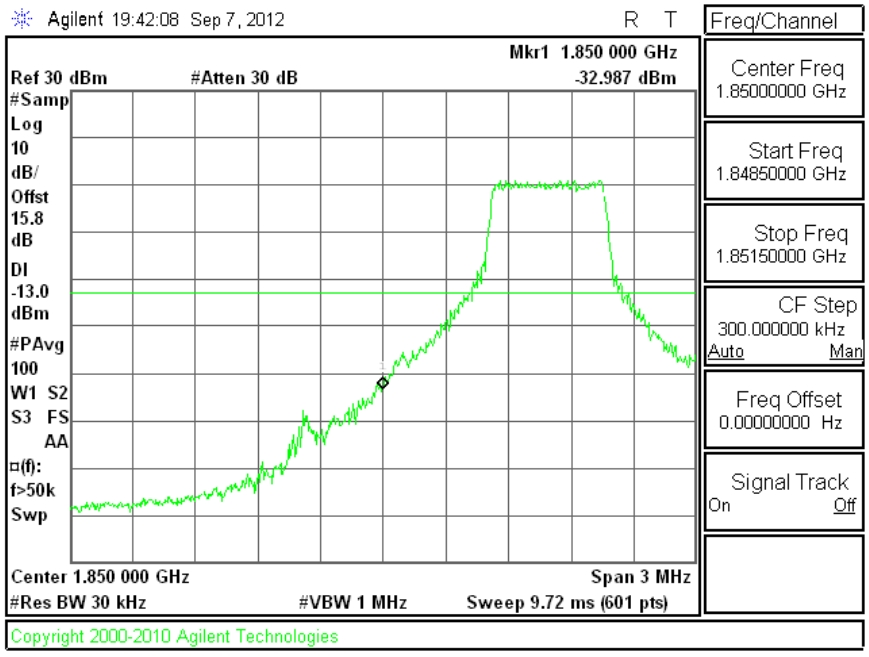
LOW CH, RB1-5



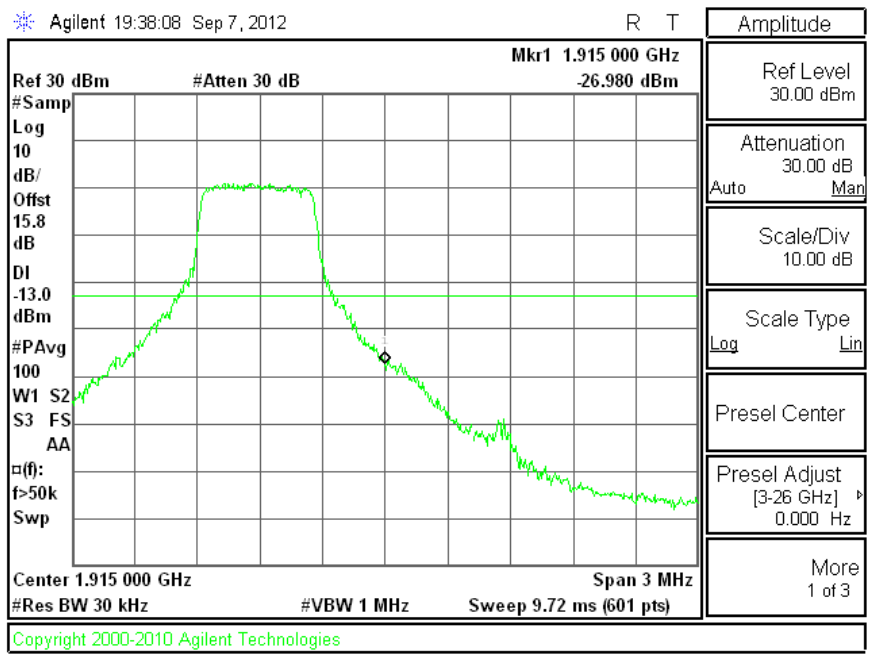
HIGH CH, RB1-5



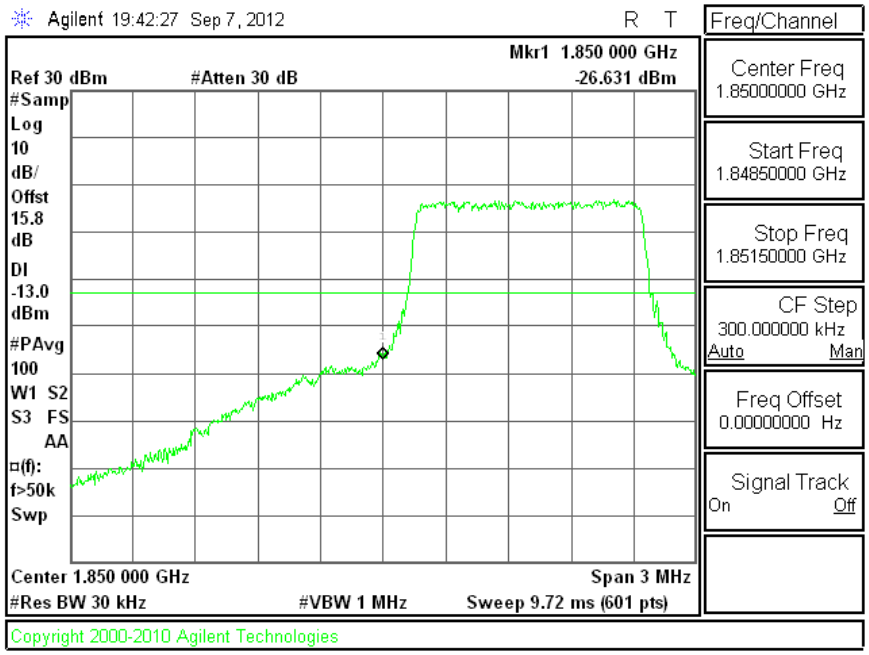
LOW CH, RB3-2



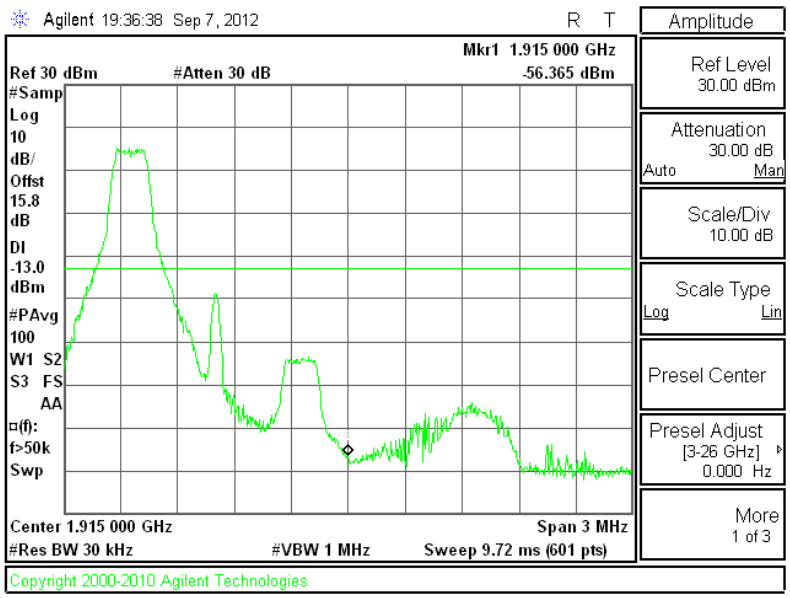
HIGH CH, RB3-2



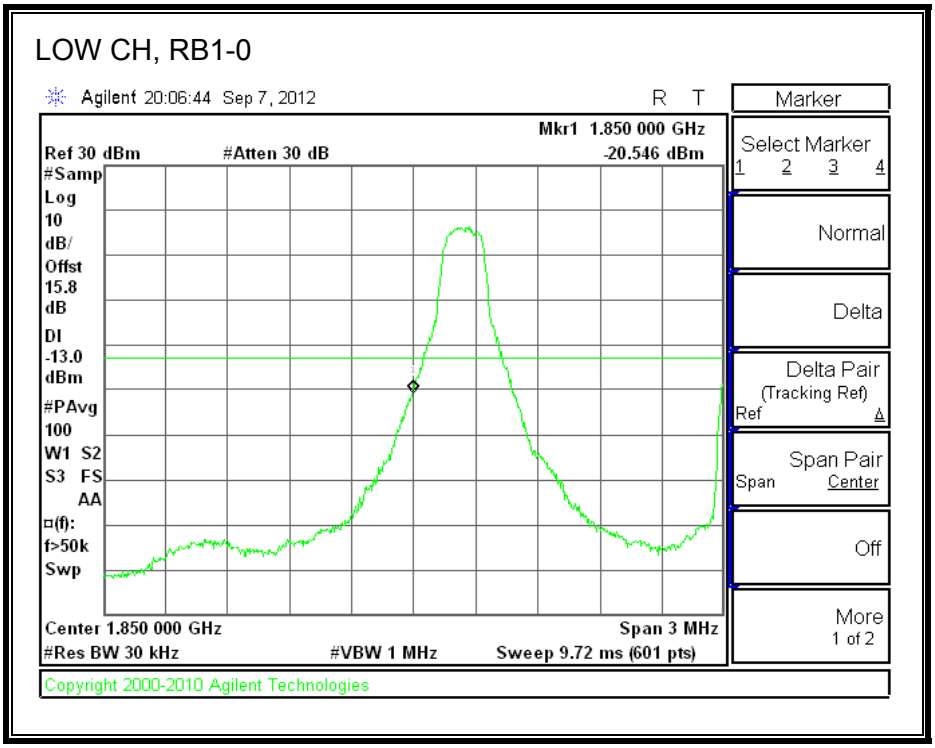
LOW CH, RB6-0

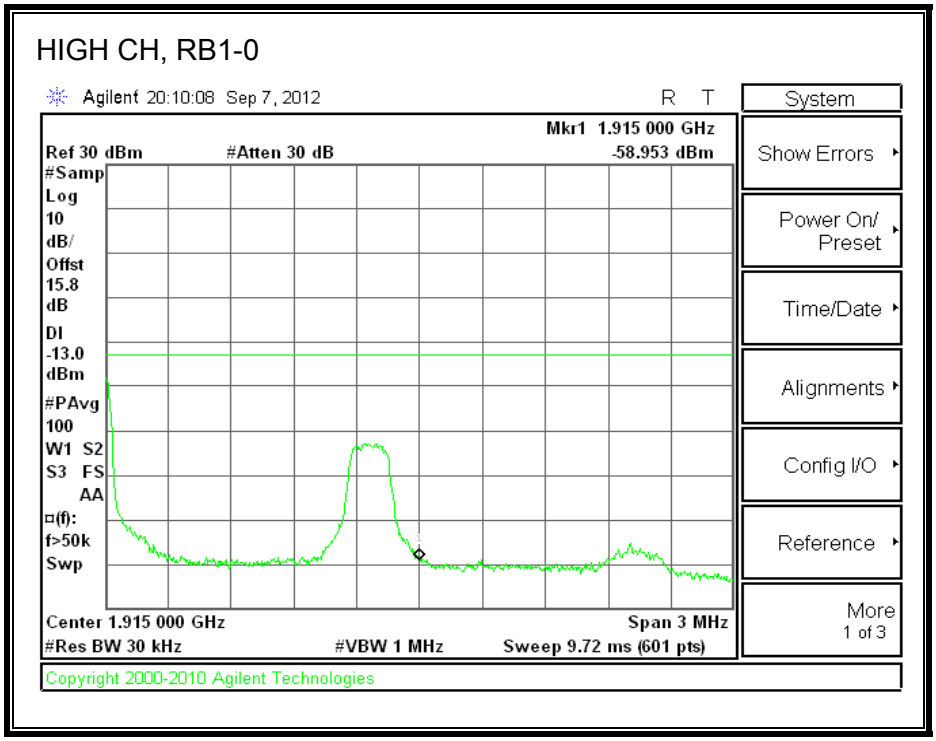


HIGH CH, RB6-0

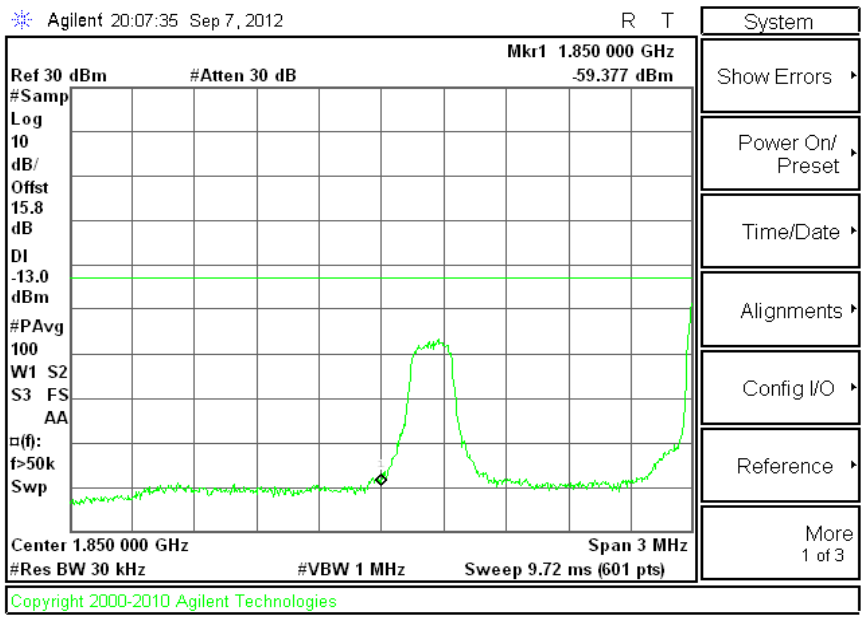


QPSK Band 25 (3.0 MHz BAND WIDTH)

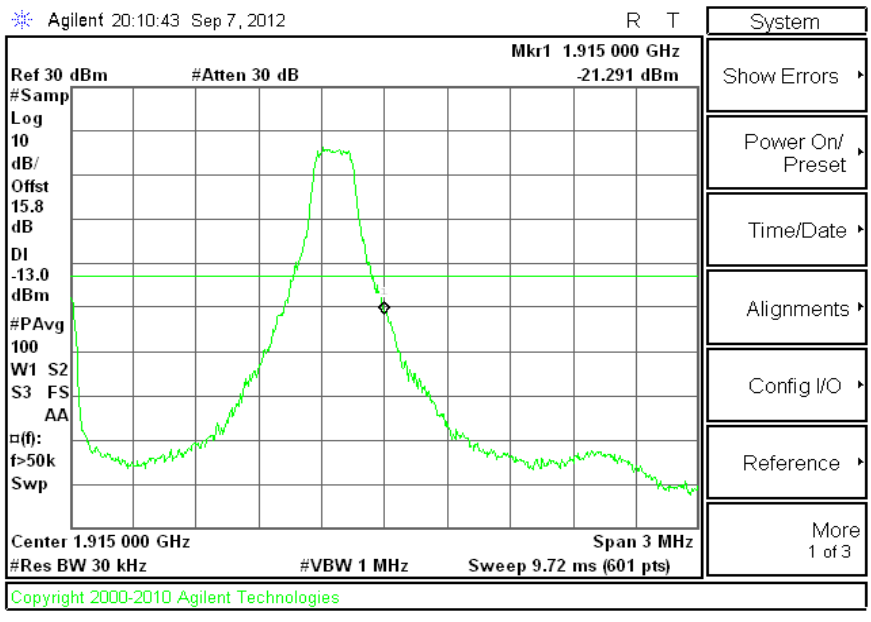




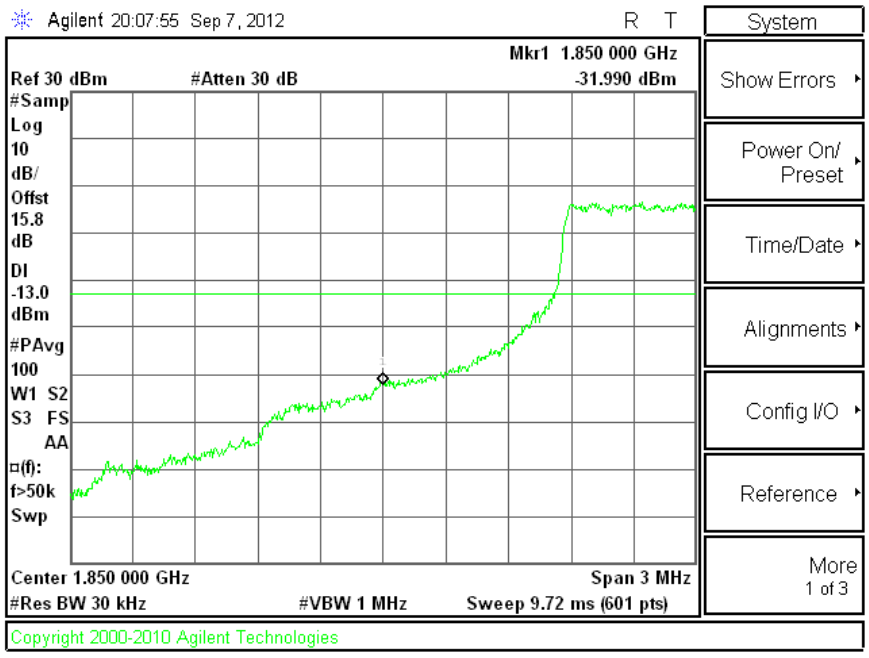
LOW CH, RB1-14



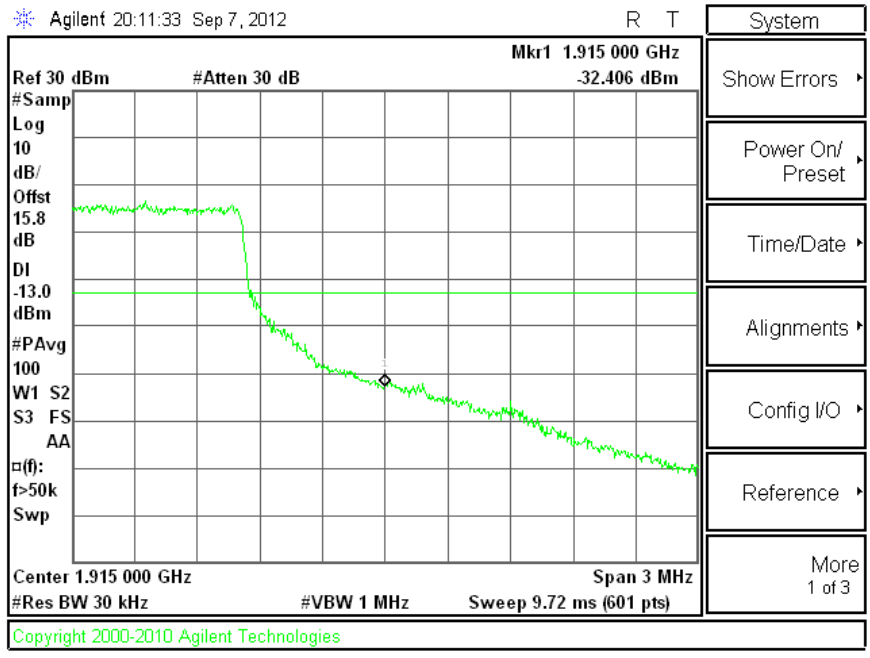
HIGH CH, RB1-14



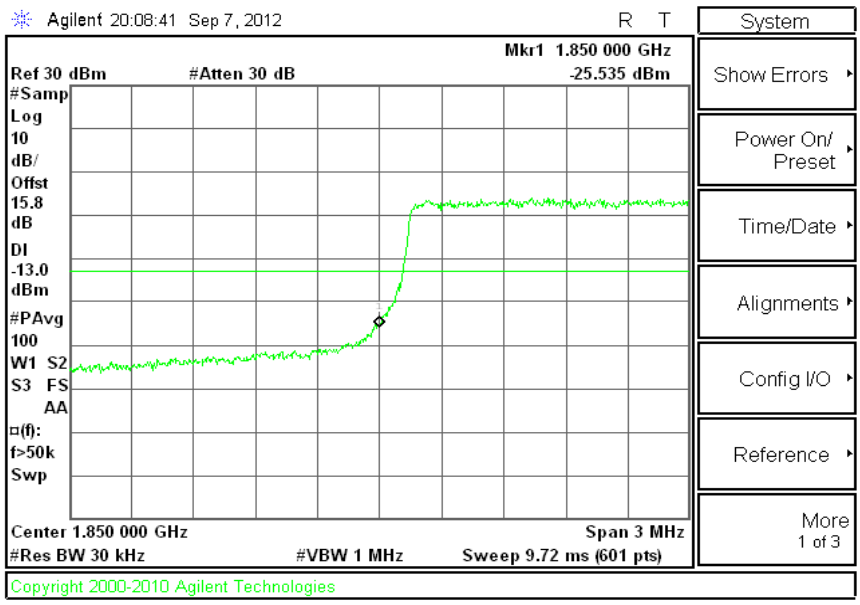
LOW CH, RB8-4



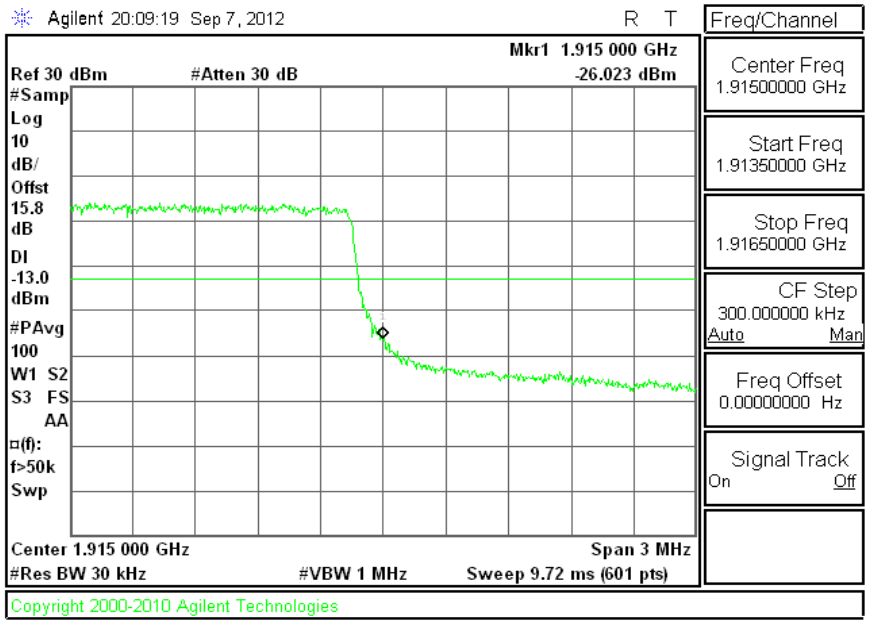
HIGH CH, RB8-4



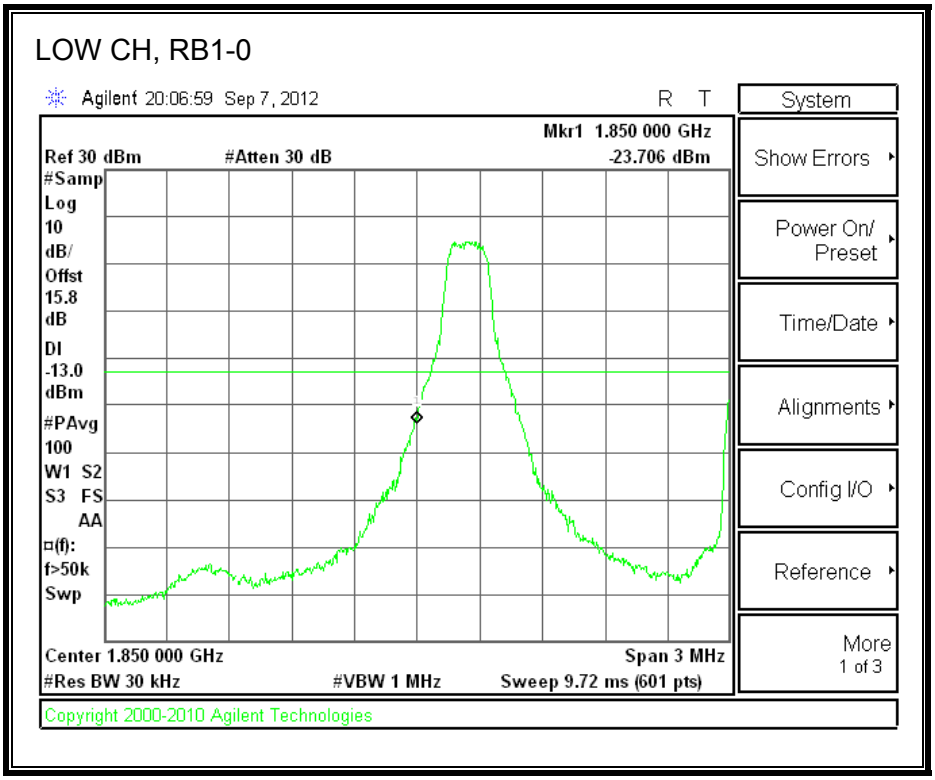
LOW CH, RB15-0

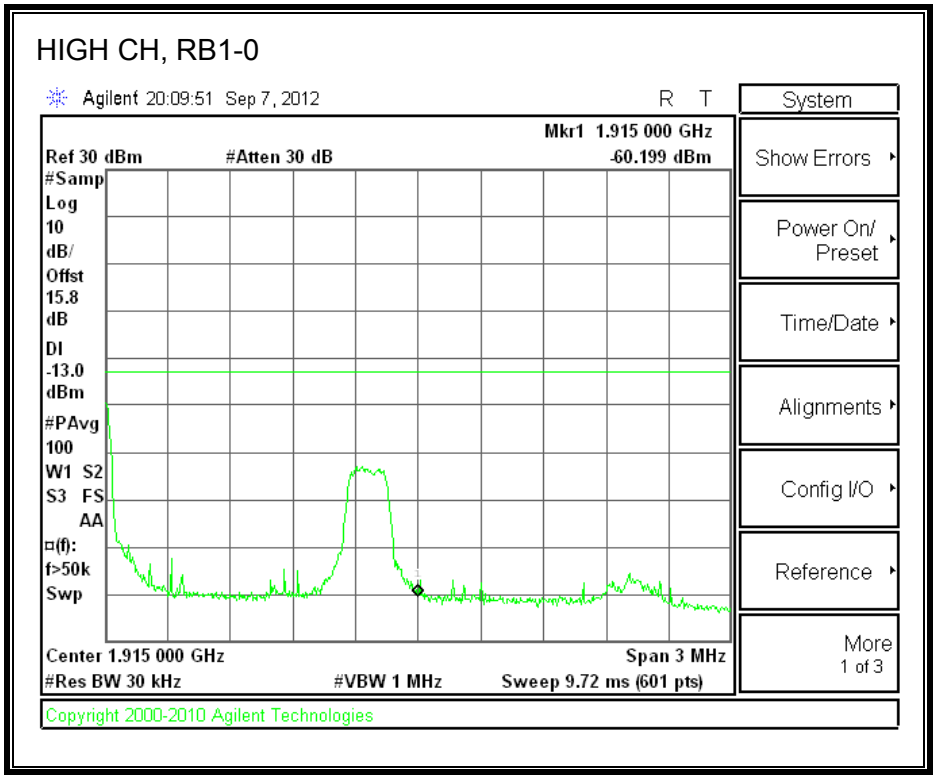


HIGH CH, RB15-0

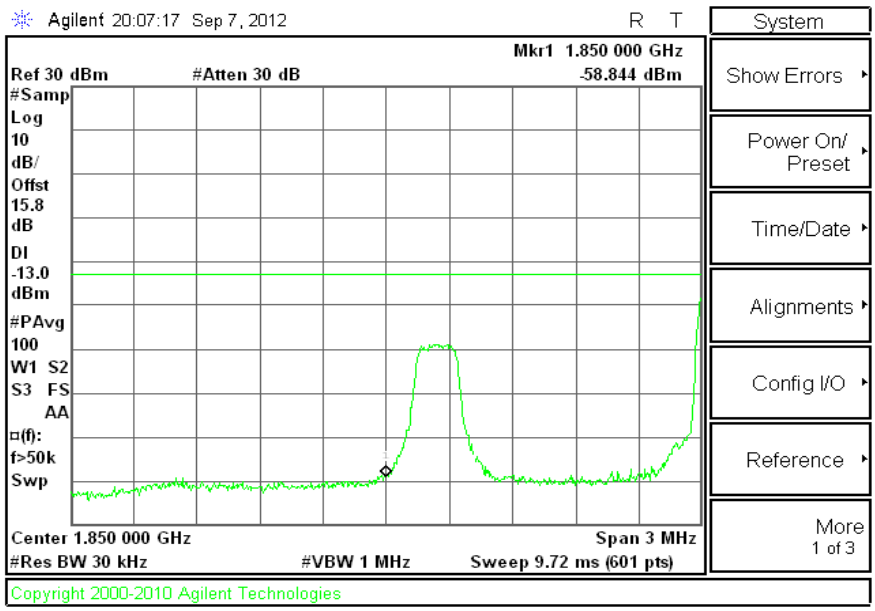


16QAM Band 25 (3.0 MHz BAND WIDTH)

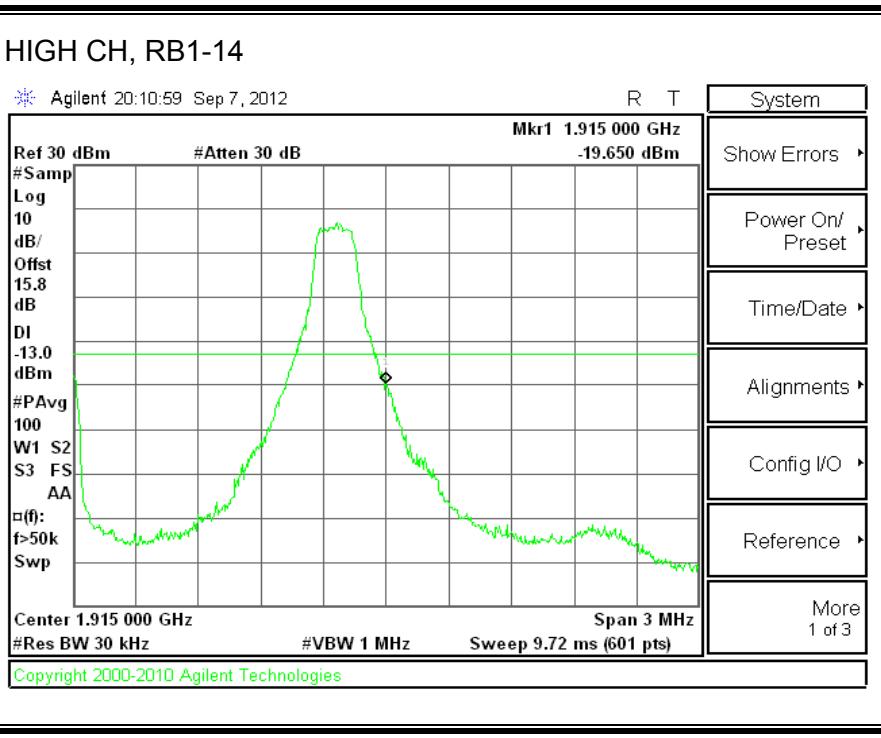




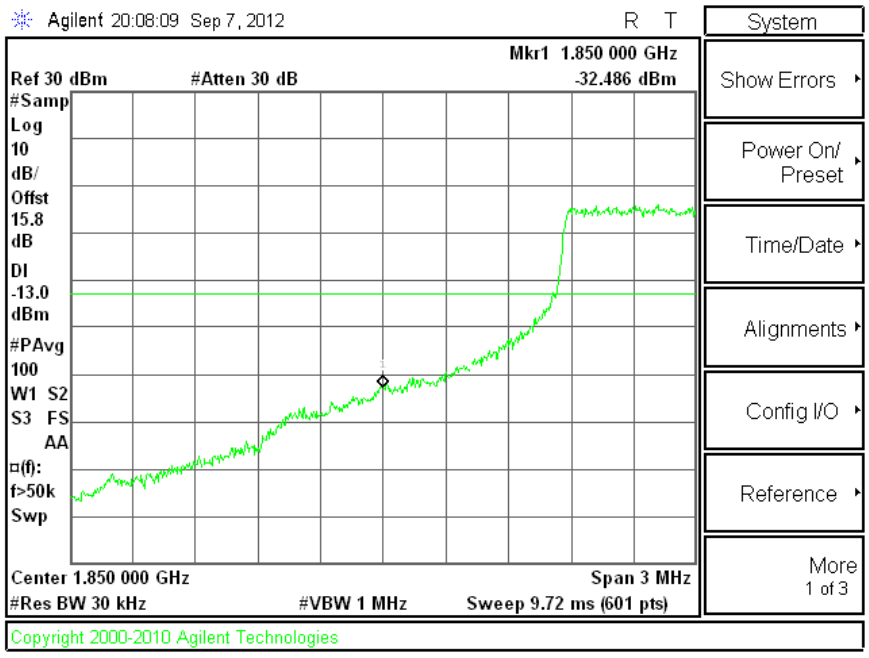
LOW CH, RB1-14



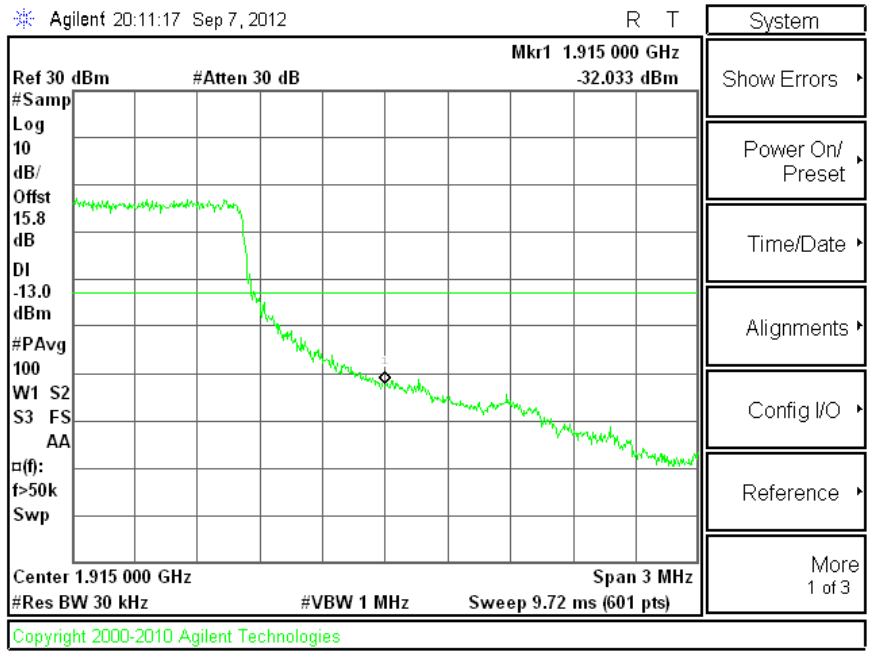
HIGH CH, RB1-14



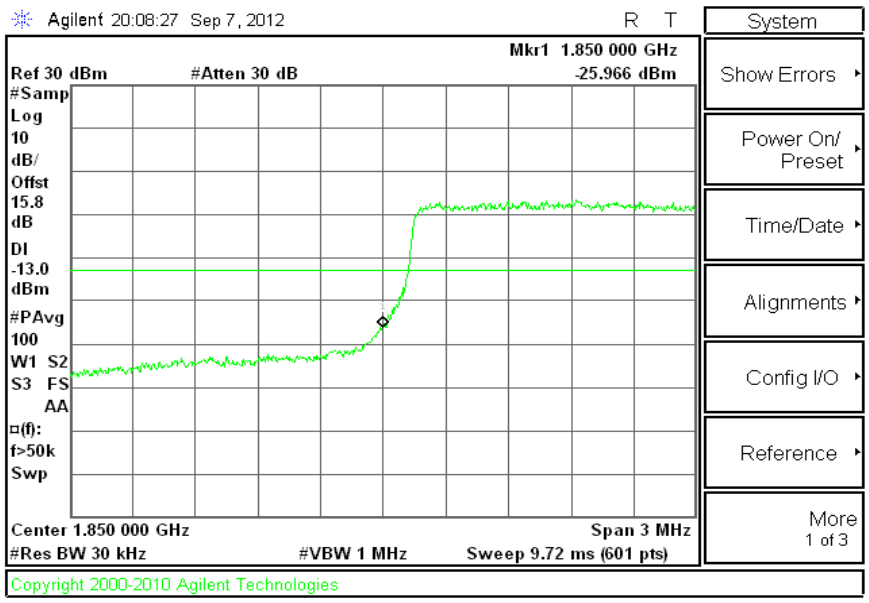
LOW CH, RB8-4



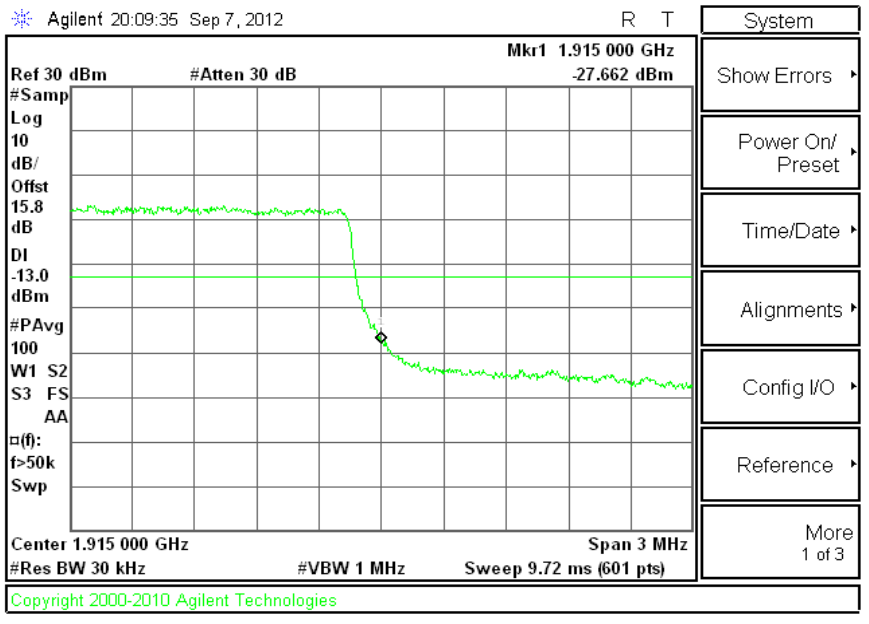
HIGH CH, RB8-4



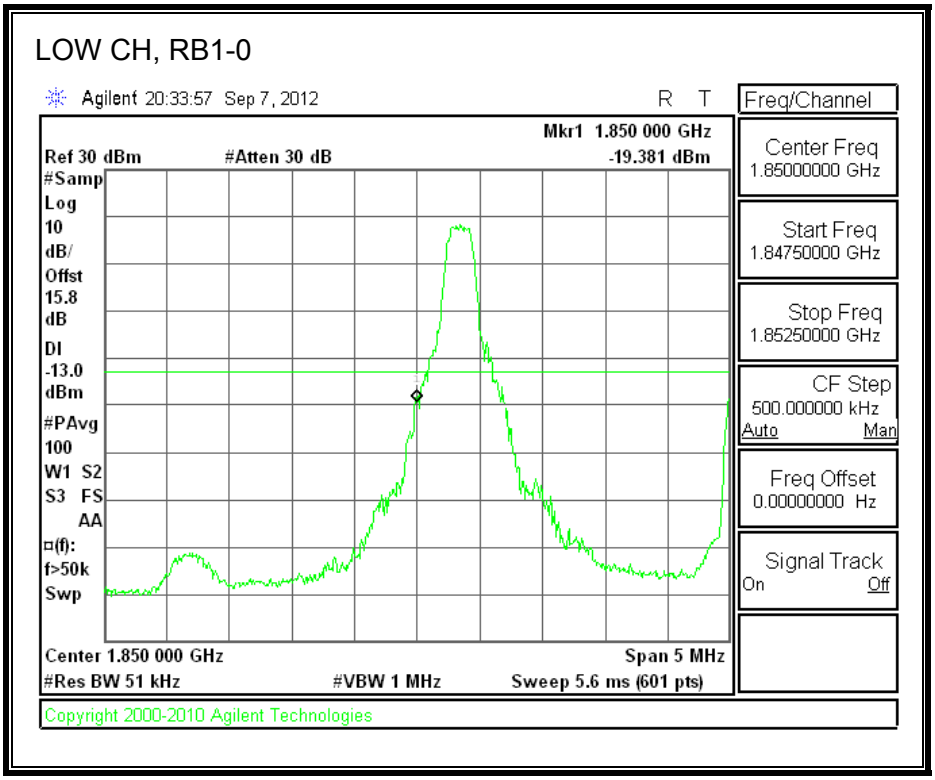
LOW CH, RB15-0

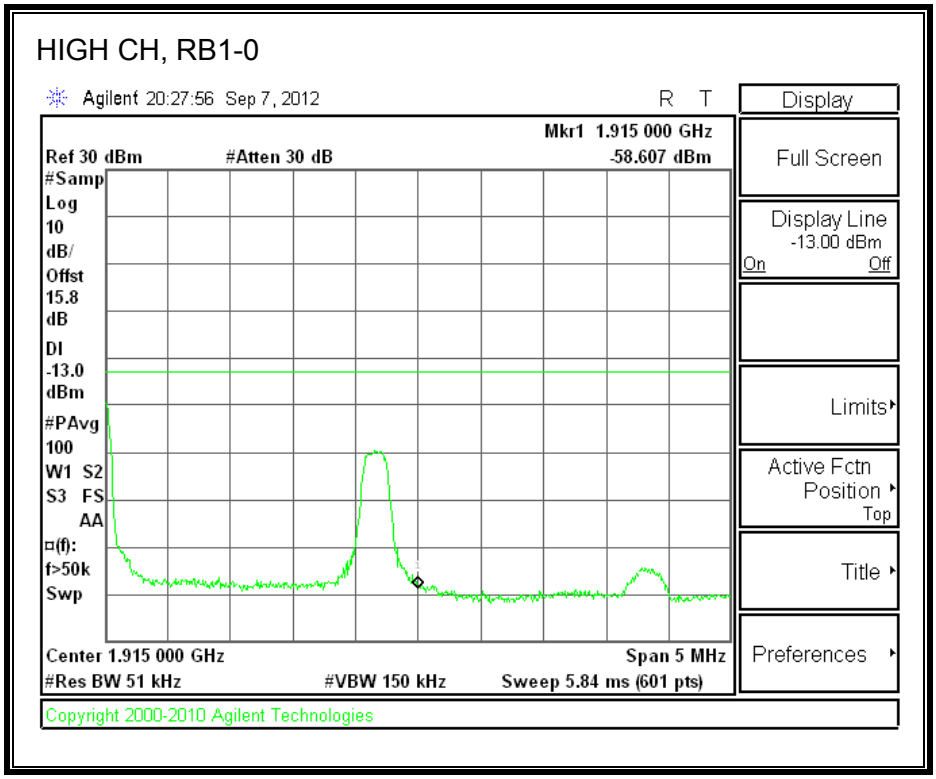


HIGH CH, RB15-0

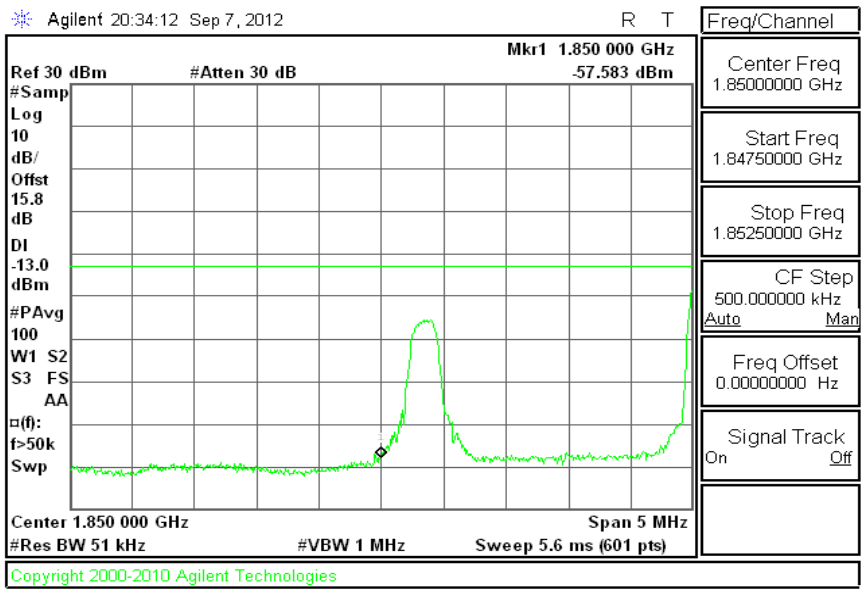


LTE QPSK Band 25 (5.0 MHz BAND WIDTH)

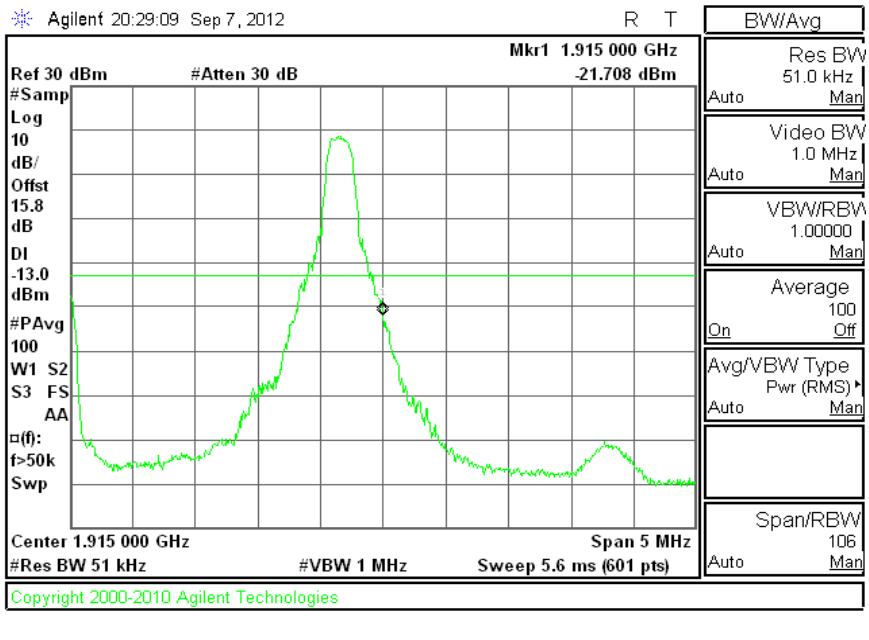




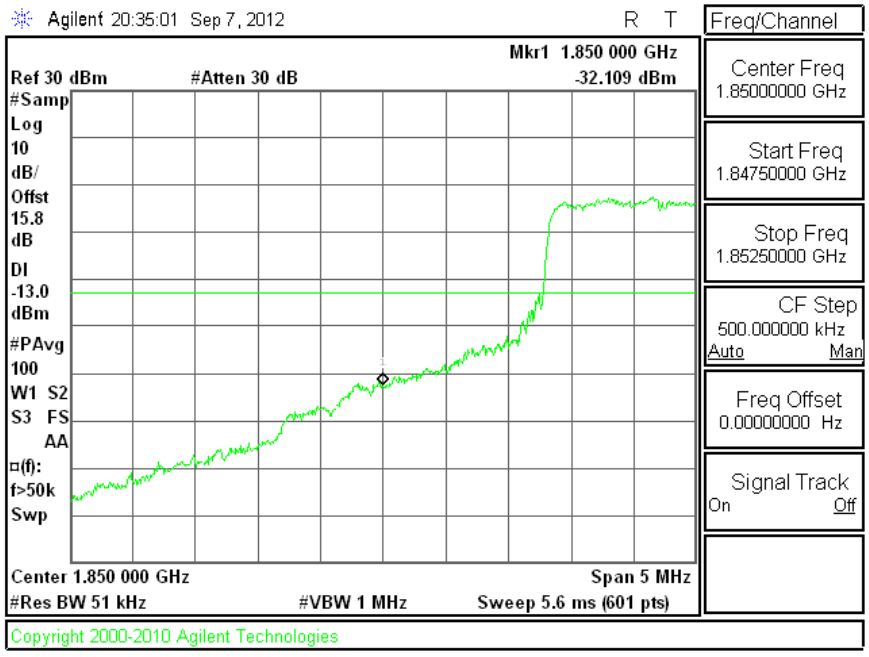
LOW CH, RB1-24



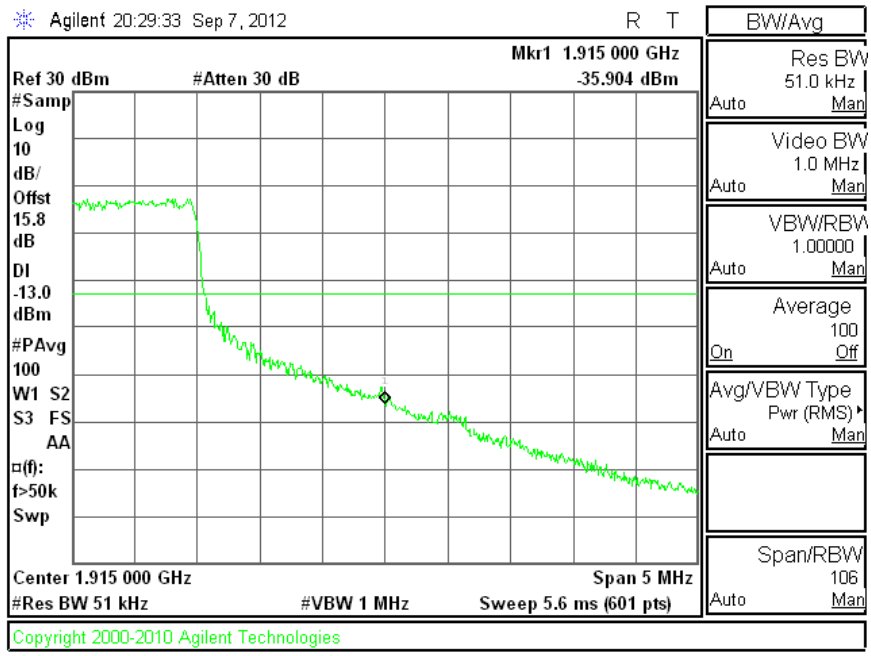
HIGH CH, RB1-24



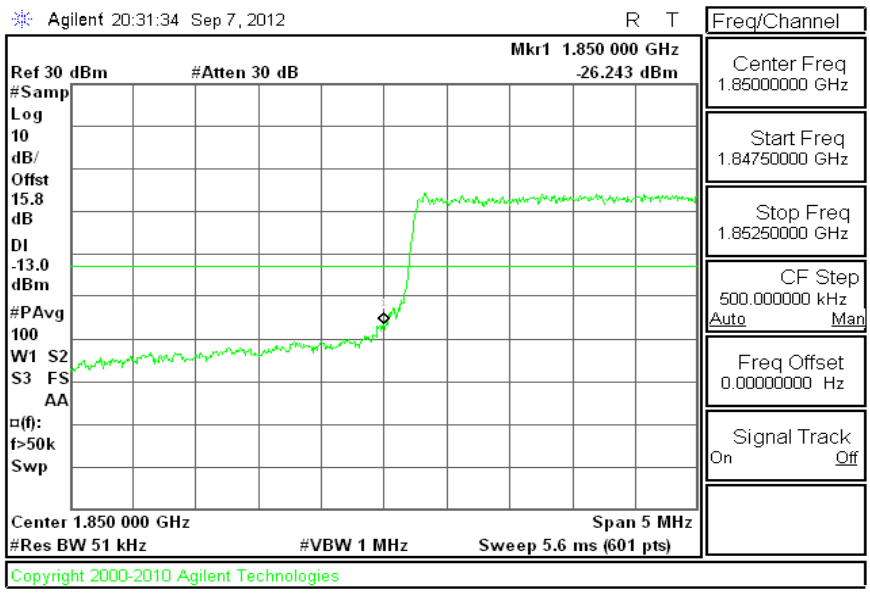
LOW CH, RB12-6



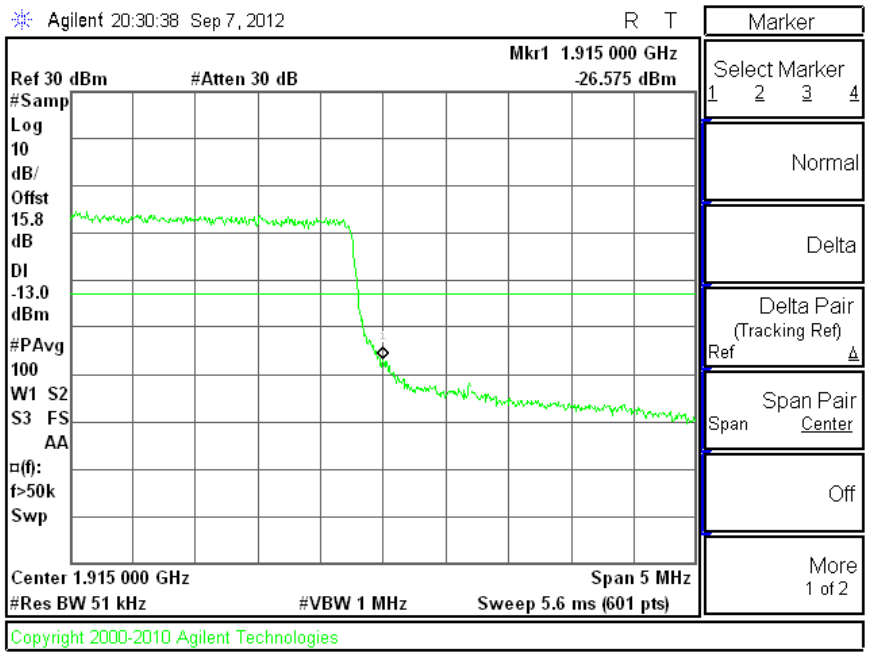
HIGH CH, RB12-6



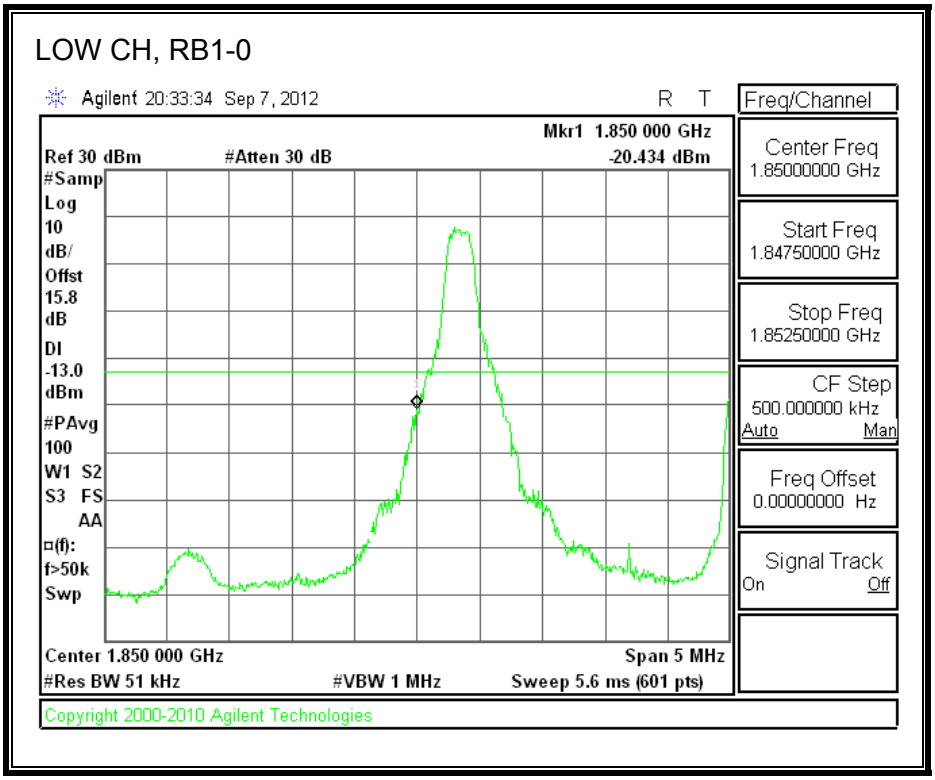
LOW CH, RB25-0

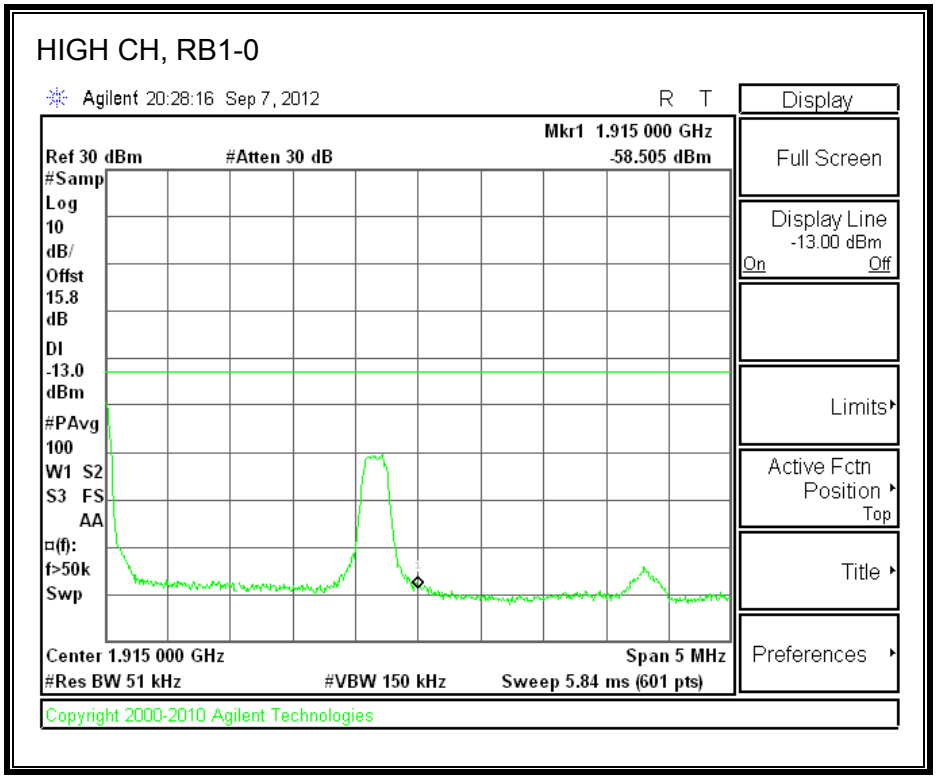


HIGH CH, RB25-0

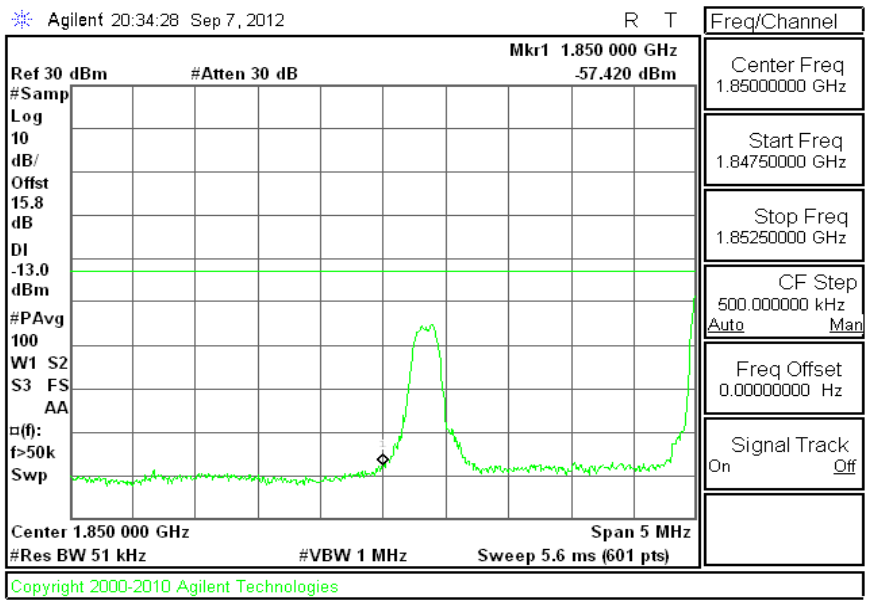


16QAM Band 25 (5.0 MHz BAND WIDTH)

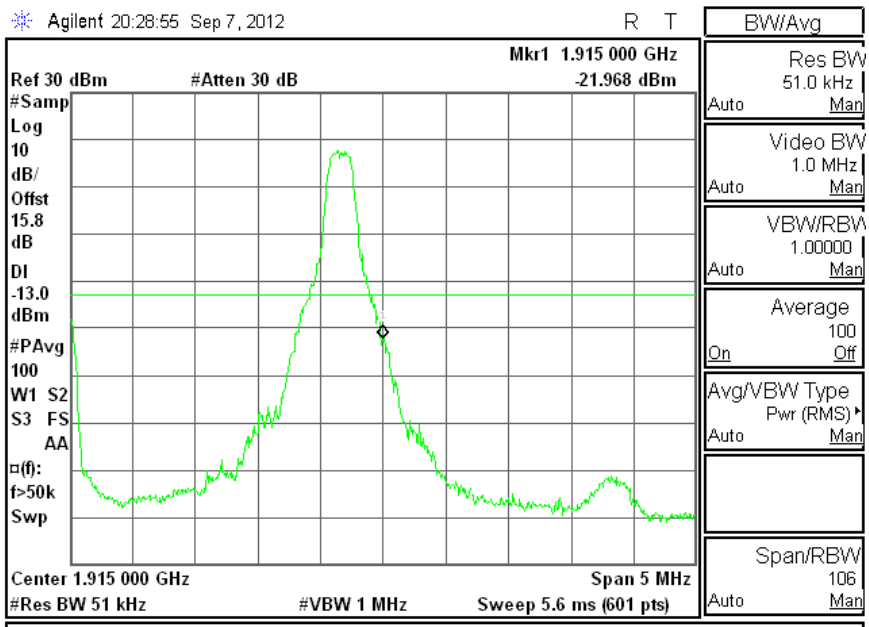




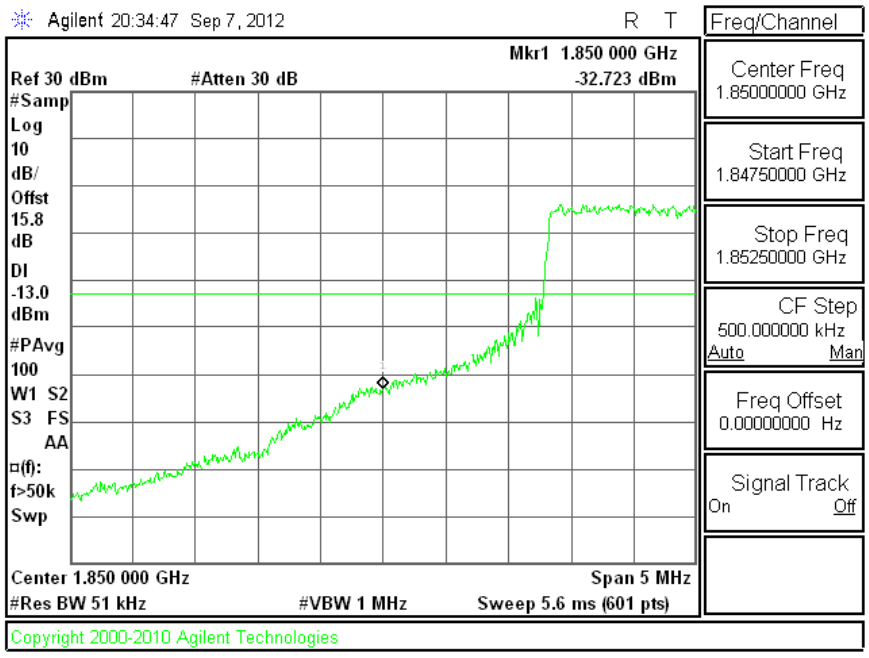
LOW CH, RB1-24



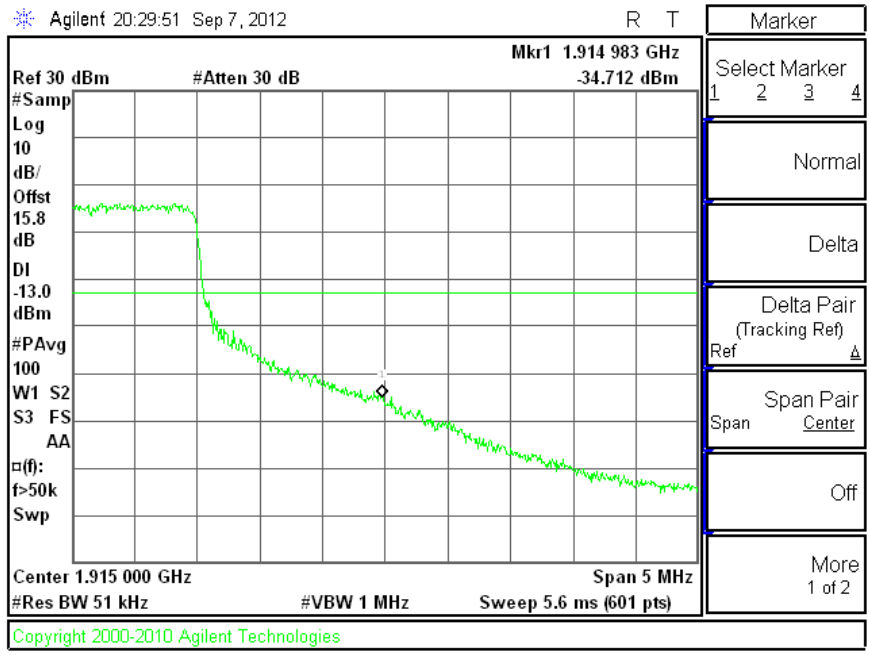
HIGH CH, RB1-24



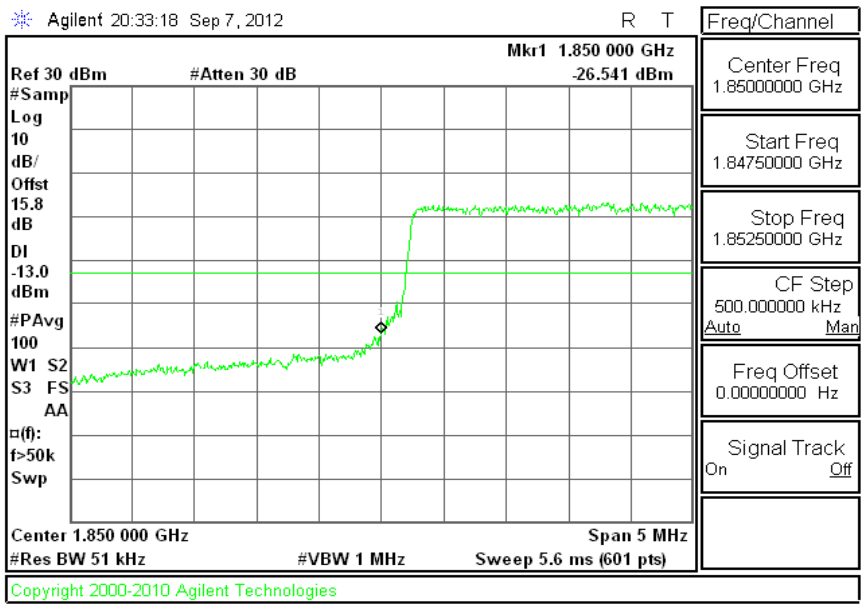
LOW CH, RB12-6



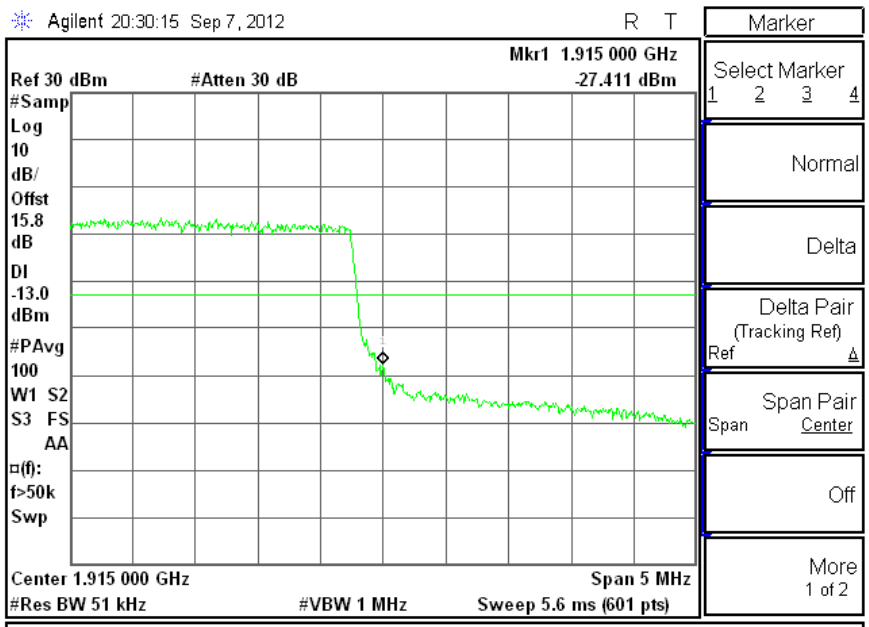
HIGH CH, RB12-6



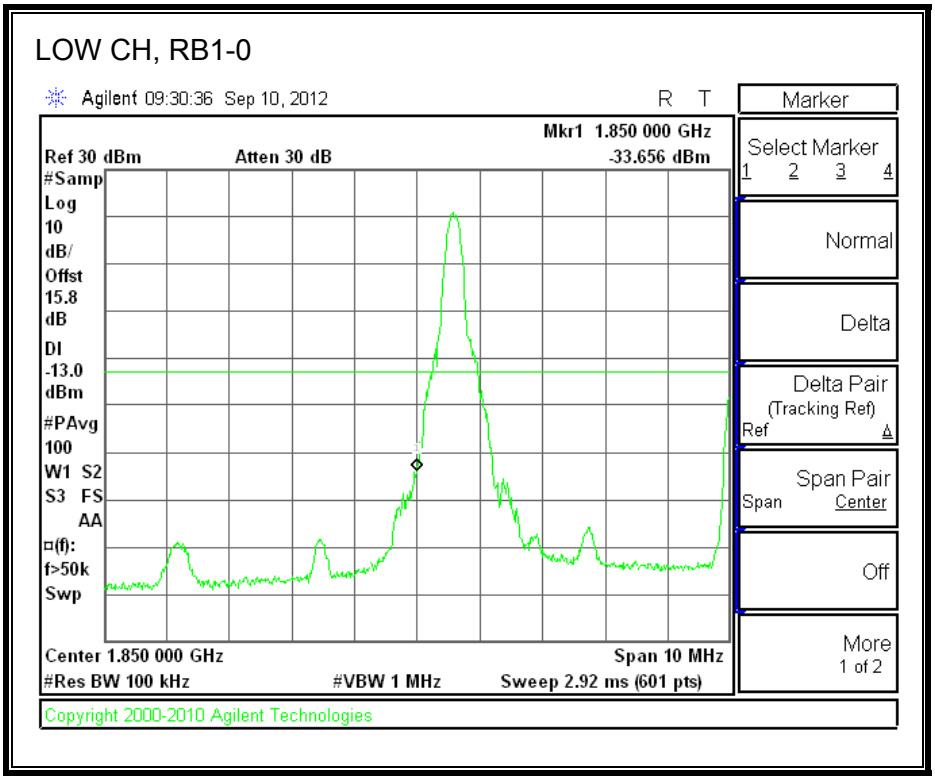
LOW CH, RB25-0

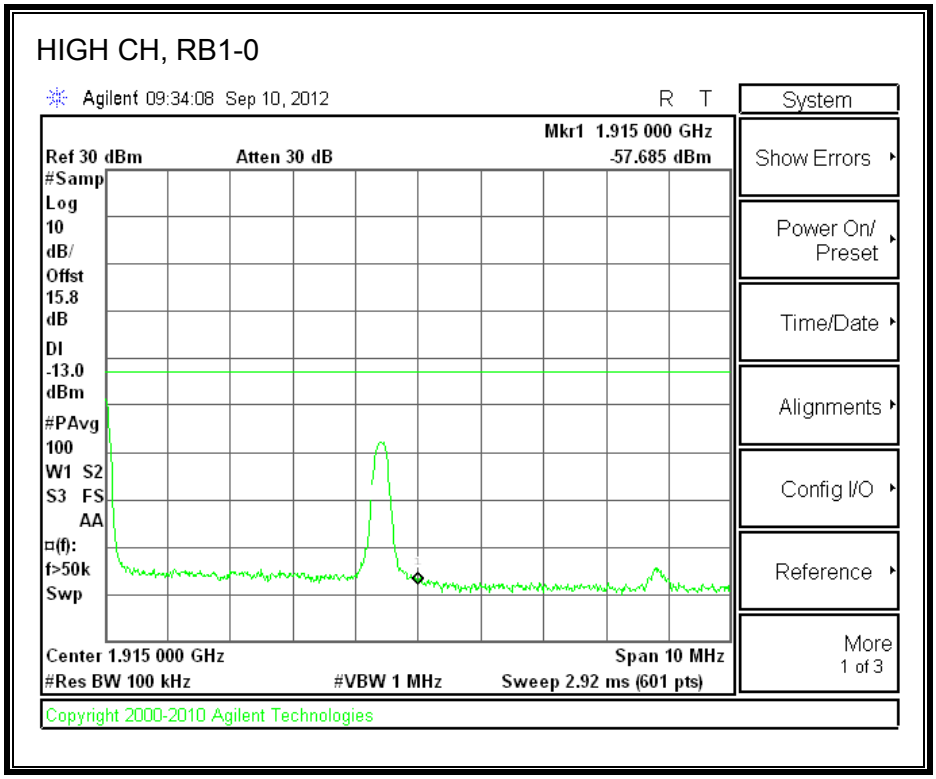


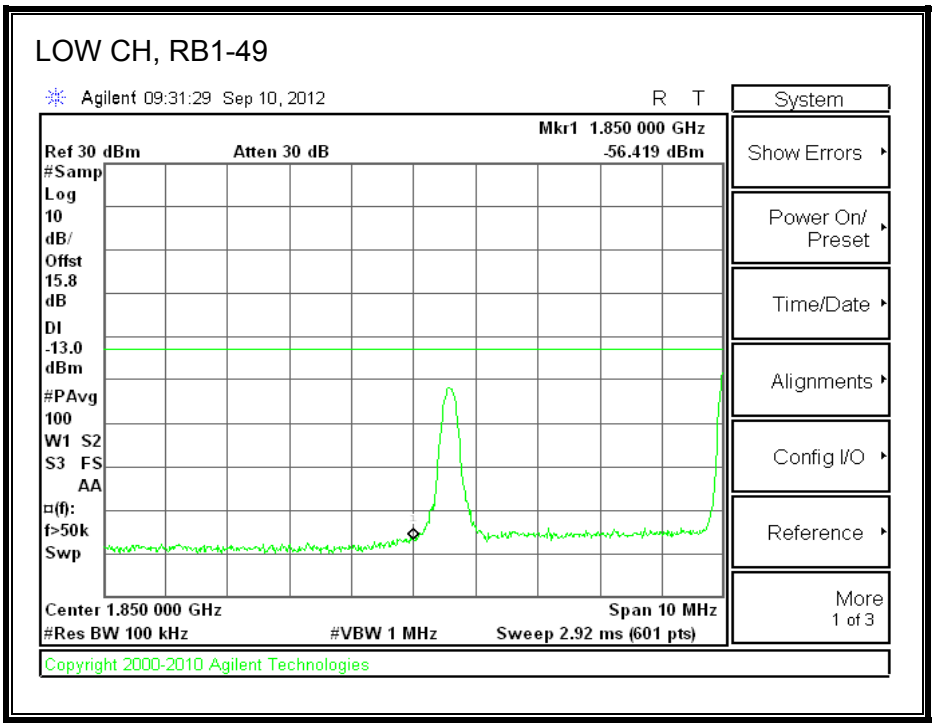
HIGH CH, RB25-0



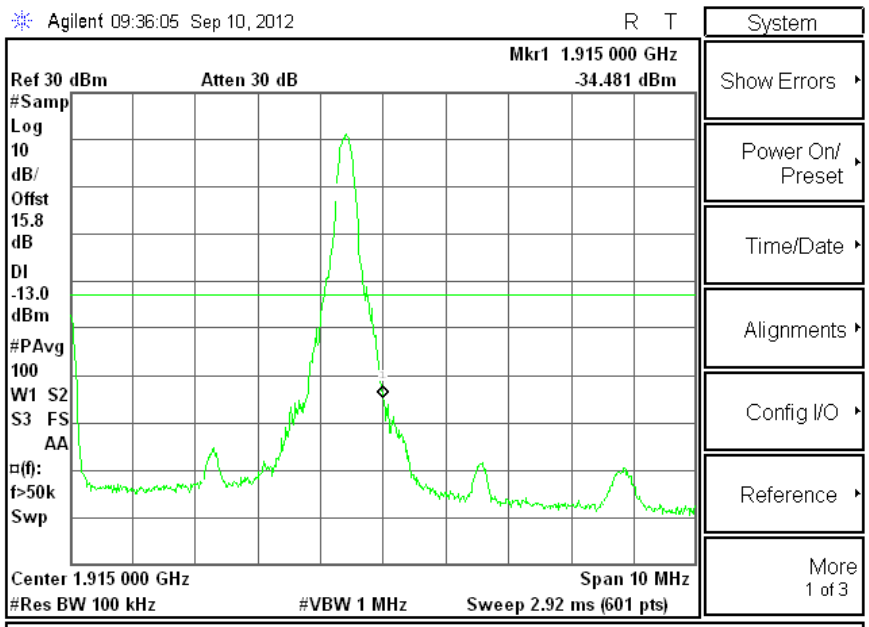
QPSK Band 25 (10.0 MHz BAND WIDTH)



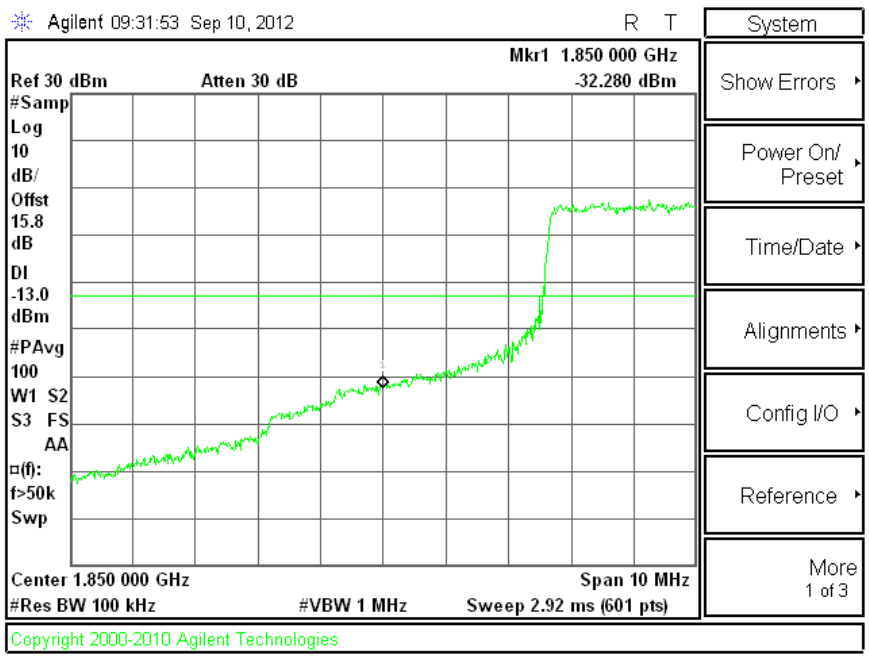




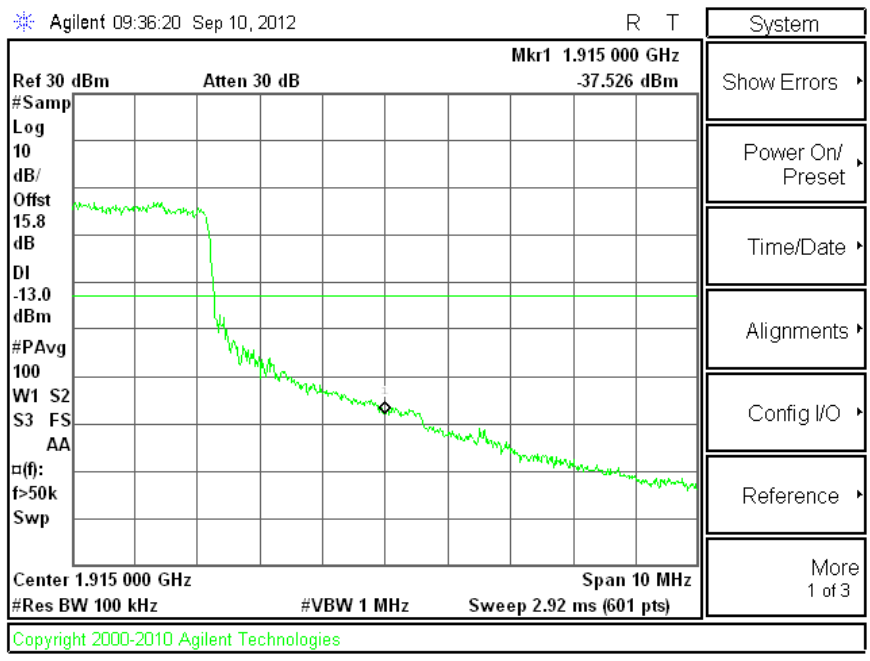
HIGH CH, RB1-49



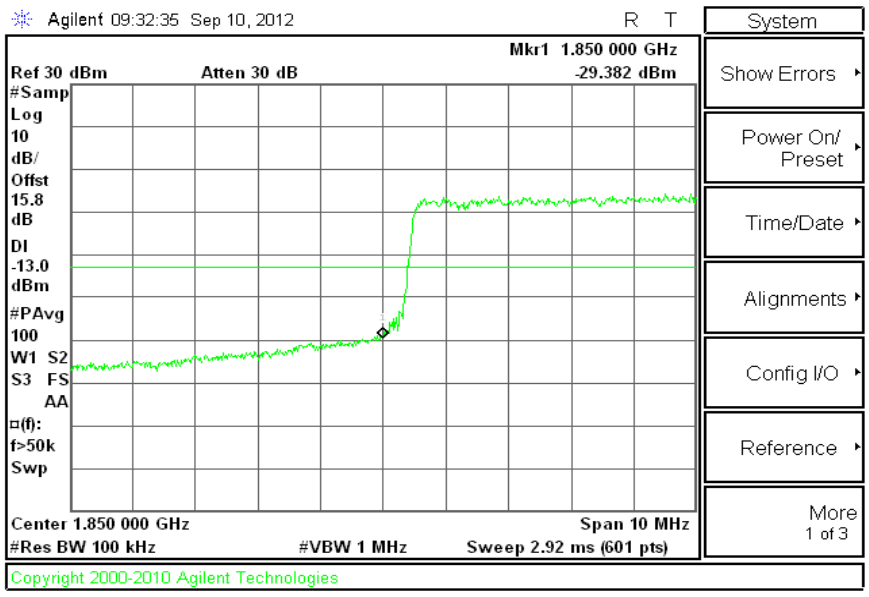
LOW CH, RB25-12



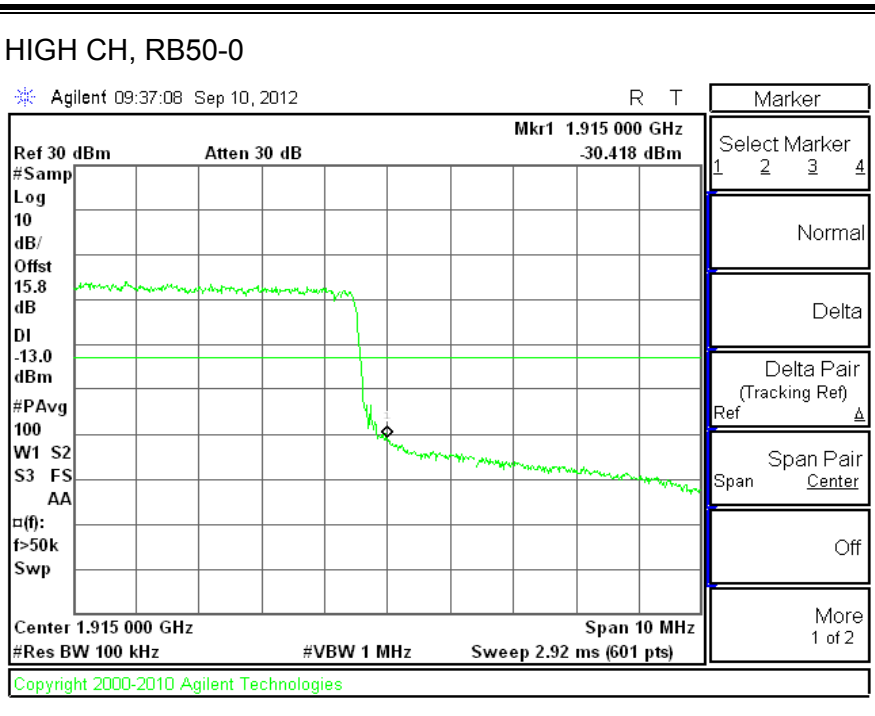
HIGH CH, RB25-12



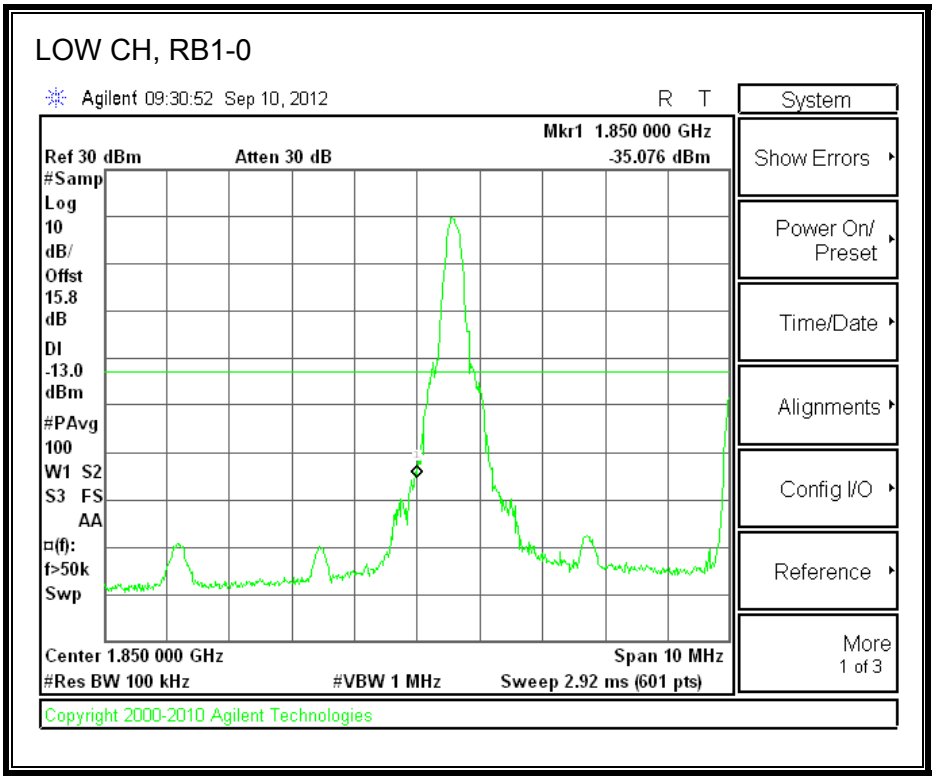
LOW CH, RB50-0

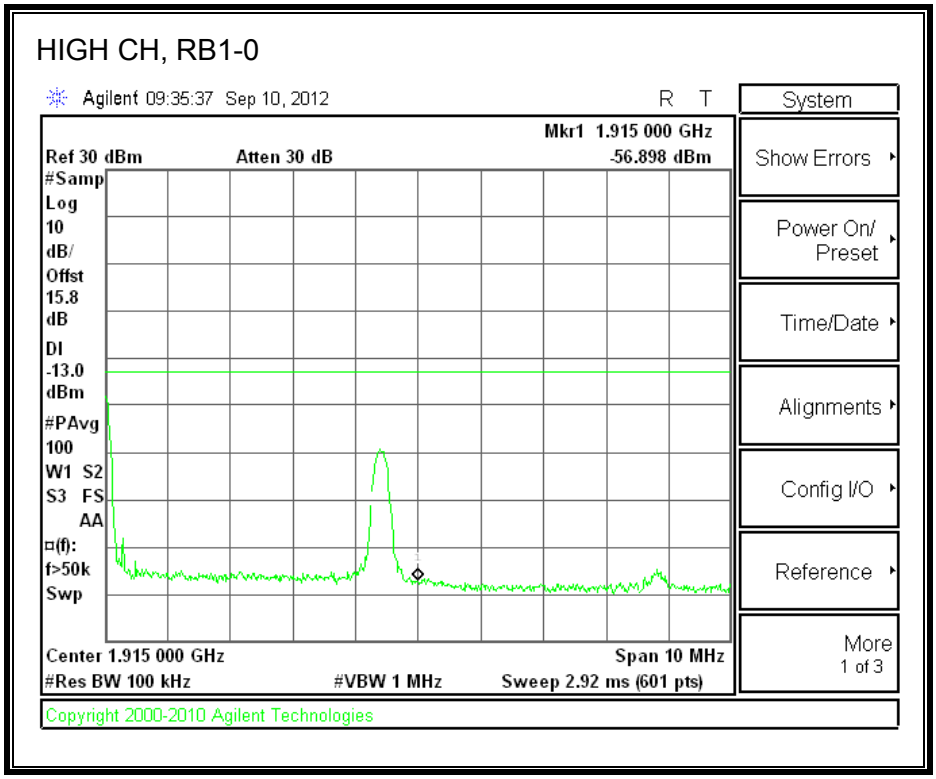


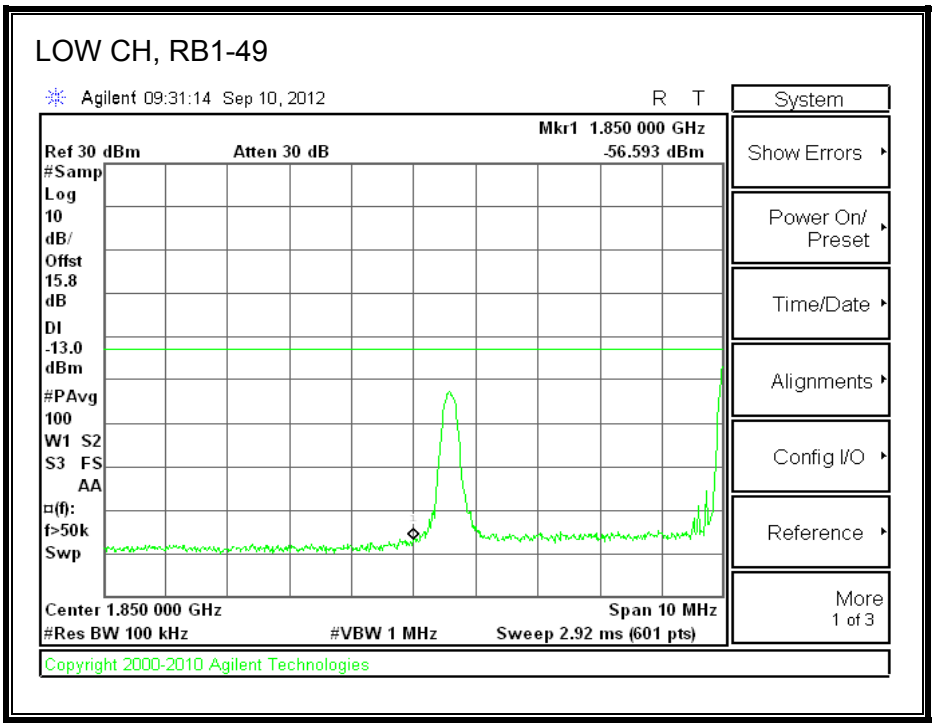
HIGH CH, RB50-0



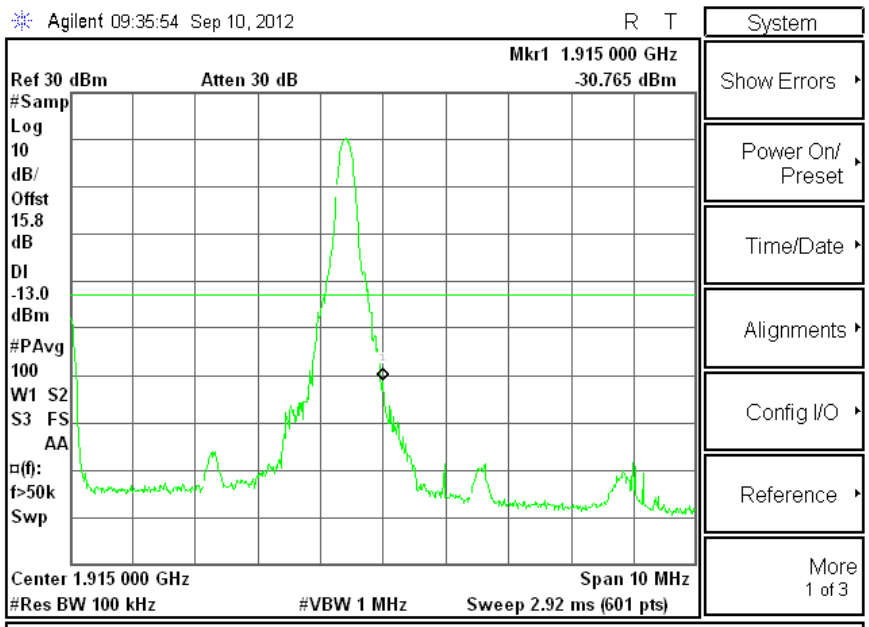
16QAM Band 25 (10.0 MHz BAND WIDTH)



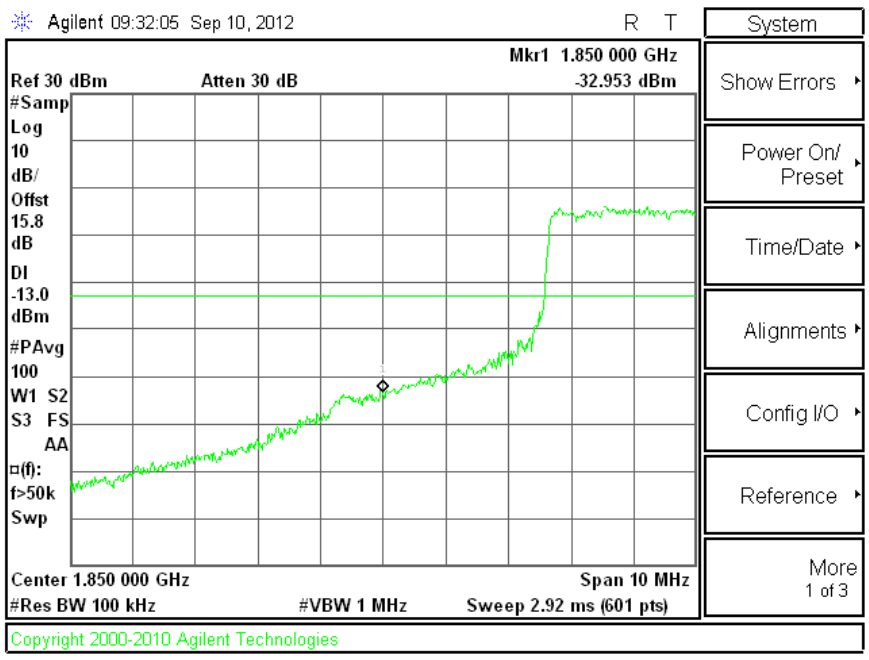




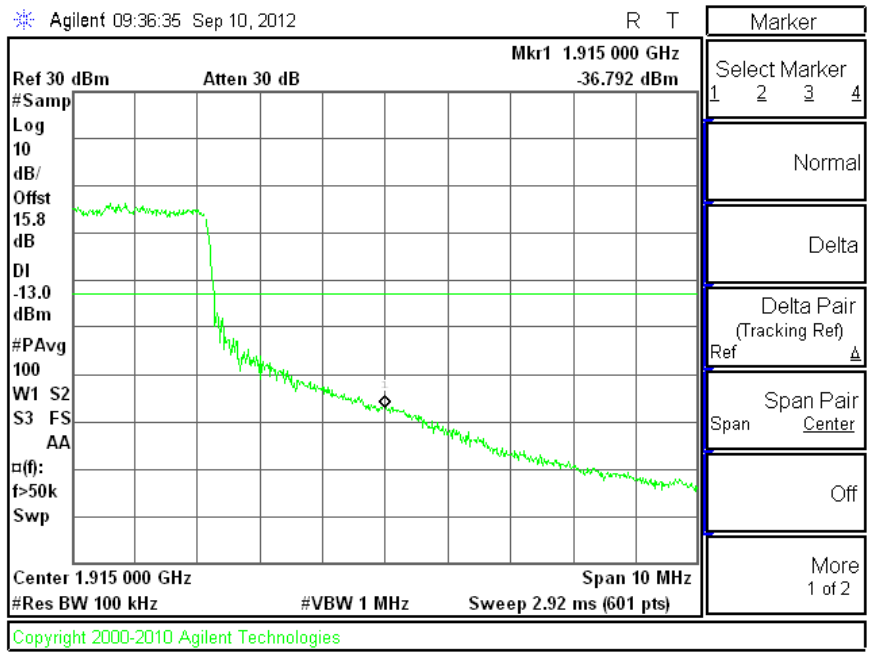
HIGH CH, RB1-49

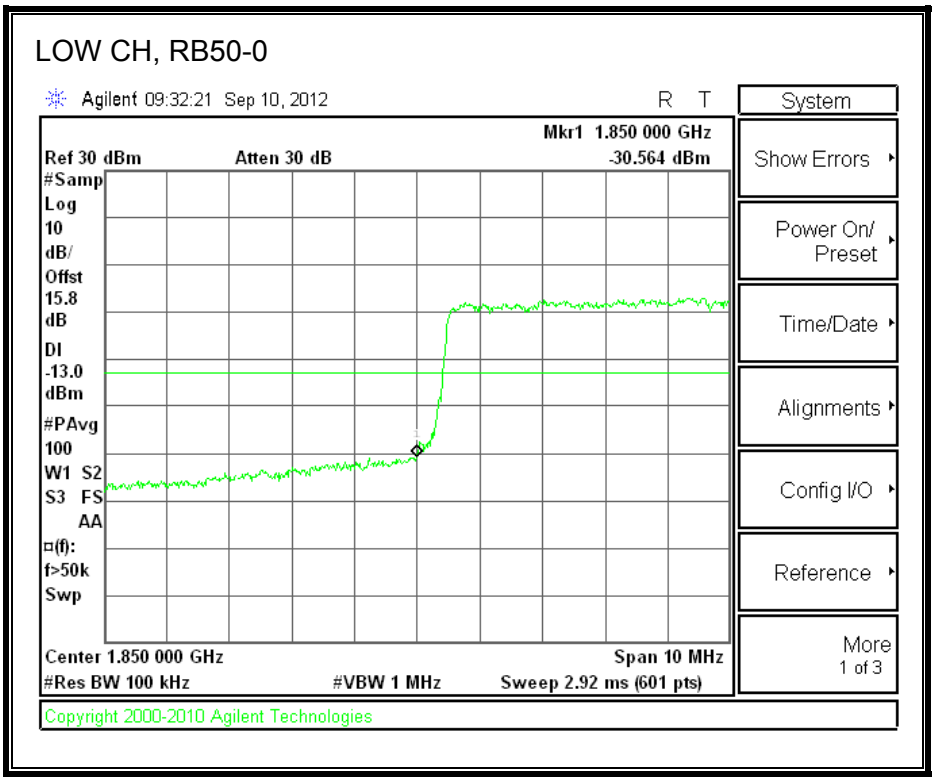


LOW CH, RB25-12

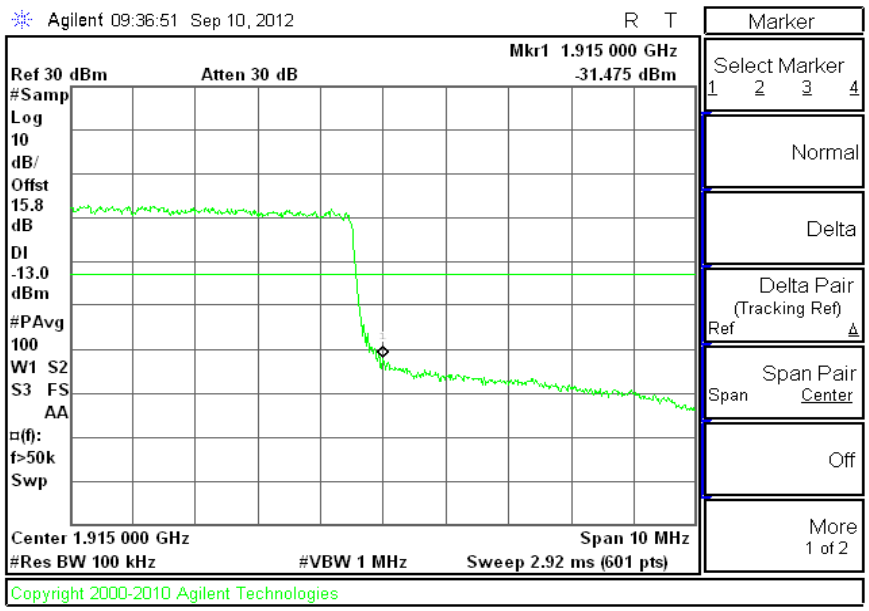


HIGH CH, RB25-12

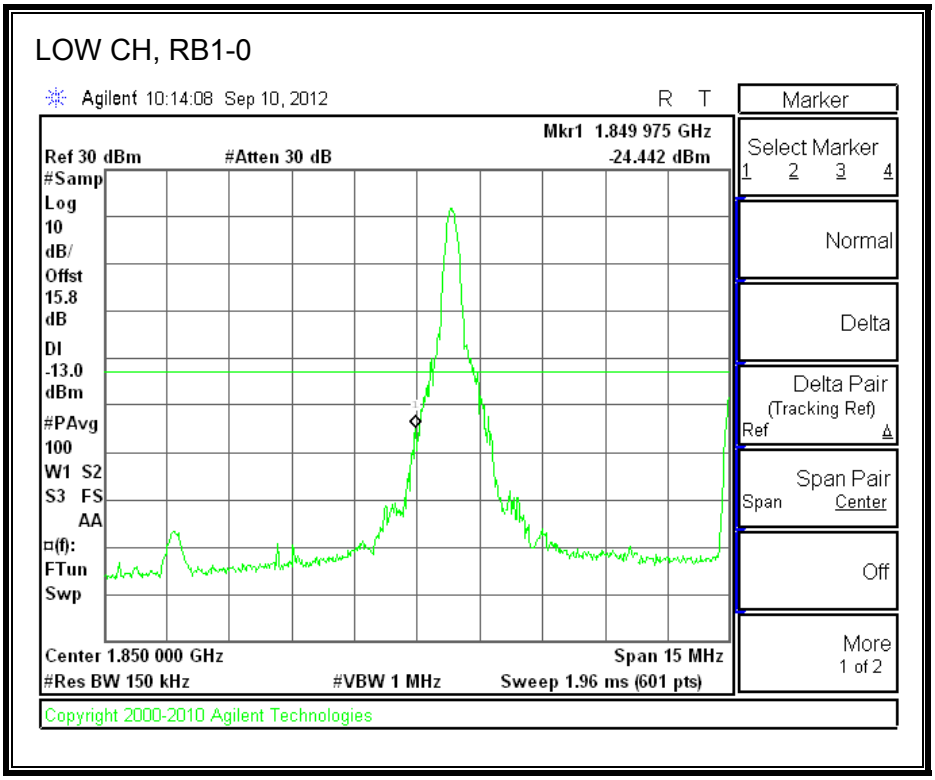


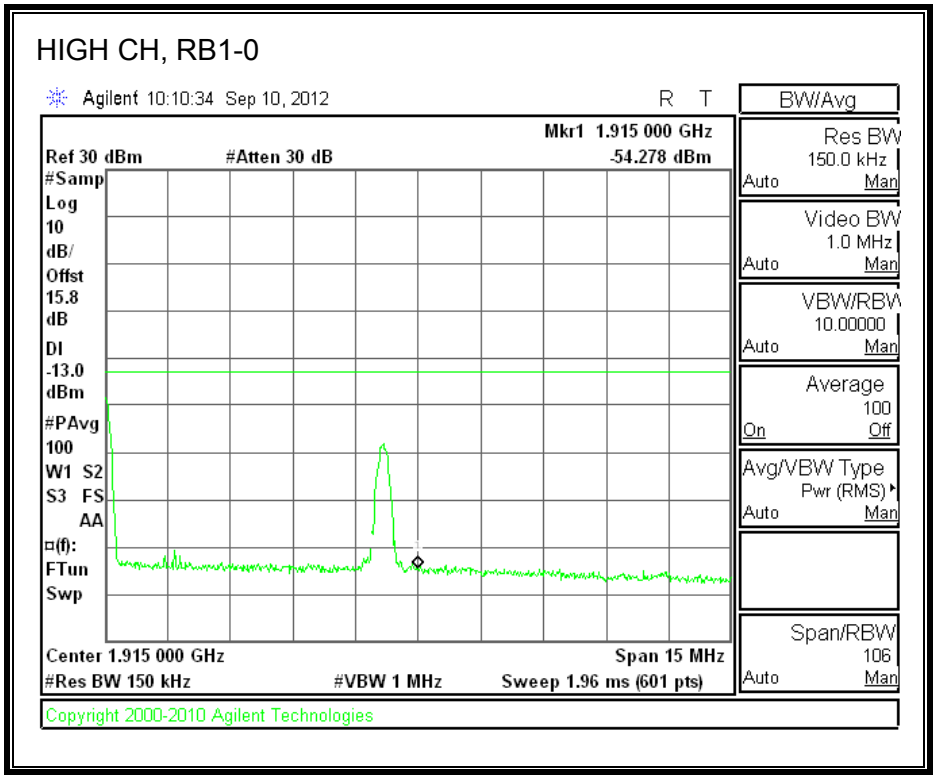


HIGH CH, RB50-0

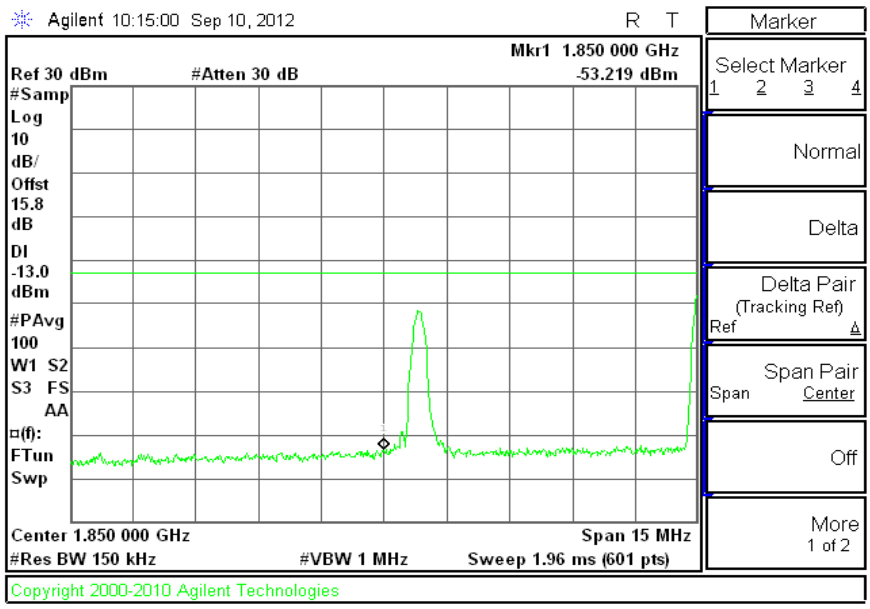


QPSK Band 25 (15.0 MHz BAND WIDTH)

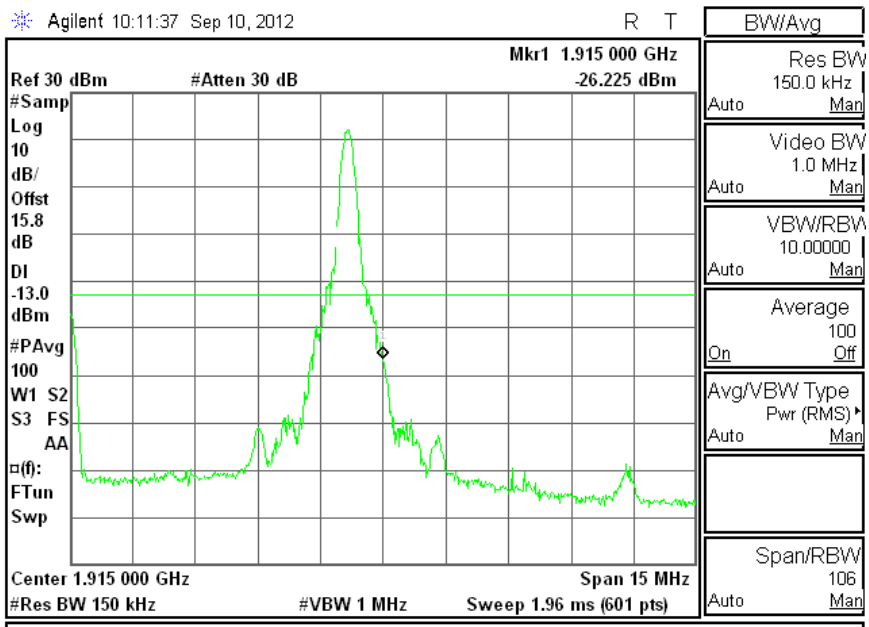




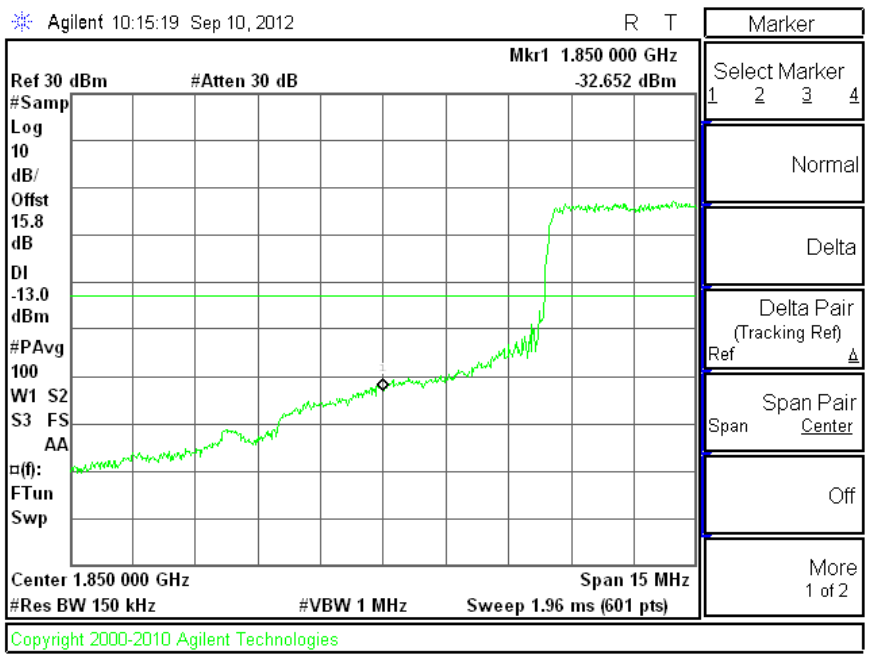
LOW CH, RB1-74



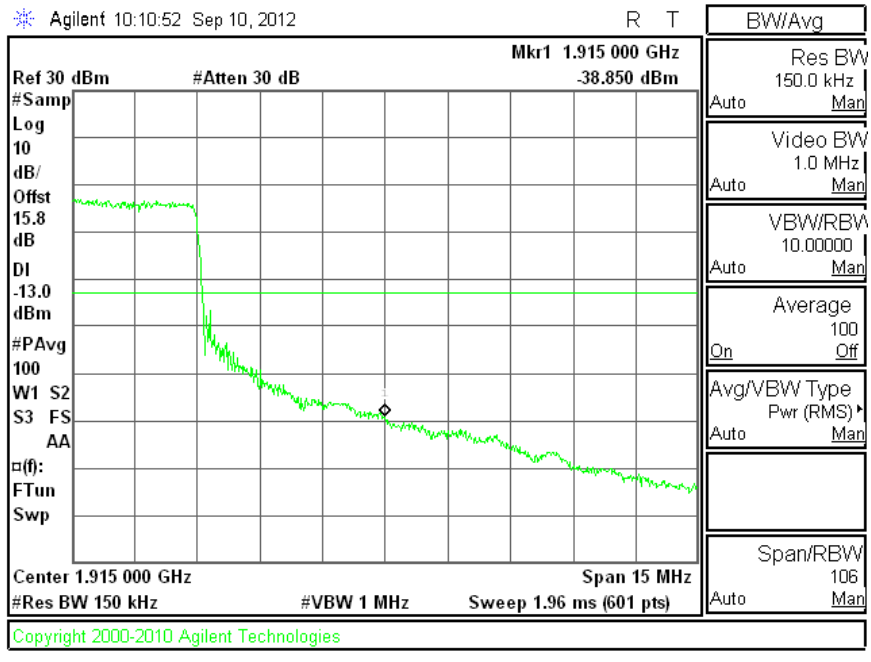
HIGH CH, RB1-74



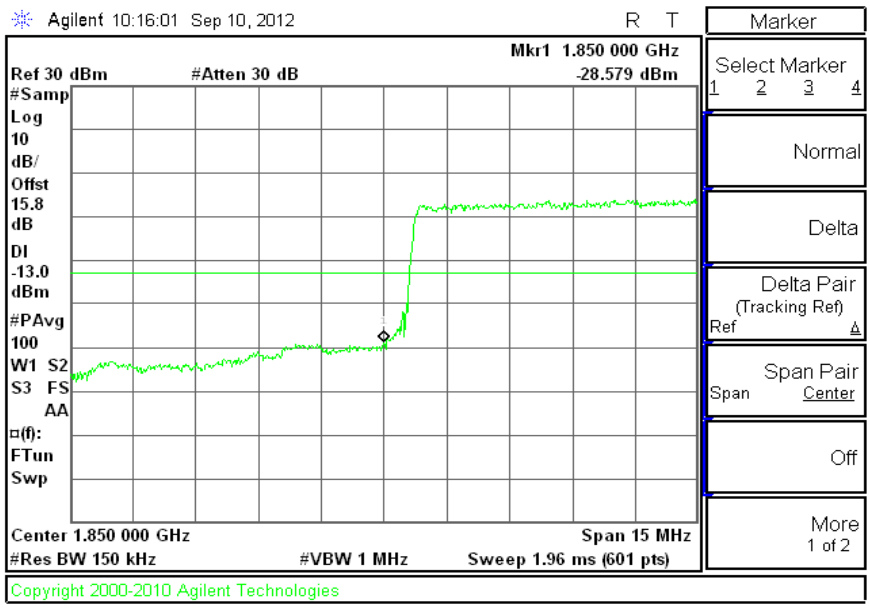
LOW CH, RB36-18



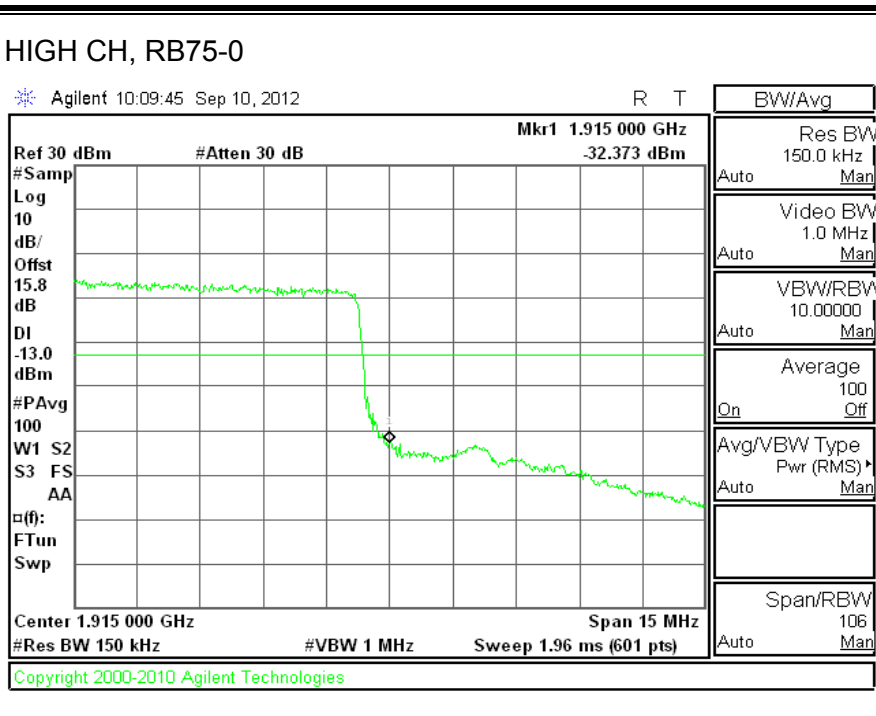
HIGH CH, RB36-18



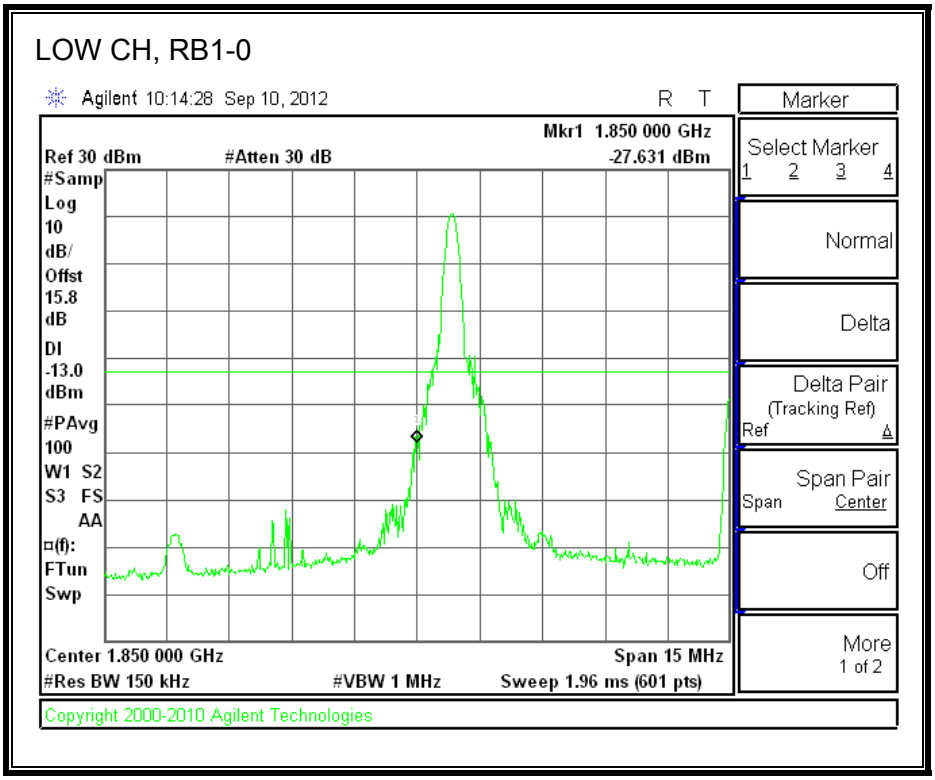
LOW CH, RB75-0

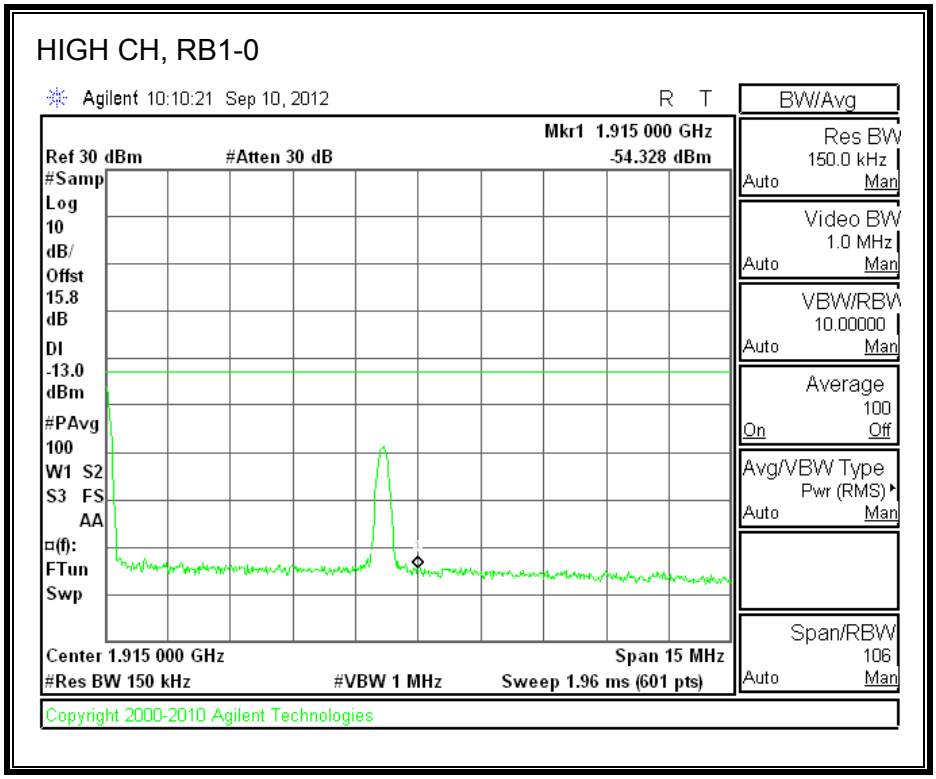


HIGH CH, RB75-0

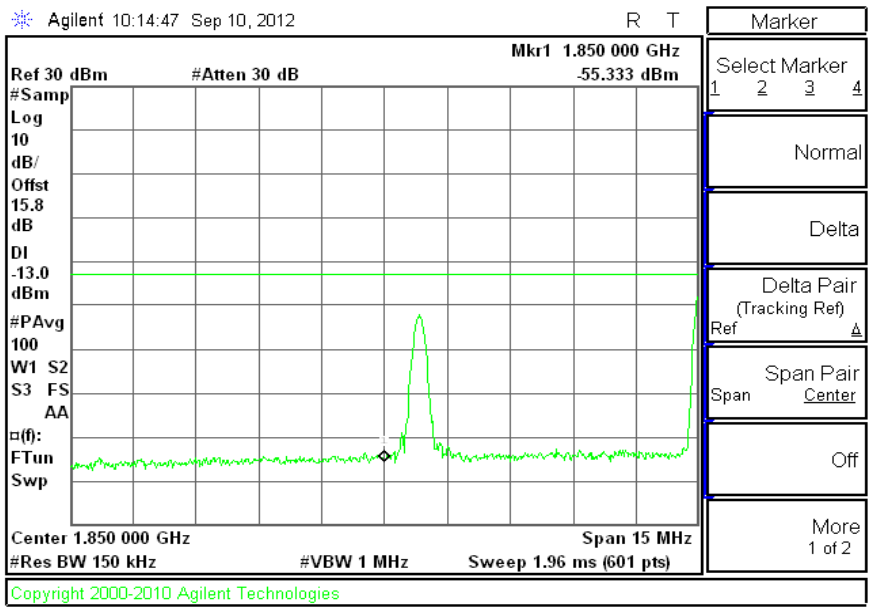


16QAM Band 2 (15.0 MHz BAND WIDTH)

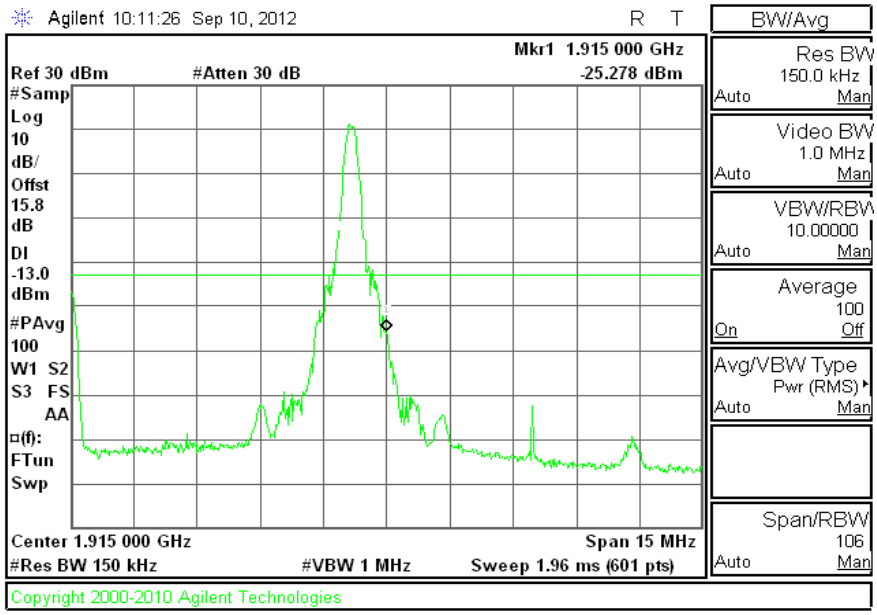




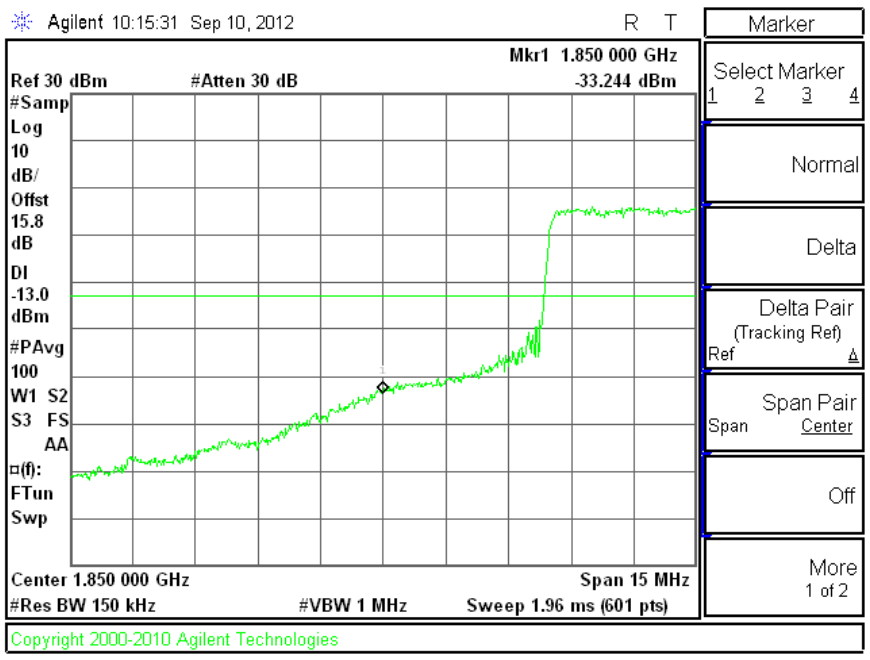
LOW CH, RB1-74



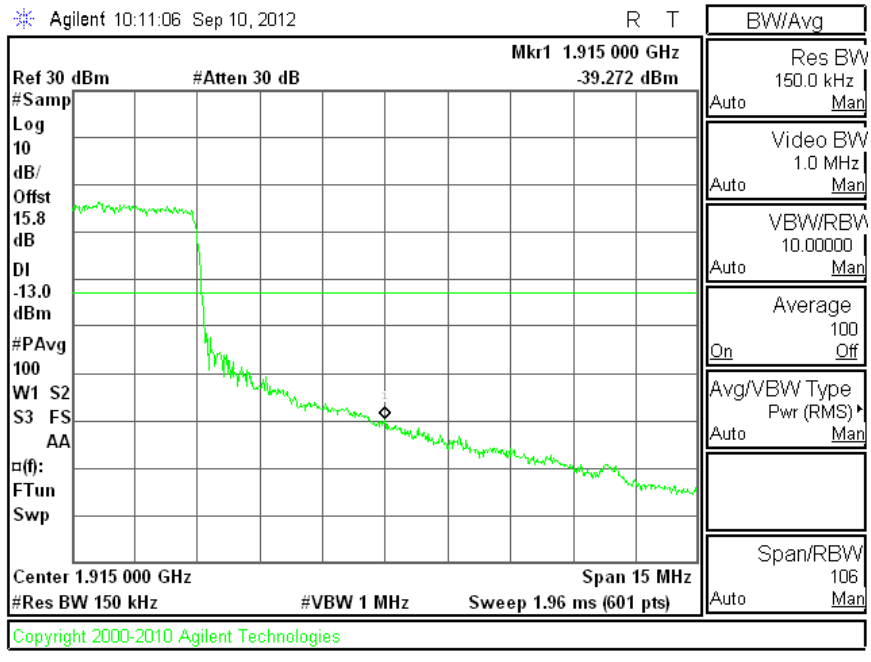
HIGH CH, RB1-74

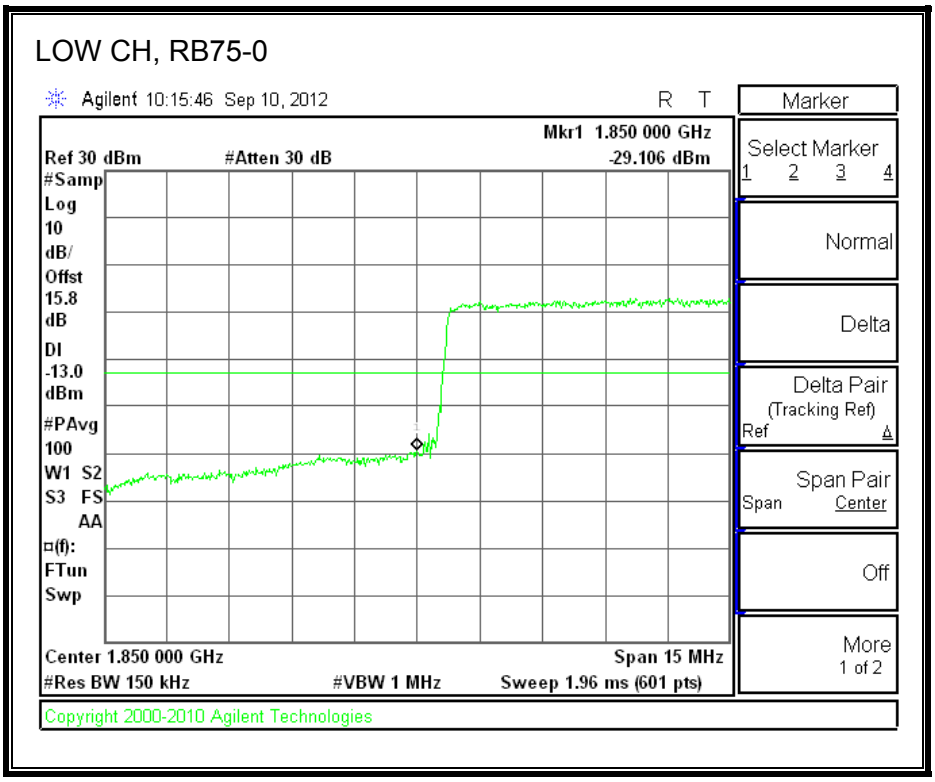


LOW CH, RB36-18

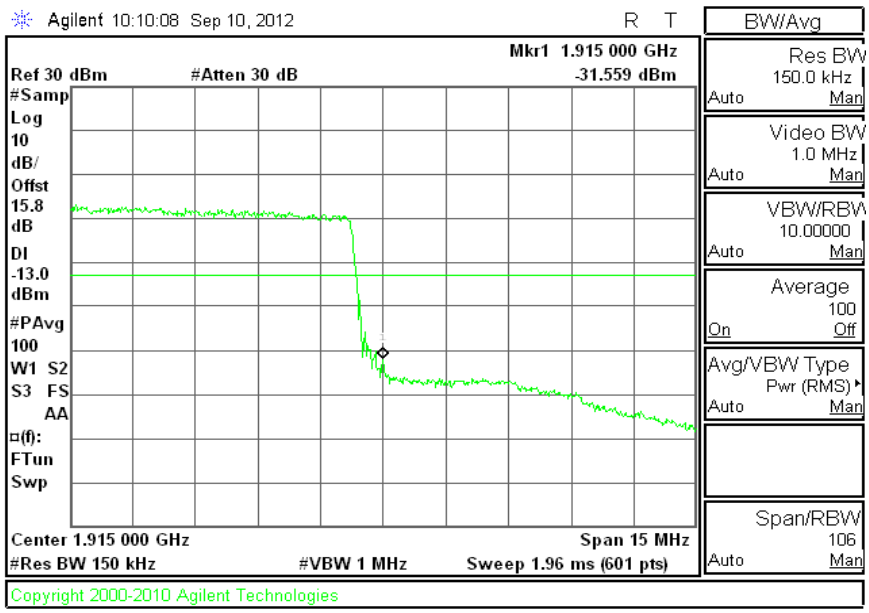


HIGH CH, RB36-18

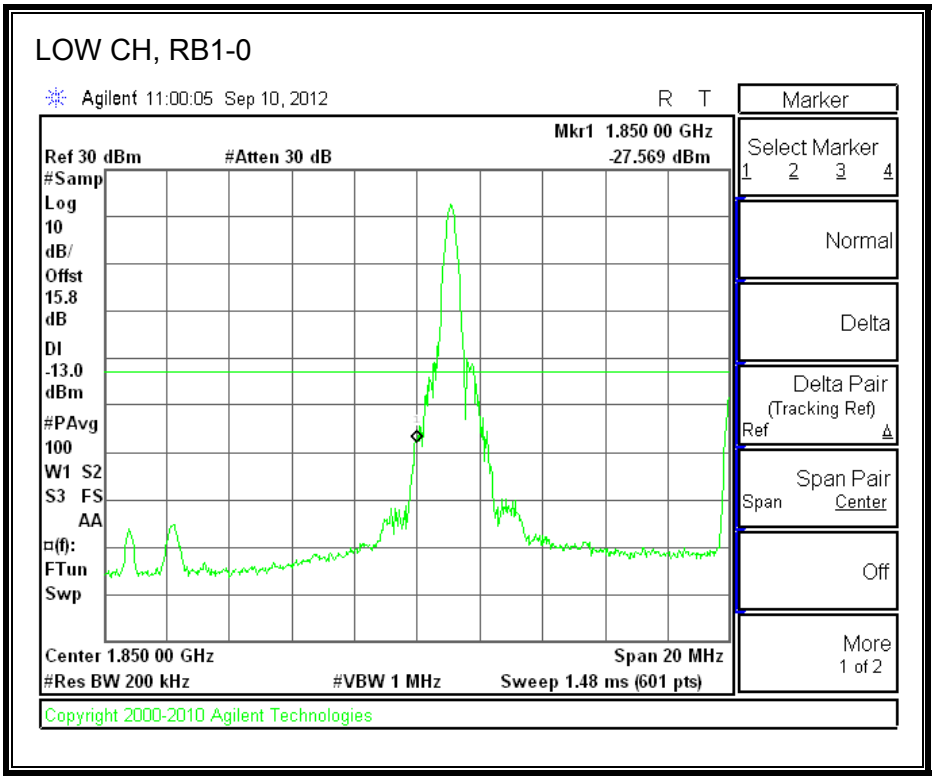


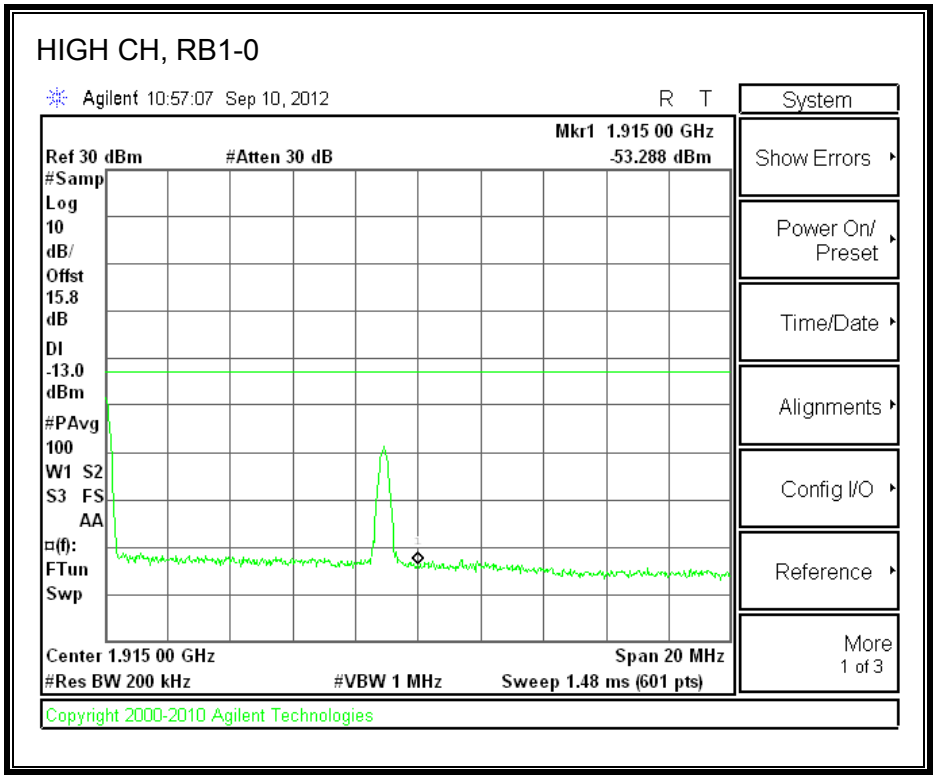


HIGH CH, RB75-0

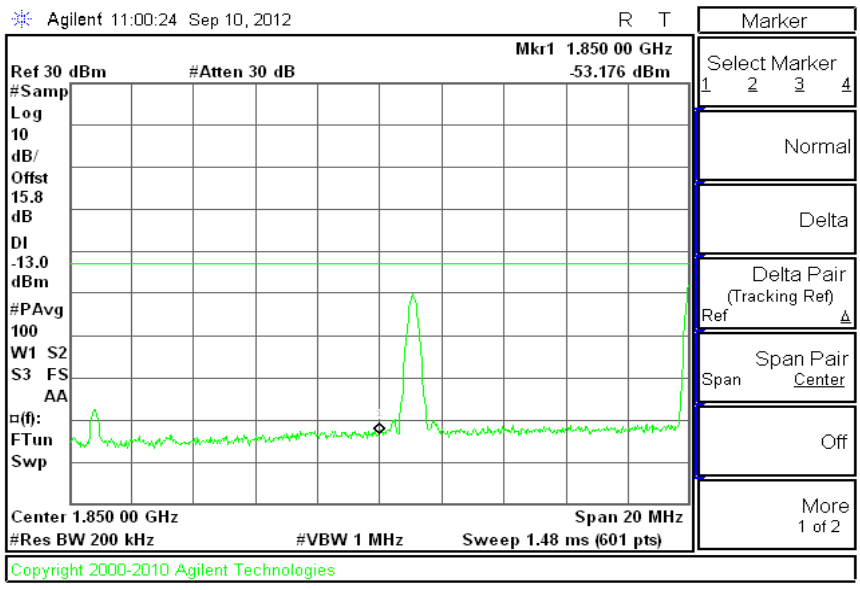


QPSK Band 25 (20.0 MHz BAND WIDTH)

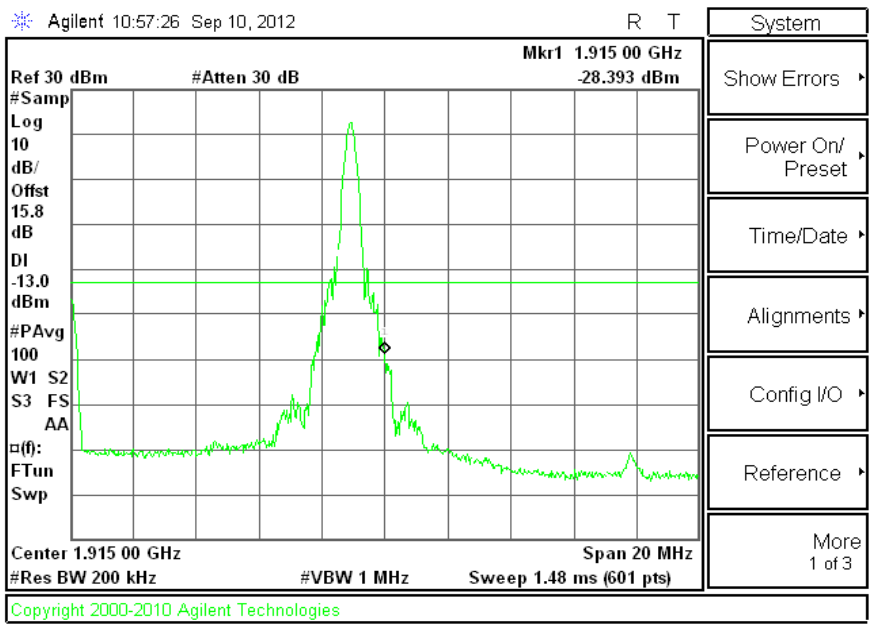




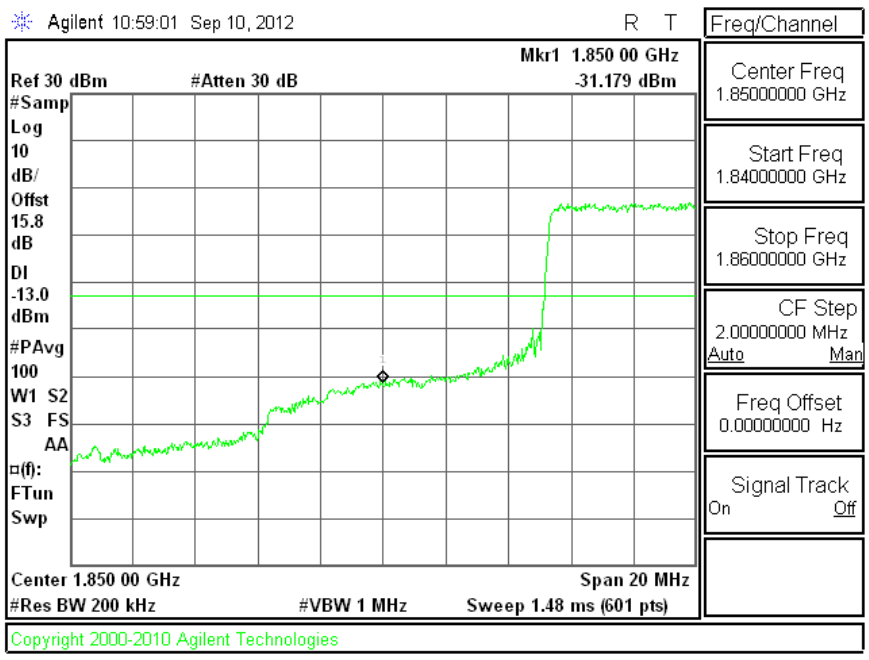
LOW CH, RB1-99



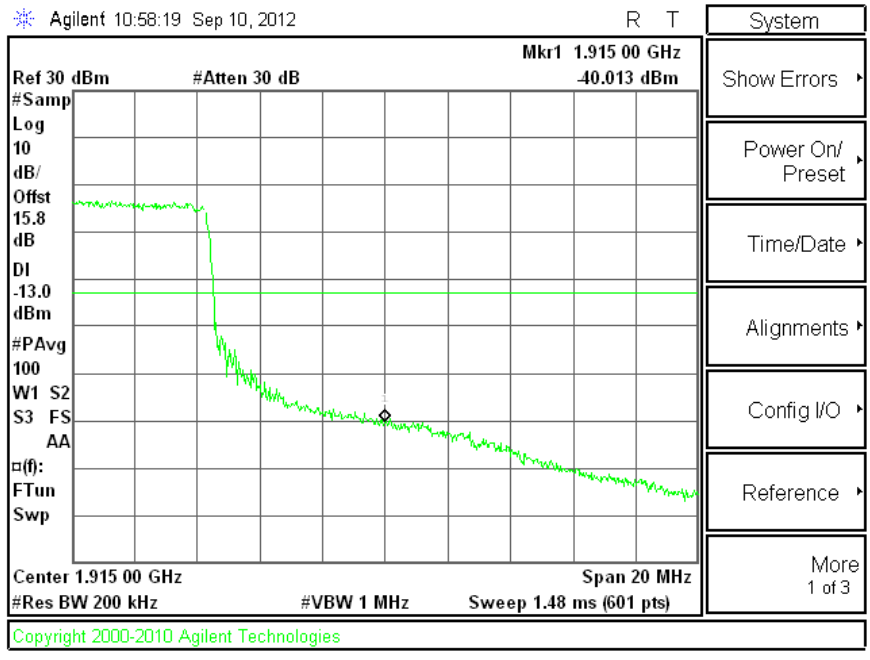
HIGH CH, RB1-99



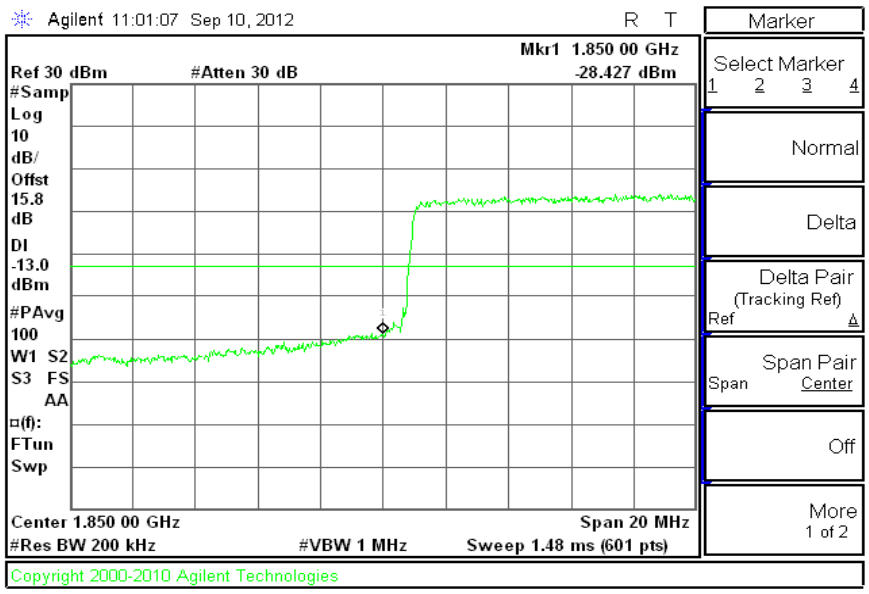
LOW CH, RB50-24



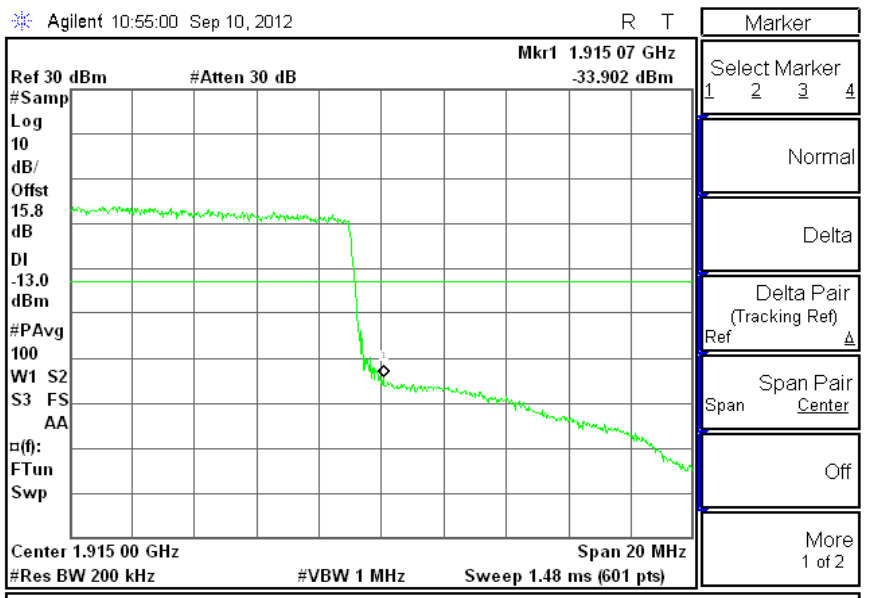
HIGH CH, RB50-24



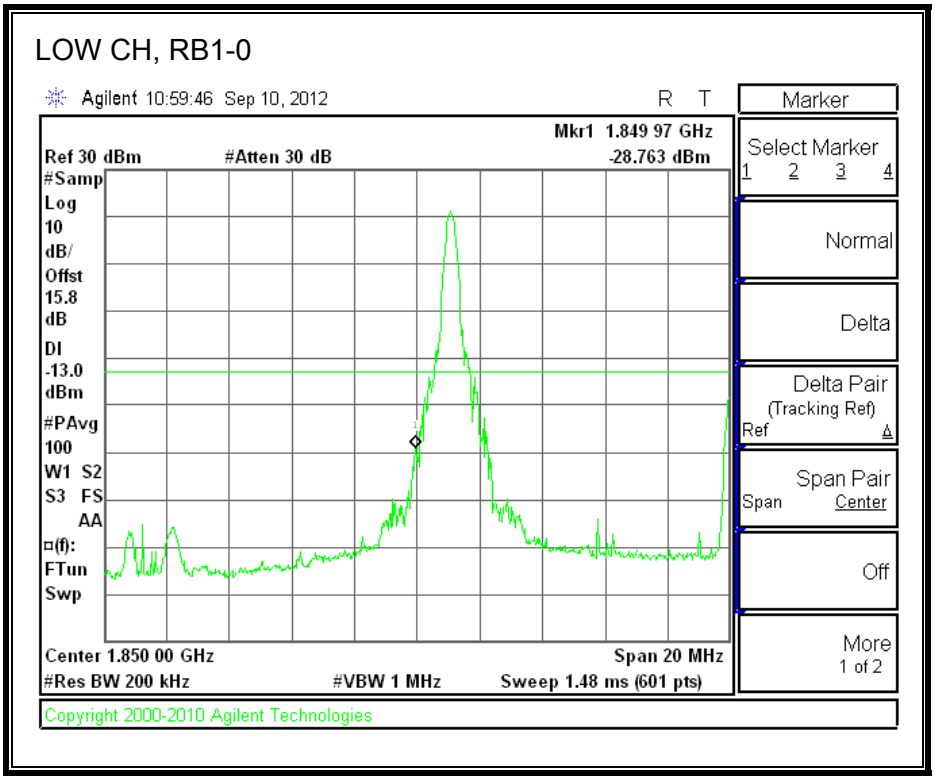
LOW CH, RB100-0

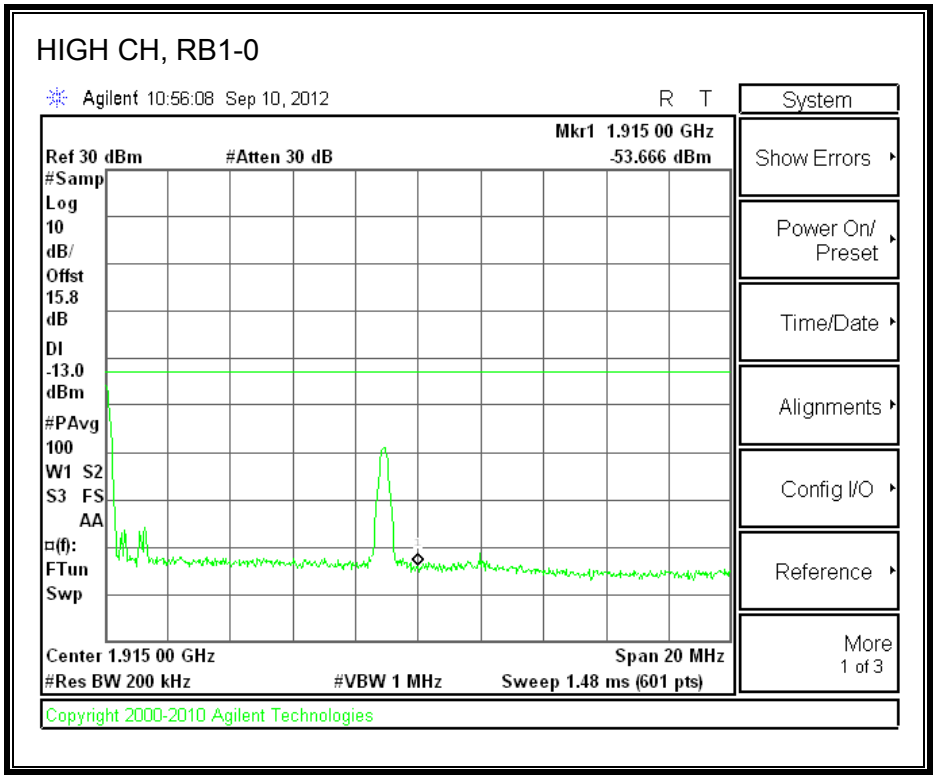


HIGH CH, RB100-0

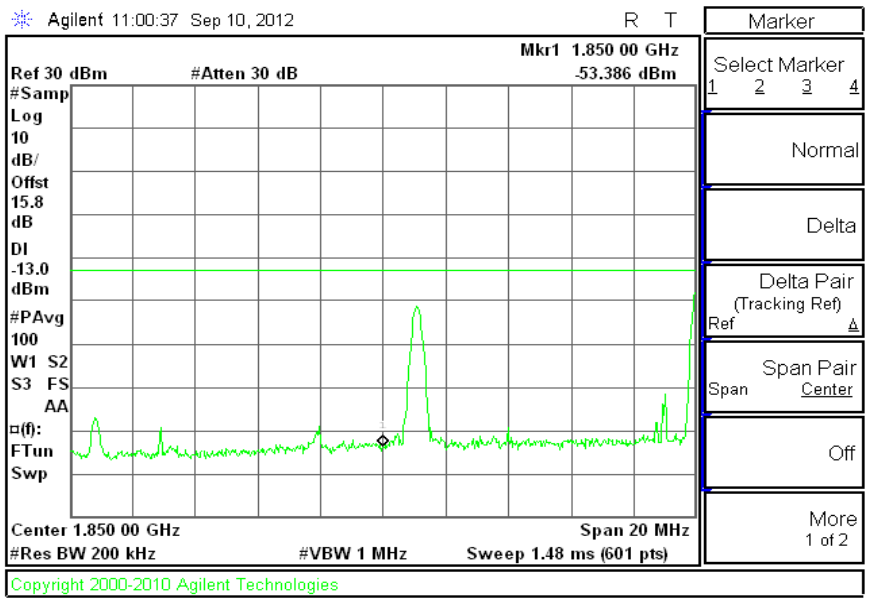


16QAM Band 25 (20.0 MHz BAND WIDTH)

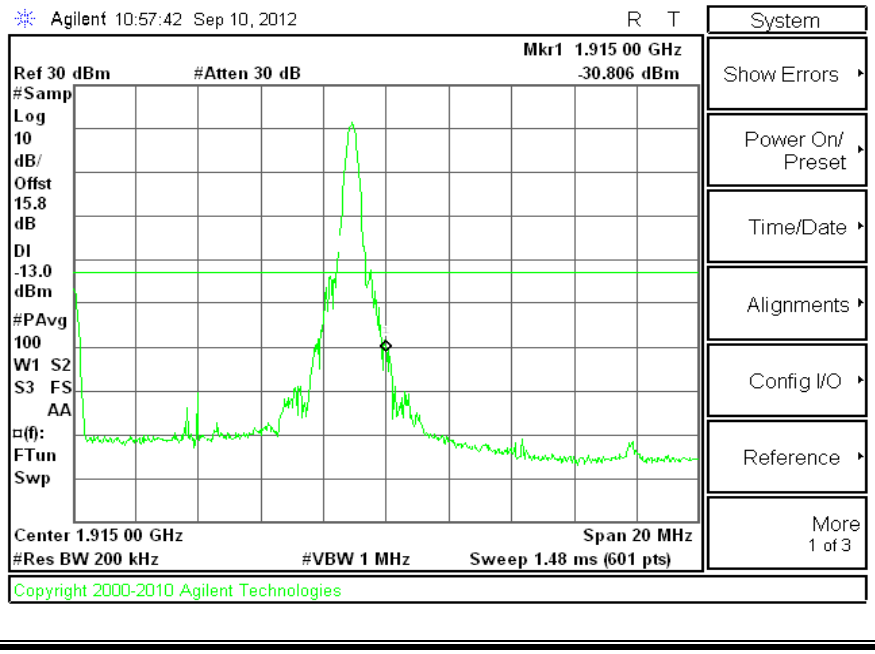




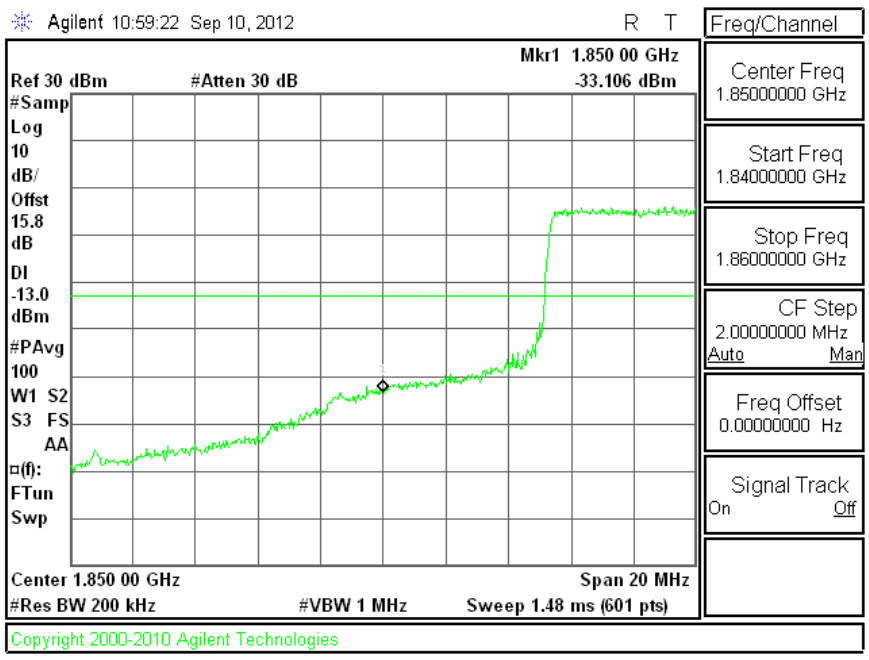
LOW CH, RB1-99



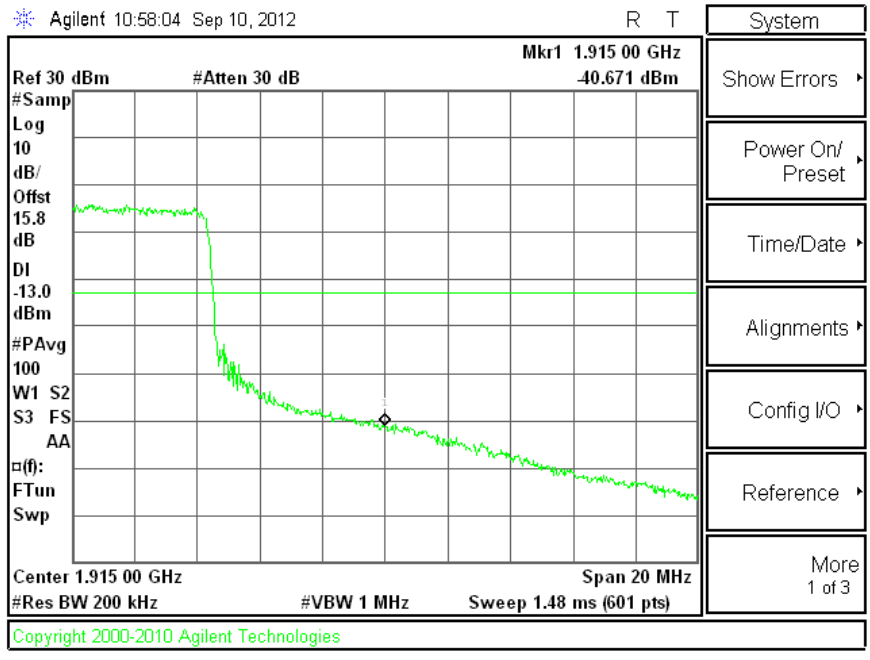
HIGH CH, RB1-99



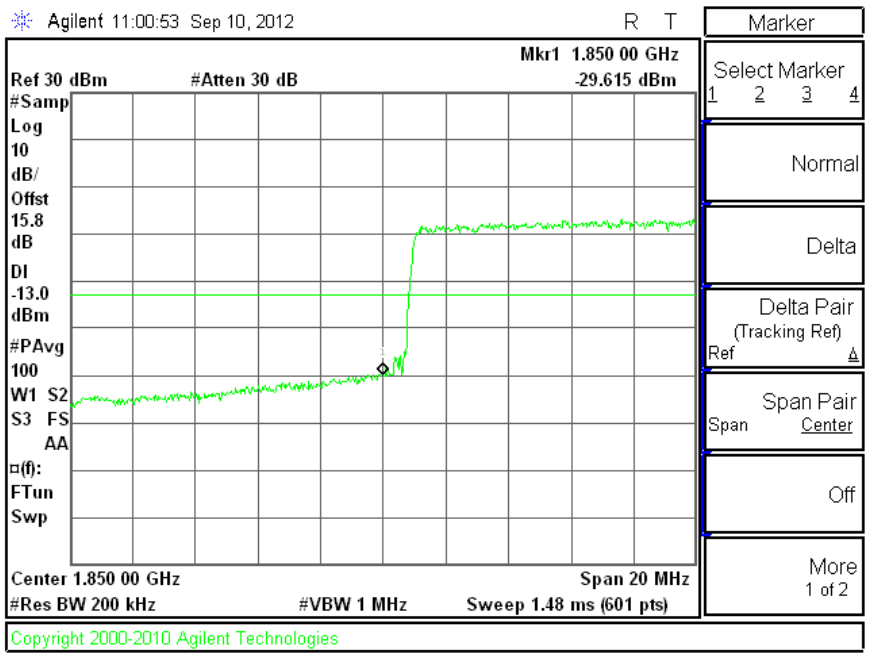
LOW CH, RB50-24



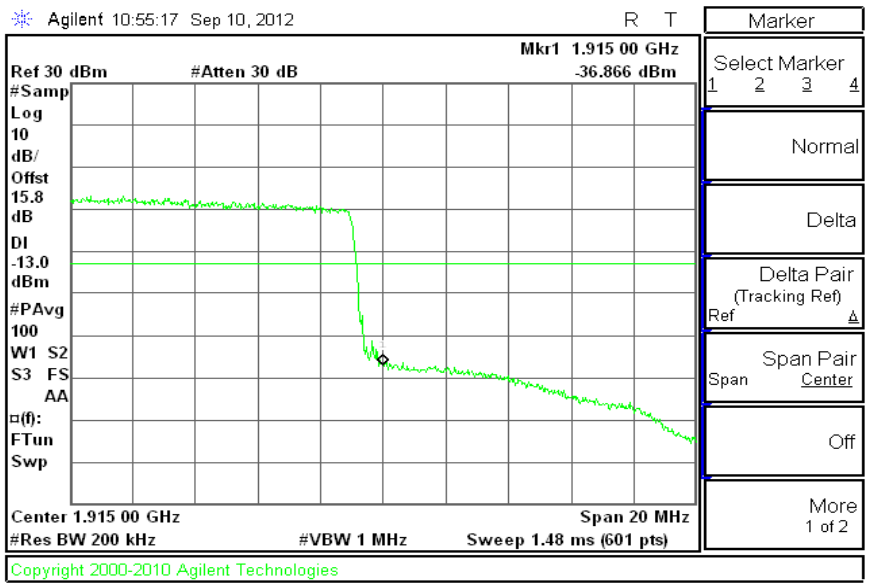
HIGH CH, RB50-24



LOW CH, RB100-0



HIGH CH, RB100-0



8.3. OUT OF BAND EMISSIONS

RULE PART(S)

FCC: §2.1051, §22.901, §22.917, §24.238, §24.238 and §90.691

LIMITS

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.

TEST PROCEDURE

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

For each out of band emissions measurement:

- Set display line at -13 dBm
- Set RBW & VBW to 100 kHz for the measurement below 1 GHz, and 1 MHz for the measurement above 1 GHz.

MODES TESTED

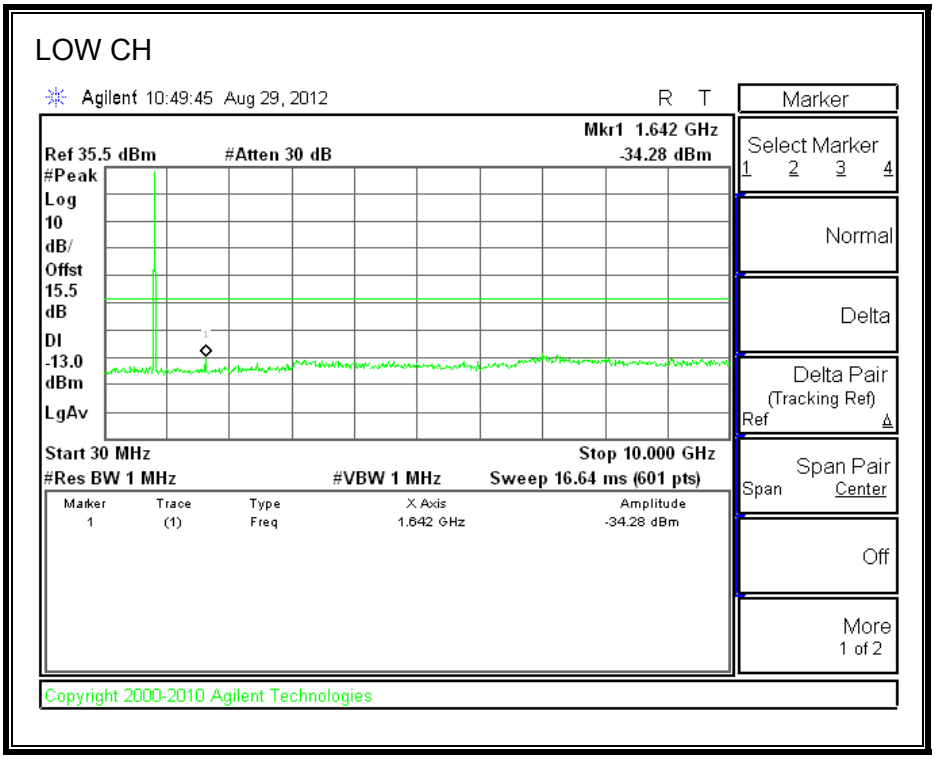
- GPRS and EGPRS
- UMTS, REL 99 and HSDPA
- CDMA BC10, BC0, BC1
- LTE BAND 5
- LTE BAND 13
- LTE BAND 25

RESULTS

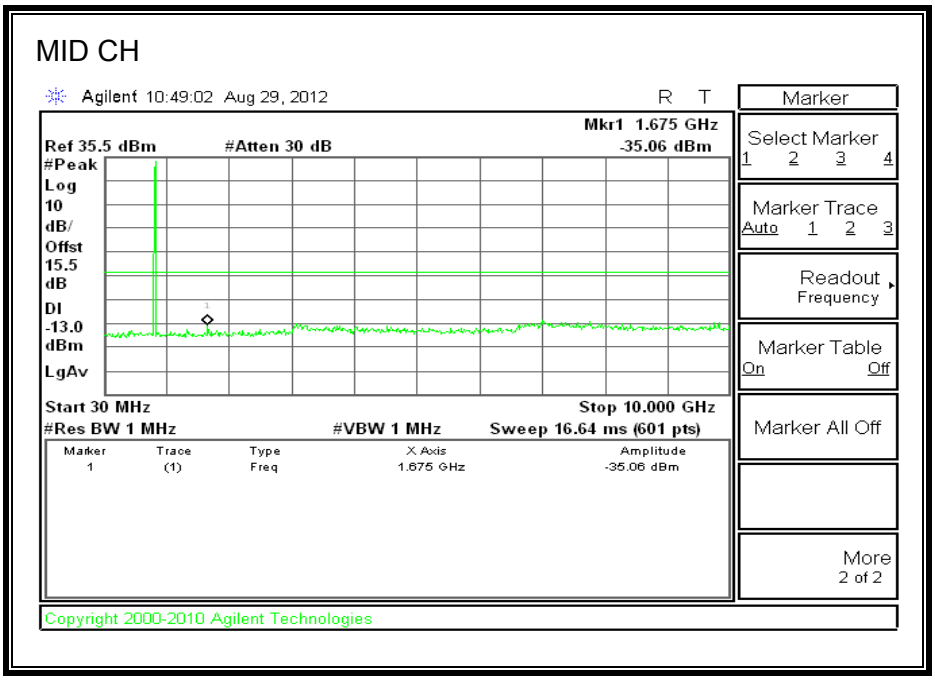
8.3.1. GSM

(Cellular Band)

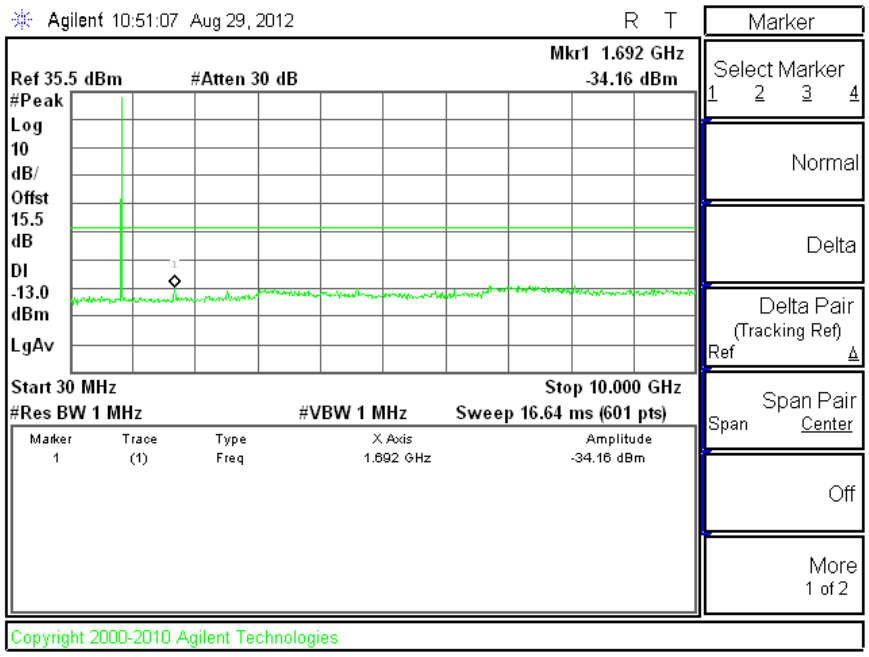
LOW CH



MID CH

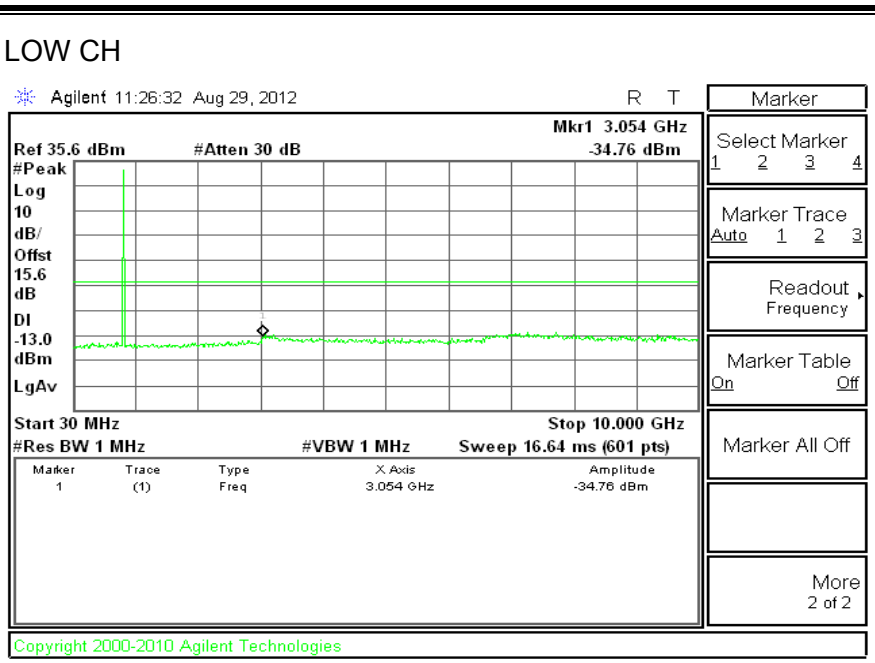


HIGH CH

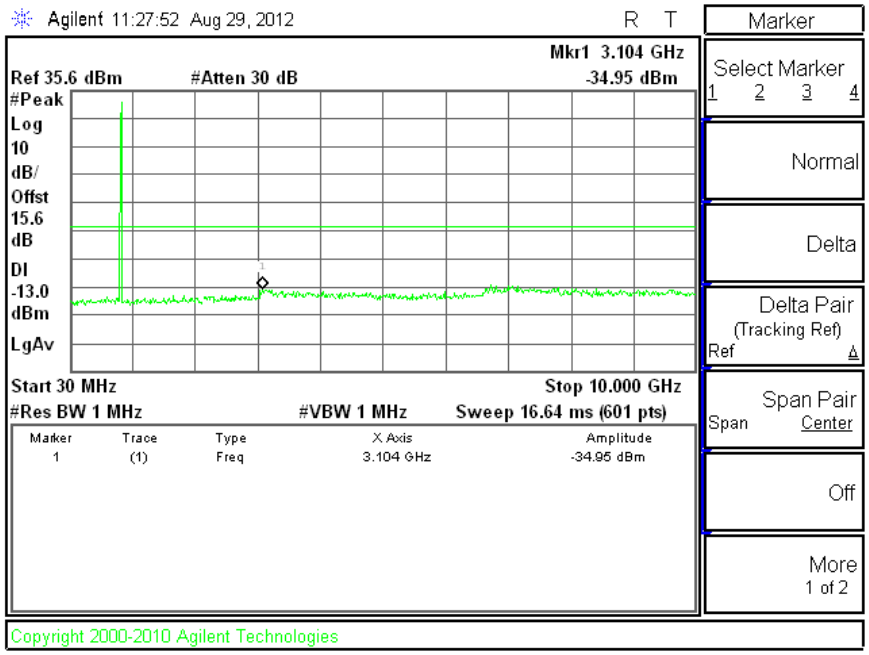


EGPRS Mode (Cellular Band)

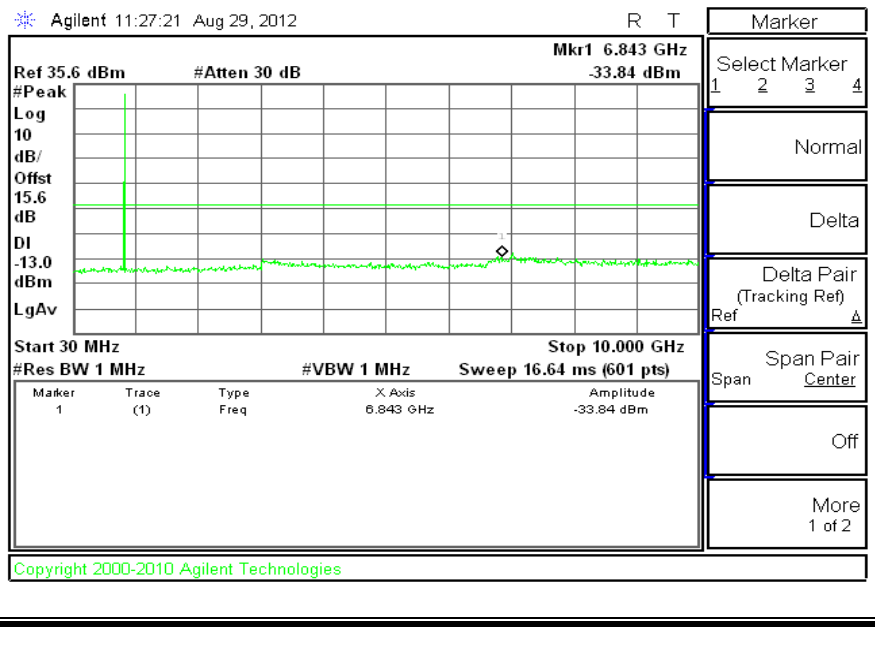
LOW CH



MID CH

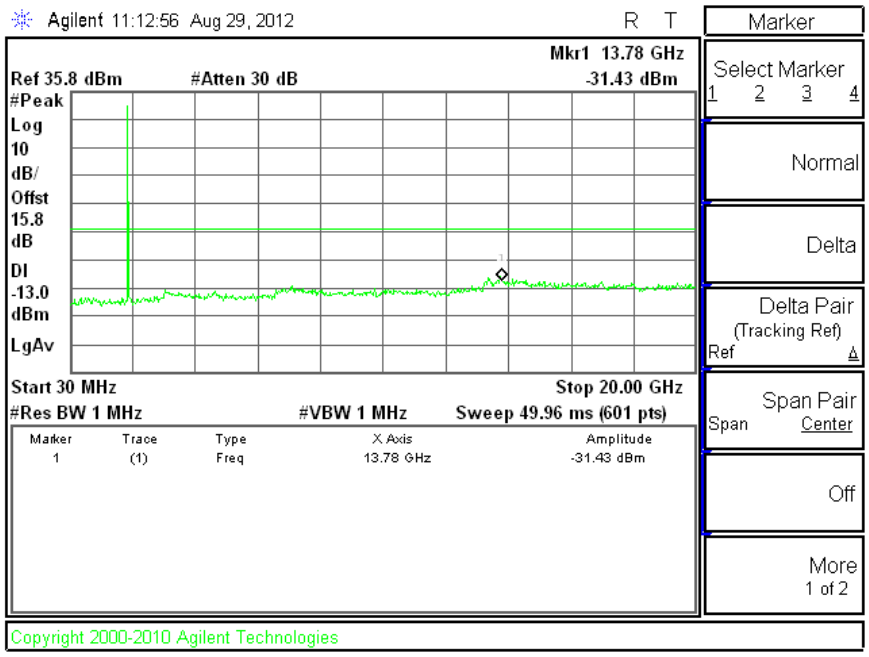


HIGH CH

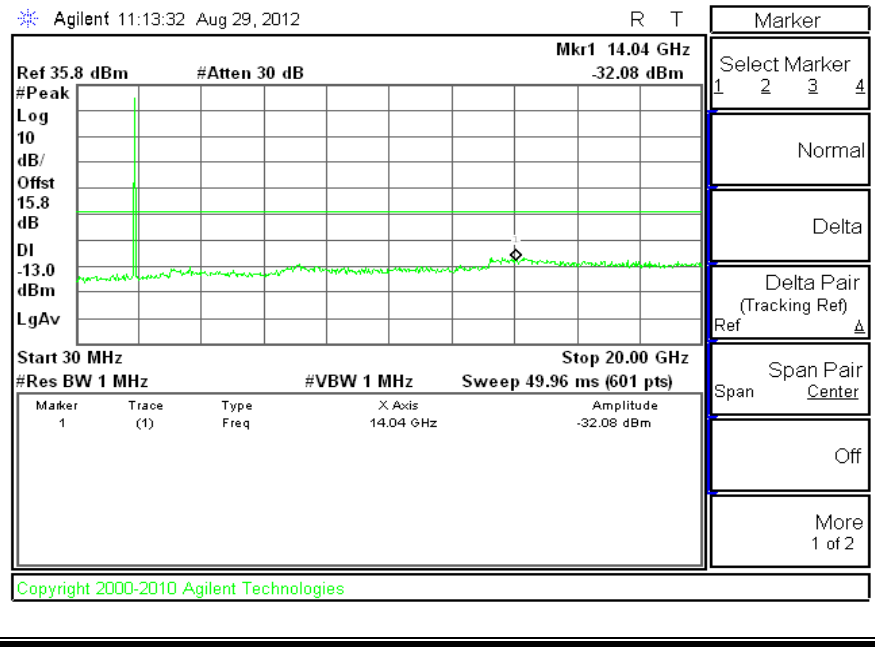


GPRS PCS BAND

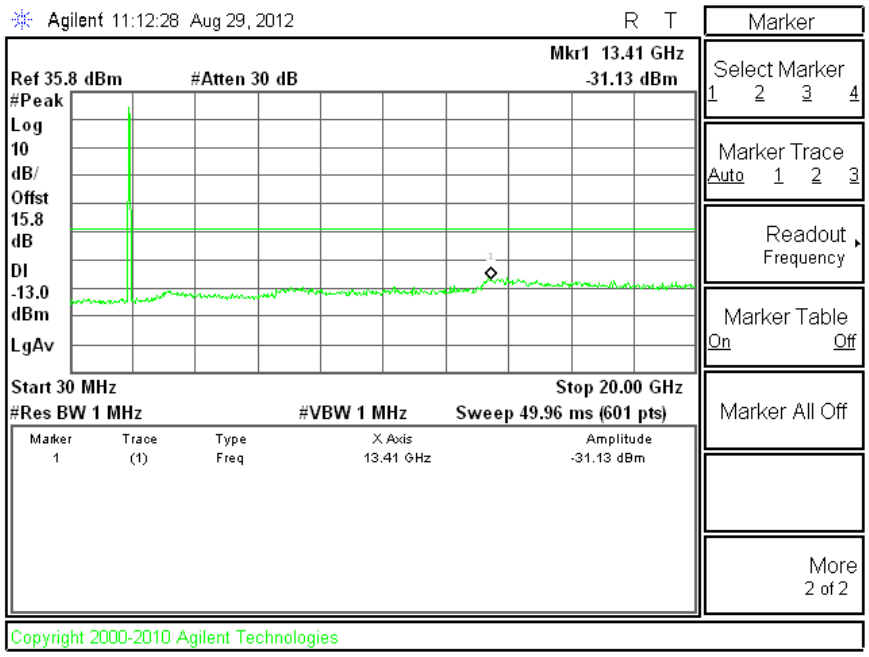
LOW CH



MID CH

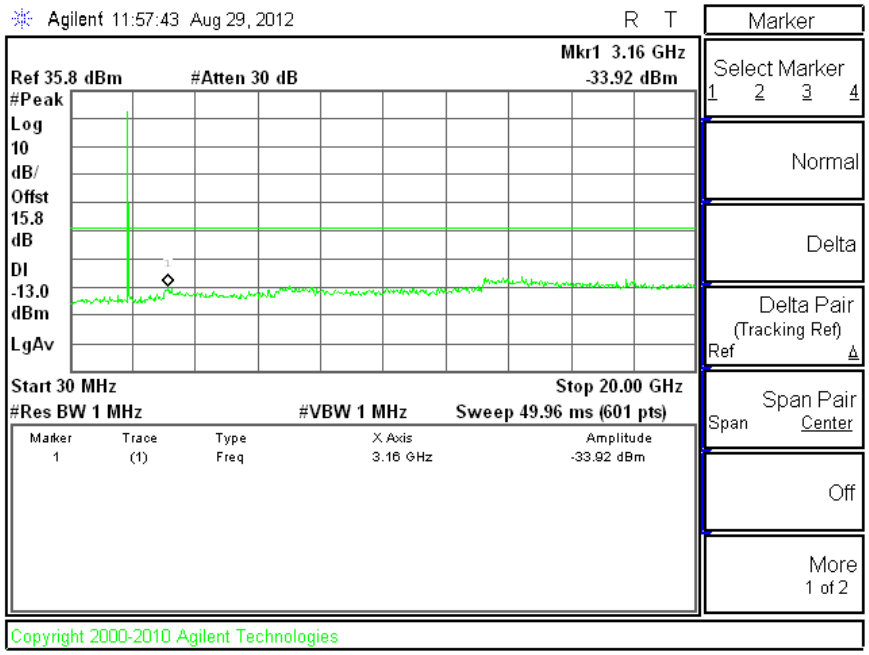


HIGH CH

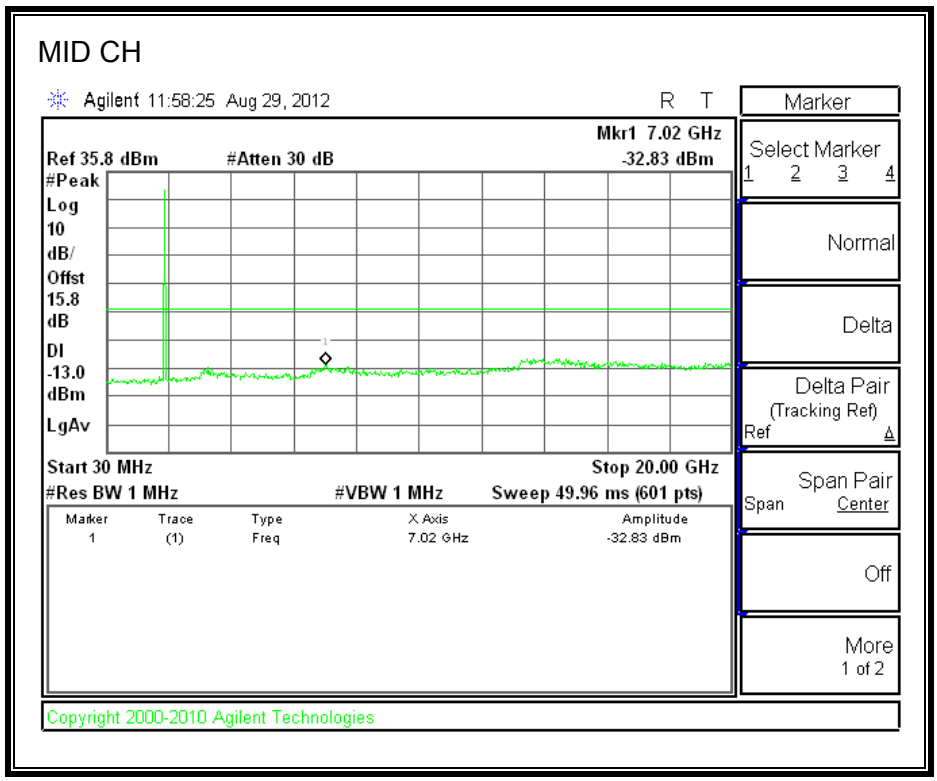


EGPRS PCS Band

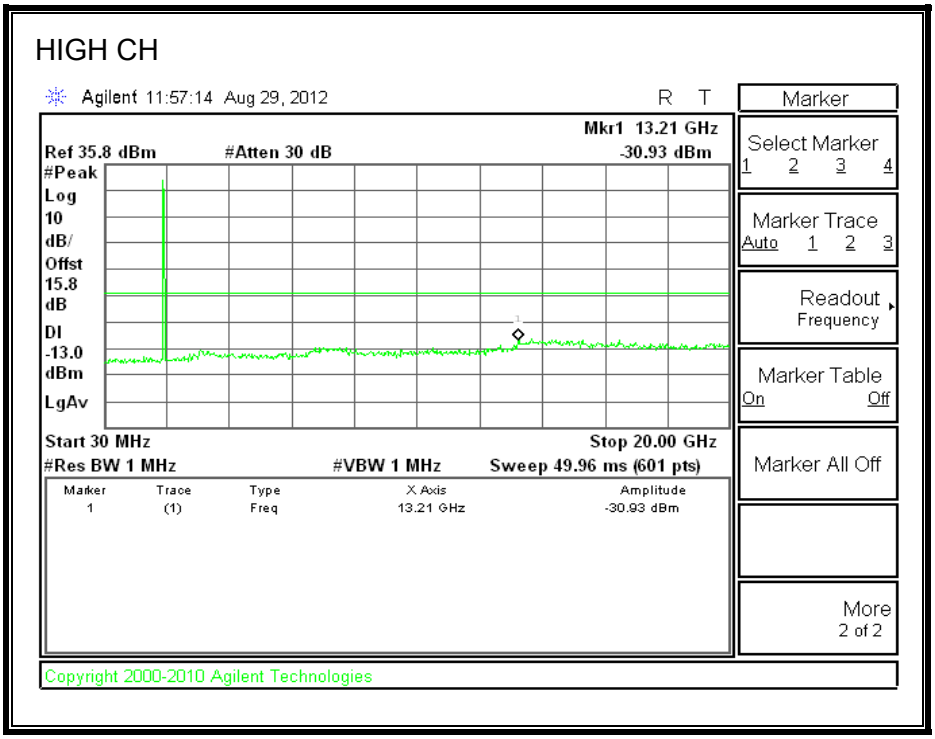
LOW CH



MID CH



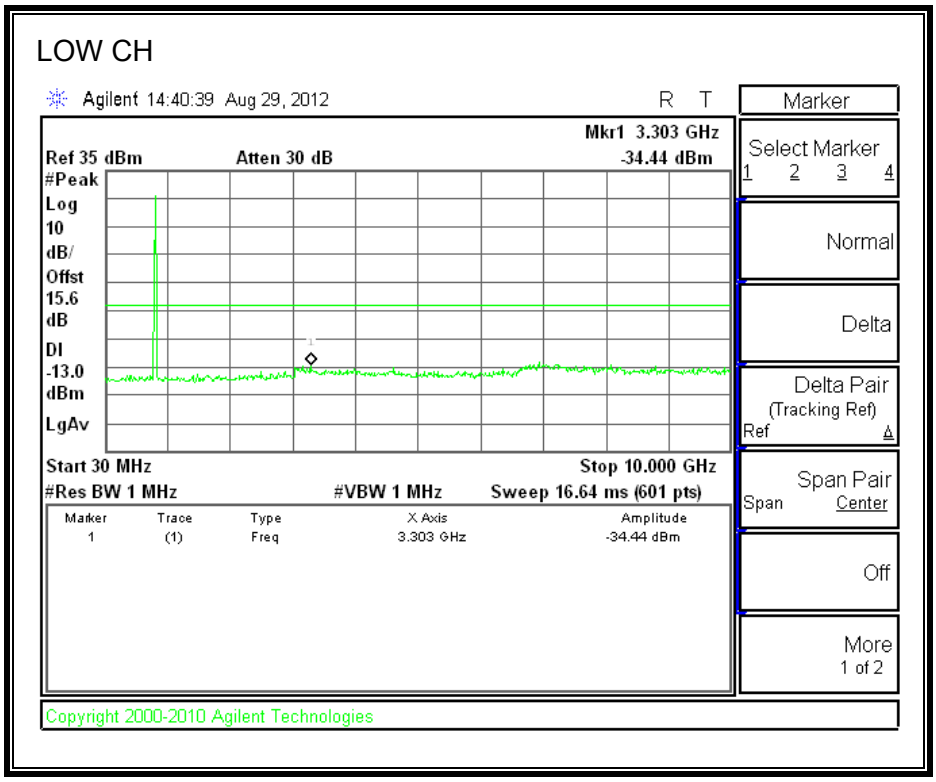
HIGH CH



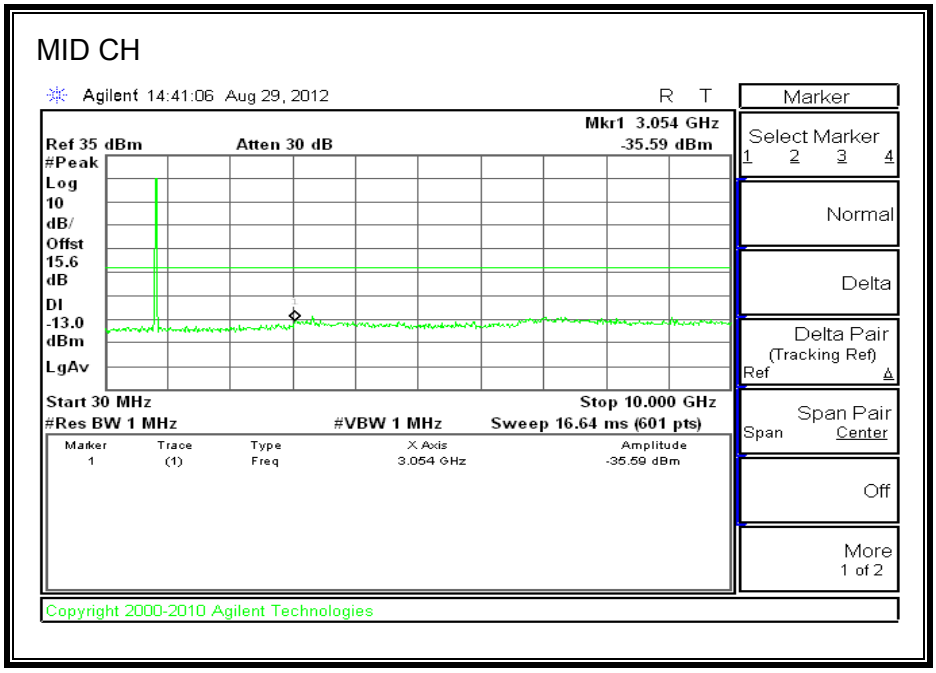
8.3.2. WCDMA

CELL BAND, REL 99

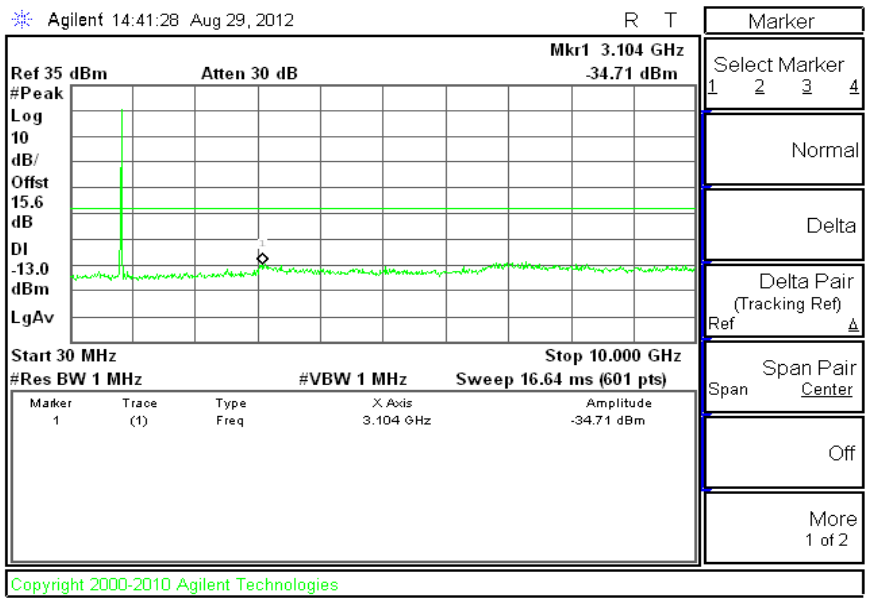
LOW CH



MID CH

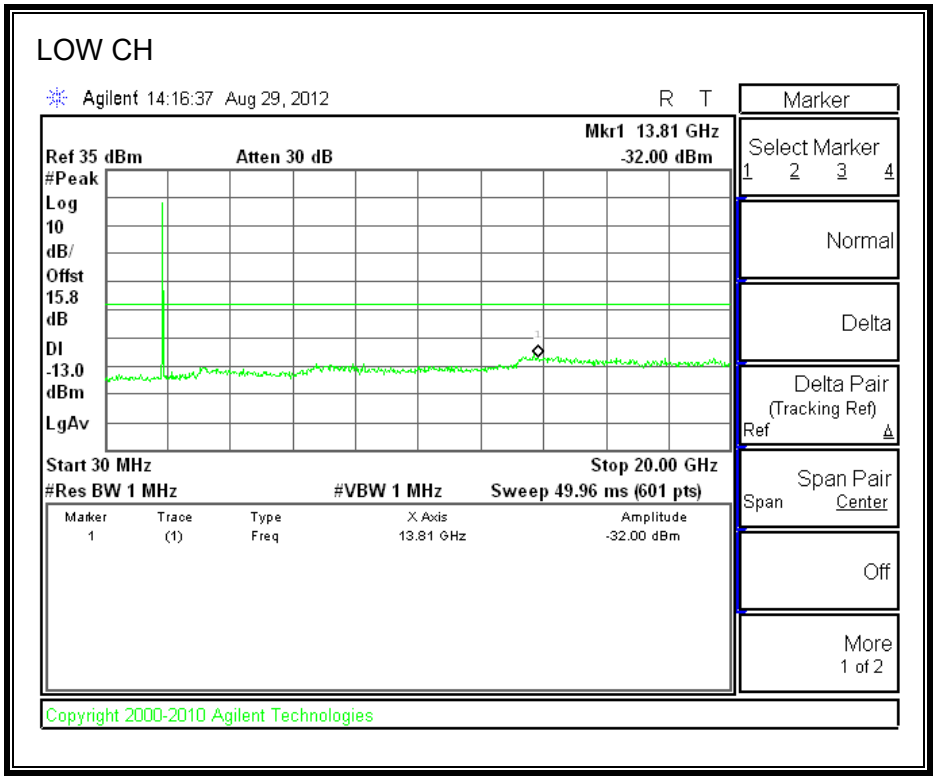


HIGH CH



PCS BAND, REL 99

LOW CH



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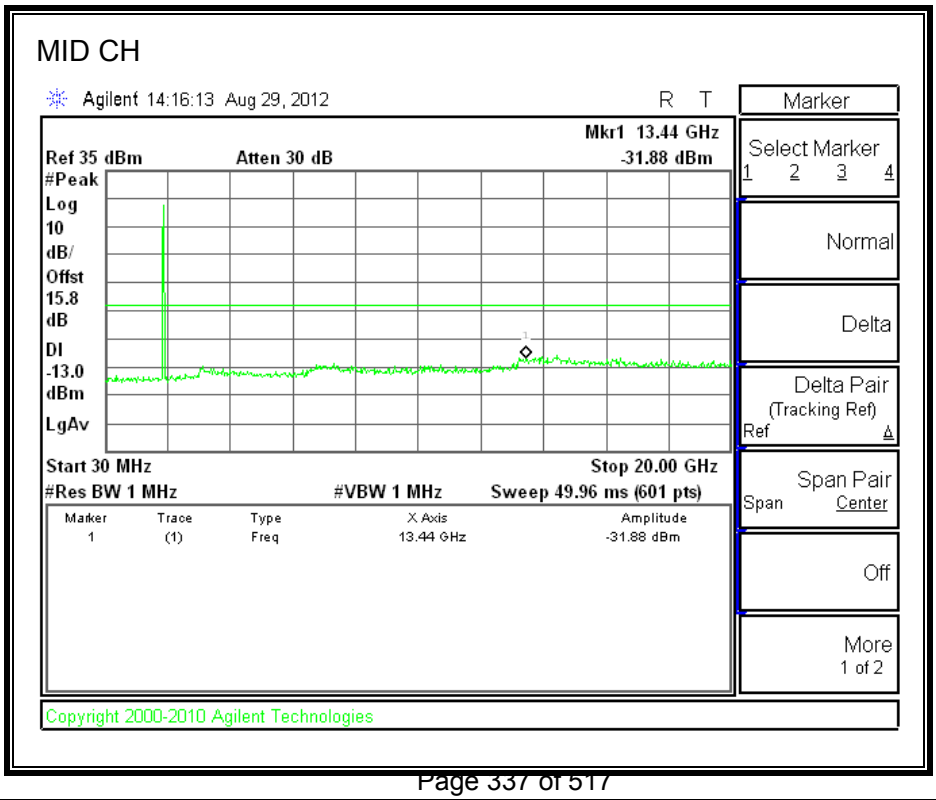
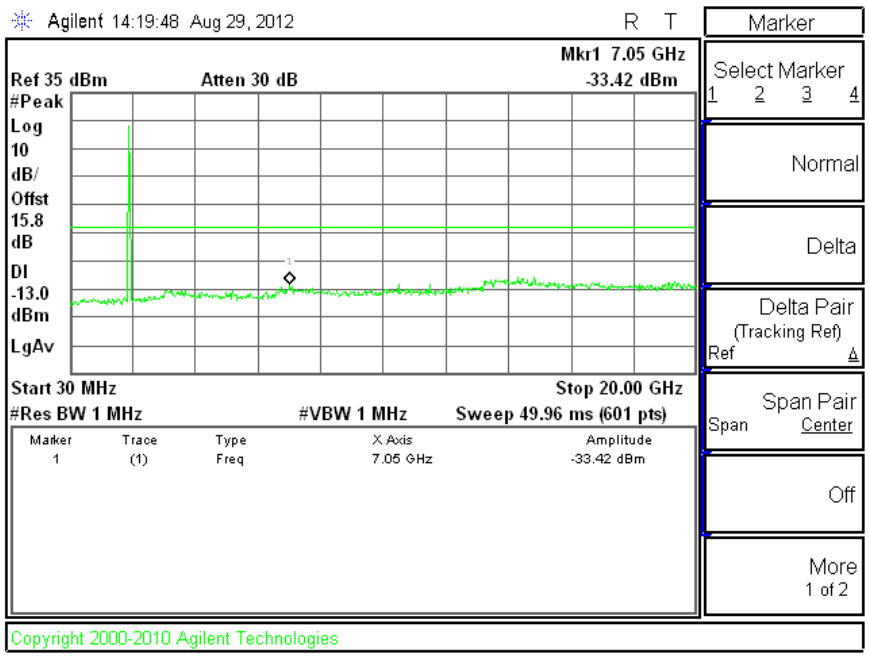
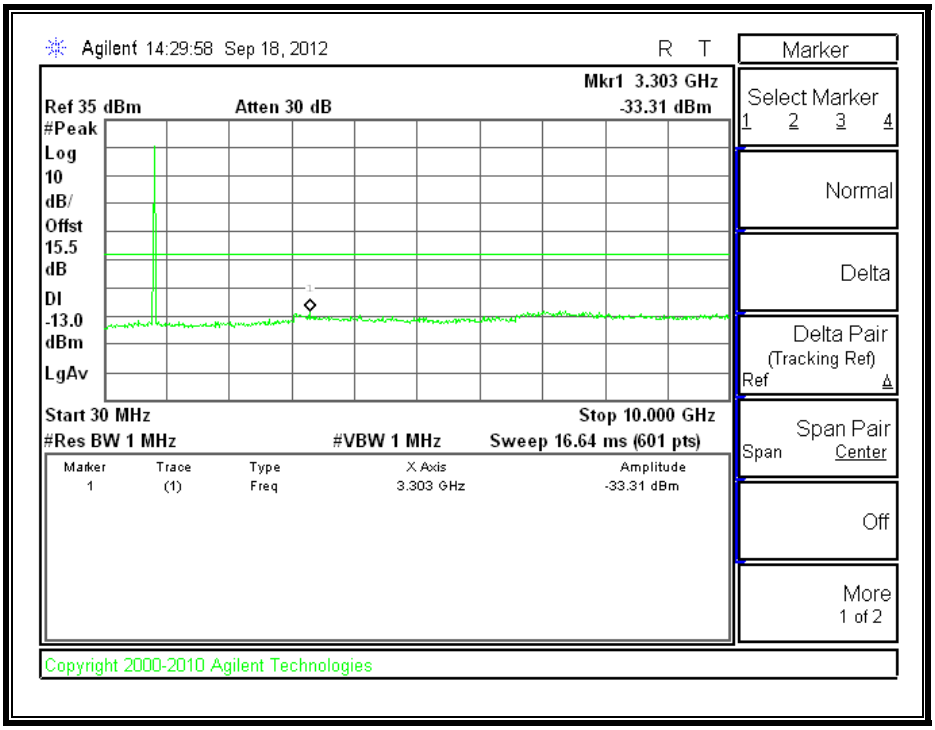
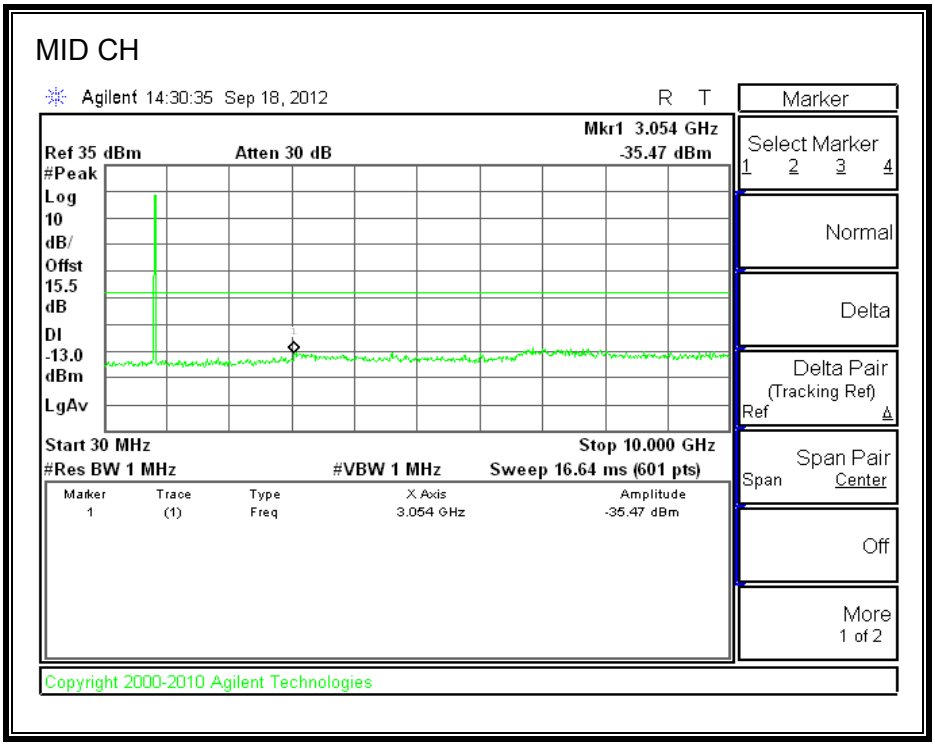


HIGH CH

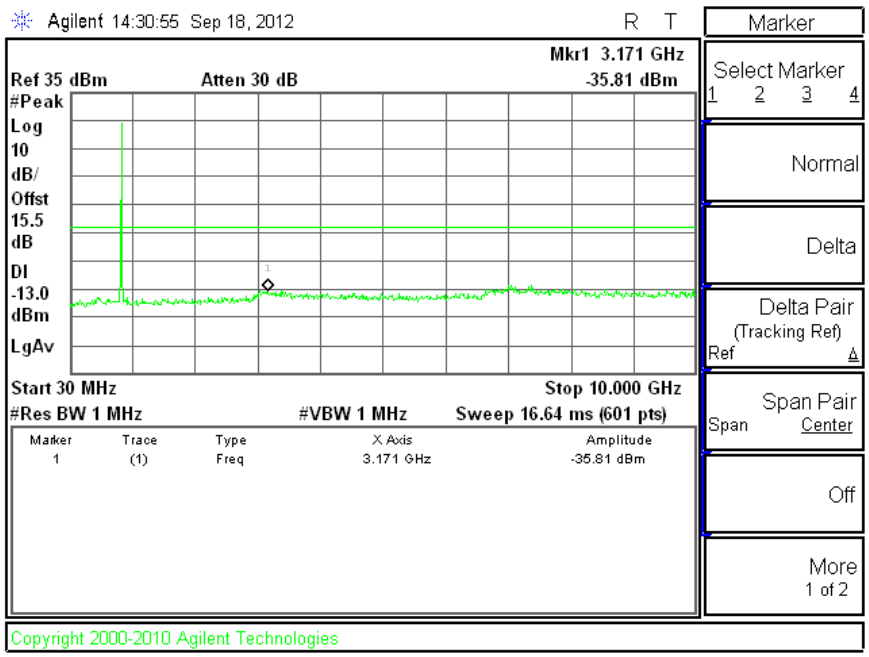


CELL BAND, HSUPA,

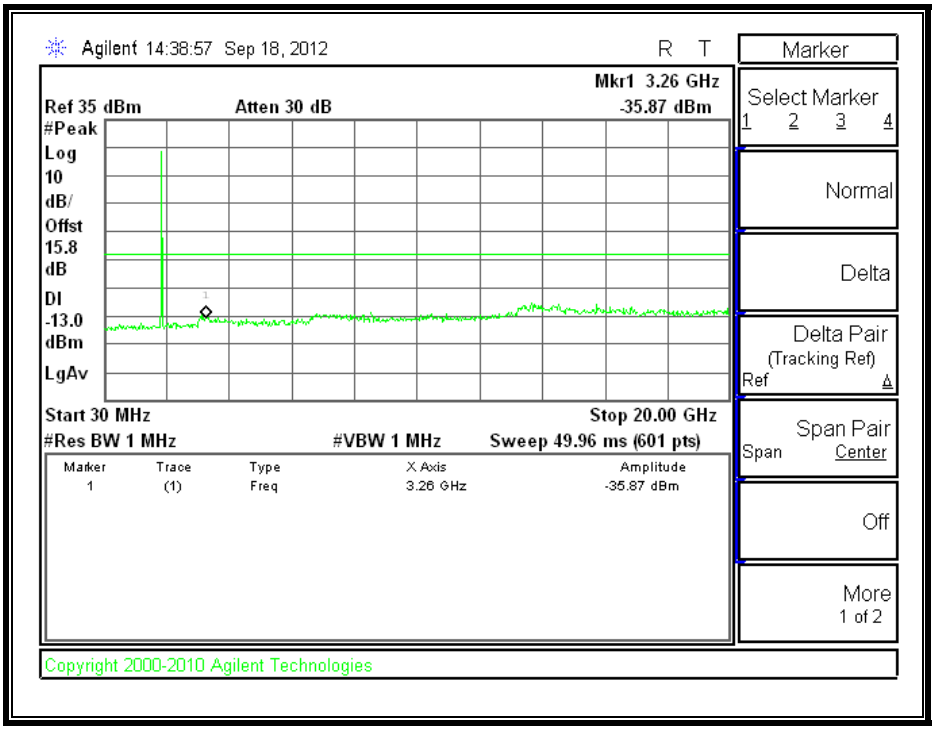


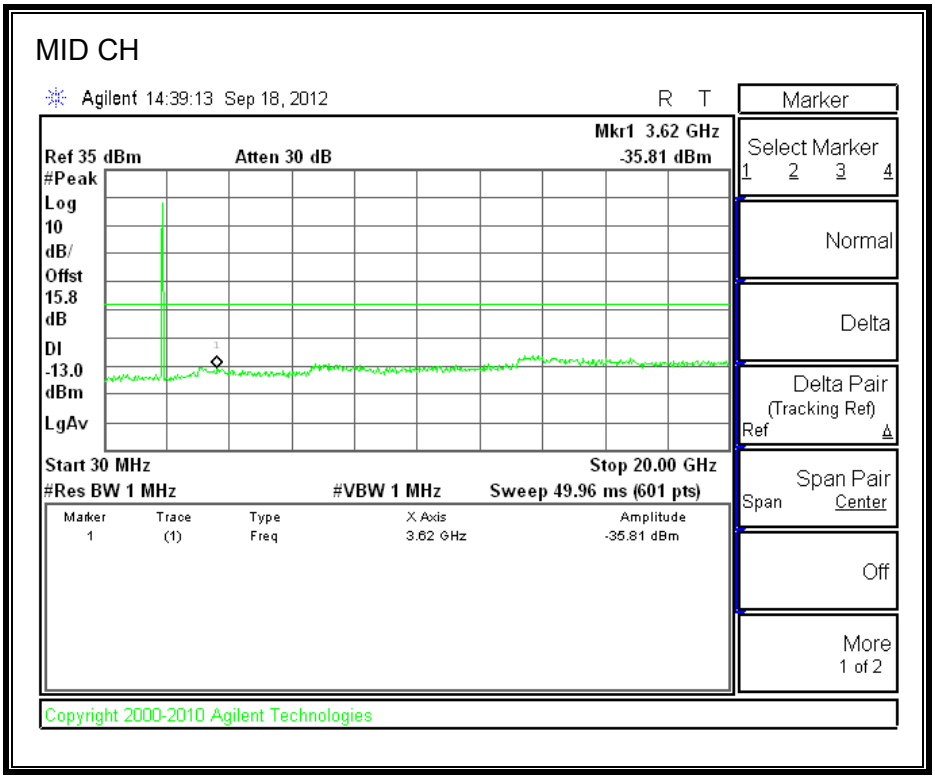


HIGH CH

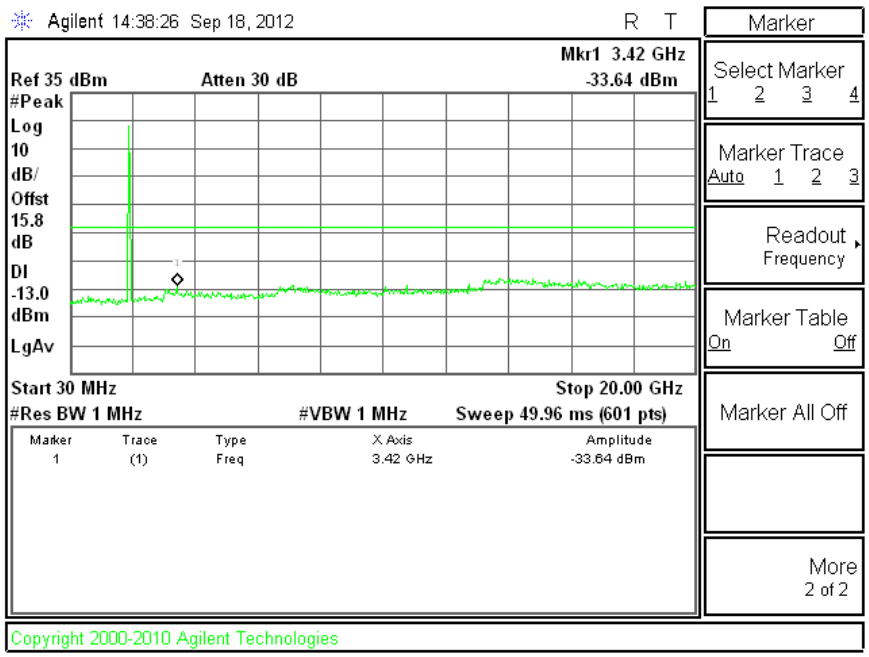


PCS BAND, HSUPA





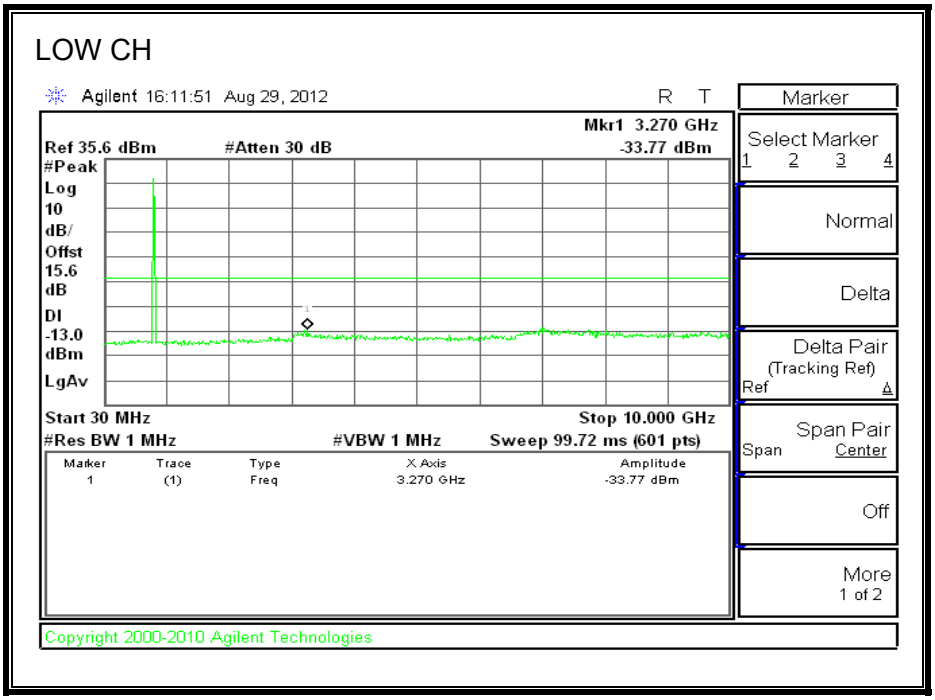
HIGH CH



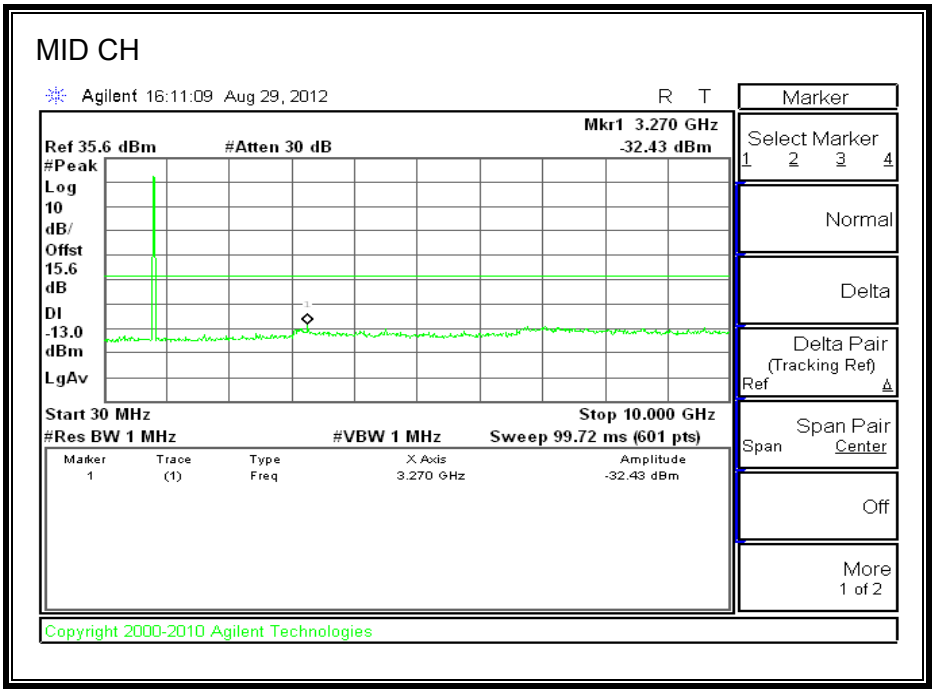
8.3.3. CDMA, BC10

1xRTT

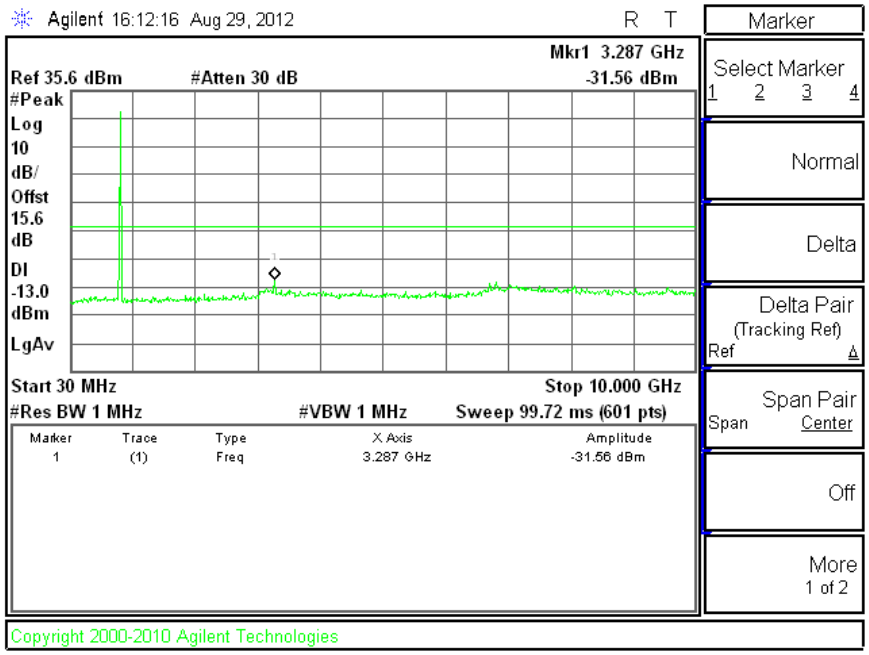
LOW CH



MID CH

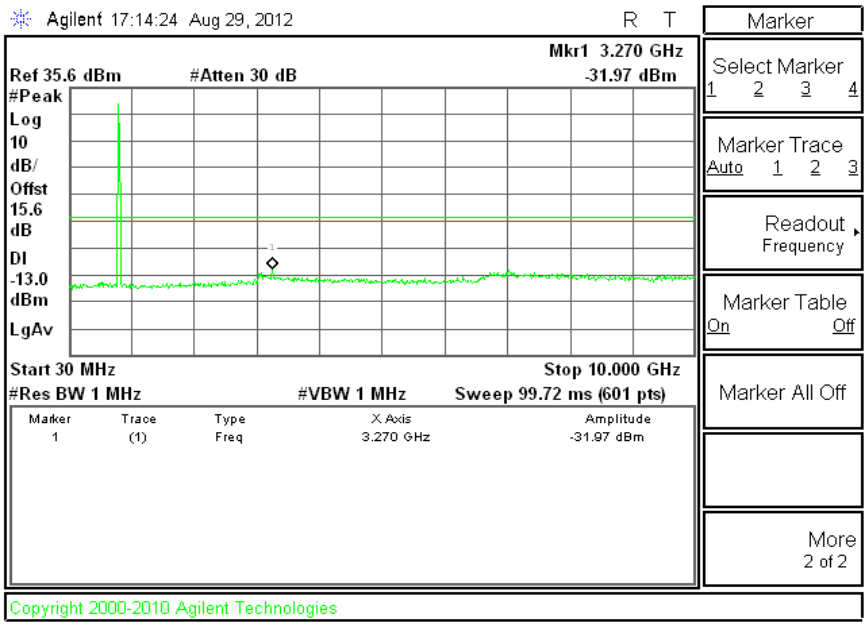


HIGH CH



EVDO

LOW CH



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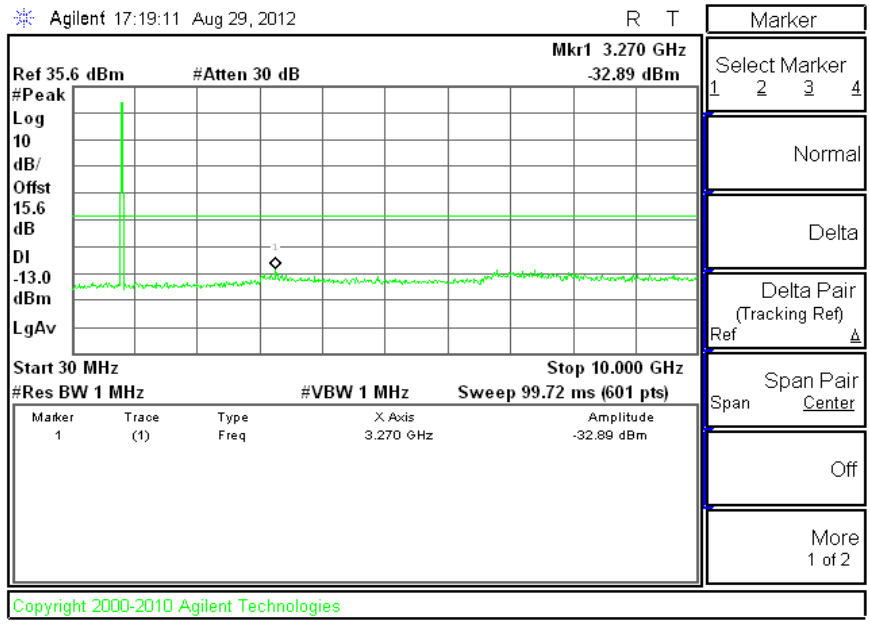
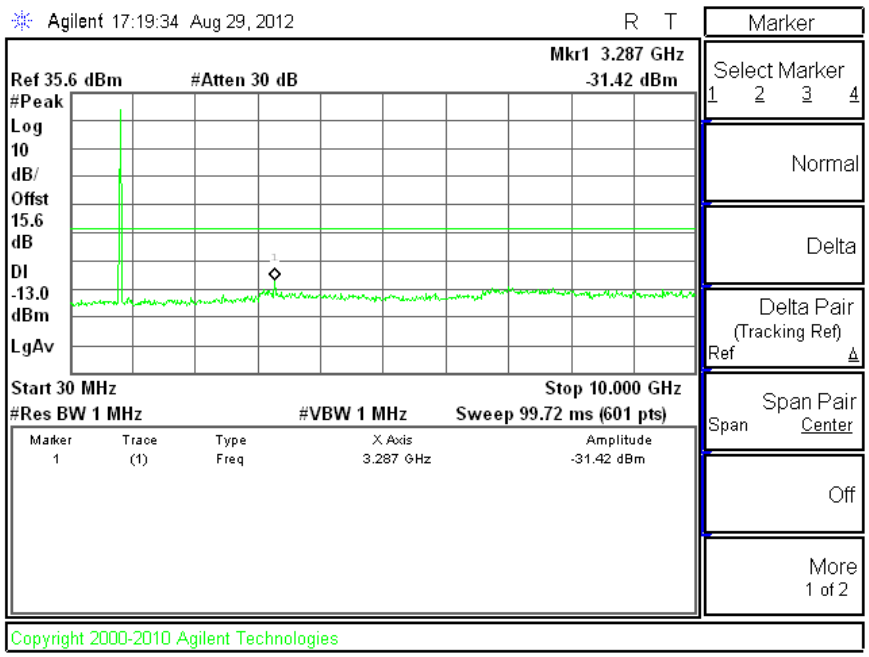


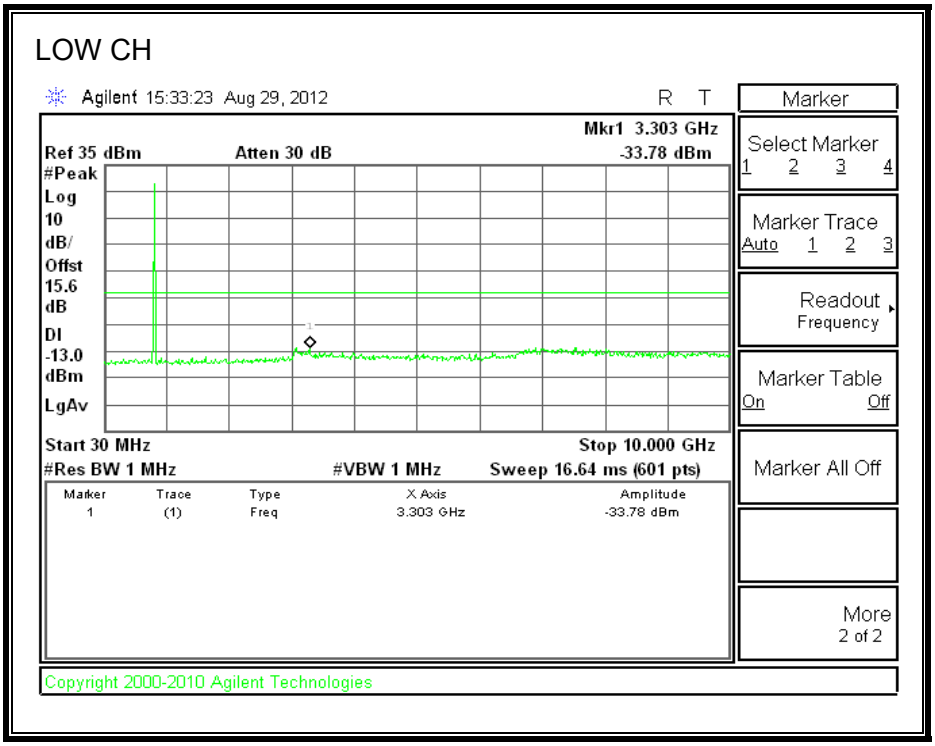
HIGH CH



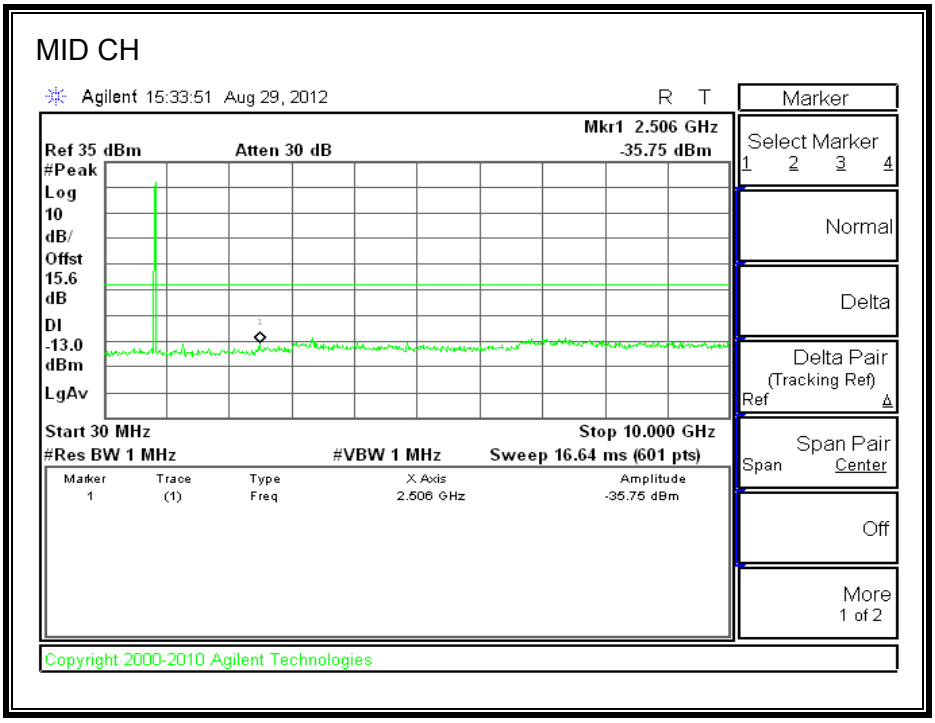
8.3.4. CDMA, BC0 and BC1

CELL BAND, 1xRTT

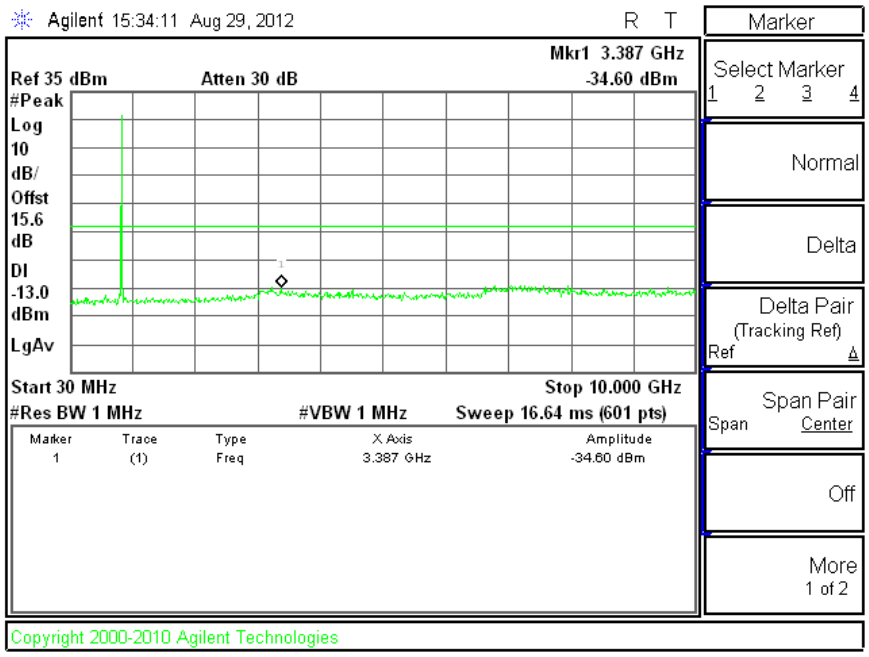
LOW CH



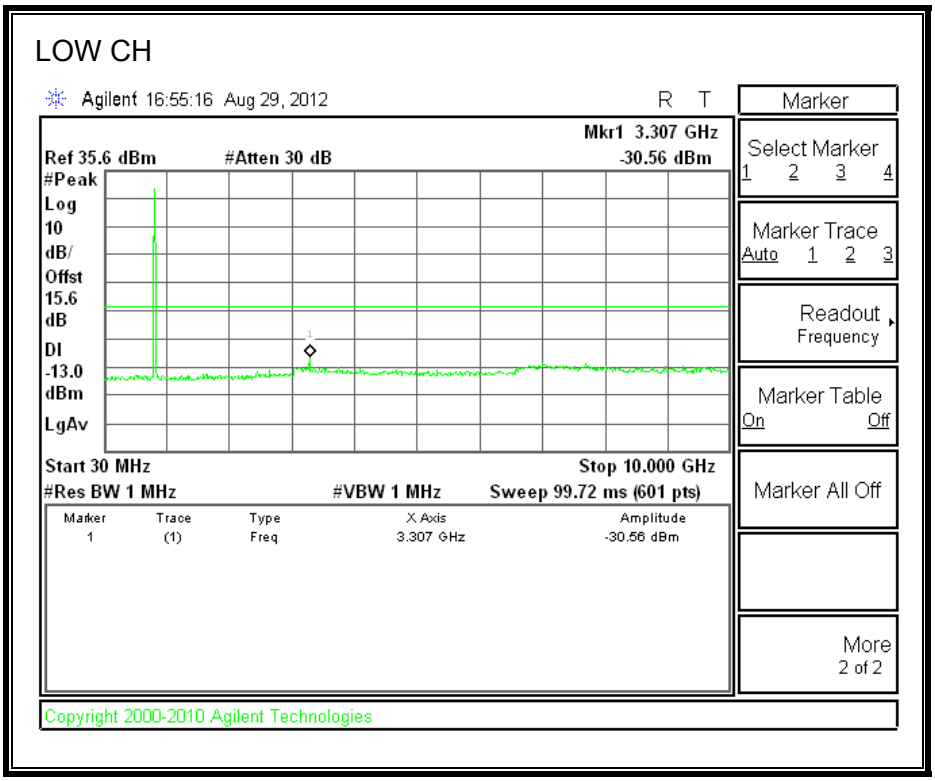
MID CH



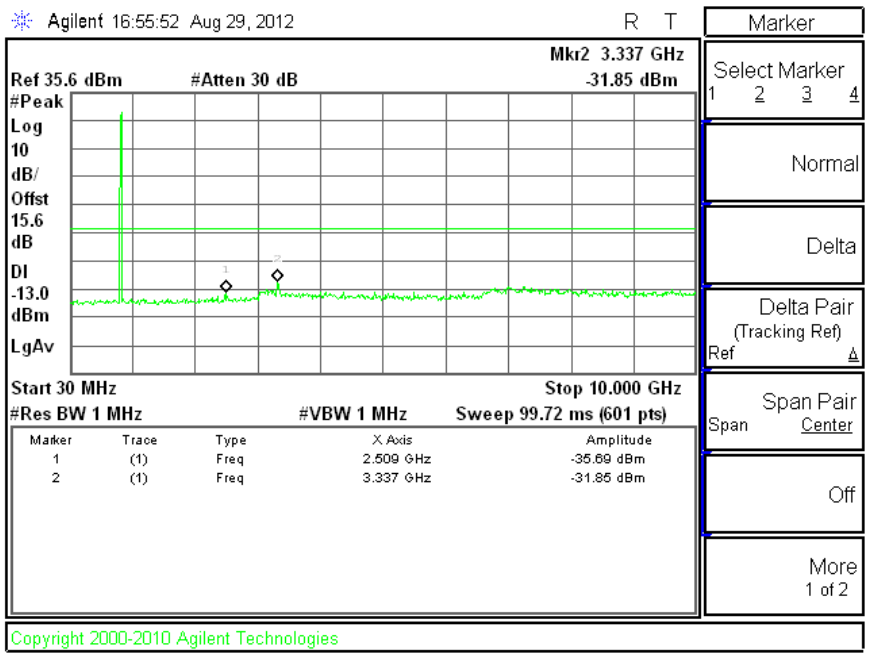
HIGH CH



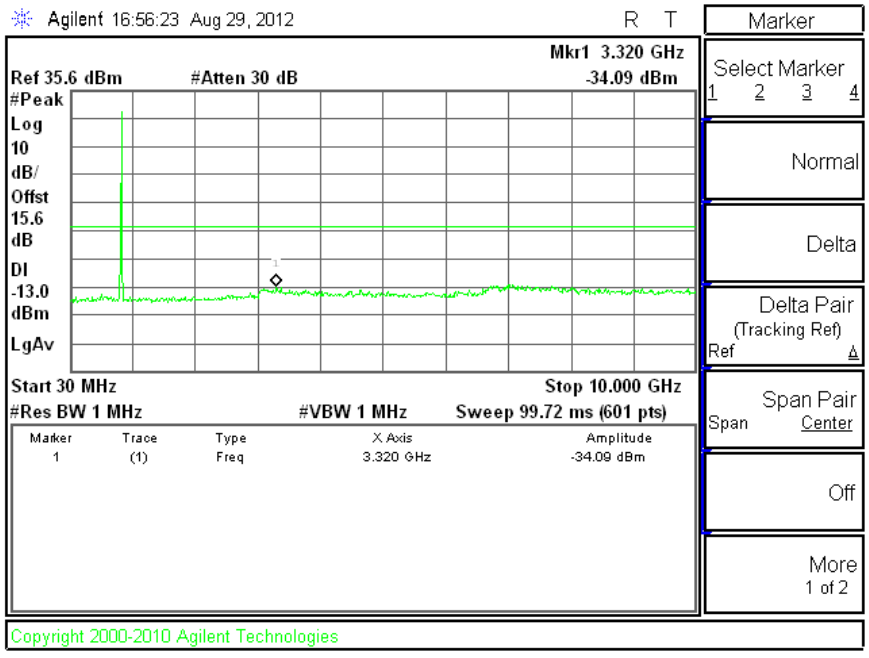
Cell BAND, EVDO, Rev A



MID CH

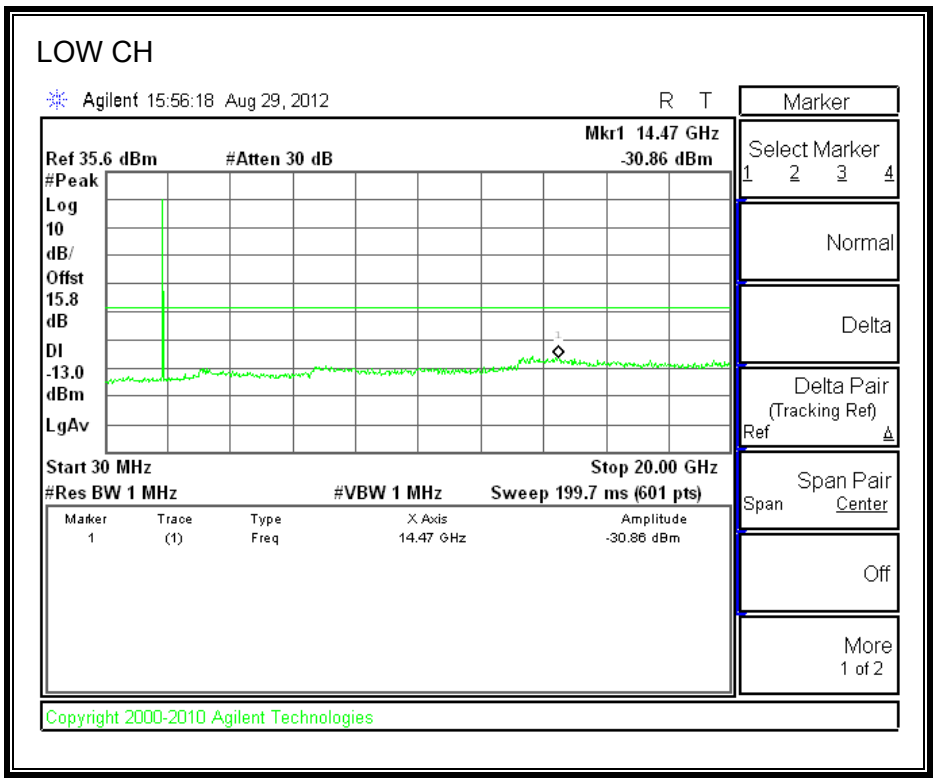


HIGH CH

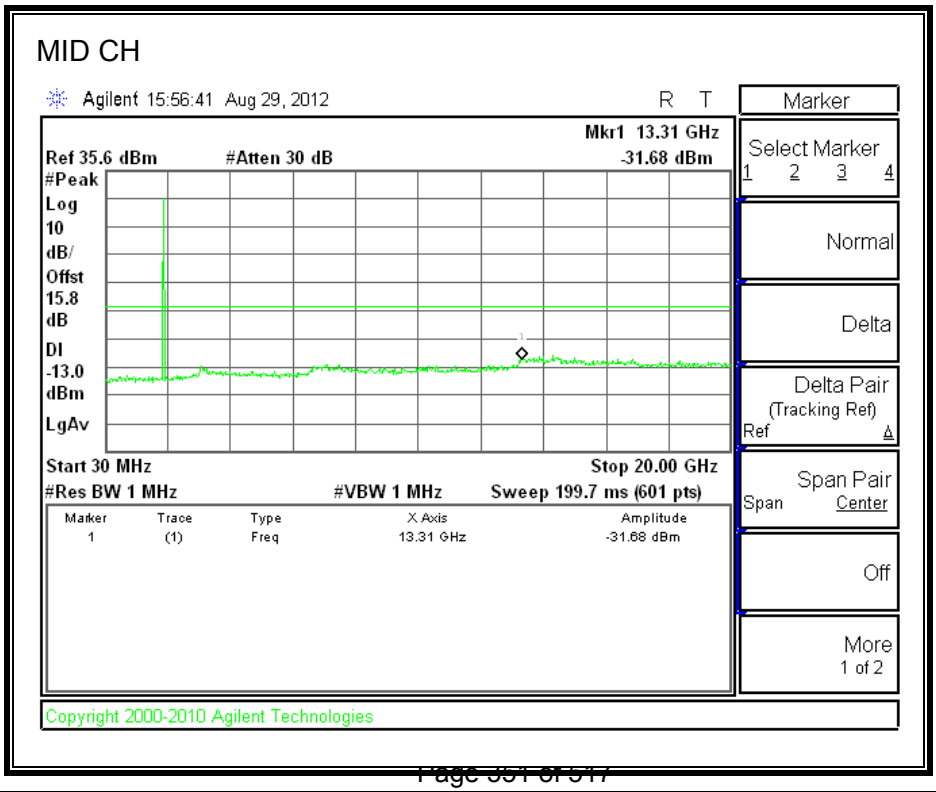


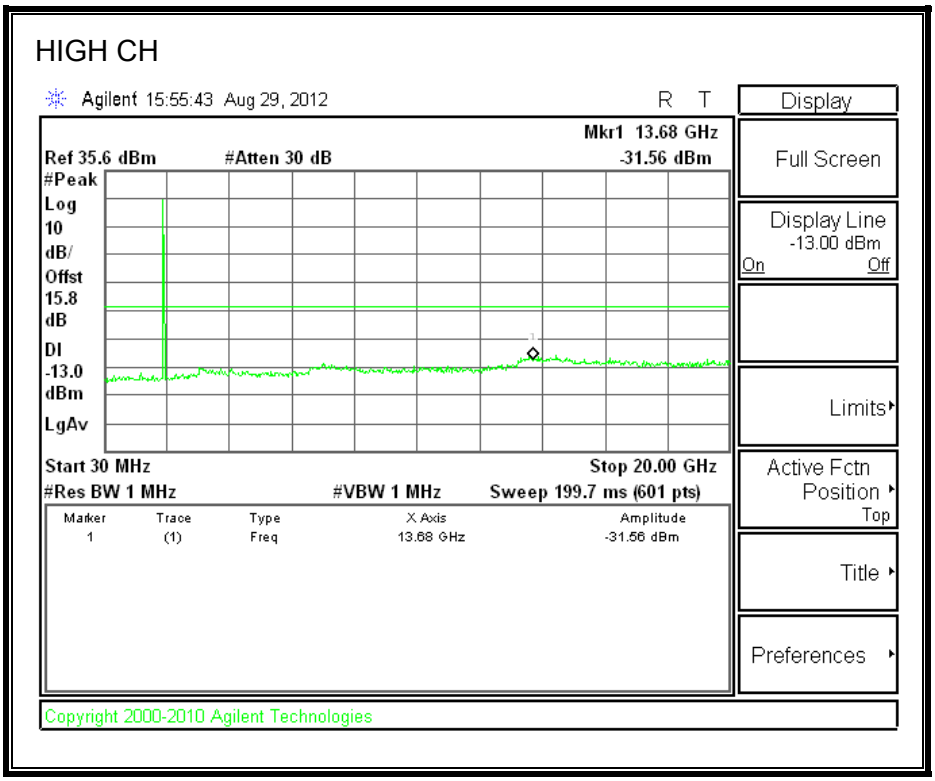
BC1, PCS BAND, 1xRTT

LOW CH



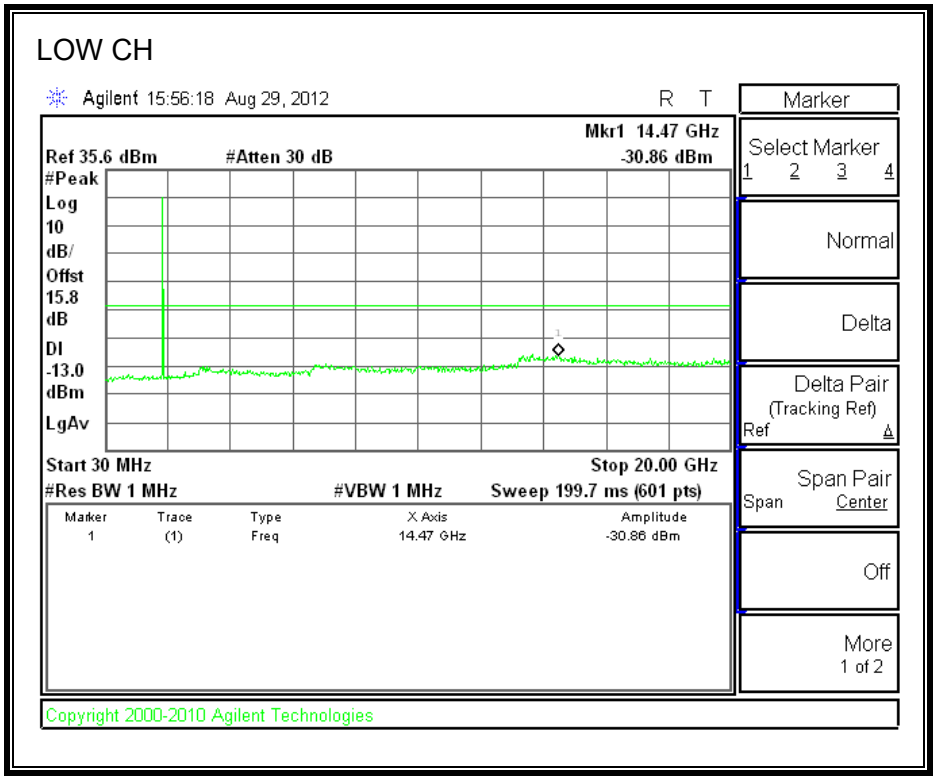
MID CH



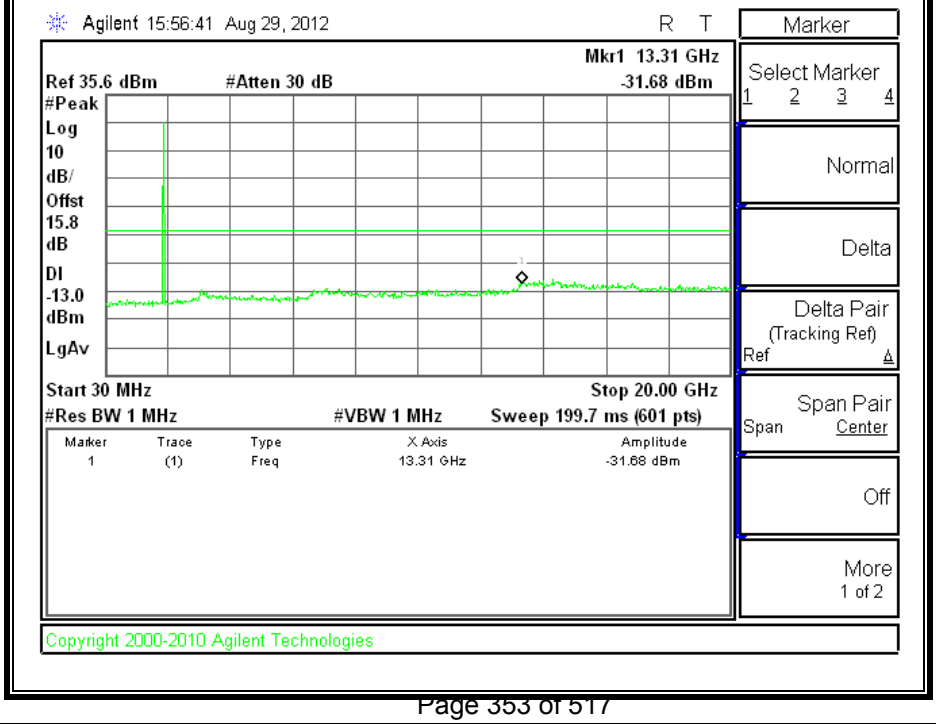


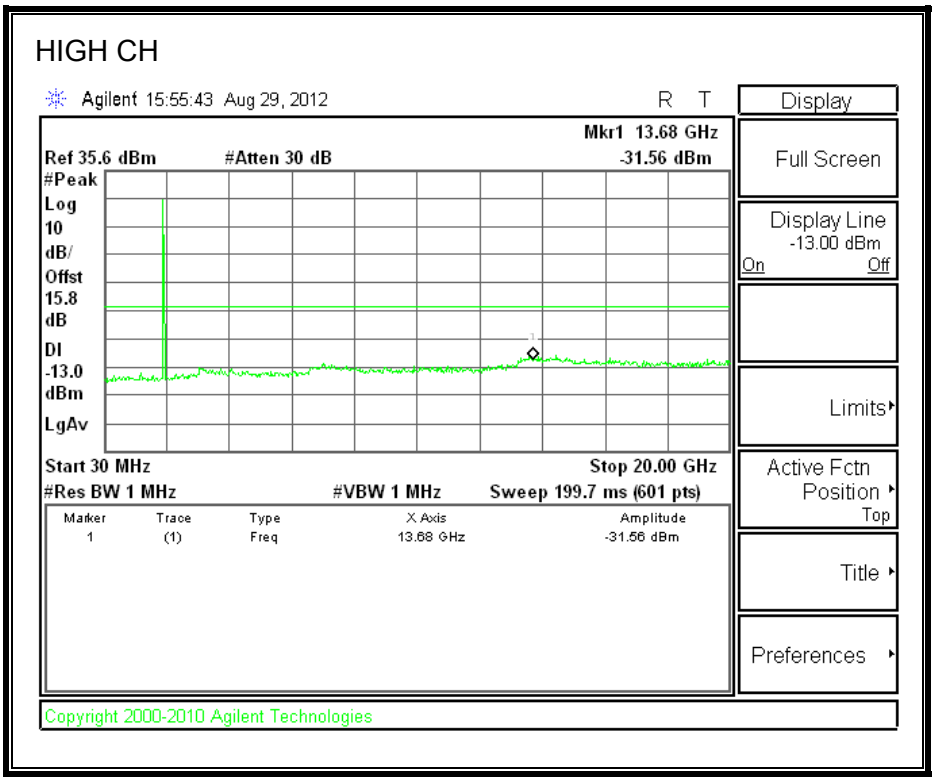
PCS BAND, EVDO Rev A

LOW CH



MID CH

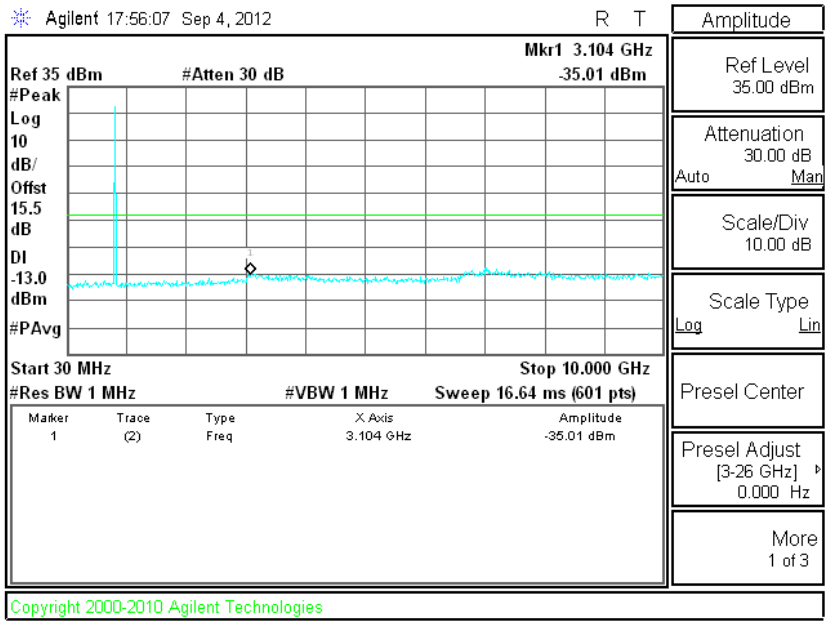




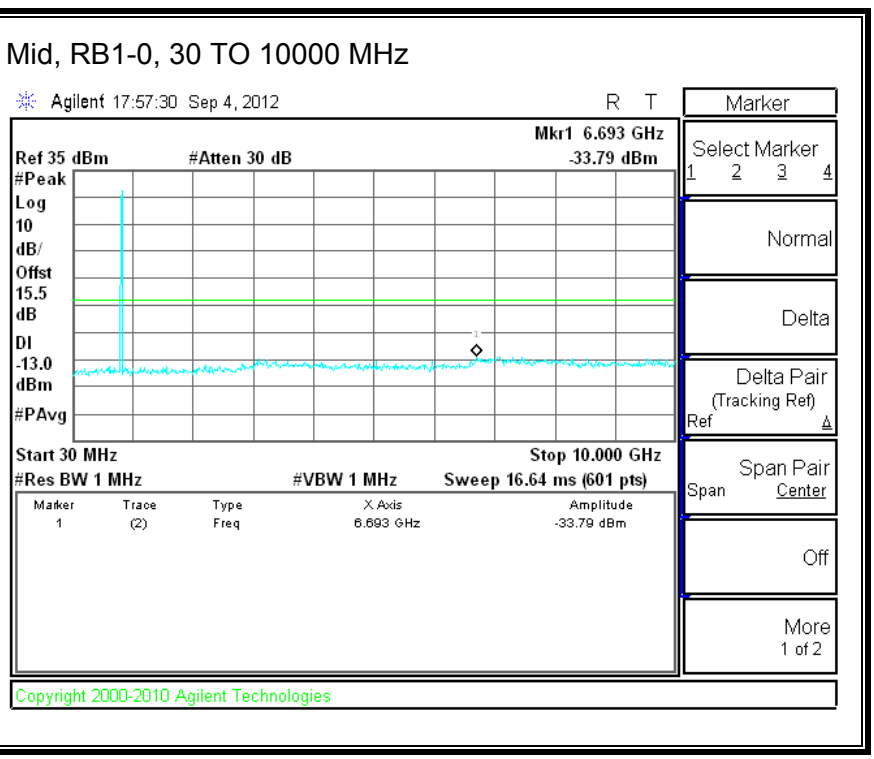
8.3.5. LTE BAND 5

LTE QPSK (1.4 MHz BANDWIDTH)

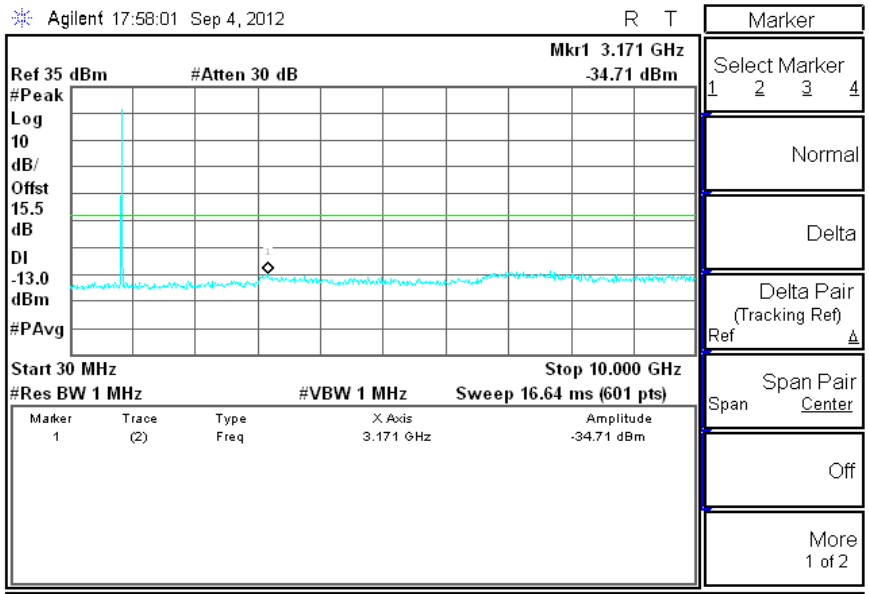
LOW, RB1-0, 30 TO 10000 MHz



Mid, RB1-0, 30 TO 10000 MHz

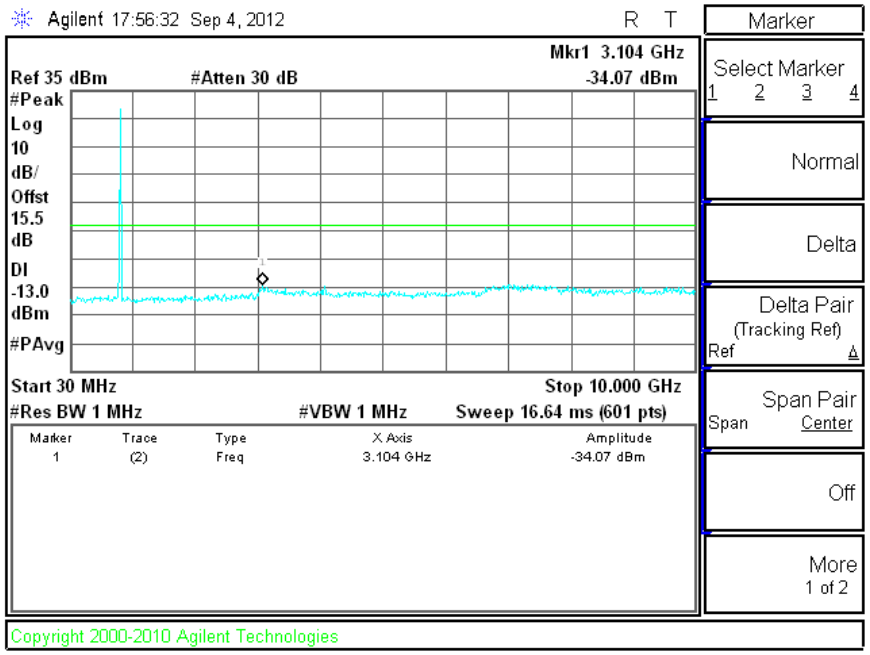


High, RB1-0, 30 TO 10000 MHz

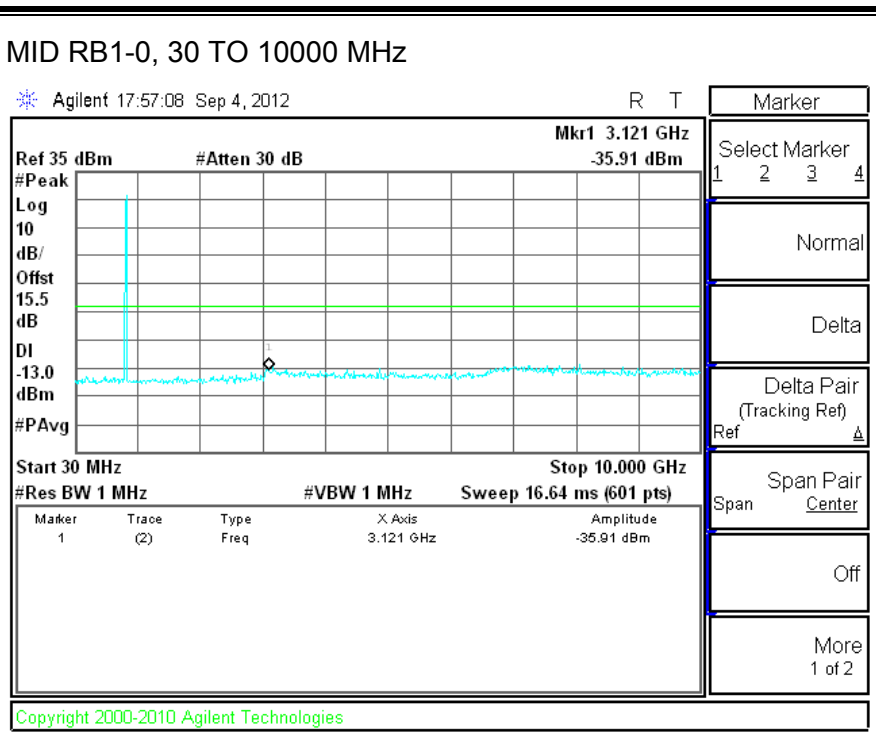


LTE 16QAM

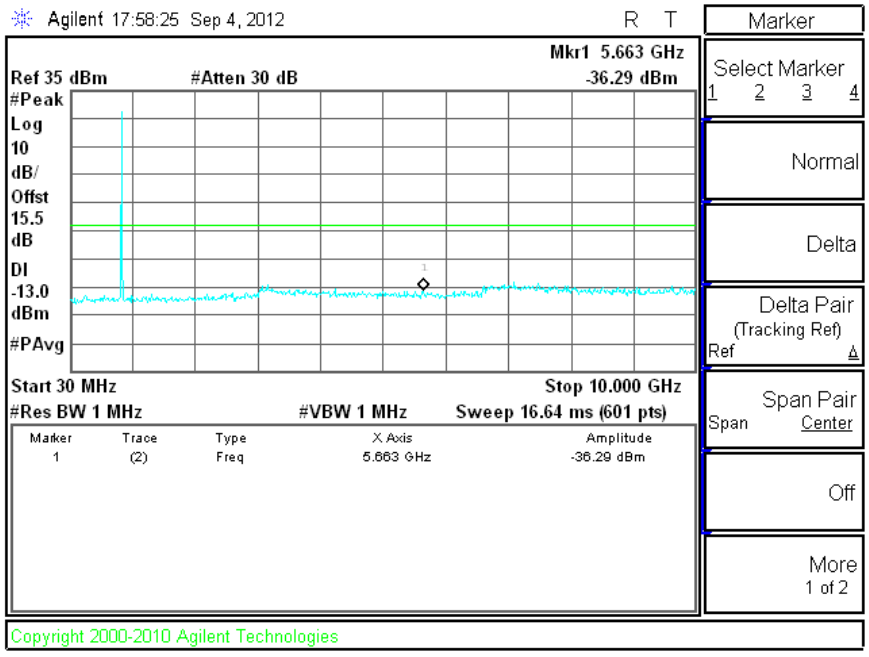
LOW, RB1-0, 30 TO 10000 MHz



MID RB1-0, 30 TO 10000 MHz



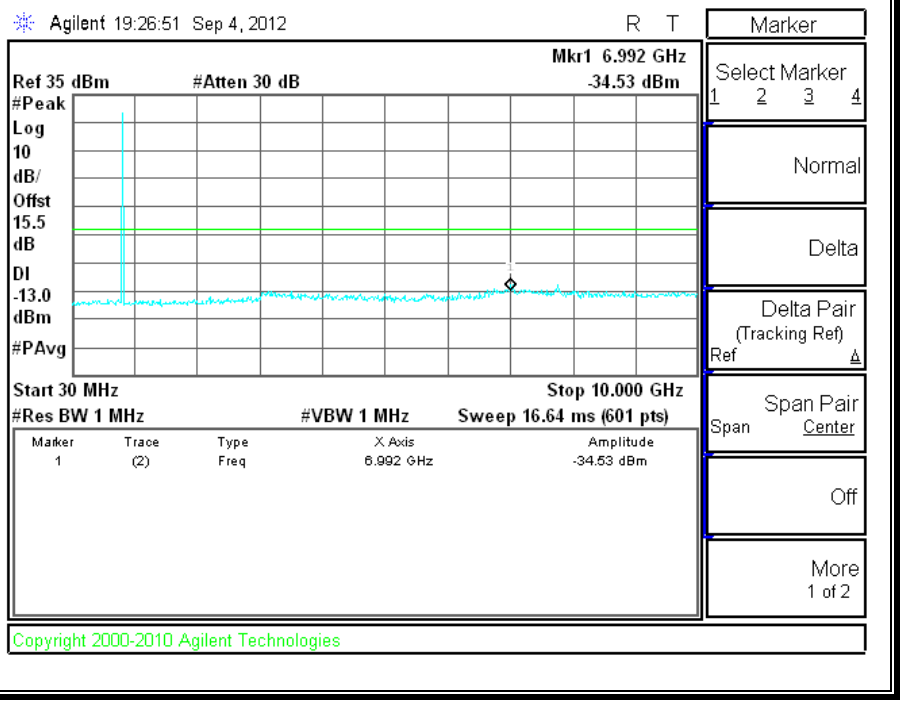
HIGH, RB1-0, 30 TO 10000 MHz



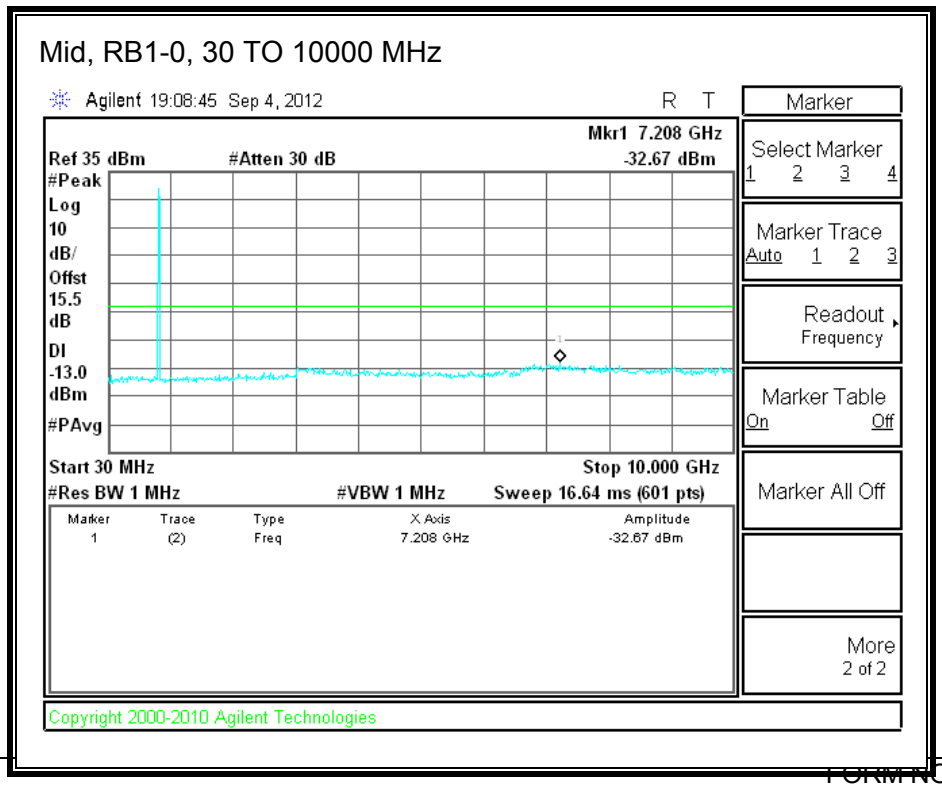
Band 5 (3.0 MHz BANDWIDTH)

LTE QPSK

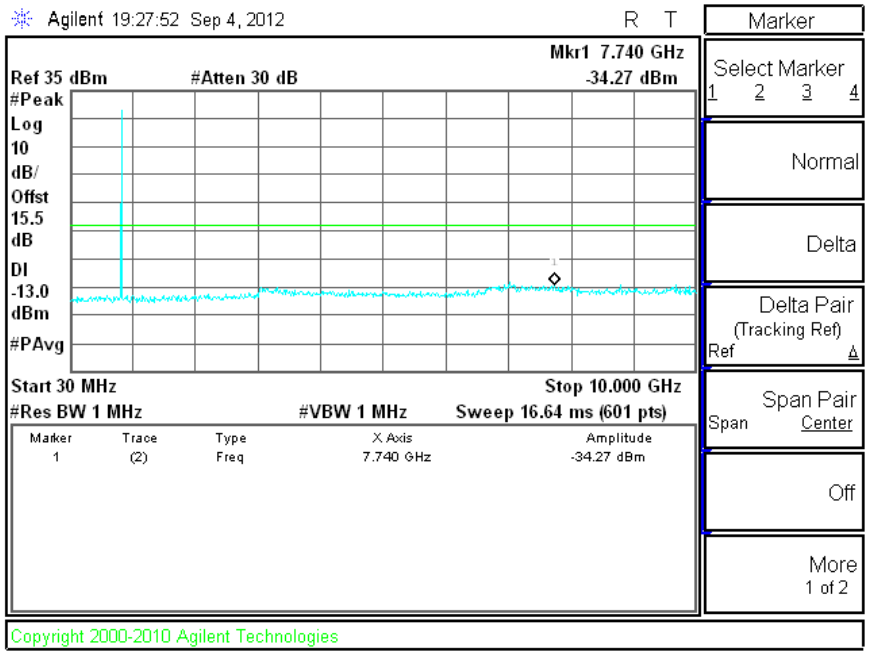
LOW, RB1-0, 30 TO 10000 MHz



Mid, RB1-0, 30 TO 10000 MHz

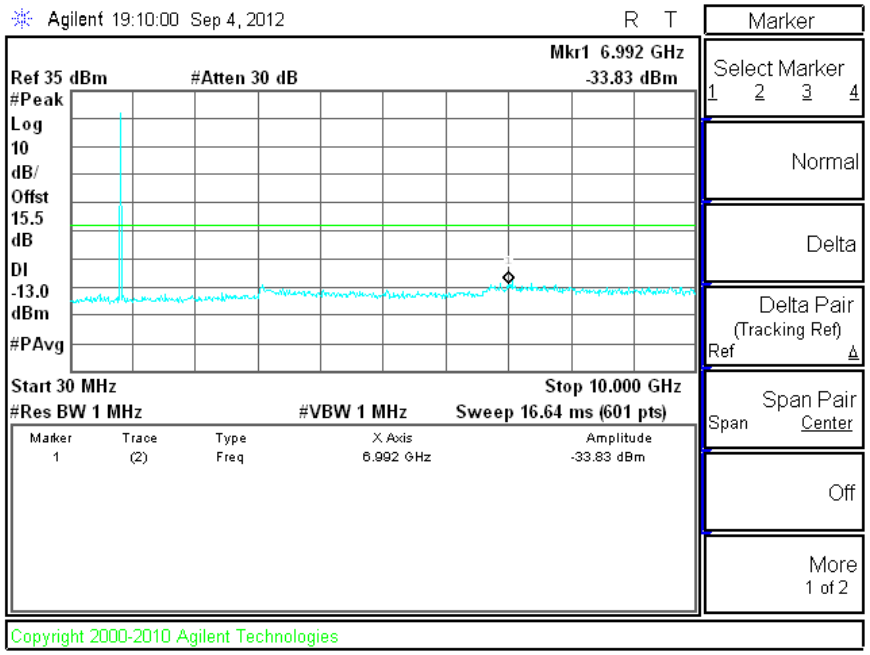


High, RB1-0, 30 TO 10000 MHz

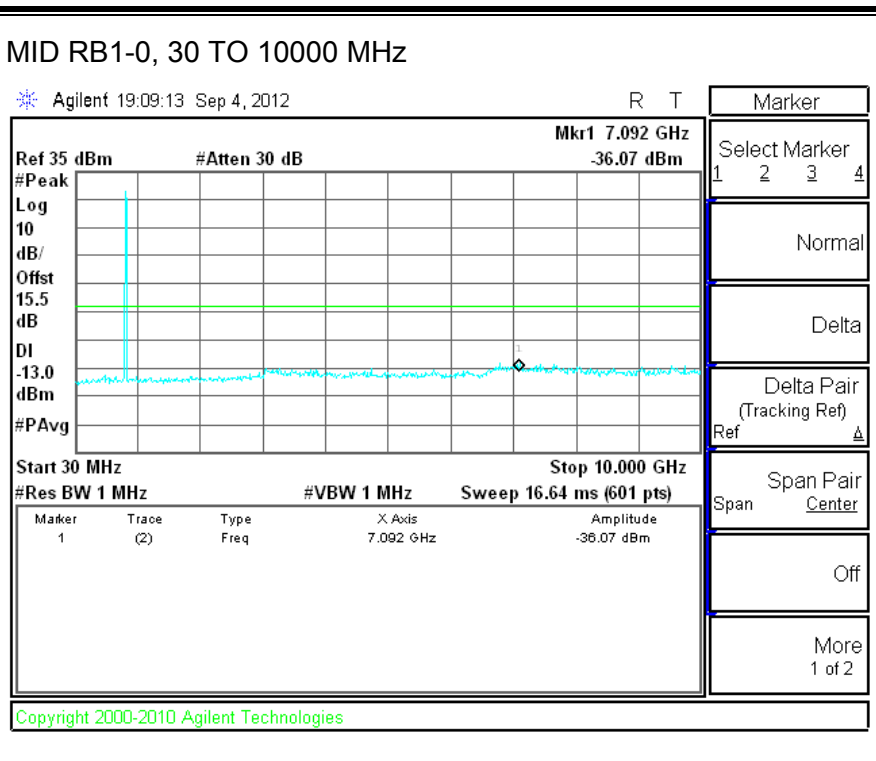


LTE 16QAM

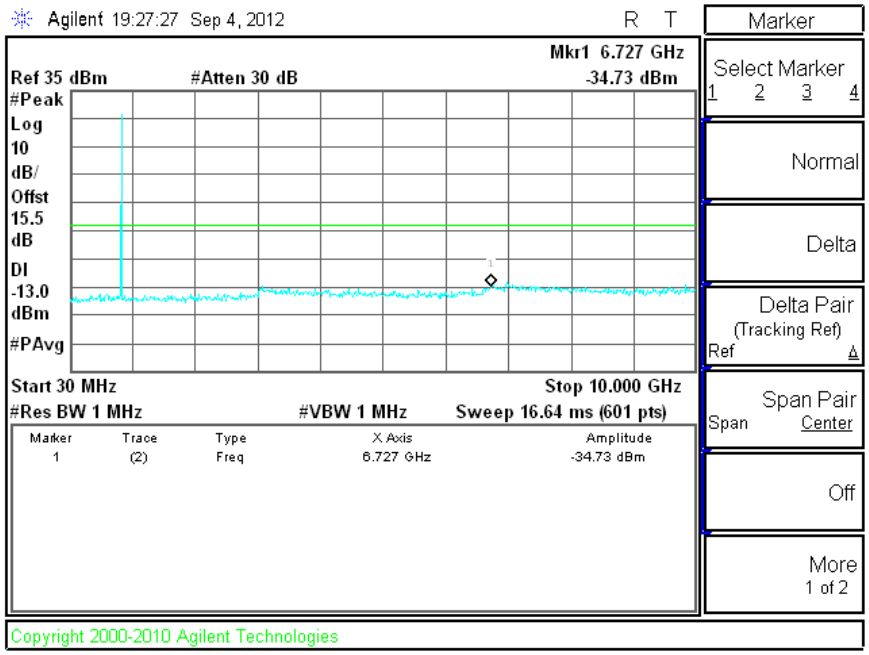
LOW, RB1-0, 30 TO 10000 MHz



MID RB1-0, 30 TO 10000 MHz



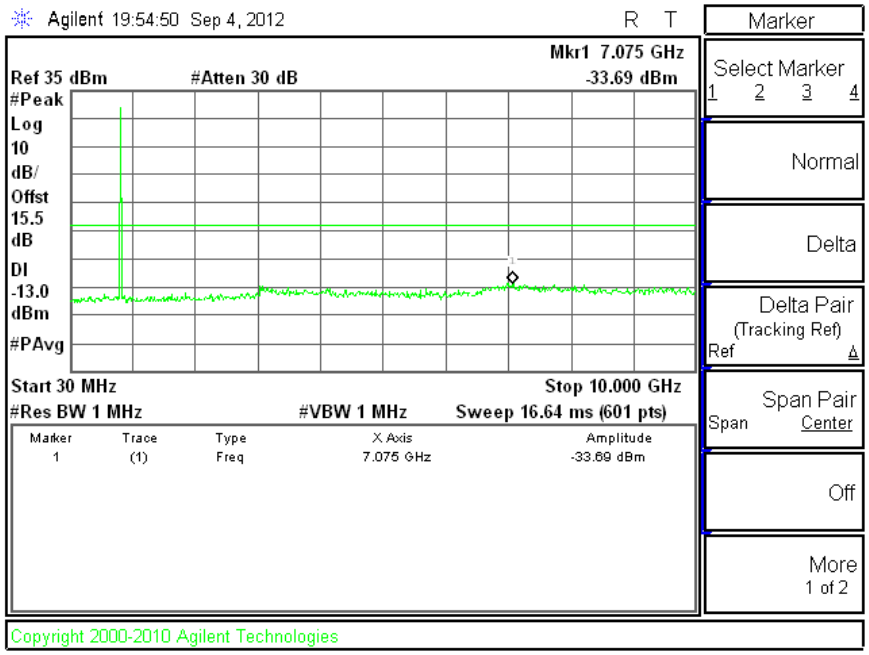
HIGH, RB1-0, 30 TO 10000 MHz



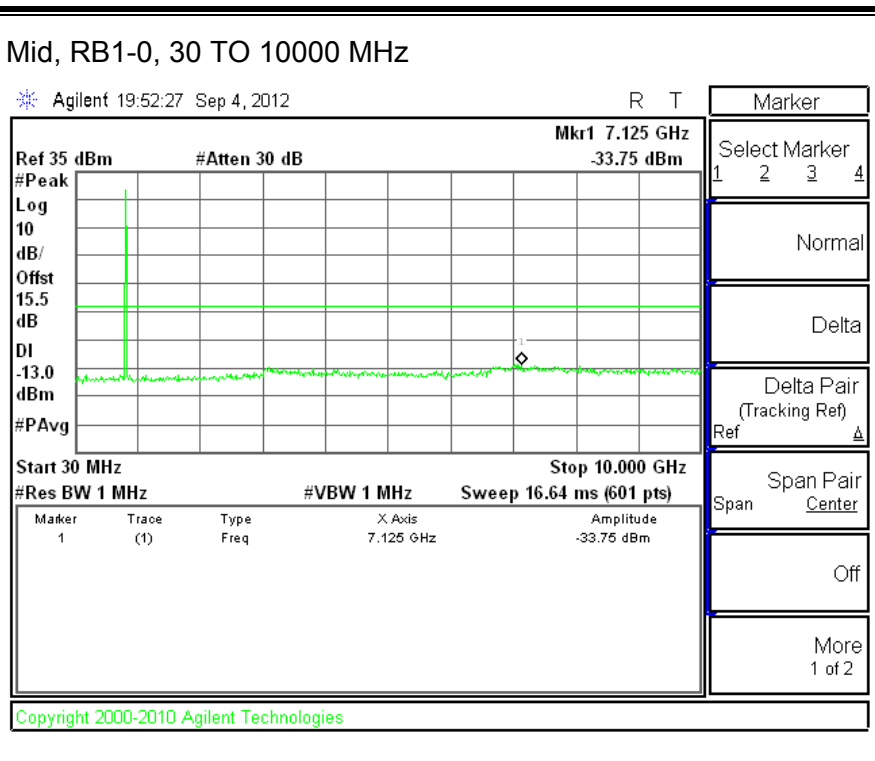
Band 5 (5 MHz BANDWIDTH)

LTE QPSK

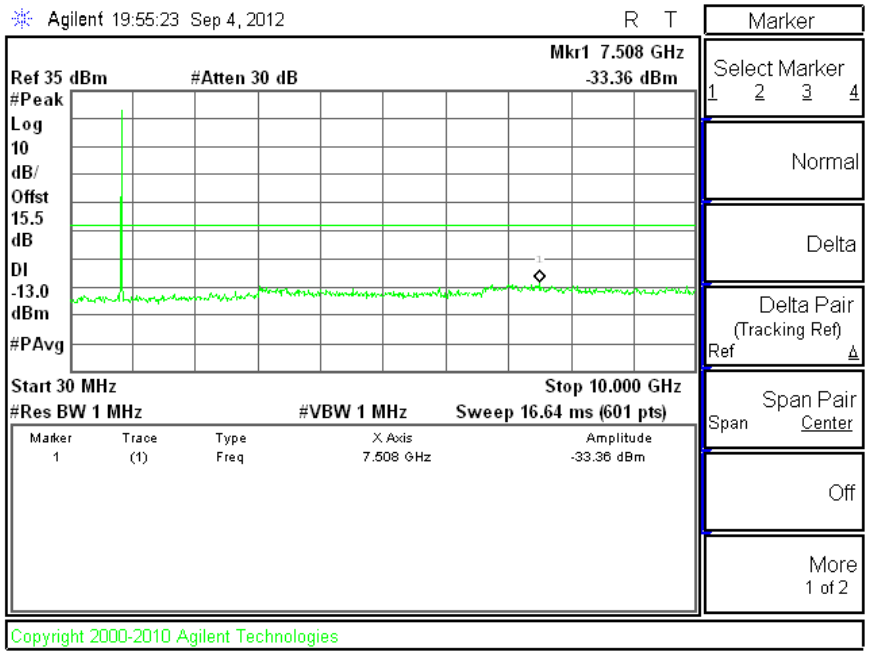
LOW, RB1-0, 30 TO 10000 MHz



Mid, RB1-0, 30 TO 10000 MHz

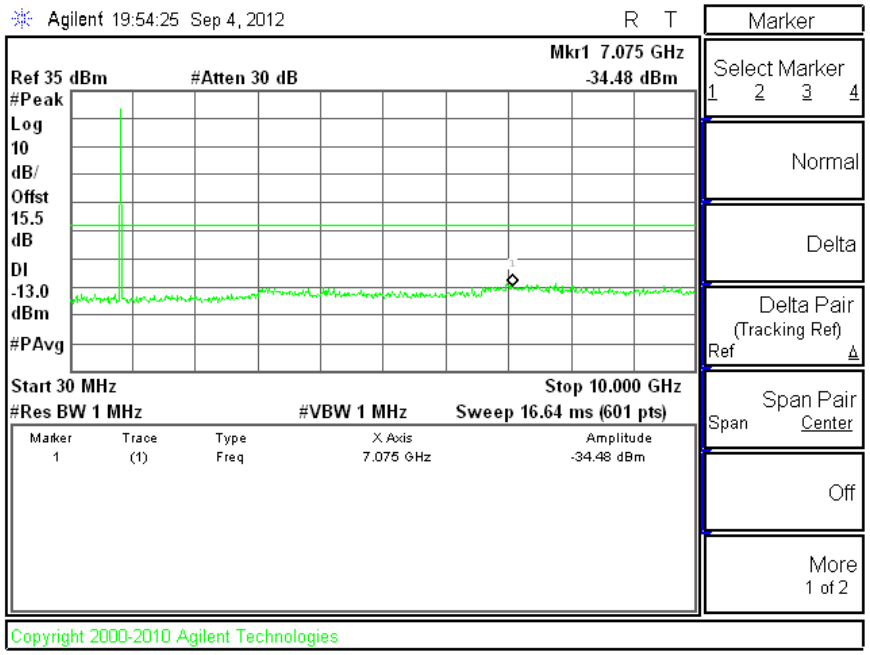


High, RB1-0, 30 TO 10000 MHz

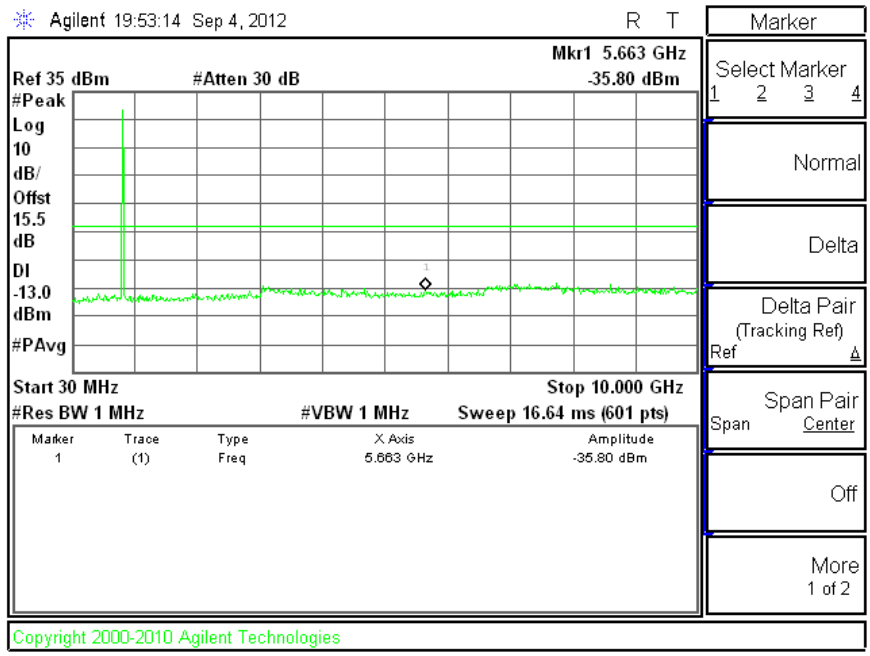


LTE 16QAM

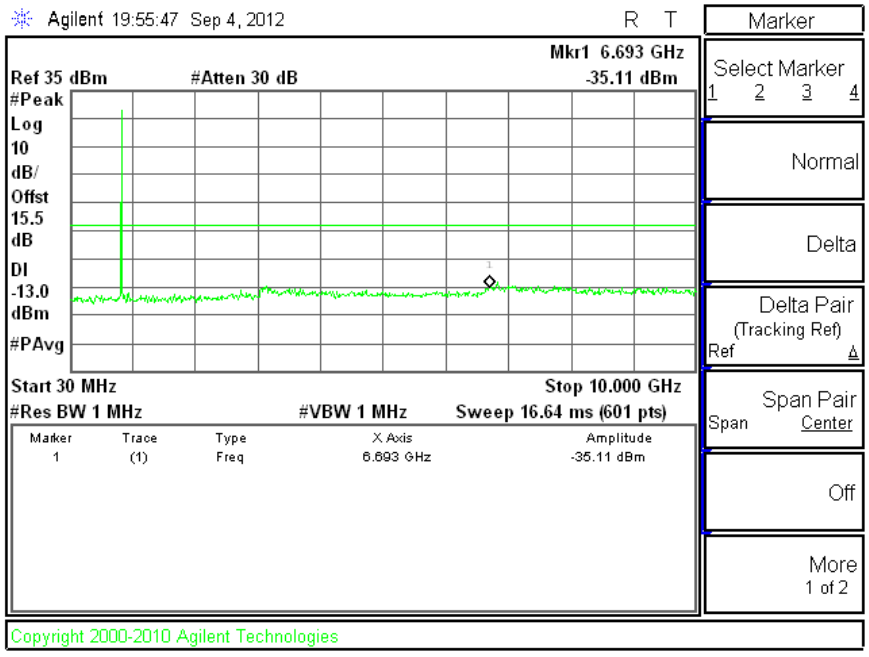
LOW, RB1-0, 30 TO 10000 MHz



MID RB1-0, 30 TO 10000 MHz



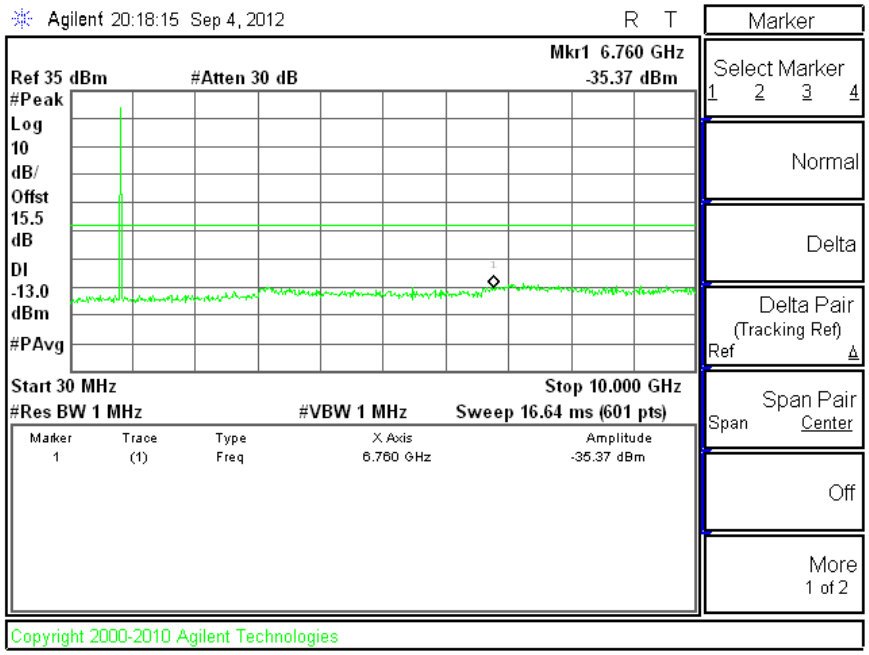
HIGH, RB1-0, 30 TO 10000 MHz



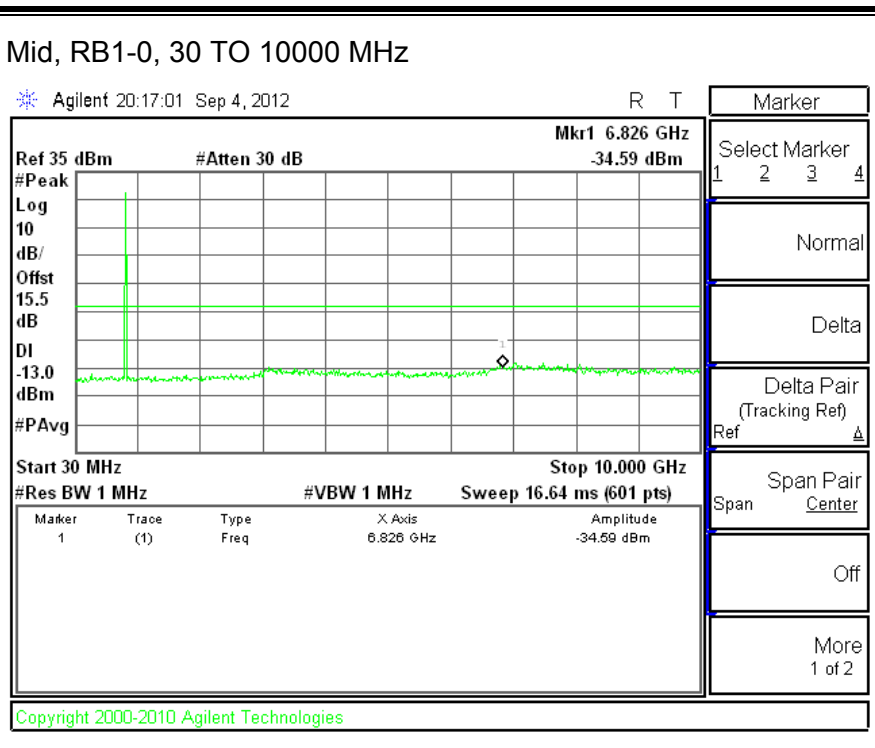
Band 5 (10 MHz BANDWIDTH)

LTE QPSK

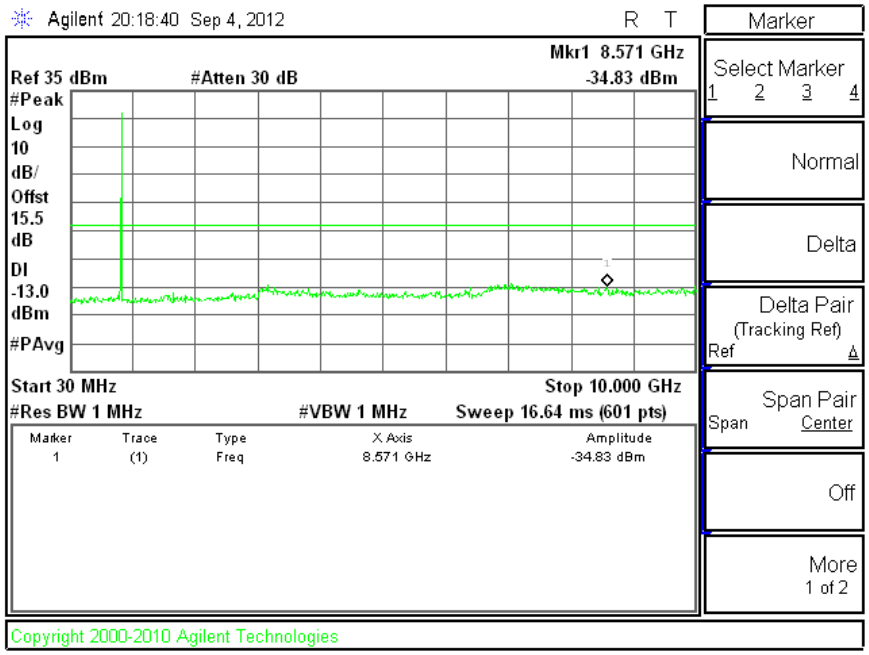
LOW, RB1-0, 30 TO 10000 MHz



Mid, RB1-0, 30 TO 10000 MHz

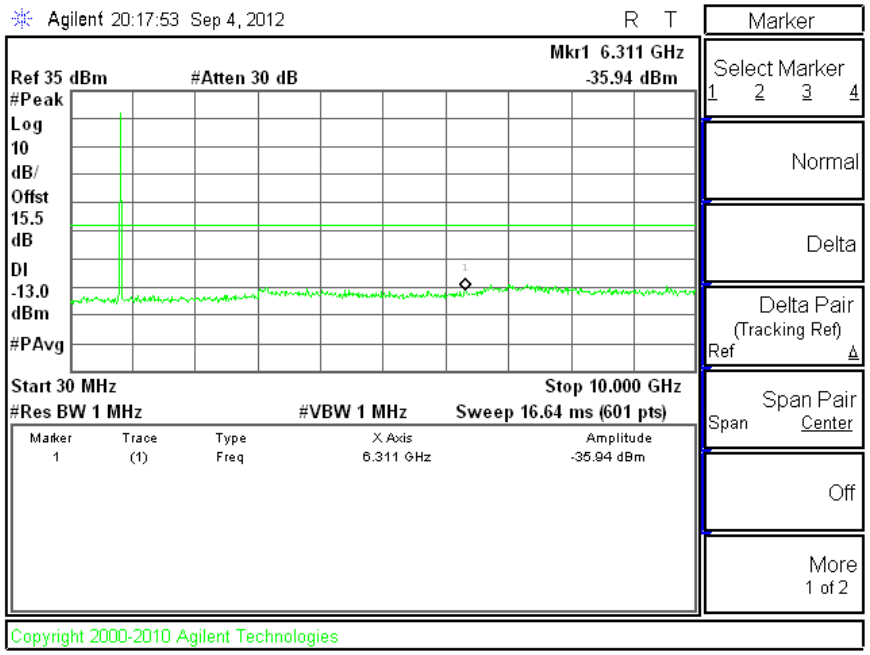


High, RB1-0, 30 TO 10000 MHz

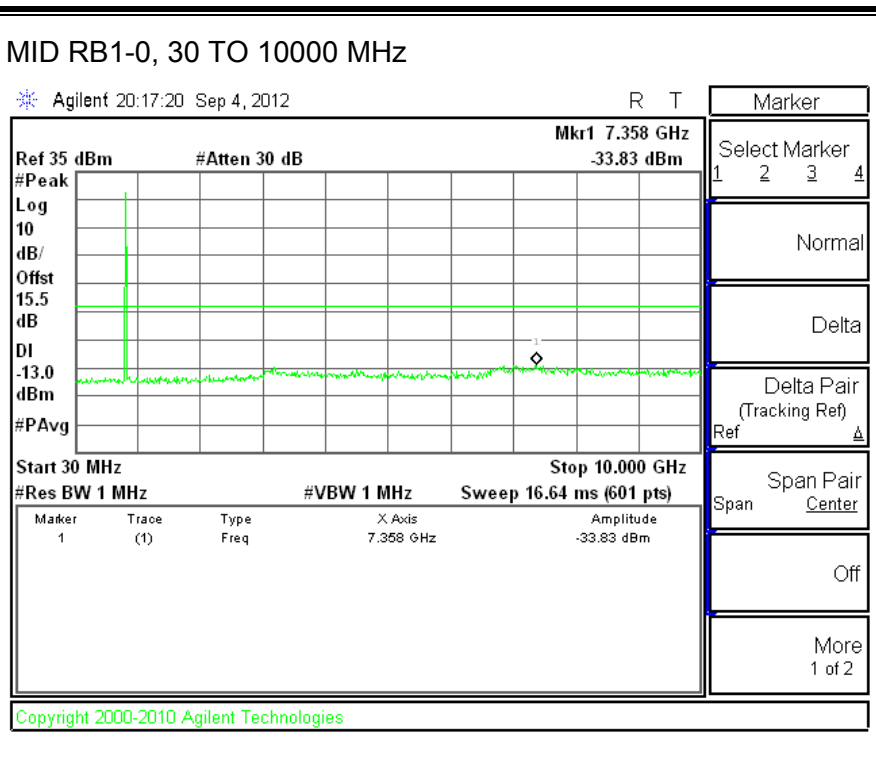


LTE 16QAM

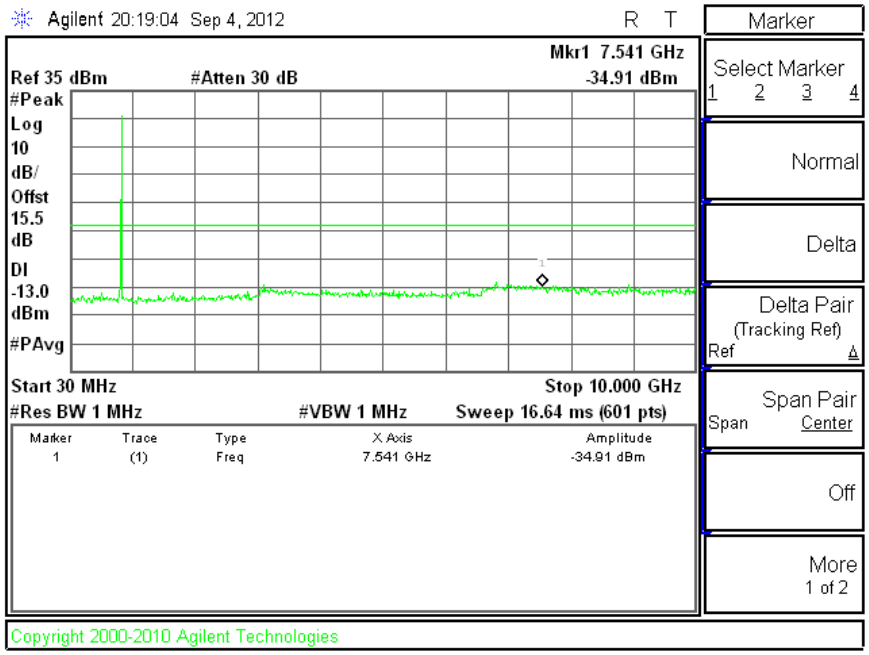
LOW, RB1-0, 30 TO 10000 MHz



MID RB1-0, 30 TO 10000 MHz



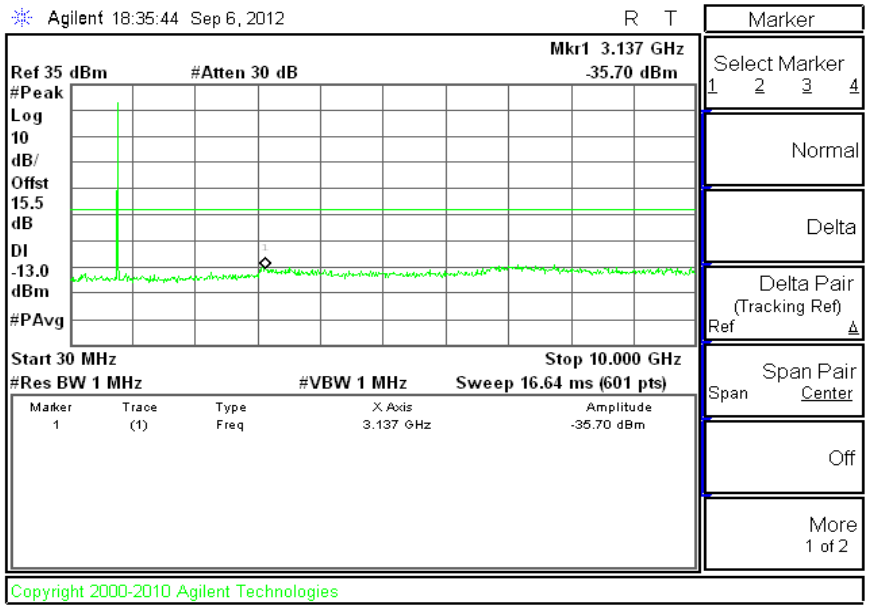
HIGH, RB1-0, 30 TO 10000 MHz



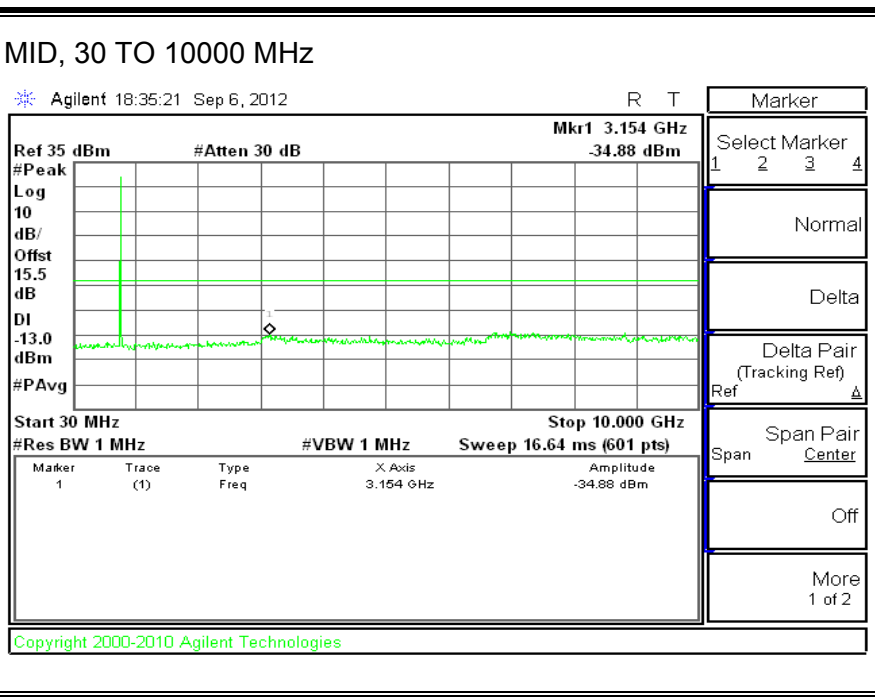
8.3.6. LTE BAND 13

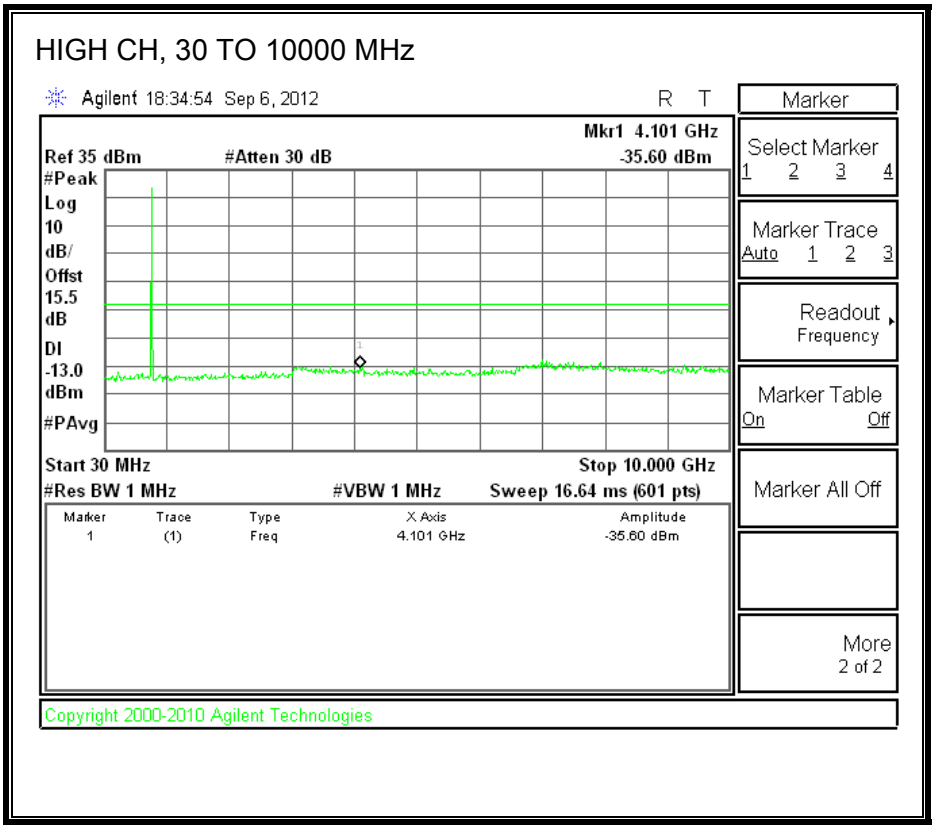
QPSK (5 MHz BANDWIDTH)

LOW, 30 TO10000 MHz

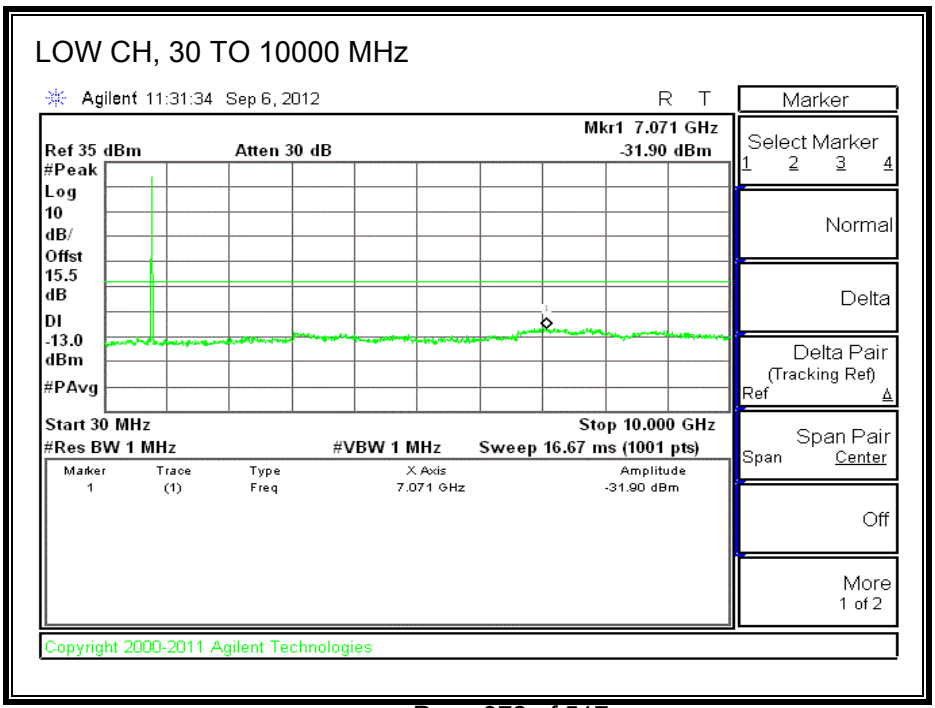


MID, 30 TO 10000 MHz

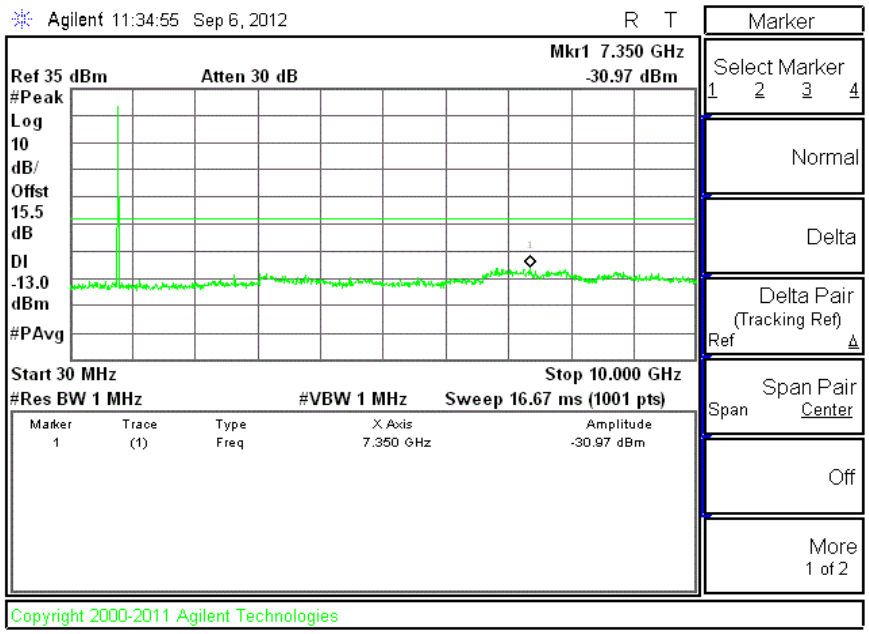




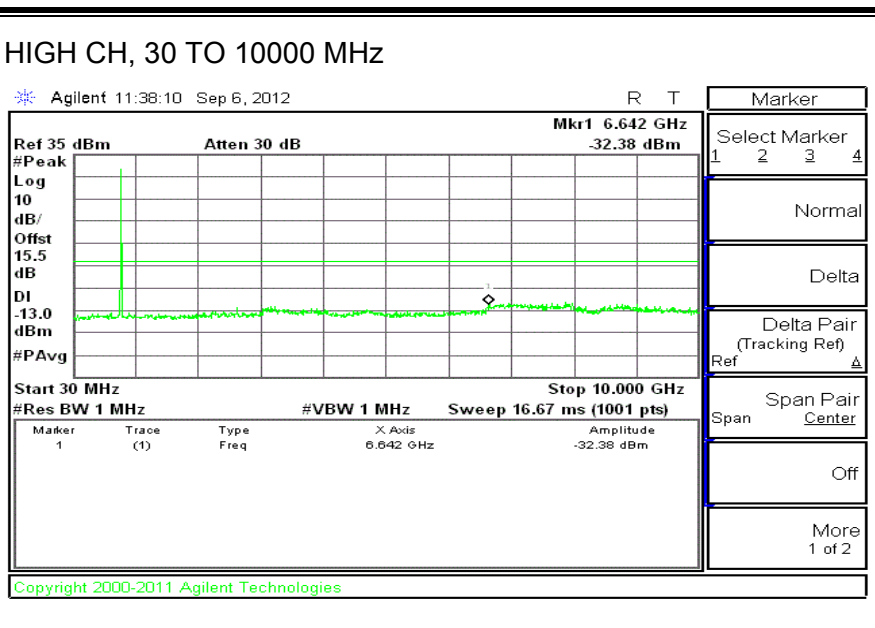
LTE 16QAM



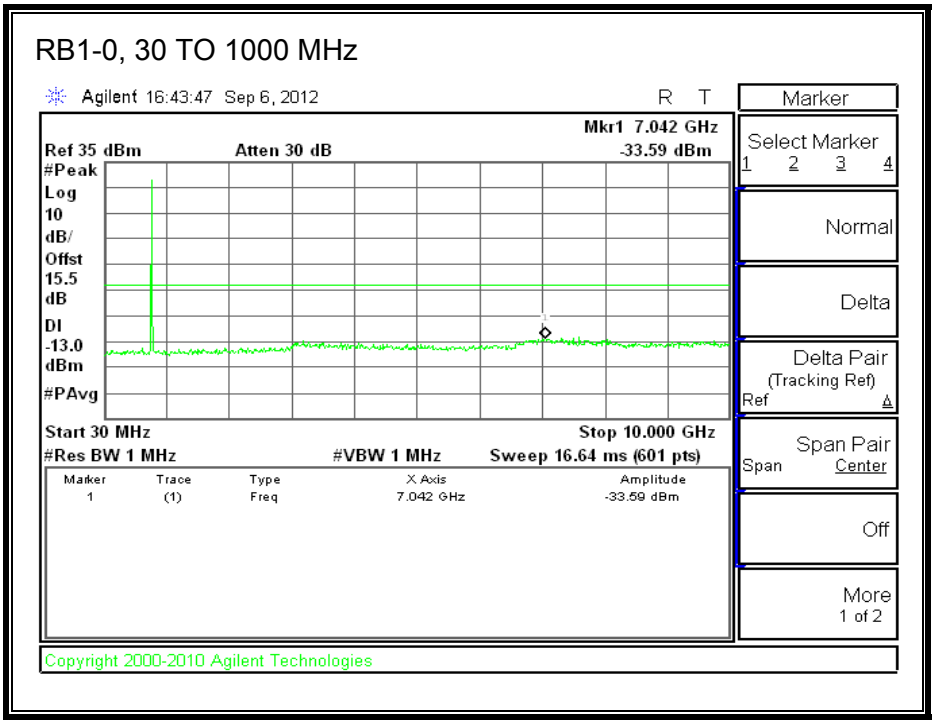
MID CH, 30 TO 10000 MHz



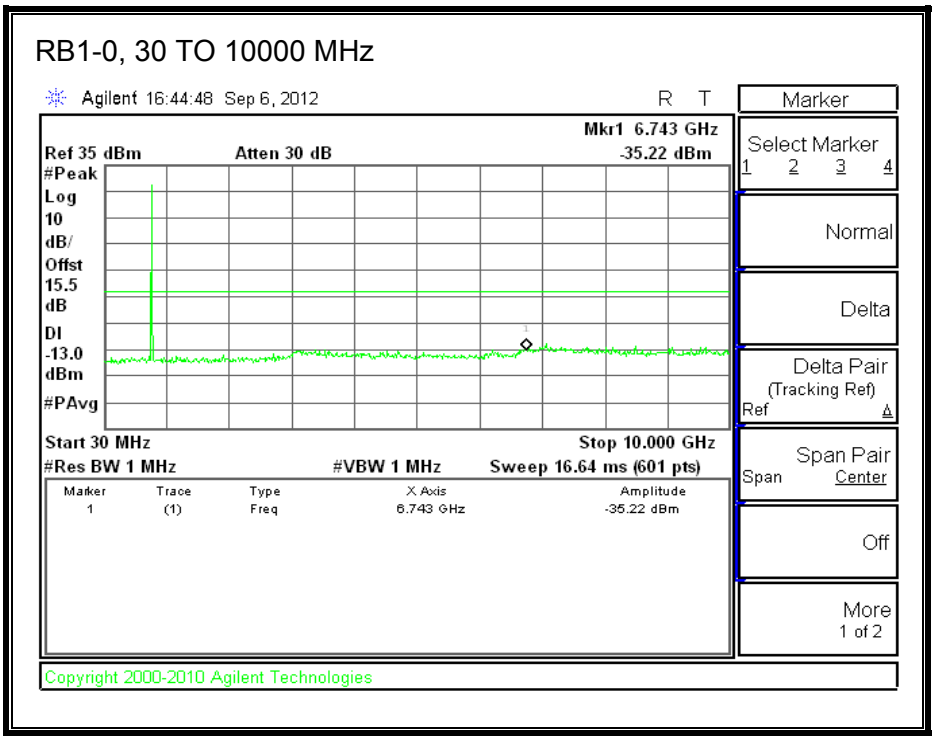
HIGH CH, 30 TO 10000 MHz



LTE QPSK Band 13, 782MHz (10MHz Bandwidth)



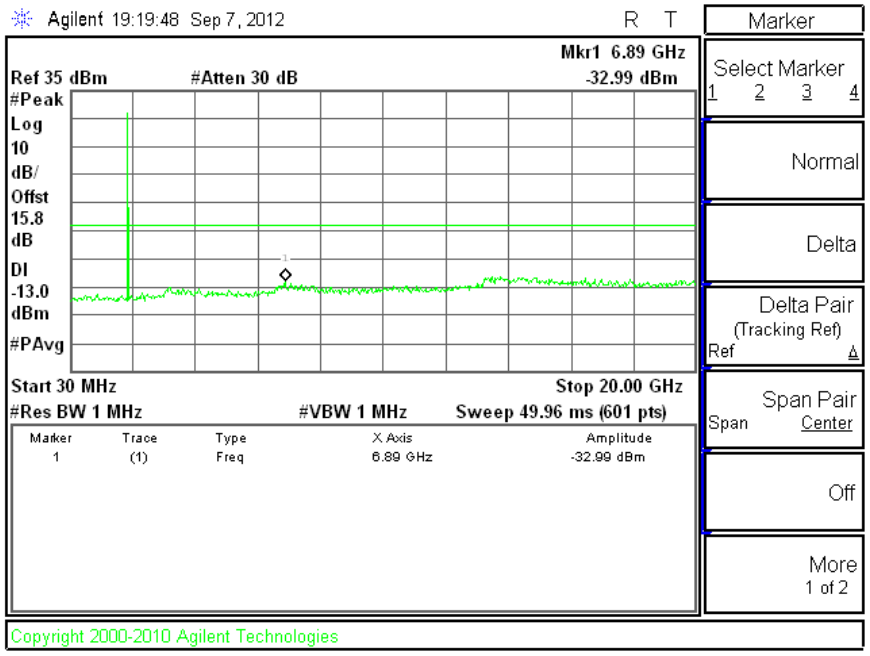
LTE 16QAM Band 13, 782MHz (10MHz Bandwidth)



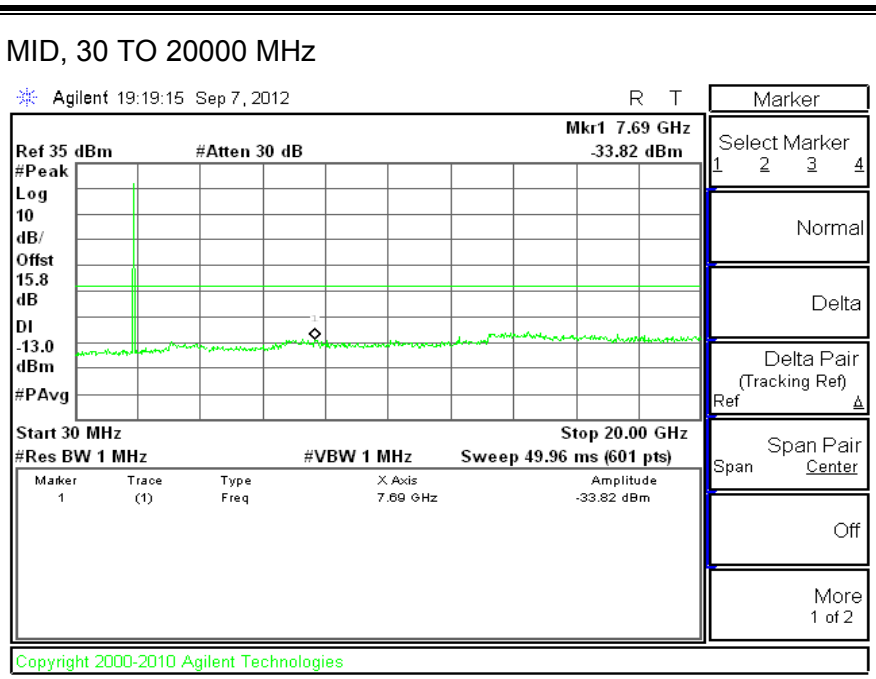
8.3.7. LTE BAND 25

LTE QPSK (1.4 MHz BANDWIDTH)

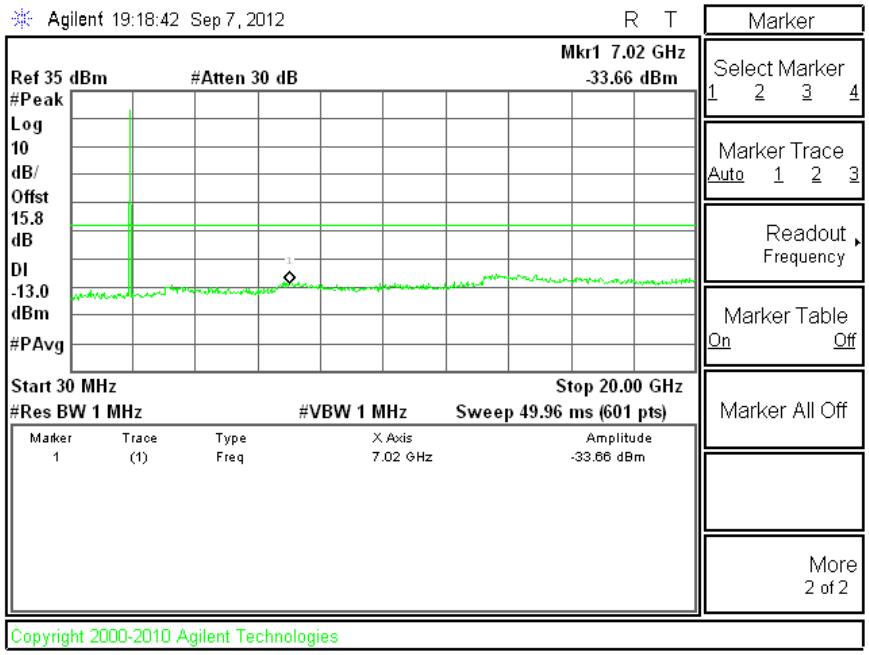
LOW, 30 TO 20000 MHz



MID, 30 TO 20000 MHz

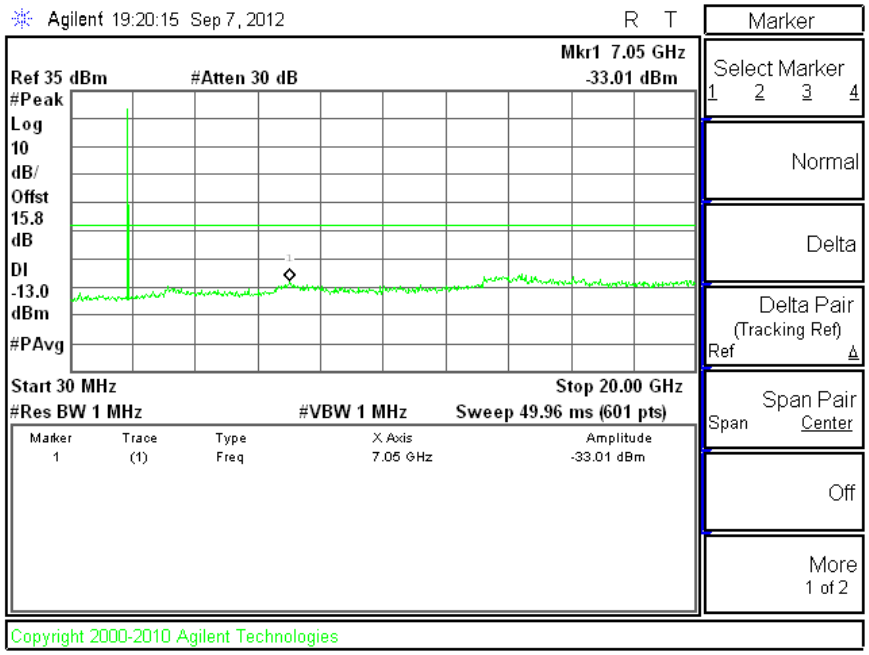


High, 30 TO 20000 MHz

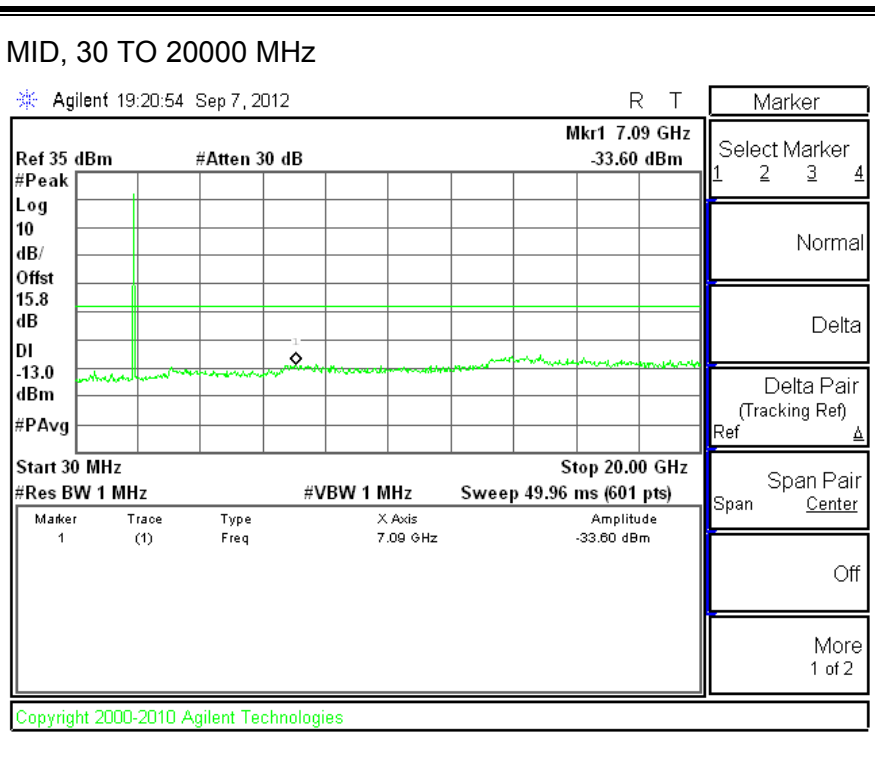


LTE 16QAM

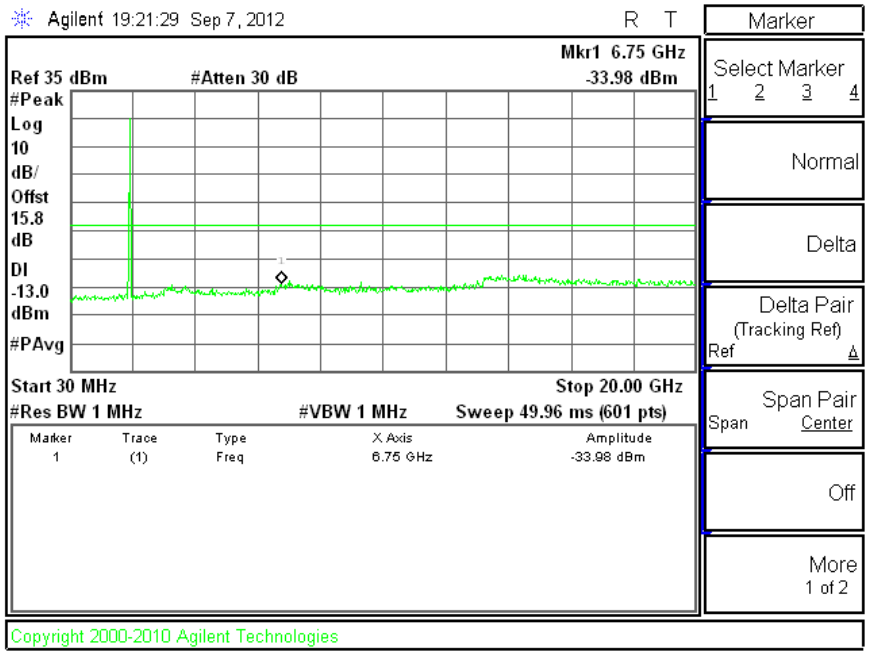
LOW, 30 TO 20000 MHz



MID, 30 TO 20000 MHz



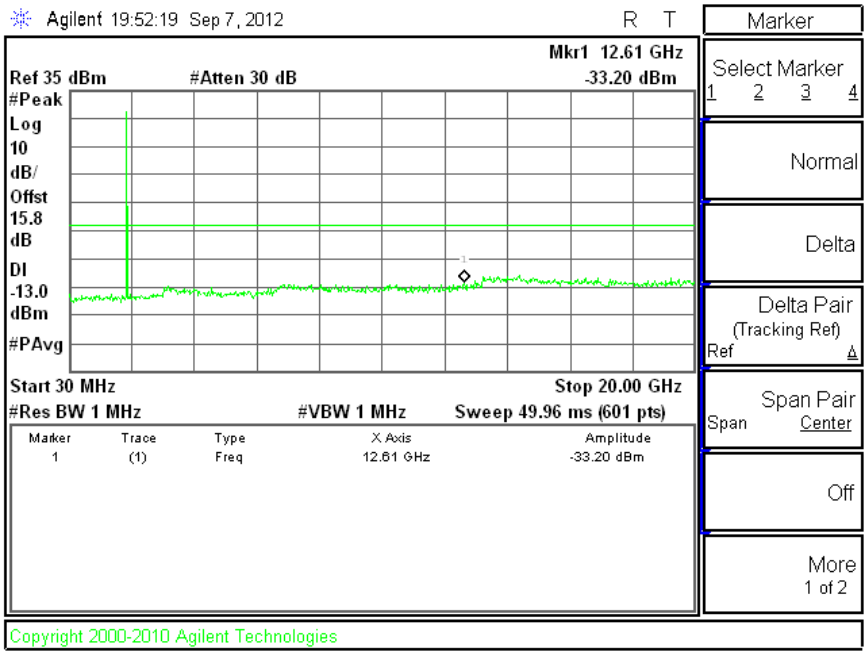
HIGH, 30 TO 20000 MHz



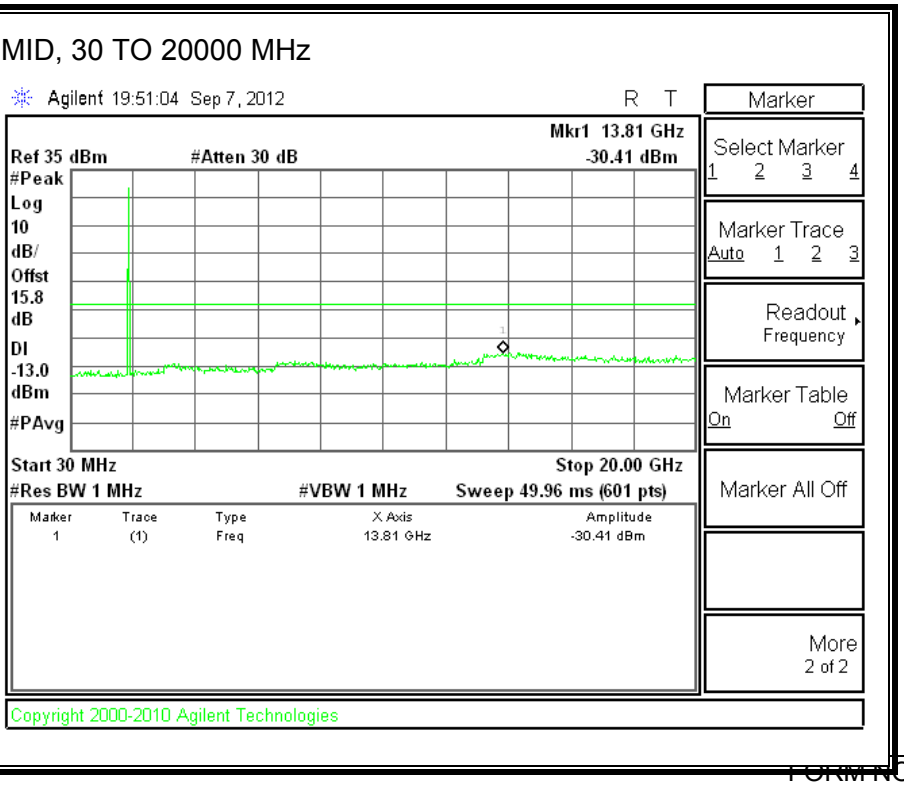
Band 25 (3 MHz BANDWIDTH)

LTE QPSK

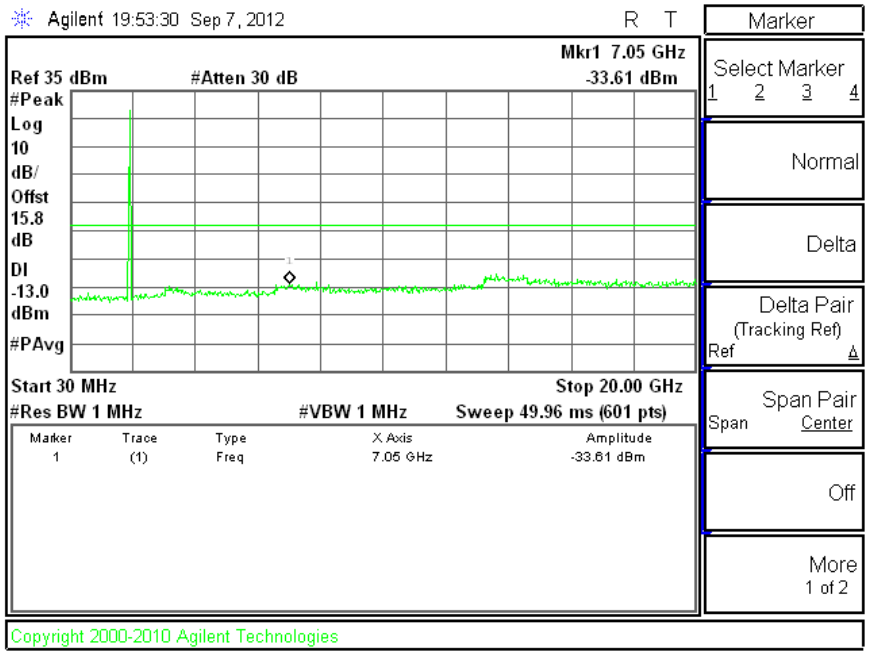
LOW, 30 TO 20000 MHz



MID, 30 TO 20000 MHz

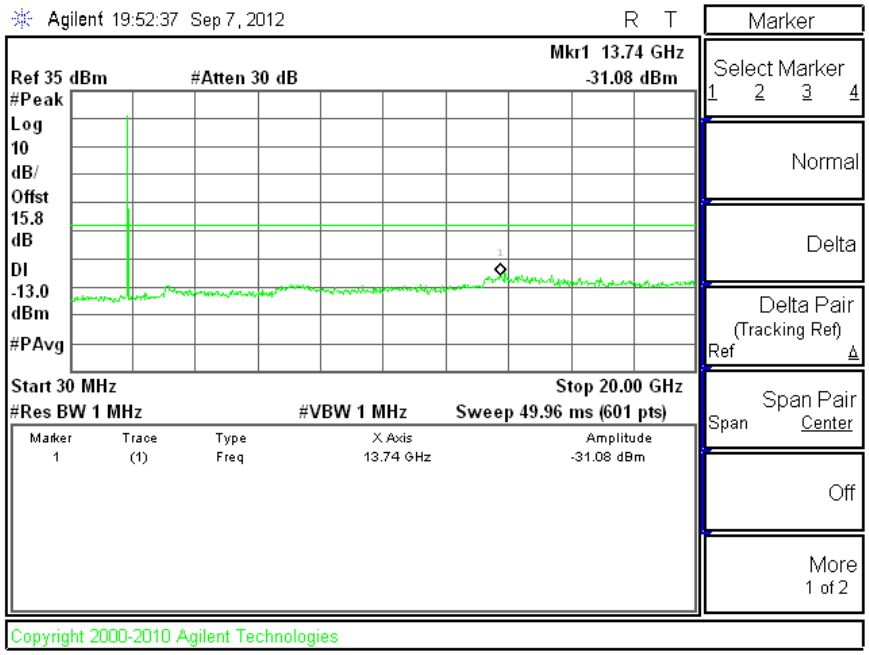


High, 30 TO 20000 MHz

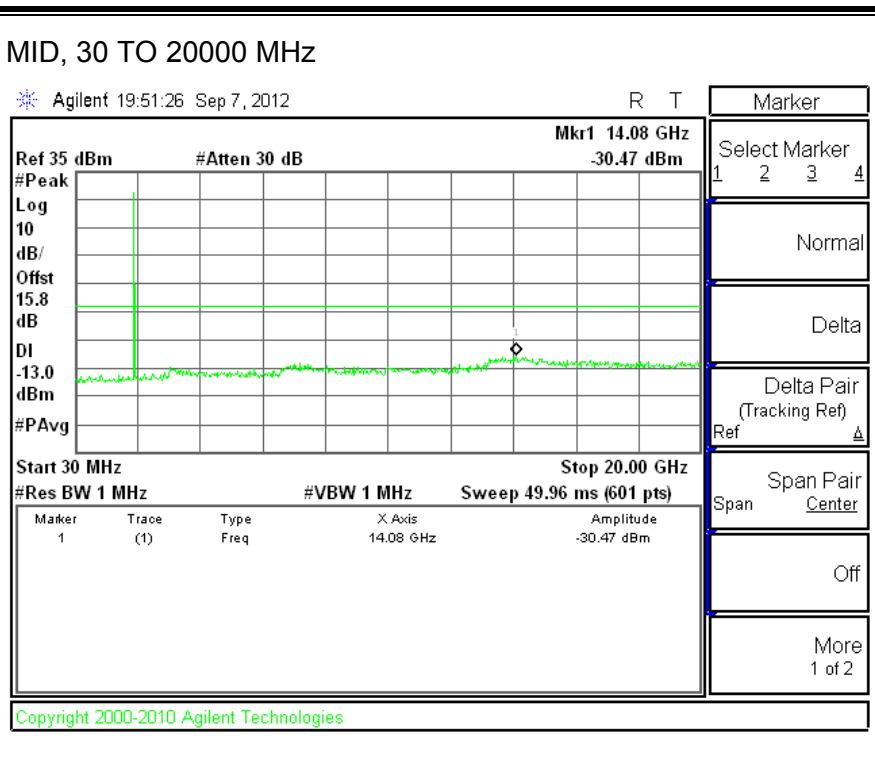


LTE 16QAM

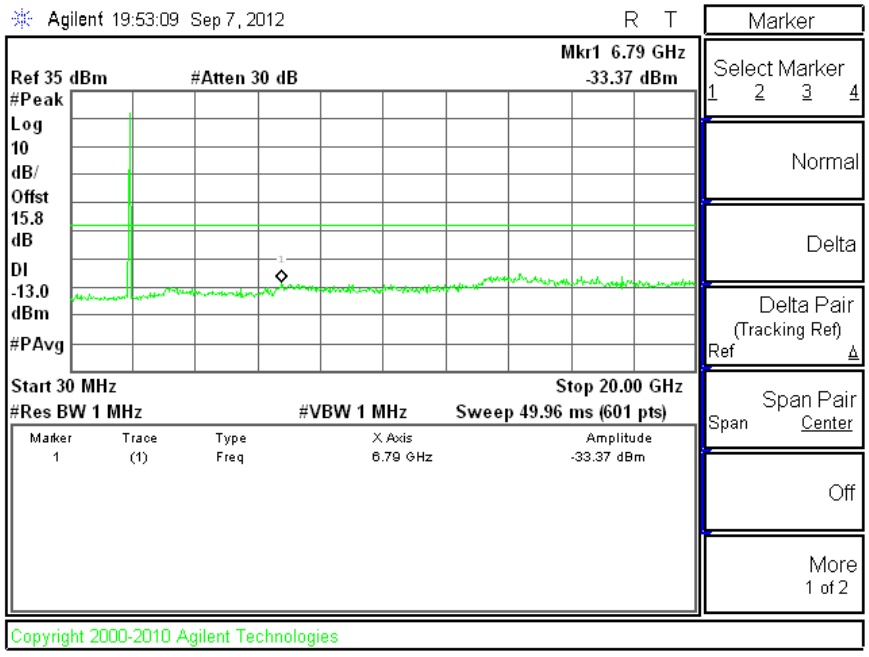
LOW, 30 TO 20000 MHz



MID, 30 TO 20000 MHz



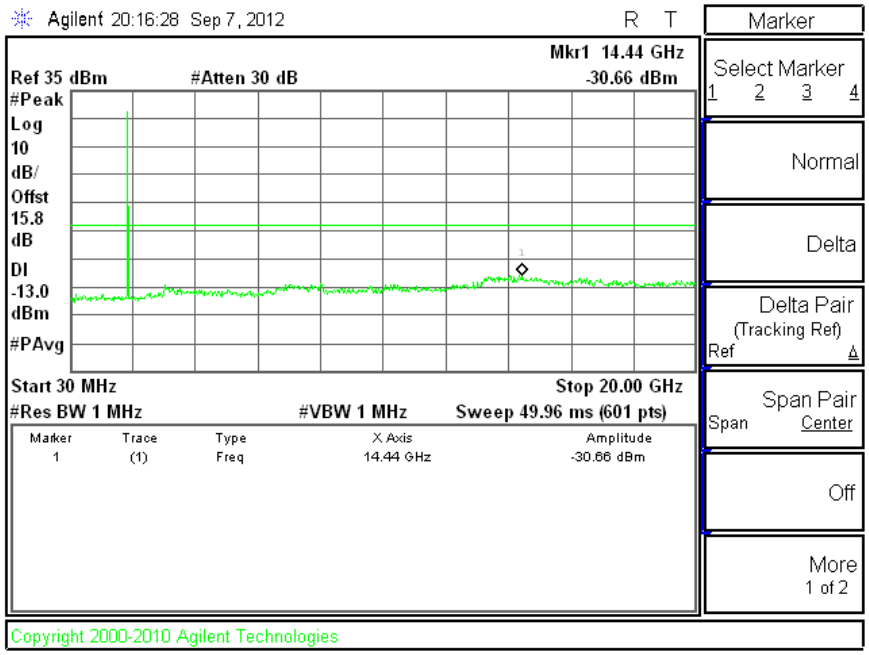
HIGH, 30 TO 20000 MHz



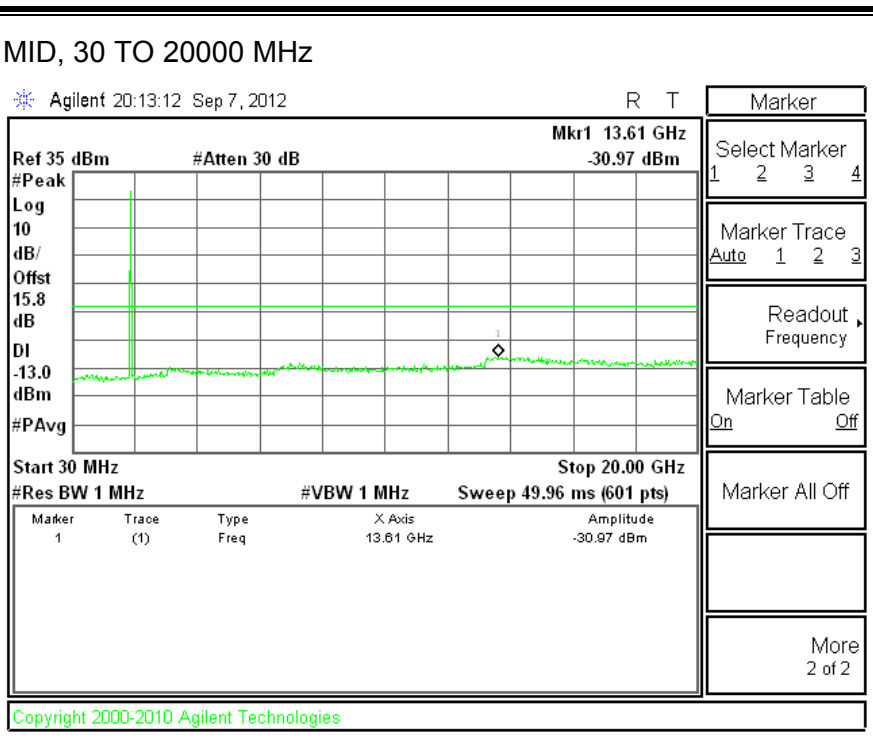
Band 25 (5 MHz BANDWIDTH)

LTE QPSK

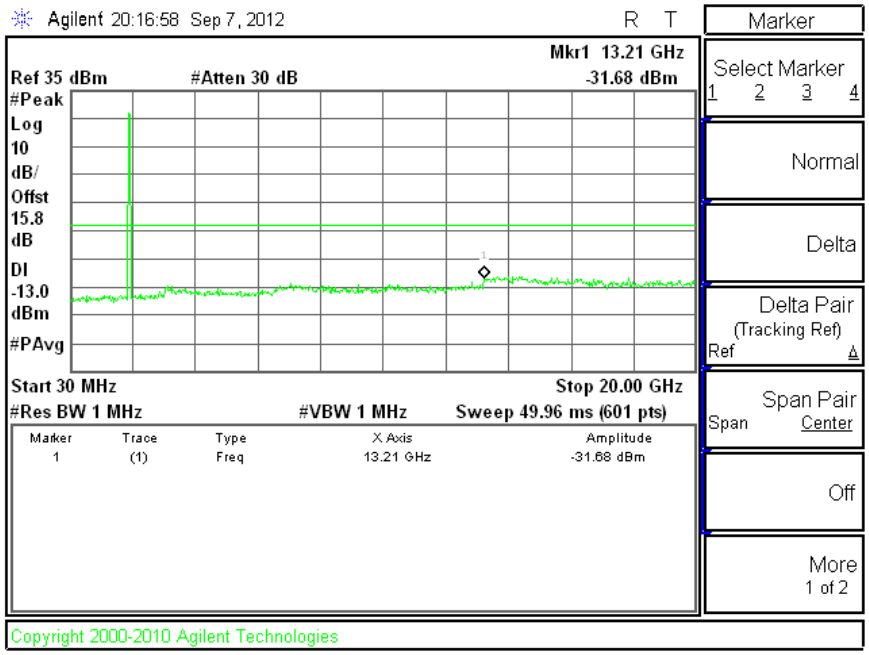
LOW, 30 TO 20000 MHz



MID, 30 TO 20000 MHz

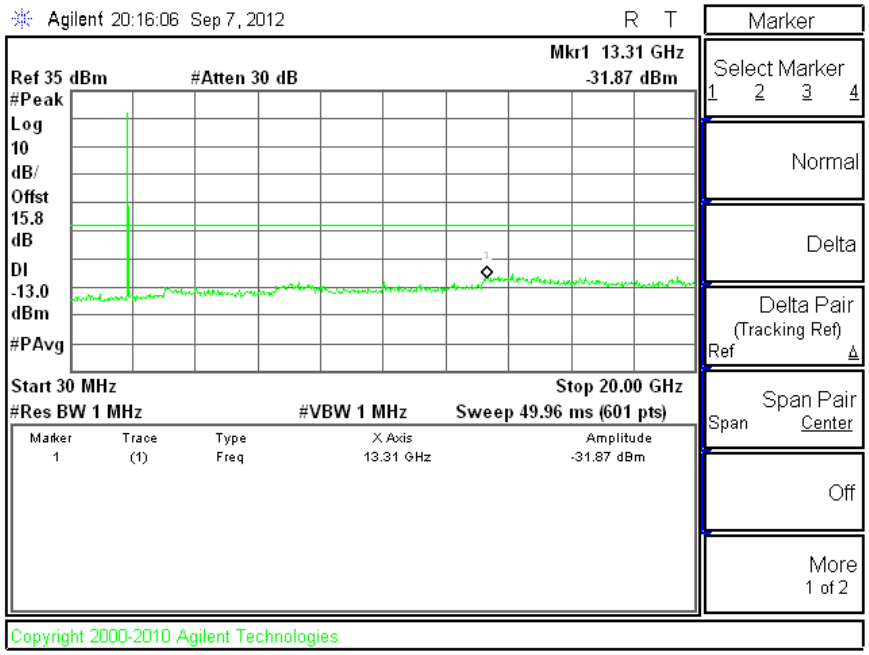


High, 30 TO 20000 MHz

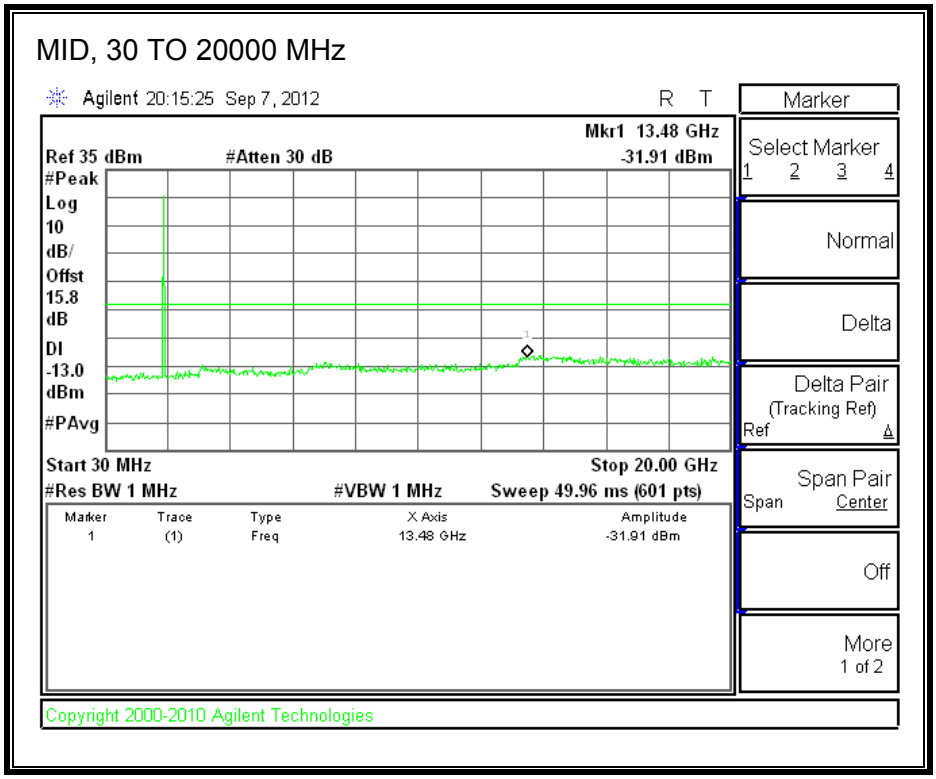


LTE 16QAM

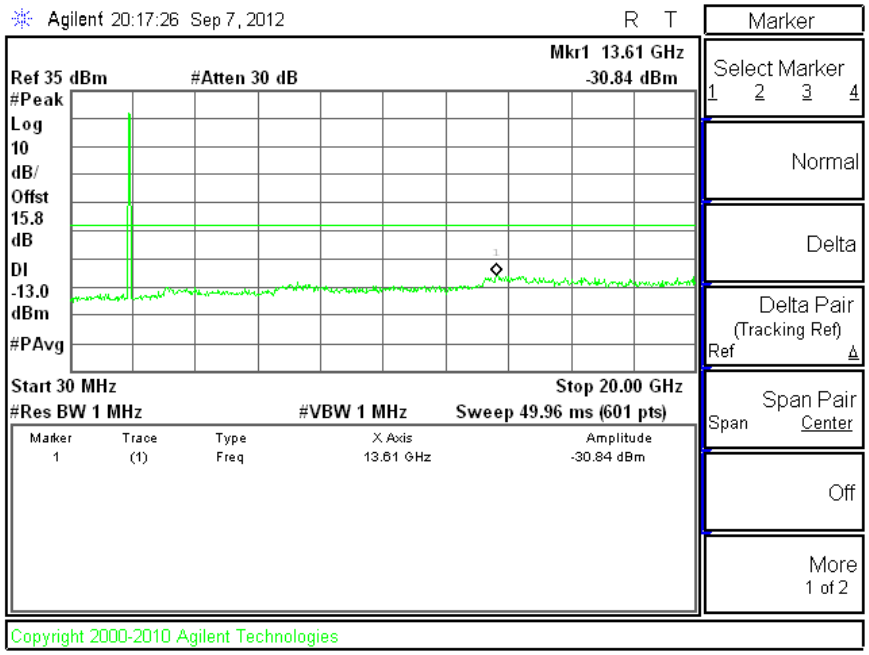
LOW, 30 TO 20000 MHz



MID, 30 TO 20000 MHz



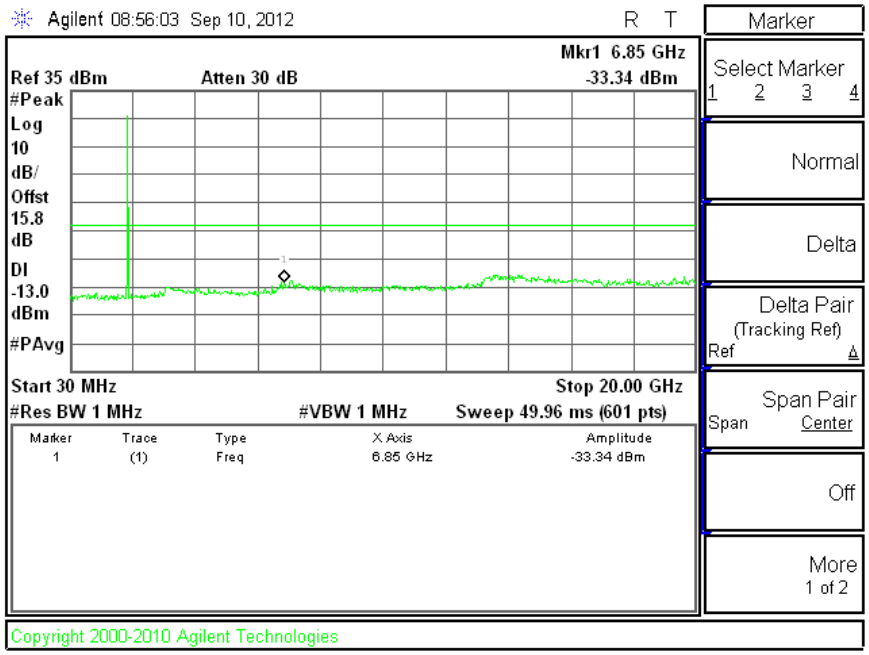
HIGH, 30 TO 20000 MHz



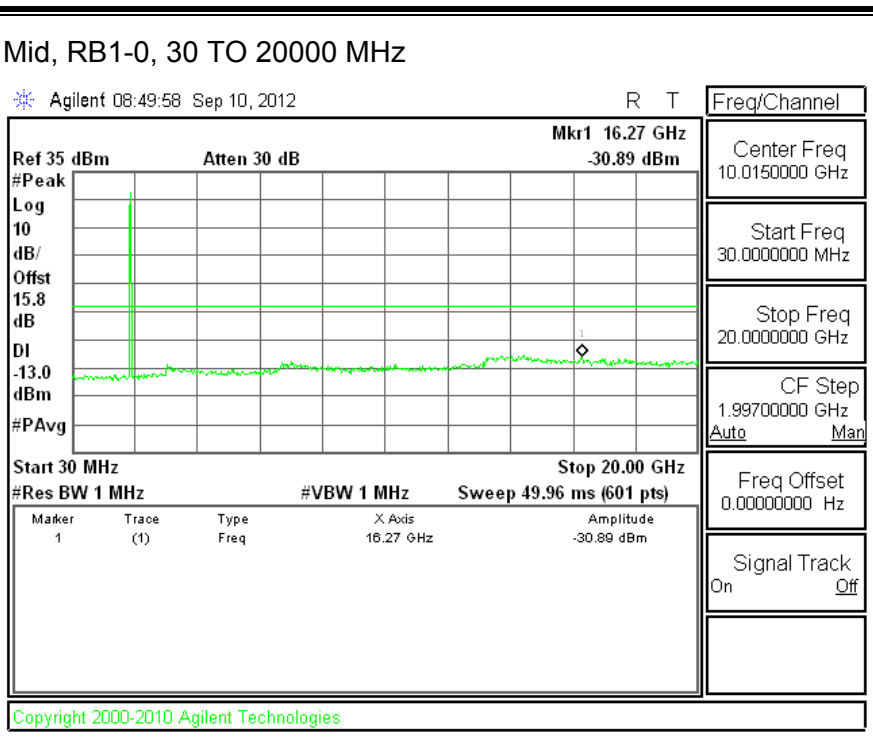
Band 25 (10 MHz BANDWIDTH)

LTE QPSK

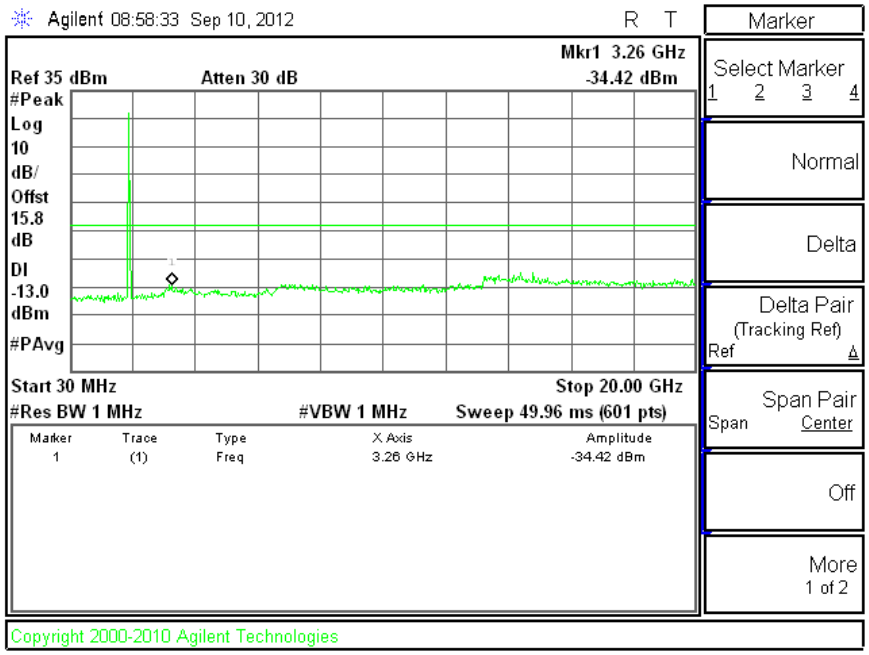
LOW, RB1-0, 30 TO 20000 MHz



Mid, RB1-0, 30 TO 20000 MHz

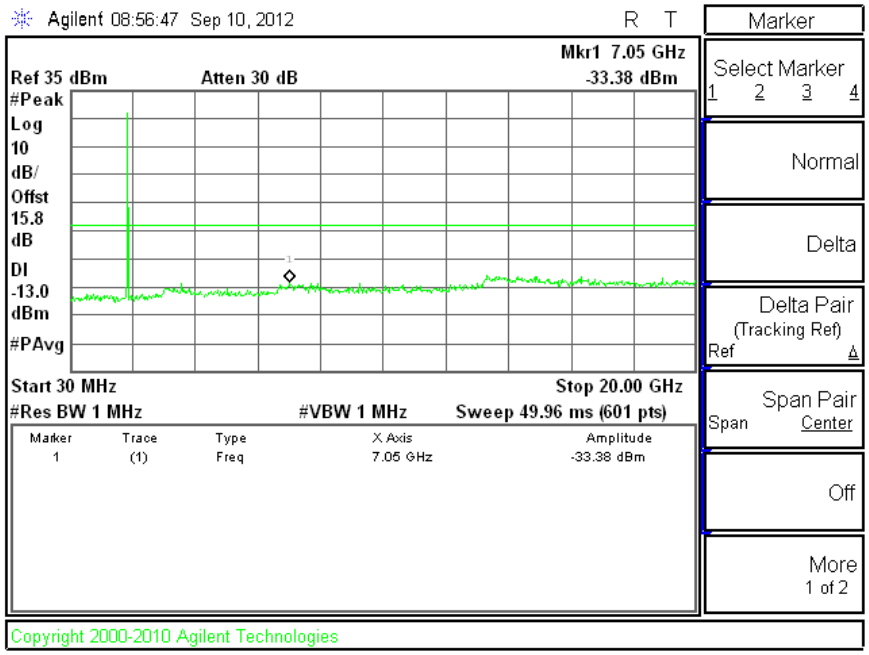


High, 30 TO 20000 MHz

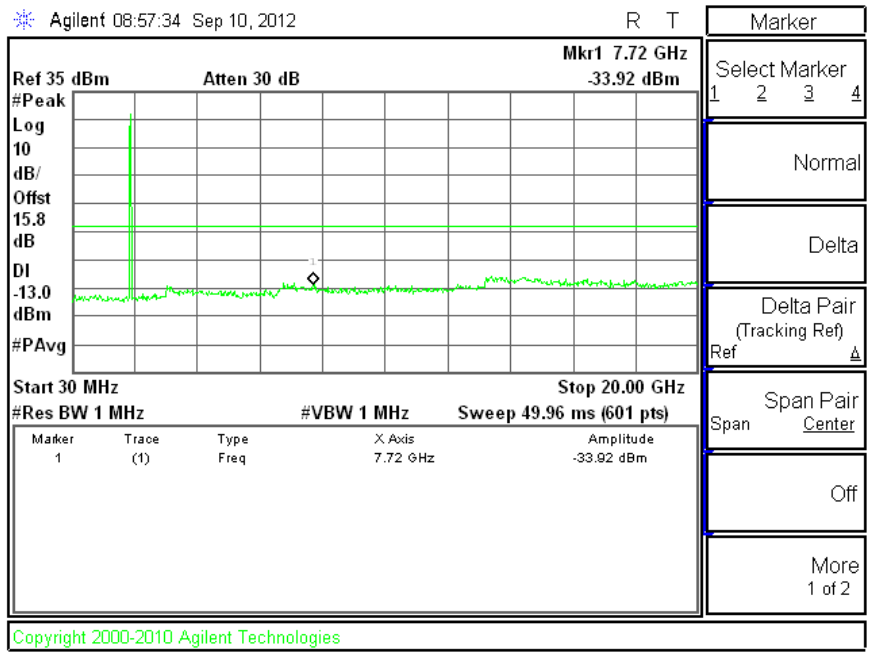


LTE 16QAM

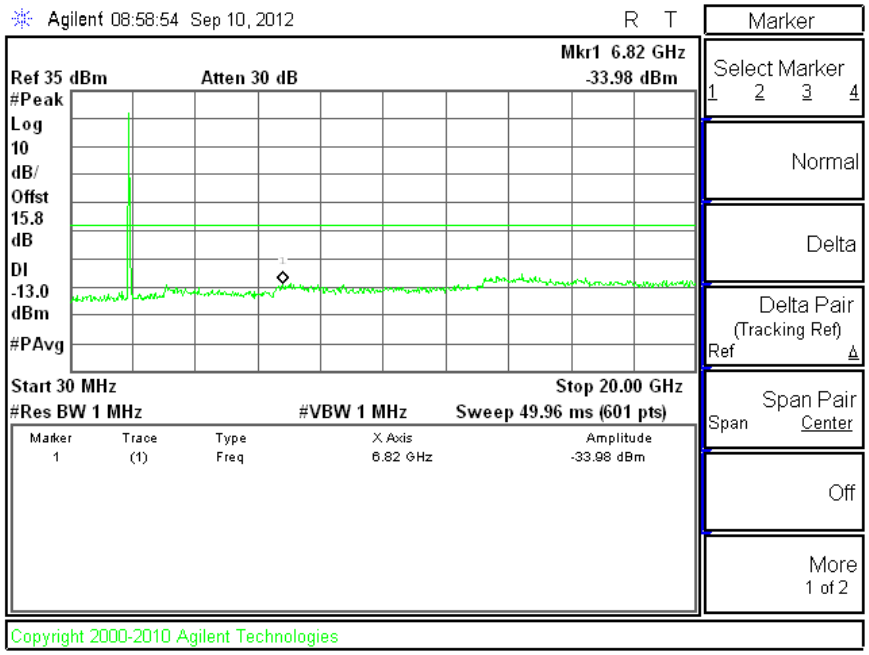
LOW, 30 TO 20000 MHz



MID, 30 TO 20000 MHz



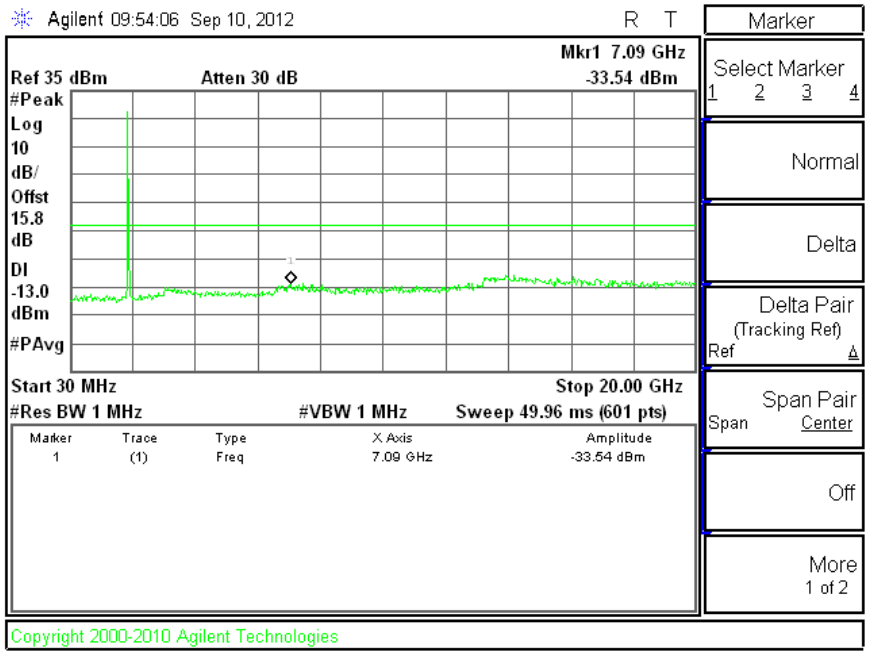
HIGH, 30 TO 20000 MHz



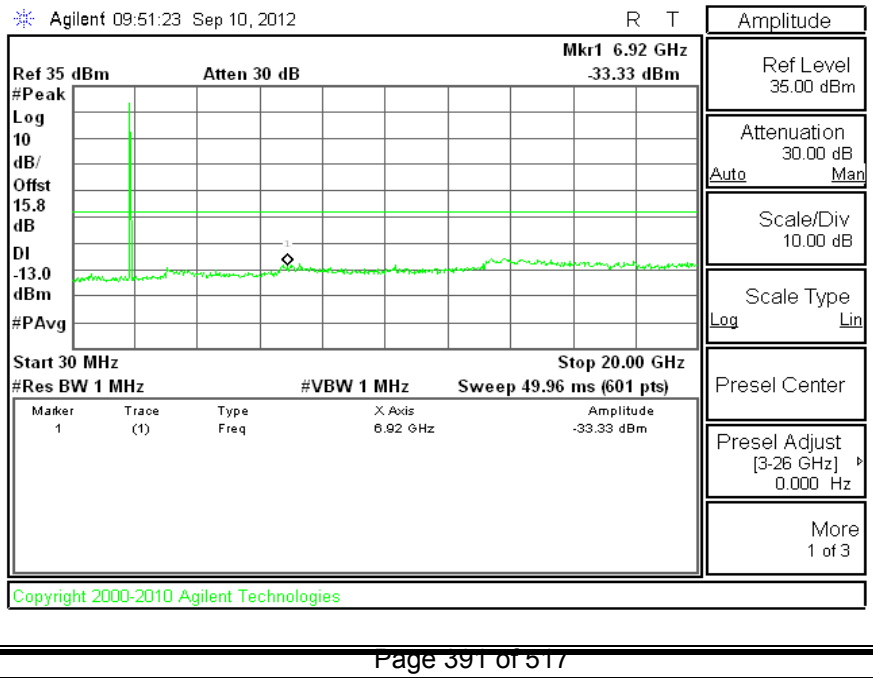
Band 25 (15 MHz BANDWIDTH)

LTE QPSK

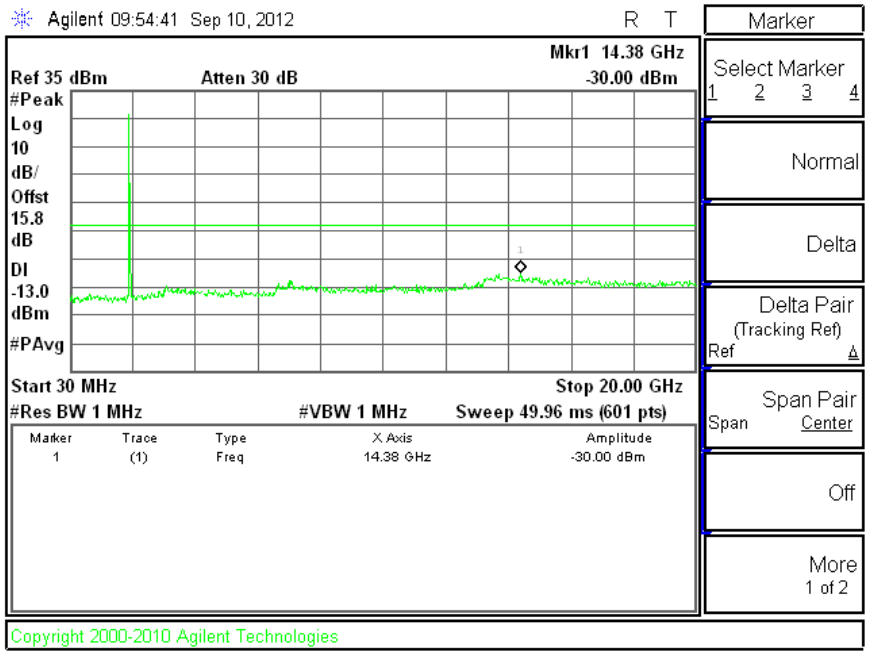
LOW, RB1-0, 30 TO 20000 MHz



Mid, RB1-0, 30 TO 20000 MHz

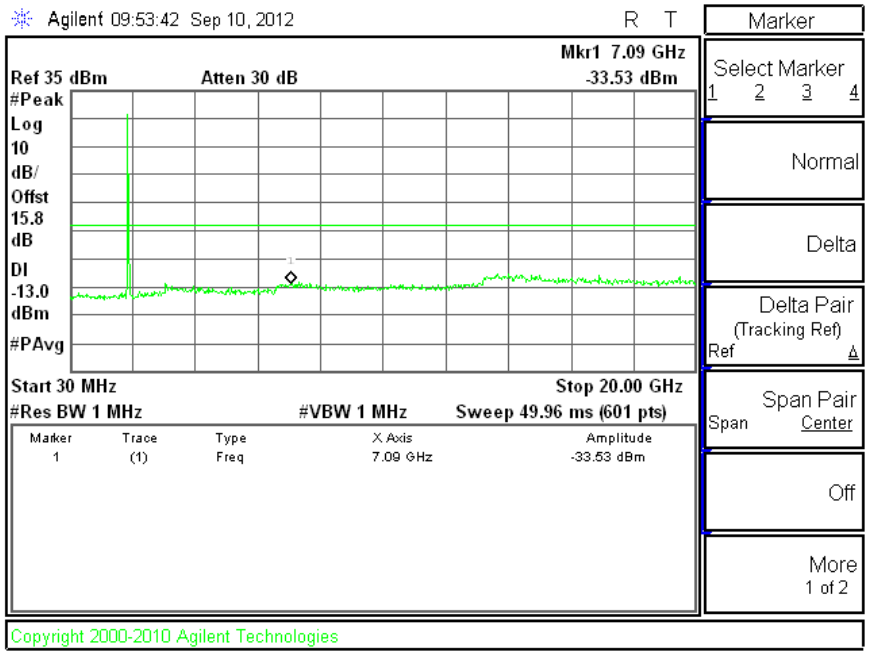


High, RB1-0, 30 TO 20000 MHz

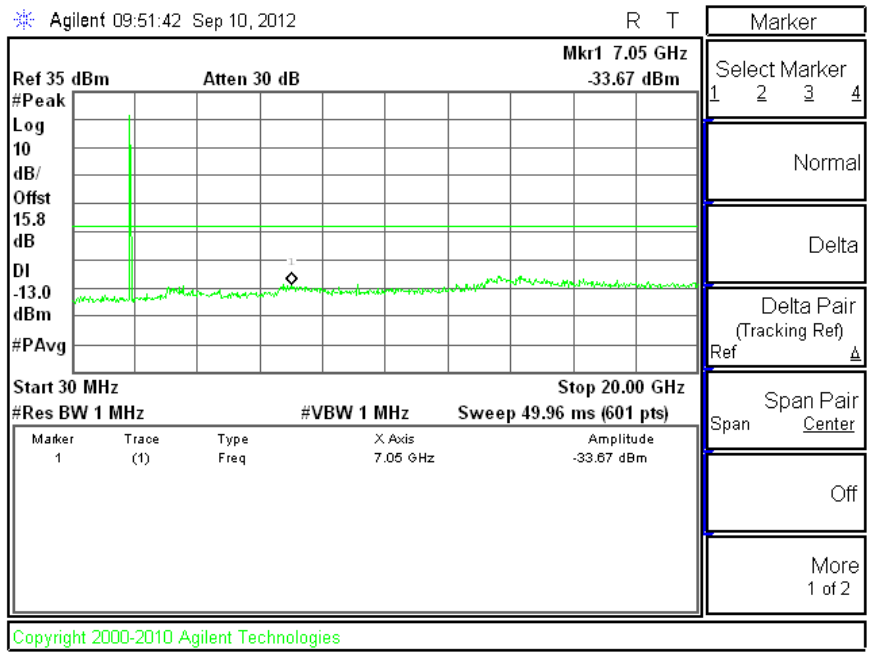


LTE 16QAM

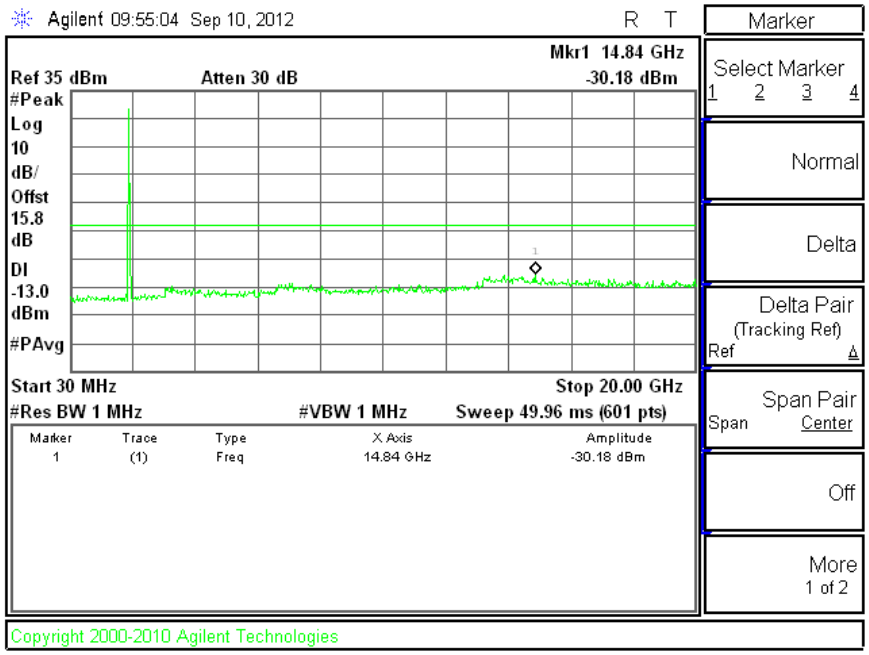
LOW, RB1-0, 30 TO 20000 MHz



MID RB1-0, 30 TO 20000 MHz



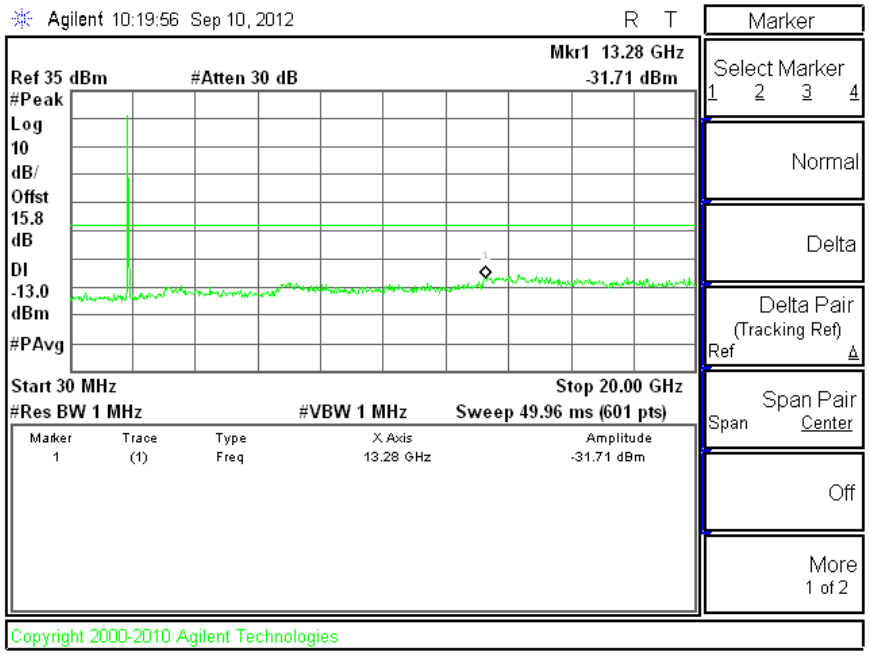
HIGH, RB1-0, 30 TO 20000 MHz



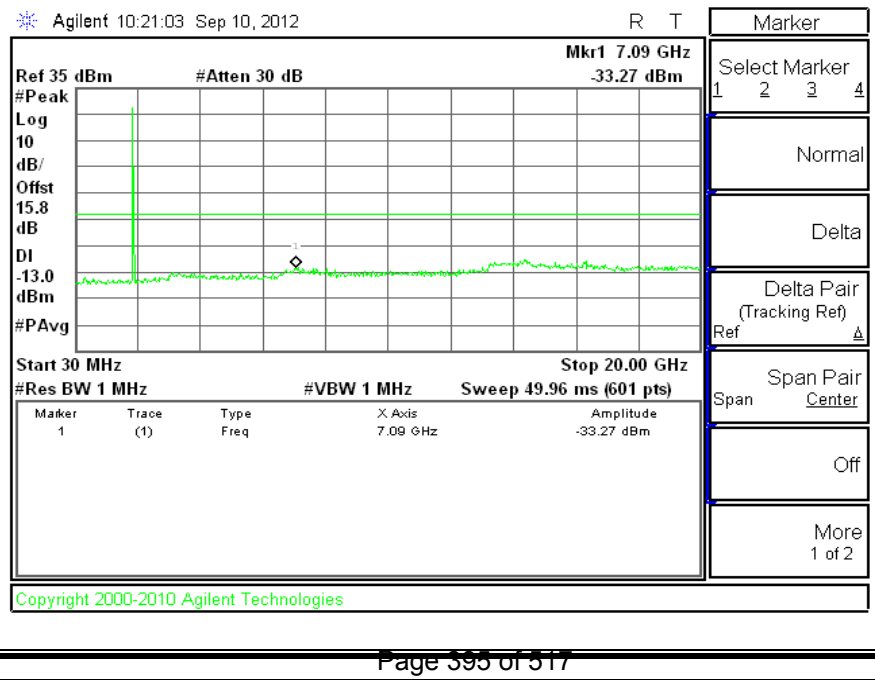
Band 25 (20 MHz BANDWIDTH)

LTE QPSK

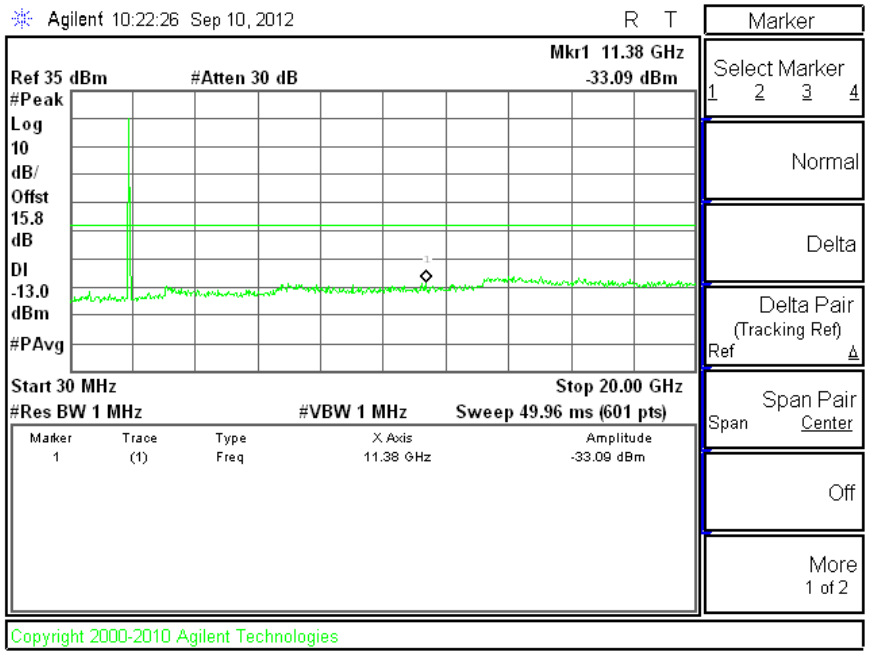
LOW, 30 TO 20000 MHz



Mid, 30 TO 20000 MHz

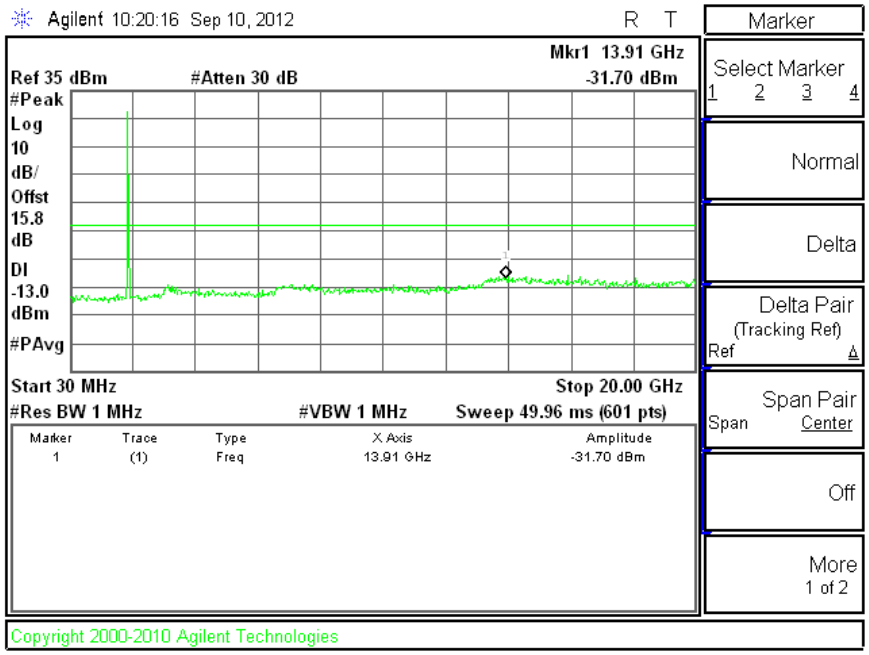


High, 30 TO 20000 MHz

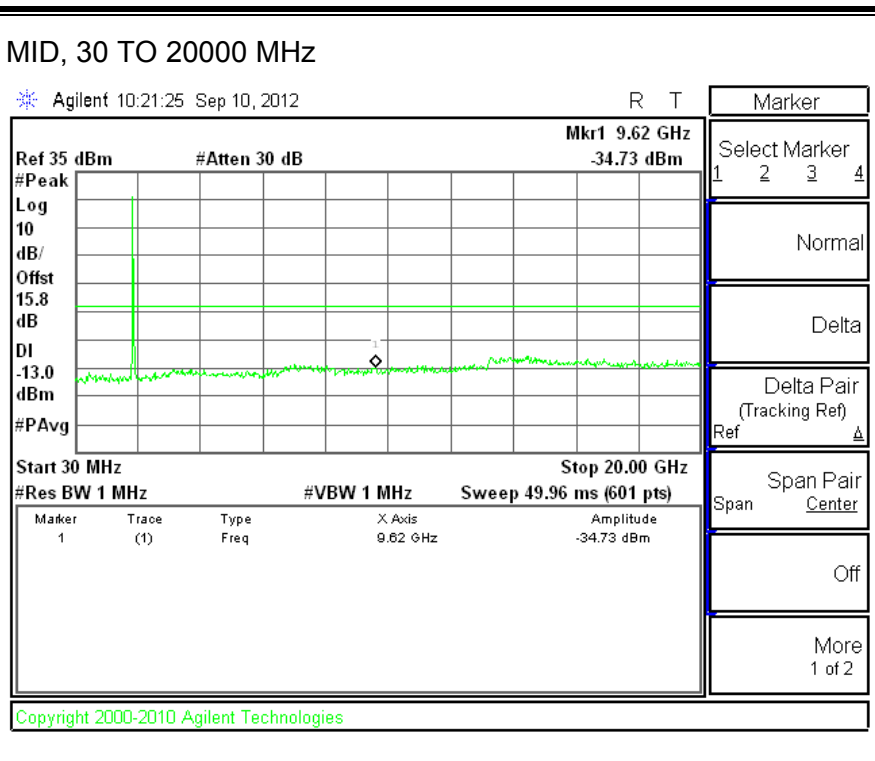


LTE 16QAM

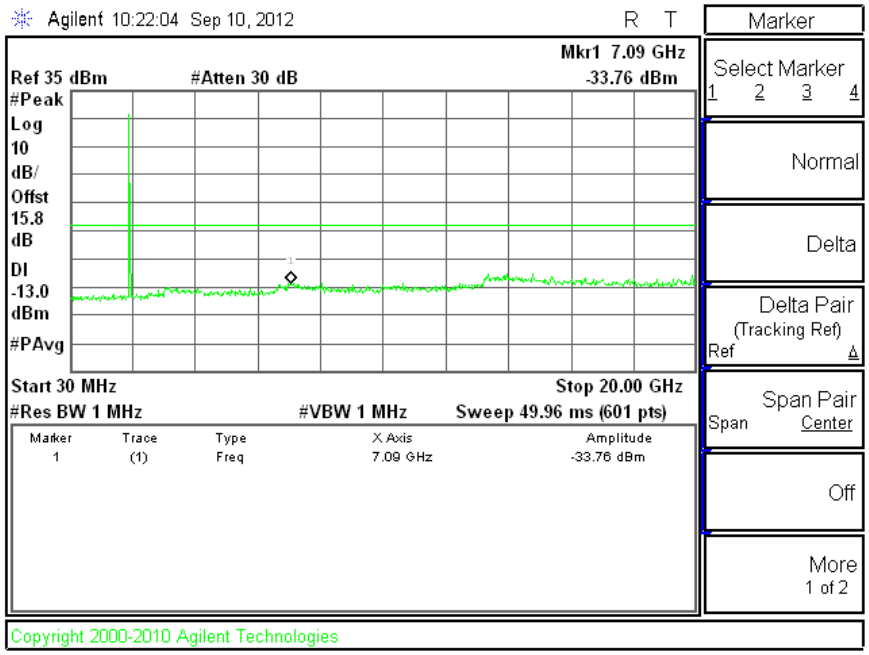
LOW, 30 TO 20000 MHz



MID, 30 TO 20000 MHz



HIGH, 30 TO 20000 MHz



8.4. FREQUENCY STABILITY

RULE PART(S)

FCC: §2.1055, §22.355, §24.235

LIMITS

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

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

TEST PROCEDURE

Use Agilent 8960 with Frequency Error measurement capability.

- Temp. = −30° to +50°C
- Voltage =Low, 3.4VDC, Normal, 3.8VDC and High, 4.3VDC.

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

- GPRS, EGPRS
- UMTS, HSDPA
- CDMA2000, BC10, BC0 and BC1
- LTE BAND 5
- LTE BAND 13
- LTE BAND 25

RESULTS

See the following pages.

800 MHz SECONDARY, 1xRTT MODULATION – MID CHANNEL

Reference Frequency: 800MHz Secondary Mid Channel 819.149991MHz @ 20°C Limit: to stay +- 2.5 ppm = 2047.875 Hz				
Power Supply (Vdc)	Environment Temperature (°C)	Frequency Deviation Measureed with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	50	819.149973	0.022	2.5
3.80	40	819.149973	0.022	2.5
3.80	30	819.149976	0.018	2.5
3.80	***20***	***819.149991***	***0***	2.5
3.80	10	819.149980	0.013	2.5
3.80	0	819.149986	0.006	2.5
3.80	-10	819.150011	-0.024	2.5
3.80	-20	819.150013	-0.027	2.5
3.80	-30	819.1500160	-0.031	2.5

Reference Frequency: 800MHz Secondary Mid Channel 819.149991MHz @ 20°C Limit: to stay +- 2.5 ppm = 2047.875 Hz				
Power Supply (Vdc)	Environment Temperature (°C)	Frequency Deviation Measureed with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	***20***	***819.149991***	***0***	***2.5***
4.20	20	819.149985	*0.007*	2.5
3.30	20	819.149982	*0.011*	2.5
End Voltage (3.1V)	20	819.149975	*0.020*	2.5

CELL, 1xRTT MODULATION – MID CHANNEL

Reference Frequency: Cellular Mid Channel 836.519996MHz @ 20ºC Limit: to stay +- 2.5 ppm = 2091.300 Hz				
DC Power Supply (Vdc)	Environment Temperature (ºC)	Frequency Deviation Measureed with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	50	836.519995	0.001	2.5
3.80	40	836.519994	0.002	2.5
3.80	30	836.519996	0.000	2.5
3.80	***20***	***836.519996***	***0***	2.5
3.80	10	836.520004	-0.010	2.5
3.80	0	836.520003	-0.008	2.5
3.80	-10	836.520004	-0.010	2.5
3.80	-20	836.519996	0.000	2.5
3.80	-30	836.519995	0.001	2.5

Reference Frequency: Cellular Mid Channel 836.519996MHz @ 20ºC Limit: to stay +- 2.5 ppm = 2091.300 Hz				
DC Power Supply (Vdc)	Environment Temperature (ºC)	Frequency Deviation Measureed with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	20	836.519996	***0.000***	2.5
4.20	20	836.519997	-0.001	2.5
3.30	20	836.520003	-0.008	2.5
End Volt (3.1)	20	836.519994	0.002	2.5

PCS, 1xRTT MODULATION – MID CHANNEL

Reference Frequency: PCS Mid Channel 1879.999987MHz @ 20ºC Limit: within the authorized block or +- 2.5 ppm = 4700.000 Hz				
Power Supply (Vdc)	Environment Temperature (ºC)	Frequency Deviation Measureed with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	50	1879.999963	0.013	2.5
3.80	40	1879.999968	0.010	2.5
3.80	30	1879.999984	0.002	2.5
3.80	***20***	1879.999987	***0***	***2.5***
3.80	10	1880.000006	-0.010	2.5
3.80	0	1880.000009	-0.012	2.5
3.80	-10	1880.000014	-0.014	2.5
3.80	-20	1879.999993	-0.003	2.5
3.80	-30	1879.999980	0.004	2.5

Reference Frequency: PCS Mid Channel 1879.999987MHz @ 20ºC Limit: within the authorized block or +- 2.5 ppm = 4700.000 Hz				
Power Supply (Vdc)	Environment Temperature (ºC)	Frequency Deviation Measureed with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	***20***	1879.999987	***0***	***2.5***
4.20	20	1880.000007	-0.011	2.5
3.30	20	1879.999994	-0.004	2.5
End Volt(3.1)	20	1879.999992	-0.003	2.5

CELL, GPRS MODULATION – MID CHANNEL

Reference Frequency: Cellular Mid Channel 836.600018 MHz @ 20ºC Limit: to stay +- 2.5 ppm = 2091.500 Hz				
DC Power Supply (Vdc)	Environment Temperature (ºC)	Frequency Deviation Measureed with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	50	836.599965	0.063	2.5
3.80	40	836.599994	0.029	2.5
3.80	30	836.600003	0.018	2.5
3.80	***20***	***836.600018***	***0***	2.5
3.80	10	836.600040	-0.026	2.5
3.80	0	836.600041	-0.027	2.5
3.80	-10	836.600049	-0.037	2.5
3.80	-20	836.600050	-0.038	2.5
3.80	-30	836.600052	-0.041	2.5

Reference Frequency: Cellular Mid Channel 836.600018 MHz @ 20ºC Limit: to stay +- 2.5 ppm = 2091.500 Hz				
DC Power Supply (Vdc)	Environment Temperature (ºC)	Frequency Deviation Measureed with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	20	836.600018	***0.000***	2.5
4.20	20	836.600010	0.010	2.5
3.40	20	836.600041	-0.027	2.5
End Volt (3.2)	20	836.600036	-0.022	2.5

PCS, GPRS MODULATION – MID CHANNEL

Reference Frequency: PCS Mid Channel 1880.000056 MHz @ 20ºC Limit: within the authorized block or +- 2.5 ppm = 4700.000 Hz				
Power Supply (Vdc)	Environment Temperature (ºC)	Frequency Deviation Measureed with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	50	1880.000033	0.012	2.5
3.80	40	1880.000030	0.014	2.5
3.80	30	1880.000111	-0.029	2.5
3.80	***20***	1880.000056	***0***	***2.5***
3.80	10	1880.000143	-0.046	2.5
3.80	0	1880.000157	-0.054	2.5
3.80	-10	1880.000152	-0.051	2.5
3.80	-20	1880.000098	-0.022	2.5
3.80	-30	1880.000144	-0.047	2.5

Reference Frequency: PCS Mid Channel 1880.000056 MHz @ 20ºC Limit: within the authorized block or +- 2.5 ppm = 4700.000 Hz				
Power Supply (Vdc)	Environment Temperature (ºC)	Frequency Deviation Measureed with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	***20***	1880.000056	***0***	***2.5***
4.20	20	1880.000076	-0.011	2.5
3.40	20	1880.000109	-0.028	2.5
End Volt(3.2)	20	1880.000098	-0.022	2.5

CELL, EGPRS MODULATION – MID CHANNEL

Reference Frequency: Cellular Mid Channel 836.600041 MHz @ 20ºC Limit: to stay +- 2.5 ppm = 2091.500 Hz				
DC Power Supply (Vdc)	Environment Temperature (ºC)	Frequency Deviation Measureed with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	50	836.600011	0.036	2.5
3.80	40	836.600019	0.026	2.5
3.80	30	836.600071	-0.036	2.5
3.80	***20***	***836.600041***	***0***	2.5
3.80	10	836.600103	-0.074	2.5
3.80	0	836.600096	-0.066	2.5
3.80	-10	836.600084	-0.051	2.5
3.80	-20	836.600089	-0.057	2.5
3.80	-30	836.599999	0.050	2.5

Reference Frequency: Cellular Mid Channel 836.600041 MHz @ 20ºC Limit: to stay +- 2.5 ppm = 2091.500 Hz				
DC Power Supply (Vdc)	Environment Temperature (ºC)	Frequency Deviation Measureed with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	20	836.600041	***0.000***	2.5
4.20	20	836.600028	0.016	2.5
3.40	20	836.600044	-0.004	2.5
End Volt (3.2)	20	836.599995	0.055	2.5

PCS, EGPRS MODULATION – MID CHANNEL

Reference Frequency: PCS Mid Channel 1880.000064 MHz @ 20ºC Limit: within the authorized block or +- 2.5 ppm = 4700.000 Hz				
Power Supply (Vdc)	Environment Temperature (ºC)	Frequency Deviation Measureed with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	50	1880.000037	0.014	2.5
3.80	40	1880.000035	0.015	2.5
3.80	30	1880.000079	-0.008	2.5
3.80	***20***	1880.000064	***0***	***2.5***
3.80	10	1880.000139	-0.040	2.5
3.80	0	1880.000146	-0.044	2.5
3.80	-10	1880.000155	-0.048	2.5
3.80	-20	1880.000098	-0.018	2.5
3.80	-30	1880.000035	0.015	2.5

Reference Frequency: PCS Mid Channel 1880.000064 MHz @ 20ºC Limit: within the authorized block or +- 2.5 ppm = 4700.000 Hz				
Power Supply (Vdc)	Environment Temperature (ºC)	Frequency Deviation Measureed with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	***20***	1880.000064	***0***	***2.5***
4.20	20	1880.000122	-0.031	2.5
3.40	20	1880.000133	-0.037	2.5
End Volt(3.2)	20	1880.000126	-0.033	2.5

CELL WCDMA – MID CHANNEL

Reference Frequency: Cellular Mid Channel 836.000021 MHz @ 20ºC Limit: to stay +- 2.5 ppm = 2090.000 Hz				
DC Power Supply (Vdc)	Environment Temperature (ºC)	Frequency Deviation Measureed with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	50	836.000024	-0.004	2.5
3.80	40	836.000023	-0.002	2.5
3.80	30	836.000023	-0.002	2.5
3.80	***20***	***836.000021***	***0***	2.5
3.80	10	836.000023	-0.002	2.5
3.80	0	835.999998	0.028	2.5
3.80	-10	836.000001	0.024	2.5
3.80	-20	836.000017	0.005	2.5
3.80	-30	835.999998	0.028	2.5

Reference Frequency: Cellular Mid Channel 835.999996MHz @ 20ºC Limit: to stay +- 2.5 ppm = 2090.000 Hz				
DC Power Supply (Vdc)	Environment Temperature (ºC)	Frequency Deviation Measureed with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	20	836.000021	***0.000***	2.5
4.20	20	835.999999	0.026	2.5
3.40	20	836.000022	-0.001	2.5
End Volt (3.2)	20	836.000025	-0.005	2.5

PCS, WCDMA – MID CHANNEL

Reference Frequency: PCS Mid Channel 1879.999966 MHz @ 20ºC Limit: within the authorized block or +- 2.5 ppm = 4700.000 Hz				
Power Supply (Vdc)	Environment Temperature (ºC)	Frequency Deviation Measureed with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	50	1879.999963	0.002	2.5
3.80	40	1879.999959	0.004	2.5
3.80	30	1879.999969	-0.002	2.5
3.80	***20***	1879.999966	***0***	***2.5***
3.80	10	1880.000038	-0.038	2.5
3.80	0	1880.000037	-0.038	2.5
3.80	-10	1880.000040	-0.039	2.5
3.80	-20	1880.000039	-0.039	2.5
3.80	-30	1880.000037	-0.038	2.5

Reference Frequency: PCS Mid Channel 1879.999966 MHz @ 20ºC Limit: within the authorized block or +- 2.5 ppm = 4700.000 Hz				
Power Supply (Vdc)	Environment Temperature (ºC)	Frequency Deviation Measureed with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	***20***	1879.999966	***0***	***2.5***
4.20	20	1879.999983	-0.009	2.5
3.40	20	1879.999966	0.000	2.5
End Volt(3.2)	20	1879.999975	-0.005	2.5

LTE BAND 5 – 836.5MHz,QPSK

Reference Frequency: LTE Band 5_Mid Channe 836.500008 MHz @ 20°C Limit: to stay +- 2.5 ppm = 2091.250 Hz				
Power Supply (Vdc)	Environment Temperature (°C)	Frequency Deviation Measureed with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	50	836.500013	-0.006	2.5
3.80	40	836.500014	-0.007	2.5
3.80	30	836.500012	-0.005	2.5
3.80	***20***	***836.500008***	***0***	2.5
3.80	10	836.500014	-0.007	2.5
3.80	0	836.500014	-0.007	2.5
3.80	-10	836.500015	-0.008	2.5
3.80	-20	836.500014	-0.007	2.5
3.80	-30	836.500016	-0.010	2.5

Reference Frequency: LTE Band 5_Mid channel 836.500008 MHz @ 20°C Limit: to stay +- 2.5 ppm = 2091.250 Hz				
Power Supply (Vdc)	Environment Temperature (°C)	Frequency Deviation Measureed with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	***20***	***836.500008***	***0***	***2.5***
4.30	20	836.500013	-0.006	2.5
3.40	20	836.500015	-0.008	2.5
End Volt(3.2)	20	836.500012	-0.005	2.5

LTE BAND 5 – 836.5 MHz, 16QAM

Reference Frequency: LTE Band 5_Mid Channel 836.500006 MHz @ 20°C Limit: to stay +- 2.5 ppm = 2091.250 Hz				
Power Supply (Vac)	Environment Temperature (°C)	Frequency Deviation Measureed with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	50	836.500013	-0.008	2.5
3.80	40	836.500025	-0.023	2.5
3.80	30	836.500019	-0.016	2.5
3.80	***20***	***836.500006***	***0***	2.5
3.80	10	836.500013	-0.008	2.5
3.80	0	836.500012	-0.007	2.5
3.80	-10	836.500012	-0.007	2.5
3.80	-20	836.500013	-0.008	2.5
3.80	-30	836.500013	-0.008	2.5

Reference Frequency: LTE Band 5_Mid Channel 836.500006 MHz @ 20°C Limit: to stay +- 2.5 ppm = 2091.250 Hz				
Power Supply (Vac)	Environment Temperature (°C)	Frequency Deviation Measureed with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	***20***	***836.500006***	***0***	***2.5***
4.30	20	836.500010	*-0.005*	2.5
3.40	20	836.500009	*-0.004*	2.5
End Volt(3.2)	20	836.500008	*-0.002*	2.5

QPSK, LTE BAND 13 – 782.000 MHz

Reference Frequency: LTE Band 782.000004MHz @ 20°C Limit: to stay +- 2.5 ppm = 1955.000 Hz				
Power Supply (Vdc)	Environment Temperature (°C)	Frequency Deviation Measureed with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	50	782.000008	-0.005	2.5
3.80	40	782.000007	-0.004	2.5
3.80	30	782.000008	-0.005	2.5
3.80	***20***	***782.000004***	***0***	2.5
3.80	10	782.000009	-0.006	2.5
3.80	0	782.000007	-0.004	2.5
3.80	-10	782.000007	-0.004	2.5
3.80	-20	782.000008	-0.005	2.5
3.80	-30	782.000007	-0.004	2.5

Reference Frequency: Cellular Mid Channel 782.000004 MHz @ 20°C Limit: to stay +- 2.5 ppm = 1955.000 Hz				
Power Supply (Vdc)	Environment Temperature (°C)	Frequency Deviation Measureed with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	***20***	***782.000004***	***0***	***2.5***
4.30	20	782.000009	*-0.006*	2.5
3.40	20	782.000011	*-0.009*	2.5
End Voltage(3.2)	20	782.000006	*-0.003*	2.5

16QAM-LTE BAND 13– 782.000 MHz

Reference Frequency: LTE Band 782.000013MHz @ 20°C Limit: to stay +- 2.5 ppm = 1955.000 Hz				
Power Supply (Vdc)	Environment Temperature (°C)	Frequency Deviation Measureed with Time Elapse (MHz)	Delta (ppm)	Limit (ppm)
3.80	50	782.000017	-0.005	2.5
3.80	40	782.000023	-0.013	2.5
3.80	30	782.000023	-0.013	2.5
3.80	***20***	***782.000013***	***0***	2.5
3.80	10	782.000024	-0.014	2.5
3.80	0	782.000024	-0.014	2.5
3.80	-10	782.000025	-0.015	2.5
3.80	-20	782.000025	-0.015	2.5
3.80	-30	782.000024	-0.014	2.5

Reference Frequency: Cellular Mid Channel 782.000013 MHz @ 20°C Limit: to stay +- 2.5 ppm = 1955.000 Hz				
Power Supply (Vdc)	Environment Temperature (°C)	Frequency Deviation Measureed with Time Elapse (MHz)	Delta (ppm)	Limit (ppm)
3.80	***20***	***782.000013***	***0***	***2.5***
4.30	20	782.000017	*-0.005*	2.5
3.40	20	782.000018	*-0.006*	2.5
End Voltage(3.2)	20	782.000016	*-0.004*	2.5

QPSK, LTE BAND 25 – 1882.500 MHz

Reference Frequency: LTE Band 25, Mid Ch 1882.500009MHz @ 20°C Limit: to stay +- 2.5 ppm = 4706.250 Hz				
Power Supply (Vdc)	Environment Temperature (°C)	Frequency Deviation Measureed with Time Elapse (MHz)	Delta (ppm)	Limit (ppm)
3.80	50	1882.500017	-0.004	2.5
3.80	40	1882.500017	-0.004	2.5
3.80	30	1882.500020	-0.006	2.5
3.80	***20***	***1882.500009***	***0***	2.5
3.80	10	1882.500018	-0.005	2.5
3.80	0	1882.500019	-0.005	2.5
3.80	-10	1882.500022	-0.007	2.5
3.80	-20	1882.500027	-0.010	2.5
3.80	-30	1882.500027	-0.010	2.5

Reference Frequency: LTE Band 25, Mid Channel 1882.500009MHz @ 20°C Limit: to stay +- 2.5 ppm = 4706.250 Hz				
Power Supply (Vdc)	Environment Temperature (°C)	Frequency Deviation Measureed with Time Elapse (MHz)	Delta (ppm)	Limit (ppm)
3.80	***20***	***1882.500009***	***0***	***2.5***
4.30	20	1882.500015	*-0.003*	2.5
3.40	20	1882.500021	*-0.006*	2.5
End Voltage(3.2)	20	1882.500018	*-0.005*	2.5

16QAM-LTE BAND 25– 1882.500 MHz

Reference Frequency: LTE Band 25, Mid Ch, 1882.500016MHz @ 20°C Limit: to stay +- 2.5 ppm = 4706.250 Hz				
Power Supply (Vdc)	Environment Temperature (°C)	Frequency Deviation Measureed with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	50	1882.500031	-0.008	2.5
3.80	40	1882.500034	-0.010	2.5
3.80	30	1882.500035	-0.010	2.5
3.80	***20***	***1882.500016***	***0***	2.5
3.80	10	1882.500032	-0.008	2.5
3.80	0	1882.500030	-0.007	2.5
3.80	-10	1882.500031	-0.008	2.5
3.80	-20	1882.500033	-0.009	2.5
3.80	-30	1882.500035	-0.010	2.5

Reference Frequency: LTE Band 25, Mid Channel 1882.500016 MHz @ 20°C Limit: to stay +- 2.5 ppm = 4706.250 Hz				
Power Supply (Vdc)	Environment Temperature (°C)	Frequency Deviation Measureed with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	***20***	***1882.500016***	***0***	***2.5***
4.30	20	1882.500028	*-0.006*	2.5
3.40	20	1882.500025	*-0.005*	2.5
End Voltage(3.2)	20	1882.500030	*-0.007*	2.5

9. RADIATED TEST RESULTS

9.1. RADIATED POWER (ERP & EIRP)

RULE PART(S)

FCC: §2.1046, §22.913, §24.232, §27.50 and § 90.635.

LIMITS

22.913(a) - The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.

24.232(c) - Mobile/portable stations are limited to 2 watts e.i.r.p. peak power and the equipment must employ means to limit the power to the minimum necessary for successful communications.

27.50 (c) (10) the following power and antenna height requirements apply to stations transmitting in the 698–746 MHz band, the portable stations (hand-held devices) are limited to 3 watts ERP.

27.50 (b)(10) Portable stations (hand-held devices) transmitting in the 746–757 MHz, 758–763 MHz, 776–793 MHz, and 805–806 MHz bands are limited to 3 watts ERP.

27.50 (d)(4) The following power and antenna height requirements apply to stations transmitting in the 1710–1755 MHz and 2110–2155 MHz bands: Fixed, mobile, and portable (hand-held) stations operating in the 1710–1755 MHz band are limited to 1 watt EIRP.

§ 90.635 Limitations on power and antenna height.

(a) The effective radiated power and antenna height for base stations may not exceed 1 kilowatt (30 dBw) and 304 m. (1,000 ft.) above average terrain (AAT), respectively, or the equivalent thereof as determined from the Table. These are maximum values, and applicants will be required to justify power levels and antenna heights requested.

(b) The maximum output power of the transmitter for mobile stations is 100 watts (20 dBw).

Table—Equivalent Power and Antenna Heights for Base Stations in the 851–869 MHz and 935–940 MHz Bands Which Have a Requirement for a 32 km (20 mi) Service Area Radius

Antenna height (ATT) meters (feet)	Effective radiated power (watts)[1,2,4]
Above 1,372 (4,500)	65
Above 1,220 (4,000) to 1,372 (4,500)	70
Above 1,067 (3,500) to 1,220 (4,000)	75
Above 915 (3,000) to 1,067 (3,500)	100
Above 763 (2,500) to 915 (3,000)	140
Above 610 (2,000) to 763 (2,500)	200
Above 458 (1,500) to 610 (2,000)	350
Above 305 (1,000) to 458 (1,500)	600
Up to 305 (1,000)	31,000

1Power is given in terms of effective radiated power (ERP).

2Applicants in the Los Angeles, CA, area who demonstrate a need to serve both the downtown and fringe areas will be permitted to utilize an ERP of 1 kw at the following mountaintop sites: Santiago Park, Sierra Peak, Mount Lukens, and Mount Wilson.

3Stations with antennas below 305 m (1,000 ft) (AAT) will be restricted to a maximum power of 1 kw (ERP).

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

TEST PROCEDURE

ANSI / TIA / EIA 603C Clause 2.2.17

MODES TESTED

- GPRS and EGPRS
- UMTS, REL 99 and HSDPA
- CDMA BC10, BC0, BC1
- CDMA2000 REV B
- LTE BAND 5
- LTE BAND 13
- LTE BAND 25

TEST RESULTS

Mode	Channel	f (MHz)	ERP (PEAK)	
			dBm	mW
GPRS	128	824.20	32.80	1905.46
	190	836.60	31.24	1330.45
	251	848.80	32.35	1717.91
EGPRS	128	824.20	31.18	1312.20
	190	836.60	29.64	920.45
	251	848.80	30.57	1140.25

Mode	Channel	f (MHz)	EIRP (PEAK)	
			dBm	mW
GPRS	512	1852.40	31.26	1336.60
	661	1880.00	32.65	1840.77
	810	1909.80	31.30	1348.96
EGPRS	512	1852.40	31.00	1258.93
	661	1880.00	32.00	1584.89
	810	1909.80	31.19	1315.22

Mode	Channel	f (MHz)	ERP (AVERAGE)	
			dBm	mW
UMTS,REL 99	4357	826.40	22.10	162.18
	4405	836.00	22.50	177.83
	4455	846.00	22.40	173.78

Mode	Channel	f (MHz)	EIRP (PEAK)	
			dBm	mW
UMTS,REL 99	9662	1852.40	27.96	625.17
	9800	1880.00	29.12	816.58
	9938	1907.60	28.59	722.77

Mode	Channel	f (MHz)	ERP (AVERAGE)	
			dBm	mW
UMTS, HSUPA	4357	826.40	21.35	136.46
	4405	836.00	21.70	147.91
	4455	846.00	21.40	138.04

Mode	Channel	f (MHz)	ERP (AVERAGE)	
			dBm	mW
UMTS, HSUPA	9662	1850.20	27.15	518.80
	9800	1880.00	28.69	739.61
	9938	1907.60	28.67	736.21

Mode	Channel	f (MHz)	ERP / EIRP	
			dBm	mW
BC10, 1xRTT	476	817.90	23.10	204.17
	526	819.15	23.30	213.80
	684	823.10	22.80	190.55
CDMA, BC0, 1xRTT	1013	824.70	22.80	190.55
	384	836.52	22.93	196.34
	777	848.31	23.10	204.17
CDMA, BC1, 1xRTT	25	1851.25	28.28	672.98
	600	1880.00	30.12	1028.02
	1175	1908.75	28.89	774.46

Mode	Channel	f (MHz)	ERP / EIRP	
			dBm	mW
BC10, EVDO A	476	817.90	23.30	213.80
	526	819.15	23.40	218.78
	684	823.10	23.30	213.80
CDMA, BC 0, EVDO A	1013	824.70	22.90	194.98
	384	836.52	22.70	186.21
	777	848.31	22.60	181.97
CDMA, BC1, EVDO REV A	25	1851.25	28.45	699.84
	600	1880.00	29.08	809.10
	1175	1908.75	28.20	660.69

Mode	Channel	f (MHz)	ERP	
			dBm	mW
EVDO Rev B Two Carriers Min.	1013+31	824.70+825.93	21.60	144.54
	384+425	836.52+837.75	22.20	165.96
	736+777	847.08+848.31	21.70	147.91
EVDO Rev B Two Carriers Max	1013+156	824.829.68	21.10	128.82
	384+550	836.52+841.50	21.50	165.96
	611+777	843.33+848.31	20.80	147.91
EVDO Rev B Three Carriers Min.	1013+31+72	824.70+825.93+827.16	21.90	128.82
	384+425+466	836.52+837.75+838.98	22.20	141.25
	695+736+777	845.85+847.08+848.31	21.70	120.23

LTE Band 5 (1.4 MHz BANDWIDTH)

Mode	RB/RB SIZE	f (MHz)	ERP (Average)	
			dBm	mW
1.4MHz Band QPSK	1/0	824.7	21.71	148.25
		836.5	21.91	155.24
		848.3	23.01	199.99
1.4MHz Band 16QAM	1/0	824.7	20.93	123.88
		836.5	21.24	133.05
		848.3	22.16	164.44

LTE Band 5 (3 MHz BANDWIDTH)

Mode	RB/RB SIZE	f (MHz)	ERP (Average)	
			dBm	mW
3 MHZ BAND QPSK	1/0	825.5	21.67	146.89
		836.5	21.83	152.41
		847.5	22.95	197.24
3 MHZ BAND 16QAM	1/0	825.5	20.78	119.67
		836.5	20.95	124.45
		847.5	22.01	158.85

LTE Band 5 (5 MHz BANDWIDTH)

Mode	RB/RB SIZE	f (MHz)	ERP (Average)	
			dBm	mW
5 MHz Band QPSK	1/0	826.5	21.64	145.88
		836.5	21.42	138.68
		846.5	22.43	174.98
5 MHz Band 16QAM	1/0	826.5	21.15	130.32
		836.5	21.08	128.23
		846.5	21.95	156.68

LTE Band 5 (10 MHz BANDWIDTH)

Mode	RB/RB SIZE	f (MHz)	ERP (Average)	
			dBm	mW
10 MHZ BAND QPSK	1/0	829.0	21.77	150.31
		836.5	21.22	132.43
		844.0	22.49	177.42
10 MHZ BAND 16QAM	1/0	829.0	20.89	122.74
		836.5	19.99	99.77
		844.0	21.75	149.62

LTE Band 13 (5 MHz BANDWIDTH)

Mode	RB/RB SIZE	f (MHz)	ERP (Average)	
			dBm	mW
5 MHZ BAND QPSK	1/0	779.5	**23.00**	199.53
		782.0	22.61	182.39
		784.5	22.10	162.18
5 MHZ BAND 16QAM	1/0	779.5	22.30	169.82
		782.0	21.80	151.36
		784.5	21.40	138.04

LTE BAND 13 (10 MHz BANDWIDTH)

Mode	RB/RB SIZE	f (MHz)	ERP (Average)	
			dBm	mW
10 MHZ BAND QPSK	1/0	782.0	21.60	144.54
10 MHz BAND 16QAM	1/0		20.90	123.03

LTE Band 25 (1.4 MHz BANDWIDTH)

Mode	RB/RB SIZE	f (MHz)	EIRP(Peak)	
			dBm	mW
1.4 MHZ BAND QPSK	6/0	1850.7	28.77	753.36
		1880.0	29.13	818.46
		1914.3	29.39	868.96
1.4 MHZ BAND 16QAM	6/0	1850.7	27.71	590.20
		1880.0	28.08	642.69
		1914.3	28.43	696.63

LTE Band 25 (3 MHz BAND WIDTH)

Mode	RB/RB SIZE	f (MHz)	EIRP(Peak)	
			dBm	mW
3 MHZ BAND QPSK	15/0	1851.5	29.11	814.70
		1880.0	29.50	891.25
		1913.5	29.79	952.80
3 MHZ BAND 16QAM	15/0	1851.5	28.17	656.15
		1880.0	28.60	724.44
		1913.5	28.86	769.13

LTE Band 25 (5.0MHz BANDWIDTH)

Mode	RB/RB SIZE	f (MHz)	EIRP(Peak)	
			dBm	mW
5 MHZ BAND QPSK	25/0	1852.5	29.10	812.83
		1880.0	29.39	868.96
		1912.5	29.78	950.60
5 MHZ BAND 16QAM	25/0	1852.5	28.18	657.66
		1880.0	28.63	729.46
		1912.5	28.93	781.63

LTE Band 25 (10 MHz BANDWIDTH)

Mode	RB/RB SIZE	f (MHz)	EIRP(Peak)	
			dBm	mW
10 MHZ BAND QPSK	50/0	1855.0	28.97	788.86
		1880.0	29.26	843.33
		1910.0	29.65	922.57
10 MHZ BAND 16QAM	50/0	1855.0	28.00	630.96
		1880.0	28.66	734.51
		1910.0	28.75	749.89

LTE Band 25 (15 MHz BANDWIDTH)

Mode	RB/RB SIZE	f (MHz)	EIRP(Peak)	
			dBm	mW
15 MHZ BAND QPSK	75/0	1857.5	29.39	868.96
		1880.0	29.62	916.22
		1907.5	30.11	1025.65
15 MHZ BAND 16QAM	75/0	1857.5	28.40	691.83
		1880.0	28.62	727.78
		1907.5	29.14	820.35

LTE Band 25 (20 MHz BANDWIDTH)

Mode	RB/RB SIZE	f (MHz)	EIRP(Peak)	
			dBm	mW
20 MHZ BAND QPSK	100/0	1860.0	29.61	914.11
		1880.0	29.30	851.14
		1905.0	29.74	941.89
20 MHZ BAND 16QAM	100/0	1860.0	28.66	734.51
		1880.0	28.41	693.43
		1905.0	28.78	755.09

9.1.1. GSM

GPRS (Cellular Band)

High Frequency Substitution Measurement
Compliance Certification Services Chamber B

Company: Apple
Date: 09/05/12
Test Engineer: MENGISTU MEKURIA
Configuration: EUT WITH AC ADAPTER
Mode: 850MHz Band, GPRS MODE

Test Equipment:
Receiving: Sunol T122, and Chamber B N-type Cable (Setup this one for testing EUT)
Substitution: Dipole S/N: 1629, 4ft SMA Cable (245182002) Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
824.20	33.30	V	0.5	0.0	32.80	38.5	-5.6	
824.20	28.52	H	0.5	0.0	28.02	38.5	-10.4	
836.60	31.74	V	0.5	0.0	31.24	38.5	-7.2	
836.60	28.09	H	0.5	0.0	27.59	38.5	-10.9	
848.80	32.85	V	0.5	0.0	32.35	38.5	-6.1	
848.80	27.40	H	0.5	0.0	26.90	38.5	-11.5	

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EGPRS (Cellular Band)

High Frequency Substitution Measurement
Compliance Certification Services Chamber B

Company: Apple
Date: 09/05/12
Test Engineer: MENGISTU MEKURIA
Configuration: EUT WITH AC ADAPTER
Mode: 850MHz Band, EGPRS MODE

Test Equipment:
Receiving: Sunol T122, and 5m Chamber B N-type Cable (Setup this one for testing EUT)
Substitution: Dipole S/N: 1629, 4ft SMA Cable (245182002) Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
824.20	31.68	V	0.5	0.0	31.18	38.5	-7.3	
824.20	26.90	H	0.5	0.0	26.40	38.5	-12.0	
836.60	30.14	V	0.5	0.0	29.64	38.5	-8.8	
836.60	26.44	H	0.5	0.0	25.94	38.5	-12.5	
848.80	31.07	V	0.5	0.0	30.57	38.5	-7.9	
848.80	25.71	H	0.5	0.0	25.21	38.5	-13.2	

Rev. 3.17.11

GPRS (PCS Band)

High Frequency Fundamental Measurement
Compliance Certification Services Chamber B

Company: Aoole
Date: 09/05/12
Test Engineer: MENGISTU MEKURIA
Configuration: EUT WITH AC ADAPTER
Mode: 1900MHz Band, GPRS MODE
Worst Case : Y position with AC Adapter

Test Equipment:
Receiving: Horn T59, and Camber B SMA Cables
Substitution: Horn T217 Substitution, 4ft SMA Cable (245182002) Warehouse

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
1.852	23.5	V	0.85	8.62	31.26	33.0	-1.7	
1.852	13.9	H	0.85	8.47	21.55	33.0	-11.5	
1.880	25.0	V	0.85	8.46	32.65	33.0	-0.4	
1.880	15.6	H	0.85	8.36	23.10	33.0	-9.9	
1.908	23.9	V	0.85	8.30	31.30	33.0	-1.7	
1.908	16.1	H	0.85	8.25	23.54	33.0	-9.5	

Rev. 3.17.11

EGPRS (PCS Band)

High Frequency Fundamental Measurement
Compliance Certification Services Chamber B

Company: Apple
Date: 09/05/12
Test Engineer: MENGISTU MEKURIA
Configuration: EUT WITH AC ADAPTER
Mode: 1900MHz Band, EGPRS MODE

Test Equipment:
Receiving: Horn T59, and Camber B SMA Cables
Substitution: Horn T217 Substitution, 4ft SMA Cable (245182002) Warehouse

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
1.852	23.2	V	0.85	8.62	31.00	33.0	-2.0	
1.852	13.7	H	0.85	8.47	21.30	33.0	-11.7	
1.880	24.4	V	0.85	8.46	32.00	33.0	-1.0	
1.880	15.4	H	0.85	8.36	22.91	33.0	-10.1	
1.908	23.7	V	0.85	8.30	31.19	33.0	-1.8	
1.908	16.3	H	0.85	8.25	23.67	33.0	-9.3	

Rev. 3.17.11

9.1.2. WCDMA

REL 99 (Cellular Band)

High Frequency Substitution Measurement
Compliance Certification Services Chamber B

Company: Apple
Date: 09/05/12
Test Engineer: MENGISTU MEKURIA
Configuration: EUT WITH HEADSET
Mode: TX, 850 MHz BAND, WCDMA MODE

Test Equipment:
Receiving: Sunol T122, and 3m Chamber N-type Cable (Setup this one for testing EUT)
Substitution: Dipole S/N: 1629, 4ft SMA Cable (245182002) Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
826.40	22.60	V	0.5	0.0	22.10	38.5	-16.3	
826.40	20.29	H	0.5	0.0	19.79	38.5	-18.7	
Mid Ch								
836.60	23.00	V	0.5	0.0	22.50	38.5	-15.9	
836.60	20.16	H	0.5	0.0	19.66	38.5	-18.8	
High Ch								
846.60	22.90	V	0.5	0.0	22.40	38.5	-16.0	
846.60	19.99	H	0.5	0.0	19.49	38.5	-19.0	

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REL 99 (PCS Band)

High Frequency Fundamental Measurement
Compliance Certification Services Chamber B

Company: Apple
Date: 09/05/12
Test Engineer: MENGISTU MEKURIA
Configuration: EUT WITH AC ADAPTER AND HEADSET
Mode: TX, 1900 MHz BAND, WCDMA MODE

Test Equipment:
Receiving: Horn T59, and Chamber B SMA Cables
Substitution: Horn T217 Substitution, 4ft SMA Cable (245182002) Warehouse

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
1.852	20.2	V	0.85	8.62	27.96	33.0	-5.0	
1.852	10.7	H	0.85	8.47	18.30	33.0	-14.7	
1.880	21.5	V	0.85	8.46	29.12	33.0	-3.9	
1.880	12.4	H	0.85	8.36	19.93	33.0	-13.1	
1.908	21.1	V	0.85	8.30	28.59	33.0	-4.4	
1.908	12.7	H	0.85	8.25	20.10	33.0	-12.9	

Rev. 3.17.11

HSUPA (Cellular Band)

High Frequency Substitution Measurement
Compliance Certification Services Chamber B

Company: APPLE
Project #: 12U14507
Date: 09/21/12
Test Engineer: MENGISTU MEKURIA
Configuration: EUT ALONE
Mode: TX, 850 MHz BAND, HSUPA MODE

Test Equipment:
Receiving: Sunol T122, and 5m Chamber B N-type Cable (Setup this one for testing EUT)
Substitution: Dipole S/N: 1629, 4ft SMA Cable (245182002) Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
826.40	21.85	V	0.5	0.0	21.35	38.5	-17.1	
826.40	19.52	H	0.5	0.0	19.02	38.5	-19.4	
836.60	22.20	V	0.5	0.0	21.70	38.5	-16.7	
836.60	19.83	H	0.5	0.0	19.33	38.5	-19.1	
846.60	21.90	V	0.5	0.0	21.40	38.5	-17.0	
846.60	18.80	H	0.5	0.0	18.30	38.5	-20.1	

Rev. 3.17.11

HSUPA (PCS Band)

High Frequency Fundamental Measurement
Compliance Certification Services Chamber B

Company: APPLE
Project #: 12U14507
Date: 09/21/12
Test Engineer: MENGISTU MEKURIA
Configuration: EUT WITH AC ADAPTER AND HEADSET
Mode: TX, 1900 MHz BAND, HSUPA MODE

Test Equipment:
Receiving: Horn T59, and Camber B SMA Cables
Substitution: Horn T217 Substitution, 4ft SMA Cable (245182002) Warehouse

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
1.852	19.4	V	0.85	8.62	27.15	33.0	-5.9	
1.852	10.7	H	0.85	8.47	18.29	33.0	-14.7	
1.880	21.1	V	0.85	8.46	28.69	33.0	-4.3	
1.880	12.3	H	0.85	8.36	19.85	33.0	-13.2	
1.908	21.2	V	0.85	8.30	28.67	33.0	-4.3	
1.908	14.1	H	0.85	8.25	21.53	33.0	-11.5	

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9.1.3. CDMA2000

BC10, 1xRTT

High Frequency Substitution Measurement
Compliance Certification Services Chamber B

Company: APPLE
Project #: 12U14526
Date: 09/06/12
Test Engineer: MENGISTU MEKURIA
Configuration: EUT WITH AC ADAPTER
Mode: TX, 800 MHz SECONDARY BAND,CDMA 1xRTT

Test Equipment:
Receiving: Sunol T122, and 3m Chamber N-type Cable (Setup this one for testing EUT)
Substitution: Dipole S/N: 1629, 4ft SMA Cable (245182002) Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
817.90	23.60	V	0.5	0.0	23.10	38.5	-15.3	
817.90	17.82	H	0.5	0.0	17.32	38.5	-21.1	
819.15	23.80	V	0.5	0.0	23.30	38.5	-15.1	
819.15	18.00	H	0.5	0.0	17.50	38.5	-20.9	
823.10	23.30	V	0.5	0.0	22.80	38.5	-15.6	
823.10	18.14	H	0.5	0.0	17.64	38.5	-20.8	

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BC0, 1xRTT

High Frequency Substitution Measurement
Compliance Certification Services Chamber B

Company: Apple
Date: 09/06/12
Test Engineer: MENGISTU MEKURIA
Configuration: EUT WITH AC ADAPTER
Mode: TX, 850 MHz BAND,CDMA 1xRTT

Test Equipment:
Receiving: Sunol T122, and Chamber B N-type Cable (Setup this one for testing EUT)
Substitution: Dipole S/N: 1629, 4ft SMA Cable (245182002) Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
824.70	23.30	V	0.5	0.0	22.80	38.5	-15.6	
824.70	18.54	H	0.5	0.0	18.04	38.5	-20.4	
836.52	23.43	V	0.5	0.0	22.93	38.5	-15.5	
836.52	17.25	H	0.5	0.0	16.75	38.5	-21.7	
848.31	23.60	V	0.5	0.0	23.10	38.5	-15.3	
848.31	16.60	H	0.5	0.0	16.10	38.5	-22.3	

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BC1, 1xRTT

High Frequency Fundamental Measurement
Compliance Certification Services Chamber B

Company: APPLE
Date: 09/06/12
Test Engineer: MENGISTU MEKURIA
Configuration: EUT WITH HEADSET
Mode: TX, 19000 MHz BAND,CDMA2000 1xRTT MODE

Test Equipment:
Receiving: Horn T59, and Camber B SMA Cables
Substitution: Horn T217 Substitution, 4ft SMA Cable (245182002) Warehouse

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
1.851	20.5	V	0.85	8.62	28.28	33.0	-4.7	
1.851	11.7	H	0.85	8.47	19.33	33.0	-13.7	
1.880	22.5	V	0.85	8.46	30.12	33.0	-2.9	
1.880	13.9	H	0.85	8.36	21.44	33.0	-11.6	
1.909	21.4	V	0.85	8.30	28.89	33.0	-4.1	
1.909	13.2	H	0.85	8.25	20.55	33.0	-12.5	

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BC10 EVDO REV A

High Frequency Substitution Measurement
Compliance Certification Services Chamber B

Company: APPLE
Date: 09/07/12
Test Engineer: MENGISTU MEKURIA
Configuration: EUT WITH AC ADAPTER
Mode: TX, 800 MHz SECONDARY BAND,CDMA2000 EVDO

Test Equipment:
Receiving: Sunol T122, and 3m Chamber N-type Cable (Setup this one for testing EUT)
Substitution: Dipole S/N: 1629, 4ft SMA Cable (245182002) Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
817.90	23.80	V	0.5	0.0	23.30	38.5	-15.1	
817.90	20.04	H	0.5	0.0	19.54	38.5	-18.9	
819.15	23.90	V	0.5	0.0	23.40	38.5	-15.0	
819.15	20.24	H	0.5	0.0	19.74	38.5	-18.7	
823.10	23.80	V	0.5	0.0	23.30	38.5	-15.1	
823.10	20.84	H	0.5	0.0	20.34	38.5	-18.1	

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BC0, EVDO REV A (Cellular Band)

High Frequency Substitution Measurement
Compliance Certification Services Chamber B

Company: APPLE
Date: 09/07/12
Test Engineer: MENGISTU MEKURIA
Configuration: EUT WITH AC ADAPTER
Mode: TX, 850 MHz BAND, CDMA2000 EVDO

Test Equipment:
Receiving: Sunol T122, and 3m Chamber N-type Cable (Setup this one for testing EUT)
Substitution: Dipole S/N: 1629, 4ft SMA Cable (245182002) Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
824.70	23.40	V	0.5	0.0	22.90	38.5	-15.5	
824.70	19.54	H	0.5	0.0	19.04	38.5	-19.4	
836.52	23.20	V	0.5	0.0	22.70	38.5	-15.7	
836.52	19.65	H	0.5	0.0	19.15	38.5	-19.3	
848.31	23.10	V	0.5	0.0	22.60	38.5	-15.8	
848.31	19.60	H	0.5	0.0	19.10	38.5	-19.3	

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BC1 EVDO REV A

High Frequency Fundamental Measurement
Compliance Certification Services Chamber B

Company: APPLE
Date: 09/06/12
Test Engineer: MENGISTU MEKURIA
Configuration: EUT WITH HEADSET
Mode: TX, 19000 MHz BAND,CDMA2000 EVDO

Test Equipment:
Receiving: Horn T59, and Camber B SMA Cables
Substitution: Horn T217 Substitution, 4ft SMA Cable (245182002) Warehouse

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
1.851	20.7	V	0.85	8.62	28.45	33.0	-4.6	
1.851	10.6	H	0.85	8.47	18.23	33.0	-14.8	
1.880	21.5	V	0.85	8.46	29.08	33.0	-3.9	
1.880	11.5	H	0.85	8.36	18.98	33.0	-14.0	
1.909	20.8	V	0.85	8.30	28.20	33.0	-4.8	
1.909	12.3	H	0.85	8.25	19.73	33.0	-13.3	

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CDMA2000 CELL BAND, EVDO REV B

Two Carriers Minimum Separation

High Frequency Substitution Measurement
Compliance Certification Services Chamber B

Company: APPLE
Date: 09/20/12
Test Engineer: MENGISTU MEKURIA
Configuration: EUT WITH AC ADAPTER
Mode: TX, 850 MHz BAND, CDMA2000 EVDO REV B MODE_2 CARRIER WITH MINIMUM SEPARATIONS

Test Equipment:
Receiving: Sunol T122, and 3m Chamber N-type Cable (Setup this one for testing EUT)
Substitution: Dipole S/N: 1629, 4ft SMA Cable (245182002) Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
824.70	22.10	V	0.5	0.0	21.60	38.5	-16.8	
824.70	13.54	H	0.5	0.0	13.04	38.5	-25.4	
836.52	22.70	V	0.5	0.0	22.20	38.5	-16.2	
836.52	13.25	H	0.5	0.0	12.75	38.5	-25.7	
848.31	22.20	V	0.5	0.0	21.70	38.5	-16.7	
848.31	13.10	H	0.5	0.0	12.60	38.5	-25.8	

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CDMA2000 CELL BAND, EVDO REV B

Two Carriers Maximum Separation

High Frequency Substitution Measurement
Compliance Certification Services Chamber B

Company: APPLE
Date: 09/20/12
Test Engineer: MENGISTU MEKURIA
Configuration: EUT WITH AC ADAPTER
Mode: TX, 850 MHz BAND, CDMA2000 EVDO REV B MODE_2 CARRIER with Max Separation

Test Equipment:
Receiving: Sunol T122, and 3m Chamber N-type Cable (Setup this one for testing EUT)
Substitution: Dipole S/N: 1629, 4ft SMA Cable (245182002) Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
824.70	21.60	V	0.5	0.0	21.10	38.5	-17.3	
824.70	21.47	H	0.5	0.0	20.97	38.5	-17.5	
836.52	22.00	V	0.5	0.0	21.50	38.5	-16.9	
836.52	19.38	H	0.5	0.0	18.88	38.5	-19.6	
848.31	21.30	V	0.5	0.0	20.80	38.5	-17.6	
848.31	18.75	H	0.5	0.0	18.25	38.5	-20.2	

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CDMA2000 CELL BAND, EVDO REV B

Three Carriers Minimum Separation

High Frequency Substitution Measurement
Compliance Certification Services Chamber B

Company: APPLE
Date: 09/20/12
Test Engineer: MENGISTU MEKURIA
Configuration: EUT WITH AC ADAPTER
Mode: TX, 850 MHz BAND, CDMA2000 EVDO REV B MODE_3 CARRIER WITH MINIMUM SEPARATIONS

Test Equipment:
Receiving: Sunol T122, and 3m Chamber N-type Cable (Setup this one for testing EUT)
Substitution: Dipole S/N: 1629, 4ft SMA Cable (245182002) Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
824.70	22.40	V	0.5	0.0	21.90	38.5	-16.5	
824.70	12.00	H	0.5	0.0	11.50	38.5	-26.9	
836.52	22.70	V	0.5	0.0	22.20	38.5	-16.2	
836.52	12.00	H	0.5	0.0	11.50	38.5	-26.9	
848.31	22.20	V	0.5	0.0	21.70	38.5	-16.7	
848.31	12.50	H	0.5	0.0	12.00	38.5	-26.4	

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9.1.4. LTE BAND 5

LTE QPSK Band 5 (1.4 MHz BAND WIDTH)

AVERAGE

High Frequency Substitution Measurement
Compliance Certification Services Chamber B

Company: APPLE
Project #: 12U14507
Date: 09/11/12
Test Engineer: MENGISTU MEKURIA
Configuration: EUT (C13) WITH AC ADAPTER
Mode: TX. BAND 5_1.4 MHz BW_RB1-0_QPSK MODE

Test Equipment:
Receiving: Sunol T122, and 5m Chamber B N-type Cable (Setup this one for testing EUT)
Substitution: Dipole S/N: 1629, 4ft SMA Cable (245182002) Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
824.70	22.21	V	0.5	0.0	21.71	38.5	-16.7	
824.70	18.03	H	0.5	0.0	17.53	38.5	-20.9	
836.50	22.41	V	0.5	0.0	21.91	38.5	-16.5	
836.50	18.34	H	0.5	0.0	17.84	38.5	-20.6	
848.30	23.51	V	0.5	0.0	23.01	38.5	-15.4	
848.30	16.88	H	0.5	0.0	16.38	38.5	-22.1	

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LTE 16QAM Band 5 (1.4 MHz BAND WIDTH)

High Frequency Substitution Measurement
Compliance Certification Services Chamber B

Company: APPLE
Project #: 12U14507
Date: 09/11/12
Test Engineer: MENGISTU MEKURIA
Configuration: EUT (C13) WITH AC ADAPTER
Mode: TX. BAND 5_1.4 MHz BW_RB1-0_16QAM MODE

Test Equipment:
Receiving: Sunol T122, and 5m Chamber B N-type Cable (Setup this one for testing EUT)
Substitution: Dipole S/N: 1629, 4ft SMA Cable (245182002) Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
824.70	21.43	V	0.5	0.0	20.93	38.5	-17.5	
824.70	17.20	H	0.5	0.0	16.70	38.5	-21.7	
836.50	21.74	V	0.5	0.0	21.24	38.5	-17.2	
836.50	17.66	H	0.5	0.0	17.16	38.5	-21.3	
848.30	22.66	V	0.5	0.0	22.16	38.5	-16.3	
848.30	15.91	H	0.5	0.0	15.41	38.5	-23.0	

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LTE QPSK Band 5 (3.0 MHz BAND WIDTH)

High Frequency Substitution Measurement
Compliance Certification Services Chamber B

Company: APPLE
Project #: 12U14507
Date: 09/11/12
Test Engineer: MENGISTU MEKURIA
Configuration: EUT (C13) WITH AC ADAPTER
Mode: TX. BAND 5_3.0 MHz BW_RB1-0_QPSK MODE

Test Equipment:
Receiving: Sunol T122, and 5m Chamber B N-type Cable (Setup this one for testing EUT)
Substitution: Dipole S/N: 1629, 4ft SMA Cable (245182002) Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
825.50	22.17	V	0.5	0.0	21.67	38.5	-16.8	
825.50	18.17	H	0.5	0.0	17.67	38.5	-20.8	
836.50	22.33	V	0.5	0.0	21.83	38.5	-16.6	
836.50	18.41	H	0.5	0.0	17.91	38.5	-20.5	
847.50	23.45	V	0.5	0.0	22.95	38.5	-15.5	
847.50	16.74	H	0.5	0.0	16.24	38.5	-22.2	

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LTE 16QAM Band 5 (3.0 MHz BAND WIDTH)

High Frequency Substitution Measurement
Compliance Certification Services Chamber B

Company: APPLE
Project #: 12U14507
Date: 09/11/12
Test Engineer: MENGISTU MEKURIA
Configuration: EUT (C13) WITH AC ADAPTER
Mode: TX. BAND 5_3.0 MHz BW_RB1-0_16QAM MODE

Test Equipment:
Receiving: Sunol T122, and 5m Chamber B N-type Cable (Setup this one for testing EUT)
Substitution: Dipole S/N: 1629, 4ft SMA Cable (245182002) Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
825.50	21.28	V	0.5	0.0	20.78	38.5	-17.7	
825.50	17.22	H	0.5	0.0	16.72	38.5	-21.7	
836.50	21.45	V	0.5	0.0	20.95	38.5	-17.5	
836.50	17.49	H	0.5	0.0	16.99	38.5	-21.5	
847.50	22.51	V	0.5	0.0	22.01	38.5	-16.4	
847.50	15.68	H	0.5	0.0	15.18	38.5	-23.3	

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LTE QPSK Band 5 (5.0 MHz BAND WIDTH)

High Frequency Substitution Measurement
Compliance Certification Services Chamber B

Company: APPLE
Project #: 12U14507
Date: 09/11/12
Test Engineer: MENGISTU MEKURIA
Configuration: EUT (C13) WITH AC ADAPTER
Mode: TX. BAND 5_5.0 MHz BW_RB1-0_QPSK MODE

Test Equipment:
Receiving: Sunol T122, and 5m Chamber B N-type Cable (Setup this one for testing EUT)
Substitution: Dipole S/N: 1629, 4ft SMA Cable (245182002) Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
826.50	22.14	V	0.5	0.0	21.64	38.5	-16.8	
826.50	17.88	H	0.5	0.0	17.38	38.5	-21.1	
836.50	21.92	V	0.5	0.0	21.42	38.5	-17.0	
836.50	18.31	H	0.5	0.0	17.81	38.5	-20.6	
846.50	22.93	V	0.5	0.0	22.43	38.5	-16.0	
846.50	16.52	H	0.5	0.0	16.02	38.5	-22.4	

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LTE 16QAM Band 5 (5.0 MHz BAND WIDTH)

High Frequency Substitution Measurement
Compliance Certification Services Chamber B

Company: APPLE
Project #: 12U14507
Date: 09/11/12
Test Engineer: MENGISTU MEKURIA
Configuration: EUT (C13) WITH AC ADAPTER
Mode: TX. BAND 5_5.0 MHz BW_RB1-0_16QAM MODE

Test Equipment:
Receiving: Sunol T122, and 5m Chamber B N-type Cable (Setup this one for testing EUT)
Substitution: Dipole S/N: 1629, 4ft SMA Cable (245182002) Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
826.50	21.65	V	0.5	0.0	21.15	38.5	-17.3	
826.50	17.31	H	0.5	0.0	16.81	38.5	-21.6	
836.50	21.58	V	0.5	0.0	21.08	38.5	-17.4	
836.50	18.05	H	0.5	0.0	17.55	38.5	-20.9	
846.50	22.45	V	0.5	0.0	21.95	38.5	-16.5	
846.50	15.81	H	0.5	0.0	15.31	38.5	-23.1	

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LTE QPSK Band 5 (10.0 MHz BAND WIDTH)

High Frequency Substitution Measurement
Compliance Certification Services Chamber B

Company: APPLE
Project #: 12U14507
Date: 09/11/12
Test Engineer: MENGISTU MEKURIA
Configuration: EUT (C13) WITH AC ADAPTER
Mode: TX. BAND 5_10.0 MHz BW_RB1-0_QPSK MODE

Test Equipment:
Receiving: Sunol T122, and 5m Chamber B N-type Cable (Setup this one for testing EUT)
Substitution: Dipole S/N: 1629, 4ft SMA Cable (245182002) Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
829.00	22.27	V	0.5	0.0	21.77	38.5	-16.7	
829.00	16.33	H	0.5	0.0	15.83	38.5	-22.6	
836.50	21.72	V	0.5	0.0	21.22	38.5	-17.2	
836.50	18.03	H	0.5	0.0	17.53	38.5	-20.9	
844.00	22.99	V	0.5	0.0	22.49	38.5	-16.0	
844.00	16.84	H	0.5	0.0	16.34	38.5	-22.1	

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LTE 16QAM Band 5 (10.0 MHz BAND WIDTH)

High Frequency Substitution Measurement
Compliance Certification Services Chamber B

Company: APPLE
Project #: 12U14507
Date: 09/11/12
Test Engineer: MENGISTU MEKURIA
Configuration: EUT (C13) WITH AC ADAPTER
Mode: TX. BAND 5_10.0 MHz BW_RB1-0_16QAM MODE

Test Equipment:
Receiving: Sunol T122, and 5m Chamber B N-type Cable (Setup this one for testing EUT)
Substitution: Dipole S/N: 1629, 4ft SMA Cable (245182002) Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
829.00	21.39	V	0.5	0.0	20.89	38.5	-17.6	
829.00	15.88	H	0.5	0.0	15.38	38.5	-23.1	
836.50	20.49	V	0.5	0.0	19.99	38.5	-18.5	
836.50	16.71	H	0.5	0.0	16.21	38.5	-22.2	
844.00	22.25	V	0.5	0.0	21.75	38.5	-16.7	
844.00	15.95	H	0.5	0.0	15.45	38.5	-23.0	

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9.1.5. LTE BAND 13

AVERAGE

LTE QPSK Band 13 (5.0 MHz BAND WIDTH)

High Frequency Substitution Measurement
Compliance Certification Services Chamber B

Company: APPLE
Project #: 12U14507
Date: 09/07/12
Test Engineer: MENGISTU MEKURIA
Configuration: EUT WITH AN ADAPTER
Mode: TX, BAND 13_5MHz BW_RB1-0_ QPSK MODE

Test Equipment:
Receiving: Sunol T122, and Chamber B N-type Cable (Setup this one for testing EUT)
Substitution: Dipole S/N: 00022117, 6ft SMA Cable (SN # 208947003) Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
779.50	23.50	V	0.5	0.0	23.00	38.5	-15.4	
779.50	13.25	H	0.5	0.0	12.75	38.5	-25.7	
782.00	23.11	V	0.5	0.0	22.61	38.5	-15.8	
782.00	13.35	H	0.5	0.0	12.85	38.5	-25.6	
784.50	22.60	V	0.5	0.0	22.10	38.5	-16.3	
784.50	13.15	H	0.5	0.0	12.65	38.5	-25.8	

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LTE 16QAM Band 13 (5.0 MHz BAND WIDTH)

High Frequency Substitution Measurement
Compliance Certification Services Chamber B

Company: APPLE
Project #: 12U14507
Date: 09/07/12
Test Engineer: MENGISTU MEKURIA
Configuration: EUT WITH AN ADAPTER
Mode: TX, BAND 13_5MHz BW_RB1-0_ 16QAM MODE

Test Equipment:
Receiving: Sunol T122, and Chamber B N-type Cable (Setup this one for testing EUT)
Substitution: Dipole S/N: 00022117, 6ft SMA Cable (SN # 208947003) Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
779.50	22.80	V	0.5	0.0	22.30	38.5	-16.1	
779.50	12.35	H	0.5	0.0	11.85	38.5	-26.6	
782.00	22.30	V	0.5	0.0	21.80	38.5	-16.6	
782.00	12.65	H	0.5	0.0	12.15	38.5	-26.3	
784.50	21.90	V	0.5	0.0	21.40	38.5	-17.0	
784.50	12.35	H	0.5	0.0	11.85	38.5	-26.6	

Rev. 3.17.11

LTE QPSK and 16QAM Band 13 (10.0 MHz BAND WIDTH)

High Frequency Substitution Measurement
Compliance Certification Services Chamber B

Company: APPLE
Project #: 12U14507
Date: 09/07/12
Test Engineer: MENGISTU MEKURIA
Configuration: EUT WITH AC ADAPTER
Mode: TX, BAND 13_10MHz BW_RB1-0_ QPSK and 16QAM

Test Equipment:
Receiving: Sunol T130, and 3m Chamber N-type Cable (Setup this one for testing EUT)
Substitution: Dipole S/N: 00022117, 6ft SMA Cable (SN # 208947003) Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
QPSK								
782.00	22.10	V	0.5	0.0	21.60	38.5	-16.8	
782.00	12.35	H	0.5	0.0	11.85	38.5	-26.6	
16QAM								
782.00	21.40	V	0.5	0.0	20.90	38.5	-17.5	
782.00	11.35	H	0.5	0.0	10.85	38.5	-27.6	

Rev. 3.17.11

9.1.6. LTE BAND 25

EIRP LTE QPSK Band 25 (1.4 MHz BAND WIDTH)

PEAK

High Frequency Fundamental Measurement
Compliance Certification Services Chamber B

Company: APPLE
Project #: 12U14507
Date: 09/08/12
Test Engineer: MENGISTU MEKURIA
Configuration: EUT (C13) WITH AC ADAPTER
Mode: TX. BAND 25_1.4 MHz BW_RB6-0_QPSK MODE

Test Equipment:
Receiving: Horn T59, and Camber B SMA Cables
Substitution: Horn T217 Substitution, 4ft SMA Cable (245182002) Warehouse

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
1.850	21.0	V	0.85	8.62	28.77	33.0	-4.2	
1.850	10.5	H	0.85	8.47	18.11	33.0	-14.9	
1.880	21.5	V	0.85	8.46	29.13	33.0	-3.9	
1.880	12.4	H	0.85	8.36	19.94	33.0	-13.1	
1.910	21.9	V	0.85	8.30	29.39	33.0	-3.6	
1.910	14.9	H	0.85	8.25	22.29	33.0	-10.7	

Rev. 3.17.11

EIRP LTE 16QAM Band 25 (1.4 MHz BAND WIDTH)

High Frequency Fundamental Measurement
Compliance Certification Services Chamber B

Company: APPLE
Project #: 12U14507
Date: 09/08/12
Test Engineer: MENGISTU MEKURIA
Configuration: EUT (C13) WITH AC ADAPTER
Mode: TX. BAND 25_1.4 MHz BW_RB6-0_16QAM MODE

Test Equipment:
Receiving: Horn T59, and Camber B SMA Cables
Substitution: Horn T217 Substitution, 4ft SMA Cable (245182002) Warehouse

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
1.850	19.9	V	0.85	8.62	27.71	33.0	-5.3	
1.850	9.5	H	0.85	8.47	17.08	33.0	-15.9	
1.880	20.5	V	0.85	8.46	28.08	33.0	-4.9	
1.880	11.4	H	0.85	8.36	18.93	33.0	-14.1	
1.910	21.0	V	0.85	8.30	28.43	33.0	-4.6	
1.910	13.9	H	0.85	8.25	21.30	33.0	-11.7	

Rev. 3.17.11

EIRP LTE QPSK Band 25 (3.0 MHz BAND WIDTH)

High Frequency Fundamental Measurement
Compliance Certification Services Chamber A

Company: APPLE
Project #: 12U14507
Date: 09/08/12
Test Engineer: MENGISTU MEKURIA
Configuration: EUT (C13) WITH AC ADAPTER
Mode: LTE Band 25, 3MHz BW, QPSK

Test Equipment:
Receiving: Horn T73, and Chamber A SMA Cables
Substitution: Horn T217 Substitution, 4ft SMA Cable (244639001) Warehouse

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
1.855	21.3	V	0.85	8.62	29.11	33.0	-3.9	
1.855	13.1	H	0.85	8.47	20.72	33.0	-12.3	
1.883	21.9	V	0.85	8.46	29.50	33.0	-3.5	
1.883	14.0	H	0.85	8.36	21.50	33.0	-11.5	
1.910	22.3	V	0.85	8.30	29.79	33.0	-3.2	
1.910	14.5	H	0.85	8.25	21.90	33.0	-11.1	

Rev. 3.17.11

EIRP LTE 16QAM Band 25 (3.0 MHz BAND WIDTH)

PEAK

High Frequency Fundamental Measurement
Compliance Certification Services Chamber A

Company: APPLE
Project #: 12U14507
Date: 09/08/12
Test Engineer: MENGISTU MEKURIA
Configuration: EUT (C13) WITH AC ADAPTER
Mode: LTE Band 25, 3MHz BW, 16QAM

Test Equipment:
Receiving: Horn T73, and Chamber A SMA Cables
Substitution: Horn T217 Substitution, 4ft SMA Cable (244639001) Warehouse

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
1.855	20.4	V	0.85	8.62	28.17	33.0	-4.8	
1.855	12.6	H	0.85	8.47	20.22	33.0	-12.8	
1.883	21.0	V	0.85	8.46	28.60	33.0	-4.4	
1.883	13.0	H	0.85	8.36	20.52	33.0	-12.5	
1.910	21.4	V	0.85	8.30	28.86	33.0	-4.1	
1.910	13.0	H	0.85	8.25	20.40	33.0	-12.6	

Rev. 3.17.11

EIRP LTE QPSK Band 25 (5.0 MHz BAND WIDTH)

High Frequency Fundamental Measurement
Compliance Certification Services Chamber A

Company: APPLE
Project #: 12U14507
Date: 09/08/12
Test Engineer: MENGISTU MEKURIA
Configuration: EUT (C13) WITH AC ADAPTER
Mode: LTE Band 25, 5MHz BW, QPSK

Test Equipment:
Receiving: Horn T73, and Chamber A SMA Cables
Substitution: Horn T217 Substitution, 4ft SMA Cable (244639001) Warehouse

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
1.855	21.3	V	0.85	8.62	29.10	33.0	-3.9	
1.855	13.1	H	0.85	8.47	20.72	33.0	-12.3	
1882.5	21.8	V	0.85	8.46	29.39	33.0	-3.6	
1882.5	14.1	H	0.85	8.36	21.62	33.0	-11.4	
1.910	22.3	V	0.85	8.30	29.78	33.0	-3.2	
1.910	14.0	H	0.85	8.25	21.40	33.0	-11.6	

Rev. 3.17.11

EIRP LTE 16QAM Band 25 (5.0 MHz BAND WIDTH)

High Frequency Fundamental Measurement
Compliance Certification Services Chamber A

Company: APPLE
Project #: 12U14507
Date: 09/08/12
Test Engineer: MENGISTU MEKURIA
Configuration: EUT (C13) WITH AC ADAPTER
Mode: LTE Band 25, 5MHz BW, 16QAM

Test Equipment:
Receiving: Horn T73, and Chamber A SMA Cables
Substitution: Horn T217 Substitution, 4ft SMA Cable (244639001) Warehouse

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
1.855	20.4	V	0.85	8.62	28.18	33.0	-4.8	
1.855	12.6	H	0.85	8.47	20.22	33.0	-12.8	
1.883	21.0	V	0.85	8.46	28.63	33.0	-4.4	
1.883	13.2	H	0.85	8.36	20.70	33.0	-12.3	
1.910	21.5	V	0.85	8.30	28.93	33.0	-4.1	
1.910	13.0	H	0.85	8.25	20.40	33.0	-12.6	

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EIRP LTE QPSK Band 25 (10.0 MHz BAND WIDTH)

High Frequency Fundamental Measurement
Compliance Certification Services Chamber A

Company: APPLE
Project #: 12U14507
Date: 09/08/12
Test Engineer: MENGISTU MEKURIA
Configuration: EUT (C13) WITH AC ADAPTER
Mode: LTE Band 25, 10MHz BW, QPSK

Test Equipment:
Receiving: Horn T73, and Chamber A SMA Cables
Substitution: Horn T217 Substitution, 4ft SMA Cable (244639001) Warehouse

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
1.855	21.2	V	0.85	8.62	28.97	33.0	-4.0	
1.855	13.8	H	0.85	8.47	21.42	33.0	-11.6	
1882.5	21.7	V	0.85	8.46	29.26	33.0	-3.7	
1882.5	14.1	H	0.85	8.36	21.64	33.0	-11.4	
1.910	22.2	V	0.85	8.30	29.65	33.0	-3.4	
1.910	14.0	H	0.85	8.25	21.40	33.0	-11.6	

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EIRP LTE 16QAM Band 25 (10.0 MHz BAND WIDTH)

High Frequency Fundamental Measurement
Compliance Certification Services Chamber A

Company: APPLE
Project #: 12U14507
Date: 09/08/12
Test Engineer: MENGISTU MEKURIA
Configuration: EUT (C13) WITH AC ADAPTER
Mode: LTE Band 25, 10MHz BW, 16QAM

Test Equipment:
Receiving: Horn T73, and Chamber A SMA Cables
Substitution: Horn T217 Substitution, 4ft SMA Cable (244639001) Warehouse

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
1.855	20.2	V	0.85	8.62	28.00	33.0	-5.0	
1.855	12.7	H	0.85	8.47	20.32	33.0	-12.7	
1.883	21.1	V	0.85	8.46	28.66	33.0	-4.3	
1.883	13.1	H	0.85	8.36	20.62	33.0	-12.4	
1.910	21.3	V	0.85	8.30	28.75	33.0	-4.3	
1.910	13.0	H	0.85	8.25	20.40	33.0	-12.6	

Rev. 3.17.11

EIRP LTE QPSK Band 25 (15.0 MHz BAND WIDTH)

High Frequency Fundamental Measurement
Compliance Certification Services Chamber A

Company: APPLE
Project #: 12U14507
Date: 09/08/12
Test Engineer: MENGISTU MEKURIA
Configuration: EUT (C13) WITH AC ADAPTER
Mode: LTE Band 25, 15MHz BW, QPSK

Test Equipment:
Receiving: Horn T73, and Chamber A SMA Cables
Substitution: Horn T217 Substitution, 4ft SMA Cable (244639001) Warehouse

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
1.855	21.6	V	0.85	8.62	29.39	33.0	-3.6	
1.855	13.6	H	0.85	8.47	21.22	33.0	-11.8	
1.883	22.0	V	0.85	8.46	29.62	33.0	-3.4	
1.883	14.1	H	0.85	8.36	21.65	33.0	-11.4	
1.910	22.7	V	0.85	8.30	30.11	33.0	-2.9	
1.910	13.8	H	0.85	8.25	21.20	33.0	-11.8	

Rev. 3.17.11

EIRP LTE 16QAM Band 25 (15.0 MHz BAND WIDTH)

High Frequency Fundamental Measurement
Compliance Certification Services Chamber A

Company: APPLE
Project #: 12U14507
Date: 09/08/12
Test Engineer: MENGISTU MEKURIA
Configuration: EUT (C13) WITH AC ADAPTER
Mode: LTE Band 25, 15MHz BW, 16QAM

Test Equipment:
Receiving: Horn T73, and Chamber A SMA Cables
Substitution: Horn T217 Substitution, 4ft SMA Cable (244639001) Warehouse

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
1.855	20.6	V	0.85	8.62	28.40	33.0	-4.6	
1.855	12.8	H	0.85	8.47	20.42	33.0	-12.6	
1.883	21.0	V	0.85	8.46	28.62	33.0	-4.4	
1.883	13.2	H	0.85	8.36	20.72	33.0	-12.3	
1.910	21.7	V	0.85	8.30	29.14	33.0	-3.9	
1.910	13.0	H	0.85	8.25	20.40	33.0	-12.6	

Rev. 3.17.11

EIRP LTE QPSK Band 25 (20.0 MHz BAND WIDTH)

High Frequency Fundamental Measurement
Compliance Certification Services Chamber A

Company: APPLE
Project #: 12U14507
Date: 09/08/12
Test Engineer: MENGISTU MEKURIA
Configuration: EUT (C13) WITH AC ADAPTER
Mode: LTE Band 25, 20MHz BW, QPSK

Test Equipment:
Receiving: Horn T73, and Chamber A SMA Cables
Substitution: Horn T217 Substitution, 4ft SMA Cable (244639001) Warehouse

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
1.860	21.8	V	0.85	8.62	29.61	33.0	-3.4	
1.860	11.9	H	0.85	8.47	19.54	33.0	-13.5	
1.883	21.7	V	0.85	8.46	29.30	33.0	-3.7	
1.883	14.0	H	0.85	8.36	21.48	33.0	-11.5	
1.905	22.3	V	0.85	8.30	29.74	33.0	-3.3	
1.905	14.5	H	0.85	8.25	21.90	33.0	-11.1	

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EIRP LTE 16QAM Band 25 (20.0 MHz BAND WIDTH)

High Frequency Fundamental Measurement
Compliance Certification Services Chamber A

Company: APPLE
Project #: 12U14507
Date: 09/08/12
Test Engineer: MENGISTU MEKURIA
Configuration: EUT (C13) WITH AC ADAPTER
Mode: LTE Band 25, 20MHz BW, 16QAM

Test Equipment:
Receiving: Horn T73, and Chamber A SMA Cables
Substitution: Horn T217 Substitution, 4ft SMA Cable (244639001) Warehouse

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
1.860	20.9	V	0.85	8.62	28.66	33.0	-4.3	
1.860	11.0	H	0.85	8.47	18.66	33.0	-14.3	
1.883	20.8	V	0.85	8.46	28.41	33.0	-4.6	
1.883	13.1	H	0.85	8.36	20.58	33.0	-12.4	
1.905	21.3	V	0.85	8.30	28.78	33.0	-4.2	
1.905	14.1	H	0.85	8.25	21.52	33.0	-11.5	

Rev. 3.17.11

9.1. 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.

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.

WCDMA

Peak-To-Average Ratio:

Mode	Channel Band-width (KHZ)	Modulation	Couducted Power (dBm)		Peak-to-Average Ratio (PAR)
			*Peak	Average	
UMTS	5	REL99	27.89	24.46	3.43

Mode	Channel Band-width (MHZ)	Ch. No.	Couducted Power (dBm)		Peak-to-Average Ratio (PAR)
			*Peak	Average	
UMTS	5	HSDPA	27.31	23.51	3.8

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

BC10

Peak-To-Average Ratio:

Mode	Channel Band-width (KHZ)	Modulation	Couducted Power (dBm)		Peak-to-Average Ratio (PAR)
			*Peak	Average	
BC10	250	1xRTT	28.6	24.86	3.74

Mode	Channel Band-width (KHZ)	Modulation	Couducted Power (dBm)		Peak-to-Average Ratio
			*Peak	Average	
BC10	250	EVDO	29.04	24.84	4.2

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

CDMA2000

Mode	Channel Band-width (KHZ)	Modulation	Couducted Power (dBm)		Peak-to-Average Ratio (PAR)
			*Peak	Average	
BC0	250	1xRTT	28.99	24.4	4.59

Mode	Channel Band-width (KHZ)	Ch. No.	Couducted Power (dBm)		Peak-to-Average Ratio (PAR)
			*Peak	Average	
BC0	5	EVDO	29.68	24.81	4.87

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

Mode	Channel Band-width (KHZ)	Modulation	Couducted Power (dBm)		Peak-to-Average Ratio (PAR)
			*Peak	Average	
BC1	250	1xRTT			

Mode	Channel Band-width (KHZ)	Ch. No.	Couducted Power (dBm)		Peak-to-Average Ratio (PAR)
			*Peak	Average	
BC1	5	EVDO			

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

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	29.76	24.01	5.75

Mode	Channel Band-width	Ch. No.	f (MHz)	Couducted Power (dBm)		Peak-to-Average Ratio
				*Peak	Average	
16QAM	1.4	RB1 0	836.5	29.5	22.65	6.85

*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	RB1 0	836.5	30.06	23.96	6.1

Mode	Channel Band-width	Ch. No.	f (MHz)	Couducted Power (dBm)		Peak-to-Average Ratio
				*Peak	Average	
16QAM	3	RB1 0	836.5	30.22	22.89	7.33

*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	RB1 0	836.5	30.31	24.01	6.3

Mode	Channel Band-width	Ch. No.	f (MHz)	Couducted Power (dBm)		Peak-to-Average Ratio
				*Peak	Average	
16QAM	5	RB1 0	1880	30.06	23.02	7.04

*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	RB1 0	836.5	29.71	23.74	5.97

Mode	Channel Band-width	Ch. No.	f (MHz)	Couducted Power (dBm)		Peak-to-Average Ratio
				*Peak	Average	
16QAM	10	RB1 0	836.5	29.74	22.48	7.26

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

LTE BAND 13

Mode	Channel Band-width (MHZ)	Modulation	f (MHz)	Couducted Power (dBm)		Peak-to-Average Ratio (PAR)
				*Peak	Average	
QPSK	5	RB1-0	782	27.9	24	3.9

Mode	Channel Band-width	Ch. No.	f (MHz)	Couducted Power (dBm)		Peak-to-Average Ratio
				*Peak	Average	
16QAM	5	RB1-0	782	28.53	22.99	5.54

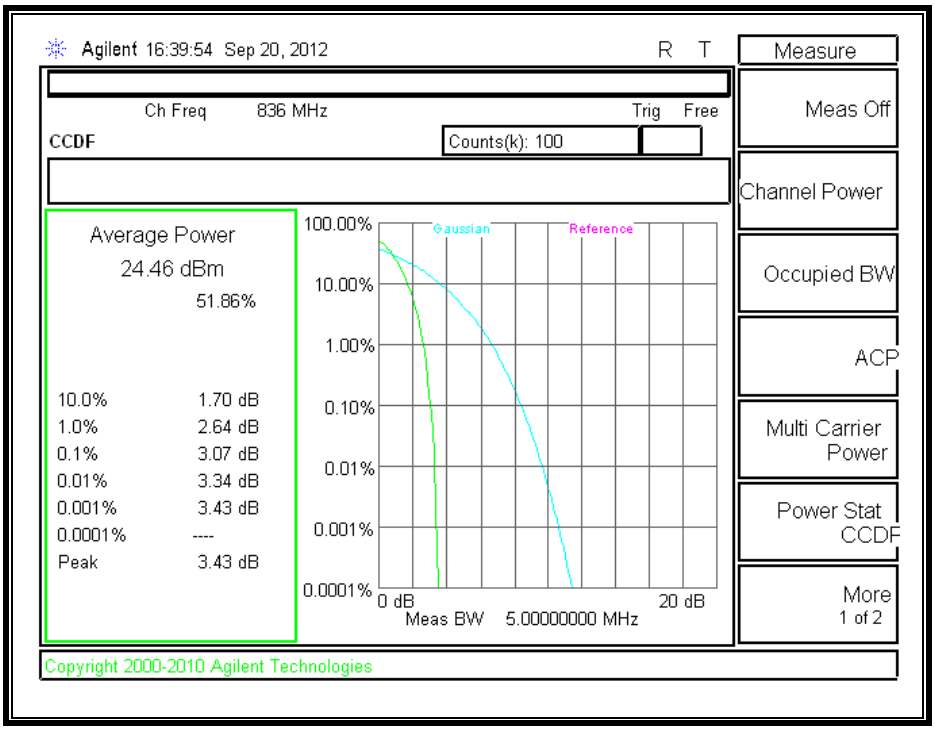
*Peak Reading = Average Reading + Peak-to-Average Ratio

Mode	Channel Band-width (MHZ)	Modulation	f (MHz)	Couducted Power (dBm)		Peak-to-Average Ratio (PAR)
				*Peak	Average	
QPSK	10	RB1-0	782	28.08	23.99	4.09

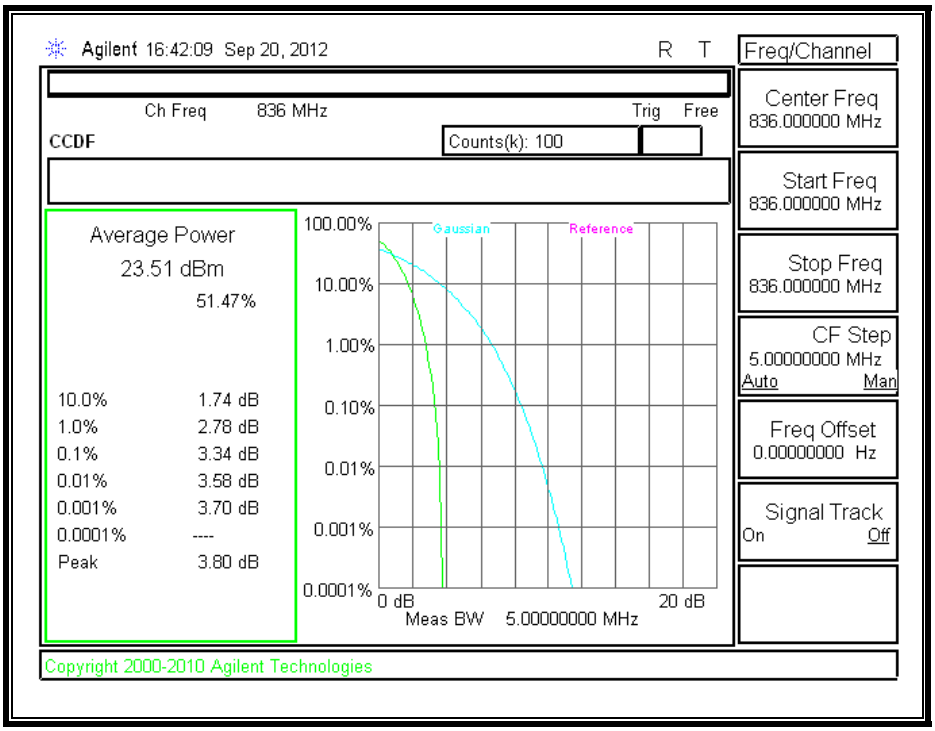
Mode	Channel Band-width	Ch. No.	f (MHz)	Couducted Power (dBm)		Peak-to-Average Ratio
				*Peak	Average	
16QAM	10	RB1-0	782	28.1	23.07	5.03

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

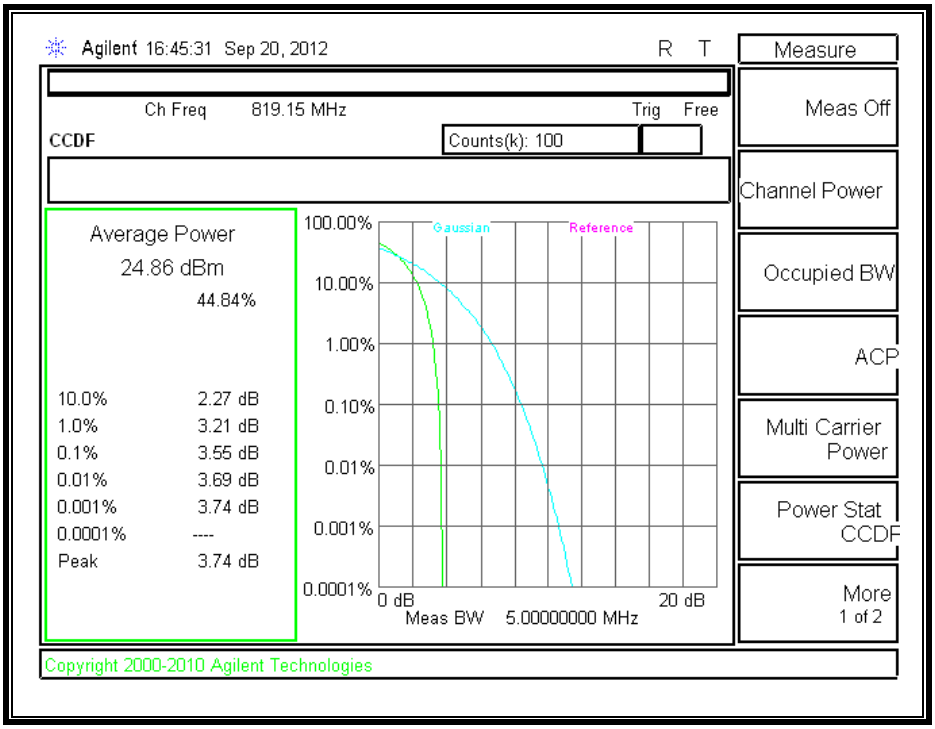
UMTS850, REL 99



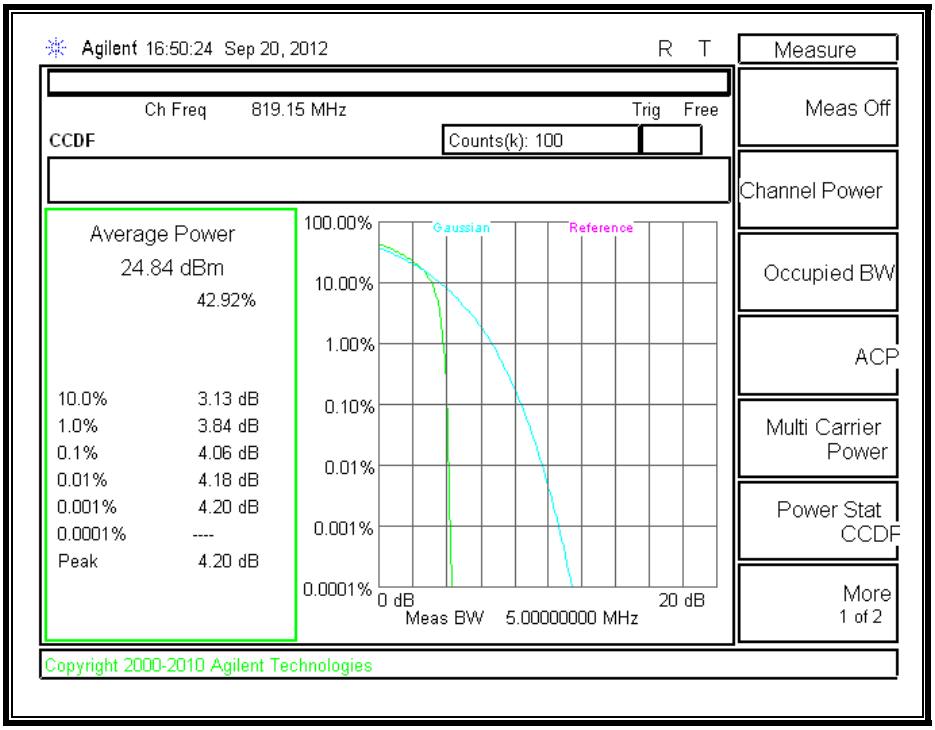
UMTS850, HSDPA



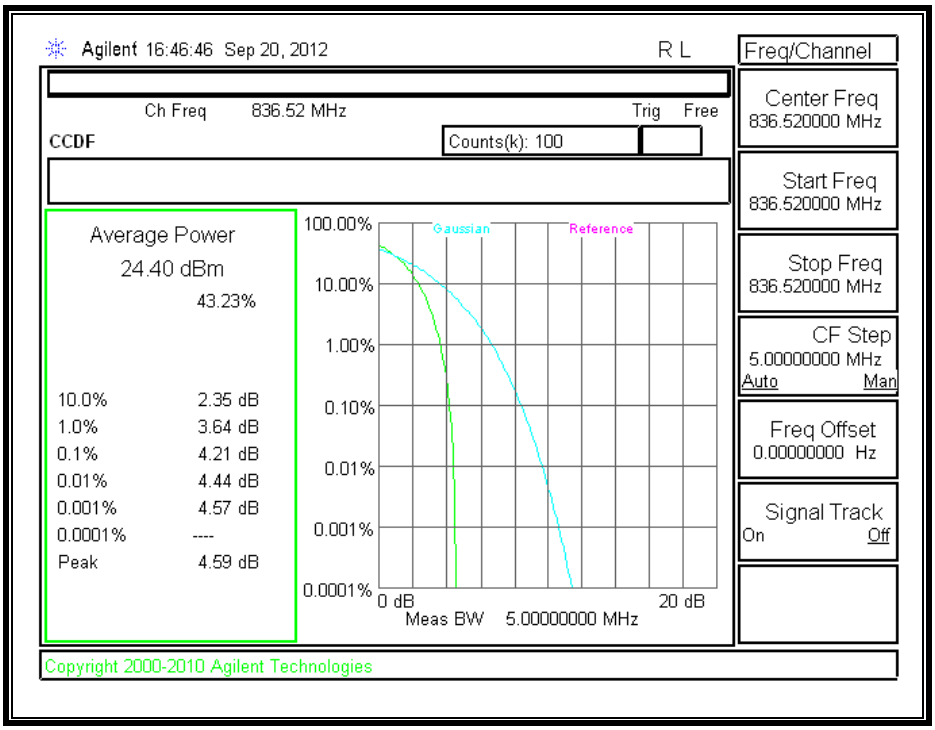
BC10, 1xRTT



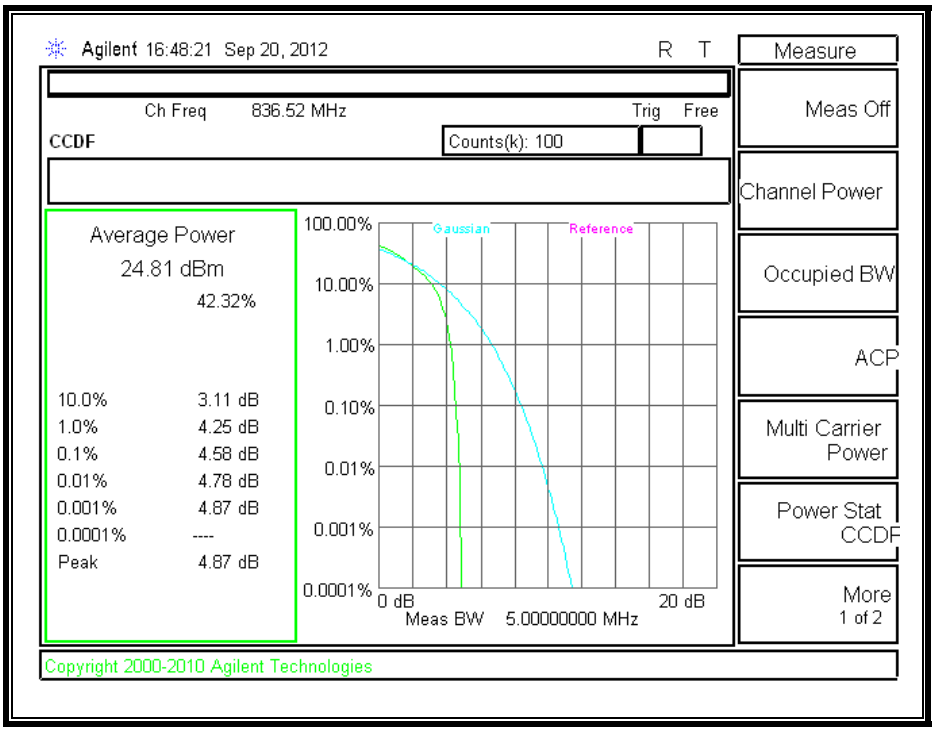
BC10, EVDO



BC0, 1xRTT

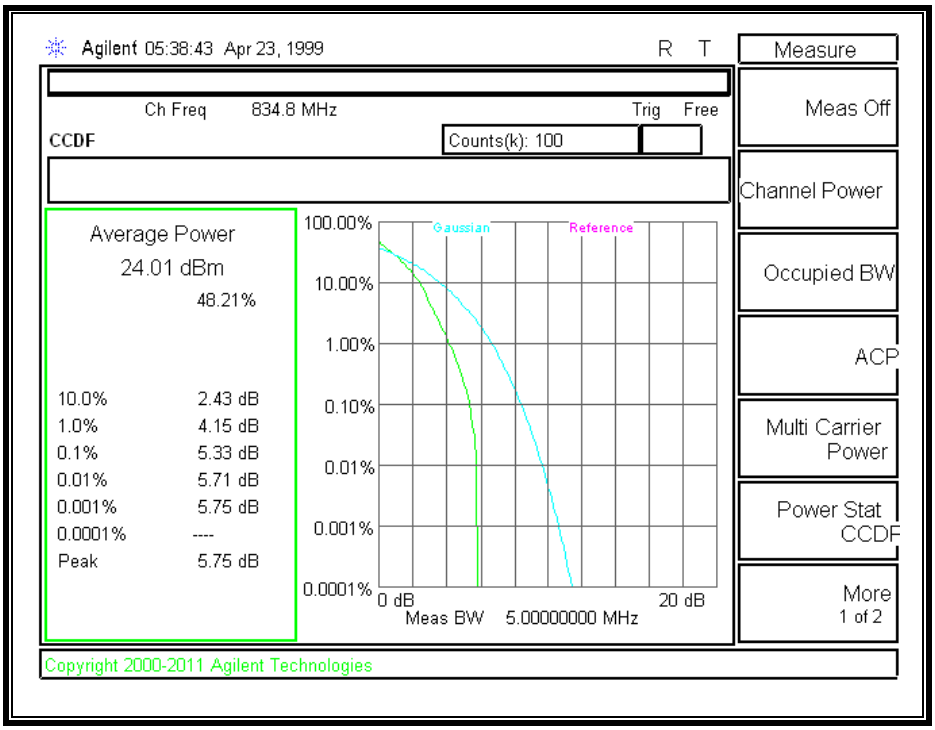


BC0, EVDO

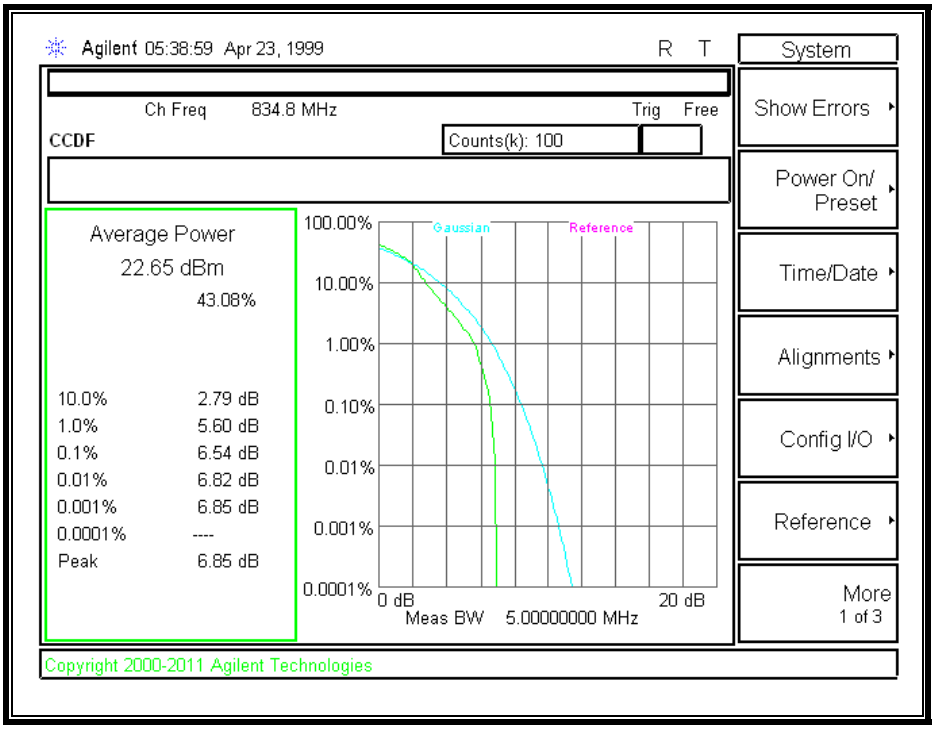


LTE BAND 5

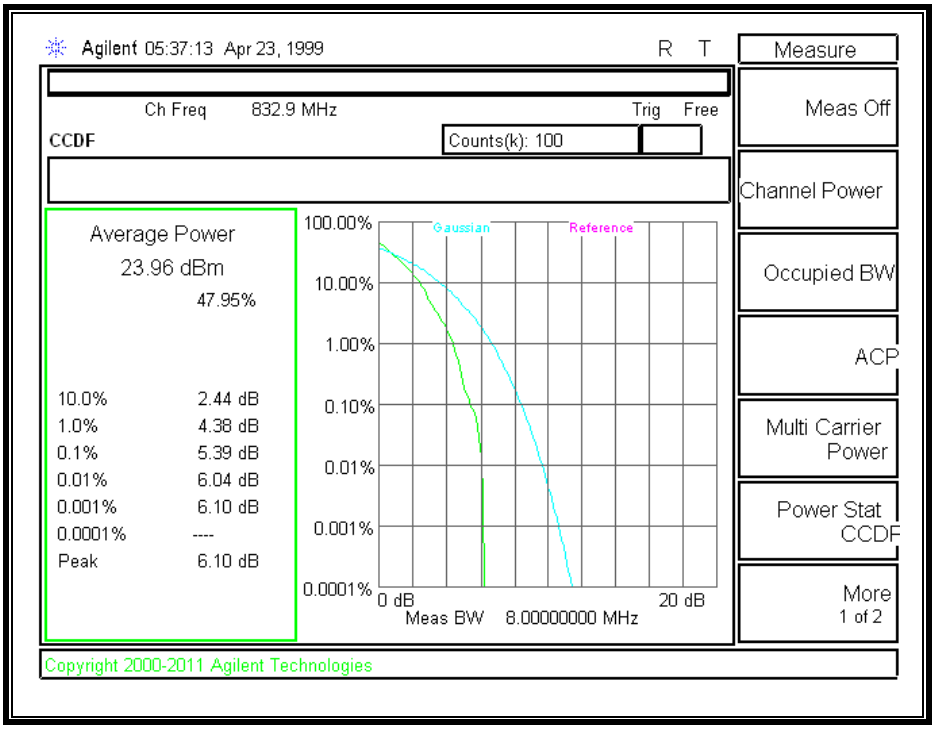
1.4MHz_QPSK



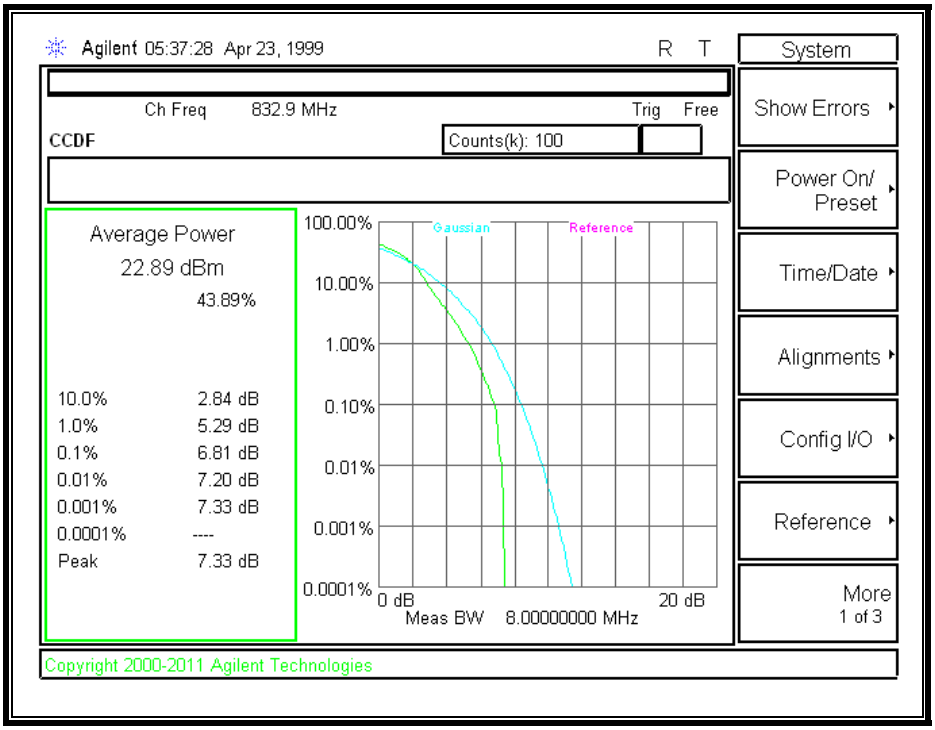
1.4MHz_16QAM



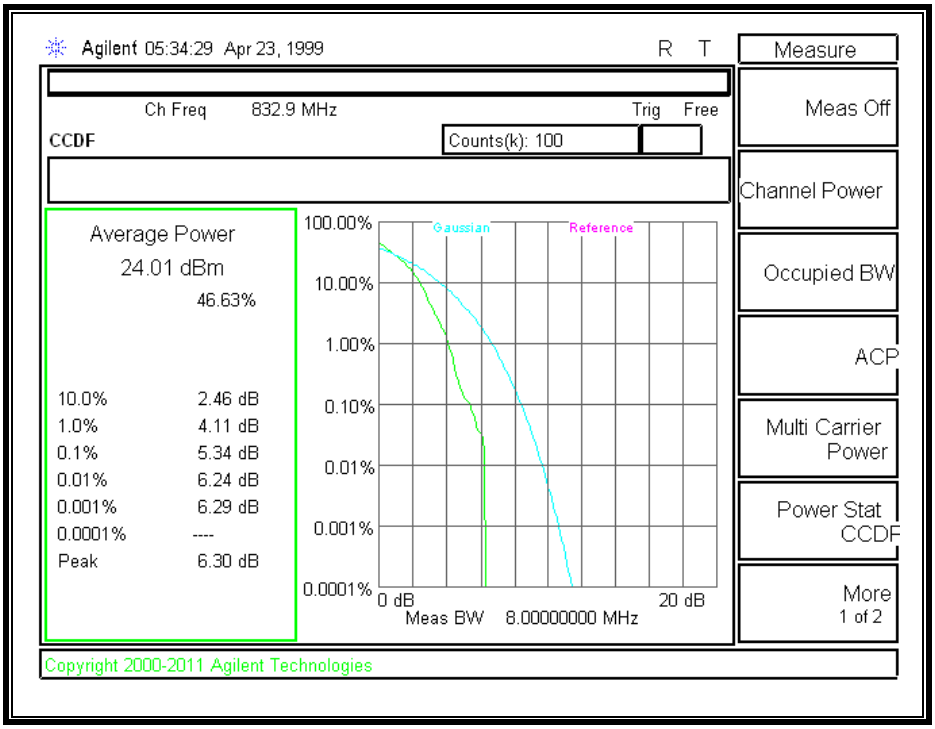
3.0MHz_QPSK, RB1-0



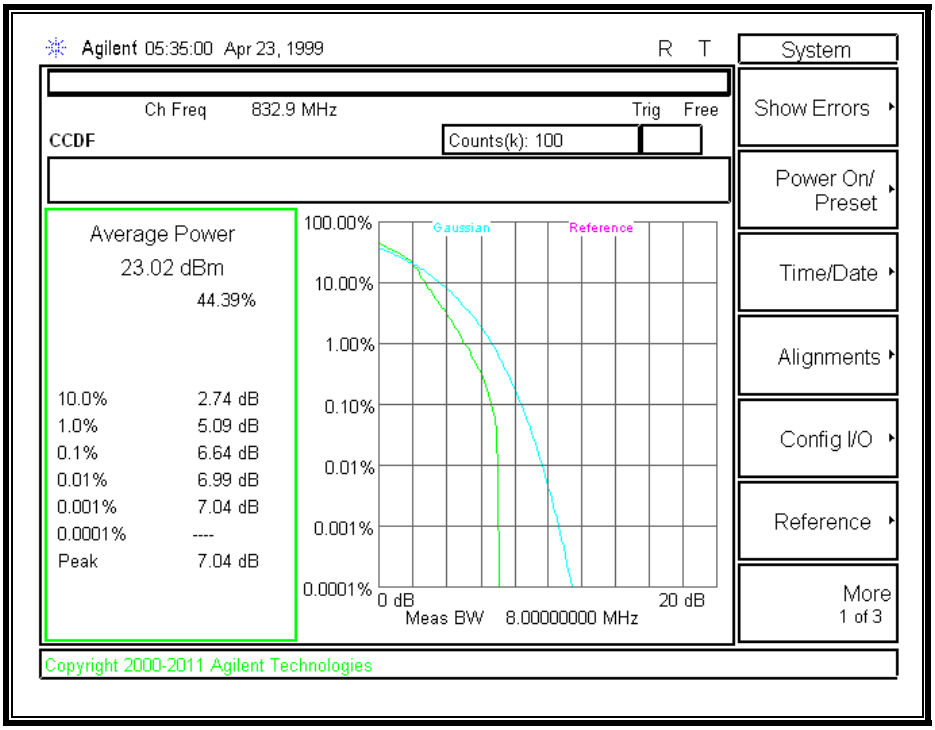
3.0MHz_16QAM



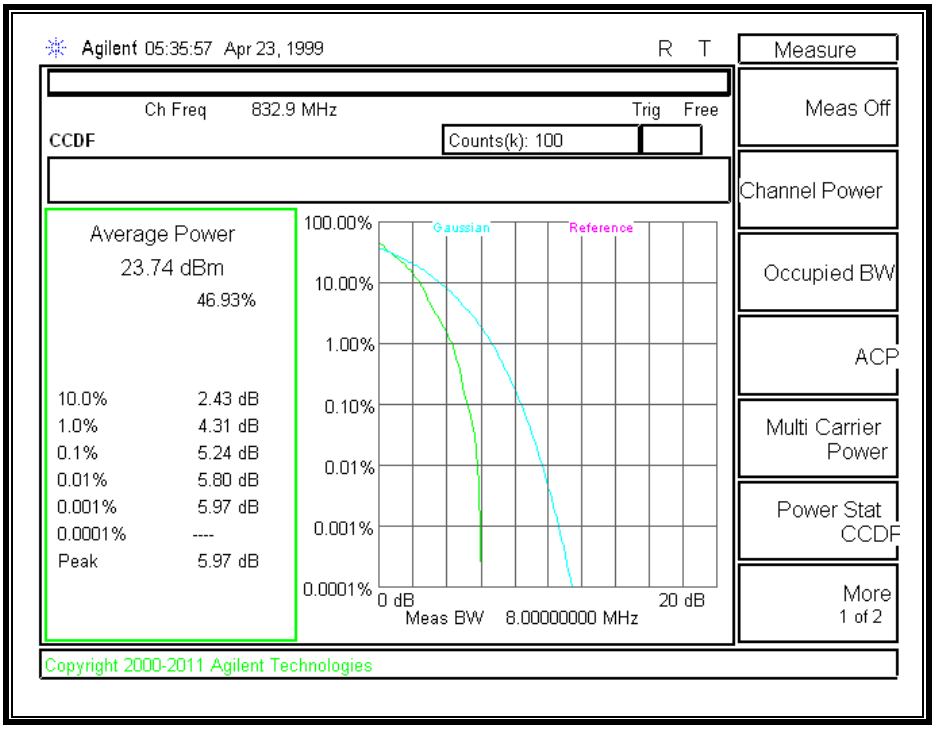
5.0MHz_QPSK



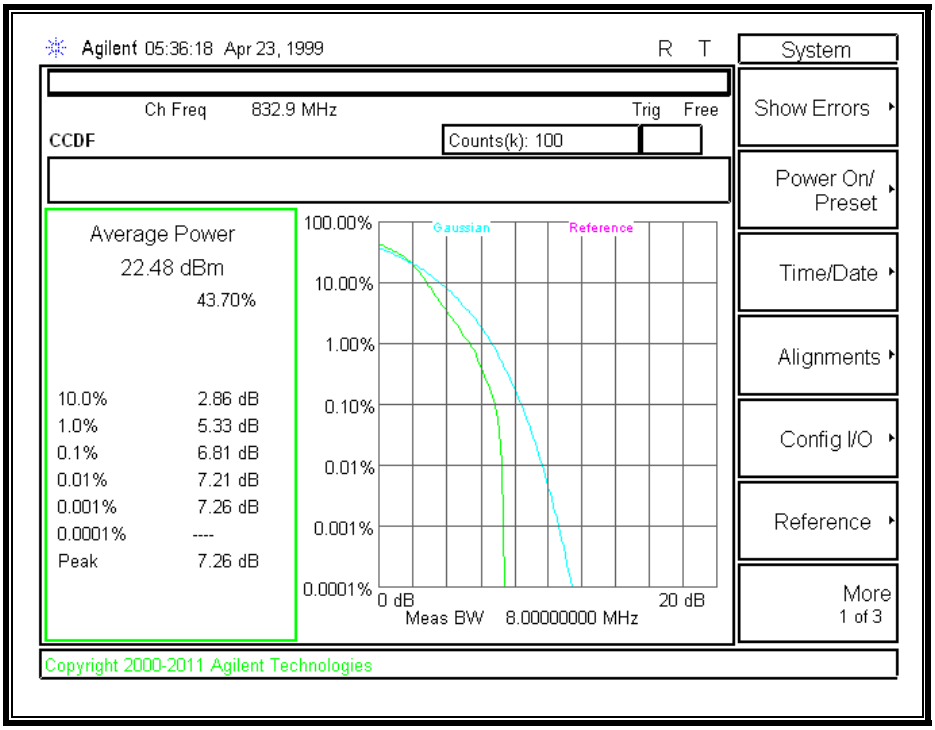
5.0MHz_16QAM



10MHz_QPSK

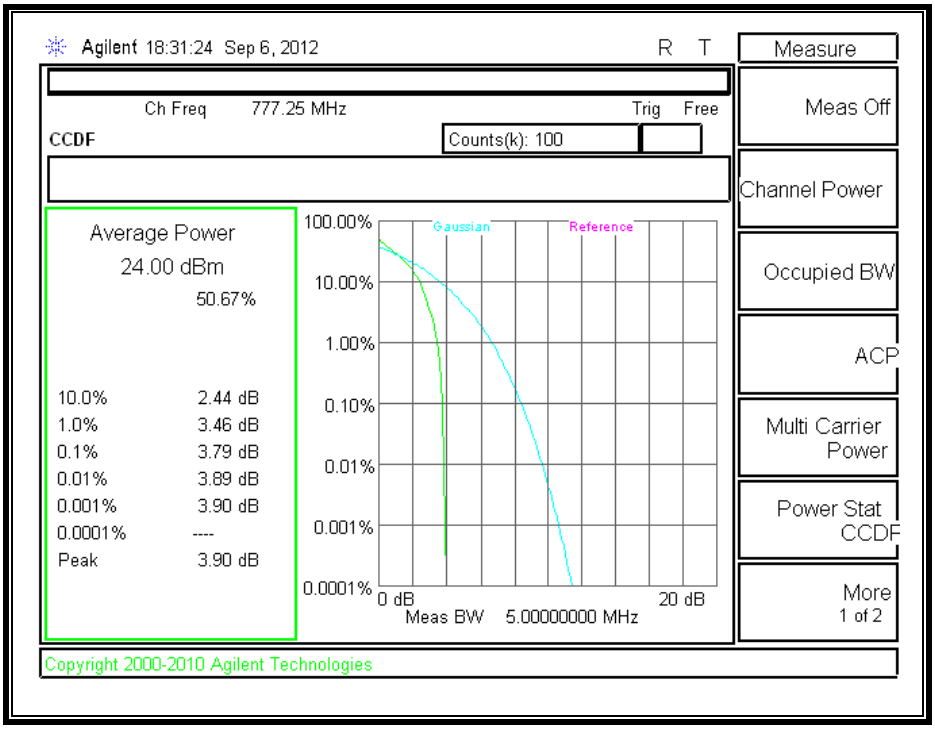


10MHz_16QAM

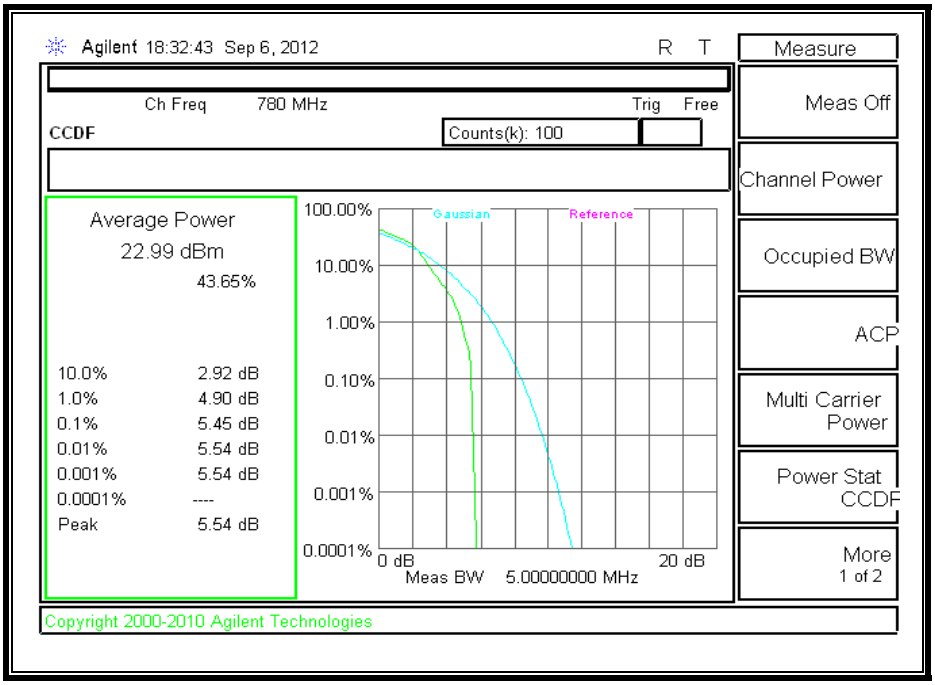


LTE BAND 13

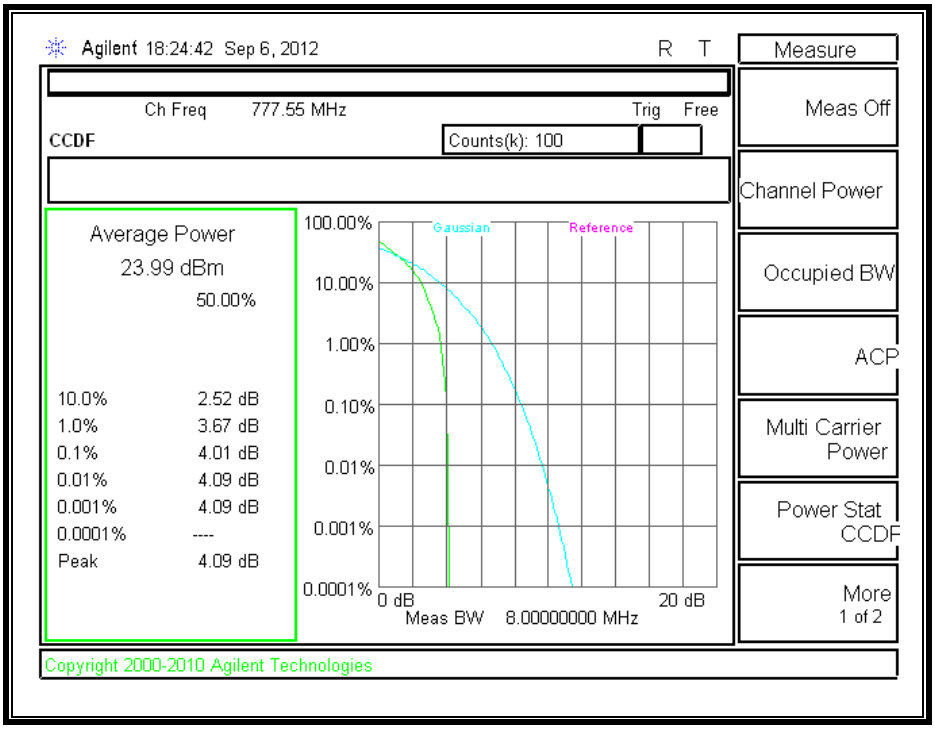
5.0MHz_QPSK



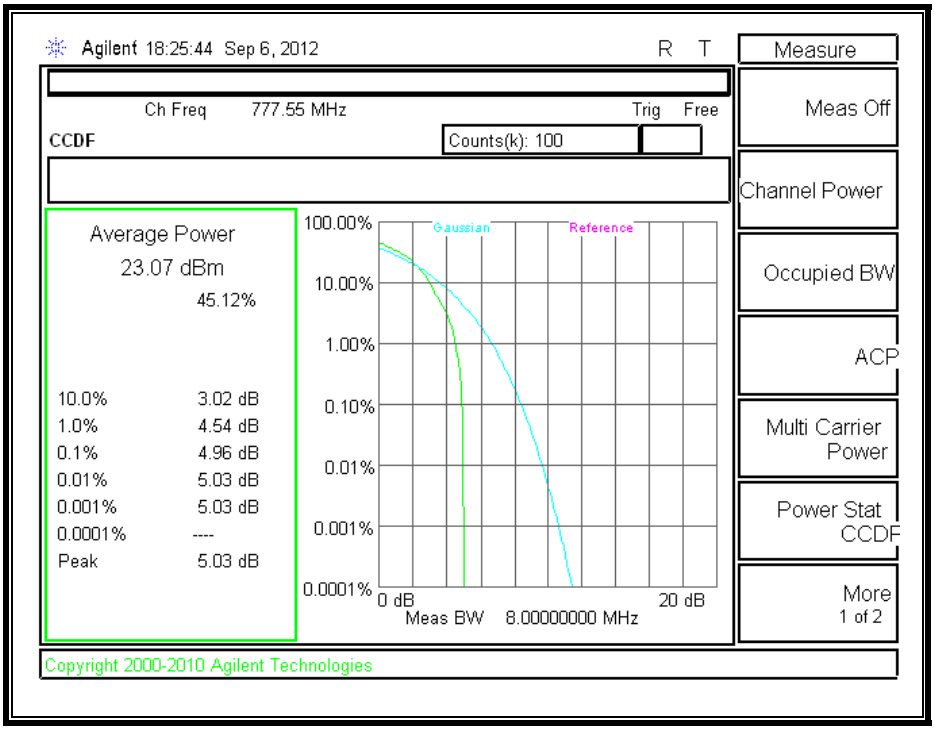
5.0MHz_16QAM



10MHz_QPSK



10MHz_16QAM



9.2. FIELD STRENGTH OF SPURIOUS RADIATION

RULE PART(S)

FCC: §2.1053, §22.917, §24.238, §27.53 (c)(2) 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

(c) For operations in the 746–758 MHz band and the 776–788 MHz band, the power of any emission outside the 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, in accordance with the following:

(2) On any frequency outside the 776–788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least 43 + 10 log (P) dB;

(f) For operations in the 746–763 MHz, 775–793 MHz, and 805–806 MHz bands, emissions in the band 1559–1610 MHz shall be limited to −70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and −80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth. For the purpose of equipment authorization, a transmitter shall be tested with an antenna that is representative of the type that will be used with the equipment in normal operation.

(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:

§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.

(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.

§ 90.691 Emission mask requirements for EA-based systems.

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.

MODES TESTED:

- GPRS and EGPRS
- UMTS, REL 99 and HSDPA
- CDMA2000, BC10, BC0 and BC1
- CDMA2000, BC0, REV B
- LTE BAND 5
- LTE BAND 13
- LTE BAND 25

RESULTS

GPRS (Cellular Band)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: APPLE
Date: 09/05/12
Test Engineer: MENGISTU MEKURIA
Configuration: EUT with AC Adapter
Mode: TX, 850MHz BAND GPRS MODE

Chamber	Pre-amplifer	Filter	Limit
5m Chamber B	T145 8449B	Filter 1	Part 22

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (824.2MHz)									
1.648	-8.0	H	3.0	35.5	1.0	-42.5	-13.0	-29.5	
2.473	-2.0	V	3.0	35.4	1.0	-36.4	-13.0	-23.4	
3.297	-23.1	V	3.0	35.5	1.0	-57.7	-13.0	-44.7	
1.648	-11.0	H	3.0	35.5	1.0	-45.6	-13.0	-32.6	
2.473	3.6	H	3.0	35.4	1.0	-30.9	-13.0	-17.9	
4.121	-20.0	H	3.0	35.2	1.0	-54.3	-13.0	-41.3	
Mid Ch, (836.6MHz)									
1.673	-6.8	V	3.0	35.5	1.0	-41.3	-13.0	-28.3	
2.510	-1.5	V	3.0	35.4	1.0	-35.9	-13.0	-22.9	
4.183	-21.9	V	3.0	35.2	1.0	-56.1	-13.0	-43.1	
1.673	-9.6	H	3.0	35.5	1.0	-44.1	-13.0	-31.1	
2.510	3.0	H	3.0	35.4	1.0	-31.4	-13.0	-18.4	
4.183	-20.3	H	3.0	35.2	1.0	-54.6	-13.0	-41.6	
High Ch, (848.8MHz)									
1.698	-8.7	V	3.0	35.5	1.0	-43.2	-13.0	-30.2	
2.546	2.2	V	3.0	35.4	1.0	-32.3	-13.0	-19.3	
4.244	-18.2	V	3.0	35.2	1.0	-52.4	-13.0	-39.4	
1.698	-13.2	H	3.0	35.5	1.0	-47.7	-13.0	-34.7	
2.546	4.2	H	3.0	35.4	1.0	-30.2	-13.0	-17.2	
4.244	-16.0	H	3.0	35.2	1.0	-50.2	-13.0	-37.2	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

EGPRS (Cellular Band)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: APPLE
Date: 09/05/12
Test Engineer: MENGISTU MEKURIA
Configuration: EUT with AC Adapter
Mode: TX, 850MHz BAND EGPRS MODE

Chamber	Pre-amplifer	Filter	Limit
5m Chamber B	T145 8449B	Filter 1	Part 22

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (824.2MHz)									
1.648	-15.4	V	3.0	35.5	1.0	-50.0	-13.0	-37.0	
2.473	-7.0	V	3.0	35.4	1.0	-41.4	-13.0	-28.4	
1.648	-19.3	H	3.0	35.5	1.0	-53.9	-13.0	-40.9	
2.473	-1.5	H	3.0	35.4	1.0	-35.9	-13.0	-22.9	
Mid Ch, (836.6MHz)									
1.673	-16.0	V	3.0	35.5	1.0	-50.5	-13.0	-37.5	
2.510	-5.4	V	3.0	35.4	1.0	-39.8	-13.0	-26.8	
1.673	-21.1	H	3.0	35.5	1.0	-55.7	-13.0	-42.7	
2.510	-2.6	H	3.0	35.4	1.0	-37.0	-13.0	-24.0	
High Ch, (848.8MHz)									
1.698	-21.6	V	3.0	35.5	1.0	-56.1	-13.0	-43.1	
2.546	-4.5	V	3.0	35.4	1.0	-39.0	-13.0	-26.0	
1.698	-22.0	H	3.0	35.5	1.0	-56.5	-13.0	-43.5	
3.395	-19.0	H	3.0	35.5	1.0	-53.5	-13.0	-40.5	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

UMTS REL 99 (Cellular Band)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: APPLE
Date: 09/05/12
Test Engineer: MENGISTU MEKURIA
Configuration: EUT WITH AC ADAPTER
Mode: TX, 850MHz BAND WCDMA MODE

Chamber	Pre-amplifer	Filter	Limit
5m Chamber B	T145 8449B	Filter 1	Part 22

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (826.4MHz)									
1.653	-22.8	V	3.0	35.5	1.0	-57.3	-13.0	-44.3	
2.479	-14.0	V	3.0	35.4	1.0	-48.4	-13.0	-35.4	
3.306	-11.2	V	3.0	35.5	1.0	-45.7	-13.0	-32.7	
1.653	-25.8	H	3.0	35.5	1.0	-60.4	-13.0	-47.4	
2.479	-19.1	H	3.0	35.4	1.0	-53.5	-13.0	-40.5	
3.306	-9.5	H	3.0	35.5	1.0	-44.0	-13.0	-31.0	
Mid Ch, (836.6MHz)									
1.673	-20.9	V	3.0	35.5	1.0	-55.4	-13.0	-42.4	
2.510	-16.7	V	3.0	35.4	1.0	-51.2	-13.0	-38.2	
3.346	-18.4	V	3.0	35.5	1.0	-52.9	-13.0	-39.9	
1.673	-23.7	H	3.0	35.5	1.0	-58.2	-13.0	-45.2	
2.510	-18.8	H	3.0	35.4	1.0	-53.2	-13.0	-40.2	
3.346	-16.8	H	3.0	35.5	1.0	-51.3	-13.0	-38.3	
High Ch, (846.6MHz)									
1.693	-19.4	V	3.0	35.5	1.0	-53.9	-13.0	-40.9	
2.540	-10.8	V	3.0	35.4	1.0	-45.2	-13.0	-32.2	
3.386	-17.9	V	3.0	35.5	1.0	-52.4	-13.0	-39.4	
1.693	-22.0	H	3.0	35.5	1.0	-56.5	-13.0	-43.5	
2.540	-16.7	H	3.0	35.4	1.0	-51.1	-13.0	-38.1	
3.386	-17.6	H	3.0	35.5	1.0	-52.1	-13.0	-39.1	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

UMTS HSUPA (Cellular Band)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: APPLE
Date: 09/21/12
Test Engineer: MENGISTU MEKURIA
Configuration: EUT WITH AC ADAPTER
Mode: TX, 850MHz BAND HSUPA MODE

Chamber	Pre-amplifer	Filter	Limit
5m Chamber B	T145 8449B	Filter 1	Part 22

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (826.4MHz)									
1.653	-23.9	V	3.0	35.5	1.0	-58.4	-13.0	-45.4	
2.479	-18.8	V	3.0	35.4	1.0	-53.2	-13.0	-40.2	
3.306	-13.4	V	3.0	35.5	1.0	-48.0	-13.0	-35.0	
1.653	-25.2	H	3.0	35.5	1.0	-59.7	-13.0	-46.7	
2.479	-22.1	H	3.0	35.4	1.0	-56.5	-13.0	-43.5	
3.306	-12.6	H	3.0	35.5	1.0	-47.1	-13.0	-34.1	
Mid Ch, (836.6MHz)									
1.673	-21.2	V	3.0	35.5	1.0	-55.8	-13.0	-42.8	
2.510	-19.9	V	3.0	35.4	1.0	-54.3	-13.0	-41.3	
3.346	-20.4	V	3.0	35.5	1.0	-54.9	-13.0	-41.9	
1.673	-27.2	H	3.0	35.5	1.0	-61.7	-13.0	-48.7	
2.510	-22.2	H	3.0	35.4	1.0	-56.7	-13.0	-43.7	
3.346	-19.6	H	3.0	35.5	1.0	-54.1	-13.0	-41.1	
High Ch, (846.6MHz)									
1.693	-21.0	V	3.0	35.5	1.0	-55.5	-13.0	-42.5	
2.540	-13.3	V	3.0	35.4	1.0	-47.7	-13.0	-34.7	
3.386	-21.8	V	3.0	35.5	1.0	-56.3	-13.0	-43.3	
1.693	-23.8	H	3.0	35.5	1.0	-58.3	-13.0	-45.3	
2.540	-18.4	H	3.0	35.4	1.0	-52.8	-13.0	-39.8	
3.386	-21.8	H	3.0	35.5	1.0	-56.3	-13.0	-43.3	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

GPRS (PCS Band)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: APPLE
Date: 09/05/12
Test Engineer: MENGISTU MEKURIA
Configuration: EUT with AC Adapter
Mode: TX, 1900MHz BAND GPRS MODE

Chamber	Pre-amplifer	Filter	Limit
5m Chamber B	T145 8449B	Filter 1	Part 24

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (1850.20MHz)									
3.705	-22.9	V	3.0	35.4	1.0	-57.2	-13.0	-44.2	
5.557	-19.8	V	3.0	35.4	1.0	-54.2	-13.0	-41.2	
3.705	-22.9	H	3.0	35.4	1.0	-57.3	-13.0	-44.3	
5.557	-20.0	H	3.0	35.4	1.0	-54.4	-13.0	-41.4	
Mid Ch, (1880.00MHz)									
3.760	-22.4	V	3.0	35.3	1.0	-56.7	-13.0	-43.7	
5.640	-21.4	V	3.0	35.4	1.0	-55.8	-13.0	-42.8	
3.760	-23.0	H	3.0	35.3	1.0	-57.3	-13.0	-44.3	
5.640	-20.3	H	3.0	35.4	1.0	-54.7	-13.0	-41.7	
High Ch, (1909.80MHz)									
3.815	-22.0	V	3.0	35.3	1.0	-56.3	-13.0	-43.3	
5.723	-21.0	V	3.0	35.4	1.0	-55.5	-13.0	-42.5	
3.815	-22.1	H	3.0	35.3	1.0	-56.5	-13.0	-43.5	
5.723	-19.2	H	3.0	35.4	1.0	-53.7	-13.0	-40.7	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

EGPRS (PCS Band)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: APPLE
Date: 09/05/12
Test Engineer: MENGISTU MEKURIA
Configuration: EUT with AC Adapter
Mode: TX, 1900MHz BAND EGPRS MODE

Chamber	Pre-amplifer	Filter	Limit
5m Chamber B	T145 8449B	Filter 1	Part 24

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (1850.20MHz)									
3.705	-23.3	V	3.0	35.4	1.0	-57.6	-13.0	-44.6	
5.557	-20.7	V	3.0	35.4	1.0	-55.1	-13.0	-42.1	
3.705	-24.2	H	3.0	35.4	1.0	-58.6	-13.0	-45.6	
5.557	-20.3	H	3.0	35.4	1.0	-54.7	-13.0	-41.7	
Mid Ch, (1880.00MHz)									
3.760	-23.8	V	3.0	35.3	1.0	-58.2	-13.0	-45.2	
5.640	-20.2	V	3.0	35.4	1.0	-54.6	-13.0	-41.6	
3.760	-23.1	H	3.0	35.3	1.0	-57.4	-13.0	-44.4	
5.640	-19.2	H	3.0	35.4	1.0	-53.7	-13.0	-40.7	
High Ch, (1909.80MHz)									
3.815	-22.0	V	3.0	35.3	1.0	-56.3	-13.0	-43.3	
5.723	-20.9	V	3.0	35.4	1.0	-55.4	-13.0	-42.4	
3.815	-21.5	H	3.0	35.3	1.0	-55.8	-13.0	-42.8	
5.723	-18.9	H	3.0	35.4	1.0	-53.4	-13.0	-40.4	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

UMTS REL 99 (PCS Band)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: APPLE
Date: 09/06/12
Test Engineer: MENGISTU MEKURIA
Configuration: EUT WITH AC ADAPTER
Mode: TX, 850MHz BAND WCDMA MODE

Chamber	Pre-amplifer	Filter	Limit
5m Chamber B	T145 8449B	Filter 1	Part 24

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (18524MHz)									
3.705	-22.1	V	3.0	35.4	1.0	-56.5	-13.0	-43.5	
5.557	-15.8	V	3.0	35.4	1.0	-50.2	-13.0	-37.2	
3.705	-22.1	H	3.0	35.4	1.0	-56.5	-13.0	-43.5	
5.557	-12.0	H	3.0	35.4	1.0	-46.4	-13.0	-33.4	
Mid Ch, (1880.00MHz)									
3.760	-23.6	V	3.0	35.3	1.0	-57.9	-13.0	-44.9	
5.640	-15.7	V	3.0	35.4	1.0	-50.1	-13.0	-37.1	
3.760	-22.6	H	3.0	35.3	1.0	-56.9	-13.0	-43.9	
5.640	-12.8	H	3.0	35.4	1.0	-47.3	-13.0	-34.3	
High Ch, (1907.60MHz)									
3.815	-22.0	V	3.0	35.3	1.0	-56.3	-13.0	-43.3	
5.723	-14.6	V	3.0	35.4	1.0	-49.1	-13.0	-36.1	
3.815	-22.3	H	3.0	35.3	1.0	-56.6	-13.0	-43.6	
5.723	-11.7	H	3.0	35.4	1.0	-46.1	-13.0	-33.1	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

UMTS HSDPA (PCS Band)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: APPLE
Date: 09/21/12
Test Engineer: MENGISTU MEKURIA
Configuration: EUT WITH AC ADAPTER
Mode: TX, 1900MHz BAND HSUPA MODE

Chamber	Pre-amplifer	Filter	Limit
5m Chamber B	T145 8449B	Filter 1	Part 24

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (18524MHz)									
3.705	-23.3	V	3.0	35.4	1.0	-57.7	-13.0	-44.7	
5.557	-21.9	V	3.0	35.4	1.0	-56.3	-13.0	-43.3	
3.705	-23.4	H	3.0	35.4	1.0	-57.7	-13.0	-44.7	
5.557	-20.7	H	3.0	35.4	1.0	-55.1	-13.0	-42.1	
Mid Ch, (1880.00MHz)									
3.760	-23.3	V	3.0	35.3	1.0	-57.7	-13.0	-44.7	
5.640	-21.2	V	3.0	35.4	1.0	-55.6	-13.0	-42.6	
3.760	-23.0	H	3.0	35.3	1.0	-57.3	-13.0	-44.3	
5.640	-20.3	H	3.0	35.4	1.0	-54.8	-13.0	-41.8	
High Ch, (1907.60MHz)									
3.815	-22.8	V	3.0	35.3	1.0	-57.1	-13.0	-44.1	
5.723	-21.3	V	3.0	35.4	1.0	-55.8	-13.0	-42.8	
3.815	-23.1	H	3.0	35.3	1.0	-57.4	-13.0	-44.4	
5.723	-20.2	H	3.0	35.4	1.0	-54.7	-13.0	-41.7	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

BC10, 1xRTT

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: APPLE
Date: 09/07/12
Test Engineer: MENGISTU MEKURIA
Configuration: EUT WITH AC ADAPTER
Mode: TX, 800MHz BAND CDMA 1xRTT MODE

Chamber	Pre-amplifer	Filter	Limit
5m Chamber B	T145 8449B	Filter 1	Part 90

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (817.90MHz)									
1.636	-15.8	V	3.0	35.6	1.0	-50.3	-13.0	-37.3	
2.454	-20.1	V	3.0	35.4	1.0	-54.6	-13.0	-41.6	
3.272	-15.2	V	3.0	35.5	1.0	-49.7	-13.0	-36.7	
1.636	-24.2	H	3.0	35.6	1.0	-58.7	-13.0	-45.7	
2.454	-25.5	H	3.0	35.4	1.0	-60.0	-13.0	-47.0	
3.272	-14.9	H	3.0	35.5	1.0	-49.4	-13.0	-36.4	
4.090		H	3.0	35.2	1.0	-34.2	-13.0	-21.2	
Mid Ch, (819.15MHz)									
1.638	-16.7	V	3.0	35.6	1.0	-51.3	-13.0	-38.3	
2.457	-18.2	V	3.0	35.4	1.0	-52.7	-13.0	-39.7	
3.277	-14.0	V	3.0	35.5	1.0	-48.5	-13.0	-35.5	
1.638	-25.2	H	3.0	35.6	1.0	-59.7	-13.0	-46.7	
2.457	-23.8	H	3.0	35.4	1.0	-58.2	-13.0	-45.2	
3.277	-14.2	H	3.0	35.5	1.0	-48.7	-13.0	-35.7	
High Ch, (8823.10MHz)									
1.646	-20.1	V	3.0	35.5	1.0	-54.6	-13.0	-41.6	
2.469	-17.9	V	3.0	35.4	1.0	-52.3	-13.0	-39.3	
3.292	-8.4	V	3.0	35.5	1.0	-42.9	-13.0	-29.9	
1.646	-26.7	H	3.0	35.5	1.0	-61.2	-13.0	-48.2	
2.469	-22.9	H	3.0	35.4	1.0	-57.3	-13.0	-44.3	
3.292	-7.4	H	3.0	35.5	1.0	-41.9	-13.0	-28.9	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

BC10, EVDO REV A

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: APPLE
Project #: 12U14526
Date: 09/07/12
Test Engineer: MENGISTU MEKURIA
Configuration: EUT WITH AC ADAPTER
Mode: TX, 800 MHz SECONDARY BAND,CDMA EVDO REV A MODE

Chamber	Pre-amplifer	Filter	Limit
5m Chamber B	T145 8449B	Filter 1	Part 90

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (817.90MHz)									
1.636	-17.7	V	3.0	35.6	1.0	-52.3	-13.0	-39.3	
2.454	-19.7	V	3.0	35.4	1.0	-54.1	-13.0	-41.1	
3.272	-14.4	V	3.0	35.5	1.0	-49.0	-13.0	-36.0	
1.636	-20.9	H	3.0	35.6	1.0	-55.4	-13.0	-42.4	
2.454	-23.9	H	3.0	35.4	1.0	-58.4	-13.0	-45.4	
3.272	-13.0	H	3.0	35.5	1.0	-47.5	-13.0	-34.5	
Mid Ch, (819.15MHz)									
1.638	-17.4	V	3.0	35.6	1.0	-51.9	-13.0	-38.9	
2.457	-16.5	V	3.0	35.4	1.0	-51.0	-13.0	-38.0	
3.277	-14.7	V	3.0	35.5	1.0	-49.3	-13.0	-36.3	
1.638	-22.9	H	3.0	35.6	1.0	-57.4	-13.0	-44.4	
2.457	-19.6	H	3.0	35.4	1.0	-54.1	-13.0	-41.1	
3.277	-11.8	H	3.0	35.5	1.0	-46.4	-13.0	-33.4	
High Ch, (8823.10MHz)									
1.646	-19.9	V	3.0	35.5	1.0	-54.5	-13.0	-41.5	
2.469	-17.8	V	3.0	35.4	1.0	-52.2	-13.0	-39.2	
3.292	-6.9	V	3.0	35.5	1.0	-41.5	-13.0	-28.5	
1.646	-23.1	H	3.0	35.5	1.0	-57.7	-13.0	-44.7	
2.469	-22.0	H	3.0	35.4	1.0	-56.4	-13.0	-43.4	
3.292	-4.9	H	3.0	35.5	1.0	-39.4	-13.0	-26.4	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

CDMA2000, CELL Band, 1xRTT

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: APPLE
Date: 09/07/12
Test Engineer: MENGISTU MEKURIA
Configuration: EUT WITH AC ADAPTER
Mode: TX, 850MHz BAND CDMA 1xRTT MODE

Chamber	Pre-amplifer	Filter	Limit
5m Chamber B	T145 8449B	Filter 1	Part 22

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (824.70MHz)									
1.649	-21.4	V	3.0	35.5	1.0	-55.9	-13.0	-42.9	
2.474	-14.1	V	3.0	35.4	1.0	-48.6	-13.0	-35.6	
3.299	-6.4	V	3.0	35.5	1.0	-40.9	-13.0	-27.9	
1.649	-24.9	H	3.0	35.5	1.0	-59.5	-13.0	-46.5	
2.474	-20.7	H	3.0	35.4	1.0	-55.1	-13.0	-42.1	
3.299	-5.5	H	3.0	35.5	1.0	-40.0	-13.0	-27.0	
Mid Ch, (836.52MHz)									
1.673	-21.2	V	3.0	35.5	1.0	-55.8	-13.0	-42.8	
2.510	-16.5	V	3.0	35.4	1.0	-50.9	-13.0	-37.9	
3.346	-15.1	V	3.0	35.5	1.0	-49.6	-13.0	-36.6	
1.673	-26.0	H	3.0	35.5	1.0	-60.5	-13.0	-47.5	
2.510	-21.6	H	3.0	35.4	1.0	-56.0	-13.0	-43.0	
3.346	-15.9	H	3.0	35.5	1.0	-50.4	-13.0	-37.4	
High Ch, (848.31MHz)									
1.697	-17.7	V	3.0	35.5	1.0	-52.2	-13.0	-39.2	
2.545	-14.7	V	3.0	35.4	1.0	-49.1	-13.0	-36.1	
3.393	-18.1	V	3.0	35.5	1.0	-52.6	-13.0	-39.6	
1.697	-21.4	H	3.0	35.5	1.0	-55.9	-13.0	-42.9	
2.545	-20.0	H	3.0	35.4	1.0	-54.5	-13.0	-41.5	
3.393	-18.3	H	3.0	35.5	1.0	-52.8	-13.0	-39.8	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

CDMA2000, CELL BAND, EVDO REV A

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: APPLE
Date: 09/07/12
Test Engineer: MENGISTU MEKURIA
Configuration: EUT WITH AC ADAPTER
Mode: TX, 850MHz BAND CDMA EVDO REV A

Chamber	Pre-amplifer	Filter	Limit
5m Chamber B	T145 8449B	Filter 1	Part 22

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (824.70MHz)									
1.649	-23.0	V	3.0	35.5	1.0	-57.5	-13.0	-44.5	
2.474	-13.9	V	3.0	35.4	1.0	-48.3	-13.0	-35.3	
3.299	-3.9	V	3.0	35.5	1.0	-38.4	-13.0	-25.4	
1.649	-24.1	H	3.0	35.5	1.0	-58.7	-13.0	-45.7	
2.474	-20.9	H	3.0	35.4	1.0	-55.3	-13.0	-42.3	
3.299	-4.2	H	3.0	35.5	1.0	-38.7	-13.0	-25.7	
Mid Ch, (836.52MHz)									
1.673	-20.9	V	3.0	35.5	1.0	-55.4	-13.0	-42.4	
2.510	-18.2	V	3.0	35.4	1.0	-52.6	-13.0	-39.6	
3.346	-16.3	V	3.0	35.5	1.0	-50.8	-13.0	-37.8	
1.673	-25.3	H	3.0	35.5	1.0	-59.8	-13.0	-46.8	
2.510	-24.8	H	3.0	35.4	1.0	-59.2	-13.0	-46.2	
3.346	-15.2	H	3.0	35.5	1.0	-49.7	-13.0	-36.7	
High Ch, (848.31MHz)									
1.697	-16.4	V	3.0	35.5	1.0	-50.9	-13.0	-37.9	
2.545	-13.4	V	3.0	35.4	1.0	-47.8	-13.0	-34.8	
3.393	-18.1	V	3.0	35.5	1.0	-52.6	-13.0	-39.6	
1.697	-18.6	H	3.0	35.5	1.0	-53.1	-13.0	-40.1	
2.545	-20.5	H	3.0	35.4	1.0	-54.9	-13.0	-41.9	
3.393	-17.7	H	3.0	35.5	1.0	-52.2	-13.0	-39.2	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

CDMA2000, 1xRTT PCS Band

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: APPLE
Date: 09/07/12
Test Engineer: MENGISTU MEKURIA
Configuration: EUT WITH AC ADAPTER
Mode: TX, PCS BAND CDMA 1xRTT MODE

Chamber	Pre-amplifer	Filter	Limit
5m Chamber B	T145 8449B	Filter 1	Part 24

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (1851.25MHz)									
3.705	-17.9	V	3.0	35.4	1.0	-52.2	-13.0	-39.2	
5.557	-12.8	V	3.0	35.4	1.0	-47.2	-13.0	-34.2	
3.705	-16.7	H	3.0	35.4	1.0	-51.0	-13.0	-38.0	
5.557	-13.0	H	3.0	35.4	1.0	-47.4	-13.0	-34.4	
Mid Ch, (1880.00MHz)									
3.760	-18.7	V	3.0	35.3	1.0	-53.1	-13.0	-40.1	
5.640	-12.7	V	3.0	35.4	1.0	-47.1	-13.0	-34.1	
3.760	-18.5	H	3.0	35.3	1.0	-52.8	-13.0	-39.8	
5.640	-12.8	H	3.0	35.4	1.0	-47.3	-13.0	-34.3	
High Ch, (1908.75MHz)									
3.815	-18.6	V	3.0	35.3	1.0	-52.9	-13.0	-39.9	
5.723	-12.6	V	3.0	35.4	1.0	-47.1	-13.0	-34.1	
3.815	-17.3	H	3.0	35.3	1.0	-51.6	-13.0	-38.6	
5.723	-12.7	H	3.0	35.4	1.0	-47.1	-13.0	-34.1	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

CDMA2000, EVDO

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: APPLE
Date: 09/07/12
Test Engineer: MENGISTU MEKURIA
Configuration: EUT WITH AC ADAPTER
Mode: TX, PCS BAND CDMA EVDO REV A

Chamber	Pre-amplifer	Filter	Limit
5m Chamber B	T145 8449B	Filter 1	Part 24

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (1851.25MHz)									
3.705	-16.9	V	3.0	35.4	1.0	-51.2	-13.0	-38.2	
5.557	-10.8	V	3.0	35.4	1.0	-45.2	-13.0	-32.2	
3.705	-17.7	H	3.0	35.4	1.0	-52.0	-13.0	-39.0	
5.557	-10.0	H	3.0	35.4	1.0	-44.4	-13.0	-31.4	
Mid Ch, (1880.00MHz)									
3.760	-18.7	V	3.0	35.3	1.0	-53.1	-13.0	-40.1	
5.640	-11.7	V	3.0	35.4	1.0	-46.1	-13.0	-33.1	
3.760	-16.5	H	3.0	35.3	1.0	-50.8	-13.0	-37.8	
5.640	-9.8	H	3.0	35.4	1.0	-44.3	-13.0	-31.3	
High Ch, (1908.75MHz)									
3.815	-15.6	V	3.0	35.3	1.0	-49.9	-13.0	-36.9	
5.723	-10.6	V	3.0	35.4	1.0	-45.1	-13.0	-32.1	
3.815	-16.3	H	3.0	35.3	1.0	-50.6	-13.0	-37.6	
5.723	-8.7	H	3.0	35.4	1.0	-43.1	-13.0	-30.1	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

CDMA2000, CELL BAND, EVDO REV B

Two Carriers Minimum Separation

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: APPLE
Date: 09/20/12
Test Engineer: MENGISTU MEKURIA
Configuration: EUT WITH AC ADAPTER
Mode: TX, 850MHz BAND CDMA EVDO REV B, 2 CARRIER WITH MINIMUM SEPARATION

Chamber	Pre-amplifer	Filter	Limit
5m Chamber B	T145 8449B	Filter 1	Part 22

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (824.70MHz)									
1.649	-22.9	V	3.0	35.5	1.0	-57.5	-13.0	-44.5	
2.474	-16.9	V	3.0	35.4	1.0	-51.3	-13.0	-38.3	
3.299	-8.9	V	3.0	35.5	1.0	-43.5	-13.0	-30.5	
1.649	-26.0	H	3.0	35.5	1.0	-60.6	-13.0	-47.6	
2.474	-22.2	H	3.0	35.4	1.0	-56.6	-13.0	-43.6	
3.299	-8.7	H	3.0	35.5	1.0	-43.2	-13.0	-30.2	
Mid Ch, (836.52MHz)									
1.673	-24.2	V	3.0	35.5	1.0	-58.7	-13.0	-45.7	
2.510	-19.5	V	3.0	35.4	1.0	-53.9	-13.0	-40.9	
3.346	-18.0	V	3.0	35.5	1.0	-52.6	-13.0	-39.6	
1.673	-27.3	H	3.0	35.5	1.0	-61.8	-13.0	-48.8	
2.510	-24.5	H	3.0	35.4	1.0	-58.9	-13.0	-45.9	
3.346	-16.3	H	3.0	35.5	1.0	-50.8	-13.0	-37.8	
High Ch, (848.31MHz)									
1.697	-19.5	V	3.0	35.5	1.0	-54.0	-13.0	-41.0	
2.545	-14.7	V	3.0	35.4	1.0	-49.1	-13.0	-36.1	
3.393	-21.2	V	3.0	35.5	1.0	-55.7	-13.0	-42.7	
1.697	-24.1	H	3.0	35.5	1.0	-58.6	-13.0	-45.6	
2.545	-22.3	H	3.0	35.4	1.0	-56.7	-13.0	-43.7	
3.393	-20.1	H	3.0	35.5	1.0	-54.6	-13.0	-41.6	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

CDMA2000, CELL BAND, EVDO REV B

Two Carriers Maximum Separation

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: APPLE
Date: 09/20/12
Test Engineer: MENGISTU MEKURIA
Configuration: EUT WITH AC ADAPTER
Mode: TX, 850MHz BAND CDMA EVDO REV B, 2 CARRIER WITH MAXIMUM SEPARATION

Chamber	Pre-amplifer	Filter	Limit
5m Chamber B	T145 8449B	Filter 1	Part 22

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (824.70MHz)									
1.649	-24.4	V	3.0	35.5	1.0	-58.9	-13.0	-45.9	
2.474	-14.6	V	3.0	35.4	1.0	-49.1	-13.0	-36.1	
3.299	-10.7	V	3.0	35.5	1.0	-45.3	-13.0	-32.3	
1.649	-26.1	H	3.0	35.5	1.0	-60.7	-13.0	-47.7	
2.474	-20.8	H	3.0	35.4	1.0	-55.2	-13.0	-42.2	
3.299	-11.1	H	3.0	35.5	1.0	-45.7	-13.0	-32.7	
Mid Ch, (836.52MHz)									
1.673	-22.8	V	3.0	35.5	1.0	-57.3	-13.0	-44.3	
2.510	-15.4	V	3.0	35.4	1.0	-49.8	-13.0	-36.8	
3.346	-15.7	V	3.0	35.5	1.0	-50.2	-13.0	-37.2	
1.673	-26.8	H	3.0	35.5	1.0	-61.3	-13.0	-48.3	
2.510	-22.3	H	3.0	35.4	1.0	-56.7	-13.0	-43.7	
3.346	-16.1	H	3.0	35.5	1.0	-50.6	-13.0	-37.6	
High Ch, (848.31MHz)									
1.697	-20.4	V	3.0	35.5	1.0	-55.0	-13.0	-42.0	
2.545	-13.3	V	3.0	35.4	1.0	-47.8	-13.0	-34.8	
3.393	-18.1	V	3.0	35.5	1.0	-52.6	-13.0	-39.6	
1.697	-24.0	H	3.0	35.5	1.0	-58.5	-13.0	-45.5	
2.545	-20.5	H	3.0	35.4	1.0	-55.0	-13.0	-42.0	
3.393	-17.8	H	3.0	35.5	1.0	-52.3	-13.0	-39.3	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

CDMA2000, CELL BAND, EVDO REV B

Three Carriers Minimum Separation

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: APPLE
Date: 09/20/12
Test Engineer: MENGISTU MEKURIA
Configuration: EUT WITH AC ADAPTER
Mode: TX, 850MHz BAND CDMA EVDO REV B, 3 CARRIER WITH MINIMUM SEPARATION

Chamber	Pre-amplifer	Filter	Limit
5m Chamber B	T145 8449B	Filter 1	Part 22

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (824.70MHz)									
1.649	-25.2	V	3.0	35.5	1.0	-59.7	-13.0	-46.7	
2.474	-17.1	V	3.0	35.4	1.0	-51.6	-13.0	-38.6	
3.299	-12.4	V	3.0	35.5	1.0	-46.9	-13.0	-33.9	
1.649	-27.5	H	3.0	35.5	1.0	-62.1	-13.0	-49.1	
2.474	-22.4	H	3.0	35.4	1.0	-56.9	-13.0	-43.9	
3.299	-11.2	H	3.0	35.5	1.0	-45.8	-13.0	-32.8	
Mid Ch, (836.52MHz)									
1.673	-22.9	V	3.0	35.5	1.0	-57.4	-13.0	-44.4	
2.510	-17.6	V	3.0	35.4	1.0	-52.0	-13.0	-39.0	
3.346	-19.4	V	3.0	35.5	1.0	-53.9	-13.0	-40.9	
1.673	-27.5	H	3.0	35.5	1.0	-62.0	-13.0	-49.0	
2.510	-25.1	H	3.0	35.4	1.0	-59.5	-13.0	-46.5	
3.346	-17.7	H	3.0	35.5	1.0	-52.2	-13.0	-39.2	
High Ch, (848.31MHz)									
1.697	-24.1	V	3.0	35.5	1.0	-58.6	-13.0	-45.6	
2.545	-14.5	V	3.0	35.4	1.0	-48.9	-13.0	-35.9	
3.393	-21.4	V	3.0	35.5	1.0	-55.9	-13.0	-42.9	
1.697	-26.8	H	3.0	35.5	1.0	-61.3	-13.0	-48.3	
2.545	-22.5	H	3.0	35.4	1.0	-57.0	-13.0	-44.0	
3.393	-19.7	H	3.0	35.5	1.0	-54.1	-13.0	-41.1	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

LTE QPSK Band 5 (1.4.0 MHz BANDWIDTH)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Apple
Project #: 12U14507
Date: 09/11/12
Test Engineer: MENGISTU MEKURIA
Configuration: EUT WITH HEADSET AND AC ADAPTER
Mode: TX, LTE Band 5, 1.4MHz QPSK

Chamber	Pre-amplifer	Filter	Limit
5m Chamber B	T145 8449B	Filter 1	Part 22

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (824.7MHz)									
1.649	-22.2	V	3.0	35.5	1.0	-56.8	-13.0	-43.8	
2.474	-13.4	V	3.0	35.4	1.0	-47.9	-13.0	-34.9	
3.299	-4.0	V	3.0	35.5	1.0	-38.6	-13.0	-25.6	
1.649	-27.1	H	3.0	35.5	1.0	-61.6	-13.0	-48.6	
2.474	-11.4	H	3.0	35.4	1.0	-45.8	-13.0	-32.8	
3.299	-1.3	H	3.0	35.5	1.0	-35.8	-13.0	-22.8	
Mid Ch, (836.5MHz)									
1.673	-18.7	V	3.0	35.5	1.0	-53.3	-13.0	-40.3	
2.510	-9.6	V	3.0	35.4	1.0	-44.0	-13.0	-31.0	
3.346	-17.1	V	3.0	35.5	1.0	-51.6	-13.0	-38.6	
1.673	-19.0	H	3.0	35.5	1.0	-53.5	-13.0	-40.5	
2.510	-11.8	H	3.0	35.4	1.0	-46.2	-13.0	-33.2	
3.346	-16.4	H	3.0	35.5	1.0	-50.9	-13.0	-37.9	
High Ch, (848.3MHz)									
1.697	-15.4	V	3.0	35.5	1.0	-49.9	-13.0	-36.9	
2.545	-13.0	V	3.0	35.4	1.0	-47.4	-13.0	-34.4	
3.393	-19.9	V	3.0	35.5	1.0	-54.4	-13.0	-41.4	
1.697	-19.2	H	3.0	35.5	1.0	-53.8	-13.0	-40.8	
2.545	-7.3	H	3.0	35.4	1.0	-41.7	-13.0	-28.7	
3.393	-18.8	H	3.0	35.5	1.0	-53.3	-13.0	-40.3	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

LTE 16QAM Band 5(1.4.0 MHz BANDWIDTH)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Apple
Project #: 12U14507
Date: 09/11/12
Test Engineer: MENGISTU MEKURIA
Configuration: EUT WITH HEADSET AND AC ADAPTER
Mode: TX, LTE Band 5, 1.4MHz 16QAM

Chamber	Pre-amplifer	Filter	Limit
5m Chamber B	T145 8449B	Filter 1	Part 22

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (824.7MHz)									
1.649	-19.9	V	3.0	35.5	1.0	-54.4	-13.0	-41.4	
2.474	-13.8	V	3.0	35.4	1.0	-48.2	-13.0	-35.2	
3.299	-4.2	V	3.0	35.5	1.0	-38.7	-13.0	-25.7	
1.649	-25.9	H	3.0	35.5	1.0	-60.5	-13.0	-47.5	
2.474	-12.4	H	3.0	35.4	1.0	-46.8	-13.0	-33.8	
3.299	-2.6	H	3.0	35.5	1.0	-37.1	-13.0	-24.1	
Mid Ch, (836.5MHz)									
1.673	-18.9	V	3.0	35.5	1.0	-53.5	-13.0	-40.5	
2.510	-11.9	V	3.0	35.4	1.0	-46.3	-13.0	-33.3	
3.346	-17.9	V	3.0	35.5	1.0	-52.4	-13.0	-39.4	
1.673	-20.7	H	3.0	35.5	1.0	-55.2	-13.0	-42.2	
2.510	-13.2	H	3.0	35.4	1.0	-47.6	-13.0	-34.6	
3.346	-16.3	H	3.0	35.5	1.0	-50.9	-13.0	-37.9	
High Ch, (848.3MHz)									
1.697	-17.2	V	3.0	35.5	1.0	-51.7	-13.0	-38.7	
2.545	-10.2	V	3.0	35.4	1.0	-44.7	-13.0	-31.7	
3.393	-20.5	V	3.0	35.5	1.0	-55.0	-13.0	-42.0	
1.697	-19.4	H	3.0	35.5	1.0	-53.9	-13.0	-40.9	
2.545	-12.2	H	3.0	35.4	1.0	-46.6	-13.0	-33.6	
3.393	-19.2	H	3.0	35.5	1.0	-53.7	-13.0	-40.7	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

LTE QPSK Band 5 (3.0 MHz BANDWIDTH)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Apple
Project #: 12U14507
Date: 09/11/12
Test Engineer: MENGISTU MEKURIA
Configuration: EUT WITH HEADSET AND AC ADAPTER
Mode: TX, LTE Band 5, 3MHz QPSK

Chamber	Pre-amplifer	Filter	Limit
5m Chamber B	T145 8449B	Filter 1	Part 22

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (825.5MHz)									
1.651	-24.3	V	3.0	35.5	1.0	-58.9	-13.0	-45.9	
2.477	-13.6	V	3.0	35.4	1.0	-48.1	-13.0	-35.1	
3.302	-3.8	V	3.0	35.5	1.0	-38.3	-13.0	-25.3	
1.651	-26.4	H	3.0	35.5	1.0	-61.0	-13.0	-48.0	
2.477	-8.5	H	3.0	35.4	1.0	-42.9	-13.0	-29.9	
3.302	-3.4	H	3.0	35.5	1.0	-37.9	-13.0	-24.9	
Mid Ch, (836.5MHz)									
1.673	-17.3	V	3.0	35.5	1.0	-51.8	-13.0	-38.8	
2.510	-6.4	V	3.0	35.4	1.0	-40.8	-13.0	-27.8	
3.346	-17.9	V	3.0	35.5	1.0	-52.4	-13.0	-39.4	
1.673	-20.7	H	3.0	35.5	1.0	-55.3	-13.0	-42.3	
2.510	-9.2	H	3.0	35.4	1.0	-43.7	-13.0	-30.7	
3.346	-17.1	H	3.0	35.5	1.0	-51.6	-13.0	-38.6	
High Ch, (847.5MHz)									
1.695	-19.5	V	3.0	35.5	1.0	-54.0	-13.0	-41.0	
2.543	-5.2	V	3.0	35.4	1.0	-39.7	-13.0	-26.7	
3.390	-15.5	V	3.0	35.5	1.0	-50.0	-13.0	-37.0	
1.695	-21.8	H	3.0	35.5	1.0	-56.3	-13.0	-43.3	
2.543	-8.2	H	3.0	35.4	1.0	-42.6	-13.0	-29.6	
3.390	-15.3	H	3.0	35.5	1.0	-49.8	-13.0	-36.8	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

LTE 16QAM Band 5 (3.0 MHz BANDWIDTH)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Apple
Project #: 12U14507
Date: 09/11/12
Test Engineer: MENGISTU MEKURIA
Configuration: EUT WITH HEADSET AND AC ADAPTER
Mode: TX, LTE Band 5, 3MHz 16QAM

Chamber	Pre-amplifer	Filter	Limit
5m Chamber B	T145 8449B	Filter 1	Part 22

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (825.5MHz)									
1.651	-23.7	V	3.0	35.5	1.0	-58.2	-13.0	-45.2	
2.477	-13.6	V	3.0	35.4	1.0	-48.0	-13.0	-35.0	
3.302	-3.6	V	3.0	35.5	1.0	-38.1	-13.0	-25.1	
1.651	-25.9	H	3.0	35.5	1.0	-60.4	-13.0	-47.4	
2.477	-13.0	H	3.0	35.4	1.0	-47.4	-13.0	-34.4	
3.302	-3.6	H	3.0	35.5	1.0	-38.1	-13.0	-25.1	
Mid Ch, (836.5MHz)									
1.673	-17.3	V	3.0	35.5	1.0	-51.9	-13.0	-38.9	
2.510	-6.6	V	3.0	35.4	1.0	-41.0	-13.0	-28.0	
3.346	-19.1	V	3.0	35.5	1.0	-53.7	-13.0	-40.7	
1.673	-21.7	H	3.0	35.5	1.0	-56.2	-13.0	-43.2	
2.510	-10.4	H	3.0	35.4	1.0	-44.9	-13.0	-31.9	
3.346	-18.2	H	3.0	35.5	1.0	-52.7	-13.0	-39.7	
High Ch, (847.5MHz)									
1.695	-18.9	V	3.0	35.5	1.0	-53.4	-13.0	-40.4	
2.543	-5.6	V	3.0	35.4	1.0	-40.0	-13.0	-27.0	
3.390	-14.5	V	3.0	35.5	1.0	-49.0	-13.0	-36.0	
1.695	-21.3	H	3.0	35.5	1.0	-55.8	-13.0	-42.8	
2.543	-12.0	H	3.0	35.4	1.0	-46.4	-13.0	-33.4	
3.390	-13.8	H	3.0	35.5	1.0	-48.3	-13.0	-35.3	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

LTE QPSK Band 5 (5 MHz BANDWIDTH)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Apple
Project #: 12U14507
Date: 09/11/12
Test Engineer: MENGISTU MEKURIA
Configuration: EUT WITH HEADSET AND AC ADAPTER
Mode: TX, LTE Band 5, 5MHz QPSK

Chamber	Pre-amplifer	Filter	Limit
5m Chamber B	T145 8449B	Filter 1	Part 22

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (826.5MHz)									
1.653	-25.0	V	3.0	35.5	1.0	-59.6	-13.0	-46.6	
2.480	-14.5	V	3.0	35.4	1.0	-48.9	-13.0	-35.9	
3.306	-4.4	V	3.0	35.5	1.0	-39.0	-13.0	-26.0	
1.653	-26.6	H	3.0	35.5	1.0	-61.1	-13.0	-48.1	
2.480	-8.4	H	3.0	35.4	1.0	-42.8	-13.0	-29.8	
3.306	-2.3	H	3.0	35.5	1.0	-36.8	-13.0	-23.8	
Mid Ch, (836.5MHz)									
1.673	-22.1	V	3.0	35.5	1.0	-56.6	-13.0	-43.6	
2.510	-7.1	V	3.0	35.4	1.0	-41.5	-13.0	-28.5	
3.346	-16.1	V	3.0	35.5	1.0	-50.6	-13.0	-37.6	
1.673	-23.8	H	3.0	35.5	1.0	-58.3	-13.0	-45.3	
2.510	-7.8	H	3.0	35.4	1.0	-42.2	-13.0	-29.2	
3.346	-15.9	H	3.0	35.5	1.0	-50.4	-13.0	-37.4	
High Ch, (846.5MHz)									
1.693	-17.3	V	3.0	35.5	1.0	-51.8	-13.0	-38.8	
2.532	-6.2	V	3.0	35.4	1.0	-40.6	-13.0	-27.6	
3.371	-13.3	V	3.0	35.5	1.0	-47.8	-13.0	-34.8	
1.693	-19.7	H	3.0	35.5	1.0	-54.2	-13.0	-41.2	
2.532	-10.2	H	3.0	35.4	1.0	-44.6	-13.0	-31.6	
3.371	-11.8	H	3.0	35.5	1.0	-46.3	-13.0	-33.3	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

LTE QPSK Band 5 (10 MHz BANDWIDTH)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Apple
Project #: 12U14507
Date: 09/11/12
Test Engineer: MENGISTU MEKURIA
Configuration: EUT WITH HEADSET AND AC ADAPTER
Mode: TX, LTE Band 5, 5MHz 16QAM

Chamber	Pre-amplifer	Filter	Limit
5m Chamber B	T145 8449B	Filter 1	Part 22

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (826.5MHz)									
1.653	-23.5	V	3.0	35.5	1.0	-58.0	-13.0	-45.0	
2.480	-14.3	V	3.0	35.4	1.0	-48.8	-13.0	-35.8	
3.306	-4.2	V	3.0	35.5	1.0	-38.7	-13.0	-25.7	
1.653	-27.3	H	3.0	35.5	1.0	-61.8	-13.0	-48.8	
2.480	-12.3	H	3.0	35.4	1.0	-46.7	-13.0	-33.7	
3.306	-3.1	H	3.0	35.5	1.0	-37.6	-13.0	-24.6	
Mid Ch, (836.5MHz)									
1.673	-20.4	V	3.0	35.5	1.0	-54.9	-13.0	-41.9	
2.510	-6.9	V	3.0	35.4	1.0	-41.3	-13.0	-28.3	
3.346	-14.3	V	3.0	35.5	1.0	-48.9	-13.0	-35.9	
1.673	-24.5	H	3.0	35.5	1.0	-59.0	-13.0	-46.0	
2.510	-8.5	H	3.0	35.4	1.0	-42.9	-13.0	-29.9	
3.346	-14.0	H	3.0	35.5	1.0	-48.5	-13.0	-35.5	
High Ch, (846.5MHz)									
1.693	-19.8	V	3.0	35.5	1.0	-54.3	-13.0	-41.3	
2.532	-3.4	V	3.0	35.4	1.0	-37.9	-13.0	-24.9	
3.371	-10.5	V	3.0	35.5	1.0	-45.0	-13.0	-32.0	
1.693	-15.6	H	3.0	35.5	1.0	-50.1	-13.0	-37.1	
2.532	-2.6	H	3.0	35.4	1.0	-37.0	-13.0	-24.0	
3.371	-11.4	H	3.0	35.5	1.0	-45.9	-13.0	-32.9	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

LTE 16QAM Band 5 (10 MHz BANDWIDTH)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Apple
Project #: 12U14507
Date: 09/11/12
Test Engineer: MENGISTU MEKURIA
Configuration: EUT WITH HEADSET AND AC ADAPTER
Mode: TX, LTE Band 5, 10MHz QPSK

Chamber	Pre-amplifer	Filter	Limit
5m Chamber B	T145 8449B	Filter 1	Part 22

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (829MHz)									
1.658	-23.0	V	3.0	35.5	1.0	-57.6	-13.0	-44.6	
2.487	-13.1	V	3.0	35.4	1.0	-47.5	-13.0	-34.5	
3.316	-3.9	V	3.0	35.5	1.0	-38.4	-13.0	-25.4	
1.658	-26.0	H	3.0	35.5	1.0	-60.5	-13.0	-47.5	
2.487	-10.6	H	3.0	35.4	1.0	-45.0	-13.0	-32.0	
3.316	-2.3	H	3.0	35.5	1.0	-36.9	-13.0	-23.9	
Mid Ch, (836.5MHz)									
1.673	-19.7	V	3.0	35.5	1.0	-54.3	-13.0	-41.3	
2.510	-7.3	V	3.0	35.4	1.0	-41.7	-13.0	-28.7	
3.346	-9.9	V	3.0	35.5	1.0	-44.4	-13.0	-31.4	
1.673	-21.9	H	3.0	35.5	1.0	-56.4	-13.0	-43.4	
2.510	-8.1	H	3.0	35.4	1.0	-42.5	-13.0	-29.5	
3.346	-8.3	H	3.0	35.5	1.0	-42.8	-13.0	-29.8	
High Ch, (844MHz)									
1.688	-19.5	V	3.0	35.5	1.0	-54.0	-13.0	-41.0	
2.532	-7.2	V	3.0	35.4	1.0	-41.6	-13.0	-28.6	
3.376	-9.8	V	3.0	35.5	1.0	-44.3	-13.0	-31.3	
4.220	-13.0	V	3.0	35.2	1.0	-47.2	-13.0	-34.2	
1.688	-21.8	H	3.0	35.5	1.0	-56.3	-13.0	-43.3	
2.532	-7.9	H	3.0	35.4	1.0	-42.4	-13.0	-29.4	
3.376	-8.2	H	3.0	35.5	1.0	-42.7	-13.0	-29.7	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

LTE QPSK Band 13 (5.0MHz BANDWIDTH)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Apple
Project #: 12U14507
Date: 09/11/12
Test Engineer: MENGISTU MEKURIA
Configuration: EUT WITH HEADSET AND AC ADAPTER
Mode: TX, LTE Band 5, 10MHz 16QAM

Chamber	Pre-amplifer	Filter	Limit
5m Chamber B	T145 8449B	Filter 1	Part 22

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (829MHz)									
1.658	-23.6	V	3.0	35.5	1.0	-58.2	-13.0	-45.2	
2.487	-13.1	V	3.0	35.4	1.0	-47.5	-13.0	-34.5	
3.316	-2.9	V	3.0	35.5	1.0	-37.4	-13.0	-24.4	
1.658	-26.5	H	3.0	35.5	1.0	-61.0	-13.0	-48.0	
2.487	-14.0	H	3.0	35.4	1.0	-48.4	-13.0	-35.4	
3.316	-3.8	H	3.0	35.5	1.0	-38.3	-13.0	-25.3	
Mid Ch, (836.5MHz)									
1.673	-22.5	V	3.0	35.5	1.0	-57.1	-13.0	-44.1	
2.510	-5.9	V	3.0	35.4	1.0	-40.3	-13.0	-27.3	
3.346	-9.7	V	3.0	35.5	1.0	-44.2	-13.0	-31.2	
1.673	-24.1	H	3.0	35.5	1.0	-58.6	-13.0	-45.6	
2.510	-11.0	H	3.0	35.4	1.0	-45.4	-13.0	-32.4	
3.346	-8.7	H	3.0	35.5	1.0	-43.2	-13.0	-30.2	
High Ch, (844MHz)									
1.688	-22.3	V	3.0	35.5	1.0	-56.9	-13.0	-43.9	
2.532	-5.8	V	3.0	35.4	1.0	-40.2	-13.0	-27.2	
3.376	-9.6	V	3.0	35.5	1.0	-44.1	-13.0	-31.1	
1.688	-24.0	H	3.0	35.5	1.0	-58.5	-13.0	-45.5	
2.532	-10.9	H	3.0	35.4	1.0	-45.3	-13.0	-32.3	
3.376	-8.6	H	3.0	35.5	1.0	-43.1	-13.0	-30.1	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

LTE 16QAM Band 13 (5.0 MHz BANDWIDTH)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Apple
Project #: 12U14507
Date: 09/12/12
Test Engineer: Mengistu Mekuria
Configuration: EUT with Headset and AC Adapter
Mode: TX, LTE Band 13, 5MHz QPSK

Chamber	Pre-amplifer	Filter	Limit
5m Chamber A	T144 8449B	Filter 1	Part 27

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 779.5MHz									
1.559	-25.1	V	3.0	38.3	1.0	-62.4	-13.0	-49.4	
2.339	-21.7	V	3.0	37.5	1.0	-58.3	-13.0	-45.3	
3.118	-20.4	V	3.0	37.3	1.0	-56.7	-13.0	-43.7	
1.559	-29.3	H	3.0	38.3	1.0	-66.6	-13.0	-53.6	
2.339	-24.3	H	3.0	37.5	1.0	-60.8	-13.0	-47.8	
3.118	-20.6	H	3.0	37.3	1.0	-56.9	-13.0	-43.9	
Mid Ch, 782MHz									
1.564	-26.0	V	3.0	38.3	1.0	-63.3	-13.0	-50.3	
2.346	-22.7	V	3.0	37.5	1.0	-59.2	-13.0	-46.2	
3.128	-19.4	V	3.0	37.3	1.0	-55.6	-13.0	-42.6	
1.564	-27.3	H	3.0	38.3	1.0	-64.6	-13.0	-51.6	
2.346	-22.3	H	3.0	37.5	1.0	-58.8	-13.0	-45.8	
3.128	-18.6	H	3.0	37.3	1.0	-54.9	-13.0	-41.9	
High Ch, 784.5MHz									
1.693	-22.6	V	3.0	38.1	1.0	-59.7	-13.0	-46.7	
2.532	-21.1	V	3.0	37.5	1.0	-57.5	-13.0	-44.5	
3.371	-18.8	V	3.0	37.1	1.0	-54.9	-13.0	-41.9	
1.693	-25.0	H	3.0	38.1	1.0	-62.1	-13.0	-49.1	
2.532	-22.7	H	3.0	37.5	1.0	-59.2	-13.0	-46.2	
3.371	-17.9	H	3.0	37.1	1.0	-54.0	-13.0	-41.0	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

LTE QPSK Radiated Measurement in 1559-1610MHz Band

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Apple
Project #: 12U14507
Date: 09/12/12
Test Engineer: Mengistu Mekuria
Configuration: EUT with Headset and AC Adapter
Mode: TX, LTE Band 13, 5MHz 16QAM

Chamber	Pre-amplifer	Filter	Limit
5m Chamber A	T144 8449B	Filter 1	Part 22

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 779.5MHz									
1.559	-20.2	V	3.0	38.3	1.0	-57.4	-13.0	-44.4	
2.339	-18.7	V	3.0	37.5	1.0	-55.3	-13.0	-42.3	
3.118	-17.4	V	3.0	37.3	1.0	-53.7	-13.0	-40.7	
1.559	-21.3	H	3.0	38.3	1.0	-58.6	-13.0	-45.6	
2.339	-22.3	H	3.0	37.5	1.0	-58.8	-13.0	-45.8	
3.118	-18.6	H	3.0	37.3	1.0	-54.9	-13.0	-41.9	
Mid Ch, 782MHz									
1.564	-22.1	V	3.0	38.3	1.0	-59.4	-13.0	-46.4	
2.346	-20.7	V	3.0	37.5	1.0	-57.2	-13.0	-44.2	
3.128	-16.4	V	3.0	37.3	1.0	-52.6	-13.0	-39.6	
1.564	-26.3	H	3.0	38.3	1.0	-63.6	-13.0	-50.6	
2.346	-23.3	H	3.0	37.5	1.0	-59.8	-13.0	-46.8	
3.128	-18.6	H	3.0	37.3	1.0	-54.9	-13.0	-41.9	
High Ch, 784.5MHz									
1.693	-19.6	V	3.0	38.1	1.0	-56.7	-13.0	-43.7	
2.532	-18.1	V	3.0	37.5	1.0	-54.5	-13.0	-41.5	
3.371	-17.8	V	3.0	37.1	1.0	-53.9	-13.0	-40.9	
1.693	-23.0	H	3.0	38.1	1.0	-60.1	-13.0	-47.1	
2.532	-21.7	H	3.0	37.5	1.0	-58.2	-13.0	-45.2	
3.371	-17.9	H	3.0	37.1	1.0	-54.0	-13.0	-41.0	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

LTE QPSK Radiated Measurement in 1559-1610MHz Band

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Apple
Project #: 12U14507
Date: 09/12/12
Test Engineer: Mengistu Mekuria
Configuration: EUT with Headset and AC Adapter
Mode: TX, LTE Band 13, 5MHz QPSK

Chamber	Pre-amplifer	Filter	Limit
5m Chamber A	T144 8449B	Filter 1	Part 27

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 779.5									
1.558	-21.2	V	3.0	38.3	1.0	-58.5	-40.0	-18.5	
1.558	-24.3	H	3.0	38.3	1.0	-61.6	-40.0	-21.6	
Mid Ch, 782MHz									
1.564	-20.1	V	3.0	38.3	1.0	-57.4	-40.0	-17.4	
1.564	-24.3	H	3.0	38.3	1.0	-61.6	-40.0	-21.6	
High Ch, 784.5MHz									
1.569	-19.1	V	3.0	38.3	1.0	-56.3	-40.0	-16.3	
1.569	-24.2	H	3.0	38.3	1.0	-61.5	-40.0	-21.5	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

LTE QPSK Band 13 (10.0MHz BANDWIDTH)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Apple
Project #: 12U14507
Date: 09/12/12
Test Engineer: Mengistu Mekuria
Configuration: EUT with Headset and AC Adapter
Mode: TX, LTE Band 13, 10MHz QPSK

Chamber	Pre-amplifer	Filter	Limit
5m Chamber A	T144 8449B	Filter 1	Part 27

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Mid Ch, 782MHz									
1.564	-23.1	V	3.0	38.3	1.0	-60.3	-13.0	-47.3	
2.346	-18.7	V	3.0	37.5	1.0	-55.2	-13.0	-42.2	
3.128	-18.4	V	3.0	37.3	1.0	-54.6	-13.0	-41.6	
1.564	-24.3	H	3.0	38.3	1.0	-61.6	-13.0	-48.6	
2.346	-22.3	H	3.0	37.5	1.0	-58.8	-13.0	-45.8	
3.128	-18.6	H	3.0	37.3	1.0	-54.9	-13.0	-41.9	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

LTE 16QAM Band 13 (10.0MHz BANDWIDTH)

Test Engineer: Mengistu Mekuria
Configuration: EUT with Headset and AC Adapter
Mode: TX, LTE Band 13, 10MHz 16QAM

Chamber	Pre-amplifer	Filter	Limit
5m Chamber A	T144 8449B	Filter 1	Part 27

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Mid Ch, 782MHz									
1.564	-21.1	V	3.0	38.3	1.0	-58.4	-13.0	-45.4	
2.346	-18.7	V	3.0	37.5	1.0	-55.2	-13.0	-42.2	
3.128	-16.4	V	3.0	37.3	1.0	-52.6	-13.0	-39.6	
1.564	-19.9	H	3.0	38.3	1.0	-57.2	-13.0	-44.2	
2.346	-21.3	H	3.0	37.5	1.0	-57.8	-13.0	-44.8	
3.128	-16.6	H	3.0	37.3	1.0	-52.9	-13.0	-39.9	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

LTE QPSK and 16QAM Radiated Measurement in 1559-1610MHz Band

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company:	Apple
Project #:	12U14507
Date:	09/12/12
Test Engineer:	Mengistu Mekuria
Configuration:	EUT with Headset and AC Adapter
Mode:	TX, LTE Band 13, 10MHz, QPSK and 16QAM

Chamber	Pre-amplifer	Filter	Limit
5m Chamber A	T144 8449B	Filter 1	Part 27

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
QPSK, Mid Ch, 782MHz									
1.564	-21.1	V	3.0	38.3	1.0	-58.4	-40.0	-18.4	
1.564	-26.2	H	3.0	38.3	1.0	-63.5	-40.0	-23.5	
16QAM, Mid Ch, 782MHz									
1.564	-21.0	V	3.0	38.3	1.0	-58.3	-40.0	-18.3	
1.564	-26.8	H	3.0	38.3	1.0	-64.0	-40.0	-24.0	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

LTE QPSK Band 25 (1.4.0 MHz BANDWIDTH)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Apple
Project #: 12U14507
Date: 09/12/12
Test Engineer: MENGISTU MEKURIA
Configuration: EUT WITH HEADSET AND AC ADAPTER
Mode: TX, LTE Band 25 1.4MHz BW, QPSK

Chamber	Pre-amplifer	Filter	Limit
5m Chamber A	T144 8449B	Filter 1	Part 24

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (1850.7MHz)									
3.701	-18.1	V	3.0	36.8	1.0	-53.9	-13.0	-40.9	
5.552	-14.7	V	3.0	36.3	1.0	-50.0	-13.0	-37.0	
11.104	-7.7	V	3.0	36.9	1.0	-43.6	-13.0	-30.6	
3.701	-20.0	H	3.0	36.8	1.0	-55.8	-13.0	-42.8	
5.552	-16.1	H	3.0	36.3	1.0	-51.4	-13.0	-38.4	
11.104	-9.1	H	3.0	36.9	1.0	-45.0	-13.0	-32.0	
Mid Ch, (1882.5MHz)									
3.765	-19.9	V	3.0	36.8	1.0	-55.7	-13.0	-42.7	
5.648	-16.6	V	3.0	36.3	1.0	-51.9	-13.0	-38.9	
11.295	-8.5	V	3.0	36.8	1.0	-44.3	-13.0	-31.3	
3.765	-20.8	H	3.0	36.8	1.0	-56.6	-13.0	-43.6	
5.648	-14.9	H	3.0	36.3	1.0	-50.2	-13.0	-37.2	
11.295	-10.2	H	3.0	36.8	1.0	-46.0	-13.0	-33.0	
High Ch, (1914.3MHz)									
3.829	-18.8	V	3.0	36.7	1.0	-54.5	-13.0	-41.5	
5.743	-16.5	V	3.0	36.3	1.0	-51.8	-13.0	-38.8	
11.486	-6.3	V	3.0	36.8	1.0	-42.1	-13.0	-29.1	
3.829	-19.6	H	3.0	36.7	1.0	-55.4	-13.0	-42.4	
5.743	-15.7	H	3.0	36.3	1.0	-51.1	-13.0	-38.1	
11.486	-8.3	H	3.0	36.8	1.0	-44.0	-13.0	-31.0	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

LTE 16QAM Band 25 (1.4.0 MHz BANDWIDTH)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Apple
Project #: 12U14507
Date: 09/12/12
Test Engineer: MENGISTU MEKURIA
Configuration: EUT WITH HEADSET AND AC ADAPTER
Mode: TX, LTE Band 25 1.4MHz BW, 16QAM

Chamber	Pre-amplifer	Filter	Limit
5m Chamber A	T144 8449B	Filter 1	Part 24

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (1850.7MHz)									
3.701	-18.1	V	3.0	36.8	1.0	-53.9	-13.0	-40.9	
5.552	-14.7	V	3.0	36.3	1.0	-50.0	-13.0	-37.0	
11.104	-7.7	V	3.0	36.9	1.0	-43.6	-13.0	-30.6	
3.701	-20.0	H	3.0	36.8	1.0	-55.8	-13.0	-42.8	
5.552	-16.1	H	3.0	36.3	1.0	-51.4	-13.0	-38.4	
11.104	-9.1	H	3.0	36.9	1.0	-45.0	-13.0	-32.0	
Mid Ch, (1882.5MHz)									
3.765	-20.9	V	3.0	36.8	1.0	-56.7	-13.0	-43.7	
5.648	-15.6	V	3.0	36.3	1.0	-50.9	-13.0	-37.9	
11.295	-4.5	V	3.0	36.8	1.0	-40.3	-13.0	-27.3	
3.765	-20.8	H	3.0	36.8	1.0	-56.6	-13.0	-43.6	
5.648	-14.9	H	3.0	36.3	1.0	-50.2	-13.0	-37.2	
11.295	-9.2	H	3.0	36.8	1.0	-45.0	-13.0	-32.0	
High Ch, (1914.3MHz)									
3.829	-19.8	V	3.0	36.7	1.0	-55.5	-13.0	-42.5	
7.657	-5.8	V	3.0	36.6	1.0	-41.5	-13.0	-28.5	
11.486	3.7	V	3.0	36.8	1.0	-32.1	-13.0	-19.1	
3.829	-20.6	H	3.0	36.7	1.0	-56.4	-13.0	-43.4	
5.743	-16.7	H	3.0	36.3	1.0	-52.1	-13.0	-39.1	
11.486	-8.8	H	3.0	36.8	1.0	-44.5	-13.0	-31.5	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

LTE QPSK Band 25 (3.0 MHz BANDWIDTH)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Apple
Project #: 12U14507
Date: 09/12/12
Test Engineer: MENGISTU MEKURIA
Configuration: EUT WITH HEADSET AND AC ADAPTER
Mode: TX, LTE Band 25 3.0MHz BW, QPSK

Chamber	Pre-amplifer	Filter	Limit
5m Chamber A	T144 8449B	Filter 1	Part 24

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (1851.5MHz)									
3.703	-12.1	V	3.0	36.8	1.0	-47.9	-13.0	-34.9	
5.555	-10.7	V	3.0	36.3	1.0	-46.0	-13.0	-33.0	
11.109	-6.9	V	3.0	36.9	1.0	-42.8	-13.0	-29.8	
3.703	-14.0	H	3.0	36.8	1.0	-49.8	-13.0	-36.8	
5.555	-10.1	H	3.0	36.3	1.0	-45.3	-13.0	-32.3	
Mid Ch, (1882.5MHz)									
3.765	-10.9	V	3.0	36.8	1.0	-46.7	-13.0	-33.7	
5.648	-10.6	V	3.0	36.3	1.0	-45.9	-13.0	-32.9	
3.765	-23.2	H	3.0	36.8	1.0	-58.9	-13.0	-45.9	
5.648	-8.9	H	3.0	36.3	1.0	-44.2	-13.0	-31.2	
High Ch, (1913.5MHz)									
3.827	-12.1	V	3.0	36.7	1.0	-47.8	-13.0	-34.8	
5.741	-10.5	V	3.0	36.3	1.0	-45.8	-13.0	-32.8	
3.827	-13.6	H	3.0	36.7	1.0	-49.4	-13.0	-36.4	
5.741	-9.7	H	3.0	36.3	1.0	-45.1	-13.0	-32.1	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

LTE 16QAM Band 25 (3.0 MHz BANDWIDTH)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Apple
Project #: 12U14507
Date: 09/12/12
Test Engineer: MENGISTU MEKURIA
Configuration: EUT WITH HEADSET AND AC ADAPTER
Mode: TX, LTE Band 25 3.0MHz BW, 16QAM

Chamber	Pre-amplifer	Filter	Limit
5m Chamber A	T144 8449B	Filter 1	Part 24

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (1851.5MHz)									
3.703	-15.1	V	3.0	36.8	1.0	-50.9	-13.0	-37.9	
5.555	-10.7	V	3.0	36.3	1.0	-46.0	-13.0	-33.0	
3.703	-16.0	H	3.0	36.8	1.0	-51.8	-13.0	-38.8	
5.555	-12.1	H	3.0	36.3	1.0	-47.3	-13.0	-34.3	
Mid Ch, (1882.5MHz)									
3.765	-13.9	V	3.0	36.8	1.0	-49.7	-13.0	-36.7	
5.648	-11.6	V	3.0	36.3	1.0	-46.9	-13.0	-33.9	
3.765	-14.8	H	3.0	36.8	1.0	-50.6	-13.0	-37.6	
5.648	-11.9	H	3.0	36.3	1.0	-47.2	-13.0	-34.2	
High Ch, (1913.5MHz)									
3.827	-14.2	V	3.0	36.7	1.0	-49.9	-13.0	-36.9	
5.741	-11.5	V	3.0	36.3	1.0	-46.8	-13.0	-33.8	
3.827	-14.6	H	3.0	36.7	1.0	-50.4	-13.0	-37.4	
5.741	-10.7	H	3.0	36.3	1.0	-46.1	-13.0	-33.1	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

LTE QPSK Band 25 (5 MHz BANDWIDTH)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company:	Apple
Project #:	12U14507
Date:	09/12/12
Test Engineer:	MENGISTU MEKURIA
Configuration:	EUT WITH HEADSET AND AC ADAPTER
Mode:	TX, LTE Band 25 5.0MHz BW, QPSK

Chamber	Pre-amplifer	Filter	Limit
5m Chamber A	T144 8449B	Filter 1	Part 24

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (1852.5.0MHz)									
3.705	-13.1	V	3.0	36.8	1.0	-48.9	-13.0	-35.9	
5.558	-10.7	V	3.0	36.3	1.0	-46.0	-13.0	-33.0	
3.705	-15.0	H	3.0	36.8	1.0	-50.8	-13.0	-37.8	
5.558	-12.0	H	3.0	36.3	1.0	-47.3	-13.0	-34.3	
Mid Ch, (1882.5MHz)									
3.765	-12.4	V	3.0	36.8	1.0	-48.2	-13.0	-35.2	
5.648	-10.6	V	3.0	36.3	1.0	-45.9	-13.0	-32.9	
3.765	-13.8	H	3.0	36.8	1.0	-49.6	-13.0	-36.6	
5.648	-9.9	H	3.0	36.3	1.0	-45.2	-13.0	-32.2	
High Ch, (1912.5MHz)									
3.825	-11.8	V	3.0	36.7	1.0	-47.5	-13.0	-34.5	
5.738	-10.5	V	3.0	36.3	1.0	-45.8	-13.0	-32.8	
3.825	-12.7	H	3.0	36.7	1.0	-48.4	-13.0	-35.4	
5.738	-9.7	H	3.0	36.3	1.0	-45.1	-13.0	-32.1	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

LTE 16QAM Band 25 (5 MHz BANDWIDTH)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Apple
Project #: 12U14507
Date: 09/12/12
Test Engineer: MENGISTU MEKURIA
Configuration: EUT WITH HEADSET AND AC ADAPTER
Mode: TX, LTE Band 25 5.0MHz BW, 16QAM

Chamber	Pre-amplifer	Filter	Limit
5m Chamber A	T144 8449B	Filter 1	Part 24

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (1852.5.0MHz)									
3.705	-15.1	V	3.0	36.8	1.0	-50.9	-13.0	-37.9	
5.558	-12.7	V	3.0	36.3	1.0	-48.0	-13.0	-35.0	
3.705	-16.0	H	3.0	36.8	1.0	-51.8	-13.0	-38.8	
5.558	-12.0	H	3.0	36.3	1.0	-47.3	-13.0	-34.3	
Mid Ch, (1882.5MHz)									
3.765	-15.9	V	3.0	36.8	1.0	-51.7	-13.0	-38.7	
5.648	-10.6	V	3.0	36.3	1.0	-45.9	-13.0	-32.9	
3.765	-16.8	H	3.0	36.8	1.0	-52.6	-13.0	-39.6	
5.648	-9.9	H	3.0	36.3	1.0	-45.2	-13.0	-32.2	
High Ch, (1912.5MHz)									
3.825	-14.8	V	3.0	36.7	1.0	-50.5	-13.0	-37.5	
5.738	-12.5	V	3.0	36.3	1.0	-47.8	-13.0	-34.8	
3.825	-13.7	H	3.0	36.7	1.0	-49.4	-13.0	-36.4	
5.738	-11.7	H	3.0	36.3	1.0	-47.1	-13.0	-34.1	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

LTE QPSK Band 25 (10 MHz BANDWIDTH)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Apple
Project #: 12U14507
Date: 09/12/12
Test Engineer: MENGISTU MEKURIA
Configuration: EUT WITH HEADSET AND AC ADAPTER
Mode: TX, LTE Band 25 10MHz BW, QPSK

Chamber	Pre-amplifer	Filter	Limit
5m Chamber A	T144 8449B	Filter 1	Part 24

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (1855.0MHz)									
3.710	-17.1	V	3.0	36.8	1.0	-52.9	-13.0	-39.9	
11.130	-6.7	V	3.0	36.9	1.0	-42.5	-13.0	-29.5	
3.710	-17.0	H	3.0	36.8	1.0	-52.8	-13.0	-39.8	
11.130	-7.2	H	3.0	36.9	1.0	-43.0	-13.0	-30.0	
Mid Ch, (1882.5MHz)									
3.765	-13.9	V	3.0	36.8	1.0	-49.7	-13.0	-36.7	
11.295	-6.5	V	3.0	36.8	1.0	-42.3	-13.0	-29.3	
3.765	-16.8	H	3.0	36.8	1.0	-52.6	-13.0	-39.6	
11.295	-7.2	H	3.0	36.8	1.0	-43.0	-13.0	-30.0	
High Ch, (1910.0MHz)									
3.820	-14.8	V	3.0	36.7	1.0	-50.5	-13.0	-37.5	
11.460	-6.3	V	3.0	36.8	1.0	-42.1	-13.0	-29.1	
3.820	-16.7	H	3.0	36.7	1.0	-52.4	-13.0	-39.4	
11.460	-7.3	H	3.0	36.8	1.0	-43.0	-13.0	-30.0	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

LTE 16QAM Band 25(10 MHz BANDWIDTH)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Apple
Project #: 12U14507
Date: 09/12/12
Test Engineer: MENGISTU MEKURIA
Configuration: EUT WITH HEADSET AND AC ADAPTER
Mode: TX, LTE Band 25 10MHz BW, 16QAM

Chamber	Pre-amplifer	Filter	Limit
5m Chamber A	T144 8449B	Filter 1	Part 24

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (1855.0MHz)									
3.710	-17.1	V	3.0	36.8	1.0	-52.9	-13.0	-39.9	
11.130	-6.7	V	3.0	36.9	1.0	-42.5	-13.0	-29.5	
3.710	-17.0	H	3.0	36.8	1.0	-52.8	-13.0	-39.8	
11.130	-8.2	H	3.0	36.9	1.0	-44.0	-13.0	-31.0	
Mid Ch, (1882.5MHz)									
3.765	-16.9	V	3.0	36.8	1.0	-52.7	-13.0	-39.7	
11.295	-6.5	V	3.0	36.8	1.0	-42.3	-13.0	-29.3	
3.765	-16.8	H	3.0	36.8	1.0	-52.6	-13.0	-39.6	
11.295	-8.2	H	3.0	36.8	1.0	-44.0	-13.0	-31.0	
High Ch, (1910.0MHz)									
3.820	-16.8	V	3.0	36.7	1.0	-52.5	-13.0	-39.5	
11.460	-6.3	V	3.0	36.8	1.0	-42.1	-13.0	-29.1	
3.820	-16.7	H	3.0	36.7	1.0	-52.4	-13.0	-39.4	
11.460	-8.3	H	3.0	36.8	1.0	-44.0	-13.0	-31.0	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

LTE QPSK Band 25 (15MHz BANDWIDTH)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Apple
Project #: 12U14507
Date: 09/12/12
Test Engineer: MENGISTU MEKURIA
Configuration: EUT WITH HEADSET AND AC ADAPTER
Mode: TX, LTE Band 25 15.0MHz BW, QPSK

Chamber	Pre-amplifer	Filter	Limit
5m Chamber A	T144 8449B	Filter 1	Part 24

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (1857.5MHz)									
3.715	-11.1	V	3.0	36.8	1.0	-46.9	-13.0	-33.9	
5.573	-9.7	V	3.0	36.3	1.0	-45.0	-13.0	-32.0	
3.715	-13.0	H	3.0	36.8	1.0	-48.8	-13.0	-35.8	
5.573	-10.0	H	3.0	36.3	1.0	-45.3	-13.0	-32.3	
Mid Ch, (1882.5MHz)									
3.765	-11.9	V	3.0	36.8	1.0	-47.7	-13.0	-34.7	
5.648	-9.6	V	3.0	36.3	1.0	-44.9	-13.0	-31.9	
3.765	-13.8	H	3.0	36.8	1.0	-49.6	-13.0	-36.6	
5.648	-9.9	H	3.0	36.3	1.0	-45.2	-13.0	-32.2	
High Ch, (1907.5MHz)									
3.815	-11.4	V	3.0	36.7	1.0	-47.2	-13.0	-34.2	
5.723	-9.5	V	3.0	36.3	1.0	-44.8	-13.0	-31.8	
3.815	-12.7	H	3.0	36.7	1.0	-48.4	-13.0	-35.4	
5.723	-9.8	H	3.0	36.3	1.0	-45.1	-13.0	-32.1	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

LTE 16QAM Band 25 (15MHz BANDWIDTH)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company:	Apple
Project #:	12U14507
Date:	09/12/12
Test Engineer:	MENGISTU MEKURIA
Configuration:	EUT WITH HEADSET AND AC ADAPTER
Mode:	TX, LTE Band 25 15.0MHz BW, 16QAM

Chamber	Pre-amplifer	Filter	Limit
5m Chamber A	T144 8449B	Filter 1	Part 24

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (1857.5MHz)									
3.715	-11.1	V	3.0	36.8	1.0	-46.9	-13.0	-33.9	
5.573	-9.7	V	3.0	36.3	1.0	-45.0	-13.0	-32.0	
3.715	-15.0	H	3.0	36.8	1.0	-50.8	-13.0	-37.8	
5.573	-12.0	H	3.0	36.3	1.0	-47.3	-13.0	-34.3	
Mid Ch, (1882.5MHz)									
3.765	-11.9	V	3.0	36.8	1.0	-47.7	-13.0	-34.7	
5.648	-9.6	V	3.0	36.3	1.0	-44.9	-13.0	-31.9	
3.765	-13.8	H	3.0	36.8	1.0	-49.6	-13.0	-36.6	
5.648	-11.9	H	3.0	36.3	1.0	-47.2	-13.0	-34.2	
High Ch, (1907.5MHz)									
3.815	-11.4	V	3.0	36.7	1.0	-47.2	-13.0	-34.2	
5.723	-8.5	V	3.0	36.3	1.0	-43.8	-13.0	-30.8	
3.815	-14.7	H	3.0	36.7	1.0	-50.4	-13.0	-37.4	
5.723	-12.8	H	3.0	36.3	1.0	-48.1	-13.0	-35.1	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

LTE QPSK Band 25 (20 MHz BANDWIDTH)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Apple
Project #: 12U14507
Date: 09/12/12
Test Engineer: MENGISTU MEKURIA
Configuration: EUT WITH HEADSET AND AC ADAPTER
Mode: TX, LTE Band 25 20.0MHz BW, QPSK

Chamber	Pre-amplifer	Filter	Limit
5m Chamber A	T144 8449B	Filter 1	Part 24

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (1860.0MHz)									
3.720	-11.0	V	3.0	36.8	1.0	-46.8	-13.0	-33.8	
5.580	-9.7	V	3.0	36.3	1.0	-45.0	-13.0	-32.0	
3.720	-13.9	H	3.0	36.8	1.0	-49.7	-13.0	-36.7	
5.580	-10.0	H	3.0	36.3	1.0	-45.3	-13.0	-32.3	
Mid Ch, (1882.5MHz)									
3.765	-9.9	V	3.0	36.8	1.0	-45.7	-13.0	-32.7	
5.648	-8.6	V	3.0	36.3	1.0	-43.9	-13.0	-30.9	
3.765	-12.8	H	3.0	36.8	1.0	-48.6	-13.0	-35.6	
5.648	-9.9	H	3.0	36.3	1.0	-45.2	-13.0	-32.2	
High Ch, (1905MHz)									
3.810	-11.4	V	3.0	36.7	1.0	-47.2	-13.0	-34.2	
5.715	-8.5	V	3.0	36.3	1.0	-43.8	-13.0	-30.8	
3.810	-13.3	H	3.0	36.7	1.0	-49.0	-13.0	-36.0	
5.715	-9.8	H	3.0	36.3	1.0	-45.1	-13.0	-32.1	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

LTE 16QAM Band 25 (20MHz BANDWIDTH)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Apple
Project #: 12U14507
Date: 09/12/12
Test Engineer: MENGISTU MEKURIA
Configuration: EUT WITH HEADSET AND AC ADAPTER
Mode: TX, LTE Band 25 20.0MHz BW, 16QAM

Chamber	Pre-amplifer	Filter	Limit
5m Chamber A	T144 8449B	Filter 1	Part 24

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (1860.0MHz)									
3.720	-11.0	V	3.0	36.8	1.0	-46.8	-13.0	-33.8	
5.580	-9.7	V	3.0	36.3	1.0	-45.0	-13.0	-32.0	
3.720	-14.9	H	3.0	36.8	1.0	-50.7	-13.0	-37.7	
5.580	-12.0	H	3.0	36.3	1.0	-47.3	-13.0	-34.3	
Mid Ch, (1882.5MHz)									
3.765	-11.6	V	3.0	36.8	1.0	-47.4	-13.0	-34.4	
5.648	-9.6	V	3.0	36.3	1.0	-44.9	-13.0	-31.9	
3.765	-16.8	H	3.0	36.8	1.0	-52.6	-13.0	-39.6	
5.648	-11.9	H	3.0	36.3	1.0	-47.2	-13.0	-34.2	
High Ch, (1905MHz)									
3.810	-12.8	V	3.0	36.7	1.0	-48.6	-13.0	-35.6	
5.715	-11.1	V	3.0	36.3	1.0	-46.4	-13.0	-33.4	
3.810	-13.7	H	3.0	36.7	1.0	-49.4	-13.0	-36.4	
5.715	-11.8	H	3.0	36.3	1.0	-47.1	-13.0	-34.1	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.